Paragon Analytics

Radiochemistry Case Narrative
Gross Alpha/Beta

KENT & SULLIVAN

Ross Adams

PAI WO 0405095

1. This report consists of the analytical results and supporting documentation for 12 water samples received by Paragon on 5/11/04.
2. These samples were prepared according to Paragon Analytics procedure SOP702R16.
3. The samples were analyzed for gross alpha and beta activity by gas flow proportional counting according to Paragon Analytics procedure SOP724R8. The analyses were completed on 5/25/04. Gross alpha results are referenced to ^{241}Am. Gross beta results are referenced to ^{90}Sr/Y.
4. The analysis results for these samples are reported in units of pCi/L. The samples were not filtered prior to analysis.
5. No anomalous situations were encountered during the preparation or analysis of these samples. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, Paragon Analytics certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Clare Lenich — 5/26/04
Clare Lenich
Radiochemistry Instrument Technician
Date

Leah Balko — 6/1/04
Radiochemistry Final Data Review
Date

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PARAGON ANALYTICS
Radiochemistry Data Package

Section 1

SAMPLE RESULTS SUMMARY

Gross Alpha/Beta Analysis by GFPC Sample Results Summary

Client Name: Kent & Sullivan Inc.
Client Project Name: Ross Adams
Client Project Number:

Laboratory Name: Paragon Analytics
PAI Work Order: 0405095

Reported on: Wednesday, May 26, 2004 12:54:19 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0405095-1	SW-01	Sample	GROSS ALPHA	0.86 +/- 0.43	0.62	pCi/l	WATER	AB040519-2	5/24/2004	LT
0405095-1	SW-01	Sample	GROSS BETA	0.35 +/- 0.77	1.47	pCi/l	WATER	AB040519-2	5/24/2004	U
0405095-2	SW-02	Sample	GROSS ALPHA	1.26 +/- 0.57	0.84	pCi/l	WATER	AB040519-2	5/24/2004	LT
0405095-2	SW-02	Sample	GROSS BETA	1.74 +/- 0.84	1.44	pCi/l	WATER	AB040519-2	5/24/2004	LT
0405095-3	SW-04	Sample	GROSS ALPHA	0.09 +/- 0.38	0.78	pCi/l	WATER	AB040519-2	5/24/2004	U
0405095-3	SW-04	Sample	GROSS BETA	-0.15 +/- 0.74	1.45	pCi/l	WATER	AB040519-2	5/24/2004	U
0405095-4	SW-05	Sample	GROSS ALPHA	1.83 +/- 0.63	0.78	pCi/l	WATER	AB040519-2	5/24/2004	
0405095-4	SW-05	Sample	GROSS BETA	1.64 +/- 0.84	1.46	pCi/l	WATER	AB040519-2	5/24/2004	LT
0405095-5	SW-06	Sample	GROSS ALPHA	1.16 +/- 0.55	0.83	pCi/l	WATER	AB040519-2	5/24/2004	LT

Comments:

Data Package ID: *ABW0405095-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

000003

Gross Alpha/Beta Analysis by GFPC Sample Results Summary

Client Name: Kent & Sullivan Inc.
Client Project Name: Ross Adams
Client Project Number:

Laboratory Name: Paragon Analytics
PAI Work Order: 0405095

Reported on: Wednesday, May 26, 2004 12:54:19 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0405095-5	SW-06	Sample	GROSS BETA	1.49 +/- 0.83	1.46	pCi/l	WATER	AB040519-2	5/24/2004	LT
0405095-6	SW-07	Sample	GROSS ALPHA	34.6 +/- 5.8	0.9	pCi/l	WATER	AB040519-2	5/24/2004	
0405095-6	SW-07	Sample	GROSS BETA	19.1 +/- 3.4	1.9	pCi/l	WATER	AB040519-2	5/24/2004	
0405095-7	SW-08	Sample	GROSS ALPHA	6.1 +/- 1.2	0.7	pCi/l	WATER	AB040519-2	5/24/2004	
0405095-7	SW-08	Sample	GROSS BETA	4.3 +/- 1.2	1.5	pCi/l	WATER	AB040519-2	5/24/2004	LT
0405095-8	SW-09	Sample	GROSS ALPHA	15.8 +/- 2.8	0.7	pCi/l	WATER	AB040519-2	5/24/2004	
0405095-8	SW-09	Sample	GROSS BETA	12.3 +/- 2.3	1.6	pCi/l	WATER	AB040519-2	5/24/2004	
0405095-9	SW-10	Sample	GROSS ALPHA	1.35 +/- 0.58	0.85	pCi/l	WATER	AB040519-2	5/24/2004	LT
0405095-9	SW-10	Sample	GROSS BETA	1.70 +/- 0.88	1.52	pCi/l	WATER	AB040519-2	5/24/2004	LT

Comments:

Data Package ID: *ABW0405095-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

100004

Gross Alpha/Beta Analysis by GFPC Sample Results Summary

Client Name: Kent & Sullivan Inc.
Client Project Name: Ross Adams
Client Project Number:

Laboratory Name: Paragon Analytics
PAI Work Order: 0405095

Reported on: Wednesday, May 26, 2004 12:54:19 PM

Lab Sample ID	Client Sample ID	Sample Type	Nuclide	Result +/- 2 s TPU	MDC	Units	Matrix	Prep Batch	Date Analyzed	Flags
0405095-10	SW-11	Sample	GROSS ALPHA	1.23 +/- 0.56	0.81	pCi/l	WATER	AB040519-2	5/24/2004	LT
0405095-10	SW-11	Sample	GROSS BETA	1.70 +/- 0.87	1.52	pCi/l	WATER	AB040519-2	5/24/2004	LT
0405095-11	FR-01	Sample	GROSS ALPHA	-0.27 +/- 0.32	0.74	pCi/l	WATER	AB040519-2	5/24/2004	U
0405095-11	FR-01	Sample	GROSS BETA	-0.58 +/- 0.83	1.64	pCi/l	WATER	AB040519-2	5/24/2004	U
0405095-12	FR-02	Sample	GROSS ALPHA	9.6 +/- 1.8	0.9	pCi/l	WATER	AB040519-2	5/25/2004	
0405095-12	FR-02	Sample	GROSS BETA	4.7 +/- 1.3	1.7	pCi/l	WATER	AB040519-2	5/25/2004	LT

Comments:

Data Package ID: *ABW0405095-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

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PARAGON ANALYTICS

Radiochemistry Data Package

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Section 2

QC RESULTS SUMMARY

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Method Blank Results

Lab Name: Paragon Analytics
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Lab ID: AB040519-2MB

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 19-May-04
Date Prepared: 19-May-04
Date Analyzed: 25-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes

Final Aliquot: 200 ml
Result Units: pCi/l
File Name: aba0525d

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	-0.26 +/- 0.39	0.86	U
12587-47-2	GROSS BETA	-0.11 +/- 0.86	1.68	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Laboratory Control Sample(s)

Lab Name: **Paragon Analytics**
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Lab ID: AB040519-2LCS

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 19-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 180 minutes

Final Aliquot: 200 ml
Result Units: pCi/l
File Name: aba0524

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
12587-46-1	GROSS ALPHA	233 +/- 38	1	229	102	70 - 130	P
12587-47-2	GROSS BETA	232 +/- 37	5	214	108	70 - 130	P,M3

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Duplicate Sample Results (DER)

Lab Name: Paragon Analytics
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: SW-11
Lab ID: 0405095-10DUP

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 06-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: abb0524h

CASNO	Analyte	Sample Result +/- 2 s TPU	Duplicate Result +/- 2 s TPU	DER	Control Limit	Lab Qualifiers
12587-46-1	GROSS ALPHA	1.23 +/- 0.56	1.88 +/- 0.65	0.75	2.13	
12587-47-2	GROSS BETA	1.70 +/- 0.87	1.59 +/- 0.87	0.09	2.13	LT

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *ABW0405095-1*

PARAGON ANALYTICS
Radiochemistry Data Package

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Section 3

INDIVIDUAL SAMPLE RESULTS

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: SW-01
Lab ID: 0405095-1

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 05-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: abb0524h

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	0.86 +/- 0.43	0.62	LT
12587-47-2	GROSS BETA	0.35 +/- 0.77	1.47	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: **Paragon Analytics**
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: SW-02
Lab ID: 0405095-2

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 05-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: abb0524h

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	1.26 +/- 0.57	0.84	LT
12587-47-2	GROSS BETA	1.74 +/- 0.84	1.44	LT

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: SW-04
Lab ID: 0405095-3

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 04-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: abb0524h

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	0.09 +/- 0.38	0.78	U
12587-47-2	GROSS BETA	-0.15 +/- 0.74	1.45	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: SW-05
Lab ID: 0405095-4

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 06-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: abb0524h

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	1.83 +/- 0.63	0.78	
12587-47-2	GROSS BETA	1.64 +/- 0.84	1.46	LT

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: SW-06
Lab ID: 0405095-5

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 06-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: abb0524h

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	1.16 +/- 0.55	0.83	LT
12587-47-2	GROSS BETA	1.49 +/- 0.83	1.46	LT

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: SW-07
Lab ID: 0405095-6

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 03-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: abb0524h

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	34.6 +/- 5.8	0.9	
12587-47-2	GROSS BETA	19.1 +/- 3.4	1.9	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: SW-08
Lab ID: 0405095-7

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 03-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: abb0524h

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	6.1 +/- 1.2	0.7	
12587-47-2	GROSS BETA	4.3 +/- 1.2	1.5	LT

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: SW-09
Lab ID: 0405095-8

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 05-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: abb0524h

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	15.8 +/- 2.8	0.7	
12587-47-2	GROSS BETA	12.3 +/- 2.3	1.6	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: SW-10
Lab ID: 0405095-9

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 05-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: abb0524h

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	1.35 +/- 0.58	0.85	LT
12587-47-2	GROSS BETA	1.70 +/- 0.88	1.52	LT

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: **Paragon Analytics**
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: SW-11
Lab ID: 0405095-10

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 06-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: abb0524h

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	1.23 +/- 0.56	0.81	LT
12587-47-2	GROSS BETA	1.70 +/- 0.87	1.52	LT

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Sample Duplicate Results

Lab Name: Paragon Analytics
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: SW-11
Lab ID: 0405095-10DUP

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 06-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: abb0524h

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	1.88 +/- 0.65	0.81	
12587-47-2	GROSS BETA	1.59 +/- 0.87	1.52	LT

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)
MDC - Minimum Detectable Concentration (see PAI SOP 709)
BDL - Below Detection Limit

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: FR-01
Lab ID: 0405095-11

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 06-May-04
Date Prepared: 19-May-04
Date Analyzed: 24-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: abb0524h

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	-0.27 +/- 0.32	0.74	U
12587-47-2	GROSS BETA	-0.58 +/- 0.83	1.64	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *ABW0405095-1*

Gross Alpha/Beta Analysis by GFPC

PAI 724 Rev 8

Sample Results

Lab Name: Paragon Analytics
Work Order Number: 0405095
Client Name: Kent & Sullivan Inc.
ClientProject ID: Ross Adams

Field ID: FR-02
Lab ID: 0405095-12

Sample Matrix: WATER
Prep SOP: PAI 702 Rev 16
Date Collected: 06-May-04
Date Prepared: 19-May-04
Date Analyzed: 25-May-04

Prep Batch: AB040519-2
QCBatchID: AB040519-2-2
Run ID: ab040519-2a
Count Time: 480 minutes
Report Basis: Unfiltered

Final Aliquot: 200 ml
Prep Basis: Unfiltered
Moisture(%): NA
Result Units: pCi/l
File Name: aba0525d

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Lab Qualifier
12587-46-1	GROSS ALPHA	9.6 +/- 1.8	0.9	
12587-47-2	GROSS BETA	4.7 +/- 1.3	1.7	LT

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

Abbreviations:

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

BDL - Below Detection Limit

Data Package ID: *ABW0405095-1*

PARAGON ANALYTICS
Radiochemistry Data Package

4

Section 4

RAW DATA

Gross Alpha/Beta Analysis by GFPC Raw Data Report

Laboratory Name: Paragon Analytics
PAI Work Order: 0405095

Prep SOP: PAI 702
Analytical SOP: PAI 724

Reported on: Wednesday, May 26, 2004
12:50:36 PM

Sample ID QC Type	Nuclide Type	Sample Date/Time	Prep Batch QCBatchID	Ingrowth Date /Time	Decay Date/Time	Matrix %Moist.	Samp Alq Analy Alq	Inst ID Det ID	AnRunID File Name	Count Date/Time	GrossCPM BkgCPM	BaseEff ProgEff	CntDur(min) Yield	Activity +/- 2 s TPU	MDC DecLev	ReportUnits ReportBasis	DER RPD	%Spk. Recov Flags
0405095-1	GROSS ALPHA	5/5/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	0.133	20.85%	480	0.86	0.62	pCi/l	NA	
SMP	Trg. Analyte	4:40:00 PM	AB040519-2-2	NA	NA	NA	200 ml	A1	abb0524h	5:41 PM	0.055	NA	NA	0.43	NA	Unfiltered	NA	LT
0405095-1	GROSS BETA	5/5/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	1.531	40.35%	480	0.35	1.47	pCi/l	NA	
SMP	Trg. Analyte	4:40:00 PM	AB040519-2-2	NA	NA	NA	200 ml	A1	abb0524h	5:41 PM	1.433	NA	NA	0.77	NA	Unfiltered	NA	U
0405095-2	GROSS ALPHA	5/5/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	0.227	20.41%	480	1.26	0.84	pCi/l	NA	
SMP	Trg. Analyte	3:50:00 PM	AB040519-2-2	NA	NA	NA	200 ml	A2	abb0524h	5:41 PM	0.111	NA	NA	0.57	NA	Unfiltered	NA	LT
0405095-2	GROSS BETA	5/5/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	1.740	40.66%	480	1.74	1.44	pCi/l	NA	
SMP	Trg. Analyte	3:50:00 PM	AB040519-2-2	NA	NA	NA	200 ml	A2	abb0524h	5:41 PM	1.366	NA	NA	0.84	NA	Unfiltered	NA	LT
0405095-3	GROSS ALPHA	5/4/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	0.100	20.99%	480	0.09	0.78	pCi/l	NA	
SMP	Trg. Analyte	5:52:00 PM	AB040519-2-2	NA	NA	NA	200 ml	A3	abb0524h	5:41 PM	0.091	NA	NA	0.38	NA	Unfiltered	NA	U
0405095-3	GROSS BETA	5/4/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	1.465	41.32%	480	-0.15	1.45	pCi/l	NA	
SMP	Trg. Analyte	5:52:00 PM	AB040519-2-2	NA	NA	NA	200 ml	A3	abb0524h	5:41 PM	1.466	NA	NA	0.74	NA	Unfiltered	NA	U
0405095-4	GROSS ALPHA	5/6/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	0.248	20.37%	480	1.83	0.78	pCi/l	NA	
SMP	Trg. Analyte	11:45:00 AM	AB040519-2-2	NA	NA	NA	200 ml	A4	abb0524h	5:41 PM	0.086	NA	NA	0.63	NA	Unfiltered	NA	
0405095-4	GROSS BETA	5/6/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	1.735	40.37%	480	1.64	1.46	pCi/l	NA	
SMP	Trg. Analyte	11:45:00 AM	AB040519-2-2	NA	NA	NA	200 ml	A4	abb0524h	5:41 PM	1.378	NA	NA	0.84	NA	Unfiltered	NA	LT
0405095-5	GROSS ALPHA	5/6/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	0.206	21.48%	480	1.16	0.83	pCi/l	NA	
SMP	Trg. Analyte	8:50:00 AM	AB040519-2-2	NA	NA	NA	200 ml	B3	abb0524h	5:41 PM	0.102	NA	NA	0.55	NA	Unfiltered	NA	LT
0405095-5	GROSS BETA	5/6/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	1.885	42.53%	480	1.49	1.46	pCi/l	NA	
SMP	Trg. Analyte	8:50:00 AM	AB040519-2-2	NA	NA	NA	200 ml	B3	abb0524h	5:41 PM	1.552	NA	NA	0.83	NA	Unfiltered	NA	LT
0405095-6	GROSS ALPHA	5/3/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	3.233	20.38%	480	34.6	0.9	pCi/l	NA	
SMP	Trg. Analyte	4:03:00 PM	AB040519-2-2	NA	NA	NA	200 ml	B4	abb0524h	5:41 PM	0.109	NA	NA	5.8	NA	Unfiltered	NA	

Comments:

Data Package ID: *ABW0405095-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

D - DER is greater than Control Limit of 2.13

+ - Duplicate RPD not within limits.

LT - Result is less than Request MDC, greater than sample specific MDC

* - Aliquot Basis is 'As Recieved' while the Report Basis is 'Dry Weight'.

- Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Recieved'.

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Notes:

1) The Tracer results are not yield corrected (i.e. activity measured not activity added).

2) Where sample time is not available, 12:00 PM (Mountain) is used for decay correction.

Abbreviations:

TR- Tracer TA - Target Analyte

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

DER - Duplicate Error Ratio

BDL - Below Detection Limit

Gross Alpha/Beta Analysis by GFPC Raw Data Report

Laboratory Name: Paragon Analytics
PAI Work Order: 0405095

Prep SOP: PAI 702
Analytical SOP: PAI 724

Reported on: Wednesday, May 26, 2004
12:50:36 PM

Sample ID QC Type	Nuclide Type	Sample Date/Time	Prep Batch QCBatchID	Ingrowth Date /Time	Decay Date/Time	Matrix %Moist.	Samp Alq Analy Alq	Inst ID Det ID	AnRunID File Name	Count Date/Time	GrossCPM BkgCPM	BaseEff ProgEff	CntDur(min) Yield	Activity +/- 2 s TPU	MDC DecLev	ReportUnits ReportBasis	DER RPD	%Spk. Recov Flags
0405095-6	GROSS BETA	5/3/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	5.954	40.28%	480	19.1	1.9	pCi/l	NA	
SMP	Trg. Analyte	4:03:00 PM	AB040519-2-2	NA	NA	NA	200 ml	B4	abb0524h	5:41 PM	1.694	NA	NA	3.4	NA	Unfiltered	NA	
0405095-7	GROSS ALPHA	5/3/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	0.675	21.70%	480	6.1	0.7	pCi/l	NA	
SMP	Trg. Analyte	4:59:00 PM	AB040519-2-2	NA	NA	NA	200 ml	C1	abb0524h	5:41 PM	0.077	NA	NA	1.2	NA	Unfiltered	NA	
0405095-7	GROSS BETA	5/3/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	2.544	41.75%	480	4.3	1.5	pCi/l	NA	
SMP	Trg. Analyte	4:59:00 PM	AB040519-2-2	NA	NA	NA	200 ml	C1	abb0524h	5:41 PM	1.564	NA	NA	1.2	NA	Unfiltered	NA	LT
0405095-8	GROSS ALPHA	5/5/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	1.544	21.27%	480	15.8	0.7	pCi/l	NA	
SMP	Trg. Analyte	12:30:00 PM	AB040519-2-2	NA	NA	NA	200 ml	C2	abb0524h	5:41 PM	0.068	NA	NA	2.8	NA	Unfiltered	NA	
0405095-8	GROSS BETA	5/5/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	4.248	41.76%	480	12.3	1.6	pCi/l	NA	
SMP	Trg. Analyte	12:30:00 PM	AB040519-2-2	NA	NA	NA	200 ml	C2	abb0524h	5:41 PM	1.564	NA	NA	2.3	NA	Unfiltered	NA	
0405095-9	GROSS ALPHA	5/5/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	0.242	21.17%	480	1.35	0.85	pCi/l	NA	
SMP	Trg. Analyte	2:57:00 PM	AB040519-2-2	NA	NA	NA	200 ml	C3	abb0524h	5:41 PM	0.116	NA	NA	0.58	NA	Unfiltered	NA	LT
0405095-9	GROSS BETA	5/5/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	2.017	41.91%	480	1.70	1.52	pCi/l	NA	
SMP	Trg. Analyte	2:57:00 PM	AB040519-2-2	NA	NA	NA	200 ml	C3	abb0524h	5:41 PM	1.638	NA	NA	0.88	NA	Unfiltered	NA	LT
0405095-10	GROSS ALPHA	5/6/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	0.196	20.63%	480	1.23	0.81	pCi/l	NA	
SMP	Trg. Analyte	5:00:00 PM	AB040519-2-2	NA	NA	NA	200 ml	C4	abb0524h	5:41 PM	0.089	NA	NA	0.56	NA	Unfiltered	NA	LT
0405095-10	GROSS BETA	5/6/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	1.948	41.40%	480	1.70	1.52	pCi/l	NA	
SMP	Trg. Analyte	5:00:00 PM	AB040519-2-2	NA	NA	NA	200 ml	C4	abb0524h	5:41 PM	1.586	NA	NA	0.87	NA	Unfiltered	NA	LT
0405095-10	GROSS ALPHA	5/6/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	0.258	21.11%	480	1.88	0.81	pCi/l	0.75	
DUP	Trg. Analyte	5:00:00 PM	AB040519-2-2	NA	NA	NA	200 ml	D1	abb0524h	5:41 PM	0.093	NA	NA	0.65	NA	Unfiltered	NA	
0405095-10	GROSS BETA	5/6/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	1.910	41.15%	480	1.59	1.52	pCi/l	0.09	
DUP	Trg. Analyte	5:00:00 PM	AB040519-2-2	NA	NA	NA	200 ml	D1	abb0524h	5:41 PM	1.554	NA	NA	0.87	NA	Unfiltered	NA	LT

Comments:

Data Package ID: *ABW0405095-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

D - DER is greater than Control Limit of 2.13

+ - Duplicate RPD not within limits.

LT - Result is less than Request MDC, greater than sample specific MDC

* - Aliquot Basis is 'As Recieved' while the Report Basis is 'Dry Weight'.

- Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Recieved'.

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Notes:

1) The Tracer results are not yield corrected (i.e. activity measured not activity added).

2) Where sample time is not available, 12:00 PM (Mountain) is used for decay correction.

Abbreviations:

TR- Tracer TA - Target Analyte

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

DER - Duplicate Error Ratio

BDL - Below Detection Limit

Gross Alpha/Beta Analysis by GFPC Raw Data Report

Laboratory Name: Paragon Analytics
PAI Work Order: 0405095

Prep SOP: PAI 702
Analytical SOP: PAI 724

Reported on: Wednesday, May 26, 2004
12:50:36 PM

Sample ID QC Type	Nuclide Type	Sample Date/Time	Prep Batch QCBatchID	Ingrowth Date /Time	Decay Date/Time	Matrix %Moist.	Samp Alq Analy Alq	Inst ID Det ID	AnRunID File Name	Count Date/Time	GrossCPM BkgCPM	BaseEff ProgEff	CntDur(min) Yield	Activity +/- 2 s TPU	MDC DecLev	ReportUnits ReportBasis	DER RPD	%Spk. Recov Flags
0405095-11	GROSS ALPHA	5/6/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	0.067	21.01%	480	-0.27	0.74	pCi/l	NA	
SMP	Trg. Analyte	8:00:00 AM	AB040519-2-2	NA	NA	NA	200 ml	D2	abb0524h	5:41 PM	0.091	NA	NA	0.32	NA	Unfiltered	NA	U
0405095-11	GROSS BETA	5/6/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-b	ab040519-2a	5/24/2004	1.790	41.02%	480	-0.58	1.64	pCi/l	NA	
SMP	Trg. Analyte	8:00:00 AM	AB040519-2-2	NA	NA	NA	200 ml	D2	abb0524h	5:41 PM	1.877	NA	NA	0.83	NA	Unfiltered	NA	U
0405095-12	GROSS ALPHA	5/6/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-a	ab040519-2a	5/25/2004	1.008	20.75%	480	9.6	0.9	pCi/l	NA	
SMP	Trg. Analyte	8:10:00 AM	AB040519-2-2	NA	NA	NA	200 ml	C3	aba0525d	2:35 PM	0.128	NA	NA	1.8	NA	Unfiltered	NA	
0405095-12	GROSS BETA	5/6/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-a	ab040519-2a	5/25/2004	2.915	41.03%	480	4.7	1.7	pCi/l	NA	
SMP	Trg. Analyte	8:10:00 AM	AB040519-2-2	NA	NA	NA	200 ml	C3	aba0525d	2:35 PM	1.835	NA	NA	1.3	NA	Unfiltered	NA	LT
AB040519-2	GROSS ALPHA	5/19/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-a	ab040519-2a	5/25/2004	0.094	20.65%	480	-0.26	0.86	pCi/l	NA	
MB	Trg. Analyte	10:57:31 AM	AB040519-2-2	NA	NA	NA	200 ml	C4	aba0525d	2:35 PM	0.116	NA	NA	0.39	NA	Unfiltered	NA	U
AB040519-2	GROSS BETA	5/19/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-a	ab040519-2a	5/25/2004	1.892	40.34%	480	-0.11	1.68	pCi/l	NA	
MB	Trg. Analyte	10:57:31 AM	AB040519-2-2	NA	NA	NA	200 ml	C4	aba0525d	2:35 PM	1.890	NA	NA	0.86	NA	Unfiltered	NA	U
AB040519-2	GROSS ALPHA	5/19/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-a	ab040519-2a	5/24/2004	22.156	21.50%	180	233	1	pCi/l	NA	102
LCS	Trg. Analyte	10:57:31 AM	AB040519-2-2	NA	NA	NA	200 ml	C1	aba0524	11:09 AM	0.066	NA	NA	38	NA	Unfiltered	NA	P
AB040519-2	GROSS BETA	5/19/2004	AB040519-2	NA	NA	WATER	200 ml	LB4100-a	ab040519-2a	5/24/2004	48.494	40.81%	180	232	5	pCi/l	NA	108
LCS	Trg. Analyte	10:57:31 AM	AB040519-2-2	NA	NA	NA	200 ml	C1	aba0524	11:09 AM	1.757	NA	NA	37	NA	Unfiltered	NA	P,M3

Comments:

Data Package ID: *ABW0405095-1*

Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

D - DER is greater than Control Limit of 2.13

+ - Duplicate RPD not within limits.

LT - Result is less than Request MDC, greater than sample specific MDC

* - Aliquot Basis is 'As Recieved' while the Report Basis is 'Dry Weight'.

\# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Recieved'.

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Notes:

1) The Tracer results are not yield corrected (i.e. activity measured not activity added).

2) Where sample time is not available, 12:00 PM (Mountain) is used for decay correction.

Abbreviations:

TR- Tracer TA - Target Analyte

TPU - Total Propagated Uncertainty (see PAI SOP 743)

MDC - Minimum Detectable Concentration (see PAI SOP 709)

DER - Duplicate Error Ratio

BDL - Below Detection Limit

PAI - Gas Flow Proportional Sample Analysis LB4100-A

Unit Type:	LB4100-A/W	Data file name:	ABA0524	Background logfile:	BKGAB
Counting Unit ID:	Orange	Batch ID:	AB040519-2	Date of Bkg. Cal:	5/22/04
High Voltage Mode:	Simultaneous	Count Preset (m):	180	Alpha efficiency logfile:	Am241R-02/04
Application Revision:	C	Batch Ended:	5/24/04 14:04	Alpha attenuation calibration:	ABA0204.XLS
Application Version:	PAI			Beta efficiency logfile:	Sr90R-02/04
Rev.12/29/03 JE				Beta attenuation calibration:	ABA0204.XLS

Alpha prog. logfile:	n/a
Alpha prog. attenuation:	n/a
Beta prog. logfile:	n/a
Beta prog. attenuation:	n/a

Alpha Attenuation Calibration		Beta Attenuation Calibration	
y = b*m^(a*(mass-x0))		y = b*m^(a*(mass-x0))	
Alpha b=	1.22020	Beta b=	1.0000
m=	0.99440	m=	0.9999
a=	1.0000	a=	1.0000
x0=	0.0000	x0=	0.0000
Alpha to Beta X-talk		Beta to Alpha X-talk	
y = b *m^-mass		y = b*mass + m	
a ->b xtalk b=	0.22256	b ->a xtalk b=	-2.00E-06
a ->b xtalk m=	1.0000	b ->a xtalk m=	0.0007

Det. ID	Sample ID	Count End Date & Time	Count Dur. (min)	Resid. Mass (mg)	Alpha Activity Gross CPM	Alpha Bkg. CPM	Alpha b>a xtlk CPM	Alpha Base Eff	Alpha Base Cor.Fact.	Alpha Progeny Eff	Alpha Progeny Cor.Fact.	Beta Activity Gross CPM	Beta Bkg. CPM	Beta a>b xtlk CPM	Beta Base Eff	Beta Base Cor.Fact.	Beta Progeny Eff	Beta Progeny Cor.Fact.
A1	0405002-1	5/24/04 14:04	180.00	45.5	0.161	0.152	0.002	0.1941	0.945	n/a	n/a	2.828	2.166	0.0358	0.3936	0.995	n/a	n/a
A3	0405002-3	5/24/04 14:04	180.00	43.0	0.117	0.099	0.002	0.1998	0.958	n/a	n/a	2.456	2.050	0.0259	0.4035	0.996	n/a	n/a
A4	0405002-3MS	5/24/04 14:04	180.00	38.4	20.639	0.063	0.030	0.1996	0.984	n/a	n/a	48.000	2.041	4.5899	0.3971	0.996	n/a	n/a
B1	0405002-5	5/24/04 14:04	180.00	88.8	0.089	0.075	0.001	0.2145	0.741	n/a	n/a	2.300	1.874	0.0197	0.4204	0.991	n/a	n/a
B3	0405002-7	5/24/04 14:04	180.00	42.2	0.144	0.051	0.001	0.2055	0.963	n/a	n/a	2.289	1.766	0.0321	0.4115	0.996	n/a	n/a
B4	0405002-7D	5/24/04 14:04	180.00	46.2	0.144	0.108	0.002	0.2033	0.941	n/a	n/a	2.522	1.856	0.0321	0.3999	0.995	n/a	n/a
C1	AB040519-2LCS	5/24/04 14:04	180.00	36.6	22.156	0.066	0.030	0.2150	0.993	n/a	n/a	48.494	1.757	4.9273	0.4081	0.996	n/a	n/a

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5/26/02

pg 276930 a
(cont. from pg NA b)

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100A

SOP 724 Rev 8

Date: 5/24/04

Instrument Background and Response Checklist

P-10 Supply	P-10 Flow
1 2000	A 6.1
2 1200	B
	C
	D

Bkg.	Cal. File ID
Dr A	BKA0521W
Dr B	BKA0522W
Dr C	
Dr D	NP

Det	DR 1	DR 2	DR Stat	Cmnt	Bkg 1	Bkg 2	Bkg Stat	Cmnt	On-line	Det	DR 1	DR 2	DR Stat	Cmnt	Bkg 1	Bkg 2	Bkg Stat	Cmnt	On-line
1	g		P		g		P			9	g		P		g		P		
2	g				g				OLBW	10									
3										11									
4										12									
5										13	NP				NP				OL
6		g	R	LB					OLB	14									
7			P							15									
8										16									

P = passes; R = Recount; H = high; L = low; W = weekly; α = Alpha; B = Beta; DR = Daily Response Check; Stat = Status; Det = Detector; Bkg = Background; OL = Offline; NP = Not Processed.

Runlog

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp. Init.	Outp. Date	Cmnt Below
12										
5/24/04 1-16	DR Checks	NA	NA	EFA0524	30	0929	g	g	5/24/04	NA
6	DR Recount	NA	NA	EFA0524A	30	0933	g	g	5/24/04	
1-12	BKG Checks	NA	NA	BKA0524	60	0944	g	g	5/24/04	
1	0405002-1	AB040519-2	α/B	~~ABB25~~ ABA0524	180	1103	g	g	5/24/04	
3	-3									
4	-3MS									
5	-5									
7	-7									
8	-7D									
9	AB040519-2LCS									
10	0405173-4	AB040521-1		ABA0524A	120	1104		g	5/24/04	
1	SR040521-1LCS	SR040521-1	Sr90	SRA0524A	60	1411	g	g	5/24/04	
3	-1LCSD									
4	SR040506-2MLCS	SR040506-2		SRA0524A		1412	g			
5	-2MPLCS									
7	-2PLCSD									

Form 780r6.frm (4/6/2001)

Reviewed by g Date 5/25/04

PAI - Gas Flow Proportional Sample Analysis LB4100-B

Unit Type:	LB4100 -B	Data file name:	ABB0524H	Background logfile:	BKGABW
Counting Unit ID:	Aqua	Batch ID:	AB040519-2	Date of Bkg. Cal:	5/22/04
High Voltage Mode:	Simultaneous	Count Preset (m):	480	Alpha efficiency logfile:	Am241-11/03
Application Revision:	2	Batch Ended:	5/25/04 1:42	Alpha attenuation calibration:	ABA1103.XLS
Application Version:	Standard			Beta efficiency logfile:	Sr90R-11/03
Rev.12/29/03 JE				Beta attenuation calibration:	ABA1103.XLS

Alpha prog. logfile:	n/a
Alpha prog. attenuation:	n/a
Beta prog. logfile:	n/a
Beta prog. attenuation:	n/a

Alpha Attenuation Calibration		Beta Attenuation Calibration	
y = b*m^(a*(mass-x0))		y = b*m^(a*(mass-x0))	
Alpha b=	1.24550	Beta b=	1.0000
m=	0.99400	m=	0.9999
a=	1.0000	a=	1.0000
x0=	0.0000	x0=	0.0000
Alpha to Beta X-talk		Beta to Alpha X-talk	
y = m *b^-mass		y = m*mass + b	
a ->b xtalk m=	0.2740	b ->a xtalk m=	-2.00E-06
a ->b xtalk b=	1.0010	b ->a xtalk b=	0.0007

Det. ID	Sample ID	Count End Date & Time	Count Dur. (min)	Resid. Mass (mg)	Alpha Activity Gross CPM	Alpha Bkg. CPM	Alpha b>a xtlk CPM	Alpha Base Eff	Alpha Base Cor.Fact.	Alpha Progeny Eff	Alpha Progeny Cor.Fact.	Beta Activity Gross CPM	Beta Bkg. CPM	Beta a>b xtlk CPM	Beta Base Eff	Beta Base Cor.Fact.	Beta Progeny Eff	Beta Progeny Cor.Fact.
A1	0405095-1	5/25/04 1:41	480.00	40.8	0.133	0.055	0.001	0.2085	0.974	n/a	n/a	1.531	1.433	0.0351	0.4035	0.996	n/a	n/a
A2	0405095-2	5/25/04 1:41	480.00	35.5	0.227	0.111	0.001	0.2041	1.005	n/a	n/a	1.740	1.366	0.0601	0.4085	0.996	n/a	n/a
A3	0405095-3	5/25/04 1:41	480.00	41.7	0.100	0.091	0.001	0.2099	0.969	n/a	n/a	1.465	1.466	0.0263	0.4132	0.996	n/a	n/a
A4	0405095-4	5/25/04 1:41	480.00	40.9	0.248	0.086	0.001	0.2037	0.974	n/a	n/a	1.735	1.378	0.0652	0.4037	0.996	n/a	n/a
C1	0405095-7	5/25/04 1:41	480.00	33.1	0.675	0.077	0.002	0.2170	1.021	n/a	n/a	2.544	1.564	0.1789	0.4175	0.997	n/a	n/a
C2	0405095-8	5/25/04 1:41	480.00	38.9	1.544	0.068	0.003	0.2127	0.986	n/a	n/a	4.248	1.564	0.4069	0.4176	0.996	n/a	n/a
C3	0405095-9	5/25/04 1:41	480.00	39.5	0.242	0.116	0.001	0.2117	0.982	n/a	n/a	2.017	1.638	0.0637	0.4191	0.996	n/a	n/a
C4	0405095-10	5/25/04 1:41	480.00	47.6	0.196	0.089	0.001	0.2063	0.935	n/a	n/a	1.948	1.586	0.0512	0.4140	0.995	n/a	n/a
D1	0405095-10D	5/25/04 1:42	480.00	48.1	0.258	0.093	0.001	0.2111	0.932	n/a	n/a	1.910	1.554	0.0675	0.4115	0.995	n/a	n/a
D2	0405095-11	5/25/04 1:42	480.00	33.3	0.067	0.091	0.001	0.2101	1.019	n/a	n/a	1.790	1.877	0.0177	0.4102	0.997	n/a	n/a
B3	0405095-5	5/25/04 1:42	480.00	48.3	0.206	0.102	0.001	0.2148	0.931	n/a	n/a	1.885	1.552	0.0538	0.4253	0.995	n/a	n/a
B4	0405095-6	5/25/04 1:42	480.00	36.8	3.233	0.109	0.004	0.2038	0.998	n/a	n/a	5.954	1.694	0.8539	0.4028	0.996	n/a	n/a

000033

8/12/2004

pg 276461 a

(cont. from pg NA b)

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100B

SOP 724 Rev 8

Date: 5/24/09

Instrument Background and Response Checklist

P-10 Supply	P-10 Flow
1 ~~2000~~	A G.
2 ~~1600~~	B
1400 cylinder	C
	D

Bkg.	Cal. File ID
Dr A	BKB0521W
Dr B	
Dr C	
Dr D	

Det	DR 1	DR 2	DR Stat	Cmnt	Bkg 1	Bkg 2	Bkg Stat	Cmnt	On-line	Det	DR 1	DR 2	DR Stat	Cmnt	Bkg 1	Bkg 2	Bkg Stat	Cmnt	On-line
1	S		P		S		P			9	S		P		S		P		
2	9				9					10	9				S				
3										11									
4										12									
5			P/OLB				P/OLB		OLB	13									
6			P				P			14									
7			P				P			15									OLB-W
8										16							LB		

P = passes; R = Recount; H = high; L = low; W = weekly; α = Alpha; B = Beta; DR = Daily Response Check; Stat = Status; Det = Detector; Bkg = Background; OL = Offline; NP = Not Processed.

Runlog

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp. Init.	Outp. Date	Cmnt Below
1-16	DR Checks	NA	NA	EFB0524	30	0915	S	S	5/24/09	NA
1-16	BKG Checks			BKB0524	60	0926		S	5/24/09	
1	04 04 269-13	AB040519-1	AB	ABB0524	75	1039	TT	TT	5.24.04	
2	04 04 278-1									
3	04 04 281-2									
4	-3									
7	-3D									
8	-4									
9	-5									
10	-10									
11	-11									
12	-12									
13	-13									
14	-15									
1	04 05 003-2			ABB0524A		12:11				
2	-3									

Form 780r6.frm (4/6/2001)

Reviewed by TT Date 5-24-04

Comments:

000031

5-24-04

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100B

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp. Init.	Outp. Date	Cmnt Below
3	04 05 003-4	AB040519-1	AB	ABB0524A	75	12:11	YZ	YZ	5-24-04	NA
4	-4D									
7	-4MS									
8	-4MSD									
9	-5									
10	-6									
11	-7									
12	-8									
13	AB040519-1MB									
14	-1LCS									
1	-1LCSD			AB305248		13:32				
2	04 05 180-2	AB040524-4	AB	ABB0524C	10	13:34	YZ			
3	-3									
4	-4									
7	-5									
8	-6									
9	-7									
10	-8									
11	-10									
12	-11									
13	-12									
14	-17									
2	-10D			ABB0524D		13:49				
3	-13									
4	-14									
7	-15									
8	-16									
9	-17D									
10	-18									
11	-19									

Form 780r6.frm (4/6/2001)

Reviewed YZ Date 5-24-04

Comments:

000032

pg 276462 a
(cont. from pg 276461 b)

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: **LB4100B**

SOP 724 Rev 8

Date: 5-24-04

Instrument Background and Response Checklist

P-10 Supply	P-10 Flow
1 2000	A 0.1
2 1600	B
1400 5/24/04	C
	D

Bkg.	Cal. File ID
Dr A	BKB0521W
Dr B	
Dr C	
Dr D	

Det	DR 1	DR 2	DR Stat	Cmnt	Bkg 1	Bkg 2	Bkg Stat	Cmnt	On-line	Det	DR 1	DR 2	DR Stat	Cmnt	Bkg 1	Bkg 2	Bkg Stat	Cmnt	On-line
1	*				*					9	*				*				
2										10									
3										11									
4										12									
5										13									
6										14									
7										15									
8										16									

P = passes; R = Recount; H = high; L = low; W = weekly; α = Alpha; B = Beta; DR = Daily Response Check; Stat = Status; Det = Detector; Bkg = Background; OL = Offline; NP = Not Processed.

*Daily CC info on pg. 276461a. YZ 5-24-04

Runlog

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp. Init.	Outp. Date	Cmnt Below
12	04 05 180-20	AB040524-4	AB	ABB0524D	10	13:49	YZ	YZ	5-24-04	MA
13	-22									
14	-23									
2	AB040524-4ALCS			ABB0524E		14:05				
3	-4ALCS									
4	-4MB									
7	04 05 180-24	AB040524-5		ABB0524F		14:06				
8	-25									
9	-26									
10	-27									
11	-28									
12	AB040524-5~~ALCS~~ MB YZ 5-24-04				YZ 5-24-04					
13	-5~~ALCS~~ ALCS			ABB0524G		14:20				
14	-5~~ALCS~~ BLCS									
YZ 5-24-04 12 ~~14~~	04 05 180-24D			ABB0524G						

YZ 5-24-04

Form 780r6.frm (4/6/2001)

Reviewed by YZ Date 5-24-04

Comments:

000033

5-24-04

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100B

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp. Init.	Outp. Date	Cmnt Below
14	04 04 268-2	S2040521-1	Sr 90	S2B0524	180	14:34	77	S	5/24/04	N/A
13	-3									
12	-4									
11	-5									
10	-6									
9	04 04 269-2									
8	-12									
7	04 04 281-6									
4	-8									
3	-9									
2	S2040521-MB									
1	0405095-1	AB040519-2	α/β	ABB0524H	480	1740	S	LWS	5/25/04	
2 2	-2									
3 3	-3									
4 4	-4									
7 5	-5									
8 6	-6									
9 7	-7									
10 8	-8									
11 9	-9									
12	-10									
13	-10D									
14	-11									

5/24/04

LWS 5/24/04

Form 780r6.frm (4/6/2001)

Reviewed LWS Date 5/25/04

Comments:

000034

PAI - Gas Flow Proportional Sample Analysis LB4100-A

Unit Type:	LB4100-A/W	Data file name:	ABA0525D	Background logfile:	BKGAB
Counting Unit ID:	Orange	Batch ID:	AB040519-2	Date of Bkg. Cal:	5/22/04
High Voltage Mode:	Simultaneous	Count Preset (m):	480	Alpha efficiency logfile:	Am241R-02/04
Application Revision:	C	Batch Ended:	5/25/04 22:27	Alpha attenuation calibration:	ABA0204.XLS
Application Version:	PAI			Beta efficiency logfile:	Sr90R-02/04
Rev.12/29/03 JE				Beta attenuation calibration:	ABA0204.XLS

Alpha prog. logfile:	n/a
Alpha prog. attenuation:	n/a
Beta prog. logfile:	n/a
Beta prog. attenuation:	n/a

Alpha Attenuation Calibration y = b*m^(a*(mass-x0))		Beta Attenuation Calibration y = b*m^(a*(mass-x0))	
Alpha b=	1.22020	Beta b=	1.0000
m=	0.99440	m=	0.9999
a=	1.0000	a=	1.0000
x0=	0.0000	x0=	0.0000
Alpha to Beta X-talk y = b *m^-mass		**Beta to Alpha X-talk y = b*mass + m**	
a ->b xtalk b=	0.22256	b ->a xtalk b=	-2.00E-06
a ->b xtalk m=	1.0000	b ->a xtalk m=	0.0007

Det. ID	Sample ID	Count End Date & Time	Count Dur. (min)	Resid. Mass (mg)	Alpha Activity Gross CPM	Alpha Bkg. CPM	Alpha b>a xtlk CPM	Alpha Base Eff	Alpha Base Cor.Fact.	Alpha Progeny Eff	Alpha Progeny Cor.Fact.	Beta Activity Gross CPM	Beta Bkg. CPM	Beta a>b xtlk CPM	Beta Base Eff	Beta Base Cor.Fact.	Beta Progeny Eff	Beta Progeny Cor.Fact.
C3	0405095-12	5/25/04 22:27	480.00	36.4	1.008	0.128	0.002	0.2075	0.995	n/a	n/a	2.815	1.835	0.2243	0.4103	0.996	n/a	n/a
C4	AB040519-2MB	5/25/04 22:27	480.00	35.8	0.094	0.116	0.001	0.2065	0.998	n/a	n/a	1.892	1.890	0.0209	0.4034	0.996	n/a	n/a

000035

5/26/04

pg 276931 a
(cont. from pg NA b)

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100A

SOP 724 Rev 8

Date: 5/25/09

Instrument Background and Response Checklist

P-10 Supply	P-10 Flow
1 2000	A 0.1
2 1200	B
	C
	D

Bkg.	Cal. File ID
Dr A	BK+05210
Dr B	BK+05220
Dr C	
Dr D	NP

Det	DR 1	DR 2	DR Stat	Cmnt	Bkg 1	Bkg 2	Bkg Stat	Cmnt	On-line	Det	DR 1	DR 2	DR Stat	Cmnt	Bkg 1	Bkg 2	Bkg Stat	Cmnt	On-line
1	S		P		S		P		–	9	S		P		S		P		–
2	S				S				OLB-W	10									–
3									–	11									–
4									–	12									–
5									–	13	NP				NP				OL
6									–	14									
7									–	15									
8									–	16									

P = passes; R = Recount; H = high; L = low; W = weekly; α = Alpha; B = Beta; DR = Daily Response Check; Stat = Status; Det = Detector; Bkg = Background; OL = Offline; NP = Not Processed.

Runlog

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp. Init.	Outp. Date	Cmnt Below
1-12	DR Checks	NA	NA	BDA0525	30	0906	S	S	5/25/07	NA
1-12	BKG Checks	NA	NA	BKA0525	60	0921	S	7/2	5-25-04	
5	0404281-16	SR040515-1	Sr 90	SRA0525	120	1032	7/2	7/2	5-25-04	
6	-16D									
7	-17									
8	SR040515-1MB									
9	-12CS									
1	0405166-1	AB040521-3	AB	ABA0525	10	1035	7/2	7/2	5-25-04	
2	-2									
3	AB040521-3ACCS									
4	-3BCCS									
3	-3MB			ABA0525A		1049				
4	0405166-2D									
1	-2			ABA0525B		1245				
									7/2	5-25-04

Form 780r6.frm (4/6/2001)

Reviewed by 7/2 Date 5-25-04

Comments:

000036

pg 210931 b

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100A

5.25.04

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp. Init.	Outp. Date	Cmnt Below
3	04 17015-1	04 17 015	AB	ABA0525C	60	1250	JZ	JZ	5.25.04	NA
4	-1MS									
5	-2									
6	-2MS									
7	-3									
8	-3MS									
9	-4									
10	-4MS									
11	-MB									
12	-LCS									
3.26.04 11 ~~13~~	04 05 095-12	AB040519-2	AB	ABA0525D	480	14:23	JZ	1250	5/26/04	
12 ~~14~~	AB040519-2MB									
1	04 02 086-1	SZ040506-2	Sr 90	SZA0525A	1000	14:28	JZ			
3	-2									
4	-8									
5	-14									
6	-17									
7	-19									
8	-20									
9	-23									
10	-35									

LB 5/26/04

Form 780r6.frm (4/6/2001)

Reviewed LB Date 5/26/04

Comments:

000037

PARAGON ANALYTICS
Radiochemistry Data Package

Section 5

QUALITY ASSURANCE SUMMARY REPORTS

5

No *NON-CONFORMANCE REPORTS* or
QUALITY ASSURANCE SUMMARY SHEETS
are included in this data package.

PARAGON ANALYTICS
Radiochemistry Data Package

Section 6

LABORATORY BENCH SHEETS

6

Radiochemistry Instrument Worksheet

Paragon Analytics

Prep Batch: AB040519-2

Prep Procedure: GAB

Analytical QASS / NCR? Y ~~N~~

Prep Num	LabID	QC Type	Init Alq	Fin Alq	Units	Residual Mass (mg)	Cnt 1 File	Cnt 1 Inst/Det	Cnt 1 Pos Chk By	Cnt 2 File	Cnt 2 Inst/Det	Cnt 2 Pos Chk By	Cnt 3 File	Cnt 3 Inst/Det	Cnt 3 Pos Chk By	Notes
1	0405002-1	SMP	200	200	ml	45.5	ABA0524	1	S							
1	0405002-3	SMP	200	200	ml	43		2 3								
1	0405002-3	MS	200	200	ml	38.4		3 4								
1	0405002-5	SMP	200	200	ml	88.8		4 5								
1	0405002-7	SMP	200	200	ml	42.2		5 7								
1	0405002-7	DUP	200	200	ml	46.2		6 8								
1	0405095-1	SMP	200	200	ml	40.8	ABA0524HT	1	LCS							
1	0405095-2	SMP	200	200	ml	35.5		2								
1	0405095-3	SMP	200	200	ml	41.7		3								
1	0405095-4	SMP	200	200	ml	40.9		4								
1	0405095-5	SMP	200	200	ml	48.3		7								
1	0405095-6	SMP	200	200	ml	36.8		8								
1	0405095-7	SMP	200	200	ml	33.1		9								
1	0405095-8	SMP	200	200	ml	38.9		10								
1	0405095-9	SMP	200	200	ml	39.5		11								
1	0405095-10	SMP	200	200	ml	47.6		12								
1	0405095-10	DUP	200	200	ml	48.1		13								
1	0405095-11	SMP	200	200	ml	33.3		14								
1	0405095-12	SMP	200	200	ml	36.4	ABA0525D	~~VR~~ 11	LCS							
1	AB040519-2	MB	200	200	ml	35.8		~~VR~~ 12								
1	AB040519-2	LCS	200	200	ml	36.6	ABA0524 5/24/04	9	S							

S 5/26/04

Spike Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
S1	Sr-90	600.2613.31	47.624	DPM/ml	05/19/04	1	ml	T-200
S2	AM-241	616.2613.42	101.624	DPM/ml	05/19/04	1	ml	T-200

Supersedes: N/A

00004

Radiochemistry Prep Worksheet

Paragon Analytics

Prep Batch: AB040519-2

Prep Procedure: GAB

Reviewed By: CRW CW **Review Date:** 5/22/04

Non-Routine Pre-Treatment? Y / (N) **Batch:** N/A **Re-Prep?** Y / (N) **Batch:** N/A **Prep QASS / NCR?** Y / (N) N/A

Prep SOP: PAI 702 **Rev:** 16
Prep SOP: NONE
Matrix Class: liquid

Prep Analyst: Chad Wangeline
Prep Date: 5/19/04
Prep Dept: RS

Balance: 13
Balance:

Samp Num	Prep Num	LabID	QC Type	Dish No.	Init Alq ml	Fin Alq ml	Prep Basis	Standards	Prep Notes
1	1	0405002-1	SMP		200	200	Unfiltered	CW 5/22/04	
2	1	0405002-3	SMP		200	200	Unfiltered		
3	1	0405002-3	MS		200	200	Unfiltered	S1,S2	
4	1	0405002-5	SMP		200	200	Unfiltered		
5	1	0405002-7	SMP		200	200	Unfiltered		
6	1	0405002-7	DUP		200	200	Unfiltered		
7	1	0405095-1	SMP		200	200	Unfiltered		
8	1	0405095-2	SMP		200	200	Unfiltered		
9	1	0405095-3	SMP		200	200	Unfiltered		
10	1	0405095-4	SMP		200	200	Unfiltered		
11	1	0405095-5	SMP		200	200	Unfiltered		
12	1	0405095-6	SMP		200	200	Unfiltered		
13	1	0405095-7	SMP		200	200	Unfiltered		
14	1	0405095-8	SMP		200	200	Unfiltered		
15	1	0405095-9	SMP		200	200	Unfiltered		
16	1	0405095-10	SMP		200	200	Unfiltered		
17	1	0405095-10	DUP		200	200	Unfiltered		
18	1	0405095-11	SMP		200	200	Unfiltered		
19	1	0405095-12	SMP		200	200	Unfiltered		
20	1	AB040519-2	MB		200	200	Unfiltered		
21	1	AB040519-2	LCS		200	200	Unfiltered	S1,S2	

CW 5/22/04

Spiked By: Chad Wangeline **Date:** 5/20/04
Witnessed By: Nick Tisch **Date:** 5/20/04

Relinquished By: NT
Date: 5/22/04
Received By: RZ
Date: 5-24-04

Spike Solution Information

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
S1	Sr-90	600.2613.31	47.624	DPM/ml	05/19/04	1	ml	T-200
S2	AM-241	616.2613.42	101.624	DPM/ml	05/19/04	1	ml	T-200

Comments
ALL SAMPLES DESICCATED 5/21/04 @ 1800

Supersedes: 5/20/04 1256

Radiochemistry Prep Worksheet

Paragon Analytics

Prep Batch: AB040519-2

Prep Procedure: GAB

Prep Batch Not Validated!!!

Reviewed By: **Review Date:**

Non-Routine Pre-Treatment? Y / N **Batch:** _____ **Re-Prep?** Y / N **Batch:** _____ **Prep QASS / NCR?** Y / N _____

Prep SOP: PAI 702 **Rev:** 16
Prep SOP: NONE
Matrix Class: liquid

Prep Analyst: Chad Wangeline CW
Prep Date: 5/19/04
Prep Dept: RS

Balance:
Balance:

Samp Num	Prep Num	LabID	QC Type	Dish No.	Init Alq ml	Fin Alq ml	Prep Basis	Standards	Prep Notes
1	1	0405002-1	SMP		200	200	Unfiltered		
2	1	0405002-3	SMP		200	200	Unfiltered		
3	1	0405002-3	MS		200	200	Unfiltered	S1,S2	
4	1	0405002-5	SMP		200	200	Unfiltered		
5	1	0405002-7	SMP		200	200	Unfiltered		
6	1	0405002-7	DUP		200	200	Unfiltered		
7	1	0405095-1	SMP		200	200	Unfiltered		
8	1	0405095-2	SMP		200	200	Unfiltered		
9	1	0405095-3	SMP		200	200	Unfiltered		
10	1	0405095-4	SMP		200	200	Unfiltered		
11	1	0405095-5	SMP		200	200	Unfiltered		
12	1	0405095-6	SMP		200	200	Unfiltered		
13	1	0405095-7	SMP		200	200	Unfiltered		
14	1	0405095-8	SMP		200	200	Unfiltered		
15	1	0405095-9	SMP		200	200	Unfiltered		
16	1	0405095-10	SMP		200	200	Unfiltered		
17	1	0405095-10	DUP		200	200	Unfiltered		
18	1	0405095-11	SMP		200	200	Unfiltered		
19	1	0405095-12	SMP		200	200	Unfiltered		
20	1	AB040519-2	MB		200	200	Unfiltered		
21	1	AB040519-2	LCS		200	200	Unfiltered	S1,S2	

DRAFT

Spiked By: CW **Date:** 5/20/04
Witnessed By: NT **Date:** 5/20/04

Relinquished By: _____
Date: _____
Received By: _____
Date: _____

Spike Solution Information 4/21/04

Soln #	Nuclide	SolnID	Prep Conc	Units	Prep Date	Aliquot	Units	Pipet ID
S1	Sr-90	600.2613.31	47.624	DPM/ml	05/19/04	1	ml	T-200
S2	AM-241	616.2613.42	101.624	DPM/ml	05/19/04	1	ml	T-200

4/21/04

Comments

00064

Supersedes: N/A

Radiochemistry Gravimetric Worksheet

Paragon Analytics

Prep Batch: AB040519-2

Prep Procedure: **GAB**

Reviewed By: CRW CW Review Date: **5/22/04**

Prep Num	Planc. Num	LabID	QC Type	Test Alq (ml)	Tare Mass (g)	Initial Gross Mass (g)	Initial Net Mass (mg)	Suggested Alq (ml)	Samp Vol Available (ml)	Samp Vol Taken (ml)	Fin Gross Mass (g)	Final Net Mass (mg)	Salt Sol. Added (ml)	Flag
1	1	0405002-1	SMP	10	8.9664	8.9687	2.3	200	200	200	9.0119	45.5	0	
1	2	0405002-3	SMP	10	8.9696	8.9719	2.3	200	200	200	9.0126	43	0	
1	3	0405002-3	MS	10	9.0101	0.0000	0	200	200	200	9.0485	38.4	0	
1	4	0405002-5	SMP	10	8.9561	8.9581	2	200	200	200	9.0449	88.8	0	
1	5	0405002-7	SMP	10	8.9762	8.9783	2.1	200	200	200	9.0184	42.2	0	
1	6	0405002-7	DUP	10	9.0180	0.0000	0	200	200	200	9.0642	46.2	0	
1	7	0405095-1	SMP	10	8.9624	8.9630	0.6	200	200	200	9.0032	40.8	0	
1	8	0405095-2	SMP	10	8.9783	8.9784	0.1	200	200	200	9.0138	35.5	0	
1	9	0405095-3	SMP	10	8.9642	8.9646	0.4	200	200	200	9.0059	41.7	0	
1	10	0405095-4	SMP	10	8.9769	8.9776	0.7	200	200	200	9.0178	40.9	0	
1	11	0405095-5	SMP	10	9.0426	9.0436	1	200	200	200	9.0909	48.3	0	
1	12	0405095-6	SMP	10	8.9531	8.9536	0.5	200	200	200	8.9899	36.8	0	
1	13	0405095-7	SMP	10	8.9839	8.9841	0.2	200	200	200	9.0170	33.1	0	
1	14	0405095-8	SMP	10	9.0350	9.0354	0.4	200	200	200	9.0739	38.9	0	
1	15	0405095-9	SMP	10	9.0199	9.0215	1.6	200	200	200	9.0594	39.5	0	
1	16	0405095-10	SMP	10	8.9642	8.9650	0.8	200	200	200	9.0118	47.6	0	
1	17	0405095-10	DUP	10	8.9879	0.0000	0	200	200	200	9.0360	48.1	0	
1	18	0405095-11	SMP	10	9.0140	9.0144	0.4	200	200	200	9.0473	33.3	0	
1	19	0405095-12	SMP	10	9.0123	9.0126	0.3	200	200	200	9.0487	36.4	0	
1	20	AB040519-2	MB	10	9.0172	0.0000	0	200	200	200	9.0530	35.8	0	
1	21	AB040519-2	LCS	10	9.0192	0.0000	0	200	200	200	9.0558	36.6	0	

Supersedes: N/A

SAMPLE CONDITION FORM (LIQUID)

ANALYST: CW

ANALYSIS DATE: 5/20/04 METHOD: 6α/β

WORK ORDER	SAMPLE ID	SAMPLE CONDITION		
		pH	Color	Remarks
0405002	1	<2	Clear	None
	3			
	5			
	7			
0405095	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			

CW 5/20/04

PARAGON ANALYTICS
Radiochemistry Data Package

Section 7

STANDARDS TRACEABILITY DOCUMENTS

7

PREPARE A WORKING LEVEL SPIKING SOLUTION AT APPROXIMATELY 100 dpm/mL BY DILUTING 616.2382.38 WITH 1M HCl.

ACTIVITY OF 616.2382.38: 52,128.96

1. DETERMINE DENSITY OF 1M HCl

MASS OF EMPTY 100 mL CLASS A VOLUMETRIC FLASK 68.5642 g Bal#
MASS OF FLASK + 100 mL 1M HCl → 169.9544 g
NET MASS OF 1M HCl → 101.3902 g

$\rho = \frac{101.3902 g}{100 mL} = 1.014 g/mL$

LOT # 432668

2. TRANSFER STD 616.2382.38 TO A 1L NALGENE BOTTLE

MASS OF BOTTLE w/o LID ~~74.37~~ Q 04/20/04 74.3654 g BAL#12
MASS OF BOTTLE w/o LID + STD 76.2944 g
NET MASS OF STD 1.9290 g

3. ADD 1M HCl TO FINAL DILUTION (1L)

MASS OF BOTTLE w/o LID (FROM ABOVE) 74.3654 g Bal#12
MASS OF BOTTLE + STD + 1M HCl 1074.4 g
NET MASS OF STD + 1M HCl 1000.0 g

4. FINAL ACTIVITY CALCULATION

$$\frac{(52128.96\ dpm/g)(1.9290 g)(1.014\ g/mL)}{1000.0 g} = \cancel{101.} \quad 102.0\ dpm/mL$$

Q 04/20/04

SD 4/28/04

Stnd ID: 616.2613.42

Description: Am-241
Expiration: 4/21/05
Activity: 102.00 dpm/mL

2s Uncertainty: 2.24 dpm/mL
Ref. Date: 4/18/02
Ref Time: N/A
Prep Date: 4/20/04
Matrix/Comp. 1M HCl
Half Life (y): 4.32E+02

Prep by: AF

SD 4/28/04

SD 4/28/04

SD 4/28/04

Continued on Page

Read and Understood By

Signed 04/20/04 Date Signed 4/28/04 Date

Am-241 primary dilution

prepare a primary dilution of RSO 6116 (NIST: ~~SRM~~ SRS 63651-307) by diluting w/ 1M HCl — 10/14/02

1) Determine the density of 1M HCl (Lot # 42223 + Lot # 42216)

mass of 100ml Vol flask	62.4712 g	(Bal 12)
mass of flask + 1M HCl	163.8021 g	
Net mass of ~~std~~ HCl	101.330900 g	

2) Transfer Contents of ampule to 40 ml vot Vial

mass of VOA vial w/o lid	22.3577 g	(Bal 12)
mass of opened amp ~~mass of vial~~ + 50ml beaker	37.9238 g	
mass of beaker + empty ampule	32.9862 g	
Net mass of std transferred	4.937600 g	

3) Dilute Std to final Vol w/ 1M HCl

mass of VOA Vial w/o lid (from above)	22.3577 g	(Bal 12)
mass of std + VOA Vial + 1M HCl	63.7403 g	
Net mass of diluted std	41.382600 g	

4) Final Activity Calc

$$\frac{\left(\frac{3.728 \times 10^4 \text{ dps}}{5.11972 \text{ g}}\right)\left(60 \frac{\text{dpm}}{\text{dps}}\right)(4.9376 \text{ g})}{41.38260 \text{ g}} = \cancel{52,066 \text{ dpm/g}}$$

52,128.96 dpm/g

ANALYTICS
1380 Seaboard Ind Blvd * Atlanta, GA 30318 * USA * 404-352-8677
Am-241
SRS 63651-307 Amount 1.008 µCi QA
Date 4/18/02 12:00 EST Exp. ----------
PO # EW040502, Item 3
5.11972 g 1M HCl solution
CAUTION RADIOACTIVE MATERIAL

Continued on Page

Read and Understood By

Signed 10-14-02 Date Signed Date

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

PAI.FO 0616
rec'd 4-22-02

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

63651-307

Am-241 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Am-241
ACTIVITY (dps):	3.728 E4
HALF-LIFE:	4.322 E2 years
CALIBRATION DATE:	April 18, 2002 12:00 EST
TOTAL UNCERTAINTY*:	3.3%
SYSTEMATIC:	3.0%
RANDOM:	0.3%

*99% confidence level.

Impurities: γ-impurities <0.1%

5.11972 grams 1M HCl solution.

P O NUMBER EW040502, Item 3

SOURCE PREPARED BY: M Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED: M Rontz 4-19-02

Prepare a working level spiking solution by diluting 600.2613.30 with 0.1 M HCl.

1) Density of 0.1 M HCl

Mass of class A 100mL volumetric flask 67.5747g Bal #12
mass of flask + 100mL of 0.1 M HCl 167.3551g +
Net mass of 100mL of 0.1 M HCl 99.7804g

Lot # H613 X41A11 $\rho = 0.9978$ g/mL

2) Transfer std. 600.2613.30 to a 1L Nalgene bottle

Mass of bottle w/o lid 74.4982 g Bal #12
mass of bottle + std. 76.7672 g +
Net mass of std 2.2690 g

3) Add 0.1 M HCl to final dilution

Mass of bottle w/o lid from above 74.4982 g Bal #12
Mass of bottle, std + 0.1 M HCl 1072.6 g Bal #026
Net mass of std + 0.1 M HCl 998.1 g

4) Final Activity Calculation

$$\frac{(1.868\times10^4\ \text{dps})(60\ \tfrac{\text{dpm}}{\text{dps}})(2.2690\text{g})(0.9978\ \text{g/mL})}{(\cancel{58.3054}\ 58.3559\text{g})(998.1\text{g})} = \cancel{50.5379}\ 50.79\ \text{dpm/mL}$$

SD 12/11/03 CW 12/10/03 CW 12/10/03

Stnd ID: 600.2613.31

Description: Sr-90
Expiration: 12/2/04
Activity: 50.79 dpm/mL

2s Uncertainty: 1.69 dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 12/1/03 Prep by: CW
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01

SD 12/11/03 SD 12/11/03

Continued on Page

Read and Understood by

Signed 12/1/03 Date Signed 12/10/03 Date

PROJECT 600.2613.30 Sr-90 Notebook No. 2613

Continued From Page

Transfer contents of ampoule 600 to a 125 mL glass bottle for a 1° solution.

1) Transfer ampoule 600 to a 125 mL bottle

mass of open ampoule + std.	139.6110 g Bal #12
mass of empty ampoule	89.5551 g
Net mass of std.	50.0559 g

SD 12/10/03 Density from following page P = 0.9978 g/mL

2) Final Activity Calculation

$$\frac{(1.868\times10^4\ \text{dps})(60\ \text{dpm/dps})}{50.0559\ \cancel{50.3054}\ \text{g}}\ \text{SD 12/10/03}$$

CW 12/10/03

$$= \left(\cancel{22{,}279.914}\ 22{,}390.967\ \text{dpm/g}\right)(0.9978\ \text{g/mL})$$

CW 12/10/03

CW 12/1/03

$$= \cancel{22{,}230.898}\ 22{,}341.707\ \text{dpm/mL}$$

SD 12/10/03

ANALYTICS

1380 Seaboard Ind Blvd * Atlanta, GA 30318 * USA * 404-352-8677

Sr-90

SRS 62751-307 Amount 0.505 µCi QA MN

Date 12/01/01 12:00 EST Exp. ------

PO # 001703, Item 1

50.3054 g 0.1M HCl solution

CAUTION RADIOACTIVE MATERIAL

CW 12/1/03

CW 12/1/03

CW 12/1/03

SD 12/11/03

Stnd ID: 600.2613.30

Description: Sr-90

Expiration: 12/2/04

Activity: 22341.71 dpm/mL

2s Uncertainty: 744.72 dpm/mL

Ref. Date: 12/1/01

Ref Time: N/A

Prep Date: 12/1/03 Prep by: CW

Matrix/Comp. 0.1 M HCl

Half Life (y): 2.88E+01

SD 12/11/03

SD 12/11/03

SD 12/11/03

Continued on Page

Read and Understood By

Signed 12/1/03 Date

Signed 12/1/03 Date

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

PAI 00600
rec'd 12-05-01

62751-307

Sr-90 50 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by the Department Des Applications Et De La Metrologie Des Rayonnements Ionisants (DAMRI), Paris, France, as Number 25931.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Sr-90
ACTIVITY (dps):	1.868 E4
HALF-LIFE:	28.79 years
CALIBRATION DATE:	December 1, 2001 12:00 EST
TOTAL UNCERTAINTY*:	5.0%

*99% Confidence Level

Impurities: γ-impurities <0.1%

50.3054 grams 0.1M HCl solution with 30 μg/g Sr carrier.

P O NUMBER 001703, Item 1

SOURCE PREPARED BY: M Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED: [illegible] 12-4-01

PARAGON ANALYTICS
Radiochemistry Data Package

Section 8

CHAIN OF CUSTODY

8

Paragon Analytics

Sample Number(s) Cross-Reference Table

Paragon OrderNum: 0405095
Client Name: Kent & Sullivan Inc.
Client Project Name: Ross Adams
Client Project Number:
Client PO Number:

Client Sample	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
SW-01	0405095-1		WATER	05-May-04	16:40
SW-02	0405095-2		WATER	05-May-04	15:50
SW-04	0405095-3		WATER	04-May-04	17:52
SW-05	0405095-4		WATER	06-May-04	11:45
SW-06	0405095-5		WATER	06-May-04	8:50
SW-07	0405095-6		WATER	03-May-04	16:03
SW-08	0405095-7		WATER	03-May-04	16:59
SW-09	0405095-8		WATER	05-May-04	12:30
SW-10	0405095-9		WATER	05-May-04	14:57
SW-11	0405095-10		WATER	06-May-04	17:00
FR-01	0405095-11		WATER	06-May-04	8:00
FR-02	0405095-12		WATER	06-May-04	8:10

Paragon Analytics, Inc.
225 Commerce Drive Fort Collins, CO 80524
800-443-1511 or (970) 490-1511 (970) 490-1522 Fax

Chain-of-Custody

Accession Number (LAB ID) 0405095

Date _____ Page 1 of 9

Project Name / No.: Ross Adams Sampler(s): _____ (circle one) Turnaround: Standard or Rush (Due _____) Dispose or Return to Client

Report To: SUE KENT
Phone: 907 283-0949
Fax: 907 283 0947
Company: KENT & SULLIVAN INC
Address: 53495 THUNDER RD
KENAI AK 99611

circle method or specify under comments

Sample ID	Date	Time *	Lab ID	Matrix	No. of Containers	VOCs SW8260B E624 E524.2 OLMO__	BTEX (only) SW8021B	SVOCs SW8270C E625 E525 OLMO__	OC Pesticides SW8081A E608 E508 OLMO__	PCBs SW8082 E608 E508 OLMO__	OP Pesticides SW8141A E614	Herbicides SW8151A E615	TCLP Organics SW1311 8260B 8270C 8081A 8151A	TCLP Metals SW 1311 6010B 7471	Total Metals SW6010B 7470 7471 E200 ILMO__	Dissolved Metals SW6010B 7470 E200 ILMO__	Reactive CN / S SW846 Chapter 7	Hexavalent Chromium SW7196A Alkaline Digest? Y / N	Inorganic Anions ** SW9056 E300.0	pH SW9040B 9045C	Oil & Grease SW9071A E413.2	TPH GRO DRO SW6015B (both)	TOX SW9020B	Gross Alpha / Beta SW9310 E900.0	Actinides by PAI SOP (circle) Pu / U / Am / Th / Cm	Total Uranium by KPA D5174-91	Tritium E906.0	Total Alpha-Emitting Radium SW9315 E903.0	Radium 226 SW9315 E903.0 Radium 228 SW9320 E904.0	Strontium 89 D5811-95 Strontium 90 D5811-95	Gamma Isotopes ** E901.1	Th-isotopic	Pb 210	Hold with Hardness
[illegible]	5/5/04	1640	1	SUE	5										(B)									X					X					X
[illegible]	5/5/04	1550	2		5										(B)									X					X					X
[illegible]	5/4/04	1152	3		5										(B)									X					X					X
[illegible]	5/6/04	1145	4		8										X									X					X			X	X	X
[illegible]	5/6/04	0850	5		5										(B)									X					(X)					X
[illegible]	[illegible]	1603	6		8										X									X					X			X	X	X
[illegible]	[illegible]	1609	7		5										(B)									X					(X)					X
[illegible]	5/5/04	1230	8		5										(B)									X					(X)					X
[illegible]	5/5/04	1457	9		5										(B)									X					(X)					X
[illegible]	5/6/04	1700	10	↓	5										(B)									X					(X)					X

Comments:

(X) [illegible]

(B) [illegible]

Relinquished By: (1)
Signature Gerald Warrick
Printed Name Gerald Warrick
Date 5-10-04 Time 10:00
Company Kent & Sullivan

Relinquished By: (2)
Signature _____
Printed Name _____
Date _____ Time _____
Company _____

Received By: (1)
Signature [illegible]
Printed Name Amy Wolf
Date 5/11/04 Time 1645
Company Paragon Analytics

Received By: (2)
Signature _____
Printed Name _____
Date _____ Time _____
Company _____

000055

Form 202r4.xls (1/3/01)

* Time Zone (circle one): EST CST MST PST ** Indicate specific analytes under comments. Distribution: white / yellow (Paragon); pink retained by originator.

Paragon Analytics, Inc.
225 Commerce Drive Fort Collins, CO 80524
800-443-1511 or (970) 490-1511 (970) 490-1522 Fax

Chain-of-Custody

Accession Number (LAB ID) 0405095

Date _____ Page 2 of 9

Project Name / No.: _____ Sampler(s): _____ (circle one) Turnaround: Standard or Rush (Due _____) Dispose or Return to Client

Report To:
Phone:
Fax:
Company:
Address:

See page 1

circle method or specify under comments

Sample ID	Date 2004	Time *	Lab ID	Matrix	No. of Containers	VOCs SW8260B E624 E524.2 OLMO__	BTEX (only) SW8021B	SVOCs SW8270C E625 E525 OLMO__	OC Pesticides SW8081A E608 E508 OLMO__	PCBs SW8082 E608 E508 OLMO__	OP Pesticides SW8141A E614	Herbicides SW8151A E615	TCLP Organics SW1311 8260B 8270C 8081A 8151A	TCLP Metals SW 1311 6010B 7471	Total Metals SW6010B 7470 7471 E200 ILMO__	Dissolved Metals SW6010B 7470 E200 ILMO__	Reactive CN / S SW846 Chapter 7	Hexavalent Chromium SW7196A Alkaline Digest? Y / N	Inorganic Anions ** SW9056 E300.0	pH SW9040B 9045C	Oil & Grease SW9071A E413.2	TPH GRO DRO SW8015B (both)	TOX SW9020B	Gross Alpha / Beta SW9310 E900.0	Actinides by PAI SOP (circle): Pu / U / Am / Th / Cm	~~Total~~ Uranium by ~~[illegible]~~ Isotopic	Tritium E906.0	Total Alpha-Emitting Radium SW9315 E903.0	Radium 226 SW9315 E903.0 Radium 228 SW9320 E904.0	Strontium 89 D5811-95 Strontium 90 D5811-95	Gamma Isotopes ** E901.1	Th- isotopic	Ac 227 - Pa 231 - Pb 210
FR-01	5-6-04	0800	11	W	2										(B)									X									
FR-02	↓	0810	12	W	2										(B)									X									
MSED-01 (*)	5-6	1300		SED	2										(C)											X			X			X	
MSED-02	5-6	1340			3										(C)											X			X			X	
MSED-03	5-6	1400			2¼										(C)											X			X			X	
MSED-04	5-6	0910			3										(C)											X			X			X	X
MSED-05	5-6	0920			3										(C)											X			X			X	
MSED-06	5-7	0830			[illegible]										(C)											X			X			X	
MSED-07	5-7	0900		↓	3										(C)											X			X			X	

Comments:
(B) Hold analyses pending metals analyses from samples [illegible] and [illegible]-07.
(C) Hold analyses pending metals results from samples OSA-01, 700-01, and 900-01.
(*) on WO# 0405096 DWS 5/12/04

Form 202r4.xls (1/3/01)

Relinquished By: (1)	Relinquished By: (2)
Signature Gerald Warrick	Signature
Printed Name Gerald Warrick	Printed Name
Date 5-10-04 Time 10:00	Date Time
Company Kent + Sullivan	Company

Received By: (1)	Received By: (2)
Signature [signature]	Signature
Printed Name Amy Wolf	Printed Name
Date 5/11/04 Time 11:45	Date Time
Company Paragon Analytics	Company

* Time Zone (circle one): EST CST MST PST ** Indicate specific analytes under comments. Distribution: white / yellow (Paragon); pink retained by originator.

000056

Paragon Analytics, Inc. -- Fort Collins, Colorado

CONDITION OF SAMPLE UPON RECEIPT FORM

CLIENT: Kent + Sullivan WORKORDER NO: 0405095

PROJECT MANAGER: Debbie Fazio INITIALS: DW DATE: 5/12/04

1. Does this project require any special handling in addition to standard Paragon procedures?		Yes	No
IS PRE-SCREENING REQUIRED? (radiochemistry, DOE, etc.)		Yes	No
2. Are custody seals on shipping containers intact? How many custody seals are provided? 2 each	N/A	Yes	No
3. Are the custody seals on sample containers intact?	N/A	Yes	No
4. Is there a Chain-of-Custody (COC) or other representative documents, letters, or shipping memos?		Yes	No
5. Is the COC complete? Relinquished: Yes ✓ No___ Analyses Requested: Yes ✓ No___	N/A	Yes	No
6. Is the COC in agreement with the samples received? No. of Samples: Yes ✓ No___ Sample ID's: Yes ✓ No___ Matrix: Yes ✓ No___ No. of Containers: Yes ✓ No___	N/A	Yes	No
7. Were COC (if applicable) and sample labels legible?		Yes	No
8. Were airbills present and/or removable?	N/A	Yes	No
9. Are all aqueous samples requiring chemical preservation preserved correctly (excluding volatile organics)?	N/A	Yes	No
Are all aqueous **non-preserved** samples at the correct pH?		Yes	No
10. Is there enough sample for requested analyses? If so, were samples placed in the proper containers?		Yes	No
11. Are all samples within holding times for the requested analyses?		Yes	No
12. Were all sample containers received intact? (not broken or leaking, etc.)		Yes	No
13. Are samples requiring no headspace (volatiles, reactive cyanide/sulfide, radon), headspace free? **Size of bubble:** ___ < **green pea:** ___ > **green pea** (List sample IDs and affected containers on Page 2)	N/A	Yes	No
14. Were samples checked for and free from the presence of residual chlorine?	N/A	Yes	No
15. Were the sample(s) shipped on ice?	N/A	Yes	No
16. Were cooler temperatures measured at 0.1 - 6 °C ? **IR Gun Used*:** 1 2	N/A	Yes	No
17. Were all samples cooled that should have been cooled?	N/A	Yes	No

Cooler #'s	866	933	930	681	166	9	816	4	
Temperature	10°	10°	15°	10°	12°	12°	14°	11°	°C

Project Manager Signature / Date: Debbie Fazio 5/13/04

A NO RESPONSE TO ANY QUESTION EXCEPT # 1 REQUIRES THE COMPLETION OF PAGE 2 OF THIS FORM

* IR Gun #1 (original): Raytek, SN SC-PM3/T29403
IR Gun #2 (newer): Oakton, SN 2SCIR1201

Paragon Analytics, Inc. -- Fort Collins, Colorado

CONDITION OF SAMPLE UPON RECEIPT FORM

CLIENT: Kent + Sullivan WORKORDER NO: 0405095

PROJECT MANAGER: Debbie Fazio INITIALS: DW DATE: 5/12/04

- X **Custody seals** broken (on outside of shipping container or on sample containers).
- No Chain-of-Custody (**COC**) present.
- **Number of samples** on the COC do not match the number of samples received.
- Aqueous samples **not preserved correctly** (see pH discussion below).
- SVOC samples contained **residual chlorine** (list sample IDs and affected containers below).
- X Samples received at **inappropriate temperature.**
- **Insufficient sample** to perform requested analyses.
- Extraction or analytical **holding times** expired in transit.
- **Broken/leaking bottles** and intact bottles received in same cooler (list affected sample IDs below).
- **No analyses requested.**
- **Incorrect sample type** received.
- VOAs, reactive CN/S, radon not **headspace** free (list sample IDs and affected vials below).
- **Airbills** not present and/or removable (record applicable shipper's tracking number below).
- X Other (describe below).

