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CT & E ENVIRONMENTAL SERVICES, INC
DATA COMPLETENESS CHECKLIST
LB 770 GAS PROPORTIONAL COUNTER

Gross Alpha/Beta

Laboratory Job Number: 985847

Item #	Title	In Pkg	Comments
1)	Formula Used in Calculation	✓	11-24-98 cy
2)	Instrument Run Log	✓	11-24-98 cy
3)	Instrument Printouts	✓	11-24-98 cy
4)	Sample Measurement Activity Calculation Report	✓	11-24-98 cy
5)	Instrument Daily Calibration	✓	11-24-98 cy
6)	Background Printouts	✓	11-24-98 cy
7)	Efficiency and Background Acceptance Criteria	✓	11-24-98 cy
8)	Standards Preparation Log	✓	11-24-98 cy
9)	Standards Certification	✓	11-24-98 cy
10)	Control Charts	✓	11-24-98 cy
11)	Source Calibration Certificates	✓	11-24-98 cy
12)	Weight Curve	✓	11-24-98 cy

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GROSS ALPHA/BETA CALCULATIONS

1.) **Calculation of gross alpha or gross beta activity in pCi/unit volume:**

$$Activity\ (pCi\ /\ unit\ volume) = \frac{(Sample\ cpm - Bkg\ cpm)}{(Volume\ x\ Method\ Efficiency\ x\ 2.22\ dpm\ /\ pCi)}$$

2.) **Calculation of gross alpha/beta error at the 95% confidence level:**

$$Error\ at\ 95\%\ (pCi\ /\ unit\ volume) = \frac{1.96\ x \sqrt{\frac{Sample\ cpm}{Sample\ CT} + \frac{Bkg\ cpm}{Bkg\ CT}}}{(Volume\ x\ Method\ Efficiency\ x\ 2.22\ dpm\ /\ pCi)}$$

3.) **Calculation of gross alpha/beta Lower Limit of Detection (LLD):**

$$LLD\ (pCi\ /\ unit\ volume) = \frac{4.66\ x \sqrt{\frac{Bkg\ cpm}{Bkg\ CT}}}{(Volume\ x\ Method\ Efficiency\ x\ 2.22\ dpm\ /\ pCi)}$$

Where:

cpm	=	counts per minute
CT	=	count time
Volume	=	Sample volume per gram, liter or filter depending on matrix type
Note:		Method efficiencies for gross alpha/beta are corrected for the weight of material on the sample planchet.

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GROSS ALPHA/BETA ANALYSIS

EPA Method 900.0, SOP CA-GLR-02.0 Revision 4

Calibration File ID _____ LB770 Instrument ID _____ Analyst Cy Date 10-2-98

Sample ID	Sample Vol Lg	Planchet & Sample Preparation (grams)				
		Initial Weight	+ 5mLs Sample	Solids/ 5mLs	mLs to Add	Final Weight
985836 - 1	0.010	9.4707	9.5197	0.0490	5	9.5547
2	0.010	9.3812	9.4414	0.0602	5	9.4741
3	0.200	9.4659	9.4672	0.0013	195	9.5229
4	0.010	9.4545	9.5015	0.0470	5	9.5359
985847 - 1	0.400	9.4660	9.4665	0.0005	395	9.5557
2	0.400	9.4801	9.4804	0.0003	395	9.5628
MD 2	0.400	9.4675	9.4682	0.0007	395	9.5519
3	0.400	9.4110	9.4117	0.0007	395	9.4965
4	0.400	9.4631	9.4639	0.0008	395	9.5472
5	0.400	9.4456	9.4464	0.0008	395	9.5296
6	0.400	9.4376	9.4387	0.0011	395	9.5202
7	0.400	9.4192	9.4196	0.0004	395	9.5000
8	0.400	9.4814	9.4822	0.0008	395	9.5549
9	0.400	9.4621	9.4626	0.0005	395	9.5341
10	0.400	9.4538	9.4548	0.0010	95	9.4747
11	0.400	9.4119	9.4127	0.0008	395	9.4849
12	0.400	9.3375	9.3381	0.0006	395	9.4128
MSA 12	0.400	9.4549	9.4554	0.0007	395	9.4916
MSB 12	0.400	9.4529	9.4536	0.0007	395	9.4922
13	0.400	9.4665	9.4672	0.0007	395	9.5475
MSA 13	0.400	9.6039	9.6045	0.0006	395	9.6385
MSB 13	0.400	9.4053	9.4061	0.0008	395	9.4431
985841 - 1	0.055	9.3684	9.3779	0.0095	50	9.4162
2	0.055	9.4339	9.4428	0.0089	50	9.5003
3	0.045	9.3716	9.3829	0.0113	40	9.4234
MB1AB1002	1.0	NA 9.4129	NA	NA	NA	9.4129
MB2AB1002		9.4091				9.4091
LC1A1002		9.4284				9.4284
LC1B1002		9.4257				9.4257
		10-2-98 Cy				

Spike ✓	Nuclide	Isotope Number	Expiration Date	Activity pCi/mL	Vol mL	Standard Control ID	Spiked By
✓	Am 241	284.07	4-14-99	5.1	5.0	985847-MSA-12;MSA 13	Cy
						LC1A1002	
	Cs 137	337.03	10-1-99	3.6		985847-MSB-12;MSB 13	
						LC1B1002	

mLs of Sample to Add = 1 / 2 x Weight of Sample minus 5 Book Number 98024 Page Number 53

S A M P L E M E A S U R E M E N T

Comment: RUSH ALPHA BETA SAMPLES
LB770 Number 1 User File: ALPHA/BETA Sample Data File: AB583611
Sample Set: AB583611 Mode: Alpha/Beta
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BG Beta [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Eff. Alpha	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Eff. Beta	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Spillover	0.303	0.313	0.333	0.312	0.323	0.332	0.326	0.330	0.338	0.317
T(1/2) Alpha [days]	--	--	--	--	--	--	--	--	--	--
T(1/2) Beta [days]	--	--	--	--	--	--	--	--	--	--
Manuf. Alpha Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Manuf. Beta Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 07.10.98 Time 13:32:47
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 1/7
Guard [cpm] 1061

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	985836-001	0.200	22.5	1	2.54	6.38	1
2	2	985836-002	0.210	21.9	1	2.84	6.01	1
3	3	985836-003	0.250	20.0	1	1.99	7.30	1
4	4	985836-004	0.360	16.7	1	2.53	6.49	1
5	5	985847-001	0.210	21.9	1	3.04	5.82	1
6	6	985847-002	0.180	23.3	1	2.42	6.53	1
7	7	985847-002 MD	0.390	15.9	1	2.10	7.18	1
8	8	985847-003	0.250	20.0	1	2.22	6.90	1
9	9	985847-004	0.220	21.4	1	2.43	6.55	1
10	10	E	0.070	37.1	1	1.30	8.86	1

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
9b	1	-0.1	4.7	-1.7	-0.2	0.5	1.0	0.4	0.8	0.7	-1.5

Sample Results

Measurement Date 07.10.98 Time 15:12:53
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 2/7
Guard [cpm] 1053

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	985836-001	0.150	26.0	1	2.67	6.17	1
2	2	985836-002	0.090	33.3	1	2.55	6.31	1
3	3	985836-003	0.210	21.9	1	1.84	7.55	1
4	4	985836-004	0.260	19.6	1	2.12	7.03	1
5	5	985847-001	0.120	29.2	1	2.88	5.94	1
6	6	985847-002	0.210	21.9	1	2.38	6.60	1
7	7	985847-002 MD	0.190	23.2	1	2.52	6.39	1
8	8	985847-003	0.240	20.4	1	2.02	7.22	1
9	9	985847-004	0.250	20.0	1	2.35	6.69	1
10	10	E	0.070	37.1	1	1.42	8.46	1

Sample Results

Measurement Date 07.10.98 Time 16:52:58
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 3/7
Guard [cpm] 1053

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	985836-001	0.140	26.4	1	2.61	6.25	1
2	2	985836-002	0.120	29.2	1	2.68	6.15	1
3	3	985836-003	0.130	27.7	1	1.80	7.57	1
4	4	985836-004	0.150	26.0	1	2.22	6.79	1
5	5	985847-001	0.210	21.9	1	2.88	5.97	1
6	6	985847-002	0.180	23.3	1	2.33	6.65	1
7	7	985847-002 MD	0.090	33.3	1	2.41	6.51	1
8	8	985847-003	0.170	24.1	1	2.02	7.16	1
9	9	985847-004	0.120	29.2	1	1.99	7.19	1
10	10	E	0.060	40.0	1	1.42	8.44	1

Sample Results

Measurement Date 07.10.98 Time 18:33:02
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 4/7
Guard [cpm] 1058

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	985836-001	0.070	37.1	1	2.42	6.45	1
2	2	985836-002	0.090	33.3	1	2.52	6.34	1
3	3	985836-003	0.180	23.3	1	1.58	8.16	1
4	4	985836-004	0.120	29.2	1	2.12	6.92	1
5	5	985847-001	0.140	26.4	1	2.91	5.90	1
6	6	985847-002	0.160	25.0	1	2.26	6.78	1
7	7	985847-002 MD	0.150	26.0	1	2.09	7.03	1
8	8	985847-003	0.180	23.3	1	1.92	7.34	1
9	9	985847-004	0.140	26.4	1	2.25	6.75	1
10	10	E	0.060	40.0	1	1.15	9.38	1

Sample Results

Measurement Date 07.10.98 Time 20:13:06
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 5/7
Guard [cpm] 1060

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	985836-001	0.110	30.0	1	2.55	6.32	1
2	2	985836-002	0.120	29.2	1	2.37	6.58	1
3	3	985836-003	0.150	26.0	1	1.74	7.70	1
4	4	985836-004	0.120	29.2	1	2.24	6.73	1
5	5	985847-001	0.270	19.3	1	2.83	6.07	1
6	6	985847-002	0.140	26.4	1	2.02	7.11	1
7	7	985847-002 MD	0.100	32.0	1	2.12	6.94	1
8	8	985847-003	0.020	70.0	1	1.76	7.54	1
9	9	985847-004	0.090	33.3	1	2.24	6.74	1
10	10	E	0.070	37.1	1	1.16	9.41	1

Sample Results

Measurement Date 07.10.98 Time 21:53:10
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 6/7
Guard [cpm] 1052

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	985836-001	0.050	44.0	1	2.34	6.55	1
2	2	985836-002	0.120	29.2	1	2.69	6.17	1
3	3	985836-003	0.110	30.0	1	1.77	7.61	1
4	4	985836-004	0.080	35.0	1	1.68	7.77	1
5	5	985847-001	0.070	37.1	1	2.75	6.08	1
6	6	985847-002	0.160	25.0	1	2.59	6.30	1
7	7	985847-002 MD	0.100	32.0	1	2.31	6.63	1
8	8	985847-003	0.130	27.7	1	1.80	7.57	1
9	9	985847-004	0.140	26.4	1	2.41	6.51	1
10	10	E	0.040	50.0	1	1.47	8.32	1

Sample Results

Measurement Date 07.10.98 Time 23:33:15
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 7/7
Guard [cpm] 1056

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	985836-001	0.080	35.0	1	2.42	6.46	1
2	2	985836-002	0.060	40.0	1	2.59	6.25	1
3	3	985836-003	0.080	35.0	1	1.77	7.56	1
4	4	985836-004	0.060	40.0	1	2.05	7.02	1
5	5	985847-001	0.080	35.0	1	2.66	6.16	1
6	6	985847-002	0.170	24.1	1	2.73	6.14	1
7	7	985847-002 MD	0.120	29.2	1	2.11	6.96	1
8	8	985847-003	0.030	56.7	1	2.06	6.99	1
9	9	985847-004	0.060	40.0	1	1.91	7.28	1
10	10	E	0.030	56.7	1	1.43	8.39	1

Average of 7 cycles

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA CPM	BETA %Error	BETA Cat	BETA Num
1	1	985836-001	0.114	11.1	1	7	2.51	2.41	1	7
2	2	985836-002	0.116	11.2	1	7	2.61	2.36	1	7
3	3	985836-003	0.159	9.48	1	7	1.78	2.88	1	7
4	4	985836-004	0.164	9.34	1	7	2.14	2.62	1	7
5	5	985847-001	0.157	9.53	1	7	2.85	2.26	1	7
6	6	985847-002	0.171	9.09	1	7	2.39	2.48	1	7
7	7	985847-002 MD	0.163	9.40	1	7	2.24	2.57	1	7
8	8	985847-003	0.146	9.87	1	7	1.97	2.74	1	7
9	9	985847-004	0.146	9.88	1	7	2.23	2.57	1	7
10	10	E	0.057	15.6	1	7	1.33	3.30	1	7

S A M P L E M E A S U R E M E N T

Comment: RUSH ALPHA BETA SAMPLES
LB770 Number 2 User File: ALPHA/BETA Sample Data File: AB583621
Sample Set: AB583621 Mode: Alpha/Beta
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BG Beta [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Eff. Alpha	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Eff. Beta	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Spillover	0.336	0.309	0.295	0.316	0.321	0.362	0.338	0.343	0.403	0.400
T(1/2) Alpha [days]	--	--	--	--	--	--	--	--	--	--
T(1/2) Beta [days]	--	--	--	--	--	--	--	--	--	--
Manuf. Alpha Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Manuf. Beta Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 07.10.98 Time 13:33:57
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 1/7
Guard [cpm] 1061

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	5	985847-005	0.370	16.5	1	2.64	6.34	1
2	6	985847-006	0.370	16.5	1	2.06	7.25	1
3	7	985847-007	0.320	17.8	1	2.22	6.90	1
4	8	985847-008	0.350	16.9	1	2.05	7.22	1
5	9	985847-009	0.320	17.8	1	2.43	6.59	1
6	10	985847-010	0.190	23.2	1	2.43	6.54	1
7	11	985847-011	0.240	20.4	1	2.55	6.39	1
8	12	985847-012	0.230	20.9	1	2.35	6.68	1
9	13	E	0.030	56.7	1	5.50	4.27	1
10	14	985847-012 MSA	4.56	4.69	1	2.19	9.97	1

Sample Results

Measurement Date 07.10.98 Time 15:14:03
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 2/7
Guard [cpm] 1056

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	5	985847-005	0.280	18.9	1	2.96	5.95	1
2	6	985847-006	0.230	20.9	1	2.50	6.44	1
3	7	985847-007	0.170	24.1	1	2.05	7.07	1
4	8	985847-008	0.140	26.4	1	1.91	7.35	1
5	9	985847-009	0.210	21.9	1	2.34	6.66	1
6	10	985847-010	0.170	24.1	1	2.05	7.13	1
7	11	985847-011	0.080	35.0	1	2.02	7.07	1
8	12	985847-012	0.130	27.7	1	2.43	6.49	1
9	13	E	0.120	29.2	1	5.55	4.27	1
10	14	985847-012 MSA	4.88	4.53	1	1.50	13.8	1

Sample Results

Measurement Date 07.10.98 Time 16:54:08
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 3/7
Guard [cpm] 1065

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	5	985847-005	0.210	21.9	1	2.80	6.07	1
2	6	985847-006	0.170	24.1	1	2.08	7.08	1
3	7	985847-007	0.180	23.3	1	1.87	7.45	1
4	8	985847-008	0.120	29.2	1	1.71	7.77	1
5	9	985847-009	0.160	25.0	1	2.24	6.79	1
6	10	985847-010	0.130	27.7	1	1.72	7.78	1
7	11	985847-011	0.190	23.2	1	2.07	7.12	1
8	12	985847-012	0.140	26.4	1	2.36	6.60	1
9	13	E	0.050	44.0	1	5.39	4.32	1
10	14	985847-012 MSA	4.88	4.53	1	1.46	14.1	1

Sample Results

Measurement Date 07.10.98 Time 18:34:12
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 4/7
Guard [cpm] 1054

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	5	985847-005	0.078	29.5	1	3.05	5.78	1
2	6	985847-006	0.140	26.4	1	2.28	6.72	1
3	7	985847-007	0.170	24.1	1	1.81	7.57	1
4	8	985847-008	0.170	24.1	1	1.76	7.69	1
5	9	985847-009	0.140	26.4	1	2.23	6.76	1
6	10	985847-010	0.100	32.0	1	2.00	7.14	1
7	11	985847-011	0.140	26.4	1	2.17	6.90	1
8	12	985847-012	0.080	35.0	1	2.21	6.78	1
9	13	E	0.070	37.1	1	5.37	4.34	1
10	14	985847-012 MSA	4.37	4.78	1	2.12	10.1	1

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
a	1	4.6	0.2	0.2	0.2	0.2	1.9	-0.7	-0.7	-0.7	-0.7

Sample Results

Measurement Date 07.10.98 Time 20:14:16
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 5/7
Guard [cpm] 1055

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	5	985847-005	0.150	26.0	1	2.78	6.08	1
2	6	985847-006	0.100	32.0	1	2.08	7.02	1
3	7	985847-007	0.190	23.2	1	1.93	7.34	1
4	8	985847-008	0.100	32.0	1	1.56	8.09	1
5	9	985847-009	0.110	30.0	1	1.85	7.48	1
6	10	985847-010	0.130	27.7	1	1.90	7.36	1
7	11	985847-011	0.080	35.0	1	1.90	7.30	1
8	12	985847-012	0.050	44.0	1	2.09	6.93	1
9	13	E	0.060	40.0	1	4.69	4.63	1
10	14	985847-012 MSA	4.77	4.57	1	1.62	12.8	1

Sample Results

Measurement Date 07.10.98 Time 21:54:20
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 6/7
Guard [cpm] 1056

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	5	985847-005	0.110	30.0	1	2.57	6.30	1
2	6	985847-006	0.130	27.7	1	2.07	7.05	1
3	7	985847-007	0.120	29.2	1	2.31	6.64	1
4	8	985847-008	0.090	33.3	1	1.74	7.63	1
5	9	985847-009	0.110	30.0	1	2.24	6.73	1
6	10	985847-010	0.090	33.3	1	1.97	7.22	1
7	11	985847-011	0.110	30.0	1	1.83	7.47	1
8	12	985847-012	0.040	50.0	1	2.27	6.66	1
9	13	E	0.070	37.1	1	4.57	4.70	1
10	14	985847-012 MSA	4.64	4.63	1	1.66	12.4	1

Sample Results

Measurement Date 07.10.98 Time 23:34:25
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 7/7
Guard [cpm] 1052

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	5	985847-005	0.180	23.3	1	2.45	6.49	1
2	6	985847-006	0.140	26.4	1	2.03	7.10	1
3	7	985847-007	0.140	26.4	1	1.93	7.31	1
4	8	985847-008	0.110	30.0	1	1.65	7.85	1
5	9	985847-009	0.050	44.0	1	2.35	6.54	1
6	10	985847-010	0.100	32.0	1	1.85	7.44	1
7	11	985847-011	0.120	29.2	1	2.12	6.94	1
8	12	985847-012	0.080	35.0	1	2.34	6.57	1
9	13	E	0.070	37.1	1	4.41	4.78	1
10	14	985847-012 MSA	4.63	4.64	1	1.72	12.1	1

Average of 7 cycles

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA CPM	BETA %Error	BETA Cat	BETA Num
1	5	985847-005	0.197	8.45	1	7	2.75	2.32	1	7
2	6	985847-006	0.183	8.83	1	7	2.15	2.62	1	7
3	7	985847-007	0.184	8.81	1	7	2.02	2.71	1	7
4	8	985847-008	0.154	9.61	1	7	1.77	2.89	1	7
5	9	985847-009	0.157	9.53	1	7	2.24	2.56	1	7
6	10	985847-010	0.130	10.5	1	7	1.99	2.72	1	7
7	11	985847-011	0.137	10.2	1	7	2.10	2.65	1	7
8	12	985847-012	0.107	11.5	1	7	2.29	2.52	1	7
9	13	E	0.067	14.4	1	7	5.07	1.69	1	7
10	14	985847-012 MSA	4.68	1.75	1	7	1.75	4.51	1	7

S A M P L E M E A S U R E M E N T

Comment: RUSH ALPHA BETA SAMPLES
LB770 Number 3 User File: ALPHA/BETA Sample Data File: AB583631
Sample Set: AB583631 Mode: Alpha/Beta
HV-Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

Category	Alpha Low	Alpha High	Beta Low	Beta High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BG Beta [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Eff. Alpha	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Eff. Beta	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Spillover	0.264	0.278	0.285	0.275	0.269	0.878	0.280	0.265	0.297	0.264
T(1/2) Alpha [days]	--	--	--	--	--	--	--	--	--	--
T(1/2) Beta [days]	--	--	--	--	--	--	--	--	--	--
Manuf. Alpha Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Manuf. Beta Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 07.10.98 Time 13:35:18
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 1/7
Guard [cpm] 1048

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	12	985847-012 MSB	0.430	15.3	1	14.9	2.60	1
2	13	985847-013	0.180	23.3	1	2.70	6.15	1
3	14	985847-013 MSA	5.77	4.16	1	# outlier >1		
4	15	985847-013 MSB	0.250	20.0	1	14.7	2.62	1
5	16	985841-1 FLAMED	0.390	15.9	1	1.82	7.71	1
6	17	E	0.140	26.4	1	6.40	4.02	1
7	18	985841-2 FLAMED	0.480	14.4	1	3.11	5.83	1
8	19	985841-3 FLAMED	0.470	14.7	1	2.09	7.19	1
9	20	MB1AB1002 BLK	0.250	20.0	1	1.48	8.47	1
10	21	MB2AB1002 MB	0.100	32.0	1	1.64	7.85	1

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
3b	2	-0.7	-1.5	-0.9	-0.4	1.0	-0.3	1.0	4.5	1.7	8.6

Sample Results

Measurement Date 07.10.98 Time 15:15:23
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 2/7
Guard [cpm] 1046

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	12	985847-012 MSB	0.210	21.9	1	14.9	2.59	1
2	13	985847-013	0.240	20.4	1	2.28	6.75	1
3	14	985847-013 MSA	5.74	4.18	1	6.66	4.43	1
4	15	985847-013 MSB	0.250	20.0	1	14.8	2.61	1
5	16	985841-1 FLAMED	0.260	19.6	1	2.26	6.77	1
6	17	E	0.140	26.4	1	6.95	3.86	1
7	18	985841-2 FLAMED	0.310	18.1	1	3.60	5.36	1
8	19	985841-3 FLAMED	0.210	21.9	1	2.03	7.13	1
9	20	MB1AB1002 BLK	0.120	29.2	1	1.29	8.96	1
10	21	MB2AB1002 MB	0.130	27.7	1	1.69	7.77	1

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
5	1	-2.5	-0.7	1.3	0.4	1.2	6.4	0.3	-0.3	0.2	0.0

Sample Results

Measurement Date 07.10.98 Time 16:55:28
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 3/7
Guard [cpm] 1045

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	12	985847-012 MSB	0.210	21.9	1	14.5	2.63	1
2	13	985847-013	0.220	21.4	1	2.53	6.37	1
3	14	985847-013 MSA	5.04	4.44	1	6.79	4.33	1
4	15	985847-013 MSB	0.200	22.5	1	14.7	2.62	1
5	16	985841-1 FLAMED	0.260	19.6	1	2.08	7.07	1
6	17	E	0.150	26.0	1	7.12	3.81	1
7	18	985841-2 FLAMED	0.370	16.5	1	3.83	5.20	1
8	19	985841-3 FLAMED	0.260	19.6	1	1.86	7.52	1
9	20	MB1AB1002 BLK	0.130	27.7	1	1.56	8.14	1
10	21	MB2AB1002 MB	0.170	24.1	1	2.00	7.17	1

Sample Results

Measurement Date 07.10.98 Time 18:35:32
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 4/7
Guard [cpm] 1041

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	12	985847-012 MSB	0.280	18.9	1	14.7	2.62	1
2	13	985847-013	0.160	25.0	1	2.69	6.18	1
3	14	985847-013 MSA	5.24	4.37	1	6.58	4.42	1
4	15	985847-013 MSB	0.210	21.9	1	15.2	2.57	1
5	16	985841-1 FLAMED	0.150	26.0	1	2.02	7.13	1
6	17	E	0.090	33.3	1	6.79	3.87	1
7	18	985841-2 FLAMED	0.380	16.3	1	3.53	5.43	1
8	19	985841-3 FLAMED	0.270	19.3	1	1.78	7.71	1
9	20	MB1AB1002 BLK	0.160	25.0	1	1.36	8.74	1
10	21	MB2AB1002 MB	0.160	25.0	1	1.74	7.71	1

Sample Results

Measurement Date 07.10.98 Time 20:15:36
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 5/7
Guard [cpm] 1041

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	12	985847-012 MSB	0.150	26.0	1	14.9	2.60	1
2	13	985847-013	0.110	30.0	1	2.68	6.16	1
3	14	985847-013 MSA	5.25	4.36	1	6.82	4.39	1
4	15	985847-013 MSB	0.160	25.0	1	15.6	2.54	1
5	16	985841-1 FLAMED	0.160	25.0	1	2.19	6.86	1
6	17	E	0.080	35.0	1	7.08	3.80	1
7	18	985841-2 FLAMED	0.310	18.1	1	3.71	5.28	1
8	19	985841-3 FLAMED	0.270	19.3	1	2.08	7.07	1
9	20	MB1AB1002 BLK	0.110	30.0	1	1.50	8.28	1
10	21	MB2AB1002 MB	0.100	32.0	1	1.73	7.67	1

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
b	1	5.1	-0.1	-0.5	-1.2	0.4	-0.2	3.1	1.0	-1.3	-1.3

Sample Results

Measurement Date 07.10.98 Time 21:55:40
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 6/7
Guard [cpm] 1036

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	12	985847-012 MSB	0.120	29.2	1	15.4	2.55	1
2	13	985847-013	0.100	32.0	1	2.37	6.53	1
3	14	985847-013 MSA	5.08	4.43	1	6.03	4.71	1
4	15	985847-013 MSB	0.130	27.7	1	15.2	2.57	1
5	16	985841-1 FLAMED	0.200	22.5	1	1.96	7.26	1
6	17	E	0.150	26.0	1	6.77	3.92	1
7	18	985841-2 FLAMED	0.190	23.2	1	2.82	6.03	1
8	19	985841-3 FLAMED	0.240	20.4	1	2.25	6.81	1
9	20	MB1AB1002 BLK	0.060	40.0	1	1.21	9.16	1
10	21	MB2AB1002 MB	0.080	35.0	1	1.41	8.52	1

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
2b	1	-1.2	-0.4	3.6	-2.7	3.6	-1.2	-0.8	-1.0	4.5	0.2

Sample Results

Measurement Date 07.10.98 Time 23:35:44
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 7/7
Guard [cpm] 1046

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	12	985847-012 MSB	0.110	30.0	1	14.8	2.61	1
2	13	985847-013	0.070	37.1	1	2.42	6.44	1
3	14	985847-013 MSA	5.26	4.35	1	6.57	4.44	1
4	15	985847-013 MSB	0.130	27.7	1	15.5	2.55	1
5	16	985841-1 FLAMED	0.130	27.7	1	1.84	7.47	1
6	17	E	0.120	29.2	1	7.09	3.81	1
7	18	985841-2 FLAMED	0.400	15.8	1	3.51	5.44	1
8	19	985841-3 FLAMED	0.260	19.6	1	1.87	7.48	1
9	20	MB1AB1002 BLK	0.110	30.0	1	1.28	9.01	1
10	21	MB2AB1002 MB	0.070	37.1	1	1.38	8.61	1

Average of 7 cycles

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA CPM	BETA %Error	BETA Cat	BETA Num
1	12	985847-012 MSB	0.216	8.17	1	7	14.9	0.983	1	7
2	13	985847-013	0.154	9.61	1	7	2.52	2.40	1	7
3	14	985847-013 MSA	5.34	1.63	1	7	6.57	1.82	1	6
4	15	985847-013 MSB	0.190	8.68	1	7	15.1	0.976	1	7
5	16	985841-1 FLAMED	0.221	8.03	1	7	2.02	2.71	1	7
6	17	E	0.124	10.7	1	7	6.88	1.46	1	7
7	18	985841-2 FLAMED	0.349	6.42	1	7	3.44	2.08	1	7
8	19	985841-3 FLAMED	0.283	7.12	1	7	1.99	2.74	1	7
9	20	MB1AB1002 BLK	0.134	10.3	1	7	1.38	3.27	1	7
10	21	MB2AB1002 MB	0.116	11.1	1	7	1.66	2.97	1	7

S A M P L E M E A S U R E M E N T

Comment: RUSH ALPHA BETA SAMPLES
LB770 Number 4 User File: ALPHA/BETA Sample Data File: AB583641
Sample Set: AB583641 Mode: Alpha/Beta
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BG Beta [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Eff. Alpha	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Eff. Beta	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Spillover	0.323	0.333	0.325	0.320	0.334	0.320	0.310	0.315	0.322	0.464
T(1/2) Alpha [days]	--	--	--	--	--	--	--	--	--	--
T(1/2) Beta [days]	--	--	--	--	--	--	--	--	--	--
Manuf. Alpha Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Manuf. Beta Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 07.10.98 Time 13:35:59
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 1/7
Guard [cpm] 1046

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	LC1A1002 LCSA	12.7	2.80	1	2.40	10.4	1
2	2	LC1B1002 LCSB	0.230	20.9	1	15.3	2.57	1
3	3	E	0.120	29.2	1	1.12	9.63	1
4	4	E	0.210	21.9	1	1.18	9.55	1
5	5	E	0.220	21.4	1	2.82	6.07	1
6	6	E	0.240	20.4	1	3.31	5.58	1
7	7	E	0.170	24.1	1	2.99	5.86	1
8	8	E	0.160	25.0	1	1.44	8.54	1
9	9	E	0.270	19.3	1	1.63	8.08	1
10	10	E	0.200	22.5	1	1.81	7.69	1

Outlier Screening

		Measurem.# (S-deviations)									
Det#	Outlier(> 4.0S)	1	2	3	4	5	6	7	8	9	10
1b	1	-1.2	-1.6	-1.8	-0.3	-1.4	-0.8	1.5	1.8	5.8	3.9

Detectors with Trend:1b

Sample Results

Measurement Date 07.10.98 Time 15:16:03
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 2/7
Guard [cpm] 1049

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	LC1A1002 LCSA	13.8	2.69	1	6.89	5.18	1
2	2	LC1B1002 LCSB	0.130	27.7	1	15.8	2.52	1
3	3	E	0.140	26.4	1	1.03	10.1	1
4	4	E	0.190	23.2	1	1.28	9.15	1
5	5	E	0.260	19.6	1	2.69	6.24	1
6	6	E	0.200	22.5	1	4.15	4.97	1
7	7	E	0.190	23.2	1	3.49	5.41	1
8	8	E	0.250	20.0	1	2.19	6.89	1
9	9	E	0.260	19.6	1	1.51	8.43	1
10	10	E	0.200	22.5	1	2.26	6.87	1

Sample Results

Measurement Date 07.10.98 Time 16:56:07
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 3/7
Guard [cpm] 1036

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	LC1A1002 LCSA	13.2	2.76	1	6.84	5.16	1
2	2	LC1B1002 LCSB	0.160	25.0	1	15.3	2.57	1
3	3	E	0.270	19.3	1	1.14	9.81	1
4	4	E	0.140	26.4	1	1.33	8.91	1
5	5	E	0.160	25.0	1	2.58	6.33	1
6	6	E	0.210	21.9	1	4.31	4.87	1
7	7	E	0.160	25.0	1	3.60	5.31	1
8	8	E	0.230	20.9	1	1.95	7.34	1
9	9	E	0.140	26.4	1	1.34	8.84	1
10	10	E	0.110	30.0	1	1.94	7.32	1

Sample Results

Measurement Date 07.10.98 Time 18:36:11
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 4/7
Guard [cpm] 1044

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	LC1A1002 LCSA	12.9	2.79	1	6.93	5.08	1
2	2	LC1B1002 LCSB	0.100	32.0	1	15.4	2.56	1
3	3	E	0.170	24.1	1	1.42	8.56	1
4	4	E	0.170	24.1	1	1.25	9.23	1
5	5	E	0.140	26.4	1	2.66	6.20	1
6	6	E	0.130	27.7	1	4.21	4.90	1
7	7	E	0.140	26.4	1	3.57	5.33	1
8	8	E	0.160	25.0	1	2.01	7.16	1
9	9	E	0.150	26.0	1	1.17	9.47	1
10	10	E	0.100	32.0	1	2.05	7.11	1

Sample Results

Measurement Date 07.10.98 Time 20:16:15
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 5/7
Guard [cpm] 1043

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	LC1A1002 LCSA	12.7	2.81	1	7.45	4.82	1
2	2	LC1B1002 LCSB	0.120	29.2	1	15.1	2.58	1
3	3	E	0.100	32.0	1	1.20	9.27	1
4	4	E	0.070	37.1	1	1.20	9.27	1
5	5	E	0.100	32.0	1	2.49	6.39	1
6	6	E	0.050	44.0	1	3.95	5.03	1
7	7	E	0.060	40.0	1	3.32	5.51	1
8	8	E	0.130	27.7	1	1.87	7.44	1
9	9	E	0.090	33.3	1	1.45	8.41	1
10	10	E	0.070	37.1	1	1.81	7.52	1

Sample Results

Measurement Date 07.10.98 Time 21:56:20
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 6/7
Guard [cpm] 1042

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	LC1A1002 LCSA	13.6	2.72	1	6.65	5.31	1
2	2	LC1B1002 LCSB	0.070	37.1	1	15.4	2.55	1
3	3	E	0.130	27.7	1	0.958	10.5	1
4	4	E	0.100	32.0	1	1.15	9.49	1
5	5	E	0.090	33.3	1	2.38	6.55	1
6	6	E	0.070	37.1	1	4.20	4.91	1
7	7	E	0.070	37.1	1	3.33	5.50	1
8	8	E	0.060	40.0	1	1.45	8.34	1
9	9	E	0.080	35.0	1	1.36	8.65	1
10	10	E	0.070	37.1	1	1.79	7.55	1

Sample Results

Avg of 6

Measurement Date 08.10.98 Time 5:03:52
Measuring Time [min:sec] Elapsed 0001:04 Preset 0100:00 Cycle 7/7
Guard [cpm] 1026

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	LC1A1002 LCSA	10.3	30.2	1	3.23	82.8	1
2	2	LC1B1002 LCSB	0.000	0.000	1	18.8	22.4	1
3	3	E	0.000	0.000	1	0.000	0.000	1
4	4	E	0.938	100.0	1	0.000	0.000	1
5	5	E	0.000	0.000	1	0.938	100.0	1
6	6	E	0.000	0.000	1	4.69	44.7	1
7	7	E	0.000	0.000	1	1.88	70.7	1
8	8	E	0.000	0.000	1	1.88	70.7	1
9	9	E	0.000	0.000	1	3.75	50.0	1
10	10	E	0.000	0.000	1	2.81	57.7	1

Not used mcf 10/8/98

Average of 7 cycles

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA CPM	BETA %Error	BETA Cat	BETA Num
1	1	LC1A1002 LCSA	13.1	1.13	1	7	6.19	2.24	1	7
2	2	LC1B1002 LCSB	0.135	11.1	1	7	15.4	1.04	1	7
3	3	E	0.155	10.4	1	7	1.14	3.92	1	7
4	4	E	0.148	10.6	1	7	1.23	3.78	1	7
5	5	E	0.161	10.2	1	7	2.60	2.57	1	7
6	6	E	0.150	10.5	1	7	4.02	2.05	1	7
7	7	E	0.131	11.2	1	7	3.38	2.23	1	7
8	8	E	0.165	10.0	1	7	1.82	3.08	1	7
9	9	E	0.165	10.0	1	7	1.41	3.51	1	7
10	10	E	0.125	11.6	1	7	1.94	2.99	1	7

S A M P L E M E A S U R E M E N T

Comment: BACKGROUND AND CALIBRATIONS UPDATE DAILY
LB770 Number 1 User File: CALIBRARTIONS Sample Data File: C1100798
Sample Set: CALIBRATION UPDATE Mode: Alpha/Beta
HV Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.067	0.067	0.200	0.100	0.300	0.167	0.233	0.167	0.200	0.333
BG Beta [cpm]	1.70	1.27	1.13	1.13	1.70	2.13	1.27	1.33	1.37	1.87
Eff. Alpha	0.288	0.291	0.288	0.275	0.273	0.289	0.283	0.247	0.284	0.277
Eff. Beta	0.380	0.322	0.361	0.342	0.372	0.372	0.393	0.375	0.370	0.362
Spillover	0.303	0.313	0.333	0.312	0.323	0.332	0.326	0.330	0.338	0.317
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
T(1/2) Beta [days]	19569	10560	10560	10560	10560	10560	10560	10560	10560	10560
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 07.10.98 Time 6:26:43
Measuring Time [min:sec] Elapsed 0000:02 Preset 0000:01 Cycle 1/1
Guard [cpm] 1020

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	4231	DAILY UPDATE	0.000	0.000	1	79.7	> 100	2
2	4232	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
3	4233	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
4	4234	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
5	4235	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
6	4236	DAILY UPDATE	0.000	0.000	1	85.0	> 100	2
7	4237	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
8	4238	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
9	4239	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
10	4240	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1

Date Next Calibration Due Oct 8, 1998 (Date) Initials

S A M P L E M E A S U R E M E N T

Comment: BACKGROUND AND CALIBRATIONS UPDATE DAILY
LB770 Number 2 User File: CALIBRARTIONS Sample Data File: C2100798
Sample Set: CALIBRATION UPDATE Mode: Alpha/Beta
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.133	0.100	0.133	0.100	0.300	0.233	0.200	0.067	0.133	0.200
BG Beta [cpm]	1.17	1.53	1.67	1.40	2.30	1.90	1.43	1.10	2.33	1.73
Eff. Alpha	0.280	0.279	0.281	0.273	0.272	0.280	0.277	0.240	0.265	0.261
Eff. Beta	0.373	0.311	0.348	0.333	0.361	0.373	0.397	0.380	0.385	0.373
Spillover	0.336	0.309	0.295	0.316	0.321	0.362	0.338	0.343	0.403	0.400
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
T(1/2) Beta [days]	19569	10560	10560	10560	10560	10560	10560	10560	10560	10560
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 07.10.98 Time 6:27:00
Measuring Time [min:sec] Elapsed 0000:02 Preset 0000:01 Cycle 1/1
Guard [cpm] 1050

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	4231	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
2	4232	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
3	4233	DAILY UPDATE	0.000	0.000	1	92.5	> 100	2
4	4234	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
5	4235	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
6	4236	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
7	4237	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
8	4238	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
9	4239	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
10	4240	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1

Date Next Calibration Due Oct 8, 1998 (Date) MKJ (Initials)

S A M P L E M E A S U R E M E N T

Comment: BACKGROUND AND CALIBRATIONS UPDATE DAILY
LB770 Number 3 User File: CALIBRARTIONS Sample Data File: C3100798
Sample Set: CALIBRATION UPDATE Mode: Alpha/Beta
HV Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.133	0.033	0.033	0.133	0.067	0.167	0.133	0.067	0.067	0.167
BG Beta [cpm]	1.47	1.20	0.900	1.10	1.13	3.80	1.47	1.03	1.30	1.37
Eff. Alpha	0.290	0.297	0.294	0.288	0.291	0.287	0.284	0.256	0.285	0.274
Eff. Beta	0.363	0.318	0.347	0.350	0.362	0.084	0.385	0.367	0.371	0.344
Spillover	0.264	0.278	0.285	0.275	0.269	0.878	0.280	0.265	0.297	0.264
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
T(1/2) Beta [days]	19569	10560	10560	10560	10560	10560	10560	10560	10560	10560
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 07.10.98 Time 6:27:17
Measuring Time [min:sec] Elapsed 0000:02 Preset 0000:01 Cycle 1/1
Guard [cpm] 1140

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	4221	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
2	4222	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
3	4223	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
4	4224	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
5	4225	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
6	4226	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
7	4227	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
8	4228	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
9	4229	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
10	4230	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1

Date Next Calibration Due Oct 8, 1998 NRF
Date Initials

S A M P L E M E A S U R E M E N T

Comment: BACKGROUND AND CALIBRATIONS UPDATE DAILY
LB770 Number 4 User File: CALIBRARTIONS Sample Data File: C4100798
Sample Set: CALIBRATION UPDATE Mode: Alpha/Beta
HV Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.067	0.100	0.100	0.167	0.033	0.200	0.100	0.200	0.133	0.067
BG Beta [cpm]	1.63	1.13	1.37	1.30	1.47	1.63	1.30	1.60	0.933	1.47
Eff. Alpha	0.287	0.283	0.287	0.278	0.267	0.289	0.276	0.246	0.285	0.220
Eff. Beta	0.372	0.312	0.346	0.337	0.358	0.356	0.384	0.359	0.356	0.361
Spillover	0.323	0.333	0.325	0.320	0.334	0.320	0.310	0.315	0.322	0.464
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
T(1/2) Beta [days]	19569	10560	10560	10560	10560	10560	10560	10560	10560	10560
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 07.10.98 Time 6:27:35
Measuring Time [min:sec] Elapsed 0000:02 Preset 0000:01 Cycle 1/1
Guard [cpm] 870.0

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	4231	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
2	4232	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
3	4233	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
4	4234	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
5	4235	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
6	4236	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
7	4237	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
8	4238	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
9	4239	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
10	4240	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1

Date Next Calibration Due Oct 8, 1998 (Date) MRJ (Initials)

Reviewed by Natalie R. Frank

Date Oct 8, 1998

file name: OCT98AB1.wk1

Job Number	Sample Number	LB-770 Detector Number	Volume lit/grm	Count Time min	Planchet Initial Weight gm	Planchet Final Weight gm	Weight Diff gm	Total Alpha Eff	Total Beta Eff	Alpha Sample cpm	Beta Sample cpm	Alpha Method Blank cpm	Beta Method Blank cpm	Alpha Sample Det Bkg cpm	Beta Sample Det Bkg cpm	Alpha MB Det Bkg cpm	Beta MB Det Bkg cpm
984000	1	2-1	0.1	700	9.1000	9.2000	0.1000	0.084	0.311	0.326	2.940	0.200	1.19	0.133	0.650	0.163	0.750
985836	1	1-1	0.010	700	9.4707	9.5547	0.0840	0.1015	0.3179	0.114	2.51	0.134	1.38	0.116	1.34	0.141	1.17
	2	1-2	0.010	700	9.3812	9.4741	0.0929	0.0929	0.3123	0.116	2.61	0.134	1.38	0.141	1.60	0.141	1.17
	3	1-3	0.200	700	9.4659	9.5229	0.0570	0.1327	0.3355	0.159	1.78	0.134	1.38	0.131	1.09	0.141	1.17
	4	1-4	0.010	700	9.4545	9.5359	0.0814	0.1041	0.3195	0.164	2.14	0.134	1.38	0.144	1.11	0.141	1.17
985847	1	1-5	0.400	700	9.4660	9.5557	0.0897	0.0959	0.3143	0.157	2.85	0.134	1.38	0.163	1.81	0.141	1.17
	2	1-6	0.400	700	9.4801	9.5628	0.0827	0.1027	0.3187	0.171	2.39	0.134	1.38	0.140	1.75	0.141	1.17
	2 MD	1-7	0.400	700	9.4675	9.5519	0.0844	0.1011	0.3177	0.163	2.24	0.134	1.38	0.120	1.25	0.141	1.17
	3	1-8	0.400	700	9.4110	9.4965	0.0855	0.0999	0.3169	0.146	1.97	0.134	1.38	0.116	1.17	0.141	1.17
	4	1-9	0.400	700	9.4631	9.5472	0.0841	0.1013	0.3178	0.146	2.23	0.134	1.38	0.156	1.26	0.141	1.17
	5	2-1	0.400	700	9.4456	9.5296	0.0840	0.0985	0.3186	0.197	2.75	0.134	1.38	0.146	2.07	0.141	1.17
	6	2-2	0.400	700	9.4376	9.5202	0.0826	0.0999	0.3193	0.183	2.15	0.134	1.38	0.169	1.37	0.141	1.17
	7	2-3	0.400	700	9.4192	9.5000	0.0808	0.1017	0.3202	0.184	2.02	0.134	1.38	0.144	1.29	0.141	1.17
	8	2-4	0.400	700	9.4814	9.5549	0.0735	0.1094	0.3237	0.154	1.77	0.134	1.38	0.164	1.30	0.141	1.17
	9	2-5	0.400	700	9.4621	9.5341	0.0720	0.1112	0.3245	0.157	2.24	0.134	1.38	0.153	1.83	0.141	1.17
	10	2-6	0.400	700	9.4538	9.4747	0.0209	0.1852	0.3504	0.130	1.99	0.134	1.38	0.133	1.84	0.141	1.17
	11	2-7	0.400	700	9.4119	9.4849	0.0730	0.1101	0.3240	0.137	2.10	0.134	1.38	0.087	1.29	0.141	1.17
	12	2-8	0.400	700	9.3375	9.4104	0.0729	0.1139	0.3282	0.107	2.29	0.134	1.38	0.091	1.72	0.141	1.17
	12 MSA	2-10	0.400	700	9.4549	9.4916	0.0367	0.1139	0.3282	4.680	1.75	0.134	1.38	0.131	1.73	0.141	1.17
	12 MSB	3-1	0.400	700	9.4529	9.4922	0.0393	0.1139	0.3282	0.216	14.90	0.134	1.38	0.177	2.72	0.141	1.17
	13	3-2	0.400	700	9.4665	9.5514	0.0849	0.1010	0.3206	0.154	2.52	0.134	1.38	0.159	1.58	0.141	1.17
	13 MSA	3-3	0.400	700	9.6039	9.6385	0.0346	0.1010	0.3206	5.340	6.57	0.134	1.38	0.176	1.16	0.141	1.17
	13 MSB	3-4	0.400	700	9.4053	9.4431	0.0378	0.1010	0.3206	0.190	15.10	0.134	1.38	0.153	1.08	0.141	1.17
985841	1 FLAMED	3-5	0.055	700	9.3684	9.3980	0.0296	0.1755	0.3573	0.221	2.02	0.134	1.38	0.139	1.34	0.141	1.17
	2 FLAMED	3-7	0.055	700	9.4339	9.4714	0.0375	0.1619	0.3517	0.349	3.44	0.134	1.38	0.156	2.30	0.141	1.17
	3 FLAMED	3-8	0.045	700	9.3716	9.4020	0.0304	0.1741	0.3568	0.283	1.99	0.134	1.38	0.154	1.26	0.141	1.17
MB1AB1002	BLK	3-9	1.000	700	9.4129	9.4129	0.0000	0.2365	0.3788	0.134	1.38	0.134	1.38	0.141	1.17	0.141	1.17
MB2AB1002	MB	3-10	1.000	700	9.4091	9.4091	0.0000	0.2365	0.3788	0.116	1.66	0.134	1.38	0.113	1.34	0.141	1.17
LC1A1002	LCSA	4-1	1.000	600	9.4284	9.4284	0.0000	0.2365	0.3619	13.150	6.19	0.134	1.38	0.146	1.53	0.141	1.17
LC1B1002	LCSB	4-2	1.000	600	9.4257	9.4257	0.0000	0.2365	0.3619	0.135	15.38	0.134	1.38	0.156	1.05	0.141	1.17

file name: OCT98AB1.

Job Number	Sample Number	Alpha Sample Det Eff	Beta Sample Det Eff	Alpha MB Det Eff	Beta MB Det Eff	Corr Alpha cpm	Corr Beta cpm	Gross Alpha Activity pCi/vol	Gross Alpha Error pCi/vol	Gross Alpha LLD pCi/vol	Gross Beta Activity pCi/vol	Gross Beta Error pCi/vol	Gross Beta LLD pCi/vol
984000	1	0.279	0.351	0.285	0.341	0.157	1.837	8.4	2.9	4.2	26.6	2.2	2.8
985836	1	0.288	0.380	0.285	0.371	-0.002	0.955	-0.9	16.4	28.6	135.3	20.7	29.3
	2	0.291	0.322	0.285	0.371	-0.025	0.828	-12.1	18.0	31.3	119.4	21.3	29.8
	3	0.288	0.361	0.285	0.371	0.028	0.486	0.5	0.7	1.1	3.3	0.9	1.4
	4	0.275	0.342	0.285	0.371	0.020	0.836	8.7	17.5	27.9	117.9	19.6	29.2
985847	1	0.273	0.372	0.285	0.371	-0.006	0.829	-0.1	0.5	0.8	3.0	0.5	0.7
	2	0.289	0.372	0.285	0.371	0.031	0.429	0.3	0.4	0.7	1.5	0.5	0.7
	2 MD	0.283	0.393	0.285	0.371	0.043	0.768	0.5	0.4	0.7	2.7	0.5	0.7
	3	0.247	0.375	0.285	0.371	0.030	0.588	0.3	0.4	0.7	2.1	0.5	0.7
	4	0.284	0.370	0.285	0.371	-0.010	0.761	-0.1	0.4	0.7	2.7	0.5	0.7
	5	0.280	0.373	0.285	0.371	0.051	0.469	0.6	0.5	0.7	1.7	0.5	0.7
	6	0.279	0.311	0.285	0.371	0.014	0.604	0.2	0.5	0.7	2.1	0.5	0.7
	7	0.281	0.348	0.285	0.371	0.040	0.533	0.4	0.5	0.7	1.9	0.5	0.7
	8	0.273	0.333	0.285	0.371	-0.010	0.282	-0.1	0.4	0.7	1.0	0.5	0.7
	9	0.272	0.361	0.285	0.371	0.004	0.206	0.0	0.4	0.7	0.7	0.5	0.7
	10	0.280	0.373	0.285	0.371	-0.003	-0.061	0.0	0.2	0.4	-0.2	0.4	0.7
	11	0.277	0.397	0.285	0.371	0.050	0.585	0.5	0.4	0.7	2.0	0.5	0.7
	12	0.240	0.380	0.285	0.371	0.016	0.355	0.2	0.4	0.6	1.2	0.5	0.7
	12 MSA	0.261	0.373	0.285	0.371	4.549	-0.191	45.0	1.6	0.6	-0.7	0.4	0.7
	12 MSB	0.290	0.363	0.285	0.371	0.039	11.975	0.4	0.4	0.6	41.1	1.0	0.7
	13	0.297	0.318	0.285	0.371	-0.005	0.760	-0.1	0.4	0.7	2.7	0.5	0.7
	13 MSA	0.294	0.347	0.285	0.371	5.164	5.214	57.6	1.9	0.7	18.3	0.7	0.7
	13 MSB	0.288	0.350	0.285	0.371	0.037	13.822	0.4	0.5	0.7	48.6	1.1	0.7
985841	1 FLAMED	0.291	0.362	0.285	0.371	0.082	0.475	3.8	2.1	3.0	10.9	3.1	4.7
	2 FLAMED	0.284	0.385	0.285	0.371	0.193	0.922	9.8	2.6	3.3	21.5	3.8	4.8
	3 FLAMED	0.256	0.367	0.285	0.371	0.129	0.522	7.4	2.8	3.7	14.7	3.8	5.8
MB1AB1002	BLK	0.285	0.371	0.285	0.371	-0.007	0.000	0.0	0.1	0.1	0.0	0.1	0.2
MB2AB1002	MB	0.274	0.344	0.285	0.371	0.003	0.125	0.0	0.1	0.1	0.1	0.2	0.2
LC1A1002	LCSA	0.287	0.372	0.285	0.371	13.004	4.453	24.8	0.6	0.1	5.5	0.3	0.3
LC1B1002	LCSB	0.283	0.312	0.285	0.371	-0.021	14.157	0.0	0.1	0.1	17.6	0.4	0.3

QA-CHECK3.wk1 ALPHA DATE 10/07/98 pCi/L
TIME 13:32

	Standard Known Value	LCS Sample Value	LCS Recovery
LC1A1002	25.500	24.800	97.3
	25.500		0.0
	0.000		ERR
	0.000		ERR

985847-012

Sample Activity	Spiked Sample Activity	Standard Value	Sample Volume	Spike Value	SPIKE RECOVERY
0.200	45.000	25.500	0.4000	63.750	70.3
0.200		25.500	0.4000	63.750	-0.3
985847-013					
-0.100	57.600	25.500	0.400	63.750	90.5
				ERR	ERR
				ERR	ERR

985847-002

Sample Activity	Duplicate Activity	Sample ERROR	Duplicate ERROR	Duplicate RER
0.300	0.500	0.400	0.400	0.35
				ERR
				ERR

900.0

MB2AB1002 = 0.0 BATCH # 10274

LABNET

BATCH #

BATCH #

RAW DATA FOR ALPHA/BETA IS IN JOB # 985836.
10/08/98 N.R.F.

QA-CHECK3.wk1 BETA DATE 10/07/98 pCi/L
TIME 13:32

	Standard Known Value	LCS Sample Value	LCS Recovery
LC1B1002	18.000	17.600	97.8
	18.000		0.0
	0.000		ERR
	0.000		ERR

985847-012

Sample Activity	Spiked Sample Activity	Standard Value	Sample Volume	Spike Value	SPIKE RECOVERY
1.200	41.100	18.000	0.4000	45.000	88.7
1.200		18.000	0.4000	45.000	-2.7
985847-013					
2.700	48.600	18.000	0.400	45.000	102.0
				ERR	ERR
				ERR	ERR

985847-002

Sample Activity	Duplicate Activity	Sample ERROR	Duplicate ERROR	Duplicate RER
1.500	2.700	0.500	0.500	1.70
				ERR
				ERR

900.0

MB2AB1002 = 0.1 BATCH # 10274

LABNET

BATCH #

BATCH #

RAW DATA FOR ALPHA/BETA IS IN JOB # 985836.
10/08/98 N.R.F.

C A L I B R A T I O N A L P H A

Comment: Am-241 MODEL CAL2710 ALPHA STANDARDS
LB770 Number 1 User File: A-PLANCHET CAL Cal. Data File: AM100798
Sample Set: AM-CALIBRATION Mode: Alpha Only
Calibration Parameter File Name: A-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.133	0.100	0.133	0.133	0.133	0.133	0.167	0.200	0.033	0.133
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
Activity	145.9	204.5	177.8	171.2	179.0	192.0	132.6	194.5	201.3	170.5

Calibration Results

Measurement Date 07.10.98 Time 4:51:43
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 1058

Det#	Spl#	Spl. Name	cpm	Eff	%Error	cpm	Spill	%Error
1	1	SERIAL # A962	2518	0.288	0.633	762.2	0.303	1.31
2	2	SERIAL # A963	3576	0.291	0.531	1119	0.313	1.09
3	3	SERIAL # A964	3070	0.288	0.573	1021	0.333	1.15
4	4	SERIAL # A965	2822	0.275	0.598	880.7	0.312	1.23
5	5	SERIAL # A966	2932	0.273	0.587	946.0	0.323	1.19
	6	SERIAL # A967	3335	0.289	0.550	1106	0.332	1.10
7	7	SERIAL # A968	2250	0.283	0.670	732.6	0.326	1.35
8	8	SERIAL # A969	2879	0.247	0.592	950.0	0.330	1.19
9	9	SERIAL # A970	3429	0.284	0.542	1160	0.338	1.08
10	10	SERIAL # A971	2832	0.277	0.597	897.4	0.317	1.22

C A L I B R A T I O N B E T A

Comment: Cs-137 MODEL CAL2705 BETA STANDARDS
770 Number 1 User File: B-PLANCHET CAL Cal. Data File: CS100798
Sample Set: B-PLANCHET-CAL Mode: Beta Only
Calibration Parameter File Name: B-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Beta [cpm]	1.40	1.63	0.967	2.00	1.33	1.57	1.40	1.57	1.10	1.77
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Beta [days]	10560	10560	10560	10560	10560	10560	10560	10560	10560	10560
Activity	1703	1748	1733	1763	1718	1733	1775	1766	1794	1789

Calibration Results

Measurement Date 07.10.98 Time 5:14:13
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 2237

Det#	Spl#	Spl. Name	cpm	Spill	%Error	cpm	Eff	%Error
1	1	SERIAL # A952	0.870	0.000	40.1	38854	0.380	0.171
2	2	SERIAL # A953	2.15	0.000	23.7	33749	0.322	0.183
3	3	SERIAL # A954	1.10	0.000	35.0	37513	0.361	0.174
4	4	SERIAL # A955	1.21	0.000	33.1	36131	0.342	0.177
5	5	SERIAL # A956	0.757	0.000	43.6	38361	0.372	0.172
	6	SERIAL # A957	1.32	0.000	31.4	38729	0.372	0.171
7	7	SERIAL # A958	2.19	0.000	24.0	41903	0.393	0.165
8	8	SERIAL # A959	1.82	0.000	27.0	39721	0.375	0.169
9	9	SERIAL # A960	2.68	0.000	20.7	39854	0.370	0.169
10	10	SERIAL # A961	0.757	0.000	43.6	38817	0.362	0.171

C A L I B R A T I O N A L P H A

Comment: Am-241 MODEL CAL2710 ALPHA STANDARDS
[illegible]0 Number 2 User File: A-PLANCHET CAL Cal. Data File: AM100798
Sample Set: AM-CALIBRATION Mode: Alpha Only
Calibration Parameter File Name: A-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.133	0.100	0.133	0.133	0.133	0.133	0.167	0.200	0.033	0.133
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
Activity	145.9	204.5	177.8	171.2	179.0	192.0	132.6	194.5	201.3	170.5

Calibration Results

Measurement Date 07.10.98 Time 5:14:25
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 1053

Det#	Spl#	Spl. Name	cpm	Eff	%Error	cpm	Spill	%Error
1	1	SERIAL # A962	2448	0.280	0.642	822.7	0.336	1.28
2	2	SERIAL # A963	3428	0.279	0.542	1059	0.309	1.12
3	3	SERIAL # A964	2997	0.281	0.580	883.6	0.295	1.22
4	4	SERIAL # A965	2808	0.273	0.599	886.5	0.316	1.22
[illegible]	5	SERIAL # A966	2926	0.272	0.587	940.6	0.321	1.19
[illegible]	6	SERIAL # A967	3229	0.280	0.559	1169	0.362	1.08
7	7	SERIAL # A968	2206	0.277	0.676	745.3	0.338	1.35
8	8	SERIAL # A969	2806	0.240	0.600	963.8	0.343	1.19
9	9	SERIAL # A970	3202	0.265	0.561	1289	0.403	1.05
10	10	SERIAL # A971	2675	0.261	0.614	1071	0.400	1.15

C A L I B R A T I O N B E T A

Comment: Cs-137 MODEL CAL2705 BETA STANDARDS
LB770 Number 2 User File: B-PLANCHET CAL Cal. Data File: CS100798
Sample Set: B-PLANCHET-CAL Mode: Beta Only
Calibration Parameter File Name: B-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Beta [cpm]	1.40	1.63	0.967	2.00	1.33	1.57	1.40	1.57	1.10	1.77
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Beta [days]	10560	10560	10560	10560	10560	10560	10560	10560	10560	10560
Activity	1703	1748	1733	1763	1718	1733	1775	1766	1794	1789

Calibration Results

Measurement Date 07.10.98 Time 4:51:57
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 2237

Det#	Spl#	Spl. Name	cpm	Spill	%Error	cpm	Eff	%Error
1	1	SERIAL # A952	2.23	0.000	23.5	38120	0.373	0.173
2	2	SERIAL # A953	3.29	0.000	19.0	32600	0.311	0.187
3	3	SERIAL # A954	8.13	0.000	12.0	36187	0.348	0.177
4	4	SERIAL # A955	4.05	0.000	17.2	35244	0.333	0.179
5	5	SERIAL # A956	2.00	0.000	25.0	37191	0.361	0.175
	6	SERIAL # A957	0.530	0.000	54.3	38818	0.373	0.171
7	7	SERIAL # A958	1.28	0.000	32.5	42300	0.397	0.164
8	8	SERIAL # A959	0.113	0.000	>100%	40275	0.380	0.168
9	9	SERIAL # A960	0.643	0.000	43.5	41416	0.385	0.165
10	10	SERIAL # A961	0.643	0.000	48.1	40041	0.373	0.168

C A L I B R A T I O N A L P H A

Comment: Am-241 MODEL CAL2710 ALPHA STANDARDS
LB770 Number 3 User File: A-PLANCHET CAL Cal. Data File: AM100798
Sample Set: AM-CALIBRATION Mode: Alpha Only
Calibration Parameter File Name: A-CAL
HV-Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.133	0.100	0.133	0.133	0.133	0.133	0.167	0.200	0.033	0.133
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
Activity	145.9	204.5	177.8	171.2	179.0	192.0	132.6	194.5	201.3	170.5

Calibration Results

Measurement Date 07.10.98 Time 5:45:11
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 1039

Det#	Spl#	Spl. Name	cpm	Eff	%Error	cpm	Spill	%Error
1	1	SERIAL # A962	2540	0.290	0.630	670.4	0.264	1.38
2	2	SERIAL # A963	3643	0.297	0.526	1014	0.278	1.13
3	3	SERIAL # A964	3133	0.294	0.568	893.7	0.285	1.21
4	4	SERIAL # A965	2960	0.288	0.584	815.3	0.275	1.26
5	5	SERIAL # A966	3124	0.291	0.568	840.6	0.269	1.23
	6	SERIAL # A967	3301	0.287	0.553	2897	0.878	0.809
7	7	SERIAL # A968	2261	0.284	0.668	632.7	0.280	1.43
8	8	SERIAL # A969	2989	0.256	0.581	793.2	0.265	1.27
9	9	SERIAL # A970	3444	0.285	0.541	1023	0.297	1.13
10	10	SERIAL # A971	2806	0.274	0.599	739.6	0.264	1.31

C A L I B R A T I O N B E T A

Comment: Cs-137 MODEL CAL2705 BETA STANDARDS
LB770 Number 3 User File: B-PLANCHET CAL Cal. Data File: CS100798
Sample Set: B-PLANCHET-CAL Mode: Beta Only
Calibration Parameter File Name: B-CAL
HV-Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Beta [cpm]	1.40	1.63	0.967	2.00	1.33	1.57	1.40	1.57	1.10	1.77
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Beta [days]	10560	10560	10560	10560	10560	10560	10560	10560	10560	10560
Activity	1703	1748	1733	1763	1718	1733	1775	1766	1794	1789

Calibration Results

Measurement Date 07.10.98 Time 6:02:33
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 2224

Det#	Spl#	Spl. Name	cpm	Spill	%Error	cpm	Eff	%Error
1	1	SERIAL # A952	21.9	0.001	7.24	37128	0.363	0.175
2	2	SERIAL # A953	9.41	0.000	11.1	33368	0.318	0.184
3	3	SERIAL # A954	19.1	0.001	7.74	36100	0.347	0.177
4	4	SERIAL # A955	8.81	0.000	11.5	36976	0.350	0.175
5	5	SERIAL # A956	22.3	0.001	7.16	37285	0.362	0.174
	6	SERIAL # A957	31.7	0.004	6.01	8750	0.084	0.360
7	7	SERIAL # A958	18.5	0.000	7.88	40962	0.385	0.166
8	8	SERIAL # A959	27.6	0.001	6.45	38902	0.367	0.171
9	9	SERIAL # A960	12.2	0.000	9.66	39920	0.371	0.169
10	10	SERIAL # A961	14.9	0.000	8.77	36919	0.344	0.175

C A L I B R A T I O N A L P H A

Comment: Am-241 MODEL CAL2710 ALPHA STANDARDS
770 Number 4 User File: A-PLANCHET CAL Cal. Data File: AM100798
Sample Set: AM-CALIBRATION Mode: Alpha Only
Calibration Parameter File Name: A-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.133	0.100	0.133	0.133	0.133	0.133	0.167	0.200	0.033	0.133
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
Activity	145.9	204.5	177.8	171.2	179.0	192.0	132.6	194.5	201.3	170.5

Calibration Results

Measurement Date 07.10.98 Time 6:02:46
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 1041

Det#	Spl#	Spl. Name	cpm	Eff	%Error	cpm	Spill	%Error
1	1	SERIAL # A962	2516	0.287	0.633	813.0	0.323	1.28
2	2	SERIAL # A963	3474	0.283	0.539	1156	0.333	1.08
3	3	SERIAL # A964	3064	0.287	0.574	997.0	0.325	1.16
4	4	SERIAL # A965	2852	0.278	0.595	912.8	0.320	1.21
5	5	SERIAL # A966	2865	0.267	0.593	955.6	0.334	1.19
	6	SERIAL # A967	3331	0.289	0.550	1067	0.320	1.12
7	7	SERIAL # A968	2192	0.276	0.678	679.2	0.310	1.40
8	8	SERIAL # A969	2868	0.246	0.593	904.2	0.315	1.21
9	9	SERIAL # A970	3446	0.285	0.541	1109	0.322	1.10
10	10	SERIAL # A971	2254	0.220	0.669	1045	0.464	1.19

Detectors with Trend:2a

C A L I B R A T I O N B E T A

Comment: Cs-137 MODEL CAL2705 BETA STANDARDS
LB770 Number 4 User File: B-PLANCHET CAL Cal. Data File: CS100798
Sample Set: B-PLANCHET-CAL Mode: Beta Only
Calibration Parameter File Name: B-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Beta [cpm]	1.40	1.63	0.967	2.00	1.33	1.57	1.40	1.57	1.10	1.77
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Beta [days]	10560	10560	10560	10560	10560	10560	10560	10560	10560	10560
Activity	1703	1748	1733	1763	1718	1733	1775	1766	1794	1789

Calibration Results

Measurement Date 07.10.98 Time 5:45:24
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 2201

Det#	Spl#	Spl. Name	cpm	Spill	%Error	cpm	Eff	%Error
1	1	SERIAL # A952	2.91	0.000	20.4	38061	0.372	0.173
2	2	SERIAL # A953	4.31	0.000	16.5	32671	0.312	0.186
3	3	SERIAL # A954	5.18	0.000	15.1	36003	0.346	0.178
4	4	SERIAL # A955	5.75	0.000	14.3	35601	0.337	0.179
5	5	SERIAL # A956	4.39	0.000	16.4	36894	0.358	0.175
	6	SERIAL # A957	5.52	0.000	14.6	37031	0.356	0.175
7	7	SERIAL # A958	10.1	0.000	10.7	40888	0.384	0.167
8	8	SERIAL # A959	6.58	0.000	13.4	38037	0.359	0.173
9	9	SERIAL # A960	3.82	0.000	17.3	38327	0.356	0.172
10	10	SERIAL # A961	0.530	0.000	54.3	38775	0.361	0.171

B A C K G R O U N D M E A S U R E M E N T

Comment: DAILY BACKGROUND OF 30 MIN
770 Number 1 User File: CALIBRARTIONS Bkg. Data File: BG100798
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 07.10.98 Time 5:44:22
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/1
Guard [cpm] 1062

	ALPHA			BETA		
Det#	cpm	+/-cpm	Cat	cpm	+/-cpm	Cat
1	0.067	0.047	1	1.70	0.238	1
2	0.067	0.047	1	1.27	0.205	1
3	0.200	0.082	1	1.13	0.194	1
4	0.100	0.058	1	1.13	0.194	1
5	0.300	0.100	2	1.70	0.238	1
6	0.167	0.075	1	2.13	0.267	1
7	0.233	0.088	1	1.27	0.205	1
8	0.167	0.075	1	1.33	0.211	1
9	0.200	0.082	1	1.37	0.213	1
10	0.333	0.105	2	1.87	0.249	1

B A C K G R O U N D M E A S U R E M E N T

Comment: DAILY BACKGROUNDS OF 30 MIN
0 Number 2 User File: CALIBRARTIONS Bkg. Data File: BG100798
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 07.10.98 Time 5:44:33
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/1
Guard [cpm] 1060

	ALPHA			BETA		
Det#	cpm	+/-cpm	Cat	cpm	+/-cpm	Cat
1	0.133	0.067	1	1.17	0.197	1
2	0.100	0.058	1	1.53	0.226	1
3	0.133	0.067	1	1.67	0.236	1
4	0.100	0.058	1	1.40	0.216	1
5	0.300	0.100	2	2.30	0.277	1
6	0.233	0.088	1	1.90	0.252	1
7	0.200	0.082	1	1.43	0.219	1
8	0.067	0.047	1	1.10	0.191	1
9	0.133	0.067	1	2.33	0.279	1
10	0.200	0.082	1	1.73	0.240	1

B A C K G R O U N D M E A S U R E M E N T

Comment: DAILY BACKGROUNDS OF 30 MIN
LB770 Number 3 User File: CALIBRARTIONS Bkg. Data File: BG100798
HV-Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 07.10.98 Time 4:52:07
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/1
Guard [cpm] 1041

	ALPHA			BETA		
Det#	cpm	+/-cpm	Cat	cpm	+/-cpm	Cat
1	0.133	0.067	1	1.47	0.221	1
2	0.033	0.033	1	1.20	0.200	1
3	0.033	0.033	1	0.900	0.173	1
4	0.133	0.067	1	1.10	0.191	1
5	0.067	0.047	1	1.13	0.194	1
6	0.167	0.075	1	3.80	0.356	2
7	0.133	0.067	1	1.47	0.221	1
8	0.067	0.047	1	1.03	0.186	1
9	0.067	0.047	1	1.30	0.208	1
10	0.167	0.075	1	1.37	0.213	1

Detectors with Trend:7a

B A C K G R O U N D M E A S U R E M E N T

Comment: DAILY BACKGROUNDS OF 30 MIN
LB770 Number 4 User File: CALIBRARTIONS Bkg. Data File: BG100798
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 07.10.98 Time 4:52:19
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/1
Guard [cpm] 1038

	ALPHA			BETA		
Det#	cpm	+/-cpm	Cat	cpm	+/-cpm	Cat
1	0.067	0.047	1	1.63	0.233	1
2	0.100	0.058	1	1.13	0.194	1
3	0.100	0.058	1	1.37	0.213	1
4	0.167	0.075	1	1.30	0.208	1
5	0.033	0.033	1	1.47	0.221	1
6	0.200	0.082	1	1.63	0.233	1
7	0.100	0.058	1	1.30	0.208	1
8	0.200	0.082	1	1.60	0.231	1
9	0.133	0.067	1	0.933	0.176	1
10	0.067	0.047	1	1.47	0.221	1

B A C K G R O U N D M E A S U R E M E N T

Comment: WEEKLY BACKGROUND OF 1000 MIN
LB770 Number 1 User File: CALIBRARTIONS Bkg. Data File: BW092798
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 27.09.98 Time 9:56:18
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 1/7
Guard [cpm] 1043

	ALPHA			BETA		
Det#	cpm	+/-cpm	Cat	cpm	+/-cpm	Cat
1	0.100	0.032	1	1.20	0.110	1
2	0.120	0.035	1	1.50	0.122	1
3	0.160	0.040	1	1.09	0.104	1
4	0.180	0.042	1	1.16	0.108	1
5	0.230	0.048	1	1.79	0.134	1
6	0.220	0.047	1	1.89	0.137	1
7	0.140	0.037	1	1.21	0.110	1
8	0.130	0.036	1	1.11	0.105	1
9	0.240	0.049	1	1.32	0.115	1
10	0.190	0.044	1	1.54	0.124	1

Background Results

Measurement Date 27.09.98 Time 11:36:23
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 2/7
Guard [cpm] 1043

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.130	0.036	1	1.55	0.124	1
2	0.180	0.042	1	1.57	0.125	1
3	0.180	0.042	1	1.10	0.105	1
4	0.140	0.037	1	1.13	0.106	1
5	0.180	0.042	1	1.61	0.127	1
6	0.140	0.037	1	1.74	0.132	1
7	0.110	0.033	1	1.27	0.113	1
8	0.100	0.032	1	1.21	0.110	1
9	0.220	0.047	1	1.14	0.107	1
10	0.150	0.039	1	1.55	0.124	1

Detectors with Trend:8a

Background Results

Measurement Date 27.09.98 Time 13:16:27
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 3/7
Guard [cpm] 1048

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.170	0.041	1	1.41	0.119	1
2	0.120	0.035	1	1.66	0.129	1
3	0.120	0.035	1	1.17	0.108	1
4	0.080	0.028	1	0.930	0.096	1
5	0.130	0.036	1	1.53	0.124	1
6	0.100	0.032	1	1.86	0.136	1
7	0.130	0.036	1	1.04	0.102	1
8	0.130	0.036	1	1.25	0.112	1
9	0.130	0.036	1	1.12	0.106	1
10	0.050	0.022	1	1.52	0.123	1

Background Results

Measurement Date 27.09.98 Time 14:56:31
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 4/7
Guard [cpm] 1047

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.120	0.035	1	1.27	0.113	1
2	0.170	0.041	1	1.69	0.130	1
3	0.080	0.028	1	0.950	0.097	1
4	0.170	0.041	1	1.17	0.108	1
5	0.140	0.037	1	1.75	0.132	1
6	0.140	0.037	1	2.09	0.145	1
7	0.140	0.037	1	1.43	0.120	1
8	0.070	0.026	1	1.15	0.107	1
9	0.140	0.037	1	1.20	0.110	1
10	0.190	0.044	1	1.59	0.126	1

Background Results

Measurement Date 27.09.98 Time 16:36:35
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 5/7
Guard [cpm] 1045

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.080	0.028	1	1.26	0.112	1
2	0.110	0.033	1	1.57	0.125	1
3	0.120	0.035	1	1.31	0.114	1
4	0.111	0.028	1	1.25	0.112	1
5	0.180	0.042	1	1.79	0.134	1
6	0.190	0.044	1	1.68	0.130	1
7	0.080	0.028	1	1.44	0.120	1
8	0.110	0.033	1	1.11	0.105	1
9	0.140	0.037	1	1.47	0.121	1
10	0.150	0.039	1	1.33	0.115	1

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
4a	1	-0.8	0.7	5.1	-0.1	-0.1	-0.8	0.7	-0.1	0.7	-0.1

Background Results

Measurement Date 27.09.98 Time 18:16:39
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 6/7
Guard [cpm] 1039

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.120	0.035	1	1.36	0.117	1
2	0.180	0.042	1	1.59	0.126	1
3	0.080	0.028	1	1.00	0.100	1
4	0.160	0.040	1	0.940	0.097	1
5	0.140	0.037	1	2.11	0.145	1
6	0.120	0.035	1	1.56	0.125	1
7	0.180	0.042	1	1.34	0.116	1
8	0.180	0.042	1	1.20	0.110	1
9	0.150	0.039	1	1.30	0.114	1
10	0.150	0.039	1	1.45	0.120	1

Background Results

Measurement Date 27.09.98 Time 19:56:43
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 7/7
Guard [cpm] 1037

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.090	0.030	1	1.32	0.115	1
2	0.110	0.033	1	1.63	0.128	1
3	0.180	0.042	1	1.00	0.100	1
4	0.170	0.041	1	1.17	0.108	1
5	0.140	0.037	1	2.08	0.144	1
6	0.070	0.026	1	1.44	0.120	1
7	0.060	0.024	1	1.02	0.101	1
8	0.090	0.030	1	1.14	0.107	1
9	0.070	0.026	1	1.26	0.112	1
10	0.230	0.048	1	1.63	0.128	1

Average of 7 cycles

Det#	ALPHA cpm	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA cpm	BETA %Error	BETA Cat	BETA Num
1	0.116	11.1	1	7	1.34	3.27	1	7
2	0.141	10.0	1	7	1.60	2.98	1	7
3	0.131	10.4	1	7	1.09	3.62	1	7
4	0.144	9.72	1	7	1.11	3.59	1	7
5	0.163	9.30	1	7	1.81	2.81	1	7
6	0.140	10.1	1	7	1.75	2.86	1	7
7	0.120	10.8	1	7	1.25	3.39	1	7
8	0.116	11.1	1	7	1.17	3.50	1	7
9	0.156	9.55	1	7	1.26	3.37	1	7
~~10~~	~~0.159~~	~~9.54~~	~~1~~	~~7~~	~~1.52~~	~~3.07~~	~~1~~	~~7~~

B A C K G R O U N D M E A S U R E M E N T

Comment: WEEKLY BACKGROUNDS OF 1000 MIN
LB770 Number 2 User File: CALIBRARTIONS Bkg. Data File: BW092798
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 27.09.98 Time 9:57:09
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 1/7
Guard [cpm] 1041

	ALPHA			BETA		
Det#	cpm	+/-cpm	Cat	cpm	+/-cpm	Cat
1	0.200	0.045	1	1.64	0.128	1
2	0.190	0.044	1	1.29	0.114	1
3	0.170	0.041	1	1.39	0.118	1
4	0.140	0.037	1	1.22	0.110	1
5	0.170	0.041	1	1.75	0.132	1
6	0.140	0.037	1	1.98	0.141	1
7	0.110	0.033	1	1.36	0.117	1
8	0.110	0.033	1	1.94	0.139	1
9	0.170	0.041	1	1.88	0.137	1
10	0.150	0.039	1	1.80	0.134	1

Background Results

Measurement Date 27.09.98 Time 11:37:13
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 2/7
Guard [cpm] 1037

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.090	0.030	1	1.69	0.130	1
2	0.160	0.040	1	1.43	0.120	1
3	0.130	0.036	1	1.27	0.113	1
4	0.150	0.039	1	1.22	0.110	1
5	0.250	0.050	1	1.79	0.134	1
6	0.150	0.039	1	1.70	0.130	1
7	0.050	0.022	1	1.42	0.119	1
8	0.060	0.024	1	1.63	0.128	1
9	0.100	0.032	1	1.90	0.138	1
10	0.170	0.041	1	1.67	0.129	1

Background Results

Measurement Date 27.09.98 Time 13:17:17
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 3/7
Guard [cpm] 1037

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.120	0.035	1	2.07	0.144	1
2	0.130	0.036	1	1.39	0.118	1
3	0.130	0.036	1	1.06	0.103	1
4	0.210	0.046	1	1.56	0.125	1
5	0.120	0.035	1	1.90	0.138	1
6	0.150	0.039	1	1.75	0.132	1
7	0.090	0.030	1	1.19	0.109	1
8	0.030	0.017	1	1.48	0.122	1
9	0.050	0.022	1	5.60	0.257	3
10	0.120	0.035	1	1.79	0.134	1

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
9b	1	-4.5	-2.2	-0.8	-0.7	0.7	-0.6	0.8	0.4	1.4	1.0

Detectors with Trend:9b

Background Results

Measurement Date 27.09.98 Time 14:57:21
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 4/7
Guard [cpm] 1046

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.230	0.048	1	2.41	0.155	1
2	0.160	0.040	1	1.44	0.120	1
3	0.130	0.036	1	1.46	0.121	1
4	0.190	0.044	1	1.09	0.104	1
5	0.050	0.022	1	1.88	0.137	1
6	0.200	0.045	1	1.71	0.131	1
7	0.090	0.030	1	1.29	0.114	1
8	0.100	0.032	1	1.84	0.136	1
9	0.120	0.035	1	6.17	0.248	3
10	0.170	0.041	1	1.83	0.135	1

Background Results

Measurement Date 27.09.98 Time 16:37:25
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 5/7
Guard [cpm] 1041

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.160	0.040	1	2.44	0.156	1
2	0.260	0.051	1	1.52	0.123	1
3	0.140	0.037	1	1.35	0.116	1
4	0.240	0.049	1	1.38	0.117	1
5	0.140	0.037	1	1.72	0.131	1
6	0.080	0.028	1	1.96	0.140	1
7	0.120	0.035	1	1.33	0.115	1
8	0.140	0.037	1	1.87	0.137	1
9	0.080	0.028	1	5.81	0.241	3
10	0.160	0.040	1	1.68	0.130	1

Background Results

Measurement Date 27.09.98 Time 18:17:29
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 6/7
Guard [cpm] 1041

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.080	0.028	1	2.17	0.147	1
2	0.170	0.041	1	1.22	0.110	1
3	0.170	0.041	1	1.24	0.111	1
4	0.140	0.037	1	1.44	0.120	1
5	0.160	0.040	1	1.91	0.138	1
6	0.060	0.024	1	1.76	0.133	1
7	0.090	0.030	1	1.39	0.118	1
8	0.110	0.033	1	1.61	0.127	1
9	0.090	0.030	1	5.45	0.233	3
10	0.060	0.024	1	1.59	0.126	1

Background Results

Measurement Date 27.09.98 Time 19:57:33
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 7/7
Guard [cpm] 1043

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.140	0.037	1	2.08	0.144	1
2	0.110	0.033	1	1.28	0.113	1
3	0.140	0.037	1	1.23	0.111	1
4	0.080	0.028	1	1.16	0.108	1
5	0.180	0.042	1	1.89	0.137	1
6	0.150	0.039	1	1.99	0.141	1
7	0.060	0.024	1	1.08	0.104	1
8	0.090	0.030	1	1.68	0.130	1
9	0.060	0.024	1	5.42	0.233	3
10	0.090	0.030	1	1.72	0.131	1

Average of 7 cycles

Det#	ALPHA cpm	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA cpm	BETA %Error	BETA Cat	BETA Num
1	0.146	9.90	1	7	2.07	2.62	1	7
2	0.169	9.21	1	7	1.37	3.23	1	7
3	0.144	9.90	1	7	1.29	3.33	1	7
4	0.164	9.32	1	7	1.30	3.31	1	7
5	0.153	9.63	1	7	1.83	2.79	1	7
6	0.133	10.4	1	7	1.84	2.79	1	7
7	0.087	12.8	1	7	1.29	3.32	1	7
8	0.091	12.4	1	7	1.72	2.89	1	7
~~9~~	~~0.096~~	~~12.2~~	~~1~~	~~7~~	~~4.60~~	~~1.79~~	~~2~~	~~7~~
10	0.131	10.4	1	7	1.73	2.88	1	7

B A C K G R O U N D M E A S U R E M E N T

Comment: WEEKLY BACKGROUNDS OF 1000 MIN
LB770 Number 3 User File: CALIBRARTIONS Bkg. Data File: BW092798
HV-Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 27.09.98 Time 9:58:07
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 1/7
Guard [cpm] 1025

	ALPHA			BETA		
Det#	cpm	+/-cpm	Cat	cpm	+/-cpm	Cat
1	0.230	0.048	1	1.74	0.132	1
2	0.140	0.037	1	1.59	0.126	1
3	0.100	0.032	1	1.13	0.106	1
4	0.200	0.045	1	1.33	0.115	1
5	0.130	0.036	1	1.26	0.112	1
6	0.220	0.047	1	3.42	0.185	2
7	0.230	0.048	1	1.24	0.111	1
8	0.180	0.042	1	1.22	0.110	1
9	0.090	0.030	1	1.10	0.105	1
10	0.140	0.037	1	1.45	0.120	1

Background Results

Measurement Date 27.09.98 Time 11:38:12
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 2/7
Guard [cpm] 1023

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.230	0.048	1	1.90	0.138	1
2	0.130	0.036	1	1.65	0.128	1
3	0.210	0.046	1	1.24	0.111	1
4	0.130	0.036	1	1.02	0.101	1
5	0.110	0.033	1	1.16	0.108	1
6	0.260	0.051	1	4.37	0.209	2
7	0.160	0.040	1	1.95	0.140	1
8	0.150	0.039	1	1.26	0.112	1
9	0.170	0.041	1	1.21	0.110	1
10	0.110	0.033	1	1.29	0.114	1

Detectors with Trend:7b

Background Results

Measurement Date 27.09.98 Time 13:18:16
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 3/7
Guard [cpm] 1024

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.130	0.036	1	2.94	0.171	2
2	0.180	0.042	1	1.49	0.122	1
3	0.160	0.040	1	1.00	0.100	1
4	0.190	0.044	1	0.980	0.099	1
5	0.220	0.047	1	1.40	0.118	1
6	0.200	0.045	1	5.48	0.234	3
7	0.170	0.041	1	2.56	0.160	2
8	0.220	0.047	1	1.07	0.103	1
9	0.160	0.040	1	1.06	0.103	1
10	0.150	0.039	1	1.48	0.122	1

Background Results

Measurement Date 27.09.98 Time 14:58:20
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 4/7
Guard [cpm] 1028

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.160	0.040	1	3.12	0.177	2
2	0.120	0.035	1	1.58	0.126	1
3	0.210	0.046	1	1.02	0.101	1
4	0.140	0.037	1	1.06	0.103	1
5	0.170	0.041	1	1.33	0.115	1
6	0.200	0.045	1	5.80	0.241	3
7	0.180	0.042	1	2.38	0.154	1
8	0.190	0.044	1	1.24	0.111	1
9	0.190	0.044	1	1.26	0.112	1
10	0.100	0.032	1	1.46	0.121	1

Background Results

Measurement Date 27.09.98 Time 16:38:24
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 5/7
Guard [cpm] 1030

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.220	0.047	1	2.94	0.171	2
2	0.240	0.049	1	1.70	0.130	1
3	0.210	0.046	1	1.48	0.122	1
4	0.200	0.045	1	1.12	0.106	1
5	0.110	0.033	1	1.59	0.126	1
6	0.240	0.049	1	6.21	0.249	3
7	0.080	0.028	1	2.71	0.165	2
8	0.110	0.033	1	1.33	0.115	1
9	0.150	0.039	1	1.14	0.107	1
10	0.080	0.028	1	1.20	0.110	1

Background Results

Measurement Date 27.09.98 Time 18:18:28
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 6/7
Guard [cpm] 1031

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.160	0.040	1	3.08	0.175	2
2	0.180	0.042	1	1.49	0.122	1
3	0.200	0.045	1	1.00	0.100	1
4	0.120	0.035	1	1.11	0.105	1
5	0.120	0.035	1	1.22	0.110	1
6	0.230	0.048	1	6.13	0.248	3
7	0.070	0.026	1	2.80	0.167	2
8	0.110	0.033	1	1.33	0.115	1
9	0.150	0.039	1	1.40	0.118	1
10	0.090	0.030	1	1.29	0.114	1

Background Results

Measurement Date 27.09.98 Time 19:58:32
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 7/7
Guard [cpm] 1021

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.110	0.033	1	3.32	0.182	2
2	0.120	0.035	1	1.54	0.124	1
3	0.140	0.037	1	1.24	0.111	1
4	0.090	0.030	1	0.960	0.098	1
5	0.110	0.033	1	1.42	0.119	1
6	0.170	0.041	1	5.78	0.240	3
7	0.200	0.045	1	2.43	0.156	1
8	0.120	0.035	1	1.39	0.118	1
9	0.080	0.028	1	1.02	0.101	1
10	0.120	0.035	1	1.21	0.110	1

Average of 7 cycles

Det#	ALPHA cpm	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA cpm	BETA %Error	BETA Cat	BETA Num
1	0.177	8.98	1	7	2.72	2.29	2	7
2	0.159	9.47	1	7	1.58	3.01	1	7
3	0.176	9.04	1	7	1.16	3.51	1	7
4	0.153	9.70	1	7	1.08	3.63	1	7
5	0.139	10.1	1	7	1.34	3.26	1	7
~~6~~	~~0.217~~	~~8.12~~	~~1~~	~~7~~	~~5.31~~	~~1.64~~	~~3~~	~~7~~
7	0.156	9.55	1	7	2.30	2.49	1	7
8	0.154	9.64	1	7	1.26	3.35	1	7
9	0.141	10.1	1	7	1.17	3.49	1	7
10	0.113	11.3	1	7	1.34	3.27	1	7

B A C K G R O U N D M E A S U R E M E N T

Comment: WEEKLY BACKGROUNDS OF 1000 MIN
LB770 Number 4 User File: CALIBRARTIONS Bkg. Data File: BW092798
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 27.09.98 Time 9:55:42
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 1/7
Guard [cpm] 1025

	ALPHA			BETA		
Det#	cpm	+/-cpm	Cat	cpm	+/-cpm	Cat
1	0.140	0.037	1	1.66	0.129	1
2	0.110	0.033	1	1.05	0.102	1
3	0.200	0.045	1	1.18	0.109	1
4	0.170	0.041	1	1.14	0.107	1
5	0.200	0.045	1	1.69	0.130	1
6	0.180	0.042	1	1.60	0.126	1
7	0.160	0.040	1	1.27	0.113	1
8	0.220	0.047	1	1.33	0.115	1
9	0.190	0.044	1	1.16	0.108	1
10	0.160	0.040	1	1.43	0.120	1

Background Results

Measurement Date 27.09.98 Time 11:35:48
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 2/7
Guard [cpm] 1027

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.180	0.042	1	1.36	0.117	1
2	0.130	0.036	1	0.980	0.099	1
3	0.270	0.052	1	0.960	0.098	1
4	0.150	0.039	1	1.06	0.103	1
5	0.180	0.042	1	1.89	0.137	1
6	0.110	0.033	1	2.80	0.167	2
7	0.150	0.039	1	1.75	0.132	1
8	0.300	0.055	2	1.49	0.122	1
9	0.150	0.039	1	1.07	0.103	1
10	0.190	0.044	1	1.71	0.131	1

Background Results

Measurement Date 27.09.98 Time 13:15:52
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 3/7
Guard [cpm] 1025

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.180	0.042	1	1.53	0.124	1
2	0.190	0.044	1	0.970	0.098	1
3	0.160	0.040	1	1.31	0.114	1
4	0.100	0.032	1	1.05	0.102	1
5	0.060	0.024	1	1.69	0.130	1
6	0.130	0.036	1	4.30	0.207	2
7	0.100	0.032	1	3.08	0.175	2
8	0.140	0.037	1	1.69	0.130	1
9	0.080	0.028	1	1.27	0.113	1
10	0.170	0.041	1	1.71	0.131	1

Background Results

Measurement Date 27.09.98 Time 14:55:56
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 4/7
Guard [cpm] 1030

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.150	0.039	1	1.76	0.133	1
2	0.170	0.041	1	1.11	0.105	1
3	0.170	0.041	1	1.08	0.104	1
4	0.160	0.040	1	1.17	0.108	1
5	0.090	0.030	1	1.65	0.128	1
6	0.140	0.037	1	4.14	0.203	2
7	0.140	0.037	1	3.43	0.185	2
8	0.110	0.033	1	1.41	0.119	1
9	0.220	0.047	1	1.46	0.121	1
10	0.080	0.028	1	1.61	0.127	1

Background Results

Measurement Date 27.09.98 Time 16:36:00
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 5/7
Guard [cpm] 1035

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.190	0.044	1	1.70	0.130	1
2	0.110	0.033	1	1.05	0.102	1
3	0.100	0.032	1	1.29	0.114	1
4	0.150	0.039	1	1.12	0.106	1
5	0.070	0.026	1	1.63	0.128	1
6	0.200	0.045	1	4.29	0.207	2
7	0.100	0.032	1	3.47	0.186	2
8	0.120	0.035	1	1.46	0.121	1
9	0.130	0.036	1	1.09	0.104	1
10	0.080	0.028	1	1.54	0.124	1

Background Results

Measurement Date 27.09.98 Time 18:16:04
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 6/7
Guard [cpm] 1028

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.140	0.037	1	1.45	0.120	1
2	0.160	0.040	1	1.15	0.107	1
3	0.130	0.036	1	1.16	0.108	1
4	0.180	0.042	1	1.30	0.114	1
5	0.230	0.048	1	1.70	0.130	1
6	0.150	0.039	1	4.43	0.210	2
7	0.150	0.039	1	3.62	0.190	2
8	0.180	0.042	1	1.50	0.122	1
9	0.200	0.045	1	1.55	0.124	1
10	0.050	0.022	1	1.58	0.126	1

Background Results

Measurement Date 27.09.98 Time 19:56:08
Measuring Time [min:sec] Elapsed 0100:00 Preset 0100:00 Cycle 7/7
Guard [cpm] 1022

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.040	0.020	1	1.24	0.111	1
2	0.220	0.047	1	1.02	0.101	1
3	0.140	0.037	1	1.10	0.105	1
4	0.080	0.028	1	1.05	0.102	1
5	0.130	0.036	1	1.75	0.132	1
6	0.111	0.028	1	4.33	0.208	2
7	0.130	0.036	1	3.91	0.198	2
8	0.220	0.047	1	1.62	0.127	1
9	0.120	0.035	1	1.20	0.110	1
10	0.080	0.028	1	1.62	0.127	1

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
6a	1	-0.9	-0.9	4.5	3.8	-0.1	-0.9	-0.9	-0.9	-0.1	0.7

Average of 7 cycles

Det#	ALPHA cpm	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA cpm	BETA %Error	BETA Cat	BETA Num
1	0.146	9.86	1	7	1.53	3.06	1	7
2	0.156	9.58	1	7	1.05	3.68	1	7
3	0.167	9.24	1	7	1.15	3.52	1	7
4	0.141	10.0	1	7	1.13	3.56	1	7
5	0.137	10.2	1	7	1.71	2.88	1	7
6	0.146	9.72	1	7	3.70	1.96	2	7
7	0.133	10.4	1	7	2.93	2.21	2	7
8	0.184	8.80	1	7	1.50	3.08	1	7
9	0.156	9.62	1	7	1.26	3.37	1	7
10	0.116	11.1	1	7	1.60	2.99	1	7

LB770 BACKGROUND AND EFFICIENCY ACCEPTANCE CRITERIA

Plateau run6/01/98

		LB770-01				LB770-02				LB770-03				LB770-04			
		α EFF	β EFF	α BKG	β BKG	α EFF	β EFF	α BKG	β BKG	α EFF	β EFF	α BKG	β BKG	α EFF	β EFF	α BKG	β BKG
DETECTOR 1	UCL	29.4	38.2	0.3	2.5	28.6	37.3	0.3	2.5	29.8	36.4	0.3	2.5	29.3	38.1	0.3	2.5
	UWL	29.3	38.0			28.4	37.2			29.6	36.1			29.1	37.6		
	LWL	28.2	36.9			27.3	36.2			28.4	34.8			27.9	34.8		
	LCL	28.0	36.8	0.0	0.0	27.1	36.1	0.0	0.0	28.2	34.5	0.0	0.0	27.7	34.3	0.0	0.0
DETECTOR 2	UCL	29.8	32.2	0.3	2.5	29.1	31.0	0.3	2.5	30.5	31.9	0.3	2.5	30.0	32.7	0.3	2.5
	UWL	29.6	32.1			28.8	30.9			30.2	31.7			29.8	32.3		
	LWL	28.1	31.4			27.2	30.1			28.2	30.5			28.2	29.7		
	LCL	27.8	31.3	0.0	0.0	27.0	30.0	0.0	0.0	27.9	30.4	0.0	0.0	28.0	29.3	0.0	0.0
DETECTOR 3	UCL	29.4	36.8	0.3	2.5	29.1	34.9	0.3	2.5	31.0	36.7	0.3	2.5	30.5	39.5	0.3	2.5
	UWL	29.2	36.6			28.9	34.8			30.7	36.4			30.0	38.3		
	LWL	28.2	35.6			27.3	34.1			29.1	34.6			26.8	30.3		
	LCL	28.0	35.4	0.0	0.0	27.1	33.9	0.0	0.0	28.8	34.3	0.0	0.0	26.3	29.0	0.0	0.0
DETECTOR 4	UCL	28.2	35.7	0.3	2.5	27.9	34.7	0.3	2.5	30.0	36.0	0.3	2.5	29.1	35.9	0.3	2.5
	UWL	28.0	35.3			27.8	34.5			29.8	35.6			28.7	35.4		
	LWL	27.2	33.2			26.9	32.6			28.5	33.1			26.6	31.7		
	LCL	27.1	32.8	0.0	0.0	26.8	32.3	0.0	0.0	28.3	32.8	0.0	0.0	26.3	31.1	0.0	0.0
DETECTOR 5	UCL	28.8	37.3	0.3	2.5	28.2	36.7	0.3	2.5	30.1	36.8	0.3	2.5	29.4	37.4	0.3	2.5
	UWL	28.7	37.2			28.0	36.5			29.8	36.5			29.1	37.0		
	LWL	27.6	36.4			27.1	35.5			28.4	35.1			26.9	34.3		
	LCL	27.4	36.2	0.0	0.0	26.9	35.3	0.0	0.0	28.2	34.8	0.0	0.0	26.6	33.9	0.0	0.0
DETECTOR 6	UCL	30.3	38.1	0.3	2.5	29.3	38.3	0.3	2.5	30.9	11.3	0.3	2.5	29.8	37.4	0.3	2.5
	UWL	30.1	37.9			29.1	38.1			30.5	11.1			29.6	37.0		
	LWL	28.7	36.3			27.7	36.7			28.4	9.5			27.8	34.6		
	LCL	28.4	36.1	0.0	0.0	27.5	36.5	0.0	0.0	28.1	9.3	0.0	0.0	27.6	34.2	0.0	0.0
DETECTOR 7	UCL	28.8	40.2	0.3	2.5	28.2	40.3	0.3	2.5	29.4	39.3	0.3	2.5	28.9	39.9	0.3	2.5
	UWL	28.6	40.1			28.1	40.2			29.2	39.1			28.7	39.5		
	LWL	27.6	38.9			27.1	39.2			27.6	37.3			27.0	37.0		
	LCL	27.4	38.7	0.0	0.0	27.0	39.1	0.0	0.0	27.4	37.0	0.0	0.0	26.7	36.6	0.0	0.0
DETECTOR 8	UCL	25.7	38.0	0.3	2.5	24.7	38.1	0.3	2.5	26.2	37.0	0.3	2.5	25.5	37.6	0.3	2.5
	UWL	25.6	37.8			24.5	38.0			26.0	36.7			25.3	37.2		
	LWL	24.5	36.4			23.6	37.4			24.7	34.8			24.0	34.7		
	LCL	24.3	36.2	0.0	0.0	23.4	37.3	0.0	0.0	24.5	34.5	0.0	0.0	23.8	34.3	0.0	0.0
DETECTOR 9	UCL	28.9	37.7	0.3	2.5	27.5	38.9	0.3	2.5	30.0	36.7	0.3	2.5	29.7	37.7	0.3	2.5
	UWL	28.8	37.5	0.0	0.0	27.3	38.8	0.0	0.0	29.7	36.6			29.4	37.3		
	LWL	27.9	36.1			26.0	37.9			28.4	35.3			27.5	34.6		
	LCL	27.8	35.9			25.8	37.7			28.2	35.2	0.0	0.0	27.2	34.2	0.0	0.0
DETECTOR 10	UCL	28.3	36.0	0.3	2.5	27.2	37.8	0.3	2.5	29.2	35.3	0.3	2.5	26.4	38.0	0.3	2.5
	UWL	28.2	35.8			27.0	37.8			29.0	35.0			26.0	37.7		
	LWL	27.2	35.1			26.0	37.2			27.7	33.2			23.5	35.4		
	LCL	27.0	34.9	0.0	0.0	25.8	37.1	0.0	0.0	27.5	32.9	0.0	0.0	23.1	35.0	0.0	0.0

These limits apply to North American Scientific AM 241 planchets series numbers A962-A971 for Alpha and North American Scientific - 137 planchets series number A952 - A961 for Beta. The data collected for the period of 6/01/98 - 6/30/98

Nuclide Am-241 Isotope # 284 Date Received 10-3-94 Received By Mark Ensor

INCOMING HEALTH PHYSICS

Radiation Level @ Package Surface , Radiation Level @ 1 meter From Package Surface

Removable Contamination Survey DPM/100 Square Centimeters

Incoming Health Physics Results Health Physics Approval By

Characterization of Radioactive Material Solution

Manufacturer: Isotope Products , Model # :7241 , Serial #: 470-75-1 , NIST Traceable yes

Half-Life:432.70 + or - 0.5 years , Date of Calibration:10-01-94 ,Time of Calibration: 12:00:00h

Chemical Form:AmCl3 , Sample Mass:5.1824 + or - grams

Activity Concentration at TOC:1.96 uCi/g , Total Activity @ TOC:10.158 uCi

DPM Conversion Factor: 2220000 , Activity @ Receipt in DPM 22,549,461 , Activity@ Receipt in uCi: 10.1574

Preparation of Primary Stock Solution

Preparation Date:03-07-95 , Activity on Prep Date : 22,534,126.6 DPM , 4,348,202.9 DPM /grams In The Ampoul

pCi per grams Of Standard In Ampoule at Prep= 1,958,649.9 ,Volume of Stock Solution: 1000 mlls

Stock Solution Concentration: 22,534.1 DPM/ml @ prep Stock Solution Total Activity @ Prep in uCi: 10.1505

Stock Solution Concentration: 10,150.5 pCi/ ml at prep , Total Stock Solution Activity @ Prep10,150,507.5 pCi

Preparation of Working Solutions

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Working Sol'n #	284.01	284.02	284.03	284.04	284.05
TOC	9/26/95	9/26/95	11/6/96	11/6/96	11/10/97
Volumetric or Gravimetric	Volumetric	Volumetric	Volumetric	Volumetric	Volumetric
Stock Solution ID	284.00	284.01	284.01	284.03	284.01
Stock Solution Used(ml or grams)	10	10	25	100	25
DPM/ml of Stock Sol. At TOC	22,534.100	450.3	450.3	11.2	450.3
Stock Solution TOC	3/7/95	9/26/95	9/26/95	11/6/96	09/26/95
Working Solution Volume (ml)	500.0	1,000.0	1,000.0	500.0	1,000.0
Total DPM@ TOC	225,140.3	4,503.0	11,237.4	1,123.7	11,219.2
DPM / ml @TOC	450.3	4.5	11.2	2.2	11.2
pCi/ml @ TOC	**202.8**	**2.0**	**5.1**	**1.0**	**5.1**
pCi/Liter @ TOC	202,829.1	2,028.4	5,061.9	1,012.3	5,053.7
Original Working Solution #					
Date Exhausted					

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

Nuclide Am-241 Isotope # 284 Date Received 10-3-94 Received By Mark Ensor

Radionuclide Standard Data Sheet

'22/98

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Working Sol'n #	**284.06**	**284.07**			
TOC	11/10/97	04/14/98			
Volumetric or Gravimetric	Volumetric	Volumetric			
Stock Solution ID	284.05	284.01			
Stock Solution Used(ml or grams)	100	50			
DPM/ml of Stock Sol. At TOC	11.2	450.3			
Stock Solution TOC	11/10/97	09/26/95			
Working Solution Volume (ml)	1,000.0	2,000.0			
Total DPM@ TOC	1,120.0	22,423.2	0.0	0.0	0.0
DPM / ml @TOC	1.1	11.212	?	?	?
pCi/ml @ TOC	**0.5**	**5.1**			
pCi/Liter @ TOC	504.5	5,050.3			
Original Working Solution #					
Date Exhausted					

Working Sol'n #					
TOC					
Volumetric or Gravimetric					
Stock Solution ID					
Stock Solution Used(ml or grams)					
DPM/ml of Stock Sol. At TOC					
Stock Solution TOC					
Working Solution Volume (ml)					
Total DPM@ TOC	0.0	0.0	0.0	0.0	0.0
DPM / ml @TOC	?	?	?	?	?
pCi/ml @ TOC					
pCi/Liter @ TOC					
Original Working Solution #					
Date Exhausted					

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

Activity Remaining in Stock Solution as of Report Date:

Current Stoc k Solution A ctivity: 10.099 uCi

STANDARD PREPARATION WORKSHEET

Isotope Number: 284.00

Radionuclide: Am-241

Date of Preparation: 3-7-95

Prepared by: Dee F.

Isotope Number of Stock Solution: Isotope Products Source # 470-75-1

PREPARATION NOTES:

1) **Amount of Stock Solution measured in volumetric flask.**

Vial weight with solution = 8.6638 g
Vial weight empty & Dried = 3.4829 g
Total = 5.1809 g

2) **Amount and type of dilution measured in volumetric flask.**

Diluted to 1.0 L with 4N HNO_3

3) **Final Concentration.**

10,1
10,150 pCi/ml
DW
3/16/95

4) **Notes, Comments, and Calculations.**

WITNESSED BY_____

QC26 EFF 07-15-94:REV 2

STANDARD PREPARATION WORKSHEET

Isotope Number: 284.07 JOB # 9846272 mo 4/14/98

Radionuclide: Am 241

Date of Preparation: 4/14/98

Prepared by: MLO

Isotope Number of Stock Solution: 284-01

PREPARATION NOTES:

1) **Amount of Stock Solution measured in volumetric flask.**

50mL of 284.01 @ 208 pCi/mL

2) **Amount and type of dilution measured in volumetric flask.**

50mL of 284.01 DILUTED TO 2000mL W 4N HNO_3

3) **Final Concentration.**

5.1 pCi/mL ✓ 4/22/98

4) **Notes, Comments, and Calculations.** WITNESSED BY 4-14-98

QC26 EFF 07-15-94:REV 2

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	Am-241	Customer:	CORE LABORATORIES
Half Life:	432.7 ± 0.5 years	P.O.No.:	57210-1436
Catalog No.:	7241	Reference Date:	October 1 1994 12:00 PST.
Source No.:	470-75-1	Contained Radioactivity:	10.16 μCi
		Contained Radioactivity:	376 kBq

Description of Solution

a. Mass of solution:	5.1824 g in a 5 ml flame sealed ampoule	
b. Chemical form:	AmCl3 in 1 M HCl	
c. Carrier content:	None	
d. Density:	Approximately 1.0171	g/ml @ 20°C.

Radioimpurities None detected

Radioactive Daughters None detected

Radionuclide Concentration

1.960 μCi/g.

Method of Calibration

The source was prepared from a weighed aliquot of solution whose concentration in μCi/gram was determined by a liquid scintillation counter.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±1.5%
b. Random uncertainty in assay:	±0.8%
c. Random uncertainty in weighing(s):	±0.1%
d. Total uncertainty at the 99% confidence level:	±1.7%

NIST Traceability

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

Leak Test(s)

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

Notes

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

ERIC BURKS
QUALITY CONTROL

29 SEPTEMBER 1994
Date Signed

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

ISOTOPE PRODUCTS LABORATORIES

3017 N. SAN FERNANDO BLVD.

BURBANK, CALIFORNIA 91504

FAX (818) 843-6168 • PHONE (818) 843-7000

*** PACKING LIST ***

Shipper No: 2479
Ship Date: 9/13/94
Page: 1

SOLD TO: CORE LABORATORIES
420 WEST FIRST ST.
CASPER, WY 82601

SHIP TO: CORE LABORATORIES
420 WEST FIRST ST.
CASPER, WY 82601

Sales Order No: 30448
Order Date : 9/13/94
Cust Code : CORELAB
Job Number :

Purchase Ord No: 57210-1436
Ship Via : FED EX 2ND DAY
FOB : BURBANK
Salesperson No : 1

Line	Part Number	Description	Bin Loc	Qty Orig Ordered	Qty Ship To Date	Qty On Backorder	Qty This Shipment	Qty Actually Shipped
1	7241-10U	Am-241 10 uCi solution Calibrated and NIST traceable Chemical Form: Americium chloride in 1 M HCl. Options:		1.00	—	—	1.00	1
	10011-1	5 ml Flame Sealed Ampoule Volume= 5 ml						
2	7230-10U	Th-230, 10 uCi, in 5 ml flame sealed ampoule. Calibrated & NIST +/-5%. Chemical Form: Thorium Nitrate in 0.1M HNO3 Options:		1.00	—	—	1.00	1
	10011-1	5 ml Flame Sealed Ampoule Volume= 5 ml						
3	7232-50N	Th-232, 50 nCi in 5 ml flame sealed ampoule. Calibrated & NIST +/-5%. Chemical Form: Thorium Nitrate in H20 Options:		1.00	—	—	1.00	1
	10011-1	5 ml Flame Sealed Ampoule Volume= 5 ml						
4	7090-50U	Sr/Y-90, 50 uCi in 5 ml		1.00	—	—	1.00	1

Rec'd 10/13/94

ISOTOPE PRODUCTS LABORATORIES

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BURBANK, CALIFORNIA 91504

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Order Date : 9/13/94
Cust Code : CORELAB
Job Number :

Purchase Ord No: 57210-1436
Ship Via : FED EX 2ND DAY
FOB : BURBANK
Salesperson No : 1

Line	Part Number	Description	Bin Loc	Qty Orig Ordered	Qty Ship To Date	Qty On Backorder	Qty This Shipment	Qty Actually Shipped
		flame sealed ampoule. Calibrated & NIST +/-5%. Chemcial Form: Strontium Chloride in 0.1M HCl Options:						
M	10011-1	5 ml Flame Sealed Ampoule Volume= 5 ml						
5	7229-500N	Th-229, 500 nCi in 5 ml flame sealed ampoule. Calibrated & NIST +/-5%. Chemical Form: Thorium Nitrate in 0.1M HNO3 Options:		1.00	—	—	1.00	1
M	10011-1	5 ml Flame Sealed Ampoule Volume= 5 ml						5

Total Weight : _____
Total Cubic Ft: _____

Freight : _____
Insurance: _____

Date Filled: Sept. 29, 94
Filled By : -celin

ISOTOPE PRODUCTS LABORATORIES · 1800 N. Keystone St., Burbank, CA 91504
(818) 843-7000 · FAX (818) 843-6168

EMERGENCY RESPONSE INFORMATION
(49CFR 172.600, 602, 604)
May 1, 1994

1) PROPER SHIPPING NAME AND HAZARD CLASS

____ a) Radioactive material, Excepted package, limited quantity of material N.O.S., UN2910, Class 7.

____ b) Radioactive material special form N.O.S., UN2974, Class 7

✓ c) Radioactive material, N.O.S., UN2982, Class 7

____ d) Compressed Gas, N.O.S., Non-flammable gas, UN1956, Class 2.2

____ e) Nitrogen, Compressed, Non-flammable gas, UN1066, Class 2.2

____ f) Nitric Acid, 40% or less, Corrosive material, NA1760, Class 8

____ g) Hydrochloric Acid, Corrosive material, UN1789, Class 8

2) IMMEDIATE HAZARDS TO HEALTH: no significant hazards

3) RISKS OF FIRE OR EXPLOSION:

✓ a) none

____ b) Compressed gas: could explode on exposure to intense heat or flame

4) IMMEDIATE PRECAUTIONS: Keep non-essential people away from area; notify radiation safety authorities

5) EMERGENCY FIRE MEASURES: Self-contained breathing apparatus and firefighters' protective gear should be used.

6) HANDLING SPILLS OR LEAKS: Do not touch exposed contents. See 4) above.

7) FIRST AID: Use standard first aid measures as required. Advise medical personnel that victim may be contaminated with low level radioactive material.

8) 24 hour emergency response number: (818)566-6933.

IPL 92-0306(5/94)

Nuclide Cs-137 Isotope # 327 Date Received 1/25/97 Received By DDP

INCOMING HEALTH PHYSICS

Radiation Level @ Package Surface , Radiation Level @ 1 meter From Package Surface

Removable Contamination Survey DPM/100 Square Centimeters

Incoming Health Physics Results Health Physics Approval By

Characterization of Radioactive Material Solution

Manufacturer: USEPA , Model # :94019-1 , Serial #: , NIST Traceable

Half-Life:30.10 + or - years , Date of Calibration:1/23/95 ,Time of Calibration: 05:00:00h

Chemical Form: , Sample Mass:5.0030 + or - grams

Activity Concentration at TOC:29.0 nCi/g , Total Activity @ TOC:145.087 nCi

DPM Conversion Factor: 2220 , Activity @ Receipt in DPM 307,537 , Activity@ Receipt in uCi: 0.1385

Preparation of Primary Stock Solution

Preparation Date:1/30/97 , Activity on Prep Date : 307,439.9 DPM , 61,451.1 DPM /grams In The Ampoul

pCi per grams Of Standard In Ampoule at Prep= 27,680.7 ,Volume of Stock Solution: 1000 ml

Stock Solution Concentration: 307.4 DPM/ml @ prep Stock Solution Total Activity @ Prep in uCi: 0.1385

Stock Solution Concentration: 138.5 pCi/ ml at prep , Total Stock Solution Activity @ Prep138,486.5 pCi

Preparation of Working Solutions

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Working Sol'n #	327.01	327.02	327.03	327.04	
TOC	1/30/97	08/20/97	1/2/98	10/01/98	
Volumetric or Gravimetric	Volumetric	Volumetric	Volumetric	Volumetric	
Stock Solution ID	327.00	327.00	327.00	327.00	
Stock Solution Used(ml or grams)	25	25	50	50	
DPM/ml of Stock Sol. At TOC	307.400	307.4	307.4	307.4	
Stock Solution TOC	1/30/97	1/30/97	1/30/97	1/30/97	
Working Solution Volume (ml)	1,000.0	1,000.0	2,000.0	2,000.0	
Total DPM@ TOC	7,685.0	7,587.7	15,048.1	14,792.1	0.0
DPM / ml @TOC	7.7	7.6	7.5	7.4	?
pCi/ml @ TOC	**3.5**	**3.4**	**3.4**	**3.3**	
pCi/Liter @ TOC	3,461.7	3,417.9	3,389.2	3,331.6	
Original Working Solution #					
Date Exhausted					

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

STANDARD PREPARATION WORKSHEET

Isotope Number: 327.00

Radionuclide: Cs137

Date of Preparation: 1/30/97

Prepared by: MG

Isotope Number of Stock Solution: N/A

PREPARATION NOTES:

1) **Amount of Stock Solution measured in volumetric flask.**

GROSS AMPOULE WT. : 9.4563 g

EMPTY AMPOULE WT. : 4.4533 g

NET WT OF STANDARD : 5.0030 g ACTIVITY OF STANDARD : 29.0 nCi/g

GROSS ACTIVITY : 145.087 nCi (145087 pCi)

2) **Amount and type of dilution measured in volumetric flask.**

5.0030 g OF 327.0 @ 29000 pCi/g

DILUTED TO 1000 mL IN 4N HNO_3

3) **Final Concentration.**

145.087 pCi/L = 145 pCi/mL

= 138.6 pCi/mL (decay corrected)

2/3/97

4) **Notes, Comments, and Calculations.**

WITNESSED BY [illegible] 1-30-97

QC26 EFF 07-15-94:REV 2

STANDARD PREPARATION WORKSHEET

Isotope Number: 327.03 JOB # 984003

Radionuclide: Cs 137

Date of Preparation: 1/2/98

Prepared by: MO

Isotope Number of Stock Solution: 327.00

PREPARATION NOTES:

1) Amount of Stock Solution measured in volumetric flask.

50 mL of 327.00 @ 145 pCi/mL

2) Amount and type of dilution measured in volumetric flask.

50 mL of 327.00 DILUTED TO 2000 mL IN 4N HNO_3

3) Final Concentration.

3.6 pCi/mL 3.4 pCi/mL

Decay/corrected Dr

1/9/98

4) Notes, Comments, and Calculations. WITNESSED BY: 1-2-98

QC26 EFF 07-15-94:REV 2

Isotope 327

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
702/798-2100

Rec'd 1/25/97

Calibration Certificate

Description

Principal Radionuclide	Cs-137
Total Mass of this Solution	Approx. 5 grams
Total Activity	Approx. 145 nanocuries
Half-life	30.1 years
Activity Concentration	29.0 nanocuries/gram
Date and Time of Standardization	January 23, 1995 0400 hours PST
Solution Number	94019-1

Measurement

Method of Measurement:

The activity of the primary solution was measured by four pi efficiency tracing.
The activity of the dilution was measured using gamma spectroscopy counting.

Activity of daughter radionuclide:

The principal activity was accompanied at the quoted time by :
27.4 nanocuries / gram of the daughter nuclide..... Barium-137m

Useful Life

We recommend that this solution should not be used after..... January, 2001

Isotope 327

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
ENVIRONMENTAL MONITORING SYSTEMS LABORATORY-LAS VEGAS
P.O. BOX 93478
LAS VEGAS, NEVADA 89193-3478
702/798-2100

Rec'd 12/1 Rc. Rec'd 1/25/97

Calibration Certificate

Description

Principal Radionuclide	Cs-137
Total Mass of this Solution	Approx. 5 grams
Total Activity	Approx. 145 nanocuries
Half-life	30.1 years
Activity Concentration	29.0 nanocuries/gram
Date and Time of Standardization	January 23, 1995 0400 hours PST
Solution Number	94019-1

Measurement

Method of Measurement:

The activity of the primary solution was measured by four pi efficiency tracing.
The activity of the dilution was measured using gamma spectroscopy counting.

Activity of daughter radionuclide:

The principal activity was accompanied at the quoted time by :
27.4 nanocuries / gram of the daughter nuclide..... Barium-137m

Useful Life

We recommend that this solution should not be used after..... January, 2001

Purity:

The activities other than that of the principal nuclide and of its daughter nuclides were estimated to be:

(1) Other	<	0.002%	of the principal activity
(2)	<		of the principal activity
(3)	<		of the principal activity

The activities of the impurities are not included in the quoted figures of the principal activity.

Random Errors:

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than ± 0.3 %

(The 99.7% confidence limits are given by t(sm) where t is obtained from the Student t factor for the degree of freedom (n-1)).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error ($+\delta$, $-\delta'$). These have been estimated not to exceed ± 2.8% .

The overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error [t(sm)] at the 99.7% confidence limits and the worst case estimate of the systematic errors ($+\delta$, $-\delta'$). The overall uncertainty is therefore calculated on the basis of + [t(sm) $+\delta$], - [t(sm) $+\delta'$] and is ± 3.9 % of the quoted radioactive concentration.

Decay Schemes:

This standardization is based on the following assumptions of the principal nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Cs-137 decays 100 percent by beta emission with 94.6 percent leading to the 0.662 KeV level of Barium-137m.

Chemical Composition of Solution:

Carrier content per gram of solution: Approximately 100 micrograms cesium

Other components:

Preservative: 0.1 M HCl

Remarks:

Date Certificate Prepared January 26, 1995

Approval Signature George Dalleck

Revised 9/94

RADIONUCLIDE REQUEST FORM

To: U.S. EPA NERL CRD-LV
RADQA
P.O. Box 93478
Las Vegas, NV 89193-3478

Fax: 702 798-2236

Please ship the calibrated standards listed below to:

Contact Person: Dave Demorest
Title: RSO
Alternate Person: Ronni Mull
Title: Assistant RSO / Laboratory Manager
Laboratory: Core Laboratories
Address: 420 West 1st
Casper WY 82601
Telephone: (307) 235-5741

NRC License and/or State License Type: Byproduct
Number: 49-21194-01 Exp. Date In Timely Renewal (See attached letter)

Note: When requesting radionuclides, a copy of the current NRC license and/or State license must be on file with us.

RADIONUCLIDE STANDARD DESIRED:

CS-137

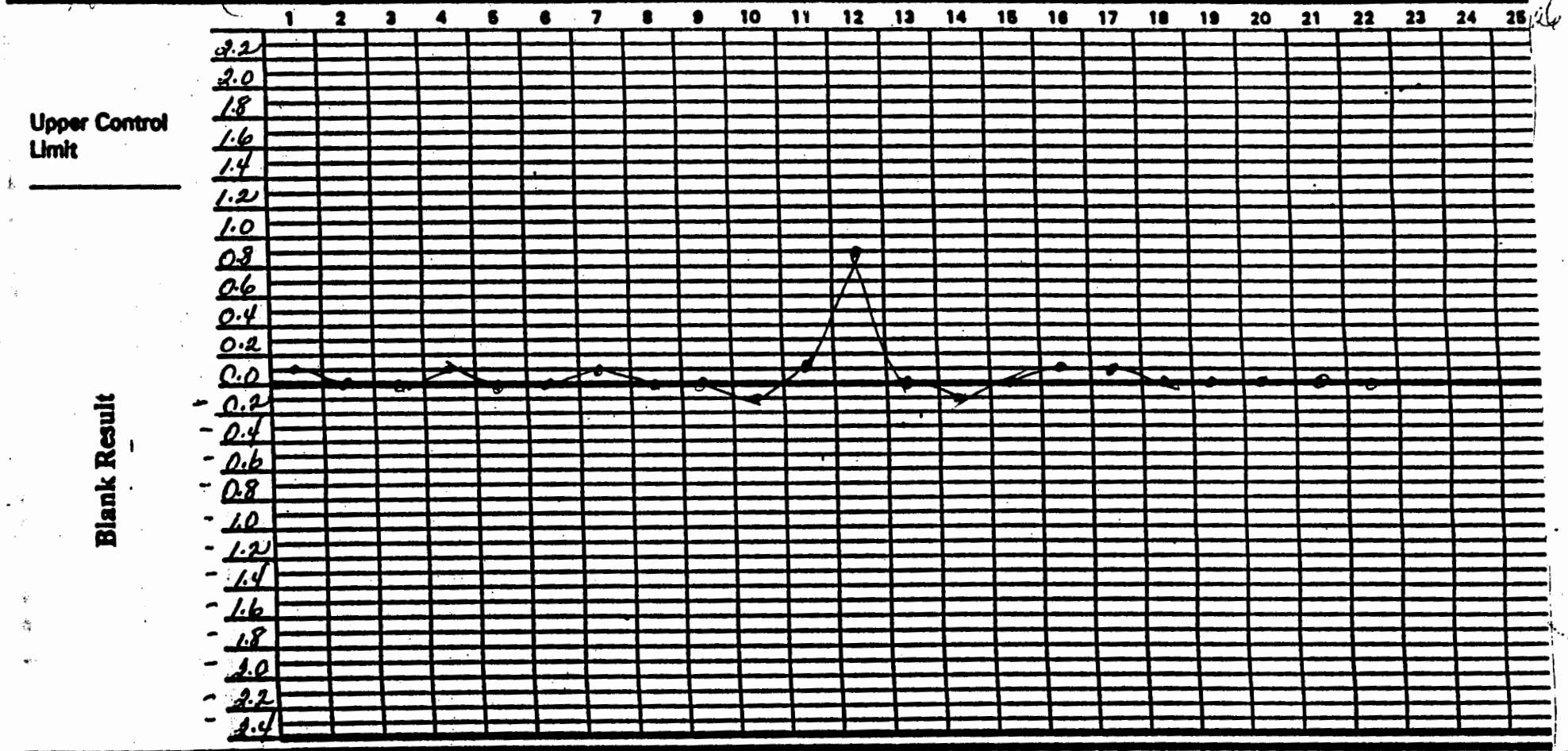
I certify that the calibrated standard(s) requested are to be used only in this laboratory by qualified personnel for the purpose of developing or checking analytical procedures and/or for calibrating instrumentation. I further certify that I am authorized to receive the radionuclides listed above under the license number(s) listed above.

Signature [signature] Date 1-7-96
Title RSO Lab Code HP

Blank

LUKE LAB LABORATORIES

PARAMETER	METHOD	QC TYPE	PERIOD COVERED
AlPhA (H2O)	CA ALR-02.0	Method/Reagent Blank	MEAN = SD =



RUN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13
DATA POINT	0.1	0.0	0.0	0.1	0.0	0.6	0.1	0.0	0.0	-0.1	0.1	0.9	0.0
DATE /INITIALS	8/13/98	8/18/98	8/19/98	8/20/98	8/25/98	9/1/98	9/14/98	9/14/98	9/15/98	9/18/98	9/23/98	9/29/98	10/7/98
QC BATCH NUMBER	9521	9585	9610	9645	9666	9905	9921	9922	9940	9979	10124	10130	10274

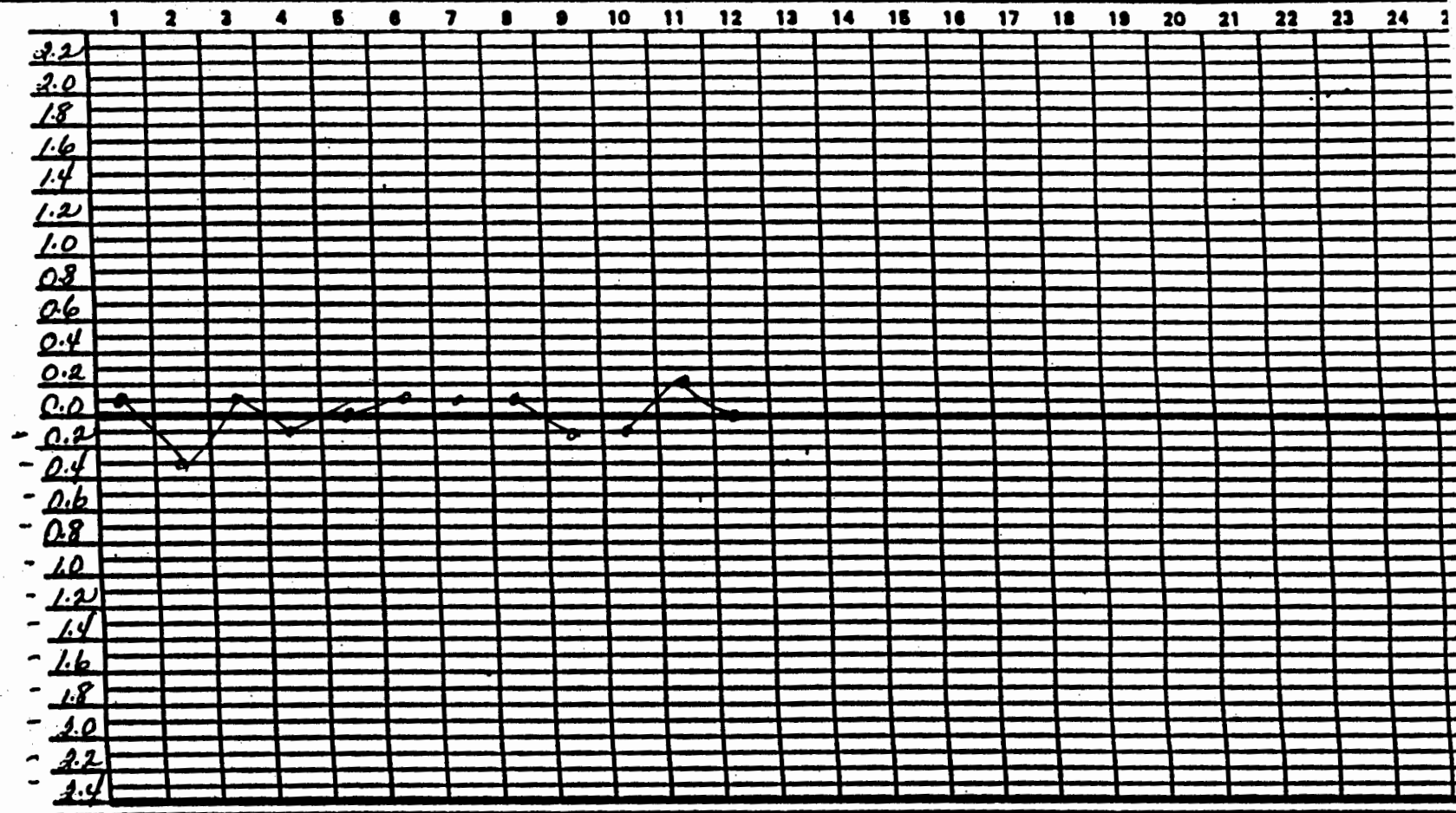
RUN NUMBER	14	15	16	17	18	19	20	21	22	23	24	25	26
DATA POINT	-0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0				
DATE /INITIALS	10/6/98	10/21/98	10/25/98	11/2/98	11/4/98	11/10/98	11/11/98	11/12/98	11/17/98				
QC BATCH NUMBER	10381	10447	10460	10516	10542	10704	10728	10746	10906				

97

Blank

JKELAB LABORATORIES

PARAMETER	METHOD	QC TYPE	PERIOD COVERED
GROSS BETA H2O	CA-GLR-020	Method/Reagent Blank	MEAN = SD =



RUN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12
DATA POINT	0.1	-0.3	0.1	-0.1	0.0	0.1	0.1	0.1	-0.1	-0.1	0.2	0.0
DATE /INITIALS	9/25/98	9/29/98	10/2/98	10/5/98	10/9/98	10/23/98	11/2/98	11/4/98	11/10/98	11/11/98	11/12/98	11/12/98
QC BATCH NUMBER	10124	10150	10274	10361	10447	10480	10596	10642	10704	10728	10746	10806

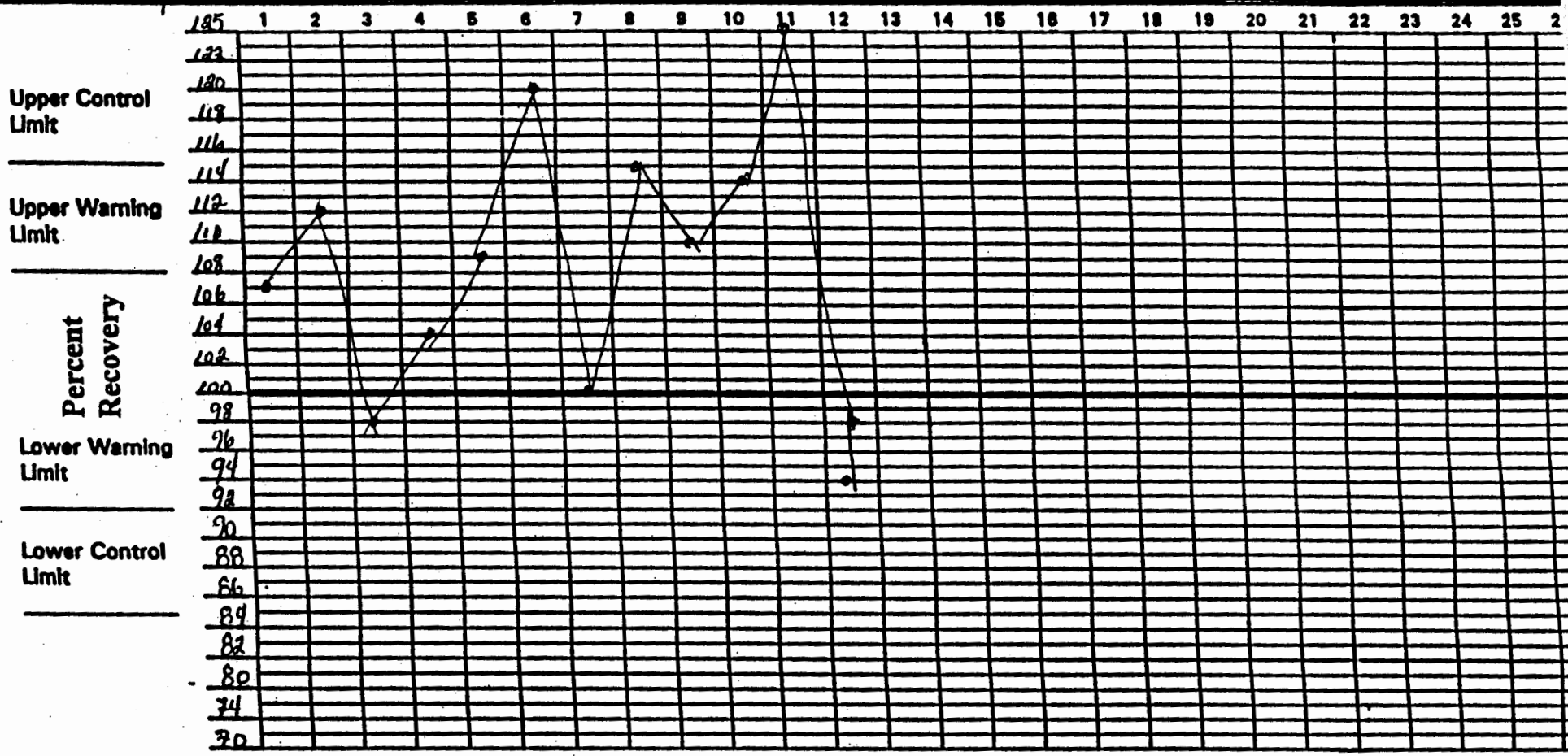
RUN NUMBER	14	15	16	17	18	19	20	21	22	23	24	25
DATA POINT												
DATE /INITIALS												
QC BATCH NUMBER												

CORE LABORATORIES

Percent Recov = (Measured Activity of Standard Reference Material) x
(Actual Activity of Standard Reference Material)

Accu
Con
Cl

PARAMETER	METHOD	QC TYPE	PERIOD COVERED
GROSS BETA (H2O)	CA-GLR-020	Laboratory Control Sample	MEAN = SD =



RUN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13
DATA POINT	106.7	111.7	97.8	103.6	109.1	120.0	99.6	115.2	110.5	113.9	124.8	95.3	
DATE /INITIALS	9/25/98	9/29/98	10/7/98	10/13/98	10/20/98	10/27/98	11/2/98	11/4/98	11/10/98	11/18/98	11/17/98	11/24/98	
QC BATCH NUMBER	10122	10150	10274	10381	10447	10480	10516	10621	10704	10728	10746	10806	

RUN NUMBER	14	15	16	17	18	19	20	21	22	23	24	25	26
DATA POINT													
DATE /INITIALS													
QC BATCH NUMBER													

CORE LABORATORIES

RER = $\frac{|\text{Reported Value} - \text{Dup Value}|}{((\text{Reported Value Error})^2 + (\text{Dup Error})^2)^{1/2}}$

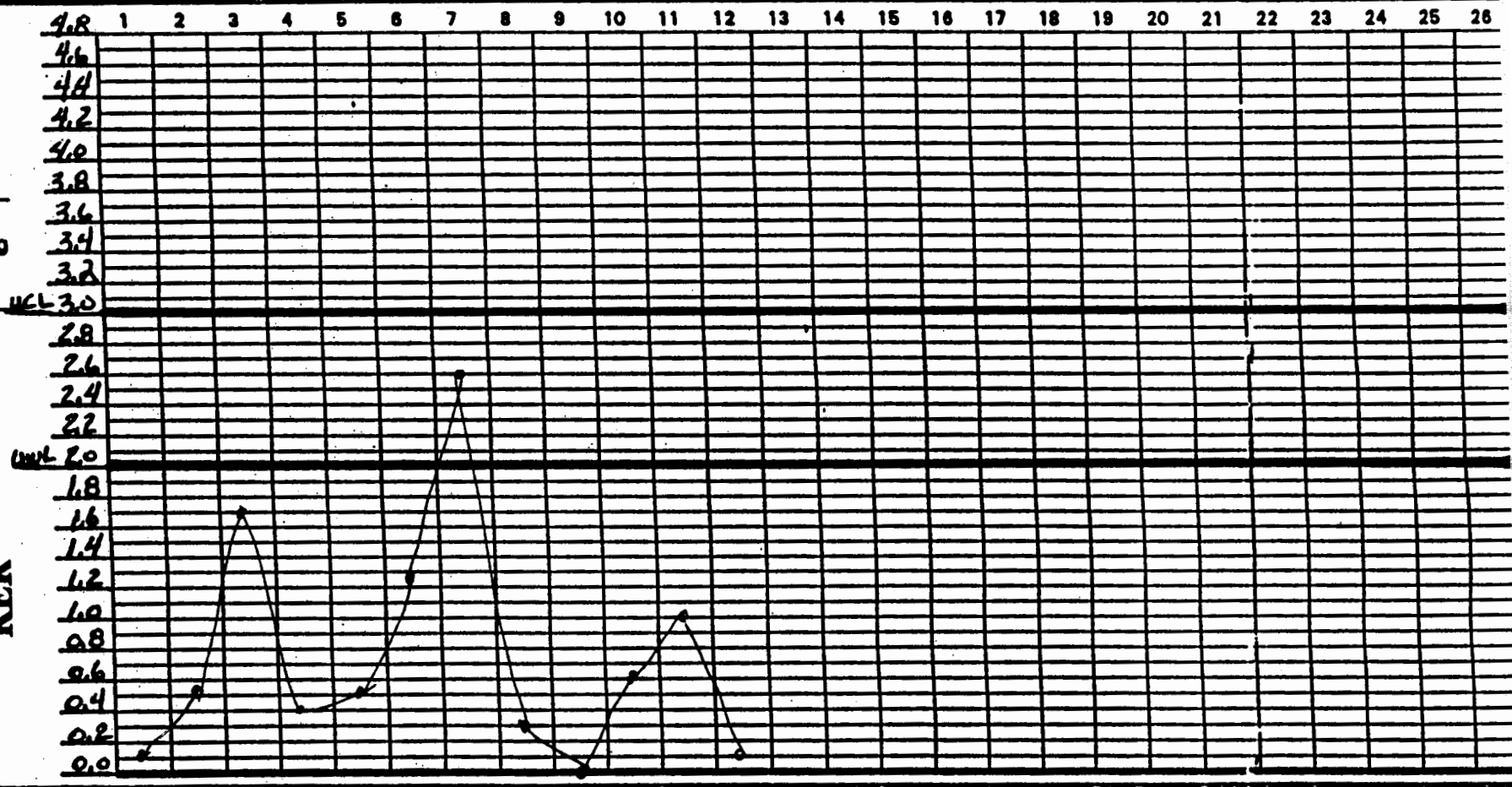
Note: Use TPU in place of error if TPU is calculated.

Precision Control Chart

PARAMETER	METHOD	QC TYPE	PERIOD COVERED
GROSS BETA (H2O)	CA-GLR-02.0	**Duplicate Precision**	MEAN = SD =

Upper Control Limit 3.0

Upper Warning Limit 2.0



RUN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13
DATA POINT	0.13	0.52	1.7	0.35	0.53	1.28	2.56	0.32	0.00	0.58	1.00	0.06	
DATE /INITIALS	9/25/98	9/25/98	10/7/98	10/5/98	10/26/98	10/28/98	11/6/98	11/4/98	11/6/98	11/9/98	11/12/98	11/17/98	
QC BATCH NUMBER	10124	10150	10244	10338	10447	10480	10596	10642	10704	10728	10746	10806	

RUN NUMBER	14	15	16	17	18	19	20	21	22	23	24	25	26
DATA POINT													
DATE /INITIALS													
QC BATCH NUMBER													

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 46.02 nCi Serial Number A952

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.15%
Total uncertainty	± 2.97%

Daniel J Zhla
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 47.25 nCi Serial Number A953

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.14%
Total uncertainty	± 2.96%

Daniel [illegible] 7-13-93

Calibration Laboratory Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 46.02 nCi Serial Number A952

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.15%
Total uncertainty	± 2.97%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

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North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 47.25 nCi Serial Number A953

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

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TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.14%
Total uncertainty	± 2.96%

Daniel J. Lub
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 46.84 nCi Serial Number A954

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.15%
Total uncertainty	± 2.97%

Daniel L Kelly
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 47.66 nCi Serial Number A955

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.14%
Total uncertainty	± 2.96%

Daniel Thle
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 46.43 nCi Serial Number A956

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.15%
Total uncertainty	± 2.97%

Daniel J Kile — Calibration Laboratory

7-13-93 — Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 46.84 nCi Serial Number A957

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.15%
Total uncertainty	± 2.97%

Daniel L Tab — Calibration Laboratory

7-13-93 — Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 47.97 nCi Serial Number A958

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.14%
Total uncertainty	± 2.96%

Daniel J Thole — Calibration Laboratory

7-13-93 — Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 47.73 nCi Serial Number A959

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.14%
Total uncertainty	± 2.96%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 48.48 nCi Serial Number A960

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.14%
Total uncertainty	± 2.96%

Daniel J Thle — Calibration Laboratory

7-13-93 — Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 48.35 nCi Serial Number A961

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.14%
Total uncertainty	± 2.96%

Daniel Thle
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 3.944 nCi Serial Number A962

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.85%
Total uncertainty	± 3.59%

Daniel Ikle
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 5.527 nCi Serial Number A963

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 1.21%
Total uncertainty	± 3.95%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 4.805 nCi Serial Number A964

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.61%
Total uncertainty	± 3.35%

Daniel J. Thle — Calibration Laboratory

7-13-93 — Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 4.628 nCi Serial Number A965

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.97%
Total uncertainty	± 3.71%

Daniel J Thle — 7-13-93

Calibration Laboratory — Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 4.837 nCi Serial Number A966

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.57%
Total uncertainty	± 3.31%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 5.188 nCi Serial Number A967

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.69%
Total uncertainty	± 3.43%

Daniel L Thle — Calibration Laboratory

7-13-93 — Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 3.583 nCi Serial Number A968

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 1.33%
Total uncertainty	± 4.07%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 5.258 nCi Serial Number A969

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.81%
Total uncertainty	± 3.55%

Daniel Th[illegible]
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 5.441 nCi Serial Number A970

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.73%
Total uncertainty	± 3.47%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 4.608 nCi Serial Number A971

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.89%
Total uncertainty	± 3.63%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

LB770-2 Gross Alpha Absorption Curve, 1998

Sample #	Planchett A			Planchett B			Planchett C			Average	Planchett A			Planchett B			Planchett C			Average	Activity Added in	Average
	Gross Weight	Tare Weight	Net Weight	Gross Weight	Tare Weight	Net Weight	Gross Weight	Tare Weight	Net Weight	Planchett Weight	Gross CPM	BKG CPM	Net CPM	Gross CPM	BKG CPM	Net CPM	Gross CPM	BKG CPM	Net CPM	CPM	DPM	Efficiency CPM/DPM
1	9.7559	9.7557	0.0002	9.8509	9.8504	0.0005	10.0810	10.0803	0.0007	0.000467	321	0.134	320.9	324.2	0.134	324.1	326.3	0.134	326.2	323.7	1351.98	0.23942
2	9.9290	9.9227	0.0063	9.8980	9.8915	0.0065	9.9321	9.9258	0.0063	0.006300	309.9	0.113	309.8	0	0.113	-0.1	310.8	0.113	310.7	310.2	1351.98	0.22946
3	9.7370	9.7210	0.0160	9.6844	9.6685	0.0159	9.7713	9.7554	0.0159	0.015933	285.1	0.169	284.9	274.4	0.169	274.2	271.9	0.169	271.7	277.0	1351.98	0.20485
4	9.8709	9.8388	0.0321	9.8941	9.8619	0.0322	9.7464	9.7143	0.0321	0.032133	224.2	0.143	224.1	223.4	0.143	223.3	227.2	0.143	227.1	224.8	1351.98	0.16626
5	9.9825	9.9181	0.0644	10.0012	9.9374	0.0638	9.8875	9.8234	0.0641	0.064100	142.6	0.131	142.5	151.4	0.131	151.3	129.9	0.131	129.8	141.2	1351.98	0.10441
6	9.9936	9.9130	0.0806	9.9234	9.8432	0.0802	10.0320	9.9520	0.0800	0.080267	129.7	0.136	129.6	130.6	0.136	130.5	118.1	0.136	118.0	126.0	1351.98	0.09319
7	9.7966	9.7002	0.0964	10.0739	9.9775	0.0964	9.8130	9.7167	0.0963	0.096367	108.4	0.144	108.3	113.5	0.144	113.4	112.1	0.144	112.0	111.2	1351.98	0.08224
8	9.9888	9.8623	0.1265	9.9008	9.7747	0.1261	9.8587	9.7320	0.1267	0.126433	87.3	0.099	87.2	84.9	0.099	84.8	81.9	0.099	81.8	84.6	1351.98	0.06257
9	10.0021	9.8442	0.1579	10.0280	9.8707	0.1573	10.0517	9.8940	0.1577	0.157633	72.9	0.081	72.8	75.8	0.081	75.7	75.1	0.081	75.0	74.5	1351.98	0.05511

Sample Weight	Sample Efficiency
0.0000	0.2295
0.0002	0.2290
0.0004	0.2286
0.0005	0.2281
0.0006	0.2277
0.0008	0.2272
0.0010	0.2268
0.0012	0.2263
0.0014	0.2259
0.0016	0.2254
0.0018	0.2250
0.0020	0.2245
0.0022	0.2241
0.0024	0.2236
0.0026	0.2232
0.0028	0.2227
0.0030	0.2223
0.0032	0.2219
0.0034	0.2214
0.0036	0.2210
0.0038	0.2205
0.0040	0.2201
0.0042	0.2197
0.0044	0.2192
0.0046	0.2188
0.0048	0.2184
0.0050	0.2179
0.0052	0.2175
0.0054	0.2171
0.0056	0.2166
0.0058	0.2162
0.0060	0.2158
0.0062	0.2153
0.0063	0.2149
0.0064	0.2145
0.0066	0.2141
0.0068	0.2136
0.0070	0.2132
0.0072	0.2128
0.0074	0.2124
0.0076	0.2120
0.0078	0.2115
0.0080	0.2111
0.0082	0.2107
0.0084	0.2103
0.0086	0.2099
0.0088	0.2094
0.0090	0.2090
0.0092	0.2086
0.0094	0.2082

Sample Weight	Sample Efficiency
0.0096	0.2078
0.0098	0.2074
0.0100	0.2070
0.0102	0.2066
0.0104	0.2061
0.0106	0.2057
0.0108	0.2053
0.0110	0.2049
0.0112	0.2045
0.0114	0.2041
0.0116	0.2037
0.0118	0.2033
0.0120	0.2029
0.0122	0.2025
0.0124	0.2021
0.0126	0.2017
0.0128	0.2013
0.0130	0.2009
0.0132	0.2005
0.0134	0.2001
0.0136	0.1997
0.0138	0.1993
0.0140	0.1989
0.0142	0.1985
0.0144	0.1981
0.0146	0.1977
0.0148	0.1973
0.0150	0.1969
0.0152	0.1966
0.0154	0.1962
0.0156	0.1958
0.0158	0.1954
0.0159	0.1950
0.0160	0.1946
0.0162	0.1942
0.0164	0.1938
0.0166	0.1935
0.0168	0.1931
0.0170	0.1927
0.0172	0.1923
0.0174	0.1919
0.0176	0.1915
0.0178	0.1912
0.0180	0.1908
0.0182	0.1904
0.0184	0.1900
0.0186	0.1897
0.0188	0.1893
0.0190	0.1889
0.0192	0.1885

Sample Weight	Sample Efficiency
0.0194	0.1882
0.0196	0.1878
0.0198	0.1874
0.0200	0.1870
0.0202	0.1867
0.0204	0.1863
0.0206	0.1859
0.0208	0.1856
0.0210	0.1852
0.0212	0.1848
0.0214	0.1845
0.0216	0.1841
0.0218	0.1837
0.0220	0.1834
0.0222	0.1830
0.0224	0.1826
0.0226	0.1823
0.0228	0.1819
0.0230	0.1816
0.0232	0.1812
0.0234	0.1808
0.0236	0.1805
0.0238	0.1801
0.0240	0.1798
0.0242	0.1794
0.0244	0.1790
0.0246	0.1787
0.0248	0.1783
0.0250	0.1780
0.0252	0.1776
0.0254	0.1773
0.0256	0.1769
0.0258	0.1766
0.0260	0.1762
0.0262	0.1759
0.0264	0.1755
0.0266	0.1752
0.0268	0.1748
0.0270	0.1745
0.0272	0.1741
0.0274	0.1738
0.0276	0.1735
0.0278	0.1731
0.0280	0.1728
0.0282	0.1724
0.0284	0.1721
0.0286	0.1717
0.0288	0.1714
0.0290	0.1711
0.0292	0.1707

Sample Weight	Sample Efficiency
0.0294	0.1704
0.0296	0.1700
0.0298	0.1697
0.0300	0.1694
0.0302	0.1690
0.0304	0.1687
0.0306	0.1684
0.0308	0.1680
0.0310	0.1677
0.0312	0.1674
0.0314	0.1670
0.0316	0.1667
0.0318	0.1664
0.0320	0.1660
0.0321	0.1657
0.0322	0.1654
0.0324	0.1651
0.0326	0.1647
0.0328	0.1644
0.0330	0.1641
0.0332	0.1638
0.0334	0.1634
0.0336	0.1631
0.0338	0.1628
0.0340	0.1625
0.0342	0.1621
0.0344	0.1618
0.0346	0.1615
0.0348	0.1612
0.0350	0.1609
0.0352	0.1605
0.0354	0.1602
0.0356	0.1599
0.0358	0.1596
0.0360	0.1593
0.0362	0.1589
0.0364	0.1586
0.0366	0.1583
0.0368	0.1580
0.0370	0.1577
0.0372	0.1574
0.0374	0.1571
0.0376	0.1568
0.0378	0.1564
0.0380	0.1561
0.0382	0.1558
0.0384	0.1555
0.0386	0.1552
0.0388	0.1549
0.0390	0.1546

Sample Weight	Sample Efficiency
0.0392	0.1543
0.0394	0.1540
0.0396	0.1537
0.0398	0.1534
0.0400	0.1531
0.0402	0.1528
0.0404	0.1525
0.0406	0.1522
0.0408	0.1519
0.0410	0.1516
0.0412	0.1513
0.0414	0.1510
0.0416	0.1507
0.0418	0.1504
0.0420	0.1501
0.0422	0.1498
0.0424	0.1495
0.0426	0.1492
0.0428	0.1489
0.0430	0.1486
0.0432	0.1483
0.0434	0.1480
0.0436	0.1477
0.0438	0.1474
0.0440	0.1471
0.0442	0.1468
0.0444	0.1465
0.0446	0.1462
0.0448	0.1459
0.0450	0.1457
0.0452	0.1454
0.0454	0.1451
0.0456	0.1448
0.0458	0.1445
0.0460	0.1442
0.0462	0.1439
0.0464	0.1436
0.0466	0.1434
0.0468	0.1431
0.0470	0.1428
0.0472	0.1425
0.0474	0.1422
0.0476	0.1419
0.0478	0.1417
0.0480	0.1414
0.0482	0.1411
0.0484	0.1408
0.0486	0.1405
0.0488	0.1403
0.0490	0.1400

Sample Weight	Sample Efficiency
0.0492	0.1397
0.0494	0.1394
0.0496	0.1392
0.0498	0.1389
0.0500	0.1386
0.0502	0.1383
0.0504	0.1381
0.0506	0.1378
0.0508	0.1375
0.0510	0.1372
0.0512	0.1370
0.0514	0.1367
0.0516	0.1364
0.0518	0.1361
0.0520	0.1359
0.0522	0.1356
0.0524	0.1353
0.0526	0.1351
0.0528	0.1348
0.0530	0.1345
0.0532	0.1343
0.0534	0.1340
0.0536	0.1337
0.0538	0.1335
0.0540	0.1332
0.0542	0.1329
0.0544	0.1327
0.0546	0.1324
0.0548	0.1322
0.0550	0.1319
0.0552	0.1316
0.0554	0.1314
0.0556	0.1311
0.0558	0.1309
0.0560	0.1306
0.0562	0.1303
0.0564	0.1301
0.0566	0.1298
0.0568	0.1296
0.0570	0.1293
0.0572	0.1290
0.0574	0.1288
0.0576	0.1285
0.0578	0.1283
0.0580	0.1280
0.0582	0.1278
0.0584	0.1275
0.0586	0.1273
0.0588	0.1270
0.0590	0.1268

Sample Weight	Sample Efficiency
0.0592	0.1265
0.0594	0.1263
0.0596	0.1260
0.0598	0.1258
0.0600	0.1255
0.0602	0.1253
0.0604	0.1250
0.0606	0.1248
0.0608	0.1245
0.0610	0.1243
0.0612	0.1240
0.0614	0.1238
0.0616	0.1235
0.0618	0.1233
0.0620	0.1230
0.0622	0.1228
0.0624	0.1226
0.0626	0.1223
0.0628	0.1221
0.0630	0.1218
0.0632	0.1216
0.0634	0.1213
0.0636	0.1211
0.0638	0.1209
0.0640	0.1206
0.0641	0.1204
0.0642	0.1201
0.0644	0.1199
0.0646	0.1197
0.0648	0.1194
0.0650	0.1192
0.0652	0.1190
0.0654	0.1187
0.0656	0.1185
0.0658	0.1183
0.0660	0.1180
0.0662	0.1178
0.0664	0.1176
0.0666	0.1173
0.0668	0.1171
0.0670	0.1169
0.0672	0.1166
0.0674	0.1164
0.0676	0.1162
0.0678	0.1159
0.0680	0.1157
0.0682	0.1155
0.0684	0.1152
0.0686	0.1150
0.0688	0.1148

Sample Weight	Sample Efficiency
0.0690	0.114
0.0692	0.114
0.0694	0.114
0.0696	0.113
0.0698	0.113
0.0700	0.113
0.0702	0.113
0.0704	0.113
0.0706	0.112
0.0708	0.112
0.0710	0.112
0.0712	0.112
0.0714	0.111
0.0716	0.111
0.0718	0.111
0.0720	0.111
0.0722	0.111
0.0724	0.110
0.0726	0.110
0.0728	0.110
0.0730	0.110
0.0732	0.109
0.0734	0.109
0.0736	0.109
0.0738	0.109
0.0740	0.109
0.0742	0.108
0.0744	0.108
0.0746	0.108
0.0748	0.108
0.0750	0.107
0.0752	0.107
0.0754	0.107
0.0756	0.107
0.0758	0.107
0.0760	0.106
0.0762	0.106
0.0764	0.106
0.0766	0.106
0.0768	0.106
0.0770	0.105
0.0772	0.105
0.0774	0.105
0.0776	0.105
0.0778	0.105
0.0780	0.104
0.0782	0.104
0.0784	0.104
0.0786	0.104
0.0788	0.103

LB770-2 Gross Alpha Absorption Curve, 1998

Sample I	Planchett A			Planchett B			Planchett C			Average Planchett Weight	Planchett A			Planchett B			Planchett C			Average CPM	Activity Added in DPM	Average Efficiency CPM/DPM
	Gross Weight	Tare Weight	Net Weight	Gross Weight	Tare Weight	Net Weight	Gross Weight	Tare Weight	Net Weight		Gross CPM	BKG CPM	Net CPM	Gross CPM	BKG CPM	Net CPM	Gross CPM	BKG CPM	Net CPM			
1	9.7559	9.7557	0.0002	9.8509	9.8504	0.0005	10.0810	10.0803	0.0007	0.000467	321	0.134	320.9	324.2	0.134	324.1	326.3	0.134	326.2	323.7	1351.98	0.239426
2	9.9290	9.9227	0.0063	9.8980	9.8915	0.0065	9.9321	9.9258	0.0063	0.006300	309.9	0.113	309.8	0	0.113	-0.1	310.8	0.113	310.7	310.2	1351.98	0.229469
3	9.7370	9.7210	0.0160	9.6844	9.6685	0.0159	9.7713	9.7554	0.0159	0.015933	285.1	0.169	284.9	274.4	0.169	274.2	271.9	0.169	271.7	277.0	1351.98	0.204858
4	9.8709	9.8388	0.0321	9.8941	9.8619	0.0322	9.7464	9.7143	0.0321	0.032133	224.2	0.143	224.1	223.4	0.143	223.3	227.2	0.143	227.1	224.8	1351.98	0.166267
5	9.9825	9.9181	0.0644	10.0012	9.9374	0.0638	9.8875	9.8234	0.0641	0.064100	142.6	0.131	142.5	151.4	0.131	151.3	129.9	0.131	129.8	141.2	1351.98	0.104416
6	9.9936	9.9130	0.0806	9.9234	9.8432	0.0802	10.0320	9.9520	0.0800	0.080267	129.7	0.136	129.6	130.6	0.136	130.5	118.1	0.136	118.0	126.0	1351.98	0.093195
7	9.7966	9.7002	0.0964	10.0739	9.9775	0.0964	9.8130	9.7167	0.0963	0.096367	108.4	0.144	108.3	113.5	0.144	113.4	112.1	0.144	112.0	111.2	1351.98	0.082242
8	9.9888	9.8623	0.1265	9.9008	9.7747	0.1261	9.8587	9.7320	0.1267	0.126433	87.3	0.099	87.2	84.9	0.099	84.8	81.9	0.099	81.8	84.6	1351.98	0.062576
9	10.0021	9.8442	0.1579	10.0280	9.8707	0.1573	10.0517	9.8940	0.1577	0.157633	72.9	0.081	72.8	75.8	0.081	75.7	75.1	0.081	75.0	74.5	1351.98	0.055118

Sample Weight	Sample Efficiency	Sample Weight	Sample Efficiency	Sample Weight	Sample Efficiency	Sample Weight	Sample Efficiency	Sample Weight	Sample Efficiency	Sample Weight	Sample Efficiency	Sample Weight	Sample Efficiency	Sample Weight	Sample Efficiency
0.0790	0.1037	0.0888	0.0939	0.0986	0.0851	0.1086	0.0770	0.1186	0.0697	0.1284	0.0632	0.1384	0.0572	0.1484	0.0518
0.0792	0.1035	0.0890	0.0937	0.0988	0.0849	0.1088	0.0769	0.1188	0.0696	0.1286	0.0630	0.1386	0.0571	0.1486	0.0517
0.0794	0.1033	0.0892	0.0936	0.0990	0.0847	0.1090	0.0767	0.1190	0.0695	0.1288	0.0629	0.1388	0.0570	0.1488	0.0516
0.0796	0.1031	0.0894	0.0934	0.0992	0.0846	0.1092	0.0766	0.1192	0.0693	0.1290	0.0628	0.1390	0.0569	0.1490	0.0515
0.0798	0.1029	0.0896	0.0932	0.0994	0.0844	0.1094	0.0764	0.1194	0.0692	0.1292	0.0627	0.1392	0.0567	0.1492	0.0514
0.0800	0.1027	0.0898	0.0930	0.0996	0.0842	0.1096	0.0763	0.1196	0.0691	0.1294	0.0625	0.1394	0.0566	0.1494	0.0513
0.0802	0.1025	0.0900	0.0928	0.0998	0.0841	0.1098	0.0761	0.1198	0.0689	0.1296	0.0624	0.1396	0.0565	0.1496	0.0512
0.0803	0.1023	0.0902	0.0926	0.1000	0.0839	0.1100	0.0760	0.1200	0.0688	0.1298	0.0623	0.1398	0.0564	0.1498	0.0511
0.0804	0.1021	0.0904	0.0925	0.1002	0.0837	0.1102	0.0758	0.1202	0.0686	0.1300	0.0622	0.1400	0.0563	0.1500	0.0510
0.0806	0.1019	0.0906	0.0923	0.1004	0.0836	0.1104	0.0757	0.1204	0.0685	0.1302	0.0620	0.1402	0.0562	0.1502	0.0509
0.0808	0.1017	0.0908	0.0921	0.1006	0.0834	0.1106	0.0755	0.1206	0.0684	0.1304	0.0619	0.1404	0.0561	0.1504	0.0508
0.0810	0.1015	0.0910	0.0919	0.1008	0.0832	0.1108	0.0754	0.1208	0.0682	0.1306	0.0618	0.1406	0.0560	0.1506	0.0507
0.0812	0.1013	0.0912	0.0917	0.1010	0.0831	0.1110	0.0752	0.1210	0.0681	0.1308	0.0617	0.1408	0.0558	0.1508	0.0506
0.0814	0.1011	0.0914	0.0915	0.1012	0.0829	0.1112	0.0751	0.1212	0.0680	0.1310	0.0615	0.1410	0.0557	0.1510	0.0505
0.0816	0.1009	0.0916	0.0914	0.1014	0.0827	0.1114	0.0749	0.1214	0.0678	0.1312	0.0614	0.1412	0.0556	0.1512	0.0504
0.0818	0.1007	0.0918	0.0912	0.1016	0.0826	0.1116	0.0748	0.1216	0.0677	0.1314	0.0613	0.1414	0.0555	0.1514	0.0503
0.0820	0.1005	0.0920	0.0910	0.1018	0.0824	0.1118	0.0746	0.1218	0.0676	0.1316	0.0612	0.1416	0.0554	0.1516	0.0502
0.0822	0.1003	0.0922	0.0908	0.1020	0.0822	0.1120	0.0745	0.1220	0.0674	0.1318	0.0611	0.1418	0.0553	0.1518	0.0501
0.0824	0.1001	0.0924	0.0906	0.1022	0.0821	0.1122	0.0743	0.1222	0.0673	0.1320	0.0609	0.1420	0.0552	0.1520	0.0500
0.0826	0.0999	0.0926	0.0905	0.1024	0.0819	0.1124	0.0742	0.1224	0.0672	0.1322	0.0608	0.1422	0.0551	0.1522	0.0499
0.0828	0.0997	0.0928	0.0903	0.1026	0.0817	0.1126	0.0740	0.1226	0.0670	0.1324	0.0607	0.1424	0.0550	0.1524	0.0498
0.0830	0.0995	0.0930	0.0901	0.1028	0.0816	0.1128	0.0739	0.1228	0.0669	0.1326	0.0606	0.1426	0.0549	0.1526	0.0497
0.0832	0.0993	0.0932	0.0899	0.1030	0.0814	0.1130	0.0737	0.1230	0.0668	0.1328	0.0605	0.1428	0.0547	0.1528	0.0496
0.0834	0.0991	0.0934	0.0897	0.1032	0.0813	0.1132	0.0736	0.1232	0.0666	0.1330	0.0603	0.1430	0.0546	0.1530	0.0495
0.0836	0.0989	0.0936	0.0896	0.1034	0.0811	0.1134	0.0734	0.1234	0.0665	0.1332	0.0602	0.1432	0.0545	0.1532	0.0494
0.0838	0.0987	0.0938	0.0894	0.1036	0.0809	0.1136	0.0733	0.1236	0.0664	0.1334	0.0601	0.1434	0.0544	0.1534	0.0493
0.0840	0.0985	0.0940	0.0892	0.1038	0.0808	0.1138	0.0731	0.1238	0.0662	0.1336	0.0600	0.1436	0.0543	0.1536	0.0492
0.0842	0.0983	0.0942	0.0890	0.1040	0.0806	0.1140	0.0730	0.1240	0.0661	0.1338	0.0599	0.1438	0.0542	0.1538	0.0491
0.0844	0.0981	0.0944	0.0889	0.1042	0.0805	0.1142	0.0729	0.1242	0.0660	0.1340	0.0597	0.1440	0.0541	0.1540	0.0490
0.0846	0.0979	0.0946	0.0887	0.1044	0.0803	0.1144	0.0727	0.1244	0.0658	0.1342	0.0596	0.1442	0.0540	0.1542	0.0489
0.0848	0.0977	0.0948	0.0885	0.1046	0.0801	0.1146	0.0726	0.1246	0.0657	0.1344	0.0595	0.1444	0.0539	0.1544	0.0488
0.0850	0.0975	0.0950	0.0883	0.1048	0.0800	0.1148	0.0724	0.1248	0.0656	0.1346	0.0594	0.1446	0.0538	0.1546	0.0487
0.0852	0.0974	0.0952	0.0882	0.1050	0.0798	0.1150	0.0723	0.1250	0.0655	0.1348	0.0593	0.1448	0.0537	0.1548	0.0486
0.0854	0.0972	0.0954	0.0880	0.1052	0.0797	0.1152	0.0721	0.1252	0.0653	0.1350	0.0592	0.1450	0.0536	0.1550	0.0485
0.0856	0.0970	0.0956	0.0878	0.1054	0.0795	0.1154	0.0720	0.1254	0.0652	0.1352	0.0590	0.1452	0.0535	0.1552	0.0484
0.0858	0.0968	0.0958	0.0876	0.1056	0.0794	0.1156	0.0719	0.1256	0.0651	0.1354	0.0589	0.1454	0.0534	0.1554	0.0483
0.0860	0.0966	0.0960	0.0875	0.1058	0.0792	0.1158	0.0717	0.1258	0.0649	0.1356	0.0588	0.1456	0.0532	0.1556	0.0482
0.0862	0.0964	0.0962	0.0873	0.1060	0.0790	0.1160	0.0716	0.1260	0.0648	0.1358	0.0587	0.1458	0.0531	0.1558	0.0481
0.0864	0.0962	0.0964	0.0871	0.1062	0.0789	0.1162	0.0714	0.1262	0.0647	0.1360	0.0586	0.1460	0.0530	0.1560	0.0480
0.0866	0.0960	0.0964	0.0869	0.1064	0.0787	0.1164	0.0713	0.1264	0.0646	0.1362	0.0585	0.1462	0.0529	0.1562	0.0479
0.0868	0.0958	0.0966	0.0868	0.1066	0.0786	0.1166	0.0711	0.1264	0.0644	0.1364	0.0583	0.1464	0.0528	0.1564	0.0478
0.0870	0.0956	0.0968	0.0866	0.1068	0.0784	0.1168	0.0710	0.1266	0.0643	0.1366	0.0582	0.1466	0.0527	0.1566	0.0477
0.0872	0.0954	0.0970	0.0864	0.1070	0.0783	0.1170	0.0709	0.1268	0.0642	0.1368	0.0581	0.1468	0.0526	0.1568	0.0476
0.0874	0.0952	0.0972	0.0862	0.1072	0.0781	0.1172	0.0707	0.1270	0.0640	0.1370	0.0580	0.1470	0.0525	0.1570	0.0476
0.0876	0.0951	0.0974	0.0861	0.1074	0.0779	0.1174	0.0706	0.1272	0.0639	0.1372	0.0579	0.1472	0.0524	0.1572	0.0475
0.0878	0.0949	0.0976	0.0859	0.1076	0.0778	0.1176	0.0704	0.1274	0.0638	0.1374	0.0578	0.1474	0.0523	0.1574	0.0474
0.0880	0.0947	0.0978	0.0857	0.1078	0.0776	0.1178	0.0703	0.1276	0.0637	0.1376	0.0576	0.1476	0.0522	0.1576	0.0473
0.0882	0.0945	0.0980	0.0856	0.1080	0.0775	0.1180	0.0702	0.1278	0.0635	0.1378	0.0575	0.1478	0.0521	0.1576	0.0472
0.0884	0.0943	0.0982	0.0854	0.1082	0.0773	0.1182	0.0700	0.1280	0.0634	0.1380	0.0574	0.1480	0.0520	0.1578	0.0471
0.0886	0.0941	0.0984	0.0852	0.1084	0.0772	0.1184	0.0699	0.1282	0.0633	0.1382	0.0573	0.1482	0.0519	0.1580	0.0470

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Sample #	Planchett A			Planchett B			Planchett C			Average Planchett Weight	Planchett A			Planchett B			Planchett C			Average CPM	Activity Added in DPM	Average Efficiency CPM/DPM
	Gross Weight	Tare Weight	Net Weight	Gross Weight	Tare Weight	Net Weight	Gross Weight	Tare Weight	Net Weight		Gross CPM	BKG CPM	Net CPM	Gross CPM	BKG CPM	Net CPM	Gross CPM	BKG CPM	Net CPM			
1	9.7559	9.7557	0.0002	9.8509	9.8504	0.0005	10.0810	10.0803	0.0007	0.000467	321	0.134	320.9	324.2	0.134	324.1	326.3	0.134	326.2	323.7	1351.98	0.239426
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3	9.7370	9.7210	0.0160	9.6844	9.6685	0.0159	9.7713	9.7554	0.0159	0.015933	285.1	0.169	284.9	274.4	0.169	274.2	271.9	0.169	271.7	277.0	1351.98	0.204858
4	9.8709	9.8388	0.0321	9.8941	9.8619	0.0322	9.7464	9.7143	0.0321	0.032133	224.2	0.143	224.1	223.4	0.143	223.3	227.2	0.143	227.1	224.8	1351.98	0.166267
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6	9.9936	9.9130	0.0806	9.9234	9.8432	0.0802	10.0320	9.9520	0.0800	0.080267	129.7	0.136	129.6	130.6	0.136	130.5	118.1	0.136	118.0	126.0	1351.98	0.093195
7	9.7966	9.7002	0.0964	10.0739	9.9775	0.0964	9.8130	9.7167	0.0963	0.096367	108.4	0.144	108.3	113.5	0.144	113.4	112.1	0.144	112.0	111.2	1351.98	0.082242
8	9.9888	9.8623	0.1265	9.9008	9.7747	0.1261	9.8587	9.7320	0.1267	0.126433	87.3	0.099	87.2	84.9	0.099	84.8	81.9	0.099	81.8	84.6	1351.98	0.062576
9	10.0021	9.8442	0.1579	10.0280	9.8707	0.1573	10.0517	9.8940	0.1577	0.157633	72.9	0.081	72.8	75.8	0.081	75.7	75.1	0.081	75.0	74.5	1351.98	0.055118

Sample Weight	Sample Efficiency
0.1582	0.0469
0.1584	0.0468
0.1586	0.0467
0.1588	0.0466
0.1590	0.0465
0.1592	0.0464
0.1594	0.0463
0.1596	0.0462
0.1598	0.0462
0.1600	0.0461
0.1602	0.0460
0.1604	0.0459
0.1606	0.0458
0.1608	0.0457
0.1610	0.0456
0.1612	0.0455
0.1614	0.0454
0.1616	0.0453
0.1618	0.0452
0.1620	0.0452
0.1622	0.0451
0.1624	0.0450
0.1626	0.0449
0.1628	0.0448
0.1630	0.0447
0.1632	0.0446
0.1634	0.0445
0.1636	0.0444
0.1638	0.0444
0.1640	0.0443
0.1642	0.0442
0.1644	0.0441
0.1646	0.0440
0.1648	0.0439
0.1650	0.0438
0.1652	0.0437
0.1654	0.0437
0.1656	0.0436
0.1658	0.0435
0.1660	0.0434
0.1662	0.0433
0.1664	0.0432
0.1666	0.0431
0.1668	0.0431
0.1670	0.0430
0.1672	0.0429
0.1674	0.0428
0.1676	0.0427
0.1678	0.0426
0.1680	0.0425

Sample Weight	Sample Efficiency
0.1682	0.0425
0.1684	0.0424
0.1686	0.0423
0.1688	0.0422
0.1690	0.0421
0.1692	0.0420
0.1694	0.0420
0.1696	0.0419
0.1698	0.0418
0.1700	0.0417
0.1702	0.0416
0.1704	0.0415
0.1706	0.0415
0.1708	0.0414
0.1710	0.0413
0.1712	0.0412
0.1714	0.0411
0.1716	0.0411
0.1718	0.0410
0.1720	0.0409
0.1722	0.0408
0.1724	0.0407
0.1726	0.0406
0.1728	0.0406
0.1730	0.0405
0.1732	0.0404
0.1734	0.0403
0.1736	0.0402
0.1738	0.0402
0.1740	0.0401
0.1742	0.0400
0.1744	0.0399
0.1746	0.0399
0.1748	0.0398
0.1750	0.0397
0.1752	0.0396
0.1754	0.0395
0.1756	0.0395
0.1758	0.0394
0.1760	0.0393
0.1762	0.0392
0.1764	0.0391
0.1766	0.0391
0.1768	0.0390
0.1770	0.0389
0.1772	0.0388
0.1774	0.0388
0.1776	0.0387
0.1778	0.0386
0.1780	0.0385

Sample Weight	Sample Efficiency
0.1782	0.0385
0.1784	0.0384
0.1786	0.0383
0.1788	0.0382
0.1790	0.0381
0.1792	0.0381
0.1794	0.0380
0.1796	0.0379
0.1798	0.0378
0.1800	0.0378
0.1802	0.0377
0.1804	0.0376
0.1806	0.0375
0.1808	0.0375
0.1810	0.0374
0.1812	0.0373
0.1814	0.0373
0.1816	0.0372
0.1818	0.0371
0.1820	0.0370
0.1822	0.0370
0.1824	0.0369
0.1826	0.0368
0.1828	0.0367
0.1830	0.0367
0.1832	0.0366
0.1834	0.0365
0.1836	0.0364
0.1838	0.0364
0.1840	0.0363
0.1842	0.0362
0.1844	0.0362
0.1846	0.0361
0.1848	0.0360
0.1850	0.0359
0.1852	0.0359
0.1854	0.0358
0.1856	0.0357
0.1858	0.0357
0.1860	0.0356
0.1862	0.0355
0.1864	0.0354
0.1866	0.0354
0.1868	0.0353
0.1870	0.0352
0.1872	0.0352
0.1874	0.0351
0.1876	0.0350
0.1878	0.0350
0.1880	0.0349

Sample Weight	Sample Efficiency
0.1882	0.0348
0.1884	0.0348
0.1886	0.0347
0.1888	0.0346
0.1890	0.0345
0.1892	0.0345
0.1894	0.0344
0.1896	0.0343
0.1898	0.0343
0.1900	0.0342
0.1902	0.0341
0.1904	0.0341
0.1906	0.0340
0.1908	0.0339
0.1910	0.0339
0.1912	0.0338
0.1914	0.0337
0.1916	0.0337
0.1918	0.0336
0.1920	0.0335
0.1922	0.0335
0.1924	0.0334
0.1926	0.0333
0.1928	0.0333
0.1930	0.0332
0.1932	0.0331
0.1934	0.0331
0.1936	0.0330
0.1938	0.0329
0.1940	0.0329
0.1942	0.0328
0.1944	0.0327
0.1946	0.0327
0.1948	0.0326
0.1950	0.0325
0.1952	0.0325
0.1954	0.0324
0.1956	0.0324
0.1958	0.0323
0.1960	0.0322
0.1962	0.0322
0.1964	0.0321
0.1966	0.0320
0.1968	0.0320
0.1970	0.0319
0.1972	0.0318
0.1974	0.0318
0.1976	0.0317
0.1978	0.0317
0.1980	0.0316

Sample Weight	Sample Efficiency
0.1982	0.0315
0.1984	0.0315
0.1986	0.0314
0.1988	0.0313
0.1990	0.0313
0.1992	0.0312
0.1994	0.0312
0.1996	0.0311
0.1998	0.0310
0.2000	0.0310
0.2002	0.0309

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CT & E ENVIRONMENTAL SERVICES, INC
DATA COMPLETENESS CHECKLIST
ALPHA SPECTROMETER

Isotopic Plutonium

Laboratory Job Number: 985847

Item #	Title	In Pkg	Comments
1)	Formulas Used in Calculations	✓	11-24-98 cy
2)	Precipitation Information	✓	11-24-98 cy
3)	Instrument Printouts	✓	11-24-98 cy
4)	Sample Measurement Activity Calculation Report	✓	11-24-98 cy
5)	Instrument Weekly Calibration	✓	11-24-98 cy
6)	Instrument Backgrounds	✓	11-24-98 cy
7)	Resolution Checks (FWHM)	✓	11-24-98 cy
8)	Standards Preparation Log	✓	11-24-98 cy
9)	Standards Certifications	✓	11-24-98 cy
10)	Control Charts	✓	11-24-98 cy
11)	Preparation for Instrument Standards	✓	11-24-98 cy
12)	Sealed Source Information	✓	11-24-98 cy
13)	"The Source" Certificates of Calibration	✓	11-24-98 cy

Comments: _____

CORELAB

CORE LABORATORIES

CORE LABORATORIES

Calculations for Alpha Spectrometer Analytes by ALPHAMAT Software

1.) Calculation of Chemical Recovery

$$Cr = \left(\frac{CPM_{tr} / Ef_d}{DPM_e} \right) \times \left(\frac{V_t}{V_a} \right)$$

2.) Calculation for Total Efficiency

$$Ef_t = Ef_d \times Cr$$

3.) Calculation for DPM of Analyte

$$DPM_a = \frac{CPM_n}{Ef_t}$$

4.) Calculation for Detection Limit

$$L_d = \frac{k^2}{T_s} + 2k\sqrt{\left(\frac{R_b}{T_b}\right)\left(1 + \frac{T_b}{T_s}\right)}$$

5.) Calculation for MDA

$$MDA = \frac{L_d}{Ef_t}$$

6.) Calculation for Total MDA

$$MDA_t = MDA\left(\frac{V_t}{V_a}\right)$$

7.) Calculation for Error of Analyte

$$Err_a = \frac{\sqrt{\frac{R_g}{T_s} + \frac{R_b}{T_b}}}{R_n}$$

8.) Calculation for Error of Tracer

$$Err_{tr} = \frac{1}{\sqrt{Cnt_g}}$$

9.) Calculation for Total Error

$$Err_t = 1.96 \times DPM_a\left(\frac{V_t}{V_a}\right) \times \sqrt{Err_a^2 + Err_{tr}^2}$$

Where:

- Cr - Chemical Recovery
- CPM_{tr} - Net Counts per Minute for the Tracer
- DPM_e - Disintegrations per Minute for the Tracer
- Ef_d - Detector Efficiency
- V_t - Volume Total
- V_a - Volume Aliquot
- Ef_t - Total Efficiency
- DPM_a - Disintegrations per Minute computed for an analyte (nuclide)
- CPM_n - Net Counts per Minute for a Nuclide
- L_d - Detection Limit
- k - 1.96 (2 sigma)
- R_b - Background Counts per Minute for a Nuclide
- T_b - Live Time Background in Minutes
- T_s - Live Time Sample in Minutes
- MDA - Minimum Detectable Activity
- MDA_t - Total MDA
- Err_a - Error for an analyte
- R_g - Gross Counts per Minute for a Nuclide
- R_n - Net Counts per Minute for a Nuclide
- Err_{tr} - Error for a Tracer
- Cnt_g - Gross Counts for a Nuclide
- Err_t - Total Error

CORELAB

CORE LABORATORIES

P3940

SAMPLE VOLUME BOOK

SOP CA-GLR-01.0 Rev 2

Analysis ISO Pu Analyst JH Date 10-15-98

Sample ID	Sample Vol L,g	Sample Conc	Calculated Vol/Wt L,g	Sample Matrix	Comments
985847-1	0.5L	N/A	N/A	H_2O	Clear liquid
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
985892-1					
1xMS					
1xMSD					
2					
3					
3MD					
985898-1					
MB1PU1015	1.0L				QC
LCS1PU1015					

JH 10-15-98

Spike √	Trace √	Nuclide	Isotope Number	Expiration Date	Activity pCi/mL	Vol mL	Standard Control ID	Spiked/ Witnessed By
✓		Pu239	153.05	7-21-99	1.6	3mL	5892-1xMS	Rel01 JH
							5892-1xMSD	
							LCS1PU1015	
	✓	Pu242	224.10	2-25-99	1.5	3mL	All Samples	
				JH 10-15-98				

FORM RADCHEM-49, REV # 3

Book Number 98031 Page Number 41

CORELAB

CORE LABORATORIES

SAMPLE VOLUME BOOK

SOP CA-GLR-01.0 Rev 2

Analysis 150 Pu Rerun Analyst MC Date 10/20/98

Sample ID	Sample Vol L,g	Sample Conc	Calculated Vol/Wt L,g	Sample Matrix	Comments
985847-7	0.5L	N/A	N/A	H2O	CLEAR LIQUID
7 Dups	0.25L				
8	0.5L				
8 MS					
MB1PU1028	1.0L				QC
LCS1PU1028					

MC 10/20/98

Spike √	Trace √	Nuclide	Isotope Number	Expiration Date	Activity pCi/mL	Vol mL	Standard Control ID	Spiked/ Witnessed By
✓		PU239	153.05	7/21/99	1.6	3mL	5847-7 Dups	MC
							LCS1PU1028	
	✓	PU242	224.10	2/25/99	1.5	3mL	ALL SAMPLES	

MC 10/20/98

FORM RADCHEM-49, REV # 3

Book Number 98031 Page Number 66

CORELAB

CORE LABORATORIES

OUT OF CONTROL EVENT REPORT

LOCATION Casper JOB/SAMPLES INVOLVED 985847-7&8

PARAMETER 150 Pu METHOD Column

DATE OCCURRED 10-22-98 COMPLETED BY DF DATE 10-22-98

OUT OF CONTROL EVENT

SAMPLE ANALYSIS

- ____ Holding time missed
- ____ Surr % rec. not within QC limits
- ____ Calculation error
- ____ Reporting error
- X Tracer % rec. not within QC limits

QUALITY CONTROL ANALYSIS

- ____ Blank value out of control
- ____ LCS % rec. not acceptable
- ____ Spike % rec. not acceptable
- ____ Duplicate RPD (RER) not acceptable

CALIBRATION

- ____ Initial calibration not within QC limits
- ____ Calibration Verification not within QC limits

OTHER (Explain)

CORRECTIVE ACTION

- ____ Recalculate/report results
- ____ Reanalyze sample(s)
- X Redigest/re-extract samples
- ____ Perform standard additions
- ____ Repeat QC analysis
- ____ Repeat calibration
- ____ Prepare new standards
- ____ Perform instrument service

OTHER (Explain)

RESOLUTION

APPROVED BY

Laboratory Supervisor/Manager _____ Date _____

QA/QC Coordinator [illegible] Date [illegible]

Case Narrative Required: Yes _____ No _____

AUTHORIZATION REQUIRED FOR WORK RELEASE

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-1 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 2 Input 2 (Det #18)
Efficiency: 23.36% Chem. Recovery: 75.62%
Total Eff.: 17.66% Manual:100.00%
CALIBRATION: 3465.45 + 5.22536 * Chn + -0.000511 Chn **2 keV
Original: 3465.45 + 5.2377 * Chn + -0.000511 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03487.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:52:37
Live Time: 7200.00 Real Time: 7200.14 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3626.CHN
Background File: C:\USER\ALPHA\BKGND\B0003544.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3626

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	405.24	365	415	2.00	2.00	0.96	27.04	0.23
2.	334.59	305	355	2.00	2.00	0.00	6.00	0.05
Tracer	282.33	252	302	12.00	11.00	0.24	211.76	1.76

D E C A Y C O R R E C T E D R E S U L T S

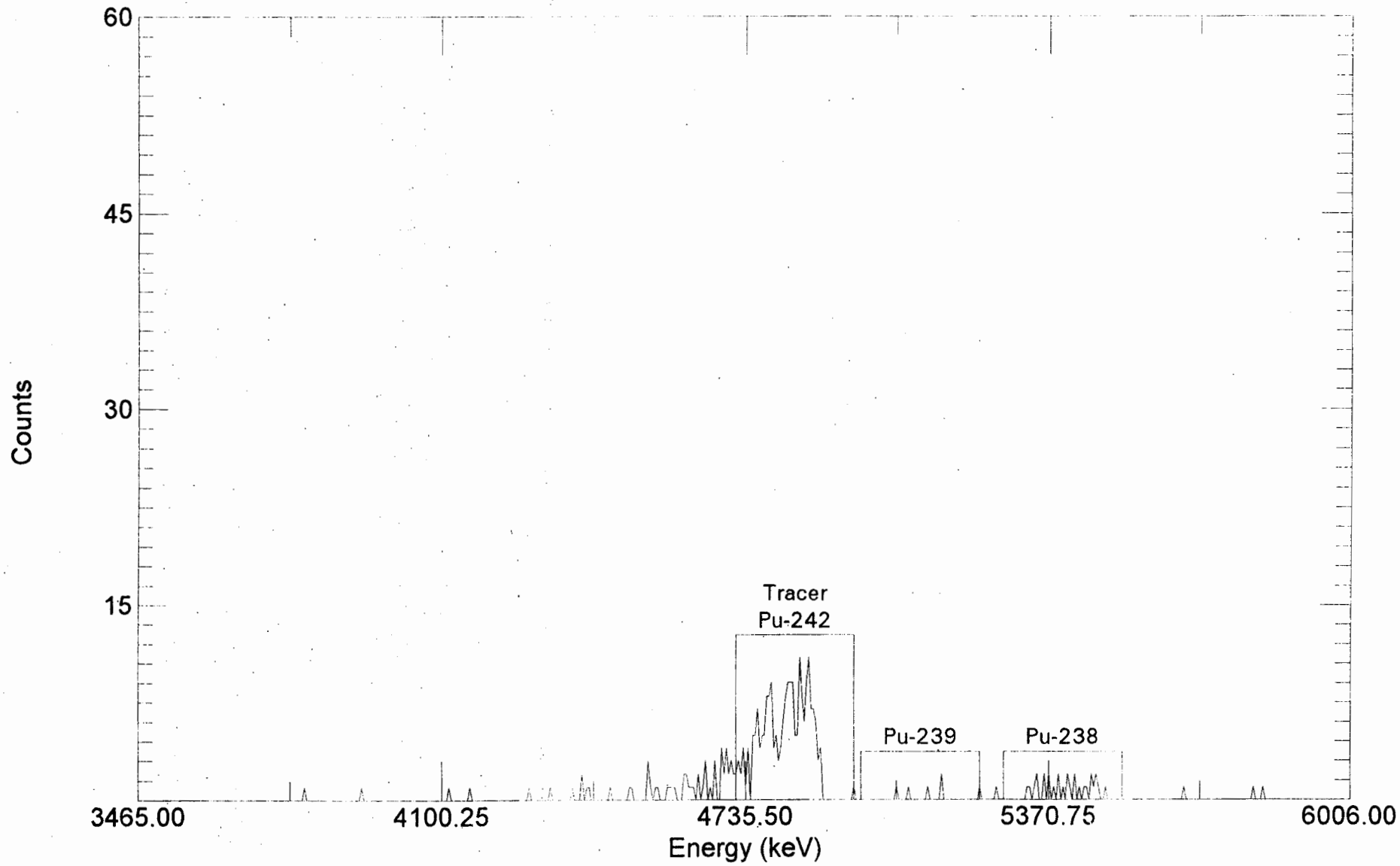
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.622	1.0000	1.28	0.28	38.39
2.	Pu-239	0.73	5156.60	9.767	1.0000	0.28	0.18	80.02
Tracer	Pu-242	0.78	4900.00	59.242	6.0000	9.99	0.23	13.46

T O T A L S		% Recovery
Gross Count	308.0000	100.00
Net Area	302.4800	98.21
Background	5.5200	1.79
Composite Fit	246.0000	79.87
Residuals	56.4800	18.34

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3626 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:52:37 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3626.CHN
Sample: 985847-1 ISO PU

Real Time: 7200.14 s. Live Time: 7200.00 s.
Detector: #18 MCB 2 Input 2 (Det #18)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-2 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 2 Input 3 (Det #19)
Efficiency: 20.99% Chem. Recovery:105.82%
Total Eff.: 22.21% Manual:100.00%
CALIBRATION: 3432.37 + 5.36816 * Chn + -0.000847 Chn **2 keV
Original: 3432.37 + 5.4333 * Chn + -0.000847 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03488.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:52:55
Live Time: 7200.00 Real Time: 7200.12 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3627.CHN
Background File: C:\USER\ALPHA\BKGND\B0003545.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3627

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	411.74	372	422	2.00	4.00	4.08	24.92	0.21
2.	339.37	309	359	2.00	2.00	1.68	6.32	0.05
Tracer	286.33	256	306	6.00	19.00	0.72	266.28	2.22

D E C A Y C O R R E C T E D R E S U L T S

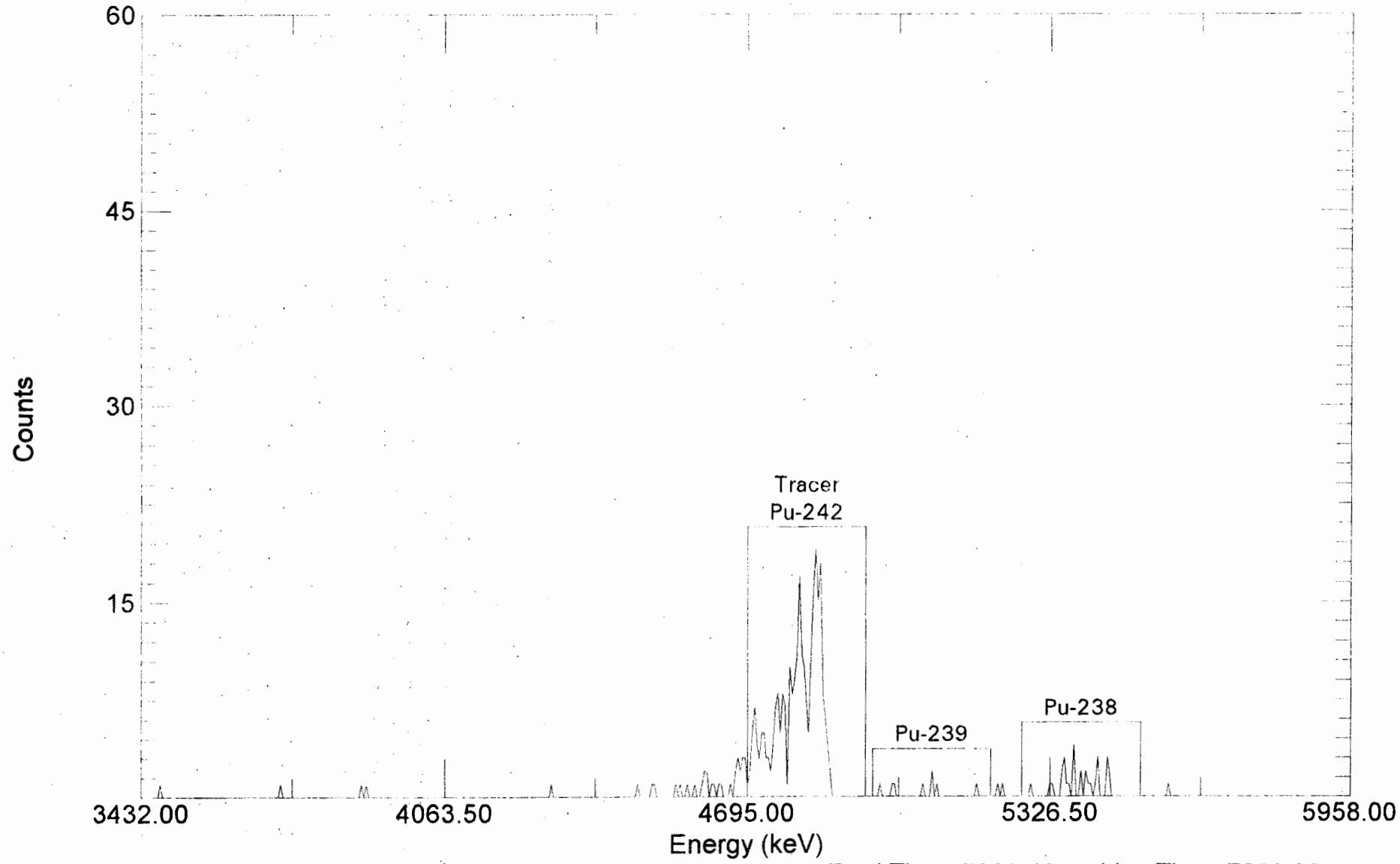
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.341	1.0000	0.93	0.31	42.53
2.	Pu-239	0.73	5156.60	9.587	1.0000	0.24	0.25	88.25
Tracer	Pu-242	0.78	4900.00	29.299	3.0000	9.99	0.21	12.00

T O T A L S		% Recovery
Gross Count	342.0000	100.00
Net Area	331.2000	96.84
Background	10.8000	3.16
Composite Fit	304.0000	88.89
Residuals	27.2000	7.95

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3627 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:52:55 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3627.CHN
Sample: 985847-2 ISO PU

Real Time: 7200.12 s. Live Time: 7200.00 s.
Detector: #19 MCB 2 Input 3 (Det #19)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-3 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 2 Input 5 (Det #21)
Efficiency: 23.41% Chem. Recovery: 74.57%
Total Eff.: 17.46% Manual:100.00%
CALIBRATION: 3547.39 + 4.64706 * Chn + 0.000312 Chn **2 keV
Original: 3547.39 + 4.7272 * Chn + 0.000312 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03489.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:53:29
Live Time: 7200.00 Real Time: 7200.14 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3628.CHN
Background File: C:\USER\ALPHA\BKGND\B0003546.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3628

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	408.76	369	419	2.00	3.00	5.28	20.72	0.17
2.	338.59	309	359	2.00	1.00	1.20	2.80	0.02
Tracer	285.59	256	306	4.00	18.00	0.72	209.28	1.74

D E C A Y C O R R E C T E D R E S U L T S

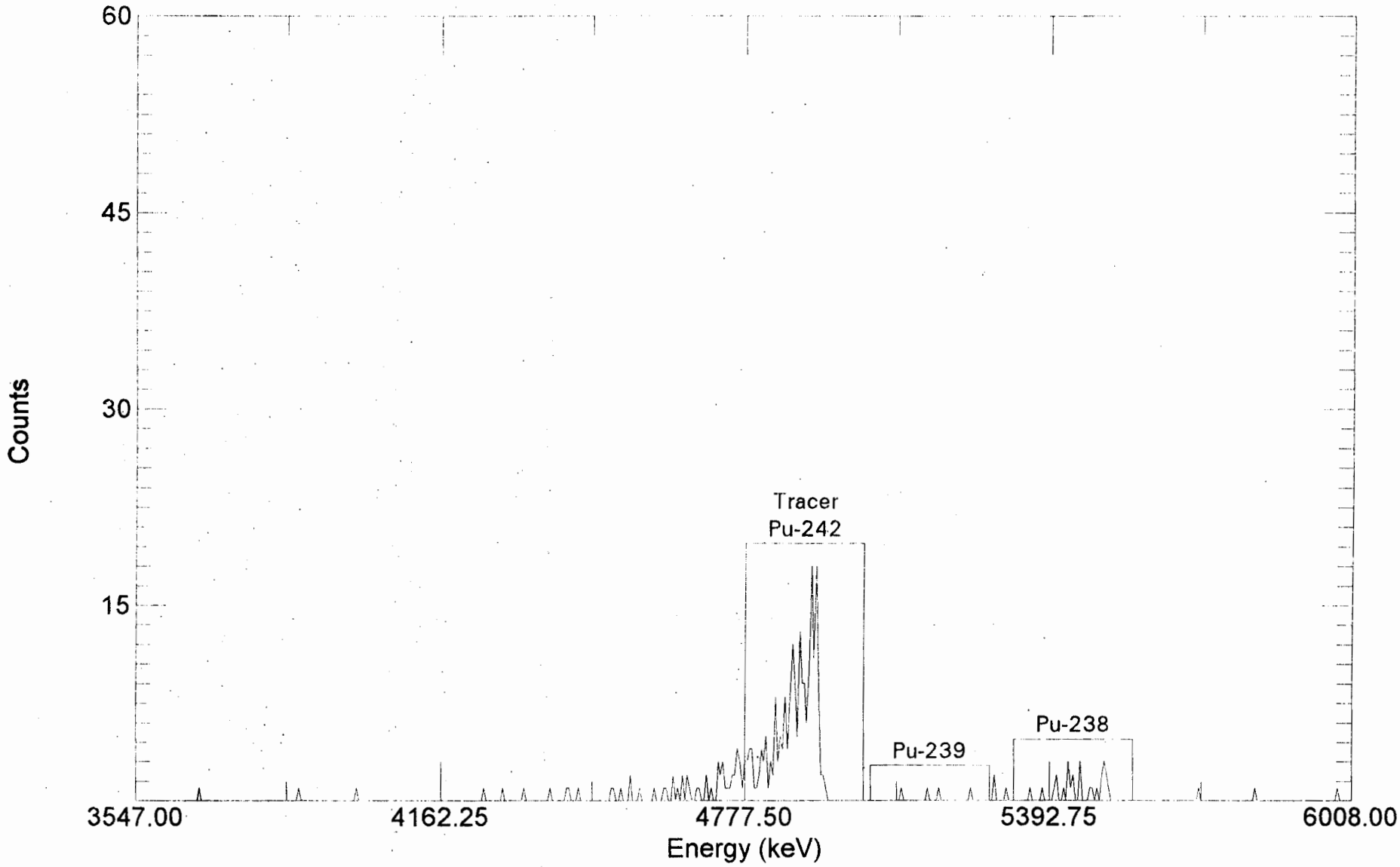
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.804	1.0000	0.99	0.42	48.52
2.	Pu-239	0.73	5156.60	9.717	1.0000	0.13	0.30	141.20
Tracer	Pu-242	0.78	4900.00	19.301	2.0000	9.99	0.27	13.53

T O T A L S		% Recovery
Gross Count	301.0000	100.00
Net Area	289.4800	96.17
Background	11.5200	3.83
Composite Fit	240.0000	79.73
Residuals	49.4800	16.44

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3628 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:53:29 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3628.CHN
Sample: 985847-3 ISO PU

Real Time: 7200.14 s. Live Time: 7200.00 s.
Detector: #21 MCB 2 Input 5 (Det #21)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-4 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 2 Input 6 (Det #22)
Efficiency: 20.74% Chem. Recovery: 63.87%
Total Eff.: 13.25% Manual:100.00%
CALIBRATION: 3450.5 + 5.33645 * Chn + -0.000684 Chn **2 keV
Original: 3450.5 + 5.3903 * Chn + -0.000684 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03490.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:53:35
Live Time: 7200.00 Real Time: 7200.14 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3629.CHN
Background File: C:\USER\ALPHA\BKGND\B0003547.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3629

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	404.90	365	415	4.00	3.00	2.88	25.12	0.21
2.	334.01	304	354	2.00	2.00	0.72	8.28	0.07
Tracer	281.80	252	302	2.00	12.00	1.20	158.80	1.32

D E C A Y C O R R E C T E D R E S U L T S

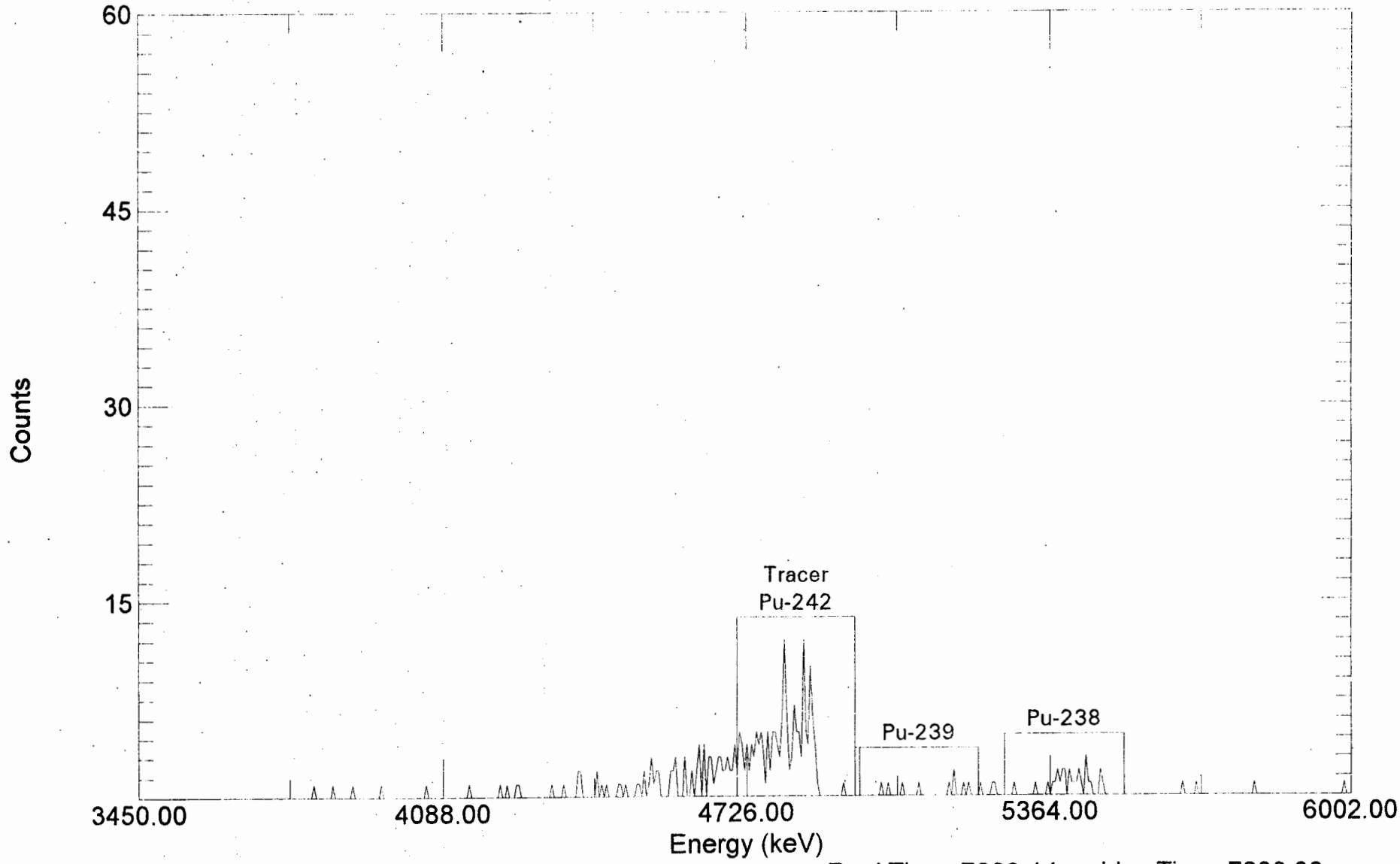
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	19.130	2.0000	1.58	0.47	41.41
2.	Pu-239	0.73	5156.60	9.759	1.0000	0.52	0.36	71.18
Tracer	Pu-242	0.78	4900.00	9.902	1.0000	9.99	0.39	15.50

T O T A L S		% Recovery
Gross Count	292.0000	100.00
Net Area	280.9600	96.22
Background	11.0400	3.78
Composite Fit	197.0000	67.47
Residuals	83.9600	28.75

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3629 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:53:35 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3629.CHN
Sample: 985847-4 ISO PU

Real Time: 7200.14 s. Live Time: 7200.00 s.
Detector: #22 MCB 2 Input 6 (Det #22)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-5 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 2 Input 7 (Det #23)
Efficiency: 23.09% Chem. Recovery: 79.58%
Total Eff.: 18.38% Manual:100.00%
CALIBRATION: 3463.05 + 5.20409 * Chn + -0.000446 Chn **2 keV
Original: 3463.05 + 5.2464 * Chn + -0.000446 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03491.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:53:42
Live Time: 7200.00 Real Time: 7200.14 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3630.CHN
Background File: C:\USER\ALPHA\BKGND\B0003548.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3630

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	405.31	365	415	4.00	4.00	1.68	35.32	0.29
2.	335.05	305	355	2.00	1.00	0.96	3.04	0.03
Tracer	282.98	253	303	8.00	17.00	0.72	220.28	1.84

D E C A Y C O R R E C T E D R E S U L T S

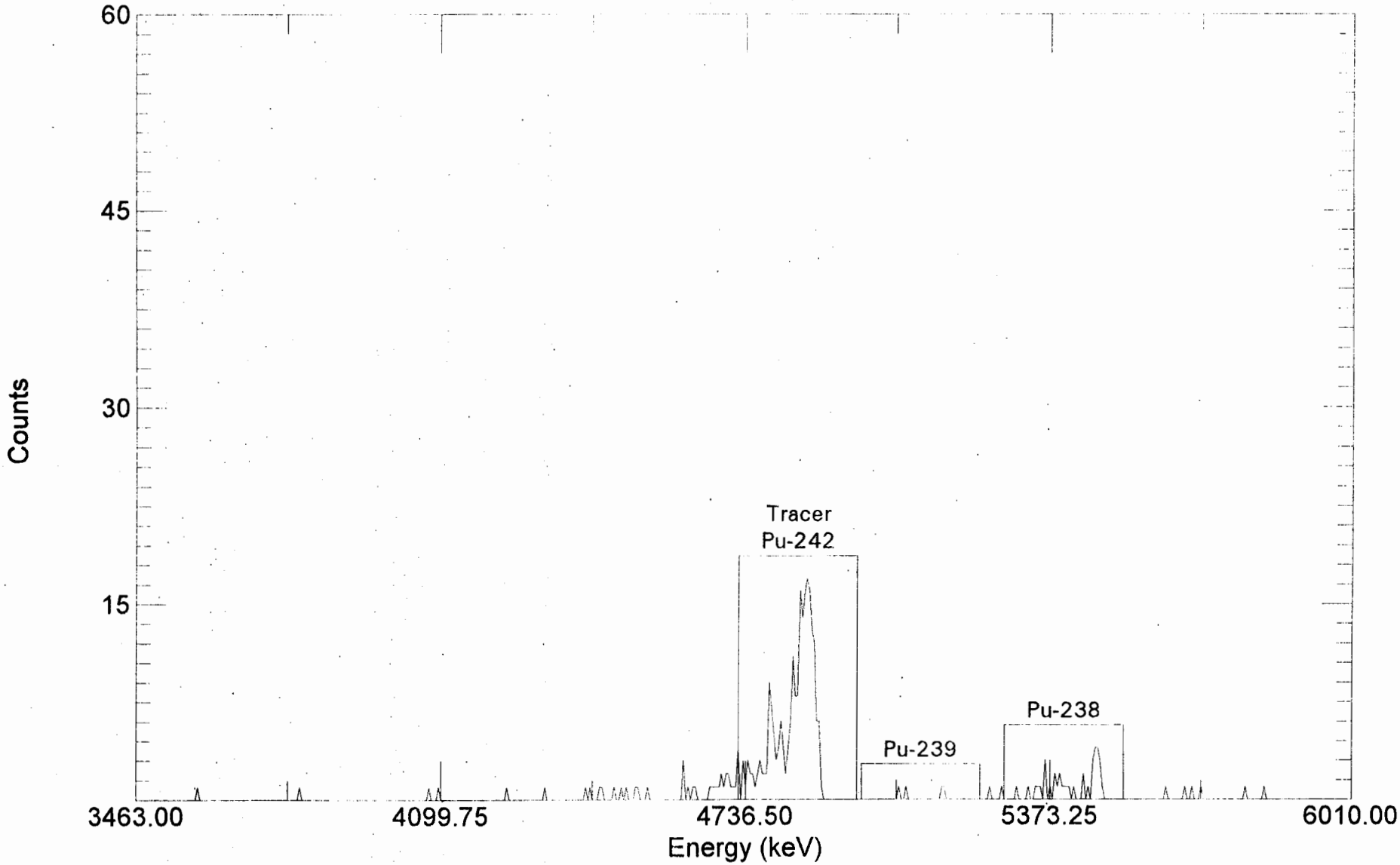
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	19.370	2.0000	1.60	0.30	33.80
2.	Pu-239	0.73	5156.60	9.810	1.0000	0.14	0.27	129.84
Tracer	Pu-242	0.78	4900.00	39.613	4.0000	9.99	0.26	13.18

T O T A L S		% Recovery
Gross Count	307.0000	100.00
Net Area	293.0800	95.47
Background	13.9200	4.53
Composite Fit	262.0000	85.34
Residuals	31.0800	10.12

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3630 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:53:42 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3630.CHN
Sample: 985847-5 ISO PU

Real Time: 7200.14 s. Live Time: 7200.00 s.
Detector: #23 MCB 2 Input 7 (Det #23)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-6 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 2 Input 8 (Det #24)
Efficiency: 21.46% Chem. Recovery: 73.96%
Total Eff.: 15.87% Manual:100.00%
CALIBRATION: 3417.36 + 5.48185 * Chn + -0.000974 Chn **2 keV
Original: 3417.36 + 5.5357 * Chn + -0.000974 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03492.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:53:50
Live Time: 7200.00 Real Time: 7200.14 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3631.CHN
Background File: C:\USER\ALPHA\BKGND\B0003549.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3631

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	409.55	370	420	2.00	3.00	3.60	28.40	0.24
2.	337.51	308	358	2.00	2.00	0.00	5.00	0.04
Tracer	284.88	255	305	2.00	17.00	0.72	190.28	1.59

D E C A Y C O R R E C T E D R E S U L T S

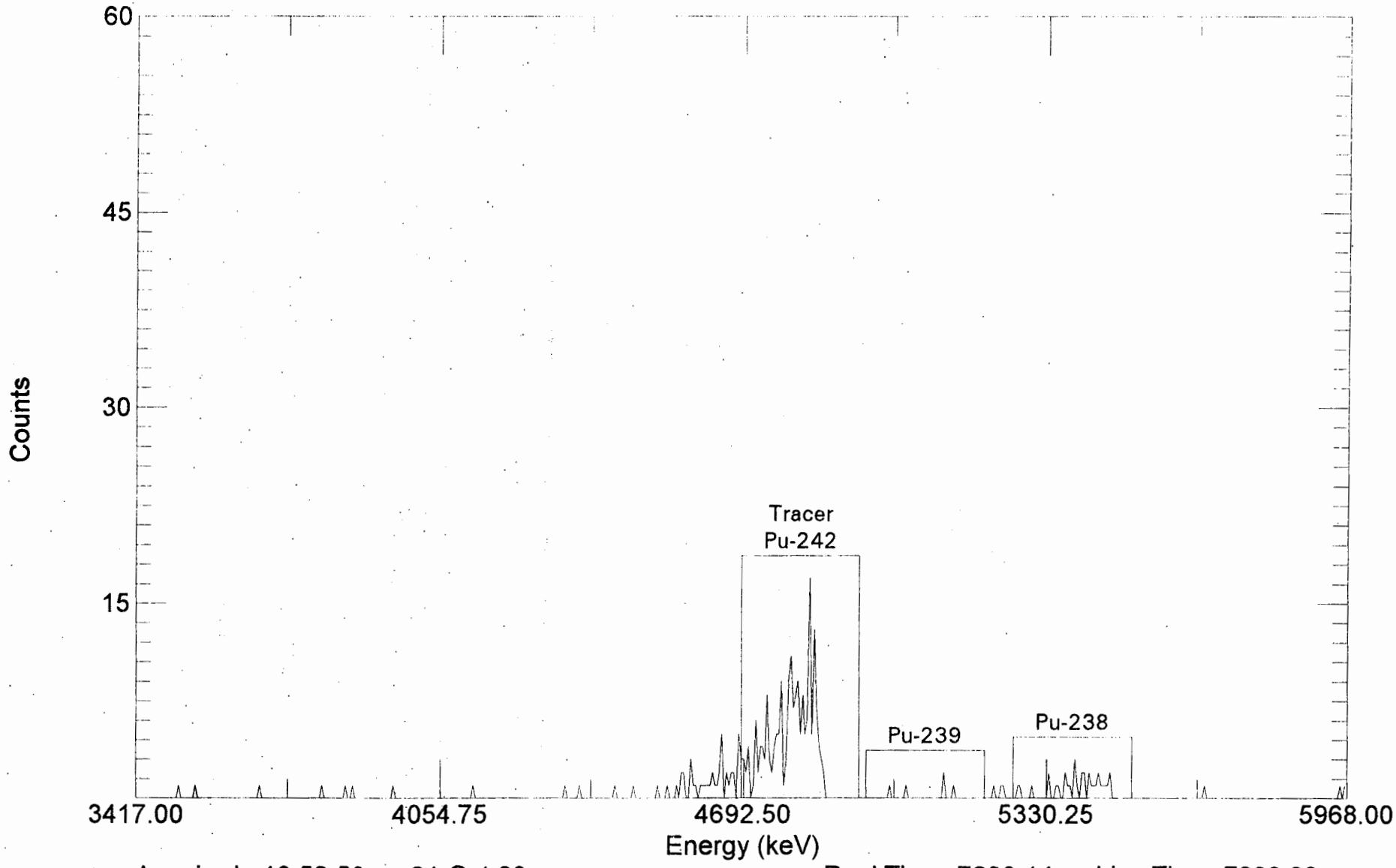
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.368	1.0000	1.49	0.41	39.17
2.	Pu-239	0.73	5156.60	9.649	1.0000	0.26	0.20	87.65
Tracer	Pu-242	0.78	4900.00	9.854	1.0000	9.99	0.30	14.18

T O T A L S		% Recovery
Gross Count	286.0000	100.00
Net Area	274.7200	96.06
Background	11.2800	3.94
Composite Fit	228.0000	79.72
Residuals	46.7200	16.34

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3631 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:53:50 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3631.CHN
Sample: 985847-6 ISO PU

Real Time: 7200.14 s. Live Time: 7200.00 s.
Detector: #24 MCB 2 Input 8 (Det #24)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-9 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 3 Input 3 (Det #27)
Efficiency: 20.60% Chem. Recovery: 48.80%
Total Eff.: 10.05% Manual:100.00%
CALIBRATION: 3420.19 + 5.3963 * Chn + -0.000738 Chn **2 keV
Original: 3420.19 + 5.428 * Chn + -0.000738 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03496.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:54:26
Live Time: 7200.00 Real Time: 7239.68 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3634.CHN
Background File: C:\USER\ALPHA\BKGND\B0003552.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3634

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	408.01	368	418	2.00	2.00	2.64	12.36	0.10
2.	337.34	307	357	4.00	1.00	0.96	4.04	0.03
Tracer	285.36	255	305	2.00	9.00	0.48	120.52	1.00

D E C A Y C O R R E C T E D R E S U L T S

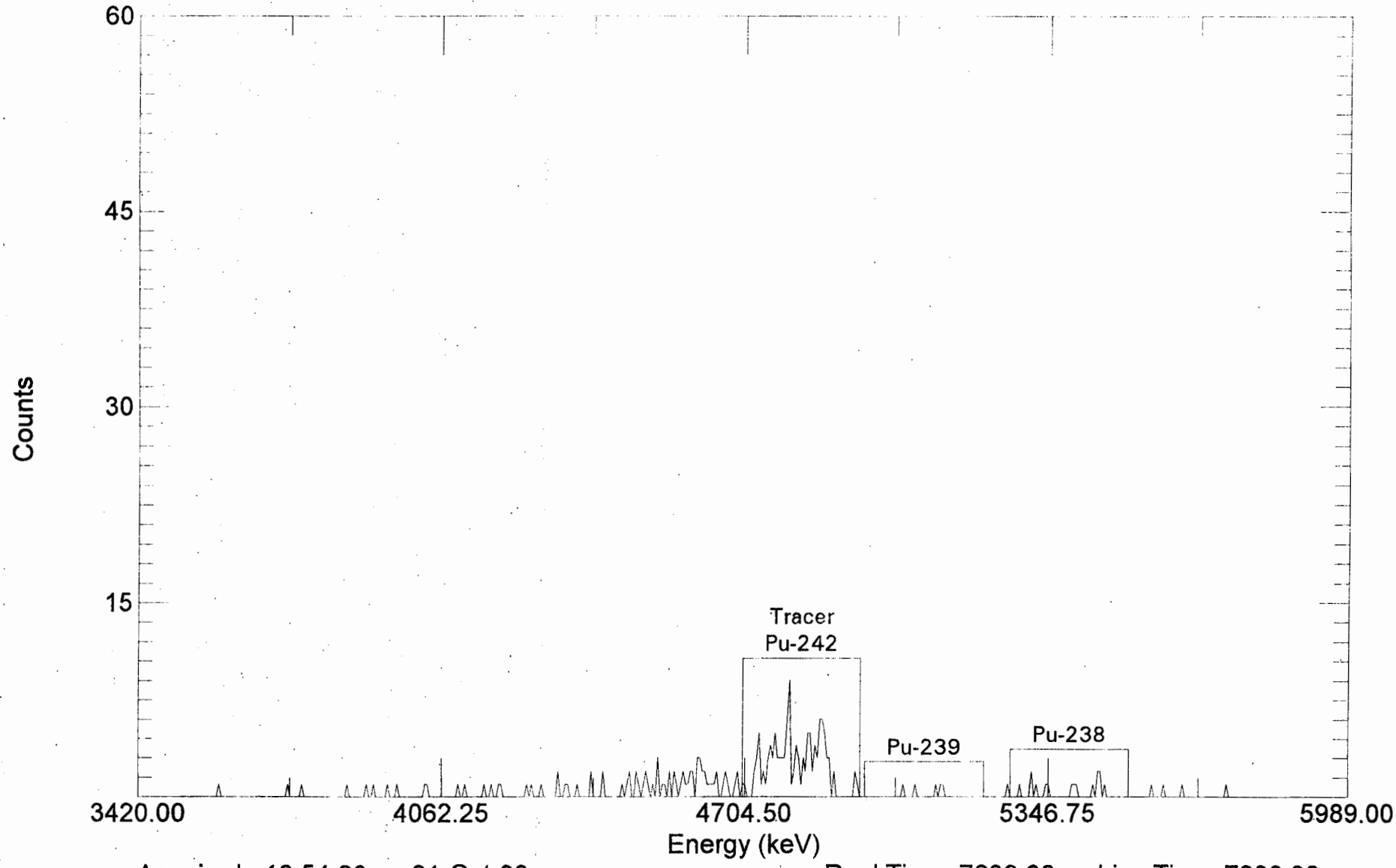
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.588	1.0000	1.02	0.61	61.73
2.	Pu-239	0.73	5156.60	19.594	2.0000	0.33	0.49	109.08
Tracer	Pu-242	0.78	4900.00	9.950	1.0000	9.99	0.44	17.82

T O T A L S		% Recovery
Gross Count	228.0000	100.00
Net Area	218.4000	95.79
Background	9.6000	4.21
Composite Fit	141.0000	61.84
Residuals	77.4000	33.95

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3634 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:54:26 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3634.CHN
Sample: 985847-9 ISO PU

Real Time: 7239.68 s. Live Time: 7200.00 s.
Detector: #27 MCB 3 Input 3 (Det #27)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-10 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 3 Input 4 (Det #28)
Efficiency: 21.64% Chem. Recovery: 49.45%
Total Eff.: 10.70% Manual:100.00%
CALIBRATION: 3375.52 + 5.74221 * Chn + -0.0014 Chn **2 keV
Original: 3375.52 + 5.8252 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03497.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:54:36
Live Time: 7200.00 Real Time: 7239.70 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3635.CHN
Background File: C:\USER\ALPHA\BKGND\B0003553.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3635

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	411.00	371	421	2.00	4.00	7.68	18.32	0.15
2.	338.03	308	358	2.00	1.00	0.48	3.52	0.03
Tracer	285.34	255	305	2.00	11.00	0.72	128.28	1.07

D E C A Y C O R R E C T E D R E S U L T S

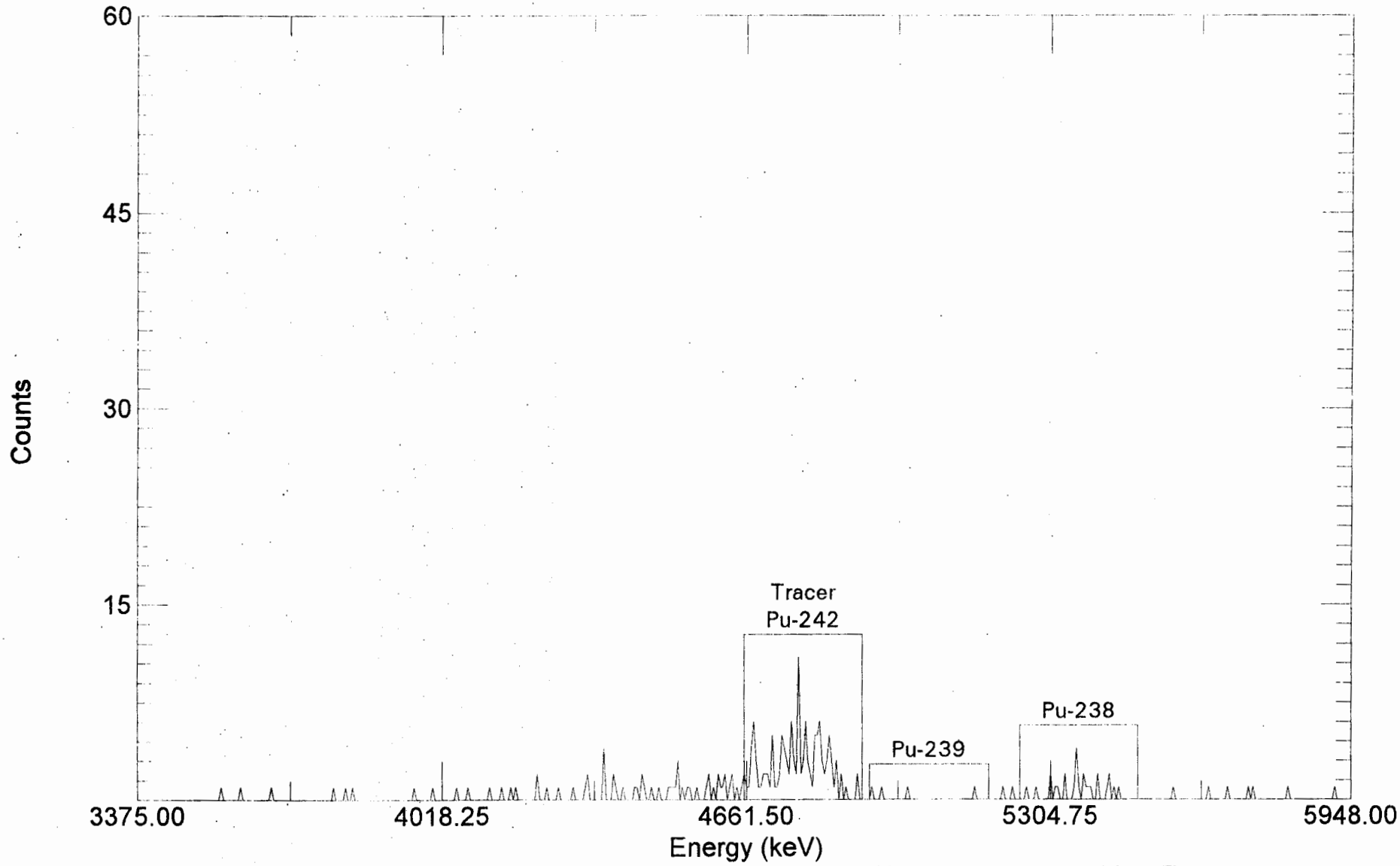
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.183	1.0000	1.43	0.76	55.01
2.	Pu-239	0.73	5156.60	9.591	1.0000	0.27	0.41	111.75
Tracer	Pu-242	0.78	4900.00	9.887	1.0000	9.99	0.44	17.26