Describe discrepancy:

• Sample #1 - #10: 500 ml poly bottles are labeled for alkalinity analysis and were received at pH 7. Labels list preservative as HNO_3.

• Cooler #930 received with rear outside custody seal intact. Front custody seal was present but was not intact. All strapping tape was intact

• All samples received between 10° - 15°C. Insufficient ice packed with samples. Refer to page 1 for cooler temperatures and refer to DOT ~~page~~ Survey pages for cooler contents.

dw 5/12/04

Was the client contacted? ___ No; ✓ Yes: Name Sue Kent Date/Time 5/13/04

Was the pH of any sample adjusted by the laboratory? ___ No; ___ Yes (see Table below):

NOTE: No pH adjustments shall be made without prior consent of Project Manager. After pH adjustment, hold metals and radchem samples ≥ 16 hr before analysis.

Sample ID	*Initial pH*	*Final pH (wait 30 min)*	*Type of Reagent Used*	*Lot No. of Reagent Used*	*Initials / Date / Time*

Was the laboratory directed to proceed with the analysis of any samples yielding the presence of residual chlorine? ___ No: ___ Yes (see notes above).

Project Manager Signature / Date: 5/13/04

000058

SAMPLE LOGIN / DOT SURVEY

Client: Kent & Sullivan Workorder No: 0405095

Project Manager: Debbie Fazio Initials: AW Date: 5/12/04

COOLER #: 866 External Micro R Meter Reading (μ R/hr): 50

Paragon Sample ID:	Client Sample ID:	Micro R Meter Reading (μ R/hr):
0405095-6-5	SW-07	< background
0405095-8-2	SW-09	< background
0405095-8-3	SW-09	< background
0405095-8-4	SW-09	< background
0405095-8-5	SW-09	< background
0405095-10-2	SW-11	< background
0405095-10-3	SW-11	< background
0405095-10-4	SW-11	< background

COOLER #: 933 External Micro R Meter Reading (μ R/hr): 150

Paragon Sample ID:	Client Sample ID:	Micro R Meter Reading (μ R/hr):
0405095-4-1	SW-05	< background
0405095-4-4	SW-05	< background
0405095-4-6	SW-05	< background
0405095-4-7	SW-05	< background
0405095-4-8	SW-05	< background

COOLER #: 930 External Micro R Meter Reading (μ R/hr): 380

Paragon Sample ID:	Client Sample ID:	Micro R Meter Reading (μ R/hr):
0405095-2-1	SW-02	< background
0405095-2-2	SW-02	< background
0405095-2-3	SW-02	< background
0405095-6-8	SW-07	< background
0405095-7-4	SW-08	< background
0405095-7-5	SW-08	< background
0405095-8-1	SW-09	< background
0405095-9-3	SW-10	< background
0405095-10-1	SW-11	< background

If applicable, was the client contacted? **YES / NO / NA** Client Rep. Name: S. Kent Date/Time: 5/13/04

Project Manager Signature/ Date: 5/13/04

000059

SAMPLE LOGIN / DOT SURVEY

Client: Kent & Sullivan Workorder No: 0405095

Project Manager: Debbie Fazio Initials: AW Date: 5/12/04

COOLER #: 681 External Micro R Meter Reading (μ R/hr): 70

Paragon Sample ID:	Client Sample ID:	Micro R Meter Reading (μ R/hr):
0405095-1-1	SW-01	< background
0405095-1-2	SW-01	< background
0405095-1-3	SW-01	< background
0405095-1-4	SW-01	< background
0405095-1-5	SW-01	< background
0405095-3-2	SW-04	< background
0405095-6-1	SW-07	< background
0405095-9-1	SW-10	< background
0405095-9-2	SW-10	< background
0405095-9-5	SW-10	< background

COOLER #: 166 External Micro R Meter Reading (μ R/hr): 60

Paragon Sample ID:	Client Sample ID:	Micro R Meter Reading (μ R/hr):
0405095-2-4	SW-02	< background
0405095-2-5	SW-02	< background
0405095-3-1	SW-04	< background
0405095-3-3	SW-04	< background
0405095-9-4	SW-10	< background
0405095-11-1	FR-01	< background
0405095-11-2	FR-01	< background
0405095-12-1	FR-02	< background
0405095-12-2	FR-02	< background

COOLER #: 9 External Micro R Meter Reading (μ R/hr): 80

Paragon Sample ID:	Client Sample ID:	Micro R Meter Reading (μ R/hr):
0405095-3-4	SW-04	< background
0405095-3-5	SW-04	< background
0405095-4-2	SW-05	< background
0405095-4-3	SW-05	< background
0405095-4-5	SW-05	< background
0405095-5-1	SW-06	< background
0405095-5-2	SW-06	< background
0405095-5-3	SW-06	< background
0405095-5-5	SW-06	< background

If applicable, was the client contacted? YES / NO / NA Client Rep. Name: [illegible] Date/Time: 5/13/04

Project Manager Signature/ Date: [illegible] 5/13/04

00006

SAMPLE LOGIN / DOT SURVEY

Client: Kent & Sullivan Workorder No: 0405095

Project Manager: Debbie Fazio Initials: AW Date: 5/12/04

COOLER #: **816** External Micro R Meter Reading (μ R/hr): **50**

Paragon Sample ID:	**Client Sample ID:**	**Micro R Meter Reading (μ R/hr):**
0405095-5-4	SW-06	< background

COOLER #: **4** External Micro R Meter Reading (μ R/hr): **100**

Paragon Sample ID:	**Client Sample ID:**	**Micro R Meter Reading (μ R/hr):**
0405095-6-2	SW-07	< background
0405095-6-3	SW-07	< background
0405095-6-4	SW-07	< background
0405095-6-6	SW-07	< background
0405095-6-7	SW-07	< background
0405095-7-1	SW-08	< background
0405095-7-2	SW-08	< background
0405095-7-3	SW-08	< background
0405095-10-5	SW-11	< background

If applicable, was the client contacted? **YES / NO / NA** Client Rep. Name: Skeet Date/Time: 5/13/04

Project Manager Signature/ Date: 5/13/04

0405095

AirCargo
Alaska Airlines
1-800-2ALASKA
Airbill Number
027 KTN 5436-6152 Box No. 0017
Destination
DEN
Pieces 17 | Total Weight 865 | Date 10-MAY-04
14 RAIDOACTIVE COOLERS COOL
3 MT COOLERS
50 2 seals
#866
ARTIC 0-0410-3-1635

AirCargo
Alaska Airlines
1-800-2ALASKA
Airbill Number
027 KTN 5436-6152 Box No. 0003
Destination
DEN
Pieces 17 | Total Weight 865 | Date 10-MAY-04
14 RAIDOACTIVE COOLERS COOL
3 MT COOLERS
2 seals 150
#933
10°C
ARTIC 0-0410-3-1635

1-800-2ALASKA
027 KTN 5436-6152 Box No. 0012
Destination
DEN
Pieces 17 | Total Weight 865 | Date 10-MAY-04
14 RAIDOACTIVE COOLERS COOL
3 MT COOLERS
#930 380
Back intact
Front Not
15°C
ARTIC 0-0410-3-1635

1-800-2ALASKA
027 KTN 5436-6152 Box No. 0004
Destination
DEN
Pieces 17 | Total Weight 865 | Date 10-MAY-04
14 RAIDOACTIVE COOLERS COOL
3 MT COOLERS
70
10°C
#681
2 seals
ARTIC 0-0410-3-1635

000062

0405095

Air Cargo
Alaska Airlines
1-800-2ALASKA
Airbill Number
027 KTN 5436-6152 Box No. 0013
Destination DEN
Pieces 17 | Total Weight 865 | Date 10-MAY-04
14 RAIDOACTIVE COOLERS COOL
3 MT COOLERS
60 12°C
4 2 seals
ARTIC 0-0410-3-1635

Air Cargo
Alaska Airlines
1-800-2ALASKA
Airbill Number
027 KTN 5436-6152 Box No. 0016
Destination DEN
Pieces 17 | Total Weight 865 | Date 10-MAY-04
14 RAIDOACTIVE COOLERS COOL
3 MT COOLERS
80 12°C
9 2 seals
ARTIC 0-0410-3-1635

1-800-2ALASKA
027 KTN 5436-6152 Box No. 0005
Destination DEN
Pieces 17 | Total Weight 865 | Date 10-MAY-04
14 RAIDOACTIVE COOLERS COOL
3 MT COOLERS
100
4 2 seals
ARTIC 0-0410-3-1635

1-800-2ALASKA
027 KTN 5436-6152 Box No. 0014
Destination DEN
Pieces 17 | Total Weight 865 | Date 10-MAY-04
14 RAIDOACTIVE COOLERS COOL
3 MT COOLERS
50 14°C
816 2 seals
ARTIC 0-0410-3-1635

PARAGON ANALYTICS
Radiochemistry Data Package

Section 9

ADDITIONAL SUPPORTING DOCUMENTATION

9

Gas Proportional Counter

Instrument Calibration

Background Calibration

LB4100-A Weekly Instrument Calibration and Check
Background Determinations

Detector	Alpha				Beta				Detector
ID	CPM	LCL	UCL	Flag	CPM	LCL	UCL	Flag	ID
A1 (01)	0.152	0.098	0.253	PASS	2.166	2.125	2.556	PASS	A1 (01)
A2 (02)	0.060	0.045	0.140	PASS	3.232	1.420	2.659	FLAG-HIGH	A2 (02)
A3 (03)	0.099	0.052	0.176	PASS	2.050	1.793	2.380	PASS	A3 (03)
A4 (04)	0.063	0.025	0.200	PASS	2.041	1.774	2.173	PASS	A4 (04)
B1 (05)	0.075	0.026	0.139	PASS	1.874	1.691	2.015	PASS	B1 (05)
B2 (06)	0.063	0.057	0.111	PASS	1.741	1.376	2.016	PASS	B2 (06)
B3 (07)	0.051	0.030	0.153	PASS	1.766	1.659	2.095	PASS	B3 (07)
B4 (08)	0.108	0.047	0.120	PASS	1.856	1.649	1.952	PASS	B4 (08)
C1 (09)	0.066	0.035	0.168	PASS	1.757	1.466	2.042	PASS	C1 (09)
C2 (10)	0.069	0.027	0.174	PASS	1.776	1.584	2.013	PASS	C2 (10)
C3 (11)	0.128	0.047	0.148	PASS	1.835	1.517	2.028	PASS	C3 (11)
C4 (12)	0.116	0.023	0.188	PASS	1.890	1.628	2.272	PASS	C4 (12)
D1 (13)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D1 (13)
D2 (14)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D2 (14)
D3 (15)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D3 (15)
D4 (16)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D4 (16)

-detector 2 will be recounted in file BKA0522W

Reviewed by: LCB LCB 5/22/04 Date: 5/22/04

Control Limits set 4/16/04. CJ 4/16/04.

000056

BKA0521W.XLD

Printed 5/22/04 7:59 AM

LB4100-A Weekly Instrument Calibration and Check
Background Determinations

Detector	Alpha				Beta				Detector
ID	CPM	LCL	UCL	Flag	CPM	LCL	UCL	Flag	ID
A1 (01)	#REF!	0.098	0.253	#REF!	#REF!	2.125	2.556	#REF!	A1 (01)
A2 (02)	0.063	0.045	0.140	PASS	3.342	1.420	2.659	FLAG-HIGH	A2 (02)
A3 (03)	#REF!	0.052	0.176	#REF!	#REF!	1.793	2.380	#REF!	A3 (03)
A4 (04)	#REF!	0.025	0.200	#REF!	#REF!	1.774	2.173	#REF!	A4 (04)
B1 (05)	#REF!	0.026	0.139	#REF!	#REF!	1.691	2.015	#REF!	B1 (05)
B2 (06)	#REF!	0.057	0.111	#REF!	#REF!	1.376	2.016	#REF!	B2 (06)
B3 (07)	#REF!	0.030	0.153	#REF!	#REF!	1.659	2.095	#REF!	B3 (07)
B4 (08)	#REF!	0.047	0.120	#REF!	#REF!	1.649	1.952	#REF!	B4 (08)
C1 (09)	#REF!	0.035	0.168	#REF!	#REF!	1.466	2.042	#REF!	C1 (09)
C2 (10)	#REF!	0.027	0.174	#REF!	#REF!	1.584	2.013	#REF!	C2 (10)
C3 (11)	#REF!	0.047	0.148	#REF!	#REF!	1.517	2.028	#REF!	C3 (11)
C4 (12)	#REF!	0.023	0.188	#REF!	#REF!	1.628	2.272	#REF!	C4 (12)
D1 (13)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D1 (13)
D2 (14)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D2 (14)
D3 (15)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D3 (15)
D4 (16)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D4 (16)

- 2 is offline B for the week.

Reviewed by: _____ Date: 5/24/04

Control Limits set 4/16/04. CJ 4/16/04.

BKA0522W.XLD

Printed 5/24/04 9:18 AM

000047

LB4100-B Weekly Instrument Calibration and Check
Background Determinations

Detector	Alpha				Beta				Detector
ID	CPM	LCL	UCL	Flag	CPM	LCL	UCL	Flag	ID
A1 (01)	0.055	0.044	0.150	PASS	1.433	1.244	1.486	PASS	A1 (01)
A2 (02)	0.111	0.050	0.235	PASS	1.366	1.255	1.493	PASS	A2 (02)
A3 (03)	0.091	0.037	0.173	PASS	1.466	1.251	1.518	PASS	A3 (03)
A4 (04)	0.086	0.001	0.193	PASS	1.378	1.225	1.540	PASS	A4 (04)
B1 (05)	0.113	-0.006	0.283	PASS	1.631	1.428	1.981	OFFLINE	B1 (05)
B2 (06)	0.072	0.008	0.247	PASS	1.415	1.339	1.770	OFFLINE	B2 (06)
B3 (07)	0.102	0.039	0.259	PASS	1.552	1.421	1.747	PASS	B3 (07)
B4 (08)	0.109	-0.027	0.316	PASS	1.694	1.498	1.741	PASS	B4 (08)
C1 (09)	0.077	0.046	0.174	PASS	1.564	1.324	1.754	PASS	C1 (09)
C2 (10)	0.068	0.042	0.205	PASS	1.564	1.327	1.733	PASS	C2 (10)
C3 (11)	0.116	0.067	0.219	PASS	1.638	1.344	1.766	PASS	C3 (11)
C4 (12)	0.089	-0.012	0.216	PASS	1.586	1.338	1.726	PASS	C4 (12)
D1 (13)	0.093	0.028	0.206	PASS	1.554	1.302	1.759	PASS	D1 (13)
D2 (14)	0.091	0.017	0.207	PASS	1.877	1.730	2.319	PASS	D2 (14)
D3 (15)	0.059	0.044	0.147	PASS	3.032	1.566	2.045	FLAG-HIGH	D3 (15)
D4 (16)	0.084	0.022	0.206	PASS	3.483	1.405	2.033	FLAG-HIGH	D4 (16)

= ~~detectors 15, 16 will be recounted in file BKB0522W~~ NA 5/24/04

Reviewed by: LLB Date: 5/22/04

Control Limits set 1/26/04.
CJ 1/26/04

Gas Proportional Counter

Quality Control Data

Daily Background Checks

LB4100-A Daily Instrument Performance Checks
Background Checks

Detector	Alpha				Beta				Detector
ID	CPM	LCL	UCL	Flag	CPM	LCL	UCL	Flag	ID
A1 (01)	0.200	0.001	0.303	PASS	2.617	1.596	2.736	PASS	A1 (01)
A2 (02)	0.133	-0.034	0.160	PASS	2.733	2.634	4.050	PASS	A2 (02)
A3 (03)	0.033	-0.023	0.221	PASS	1.917	1.495	2.605	PASS	A3 (03)
A4 (04)	0.067	-0.034	0.160	PASS	2.067	1.488	2.594	PASS	A4 (04)
B1 (05)	0.083	-0.031	0.181	PASS	1.717	1.344	2.404	PASS	B1 (05)
B2 (06)	0.067	-0.034	0.160	PASS	1.433	1.230	2.252	PASS	B2 (06)
B3 (07)	0.050	-0.036	0.138	PASS	1.617	1.251	2.281	PASS	B3 (07)
B4 (08)	0.150	-0.019	0.235	PASS	2.067	1.328	2.384	PASS	B4 (08)
C1 (09)	0.117	-0.033	0.165	PASS	1.700	1.244	2.270	PASS	C1 (09)
C2 (10)	0.050	-0.033	0.171	PASS	1.550	1.260	2.292	PASS	C2 (10)
C3 (11)	0.083	-0.011	0.267	PASS	1.817	1.310	2.360	PASS	C3 (11)
C4 (12)	0.050	-0.016	0.248	PASS	1.933	1.358	2.422	PASS	C4 (12)
D1 (13)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D1 (13)
D2 (14)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D2 (14)
D3 (15)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D3 (15)
D4 (16)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D4 (16)

Reviewed by: _____ Date: 5/24/04

Control limits established from prevoius weekly background determinations.
Weekly Background File: BKA0521W Date: 5/21/04 Analyst: CJ

LB4100-B Daily Instrument Performance Checks
Background Checks

Detector	Alpha				Beta				Detector
ID	CPM	LCL	UCL	Flag	CPM	LCL	UCL	Flag	ID
A1 (01)	0.067	-0.036	0.146	PASS	1.333	0.969	1.897	PASS	A1 (01)
A2 (02)	0.133	-0.018	0.240	PASS	1.317	0.913	1.819	PASS	A2 (02)
A3 (03)	0.100	-0.026	0.208	PASS	1.450	0.997	1.935	PASS	A3 (03)
A4 (04)	0.150	-0.028	0.200	PASS	1.533	0.923	1.833	PASS	A4 (04)
B1 (05)	0.200	-0.017	0.243	PASS	1.633	1.136	2.126	OFFLINE	B1 (05)
B2 (06)	0.083	-0.032	0.176	PASS	1.233	0.954	1.876	OFFLINE	B2 (06)
B3 (07)	0.067	-0.022	0.226	PASS	1.783	1.070	2.034	PASS	B3 (07)
B4 (08)	0.083	-0.019	0.237	PASS	1.617	1.190	2.198	PASS	B4 (08)
C1 (09)	0.117	-0.030	0.184	PASS	1.450	1.080	2.048	PASS	C1 (09)
C2 (10)	0.150	-0.033	0.169	PASS	1.483	1.080	2.048	PASS	C2 (10)
C3 (11)	0.083	-0.016	0.248	PASS	1.767	1.142	2.134	PASS	C3 (11)
C4 (12)	0.050	-0.027	0.205	PASS	1.633	1.098	2.074	PASS	C4 (12)
D1 (13)	0.117	-0.025	0.211	PASS	1.733	1.071	2.037	PASS	D1 (13)
D2 (14)	0.100	-0.026	0.208	PASS	1.583	1.346	2.408	PASS	D2 (14)
D3 (15)	0.017	-0.035	0.153	PASS	2.650	2.358	3.706	PASS	D3 (15)
D4 (16)	0.167	-0.028	0.196	PASS	2.733	2.760	4.206	FLAG-LOW	D4 (16)

-16 is offline B for the week.

Reviewed by: S Date: 5/24/05

Control limits established from prevoius weekly background determinations.
Weekly Background File: BKB0521W Date: 5/21/04 Analyst: CJ

000071

LB4100-A Daily Instrument Performance Checks
Background Checks

Detector	Alpha				Beta				Detector
ID	CPM	LCL	UCL	Flag	CPM	LCL	UCL	Flag	ID
A1 (01)	0.067	0.001	0.303	PASS	2.400	1.596	2.736	PASS	A1 (01)
A2 (02)	0.033	-0.034	0.160	PASS	2.967	2.634	4.050	PASS	A2 (02)
A3 (03)	0.100	-0.023	0.221	PASS	1.950	1.495	2.605	PASS	A3 (03)
A4 (04)	0.050	-0.034	0.160	PASS	1.767	1.488	2.594	PASS	A4 (04)
B1 (05)	0.083	-0.031	0.181	PASS	1.717	1.344	2.404	PASS	B1 (05)
B2 (06)	0.100	-0.034	0.160	PASS	1.617	1.230	2.252	PASS	B2 (06)
B3 (07)	0.067	-0.036	0.138	PASS	1.833	1.251	2.281	PASS	B3 (07)
B4 (08)	0.083	-0.019	0.235	PASS	1.717	1.328	2.384	PASS	B4 (08)
C1 (09)	0.033	-0.033	0.165	PASS	2.033	1.244	2.270	PASS	C1 (09)
C2 (10)	0.100	-0.033	0.171	PASS	1.400	1.260	2.292	PASS	C2 (10)
C3 (11)	0.117	-0.011	0.267	PASS	1.567	1.310	2.360	PASS	C3 (11)
C4 (12)	0.133	-0.016	0.248	PASS	2.000	1.358	2.422	PASS	C4 (12)
D1 (13)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D1 (13)
D2 (14)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D2 (14)
D3 (15)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D3 (15)
D4 (16)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D4 (16)

Reviewed by: TT Date: 5-25-04

Control limits established from prevoius weekly background determinations.
Weekly Background File: BKA0521W Date: 5/21/04 Analyst: CJ

LB4100-B Daily Instrument Performance Checks
Background Checks

Detector	Alpha				Beta				Detector
ID	CPM	LCL	UCL	Flag	CPM	LCL	UCL	Flag	ID
A1 (01)	0.033	-0.036	0.146	PASS	1.250	0.969	1.897	PASS	A1 (01)
A2 (02)	0.117	-0.018	0.240	PASS	1.117	0.913	1.819	PASS	A2 (02)
A3 (03)	0.050	-0.026	0.208	PASS	1.633	0.997	1.935	PASS	A3 (03)
A4 (04)	0.100	-0.028	0.200	PASS	1.167	0.923	1.833	PASS	A4 (04)
B1 (05)	0.133	-0.017	0.243	PASS	1.817	1.136	2.126	OFFLINE	B1 (05)
B2 (06)	0.083	-0.032	0.176	PASS	1.333	0.954	1.876	OFFLINE	B2 (06)
B3 (07)	0.050	-0.022	0.226	PASS	1.683	1.070	2.034	PASS	B3 (07)
B4 (08)	0.117	-0.019	0.237	PASS	1.600	1.190	2.198	PASS	B4 (08)
C1 (09)	0.183	-0.030	0.184	PASS	1.400	1.080	2.048	PASS	C1 (09)
C2 (10)	0.067	-0.033	0.169	PASS	1.417	1.080	2.048	PASS	C2 (10)
C3 (11)	0.167	-0.016	0.248	PASS	1.700	1.142	2.134	PASS	C3 (11)
C4 (12)	0.033	-0.027	0.205	PASS	1.450	1.098	2.074	PASS	C4 (12)
D1 (13)	0.067	-0.025	0.211	PASS	1.433	1.071	2.037	PASS	D1 (13)
D2 (14)	0.033	-0.026	0.208	PASS	1.750	1.346	2.408	PASS	D2 (14)
D3 (15)	0.100	-0.035	0.153	PASS	2.767	2.358	3.706	PASS	D3 (15)
D4 (16)	0.033	-0.028	0.196	PASS	3.183	2.760	4.206	PASS	D4 (16)

Reviewed by: CCM Date: 5/25/04

Control limits established from prevoius weekly background determinations.
Weekly Background File: BKB0521W Date: 5/21/04 Analyst: CJ

000073

LB4100-A Daily Instrument Performance Checks
Background Checks

Detector	Alpha				Beta				Detector
ID	CPM	LCL	UCL	Flag	CPM	LCL	UCL	Flag	ID
A1 (01)	0.083	0.001	0.303	PASS	2.167	1.596	2.736	PASS	A1 (01)
A2 (02)	0.083	-0.034	0.160	PASS	4.500	2.634	4.050	FLAG-HIGH	A2 (02)
A3 (03)	0.100	-0.023	0.221	PASS	2.167	1.495	2.605	PASS	A3 (03)
A4 (04)	0.117	-0.034	0.160	PASS	1.883	1.488	2.594	PASS	A4 (04)
B1 (05)	0.050	-0.031	0.181	PASS	1.883	1.344	2.404	PASS	B1 (05)
B2 (06)	0.150	-0.034	0.160	PASS	1.800	1.230	2.252	PASS	B2 (06)
B3 (07)	0.117	-0.036	0.138	PASS	1.817	1.251	2.281	PASS	B3 (07)
B4 (08)	0.133	-0.019	0.235	PASS	1.750	1.328	2.384	PASS	B4 (08)
C1 (09)	0.083	-0.033	0.165	PASS	1.950	1.244	2.270	PASS	C1 (09)
C2 (10)	0.050	-0.033	0.171	PASS	1.583	1.260	2.292	PASS	C2 (10)
C3 (11)	0.100	-0.011	0.267	PASS	1.917	1.310	2.360	PASS	C3 (11)
C4 (12)	0.100	-0.016	0.248	PASS	1.917	1.358	2.422	PASS	C4 (12)
D1 (13)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D1 (13)
D2 (14)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D2 (14)
D3 (15)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D3 (15)
D4 (16)	#REF!	#REF!	#REF!	OFFLINE	#REF!	#REF!	#REF!	OFFLINE	D4 (16)

2 is offline B for the week

Reviewed by: _____ Date: 5/26/04

Control limits established from prevoius weekly background determinations.
Weekly Background File: BKA0521W Date: 5/21/04 Analyst: CJ

000074

Gas Proportional Counter

Quality Control Data

Daily Instrument Performance Checks

LB4100-A Daily Instrument Performance Check
Efficiency Determinations

Detector	Alpha				Beta				Detector
ID	Eff.	LCL	UCL	Flag	Eff.	LCL	UCL	Flag	ID
A1 (01)	0.2294	0.2085	0.2546	PASS	0.8769	0.7959	0.9352	PASS	A1 (01)
A2 (02)	0.2246	0.2062	0.2574	PASS	0.8730	0.7892	0.9828	PASS	A2 (02)
A3 (03)	0.2377	0.2062	0.2690	PASS	0.8629	0.7715	0.9888	PASS	A3 (03)
A4 (04)	0.2181	0.1880	0.2528	PASS	0.8347	0.7382	0.9417	PASS	A4 (04)
B1 (05)	0.2420	0.2257	0.2534	PASS	0.8714	0.8564	0.9214	PASS	B1 (05)
B2 (06)	0.2431	0.2387	0.2630	PASS	0.8953	0.9020	0.9548	FLAG-LOW	B2 (06)
B3 (07)	0.2373	0.2186	0.2492	PASS	0.8819	0.8665	0.9156	PASS	B3 (07)
B4 (08)	0.2507	0.2435	0.2799	PASS	0.9362	0.9071	0.9634	PASS	B4 (08)
C1 (09)	0.2689	0.2476	0.2862	PASS	0.8953	0.8520	0.9638	PASS	C1 (09)
C2 (10)	0.2259	0.2133	0.2394	PASS	0.8499	0.8366	0.8885	PASS	C2 (10)
C3 (11)	0.2341	0.2148	0.2570	PASS	0.8875	0.8661	0.9334	PASS	C3 (11)
C4 (12)	0.2551	0.2402	0.2658	PASS	0.9240	0.8990	0.9597	PASS	C4 (12)
D1 (13)	#VALUE!	#VALUE!	#VALUE!	OFFLINE	#VALUE!	#VALUE!	#VALUE!	OFFLINE	D1 (13)
D2 (14)	#VALUE!	#VALUE!	#VALUE!	OFFLINE	#VALUE!	#VALUE!	#VALUE!	OFFLINE	D2 (14)
D3 (15)	#VALUE!	#VALUE!	#VALUE!	OFFLINE	#VALUE!	#VALUE!	#VALUE!	OFFLINE	D3 (15)
D4 (16)	#VALUE!	#VALUE!	#VALUE!	OFFLINE	#VALUE!	#VALUE!	#VALUE!	OFFLINE	D4 (16)

-6 is recounted in file EFA0524A

Reviewed by: S Date: 5/24/04

Historical Control Limits established 03/03/04. CJ

000076

LB4100-A Daily Instrument Performance Check
Efficiency Determinations

Detector	Alpha				Beta				Detector
ID	Eff.	LCL	UCL	Flag	Eff.	LCL	UCL	Flag	ID
A1 (01)	#VALUE!	0.2085	0.2546	**#VALUE!**	#VALUE!	0.7959	0.9352	**#VALUE!**	A1 (01)
A2 (02)	#VALUE!	0.2062	0.2574	**#VALUE!**	#VALUE!	0.7892	0.9828	**#VALUE!**	A2 (02)
A3 (03)	#VALUE!	0.2062	0.2690	**#VALUE!**	#VALUE!	0.7715	0.9888	**#VALUE!**	A3 (03)
A4 (04)	#VALUE!	0.1880	0.2528	**#VALUE!**	#VALUE!	0.7382	0.9417	**#VALUE!**	A4 (04)
B1 (05)	#VALUE!	0.2257	0.2534	**#VALUE!**	#VALUE!	0.8564	0.9214	**#VALUE!**	B1 (05)
B2 (06)	0.2402	0.2387	0.2630	**PASS**	0.8982	0.9020	0.9548	**FLAG-LOW**	B2 (06)
B3 (07)	#VALUE!	0.2186	0.2492	**#VALUE!**	#VALUE!	0.8665	0.9156	**#VALUE!**	B3 (07)
B4 (08)	#VALUE!	0.2435	0.2799	**#VALUE!**	#VALUE!	0.9071	0.9634	**#VALUE!**	B4 (08)
C1 (09)	#VALUE!	0.2476	0.2862	**#VALUE!**	#VALUE!	0.8520	0.9638	**#VALUE!**	C1 (09)
C2 (10)	#VALUE!	0.2133	0.2394	**#VALUE!**	#VALUE!	0.8366	0.8885	**#VALUE!**	C2 (10)
C3 (11)	#VALUE!	0.2148	0.2570	**#VALUE!**	#VALUE!	0.8661	0.9334	**#VALUE!**	C3 (11)
C4 (12)	#VALUE!	0.2402	0.2658	**#VALUE!**	#VALUE!	0.8990	0.9597	**#VALUE!**	C4 (12)
D1 (13)	#VALUE!	#VALUE!	#VALUE!	**OFFLINE**	#VALUE!	#VALUE!	#VALUE!	**OFFLINE**	D1 (13)
D2 (14)	#VALUE!	#VALUE!	#VALUE!	**OFFLINE**	#VALUE!	#VALUE!	#VALUE!	**OFFLINE**	D2 (14)
D3 (15)	#VALUE!	#VALUE!	#VALUE!	**OFFLINE**	#VALUE!	#VALUE!	#VALUE!	**OFFLINE**	D3 (15)
D4 (16)	#VALUE!	#VALUE!	#VALUE!	**OFFLINE**	#VALUE!	#VALUE!	#VALUE!	**OFFLINE**	D4 (16)

-6 is Alpha B for today.

Reviewed by: _____ Date: 5/24/04

Historical Control Limits established 03/03/04. CJ

000077

LB4100 - B

Daily Instrument Performance Check
Efficiency Determinations

Detector	Alpha				Beta				Detector
ID	Eff.	LCL	UCL	Flag	Eff.	LCL	UCL	Flag	ID
A1 (01)	0.2390	0.2277	0.2583	PASS	0.8610	0.8448	0.8995	PASS	A1 (01)
A2 (02)	0.2360	0.2314	0.2605	PASS	0.8479	0.8428	0.8989	PASS	A2 (02)
A3 (03)	0.2472	0.2291	0.2588	PASS	0.8940	0.8661	0.9191	PASS	A3 (03)
A4 (04)	0.2472	0.2302	0.2602	PASS	0.8817	0.8514	0.9123	PASS	A4 (04)
B1 (05)	0.2493	0.2342	0.2646	PASS	0.8858	0.9050	0.9663	OFFLINE	B1 (05)
B2 (06)	0.2296	0.2219	0.2484	PASS	0.8541	0.8585	0.9286	OFFLINE	B2 (06)
B3 (07)	0.2449	0.2343	0.2656	PASS	0.9201	0.8782	0.9579	PASS	B3 (07)
B4 (08)	0.2522	0.2236	0.2616	PASS	0.8640	0.8623	0.9360	PASS	B4 (08)
C1 (09)	0.2685	0.2453	0.2752	PASS	0.9145	0.8863	0.9595	PASS	C1 (09)
C2 (10)	0.2517	0.2311	0.2644	PASS	0.8965	0.8750	0.9478	PASS	C2 (10)
C3 (11)	0.2462	0.2362	0.2674	PASS	0.9122	0.8588	0.9345	PASS	C3 (11)
C4 (12)	0.2385	0.2241	0.2531	PASS	0.8562	0.8415	0.9081	PASS	C4 (12)
D1 (13)	0.2445	0.2332	0.2660	PASS	0.8996	0.8681	0.9355	PASS	D1 (13)
D2 (14)	0.2484	0.2375	0.2664	PASS	0.8897	0.8713	0.9377	PASS	D2 (14)
D3 (15)	0.2491	0.2387	0.2733	PASS	0.8918	0.8858	0.9433	PASS	D3 (15)
D4 (16)	0.2591	0.2381	0.2666	PASS	0.8891	0.8823	0.9367	PASS	D4 (16)

Reviewed by: _____ Date: 5/24/04

Control Limits established 12/21/03. JME

000078

LB4100-A Daily Instrument Performance Check
Efficiency Determinations

Detector	Alpha				Beta				Detector
ID	Eff.	LCL	UCL	Flag	Eff.	LCL	UCL	Flag	ID
A1 (01)	0.2174	0.2085	0.2546	PASS	0.8395	0.7959	0.9352	PASS	A1 (01)
A2 (02)	0.2161	0.2062	0.2574	PASS	0.8517	0.7892	0.9828	PASS	A2 (02)
A3 (03)	0.2355	0.2062	0.2690	PASS	0.8779	0.7715	0.9888	PASS	A3 (03)
A4 (04)	0.2054	0.1880	0.2528	PASS	0.7878	0.7382	0.9417	PASS	A4 (04)
B1 (05)	0.2347	0.2257	0.2534	PASS	0.8816	0.8564	0.9214	PASS	B1 (05)
B2 (06)	0.2492	0.2387	0.2630	PASS	0.9199	0.9020	0.9548	PASS	B2 (06)
B3 (07)	0.2355	0.2186	0.2492	PASS	0.8859	0.8665	0.9156	PASS	B3 (07)
B4 (08)	0.2597	0.2435	0.2799	PASS	0.9238	0.9071	0.9634	PASS	B4 (08)
C1 (09)	0.2587	0.2476	0.2862	PASS	0.8873	0.8520	0.9638	PASS	C1 (09)
C2 (10)	0.2236	0.2133	0.2394	PASS	0.8469	0.8366	0.8885	PASS	C2 (10)
C3 (11)	0.2388	0.2148	0.2570	PASS	0.8872	0.8661	0.9334	PASS	C3 (11)
C4 (12)	0.2577	0.2402	0.2658	PASS	0.9381	0.8990	0.9597	PASS	C4 (12)
D1 (13)	#VALUE!	#VALUE!	#VALUE!	OFFLINE	#VALUE!	#VALUE!	#VALUE!	OFFLINE	D1 (13)
D2 (14)	#VALUE!	#VALUE!	#VALUE!	OFFLINE	#VALUE!	#VALUE!	#VALUE!	OFFLINE	D2 (14)
D3 (15)	#VALUE!	#VALUE!	#VALUE!	OFFLINE	#VALUE!	#VALUE!	#VALUE!	OFFLINE	D3 (15)
D4 (16)	#VALUE!	#VALUE!	#VALUE!	OFFLINE	#VALUE!	#VALUE!	#VALUE!	OFFLINE	D4 (16)

Reviewed by: _____ Date: 5/25/04

Historical Control Limits established 03/03/04. CJ

000073

LB4100 - B

Daily Instrument Performance Check
Efficiency Determinations

Detector	Alpha				Beta				Detector
ID	Eff.	LCL	UCL	Flag	Eff.	LCL	UCL	Flag	ID
A1 (01)	0.2441	0.2277	0.2583	PASS	0.8658	0.8448	0.8995	PASS	A1 (01)
A2 (02)	0.2380	0.2314	0.2605	PASS	0.8779	0.8428	0.8989	PASS	A2 (02)
A3 (03)	0.2468	0.2291	0.2588	PASS	0.8766	0.8661	0.9191	PASS	A3 (03)
A4 (04)	0.2412	0.2302	0.2602	PASS	0.8905	0.8514	0.9123	PASS	A4 (04)
B1 (05)	0.2420	0.2342	0.2646	PASS	0.8868	0.9050	0.9663	OFFLINE	B1 (05)
B2 (06)	0.2357	0.2219	0.2484	PASS	0.8520	0.8585	0.9286	OFFLINE	B2 (06)
B3 (07)	0.2515	0.2343	0.2656	PASS	0.9161	0.8782	0.9579	PASS	B3 (07)
B4 (08)	0.2368	0.2236	0.2616	PASS	0.8755	0.8623	0.9360	PASS	B4 (08)
C1 (09)	0.2591	0.2453	0.2752	PASS	0.9353	0.8863	0.9595	PASS	C1 (09)
C2 (10)	0.2425	0.2311	0.2644	PASS	0.9065	0.8750	0.9478	PASS	C2 (10)
C3 (11)	0.2582	0.2362	0.2674	PASS	0.9046	0.8588	0.9345	PASS	C3 (11)
C4 (12)	0.2448	0.2241	0.2531	PASS	0.8819	0.8415	0.9081	PASS	C4 (12)
D1 (13)	0.2466	0.2332	0.2660	PASS	0.9014	0.8681	0.9355	PASS	D1 (13)
D2 (14)	0.2592	0.2375	0.2664	PASS	0.8990	0.8713	0.9377	PASS	D2 (14)
D3 (15)	0.2595	0.2387	0.2733	PASS	0.8945	0.8858	0.9433	PASS	D3 (15)
D4 (16)	0.2535	0.2381	0.2666	PASS	0.8934	0.8823	0.9367	PASS	D4 (16)

Reviewed by: LCB Date: 5/25/04

Control Limits established 12/21/03. JME

000080

LB4100-A Daily Instrument Performance Check
Efficiency Determinations

Detector	Alpha				Beta				Detector
ID	Eff.	LCL	UCL	Flag	Eff.	LCL	UCL	Flag	ID
A1 (01)	0.2227	0.2085	0.2546	PASS	0.8555	0.7959	0.9352	PASS	A1 (01)
A2 (02)	0.2248	0.2062	0.2574	PASS	0.8414	0.7892	0.9828	PASS	A2 (02)
A3 (03)	0.2288	0.2062	0.2690	PASS	0.8605	0.7715	0.9888	PASS	A3 (03)
A4 (04)	0.2171	0.1880	0.2528	PASS	0.8120	0.7382	0.9417	PASS	A4 (04)
B1 (05)	0.2495	0.2257	0.2534	PASS	0.8753	0.8564	0.9214	PASS	B1 (05)
B2 (06)	0.2520	0.2387	0.2630	PASS	0.9119	0.9020	0.9548	PASS	B2 (06)
B3 (07)	0.2290	0.2186	0.2492	PASS	0.8884	0.8665	0.9156	PASS	B3 (07)
B4 (08)	0.2537	0.2435	0.2799	PASS	0.9263	0.9071	0.9634	PASS	B4 (08)
C1 (09)	0.2709	0.2476	0.2862	PASS	0.8935	0.8520	0.9638	PASS	C1 (09)
C2 (10)	0.2300	0.2133	0.2394	PASS	0.8514	0.8366	0.8885	PASS	C2 (10)
C3 (11)	0.2395	0.2148	0.2570	PASS	0.9093	0.8661	0.9334	PASS	C3 (11)
C4 (12)	0.2578	0.2402	0.2658	PASS	0.9188	0.8990	0.9597	PASS	C4 (12)
D1 (13)	#VALUE!	#VALUE!	#VALUE!	OFFLINE	#VALUE!	#VALUE!	#VALUE!	OFFLINE	D1 (13)
D2 (14)	#VALUE!	#VALUE!	#VALUE!	OFFLINE	#VALUE!	#VALUE!	#VALUE!	OFFLINE	D2 (14)
D3 (15)	#VALUE!	#VALUE!	#VALUE!	OFFLINE	#VALUE!	#VALUE!	#VALUE!	OFFLINE	D3 (15)
D4 (16)	#VALUE!	#VALUE!	#VALUE!	OFFLINE	#VALUE!	#VALUE!	#VALUE!	OFFLINE	D4 (16)

Reviewed by: CWB Date: 5/26/04

Historical Control Limits established 03/03/04. CJ

000081

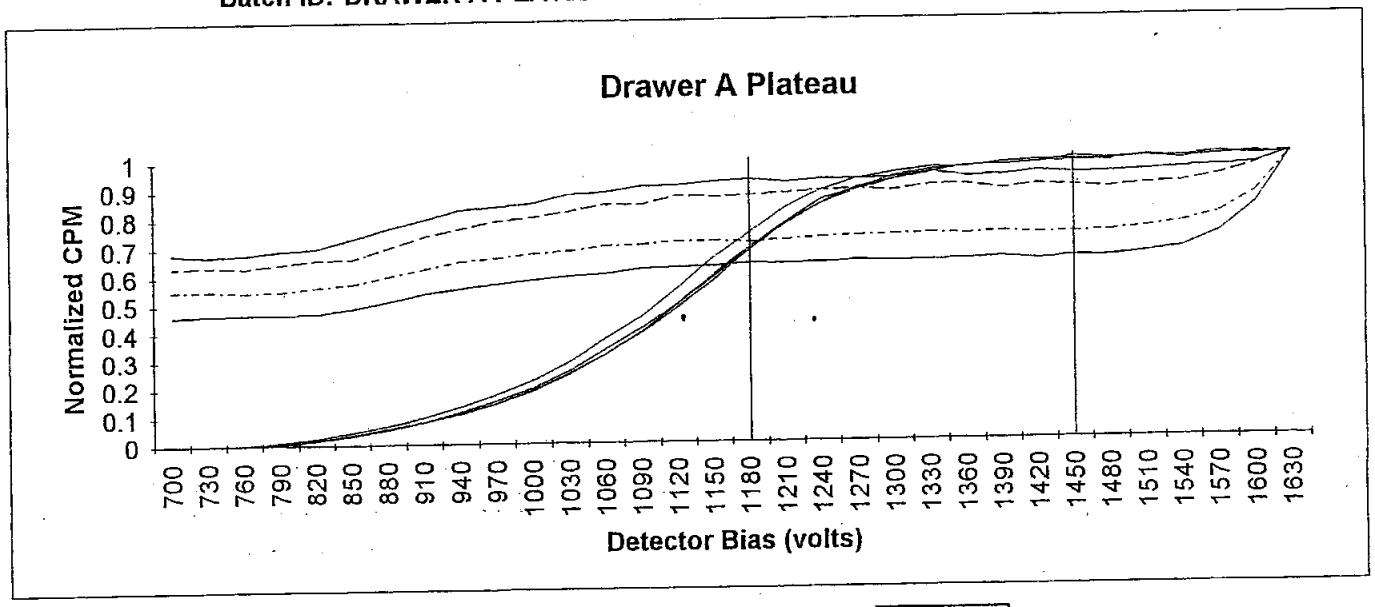
Gas Proportional Counter

Instrument Calibration

Initial Efficiency Calibration Standards Traceability

Unit Type: LB4100/W-A
Date Performed: 1/29/04 08:56
FileName: PTA0129A
Batch ID: DRAWER A PLATEAU

Unit Id: Orange
Application Revision: B
Application Version: Standard



Optimum alpha beta simultaneous operating voltage: 1447.5

Optimum alpha only operating voltage: 1180

	A1	A2	A3	A4
Beta slope at beta voltage	0.92%	1.77%	1.88%	2.16%
Alpha slope at beta voltage	0.56%	0.28%	1.54%	1.11%
Alpha slope at alpha voltage	1.02%	1.74%	1.52%	0.95%

000083

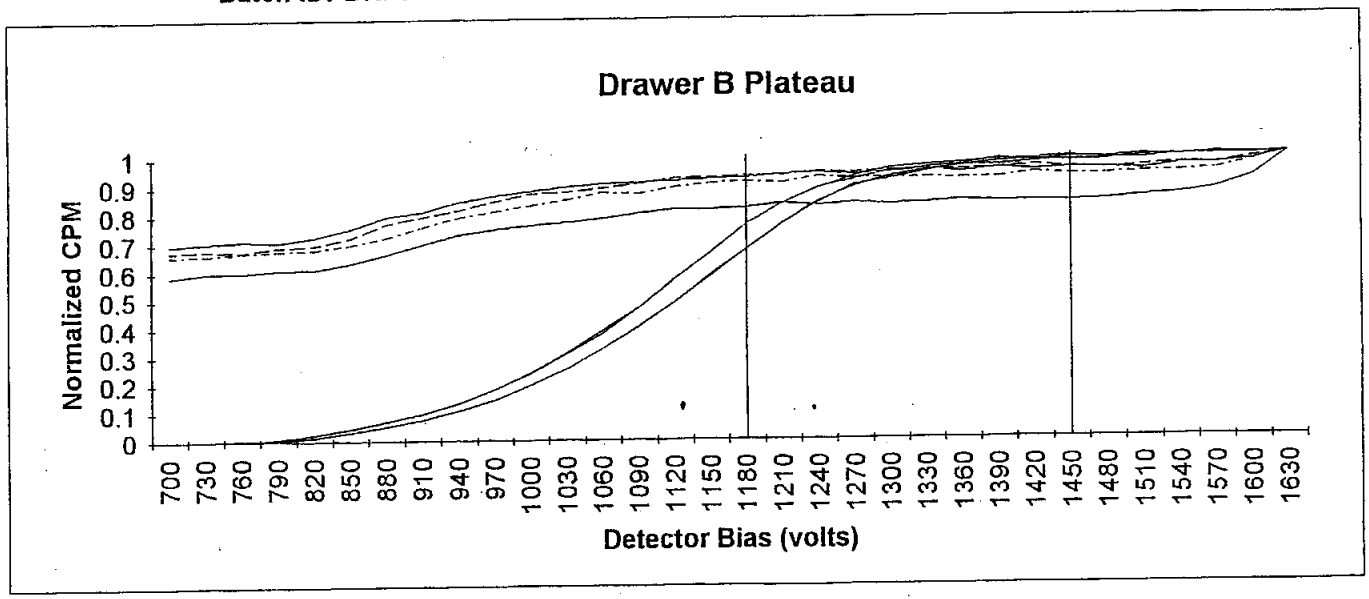
Printed 1/29/04 3:23 PM

g 2/6/04

RG 2/12/04

Unit Type: LB4100/W-A
Date Performed: 1/28/04 11:08
FileName: PTA0128B
Batch ID: DRAWER B PLATEAU

Unit Id: Orange
Application Revision: B
Application Version: Standard



Optimum alpha beta simultaneous operating voltage: 1447.5

Optimum alpha only operating voltage: 1180

	B1	B2	B3	B4
Beta slope at beta voltage	1.14%	0.11%	0.85%	2.10%
Alpha slope at beta voltage	-0.54%	-0.10%	1.37%	0.88%
Alpha slope at alpha voltage	2.29%	1.61%	1.63%	2.40%

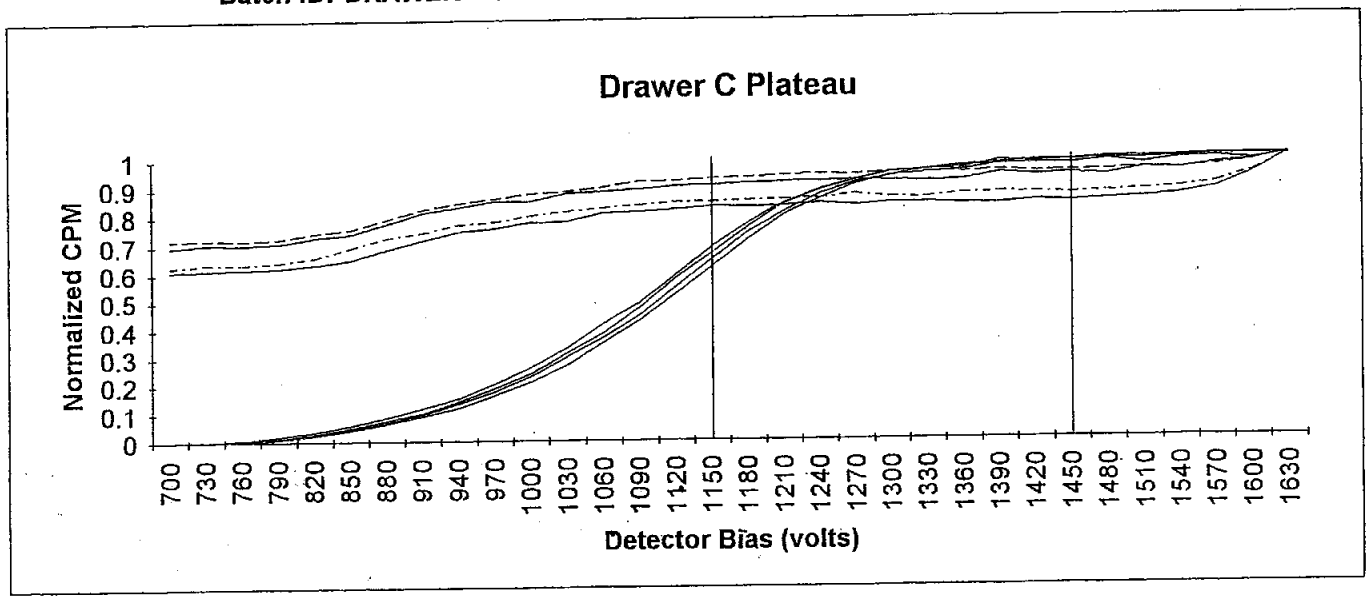
000084

Printed 1/29/04 9:05 AM

9 2/6/04

Unit Type: LB4100/W-A
Date Performed: 1/29/04 08:53
FileName: PTA0129C
Batch ID: DRAWER C PLATEAU

Unit Id: Orange
Application Revision: B
Application Version: Standard



Optimum alpha beta simultaneous operating voltage: 1447.5

Optimum alpha only operating voltage: 1150

	C1	C2	C3	C4
Beta slope at beta voltage	0.35%	0.29%	1.43%	1.56%
Alpha slope at beta voltage	0.84%	0.49%	1.42%	0.53%
Alpha slope at alpha voltage	2.02%	1.76%	1.84%	1.77%

Printed 1/29/04 3:25 PM

92/6/04

000085

1/28/04 Plateaus are performed on Drawers A, B, C

Plateau parameters are:
Starting volts: 700
Ending volts: 1650
Volts per step: 30
Count time per step: 5 min
Time between steps: .10 min

Count preset: 40,000
Weak count time: .10 min
Weak count limit: 10

Filenames: PT0128 A A (Data from this file not used) PTA0129C
~~PT0128 B~~ PTA0128B PTA0129A

Sources Used:	Det			
Am241 - 410	1	3	~~9~~	
411	2	4	~~10~~	
412	5	7	9	11
413	6	8	10	12
Sr90 - 406	3	1	~~11~~	
407	4	2	~~12~~	
408	7	5	11	9
409	8	6	12	10

Operating voltage:
Drawer A: ~~1447.5~~ 1447.5
Drawer B: 1447.5
Drawer C: 1447.5

1/30/04 Set ROI's on Drawers A, B, C

Source Used	Det		
Sr90/Y90 - 406	1	5	9
407	2	6	10
408	3	7	11
409	4	8	12

Continued on Page

Read and Understood By

Clau Lenich — Signed — 2/10/04 — Date
Leah Balko — Signed — 2/10/04 — Date

LB4100-A Raw Counts for Am-241 using Ringed Planchets, Efficiency Calibration (Control ID 1121)

Detector ID	A1 (01)	A2 (02)	A3 (03)	A4 (04)	B1 (05)	B2 (06)	B3 (07)	B4 (08)
total time	4.68	4.65	4.55	4.56	4.24	4.32	4.42	4.47
total counts	10006	10006	10012	10028	10016	10025	10006	10010
BKG counts	0.158	0.1	0.145	0.087	0.067	0.082	0.112	0.091
Alpha CPM	2137.8762	2151.72796	2200.29456	2199.03581	2362.1972	2320.5199	2263.6889	2239.283
Alpha Efficiency	**0.1940963**	**0.19535387**	**0.1997632**	**0.19964892**	**0.2144622**	**0.2106784**	**0.2055187**	**0.203303**
archived STDEV	0.0100855	0.01015081	0.01037982	0.01037356	0.0111435	0.0109467	0.010679	0.010564
Data file	EAM0203A	EAM0203A	EAM0203A	EAM0203A	EAM0203B	EAM0203B	EAM0203B	EAM0203B

Detector ID	C1 (09)	C2 (10)	C3 (11)	C4 (12)
total time	4.23	4.41	4.38	4.4
total counts	10018	10003	10012	10007
BKG counts	0.1	0.08	0.095	0.115
Alpha CPM	2368.2215	2268.17397	2285.74975	2274.20318
Alpha Efficiency	**0.2150092**	**0.20592593**	**0.20752162**	**0.20647332**
archived STDEV	0.0111719	0.01070019	0.01078293	0.01072857
Data file	EAM0203C	EAM0203C	EAM0203C	EAM0203C

000087

2/3/04 ~~Sr 89 calibration - Sr 89 on flat planchets~~
gr
~~Benchsheet: 240785a Source ID:~~ g 2/3/04

Gross Beta - Sr-90 Calibration - Sr90 on Ringed Planchets

Benchsheet: 240788a Source ID: 1120 Log file - Sr90R - 02/04

Source	Det	Filenames:
0317011 - 1	A1 B1 C1	EGB0203A
-2	A2 B2 C2	EGB0203B
-4	A3 B3 C3	EGB0203C
-5	A4 B4 C4	

g 2/3/04

Gross Alpha Am 241 Calib. - Am241 on Ringed Planchets

Benchsheet: 240787A Source ID: 1121 Log file - Am241R - 02/04

Source	Det	Filenames:
0317010 - 1	A1 B1 C1	EAM0203A
-2	A2 B2 C2	EAM0203B
-3	A3 B3 C3	EAM0203C
-5	A4 B4 C4	

Sr90 Calibration - Sr90 on Flat Planchets

Benchsheet: 240786a Source: 1122 Log file - Sr90F - 02/04

Sources:	Det	Filenames:
0317009 - 2	A1 B1 C1	ESR0203A
-3	A2 B2 C2	ESR0203B
-4	A3 B3 C3	ESR0203C
-5	A4 B4 C4	

Continued on Page

Read and Understood By

Clare Lenich 2/10/04 Leah Balho 2/10/04
Signed Date Signed Date

Source Database for OSUM for LB4100-A
Number of sources in table: 101

Application Revision: A

Control ID	Isotope	Type	Half-Life (Days)	DPM	Std dev	Date	Status	Alpha/Beta Archive File
1118	Am-241	Alpha	157856.78	2220.222	111.01	18-Mar-99	PAI	DAILY-02/04
1119	Ra-226	Alpha	584400	4207.96	210.40	9-Sep-91	PAI	Ra-226-02/04
1120	Sr-90/Y-90	Beta	10511.61	22065.912	1103.30	18-Mar-99	PAI	Sr90R-02/04
1121	Am-241	Alpha	157856.78	11101.11	555.06	18-Mar-99	PAI	Am241R-02/04
1122	Sr-90/Y-90	Beta	10511.61	2206.59	110.33	18-Mar-99	PAI	Sr90F-02/04
1123	Th-230	Alpha	27539096	1980.14	99.01	2-Jul-02	PAI	Th230-02/04

000083

pg 269522 a
(cont. from pg NA b)

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100A

SOP 724 Rev 8

Date: 2/3/04

Instrument Background and Response Checklist

P-10 Supply	P-10 Flow
1 650	A 0.1
2 600	B
	C
	D

Bkg.	Cal. File ID
Dr A	BKA0130 W
Dr B	
Dr C	
Dr D	NP

Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On line	Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On-line
1	SD		P		SD		P		✓	9	SD		P		SD		P		✓
2			R	*R-HαB			Hα		OLαB	10									✓
3			R	HB			P		αB	11									✓
4			R	HαB					OLαβ	12									✓
5									—	13	NP				NP				
6									✓	14									
7									—	15									
8									✓	16									

* Det. 2 needed 2 recounts due to Hα on 1st count and HB on 2nd count. SD 2/3/04

P = passes; R = Recount, H = high; L = low; W = weekly; α = Alpha; B = Beta; DR = Daily Response Check; Stat = Status; Det = Detector; Bkg = Background; OL = Offline; NP = Not Processed.

Runlog

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp .Init.	Outp. Date	Cmnt Below
1-12	DR checks	—	—	EFA0203	10	0606	SD	SD	2/3/04	NA
2-4	DR Recount	—	—	EFA0203A	10	0623	SD	✓	✓	
2	DR Recount	—	—	EFA0203B	10	0634	SD	✓	✓	
1-12	BKg Count	—	—	BKA05 0203	60	0655	SD		2/3/04	
1-4	0413047-S1,S3-S5	13047TRA.XLS	Ru226	ETRA203A	40	0919			2/3/04	
5-8				ETRA203B		0939				
9-12				ETRA203C		0955				
1-4	0317011-1,2,4,5	Sr 240788a	GB-Sr90Calib	EGB0203A	40	1115			2/3/04	
5-8				EGB0203B		1118				
9-12				EGB0203C		1120				
1-4	0317010-1,2,3,5	240787a	GA-Am241	EAM0203A	40	1128			2/3/04	
5-8				EAM0203B		1139				
9-12				EAM0203C		1140				
1-4	0317009-2-5	240786a	Sr90Plat Cal.	ESR0203A	40	1142			2/3/04	
5-8				ESR0203B		1156				
9-12				ESR0203C		1209				

Reviewed by _____ Date 2/4/04

Form 780r6.frm (4/6/2001)

Comments:

00009

G-L efficiency

Paragon Analytics, Inc.

240787 A

WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES

Matrix — Prep Analyst NT Prep Date 5/7/03 Analyte 241 Am Analytical Batch —

Pretreatment? (Y / N) Batch _____ Count Date / Time _____ Superseded _____

Paragon WO No.	Sample Wt. (g/L)	Sample Aliq. (g/L)	Aliquot Basis (Dry / AR)	Spike Information	Remarks	Det. No.	Filename	POS Ckd By
0317010-1				1				
-2								
-3								
-4							S4 = outlier; do not use.	
-5								DZB 8/1/03

NT 5/7/03

NT 5/7/03

NT 5/7/03

Balance No. NA Spiked By NT Date 5/7/03 Spike Witness [signature] Date 05/07/03 QASS? (Y / N) No. _____

	Isotope	No	Act / mL	Vol	Pi	Total Act (dpm)	Decay Corrected	~~Pipette~~ Pipet	Relinquished by / Date	Received by / Date
Spike 1	0	241 Am	512.1570.67	11101.1	1 ml	11,101.1		1200	CW 5/9/03	[signature] 5/9/03
Spike 2										
Spike 3								2		
Spike 4										

NT 5/7/03

NT 5/9/03

NT 5/7/03

Electronic Benchsheet No. (if / when generated) NA Reviewed by / Date CW 5/9/03

 Form 798r0.frm (5/12/2002)

000091

Paragon Analytics, Inc.

240787 B

WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES / ACTINIDES

Initials NT Date 5/7/03 Method (SOP / Rev) 702R16 Matrix —

COMMENTS

^{241}Am (Gross) Efficiency planchets

1) 5 unused planchets were labeled and placed on a hotplate
2) 5 ml concentrated HNO_3 was added to each sample
3) 1ml of ^{241}Am was added to each planchet
4) Samples were then taken to dryness and relinquished to the instrument lab for counting.

Reviewed by / Date CW 5/9/03

000092

Am-241 Primary Standard

1) Transfer RSO#512 (Analytics # 57372 ~~037~~ 307) to ~~3-23-99~~ 100 ml poly. bottle. DCB 3/23/99

a) Ampule, full w/ beaker 38.5221 g (Bal 12)
Ampule, empty w/ beaker 33.2720 g ★ see below
Net std. mass 5.2501 g

★ Note - a large piece of glass broke off of the ampule + fell into the 100 ml poly bottle. It was removed w/ a spatula + returned to the ampule prior to taking the empty weight. To confirm the amount transferred the 100 ml poly was weighed after transfer, as well as before:

100 ml poly, empty 14.6146 g (Bal. 12)
100 ml poly, w/ std. 19.8506 g
Net std. transferred 5.2360 g

To account for losses to the spatula this value will be used, although it confirms the previous calc to within 0.27%

b) Add 3N HNO_3 to 100 ml poly:

100 ml poly, empty 14.6146 g (Bal 12)
~~100 ml poly, w/ HNO_3 93.9 g (Bal 16)~~ DCB 3/23/99
100 ml poly w/ HNO_3 108.6 g (Bal 16)
Net std mass 93.9 g

c) Quantitatively transfer contents of 100 ml poly to 250 ml poly + dilute w/ HNO_3. (Initial error in choosing bottle size)

250 ml poly, empty 26.5 g (Bal 16)
250 ml poly, w/ std, HNO_3 255.8 g
TOT. Std. Mass. 229.3 g

In summary, 5.2360 g of neat standard was diluted to 229.3 g w/ 3M HNO_3.

SEE NEXT PAGE

Continued on Page 68

Read and Understood By

Signed	Date	Signed	Date
David C Burn	3/23/99	[signature] Maunsell	3/24/99

Am 241 Primary Standard

2) Density of 3M HNO_3; using 100ml class A vol. flask:

$$\frac{109.6568\ g}{100\ ml} = 1.0966\ g/ml$$

3) Calculations:

Act. conc. of neat std.

wrong calc!!

$$\left(\frac{36810\ dps}{5.03043\ g}\right)\left(\frac{60\ s/m}{2.22\ dpm/pCi}\right) = 197,769.3\ pCi/g$$

DCB

Act. conc. of final std.

$$\frac{(197,769.3\ pCi/g)(5.236\ g)}{(229.3\ g)} = 4516.0\ pCi/g$$

DCB 3/23/99

By volume:

$$\frac{4516.0\ pCi/g}{1.09}$$

Act. of neat std.

$$\left(\frac{40270\ dps}{5.45013\ g}\right)\left(\frac{60\ s/m}{2.22\ dpm/pCi}\right) = 199,697.7\ pCi/g$$

Act conc. of final std.

$$\frac{(199,697.7\ pCi/g)(5.236\ g)}{229.3\ g} = 4,560.0\ pCi/g$$

By Vol.

$$(4560\ pCi/g)(1.0966\ g/ml) = 5000.5\ pCi/ml$$

Ref Date = 3/18/99
Exp Date = 3/18/04

Verified 3/25/99 DCB

Continued on Page

Read and Understood By

Signed 3/23/99 Date Signed 3/24/99 Date

ANALYTICS

Atlanta, Georgia 30318 · U.S.A.
Phone (404) 352-8677
Fax (404) 352-2837

rec'd 3-22-99

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

Std ID: 512

57372-307

Am-241 5 mL Liquid in Flame Sealed Vial

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.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ISOTOPE:	Am-241
ACTIVITY (dps):	4.027 E+04
HALF-LIFE:	432.2 years
CALIBRATION DATE:	March 18, 1999 12:00 EST
TOTAL UNCERTAINTY:	3.5%
SYSTEMATIC:	2.5%
RANDOM:	1.0%

5.45013 grams of solution 3M HNO_3.

P O NUMBER 22190, Item 2

SOURCE PREPARED BY: M. D. Currie, Radiochemist

Q A APPROVED: 3-18-99

Code #: 512.1572.67 Name of Standard: Am 241 Primary Std.

Date: 3/25/99 Analyst: DCB/BP

Aliquot for verification: 3 ea - 1 ml on ringed planchet

Work up: See attached benchsheet

Expected activity and uncertainty: 5000.5 pCi/ml ± 175.0 pCi/ml

Results of Counting and counting uncertainty: 4986 ± 58.4 pCi/ml.
(= 99.72 % of expected)

Radiochemistry Technical Manager: [signature] Date: 3/25/99

Radiochemistry QA Manager: [signature] Date: 3/25/99

ATI FM 718FC
(2/27/9

Standard Verification for Am 241

Analyst:KH/BP
Prep. Date:S.3/24/99
Prep. Date;C3/24/99

Data Filename: WAT 0323A
Count Date/Time: 3/24/99

W.O.#	Sample #	Digest Aliquot ML	Final Gross PC (g)	Final Solid Mass (mg)	Filtered or Unfiltered	Remarks	CAR GRP	Pos Car No.	POS Ckd by
99-15-021	1	1	NA	NA	NA			1	LAD
99-15-021	2	1	NA	NA	NA			2	↓
99-15-021	3	1	NA	NA	NA			3	↓

Std. NO:	Std. type	Pipet No.	Vol. mL
512.1572.67	Am 241	RS-009	1.0043

Spike Witne BP 3/24/99
Reviewed b KH 3/24/99
Relinquishe KH 3/24/99
Received by: CM 3/24/99

PAI - Gross Alpha & Beta

Unit Type: LB4100/W
Counting Unit ID: Orange

Alpha efficiency logfile: AM241RNG
Alpha attenuation calibration: ATAM518R.XLD
Certainty level for MDA and flags: 95.00%
High Voltage Mode: Simultaneous

Beta Calibration Factors
Beta mM: 0.999056
polyn. a=>B xtalk A: 6.574E-06
polyn. a=>B xtalk B: -8.291E-04
polyn. a=>B xtalk C: 3.086E-01
Alpha mM 0.991587892
polyn. B=>a xtalk A: -2.353E-09
polyn. B=>a xtalk B: 3.880E-08
polyn. B=>a xtalk C: 7.064E-04

Beta efficiency logfile: SR90RJNG
Beta attenuation calibration: AT520SRY.XLD
Application Revision: C
Application Version: PAI

Offsets per QASS 151168
alpha B= 1.00000
beta B= 1.00000

Data file name: WAT0323a
Batch ID: 15021std, 15
Count Duration (m): 10
Batch Ended: ********
Activity Units: pCi
Date of Bkg. Cal: 3/19/99

Rev. 6/2/98 rb

Det. ID	Sample ID	Count End Date & Time	Count Duration (min)	Resid. Mass (mg)	Sample Volume (g / L)	Alpha Activity Gross CPM	Alpha Activity Activity Concentration	Alpha Activity 2σ	Alpha Activity MDC	Beta Activity Gross CPM	Beta Activity Activity Concentration	Beta Activity MDC	Alpha Calibrations bkg CPM	Alpha Calibrations effM	Alpha Calibrations b=>a x-tlk (fracL)	Beta Calibrations bkg CPM	Beta Calibrations effM	Beta Calibrations a=>b x-tlk (fracL)
C1	99-15-019-03	3/24/99 14:27	10.00	0.0	0.0010	6.900	-185.271	4037.160	7271.774	9786.200	9615332.110	3184.991	0.0930	0.25678	0.00071	1.9480	0.45630	0.30861
A1	99-15-021-01	3/24/99 14:27	10.00	0.0	0.0010	2794.000	4950611.388	58077.031	2910.358	974.400	109585.582	43421.997	0.1810	0.25306	0.00071	2.3400	0.44941	0.30861
A2	99-15-021-02	3/24/99 14:27	10.00	0.0	0.0010	2811.300	5024686.758	58765.180	2978.879	1037.900	167552.471	43428.023	0.1670	0.25087	0.00071	1.9640	0.45063	0.30861
A3	99-15-021-03	3/24/99 14:27	10.00	0.0	0.0010	2806.700	4982226.619	58315.123	2902.748	1001.000	132409.235	43492.575	0.1530	0.25259	0.00071	2.0880	0.44963	0.30861
B3	99-15-019-01	3/24/99 14:28	10.00	0.0	0.0010	5.200	-3032.660	3944.621	7553.667	9550.300	9686761.655	3089.243	0.1080	0.24469	0.00071	1.9530	0.44204	0.30861
B4	99-15-019-02	3/24/99 14:28	10.00	0.0	0.0010	4.400	-4548.044	3702.056	7356.203	9693.000	9623989.176	2900.815	0.1200	0.25318	0.00071	1.8890	0.45159	0.30861

Average Am Act.= 4.986E+06 pCi/l
Average Am Unc.= 5.839E+04 pCi/l (2 sigma)

Expected Am Act.= 5.000E+06

Relative Recovey= 99.72%

Average Sr/Y Act.= 9.642E+06 pCi/l
Average Sr/Y Unc.= 6.079E+04 pCi/l (2 sigma)

Expected Sr/Y Act.= 9.940E+06

Relative Recovey= 97.01%

000098

LB4100-A Raw Counts for Sr-90 using Ringed Planchets, Efficiency Calibration (Control ID 1120)

Detector ID	A1 (01)	A2 (02)	A3 (03)	A4 (04)	B1 (05)	B2 (06)	B3 (07)	B4 (08)
total time	1.31	1.34	1.27	1.29	1.22	1.23	1.24	1.28
total counts	10118	10032	10055	10053	10064	10076	10012	10043
BKG counts	2.341	2.057	2.097	1.792	1.792	1.618	1.945	1.786
Beta CPM	7721.32312	7484.51016	7915.22583	7791.0843	8247.3883	8190.2519	8072.2485	7844.308
Beta Efficiency	**0.39359051**	**0.38151909**	**0.4034746**	**0.3971465**	**0.4204065**	**0.417494**	**0.4114788**	**0.39986**
archived STDEV	0.0204476	0.01982355	0.02096344	0.0206347	0.0218427	0.0216909	0.021381	0.020776
Data file	EGB0203A	EGB0203A	EGB0203A	EGB0203A	EGB0203B	EGB0203B	EGB0203B	EGB0203B

Detector ID	C1 (09)	C2 (10)	C3 (11)	C4 (12)
total time	1.26	1.26	1.25	1.27
total counts	10090	10083	10063	10054
BKG counts	1.757	1.875	1.736	1.983
Beta CPM	8006.17951	8000.50595	8048.664	7914.5524
Beta Efficiency	**0.408111**	**0.4078218**	**0.41027663**	**0.4034404**
archived STDEV	0.02120291	0.02118818	0.02131647	0.0209617
Data file	EGB0203C	EGB0203C	EGB0203C	EGB0203C

000099

Source Database for OSUM for LB4100-A
Number of sources in table: 101

Application Revision: A

Control ID	Isotope	Type	Half-Life (Days)	DPM	Std dev	Date	Status	Alpha/Beta Archive File
1118	Am-241	Alpha	157856.78	2220.222	111.01	18-Mar-99	PAI	DAILY-02/04
1119	Ra-226	Alpha	584400	4207.96	210.40	9-Sep-91	PAI	Ra-226-02/04
1120	Sr-90/Y-90	Beta	10511.61	22065.912	1103.30	18-Mar-99	PAI	Sr90R-02/04
1121	Am-241	Alpha	157856.78	11101.11	555.06	18-Mar-99	PAI	Am241R-02/04
1122	Sr-90/Y-90	Beta	10511.61	2206.59	110.33	18-Mar-99	PAI	Sr90F-02/04
1123	Th-230	Alpha	27539096	1980.14	99.01	2-Jul-02	PAI	Th230-02/04

000100

2/3/04 ~~Sr 89 calibration - Sr 89 on flat planchets~~
cg
~~Benchsheet: 240785a Source ID:~~ g 2/3/04

Gross Beta - Sr-90 Calibration - Sr90 on Ringed Planchets

Benchsheet: 240788a Source ID: 1120 Log file - Sr90R - 02/04

Source	Det	Filenames:
0317011 - 1	A1 B1 C1	EGB0203A
-2	A2 B2 C2	EGB0203B
-4	A3 B3 C3	EGB0203C
-5	A4 B4 C4	

g 2/3/04

Gross Alpha Am 241 Calib. - Am241 on Ringed Planchets

Benchsheet: 240787A Source ID: 1121 Log file - Am241R - 02/04

Source	Det	Filenames:
0317010 - 1	A1 B1 C1	EAM0203A
-2	A2 B2 C2	EAM0203B
-3	A3 B3 C3	EAM0203C
-5	A4 B4 C4	

Sr90 Calibration - Sr90 on Flat Planchets

Benchsheet: 240786a Source: 1122 Log file - Sr90F - 02/04

Sources:	Det	Filenames:
0317009 - 2	A1 B1 C1	ESR0203A
-3	A2 B2 C2	ESR0203B
-4	A3 B3 C3	ESR0203C
-5	A4 B4 C4	

Continued on Page

Read and Understood By

Clare Lenich 2/10/04 Leah Balho 2/10/04
Signed Date Signed Date

pg 269522 a
(cont. from pg NA b)

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100A

SOP 724 Rev 8

Date: 2/3/04

Instrument Background and Response Checklist

P-10 Supply	P-10 Flow
1 650	A 0.1
2 600	B
	C
	D

Bkg.	Cal. File ID
Dr A	BKA0130 W
Dr B	
Dr C	
Dr D	NP

Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On line	Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On-line
1	SD		P		SD		P		✓	9	SD		P		SD		P		✓
2			R	*R-HαB			Hα		OLαB	10									✓
3			R	HB			P		αB	11									✓
4			R	HαB					αα/β	12									✓
5									✓	13	NP				NP				
6									✓	14									
7									✓	15									
8									✓	16									

* Det. 2 needed 2 recounts due to Hα on 1st count and HB on 2nd count. SD 2/3/04

P = passes; R = Recount, H = high; L = low; W = weekly; α = Alpha; B = Beta; DR = Daily Response Check; Stat = Status; Det = Detector; Bkg = Background; OL = Offline; NP = Not Processed.

Runlog

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp .Init.	Outp. Date	Cmnt Below
1-12	DR checks	—	—	EFA0203	10	0606	SD	SD	2/3/04	NA
2-4	DR Recount	—	—	EFA0203A	10	0623	SD	✓	✓	
2	DR Recount	—	—	EFA0203B	10	0634	SD	✓	✓	
1-12	Bkg Count	—	—	BKA05 0203	60	0655	SD		2/3/04	
1-4	0413047-S1, S3-S5	13047RA.XLS	Ru226	BTRA203A	40	0919			2/3/04	
5-8				BTRA203B		0939				
9-12				BTRA203C		0955				
1-4	0317011-1,2,4,5	Sr 240788a	GB-Sr90 Calib	EGB0203A	40	1115			2/3/04	
5-8				EGB0203B		1118				
9-12				EGB0203C		1120				
1-4	0317010-1,2,3,5	240787a	GA-Am241	EAM0203A	40	1128			2/3/04	
5-8				EAM0203B		1139				
9-12				EAM0203C		1140				
1-4	0317009-2-5	240786a	Sr90 Plat Cal.	ESR0203A	40	1192			2/3/04	
5-8				ESR0203B		1156				
9-12				ESR0203C		1209				

Form 780r6.frm (4/6/2001)

Reviewed by [signature] Date 2/4/04

Comments:

G-β efficiency

Paragon Analytics, Inc.

240788 A

WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES

Matrix — Prep Analyst NT Prep Date 5/7/03 Analyte ^{90}Sr Analytical Batch _____

Pretreatment? (Y / N) Batch _____ Count Date / Time _____ Superseded _____

Paragon WO No.	Sample Wt. (g / L)	Sample Aliq. (g / L)	Aliquot Basis (Dry / AR)	Spike Information	Remarks	Det. No.	Filename	POS Ckd By
0317011 - 1				1			~~SRB~~	
-2								
-3							3 = outlier; do not use.	
-4								
-5								

NT 5/7/03

NT 5/7/03

NT 5/7/03

Balance No. NA Spiked By NT Date 5/7/03 Spike Witness [signature] Date 05/07/03 QASS? (Y / N) No. _____

	Isotope	No	Act / mL	Vol	P	Total Act (dpm)	Decay Corrected	Pipet	Relinquished by / Date	Received by / Date
Spike 1	^{90}Sr	514,152.72	11032.956	1ml	1	11032.956		T-290	CW 5/9/03	[initials] 5/9/03
Spike 2										
Spike 3								2		
Spike 4										

NT 5/7/03

NT 5/9/03

Electronic Benchsheet No. (if / when generated) NA Reviewed by / Date CW 5/9/03

 Form 798r0.frm (5/12/2002)

000103

Paragon Analytics, Inc.

240788 B

WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES / ACTINIDES

Initials NT Date 5/7/03 Method (SOP / Rev) 702R16 Matrix ——

^{90}Sr (G-B) efficiency COMMENTS

1) 5 ringed planchets were labeled and placed on a hotplate.
2) 5ml concentrated HNO_3 was added to each sample planchet.
3) 1ml ~~95~~ NT 5/8/03 ^{90}Sr was added to each planchet.
4) Samples were then taken to dryness and relinquished to the instrument lab for counting.

Reviewed by / Date CW 5/9/03

000104

PROJECT 514.10 12.12

Continued From Page

Sr-90 Primary Standard

1) Transfer RSO#514 (Analytics 57370-307) to a a 250 ml poly bottle & dilute to final conc. of approx 5000 pCi/ml w/ 0.1 M HCl.

a) Ampule, full w/ beaker 36.5911 g (Bal 12)
Ampule, empty w/ beaker 31.7310
Net std transferred 4.8601 g

b) 250 ml poly, empty 26.4116 g (Bal 12)
bottle w/ std, 0.1 M HCl 223.6 g (Bal 16)
Total diluted std mass 197.2 g

2) Density of 0.1 M HCl using 100 ml class A flask.

99.7100 g / 100 ml = .9971 g/ml.

3) Calculations

orig. std. $\left(\frac{3.757E4 \text{ dpm}}{5.02081 \text{ g}}\right)\left(\frac{60 \text{ d/m}}{2.22 \text{ dpm/pCi}}\right) = 202,239.4$ pCi/g

dil. std by mass $\frac{(202,239.4 \text{ pCi/g})(4.8601 \text{ g})}{(197.2 \text{ g})} = 4984.3$ pCi/g

dil std by vol (4984.3 pCi/g)(.9971 g/ml) = 4969.8 pCi/ml.