T O T A L S		% Recovery
Gross Count	231.0000	100.00
Net Area	212.0400	91.79
Background	18.9600	8.21
Composite Fit	159.0000	68.83
Residuals	53.0400	22.96

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3635 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:54:36 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3635.CHN
Sample: 985847-10 ISO PU

Real Time: 7239.70 s. Live Time: 7200.00 s.
Detector: #28 MCB 3 Input 4 (Det #28)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-11 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 3 Input 5 (Det #29)
Efficiency: 24.12% Chem. Recovery: 65.38%
Total Eff.: 15.77% Manual:100.00%
CALIBRATION: 3359.46 + 5.808 * Chn + -0.0014 Chn **2 keV
Original: 3359.46 + 5.8962 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03498.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:55:00
Live Time: 7200.00 Real Time: 7239.16 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3636.CHN
Background File: C:\USER\ALPHA\BKGND\B0003554.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3636

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	408.64	369	419	4.00	4.00	3.36	26.64	0.22
2.	336.76	307	357	2.00	1.00	0.96	5.04	0.04
Tracer	284.80	255	305	6.00	12.00	0.96	189.04	1.58

D E C A Y C O R R E C T E D R E S U L T S

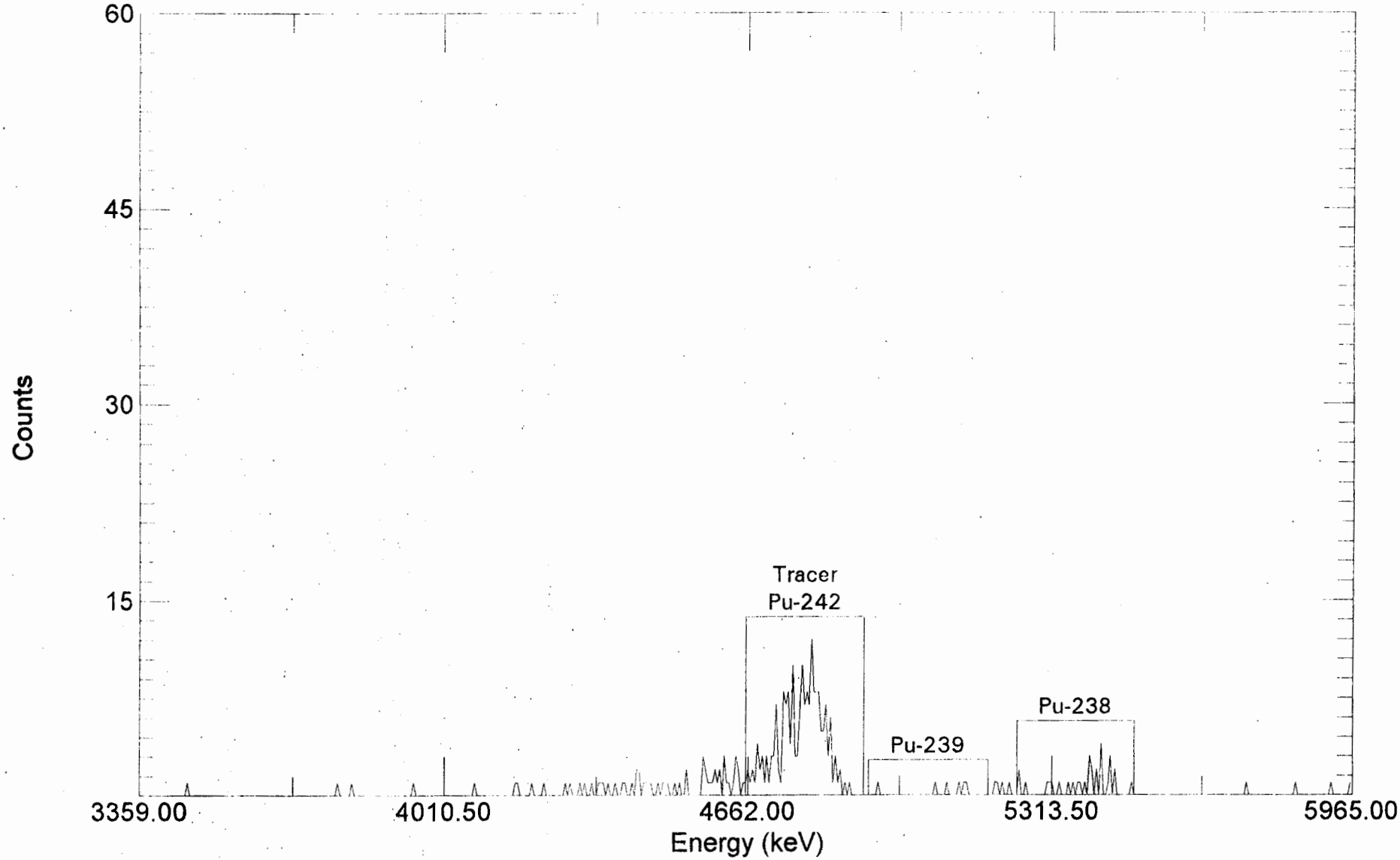
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	18.655	2.0000	1.41	0.41	40.43
2.	Pu-239	0.73	5156.60	9.730	1.0000	0.27	0.31	95.70
Tracer	Pu-242	0.78	4900.00	30.063	3.0000	9.99	0.31	14.22

T O T A L S		% Recovery
Gross Count	297.0000	100.00
Net Area	285.4800	96.12
Background	11.5200	3.88
Composite Fit	226.0000	76.09
Residuals	59.4800	20.03

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3636 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:55:00 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3636.CHN
Sample: 985847-11 ISO PU

Real Time: 7239.16 s. Live Time: 7200.00 s.
Detector: #29 MCB 3 Input 5 (Det #29)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-12 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 3 Input 6 (Det #30)
Efficiency: 20.73% Chem. Recovery: 71.43%
Total Eff.: 14.81% Manual:100.00%
CALIBRATION: 3362.2 + 5.89955 * Chn + -0.0016 Chn **2 keV
Original: 3362.2 + 5.9334 * Chn + -0.0016 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03499.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:55:09
Live Time: 7200.00 Real Time: 7238.96 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3637.CHN
Background File: C:\USER\ALPHA\BKGND\B0003555.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3637

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	407.17	367	417	2.00	3.00	3.12	19.88	0.17
2.	334.50	305	355	2.00	1.00	0.48	1.52	0.01
Tracer	282.27	252	302	2.00	12.00	0.48	177.52	1.48

D E C A Y C O R R E C T E D R E S U L T S

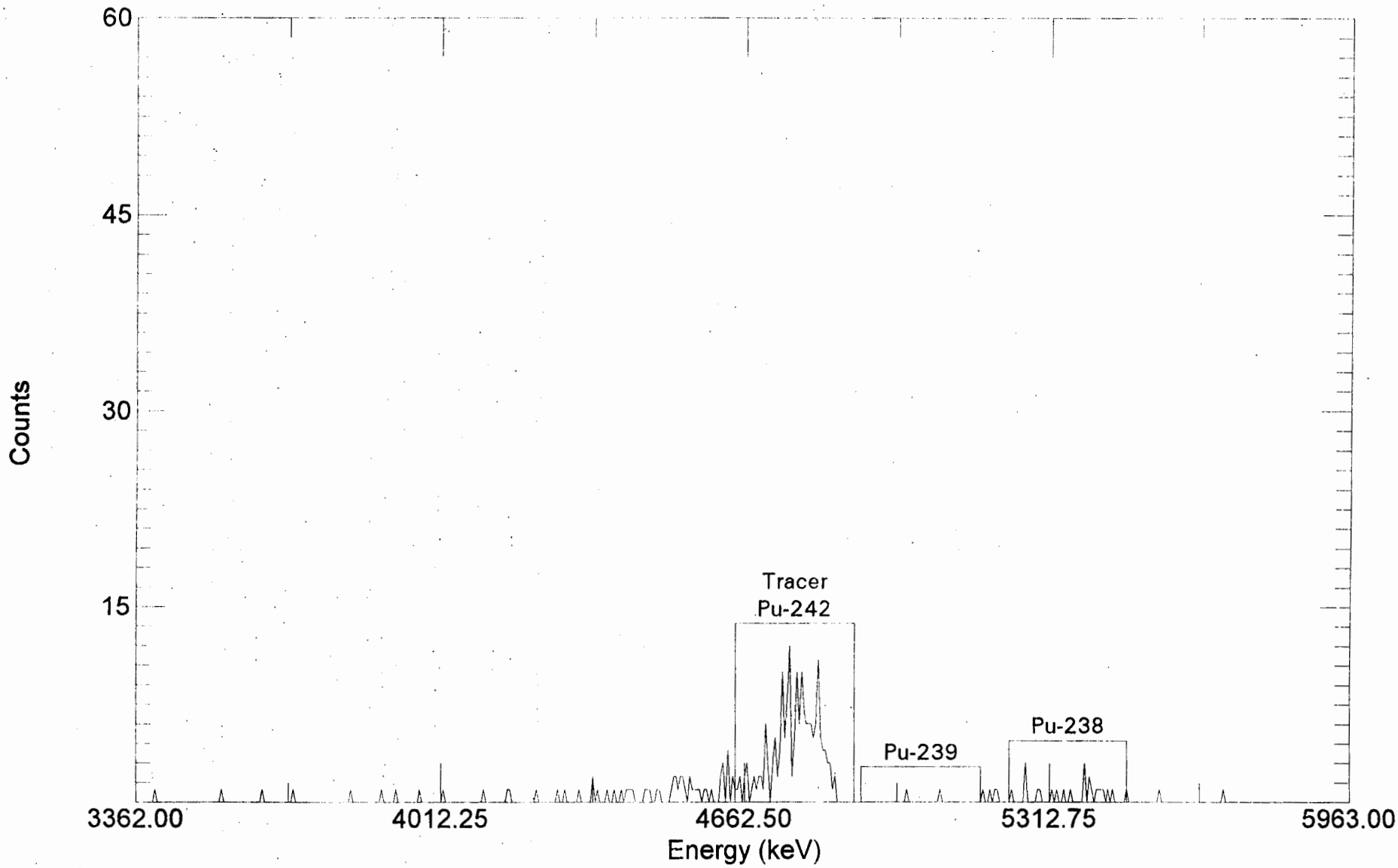
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.193	1.0000	1.12	0.43	47.47
2.	Pu-239	0.73	5156.60	9.658	1.0000	0.09	0.30	183.62
Tracer	Pu-242	0.78	4900.00	9.993	1.0000	9.99	0.30	14.69

T O T A L S		% Recovery
Gross Count	271.0000	100.00
Net Area	262.1200	96.72
Background	8.8800	3.28
Composite Fit	203.0000	74.91
Residuals	59.1200	21.82

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3637 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:55:09 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3637.CHN
Sample: 985847-12 ISO PU

Real Time: 7238.96 s. Live Time: 7200.00 s.
Detector: #30 MCB 3 Input 6 (Det #30)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-13 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 3 Input 7 (Det #31)
Efficiency: 23.04% Chem. Recovery: 45.89%
Total Eff.: 10.57% Manual:100.00%
CALIBRATION: 3495.42 + 4.99207 * Chn + -0.000155 Chn **2 keV
Original: 3495.42 + 5.0692 * Chn + -0.000155 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03500.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:55:18
Live Time: 7200.00 Real Time: 7238.76 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3638.CHN
Background File: C:\USER\ALPHA\BKGND\B0003556.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3638

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	406.50	366	416	2.00	4.00	2.64	16.36	0.14
2.	336.28	306	356	2.00	1.00	1.20	3.80	0.03
Tracer	283.86	254	304	6.00	8.00	0.24	126.76	1.06

D E C A Y C O R R E C T E D R E S U L T S

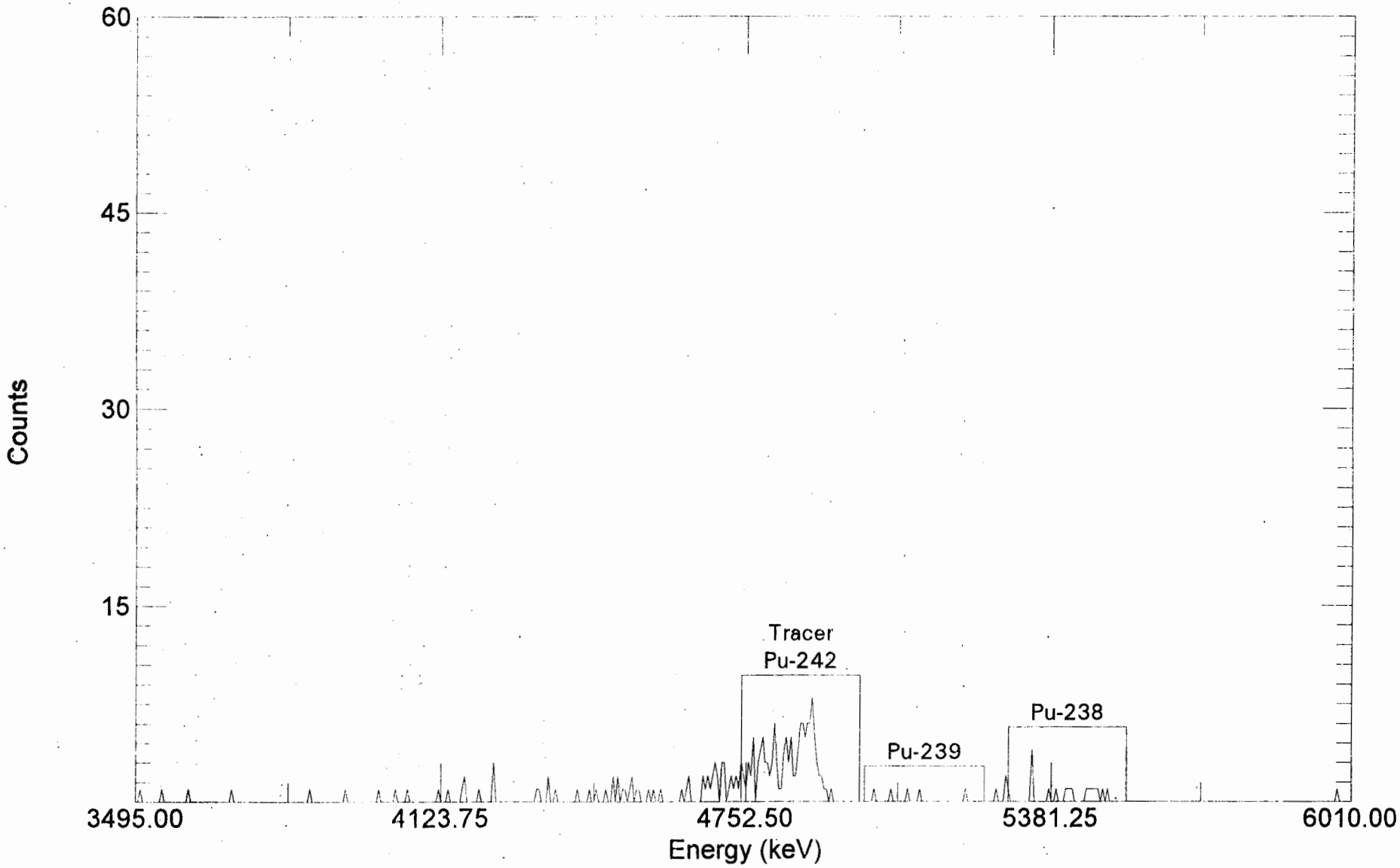
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.732	1.0000	1.29	0.58	52.43
2.	Pu-239	0.73	5156.60	9.776	1.0000	0.30	0.49	116.13
Tracer	Pu-242	0.78	4900.00	29.424	3.0000	9.99	0.39	17.39

T O T A L S		% Recovery
Gross Count	226.0000	100.00
Net Area	219.0400	96.92
Background	6.9600	3.08
Composite Fit	151.0000	66.81
Residuals	68.0400	30.11

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3638 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:55:18 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3638.CHN
Sample: 985847-13 ISO PU

Real Time: 7238.76 s. Live Time: 7200.00 s.
Detector: #31 MCB 3 Input 7 (Det #31)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985892-1 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 3 Input 8 (Det #32)
Efficiency: 21.82% Chem. Recovery: 69.59%
Total Eff.: 15.19% Manual:100.00%
CALIBRATION: 3431.77 + 5.29693 * Chn + -0.000531 Chn **2 keV
Original: 3431.77 + 5.3512 * Chn + -0.000531 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03501.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:55:30
Live Time: 7200.00 Real Time: 7238.48 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3639.CHN
Background File: C:\USER\ALPHA\BKGND\B0003557.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3639

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	406.88	367	417	2.00	2.00	4.08	10.92	0.09
2.	337.01	307	357	2.00	1.00	0.96	6.04	0.05
Tracer	285.35	255	305	6.00	19.00	0.96	182.04	1.52

D E C A Y C O R R E C T E D R E S U L T S

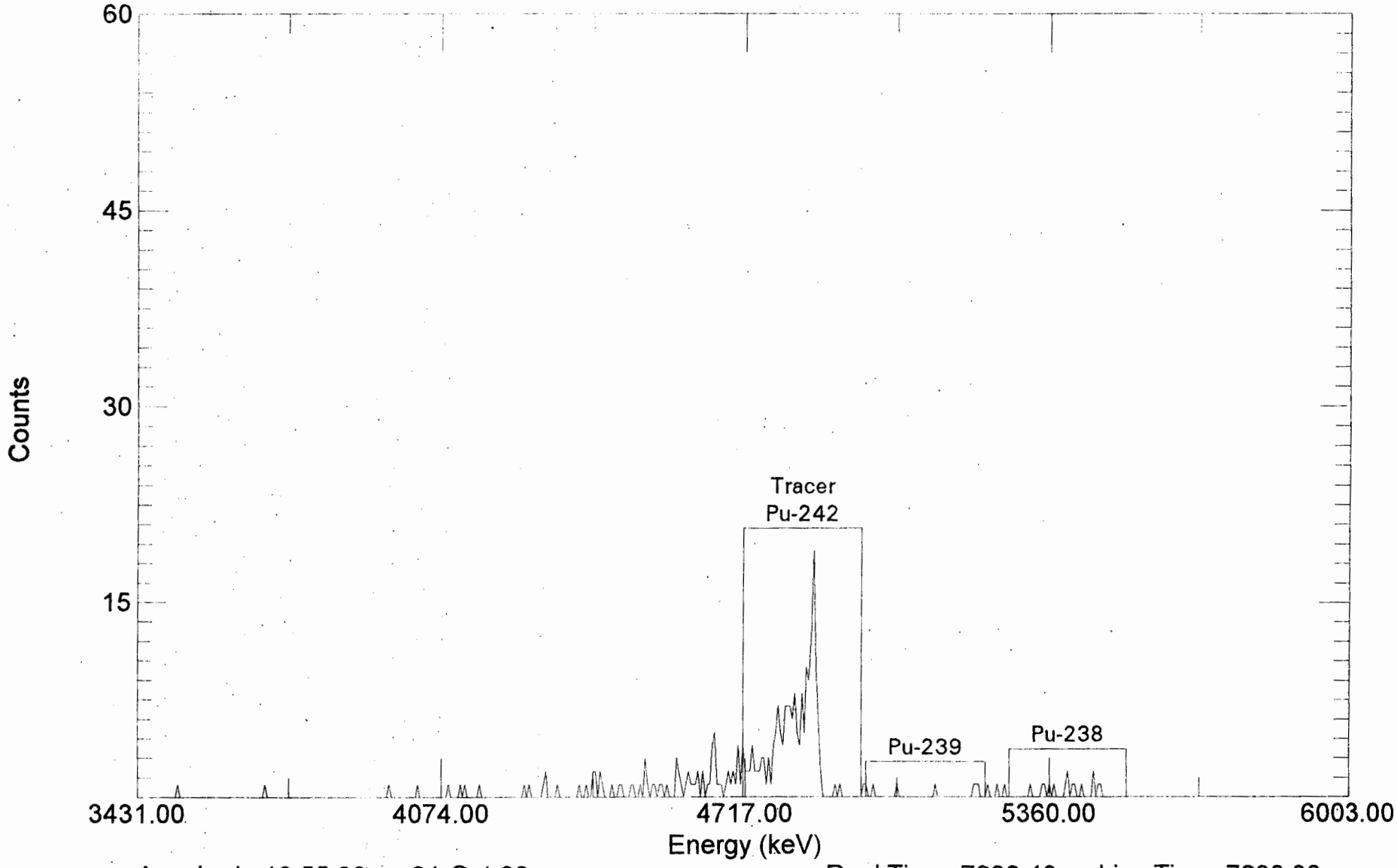
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.730	1.0000	0.60	0.45	70.06
2.	Pu-239	0.73	5156.60	9.878	1.0000	0.33	0.33	86.19
Tracer	Pu-242	0.78	4900.00	29.963	3.0000	9.99	0.33	14.49

T O T A L S		% Recovery
Gross Count	289.0000	100.00
Net Area	276.2800	95.60
Background	12.7200	4.40
Composite Fit	205.0000	70.93
Residuals	71.2800	24.66

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3639 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:55:30 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3639.CHN
Sample: 985892-1 ISO PU

Real Time: 7238.48 s. Live Time: 7200.00 s.
Detector: #32 MCB 3 Input 8 (Det #32)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: 985892-1ms ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 4 Input 1 (Det #33)
Efficiency: 24.86% Chem. Recovery: 42.04%
Total Eff.: 10.45% Manual:100.00%
CALIBRATION: 3455.85 + 5.24346 * Chn + -0.000964 Chn **2 keV
Original: 3455.85 + 5.3442 * Chn + -0.000964 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03502.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:55:53
Live Time: 7200.00 Real Time: 7205.10 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3640.CHN
Background File: C:\USER\ALPHA\BKGND\B0003558.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3640

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	422.49	373	423	2.00	2.00	2.88	5.12	0.04
2.	346.42	300	356	2.00	6.00	1.92	98.08	0.82
Tracer	290.99	249	299	4.00	9.00	0.72	125.28	1.04

D E C A Y C O R R E C T E D R E S U L T S

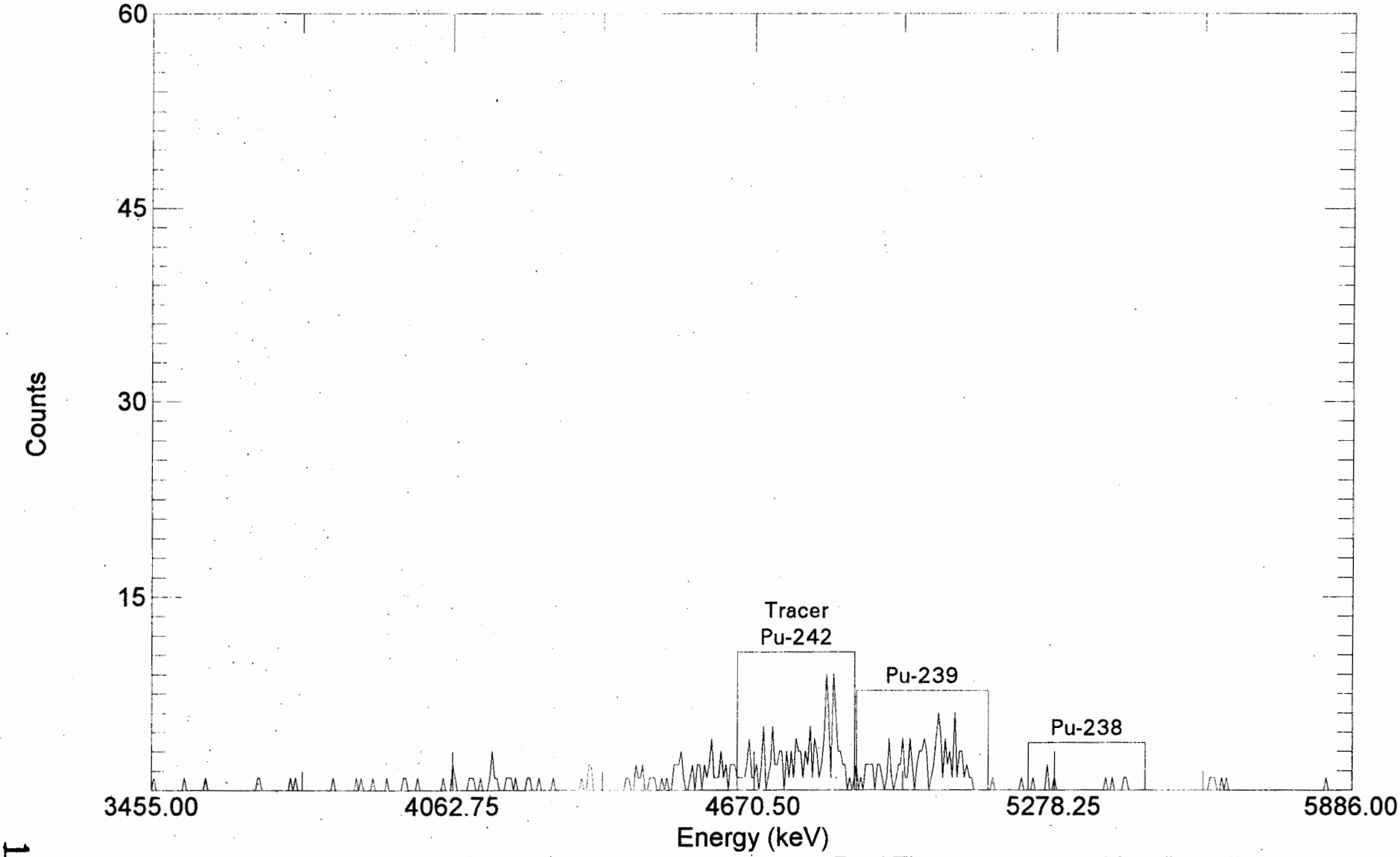
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	8.858	1.0000	0.41	0.60	109.39
2.	Pu-239	0.73	5156.60	9.151	1.0000	7.82	0.54	19.99
Tracer	Pu-242	0.78	4900.00	18.730	2.0000	9.99	0.45	17.46

T O T A L S		% Recovery
Gross Count	338.0000	100.00
Net Area	326.9600	96.73
Background	11.0400	3.27
Composite Fit	234.0000	69.23
Residuals	92.9600	27.50

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3640 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:55:53 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3640.CHN
Sample: 985892-1ms ISO PU

Real Time: 7205.10 s. Live Time: 7200.00 s.
Detector: #33 MCB 4 Input 1 (Det #33)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985892-1msd ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 4 Input 2 (Det #34)
Efficiency: 23.95% Chem. Recovery: 60.52%
Total Eff.: 14.49% Manual:100.00%
CALIBRATION: 3459.08 + 5.23742 * Chn + -0.000554 Chn **2 keV
Original: 3459.08 + 5.2729 * Chn + -0.000554 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03503.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:56:11
Live Time: 7200.00 Real Time: 7205.10 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3641.CHN
Background File: C:\USER\ALPHA\BKGND\B0003559.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3641

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	407.03	364	414	2.00	2.00	2.16	15.84	0.13
2.	336.06	298	354	4.00	10.00	0.72	170.28	1.42
Tracer	283.63	247	297	4.00	10.00	0.24	173.76	1.45

D E C A Y C O R R E C T E D R E S U L T S

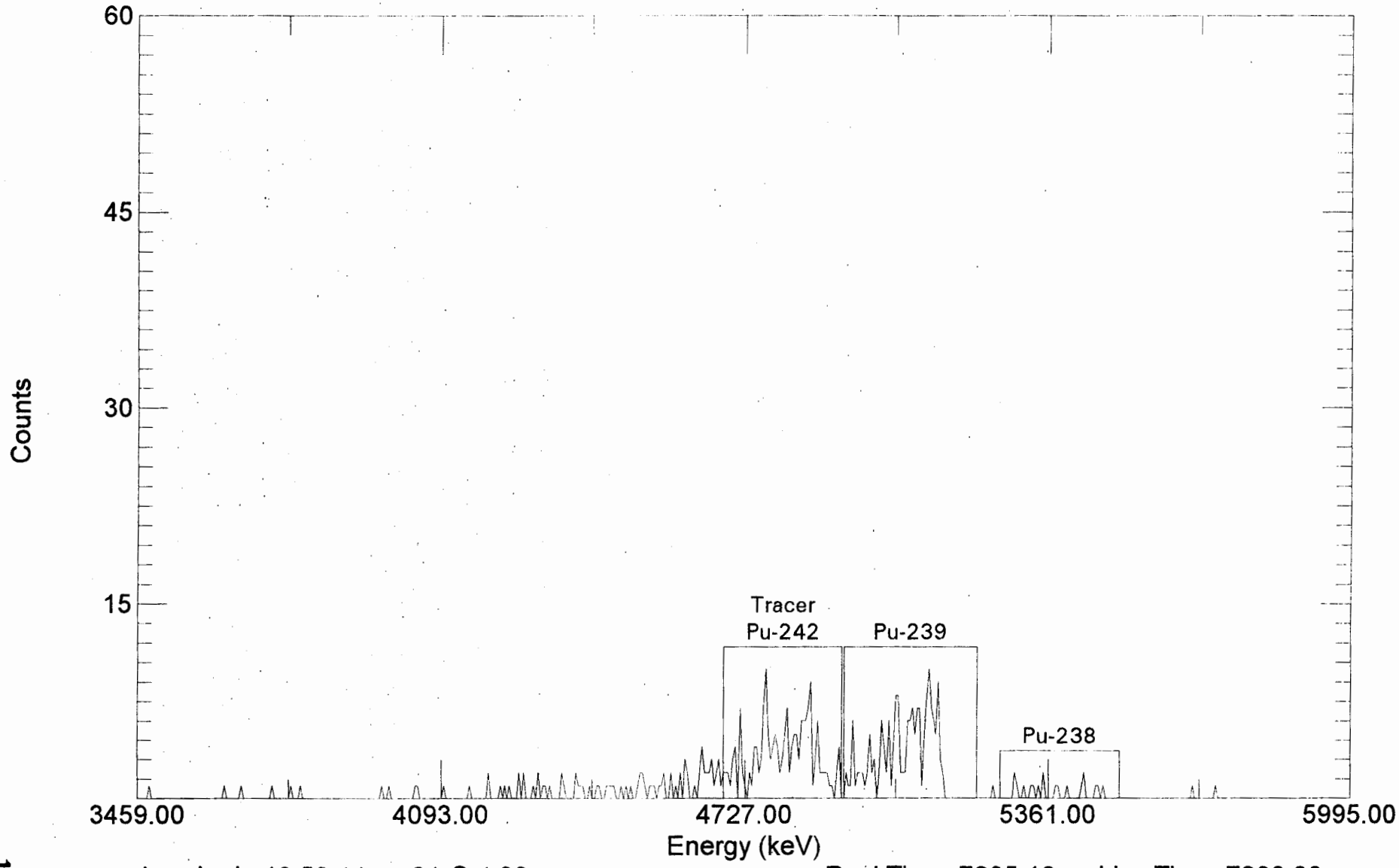
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.573	1.0000	0.91	0.40	52.68
2.	Pu-239	0.73	5156.60	19.460	2.0000	9.79	0.33	15.05
Tracer	Pu-242	0.78	4900.00	19.693	2.0000	9.99	0.28	14.86

T O T A L S		% Recovery
Gross Count	457.0000	100.00
Net Area	450.5200	98.58
Background	6.4800	1.42
Composite Fit	363.0000	79.43
Residuals	87.5200	19.15

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3641 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:56:11 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3641.CHN
Sample: 985892-1msd ISO PU

Real Time: 7205.10 s. Live Time: 7200.00 s.
Detector: #34 MCB 4 Input 2 (Det #34)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: 985892-2 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 4 Input 3 (Det #35)
Efficiency: 20.32% Chem. Recovery: 58.61%
Total Eff.: 11.91% Manual:100.00%
CALIBRATION: 3403.69 + 5.48908 * Chn + -0.000906 Chn **2 keV
Original: 3403.69 + 5.5558 * Chn + -0.000906 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03504.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:56:27
Live Time: 7200.00 Real Time: 7205.12 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3642.CHN
Background File: C:\USER\ALPHA\BKGND\B0003560.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3642

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	409.40	369	419	2.00	3.00	2.64	19.36	0.16
2.	338.23	308	358	2.00	1.00	0.48	2.52	0.02
Tracer	286.11	256	306	6.00	14.00	0.24	142.76	1.19

D E C A Y C O R R E C T E D R E S U L T S

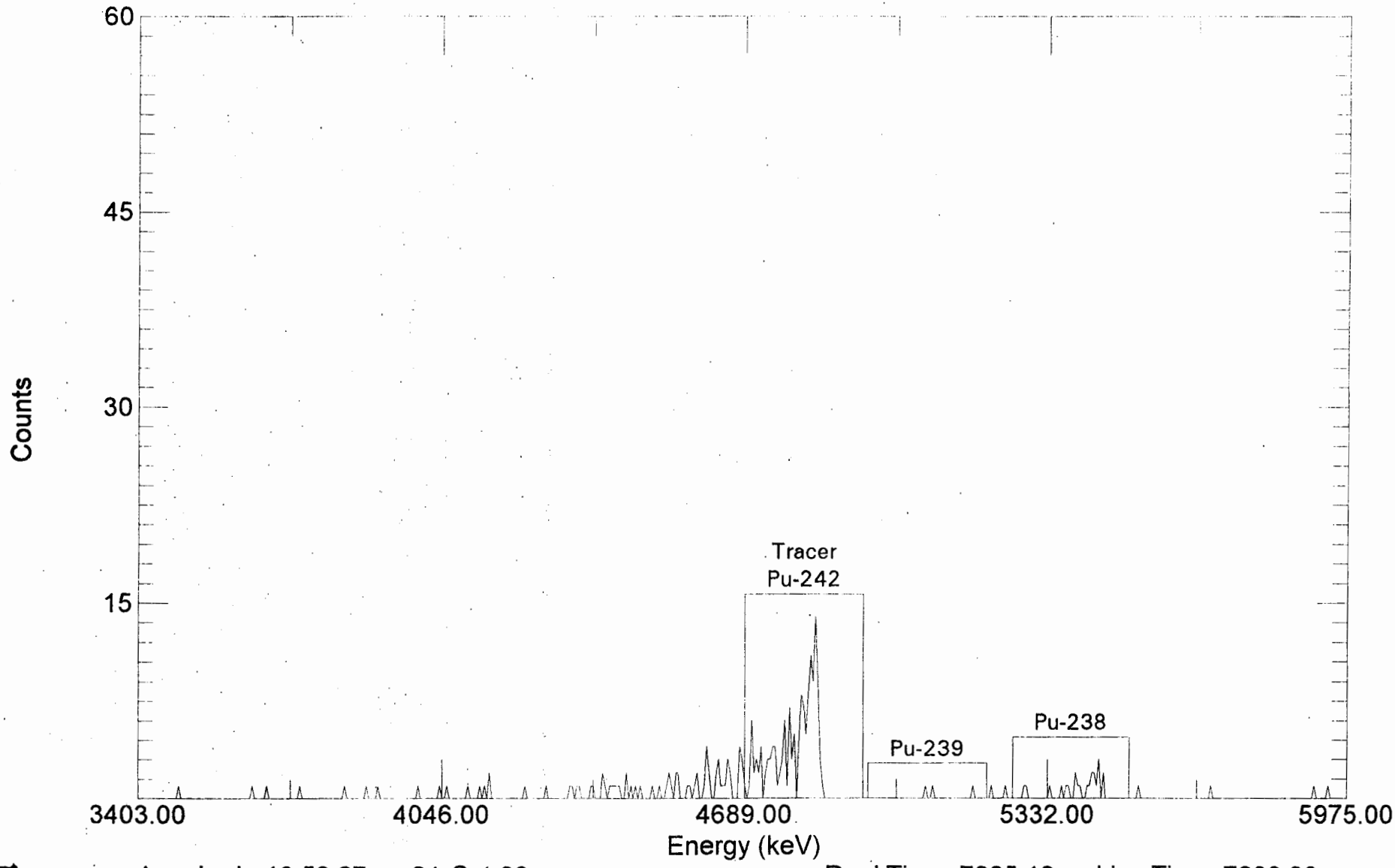
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.494	1.0000	1.35	0.51	47.65
2.	Pu-239	0.73	5156.60	9.752	1.0000	0.18	0.37	135.33
Tracer	Pu-242	0.78	4900.00	29.824	3.0000	9.99	0.34	16.39

T O T A L S		% Recovery
Gross Count	252.0000	100.00
Net Area	244.0800	96.86
Background	7.9200	3.14
Composite Fit	168.0000	66.67
Residuals	76.0800	30.19

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3642 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:56:27 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3642.CHN
Sample: 985892-2 ISO PU

Real Time: 7205.12 s. Live Time: 7200.00 s.
Detector: #35 MCB 4 Input 3 (Det #35)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985892-3 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 4 Input 4 (Det #36)
Efficiency: 22.13% Chem. Recovery: 62.59%
Total Eff.: 13.85% Manual:100.00%
CALIBRATION: 3359.6 + 5.82846 * Chn + -0.0015 Chn **2 keV
Original: 3359.6 + 5.9061 * Chn + -0.0015 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03505.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:56:43
Live Time: 7200.00 Real Time: 7205.12 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3643.CHN
Background File: C:\USER\ALPHA\BKGND\B0003561.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3643

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	410.42	364	414	4.00	3.00	5.28	28.72	0.24
2.	337.66	302	352	2.00	1.00	1.68	4.32	0.04
Tracer	285.23	242	296	4.00	12.00	0.96	166.04	1.38

D E C A Y C O R R E C T E D R E S U L T S

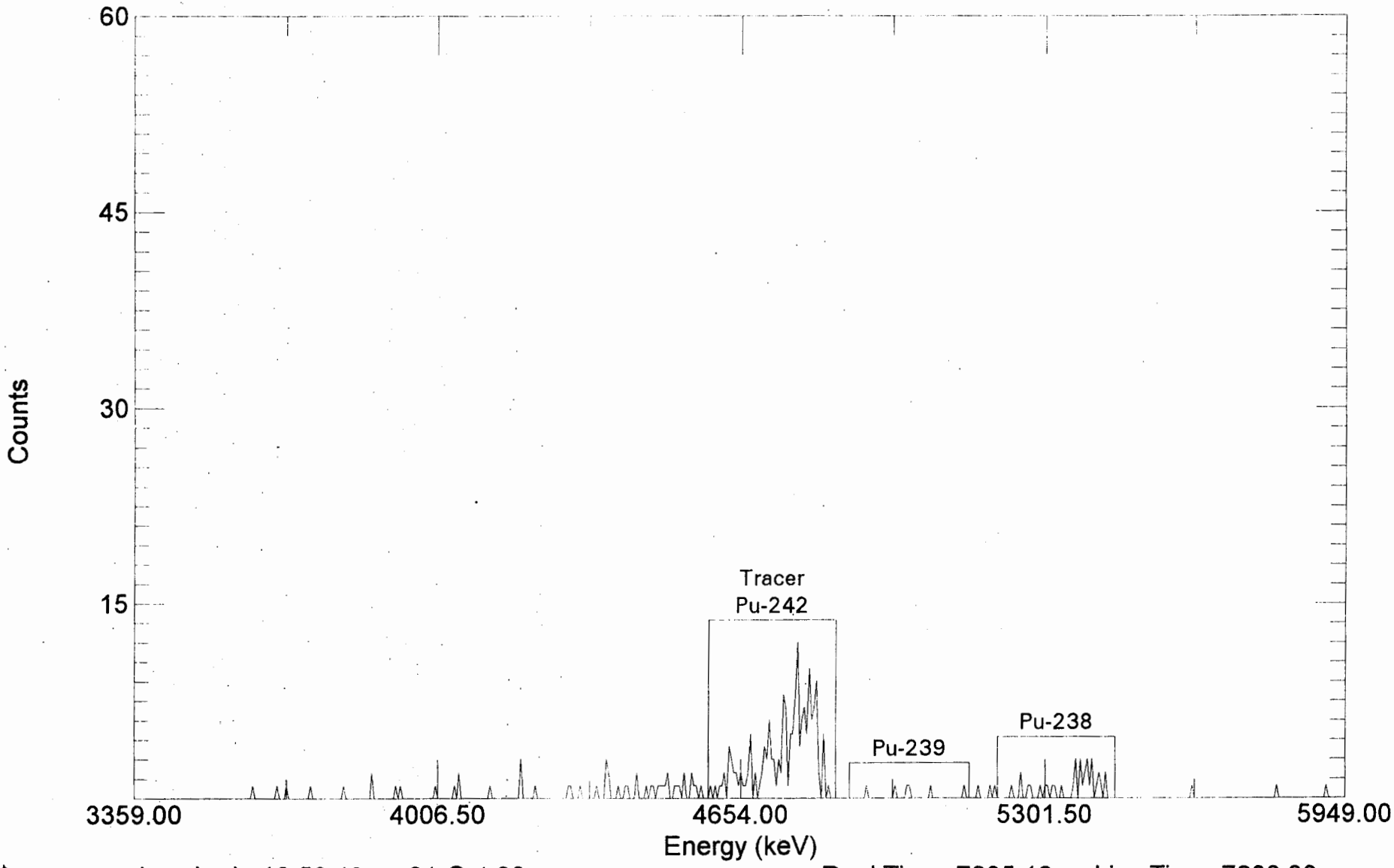
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	18.389	2.0000	1.73	0.53	39.97
2.	Pu-239	0.73	5156.60	9.631	1.0000	0.26	0.40	112.03
Tracer	Pu-242	0.78	4900.00	19.891	2.0000	9.99	0.36	15.17

T O T A L S		% Recovery
Gross Count	264.0000	100.00
Net Area	245.7600	93.09
Background	18.2400	6.91
Composite Fit	207.0000	78.41
Residuals	38.7600	14.68

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3643 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:56:43 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3643.CHN
Sample: 985892-3 ISO PU

Real Time: 7205.12 s. Live Time: 7200.00 s.
Detector: #36 MCB 4 Input 4 (Det #36)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985892-3md ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 4 Input 6 (Det #38)
Efficiency: 20.11% Chem. Recovery:101.44%
Total Eff.: 20.40% Manual:100.00%
CALIBRATION: 3526.18 + 4.80772 * Chn + -0.000108 Chn **2 keV
Original: 3526.18 + 4.8964 * Chn + -0.000108 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03507.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:57:07
Live Time: 7200.00 Real Time: 7204.34 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3644.CHN
Background File: C:\USER\ALPHA\BKGND\B0003563.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3644

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	414.21	374	424	2.00	4.00	6.72	20.28	0.17
2.	341.75	312	362	6.00	1.00	1.44	8.56	0.07
Tracer	287.61	258	308	2.00	14.00	1.44	244.56	2.04

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.437	1.0000	0.83	0.38	50.58
2.	Pu-239	0.73	5156.60	28.403	3.0000	0.35	0.26	72.71
Tracer	Pu-242	0.78	4900.00	9.491	1.0000	9.99	0.26	12.50

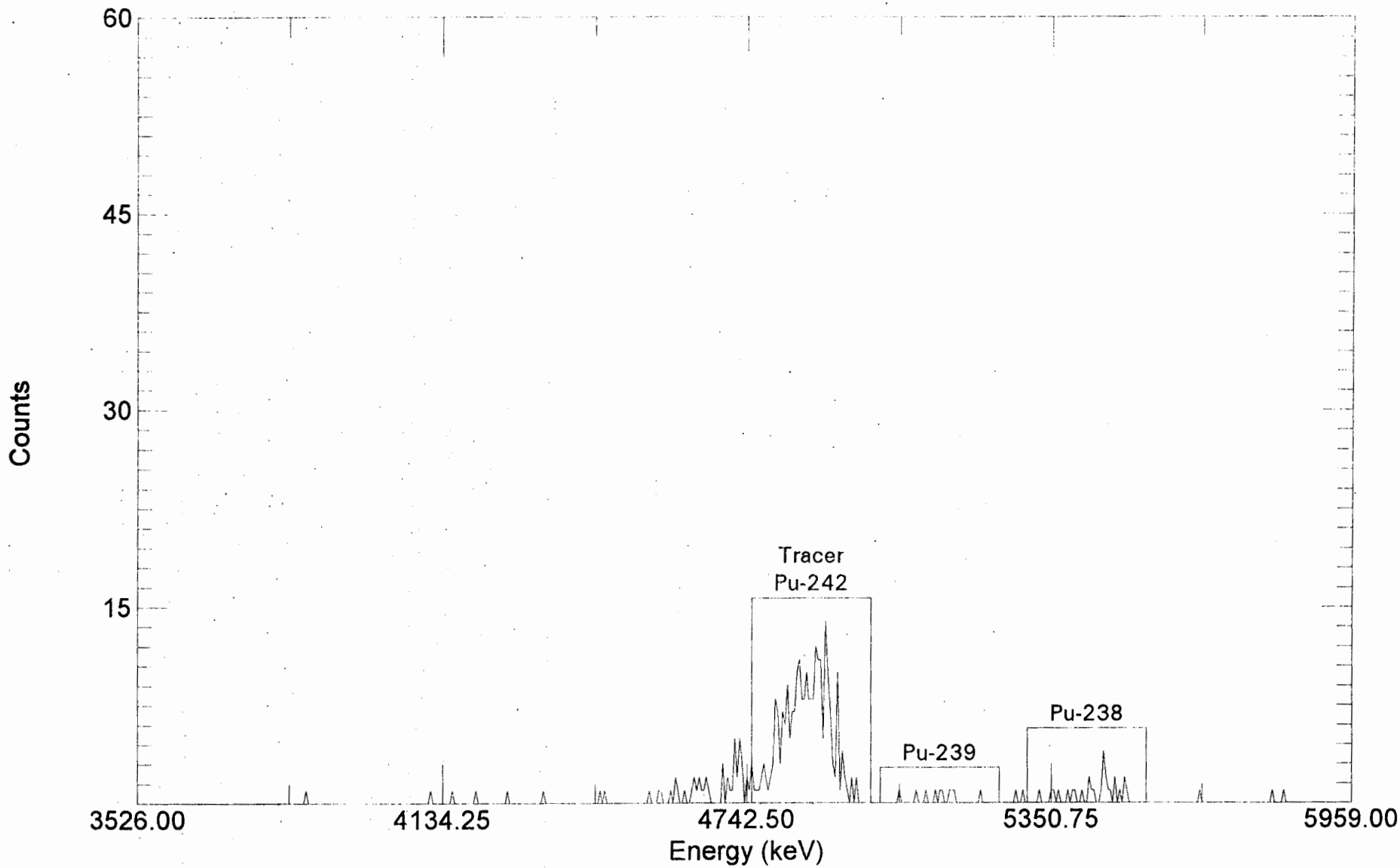
T O T A L S		% Recovery
Gross Count	340.0000	100.00
Net Area	322.7200	94.92
Background	17.2800	5.08
Composite Fit	283.0000	83.24
Residuals	39.7200	11.68

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3644

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:57:07 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3644.CHN
Sample: 985892-3md ISO PU

Real Time: 7204.34 s. Live Time: 7200.00 s.
Detector: #38 MCB 4 Input 6 (Det #38)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985898-1 ISO PU
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 4 Input 7 (Det #39)
Efficiency: 23.08% Chem. Recovery: 45.37%
Total Eff.: 10.47% Manual:100.00%
CALIBRATION: 3619.64 + 4.32789 * Chn + 0.000587 Chn **2 keV
Original: 3619.64 + 4.396 * Chn + 0.000587 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03508.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:57:27
Live Time: 7200.00 Real Time: 7203.38 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3645.CHN
Background File: C:\USER\ALPHA\BKGND\B0003564.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3645

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	411.31	371	421	2.00	3.00	3.60	14.40	0.12
2.	339.50	309	359	2.00	1.00	1.44	3.56	0.03
Tracer	284.84	255	305	2.00	12.00	0.48	125.52	1.05

D E C A Y C O R R E C T E D R E S U L T S

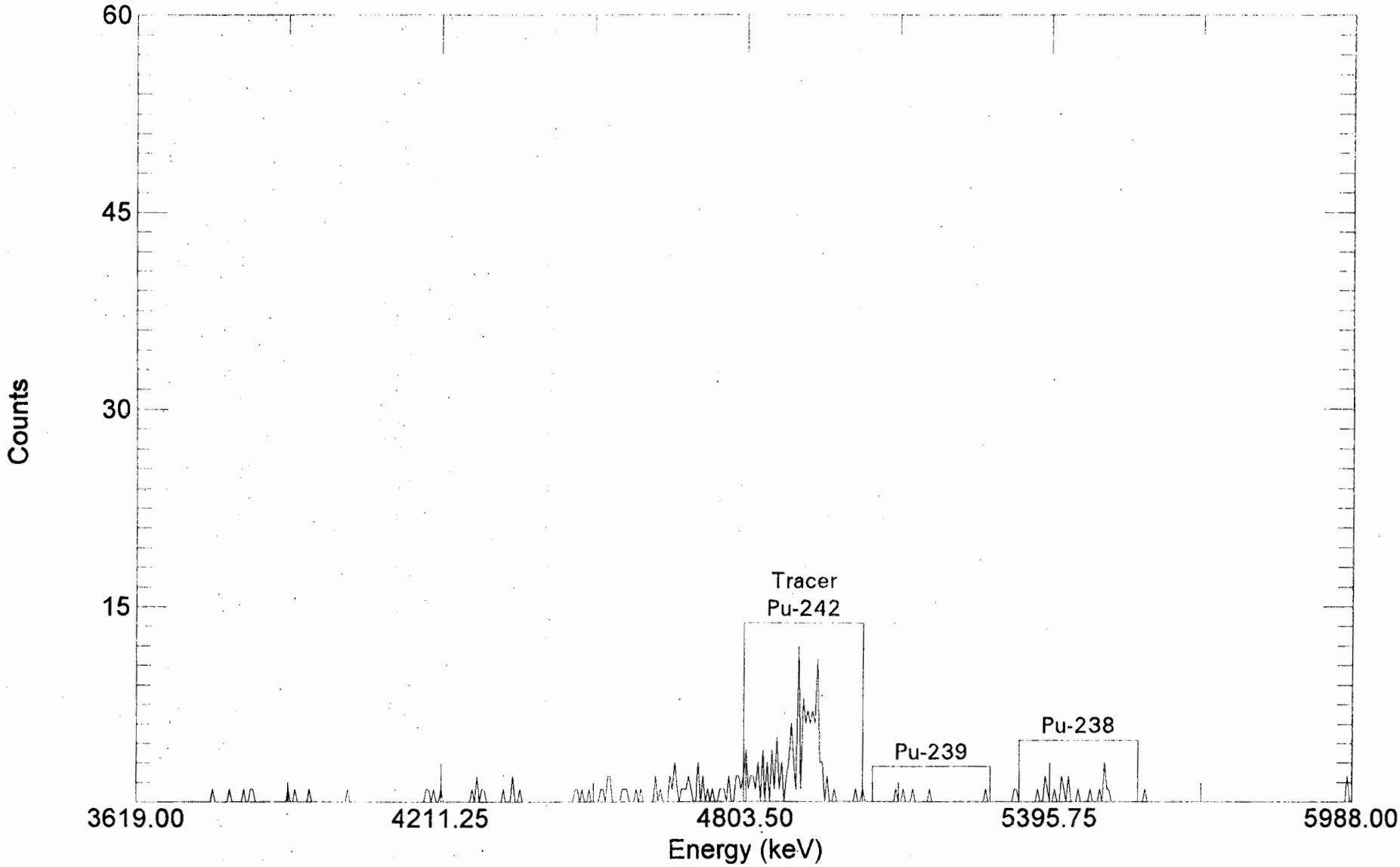
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.622	1.0000	1.15	0.63	58.08
2.	Pu-239	0.73	5156.60	9.453	1.0000	0.28	0.51	124.13
Tracer	Pu-242	0.78	4900.00	9.325	1.0000	9.99	0.42	17.46

T O T A L S		% Recovery
Gross Count	224.0000	100.00
Net Area	211.5200	94.43
Background	12.4800	5.57
Composite Fit	149.0000	66.52
Residuals	62.5200	27.91

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3645 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:57:27 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3645.CHN
Sample: 985898-1 ISO PU

Real Time: 7203.38 s. Live Time: 7200.00 s.
Detector: #39 MCB 4 Input 7 (Det #39)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985842\5892\5898-MB1PU1015
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 4 Input 8 (Det #40)
Efficiency: 22.69% Chem. Recovery: 75.20%
Total Eff.: 17.06% Manual:100.00%
CALIBRATION: 3562.72 + 4.57788 * Chn + 0.000303 Chn **2 keV
Original: 3562.72 + 4.6611 * Chn + 0.000303 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03509.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:57:46
Live Time: 7200.00 Real Time: 7202.52 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3646.CHN
Background File: C:\USER\ALPHA\BKGND\B0003565.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3646

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	411.76	372	422	4.00	3.00	4.56	23.44	0.20
2.	340.50	310	360	2.00	1.00	1.44	2.56	0.02
Tracer	286.68	257	307	6.00	16.00	1.44	204.56	1.70

D E C A Y C O R R E C T E D R E S U L T S

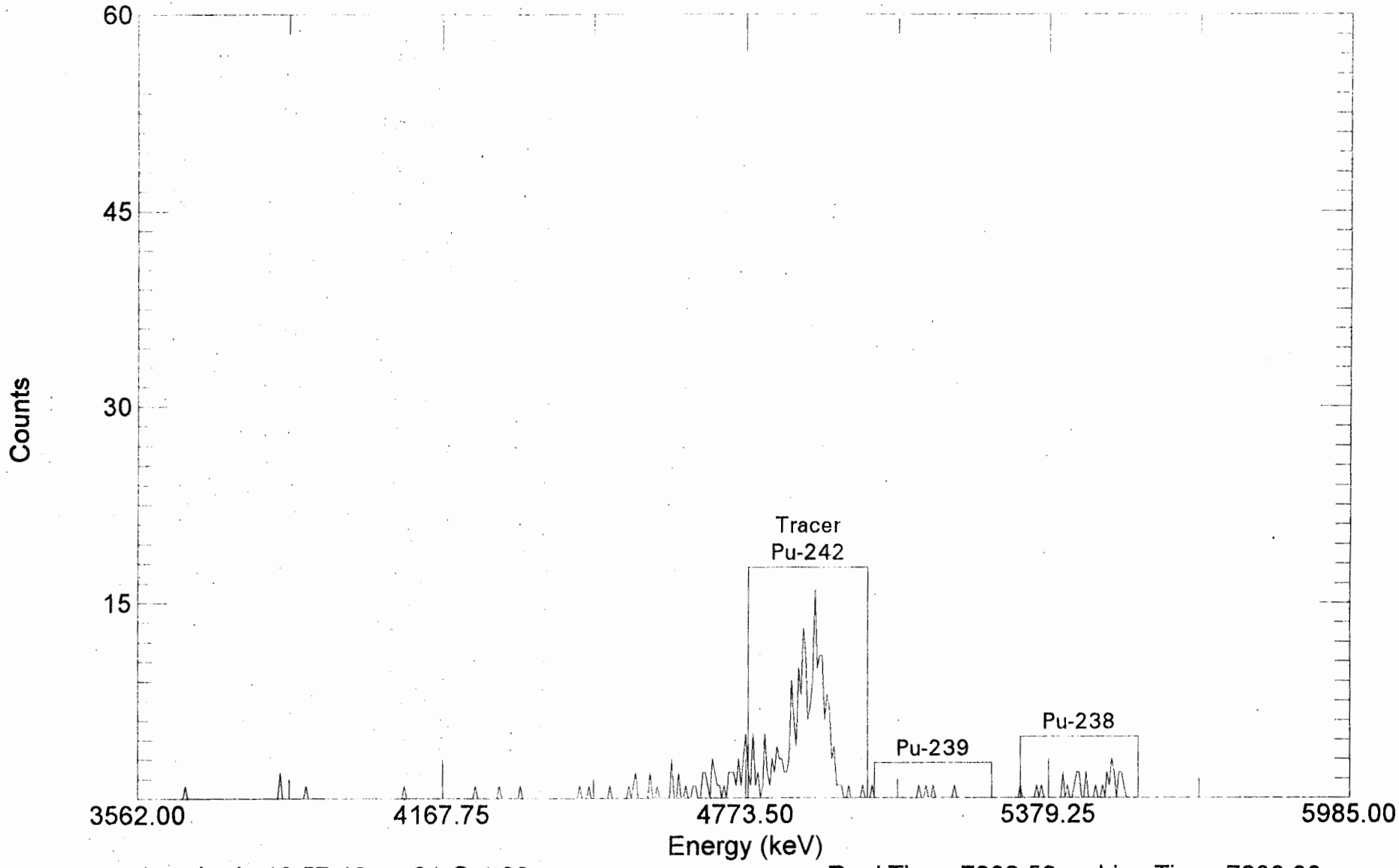
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	19.310	2.0000	1.14	0.41	44.45
2.	Pu-239	0.73	5156.60	9.568	1.0000	0.13	0.31	154.70
Tracer	Pu-242	0.78	4900.00	28.510	3.0000	9.99	0.31	13.66

T O T A L S		% Recovery
Gross Count	297.0000	100.00
Net Area	284.2800	95.72
Background	12.7200	4.28
Composite Fit	238.0000	80.13
Residuals	46.2800	15.58

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3646 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:57:46 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3646.CHN
Sample: 985842\5892\5898-MB1PU1015

Real Time: 7202.52 s. Live Time: 7200.00 s.
Detector: #40 MCB 4 Input 8 (Det #40)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: 985847\5892\5898-LCS1PU1015
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 5 Input 1 (Det #41)
Efficiency: 24.63% Chem. Recovery: 62.66%
Total Eff.: 15.43% Manual:100.00%
CALIBRATION: 3418.49 + 5.45427 * Chn + -0.0011 Chn **2 keV
Original: 3418.49 + 5.5496 * Chn + -0.0011 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03510.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 16:58:22
Live Time: 7200.00 Real Time: 7200.04 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3647.CHN
Background File: C:\USER\ALPHA\BKGND\B0003566.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3647

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	416.43	368	418	2.00	2.00	0.72	20.28	0.17
2.	342.30	297	356	6.00	11.00	1.92	184.08	1.53
Tracer	288.40	248	296	10.00	13.00	0.00	185.00	1.54

D E C A Y C O R R E C T E D R E S U L T S

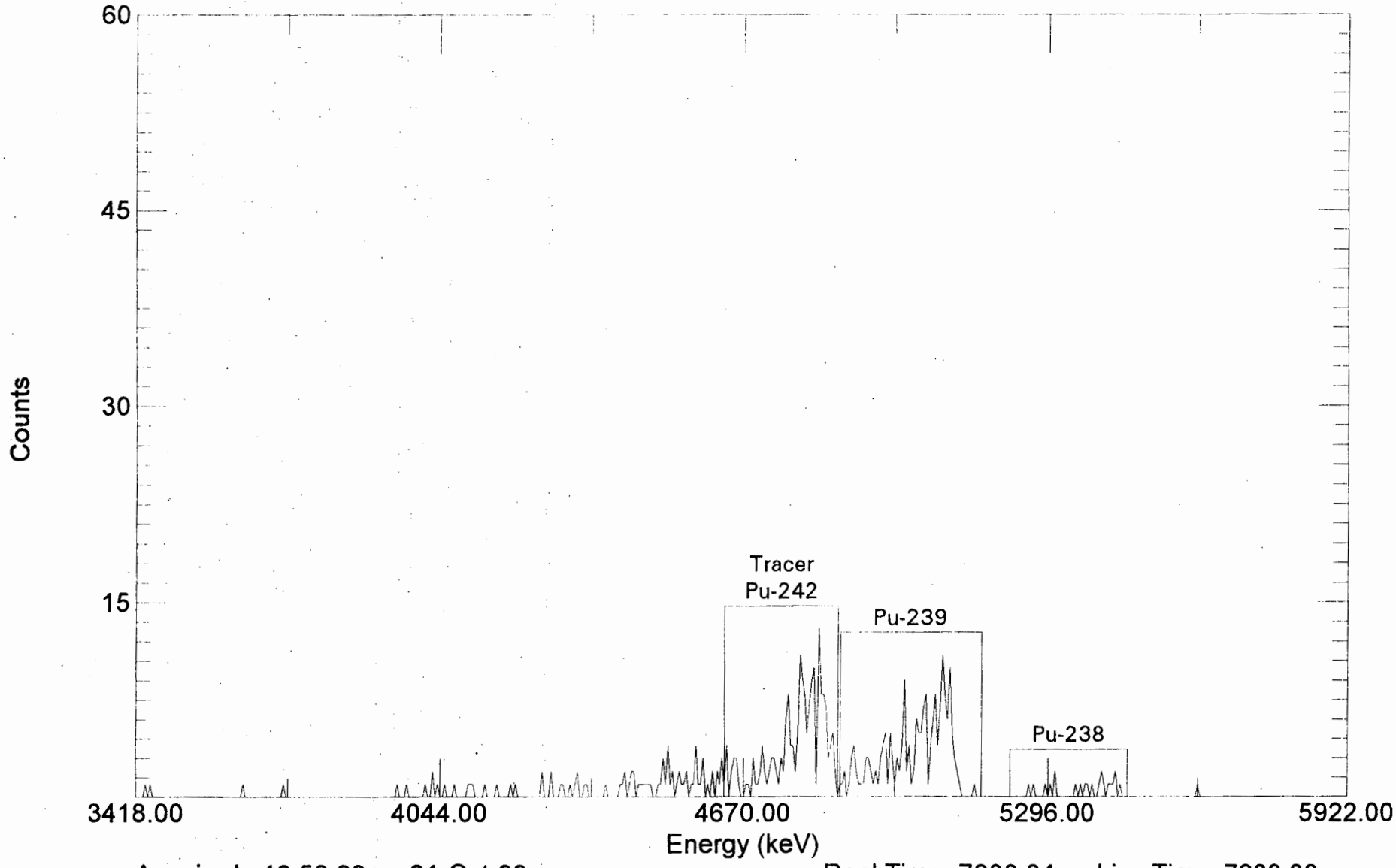
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.076	1.0000	1.10	0.31	44.33
2.	Pu-239	0.73	5156.60	28.207	3.0000	9.94	0.37	14.53
Tracer	Pu-242	0.78	4900.00	48.198	5.0000	9.99	0.21	14.41

T O T A L S		% Recovery
Gross Count	480.0000	100.00
Net Area	473.7600	98.70
Background	6.2400	1.30
Composite Fit	392.0000	81.67
Residuals	81.7600	17.03

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3647 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 16:58:22 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3647.CHN
Sample: 985847\5892\5898-LCS1PU1015

Real Time: 7200.04 s. Live Time: 7200.00 s.
Detector: #41 MCB 5 Input 1 (Det #41)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-7 ISO PU rerun
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 3 Input 8 (Det #32)
Efficiency: 21.11% Chem. Recovery: 87.63%
Total Eff.: 18.50% Manual:100.00%
CALIBRATION: 3343.57 + 5.93236 * Chn + -0.0016 Chn **2 keV
Original: 3343.57 + 5.9906 * Chn + -0.0016 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03794.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 29-Oct-98 17:20:07
Live Time: 7200.00 Real Time: 7200.26 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3982.CHN
Background File: C:\USER\ALPHA\BKGND\B0003734.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3982

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	408.31	368	418	2.00	5.00	3.12	29.88	0.25
2.	336.08	306	356	2.00	2.00	0.72	6.28	0.05
Tracer	284.14	249	299	6.00	19.00	0.24	221.76	1.85

D E C A Y C O R R E C T E D R E S U L T S

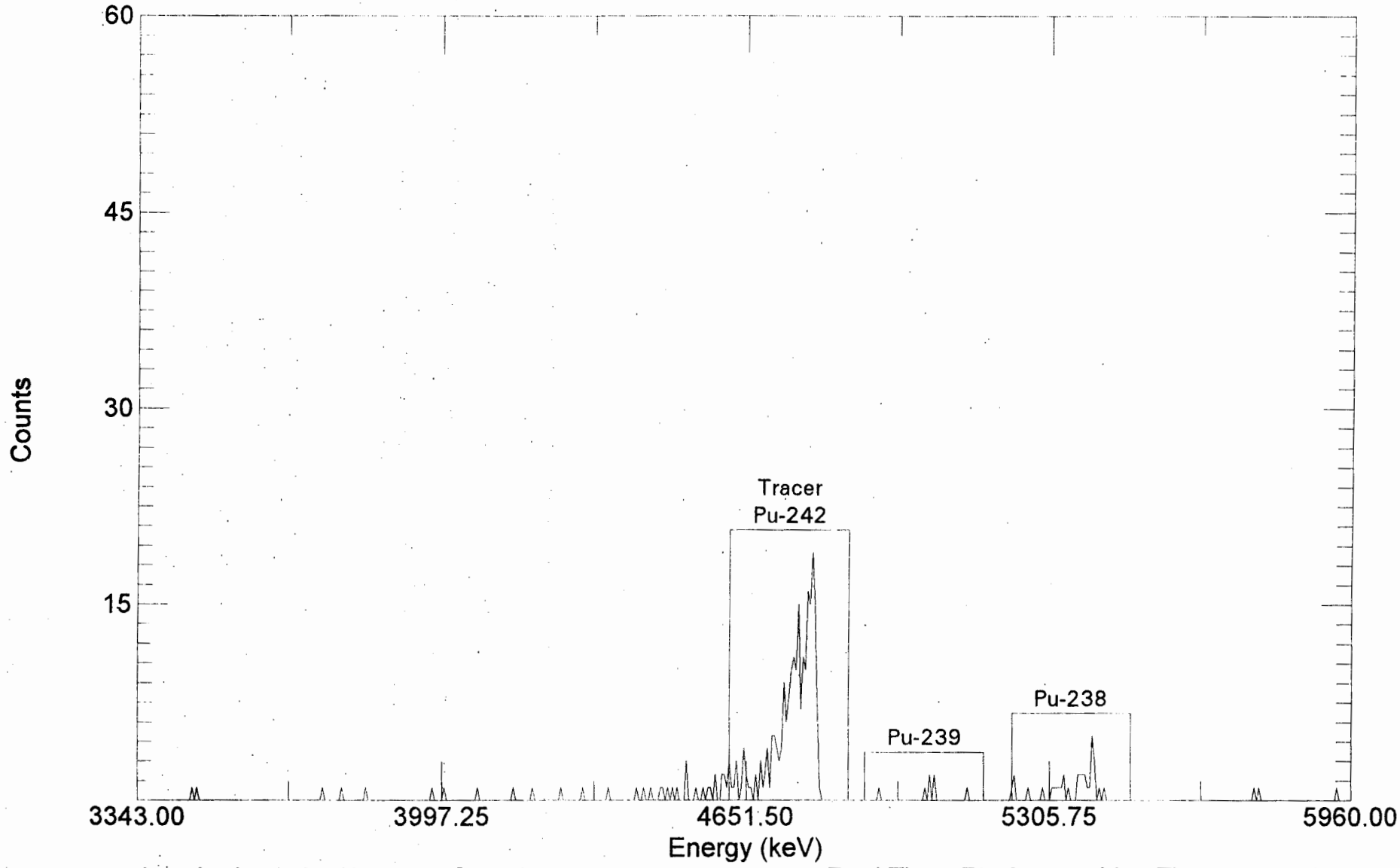
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.252	1.0000	1.35	0.34	37.78
2.	Pu-239	0.73	5156.60	9.714	1.0000	0.28	0.25	82.82
Tracer	Pu-242	0.78	4900.00	30.139	3.0000	9.99	0.22	13.15

T O T A L S		% Recovery
Gross Count	300.0000	100.00
Net Area	290.8800	96.96
Background	9.1200	3.04
Composite Fit	262.0000	87.33
Residuals	28.8800	9.63

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3982 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:20:07 on 29-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3982.CHN
Sample: 985847-7 ISO PU rerun

Real Time: 7200.26 s. Live Time: 7200.00 s.
Detector: #32 MCB 3 Input 8 (Det #32)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-7ms ISO PU rerun
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 4 Input 1 (Det #33)
Efficiency: 24.45% Chem. Recovery: 83.34%
Total Eff.: 20.38% Manual:100.00%
CALIBRATION: 3599.38 + 4.43159 * Chn + 0.00027 Chn **2 keV
Original: 3599.38 + 4.5034 * Chn + 0.00027 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03819.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 29-Oct-98 17:20:27
Live Time: 7200.00 Real Time: 7202.16 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3983.CHN
Background File: C:\USER\ALPHA\BKGND\B0003735.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3983

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	418.02	378	428	4.00	3.00	2.64	23.36	0.19
2.	344.17	314	364	4.00	24.00	0.48	280.52	2.34
Tracer	288.42	253	303	12.00	15.00	0.72	244.28	2.04

D E C A Y C O R R E C T E D R E S U L T S

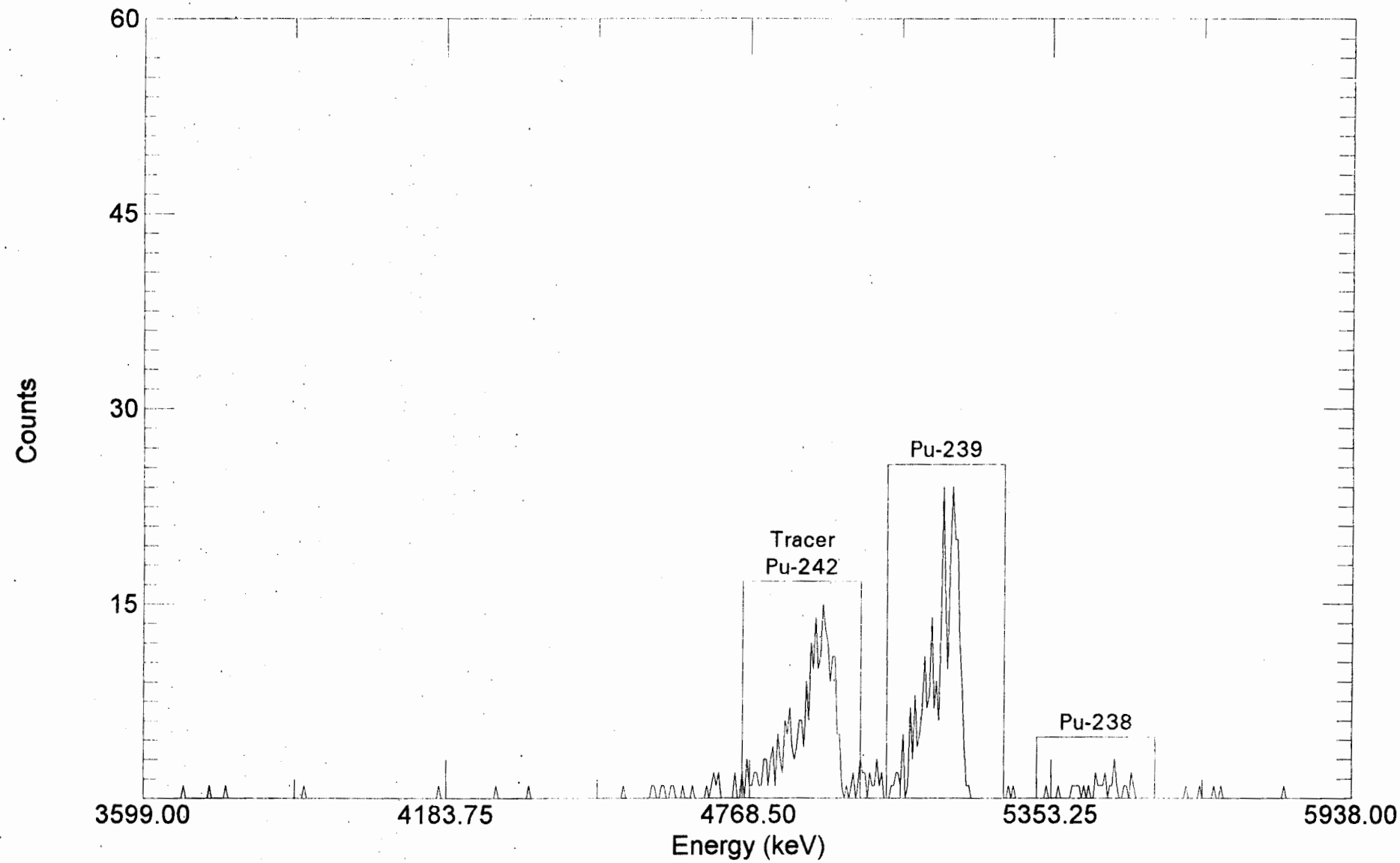
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	18.629	2.0000	0.96	0.30	42.91
2.	Pu-239	0.73	5156.60	18.470	2.0000	11.47	0.22	11.71
Tracer	Pu-242	0.78	4900.00	55.048	6.0000	9.99	0.23	12.52

T O T A L S		% Recovery
Gross Count	598.0000	100.00
Net Area	587.4400	98.23
Background	10.5600	1.77
Composite Fit	552.0000	92.31
Residuals	35.4400	5.93

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3983 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:20:27 on 29-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3983.CHN
Sample: 985847-7ms ISO PU rerun

Real Time: 7202.16 s. Live Time: 7200.00 s.
Detector: #33 MCB 4 Input 1 (Det #33)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-8 ISO PU rerun
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 4 Input 2 (Det #34)
Efficiency: 24.70% Chem. Recovery: 72.27%
Total Eff.: 17.85% Manual:100.00%
CALIBRATION: 3493.91 + 4.99601 * Chn + -0.00021 Chn **2 keV
Original: 3493.91 + 5.0508 * Chn + -0.00021 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03820.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 29-Oct-98 17:20:43
Live Time: 7200.00 Real Time: 7202.14 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3984.CHN
Background File: C:\USER\ALPHA\BKGND\B0003736.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3984

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	408.36	368	418	2.00	3.00	0.72	21.28	0.18
2.	337.59	308	358	2.00	1.00	0.48	4.52	0.04
Tracer	284.85	250	300	8.00	18.00	0.00	214.00	1.78

D E C A Y C O R R E C T E D R E S U L T S

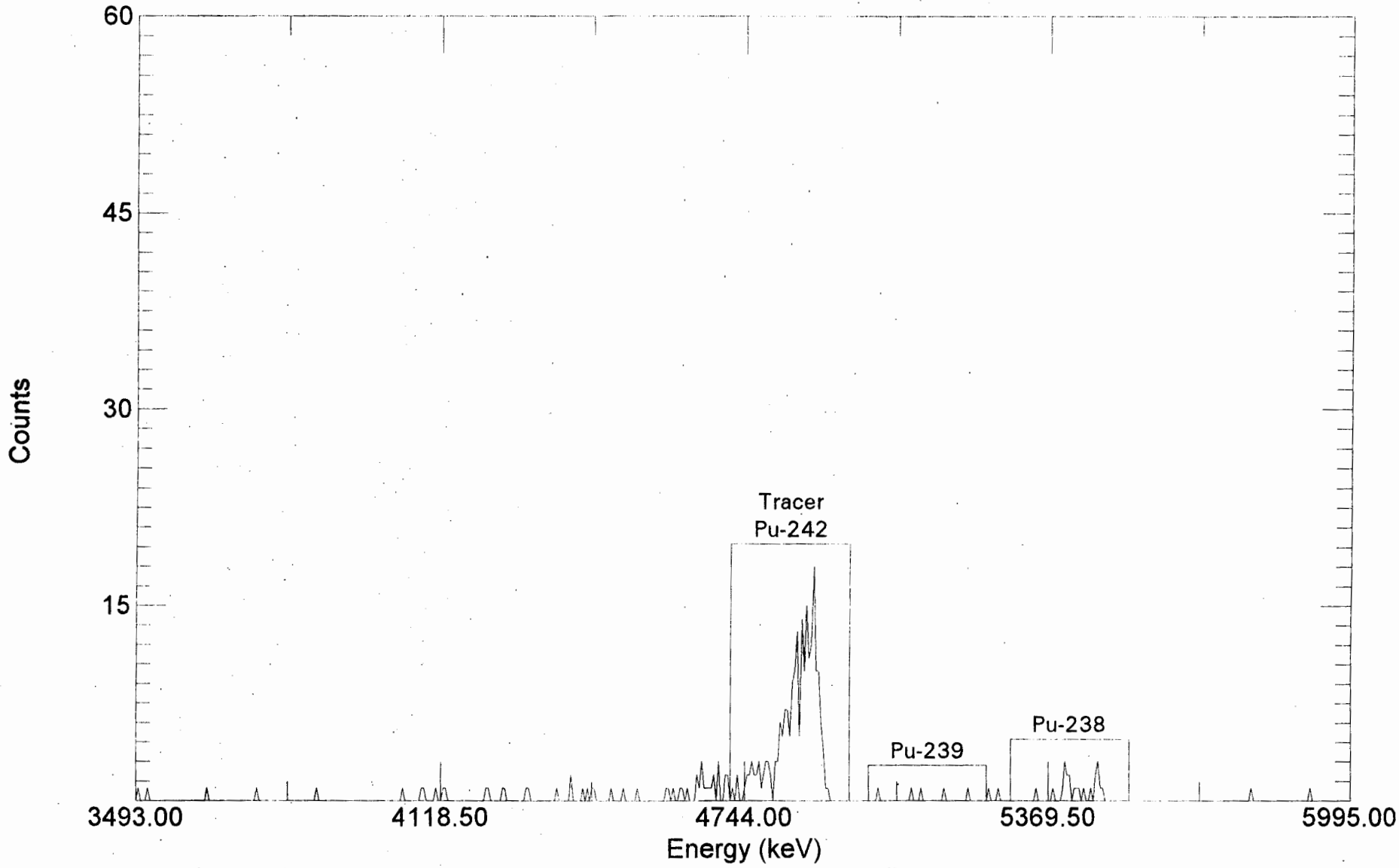
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.649	1.0000	0.99	0.26	43.24
2.	Pu-239	0.73	5156.60	9.708	1.0000	0.21	0.25	97.23
Tracer	Pu-242	0.78	4900.00	39.011	4.0000	9.99	0.18	13.40

T O T A L S		% Recovery
Gross Count	297.0000	100.00
Net Area	292.6800	98.55
Background	4.3200	1.45
Composite Fit	241.0000	81.14
Residuals	51.6800	17.40

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3984 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:20:43 on 29-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3984.CHN
Sample: 985847-8 ISO PU rerun

Real Time: 7202.14 s. Live Time: 7200.00 s.
Detector: #34 MCB 4 Input 2 (Det #34)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-8md ISO PU rerun
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 4 Input 3 (Det #35)
Efficiency: 20.05% Chem. Recovery: 73.02%
Total Eff.: 14.64% Manual:100.00%
CALIBRATION: 3379.96 + 5.69391 * Chn + -0.0013 Chn **2 keV
Original: 3379.96 + 5.741 * Chn + -0.0013 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03821.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 29-Oct-98 17:20:56
Live Time: 7200.00 Real Time: 7202.14 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3985.CHN
Background File: C:\USER\ALPHA\BKGND\B0003737.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3985

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	410.68	371	421	2.00	3.00	2.40	22.60	0.19
2.	338.13	308	358	2.00	1.00	0.24	2.76	0.02
Tracer	285.58	251	301	4.00	20.00	0.48	175.52	1.46

D E C A Y C O R R E C T E D R E S U L T S

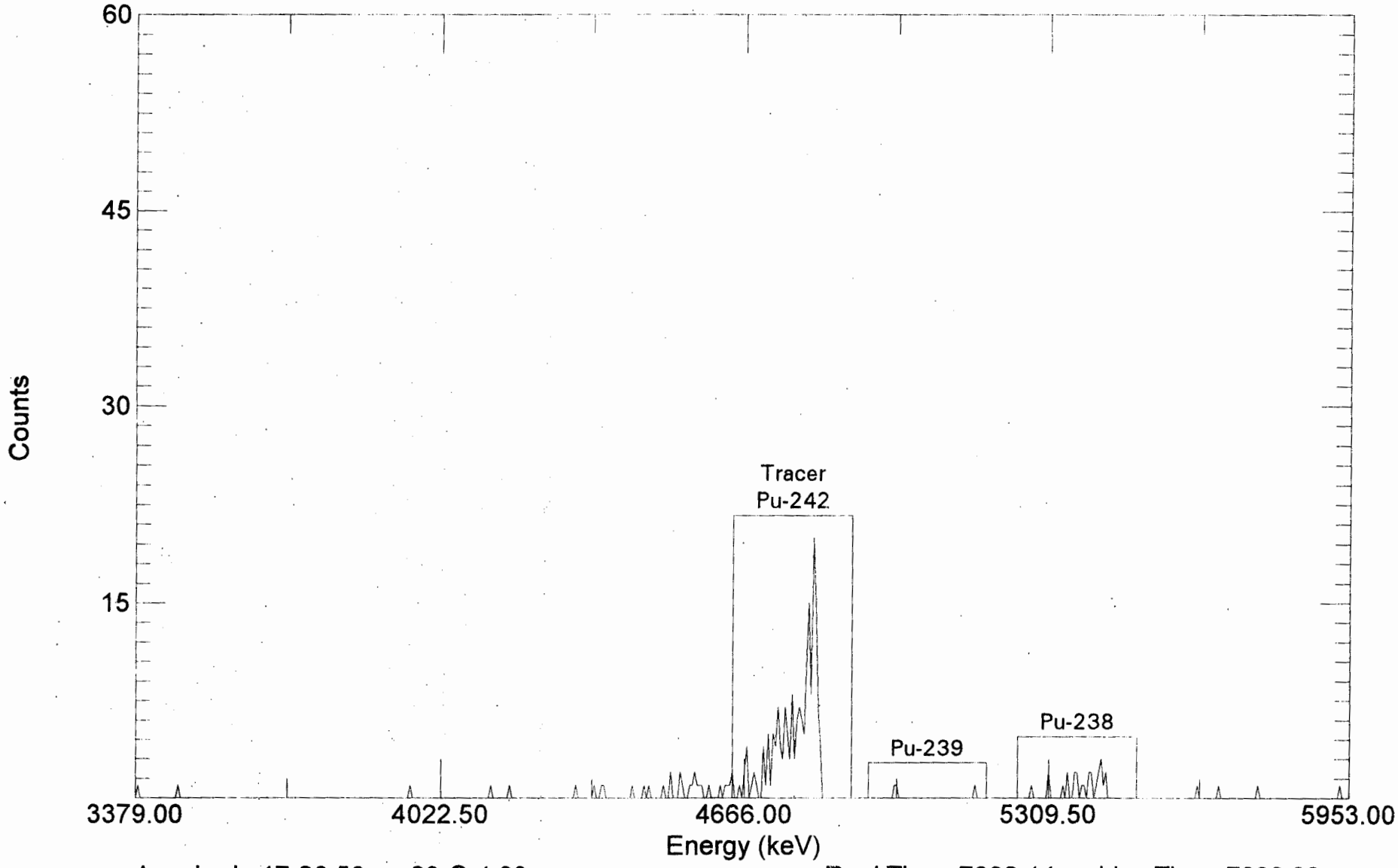
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.252	1.0000	1.29	0.41	43.48
2.	Pu-239	0.73	5156.60	9.630	1.0000	0.16	0.28	123.28
Tracer	Pu-242	0.78	4900.00	19.806	2.0000	9.99	0.30	14.77

T O T A L S		% Recovery
Gross Count	238.0000	100.00
Net Area	232.9600	97.88
Background	5.0400	2.12
Composite Fit	204.0000	85.71
Residuals	28.9600	12.17

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3985 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:20:56 on 29-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3985.CHN
Sample: 985847-8md ISO PU rerun

Real Time: 7202.14 s. Live Time: 7200.00 s.
Detector: #35 MCB 4 Input 3 (Det #35)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-MB1PU1028
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 4 Input 4 (Det #36)
Efficiency: 22.51% Chem. Recovery: 84.33%
Total Eff.: 18.98% Manual:100.00%
CALIBRATION: 3359.73 + 5.82455 * Chn + -0.0015 Chn **2 keV
Original: 3359.73 + 5.902 * Chn + -0.0015 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03822.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 29-Oct-98 17:21:11
Live Time: 7200.00 Real Time: 7202.16 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3986.CHN
Background File: C:\USER\ALPHA\BKGND\B0003738.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3986

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	410.75	371	421	2.00	5.00	3.84	33.16	0.28
2.	337.90	308	358	2.00	1.00	2.16	3.84	0.03
Tracer	285.42	250	300	10.00	15.00	1.44	227.56	1.90

D E C A Y C O R R E C T E D R E S U L T S

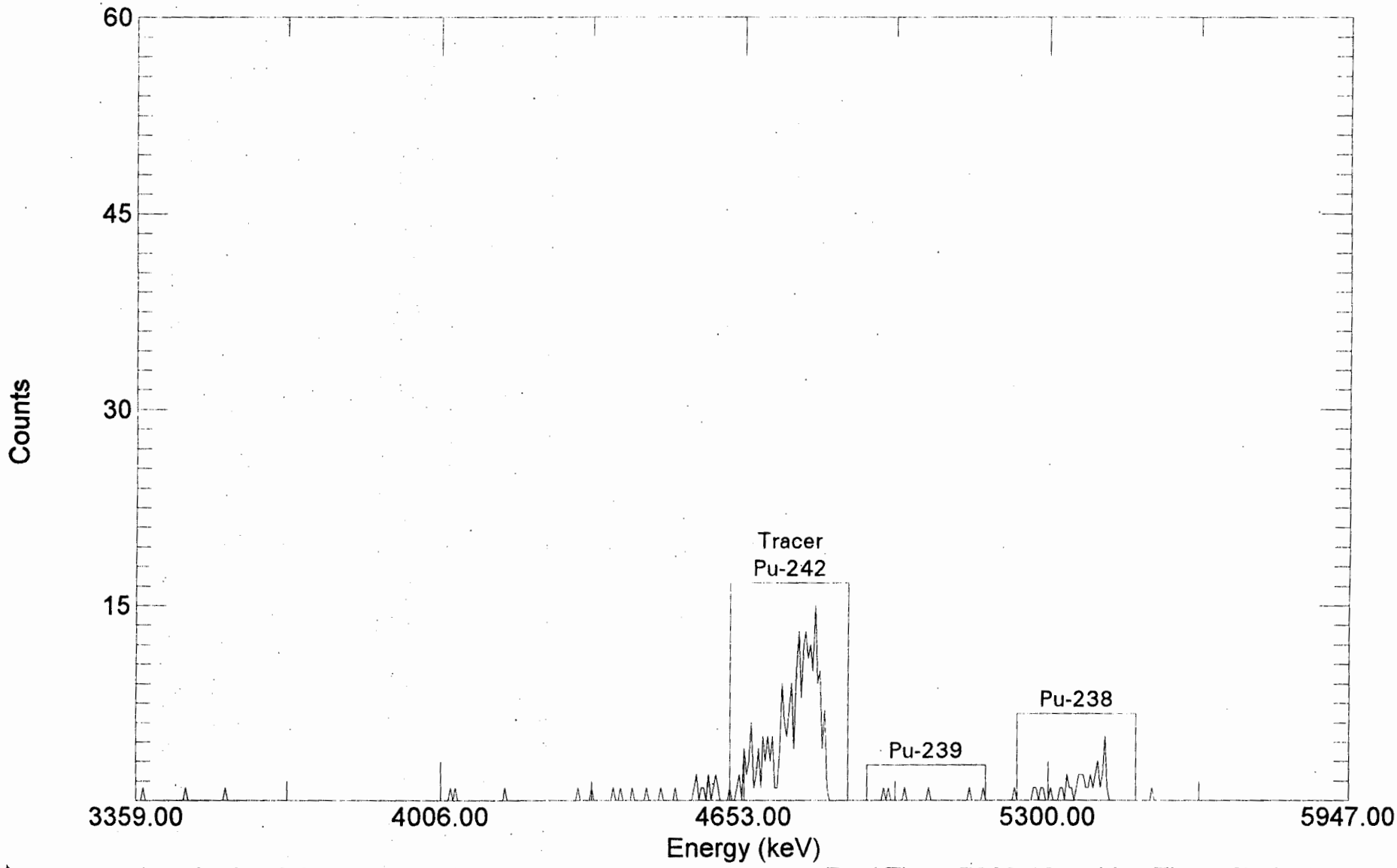
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.185	1.0000	1.46	0.35	36.06
2.	Pu-239	0.73	5156.60	9.622	1.0000	0.17	0.31	126.32
Tracer	Pu-242	0.78	4900.00	49.683	5.0000	9.99	0.28	12.95

T O T A L S		% Recovery
Gross Count	299.0000	100.00
Net Area	282.4400	94.46
Background	16.5600	5.54
Composite Fit	272.0000	90.97
Residuals	10.4400	3.49

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3986 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:21:11 on 29-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3986.CHN
Sample: 985847-MB1PU1028

Real Time: 7202.16 s. Live Time: 7200.00 s.
Detector: #36 MCB 4 Input 4 (Det #36)
Type: ISO PU

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-LCS1PU1028
Type: ISO PU Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 9.99 DPM

DETECTOR: MCB 4 Input 6 (Det #38)
Efficiency: 20.60% Chem. Recovery: 93.96%
Total Eff.: 19.36% Manual:100.00%
CALIBRATION: 3510.95 + 4.91381 * Chn + -0.000315 Chn **2 keV
Original: 3510.95 + 5.0206 * Chn + -0.000315 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03823.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 29-Oct-98 17:21:33
Live Time: 7200.00 Real Time: 7201.34 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3987.CHN
Background File: C:\USER\ALPHA\BKGND\B0003739.CHN
Nuclide Library: C:\USER\ALPHA\PU242.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3987

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	415.67	376	426	2.00	7.00	2.40	29.60	0.25
2.	342.42	312	362	6.00	22.00	1.20	288.80	2.41
Tracer	288.00	253	303	6.00	14.00	0.96	232.04	1.93

D E C A Y C O R R E C T E D R E S U L T S

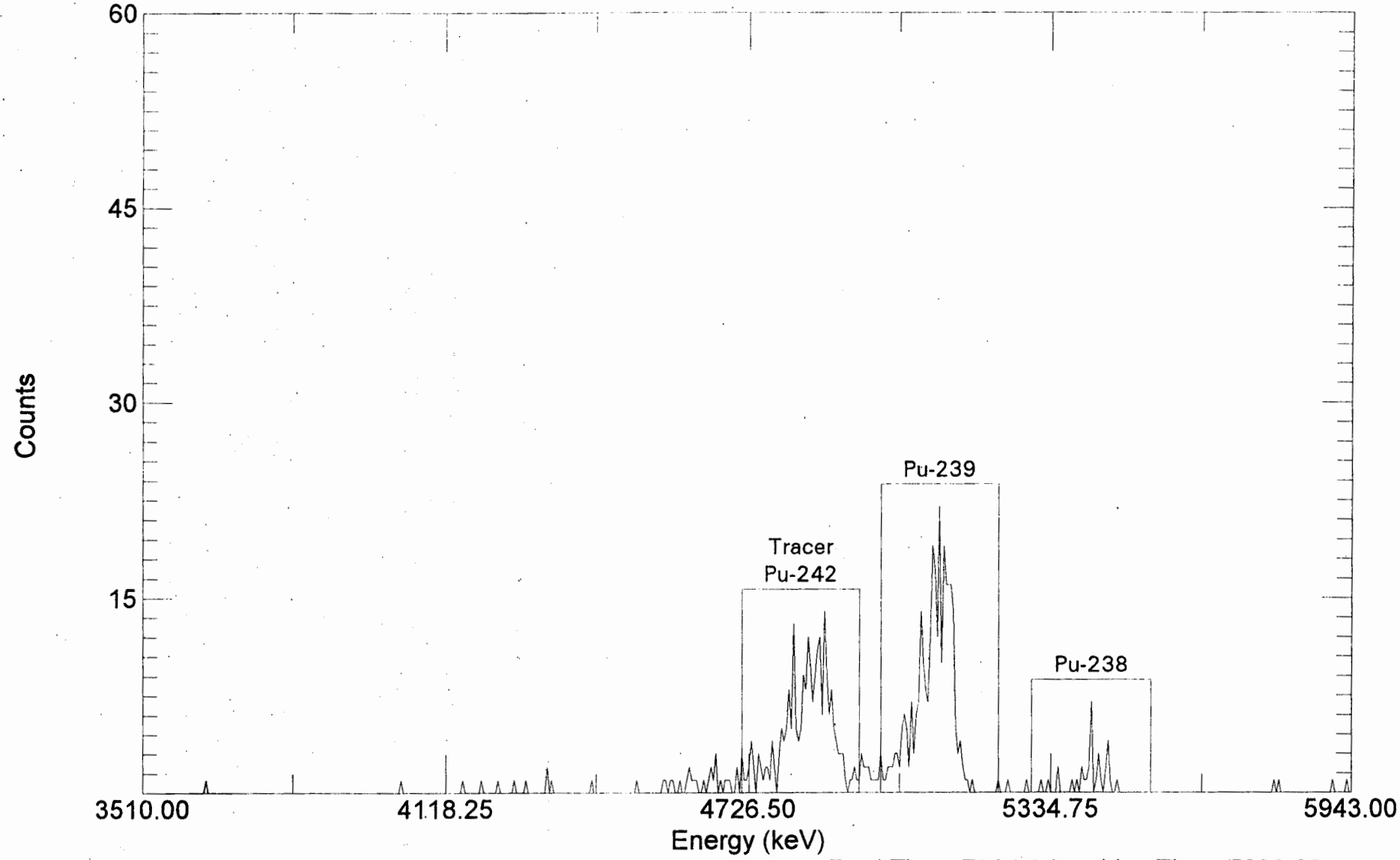
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Pu-238	0.72	5499.07	9.304	1.0000	1.27	0.31	37.54
2.	Pu-239	0.73	5156.60	28.189	3.0000	12.43	0.27	11.56
Tracer	Pu-242	0.78	4900.00	28.394	3.0000	9.99	0.26	12.84

T O T A L S		% Recovery
Gross Count	611.0000	100.00
Net Area	600.9200	98.35
Background	10.0800	1.65
Composite Fit	555.0000	90.83
Residuals	45.9200	7.52

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3987 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:21:33 on 29-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3987.CHN
Sample: 985847-LCS1PU1028

Real Time: 7201.34 s. Live Time: 7200.00 s.
Detector: #38 MCB 4 Input 6 (Det #38)
Type: ISO PU

Reviewed by Natalie R. Funk

Date Oct 29, 1998

28-Oct-98

FILE NAME:

JOB NUMBER	SAMPLE NUMBER	SAMPLE VOLUME liters or gram	Count Time Min	Total EFF	Net Area Tracer	Net Area Pu238	Percent PU 238 Contam	PU 238 ACTIVITY dpm	PU 238 MDA dpm	PU 238 ERROR %
EXAMPLE:										
984000	1	0.5	120	0.1766	211.76	27.04	11.5	0.13	0.35	12.8
985847	1	0.50	120	0.1766	211.76	27.04	11.5	0.13	0.28	38.39
	2	0.50	120	0.2221	266.28	24.92	11.5	-0.21	0.31	42.53
	3	0.50	120	0.1746	209.28	20.72	11.5	-0.16	0.42	48.52
	4	0.50	120	0.1325	158.8	25.12	11.5	0.43	0.47	41.41
	5	0.50	120	0.1838	220.28	35.32	11.5	0.45	0.30	33.80
	6	0.50	120	0.1587	190.28	28.4	11.5	0.34	0.41	39.17
	9	0.50	120	0.1005	120.52	12.36	11.5	-0.12	0.61	61.73
	10	0.50	120	0.107	128.28	18.32	11.5	0.28	0.76	55.01
	11	0.50	120	0.1577	189.04	26.64	11.5	0.26	0.41	40.43
	12	0.50	120	0.1481	177.52	19.88	11.5	-0.03	0.43	47.47
	13	0.50	120	0.1057	126.76	16.36	11.5	0.14	0.58	52.43
985892	1	0.50	120	0.1519	182.04	10.92	11.5	-0.55	0.45	70.06
	1 MS	0.50	120	0.1045	125.28	5.12	11.5	-0.74	0.60	109.39
	1 MSD	0.50	120	0.1449	173.76	15.84	11.5	-0.24	0.40	52.68
	2	0.50	120	0.1191	142.76	19.36	11.5	0.21	0.51	47.65
	3	0.50	120	0.1385	166.04	28.72	11.5	0.58	0.53	39.97
	3 MD	0.50	120	0.204	244.56	20.28	11.5	-0.32	0.38	50.58
985898	1	0.50	120	0.1047	125.52	14.4	11.5	0.00	0.63	58.08
MB1PU1015	MB	1.00	120	0.1706	204.56	23.44	11.5	0.00	0.41	44.45
LCS1PU1015	LCS	1.00	120	0.1543	185	20.28	11.5	-0.05	0.31	44.33

FILE NAME:

JOB NUMBER	SAMPLE NUMBER	PU239/240 ACTIVITY dpm	PU239/240 MDA dpm	PU239/240 ERROR %	TRACER ERROR %
EXAMPLE:					
984000	1	1.01	0.29	2.4	18.6
985847	1	0.28	0.18	80.02	13.46
	2	0.24	0.25	88.25	12.00
	3	0.13	0.30	141.20	13.53
	4	0.52	0.36	71.18	15.50
	5	0.14	0.27	129.84	13.18
	6	0.26	0.20	87.65	14.18
	9	0.33	0.49	109.08	17.82
	10	0.27	0.41	111.75	17.26
	11	0.27	0.31	95.70	14.22
	12	0.09	0.30	183.62	14.69
	13	0.30	0.49	116.13	17.39
985892	1	0.33	0.33	86.19	14.49
	1 MS	7.82	0.54	19.99	17.46
	1 MSD	9.79	0.33	15.05	14.86
	2	0.18	0.37	135.33	16.39
	3	0.26	0.40	112.03	15.17
	3 MD	0.35	0.26	72.71	12.50
985898	1	0.28	0.51	124.13	17.46
MB1PU1015	MB	0.13	0.31	154.70	13.66
LCS1PU1015	LCS	9.94	0.37	14.53	14.41

FILE NAME:

JOB NUMBER	SAMPLE NUMBER	PU 238 ACTIVITY pCi/l g	PU 238 ERROR pCi/l g	PU 238 LLD pCi/l g	PU239/240 ACTIVITY pCi/l g	PU239/240 ERROR pCi/l g	PU239/240 LLD pCi/l g
EXAMPLE:							
984000	1	0.11	0.03	11.53	0.91	0.17	2.16
985847	1	0.1	0.0	0.3	0.3	0.2	0.2
	2	-0.2	-0.1	0.3	0.2	0.2	0.2
	3	-0.1	-0.1	0.4	0.1	0.2	0.3
	4	0.4	0.2	0.4	0.5	0.3	0.3
	5	0.4	0.2	0.3	0.1	0.2	0.2
	6	0.3	0.1	0.4	0.2	0.2	0.2
	9	-0.1	-0.1	0.5	0.3	0.3	0.4
	10	0.3	0.1	0.7	0.2	0.3	0.4
	11	0.2	0.1	0.4	0.2	0.2	0.3
	12	0.0	0.0	0.4	0.1	0.1	0.3
	13	0.1	0.1	0.5	0.3	0.3	0.4
985892	1	-0.5	-0.4	0.4	0.3	0.3	0.3
	1 MS	-0.7	-0.7	0.5	7.0	1.9	0.5
	1 MSD	-0.2	-0.1	0.4	8.8	1.9	0.3
	2	0.2	0.1	0.5	0.2	0.2	0.3
	3	0.5	0.2	0.5	0.2	0.3	0.4
	3 MD	-0.3	-0.2	0.3	0.3	0.2	0.2
985898	1	0.0	0.0	0.6	0.3	0.3	0.5
MB1PU1015	MB	0.0	0.0	0.2	0.1	0.1	0.1
LCS1PU1015	LCS	0.0	0.0	0.1	4.5	0.9	0.2

QA-CHECK3.wk1 PU239/240 DATE 10/21/98 pCi/L
TIME 16:52

	Standard Known Value	LCS Sample Value	LCS Recovery
LCS1PU1015	4.800	4.500	93.7
	4.800		0.0
	0.000		ERR
	0.000		ERR

985892-001

Sample Activity	Spiked Sample Activity	Standard Value	Sample Volume	Spike Value	SPIKE RECOVERY
0.300	7.000	4.800	0.5000	9.600	69.8
0.300	8.800	4.800	0.5000	9.600	88.5
0.000		0.000	0.000	ERR	ERR
0.000		0.000	0.000	ERR	ERR

985892-003

Sample Activity	Duplicate Activity	Sample ERROR	Duplicate ERROR	Duplicate RER
0.200	0.300	0.300	0.200	0.28
				ERR
				ERR

MB1PU1015 = 0.1 BATCH # 6525 ISOPU

BATCH # _____ LABNET

BATCH # _____

RAW DATA FOR ISOPU IS IN JOB # 985892.
10/29/98 N.R.F.

QA-CHECK3.wk1 PU239/240 DATE 10/21/98 pCi/L
TIME 16:52

	Standard Known Value	LCS Sample Value	LCS Recovery
LCS1PU1015	4.800	4.500	93.7
	4.800		0.0
	0.000		ERR
	0.000		ERR

985892-001

Sample Activity	Spiked Sample Activity	Standard Value	Sample Volume	Spike Value	SPIKE RECOVERY
0.300	7.000	4.800	0.5000	9.600	69.8
0.300	8.800	4.800	0.5000	9.600	88.5
0.000		0.000	0.000	ERR	ERR
0.000		0.000	0.000	ERR	ERR

985892-003

Sample Activity	Duplicate Activity	Sample ERROR	Duplicate ERROR	Duplicate RER
0.200	0.300	0.300	0.200	0.28
				ERR
				ERR

ISOPU

MB1PU1015 = 0.1 BATCH # 10525

LABNET

BATCH # _____

30-Oc-98

FILE NAME:

JOB NUMBER	SAMPLE NUMBER	SAMPLE VOLUME liters or gram	Count Time Min	Total EFF	Net Area Tracer	Net Area Pu238	Percent PU 238 Contam	PU 238 ACTIVITY dpm	PU 238 MDA dpm	PU 238 ERROR %	PU A
EXAMPLE:											
984000	1	0.5	120	0.1766	211.76	27.04	11.5	0.13	0.35	12.8	
985847	7	0.50	120	0.185	221.76	29.88	11.5	0.20	0.34	37.78	
	7 MS	0.25	120	0.2038	244.28	23.36	11.5	-0.19	0.3	42.91	
	8	0.50	120	0.1785	214	21.28	11.5	-0.16	0.26	43.24	
	8 MD	0.50	120	0.1464	175.52	22.6	11.5	0.14	0.41	43.48	
MB1PU1028	MB	1.00	120	0.1898	227.56	33.16	11.5	0.31	0.35	36.06	
LCS1PU1028	LCS	1.00	120	0.1936	232.04	29.6	11.5	0.13	0.31	37.54	

FILE NAME:

JOB NUMBER	SAMPLE NUMBER	PU239/240 ACTIVITY dpm	PU239/240 MDA dpm	PU239/240 ERROR %	TRACER ERROR %
EXAMPLE:					
984000	1	1.01	0.29	2.4	18.6
985847	7	0.28	0.25	82.82	13.15
	7 MS	11.47	0.22	11.71	12.52
	8	0.21	0.25	97.23	13.40
	8 MD	0.16	0.28	123.28	14.77
MB1PU1028	MB	0.17	0.31	126.32	12.95
LCS1PU1028	LCS	12.43	0.27	11.56	12.84

Reviewed by Natalie D. Funk 30-Oct-98

Date Oct 30, 1998

FILE NAME:

JOB NUMBER	SAMPLE NUMBER	PU 238 ACTIVITY pCi/1 g	PU 238 ERROR pCi/1 g	PU 238 LLD pCi/1 g	PU239/240 ACTIVITY pCi/1 g	PU239/240 ERROR pCi/1 g	PU239/240 LLD pCi/1 g
EXAMPLE:							
984000	1	0.11	0.03	11.53	0.91	0.17	2.16
985847	7	0.18	0.07	0.3	0.3	0.2	0.2
	7 MS	-0.35	-0.16	0.5	20.7	3.5	0.4
	8	-0.14	-0.07	0.2	0.2	0.2	0.2
	8 MD	0.12	0.06	0.4	0.1	0.2	0.3
MB1PU1028	MB	0.14	0.06	0.2	0.1	0.1	0.1
LCS1PU1028	LCS	0.06	0.02	0.1	5.6	1.0	0.1

QA-CHECK3.wk1 PU239/240 DATE 10/29/98 pCi/L
TIME 17:20

	Standard Known Value	LCS Sample Value	LCS Recovery
LCS1PU1028	4.800	5.600	116.7
	4.800		0.0
	0.000		ERR
	0.000		ERR

985847-007

Sample Activity	Spiked Sample Activity	Standard Value	Sample Volume	Spike Value	SPIKE RECOVERY
0.300	20.700	4.800	0.2500	19.200	106.2
0.300		4.800	0.2500	19.200	-1.6
0.000		0.000	0.000	ERR	ERR
0.000		0.000	0.000	ERR	ERR

985847-008

Sample Activity	Duplicate Activity	Sample ERROR	Duplicate ERROR	Duplicate RER
0.200	0.100	0.200	0.200	0.35
				ERR
				ERR

MB1PU1028 = 0.1 BATCH # 10558 ISOPU

BATCH # _____ LABNET

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3098292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 6 (Det #30)
Efficiency: 20.19% Chem. Recovery: 0.00%
Total Eff.: 20.19% Manual:100.00%
CALIBRATION: 3362.2 + 5.93343 * Chn + -0.00157944 Chn **2 keV
Original: 3532.09 + 4.9013 * Chn + -5.3e-005 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03053.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:39:54
Live Time: 3600.00 Real Time: 3602.56 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03470.CHN
Background File: C:\USER\ALPHA\BKGND\B0002993.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03470

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	400.67	19.69	194.94	5169.46	0.75	5168.71	86.15
2.	331.71	24.99	224.18	5771.57	0.20	5771.37	96.19
3.	238.54	20.49	168.51	5974.04	0.38	5973.67	99.56

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	109.115	1.9758	426.67	0.42	2.73
2.	Pu-239	0.73	5156.60	121.874	2.8481	476.42	16.19	1.58
3.	Th-230	0.76	4687.70	154.492	1.3679	493.12	6.42	2.54

T O T A L S		% Recovery
Gross Count	16171.0000	100.00
Net Area	16166.6800	99.97
Background	4.3200	0.03
Composite Fit	16915.0588	104.60
Residuals	748.3788	4.63

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3198292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 7 (Det #31)
Efficiency: 22.49% Chem. Recovery: 0.00%
Total Eff.: 22.49% Manual:100.00%
CALIBRATION: 3495.42 + 5.06919 * Chn + -0.000154538 Chn **2 keV
Original: 3506.06 + 4.9588 * Chn + 9.5e-005 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03054.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:40:00
Live Time: 3600.00 Real Time: 3602.56 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03471.CHN
Background File: C:\USER\ALPHA\BKGND\B0002994.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03471

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	397.50	26.74	185.85	4651.61	0.43	4651.18	77.52
2.	331.04	20.19	214.65	5430.64	0.34	5430.30	90.50
3.	236.91	23.41	154.78	5411.24	0.12	5411.12	90.19

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	124.632	3.2980	344.69	0.35	2.87
2.	Pu-239	0.73	5156.60	112.881	2.1997	402.42	9.85	2.66
3.	Th-230	0.76	4687.70	152.591	1.6318	401.00	6.13	2.66

T O T A L S		% Recovery
Gross Count	15331.0000	100.00
Net Area	15327.7600	99.98
Background	3.2400	0.02
Composite Fit	15493.4911	101.06
Residuals	165.7311	1.08

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3298292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 8 (Det #32)
Efficiency: 21.10% Chem. Recovery: 0.00%
Total Eff.: 21.10% Manual:100.00%
CALIBRATION: 3431.77 + 5.35125 * Chn + -0.000530969 Chn **2 keV
Original: 3335.06 + 6.034 * Chn + -0.0016 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03055.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:40:0
Live Time: 3600.00 Real Time: 3602.56 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03472.CHN
Background File: C:\USER\ALPHA\BKGND\B0002995.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03472

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	399.73	18.10	201.65	4852.81	0.17	4852.64	80.88
2.	333.35	12.75	223.27	5998.81	0.14	5998.67	99.97
3.	240.43	11.07	159.71	7732.34	0.34	7732.00	128.87

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	103.895	2.0667	383.31	0.35	2.81
2.	Pu-239	0.73	5156.60	105.034	1.1392	473.80	10.96	2.53
3.	Th-230	0.76	4687.70	180.765	0.4694	610.74	9.56	2.23

T O T A L S		% Recovery
Gross Count	15468.0000	100.00
Net Area	15464.6400	99.98
Background	3.3600	0.02
Composite Fit	18583.6569	120.14
Residuals	3119.0169	20.16

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Okele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3398292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 1 (Det #33)
Efficiency: 24.65% Chem. Recovery: 0.00%
Total Eff.: 24.65% Manual:100.00%
CALIBRATION: 3455.85 + 5.34424 * Chn + -0.000963563 Chn **2 keV
Original: 3509.28 + 5.0452 * Chn + -0.000532 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03056.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:40:21
Live Time: 3600.00 Real Time: 3602.36 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03473.CHN
Background File: C:\USER\ALPHA\BKGND\B0002996.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03473

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	410.22	21.40	175.43	5025.11	0.63	5024.47	83.74
2.	338.95	19.20	210.74	5785.13	0.68	5784.45	96.41
3.	240.97	18.95	151.08	5784.23	0.10	5784.13	96.40

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Dai	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	116.000	1.9510	339.72	0.34	2.77
2.	Pu-239	0.73	5156.60	111.705	1.8160	391.11	12.94	2.58
3.	Th-230	0.76	4687.70	152.159	1.1299	391.08	6.80	2.58

T O T A L S		% Recovery
Gross Count	15896.0000	100.00
Net Area	15891.5600	99.97
Background	4.4400	0.03
Composite Fit	16594.4716	104.39
Residuals	702.9116	4.42

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele).

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3498292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 2 (Det #34)
Efficiency: 24.32% Chem. Recovery: 0.00%
Total Eff.: 24.32% Manual:100.00%
CALIBRATION: 3459.08 + 5.27294 * Chn + -0.000554487 Chn **2 keV
Original: 3500.26 + 5.029 * Chn + -0.000192 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03078.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:40:28
Live Time: 3600.00 Real Time: 3602.36 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03474.CHN
Background File: C:\USER\ALPHA\BKGND\B0002997.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03474

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	401.34	21.23	192.46	4680.47	0.09	4680.38	78.01
2.	333.64	15.47	224.36	5617.69	0.25	5617.44	93.62
3.	239.01	14.63	167.25	5451.96	0.04	5451.92	90.87

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	108.555	2.5128	320.75	0.29	2.86
2.	Pu-239	0.73	5156.60	101.748	1.5911	384.97	8.80	2.62
3.	Th-230	0.76	4687.70	128.349	1.0339	373.62	5.86	2.65

T O T A L S		% Recovery
Gross Count	15635.0000	100.00
Net Area	15632.2400	99.98
Background	2.7600	0.02
Composite Fit	15750.1240	100.74
Residuals	117.8840	0.75

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3598292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 3 (Det #35)
Efficiency: 20.60% Chem. Recovery: 0.00%
Total Eff.: 20.60% Manual:100.00%
CALIBRATION: 3403.69 + 5.55583 * Chn + -0.000906281 Chn **2 keV
Original: 3588.4 + 4.5069 * Chn + 0.000556 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03058.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:40:36
Live Time: 3600.00 Real Time: 3602.36 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03475.CHN
Background File: C:\USER\ALPHA\BKGND\B0002998.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03475

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	401.03	23.66	176.54	4776.05	0.97	4775.08	79.58
2.	333.67	17.52	199.24	5361.54	0.16	5361.38	89.36
3.	240.55	13.11	141.03	1755.76	0.00	1755.76	29.26

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	122.105	2.4295	386.33	0.43	2.84
2.	Pu-239	0.73	5156.60	112.886	1.6688	433.77	13.68	2.68
3.	Th-230	0.76	4687.70	67.129	7.3518	142.05	9.61	4.68

T O T A L S		% Recovery
Gross Count	15068.0000	100.00
Net Area	15064.5200	99.98
Background	3.4800	0.02
Composite Fit	14798.4873	98.21
Residuals	266.0327	1.77

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3698292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 4 (Det #36)
Efficiency: 22.45% Chem. Recovery: 0.00%
Total Eff.: 22.45% Manual:100.00%
CALIBRATION: 3359.6 + 5.90607 * Chn + -0.00153771 Chn **2 keV
Original: 3402.81 + 5.7118 * Chn + -0.0013 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03059.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:40:43
Live Time: 3600.00 Real Time: 3602.36 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03476.CHN
Background File: C:\USER\ALPHA\BKGND\B0002999.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03476

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	402.14	20.67	152.24	4446.35	0.91	4445.43	74.09
2.	333.16	20.18	197.48	5139.91	0.14	5139.77	85.66
3.	239.85	14.27	140.25	5356.92	0.27	5356.65	89.28

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	119.474	1.8143	330.02	0.39	2.94
2.	Pu-239	0.73	5156.60	113.390	2.0995	381.57	15.22	2.73
3.	Th-230	0.76	4687.70	152.274	0.8226	397.67	6.24	2.68

T O T A L S		% Recovery
Gross Count	14970.0000	100.00
Net Area	14963.8800	99.96
Background	6.1200	0.04
Composite Fit	14943.1815	99.82
Residuals	20.6985	0.14

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3798292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 5 (Det #37)
Efficiency: 23.08% Chem. Recovery: 0.00%
Total Eff.: 23.08% Manual:100.00%
CALIBRATION: 3709.52 + 3.74185 * Chn + 0.00167621 Chn **2 keV
Original: 3245.58 + 6.7001 * Chn + -0.0028 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03477.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:20:53
Live Time: 3600.00 Real Time: 3600.30 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03493.CHN
Background File: C:\USER\ALPHA\BKGND\B0003000.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03493

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	402.27	19.61	199.50	5144.22	0.88	5143.34	85.72
2.	336.12	9.83	225.43	6514.44	0.03	6514.41	108.57
3.	236.38	31.54	166.69	4896.63	0.17	4896.46	81.61

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	116.050	2.0535	371.41	0.37	2.73
2.	Pu-239	0.73	5156.60	103.757	0.7663	470.42	11.34	2.43
3.	Th-230	0.76	4687.70	136.355	3.1104	353.59	12.43	2.80

T O T A L S		% Recovery
Gross Count	15532.0000	100.00
Net Area	15528.1600	99.98
Background	3.8400	0.02
Composite Fit	16555.2930	106.59
Residuals	1027.1329	6.61

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3898292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 6 (Det #38)
Efficiency: 20.07% Chem. Recovery: 0.00%
Total Eff.: 20.07% Manual:100.00%
CALIBRATION: 3526.18 + 4.89643 * Chn + -0.000107572 Chn **2 keV
Original: 3448.88 + 5.4715 * Chn + -0.0011 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03061.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:41:01
Live Time: 3600.00 Real Time: 3602.36 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03478.CHN
Background File: C:\USER\ALPHA\BKGND\B0003001.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03478

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	403.84	25.52	183.26	4758.34	0.97	4757.37	79.29
2.	335.45	21.77	214.11	5657.46	0.19	5657.27	94.29
3.	238.47	30.71	151.63	4856.59	0.27	4856.32	80.94

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	121.728	2.8863	395.07	0.44	2.84
2.	Pu-239	0.73	5156.60	118.267	2.2622	469.79	12.40	2.61
3.	Th-230	0.76	4687.70	152.343	2.1999	403.28	1.87	2.81

T O T A L S		% Recovery
Gross Count	15014.0000	100.00
Net Area	15009.4400	99.97
Background	4.5600	0.03
Composite Fit	15272.3901	101.72
Residuals	262.9501	1.75

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Uxele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3998292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 7 (Det #39)
Efficiency: 22.97% Chem. Recovery: 0.00%
Total Eff.: 22.97% Manual:100.00%
CALIBRATION: 3619.64 + 4.39603 * Chn + 0.000586926 Chn **2 keV
Original: 3548.86 + 4.6095 * Chn + 0.000556 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03062.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:41:08
Live Time: 3600.00 Real Time: 3602.34 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03479.CHN
Background File: C:\USER\ALPHA\BKGND\B0003002.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03479

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	402.88	25.11	178.71	4751.13	0.90	4750.23	79.17
2.	334.67	18.21	212.73	5712.62	0.63	5711.99	95.20
3.	235.55	40.64	157.42	4872.93	0.44	4872.49	81.21

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	124.400	2.7078	344.67	0.38	2.84
2.	Pu-239	0.73	5156.60	110.102	1.7567	414.45	11.34	2.59
3.	Th-230	0.76	4687.70	163.495	4.0409	353.54	8.33	2.81

T O T A L S		% Recovery
Gross Count	15302.0000	100.00
Net Area	15296.6000	99.96
Background	5.4000	0.04
Composite Fit	15346.4419	100.29
Residuals	49.8419	0.33

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4098292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 8 (Det #40)
Efficiency: 22.52% Chem. Recovery: 0.00%
Total Eff.: 22.52% Manual:100.00%
CALIBRATION: 3562.72 + 4.6611 * Chn + 0.000303396 Chn **2 keV
Original: 3490.53 + 5.0361 * Chn + -0.000261 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03063.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:41:15
Live Time: 3600.00 Real Time: 3602.36 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03480.CHN
Background File: C:\USER\ALPHA\BKGND\B0003003.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03480

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	402.10	40.13	192.43	4997.23	0.26	4996.97	83.28
2.	334.66	32.33	227.85	5909.89	0.22	5909.67	98.49
3.	237.68	44.64	165.35	5150.16	0.17	5149.99	85.83

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	155.213	5.8257	369.82	0.34	2.77
2.	Pu-239	0.73	5156.60	136.972	4.0803	437.36	8.46	2.55
3.	Th-230	0.76	4687.70	177.087	4.5862	381.14	5.01	2.73

T O T A L S		% Recovery
Gross Count	16445.0000	100.00
Net Area	16442.6000	99.99
Background	2.4000	0.01
Composite Fit	16057.2758	97.64
Residuals	385.3242	2.34

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4198292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 1 (Det #41)
Efficiency: 24.95% Chem. Recovery: 0.00%
Total Eff.: 24.95% Manual:100.00%
CALIBRATION: 3418.49 + 5.54962 * Chn + -0.0011233 Chn **2 keV
Original: 3336.24 + 6.026 * Chn + -0.0019 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03079.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:41:28
Live Time: 3600.00 Real Time: 3601.70 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03481.CHN
Background File: C:\USER\ALPHA\BKGND\B0003004.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03481

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	405.90	36.74	170.52	4557.69	0.12	4557.57	75.96
2.	336.05	33.65	190.49	5184.64	0.40	5184.24	86.40
3.	240.40	24.39	154.49	4967.39	0.20	4967.19	82.79

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	141.565	4.6792	304.45	0.29	2.90
2.	Pu-239	0.73	5156.60	141.487	3.9303	346.31	8.63	2.72
3.	Th-230	0.76	4687.70	145.467	1.9320	331.81	10.18	2.78

T O T A L S		% Recovery
Gross Count	14941.0000	100.00
Net Area	14938.6000	99.98
Background	2.4000	0.02
Composite Fit	14919.2108	99.85
Residuals	19.3892	0.13

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4498292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 4 (Det #44)
Efficiency: 21.95% Chem. Recovery: 0.00%
Total Eff.: 21.95% Manual:100.00%
CALIBRATION: 3428.15 + 5.39471 * Chn + -0.000918407 Chn **2 keV
Original: 3517.44 + 4.8039 * Chn + 2e-006 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03081.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:41:39
Live Time: 3600.00 Real Time: 3601.70 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03482.CHN
Background File: C:\USER\ALPHA\BKGND\B0003006.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03482

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	410.09	15.98	146.07	4129.52	1.49	4128.03	68.80
2.	340.09	14.50	174.99	4460.97	1.22	4459.75	74.33
3.	243.58	13.42	136.81	4479.51	0.77	4478.73	74.65

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	107.487	1.3889	313.44	0.43	3.05
2.	Pu-239	0.73	5156.60	98.811	1.4308	338.63	14.06	2.94
3.	Th-230	0.76	4687.70	125.281	0.9315	340.07	6.14	2.93

T O T A L S		% Recovery
Gross Count	13505.0000	100.00
Net Area	13487.2400	99.87
Background	17.7600	0.13
Composite Fit	13069.9932	96.78
Residuals	417.2468	3.09

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4598292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 5 (Det #45)
Efficiency: 23.04% Chem. Recovery: 0.00%
Total Eff.: 23.04% Manual:100.00%
CALIBRATION: 3383.43 + 5.70293 * Chn + -0.001409 Chn **2 keV
Original: 3570.05 + 4.5295 * Chn + 0.000342 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03082.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:41:51
Live Time: 3600.00 Real Time: 3601.70 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03483.CHN
Background File: C:\USER\ALPHA\BKGND\B0003007.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03483

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	418.27	22.12	190.56	4964.87	0.40	4964.47	82.74
2.	339.38	22.18	218.88	5679.78	0.00	5679.78	94.66
3.	243.33	16.95	157.96	2197.92	0.12	2197.80	36.63

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	109.149	2.3641	359.12	0.34	2.78
2.	Pu-239	0.73	5156.60	113.725	2.3884	410.86	11.35	2.60
3.	Th-230	0.76	4687.70	85.037	12.5760	158.98	5.54	4.18

T O T A L S		% Recovery
Gross Count	15413.0000	100.00
Net Area	15413.0800	99.99
Background	1.9200	0.01
Composite Fit	16197.0397	105.07
Residuals	783.9597	5.09

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4698292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 6 (Det #46)
Efficiency: 20.44% Chem. Recovery: 0.00%
Total Eff.: 20.44% Manual:100.00%
CALIBRATION: 3542.21 + 4.71548 * Chn + 0.000125741 Chn **2 keV
Original: 3476.24 + 5.1664 * Chn + -0.000597 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03083.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:41:58
Live Time: 3600.00 Real Time: 3601.70 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03484.CHN
Background File: C:\USER\ALPHA\BKGND\B0003008.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03484

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	407.78	17.63	192.56	4749.12	0.72	4748.39	79.14
2.	339.29	10.85	220.04	5612.14	0.47	5611.67	93.53
3.	241.37	14.06	168.25	5521.12	0.06	5521.06	92.02

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	102.632	1.9213	387.18	0.41	3.84
2.	Pu-239	0.73	5156.60	93.163	1.0110	457.57	11.10	2.62
3.	Th-230	0.76	4687.70	121.965	0.9795	450.18	8.04	2.64

T O T A L S		% Recovery
Gross Count	15973.0000	100.00
Net Area	15968.2000	99.97
Background	4.8000	0.03
Composite Fit	15882.3740	99.43
Residuals	85.8260	0.54

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4798292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 7 (Det #47)
Efficiency: 23.18% Chem. Recovery: 0.00%
Total Eff.: 23.18% Manual:100.00%
CALIBRATION: 3422.54 + 5.60988 * Chn + -0.00134815 Chn **2 keV
Original: 3520.71 + 4.9542 * Chn + -0.000293 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03084.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:42:05
Live Time: 3600.00 Real Time: 3601.68 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03485.CHN
Background File: C:\USER\ALPHA\BKGND\B0003009.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03485

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	407.79	27.74	156.86	4803.33	0.52	4802.81	80.05
2.	336.29	30.29	194.47	5428.98	0.59	5428.39	90.47
3.	239.28	34.02	139.55	5204.02	0.31	5203.72	86.73

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	132.310	2.4485	345.33	0.35	2.83
2.	Pu-239	0.73	5156.60	134.301	3.2182	390.31	15.43	2.66
3.	Th-230	0.76	4687.70	180.853	2.3439	374.15	6.60	2.72

T O T A L S		% Recovery
Gross Count	16123.0000	100.00
Net Area	16119.4000	99.98
Background	3.6000	0.02
Composite Fit	15436.3372	95.74
Residuals	683.0627	4.24

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4898292
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 8 (Det #48)
Efficiency: 21.90% Chem. Recovery: 0.00%
Total Eff.: 21.90% Manual:100.00%
CALIBRATION: 3638.32 + 4.19653 * Chn + 0.000847494 Chn **2 keV
Original: 3544.33 + 4.7517 * Chn keV
File: C:\USER\ALPHA\CALIB\CAL03085.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 08:42:14
Live Time: 3600.00 Real Time: 3601.70 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03486.CHN
Background File: C:\USER\ALPHA\BKGND\B0003010.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03486

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	406.86	43.68	156.90	4672.30	0.79	4671.51	77.86
2.	338.64	30.38	177.34	5652.88	0.16	5652.72	94.21
3.	238.57	47.27	131.00	4778.60	0.20	4778.40	79.64

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	173.892	4.8673	355.52	0.39	2.87
2.	Pu-239	0.73	5156.60	149.036	2.5844	430.19	12.58	2.61
3.	Th-230	0.76	4687.70	190.996	3.7161	363.65	10.93	2.84

T O T A L S		% Recovery
Gross Count	15197.0000	100.00
Net Area	15194.6000	99.98
Background	2.4000	0.02
Composite Fit	15103.7774	99.39
Residuals	90.8226	0.60

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Okele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f1898292
Type: calsource2 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 2 (Det #18)
Efficiency: 23.36% Chem. Recovery: 0.00%
Total Eff.: 23.36% Manual:100.00%
CALIBRATION: 3465.45 + 5.2377 * Chn + -0.000511 Chn **2 keV
Original: 3465.45 + 5.2377 * Chn + -0.000511 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03459.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:18:44
Live Time: 1200.00 Real Time: 1200.82 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03487.CHN
Background File: C:\USER\ALPHA\BKGND\B0002981.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE2.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03487

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	243.09	210	270	4.00	1451.00	0.16	7896.84	394.84

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4708.46	19.957	2.0000	1690.00	0.89	2.21

T O T A L S		% Recovery
Gross Count	8013.0000	100.00
Net Area	8012.3600	99.99
Background	0.6400	0.01
Composite Fit	7897.0000	98.55
Residuals	115.3600	1.44

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f1998292
Type: calsource3 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 3 (Det #19)
Efficiency: 20.99% Chem. Recovery: 0.00%
Total Eff.: 20.99% Manual:100.00%
CALIBRATION: 3432.37 + 5.4333 * Chn + -0.000847 Chn **2 keV
Original: 3432.37 + 5.4333 * Chn + -0.000847 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03460.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:18:50
Live Time: 1200.00 Real Time: 1200.82 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03488.CHN
Background File: C:\USER\ALPHA\BKGND\B0002982.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE3.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03488

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.80	210	270	4.00	619.00	0.24	4366.76	218.34

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4711.67	20.074	2.0000	1040.00	1.01	2.97

T O T A L S		% Recovery
Gross Count	4615.0000	100.00
Net Area	4613.7600	99.97
Background	1.2400	0.03
Composite Fit	4367.0000	94.63
Residuals	246.7600	5.35

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2198292
Type: calsource5 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 5 (Det #21)
Efficiency: 23.41% Chem. Recovery: 0.00%
Total Eff.: 23.41% Manual:100.00%
CALIBRATION: 3547.39 + 4.7272 * Chn + 0.000312 Chn **2 keV
Original: 3547.39 + 4.7272 * Chn + 0.000312 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03461.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:19:01
Live Time: 1200.00 Real Time: 1200.82 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03489.CHN
Background File: C:\USER\ALPHA\BKGND\B0002984.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE5.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03489

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	243.49	210	270	6.00	1293.00	0.16	7490.84	374.54

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4716.91	29.275	3.0000	1600.00	0.89	2.26

T O T A L S		% Recovery
Gross Count	7775.0000	100.00
Net Area	7773.8000	99.98
Background	1.2000	0.02
Composite Fit	7491.0000	96.35
Residuals	282.8000	3.64

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2298292
Type: calsource6 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 6 (Det #22)
Efficiency: 20.74% Chem. Recovery: 0.00%
Total Eff.: 20.74% Manual:100.00%
CALIBRATION: 3450.5 + 5.3903 * Chn + -0.000684 Chn **2 keV
Original: 3450.5 + 5.3903 * Chn + -0.000684 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03462.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:19:06
Live Time: 1200.00 Real Time: 1200.82 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03490.CHN
Background File: C:\USER\ALPHA\BKGND\B0002985.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE6.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03490

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	241.11	210	270	6.00	953.00	0.12	6388.88	319.44

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4710.38	30.363	3.0000	1540.00	0.99	2.45

T O T A L S		% Recovery
Gross Count	6707.0000	100.00
Net Area	6705.4000	99.98
Background	1.6000	0.02
Composite Fit	6389.0000	95.26
Residuals	316.4000	4.72

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2398292
Type: calsource7 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 7 (Det #23)
Efficiency: 23.09% Chem. Recovery: 0.00%
Total Eff.: 23.09% Manual:100.00%
CALIBRATION: 3463.05 + 5.2464 * Chn + -0.000446 Chn **2 keV
Original: 3463.05 + 5.2464 * Chn + -0.000446 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03463.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:19:12
Live Time: 1200.00 Real Time: 1200.84 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03491.CHN
Background File: C:\USER\ALPHA\BKGND\B0002986.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE7.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03491

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	242.38	210	270	6.00	1238.00	0.12	7388.88	369.44

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4708.48	30.181	3.0000	1600.00	0.89	2.28

T O T A L S		% Recovery
Gross Count	7556.0000	100.00
Net Area	7555.1200	99.99
Background	0.8800	0.01
Composite Fit	7389.0000	97.79
Residuals	166.1200	2.20

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2498292
Type: calsource9 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 8 (Det #24)
Efficiency: 21.46% Chem. Recovery: 0.00%
Total Eff.: 21.46% Manual:100.00%
CALIBRATION: 3417.36 + 5.5357 * Chn + -0.000974 Chn **2 keV
Original: 3417.36 + 5.5357 * Chn + -0.000974 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03464.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:19:17
Live Time: 1200.00 Real Time: 1200.82 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03492.CHN
Background File: C:\USER\ALPHA\BKGND\B0002987.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE9.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03492

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.84	210	270	4.00	980.00	0.12	5321.88	266.09

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4714.36	20.235	2.0000	1240.00	0.96	2.69

T O T A L S		% Recovery
Gross Count	5762.0000	100.00
Net Area	5760.6000	99.98
Background	1.4000	0.02
Composite Fit	5322.0000	92.36
Residuals	438.6000	7.61

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2598292
Type: calsource1 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 1 (Det #25)
Efficiency: 24.06% Chem. Recovery: 0.00%
Total Eff.: 24.06% Manual:100.00%
CALIBRATION: 3472.31 + 5.3315 * Chn + -0.000763 Chn **2 keV
Original: 3472.31 + 5.3315 * Chn + -0.000763 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03465.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:59:24
Live Time: 1200.00 Real Time: 1201.06 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03494.CHN
Background File: C:\USER\ALPHA\BKGND\B0002988.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE1.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03494

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	243.43	210	270	8.00	564.00	0.32	5582.68	279.13

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4724.95	39.680	4.0000	1160.00	0.89	2.62

T O T A L S		% Recovery
Gross Count	5704.0000	100.00
Net Area	5701.4400	99.96
Background	2.5600	0.04
Composite Fit	5583.0000	97.88
Residuals	118.4400	2.08

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S
Core Lab

SAMPLE: f2698292
Type: calsource2 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 2 (Det #26)
Efficiency: 25.07% Chem. Recovery: 0.00%
Total Eff.: 25.07% Manual:100.00%
CALIBRATION: 3431.74 + 5.4102 * Chn + -0.000771 Chn **2 keV
Original: 3431.74 + 5.4102 * Chn + -0.000771 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03466.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:59:28
Live Time: 1200.00 Real Time: 1201.06 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03495.CHN
Background File: C:\USER\ALPHA\BKGND\B0002989.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE2.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03495

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	246.63	210	270	6.00	845.00	0.20	8474.80	423.74

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4719.17	30.179	3.0000	1690.00	0.84	2.13

T O T A L S		% Recovery
Gross Count	8605.0000	100.00
Net Area	8603.9200	99.99
Background	1.0800	0.01
Composite Fit	8475.0000	98.49
Residuals	128.9200	1.50

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2798292
Type: calsource3 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 3 (Det #27)
Efficiency: 20.60% Chem. Recovery: 0.00%
Total Eff.: 20.60% Manual:100.00%
CALIBRATION: 3420.19 + 5.428 * Chn + -0.000738 Chn **2 keV
Original: 3420.19 + 5.428 * Chn + -0.000738 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03467.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:59:32
Live Time: 1200.00 Real Time: 1201.06 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03496.CHN
Background File: C:\USER\ALPHA\BKGND\B0002990.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE3.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03496

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	247.52	210	270	6.00	421.00	0.12	4284.88	214.24

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4718.51	30.376	3.0000	1040.00	1.00	2.99

T O T A L S		% Recovery
Gross Count	4508.0000	100.00
Net Area	4506.9600	99.98
Background	1.0400	0.02
Composite Fit	4285.0000	95.05
Residuals	221.9600	4.92

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2898292
Type: calsource4 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 4 (Det #28)
Efficiency: 21.64% Chem. Recovery: 0.00%
Total Eff.: 21.64% Manual:100.00%
CALIBRATION: 3375.52 + 5.8252 * Chn + -0.0014 Chn **2 keV
Original: 3375.52 + 5.8252 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03468.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:59:37
Live Time: 1200.00 Real Time: 1201.08 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03497.CHN
Background File: C:\USER\ALPHA\BKGND\B0002991.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE4.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03497

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.41	210	270	12.00	340.00	0.20	5192.80	259.64

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4715.65	61.690	6.0000	1200.00	0.97	2.72

T O T A L S		% Recovery
Gross Count	5614.0000	100.00
Net Area	5612.6000	99.98
Background	1.4000	0.02
Composite Fit	5193.0000	92.50
Residuals	419.6000	7.47

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2998292
Type: calsource5 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 5 (Det #29)
Efficiency: 24.12% Chem. Recovery: 0.00%
Total Eff.: 24.12% Manual:100.00%
CALIBRATION: 3359.46 + 5.8962 * Chn + -0.0014 Chn **2 keV
Original: 3359.46 + 5.8962 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03469.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:59:47
Live Time: 1200.00 Real Time: 1201.08 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03498.CHN
Background File: C:\USER\ALPHA\BKGND\B0002992.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE5.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03498

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.44	210	270	8.00	639.00	0.08	7717.92	385.90

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4717.06	41.694	4.0000	1600.00	0.84	2.23

T O T A L S		% Recovery
Gross Count	8072.0000	100.00
Net Area	8071.1200	99.99
Background	0.8800	0.01
Composite Fit	7718.0000	95.61
Residuals	353.1200	4.37

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3098292
Type: calsource6 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 6 (Det #30)
Efficiency: 20.73% Chem. Recovery: 0.00%
Total Eff.: 20.73% Manual:100.00%
CALIBRATION: 3362.2 + 5.9334 * Chn + -0.0016 Chn **2 keV
Original: 3362.2 + 5.9334 * Chn + -0.0016 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03470.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:59:52
Live Time: 1200.00 Real Time: 1201.08 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03499.CHN
Background File: C:\USER\ALPHA\BKGND\B0002993.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE6.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03499

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.21	210	270	8.00	614.00	0.16	6383.84	319.19

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4715.77	41.215	4.0000	1540.00	1.00	2.45

T O T A L S		% Recovery
Gross Count	6703.0000	100.00
Net Area	6701.5600	99.98
Background	1.4400	0.02
Composite Fit	6384.0000	95.24
Residuals	317.5600	4.74

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3198292
Type: calsource7 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 7 (Det #31)
Efficiency: 23.04% Chem. Recovery: 0.00%
Total Eff.: 23.04% Manual:100.00%
CALIBRATION: 3495.42 + 5.0692 * Chn + -0.000155 Chn **2 keV
Original: 3495.42 + 5.0692 * Chn + -0.000155 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03471.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 13:59:57
Live Time: 1200.00 Real Time: 1201.08 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03500.CHN
Background File: C:\USER\ALPHA\BKGND\B0002994.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE7.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03500

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	242.46	210	270	8.00	675.00	0.08	7371.92	368.60

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4715.40	39.952	4.0000	1600.00	0.88	2.28

T O T A L S		% Recovery
Gross Count	7577.0000	100.00
Net Area	7575.9200	99.99
Background	1.0800	0.01
Composite Fit	7372.0000	97.29
Residuals	203.9200	2.69

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3298292
Type: calsource9 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 8 (Det #32)
Efficiency: 21.82% Chem. Recovery: 0.00%
Total Eff.: 21.82% Manual:100.00%
CALIBRATION: 3431.77 + 5.3512 * Chn + -0.000531 Chn **2 keV
Original: 3431.77 + 5.3512 * Chn + -0.000531 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03472.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 14:00:03
Live Time: 1200.00 Real Time: 1201.06 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03501.CHN
Background File: C:\USER\ALPHA\BKGND\B0002995.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE9.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03501

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.11	210	270	6.00	959.00	0.12	5410.88	270.54

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4706.40	30.552	3.0000	1240.00	0.94	2.66

T O T A L S		% Recovery
Gross Count	5823.0000	100.00
Net Area	5821.8800	99.98
Background	1.1200	0.02
Composite Fit	5411.0000	92.92
Residuals	410.8800	7.06

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S
Core Lab

SAMPLE: f3398292
Type: calsource1 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 1 (Det #33)
Efficiency: 24.86% Chem. Recovery: 0.00%
Total Eff.: 24.86% Manual:100.00%
CALIBRATION: 3455.85 + 5.3442 * Chn + -0.000964 Chn **2 keV
Original: 3455.85 + 5.3442 * Chn + -0.000964 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03473.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 14:40:30
Live Time: 1200.00 Real Time: 1201.00 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03502.CHN
Background File: C:\USER\ALPHA\BKGND\B0002996.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE1.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03502

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	246.44	210	270	8.00	647.00	0.16	5767.84	288.39

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4714.32	38.953	4.0000	1160.00	0.84	2.58

T O T A L S		% Recovery
Gross Count	5853.0000	100.00
Net Area	5851.5200	99.97
Background	1.4800	0.03
Composite Fit	5768.0000	98.55
Residuals	83.5200	1.43

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3498292
Type: calsource2 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 2 (Det #34)
Efficiency: 23.95% Chem. Recovery: 0.00%
Total Eff.: 23.95% Manual:100.00%
CALIBRATION: 3459.08 + 5.2729 * Chn + -0.000554 Chn **2 keV
Original: 3459.08 + 5.2729 * Chn + -0.000554 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03474.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 14:40:35
Live Time: 1200.00 Real Time: 1201.00 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03503.CHN
Background File: C:\USER\ALPHA\BKGND\B0002997.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE2.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03503

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	243.47	210	270	6.00	1173.00	0.00	8094.00	404.70

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4710.02	30.019	3.0000	1690.00	0.80	2.18

T O T A L S		% Recovery
Gross Count	8223.0000	100.00
Net Area	8222.0800	99.99
Background	0.9200	0.01
Composite Fit	8094.0000	98.43
Residuals	128.0800	1.56

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3598292
Type: calsource3 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 3 (Det #35)
Efficiency: 20.32% Chem. Recovery: 0.00%
Total Eff.: 20.32% Manual:100.00%
CALIBRATION: 3403.69 + 5.5558 * Chn + -0.000906 Chn **2 keV
Original: 3403.69 + 5.5558 * Chn + -0.000906 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03475.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 14:40:39
Live Time: 1200.00 Real Time: 1201.00 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03504.CHN
Background File: C:\USER\ALPHA\BKGND\B0002998.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE3.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03504

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	243.78	210	270	4.00	691.00	0.00	4227.00	211.35

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4704.24	20.456	2.0000	1040.00	0.95	3.01

T O T A L S		% Recovery
Gross Count	4463.0000	100.00
Net Area	4461.8400	99.97
Background	1.1600	0.03
Composite Fit	4227.0000	94.71
Residuals	234.8400	5.26

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3698292
Type: calsource4 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 4 (Det #36)
Efficiency: 22.13% Chem. Recovery: 0.00%
Total Eff.: 22.13% Manual:100.00%
CALIBRATION: 3359.6 + 5.9061 * Chn + -0.0015 Chn **2 keV
Original: 3359.6 + 5.9061 * Chn + -0.0015 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03476.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 14:40:43
Live Time: 1200.00 Real Time: 1201.00 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03505.CHN
Background File: C:\USER\ALPHA\BKGND\B0002999.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE4.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03505

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	243.43	210	270	12.00	397.00	0.12	5310.88	265.54

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4708.43	62.110	6.0000	1200.00	0.93	2.69

T O T A L S		% Recovery
Gross Count	5746.0000	100.00
Net Area	5743.9600	99.96
Background	2.0400	0.04
Composite Fit	5311.0000	92.43
Residuals	432.9600	7.53

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3798292
Type: calsource5 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 5 (Det #37)
Efficiency: 23.57% Chem. Recovery: 0.00%
Total Eff.: 23.57% Manual:100.00%
CALIBRATION: 3709.52 + 3.7418 * Chn + 0.0017 Chn **2 keV
Original: 3709.52 + 3.7418 * Chn + 0.0017 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03493.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 14:40:51
Live Time: 1200.00 Real Time: 1201.00 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03506.CHN
Background File: C:\USER\ALPHA\BKGND\B0003000.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE5.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03506

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.32	210	270	6.00	1274.00	0.16	7543.84	377.19

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4725.17	27.435	3.0000	1600.00	0.88	2.26

T O T A L S		% Recovery
Gross Count	7861.0000	100.00
Net Area	7859.7200	99.98
Background	1.2800	0.02
Composite Fit	7544.0000	95.97
Residuals	315.7200	4.02

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3898292
Type: calsource6 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 6 (Det #38)
Efficiency: 20.11% Chem. Recovery: 0.00%
Total Eff.: 20.11% Manual:100.00%
CALIBRATION: 3526.18 + 4.8964 * Chn + -0.000108 Chn **2 keV
Original: 3526.18 + 4.8964 * Chn + -0.000108 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03478.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 14:40:56
Live Time: 1200.00 Real Time: 1200.98 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03507.CHN
Background File: C:\USER\ALPHA\BKGND\B0003001.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE6.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03507

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	245.87	210	270	10.00	446.00	0.08	6193.92	309.70

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4723.54	48.433	5.0000	1540.00	1.01	2.49

T O T A L S		% Recovery
Gross Count	6468.0000	100.00
Net Area	6466.4800	99.98
Background	1.5200	0.02
Composite Fit	6194.0000	95.76
Residuals	272.4800	4.21

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3998292
Type: calsource7 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 7 (Det #39)
Efficiency: 23.08% Chem. Recovery: 0.00%
Total Eff.: 23.08% Manual:100.00%
CALIBRATION: 3619.64 + 4.396 * Chn + 0.000587 Chn **2 keV
Original: 3619.64 + 4.396 * Chn + 0.000587 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03479.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 14:41:00
Live Time: 1200.00 Real Time: 1201.00 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03508.CHN
Background File: C:\USER\ALPHA\BKGND\B0003002.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE7.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03508

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.61	210	270	6.00	857.00	0.32	7386.68	369.33

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4730.09	28.099	3.0000	1600.00	0.93	2.28

T O T A L S		% Recovery
Gross Count	7555.0000	100.00
Net Area	7553.2000	99.98
Background	1.8000	0.02
Composite Fit	7387.0000	97.78
Residuals	166.2000	2.20

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4098292
Type: calsource9 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 8 (Det #40)
Efficiency: 22.69% Chem. Recovery: 0.00%
Total Eff.: 22.69% Manual:100.00%
CALIBRATION: 3562.72 + 4.6611 * Chn + 0.000303 Chn **2 keV
Original: 3562.72 + 4.6611 * Chn + 0.000303 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03480.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 14:41:05
Live Time: 1200.00 Real Time: 1201.00 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03509.CHN
Background File: C:\USER\ALPHA\BKGND\B0003003.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE9.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03509

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	246.85	210	270	10.00	466.00	0.12	5625.88	281.29

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4731.79	48.107	5.0000	1240.00	0.91	2.61

T O T A L S		% Recovery
Gross Count	6050.0000	100.00
Net Area	6049.2000	99.99
Background	0.8000	0.01
Composite Fit	5626.0000	92.99
Residuals	423.2000	7.00

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4198292
Type: calsource1 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 1 (Det #41)
Efficiency: 24.63% Chem. Recovery: 0.00%
Total Eff.: 24.63% Manual:100.00%
CALIBRATION: 3418.49 + 5.5496 * Chn + -0.0011 Chn **2 keV
Original: 3418.49 + 5.5496 * Chn + -0.0011 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03481.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:49:23
Live Time: 1200.00 Real Time: 1200.74 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03510.CHN
Background File: C:\USER\ALPHA\BKGND\B0003004.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE1.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03510

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	246.43	210	270	8.00	597.00	0.08	5713.92	285.70

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4719.30	40.060	4.0000	1160.00	0.83	2.59

T O T A L S		% Recovery
Gross Count	5818.0000	100.00
Net Area	5817.2000	99.99
Background	0.8000	0.01
Composite Fit	5714.0000	98.21
Residuals	103.2000	1.77

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4498292
Type: calsource4 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 4 (Det #44)
Efficiency: 21.77% Chem. Recovery: 0.00%
Total Eff.: 21.77% Manual:100.00%
CALIBRATION: 3428.15 + 5.3947 * Chn + -0.000918 Chn **2 keV
Original: 3428.15 + 5.3947 * Chn + -0.000918 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03482.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:49:30
Live Time: 1200.00 Real Time: 1200.74 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03511.CHN
Background File: C:\USER\ALPHA\BKGND\B0003006.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE4.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03511

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	247.35	210	270	6.00	771.00	0.72	5224.28	261.21

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4706.35	29.643	3.0000	1200.00	1.04	2.71

T O T A L S		% Recovery
Gross Count	5524.0000	100.00
Net Area	5518.0800	99.89
Background	5.9200	0.11
Composite Fit	5225.0000	94.59
Residuals	293.0800	5.31

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4598292
Type: calsource5 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 5 (Det #45)
Efficiency: 23.52% Chem. Recovery: 0.00%
Total Eff.: 23.52% Manual:100.00%
CALIBRATION: 3383.43 + 5.7029 * Chn + -0.0014 Chn **2 keV
Original: 3383.43 + 5.7029 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03483.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:49:38
Live Time: 1200.00 Real Time: 1200.74 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03512.CHN
Background File: C:\USER\ALPHA\BKGND\B0003007.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE5.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03512

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	247.94	210	270	6.00	851.00	0.08	7527.92	376.40

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4711.37	30.052	3.0000	1600.00	0.86	2.26

T O T A L S		% Recovery
Gross Count	7766.0000	100.00
Net Area	7765.3600	99.99
Background	0.6400	0.01
Composite Fit	7528.0000	96.94
Residuals	237.3600	3.06

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4698292
Type: calsource6 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 6 (Det #46)
Efficiency: 21.36% Chem. Recovery: 0.00%
Total Eff.: 21.36% Manual:100.00%
CALIBRATION: 3542.21 + 4.7155 * Chn + 0.000126 Chn **2 keV
Original: 3542.21 + 4.7155 * Chn + 0.000126 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03484.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:49:42
Live Time: 1200.00 Real Time: 1200.74 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03513.CHN
Background File: C:\USER\ALPHA\BKGND\B0003008.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE6.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03513

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	245.59	210	270	4.00	1072.00	0.12	6577.88	328.89

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4707.89	19.110	2.0000	1540.00	0.96	2.42

T O T A L S		% Recovery
Gross Count	6782.0000	100.00
Net Area	6780.4000	99.98
Background	1.6000	0.02
Composite Fit	6578.0000	96.99
Residuals	202.4000	2.98

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4798292
Type: calsource7 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 7 (Det #47)
Efficiency: 23.98% Chem. Recovery: 0.00%
Total Eff.: 23.98% Manual:100.00%
CALIBRATION: 3422.54 + 5.6099 * Chn + -0.0013 Chn **2 keV
Original: 3422.54 + 5.6099 * Chn + -0.0013 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03485.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:49:48
Live Time: 1200.00 Real Time: 1200.74 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03514.CHN
Background File: C:\USER\ALPHA\BKGND\B0003009.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE7.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03514

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	245.33	210	270	10.00	586.00	0.12	7673.88	383.69

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4720.57	49.720	5.0000	1600.00	0.86	2.24

T O T A L S		% Recovery
Gross Count	7799.0000	100.00
Net Area	7797.8000	99.98
Background	1.2000	0.02
Composite Fit	7674.0000	98.40
Residuals	123.8000	1.59

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4898292
Type: calsource9 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 8 (Det #48)
Efficiency: 21.51% Chem. Recovery: 0.00%
Total Eff.: 21.51% Manual:100.00%
CALIBRATION: 3638.32 + 4.1965 * Chn + 0.000847 Chn **2 keV
Original: 3638.32 + 4.1965 * Chn + 0.000847 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03486.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:49:52
Live Time: 1200.00 Real Time: 1200.72 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03515.CHN
Background File: C:\USER\ALPHA\BKGND\B0003010.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE9.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03515

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	247.14	210	270	10.00	389.00	0.08	5333.92	266.70

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4727.18	46.152	5.0000	1240.00	0.95	2.68

T O T A L S		% Recovery
Gross Count	5736.0000	100.00
Net Area	5735.2000	99.99
Background	0.8000	0.01
Composite Fit	5334.0000	92.99
Residuals	401.2000	6.99

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b1898292
Type: Background Sample Collected: 19-Oct-98 16:23:29
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 2 (Det #18)
Efficiency: 23.36% Chem. Recovery: 0.00%
Total Eff.: 23.36% Manual:100.00%
CALIBRATION: 3465.45 + 5.2377 * Chn + -0.000511 Chn **2 keV
Original: 3465.45 + 5.2377 * Chn + -0.000511 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03487.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:23:45
Live Time: 30000.00 Real Time: 30000.48 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003544.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003544

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	23.0000	100.00
Net Area	23.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	23.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b1998292
Type: Background Sample Collected: 19-Oct-98 16:23:45
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 3 (Det #19)
Efficiency: 20.99% Chem. Recovery: 0.00%
Total Eff.: 20.99% Manual:100.00%
CALIBRATION: 3432.37 + 5.4333 * Chn + -0.000847 Chn **2 keV
Original: 3432.37 + 5.4333 * Chn + -0.000847 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03488.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:23:48
Live Time: 30000.00 Real Time: 30000.50 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003545.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003545

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	45.0000	100.00
Net Area	45.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	45.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2198292
Type: Background Sample Collected: 19-Oct-98 16:23:49
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 5 (Det #21)
Efficiency: 23.41% Chem. Recovery: 0.00%
Total Eff.: 23.41% Manual:100.00%
CALIBRATION: 3547.39 + 4.7272 * Chn + 0.000312 Chn **2 keV
Original: 3547.39 + 4.7272 * Chn + 0.000312 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03489.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:23:55
Live Time: 30000.00 Real Time: 30000.48 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003546.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003546

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	48.0000	100.00
Net Area	48.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	48.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2298292
Type: Background Sample Collected: 19-Oct-98 16:23:55
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 6 (Det #22)
Efficiency: 20.74% Chem. Recovery: 0.00%
Total Eff.: 20.74% Manual:100.00%
CALIBRATION: 3450.5 + 5.3903 * Chn + -0.000684 Chn **2 keV
Original: 3450.5 + 5.3903 * Chn + -0.000684 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03490.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:23:57
Live Time: 30000.00 Real Time: 30000.48 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003547.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003547

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	46.0000	100.00
Net Area	46.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	46.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2398292
Type: Background Sample Collected: 19-Oct-98 16:23:57
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 7 (Det #23)
Efficiency: 23.09% Chem. Recovery: 0.00%
Total Eff.: 23.09% Manual:100.00%
CALIBRATION: 3463.05 + 5.2464 * Chn + -0.000446 Chn **2 keV
Original: 3463.05 + 5.2464 * Chn + -0.000446 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03491.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:23:59
Live Time: 30000.00 Real Time: 30000.48 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003548.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003548

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	58.0000	100.00
Net Area	58.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	58.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2498292
Type: Background Sample Collected: 19-Oct-98 16:23:59
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 8 (Det #24)
Efficiency: 21.46% Chem. Recovery: 0.00%
Total Eff.: 21.46% Manual:100.00%
CALIBRATION: 3417.36 + 5.5357 * Chn + -0.000974 Chn **2 keV
Original: 3417.36 + 5.5357 * Chn + -0.000974 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03492.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:01
Live Time: 30000.00 Real Time: 30000.50 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003549.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003549

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	47.0000	100.00
Net Area	47.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	47.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4098292
Type: Background Sample Collected: 19-Oct-98 16:24:53
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 8 (Det #40)
Efficiency: 22.69% Chem. Recovery: 0.00%
Total Eff.: 22.69% Manual:100.00%
CALIBRATION: 3562.72 + 4.6611 * Chn + 0.000303 Chn **2 keV
Original: 3562.72 + 4.6611 * Chn + 0.000303 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03509.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:55
Live Time: 30000.00 Real Time: 30000.58 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003565.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003565

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	53.0000	100.00
Net Area	53.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	53.0000	100.00

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4198292
Type: Background Sample Collected: 19-Oct-98 16:24:56
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 1 (Det #41)
Efficiency: 24.63% Chem. Recovery: 0.00%
Total Eff.: 24.63% Manual:100.00%
CALIBRATION: 3418.49 + 5.5496 * Chn + -0.0011 Chn **2 keV
Original: 3418.49 + 5.5496 * Chn + -0.0011 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03510.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:25:02
Live Time: 30000.00 Real Time: 30000.56 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003566.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003566

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	26.0000	100.00
Net Area	26.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	26.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4498292
Type: Background Sample Collected: 19-Oct-98 16:25:02
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 4 (Det #44)
Efficiency: 21.77% Chem. Recovery: 0.00%
Total Eff.: 21.77% Manual:100.00%
CALIBRATION: 3428.15 + 5.3947 * Chn + -0.000918 Chn **2 keV
Original: 3428.15 + 5.3947 * Chn + -0.000918 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03511.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:25:04
Live Time: 30000.00 Real Time: 30000.54 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003567.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003567

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	143.0000	100.00
Net Area	143.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	143.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4598292
Type: Background Sample Collected: 19-Oct-98 16:25:05
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 5 (Det #45)
Efficiency: 23.52% Chem. Recovery: 0.00%
Total Eff.: 23.52% Manual:100.00%
CALIBRATION: 3383.43 + 5.7029 * Chn + -0.0014 Chn **2 keV
Original: 3383.43 + 5.7029 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03512.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:25:10
Live Time: 30000.00 Real Time: 30000.56 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003568.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003568

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	20.0000	100.00
Net Area	20.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	20.0000	100.00

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4698292
Type: Background Sample Collected: 19-Oct-98 16:25:10
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 6 (Det #46)
Efficiency: 21.36% Chem. Recovery: 0.00%
Total Eff.: 21.36% Manual:100.00%
CALIBRATION: 3542.21 + 4.7155 * Chn + 0.000126 Chn **2 keV
Original: 3542.21 + 4.7155 * Chn + 0.000126 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03513.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:25:12
Live Time: 30000.00 Real Time: 30000.56 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003569.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003569

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	43.0000	100.00
Net Area	43.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	43.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4798292
Type: Background Sample Collected: 19-Oct-98 16:25:12
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 7 (Det #47)
Efficiency: 23.98% Chem. Recovery: 0.00%
Total Eff.: 23.98% Manual:100.00%
CALIBRATION: 3422.54 + 5.6099 * Chn + -0.0013 Chn **2 keV
Original: 3422.54 + 5.6099 * Chn + -0.0013 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03514.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:25:15
Live Time: 30000.00 Real Time: 30000.54 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003570.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003570

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	29.0000	100.00
Net Area	29.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	29.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4898292
Type: Background Sample Collected: 19-Oct-98 16:25:15
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 8 (Det #48)
Efficiency: 21.51% Chem. Recovery: 0.00%
Total Eff.: 21.51% Manual:100.00%
CALIBRATION: 3638.32 + 4.1965 * Chn + 0.000847 Chn **2 keV
Original: 3638.32 + 4.1965 * Chn + 0.000847 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03515.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:25:17
Live Time: 30000.00 Real Time: 30000.56 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003571.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003571

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	30.0000	100.00
Net Area	30.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	30.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 18 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 2 (Det #18)
Efficiency: 23.36% Chem. Recovery: 0.00%
Total Eff.: 23.36% Manual:100.00%
CALIBRATION: 3465.45 + 5.2377 * Chn + -0.000511 Chn **2 keV
Original: 3465.45 + 5.2377 * Chn + -0.000511 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03487.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:57:42
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3516.CHN
Background File: C:\USER\ALPHA\BKGND\B0002981.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3516

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	277.02	1.97	241.70	1145.92	0.00	1145.92	6875.51

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4877.20	9.784	11.0321	29432.84	98.67	5.79

T O T A L S		% Recovery
Gross Count	1253.0000	100.00
Net Area	1252.9947	100.00
Background	0.0053	0.00
Composite Fit	1145.9187	91.45
Residuals	107.0760	8.55

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 19 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 3 (Det #19)
Efficiency: 20.99% Chem. Recovery: 0.00%
Total Eff.: 20.99% Manual:100.00%
CALIBRATION: 3432.37 + 5.4333 * Chn + -0.000847 Chn **2 keV
Original: 3432.37 + 5.4333 * Chn + -0.000847 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03488.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:57:53
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3517.CHN
Background File: C:\USER\ALPHA\BKGND\B0002982.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3517

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	276.02	2.73	209.54	1168.70	0.00	1168.70	7012.19

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4867.53	13.564	6.2901	33407.29	109.81	5.73

T O T A L S		% Recovery
Gross Count	1253.0000	100.00
Net Area	1252.9897	100.00
Background	0.0103	0.00
Composite Fit	1168.6984	93.27
Residuals	84.2913	6.73

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 21 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 5 (Det #21)
Efficiency: 23.41% Chem. Recovery: 0.00%
Total Eff.: 23.41% Manual:100.00%
CALIBRATION: 3547.39 + 4.7272 * Chn + 0.000312 Chn **2 keV
Original: 3547.39 + 4.7272 * Chn + 0.000312 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03489.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:58:13
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3518.CHN
Background File: C:\USER\ALPHA\BKGND\B0002984.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3518

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	282.70	2.11	232.86	1140.08	0.00	1140.08	6840.48

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4908.71	10.326	10.8736	29220.31	98.46	5.80

T O T A L S		% Recovery
Gross Count	1254.0000	100.00
Net Area	1253.9900	100.00
Background	0.0100	0.00
Composite Fit	1140.0792	90.92
Residuals	113.9108	9.08

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 22 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 6 (Det #22)
Efficiency: 20.74% Chem. Recovery: 0.00%
Total Eff.: 20.74% Manual:100.00%
CALIBRATION: 3450.5 + 5.3903 * Chn + -0.000684 Chn **2 keV
Original: 3450.5 + 5.3903 * Chn + -0.000684 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03490.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:58:21
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3519.CHN
Background File: C:\USER\ALPHA\BKGND\B0002985.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3519

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	284.30	2.48	219.19	1165.15	0.00	1165.15	6990.90

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4927.68	12.415	12.5435	33707.32	111.14	5.74

T O T A L S		% Recovery
Gross Count	1252.0000	100.00
Net Area	1251.9867	100.00
Background	0.0133	0.00
Composite Fit	1165.1498	93.06
Residuals	86.8369	6.94

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 23 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 7 (Det #23)
Efficiency: 23.09% Chem. Recovery: 0.00%
Total Eff.: 23.09% Manual:100.00%
CALIBRATION: 3463.05 + 5.2464 * Chn + -0.000446 Chn **2 keV
Original: 3463.05 + 5.2464 * Chn + -0.000446 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03491.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:58:32
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3520.CHN
Background File: C:\USER\ALPHA\BKGND\B0002986.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3520

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	279.44	2.06	237.45	1150.48	0.00	1150.48	6902.90

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4894.27	10.306	10.7709	29895.64	99.83	5.78

T O T A L S		% Recovery
Gross Count	1253.0000	100.00
Net Area	1252.9927	100.00
Background	0.0073	0.00
Composite Fit	1150.4840	91.82
Residuals	102.5087	8.18

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 24 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 8 (Det #24)
Efficiency: 21.46% Chem. Recovery: 0.00%
Total Eff.: 21.46% Manual:100.00%
CALIBRATION: 3417.36 + 5.5357 * Chn + -0.000974 Chn **2 keV
Original: 3417.36 + 5.5357 * Chn + -0.000974 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03492.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:58:40
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3521.CHN
Background File: C:\USER\ALPHA\BKGND\B0002987.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3521

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	292.96	2.07	236.72	1149.64	0.00	1149.64	6897.81

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4955.50	10.288	11.2547	32142.65	107.44	5.78

T O T A L S		% Recovery
Gross Count	1253.0000	100.00
Net Area	1252.9883	100.00
Background	0.0117	0.00
Composite Fit	1149.6356	91.75
Residuals	103.3528	8.25

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 25 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 1 (Det #25)
Efficiency: 24.06% Chem. Recovery: 0.00%
Total Eff.: 24.06% Manual:100.00%
CALIBRATION: 3472.31 + 5.3315 * Chn + -0.000763 Chn **2 keV
Original: 3472.31 + 5.3315 * Chn + -0.000763 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03494.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:58:53
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3522.CHN
Background File: C:\USER\ALPHA\BKGND\B0002988.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3522

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	282.04	3.32	197.05	1210.52	0.00	1210.52	7263.12

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4915.30	16.250	14.3750	30187.54	95.84	5.63

T O T A L S		% Recovery
Gross Count	1276.0000	100.00
Net Area	1275.9787	100.00
Background	0.0213	0.00
Composite Fit	1210.5208	94.87
Residuals	65.4579	5.13

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 26 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 2 (Det #26)
Efficiency: 25.07% Chem. Recovery: 0.00%
Total Eff.: 25.07% Manual:100.00%
CALIBRATION: 3431.74 + 5.4102 * Chn + -0.000771 Chn **2 keV
Original: 3431.74 + 5.4102 * Chn + -0.000771 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03495.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:59:00
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3523.CHN
Background File: C:\USER\ALPHA\BKGND\B0002989.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3523

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	282.17	2.82	212.42	1203.60	0.00	1203.60	7221.63

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4896.96	14.032	12.2746	28805.85	91.94	5.65

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9910	100.00
Background	0.0090	0.00
Composite Fit	1203.6046	94.47
Residuals	70.3864	5.52

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 27 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 3 (Det #27)
Efficiency: 20.60% Chem. Recovery: 0.00%
Total Eff.: 20.60% Manual:100.00%
CALIBRATION: 3420.19 + 5.428 * Chn + -0.000738 Chn **2 keV
Original: 3420.19 + 5.428 * Chn + -0.000738 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03496.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:59:09
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3524.CHN
Background File: C:\USER\ALPHA\BKGND\B0002990.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3524

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	285.43	3.46	171.93	1088.83	0.00	1088.83	6532.96

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4909.39	17.307	4.3448	31713.38	111.89	5.94

T O T A L S		% Recovery
Gross Count	1273.0000	100.00
Net Area	1272.9913	100.00
Background	0.0087	0.00
Composite Fit	1088.8262	85.53
Residuals	184.1651	14.47

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 28 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 4 (Det #28)
Efficiency: 21.64% Chem. Recovery: 0.00%
Total Eff.: 21.64% Manual:100.00%
CALIBRATION: 3375.52 + 5.8252 * Chn + -0.0014 Chn **2 keV
Original: 3375.52 + 5.8252 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03497.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:59:17
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3525.CHN
Background File: C:\USER\ALPHA\BKGND\B0002991.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3525

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	281.04	9.55	120.88	1260.47	0.00	1260.47	7562.83

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4902.04	48.131	25.1601	34948.40	106.52	5.52

T O T A L S		% Recovery
Gross Count	1275.0000	100.00
Net Area	1274.9883	100.00
Background	0.0117	0.00
Composite Fit	1260.4722	98.86
Residuals	14.5162	1.14

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 29 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 5 (Det #29)
Efficiency: 24.12% Chem. Recovery: 0.00%
Total Eff.: 24.12% Manual:100.00%
CALIBRATION: 3359.46 + 5.8962 * Chn + -0.0014 Chn **2 keV
Original: 3359.46 + 5.8962 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03498.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:59:30
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3526.CHN
Background File: C:\USER\ALPHA\BKGND\B0002992.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3526

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	286.07	4.93	166.21	1245.12	0.00	1245.12	7470.73

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4931.61	25.120	19.0087	30973.17	95.56	5.55

T O T A L S		% Recovery
Gross Count	1275.0000	100.00
Net Area	1274.9927	100.00
Background	0.0073	0.00
Composite Fit	1245.1213	97.66
Residuals	29.8714	2.34

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 30 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 6 (Det #30)
Efficiency: 20.73% Chem. Recovery: 0.00%
Total Eff.: 20.73% Manual:100.00%
CALIBRATION: 3362.2 + 5.9334 * Chn + -0.0016 Chn **2 keV
Original: 3362.2 + 5.9334 * Chn + -0.0016 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03499.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:59:37
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3527.CHN
Background File: C:\USER\ALPHA\BKGND\B0002993.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3527

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	281.34	3.63	188.33	1211.24	0.00	1211.24	7267.44

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4904.87	18.291	15.0309	35057.57	111.19	5.63

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9880	100.00
Background	0.0120	0.00
Composite Fit	1211.2392	95.07
Residuals	62.7488	4.93

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 31 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 7 (Det #31)
Efficiency: 23.04% Chem. Recovery: 0.00%
Total Eff.: 23.04% Manual:100.00%
CALIBRATION: 3495.42 + 5.0692 * Chn + -0.000155 Chn **2 keV
Original: 3495.42 + 5.0692 * Chn + -0.000155 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03500.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:59:47
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3528.CHN
Background File: C:\USER\ALPHA\BKGND\B0002994.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3528

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	283.79	3.99	180.02	1212.97	0.00	1212.97	7277.80

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4921.52	19.867	15.3729	31587.68	100.07	5.63

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9910	100.00
Background	0.0090	0.00
Composite Fit	1212.9671	95.21
Residuals	61.0239	4.79

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 32 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 8 (Det #32)
Efficiency: 21.82% Chem. Recovery: 0.00%
Total Eff.: 21.82% Manual:100.00%
CALIBRATION: 3431.77 + 5.3512 * Chn + -0.000531 Chn **2 keV
Original: 3431.77 + 5.3512 * Chn + -0.000531 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03501.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 15:59:54
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3529.CHN
Background File: C:\USER\ALPHA\BKGND\B0002995.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3529

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1	274.33	1.57	271.61	1148.47	0.00	1148.47	6890.81

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1. *******	1.00	4859.79	7.948	9.4529	31580.24	105.65	5.78

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9907	100.00
Background	0.0093	0.00
Composite Fit	1148.4682	90.15
Residuals	125.5225	9.85

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 33 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 1 (Det #33)
Efficiency: 24.86% Chem. Recovery: 0.00%
Total Eff.: 24.86% Manual:100.00%
CALIBRATION: 3455.85 + 5.3442 * Chn + -0.000964 Chn **2 keV
Original: 3455.85 + 5.3442 * Chn + -0.000964 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03502.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:16:30
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3530.CHN
Background File: C:\USER\ALPHA\BKGND\B0002996.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3530

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	316.57	2.41	228.25	1194.73	0.00	1194.73	7168.41

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Widtn (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	5051.04	11.395	11.9582	28835.10	92.72	5.67

T O T A L S		% Recovery
Gross Count	1296.0000	100.00
Net Area	1295.9877	100.00
Background	0.0123	0.00
Composite Fit	1194.7343	92.19
Residuals	101.2534	7.81

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 34 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 2 (Det #34)
Efficiency: 23.95% Chem. Recovery: 0.00%
Total Eff.: 23.95% Manual:100.00%
CALIBRATION: 3459.08 + 5.2729 * Chn + -0.000554 Chn **2 keV
Original: 3459.08 + 5.2729 * Chn + -0.000554 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03503.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:16:40
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3531.CHN
Background File: C:\USER\ALPHA\BKGND\B0002997.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3531

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	300.49	2.40	230.78	1206.02	0.00	1206.01	7236.09

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4993.51	11.852	11.8797	30213.32	96.27	5.64

T O T A L S		% Recovery
Gross Count	1294.0000	100.00
Net Area	1293.9923	100.00
Background	0.0077	0.00
Composite Fit	1206.0153	93.20
Residuals	87.9770	6.80

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 35 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 3 (Det #35)
Efficiency: 20.32% Chem. Recovery: 0.00%
Total Eff.: 20.32% Manual:100.00%
CALIBRATION: 3403.69 + 5.5558 * Chn + -0.000906 Chn **2 keV
Original: 3403.69 + 5.5558 * Chn + -0.000906 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03504.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:16:50
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3532.CHN
Background File: C:\USER\ALPHA\BKGND\B0002998.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3532

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	297.56	1.95	249.21	1175.21	0.00	1175.21	7051.24

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1:	*******	1.00	4976.67	9.801	10.1991	34701.00	113.43	5.72

T O T A L S		% Recovery
Gross Count	1297.0000	100.00
Net Area	1296.9903	100.00
Background	0.0097	0.00
Composite Fit	1175.2071	90.61
Residuals	121.7832	9.39

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 36 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 4 (Det #36)
Efficiency: 22.13% Chem. Recovery: 0.00%
Total Eff.: 22.13% Manual:100.00%
CALIBRATION: 3359.6 + 5.9061 * Chn + -0.0015 Chn **2 keV
Original: 3359.6 + 5.9061 * Chn + -0.0015 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03505.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:16:58
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3533.CHN
Background File: C:\USER\ALPHA\BKGND\B0002999.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3533

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	305.76	9.63	121.43	1271.49	0.00	1271.49	7628.95

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	5025.24	48.051	24.8801	34473.34	104.19	5.50

T O T A L S		% Recovery
Gross Count	1296.0000	100.00
Net Area	1295.9830	100.00
Background	0.0170	0.00
Composite Fit	1271.4922	98.11
Residuals	24.4908	1.89

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 37 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 5 (Det #37)
Efficiency: 23.57% Chem. Recovery: 0.00%
Total Eff.: 23.57% Manual:100.00%
CALIBRATION: 3709.52 + 3.7418 * Chn + 0.0017 Chn **2 keV
Original: 3709.52 + 3.7418 * Chn + 0.0017 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03506.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:17:14
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3534.CHN
Background File: C:\USER\ALPHA\BKGND\B0003000.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3534

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	298.82	1.62	270.66	1163.14	0.00	1163.14	6978.83

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4979.44	7.719	9.8793	29608.93	97.79	5.75

T O T A L S		% Recovery
Gross Count	1296.0000	100.00
Net Area	1295.9893	100.00
Background	0.0107	0.00
Composite Fit	1163.1375	89.75
Residuals	132.8518	10.25

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 38 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 6 (Det #38)
Efficiency: 20.11% Chem. Recovery: 0.00%
Total Eff.: 20.11% Manual:100.00%
CALIBRATION: 3526.18 + 4.8964 * Chn + -0.000108 Chn **2 keV
Original: 3526.18 + 4.8964 * Chn + -0.000108 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03507.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:17:24
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3535.CHN
Background File: C:\USER\ALPHA\BKGND\B0003001.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3535

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	311.08	13.99	102.02	1287.42	0.00	1287.42	7724.52

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	5038.91	67.562	28.3964	38411.36	114.62	5.46

T O T A L S		% Recovery
Gross Count	1295.0000	100.00
Net Area	1294.9873	100.00
Background	0.0127	0.00
Composite Fit	1287.4207	99.41
Residuals	7.5666	0.58

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 39 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 7 (Det #39)
Efficiency: 23.08% Chem. Recovery: 0.00%
Total Eff.: 23.08% Manual:100.00%
CALIBRATION: 3619.64 + 4.396 * Chn + 0.000587 Chn **2 keV
Original: 3619.64 + 4.396 * Chn + 0.000587 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03508.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:17:32
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3536.CHN
Background File: C:\USER\ALPHA\BKGND\B0003002.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3536

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	298.66	2.33	231.62	1191.60	0.00	1191.60	7149.58

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4984.91	11.037	11.8313	30977.40	99.87	5.68

T O T A L S		% Recovery
Gross Count	1296.0000	100.00
Net Area	1295.9850	100.00
Background	0.0150	0.00
Composite Fit	1191.5974	91.94
Residuals	104.3876	8.05

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 40 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 8 (Det #40)
Efficiency: 22.69% Chem. Recovery: 0.00%
Total Eff.: 22.69% Manual:100.00%
CALIBRATION: 3562.72 + 4.6611 * Chn + 0.000303 Chn **2 keV
Original: 3562.72 + 4.6611 * Chn + 0.000303 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03509.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:17:41
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3537.CHN
Background File: C:\USER\ALPHA\BKGND\B0003003.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3537

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	299.36	10.68	115.90	1277.85	0.00	1277.85	7667.10

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4985.21	51.716	26.2613	33790.68	101.58	5.48

T O T A L S		% Recovery
Gross Count	1296.0000	100.00
Net Area	1295.9933	100.00
Background	0.0067	0.00
Composite Fit	1277.8507	98.60
Residuals	18.1426	1.40

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 41 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 1 (Det #41)
Efficiency: 24.63% Chem. Recovery: 0.00%
Total Eff.: 24.63% Manual:100.00%
CALIBRATION: 3418.49 + 5.5496 * Chn + -0.0011 Chn **2 keV
Original: 3418.49 + 5.5496 * Chn + -0.0011 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03510.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:17:57
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3538.CHN
Background File: C:\USER\ALPHA\BKGND\B0003004.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3538

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	312.11	5.45	157.38	1239.90	0.00	1239.90	7439.39

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	5043.43	26.517	18.6005	30204.60	93.59	5.57

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9933	100.00
Background	0.0067	0.00
Composite Fit	1239.8987	97.32
Residuals	34.0946	2.68

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 44 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 4 (Det #44)
Efficiency: 21.77% Chem. Recovery: 0.00%
Total Eff.: 21.77% Manual:100.00%
CALIBRATION: 3428.15 + 5.3947 * Chn + -0.000918 Chn **2 keV
Original: 3428.15 + 5.3947 * Chn + -0.000918 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03511.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:18:08
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3539.CHN
Background File: C:\USER\ALPHA\BKGND\B0003006.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3539

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	298.56	2.42	224.29	1176.72	0.00	1176.72	7060.32

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4956.96	11.720	12.4040	32431.42	105.89	5.71

T O T A L S		% Recovery
Gross Count	1275.0000	100.00
Net Area	1274.9507	100.00
Background	0.0493	0.00
Composite Fit	1176.7200	92.29
Residuals	98.2306	7.70

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 45 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 5 (Det #45)
Efficiency: 23.52% Chem. Recovery: 0.00%
Total Eff.: 23.52% Manual:100.00%
CALIBRATION: 3383.43 + 5.7029 * Chn + -0.0014 Chn **2 keV
Original: 3383.43 + 5.7029 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03512.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:18:20
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3540.CHN
Background File: C:\USER\ALPHA\BKGND\B0003007.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3540

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	303.90	4.11	177.26	1211.85	0.00	1211.85	7271.11

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4987.23	19.923	15.9672	30914.60	98.00	5.63

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9947	100.00
Background	0.0053	0.00
Composite Fit	1211.8524	95.12
Residuals	62.1423	4.88

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 46 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 6 (Det #46)
Efficiency: 21.36% Chem. Recovery: 0.00%
Total Eff.: 21.36% Manual:100.00%
CALIBRATION: 3542.21 + 4.7155 * Chn + 0.000126 Chn **2 keV
Original: 3542.21 + 4.7155 * Chn + 0.000126 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03513.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:18:29
Live Time: 10.00 Real Time: 10.04 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3541.CHN
Background File: C:\USER\ALPHA\BKGND\B0003008.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3541

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	293.48	1.61	266.73	1140.75	0.00	1140.75	6844.50

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4936.96	7.696	9.6465	32043.54	107.91	5.80

T O T A L S		% Recovery
Gross Count	1275.0000	100.00
Net Area	1274.9867	100.00
Background	0.0133	0.00
Composite Fit	1140.7502	89.47
Residuals	134.2365	10.53

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 47 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 7 (Det #47)
Efficiency: 23.98% Chem. Recovery: 0.00%
Total Eff.: 23.98% Manual:100.00%
CALIBRATION: 3422.54 + 5.6099 * Chn + -0.0013 Chn **2 keV
Original: 3422.54 + 5.6099 * Chn + -0.0013 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03514.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:18:37
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3542.CHN
Background File: C:\USER\ALPHA\BKGND\B0003009.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3542

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	303.52	6.56	144.75	1250.36	0.00	1250.36	7502.16

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	5005.51	31.604	19.8445	31285.08	96.13	5.54

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9900	100.00
Background	0.0100	0.00
Composite Fit	1250.3602	98.14
Residuals	23.6298	1.85

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 48 10/19/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 8 (Det #48)
Efficiency: 21.51% Chem. Recovery: 0.00%
Total Eff.: 21.51% Manual:100.00%
CALIBRATION: 3638.32 + 4.1965 * Chn + 0.000847 Chn **2 keV
Original: 3638.32 + 4.1965 * Chn + 0.000847 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03515.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:18:45
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3543.CHN
Background File: C:\USER\ALPHA\BKGND\B0003010.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3543

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	302.69	10.72	115.36	1274.03	0.00	1274.03	7644.19

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4986.14	50.465	26.2004	35537.83	107.17	5.49

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9933	100.00
Background	0.0067	0.00
Composite Fit	1274.0314	100.00
Residuals	0.0381	0.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2598292
Type: Background Sample Collected: 19-Oct-98 16:24:02
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 1 (Det #25)
Efficiency: 24.06% Chem. Recovery: 0.00%
Total Eff.: 24.06% Manual:100.00%
CALIBRATION: 3472.31 + 5.3315 * Chn + -0.000763 Chn **2 keV
Original: 3472.31 + 5.3315 * Chn + -0.000763 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03494.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:08
Live Time: 30000.00 Real Time: 30000.86 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003550.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003550

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	58.0000	100.00
Net Area	58.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	58.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2698292
Type: Background Sample Collected: 19-Oct-98 16:24:08
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 2 (Det #26)
Efficiency: 25.07% Chem. Recovery: 0.00%
Total Eff.: 25.07% Manual:100.00%
CALIBRATION: 3431.74 + 5.4102 * Chn + -0.000771 Chn **2 keV
Original: 3431.74 + 5.4102 * Chn + -0.000771 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03495.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:10
Live Time: 30000.00 Real Time: 30000.88 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003551.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003551

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	32.0000	100.00
Net Area	32.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	32.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2798292
Type: Background Sample Collected: 19-Oct-98 16:24:10
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 3 (Det #27)
Efficiency: 20.60% Chem. Recovery: 0.00%
Total Eff.: 20.60% Manual:100.00%
CALIBRATION: 3420.19 + 5.428 * Chn + -0.000738 Chn **2 keV
Original: 3420.19 + 5.428 * Chn + -0.000738 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03496.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:12
Live Time: 30000.00 Real Time: 30000.88 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003552.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003552

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	40.0000	100.00
Net Area	40.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	40.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2898292
Type: Background Sample Collected: 19-Oct-98 16:24:12
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 4 (Det #28)
Efficiency: 21.64% Chem. Recovery: 0.00%
Total Eff.: 21.64% Manual:100.00%
CALIBRATION: 3375.52 + 5.8252 * Chn + -0.0014 Chn **2 keV
Original: 3375.52 + 5.8252 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03497.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:14
Live Time: 30000.00 Real Time: 30000.88 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003553.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003553

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	79.0000	100.00
Net Area	79.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	79.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2998292
Type: Background Sample Collected: 19-Oct-98 16:24:15
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 5 (Det #29)
Efficiency: 24.12% Chem. Recovery: 0.00%
Total Eff.: 24.12% Manual:100.00%
CALIBRATION: 3359.46 + 5.8962 * Chn + -0.0014 Chn **2 keV
Original: 3359.46 + 5.8962 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03498.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:20
Live Time: 30000.00 Real Time: 30000.86 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003554.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003554

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	48.0000	100.00
Net Area	48.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	48.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3098292
Type: Background Sample Collected: 19-Oct-98 16:24:20
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 6 (Det #30)
Efficiency: 20.73% Chem. Recovery: 0.00%
Total Eff.: 20.73% Manual:100.00%
CALIBRATION: 3362.2 + 5.9334 * Chn + -0.0016 Chn **2 keV
Original: 3362.2 + 5.9334 * Chn + -0.0016 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03499.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:22
Live Time: 30000.00 Real Time: 30000.84 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003555.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003555

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	37.0000	100.00
Net Area	37.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	37.0000	100.00

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3198292
Type: Background Sample Collected: 19-Oct-98 16:24:22
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 7 (Det #31)
Efficiency: 23.04% Chem. Recovery: 0.00%
Total Eff.: 23.04% Manual:100.00%
CALIBRATION: 3495.42 + 5.0692 * Chn + -0.000155 Chn **2 keV
Original: 3495.42 + 5.0692 * Chn + -0.000155 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03500.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:24
Live Time: 30000.00 Real Time: 30000.88 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003556.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003556

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	29.0000	100.00
Net Area	29.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	29.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3298292
Type: Background Sample Collected: 19-Oct-98 16:24:24
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 8 (Det #32)
Efficiency: 21.82% Chem. Recovery: 0.00%
Total Eff.: 21.82% Manual:100.00%
CALIBRATION: 3431.77 + 5.3512 * Chn + -0.000531 Chn **2 keV
Original: 3431.77 + 5.3512 * Chn + -0.000531 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03501.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:25
Live Time: 30000.00 Real Time: 30000.88 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003557.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003557

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	53.0000	100.00
Net Area	53.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	53.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3398292
Type: Background Sample Collected: 19-Oct-98 16:24:26
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 1 (Det #33)
Efficiency: 24.86% Chem. Recovery: 0.00%
Total Eff.: 24.86% Manual:100.00%
CALIBRATION: 3455.85 + 5.3442 * Chn + -0.000964 Chn **2 keV
Original: 3455.85 + 5.3442 * Chn + -0.000964 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03502.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:33
Live Time: 30000.00 Real Time: 30000.60 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003558.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003558

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	46.0000	100.00
Net Area	46.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	46.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3498292
Type: Background Sample Collected: 19-Oct-98 16:24:33
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 2 (Det #34)
Efficiency: 23.95% Chem. Recovery: 0.00%
Total Eff.: 23.95% Manual:100.00%
CALIBRATION: 3459.08 + 5.2729 * Chn + -0.000554 Chn **2 keV
Original: 3459.08 + 5.2729 * Chn + -0.000554 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03503.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:35
Live Time: 30000.00 Real Time: 30000.60 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003559.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003559

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	27.0000	100.00
Net Area	27.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	27.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3598292
Type: Background Sample Collected: 19-Oct-98 16:24:35
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 3 (Det #35)
Efficiency: 20.32% Chem. Recovery: 0.00%
Total Eff.: 20.32% Manual:100.00%
CALIBRATION: 3403.69 + 5.5558 * Chn + -0.000906 Chn **2 keV
Original: 3403.69 + 5.5558 * Chn + -0.000906 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03504.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:39
Live Time: 30000.00 Real Time: 30000.58 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003560.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003560

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	33.0000	100.00
Net Area	33.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	33.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3698292
Type: Background Sample Collected: 19-Oct-98 16:24:39
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 4 (Det #36)
Efficiency: 22.13% Chem. Recovery: 0.00%
Total Eff.: 22.13% Manual:100.00%
CALIBRATION: 3359.6 + 5.9061 * Chn + -0.0015 Chn **2 keV
Original: 3359.6 + 5.9061 * Chn + -0.0015 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03505.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:44
Live Time: 30000.00 Real Time: 30000.58 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003561.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003561

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	76.0000	100.00
Net Area	76.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	76.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3798292
Type: Background Sample Collected: 19-Oct-98 16:24:45
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 5 (Det #37)
Efficiency: 23.57% Chem. Recovery: 0.00%
Total Eff.: 23.57% Manual:100.00%
CALIBRATION: 3709.52 + 3.7418 * Chn + 0.0017 Chn **2 keV
Original: 3709.52 + 3.7418 * Chn + 0.0017 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03506.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:49
Live Time: 30000.00 Real Time: 30000.60 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003562.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003562

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	55.0000	100.00
Net Area	55.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	55.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3898292
Type: Background Sample Collected: 19-Oct-98 16:24:49
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 6 (Det #38)
Efficiency: 20.11% Chem. Recovery: 0.00%
Total Eff.: 20.11% Manual:100.00%
CALIBRATION: 3526.18 + 4.8964 * Chn + -0.000108 Chn **2 keV
Original: 3526.18 + 4.8964 * Chn + -0.000108 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03507.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:51
Live Time: 30000.00 Real Time: 30000.60 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003563.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003563

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	72.0000	100.00
Net Area	72.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	72.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3998292
Type: Background Sample Collected: 19-Oct-98 16:24:51
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 7 (Det #39)
Efficiency: 23.08% Chem. Recovery: 0.00%
Total Eff.: 23.08% Manual:100.00%
CALIBRATION: 3619.64 + 4.396 * Chn + 0.000587 Chn **2 keV
Original: 3619.64 + 4.396 * Chn + 0.000587 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03508.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 19-Oct-98 16:24:53
Live Time: 30000.00 Real Time: 30000.58 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003564.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003564

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	52.0000	100.00
Net Area	52.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	52.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e1898299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 2 (Det #18)
Efficiency: 23.36% Chem. Recovery: 0.00%
Total Eff.: 23.36% Manual:100.00%
CALIBRATION: 3484.94 + 5.14008 * Chn + -0.000371378 Chn **2 keV
Original: 3465.45 + 5.2377 * Chn + -0.000511 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03487.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:36:24
Live Time: 3600.00 Real Time: 3601.94 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03748.CHN
Background File: C:\USER\ALPHA\BKGND\BC003721.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03748

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	400.92	18.58	182.03	4823.79	0.43	4823.36	80.39
2.	333.24	14.37	204.32	5568.71	0.37	5568.33	92.81
3.	238.09	17.65	150.57	5553.71	0.06	5553.65	92.56

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	110.953	1.8374	344.13	0.34	2.82
2.	Pu-239	0.73	5156.60	106.937	1.2876	397.28	12.37	2.63
3.	Th-230	0.76	4687.70	147.322	1.0930	396.24	8.49	2.63

T O T A L S		% Recovery
Gross Count	15443.0000	100.00
Net Area	15440.3600	99.98
Background	2.6400	0.02
Composite Fit	15946.2120	103.26
Residuals	505.8521	3.28

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e1998299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 3 (Det #19)
Efficiency: 20.99% Chem. Recovery: 0.00%
Total Eff.: 20.99% Manual:100.00%
CALIBRATION: 3695.97 + 3.80248 * Chn + 0.00162913 Chn **2 keV
Original: 3432.37 + 5.4333 * Chn + -0.000847 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03488.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:36:35
Live Time: 3600.00 Real Time: 3601.94 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03749.CHN
Background File: C:\USER\ALPHA\BKGND\B0003722.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03749

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	401.64	24.96	184.39	4325.70	0.60	4325.10	72.09
2.	335.81	12.56	217.89	5134.09	0.44	5133.65	85.56
3.	236.79	38.40	153.01	4430.26	0.30	4429.96	73.83

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	119.877	3.3806	343.43	0.39	2.98
2.	Pu-239	0.73	5156.60	91.269	1.3448	407.63	7.74	2.74
3.	Th-230	0.76	4687.70	149.889	4.2347	351.75	7.06	2.94

T O T A L S		% Recovery
Gross Count	14378.0000	100.00
Net Area	14374.4000	99.97
Background	3.6000	0.03
Composite Fit	13890.0486	96.61
Residuals	484.3514	3.37

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e2198299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 5 (Det #21)
Efficiency: 23.41% Chem. Recovery: 0.00%
Total Eff.: 23.41% Manual:100.00%
CALIBRATION: 3532.54 + 4.92599 * Chn + -0.000137674 Chn **2 keV
Original: 3547.39 + 4.7272 * Chn + 0.000312 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03489.CHN
ACQUISITION: 512 Cnannels Spectrum Acquired: 26-Oct-98 08:36:48
Live Time: 3600.00 Real Time: 3601.96 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03750.CHN
Background File: C:\USER\ALPHA\BKGND\B0003723.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03750

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	401.06	19.49	214.62	5280.57	0.45	5280.12	88.00
2.	332.79	18.38	245.90	5925.74	0.28	5925.46	98.76
3.	236.06	32.42	170.49	5064.45	0.34	5064.11	84.40

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	105.876	2.1975	375.92	0.34	2.70
2.	Pu-239	0.73	5156.60	102.543	2.1035	421.86	11.02	2.55
3.	Th-230	0.76	4687.70	148.954	3.1682	360.54	5.74	2.75

T O T A L S		% Recovery
Gross Count	16329.0000	100.00
Net Area	16326.1200	99.98
Background	2.8800	0.02
Composite Fit	16270.7670	99.64
Residuals	55.3530	0.34

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e2298299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 6 (Det #22)
Efficiency: 20.74% Chem. Recovery: 0.00%
Total Eff.: 20.74% Manual:100.00%
CALIBRATION: 3548.7 + 4.75406 * Chn + 0.000351893 Chn **2 keV
Original: 3450.5 + 5.3903 * Chn + -0.000684 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03490.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:36:58
Live Time: 3600.00 Real Time: 3601.94 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03751.CHN
Background File: C:\USER\ALPHA\BKGND\B0003724.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03751

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	395.90	34.75	201.36	5046.58	0.80	5045.78	84.10
2.	330.15	18.87	233.98	5916.91	0.16	5916.75	98.61
3.	235.48	19.88	168.47	2570.91	0.01	2570.90	42.85

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	144.334	4.9486	405.48	0.41	2.76
2.	Pu-239	0.73	5156.60	110.682	2.0157	475.47	8.32	2.55
3.	Th-230	0.76	4687.70	85.339	9.6129	206.60	6.83	3.87

T O T A L S		% Recovery
Gross Count	15985.0000	100.00
Net Area	15981.1600	99.98
Background	3.8400	0.02
Composite Fit	16300.2264	101.97
Residuals	319.0664	2.00

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S
Core Lab

SAMPLE: e2398299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 7 (Det #23)
Efficiency: 23.09% Chem. Recovery: 0.00%
Total Eff.: 23.09% Manual:100.00%
CALIBRATION: 3508.1 + 5.06373 * Chn + -0.000293374 Chn **2 keV
Original: 3463.05 + 5.2464 * Chn + -0.000446 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03491.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:37:06
Live Time: 3600.00 Real Time: 3601.96 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03752.CHN
Background File: C:\USER\ALPHA\BKGND\B0003725.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03752

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	399.86	18.95	209.05	5533.49	0.37	5533.12	92.22
2.	331.93	16.71	239.97	6229.09	0.32	6228.77	103.81
3.	236.18	24.43	171.24	5503.60	0.09	5503.51	91.73

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	111.235	1.8875	399.39	0.34	2.64
2.	Pu-239	0.73	5156.60	106.312	1.6601	449.60	13.61	2.48
3.	Th-230	0.76	4687.70	142.939	1.9373	397.25	7.75	2.64

T O T A L S		% Recovery
Gross Count	16728.0000	100.00
Net Area	16724.4000	99.98
Background	3.6000	0.02
Composite Fit	17266.1774	103.22
Residuals	541.7775	3.24

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e2498299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 8 (Det #24)
Efficiency: 21.46% Chem. Recovery: 0.00%
Total Eff.: 21.46% Manual:100.00%
CALIBRATION: 3430.23 + 5.42991 * Chn + -0.000828034 Chn **2 keV
Original: 3417.36 + 5.5357 * Chn + -0.000974 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03492.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:37:13
Live Time: 3600.00 Real Time: 3601.92 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03753.CHN
Background File: C:\USER\ALPHA\BKGND\B0003726.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03753

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	403.42	16.01	197.92	5475.81	0.55	5475.27	91.25
2.	335.06	13.02	235.50	6185.99	0.32	6185.67	103.09
3.	240.40	13.70	175.28	6268.31	0.60	6267.70	104.46

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	108.342	1.4352	425.23	0.38	2.65
2.	Pu-239	0.73	5156.60	100.976	1.2048	480.40	16.06	2.49
3.	Th-230	0.76	4687.70	138.411	0.8526	486.77	8.85	2.48

T O T A L S		% Recovery
Gross Count	16131.0000	100.00
Net Area	16127.2800	99.98
Background	3.7200	0.02
Composite Fit	17930.1105	111.15
Residuals	1802.8306	11.18

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e2598299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 1 (Det #25)
Efficiency: 24.06% Chem. Recovery: 0.00%
Total Eff.: 24.06% Manual:100.00%
CALIBRATION: 3432.68 + 5.46962 * Chn + -0.000842733 Chn **2 keV
Original: 3472.31 + 5.3315 * Chn + -0.000763 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03494.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:37:23
Live Time: 3600.00 Real Time: 3602.54 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03754.CHN
Background File: C:\USER\ALPHA\BKGND\B0003727.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03754

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	400.06	19.38	199.61	5174.09	0.88	5173.20	86.22
2.	332.18	18.92	224.03	5665.22	0.66	5664.56	94.41
3.	238.19	19.73	163.39	5565.53	0.76	5564.78	92.75

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	109.519	2.0061	358.35	0.36	2.73
2.	Pu-239	0.73	5156.60	109.152	2.0221	392.39	12.17	2.60
3.	Th-230	0.76	4687.70	144.642	1.3807	385.48	5.98	2.63

T O T A L S		% Recovery
Gross Count	16038.0000	100.00
Net Area	16029.4800	99.95
Background	8.5200	0.05
Composite Fit	16404.8416	102.29
Residuals	375.3616	2.34

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e2698299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 2 (Det #26)
Efficiency: 25.07% Chem. Recovery: 0.00%
Total Eff.: 25.07% Manual:100.00%
CALIBRATION: 3344.55 + 5.91537 * Chn + -0.00151421 Chn **2 keV
Original: 3431.74 + 5.4102 * Chn + -0.000771 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03495.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:37:30
Live Time: 3600.00 Real Time: 3602.56 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03755.CHN
Background File: C:\USER\ALPHA\BKGND\B0003728.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03755

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	403.74	21.63	196.45	5134.08	0.41	5133.67	85.56
2.	335.07	21.76	219.12	5618.50	0.82	5617.68	93.63
3.	242.06	15.83	169.47	5345.70	0.34	5345.37	89.09

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	112.006	2.2837	341.29	0.32	2.74
2.	Pu-239	0.73	5156.60	115.578	2.3742	373.47	11.64	2.62
3.	Th-230	0.76	4687.70	131.529	1.1826	355.36	5.26	2.68

T O T A L S		% Recovery
Gross Count	16124.0000	100.00
Net Area	16119.4400	99.97
Background	4.5600	0.03
Composite Fit	16098.2797	99.84
Residuals	21.1603	0.13

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e2798299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 3 (Det #27)
Efficiency: 20.60% Chem. Recovery: 0.00%
Total Eff.: 20.60% Manual:100.00%
CALIBRATION: 3389.18 + 5.53265 * Chn + -0.000851952 Chn **2 keV
Original: 3420.19 + 5.428 * Chn + -0.000738 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03496.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:37:38
Live Time: 3600.00 Real Time: 3602.54 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03756.CHN
Background File: C:\USER\ALPHA\BKGND\B0003729.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03756

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	404.14	28.39	167.78	4669.64	0.20	4669.44	77.82
2.	336.93	19.67	187.99	5534.65	0.32	5534.34	92.24
3.	243.86	14.52	150.59	6107.24	0.98	6106.27	101.77

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	134.279	2.9578	377.79	0.36	2.87
2.	Pu-239	0.73	5156.60	125.674	1.6874	447.76	13.79	2.63
3.	Th-230	0.76	4687.70	159.343	0.7793	494.03	10.31	2.51

T O T A L S		% Recovery
Gross Count	15027.0000	100.00
Net Area	15022.6800	99.97
Background	4.3200	0.03
Composite Fit	16311.5377	108.55
Residuals	1288.8577	8.58

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e2898299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 4 (Det #28)
Efficiency: 21.64% Chem. Recovery: 0.00%
Total Eff.: 21.64% Manual:100.00%
CALIBRATION: 3394.73 + 5.71287 * Chn + -0.00118947 Chn **2 keV
Original: 3375.52 + 5.8252 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03497.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:37:44
Live Time: 3600.00 Real Time: 3602.54 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03757.CHN
Background File: C:\USER\ALPHA\BKGND\B0003730.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03757

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	399.25	31.79	183.02	5080.48	1.02	5079.46	84.66
2.	331.25	29.21	216.53	5709.99	0.21	5709.79	95.16
3.	238.13	24.33	168.36	5426.19	0.34	5425.85	90.43

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	138.516	3.4834	391.21	0.41	2.75
2.	Pu-239	0.73	5156.60	133.434	3.3959	439.76	13.70	2.59
3.	Th-230	0.76	4687.70	149.597	1.9200	417.89	5.84	2.66

T O T A L S		% Recovery
Gross Count	16180.0000	100.00
Net Area	16173.8800	99.96
Background	6.1200	0.04
Composite Fit	16236.6058	100.35
Residuals	62.7258	0.39

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e2998299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 5 (Det #29)
Efficiency: 24.12% Chem. Recovery: 0.00%
Total Eff.: 24.12% Manual:100.00%
CALIBRATION: 3423.9 + 5.54668 * Chn + -0.001001 Chn **2 keV
Original: 3359.46 + 5.8962 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03498.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:37:56
Live Time: 3600.00 Real Time: 3602.54 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03758.CHN
Background File: C:\USER\ALPHA\BKGND\B0003731.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03758

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	400.76	24.94	192.46	5477.91	0.97	5476.94	91.28
2.	332.31	27.49	211.47	6048.82	0.56	6048.26	100.80
3.	238.08	24.54	165.48	5562.17	0.12	5562.05	92.70

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	126.890	2.3964	378.45	0.36	2.65
2.	Pu-239	0.73	5156.60	136.031	2.7024	417.93	14.96	2.52
3.	Th-230	0.76	4687.70	152.585	1.8261	384.33	7.59	2.63

T O T A L S		% Recovery
Gross Count	16765.0000	100.00
Net Area	16760.6800	99.97
Background	4.3200	0.03
Composite Fit	17088.9048	101.93
Residuals	328.2248	1.96

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3098299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 6 (Det #30)
Efficiency: 20.73% Chem. Recovery: 0.00%
Total Eff.: 20.73% Manual:100.00%
CALIBRATION: 3346.74 + 6.02273 * Chn + -0.00166297 Chn **2 keV
Original: 3362.2 + 5.9334 * Chn + -0.0016 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03499.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:38:03
Live Time: 3600.00 Real Time: 3602.54 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03759.CHN
Background File: C:\USER\ALPHA\BKGND\B0003732.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03759

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	399.20	24.79	194.63	5090.09	1.03	5089.07	84.82
2.	330.70	30.92	213.98	5700.03	0.27	5699.76	95.00
3.	238.33	22.16	161.30	5616.36	0.33	5616.02	93.60

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	118.027	2.7384	409.15	0.43	2.75
2.	Pu-239	0.73	5156.60	137.709	3.6174	458.25	14.39	2.60
3.	Th-230	0.76	4687.70	157.041	1.5376	451.52	5.89	2.62

T O T A L S		% Recovery
Gross Count	15985.0000	100.00
Net Area	15980.5600	99.97
Background	4.4400	0.03
Composite Fit	16406.4824	102.64
Residuals	425.9224	2.66

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3198299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 7 (Det #31)
Efficiency: 23.04% Chem. Recovery: 0.00%
Total Eff.: 23.04% Manual:100.00%
CALIBRATION: 3482.5 + 5.3072 * Chn + -0.000705758 Chn **2 keV
Original: 3495.42 + 5.0692 * Chn + -0.000155 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03500.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:38:10
Live Time: 3600.00 Real Time: 3602.54 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03760.CHN
Background File: C:\USER\ALPHA\BKGND\B0003733.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03760

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	398.64	22.41	179.13	4577.66	0.78	4576.88	76.28
2.	329.91	27.49	215.16	5443.40	0.22	5443.18	90.72
3.	234.39	36.94	157.89	4850.66	0.34	4850.32	80.84

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	112.822	2.4841	331.08	0.37	2.90
2.	Pu-239	0.73	5156.60	124.341	3.3643	393.75	11.79	2.66
3.	Th-230	0.76	4687.70	165.250	3.5764	350.86	5.12	2.81

T O T A L S		% Recovery
Gross Count	15157.0000	100.00
Net Area	15152.8000	99.97
Background	4.2000	0.03
Composite Fit	14871.7270	98.12
Residuals	281.0730	1.85

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3298299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 8 (Det #32)
Efficiency: 21.82% Chem. Recovery: 0.00%
Total Eff.: 21.82% Manual:100.00%
CALIBRATION: 3343.57 + 5.99055 * Chn + -0.00157964 Chn **2 keV
Original: 3431.77 + 5.3512 * Chn + -0.000531 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03501.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:38:16
Live Time: 3600.00 Real Time: 3602.54 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03761.CHN
Background File: C:\USER\ALPHA\BKGND\B0003734.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03761

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	399.78	17.61	197.59	4697.90	0.71	4697.19	78.29
2.	331.65	21.86	218.25	5421.99	0.34	5421.65	90.36
3.	239.50	15.11	165.50	6087.69	0.18	6087.50	101.46

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	97.952	2.0335	358.78	0.39	2.86
2.	Pu-239	0.73	5156.60	114.127	2.5201	414.12	11.23	2.66
3.	Th-230	0.76	4687.70	150.595	0.9194	464.98	5.26	2.51

T O T A L S		% Recovery
Gross Count	15324.0000	100.00
Net Area	15319.4400	99.97
Background	4.5600	0.03
Composite Fit	16207.5762	105.77
Residuals	888.1362	5.80

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3398299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 1 (Det #33)
Efficiency: 24.86% Chem. Recovery: 0.00%
Total Eff.: 24.86% Manual:100.00%
CALIBRATION: 3599.38 + 4.50337 * Chn + 0.000269709 Chn **2 keV
Original: 3279.27 + 6.4907 * Chn + -0.0027 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03762.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 09:47:14
Live Time: 3600.00 Real Time: 3600.42 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03775.CHN
Background File: C:\USER\ALPHA\BKGND\B0003735.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03775

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	408.92	29.63	180.09	4937.60	0.66	4936.94	82.28
2.	338.91	21.15	206.00	5764.60	0.24	5764.36	96.07
3.	238.27	33.80	160.27	5132.95	0.60	5132.35	85.54

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	132.129	3.2242	330.98	0.34	2.79
2.	Pu-239	0.73	5156.60	116.680	1.9910	386.45	10.11	2.58
3.	Th-230	0.76	4687.70	151.771	2.9487	344.08	7.40	2.74

T O T A L S		% Recovery
Gross Count	15920.0000	100.00
Net Area	15914.7200	99.97
Background	5.2800	0.03
Composite Fit	15835.1498	99.47
Residuals	79.5702	0.50

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3498299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 2 (Det #34)
Efficiency: 23.95% Chem. Recovery: 0.00%
Total Eff.: 23.95% Manual:100.00%
CALIBRATION: 3493.91 + 5.05079 * Chn + -0.000210344 Chn **2 keV
Original: 3459.08 + 5.2729 * Chn + -0.000554 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03503.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:38:36
Live Time: 3600.00 Real Time: 3602.06 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03763.CHN
Background File: C:\USER\ALPHA\BKGND\B0003736.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03763

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	401.11	22.15	193.14	4703.39	0.15	4703.24	78.39
2.	333.84	15.60	228.18	5612.59	0.15	5612.44	93.54
3.	238.73	15.12	170.18	5420.83	0.14	5420.70	90.34

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	111.662	2.6564	327.30	0.31	2.86
2.	Pu-239	0.73	5156.60	100.640	1.6516	390.57	8.79	2.62
3.	Th-230	0.76	4687.70	125.122	1.1070	377.22	5.53	2.66

T O T A L S		% Recovery
Gross Count	15602.0000	100.00
Net Area	15599.8400	99.99
Background	2.1600	0.01
Composite Fit	15736.8102	100.86
Residuals	136.9702	0.88

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3598299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 3 (Det #35)
Efficiency: 20.32% Chem. Recovery: 0.00%
Total Eff.: 20.32% Manual:100.00%
CALIBRATION: 3379.96 + 5.74102 * Chn + -0.00125899 Chn **2 keV
Original: 3403.69 + 5.5558 * Chn + -0.000906 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03504.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:38:43
Live Time: 3600.00 Real Time: 3602.06 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03764.CHN
Background File: C:\USER\ALPHA\BKGND\B0003737.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03764

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	402.34	16.91	169.98	4725.50	0.77	4724.72	78.75
2.	333.92	15.20	188.86	5676.24	0.09	5676.16	94.60
3.	240.47	10.09	147.76	6127.62	0.18	6127.44	102.12

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	109.652	1.5238	387.53	0.42	2.85
2.	Pu-239	0.73	5156.60	118.173	1.2037	465.56	16.04	2.60
3.	Th-230	0.76	4687.70	155.791	0.5093	502.58	11.69	2.50

T O T A L S		% Recovery
Gross Count	14826.0000	100.00
Net Area	14823.4800	99.98
Background	2.5200	0.02
Composite Fit	16529.3581	111.49
Residuals	1705.8781	11.51

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3698299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 4 (Det #36)
Efficiency: 22.13% Chem. Recovery: 0.00%
Total Eff.: 22.13% Manual:100.00%
CALIBRATION: 3359.73 + 5.90202 * Chn + -0.00153975 Chn **2 keV
Original: 3359.6 + 5.9061 * Chn + -0.0015 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03505.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:38:51
Live Time: 3600.00 Real Time: 3602.08 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03765.CHN
Background File: C:\USER\ALPHA\BKGND\B0003738.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03765

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	402.53	17.84	161.35	4711.22	1.39	4709.83	78.50
2.	333.46	19.18	182.08	5157.00	0.69	5156.31	85.94
3.	240.03	11.52	130.71	6207.29	0.52	6206.78	103.45

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	114.275	1.5161	354.71	0.42	2.86
2.	Pu-239	0.73	5156.60	119.003	1.7306	388.33	16.56	2.73
3.	Th-230	0.76	4687.70	181.320	0.5012	467.45	18.40	2.49

T O T A L S		% Recovery
Gross Count	15157.0000	100.00
Net Area	15148.7200	99.95
Background	8.2800	0.05
Composite Fit	16568.8156	109.31
Residuals	1420.0956	9.37

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3898299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 6 (Det #38)
Efficiency: 20.11% Chem. Recovery: 0.00%
Total Eff.: 20.11% Manual:100.00%
CALIBRATION: 3510.95 + 5.02064 * Chn + -0.000314587 Chn **2 keV
Original: 3526.18 + 4.8964 * Chn + -0.000108 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03507.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:39:03
Live Time: 3600.00 Real Time: 3602.08 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03766.CHN
Background File: C:\USER\ALPHA\BKGND\B0003739.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03766

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	403.59	32.84	181.32	4828.87	0.78	4828.09	80.47
2.	334.80	27.03	218.79	5540.45	0.37	5540.08	92.33
3.	237.93	37.50	159.84	4904.05	0.42	4903.63	81.73

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	137.326	3.9596	400.14	0.42	2.82
2.	Pu-239	0.73	5156.60	122.703	3.2773	459.15	11.86	2.63
3.	Th-230	0.76	4687.70	162.840	3.6628	406.40	5.68	2.80

T O T A L S		% Recovery
Gross Count	15216.0000	100.00
Net Area	15210.9600	99.97
Background	**5.0400**	**0.03**
Composite Fit	15273.3782	100.38
Residuals	62.4182	0.41

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e3998299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 7 (Det #39)
Efficiency: 23.08% Chem. Recovery: 0.00%
Total Eff.: 23.08% Manual:100.00%
CALIBRATION: 3567.49 + 4.77805 * Chn keV
Original: 3580.69 + 4.72781 * Chn keV
File: C:\USER\ALPHA\CALIB\CAL03767.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:32:24
Live Time: 3600.00 Real Time: 3602.08 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03795.CHN
Background File: C:\USER\ALPHA\BKGND\B0003740.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03795

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	401.53	32.23	185.56	4779.25	0.25	4778.99	79.65
2.	332.59	33.45	209.00	5429.92	0.59	5429.34	90.49

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	133.774	4.1224	345.10	0.33	2.84
2.	Pu-239	0.73	5156.60	136.955	4.2869	392.07	10.01	2.66

T O T A L S		% Recovery
Gross Count	15256.0000	100.00
Net Area	15252.1600	99.97
Background	3.8400	0.03
Composite Fit	10563.2793	69.24
Residuals	4688.8809	30.73

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4098299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 8 (Det #40)
Efficiency: 22.69% Chem. Recovery: 0.00%
Total Eff.: 22.69% Manual:100.00%
CALIBRATION: 3510.28 + 4.96478 * Chn + -0.00021758 Chn **2 keV
Original: 3562.72 + 4.6611 * Chn + 0.000303 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03509.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:39:16
Live Time: 3600.00 Real Time: 3602.08 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03768.CHN
Background File: C:\USER\ALPHA\BKGND\B0003741.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03768

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	405.14	21.84	190.72	5161.53	0.38	5161.15	86.02
2.	336.56	16.97	228.01	6019.92	0.36	6019.56	100.33
3.	239.67	29.06	159.71	5076.94	0.35	5076.59	84.61

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	117.606	2.1862	379.11	0.35	2.73
2.	Pu-239	0.73	5156.60	107.123	1.6503	442.16	13.07	2.53
3.	Th-230	0.76	4687.70	148.958	2.4506	372.90	8.17	2.75

T O T A L S		% Recovery
Gross Count	16285.0000	100.00
Net Area	16280.8000	99.97
Background	4.2000	0.03
Composite Fit	16258.3907	99.84
Residuals	22.4093	0.14

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4198299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 1 (Det #41)
Efficiency: 24.63% Chem. Recovery: 0.00%
Total Eff.: 24.63% Manual:100.00%
CALIBRATION: 3366.93 + 5.8905 * Chn + -0.00168988 Chn **2 keV
Original: 3418.49 + 5.5496 * Chn + -0.0011 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03510.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:39:30
Live Time: 3600.00 Real Time: 3601.68 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03769.CHN
Background File: C:\USER\ALPHA\BKGND\B0003742.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03769

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	407.35	30.09	167.85	4752.00	0.42	4751.58	79.19
2.	336.26	34.31	195.74	5364.68	0.44	5364.24	89.40
3.	240.86	23.37	152.40	5115.91	0.44	5115.47	85.26

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	129.688	3.1100	321.53	0.32	2.84
2.	Pu-239	0.73	5156.60	142.140	3.9918	362.99	12.33	2.68
3.	Th-230	0.76	4687.70	150.429	1.7243	346.15	4.51	2.74

T O T A L S		% Recovery
Gross Count	15247.0000	100.00
Net Area	15244.1200	99.98
Background	2.8800	0.02
Composite Fit	15232.6038	99.91
Residuals	11.5162	0.08

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4498299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 4 (Det #44)
Efficiency: 21.77% Chem. Recovery: 0.00%
Total Eff.: 21.77% Manual:100.00%
CALIBRATION: 3469.31 + 5.07326 * Chn + -0.000341848 Chn **2 keV
Original: 3428.15 + 5.3947 * Chn + -0.000918 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03511.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:39:36
Live Time: 3600.00 Real Time: 3601.68 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03770.CHN
Background File: C:\USER\ALPHA\BKGND\B0003743.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03770

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	408.77	20.80	154.45	3708.82	1.05	3707.77	61.80
2.	340.39	14.13	180.91	4521.97	1.31	4520.67	75.34
3.	244.18	10.27	131.83	4364.01	1.04	4362.98	72.72

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	105.983	2.4974	283.86	0.41	3.22
2.	Pu-239	0.73	5156.60	97.910	1.4269	346.09	8.19	2.92
3.	Th-230	0.76	4687.70	120.032	0.6798	334.02	14.29	2.97

T O T A L S		% Recovery
Gross Count	13187.0000	100.00
Net Area	13169.9600	99.87
Background	17.0400	0.13
Composite Fit	12965.5019	98.32
Residuals	204.4581	1.55

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4598299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 5 (Det #45)
Efficiency: 23.52% Chem. Recovery: 0.00%
Total Eff.: 23.52% Manual:100.00%
CALIBRATION: 3514.81 + 4.96661 * Chn + -0.000407118 Chn **2 keV
Original: 3383.43 + 5.7029 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03512.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:39:47
Live Time: 3600.00 Real Time: 3601.70 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03771.CHN
Background File: C:\USER\ALPHA\BKGND\B0003744.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03771

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	410.72	18.47	189.79	5069.53	0.38	5069.14	84.49
2.	340.04	19.23	215.12	5484.56	0.32	5484.24	91.40
3.	240.91	28.15	165.05	4907.28	0.14	4907.14	81.79

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	106.611	1.8021	359.21	0.34	2.75
2.	Pu-239	0.73	5156.60	105.445	2.0380	388.62	12.59	2.65
3.	Th-230	0.76	4687.70	137.836	2.6171	347.73	5.84	2.80

T O T A L S		% Recovery
Gross Count	15297.0000	100.00
Net Area	15294.0000	99.98
Background	3.0000	0.02
Composite Fit	15461.3605	101.07
Residuals	167.3605	1.09

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4698299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 6 (Det #46)
Efficiency: 21.36% Chem. Recovery: 0.00%
Total Eff.: 21.36% Manual:100.00%
CALIBRATION: 3468.87 + 5.18274 * Chn + -0.000575674 Chn **2 keV
Original: 3542.21 + 4.7155 * Chn + 0.000126 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03513.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:39:53
Live Time: 3600.00 Real Time: 3601.68 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03772.CHN
Background File: C:\USER\ALPHA\BKGND\BC003745.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03772

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	407.66	18.72	186.73	4687.70	0.63	4687.07	78.12
2.	338.36	14.04	220.36	5613.92	0.10	5613.82	93.56
3.	241.66	13.58	168.58	5585.40	0.48	5584.92	93.08

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	103.818	2.0178	365.72	0.39	2.86
2.	Pu-239	0.73	5156.60	98.395	1.3770	438.03	11.07	2.62
3.	Th-230	0.76	4687.70	125.693	0.9300	435.78	6.95	2.62

T O T A L S		% Recovery
Gross Count	15981.0000	100.00
Net Area	15977.0400	99.98
Background	3.9600	0.02
Composite Fit	15887.0143	99.41
Residuals	90.0257	0.56

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4798299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 7 (Det #47)
Efficiency: 23.98% Chem. Recovery: 0.00%
Total Eff.: 23.98% Manual:100.00%
CALIBRATION: 3543.5 + 4.79324 * Chn + -3.40502e-005 Chn **2 keV
Original: 3422.54 + 5.6099 * Chn + -0.0013 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03514.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:39:59
Live Time: 3600.00 Real Time: 3601.70 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03773.CHN
Background File: C:\USER\ALPHA\BKGND\B0003746.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03773

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	406.43	33.38	159.34	4642.11	0.29	4641.82	77.36
2.	337.34	24.94	196.06	5696.82	0.29	5696.53	94.94
3.	239.12	28.49	149.09	5236.09	0.23	5235.86	87.26

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	146.156	3.4150	322.62	0.32	2.88
2.	Pu-239	0.73	5156.60	129.444	2.3192	395.92	11.92	2.60
3.	Th-230	0.76	4687.70	156.052	2.0562	363.90	8.54	2.71

T O T A L S		% Recovery
Gross Count	16185.0000	100.00
Net Area	16182.1200	99.98
Background	2.8800	0.02
Composite Fit	15701.0082	97.01
Residuals	481.1118	2.97

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: e4898299
Type: Calibration Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 8 (Det #48)
Efficiency: 21.51% Chem. Recovery: 0.00%
Total Eff.: 21.51% Manual:100.00%
CALIBRATION: 3573.44 + 4.60682 * Chn + 0.000214882 Chn **2 keV
Original: 3638.32 + 4.1965 * Chn + 0.000847 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03515.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 08:40:06
Live Time: 3600.00 Real Time: 3601.70 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03774.CHN
Background File: C:\USER\ALPHA\BKGND\B0003747.CHN
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: CAL03774

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	407.42	33.30	160.55	4587.77	0.84	4586.93	76.45
2.	338.32	24.21	187.71	5574.10	0.27	5573.83	92.90
3.	239.20	31.72	148.04	4723.42	0.26	4723.16	78.72