Ref Date = 3/18/99 Verified 3/25/99 DCS
Exp Date = 3/23/04

Continued on Page

Read and Understood By

Signed 3/23/99 Date Signed 3/24/99 Date

ANALYTICS

Atlanta, Georgia 30318 · U.S.A.
Phone (404) 352-8677
Fax (404) 352-2837

rec'd 3-23-99

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

57370-307

Sr-90 5 mL Liquid in Flame Sealed Vial

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.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ISOTOPE:	Sr-90
ACTIVITY (dps):	3.757 E+04
HALF-LIFE:	28.74 years
CALIBRATION DATE:	March 18, 1999 12:00 EST
TOTAL UNCERTAINTY:	4.0%
SYSTEMATIC:	3.5%
RANDOM:	0.5%

5.02081 grams of solution 30 ppm Sr carrier in 0.1M HCl.

P O NUMBER 22170, Item 2

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

Q A APPROVED: _____ 3-18-99

Code #: 514.1572.72 Name of Standard: Sr 90 - Primary Std

Date: 3/24/99 Analyst: DCB / BP

Aliquot for verification: 3ea - 1ml std. on a ringed planchet

Work up: Std. converted to HNO_3 matrix in glass beaker + quantitatively transferred to planchet. See attached benchsheet.

Expected activity and uncertainty: 4969.8 ± 198.8 pCi/ml

Results of Counting and counting uncertainty: 4821 ± 60.8 pCi/ml
(= 97.01 % of expected value)

Radiochemistry Technical Manager: David C Burns Date: 3/25/99

Radiochemistry QA Manager: [signature] Date: 3/25/99

ATI FM 718F(
(2/27/

000107

Standard Verification for Sr-90

Analyst: KH
Prep. Date: 3/24/99
Prep. Date: 3/24/99

Data Filename: WAT0323A
Count Date/Time: 3/24/99

W.O.#	Sample #	Aliquot ML	Final Gross PC (g)	Final Solid Mass (mg)	Filtered or Unfiltered	Remarks	CAR GRP	Pos Car No.	POS Ckd by
99-15-019	1	1	NA	NA	NA			7	CM
99-15-019	2	1	NA	NA	NA			8	↓
99-15-019	3	1	NA	NA	NA			9	↓

Std. NO:	Std. type	Pipet Used	Vol. mL
514.1572.72	Sr-90	RS-009	1.0043

KH 3-30-99

Spike Witne BP 3/24/99
Reviewed b KH 3/24/99
Relinquishe KH 3/24/99
Received by: CM 3/24/99

3/24/99.....12:48 PM

R/BENCH-SH/15019STD.XLS

~~000107~~ 000108

PAI - Gross Alpha & Gross ...

Unit Type: LB4100/W
Counting Unit ID: Orange

Alpha efficiency logfile: AM241RNG
Alpha attenuation calibration: ATAM518R.XLD
Certainty level for MDA and flags: 95.00%
High Voltage Mode: Simultaneous

Beta Calibration Factors
Beta mM: 0.999056
polyn. a=>B xtalk A: 6.574E-06
polyn. a=>B xtalk B: -8.291E-04
polyn. a=>B xtalk C: 3.086E-01
Alpha mM 0.991587892
polyn. B=>a xtalk A: -2.353E-09
polyn. B=>a xtalk B: 3.880E-08
polyn. B=>a xtalk C: 7.064E-04

Beta efficiency logfile: SR90RING
Beta attenuation calibration: AT520SRY.XLD
Application Revision: C
Application Version: PAI

Offsets per QASS 151168
alpha B= 1.00000
beta B= 1.00000

Data file name: WAT0323a
Batch ID: 15021std, 15
Count Duration (m): 10
Batch Ended: ########
Activity Units: pCi
Date of Bkg. Cal: 3/19/99

Rev. 6/2/98 rts

Det. ID	Sample ID	Count End Date & Time	Count Duration (min)	Resid. Mass (mg)	Sample Volume (g / L)	Alpha Activity Gross CPM	Alpha Activity Activity Concentration	Alpha Activity 2σ	Alpha Activity MDC	Beta Activity Gross CPM	Beta Activity Activity Concentration	Beta Activity MDC	Alpha Calibrations bkg CPM	Alpha Calibrations effM	Alpha Calibrations b=>a x-tlk (fract.)	Beta Calibrations bkg CPM	Beta Calibrations effM	Beta Calibrations a=>b x-tlk (fract.)
C1	99-15-019-03	3/24/99 14:27	10.00	0.0	0.0010	6.900	-185.271	4037.160	7271.774	9786.200	9615332.110	3184.991	0.0930	0.25678	0.00071	1.9480	0.45630	0.30861
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A2	99-15-021-02	3/24/99 14:27	10.00	0.0	0.0010	2811.300	5024686.758	58765.180	2978.879	1037.900	167552.471	43428.023	0.1670	0.25087	0.00071	1.9640	0.45063	0.30861
A3	99-15-021-03	3/24/99 14:27	10.00	0.0	0.0010	2806.700	4982226.619	58315.123	2902.748	1001.000	132409.235	43492.575	0.1530	0.25259	0.00071	2.0880	0.44963	0.30861
B3	99-15-019-01	3/24/99 14:28	10.00	0.0	0.0010	5.200	-3032.660	3944.621	7553.667	9550.300	9686761.655	3089.243	0.1080	0.24469	0.00071	1.9530	0.44204	0.30861
B4	99-15-019-02	3/24/99 14:28	10.00	0.0	0.0010	4.400	-4548.044	3702.056	7356.203	9693.000	9623989.176	2900.815	0.1200	0.25318	0.00071	1.8890	0.45159	0.30861

Average Am Act.= 4.986E+06 pCi/l
Average Am Unc.= 5.839E+04 pCi/l (2 sigma)

Expected Am Act.= 5.000E+06

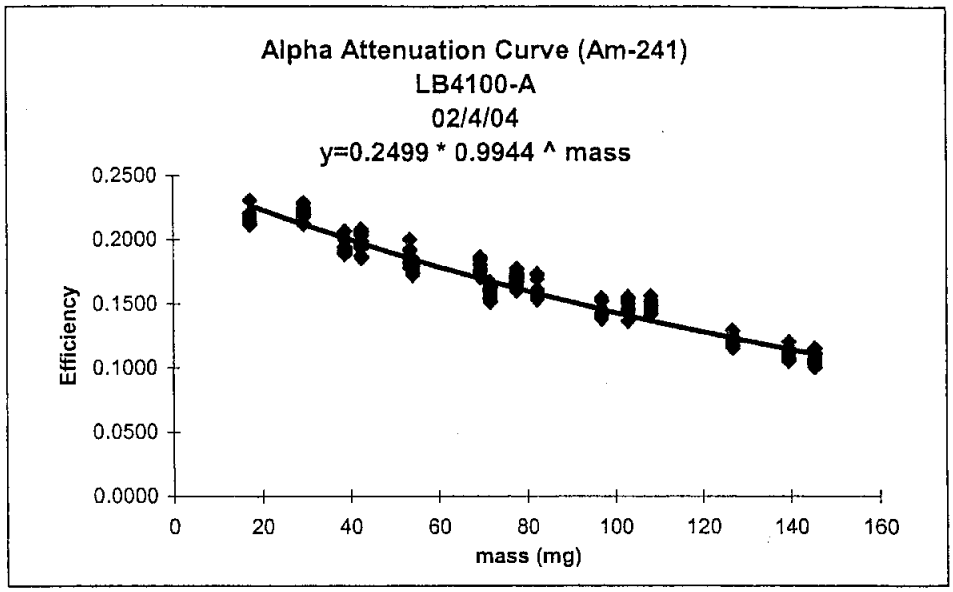
Relative Recovey= 99.72%

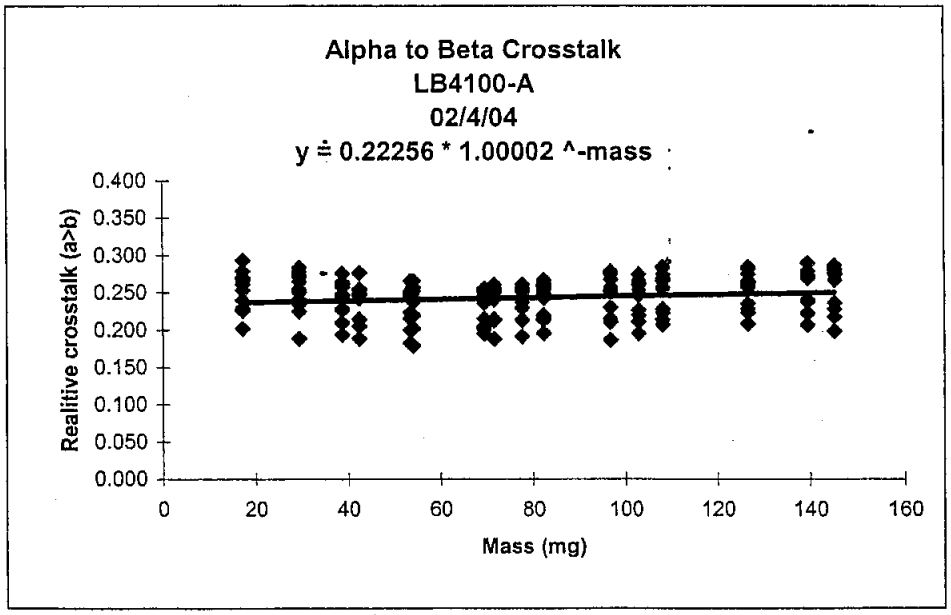
Average Sr/Y Act.= 9.642E+06 pCi/l
Average Sr/Y Unc.= 6.079E+04 pCi/l (2 sigma)

Expected Sr/Y Act.= 9.940E+06

Relative Recovey= 97.01%

000109


Alpha Attenuation Curve (Am-241)
LB4100-A
02/4/04
y=0.2499 * 0.9944 ^ mass
Efficiency
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
0
20
40
60
80
100
120
140
160
mass (mg)


Alpha to Beta Crosstalk
LB4100-A
02/4/04
y = 0.22256 * 1.00002 ^-mass
Realitive crosstalk (a>b)
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0
20
40
60
80
100
120
140
160
Mass (mg)

Paragon Analytics, Inc.

QUALITY ASSURANCE SUMMARY SHEET

PAI W.O. # / BATCH —

TEST Am241 Attenuation

263233

INST ~~METHOD~~ 664100A

SOP/REV (PREP) —

SOP/REV (ANAL) 724R8

Briefly document any QA or other problems or deviations associated with the analysis of samples. Problems could result from: log-in, color, odor, dilution, consistency, scheduling, equipment, or instrumentation, or may include documentation of minor deviations necessary due to unique DQO's or sample characteristics.

- The mass attenuation curve used for gross alpha/Am-241 analysis does not adequately intercept the zero mass calibration results to allow the use of the zero mass standards to be included in the calibration curve. 2/10/04
- Consequently, the mass attenuation curve is produced without the zero mass data points as described below.
- Client samples will only be analyzed if the residual planchet mass exceeds the minimum mass in the mass attenuation curve. While this is believed to be a result of using muffled planchets instead of detergent-washed planchets, the quality of the analytical data is not affected and the calibrations will be used without qualification. 2/10/04 2/10/04
- The normal mass-corrected efficiency is of the form $e*b*m^x$, where x is the residual mass on the planchet in mg and e is the individual zero-mass detector efficiency. The actual mass-corrected efficiency curve generated by this data, exclusive of the zero mass standards is $0.2499*0.9944^x$. The average zero mass efficiency is 0.2048.
- To facilitate the reporting of data with our current analytical software the mass attenuation correction used is $(0.2499/0.2048)*0.9944^x$ or $1.2202*0.9944^x$. This attenuation coefficient is relative to each detectors individual zero mass counting efficiency, so the final mass-corrected counting efficiency for an individual detector becomes $e*1.2202*0.9944^x$. This is the equation used in the analytical process.

r:\inst\gfp\am241mac.doc 2/10/04

TECHNICIAN/ANALYST [signature] DATE 2/10/04

DEPARTMENT MANAGER [signature] DATE 2/10/04

FORM 302r5.FRM (04/30/01)

Paragon Analytics, Inc.

QUALITY ASSURANCE SUMMARY SHEET

263236

PAI W.O. # / BATCH Mass Attn. Curve
TEST —
METHOD —
SOP/REV (PREP) —
SOP/REV (ANAL) 724R8

Briefly document any QA or other problems or deviations associated with the analysis of samples. Problems could result from: log-in, color, odor, dilution, consistency, scheduling, equipment, or instrumentation, or may include documentation of minor deviations necessary due to unique DQO's or sample characteristics.

Current requirements per SOP 724 state that for mass attenuation curves, that the fitted value be within 10% of the observed value for each point on the curve. In some instances, this is not achievable while maintaining enough data points to establish a curve. In these cases, the curve was fitted to be within 15% of the observed values. Data quality is not significantly affected.

2/17/04

TECHNICIAN/ANALYST Clare Lenich DATE 2/17/04

DEPARTMENT MANAGER [signature] DATE 2/17/04

FORM 302r5.FRM (04/30/01)

Alpha Attenuation Calibration Worksheet - LB4100 A

	Am-241	Am-241
Standard ID	541.1808.26	512.1572.67
Cert Act (pCi/ml)	24905.6	5000.5
To	2/3/00	3/18/99

*y=b*m^ax*

b	*0.2499*
m	*0.9944*
a	*1*

min rel dev*	-10.2%
max rel dev*	12.9%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
aam0204	A1	3	10021	4.29	2/4/04 4:12 PM	2335.90	24905.6	0.2	10987.3	0.2126	0.1941	17.2	0.2126	0.226891	-0.0143	-6.72%
aam0204	A2	3	10025	4.24	2/4/04 4:35 PM	2364.39	24905.6	0.2	10987.3	0.2152	0.1954	17.2	0.2152	0.226891	-0.0117	-5.44%
aam0204	A3	3	10022	4.3	2/4/04 11:20 AM	2330.70	24905.6	0.2	10987.3	0.2121	0.1998	17.2	0.2121	0.226891	-0.0148	-6.96%
aam0204	A4	3	10008	4.25	2/4/04 11:35 AM	2354.82	24905.6	0.2	10987.3	0.2143	0.1996	17.2	0.2143	0.226891	-0.0126	-5.86%
aam0204	B1	3	10019	3.95	2/4/04 11:49 AM	2536.46	24905.6	0.2	10987.3	0.2309	0.2145	17.2	0.2309	0.226891	0.0040	1.72%
aam0204	B2	3	10028	4.18	2/4/04 12:03 PM	2399.04	24905.6	0.2	10987.3	0.2183	0.2107	17.2	0.2183	0.226891	-0.0085	-3.91%
aam0204	B3	3	10016	4.18	2/4/04 12:15 PM	2396.17	24905.6	0.2	10987.3	0.2181	0.2055	17.2	0.2181	0.226891	-0.0088	-4.04%
aam0204	B4	3	10037	4.15	2/4/04 12:30 PM	2418.55	24905.6	0.2	10987.3	0.2201	0.2033	17.2	0.2201	0.226891	-0.0068	-3.07%
aam0204	C1	3	10013	3.95	2/4/04 12:47 PM	2534.94	24905.6	0.2	10987.3	0.2307	0.2150	17.2	0.2307	0.226891	0.0038	1.66%
aam0204	C2	3	10003	4.12	2/4/04 12:58 PM	2427.91	24905.6	0.2	10987.3	0.2210	0.2059	17.2	0.2210	0.226891	-0.0059	-2.68%
aam0204	C3	3	10008	4.14	2/4/04 1:27 PM	2417.39	24905.6	0.2	10987.3	0.2200	0.2075	17.2	0.2200	0.226891	-0.0069	-3.12%
aam0204	C4	3	10017	4.19	2/4/04 1:37 PM	2390.69	24905.6	0.2	10987.3	0.2176	0.2065	17.2	0.2176	0.226891	-0.0093	-4.28%
aam0204	A1	6	10030	4.3	2/4/04 3:09 PM	2332.56	24905.6	0.2	10987.3	0.2123	0.1941	29.4	0.2123	0.211867	0.0004	0.20%
aam0204	A2	6	10023	4.29	2/4/04 3:26 PM	2336.36	24905.6	0.2	10987.3	0.2126	0.1954	29.4	0.2126	0.211867	0.0008	0.36%
aam0204	A3	6	10008	4.19	2/4/04 3:44 PM	2388.54	24905.6	0.2	10987.3	0.2174	0.1998	29.4	0.2174	0.211867	0.0055	2.54%
aam0204	A4	6	10012	4.17	2/4/04 4:12 PM	2400.96	24905.6	0.2	10987.3	0.2185	0.1996	29.4	0.2185	0.211867	0.0067	3.05%
aam0204	B1	6	10006	3.98	2/4/04 4:35 PM	2514.07	24905.6	0.2	10987.3	0.2288	0.2145	29.4	0.2288	0.211867	0.0169	7.41%
aam0204	B2	6	10026	4.15	2/4/04 11:20 AM	2415.90	24905.6	0.2	10987.3	0.2199	0.2107	29.4	0.2199	0.211867	0.0080	3.64%
aam0204	B3	6	10010	4.17	2/4/04 11:35 AM	2400.48	24905.6	0.2	10987.3	0.2185	0.2055	29.4	0.2185	0.211867	0.0066	3.03%
aam0204	B4	6	10013	4.11	2/4/04 11:50 AM	2436.25	24905.6	0.2	10987.3	0.2217	0.2033	29.4	0.2217	0.211867	0.0099	4.45%
aam0204	C1	6	10006	3.99	2/4/04 12:03 PM	2507.77	24905.6	0.2	10987.3	0.2282	0.2150	29.4	0.2282	0.211867	0.0164	7.17%
aam0204	C2	6	10025	4.05	2/4/04 12:15 PM	2475.31	24905.6	0.2	10987.3	0.2253	0.2059	29.4	0.2253	0.211867	0.0134	5.96%
aam0204	C3	6	10023	4.16	2/4/04 12:30	2409.38	24905.6	0.2	10987.3	0.2193	0.2075	29.4	0.2193	0.211867	0.0074	3.38%
aam0204	C4	6	10023	4.09	2/4/04 12:47 PM	2450.61	24905.6	0.2	10987.3	0.2230	0.2065	29.4	0.2230	0.211867	0.0112	5.01%
aam0204	A1	7	10013	4.91	2/4/04 2:55 PM	2039.31	24905.6	0.2	10987.3	0.1856	0.1941	42.4	0.1856	0.196951	-0.0113	-6.11%
aam0204	A2	7	10013	4.65	2/4/04 3:10 PM	2153.33	24905.6	0.2	10987.3	0.1960	0.1954	42.4	0.1960	0.196951	-0.0010	-0.49%
aam0204	A3	7	10021	4.86	2/4/04 3:27 PM	2061.93	24905.6	0.2	10987.3	0.1877	0.1998	42.4	0.1877	0.196951	-0.0093	-4.95%
aam0204	A4	7	10012	4.71	2/4/04 3:44 PM	2125.69	24905.6	0.2	10987.3	0.1935	0.1996	42.4	0.1935	0.196951	-0.0035	-1.80%
aam0204	B1	7	10023	4.41	2/4/04 4:12 PM	2272.79	24905.6	0.2	10987.3	0.2069	0.2145	42.4	0.2069	0.196951	0.0099	4.79%
aam0204	B2	7	10017	4.48	2/4/04 4:36 PM	2235.94	24905.6	0.2	10987.3	0.2035	0.2107	42.4	0.2035	0.196951	0.0066	3.22%
aam0204	B3	7	10005	4.57	2/4/04 11:20 AM	2189.28	24905.6	0.2	10987.3	0.1993	0.2055	42.4	0.1993	0.196951	0.0023	1.16%
aam0204	B4	7	10020	4.58	2/4/04 11:36 AM	2187.77	24905.6	0.2	10987.3	0.1991	0.2033	42.4	0.1991	0.196951	0.0022	1.09%
aam0204	C1	7	10010	4.37	2/4/04 11:50 AM	2290.62	24905.6	0.2	10987.3	0.2085	0.2150	42.4	0.2085	0.196951	0.0115	5.53%
aam0204	C2	7	10025	4.46	2/4/04 12:04 PM	2247.76	24905.6	0.2	10987.3	0.2046	0.2059	42.4	0.2046	0.196951	0.0076	3.73%
aam0204	C3	7	10003	4.64	2/4/04 12:16	2155.82	24905.6	0.2	10987.3	0.1962	0.2075	42.4	0.1962	0.196951	-0.0007	-0.38%
aam0204	C4	7	10006	4.67	2/4/04 12:30 PM	2142.61	24905.6	0.2	10987.3	0.1950	0.2065	42.4	0.1950	0.196951	-0.0019	-1.00%
aam0204	A1	8	10013	4.83	2/4/04 2:45 PM	2073.08	24905.6	0.2	10987.3	0.1887	0.1941	38.7	0.1887	0.201086	-0.0124	-6.57%
aam0204	A2	8	10021	4.7	2/4/04 2:55 PM	2132.13	24905.6	0.2	10987.3	0.1941	0.1954	38.7	0.1941	0.201086	-0.0070	-3.62%

Alpha Attenuation Calibration Worksheet - LB4100 A

	Am-241	Am-241		
Standard ID	541.1808.26	512.1572.67		
Cert Act (pCi/ml)	24905.6	5000.5		
To	2/3/00	3/18/99		

y=b*m^ax

b	0.2499
m	0.9944
a	1
min rel dev*	-10.2%
max rel dev*	12.9%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
aam0204	A3	8	10013	4.75	2/4/04 3:10 PM	2108.00	24905.6	0.2	10987.3	0.1919	0.1998	38.7	0.1919	0.201086	-0.0092	-4.81%
aam0204	A4	8	10017	4.79	2/4/04 3:27 PM	2091.23	24905.6	0.2	10987.3	0.1903	0.1996	38.7	0.1903	0.201086	-0.0108	-5.65%
aam0204	B1	8	10014	4.54	2/4/04 3:44 PM	2205.73	24905.6	0.2	10987.3	0.2008	0.2145	38.7	0.2008	0.201086	-0.0003	-0.17%
aam0204	B2	8	10021	4.7	2/4/04 4:12 PM	2132.13	24905.6	0.2	10987.3	0.1941	0.2107	38.7	0.1941	0.201086	-0.0070	-3.62%
aam0204	B3	8	10006	4.68	2/4/04 4:36 PM	2138.03	24905.6	0.2	10987.3	0.1946	0.2055	38.7	0.1946	0.201086	-0.0065	-3.34%
aam0204	B4	8	10022	4.8	2/4/04 11:20 AM	2087.92	24905.6	0.2	10987.3	0.1900	0.2033	38.7	0.1900	0.201086	-0.0111	-5.82%
aam0204	C1	8	10015	4.41	2/4/04 11:35 AM	2270.98	24905.6	0.2	10987.3	0.2067	0.2150	38.7	0.2067	0.201086	0.0056	2.71%
aam0204	C2	8	10019	4.56	2/4/04 11:50 AM	2197.15	24905.6	0.2	10987.3	0.2000	0.2059	38.7	0.2000	0.201086	-0.0011	-0.56%
aam0204	C3	8	10010	4.73	2/4/04 12:04	2116.28	24905.6	0.2	10987.3	0.1926	0.2075	38.7	0.1926	0.201086	-0.0085	-4.40%
aam0204	C4	8	10005	4.75	2/4/04 12:16 PM	2106.32	24905.6	0.2	10987.3	0.1917	0.2065	38.7	0.1917	0.201086	-0.0094	-4.89%
aam0204	A1	9	10022	5.02	2/4/04 2:21 PM	1996.41	24905.6	0.2	10987.3	0.1817	0.1941	53.4	0.1817	0.185153	-0.0035	-1.90%
aam0204	A2	9	10008	4.91	2/4/04 2:45 PM	2038.29	24905.6	0.2	10987.3	0.1855	0.1954	53.4	0.1855	0.185153	0.0004	0.19%
aam0204	A3	9	10005	5.01	2/4/04 2:55 PM	1997.01	24905.6	0.2	10987.3	0.1818	0.1998	53.4	0.1818	0.185153	-0.0034	-1.87%
aam0204	A4	9	10017	5.11	2/4/04 3:10 PM	1960.27	24905.6	0.2	10987.3	0.1784	0.1996	53.4	0.1784	0.185153	-0.0067	-3.78%
aam0204	B1	9	10006	4.72	2/4/04 3:27 PM	2119.92	24905.6	0.2	10987.3	0.1929	0.2145	53.4	0.1929	0.185153	0.0078	4.04%
aam0204	B2	9	10023	4.86	2/4/04 3:44 PM	2062.35	24905.6	0.2	10987.3	0.1877	0.2107	53.4	0.1877	0.185153	0.0026	1.36%
aam0204	B3	9	10025	4.89	2/4/04 4:13 PM	2050.10	24905.6	0.2	10987.3	0.1866	0.2055	53.4	0.1866	0.185153	0.0014	0.77%
aam0204	B4	9	10003	4.97	2/4/04 4:36 PM	2012.68	24905.6	0.2	10987.3	0.1832	0.2033	53.4	0.1832	0.185153	-0.0020	-1.08%
aam0204	C1	9	10004	4.54	2/4/04 11:20 AM	2203.52	24905.6	0.2	10987.3	0.2006	0.2150	53.4	0.2006	0.185153	0.0154	7.68%
aam0204	C2	9	10006	4.75	2/4/04 11:36 AM	2106.53	24905.6	0.2	10987.3	0.1917	0.2059	53.4	0.1917	0.185153	0.0066	3.43%
aam0204	C3	9	10024	4.87	2/4/04 11:50	2058.32	24905.6	0.2	10987.3	0.1873	0.2075	53.4	0.1873	0.185153	0.0022	1.17%
aam0204	C4	9	9999	4.98	2/4/04 12:04 PM	2007.83	24905.6	0.2	10987.3	0.1827	0.2065	53.4	0.1827	0.185153	-0.0024	-1.32%
aam0204	A1	10	10019	5.28	2/4/04 2:10 PM	1897.54	24905.6	0.2	10987.3	0.1727	0.1941	54	0.1727	0.18453	-0.0118	-6.85%
aam0204	A2	10	10008	5.18	2/4/04 2:21 PM	1932.05	24905.6	0.2	10987.3	0.1758	0.1954	54	0.1758	0.18453	-0.0087	-4.94%
aam0204	A3	10	10015	5.26	2/4/04 2:45 PM	1903.99	24905.6	0.2	10987.3	0.1733	0.1998	54	0.1733	0.18453	-0.0112	-6.49%
aam0204	A4	10	10010	5.21	2/4/04 2:56 PM	1921.31	24905.6	0.2	10987.3	0.1749	0.1996	54	0.1749	0.18453	-0.0097	-5.53%
aam0204	B1	10	10015	4.92	2/4/04 3:10 PM	2035.57	24905.6	0.2	10987.3	0.1853	0.2145	54	0.1853	0.18453	0.0007	0.40%
aam0204	B2	10	10010	5.12	2/4/04 3:27 PM	1955.08	24905.6	0.2	10987.3	0.1779	0.2107	54	0.1779	0.18453	-0.0066	-3.70%
aam0204	B3	10	10002	5.07	2/4/04 3:45 PM	1972.78	24905.6	0.2	10987.3	0.1796	0.2055	54	0.1796	0.18453	-0.0050	-2.77%
aam0204	B4	10	10016	5.22	2/4/04 4:13 PM	1918.77	24905.6	0.2	10987.3	0.1746	0.2033	54	0.1746	0.18453	-0.0099	-5.67%
aam0204	C1	10	10000	5.01	2/4/04 4:36 PM	1996.01	24905.6	0.2	10987.3	0.1817	0.2150	54	0.1817	0.18453	-0.0029	-1.58%
aam0204	C2	10	10014	4.91	2/4/04 11:21 AM	2039.51	24905.6	0.2	10987.3	0.1856	0.2059	54	0.1856	0.18453	0.0011	0.59%
aam0204	C3	10	10001	5.09	2/4/04 11:36	1964.83	24905.6	0.2	10987.3	0.1788	0.2075	54	0.1788	0.18453	-0.0057	-3.19%
aam0204	C4	10	10027	5.09	2/4/04 11:51 AM	1969.94	24905.6	0.2	10987.3	0.1793	0.2065	54	0.1793	0.18453	-0.0052	-2.92%
aam0204	A1	11	10003	5.33	2/4/04 1:59 PM	1876.74	24905.6	0.2	10987.3	0.1708	0.1941	69.4	0.1708	0.169242	0.0016	0.92%
aam0204	A2	11	10000	5.3	2/4/04 2:10 PM	1886.79	24905.6	0.2	10987.3	0.1717	0.1954	69.4	0.1717	0.169242	0.0025	1.45%
aam0204	A3	11	10006	5.31	2/4/04 2:21 PM	1884.37	24905.6	0.2	10987.3	0.1715	0.1998	69.4	0.1715	0.169242	0.0023	1.32%
aam0204	A4	11	10015	5.3	2/4/04 2:45 PM	1889.62	24905.6	0.2	10987.3	0.1720	0.1996	69.4	0.1720	0.169242	0.0027	1.59%

000114

Alpha Attenuation Calibration Worksheet - LB4100 A

	Am-241	Am-241
Standard ID	541.1808.26	512.1572.67
Cert Act (pCi/ml)	24905.6	5000.5
To	2/3/00	3/18/99

*y=b*m^ax*

b	*0.2499*
m	*0.9944*
a	*1*

min rel dev*	-10.2%
max rel dev*	12.9%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
aam0204	B1	11	10001	4.93	2/4/04 2:55 PM	2028.60	24905.6	0.2	10987.3	0.1846	0.2145	69.4	0.1846	0.169242	0.0154	8.34%
aam0204	B2	11	10014	5.05	2/4/04 3:10 PM	1982.97	24905.6	0.2	10987.3	0.1805	0.2107	69.4	0.1805	0.169242	0.0112	6.23%
aam0204	B3	11	10010	5.15	2/4/04 3:27 PM	1943.69	24905.6	0.2	10987.3	0.1769	0.2055	69.4	0.1769	0.169242	0.0077	4.33%
aam0204	B4	11	10010	5.17	2/4/04 3:45 PM	1936.17	24905.6	0.2	10987.3	0.1762	0.2033	69.4	0.1762	0.169242	0.0070	3.96%
aam0204	C1	11	10024	4.89	2/4/04 4:13 PM	2049.90	24905.6	0.2	10987.3	0.1866	0.2150	69.4	0.1866	0.169242	0.0173	9.29%
aam0204	C2	11	10002	5.03	2/4/04 4:36 PM	1988.47	24905.6	0.2	10987.3	0.1810	0.2059	69.4	0.1810	0.169242	0.0117	6.49%
aam0204	C3	11	10007	5.19	2/4/04 11:21	1928.13	24905.6	0.2	10987.3	0.1755	0.2075	69.4	0.1755	0.169242	0.0062	3.56%
aam0204	C4	11	9999	5.2	2/4/04 11:36 AM	1922.88	24905.6	0.2	10987.3	0.1750	0.2065	69.4	0.1750	0.169242	0.0058	3.30%
aam0204	A1	12	10018	5.91	2/4/04 1:39 PM	1695.09	24905.6	0.2	10987.3	0.1543	0.1941	71.6	0.1543	0.167164	-0.0129	-8.35%
aam0204	A2	12	10015	5.92	2/4/04 2:00 PM	1691.72	24905.6	0.2	10987.3	0.1540	0.1954	71.6	0.1540	0.167164	-0.0132	-8.57%
aam0204	A3	12	10002	6	2/4/04 2:10 PM	1667.00	24905.6	0.2	10987.3	0.1517	0.1998	71.6	0.1517	0.167164	-0.0154	-10.18%
aam0204	A4	12	10020	5.69	2/4/04 2:22 PM	1760.98	24905.6	0.2	10987.3	0.1603	0.1996	71.6	0.1603	0.167164	-0.0069	-4.30%
aam0204	B1	12	10009	5.52	2/4/04 2:45 PM	1813.22	24905.6	0.2	10987.3	0.1650	0.2145	71.6	0.1650	0.167164	-0.0021	-1.29%
aam0204	B2	12	10000	5.52	2/4/04 2:56 PM	1811.59	24905.6	0.2	10987.3	0.1649	0.2107	71.6	0.1649	0.167164	-0.0023	-1.38%
aam0204	B3	12	10005	5.62	2/4/04 3:11 PM	1780.25	24905.6	0.2	10987.3	0.1620	0.2055	71.6	0.1620	0.167164	-0.0051	-3.17%
aam0204	B4	12	10008	5.76	2/4/04 3:28 PM	1737.50	24905.6	0.2	10987.3	0.1581	0.2033	71.6	0.1581	0.167164	-0.0090	-5.71%
aam0204	C1	12	10007	5.44	2/4/04 3:45 PM	1839.52	24905.6	0.2	10987.3	0.1674	0.2150	71.6	0.1674	0.167164	0.0003	0.15%
aam0204	C2	12	10011	5.55	2/4/04 4:13 PM	1803.78	24905.6	0.2	10987.3	0.1642	0.2059	71.6	0.1642	0.167164	-0.0030	-1.82%
aam0204	C3	12	10018	5.86	2/4/04 16:37	1709.56	24905.6	0.2	10987.3	0.1556	0.2075	71.6	0.1556	0.167164	-0.0116	-7.44%
aam0204	C4	12	10007	5.77	2/4/04 11:21 AM	1734.32	24905.6	0.2	10987.3	0.1578	0.2065	71.6	0.1578	0.167164	-0.0093	-5.90%
aam0204	A1	13	10022	5.32	2/4/04 1:30 PM	1883.83	24905.6	0.2	10987.3	0.1715	0.1941	77.6	0.1715	0.161625	0.0098	5.73%
aam0204	A2	13	10013	5.54	2/4/04 1:39 PM	1807.40	24905.6	0.2	10987.3	0.1645	0.1954	77.6	0.1645	0.161625	0.0029	1.75%
aam0204	A3	13	10008	5.61	2/4/04 2:00 PM	1783.96	24905.6	0.2	10987.3	0.1624	0.1998	77.6	0.1624	0.161625	0.0007	0.46%
aam0204	A4	13	10015	5.69	2/4/04 2:10 PM	1760.11	24905.6	0.2	10987.3	0.1602	0.1996	77.6	0.1602	0.161625	-0.0014	-0.89%
aam0204	B1	13	10011	5.23	2/4/04 2:21 PM	1914.15	24905.6	0.2	10987.3	0.1742	0.2145	77.6	0.1742	0.161625	0.0126	7.23%
aam0204	B2	13	10024	5.27	2/4/04 2:45 PM	1902.09	24905.6	0.2	10987.3	0.1731	0.2107	77.6	0.1731	0.161625	0.0115	6.64%
aam0204	B3	13	10014	5.45	2/4/04 2:56 PM	1837.43	24905.6	0.2	10987.3	0.1672	0.2055	77.6	0.1672	0.161625	0.0056	3.35%
aam0204	B4	13	10012	5.45	2/4/04 3:10 PM	1837.06	24905.6	0.2	10987.3	0.1672	0.2033	77.6	0.1672	0.161625	0.0056	3.33%
aam0204	C1	13	10021	5.14	2/4/04 3:27 PM	1949.61	24905.6	0.2	10987.3	0.1774	0.2150	77.6	0.1774	0.161625	0.0158	8.91%
aam0204	C2	13	10003	5.37	2/4/04 3:45 PM	1862.76	24905.6	0.2	10987.3	0.1695	0.2059	77.6	0.1695	0.161625	0.0079	4.67%
aam0204	C3	13	10011	5.44	2/4/04 16:13	1840.26	24905.6	0.2	10987.3	0.1675	0.2075	77.6	0.1675	0.161625	0.0059	3.50%
aam0204	C4	13	10018	5.48	2/4/04 4:37 PM	1828.10	24905.6	0.2	10987.3	0.1664	0.2065	77.6	0.1664	0.161625	0.0048	2.86%
aam0204	A1	14	10017	5.94	2/4/04 12:59 PM	1686.36	24905.6	0.2	10987.3	0.1535	0.1941	82.3	0.1535	0.157415	-0.0039	-2.56%
aam0204	A2	14	10008	5.24	2/4/04 1:30 PM	1909.92	24905.6	0.2	10987.3	0.1738	0.1954	82.3	0.1738	0.157415	0.0164	9.44%
aam0204	A3	14	10019	5.86	2/4/04 1:39 PM	1709.73	24905.6	0.2	10987.3	0.1556	0.1998	82.3	0.1556	0.157415	-0.0018	-1.16%
aam0204	A4	14	10017	5.71	2/4/04 2:00 PM	1754.29	24905.6	0.2	10987.3	0.1597	0.1996	82.3	0.1597	0.157415	0.0023	1.41%
aam0204	B1	14	10025	5.39	2/4/04 2:10 PM	1859.93	24905.6	0.2	10987.3	0.1693	0.2145	82.3	0.1693	0.157415	0.0119	7.01%
aam0204	B2	14	10013	5.68	2/4/04 2:22 PM	1762.85	24905.6	0.2	10987.3	0.1604	0.2107	82.3	0.1604	0.157415	0.0030	1.89%

000115

Alpha Attenuation Calibration Worksheet - LB4100 A

	Am-241	Am-241
Standard ID	541.1808.26	512.1572.67
Cert Act (pCi/ml)	24905.6	5000.5
To	2/3/00	3/18/99

*y=b*m^ax*

b	*0.2499*
m	*0.9944*
a	*1*

min rel dev*	-10.2%
max rel dev*	12.9%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
aam0204	B3	14	10005	5.64	2/4/04 2:45 PM	1773.94	24905.6	0.2	10987.3	0.1615	0.2055	82.3	0.1615	0.157415	0.0040	2.50%
aam0204	B4	14	10014	5.72	2/4/04 2:56 PM	1750.70	24905.6	0.2	10987.3	0.1593	0.2033	82.3	0.1593	0.157415	0.0019	1.21%
aam0204	C1	14	10012	5.28	2/4/04 3:10 PM	1896.21	24905.6	0.2	10987.3	0.1726	0.2150	82.3	0.1726	0.157415	0.0152	8.79%
aam0204	C2	14	10011	5.65	2/4/04 3:28 PM	1771.86	24905.6	0.2	10987.3	0.1613	0.2059	82.3	0.1613	0.157415	0.0038	2.39%
aam0204	C3	14	10004	5.69	2/4/04 15:45	1758.17	24905.6	0.2	10987.3	0.1600	0.2075	82.3	0.1600	0.157415	0.0026	1.63%
aam0204	C4	14	10021	5.75	2/4/04 4:13 PM	1742.78	24905.6	0.2	10987.3	0.1586	0.2065	82.3	0.1586	0.157415	0.0012	0.76%
aam0204	A1	15	10004	6.66	2/4/04 12:50 PM	1502.10	24905.6	0.2	10987.3	0.1367	0.1941	102.9	0.1367	0.140218	-0.0035	-2.56%
aam0204	A2	15	10017	6.38	2/4/04 1:00 PM	1570.06	24905.6	0.2	10987.3	0.1429	0.1954	102.9	0.1429	0.140218	0.0027	1.88%
aam0204	A3	15	9999	5.9	2/4/04 1:31 PM	1694.75	24905.6	0.2	10987.3	0.1542	0.1998	102.9	0.1542	0.140218	0.0140	9.09%
aam0204	A4	15	10015	6.21	2/4/04 1:39 PM	1612.72	24905.6	0.2	10987.3	0.1468	0.1996	102.9	0.1468	0.140218	0.0066	4.47%
aam0204	B1	15	10007	6.07	2/4/04 2:00 PM	1648.60	24905.6	0.2	10987.3	0.1500	0.2145	102.9	0.1500	0.140218	0.0098	6.55%
aam0204	B2	15	10013	6.04	2/4/04 2:10 PM	1657.78	24905.6	0.2	10987.3	0.1509	0.2107	102.9	0.1509	0.140218	0.0107	7.07%
aam0204	B3	15	10005	6.24	2/4/04 2:22 PM	1603.37	24905.6	0.2	10987.3	0.1459	0.2055	102.9	0.1459	0.140218	0.0057	3.91%
aam0204	B4	15	10006	6.29	2/4/04 2:46 PM	1590.78	24905.6	0.2	10987.3	0.1448	0.2033	102.9	0.1448	0.140218	0.0046	3.15%
aam0204	C1	15	10018	5.86	2/4/04 2:56 PM	1709.56	24905.6	0.2	10987.3	0.1556	0.2150	102.9	0.1556	0.140218	0.0154	9.88%
aam0204	C2	15	10002	5.96	2/4/04 3:11 PM	1678.19	24905.6	0.2	10987.3	0.1527	0.2059	102.9	0.1527	0.140218	0.0125	8.20%
aam0204	C3	15	10015	6.31	2/4/04 15:28	1587.16	24905.6	0.2	10987.3	0.1445	0.2075	102.9	0.1445	0.140218	0.0042	2.93%
aam0204	C4	15	10013	6.35	2/4/04 3:46 PM	1576.85	24905.6	0.2	10987.3	0.1435	0.2065	102.9	0.1435	0.140218	0.0033	2.30%
aam0204	A1	16	10023	6.42	2/4/04 12:32 PM	1561.21	24905.6	0.2	10987.3	0.1421	0.1941	96.8	0.1421	0.145105	-0.0030	-2.12%
aam0204	A2	16	10012	6.58	2/4/04 12:50 PM	1521.58	24905.6	0.2	10987.3	0.1385	0.1954	96.8	0.1385	0.145105	-0.0066	-4.78%
aam0204	A3	16	10016	6.59	2/4/04 1:00 PM	1519.88	24905.6	0.2	10987.3	0.1383	0.1998	96.8	0.1383	0.145105	-0.0068	-4.90%
aam0204	A4	16	10014	5.95	2/4/04 1:31 PM	1683.03	24905.6	0.2	10987.3	0.1532	0.1996	96.8	0.1532	0.145105	0.0081	5.27%
aam0204	B1	16	10009	6	2/4/04 1:39 PM	1668.17	24905.6	0.2	10987.3	0.1518	0.2145	96.8	0.1518	0.145105	0.0067	4.43%
aam0204	B2	16	10005	6.34	2/4/04 2:01 PM	1578.08	24905.6	0.2	10987.3	0.1436	0.2107	96.8	0.1436	0.145105	-0.0015	-1.03%
aam0204	B3	16	10007	6.39	2/4/04 2:11 PM	1566.04	24905.6	0.2	10987.3	0.1425	0.2055	96.8	0.1425	0.145105	-0.0026	-1.81%
aam0204	B4	16	10023	6.56	2/4/04 2:23 PM	1527.90	24905.6	0.2	10987.3	0.1391	0.2033	96.8	0.1391	0.145105	-0.0060	-4.35%
aam0204	C1	16	10004	5.88	2/4/04 2:46 PM	1701.36	24905.6	0.2	10987.3	0.1548	0.2150	96.8	0.1548	0.145105	0.0097	6.29%
aam0204	C2	16	10008	6.22	2/4/04 2:57 PM	1609.00	24905.6	0.2	10987.3	0.1464	0.2059	96.8	0.1464	0.145105	0.0013	0.91%
aam0204	C3	16	10012	6.37	2/4/04 15:11	1571.74	24905.6	0.2	10987.3	0.1431	0.2075	96.8	0.1431	0.145105	-0.0021	-1.44%
aam0204	C4	16	10013	6.45	2/4/04 3:29 PM	1552.40	24905.6	0.2	10987.3	0.1413	0.2065	96.8	0.1413	0.145105	-0.0038	-2.70%
aam0204	A1	17	10000	7.89	2/4/04 12:19 PM	1267.43	24905.6	0.2	10987.3	0.1154	0.1941	126.7	0.1154	0.122676	-0.0073	-6.35%
aam0204	A2	17	10005	7.72	2/4/04 12:33 PM	1295.98	24905.6	0.2	10987.3	0.1180	0.1954	126.7	0.1180	0.122676	-0.0047	-4.00%
aam0204	A3	17	10003	7.75	2/4/04 12:51 PM	1290.71	24905.6	0.2	10987.3	0.1175	0.1998	126.7	0.1175	0.122676	-0.0052	-4.43%
aam0204	A4	17	10014	7.57	2/4/04 1:01 PM	1322.85	24905.6	0.2	10987.3	0.1204	0.1996	126.7	0.1204	0.122676	-0.0023	-1.89%
aam0204	B1	17	10008	7.38	2/4/04 1:30 PM	1356.10	24905.6	0.2	10987.3	0.1234	0.2145	126.7	0.1234	0.122676	0.0007	0.61%
aam0204	B2	17	10005	7.43	2/4/04 1:41 PM	1346.57	24905.6	0.2	10987.3	0.1226	0.2107	126.7	0.1226	0.122676	-0.0001	-0.10%
aam0204	B3	17	10001	7.63	2/4/04 2:02 PM	1310.75	24905.6	0.2	10987.3	0.1193	0.2055	126.7	0.1193	0.122676	-0.0034	-2.83%
aam0204	B4	17	10001	7.69	2/4/04 2:12 PM	1300.52	24905.6	0.2	10987.3	0.1184	0.2033	126.7	0.1184	0.122676	-0.0043	-3.64%

000116

Alpha Attenuation Calibration Worksheet - LB4100 A

	Am-241	Am-241		
Standard ID	541.1808.26	512.1572.67		
Cert Act (pCi/ml)	24905.6	5000.5		
To	2/3/00	3/18/99		

y=b*m^ax

b	0.2499
m	0.9944
a	1
min rel dev*	-10.2%
max rel dev*	12.9%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
aam0204	C1	17	10010	7.05	2/4/04 2:23 PM	1419.86	24905.6	0.2	10987.3	0.1292	0.2150	126.7	0.1292	0.122676	0.0066	5.07%
aam0204	C2	17	10006	7.3	2/4/04 2:47 PM	1370.68	24905.6	0.2	10987.3	0.1248	0.2059	126.7	0.1248	0.122676	0.0021	1.66%
aam0204	C3	17	10004	7.54	2/4/04 2:58 PM	1326.79	24905.6	0.2	10987.3	0.1208	0.2075	126.7	0.1208	0.122676	-0.0019	-1.59%
aam0204	C4	17	10013	7.58	2/4/04 3:13 PM	1320.98	24905.6	0.2	10987.3	0.1202	0.2065	126.7	0.1202	0.122676	-0.0024	-2.04%
aam0204	A1	18	10014	6.43	2/4/04 12:06 PM	1557.39	24905.6	0.2	10987.3	0.1417	0.1941	108.1	0.1417	0.136183	0.0056	3.92%
aam0204	A2	18	10008	6.25	2/4/04 12:18 PM	1601.28	24905.6	0.2	10987.3	0.1457	0.1954	108.1	0.1457	0.136183	0.0096	6.56%
aam0204	A3	18	10025	6.25	2/4/04 12:32 PM	1604.00	24905.6	0.2	10987.3	0.1460	0.1998	108.1	0.1460	0.136183	0.0098	6.72%
aam0204	A4	18	10005	6.38	2/4/04 12:49 PM	1568.18	24905.6	0.2	10987.3	0.1427	0.1996	108.1	0.1427	0.136183	0.0065	4.58%
aam0204	B1	18	10026	5.97	2/4/04 12:59 PM	1679.40	24905.6	0.2	10987.3	0.1528	0.2145	108.1	0.1528	0.136183	0.0167	10.90%
aam0204	B2	18	10022	6.15	2/4/04 1:29 PM	1629.59	24905.6	0.2	10987.3	0.1483	0.2107	108.1	0.1483	0.136183	0.0121	8.18%
aam0204	B3	18	10017	6.26	2/4/04 1:39 PM	1600.16	24905.6	0.2	10987.3	0.1456	0.2055	108.1	0.1456	0.136183	0.0095	6.49%
aam0204	B4	18	10002	6.29	2/4/04 2:00 PM	1590.14	24905.6	0.2	10987.3	0.1447	0.2033	108.1	0.1447	0.136183	0.0085	5.90%
aam0204	C1	18	10003	5.82	2/4/04 2:10 PM	1718.73	24905.6	0.2	10987.3	0.1564	0.2150	108.1	0.1564	0.136183	0.0202	12.94%
aam0204	C2	18	10010	6	2/4/04 2:22 PM	1668.33	24905.6	0.2	10987.3	0.1518	0.2059	108.1	0.1518	0.136183	0.0157	10.31%
aam0204	C3	18	10018	6.09	2/4/04 2:46 PM	1644.99	24905.6	0.2	10987.3	0.1497	0.2075	108.1	0.1497	0.136183	0.0135	9.04%
aam0204	C4	18	10006	6.14	2/4/04 2:56 PM	1629.64	24905.6	0.2	10987.3	0.1483	0.2065	108.1	0.1483	0.136183	0.0121	8.18%
aam0204	A1	19	10005	8.64	2/4/04 11:54 AM	1157.99	24905.6	0.2	10987.3	0.1054	0.1941	139.5	0.1054	0.114167	-0.0088	-8.33%
aam0204	A2	19	10003	8.31	2/4/04 12:08 PM	1203.73	24905.6	0.2	10987.3	0.1096	0.1954	139.5	0.1096	0.114167	-0.0046	-4.21%
aam0204	A3	19	10001	8.45	2/4/04 12:20 PM	1183.55	24905.6	0.2	10987.3	0.1077	0.1998	139.5	0.1077	0.114167	-0.0064	-5.99%
aam0204	A4	19	10012	8.22	2/4/04 12:34 PM	1218.00	24905.6	0.2	10987.3	0.1109	0.1996	139.5	0.1109	0.114167	-0.0033	-2.99%
aam0204	B1	19	10010	7.84	2/4/04 12:51 PM	1276.79	24905.6	0.2	10987.3	0.1162	0.2145	139.5	0.1162	0.114167	0.0020	1.75%
aam0204	B2	19	10001	8.21	2/4/04 1:02 PM	1218.15	24905.6	0.2	10987.3	0.1109	0.2107	139.5	0.1109	0.114167	-0.0033	-2.98%
aam0204	B3	19	10006	8.16	2/4/04 1:31 PM	1226.23	24905.6	0.2	10987.3	0.1116	0.2055	139.5	0.1116	0.114167	-0.0026	-2.30%
aam0204	B4	19	10009	8.32	2/4/04 1:41 PM	1203.00	24905.6	0.2	10987.3	0.1095	0.2033	139.5	0.1095	0.114167	-0.0047	-4.27%
aam0204	C1	19	10011	7.55	2/4/04 2:02 PM	1325.96	24905.6	0.2	10987.3	0.1207	0.2150	139.5	0.1207	0.114167	0.0065	5.40%
aam0204	C2	19	10006	8.02	2/4/04 2:12 PM	1247.63	24905.6	0.2	10987.3	0.1136	0.2059	139.5	0.1136	0.114167	-0.0006	-0.54%
aam0204	C3	19	10005	8.15	2/4/04 2:24 PM	1227.61	24905.6	0.2	10987.3	0.1117	0.2075	139.5	0.1117	0.114167	-0.0024	-2.18%
aam0204	C4	19	10001	8.3	2/4/04 2:48 PM	1204.94	24905.6	0.2	10987.3	0.1097	0.2065	139.5	0.1097	0.114167	-0.0045	-4.10%
aam0204	A1	20	10011	9.04	2/4/04 11:40 AM	1107.41	24905.6	0.2	10987.3	0.1008	0.1941	145.3	0.1008	0.110509	-0.0097	-9.64%
aam0204	A2	20	10003	8.7	2/4/04 11:54 AM	1149.77	24905.6	0.2	10987.3	0.1046	0.1954	145.3	0.1046	0.110509	-0.0059	-5.60%
aam0204	A3	20	10003	8.85	2/4/04 12:08 PM	1130.28	24905.6	0.2	10987.3	0.1029	0.1998	145.3	0.1029	0.110509	-0.0076	-7.42%
aam0204	A4	20	10013	8.5	2/4/04 12:20 PM	1178.00	24905.6	0.2	10987.3	0.1072	0.1996	145.3	0.1072	0.110509	-0.0033	-3.07%
aam0204	B1	20	10001	8.18	2/4/04 12:34 PM	1222.62	24905.6	0.2	10987.3	0.1113	0.2145	145.3	0.1113	0.110509	0.0008	0.69%
aam0204	B2	20	10010	8.38	2/4/04 12:51 PM	1194.51	24905.6	0.2	10987.3	0.1087	0.2107	145.3	0.1087	0.110509	-0.0018	-1.65%
aam0204	B3	20	10000	8.58	2/4/04 1:02 PM	1165.50	24905.6	0.2	10987.3	0.1061	0.2055	145.3	0.1061	0.110509	-0.0044	-4.18%
aam0204	B4	20	10012	8.54	2/4/04 1:31 PM	1172.37	24905.6	0.2	10987.3	0.1067	0.2033	145.3	0.1067	0.110509	-0.0038	-3.57%
aam0204	C1	20	10001	7.87	2/4/04 1:41 PM	1270.78	24905.6	0.2	10987.3	0.1157	0.2150	145.3	0.1157	0.110509	0.0051	4.45%
aam0204	C2	20	10007	8.12	2/4/04 2:02 PM	1232.39	24905.6	0.2	10987.3	0.1122	0.2059	145.3	0.1122	0.110509	0.0017	1.48%

000117

Alpha Attenuation Calibration Worksheet - LB4100 A

	Am-241	Am-241		
Standard ID	541.1808.26	512.1572.67		
Cert Act (pCi/ml)	24905.6	5000.5		
To	2/3/00	3/18/99		

*y=b*m^ax*

b	*0.2499*
m	*0.9944*
a	*1*
min rel dev*	-10.2%
max rel dev*	12.9%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
aam0204	C3	20	10006	8.51	2/4/04 2:13 PM	1175.79	24905.6	0.2	10987.3	0.1070	0.2075	145.3	0.1070	0.110509	-0.0035	-3.27%
aam0204	C4	20	10010	8.59	2/4/04 2:25 PM	1165.31	24905.6	0.2	10987.3	0.1061	0.2065	145.3	0.1061	0.110509	-0.0044	-4.19%

000118

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 A

*y=b*m^-x*

b	*0.22256*
m	*1.00002*
a	*1*

min rel dev	-24.1%	0.241
max rel dev	24.1%	0.241
limit	< 25%	

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
aam0204	A1	3	10021	2709	4.29	2/4/04 4:12 PM	2335.90	631.47	52.6	17.2	0.270	0.222472	0.0479	17.70%	2.25%
aam0204	A2	3	10025	2694	4.24	2/4/04 4:35 PM	2364.39	635.38	53.2	17.2	0.269	0.222472	0.0463	17.21%	2.25%
aam0204	A3	3	10022	2535	4.3	2/4/04 11:20 AM	2330.70	589.53	52.1	17.2	0.253	0.222472	0.0305	12.05%	2.24%
aam0204	A4	3	10008	2399	4.25	2/4/04 11:35 AM	2354.82	564.47	52.4	17.2	0.240	0.222472	0.0172	7.19%	2.23%
aam0204	B1	3	10019	2296	3.95	2/4/04 11:49 AM	2536.46	581.27	56.2	17.2	0.229	0.222472	0.0067	2.92%	2.22%
aam0204	B2	3	10028	2940	4.18	2/4/04 12:03 PM	2399.04	703.35	54.5	17.2	0.293	0.222472	0.0707	24.12%	2.27%
aam0204	B3	3	10016	2794	4.18	2/4/04 12:15 PM	2396.17	668.42	54.2	17.2	0.279	0.222472	0.0565	20.25%	2.26%
aam0204	B4	3	10037	2671	4.15	2/4/04 12:30 PM	2418.55	643.61	54.3	17.2	0.266	0.222472	0.0436	16.40%	2.25%
aam0204	C1	3	10013	2020	3.95	2/4/04 12:47 PM	2534.94	511.39	55.5	17.2	0.202	0.222472	-0.0207	-10.28%	2.19%
aam0204	C2	3	10003	2263	4.12	2/4/04 12:58 PM	2427.91	549.27	53.8	17.2	0.226	0.222472	0.0038	1.66%	2.21%
aam0204	C3	3	10008	2613	4.14	2/4/04 1:27 PM	2417.39	631.16	54.3	17.2	0.261	0.222472	0.0386	14.79%	2.25%
aam0204	C4	3	10017	2674	4.19	2/4/04 1:37 PM	2390.69	638.19	53.8	17.2	0.267	0.222472	0.0445	16.66%	2.25%
aam0204	A1	6	10030	2715	4.3	2/4/04 3:09 PM	2332.56	631.40	52.5	29.4	0.271	0.222413	0.0483	17.83%	2.25%
aam0204	A2	6	10023	2752	4.29	2/4/04 3:26 PM	2336.36	641.49	52.7	29.4	0.275	0.222413	0.0522	19.00%	2.26%
aam0204	A3	6	10008	2647	4.19	2/4/04 3:44 PM	2388.54	631.74	53.7	29.4	0.264	0.222413	0.0421	15.91%	2.25%
aam0204	A4	6	10012	2342	4.17	2/4/04 4:12 PM	2400.96	561.63	53.3	29.4	0.234	0.222413	0.0115	4.92%	2.22%
aam0204	B1	6	10006	2416	3.98	2/4/04 4:35 PM	2514.07	607.04	56.0	29.4	0.241	0.222413	0.0190	7.89%	2.23%
aam0204	B2	6	10026	2840	4.15	2/4/04 11:20 AM	2415.90	684.34	54.7	29.4	0.283	0.222413	0.0609	21.48%	2.26%
aam0204	B3	6	10010	2786	4.17	2/4/04 11:35 AM	2400.48	668.11	54.3	29.4	0.278	0.222413	0.0559	20.09%	2.26%
aam0204	B4	6	10013	2718	4.11	2/4/04 11:50 AM	2436.25	661.31	54.9	29.4	0.271	0.222413	0.0490	18.06%	2.25%
aam0204	C1	6	10006	1885	3.99	2/4/04 12:03 PM	2507.77	472.43	54.7	29.4	0.188	0.222413	-0.0340	-18.06%	2.18%
aam0204	C2	6	10025	2254	4.05	2/4/04 12:15 PM	2475.31	556.54	54.7	29.4	0.225	0.222413	0.0024	1.08%	2.21%
aam0204	C3	6	10023	2508	4.16	2/4/04 12:30 PM	2409.38	602.88	53.8	29.4	0.250	0.222413	0.0278	11.11%	2.23%
aam0204	C4	6	10023	2548	4.09	2/4/04 12:47 PM	2450.61	622.98	54.8	29.4	0.254	0.222413	0.0318	12.51%	2.24%
aam0204	A1	7	10013	2549	4.91	2/4/04 2:55 PM	2039.31	519.14	45.7	42.4	0.255	0.22235	0.0322	12.66%	2.24%
aam0204	A2	7	10013	2485	4.65	2/4/04 3:10 PM	2153.33	534.41	48.1	42.4	0.248	0.22235	0.0258	10.41%	2.23%
aam0204	A3	7	10021	2538	4.86	2/4/04 3:27 PM	2061.93	522.22	46.1	42.4	0.253	0.22235	0.0309	12.21%	2.24%
aam0204	A4	7	10012	2146	4.71	2/4/04 3:44 PM	2125.69	455.63	46.8	42.4	0.214	0.22235	-0.0080	-3.74%	2.20%
aam0204	B1	7	10023	2053	4.41	2/4/04 4:12 PM	2272.79	465.53	49.8	42.4	0.205	0.22235	-0.0175	-8.55%	2.19%
aam0204	B2	7	10017	2768	4.48	2/4/04 4:36 PM	2235.94	617.86	50.5	42.4	0.276	0.22235	0.0540	19.53%	2.26%
aam0204	B3	7	10005	2542	4.57	2/4/04 11:20 AM	2189.28	556.24	49.0	42.4	0.254	0.22235	0.0317	12.49%	2.24%
aam0204	B4	7	10020	2467	4.58	2/4/04 11:36 AM	2187.77	538.65	48.8	42.4	0.246	0.22235	0.0239	9.69%	2.23%
aam0204	C1	7	10010	1883	4.37	2/4/04 11:50 AM	2290.62	430.89	49.9	42.4	0.188	0.22235	-0.0342	-18.20%	2.18%

000119

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 A

*y=b*m^-x*

b	*0.22256*
m	*1.00002*
a	*1*

min rel dev	-24.1%	0.241
max rel dev	24.1%	0.241
limit	< 25%	

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
aam0204	C2	7	10025	2056	4.46	2/4/04 12:04 PM	2247.76	460.99	49.3	42.4	0.205	0.22235	-0.0173	-8.42%	2.19%
aam0204	C3	7	10003	2416	4.64	2/4/04 12:16 PM	2155.82	520.69	48.0	42.4	0.242	0.22235	0.0192	7.94%	2.23%
aam0204	C4	7	10006	2477	4.67	2/4/04 12:30 PM	2142.61	530.41	47.8	42.4	0.248	0.22235	0.0252	10.18%	2.23%
aam0204	A1	8	10013	2605	4.83	2/4/04 2:45 PM	2073.08	539.34	46.5	38.7	0.260	0.222368	0.0378	14.53%	2.24%
aam0204	A2	8	10021	2614	4.7	2/4/04 2:55 PM	2132.13	556.17	47.8	38.7	0.261	0.222368	0.0385	14.75%	2.24%
aam0204	A3	8	10013	2458	4.75	2/4/04 3:10 PM	2108.00	517.47	47.0	38.7	0.245	0.222368	0.0231	9.42%	2.23%
aam0204	A4	8	10017	2265	4.79	2/4/04 3:27 PM	2091.23	472.86	46.3	38.7	0.226	0.222368	0.0037	1.66%	2.21%
aam0204	B1	8	10014	2288	4.54	2/4/04 3:44 PM	2205.73	503.96	48.9	38.7	0.228	0.222368	0.0061	2.68%	2.22%
aam0204	B2	8	10021	2760	4.7	2/4/04 4:12 PM	2132.13	587.23	48.1	38.7	0.275	0.222368	0.0531	19.26%	2.26%
aam0204	B3	8	10006	2642	4.68	2/4/04 4:36 PM	2138.03	564.53	48.1	38.7	0.264	0.222368	0.0417	15.78%	2.25%
aam0204	B4	8	10022	2583	4.8	2/4/04 11:20 AM	2087.92	538.13	46.8	38.7	0.258	0.222368	0.0354	13.72%	2.24%
aam0204	C1	8	10015	1936	4.41	2/4/04 11:35 AM	2270.98	439.00	49.6	38.7	0.193	0.222368	-0.0291	-15.03%	2.18%
aam0204	C2	8	10019	2099	4.56	2/4/04 11:50 AM	2197.15	460.31	48.3	38.7	0.210	0.222368	-0.0129	-6.14%	2.20%
aam0204	C3	8	10010	2476	4.73	2/4/04 12:04 PM	2116.28	523.47	47.2	38.7	0.247	0.222368	0.0250	10.10%	2.23%
aam0204	C4	8	10005	2621	4.75	2/4/04 12:16 PM	2106.32	551.79	47.3	38.7	0.262	0.222368	0.0396	15.12%	2.25%
aam0204	A1	9	10022	2469	5.02	2/4/04 2:21 PM	1996.41	491.83	44.5	53.4	0.246	0.222297	0.0241	9.77%	2.23%
aam0204	A2	9	10008	2431	4.91	2/4/04 2:45 PM	2038.29	495.11	45.4	53.4	0.243	0.222297	0.0206	8.48%	2.23%
aam0204	A3	9	10005	2451	5.01	2/4/04 2:55 PM	1997.01	489.22	44.6	53.4	0.245	0.222297	0.0227	9.26%	2.23%
aam0204	A4	9	10017	2236	5.11	2/4/04 3:10 PM	1960.27	437.57	43.3	53.4	0.223	0.222297	0.0009	0.41%	2.21%
aam0204	B1	9	10006	2154	4.72	2/4/04 3:27 PM	2119.92	456.36	46.7	53.4	0.215	0.222297	-0.0070	-3.26%	2.20%
aam0204	B2	9	10023	2659	4.86	2/4/04 3:44 PM	2062.35	547.12	46.3	53.4	0.265	0.222297	0.0430	16.21%	2.25%
aam0204	B3	9	10025	2479	4.89	2/4/04 4:13 PM	2050.10	506.95	45.7	53.4	0.247	0.222297	0.0250	10.10%	2.23%
aam0204	B4	9	10003	2441	4.97	2/4/04 4:36 PM	2012.68	491.15	44.9	53.4	0.244	0.222297	0.0217	8.90%	2.23%
aam0204	C1	9	10004	1824	4.54	2/4/04 11:20 AM	2203.52	401.76	47.9	53.4	0.182	0.222297	-0.0400	-21.92%	2.17%
aam0204	C2	9	10006	1995	4.75	2/4/04 11:36 AM	2106.53	420.00	46.1	53.4	0.199	0.222297	-0.0229	-11.49%	2.19%
aam0204	C3	9	10024	2439	4.87	2/4/04 11:50 AM	2058.32	500.82	45.8	53.4	0.243	0.222297	0.0210	8.64%	2.23%
aam0204	C4	9	9999	2518	4.98	2/4/04 12:04 PM	2007.83	505.62	44.9	53.4	0.252	0.222297	0.0295	11.73%	2.24%
aam0204	A1	10	10019	2519	5.28	2/4/04 2:10 PM	1897.54	477.08	42.4	54	0.251	0.222294	0.0291	11.59%	2.24%
aam0204	A2	10	10008	2544	5.18	2/4/04 2:21 PM	1932.05	491.12	43.3	54	0.254	0.222294	0.0319	12.55%	2.24%
aam0204	A3	10	10015	2442	5.26	2/4/04 2:45 PM	1903.99	464.26	42.4	54	0.244	0.222294	0.0215	8.83%	2.23%
aam0204	A4	10	10010	2189	5.21	2/4/04 2:56 PM	1921.31	420.15	42.4	54	0.219	0.222294	-0.0036	-1.65%	2.21%
aam0204	B1	10	10015	2202	4.92	2/4/04 3:10 PM	2035.57	447.56	44.9	54	0.220	0.222294	-0.0024	-1.10%	2.21%
aam0204	B2	10	10010	2659	5.12	2/4/04 3:27 PM	1955.08	519.34	44.0	54	0.266	0.222294	0.0433	16.32%	2.25%

000120

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 A

*y=b*m^-x*

b	*0.22256*
m	*1.00002*
a	*1*

min rel dev	-24.1%	0.241
max rel dev	24.1%	0.241
limit	< 25%	

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
aam0204	B3	10	10002	2445	5.07	2/4/04 3:45 PM	1972.78	482.25	44.0	54	0.244	0.222294	0.0222	9.06%	2.23%
aam0204	B4	10	10016	2583	5.22	2/4/04 4:13 PM	1918.77	494.83	43.0	54	0.258	0.222294	0.0356	13.80%	2.24%
aam0204	C1	10	10000	1791	5.01	2/4/04 4:36 PM	1996.01	357.49	43.3	54	0.179	0.222294	-0.0432	-24.12%	2.17%
aam0204	C2	10	10014	2024	4.91	2/4/04 11:21 AM	2039.51	412.22	44.7	54	0.202	0.222294	-0.0202	-9.98%	2.19%
aam0204	C3	10	10001	2375	5.09	2/4/04 11:36 AM	1964.83	466.60	43.7	54	0.237	0.222294	0.0152	6.39%	2.22%
aam0204	C4	10	10027	2385	5.09	2/4/04 11:51 AM	1969.94	468.57	43.8	54	0.238	0.222294	0.0156	6.54%	2.22%
aam0204	A1	11	10003	2506	5.33	2/4/04 1:59 PM	1876.74	470.17	42.0	69.4	0.251	0.22222	0.0283	11.30%	2.24%
aam0204	A2	11	10000	2460	5.3	2/4/04 2:10 PM	1886.79	464.15	42.1	69.4	0.246	0.22222	0.0238	9.67%	2.23%
aam0204	A3	11	10006	2518	5.31	2/4/04 2:21 PM	1884.37	474.20	42.2	69.4	0.252	0.22222	0.0294	11.69%	2.24%
aam0204	A4	11	10015	2151	5.3	2/4/04 2:45 PM	1889.62	405.85	41.6	69.4	0.215	0.22222	-0.0074	-3.46%	2.20%
aam0204	B1	11	10001	2048	4.93	2/4/04 2:55 PM	2028.60	415.42	44.5	69.4	0.205	0.22222	-0.0174	-8.52%	2.20%
aam0204	B2	11	10014	2525	5.05	2/4/04 3:10 PM	1982.97	500.00	44.3	69.4	0.252	0.22222	0.0299	11.87%	2.24%
aam0204	B3	11	10010	2523	5.15	2/4/04 3:27 PM	1943.69	489.90	43.5	69.4	0.252	0.22222	0.0298	11.83%	2.24%
aam0204	B4	11	10010	2412	5.17	2/4/04 3:45 PM	1936.17	466.54	43.1	69.4	0.241	0.22222	0.0187	7.78%	2.23%
aam0204	C1	11	10024	1953	4.89	2/4/04 4:13 PM	2049.90	399.39	44.8	69.4	0.195	0.22222	-0.0274	-14.06%	2.18%
aam0204	C2	11	10002	2006	5.03	2/4/04 4:36 PM	1988.47	398.81	43.6	69.4	0.201	0.22222	-0.0217	-10.80%	2.19%
aam0204	C3	11	10007	2555	5.19	2/4/04 11:21 AM	1928.13	492.29	43.2	69.4	0.255	0.22222	0.0331	12.96%	2.24%
aam0204	C4	11	9999	2357	5.2	2/4/04 11:36 AM	1922.88	453.27	42.8	69.4	0.236	0.22222	0.0135	5.73%	2.22%
aam0204	A1	12	10018	2492	5.91	2/4/04 1:39 PM	1695.09	421.66	37.9	71.6	0.249	0.222209	0.0265	10.67%	2.23%
aam0204	A2	12	10015	2564	5.92	2/4/04 2:00 PM	1691.72	433.11	37.9	71.6	0.256	0.222209	0.0338	13.20%	2.24%
aam0204	A3	12	10002	2501	6	2/4/04 2:10 PM	1667.00	416.83	37.3	71.6	0.250	0.222209	0.0278	11.13%	2.24%
aam0204	A4	12	10020	2132	5.69	2/4/04 2:22 PM	1760.98	374.69	38.7	71.6	0.213	0.222209	-0.0094	-4.43%	2.20%
aam0204	B1	12	10009	2143	5.52	2/4/04 2:45 PM	1813.22	388.22	39.9	71.6	0.214	0.222209	-0.0081	-3.78%	2.20%
aam0204	B2	12	10000	2606	5.52	2/4/04 2:56 PM	1811.59	472.10	40.7	71.6	0.261	0.222209	0.0384	14.73%	2.25%
aam0204	B3	12	10005	2536	5.62	2/4/04 3:11 PM	1780.25	451.25	39.9	71.6	0.253	0.222209	0.0313	12.33%	2.24%
aam0204	B4	12	10008	2503	5.76	2/4/04 3:28 PM	1737.50	434.55	38.8	71.6	0.250	0.222209	0.0279	11.15%	2.24%
aam0204	C1	12	10007	1880	5.44	2/4/04 3:45 PM	1839.52	345.59	40.1	71.6	0.188	0.222209	-0.0343	-18.28%	2.18%
aam0204	C2	12	10011	2136	5.55	2/4/04 4:13 PM	1803.78	384.86	39.7	71.6	0.213	0.222209	-0.0088	-4.14%	2.20%
aam0204	C3	12	10018	2409	5.86	2/4/04 4:37 PM	1709.56	411.09	38.0	71.6	0.240	0.222209	0.0183	7.59%	2.23%
aam0204	C4	12	10007	2561	5.77	2/4/04 11:21 AM	1734.32	443.85	38.9	71.6	0.256	0.222209	0.0337	13.17%	2.24%
aam0204	A1	13	10022	2509	5.32	2/4/04 1:30 PM	1883.83	471.62	42.1	77.6	0.250	0.22218	0.0282	11.25%	2.23%
aam0204	A2	13	10013	2524	5.54	2/4/04 1:39 PM	1807.40	455.60	40.4	77.6	0.252	0.22218	0.0299	11.86%	2.24%
aam0204	A3	13	10008	2555	5.61	2/4/04 2:00 PM	1783.96	455.44	40.0	77.6	0.255	0.22218	0.0331	12.97%	2.24%

000121

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 A

*y=b*m^-x*

b	*0.22256*
m	*1.00002*
a	*1*

min rel dev	-24.1%	0.241
max rel dev	24.1%	0.241
limit	< 25%	

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
aam0204	A4	13	10015	2295	5.69	2/4/04 2:10 PM	1760.41	403.34	39.0	77.6	0.229	0.22218	0.0070	3.04%	2.22%
aam0204	B1	13	10011	2129	5.23	2/4/04 2:21 PM	1914.15	407.07	42.1	77.6	0.213	0.22218	-0.0095	-4.47%	2.20%
aam0204	B2	13	10024	2612	5.27	2/4/04 2:45 PM	1902.09	495.64	42.7	77.6	0.261	0.22218	0.0384	14.73%	2.24%
aam0204	B3	13	10014	2569	5.45	2/4/04 2:56 PM	1837.43	471.38	41.2	77.6	0.257	0.22218	0.0344	13.39%	2.24%
aam0204	B4	13	10012	2410	5.45	2/4/04 3:10 PM	1837.06	442.20	40.9	77.6	0.241	0.22218	0.0185	7.70%	2.23%
aam0204	C1	13	10021	1915	5.14	2/4/04 3:27 PM	1949.61	372.57	42.5	77.6	0.191	0.22218	-0.0311	-16.26%	2.18%
aam0204	C2	13	10003	2135	5.37	2/4/04 3:45 PM	1862.76	397.58	41.0	77.6	0.213	0.22218	-0.0087	-4.10%	2.20%
aam0204	C3	13	10011	2446	5.44	2/4/04 4:13 PM	1840.26	449.63	41.0	77.6	0.244	0.22218	0.0222	9.07%	2.23%
aam0204	C4	13	10018	2372	5.48	2/4/04 4:37 PM	1828.10	432.85	40.6	77.6	0.237	0.22218	0.0146	6.16%	2.22%
aam0204	A1	14	10017	2539	5.94	2/4/04 12:59 PM	1686.36	427.44	37.7	82.3	0.253	0.222158	0.0313	12.35%	2.24%
aam0204	A2	14	10008	2566	5.24	2/4/04 1:30 PM	1909.92	489.69	42.8	82.3	0.256	0.222158	0.0342	13.35%	2.24%
aam0204	A3	14	10019	2551	5.86	2/4/04 1:39 PM	1709.73	435.32	38.3	82.3	0.255	0.222158	0.0325	12.75%	2.24%
aam0204	A4	14	10017	2138	5.71	2/4/04 2:00 PM	1754.29	374.43	38.6	82.3	0.213	0.222158	-0.0087	-4.09%	2.20%
aam0204	B1	14	10025	2176	5.39	2/4/04 2:10 PM	1859.93	403.71	41.0	82.3	0.217	0.222158	-0.0051	-2.35%	2.20%
aam0204	B2	14	10013	2669	5.68	2/4/04 2:22 PM	1762.85	469.89	39.7	82.3	0.267	0.222158	0.0444	16.66%	2.25%
aam0204	B3	14	10005	2596	5.64	2/4/04 2:45 PM	1773.94	460.28	39.8	82.3	0.259	0.222158	0.0373	14.38%	2.24%
aam0204	B4	14	10014	2626	5.72	2/4/04 2:56 PM	1750.70	459.09	39.3	82.3	0.262	0.222158	0.0401	15.28%	2.25%
aam0204	C1	14	10012	1957	5.28	2/4/04 3:10 PM	1896.21	370.64	41.4	82.3	0.195	0.222158	-0.0267	-13.66%	2.19%
aam0204	C2	14	10011	2197	5.65	2/4/04 3:28 PM	1771.86	388.85	39.1	82.3	0.219	0.222158	-0.0027	-1.23%	2.21%
aam0204	C3	14	10004	2423	5.69	2/4/04 3:45 PM	1758.17	425.83	39.2	82.3	0.242	0.222158	0.0200	8.28%	2.23%
aam0204	C4	14	10021	2495	5.75	2/4/04 4:13 PM	1742.78	433.91	38.9	82.3	0.249	0.222158	0.0268	10.77%	2.23%
aam0204	A1	15	10004	2600	6.66	2/4/04 12:50 PM	1502.10	390.39	33.7	102.9	0.260	0.222058	0.0378	14.56%	2.24%
aam0204	A2	15	10017	2630	6.38	2/4/04 1:00 PM	1570.06	412.23	35.3	102.9	0.263	0.222058	0.0405	15.42%	2.25%
aam0204	A3	15	9999	2531	5.9	2/4/04 1:31 PM	1694.75	428.98	37.9	102.9	0.253	0.222058	0.0311	12.27%	2.24%
aam0204	A4	15	10015	2191	6.21	2/4/04 1:39 PM	1612.72	352.82	35.6	102.9	0.219	0.222058	-0.0033	-1.50%	2.21%
aam0204	B1	15	10007	2263	6.07	2/4/04 2:00 PM	1648.60	372.82	36.5	102.9	0.226	0.222058	0.0041	1.81%	2.21%
aam0204	B2	15	10013	2663	6.04	2/4/04 2:10 PM	1657.78	440.89	37.3	102.9	0.266	0.222058	0.0439	16.51%	2.25%
aam0204	B3	15	10005	2744	6.24	2/4/04 2:22 PM	1603.37	439.74	36.2	102.9	0.274	0.222058	0.0522	19.03%	2.26%
aam0204	B4	15	10006	2481	6.29	2/4/04 2:46 PM	1590.78	394.44	35.5	102.9	0.248	0.222058	0.0259	10.44%	2.23%
aam0204	C1	15	10018	1954	5.86	2/4/04 2:56 PM	1709.56	333.45	37.3	102.9	0.195	0.222058	-0.0270	-13.85%	2.18%
aam0204	C2	15	10002	2107	5.96	2/4/04 3:11 PM	1678.19	353.52	36.9	102.9	0.211	0.222058	-0.0114	-5.41%	2.20%
aam0204	C3	15	10015	2458	6.31	2/4/04 3:28 PM	1587.16	389.54	35.4	102.9	0.245	0.222058	0.0234	9.52%	2.23%
aam0204	C4	15	10013	2613	6.35	2/4/04 3:46 PM	1576.85	411.50	35.4	102.9	0.261	0.222058	0.0389	14.91%	2.24%