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Am-241	0.86	5486.00	144.765	3.5255	355.41	0.40	2.89
2.	Pu-239	0.73	5156.60	129.579	2.1572	431.88	12.56	2.63
3.	Th-230	0.76	4687.70	149.847	2.7288	365.97	9.45	2.85

T O T A L S		% Recovery
Gross Count	14978.0000	100.00
Net Area	14973.9200	99.97
Background	4.0800	0.03
Composite Fit	14885.2907	99.38
Residuals	88.6292	0.59

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f1898299
Type: calsource2 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 2 (Det #18)
Efficiency: 23.53% Chem. Recovery: 0.00%
Total Eff.: 23.53% Manual:100.00%
CALIBRATION: 3484.94 + 5.1401 * Chn + -0.000371 Chn **2 keV
Original: 3484.94 + 5.1401 * Chn + -0.000371 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03748.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 09:52:34
Live Time: 1200.00 Real Time: 1200.82 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03776.CHN
Background File: C:\USER\ALPHA\BKGND\B0003721.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE2.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03776

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	242.96	210	270	4.00	1432.00	0.04	7952.96	397.65

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4711.88	19.839	2.0000	1690.00	0.85	2.20

T O T A L S		% Recovery
Gross Count	8067.0000	100.00
Net Area	8066.1200	99.99
Background	0.8800	0.01
Composite Fit	7953.0000	98.59
Residuals	113.1200	1.40

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f1998299
Type: calsource3 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 3 (Det #19)
Efficiency: 20.59% Chem. Recovery: 0.00%
Total Eff.: 20.59% Manual:100.00%
CALIBRATION: 3695.97 + 3.8025 * Chn + 0.0016 Chn **2 keV
Original: 3695.97 + 3.8025 * Chn + 0.0016 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03749.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 09:52:39
Live Time: 1200.00 Real Time: 1200.84 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03777.CHN
Background File: C:\USER\ALPHA\BKGND\B0003722.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE3.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03777

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.65	210	270	4.00	612.00	0.12	4281.88	214.09

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4722.02	18.342	2.0000	1040.00	1.00	3.00

T O T A L S		% Recovery
Gross Count	4472.0000	100.00
Net Area	4470.8000	99.97
Background	1.2000	0.03
Composite Fit	4282.0000	95.75
Residuals	188.8000	4.22

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2198299
Type: calsource5 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 5 (Det #21)
Efficiency: 23.19% Chem. Recovery: 0.00%
Total Eff.: 23.19% Manual:100.00%
CALIBRATION: 3532.54 + 4.926 * Chn + -0.000138 Chn **2 keV
Original: 3532.54 + 4.926 * Chn + -0.000138 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03750.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 09:53:52
Live Time: 1200.00 Real Time: 1200.82 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03782.CHN
Background File: C:\USER\ALPHA\BKGND\B0003723.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE5.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03782

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	243.47	210	270	6.00	1309.00	0.16	7421.84	371.09

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4723.71	29.153	3.0000	1600.00	0.90	2.28

T O T A L S		% Recovery
Gross Count	7721.0000	100.00
Net Area	7720.0400	99.99
Background	0.9600	0.01
Composite Fit	7422.0000	96.13
Residuals	298.0400	3.86

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2298299
Type: calsource6 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 6 (Det #22)
Efficiency: 20.87% Chem. Recovery: 0.00%
Total Eff.: 20.87% Manual:100.00%
CALIBRATION: 3548.7 + 4.7541 * Chn + 0.000352 Chn **2 keV
Original: 3548.7 + 4.7541 * Chn + 0.000352 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03751.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 09:53:55
Live Time: 1200.00 Real Time: 1200.82 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03783.CHN
Background File: C:\USER\ALPHA\BKGND\B0003724.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE6.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03783

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	241.16	210	270	6.00	980.00	0.04	6426.96	321.35

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4715.67	29.543	3.0000	1540.00	0.96	2.44

T O T A L S		% Recovery
Gross Count	6785.0000	100.00
Net Area	6783.7200	99.98
Background	1.2800	0.02
Composite Fit	6427.0000	94.72
Residuals	356.7200	5.26

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2398299
Type: calsource7 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 7 (Det #23)
Efficiency: 23.02% Chem. Recovery: 0.00%
Total Eff.: 23.02% Manual:100.00%
CALIBRATION: 3508.1 + 5.0637 * Chn + -0.000293 Chn **2 keV
Original: 3508.1 + 5.0637 * Chn + -0.000293 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03752.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 09:53:58
Live Time: 1200.00 Real Time: 1200.82 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03784.CHN
Background File: C:\USER\ALPHA\BKGND\B0003725.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE7.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03784

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	242.50	210	270	4.00	1299.00	0.04	7366.96	368.35

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4718.83	19.686	2.0000	1600.00	0.87	2.28

T O T A L S		% Recovery
Gross Count	7551.0000	100.00
Net Area	7549.8000	99.98
Background	1.2000	0.02
Composite Fit	7367.0000	97.56
Residuals	182.8000	2.42

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2498299
Type: calsource9 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 8 (Det #24)
Efficiency: 22.02% Chem. Recovery: 0.00%
Total Eff.: 22.02% Manual:100.00%
CALIBRATION: 3430.23 + 5.4299 * Chn + -0.000828 Chn **2 keV
Original: 3430.23 + 5.4299 * Chn + -0.000828 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03753.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 09:54:01
Live Time: 1200.00 Real Time: 1200.82 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03785.CHN
Background File: C:\USER\ALPHA\BKGND\B0003726.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE9.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03785

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.95	210	270	4.00	975.00	0.32	5461.68	273.08

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4710.62	20.097	2.0000	1240.00	0.97	2.65

T O T A L S		% Recovery
Gross Count	5881.0000	100.00
Net Area	5879.7600	99.98
Background	1.2400	0.02
Composite Fit	5462.0000	92.88
Residuals	417.7600	7.10

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2598299
Type: calsource1 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 1 (Det #25)
Efficiency: 23.96% Chem. Recovery: 0.00%
Total Eff.: 23.96% Manual:100.00%
CALIBRATION: 3432.68 + 5.4696 * Chn + -0.000843 Chn **2 keV
Original: 3432.68 + 5.4696 * Chn + -0.000843 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03754.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 10:29:37
Live Time: 1200.00 Real Time: 1201.06 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03787.CHN
Background File: C:\USER\ALPHA\BKGND\B0003727.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE1.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03787

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	243.37	210	270	8.00	556.00	0.56	5558.44	277.92

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4713.91	40.474	4.0000	1160.00	0.93	2.63

T O T A L S		% Recovery
Gross Count	5672.0000	100.00
Net Area	5669.1600	99.95
Background	2.8400	0.05
Composite Fit	5559.0000	98.01
Residuals	110.1600	1.94

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2698299
Type: calsource2 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 2 (Det #26)
Efficiency: 25.01% Chem. Recovery: 0.00%
Total Eff.: 25.01% Manual:100.00%
CALIBRATION: 3344.55 + 5.9154 * Chn + -0.0015 Chn **2 keV
Original: 3344.55 + 5.9154 * Chn + -0.0015 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03755.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 10:29:40
Live Time: 1200.00 Real Time: 1201.06 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03788.CHN
Background File: C:\USER\ALPHA\BKGND\B0003728.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE2.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03788

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	246.78	210	270	6.00	841.00	0.24	8452.76	422.64

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4713.02	31.050	3.0000	1690.00	0.85	2.13

T O T A L S		% Recovery
Gross Count	8608.0000	100.00
Net Area	8606.4800	99.98
Background	1.5200	0.02
Composite Fit	8453.0000	98.20
Residuals	153.4800	1.78

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2798299
Type: calsource3 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 3 (Det #27)
Efficiency: 20.93% Chem. Recovery: 0.00%
Total Eff.: 20.93% Manual:100.00%
CALIBRATION: 3389.18 + 5.5326 * Chn + -0.000852 Chn **2 keV
Original: 3389.18 + 5.5326 * Chn + -0.000852 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03756.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 10:29:45
Live Time: 1200.00 Real Time: 1201.06 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03789.CHN
Background File: C:\USER\ALPHA\BKGND\B0003729.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE3.ALS

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03789

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	247.81	210	270	6.00	410.00	0.48	4352.52	217.63

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4707.92	30.662	3.0000	1040.00	1.05	2.97

T O T A L S		% Recovery
Gross Count	4596.0000	100.00
Net Area	4594.5600	99.97
Background	1.4400	0.03
Composite Fit	4353.0000	94.71
Residuals	241.5600	5.26

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2898299
Type: calsource4 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 4 (Det #28)
Efficiency: 21.38% Chem. Recovery: 0.00%
Total Eff.: 21.38% Manual:100.00%
CALIBRATION: 3394.73 + 5.7129 * Chn + -0.0012 Chn **2 keV
Original: 3394.73 + 5.7129 * Chn + -0.0012 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03757.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 10:29:49
Live Time: 1200.00 Real Time: 1201.08 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03790.CHN
Background File: C:\USER\ALPHA\BKGND\B0003730.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE4.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03790

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.59	210	270	8.00	361.00	0.24	5131.76	256.59

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4720.28	41.007	4.0000	1200.00	0.99	2.74

T O T A L S		% Recovery
Gross Count	5509.0000	100.00
Net Area	5506.9600	99.96
Background	2.0400	0.04
Composite Fit	5132.0000	93.16
Residuals	374.9600	6.81

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f2998299
Type: calsource5 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 5 (Det #29)
Efficiency: 24.42% Chem. Recovery: 0.00%
Total Eff.: 24.42% Manual:100.00%
CALIBRATION: 3423.9 + 5.5467 * Chn + -0.001 Chn **2 keV
Original: 3423.9 + 5.5467 * Chn + -0.001 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03758.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 10:29:59
Live Time: 1200.00 Real Time: 1201.08 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03791.CHN
Background File: C:\USER\ALPHA\BKGND\B0003731.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE5.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03791

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.45	210	270	8.00	664.00	0.16	7815.84	390.79

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4720.05	40.462	4.0000	1600.00	0.85	2.22

T O T A L S		% Recovery
Gross Count	8166.0000	100.00
Net Area	8164.5600	99.98
Background	1.4400	0.02
Composite Fit	7816.0000	95.71
Residuals	348.5600	4.27

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3098299
Type: calsource6 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 6 (Det #30)
Efficiency: 20.30% Chem. Recovery: 0.00%
Total Eff.: 20.30% Manual:100.00%
CALIBRATION: 3346.74 + 6.0227 * Chn + -0.0017 Chn **2 keV
Original: 3346.74 + 6.0227 * Chn + -0.0017 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03759.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 10:30:05
Live Time: 1200.00 Real Time: 1201.06 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03792.CHN
Background File: C:\USER\ALPHA\BKGND\B0003732.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE6.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03792

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.23	210	270	8.00	594.00	0.20	6252.80	312.64

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4716.24	41.539	4.0000	1540.00	1.03	2.48

T O T A L S		% Recovery
Gross Count	6593.0000	100.00
Net Area	6591.5200	99.98
Background	1.4800	0.02
Composite Fit	6253.0000	94.84
Residuals	338.5200	5.13

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3198299
Type: calsource7 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 7 (Det #31)
Efficiency: 23.32% Chem. Recovery: 0.00%
Total Eff.: 23.32% Manual:100.00%
CALIBRATION: 3482.5 + 5.3072 * Chn + -0.000706 Chn **2 keV
Original: 3482.5 + 5.3072 * Chn + -0.000706 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03760.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 10:30:11
Live Time: 1200.00 Real Time: 1201.06 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03793.CHN
Background File: C:\USER\ALPHA\BKGND\B0003733.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE7.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03793

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	242.50	210	270	8.00	715.00	0.16	7462.84	373.14

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4727.96	39.718	4.0000	1600.00	0.89	2.27

T O T A L S		% Recovery
Gross Count	7661.0000	100.00
Net Area	7659.6000	99.98
Background	1.4000	0.02
Composite Fit	7463.0000	97.42
Residuals	196.6000	2.57

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3298299
Type: calsource9 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 8 (Det #32)
Efficiency: 21.11% Chem. Recovery: 0.00%
Total Eff.: 21.11% Manual:100.00%
CALIBRATION: 3343.57 + 5.9906 * Chn + -0.0016 Chn **2 keV
Original: 3343.57 + 5.9906 * Chn + -0.0016 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03761.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 10:30:16
Live Time: 1200.00 Real Time: 1201.06 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03794.CHN
Background File: C:\USER\ALPHA\BKGND\B0003734.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE9.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03794

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.32	210	270	6.00	772.00	0.12	5235.88	261.79

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4711.68	31.253	3.0000	1240.00	0.98	2.71

T O T A L S		% Recovery
Gross Count	5666.0000	100.00
Net Area	5664.4800	99.97
Background	1.5200	0.03
Composite Fit	5236.0000	92.41
Residuals	428.4800	7.56

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3398299
Type: calsource1 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 1 (Det #33)
Efficiency: 24.45% Chem. Recovery: 0.00%
Total Eff.: 24.45% Manual:100.00%
CALIBRATION: 3599.38 + 4.5034 * Chn + 0.00027 Chn **2 keV
Original: 3599.38 + 4.5034 * Chn + 0.00027 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03775.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 13:14:28
Live Time: 1200.00 Real Time: 1201.04 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03819.CHN
Background File: C:\USER\ALPHA\BKGND\B0003735.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE1.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03819

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	246.49	210	270	8.00	619.00	0.32	5672.68	283.63

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4725.84	37.092	4.0000	1160.00	0.88	2.60

T O T A L S		% Recovery
Gross Count	5786.0000	100.00
Net Area	5784.2400	99.97
Background	1.7600	0.03
Composite Fit	5673.0000	98.05
Residuals	111.2400	1.92

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3498299
Type: calsource2 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 2 (Det #34)
Efficiency: 24.70% Chem. Recovery: 0.00%
Total Eff.: 24.70% Manual:100.00%
CALIBRATION: 3493.91 + 5.0508 * Chn + -0.00021 Chn **2 keV
Original: 3493.91 + 5.0508 * Chn + -0.00021 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03763.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 13:14:33
Live Time: 1200.00 Real Time: 1201.04 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03820.CHN
Background File: C:\USER\ALPHA\BKGND\B0003736.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE2.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03820

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	243.46	210	270	6.00	1250.00	0.04	8348.96	417.45

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4711.13	29.691	3.0000	1690.00	0.81	2.15

T O T A L S		% Recovery
Gross Count	8484.0000	100.00
Net Area	8483.2800	99.99
Background	0.7200	0.01
Composite Fit	8349.0000	98.41
Residuals	134.2800	1.58

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3598299
Type: calsource3 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 3 (Det #35)
Efficiency: 20.05% Chem. Recovery: 0.00%
Total Eff.: 20.05% Manual:100.00%
CALIBRATION: 3379.96 + 5.741 * Chn + -0.0013 Chn **2 keV
Original: 3379.96 + 5.741 * Chn + -0.0013 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03764.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 13:14:37
Live Time: 1200.00 Real Time: 1201.04 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03821.CHN
Background File: C:\USER\ALPHA\BKGND\B0003737.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE3.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03821

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	243.74	210	270	4.00	626.00	0.16	4170.84	208.54

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4702.03	20.429	2.0000	1040.00	1.04	3.03

T O T A L S		% Recovery
Gross Count	4418.0000	100.00
Net Area	4417.1600	99.98
Background	0.8400	0.02
Composite Fit	4171.0000	94.41
Residuals	246.1600	5.57

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3698299
Type: calsource4 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 4 (Det #36)
Efficiency: 22.51% Chem. Recovery: 0.00%
Total Eff.: 22.51% Manual:100.00%
CALIBRATION: 3359.73 + 5.902 * Chn + -0.0015 Chn **2 keV
Original: 3359.73 + 5.902 * Chn + -0.0015 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03765.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 13:14:41
Live Time: 1200.00 Real Time: 1201.04 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03822.CHN
Background File: C:\USER\ALPHA\BKGND\B0003738.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE4.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03822

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	242.86	210	270	14.00	338.00	0.32	5402.68	270.13

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4704.63	72.428	7.0000	1200.00	0.95	2.67

T O T A L S		% Recovery
Gross Count	5847.0000	100.00
Net Area	5844.2400	99.95
Background	2.7600	0.05
Composite Fit	5403.0000	92.41
Residuals	441.2400	7.55

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3898299
Type: calsource6 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 6 (Det #38)
Efficiency: 20.60% Chem. Recovery: 0.00%
Total Eff.: 20.60% Manual:100.00%
CALIBRATION: 3510.95 + 5.0206 * Chn + -0.000315 Chn **2 keV
Original: 3510.95 + 5.0206 * Chn + -0.000315 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03766.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 13:14:54
Live Time: 1200.00 Real Time: 1201.02 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03823.CHN
Background File: C:\USER\ALPHA\BKGND\B0003739.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE6.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03823

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	245.91	210	270	12.00	393.00	0.28	6343.72	317.19

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4726.50	58.388	6.0000	1540.00	1.04	2.46

T O T A L S		% Recovery
Gross Count	6646.0000	100.00
Net Area	6644.3200	99.97
Background	1.6800	0.03
Composite Fit	6344.0000	95.46
Residuals	300.3200	4.52

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f3998299
Type: calsource7 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 7 (Det #39)
Efficiency: 23.16% Chem. Recovery: 0.00%
Total Eff.: 23.16% Manual:100.00%
CALIBRATION: 3567.49 + 4.778 * Chn keV
Original: 3567.49 + 4.778 * Chn keV
File: C:\USER\ALPHA\CALIB\CAL03795.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 13:14:58
Live Time: 1200.00 Real Time: 1201.04 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03824.CHN
Background File: C:\USER\ALPHA\BKGND\B0003740.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE7.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03824

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	244.76	210	270	6.00	903.00	0.12	7411.88	370.59

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4736.95	28.668	3.0000	1600.00	0.89	2.28

T O T A L S		% Recovery
Gross Count	7576.0000	100.00
Net Area	7574.7200	99.98
Background	1.2800	0.02
Composite Fit	7412.0000	97.84
Residuals	162.7200	2.15

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4098299
Type: calsource9 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 8 (Det #40)
Efficiency: 22.79% Chem. Recovery: 0.00%
Total Eff.: 22.79% Manual:100.00%
CALIBRATION: 3510.28 + 4.9648 * Chn + -0.000218 Chn **2 keV
Original: 3510.28 + 4.9648 * Chn + -0.000218 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03768.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 13:15:03
Live Time: 1200.00 Real Time: 1201.02 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03825.CHN
Background File: C:\USER\ALPHA\BKGND\B0003741.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE9.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03825

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	246.92	210	270	10.00	428.00	0.24	5651.76	282.59

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4722.90	48.571	5.0000	1240.00	0.93	2.61

T O T A L S		% Recovery
Gross Count	6053.0000	100.00
Net Area	6051.6000	99.98
Background	1.4000	0.02
Composite Fit	5652.0000	93.38
Residuals	399.6000	6.60

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4198299
Type: calsource1 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 1 (Det #41)
Efficiency: 24.94% Chem. Recovery: 0.00%
Total Eff.: 24.94% Manual:100.00%
CALIBRATION: 3366.93 + 5.8905 * Chn + -0.0017 Chn **2 keV
Original: 3366.93 + 5.8905 * Chn + -0.0017 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03769.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:39:36
Live Time: 1200.00 Real Time: 1200.72 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03796.CHN
Background File: C:\USER\ALPHA\BKGND\B0003742.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE1.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03796

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	246.59	210	270	8.00	527.00	0.20	5785.80	289.29

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4716.09	40.417	4.0000	1160.00	0.84	2.58

T O T A L S		% Recovery
Gross Count	5868.0000	100.00
Net Area	5867.0400	99.98
Background	0.9600	0.02
Composite Fit	5786.0000	98.60
Residuals	81.0400	1.38

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4498299
Type: calsource4 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 4 (Det #44)
Efficiency: 22.04% Chem. Recovery: 0.00%
Total Eff.: 22.04% Manual:100.00%
CALIBRATION: 3469.31 + 5.0733 * Chn + -0.000342 Chn **2 keV
Original: 3469.31 + 5.0733 * Chn + -0.000342 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03770.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:39:41
Live Time: 1200.00 Real Time: 1200.74 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03797.CHN
Background File: C:\USER\ALPHA\BKGND\B0003743.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE4.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03797

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	247.53	210	270	4.00	807.00	0.76	5289.24	264.46

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4704.16	19.616	2.0000	1200.00	1.03	2.70

T O T A L S		% Recovery
Gross Count	5545.0000	100.00
Net Area	5539.3200	99.90
Background	5.6800	0.10
Composite Fit	5290.0000	95.40
Residuals	249.3200	4.50

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4598299
Type: calsource5 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 5 (Det #45)
Efficiency: 23.69% Chem. Recovery: 0.00%
Total Eff.: 23.69% Manual:100.00%
CALIBRATION: 3514.81 + 4.9666 * Chn + -0.000407 Chn **2 keV
Original: 3514.81 + 4.9666 * Chn + -0.000407 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03771.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:39:51
Live Time: 1200.00 Real Time: 1200.74 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03798.CHN
Background File: C:\USER\ALPHA\BKGND\B0003744.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE5.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03798

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	247.99	210	270	6.00	1023.00	0.08	7580.92	379.05

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4721.44	28.588	3.0000	1600.00	0.86	2.25

T O T A L S		% Recovery
Gross Count	7786.0000	100.00
Net Area	7785.0000	99.99
Background	1.0000	0.01
Composite Fit	7581.0000	97.37
Residuals	204.0000	2.62

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4698299
Type: calsource6 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 6 (Det #46)
Efficiency: 20.29% Chem. Recovery: 0.00%
Total Eff.: 20.29% Manual:100.00%
CALIBRATION: 3468.87 + 5.1827 * Chn + -0.000576 Chn **2 keV
Original: 3468.87 + 5.1827 * Chn + -0.000576 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03772.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:40:01
Live Time: 1200.00 Real Time: 1200.74 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03799.CHN
Background File: C:\USER\ALPHA\BKGND\B0003745.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE6.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03799

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	245.63	210	270	4.00	1021.00	0.20	6250.80	312.54

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4707.14	19.599	2.0000	1540.00	1.03	2.48

T O T A L S		% Recovery
Gross Count	6474.0000	100.00
Net Area	6472.6800	99.98
Background	1.3200	0.02
Composite Fit	6251.0000	96.56
Residuals	221.6800	3.42

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4798299
Type: calsource7 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 7 (Det #47)
Efficiency: 23.31% Chem. Recovery: 0.00%
Total Eff.: 23.31% Manual:100.00%
CALIBRATION: 3543.5 + 4.7932 * Chn + -3.4e-005 Chn **2 keV
Original: 3543.5 + 4.7932 * Chn + -3.4e-005 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03773.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:40:06
Live Time: 1200.00 Real Time: 1200.72 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03800.CHN
Background File: C:\USER\ALPHA\BKGND\B0003746.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE7.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03800

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	245.44	210	270	10.00	624.00	0.12	7458.88	372.94

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4717.90	47.765	5.0000	1600.00	0.88	2.27

T O T A L S		% Recovery
Gross Count	7582.0000	100.00
Net Area	7581.0400	99.99
Background	0.9600	0.01
Composite Fit	7459.0000	98.38
Residuals	122.0400	1.61

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N C A L I B R A T I O N A N A L Y S I S

Core Lab

SAMPLE: f4898299
Type: calsource9 Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 8 (Det #48)
Efficiency: 21.86% Chem. Recovery: 0.00%
Total Eff.: 21.86% Manual:100.00%
CALIBRATION: 3573.44 + 4.6068 * Chn + 0.000215 Chn **2 keV
Original: 3573.44 + 4.6068 * Chn + 0.000215 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03774.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:40:12
Live Time: 1200.00 Real Time: 1200.74 Sec.
Spectrum File: C:\USER\ALPHA\CALIB\CAL03801.CHN
Background File: C:\USER\ALPHA\BKGND\B0003747.CHN
Nuclide Library: C:\USER\ALPHA\SOURCE9.ALB

ANALYSIS Method: Absolute Region-Of-Interest
Results: CAL03801

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	247.43	210	270	8.00	634.00	0.16	5420.84	271.04

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	Th-230	0.76	4726.47	37.706	4.0000	1240.00	0.95	2.66

T O T A L S		% Recovery
Gross Count	5817.0000	100.00
Net Area	5815.6400	99.98
Background	1.3600	0.02
Composite Fit	5421.0000	93.19
Residuals	394.6400	6.78

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b1898298
Type: Background Sample Collected: 25-Oct-98 11:59:46
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 2 (Det #18)
Efficiency: 23.36% Chem. Recovery: 0.00%
Total Eff.: 23.36% Manual:100.00%
CALIBRATION: 3465.45 + 5.2377 * Chn + -0.000511 Chn **2 keV
Original: 3465.45 + 5.2377 * Chn + -0.000511 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03487.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 11:59:53
Live Time: 30000.00 Real Time: 30000.48 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003721.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003721

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	22.0000	100.00
Net Area	22.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	22.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b1998298
Type: Background Sample Collected: 25-Oct-98 11:59:53
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 3 (Det #19)
Efficiency: 20.99% Chem. Recovery: 0.00%
Total Eff.: 20.99% Manual:100.00%
CALIBRATION: 3432.37 + 5.4333 * Chn + -0.000847 Chn **2 keV
Original: 3432.37 + 5.4333 * Chn + -0.000847 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03488.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 11:59:55
Live Time: 30000.00 Real Time: 30000.48 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003722.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003722

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	30.0000	100.00
Net Area	30.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	30.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2198298
Type: Background Sample Collected: 25-Oct-98 11:59:58
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 5 (Det #21)
Efficiency: 23.41% Chem. Recovery: 0.00%
Total Eff.: 23.41% Manual:100.00%
CALIBRATION: 3547.39 + 4.7272 * Chn + 0.000312 Chn **2 keV
Original: 3547.39 + 4.7272 * Chn + 0.000312 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03489.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:04
Live Time: 30000.00 Real Time: 30000.48 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003723.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003723

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	24.0000	100.00
Net Area	24.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	24.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2298298
Type: Background Sample Collected: 25-Oct-98 12:00:04
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 6 (Det #22)
Efficiency: 20.74% Chem. Recovery: 0.00%
Total Eff.: 20.74% Manual:100.00%
CALIBRATION: 3450.5 + 5.3903 * Chn + -0.000684 Chn **2 keV
Original: 3450.5 + 5.3903 * Chn + -0.000684 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03490.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:06
Live Time: 30000.00 Real Time: 30000.48 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003724.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003724

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	32.0000	100.00
Net Area	32.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	32.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2398298
Type: Background Sample Collected: 25-Oct-98 12:00:06
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 7 (Det #23)
Efficiency: 23.09% Chem. Recovery: 0.00%
Total Eff.: 23.09% Manual:100.00%
CALIBRATION: 3463.05 + 5.2464 * Chn + -0.000446 Chn **2 keV
Original: 3463.05 + 5.2464 * Chn + -0.000446 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03491.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:08
Live Time: 30000.00 Real Time: 30000.48 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003725.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003725

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	30.0000	100.00
Net Area	30.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	30.0000	100.00

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2498298
Type: Background Sample Collected: 25-Oct-98 12:00:08
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 8 (Det #24)
Efficiency: 21.46% Chem. Recovery: 0.00%
Total Eff.: 21.46% Manual:100.00%
CALIBRATION: 3417.36 + 5.5357 * Chn + -0.000974 Chn **2 keV
Original: 3417.36 + 5.5357 * Chn + -0.000974 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03492.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:11
Live Time: 30000.00 Real Time: 30000.48 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003726.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003726

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	31.0000	100.00
Net Area	31.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	31.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2598298
Type: Background Sample Collected: 25-Oct-98 12:00:25
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 1 (Det #25)
Efficiency: 24.06% Chem. Recovery: 0.00%
Total Eff.: 24.06% Manual:100.00%
CALIBRATION: 3472.31 + 5.3315 * Chn + -0.000763 Chn **2 keV
Original: 3472.31 + 5.3315 * Chn + -0.000763 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03494.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:31
Live Time: 30000.00 Real Time: 30000.88 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003727.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003727

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	71.0000	100.00
Net Area	71.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	71.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2698298
Type: Background Sample Collected: 25-Oct-98 12:00:31
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 2 (Det #26)
Efficiency: 25.07% Chem. Recovery: 0.00%
Total Eff.: 25.07% Manual:100.00%
CALIBRATION: 3431.74 + 5.4102 * Chn + -0.000771 Chn **2 keV
Original: 3431.74 + 5.4102 * Chn + -0.000771 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03495.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:33
Live Time: 30000.00 Real Time: 30000.88 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003728.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003728

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	38.0000	100.00
Net Area	38.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	38.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S
Core Lab

SAMPLE: b2798298
Type: Background Sample Collected: 25-Oct-98 12:00:33
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 3 (Det #27)
Efficiency: 20.60% Chem. Recovery: 0.00%
Total Eff.: 20.60% Manual:100.00%
CALIBRATION: 3420.19 + 5.428 * Chn + -0.000738 Chn **2 keV
Original: 3420.19 + 5.428 * Chn + -0.000738 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03496.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:35
Live Time: 30000.00 Real Time: 30000.86 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003729.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALS

ANALYSIS Method: No Analysis
Results: B0003729

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	36.0000	100.00
Net Area	36.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	36.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2898298
Type: Background Sample Collected: 25-Oct-98 12:00:35
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 4 (Det #28)
Efficiency: 21.64% Chem. Recovery: 0.00%
Total Eff.: 21.64% Manual:100.00%
CALIBRATION: 3375.32 + 5.8252 * Chn + -0.0014 Chn **2 keV
Original: 3375.32 + 5.8252 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03497.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:37
Live Time: 30000.00 Real Time: 30000.88 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003730.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003730

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	51.0000	100.00
Net Area	51.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	51.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b2998298
Type: Background Sample Collected: 25-Oct-98 12:00:38
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 5 (Det #29)
Efficiency: 24.12% Chem. Recovery: 0.00%
Total Eff.: 24.12% Manual:100.00%
CALIBRATION: 3359.46 + 5.8962 * Chn + -0.0014 Chn **2 keV
Original: 3359.46 + 5.8962 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03498.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:43
Live Time: 30000.00 Real Time: 30000.88 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003731.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003731

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	36.0000	100.00
Net Area	36.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	36.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3098298
Type: Background Sample Collected: 25-Oct-98 12:00:43
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 6 (Det #30)
Efficiency: 20.73% Chem. Recovery: 0.00%
Total Eff.: 20.73% Manual:100.00%
CALIBRATION: 3362.2 + 5.9334 * Chn + -0.0016 Chn **2 keV
Original: 3362.2 + 5.9334 * Chn + -0.0016 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03499.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:45
Live Time: 30000.00 Real Time: 30000.86 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003732.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003732

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	37.0000	100.00
Net Area	37.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	37.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3198298
Type: Background Sample Collected: 25-Oct-98 12:00:46
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 7 (Det #31)
Efficiency: 23.04% Chem. Recovery: 0.00%
Total Eff.: 23.04% Manual:100.00%
CALIBRATION: 3495.42 + 5.0692 * Chn + -0.000155 Chn **2 keV
Original: 3495.42 + 5.0692 * Chn + -0.000155 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03500.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:47
Live Time: 30000.00 Real Time: 30000.85 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003733.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003733

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	35.0000	100.00
Net Area	35.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	35.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3298298
Type: Background Sample Collected: 25-Oct-98 12:00:47
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 8 (Det #32)
Efficiency: 21.82% Chem. Recovery: 0.00%
Total Eff.: 21.82% Manual:100.00%
CALIBRATION: 3431.77 + 5.3512 * Chn + -0.000531 Chn **2 keV
Original: 3431.77 + 5.3512 * Chn + -0.000531 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03501.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:49
Live Time: 30000.00 Real Time: 30000.86 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003734.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003734

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	38.0000	100.00
Net Area	38.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	38.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3399298
Type: Background Sample Collected: 25-Oct-98 12:00:50
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 1 (Det #33)
Efficiency: 24.86% Chem. Recovery: 0.00%
Total Eff.: 24.86% Manual:100.00%
CALIBRATION: 3455.85 + 5.3442 * Chn + -0.000964 Chn **2 keV
Original: 3455.85 + 5.3442 * Chn + -0.000964 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03502.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:56
Live Time: 30000.00 Real Time: 30000.52 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003735.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: Nc Analysis
Results: B0003735

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	44.0000	100.00
Net Area	44.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	44.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3498298
Type: Background Sample Collected: 25-Oct-98 12:00:56
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 2 (Det #34)
Efficiency: 23.95% Chem. Recovery: 0.00%
Total Eff.: 23.95% Manual:100.00%
CALIBRATION: 3459.08 + 5.2729 * Chn + -0.000554 Chn **2 keV
Original: 3459.08 + 5.2729 * Chn + -0.000554 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03503.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:00:59
Live Time: 30000.00 Real Time: 30000.52 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003736.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003736

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	18.0000	100.00
Net Area	18.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	18.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S
Core Lab

SAMPLE: b3598298
Type: Background Sample Collected: 25-Oct-98 12:00:59
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 3 (Det #35)
Efficiency: 20.32% Chem. Recovery: 0.00%
Total Eff.: 20.32% Manual:100.00%
CALIBRATION: 3403.69 + 5.5558 * Chn + -0.000906 Chn **2 keV
Original: 3403.69 + 5.5558 * Chn + -0.000906 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03504.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:01:01
Live Time: 30000.00 Real Time: 30000.52 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003737.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003737

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	21.0000	100.00
Net Area	21.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	21.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3698298
Type: Background Sample Collected: 25-Oct-98 12:01:01
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 4 (Det #36)
Efficiency: 22.13% Chem. Recovery: 0.00%
Total Eff.: 22.13% Manual:100.00%
CALIBRATION: 3359.6 + 5.9061 * Chn + -0.0015 Chn **2 keV
Original: 3359.6 + 5.9061 * Chn + -0.0015 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03505.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:01:03
Live Time: 30000.00 Real Time: 30000.52 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003738.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003738

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	69.0000	100.00
Net Area	69.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	69.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b3898298
Type: Background Sample Collected: 25-Oct-98 12:01:04
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 6 (Det #38)
Efficiency: 20.11% Chem. Recovery: 0.00%
Total Eff.: 20.11% Manual:100.00%
CALIBRATION: 3526.18 + 4.8964 * Chn + -0.000108 Chn **2 keV
Original: 3526.18 + 4.8964 * Chn + -0.000108 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03507.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:01:09
Live Time: 30000.00 Real Time: 30000.52 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003739.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003739

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	42.0000	100.00
Net Area	42.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	42.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: B3998298
Type: Background Sample Collected: 25-Oct-98 12:01:09
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 7 (Det #39)
Efficiency: 23.08% Chem. Recovery: 0.00%
Total Eff.: 23.08% Manual:100.00%
CALIBRATION: 3619.64 + 4.396 * Chn + 0.000587 Chn **2 keV
Original: 3619.64 + 4.396 * Chn + 0.000587 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03508.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:01:11
Live Time: 30000.00 Real Time: 30000.52 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003740.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003740

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	32.0000	100.00
Net Area	32.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	32.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4098298
Type: Background Sample Collected: 25-Oct-98 12:01:11
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 8 (Det #40)
Efficiency: 22.69% Chem. Recovery: 0.00%
Total Eff.: 22.69% Manual:100.00%
CALIBRATION: 3562.72 + 4.6611 * Chn + 0.000303 Chn **2 keV
Original: 3562.72 + 4.6611 * Chn + 0.000303 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03509.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:01:13
Live Time: 30000.00 Real Time: 30000.50 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003741.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003741

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Cal	Aliquot DPM	MDA	% Error

T O T A L S		Recovery
Gross Count	35.0000	100.00
Net Area	35.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	35.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4198298
Type: Background Sample Collected: 25-Oct-98 12:01:15
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 1 (Det #41)
Efficiency: 24.63% Chem. Recovery: 0.00%
Total Eff.: 24.63% Manual:100.00%
CALIBRATION: 3418.49 + 5.5496 * Chn + -0.0011 Chn **2 keV
Original: 3418.49 + 5.5496 * Chn + -0.0011 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03510.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:01:19
Live Time: 30000.00 Real Time: 30000.54 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003742.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003742

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	24.0000	100.00
Net Area	24.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	24.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4498298
Type: Background Sample Collected: 25-Oct-98 12:01:19
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 4 (Det #44)
Efficiency: 21.77% Chem. Recovery: 0.00%
Total Eff.: 21.77% Manual:100.00%
CALIBRATION: 3428.15 + 5.3947 * Chn + -0.000918 Chn **2 keV
Original: 3428.15 + 5.3947 * Chn + -0.000918 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03511.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:01:21
Live Time: 30000.00 Real Time: 30000.54 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003743.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003743

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	142.0000	100.00
Net Area	142.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	142.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4598298
Type: Background Sample Collected: 25-Oct-98 12:01:22
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 5 (Det #45)
Efficiency: 23.52% Chem. Recovery: 0.00%
Total Eff.: 23.52% Manual:100.00%
CALIBRATION: 3383.43 + 5.7029 * Chn + -0.0014 Chn **2 keV
Original: 3383.43 + 5.7029 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03512.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:01:28
Live Time: 30000.00 Real Time: 30000.52 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003744.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003744

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	25.0000	100.00
Net Area	25.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	25.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4698298
Type: Background Sample Collected: 25-Oct-98 12:01:28
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 6 (Det #46)
Efficiency: 21.36% Chem. Recovery: 0.00%
Total Eff.: 21.36% Manual:100.00%
CALIBRATION: 3542.21 + 4.7155 * Chn + 0.000126 Chn **2 keV
Original: 3542.21 + 4.7155 * Chn + 0.000126 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03513.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:01:30
Live Time: 30000.00 Real Time: 30000.56 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003745.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003745

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	33.0000	100.00
Net Area	33.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	33.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4798298
Type: Background Sample Collected: 25-Oct-98 12:01:30
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 7 (Det #47)
Efficiency: 23.98% Chem. Recovery: 0.00%
Total Eff.: 23.98% Manual:100.00%
CALIBRATION: 3422.54 + 5.6099 * Chn + -0.0013 Chn **2 keV
Original: 3422.54 + 5.6099 * Chn + -0.0013 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03514.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:01:31
Live Time: 30000.00 Real Time: 30000.54 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003746.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003746

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	24.0000	100.00
Net Area	24.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	24.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N B A C K G R O U N D A N A L Y S I S

Core Lab

SAMPLE: b4898298
Type: Background Sample Collected: 25-Oct-98 12:01:31
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 8 (Det #48)
Efficiency: 21.51% Chem. Recovery: 0.00%
Total Eff.: 21.51% Manual:100.00%
CALIBRATION: 3638.32 + 4.1965 * Chn + 0.000847 Chn **2 keV
Original: 3638.32 + 4.1965 * Chn + 0.000847 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03515.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 25-Oct-98 12:01:34
Live Time: 30000.00 Real Time: 30000.54 Sec.
Spectrum File: C:\USER\ALPHA\BKGND\B0003747.CHN
Background File:
Nuclide Library: C:\USER\ALPHA\ALPHAVIS.ALB

ANALYSIS Method: No Analysis
Results: B0003747

P E A K S

Channel	FWHM	Height	Gross	Background	Net Area	CPM

D E C A Y C O R R E C T E D R E S U L T S

Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error

T O T A L S		% Recovery
Gross Count	34.0000	100.00
Net Area	34.0000	100.00
Background	0.0000	0.00
Composite Fit	0.0000	0.00
Residuals	34.0000	100.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 18 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 2 (Det #18)
Efficiency: 23.53% Chem. Recovery: 0.00%
Total Eff.: 23.53% Manual:100.00%
CALIBRATION: 3484.94 + 5.1401 * Chn + -0.000371 Chn **2 keV
Original: 3484.94 + 5.1401 * Chn + -0.000371 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03776.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:41:24
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3802.CHN
Background File: C:\USER\ALPHA\BKGND\B0003721.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3802

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	276.96	1.97	242.32	1148.48	0.00	1148.48	6890.88

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4880.11	9.738	10.9265	29285.53	98.00	5.78

T O T A L S		% Recovery
Gross Count	1255.0000	100.00
Net Area	1254.9927	100.00
Background	0.0073	0.00
Composite Fit	1148.4812	91.51
Residuals	106.5115	8.49

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 19 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 3 (Det #19)
Efficiency: 20.59% Chem. Recovery: 0.00%
Total Eff.: 20.59% Manual:100.00%
CALIBRATION: 3695.97 + 3.8025 * Chn + 0.0016 Chn **2 keV
Original: 3695.97 + 3.8025 * Chn + 0.0016 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03777.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:41:39
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3803.CHN
Background File: C:\USER\ALPHA\BKGND\B0003722.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3803

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	276.12	2.80	207.56	1171.33	0.00	1171.33	7028.00

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4867.91	13.111	13.5159	34133.07	111.96	5.73

T O T A L S		% Recovery
Gross Count	1255.0000	100.00
Net Area	1254.9900	100.00
Background	0.0100	0.00
Composite Fit	1171.3332	93.33
Residuals	83.6568	6.67

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 21 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 5 (Det #21)
Efficiency: 23.19% Chem. Recovery: 0.00%
Total Eff.: 23.19% Manual:100.00%
CALIBRATION: 3532.54 + 4.926 * Chn + -0.000138 Chn **2 keV
Original: 3532.54 + 4.926 * Chn + -0.000138 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03782.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:41:50
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3804.CHN
Background File: C:\USER\ALPHA\BKGND\B0003723.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3804

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	282.73	2.07	235.24	1140.54	0.00	1140.54	6843.21

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4914.25	10.012	10.9497	29509.33	99.42	5.80

T O T A L S		% Recovery
Gross Count	1255.0000	100.00
Net Area	1254.9920	100.00
Background	0.0080	0.00
Composite Fit	1140.5356	90.88
Residuals	114.4564	9.12

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 22 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 6 (Det #22)
Efficiency: 20.87% Chem. Recovery: 0.00%
Total Eff.: 20.87% Manual:100.00%
CALIBRATION: 3548.7 + 4.7541 * Chn + 0.000352 Chn **2 keV
Original: 3548.7 + 4.7541 * Chn + 0.000352 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03783.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:41:59
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3805.CHN
Background File: C:\USER\ALPHA\BKGND\B0003724.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3805

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	284.30	2.58	216.72	1173.56	0.00	1173.56	7041.38

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4928.73	12.763	12.1410	33739.25	110.45	5.72

T O T A L S		% Recovery
Gross Count	1254.0000	100.00
Net Area	1253.9893	100.00
Background	0.0107	0.00
Composite Fit	1173.5636	93.59
Residuals	80.4257	6.41

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 23 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 7 (Det #23)
Efficiency: 23.02% Chem. Recovery: 0.00%
Total Eff.: 23.02% Manual:100.00%
CALIBRATION: 3508.1 + 5.0637 * Chn + -0.000293 Chn **2 keV
Original: 3508.1 + 5.0637 * Chn + -0.000293 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03784.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:42:06
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3806.CHN
Background File: C:\USER\ALPHA\BKGND\B0003725.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3806

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	279.83	2.16	231.53	1148.75	0.00	1148.75	6892.51

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4902.12	10.597	11.1706	29941.39	100.13	5.78

T O T A L S		% Recovery
Gross Count	1253.0000	100.00
Net Area	1252.9900	100.00
Background	0.0100	0.00
Composite Fit	1148.7514	91.68
Residuals	104.2386	8.32

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 24 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 2 Input 8 (Det #24)
Efficiency: 22.02% Chem. Recovery: 0.00%
Total Eff.: 22.02% Manual:100.00%
CALIBRATION: 3430.23 + 5.4299 * Chn + -0.000828 Chn **2 keV
Original: 3430.23 + 5.4299 * Chn + -0.000828 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03785.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:42:15
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3807.CHN
Background File: C:\USER\ALPHA\BKGND\B0003726.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3807

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	292.87	2.04	238.53	1149.85	0.00	1149.85	6899.12

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4949.46	10.095	11.5178	31331.16	104.68	5.78

T O T A L S		% Recovery
Gross Count	1255.0000	100.00
Net Area	1254.9897	100.00
Background	0.0103	0.00
Composite Fit	1149.8536	91.62
Residuals	105.1361	8.38

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 25 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 1 (Det #25)
Efficiency: 23.96% Chem. Recovery: 0.00%
Total Eff.: 23.96% Manual:100.00%
CALIBRATION: 3432.68 + 5.4696 * Chn + -0.000843 Chn **2 keV
Original: 3432.68 + 5.4696 * Chn + -0.000843 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03787.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:42:29
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3808.CHN
Background File: C:\USER\ALPHA\BKGND\B0003727.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3808

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	281.94	3.45	193.19	1210.60	0.00	1210.60	7263.60

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4907.79	17.228	8.9402	30315.53	96.24	5.63

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9763	100.00
Background	0.0237	0.00
Composite Fit	1210.6008	95.02
Residuals	63.3755	4.97

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 26 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 2 (Det #26)
Efficiency: 25.01% Chem. Recovery: 0.00%
Total Eff.: 25.01% Manual:100.00%
CALIBRATION: 3344.55 + 5.9154 * Chn + -0.0015 Chn **2 keV
Original: 3344.55 + 5.9154 * Chn + -0.0015 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03788.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:42:37
Live Time: 10.00 Real Time: 10.04 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3809.CHN
Background File: C:\USER\ALPHA\BKGND\B0003728.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3809

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	282.18	3.07	203.51	1203.11	0.00	1203.11	7218.68

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4894.34	15.564	14.1884	28863.16	92.16	5.65

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9873	100.00
Background	0.0127	0.00
Composite Fit	1203.1128	94.44
Residuals	70.8745	5.56

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 27 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 3 (Det #27)
Efficiency: 20.93% Chem. Recovery: 0.00%
Total Eff.: 20.93% Manual:100.00%
CALIBRATION: 3389.18 + 5.5326 * Chn + -0.000852 Chn **2 keV
Original: 3389.18 + 5.5326 * Chn + -0.000852 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03789.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:42:46
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3810.CHN
Background File: C:\USER\ALPHA\BKGND\B0003729.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3810

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	285.57	3.87	157.93	1064.62	0.00	1064.62	6387.70
2.	273.62	4.88	16.72	128.51	0.00	128.51	771.08

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4899.64	19.523	4.1602	30519.33	110.13	6.01
2.	*******	1.00	4839.24	24.717	3.9720	3684.07	74007.49	17.29

T O T A L S		% Recovery
Gross Count	1273.0000	100.00
Net Area	1272.9880	100.00
Background	0.0120	0.00
Composite Fit	1193.1287	93.73
Residuals	79.8593	6.27

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 28 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 4 (Det #28)
Efficiency: 21.38% Chem. Recovery: 0.00%
Total Eff.: 21.38% Manual:100.00%
CALIBRATION: 3394.73 + 5.7129 * Chn + -0.0012 Chn **2 keV
Original: 3394.73 + 5.7129 * Chn + -0.0012 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03790.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:42:55
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3811.CHN
Background File: C:\USER\ALPHA\BKGND\B0003730.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3811

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	280.18	7.86	132.16	1249.64	0.00	1249.64	7497.85

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4901.18	39.594	22.0196	35069.48	107.82	5.54

T O T A L S		% Recovery
Gross Count	1272.0000	100.00
Net Area	1271.9830	100.00
Background	0.0170	0.00
Composite Fit	1249.6424	98.24
Residuals	22.3406	1.76

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 29 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 5 (Det #29)
Efficiency: 24.42% Chem. Recovery: 0.00%
Total Eff.: 24.42% Manual:100.00%
CALIBRATION: 3423.9 + 5.5467 * Chn + -0.001 Chn **2 keV
Original: 3423.9 + 5.5467 * Chn + -0.001 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03791.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:43:11
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3812.CHN
Background File: C:\USER\ALPHA\BKGND\B0003731.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3812

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	285.34	5.44	156.60	1232.36	0.00	1232.36	7394.17

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4930.17	27.063	18.7523	30279.15	94.39	5.58

T O T A L S		% Recovery
Gross Count	1275.0000	100.00
Net Area	1274.9880	100.00
Background	0.0120	0.00
Composite Fit	1232.3616	96.66
Residuals	42.6264	3.34

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 30 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 6 (Det #30)
Efficiency: 20.30% Chem. Recovery: 0.00%
Total Eff.: 20.30% Manual:100.00%
CALIBRATION: 3346.74 + 6.0227 * Chn + -0.0017 Chn **2 keV
Original: 3346.74 + 6.0227 * Chn + -0.0017 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03792.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:43:19
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3813.CHN
Background File: C:\USER\ALPHA\BKGND\B0003732.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3813

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	281.59	3.73	186.52	1214.56	0.00	1214.56	7287.34

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4907.85	18.870	15.2079	35898.24	113.55	5.62

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9877	100.00
Background	0.0123	0.00
Composite Fit	1214.5570	95.33
Residuals	59.4307	4.66

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 31 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 7 (Det #31)
Efficiency: 23.32% Chem. Recovery: 0.00%
Total Eff.: 23.32% Manual:100.00%
CALIBRATION: 3482.5 + 5.3072 * Chn + -0.000706 Chn **2 keV
Original: 3482.5 + 5.3072 * Chn + -0.000706 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03793.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:43:27
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3814.CHN
Background File: C:\USER\ALPHA\BKGND\B0003733.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3814

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	283.92	4.19	177.73	1228.07	0.00	1228.07	7368.44

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4932.42	20.581	16.4278	31597.08	98.89	5.59

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9883	100.00
Background	0.0117	0.00
Composite Fit	1228.0739	96.40
Residuals	45.9144	3.60

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 32 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 3 Input 8 (Det #32)
Efficiency: 21.11% Chem. Recovery: 0.00%
Total Eff.: 21.11% Manual:100.00%
CALIBRATION: 3343.57 + 5.9906 * Chn + -0.0016 Chn **2 keV
Original: 3343.57 + 5.9906 * Chn + -0.0016 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03794.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 11:43:34
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3815.CHN
Background File: C:\USER\ALPHA\BKGND\B0003734.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3815

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	274.40	2.36	228.03	1181.77	0.00	1181.77	7090.60

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4866.90	12.063	11.8814	33588.82	109.19	5.70

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9873	100.00
Background	0.0127	0.00
Composite Fit	1181.7665	92.76
Residuals	92.2208	7.24

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 33 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 1 (Det #33)
Efficiency: 24.45% Chem. Recovery: 0.00%
Total Eff.: 24.45% Manual:100.00%
CALIBRATION: 3599.38 + 4.5034 * Chn + 0.00027 Chn **2 keV
Original: 3599.38 + 4.5034 * Chn + 0.00027 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03819.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 14:49:44
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3826.CHN
Background File: C:\USER\ALPHA\BKGND\B0003735.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3826

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	316.77	2.63	221.84	1214.78	0.00	1214.78	7288.70

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	5053.04	12.315	12.6750	29810.62	94.27	5.62

T O T A L S		% Recovery
Gross Count	1300.0000	100.00
Net Area	1299.9853	100.00
Background	0.0147	0.00
Composite Fit	1214.7827	93.44
Residuals	85.2026	6.55

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 34 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 2 (Det #34)
Efficiency: 24.70% Chem. Recovery: 0.00%
Total Eff.: 24.70% Manual:100.00%
CALIBRATION: 3493.91 + 5.0508 * Chn + -0.00021 Chn **2 keV
Original: 3493.91 + 5.0508 * Chn + -0.00021 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03820.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 14:49:52
Live Time: 10.00 Real Time: 10.04 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3827.CHN
Background File: C:\USER\ALPHA\BKGND\B0003736.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3827

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	301.02	2.35	234.55	1213.98	0.00	1213.98	7283.89

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4995.29	11.590	11.1996	29489.43	93.32	5.63

T O T A L S		% Recovery
Gross Count	1300.0000	100.00
Net Area	1299.9940	100.00
Background	0.0060	0.00
Composite Fit	1213.9816	93.38
Residuals	86.0124	6.62

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 35 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 3 (Det #35)
Efficiency: 20.05% Chem. Recovery: 0.00%
Total Eff.: 20.05% Manual:100.00%
CALIBRATION: 3379.96 + 5.741 * Chn + -0.0013 Chn **2 keV
Original: 3379.96 + 5.741 * Chn + -0.0013 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03821.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 14:50:00
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3828.CHN
Background File: C:\USER\ALPHA\BKGND\B0003737.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3828

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	297.61	1.98	247.35	1175.26	0.00	1175.26	7051.58

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4973.37	9.852	10.6441	35169.99	114.96	5.72

T O T A L S		% Recovery
Gross Count	1298.0000	100.00
Net Area	1297.9930	100.00
Background	0.0070	0.00
Composite Fit	1175.2637	90.54
Residuals	122.7293	9.46

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 36 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 4 (Det #36)
Efficiency: 22.51% Chem. Recovery: 0.00%
Total Eff.: 22.51% Manual:100.00%
CALIBRATION: 3359.73 + 5.902 * Chn + -0.0015 Chn **2 keV
Original: 3359.73 + 5.902 * Chn + -0.0015 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03822.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 14:50:08
Live Time: 10.00 Real Time: 10.30 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3829.CHN
Background File: C:\USER\ALPHA\BKGND\B0003738.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3829

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	305.62	9.70	120.50	1266.14	0.00	1266.14	7596.87

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	5023.37	48.356	23.6826	33748.85	102.42	5.51

T O T A L S		% Recovery
Gross Count	1292.0000	100.00
Net Area	1291.9770	100.00
Background	0.0230	0.00
Composite Fit	1266.1445	98.00
Residuals	25.8325	2.00

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 38 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 6 (Det #38)
Efficiency: 20.60% Chem. Recovery: 0.00%
Total Eff.: 20.60% Manual:100.00%
CALIBRATION: 3510.95 + 5.0206 * Chn + -0.000315 Chn **2 keV
Original: 3510.95 + 5.0206 * Chn + -0.000315 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03823.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 14:50:26
Live Time: 10.00 Real Time: 10.52 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3830.CHN
Background File: C:\USER\ALPHA\BKGND\B0003739.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3830

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	310.70	12.89	104.98	1271.64	0.00	1271.64	7629.83

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	5040.46	62.172	14.1808	37038.02	111.91	5.50

T O T A L S		% Recovery
Gross Count	1286.0000	100.00
Net Area	1285.9860	100.00
Background	0.0140	0.00
Composite Fit	1271.6386	98.88
Residuals	14.3474	1.12

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 39 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 7 (Det #39)
Efficiency: 23.16% Chem. Recovery: 0.00%
Total Eff.: 23.16% Manual:100.00%
CALIBRATION: 3567.49 + 4.778 * Chn keV
Original: 3567.49 + 4.778 * Chn keV
File: C:\USER\ALPHA\CALIB\CAL03824.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 14:50:34
Live Time: 10.00 Real Time: 10.52 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3831.CHN
Background File: C:\USER\ALPHA\BKGND\B0003740.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3831

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	298.99	2.09	245.61	1196.60	0.00	1196.60	7179.59

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4996.05	9.963	11.1208	30999.96	99.55	5.67

T O T A L S		% Recovery
Gross Count	1300.0000	100.00
Net Area	1299.9893	100.00
Background	0.0107	0.00
Composite Fit	1196.5988	92.05
Residuals	103.3905	7.95

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 40 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 4 Input 8 (Det #40)
Efficiency: 22.79% Chem. Recovery: 0.00%
Total Eff.: 22.79% Manual:100.00%
CALIBRATION: 3510.28 + 4.9648 * Chn + -0.000218 Chn **2 keV
Original: 3510.28 + 4.9648 * Chn + -0.000218 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03825.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 14:50:43
Live Time: 10.00 Real Time: 10.26 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3832.CHN
Background File: C:\USER\ALPHA\BKGND\B0003741.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3832

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	299.09	6.30	151.31	1280.97	0.00	1280.97	7685.84

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4975.70	30.439	19.8385	33724.60	101.17	5.48

T O T A L S		% Recovery
Gross Count	1302.0000	100.00
Net Area	1301.9883	100.00
Background	0.0117	0.00
Composite Fit	1280.9730	98.39
Residuals	21.0153	1.61

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 41 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 1 (Det #41)
Efficiency: 24.94% Chem. Recovery: 0.00%
Total Eff.: 24.94% Manual:100.00%
CALIBRATION: 3366.93 + 5.8905 * Chn + -0.0017 Chn **2 keV
Original: 3366.93 + 5.8905 * Chn + -0.0017 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03796.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 14:50:59
Live Time: 10.00 Real Time: 20.06 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3833.CHN
Background File: C:\USER\ALPHA\BKGND\B0003742.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3833

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	312.38	7.26	138.59	1260.03	0.00	1260.03	7560.20

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	5041.11	35.063	12.1942	30313.57	92.45	5.52

T O T A L S		% Recovery
Gross Count	1274.0000	100.00
Net Area	1273.9920	100.00
Background	0.0080	0.00
Composite Fit	1260.0343	98.90
Residuals	13.9577	1.10

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 44 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 4 (Det #44)
Efficiency: 22.04% Chem. Recovery: 0.00%
Total Eff.: 22.04% Manual:100.00%
CALIBRATION: 3469.31 + 5.0733 * Chn + -0.000342 Chn **2 keV
Original: 3469.31 + 5.0733 * Chn + -0.000342 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03797.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 14:51:11
Live Time: 10.00 Real Time: 13.20 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3834.CHN
Background File: C:\USER\ALPHA\BKGND\B0003743.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3834

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	298.50	2.56	214.98	1160.02	0.00	1160.02	6960.14

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4953.23	12.455	13.2955	31579.60	104.61	5.75

T O T A L S		% Recovery
Gross Count	1253.0000	100.00
Net Area	1252.9527	100.00
Background	0.0473	0.00
Composite Fit	1160.0240	92.58
Residuals	92.9286	7.42

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: pulser ck det 45 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 5 (Det #45)
Efficiency: 23.69% Chem. Recovery: 0.00%
Total Eff.: 23.69% Manual:100.00%
CALIBRATION: 3514.81 + 4.9666 * Chn + -0.000407 Chn **2 keV
Original: 3514.81 + 4.9666 * Chn + -0.000407 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03798.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 14:51:27
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3835.CHN
Background File: C:\USER\ALPHA\BKGND\B00C3744.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3835

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	303.64	2.88	209.49	1198.65	0.00	1198.65	7191.88

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4985.34	13.574	13.1722	30358.29	97.33	5.66

T O T A L S		% Recovery
Gross Count	1278.0000	100.00
Net Area	1277.9917	100.00
Background	0.0083	0.00
Composite Fit	1198.6468	93.79
Residuals	79.3449	6.21

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 46 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 6 (Det #46)
Efficiency: 20.29% Chem. Recovery: 0.00%
Total Eff.: 20.29% Manual:100.00%
CALIBRATION: 3468.87 + 5.1827 * Chn + -0.000576 Chn **2 keV
Original: 3468.87 + 5.1827 * Chn + -0.000576 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03799.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 14:51:34
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3836.CHN
Background File: C:\USER\ALPHA\BKGND\B0003745.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3836

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	293.45	1.55	272.00	1143.74	0.00	1143.74	6862.47

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4940.12	7.526	9.8086	33821.92	113.63	5.80

T O T A L S		% Recovery
Gross Count	1277.0000	100.00
Net Area	1276.9890	100.00
Background	0.0110	0.00
Composite Fit	1143.7448	89.56
Residuals	133.2442	10.43

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 47 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 7 (Det #47)
Efficiency: 23.31% Chem. Recovery: 0.00%
Total Eff.: 23.31% Manual:100.00%
CALIBRATION: 3543.5 + 4.7932 * Chn + -3.4e-005 Chn **2 keV
Original: 3543.5 + 4.7932 * Chn + -3.4e-005 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03800.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 14:51:44
Live Time: 10.00 Real Time: 10.02 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3837.CHN
Background File: C:\USER\ALPHA\BKGND\B0003746.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3837

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	303.42	6.87	141.73	1253.58	0.00	1253.58	7521.50

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4994.73	32.800	20.8280	32267.25	98.91	5.54

T O T A L S		% Recovery
Gross Count	1276.0000	100.00
Net Area	1275.9920	100.00
Background	0.0080	0.00
Composite Fit	1253.5829	98.24
Residuals	22.4091	1.76

Analyzed By: DF (Dee Fairservis)

Checked By: _____ (Don Ukele)

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: pulser ck det 48 10/26/98
Type: PULSER Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot

DETECTOR: MCB 5 Input 8 (Det #48)
Efficiency: 21.86% Chem. Recovery: 0.00%
Total Eff.: 21.86% Manual:100.00%
CALIBRATION: 3573.44 + 4.6068 * Chn + 0.000215 Chn **2 keV
Original: 3573.44 + 4.6068 * Chn + 0.000215 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03801.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 26-Oct-98 14:51:55
Live Time: 10.00 Real Time: 10.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3838.CHN
Background File: C:\USER\ALPHA\BKGND\B0003747.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Absolute Peak Search And Fit
Results: ALPH3838

P E A K S

	Channel	FWHM	Height	Gross	Background	Net Area	CPM
1.	302.66	5.22	160.58	1237.25	0.00	1237.25	7423.48

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	*******	1.00	4987.44	24.704	17.7668	33959.20	105.48	5.57

T O T A L S		% Recovery
Gross Count	1278.0000	100.00
Net Area	1277.9887	100.00
Background	0.0113	0.00
Composite Fit	1237.2471	96.81
Residuals	40.7416	3.19

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

Nuclide Pu-242 Isotope # 224 Date Received Received By E.S. Wallace

INCOMING HEALTH PHYSICS

Radiation Level @ Package Surface N/A uR/hr , Radiation Level @ 1 meter From Package Surface N/A uR/hr

Removable Contamination Survey N/A DPM/100 Square Centimeters

Incoming Health Physics Results N/A Health Physics Approval By E.S. Wallace

Characterization of Radioactive Material Solution

Manufacturer: North American Standards , Model # : CAL3000 , Serial #: A1885-A , NIST Traceable Yes

Half-Life 373,600.00 + or - years , Date of Calibration 11-01-93 , Time of Calibration:

Chemical Form: Pu (NO3)4 , Sample Mass: 5.4 + or - grams

Activity Concentration at TOC: 807.4 Bq/g , Total Activity @ TOC: 4359.960 Bq

DPM Conversion Factor: 60 , Activity @ Receipt in DPM 262,567 , Activity@ Receipt in uCi: 0.1183

Preparation of Primary Stock Solution

Preparation Date: 01-24-94 , Activity on Prep Date : 261,597.5 DPM , 48,444.0 DPM /grams In The Ampoul

pCi per grams Of Standard In Ampoule at Prep= 21,821.6 , Volume of Stock Solution: 1000 L

Stock Solution Concentration: 261.6 DPM/ml @ prep Stock Solution Total Activity @ Prep in uCi: 0.1178

Stock Solution Concentration: 117.8 pCi/ ml at prep , Total Stock Solution Activity @ Prep 117,836.7 pCi

Preparation of Working Solutions

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Working Sol'n #	224.01	224.02	224.03	224.04	224.05
TOC	04-11-94	08-10-94	08-24-94	10-13-94	10/11/95
Volumetric or Gravimetric	Volumetric	Volumetric	Volumetric	Volumetric	Volumetric
Stock Solution ID	224.00	224.00	224.00	224.00	224.00
Stock Solution Used(ml or grams)	15	10	25	25	25
DPM/ml of Stock Sol. At TOC	261.600	261.6	261.6	261.6	261.6
Stock Solution TOC	01-24-94	01-24-94	01-24-94	01-24-94	01-24-94
Working Solution Volume (ml)	1,000.0	1,000.0	2,000.0	2,000.0	1,000.0
Total DPM@ TOC	3,924.0	2,616.0	6,540.0	6,540.0	6,540.0
DPM / ml @TOC	3.9	2.6	3.3	3.3	6.5
pCi/ml @ TOC	**1.8**	**1.2**	**1.5**	**1.5**	**2.9**
pCi/Liter @ TOC	1,767.6	1,178.4	1,473.0	1,473.0	2,945.9
Original Working Solution #	04-11-95	08-10-95			
Date Exhausted	04-11-95	08-10-95	08-24-95		

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

Radioactive Material Standard Solution Preparation Log

Isotope Number ~~219.0~~ 224.0 WW 5-3-94

Radionuclide Pu-242 (A1885-A)

Date of Preparation 1-24-94

Prepared By Dee Faussemius

Isotope Number of Stock Solution ~~219.0~~

Preparation Notes

1. amount stock solution measured in volumetric:
Syringe Wt. empty: 9.4013 g
Syringe with Sol'n : 14.8014 g
Diff = 5.40

2. Amount and type of diluent measured in volumetric:
Diluted to 1.0 l w/ 4N HNO_3

3. Final Concentration 117.8 pCi/ml

4. Notes:

5.

STANDARD PREPARATION WORKSHEET

Isotope Number: 22A.06 JOB # 962380

Radionuclide: Pu 242

Date of Preparation: 11/5/96

Prepared by: MG

Isotope Number of Stock Solution: 22A.00

PREPARATION NOTES:

1) Amount of Stock Solution measured in volumetric flask.

25 mL of 22A.00 @ 117.8 pCi/mL

2) Amount and type of dilution measured in volumetric flask.

25 mL of 22A.00 DILUTED TO 1000 mL IN 4N HNO_3

3) Final Concentration.

2.9 pCi/mL ✓ DW 11/6/96

4) Notes, Comments, and Calculations.

WITNESSED BY [signature]

QC26 EFF 07-15-94:REV 2

CERTIFICATE OF CALIBRATION

MODEL CAL3000 STANDARDIZED SOLUTION

NUCLIDE Pu-242[1] SERIAL NUMBER A1885-A HALF LIFE [2] 3.763 x 10^5 years

REFERENCE DATE Nov. 1, 1993 CHEMICAL FORM $Pu(NO_3)_4$ in 4 M HNO_3

TOTAL ACTIVITY 4396 Bq (118.8 nCi) MASS 5.4447 g

CONCENTRATION 807.4 Bq/g (21.82 nCi/g)

PRINCIPAL EMISSIONS[2]

Type	Energy (keV)	Intensity (%)
alpha	4856.4	22.4
alpha	4900.6	78

SOURCE DESCRIPTION

Standardized solution in a 5 milliliter flame-sealed ampoule.

METHOD OF CALIBRATION

Gravimetric aliquots of a master solution were calibrated by liquid alpha-spectroscopy. The efficiency for Pu-242 was established through ongoing intercomparisons with the National Institute of Standards and Technology. A gravimetric aliquot of this master solution was diluted to 5 ml and dispensed into a flame-sealed ampoule. This standard is indirectly (implicitly) traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	2.20%
Weighing uncertainty	0.46%
Total uncertainty	2.66%

Calibration Laboratory

12-15-93
Date

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

Nuclide Pu-239 Isotope # 153 Date Received 8-28-89 Received By N/A

INCOMING HEALTH PHYSICS

Radiation Level @ Package Surface N/A N/A , Radiation Level @ 1 meter From Package Surface N/A N/A

Removable Contamination Survey N/A DPM/100 Square Centimeters

Incoming Health Physics Results N/A Health Physics Approval By N/A

Characterization of Radioactive Material Solution

Manufacturer: EMSL-LV , Model # : , Serial #: 2493-1 , NIST Traceable

Half-Life 24,000.00 + or - years , Date of Calibration 3-21-88 ,Time of Calibration: 05:00:00h

Chemical Form: , Sample Mass: 5.0 + or - grams

Activity Concentration at TOC: 16.2 nCi/gram , Total Activity @ TOC: 81.000 nCi

DPM Conversion Factor: 2220 , Activity @ Receipt in DPM 179,813 , Activity@ Receipt in uCi: 0.0810

Preparation of Primary Stock Solution

Preparation Date: 11-2-93 , Activity on Prep Date : 179,790.8 DPM , 35,958.2 DPM /grams In The Ampoul

pCi per grams Of Standard In Ampoule at Prep= 16,197.4 ,Volume of Stock Solution: 500 ML

Stock Solution Concentration: 359.6 DPM/ml @ prep Stock Solution Total Activity @ Prep in uCi: 0.0810

Stock Solution Concentration: 162.0 pCi/ ml at prep , Total Stock Solution Activity @ Prep 80,986.8 pCi

Preparation of Working Solutions

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Working Sol'n #	153.01	153.02	153.03	153.04	153.05
TOC	12-9-93	7/2/96	7/2/96	07/07/97	07/21/98
Volumetric or Gravimetric Prep	Volumetric	Volumetric	Volumetric	Volumetric	Volumetric
Stock Solution ID	153.00	153.00	153.02	153.00	153.00
Stock Solution Used(ml or grams)	50.0	100	100	10	10
DPM/ml of Stock Sol. At TOC	359.600	359.6	36.0	359.6	359.6
Stock Solution TOC	11-2-93	11-2-93	7-2-96	11/02/93	11/02/93
Working Solution Volume (ml)	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Total DPM@ TOC	17,979.9	35,957.2	3,596.0	3,595.6	3,595.5
DPM / ml @TOC	18.0	36.0	3.6	3.6	3.6
pCi/ml @ TOC	**8.1**	**16.2**	**1.6**	**1.6**	**1.6**
pCi/Liter @ TOC	8,099	16,197	1,620	1,620	1,620
Original Working Solution #					
Date Exhausted					

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

Radioactive Material Standard Solution Preparation Log

Isotope Number 153.0

Radionuclide Pu-239

Date of Preparation 11-2-93

Prepared By Dee Fauserris

Isotope Number of Stock Solution _____

Preparation Notes

1. amount stock solution measured in volumetric:
Syringe wt. empty = 9.364 DF 11-2-93
Syringe wt + std vol = 14.902

2. Amount and type of diluent measured in volumetric:
Diluted to 500 mls with 4N HNO_3

3. Final Concentration 162 pCi/ml

4. Notes:

5.

STANDARD PREPARATION WORKSHEET

Isotope Number: 153.05 JOB # 905383

Radionuclide: Pu 239

Date of Preparation: 7/21/98

Prepared by: MB

Isotope Number of Stock Solution: 153.00

PREPARATION NOTES:

1) Amount of Stock Solution measured in volumetric flask.

10mL of 153.00 @ 162.0 pCi/mL

2) Amount and type of dilution measured in volumetric flask.

10mL of 153.00 DILUTED TO 1000mL IN 4N HNO_3

3) Final Concentration.

1.6 pCi/mL ✓ DW

4) Notes, Comments, and Calculations. [illegible] 7/21/98

QC26 EFF 07-15-94:REV 2

ISO # 153

Rec'd 8-28-89

U.S. Environmental Protection Agency
Environmental Monitoring Systems Laboratory-Las Vegas
Nuclear Radiation Assessment Division

Calibration Certificate

Description

Principal radionuclide: PLUTONIUM-239 Half-life: 2.4×10^4 years

Nominal activity: 81 nano curies

Nominal volume: 5 ml in ampoule/bottle number: 2493-1

Measurement Activity of principal radionuclide

Activity per gram of this solution

16.2 nano curies of Plutonium-239

at 0400 hours PST on March 21, 1988

Activity of daughter radionuclide

The principal activity was accompanied at the quoted time by

curies Per gram

of the daughter nuclide

Total mass of this solution

APPROX. 5.0 grams

Method of measurement

The activity of the primary solution was measured by an internal gas flow proportional counter.

The activity of the dilution was measured by liquid scintillation counting.

Useful Life

This radionuclide has decayed through 0.0 half lives since it was obtained by EMSL-LV

We recommend that this solution should not be used after January 1995

Purity

The manufacturer states that activities other than that of the principal nuclide and of its daughter nuclides, if any, were estimated/known to be:

(1) see remarks	less than equal to	%	of the principal activity
(2)	less than equal to	%	of the principal activity
(3)	less than equal to	%	of the principal activity

The activity of impurity (1) is not (2) is not (3) is not included in the quoted figures of the principal activity.

Random Errors

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than ± 0.10 %
(The 99.7% confidence limits are given by t(sm) where t is obtained from the student t factor for the degree of freedom (n-1)).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error ($+\delta - \delta'$). These have been estimated not to exceed

+ 3.3% or - 3.3 %

the overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error [t(sm)] at the 99.7% confidence limits and the worst case estimate of the systematic errors ($+\delta, -\delta'$)
The overall uncertainty is therefore calculated on the basis of $+ [t(sm) + \delta], - [t(sm) + \delta']$
and is + 3.7 %, -3.7 % of the quoted radioactive concentration.

Decay Schemes

This standardization is based on the following assumptions of the principle nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Plutonium-239 and impurities were assumed to decay 100 percent by alpha emission.

Chemical Composition of Solution

Carrier content per gram of solution:

Other components:
4M nitric acid

Preservative:

Remarks

IMPURITIES:

Pu-238	0.033 percent of the total activity
Pu-240	4.6×10^{-5} percent of the total activity
Pu-241	1.5×10^{-3} percent of the total activity
Pu-242	8.8×10^{-6} percent of the total activity
Pu-244	6.2×10^{-9} percent of the total activity

Date Certificate Prepared April 7, 1988

Approval Signature Paul B. Wahn

Revised 1/84

CORE LABORATORIES

Western Atlas International

B. ..k

PARAMETER	METHOD	QC TYPE	PERIOD COVERED
Water Plutonium 241		Method/Reagent Blank	MEAN = SD =

Upper Control Limit 2 pCi/l

Blank Result

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
2.4																										
2.2																										
2.0																										
1.8																										
1.6																										
1.4																										
1.2																										
1.0																										
0.8																										
0.6																										
0.4																										
0.2																										
0.0																										
-0.2																										
-0.4																										
-0.6																										
-0.8																										
-1.0																										
-1.2																										
-1.4																										
-1.6																										
-1.8																										
-2.0																										
-2.2																										
-2.4																										

RUN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13
DATA POINT	-10.03	-20.4	-21.4										
DATE /INITIALS	10-1-94 JM	10-1-94 JM	10-6-94 JM										
QC BATCH NUMBER	157687	157566	158717										

RUN NUMBER	14	15	16	17	18	19	20	21	22	23	24	25	26
DATA POINT													
DATE /INITIALS													
QC BATCH NUMBER													

CORE LABORATORIES

Western Atlas International

Percent Recover = (Measured Activity of Standard Reference Material) x 100
(Actual Activity of Standard Reference Material)

Accuracy Control Chart

PARAMETER	METHOD	QC TYPE	PERIOD COVERED
Water Plutonium 241		Laboratory Control Sample	MEAN = N/A SD = N/A

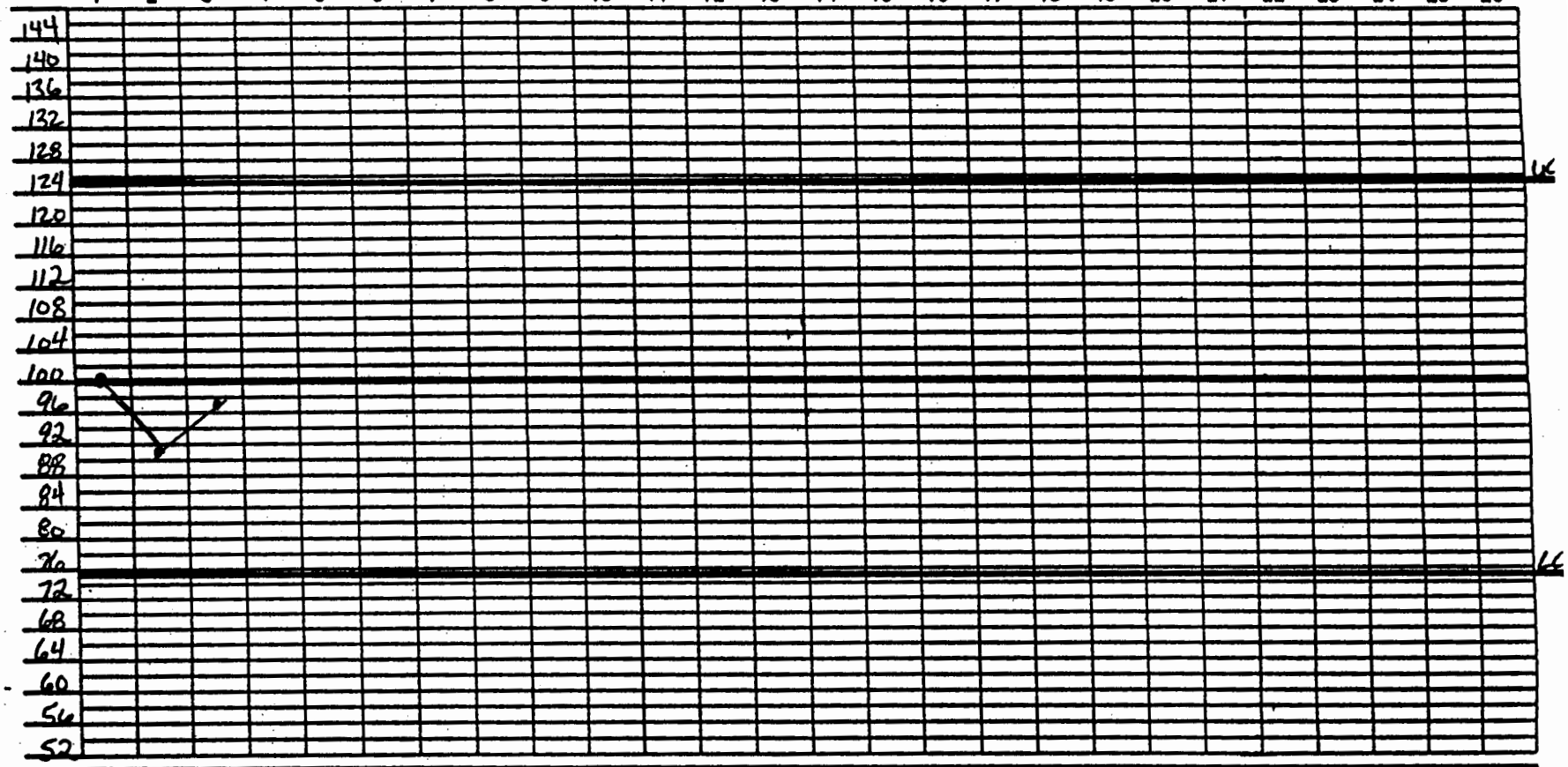
Upper Control Limit: 125

Upper Warning Limit: N/A

Lower Warning Limit: N/A

Lower Control Limit: 75

Percent Recovery



RUN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13
DATA POINT	100.0%	91.6%	97.2										
DATE /INITIALS	10-1-94 JM	10-1-94 JM	10-1-94 JM										
QC BATCH NUMBER	157087	157366	158717										

RUN NUMBER	14	15	16	17	18	19	20	21	22	23	24	25	26
DATA POINT													
DATE /INITIALS													
QC BATCH NUMBER													

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A Litton/Dresser Company

RER = ____ |Reported Value - Dup Value| / ((Reported Value Error)^2 + (Dup Error)^2)$^{1/2}$

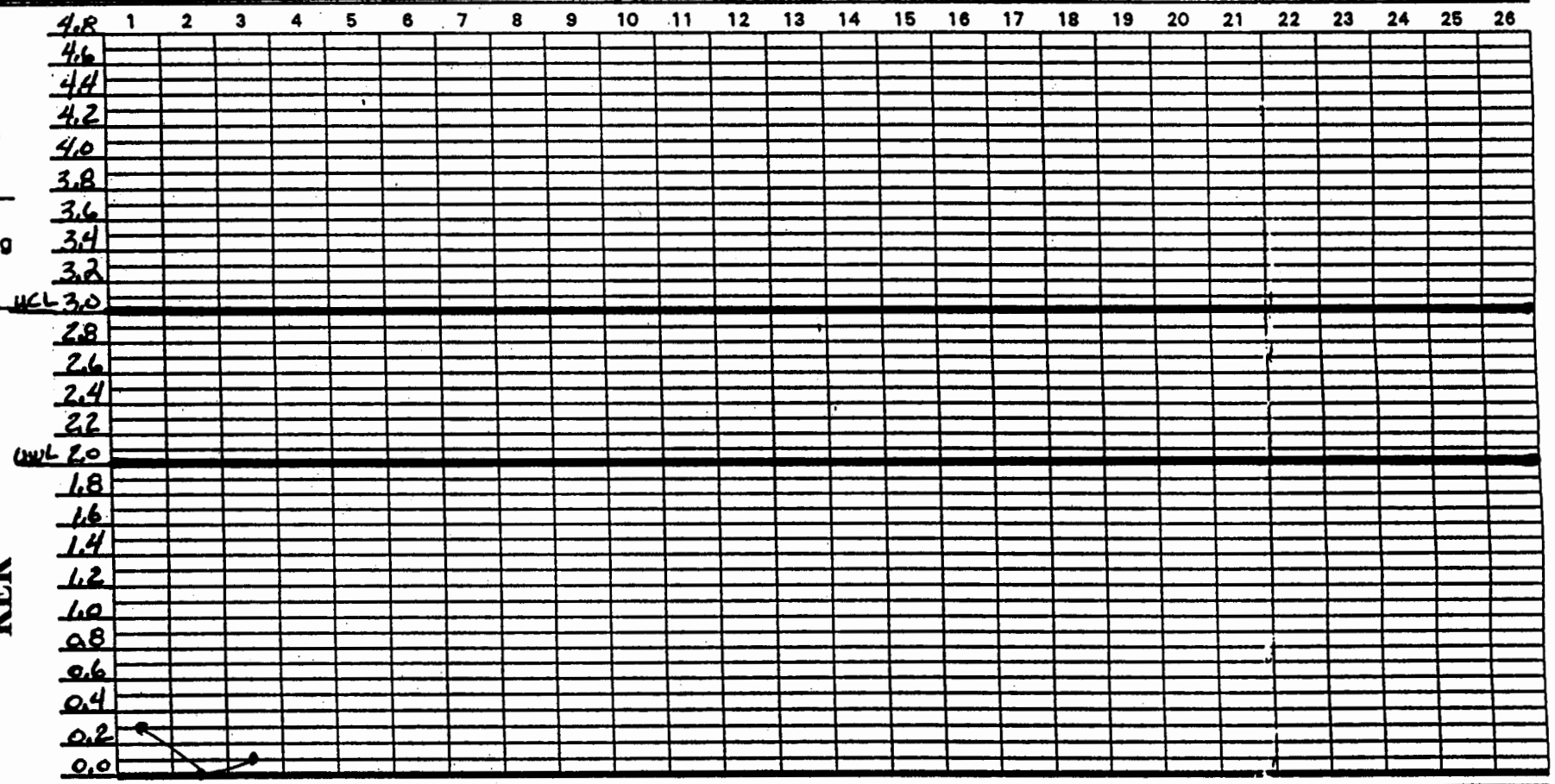
Note: Use TPU in place of error if TPU is calculated.

Precision Control Chart

PARAMETER	METHOD	QC TYPE	PERIOD COVERED
Water Plutonium 241	Cat-tex R-11.0	**Duplicate Precision**	MEAN = SD =

Upper Control Limit 3.0

Upper Warning Limit 2.0



RUN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13
DATA POINT	0.3	0.0	0.1										
DATE /INITIALS	10-1-94 jm	10-1-94 jm	10-13-94 jm										
QC BATCH NUMBER	157687	157566	158917										

RUN NUMBER	14	15	16	17	18	19	20	21	22	23	24	25	26
DATA POINT													
DATE /INITIALS													
QC BATCH NUMBER													

The following eight calibration standards have been made from N.I.S.T. traceable standards.

1ST021S	5ST021S
2ST021S	6ST021S
3ST021S	7ST021S
4ST021S	8ST021S

These standards include both Am241 and Pu239. Each standard has 4ml Am241 with an activity of 50pCi/ml and 1ml Pu 239 with an activity of 162pCi/ml.

Each volume was pippeted into a 250ml beaker with a calibrated pipette. The corresponding calibrations were 0.992ml (PU) and 3.97ml (Am).

The ISO numbers for the radio nuclides are, 131.00 for Pu239 and 181.01 for Am241.

Added to each sample was 10ml 1:1 H_2SO_4.

Samples were fused, brought up in 7 ml 4N HCl and washed into centrifuge tubes with distilled water. Five drops of Ascorbic acid, 3 drops of Titanium Trichloride and 1 ml Hydrofluoric acid was added to each. Samples were allowed to sit for 1 hour to precipitate, samples were then filtered.

Isotope Number 1[illegible]

Radionuclide Am241 PO# 57210-077

Date of Preparation 15 Feb 93

Prepared By [signature] Mitchell

Isotope Number of Stock Solution 181.00

Preparation Notes

1. placed 10 ml stock sol. (1000 pCi/ml) into volumetric flask

2. Placed 100 ml 4M HNO_3 into 200 ml volumetric flask. Poured 10 ml stock solution into 200 ml volumetric

3. Rinsed 10 ml volumetric 5 times with 4M HNO_3 & poured into 200 ml volumetric

4. Brought vol. in 200 ml volumetric halfway up neck w/ 4M HNO_3

5. Brought to volume with distilled water

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

41163-277

Am-241 100 mL Liquid in Flame Sealed Bottle

This standard radionuclide source was prepared gravimetrically from a calibrated master liquid radionuclide solution source. The master source was calibrated by liquid scintillation counting.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

Source prepared by: E. W. Belvin
E. W. Belvin, Production Manager

ISOTOPE:	Am-241
ACTIVITY (dps):	3698
HALF-LIFE:	432 years
CALIBRATION DATE:	November 19, 1991 12:00 EST
TOTAL ERROR:	3.0%
SYSTEMATIC ERROR:	2.7%
RANDOM ERROR:	1.3%

100.00 grams of solution 1M HCl.

P O NUMBER 57216-277, Item 3

Q A APPROVED [illegible] 11-19-91

Certificate of Participation

Analytics, Incorporated
Atlanta, Georgia

is a participant for the period January 1, 1991, through December 31, 1991, in a radioactivity measurements assurance program conducted by the National Institute of Standards and Technology, in cooperation with the U.S. Council for Energy Awareness. Continued participation is evidenced by dated Reports of Traceability issued for particular radionuclides, which indicate the deviation of the participant's reported value from that measured by the National Institute of Standards and Technology. The significance of these Reports is addressed below.*

For the Director,

Dale D. Hoppes, Group Leader
Radioactivity Group
Center for Radiation Research

*As guidance for the proper use of Reports of Traceability, it should be emphasized that the National Institute of Standards and Technology is concerned only with fostering good measurement capability and consistency with the national measurement system. The assurance of the proper application of that capability to the ultimate consumer products is the responsibility of each manufacturer of these products and of the Federal regulatory agencies.

A continuing traceability program in radioactivity demonstrates, to the degree established by the periodic assay of enlisted radioactivity samples, a continuing competence to maintain the instrument systems and standards necessary for accurate measurement. Such a program cannot, however, endorse each and every measurement nor the final product, any more than a spot check can vouch for every unchecked item. Care should be taken, therefore, not to imply such endorsement. The proper use of this Report is governed by section 200.114 of Title 15 of the Code of Federal Regulations. These regulations may be met if Reports are quoted only in their entirety. Excerpts out of context may be misleading.

Removable Contamination Survey N/A DPM/100 Square Centimeters

Incoming Health Physics Results N/A Health Physics Approval By N/A

Characterization of Radioactive Material Solution

Manufacturer: EMSL-LV , Model #: , Serial #: 2493-1 , NIST Traceable

Half-Life 24.000 + or - years , Date of Calibration: 3-21-88 , Time of Calibration: 05:00:0

Chemical Form. Nitrate , Sample Mass: 5.0 + or - grams

Activity Concentration at TOC: 16.2000 nCi/gram , Total Activity @ TOC: 81 nCi

DPM Conversion Factor: 2220 , Activity @ Receipt in DPM: 179,819.8 , Activity @ Receipt in uCi: 0.081

Preparation of Primary Stock Solution

Preparation Date: 9-22-92 , Activity on Prep Date: 179,796.6 DPM , 35,959.3 DPM / grams In The A

pCi per grams Of Standard in Ampoule at Prep= 16,197.9 , Volume of Stock Solution: 500 ml

Stock Solution Concentration: 359.6 DPM/ml @ prep Stock Solution Total Activity @ Prep in uCi: 0.08

Stock Solution Concentration: 162.0 pCi/ ml at prep , Total Stock Solution Activity @ Prep 80,989.5 pCi

Preparation of Working Solutions

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Meth

Working Soln #	131.01	131.02	131.03	131.04	131.05
TOC	9-22-92	2-19-93			
Volumetric or Gravimetric Prep	Volumetric	Volumetric			
Stock Solution ID	131.00	131.00			
Stock Solution Used(ml or grams)	50.0000	10			
DPM/ml of Stock Sol. At TOC	359.6	359.6			
Stock Solution TOC	9-22-92	9-22-92			
Working Solution Volume (ml)	1,000.0	1000.0			
Total DPM @ TOC	17,980.0	0.0 3596	0.0	0.0	0.0
DPM / ml @TOC	18.0	? 3.6	?	?	?
pCi/ml @ TOC	8.1	1.6			
pCi/Liter @ TOC	8,099	1620			
Original Working Solution #					
Date Exhausted					

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for work solutions prepared by the gravimetric method are grams of Stock Solution.

Calibration Certificate

Description

Principal radionuclide: PLUTONIUM-239

Half-life: 2.4×10^4 years

Nominal activity: 81 nano curies

Nominal volume: 5 ml in ampoule/bottle number 2493-1

Measurement

Activity of principal radionuclide

Activity per gram of this solution

16.2 nano curies of Plutonium-239

at 0400 hours PST on March 21, 1988

Activity of daughter radionuclide

The principal activity was decomposed at the quoted time by.

curies per gram

of the daughter nuclide

Total mass of this solution

APPROX. 5.0 grams

Method of measurement

The activity of the primary solution was measured by an internal gas flow proportional counter.

The activity of the dilution was measured by liquid scintillation counting.

Useful Life

This radionuclide has decayed through 0.5 half lives since it was standard by [illegible]

We recommend that this solution should not be used after March 1990

Purity

The manufacturer states that activities [illegible] and of its daughter nuclides, if any, were estimated/known to be:

(1) see remarks	less than equal to	%	of the principal activity
(2)	less than equal to	%	of the principal activity
(3)	less than equal to	%	of the principal activity

The activity of impurity (1) is not (2) is not (3) is not included in the quoted figures of the principal activity.

Random Errors

The precision of this standard was such that the certified value of the radioactive concentration of the principal activity had a standard error (sm) not greater than ± .10 %
(The 99.7% confidence limits are given by t(sm) where t is obtained from the student t factor for the degree of freedom (n-1)).

The maximum uncertainty due to the assessable systematic errors (dilution, counting, and known uncertainty of the standard) is obtained by the separate arithmetic summation of the positive and negative systematic error (+ δ - δ'). These have been estimated not to exceed

+ 3.3% or - 3.3%

the overall uncertainty (often called accuracy) is an estimate of the possible divergence of the quoted result from the true value. It is a combination of random error [t(sm)] at the 99.7% confidence limits and the worst case estimate of the systematic errors (+ δ, - δ').
The overall uncertainty is therefore calculated on the basis of + [t(sm) + δ], - [t(sm) + δ'] and is + 3.7%, - 3.7% of the quoted radioactive concentration.

Decay Schemes

This standardization is based on the following assumptions of the principle nuclide, its daughter nuclides and impurities (no allowance for error in these assumptions or the assumption of quoted half-life have been included in the statement of accuracy above).

Plutonium-239 and impurities were assumed to decay 100 percent by alpha emission.

Chemical Composition of Solution

Carrier content per gram of solution:

Other components:

4M nitric acid

Preservative:

Remarks

IMPURITIES:

Pu-238	0.033% of the total activity
Pu-240	4.6×10^{-3}% of the total activity
Pu-241	1.5×10^{-3}% of the total activity
Pu-242	8.8×10^{-6}% of the total activity
Pu-244	6.2×10^{-9}% of the total activity

Seal Certificate Prepared April 7, 1988

Approval Signature John D. Albright

Revised 1/86

Source #	20.04301	Source Type	Planchet
Manufacturer	The	Serial #	93TH2202008
Nuclide	Th-230		
Half Life	77000	Years	
TOC	6-07-93		
Activity @ TOC	1160.0000	dpm	

Date Source Received: 6-11-93

Normal Location in Lab: Counting Room

Date Data Sheet Prepared: 6/11/93

Current Activity in dpm : 1,160 dpm

Current Activity in DPM: 1,160

Activity in Microcuries (uCi):0.001

Traceability: NIST

CORE LABORATORIES

Source #	20.04302	Source Type	Planchet
Manufacturer	The	Serial #	93TH2202009
Nuclide	Th-230		
Half Life	77000	Years	
TOC	6-07-93		
Activity @ TOC	1690.0000	dpm	

Date Source Received: 6-11-93

Normal Location in Lab: Counting Room

Date Data Sheet Prepared: 6/11/93

Current Activity in dpm : 1,690 dpm

Current Activity in DPM: 1,690

Activity in Microcuries (uCi):0.001

Traceability: NIST

CORE LABORATORIES

Source #	20.04303	Source Type	Planchet
Manufacturer	The	Serial #	93TH2202010
Nuclide	Th-230		
Half Life	77000	Years	
TOC	6-07-93		
Activity @ TOC	1040.0000	dpm	

Date Source Received: 6-11-93

Normal Location in Lab: Counting Room

Date Data Sheet Prepared: 6/11/93

Current Activity in dpm : 1,040 dpm

Current Activity in DPM: 1,040

Activity in Microcuries (uCi):0.000

Traceability: NIST

CORE LABORATORIES

Source #	20.04304	Source Type	Planchet
Manufacturer	The	Serial #	93TH2202011
Nuclide	Th-230		
Half Life	77000	Years	
TOC	6-07-93		
Activity @ TOC	1200.0000	dpm	

Date Source Received: 6-11-93

Normal Location in Lab: Counting Room

Date Data Sheet Prepared: 6/11/93

Current Activity in dpm : 1,200 dpm

Current Activity in DPM: 1,200

Activity in Microcuries (uCi):0.001

Traceability: NIST

CORE LABORATORIES

Source #	20.04305	Source Type	Planchet
Manufacturer	The	Serial #	93TH2202012
Nuclide	Th-230		
Half Life	77000	Years	
TOC	6-07-93		
Activity @ TOC	1600.0000	dpm	

Date Source Received: 6-11-93

Normal Location in Lab: Counting Room

Date Data Sheet Prepared: 6/11/93

Current Activity in dpm : 1,600 dpm

Current Activity in DPM: 1,600

Activity in Microcuries (uCi):0.001

Traceability: NIST

CORE LABORATORIES

Source #	20.04306	Source Type	Planchet
Manufacturer	The	Serial #	93TH2202013
Nuclide	Th-230		
Half Life	77000	Years	
TOC	6-07-93		
Activity @ TOC	1540.0000	dpm	

Date Source Received: 6-11-93

Normal Location in Lab: Counting Room

Date Data Sheet Prepared: 6/11/93

Current Activity in dpm : 1,540 dpm

Current Activity in DPM: 1,540

Activity in Microcuries (uCi):0.001

Traceability: NIST

CORE LABORATORIES

Source #	[illegible]	Source Type Planchet
Manufacturer	The	Serial # 93TH2202014
Nuclide	Th-230	
Half Life	77000	Years
TOC	6-07-93	
Activity @ TOC	1600.0000	dpm

Date Source Received: 6-11-93

Normal Location in Lab: Counting Room

Date Data Sheet Prepared: 6/11/93

Current Activity in dpm : 1,600 dpm

Current Activity in DPM: 1,600

Activity in Microcuries (uCi):0.001

Traceability: NIST

CORE LABORATORIES

THE SOURCE INC.

Radiation standards and check sources
2810 Siler Lane Santa Fe, NM 87501
(505)473-9538 FAX(505)473-5805

Certificate of Calibration
(Alpha Source)

The Thorium 230 alpha source was measured in a gas proportional counter using P-10 as counting gas. The alpha emissions from the surface of the source were measured at its plateau voltage to determine its 2π cpm rate. Corrections were applied for background, coincidence loss and backscatter factors when applicable. Alpha standard 90TH4704627A is our NIST referenced source used in establishing NIST traceability.

REF.PO# 57210-200

Active Diameter(or area) 19mm Mounting Material SS
Total Diameter(or area) 22mm Thickness 0.79mm

810	cpm±	40	cpm 2π
1,600	dpm ±	80	dpm 4π
0.00072	micro-curie		
06-07-93	date of measurement		
93TH2202014	source serial number		
5.0%	overall uncertainty(percent)		

Michael A. Ortiz
Calibration Manager

Cherise L. Gonzales
Quality Assurance Manager

less than 20 leak test results
(dpm /source or100cm^2)

The overall uncertainty of the measurement is three times the value found from combining quadratically the sum of the overall uncertainty reported by NIST in the radioactivity measurements assurance program; the standard deviation of the mean for the NIST standard as measured in the system used for calibration; and the standard deviation of the mean for the source measurements.

AC005-93

THE SOURCE INC.

Radiation standards and check sources
2810 Siler Lane Santa Fe, NM 87501
(505)473-9538 FAX(505)473-5805

Certificate of Calibration
(Alpha Source)

The Thorium 230 alpha source was measured in a gas proportional counter using P-10 as counting gas. The alpha emissions from the surface of the source were measured at its plateau voltage to determine its 2π cpm rate. Corrections were applied for background, coincidence loss and backscatter factors when applicable. Alpha standard 90TH4704627A is our NIST referenced source used in establishing NIST traceability.

REF.PO# 57210-200

Active Diameter(or area) 19mm Mounting Material Ss
Total Diameter(or area) 22mm Thickness 0.79mm

590	cpm±	30	cpm 2σ
1,160	dpm ±	60	dpm 4σ
0.00052	micro-curie		
06-07-93	date of measurement		
93TH2202008	source serial number		
5.00	overall uncertainty(percent)		

Michael A. Ortiz
Calibration Manager

Charles L. Gonzales
Quality Assurance Manager

less than 30 leak test results
(dpm /source or100cm^2)

The overall uncertainty of the measurement is three times the value found from combining quadratically the sum of the overall uncertainty reported by NIST in the radioactivity measurements assurance program; the standard deviation of the mean for the NIST standard as measured in the system used for calibration; and the standard deviation of the mean for the source measurements.

AC005-93

THE SOURCE INC.

Radiation standards and check sources
2810 Siler Lane Santa Fe, NM 87501
(505)473-8538 FAX(505)473-5805

Certificate of Calibration
(Alpha Source)

The Thorium 230 alpha source was measured in a gas proportional counter using P-10 as counting gas. The alpha emissions from the surface of the source were measured at its plateau voltage to determine its 2π cpm rate. Corrections were applied for background, coincidence loss and backscatter factors when applicable. Alpha standard 90TH4704627A is our NIST referenced source used in establishing NIST traceability.

REF.PO# 57210-200

Active Diameter(or area) 19mm Mounting Material Ss
Total Diameter(or area) 22mm Thickness 0.79mm

860	cpm ±	40	cpm 2π
1,690	dpm ±	85	dpm 4π
0.00076	micro-curie		
06-07-93	date of measurement		
93TH2202009	source serial number		
5.0%	overall uncertainty(percent)		

Michael A. Ortiz
Calibration Manager

Charles L. Gonzales
Quality Assurance Manager

less than 20 leak test results
(dpm /source or 100cm^2)

The overall uncertainty of the measurement is three times the value found from combining quadratically the sum of the overall uncertainty reported by NIST in the radioactivity measurements assurance program; the standard deviation of the mean for the NIST standard as measured in the system used for calibration; and the standard deviation of the mean for the source measurements.

AC005-93

INC.

Radiation standards and check sources
2810 Siler Lane Santa Fe, NM 87501
(505)473-9538 FAX(505)473-5805

Certificate of Calibration
(Alpha Source)

The Thorium 230 alpha source was measured in a gas proportional counter using P-10 as counting gas. The alpha emissions from the surface of the source were measured at its plateau voltage to determine its 2π cpm rate. Corrections were applied for background, coincidence loss and backscatter factors when applicable. Alpha standard 90TH4704627A is our NIST referenced source used in establishing NIST traceability.

REF.PO# 57210-200

Active Diameter(or area) 19mm Mounting Material Ni
Total Diameter(or area) 22mm Thickness 0.79mm

530	cpm ±	25	cpm 2σ
1,040	dpm ±	50	dpm 4σ
0.00047	micro-curie		
06-07-93	date of measurement		
93TH2202010	source serial number		
5.0%	overall uncertainty(percent)		

Michael A. Ortiz
Calibration Manager

Charles L. Gonzales
Quality Assurance Manager

less than 20 leak test results
(dpm /source or 100cm²)

The overall uncertainty of the measurement is three times the value found from combining quadratically the sum of the overall uncertainty reported by NIST in the radioactivity measurements assurance program; the standard deviation of the mean for the NIST standard as measured in the system used for calibration; and the standard deviation of the mean for the source measurements.

AC005-93

INC.

Radiation standards and check sources
2810 Siler Lane Santa Fe, NM 87501
(505)473-8538 FAX(505)473-5805

Certificate of Calibration
(Alpha Source)

The Thorium 230 alpha source was measured in a gas proportional counter using P-10 as counting gas. The alpha emissions from the surface of the source were measured at its plateau voltage to determine its 2π cpm rate. Corrections were applied for background, coincidence loss and backscatter factors when applicable. Alpha standard 90TH4704627A is our NIST referenced source used in establishing NIST traceability.

REF.PO# 57210-200

Active Diameter(or area) 19mm Mounting Material SS
Total Diameter(or area) 22mm Thickness 0.79mm

620	cpm±	30	cpm 2σ
1,200	dpm ±	60	dpm 4σ
0.00054	micro-curie		
06-07-93	date of measurement		
93TH2202011	source serial number		
5.0%	overall uncertainty(percent)		

Michael A. Ortiz
Calibration Manager

Charles L. Gonzales
Quality Assurance Manager

less than 20 leak test results
(dpm /source or100cm²)

The overall uncertainty of the measurement is three times the value found from combining quadratically the sum of the overall uncertainty reported by NIST in the radioactivity measurements assurance program; the standard deviation of the mean for the NIST standard as measured in the system used for calibration; and the standard deviation of the mean for the source measurements.

AC005-93

THE SOURCE INC.

Radiation standards and check sources
2810 Siler Lane Santa Fe, NM 87501
(505)473-9538 FAX(505)473-5805

Certificate of Calibration
(Alpha Source)

The Thorium 230 alpha source was measured in a gas proportional counter using P-10 as counting gas. The alpha emissions from the surface of the source were measured at its plateau voltage to determine its 2π cpm rate. Corrections were applied for background, coincidence loss and backscatter factors when applicable. Alpha standard 90TH4704627A is our NIST referenced source used in establishing NIST traceability.

REF.PO# 57210-200

Active Diameter(or area) 19mm Mounting Material SS
Total Diameter(or area) 22mm Thickness 0.75mm

810	cpm 2π	40	cpm 2π
1,600	dpm 2π	80	dpm 4π
0.00072	micro-curie		
06-07-93	date of measurement		
93TH2202012	source serial number		
5.0%	overall uncertainty(percent)		

Michael A. Ortiz
Calibration Manager

Charles L. Gonzales
Quality Assurance Manager

less than 30 leak test results
(dpm /source or 100cm²)

The overall uncertainty of the measurement is three times the value found from combining quadratically the sum of the overall uncertainty reported by NIST in the radioactivity measurements assurance program; the standard deviation of the mean for the NIST standard as measured in the system used for calibration; and the standard deviation of the mean for the source measurements.

AC005-93

THE SOURCE INC.

Radiation standards and check sources
2810 Siler Lane Santa Fe, NM 87501
(505)473-5538 FAX(505)473-5605

Certificate of Calibration
(Alpha Source)

The Thorium 230 alpha source was measured in a gas proportional counter using P-10 as counting gas. The alpha emissions from the surface of the source were measured at its plateau voltage to determine its 2π cpm rate. Corrections were applied for background, coincidence loss and backscatter factors when applicable. Alpha standard 90DM4704627A is our NIST referenced source used in establishing NIST traceability.

REF.POS 57210-200

Active Diameter(or area) 19mm Mounting Material SS
Total Diameter(or area) 22mm Thickness 0.79mm

780	cpm±	40	cpm 2σ
1,540	dpm ±	75	dpm 4σ
0.00069	micro-curie		
06-07-93	date of measurement		
93TM2202013	source serial number		
5.09	overall uncertainty(percent)		

Michael A. Ortiz
Calibration Manager

Charles L. Gonzales
Quality Assurance Manager

less than 20 leak test results
(dpm /source or100cm²)

The overall uncertainty of the measurement is three times the value found from combining quadratically the sum of the overall uncertainty reported by NIST in the radioactivity measurements assurance program; the standard deviation of the mean for the NIST standard as measured in the system used for calibration; and the standard deviation of the mean for the source measurements.

AC005-93

THE SOURCE INC.

Radiation standards and check sources
2810 Siler Lane Santa Fe, NM 87501
(505)473-8538 FAX(505)473-5505

Certificate of Calibration
(Alpha Source)

The Thorium 230 alpha source was measured in a gas proportional counter using P-10 as counting gas. The alpha emissions from the surface of the source were measured at its plateau voltage to determine its 2π cpm rate. Corrections were applied for background, coincidence loss and backscatter factors when applicable. Alpha standard 90TM4704627A is our NIST referenced source used in establishing NIST traceability.

REF.POS 57210-200

Active Diameter(or area) 19mm Mounting Material SS
Total Diameter(or area) 22mm Thickness 0.79mm

810	cpm±	40	cpm 2σ
1,600	dpm ±	80	dpm 4σ
0.00072	micro-curie		
06-07-93	date of measurement		
93TM2202014	source serial number		
5.08	overall uncertainty(percent)		

Michael A. Ortiz
Calibration Manager

Charles L. Gonzales
Quality Assurance Manager

less than 20 leak test results
(dpm /source or100cm²)

The overall uncertainty of the measurement is three times the value found from combining quadratically the sum of the overall uncertainty reported by NIST in the radioactivity measurements assurance program; the standard deviation of the mean for the NIST standard as measured in the system used for calibration; and the standard deviation of the mean for the source measurements.

AC006-93

THE SOURCE INC.

Radiation standards and check sources
2816 Siler Lane Santa Fe, NM 87501
(505)473-0538 FAX(505)473-5805

Certificate of Calibration
(Alpha Source)

The Thorium 230 alpha source was measured in a gas proportional counter using P-10 as counting gas. The alpha emissions from the surface of the source were measured at its plateau voltage to determine its 2π cpm rate. Corrections were applied for background, coincidence loss and backscatter factors when applicable. Alpha standard 90TH4704627A is our NIST referenced source used in establishing NIST traceability.

REF.PO# 57210-200

Active Diameter(or area) 19mm Mounting Material Ni
Total Diameter(or area) 22mm Thickness 0.75mm

635	cpm±	30 cpm 2σ
1,250	dpm ±	60 dpm 4σ
0.00056	micro-curie	
06-07-93	date of measurement	
93TH2202015	source serial number	
5.00	overall uncertainty(percent)	

Michael A. Ortiz
Calibration Manager

Charles L. Gonzales
Quality Assurance Manager

less than 30 leak test results
(dpm /source or 100cm²)

The overall uncertainty of the measurement is three times the value found from combining quadratically the sum of the overall uncertainty reported by NIST in the radioactivity measurements assurance program; the standard deviation of the mean for the NIST standard as measured in the system used for calibration; and the standard deviation of the mean for the source measurements.