000122

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 A

*y=b*m^-x*

b	*0.22256*
m	*1.00002*
a	*1*

min rel dev	-24.1%	0.241
max rel dev	24.1%	0.241
limit	< 25%	

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
aam0204	A1	16	10023	2506	6.42	2/4/04 12:32 PM	1561.21	390.34	34.9	96.8	0.250	0.222088	0.0279	11.17%	2.23%
aam0204	A2	16	10012	2577	6.58	2/4/04 12:50 PM	1521.58	391.64	34.1	96.8	0.257	0.222088	0.0353	13.72%	2.24%
aam0204	A3	16	10016	2549	6.59	2/4/04 1:00 PM	1519.88	386.80	34.0	96.8	0.254	0.222088	0.0324	12.73%	2.24%
aam0204	A4	16	10014	2305	5.95	2/4/04 1:31 PM	1683.03	387.39	37.3	96.8	0.230	0.222088	0.0081	3.51%	2.22%
aam0204	B1	16	10009	2150	6	2/4/04 1:39 PM	1668.17	358.33	36.8	96.8	0.215	0.222088	-0.0073	-3.39%	2.20%
aam0204	B2	16	10005	2781	6.34	2/4/04 2:01 PM	1578.08	438.64	35.7	96.8	0.278	0.222088	0.0559	20.10%	2.26%
aam0204	B3	16	10007	2749	6.39	2/4/04 2:11 PM	1566.04	430.20	35.3	96.8	0.275	0.222088	0.0526	19.15%	2.26%
aam0204	B4	16	10023	2678	6.56	2/4/04 2:23 PM	1527.90	408.23	34.4	96.8	0.267	0.222088	0.0451	16.88%	2.25%
aam0204	C1	16	10004	1864	5.88	2/4/04 2:46 PM	1701.36	317.01	37.1	96.8	0.186	0.222088	-0.0358	-19.19%	2.18%
aam0204	C2	16	10008	2100	6.22	2/4/04 2:57 PM	1609.00	337.62	35.4	96.8	0.210	0.222088	-0.0123	-5.84%	2.20%
aam0204	C3	16	10012	2526	6.37	2/4/04 3:11 PM	1571.74	396.55	35.2	96.8	0.252	0.222088	0.0302	11.97%	2.24%
aam0204	C4	16	10013	2517	6.45	2/4/04 3:29 PM	1552.40	390.23	34.7	96.8	0.251	0.222088	0.0293	11.65%	2.24%
aam0204	A1	17	10000	2632	7.89	2/4/04 12:19 PM	1267.43	333.59	28.5	126.7	0.263	0.221943	0.0413	15.68%	2.25%
aam0204	A2	17	10005	2654	7.72	2/4/04 12:33 PM	1295.98	343.78	29.1	126.7	0.265	0.221943	0.0433	16.33%	2.25%
aam0204	A3	17	10003	2559	7.75	2/4/04 12:51 PM	1290.71	330.19	28.9	126.7	0.256	0.221943	0.0339	13.24%	2.24%
aam0204	A4	17	10014	2280	7.57	2/4/04 1:01 PM	1322.85	301.19	29.3	126.7	0.228	0.221943	0.0057	2.52%	2.21%
aam0204	B1	17	10008	2350	7.38	2/4/04 1:30 PM	1356.10	318.43	30.1	126.7	0.235	0.221943	0.0129	5.48%	2.22%
aam0204	B2	17	10005	2819	7.43	2/4/04 1:41 PM	1346.57	379.41	30.5	126.7	0.282	0.221943	0.0598	21.23%	2.26%
aam0204	B3	17	10001	2841	7.63	2/4/04 2:02 PM	1310.75	372.35	29.7	126.7	0.284	0.221943	0.0621	21.87%	2.27%
aam0204	B4	17	10001	2742	7.69	2/4/04 2:12 PM	1300.52	356.57	29.4	126.7	0.274	0.221943	0.0522	19.05%	2.26%
aam0204	C1	17	10010	2082	7.05	2/4/04 2:23 PM	1419.86	295.32	31.2	126.7	0.208	0.221943	-0.0140	-6.71%	2.20%
aam0204	C2	17	10006	2223	7.3	2/4/04 2:47 PM	1370.68	304.52	30.3	126.7	0.222	0.221943	0.0002	0.10%	2.21%
aam0204	C3	17	10004	2587	7.54	2/4/04 2:58 PM	1326.79	343.10	29.8	126.7	0.259	0.221943	0.0367	14.17%	2.24%
aam0204	C4	17	10013	2607	7.58	2/4/04 3:13 PM	1320.98	343.93	29.6	126.7	0.260	0.221943	0.0384	14.76%	2.24%
aam0204	A1	18	10014	2741	6.43	2/4/04 12:06 PM	1557.39	426.28	35.1	108.1	0.274	0.222033	0.0517	18.88%	2.26%
aam0204	A2	18	10008	2661	6.25	2/4/04 12:18 PM	1601.28	425.76	36.0	108.1	0.266	0.222033	0.0439	16.49%	2.25%
aam0204	A3	18	10025	2662	6.25	2/4/04 12:32 PM	1604.00	425.92	36.0	108.1	0.266	0.222033	0.0435	16.38%	2.25%
aam0204	A4	18	10005	2278	6.38	2/4/04 12:49 PM	1568.18	357.05	34.7	108.1	0.228	0.222033	0.0057	2.48%	2.22%
aam0204	B1	18	10026	2230	5.97	2/4/04 12:59 PM	1679.40	373.53	37.1	108.1	0.222	0.222033	0.0004	0.17%	2.21%
aam0204	B2	18	10022	2849	6.15	2/4/04 1:29 PM	1629.59	463.25	36.9	108.1	0.284	0.222033	0.0622	21.89%	2.26%
aam0204	B3	18	10017	2834	6.26	2/4/04 1:39 PM	1600.16	452.72	36.2	108.1	0.283	0.222033	0.0609	21.52%	2.26%
aam0204	B4	18	10002	2687	6.29	2/4/04 2:00 PM	1590.14	427.19	35.8	108.1	0.269	0.222033	0.0466	17.35%	2.25%
aam0204	C1	18	10003	2065	5.82	2/4/04 2:10 PM	1718.73	354.81	37.8	108.1	0.206	0.222033	-0.0156	-7.55%	2.20%

00023

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 A

*y=b*m^-x*

b	*0.22256*
m	*1.00002*
a	*1*

min rel dev	-24.1%	0.241
max rel dev	24.1%	0.241
limit	< 25%	

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
aam0204	C2	18	10010	2135	6	2/4/04 2:22 PM	1668.33	355.83	36.7	108.1	0.213	0.222033	-0.0087	-4.10%	2.20%
aam0204	C3	18	10018	2546	6.09	2/4/04 2:46 PM	1644.99	418.06	36.8	108.1	0.254	0.222033	0.0321	12.63%	2.24%
aam0204	C4	18	10006	2569	6.14	2/4/04 2:56 PM	1629.64	418.40	36.5	108.1	0.257	0.222033	0.0347	13.52%	2.24%
aam0204	A1	19	10005	2708	8.64	2/4/04 11:54 AM	1157.99	313.43	26.1	139.5	0.271	0.221882	0.0488	18.02%	2.25%
aam0204	A2	19	10003	2730	8.31	2/4/04 12:08 PM	1203.73	328.52	27.2	139.5	0.273	0.221882	0.0510	18.70%	2.26%
aam0204	A3	19	10001	2787	8.45	2/4/04 12:20 PM	1183.55	329.82	26.8	139.5	0.279	0.221882	0.0568	20.38%	2.26%
aam0204	A4	19	10012	2404	8.22	2/4/04 12:34 PM	1218.00	292.46	27.1	139.5	0.240	0.221882	0.0182	7.59%	2.23%
aam0204	B1	19	10010	2377	7.84	2/4/04 12:51 PM	1276.79	303.19	28.4	139.5	0.237	0.221882	0.0156	6.56%	2.22%
aam0204	B2	19	10001	2894	8.21	2/4/04 1:02 PM	1218.15	352.50	27.7	139.5	0.289	0.221882	0.0675	23.32%	2.27%
aam0204	B3	19	10006	2732	8.16	2/4/04 1:31 PM	1226.23	334.80	27.7	139.5	0.273	0.221882	0.0512	18.74%	2.26%
aam0204	B4	19	10009	2717	8.32	2/4/04 1:41 PM	1203.00	326.56	27.1	139.5	0.271	0.221882	0.0496	18.26%	2.25%
aam0204	C1	19	10011	2062	7.55	2/4/04 2:02 PM	1325.96	273.11	29.1	139.5	0.206	0.221882	-0.0159	-7.72%	2.20%
aam0204	C2	19	10006	2215	8.02	2/4/04 2:12 PM	1247.63	276.18	27.6	139.5	0.221	0.221882	-0.0005	-0.23%	2.21%
aam0204	C3	19	10005	2789	8.15	2/4/04 2:24 PM	1227.61	342.21	27.8	139.5	0.279	0.221882	0.0569	20.40%	2.26%
aam0204	C4	19	10001	2682	8.3	2/4/04 2:48 PM	1204.94	323.13	27.1	139.5	0.268	0.221882	0.0463	17.26%	2.25%
aam0204	A1	20	10011	2810	9.04	2/4/04 11:40 AM	1107.41	310.84	25.1	145.3	0.281	0.221854	0.0588	20.96%	2.26%
aam0204	A2	20	10003	2753	8.7	2/4/04 11:54 AM	1149.77	316.44	26.0	145.3	0.275	0.221854	0.0534	19.39%	2.26%
aam0204	A3	20	10003	2821	8.85	2/4/04 12:08 PM	1130.28	318.76	25.6	145.3	0.282	0.221854	0.0602	21.33%	2.26%
aam0204	A4	20	10013	2363	8.5	2/4/04 12:20 PM	1178.00	278.00	26.2	145.3	0.236	0.221854	0.0141	5.99%	2.22%
aam0204	B1	20	10001	2275	8.18	2/4/04 12:34 PM	1222.62	278.12	27.1	145.3	0.227	0.221854	0.0056	2.47%	2.22%
aam0204	B2	20	10010	2866	8.38	2/4/04 12:51 PM	1194.51	342.00	27.1	145.3	0.286	0.221854	0.0645	22.51%	2.27%
aam0204	B3	20	10000	2806	8.58	2/4/04 1:02 PM	1165.50	327.04	26.4	145.3	0.281	0.221854	0.0587	20.94%	2.26%
aam0204	B4	20	10012	2790	8.54	2/4/04 1:31 PM	1172.37	326.70	26.5	145.3	0.279	0.221854	0.0568	20.39%	2.26%
aam0204	C1	20	10001	1983	7.87	2/4/04 1:41 PM	1270.78	251.97	27.8	145.3	0.198	0.221854	-0.0236	-11.89%	2.19%
aam0204	C2	20	10007	2174	8.12	2/4/04 2:02 PM	1232.39	267.73	27.2	145.3	0.217	0.221854	-0.0046	-2.12%	2.21%
aam0204	C3	20	10006	2667	8.51	2/4/04 2:13 PM	1175.79	313.40	26.5	145.3	0.267	0.221854	0.0447	16.77%	2.25%
aam0204	C4	20	10010	2739	8.59	2/4/04 2:25 PM	1165.31	318.86	26.3	145.3	0.274	0.221854	0.0518	18.92%	2.26%

2/3/04 Gross Alpha - Th230 Calibration
Th230 on Ringed Planchets

Benchsheet: 19017TH.XLS Source: 1123 Log file: Th230-02/04

Sources:	Det	Filenames
0219017-S1	A1 B1 C1	ETH0203A
-S2	A2 B2 C2	ETH0203B
-S3	A3 B3 C3	ETH0203C
-S4	A4 B4 C4	

2/4/04 Am-241 Attenuation Curve - Am241 on Ringed planchets

Benchsheet: 17014AMC.XLS Planchets: 0317014-1-20
Filenames: AAM0204

Det	1115	1131	1145	1159	1211	1225	1243	1253	1322	1333	1354	1404	1416	1439	1450	1505	1522	1539	1607	1631
1	1	20	19	18	17	16	15	14	13	12	11	10	9	9	7	6	5	4	35	2
2	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	40	3
3	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4
4	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5
5	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6
6	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7
7	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8
8	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9
9	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10
10	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11
11	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12
12	12	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13

Planchets # 0317014-1,2,4,5 were omitted due to a poor fit. g 2/10/04

S 2/4/04

Continued on Page

Read and Understood By

Clare Lenich 2/10/04 Leah Balko 2/10/04
Signed Date Signed Date

pg 269523 a
(cont. from pg NA b)

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100A

SOP 724 Rev 8

Date: 2/4/04

Instrument Background and Response Checklist

P-10 Supply	P-10 Flow
1 1650	A 6.1
2 500	B
	C
	D

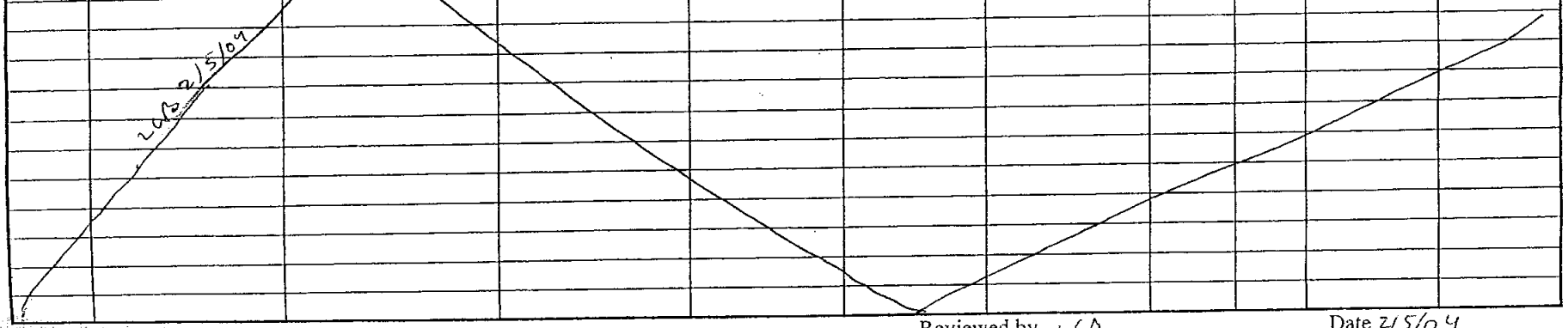
Bkg.	Cal. File ID
Dr A	BKA0130W
Dr B	
Dr C	
Dr D	NP

Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On line	Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On-line
1	g		P		g		P		✓	9	g		P		g		P		✓
2		g	P	P					✓	10									✓
3									✓	11									✓
4		✓	✓	✓					✓	12									✓
5			P						✓	13	NP				NP				OL
6									✓	14									
7									✓	15									
8	✓		✓		✓		✓		✓	16	✓				✓				✓

P = passes; R = Recount, H = high; L = low; W = weekly; α = Alpha; B = Beta; DR = Daily Response Check; Stat = Status; Det = Detector; Bkg = Background; OL = Offline; NP = Not Processed.

Runlog

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp .Init.	Outp. Date	Cmnt Below
1-12	DR Checks	NA	NA	EFA0209	30	0841	g	g	2/4/04	NA
2,3,4	DR Recount	NA	NA	EFA0204A	30	0851	g	g	2/4/04	
1-12	BKG Check	NA	NA	BKA0204	60	0858	g	g	2/4/04	
1-12	03170141-20	17014AMC.XLS	Am241 Curve	AAM0204	10	1115	g	g	2/4/04	



Reviewed by LCD Date 2/5/04

Form 780r6.frm (4/6/2001)

Comments:

000126

Gross Alpha/Beta in Water*

Analyst: NT
Prep. Date:S 05/08/03
Prep. Date:C 05/12/03

Analytical Balance No:13
SOP Used:702 Rev16

Data Filename:
Count Date/Time:

W.O.#	Sample #	Gravimetric Aliquot Determination Tare PC (g)	Gross PC (g)	Solid Mass (g)	Salt added (ml)	Remarks	CAR GRP	Pos Car No.	POS Ckd by
0317014	1	9.0299	9.037	7.1	0.2	ALL DESSICATED ON 05/12/03 @ 17:30			
0317014	2	9.0251	9.032	6.9	0.2				
0317014	3	9.0166	9.0338	17.2	0.5				
0317014	4	9.0126	9.0296	17	0.5				
0317014	5	9.0149	9.0461	31.2	0.8				
0317014	6	9.0261	9.0555	29.4	0.8				
0317014	7	9.0187	9.0611	42.4	1.1				
0317014	8	9.0487	9.0874	38.7	1.1				
0317014	9	9.0436	9.097	53.4	1.4				
0317014	10	9.0422	9.0962	54	1.4				
0317014	11	9.0332	9.1026	69.4	1.7				
0317014	12	8.9964	9.068	71.6	1.7				
0317014	13	9.0514	9.129	77.6	2				
0317014	14	9.032	9.1143	82.3	2				
0317014	15	9.0294	9.1323	102.9	2.3				
0317014	16	9.0159	9.1127	96.8	2.3				
0317014	17	9.0248	9.1515	126.7	2.6				
0317014	18	9.035	9.1431	108.1	2.6				
0317014	19	9.0143	9.1538	139.5	2.9				
0317014	20	9.032	9.1773	145.3	2.9				

*ALL DESSICATED ON 05/12/03 @ 17:30

Std. No.	Std. Type	Pipet NO.	Spike Vol (ml)	Spike dpm/ml
541.1808.26	Am 241	RS-010	0.2	11058.12

Spiked by: NT 05/08/03
Spike Witness: JRK 05/08/03
Reviewed by: 2/5/04

Relinquished by: see previous
Received by:

* samples were re-weighed on 2/4/04 prior to counting, and new weights were entered into the benchsheet 2/5/04

2/5/04.....11:00 AM

R/BENCH-SH/17014amc

000027

Gross Alpha/Beta in Water

DRAFT

Analyst: NT
Prep. Date:S. 05/08/03
Prep. Date:C 05/12/03

Analytical Balance No:13
SOP Used:702 Rev16

Data Filename:
Count Date/Time:

W.O.#	Sample #	Gravimetric Aliquot Determination Tare PC (g)	Gross PC (g)	Solid Mass (g)	Salt added (ml)		Remarks	CAR GRP	Pos Car No.	POS Ckd by
0317014	1	9.0299	9.037	7.1		0.2	ALL DESSICATED ON 05/12/03 @ 17:30			
0317014	2	9.0251	9.032	6.9		0.2				
0317014	3	9.0166	9.0338	17.2		0.5				
0317014	4	9.0126	9.0296	17		0.5				
0317014	5	9.0149	9.0461	31.2		0.8				
0317014	6	9.0261	9.0555	29.4		0.8				
0317014	7	9.0187	9.0611	42.4		1.1				
0317014	8	9.0487	9.0874	38.7		1.1				
0317014	9	9.0436	9.097	53.4		1.4				
0317014	10	9.0422	9.0962	54		1.4				
0317014	11	9.0332	9.1026	69.4		1.7				
0317014	12	8.9964	9.068	71.6		1.7				
0317014	13	9.0514	9.129	77.6		2				
0317014	14	9.032	9.1143	82.3		2				
0317014	15	9.0294	9.1279	98.5	9.1323	2.3				
0317014	16	9.0159	9.1127	96.8		2.3				
0317014	17	9.0248	9.1437	118.9	9.1515	2.6				
0317014	18	9.035	9.1393	104.3	9.1431	2.6				
0317014	19	9.0143	9.1459	131.6	9.1538	2.9				
0317014	20	9.032	9.1672	135.2	9.1713	2.9				

*ALL DESSICATED ON 05/12/03 @ 17:30

Std. No.	Std. Type	Pipet NO.	Spike Vol (ml)	Spike dpm/ml
541.1808.26	Am 241	RS-010	0.2	11058.12

Spiked by: NT 05/08/03
Spike Witness: JRK 05/08/03
Reviewed by: Cu 5/13/03
Relinquished by: Cu 5/13/03
Received by: E 5/17/03

5/13/03.....3:15 PM

R/BENCH-SH/17014AMC.XLS

000128

Gross Alpha/Beta in Water

DRAFT

Analyst: NT NT
Prep. Date:S. 5/8/03
Prep. Date:C 5/12/03

DRAFT

Analytical Balance No:13
SOP Used:702 Rev15

Data Filename:
Count Date/Time:

all desiccated on 5/12/03 @ 17:30.

W.O.#	Sample #	Gravimetric Aliquot Determinatio Tare PC (g)	Gross PC (g)	Solid Mass (g)	Salt added (ml)
0317014	1			0	0.2
0317014	2			0	0.2
0317014	3			0	0.5
0317014	4			0	0.5
0317014	5			0	0.8
0317014	6			0	0.8
0317014	7			0	1.1
0317014	8			0	1.1
0317014	9			0	1.4
0317014	10			0	1.4
0317014	11			0	1.7
0317014	12			0	1.7
0317014	13			0	2
0317014	14			0	2
0317014	15			0	2.3
0317014	16			0	2.3
0317014	17			0	2.6
0317014	18			0	2.6
0317014	19			0	2.9
0317014	20			0	2.9

Std. No.	Std. Type	Pipet NO.	Spike Vol (ml)	Spike Act./ml
S41.1808.26	Am 241	RS-010	0.2	11,058.12 dpm/ml

Spiked by: NT 5/8/03
Spike Witness: JAK 5/9/03
Reviewed by:

Relinquished by:
Received by:

5/8/03.....3:54 PM

R/BENCH-SH/17014AMC.XLS

000129

PROJECT 571.1808.26 Am-241 PRIMARY STD. Continued From Page

1) Prepare a primary dilution of Am-241. Transfer Std 541 (Analytics SRS 59175-307) to a 40 ml VOA vial + dilute to capacity w/ 3M HNO_3.

2) Determine mass of std. transferred:

Mass of ampule (opened) + beaker	= 38.2533 g	Bal 12
Mass of empty ampule + beaker	= 33.1473 g	↓
Net mass of std transferred	= 5.1060 g	

3) Dilute standard to final mass w/ 3M HNO_3

Mass of empty 40 ml VOA w/ lid	= 27.1418 g	Bal 12
VOA + std + 3M HNO_3	= 72.0838 g	↓
Final mass of 1° std.	44.9420 g	

4) Final Activity Calculation:

$$\frac{(4.096\times10^4\ dps)(5.1060\ g)(60\ dpm/dps)}{(5.55093\ g)(44.9420\ g)} = 50{,}300.7\ dpm/g$$

ANALYTICS
1680 Seaboard Ind. Blvd. Atlanta, GA 30318 U.S.A. (404) 352-8677
Type: Am-241
SRS: 59175-307 Date: 2/3/00 12:00 EST
Amount: 1,107,101 Exp: [illegible] QA: [illegible]
PO#: 23018 Item 1
5.55093 grams 3M HNO3 solution
GAUTION: RADIOACTIVE MATERIAL

Continued on Page

Read and Understood By

Signed	Date	Signed	Date
[signature]	3/7/00	Melissa Guyttal	3/22/00

ANALYTICS

PAID 00541
Recd 2-04-00

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

59175-307

Am-241 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master liquid radionuclide solution source. The master source was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Am-241
ACTIVITY (dps):	4.096 E4
HALF-LIFE:	432.2 years
CALIBRATION DATE:	February 3, 2000 12:00 EST
TOTAL UNCERTAINTY*:	3.5%
SYSTEMATIC:	2.5%
RANDOM:	1.0%

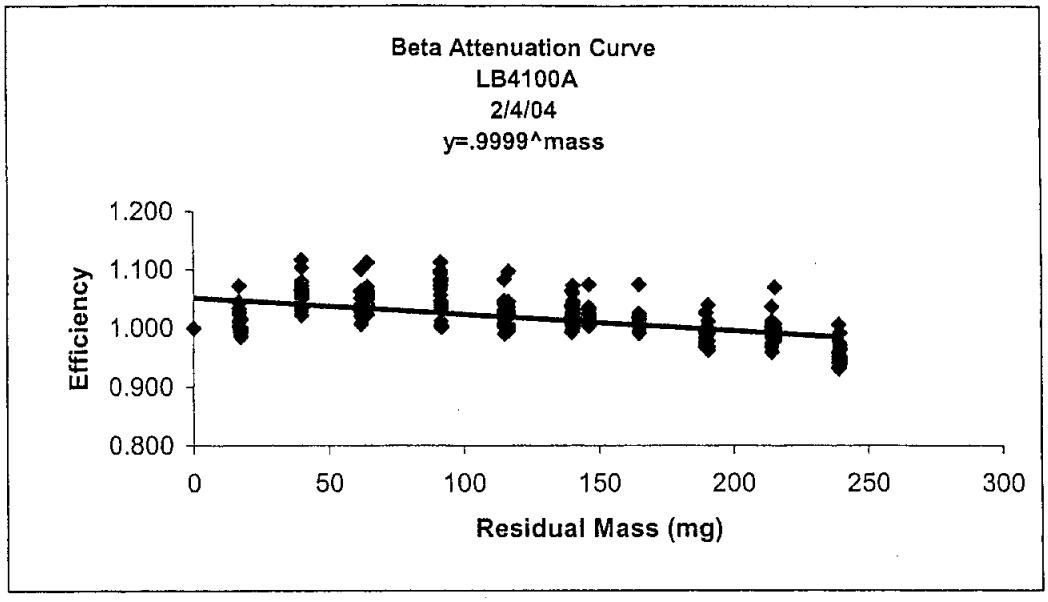
*99% confidence level.

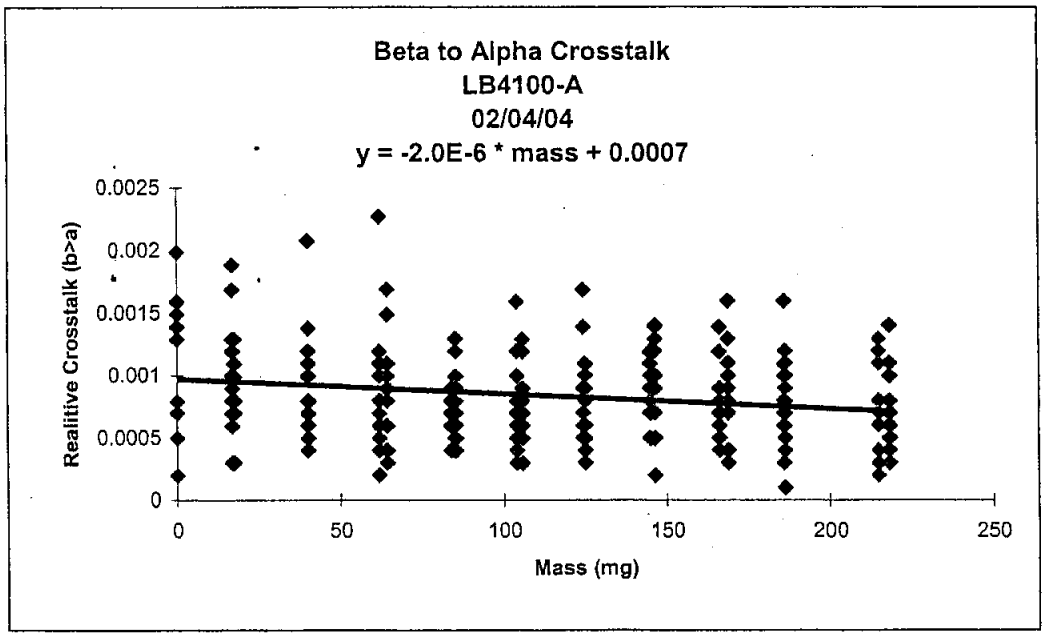
5.55093 grams 3M HNO_3 solution.

P O NUMBER 23018, Item 1

SOURCE PREPARED BY: _____
E. A. Taskaev, Radiochemist

Q A APPROVED: RCW 2/3/00


Beta Attenuation Curve
LB4100A
2/4/04
y=.9999^mass
Efficiency
1.200
1.100
1.000
0.900
0.800
0
50
100
150
200
250
300
Residual Mass (mg)


Beta to Alpha Crosstalk
LB4100-A
02/04/04
y = -2.0E-6 * mass + 0.0007
Realitive Crosstalk (b>a)
0.0025
0.002
0.0015
0.001
0.0005
0
0
50
100
150
200
250
Mass (mg)

Beta Attenuation Calibration Worksheet - LB4100A

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4418.39
4417.82

Attenuation equation
*y=b*m^ax*
b 1
m 0.9999
a 1

min rel dev -4.9%
max rel dev 11.0%
limit < 15%

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
AGB0203A	A1	1120	20	10118	1.31	2/3/04 11:17	2.341	7724	4418.39	1	19617.7	0.3936	0.3936	0	1.000	1	0.000	0.00%
AGB0203A	A2	1120	15	10032	1.34	2/3/04 11:17	2.057	7487	4418.39	1	19617.7	0.3815	0.3815	0	1.000	1	0.000	0.00%
AGB0203A	A3	1120	13	10055	1.27	2/3/04 11:17	2.097	7917	4418.39	1	19617.7	0.4035	0.4035	0	1.000	1	0.000	0.00%
AGB0203A	A4	1120	22	10053	1.29	2/3/04 11:17	1.939	7793	4418.39	1	19617.7	0.3971	0.3971	0	1.000	1	0.000	0.00%
AGB0203B	B1	1120	10	10064	1.22	2/3/04 11:19	1.792	8249	4418.39	1	19617.7	0.4204	0.4204	0	1.000	1	0.000	0.00%
AGB0203B	B2	1120	32	10076	1.23	2/3/04 11:19	1.618	8192	4418.39	1	19617.7	0.4175	0.4175	0	1.000	1	0.000	0.00%
AGB0203B	B3	1120	8	10012	1.24	2/3/04 11:19	1.945	8074	4418.39	1	19617.7	0.4115	0.4115	0	1.000	1	0.000	0.00%
AGB0203B	B4	1120	10	10043	1.28	2/3/04 11:19	1.786	7846	4418.39	1	19617.7	0.3999	0.3999	0	1.000	1	0.000	0.00%
AGB0203C	C1	1120	18	10090	1.26	2/3/04 11:21	1.757	8008	4418.39	1	19617.7	0.4081	0.4081	0	1.000	1	0.000	0.00%
AGB0203C	C2	1120	28	10083	1.26	2/3/04 11:22	1.875	8002	4418.39	1	19617.7	0.4078	0.4078	0	1.000	1	0.000	0.00%
AGB0203C	C3	1120	13	10063	1.25	2/3/04 11:21	1.736	8050	4418.39	1	19617.7	0.4103	0.4103	0	1.000	1	0.000	0.00%
AGB0203C	C4	1120	22	10054	1.27	2/3/04 11:22	1.983	7917	4418.39	1	19617.7	0.4034	0.4034	0	1.000	1	0.000	0.00%
ASR0205	A1	1	5	10066	1.25	2/5/04 10:44	2.341	8053	4417.82	1	19615.1	0.4104	0.3936	16.9	1.043	0.998312	0.044	4.26%
ASR0205	A2	1	9	10030	1.25	2/5/04 11:02	2.057	8024	4417.82	1	19615.1	0.4090	0.3815	16.9	1.072	0.998312	0.074	6.87%
ASR0205	A3	1	13	10073	1.26	2/5/04 11:07	2.097	7994	4417.82	1	19615.1	0.4075	0.4035	16.9	1.010	0.998312	0.012	1.14%
ASR0205	A4	1	16	10091	1.28	2/5/04 11:14	1.939	7884	4417.82	1	19615.1	0.4018	0.3971	16.9	1.012	0.998312	0.013	1.33%
ASR0205	B1	1	16	10093	1.22	2/5/04 11:18	1.792	8273	4417.82	1	19615.1	0.4217	0.4204	16.9	1.003	0.998312	0.005	0.47%
ASR0205	B2	1	11	10094	1.2	2/5/04 11:23	1.618	8412	4417.82	1	19615.1	0.4288	0.4175	16.9	1.027	0.998312	0.029	2.79%
ASR0205	B3	1	10	10093	1.21	2/5/04 11:26	1.945	8341	4417.82	1	19615.1	0.4252	0.4115	16.9	1.033	0.998312	0.035	3.38%
ASR0205	B4	1	7	10164	1.24	2/5/04 11:29	1.786	8197	4417.82	1	19615.1	0.4178	0.3999	16.9	1.045	0.998312	0.047	4.45%
ASR0205	C1	1	8	10099	1.21	2/5/04 11:39	1.757	8346	4417.82	1	19615.1	0.4254	0.4081	16.9	1.042	0.998312	0.044	4.23%
ASR0205	C2	1	6	10077	1.23	2/5/04 11:43	1.875	8193	4417.82	1	19615.1	0.4176	0.4078	16.9	1.024	0.998312	0.026	2.50%
ASR0205	C3	1	10	10092	1.2	2/5/04 11:48	1.736	8410	4417.82	1	19615.1	0.4287	0.4103	16.9	1.045	0.998312	0.047	4.45%
ASR0205	C4	1	10	10070	1.22	2/5/04 12:12	1.983	8254	4417.82	1	19615.1	0.4207	0.4034	16.9	1.043	0.998312	0.044	4.26%
ASR0205	A1	2	16	10052	1.31	2/5/04 12:59	2.341	7673	4417.82	1	19615.1	0.3911	0.3936	17.5	0.994	0.998252	-0.005	-0.47%
ASR0205	A2	2	15	10039	1.32	2/5/04 10:44	2.057	7605	4417.82	1	19615.1	0.3876	0.3815	17.5	1.016	0.998252	0.018	1.75%
ASR0205	A3	2	11	10057	1.29	2/5/04 11:02	2.097	7796	4417.82	1	19615.1	0.3973	0.4035	17.5	0.985	0.998252	-0.013	-1.36%
ASR0205	A4	2	11	10060	1.3	2/5/04 11:07	1.939	7738	4417.82	1	19615.1	0.3944	0.3971	17.5	0.993	0.998252	-0.005	-0.52%
ASR0205	B1	2	8	10197	1.24	2/5/04 11:14	1.792	8223	4417.82	1	19615.1	0.4191	0.4204	17.5	0.997	0.998252	-0.001	-0.13%
ASR0205	B2	2	19	10087	1.25	2/5/04 11:19	1.618	8070	4417.82	1	19615.1	0.4113	0.4175	17.5	0.985	0.998252	-0.013	-1.32%
ASR0205	B3	2	9	10111	1.27	2/5/04 11:23	1.945	7961	4417.82	1	19615.1	0.4058	0.4115	17.5	0.986	0.998252	-0.012	-1.23%
ASR0205	B4	2	4	10044	1.28	2/5/04 11:26	1.786	7847	4417.82	1	19615.1	0.4000	0.3999	17.5	1.000	0.998252	0.002	0.20%
ASR0205	C1	2	9	10012	1.26	2/5/04 11:29	1.757	7946	4417.82	1	19615.1	0.4050	0.4081	17.5	0.992	0.998252	-0.006	-0.59%
ASR0205	C2	2	11	10081	1.24	2/5/04 11:39	1.875	8130	4417.82	1	19615.1	0.4144	0.4078	17.5	1.016	0.998252	0.018	1.75%
ASR0205	C3	2	10	10037	1.23	2/5/04 11:44	1.736	8160	4417.82	1	19615.1	0.4159	0.4103	17.5	1.014	0.998252	0.016	1.53%
ASR0205	C4	2	8	10038	1.27	2/5/04 11:48	1.983	7904	4417.82	1	19615.1	0.4029	0.4034	17.5	0.999	0.998252	0.000	0.03%
ASR0205	A1	3	11	10064	1.23	2/5/04 12:51	2.341	8182	4417.82	1	19615.1	0.4170	0.3936	40.1	1.060	0.995998	0.064	5.99%
ASR0205	A2	3	5	10075	1.22	2/5/04 12:59	2.057	8258	4417.82	1	19615.1	0.4209	0.3815	40.1	1.103	0.995998	0.107	9.72%

00133

Beta Attenuation Calibration Worksheet - LB4100A

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4418.39
4417.82

Attenuation equation
*y=b*m^ax*

b	*1*
m	*0.9999*
a	*1*

min rel dev	-4.9%
max rel dev	11.0%
limit	< 15%

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ASR0205	A3	3	16	10086	1.2	2/5/04 10:44	2.097	8405	4417.82	1	19615.1	0.4284	0.4035	40.1	1.062	0.995998	0.066	6.19%
ASR0205	A4	3	11	10057	1.22	2/5/04 11:02	1.939	8243	4417.82	1	19615.1	0.4202	0.3971	40.1	1.058	0.995998	0.062	5.86%
ASR0205	B1	3	14	10033	1.19	2/5/04 11:07	1.792	8431	4417.82	1	19615.1	0.4297	0.4204	40.1	1.022	0.995998	0.026	2.56%
ASR0205	B2	3	10	10091	1.17	2/5/04 11:14	1.618	8625	4417.82	1	19615.1	0.4396	0.4175	40.1	1.053	0.995998	0.057	5.41%
ASR0205	B3	3	11	10101	1.21	2/5/04 11:18	1.945	8348	4417.82	1	19615.1	0.4255	0.4115	40.1	1.034	0.995998	0.038	3.68%
ASR0205	B4	3	4	10016	1.19	2/5/04 11:23	1.786	8417	4417.82	1	19615.1	0.4290	0.3999	40.1	1.073	0.995998	0.077	7.17%
ASR0205	C1	3	13	10081	1.18	2/5/04 11:26	1.757	8543	4417.82	1	19615.1	0.4355	0.4081	40.1	1.067	0.995998	0.071	6.65%
ASR0205	C2	3	11	10043	1.22	2/5/04 11:29	1.875	8232	4417.82	1	19615.1	0.4196	0.4078	40.1	1.029	0.995998	0.033	3.19%
ASR0205	C3	3	11	10079	1.18	2/5/04 11:39	1.736	8542	4417.82	1	19615.1	0.4354	0.4103	40.1	1.061	0.995998	0.065	6.14%
ASR0205	C4	3	10	10051	1.19	2/5/04 11:43	1.983	8446	4417.82	1	19615.1	0.4305	0.4034	40.1	1.067	0.995998	0.071	6.66%
ASR0205	A1	4	12	10122	1.24	2/5/04 12:48	2.341	8163	4417.82	1	19615.1	0.4160	0.3936	40	1.057	0.996008	0.061	5.77%
ASR0205	A2	4	9	10034	1.2	2/5/04 12:51	2.057	8362	4417.82	1	19615.1	0.4262	0.3815	40	1.117	0.996008	0.121	10.84%
ASR0205	A3	4	7	10140	1.22	2/5/04 12:59	2.097	8311	4417.82	1	19615.1	0.4236	0.4035	40	1.050	0.996008	0.054	5.14%
ASR0205	A4	4	11	10125	1.23	2/5/04 10:44	1.939	8232	4417.82	1	19615.1	0.4196	0.3971	40	1.056	0.996008	0.060	5.72%
ASR0205	B1	4	10	10030	1.17	2/5/04 11:02	1.792	8573	4417.82	1	19615.1	0.4370	0.4204	40	1.039	0.996008	0.043	4.17%
ASR0205	B2	4	9	10016	1.16	2/5/04 11:07	1.618	8634	4417.82	1	19615.1	0.4401	0.4175	40	1.054	0.996008	0.058	5.52%
ASR0205	B3	4	13	10023	1.2	2/5/04 11:14	1.945	8353	4417.82	1	19615.1	0.4257	0.4115	40	1.035	0.996008	0.039	3.73%
ASR0205	B4	4	4	10077	1.19	2/5/04 11:18	1.786	8468	4417.82	1	19615.1	0.4316	0.3999	40	1.079	0.996008	0.083	7.73%
ASR0205	C1	4	12	10092	1.18	2/5/04 11:23	1.757	8553	4417.82	1	19615.1	0.4359	0.4081	40	1.068	0.996008	0.072	6.75%
ASR0205	C2	4	4	10073	1.18	2/5/04 11:26	1.875	8536	4417.82	1	19615.1	0.4351	0.4078	40	1.067	0.996008	0.071	6.64%
ASR0205	C3	4	9	10035	1.2	2/5/04 11:29	1.736	8363	4417.82	1	19615.1	0.4262	0.4103	40	1.039	0.996008	0.043	4.13%
ASR0205	C4	4	10	10018	1.19	2/5/04 11:39	1.983	8418	4417.82	1	19615.1	0.4291	0.4034	40	1.064	0.996008	0.068	6.35%
ASR0205	A1	5	9	10091	1.23	2/5/04 12:38	2.341	8204	4417.82	1	19615.1	0.4181	0.3936	61.8	1.062	0.993839	0.069	6.45%
ASR0205	A2	5	8	10059	1.22	2/5/04 12:48	2.057	8245	4417.82	1	19615.1	0.4202	0.3815	61.8	1.101	0.993839	0.108	9.77%
ASR0205	A3	5	6	10080	1.24	2/5/04 12:51	2.097	8129	4417.82	1	19615.1	0.4143	0.4035	61.8	1.027	0.993839	0.033	3.22%
ASR0205	A4	5	9	10040	1.28	2/5/04 12:59	1.939	7844	4417.82	1	19615.1	0.3998	0.3971	61.8	1.007	0.993839	0.013	1.27%
ASR0205	B1	5	11	10067	1.18	2/5/04 10:44	1.792	8531	4417.82	1	19615.1	0.4348	0.4204	61.8	1.034	0.993839	0.041	3.92%
ASR0205	B2	5	12	10052	1.18	2/5/04 11:02	1.618	8519	4417.82	1	19615.1	0.4342	0.4175	61.8	1.040	0.993839	0.046	4.44%
ASR0205	B3	5	8	10079	1.21	2/5/04 11:07	1.945	8330	4417.82	1	19615.1	0.4246	0.4115	61.8	1.032	0.993839	0.038	3.68%
ASR0205	B4	5	6	10098	1.21	2/5/04 11:14	1.786	8345	4417.82	1	19615.1	0.4254	0.3999	61.8	1.064	0.993839	0.070	6.58%
ASR0205	C1	5	11	10045	1.23	2/5/04 11:18	1.757	8167	4417.82	1	19615.1	0.4163	0.4081	61.8	1.020	0.993839	0.026	2.56%
ASR0205	C2	5	4	10026	1.18	2/5/04 11:23	1.875	8497	4417.82	1	19615.1	0.4331	0.4078	61.8	1.062	0.993839	0.068	6.41%
ASR0205	C3	5	8	10085	1.21	2/5/04 11:26	1.736	8335	4417.82	1	19615.1	0.4248	0.4103	61.8	1.035	0.993839	0.042	4.02%
ASR0205	C4	5	7	10070	1.21	2/5/04 11:29	1.983	8322	4417.82	1	19615.1	0.4242	0.4034	61.8	1.051	0.993839	0.058	5.48%
ASR0205	A1	6	8	10027	1.22	2/5/04 12:35	2.341	8219	4417.82	1	19615.1	0.4189	0.3936	64.2	1.064	0.993601	0.071	6.64%
ASR0205	A2	6	11	10078	1.21	2/5/04 12:38	2.057	8329	4417.82	1	19615.1	0.4245	0.3815	64.2	1.113	0.993601	0.119	10.70%
ASR0205	A3	6	13	10063	1.22	2/5/04 12:48	2.097	8248	4417.82	1	19615.1	0.4204	0.4035	64.2	1.042	0.993601	0.048	4.64%
ASR0205	A4	6	18	10091	1.23	2/5/04 12:51	1.939	8204	4417.82	1	19615.1	0.4182	0.3971	64.2	1.053	0.993601	0.059	5.63%

1100 37

Beta Attenuation Calibration Worksheet - LB4100A

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4418.39
4417.82

Attenuation equation
*y=b*m^ax*

b	*1*
m	*0.9999*
a	*1*

min rel dev	-4.9%
max rel dev	11.0%
limit	< 15%

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ASR0205	B1	6	10	10040	1.19	2/5/04 12:59	1.792	8437	4417.82	1	19615.1	0.4300	0.4204	64.2	1.023	0.993601	0.029	2.86%
ASR0205	B2	6	14	10149	1.19	2/5/04 10:44	1.618	8529	4417.82	1	19615.1	0.4347	0.4175	64.2	1.041	0.993601	0.048	4.58%
ASR0205	B3	6	9	10046	1.2	2/5/04 11:02	1.945	8372	4417.82	1	19615.1	0.4267	0.4115	64.2	1.037	0.993601	0.043	4.18%
ASR0205	B4	6	8	10070	1.21	2/5/04 11:07	1.786	8322	4417.82	1	19615.1	0.4242	0.3999	64.2	1.061	0.993601	0.067	6.34%
ASR0205	C1	6	9	10098	1.19	2/5/04 11:14	1.757	8486	4417.82	1	19615.1	0.4325	0.4081	64.2	1.060	0.993601	0.066	6.25%
ASR0205	C2	6	6	10078	1.19	2/5/04 11:18	1.875	8469	4417.82	1	19615.1	0.4317	0.4078	64.2	1.058	0.993601	0.065	6.13%
ASR0205	C3	6	5	10050	1.19	2/5/04 11:23	1.736	8445	4417.82	1	19615.1	0.4305	0.4103	64.2	1.049	0.993601	0.056	5.30%
ASR0205	C4	6	4	10088	1.19	2/5/04 11:26	1.983	8477	4417.82	1	19615.1	0.4321	0.4034	64.2	1.071	0.993601	0.077	7.23%
ASR0205	A1	7	12	10126	1.27	2/5/04 12:31	2.341	7973	4417.82	1	19615.1	0.4064	0.3936	91.7	1.032	0.990872	0.042	4.03%
ASR0205	A2	7	5	10067	1.24	2/5/04 12:35	2.057	8119	4417.82	1	19615.1	0.4138	0.3815	91.7	1.085	0.990872	0.094	8.64%
ASR0205	A3	7	8	10078	1.27	2/5/04 12:38	2.097	7935	4417.82	1	19615.1	0.4045	0.4035	91.7	1.002	0.990872	0.012	1.15%
ASR0205	A4	7	16	10063	1.29	2/5/04 12:48	1.939	7801	4417.82	1	19615.1	0.3976	0.3971	91.7	1.001	0.990872	0.010	1.02%
ASR0205	B1	7	13	10099	1.22	2/5/04 12:51	1.792	8278	4417.82	1	19615.1	0.4219	0.4204	91.7	1.004	0.990872	0.013	1.27%
ASR0205	B2	7	8	10039	1.22	2/5/04 12:59	1.618	8229	4417.82	1	19615.1	0.4194	0.4175	91.7	1.005	0.990872	0.014	1.37%
ASR0205	B3	7	9	10045	1.23	2/5/04 10:44	1.945	8167	4417.82	1	19615.1	0.4162	0.4115	91.7	1.012	0.990872	0.021	2.05%
ASR0205	B4	7	7	10079	1.24	2/5/04 11:02	1.786	8128	4417.82	1	19615.1	0.4143	0.3999	91.7	1.036	0.990872	0.045	4.37%
ASR0205	C1	7	12	10010	1.21	2/5/04 11:07	1.757	8273	4417.82	1	19615.1	0.4217	0.4081	91.7	1.033	0.990872	0.042	4.10%
ASR0205	C2	7	7	10054	1.21	2/5/04 11:14	1.875	8309	4417.82	1	19615.1	0.4235	0.4078	91.7	1.038	0.990872	0.048	4.58%
ASR0205	C3	7	6	10098	1.24	2/5/04 11:19	1.736	8144	4417.82	1	19615.1	0.4151	0.4103	91.7	1.012	0.990872	0.021	2.06%
ASR0205	C4	7	5	10060	1.22	2/5/04 11:23	1.983	8246	4417.82	1	19615.1	0.4203	0.4034	91.7	1.042	0.990872	0.051	4.88%
ASR0205	A1	8	11	10134	1.2	2/5/04 12:25	2.341	8445	4417.82	1	19615.1	0.4304	0.3936	91.4	1.094	0.990902	0.103	9.39%
ASR0205	A2	8	11	10079	1.21	2/5/04 12:31	2.057	8330	4417.82	1	19615.1	0.4246	0.3815	91.4	1.113	0.990902	0.122	10.95%
ASR0205	A3	8	6	10099	1.19	2/5/04 12:35	2.097	8487	4417.82	1	19615.1	0.4325	0.4035	91.4	1.072	0.990902	0.081	7.57%
ASR0205	A4	8	7	10028	1.19	2/5/04 12:38	1.939	8427	4417.82	1	19615.1	0.4295	0.3971	91.4	1.081	0.990902	0.091	8.38%
ASR0205	B1	8	8	10104	1.16	2/5/04 12:47	1.792	8710	4417.82	1	19615.1	0.4440	0.4204	91.4	1.056	0.990902	0.065	6.17%
ASR0205	B2	8	14	10025	1.17	2/5/04 12:51	1.618	8568	4417.82	1	19615.1	0.4367	0.4175	91.4	1.046	0.990902	0.055	5.28%
ASR0205	B3	8	8	10162	1.18	2/5/04 12:59	1.945	8612	4417.82	1	19615.1	0.4389	0.4115	91.4	1.067	0.990902	0.076	7.11%
ASR0205	B4	8	7	10083	1.19	2/5/04 10:44	1.786	8473	4417.82	1	19615.1	0.4319	0.3999	91.4	1.080	0.990902	0.089	8.26%
ASR0205	C1	8	13	10064	1.17	2/5/04 11:02	1.757	8602	4417.82	1	19615.1	0.4384	0.4081	91.4	1.074	0.990902	0.083	7.76%
ASR0205	C2	8	6	10047	1.17	2/5/04 11:07	1.875	8587	4417.82	1	19615.1	0.4377	0.4078	91.4	1.073	0.990902	0.082	7.67%
ASR0205	C3	8	14	10077	1.14	2/5/04 11:14	1.736	8839	4417.82	1	19615.1	0.4506	0.4103	91.4	1.098	0.990902	0.107	9.77%
ASR0205	C4	8	10	10034	1.17	2/5/04 11:18	1.983	8576	4417.82	1	19615.1	0.4371	0.4034	91.4	1.083	0.990902	0.093	8.54%
ASR0205	A1	9	10	10102	1.27	2/5/04 12:18	2.341	7954	4417.82	1	19615.1	0.4054	0.3936	115	1.030	0.988566	0.041	4.02%
ASR0205	A2	9	10	10050	1.24	2/5/04 12:26	2.057	8105	4417.82	1	19615.1	0.4131	0.3815	115	1.083	0.988566	0.094	8.70%
ASR0205	A3	9	10	10105	1.27	2/5/04 12:31	2.097	7957	4417.82	1	19615.1	0.4055	0.4035	115	1.005	0.988566	0.017	1.65%
ASR0205	A4	9	7	10063	1.26	2/5/04 12:35	1.939	7987	4417.82	1	19615.1	0.4071	0.3971	115	1.025	0.988566	0.036	3.55%
ASR0205	B1	9	13	10144	1.22	2/5/04 12:38	1.792	8315	4417.82	1	19615.1	0.4238	0.4204	115	1.008	0.988566	0.020	1.94%
ASR0205	B2	9	10	10092	1.23	2/5/04 12:48	1.618	8205	4417.82	1	19615.1	0.4182	0.4175	115	1.002	0.988566	0.013	1.31%

000135

Beta Attenuation Calibration Worksheet - LB4100A

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4418.39
4417.82

Attenuation equation
*y=b*m^ax*

b	*1*
m	*0.9999*
a	*1*

min rel dev	-4.9%
max rel dev	11.0%
limit	< 15%

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ASR0205	B3	9	3	10072	1.26	2/5/04 12:51	1.945	7994	4417.82	1	19615.1	0.4074	0.4115	115	0.990	0.988566	0.002	0.16%
ASR0205	B4	9	10	10038	1.23	2/5/04 12:59	1.786	8161	4417.82	1	19615.1	0.4160	0.3999	115	1.040	0.988566	0.052	4.97%
ASR0205	C1	9	14	10059	1.2	2/5/04 10:44	1.757	8383	4417.82	1	19615.1	0.4273	0.4081	115	1.047	0.988566	0.058	5.57%
ASR0205	C2	9	4	10039	1.22	2/5/04 11:02	1.875	8229	4417.82	1	19615.1	0.4194	0.4078	115	1.028	0.988566	0.040	3.88%
ASR0205	C3	9	10	10045	1.23	2/5/04 11:07	1.736	8167	4417.82	1	19615.1	0.4163	0.4103	115	1.015	0.988566	0.026	2.56%
ASR0205	C4	9	8	10075	1.22	2/5/04 11:14	1.983	8258	4417.82	1	19615.1	0.4209	0.4034	115	1.043	0.988566	0.055	5.25%
ASR0205	A1	10	5	10090	1.27	2/5/04 12:12	2.341	7945	4417.82	1	19615.1	0.4049	0.3936	116.5	1.029	0.988418	0.040	3.92%
ASR0205	A2	10	16	10096	1.23	2/5/04 12:18	2.057	8208	4417.82	1	19615.1	0.4184	0.3815	116.5	1.097	0.988418	0.108	9.86%
ASR0205	A3	10	9	10152	1.25	2/5/04 12:26	2.097	8122	4417.82	1	19615.1	0.4139	0.4035	116.5	1.026	0.988418	0.038	3.66%
ASR0205	A4	10	10	10013	1.24	2/5/04 12:31	1.939	8075	4417.82	1	19615.1	0.4116	0.3971	116.5	1.036	0.988418	0.048	4.62%
ASR0205	B1	10	7	10092	1.23	2/5/04 12:35	1.792	8205	4417.82	1	19615.1	0.4182	0.4204	116.5	0.995	0.988418	0.006	0.64%
ASR0205	B2	10	6	10098	1.21	2/5/04 12:38	1.618	8345	4417.82	1	19615.1	0.4254	0.4175	116.5	1.019	0.988418	0.030	2.99%
ASR0205	B3	10	9	10021	1.24	2/5/04 12:48	1.945	8081	4417.82	1	19615.1	0.4119	0.4115	116.5	1.001	0.988418	0.013	1.26%
ASR0205	B4	10	11	10029	1.25	2/5/04 12:51	1.786	8023	4417.82	1	19615.1	0.4089	0.3999	116.5	1.023	0.988418	0.034	3.35%
ASR0205	C1	10	9	10008	1.22	2/5/04 12:59	1.757	8203	4417.82	1	19615.1	0.4181	0.4081	116.5	1.025	0.988418	0.036	3.52%
ASR0205	C2	10	21	10024	1.25	2/5/04 10:44	1.875	8019	4417.82	1	19615.1	0.4087	0.4078	116.5	1.002	0.988418	0.014	1.38%
ASR0205	C3	10	8	10038	1.24	2/5/04 11:02	1.736	8095	4417.82	1	19615.1	0.4126	0.4103	116.5	1.006	0.988418	0.017	1.72%
ASR0205	C4	10	7	10088	1.22	2/5/04 11:07	1.983	8269	4417.82	1	19615.1	0.4215	0.4034	116.5	1.045	0.988418	0.056	5.38%
ASR0205	A1	11	12	10069	1.23	2/5/04 11:48	2.341	8186	4417.82	1	19615.1	0.4172	0.3936	140.4	1.060	0.986059	0.074	6.98%
ASR0205	A2	11	9	10114	1.26	2/5/04 12:12	2.057	8027	4417.82	1	19615.1	0.4091	0.3815	140.4	1.072	0.986059	0.086	8.05%
ASR0205	A3	11	10	10081	1.24	2/5/04 12:18	2.097	8130	4417.82	1	19615.1	0.4144	0.4035	140.4	1.027	0.986059	0.041	3.98%
ASR0205	A4	11	8	10059	1.26	2/5/04 12:26	1.939	7983	4417.82	1	19615.1	0.4069	0.3971	140.4	1.025	0.986059	0.039	3.76%
ASR0205	B1	11	8	10056	1.22	2/5/04 12:31	1.792	8243	4417.82	1	19615.1	0.4201	0.4204	140.4	0.999	0.986059	0.013	1.33%
ASR0205	B2	11	6	10026	1.22	2/5/04 12:35	1.618	8218	4417.82	1	19615.1	0.4189	0.4175	140.4	1.003	0.986059	0.017	1.72%
ASR0205	B3	11	6	10111	1.2	2/5/04 12:38	1.945	8426	4417.82	1	19615.1	0.4295	0.4115	140.4	1.044	0.986059	0.058	5.52%
ASR0205	B4	11	7	10039	1.24	2/5/04 12:48	1.786	8096	4417.82	1	19615.1	0.4127	0.3999	140.4	1.032	0.986059	0.046	4.45%
ASR0205	C1	11	8	10065	1.21	2/5/04 12:51	1.757	8318	4417.82	1	19615.1	0.4240	0.4081	140.4	1.039	0.986059	0.053	5.08%
ASR0205	C2	11	6	10100	1.24	2/5/04 12:59	1.875	8145	4417.82	1	19615.1	0.4152	0.4078	140.4	1.018	0.986059	0.032	3.14%
ASR0205	C3	11	16	10034	1.2	2/5/04 10:44	1.736	8362	4417.82	1	19615.1	0.4262	0.4103	140.4	1.039	0.986059	0.053	5.08%
ASR0205	C4	11	7	10024	1.21	2/5/04 11:02	1.983	8284	4417.82	1	19615.1	0.4222	0.4034	140.4	1.047	0.986059	0.061	5.78%
ASR0205	A1	12	5	10079	1.26	2/5/04 11:44	2.341	7999	4417.82	1	19615.1	0.4077	0.3936	140	1.036	0.986098	0.050	4.80%
ASR0205	A2	12	4	10110	1.27	2/5/04 11:48	2.057	7961	4417.82	1	19615.1	0.4057	0.3815	140	1.063	0.986098	0.077	7.28%
ASR0205	A3	12	15	10061	1.28	2/5/04 12:12	2.097	7860	4417.82	1	19615.1	0.4006	0.4035	140	0.993	0.986098	0.007	0.69%
ASR0205	A4	12	10	10102	1.27	2/5/04 12:18	1.939	7954	4417.82	1	19615.1	0.4054	0.3971	140	1.021	0.986098	0.035	3.40%
ASR0205	B1	12	7	10083	1.23	2/5/04 12:26	1.792	8198	4417.82	1	19615.1	0.4178	0.4204	140	0.994	0.986098	0.008	0.78%
ASR0205	B2	12	5	10033	1.22	2/5/04 12:31	1.618	8224	4417.82	1	19615.1	0.4192	0.4175	140	1.004	0.986098	0.018	1.79%
ASR0205	B3	12	9	10096	1.24	2/5/04 12:35	1.945	8142	4417.82	1	19615.1	0.4150	0.4115	140	1.009	0.986098	0.022	2.22%
ASR0205	B4	12	10	10027	1.23	2/5/04 12:38	1.786	8152	4417.82	1	19615.1	0.4155	0.3999	140	1.039	0.986098	0.053	5.10%

00136

Beta Attenuation Calibration Worksheet - LB4100A

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4418.39
4417.82

Attenuation equation
*y=b*m^ax*

b	*1*
m	*0.9999*
a	*1*

min rel dev	-4.9%
max rel dev	11.0%
limit	< 15%

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ASR0205	C1	12	13	10035	1.26	2/5/04 12:48	1.757	7964	4417.82	1	19615.1	0.4059	0.4081	140	0.995	0.986098	0.009	0.86%
ASR0205	C2	12	9	10031	1.23	2/5/04 12:51	1.875	8155	4417.82	1	19615.1	0.4157	0.4078	140	1.019	0.986098	0.033	3.25%
ASR0205	C3	12	5	10052	1.23	2/5/04 12:59	1.736	8172	4417.82	1	19615.1	0.4165	0.4103	140	1.015	0.986098	0.029	2.87%
ASR0205	C4	12	13	10040	1.24	2/5/04 10:44	1.983	8097	4417.82	1	19615.1	0.4127	0.4034	140	1.023	0.986098	0.037	3.60%
ASR0205	A1	13	6	10155	1.27	2/5/04 11:39	2.341	7996	4417.82	1	19615.1	0.4075	0.3936	146.3	1.035	0.985477	0.050	4.82%
ASR0205	A2	13	13	10137	1.26	2/5/04 11:44	2.057	8045	4417.82	1	19615.1	0.4101	0.3815	146.3	1.075	0.985477	0.089	8.31%
ASR0205	A3	13	11	10141	1.26	2/5/04 11:48	2.097	8048	4417.82	1	19615.1	0.4102	0.4035	146.3	1.017	0.985477	0.031	3.07%
ASR0205	A4	13	11	10052	1.25	2/5/04 12:12	1.939	8042	4417.82	1	19615.1	0.4099	0.3971	146.3	1.032	0.985477	0.047	4.51%
ASR0205	B1	13	2	10063	1.21	2/5/04 12:18	1.792	8317	4417.82	1	19615.1	0.4239	0.4204	146.3	1.008	0.985477	0.023	2.26%
ASR0205	B2	13	9	10067	1.2	2/5/04 12:26	1.618	8389	4417.82	1	19615.1	0.4276	0.4175	146.3	1.024	0.985477	0.039	3.78%
ASR0205	B3	13	12	10046	1.24	2/5/04 12:31	1.945	8102	4417.82	1	19615.1	0.4129	0.4115	146.3	1.004	0.985477	0.018	1.80%
ASR0205	B4	13	9	10064	1.24	2/5/04 12:35	1.786	8116	4417.82	1	19615.1	0.4137	0.3999	146.3	1.035	0.985477	0.049	4.74%
ASR0205	C1	13	6	10035	1.23	2/5/04 12:38	1.757	8159	4417.82	1	19615.1	0.4158	0.4081	146.3	1.019	0.985477	0.033	3.28%
ASR0205	C2	13	7	10072	1.22	2/5/04 12:48	1.875	8256	4417.82	1	19615.1	0.4208	0.4078	146.3	1.032	0.985477	0.046	4.49%
ASR0205	C3	13	9	10076	1.21	2/5/04 12:51	1.736	8327	4417.82	1	19615.1	0.4244	0.4103	146.3	1.035	0.985477	0.049	4.74%
ASR0205	C4	13	7	10044	1.23	2/5/04 12:59	1.983	8166	4417.82	1	19615.1	0.4162	0.4034	146.3	1.032	0.985477	0.046	4.47%
ASR0205	A1	14	10	10046	1.28	2/5/04 11:29	2.341	7848	4417.82	1	19615.1	0.4000	0.3936	164.9	1.016	0.983646	0.033	3.21%
ASR0205	A2	14	11	10055	1.25	2/5/04 11:39	2.057	8044	4417.82	1	19615.1	0.4100	0.3815	164.9	1.075	0.983646	0.091	8.47%
ASR0205	A3	14	7	10040	1.25	2/5/04 11:44	2.097	8032	4417.82	1	19615.1	0.4094	0.4035	164.9	1.015	0.983646	0.031	3.05%
ASR0205	A4	14	10	10090	1.28	2/5/04 11:48	1.939	7883	4417.82	1	19615.1	0.4018	0.3971	164.9	1.012	0.983646	0.028	2.77%
ASR0205	B1	14	9	10069	1.22	2/5/04 12:12	1.792	8253	4417.82	1	19615.1	0.4207	0.4204	164.9	1.001	0.983646	0.017	1.70%
ASR0205	B2	14	10	10066	1.24	2/5/04 12:18	1.618	8118	4417.82	1	19615.1	0.4138	0.4175	164.9	0.991	0.983646	0.007	0.75%
ASR0205	B3	14	5	10050	1.25	2/5/04 12:26	1.945	8040	4417.82	1	19615.1	0.4098	0.4115	164.9	0.996	0.983646	0.012	1.23%
ASR0205	B4	14	11	10080	1.26	2/5/04 12:31	1.786	8000	4417.82	1	19615.1	0.4078	0.3999	164.9	1.020	0.983646	0.036	3.54%
ASR0205	C1	14	16	10097	1.23	2/5/04 12:35	1.757	8209	4417.82	1	19615.1	0.4184	0.4081	164.9	1.025	0.983646	0.042	4.06%
ASR0205	C2	14	9	10051	1.25	2/5/04 12:38	1.875	8041	4417.82	1	19615.1	0.4098	0.4078	164.9	1.005	0.983646	0.021	2.12%
ASR0205	C3	14	10	10060	1.23	2/5/04 12:48	1.736	8179	4417.82	1	19615.1	0.4169	0.4103	164.9	1.016	0.983646	0.032	3.19%
ASR0205	C4	14	12	10051	1.25	2/5/04 12:51	1.983	8041	4417.82	1	19615.1	0.4098	0.4034	164.9	1.016	0.983646	0.032	3.17%
ASR0205	A1	15	9	10116	1.32	2/5/04 11:26	2.341	7664	4417.82	1	19615.1	0.3906	0.3936	189.7	0.992	0.98121	0.011	1.12%
ASR0205	A2	15	11	10069	1.31	2/5/04 11:29	2.057	7686	4417.82	1	19615.1	0.3917	0.3815	189.7	1.027	0.98121	0.046	4.44%
ASR0205	A3	15	7	10050	1.31	2/5/04 11:39	2.097	7672	4417.82	1	19615.1	0.3910	0.4035	189.7	0.969	0.98121	-0.012	-1.25%
ASR0205	A4	15	9	10108	1.31	2/5/04 11:44	1.939	7716	4417.82	1	19615.1	0.3933	0.3971	189.7	0.990	0.98121	0.009	0.91%
ASR0205	B1	15	11	10062	1.25	2/5/04 11:48	1.792	8050	4417.82	1	19615.1	0.4103	0.4204	189.7	0.976	0.98121	-0.005	-0.54%
ASR0205	B2	15	15	10062	1.25	2/5/04 12:12	1.618	8050	4417.82	1	19615.1	0.4103	0.4175	189.7	0.983	0.98121	0.002	0.16%
ASR0205	B3	15	5	10048	1.28	2/5/04 12:18	1.945	7850	4417.82	1	19615.1	0.4001	0.4115	189.7	0.972	0.98121	-0.009	-0.91%
ASR0205	B4	15	11	10059	1.25	2/5/04 12:26	1.786	8047	4417.82	1	19615.1	0.4102	0.3999	189.7	1.026	0.98121	0.045	4.34%
ASR0205	C1	15	10	10086	1.26	2/5/04 12:31	1.757	8005	4417.82	1	19615.1	0.4080	0.4081	189.7	1.000	0.98121	0.019	1.85%
ASR0205	C2	15	8	10067	1.26	2/5/04 12:35	1.875	7990	4417.82	1	19615.1	0.4072	0.4078	189.7	0.999	0.98121	0.017	1.74%

300 37

Beta Attenuation Calibration Worksheet - LB4100A

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4418.39
4417.82

Attenuation equation
*y=b*m^ax*

b	*1*
m	*0.9999*
a	*1*

min rel dev	-4.9%
max rel dev	11.0%
limit	< 15%

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ASR0205	C3	15	8	10041	1.29	2/5/04 12:38	1.736	7784	4417.82	1	19615.1	0.3967	0.4103	189.7	0.967	0.98121	-0.014	-1.47%
ASR0205	C4	15	2	10026	1.27	2/5/04 12:48	1.983	7894	4417.82	1	19615.1	0.4024	0.4034	189.7	0.997	0.98121	0.016	1.62%
ASR0205	A1	16	11	10090	1.32	2/5/04 11:23	2.341	7644	4417.82	1	19615.1	0.3896	0.3936	190.6	0.990	0.981121	0.009	0.88%
ASR0205	A2	16	10	10037	1.29	2/5/04 11:26	2.057	7781	4417.82	1	19615.1	0.3966	0.3815	190.6	1.039	0.981121	0.058	5.61%
ASR0205	A3	16	7	10061	1.32	2/5/04 11:29	2.097	7622	4417.82	1	19615.1	0.3885	0.4035	190.6	0.963	0.981121	-0.018	-1.90%
ASR0205	A4	16	8	10063	1.32	2/5/04 11:39	1.939	7623	4417.82	1	19615.1	0.3886	0.3971	190.6	0.978	0.981121	-0.003	-0.28%
ASR0205	B1	16	8	10071	1.26	2/5/04 11:44	1.792	7993	4417.82	1	19615.1	0.4074	0.4204	190.6	0.969	0.981121	-0.012	-1.25%
ASR0205	B2	16	8	10098	1.26	2/5/04 11:48	1.618	8014	4417.82	1	19615.1	0.4085	0.4175	190.6	0.978	0.981121	-0.003	-0.27%
ASR0205	B3	16	9	10011	1.24	2/5/04 12:12	1.945	8073	4417.82	1	19615.1	0.4115	0.4115	190.6	1.000	0.981121	0.019	1.89%
ASR0205	B4	16	4	10077	1.27	2/5/04 12:18	1.786	7935	4417.82	1	19615.1	0.4044	0.3999	190.6	1.011	0.981121	0.030	3.00%
ASR0205	C1	16	15	10047	1.26	2/5/04 12:26	1.757	7974	4417.82	1	19615.1	0.4064	0.4081	190.6	0.996	0.981121	0.015	1.48%
ASR0205	C2	16	4	10071	1.27	2/5/04 12:31	1.875	7930	4417.82	1	19615.1	0.4042	0.4078	190.6	0.991	0.981121	0.010	1.00%
ASR0205	C3	16	9	10092	1.26	2/5/04 12:35	1.736	8010	4417.82	1	19615.1	0.4082	0.4103	190.6	0.995	0.981121	0.014	1.40%
ASR0205	C4	16	8	10082	1.28	2/5/04 12:38	1.983	7877	4417.82	1	19615.1	0.4015	0.4034	190.6	0.995	0.981121	0.014	1.40%
ASR0205	A1	17	7	10077	1.29	2/5/04 11:19	2.341	7812	4417.82	1	19615.1	0.3981	0.3936	214.2	1.012	0.978809	0.033	3.23%
ASR0205	A2	17	2	10086	1.3	2/5/04 11:23	2.057	7758	4417.82	1	19615.1	0.3954	0.3815	214.2	1.036	0.978809	0.058	5.56%
ASR0205	A3	17	8	10101	1.31	2/5/04 11:26	2.097	7711	4417.82	1	19615.1	0.3930	0.4035	214.2	0.974	0.978809	-0.005	-0.49%
ASR0205	A4	17	18	10089	1.35	2/5/04 11:29	1.939	7473	4417.82	1	19615.1	0.3809	0.3971	214.2	0.959	0.978809	-0.020	-2.06%
ASR0205	B1	17	5	10059	1.24	2/5/04 11:39	1.792	8112	4417.82	1	19615.1	0.4135	0.4204	214.2	0.984	0.978809	0.005	0.48%
ASR0205	B2	17	10	10155	1.26	2/5/04 11:44	1.618	8060	4417.82	1	19615.1	0.4108	0.4175	214.2	0.984	0.978809	0.005	0.52%
ASR0205	B3	17	6	10081	1.29	2/5/04 11:48	1.945	7815	4417.82	1	19615.1	0.3983	0.4115	214.2	0.968	0.978809	-0.011	-1.12%
ASR0205	B4	17	6	10013	1.28	2/5/04 12:12	1.786	7823	4417.82	1	19615.1	0.3987	0.3999	214.2	0.997	0.978809	0.018	1.84%
ASR0205	C1	17	5	10037	1.25	2/5/04 12:18	1.757	8030	4417.82	1	19615.1	0.4093	0.4081	214.2	1.003	0.978809	0.024	2.40%
ASR0205	C2	17	5	10047	1.25	2/5/04 12:26	1.875	8038	4417.82	1	19615.1	0.4097	0.4078	214.2	1.005	0.978809	0.026	2.56%
ASR0205	C3	17	5	10077	1.25	2/5/04 12:31	1.736	8062	4417.82	1	19615.1	0.4109	0.4103	214.2	1.002	0.978809	0.023	2.27%
ASR0205	C4	17	6	10031	1.26	2/5/04 12:35	1.983	7961	4417.82	1	19615.1	0.4058	0.4034	214.2	1.006	0.978809	0.027	2.68%
ASR0205	A1	18	7	10035	1.29	2/5/04 11:14	2.341	7779	4417.82	1	19615.1	0.3965	0.3936	215.3	1.007	0.978701	0.029	2.84%
ASR0205	A2	18	3	10009	1.25	2/5/04 11:19	2.057	8007	4417.82	1	19615.1	0.4081	0.3815	215.3	1.070	0.978701	0.091	8.51%
ASR0205	A3	18	10	10095	1.3	2/5/04 11:23	2.097	7765	4417.82	1	19615.1	0.3958	0.4035	215.3	0.981	0.978701	0.002	0.23%
ASR0205	A4	18	10	10058	1.32	2/5/04 11:26	1.939	7620	4417.82	1	19615.1	0.3884	0.3971	215.3	0.978	0.978701	-0.001	-0.08%
ASR0205	B1	18	16	10061	1.23	2/5/04 11:29	1.792	8180	4417.82	1	19615.1	0.4169	0.4204	215.3	0.992	0.978701	0.013	1.31%
ASR0205	B2	18	13	10120	1.24	2/5/04 11:39	1.618	8161	4417.82	1	19615.1	0.4160	0.4175	215.3	0.996	0.978701	0.018	1.78%
ASR0205	B3	18	10	10125	1.27	2/5/04 11:44	1.945	7972	4417.82	1	19615.1	0.4063	0.4115	215.3	0.988	0.978701	0.009	0.89%
ASR0205	B4	18	3	10063	1.29	2/5/04 11:48	1.786	7801	4417.82	1	19615.1	0.3976	0.3999	215.3	0.994	0.978701	0.016	1.57%
ASR0205	C1	18	3	10054	1.28	2/5/04 12:12	1.757	7855	4417.82	1	19615.1	0.4004	0.4081	215.3	0.981	0.978701	0.002	0.23%
ASR0205	C2	18	8	10031	1.26	2/5/04 12:18	1.875	7961	4417.82	1	19615.1	0.4058	0.4078	215.3	0.995	0.978701	0.016	1.64%
ASR0205	C3	18	9	10052	1.27	2/5/04 12:26	1.736	7915	4417.82	1	19615.1	0.4034	0.4103	215.3	0.983	0.978701	0.005	0.47%
ASR0205	C4	18	8	10069	1.27	2/5/04 12:31	1.983	7928	4417.82	1	19615.1	0.4041	0.4034	215.3	1.002	0.978701	0.023	2.29%

001138

Beta Attenuation Calibration Worksheet - LB4100A

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4418.39
4417.82

Attenuation equation
*y=b*m^ax*

b	*1*
m	*0.9999*
a	*1*

min rel dev	-4.9%
max rel dev	11.0%
limit	< 15%

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ASR0205	A1	19	13	10038	1.35	2/5/04 11:07	2.341	7436	4417.82	1	19615.1	0.3790	0.3936	239.5	0.963	0.976336	-0.014	-1.40%
ASR0205	A2	19	10	10028	1.35	2/5/04 11:14	2.057	7428	4417.82	1	19615.1	0.3786	0.3815	239.5	0.992	0.976336	0.016	1.61%
ASR0205	A3	19	6	10024	1.33	2/5/04 11:19	2.097	7537	4417.82	1	19615.1	0.3841	0.4035	239.5	0.952	0.976336	-0.024	-2.55%
ASR0205	A4	19	10	10080	1.36	2/5/04 11:23	1.939	7412	4417.82	1	19615.1	0.3778	0.3971	239.5	0.951	0.976336	-0.025	-2.64%
ASR0205	B1	19	5	10072	1.3	2/5/04 11:26	1.792	7748	4417.82	1	19615.1	0.3949	0.4204	239.5	0.939	0.976336	-0.037	-3.94%
ASR0205	B2	19	10	10067	1.31	2/5/04 11:29	1.618	7685	4417.82	1	19615.1	0.3917	0.4175	239.5	0.938	0.976336	-0.038	-4.06%
ASR0205	B3	19	7	10047	1.32	2/5/04 11:39	1.945	7611	4417.82	1	19615.1	0.3879	0.4115	239.5	0.943	0.976336	-0.034	-3.56%
ASR0205	B4	19	6	10065	1.32	2/5/04 11:44	1.786	7625	4417.82	1	19615.1	0.3886	0.3999	239.5	0.972	0.976336	-0.004	-0.45%
ASR0205	C1	19	10	10063	1.3	2/5/04 11:48	1.757	7741	4417.82	1	19615.1	0.3945	0.4081	239.5	0.967	0.976336	-0.010	-0.99%
ASR0205	C2	19	8	10051	1.33	2/5/04 12:12	1.875	7557	4417.82	1	19615.1	0.3852	0.4078	239.5	0.944	0.976336	-0.032	-3.37%
ASR0205	C3	19	7	10066	1.32	2/5/04 12:18	1.736	7626	4417.82	1	19615.1	0.3887	0.4103	239.5	0.947	0.976336	-0.029	-3.06%
ASR0205	C4	19	4	10060	1.34	2/5/04 12:26	1.983	7507	4417.82	1	19615.1	0.3826	0.4034	239.5	0.948	0.976336	-0.028	-2.94%
ASR0205	A1	20	7	10055	1.36	2/5/04 11:02	2.341	7393	4417.82	1	19615.1	0.3768	0.3936	239.1	0.957	0.976375	-0.019	-1.99%
ASR0205	A2	20	3	10089	1.34	2/5/04 11:07	2.057	7529	4417.82	1	19615.1	0.3837	0.3815	239.1	1.006	0.976375	0.029	2.93%
ASR0205	A3	20	7	10066	1.35	2/5/04 11:14	2.097	7456	4417.82	1	19615.1	0.3800	0.4035	239.1	0.942	0.976375	-0.034	-3.66%
ASR0205	A4	20	10	10086	1.36	2/5/04 11:19	1.939	7416	4417.82	1	19615.1	0.3780	0.3971	239.1	0.952	0.976375	-0.025	-2.59%
ASR0205	B1	20	7	10077	1.28	2/5/04 11:23	1.792	7873	4417.82	1	19615.1	0.4013	0.4204	239.1	0.954	0.976375	-0.022	-2.29%
ASR0205	B2	20	14	10066	1.32	2/5/04 11:26	1.618	7626	4417.82	1	19615.1	0.3887	0.4175	239.1	0.931	0.976375	-0.045	-4.87%
ASR0205	B3	20	5	10105	1.32	2/5/04 11:29	1.945	7655	4417.82	1	19615.1	0.3902	0.4115	239.1	0.948	0.976375	-0.028	-2.97%
ASR0205	B4	20	3	10013	1.33	2/5/04 11:39	1.786	7529	4417.82	1	19615.1	0.3837	0.3999	239.1	0.960	0.976375	-0.017	-1.74%
ASR0205	C1	20	8	10008	1.34	2/5/04 11:44	1.757	7469	4417.82	1	19615.1	0.3807	0.4081	239.1	0.933	0.976375	-0.044	-4.68%
ASR0205	C2	20	4	10083	1.29	2/5/04 11:48	1.875	7816	4417.82	1	19615.1	0.3984	0.4078	239.1	0.977	0.976375	0.000	0.05%
ASR0205	C3	20	12	10044	1.34	2/5/04 12:12	1.736	7496	4417.82	1	19615.1	0.3820	0.4103	239.1	0.931	0.976375	-0.045	-4.85%
ASR0205	C4	20	16	10075	1.33	2/5/04 12:18	1.983	7575	4417.82	1	19615.1	0.3861	0.4034	239.1	0.957	0.976375	-0.019	-2.03%

000139

Beta to Alpha Crosstalk Calibration Worksheet - LB4100A

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4417.67
4417.09

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
AGB0203A	A1	1120	20	10118	1.31	2/3/04 11:17	15.3	7724	153.7	0	0.0020	0.0007	0.001	64.59%	1.99%
AGB0203A	A2	1120	15	10032	1.34	2/3/04 11:17	11.2	7487	149.6	0	0.0015	0.0007	0.001	53.18%	2.00%
AGB0203A	A3	1120	13	10055	1.27	2/3/04 11:17	10.2	7917	158.0	0	0.0013	0.0007	0.001	45.86%	2.00%
AGB0203A	A4	1120	22	10053	1.29	2/3/04 11:17	17.1	7793	155.6	0	0.0022	0.0007	0.001	68.01%	2.00%
AGB0203B	B1	1120	10	10064	1.22	2/3/04 11:19	8.2	8249	164.5	0	0.0010	0.0007	0.000	29.55%	1.99%
AGB0203B	B2	1120	32	10076	1.23	2/3/04 11:19	26.0	8192	163.5	0	0.0032	0.0007	0.002	77.96%	2.00%
AGB0203B	B3	1120	8	10012	1.24	2/3/04 11:19	6.5	8074	161.5	0	0.0008	0.0007	0.000	12.40%	2.00%
AGB0203B	B4	1120	10	10043	1.28	2/3/04 11:19	7.8	7846	156.7	0	0.0010	0.0007	0.000	29.70%	2.00%
AGB0203C	C1	1120	18	10090	1.26	2/3/04 11:21	14.3	8008	159.6	0	0.0018	0.0007	0.001	60.76%	1.99%
AGB0203C	C2	1120	28	10083	1.26	2/3/04 11:22	22.2	8002	159.6	0	0.0028	0.0007	0.002	74.79%	1.99%
AGB0203C	C3	1120	13	10063	1.25	2/3/04 11:21	10.4	8050	160.6	0	0.0013	0.0007	0.001	45.81%	2.00%
AGB0203C	C4	1120	22	10054	1.27	2/3/04 11:22	17.3	7917	158.1	0	0.0022	0.0007	0.001	68.01%	2.00%
ASR0205	A1	1	5	10066	1.25	2/5/04 10:44	4.0	8053	160.6	16.9	0.0005	0.000666	0.000	-34.12%	1.99%
ASR0205	A2	1	9	10030	1.25	2/5/04 11:02	7.2	8024	160.3	16.9	0.0009	0.000666	0.000	25.76%	2.00%
ASR0205	A3	1	13	10073	1.26	2/5/04 11:07	10.3	7994	159.4	16.9	0.0013	0.000666	0.001	48.38%	1.99%
ASR0205	A4	1	16	10091	1.28	2/5/04 11:14	12.5	7884	157.1	16.9	0.0016	0.000666	0.001	57.98%	1.99%
ASR0205	B1	1	16	10093	1.22	2/5/04 11:18	13.1	8273	164.8	16.9	0.0016	0.000666	0.001	57.98%	1.99%
ASR0205	B2	1	11	10094	1.2	2/5/04 11:23	9.2	8412	167.5	16.9	0.0011	0.000666	0.000	38.87%	1.99%
ASR0205	B3	1	10	10093	1.21	2/5/04 11:26	8.3	8341	166.1	16.9	0.0010	0.000666	0.000	32.76%	1.99%
ASR0205	B4	1	7	10164	1.24	2/5/04 11:29	5.6	8197	162.7	16.9	0.0007	0.000666	0.000	3.27%	1.98%
ASR0205	C1	1	8	10099	1.21	2/5/04 11:39	6.6	8346	166.2	16.9	0.0008	0.000666	0.000	15.90%	1.99%
ASR0205	C2	1	6	10077	1.23	2/5/04 11:43	4.9	8193	163.3	16.9	0.0006	0.000666	0.000	-11.89%	1.99%
ASR0205	C3	1	10	10092	1.2	2/5/04 11:48	8.3	8410	167.5	16.9	0.0010	0.000666	0.000	32.77%	1.99%
ASR0205	C4	1	10	10070	1.22	2/5/04 12:12	8.2	8254	164.6	16.9	0.0010	0.000666	0.000	32.91%	1.99%
ASR0205	A1	2	16	10052	1.31	2/5/04 12:59	12.2	7673	153.2	17.5	0.0016	0.000665	0.001	58.22%	2.00%
ASR0205	A2	2	15	10039	1.32	2/5/04 10:44	11.4	7605	151.9	17.5	0.0015	0.000665	0.001	55.49%	2.00%
ASR0205	A3	2	11	10057	1.29	2/5/04 11:02	8.5	7796	155.6	17.5	0.0011	0.000665	0.000	39.20%	2.00%
ASR0205	A4	2	11	10060	1.3	2/5/04 11:07	8.5	7738	154.4	17.5	0.0011	0.000665	0.000	39.18%	2.00%
ASR0205	B1	2	8	10197	1.24	2/5/04 11:14	6.5	8223	162.9	17.5	0.0008	0.000665	0.000	15.24%	1.98%
ASR0205	B2	2	19	10087	1.25	2/5/04 11:19	15.2	8070	160.8	17.5	0.0019	0.000665	0.001	64.70%	1.99%
ASR0205	B3	2	9	10111	1.27	2/5/04 11:23	7.1	7961	158.4	17.5	0.0009	0.000665	0.000	25.29%	1.99%
ASR0205	B4	2	4	10044	1.28	2/5/04 11:26	3.1	7847	156.6	17.5	0.0004	0.000665	0.000	-66.98%	2.00%

000140

Beta to Alpha Crosstalk Calibration Worksheet - LB4100A

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4417.67
4417.09

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ASR0205	C1	2	9	10012	1.26	2/5/04 11:29	7.1	7946	158.9	17.5	0.0009	0.000665	0.000	26.02%	2.00%
ASR0205	C2	2	11	10081	1.24	2/5/04 11:39	8.9	8130	162.0	17.5	0.0011	0.000665	0.000	39.06%	1.99%
ASR0205	C3	2	10	10037	1.23	2/5/04 11:44	8.1	8160	163.0	17.5	0.0010	0.000665	0.000	33.25%	2.00%
ASR0205	C4	2	8	10038	1.27	2/5/04 11:48	6.3	7904	157.8	17.5	0.0008	0.000665	0.000	16.56%	2.00%
ASR0205	A1	3	11	10064	1.23	2/5/04 12:51	8.9	8182	163.2	40	0.0011	0.00062	0.000	43.28%	1.99%
ASR0205	A2	3	5	10075	1.22	2/5/04 12:59	4.1	8258	164.6	40	0.0005	0.00062	0.000	-24.93%	1.99%
ASR0205	A3	3	16	10086	1.2	2/5/04 10:44	13.3	8405	167.5	40	0.0016	0.00062	0.001	60.92%	1.99%
ASR0205	A4	3	11	10057	1.22	2/5/04 11:02	9.0	8243	164.5	40	0.0011	0.00062	0.000	43.32%	2.00%
ASR0205	B1	3	14	10033	1.19	2/5/04 11:07	11.8	8431	168.5	40	0.0014	0.00062	0.001	55.57%	2.00%
ASR0205	B2	3	10	10091	1.17	2/5/04 11:14	8.5	8625	171.8	40	0.0010	0.00062	0.000	37.44%	1.99%
ASR0205	B3	3	11	10101	1.21	2/5/04 11:18	9.1	8348	166.2	40	0.0011	0.00062	0.000	43.07%	1.99%
ASR0205	B4	3	4	10016	1.19	2/5/04 11:23	3.4	8417	168.2	40	0.0004	0.00062	0.000	-55.25%	2.00%
ASR0205	C1	3	13	10081	1.18	2/5/04 11:26	11.0	8543	170.3	40	0.0013	0.00062	0.001	51.92%	1.99%
ASR0205	C2	3	11	10043	1.22	2/5/04 11:29	9.0	8232	164.4	40	0.0011	0.00062	0.000	43.39%	2.00%
ASR0205	C3	3	11	10079	1.18	2/5/04 11:39	9.3	8542	170.3	40	0.0011	0.00062	0.000	43.19%	1.99%
ASR0205	C4	3	10	10051	1.19	2/5/04 11:43	8.4	8446	168.6	40	0.0010	0.00062	0.000	37.68%	2.00%
ASR0205	A1	4	12	10122	1.24	2/5/04 12:48	9.7	8163	162.4	40.1	0.0012	0.00062	0.001	47.72%	1.99%
ASR0205	A2	4	9	10034	1.2	2/5/04 12:51	7.5	8362	167.0	40.1	0.0009	0.00062	0.000	30.90%	2.00%
ASR0205	A3	4	7	10140	1.22	2/5/04 12:59	5.7	8311	165.1	40.1	0.0007	0.00062	0.000	10.22%	1.99%
ASR0205	A4	4	11	10125	1.23	2/5/04 10:44	8.9	8232	163.7	40.1	0.0011	0.00062	0.000	42.95%	1.99%
ASR0205	B1	4	10	10030	1.17	2/5/04 11:02	8.5	8573	171.3	40.1	0.0010	0.00062	0.000	37.83%	2.00%
ASR0205	B2	4	9	10016	1.16	2/5/04 11:07	7.8	8634	172.6	40.1	0.0009	0.00062	0.000	31.02%	2.00%
ASR0205	B3	4	13	10023	1.2	2/5/04 11:14	10.8	8353	167.0	40.1	0.0013	0.00062	0.001	52.21%	2.00%
ASR0205	B4	4	4	10077	1.19	2/5/04 11:18	3.4	8468	168.7	40.1	0.0004	0.00062	0.000	-56.14%	1.99%
ASR0205	C1	4	12	10092	1.18	2/5/04 11:23	10.2	8553	170.4	40.1	0.0012	0.00062	0.001	47.87%	1.99%
ASR0205	C2	4	4	10073	1.18	2/5/04 11:26	3.4	8536	170.1	40.1	0.0004	0.00062	0.000	-56.08%	1.99%
ASR0205	C3	4	9	10035	1.2	2/5/04 11:29	7.5	8363	167.0	40.1	0.0009	0.00062	0.000	30.89%	2.00%
ASR0205	C4	4	10	10018	1.19	2/5/04 11:39	8.4	8418	168.3	40.1	0.0010	0.00062	0.000	37.91%	2.00%
ASR0205	A1	5	9	10091	1.23	2/5/04 12:38	7.3	8204	163.4	61.8	0.0009	0.000576	0.000	35.37%	1.99%
ASR0205	A2	5	8	10059	1.22	2/5/04 12:48	6.6	8245	164.5	61.8	0.0008	0.000576	0.000	27.52%	1.99%
ASR0205	A3	5	6	10080	1.24	2/5/04 12:51	4.8	8129	162.0	61.8	0.0006	0.000576	0.000	3.16%	1.99%
ASR0205	A4	5	9	10040	1.28	2/5/04 12:59	7.0	7844	156.6	61.8	0.0009	0.000576	0.000	35.70%	2.00%

000141

Beta to Alpha Crosstalk Calibration Worksheet - LB4100A

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4417.67
4417.09

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ASR0205	B1	5	11	10067	1.18	2/5/04 10:44	9.3	8531	170.2	61.8	0.0011	0.000576	0.001	47.25%	1.99%
ASR0205	B2	5	12	10052	1.18	2/5/04 11:02	10.2	8519	170.0	61.8	0.0012	0.000576	0.001	51.72%	2.00%
ASR0205	B3	5	8	10079	1.21	2/5/04 11:07	6.6	8330	166.0	61.8	0.0008	0.000576	0.000	27.38%	1.99%
ASR0205	B4	5	6	10098	1.21	2/5/04 11:14	5.0	8345	166.1	61.8	0.0006	0.000576	0.000	2.99%	1.99%
ASR0205	C1	5	11	10045	1.23	2/5/04 11:18	8.9	8167	163.1	61.8	0.0011	0.000576	0.001	47.36%	2.00%
ASR0205	C2	5	4	10026	1.18	2/5/04 11:23	3.4	8497	169.7	61.8	0.0004	0.000576	0.000	-44.47%	2.00%
ASR0205	C3	5	8	10085	1.21	2/5/04 11:26	6.6	8335	166.1	61.8	0.0008	0.000576	0.000	27.34%	1.99%
ASR0205	C4	5	7	10070	1.21	2/5/04 11:29	5.8	8322	165.9	61.8	0.0007	0.000576	0.000	17.08%	1.99%
ASR0205	A1	6	8	10027	1.22	2/5/04 12:35	6.6	8219	164.2	64.2	0.0008	0.000572	0.000	28.36%	2.00%
ASR0205	A2	6	11	10078	1.21	2/5/04 12:38	9.1	8329	166.0	64.2	0.0011	0.000572	0.001	47.63%	1.99%
ASR0205	A3	6	13	10063	1.22	2/5/04 12:48	10.7	8248	164.6	64.2	0.0013	0.000572	0.001	55.75%	2.00%
ASR0205	A4	6	18	10091	1.23	2/5/04 12:51	14.6	8204	163.5	64.2	0.0018	0.000572	0.001	67.96%	1.99%
ASR0205	B1	6	10	10040	1.19	2/5/04 12:59	8.4	8437	168.5	64.2	0.0010	0.000572	0.000	42.61%	2.00%
ASR0205	B2	6	14	10149	1.19	2/5/04 10:44	11.8	8529	169.4	64.2	0.0014	0.000572	0.001	58.56%	1.99%
ASR0205	B3	6	9	10046	1.2	2/5/04 11:02	7.5	8372	167.1	64.2	0.0009	0.000572	0.000	36.20%	2.00%
ASR0205	B4	6	8	10070	1.21	2/5/04 11:07	6.6	8322	165.9	64.2	0.0008	0.000572	0.000	28.05%	1.99%
ASR0205	C1	6	9	10098	1.19	2/5/04 11:14	7.6	8486	169.0	64.2	0.0009	0.000572	0.000	35.87%	1.99%
ASR0205	C2	6	6	10078	1.19	2/5/04 11:18	5.0	8469	168.8	64.2	0.0006	0.000572	0.000	3.99%	1.99%
ASR0205	C3	6	5	10050	1.19	2/5/04 11:23	4.2	8445	168.5	64.2	0.0005	0.000572	0.000	-14.89%	2.00%
ASR0205	C4	6	4	10088	1.19	2/5/04 11:26	3.4	8477	168.8	64.2	0.0004	0.000572	0.000	-44.16%	1.99%
ASR0205	A1	7	12	10126	1.27	2/5/04 12:31	9.4	7973	158.6	83.8	0.0012	0.000532	0.001	55.07%	1.99%
ASR0205	A2	7	5	10067	1.24	2/5/04 12:35	4.0	8119	161.9	83.8	0.0005	0.000532	0.000	-7.19%	1.99%
ASR0205	A3	7	8	10078	1.27	2/5/04 12:38	6.3	7935	158.2	83.8	0.0008	0.000532	0.000	32.93%	1.99%
ASR0205	A4	7	16	10063	1.29	2/5/04 12:48	12.4	7801	155.6	83.8	0.0016	0.000532	0.001	66.52%	2.00%
ASR0205	B1	7	13	10099	1.22	2/5/04 12:51	10.7	8278	164.8	83.8	0.0013	0.000532	0.001	58.64%	1.99%
ASR0205	B2	7	8	10039	1.22	2/5/04 12:59	6.6	8229	164.3	83.8	0.0008	0.000532	0.000	33.19%	2.00%
ASR0205	B3	7	9	10045	1.23	2/5/04 10:44	7.3	8167	163.0	83.8	0.0009	0.000532	0.000	40.58%	2.00%
ASR0205	B4	7	7	10079	1.24	2/5/04 11:02	5.6	8128	162.0	83.8	0.0007	0.000532	0.000	23.34%	1.99%
ASR0205	C1	7	12	10010	1.21	2/5/04 11:07	9.9	8273	165.5	83.8	0.0012	0.000532	0.001	55.59%	2.00%
ASR0205	C2	7	7	10054	1.21	2/5/04 11:14	5.8	8309	165.8	83.8	0.0007	0.000532	0.000	23.53%	2.00%
ASR0205	C3	7	6	10098	1.24	2/5/04 11:19	4.8	8144	162.1	83.8	0.0006	0.000532	0.000	10.40%	1.99%
ASR0205	C4	7	5	10060	1.22	2/5/04 11:23	4.1	8246	164.5	83.8	0.0005	0.000532	0.000	-7.12%	1.99%

000142

Beta to Alpha Crosstalk Calibration Worksheet - LB4100A

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4417.67
4417.09

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ASR0205	A1	8	11	10134	1.2	2/5/04 12:25	9.2	8445	167.9	85.1	0.0011	0.00053	0.001	51.19%	1.99%
ASR0205	A2	8	11	10079	1.21	2/5/04 12:31	9.1	8330	166.0	85.1	0.0011	0.00053	0.001	51.46%	1.99%
ASR0205	A3	8	6	10099	1.19	2/5/04 12:35	5.0	8487	168.9	85.1	0.0006	0.00053	0.000	10.83%	1.99%
ASR0205	A4	8	7	10028	1.19	2/5/04 12:38	5.9	8427	168.4	85.1	0.0007	0.00053	0.000	24.10%	2.00%
ASR0205	B1	8	8	10104	1.16	2/5/04 12:47	6.9	8710	173.4	85.1	0.0008	0.00053	0.000	33.09%	1.99%
ASR0205	B2	8	14	10025	1.17	2/5/04 12:51	12.0	8568	171.3	85.1	0.0014	0.00053	0.001	62.06%	2.00%
ASR0205	B3	8	8	10162	1.18	2/5/04 12:59	6.8	8612	170.9	85.1	0.0008	0.00053	0.000	32.70%	1.98%
ASR0205	B4	8	7	10083	1.19	2/5/04 10:44	5.9	8473	168.8	85.1	0.0007	0.00053	0.000	23.69%	1.99%
ASR0205	C1	8	13	10064	1.17	2/5/04 11:02	11.1	8602	171.6	85.1	0.0013	0.00053	0.001	58.99%	1.99%
ASR0205	C2	8	6	10047	1.17	2/5/04 11:07	5.1	8587	171.4	85.1	0.0006	0.00053	0.000	11.28%	2.00%
ASR0205	C3	8	14	10077	1.14	2/5/04 11:14	12.3	8839	176.2	85.1	0.0014	0.00053	0.001	61.87%	1.99%
ASR0205	C4	8	10	10034	1.17	2/5/04 11:18	8.5	8576	171.3	85.1	0.0010	0.00053	0.000	46.84%	2.00%
ASR0205	A1	9	10	10102	1.27	2/5/04 12:18	7.9	7954	158.4	103.9	0.0010	0.000492	0.000	50.28%	1.99%
ASR0205	A2	9	10	10050	1.24	2/5/04 12:26	8.1	8105	161.8	103.9	0.0010	0.000492	0.001	50.53%	2.00%
ASR0205	A3	9	10	10105	1.27	2/5/04 12:31	7.9	7957	158.4	103.9	0.0010	0.000492	0.000	50.26%	1.99%
ASR0205	A4	9	7	10063	1.26	2/5/04 12:35	5.6	7987	159.3	103.9	0.0007	0.000492	0.000	29.24%	1.99%
ASR0205	B1	9	13	10144	1.22	2/5/04 12:38	10.7	8315	165.2	103.9	0.0013	0.000492	0.001	61.59%	1.99%
ASR0205	B2	9	10	10092	1.23	2/5/04 12:48	8.1	8205	163.4	103.9	0.0010	0.000492	0.000	50.33%	1.99%
ASR0205	B3	9	3	10072	1.26	2/5/04 12:51	2.4	7994	159.3	103.9	0.0003	0.000492	0.000	-65.25%	1.99%
ASR0205	B4	9	10	10038	1.23	2/5/04 12:59	8.1	8161	163.0	103.9	0.0010	0.000492	0.001	50.59%	2.00%
ASR0205	C1	9	14	10059	1.2	2/5/04 10:44	11.7	8383	167.3	103.9	0.0014	0.000492	0.001	64.64%	2.00%
ASR0205	C2	9	4	10039	1.22	2/5/04 11:02	3.3	8229	164.3	103.9	0.0004	0.000492	0.000	-23.53%	2.00%
ASR0205	C3	9	10	10045	1.23	2/5/04 11:07	8.1	8167	163.0	103.9	0.0010	0.000492	0.001	50.56%	2.00%
ASR0205	C4	9	8	10075	1.22	2/5/04 11:14	6.6	8258	164.6	103.9	0.0008	0.000492	0.000	38.01%	1.99%
ASR0205	A1	10	5	10090	1.27	2/5/04 12:12	3.9	7945	158.2	105.7	0.0005	0.000489	0.000	1.40%	1.99%
ASR0205	A2	10	16	10096	1.23	2/5/04 12:18	13.0	8208	163.5	105.7	0.0016	0.000489	0.001	69.17%	1.99%
ASR0205	A3	10	9	10152	1.25	2/5/04 12:26	7.2	8122	161.3	105.7	0.0009	0.000489	0.000	44.89%	1.99%
ASR0205	A4	10	10	10013	1.24	2/5/04 12:31	8.1	8075	161.5	105.7	0.0010	0.000489	0.001	51.08%	2.00%
ASR0205	B1	10	7	10092	1.23	2/5/04 12:35	5.7	8205	163.4	105.7	0.0007	0.000489	0.000	29.56%	1.99%
ASR0205	B2	10	6	10098	1.21	2/5/04 12:38	5.0	8345	166.1	105.7	0.0006	0.000489	0.000	17.77%	1.99%
ASR0205	B3	10	9	10021	1.24	2/5/04 12:48	7.3	8081	161.5	105.7	0.0009	0.000489	0.000	45.60%	2.00%
ASR0205	B4	10	11	10029	1.25	2/5/04 12:51	8.8	8023	160.3	105.7	0.0011	0.000489	0.001	55.45%	2.00%

000143

Beta to Alpha Crosstalk Calibration Worksheet - LB4100A

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4417.67
4417.09

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ASR0205	C1	10	9	10008	1.22	2/5/04 12:59	7.4	8203	164.1	105.7	0.0009	0.000489	0.000	45.67%	2.00%
ASR0205	C2	10	21	10024	1.25	2/5/04 10:44	16.8	8019	160.4	105.7	0.0021	0.000489	0.002	76.68%	2.00%
ASR0205	C3	10	8	10038	1.24	2/5/04 11:02	6.5	8095	161.7	105.7	0.0008	0.000489	0.000	38.69%	2.00%
ASR0205	C4	10	7	10088	1.22	2/5/04 11:07	5.7	8269	164.7	105.7	0.0007	0.000489	0.000	29.59%	1.99%
ASR0205	A1	11	12	10069	1.23	2/5/04 11:48	9.8	8186	163.3	124.2	0.0012	0.000452	0.001	62.11%	1.99%
ASR0205	A2	11	9	10114	1.26	2/5/04 12:12	7.1	8027	159.7	124.2	0.0009	0.000452	0.000	49.25%	1.99%
ASR0205	A3	11	10	10081	1.24	2/5/04 12:18	8.1	8130	162.0	124.2	0.0010	0.000452	0.001	54.47%	1.99%
ASR0205	A4	11	8	10059	1.26	2/5/04 12:26	6.3	7983	159.3	124.2	0.0008	0.000452	0.000	43.22%	1.99%
ASR0205	B1	11	8	10056	1.22	2/5/04 12:31	6.6	8243	164.5	124.2	0.0008	0.000452	0.000	43.23%	2.00%
ASR0205	B2	11	6	10026	1.22	2/5/04 12:35	4.9	8218	164.2	124.2	0.0006	0.000452	0.000	24.54%	2.00%
ASR0205	B3	11	6	10111	1.2	2/5/04 12:38	5.0	8426	167.6	124.2	0.0006	0.000452	0.000	23.90%	1.99%
ASR0205	B4	11	7	10039	1.24	2/5/04 12:48	5.6	8096	161.7	124.2	0.0007	0.000452	0.000	35.23%	2.00%
ASR0205	C1	11	8	10065	1.21	2/5/04 12:51	6.6	8318	165.9	124.2	0.0008	0.000452	0.000	43.18%	1.99%
ASR0205	C2	11	6	10100	1.24	2/5/04 12:59	4.8	8145	162.1	124.2	0.0006	0.000452	0.000	23.98%	1.99%
ASR0205	C3	11	16	10034	1.2	2/5/04 10:44	13.3	8362	167.1	124.2	0.0016	0.000452	0.001	71.68%	2.00%
ASR0205	C4	11	7	10024	1.21	2/5/04 11:02	5.8	8284	165.5	124.2	0.0007	0.000452	0.000	35.33%	2.00%
ASR0205	A1	12	5	10079	1.26	2/5/04 11:44	4.0	7999	159.4	124.8	0.0005	0.00045	0.000	9.21%	1.99%
ASR0205	A2	12	4	10110	1.27	2/5/04 11:48	3.1	7961	158.4	124.8	0.0004	0.00045	0.000	-13.84%	1.99%
ASR0205	A3	12	15	10061	1.28	2/5/04 12:12	11.7	7860	156.8	124.8	0.0015	0.00045	0.001	69.79%	2.00%
ASR0205	A4	12	10	10102	1.27	2/5/04 12:18	7.9	7954	158.4	124.8	0.0010	0.00045	0.001	54.50%	1.99%
ASR0205	B1	12	7	10083	1.23	2/5/04 12:26	5.7	8198	163.3	124.8	0.0007	0.00045	0.000	35.12%	1.99%
ASR0205	B2	12	5	10033	1.22	2/5/04 12:31	4.1	8224	164.2	124.8	0.0005	0.00045	0.000	9.62%	2.00%
ASR0205	B3	12	9	10096	1.24	2/5/04 12:35	7.3	8142	162.1	124.8	0.0009	0.00045	0.000	49.48%	1.99%
ASR0205	B4	12	10	10027	1.23	2/5/04 12:38	8.1	8152	162.9	124.8	0.0010	0.00045	0.001	54.84%	2.00%
ASR0205	C1	12	13	10035	1.26	2/5/04 12:48	10.3	7964	159.1	124.8	0.0013	0.00045	0.001	65.23%	2.00%
ASR0205	C2	12	9	10031	1.23	2/5/04 12:51	7.3	8155	162.9	124.8	0.0009	0.00045	0.000	49.80%	2.00%
ASR0205	C3	12	5	10052	1.23	2/5/04 12:59	4.1	8172	163.1	124.8	0.0005	0.00045	0.000	9.45%	2.00%
ASR0205	C4	12	13	10040	1.24	2/5/04 10:44	10.5	8097	161.7	124.8	0.0013	0.00045	0.001	65.22%	2.00%
ASR0205	A1	13	6	10155	1.27	2/5/04 11:39	4.7	7996	158.7	144.8	0.0006	0.00041	0.000	30.54%	1.99%
ASR0205	A2	13	13	10137	1.26	2/5/04 11:44	10.3	8045	159.9	144.8	0.0013	0.00041	0.001	68.00%	1.99%
ASR0205	A3	13	11	10141	1.26	2/5/04 11:48	8.7	8048	159.9	144.8	0.0011	0.00041	0.001	62.16%	1.99%
ASR0205	A4	13	11	10052	1.25	2/5/04 12:12	8.8	8042	160.5	144.8	0.0011	0.00041	0.001	62.50%	2.00%

000144

Beta to Alpha Crosstalk Calibration Worksheet - LB4100A

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4417.67
4417.09

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ASR0205	B1	13	2	10063	1.21	2/5/04 12:18	1.7	8317	165.8	144.8	0.0002	0.00041	0.000	-106.49%	1.99%
ASR0205	B2	13	9	10067	1.2	2/5/04 12:26	7.5	8389	167.3	144.8	0.0009	0.00041	0.000	54.09%	1.99%
ASR0205	B3	13	12	10046	1.24	2/5/04 12:31	9.7	8102	161.8	144.8	0.0012	0.00041	0.001	65.64%	2.00%
ASR0205	B4	13	9	10064	1.24	2/5/04 12:35	7.3	8116	161.9	144.8	0.0009	0.00041	0.000	54.11%	1.99%
ASR0205	C1	13	6	10035	1.23	2/5/04 12:38	4.9	8159	162.9	144.8	0.0006	0.00041	0.000	31.36%	2.00%
ASR0205	C2	13	7	10072	1.22	2/5/04 12:48	5.7	8256	164.6	144.8	0.0007	0.00041	0.000	40.95%	1.99%
ASR0205	C3	13	9	10076	1.21	2/5/04 12:51	7.4	8327	166.0	144.8	0.0009	0.00041	0.000	54.05%	1.99%
ASR0205	C4	13	7	10044	1.23	2/5/04 12:59	5.7	8166	163.0	144.8	0.0007	0.00041	0.000	41.11%	2.00%
ASR0205	A1	14	10	10046	1.28	2/5/04 11:29	7.8	7848	156.7	146.3	0.0010	0.000407	0.001	59.07%	2.00%
ASR0205	A2	14	11	10055	1.25	2/5/04 11:39	8.8	8044	160.5	146.3	0.0011	0.000407	0.001	62.76%	2.00%
ASR0205	A3	14	7	10040	1.25	2/5/04 11:44	5.6	8032	160.4	146.3	0.0007	0.000407	0.000	41.57%	2.00%
ASR0205	A4	14	10	10090	1.28	2/5/04 11:48	7.8	7883	157.0	146.3	0.0010	0.000407	0.001	58.89%	1.99%
ASR0205	B1	14	9	10069	1.22	2/5/04 12:12	7.4	8253	164.6	146.3	0.0009	0.000407	0.000	54.42%	1.99%
ASR0205	B2	14	10	10066	1.24	2/5/04 12:18	8.1	8118	161.9	146.3	0.0010	0.000407	0.001	58.99%	1.99%
ASR0205	B3	14	5	10050	1.25	2/5/04 12:26	4.0	8040	160.4	146.3	0.0005	0.000407	0.000	18.11%	2.00%
ASR0205	B4	14	11	10080	1.26	2/5/04 12:31	8.7	8000	159.5	146.3	0.0011	0.000407	0.001	62.67%	1.99%
ASR0205	C1	14	16	10097	1.23	2/5/04 12:35	13.0	8209	163.5	146.3	0.0016	0.000407	0.001	74.29%	1.99%
ASR0205	C2	14	9	10051	1.25	2/5/04 12:38	7.2	8041	160.5	146.3	0.0009	0.000407	0.000	54.50%	2.00%
ASR0205	C3	14	10	10060	1.23	2/5/04 12:48	8.1	8179	163.2	146.3	0.0010	0.000407	0.001	59.02%	2.00%
ASR0205	C4	14	12	10051	1.25	2/5/04 12:51	9.6	8041	160.5	146.3	0.0012	0.000407	0.001	65.88%	2.00%
ASR0205	A1	15	9	10116	1.32	2/5/04 11:26	6.8	7664	152.5	166.1	0.0009	0.000368	0.001	58.66%	1.99%
ASR0205	A2	15	11	10069	1.31	2/5/04 11:29	8.4	7686	153.3	166.1	0.0011	0.000368	0.001	66.33%	1.99%
ASR0205	A3	15	7	10050	1.31	2/5/04 11:39	5.3	7672	153.1	166.1	0.0007	0.000368	0.000	47.19%	2.00%
ASR0205	A4	15	9	10108	1.31	2/5/04 11:44	6.9	7716	153.6	166.1	0.0009	0.000368	0.001	58.69%	1.99%
ASR0205	B1	15	11	10062	1.25	2/5/04 11:48	8.8	8050	160.6	166.1	0.0011	0.000368	0.001	66.36%	1.99%
ASR0205	B2	15	15	10062	1.25	2/5/04 12:12	12.0	8050	160.6	166.1	0.0015	0.000368	0.001	75.33%	2.00%
ASR0205	B3	15	5	10048	1.28	2/5/04 12:18	3.9	7850	156.7	166.1	0.0005	0.000368	0.000	26.09%	2.00%
ASR0205	B4	15	11	10059	1.25	2/5/04 12:26	8.8	8047	160.6	166.1	0.0011	0.000368	0.001	66.37%	2.00%
ASR0205	C1	15	10	10086	1.26	2/5/04 12:31	7.9	8005	159.5	166.1	0.0010	0.000368	0.001	62.90%	1.99%
ASR0205	C2	15	8	10067	1.26	2/5/04 12:35	6.3	7990	159.3	166.1	0.0008	0.000368	0.000	53.72%	1.99%
ASR0205	C3	15	8	10041	1.29	2/5/04 12:38	6.2	7784	155.4	166.1	0.0008	0.000368	0.000	53.84%	2.00%
ASR0205	C4	15	2	10026	1.27	2/5/04 12:48	1.6	7894	157.7	166.1	0.0002	0.000368	0.000	-84.38%	2.00%

000145

Beta to Alpha Crosstalk Calibration Worksheet - LB4100A

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4417.67
4417.09

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ASR0205	A1	16	11	10090	1.32	2/5/04 11:23	8.3	7644	152.3	168.7	0.0011	0.000363	0.001	66.74%	1.99%
ASR0205	A2	16	10	10037	1.29	2/5/04 11:26	7.8	7781	155.4	168.7	0.0010	0.000363	0.001	63.61%	2.00%
ASR0205	A3	16	7	10061	1.32	2/5/04 11:29	5.3	7622	152.0	168.7	0.0007	0.000363	0.000	47.88%	1.99%
ASR0205	A4	16	8	10063	1.32	2/5/04 11:39	6.1	7623	152.1	168.7	0.0008	0.000363	0.000	54.39%	1.99%
ASR0205	B1	16	8	10071	1.26	2/5/04 11:44	6.3	7993	159.4	168.7	0.0008	0.000363	0.000	54.35%	1.99%
ASR0205	B2	16	8	10098	1.26	2/5/04 11:48	6.3	8014	159.6	168.7	0.0008	0.000363	0.000	54.23%	1.99%
ASR0205	B3	16	9	10011	1.24	2/5/04 12:12	7.3	8073	161.5	168.7	0.0009	0.000363	0.001	59.67%	2.00%
ASR0205	B4	16	4	10077	1.27	2/5/04 12:18	3.1	7935	158.1	168.7	0.0004	0.000363	0.000	8.65%	1.99%
ASR0205	C1	16	15	10047	1.26	2/5/04 12:26	11.9	7974	159.2	168.7	0.0015	0.000363	0.001	75.71%	2.00%
ASR0205	C2	16	4	10071	1.27	2/5/04 12:31	3.1	7930	158.1	168.7	0.0004	0.000363	0.000	8.71%	1.99%
ASR0205	C3	16	9	10092	1.26	2/5/04 12:35	7.1	8010	159.5	168.7	0.0009	0.000363	0.001	59.34%	1.99%
ASR0205	C4	16	8	10082	1.28	2/5/04 12:38	6.3	7877	157.0	168.7	0.0008	0.000363	0.000	54.30%	1.99%
ASR0205	A1	17	7	10077	1.29	2/5/04 11:19	5.4	7812	155.7	186	0.0007	0.000328	0.000	52.78%	1.99%
ASR0205	A2	17	2	10086	1.3	2/5/04 11:23	1.5	7758	154.5	186	0.0002	0.000328	0.000	-65.41%	1.99%
ASR0205	A3	17	8	10101	1.31	2/5/04 11:26	6.1	7711	153.5	186	0.0008	0.000328	0.000	58.59%	1.99%
ASR0205	A4	17	18	10089	1.35	2/5/04 11:29	13.3	7473	148.9	186	0.0018	0.000328	0.001	81.62%	1.99%
ASR0205	B1	17	5	10059	1.24	2/5/04 11:39	4.0	8112	161.8	186	0.0005	0.000328	0.000	34.01%	1.99%
ASR0205	B2	17	10	10155	1.26	2/5/04 11:44	7.9	8060	160.0	186	0.0010	0.000328	0.001	66.69%	1.99%
ASR0205	B3	17	6	10081	1.29	2/5/04 11:48	4.7	7815	155.7	186	0.0006	0.000328	0.000	44.89%	1.99%
ASR0205	B4	17	6	10013	1.28	2/5/04 12:12	4.7	7823	156.4	186	0.0006	0.000328	0.000	45.26%	2.00%
ASR0205	C1	17	5	10037	1.25	2/5/04 12:18	4.0	8030	160.3	186	0.0005	0.000328	0.000	34.16%	2.00%
ASR0205	C2	17	5	10047	1.25	2/5/04 12:26	4.0	8038	160.4	186	0.0005	0.000328	0.000	34.09%	2.00%
ASR0205	C3	17	5	10077	1.25	2/5/04 12:31	4.0	8062	160.7	186	0.0005	0.000328	0.000	33.89%	1.99%
ASR0205	C4	17	6	10031	1.26	2/5/04 12:35	4.8	7961	159.0	186	0.0006	0.000328	0.000	45.16%	2.00%
ASR0205	A1	18	7	10035	1.29	2/5/04 11:14	5.4	7779	155.4	186.3	0.0007	0.000327	0.000	53.06%	2.00%
ASR0205	A2	18	3	10009	1.25	2/5/04 11:19	2.4	8007	160.1	186.3	0.0003	0.000327	0.000	-9.23%	2.00%
ASR0205	A3	18	10	10095	1.3	2/5/04 11:23	7.7	7765	154.7	186.3	0.0010	0.000327	0.001	66.95%	1.99%
ASR0205	A4	18	10	10058	1.32	2/5/04 11:26	7.6	7620	152.0	186.3	0.0010	0.000327	0.001	67.07%	2.00%
ASR0205	B1	18	16	10061	1.23	2/5/04 11:29	13.0	8180	163.2	186.3	0.0016	0.000327	0.001	79.41%	2.00%
ASR0205	B2	18	13	10120	1.24	2/5/04 11:39	10.5	8161	162.4	186.3	0.0013	0.000327	0.001	74.51%	1.99%
ASR0205	B3	18	10	10125	1.27	2/5/04 11:44	7.9	7972	158.5	186.3	0.0010	0.000327	0.001	66.85%	1.99%
ASR0205	B4	18	3	10063	1.29	2/5/04 11:48	2.3	7801	155.5	186.3	0.0003	0.000327	0.000	-9.82%	1.99%

000146

Beta to Alpha Crosstalk Calibration Worksheet - LB4100A

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4417.67
4417.09

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ASR0205	C1	18	3	10054	1.28	2/5/04 12:12	2.3	7855	156.7	186.3	0.0003	0.000327	0.000	-9.72%	1.99%
ASR0205	C2	18	8	10031	1.26	2/5/04 12:18	6.3	7961	159.0	186.3	0.0008	0.000327	0.000	58.95%	2.00%
ASR0205	C3	18	9	10052	1.27	2/5/04 12:26	7.1	7915	158.0	186.3	0.0009	0.000327	0.001	63.43%	2.00%
ASR0205	C4	18	8	10069	1.27	2/5/04 12:31	6.3	7928	158.1	186.3	0.0008	0.000327	0.000	58.79%	1.99%
ASR0205	A1	19	13	10038	1.35	2/5/04 11:07	9.6	7436	148.5	214.9	0.0013	0.00027	0.001	79.14%	2.00%
ASR0205	A2	19	10	10028	1.35	2/5/04 11:14	7.4	7428	148.4	214.9	0.0010	0.00027	0.001	72.90%	2.00%
ASR0205	A3	19	6	10024	1.33	2/5/04 11:19	4.5	7537	150.6	214.9	0.0006	0.00027	0.000	54.86%	2.00%
ASR0205	A4	19	10	10080	1.36	2/5/04 11:23	7.4	7412	147.7	214.9	0.0010	0.00027	0.001	72.76%	1.99%
ASR0205	B1	19	5	10072	1.3	2/5/04 11:26	3.8	7748	154.4	214.9	0.0005	0.00027	0.000	45.57%	1.99%
ASR0205	B2	19	10	10067	1.31	2/5/04 11:29	7.6	7685	153.3	214.9	0.0010	0.00027	0.001	72.80%	1.99%
ASR0205	B3	19	7	10047	1.32	2/5/04 11:39	5.3	7611	151.9	214.9	0.0007	0.00027	0.000	61.22%	2.00%
ASR0205	B4	19	6	10065	1.32	2/5/04 11:44	4.5	7625	152.1	214.9	0.0006	0.00027	0.000	54.67%	1.99%
ASR0205	C1	19	10	10063	1.3	2/5/04 11:48	7.7	7741	154.4	214.9	0.0010	0.00027	0.001	72.81%	1.99%
ASR0205	C2	19	8	10051	1.33	2/5/04 12:12	6.0	7557	150.8	214.9	0.0008	0.00027	0.001	66.05%	2.00%
ASR0205	C3	19	7	10066	1.32	2/5/04 12:18	5.3	7626	152.1	214.9	0.0007	0.00027	0.000	61.15%	1.99%
ASR0205	C4	19	4	10060	1.34	2/5/04 12:26	3.0	7507	149.7	214.9	0.0004	0.00027	0.000	32.04%	1.99%
ASR0205	A1	20	7	10055	1.36	2/5/04 11:02	5.1	7393	147.5	218.2	0.0007	0.000264	0.000	62.14%	2.00%
ASR0205	A2	20	3	10089	1.34	2/5/04 11:07	2.2	7529	149.9	218.2	0.0003	0.000264	0.000	11.35%	1.99%
ASR0205	A3	20	7	10066	1.35	2/5/04 11:14	5.2	7456	148.7	218.2	0.0007	0.000264	0.000	62.09%	1.99%
ASR0205	A4	20	10	10086	1.36	2/5/04 11:19	7.4	7416	147.8	218.2	0.0010	0.000264	0.001	73.41%	1.99%
ASR0205	B1	20	7	10077	1.28	2/5/04 11:23	5.5	7873	156.9	218.2	0.0007	0.000264	0.000	62.05%	1.99%
ASR0205	B2	20	14	10066	1.32	2/5/04 11:26	10.6	7626	152.1	218.2	0.0014	0.000264	0.001	81.05%	1.99%
ASR0205	B3	20	5	10105	1.32	2/5/04 11:29	3.8	7655	152.3	218.2	0.0005	0.000264	0.000	46.73%	1.99%
ASR0205	B4	20	3	10013	1.33	2/5/04 11:39	2.3	7529	150.5	218.2	0.0003	0.000264	0.000	12.02%	2.00%
ASR0205	C1	20	8	10008	1.34	2/5/04 11:44	6.0	7469	149.4	218.2	0.0008	0.000264	0.001	67.02%	2.00%
ASR0205	C2	20	4	10083	1.29	2/5/04 11:48	3.1	7816	155.7	218.2	0.0004	0.000264	0.000	33.55%	1.99%
ASR0205	C3	20	12	10044	1.34	2/5/04 12:12	9.0	7496	149.7	218.2	0.0012	0.000264	0.001	77.94%	2.00%
ASR0205	C4	20	16	10075	1.33	2/5/04 12:18	12.0	7575	151.1	218.2	0.0016	0.000264	0.001	83.40%	1.99%

000147

2/5/04 Gross Beta Attenuation Curve - Sr90 on Ringed Planchets

Benchsheet: 2301 0SR.XLS Filename: ASR0205
Planchets: 0223010-1-20

Det	1047	1100	1106	1112	1117	1121	1129	1128	1138	1142	1147	1210	1214	1224	1229	1233	1237	1249	1249	1258
1	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
2	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3
3	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4
4	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5
5	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6
6	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7
7	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8
8	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9
9	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10
10	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11
11	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12
12	12	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13

2/5/04

2/10/04

Continued on Page

Read and Understood By

Signed: [illegible] Date: 2/10/04 Signed: [illegible] Date: 2/10/04

pg 269524 a
(cont. from pg N/A b)

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100A

SOP 724 Rev 8

Date: 2/5/04

Instrument Background and Response Checklist

P-10 Supply	P-10 Flow
1 650	A 0.1
2 200	B
	C
	D

Bkg.	Cal. File ID
Dr A	BKA0130W
Dr B	
Dr C	
Dr D	NP

Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On line	Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On-line
1	LGB		P		LGB		P		✓	9	LGB		P		LGB		P		✓
2									✓	10									✓
3									✓	11						g	R	P	✓
4									✓	12							P		✓
5									✓	13	NP	LGB 2/5/04	NP		NP				OL
6									✓	14									
7									✓	15									
8									✓	16									

P = passes; R = Recount, H = high; L = low; W = weekly; α = Alpha; B = Beta; DR = Daily Response Check; Stat = Status; Det = Detector; Bkg = Background; OL = Offline; NP = Not Processed.

Runlog

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp .Init.	Outp. Date	Cmnt Below
1-12	DR Checks	–	–	EFA0205	30	0639	LGB	LGB	2/5/04	NA
1-12	Bkg Checks	–	–	BKA0205	60	0728	LGB	g	2/5/04	
11	BKG Recount	NA	NA	BKA0205A	60	0840	g	g	2/5/04	
1-12	0223010-1-20	23 0105R.KLS	Sr90R.Ath.	ASR0205	70	1092	g	g	2/5/04	

Reviewed by g Date 2/5/04

Form 780r6.frm (4/6/2001)

Comments:

0001

Sr 90 Mass Attenuation Curve

Analyst: JRK
Prep. Date:S. 11/13/02
Prep. Date:C

Analytical Balance No:13
SOP Used:702 Rev15

Data Filename:
Count Date/Time:

W.O.#	Sample #	Gravimetric Aliquot Determination Tare PC (g)	Gross PC (g)	Solid Mass (g)	Remarks	CAR GRP	Pos Car No.	POS Ckd by
0223010	1	9.0609	9.0778	16.9	0.3 ml Salt Used			
0223010	2	9.0665	9.084	17.5	0.3 ml Salt Used			
0223010	3	9.0579	9.098	40.1	0.7 ml Salt Used			
0223010	4	9.0563	9.0963	40	0.7 ml Salt Used			
0223010	5	9.0778	9.1396	61.8	1.1 ml Salt Used			
0223010	6	9.1144	9.1786	64.2	1.1 ml Salt Used			
0223010	7	9.0731	9.1648	91.7	1.5 ml Salt Used			
0223010	8	9.059	9.1504	91.4	1.5 ml Salt Used			
0223010	9	9.0622	9.1772	115	1.9 ml Salt Used			
0223010	10	9.0717	9.1882	116.5	1.9 ml Salt Used			
0223010	11	9.0634	9.2038	140.4	2.3 ml Salt Used			
0223010	12	9.0671	9.2071	140	2.3 ml Salt Used			
0223010	13	9.0761	9.2224	146.3	2.7 ml Salt Used			
0223010	14	9.0851	9.25	164.9	2.7 ml Salt Used			
0223010	15	9.0872	9.2769	189.7	3.1 ml Salt Used			
0223010	16	9.0635	9.2541	190.6	3.1 ml Salt Used			
0223010	17	9.0622	9.2764	214.2	3.5 ml Salt Used			
0223010	18	9.082	9.2973	215.3	3.5 ml Salt Used			
0223010	19	9.0549	9.2944	239.5	3.9 ml Salt Used			
0223010	20	9.0719	9.311	239.1	3.9 ml Salt Used			

* Samples were re-weighed on 2/5/04 prior to counting and new weights entered into benchsheet. 2/5/04

Std. No.	Std. Type	Spike Vol (ml)	Spike Act./ml
514.1572.72	Sr-90	1.0	11033.0

Spiked by: JRK 11/13/02
Spike Witness: NT 11/13/02
Reviewed by: 2/5/04

2/5/04.....10:59 AM

R/BENCH-SH/23010sr

Sr 90 Mass Attenuation Curve

DRAFT

Analyst: JRK
Prep. Date:S. 11/13/02
Prep. Date:C

Analytical Balance No:13
SOP Used:702 Rev15

Data Filename:
Count Date/Time:

W.O.#	Sample #	Gravimetric Aliquot Determination Tare PC (g)	Gross PC (g)	Solid Mass (g)	Remarks	CAR GRP	Pos Car No.	POS Ckd by
0223010	1	9.0609	9.0778	16.9	0.3 ml Salt Used			
0223010	2	9.0665	9.084	17.5	0.3 ml Salt Used			
0223010	3	9.0579	9.098	40.1	0.7 ml Salt Used			
0223010	4	9.0563	9.0963	40	0.7 ml Salt Used			
0223010	5	9.0778	9.1396	61.8	1.1 ml Salt Used			
0223010	6	9.1144	9.1786	64.2	1.1 ml Salt Used			
0223010	7	9.0731	9.1582 9.1048	85.1	1.5 ml Salt Used			
0223010	8	9.059	9.1428 9.1504	83.8	1.5 ml Salt Used			
0223010	9	9.0622	9.1661 9.1712	103.9	1.9 ml Salt Used			
0223010	10	9.0717	9.1774 9.1882	105.7	1.9 ml Salt Used			
0223010	11	9.0634	9.1882 9.2028	124.8	2.3 ml Salt Used			
0223010	12	9.0671	9.1913 9.2071	124.2	2.3 ml Salt Used			
0223010	13	9.0761	9.2224	146.3	2.7 ml Salt Used			
0223010	14	9.0851	9.2299 9.2500	144.8	2.7 ml Salt Used			
0223010	15	9.0872	9.2533 9.2769	166.1	3.1 ml Salt Used			
0223010	16	9.0635	9.2322 9.2541	168.7	3.1 ml Salt Used			
0223010	17	9.0622	9.2482 9.2704	186	3.5 ml Salt Used			
0223010	18	9.082	9.2683 9.2873	186.3	3.5 ml Salt Used			
0223010	19	9.0549	9.2698 9.2944	214.9	3.9 ml Salt Used			
0223010	20	9.0719	9.2901 9.3110	218.2	3.9 ml Salt Used			

Std. No.	Std. Type	Spike Vol (ml)	Spike Act./ml
514.1572.72	Sr-90	1.0	11033.0

Spiked by: JRK 11/13/02
Spike Witness: NT 11/13/02
Reviewed by: E 11/13/02

00151

11/14/02.....10:42 AM

R/BENCH-SH/23010SR.XLS

Sr 90 Mass Attenuation Curve

DRAFT

Analyst: _____

Prep. Date:S. _____

Prep. Date:C

Analytical Balance No:13

SOP Used:702 Rev15

Data Filename: _____

Count Date/Time:

W.O.#	Sample #	Gravimetric Aliquot Determination Tare PC (g)	Gross PC (g)	Solid Mass (g)	Remarks	CAR GRP	Pos Car No.	POS Ckd by
0223010	1	9.0609		-9060.9	11/13 @ 1200			
0223010	1-D1	9.0665		-9066.5				
0223010	2	9.0579		-9057.9				
0223010	2-D1	9.0563		-9056.3				
0223010	3	9.0778		-9077.8				
0223010	2-D1	9.1144		-9114.4				
0223010	4	9.0731		-9073.1				
0223010	4-D1	9.059		-9059				
0223010	5	9.0622		-9062.2				
0223010	5-D1	9.0717		-9071.7				
0223010	6	9.0634		-9063.4				
0223010	6-D1	9.0671		-9067.1				
0223010	7	9.0761		-9076.1				
0223010	7-D1	9.0851		-9085.1				
0223010	8	9.0872		-9087.2				
0223010	8-D1	9.0635		-9063.5				
0223010	9	9.0622		-9062.2				
0223010	9-D1	9.082		-9082				
0223010	10	9.0549		-9054.9				
0223010	10-D1	9.0719		-9071.9				

Std. No.	Std. Type	Spike Vol (ml)	Spike Act./ml
514.1572.72	Sr-90	1.0	11033.0

Spiked by: IRQ 11/13/02

Spike Witness: NT 11/13/02

000152

11/13/02.....9:25 AM

R/BENCH-SH/23010SR.XLS

Paragon Analytics, Inc.

QUALITY ASSURANCE SUMMARY SHEET

PAI W.O. # / BATCH 0223010

TEST

246143 METHOD Sr 90 Mass Attenuation

SOP/REV (PREP) 702 R15

SOP/REV (ANAL)

Briefly document any QA or other problems or deviations associated with the analysis of samples. Problems could result from: log-in, color, odor, dilution, consistency, scheduling, equipment, or instrumentation, or may include documentation of minor deviations necessary due to unique DQO's or sample characteristics.

JRK 11/14/02

Work order number 0223010 was used for a Sr90 mass attenuation curve. It was found that 10 mg of salt was approx. 0.3 ml of solution and 15 mg was approx. 0.4 ml. A range of 10 ringed planchets was created with 0.3 ml salt solution and increasing in 0.4 ml increments. A duplicate for each planchet was also created. Each planchet was spiked with approx. 11,000 dpm of Sr90 standard. The salt and Sr90 solution was converted to a nitric system with 5 ml concentrated nitric acid. It was then dried down and the steam bath and dissolved in 1N nitric acid. The samples where then transferred to the labeled planchets and dried down on the hot plate. The ringed planchets where then weighed and submitted for counting.

JRK 11/14/02

JRK 11/14/02

JRK 11/14/02

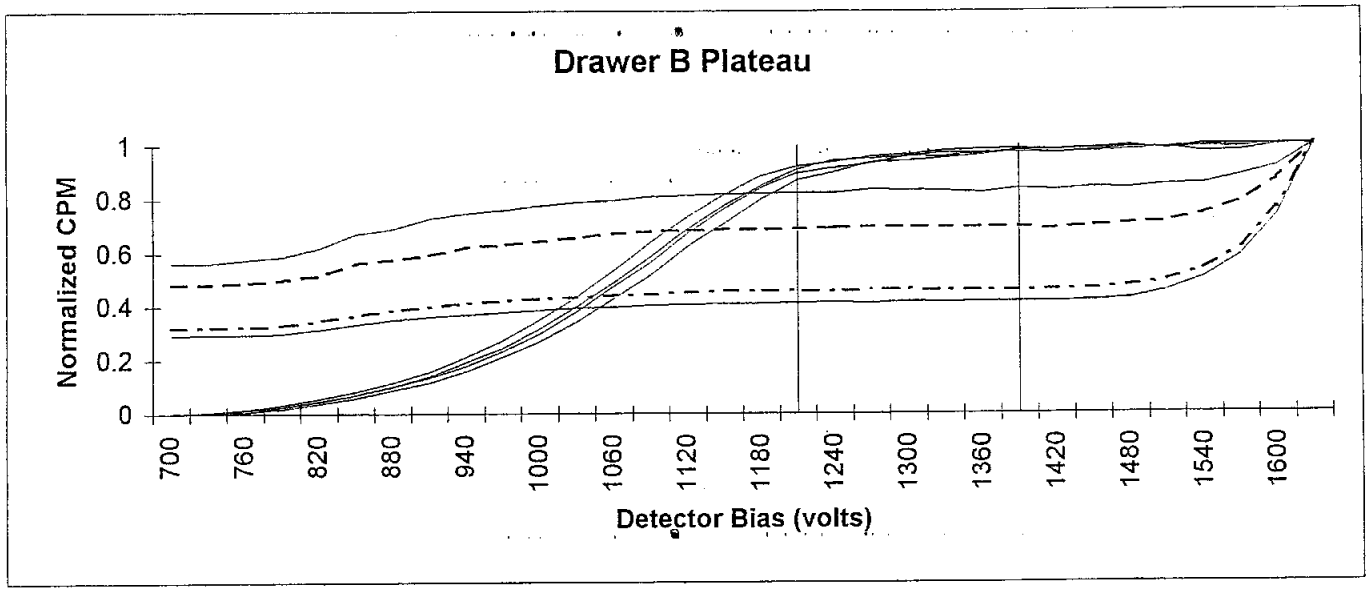
TECHNICIAN/ANALYST DATE 11/14/02

DEPARTMENT MANAGER DATE 11/14/02

FORM 302r5.FRM (04/30/01)

Unit Type: LB4100/W
Date Performed: 11/11/03 09:19
FileName: PTB1111B
Batch ID: DRAWER B

Unit Id: Aqua
Application Revision: 2
Application Version: Standard



Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 1200

	B1	B2	B3	B4
Beta slope at beta voltage	0.25%	1.73%	1.96%	1.01%
Alpha slope at beta voltage	1.26%	0.14%	0.86%	0.88%
Alpha slope at alpha voltage	1.42%	0.92%	0.63%	0.59%

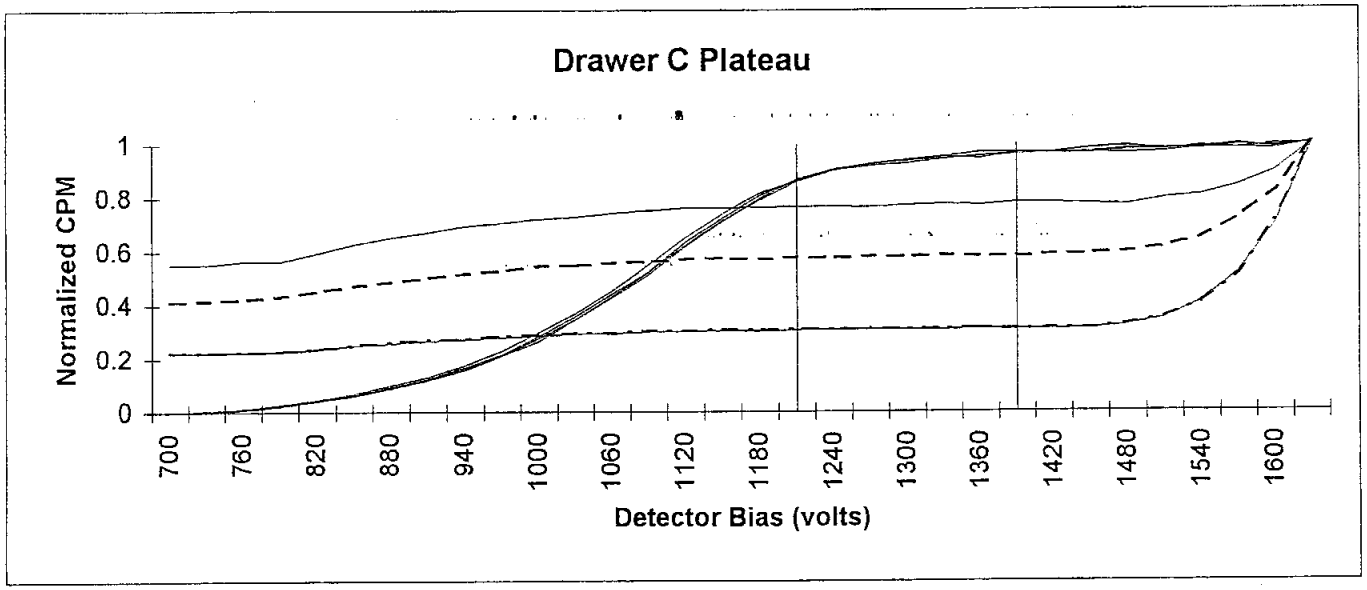
AK 11/13/03

Printed 11/11/03 3:39 PM

000 54

Unit Type: LB4100/W
Date Performed: 11/11/03 15:41
FileName: PTB1111C
Batch ID: DRAWER C

Unit Id: Aqua
Application Revision: 2
Application Version: Standard



Optimum alpha beta simultaneous operating voltage: 1380

Optimum alpha only operating voltage: 1200

	C1	C2	C3	C4
Beta slope at beta voltage	1.97%	2.08%	1.59%	2.05%
Alpha slope at beta voltage	0.49%	0.66%	0.69%	-0.24%
Alpha slope at alpha voltage	0.44%	1.15%	1.08%	1.14%

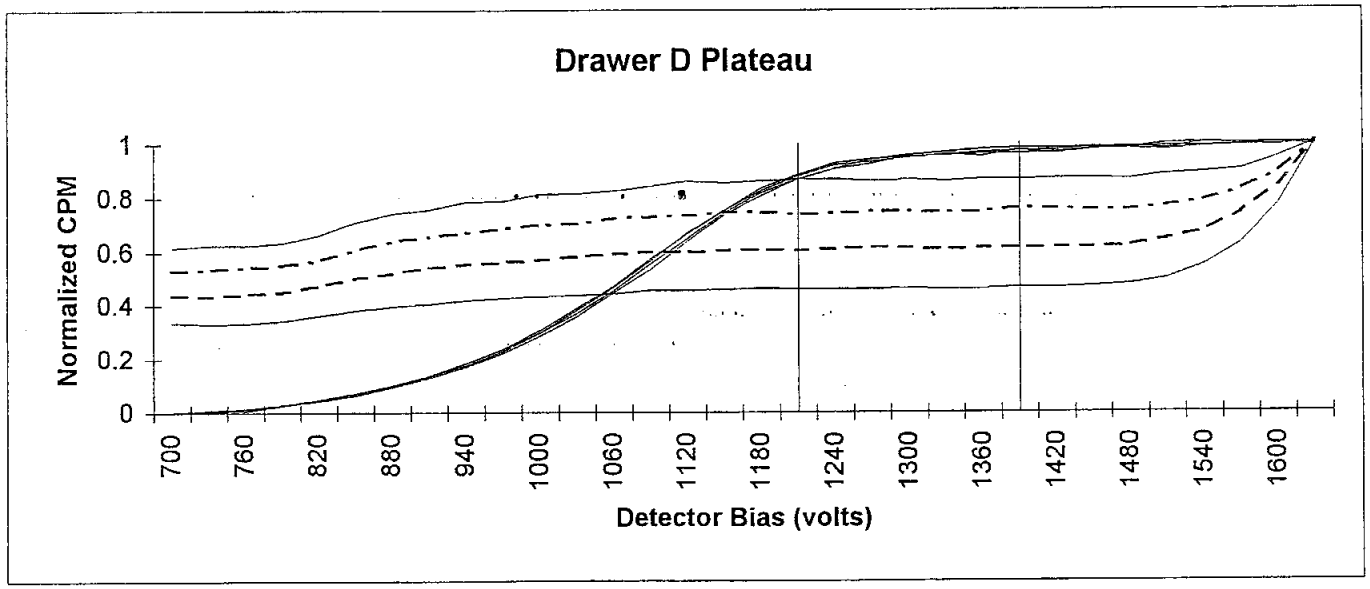
JE 11/13/03

Printed 11/12/03 11:16 AM

000155

Unit Type: LB4100/W
Date Performed: 11/11/03 15:42
FileName: PTB1111D
Batch ID: DRAWER D

Unit Id: Aqua
Application Revision: 2
Application Version: Standard



Optimum alpha beta simultaneous operating voltage: 1380

Optimum alpha only operating voltage: 1200

	D1	D2	D3	D4
Beta slope at beta voltage	1.81%	2.16%	1.11%	1.43%
Alpha slope at beta voltage	1.57%	0.87%	0.73%	0.96%
Alpha slope at alpha voltage	0.20%	1.53%	0.77%	0.04%

JE 11/13/03

Printed 11/12/03 11:17 AM

000 56

LB4100-B Raw counts for Am-241 Ring Planchet Efficiency Calibrations (Control ID #1122)

Detector ID	A1	A2	A3	A4	B1	B2	B3	B4
total time	4.36	4.45	4.34	4.47	4.07	4.15	4.23	4.46
total counts	10016	10009	10036	10033	10014	10023	10010	10014
Alpha CPM	2297.15971	2249.06348	2312.3374	2244.43402	2460.33326	2415.05672	2366.26726	2245.16548
Alpha BKG CPM	0.088	0.15	0.105	0.085	0.109	0.124	0.163	0.126
Alpha Efficiency	0.20848693	0.20412179	0.20986444	0.20370163	0.22329634	0.2191871	0.21475904	0.20376802
archived STDEV	0.01083301	0.01060636	0.01090419	0.01058403	0.01160256	0.01138886	0.01115906	0.01058787
Data file	EAM1118A	EAM1118A	EAM1118A	EAM1118A	EAM1118B	EAM1118B	EAM1118B	EAM1118B

Detector ID	C1	C2	C3	C4	D1	D2	D3	D4
total time	4.19	4.27	4.3	4.4	4.31	4.33	4.33	4.35
total counts	10020	10009	10031	10002	10023	10022	10032	10020
Alpha CPM	2391.31311	2343.8961	2332.6297	2273.08882	2325.40704	2314.44365	2316.74512	2303.34528
Alpha BKG CPM	0.095	0.132	0.161	0.093	0.115	0.106	0.114	0.114
Alpha Efficiency	0.21703217	0.21272867	0.21170615	0.2063023	0.21105064	0.21005562	0.2102645	0.20904835
archived STDEV	0.01127694	0.01105357	0.011	0.01071977	0.01096609	0.0109144	0.01092506	0.01086211
Data file	EAM1118C	EAM1118C	EAM1118C	EAM1118C	EAM1118D	EAM1118D	EAM1118D	EAM1118D

OK
AE
12/11/03

Source Database for OSUM for LB4100-B

Number of sources in table: 43

Application Revision: A

Control ID	Isotope	Type	Half-Life (days)	DPM	Std dev	Date	Status	Alpha/Beta Archive File
1119	I-129	Beta	5734268000	4414	220.70	15-Apr-93	PAI	I129-11/03
1120	Pb-210	Beta	8144.852	1187.602	59.38	18-Jun-03	PAI	Pb210-11/03
1121	Sr-90/Y-90	Beta	10446.15	22065.912	1103.30	18-Mar-99	PAI	Sr90R-11/03
1122	Am-241	Alpha	157861.05	11101.11	555.06	18-Mar-99	PAI	Am241-11/03

000158

JE
11/14/03

Pb-210 Calibration
Pb-210 on flat planchets

Benchsheet: 259526 Source ID: 1120 logfile: Pb210-11/03

Source:	Det:	Filenames:
0322033-S1	A1 B1 C1	EPB1114A
-S3	A2 B2 C2	EPB1114B
-S4	A3 B3 C3	EPB1114C
-S5	A4 B4 C4	EPB1114D

1/18/03
JE

Gross Alpha (Am-241) Calibration
Am-241 on ringed planchets

Benchsheet: 240787 Source ID: 1122 logfile: Am241-11/03

Source:	Det:	Filenames:
0317010-1	A1 B1 C1 D1	EAM1118A
-2	A2 B2 C2 D2	B
-3	A3 B3 C3 D3	C
-5	A4 B4 C4 D4	D

1/18/03
JE

Gross Beta (Sr-90) Calibration
Sr-90 on ringed planchets

Benchsheet: 240788 Source ID: 1121 logfile: Sr90R-11/03

Source:	Det:	filenames:
0317011-1	A1 B1 C1 D1	EGB1118A
-2	A2 B2 C2 D2	B
-4	A3 B3 C3 D3	C
-5	A4 B4 C4 D4	D

JE 12/1/03
Read and Understood By

Continued on Page

Clare Jensen 12/1/03 Julie Ellingson 12/1/03
Signature Date Signature Date

pg 265845 a
(cont. from pg N/A b)

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: **LB4100B**

SOP 724 Rev 8

Date: 11/18/03

Instrument Background and Response Checklist

P-10 Supply	P-10 Flow
1 1000	A 0.1
2 200	B
	C
	D

Bkg.	Cal. File ID
Dr A	BKB 1116W
Dr B	
Dr C	
Dr D	

Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On line	Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On-line
1	LGB		P		JE		P		✓	9	LGB		P		JE		P		✓
2									✓	10							P		✓
3									✓	11						JE	R	P	✓
4									✓	12							P		✓
5									✓	13									✓
6									✓	14									✓
7									✓	15									✓
8									✓	16							P		✓

P = passes; R = Recount, H = high; L = low; W = weekly; α = Alpha; B = Beta; DR = Daily Response Check; Stat = Status; Det = Detector; Bkg = Background; OL = Offline; NP = Not Processed.

Runlog

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp Init.	Outp. Date	Cmnt Below
1-16	DR Checks	–	–	EFB 1118	30	0707	LGB	JE	11/18/03	A
1-16	BKG Check	–	–	BKB1118	60	0732	JE	JE	11/18/03	
11	BKG Recount	–	–	BKB1118A	60	0916	JE	JE	11/18/03	
1-4	0317016-1,3,5	240787	Am-241 eff	EAM1118A	10	1026	JE	JE	11/18/03	
5-8				B		1032	JE	JE	11/18/03	
9-12				C		1038	JE	JE	11/18/03	
13-16				D		1057	JE	JE	11/18/03	
1-4	0317011-1,2,4,5	240788	Sr-90 gross β eff	EGB1118A	5	1032	JE	JE	11/18/03	
5-8				B		1038	JE	JE	11/18/03	
9-12				C		1057	JE	JE	11/18/03	
13-16				D		1104	JE	JE	11/18/03	
0317014-1,2,0 1-16	~~17014AM~~ 11/18/03	17014AMC.XLS	Am-241 curve	ATC1118	10/step	1117	JE	JE	11/18/03	

11/19/03

Reviewed by JE Date 11/19/03

Form 780r6.frm (4/6/2001)

Comments:

000160

G-L efficiency

Paragon Analytics, Inc.

210787 A

WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES

Matrix — Prep Analyst NT Prep Date 5/7/03 Analyte 241Am Analytical Batch —

Pretreatment? (Y / N) Batch _____ Count Date / Time _____ Superseded _____

Paragon WO No.	Sample Wt. (g / L)	Sample Aliq. (g / L)	Aliquot Basis (Dry / AR)	Spike Information	Remarks	Det. No.	Filename	POS Ckd By
0317010-1	—	NT 5/7/03		1	NT 5/7/03			
-2								
-3								
-4							SY = outlier; do not use.	DRB 5/16/03
-5								

NT 5/7/03

Balance No. NA Spiked By NT Date 5/7/03 Spike Witness [illegible] Date 05/07/03 QASS? (Y / N) No. _____

	Isotope	No	Act / mL	Vol	P	Total Act (dpm)	Decay Corrected	Spike Pipet	Relinquished by / Date	Received by / Date
Spike 1	241Am	512.1572.07	11101.1	1 ml		11,101.1		209	CW 5/9/03	5/9/03
Spike 2										
Spike 3								2		
Spike 4										

NT 5/7/03 NT 5/7/03

Electronic Benchsheet No. (if / when generated) NA Reviewed by / Date CW 5/9/03

 Form 798r0.frm (5/12/2002)

00016

240787 B

WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES / ACTINIDES

Initials NT Date 5/7/03 Method (SOP / Rev) 702 R16 Matrix —

COMMENTS

^{241}Am (Gross α) Efficiency planchets.

1) 5 unused planchets were labeled and placed on a hotplate
2) 5 ml concentrated HNO_3 was added to each sample
3) 1ml of ^{241}Am was added to each planchet
4) Samples were then taken to Duplex and relinquished to the instrument lab for counting.

Reviewed by / Date CW 5/9/03

Am-241 Primary Standard

1) Transfer RSO#512 (Analytics # 57372 ~~-037~~ 307) to ~~3.2279~~ 100 ml poly. bottle. DCB 3/23/99

a) Ampule, full w/ beaker 38.5221 g (Bal 12)
Ampule, empty w/ beaker 33.2720 g ★ see below
Net Std. mass 5.2501 g

★ Note - a large piece of glass broke off of the ampule + fell into the 100 ml poly bottle. It was removed w/ a spatula + returned to the ampule prior to taking the empty weight. To confirm the amount transferred the 100 ml poly was weighed after transfer, as well as before:

100 ml poly, empty 14.6146 g (Bal 12)
100 ml poly, w/ std. 19.8506 g
Net std. transferred 5.2360 g

To account for losses to the spatula this value will be used, although it confirms the previous calc to within 0.27%

b) Add 3N HNO_3 to 100 ml poly:

100 ml poly, empty 14.6146 g (Bal 12)
~~100 ml poly, w/ HNO_3 93.9 g (Bal 16)~~ DCB 3/23/99
100 ml poly w/ HNO_3 108.6 g (Bal 16)
Net Std mass 93.9 g

c) Quantitatively transfer contents of 100 ml poly to 250 ml poly + dilute w/ HNO_3. (Initial error in choosing bottle size)

250 ml poly, empty 26.5 g (Bal 16)
250 ml poly, w/ std, HNO_3 255.8 g
TOT. Std. Mass. 229.3 g

In summary, 5.2360 g of neat standard was diluted to 229.3 g w/ 3M HNO_3.

SEE NEXT PAGE

Continued on Page 68

Read and Understood By

David C Burn 3/23/99 [signature] 3/24/99
Signed Date Signed Date

Am 241 Primary Standard

2) Density of 3M HNO_3; using 100ml class A vol. flask:

$$\frac{109.6568\ g}{100\ ml} = 1.0966\ g/ml$$

3) Calculations:

Act. conc. of neat std.

wrong calc!!

$$\cancel{\left(\frac{36810\ dpm}{5.03043\ g}\right)\left(\frac{60\ s/m}{2.22\ dpm/pCi}\right) = 197,769.3\ pCi/g}$$

TCB

Act. conc. of final std.

TCB 3/23/99

$$\cancel{\frac{(197,769.3\ pCi/g)(5.236\ g)}{(229.3\ g)} = 4516.0\ pCi/g}$$

By volume:

$$\cancel{\frac{4516.0\ pCi/g}{1.09}}$$

Act. of neat std.

$$\left(\frac{40270\ dpm}{5.45013\ g}\right)\left(\frac{60\ s/m}{2.22\ dpm/pCi}\right) = 199,697.7\ pCi/g$$

Act conc. of final std.

$$\frac{(199,697.7\ pCi/g)(5.236\ g)}{229.3\ g} = 4,560.0\ pCi/g$$

By Vol.

$$(4,560\ pCi/g)(1.0966\ g/ml) = 5,000.5\ pCi/ml$$

Ref Date = 3/18/99
Exp Date = 3/18/04

Verified 3/25/99 TCB

Continued on Page

Read and Understood By

Signed: [signature] Date: 3/23/99 Signed: [signature] Date: 3/24/99

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

RAL IW 5+2
rec'd 3-22-99

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

57372-307

Am-241 5 mL Liquid in Flame Sealed Vial

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.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ISOTOPE:	Am-241
ACTIVITY (dps):	4.027 E+04
HALF-LIFE:	432.2 years
CALIBRATION DATE:	March 18, 1999 12:00 EST
TOTAL UNCERTAINTY:	3.5%
SYSTEMATIC:	2.5%
RANDOM:	1.0%

5.45013 grams of solution 3M HNO_3.

P O NUMBER 22190, Item 2

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

Q A APPROVED: DM. Mt 3-18-99

Code #: 512.1572.67 Name of Standard: Am 241 Primary Std.

Date: 3/25/99 Analyst: DCB/BP

Aliquot for verification: 3ea - 1ml on ringed planchet

Work up: See attached benchsheet.