AC005-03

CT & E ENVIRONMENTAL SERVICES, INC
DATA COMPLETENESS CHECKLIST
LB 770 GAS PROPORTIONAL COUNTER

Strontium-89,90

Laboratory Job Number: 985847

Item #	Title	In Pkg	Comments
1)	Formula Used in Calculation	* ✓	11-24-98 cy
2)	Instrument Run Log	✓	11-24-98 cy
3)	Instrument Printouts	✓	11-24-98 cy
4)	Sample Measurement Activity Calculation Report	✓	11-24-98 cy
5)	Instrument Daily Calibration	✓	11-24-98 cy
6)	Background Printouts	✓	11-24-98 cy
7)	Efficiency and Background Acceptance Criteria	✓	11-24-98 cy
8)	Standards Preparation Log	✓	11-24-98 cy
9)	Standards Certification	✓	11-24-98 cy
10)	Control Charts	✓	11-24-98 cy
11)	Source Calibration Certificates	✓	11-24-98 cy

Comments: * The Sr^{89} calculations are the same, just different counts

CORELAB

CORE LABORATORIES

STRONTIUM 90 CALCULATIONS

1.) Calculation of strontium 90 activity in pCi/unit volume:

$$Activity\ (pCi\ /\ unit\ volume) = \frac{(Sample\ cpm - Bkg\ cpm)}{(Volume\ x\ Method\ Efficiency\ x\ 2.22\ dpm\ /\ pCi)}$$

2.) Calculation of strontium 90 error at the 95% confidence level:

$$Error\ at\ 95\%\ (pCi\ /\ unit\ volume) = \frac{1.96\ x \sqrt{\frac{Sample\ cpm}{Sample\ CT} + \frac{Bkg\ cpm}{Bkg\ CT}}}{(Volume\ x\ Method\ Efficiency\ x\ 2.22\ dpm\ /\ pCi)}$$

3.) Calculation of strontium 90 Lower Limit of Detection (LLD):

$$LLD\ (pCi\ /\ unit\ volume) = \frac{4.66\ x \sqrt{\frac{Bkg\ cpm}{Bkg\ CT}}}{(Volume\ x\ Method\ Efficiency\ x\ 2.22\ dpm\ /\ pCi)}$$

Where:

cpm	=	counts per minute
CT	=	count time
Volume	=	Sample volume per gram, liter or filter depending on matrix type

CORE LABORATORIES

SAMPLE VOLUME BOOK

SOP CA-GLR-01.0 Rev 2

Analysis Sr 89-90 Analyst MG Date 10/14/98

Sample ID	Sample Vol L,g	Sample Conc	Calculated Vol/Wt L,g	Sample Matrix	Comments
985847-1	0.5L	N/A	N/A	H_2O	CLEAR LIQUID
1 tms					
1 tmsD					
2					
3					
4					
5					
6					
6 sD					
7					
8					
9					
9 tms					
9 tmsD					
10					
11					
12					
13					
MB1Sr 1014	1.0L				QC
MB2Sr 1014					
STIS r 1014					
LCIS r 1014					
ST2S r 1014					
LC2S r 1014					

MG 10/14/98

Spike √	Trace √	Nuclide	Isotope Number	Expiration Date	Activity pCi/mL	Vol mL	Standard Control ID	Spiked/ Witnessed By
√		Sr 89	346.00	12/18/98	22.2	1 mL	5847-1 tms MSD	MG
							ST2S r 1014	
							LC1S r 1014	
		Sr 90	286.06	7/21/99	11.1	2 mL	5847-9 tms, MSD	
							ST2S r 1014	
							LC2S r 1014	

FORM RADCHEM-49, REV # 3

Book Number 98031 Page Number 39

S A M P L E M E A S U R E M E N T

Comment: SR89/90 SAMPLES
LB770 Number 1 User File: SR90/YT90 Sample Data File: SR584711
Sample Set: SR584711 Mode: Alpha/Beta
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BG Beta [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Eff. Alpha	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Eff. Beta	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Spillover	0.475	0.410	0.466	0.471	0.519	0.490	0.583	0.648	0.516	0.474
T(1/2) Alpha [days]	--	--	--	--	--	--	--	--	--	--
T(1/2) Beta [days]	--	--	--	--	--	--	--	--	--	--
Manuf. Alpha Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Manuf. Beta Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 16.10.98 Time 14:13:09
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/6
Guard [cpm] 1093

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	985847-001	0.667	22.3	1	2.98	11.4	1
2	2	985847-001 MS	0.533	25.0	1	16.5	4.54	1
3	3	985847-001 MSD	0.500	25.8	1	17.7	4.38	1
4	4	985847-002	0.633	22.9	1	2.27	13.2	1
5	5	985847-003	0.200	41.0	1	2.46	12.0	1
6	6	985847-004	0.467	26.8	1	2.81	11.6	1
7	7	985847-005	0.633	22.9	1	2.63	12.4	1
8	8	985847-006	0.333	31.5	1	2.42	12.6	1
9	9	985847-006 MD	0.367	30.2	1	2.64	11.8	1
10	10	985847-007	0.533	25.0	1	2.45	12.5	1

Sample Results

Measurement Date 16.10.98 Time 14:43:15
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 2/6
Guard [cpm] 1091

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	985847-001	0.433	27.7	1	1.63	15.6	1
2	2	985847-001 MS	0.500	25.8	1	15.5	4.67	1
3	3	985847-001 MSD	0.433	27.7	1	16.6	4.52	1
4	4	985847-002	0.400	28.8	1	1.68	15.2	1
5	5	985847-003	0.433	27.7	1	2.61	12.0	1
6	6	985847-004	0.533	25.0	1	2.11	13.7	1
7	7	985847-005	0.467	26.8	1	1.83	15.0	1
8	8	985847-006	0.500	25.8	1	2.08	14.2	1
9	9	985847-006 MD	0.600	23.5	1	1.86	15.0	1
10	10	985847-007	0.300	33.3	1	2.12	13.1	1

Sample Results

Measurement Date 16.10.98 Time 15:13:20
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 3/6
Guard [cpm] 1091

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	985847-001	0.233	37.8	1	1.96	13.6	1
2	2	985847-001 MS	0.333	31.5	1	16.4	4.53	1
3	3	985847-001 MSD	0.333	31.5	1	15.9	4.62	1
4	4	985847-002	0.400	28.8	1	1.81	14.6	1
5	5	985847-003	0.100	58.0	1	3.45	9.95	1
6	6	985847-004	0.600	23.5	1	2.14	13.7	1
7	7	985847-005	0.300	33.3	1	1.52	16.1	1
8	8	985847-006	0.333	31.5	1	1.52	16.5	1
9	9	985847-006 MD	0.133	50.4	1	1.50	15.4	1
10	10	985847-007	0.267	35.2	1	1.87	14.0	1

Sample Results

Measurement Date 16.10.98 Time 15:43:24
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 4/6
Guard [cpm] 1073

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	985847-001	0.133	50.4	1	1.57	15.0	1
2	2	985847-001 MS	0.233	37.8	1	14.4	4.83	1
3	3	985847-001 MSD	0.233	37.8	1	17.3	4.41	1
4	4	985847-002	0.333	31.5	1	1.48	16.2	1
5	5	985847-003	0.333	31.5	1	2.16	13.1	1
6	6	985847-004	0.233	37.8	1	2.22	12.7	1
7	7	985847-005	0.233	37.8	1	1.10	19.1	1
8	8	985847-006	0.300	33.3	1	1.24	18.4	1
9	9	985847-006 MD	0.067	70.1	1	1.70	14.2	1
10	10	985847-007	0.167	44.9	1	1.59	15.0	1

Sample Results

Measurement Date 16.10.98 Time 16:13:29
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 5/6
Guard [cpm] 1087

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	985847-001	0.200	41.0	1	1.34	16.6	1
2	2	985847-001 MS	0.167	44.9	1	15.9	4.60	1
3	3	985847-001 MSD	0.233	37.8	1	17.6	4.37	1
4	4	985847-002	0.133	50.4	1	1.17	17.5	1
5	5	985847-003	0.200	41.0	1	2.06	13.2	1
6	6	985847-004	0.267	35.2	1	1.70	14.7	1
7	7	985847-005	0.167	44.9	1	1.70	14.6	1
8	8	985847-006	0.233	37.8	1	1.82	14.4	1
9	9	985847-006 MD	0.267	35.2	1	1.60	15.4	1
10	10	985847-007	0.267	35.2	1	1.67	14.9	1

Sample Results

Measurement Date 16.10.98 Time 16:43:34
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 6/6
Guard [cpm] 1090

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	985847-001	0.267	35.2	1	1.41	16.3	1
2	2	985847-001 MS	0.267	35.2	1	15.8	4.61	1
3	3	985847-001 MSD	0.033	100.0	1	15.8	4.60	1
4	4	985847-002	0.333	31.5	1	1.08	19.4	1
5	5	985847-003	0.467	26.8	1	1.59	16.1	1
6	6	985847-004	0.133	50.4	1	1.80	14.0	1
7	7	985847-005	0.067	70.1	1	1.99	13.1	1
8	8	985847-006	0.133	50.4	1	1.21	17.5	1
9	9	985847-006 MD	0.133	50.4	1	1.40	16.0	1
10	10	985847-007	0.367	30.2	1	1.93	14.0	1

Average of 6 cycles

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA CPM	BETA %Error	BETA Cat	BETA Num
1	1	985847-001	0.322	13.1	1	6	1.81	5.87	1	6
2	2	985847-001 MS	0.339	12.8	1	6	15.8	1.89	1	6
3	3	985847-001 MSD	0.294	13.7	1	6	16.8	1.83	1	6
4	4	985847-002	0.372	12.2	1	6	1.58	6.39	1	6
5	5	985847-003	0.289	13.9	1	6	2.39	5.05	1	6
6	6	985847-004	0.372	12.2	1	6	2.13	5.42	1	6
7	7	985847-005	0.311	13.4	1	6	1.80	5.99	1	6
8	8	985847-006	0.305	13.5	1	6	1.71	6.21	1	6
9	9	985847-006 MD	0.261	14.6	1	6	1.78	5.90	1	6
10	10	985847-007	0.317	13.2	1	6	1.94	5.65	1	6

S A M P L E M E A S U R E M E N T

Comment: SR89/90 SAMPLES
LB770 Number 2 User File: SR90/YT90 Sample Data File: SR584721
Sample Set: SR584721 Mode: Alpha/Beta
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BG Beta [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Eff. Alpha	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Eff. Beta	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Spillover	0.526	0.496	0.574	0.511	0.543	0.413	0.496	0.363	0.411	0.407
T(1/2) Alpha [days]	--	--	--	--	--	--	--	--	--	--
T(1/2) Beta [days]	--	--	--	--	--	--	--	--	--	--
Manuf. Alpha Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Manuf. Beta Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 16.10.98 Time 14:12:55
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/6
Guard [cpm] 1091

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	8	985847-008	0.567	24.2	1	3.47	10.4	1
2	9	985847-009	0.533	25.0	1	2.20	13.4	1
3	10	985847-009 MS	0.667	22.3	1	15.7	4.70	1
4	11	985847-009 MSD	0.533	25.0	1	16.6	4.54	1
5	12	985847-010	0.567	24.2	1	2.76	11.9	1
6	13	E	0.067	70.1	1	1.94	13.3	1
7	14	E	0.133	50.4	1	1.60	14.9	1
8	15	E	0.033	100.0	1	1.75	13.8	1
9	16	E	0.100	58.0	1	4.46	8.70	1
10	17	985847-011	0.733	21.3	1	2.40	12.8	1

Sample Results

Measurement Date 16.10.98 Time 14:43:00
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 2/6
Guard [cpm] 1093

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	8	985847-008	0.467	26.8	1	2.52	12.3	1
2	9	985847-009	0.533	25.0	1	1.47	17.0	1
3	10	985847-009 MS	0.200	41.0	1	15.6	4.65	1
4	11	985847-009 MSD	0.200	41.0	1	15.5	4.66	1
5	12	985847-010	0.533	25.0	1	2.81	11.7	1
6	13	E	0.033	100.0	1	2.15	12.5	1
7	14	E	0.033	100.0	1	1.28	16.3	1
8	15	E	0.067	70.1	1	1.44	15.4	1
9	16	E	0.133	50.4	1	3.94	9.28	1
10	17	985847-011	0.700	21.9	1	2.41	12.7	1

Sample Results

Measurement Date 16.10.98 Time 15:13:05
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 3/6
Guard [cpm] 1086

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	8	985847-008	0.233	37.8	1	2.98	10.9	1
2	9	985847-009	0.367	30.2	1	1.95	13.9	1
3	10	985847-009 MS	0.567	24.2	1	14.0	4.96	1
4	11	985847-009 MSD	0.333	31.5	1	16.2	4.57	1
5	12	985847-010	0.267	35.2	1	2.12	13.2	1
6	13	E	0.200	41.0	1	2.05	13.1	1
7	14	E	0.033	100.0	1	1.45	15.3	1
8	15	E	0.067	70.1	1	1.14	17.3	1
9	16	E	0.200	41.0	1	4.02	9.23	1
10	17	985847-011	0.400	28.8	1	1.97	13.7	1

Sample Results

Measurement Date 16.10.98 Time 15:43:10
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 4/6
Guard [cpm] 1090

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	8	985847-008	0.267	35.2	1	2.16	13.0	1
2	9	985847-009	0.433	27.7	1	1.55	16.1	1
3	10	985847-009 MS	0.267	35.2	1	14.9	4.76	1
4	11	985847-009 MSD	0.400	28.8	1	15.8	4.64	1
5	12	985847-010	0.200	41.0	1	2.16	12.9	1
6	13	E	0.100	58.0	1	1.69	14.3	1
7	14	E	0.067	70.1	1	1.23	16.8	1
8	15	E	0.100	58.0	1	1.83	13.7	1
9	16	E	0.100	58.0	1	4.16	9.02	1
10	17	985847-011	0.133	50.4	1	1.81	13.9	1

Sample Results

Measurement Date 16.10.98 Time 16:13:14
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 5/6
Guard [cpm] 1085

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	8	985847-008	0.267	35.2	1	1.76	14.6	1
2	9	985847-009	0.367	30.2	1	1.88	14.2	1
3	10	985847-009 MS	0.333	31.5	1	14.5	4.84	1
4	11	985847-009 MSD	0.500	25.8	1	15.9	4.63	1
5	12	985847-010	0.167	44.9	1	2.11	13.0	1
6	13	E	0.200	41.0	1	1.68	14.5	1
7	14	E	0.000	0.000	1	1.83	13.5	1
8	15	E	0.000	0.000	1	1.03	18.0	1
9	16	E	0.067	70.1	1	3.47	9.85	1
10	17	985847-011	0.167	44.9	1	1.57	15.0	1

Sample Results

Measurement Date 16.10.98 Time 16:43:19
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 6/6
Guard [cpm] 1083

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	8	985847-008	0.367	30.2	1	1.91	14.2	1
2	9	985847-009	0.100	58.0	1	1.42	15.7	1
3	10	985847-009 MS	0.133	50.4	1	16.0	4.59	1
4	11	985847-009 MSD	0.233	37.8	1	15.9	4.61	1
5	12	985847-010	0.333	31.5	1	1.85	14.4	1
6	13	E	0.033	100.0	1	1.79	13.7	1
7	14	E	0.000	0.000	1	1.70	14.0	1
8	15	E	0.033	100.0	1	1.25	16.4	1
9	16	E	0.033	100.0	1	3.59	9.68	1
10	17	985847-011	0.167	44.9	1	2.03	13.1	1

Average of 6 cycles

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA CPM	BETA %Error	BETA Cat	BETA Num
1	8	985847-008	0.361	12.4	1	6	2.47	5.02	1	6
2	9	985847-009	0.389	12.0	1	6	1.75	6.09	1	6
3	10	985847-009 MS	0.361	12.4	1	6	15.1	1.94	1	6
4	11	985847-009 MSD	0.367	12.3	1	6	16.0	1.88	1	6
5	12	985847-010	0.344	12.7	1	6	2.30	5.21	1	6
6	13	E	0.106	23.0	1	6	1.88	5.52	1	6
7	14	E	0.044	35.4	1	6	1.52	6.12	1	6
8	15	E	0.050	33.3	1	6	1.41	6.34	1	6
9	16	E	0.106	23.0	1	6	3.94	3.78	1	6
10	17	985847-011	0.383	12.0	1	6	2.03	5.50	1	6

S A M P L E M E A S U R E M E N T

Comment: SR89/90 SAMPLES
LB770 Number 3 User File: SR90/YT90 Sample Data File: SR584731
Sample Set: SR584731 Mode: Alpha/Beta
HV-Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BG Beta [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Eff. Alpha	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Eff. Beta	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Spillover	1.04	0.847	0.839	0.883	0.808	1.02	1.33	0.854	0.649	1.12
T(1/2) Alpha [days]	--	--	--	--	--	--	--	--	--	--
T(1/2) Beta [days]	--	--	--	--	--	--	--	--	--	--
Manuf. Alpha Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Manuf. Beta Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 16.10.98 Time 14:13:09
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/6
Guard [cpm] 1072

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	12	985847-012	0.667	22.3	1	4.01	10.6	1
2	13	985847-013	0.500	25.8	1	3.28	11.2	1
3	14	MB1SR1014 BLK	0.533	25.0	1	2.72	12.7	1
4	15	MB2SR1014 MB	0.600	23.5	1	2.04	15.6	1
5	16	ST1SR1014 EFF	0.533	25.0	1	17.6	4.45	1
6	17	E	0.200	41.0	1	28.9	3.42	2
7	18	LC1SR1014 LCS	0.833	20.0	1	19.0	4.46	1
8	19	LC2SR1014 LCS	0.733	21.3	1	17.5	4.50	1
9	20	ST2SR1014 EFF	0.533	25.0	1	15.9	4.65	1
10	21	E	0.100	58.0	1	1.32	17.3	1

Sample Results

Measurement Date 16.10.98 Time 14:43:20
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 2/6
Guard [cpm] 1074

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	12	985847-012	0.533	25.0	1	3.51	11.2	1
2	13	985847-013	0.467	26.8	1	2.01	15.1	1
3	14	MB1SR1014 BLK	0.500	25.8	1	2.08	14.8	1
4	15	MB2SR1014 MB	0.633	22.9	1	2.41	14.1	1
5	16	ST1SR1014 EFF	0.433	27.7	1	19.3	4.23	1
6	17	E	0.133	50.4	1	28.2	3.45	2
7	18	LC1SR1014 LCS	0.433	27.7	1	17.9	4.47	1
8	19	LC2SR1014 LCS	0.633	22.9	1	16.9	4.57	1
9	20	ST2SR1014 EFF	0.400	28.8	1	17.4	4.43	1
10	21	E	0.033	100.0	1	1.83	13.8	1

Detectors with Trend:3a

Sample Results

Measurement Date 16.10.98 Time 15:13:25
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 3/6
Guard [cpm] 1083

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	12	985847-012	0.300	33.3	1	3.25	10.6	1
2	13	985847-013	0.267	35.2	1	2.27	13.2	1
3	14	MB1SR1014 BLK	0.333	31.5	1	1.39	18.2	1
4	15	MB2SR1014 MB	0.500	25.8	1	1.09	23.2	1
5	16	ST1SR1014 EFF	0.400	28.8	1	17.3	4.46	1
6	17	E	0.200	41.0	1	27.9	3.48	2
7	18	LC1SR1014 LCS	0.467	26.8	1	17.3	4.57	1
8	19	LC2SR1014 LCS	0.467	26.8	1	16.4	4.61	1
9	20	ST2SR1014 EFF	0.200	41.0	1	15.9	4.61	1
10	21	E	0.100	58.0	1	1.06	17.7	1

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
5	1	1.4	4.7	0.3	-1.0	0.1	0.3	-0.5	0.9	-0.8	-0.8
10b	1	-0.5	-0.1	4.4	-1.0	-0.5	-0.6	-1.0	0.8	0.4	2.6

Sample Results

Measurement Date 16.10.98 Time 15:43:29
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 4/6
Guard [cpm] 1073

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	12	985847-012	0.267	35.2	1	2.86	11.8	1
2	13	985847-013	0.367	30.2	1	1.96	14.8	1
3	14	MB1SR1014 BLK	0.333	31.5	1	1.24	17.1	1
4	15	MB2SR1014 MB	0.100	58.0	1	1.25	17.4	1
5	16	ST1SR1014 EFF	0.300	33.3	1	16.6	4.54	1
6	17	E	0.233	37.8	1	28.8	3.43	2
7	18	LC1SR1014 LCS	0.300	33.3	1	19.3	4.26	1
8	19	LC2SR1014 LCS	0.167	44.9	1	16.5	4.53	1
9	20	ST2SR1014 EFF	0.167	44.9	1	15.3	4.69	1
10	21	E	0.100	58.0	1	1.42	16.5	1

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
b	1	-0.3	-0.2	0.5	0.1	1.7	-1.0	-0.5	4.9	1.4	-1.7

Sample Results

Measurement Date 16.10.98 Time 16:13:34
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 5/6
Guard [cpm] 1066

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	12	985847-012	0.433	27.7	1	3.18	11.6	1
2	13	985847-013	0.267	35.2	1	2.97	11.3	1
3	14	MB1SR1014 BLK	0.333	31.5	1	1.75	15.7	1
4	15	MB2SR1014 MB	0.333	31.5	1	1.41	18.2	1
5	16	ST1SR1014 EFF	0.400	28.8	1	18.1	4.36	1
6	17	E	0.067	70.1	1	27.8	3.47	2
7	18	LC1SR1014 LCS	0.300	33.3	1	17.7	4.45	1
8	19	LC2SR1014 LCS	0.500	25.8	1	17.3	4.49	1
9	20	ST2SR1014 EFF	0.367	30.2	1	15.0	4.77	1
10	21	E	0.100	58.0	1	2.32	12.6	1

Detectors with Trend:10a

Sample Results

Measurement Date 16.10.98 Time 16:43:39
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 6/6
Guard [cpm] 1075

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	12	985847-012	0.333	31.5	1	2.45	13.2	1
2	13	985847-013	0.233	37.8	1	2.04	13.9	1
3	14	MB1SR1014 BLK	0.167	44.9	1	1.23	18.1	1
4	15	MB2SR1014 MB	0.267	35.2	1	1.10	20.7	1
5	16	ST1SR1014 EFF	0.400	28.8	1	16.2	4.61	1
6	17	E	0.067	70.1	1	27.6	3.49	2
7	18	LC1SR1014 LCS	0.233	37.8	1	17.7	4.43	1
8	19	LC2SR1014 LCS	0.400	28.8	1	16.7	4.55	1
9	20	ST2SR1014 EFF	0.100	58.0	1	14.7	4.79	1
10	21	E	0.067	70.1	1	1.56	15.3	1

Average of 6 cycles

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA CPM	BETA %Error	BETA Cat	BETA Num
1	12	985847-012	0.422	11.5	1	6	3.21	4.68	1	6
2	13	985847-013	0.350	12.6	1	6	2.42	5.31	1	6
3	14	MB1SR1014 BLK	0.367	12.3	1	6	1.73	6.42	1	6
4	15	MB2SR1014 MB	0.406	11.7	1	6	1.55	7.18	1	6
5	16	ST1SR1014 EFF	0.411	11.6	1	6	17.5	1.81	1	6
6	17	E	0.150	19.3	1	6	28.2	1.41	2	6
7	18	LC1SR1014 LCS	0.428	11.4	1	6	18.2	1.81	1	6
8	19	LC2SR1014 LCS	0.483	10.7	1	6	16.9	1.85	1	6
9	20	ST2SR1014 EFF	0.295	13.7	1	6	15.7	1.90	1	6
10	21	E	0.083	25.9	1	6	1.59	6.21	1	6

16.10.98 Berthold LB770 Control System: LB770 1 Page: 1
7:22 S A M P L E M E A S U R E M E N T

Comment: BACKGROUND AND CALIBRATIONS UPDATE DAILY
770 Number 1 User File: CALIBRARTIONS Sample Data File: C1101698
Sample Set: CALIBRATION UPDATE Mode: Alpha/Beta
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.067	0.167	0.100	0.200	0.133	0.133	0.200	0.033	0.133	0.133
BG Beta [cpm]	1.53	1.37	1.37	1.27	1.63	2.00	1.90	1.00	1.47	1.83
Eff. Alpha	0.284	0.289	0.289	0.278	0.278	0.291	0.281	0.247	0.283	0.272
Eff. Beta	0.377	0.320	0.362	0.340	0.370	0.370	0.393	0.371	0.370	0.356
Spillover	0.475	0.410	0.466	0.471	0.519	0.490	0.583	0.648	0.516	0.474
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
T(1/2) Beta [days]	19569	10560	10560	10560	10560	10560	10560	10560	10560	10560
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 16.10.98 Time 7:22:37
Measuring Time [min:sec] Elapsed 0000:02 Preset 0000:01 Cycle 1/1
Guard [cpm] 1020

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	4301	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
2	4302	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
3	4303	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
4	4304	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
5	4305	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
6	4306	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
7	4307	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
8	4308	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
9	4309	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
10	4310	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1

Date Next Calibration Due Oct 19, 1998 (Date) Initials

16.10.98 Berthold LB770 Control System: LB770 2 Page: 1
7:22 S A M P L E M E A S U R E M E N T

Comment: BACKGROUND AND CALIBRATIONS UPDATE DAILY
'70 Number 2 User File: CALIBRARTIONS Sample Data File: C2101698
Sa le Set: CALIBRATION UPDATE Mode: Alpha/Beta
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.233	0.167	0.033	0.033	0.100	0.133	0.133	0.067	0.100	0.100
BG Beta [cpm]	1.70	1.37	1.50	1.43	2.20	2.80	1.67	1.93	2.23	1.67
Eff. Alpha	0.278	0.280	0.282	0.273	0.279	0.283	0.273	0.241	0.267	0.261
Eff. Beta	0.368	0.305	0.342	0.333	0.361	0.364	0.390	0.371	0.379	0.371
Spillover	0.526	0.496	0.574	0.511	0.543	0.413	0.496	0.363	0.411	0.407
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
T(1/2) Beta [days]	19569	10560	10560	10560	10560	10560	10560	10560	10560	10560
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 16.10.98 Time 7:22:48
Measuring Time [min:sec] Elapsed 0000:02 Preset 0000:01 Cycle 1/1
Guard [cpm] 870.0

			ALPHA			BETA		
Det#	Spl#	Spl. Name	CPM	%Error	Cat	CPM	%Error	Cat
1	4301	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
2	4302	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
3	4303	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
4	4304	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
5	4305	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
6	4306	DAILY UPDATE	0.000	0.000	1	178.4	74.1	3
7	4307	DAILY UPDATE	0.000	0.000	1	82.6	> 100	2
8	4308	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
9	4309	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
10	4310	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1

Date Next Calibration Due Oct 19, 1998
Date

MRG
Initials

16.10.98 Berthold LB770 Control System: LB770 3 Page: 1
7:23 S A M P L E M E A S U R E M E N T

Comment: BACKGROUND AND CALIBRATIONS UPDATE DAILY
'70 Number 3 User File: CALIBRARTIONS Sample Data File: C3101698
Sa le Set: CALIBRATION UPDATE Mode: Alpha/Beta
HV-Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.100	0.067	0.133	0.167	0.067	0.133	0.133	0.033	0.133	0.033
BG Beta [cpm]	1.77	1.80	1.37	1.63	1.57	3.70	1.37	1.17	1.60	1.33
Eff. Alpha	0.280	0.293	0.300	0.291	0.292	0.289	0.275	0.247	0.292	0.282
Eff. Beta	0.356	0.315	0.357	0.340	0.362	0.092	0.376	0.364	0.357	0.347
Spillover	1.04	0.847	0.839	0.883	0.808	1.02	1.33	0.854	0.649	1.12
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
T(1/2) Beta [days]	19569	10560	10560	10560	10560	10560	10560	10560	10560	10560
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 16.10.98 Time 7:24:22
Measuring Time [min:sec] Elapsed 0000:02 Preset 0000:01 Cycle 1/1
Guard [cpm] 1020

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	4291	DAILY UPDATE	0.000	0.000	1	85.2	> 100	2
2	4292	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
3	4293	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
4	4294	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
5	4295	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
6	4296	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
7	4297	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
8	4298	DAILY UPDATE	0.000	0.000	1	90.0	> 100	2
9	4299	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
10	4300	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1

Date Next Calibration Due Oct 19, 1998
Date

Initials

16.10.98 Berthold LB770 Control System: LB770 4 Page: 1
7:24 S A M P L E M E A S U R E M E N T

Comment: BACKGROUND AND CALIBRATIONS UPDATE DAILY
70 Number 4 User File: CALIBRARTIONS Sample Data File: C4101698
Sample Set: CALIBRATION UPDATE Mode: Alpha/Beta
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.067	0.100	0.033	0.100	0.133	0.067	0.067	0.000	0.033	0.067
BG Beta [cpm]	1.87	1.63	1.30	1.20	1.90	1.57	1.20	1.97	1.37	1.53
Eff. Alpha	0.285	0.292	0.284	0.278	0.279	0.290	0.279	0.250	0.287	0.237
Eff. Beta	0.362	0.304	0.346	0.325	0.359	0.352	0.378	0.356	0.358	0.370
Spillover	0.683	0.669	0.751	0.691	0.586	0.824	0.981	0.939	0.840	1.01
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
T(1/2) Beta [days]	19569	10560	10560	10560	10560	10560	10560	10560	10560	10560
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 16.10.98 Time 7:24:34
Measuring Time [min:sec] Elapsed 0000:02 Preset 0000:01 Cycle 1/1
Guard [cpm] 1050

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	4301	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
2	4302	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
3	4303	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
4	4304	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
5	4305	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
6	4306	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
7	4307	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
8	4308	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
9	4309	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
10	4310	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1

Date Next Calibration Due Oct 19, 1998
Date

Initials

S A M P L E M E A S U R E M E N T

Comment: SR89/90 SAMPLES 2 ND COUNT
LB770 Number 1 User File: SR90/YT90 Sample Data File: SR584712
Sample Set: SR584712 Mode: Alpha/Beta
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BG Beta [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Eff. Alpha	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Eff. Beta	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Spillover	0.314	0.309	0.342	0.314	0.333	0.337	0.341	0.341	0.352	0.321
T(1/2) Alpha [days]	--	--	--	--	--	--	--	--	--	--
T(1/2) Beta [days]	--	--	--	--	--	--	--	--	--	--
Manuf. Alpha Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Manuf. Beta Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 26.10.98 Time 7:13:28
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/6
Guard [cpm] 1067

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	11	985847-001	0.200	41.0	1	1.54	15.1	1
2	12	985847-001 MS	0.400	28.8	1	14.9	4.76	1
3	13	985847-001 MSD	0.233	37.8	1	15.5	4.65	1
4	14	985847-002	0.267	35.2	1	1.48	15.5	1
5	15	985847-003	0.233	37.8	1	1.96	13.4	1
6	16	985847-004	0.300	33.3	1	1.93	13.6	1
7	17	985847-005	0.267	35.2	1	1.88	13.8	1
8	18	985847-006	0.233	37.8	1	1.32	16.5	1
9	19	985847-006 MD	0.300	33.3	1	1.46	15.8	1
10	20	985847-007	0.233	37.8	1	1.89	13.6	1

Sample Results

Measurement Date 26.10.98 Time 7:43:34
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 2/6
Guard [cpm] 1078

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	11	985847-001	0.333	31.5	1	2.00	13.4	1
2	12	985847-001 MS	0.400	28.8	1	13.4	5.02	1
3	13	985847-001 MSD	0.400	28.8	1	14.1	4.90	1
4	14	985847-002	0.333	31.5	1	1.10	18.5	1
5	15	985847-003	0.200	41.0	1	1.90	13.5	1
6	16	985847-004	0.267	35.2	1	2.14	12.8	1
7	17	985847-005	0.333	31.5	1	1.92	13.7	1
8	18	985847-006	0.233	37.8	1	1.72	14.4	1
9	19	985847-006 MD	0.467	26.8	1	1.87	14.1	1
10	20	985847-007	0.400	28.8	1	1.77	14.3	1

Sample Results

Measurement Date 26.10.98 Time 8:13:39
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 3/6
Guard [cpm] 1072

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	11	985847-001	0.200	41.0	1	1.27	16.7	1
2	12	985847-001 MS	0.133	50.4	1	14.5	4.80	1
3	13	985847-001 MSD	0.200	41.0	1	15.6	4.63	1
4	14	985847-002	0.233	37.8	1	1.46	15.6	1
5	15	985847-003	0.200	41.0	1	2.30	12.3	1
6	16	985847-004	0.467	26.8	1	1.68	15.0	1
7	17	985847-005	0.100	58.0	1	1.40	15.7	1
8	18	985847-006	0.400	28.8	1	1.80	14.3	1
9	19	985847-006 MD	0.267	35.2	1	1.24	17.2	1
10	20	985847-007	0.367	30.2	1	1.72	14.6	1

Sample Results

Measurement Date 26.10.98 Time 8:43:44
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 4/6
Guard [cpm] 1065

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	11	985847-001	0.367	30.2	1	1.22	17.6	1
2	12	985847-001 MS	0.100	58.0	1	14.2	4.86	1
3	13	985847-001 MSD	0.200	41.0	1	15.7	4.62	1
4	14	985847-002	0.233	37.8	1	1.36	16.2	1
5	15	985847-003	0.133	50.4	1	1.86	13.6	1
6	16	985847-004	0.400	28.8	1	1.63	15.1	1
7	17	985847-005	0.433	27.7	1	1.72	14.7	1
8	18	985847-006	0.533	25.0	1	1.45	16.4	1
9	19	985847-006 MD	0.400	28.8	1	1.46	16.0	1
10	20	985847-007	0.200	41.0	1	1.50	15.3	1

Sample Results

Measurement Date 26.10.98 Time 9:13:48
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 5/6
Guard [cpm] 1063

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	11	985847-001	0.200	41.0	1	1.17	17.4	1
2	12	985847-001 MS	0.200	41.0	1	14.2	4.86	1
3	13	985847-001 MSD	0.300	33.3	1	14.0	4.91	1
4	14	985847-002	0.267	35.2	1	1.05	18.8	1
5	15	985847-003	0.267	35.2	1	1.64	14.7	1
6	16	985847-004	0.333	31.5	1	1.82	14.1	1
7	17	985847-005	0.233	37.8	1	0.887	20.5	1
8	18	985847-006	0.267	35.2	1	1.08	18.6	1
9	19	985847-006 MD	0.567	24.2	1	0.967	21.0	1
10	20	985847-007	0.200	41.0	1	1.44	15.7	1

Sample Results

Measurement Date 26.10.98 Time 9:43:53
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 6/6
Guard [cpm] 1082

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	11	985847-001	0.133	50.4	1	1.89	13.5	1
2	12	985847-001 MS	0.267	35.2	1	13.9	4.91	1
3	13	985847-001 MSD	0.233	37.8	1	13.9	4.92	1
4	14	985847-002	0.367	30.2	1	1.22	17.6	1
5	15	985847-003	0.167	44.9	1	1.74	14.1	1
6	16	985847-004	0.333	31.5	1	1.82	14.1	1
7	17	985847-005	0.167	44.9	1	1.41	15.8	1
8	18	985847-006	0.367	30.2	1	1.11	18.6	1
9	19	985847-006 MD	0.167	44.9	1	1.58	14.9	1
10	20	985847-007	0.100	58.0	1	1.43	15.5	1

Average of 6 cycles

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA CPM	BETA %Error	BETA Cat	BETA Num
1	11	985847-001	0.239	15.3	1	6	1.51	6.25	1	6
2	12	985847-001 MS	0.250	14.9	1	6	14.2	1.99	1	6
3	13	985847-001 MSD	0.261	14.6	1	6	14.8	1.95	1	6
4	14	985847-002	0.283	14.0	1	6	1.28	6.89	1	6
5	15	985847-003	0.200	16.7	1	6	1.90	5.53	1	6
6	16	985847-004	0.350	12.6	1	6	1.84	5.73	1	6
7	17	985847-005	0.255	14.7	1	6	1.54	6.24	1	6
8	18	985847-006	0.339	12.8	1	6	1.41	6.61	1	6
9	19	985847-006 MD	0.361	12.4	1	6	1.43	6.60	1	6
10	20	985847-007	0.250	14.9	1	6	1.63	6.03	1	6

S A M P L E M E A S U R E M E N T

Comment: SR89/90 SAMPLES 2 ND COUNT
LB770 Number 2 User File: SR90/YT90 Sample Data File: SR584722
Sample Set: SR580222 Mode: Alpha/Beta
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BG Beta [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Eff. Alpha	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Eff. Beta	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Spillover	0.338	0.314	0.307	0.311	0.322	0.340	0.329	0.329	0.391	0.389
T(1/2) Alpha [days]	--	--	--	--	--	--	--	--	--	--
T(1/2) Beta [days]	--	--	--	--	--	--	--	--	--	--
Manuf. Alpha Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Manuf. Beta Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 26.10.98 Time 7:13:23
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/6
Guard [cpm] 1065

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	8	985847-008	0.233	37.8	1	1.89	13.7	1
2	9	985847-009	0.200	41.0	1	1.70	14.3	1
3	10	985847-009 MS	0.267	35.2	1	28.0	3.45	2
4	11	985847-009 MSD	0.433	27.7	1	29.3	3.38	2
5	12	985847-010	0.300	33.3	1	1.70	14.5	1
6	13	985847-011	0.267	35.2	1	3.54	9.85	1
7	14	E	0.167	44.9	1	1.11	17.9	1
8	15	985847-012	0.633	22.9	1	2.46	12.3	1
9	16	E	0.200	41.0	1	3.26	10.3	1
10	17	985847-013	0.367	30.2	1	2.29	12.6	1

Sample Results

Measurement Date 26.10.98 Time 7:43:29
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 2/6
Guard [cpm] 1070

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	8	985847-008	0.500	25.8	1	2.43	12.3	1
2	9	985847-009	0.367	30.2	1	1.12	18.4	1
3	10	985847-009 MS	0.400	28.8	1	28.0	3.46	2
4	11	985847-009 MSD	0.367	30.2	1	29.9	3.35	2
5	12	985847-010	0.367	30.2	1	1.48	15.8	1
6	13	985847-011	0.133	50.4	1	2.22	12.4	1
7	14	E	0.100	58.0	1	1.23	16.7	1
8	15	985847-012	0.333	31.5	1	1.72	14.5	1
9	16	E	0.200	41.0	1	5.19	8.10	1
10	17	985847-013	0.567	24.2	1	2.05	13.7	1

Sample Results

Measurement Date 26.10.98 Time 8:13:34
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 3/6
Guard [cpm] 1064

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	8	985847-008	0.233	37.8	1	2.22	12.5	1
2	9	985847-009	0.067	70.1	1	1.71	14.1	1
3	10	985847-009 MS	0.467	26.8	1	27.4	3.50	2
4	11	985847-009 MSD	0.300	33.3	1	30.1	3.33	2
5	12	985847-010	0.167	44.9	1	1.25	16.9	1
6	13	985847-011	0.367	30.2	1	2.41	12.2	1
7	14	E	0.133	50.4	1	1.49	15.2	1
8	15	985847-012	0.100	58.0	1	1.60	14.6	1
9	16	E	0.000	0.000	1	4.83	8.30	1
10	17	985847-013	0.367	30.2	1	2.16	13.0	1

Sample Results

Measurement Date 26.10.98 Time 8:43:39
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 4/6
Guard [cpm] 1065

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	8	985847-008	0.333	31.5	1	2.35	12.3	1
2	9	985847-009	0.233	37.8	1	1.79	14.0	1
3	10	985847-009 MS	0.467	26.8	1	29.9	3.35	2
4	11	985847-009 MSD	0.367	30.2	1	32.0	3.24	2
5	12	985847-010	0.300	33.3	1	2.07	13.1	1
6	13	985847-011	0.200	41.0	1	1.90	13.6	1
7	14	E	0.333	31.5	1	1.02	19.2	1
8	15	985847-012	0.200	41.0	1	2.00	13.2	1
9	16	E	0.167	44.9	1	4.30	8.90	1
10	17	985847-013	0.100	58.0	1	2.13	12.7	1

Sample Results

Measurement Date 26.10.98 Time 9:13:43
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 5/6
Guard [cpm] 1075

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	8	985847-008	0.367	30.2	1	2.08	13.2	1
2	9	985847-009	0.567	24.2	1	1.39	16.8	1
3	10	985847-009 MS	0.267	35.2	1	28.5	3.43	2
4	11	985847-009 MSD	0.100	58.0	1	30.3	3.32	2
5	12	985847-010	0.300	33.3	1	1.77	14.2	1
6	13	985847-011	0.133	50.4	1	2.36	12.1	1
7	14	E	0.233	37.8	1	1.29	16.7	1
8	15	985847-012	0.300	33.3	1	1.84	14.0	1
9	16	E	0.133	50.4	1	4.41	8.77	1
10	17	985847-013	0.267	35.2	1	1.80	14.1	1

Sample Results

Measurement Date 26.10.98 Time 9:43:48
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 6/6
Guard [cpm] 1063

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	8	985847-008	0.300	33.3	1	2.27	12.5	1
2	9	985847-009	0.367	30.2	1	1.12	18.4	1
3	10	985847-009 MS	0.267	35.2	1	29.8	3.35	2
4	11	985847-009 MSD	0.333	31.5	1	29.9	3.35	2
5	12	985847-010	0.500	25.8	1	1.61	15.3	1
6	13	985847-011	0.333	31.5	1	1.39	16.3	1
7	14	E	0.233	37.8	1	1.76	14.2	1
8	15	985847-012	0.433	27.7	1	1.62	15.1	1
9	16	E	0.167	44.9	1	4.30	8.90	1
10	17	985847-013	0.133	50.4	1	2.41	11.9	1

Average of 6 cycles

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA CPM	BETA %Error	BETA Cat	BETA Num
1	8	985847-008	0.328	13.0	1	6	2.21	5.18	1	6
2	9	985847-009	0.300	13.6	1	6	1.47	6.40	1	6
3	10	985847-009 MS	0.356	12.5	1	6	28.6	1.40	2	6
4	11	985847-009 MSD	0.317	13.3	1	6	30.3	1.36	2	6
5	12	985847-010	0.322	13.1	1	6	1.65	6.05	1	6
6	13	985847-011	0.239	15.3	1	6	2.30	5.03	1	6
7	14	E	~~0.200~~	~~16.7~~	~~1~~	~~6~~	~~1.32~~	~~6.70~~	~~1~~	~~6~~
8	15	985847-012	0.333	12.9	1	6	1.87	5.66	1	6
9	16	E	~~0.144~~	~~19.7~~	~~1~~	~~6~~	~~4.38~~	~~3.59~~	~~1~~	~~6~~
10	17	985847-013	0.300	13.6	1	6	2.14	5.29	1	6

S A M P L E M E A S U R E M E N T

Comment: SR89/90 SAMPLES
LB770 Number 3 User File: SR90/YT90 Sample Data File: SR584732
Sa le Set: SR584732 Mode: Alpha/Beta
HV-Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BG Beta [cpm]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Eff. Alpha	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Eff. Beta	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Spillover	0.331	0.324	0.359	0.325	0.351	0.906	0.390	0.346	0.326	0.323
T(1/2) Alpha [days]	--	--	--	--	--	--	--	--	--	--
T(1/2) Beta [days]	--	--	--	--	--	--	--	--	--	--
Manuf. Alpha Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Manuf. Beta Date	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--	--/--/--
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 26.10.98 Time 7:14:50
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/6
Guard [cpm] 1046

			ALPHA			BETA		
Det#	Spl#	Spl. Name	CPM	%Error	Cat	CPM	%Error	Cat
1	1	MB1SR1014 BLK	0.300	33.3	1	2.63	11.5	1
2	2	MB2SR1014 MB	0.433	27.7	1	1.99	13.5	1
3	3	ST1SR1014 EFF	0.467	26.8	1	15.1	4.73	1
4	4	LC1SR1014 LCS	0.167	44.9	1	15.9	4.59	1
5	5	ST2SR1014 EFF	0.400	28.8	1	27.5	3.50	2
6	6	E	0.200	41.0	1	15.1	4.76	1
7	7	E	0.133	50.4	1	1.95	13.3	1
8	8	LC2SR1014 LCS	0.333	31.5	1	28.5	3.43	2
9	9	E	0.200	41.0	1	0.868	20.5	1
10	10	E	0.167	44.9	1	1.65	14.5	1

Sample Results

Measurement Date 26.10.98 Time 7:44:54
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 2/6
Guard [cpm] 1060

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	MB1SR1014 BLK	0.300	33.3	1	3.07	10.7	1
2	2	MB2SR1014 MB	0.267	35.2	1	1.98	13.3	1
3	3	ST1SR1014 EFF	0.433	27.7	1	15.0	4.74	1
4	4	LC1SR1014 LCS	0.233	37.8	1	15.5	4.66	1
5	5	ST2SR1014 EFF	0.467	26.8	1	27.4	3.50	2
6	6	E	0.267	35.2	1	15.7	4.68	1
7	7	E	0.267	35.2	1	2.03	13.3	1
8	8	LC2SR1014 LCS	0.300	33.3	1	27.8	3.47	2
9	9	E	0.167	44.9	1	1.21	17.1	1
10	10	E	0.200	41.0	1	1.17	17.5	1

Detectors with Trend:3b

Sample Results

Measurement Date 26.10.98 Time 8:14:59
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 3/6
Guard [cpm] 1049

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	MB1SR1014 BLK	0.233	37.8	1	2.86	11.0	1
2	2	MB2SR1014 MB	0.433	27.7	1	1.83	14.2	1
3	3	ST1SR1014 EFF	0.300	33.3	1	13.4	5.02	1
4	4	LC1SR1014 LCS	0.233	37.8	1	15.7	4.63	1
5	5	ST2SR1014 EFF	0.400	28.8	1	27.4	3.50	2
6	6	E	0.100	58.0	1	15.3	4.69	1
7	7	E	0.200	41.0	1	1.96	13.4	1
8	8	LC2SR1014 LCS	0.400	28.8	1	30.5	3.31	2
9	9	E	0.100	58.0	1	1.37	15.9	1
10	10	E	0.100	58.0	1	1.80	13.8	1

Sample Results

Measurement Date 26.10.98 Time 8:45:03
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 4/6
Guard [cpm] 1040

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	MB1SR1014 BLK	0.300	33.3	1	2.63	11.5	1
2	2	MB2SR1014 MB	0.200	41.0	1	1.70	14.3	1
3	3	ST1SR1014 EFF	0.367	30.2	1	13.9	4.93	1
4	4	LC1SR1014 LCS	0.200	41.0	1	14.7	4.78	1
5	5	ST2SR1014 EFF	0.200	41.0	1	26.7	3.54	2
6	6	E	0.067	70.1	1	16.3	4.53	1
7	7	E	0.133	50.4	1	2.28	12.3	1
8	8	LC2SR1014 LCS	0.433	27.7	1	29.5	3.38	2
9	9	E	0.167	44.9	1	1.18	17.3	1
10	10	E	0.167	44.9	1	1.45	15.6	1

Sample Results

Measurement Date 26.10.98 Time 9:15:08
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 5/6
Guard [cpm] 1051

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	MB1SR1014 BLK	0.500	25.8	1	2.63	11.7	1
2	2	MB2SR1014 MB	0.233	37.8	1	1.62	14.8	1
3	3	ST1SR1014 EFF	0.167	44.9	1	14.0	4.89	1
4	4	LC1SR1014 LCS	0.333	31.5	1	15.0	4.75	1
5	5	ST2SR1014 EFF	0.200	41.0	1	29.5	3.37	2
6	6	E	0.233	37.8	1	14.3	4.90	1
7	7	E	0.233	37.8	1	2.11	12.9	1
8	8	LC2SR1014 LCS	0.200	41.0	1	25.0	3.66	2
9	9	E	0.200	41.0	1	0.901	20.1	1
10	10	E	0.100	58.0	1	1.33	16.0	1

Sample Results

Measurement Date 26.10.98 Time 9:45:13
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 6/6
Guard [cpm] 1060

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	1	MB1SR1014 BLK	0.500	25.8	1	2.50	12.0	1
2	2	MB2SR1014 MB	0.167	44.9	1	1.51	15.2	1
3	3	ST1SR1014 EFF	0.167	44.9	1	14.7	4.77	1
4	4	LC1SR1014 LCS	0.367	30.2	1	15.0	4.74	1
5	5	ST2SR1014 EFF	0.267	35.2	1	28.2	3.44	2
6	6	E	0.200	41.0	1	16.7	4.51	1
7	7	E	0.133	50.4	1	1.68	14.4	1
8	8	LC2SR1014 LCS	0.667	22.3	1	31.0	3.29	2
9	9	E	0.267	35.2	1	0.946	19.9	1
10	10	E	0.033	100.0	1	1.06	17.9	1

Average of 6 cycles

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	ALPHA Num	BETA CPM	BETA %Error	BETA Cat	BETA Num
1	1	MB1SR1014 BLK	0.356	12.5	1	6	2.72	4.65	1	6
2	2	MB2SR1014 MB	0.289	13.9	1	6	1.77	5.79	1	6
3	3	ST1SR1014 EFF	0.317	13.3	1	6	14.4	1.98	1	6
4	4	LC1SR1014 LCS	0.256	14.8	1	6	15.3	1.91	1	6
5	5	ST2SR1014 EFF	0.322	13.1	1	6	27.8	1.42	2	6
6	6	E	0.178	17.7	1	6	~~15.6~~	1.91	1	6
7	7	E	0.183	17.4	1	6	~~2.00~~	5.40	1	6
8	8	LC2SR1014 LCS	0.389	11.9	1	6	28.7	1.40	2	6
9	9	E	0.183	17.4	1	6	1.08	7.43	1	6
10	10	E	0.128	20.9	1	6	1.41	6.40	1	6

Comment: BACKGROUND AND CALIBRATIONS UPDATE DAILY
LB770 Number 1 User File: CALIBRARTIONS Sample Data File: C1102698
Sample Set: CALIBRATION UPDATE Mode: Alpha/Beta
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.067	0.133	0.167	0.033	0.033	0.100	0.100	0.200	0.100	0.133
BG Beta [cpm]	1.23	1.13	1.10	1.13	2.37	1.67	1.20	1.30	1.27	1.13
Eff. Alpha	0.285	0.290	0.282	0.273	0.277	0.293	0.276	0.247	0.278	0.273
Eff. Beta	0.376	0.318	0.360	0.340	0.370	0.370	0.396	0.367	0.367	0.358
Spillover	0.314	0.309	0.342	0.314	0.333	0.337	0.341	0.341	0.352	0.321
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
T(1/2) Beta [days]	19569	10560	10560	10560	10560	10560	10560	10560	10560	10560
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 26.10.98 Time 6:58:06
Measuring Time [min:sec] Elapsed 0000:02 Preset 0000:01 Cycle 1/1
Guard [cpm] 780.0

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	4361	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
2	4362	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
3	4363	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
4	4364	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
5	4365	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
6	4366	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
7	4367	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
8	4368	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
9	4369	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
10	4370	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1

S A M P L E M E A S U R E M E N T

Comment: BACKGROUND AND CALIBRATIONS UPDATE DAILY
LB770 Number 2 User File: CALIBRARTIONS Sample Data File: C2102698
Sa le Set: CALIBRATION UPDATE Mode: Alpha/Beta
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.300	0.200	0.233	0.100	0.133	0.033	0.200	0.067	0.100	0.200
BG Beta [cpm]	2.17	1.33	1.07	0.933	1.63	1.97	1.57	1.70	1.17	1.77
Eff. Alpha	0.279	0.281	0.281	0.275	0.277	0.287	0.276	0.245	0.273	0.267
Eff. Beta	0.369	0.306	0.342	0.334	0.363	0.371	0.389	0.375	0.383	0.374
Spillover	0.338	0.314	0.307	0.311	0.322	0.340	0.329	0.329	0.391	0.389
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
T(1/2) Beta [days]	19569	10560	10560	10560	10560	10560	10560	10560	10560	10560
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 26.10.98 Time 6:58:21
Measuring Time [min:sec] Elapsed 0000:02 Preset 0000:01 Cycle 1/1
Guard [cpm] 1200

Det#	Spl#	Spl. Name	ALPHA CPM	ALPHA %Error	ALPHA Cat	BETA CPM	BETA %Error	BETA Cat
1	4361	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
2	4362	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
3	4363	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
4	4364	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
5	4365	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
6	4366	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
7	4367	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
8	4368	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
9	4369	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
10	4370	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1

S A M P L E M E A S U R E M E N T

Comment: BACKGROUND AND CALIBRATIONS UPDATE DAILY
LB770 Number 3 User File: CALIBRARTIONS Sample Data File: C3102698
Sample Set: CALIBRATION UPDATE Mode: Alpha/Beta
HV-Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [CPM]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	20.0	0.000	20.0
2	20.0	100.0	20.0	100.0
3	100.0		100.0	

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.233	0.067	0.133	0.167	0.033	0.100	0.333	0.067	0.067	0.100
BG Beta [cpm]	2.20	1.27	1.17	1.07	1.67	4.10	1.67	1.10	0.833	1.20
Eff. Alpha	0.287	0.295	0.293	0.292	0.285	0.295	0.278	0.253	0.287	0.285
Eff. Beta	0.361	0.315	0.353	0.343	0.357	0.090	0.375	0.358	0.357	0.346
Spillover	0.331	0.324	0.359	0.325	0.351	0.906	0.390	0.346	0.326	0.323
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
T(1/2) Beta [days]	19569	10560	10560	10560	10560	10560	10560	10560	10560	10560
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
Time	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Normalization	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

Sample Results

Measurement Date 26.10.98 Time 6:58:32
Measuring Time [min:sec] Elapsed 0000:02 Preset 0000:01 Cycle 1/1
Guard [cpm] 870.0

			ALPHA			BETA		
Det#	Spl#	Spl. Name	CPM	%Error	Cat	CPM	%Error	Cat
1	4351	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
2	4352	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
3	4353	DAILY UPDATE	0.000	0.000	1	93.0	> 100	2
4	4354	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
5	4355	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
6	4356	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
7	4357	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
8	4358	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
9	4359	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1
10	4360	DAILY UPDATE	0.000	0.000	1	0.000	0.000	1

26-Oct-98

Sr89

Reviewed by Natalie K. Finch

Date Oct 26, 1998

FILE NAME:
SR-OCT98.wk1

Job Number	Sample Number	LB-770 Detector Number	Volume liter/ grams	Batch Eff	Sample Count Time min	Sample cpm	Method Blank cpm	Sample Detector Bkg cpm	Method Blank Detector Bkg cpm	Sample Detector Eff	Method Blank Detector Eff	Corrected Sample cpm	Activity pCi/l pCi/g	Error pCi/l pCi/g	LLD pCi/l pCi/g
example:															
984000	1	2-1	0.05	0.1790	120	5.810	0.258	0.133	0.167	0.279	0.262	5.58	280.8	21.8	10.9
1ST COUNT													ND		
985847	1	1-1	0.50	0.2973	180	1.810	1.730	1.530	1.370	0.377	0.357	-0.1002	-0.3	0.6	1.4
SR89	1 MS	1-2	0.50	0.2973	180	15.800	1.730	1.370	1.370	0.320	0.357	14.1073	42.7	1.8	1.4
SR89	1 MSD	1-3	0.50	0.2973	180	16.800	1.730	1.370	1.370	0.362	0.357	15.0650	45.7	1.8	1.4
	2	1-4	0.50	0.2973	180	1.580	1.730	1.270	1.370	0.340	0.357	-0.0329	-0.1	0.6	1.4
	3	1-5	0.50	0.2973	180	2.390	1.730	1.630	1.370	0.370	0.357	0.3869	1.2	0.6	1.4
	4	1-6	0.50	0.2973	180	2.130	1.730	2.000	1.370	0.370	0.357	-0.2431	-0.7	0.5	1.4
	5	1-7	0.50	0.2973	180	1.800	1.730	1.900	1.370	0.393	0.357	-0.4963	-1.5	0.5	1.4
	6	1-8	0.50	0.2973	180	1.710	1.730	1.000	1.370	0.371	0.357	0.3359	1.0	0.6	1.4
	6 MD	1-9	0.50	0.2973	180	1.780	1.730	1.470	1.370	0.370	0.357	-0.0631	-0.2	0.6	1.4
	7	1-10	0.50	0.2973	180	1.940	1.730	1.830	1.370	0.356	0.357	-0.2490	-0.8	0.5	1.4
	8	2-1	0.50	0.2973	180	2.470	1.730	1.700	1.370	0.368	0.357	0.3989	1.2	0.6	1.4
	9	2-2	0.50	0.2973	180	1.750	1.730	1.370	1.370	0.305	0.357	0.0724	0.2	0.6	1.4
SR90	9 MS	2-3	0.50	0.2973	180	15.100	1.730	1.500	1.370	0.342	0.357	13.2551	40.2	1.7	1.4
SR90	9 MSD	2-4	0.50	0.2973	180	16.000	1.730	1.430	1.370	0.333	0.357	14.2342	43.1	1.8	1.4
	10	2-5	0.50	0.2973	180	2.300	1.730	2.200	1.370	0.361	0.357	-0.2640	-0.8	0.5	1.4
	11	2-10	0.50	0.2973	180	2.030	1.730	1.670	1.370	0.371	0.357	-0.0141	0.0	0.6	1.4
	12	3-1	0.50	0.2973	180	3.210	1.730	1.770 10/26/98	1.370	0.356	0.357	~~4.0810~~ 0.6510 10/26/98	0.0 ~~3.73~~ 7/26/98	0.7	1.4
	13	3-2	0.50	0.2973	180	2.420	1.730	1.800	1.370	0.315	0.357	0.3024	0.9	0.6	1.4
MB1SR1014	BLK	3-3	1.00	0.2973	180	1.730	1.730	1.370	1.370	0.357	0.357	0.0000	0.0	0.3	0.7
MB2SR1014	MB	3-4	1.00	0.2973	180	1.550	1.730	1.630	1.370	0.340	0.357	-0.4229	-0.6	0.3	0.7
ST1SR1014	EFF SR89	3-5	1.00	0.2973	180	17.500	1.730	1.570	1.370	0.362	0.357	15.5650	23.6	0.9	0.7
LC1SR1014	LCS SR89	3-7	1.00	0.2973	180	18.200	1.730	1.370	1.370	0.376	0.357	16.4508	24.9	0.9	0.7
LC2SR1014	LCS SR90	3-8	1.00	0.2973	180	16.900	1.730	1.170	1.370	0.364	0.357	15.3629	23.3	0.9	0.7
ST2SR1014	EFF SR90	3-9	1.00	0.2973	180	15.700	1.730	1.600	1.370	0.357	0.357	13.7400	20.8	0.9	0.7

Avg for EFF

QA-CHECK3.wk1 SR89 DATE 10/16/98 pCi/L
TIME 14:13

	Standard Known Value	LCS Sample Value	LCS Recovery
LC1SR1014	22.200	24.900	112.2
	22.200		0.0
	0.000		ERR
	0.000		ERR

985847-001

Sample Activity	Spiked Sample Activity	Standard Value	Sample Volume	Spike Value	SPIKE RECOVERY
-0.300	42.700	22.200	0.5000	44.400	96.8
-0.300	45.700	22.200	0.5000	44.400	103.6
0.000		22.200	0.000	ERR	ERR
0.000		22.200	0.000	ERR	ERR

985847-006

Sample Activity	Duplicate Activity	Sample ERROR	Duplicate ERROR	Duplicate RER
1.000	-0.200	0.600	0.600	1.41
				ERR
				ERR

905.89 SR89A

MB2SR1014 = -0.6 BATCH # 10483

LABNET

BATCH # _____

26-Oct-98

Reviewed by Natalie D. Funk

Date Oct 26, 1998

Sr90

FILE NAME:
SR-OCT98.wk1

Job Number	Sample Number	LB-770 Detector Number	Volume liter/ grams	Batch Eff	Sample Count Time min	Sample cpm	Method Blank cpm	Sample Detector Bkg cpm	Method Blank Detector Bkg cpm	Sample Detector Eff	Method Blank Detector Eff	Corrected Sample cpm	Activity pCi/l pCi/g	Error pCi/l pCi/g	LLD pCi/l pCi/g
example:															
984000	1	2-1	0.05	0.1790	120	5.810	0.258	0.133	0.167	0.279	0.262	5.58	280.8	21.8	10.9
2ND COUNT													ND		
985847	1	1-1	0.50	0.5198	180	1.510	2.720	1.230	2.200	0.376	0.361	-0.2616	-0.5	0.4	1.0
SR89	1 MS	1-2	0.50	0.5198	180	14.200	2.720	1.130	2.200	0.318	0.361	12.6119	21.9	1.0	1.0
SR89	1 MSD	1-3	0.50	0.5198	180	14.800	2.720	1.100	2.200	0.360	0.361	13.1814	22.8	1.0	1.0
	2	1-4	0.50	0.5198	180	1.280	2.720	1.130	2.200	0.340	0.361	-0.3398	-0.6	0.4	1.0
	3	1-5	0.50	0.5198	180	1.900	2.720	2.370	2.200	0.370	0.361	-1.0030	-1.7	0.3	1.0
	4	1-6	0.50	0.5198	180	1.840	2.720	1.670	2.200	0.370	0.361	-0.3630	-0.6	0.4	1.0
	5	1-7	0.50	0.5198	180	1.540	2.720	1.200	2.200	0.396	0.361	-0.2304	-0.4	0.4	1.0
	6	1-8	0.50	0.5198	180	1.410	2.720	1.300	2.200	0.367	0.361	-0.4186	-0.7	0.4	1.0
	6 MD	1-9	0.50	0.5198	180	1.430	2.720	1.270	2.200	0.367	0.361	-0.3686	-0.6	0.4	1.0
	7	1-10	0.50	0.5198	180	1.630	2.720	1.130	2.200	0.358	0.361	-0.0157	0.0	0.4	1.0
	8	2-1	0.50	0.5198	180	2.210	2.720	2.170	2.200	0.369	0.361	-0.4915	-0.9	0.4	1.0
	9	2-2	0.50	0.5198	180	1.470	2.720	1.330	2.200	0.306	0.361	-0.3008	-0.5	0.4	1.0
SR90	9 MS	2-3	0.50	0.5198	180	28.600	2.720	1.070	2.200	0.342	0.361	27.0374	46.9	1.4	1.0
SR90	9 MSD	2-4	0.50	0.5198	180	30.300	2.720	0.933	2.200	0.334	0.361	28.8859	50.1	1.4	1.0
	10	2-5	0.50	0.5198	180	1.650	2.720	1.630	2.200	0.363	0.361	-0.5029	-0.9	0.4	1.0
	11	2-6	0.50	0.5198	180	2.300	2.720	1.970	2.200	0.371	0.361	-0.2044	-0.4	0.4	1.0
	12	2-8	0.50	0.5198	180	1.870	2.720	1.700	2.200	0.375	0.361	-0.3702	-0.6	0.4	1.0
	13	2-10	0.50	0.5198	180	2.140	2.720	1.770	2.200	0.374	0.361	-0.1687	-0.3	0.4	1.0
MB1SR1014	BLK	3-1	1.00	0.5198	180	2.720	2.720	2.200	2.200	0.361	0.361	0.0000	0.0	0.2	0.5
MB2SR1014	MB	3-2	1.00	0.5198	180	1.770	2.720	1.270	2.200	0.315	0.361	0.0463	0.0	0.2	0.5
ST1SR1014	EFF SR89	3-3	1.00	0.5198	180	14.400	2.720	1.170	2.200	0.353	0.361	12.7215	11.0	0.5	0.5
LC1SR1014	LCS SR89	3-4	1.00	0.5198	180	15.300	2.720	1.070	2.200	0.343	0.361	13.7359	11.9	0.5	0.5
ST2SR1014	EFF SR90	3-5	1.00	0.5198	180	27.800	2.720	1.670	2.200	0.357	0.361	25.6158	22.2	0.7	0.5
LC2SR1014	LCS SR90	3-8	1.00	0.5198	180	28.700	2.720	1.100	2.200	0.358	0.361	27.0843	23.5	0.7	0.5

QA-CHECK3.wk1 SR90 DATE 10/26/98 pCi/L
TIME 07:13

	Standard Known Value	LCS Sample Value	LCS Recovery
LC2SR1014	22.200	23.500	105.9
	22.200		0.0
	0.000		ERR
	0.000		ERR

985847-009

Sample Activity	Spiked Sample Activity	Standard Value	Sample Volume	Spike Value	SPIKE RECOVERY
-0.500	46.900	22.200	0.5000	44.400	106.8
-0.500	50.100	22.200	0.5000	44.400	114.0
0.000		22.200	0.000	ERR	ERR
0.000		22.200	0.000	ERR	ERR

985847-006

Sample Activity	Duplicate Activity	Sample ERROR	Duplicate ERROR	Duplicate RER
-0.700	-0.600	0.400	0.400	0.18
				ERR
				ERR

905.89

MB2SR1014 = 0.0 BATCH # 10483

LABNET

BATCH #

C A L I B R A T I O N A L P H A

Comment: Am-241 MODEL CAL2710 ALPHA STANDARDS
770 Number 1 User File: A-PLANCHET CAL Cal. Data File: AM101698
Sample Set: AM-CALIBRATION Mode: Alpha Only
Calibration Parameter File Name: A-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.133	0.100	0.133	0.133	0.133	0.133	0.167	0.200	0.033	0.133
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
Activity	145.9	204.5	177.8	171.2	179.0	192.0	132.6	194.5	201.3	170.5

Calibration Results

Measurement Date 16.10.98 Time 5:20:45
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 1126

Det#	Spl#	Spl. Name	cpm	Eff	%Error	cpm	Spill	%Error
1	1	SERIAL # A962	2488	0.284	0.637	1182	0.475	1.12
2	2	SERIAL # A963	3548	0.289	0.533	1455	0.410	0.990
3	3	SERIAL # A964	3080	0.289	0.572	1435	0.466	1.02
4	4	SERIAL # A965	2853	0.278	0.594	1344	0.471	1.05
5	5	SERIAL # A966	2982	0.278	0.581	1548	0.519	1.03
	6	SERIAL # A967	3348	0.291	0.549	1640	0.490	0.958
7	7	SERIAL # A968	2239	0.281	0.671	1305	0.583	1.14
8	8	SERIAL # A969	2877	0.247	0.592	1865	0.648	0.945
9	9	SERIAL # A970	3422	0.283	0.543	1767	0.516	0.931
10	10	SERIAL # A971	2778	0.272	0.603	1318	0.474	1.06

Outlier Screening

		Measurem.# (S-deviations)									
Det#	Outlier(> 4.0S)	1	2	3	4	5	6	7	8	9	10
5b	1	1.9	4.9	0.7	1.0	0.9	0.7	-1.9	-1.2	-1.4	-0.7
7b	1	4.9	0.3	0.9	1.5	-0.0	-0.4	0.3	-1.9	-1.3	0.5

C A L I B R A T I O N B E T A

Comment: Cs-137 MODEL CAL2705 BETA STANDARDS
770 Number 1 User File: B-PLANCHET CAL Cal. Data File: CS101698
Sample Set: B-PLANCHET-CAL Mode: Beta Only
Calibration Parameter File Name: B-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Beta [cpm]	1.40	1.63	0.967	2.00	1.33	1.57	1.40	1.57	1.10	1.77
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Beta [days]	10560	10560	10560	10560	10560	10560	10560	10560	10560	10560
Activity	1703	1748	1733	1763	1718	1733	1775	1766	1794	1789

Calibration Results

Measurement Date 16.10.98 Time 5:38:08
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 2265

Det#	Spl#	Spl. Name	cpm	Spill	%Error	cpm	Eff	%Error
1	1	SERIAL # A952	3.48	0.000	18.6	38518	0.377	0.172
2	2	SERIAL # A953	3.18	0.000	19.4	33530	0.320	0.184
3	3	SERIAL # A954	4.16	0.000	16.9	37624	0.362	0.174
4	4	SERIAL # A955	5.86	0.000	14.2	35920	0.340	0.178
[illegible]	5	SERIAL # A956	8.25	0.000	11.9	38093	0.370	0.173
[illegible]	6	SERIAL # A957	4.05	0.000	17.1	38484	0.370	0.172
7	7	SERIAL # A958	12.2	0.000	9.76	41836	0.393	0.165
8	8	SERIAL # A959	10.7	0.000	10.5	39296	0.371	0.170
9	9	SERIAL # A960	4.62	0.000	15.8	39786	0.370	0.169
10	10	SERIAL # A961	6.55	0.000	13.4	38242	0.356	0.172

C A L I B R A T I O N A L P H A

Comment: Am-241 MODEL CAL2710 ALPHA STANDARDS
770 Number 1 User File: A-PLANCHET CAL Cal. Data File: AM102698
ple Set: AM-CALIBRATION Mode: Alpha Only
Calibration Parameter File Name: A-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.133	0.100	0.133	0.133	0.133	0.133	0.167	0.200	0.033	0.133
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
Activity	145.9	204.5	177.8	171.2	179.0	192.0	132.6	194.5	201.3	170.5

Calibration Results

Measurement Date 26.10.98 Time 5:19:39
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 1072

Det#	Spl#	Spl. Name	cpm	Eff	%Error	cpm	Spill	%Error
1	1	SERIAL # A962	2499	0.285	0.635	785.3	0.314	1.30
2	2	SERIAL # A963	3564	0.290	0.532	1101	0.309	1.10
3	3	SERIAL # A964	3010	0.282	0.579	1029	0.342	1.15
4	4	SERIAL # A965	2809	0.273	0.599	883.3	0.314	1.23
5	5	SERIAL # A966	2970	0.277	0.583	989.1	0.333	1.17
	6	SERIAL # A967	3374	0.293	0.547	1137	0.337	1.09
7	7	SERIAL # A968	2194	0.276	0.678	748.0	0.341	1.35
8	8	SERIAL # A969	2882	0.247	0.592	983.5	0.341	1.17
9	9	SERIAL # A970	3362	0.278	0.548	1185	0.352	1.07
10	10	SERIAL # A971	2795	0.273	0.601	897.3	0.321	1.22

C A L I B R A T I O N B E T A

Comment: Cs-137 MODEL CAL2705 BETA STANDARDS
770 Number 1 User File: B-PLANCHET CAL Cal. Data File: CS102698
Sample Set: B-PLANCHET-CAL Mode: Beta Only
Calibration Parameter File Name: B-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Beta [cpm]	1.40	1.63	0.967	2.00	1.33	1.57	1.40	1.57	1.10	1.77
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Beta [days]	10560	10560	10560	10560	10560	10560	10560	10560	10560	10560
Activity	1703	1748	1733	1763	1718	1733	1775	1766	1794	1789

Calibration Results

Measurement Date 26.10.98 Time 5:37:24
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 2240

Det#	Spl#	Spl. Name	cpm	Spill	%Error	cpm	Eff	%Error
1	1	SERIAL # A952	1.67	0.000	27.7	38439	0.376	0.172
2	2	SERIAL # A953	2.50	0.000	22.0	33372	0.318	0.184
3	3	SERIAL # A954	2.01	0.000	25.0	37460	0.360	0.174
4	4	SERIAL # A955	2.23	0.000	23.5	35994	0.340	0.178
5	5	SERIAL # A956	3.82	0.000	17.7	38146	0.370	0.173
	6	SERIAL # A957	1.21	0.000	33.1	38524	0.370	0.172
7	7	SERIAL # A958	4.47	0.000	16.4	42139	0.396	0.164
8	8	SERIAL # A959	6.36	0.000	13.7	38893	0.367	0.171
9	9	SERIAL # A960	3.26	0.000	18.8	39534	0.367	0.169
10	10	SERIAL # A961	2.80	0.000	20.8	38471	0.358	0.172

16.10.98 Berthold LB770 Control System: LB770 2 Page: 1
5:38 C A L I B R A T I O N A L P H A

Comment: Am-241 MODEL CAL2710 ALPHA STANDARDS
LB770 Number 2 User File: A-PLANCHET CAL Cal. Data File: AM101698
Sample Set: AM-CALIBRATION Mode: Alpha Only
Calibration Parameter File Name: A-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.133	0.100	0.133	0.133	0.133	0.133	0.167	0.200	0.033	0.133
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
Activity	145.9	204.5	177.8	171.2	179.0	192.0	132.6	194.5	201.3	170.5

Calibration Results

Measurement Date 16.10.98 Time 5:38:20
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 1089

Det#	Spl#	Spl. Name	cpm	Eff	%Error	cpm	Spill	%Error
1	1	SERIAL # A962	2436	0.278	0.644	1282	0.526	1.10
2	2	SERIAL # A963	3430	0.280	0.542	1701	0.496	0.942
3	3	SERIAL # A964	3007	0.282	0.579	1727	0.574	0.988
4	4	SERIAL # A965	2802	0.273	0.600	1431	0.511	1.03
	5	SERIAL # A966	2998	0.279	0.580	1629	0.543	0.978
	6	SERIAL # A967	3256	0.283	0.557	1345	0.413	1.03
7	7	SERIAL # A968	2173	0.273	0.682	1078	0.496	1.18
8	8	SERIAL # A969	2814	0.241	0.599	1021	0.363	1.16
9	9	SERIAL # A970	3225	0.267	0.559	1326	0.411	1.04
10	10	SERIAL # A971	2665	0.261	0.615	1085	0.407	1.14

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
3b	1	5.5	2.9	2.3	-0.6	2.9	-0.7	-1.9	-1.6	-1.6	-1.6

16.10.98 Berthold LB770 Control System: LB770 2 Page: 1
5:20 C A L I B R A T I O N B E T A

Comment: Cs-137 MODEL CAL2705 BETA STANDARDS
'70 Number 2 User File: B-PLANCHET CAL Cal. Data File: CS101698
S le Set: B-PLANCHET-CAL Mode: Beta Only
Calibration Parameter File Name: B-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Beta [cpm]	1.40	1.63	0.967	2.00	1.33	1.57	1.40	1.57	1.10	1.77
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Beta [days]	10560	10560	10560	10560	10560	10560	10560	10560	10560	10560
Activity	1703	1748	1733	1763	1718	1733	1775	1766	1794	1789

Calibration Results

Measurement Date 16.10.98 Time 5:20:58
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 2246

Det#	Spl#	Spl. Name	cpm	Spill	%Error	cpm	Eff	%Error
1	1	SERIAL # A952	7.68	0.000	12.3	37575	0.368	0.174
2	2	SERIAL # A953	19.5	0.001	7.66	31956	0.305	0.188
3	3	SERIAL # A954	34.8	0.001	5.73	35583	0.342	0.179
4	4	SERIAL # A955	18.6	0.001	7.86	35189	0.333	0.180
	5	SERIAL # A956	9.84	0.000	10.8	37203	0.361	0.175
	6	SERIAL # A957	1.32	0.000	31.4	37875	0.364	0.173
7	7	SERIAL # A958	6.96	0.000	13.0	41565	0.390	0.165
8	8	SERIAL # A959	0.908	0.000	40.9	39267	0.371	0.170
9	9	SERIAL # A960	0.190	0.000	86.8	40844	0.379	0.167
10	10	SERIAL # A961	0.190	0.000	>100%	39871	0.371	0.169

Comment: Am-241 MODEL CAL2710 ALPHA STANDARDS
LB770 Number 2 User File: A-PLANCHET CAL Cal. Data File: AM102698
Sample Set: AM-CALIBRATION Mode: Alpha Only
Calibration Parameter File Name: A-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.133	0.100	0.133	0.133	0.133	0.133	0.167	0.200	0.033	0.133
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
Activity	145.9	204.5	177.8	171.2	179.0	192.0	132.6	194.5	201.3	170.5

Calibration Results

Measurement Date 26.10.98 Time 5:37:36
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 1078

Det#	Spl#	Spl. Name	cpm	Eff	%Error	cpm	Spill	%Error
1	1	SERIAL # A962	2441	0.279	0.643	824.3	0.338	1.28
2	2	SERIAL # A963	3447	0.281	0.541	1083	0.314	1.11
3	3	SERIAL # A964	2996	0.281	0.580	919.9	0.307	1.20
4	4	SERIAL # A965	2824	0.275	0.598	879.2	0.311	1.23
	5	SERIAL # A966	2978	0.277	0.582	958.5	0.322	1.18
	6	SERIAL # A967	3301	0.287	0.553	1121	0.340	1.10
7	7	SERIAL # A968	2193	0.276	0.678	722.1	0.329	1.36
8	8	SERIAL # A969	2854	0.245	0.595	938.7	0.329	1.20
9	9	SERIAL # A970	3292	0.273	0.553	1287	0.391	1.04
10	10	SERIAL # A971	2735	0.267	0.607	1065	0.389	1.15

C A L I B R A T I O N B E T A

Comment: Cs-137 MODEL CAL2705 BETA STANDARDS
770 Number 2 User File: B-PLANCHET CAL Cal. Data File: CS102698
Sample Set: B-PLANCHET-CAL Mode: Beta Only
Calibration Parameter File Name: B-CAL
HV-Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Beta [cpm]	1.40	1.63	0.967	2.00	1.33	1.57	1.40	1.57	1.10	1.77
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Beta [days]	10560	10560	10560	10560	10560	10560	10560	10560	10560	10560
Activity	1703	1748	1733	1763	1718	1733	1775	1766	1794	1789

Calibration Results

Measurement Date 26.10.98 Time 5:19:51
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 2213

Det#	Spl#	Spl. Name	cpm	Spill	%Error	cpm	Eff	%Error
1	1	SERIAL # A952	3.60	0.000	18.3	37677	0.369	0.174
2	2	SERIAL # A953	7.27	0.000	12.6	32077	0.306	0.188
3	3	SERIAL # A954	20.1	0.001	7.56	35579	0.342	0.179
4	4	SERIAL # A955	7.91	0.000	12.1	35294	0.334	0.179
5	5	SERIAL # A956	5.41	0.000	14.8	37438	0.363	0.174
	6	SERIAL # A957	1.44	0.000	30.0	38537	0.371	0.172
7	7	SERIAL # A958	3.33	0.000	19.2	41400	0.389	0.166
8	8	SERIAL # A959	0.341	0.000	79.2	39746	0.375	0.169
9	9	SERIAL # A960	0.758	0.000	40.0	41233	0.383	0.166
10	10	SERIAL # A961	0.758	0.000	43.5	40164	0.374	0.168

16.10.98 Berthold LB770 Control System: LB770 3 Page: 1
6:12 C A L I B R A T I O N A L P H A

Comment: Am-241 MODEL CAL2710 ALPHA STANDARDS
'70 Number 3 User File: A-PLANCHET CAL Cal. Data File: AM101698
Sample Set: AM-CALIBRATION Mode: Alpha Only
Calibration Parameter File Name: A-CAL
HV-Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.133	0.100	0.133	0.133	0.133	0.133	0.167	0.200	0.033	0.133
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
Activity	145.9	204.5	177.8	171.2	179.0	192.0	132.6	194.5	201.3	170.5

Calibration Results

Measurement Date 16.10.98 Time 6:12:26
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 1089

Det#	Spl#	Spl. Name	cpm	Eff	%Error	cpm	Spill	%Error
1	1	SERIAL # A962	2452	0.280	0.642	2548	1.04	0.899
2	2	SERIAL # A963	3600	0.293	0.529	# outlier >1		
3	3	SERIAL # A964	3196	0.300	0.562	# outlier >1		
4	4	SERIAL # A965	2987	0.291	0.581	# outlier >1		
5	5	SERIAL # A966	3133	0.292	0.568	# outlier >1		
6	6	SERIAL # A967	3332	0.289	0.550	3386	1.02	0.775
7	7	SERIAL # A968	2190	0.275	0.679	2908	1.33	0.899
8	8	SERIAL # A969	2881	0.247	0.592	# outlier >1		
9	9	SERIAL # A970	3529	0.292	0.535	# outlier >1		
10	10	SERIAL # A971	2881	0.282	0.592	3234	1.12	0.837

Outlier Screening

		Measurem.# (S-deviations)									
Det#	Outlier(> 4.0S)	1	2	3	4	5	6	7	8	9	10
2b	2	6.1	10.5	3.8	-0.1	0.7	2.3	-2.7	-2.5	-0.8	-0.7
3b	2	12.1	5.1	2.4	0.4	0.8	2.5	-3.2	-1.4	1.5	-3.1
4b	2	10.3	5.7	1.6	0.4	-0.4	1.5	-1.5	-1.6	0.7	-0.7
5b	2	7.3	3.8	4.8	1.2	3.4	-1.2	-1.3	-0.0	-3.2	-2.7
8b	3	7.2	8.0	6.3	1.0	0.7	0.7	0.7	0.2	-2.2	-1.1
9b	4	8.0	5.4	5.1	3.6	0.6	-0.1	-1.1	-0.7	-2.2	-5.6
10b	1	3.8	3.6	1.5	1.7	-3.6	-1.1	-2.7	-5.5	-0.1	-3.1

Detectors with Trend:4b, 8b, 9b

C A L I B R A T I O N B E T A

Comment: Cs-137 MODEL CAL2705 BETA STANDARDS
770 Number 3 User File: B-PLANCHET CAL Cal. Data File: CS101698
Sample Set: B-PLANCHET-CAL Mode: Beta Only
Calibration Parameter File Name: B-CAL
HV-Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Beta [cpm]	1.40	1.63	0.967	2.00	1.33	1.57	1.40	1.57	1.10	1.77
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Beta [days]	10560	10560	10560	10560	10560	10560	10560	10560	10560	10560
Activity	1703	1748	1733	1763	1718	1733	1775	1766	1794	1789

Calibration Results

Measurement Date 16.10.98 Time 6:30:43
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 2265

Det#	Spl#	Spl. Name	cpm	Spill	%Error	cpm	Eff	%Error
1	1	SERIAL # A952	90.5	0.002	3.55	36397	0.356	0.177
2	2	SERIAL # A953	44.9	0.001	5.04	33056	0.315	0.185
3	3	SERIAL # A954	82.8	0.002	3.71	37123	0.357	0.175
4	4	SERIAL # A955	42.4	0.001	5.19	36018	0.340	0.178
5	5	SERIAL # A956	87.2	0.002	3.61	37329	0.362	0.174
	6	SERIAL # A957	125.9	0.013	3.03	9606	0.092	0.344
7	7	SERIAL # A958	74.5	0.002	3.91	40037	0.376	0.168
8	8	SERIAL # A959	101.5	0.003	3.35	38569	0.364	0.172
9	9	SERIAL # A960	55.1	0.001	4.54	38400	0.357	0.172
10	10	SERIAL # A961	62.2	0.002	4.28	37213	0.347	0.175

C A L I B R A T I O N A L P H A

Comment: Am-241 MODEL CAL2710 ALPHA STANDARDS
LB770 Number 3 User File: A-PLANCHET CAL Cal. Data File: AM102698
Sample Set: AM-CALIBRATION Mode: Alpha Only
Calibration Parameter File Name: A-CAL
HV-Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Alpha [cpm]	0.133	0.100	0.133	0.133	0.133	0.133	0.167	0.200	0.033	0.133
Manuf. Alpha Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Alpha [days]	157936	157936	157936	157936	157936	157936	157936	157936	157936	157936
Activity	145.9	204.5	177.8	171.2	179.0	192.0	132.6	194.5	201.3	170.5

Calibration Results

Measurement Date 26.10.98 Time 6:02:15
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 1061

Det#	Spl#	Spl. Name	cpm	Eff	%Error	cpm	Spill	%Error
1	1	SERIAL # A962	2515	0.287	0.633	833.6	0.331	1.27
2	2	SERIAL # A963	3615	0.295	0.528	1170	0.324	1.07
3	3	SERIAL # A964	3127	0.293	0.568	1124	0.359	1.11
4	4	SERIAL # A965	3000	0.292	0.580	975.3	0.325	1.17
5	5	SERIAL # A966	3060	0.285	0.574	1074	0.351	1.13
6	6	SERIAL # A967	3401	0.295	0.545	3083	0.906	0.790
7	7	SERIAL # A968	2208	0.278	0.676	862.1	0.390	1.28
8	8	SERIAL # A969	2948	0.253	0.585	1021	0.346	1.15
9	9	SERIAL # A970	3462	0.287	0.540	1129	0.326	1.09
10	10	SERIAL # A971	2913	0.285	0.588	940.2	0.323	1.19

C A L I B R A T I O N B E T A

Comment: Cs-137 MODEL CAL2705 BETA STANDARDS
LB 770 Number 3 User File: B-PLANCHET CAL Cal. Data File: CS102698
Sample Set: B-PLANCHET-CAL Mode: Beta Only
Calibration Parameter File Name: B-CAL
HV-Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

	1	2	3	4	5	6	7	8	9	10
BG Beta [cpm]	1.40	1.63	0.967	2.00	1.33	1.57	1.40	1.57	1.10	1.77
Manuf. Beta Date	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93	01.07.93
T(1/2) Beta [days]	10560	10560	10560	10560	10560	10560	10560	10560	10560	10560
Activity	1703	1748	1733	1763	1718	1733	1775	1766	1794	1789

Calibration Results

Measurement Date 26.10.98 Time 6:20:11
Measuring Time [min:sec] Elapsed 0010:00 Preset 0010:00 Cycle 1/1
Guard [cpm] 2201

Det#	Spl#	Spl. Name	cpm	Spill	%Error	cpm	Eff	%Error
1	1	SERIAL # A952	52.8	0.001	4.65	36862	0.361	0.176
2	2	SERIAL # A953	20.6	0.001	7.46	33071	0.315	0.185
3	3	SERIAL # A954	46.2	0.001	4.97	36684	0.353	0.176
4	4	SERIAL # A955	24.3	0.001	6.87	36238	0.343	0.177
5	5	SERIAL # A956	45.8	0.001	4.99	36816	0.357	0.176
6	6	SERIAL # A957	69.0	0.007	4.08	9372	0.090	0.348
7	7	SERIAL # A958	38.8	0.001	5.43	39934	0.375	0.169
8	8	SERIAL # A959	58.4	0.002	4.42	37946	0.358	0.173
9	9	SERIAL # A960	33.1	0.001	5.86	38417	0.357	0.172
10	10	SERIAL # A961	34.9	0.001	5.72	37121	0.346	0.175

16.10.98 Berthold LB770 Control System: LB770 1 Page: 1
6:11 B A C K G R O U N D M E A S U R E M E N T

Comment: DAILY BACKGROUND OF 30 MIN
'70 Number 1 User File: CALIBRARTIONS Bkg. Data File: BG101698
H Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 16.10.98 Time 6:12:06
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/1
Guard [cpm] 1093

	ALPHA			BETA		
Det#	cpm	+/-cpm	Cat	cpm	+/-cpm	Cat
1	0.067	0.047	1	1.53	0.226	1
2	0.167	0.075	1	1.37	0.213	1
3	0.100	0.058	1	1.37	0.213	1
4	0.200	0.082	1	1.27	0.205	1
5	0.133	0.067	1	1.63	0.233	1
6	0.133	0.067	1	2.00	0.258	1
7	0.200	0.082	1	1.90	0.252	1
8	0.033	0.033	1	1.00	0.183	1
9	0.133	0.067	1	1.47	0.221	1
10	0.133	0.067	1	1.83	0.247	1

B A C K G R O U N D M E A S U R E M E N T

Comment: DAILY BACKGROUND OF 30 MIN
770 Number 1 User File: CALIBRARTIONS Bkg. Data File: BG102698
HV Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 26.10.98 Time 6:01:52
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/1
Guard [cpm] 1069

	ALPHA			BETA		
Det#	cpm	+/-cpm	Cat	cpm	+/-cpm	Cat
1	0.067	0.047	1	1.23	0.203	1
2	0.133	0.067	1	1.13	0.194	1
3	0.167	0.075	1	1.10	0.191	1
4	0.033	0.033	1	1.13	0.194	1
5	0.033	0.033	1	2.37	0.281	1
6	0.100	0.058	1	1.67	0.236	1
7	0.100	0.058	1	1.20	0.200	1
8	0.200	0.082	1	1.30	0.208	1
9	0.100	0.058	1	1.27	0.205	1
10	0.133	0.067	1	1.13	0.194	1

Detectors with Trend:6a

B A C K G R O U N D M E A S U R E M E N T

Comment: DAILY BACKGROUNDS OF 30 MIN
770 Number 2 User File: CALIBRARTIONS Bkg. Data File: BG101698
Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

Category	Alpha Low	Alpha High	Beta Low	Beta High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 16.10.98 Time 6:12:15
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/1
Guard [cpm] 1093

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.233	0.088	1	1.70	0.238	1
2	0.167	0.075	1	1.37	0.213	1
3	0.033	0.033	1	1.50	0.224	1
4	0.033	0.033	1	1.43	0.219	1
5	0.100	0.058	1	2.20	0.271	1
6	0.133	0.067	1	# outlier >1		
7	0.133	0.067	1	1.67	0.236	1
8	0.067	0.047	1	1.93	0.254	1
9	0.100	0.058	1	2.23	0.273	1
10	0.100	0.058	1	1.67	0.236	1

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
6b	2	18.7	9.0	0.7	0.2	-0.7	0.2	-0.7	0.2	0.7	-0.5

Detectors with Trend:6b

B A C K G R O U N D M E A S U R E M E N T

Comment: DAILY BACKGROUNDS OF 30 MIN
70 Number 2 User File: CALIBRARTIONS Bkg. Data File: BG102698
HV Meas.Counter [V] = 1600 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

Category	Alpha Low	Alpha High	Beta Low	Beta High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 26.10.98 Time 6:02:02
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/1
Guard [cpm] 1075

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.300	0.100	2	2.17	0.269	1
2	0.200	0.082	1	1.33	0.211	1
3	0.233	0.088	1	1.07	0.189	1
4	0.100	0.058	1	0.933	0.176	1
5	0.133	0.067	1	1.63	0.233	1
6	0.033	0.033	1	1.97	0.256	1
7	0.200	0.082	1	1.57	0.229	1
8	0.067	0.047	1	1.70	0.238	1
9	0.100	0.058	1	4.17	0.373	2
10	0.200	0.082	1	1.77	0.243	1

16.10.98 Berthold LB770 Control System: LB770 3 Page: 1
5:20 B A C K G R O U N D M E A S U R E M E N T

Comment: DAILY BACKGROUNDS OF 30 MIN
770 Number 3 User File: CALIBRARTIONS Bkg. Data File: BG101698
Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

Category	Alpha Low	Alpha High	Beta Low	Beta High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 16.10.98 Time 5:21:10
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/1
Guard [cpm] 1057

Det#	ALPHA cpm	ALPHA +/-cpm	ALPHA Cat	BETA cpm	BETA +/-cpm	BETA Cat
1	0.100	0.058	1	1.77	0.243	1
2	0.067	0.047	1	1.80	0.245	1
3	0.133	0.067	1	1.37	0.213	1
4	0.167	0.075	1	1.63	0.233	1
5	0.067	0.047	1	1.57	0.229	1
6	0.133	0.067	1	3.70	0.351	2
7	0.133	0.067	1	1.37	0.213	1
8	0.033	0.033	1	1.17	0.197	1
9	0.133	0.067	1	1.60	0.231	1
10	0.033	0.033	1	1.33	0.186	1

Outlier Screening

Det#	Outlier(> 4.0S)	Measurem.# (S-deviations) 1	2	3	4	5	6	7	8	9	10
10b	1	1.3	7.1	0.4	-0.4	0.0	-1.3	-0.4	0.4	0.8	-0.8

26.10.98 Berthold LB770 Control System: LB770 3 Page: 1
5:21 B A C K G R O U N D M E A S U R E M E N T

Comment: DAILY BACKGROUND OF 30 MIN
'70 Number 3 User File: CALIBRARTIONS Bkg. Data File: BG10269A
H Meas.Counter [V] = 1625 HV-Guard Counter [V] = 1650
Statistical Error Definition: 1 standard deviation(s)

Category List [cpm]:

	Alpha		Beta	
Category	Low	High	Low	High
1	0.000	0.300	0.000	2.50
2	0.300	1.00	2.50	5.00
3	1.00		5.00	

Background Results

Measurement Date 26.10.98 Time 5:21:52
Measuring Time [min:sec] Elapsed 0030:00 Preset 0030:00 Cycle 1/1
Guard [cpm] 1050

	ALPHA			BETA		
Det#	cpm	+/-cpm	Cat	cpm	+/-cpm	Cat
1	0.233	0.088	1	2.20	0.271	1
2	0.067	0.047	1	1.27	0.205	1
3	0.133	0.067	1	1.17	0.197	1
4	0.167	0.075	1	1.07	0.189	1
5	0.033	0.033	1	1.67	0.236	1
6	0.100	0.058	1	4.10	0.370	2
7	0.333	0.105	2	1.67	0.236	1
8	0.067	0.047	1	1.10	0.191	1
9	0.067	0.047	1	0.833	0.167	1
10	0.100	0.058	1	1.20	0.200	1

LB770 BACKGROUND AND EFFICIENCY ACCEPTANCE CRITERIA

Plateau run6/01/98

		LB770-01				LB770-02				LB770-03				LB770-04			
		α EFF	β EFF	α BKG	β BKG	α EFF	β EFF	α BKG	β BKG	α EFF	β EFF	α BKG	β BKG	α EFF	β EFF	α BKG	β BKG
DETECTOR 1	UCL	29.4	38.2	0.3	2.5	28.6	37.3	0.3	2.5	29.8	36.4	0.3	2.5	29.3	38.1	0.3	2.5
	UWL	29.3	38.0			28.4	37.2			29.6	36.1			29.1	37.6		
	LWL	28.2	36.9			27.3	36.2			28.4	34.8			27.9	34.8		
	LCL	28.0	36.8	0.0	0.0	27.1	36.1	0.0	0.0	28.2	34.5	0.0	0.0	27.7	34.3	0.0	0.0
DETECTOR 2	UCL	29.8	32.2	0.3	2.5	29.1	31.0	0.3	2.5	30.5	31.9	0.3	2.5	30.0	32.7	0.3	2.5
	UWL	29.6	32.1			28.8	30.9			30.2	31.7			29.8	32.3		
	LWL	28.1	31.4			27.2	30.1			28.2	30.5			28.2	29.7		
	LCL	27.8	31.3	0.0	0.0	27.0	30.0	0.0	0.0	27.9	30.4	0.0	0.0	28.0	29.3	0.0	0.0
DETECTOR 3	UCL	29.4	36.8	0.3	2.5	29.1	34.9	0.3	2.5	31.0	36.7	0.3	2.5	30.5	39.5	0.3	2.5
	UWL	29.2	36.6			28.9	34.8			30.7	36.4			30.0	38.3		
	LWL	28.2	35.6			27.3	34.1			29.1	34.6			26.8	30.3		
	LCL	28.0	35.4	0.0	0.0	27.1	33.9	0.0	0.0	28.8	34.3	0.0	0.0	26.3	29.0	0.0	0.0
DETECTOR 4	UCL	28.2	35.7	0.3	2.5	27.9	34.7	0.3	2.5	30.0	36.0	0.3	2.5	29.1	35.9	0.3	2.5
	UWL	28.0	35.3			27.8	34.5			29.8	35.6			28.7	35.4		
	LWL	27.2	33.2			26.9	32.6			28.5	33.1			26.6	31.7		
	LCL	27.1	32.8	0.0	0.0	26.8	32.3	0.0	0.0	28.3	32.8	0.0	0.0	26.3	31.1	0.0	0.0
DETECTOR 5	UCL	28.8	37.3	0.3	2.5	28.2	36.7	0.3	2.5	30.1	36.8	0.3	2.5	29.4	37.4	0.3	2.5
	UWL	28.7	37.2			28.0	36.5			29.8	36.5			29.1	37.0		
	LWL	27.6	36.4			27.1	35.5			28.4	35.1			26.9	34.3		
	LCL	27.4	36.2	0.0	0.0	26.9	35.3	0.0	0.0	28.2	34.8	0.0	0.0	26.6	33.9	0.0	0.0
DETECTOR 6	UCL	30.3	38.1	0.3	2.5	29.3	38.3	0.3	2.5	30.9	11.3	0.3	2.5	29.8	37.4	0.3	2.5
	UWL	30.1	37.9			29.1	38.1			30.5	11.1			29.6	37.0		
	LWL	28.7	36.3			27.7	36.7			28.4	9.5			27.8	34.6		
	LCL	28.4	36.1	0.0	0.0	27.5	36.5	0.0	0.0	28.1	9.3	0.0	0.0	27.6	34.2	0.0	0.0
DETECTOR 7	UCL	28.8	40.2	0.3	2.5	28.2	40.3	0.3	2.5	29.4	39.3	0.3	2.5	28.9	39.9	0.3	2.5
	UWL	28.6	40.1			28.1	40.2			29.2	39.1			28.7	39.5		
	LWL	27.6	38.9			27.1	39.2			27.6	37.3			27.0	37.0		
	LCL	27.4	38.7	0.0	0.0	27.0	39.1	0.0	0.0	27.4	37.0	0.0	0.0	26.7	36.6	0.0	0.0
DETECTOR 8	UCL	25.7	38.0	0.3	2.5	24.7	38.1	0.3	2.5	26.2	37.0	0.3	2.5	25.5	37.6	0.3	2.5
	UWL	25.6	37.8			24.5	38.0			26.0	36.7			25.3	37.2		
	LWL	24.5	36.4			23.6	37.4			24.7	34.8			24.0	34.7		
	LCL	24.3	36.2	0.0	0.0	23.4	37.3	0.0	0.0	24.5	34.5	0.0	0.0	23.8	34.3	0.0	0.0
DETECTOR 9	UCL	28.9	37.7	0.3	2.5	27.5	38.9	0.3	2.5	30.0	36.7	0.3	2.5	29.7	37.7	0.3	2.5
	UWL	28.8	37.5	0.0	0.0	27.3	38.8	0.0	0.0	29.7	36.6			29.4	37.3		
	LWL	27.9	36.1			26.0	37.9			28.4	35.3			27.5	34.6		
	LCL	27.8	35.9			25.8	37.7			28.2	35.2	0.0	0.0	27.2	34.2	0.0	0.0
DETECTOR 10	UCL	28.3	36.0	0.3	2.5	27.2	37.8	0.3	2.5	29.2	35.3	0.3	2.5	26.4	38.0	0.3	2.5
	UWL	28.2	35.8			27.0	37.8			29.0	35.0			26.0	37.7		
	LWL	27.2	35.1			26.0	37.2			27.7	33.2			23.5	35.4		
	LCL	27.0	34.9	0.0	0.0	25.8	37.1	0.0	0.0	27.5	32.9	0.0	0.0	23.1	35.0	0.0	0.0

These limits apply to North American Scientific AM 241 planchets series numbers A962-A971 for Alpha and North American Scientific 137 planchets series number A952 - A961 for Beta. The data collected for the period of 6/01/98 - 6/30/98

Nuclide Sr-90 Isotope # 286 Date Received 10-3-94 Received By Mark Ensor

INCOMING HEALTH PHYSICS

adiation Level @ Package Surface , Radiation Level @ 1 meter From Package Surface

movable Contamination Survey DPM/100 Square Centimeters

Incoming Health Physics Results Health Physics Approval By

Characterization of Radioactive Material Solution

Manufacturer: Isotope Products , Model #:7090 , Serial #: 470-76-1 , NIST Traceable Yes

Half-Life 28.50 + or - 0.2 years , Date of Calibration 10-01-94 ,Time of Calibration: 12:00:00h

Chemical Form: SrCl2 , Sample Mass: 4.9677 + or - grams

Activity Concentration at TOC: 9.86 uCi/g , Total Activity @ TOC: 48.982 uCi

DPM Conversion Factor: 2220000 , Activity @ Receipt in DPM 108,724,489 , Activity@ Receipt in uCi: 48.9750

Preparation of Primary Stock Solution

Preparation Date: 3/7/95 , Activity on Prep Date : 107,607,352.7 DPM , 21,661,403.2 DPM /grams In The Ampoul

pCi per grams Of Standard In Ampoule at Prep= 9,757,388.8 ,Volume of Stock Solution: 1000 ml

Stock Solution Concentration: 107,607.4 DPM/ml @ prep Stock Solution Total Activity @ Prep in uCi: 48.4718

Stock Solution Concentration: 48,471.8 pCi/ ml at prep , Total Stock Solution Activity @ Prep 48,471,780.5 pCi

Preparation of Working Solutions

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Working Sol'n #	**286.01**	**286.02**	**286.03**	**286.04**	**286.05**
TOC	3/7/95	6-13-95	6-13-96	6-13-96	6/24/97
Volumetric or Gravimetric	Volumetric	Volumetric	Volumetric	Volumetric	Volumetric
Stock Solution ID	286.00	286.01	286.01	286.03	286.01
Stock Solution Used(ml or grams)	10	5	100	200	10
DPM/ml of Stock Sol. At TOC	107,607.400	1,076.1	1,076.1	104.3	1,076.1
Stock Solution TOC	3/7/95	3-7-95	3-7-95	6-13-96	3/7/95
Working Solution Volume (ml)	1,000.0	2,000.0	1,000.0	2,000.0	1,000.0
Total DPM@ TOC	1,076,074.0	5,345.5	104,333.9	20,860.0	10,175.2
DPM / ml @TOC	1,076.1	2.7	104.3	10.4	10.2
pCi/ml @ TOC	**484.7**	**1.2**	**47.0**	**4.7**	**4.6**
pCi/Liter @ TOC	484,718.0	1,203.9	46,997.2	4,698.2	4,583.4
Original Working Solution #					
Date Exhausted					

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

Nuclide Sr-90 Isotope # 286 Date Received 10-3-94 Received By Mark Ensor

Radionuclide Standard Data Sheet

8/27/98

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Working Sol'n #	**286.06**				
TOC	07/21/98				
Volumetric or Gravimetric	Volumetric				
Stock Solution ID	286.01				
Stock Solution Used(ml or grams)	25				
DPM/ml of Stock Sol. At TOC	1,076.1				
Stock Solution TOC	3/7/95				
Working Solution Volume (ml)	1,000.0				
Total DPM@ TOC	24,782.3	0.0	0.0	0.0	0.0
DPM / ml @TOC	24.8	?	?	?	?
pCi/ml @ TOC	**11.2**				
pCi/Liter @ TOC	11,163.2				
Original Working Solution #					
Date Exhausted					

Working Sol'n #					
TOC					
Volumetric or Gravimetric					
Stock Solution ID					
Stock Solution Used(ml or grams)					
DPM/ml of Stock Sol. At TOC					
Stock Solution TOC					
Working Solution Volume (ml)					
Total DPM@ TOC	0.0	0.0	0.0	0.0	0.0
DPM / ml @TOC	?	?	?	?	?
pCi/ml @ TOC					
pCi/Liter @ TOC					
Original Working Solution #					
Date Exhausted					

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

Activity Remaining in Stock Solution as of Report Date:

Current Stoc k Solution A ctivity: 44.541 uCi

STANDARD PREPARATION WORKSHEET

Isotope Number: 286.00

Radionuclide: Sr 90

Date of Preparation: 3-7-95

Prepared by: Dee 7.

Isotope Number of Stock Solution: 286.00

PREPARATION NOTES:

1) **Amount of Stock Solution measured in volumetric flask.**

Vial weight with sample = 8.3947
Vial weight empty & Dried = 3.4270
4.9677 g
Source # 470-116-1 Isotope products

2) **Amount and type of dilution measured in volumetric flask.**

Diluted to 1.0 L with 4N HNO_3

3) **Final Concentration.**

48,471.8 pCi/ml

4) **Notes, Comments, and Calculations.**

WITNESSED BY MG

QC26 EFF 07-15-94:REV 2

STANDARD PREPARATION WORKSHEET

Isotope Number: 286.01

Radionuclide: Sr 90

Date of Preparation: 3-7-95

Prepared by: [illegible] 7.

Isotope Number of Stock Solution: 286.00

PREPARATION NOTES:

1) Amount of Stock Solution measured in volumetric flask.

10 mls of 150 # 286.00 (48,471.8 pCi/ml)

2) Amount and type of dilution measured in volumetric flask.

Diluted to 1.0 L with 4N HNO_3

3) Final Concentration.

484.7 pCi/ml

4) Notes, Comments, and Calculations.

WITNESSED BY MG

QC26 EFF 07-15-94:REV 2

STANDARD PREPARATION WORKSHEET

Isotope Number: 286.06 JOB # 985382

Radionuclide: Sr90

Date of Preparation: MO 7/21/98 7/21/98

Prepared by: MO

Isotope Number of Stock Solution: 286.01

PREPARATION NOTES:

1) **Amount of Stock Solution measured in volumetric flask.**

25 mL of 286.01 @ 484.7 pCi/mL

2) **Amount and type of dilution measured in volumetric flask.**

25 mL of 286.01 DILUTED TO 1000 mL IN 4N HNO_3

3) **Final Concentration.**

~~12.1 pCi/mL~~ ✓

11.2 pCi/mL

decay corrected 8/27/98

4) **Notes, Comments, and Calculations.** [illegible] 7/21/98

QC26 EFF 07-15-94:REV 2

ISO # 2860

CERTIFICATE OF CALIBRATION
BETA STANDARD SOLUTION

Radionuclide:	Sr-90	Customer:	CORE LABORATORIES
Half Life:	28.5 ± 0.2 years	P.O.No.:	57210-1436
Catalog No.:	7090	Reference Date:	October 1 1994 12:00 PST.
Source No.:	470-76-1	Contained Radioactivity:	(Sr-90) 49.1 μCi
		Contained Radioactivity:	(Sr-90) 1816 kBq

Description of Solution

a. Mass of solution: 4.9766 g in a 5 ml flame sealed ampoule

b. Chemical form: SrCl2 in 0.1 M HCl

c. Carrier content: None

d. Density: Approximately 0.9996 g/ml @ 20°C.

Radioimpurities

None detected

Radioactive Daughters

Y-90 daughter in equilibrium.

Radionuclide Concentration

(Sr-90) 9.86 μCi/g.

Method of Calibration

The source was prepared from a weighed aliquot of solution whose concentration in μCi/gram was determined by a liquid scintillation counter.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration: ±2.0%

b. Random uncertainty in assay: ±0.9%

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

d. Total uncertainty at the 99% confidence level: ±2.2%

NIST Traceability

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

Leak Test(s)

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

Notes

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

ERIC ALLAS

QUALITY CONTROL

28 SEPTEMBER 1994

Date Signed

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

ISOTOPE PRODUCTS
LABORATORIES

3017 N. SAN FERNANDO BLVD.

BURBANK, CALIFORNIA 91504

FAX (818) 843-6168 • PHONE (818) 843-7000

*** P A C K I N G L I S T ***

Shipper No: 2479
Ship Date: 9/13/94
Page: 1

SOLD TO: CORE LABORATORIES
420 WEST FIRST ST.
CASPER, WY 82601

SHIP TO: CORE LABORATORIES
420 WEST FIRST ST.
CASPER, WY 82601

Sales Order No: 30448
Order Date : 9/13/94
Cust Code : CORELAB
Job Number :

Purchase Ord No: 57210-1436
Ship Via : FED EX 2ND DAY
FOB : BURBANK
Salesperson No : 1

Line	Part Number	Description	Bin Loc	Qty Orig Ordered	Qty Ship To Date	Qty On Backorder	Qty This Shipment	Qty Actually Shipped
1	7241-10U	Am-241 10 uCi solution Calibrated and NIST traceable Chemical Form: Americium chloride in 1 N HCl. Options:		1.00	—	—	1.00	1
	10011-1	5 ml Flame Sealed Ampoule Volume= 5 ml						
2	7230-10U	Th-230, 10 uCi, in 5 ml flame sealed ampoule. Calibrated & NIST +/-5%. Chemical Form: Thorium Nitrate in 0.1N HNO3 Options:		1.00	—	—	1.00	1
M	10011-1	5 ml Flame Sealed Ampoule Volume= 5 ml						
3	7232-50N	Th-232, 50 nCi in 5 ml flame sealed ampoule. Calibrated & NIST +/-5%. Chemical Form: Thorium Nitrate in H20 Options:		1.00	—	—	1.00	1
M	10011-1	5 ml Flame Sealed Ampoule Volume= 5 ml						
4	7090-50U	Sr/Y-90, 50 uCi in 5 ml		1.00	—	—	1.00	1

Rec'd 10/13/94

ISOTOPE PRODUCTS LABORATORIES

3017 N. SAN FERNANDO BLVD.

BURBANK, CALIFORNIA 91504

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*** P A C K I N G L I S T ***

Shipper No: 2479
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Page: 2

SOLD TO: CORE LABORATORIES
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SHIP TO: CORE LABORATORIES
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Sales Order No: 30448
Order Date : 9/13/94
Cust Code : CORELAB
Job Number :

Purchase Ord No: 57210-1436
Ship Via : FED EX 2ND DAY
FOB : BURBANK
Salesperson No : 1

Line	Part Number	Description	Bin Loc	Qty Orig Ordered	Qty Ship To Date	Qty On Backorder	Qty This Shipment	Qty Actually Shipped
		flame sealed ampoule. Calibrated & NIST +/-5%. Chemcial Form: Strontium Chloride in 0.1M HCl Options:						
	10011-1	5 ml Flame Sealed Ampoule Volume= 5 ml						
5	7229-500N	Th-229, 500 nCi in 5 ml flame sealed ampoule. Calibrated & NIST +/-5%. Chemical Form: Thorium Nitrate in 0.1M HNO3 Options:		1.00	—	—	1.00	1
N	10011-1	5 ml Flame Sealed Ampoule Volume= 5 ml						
								5

Total Weight : _____
Total Cubic Ft: _____

Freight : _____
Insurance: _____

Date Filled: Sept. 29, 94
Filled By : -celin

517

ISOTOPE PRODUCTS LABORATORIES · 1800 N. Keystone St., Burbank, CA 91504
(818) 843-7000 · FAX (818) 843-6168

EMERGENCY RESPONSE INFORMATION
(49CFR 172.600, 602, 604)
May 1, 1994

1) PROPER SHIPPING NAME AND HAZARD CLASS

____ a) Radioactive material, Excepted package, limited quantity of material N.O.S., UN2910, Class 7.

____ b) Radioactive material special form N.O.S., UN2974, Class 7

✓ c) Radioactive material, N.O.S., UN2982, Class 7

____ d) Compressed Gas, N.O.S., Non-flammable gas, UN1956, Class 2.2

____ e) Nitrogen, Compressed, Non-flammable gas, UN1066, Class 2.2

____ f) Nitric Acid, 40% or less, Corrosive material, NA1760, Class 8

____ g) Hydrochloric Acid, Corrosive material, UN1789, Class 8

2) IMMEDIATE HAZARDS TO HEALTH: no significant hazards

3) RISKS OF FIRE OR EXPLOSION:

✓ a) none

____ b) Compressed gas: could explode on exposure to intense heat or flame

4) IMMEDIATE PRECAUTIONS: Keep non-essential people away from area; notify radiation safety authorities

5) EMERGENCY FIRE MEASURES: Self-contained breathing apparatus and firefighters' protective gear should be used.

6) HANDLING SPILLS OR LEAKS: Do not touch exposed contents. See 4) above.

7) FIRST AID: Use standard first aid measures as required. Advise medical personnel that victim may be contaminated with low level radioactive material.

8) 24 hour emergency response number: (818)566-6933.