Expected activity and uncertainty: 5,000.5 pCi/ml ± 175.0 pCi/ml

Results of Counting and counting uncertainty: 4986 ± 58.4 pCi/ml.
(= 99.72 % of expected)

Radiochemistry Technical Manager: [signature] Date: 3/25/99

Radiochemistry QA Manager: [signature] Date: 3/25/99

ATI FM 718FC
(2/27/9

Standard Verification for Am 241

Analyst:KH/BP
Prep. Date:S.3/24/99
Prep. Date;C3/24/99

Data Filename: WAT 0323A
Count Date/Time: 3/24/99

W.O.#	Sample #	Digest Aliquot ML	Final Gross PC (g)	Final Solid Mass (mg)	Filtered or Unfiltered	Remarks	CAR GRP	Pos Car No.	POS Ckd by
99-15-021	1	1	NA	NA	NA			1	CAN
99-15-021	2	1	NA	NA	NA			2	↓
99-15-021	3	1	NA	NA	NA			3	↓

Std. NO:	Std. type	Pipet No.	Vol. mL
512.1572.67	Am 241	RS-009	1.0043

Spike Witne BP 3/24/99
Reviewed b KH 3/24/99
Relinquishe KH 3/24/99
Received by: CAN 3/24/99

3/24/99.....12:50 PM

R/BENCH-SH/15021STD.XLS

PAI - Gross Alpha/Beta in Water Sample Analysis

Unit Type: LB4100/W
Counting Unit ID: Orange

Alpha efficiency logfile: AM241RNG
Alpha attenuation calibration: ATAM518R.XLD
Certainty level for MDA and flags: 95.00%
High Voltage Mode: Simultaneous

Beta Calibration Factors
Beta mM: 0.999056
polyn. a=>B xtalk A: 6.574E-06
polyn. a=>B xtalk B: -8.291E-04
polyn. a=>B xtalk C: 3.086E-01

Alpha mM 0.991587892
polyn. B=>a xtalk A: -2.353E-09
polyn. B=>a xtalk B: 3.880E-08
polyn. B=>a xtalk C: 7.064E-04

Beta efficiency logfile: SR90RING
Beta attenuation calibration: AT520SRY.XLD
Application Revision: C
Application Version: PAI

Offsets per QASS 151168
alpha B= 1.00000
beta B= 1.00000

Data file name: WAT0323a
Batch ID: 15021std, 15
Count Duration (m): 10
Batch Ended: *********
Activity Units: pCi
Date of Bkg. Cal: 3/19/99

Rev. 6/2/98 rts

Det. ID	Sample ID	Count End Date & Time	Count Duration (min)	Resid. Mass (mg)	Sample Volume (g / L)	Alpha Activity				Beta Activity			Alpha Calibrations			Beta Calibrations		
						Gross CPM	Activity Concentration	2σ	MDC	Gross CPM	Activity Concentration	MDC	bkg CPM	effM	b=>a x-tlk (fract.)	bkg CPM	effM	a=>b x-tlk (fract.)
C1	99-15-019-03	3/24/99 14:27	10.00	0.0	0.0010	6.900	-185.271	4037.160	7271.774	9786.200	9615332.110	3184.991	0.0930	0.25678	0.00071	1.9480	0.45630	0.30861
A1	99-15-021-01	3/24/99 14:27	10.00	0.0	0.0010	2794.000	4950611.388	58077.031	2910.358	974.400	109585.582	43421.997	0.1810	0.25306	0.00071	2.3400	0.44941	0.30861
A2	99-15-021-02	3/24/99 14:27	10.00	0.0	0.0010	2811.300	5024686.758	58765.180	2978.879	1037.900	167552.471	43428.023	0.1670	0.25087	0.00071	1.9640	0.45063	0.30861
A3	99-15-021-03	3/24/99 14:27	10.00	0.0	0.0010	2806.700	4982226.619	58315.123	2902.748	1001.000	132409.235	43497.575	0.1530	0.25259	0.00071	2.0880	0.44963	0.30861
B3	99-15-019-01	3/24/99 14:28	10.00	0.0	0.0010	5.200	-3032.660	3944.621	7553.667	9550.300	9686761.655	3089.243	0.1080	0.24469	0.00071	1.9530	0.44204	0.30861
B4	99-15-019-02	3/24/99 14:28	10.00	0.0	0.0010	4.400	-4548.044	3702.056	7356.203	9693.000	9623989.176	2900.815	0.1200	0.25318	0.00071	1.8890	0.45159	0.30861

Average Am Act.= 4.986E+06 pCi/l
Average Am Unc.= 5.839E+04 pCi/l (2 sigma)

Expected Am Act.= 5.000E+06

Relative Recovey= 99.72%

Average Sr/Y Act.= 9.642E+06 pCi/l
Average Sr/Y Unc.= 6.079E+04 pCi/l (2 sigma)

Expected Sr/Y Act.= 9.940E+06

Relative Recovey= 97.01%

000168

LB4100-B Raw counts for Sr-90 Ring Planchet Efficiency Calibrations (Control ID #1121)

Detector ID	A1	A2	A3	A4	B1	B2	B3	B4
total time	1.28	1.26	1.24	1.27	1.21	1.22	1.21	1.27
total counts	10178	10095	10098	10103	10025	10046	10142	10082
Beta CPM	7950.1775	8010.51876	8142.10739	7953.71211	8283.50597	8232.91523	8380.26018	7936.97468
Beta BKG CPM	1.385	1.386	1.441	1.406	1.618	1.511	1.558	1.608
Beta Efficiency	0.40348739	0.40654983	0.41322822	0.40366678	0.4204046	0.41783702	0.42531507	0.40281744
archived STDEV	0.0209593	0.02112154	0.02146839	0.02097145	0.02184417	0.0217099	0.02209459	0.02092817
Data file	EGB1118A	EGB1118A	EGB1118A	EGB1118A	EGB1118B	EGB1118B	EGB1118B	EGB1118B

Detector ID	C1	C2	C3	C4	D1	D2	D3	D4
total time	1.23	1.22	1.22	1.24	1.24	1.25	1.22	1.23
total counts	10121	10041	10076	10116	10055	10105	10086	10050
Beta CPM	8226.95228	8228.82487	8257.48239	8156.59252	8107.39697	8082.082	8265.33011	8168.96271
Beta BKG CPM	1.503	1.503	1.534	1.472	1.474	1.918	1.883	1.883
Beta Efficiency	0.41753475	0.41762979	0.41908422	0.41396385	0.41146719	0.4101824	0.41948262	0.41459178
archived STDEV	0.02169123	0.02169933	0.02177351	0.02150591	0.02137858	0.02130997	0.02179388	0.02154118
Data file	EGB1118C	EGB1118C	EGB1118C	EGB1118C	EGB1118D	EGB1118D	EGB1118D	EGB1118D

OK
AE
12/1/03

Source Database for OSUM for LB4100-B

Number of sources in table: 43

Application Revision: A

Control ID	Isotope	Type	Half-Life (days)	DPM	Std dev	Date	Status	Alpha/Beta Archive File
1119	I-129	Beta	5734268000	4414	220.70	15-Apr-93	PAI	I129-11/03
1120	Pb-210	Beta	8144.852	1187.602	59.38	18-Jun-03	PAI	Pb210-11/03
1121	Sr-90/Y-90	Beta	10446.15	22065.912	1103.30	18-Mar-99	PAI	Sr90R-11/03
1122	Am-241	Alpha	157861.05	11101.11	555.06	18-Mar-99	PAI	Am241-11/03

000170

JE
11/14/03

Pb-210 Calibration
Pb-210 on flat planchets

Benchsheet: 259526 Source ID: 1120 logfile: Pb210-11/03

Source:	Det:	Filenames:
0322033-51	A1 B1 C1	EPB1114A
-53	A2 B2 C2	EPB1114B
-54	A3 B3 C3	EPB1114C
-55	A4 B4 C4	EPB1114D

1/18/03
JE

Gross Alpha (Am-241) Calibration
Am-241 on ringed planchets

Benchsheet: 240787 Source ID: 1122 logfile: Am241-11/03

Source:	Det:	Filenames:
0317010-1	A1 B1 C1 D1	EAM1118A
-2	A2 B2 C2 D2	B
-3	A3 B3 C3 D3	C
-5	A4 B4 C4 D4	D

1/18/03
JE

Gross Beta (Sr-90) Calibration
Sr-90 on ringed planchets

Benchsheet: 240788 Source ID: 1121 logfile: Sr90R-11/03

Source:	Det:	filenames:
0317011-1	A1 B1 C1 D1	EGB1118A
-2	A2 B2 C2 D2	B
-4	A3 B3 C3 D3	C
-5	A4 B4 C4 D4	D

JE 12/1/03
Read and Understood by

Continued on Page

Clare Jenkin 12/1/03 Julie Ellingson 12/1/03
Signed Date Signed Date

pg 265845 a
(cont. from pg N/A b)

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: **LB4100B**

SOP 724 Rev 8

Date: 11/18/03

Instrument Background and Response Checklist

P-10 Supply	P-10 Flow
1 1000	A 0.1
2 200	B
	C
	D

Bkg.	Cal. File ID
Dr A	BKB 1116W
Dr B	
Dr C	
Dr D	

Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On line	Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On-line
1	LGB		P		JE		P		✓	9	LGB		P		JE		P		✓
2									✓	10							P		✓
3									✓	11		2				JE	R	P	✓
4									✓	12							P		✓
5									✓	13									✓
6									✓	14									✓
7									✓	15									✓
8									✓	16					P		P		✓

P = passes; R = Recount, H = high; L = low; W = weekly; α = Alpha; B = Beta; DR = Daily Response Check; Stat = Status; Det = Detector; Bkg = Background; OL = Offline; NP = Not Processed.

Runlog

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp Init.	Outp. Date	Cmnt Below
1-16	DR Checks	–	–	EFB 1118	30	0707	LGB	JE	11/18/03	A
1-16	BKG Check	–	–	BKB1118	60	0732	JE	JE	11/18/03	
11	BKG Recount	–	–	BKB1118A	60	0916	JE	JE	11/18/03	
1-4	0317016-1,3,5	240787	Am-241 eff	EAM1118A	10	1026	JE	JE	11/18/03	
5-8				B		1032	JE	JE	11/18/03	
9-12				C		1038	JE	JE	11/18/03	
13-16				D		1057	JE	JE	11/18/03	
1-4	0317011-1,2,4,5	240788	Sr-90 gross β eff	EGB1118A	5	1032	JE	JE	11/18/03	
5-8				B		1038	JE	JE	11/18/03	
9-12				C		1057	JE	JE	11/18/03	
13-16				D		1104	JE	JE	11/18/03	
0317014-1,3,20 1-16	~~17014AM~~ 11/18/03	17014AMC.XLS	Am-241 Curve	ATC1118	10/step	1117	JE	JE	11/18/03	

11/19/03

Reviewed by JE Date 11/19/03

Form 780r6.frm (4/6/2001)

Comments:

000172

G-β efficiency

Paragon Analytics, Inc.

240788 A

WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES

Matrix — Prep Analyst NT Prep Date 5/7/03 Analyte ^{90}Sr Analytical Batch _____

Pretreatment? (Y / N) Batch _____ Count Date / Time _____ Superseded _____

Paragon WO No.	Sample Wt. (g / L)	Sample Aliq. (g / L)	Aliquot Basis (Dry / AR)	Spike Information	Remarks	Det. No.	Filename	POS Ckd By
0317011 - 1							~~5~~	
-2								
-3							3 = outlier; do not use.	
-4								
-5								

NT 5/7/03

NT 5/7/03

NT 5/7/03

Balance No. NA Spiked By NT Date 5/7/03 Spike Witness [illegible] Date 05/07/03 QASS? (Y / N) No. _____

	Isotope	No	Act / mL	Vol	P	Total Act (dpm)	Decay Corrected	Pipet	Relinquished by / Date	Received by / Date
Spike 1	^{90}Sr	514,152.72	11032.956	1ml		11032.956		T-200 1	CW 5/9/03	[illegible] 5/9/03
Spike 2										
Spike 3								2		
Spike 4										

NT 5/7/03

NT 5/9/03

Electronic Benchsheet No. (if / when generated) NA Reviewed by / Date CW 5/9/03

 Form 798r0.frm (5/12/2002)

000173

240788 B

WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES / ACTINIDES

Initials NT Date 5/7/03 Method (SOP / Rev) 702R16 Matrix ——

^{90}Sr (G-B) efficiency COMMENTS

1) 5 ringed planchets were labeled and placed on a hotplate.
2) 5ml concentrated HNO_3 was added to each sample planchet.
3) 1ml ~~95~~ NT 5/8/03 ^{90}Sr was added to each planchet.
4) Samples were then taken to dryness and relinquished to the instrument lab for counting.

Reviewed by / Date CW 5/9/03

72
PROJECT 514.1572.72

Notebook No. _____
Continued From Page _____

S-90 Primary Standard

1) Transfer RSO# 514 (Analytics 57370-307) to a a 250 ml poly bottle + dilute to final conc. of approx 5000 pCi/ml w/ 0.1 M HCl.

a) Ampule, full w/ beaker 36.5911 g (Bal 12)
Ampule, empty w/ beaker 31.7310
Net std. transferred 4.8601 g

b) 250 ml poly, empty 26.4116 g (Bal 12)
bottle w/ std, 0.1 M HCl 223.6 g (Bal 16)
Total diluted std mass 197.2 g

2) Density of 0.1 M HCl using 100 ml class A flask.

99.7100 g / 100 ml = .9971 g/ml

3) Calculations

orig. std. $\left(\frac{3.757E4 \text{ dps}}{5.02081 \text{ g}}\right)\left(\frac{60 \text{ s/m}}{2.22 \text{ dpm/pCi}}\right) = 202{,}239.4$ pCi/g

dil. std by mass $\frac{(202{,}239.4 \text{ pCi/g})(4.8601 \text{ g})}{(197.2 \text{ g})} = 4984.3$ pCi/g

dil std by vol (4984.3 pCi/g)(.9971 g/ml) = 4969.8 pCi/ml.

Ref Date = 3/18/99
Exp Date = 3/23/04

Verified 3/25/99 DCB

Continued on Page

Read and Understood By

[signature] 3/23/99 [signature] 3/24/99

Signed Date Signed Date

ANALYTICS

PAI 514
rec'd 3-23-99

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.
Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

57370-307

Sr-90 5 mL Liquid in Flame Sealed Vial

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.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ISOTOPE:	Sr-90
ACTIVITY (dps):	3.757 E+04
HALF-LIFE:	28.74 years
CALIBRATION DATE:	March 18, 1999 12:00 EST
TOTAL UNCERTAINTY:	4.0%
SYSTEMATIC:	3.5%
RANDOM:	0.5%

5.02081 grams of solution 30 ppm Sr carrier in 0.1M HCl.

P O NUMBER 22170, Item 2

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

Q A APPROVED: _____ 3-18-99

STANDARD VERIFICATION FORM

Code #: 514.1572.72 Name of Standard: Sr 90 - Primary Std

Date: 3/24/99 Analyst: DCB / BP

Aliquot for verification: 3ea - 1ml std. on a ringed planchet

Work up: Std. converted to HNO_3 matrix in glass beaker + quantitatively transferred to planchet. See attached benchsheet.

Expected activity and uncertainty: 4969.8 ± 198.8 pCi/ml

Results of Counting and counting uncertainty: 4821 ± 60.8 pCi/ml
(= 97.01 % of expected value)

Radiochemistry Technical Manager: David C Burns Date: 3/25/99

Radiochemistry QA Manager: [signature] Date: 3/25/99

~~000176~~ A11FM718 (2/2

000177

Standard Verification for Sr 90

Analyst: KH
Prep. Date: 3/24/99
Prep. Date: 3/24/99

Data Filename: WAT0323A
Count Date/Time: 3/24/99

W.O.#	Sample #	Aliquot ML	Final Gross PC (g)	Final Solid Mass (mg)	Filtered or Unfiltered	Remarks	CAR GRP	Pos Car No.	POS Ckd by
99-15-019	1	1	NA	NA	NA			7	CM
99-15-019	2	1	NA	NA	NA			8	↓
99-15-019	3	1	NA	NA	NA			9	↓

Std. NO:	Std. type	Pipet Used	Vol. mL
514.1572.72	Sr-90	RS-009	1.0043

KH 3-30-99

Spike Witne BP 3/24/99
Reviewed b KH 3/24/99
Relinquishe KH 3/24/99
Received by: CM 3/24/99

3/24/99.....12:48 PM

R/BENCH-SH/15019STD.XLS

PAI - Gross Alpha/Beta in Water Sample Analysis

Unit Type: LB4100/W
Counting Unit ID: Orange

Alpha efficiency logfile: AM241RNG
Alpha attenuation calibration: ATAM518R.XLD
Certainty level for MDA and flags: 95.00%
High Voltage Mode: Simultaneous

Beta Calibration Factors
Beta mM: 0.999056
polyn. a=>B xtalk A: 6.574E-06
polyn. a=>B xtalk B: -8.291E-04
polyn. a=>B xtalk C: 3.086E-01

Alpha mM 0.991587892
polyn. B=>a xtalk A: -2.353E-09
polyn. B=>a xtalk B: 3.880E-08
polyn. B=>a xtalk C: 7.064E-04

Beta efficiency logfile: SR90RING
Beta attenuation calibration: AT520SRY.XLD
Application Revision: C
Application Version: PAI

Offsets per QASS 151168
alpha B= 1.00000
beta B= 1.00000

Data file name: WAT0323a
Batch ID: 15021std, 15
Count Duration (m): 10
Batch Ended: #########
Activity Units: pCi
Date of Bkg. Cal: 3/19/99

Rev. 6/2/98 rts

Det. ID	Sample ID	Count End Date & Time	Count Duration (min)	Resid. Mass (mg)	Sample Volume (g / L)	Alpha Activity Gross CPM	Alpha Activity Activity Concentration	Alpha Activity 2σ	Alpha Activity MDC	Beta Activity Gross CPM	Beta Activity Activity Concentration	Beta Activity MDC	Alpha Calibrations bkg CPM	Alpha Calibrations effM	Alpha Calibrations b=>a x-tlk (fract.)	Beta Calibrations bkg CPM	Beta Calibrations effM	Beta Calibrations a=>b x-tlk (fract.)
C1	99-15-019-03	3/24/99 14:27	10.00	0.0	0.0010	6.900	-185.271	4037.160	7271.774	9786.200	9615332.110	3184.991	0.0930	0.25678	0.00071	1.9480	0.45630	0.30861
A1	99-15-021-01	3/24/99 14:27	10.00	0.0	0.0010	2794.000	4950611.388	58077.031	2910.358	974.400	109585.582	43421.997	0.1810	0.25306	0.00071	2.3400	0.44941	0.30861
A2	99-15-021-02	3/24/99 14:27	10.00	0.0	0.0010	2811.300	5024686.758	58765.180	2978.879	1037.900	167552.471	43428.023	0.1670	0.25087	0.00071	1.9640	0.45063	0.30861
A3	99-15-021-03	3/24/99 14:27	10.00	0.0	0.0010	2806.700	4982226.619	58315.123	2902.748	1001.000	132409.235	43492.575	0.1530	0.25259	0.00071	2.0880	0.44963	0.30861
B3	99-15-019-01	3/24/99 14:28	10.00	0.0	0.0010	5.200	-3032.660	3944.621	7553.667	9550.300	9686761.655	3089.243	0.1080	0.24469	0.00071	1.9530	0.44204	0.30861
B4	99-15-019-02	3/24/99 14:28	10.00	0.0	0.0010	4.400	-4548.044	3702.056	7356.203	9693.000	9623989.176	2900.815	0.1200	0.25318	0.00071	1.8890	0.45159	0.30861

Average Am Act.= 4.986E+06 pCi/l
Average Am Unc.= 5.839E+04 pCi/l (2 sigma)

Expected Am Act.= 5.000E+06

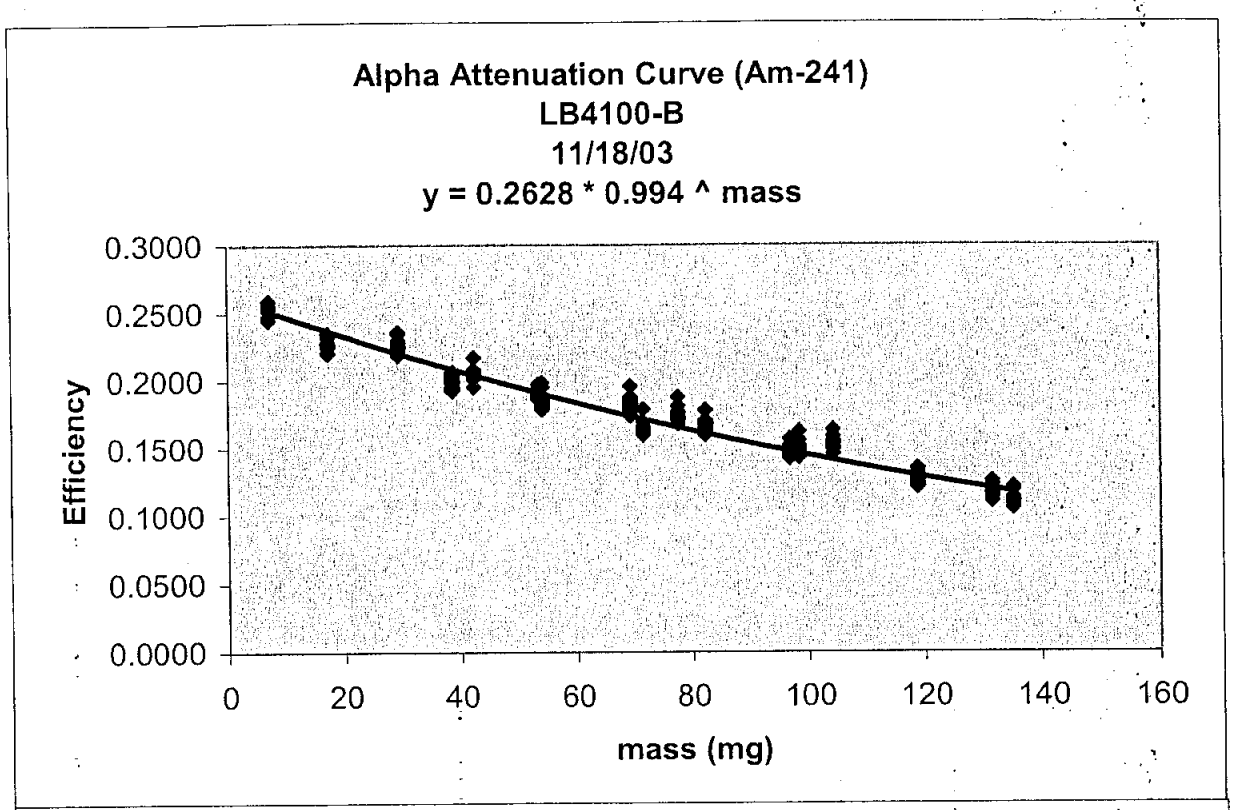
Relative Recovey= 99.72%

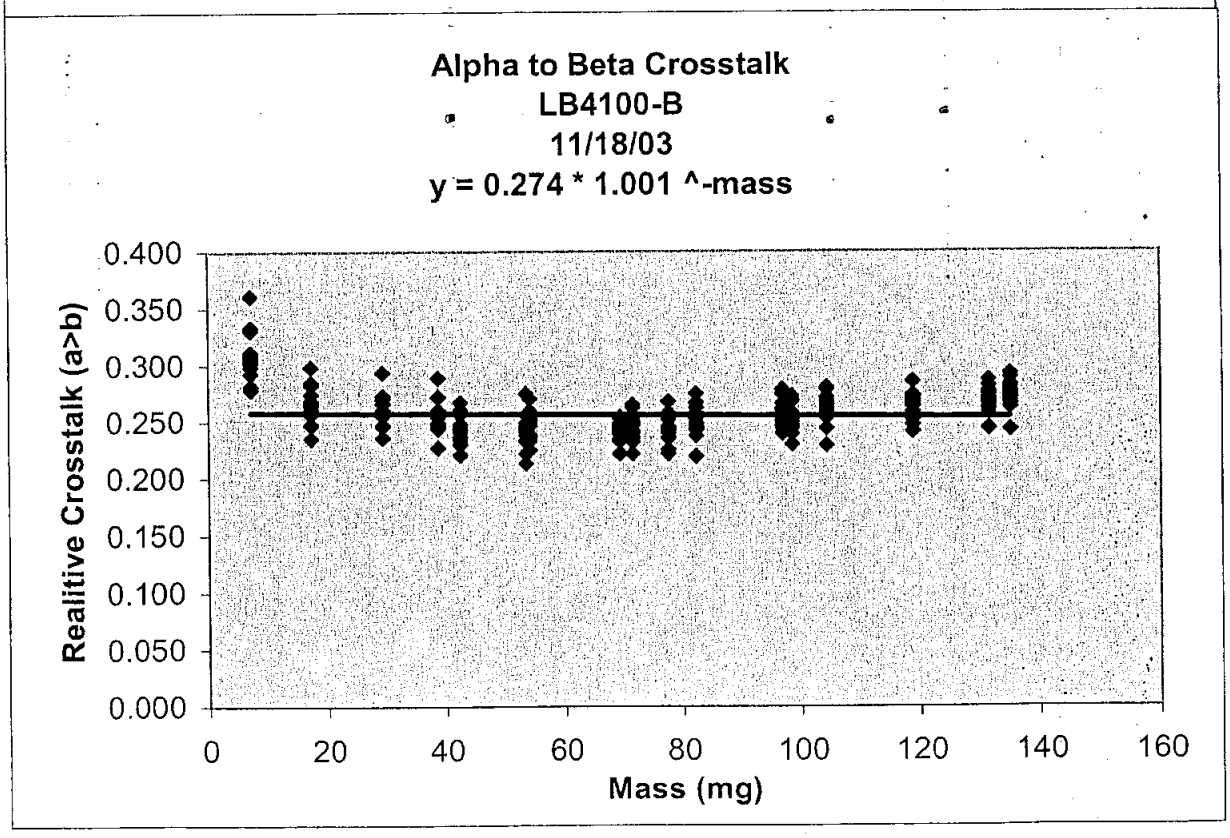
Average Sr/Y Act.= 9.642E+06 pCi/l
Average Sr/Y Unc.= 6.079E+04 pCi/l (2 sigma)

Expected Sr/Y Act.= 9.940E+06

Relative Recovey= 97.01%

000173


Alpha Attenuation Curve (Am-241)
LB4100-B
11/18/03
y = 0.2628 * 0.994 ^ mass
Efficiency
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
0
20
40
60
80
100
120
140
160
mass (mg)


Alpha to Beta Crosstalk
LB4100-B
11/18/03
y = 0.274 * 1.001 ^-mass
Realitive Crosstalk (a>b)
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0
20
40
60
80
100
120
140
160
Mass (mg)

Paragon Analytics, Inc.

QUALITY ASSURANCE SUMMARY SHEET

PAI W.O. # / BATCH —

TEST Am-241 Calibration Curve

METHOD LB.41.020-B

263223

SOP/REV (PREP) —

SOP/REV (ANAL) 724 R8

Briefly document any QA or other problems or deviations associated with the analysis of samples. Problems could result from: log-in, color, odor, dilution, consistency, scheduling, equipment, or instrumentation, or may include documentation of minor deviations necessary due to unique DQO's or sample characteristics.

AE 12/1/03

- The mass attenuation curve used for gross alpha/Am-241 analysis does not adequately intercept the zero mass calibration results to allow the use of the zero mass standards to be included in the calibration curve.
- Consequently, the mass attenuation curve is produced without the zero mass data points as described below.
- Client samples will only be analyzed if the residual planchet mass exceeds the minimum mass in the mass attenuation curve. While this is believed to be a result of using muffled planchets instead of detergent-washed planchets, the quality of the analytical data is not affected and the calibrations will be used without qualification. AE 12/1/03
- The normal mass-corrected efficiency is of the form $e*b*m^x$, where x is the residual mass on the planchet in mg and e is the individual zero-mass detector efficiency. The actual mass-corrected efficiency curve generated by this data, exclusive of the zero mass standards is $0.2628*0.994^x$. The average zero mass efficiency is 0.2110. AE 12/1/03
- To facilitate the reporting of data with our current analytical software the mass attenuation correction used is $(0.2628/0.2110)*0.994^x$ or $1.2455*0.994^x$. This attenuation coefficient is relative to each detectors individual zero mass counting efficiency, so the final mass-corrected counting efficiency for an individual detector becomes $e*1.2455*0.994^x$. This is the equation used in the analytical process.

r:\inst\gfp\am241.doc AE 12/1/03

TECHNICIAN/ANALYST Alice Fellingson DATE 12/1/03

DEPARTMENT MANAGER [signature] DATE 12/1/03

FORM 302r5.FRM (04/30/01)

Alpha Attenuation Calibration Worksheet - LB4100 AB

5/27/04

	Am-241	Am-241
Standard ID	512.1572.67	541.1808.26
Cert Act (pCi/ml)	5000.5	24905.6
To	3/18/99	2/3/00

y=b*m^ax

b	0.2628
m	0.994
a	1

min rel dev*	-10.6%
max rel dev*	14.1%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ATC1118	A1	1	10028	3.59	11/18/03 11:24	2793.31	24905.6	0.2	10991.1	0.2541	0.2085	7.1	0.2541	0.251808	0.0023	0.92%
ATC1118	A2	1	10048	3.59	11/18/03 11:32	2798.89	24905.6	0.2	10991.1	0.2547	0.2041	7.1	0.2547	0.251808	0.0028	1.12%
ATC1118	A3	1	10030	3.61	11/18/03 11:43	2778.39	24905.6	0.2	10991.1	0.2528	0.2099	7.1	0.2528	0.251808	0.0010	0.39%
ATC1118	A4	1	10008	3.72	11/18/03 11:54	2690.32	24905.6	0.2	10991.1	0.2448	0.2037	7.1	0.2448	0.251808	-0.0070	-2.87%
ATC1118	B1	1	10006	3.56	11/18/03 12:04	2810.67	24905.6	0.2	10991.1	0.2557	0.2233	7.1	0.2557	0.251808	0.0039	1.53%
ATC1118	B2	1	10001	3.55	11/18/03 12:28	2817.18	24905.6	0.2	10991.1	0.2563	0.2192	7.1	0.2563	0.251808	0.0045	1.76%
ATC1118	B3	1	10050	3.53	11/18/03 12:38	2847.03	24905.6	0.2	10991.1	0.2590	0.2148	7.1	0.2590	0.251808	0.0072	2.79%
ATC1118	B4	1	10022	3.68	11/18/03 12:48	2723.37	24905.6	0.2	10991.1	0.2478	0.2038	7.1	0.2478	0.251808	-0.0040	-1.63%
ATC1118	C1	1	10035	3.61	11/18/03 12:59	2779.78	24905.6	0.2	10991.1	0.2529	0.2170	7.1	0.2529	0.251808	0.0011	0.44%
ATC1118	C2	1	10011	3.56	11/18/03 13:09	2812.08	24905.6	0.2	10991.1	0.2559	0.2127	7.1	0.2559	0.251808	0.0040	1.58%
ATC1118	C3	1	10028	3.53	11/18/03 13:19	2840.79	24905.6	0.2	10991.1	0.2585	0.2117	7.1	0.2585	0.251808	0.0067	2.58%
ATC1118	C4	1	10025	3.61	11/18/03 13:30	2777.01	24905.6	0.2	10991.1	0.2527	0.2063	7.1	0.2527	0.251808	0.0009	0.34%
ATC1118	D1	1	10032	3.62	11/18/03 13:43	2771.27	24905.6	0.2	10991.1	0.2521	0.2111	7.1	0.2521	0.251808	0.0003	0.13%
ATC1118	D2	1	10009	3.56	11/18/03 13:53	2811.52	24905.6	0.2	10991.1	0.2558	0.2101	7.1	0.2558	0.251808	0.0040	1.56%
ATC1118	D3	1	10002	3.56	11/18/03 14:06	2809.55	24905.6	0.2	10991.1	0.2556	0.2103	7.1	0.2556	0.251808	0.0038	1.49%
ATC1118	D4	1	10054	3.58	11/18/03 14:16	2808.38	24905.6	0.2	10991.1	0.2555	0.2091	7.1	0.2555	0.251808	0.0037	1.45%
ATC1118	A1	3	10030	4.14	11/18/03 14:50	2422.71	24905.6	0.2	10991.1	0.2204	0.2085	17.2	0.2204	0.236958	-0.0165	-7.50%
ATC1118	A2	3	10042	4.13	11/18/03 14:59	2431.48	24905.6	0.2	10991.1	0.2212	0.2041	17.2	0.2212	0.236958	-0.0157	-7.11%
ATC1118	A3	3	10035	4.05	11/18/03 11:24	2477.78	24905.6	0.2	10991.1	0.2254	0.2099	17.2	0.2254	0.236958	-0.0115	-5.11%
ATC1118	A4	3	10031	4.05	11/18/03 11:32	2476.79	24905.6	0.2	10991.1	0.2253	0.2037	17.2	0.2253	0.236958	-0.0116	-5.15%
ATC1118	B1	3	10033	3.93	11/18/03 11:44	2552.93	24905.6	0.2	10991.1	0.2323	0.2233	17.2	0.2323	0.236958	-0.0047	-2.02%
ATC1118	B2	3	10020	3.88	11/18/03 11:54	2582.47	24905.6	0.2	10991.1	0.2350	0.2192	17.2	0.2350	0.236958	-0.0020	-0.85%
ATC1118	B3	3	10014	4.02	11/18/03 12:05	2491.04	24905.6	0.2	10991.1	0.2266	0.2148	17.2	0.2266	0.236958	-0.0103	-4.55%
ATC1118	B4	3	10020	4.03	11/18/03 12:28	2486.35	24905.6	0.2	10991.1	0.2262	0.2038	17.2	0.2262	0.236958	-0.0107	-4.75%
ATC1118	C1	3	10020	4.01	11/18/03 12:38	2498.75	24905.6	0.2	10991.1	0.2273	0.2170	17.2	0.2273	0.236958	-0.0096	-4.23%
ATC1118	C2	3	10020	4.05	11/18/03 12:49	2474.07	24905.6	0.2	10991.1	0.2251	0.2127	17.2	0.2251	0.236958	-0.0119	-5.27%
ATC1118	C3	3	10044	4.01	11/18/03 12:59	2504.74	24905.6	0.2	10991.1	0.2279	0.2117	17.2	0.2279	0.236958	-0.0091	-3.98%
ATC1118	C4	3	10011	4.04	11/18/03 13:10	2477.97	24905.6	0.2	10991.1	0.2255	0.2063	17.2	0.2255	0.236958	-0.0115	-5.10%
ATC1118	D1	3	10016	3.99	11/18/03 13:20	2510.28	24905.6	0.2	10991.1	0.2284	0.2111	17.2	0.2284	0.236958	-0.0086	-3.75%
ATC1118	D2	3	10029	3.99	11/18/03 13:30	2513.53	24905.6	0.2	10991.1	0.2287	0.2101	17.2	0.2287	0.236958	-0.0083	-3.62%
ATC1118	D3	3	10021	4.04	11/18/03 13:43	2480.45	24905.6	0.2	10991.1	0.2257	0.2103	17.2	0.2257	0.236958	-0.0113	-5.00%
ATC1118	D4	3	10009	4.04	11/18/03 13:54	2477.48	24905.6	0.2	10991.1	0.2254	0.2091	17.2	0.2254	0.236958	-0.0115	-5.12%
ATC1118	A1	6	10021	4.1	11/18/03 14:16	2444.15	24905.6	0.2	10991.1	0.2224	0.2085	29.4	0.2224	0.220184	0.0022	0.99%
ATC1118	A2	6	10019	4.17	11/18/03 14:27	2402.64	24905.6	0.2	10991.1	0.2186	0.2041	29.4	0.2186	0.220184	-0.0016	-0.72%
ATC1118	A3	6	10005	4.11	11/18/03 14:39	2434.31	24905.6	0.2	10991.1	0.2215	0.2099	29.4	0.2215	0.220184	0.0013	0.59%
ATC1118	A4	6	10016	4.06	11/18/03 14:50	2467.00	24905.6	0.2	10991.1	0.2245	0.2037	29.4	0.2245	0.220184	0.0043	1.90%
ATC1118	B1	6	10006	3.88	11/18/03 14:59	2578.87	24905.6	0.2	10991.1	0.2346	0.2233	29.4	0.2346	0.220184	0.0144	6.16%
ATC1118	B2	6	10008	3.86	11/18/03 11:24	2592.75	24905.6	0.2	10991.1	0.2359	0.2192	29.4	0.2359	0.220184	0.0157	6.66%

000182

Alpha Attenuation Calibration Worksheet - LB4100 A B

	Am-241	Am-241
Standard ID	512.1572.67	541.1808.26
Cert Act (pCi/ml)	5000.5	24905.6
To	3/18/99	2/3/00

y=b*m^ax

b	0.2628
m	0.994
a	1

min rel dev'	-10.6%
max rel dev*	14.1%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ATC1118	B3	6	10012	4.05	11/18/03 11:32	2472.10	24905.6	0.2	10991.1	0.2249	0.2148	29.4	0.2249	0.220184	0.0047	2.11%
ATC1118	B4	6	10020	3.96	11/18/03 11:44	2530.30	24905.6	0.2	10991.1	0.2302	0.2038	29.4	0.2302	0.220184	0.0100	4.36%
ATC1118	C1	6	10027	3.99	11/18/03 11:55	2513.03	24905.6	0.2	10991.1	0.2286	0.2170	29.4	0.2286	0.220184	0.0085	3.70%
ATC1118	C2	6	10030	4.04	11/18/03 12:05	2482.67	24905.6	0.2	10991.1	0.2259	0.2127	29.4	0.2259	0.220184	0.0057	2.52%
ATC1118	C3	6	10026	4.07	11/18/03 12:28	2463.39	24905.6	0.2	10991.1	0.2241	0.2117	29.4	0.2241	0.220184	0.0039	1.76%
ATC1118	C4	6	10022	4.08	11/18/03 12:38	2456.37	24905.6	0.2	10991.1	0.2235	0.2063	29.4	0.2235	0.220184	0.0033	1.48%
ATC1118	D1	6	10030	4.03	11/18/03 12:49	2488.83	24905.6	0.2	10991.1	0.2264	0.2111	29.4	0.2264	0.220184	0.0063	2.76%
ATC1118	D2	6	10026	4	11/18/03 12:59	2506.50	24905.6	0.2	10991.1	0.2280	0.2101	29.4	0.2280	0.220184	0.0079	3.45%
ATC1118	D3	6	10017	4.07	11/18/03 13:10	2461.18	24905.6	0.2	10991.1	0.2239	0.2103	29.4	0.2239	0.220184	0.0037	1.67%
ATC1118	D4	6	10019	4.03	11/18/03 13:20	2486.10	24905.6	0.2	10991.1	0.2262	0.2091	29.4	0.2262	0.220184	0.0060	2.66%
ATC1118	A1	8	10007	4.66	11/18/03 13:54	2147.42	24905.6	0.2	10991.1	0.1954	0.2085	38.7	0.1954	0.208199	-0.0128	-6.56%
ATC1118	A2	8	10031	4.74	11/18/03 14:07	2116.24	24905.6	0.2	10991.1	0.1925	0.2041	38.7	0.1925	0.208199	-0.0157	-8.13%
ATC1118	A3	8	10022	4.56	11/18/03 14:17	2197.81	24905.6	0.2	10991.1	0.2000	0.2099	38.7	0.2000	0.208199	-0.0082	-4.12%
ATC1118	A4	8	10009	4.7	11/18/03 14:27	2129.57	24905.6	0.2	10991.1	0.1938	0.2037	38.7	0.1938	0.208199	-0.0144	-7.45%
ATC1118	B1	8	10008	4.45	11/18/03 14:40	2248.99	24905.6	0.2	10991.1	0.2046	0.2233	38.7	0.2046	0.208199	-0.0036	-1.75%
ATC1118	B2	8	10021	4.53	11/18/03 14:50	2212.14	24905.6	0.2	10991.1	0.2013	0.2192	38.7	0.2013	0.208199	-0.0069	-3.44%
ATC1118	B3	8	10020	4.48	11/18/03 14:59	2236.61	24905.6	0.2	10991.1	0.2035	0.2148	38.7	0.2035	0.208199	-0.0047	-2.31%
ATC1118	B4	8	10018	4.42	11/18/03 11:24	2266.52	24905.6	0.2	10991.1	0.2062	0.2038	38.7	0.2062	0.208199	-0.0020	-0.96%
ATC1118	C1	8	10021	4.6	11/18/03 11:33	2178.48	24905.6	0.2	10991.1	0.1982	0.2170	38.7	0.1982	0.208199	-0.0100	-5.04%
ATC1118	C2	8	10011	4.56	11/18/03 11:44	2195.39	24905.6	0.2	10991.1	0.1997	0.2127	38.7	0.1997	0.208199	-0.0085	-4.23%
ATC1118	C3	8	10005	4.68	11/18/03 11:55	2137.82	24905.6	0.2	10991.1	0.1945	0.2117	38.7	0.1945	0.208199	-0.0137	-7.04%
ATC1118	C4	8	10021	4.59	11/18/03 12:05	2183.22	24905.6	0.2	10991.1	0.1986	0.2063	38.7	0.1986	0.208199	-0.0096	-4.81%
ATC1118	D1	8	10006	4.58	11/18/03 12:29	2184.72	24905.6	0.2	10991.1	0.1988	0.2111	38.7	0.1988	0.208199	-0.0094	-4.74%
ATC1118	D2	8	10012	4.56	11/18/03 12:39	2195.61	24905.6	0.2	10991.1	0.1998	0.2101	38.7	0.1998	0.208199	-0.0084	-4.22%
ATC1118	D3	8	10023	4.6	11/18/03 12:49	2178.91	24905.6	0.2	10991.1	0.1982	0.2103	38.7	0.1982	0.208199	-0.0100	-5.02%
ATC1118	D4	8	10022	4.53	11/18/03 13:00	2212.36	24905.6	0.2	10991.1	0.2013	0.2091	38.7	0.2013	0.208199	-0.0069	-3.43%
ATC1118	A1	7	10021	4.53	11/18/03 14:07	2212.14	24905.6	0.2	10991.1	0.2013	0.2085	42.4	0.2013	0.203614	-0.0023	-1.17%
ATC1118	A2	7	10025	4.67	11/18/03 14:17	2146.68	24905.6	0.2	10991.1	0.1953	0.2041	42.4	0.1953	0.203614	-0.0083	-4.25%
ATC1118	A3	7	10013	4.51	11/18/03 14:27	2220.18	24905.6	0.2	10991.1	0.2020	0.2099	42.4	0.2020	0.203614	-0.0016	-0.80%
ATC1118	A4	7	10012	4.49	11/18/03 14:40	2229.84	24905.6	0.2	10991.1	0.2029	0.2037	42.4	0.2029	0.203614	-0.0007	-0.36%
ATC1118	B1	7	10017	4.2	11/18/03 14:50	2385.00	24905.6	0.2	10991.1	0.2170	0.2233	42.4	0.2170	0.203614	0.0134	6.17%
ATC1118	B2	7	10017	4.41	11/18/03 14:59	2271.43	24905.6	0.2	10991.1	0.2067	0.2192	42.4	0.2067	0.203614	0.0030	1.47%
ATC1118	B3	7	10003	4.44	11/18/03 11:24	2252.93	24905.6	0.2	10991.1	0.2050	0.2148	42.4	0.2050	0.203614	0.0014	0.67%
ATC1118	B4	7	10008	4.42	11/18/03 11:33	2264.25	24905.6	0.2	10991.1	0.2060	0.2038	42.4	0.2060	0.203614	0.0024	1.16%
ATC1118	C1	7	10006	4.42	11/18/03 11:44	2263.80	24905.6	0.2	10991.1	0.2060	0.2170	42.4	0.2060	0.203614	0.0024	1.14%
ATC1118	C2	7	10029	4.44	11/18/03 11:55	2258.78	24905.6	0.2	10991.1	0.2055	0.2127	42.4	0.2055	0.203614	0.0019	0.92%
ATC1118	C3	7	10023	4.5	11/18/03 12:05	2227.33	24905.6	0.2	10991.1	0.2026	0.2117	42.4	0.2026	0.203614	-0.0010	-0.48%
ATC1118	C4	7	10018	4.45	11/18/03 12:29	2251.24	24905.6	0.2	10991.1	0.2048	0.2063	42.4	0.2048	0.203614	0.0012	0.59%

000183

Alpha Attenuation Calibration Worksheet - LB4100 Ab

	Am-241	Am-241
Standard ID	512.1572.67	541.1808.26
Cert Act (pCi/ml)	5000.5	24905.6
To	3/18/99	2/3/00

y=b*m^ax

b	0.2628
m	0.994
a	1
min rel dev'	-10.6%
max rel dev*	14.1%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ATC1118	D1	7	10011	4.48	11/18/03 12:39	2234.60	24905.6	0.2	10991.1	0.2033	0.2111	42.4	0.2033	0.203614	-0.0003	-0.15%
ATC1118	D2	7	10027	4.42	11/18/03 12:49	2268.55	24905.6	0.2	10991.1	0.2064	0.2101	42.4	0.2064	0.203614	0.0028	1.35%
ATC1118	D3	7	10020	4.49	11/18/03 13:00	2231.63	24905.6	0.2	10991.1	0.2030	0.2103	42.4	0.2030	0.203614	-0.0006	-0.28%
ATC1118	D4	7	10024	4.38	11/18/03 13:10	2288.58	24905.6	0.2	10991.1	0.2082	0.2091	42.4	0.2082	0.203614	0.0046	2.21%
ATC1118	A1	9	10031	4.85	11/18/03 13:44	2068.25	24905.6	0.2	10991.1	0.1882	0.2085	53.4	0.1882	0.190572	-0.0024	-1.27%
ATC1118	A2	9	10019	4.9	11/18/03 13:55	2044.69	24905.6	0.2	10991.1	0.1860	0.2041	53.4	0.1860	0.190572	-0.0045	-2.44%
ATC1118	A3	9	10013	4.86	11/18/03 14:07	2060.29	24905.6	0.2	10991.1	0.1875	0.2099	53.4	0.1875	0.190572	-0.0031	-1.66%
ATC1118	A4	9	10025	4.88	11/18/03 14:17	2054.30	24905.6	0.2	10991.1	0.1869	0.2037	53.4	0.1869	0.190572	-0.0037	-1.96%
ATC1118	B1	9	10022	4.62	11/18/03 14:27	2169.26	24905.6	0.2	10991.1	0.1974	0.2233	53.4	0.1974	0.190572	0.0068	3.44%
ATC1118	B2	9	10008	4.62	11/18/03 14:40	2166.23	24905.6	0.2	10991.1	0.1971	0.2192	53.4	0.1971	0.190572	0.0065	3.31%
ATC1118	B3	9	10013	4.68	11/18/03 14:50	2139.53	24905.6	0.2	10991.1	0.1947	0.2148	53.4	0.1947	0.190572	0.0041	2.10%
ATC1118	B4	9	10026	4.71	11/18/03 15:00	2128.66	24905.6	0.2	10991.1	0.1937	0.2038	53.4	0.1937	0.190572	0.0031	1.60%
ATC1118	C1	9	10014	4.84	11/18/03 11:25	2069.01	24905.6	0.2	10991.1	0.1882	0.2170	53.4	0.1882	0.190572	-0.0023	-1.24%
ATC1118	C2	9	10021	4.73	11/18/03 11:33	2118.60	24905.6	0.2	10991.1	0.1928	0.2127	53.4	0.1928	0.190572	0.0022	1.13%
ATC1118	C3	9	10012	4.83	11/18/03 11:44	2072.88	24905.6	0.2	10991.1	0.1886	0.2117	53.4	0.1886	0.190572	-0.0020	-1.05%
ATC1118	C4	9	10030	4.82	11/18/03 11:55	2080.91	24905.6	0.2	10991.1	0.1893	0.2063	53.4	0.1893	0.190572	-0.0012	-0.66%
ATC1118	D1	9	10014	4.74	11/18/03 12:05	2112.66	24905.6	0.2	10991.1	0.1922	0.2111	53.4	0.1922	0.190572	0.0016	0.86%
ATC1118	D2	9	10031	4.8	11/18/03 12:29	2089.79	24905.6	0.2	10991.1	0.1901	0.2101	53.4	0.1901	0.190572	-0.0004	-0.23%
ATC1118	D3	9	10026	4.77	11/18/03 12:39	2101.89	24905.6	0.2	10991.1	0.1912	0.2103	53.4	0.1912	0.190572	0.0007	0.35%
ATC1118	D4	9	10004	4.8	11/18/03 12:50	2084.17	24905.6	0.2	10991.1	0.1896	0.2091	53.4	0.1896	0.190572	-0.0009	-0.50%
ATC1118	A1	10	10013	5.07	11/18/03 13:31	1974.95	24905.6	0.2	10991.1	0.1797	0.2085	54	0.1797	0.189885	-0.0102	-5.68%
ATC1118	A2	10	10001	5.1	11/18/03 13:44	1960.98	24905.6	0.2	10991.1	0.1784	0.2041	54	0.1784	0.189885	-0.0115	-6.43%
ATC1118	A3	10	10043	4.9	11/18/03 13:55	2049.59	24905.6	0.2	10991.1	0.1865	0.2099	54	0.1865	0.189885	-0.0034	-1.83%
ATC1118	A4	10	10003	5	11/18/03 14:07	2000.60	24905.6	0.2	10991.1	0.1820	0.2037	54	0.1820	0.189885	-0.0079	-4.32%
ATC1118	B1	10	10002	4.59	11/18/03 14:17	2179.08	24905.6	0.2	10991.1	0.1983	0.2233	54	0.1983	0.189885	0.0084	4.22%
ATC1118	B2	10	10030	4.68	11/18/03 14:27	2143.16	24905.6	0.2	10991.1	0.1950	0.2192	54	0.1950	0.189885	0.0051	2.62%
ATC1118	B3	10	10005	4.95	11/18/03 14:40	2021.21	24905.6	0.2	10991.1	0.1839	0.2148	54	0.1839	0.189885	-0.0060	-3.26%
ATC1118	B4	10	10001	4.89	11/18/03 14:51	2045.19	24905.6	0.2	10991.1	0.1861	0.2038	54	0.1861	0.189885	-0.0038	-2.05%
ATC1118	C1	10	10014	4.93	11/18/03 15:00	2031.24	24905.6	0.2	10991.1	0.1848	0.2170	54	0.1848	0.189885	-0.0051	-2.75%
ATC1118	C2	10	10004	5.02	11/18/03 11:25	1992.83	24905.6	0.2	10991.1	0.1813	0.2127	54	0.1813	0.189885	-0.0086	-4.73%
ATC1118	C3	10	10007	4.95	11/18/03 11:33	2021.62	24905.6	0.2	10991.1	0.1839	0.2117	54	0.1839	0.189885	-0.0060	-3.24%
ATC1118	C4	10	10016	4.98	11/18/03 11:45	2011.24	24905.6	0.2	10991.1	0.1830	0.2063	54	0.1830	0.189885	-0.0069	-3.77%
ATC1118	D1	10	10005	4.92	11/18/03 11:56	2033.54	24905.6	0.2	10991.1	0.1850	0.2111	54	0.1850	0.189885	-0.0049	-2.63%
ATC1118	D2	10	10016	4.88	11/18/03 12:05	2052.46	24905.6	0.2	10991.1	0.1867	0.2101	54	0.1867	0.189885	-0.0031	-1.68%
ATC1118	D3	10	10021	5.05	11/18/03 12:29	1984.36	24905.6	0.2	10991.1	0.1805	0.2103	54	0.1805	0.189885	-0.0093	-5.17%
ATC1118	D4	10	10011	5.02	11/18/03 12:39	1994.22	24905.6	0.2	10991.1	0.1814	0.2091	54	0.1814	0.189885	-0.0084	-4.65%
ATC1118	A1	11	10010	5.13	11/18/03 13:21	1951.27	24905.6	0.2	10991.1	0.1775	0.2085	69.4	0.1775	0.173077	0.0045	2.51%
ATC1118	A2	11	10018	5.24	11/18/03 13:31	1911.83	24905.6	0.2	10991.1	0.1739	0.2041	69.4	0.1739	0.173077	0.0009	0.50%

000184

Alpha Attenuation Calibration Worksheet - LB4100 AB

	Am-241	Am-241
Standard ID	512.1572.67	541.1808.26
Cert Act (pCi/ml)	5000.5	24905.6
To	3/18/99	2/3/00

y=b*m^ax

b	0.2628
m	0.994
a	1
min rel dev*	-10.6%
max rel dev*	14.1%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ATC1118	A3	11	10000	5.08	11/18/03 13:44	1968.50	24905.6	0.2	10991.1	0.1791	0.2099	69.4	0.1791	0.173077	0.0060	3.36%
ATC1118	A4	11	10003	5.23	11/18/03 13:55	1912.62	24905.6	0.2	10991.1	0.1740	0.2037	69.4	0.1740	0.173077	0.0009	0.54%
ATC1118	B1	11	10029	4.66	11/18/03 14:07	2152.15	24905.6	0.2	10991.1	0.1958	0.2233	69.4	0.1958	0.173077	0.0227	11.61%
ATC1118	B2	11	10005	4.85	11/18/03 14:17	2062.89	24905.6	0.2	10991.1	0.1877	0.2192	69.4	0.1877	0.173077	0.0146	7.78%
ATC1118	B3	11	10007	4.99	11/18/03 14:28	2005.41	24905.6	0.2	10991.1	0.1825	0.2148	69.4	0.1825	0.173077	0.0094	5.14%
ATC1118	B4	11	10014	4.91	11/18/03 14:40	2039.51	24905.6	0.2	10991.1	0.1856	0.2038	69.4	0.1856	0.173077	0.0125	6.73%
ATC1118	C1	11	10022	5.07	11/18/03 14:51	1976.73	24905.6	0.2	10991.1	0.1798	0.2170	69.4	0.1798	0.173077	0.0068	3.76%
ATC1118	C2	11	10026	4.99	11/18/03 15:00	2009.22	24905.6	0.2	10991.1	0.1828	0.2127	69.4	0.1828	0.173077	0.0097	5.32%
ATC1118	C3	11	10016	4.96	11/18/03 11:25	2019.35	24905.6	0.2	10991.1	0.1837	0.2117	69.4	0.1837	0.173077	0.0106	5.80%
ATC1118	C4	11	10005	5.02	11/18/03 11:33	1993.03	24905.6	0.2	10991.1	0.1813	0.2063	69.4	0.1813	0.173077	0.0083	4.55%
ATC1118	D1	11	10004	4.99	11/18/03 11:45	2004.81	24905.6	0.2	10991.1	0.1824	0.2111	69.4	0.1824	0.173077	0.0093	5.11%
ATC1118	D2	11	10004	4.94	11/18/03 11:56	2025.10	24905.6	0.2	10991.1	0.1842	0.2101	69.4	0.1842	0.173077	0.0112	6.06%
ATC1118	D3	11	10017	4.93	11/18/03 12:05	2031.85	24905.6	0.2	10991.1	0.1849	0.2103	69.4	0.1849	0.173077	0.0118	6.38%
ATC1118	D4	11	10021	5.06	11/18/03 12:29	1980.43	24905.6	0.2	10991.1	0.1802	0.2091	69.4	0.1802	0.173077	0.0071	3.95%
ATC1118	A1	12	10034	5.58	11/18/03 13:11	1798.21	24905.6	0.2	10991.1	0.1636	0.2085	71.6	0.1636	0.170801	-0.0072	-4.40%
ATC1118	A2	12	10018	5.71	11/18/03 13:21	1754.47	24905.6	0.2	10991.1	0.1596	0.2041	71.6	0.1596	0.170801	-0.0112	-7.00%
ATC1118	A3	12	10019	5.59	11/18/03 13:32	1792.31	24905.6	0.2	10991.1	0.1631	0.2099	71.6	0.1631	0.170801	-0.0077	-4.74%
ATC1118	A4	12	10017	5.64	11/18/03 13:45	1776.06	24905.6	0.2	10991.1	0.1616	0.2037	71.6	0.1616	0.170801	-0.0092	-5.70%
ATC1118	B1	12	10033	5.11	11/18/03 13:55	1963.41	24905.6	0.2	10991.1	0.1786	0.2233	71.6	0.1786	0.170801	0.0078	4.39%
ATC1118	B2	12	10013	5.37	11/18/03 14:08	1864.62	24905.6	0.2	10991.1	0.1696	0.2192	71.6	0.1696	0.170801	-0.0012	-0.68%
ATC1118	B3	12	10009	5.48	11/18/03 14:18	1826.46	24905.6	0.2	10991.1	0.1662	0.2148	71.6	0.1662	0.170801	-0.0046	-2.78%
ATC1118	B4	12	10025	5.49	11/18/03 14:28	1826.05	24905.6	0.2	10991.1	0.1661	0.2038	71.6	0.1661	0.170801	-0.0047	-2.81%
ATC1118	C1	12	10021	5.64	11/18/03 14:41	1776.77	24905.6	0.2	10991.1	0.1617	0.2170	71.6	0.1617	0.170801	-0.0091	-5.66%
ATC1118	C2	12	10022	5.59	11/18/03 14:51	1792.84	24905.6	0.2	10991.1	0.1631	0.2127	71.6	0.1631	0.170801	-0.0077	-4.71%
ATC1118	C3	12	10016	5.5	11/18/03 15:00	1821.09	24905.6	0.2	10991.1	0.1657	0.2117	71.6	0.1657	0.170801	-0.0051	-3.09%
ATC1118	C4	12	10026	5.52	11/18/03 11:25	1816.30	24905.6	0.2	10991.1	0.1653	0.2063	71.6	0.1653	0.170801	-0.0055	-3.36%
ATC1118	D1	12	10001	5.52	11/18/03 11:34	1811.78	24905.6	0.2	10991.1	0.1648	0.2111	71.6	0.1648	0.170801	-0.0060	-3.62%
ATC1118	D2	12	10012	5.49	11/18/03 11:45	1823.68	24905.6	0.2	10991.1	0.1659	0.2101	71.6	0.1659	0.170801	-0.0049	-2.94%
ATC1118	D3	12	10003	5.57	11/18/03 11:56	1795.87	24905.6	0.2	10991.1	0.1634	0.2103	71.6	0.1634	0.170801	-0.0074	-4.53%
ATC1118	D4	12	10009	5.55	11/18/03 12:06	1803.42	24905.6	0.2	10991.1	0.1641	0.2091	71.6	0.1641	0.170801	-0.0067	-4.10%
ATC1118	A1	13	10035	5.44	11/18/03 13:01	1844.67	24905.6	0.2	10991.1	0.1678	0.2085	77.6	0.1678	0.164744	0.0031	1.84%
ATC1118	A2	13	10011	5.43	11/18/03 13:11	1843.65	24905.6	0.2	10991.1	0.1677	0.2041	77.6	0.1677	0.164744	0.0030	1.79%
ATC1118	A3	13	10013	5.29	11/18/03 13:21	1892.82	24905.6	0.2	10991.1	0.1722	0.2099	77.6	0.1722	0.164744	0.0075	4.34%
ATC1118	A4	13	10012	5.32	11/18/03 13:31	1881.95	24905.6	0.2	10991.1	0.1712	0.2037	77.6	0.1712	0.164744	0.0065	3.79%
ATC1118	B1	13	10019	4.86	11/18/03 13:44	2061.52	24905.6	0.2	10991.1	0.1876	0.2233	77.6	0.1876	0.164744	0.0228	12.17%
ATC1118	B2	13	10035	5.04	11/18/03 13:55	1991.07	24905.6	0.2	10991.1	0.1812	0.2192	77.6	0.1812	0.164744	0.0164	9.06%
ATC1118	B3	13	10015	5.22	11/18/03 14:08	1918.58	24905.6	0.2	10991.1	0.1746	0.2148	77.6	0.1746	0.164744	0.0098	5.62%
ATC1118	B4	13	10013	5.27	11/18/03 14:18	1900.00	24905.6	0.2	10991.1	0.1729	0.2038	77.6	0.1729	0.164744	0.0081	4.70%

000185

Alpha Attenuation Calibration Worksheet - LB4100 A

	Am-241	Am-241
Standard ID	512.1572.67	541.1808.26
Cert Act (pCi/ml)	5000.5	24905.6
To	3/18/99	2/3/00

y=b*m^ax

b	0.2628
m	0.994
a	1

min rel dev*	-10.6%
max rel dev*	14.1%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ATC1118	C1	13	10003	5.28	11/18/03 14:28	1894.51	24905.6	0.2	10991.1	0.1724	0.2170	77.6	0.1724	0.164744	0.0076	4.42%
ATC1118	C2	13	10016	5.15	11/18/03 14:41	1944.85	24905.6	0.2	10991.1	0.1769	0.2127	77.6	0.1769	0.164744	0.0122	6.90%
ATC1118	C3	13	10018	5.27	11/18/03 14:51	1900.95	24905.6	0.2	10991.1	0.1730	0.2117	77.6	0.1730	0.164744	0.0082	4.75%
ATC1118	C4	13	10009	5.34	11/18/03 15:00	1874.34	24905.6	0.2	10991.1	0.1705	0.2063	77.6	0.1705	0.164744	0.0058	3.40%
ATC1118	D1	13	10000	5.29	11/18/03 11:25	1890.36	24905.6	0.2	10991.1	0.1720	0.2111	77.6	0.1720	0.164744	0.0072	4.21%
ATC1118	D2	13	10010	5.28	11/18/03 11:34	1895.83	24905.6	0.2	10991.1	0.1725	0.2101	77.6	0.1725	0.164744	0.0077	4.49%
ATC1118	D3	13	10013	5.17	11/18/03 11:45	1936.75	24905.6	0.2	10991.1	0.1762	0.2103	77.6	0.1762	0.164744	0.0115	6.51%
ATC1118	D4	13	10019	5.22	11/18/03 11:56	1919.35	24905.6	0.2	10991.1	0.1746	0.2091	77.6	0.1746	0.164744	0.0099	5.66%
ATC1118	A1	14	10010	5.55	11/18/03 12:50	1803.60	24905.6	0.2	10991.1	0.1641	0.2085	82.3	0.1641	0.160149	0.0039	2.41%
ATC1118	A2	14	10009	5.71	11/18/03 13:01	1752.89	24905.6	0.2	10991.1	0.1595	0.2041	82.3	0.1595	0.160149	-0.0007	-0.42%
ATC1118	A3	14	10022	5.58	11/18/03 13:11	1796.06	24905.6	0.2	10991.1	0.1634	0.2099	82.3	0.1634	0.160149	0.0033	2.00%
ATC1118	A4	14	10015	5.55	11/18/03 13:21	1804.50	24905.6	0.2	10991.1	0.1642	0.2037	82.3	0.1642	0.160149	0.0040	2.45%
ATC1118	B1	14	10019	5.13	11/18/03 13:31	1953.02	24905.6	0.2	10991.1	0.1777	0.2233	82.3	0.1777	0.160149	0.0175	9.87%
ATC1118	B2	14	10000	5.34	11/18/03 13:44	1872.66	24905.6	0.2	10991.1	0.1704	0.2192	82.3	0.1704	0.160149	0.0102	6.00%
ATC1118	B3	14	10007	5.35	11/18/03 13:55	1870.47	24905.6	0.2	10991.1	0.1702	0.2148	82.3	0.1702	0.160149	0.0100	5.89%
ATC1118	B4	14	10002	5.4	11/18/03 14:08	1852.22	24905.6	0.2	10991.1	0.1685	0.2038	82.3	0.1685	0.160149	0.0084	4.97%
ATC1118	C1	14	10026	5.6	11/18/03 14:18	1790.36	24905.6	0.2	10991.1	0.1629	0.2170	82.3	0.1629	0.160149	0.0027	1.68%
ATC1118	C2	14	10001	5.42	11/18/03 14:28	1845.20	24905.6	0.2	10991.1	0.1679	0.2127	82.3	0.1679	0.160149	0.0077	4.61%
ATC1118	C3	14	10029	5.47	11/18/03 14:41	1833.46	24905.6	0.2	10991.1	0.1668	0.2117	82.3	0.1668	0.160149	0.0067	3.99%
ATC1118	C4	14	10022	5.54	11/18/03 14:51	1809.03	24905.6	0.2	10991.1	0.1646	0.2063	82.3	0.1646	0.160149	0.0044	2.70%
ATC1118	D1	14	10002	5.42	11/18/03 15:00	1845.39	24905.6	0.2	10991.1	0.1679	0.2111	82.3	0.1679	0.160149	0.0077	4.62%
ATC1118	D2	14	10007	5.44	11/18/03 11:25	1839.52	24905.6	0.2	10991.1	0.1674	0.2101	82.3	0.1674	0.160149	0.0072	4.31%
ATC1118	D3	14	10001	5.38	11/18/03 11:34	1858.92	24905.6	0.2	10991.1	0.1691	0.2103	82.3	0.1691	0.160149	0.0090	5.31%
ATC1118	D4	14	10007	5.54	11/18/03 11:45	1806.32	24905.6	0.2	10991.1	0.1643	0.2091	82.3	0.1643	0.160149	0.0042	2.55%
ATC1118	A1	16	10009	6.27	11/18/03 12:30	1596.33	24905.6	0.2	10991.1	0.1452	0.2085	96.8	0.1452	0.146767	-0.0015	-1.05%
ATC1118	A2	16	10010	6.4	11/18/03 12:40	1564.06	24905.6	0.2	10991.1	0.1423	0.2041	96.8	0.1423	0.146767	-0.0045	-3.14%
ATC1118	A3	16	10003	6.41	11/18/03 12:51	1560.53	24905.6	0.2	10991.1	0.1420	0.2099	96.8	0.1420	0.146767	-0.0048	-3.37%
ATC1118	A4	16	10023	6.29	11/18/03 13:02	1593.48	24905.6	0.2	10991.1	0.1450	0.2037	96.8	0.1450	0.146767	-0.0018	-1.23%
ATC1118	B1	16	10010	5.82	11/18/03 13:12	1719.93	24905.6	0.2	10991.1	0.1565	0.2233	96.8	0.1565	0.146767	0.0097	6.21%
ATC1118	B2	16	10017	6.01	11/18/03 13:22	1666.72	24905.6	0.2	10991.1	0.1516	0.2192	96.8	0.1516	0.146767	0.0049	3.22%
ATC1118	B3	16	10008	6.11	11/18/03 13:32	1637.97	24905.6	0.2	10991.1	0.1490	0.2148	96.8	0.1490	0.146767	0.0023	1.52%
ATC1118	B4	16	10009	6.19	11/18/03 13:45	1616.96	24905.6	0.2	10991.1	0.1471	0.2038	96.8	0.1471	0.146767	0.0003	0.24%
ATC1118	C1	16	10012	6.18	11/18/03 13:56	1620.06	24905.6	0.2	10991.1	0.1474	0.2170	96.8	0.1474	0.146767	0.0006	0.43%
ATC1118	C2	16	10014	6.29	11/18/03 14:09	1592.05	24905.6	0.2	10991.1	0.1448	0.2127	96.8	0.1448	0.146767	-0.0019	-1.32%
ATC1118	C3	16	10021	6.23	11/18/03 14:19	1608.51	24905.6	0.2	10991.1	0.1463	0.2117	96.8	0.1463	0.146767	-0.0004	-0.29%
ATC1118	C4	16	10013	6.23	11/18/03 14:29	1607.22	24905.6	0.2	10991.1	0.1462	0.2063	96.8	0.1462	0.146767	-0.0005	-0.37%
ATC1118	D1	16	10008	6.19	11/18/03 14:42	1616.80	24905.6	0.2	10991.1	0.1471	0.2111	96.8	0.1471	0.146767	0.0003	0.23%
ATC1118	D2	16	10007	6	11/18/03 14:52	1667.83	24905.6	0.2	10991.1	0.1517	0.2101	96.8	0.1517	0.146767	0.0050	3.28%

000186

Alpha Attenuation Calibration Worksheet - LB4100 A

	Am-241	Am-241
Standard ID	512.1572.67	541.1808.26
Cert Act (pCi/ml)	5000.5	24905.6
To	3/18/99	2/3/00

y=b*m^ax

b	0.2628
m	0.994
a	1

min rel dev*	-10.6%
max rel dev*	14.1%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ATC1118	D3	16	10013	6.25	11/18/03 15:01	1602.08	24905.6	0.2	10991.1	0.1458	0.2103	96.8	0.1458	0.146767	-0.0010	-0.69%
ATC1118	D4	16	10016	6.22	11/18/03 11:26	1610.29	24905.6	0.2	10991.1	0.1465	0.2091	96.8	0.1465	0.146767	-0.0003	-0.18%
ATC1118	A1	15	10008	6.31	11/18/03 12:40	1586.05	24905.6	0.2	10991.1	0.1443	0.2085	98.5	0.1443	0.145273	-0.0010	-0.67%
ATC1118	A2	15	10010	6.38	11/18/03 12:51	1568.97	24905.6	0.2	10991.1	0.1427	0.2041	98.5	0.1427	0.145273	-0.0025	-1.77%
ATC1118	A3	15	10016	6.19	11/18/03 13:01	1618.09	24905.6	0.2	10991.1	0.1472	0.2099	98.5	0.1472	0.145273	0.0019	1.32%
ATC1118	A4	15	10006	6.14	11/18/03 13:12	1629.64	24905.6	0.2	10991.1	0.1483	0.2037	98.5	0.1483	0.145273	0.0030	2.02%
ATC1118	B1	15	10013	5.62	11/18/03 13:21	1781.67	24905.6	0.2	10991.1	0.1621	0.2233	98.5	0.1621	0.145273	0.0168	10.38%
ATC1118	B2	15	10011	5.86	11/18/03 13:32	1708.36	24905.6	0.2	10991.1	0.1554	0.2192	98.5	0.1554	0.145273	0.0102	6.54%
ATC1118	B3	15	10011	6.05	11/18/03 13:45	1654.71	24905.6	0.2	10991.1	0.1506	0.2148	98.5	0.1506	0.145273	0.0053	3.51%
ATC1118	B4	15	10001	6.11	11/18/03 13:56	1636.82	24905.6	0.2	10991.1	0.1489	0.2038	98.5	0.1489	0.145273	0.0037	2.45%
ATC1118	C1	15	10005	6.13	11/18/03 14:08	1632.14	24905.6	0.2	10991.1	0.1485	0.2170	98.5	0.1485	0.145273	0.0032	2.17%
ATC1118	C2	15	10007	6.02	11/18/03 14:18	1662.29	24905.6	0.2	10991.1	0.1512	0.2127	98.5	0.1512	0.145273	0.0060	3.95%
ATC1118	C3	15	10002	6.12	11/18/03 14:29	1634.31	24905.6	0.2	10991.1	0.1487	0.2117	98.5	0.1487	0.145273	0.0034	2.30%
ATC1118	C4	15	10010	6.08	11/18/03 14:41	1646.38	24905.6	0.2	10991.1	0.1498	0.2063	98.5	0.1498	0.145273	0.0045	3.02%
ATC1118	D1	15	10011	6.17	11/18/03 14:52	1622.53	24905.6	0.2	10991.1	0.1476	0.2111	98.5	0.1476	0.145273	0.0023	1.59%
ATC1118	D2	15	10013	6.01	11/18/03 15:01	1666.06	24905.6	0.2	10991.1	0.1516	0.2101	98.5	0.1516	0.145273	0.0063	4.16%
ATC1118	D3	15	10012	6.02	11/18/03 11:26	1663.12	24905.6	0.2	10991.1	0.1513	0.2103	98.5	0.1513	0.145273	0.0060	3.99%
ATC1118	D4	15	10002	6.08	11/18/03 11:34	1645.07	24905.6	0.2	10991.1	0.1497	0.2091	98.5	0.1497	0.145273	0.0044	2.94%
ATC1118	A1	18	10021	6.07	11/18/03 11:57	1650.91	24905.6	0.2	10991.1	0.1502	0.2085	104.3	0.1502	0.14029	0.0099	6.60%
ATC1118	A2	18	10006	6.26	11/18/03 12:07	1598.40	24905.6	0.2	10991.1	0.1454	0.2041	104.3	0.1454	0.14029	0.0051	3.53%
ATC1118	A3	18	10010	6.07	11/18/03 12:30	1649.09	24905.6	0.2	10991.1	0.1500	0.2099	104.3	0.1500	0.14029	0.0097	6.50%
ATC1118	A4	18	10026	6.13	11/18/03 12:40	1635.56	24905.6	0.2	10991.1	0.1488	0.2037	104.3	0.1488	0.14029	0.0085	5.72%
ATC1118	B1	18	10011	5.58	11/18/03 12:50	1794.09	24905.6	0.2	10991.1	0.1632	0.2233	104.3	0.1632	0.14029	0.0229	14.05%
ATC1118	B2	18	10014	5.75	11/18/03 13:01	1741.57	24905.6	0.2	10991.1	0.1585	0.2192	104.3	0.1585	0.14029	0.0182	11.46%
ATC1118	B3	18	10009	5.87	11/18/03 13:12	1705.11	24905.6	0.2	10991.1	0.1551	0.2148	104.3	0.1551	0.14029	0.0148	9.57%
ATC1118	B4	18	10011	5.91	11/18/03 13:22	1693.91	24905.6	0.2	10991.1	0.1541	0.2038	104.3	0.1541	0.14029	0.0138	8.97%
ATC1118	C1	18	10010	5.96	11/18/03 13:32	1679.53	24905.6	0.2	10991.1	0.1528	0.2170	104.3	0.1528	0.14029	0.0125	8.19%
ATC1118	C2	18	10004	5.95	11/18/03 13:45	1681.34	24905.6	0.2	10991.1	0.1530	0.2127	104.3	0.1530	0.14029	0.0127	8.29%
ATC1118	C3	18	10022	5.98	11/18/03 13:56	1675.92	24905.6	0.2	10991.1	0.1525	0.2117	104.3	0.1525	0.14029	0.0122	7.99%
ATC1118	C4	18	10013	6.12	11/18/03 14:08	1636.11	24905.6	0.2	10991.1	0.1489	0.2063	104.3	0.1489	0.14029	0.0086	5.76%
ATC1118	D1	18	10005	6.06	11/18/03 14:18	1650.99	24905.6	0.2	10991.1	0.1502	0.2111	104.3	0.1502	0.14029	0.0099	6.61%
ATC1118	D2	18	10029	5.95	11/18/03 14:29	1685.55	24905.6	0.2	10991.1	0.1534	0.2101	104.3	0.1534	0.14029	0.0131	8.52%
ATC1118	D3	18	10012	5.93	11/18/03 14:41	1688.36	24905.6	0.2	10991.1	0.1536	0.2103	104.3	0.1536	0.14029	0.0133	8.67%
ATC1118	D4	18	10014	5.94	11/18/03 14:52	1685.86	24905.6	0.2	10991.1	0.1534	0.2091	104.3	0.1534	0.14029	0.0131	8.54%
ATC1118	A1	17	10008	7.52	11/18/03 12:08	1330.85	24905.6	0.2	10991.1	0.1211	0.2085	118.9	0.1211	0.128489	-0.0074	-6.12%
ATC1118	A2	17	10007	7.52	11/18/03 12:32	1330.72	24905.6	0.2	10991.1	0.1211	0.2041	118.9	0.1211	0.128489	-0.0074	-6.13%
ATC1118	A3	17	10010	7.54	11/18/03 12:42	1327.59	24905.6	0.2	10991.1	0.1208	0.2099	118.9	0.1208	0.128489	-0.0077	-6.38%
ATC1118	A4	17	10007	7.53	11/18/03 12:52	1328.95	24905.6	0.2	10991.1	0.1209	0.2037	118.9	0.1209	0.128489	-0.0076	-6.27%

000187

Alpha Attenuation Calibration Worksheet - LB4100 AB

	Am-241	Am-241
Standard ID	512.1572.67	541.1808.26
Cert Act (pCi/ml)	5000.5	24905.6
To	3/18/99	2/3/00

*y=b*m^ax*

b	*0.2628*
m	*0.994*
a	*1*
min rel dev*	-10.6%
max rel dev*	14.1%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ATC1118	B1	17	10012	6.77	11/18/03 13:02	1478.88	24905.6	0.2	10991.1	0.1346	0.2233	118.9	0.1346	0.128489	0.0061	4.51%
ATC1118	B2	17	10004	6.93	11/18/03 13:13	1443.58	24905.6	0.2	10991.1	0.1313	0.2192	118.9	0.1313	0.128489	0.0029	2.17%
ATC1118	B3	17	10012	7.35	11/18/03 13:23	1362.18	24905.6	0.2	10991.1	0.1239	0.2148	118.9	0.1239	0.128489	-0.0046	-3.67%
ATC1118	B4	17	10017	7.34	11/18/03 13:34	1364.71	24905.6	0.2	10991.1	0.1242	0.2038	118.9	0.1242	0.128489	-0.0043	-3.48%
ATC1118	C1	17	10009	7.41	11/18/03 13:46	1350.74	24905.6	0.2	10991.1	0.1229	0.2170	118.9	0.1229	0.128489	-0.0056	-4.55%
ATC1118	C2	17	10008	7.4	11/18/03 13:57	1352.43	24905.6	0.2	10991.1	0.1230	0.2127	118.9	0.1230	0.128489	-0.0054	-4.42%
ATC1118	C3	17	10017	7.27	11/18/03 14:10	1377.85	24905.6	0.2	10991.1	0.1254	0.2117	118.9	0.1254	0.128489	-0.0031	-2.50%
ATC1118	C4	17	10011	7.47	11/18/03 14:20	1340.16	24905.6	0.2	10991.1	0.1219	0.2063	118.9	0.1219	0.128489	-0.0066	-5.38%
ATC1118	D1	17	10003	7.21	11/18/03 14:30	1387.38	24905.6	0.2	10991.1	0.1262	0.2111	118.9	0.1262	0.128489	-0.0023	-1.79%
ATC1118	D2	17	10005	7.21	11/18/03 14:43	1387.66	24905.6	0.2	10991.1	0.1263	0.2101	118.9	0.1263	0.128489	-0.0022	-1.77%
ATC1118	D3	17	10010	7.11	11/18/03 14:53	1407.88	24905.6	0.2	10991.1	0.1281	0.2103	118.9	0.1281	0.128489	-0.0004	-0.31%
ATC1118	D4	17	10007	7.45	11/18/03 15:02	1343.22	24905.6	0.2	10991.1	0.1222	0.2091	118.9	0.1222	0.128489	-0.0063	-5.14%
ATC1118	A1	19	10001	8.03	11/18/03 11:48	1245.45	24905.6	0.2	10991.1	0.1133	0.2085	131.6	0.1133	0.119035	-0.0057	-5.05%
ATC1118	A2	19	10007	8.25	11/18/03 11:59	1212.97	24905.6	0.2	10991.1	0.1104	0.2041	131.6	0.1104	0.119035	-0.0087	-7.86%
ATC1118	A3	19	10004	7.88	11/18/03 12:08	1269.54	24905.6	0.2	10991.1	0.1155	0.2099	131.6	0.1155	0.119035	-0.0035	-3.05%
ATC1118	A4	19	10001	8.01	11/18/03 12:32	1248.56	24905.6	0.2	10991.1	0.1136	0.2037	131.6	0.1136	0.119035	-0.0054	-4.79%
ATC1118	B1	19	10009	7.27	11/18/03 12:41	1376.75	24905.6	0.2	10991.1	0.1253	0.2233	131.6	0.1253	0.119035	0.0062	4.97%
ATC1118	B2	19	10012	7.43	11/18/03 12:52	1347.51	24905.6	0.2	10991.1	0.1226	0.2192	131.6	0.1226	0.119035	0.0036	2.91%
ATC1118	B3	19	10007	7.91	11/18/03 13:03	1265.11	24905.6	0.2	10991.1	0.1151	0.2148	131.6	0.1151	0.119035	-0.0039	-3.42%
ATC1118	B4	19	10014	7.75	11/18/03 13:14	1292.13	24905.6	0.2	10991.1	0.1176	0.2038	131.6	0.1176	0.119035	-0.0015	-1.25%
ATC1118	C1	19	10013	7.94	11/18/03 13:24	1261.08	24905.6	0.2	10991.1	0.1147	0.2170	131.6	0.1147	0.119035	-0.0043	-3.75%
ATC1118	C2	19	10013	7.92	11/18/03 13:34	1264.27	24905.6	0.2	10991.1	0.1150	0.2127	131.6	0.1150	0.119035	-0.0040	-3.48%
ATC1118	C3	19	10011	7.89	11/18/03 13:47	1268.82	24905.6	0.2	10991.1	0.1154	0.2117	131.6	0.1154	0.119035	-0.0036	-3.11%
ATC1118	C4	19	10004	7.88	11/18/03 13:58	1269.54	24905.6	0.2	10991.1	0.1155	0.2063	131.6	0.1155	0.119035	-0.0035	-3.05%
ATC1118	D1	19	10014	7.93	11/18/03 14:10	1262.80	24905.6	0.2	10991.1	0.1149	0.2111	131.6	0.1149	0.119035	-0.0041	-3.60%
ATC1118	D2	19	10012	7.85	11/18/03 14:20	1275.41	24905.6	0.2	10991.1	0.1160	0.2101	131.6	0.1160	0.119035	-0.0030	-2.58%
ATC1118	D3	19	10011	7.85	11/18/03 14:31	1275.29	24905.6	0.2	10991.1	0.1160	0.2103	131.6	0.1160	0.119035	-0.0030	-2.59%
ATC1118	D4	19	10000	7.96	11/18/03 14:43	1256.28	24905.6	0.2	10991.1	0.1143	0.2091	131.6	0.1143	0.119035	-0.0047	-4.14%
ATC1118	A1	20	10011	8.32	11/18/03 11:37	1203.25	24905.6	0.2	10991.1	0.1095	0.2085	135.2	0.1095	0.116484	-0.0070	-6.40%
ATC1118	A2	20	10000	8.64	11/18/03 11:48	1157.41	24905.6	0.2	10991.1	0.1053	0.2041	135.2	0.1053	0.116484	-0.0112	-10.62%
ATC1118	A3	20	10004	8.25	11/18/03 11:59	1212.61	24905.6	0.2	10991.1	0.1103	0.2099	135.2	0.1103	0.116484	-0.0062	-5.58%
ATC1118	A4	20	9999	8.42	11/18/03 12:09	1187.53	24905.6	0.2	10991.1	0.1080	0.2037	135.2	0.1080	0.116484	-0.0084	-7.81%
ATC1118	B1	20	10008	7.53	11/18/03 12:32	1329.08	24905.6	0.2	10991.1	0.1209	0.2233	135.2	0.1209	0.116484	0.0044	3.67%
ATC1118	B2	20	10004	7.69	11/18/03 12:42	1300.91	24905.6	0.2	10991.1	0.1184	0.2192	135.2	0.1184	0.116484	0.0019	1.59%
ATC1118	B3	20	10004	8.14	11/18/03 12:53	1228.99	24905.6	0.2	10991.1	0.1118	0.2148	135.2	0.1118	0.116484	-0.0047	-4.17%
ATC1118	B4	20	10002	8.09	11/18/03 13:03	1236.34	24905.6	0.2	10991.1	0.1125	0.2038	135.2	0.1125	0.116484	-0.0040	-3.55%
ATC1118	C1	20	9999	8.13	11/18/03 13:14	1229.89	24905.6	0.2	10991.1	0.1119	0.2170	135.2	0.1119	0.116484	-0.0046	-4.10%
ATC1118	C2	20	10003	8.12	11/18/03 13:24	1231.90	24905.6	0.2	10991.1	0.1121	0.2127	135.2	0.1121	0.116484	-0.0044	-3.93%

000188

Alpha Attenuation Calibration Worksheet - LB4100 AB

	Am-241	Am-241
Standard ID	512.1572.67	541.1808.26
Cert Act (pCi/ml)	5000.5	24905.6
To	3/18/99	2/3/00

y=b*m^ax

b	0.2628
m	0.994
a	1

min rel dev*	-10.6%
max rel dev*	14.1%
limit	< 15%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Count Time min	TOD	Alpha cpm	Am-241 Activity pCi/ml	Spike ml	Alpha Activity dpm	Alpha cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev	%diff
ATC1118	C3	20	10002	8.13	11/18/03 13:34	1230.26	24905.6	0.2	10991.1	0.1119	0.2117	135.2	0.1119	0.116484	-0.0046	-4.07%
ATC1118	C4	20	10000	8.26	11/18/03 13:47	1210.65	24905.6	0.2	10991.1	0.1101	0.2063	135.2	0.1101	0.116484	-0.0063	-5.75%
ATC1118	D1	20	10003	8.24	11/18/03 13:58	1213.96	24905.6	0.2	10991.1	0.1104	0.2111	135.2	0.1104	0.116484	-0.0060	-5.46%
ATC1118	D2	20	10001	8.05	11/18/03 14:10	1242.36	24905.6	0.2	10991.1	0.1130	0.2101	135.2	0.1130	0.116484	-0.0034	-3.05%
ATC1118	D3	20	10008	8.2	11/18/03 14:21	1220.49	24905.6	0.2	10991.1	0.1110	0.2103	135.2	0.1110	0.116484	-0.0054	-4.90%
ATC1118	D4	20	10007	8.17	11/18/03 14:31	1224.85	24905.6	0.2	10991.1	0.1114	0.2091	135.2	0.1114	0.116484	-0.0050	-4.53%

000183

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 AB

*y=b*m^-x*

b	*0.274*
m	*1.001*
a	*1*

min rel dev	-21.87%
max rel dev	24.63%
limit	< 25%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ATC1118	A1	1	10028	2822	3.59	11/18/03 11:24	2793.31	786.07	63.2	7.1	0.281	0.272062	0.0093	3.32%	2.26%
ATC1118	A2	1	10048	2799	3.59	11/18/03 11:32	2798.89	779.67	63.1	7.1	0.279	0.272062	0.0065	2.33%	2.26%
ATC1118	A3	1	10030	3076	3.61	11/18/03 11:43	2778.39	852.08	63.4	7.1	0.307	0.272062	0.0346	11.29%	2.28%
ATC1118	A4	1	10008	3094	3.72	11/18/03 11:54	2690.32	831.72	61.5	7.1	0.309	0.272062	0.0371	12.00%	2.29%
ATC1118	B1	1	10006	3612	3.56	11/18/03 12:04	2810.67	1014.61	65.6	7.1	0.361	0.272062	0.0889	24.63%	2.33%
ATC1118	B2	1	10001	3307	3.55	11/18/03 12:28	2817.18	931.55	65.0	7.1	0.331	0.272062	0.0586	17.72%	2.31%
ATC1118	B3	1	10050	3089	3.53	11/18/03 12:38	2847.03	875.07	64.9	7.1	0.307	0.272062	0.0353	11.49%	2.28%
ATC1118	B4	1	10022	3340	3.68	11/18/03 12:48	2723.37	907.61	62.8	7.1	0.333	0.272062	0.0612	18.36%	2.31%
ATC1118	C1	1	10035	2996	3.61	11/18/03 12:59	2779.78	829.92	63.2	7.1	0.299	0.272062	0.0265	8.87%	2.28%
ATC1118	C2	1	10011	3064	3.56	11/18/03 13:09	2812.08	860.67	64.2	7.1	0.306	0.272062	0.0340	11.11%	2.28%
ATC1118	C3	1	10028	3066	3.53	11/18/03 13:19	2840.79	868.56	64.8	7.1	0.306	0.272062	0.0337	11.02%	2.28%
ATC1118	C4	1	10025	2937	3.61	11/18/03 13:30	2777.01	813.57	63.1	7.1	0.293	0.272062	0.0209	7.14%	2.27%
ATC1118	D1	1	10032	3047	3.62	11/18/03 13:43	2771.27	841.71	63.2	7.1	0.304	0.272062	0.0317	10.43%	2.28%
ATC1118	D2	1	10009	3026	3.56	11/18/03 13:53	2811.62	850.00	64.1	7.1	0.302	0.272062	0.0303	10.01%	2.28%
ATC1118	D3	1	10002	2990	3.56	11/18/03 14:06	2809.55	839.89	64.0	7.1	0.299	0.272062	0.0269	8.99%	2.28%
ATC1118	D4	1	10054	3132	3.58	11/18/03 14:16	2808.38	874.86	64.2	7.1	0.312	0.272062	0.0395	12.67%	2.28%
ATC1118	A1	3	10030	2361	4.14	11/18/03 14:50	2422.71	570.29	53.8	17.2	0.235	0.26933	-0.0339	-14.42%	2.22%
ATC1118	A2	3	10042	2486	4.13	11/18/03 14:59	2431.48	601.94	54.2	17.2	0.248	0.26933	-0.0218	-8.79%	2.23%
ATC1118	A3	3	10035	2653	4.05	11/18/03 11:24	2477.78	655.06	55.6	17.2	0.264	0.26933	-0.0050	-1.87%	2.24%
ATC1118	A4	3	10031	2584	4.05	11/18/03 11:32	2476.79	638.02	55.5	17.2	0.258	0.26933	-0.0117	-4.55%	2.24%
ATC1118	B1	3	10033	2995	3.93	11/18/03 11:44	2552.93	762.09	58.1	17.2	0.299	0.26933	0.0292	9.78%	2.28%
ATC1118	B2	3	10020	2830	3.88	11/18/03 11:54	2582.47	729.38	58.4	17.2	0.282	0.26933	0.0131	4.64%	2.26%
ATC1118	B3	3	10014	2688	4.02	11/18/03 12:05	2491.04	668.66	56.1	17.2	0.268	0.26933	-0.0009	-0.34%	2.25%
ATC1118	B4	3	10020	2853	4.03	11/18/03 12:28	2486.35	707.94	56.3	17.2	0.285	0.26933	0.0154	5.41%	2.26%
ATC1118	C1	3	10020	2566	4.01	11/18/03 12:38	2498.75	639.90	56.0	17.2	0.256	0.26933	-0.0132	-5.17%	2.24%
ATC1118	C2	3	10020	2687	4.05	11/18/03 12:49	2474.07	663.46	55.7	17.2	0.268	0.26933	-0.0012	-0.43%	2.25%
ATC1118	C3	3	10044	2700	4.01	11/18/03 12:59	2504.74	673.32	56.3	17.2	0.269	0.26933	-0.0005	-0.19%	2.25%
ATC1118	C4	3	10011	2617	4.04	11/18/03 13:10	2477.97	647.77	55.6	17.2	0.261	0.26933	-0.0079	-3.03%	2.25%
ATC1118	D1	3	10016	2473	3.99	11/18/03 13:20	2510.28	619.80	56.0	17.2	0.247	0.26933	-0.0224	-9.08%	2.23%
ATC1118	D2	3	10029	2752	3.99	11/18/03 13:30	2513.53	689.72	56.7	17.2	0.274	0.26933	0.0051	1.85%	2.25%
ATC1118	D3	3	10021	2658	4.04	11/18/03 13:43	2480.45	657.92	55.7	17.2	0.265	0.26933	-0.0041	-1.54%	2.25%
ATC1118	D4	3	10009	2658	4.04	11/18/03 13:54	2477.48	657.92	55.7	17.2	0.266	0.26933	-0.0038	-1.42%	2.25%
ATC1118	A1	6	10021	2363	4.1	11/18/03 14:16	2444.15	576.34	54.3	29.4	0.236	0.266066	-0.0303	-12.83%	2.22%

000190

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 Ab

y=b*m^-x	
b	0.274
m	1.001
a	1
min rel dev	-21.87%
max rel dev	24.63%
limit	< 25%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ATC1118	A2	6	10019	2464	4.17	11/18/03 14:27	2402.64	590.89	53.6	29.4	0.246	0.266066	-0.0201	-8.19%	2.23%
ATC1118	A3	6	10005	2603	4.11	11/18/03 14:39	2434.31	633.33	54.6	29.4	0.260	0.266066	-0.0059	-2.27%	2.24%
ATC1118	A4	6	10016	2474	4.06	11/18/03 14:50	2467.00	609.36	55.1	29.4	0.247	0.266066	-0.0191	-7.72%	2.23%
ATC1118	B1	6	10006	2937	3.88	11/18/03 14:59	2578.87	756.96	58.6	29.4	0.294	0.266066	0.0275	9.35%	2.27%
ATC1118	B2	6	10008	2730	3.86	11/18/03 11:24	2592.75	707.25	58.5	29.4	0.273	0.266066	0.0067	2.46%	2.26%
ATC1118	B3	6	10012	2585	4.05	11/18/03 11:32	2472.10	638.27	55.4	29.4	0.258	0.266066	-0.0079	-3.05%	2.24%
ATC1118	B4	6	10020	2592	3.96	11/18/03 11:44	2530.30	654.55	56.7	29.4	0.259	0.266066	-0.0074	-2.85%	2.24%
ATC1118	C1	6	10027	2477	3.99	11/18/03 11:55	2513.03	620.80	56.1	29.4	0.247	0.266066	-0.0190	-7.70%	2.23%
ATC1118	C2	6	10030	2736	4.04	11/18/03 12:05	2482.67	677.23	55.9	29.4	0.273	0.266066	0.0067	2.46%	2.25%
ATC1118	C3	6	10026	2669	4.07	11/18/03 12:28	2463.39	655.77	55.4	29.4	0.266	0.266066	0.0001	0.05%	2.25%
ATC1118	C4	6	10022	2605	4.08	11/18/03 12:38	2456.37	638.48	55.1	29.4	0.260	0.266066	-0.0061	-2.36%	2.24%
ATC1118	D1	6	10030	2607	4.03	11/18/03 12:49	2488.83	646.90	55.8	29.4	0.260	0.266066	-0.0061	-2.36%	2.24%
ATC1118	D2	6	10026	2558	4	11/18/03 12:59	2506.50	639.50	56.1	29.4	0.255	0.266066	-0.0109	-4.28%	2.24%
ATC1118	D3	6	10017	2706	4.07	11/18/03 13:10	2461.18	664.86	55.4	29.4	0.270	0.266066	0.0041	1.51%	2.25%
ATC1118	D4	6	10019	2612	4.03	11/18/03 13:20	2486.10	648.14	55.8	29.4	0.261	0.266066	-0.0054	-2.06%	2.24%
ATC1118	A1	8	10007	2271	4.66	11/18/03 13:54	2147.42	487.34	47.6	38.7	0.227	0.263604	-0.0367	-16.16%	2.21%
ATC1118	A2	8	10031	2476	4.74	11/18/03 14:07	2116.24	522.36	47.2	38.7	0.247	0.263604	-0.0168	-6.79%	2.23%
ATC1118	A3	8	10022	2607	4.56	11/18/03 14:17	2197.81	571.71	49.3	38.7	0.260	0.263604	-0.0035	-1.34%	2.24%
ATC1118	A4	8	10009	2543	4.7	11/18/03 14:27	2129.57	541.06	47.7	38.7	0.254	0.263604	-0.0095	-3.75%	2.24%
ATC1118	B1	8	10008	2889	4.45	11/18/03 14:40	2248.99	649.21	51.0	38.7	0.289	0.263604	0.0251	8.68%	2.27%
ATC1118	B2	8	10021	2723	4.53	11/18/03 14:50	2212.14	601.10	49.8	38.7	0.272	0.263604	0.0081	2.99%	2.25%
ATC1118	B3	8	10020	2588	4.48	11/18/03 14:59	2236.61	577.68	50.1	38.7	0.258	0.263604	-0.0053	-2.06%	2.24%
ATC1118	B4	8	10018	2594	4.42	11/18/03 11:24	2266.52	586.88	50.8	38.7	0.259	0.263604	-0.0047	-1.80%	2.24%
ATC1118	C1	8	10021	2483	4.6	11/18/03 11:33	2178.48	539.78	48.6	38.7	0.248	0.263604	-0.0158	-6.39%	2.23%
ATC1118	C2	8	10011	2593	4.56	11/18/03 11:44	2195.39	568.64	49.2	38.7	0.259	0.263604	-0.0046	-1.77%	2.24%
ATC1118	C3	8	10005	2541	4.68	11/18/03 11:55	2137.82	542.95	47.9	38.7	0.254	0.263604	-0.0096	-3.79%	2.24%
ATC1118	C4	8	10021	2444	4.59	11/18/03 12:05	2183.22	532.46	48.6	38.7	0.244	0.263604	-0.0197	-8.08%	2.23%
ATC1118	D1	8	10006	2491	4.58	11/18/03 12:29	2184.72	543.89	48.8	38.7	0.249	0.263604	-0.0147	-5.89%	2.23%
ATC1118	D2	8	10012	2581	4.56	11/18/03 12:39	2195.61	566.01	49.2	38.7	0.258	0.263604	-0.0058	-2.26%	2.24%
ATC1118	D3	8	10023	2470	4.6	11/18/03 12:49	2178.91	536.96	48.6	38.7	0.246	0.263604	-0.0172	-6.97%	2.23%
ATC1118	D4	8	10022	2565	4.53	11/18/03 13:00	2212.36	566.23	49.5	38.7	0.256	0.263604	-0.0077	-3.00%	2.24%
ATC1118	A1	7	10021	2211	4.53	11/18/03 14:07	2212.14	488.08	48.8	42.4	0.221	0.262631	-0.0420	-19.03%	2.21%
ATC1118	A2	7	10025	2308	4.67	11/18/03 14:17	2146.68	494.22	47.6	42.4	0.230	0.262631	-0.0324	-14.08%	2.22%

000191

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 A6

y=b*m^-x	
b	0.274
m	1.001
a	1
min rel dev	-21.87%
max rel dev	24.63%
limit	< 25%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ATC1118	A3	7	10013	2424	4.51	11/18/03 14:27	2220.18	537.47	49.5	42.4	0.242	0.262631	-0.0205	-8.49%	2.23%
ATC1118	A4	7	10012	2299	4.49	11/18/03 14:40	2229.84	512.03	49.4	42.4	0.230	0.262631	-0.0330	-14.37%	2.22%
ATC1118	B1	7	10017	2674	4.2	11/18/03 14:50	2385.00	636.67	53.6	42.4	0.267	0.262631	0.0043	1.62%	2.25%
ATC1118	B2	7	10017	2611	4.41	11/18/03 14:59	2271.43	592.06	51.0	42.4	0.261	0.262631	-0.0020	-0.76%	2.24%
ATC1118	B3	7	10003	2477	4.44	11/18/03 11:24	2252.93	557.88	50.3	42.4	0.248	0.262631	-0.0150	-6.06%	2.23%
ATC1118	B4	7	10008	2564	4.42	11/18/03 11:33	2264.25	580.09	50.7	42.4	0.256	0.262631	-0.0064	-2.51%	2.24%
ATC1118	C1	7	10006	2368	4.42	11/18/03 11:44	2263.80	535.75	50.3	42.4	0.237	0.262631	-0.0260	-10.97%	2.22%
ATC1118	C2	7	10029	2446	4.44	11/18/03 11:55	2258.78	550.90	50.3	42.4	0.244	0.262631	-0.0187	-7.68%	2.23%
ATC1118	C3	7	10023	2368	4.5	11/18/03 12:05	2227.33	526.22	49.5	42.4	0.236	0.262631	-0.0264	-11.16%	2.22%
ATC1118	C4	7	10018	2341	4.45	11/18/03 12:29	2251.24	526.07	50.0	42.4	0.234	0.262631	-0.0290	-12.39%	2.22%
ATC1118	D1	7	10011	2421	4.48	11/18/03 12:39	2234.60	540.40	49.8	42.4	0.242	0.262631	-0.0208	-8.60%	2.23%
ATC1118	D2	7	10027	2434	4.42	11/18/03 12:49	2268.55	550.68	50.5	42.4	0.243	0.262631	-0.0199	-8.19%	2.23%
ATC1118	D3	7	10020	2452	4.49	11/18/03 13:00	2231.63	546.10	49.7	42.4	0.245	0.262631	-0.0179	-7.32%	2.23%
ATC1118	D4	7	10024	2410	4.38	11/18/03 13:10	2288.58	550.23	50.9	42.4	0.240	0.262631	-0.0222	-9.24%	2.22%
ATC1118	A1	9	10031	2138	4.85	11/18/03 13:44	2068.25	440.82	45.5	53.4	0.213	0.259759	-0.0466	-21.87%	2.20%
ATC1118	A2	9	10019	2222	4.9	11/18/03 13:55	2044.69	453.47	45.2	53.4	0.222	0.259759	-0.0380	-17.13%	2.21%
ATC1118	A3	9	10013	2424	4.86	11/18/03 14:07	2060.29	498.77	45.9	53.4	0.242	0.259759	-0.0177	-7.30%	2.23%
ATC1118	A4	9	10025	2441	4.88	11/18/03 14:17	2054.30	500.20	45.8	53.4	0.243	0.259759	-0.0163	-6.68%	2.23%
ATC1118	B1	9	10022	2754	4.62	11/18/03 14:27	2169.26	596.10	48.9	53.4	0.275	0.259759	0.0150	5.47%	2.26%
ATC1118	B2	9	10008	2560	4.62	11/18/03 14:40	2166.23	554.11	48.5	53.4	0.256	0.259759	-0.0040	-1.55%	2.24%
ATC1118	B3	9	10013	2465	4.68	11/18/03 14:50	2139.53	526.71	47.7	53.4	0.246	0.259759	-0.0136	-5.52%	2.23%
ATC1118	B4	9	10026	2451	4.71	11/18/03 15:00	2128.66	520.38	47.4	53.4	0.244	0.259759	-0.0153	-6.26%	2.23%
ATC1118	C1	9	10014	2411	4.84	11/18/03 11:25	2069.01	498.14	46.1	53.4	0.241	0.259759	-0.0190	-7.89%	2.23%
ATC1118	C2	9	10021	2460	4.73	11/18/03 11:33	2118.60	520.08	47.2	53.4	0.245	0.259759	-0.0143	-5.81%	2.23%
ATC1118	C3	9	10012	2328	4.83	11/18/03 11:44	2072.88	481.99	46.0	53.4	0.233	0.259759	-0.0272	-11.71%	2.22%
ATC1118	C4	9	10030	2338	4.82	11/18/03 11:55	2080.91	485.06	46.1	53.4	0.233	0.259759	-0.0267	-11.44%	2.22%
ATC1118	D1	9	10014	2384	4.74	11/18/03 12:05	2112.66	502.95	47.0	53.4	0.238	0.259759	-0.0217	-9.11%	2.22%
ATC1118	D2	9	10031	2496	4.8	11/18/03 12:29	2089.79	520.00	46.6	53.4	0.249	0.259759	-0.0109	-4.39%	2.23%
ATC1118	D3	9	10026	2429	4.77	11/18/03 12:39	2101.89	509.22	46.8	53.4	0.242	0.259759	-0.0175	-7.22%	2.23%
ATC1118	D4	9	10004	2338	4.8	11/18/03 12:50	2084.17	487.08	46.3	53.4	0.234	0.259759	-0.0261	-11.15%	2.22%
ATC1118	A1	10	10013	2247	5.07	11/18/03 13:31	1974.95	443.20	43.7	54	0.224	0.259603	-0.0352	-15.68%	2.21%
ATC1118	A2	10	10001	2363	5.1	11/18/03 13:44	1960.98	463.33	43.6	54	0.236	0.259603	-0.0233	-9.87%	2.22%
ATC1118	A3	10	10043	2529	4.9	11/18/03 13:55	2049.59	516.12	45.8	54	0.252	0.259603	-0.0078	-3.09%	2.23%

000192

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 A B

y=b*m^-x	
b	0.274
m	1.001
a	1
min rel dev	-21.87%
max rel dev	24.63%
limit	< 25%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ATC1118	A4	10	10003	2329	5	11/18/03 14:07	2000.60	465.80	44.4	54	0.233	0.259603	-0.0268	-11.50%	2.22%
ATC1118	B1	10	10002	2704	4.59	11/18/03 14:17	2179.08	589.11	49.1	54	0.270	0.259603	0.0107	3.97%	2.25%
ATC1118	B2	10	10030	2518	4.68	11/18/03 14:27	2143.16	538.03	47.9	54	0.251	0.259603	-0.0086	-3.41%	2.23%
ATC1118	B3	10	10005	2533	4.95	11/18/03 14:40	2021.21	511.72	45.2	54	0.253	0.259603	-0.0064	-2.54%	2.24%
ATC1118	B4	10	10001	2594	4.89	11/18/03 14:51	2045.19	530.47	45.9	54	0.259	0.259603	-0.0002	-0.09%	2.24%
ATC1118	C1	10	10014	2390	4.93	11/18/03 15:00	2031.24	484.79	45.2	54	0.239	0.259603	-0.0209	-8.77%	2.22%
ATC1118	C2	10	10004	2505	5.02	11/18/03 11:25	1992.83	499.00	44.6	54	0.250	0.259603	-0.0092	-3.68%	2.24%
ATC1118	C3	10	10007	2387	4.95	11/18/03 11:33	2021.62	482.22	45.0	54	0.239	0.259603	-0.0211	-8.83%	2.23%
ATC1118	C4	10	10016	2366	4.98	11/18/03 11:45	2011.24	475.10	44.7	54	0.236	0.259603	-0.0234	-9.90%	2.22%
ATC1118	D1	10	10005	2372	4.92	11/18/03 11:56	2033.54	482.11	45.2	54	0.237	0.259603	-0.0225	-9.50%	2.22%
ATC1118	D2	10	10016	2469	4.88	11/18/03 12:05	2052.46	505.94	45.8	54	0.247	0.259603	-0.0131	-5.31%	2.23%
ATC1118	D3	10	10021	2483	5.05	11/18/03 12:29	1984.36	491.68	44.3	54	0.248	0.259603	-0.0118	-4.77%	2.23%
ATC1118	D4	10	10011	2524	5.02	11/18/03 12:39	1994.22	502.79	44.6	54	0.252	0.259603	-0.0075	-2.97%	2.24%
ATC1118	A1	11	10010	2217	5.13	11/18/03 13:21	1951.27	432.16	43.1	69.4	0.221	0.255638	-0.0342	-15.42%	2.21%
ATC1118	A2	11	10018	2218	5.24	11/18/03 13:31	1911.83	423.28	42.2	69.4	0.221	0.255638	-0.0342	-15.46%	2.21%
ATC1118	A3	11	10000	2479	5.08	11/18/03 13:44	1968.50	487.99	44.0	69.4	0.248	0.255638	-0.0077	-3.12%	2.23%
ATC1118	A4	11	10003	2461	5.23	11/18/03 13:55	1912.62	470.55	42.7	69.4	0.246	0.255638	-0.0096	-3.91%	2.23%
ATC1118	B1	11	10029	2538	4.66	11/18/03 14:07	2152.15	544.64	48.1	69.4	0.253	0.255638	-0.0026	-1.02%	2.24%
ATC1118	B2	11	10005	2545	4.85	11/18/03 14:17	2062.89	524.74	46.2	69.4	0.254	0.255638	-0.0013	-0.50%	2.24%
ATC1118	B3	11	10007	2403	4.99	11/18/03 14:28	2005.41	481.56	44.6	69.4	0.240	0.255638	-0.0155	-6.46%	2.23%
ATC1118	B4	11	10014	2424	4.91	11/18/03 14:40	2039.51	493.69	45.4	69.4	0.242	0.255638	-0.0136	-5.61%	2.23%
ATC1118	C1	11	10022	2389	5.07	11/18/03 14:51	1976.73	471.20	43.9	69.4	0.238	0.255638	-0.0173	-7.24%	2.22%
ATC1118	C2	11	10026	2450	4.99	11/18/03 15:00	2009.22	490.98	44.8	69.4	0.244	0.255638	-0.0113	-4.61%	2.23%
ATC1118	C3	11	10016	2345	4.96	11/18/03 11:25	2019.35	472.78	44.8	69.4	0.234	0.255638	-0.0215	-9.19%	2.22%
ATC1118	C4	11	10005	2400	5.02	11/18/03 11:33	1993.03	478.09	44.4	69.4	0.240	0.255638	-0.0158	-6.57%	2.23%
ATC1118	D1	11	10004	2326	4.99	11/18/03 11:45	2004.81	466.13	44.5	69.4	0.233	0.255638	-0.0231	-9.95%	2.22%
ATC1118	D2	11	10004	2428	4.94	11/18/03 11:56	2025.10	491.50	45.1	69.4	0.243	0.255638	-0.0129	-5.33%	2.23%
ATC1118	D3	11	10017	2408	4.93	11/18/03 12:05	2031.85	488.44	45.2	69.4	0.240	0.255638	-0.0152	-6.34%	2.23%
ATC1118	D4	11	10021	2348	5.06	11/18/03 12:29	1980.43	464.03	44.0	69.4	0.234	0.255638	-0.0213	-9.10%	2.22%
ATC1118	A1	12	10034	2223	5.58	11/18/03 13:11	1798.21	398.39	39.7	71.6	0.222	0.255077	-0.0335	-15.13%	2.21%
ATC1118	A2	12	10018	2324	5.71	11/18/03 13:21	1754.47	407.01	38.9	71.6	0.232	0.255077	-0.0231	-9.96%	2.22%
ATC1118	A3	12	10019	2481	5.59	11/18/03 13:32	1792.31	443.83	40.0	71.6	0.248	0.255077	-0.0074	-3.01%	2.23%
ATC1118	A4	12	10017	2424	5.64	11/18/03 13:45	1776.06	429.79	39.6	71.6	0.242	0.255077	-0.0131	-5.41%	2.23%

000193

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 AB

*y=b*m^-x*

b	*0.274*
m	*1.001*
a	*1*

min rel dev	-21.87%
max rel dev	24.63%
limit	< 25%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ATC1118	B1	12	10033	2657	5.11	11/18/03 13:55	1963.41	519.96	44.1	71.6	0.265	0.255077	0.0097	3.68%	2.25%
ATC1118	B2	12	10013	2624	5.37	11/18/03 14:08	1864.62	488.64	41.9	71.6	0.262	0.255077	0.0070	2.66%	2.25%
ATC1118	B3	12	10009	2498	5.48	11/18/03 14:18	1826.46	455.84	40.8	71.6	0.250	0.255077	-0.0055	-2.20%	2.23%
ATC1118	B4	12	10025	2489	5.49	11/18/03 14:28	1826.05	453.37	40.8	71.6	0.248	0.255077	-0.0068	-2.74%	2.23%
ATC1118	C1	12	10021	2529	5.64	11/18/03 14:41	1776.77	448.40	39.7	71.6	0.252	0.255077	-0.0027	-1.07%	2.24%
ATC1118	C2	12	10022	2471	5.59	11/18/03 14:51	1792.84	442.04	40.0	71.6	0.247	0.255077	-0.0085	-3.46%	2.23%
ATC1118	C3	12	10016	2473	5.5	11/18/03 15:00	1821.09	449.64	40.6	71.6	0.247	0.255077	-0.0082	-3.31%	2.23%
ATC1118	C4	12	10026	2370	5.52	11/18/03 11:25	1816.30	429.35	40.3	71.6	0.236	0.255077	-0.0187	-7.91%	2.22%
ATC1118	D1	12	10001	2351	5.52	11/18/03 11:34	1811.78	425.91	40.3	71.6	0.235	0.255077	-0.0200	-8.51%	2.22%
ATC1118	D2	12	10012	2400	5.49	11/18/03 11:45	1823.68	437.16	40.6	71.6	0.240	0.255077	-0.0154	-6.41%	2.23%
ATC1118	D3	12	10003	2483	5.57	11/18/03 11:56	1795.87	445.78	40.1	71.6	0.248	0.255077	-0.0069	-2.76%	2.23%
ATC1118	D4	12	10009	2477	5.55	11/18/03 12:06	1803.42	446.31	40.3	71.6	0.247	0.255077	-0.0076	-3.07%	2.23%
ATC1118	A1	13	10035	2221	5.44	11/18/03 13:01	1844.67	408.27	40.7	77.6	0.221	0.253551	-0.0322	-14.56%	2.21%
ATC1118	A2	13	10011	2253	5.43	11/18/03 13:11	1843.65	414.92	40.8	77.6	0.225	0.253551	-0.0285	-12.66%	2.21%
ATC1118	A3	13	10013	2402	5.29	11/18/03 13:21	1892.82	454.06	42.1	77.6	0.240	0.253551	-0.0137	-5.70%	2.23%
ATC1118	A4	13	10012	2356	5.32	11/18/03 13:31	1881.95	442.86	41.8	77.6	0.235	0.253551	-0.0182	-7.75%	2.22%
ATC1118	B1	13	10019	2682	4.86	11/18/03 13:44	2061.52	551.85	46.4	77.6	0.268	0.253551	0.0141	5.28%	2.25%
ATC1118	B2	13	10035	2553	5.04	11/18/03 13:55	1991.07	506.55	44.5	77.6	0.254	0.253551	0.0009	0.34%	2.24%
ATC1118	B3	13	10015	2561	5.22	11/18/03 14:08	1918.58	490.61	43.0	77.6	0.256	0.253551	0.0022	0.85%	2.24%
ATC1118	B4	13	10013	2551	5.27	11/18/03 14:18	1900.00	484.06	42.5	77.6	0.255	0.253551	0.0012	0.48%	2.24%
ATC1118	C1	13	10003	2433	5.28	11/18/03 14:28	1894.51	460.80	42.2	77.6	0.243	0.253551	-0.0103	-4.24%	2.23%
ATC1118	C2	13	10016	2421	5.15	11/18/03 14:41	1944.85	470.10	43.3	77.6	0.242	0.253551	-0.0118	-4.90%	2.23%
ATC1118	C3	13	10018	2443	5.27	11/18/03 14:51	1900.95	463.57	42.4	77.6	0.244	0.253551	-0.0097	-3.97%	2.23%
ATC1118	C4	13	10009	2457	5.34	11/18/03 15:00	1874.34	460.11	41.8	77.6	0.245	0.253551	-0.0081	-3.29%	2.23%
ATC1118	D1	13	10000	2355	5.29	11/18/03 11:25	1890.36	445.18	42.0	77.6	0.236	0.253551	-0.0181	-7.67%	2.22%
ATC1118	D2	13	10010	2577	5.28	11/18/03 11:34	1895.83	488.07	42.5	77.6	0.257	0.253551	0.0039	1.51%	2.24%
ATC1118	D3	13	10013	2430	5.17	11/18/03 11:45	1936.75	470.02	43.2	77.6	0.243	0.253551	-0.0109	-4.48%	2.23%
ATC1118	D4	13	10019	2523	5.22	11/18/03 11:56	1919.35	483.33	42.9	77.6	0.252	0.253551	-0.0017	-0.69%	2.24%
ATC1118	A1	14	10010	2193	5.55	11/18/03 12:50	1803.60	395.14	39.8	82.3	0.219	0.252363	-0.0333	-15.19%	2.21%
ATC1118	A2	14	10009	2374	5.71	11/18/03 13:01	1752.89	415.76	39.0	82.3	0.237	0.252363	-0.0152	-6.40%	2.22%
ATC1118	A3	14	10022	2460	5.58	11/18/03 13:11	1796.06	440.86	40.0	82.3	0.245	0.252363	-0.0069	-2.81%	2.23%
ATC1118	A4	14	10015	2376	5.55	11/18/03 13:21	1804.50	428.11	40.1	82.3	0.237	0.252363	-0.0151	-6.37%	2.22%
ATC1118	B1	14	10019	2752	5.13	11/18/03 13:31	1953.02	536.45	44.1	82.3	0.275	0.252363	0.0223	8.12%	2.26%

000194

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 AB

*y=b*m^-x*

b	*0.274*
m	*1.001*
a	*1*

min rel dev	-21.87%
max rel dev	24.63%
limit	< 25%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ATC1118	B2	14	10000	2664	5.34	11/18/03 13:44	1872.66	498.88	42.1	82.3	0.266	0.252363	0.0140	5.27%	2.25%
ATC1118	B3	14	10007	2481	5.35	11/18/03 13:55	1870.47	463.74	41.8	82.3	0.248	0.252363	-0.0044	-1.79%	2.23%
ATC1118	B4	14	10002	2488	5.4	11/18/03 14:08	1852.22	460.74	41.4	82.3	0.249	0.252363	-0.0036	-1.45%	2.23%
ATC1118	C1	14	10026	2534	5.6	11/18/03 14:18	1790.36	452.50	40.0	82.3	0.253	0.252363	0.0004	0.15%	2.24%
ATC1118	C2	14	10001	2456	5.42	11/18/03 14:28	1845.20	453.14	41.2	82.3	0.246	0.252363	-0.0068	-2.76%	2.23%
ATC1118	C3	14	10029	2451	5.47	11/18/03 14:41	1833.46	448.08	40.8	82.3	0.244	0.252363	-0.0080	-3.26%	2.23%
ATC1118	C4	14	10022	2459	5.54	11/18/03 14:51	1809.03	443.86	40.3	82.3	0.245	0.252363	-0.0070	-2.85%	2.23%
ATC1118	D1	14	10002	2427	5.42	11/18/03 15:00	1845.39	447.79	41.1	82.3	0.243	0.252363	-0.0097	-4.00%	2.23%
ATC1118	D2	14	10007	2621	5.44	11/18/03 11:25	1839.52	481.80	41.3	82.3	0.262	0.252363	0.0096	3.65%	2.25%
ATC1118	D3	14	10001	2430	5.38	11/18/03 11:34	1858.92	451.67	41.4	82.3	0.243	0.252363	-0.0094	-3.86%	2.23%
ATC1118	D4	14	10007	2579	5.54	11/18/03 11:45	1806.32	465.52	40.5	82.3	0.258	0.252363	0.0054	2.08%	2.24%
ATC1118	A1	16	10009	2394	6.27	11/18/03 12:30	1596.33	381.82	35.5	96.8	0.239	0.248732	-0.0095	-3.99%	2.23%
ATC1118	A2	16	10010	2441	6.4	11/18/03 12:40	1564.06	381.41	34.9	96.8	0.244	0.248732	-0.0049	-2.00%	2.23%
ATC1118	A3	16	10003	2516	6.41	11/18/03 12:51	1560.53	392.51	34.9	96.8	0.252	0.248732	0.0028	1.11%	2.24%
ATC1118	A4	16	10023	2502	6.29	11/18/03 13:02	1593.48	397.77	35.6	96.8	0.250	0.248732	0.0009	0.36%	2.23%
ATC1118	B1	16	10010	2785	5.82	11/18/03 13:12	1719.93	478.52	38.9	96.8	0.278	0.248732	0.0295	10.60%	2.26%
ATC1118	B2	16	10017	2744	6.01	11/18/03 13:22	1666.72	456.57	37.6	96.8	0.274	0.248732	0.0252	9.20%	2.26%
ATC1118	B3	16	10008	2611	6.11	11/18/03 13:32	1637.97	427.33	36.8	96.8	0.261	0.248732	0.0122	4.66%	2.24%
ATC1118	B4	16	10009	2744	6.19	11/18/03 13:45	1616.96	443.30	36.5	96.8	0.274	0.248732	0.0254	9.27%	2.26%
ATC1118	C1	16	10012	2463	6.18	11/18/03 13:56	1620.06	398.54	36.1	96.8	0.246	0.248732	-0.0027	-1.11%	2.23%
ATC1118	C2	16	10014	2546	6.29	11/18/03 14:09	1592.05	404.77	35.6	96.8	0.254	0.248732	0.0055	2.17%	2.24%
ATC1118	C3	16	10021	2518	6.23	11/18/03 14:19	1608.51	404.17	35.9	96.8	0.251	0.248732	0.0025	1.01%	2.23%
ATC1118	C4	16	10013	2528	6.23	11/18/03 14:29	1607.22	405.78	36.0	96.8	0.252	0.248732	0.0037	1.48%	2.24%
ATC1118	D1	16	10008	2600	6.19	11/18/03 14:42	1616.80	420.03	36.3	96.8	0.260	0.248732	0.0111	4.26%	2.24%
ATC1118	D2	16	10007	2571	6	11/18/03 14:52	1667.83	428.50	37.4	96.8	0.257	0.248732	0.0082	3.19%	2.24%
ATC1118	D3	16	10013	2659	6.25	11/18/03 15:01	1602.08	425.44	36.0	96.8	0.266	0.248732	0.0168	6.33%	2.25%
ATC1118	D4	16	10016	2606	6.22	11/18/03 11:26	1610.29	418.97	36.1	96.8	0.260	0.248732	0.0115	4.40%	2.24%
ATC1118	A1	15	10008	2298	6.31	11/18/03 12:40	1586.05	364.18	35.2	98.5	0.230	0.24831	-0.0187	-8.14%	2.22%
ATC1118	A2	15	10010	2436	6.38	11/18/03 12:51	1568.97	381.82	35.0	98.5	0.243	0.24831	-0.0050	-2.04%	2.23%
ATC1118	A3	15	10016	2520	6.19	11/18/03 13:01	1618.09	407.11	36.2	98.5	0.252	0.24831	0.0033	1.31%	2.24%
ATC1118	A4	15	10006	2390	6.14	11/18/03 13:12	1629.64	389.25	36.3	98.5	0.239	0.24831	-0.0095	-3.96%	2.23%
ATC1118	B1	15	10013	2728	5.62	11/18/03 13:21	1781.67	485.41	40.2	98.5	0.272	0.24831	0.0241	8.86%	2.25%
ATC1118	B2	15	10011	2685	5.86	11/18/03 13:32	1708.36	458.19	38.5	98.5	0.268	0.24831	0.0199	7.42%	2.25%

000195

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 AB

*y=b*m^-x*

b	*0.274*
m	*1.001*
a	*1*

min rel dev	-21.87%
max rel dev	24.63%
limit	< 25%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ATC1118	B3	15	10011	2451	6.05	11/18/03 13:45	1654.71	405.12	36.9	98.5	0.245	0.24831	-0.0035	-1.42%	2.23%
ATC1118	B4	15	10001	2678	6.11	11/18/03 13:56	1636.82	438.30	36.9	98.5	0.268	0.24831	0.0195	7.27%	2.25%
ATC1118	C1	15	10005	2494	6.13	11/18/03 14:08	1632.14	406.85	36.5	98.5	0.249	0.24831	0.0010	0.39%	2.23%
ATC1118	C2	15	10007	2471	6.02	11/18/03 14:18	1662.29	410.47	37.1	98.5	0.247	0.24831	-0.0014	-0.56%	2.23%
ATC1118	C3	15	10002	2515	6.12	11/18/03 14:29	1634.31	410.95	36.6	98.5	0.251	0.24831	0.0031	1.25%	2.24%
ATC1118	C4	15	10010	2468	6.08	11/18/03 14:41	1646.38	405.92	36.7	98.5	0.247	0.24831	-0.0018	-0.71%	2.23%
ATC1118	D1	15	10011	2578	6.17	11/18/03 14:52	1622.53	417.83	36.4	98.5	0.258	0.24831	0.0092	3.58%	2.24%
ATC1118	D2	15	10013	2552	6.01	11/18/03 15:01	1666.06	424.63	37.3	98.5	0.255	0.24831	0.0066	2.57%	2.24%
ATC1118	D3	15	10012	2545	6.02	11/18/03 11:26	1663.12	422.76	37.2	98.5	0.254	0.24831	0.0059	2.32%	2.24%
ATC1118	D4	15	10002	2466	6.08	11/18/03 11:34	1645.07	405.59	36.7	98.5	0.247	0.24831	-0.0018	-0.71%	2.23%
ATC1118	A1	18	10021	2291	6.07	11/18/03 11:57	1650.91	377.43	36.6	104.3	0.229	0.246875	-0.0183	-7.98%	2.21%
ATC1118	A2	18	10006	2438	6.26	11/18/03 12:07	1598.40	389.46	35.6	104.3	0.244	0.246875	-0.0032	-1.32%	2.23%
ATC1118	A3	18	10010	2546	6.07	11/18/03 12:30	1649.09	419.44	36.9	104.3	0.254	0.246875	0.0075	2.94%	2.24%
ATC1118	A4	18	10026	2613	6.13	11/18/03 12:40	1635.56	426.26	36.7	104.3	0.261	0.246875	0.0137	5.28%	2.24%
ATC1118	B1	18	10011	2804	5.58	11/18/03 12:50	1794.09	502.51	40.6	104.3	0.280	0.246875	0.0332	11.86%	2.26%
ATC1118	B2	18	10014	2652	5.75	11/18/03 13:01	1741.57	461.22	39.1	104.3	0.265	0.246875	0.0180	6.78%	2.25%
ATC1118	B3	18	10009	2636	5.87	11/18/03 13:12	1705.11	449.06	38.3	104.3	0.263	0.246875	0.0165	6.26%	2.25%
ATC1118	B4	18	10011	2785	5.91	11/18/03 13:22	1693.91	471.24	38.3	104.3	0.278	0.246875	0.0313	11.26%	2.26%
ATC1118	C1	18	10010	2545	5.96	11/18/03 13:32	1679.53	427.01	37.6	104.3	0.254	0.246875	0.0074	2.90%	2.24%
ATC1118	C2	18	10004	2681	5.95	11/18/03 13:45	1681.34	450.59	37.9	104.3	0.268	0.246875	0.0211	7.88%	2.25%
ATC1118	C3	18	10022	2582	5.98	11/18/03 13:56	1675.92	431.77	37.5	104.3	0.258	0.246875	0.0108	4.18%	2.24%
ATC1118	C4	18	10013	2639	6.12	11/18/03 14:08	1636.11	431.21	36.8	104.3	0.264	0.246875	0.0167	6.33%	2.25%
ATC1118	D1	18	10005	2553	6.06	11/18/03 14:18	1650.99	421.29	37.0	104.3	0.255	0.246875	0.0083	3.25%	2.24%
ATC1118	D2	18	10029	2721	5.95	11/18/03 14:29	1685.55	457.31	38.0	104.3	0.271	0.246875	0.0244	9.01%	2.25%
ATC1118	D3	18	10012	2607	5.93	11/18/03 14:41	1688.36	439.63	37.9	104.3	0.260	0.246875	0.0135	5.19%	2.24%
ATC1118	D4	18	10014	2533	5.94	11/18/03 14:52	1685.86	426.43	37.7	104.3	0.253	0.246875	0.0061	2.40%	2.24%
ATC1118	A1	17	10008	2411	7.52	11/18/03 12:08	1330.85	320.61	29.6	118.9	0.241	0.243298	-0.0024	-0.99%	2.23%
ATC1118	A2	17	10007	2471	7.52	11/18/03 12:32	1330.72	328.59	29.7	118.9	0.247	0.243298	0.0036	1.47%	2.23%
ATC1118	A3	17	10010	2735	7.54	11/18/03 12:42	1327.59	362.73	29.9	118.9	0.273	0.243298	0.0299	10.95%	2.26%
ATC1118	A4	17	10007	2689	7.53	11/18/03 12:52	1328.95	357.10	29.9	118.9	0.269	0.243298	0.0254	9.46%	2.25%
ATC1118	B1	17	10012	2855	6.77	11/18/03 13:02	1478.88	421.71	33.5	118.9	0.285	0.243298	0.0419	14.68%	2.27%
ATC1118	B2	17	10004	2719	6.93	11/18/03 13:13	1443.58	392.35	32.6	118.9	0.272	0.243298	0.0285	10.48%	2.26%
ATC1118	B3	17	10012	2659	7.35	11/18/03 13:23	1362.18	361.77	30.6	118.9	0.266	0.243298	0.0223	8.39%	2.25%

000196

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 AB

*y=b*m^-x*

b	*0.274*
m	*1.001*
a	*1*

min rel dev	-21.87%
max rel dev	24.63%
limit	< 25%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ATC1118	B4	17	10017	2727	7.34	11/18/03 13:34	1364.71	371.53	30.8	118.9	0.272	0.243298	0.0289	10.63%	2.25%
ATC1118	C1	17	10009	2692	7.41	11/18/03 13:46	1350.74	363.29	30.4	118.9	0.269	0.243298	0.0257	9.54%	2.25%
ATC1118	C2	17	10008	2637	7.4	11/18/03 13:57	1352.43	356.35	30.4	118.9	0.263	0.243298	0.0202	7.66%	2.25%
ATC1118	C3	17	10017	2536	7.27	11/18/03 14:10	1377.85	348.83	30.8	118.9	0.253	0.243298	0.0099	3.90%	2.24%
ATC1118	C4	17	10011	2587	7.47	11/18/03 14:20	1340.16	346.32	30.1	118.9	0.258	0.243298	0.0151	5.85%	2.24%
ATC1118	D1	17	10003	2558	7.21	11/18/03 14:30	1387.38	354.79	31.1	118.9	0.256	0.243298	0.0124	4.86%	2.24%
ATC1118	D2	17	10005	2669	7.21	11/18/03 14:43	1387.66	370.18	31.2	118.9	0.267	0.243298	0.0235	8.80%	2.25%
ATC1118	D3	17	10010	2517	7.11	11/18/03 14:53	1407.88	354.01	31.5	118.9	0.251	0.243298	0.0082	3.24%	2.24%
ATC1118	D4	17	10007	2678	7.45	11/18/03 15:02	1343.22	359.46	30.2	118.9	0.268	0.243298	0.0243	9.09%	2.25%
ATC1118	A1	19	10001	2437	8.03	11/18/03 11:48	1245.45	303.49	27.8	131.6	0.244	0.240229	0.0034	1.41%	2.23%
ATC1118	A2	19	10007	2656	8.25	11/18/03 11:59	1212.97	321.94	27.3	131.6	0.265	0.240229	0.0252	9.49%	2.25%
ATC1118	A3	19	10004	2621	7.88	11/18/03 12:08	1269.54	332.61	28.5	131.6	0.262	0.240229	0.0218	8.31%	2.25%
ATC1118	A4	19	10001	2651	8.01	11/18/03 12:32	1248.56	330.96	28.1	131.6	0.265	0.240229	0.0248	9.37%	2.25%
ATC1118	B1	19	10009	2868	7.27	11/18/03 12:41	1376.75	394.50	31.2	131.6	0.287	0.240229	0.0463	16.16%	2.27%
ATC1118	B2	19	10012	2744	7.43	11/18/03 12:52	1347.51	369.31	30.4	131.6	0.274	0.240229	0.0338	12.35%	2.26%
ATC1118	B3	19	10007	2767	7.91	11/18/03 13:03	1265.11	349.81	28.6	131.6	0.277	0.240229	0.0363	13.12%	2.26%
ATC1118	B4	19	10014	2815	7.75	11/18/03 13:14	1292.13	363.23	29.2	131.6	0.281	0.240229	0.0409	14.54%	2.26%
ATC1118	C1	19	10013	2679	7.94	11/18/03 13:24	1261.08	337.41	28.4	131.6	0.268	0.240229	0.0273	10.21%	2.25%
ATC1118	C2	19	10013	2658	7.92	11/18/03 13:34	1264.27	335.61	28.4	131.6	0.265	0.240229	0.0252	9.50%	2.25%
ATC1118	C3	19	10011	2582	7.89	11/18/03 13:47	1268.82	327.25	28.4	131.6	0.258	0.240229	0.0177	6.86%	2.24%
ATC1118	C4	19	10004	2708	7.88	11/18/03 13:58	1269.54	343.65	28.6	131.6	0.271	0.240229	0.0305	11.25%	2.25%
ATC1118	D1	19	10014	2615	7.93	11/18/03 14:10	1262.80	329.76	28.3	131.6	0.261	0.240229	0.0209	8.01%	2.24%
ATC1118	D2	19	10012	2656	7.85	11/18/03 14:20	1275.41	338.34	28.7	131.6	0.265	0.240229	0.0251	9.44%	2.25%
ATC1118	D3	19	10011	2692	7.85	11/18/03 14:31	1275.29	342.93	28.7	131.6	0.269	0.240229	0.0287	10.66%	2.25%
ATC1118	D4	19	10000	2705	7.96	11/18/03 14:43	1256.28	339.82	28.3	131.6	0.271	0.240229	0.0303	11.19%	2.25%
ATC1118	A1	20	10011	2427	8.32	11/18/03 11:37	1203.25	291.71	26.8	135.2	0.242	0.239366	0.0031	1.27%	2.23%
ATC1118	A2	20	10000	2703	8.64	11/18/03 11:48	1157.41	312.85	26.1	135.2	0.270	0.239366	0.0309	11.44%	2.25%
ATC1118	A3	20	10004	2651	8.25	11/18/03 11:59	1212.61	321.33	27.3	135.2	0.265	0.239366	0.0256	9.67%	2.25%
ATC1118	A4	20	9999	2680	8.42	11/18/03 12:09	1187.53	318.29	26.7	135.2	0.268	0.239366	0.0287	10.69%	2.25%
ATC1118	B1	20	10008	2924	7.53	11/18/03 12:32	1329.08	388.31	30.2	135.2	0.292	0.239366	0.0528	18.07%	2.27%
ATC1118	B2	20	10004	2800	7.69	11/18/03 12:42	1300.91	364.11	29.4	135.2	0.280	0.239366	0.0405	14.48%	2.26%
ATC1118	B3	20	10004	2751	8.14	11/18/03 12:53	1228.99	337.96	27.7	135.2	0.275	0.239366	0.0356	12.95%	2.26%
ATC1118	B4	20	10002	2886	8.09	11/18/03 13:03	1236.34	356.74	28.1	135.2	0.289	0.239366	0.0492	17.04%	2.27%

000197

Alpha to Beta Crosstalk Calibration Worksheet - LB4100 Aβ

*y=b*m^-x*

b	*0.274*
m	*1.001*
a	*1*

min rel dev	-21.87%
max rel dev	24.63%
limit	< 25%

File ID	Detector ID	WorkOrder 0317014 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
ATC1118	C1	20	9999	2723	8.13	11/18/03 13:14	1229.89	334.93	27.7	135.2	0.272	0.239366	0.0330	12.10%	2.26%
ATC1118	C2	20	10003	2772	8.12	11/18/03 13:24	1231.90	341.38	27.8	135.2	0.277	0.239366	0.0378	13.62%	2.26%
ATC1118	C3	20	10002	2623	8.13	11/18/03 13:34	1230.26	322.63	27.6	135.2	0.262	0.239366	0.0229	8.72%	2.25%
ATC1118	C4	20	10000	2656	8.26	11/18/03 13:47	1210.65	321.55	27.2	135.2	0.266	0.239366	0.0262	9.88%	2.25%
ATC1118	D1	20	10003	2711	8.24	11/18/03 13:58	1213.96	329.00	27.4	135.2	0.271	0.239366	0.0317	11.68%	2.25%
ATC1118	D2	20	10001	2715	8.05	11/18/03 14:10	1242.36	337.27	28.0	135.2	0.271	0.239366	0.0321	11.83%	2.26%
ATC1118	D3	20	10008	2767	8.2	11/18/03 14:21	1220.49	337.44	27.6	135.2	0.276	0.239366	0.0371	13.42%	2.26%
ATC1118	D4	20	10007	2825	8.17	11/18/03 14:31	1224.85	345.78	27.7	135.2	0.282	0.239366	0.0429	15.21%	2.26%

000198

11/18/03
JE

Alpha Attenuation Curve (Am-241)

Am-241 on ringed planchets

Benchsheet: 17014AMC.XLS file name: ATC 1118

X / #	11:17	11:28	11:39	11:50	12:00	12:24	12:34	12:44	12:55	13:06	13:16	13:26	13:39	13:49	14:03	14:12	14:22	14:35	14:45	14:55
1	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
2	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3
3	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4
4	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5
5	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6
6	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7
7	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8
8	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9
9	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10
10	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11
11	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12
#2	12	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13
13	13	12	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14
14	14	13	12	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15
15	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16
16	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17

* Data from planchets #2, -4, & 5 was not used due to poor fit. Quality of the curve is not affected as these planchets are mass duplicates of planchets -1, -3, & -6 respectively.
JE 11/20/03

JE 12/1/03

Continued on Page

Read and Understood By

Clare Zinich 12/1/03 — Signed, Date

Julie Gillespie 12/1/03 — Signed, Date

pg 265845 a
(cont. from pg N/A b)

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: **LB4100B**

SOP 724 Rev 8

Date: 11/18/03

Instrument Background and Response Checklist

P-10 Supply	P-10 Flow
1 1000	A 0.1
2 200	B
	C
	D

Bkg.	Cal. File ID
Dr A	BKB 1116W
Dr B	
Dr C	
Dr D	

Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On line	Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On-line
1	LCB		P		JE		P		✓	9	LCB		P		JE		P		✓
2									✓	10							P		✓
3									✓	11						JE	R	P	✓
4									✓	12							P		✓
5									✓	13									✓
6									✓	14									✓
7									✓	15									✓
8									✓	16							P		✓

P = passes; R = Recount, H = high; L = low; W = weekly; α = Alpha; B = Beta; DR = Daily Response Check; Stat = Status; Det = Detector; Bkg = Background; OL = Offline; NP = Not Processed.

Runlog

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start-Time	Anal. Init.	Outp .Init.	Outp. Date	Cmnt Below
1-16	DR Checks	–	–	EFB 1118	30	0707	LCB	JE	11/18/03	A
1-16	BKG Check	–	–	BKB1118	60	0732	JE	JE	11/18/03	
11	BKG Recount	–	–	BKB1118A	60	0916	JE	JE	11/18/03	
1-4	0317016-1-3,5	240787	Am-241 eff	EAM1118A	10	1026	JE	JE	11/18/03	
5-8				B		1032	JE	JE	11/18/03	
9-12				C		1038	JE	JE	11/18/03	
13-16				D		1057	JE	JE	11/18/03	
1-4	0317011-1,2,4,5	240788	Sr-90 gross β eff	EGB1118A	5	1032	JE	JE	11/18/03	
5-8				B		1038	JE	JE	11/18/03	
9-12				C		1057	JE	JE	11/18/03	
13-16				D		1104	JE	JE	11/18/03	
0317014-1720 1-16	~~17014AM~~ 11/18/03	17014AMC.XLS	Am-241 curve	ATG1118	10/step	1117	JE	JE	11/18/03	

11/19/03

Form 780r6.frm (4/6/2001)

Reviewed by [signature] Date 11/19/03

Comments:

000200

Gross Alpha/Beta in Water

Analyst: NT
Prep. Date:S. 05/08/03
Prep. Date:C 05/12/03

Analytical Balance No:13
SOP Used:702 Rev16

Data Filename:
Count Date/Time:

W.O.#	Sample #	Gravimetric Aliquot Determination Tare PC (g)	Gross PC (g)	Solid Mass (g)	Salt added (ml)	Remarks	CAR GRP	Pos Car No.	POS Ckd by
0317014	1	9.0299	9.037	7.1	0.2	ALL DESSICATED ON 05/12/03 @ 17:30			
0317014	2	9.0251	9.032	6.9	0.2				
0317014	3	9.0166	9.0338	17.2	0.5				
0317014	4	9.0126	9.0296	17	0.5				
0317014	5	9.0149	9.0461	31.2	0.8				
0317014	6	9.0261	9.0555	29.4	0.8				
0317014	7	9.0187	9.0611	42.4	1.1				
0317014	8	9.0487	9.0874	38.7	1.1				
0317014	9	9.0436	9.097	53.4	1.4				
0317014	10	9.0422	9.0962	54	1.4				
0317014	11	9.0332	9.1026	69.4	1.7				
0317014	12	8.9964	9.068	71.6	1.7				
0317014	13	9.0514	9.129	77.6	2				
0317014	14	9.032	9.1143	82.3	2				
0317014	15	9.0294	9.1279	98.5	2.3				
0317014	16	9.0159	9.1127	96.8	2.3				
0317014	17	9.0248	9.1437	118.9	2.6				
0317014	18	9.035	9.1393	104.3	2.6				
0317014	19	9.0143	9.1459	131.6	2.9				
0317014	20	9.032	9.1672	135.2	2.9				

*ALL DESSICATED ON 05/12/03 @ 17:30

Std. No.	Std. Type	Pipet NO.	Spike Vol (ml)	Spike dpm/ml
541.1808.26	Am 241	RS-010	0.2	11058.12

Spiked by: NT 05/08/03
Spike Witness: JRK 05/08/03, Relinquished by: Cw 5/13/03
Reviewed by: Cw 5/13/03 Received by: [illegible] 5/14/03

5/13/03.....3:15 PM

R/BENCH-SH/17014AMC.XLS

Gross Alpha/Beta in Water

DRAFT

Analyst: NT NT
Prep. Date:S. 5/8/03
Prep. Date:C 5/12/03

Analytical Balance No:13
SOP Used:702 Rev15

Data Filename:
Count Date/Time:

W.O.#	Sample #	Gravimetric Aliquot Determinatio Tare PC (g)	Gross PC (g)	Solid Mass (g)	Salt added (ml)
0317014	1			0	0.2
0317014	2			0	0.2
0317014	3			0	0.5
0317014	4			0	0.5
0317014	5			0	0.8
0317014	6			0	0.8
0317014	7			0	1.1
0317014	8			0	1.1
0317014	9			0	1.4
0317014	10			0	1.4
0317014	11			0	1.7
0317014	12			0	1.7
0317014	13			0	2
0317014	14			0	2
0317014	15			0	2.3
0317014	16			0	2.3
0317014	17			0	2.6
0317014	18			0	2.6
0317014	19			0	2.9
0317014	20			0	2.9

all desiccated on 5/12/03 @ 17:30.

Std. No.	Std. Type	Pipet NO.	Spike Vol (ml)	Spike Act./ml
541.1808.26	Am 241	RS-010	0.2	11,058.12 dpm/ml

Spiked by: NT 5/8/03
Spike Witness: JKK 5/9/03
Reviewed by:

Relinquished by:
Received by:

5/8/03.....3:54 PM

R/BENCH-SH/17014AMC.XLS

000202

PROJECT 541.1808.26 Am-241 PRIMARY STD. Continued From Page

1) Prepare a primary dilution of Am-241. Transfer Std 541 (Analytics SRS 59175-307) to a 40 ml VOA vial + dilute to capacity w/ 3M HNO_3.

2) Determine mass of std. transferred:

Mass of ampule (opened) + beaker	= 38.2533 g	Bal 12
Mass of empty ampule + beaker	= 33.1473 g	↓
Net mass of std. transferred	= 5.1060 g	

3) Dilute standard to final mass w/ 3M HNO_3

Mass of empty 40 ml VOA w/ lid	= 27.1418 g	Bal 12
VOA + std + 3M HNO_3	= 72.0838 g	↓
Final mass of 1° std.	44.9420 g	

4) Final Activity Calculation:

$$\frac{(4.096 \times 10^4 \text{ dps})(5.1060 \text{ g})(60 \text{ dpm/dps})}{(5.55093 \text{ g})(44.9420 \text{ g})} = 50{,}300.7 \text{ dpm/g}$$

ANALYTICS
1380 Seaboard Ind. Blvd., Atlanta, GA 30318 U.S.A. (404) 362-8677
Type: Am-241
SRS: 59175-307 Date: 2/3/00 12:00 EST
Amount: 1.107 µCi Exp: QA: [illegible]
PO: 23018 Item: 1
5.55093 grams 3M HNO3 solution
CAUTION: RADIOACTIVE MATERIAL

Continued on Page

Read and Understood By

Signed	Date	Signed	Date
[signature]	3/7/00	Melissa Gyrtsel	3/22/00

ANALYTICS

PA-IIA 00541
Recd 2-04-00

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2637

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

59175-307

Am-241 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master liquid radionuclide solution source. The master source was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Am-241
ACTIVITY (dps):	4.096 E4
HALF-LIFE:	432.2 years
CALIBRATION DATE:	February 3, 2000 12:00 EST
TOTAL UNCERTAINTY*:	3.5%
SYSTEMATIC:	2.5%
RANDOM:	1.0%

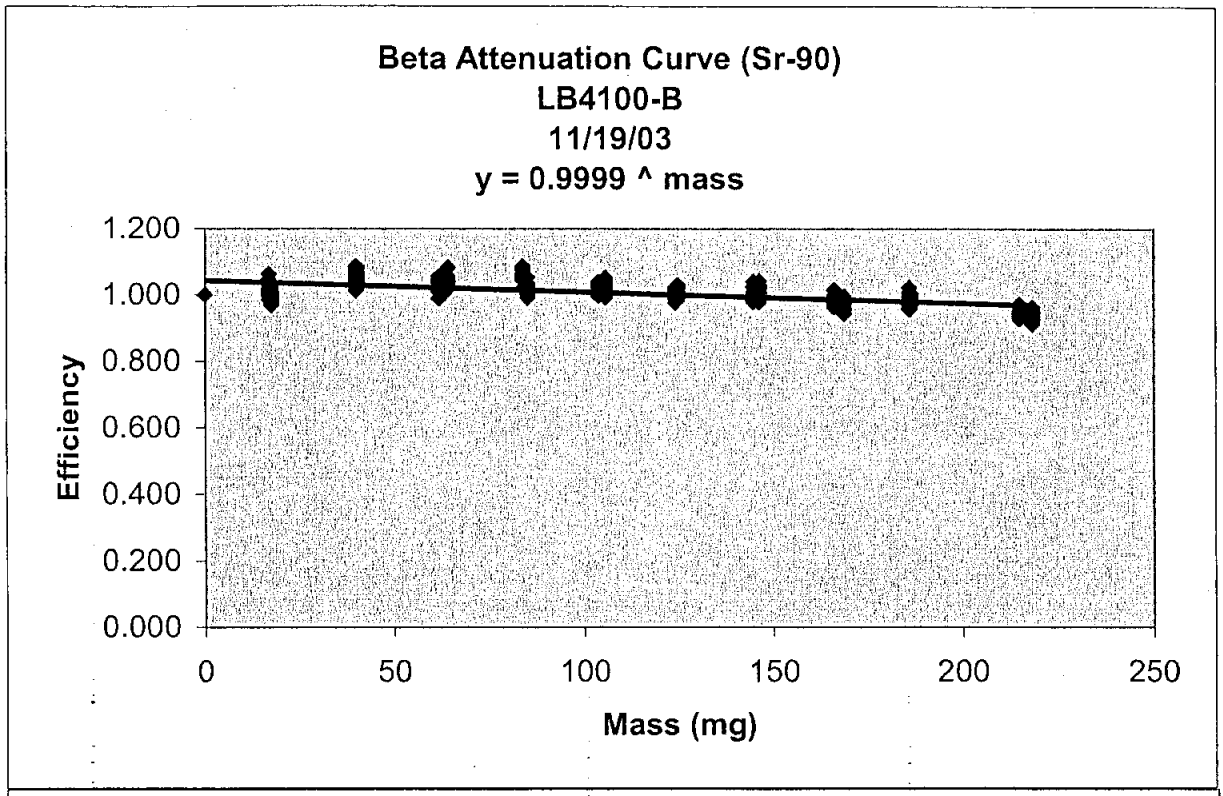
*99% confidence level.

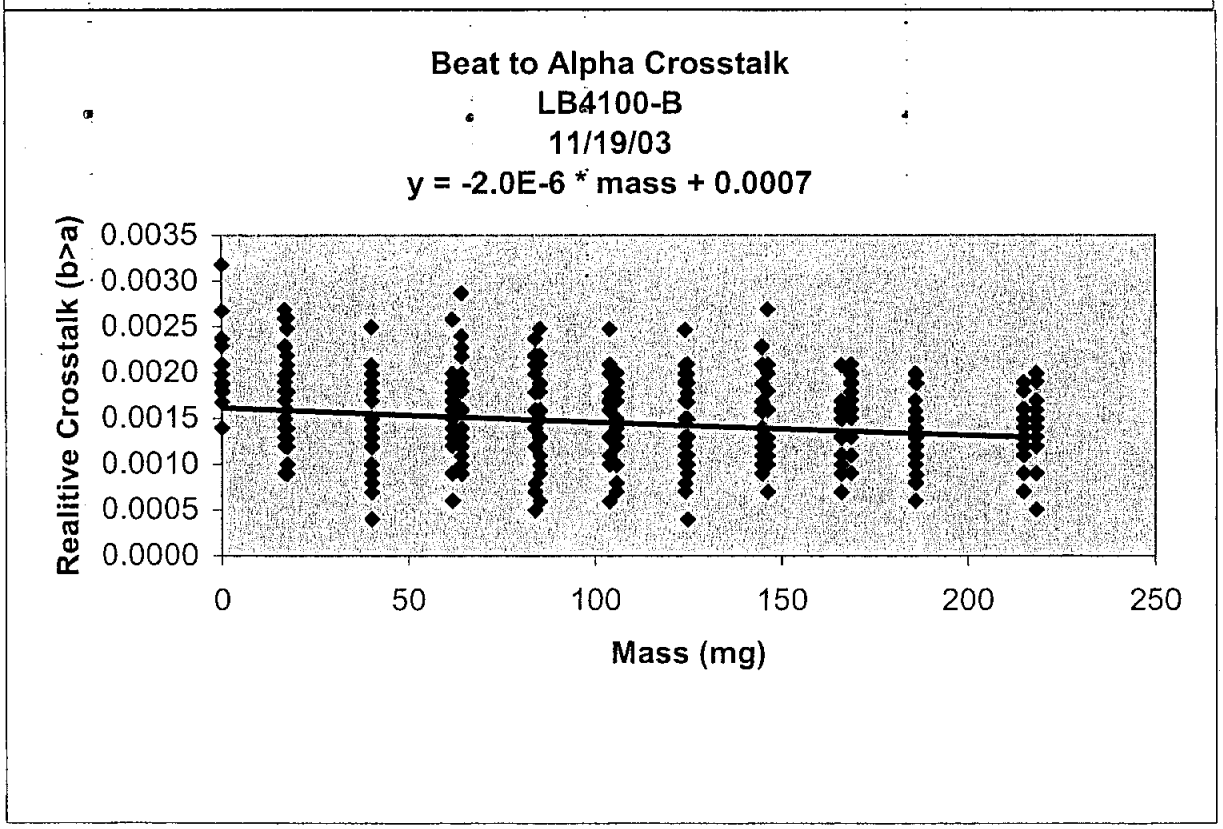
5.55093 grams 3M HNO_3 solution.