IPL 92-0306(5/94)

Nuclide Sr-89 Isotope # 346 Date Received 04/20/98 Received By mcp

INCOMING HEALTH PHYSICS

Radiation Level @ Package Surface , Radiation Level @ 1 meter From Package Surface

emovable Contamination Survey DPM/100 Square Centimeters

Incoming Health Physics Results Health Physics Approval By

Characterization of Radioactive Material Solution

Manufacturer: US EPA , Model # :9713-1 , Serial #: , NIST Traceable

Half-Life0.14 + or - years , Date of Calibration03/30/98 ,Time of Calibration: 05:00:00h

Chemical Form: , Sample Mass:5 + or - grams

Activity Concentration at TOC:65.3 nCi/g , Total Activity @ TOC:326.500 nCi

DPM Conversion Factor: 2220 , Activity @ Receipt in DPM 543,369 , Activity@ Receipt in uCi: 0.2448

Preparation of Primary Stock Solution

Preparation Date:06/08/98 , Activity on Prep Date : 277,395.3 DPM , 55,479.1 DPM /grams In The Ampoul

pCi per grams Of Standard In Ampoule at Prep= 24,990.6 ,Volume of Stock Solution: 1000 mL

Stock Solution Concentration: 277.4 DPM/ml @ prep Stock Solution Total Activity @ Prep in uCi: 0.1250

Stock Solution Concentration: 125.0 pCi/ ml at prep , Total Stock Solution Activity @ Prep124,952.8 pCi

Preparation of Working Solutions

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

rking Sol'n #					
TOC					
Volumetric or Gravimetric					
Stock Solution ID					
Stock Solution Used(ml or grams)					
DPM/ml of Stock Sol. At TOC					
Stock Solution TOC					
Working Solution Volume (ml)					
Total DPM@ TOC	0.0	0.0	0.0	0.0	0.0
DPM / ml @TOC	?	?	?	?	?
pCi/ml @ TOC					
pCi/Liter @ TOC					
Original Working Solution #					
Date Exhausted					

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

STANDARD PREPARATION WORKSHEET

Isotope Number: 346.00

Radionuclide: Sr89

Date of Preparation: 6/8/98

Prepared by: MB

Isotope Number of Stock Solution: EPA 9713-1

PREPARATION NOTES:

1) **Amount of Stock Solution measured in volumetric flask.**

GROSS AMPOULE WT.: 9.6939 g

EMPTY AMPOULE WT.: 4.6945 g

NET STANDARD WT.: 4.9994 g

ACTIVITY: 65.3 nCi/g → TOT. ACT.: 326 nCi = 326000 pCi

2) **Amount and type of dilution measured in volumetric flask.**

4.9994 g OF 346.00 no 6/8/98 DILUTED TO 1000 mL IN 4N HNO_3

3) **Final Concentration.**

326 pCi/mL @ TOC 4/30/98

DECAY CORRECTED ACTIVITY TO 6/8/98 : 125 pCi/mL Dw 6-8-98

4) **Notes, Comments, and Calculations.** DT 6-8-98

QC26 EFF 07-13-94:REV 2

rcvd. 4/20/98 JCP

Isotope 346
DU 4/28/98

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EXPOSURE RESEARCH LABORATORY
P.O. BOX 93478 • LAS VEGAS, NV 89193-3478

OFFICE OF
RESEARCH AND DEVELOPMENT

Calibration Certificate

Description

Principal radionuclide	**Strontium-89**
Half-life	**50.5 days**
Nominal activity	**326 nanocuries (approx.)**
Nominal mass of solution	**5 grams (approx.)**
Solution number	**9713-1**

Measurement

Activity of principal radionuclide	**65.3 nanocuries/gram**
Date and time of standardization	**March 30, 1998** 0400 hours PST

Method of measurement

The activity of the dilution was measured by liquid scintillation counting.
The activity of the primary solution was measured using 4π efficiency tracing.

Activity of daughter radionuclide

-NA-

Useful Life

We recommend that this solution should not be used after **September 30, 1998**.

521

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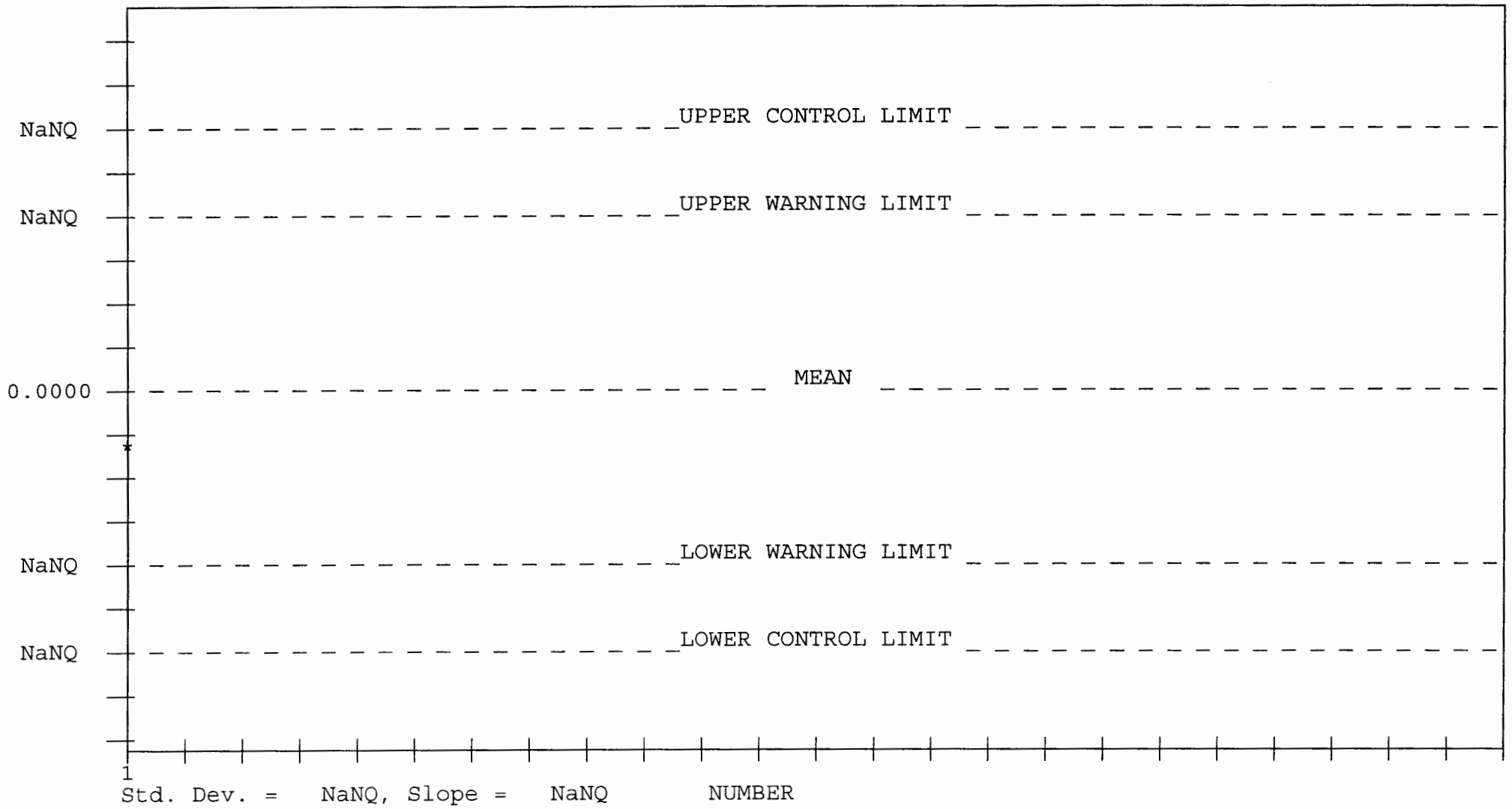
Individual Standard Deviation Chart, 1998-11-24 09:45

[SR89A],Strontium-89 activity,Total 905.89 MD Range: 08/01/1998 - 11/24/1998



Std. Dev. = NaNQ, Slope = NaNQ NUMBER

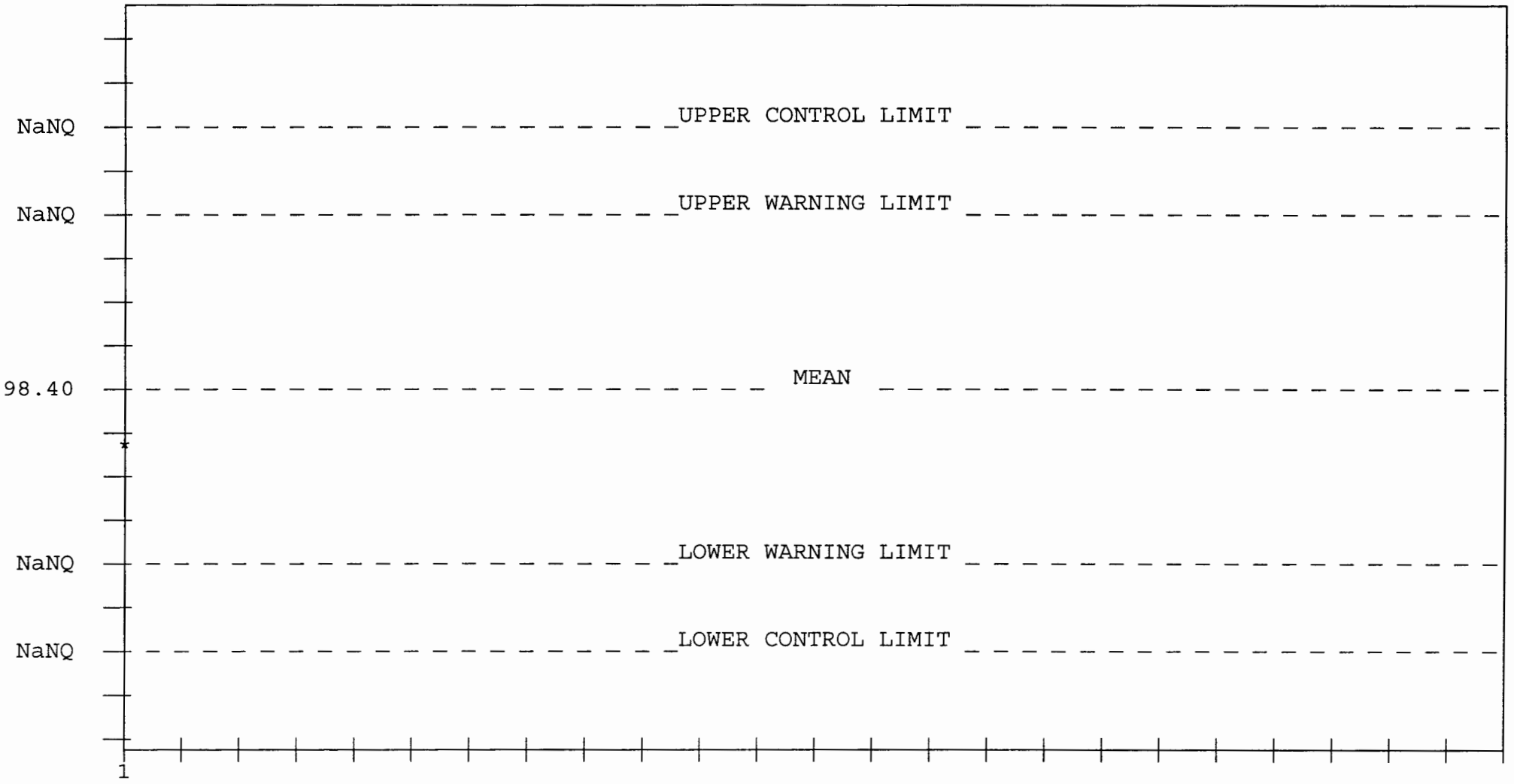
CONTROL CHART RAW DATA 1998-11-24 09:45

[SR89A],Strontium-89 activity,Total 905.89 MD Range: 08/01/1998 - 11/24/1998
Std Dev = NaNQ, UCL = NaNQ, UWL = NaNQ, LCL = NaNQ, LWL = NaNQ, Mean = 0.0000

Pos	RPD	Date	Time	Btch Grp	Smpl	Tst	Method	QC	User	Equip Code	Reag Code
1	0.0	11/23/1998	615	10871 1	5	1	905.89	MD	mdg		

Individual Standard Deviation Chart, 1998-11-24 09:45

[SR89A],Strontium-89 activity,Total 905.89 MS Range: 08/01/1998 - 11/24/1998



Std. Dev. = NaNQ, Slope = NaNQ NUMBER

CONTROL CHART RAW DATA 1998-11-24 09:45

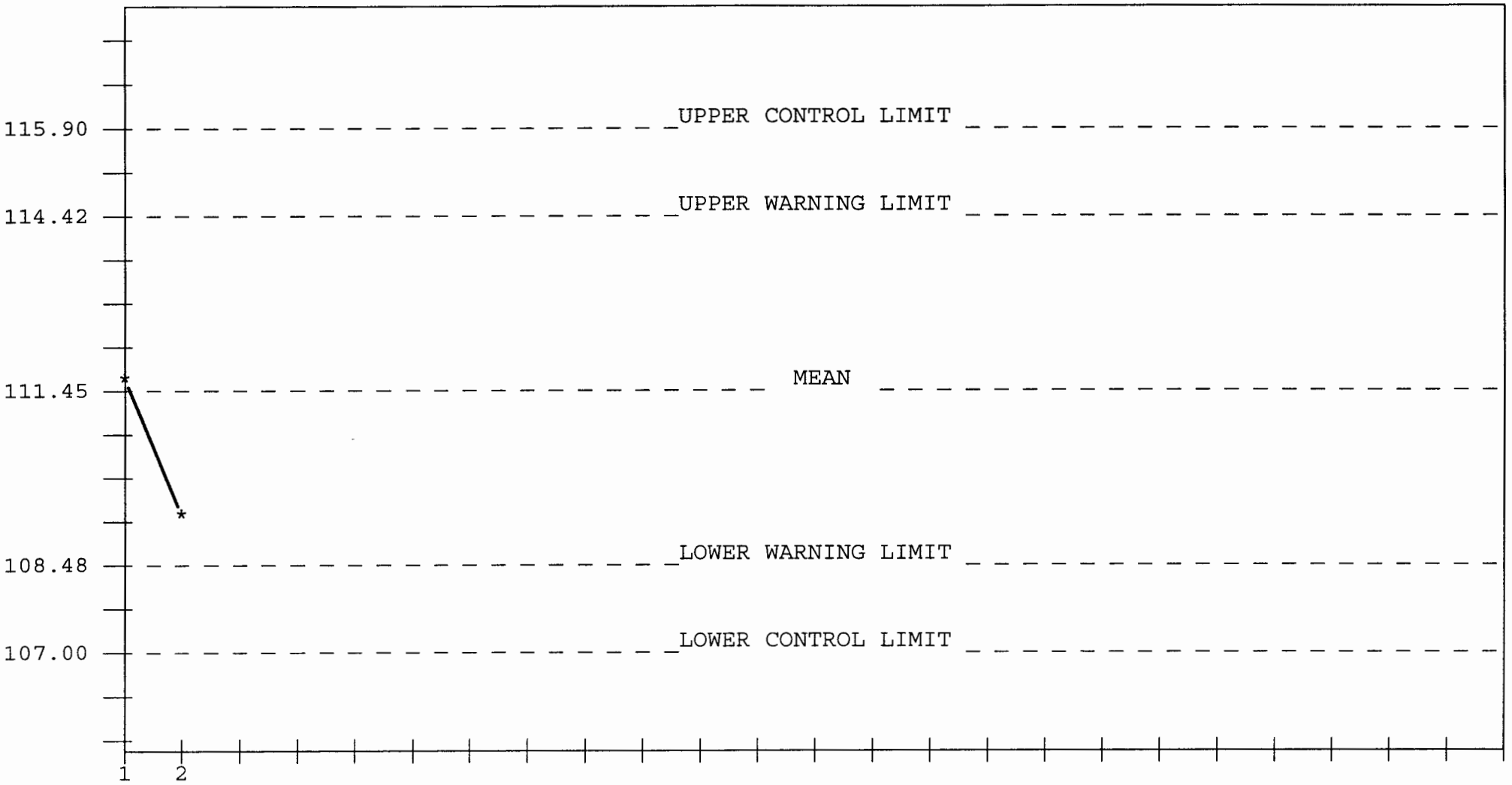
[SR89A],Strontium-89 activity,Total 905.89 MS Range: 08/01/1998 - 11/24/1998
Std Dev = NaNQ, UCL = NaNQ, UWL = NaNQ, LCL = NaNQ, LWL = NaNQ, Mean = 98.4000

Pos	% REC	Date	Time	Btch Grp	Smpl	Tst	Method	QC	User	Equip Code	Reag Code
1	98.4	08/19/1998	648	9735 1	3	1	905.89	MS	mdg		5391MS89

Individual Standard Deviation Chart, 1998-11-24 09:45

[SR90],Strontium-90,Total 905.89 MS

Range: 08/01/1998 - 11/24/1998



Std. Dev. = 1.4849, Slope = -2.1000 NUMBER

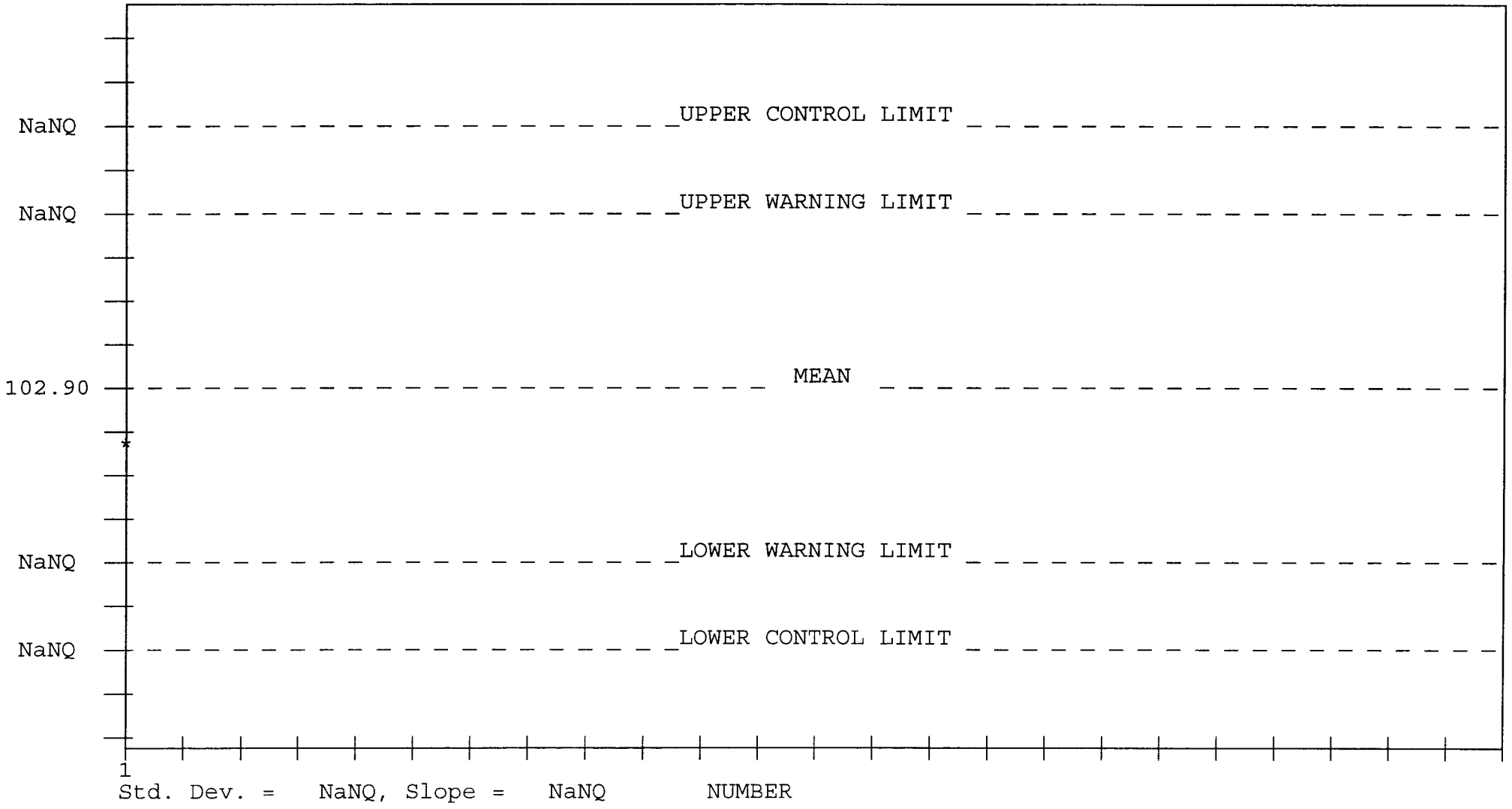
CONTROL CHART RAW DATA 1998-11-24 09:45

[SR90],Strontium-90,Total 905.89 MS Range: 08/01/1998 - 11/24/1998
Std Dev = 1.4849, UCL = 115.9048, UWL = 114.4198, LCL = 106.9952, LWL = 108.4802, Mean = 111.4500

Pos	% REC	Date	Time	Btch	Grp	Smpl	Tst	Method	QC	User	Equip Code	Reag Code
1	112.5	08/19/1998	648	9735	1	4	4	905.89	MS	mdg		5391MS90
2	110.4	11/23/1998	615	10871	1	10	4	905.89	MS	mdg		985980SR90

Individual Standard Deviation Chart, 1998-11-24 09:45

[SR89A],Strontium-89 activity,Total 905.89 MSD Range: 08/01/1998 - 11/24/1998



Std. Dev. = NaNQ, Slope = NaNQ NUMBER

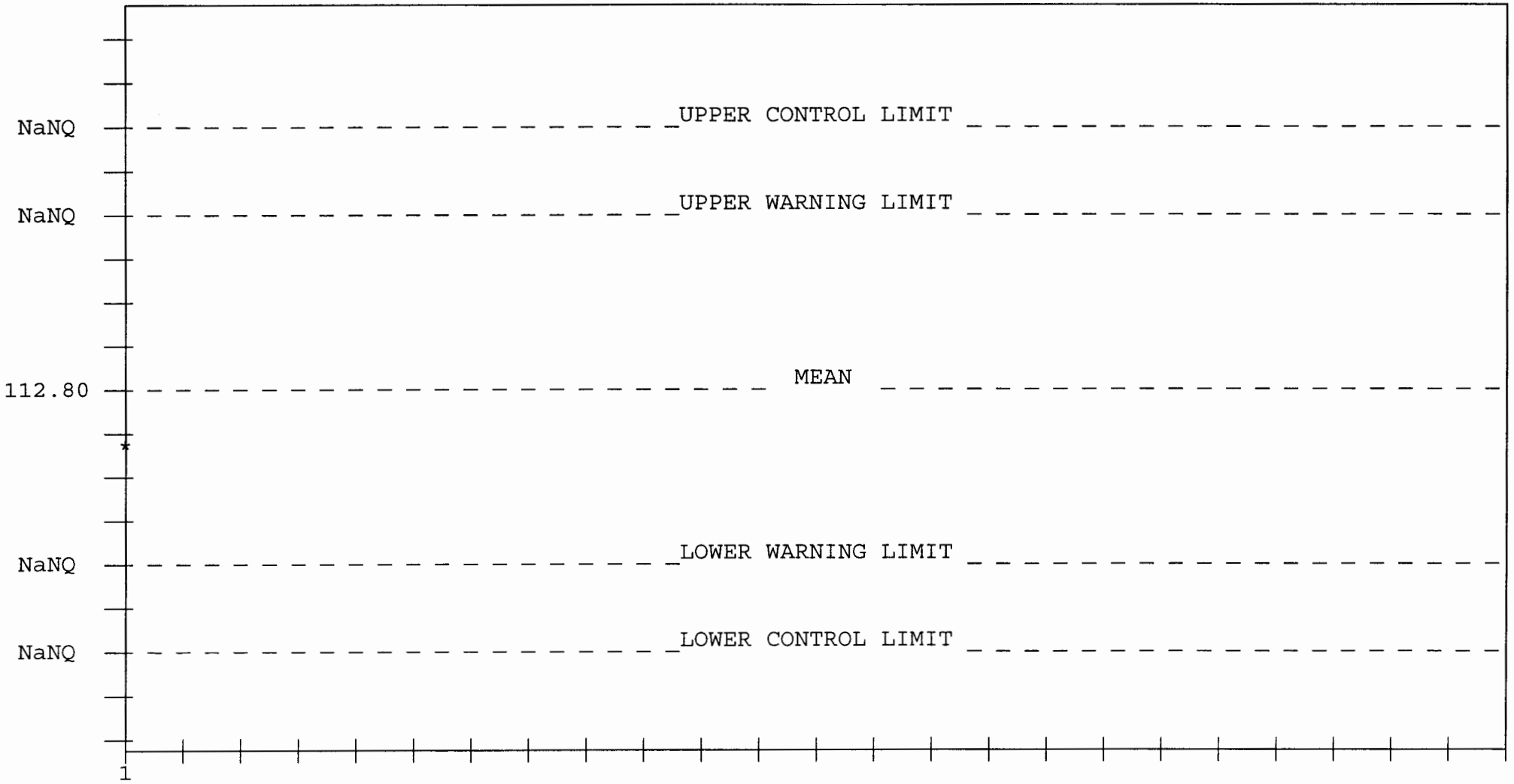
CONTROL CHART RAW DATA 1998-11-24 09:45

[SR89A],Strontium-89 activity,Total 905.89 MSD Range: 08/01/1998 - 11/24/1998
Std Dev = NaNQ, UCL = NaNQ, UWL = NaNQ, LCL = NaNQ, LWL = NaNQ, Mean = 102.9000

Pos	% REC	Date	Time	Btch Grp	Smpl	Tst	Method	QC	User	Equip Code	Reag Code
1	102.9	10/26/1998	713	10483 1	3	1	905.89	MSD	mdg		985847MSSR

Individual Standard Deviation Chart, 1998-11-24 09:45

[SR90],Strontium-90,Total 905.89 MSD Range: 08/01/1998 - 11/24/1998



Std. Dev. = NaNQ, Slope = NaNQ NUMBER

CONTROL CHART RAW DATA 1998-11-24 09:45

[SR90],Strontium-90,Total 905.89 MSD Range: 08/01/1998 - 11/24/1998
Std Dev = NaNQ, UCL = NaNQ, UWL = NaNQ, LCL = NaNQ, LWL = NaNQ, Mean = 112.8000

Pos	% REC	Date	Time	Btch Grp	Smpl	Tst	Method	QC	User	Equip Code	Reag Code
1	112.8	10/26/1998	713	10483 1	14	4	905.89	MSD	mdg		985847MSSR

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 46.02 nCi Serial Number A952

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.15%
Total uncertainty	± 2.97%

Daniel Thle
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 47.25 nCi Serial Number A953

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.14%
Total uncertainty	± 2.96%

Daniel J. Tuck — 7-13-93

Calibration Laboratory — Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 46.84 nCi Serial Number A954

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.15%
Total uncertainty	± 2.97%

Daniel L Hale — Calibration Laboratory

7-13-93 — Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 47.66 nCi Serial Number A955

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.14%
Total uncertainty	± 2.96%

Daniel Pikle
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 46.43 nCi Serial Number A956

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.15%
Total uncertainty	± 2.97%

Daniel J Kile — Calibration Laboratory

7-13-93 — Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 46.84 nCi Serial Number A957

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.15%
Total uncertainty	± 2.97%

Daniel I Tuh
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 47.97 nCi Serial Number A958

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.14%
Total uncertainty	± 2.96%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 47.73 nCi Serial Number A959

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.14%
Total uncertainty	± 2.96%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 48.48 nCi Serial Number A960

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.14%
Total uncertainty	± 2.96%

Daniel J Kile
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2705 BETA STANDARD

Radionuclide Cs-137 Activity 48.35 nCi Serial Number A961

Reference Date July 1, 1993 Half-Life[1] 30.0 ± 0.2 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
beta	E_{avg} = 188 E_{max} = 1175	100

SOURCE DESCRIPTION

The source consists of uniform array of aliquots of a calibrated Cs-137 solution deposited in a 2" diameter by 0.25" thick stainless steel planchet. The active element is sealed beneath 0.9 mg/cm² aluminized mylar.

METHOD OF CALIBRATION

The source was calibrated by dispensing a gravimetric aliquot of a solution calibrated on a high purity Germanium detector using Cs-137 gamma emission efficiency at 661.660 keV. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.82%
Weighing uncertainty	± 0.14%
Total uncertainty	± 2.96%

Daniel Thle
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 3.944 nCi Serial Number A962

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.85%
Total uncertainty	± 3.59%

Daniel Thle
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 5.527 nCi Serial Number A963

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 1.21%
Total uncertainty	± 3.95%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 4.805 nCi Serial Number A964

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.61%
Total uncertainty	± 3.35%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 4.628 nCi Serial Number A965

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.97%
Total uncertainty	± 3.71%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 4.837 nCi Serial Number A966

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.57%
Total uncertainty	± 3.31%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 5.188 nCi Serial Number A967

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.69%
Total uncertainty	± 3.43%

Daniel L Thle — Calibration Laboratory

7-13-93 — Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 3.583 nCi Serial Number A968

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 1.33%
Total uncertainty	± 4.07%

Daniel Thle
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 5.258 nCi Serial Number A969

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.81%
Total uncertainty	± 3.55%

Daniel J Thle
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 5.441 nCi Serial Number A970

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.73%
Total uncertainty	± 3.47%

Daniel J. Thola
Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CERTIFICATE OF CALIBRATION

MODEL CAL2710 ALPHA STANDARD

Radionuclide Am-241 Activity 4.608 nCi Serial Number A971

Reference Date July 1, 1993 Half Life[1] 432.7 ± 0.5 years

PRINCIPAL EMISSIONS[1]

Type	Energy (keV)	Intensity (%)
alpha	5388.40	1.4
alpha	5443.01	12.8
alpha	5485.70	85.2

SOURCE DESCRIPTION

The activity is electrodeposited and bonded at elevated temperature in a 38 mm active diameter in a 50.8 mm diameter by 6.35 mm thick stainless steel planchet.

METHOD OF CALIBRATION

The source was calibrated in a gas flow proportional counter against an efficiency established using calibration standard N1028-E-2. This standard is implicitly traceable to the National Institute of Standards and Technology.

North American Scientific, Inc. actively participates in the Radioactivity Measurements Assurance Program conducted by the National Institute of Standards and Technology in cooperation with the U.S. Council for Energy Awareness.

TOTAL UNCERTAINTY (99% Confidence Level)

Systematic uncertainty	± 2.74%
Random uncertainty	± 0.89%
Total uncertainty	± 3.63%

Calibration Laboratory

7-13-93
Date

REFERENCES

(1) Table of Radioactive Isotopes, 7th edition, 1986.

•LEAK TEST CERTIFICATION ON REVERSE•

North American Scientific, Inc. 7435 Greenbush Ave., North Hollywood, CA 91605 (818) 503-9201 Fax (818) 503-0764

CT & E ENVIRONMENTAL SERVICES, INC
DATA COMPLETENESS CHECKLIST
ALPHA SPECTROMETER

Isotopic Uranium

Laboratory Job Number: 985847

Item #	Title	In Pkg	Comments
1)	Formulas Used in Calculations	✓	11-24-98 cy
2)	Precipitation Information	✓	11-24-98 cy
3)	Instrument Printouts	✓	11-24-98 cy
4)	Sample Measurement Activity Calculation Report	✓	11-24-98 cy
5)	Instrument Weekly Calibration	✓	11-24-98 cy
6)	Instrument Backgrounds	✓	11-24-98 cy
7)	Resolution Checks (FWHM)	✓	11-24-98 cy
8)	Standards Preparation Log	✓	11-24-98 cy
9)	Standards Certifications	✓	11-24-98 cy
10)	Control Charts	✓	11-24-98 cy
11)	Preparation for Instrument Standards	✓	11-24-98 cy
12)	Sealed Source Information	✓	11-24-98 cy
13)	"The Source" Certificates of Calibration	✓	11-24-98 cy

Comments: ☆ See Isotopic Plutonium

☆☆ See Isotopic Plutonium

CORELAB

CORE LABORATORIES

CORE LABORATORIES

SAMPLE VOLUME BOOK

SOP CA-GLR-01.0 Rev 2

Analysis ISO U Analyst JH Date 10-16-98

Sample ID	Sample Vol L,g	Sample Conc	Calculated Vol/Wt L,g	Sample Matrix	Comments
985847-1	0.5L	N/A	N/A	H_2O	Clear liquid
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
985877-1					
985892-1					
2					
2*MS					
2*MSD					
3/3MD					
985898-1					
MBLU1016	1.0L				QC
LCSLU1016					

JH 10-16-98

Spike √	Trace √	Nuclide	Isotope Number	Expiration Date	Activity pCi/mL	Vol mL	Standard Control ID	Spiked/ Witnessed By
✓		ISO U	297.13	5-18-99	U238 1.2	3mL	5892-2*MS/2*MSD	JH
					U234 1.2		LCSLU1016	
	✓	U232	185.33	2-27-99	1.2	3mL	All Samples	

JH 10-16-98

FORM RADCHEM-49, REV # 3

Book Number 98031 Page Number 45

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-1 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 3 Input 1 (Det #25)
Efficiency: 24.06% Chem. Recovery: 78.48%
Total Eff.: 18.88% Manual:100.00%
CALIBRATION: 3472.31 + 5.34984 * Chn + -0.000763 Chn **2 keV
Original: 3472.31 + 5.3315 * Chn + -0.000763 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03494.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:09:19
Live Time: 7200.00 Real Time: 7202.98 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3594.CHN
Background File: C:\USER\ALPHA\BKGND\B0003550.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3594

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	252.56	228	273	4.00	5.00	1.44	40.56	0.34
2.	177.92	163	198	4.00	1.00	0.72	2.28	0.02
3.	138.18	108	153	2.00	2.00	1.44	13.56	0.11
Tracer	364.30	329	384	16.00	9.00	1.92	181.08	1.51

D E C A Y C O R R E C T E D R E S U L T S

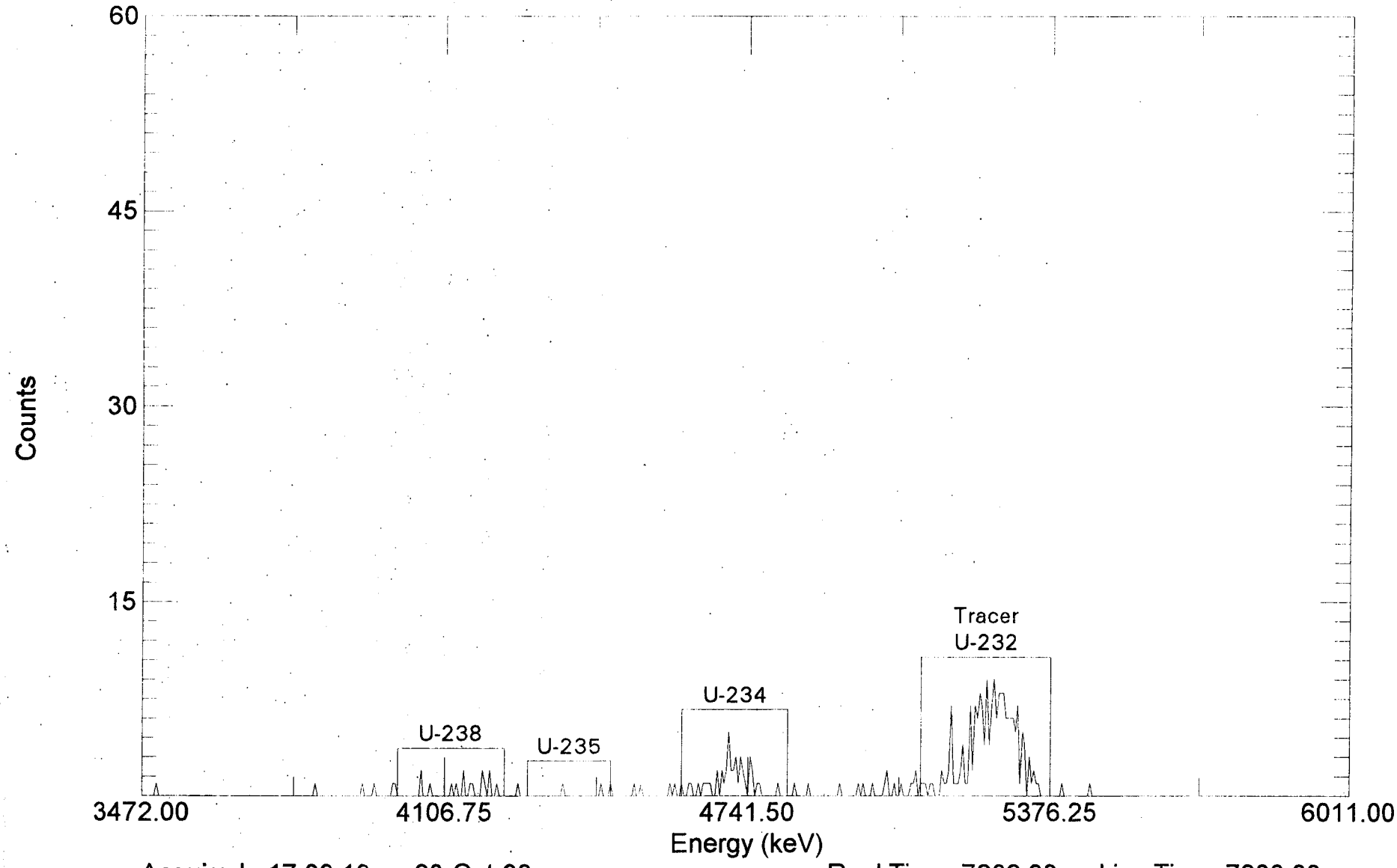
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	19.858	2.0000	1.79	0.28	31.35
2.	U-235	0.55	4400.00	20.313	2.0000	0.10	0.25	149.92
3.	U-238	0.77	4197.00	10.278	1.0000	0.60	0.28	56.14
Tracer	U-232	1.00	5320.00	76.703	8.0000	7.99	0.30	14.49

T O T A L S		% Recovery
Gross Count	271.0000	100.00
Net Area	257.0800	94.86
Background	13.9200	5.14
Composite Fit	243.0000	89.67
Residuals	14.0800	5.20

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3594 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:09:19 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3594.CHN
Sample: 985847-1 ISO U

Real Time: 7202.98 s. Live Time: 7200.00 s.
Detector: #25 MCB 3 Input 1 (Det #25)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-2 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 3 Input 2 (Det #26)
Efficiency: 25.07% Chem. Recovery: 67.30%
Total Eff.: 16.87% Manual:100.00%
CALIBRATION: 3431.74 + 5.46953 * Chn + -0.000771 Chn **2 keV
Original: 3431.74 + 5.4102 * Chn + -0.000771 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03495.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:09:29
Live Time: 7200.00 Real Time: 7202.98 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3595.CHN
Background File: C:\USER\ALPHA\BKGND\B0003551.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3595

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	254.70	230	275	2.00	2.00	0.72	20.28	0.17
2.	181.68	167	202	0.00	0.00	0.00	0.00	0.00
3.	142.79	113	158	4.00	1.00	0.48	15.52	0.13
Tracer	363.90	329	384	2.00	8.00	1.20	161.80	1.35

D E C A Y C O R R E C T E D R E S U L T S

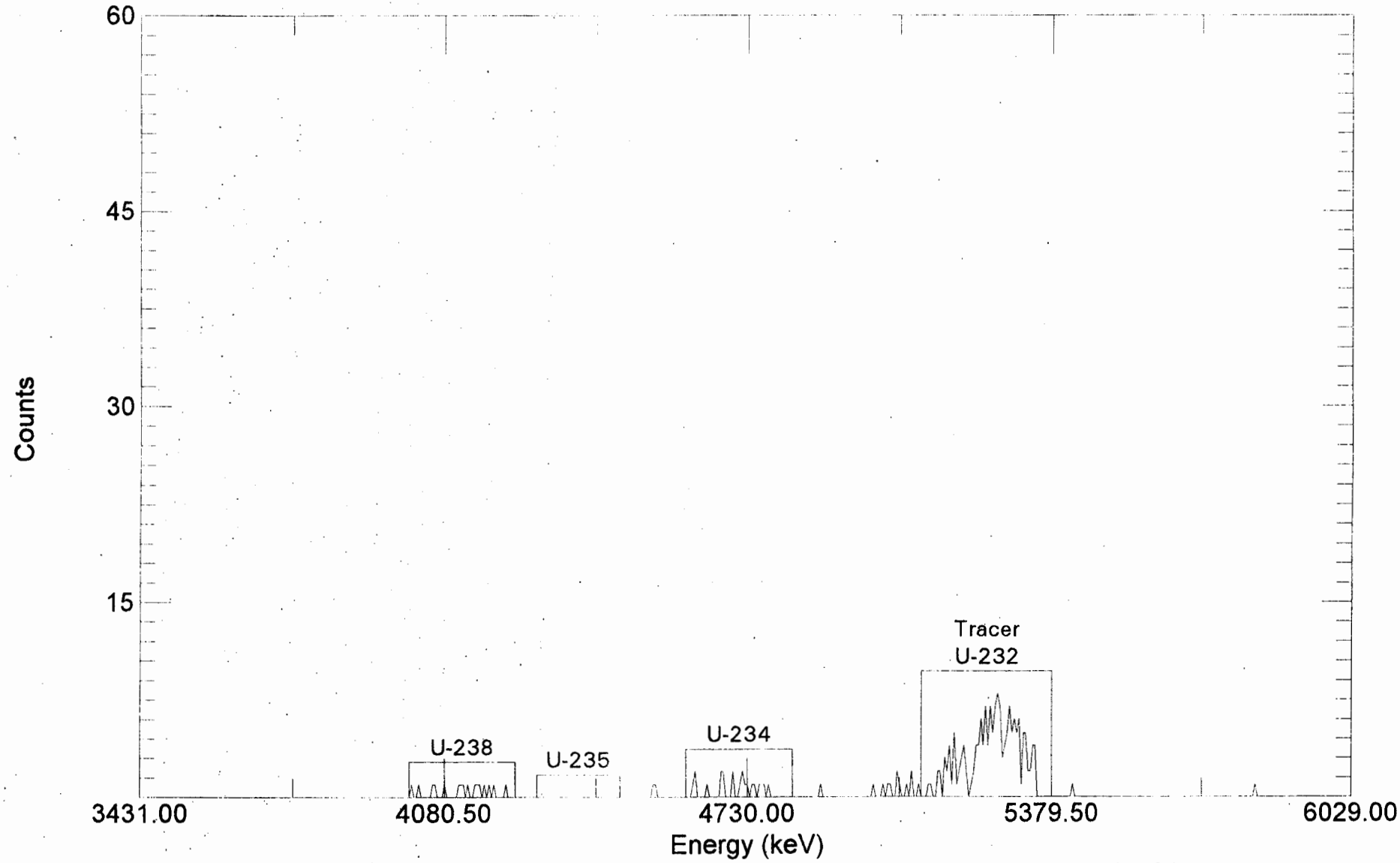
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	10.154	1.0000	1.00	0.28	44.33
2.	U-235	0.55	4400.00	0.000	0.0000	0.00	0.19	0.00
3.	U-238	0.77	4197.00	20.997	2.0000	0.77	0.26	50.56
Tracer	U-232	1.00	5320.00	9.817	1.0000	7.99	0.31	15.35

T O T A L S		% Recovery
Gross Count	216.0000	100.00
Net Area	208.3200	96.44
Background	7.6800	3.56
Composite Fit	200.0000	92.59
Residuals	8.3200	3.85

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3595 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:09:29 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3595.CHN
Sample: 985847-2 ISO U

Real Time: 7202.98 s. Live Time: 7200.00 s.
Detector: #26 MCB 3 Input 2 (Det #26)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-3 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 3 Input 3 (Det #27)
Efficiency: 20.60% Chem. Recovery: 94.05%
Total Eff.: 19.37% Manual:100.00%
CALIBRATION: 3420.19 + 5.42884 * Chn + -0.000738 Chn **2 keV
Original: 3420.19 + 5.428 * Chn + -0.000738 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03496.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:09:35
Live Time: 7200.00 Real Time: 7202.98 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3596.CHN
Background File: C:\USER\ALPHA\BKGND\B0003552.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3596

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	258.61	234	279	6.00	1.00	0.24	12.76	0.11
2.	185.14	170	205	0.00	0.00	0.48	0.00	0.00
3.	145.99	116	161	2.00	1.00	0.00	2.00	0.02
Tracer	368.40	333	388	6.00	13.00	1.20	185.80	1.55

D E C A Y C O R R E C T E D R E S U L T S

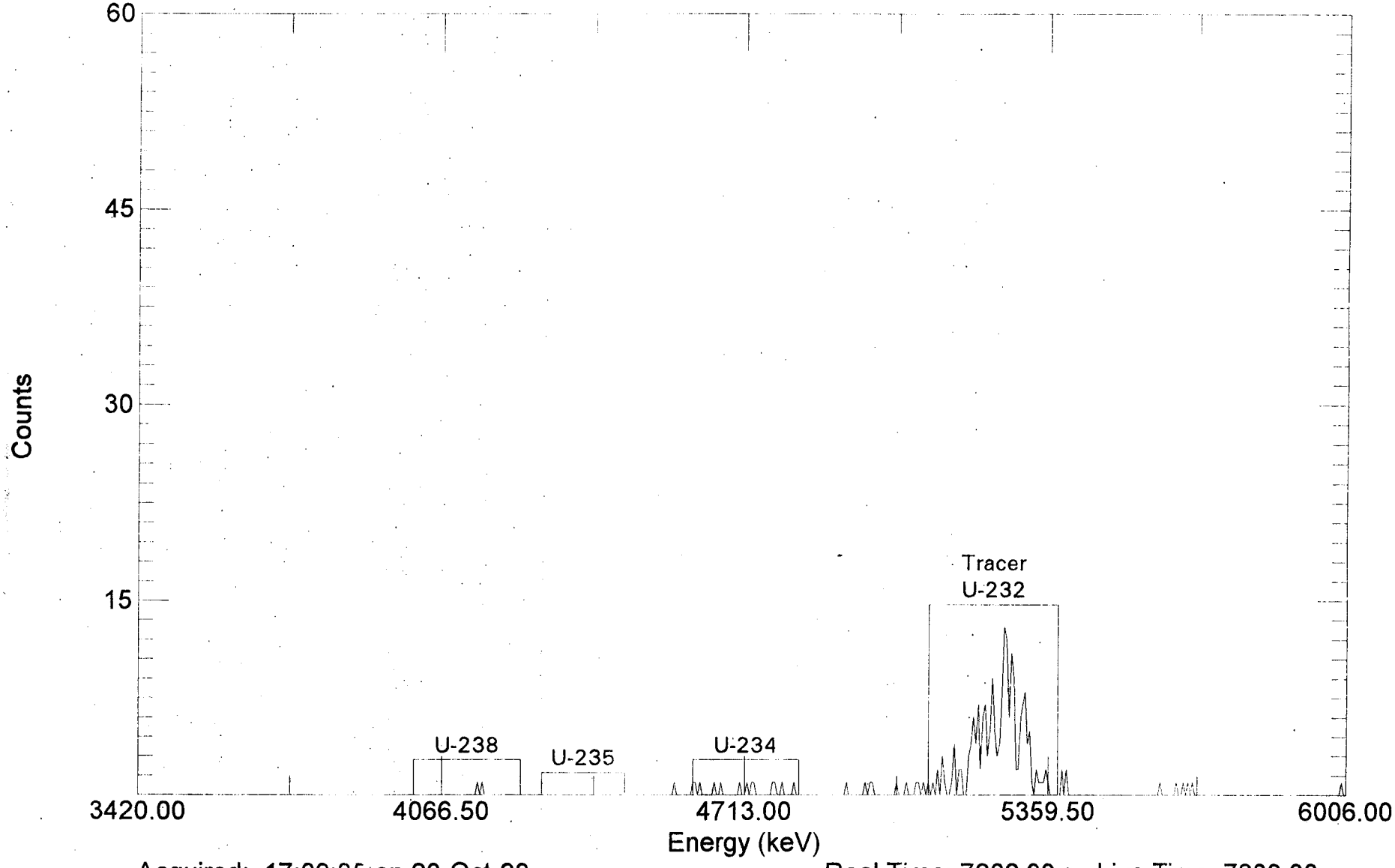
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	30.283	3.0000	0.55	0.21	55.41
2.	U-235	0.55	4400.00	0.000	0.0000	0.00	0.23	0.00
3.	U-238	0.77	4197.00	10.427	1.0000	0.09	0.17	138.59
Tracer	U-232	1.00	5320.00	29.311	3.0000	7.99	0.27	14.33

T O T A L S		% Recovery
Gross Count	222.0000	100.00
Net Area	212.4000	95.68
Background	9.6000	4.32
Composite Fit	202.0000	90.99
Residuals	10.4000	4.68

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3596 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:09:35 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3596.CHN
Sample: 985847-3 ISO U

Real Time: 7202.98 s. Live Time: 7200.00 s.
Detector: #27 MCB 3 Input 3 (Det #27)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-4 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 3 Input 4 (Det #28)
Efficiency: 21.64% Chem. Recovery: 90.18%
Total Eff.: 19.52% Manual:100.00%
CALIBRATION: 3375.52 + 5.77492 * Chn + -0.0014 Chn **2 keV
Original: 3375.52 + 5.8252 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03497.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:09:43
Live Time: 7200.00 Real Time: 7203.00 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3597.CHN
Background File: C:\USER\ALPHA\BKGND\B0003553.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3597

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	258.50	234	279	4.00	2.00	0.48	12.52	0.10
2.	185.77	171	206	2.00	1.00	0.24	1.76	0.01
3.	147.53	118	163	2.00	2.00	0.24	9.76	0.08
Tracer	369.88	335	390	6.00	11.00	3.84	187.16	1.56

D E C A Y C O R R E C T E D R E S U L T S

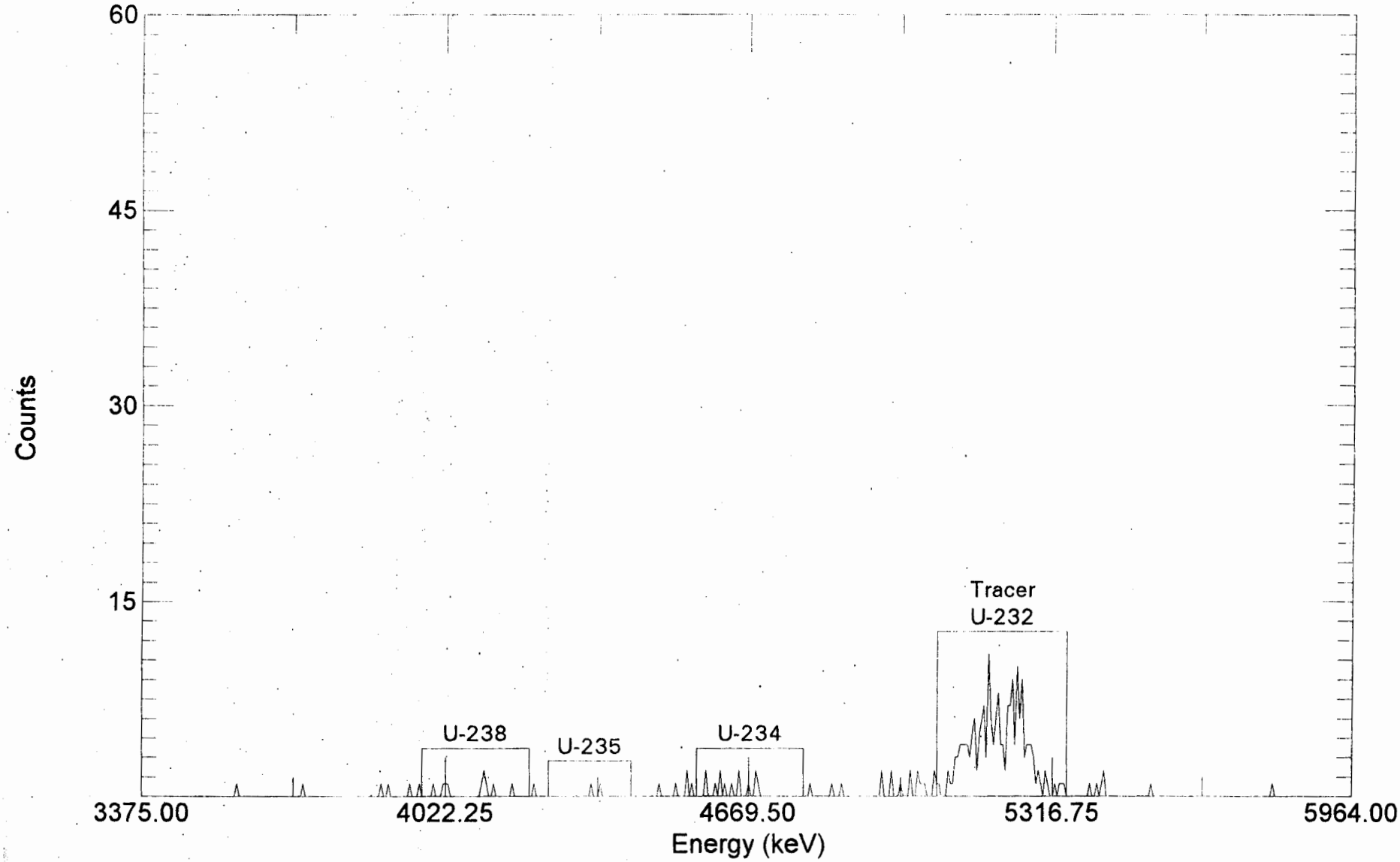
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	20.204	2.0000	0.53	0.23	56.50
2.	U-235	0.55	4400.00	10.510	1.0000	0.08	0.21	158.04
3.	U-238	0.77	4197.00	10.724	1.0000	0.42	0.21	63.55
Tracer	U-232	1.00	5320.00	28.436	3.0000	7.99	0.34	14.18

T O T A L S		% Recovery
Gross Count	252.0000	100.00
Net Area	233.0400	92.48
Background	18.9600	7.52
Composite Fit	216.0000	85.71
Residuals	17.0400	6.76

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3597 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:09:43 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3597.CHN
Sample: 985847-4 ISO U

Real Time: 7203.00 s. Live Time: 7200.00 s.
Detector: #28 MCB 3 Input 4 (Det #28)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-5 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 3 Input 5 (Det #29)
Efficiency: 24.12% Chem. Recovery: 83.68%
Total Eff.: 20.18% Manual:100.00%
CALIBRATION: 3359.46 + 5.86388 * Chn + -0.0014 Chn **2 keV
Original: 3359.46 + 5.8962 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03498.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:09:56
Live Time: 7200.00 Real Time: 7202.98 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3598.CHN
Background File: C:\USER\ALPHA\BKGND\B0003554.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3598

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	257.15	232	277	2.00	2.00	0.48	17.52	0.15
2.	185.68	171	206	2.00	1.00	0.00	2.00	0.02
3.	148.06	118	163	2.00	3.00	0.24	11.76	0.10
Tracer	366.39	331	386	10.00	12.00	1.44	193.56	1.61

D E C A Y C O R R E C T E D R E S U L T S

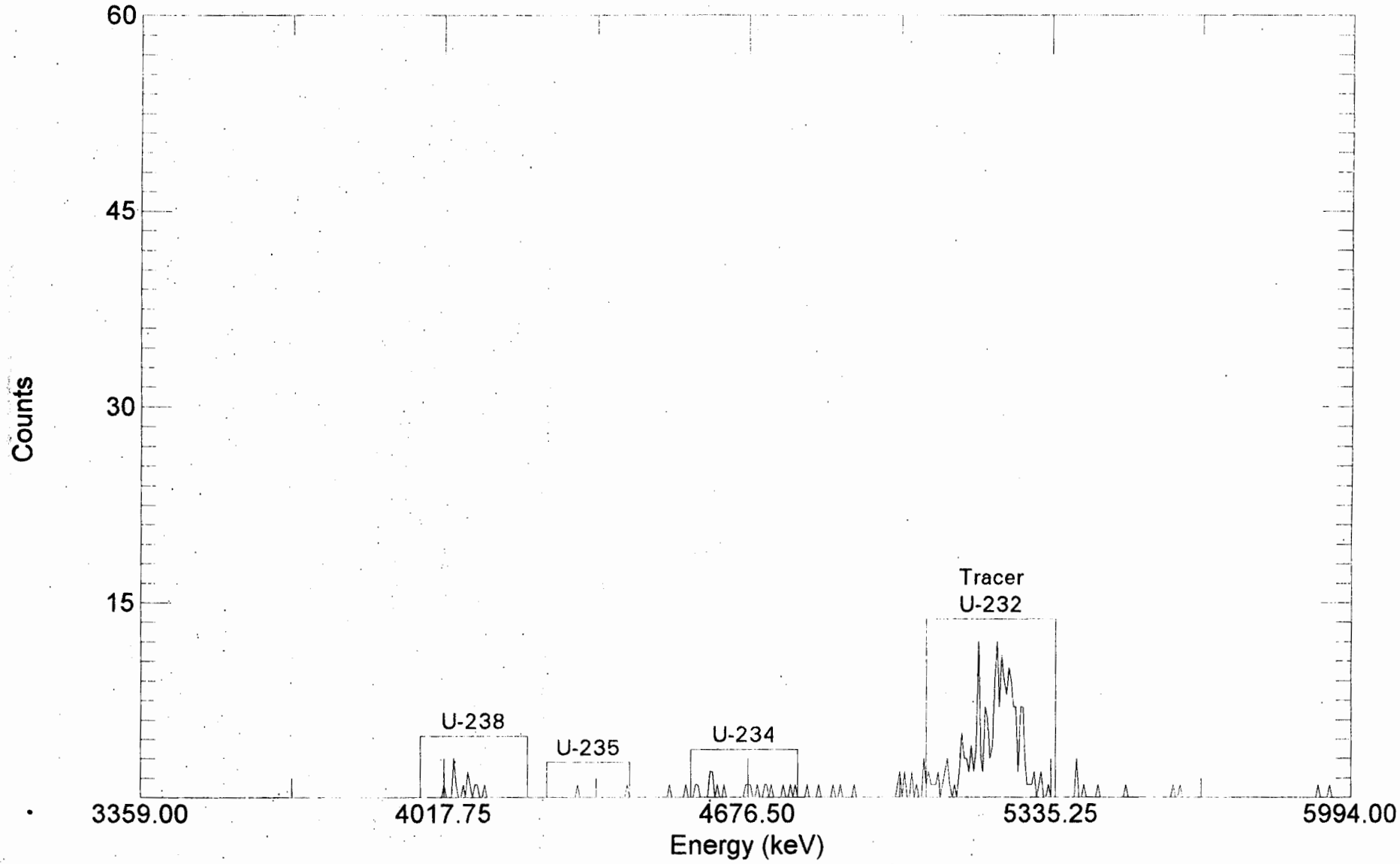
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	10.288	1.0000	0.72	0.22	47.50
2.	U-235	0.55	4400.00	10.688	1.0000	0.08	0.16	138.59
3.	U-238	0.77	4197.00	10.899	1.0000	0.49	0.20	57.77
Tracer	U-232	1.00	5320.00	48.380	5.0000	7.99	0.26	14.04

T O T A L S		% Recovery
Gross Count	255.0000	100.00
Net Area	243.4800	95.48
Background	11.5200	4.52
Composite Fit	227.0000	89.02
Residuals	16.4800	6.46

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3598 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:09:56 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3598.CHN
Sample: 985847-5 ISO U

Real Time: 7202.98 s. Live Time: 7200.00 s.
Detector: #29 MCB 3 Input 5 (Det #29)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-6 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 3 Input 6 (Det #30)
Efficiency: 20.73% Chem. Recovery:102.25%
Total Eff.: 21.20% Manual:100.00%
CALIBRATION: 3362.2 + 5.92172 * Chn + -0.0016 Chn **2 keV
Original: 3362.2 + 5.9334 * Chn + -0.0016 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03499.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:10:03
Live Time: 7200.00 Real Time: 7202.98 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3599.CHN
Background File: C:\USER\ALPHA\BKGND\B0003555.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3599

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	256.29	231	276	2.00	2.00	0.24	15.76	0.13
2.	184.44	169	204	0.00	0.00	0.48	0.00	0.00
3.	146.79	117	162	2.00	1.00	0.24	8.76	0.07
Tracer	367.01	332	387	4.00	12.00	0.72	203.28	1.69

D E C A Y C O R R E C T E D R E S U L T S

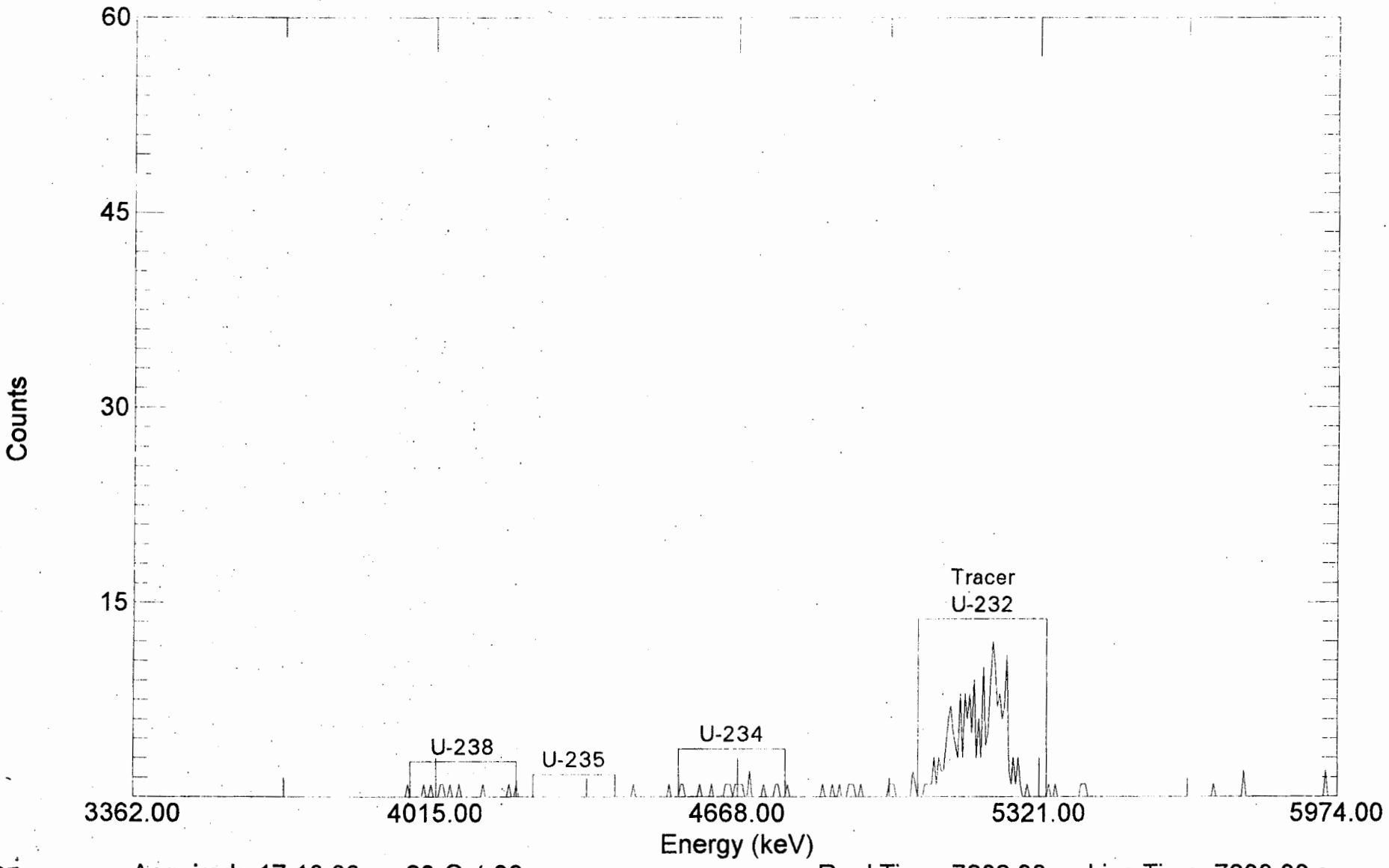
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	10.203	1.0000	0.62	0.19	49.77
2.	U-235	0.55	4400.00	0.000	0.0000	0.00	0.21	0.00
3.	U-238	0.77	4197.00	10.904	1.0000	0.34	0.19	67.17
Tracer	U-232	1.00	5320.00	18.989	2.0000	7.99	0.22	13.72

T O T A L S		% Recovery
Gross Count	256.0000	100.00
Net Area	247.1200	96.53
Background	8.8800	3.47
Composite Fit	229.0000	89.45
Residuals	18.1200	7.08

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3599 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:10:03 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3599.CHN
Sample: 985847-6 ISO U

Real Time: 7202.98 s. Live Time: 7200.00 s.
Detector: #30 MCB 3 Input 6 (Det #30)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-7 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 3 Input 7 (Det #31)
Efficiency: 23.04% Chem. Recovery: 84.54%
Total Eff.: 19.48% Manual:100.00%
CALIBRATION: 3495.42 + 5.12202 * Chn + -0.000155 Chn **2 keV
Original: 3495.42 + 5.0692 * Chn + -0.000155 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03500.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:10:10
Live Time: 7200.00 Real Time: 7202.94 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3600.CHN
Background File: C:\USER\ALPHA\BKGND\B0003556.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3600

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	251.70	227	272	4.00	2.00	0.72	11.28	0.09
2.	177.56	163	198	0.00	0.00	0.24	0.00	0.00
3.	137.55	108	153	2.00	1.00	0.24	3.76	0.03
Tracer	360.15	325	380	4.00	15.00	1.20	186.80	1.56

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	20.176	2.0000	0.48	0.24	60.30
2.	U-235	0.55	4400.00	0.000	0.0000	0.00	0.21	0.00
3.	U-238	0.77	4197.00	10.159	1.0000	0.16	0.21	104.44
Tracer	U-232	1.00	5320.00	20.041	2.0000	7.99	0.26	14.29

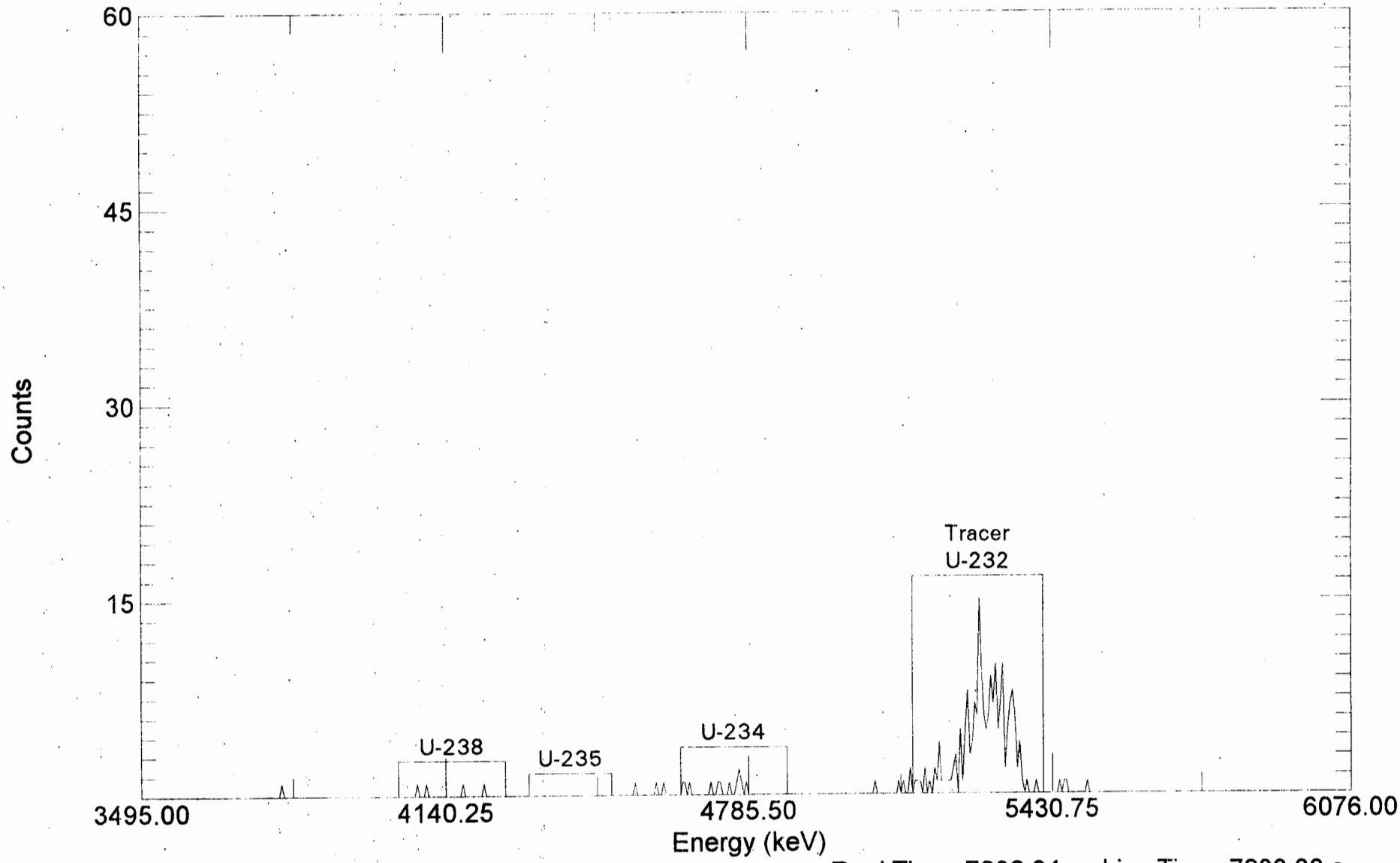
T O T A L S		% Recovery
Gross Count	217.0000	100.00
Net Area	210.0400	96.79
Background	6.9600	3.21
Composite Fit	204.0000	94.01
Residuals	6.0400	2.78

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3600

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:10:10 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3600.CHN
Sample: 985847-7 ISO U

Real Time: 7202.94 s. Live Time: 7200.00 s.
Detector: #31 MCB 3 Input 7 (Det #31)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-8 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 3 Input 8 (Det #32)
Efficiency: 21.82% Chem. Recovery: 94.87%
Total Eff.: 20.70% Manual:100.00%
CALIBRATION: 3431.77 + 5.37504 * Chn + -0.000531 Chn **2 keV
Original: 3431.77 + 5.3512 * Chn + -0.000531 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03501.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:10:16
Live Time: 7200.00 Real Time: 7202.96 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3601.CHN
Background File: C:\USER\ALPHA\BKGND\B0003557.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3601

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	256.36	231	276	2.00	2.00	1.44	8.56	0.07
2.	183.46	168	203	2.00	1.00	0.48	0.52	0.00
3.	144.43	114	159	2.00	1.00	0.72	2.28	0.02
Tracer	364.42	329	384	2.00	13.00	0.48	198.52	1.65

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	10.206	1.0000	0.34	0.26	72.71
2.	U-235	0.55	4400.00	10.360	1.0000	0.02	0.21	382.10
3.	U-238	0.77	4197.00	10.443	1.0000	0.09	0.23	149.92
Tracer	U-232	1.00	5320.00	9.976	1.0000	7.99	0.21	13.89

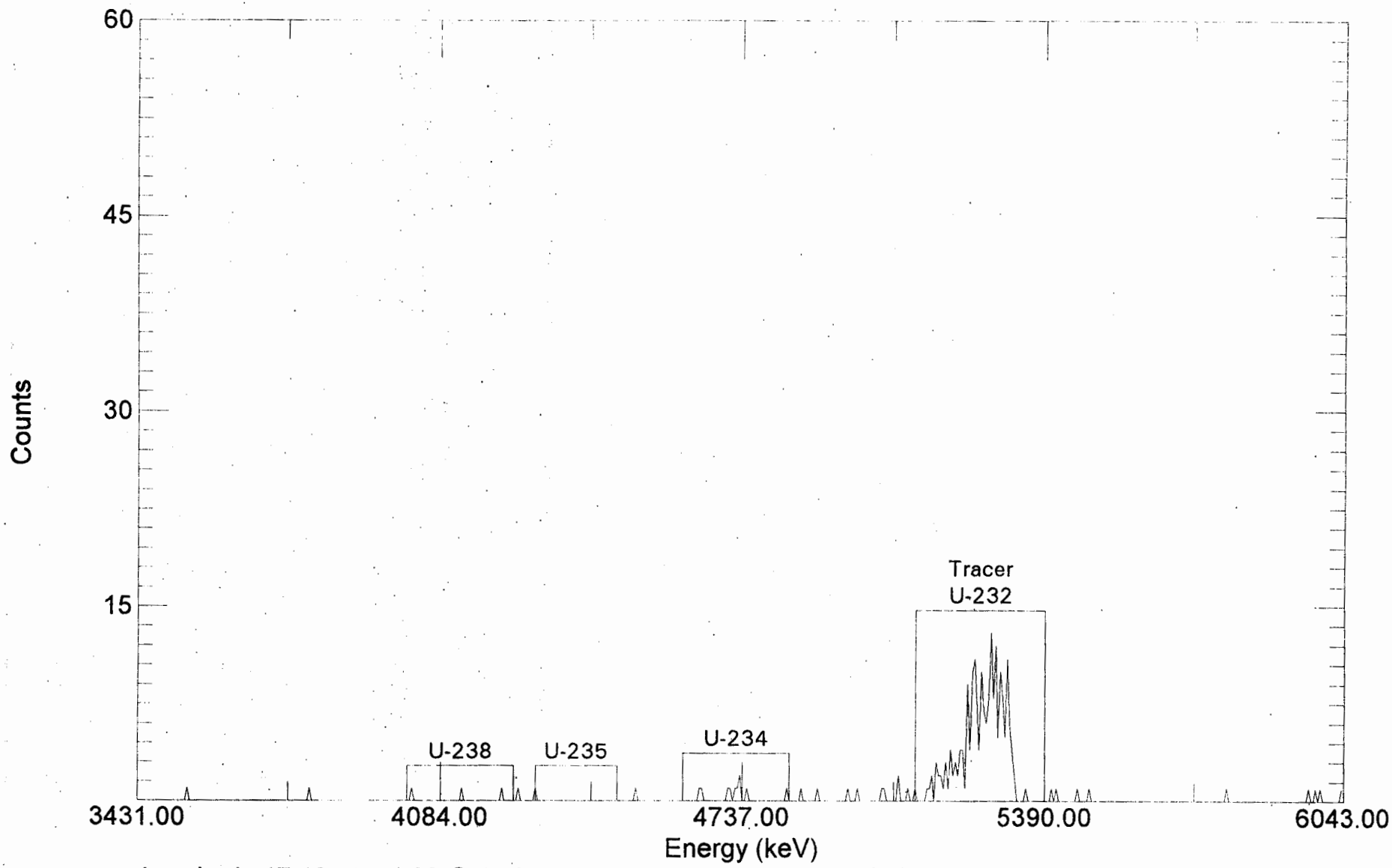
T O T A L S		% Recovery
Gross Count	235.0000	100.00
Net Area	222.2800	94.59
Background	12.7200	5.41
Composite Fit	213.0000	90.64
Residuals	9.2800	3.95

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3601

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:10:16 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3601.CHN
Sample: 985847-8 ISO U

Real Time: 7202.96 s. Live Time: 7200.00 s.
Detector: #32 MCB 3 Input 8 (Det #32)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-9 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 4 Input 1 (Det #33)
Efficiency: 24.86% Chem. Recovery: 81.60%
Total Eff.: 20.29% Manual:100.00%
CALIBRATION: 3455.85 + 5.32052 * Chn + -0.000964 Chn **2 keV
Original: 3455.85 + 5.3442 * Chn + -0.000964 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03502.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:10:27
Live Time: 7200.00 Real Time: 7206.76 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3602.CHN
Background File: C:\USER\ALPHA\BKGND\B0003558.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3602

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	260.16	235	280	2.00	2.00	0.24	11.76	0.10
2.	183.56	169	204	2.00	2.00	0.00	4.00	0.03
3.	143.01	113	158	2.00	1.00	0.24	1.76	0.01
Tracer	375.98	341	396	2.00	12.00	1.44	194.56	1.62

D E C A Y C O R R E C T E D R E S U L T S

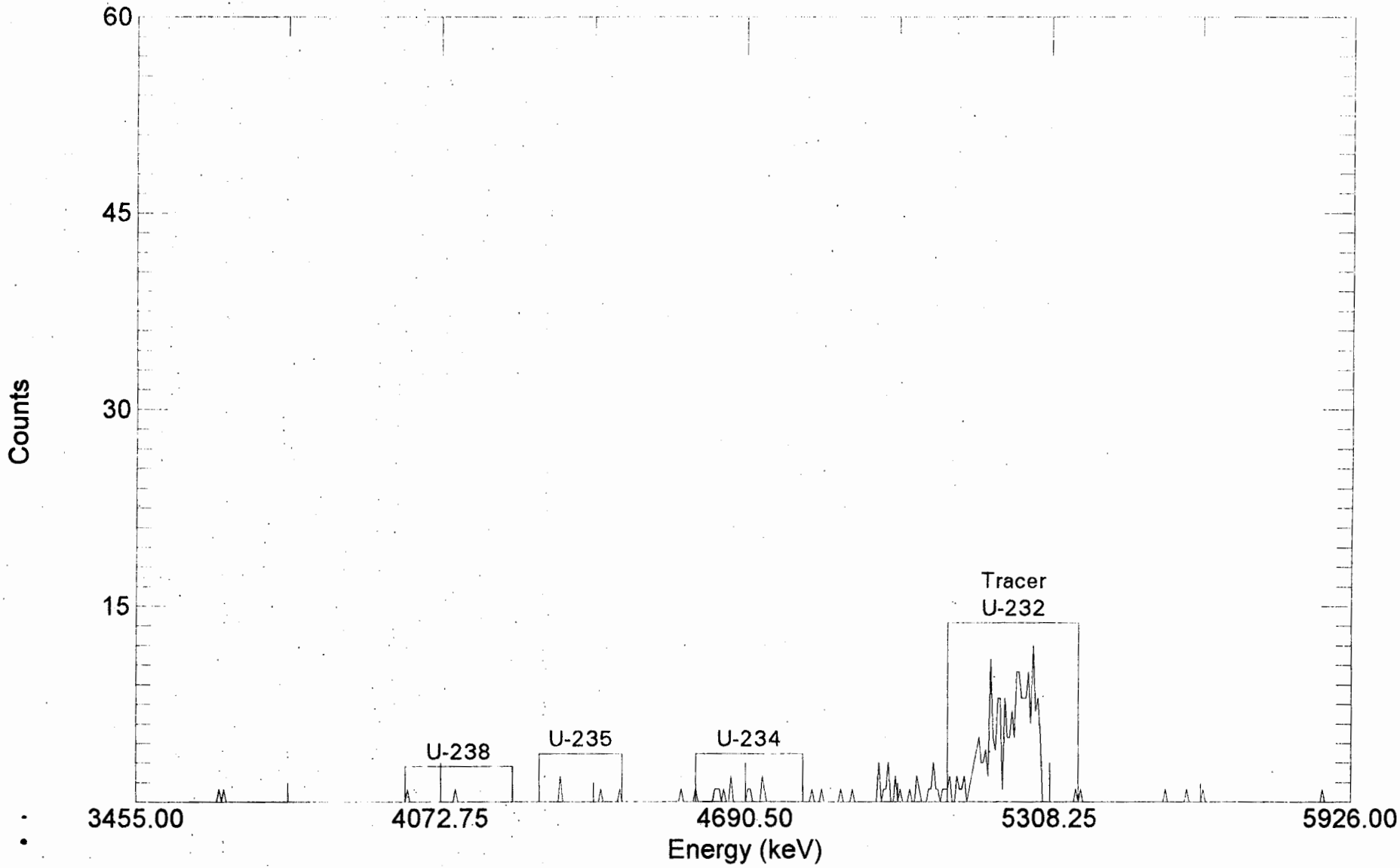
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	9.638	1.0000	0.48	0.20	57.77
2.	U-235	0.55	4400.00	9.933	1.0000	0.16	0.16	98.00
3.	U-238	0.77	4197.00	10.090	1.0000	0.07	0.20	158.04
Tracer	U-232	1.00	5320.00	9.191	1.0000	7.99	0.26	14.00

T O T A L S		% Recovery
Gross Count	250.0000	100.00
Net Area	238.9600	95.58
Background	11.0400	4.42
Composite Fit	214.0000	85.60
Residuals	24.9600	9.98

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3602 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:10:27 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3602.CHN
Sample: 985847-9 ISO U

Real Time: 7206.76 s. Live Time: 7200.00 s.
Detector: #33 MCB 4 Input 1 (Det #33)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-10 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 4 Input 2 (Det #34)
Efficiency: 23.95% Chem. Recovery: 89.37%
Total Eff.: 21.40% Manual:100.00%
CALIBRATION: 3459.08 + 5.28249 * Chn + -0.000554 Chn **2 keV
Original: 3459.08 + 5.2729 * Chn + -0.000554 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03503.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:10:36
Live Time: 7200.00 Real Time: 7206.76 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3603.CHN
Background File: C:\USER\ALPHA\BKGND\B0003559.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3603

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	255.94	231	276	2.00	1.00	0.96	4.04	0.03
2.	181.58	167	202	2.00	1.00	0.24	2.76	0.02
3.	141.80	112	157	2.00	1.00	0.00	7.00	0.06
Tracer	366.36	331	386	4.00	15.00	0.72	205.28	1.71

D E C A Y C O R R E C T E D R E S U L T S

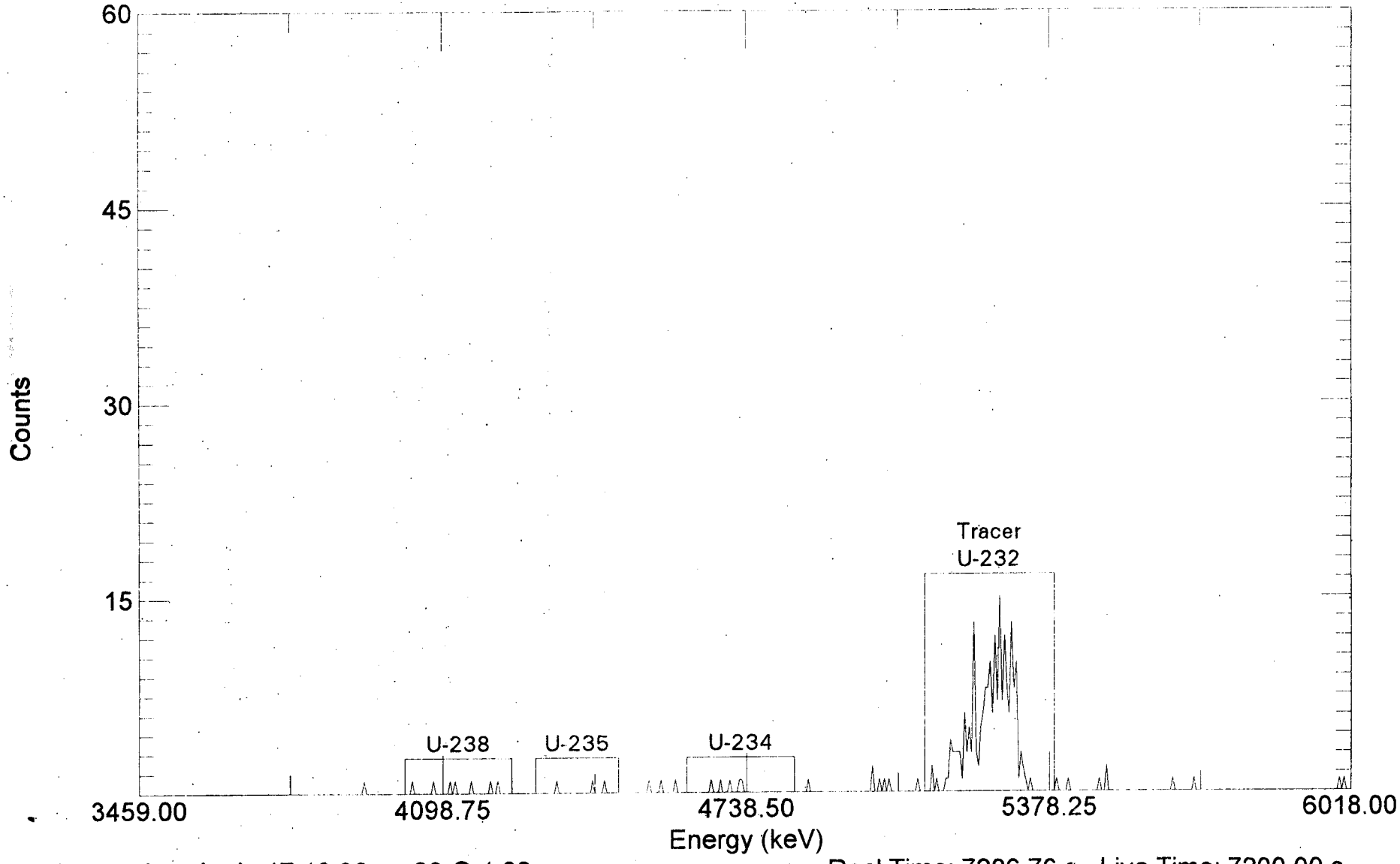
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	9.998	1.0000	0.16	0.23	109.08
2.	U-235	0.55	4400.00	10.163	1.0000	0.11	0.19	123.28
3.	U-238	0.77	4197.00	10.251	1.0000	0.27	0.15	74.08
Tracer	U-232	1.00	5320.00	19.506	2.0000	7.99	0.22	13.66

T O T A L S		% Recovery
Gross Count	241.0000	100.00
Net Area	234.5200	97.31
Background	6.4800	2.69
Composite Fit	221.0000	91.70
Residuals	13.5200	5.61

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3603 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:10:36 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3603.CHN
Sample: 985847-10 ISO U

Real Time: 7206.76 s. Live Time: 7200.00 s.
Detector: #34 MCB 4 Input 2 (Det #34)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-11 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 4 Input 3 (Det #35)
Efficiency: 20.32% Chem. Recovery: 78.14%
Total Eff.: 15.88% Manual:100.00%
CALIBRATION: 3403.69 + 5.53974 * Chn + -0.000906 Chn **2 keV
Original: 3403.69 + 5.5558 * Chn + -0.000906 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03504.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:10:44
Live Time: 7200.00 Real Time: 7206.78 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3604.CHN
Background File: C:\USER\ALPHA\BKGND\B0003560.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3604

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	258.43	233	278	2.00	1.00	0.24	5.76	0.05
2.	185.47	170	205	0.00	0.00	0.72	0.00	0.00
3.	146.72	117	162	2.00	1.00	0.24	1.76	0.01
Tracer	368.08	333	388	10.00	9.00	0.72	152.28	1.27

D E C A Y C O R R E C T E D R E S U L T S

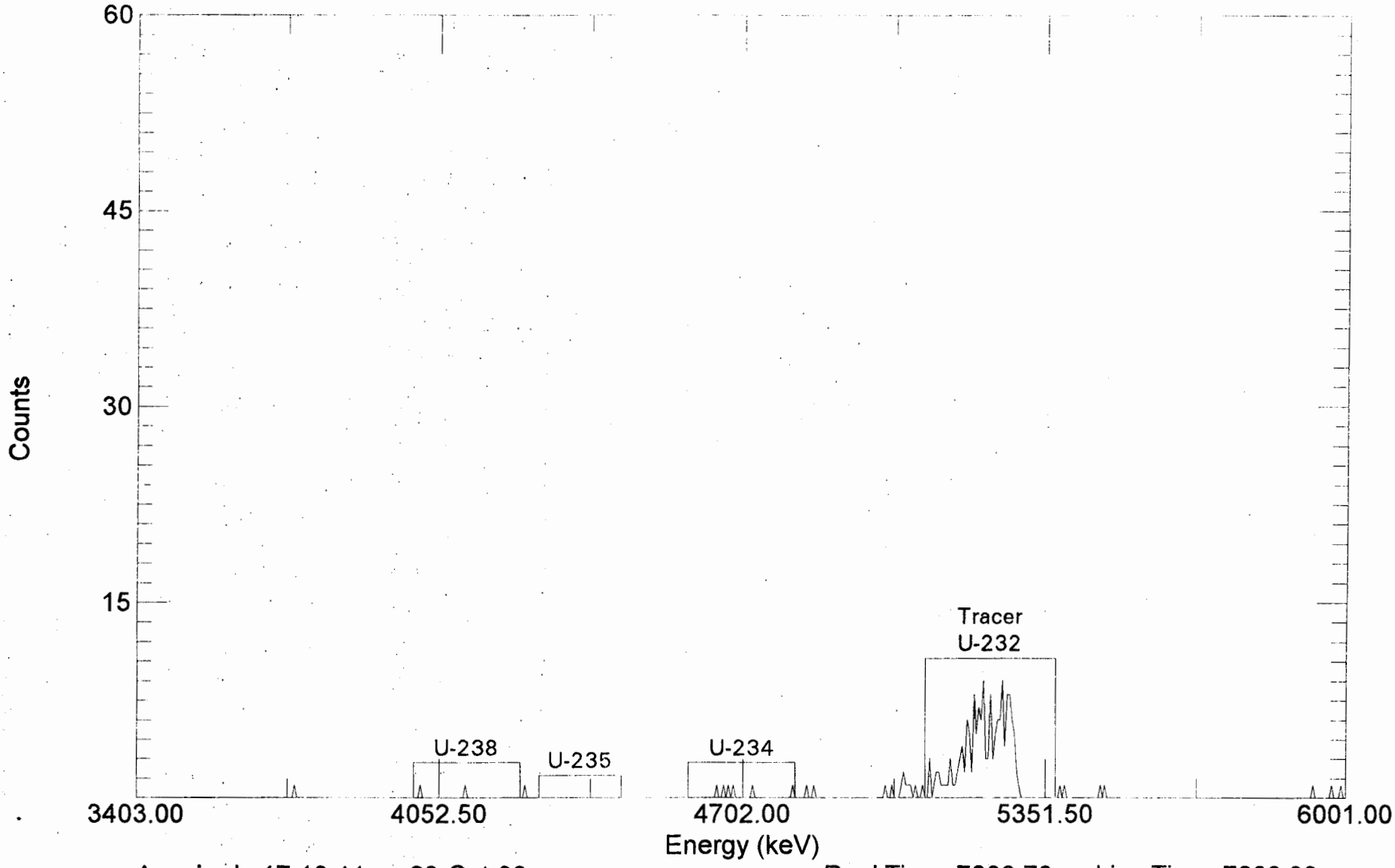
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	10.143	1.0000	0.30	0.26	83.45
2.	U-235	0.55	4400.00	0.000	0.0000	0.00	0.30	0.00
3.	U-238	0.77	4197.00	10.548	1.0000	0.09	0.26	158.04
Tracer	U-232	1.00	5320.00	48.728	5.0000	7.99	0.30	15.85

T O T A L S		% Recovery
Gross Count	182.0000	100.00
Net Area	174.0800	95.65
Background	7.9200	4.35
Composite Fit	161.0000	88.46
Residuals	13.0800	7.19

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3604 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:10:44 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3604.CHN
Sample: 985847-11 ISO U

Real Time: 7206.78 s. Live Time: 7200.00 s.
Detector: #35 MCB 4 Input 3 (Det #35)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-12 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 4 Input 4 (Det #36)
Efficiency: 22.13% Chem. Recovery: 81.31%
Total Eff.: 17.99% Manual:100.00%
CALIBRATION: 3359.6 + 5.90824 * Chn + -0.0015 Chn **2 keV
Original: 3359.6 + 5.9061 * Chn + -0.0015 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03505.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:10:51
Live Time: 7200.00 Real Time: 7206.78 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3605.CHN
Background File: C:\USER\ALPHA\BKGND\B0003561.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3605

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	256.19	231	276	2.00	1.00	1.20	7.80	0.07
2.	184.76	170	205	2.00	1.00	0.24	0.76	0.01
3.	147.24	117	162	2.00	1.00	0.24	4.76	0.04
Tracer	365.78	331	386	2.00	12.00	1.44	172.56	1.44

D E C A Y C O R R E C T E D R E S U L T S

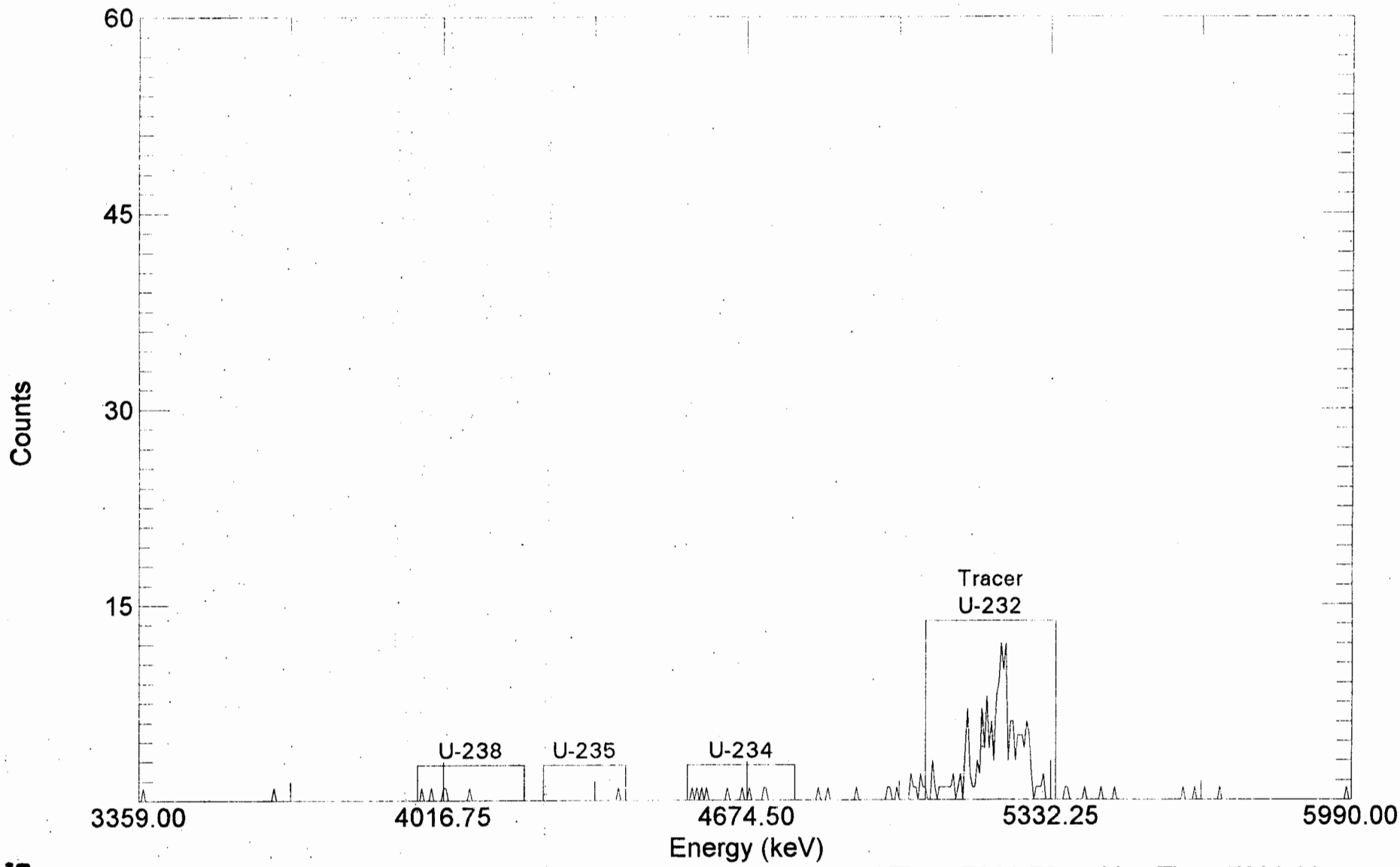
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	10.279	1.0000	0.36	0.29	75.67
2.	U-235	0.55	4400.00	10.708	1.0000	0.04	0.23	259.67
3.	U-238	0.77	4197.00	10.933	1.0000	0.22	0.23	92.20
Tracer	U-232	1.00	5320.00	9.622	1.0000	7.99	0.30	14.86

T O T A L S		% Recovery
Gross Count	213.0000	100.00
Net Area	194.7600	91.44
Background	18.2400	8.56
Composite Fit	189.0000	88.73
Residuals	5.7600	2.70

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3605 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:10:51 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3605.CHN
Sample: 985847-12 ISO U

Real Time: 7206.78 s. Live Time: 7200.00 s.
Detector: #36 MCB 4 Input 4 (Det #36)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847-13 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 4 Input 6 (Det #38)
Efficiency: 20.11% Chem. Recovery: 97.25%
Total Eff.: 19.56% Manual:100.00%
CALIBRATION: 3526.18 + 4.90604 * Chn + -0.000108 Chn **2 keV
Original: 3526.18 + 4.8964 * Chn + -0.000108 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03507.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:37:35
Live Time: 7200.00 Real Time: 7205.32 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3617.CHN
Background File: C:\USER\ALPHA\BKGND\B0003563.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3617

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	255.95	231	276	2.00	1.00	1.68	3.32	0.03
2.	178.82	164	199	0.00	0.00	0.24	0.00	0.00
3.	137.15	107	152	2.00	2.00	0.96	2.04	0.02
Tracer	368.63	334	389	6.00	10.00	1.44	187.56	1.56

D E C A Y C O R R E C T E D R E S U L T S

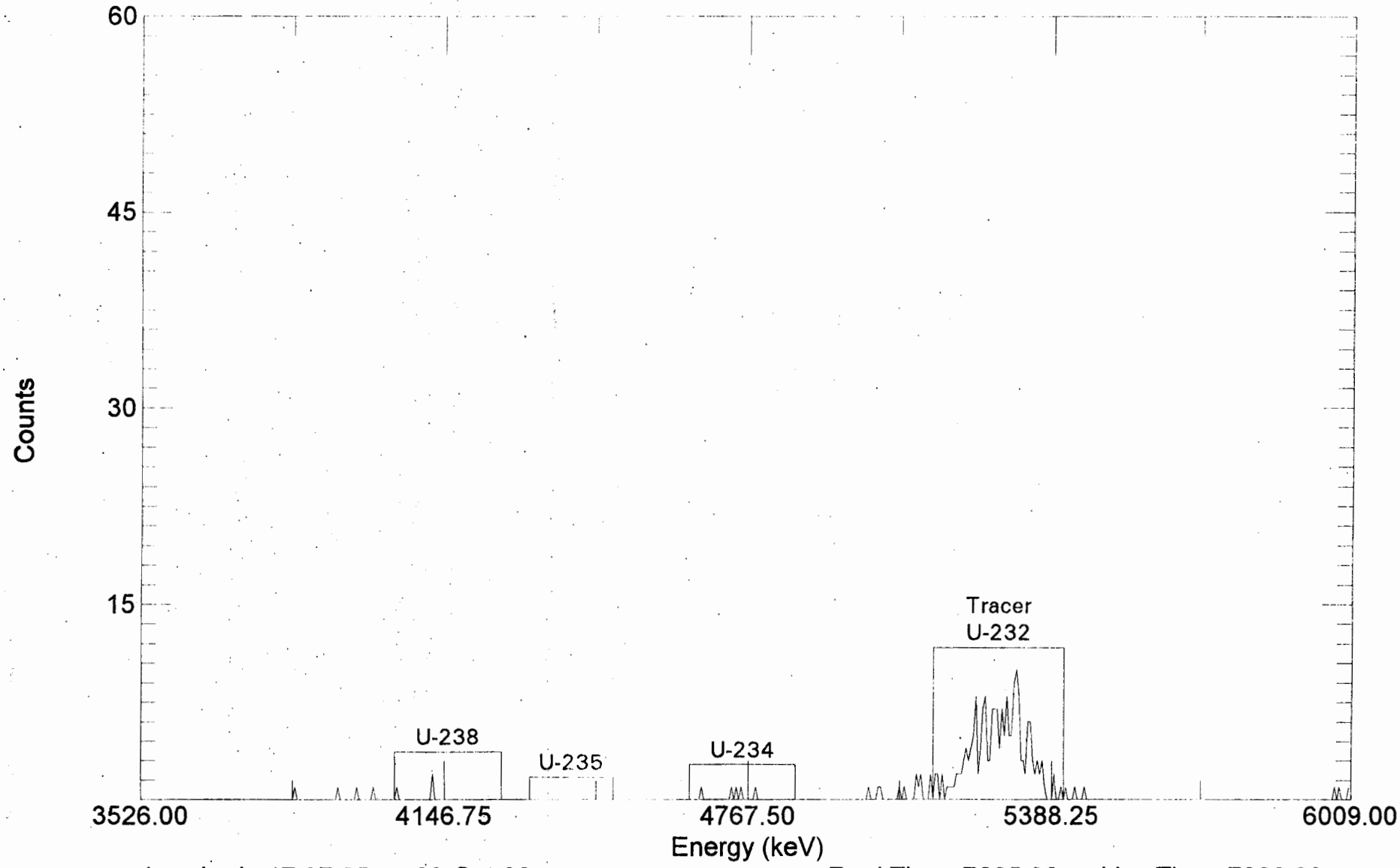
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	9.702	1.0000	0.14	0.28	133.28
2.	U-235	0.55	4400.00	0.000	0.0000	0.00	0.21	0.00
3.	U-238	0.77	4197.00	9.753	1.0000	0.09	0.25	167.94
Tracer	U-232	1.00	5320.00	28.958	3.0000	7.99	0.27	14.26

T O T A L S		% Recovery
Gross Count	219.0000	100.00
Net Area	201.7200	92.11
Background	17.2800	7.89
Composite Fit	197.0000	89.95
Residuals	4.7200	2.16

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3617 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:37:35 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3617.CHN
Sample: 985847-13 ISO U

Real Time: 7205.32 s. Live Time: 7200.00 s.
Detector: #38 MCB 4 Input 6 (Det #38)
Type: ISO U

U39

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985892-1 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 4 Input 7 (Det #39)
Efficiency: 23.08% Chem. Recovery: 77.72%
Total Eff.: 17.94% Manual:100.00%
CALIBRATION: 3619.64 + 4.37289 * Chn + 0.000587 Chn **2 keV
Original: 3619.64 + 4.396 * Chn + 0.000587 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03508.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:11:20
Live Time: 7200.00 Real Time: 7206.76 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3608.CHN
Background File: C:\USER\ALPHA\BKGND\B0003564.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3608

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	255.41	230	275	2.00	1.00	0.48	2.52	0.02
2.	174.37	159	194	2.00	1.00	0.48	1.52	0.01
3.	129.77	100	145	2.00	1.00	0.00	1.00	0.01
Tracer	370.42	335	390	6.00	11.00	0.96	172.04	1.43

D E C A Y C O R R E C T E D R E S U L T S

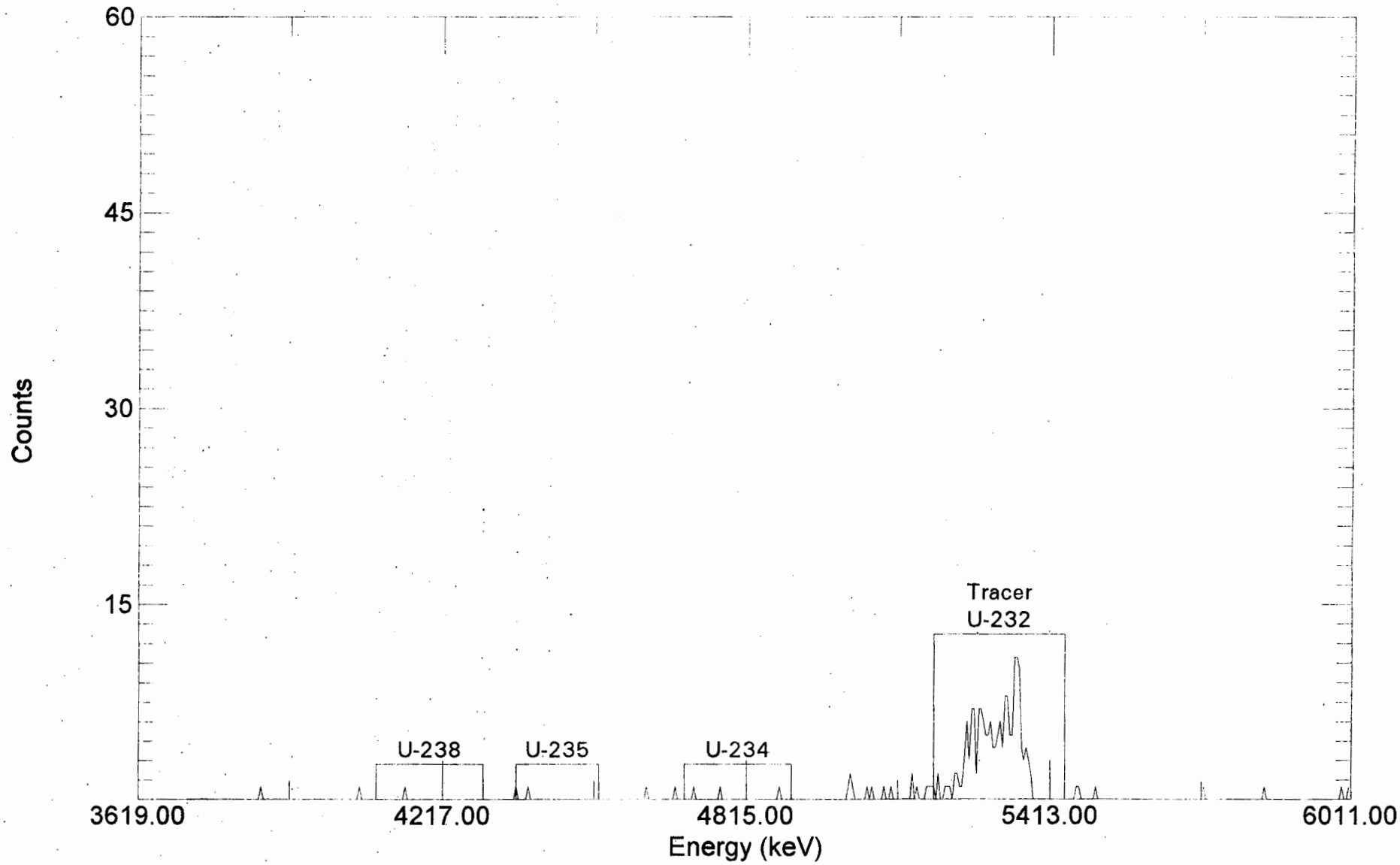
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	9.345	1.0000	0.12	0.25	135.33
2.	U-235	0.55	4400.00	9.155	1.0000	0.07	0.25	183.62
3.	U-238	0.77	4197.00	9.050	1.0000	0.05	0.18	196.00
Tracer	U-232	1.00	5320.00	28.847	3.0000	7.99	0.28	14.90

T O T A L S		% Recovery
Gross Count	204.0000	100.00
Net Area	191.5200	93.88
Background	12.4800	6.12
Composite Fit	179.0000	87.75
Residuals	12.5200	6.14

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3608 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:11:20 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3608.CHN
Sample: 985892-1 ISO U

Real Time: 7206.76 s. Live Time: 7200.00 s.
Detector: #39 MCB 4 Input 7 (Det #39)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985892-2 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 4 Input 8 (Det #40)
Efficiency: 22.69% Chem. Recovery: 89.30%
Total Eff.: 20.26% Manual:100.00%
CALIBRATION: 3562.72 + 4.66324 * Chn + 0.000303 Chn **2 keV
Original: 3562.72 + 4.6611 * Chn + 0.000303 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03509.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:11:27
Live Time: 7200.00 Real Time: 7206.76 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3609.CHN
Background File: C:\USER\ALPHA\BKGND\B0003565.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3609

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	255.68	231	276	2.00	1.00	0.72	2.28	0.02
2.	177.50	163	198	2.00	1.00	0.24	0.76	0.01
3.	134.84	105	150	0.00	0.00	0.24	0.00	0.00
Tracer	368.04	333	388	8.00	11.00	1.68	194.32	1.62

D E C A Y C O R R E C T E D R E S U L T S

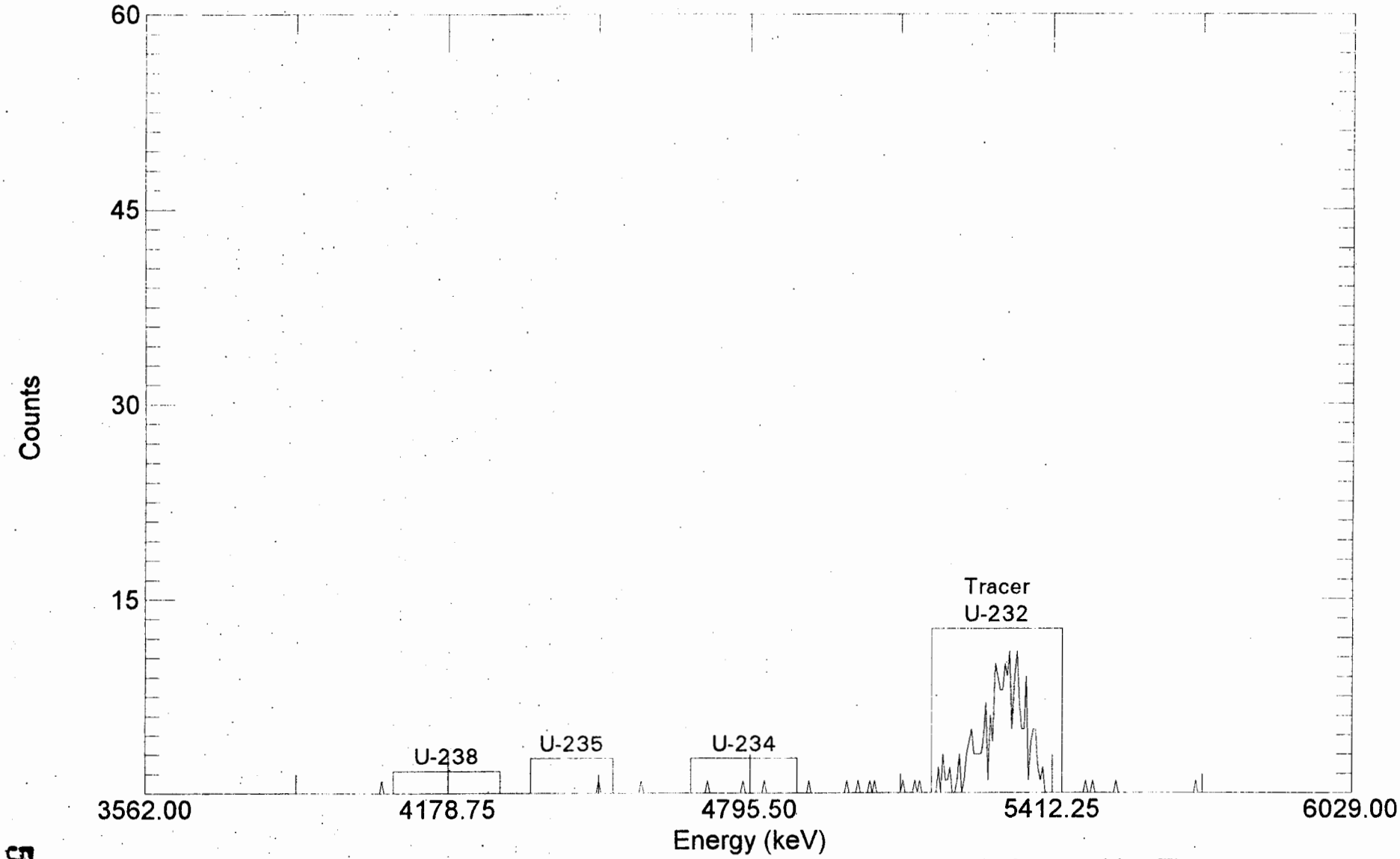
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	9.636	1.0000	0.09	0.23	149.92
2.	U-235	0.55	4400.00	9.542	1.0000	0.03	0.20	259.67
3.	U-238	0.77	4197.00	0.000	0.0000	0.00	0.20	0.00
Tracer	U-232	1.00	5320.00	39.090	4.0000	7.99	0.27	14.00

T O T A L S		% Recovery
Gross Count	214.0000	100.00
Net Area	201.2800	94.06
Background	12.7200	5.94
Composite Fit	200.0000	93.46
Residuals	1.2800	0.60

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3609 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:11:27 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3609.CHN
Sample: 985892-2 ISO U

Real Time: 7206.76 s. Live Time: 7200.00 s.
Detector: #40 MCB 4 Input 8 (Det #40)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985892-2ms ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 5 Input 1 (Det #41)
Efficiency: 24.63% Chem. Recovery: 75.59%
Total Eff.: 18.62% Manual:100.00%
CALIBRATION: 3418.49 + 5.52533 * Chn + -0.0011 Chn **2 keV
Original: 3418.49 + 5.5496 * Chn + -0.0011 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03510.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:11:40
Live Time: 7200.00 Real Time: 7200.32 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3610.CHN
Background File: C:\USER\ALPHA\BKGND\B0003566.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3610

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	258.81	234	279	14.00	12.00	0.48	192.52	1.60
2.	184.41	169	204	2.00	1.00	0.72	8.28	0.07
3.	145.09	115	160	2.00	12.00	0.96	186.04	1.55
Tracer	371.64	337	392	4.00	12.00	1.44	178.56	1.49

D E C A Y C O R R E C T E D R E S U L T S

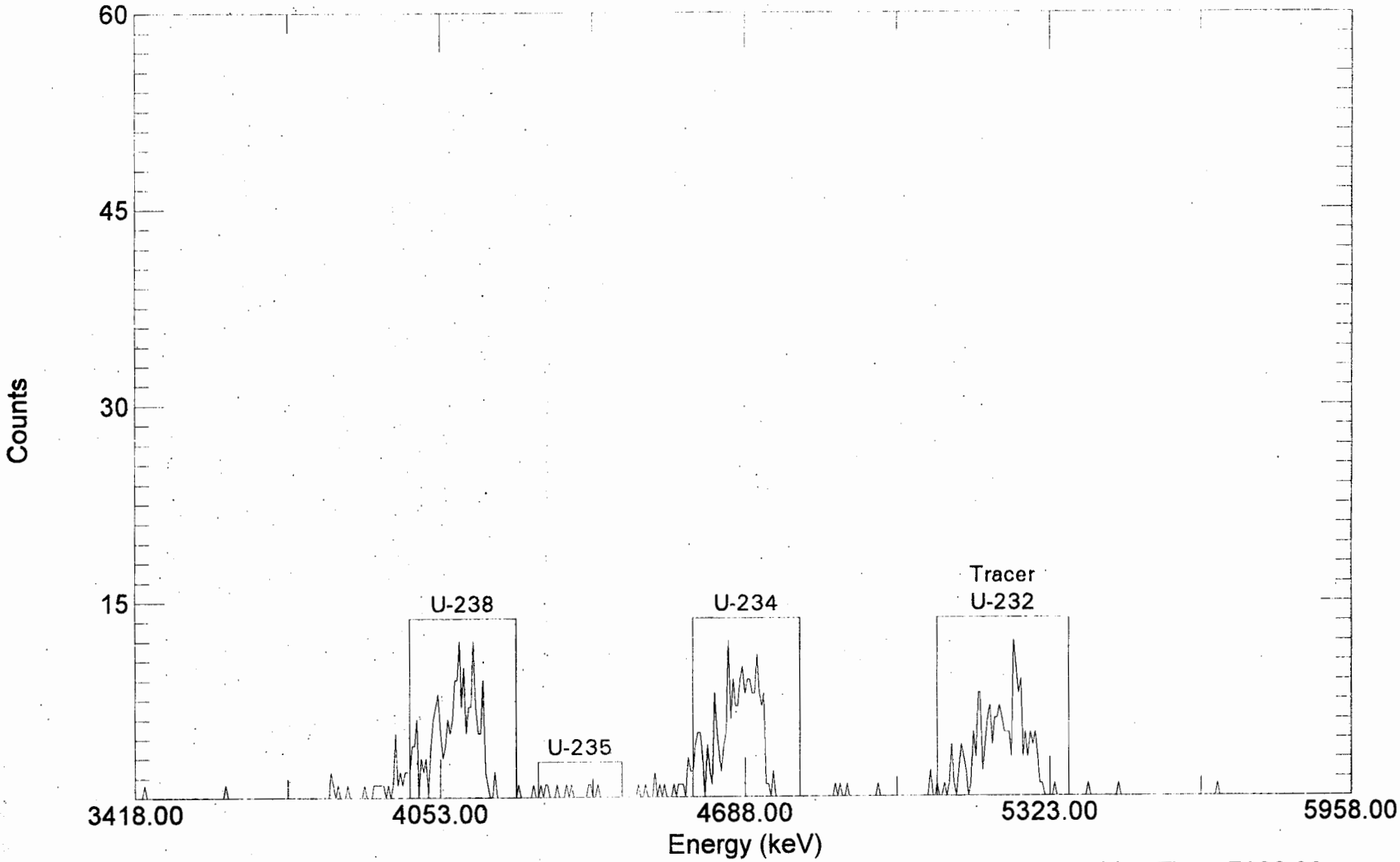
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	69.383	7.0000	8.62	0.24	14.14
2.	U-235	0.55	4400.00	10.239	1.0000	0.37	0.25	71.18
3.	U-238	0.77	4197.00	10.412	1.0000	8.33	0.27	14.41
Tracer	U-232	1.00	5320.00	18.831	2.0000	7.99	0.29	14.61

T O T A L S		% Recovery
Gross Count	623.0000	100.00
Net Area	616.7600	99.00
Background	6.2400	1.00
Composite Fit	569.0000	91.33
Residuals	47.7600	7.67

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3610 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:11:40 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3610.CHN
Sample: 985892-2ms ISO U

Real Time: 7200.32 s. Live Time: 7200.00 s.
Detector: #41 MCB 5 Input 1 (Det #41)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: 985892-2msd ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 5 Input 4 (Det #44)
Efficiency: 21.77% Chem. Recovery: 79.24%
Total Eff.: 17.25% Manual:100.00%
CALIBRATION: 3428.15 + 5.50498 * Chn + -0.000918 Chn **2 keV
Original: 3428.15 + 5.3947 * Chn + -0.000918 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03511.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:11:49
Live Time: 7200.00 Real Time: 7200.32 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3611.CHN
Background File: C:\USER\ALPHA\BKGND\B0003567.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3611

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	255.51	231	276	2.00	15.00	3.60	192.40	1.60
2.	182.07	167	202	2.00	1.00	1.44	3.56	0.03
3.	143.08	113	158	6.00	13.00	3.84	168.16	1.40
Tracer	366.00	331	386	4.00	11.00	4.56	165.44	1.38

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	10.072	1.0000	9.29	0.38	14.27
2.	U-235	0.55	4400.00	10.341	1.0000	0.17	0.31	124.13
3.	U-238	0.77	4197.00	31.454	3.0000	8.12	0.39	15.30
Tracer	U-232	1.00	5320.00	19.332	2.0000	7.99	0.41	15.03

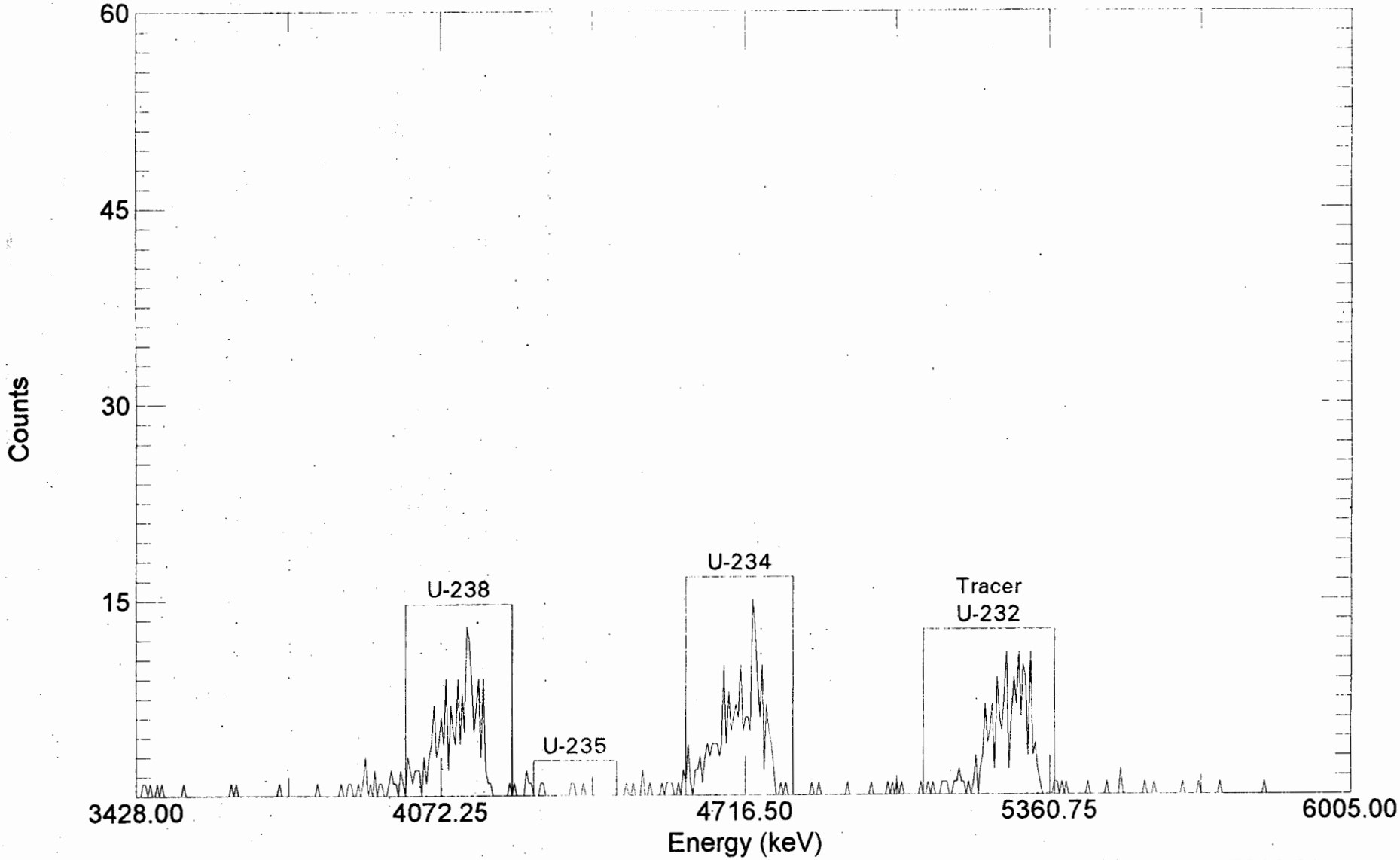
T O T A L S		% Recovery
Gross Count	613.0000	100.00
Net Area	578.6800	94.40
Background	34.3200	5.60
Composite Fit	543.0000	88.58
Residuals	35.6800	5.82

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3611

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:11:49 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3611.CHN
Sample: 985892-2msd ISO U

Real Time: 7200.32 s. Live Time: 7200.00 s.
Detector: #44 MCB 5 Input 4 (Det #44)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: ~~985820~~ 985892 -3 ISO U
Type: Uranium Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 15.984 DPM

DETECTOR: MCB 4 Input 4 (Det #36)
Efficiency: 22.13% Chem. Recovery: 45.36%
Total Eff.: 10.04% Manual:100.00%
CALIBRATION: 3359.6 + 5.91926 * Chn + -0.0015 Chn **2 keV
Original: 3359.6 + 5.9061 * Chn + -0.0015 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03505.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 08:42:24
Live Time: 7200.00 Real Time: 7200.32 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3622.CHN
Background File: C:\USER\ALPHA\BKGND\B0003561.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3622

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	255.65	231	276	2.00	1.00	1.20	2.80	0.02
2.	184.38	169	204	0.00	0.00	0.24	0.00	0.00
3.	146.94	117	162	0.00	0.00	0.24	0.00	0.00
Tracer	364.94	330	385	2.00	16.00	1.44	192.56	1.60

D E C A Y C O R R E C T E D R E S U L T S

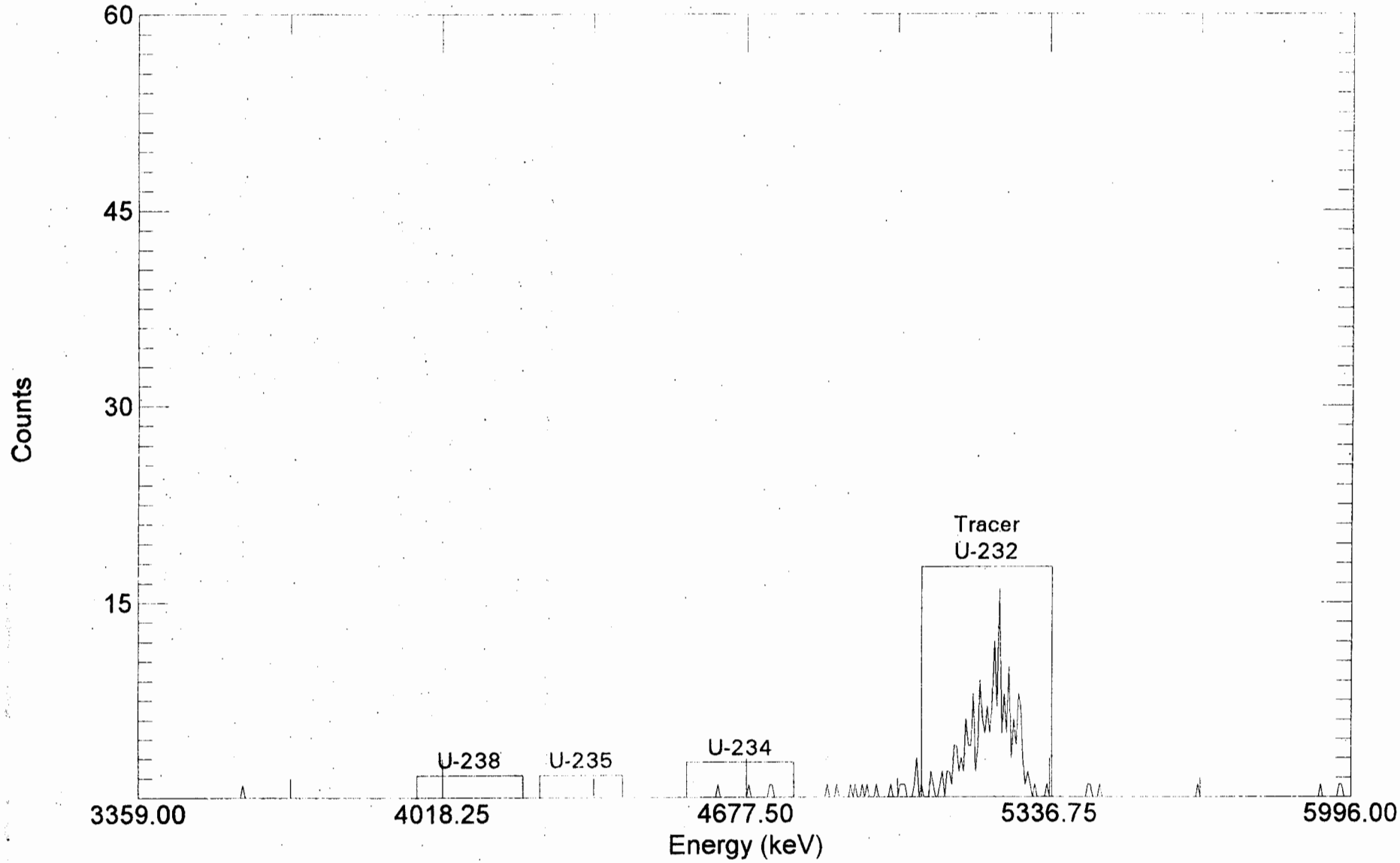
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	10.305	1.0000	0.23	0.51	141.20
2.	U-235	0.55	4400.00	0.000	0.0000	0.00	0.41	0.00
3.	U-238	0.77	4197.00	0.000	0.0000	0.00	0.41	0.00
Tracer	U-232	1.00	5320.00	9.649	1.0000	15.98	0.53	14.07

T O T A L S		% Recovery
Gross Count	221.0000	100.00
Net Area	202.7600	91.75
Background	18.2400	8.25
Composite Fit	198.0000	89.59
Residuals	4.7600	2.15

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3622 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 08:42:24 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3622.CHN
Sample: ~~985820~~-3 ISO U
985892
DT 10-21-98

Real Time: 7200.32 s. Live Time: 7200.00 s.
Detector: #36 MCB 4 Input 4 (Det #36)
Type: Uranium

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

985812 09-02-98

SAMPLE: ~~985820~~-3md ISO U

Type: Uranium Sample Collected: 16-Feb-96 08:26:41

Volume: 1 Total, 1 Aliquot

Tracer: 15.984 DPM

DETECTOR: MCB 4 Input 6 (Det #38)

Efficiency: 20.11% Chem. Recovery: 42.86%

Total Eff.: 8.62% Manual:100.00%

CALIBRATION: 3526.18 + 4.92576 * Chn + -0.000108 Chn **2 keV

Original: 3526.18 + 4.8964 * Chn + -0.000108 Chn **2 keV

File: C:\USER\ALPHA\CALIB\CAL03507.CHN

ACQUISITION: 512 Channels Spectrum Acquired: 21-Oct-98 08:43:02

Live Time: 7200.00 Real Time: 7200.34 Sec.

Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3623.CHN

Background File: C:\USER\ALPHA\BKGND\B0003563.CHN

Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration

Results: ALPH3623

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	254.91	230	275	2.00	1.00	1.68	3.32	0.03
2.	178.09	163	198	0.00	0.00	0.24	0.00	0.00
3.	136.60	107	152	2.00	1.00	0.96	1.04	0.01
Tracer	367.13	332	387	2.00	10.00	1.68	165.32	1.38

D E C A Y C O R R E C T E D R E S U L T S

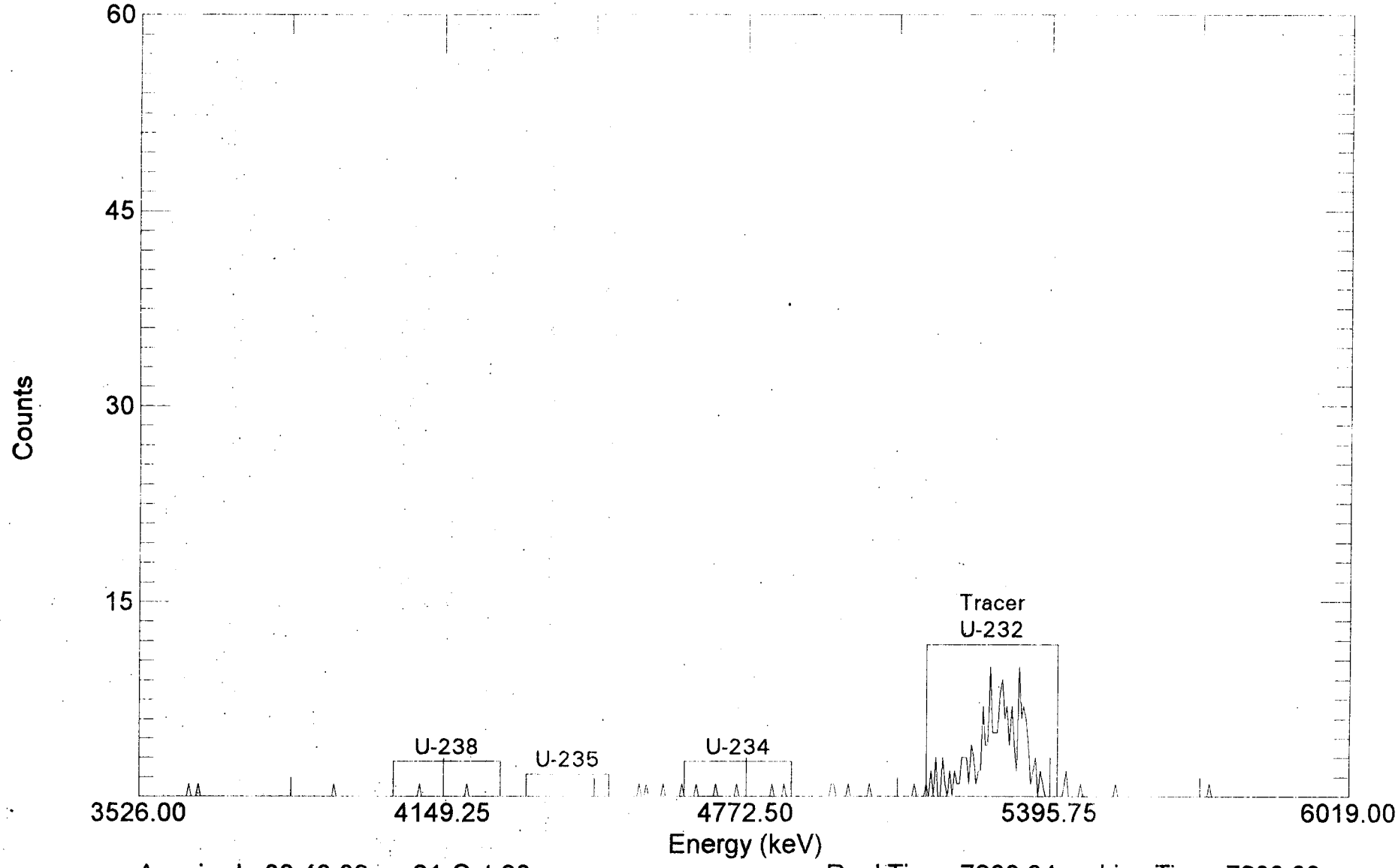
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	9.741	1.0000	0.32	0.64	133.28
2.	U-235	0.55	4400.00	0.000	0.0000	0.00	0.47	0.00
3.	U-238	0.77	4197.00	9.793	1.0000	0.10	0.57	270.18
Tracer	U-232	1.00	5320.00	9.693	1.0000	15.98	0.64	15.17

T O T A L S		% Recovery
Gross Count	192.0000	100.00
Net Area	174.7200	91.00
Background	17.2800	9.00
Composite Fit	174.0000	90.63
Residuals	0.7200	0.38

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3623 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 08:43:02 on 21-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3623.CHN
Sample: ~~985820~~ 985892 3md ISO U

Real Time: 7200.34 s. Live Time: 7200.00 s.
Detector: #38 MCB 4 Input 6 (Det #38)
Type: Uranium

DS 10-21-98

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985898-1 ISO U
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 5 Input 5 (Det #45)
Efficiency: 23.52% Chem. Recovery: 84.57%
Total Eff.: 19.89% Manual:100.00%
CALIBRATION: 3383.43 + 5.71527 * Chn + -0.0014 Chn **2 keV
Original: 3383.43 + 5.7029 * Chn + -0.0014 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03512.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:12:06
Live Time: 7200.00 Real Time: 7200.32 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3612.CHN
Background File: C:\USER\ALPHA\BKGND\B0003568.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3612

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	260.01	235	280	2.00	1.00	0.24	7.76	0.06
2.	186.38	171	206	2.00	1.00	0.00	2.00	0.02
3.	147.69	118	163	2.00	1.00	0.00	3.00	0.03
Tracer	372.91	338	393	2.00	14.00	0.24	190.76	1.59

D E C A Y C O R R E C T E D R E S U L T S

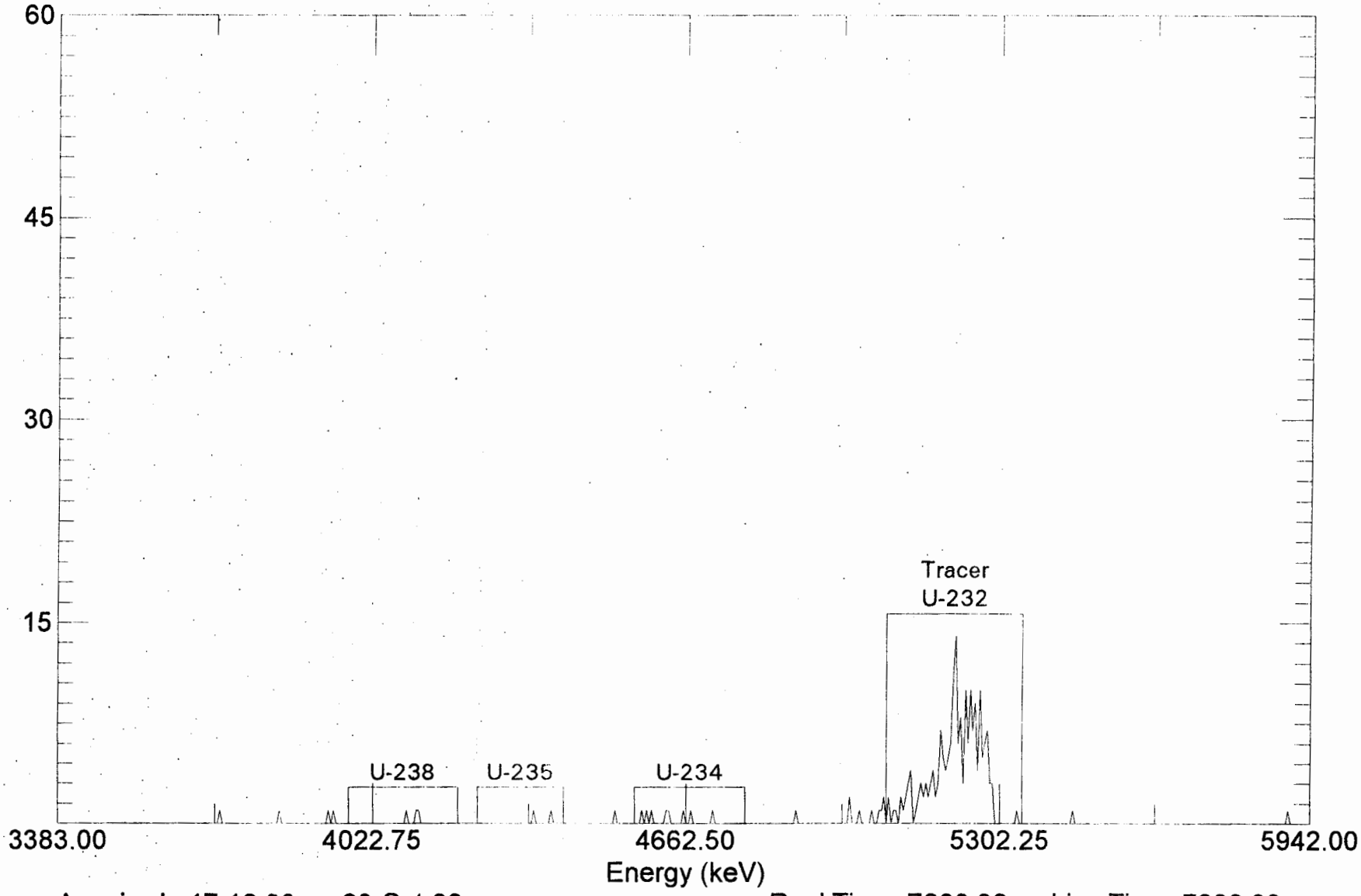
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	9.974	1.0000	0.33	0.20	71.50
2.	U-235	0.55	4400.00	10.387	1.0000	0.08	0.16	138.59
3.	U-238	0.77	4197.00	10.603	1.0000	0.13	0.16	113.16
Tracer	U-232	1.00	5320.00	9.342	1.0000	7.99	0.20	14.18

T O T A L S		% Recovery
Gross Count	220.0000	100.00
Net Area	215.2000	97.82
Background	4.8000	2.18
Composite Fit	204.0000	92.73
Residuals	11.2000	5.09

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3612 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:12:06 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3612.CHN
Sample: 985898-1 ISO U

Real Time: 7200.32 s. Live Time: 7200.00 s.
Detector: #45 MCB 5 Input 5 (Det #45)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S

Core Lab

SAMPLE: 985847\5877\5892\5898-MB1U1016
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 5 Input 6 (Det #46)
Efficiency: 21.36% Chem. Recovery: 77.52%
Total Eff.: 16.56% Manual:100.00%
CALIBRATION: 3542.21 + 4.71533 * Chn + 0.000126 Chn **2 keV
Original: 3542.21 + 4.7155 * Chn + 0.000126 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03513.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:12:38
Live Time: 7200.00 Real Time: 7200.34 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3613.CHN
Background File: C:\USER\ALPHA\BKGND\B0003569.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3613

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	259.60	235	280	2.00	3.00	1.20	20.80	0.17
2.	181.04	166	201	2.00	1.00	0.72	1.28	0.01
3.	138.35	108	153	2.00	2.00	0.24	9.76	0.08
Tracer	373.30	338	393	2.00	13.00	1.20	158.80	1.32

D E C A Y C O R R E C T E D R E S U L T S

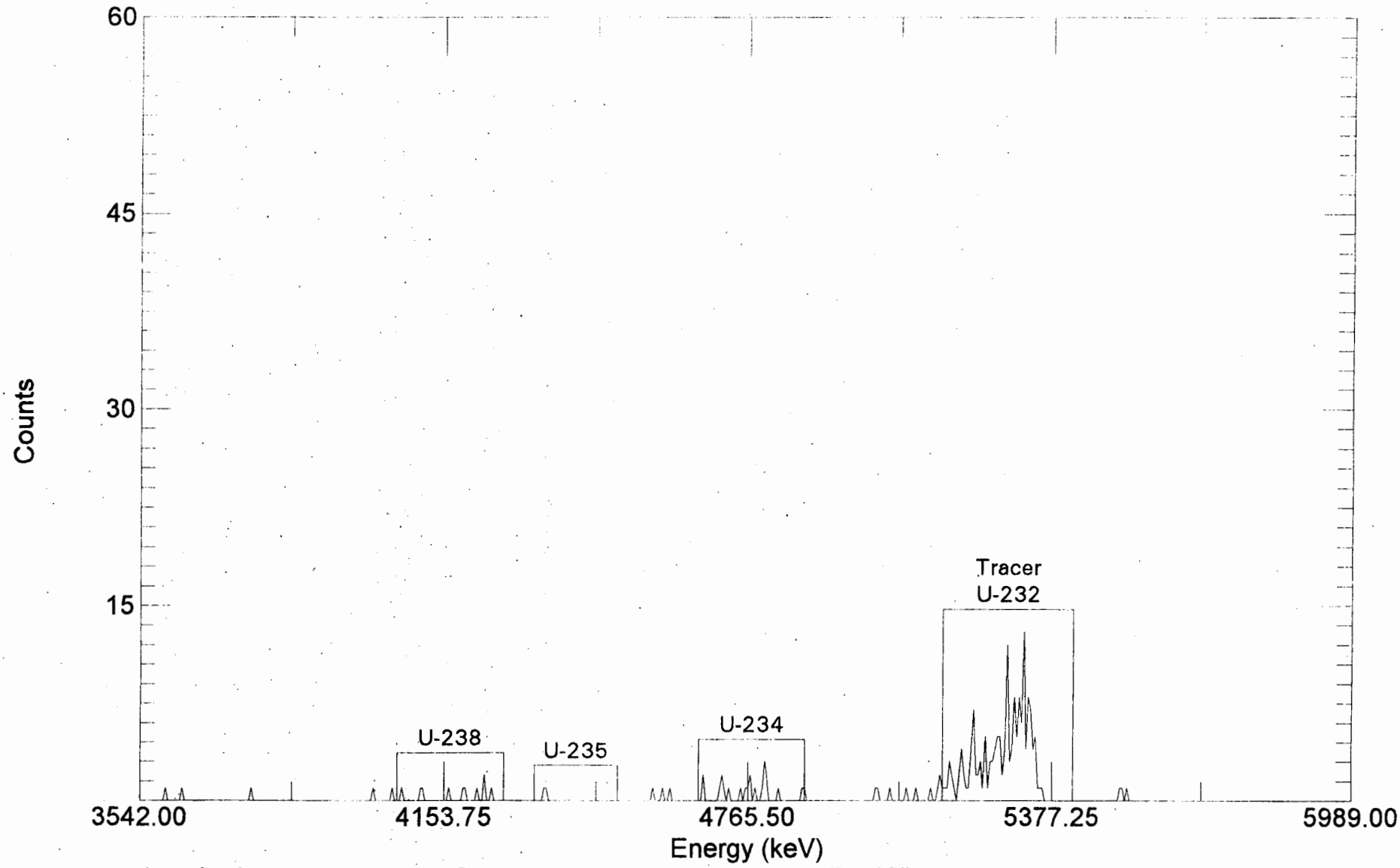
	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	9.561	1.0000	1.05	0.31	44.27
2.	U-235	0.55	4400.00	9.522	1.0000	0.06	0.28	218.79
3.	U-238	0.77	4197.00	9.500	1.0000	0.49	0.25	63.55
Tracer	U-232	1.00	5320.00	9.619	1.0000	7.99	0.31	15.50

T O T A L S		% Recovery
Gross Count	214.0000	100.00
Net Area	203.6800	95.18
Background	10.3200	4.82
Composite Fit	194.0000	90.65
Residuals	9.6800	4.52

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3613 AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:12:38 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3613.CHN
Sample: 985847\5877\5892\5898-MB1U1016

Real Time: 7200.34 s. Live Time: 7200.00 s.
Detector: #46 MCB 5 Input 6 (Det #46)
Type: ISO U

A L P H A V I S I O N S P E C T R A L A N A L Y S I S
Core Lab

SAMPLE: 985847\5877\5892\5898-LCS1U1016
Type: ISO U Sample Collected: 16-Feb-96 08:26:41
Volume: 1 Total, 1 Aliquot
Tracer: 7.992 DPM

DETECTOR: MCB 5 Input 7 (Det #47)
Efficiency: 23.98% Chem. Recovery: 72.09%
Total Eff.: 17.29% Manual:100.00%
CALIBRATION: 3422.54 + 5.60972 * Chn + -0.0013 Chn **2 keV
Original: 3422.54 + 5.6099 * Chn + -0.0013 Chn **2 keV
File: C:\USER\ALPHA\CALIB\CAL03514.CHN
ACQUISITION: 512 Channels Spectrum Acquired: 20-Oct-98 17:12:58
Live Time: 7200.00 Real Time: 7200.32 Sec.
Spectrum File: C:\USER\ALPHA\SAMPLES\ALPH3614.CHN
Background File: C:\USER\ALPHA\BKGND\B0003570.CHN
Nuclide Library: C:\USER\ALPHA\U232.ALB

ANALYSIS Method: Relative Region-Of-Interest
Slope Recalibration
Results: ALPH3614

P E A K S

	Channel	Start	End	FWHM	Height	Background	Net Area	CPM
1.	256.28	231	276	2.00	13.00	0.72	159.28	1.33
2.	181.91	167	202	2.00	1.00	0.00	5.00	0.04
3.	142.78	113	158	2.00	10.00	0.24	166.76	1.39
Tracer	369.96	335	390	6.00	8.00	1.20	165.80	1.38

D E C A Y C O R R E C T E D R E S U L T S

	Nuclide	Br. Ratio	Energy (keV)	Width (keV)	Tau	Aliquot DPM	MDA	% Error
1.	U-234	0.72	4774.80	9.887	1.0000	7.68	0.27	15.57
2.	U-235	0.55	4400.00	10.273	1.0000	0.24	0.19	87.65
3.	U-238	0.77	4197.00	10.477	1.0000	8.04	0.24	15.19
Tracer	U-232	1.00	5320.00	27.887	3.0000	7.99	0.30	15.17

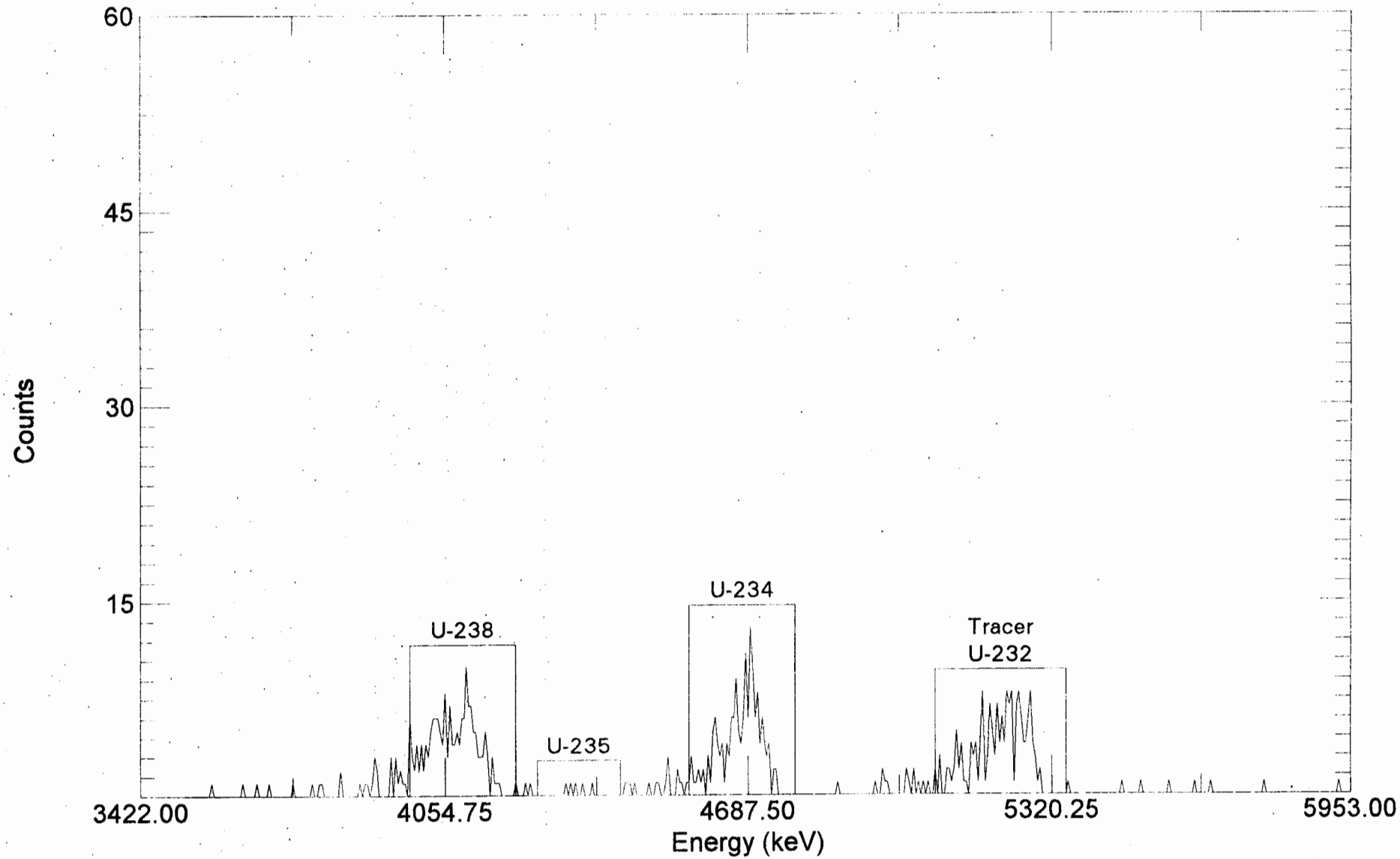
T O T A L S		% Recovery
Gross Count	569.0000	100.00
Net Area	562.0400	98.78
Background	6.9600	1.22
Composite Fit	499.0000	87.70
Residuals	63.0400	11.08

Analyzed By: _____ (Dee Fairservis)

Checked By: _____ (Don Ukele)

ALPH3614

AlphaVision Relative Region-Of-Interest (Slope Recalibration)



Acquired: 17:12:58 on 20-Oct-98
File: C:\USER\ALPHA\SAMPLES\ALPH3614.CHN
Sample: 985847\5877\5892\5898-LCS1U1016

Real Time: 7200.32 s. Live Time: 7200.00 s.
Detector: #47 MCB 5 Input 7 (Det #47)
Type: ISO U

ISOTOPIC URANIUM CALCULATION SPREADSHEET

23-Oct-98

Reviewed by Natalie R. Finch

Date Oct 23, 1998

FILE: ISO-OCT98.wk1

JOB NUMBER	SAMPLE NUMBER	SAMPLE VOLUME	U 234 ACTIVITY	U 234 MDA	U 234 ERROR	U 235 ACTIVITY	U 235 MDA	U 235 ERROR	U 238 ACTIVITY	U 238 MDA	U 238 ERROR	TRACER ERROR
984000	1	liters/ grams	dpm	dpm	%	dpm	dpm	%	dpm	dpm	%	%
985847	1	0.50	1.79	0.28	31.35	0.10	0.25	149.92	0.60	0.28	56.14	14.49
	2	0.50	1.00	0.28	44.33	0.00	0.19	0.00	0.77	0.26	50.56	15.35
	3	0.50	0.55	0.21	55.41	0.00	0.23	0.00	0.09	0.17	138.59	14.33
	4	0.50	0.53	0.23	56.50	0.08	0.21	158.04	0.42	0.21	63.55	14.18
	5	0.50	0.72	0.22	47.50	0.08	0.16	138.59	0.49	0.20	57.77	14.04
	6	0.50	0.62	0.19	49.77	0.00	0.21	0.00	0.34	0.19	67.17	13.72
	7	0.50	0.48	0.24	60.30	0.00	0.21	0.00	0.16	0.21	104.44	14.29
	8	0.50	0.34	0.26	72.71	0.02	0.21	382.10	0.09	0.23	149.92	13.89
	9	0.50	0.48	0.20	57.77	0.16	0.16	98.00	0.07	0.20	158.04	14.00
	10	0.50	0.16	0.23	109.08	0.11	0.19	123.28	0.27	0.15	74.08	13.66
	11	0.50	0.30	0.26	83.45	0.00	0.30	0.00	0.09	0.26	158.04	15.85
	12	0.50	0.36	0.29	75.67	0.04	0.23	259.67	0.22	0.23	92.20	14.86
	13	0.50	0.14	0.28	133.28	0.00	0.21	0.00	0.09	0.25	167.94	14.26
985892	1	0.50	0.12	0.25	135.33	0.07	0.25	183.62	0.05	0.18	196.00	14.90
	2	0.50	0.09	0.23	149.92	0.03	0.20	259.67	0.00	0.20	0.00	14.00
	2 MS	0.50	8.62	0.24	14.14	0.37	0.25	71.18	8.33	0.27	14.41	14.61
	2 MSD	0.50	9.29	0.38	14.27	0.17	0.31	124.13	8.12	0.39	15.30	15.03
	3	0.50	0.23	0.51	141.20	0.00	0.41	0.00	0.00	0.41	0.00	14.07
	3 MD	0.50	0.32	0.64	133.28	0.00	0.47	0.00	0.10	0.57	270.18	15.17
985898	1	0.50	0.33	0.20	71.50	0.08	0.16	138.59	0.13	0.16	113.16	14.18
MB1U1016	MB	1.00	1.05	0.31	44.27	0.06	0.28	218.79	0.49	0.25	63.55	15.50
LCS1U1016	LCS	1.00	7.68	0.27	15.57	0.24	0.19	87.65	8.04	0.24	15.19	15.17

QA-CHECK3.wk1 U234 DATE 10/20/98 pCi/L
TIME 17:09

	Standard Known Value	LCS Sample Value	LCS Recovery
LCS1U1016	3.600	3.500	97.2
	3.600		0.0
	0.000		ERR
	0.000		ERR

985892-002

Sample Activity	Spiked Sample Activity	Standard Value	Sample Volume	Spike Value	SPIKE RECOVERY
0.100	7.800	3.600	0.5000	7.200	106.9
0.100	8.400	3.600	0.5000	7.200	115.3
0.000		3.600	0.000	ERR	ERR
0.000		3.600	0.000	ERR	ERR

985892-003

Sample Activity	Duplicate Activity	Sample ERROR	Duplicate ERROR	Duplicate RER
0.200	0.300	0.300	0.400	0.20
				ERR
				ERR

MB1U1016 = ~~0.05~~ 0.5 ~~wcf 10/23/98~~ BATCH # 10462 ISOU

BATCH # _____ LABNET

BATCH # _____

RAW DATA FOR ISOU IS IN JOB # ~~985892.~~ 985847
10/23/98 N.R.F. 11-24-98 cy

QA-CHECK3.wk1 U234 DATE 10/20/98 pCi/L
TIME 17:09

	Standard Known Value	LCS Sample Value	LCS Recovery
LCS1U1016	3.600	3.500	97.2
	3.600		0.0
	0.000		ERR
	0.000		ERR

985892-002

Sample Activity	Spiked Sample Activity	Standard Value	Sample Volume	Spike Value	SPIKE RECOVERY
0.100	7.800	3.600	0.5000	7.200	106.9
0.100	8.400	3.600	0.5000	7.200	115.3
0.000		3.600	0.000	ERR	ERR
0.000		3.600	0.000	ERR	ERR

985892-003

Sample Activity	Duplicate Activity	Sample ERROR	Duplicate ERROR	Duplicate RER
0.200	0.300	0.300	0.400	0.20
				ERR
				ERR

MB1U1016 = ~~0.05~~ upf rdg 0.5 BATCH # 10462 ISOU

BATCH # _____ LABNET

QA-CHECK3.wk1 U238 DATE 10/20/98 pCi/L
TIME 17:09

	Standard Known Value	LCS Sample Value	LCS Recovery
LCS1U1016	3.600	3.600	100.0
	3.600		0.0
	0.000		ERR
	0.000		ERR

985892-002

Sample Activity	Spiked Sample Activity	Standard Value	Sample Volume	Spike Value	SPIKE RECOVERY
0.000	7.500	3.600	0.5000	7.200	104.2
0.000	7.300	3.600	0.5000	7.200	101.4
0.000		3.600	0.000	ERR	ERR
0.000		3.600	0.000	ERR	ERR

985892-003

Sample Activity	Duplicate Activity	Sample ERROR	Duplicate ERROR	Duplicate RER
0.000	0.100	0.100	0.200	0.45
				ERR
				ERR

MB1U1016 = 0.2 BATCH # 10462 ISOU

BATCH # _____ LABNET

QA-CHECK3.wk1 U235 DATE 10/20/98 pCi/L
TIME 17:09

	Standard Known Value	LCS Sample Value	LCS Recovery
LCS1U1016	0.000		ERR
	0.000		ERR
	0.000		ERR
	0.000		ERR

985892-002

Sample Activity	Spiked Sample Activity	Standard Value	Sample Volume	Spike Value	SPIKE RECOVERY
0.000		0.000	0.5000	0.000	ERR
0.000		0.000	0.5000	0.000	ERR
0.000		0.000	0.000	ERR	ERR
0.000		0.000	0.000	ERR	ERR

985892-003

Sample Activity	Duplicate Activity	Sample ERROR	Duplicate ERROR	Duplicate RER
0.000	0.000	0.100	0.100	0.00
				ERR
				ERR

MB1U1016 = 0.0 BATCH # 10462 ISOU

BATCH # _____ LABNET

U2334

ISOTOPIC URANIUM CALCULATION SPREADSHEET 23-Oct-98

FILE: ISO-OCT98.

JOB NUMBER	SAMPLE NUMBER	U 234 ACTIVITY	U 234 ERROR	U 234 LLD	U 235 ACTIVITY	U 235 ERROR	U 235 LLD	U 238 ACTIVITY	U 238 ERROR	U 238 LLD
984000	1	pCi/l/g	pCi/l/g	pCi/l/g	pCi/l/g	pCi/l/g	pCi/l/g	pCi/l/g	pCi/l/g	pCi/l/g
985847	1	1.6	0.6	0.3	0.1	0.1	0.2	0.5	0.3	0.3
	2	0.9	0.4	0.3	0.0	0.0	0.2	0.7	0.4	0.2
	3	0.5	0.3	0.2	0.0	0.0	0.2	0.1	0.1	0.2
	4	0.5	0.3	0.2	0.1	0.1	0.2	0.4	0.2	0.2
	5	0.6	0.3	0.2	0.1	0.1	0.1	0.4	0.3	0.2
	6	0.6	0.3	0.2	0.0	0.0	0.2	0.3	0.2	0.2
	7	0.4	0.3	0.2	0.0	0.0	0.2	0.1	0.2	0.2
	8	0.3	0.2	0.2	0.0	0.1	0.2	0.1	0.1	0.2
	9	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.2
	10	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.1
	11	0.3	0.2	0.2	0.0	0.0	0.3	0.1	0.1	0.2
	12	0.3	0.3	0.3	0.0	0.1	0.2	0.2	0.2	0.2
	13	0.1	0.2	0.3	0.0	0.0	0.2	0.1	0.1	0.2
985892	1	0.1	0.1	0.2	0.1	0.1	0.2	0.0	0.1	0.2
	2	0.1	0.1	0.2	0.0	0.1	0.2	0.0	0.0	0.2
	2 MS	7.8	1.6	0.2	0.3	0.2	0.2	7.5	1.5	0.2
	2 MSD	8.4	1.7	0.3	0.2	0.2	0.3	7.3	1.6	0.4
	3	0.2	0.3	0.5	0.0	0.0	0.4	0.0	0.0	0.4
	3 MD	0.3	0.4	0.6	0.0	0.0	0.4	0.1	0.2	0.5
985898	1	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
MB1U1016	MB	0.5	0.2	0.1	0.0	0.1	0.1	0.2	0.1	0.1
LCS1U1016	LCS	3.5	0.8	0.1	0.1	0.1	0.1	3.6	0.8	0.1

604

Nuclide U-232 Isotope # 185 Date Received 07-22-92 Received By E. S. Wallace

INCOMING HEALTH PHYSICS

Radiation Level @ Package Surface 23 uR/hr , Radiation Level @ 1 meter From Package Surface 23 uR/hr

Removable Contamination Survey <10 DPM/100 Square Centimeters

Incoming Health Physics Results Pass Health Physics Approval By E. S. Wallace

Characterization of Radioactive Material Solution

Manufacturer: Isotope Products , Model #: 7232 , Serial #: 407-73 , NIST Traceable Yes

Half-Life 68.90 + or - 1.0 years , Date of Calibration 08-01-92 ,Time of Calibration: 13:00:00h

Chemical Form: UO2Cl2 , Sample Mass: 5.029 + or - gram

Activity Concentration at TOC: .203 uCi/grams , Total Activity @ TOC: 1.021 uCi

DPM Conversion Factor: 2220000 , Activity @ Receipt in DPM 2,266,994 , Activity@ Receipt in uCi: 1.0212

Preparation of Primary Stock Solution

Preparation Date: 07-27-92 , Activity on Prep Date : 2,266,681.5 DPM , 450,722.1 DPM /gram In The Ampoul

pCi per gram Of Standard In Ampoule at Prep= 203,028.0 ,Volume of Stock Solution: 1000 ml

Stock Solution Concentration: 2,266.6815 DPM/ml @ prep Stock Solution Total Activity @ Prep in uCi: 1.0210

Stock Solution Concentration: 1,021.028 pCi/ ml at prep , Total Stock Solution Activity @ Prep 1,021,027.7 pCi

Preparation of Working Solutions

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Working Solution Number	185.01	185.02	185.03	185.04	185.05
TOC	07-27-92	07-27-92	01-18-93	06-08-93	06-29-93
Volumetric or Gravimetric Prep	Volumetric	Volumetric	Volumetric	Volumetric	Volumetric
Stock Solution ID	185.00	185.01	185.03	185.02	185.02
Stock Solution Used (ml or grams)	100	200	100	100	100
DPM/ml of Stock Solution at TOC	2,266.700	226.7	45.3	45.3	45.3
Stock Solution TOC	07-27-92	07-27-92	07-27-92	07-17-92	07-27-92
Working Solution Volume (ml)	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Total DPM at TOC	226,670.0	45,340.0	4,508.2	4,489.5	4,488.1
DPM/ml @ TOC	226.7	45.3	4.5	4.5	4.5
pci/ml @ TOC	**102.1**	**20.4**	**2.0**	**2.0**	**2.0**
pCi/L @ TOC	102,103.60	20,423	2,031	2,022	2,022
ug/L @ TOC	147976.24	29599.16	2943.08	2930.85	2929.96
Date Exhausted					
Expiration Date	07-27-93	07-27-93	01-18-94	06-08-94	06-29-94

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

Nuclide U-232 Isotope # 185 Date Received 07-22-92 Received By E. S. Wallace

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Working Solution Number	185.06	185.07	185.08	185.09	185.10
TOC	07-27-93	08-04-93	08-04-93	09-22-93	09-27-93
Volumetric or Gravimetric Prep	Volumetric	Volumetric	Volumetric	Volmetric	Volumetric
Stock Solution ID	185.01	185.01	185.01	185.01	185.01
Stock Solution Used (ml or grams)	10	10	10	10	10
DPM/ml of Stock Solution at TOC	226.7	226.7	226.7	226.7	226.7
Stock Solution TOC	07-27-92	07-27-92	07-27-92	07-27-92	07-27-92
Working Solution Volume (ml)	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Total DPM at TOC	2,244.3	2,243.8	2,243.8	2,240.8	2,240.5
DPM/ml @ TOC	2.2	2.244	2.244	2.241	2.240
pci/ml @ TOC	1.0	1.0	1.0	1.0	1.0
pCI/L @ TOC	1,011	1,010.7	1,010.7	1,009.4	1,009.2
ug/L @ TOC	1465.14	1464.82	1464.82	1462.84	1462.64
Date Exhausted					
Expiration Date	07-27-94	08-04-94	08-04-95	09-22-94	09-27-94

Working Solution Number	185.11	185.12	185.13	185.140	185.150
TOC	09-27-93	10-07-93	10-15-93	10-26-93	10-28-93
Volumetric or Gravimetric Prep	Volumetrric	Volumetric	Volumetric	Volumetric	Volumetric
Stock Solution ID	185.0	185.0	185.01	185.01	185.01
Stock Solution Used (ml or grams)	10.0	20.0	20.0	10.0	20.0
DPM/ml of Stock Solution at TOC	226.7	226.7	226.700	226.7	226.700
Stock Solution TOC	07-27-92	07-27-92	07-27-92	07-27-92	07-27-92
Working Solution Volume (ml)	1,000.0	2,000.0	2000.0	1000.0	2000.0
Total DPM at TOC	2,240.5	4,479.7	4478.7	2238.7	4477.1
DPM/ml @ TOC	2.2	2.2	2.2	2.2	2.2
pci/ml @ TOC	1.0	1.0	1.0	1.0	1.0
pCI/L @ TOC	1,009	1,009	1008.7	1008.4	1008.4
ug/L @ TOC	1462.64	1462.24	1461.92	1461.47	1461.39
Date Exhausted					
Expiration Date	09-27-94	10-07-94	10-15-94	10-26-94	10-28-94

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

Activity Remaining in Stock Solution as of Report Date:

Current Stoc k Solution A ctivity: 0.9998 uCi

Nuclide U-232 Isotope # 185 Date Received 07-22-92 Received By E. S. Wallace

Radionuclide Standard Data Sheet

1/25/96

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Sol'n #	185.16	185.17	185.18	185.19	185.20
TOC	11-10-93	02-03-94	05-05-94	07-11-94	08-26-94
Volumetric or Gravimetric	Volumetric	Volumetric	Volumetric	Volumetric	Volumetric
Stock Solution ID	185.01	185.01	185.01	185.01	185.01
Stock Solution Used(ml or grams)	10.0	10.0	10.0	20.0	20.0
DPM/ml of Stock Sol. At TOC	226.7	226.7	226.7	226.7	226.7
Stock Solution TOC	07-27-92	07-27-92	07-27-92	07-27-92	07-27-92
Working Solution Volume (ml)	1000.0	1000.0	1000.0	1000.0	1000.0
Total DPM@ TOC	2237.8	2232.5	2226.9	4445.6	4440.0
DPM / ml @TOC	2.2	2.2	2.2	4.4	4.4
pCi/ml @ TOC	1.0	1.0	1.0	2.0	2.0
pCi/Liter @ TOC	1008.0	1005.6	1003.1	2002.5	2000.0
Original Working Solution #					
Date Exhausted	11-10-94	02-03-95	05-05-95	07-11-95	08-26-95

Working Sol'n #	185.21	185.22	185.23
	09-27-94	11-16-94	6-15-95
Volumetric or Gravimetric	Volumetric	Volumetric	Volumetric
Stock Solution ID	185.01	185.01	185.00
Stock Solution Used(ml or grams)	50.0	50.0	5.0
DPM/ml of Stock Sol. At TOC	226.7	226.7	2266.7
Stock Solution TOC	07-27-92	07-27-92	7/27/92
Working Solution Volume (ml)	2000.0	2000.0	2000.0
Total DPM@ TOC	11090.2	11075.0	11009.3
DPM / ml @TOC	5.5	5.5	5.5
pCi/ml @ TOC	2.5	2.5	2.5
pCi/Liter @ TOC	2497.8	2494.4	2479.6
Original Working Solution #			
Date Exhausted			

Go to next page for [illegible]

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

Activity Remaining in Stock Solution as of Report Date:

Current Stoc k Solution A ctivity: 0.9857 uCi

WS#21 185.2

Nuclide U-232 Isotope # 185a Date Received 07-22-92 Received By E.S. Wallace

INCOMING HEALTH PHYSICS

Radiation Level @ Package Surface 23 uR/hr , Radiation Level @ 1 meter From Package Surface 23 uR/hr

Removable Contamination Survey <10 DPM/100 Square Centimeters

Incoming Health Physics Results Pass Health Physics Approval By E.S. Wallace

Characterization of Radioactive Material Solution

Manufacturer: Isotope Products , Model # : 7232 , Serial #: 407-73 , NIST Traceable Yes

Half-Life 68.90 + or - 1.0 years , Date of Calibration 08-01-92 , Time of Calibration: 13:00:00h

Chemical Form: UO2Cl2 , Sample Mass: 5.029 + or - grams

Activity Concentration at TOC: 0.203 uCiig , Total Activity @ TOC: 1.021 uCi

DPM Conversion Factor: 2220000 , Activity @ Receipt in DPM 2,266,994 , Activity@ Receipt in uCi: 1.0212

Preparation of Primary Stock Solution

Preparation Date: 07-27-92 , Activity on Prep Date : 2,266,681.5 DPM , 450,722.1 DPM /grams In The Ampoul

pCi per grams Of Standard In Ampoule at Prep= 203,028.0 , Volume of Stock Solution: 1000 ml

Stock Solution Concentration: 2,266.7 DPM/ml @ prep Stock Solution Total Activity @ Prep in uCi: 1.0210

Stock Solution Concentration: 1,021.0 pCi/ ml at prep , Total Stock Solution Activity @ Prep 1,021,027.7 pCi

Preparation of Working Solutions

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Working Sol'n #	185.24	185.25	185.26	185.27	185.28
TOC	01/25/96	06/26/96	11/5/96	11/5/96	10/20/97
Volumetric or Gravimetric Prep	Volumetric	Volumetric	Volumetric	Volumetric	Volumetric
Stock Solution ID	185.00	185.24	185.00	185.26	185.27
Stock Solution Used(ml or grams)	5	25	50	100	200
DPM/ml of Stock Sol. At TOC	2,267.000	5.5	2,266.7	108.6	5.4
Stock Solution TOC	07-27-92	01/25/96	07/27/92	11/5/96	11/5/96
Working Solution Volume (ml)	2,000.0	100.0	1,000.0	2,000.0	1,000.0
Total DPM@ TOC	10,943.0	136.2	108,558.3	10,860.0	1,075.6
DPM / ml @TOC	5.5	1.4	108.6	5.4	1.1
pCi/ml @ TOC	**2.5**	**0.6**	**48.9**	**2.4**	**0.5**
pCi/Liter @ TOC	2,465	614	48,900	2,446	485
Original Working Solution #					
Date Exhausted					

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

Nuclide U-232 Isotope # 185a Date Received 07-22-92 Received By E.S. Wallace

Radionuclide Standard Data Sheet

11/24/98

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Working Sol'n #	**185.29**	**185.30**	**185.31**	**185.32**	**185.33**
TOC	12/10/97	12/11/97	02/27/98	02/27/98	07/21/98
Volumetric or Gravimetric	Volumetric	Volumetric	Volumetric	Volumetric	Volumetric
Stock Solution ID	185.00	185.29	185.00	185.31	185.31
Stock Solution Used(ml or grams)	100	25	100	25	25
DPM/ml of Stock Sol. At TOC	2,266.7	214.7	2,266.7	214.3	214.3
Stock Solution TOC	07/27/92	12/10/97	07/27/92	02/27/98	02/27/98
Working Solution Volume (ml)	1,000.0	2,000.0	1,000.0	2,000.0	2,000.0
Total DPM@ TOC	214,737.9	5,367.4	214,270.8	5,356.8	5,335.6
DPM / ml @TOC	214.7	2.684	214.271	2.678	2.668
pCi/ml @ TOC	**96.7**	**1.2**	**96.5**	**1.2**	**1.2**
pCi/Liter @ TOC	96,729	1,208.9	96,518.4	1,206.5	1,201.7
Original Working Solution #					
Date Exhausted					

Working Sol'n #	**185.34**				
TOC	10/28/98				
Volumetric or Gravimetric	Volumetric				
Stock Solution ID	185.3				
Stock Solution Used(ml or grams)	25.0				
DPM/ml of Stock Sol. At TOC	214.3				
Stock Solution TOC	02/27/98				
Working Solution Volume (ml)	2,000.0				
Total DPM@ TOC	5,321.0	0.0	0.0	0.0	0.0
DPM / ml @TOC	2.7	?	?	?	?
pCi/ml @ TOC	**1.2**				
pCi/Liter @ TOC	1,198				
Original Working Solution #					
Date Exhausted					

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

Activity Remaining in Stock Solution as of Report Date:

Current Stoc k Solution A ctivity: 0.9580 uCi

Entered into Logbooks

Radioactive Material Standard Solution Preparation Log

Isotope Number ~~185.04~~ @ 17Aug93 (185.03 is new #)

Radionuclide U_{232}

Date of Preparation 18Jul93

Prepared By J DeSmet

Isotope Number of Stock Solution 185.3, activity 20.4 pCi/ml

Preparation Notes

1. used 100 ml volumetric pipette to transfer 100 ml of 185.3 to a 1 liter volumetric flask

2. Brought volume of 1L flask to bottom of neck with 4M HNO_3

3. brought 1 liter flask to volume with deionized water. No over-volume

4.

5.

STANDARD PREPARATION WORKSHEET

Isotope Number: 185.33 JOB # 985384

Radionuclide: U232

Date of Preparation: 7/21/98

Prepared by: MG

Isotope Number of Stock Solution: 185.31

PREPARATION NOTES:

1) Amount of Stock Solution measured in volumetric flask.

25 mL OF 185.31 @ 96.5 pCi/mL

2) Amount and type of dilution measured in volumetric flask.

25 mL of 185.31 DILUTED TO 2000 mL IN 4N HNO_3

3) Final Concentration.

1.2 pCi/mL ✓ DW

4) Notes, Comments, and Calculations. DT 7-21-98

QC26 EFF 07-15-94:REV 2

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide	U-232	Customer:	CORE LABORATORIES	
Half Life:	68.9 ± 1.0 years	P.O.No.:	57210-231	
Catalog No.:	7232	Reference Date:	August 1 1992	12:00 PST.
Source No.:	407-73	Contained Radioactivity:	1.022	µCi.
		Contained Radioactivity:	37.8	kBq

Description of Solution

a. Mass of solution:	5.0290	grams.
b. Chemical form:	UO2Cl2 in 2N HCl	
c. Carrier content:	N/A	
d. Density:	1.0330	gram/ml @ 20°C.

Radioimpurities None detected (other than daughters).

Radioactive Daughters

Th-228 0.13% (as of July 13 1992) and its daughters. Date of separation July 13 1992.

Radionuclide Concentration

0.203 µCi/gram.

Method of Calibration

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

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	± 3.0%
b. Random uncertainty in assay:	± 1.1%
c. Random uncertainty in weighing(s):	± 0.2%
d. Total uncertainty at the 99% confidence level:	± 4.3%

NIST Traceability

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

Notes

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

Aman U. Khan

QUALITY CONTROL

July 20, 1992

Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 No. Keystone Street.,
Burbank, California 91504
(818) 843 - 7000

Nuclide U-238 Isotope # 297 Date Received 4/20/95 Received By RB

INCOMING HEALTH PHYSICS

diation Level @ Package Surface , Radiation Level @ 1 meter From Package Surface

Removable Contamination Survey DPM/100 Square Centimeters

Incoming Health Physics Results Health Physics Approval By

Characterization of Radioactive Material Solution

Manufacturer: Isotope Products , Model # :7338 , Serial #: 483-104 , NIST Traceable Yes

Half-Life:4,468,000,000.00 + or - 0.005 years , Date of Calibration4/1/95 ,Time of Calibration: 12:00:00h

Chemical Form:Uranyl Nitrate , Sample Mass:5.1439 + or - g

Activity Concentration at TOC:0.01957 uCi/g , Total Activity @ TOC:0.101 uCi

DPM Conversion Factor: 2220000 , Activity @ Receipt in DPM 223,479 , Activity@ Receipt in uCi: 0.1007

Preparation of Primary Stock Solution

Preparation Date:05/23/95 , Activity on Prep Date : 223,478.8 DPM , 43,445.4 DPM /g In The Ampoul

pCi per g Of Standard In Ampoule at Prep= 19,570.0 ,Volume of Stock Solution: 1000 ml

Stock Solution Concentration: 223.5 DPM/ml @ prep Stock Solution Total Activity @ Prep in uCi: 0.1007

Stock Solution Concentration: 100.7 pCi/ ml at prep , Total Stock Solution Activity @ Prep100,666.1 pCi

Preparation of Working Solutions

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Working Sol'n #	297.01	297.02	297.03	297.04	297.05
TOC	1/19/96	5/16/96	5/16/96	12/30/97	12/31/97
Volumetric or Gravimetric	Volumetric	Volumetric	Volumetric	Volumetric	Volumetric
Stock Solution ID	297.00	297.00	297.02	297.00	297.04
Stock Solution Used(ml or grams)	5	100	100	50	300
DPM/ml of Stock Sol. At TOC	223.500	223.5	22.3	223.5	11.2
Stock Solution TOC	5/23/95	5/23/95	5/16/96	5/16/95	12/30/97
Working Solution Volume (ml)	500.0	1,000.0	1,000.0	1,000.0	2,000.0
Total DPM@ TOC	1,117.5	22,350.0	2,230.0	11,175.0	3,360.0
DPM / ml @TOC	2.2	22.3	2.2	11.2	1.7
pCi/ml @ TOC	**1.0**	**10.1**	**1.0**	**5.0**	**0.8**
pCi/Liter @ TOC	1,006.8	10,067.6	1,004.5	5,033.8	756.8
Original Working Solution #					
Date Exhausted					

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

Nuclide U-238 Isotope # 297 Date Received 4/20/95 Received By RB

Radionuclide Standard Data Sheet

6/3/98

Preparation Of Working Solutions By Serial Volumetric Or Gravimetric Methods

Working Sol'n #	**297.06**	**297.07**	**297.08**	**297.09**	**297.10**
TOC	1/2/98	1/2/98	1/5/98	1/5/98	1/5/98
Volumetric or Gravimetric	Volumetric	Volumetric	Volumetric	Volumetric	Volumetric
Stock Solution ID	297.05	297.05	297.05	297.05	297.07
Stock Solution Used(ml or grams)	500	250	100	50	100
DPM/ml of Stock Sol. At TOC	1.7	1.7	1.7	1.7	0.4
Stock Solution TOC	12/31/97	12/31/97	12/31/97	12/31/97	1/2/98
Working Solution Volume (ml)	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Total DPM@ TOC	839.9	420.0	168.0	84.0	42.0
DPM / ml @TOC	0.8	0.420	0.168	0.084	0.042
pCi/ml @ TOC	**0.4**	**0.2**	**0.1**	**0.0**	**0.0**
pCi/Liter @ TOC	378.4	189.2	75.7	37.8	18.9
Original Working Solution #					
Date Exhausted					

Working Sol'n #	**297.11**	**297.12**	**297.13**		
TOC	1/5/98	02/04/98	05/18/98		
Volumetric or Gravimetric	Volumetric	Volumetric	Volumetric		
Stock Solution ID	297.08	297.09	297.00		
Stock Solution Used(ml or grams)	100.0	100.0	25.0		
DPM/ml of Stock Sol. At TOC	0.2	0.1	223.500		
Stock Solution TOC	1/5/98	01/05/98	5/23/95		
Working Solution Volume (ml)	1,000.0	1,000.0	1000.0		
Total DPM@ TOC	16.8	8.4	5587.5	0.0	0.0
DPM / ml @TOC	0.0	0.0	5.6	?	?
pCi/ml @ TOC	**0.0**	**0.0**	**2.5**		
pCi/Liter @ TOC	7.567	3.8	2516.9		
Original Working Solution #					
Date Exhausted					

Note: The Stock Solution Used entry is for the quantity of stock solution utilized to prepare the working solution. The Stock Solution Used units for working solutions prepared by the volumetric method are milliliters of Stock Solution. The Stock Solution Used units for working solutions prepared by the gravimetric method are grams of Stock Solution.

Activity Remaining in Stock Solution as of Report Date:

Current Stoc k Solution A ctivity: 0.1007 uCi

STANDARD PREPARATION WORKSHEET

Isotope Number: 297.0

Radionuclide: U-nat

Date of Preparation: 5-23-95

Prepared by: Randalynn Mull

Isotope Number of Stock Solution: 297

PREPARATION NOTES:

1) Amount of Stock Solution measured in volumetric flask.

9.4120g - Full Vial
- 4.2681g - empty vial
5.1439g - soln weight

} Stock Solution in 1000 ml 4% HNO_3

2) Amount and type of dilution measured in volumetric flask.

1000 ml in 4% HNO_3

3) Final Concentration.

$$5.1439\,g\ soln \times \frac{0.01957\,\mu Ci}{1\,g} \times \frac{\cancel{1000}\ 1000000\,pCi}{1\,\mu Ci} \times \frac{1\,\mu g}{0.69\,pCi} \times \frac{1\ std}{1000\,ml} = 1.459\,E$$

or 145.89 µg/ml ✓ 5/23/95

4) Notes, Comments, and Calculations.

WITNESSED BY DL

QC26 EFF 07-15-94:REV 2

STANDARD PREPARATION WORKSHEET

Isotope Number: 297.13 JOB # 98A836

Radionuclide: ISO U

Date of Preparation: 5/18/98

Prepared by: MG

Isotope Number of Stock Solution: 297.00

PREPARATION NOTES:

1) Amount of Stock Solution measured in volumetric flask.

25 ml of 297.00 @ 48.5 pCi/ml of U238
@ 49.8 pCi/ml of U234

2) Amount and type of dilution measured in volumetric flask.

25 ml of 297.00 DILUTED TO 1000 ml IN 4N HNO_3

3) Final Concentration.

U238 1.2 pCi/ml ✓
U234 1.2 pCi/ml
4/3/98

4) Notes, Comments, and Calculations. WITNESSED BY D7 5-18-98

QC26 EFF 07-15-94:REV 2

Isotope 297

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-238NAT	Customer:	CORE LABORATORIES
Half Life:	(4.468 ± 0.005) x 10^9 years	P.O.No.:	57210-1760
Catalog No.:	7338	Reference Date:	April 1 1995 12:00 PST.
Source No.:	483-104	Contained Radioactivity:	(Total U) 0.1006 μCi
		Contained Radioactivity:	(Total U) 3.72 kBq

Description of Solution

a. Mass of solution: 5.14063 g in a 5 ml flame sealed ampoule

b. Chemical form: Uranyl Nitrate in H2O

c. Carrier content: None

d. Density: Approximately 1.040 g/ml @ 20°C.

Radioimpurities

Refer to attached technical data sheet

Radioactive Daughters

Refer to attached technical data sheet

Radionuclide Concentration

(Total U) 0.01957 μCi/g.

Method of Calibration

Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement

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

NIST Traceability

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

Leak Test(s)

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

Notes

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

Anna U. Mien

QUALITY CONTROL

22 Mar 1995

Date Signed

ISOTOPE PRODUCTS LABORATORIES
3017 N. SAN FERNANDO BLVD.
BURBANK, CALIFORNIA 91504
818·843·7000 FAX 818·843·6168

ISOTOPE PRODUCTS LABORATORIES

U-238 TECHNICAL DATA

Corporate Offices

3017 N. San Fernando Blvd.

Burbank, California

91504

Main Laboratory

1800 N. Keystone Street

Burbank, California

91504

818·843·7000

Fax 818·843·6168

The U-238 used to prepare your order was taken from Isotope Products Laboratories Lot #6794 and had the following composition as of June 1, 1994.

NUCLIDE	ATOM%	ACTIVITY%
U-232	N/D	------
U-233	N/D	------
U-234	0.005	49.501
U-235	0.720	2.250
U-236	N/D	------
U-238	99.274	48.249

Isotopic composition provided by Oak Ridge National Laboratory.

If you have any questions, please contact Technical Service.

(818)843-7000

ISOTOPE PRODUCTS LABORATORIES

Corporate Offices
3017 N. San Fernando Blvd.
Burbank, California
91504

Main Laboratory
1800 N. Keystone Street
Burbank, California
91504

818·843·7000
Fax 818·843·6168

Dear Customer:

Thank you for your order to Isotope Products Laboratories.

Please be aware that radioactive materials are not included in the notification requirements of OSHA's Hazard Communication Standard (29CFR1910.1200).

For any of our products containing mixtures of hazardous chemical substances, the appropriate MSDS information sheet will be included with your order.

This in no way minimizes the hazards and control requirements associated with radioactive materials which are subject to various federal and state regulations.

Sincerely yours,
ISOTOPE PRODUCTS LABORATORIES

Charles E. Ashbaugh III

Charles E. Ashbaugh
Radiation Safety Officer

ISOTOPE PRODUCTS LABORATORIES
1800 NORTH KEYSTONE STREET
BURBANK, CALIFORNIA 91504

This package conforms to the conditions and limitations specified in 49 CFR 173.421 for Radioactive Material Excepted Package, Limited Quantity of Material, N.O.S. UN2910 and also IATA Section 6.2.1.4.

This is to certify that this package conforms to all packaging requirements of the U.S. Department of Transportation and the International Air Transport Association rules and regulations regarding the shipment of Radioactive Materials, Limited Quantities.

The radiation level on the surface of this package is less than 0.5 mR/hr.

No other labels required.

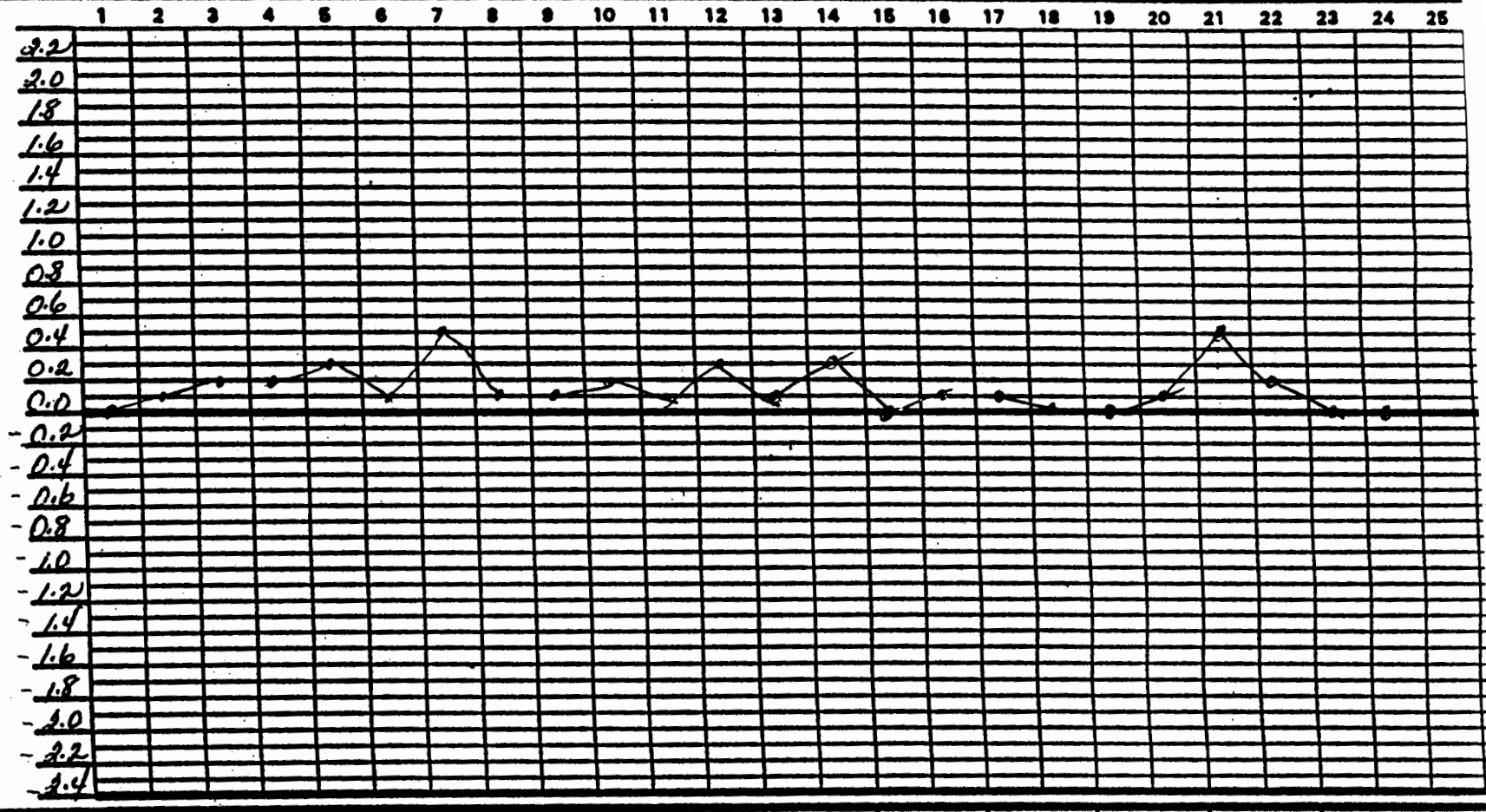
Blank

CORE LABORATORIES

PARAMETER	METHOD	QC TYPE	PERIOD COVERED
Isotopic Uranium-234	CA-GLR-041	Method/Reagent Blank	MEAN = SD =

Upper Control Limit 0.2 pCi/l

Blank Result



RUN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13
DATA POINT	0.0	0.1	0.2	0.2	0.3	0.1	0.5	0.1	0.1	0.2	0.1	0.28	0.1
DATE /INITIALS	2/10/98	2/11/98	2/11/98	2/13/98	2/13/98	3/2/98	3/4/98	3/12/98	3/12/98	04/01/98	4-1-98	4/5/98	5/1/98
QC BATCH NUMBER	6879	6928	6929	6967	6968	7165	7209	7309	7319	7653	7660	7920	8261

RUN NUMBER	14	15	16	17	18	19	20	21	22	23	24	25	26
DATA POINT	0.275	0.000	0.059	0.1	0.00	0.0	0.5	0.2	0.0	0.0			
DATE /INITIALS	5/28/98	6/2/98	5/29/98	7/13/98	7/23/99	9/9/98	10/20/98	10/29/98	11/11/98	11/4/98			
QC BATCH NUMBER	8449	8473	8472	9070	9261	9901	10462	10556	10729	10835			

CORE LABORATORIES

Percent Recover (Measured Activity of Standard Reference Material) x 100
(Actual Activity of Standard Reference Material)

Accuracy Control Chart

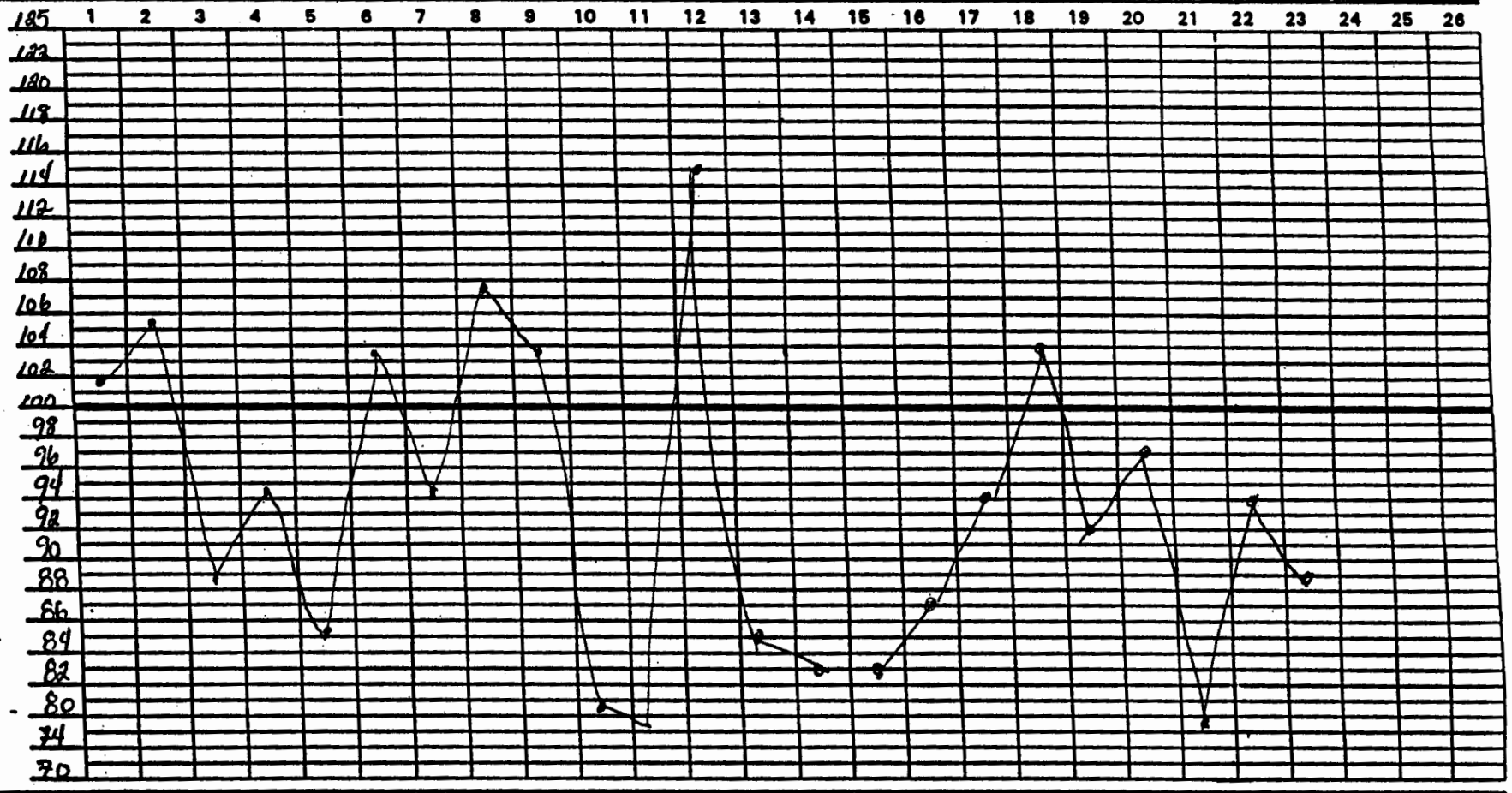
PARAMETER	METHOD	QC TYPE	PERIOD COVERED
Uranium-234 H20	CA-GHR-04.1	Laboratory Control Sample	MEAN = SD =

Upper Control Limit 117

Upper Warning Limit 113

Lower Warning Limit 87

Lower Control Limit 83



RUN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13
DATA POINT	101.9	105.6	88.9	94.4	85.2	103.7	94.4	107.4	103.7	81.5	77.8	114.8	85.2
DATE /INITIALS	1/29/98	2/10/98	2/11/98	2/11/98	2/13/98	2/13/98	3/6/98	3/4/98	3/12/98	3/12/98	4-1-98 WB	4-1-98 WB	4/15/98
QC BATCH NUMBER	6740	6879	6928	6925	6969	6968	7165	7209	7309	7311	6353	7660	7920

RUN NUMBER	14	15	16	17	18	19	20	21	22	23	24	25	26
DATA POINT	83.3	89.8	86.4	93.6	103.1	91.7	97.0	77.8	94.4	88.9			
DATE /INITIALS	5/13/98	5/28/98	5/29/98	5/29/98	7/23/98	9/1/98	10/20/98	10/29/98	11/11/98	11/14/98			
QC BATCH NUMBER	8261	8449	8473	8472	9211	9901	10462	10556	10789	10882			

CORELAB CORE LABORATORIES

RER = |Reported Value - Dup Value| / ((Reported Value Error)^2 + (Dup Error)^2)$^{1/2}$

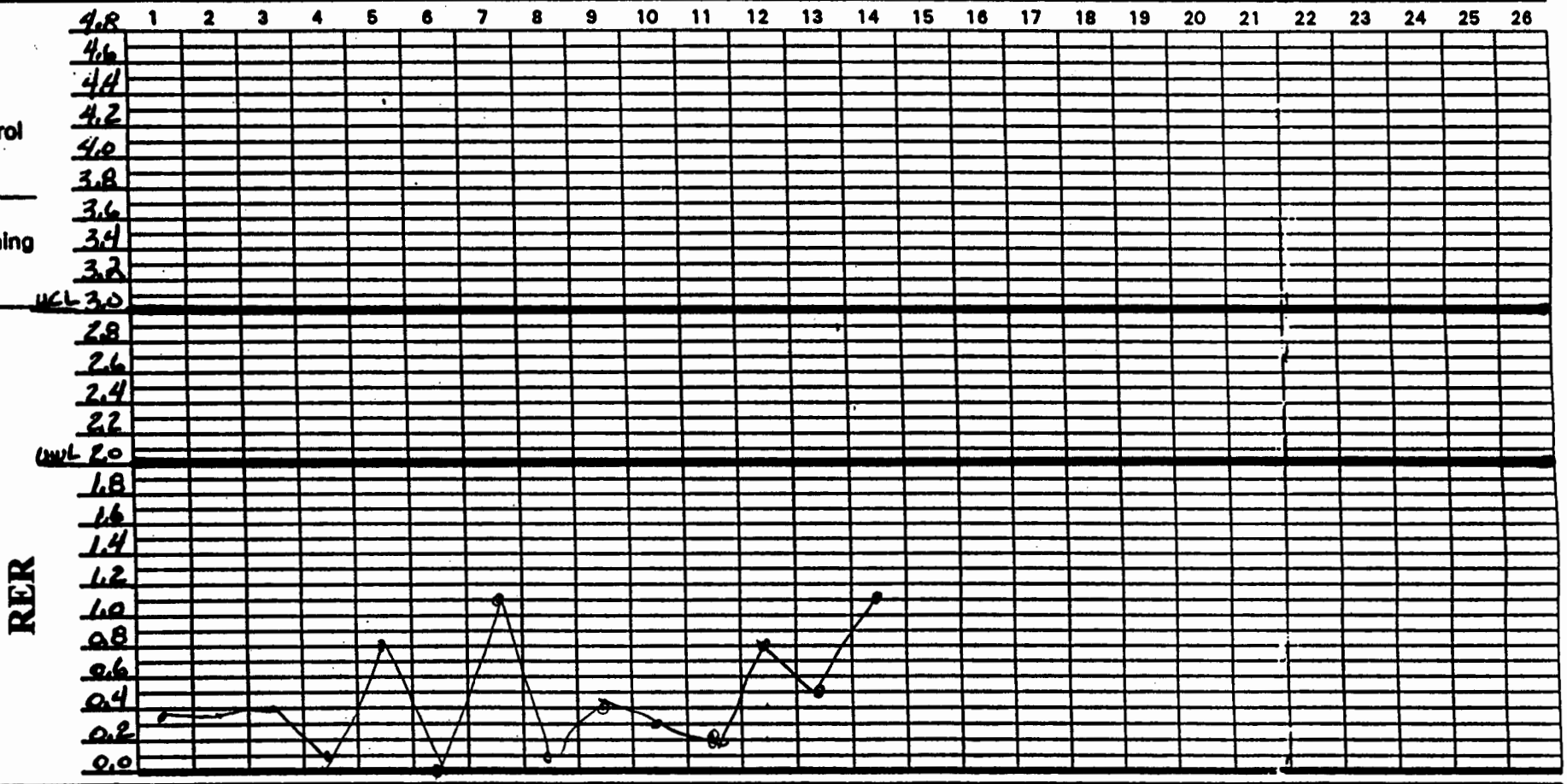
Note: Use TPU in place of error if TPU is calculated.

Precision Control Chart

PARAMETER	METHOD	QC TYPE	PERIOD COVERED
Uranium 234 H20	CA GLR-041	Duplicate Precision	MEAN = SD =

Upper Control Limit 3.0

Upper Warning Limit 2.0



RUN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13
DATA POINT	0.35	0.33	0.46	0.1	0.78	0.03	1.07	0.13	0.40	0.34	0.20	0.83	0.45
DATE /INITIALS	3/12/98	4-1-98 WB	4-1-98 WB	4/15/98 MF	5/15/98 MF	5/28/98 MF	5/29/98 MF	5/29/98 MF	7/23/98 MF	9/11/98 MF	10/20/98 MF	10/29/98 MF	11/11/98 MF
QC BATCH NUMBER	7311	7653	7662	7920	8261	8449	8473	8472	9261	9901	10462	10556	10729

RUN NUMBER	14	15	16	17	18	19	20	21	22	23	24	25	26
DATA POINT	1.11												
DATE /INITIALS	11/19/98 MF												
QC BATCH NUMBER	10832												

CT & E ENVIRONMENTAL SERVICES, INC
DATA COMPLETENESS CHECKLIST
METALS

Si, Sr

Laboratory Job Number: 985847

Item #	Title	In Pkg	Comments
1)	Digestion Log	✓	11-24-98 cy
2)	Instrument Printouts	✓	11-24-98 cy

Comments: _____

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METALS DIGESTION LOGBOOK

Method #: 3010 | Matrix: soil water oil other H_2O | QA No. 10341

Bath/Plate Temp: 95 °C | Spike ID: 980173 | Spike Vol: 1.0

Spike ID: 980086 | Spike Vol: 1.0 | H_2O_2 ID: NA

HNO_3 ID: 970308 | HCl ID: 980379 | Other ID: NA

#	Sample ID	Sample mL or g	Final Vol (mL)	Filter (Yes/No)	Comments
MB	9706527	1.0	1.0		
LCS	9706527				
1	985847-1				
MD	2				
MS	3				
2	4				
3	5				
4	6				
5	7				
6	8				
7	9				
8	10				
9	11				
10	12				
11	13				
12	13MD				
13	13MS				
14	985869-1				
15	2				
16	3				
17	4				
18	5				
19	1MS				
20	5MD				

Analyst: [illegible] Date: 10-13-98

Time: 10/26/98 13:52:09
me:
: CONC Corr. Factor: 1

m	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si2516
its	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ge	D.0140	11.98	.1899	2.995	D.0309	D-.0004	32.55
ev	.0252	.16	.0117	.038	.0000	.0705	.62
SD	180.5	1.338	3.391	1.277	.0000	20100.	1.918
	D.0251	11.81	.1779	3.038	D.0309	D-.0543	32.18
	D-.0110	12.13	.5012	2.967	D.0309	D.0794	32.20
	D.0208	11.99	.1907	2.979	D.0309	D-.0261	33.27
rors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK
gh	1000.	1000.	1000.	100.0			
w	-.0500	-.1000	-.0500	-1.000			

---

hod: RCRA Sample Name: 985847-13MS Operator: JAL
Time: 10/26/98 13:54:56
ment:
: CONC Corr. Factor: 1

m	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si2516
its	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ge	D.0915	12.16	.7206	2.814	D.0330	D-.0666	34.83
ev	.0232	.07	.0122	.078	.0009	.2937	.07
SD	26.01	.5261	1.693	2.759	2.839	441.2	.1985
	D.0936	12.19	.7276	2.902	D.0325	D-.4027	34.79
	D.0667	12.20	.7265	2.753	D.0341	D.0629	34.91
	D.1112	12.09	.7276	2.789	D.0325	D.1402	34.79
rors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK
gh	1000.	1000.	1000.	100.0			
w	-.0500	-.1000	-.0500	-1.000			

---

hod: RCRA Sample Name: 985847-13PDS X 2 Operator: JAL
Time: 10/26/98 13:57:56
ment:
: CONC Corr. Factor: 1

m	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si2516
its	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ge	1.136	10.09	1.133	5.256	4.012	4.034	17.22
ev	.011	.06	.003	.029	.031	.409	.19
SD	.0872	.6025	.7012	.5584	.7831	10.13	1.127
	1.167	10.15	1.133	5.270	3.993	3.714	17.11
	1.089	10.01	1.100	5.276	4.049	3.894	17.15
	1.112	10.07	1.166	5.222	3.995	4.494	17.12
rors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK
gh	1000.	1000.	1000.	100.0			
w	-.0500	-.1000	-.0500	-1.000			

Elem	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si251[illegible]
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Avge	D.0309	11.52	.6916	2.767	D.0346	[illegible]	28.3[illegible]
SDev	.0669	.04	.0050	.086	.0009	[illegible]	.1[illegible]
%RSD	216.9	.3304	.7264	3.104	[illegible]	[illegible]	[illegible]
#1	D-.0021	11.54	.6891	2.717	D.0341	[illegible]	28.1[illegible]
#2	D.1079	11.48	.6974	2.866	D.0341	D.1101	28.76
#3	D-.0132	11.55	.6884	2.717	D.0357	D.4473	27.87
Errors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHE
High	1000.	1000.	1000.	100.0			
Low	-.0500	-.1000	-.0500	-1.000			

Method: RCRA Sample Name: 985847-12 Operator: JAL
Run Time: 10/26/98 13:46:28
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si251
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Avge	D.0921	11.44	.5656	2.800	D.0357	D.3011	32.60
SDev	.0262	.15	.0070	.171	.0000	.3691	.25
%RSD	28.42	1.351	1.239	6.095	.0000	121.3	.7782
#1	D.0865	11.28	.5609	2.997	D.0357	D.7228	32.82
#2	D.0691	11.59	.5727	2.687	D.0357	D.1[illegible]	32.0[illegible]
#3	D.1206	11.46	.5624	2.717	D.0357	D.0[illegible]	32.1[illegible]
Errors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHE
High	1000.	1000.	1000.	100.0			
Low	-.0500	-.1000	-.0500	-1.000			

Method: RCRA Sample Name: 985847-13 Operator: JAL
Run Time: 10/26/98 13:49:22
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si2516
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Avge	D.0087	11.93	.4384	2.838	D.0336	D.0351	32.53
SDev	.0253	.21	.0039	.056	.0025	.1565	.50
%RSD	291.1	1.731	.8832	1.981	7.391	445.5	1.551
#1	D-.0171	11.79	.4394	2.795	D.0309	D.0774	32.19
#2	D.0335	11.84	.4416	2.902	D.0341	D.1662	33.11
#3	D.0098	12.17	.4341	2.818	D.0357	D-.1382	32.30
Errors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHEC
High	1000.	1000.	1000.	100.0			
Low	-.0500	-.1000	-.0500	-1.000			

Method: RCRA Sample Name: 985847-13MD Operator: JAL

	.0020	.2798	.0278
SD	1162.	97.69	3556.

D.0021	D-.0285	D.0115
D-.0017	D.5061	D.0216
D-.0009	D.3811	D-.0308

rors	LC Pass	NOCHECK	NOCHECK
gh	.0200		
w	-.0200		

---

hod: RCRA Sample Name: 985847-9 Operator: JAL
Time: 10/26/98 13:25:45
ment:
e: CONC Corr. Factor: 1

	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si2516
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ge	D.0264	9.116	.8833	2.894	D.0384	D.1268	31.57
	.0122	.036	.0103	.024	.0009	.3310	.73
SD	19.93	.2812	[illegible]	.8310	2.440	260.9	2.311

D.0112	9.155	.8812	2.908	D.0390	D.0513	31.36
D.0319	9.108	.8815	2.866	D.0390	D-.1618	32.38
D.0359	9.381	.8710	2.908	D.0374	D.4881	30.97

rors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK
gh	1000.	1000.	1000.	100.0			
w	-.0500	-.1000	-.0500	-1.000			

---

hod: RCRA Sample Name: 985847-10 Operator: JAL
Time: 10/26/98 13:39:17
ment:
e: CONC Corr. Factor: 1

	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si2516
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ge	d.1939	12.21	.7113	3.649	D.0428	D.1051	25.17
ev	.0057	.07	.0073	.091	.0009	.2441	.15
SD	8.953	.5297	1.036	2.506	2.192	232.4	.5766

d.2005	12.35	.7023	3.711	D.0422	D.0694	25.06
d.1910	12.21	.7080	3.544	D.0422	D-.1193	25.33
d.1903	12.36	.7125	3.693	D.0438	D.3651	25.11

rors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK
gh	1000.	1000.	1000.	100.0			
w	-.0500	-.1000	-.0500	-1.000			

---

hod: RCRA Sample Name: 985847-11 Operator: JAL
Time: [illegible]

Method: RCRA Sample Name: 985817-8 Operator: JAN
Run Time: 10/26/98 12:11:22
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si2[illegible]
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Avge	d.2751	10.15	.9703	2.878	D.0406	D-.1132	34.[illegible]
SDev	.0247	.03	.0034	.214	.0000	.1510	.[illegible]
%RSD	8.978	.2937	.3506	7.429	.0000	[illegible]	1.0[illegible]
#1	d.2575	10.12	.9668	3.033	D.0406	D.0589	33.[illegible]
#2	d.2646	10.18	.9705	2.631	D.0406	D-.1114	34.5
#3	d.3034	10.15	.9736	2.967	D.0406	D-.2462	34.0
Errors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCH
High	1000.	1000.	1000.	100.0			
Low	-.0500	-.1000	-.0500	-1.000			

Method: RCRA Sample Name: CCV7 Operator: JAN
Run Time: 10/26/98 12:15:48
Comment: 980915G
Mode: CONC Corr. Factor: 1

Elem	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si2[illegible]
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Avge	5.063	D.0355	D.0825	D-.0912	D.0049	1.895	Q2.8[illegible]
SDev	.053	.0246	.0152	.0357	.0000	.132	.0[illegible]
%RSD	1.038	69.39	18.36	39.13	.0000	6.[illegible]	.1[illegible]
#1	5.119	D.0276	D.0810	D-.0912	D.0049	5.032	Q2.8[illegible]
#2	5.056	D.0158	D.0983	D-.0555	D.0049	1.856	Q2.8[illegible]
#3	5.015	D.0632	D.0682	D-.1269	D.0049	4.798	Q2.8[illegible]
Errors	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	QC Pass	QC P
Value	5.000					5.000	2.50
Range	10.00					10.00	10.[illegible]

Method: RCRA Sample Name: CCV21 Operator: JAN
Run Time: 10/26/98 12:19:57
Comment: 981013A
Mode: CONC Corr. Factor: 1

Elem	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si2[illegible]
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Avge	D.1873	5.140	5.119	5.024	5.101	D-.0666	D.03[illegible]
SDev	.0429	.038	.066	.110	.037	.1805	.07[illegible]
%RSD	22.92	.7407	1.288	2.185	.7262	271.1	214.[illegible]
#1	D.1506	5.168	5.046	4.996	5.059	D.0852	D-.0[illegible]
#2	D.2345	5.097	5.135	5.145	5.124	D-.0188	D.12[illegible]
#3	D.1767	5.156	5.175	4.931	5.122	D-.2661	D-.0[illegible]
Errors	NOCHECK	QC Pass	QC Pass	QC Pass	NOCHECK	NOCHECK	NOCH

: Time: 10/26/98 12:03:02
ment:
le: CONC Corr. Factor: 1

lem	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si2516
nits	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
vge	D.1256	20.29	.6874	4.504	.1012	D.1782	30.21
Dev	.0325	.15	.0102	.191	.0009	.1734	.24
RSD	25.87	.7290	1.482	4.230	.9262	97.31	.7996
1	D.1159	20.16	.6876	4.318	.1007	D.2133	30.15
2	D.1427	20.21	.6770	4.699	.1023	D-.0101	29.97
3	D.0881	20.17	.6974	4.496	.1007	D.3312	30.22
rors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK
igh	1000.	1000.	1000.	100.0			
ow	-.0500	-.1000	-.0500	-1.000			

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thod: RCRA Sample Name: 985847-6 Operator: JAL
n Time: 10/26/98 12:05:19
mment:
de: CONC Corr. Factor: 1

lem	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si2516
nits	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
vge	D-.0506	17.09	.7354	4.347	d.0872	D.0462	27.08
Dev	.0251	.08	.0050	.135	.0009	.0420	.34
RSD	49.47	.4510	.6831	3.100	1.076	90.87	1.254
1	D-.0219	17.08	.7299	4.365	d.0877	D.0013	27.33
2	D-.0623	17.01	.7367	4.472	d.0861	D.0845	27.22
3	D-.0678	17.17	.7397	4.205	d.0877	D.0527	26.69
rors	LC Low	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK
igh	1000.	1000.	1000.	100.0			
ow	-.0500	-.1000	-.0500	-1.000			

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thod: RCRA Sample Name: 985847-7 Operator: JAL
n Time: 10/26/98 12:08:31
mment:
de: CONC Corr. Factor: 1

Elem	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si2516
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Avge	D.0264	15.85	.6650	3.033	D.0574	D-.0474	26.33
SDev	.0628	.09	.0008	.052	.0019	.1091	.43
%RSD	238.1	.5610	.1125	1.710	3.268	230.2	1.640
#1	D-.0021	15.90	.6657	2.973	D.0552	D-.0838	26.64
#2	D.0984	15.90	.6650	3.068	D.0585	D.0752	25.84
#3	D-.0171	15.71	.6642	3.056	D.0585	D-.1336	26.52
Errors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK
High	1000.	1000.	1000.	100.0			
Low	-.0500	-.1000	-.0500	-1.000			

Elem	A13961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	S125
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Avge	D-.0615	19.70	1.556	D1.552	.2176	D.0821	21.8
SDev	.0175	.04	.020	.071	.0043	.0819	.1
%RSD	28.47	.2111	1.302	4.603	1.971	62.86	1.01
#1	D-.0678	19.75	1.538	D1.557	.2225	D.0823	21.7
#2	D-.0417	19.66	1.552	D1.480	.2160	D.1727	22.2
#3	D-.0749	19.70	1.578	D1.622	.2141	D.0091	21.1
Errors	LC Low	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCH
High	1000.	1000.	1000.	100.0			
Low	-.0500	-.1000	-.0500	-1.000			

Method: RCRA Sample Name: 985847-3 Operator: JAL
Run Time: 10/26/98 11:57:35
Comment:
Mode: CONC Corr. Factor: 1

Elem	A13961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	S125
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Avge	D.0106	17.67	.2933	4.157	.0889	D-.0179	28.6
SDev	.0260	.12	.0083	.131	.0025	.0147	.5
%RSD	246.8	.6879	2.822	3.911	2.761	249.1	1.81
#1	D.0193	17.80	.2839	4.320	.0893	D.0317	29.1
#2	D.0311	17.57	.2960	4.591	.0926	D-.0551	28.0
#3	D-.0187	17.64	.2998	4.149	.0877	D-.0305	28.6
Errors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCH
High	1000.	1000.	1000.	100.0			
Low	-.0500	-.1000	-.0500	-1.000			

Method: RCRA Sample Name: 985847-4 Operator: JAL
Run Time: 10/26/98 12:00:19
Comment:
Mode: CONC Corr. Factor: 1

Elem	A13961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	S1253
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Avge	D.0058	21.95	1.862	4.423	.1310	D.2405	23.02
SDev	.0346	.09	.023	.099	.0009	.3312	.28
%RSD	596.1	.4074	1.237	2.236	.7157	138.9	1.211
#1	D.0383	22.03	1.872	4.511	.1299	D-.1131	22.77
#2	D.0098	21.86	1.877	4.318	.1315	D.3962	22.98
#3	D-.0306	21.96	1.835	4.437	.1315	D.4684	23.32
Errors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHE
High	1000.	1000.	1000.	100.0			
Low	-.0500	-.1000	-.0500	-1.000			

Method: RCRA Sample Name: 985847-5 Operator: JAL

: Time: 10/26/98 11:46:19
ment:
de: CONC Corr. Factor: 1

lem	Al3961	Ca3158	Fe2599	Mg2790	Ni2316	Pb2203	Sr4077
its	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ge	1.069	1.042	1.030	D.9480	1.057	1.053	1.049
Dev	.017	.007	.010	.0774	.021	.035	.002
SD	1.622	.6561	.9668	8.167	2.006	3.360	.2366
1	1.080	1.034	1.020	D.8727	1.034	1.081	1.046
2	1.057	1.046	1.039	D1.027	1.075	1.065	1.049
3	1.062	1.046	1.032	D.9441	1.061	1.013	1.051
rors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK
igh	1000.	1000.	1000.	100.0	100.0	100.0	
ow	-.0500	-.1000	-.0500	-1.000	-.0500	-.0500	

lem	V_3093	B_2497	Si2516
its	ppm	mg/L	mg/L
ge	k1.027	1.020	d.5798
Dev	.001	.213	.0071
RSD	.3686	23.84	1.223
2	k1.025	.8302	d.5838
3	k1.024	.9352	d.5840
rors	LC Pass	NOCHECK	NOCHECK
igh	100.0		
ow	-.0100		

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hod: RCRA Sample Name: 985847-1 Operator: JAL
: Time: 10/26/98 11:51:35
ment:
de: CONC Corr. Factor: 1

lem	Al3961	Ca3158	Fe2599	Mg2790	Sr4077	B_2497	Si2516
its	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ge	D.0665	21.43	1.492	D1.642	.2317	D.0220	21.89
Dev	.0199	.28	.011	.115	.0034	.1222	.31
SD	29.89	1.307	.7084	6.991	1.459	555.8	1.417
1	D.0644	21.46	1.501	D1.605	.2290	D-.1171	21.53
2	D.0873	21.13	1.481	D1.771	.2306	D.1122	22.05
3	D.0177	21.69	1.496	D1.551	.2355	D.0709	22.08
rors	LC Pass	LC Pass	LC Pass	LC Pass	NOCHECK	NOCHECK	NOCHECK
igh	1000.	1000.	1000.	100.0			
ow	-.0500	-.1000	-.0500	-1.000			

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hod: RCRA Sample Name: 985847-2 Operator: JAL
: Time: 10/26/98 11:54:47
ment:
de: CONC Corr. Factor: 1