P O NUMBER 23018, Item 1

SOURCE PREPARED BY: _____
E. A. Taskaev, Radiochemist

Q A APPROVED: RCW 2/3/00


Beta Attenuation Curve (Sr-90)
LB4100-B
11/19/03
y = 0.9999 ^ mass
Efficiency
1.200
1.000
0.800
0.600
0.400
0.200
0.000
0
50
100
150
200
250
Mass (mg)


Beat to Alpha Crosstalk
LB4100-B
11/19/03
y = -2.0E-6 * mass + 0.0007
Realitive Crosstalk (b>a)
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
0
50
100
150
200
250
Mass (mg)

Beta Attenuation Calibration Worksheet - LB4100~~A~~ B

5/27/04

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

Attenuation equation
*y=b*m^ax*

b	*1*
m	*0.9999*
a	*1*

min rel dev
max rel dev
limit

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev
EGB1118A	A1	1121	19	10178	1.28	11/18/03 10:34	1.385	7950	4437.76	1	19703.7	0.4035	0.4035	0	1.000	1	0.000
EGB1118A	A2	1121	20	10095	1.26	11/18/03 10:34	1.386	8011	4437.76	1	19703.7	0.4066	0.4066	0	1.000	1	0.000
EGB1118A	A3	1121	19	10098	1.24	11/18/03 10:34	1.441	8142	4437.76	1	19703.7	0.4132	0.4132	0	1.000	1	0.000
EGB1118A	A4	1121	21	10103	1.27	11/18/03 10:34	1.406	7954	4437.76	1	19703.7	0.4037	0.4037	0	1.000	1	0.000
EGB1118B	B1	1121	18	10025	1.21	11/18/03 10:40	1.618	8284	4437.76	1	19703.7	0.4204	0.4204	0	1.000	1	0.000
EGB1118B	B2	1121	21	10046	1.22	11/18/03 10:40	1.511	8233	4437.76	1	19703.7	0.4179	0.4179	0	1.000	1	0.000
EGB1118B	B3	1121	17	10142	1.21	11/18/03 10:40	1.558	8381	4437.76	1	19703.7	0.4253	0.4253	0	1.000	1	0.000
EGB1118B	B4	1121	18	10082	1.27	11/18/03 10:40	1.608	7937	4437.76	1	19703.7	0.4028	0.4028	0	1.000	1	0.000
EGB1118C	C1	1121	24	10121	1.23	11/18/03 10:59	1.503	8227	4437.76	1	19703.7	0.4175	0.4175	0	1.000	1	0.000
EGB1118C	C2	1121	23	10041	1.22	11/18/03 10:59	1.503	8229	4437.76	1	19703.7	0.4176	0.4176	0	1.000	1	0.000
EGB1118C	C3	1121	32	10076	1.22	11/18/03 10:59	1.534	8258	4437.76	1	19703.7	0.4191	0.4191	0	1.000	1	0.000
EGB1118C	C4	1121	19	10116	1.24	11/18/03 10:59	1.472	8157	4437.76	1	19703.7	0.4140	0.4140	0	1.000	1	0.000
EGB1118D	D1	1121	19	10055	1.24	11/18/03 11:05	1.474	8108	4437.75	1	19703.6	0.4115	0.4115	0	1.000	1	0.000
EGB1118D	D2	1121	27	10105	1.25	11/18/03 11:05	1.918	8082	4437.75	1	19703.6	0.4102	0.4102	0	1.000	1	0.000
EGB1118D	D3	1121	19	10086	1.22	11/18/03 11:05	1.883	8266	4437.75	1	19703.6	0.4195	0.4195	0	1.000	1	0.000
EGB1118D	D4	1121	14	10050	1.23	11/18/03 11:05	1.769	8169	4437.75	1	19703.6	0.4146	0.4146	0	1.000	1	0.000
BTC1119	A1	1	14	10076	1.25	37944.53065	1.385	8060	4437.75	1	19703.6	0.4090	0.4035	16.9	1.014	0.998312	0.015
BTC1119	A2	1	27	10058	1.25	37944.53323	1.386	8045	4437.75	1	19703.6	0.4083	0.4066	16.9	1.004	0.998312	0.006
BTC1119	A3	1	17	10030	1.23	37944.53564	1.441	8153	4437.75	1	19703.6	0.4138	0.4132	16.9	1.001	0.998312	0.003
BTC1119	A4	1	18	10025	1.21	37944.53797	1.406	8284	4437.75	1	19703.6	0.4204	0.4037	16.9	1.041	0.998312	0.043
BTC1119	B1	1	15	10099	1.17	37944.54043	1.618	8630	4437.75	1	19703.6	0.4380	0.4204	16.9	1.042	0.998312	0.044
BTC1119	B2	1	14	10078	1.19	37944.54289	1.511	8468	4437.75	1	19703.6	0.4298	0.4179	16.9	1.028	0.998312	0.030
BTC1119	B3	1	9	10076	1.22	37944.54531	1.558	8258	4437.75	1	19703.6	0.4191	0.4253	16.9	0.985	0.998312	-0.013
BTC1119	B4	1	12	10037	1.19	37944.54749	1.608	8433	4437.75	1	19703.6	0.4280	0.4028	16.9	1.062	0.998312	0.064
BTC1119	C1	1	19	10032	1.2	37944.5499	1.503	8359	4437.75	1	19703.6	0.4242	0.4175	16.9	1.016	0.998312	0.018
BTC1119	C2	1	15	10036	1.21	37944.55226	1.503	8293	4437.75	1	19703.6	0.4209	0.4176	16.9	1.008	0.998312	0.009
BTC1119	C3	1	20	10130	1.21	37944.55439	1.534	8371	4437.75	1	19703.6	0.4248	0.4191	16.9	1.014	0.998312	0.015
BTC1119	C4	1	13	10092	1.2	37944.55699	1.472	8409	4437.75	1	19703.6	0.4268	0.4140	16.9	1.031	0.998312	0.033
BTC1119	D1	1	13	10049	1.2	37944.55953	1.474	8373	4437.75	1	19703.6	0.4249	0.4115	16.9	1.033	0.998312	0.034
BTC1119	D2	1	23	10060	1.19	37944.56466	1.918	8452	4437.75	1	19703.6	0.4290	0.4102	16.9	1.046	0.998312	0.047
BTC1119	D3	1	26	10043	1.21	37944.568	1.883	8298	4437.75	1	19703.6	0.4212	0.4195	16.9	1.004	0.998312	0.006
BTC1119	D4	1	23	10118	1.24	37944.57081	1.769	8158	4437.75	1	19703.6	0.4140	0.4146	16.9	0.999	0.998312	0.000
BTC1119	A1	2	18	10024	1.27	37944.64159	1.385	7892	4437.75	1	19703.6	0.4005	0.4035	17.5	0.993	0.998252	-0.006
BTC1119	A2	2	20	10066	1.26	37944.53066	1.386	7988	4437.75	1	19703.6	0.4054	0.4066	17.5	0.997	0.998252	-0.001
BTC1119	A3	2	25	10086	1.26	37944.53324	1.441	8004	4437.75	1	19703.6	0.4062	0.4132	17.5	0.983	0.998252	-0.015
BTC1119	A4	2	26	10027	1.25	37944.53566	1.406	8020	4437.75	1	19703.6	0.4071	0.4037	17.5	1.008	0.998252	0.010
BTC1119	B1	2	20	10039	1.22	37944.53799	1.618	8227	4437.75	1	19703.6	0.4176	0.4204	17.5	0.993	0.998252	-0.005
BTC1119	B2	2	18	10114	1.23	37944.54049	1.511	8222	4437.75	1	19703.6	0.4173	0.4179	17.5	0.999	0.998252	0.000
BTC1119	B3	2	9	10060	1.24	37944.54293	1.558	8112	4437.75	1	19703.6	0.4117	0.4253	17.5	0.968	0.998252	-0.030
BTC1119	B4	2	16	10073	1.26	37944.54535	1.608	7993	4437.75	1	19703.6	0.4057	0.4028	17.5	1.007	0.998252	0.009

000204

Beta Attenuation Calibration Worksheet - LB4100A B

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

Attenuation equation
*y=b*m^ax*
b 1
m 0.9999
a 1

min rel dev
max rel dev
limit

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev
BTC1119	C1	2	20	10063	1.26	37944.54751	1.503	7985	4437.75	1	19703.6	0.4053	0.4175	17.5	0.971	0.998252	-0.028
BTC1119	C2	2	14	10105	1.23	37944.54993	1.503	8214	4437.75	1	19703.6	0.4169	0.4176	17.5	0.998	0.998252	0.000
BTC1119	C3	2	21	10077	1.25	37944.55228	1.534	8060	4437.75	1	19703.6	0.4091	0.4191	17.5	0.976	0.998252	-0.022
BTC1119	C4	2	10	10065	1.25	37944.55441	1.472	8051	4437.75	1	19703.6	0.4086	0.4140	17.5	0.987	0.998252	-0.011
BTC1119	D1	2	13	10179	1.23	37944.55703	1.474	8274	4437.75	1	19703.6	0.4199	0.4115	17.5	1.021	0.998252	0.022
BTC1119	D2	2	12	10082	1.26	37944.55957	1.918	8000	4437.75	1	19703.6	0.4060	0.4102	17.5	0.990	0.998252	-0.008
BTC1119	D3	2	22	10075	1.24	37944.56471	1.883	8123	4437.75	1	19703.6	0.4123	0.4195	17.5	0.983	0.998252	-0.015
BTC1119	D4	2	18	10099	1.27	37944.56806	1.769	7951	4437.75	1	19703.6	0.4035	0.4146	17.5	0.973	0.998252	-0.025
BTC1119	A1	4	19	10095	1.19	37944.63603	1.385	8482	4437.75	1	19703.6	0.4305	0.4035	40	1.067	0.996008	0.071
BTC1119	A2	4	10	10063	1.19	37944.63917	1.386	8455	4437.75	1	19703.6	0.4291	0.4066	40	1.055	0.996008	0.059
BTC1119	A3	4	18	10053	1.22	37944.64157	1.441	8239	4437.75	1	19703.6	0.4181	0.4132	40	1.012	0.996008	0.016
BTC1119	A4	4	21	10088	1.2	37944.53064	1.406	8405	4437.75	1	19703.6	0.4266	0.4037	40	1.057	0.996008	0.061
BTC1119	B1	4	10	10071	1.13	37944.53315	1.618	8911	4437.75	1	19703.6	0.4522	0.4204	40	1.076	0.996008	0.080
BTC1119	B2	4	10	10069	1.16	37944.5356	1.511	8679	4437.75	1	19703.6	0.4405	0.4179	40	1.054	0.996008	0.058
BTC1119	B3	4	9	10087	1.16	37944.53795	1.558	8694	4437.75	1	19703.6	0.4413	0.4253	40	1.037	0.996008	0.041
BTC1119	B4	4	14	10168	1.18	37944.54045	1.608	8616	4437.75	1	19703.6	0.4373	0.4028	40	1.085	0.996008	0.089
BTC1119	C1	4	15	10108	1.19	37944.54287	1.508	8493	4437.75	1	19703.6	0.4310	0.4175	40	1.032	0.996008	0.036
BTC1119	C2	4	13	10163	1.18	37944.54527	1.503	8611	4437.75	1	19703.6	0.4370	0.4176	40	1.046	0.996008	0.050
BTC1119	C3	4	15	10098	1.17	37944.54747	1.534	8629	4437.75	1	19703.6	0.4380	0.4191	40	1.045	0.996008	0.049
BTC1119	C4	4	13	10087	1.17	37944.54988	1.472	8620	4437.75	1	19703.6	0.4375	0.4140	40	1.057	0.996008	0.061
BTC1119	D1	4	12	10114	1.2	37944.55226	1.474	8427	4437.75	1	19703.6	0.4277	0.4115	40	1.039	0.996008	0.043
BTC1119	D2	4	14	10065	1.15	37944.55435	1.918	8751	4437.75	1	19703.6	0.4441	0.4102	40	1.083	0.996008	0.087
BTC1119	D3	4	18	10106	1.17	37944.55698	1.883	8636	4437.75	1	19703.6	0.4383	0.4195	40	1.045	0.996008	0.049
BTC1119	D4	4	25	10022	1.17	37944.55951	1.769	8564	4437.75	1	19703.6	0.4347	0.4146	40	1.048	0.996008	0.052
BTC1119	A1	3	15	10007	1.2	37944.63917	1.385	8338	4437.75	1	19703.6	0.4232	0.4035	40.1	1.049	0.995998	0.053
BTC1119	A2	3	15	10114	1.22	37944.64155	1.386	8289	4437.75	1	19703.6	0.4207	0.4066	40.1	1.035	0.995998	0.039
BTC1119	A3	3	20	10059	1.21	37944.53064	1.441	8312	4437.75	1	19703.6	0.4219	0.4132	40.1	1.021	0.995998	0.025
BTC1119	A4	3	19	10064	1.21	37944.53321	1.406	8316	4437.75	1	19703.6	0.4221	0.4037	40.1	1.046	0.995998	0.050
BTC1119	B1	3	12	10114	1.18	37944.53561	1.618	8570	4437.75	1	19703.6	0.4349	0.4204	40.1	1.035	0.995998	0.039
BTC1119	B2	3	15	10099	1.17	37944.53795	1.511	8630	4437.75	1	19703.6	0.4380	0.4179	40.1	1.048	0.995998	0.052
BTC1119	B3	3	9	10104	1.18	37944.54045	1.558	8561	4437.75	1	19703.6	0.4345	0.4253	40.1	1.022	0.995998	0.026
BTC1119	B4	3	4	10032	1.17	37944.54288	1.608	8573	4437.75	1	19703.6	0.4351	0.4028	40.1	1.080	0.995998	0.084
BTC1119	C1	3	17	10052	1.18	37944.54525	1.503	8517	4437.75	1	19703.6	0.4323	0.4175	40.1	1.035	0.995998	0.039
BTC1119	C2	3	12	10075	1.18	37944.54747	1.503	8537	4437.75	1	19703.6	0.4333	0.4176	40.1	1.037	0.995998	0.041
BTC1119	C3	3	13	10104	1.18	37944.54991	1.534	8561	4437.75	1	19703.6	0.4345	0.4191	40.1	1.037	0.995998	0.041
BTC1119	C4	3	7	10152	1.18	37944.55223	1.472	8602	4437.75	1	19703.6	0.4366	0.4140	40.1	1.055	0.995998	0.059
BTC1119	D1	3	8	10129	1.17	37944.55436	1.474	8656	4437.75	1	19703.6	0.4393	0.4115	40.1	1.068	0.995998	0.072
BTC1119	D2	3	12	10092	1.19	37944.557	1.918	8479	4437.75	1	19703.6	0.4303	0.4102	40.1	1.049	0.995998	0.053
BTC1119	D3	3	20	10096	1.15	37944.55949	1.883	8777	4437.75	1	19703.6	0.4455	0.4195	40.1	1.062	0.995998	0.066
BTC1119	D4	3	20	10113	1.18	37944.56465	1.769	8569	4437.75	1	19703.6	0.4349	0.4146	40.1	1.049	0.995998	0.053

~~000206~~
000207

Beta Attenuation Calibration Worksheet - LB4100A B

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

Attenuation equation
*y=b*m^ax*
b 1
m 0.9999
a 1

min rel dev
max rel dev
limit

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev
BTC1119	A1	5	15	10056	1.22	37944.57281	1.385	8241	4437.75	1	19703.6	0.4183	0.4035	61.8	1.037	0.993839	0.043
BTC1119	A2	5	12	10015	1.24	37944.63608	1.386	8075	4437.75	1	19703.6	0.4098	0.4066	61.8	1.008	0.993839	0.014
BTC1119	A3	5	20	10075	1.19	37944.63917	1.441	8465	4437.75	1	19703.6	0.4296	0.4132	61.8	1.040	0.993839	0.046
BTC1119	A4	5	17	10035	1.21	37944.64155	1.406	8292	4437.75	1	19703.6	0.4208	0.4037	61.8	1.043	0.993839	0.049
BTC1119	B1	5	14	10072	1.17	37944.5306	1.618	8607	4437.75	1	19703.6	0.4368	0.4204	61.8	1.039	0.993839	0.045
BTC1119	B2	5	17	10086	1.19	37944.53319	1.511	8474	4437.75	1	19703.6	0.4301	0.4179	61.8	1.029	0.993839	0.035
BTC1119	B3	5	13	10109	1.22	37944.53565	1.558	8285	4437.75	1	19703.6	0.4205	0.4253	61.8	0.989	0.993839	-0.005
BTC1119	B4	5	9	10033	1.21	37944.53799	1.608	8290	4437.75	1	19703.6	0.4208	0.4028	61.8	1.044	0.993839	0.051
BTC1119	C1	5	18	10083	1.21	37944.54045	1.503	8332	4437.75	1	19703.6	0.4229	0.4175	61.8	1.013	0.993839	0.019
BTC1119	C2	5	6	10041	1.2	37944.54289	1.503	8366	4437.75	1	19703.6	0.4246	0.4176	61.8	1.017	0.993839	0.023
BTC1119	C3	5	14	10116	1.2	37944.54529	1.534	8429	4437.75	1	19703.6	0.4278	0.4191	61.8	1.021	0.993839	0.027
BTC1119	C4	5	19	10053	1.2	37944.54749	1.472	8376	4437.75	1	19703.6	0.4251	0.4140	61.8	1.027	0.993839	0.033
BTC1119	D1	5	18	10049	1.21	37944.54992	1.474	8304	4437.75	1	19703.6	0.4214	0.4115	61.8	1.024	0.993839	0.030
BTC1119	D2	5	16	10077	1.18	37944.55225	1.918	8538	4437.75	1	19703.6	0.4333	0.4102	61.8	1.056	0.993839	0.063
BTC1119	D3	5	26	10091	1.2	37944.55439	1.883	8408	4437.75	1	19703.6	0.4267	0.4195	61.8	1.017	0.993839	0.023
BTC1119	D4	5	19	10069	1.21	37944.55701	1.769	8320	4437.75	1	19703.6	0.4223	0.4146	61.8	1.018	0.993839	0.025
BTC1119	A1	6	19	10146	1.22	37944.57076	1.385	8315	4437.75	1	19703.6	0.4220	0.4035	64.2	1.046	0.993601	0.052
BTC1119	A2	6	19	10079	1.21	37944.57279	1.386	8329	4437.75	1	19703.6	0.4227	0.4066	64.2	1.040	0.993601	0.046
BTC1119	A3	6	20	10083	1.22	37944.63605	1.441	8264	4437.75	1	19703.6	0.4194	0.4132	64.2	1.015	0.993601	0.021
BTC1119	A4	6	24	10025	1.21	37944.63919	1.406	8284	4437.75	1	19703.6	0.4204	0.4037	64.2	1.041	0.993601	0.048
BTC1119	B1	6	10	10110	1.16	37944.64152	1.618	8714	4437.75	1	19703.6	0.4423	0.4204	64.2	1.052	0.993601	0.058
BTC1119	B2	6	18	10010	1.18	37944.53061	1.511	8482	4437.75	1	19703.6	0.4305	0.4179	64.2	1.030	0.993601	0.037
BTC1119	B3	6	13	10106	1.18	37944.53319	1.558	8563	4437.75	1	19703.6	0.4346	0.4253	64.2	1.022	0.993601	0.028
BTC1119	B4	6	11	10150	1.18	37944.53561	1.608	8600	4437.75	1	19703.6	0.4365	0.4028	64.2	1.084	0.993601	0.090
BTC1119	C1	6	16	10018	1.19	37944.53795	1.503	8417	4437.75	1	19703.6	0.4272	0.4175	64.2	1.023	0.993601	0.029
BTC1119	C2	6	12	10133	1.21	37944.54046	1.503	8373	4437.75	1	19703.6	0.4250	0.4176	64.2	1.018	0.993601	0.024
BTC1119	C3	6	22	10130	1.19	37944.54288	1.534	8511	4437.75	1	19703.6	0.4320	0.4191	64.2	1.031	0.993601	0.037
BTC1119	C4	6	9	10083	1.17	37944.54528	1.472	8617	4437.75	1	19703.6	0.4373	0.4140	64.2	1.056	0.993601	0.063
BTC1119	D1	6	14	10089	1.2	37944.54749	1.474	8406	4437.75	1	19703.6	0.4266	0.4115	64.2	1.037	0.993601	0.043
BTC1119	D2	6	23	10130	1.16	37944.54988	1.918	8731	4437.75	1	19703.6	0.4431	0.4102	64.2	1.080	0.993601	0.087
BTC1119	D3	6	16	10129	1.18	37944.55225	1.883	8582	4437.75	1	19703.6	0.4356	0.4195	64.2	1.038	0.993601	0.045
BTC1119	D4	6	29	10120	1.21	37944.5544	1.769	8362	4437.75	1	19703.6	0.4244	0.4146	64.2	1.024	0.993601	0.030
BTC1119	A1	8	7	10013	1.16	37944.56463	1.385	8631	4437.75	1	19703.6	0.4380	0.4035	83.8	1.086	0.991655	0.094
BTC1119	A2	8	18	10104	1.2	37944.56797	1.386	8419	4437.75	1	19703.6	0.4273	0.4066	83.8	1.051	0.991655	0.059
BTC1119	A3	8	16	10107	1.18	37944.57074	1.441	8564	4437.75	1	19703.6	0.4346	0.4132	83.8	1.052	0.991655	0.060
BTC1119	A4	8	22	10112	1.2	37944.57279	1.406	8425	4437.75	1	19703.6	0.4276	0.4037	83.8	1.059	0.991655	0.068
BTC1119	B1	8	14	10063	1.12	37944.636	1.618	8983	4437.75	1	19703.6	0.4559	0.4204	83.8	1.084	0.991655	0.093
BTC1119	B2	8	20	10080	1.14	37944.63914	1.511	8841	4437.75	1	19703.6	0.4487	0.4179	83.8	1.074	0.991655	0.082
BTC1119	B3	8	7	10068	1.18	37944.64154	1.558	8531	4437.75	1	19703.6	0.4330	0.4253	83.8	1.018	0.991655	0.026
BTC1119	B4	8	12	10124	1.18	37944.53063	1.608	8578	4437.75	1	19703.6	0.4354	0.4028	83.8	1.081	0.991655	0.089

000208

Beta Attenuation Calibration Worksheet - LB4100AB

Standard ID	514.1572.72
Cert Act (pCi/g)	4969.8
To	3/18/99
Act. at Ct. Date	4437.76
	4437.75

Attenuation equation
*y=b*m^ax*

b	*1*
m	*0.9999*
a	*1*

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev
																min rel dev	
																max rel dev	
																limit	
BTC1119	C1	8	16	10077	1.17	37944.53317	1.503	8612	4437.75	1	19703.6	0.4371	0.4175	83.8	1.047	0.991655	0.055
BTC1119	C2	8	8	10162	1.16	37944.53559	1.503	8759	4437.75	1	19703.6	0.4445	0.4176	83.8	1.064	0.991655	0.073
BTC1119	C3	8	21	10077	1.15	37944.53793	1.534	8761	4437.75	1	19703.6	0.4447	0.4191	83.8	1.061	0.991655	0.069
BTC1119	C4	8	5	10155	1.18	37944.54044	1.472	8605	4437.75	1	19703.6	0.4367	0.4140	83.8	1.055	0.991655	0.063
BTC1119	D1	8	12	10098	1.16	37944.54286	1.474	8704	4437.75	1	19703.6	0.4417	0.4115	83.8	1.074	0.991655	0.082
BTC1119	D2	8	14	10147	1.16	37944.54528	1.918	8746	4437.75	1	19703.6	0.4439	0.4102	83.8	1.082	0.991655	0.090
BTC1119	D3	8	22	10056	1.16	37944.54748	1.883	8667	4437.75	1	19703.6	0.4399	0.4195	83.8	1.049	0.991655	0.057
BTC1119	D4	8	24	10138	1.19	37944.54993	1.769	8518	4437.75	1	19703.6	0.4323	0.4146	83.8	1.043	0.991655	0.051
BTC1119	A1	7	13	10152	1.25	37944.56801	1.385	8120	4437.75	1	19703.6	0.4121	0.4035	85.1	1.021	0.991527	0.030
BTC1119	A2	7	25	10088	1.25	37944.5708	1.386	8069	4437.75	1	19703.6	0.4095	0.4066	85.1	1.007	0.991527	0.016
BTC1119	A3	7	19	10137	1.23	37944.57282	1.441	8240	4437.75	1	19703.6	0.4182	0.4132	85.1	1.012	0.991527	0.020
BTC1119	A4	7	18	10073	1.23	37944.63608	1.406	8188	4437.75	1	19703.6	0.4156	0.4037	85.1	1.029	0.991527	0.038
BTC1119	B1	7	16	10152	1.2	37944.63918	1.618	8459	4437.75	1	19703.6	0.4293	0.4204	85.1	1.021	0.991527	0.030
BTC1119	B2	7	19	10075	1.2	37944.64156	1.511	8395	4437.75	1	19703.6	0.4260	0.4179	85.1	1.020	0.991527	0.028
BTC1119	B3	7	9	10049	1.21	37944.53065	1.558	8304	4437.75	1	19703.6	0.4214	0.4253	85.1	0.991	0.991527	-0.001
BTC1119	B4	7	15	10106	1.21	37944.53322	1.608	8351	4437.75	1	19703.6	0.4238	0.4028	85.1	1.052	0.991527	0.061
BTC1119	C1	7	16	10067	1.21	37944.53561	1.503	8319	4437.75	1	19703.6	0.4222	0.4175	85.1	1.011	0.991527	0.020
BTC1119	C2	7	10	10107	1.24	37944.538	1.503	8150	4437.75	1	19703.6	0.4136	0.4176	85.1	0.990	0.991527	-0.001
BTC1119	C3	7	16	10137	1.21	37944.54046	1.534	8376	4437.75	1	19703.6	0.4251	0.4191	85.1	1.014	0.991527	0.023
BTC1119	C4	7	6	10122	1.24	37944.54292	1.472	8162	4437.75	1	19703.6	0.4142	0.4140	85.1	1.001	0.991527	0.009
BTC1119	D1	7	13	10055	1.21	37944.54529	1.474	8309	4437.75	1	19703.6	0.4217	0.4115	85.1	1.025	0.991527	0.033
BTC1119	D2	7	11	10109	1.21	37944.5475	1.918	8353	4437.75	1	19703.6	0.4239	0.4102	85.1	1.033	0.991527	0.042
BTC1119	D3	7	21	10051	1.19	37944.54992	1.883	8445	4437.75	1	19703.6	0.4286	0.4195	85.1	1.022	0.991527	0.030
BTC1119	D4	7	22	10083	1.23	37944.55228	1.769	8196	4437.75	1	19703.6	0.4160	0.4146	85.1	1.003	0.991527	0.012
BTC1119	A1	9	11	10061	1.23	37944.55954	1.385	8179	4437.75	1	19703.6	0.4151	0.4035	103.9	1.029	0.989664	0.039
BTC1119	A2	9	17	10177	1.26	37944.56471	1.386	8076	4437.75	1	19703.6	0.4099	0.4066	103.9	1.008	0.989664	0.018
BTC1119	A3	9	20	10070	1.24	37944.56801	1.441	8120	4437.75	1	19703.6	0.4121	0.4132	103.9	0.997	0.989664	0.008
BTC1119	A4	9	18	10112	1.25	37944.5708	1.406	8088	4437.75	1	19703.6	0.4105	0.4037	103.9	1.017	0.989664	0.027
BTC1119	B1	9	16	10109	1.21	37944.57281	1.618	8353	4437.75	1	19703.6	0.4239	0.4204	103.9	1.008	0.989664	0.019
BTC1119	B2	9	13	10131	1.2	37944.63606	1.511	8441	4437.75	1	19703.6	0.4284	0.4179	103.9	1.025	0.989664	0.036
BTC1119	B3	9	17	10020	1.2	37944.63919	1.558	8349	4437.75	1	19703.6	0.4237	0.4253	103.9	0.996	0.989664	0.007
BTC1119	B4	9	10	10039	1.22	37944.64157	1.608	8227	4437.75	1	19703.6	0.4176	0.4028	103.9	1.037	0.989664	0.047
BTC1119	C1	9	13	10029	1.21	37944.53061	1.503	8287	4437.75	1	19703.6	0.4206	0.4175	103.9	1.007	0.989664	0.018
BTC1119	C2	9	6	10163	1.23	37944.53322	1.503	8261	4437.75	1	19703.6	0.4193	0.4176	103.9	1.004	0.989664	0.014
BTC1119	C3	9	21	10071	1.2	37944.53563	1.534	8391	4437.75	1	19703.6	0.4259	0.4191	103.9	1.016	0.989664	0.026
BTC1119	C4	9	10	10031	1.22	37944.53799	1.472	8221	4437.75	1	19703.6	0.4172	0.4140	103.9	1.008	0.989664	0.018
BTC1119	D1	9	13	10111	1.2	37944.54046	1.474	8425	4437.75	1	19703.6	0.4276	0.4115	103.9	1.039	0.989664	0.049
BTC1119	D2	9	16	10076	1.21	37944.54291	1.918	8326	4437.75	1	19703.6	0.4225	0.4102	103.9	1.030	0.989664	0.040
BTC1119	D3	9	21	10099	1.2	37944.5453	1.883	8414	4437.75	1	19703.6	0.4270	0.4195	103.9	1.018	0.989664	0.028
BTC1119	D4	9	25	10103	1.22	37944.54751	1.769	8280	4437.75	1	19703.6	0.4202	0.4146	103.9	1.014	0.989664	0.024

000209

Beta Attenuation Calibration Worksheet - LB4100AB

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

Attenuation equation
*y=b*m^ax*
b 1
m 0.9999
a 1

min rel dev
max rel dev
limit

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev
BTC1119	A1	10	14	10064	1.23	37944.557	1.385	8181	4437.75	1	19703.6	0.4152	0.4035	105.7	1.029	0.989486	0.040
BTC1119	A2	10	13	10086	1.23	37944.55955	1.386	8199	4437.75	1	19703.6	0.4161	0.4066	105.7	1.023	0.989486	0.034
BTC1119	A3	10	18	10105	1.24	37944.56469	1.441	8148	4437.75	1	19703.6	0.4135	0.4132	105.7	1.001	0.989486	0.011
BTC1119	A4	10	15	10063	1.22	37944.568	1.406	8247	4437.75	1	19703.6	0.4186	0.4037	105.7	1.037	0.989486	0.047
BTC1119	B1	10	18	10103	1.19	37944.57075	1.618	8489	4437.75	1	19703.6	0.4308	0.4204	105.7	1.025	0.989486	0.035
BTC1119	B2	10	15	10043	1.2	37944.57281	1.511	8368	4437.75	1	19703.6	0.4247	0.4179	105.7	1.016	0.989486	0.027
BTC1119	B3	10	10	10141	1.22	37944.63609	1.558	8311	4437.75	1	19703.6	0.4218	0.4253	105.7	0.992	0.989486	0.002
BTC1119	B4	10	7	10026	1.21	37944.6392	1.608	8285	4437.75	1	19703.6	0.4205	0.4028	105.7	1.044	0.989486	0.054
BTC1119	C1	10	14	10075	1.2	37944.64153	1.503	8395	4437.75	1	19703.6	0.4260	0.4175	105.7	1.020	0.989486	0.031
BTC1119	C2	10	12	10072	1.23	37944.53064	1.503	8187	4437.75	1	19703.6	0.4155	0.4176	105.7	0.995	0.989486	0.005
BTC1119	C3	10	20	10040	1.2	37944.53319	1.534	8365	4437.75	1	19703.6	0.4246	0.4191	105.7	1.013	0.989486	0.024
BTC1119	C4	10	17	10105	1.23	37944.53565	1.472	8214	4437.75	1	19703.6	0.4169	0.4140	105.7	1.007	0.989486	0.018
BTC1119	D1	10	19	10037	1.19	37944.53796	1.474	8433	4437.75	1	19703.6	0.4280	0.4115	105.7	1.040	0.989486	0.051
BTC1119	D2	10	8	10118	1.19	37944.54047	1.918	8501	4437.75	1	19703.6	0.4314	0.4102	105.7	1.052	0.989486	0.062
BTC1119	D3	10	19	10057	1.21	37944.54291	1.883	8310	4437.75	1	19703.6	0.4218	0.4195	105.7	1.005	0.989486	0.016
BTC1119	D4	10	17	10055	1.21	37944.54531	1.769	8308	4437.75	1	19703.6	0.4217	0.4146	105.7	1.017	0.989486	0.028
BTC1119	A1	12	11	10071	1.24	37944.55226	1.385	8121	4437.75	1	19703.6	0.4121	0.4035	124.2	1.021	0.987657	0.034
BTC1119	A2	12	17	10065	1.25	37944.55441	1.386	8051	4437.75	1	19703.6	0.4086	0.4066	124.2	1.005	0.987657	0.017
BTC1119	A3	12	25	10143	1.25	37944.55703	1.441	8113	4437.75	1	19703.6	0.4118	0.4132	124.2	0.996	0.987657	0.009
BTC1119	A4	12	21	10095	1.26	37944.55958	1.406	8011	4437.75	1	19703.6	0.4066	0.4037	124.2	1.007	0.987657	0.019
BTC1119	B1	12	15	10087	1.22	37944.56468	1.618	8267	4437.75	1	19703.6	0.4196	0.4204	124.2	0.998	0.987657	0.010
BTC1119	B2	12	19	10126	1.23	37944.56802	1.511	8231	4437.75	1	19703.6	0.4178	0.4179	124.2	1.000	0.987657	0.012
BTC1119	B3	12	8	10146	1.24	37944.57081	1.558	8181	4437.75	1	19703.6	0.4152	0.4253	124.2	0.976	0.987657	-0.011
BTC1119	B4	12	13	10061	1.24	37944.57285	1.608	8112	4437.75	1	19703.6	0.4117	0.4028	124.2	1.022	0.987657	0.034
BTC1119	C1	12	15	10048	1.22	37944.63605	1.503	8235	4437.75	1	19703.6	0.4179	0.4175	124.2	1.001	0.987657	0.013
BTC1119	C2	12	15	10100	1.22	37944.63918	1.503	8277	4437.75	1	19703.6	0.4201	0.4176	124.2	1.006	0.987657	0.018
BTC1119	C3	12	10	10031	1.23	37944.64156	1.534	8154	4437.75	1	19703.6	0.4138	0.4191	124.2	0.987	0.987657	0.000
BTC1119	C4	12	7	10010	1.24	37944.53066	1.472	8071	4437.75	1	19703.6	0.4096	0.4140	124.2	0.990	0.987657	0.002
BTC1119	D1	12	19	10023	1.22	37944.53322	1.474	8214	4437.75	1	19703.6	0.4169	0.4115	124.2	1.013	0.987657	0.026
BTC1119	D2	12	12	10033	1.24	37944.53566	1.918	8090	4437.75	1	19703.6	0.4106	0.4102	124.2	1.001	0.987657	0.013
BTC1119	D3	12	12	10022	1.2	37944.53797	1.883	8350	4437.75	1	19703.6	0.4238	0.4195	124.2	1.010	0.987657	0.023
BTC1119	D4	12	20	10067	1.23	37944.54049	1.769	8183	4437.75	1	19703.6	0.4153	0.4146	124.2	1.002	0.987657	0.014
BTC1119	A1	11	10	10034	1.23	37944.55439	1.385	8157	4437.75	1	19703.6	0.4140	0.4035	124.8	1.026	0.987598	0.038
BTC1119	A2	11	20	10084	1.26	37944.55704	1.386	8002	4437.75	1	19703.6	0.4061	0.4066	124.8	0.999	0.987598	0.011
BTC1119	A3	11	21	10039	1.24	37944.55956	1.441	8095	4437.75	1	19703.6	0.4108	0.4132	124.8	0.994	0.987598	0.007
BTC1119	A4	11	17	10145	1.25	37944.56471	1.406	8115	4437.75	1	19703.6	0.4118	0.4037	124.8	1.020	0.987598	0.033
BTC1119	B1	11	10	10041	1.19	37944.56797	1.618	8436	4437.75	1	19703.6	0.4282	0.4204	124.8	1.018	0.987598	0.031
BTC1119	B2	11	19	10057	1.21	37944.57078	1.511	8310	4437.75	1	19703.6	0.4218	0.4179	124.8	1.009	0.987598	0.022
BTC1119	B3	11	4	10147	1.21	37944.57282	1.558	8385	4437.75	1	19703.6	0.4255	0.4253	124.8	1.000	0.987598	0.013
BTC1119	B4	11	13	10007	1.24	37944.6361	1.608	8069	4437.75	1	19703.6	0.4095	0.4028	124.8	1.017	0.987598	0.029

000210

Beta Attenuation Calibration Worksheet - LB4100AB

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

Attenuation equation
y=b*m^ax
b 1
m 0.9999
a 1

min rel dev
max rel dev
limit

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev
BTC1119	C1	11	18	10127	1.21	37944.63918	1.503	8368	4437.75	1	19703.6	0.4247	0.4175	124.8	1.017	0.987598	0.030
BTC1119	C2	11	9	10050	1.21	37944.64154	1.503	8305	4437.75	1	19703.6	0.4215	0.4176	124.8	1.009	0.987598	0.022
BTC1119	C3	11	19	10078	1.24	37944.53065	1.534	8126	4437.75	1	19703.6	0.4124	0.4191	124.8	0.984	0.987598	-0.004
BTC1119	C4	11	11	10051	1.21	37944.53321	1.472	8305	4437.75	1	19703.6	0.4215	0.4140	124.8	1.018	0.987598	0.031
BTC1119	D1	11	10	10090	1.24	37944.53565	1.474	8136	4437.75	1	19703.6	0.4129	0.4115	124.8	1.003	0.987598	0.016
BTC1119	D2	11	15	10154	1.22	37944.538	1.918	8321	4437.75	1	19703.6	0.4223	0.4102	124.8	1.030	0.987598	0.042
BTC1119	D3	11	15	10072	1.23	37944.54049	1.883	8187	4437.75	1	19703.6	0.4155	0.4195	124.8	0.990	0.987598	0.003
BTC1119	D4	11	13	10090	1.24	37944.54293	1.769	8136	4437.75	1	19703.6	0.4129	0.4146	124.8	0.996	0.987598	0.008
BTC1119	A1	14	14	10095	1.24	37944.5475	1.385	8140	4437.75	1	19703.6	0.4131	0.4035	144.8	1.024	0.985625	0.038
BTC1119	A2	14	16	10055	1.26	37944.54995	1.386	7979	4437.75	1	19703.6	0.4050	0.4066	144.8	0.996	0.985625	0.010
BTC1119	A3	14	21	10078	1.25	37944.55228	1.441	8061	4437.75	1	19703.6	0.4091	0.4132	144.8	0.990	0.985625	0.004
BTC1119	A4	14	14	10066	1.27	37944.55444	1.406	7925	4437.75	1	19703.6	0.4022	0.4037	144.8	0.996	0.985625	0.011
BTC1119	B1	14	16	10183	1.25	37944.55704	1.618	8145	4437.75	1	19703.6	0.4134	0.4204	144.8	0.983	0.985625	-0.002
BTC1119	B2	14	9	10048	1.21	37944.55955	1.511	8303	4437.75	1	19703.6	0.4214	0.4179	144.8	1.008	0.985625	0.023
BTC1119	B3	14	14	10084	1.23	37944.56471	1.558	8197	4437.75	1	19703.6	0.4160	0.4253	144.8	0.978	0.985625	-0.008
BTC1119	B4	14	19	10153	1.23	37944.56803	1.608	8253	4437.75	1	19703.6	0.4189	0.4028	144.8	1.040	0.985625	0.054
BTC1119	C1	14	13	10079	1.23	37944.57078	1.503	8193	4437.75	1	19703.6	0.4158	0.4175	144.8	0.996	0.985625	0.010
BTC1119	C2	14	10	10097	1.24	37944.57281	1.503	8142	4437.75	1	19703.6	0.4132	0.4176	144.8	0.989	0.985625	0.004
BTC1119	C3	14	17	10125	1.22	37944.63606	1.534	8298	4437.75	1	19703.6	0.4211	0.4191	144.8	1.005	0.985625	0.019
BTC1119	C4	14	11	10107	1.24	37944.6392	1.472	8150	4437.75	1	19703.6	0.4136	0.4140	144.8	0.999	0.985625	0.013
BTC1119	D1	14	23	10111	1.25	37944.64157	1.474	8088	4437.75	1	19703.6	0.4105	0.4115	144.8	0.998	0.985625	0.012
BTC1119	D2	14	10	10073	1.24	37944.53066	1.918	8122	4437.75	1	19703.6	0.4122	0.4102	144.8	1.005	0.985625	0.019
BTC1119	D3	14	12	10170	1.23	37944.53323	1.883	8267	4437.75	1	19703.6	0.4196	0.4195	144.8	1.000	0.985625	0.015
BTC1119	D4	14	23	10067	1.24	37944.53566	1.769	8117	4437.75	1	19703.6	0.4120	0.4146	144.8	0.994	0.985625	0.008
BTC1119	A1	13	16	10048	1.26	37944.54993	1.385	7974	4437.75	1	19703.6	0.4047	0.4035	146.3	1.003	0.985477	0.017
BTC1119	A2	13	12	10050	1.26	37944.55229	1.386	7975	4437.75	1	19703.6	0.4048	0.4066	146.3	0.996	0.985477	0.010
BTC1119	A3	13	13	10104	1.27	37944.55442	1.441	7955	4437.75	1	19703.6	0.4037	0.4132	146.3	0.977	0.985477	-0.009
BTC1119	A4	13	21	10061	1.23	37944.55701	1.406	8179	4437.75	1	19703.6	0.4151	0.4037	146.3	1.028	0.985477	0.043
BTC1119	B1	13	16	10095	1.21	37944.55954	1.618	8342	4437.75	1	19703.6	0.4234	0.4204	146.3	1.007	0.985477	0.022
BTC1119	B2	13	21	10097	1.22	37944.56469	1.511	8275	4437.75	1	19703.6	0.4200	0.4179	146.3	1.005	0.985477	0.020
BTC1119	B3	13	7	10092	1.21	37944.568	1.558	8339	4437.75	1	19703.6	0.4232	0.4253	146.3	0.995	0.985477	0.010
BTC1119	B4	13	12	10090	1.22	37944.57079	1.608	8269	4437.75	1	19703.6	0.4197	0.4028	146.3	1.042	0.985477	0.056
BTC1119	C1	13	12	10106	1.23	37944.5728	1.503	8215	4437.75	1	19703.6	0.4169	0.4175	146.3	0.999	0.985477	0.013
BTC1119	C2	13	20	10052	1.23	37944.63606	1.503	8171	4437.75	1	19703.6	0.4147	0.4176	146.3	0.993	0.985477	0.007
BTC1119	C3	13	11	10130	1.23	37944.63919	1.534	8235	4437.75	1	19703.6	0.4179	0.4191	146.3	0.997	0.985477	0.012
BTC1119	C4	13	10	10065	1.2	37944.64154	1.472	8386	4437.75	1	19703.6	0.4256	0.4140	146.3	1.028	0.985477	0.043
BTC1119	D1	13	18	10019	1.23	37944.53065	1.474	8144	4437.75	1	19703.6	0.4133	0.4115	146.3	1.005	0.985477	0.019
BTC1119	D2	13	16	10083	1.22	37944.53323	1.918	8263	4437.75	1	19703.6	0.4194	0.4102	146.3	1.022	0.985477	0.037
BTC1119	D3	13	16	10085	1.2	37944.53563	1.883	8403	4437.75	1	19703.6	0.4264	0.4195	146.3	1.017	0.985477	0.031
BTC1119	D4	13	27	10040	1.24	37944.53801	1.769	8095	4437.75	1	19703.6	0.4109	0.4146	146.3	0.991	0.985477	0.005

000211

Beta Attenuation Calibration Worksheet - LB4100~~A~~ B

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

Attenuation equation
*y=b*m^ax*
b 1
m 0.9999
a 1

min rel dev
max rel dev
limit

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev
BTC1119	A1	15	13	10035	1.28	37944.54534	1.385	7839	4437.75	1	19703.6	0.3978	0.4035	166.1	0.986	0.983528	0.002
BTC1119	A2	15	9	10054	1.28	37944.54753	1.386	7854	4437.75	1	19703.6	0.3986	0.4066	166.1	0.980	0.983528	-0.003
BTC1119	A3	15	16	10016	1.24	37944.54992	1.441	8076	4437.75	1	19703.6	0.4099	0.4132	166.1	0.992	0.983528	0.008
BTC1119	A4	15	11	10006	1.27	37944.55231	1.406	7878	4437.75	1	19703.6	0.3998	0.4037	166.1	0.990	0.983528	0.007
BTC1119	B1	15	17	10089	1.22	37944.5544	1.618	8268	4437.75	1	19703.6	0.4196	0.4204	166.1	0.998	0.983528	0.015
BTC1119	B2	15	21	10091	1.24	37944.55704	1.511	8137	4437.75	1	19703.6	0.4130	0.4179	166.1	0.988	0.983528	0.005
BTC1119	B3	15	9	10087	1.23	37944.55957	1.558	8200	4437.75	1	19703.6	0.4161	0.4253	166.1	0.978	0.983528	-0.005
BTC1119	B4	15	16	10074	1.25	37944.56473	1.608	8058	4437.75	1	19703.6	0.4090	0.4028	166.1	1.015	0.983528	0.032
BTC1119	C1	15	16	10148	1.26	37944.56801	1.503	8053	4437.75	1	19703.6	0.4087	0.4175	166.1	0.979	0.983528	-0.005
BTC1119	C2	15	13	10135	1.25	37944.57079	1.503	8107	4437.75	1	19703.6	0.4114	0.4176	166.1	0.985	0.983528	0.002
BTC1119	C3	15	10	10095	1.27	37944.57284	1.534	7948	4437.75	1	19703.6	0.4034	0.4191	166.1	0.962	0.983528	-0.021
BTC1119	C4	15	7	10119	1.27	37944.6361	1.472	7967	4437.75	1	19703.6	0.4043	0.4140	166.1	0.977	0.983528	-0.007
BTC1119	D1	15	15	10107	1.25	37944.63922	1.474	8084	4437.75	1	19703.6	0.4103	0.4115	166.1	0.997	0.983528	0.014
BTC1119	D2	15	13	10045	1.25	37944.6416	1.918	8034	4437.75	1	19703.6	0.4078	0.4102	166.1	0.994	0.983528	0.011
BTC1119	D3	15	11	10041	1.25	37944.53067	1.883	8031	4437.75	1	19703.6	0.4076	0.4195	166.1	0.972	0.983528	-0.012
BTC1119	D4	15	15	10068	1.27	37944.53325	1.769	7926	4437.75	1	19703.6	0.4023	0.4146	166.1	0.970	0.983528	-0.013
BTC1119	A1	16	11	10082	1.28	37944.54293	1.385	7875	4437.75	1	19703.6	0.3997	0.4035	168.7	0.991	0.983272	0.007
BTC1119	A2	16	20	10113	1.29	37944.54535	1.386	7838	4437.75	1	19703.6	0.3978	0.4066	168.7	0.978	0.983272	-0.005
BTC1119	A3	16	16	10032	1.27	37944.54753	1.441	7898	4437.75	1	19703.6	0.4008	0.4132	168.7	0.970	0.983272	-0.013
BTC1119	A4	16	15	10001	1.27	37944.54995	1.406	7874	4437.75	1	19703.6	0.3996	0.4037	168.7	0.990	0.983272	0.007
BTC1119	B1	16	17	10050	1.24	37944.55228	1.618	8104	4437.75	1	19703.6	0.4113	0.4204	168.7	0.978	0.983272	-0.005
BTC1119	B2	16	19	10042	1.24	37944.55441	1.511	8097	4437.75	1	19703.6	0.4109	0.4179	168.7	0.983	0.983272	0.000
BTC1119	B3	16	9	10032	1.27	37944.55705	1.558	7898	4437.75	1	19703.6	0.4008	0.4253	168.7	0.942	0.983272	-0.041
BTC1119	B4	16	20	10035	1.27	37944.55959	1.608	7900	4437.75	1	19703.6	0.4010	0.4028	168.7	0.995	0.983272	0.012
BTC1119	C1	16	16	10035	1.28	37944.56471	1.503	7839	4437.75	1	19703.6	0.3978	0.4175	168.7	0.953	0.983272	-0.031
BTC1119	C2	16	18	10078	1.28	37944.56803	1.503	7872	4437.75	1	19703.6	0.3995	0.4176	168.7	0.957	0.983272	-0.027
BTC1119	C3	16	19	10122	1.26	37944.5708	1.534	8032	4437.75	1	19703.6	0.4076	0.4191	168.7	0.973	0.983272	-0.011
BTC1119	C4	16	16	10099	1.29	37944.57286	1.472	7828	4437.75	1	19703.6	0.3973	0.4140	168.7	0.960	0.983272	-0.024
BTC1119	D1	16	18	10111	1.28	37944.63611	1.474	7898	4437.75	1	19703.6	0.4008	0.4115	168.7	0.974	0.983272	-0.009
BTC1119	D2	16	13	10070	1.27	37944.63924	1.918	7928	4437.75	1	19703.6	0.4023	0.4102	168.7	0.981	0.983272	-0.002
BTC1119	D3	16	21	10060	1.24	37944.64159	1.883	8111	4437.75	1	19703.6	0.4117	0.4195	168.7	0.981	0.983272	-0.002
BTC1119	D4	16	20	10019	1.26	37944.53068	1.769	7950	4437.75	1	19703.6	0.4035	0.4146	168.7	0.973	0.983272	-0.010
BTC1119	A1	17	10	10090	1.27	37944.54049	1.385	7944	4437.75	1	19703.6	0.4032	0.4035	186	0.999	0.981573	0.018
BTC1119	A2	17	17	10044	1.29	37944.54295	1.386	7785	4437.75	1	19703.6	0.3951	0.4066	186	0.972	0.981573	-0.010
BTC1119	A3	17	14	10094	1.29	37944.54536	1.441	7824	4437.75	1	19703.6	0.3971	0.4132	186	0.961	0.981573	-0.021
BTC1119	A4	17	19	10048	1.28	37944.54755	1.406	7849	4437.75	1	19703.6	0.3983	0.4037	186	0.987	0.981573	0.005
BTC1119	B1	17	13	10152	1.24	37944.54994	1.618	8186	4437.75	1	19703.6	0.4154	0.4204	186	0.988	0.981573	0.007
BTC1119	B2	17	15	10159	1.25	37944.5523	1.511	8126	4437.75	1	19703.6	0.4124	0.4179	186	0.987	0.981573	0.005
BTC1119	B3	17	6	10017	1.25	37944.55442	1.558	8012	4437.75	1	19703.6	0.4066	0.4253	186	0.956	0.981573	-0.026
BTC1119	B4	17	10	10062	1.24	37944.55704	1.608	8113	4437.75	1	19703.6	0.4118	0.4028	186	1.022	0.981573	0.041

000212

Beta Attenuation Calibration Worksheet - LB4100A B

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

Attenuation equation
y=b*m^ax
b 1
m 0.9999
a 1

min rel dev
max rel dev
limit

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev
BTC1119	C1	17	15	10109	1.26	37944.55955	1.503	8022	4437.75	1	19703.6	0.4071	0.4175	186	0.975	0.981573	-0.007
BTC1119	C2	17	12	10078	1.25	37944.5647	1.503	8061	4437.75	1	19703.6	0.4091	0.4176	186	0.980	0.981573	-0.002
BTC1119	C3	17	20	10051	1.27	37944.56804	1.534	7913	4437.75	1	19703.6	0.4016	0.4191	186	0.958	0.981573	-0.023
BTC1119	C4	17	8	10053	1.24	37944.5708	1.472	8106	4437.75	1	19703.6	0.4114	0.4140	186	0.994	0.981573	0.012
BTC1119	D1	17	15	10063	1.28	37944.57286	1.474	7861	4437.75	1	19703.6	0.3989	0.4115	186	0.970	0.981573	-0.012
BTC1119	D2	17	11	10103	1.24	37944.63609	1.918	8146	4437.75	1	19703.6	0.4134	0.4102	186	1.008	0.981573	0.026
BTC1119	D3	17	16	10126	1.23	37944.63921	1.883	8231	4437.75	1	19703.6	0.4177	0.4195	186	0.996	0.981573	0.014
BTC1119	D4	17	19	10046	1.25	37944.6416	1.769	8035	4437.75	1	19703.6	0.4078	0.4146	186	0.984	0.981573	0.002
BTC1119	A1	18	12	10025	1.28	37944.53801	1.385	7831	4437.75	1	19703.6	0.3974	0.4035	186.3	0.985	0.981543	0.003
BTC1119	A2	18	15	10119	1.27	37944.5405	1.386	7967	4437.75	1	19703.6	0.4043	0.4066	186.3	0.994	0.981543	0.013
BTC1119	A3	18	20	10138	1.27	37944.54294	1.441	7982	4437.75	1	19703.6	0.4051	0.4132	186.3	0.980	0.981543	-0.001
BTC1119	A4	18	13	10044	1.26	37944.54532	1.406	7970	4437.75	1	19703.6	0.4045	0.4037	186.3	1.002	0.981543	0.021
BTC1119	B1	18	14	10097	1.23	37944.54751	1.618	8208	4437.75	1	19703.6	0.4166	0.4204	186.3	0.991	0.981543	0.009
BTC1119	B2	18	13	10090	1.26	37944.54997	1.511	8007	4437.75	1	19703.6	0.4064	0.4179	186.3	0.972	0.981543	-0.009
BTC1119	B3	18	9	10200	1.24	37944.55229	1.558	8225	4437.75	1	19703.6	0.4174	0.4253	186.3	0.981	0.981543	0.000
BTC1119	B4	18	15	10040	1.26	37944.55444	1.608	7967	4437.75	1	19703.6	0.4043	0.4028	186.3	1.004	0.981543	0.022
BTC1119	C1	18	15	10059	1.25	37944.55701	1.503	8046	4437.75	1	19703.6	0.4084	0.4175	186.3	0.978	0.981543	-0.004
BTC1119	C2	18	19	10106	1.27	37944.55956	1.503	7956	4437.75	1	19703.6	0.4038	0.4176	186.3	0.967	0.981543	-0.015
BTC1119	C3	18	14	10061	1.24	37944.56469	1.534	8112	4437.75	1	19703.6	0.4117	0.4191	186.3	0.982	0.981543	0.001
BTC1119	C4	18	11	10080	1.25	37944.56802	1.472	8063	4437.75	1	19703.6	0.4092	0.4140	186.3	0.988	0.981543	0.007
BTC1119	D1	18	15	10047	1.26	37944.57082	1.474	7973	4437.75	1	19703.6	0.4046	0.4115	186.3	0.983	0.981543	0.002
BTC1119	D2	18	8	10112	1.26	37944.57285	1.918	8024	4437.75	1	19703.6	0.4072	0.4102	186.3	0.993	0.981543	0.011
BTC1119	D3	18	15	10084	1.24	37944.63609	1.883	8131	4437.75	1	19703.6	0.4127	0.4195	186.3	0.984	0.981543	0.002
BTC1119	D4	18	11	10046	1.26	37944.63922	1.769	7972	4437.75	1	19703.6	0.4046	0.4146	186.3	0.976	0.981543	-0.006
BTC1119	A1	19	12	10060	1.33	37944.53571	1.385	7563	4437.75	1	19703.6	0.3838	0.4035	214.9	0.951	0.97874	-0.027
BTC1119	A2	19	12	10040	1.34	37944.53806	1.386	7492	4437.75	1	19703.6	0.3802	0.4066	214.9	0.935	0.97874	-0.044
BTC1119	A3	19	11	10073	1.31	37944.54052	1.441	7688	4437.75	1	19703.6	0.3902	0.4132	214.9	0.944	0.97874	-0.035
BTC1119	A4	19	16	10053	1.34	37944.54299	1.406	7501	4437.75	1	19703.6	0.3807	0.4037	214.9	0.943	0.97874	-0.036
BTC1119	B1	19	13	10078	1.3	37944.54537	1.618	7751	4437.75	1	19703.6	0.3934	0.4204	214.9	0.936	0.97874	-0.043
BTC1119	B2	19	14	10029	1.28	37944.54756	1.511	7834	4437.75	1	19703.6	0.3976	0.4179	214.9	0.952	0.97874	-0.027
BTC1119	B3	19	7	10032	1.29	37944.54998	1.558	7776	4437.75	1	19703.6	0.3946	0.4253	214.9	0.928	0.97874	-0.051
BTC1119	B4	19	13	10035	1.3	37944.55233	1.608	7718	4437.75	1	19703.6	0.3917	0.4028	214.9	0.972	0.97874	-0.006
BTC1119	C1	19	16	10008	1.29	37944.55443	1.503	7757	4437.75	1	19703.6	0.3937	0.4175	214.9	0.943	0.97874	-0.036
BTC1119	C2	19	9	10031	1.31	37944.55706	1.503	7656	4437.75	1	19703.6	0.3886	0.4176	214.9	0.930	0.97874	-0.048
BTC1119	C3	19	12	10056	1.29	37944.55958	1.534	7794	4437.75	1	19703.6	0.3956	0.4191	214.9	0.944	0.97874	-0.035
BTC1119	C4	19	12	10087	1.31	37944.56475	1.472	7699	4437.75	1	19703.6	0.3907	0.4140	214.9	0.944	0.97874	-0.035
BTC1119	D1	19	15	10087	1.32	37944.56807	1.474	7641	4437.75	1	19703.6	0.3878	0.4115	214.9	0.942	0.97874	-0.036
BTC1119	D2	19	16	10047	1.29	37944.57083	1.918	7787	4437.75	1	19703.6	0.3952	0.4102	214.9	0.963	0.97874	-0.015
BTC1119	D3	19	19	10059	1.28	37944.57287	1.883	7857	4437.75	1	19703.6	0.3988	0.4195	214.9	0.951	0.97874	-0.028
BTC1119	D4	19	18	10017	1.31	37944.63613	1.769	7645	4437.75	1	19703.6	0.3880	0.4146	214.9	0.936	0.97874	-0.043

000213

Beta Attenuation Calibration Worksheet - LB4100A B

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

Attenuation equation
y=b*m^ax
b 1
m 0.9999
a 1

min rel dev
max rel dev
limit

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Beta BKG	Beta cpm	Sr-90 Activity pCi/ml	Spike ml	Beta Activity dpm	Beta cpm/dpm	Detector Base Efficiency	Mass mg	Atten. Normalized to Zero Mass	Fitted Atten	abs dev
BTC1119	A1	20	15	10021	1.35	37944.53329	1.385	7422	4437.75	1	19703.6	0.3767	0.4035	218.2	0.934	0.978417	-0.045
BTC1119	A2	20	16	10065	1.33	37944.53571	1.386	7567	4437.75	1	19703.6	0.3840	0.4066	218.2	0.945	0.978417	-0.034
BTC1119	A3	20	19	10024	1.34	37944.53807	1.441	7480	4437.75	1	19703.6	0.3796	0.4132	218.2	0.919	0.978417	-0.060
BTC1119	A4	20	14	10038	1.33	37944.54054	1.406	7546	4437.75	1	19703.6	0.3830	0.4037	218.2	0.949	0.978417	-0.030
BTC1119	B1	20	5	10014	1.29	37944.54295	1.618	7762	4437.75	1	19703.6	0.3939	0.4204	218.2	0.937	0.978417	-0.041
BTC1119	B2	20	12	10110	1.31	37944.54538	1.511	7716	4437.75	1	19703.6	0.3916	0.4179	218.2	0.937	0.978417	-0.041
BTC1119	B3	20	17	10081	1.32	37944.54758	1.558	7636	4437.75	1	19703.6	0.3875	0.4253	218.2	0.911	0.978417	-0.067
BTC1119	B4	20	12	10062	1.34	37944.55001	1.608	7508	4437.75	1	19703.6	0.3810	0.4028	218.2	0.946	0.978417	-0.033
BTC1119	C1	20	14	10015	1.28	37944.55229	1.503	7823	4437.75	1	19703.6	0.3970	0.4175	218.2	0.951	0.978417	-0.028
BTC1119	C2	20	13	10053	1.32	37944.55446	1.503	7615	4437.75	1	19703.6	0.3865	0.4176	218.2	0.925	0.978417	-0.053
BTC1119	C3	20	9	10037	1.31	37944.55707	1.534	7661	4437.75	1	19703.6	0.3888	0.4191	218.2	0.928	0.978417	-0.051
BTC1119	C4	20	9	10057	1.3	37944.55959	1.472	7735	4437.75	1	19703.6	0.3926	0.4140	218.2	0.948	0.978417	-0.030
BTC1119	D1	20	17	10034	1.29	37944.56472	1.474	7777	4437.75	1	19703.6	0.3947	0.4115	218.2	0.959	0.978417	-0.019
BTC1119	D2	20	15	10115	1.3	37944.56807	1.918	7779	4437.75	1	19703.6	0.3948	0.4102	218.2	0.962	0.978417	-0.016
BTC1119	D3	20	20	10084	1.29	37944.57083	1.883	7816	4437.75	1	19703.6	0.3967	0.4195	218.2	0.946	0.978417	-0.033
BTC1119	D4	20	20	10037	1.31	37944.57288	1.769	7660	4437.75	1	19703.6	0.3888	0.4146	218.2	0.938	0.978417	-0.041

000214

Beta to Alpha Crosstalk Calibration Worksheet - LB4100A B

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
EGB1118A	A1	1121	19	10178	1.28	11/18/03 10:34	14.8	7952	157.8	0	0.0019	0.0007	0.001	62.50%	1.98%
EGB1118A	A2	1121	20	10095	1.26	11/18/03 10:34	15.9	8012	159.6	0	0.0020	0.0007	0.001	64.67%	1.99%
EGB1118A	A3	1121	19	10098	1.24	11/18/03 10:34	15.3	8144	162.2	0	0.0019	0.0007	0.001	62.80%	1.99%
EGB1118A	A4	1121	21	10103	1.27	11/18/03 10:34	16.5	7955	158.5	0	0.0021	0.0007	0.001	66.32%	1.99%
EGB1118B	B1	1121	18	10025	1.21	11/18/03 10:40	14.9	8285	165.6	0	0.0018	0.0007	0.001	61.01%	2.00%
EGB1118B	B2	1121	21	10046	1.22	11/18/03 10:40	17.2	8234	164.5	0	0.0021	0.0007	0.001	66.51%	2.00%
EGB1118B	B3	1121	17	10142	1.21	11/18/03 10:40	14.0	8382	166.6	0	0.0017	0.0007	0.001	58.24%	1.99%
EGB1118B	B4	1121	18	10082	1.27	11/18/03 10:40	14.2	7939	158.3	0	0.0018	0.0007	0.001	60.79%	1.99%
EGB1118C	C1	1121	24	10121	1.23	11/18/03 10:59	19.5	8228	163.8	0	0.0024	0.0007	0.002	70.48%	1.99%
EGB1118C	C2	1121	23	10041	1.22	11/18/03 10:59	18.9	8230	164.5	0	0.0023	0.0007	0.002	69.44%	2.00%
EGB1118C	C3	1121	32	10076	1.22	11/18/03 10:59	26.2	8259	164.8	0	0.0032	0.0007	0.002	77.96%	2.00%
EGB1118C	C4	1121	19	10116	1.24	11/18/03 10:59	15.3	8158	162.4	0	0.0019	0.0007	0.001	62.73%	1.99%
EGB1118D	D1	1121	19	10055	1.24	11/18/03 11:05	15.3	8109	161.9	0	0.0019	0.0007	0.001	62.96%	2.00%
EGB1118D	D2	1121	27	10105	1.25	11/18/03 11:05	21.6	8084	161.1	0	0.0027	0.0007	0.002	73.80%	1.99%
EGB1118D	D3	1121	19	10086	1.22	11/18/03 11:05	15.6	8267	164.8	0	0.0019	0.0007	0.001	62.84%	1.99%
EGB1118D	D4	1121	14	10050	1.23	11/18/03 11:05	11.4	8171	163.1	0	0.0014	0.0007	0.001	49.75%	2.00%
BTC1119	A1	1	14	10076	1.25	11/19/03 12:44	11.2	8061	160.7	16.9	0.0014	0.000666	0.001	52.05%	1.99%
BTC1119	A2	1	27	10058	1.25	11/19/03 12:47	21.6	8046	160.7	16.9	0.0027	0.000666	0.002	75.18%	2.00%
BTC1119	A3	1	17	10030	1.23	11/19/03 12:51	13.8	8154	163.0	16.9	0.0017	0.000666	0.001	60.69%	2.00%
BTC1119	A4	1	18	10025	1.21	11/19/03 12:54	14.9	8285	165.6	16.9	0.0018	0.000666	0.001	62.90%	2.00%
BTC1119	B1	1	15	10099	1.17	11/19/03 12:58	12.8	8632	171.9	16.9	0.0015	0.000666	0.001	55.15%	1.99%
BTC1119	B2	1	14	10078	1.19	11/19/03 13:01	11.8	8469	168.8	16.9	0.0014	0.000666	0.001	52.04%	1.99%
BTC1119	B3	1	9	10076	1.22	11/19/03 13:05	7.4	8259	164.6	16.9	0.0009	0.000666	0.000	25.42%	1.99%
BTC1119	B4	1	12	10037	1.19	11/19/03 13:08	10.1	8434	168.5	16.9	0.0012	0.000666	0.001	44.28%	2.00%
BTC1119	C1	1	19	10032	1.2	11/19/03 13:11	15.8	8360	167.1	16.9	0.0019	0.000666	0.001	64.82%	2.00%
BTC1119	C2	1	15	10036	1.21	11/19/03 13:15	12.4	8294	165.7	16.9	0.0015	0.000666	0.001	55.43%	2.00%
BTC1119	C3	1	20	10130	1.21	11/19/03 13:18	16.5	8372	166.5	16.9	0.0020	0.000666	0.001	66.26%	1.99%
BTC1119	C4	1	13	10092	1.2	11/19/03 13:22	10.8	8410	167.5	16.9	0.0013	0.000666	0.001	48.28%	1.99%
BTC1119	D1	1	13	10049	1.2	11/19/03 13:25	10.8	8374	167.2	16.9	0.0013	0.000666	0.001	48.50%	2.00%
BTC1119	D2	1	23	10060	1.19	11/19/03 13:33	19.3	8454	168.8	16.9	0.0023	0.000666	0.002	70.86%	2.00%
BTC1119	D3	1	26	10043	1.21	11/19/03 13:37	21.5	8300	165.9	16.9	0.0026	0.000666	0.002	74.27%	2.00%
BTC1119	D4	1	23	10118	1.24	11/19/03 13:41	18.5	8160	162.4	16.9	0.0023	0.000666	0.002	70.69%	1.99%
BTC1119	A1	2	18	10024	1.27	11/19/03 15:23	14.2	7893	157.8	17.5	0.0018	0.000665	0.001	62.97%	2.00%
BTC1119	A2	2	20	10066	1.26	11/19/03 12:44	15.9	7989	159.4	17.5	0.0020	0.000665	0.001	66.53%	2.00%
BTC1119	A3	2	25	10086	1.26	11/19/03 12:47	19.8	8005	159.6	17.5	0.0025	0.000665	0.002	73.17%	1.99%

000215

Beta to Alpha Crosstalk Calibration Worksheet - LB4100A

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
BTC1119	A4	2	26	10027	1.25	11/19/03 12:51	20.8	8022	160.4	17.5	0.0026	0.000665	0.002	74.35%	2.00%
BTC1119	B1	2	20	10039	1.22	11/19/03 12:54	16.4	8229	164.4	17.5	0.0020	0.000665	0.001	66.62%	2.00%
BTC1119	B2	2	18	10114	1.23	11/19/03 12:58	14.6	8223	163.7	17.5	0.0018	0.000665	0.001	62.63%	1.99%
BTC1119	B3	2	9	10060	1.24	11/19/03 13:01	7.3	8113	161.8	17.5	0.0009	0.000665	0.000	25.67%	1.99%
BTC1119	B4	2	16	10073	1.26	11/19/03 13:05	12.7	7994	159.4	17.5	0.0016	0.000665	0.001	58.13%	1.99%
BTC1119	C1	2	20	10063	1.26	11/19/03 13:08	15.9	7987	159.4	17.5	0.0020	0.000665	0.001	66.54%	2.00%
BTC1119	C2	2	14	10105	1.23	11/19/03 13:11	11.4	8215	163.6	17.5	0.0014	0.000665	0.001	52.00%	1.99%
BTC1119	C3	2	21	10077	1.25	11/19/03 13:15	16.8	8062	160.8	17.5	0.0021	0.000665	0.001	68.09%	1.99%
BTC1119	C4	2	10	10065	1.25	11/19/03 13:18	8.0	8052	160.6	17.5	0.0010	0.000665	0.000	33.07%	1.99%
BTC1119	D1	2	13	10179	1.23	11/19/03 13:22	10.6	8276	164.2	17.5	0.0013	0.000665	0.001	47.93%	1.98%
BTC1119	D2	2	12	10082	1.26	11/19/03 13:25	9.5	8002	159.5	17.5	0.0012	0.000665	0.001	44.13%	1.99%
BTC1119	D3	2	22	10075	1.24	11/19/03 13:33	17.7	8125	162.1	17.5	0.0022	0.000665	0.002	69.55%	1.99%
BTC1119	D4	2	18	10099	1.27	11/19/03 13:38	14.2	7952	158.4	17.5	0.0018	0.000665	0.001	62.69%	1.99%
BTC1119	A1	4	19	10095	1.19	11/19/03 15:15	16.0	8483	169.0	40	0.0019	0.00062	0.001	67.06%	1.99%
BTC1119	A2	4	10	10063	1.19	11/19/03 15:20	8.4	8456	168.7	40	0.0010	0.00062	0.000	37.61%	1.99%
BTC1119	A3	4	18	10053	1.22	11/19/03 15:23	14.8	8240	164.5	40	0.0018	0.00062	0.001	65.37%	2.00%
BTC1119	A4	4	21	10088	1.2	11/19/03 12:44	17.5	8407	167.6	40	0.0021	0.00062	0.001	70.22%	1.99%
BTC1119	B1	4	10	10071	1.13	11/19/03 12:47	8.8	8912	177.7	40	0.0010	0.00062	0.000	37.56%	1.99%
BTC1119	B2	4	10	10069	1.16	11/19/03 12:51	8.6	8680	173.1	40	0.0010	0.00062	0.000	37.57%	1.99%
BTC1119	B3	4	9	10087	1.16	11/19/03 12:54	7.8	8696	173.2	40	0.0009	0.00062	0.000	30.51%	1.99%
BTC1119	B4	4	14	10168	1.18	11/19/03 12:58	11.9	8617	171.0	40	0.0014	0.00062	0.001	54.97%	1.98%
BTC1119	C1	4	15	10108	1.19	11/19/03 13:01	12.6	8494	169.1	40	0.0015	0.00062	0.001	58.22%	1.99%
BTC1119	C2	4	13	10163	1.18	11/19/03 13:05	11.0	8613	171.0	40	0.0013	0.00062	0.001	51.53%	1.99%
BTC1119	C3	4	15	10098	1.17	11/19/03 13:08	12.8	8631	171.9	40	0.0015	0.00062	0.001	58.26%	1.99%
BTC1119	C4	4	13	10087	1.17	11/19/03 13:11	11.1	8621	171.8	40	0.0013	0.00062	0.001	51.89%	1.99%
BTC1119	D1	4	12	10114	1.2	11/19/03 13:15	10.0	8428	167.7	40	0.0012	0.00062	0.001	47.74%	1.99%
BTC1119	D2	4	14	10065	1.15	11/19/03 13:18	12.2	8752	174.6	40	0.0014	0.00062	0.001	55.43%	1.99%
BTC1119	D3	4	18	10106	1.17	11/19/03 13:22	15.4	8638	172.0	40	0.0018	0.00062	0.001	65.19%	1.99%
BTC1119	D4	4	25	10022	1.17	11/19/03 13:25	21.4	8566	171.3	40	0.0025	0.00062	0.002	75.15%	2.00%
BTC1119	A1	3	15	10007	1.2	11/19/03 15:20	12.5	8339	166.8	40.1	0.0015	0.00062	0.001	58.65%	2.00%
BTC1119	A2	3	15	10114	1.22	11/19/03 15:23	12.3	8290	165.0	40.1	0.0015	0.00062	0.001	58.21%	1.99%
BTC1119	A3	3	20	10059	1.21	11/19/03 12:44	16.5	8313	165.9	40.1	0.0020	0.00062	0.001	68.83%	2.00%
BTC1119	A4	3	19	10064	1.21	11/19/03 12:47	15.7	8317	166.0	40.1	0.0019	0.00062	0.001	67.17%	2.00%
BTC1119	B1	3	12	10114	1.18	11/19/03 12:51	10.2	8571	170.6	40.1	0.0012	0.00062	0.001	47.76%	1.99%
BTC1119	B2	3	15	10099	1.17	11/19/03 12:54	12.8	8632	171.9	40.1	0.0015	0.00062	0.001	58.27%	1.99%

000216

Beta to Alpha Crosstalk Calibration Worksheet - LB4100~~A~~B

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
BTC1119	B3	3	9	10104	1.18	11/19/03 12:58	7.6	8563	170.4	40.1	0.0009	0.00062	0.000	30.42%	1.99%
BTC1119	B4	3	4	10032	1.17	11/19/03 13:01	3.4	8574	171.2	40.1	0.0004	0.00062	0.000	-55.45%	2.00%
BTC1119	C1	3	17	10052	1.18	11/19/03 13:05	14.4	8519	170.1	40.1	0.0017	0.00062	0.001	63.35%	2.00%
BTC1119	C2	3	12	10075	1.18	11/19/03 13:08	10.2	8538	170.2	40.1	0.0012	0.00062	0.001	47.96%	1.99%
BTC1119	C3	3	13	10104	1.18	11/19/03 13:11	11.0	8563	170.5	40.1	0.0013	0.00062	0.001	51.83%	1.99%
BTC1119	C4	3	7	10152	1.18	11/19/03 13:15	5.9	8603	170.8	40.1	0.0007	0.00062	0.000	10.11%	1.99%
BTC1119	D1	3	8	10129	1.17	11/19/03 13:18	6.8	8657	172.1	40.1	0.0008	0.00062	0.000	21.53%	1.99%
BTC1119	D2	3	12	10092	1.19	11/19/03 13:22	10.1	8481	168.9	40.1	0.0012	0.00062	0.001	47.87%	1.99%
BTC1119	D3	3	20	10096	1.15	11/19/03 13:25	17.4	8779	174.9	40.1	0.0020	0.00062	0.001	68.71%	1.99%
BTC1119	D4	3	20	10113	1.18	11/19/03 13:33	16.9	8570	170.6	40.1	0.0020	0.00062	0.001	68.66%	1.99%
BTC1119	A1	5	15	10056	1.22	11/19/03 13:44	12.3	8243	164.5	61.8	0.0015	0.000576	0.001	61.36%	2.00%
BTC1119	A2	5	12	10015	1.24	11/19/03 15:15	9.7	8077	161.5	61.8	0.0012	0.000576	0.001	51.89%	2.00%
BTC1119	A3	5	20	10075	1.19	11/19/03 15:20	16.8	8466	168.9	61.8	0.0020	0.000576	0.001	70.96%	1.99%
BTC1119	A4	5	17	10035	1.21	11/19/03 15:23	14.0	8293	165.7	61.8	0.0017	0.000576	0.001	65.98%	2.00%
BTC1119	B1	5	14	10072	1.17	11/19/03 12:44	12.0	8609	171.7	61.8	0.0014	0.000576	0.001	58.53%	1.99%
BTC1119	B2	5	17	10086	1.19	11/19/03 12:47	14.3	8476	168.9	61.8	0.0017	0.000576	0.001	65.80%	1.99%
BTC1119	B3	5	13	10109	1.22	11/19/03 12:51	10.7	8286	164.9	61.8	0.0013	0.000576	0.001	55.18%	1.99%
BTC1119	B4	5	9	10033	1.21	11/19/03 12:54	7.4	8292	165.6	61.8	0.0009	0.000576	0.000	35.74%	2.00%
BTC1119	C1	5	18	10083	1.21	11/19/03 12:58	14.9	8333	166.1	61.8	0.0018	0.000576	0.001	67.71%	1.99%
BTC1119	C2	5	6	10041	1.2	11/19/03 13:01	5.0	8368	167.1	61.8	0.0006	0.000576	0.000	3.54%	2.00%
BTC1119	C3	5	14	10116	1.2	11/19/03 13:05	11.7	8430	167.7	61.8	0.0014	0.000576	0.001	58.35%	1.99%
BTC1119	C4	5	19	10053	1.2	11/19/03 13:08	15.8	8378	167.3	61.8	0.0019	0.000576	0.001	69.50%	2.00%
BTC1119	D1	5	18	10049	1.21	11/19/03 13:11	14.9	8305	165.8	61.8	0.0018	0.000576	0.001	67.82%	2.00%
BTC1119	D2	5	16	10077	1.18	11/19/03 13:15	13.6	8540	170.3	61.8	0.0016	0.000576	0.001	63.70%	1.99%
BTC1119	D3	5	26	10091	1.2	11/19/03 13:18	21.7	8409	167.6	61.8	0.0026	0.000576	0.002	77.63%	1.99%
BTC1119	D4	5	19	10069	1.21	11/19/03 13:22	15.7	8321	166.0	61.8	0.0019	0.000576	0.001	69.45%	2.00%
BTC1119	A1	6	19	10146	1.22	11/19/03 13:41	15.6	8316	165.3	64.2	0.0019	0.000572	0.001	69.48%	1.99%
BTC1119	A2	6	19	10079	1.21	11/19/03 13:44	15.7	8330	166.1	64.2	0.0019	0.000572	0.001	69.68%	1.99%
BTC1119	A3	6	20	10083	1.22	11/19/03 15:15	16.4	8265	164.8	64.2	0.0020	0.000572	0.001	71.18%	1.99%
BTC1119	A4	6	24	10025	1.21	11/19/03 15:20	19.8	8285	165.7	64.2	0.0024	0.000572	0.002	76.12%	2.00%
BTC1119	B1	6	10	10110	1.16	11/19/03 15:23	8.6	8716	173.4	64.2	0.0010	0.000572	0.000	42.21%	1.99%
BTC1119	B2	6	18	10010	1.18	11/19/03 12:44	15.3	8483	169.7	64.2	0.0018	0.000572	0.001	68.21%	2.00%
BTC1119	B3	6	13	10106	1.18	11/19/03 12:47	11.0	8564	170.5	64.2	0.0013	0.000572	0.001	55.56%	1.99%
BTC1119	B4	6	11	10150	1.18	11/19/03 12:51	9.3	8602	170.9	64.2	0.0011	0.000572	0.001	47.26%	1.99%
BTC1119	C1	6	16	10018	1.19	11/19/03 12:54	13.4	8418	168.4	64.2	0.0016	0.000572	0.001	64.21%	2.00%

000217

Beta to Alpha Crosstalk Calibration Worksheet - LB4100Aβ

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
BTC1119	C2	6	12	10133	1.21	11/19/03 12:58	9.9	8374	166.5	64.2	0.0012	0.000572	0.001	51.73%	1.99%
BTC1119	C3	6	22	10130	1.19	11/19/03 13:01	18.5	8513	169.3	64.2	0.0022	0.000572	0.002	73.68%	1.99%
BTC1119	C4	6	9	10083	1.17	11/19/03 13:05	7.7	8618	171.7	64.2	0.0009	0.000572	0.000	35.96%	1.99%
BTC1119	D1	6	14	10089	1.2	11/19/03 13:08	11.7	8408	167.5	64.2	0.0014	0.000572	0.001	58.81%	1.99%
BTC1119	D2	6	23	10130	1.16	11/19/03 13:11	19.8	8733	173.7	64.2	0.0023	0.000572	0.002	74.82%	1.99%
BTC1119	D3	6	16	10129	1.18	11/19/03 13:15	13.6	8584	170.7	64.2	0.0016	0.000572	0.001	63.81%	1.99%
BTC1119	D4	6	29	10120	1.21	11/19/03 13:18	24.0	8364	166.5	64.2	0.0029	0.000572	0.002	80.05%	1.99%
BTC1119	A1	8	7	10013	1.16	11/19/03 13:33	6.0	8632	172.6	83.8	0.0007	0.000532	0.000	23.84%	2.00%
BTC1119	A2	8	18	10104	1.2	11/19/03 13:37	15.0	8420	167.7	83.8	0.0018	0.000532	0.001	70.11%	1.99%
BTC1119	A3	8	16	10107	1.18	11/19/03 13:41	13.6	8565	170.5	83.8	0.0016	0.000532	0.001	66.37%	1.99%
BTC1119	A4	8	22	10112	1.2	11/19/03 13:44	18.3	8427	167.8	83.8	0.0022	0.000532	0.002	75.53%	1.99%
BTC1119	B1	8	14	10063	1.12	11/19/03 15:15	12.5	8985	179.3	83.8	0.0014	0.000532	0.001	61.73%	2.00%
BTC1119	B2	8	20	10080	1.14	11/19/03 15:20	17.5	8842	176.3	83.8	0.0020	0.000532	0.001	73.17%	1.99%
BTC1119	B3	8	7	10068	1.18	11/19/03 15:23	5.9	8532	170.1	83.8	0.0007	0.000532	0.000	23.43%	1.99%
BTC1119	B4	8	12	10124	1.18	11/19/03 12:44	10.2	8580	170.6	83.8	0.0012	0.000532	0.001	55.08%	1.99%
BTC1119	C1	8	16	10077	1.17	11/19/03 12:47	13.7	8613	171.7	83.8	0.0016	0.000532	0.001	66.47%	1.99%
BTC1119	C2	8	8	10162	1.16	11/19/03 12:51	6.9	8760	173.9	83.8	0.0008	0.000532	0.000	32.37%	1.98%
BTC1119	C3	8	21	10077	1.15	11/19/03 12:54	18.3	8763	174.8	83.8	0.0021	0.000532	0.002	74.45%	1.99%
BTC1119	C4	8	5	10155	1.18	11/19/03 12:58	4.2	8606	170.8	83.8	0.0005	0.000532	0.000	-8.13%	1.99%
BTC1119	D1	8	12	10098	1.16	11/19/03 13:01	10.3	8705	173.4	83.8	0.0012	0.000532	0.001	55.20%	1.99%
BTC1119	D2	8	14	10147	1.16	11/19/03 13:05	12.1	8747	173.8	83.8	0.0014	0.000532	0.001	61.41%	1.99%
BTC1119	D3	8	22	10056	1.16	11/19/03 13:08	19.0	8669	173.1	83.8	0.0022	0.000532	0.002	75.66%	2.00%
BTC1119	D4	8	24	10138	1.19	11/19/03 13:11	20.2	8519	169.4	83.8	0.0024	0.000532	0.002	77.51%	1.99%
BTC1119	A1	7	13	10152	1.25	11/19/03 13:37	10.4	8122	161.3	85.1	0.0013	0.00053	0.001	58.63%	1.99%
BTC1119	A2	7	25	10088	1.25	11/19/03 13:41	20.0	8070	160.9	85.1	0.0025	0.00053	0.002	78.62%	1.99%
BTC1119	A3	7	19	10137	1.23	11/19/03 13:44	15.4	8241	163.9	85.1	0.0019	0.00053	0.001	71.73%	1.99%
BTC1119	A4	7	18	10073	1.23	11/19/03 15:15	14.6	8189	163.3	85.1	0.0018	0.00053	0.001	70.35%	1.99%
BTC1119	B1	7	16	10152	1.2	11/19/03 15:20	13.3	8460	168.1	85.1	0.0016	0.00053	0.001	66.38%	1.99%
BTC1119	B2	7	19	10075	1.2	11/19/03 15:23	15.8	8396	167.4	85.1	0.0019	0.00053	0.001	71.91%	1.99%
BTC1119	B3	7	9	10049	1.21	11/19/03 12:44	7.4	8305	165.8	85.1	0.0009	0.00053	0.000	40.84%	2.00%
BTC1119	B4	7	15	10106	1.21	11/19/03 12:47	12.4	8352	166.3	85.1	0.0015	0.00053	0.001	64.31%	1.99%
BTC1119	C1	7	16	10067	1.21	11/19/03 12:51	13.2	8320	166.0	85.1	0.0016	0.00053	0.001	66.67%	1.99%
BTC1119	C2	7	10	10107	1.24	11/19/03 12:54	8.1	8151	162.2	85.1	0.0010	0.00053	0.000	46.45%	1.99%
BTC1119	C3	7	16	10137	1.21	11/19/03 12:58	13.2	8378	166.5	85.1	0.0016	0.00053	0.001	66.43%	1.99%
BTC1119	C4	7	6	10122	1.24	11/19/03 13:01	4.8	8163	162.3	85.1	0.0006	0.00053	0.000	10.62%	1.99%

000218

Beta to Alpha Crosstalk Calibration Worksheet - LB4100A/B

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
BTC1119	D1	7	13	10055	1.21	11/19/03 13:05	10.7	8310	165.9	85.1	0.0013	0.00053	0.001	59.02%	2.00%
BTC1119	D2	7	11	10109	1.21	11/19/03 13:08	9.1	8355	166.3	85.1	0.0011	0.00053	0.001	51.31%	1.99%
BTC1119	D3	7	21	10051	1.19	11/19/03 13:11	17.6	8446	168.7	85.1	0.0021	0.00053	0.002	74.64%	2.00%
BTC1119	D4	7	22	10083	1.23	11/19/03 13:15	17.9	8198	163.5	85.1	0.0022	0.00053	0.002	75.72%	1.99%
BTC1119	A1	9	11	10061	1.23	11/19/03 13:25	8.9	8180	163.2	103.9	0.0011	0.000492	0.001	54.98%	2.00%
BTC1119	A2	9	17	10177	1.26	11/19/03 13:33	13.5	8077	160.3	103.9	0.0017	0.000492	0.001	70.53%	1.98%
BTC1119	A3	9	20	10070	1.24	11/19/03 13:37	16.1	8121	162.0	103.9	0.0020	0.000492	0.001	75.22%	2.00%
BTC1119	A4	9	18	10112	1.25	11/19/03 13:41	14.4	8090	161.0	103.9	0.0018	0.000492	0.001	72.35%	1.99%
BTC1119	B1	9	16	10109	1.21	11/19/03 13:44	13.2	8355	166.3	103.9	0.0016	0.000492	0.001	68.90%	1.99%
BTC1119	B2	9	13	10131	1.2	11/19/03 15:15	10.8	8443	167.9	103.9	0.0013	0.000492	0.001	61.64%	1.99%
BTC1119	B3	9	17	10020	1.2	11/19/03 15:20	14.2	8350	167.0	103.9	0.0017	0.000492	0.001	70.99%	2.00%
BTC1119	B4	9	10	10039	1.22	11/19/03 15:23	8.2	8229	164.3	103.9	0.0010	0.000492	0.001	50.59%	2.00%
BTC1119	C1	9	13	10029	1.21	11/19/03 12:44	10.7	8288	165.6	103.9	0.0013	0.000492	0.001	62.03%	2.00%
BTC1119	C2	9	6	10163	1.23	11/19/03 12:47	4.9	8263	164.0	103.9	0.0006	0.000492	0.000	16.63%	1.98%
BTC1119	C3	9	21	10071	1.2	11/19/03 12:51	17.5	8393	167.4	103.9	0.0021	0.000492	0.002	76.40%	2.00%
BTC1119	C4	9	10	10031	1.22	11/19/03 12:54	8.2	8222	164.3	103.9	0.0010	0.000492	0.001	50.63%	2.00%
BTC1119	D1	9	13	10111	1.2	11/19/03 12:58	10.8	8426	167.7	103.9	0.0013	0.000492	0.001	61.72%	1.99%
BTC1119	D2	9	16	10076	1.21	11/19/03 13:01	13.2	8327	166.0	103.9	0.0016	0.000492	0.001	69.00%	1.99%
BTC1119	D3	9	21	10099	1.2	11/19/03 13:05	17.5	8416	167.7	103.9	0.0021	0.000492	0.002	76.33%	1.99%
BTC1119	D4	9	25	10103	1.22	11/19/03 13:08	20.5	8281	165.0	103.9	0.0025	0.000492	0.002	80.11%	1.99%
BTC1119	A1	10	14	10064	1.23	11/19/03 13:22	11.4	8182	163.2	105.7	0.0014	0.000489	0.001	64.88%	2.00%
BTC1119	A2	10	13	10086	1.23	11/19/03 13:25	10.6	8200	163.4	105.7	0.0013	0.000489	0.001	62.09%	1.99%
BTC1119	A3	10	18	10105	1.24	11/19/03 13:33	14.5	8149	162.3	105.7	0.0018	0.000489	0.001	72.57%	1.99%
BTC1119	A4	10	15	10063	1.22	11/19/03 13:37	12.3	8248	164.6	105.7	0.0015	0.000489	0.001	67.22%	2.00%
BTC1119	B1	10	18	10103	1.19	11/19/03 13:41	15.1	8490	169.1	105.7	0.0018	0.000489	0.001	72.58%	1.99%
BTC1119	B2	10	15	10043	1.2	11/19/03 13:44	12.5	8369	167.1	105.7	0.0015	0.000489	0.001	67.29%	2.00%
BTC1119	B3	10	10	10141	1.22	11/19/03 15:15	8.2	8312	165.2	105.7	0.0010	0.000489	0.000	50.45%	1.99%
BTC1119	B4	10	7	10026	1.21	11/19/03 15:20	5.8	8286	165.6	105.7	0.0007	0.000489	0.000	30.02%	2.00%
BTC1119	C1	10	14	10075	1.2	11/19/03 15:23	11.7	8396	167.4	105.7	0.0014	0.000489	0.001	64.84%	1.99%
BTC1119	C2	10	12	10072	1.23	11/19/03 12:44	9.8	8189	163.3	105.7	0.0012	0.000489	0.001	58.99%	1.99%
BTC1119	C3	10	20	10040	1.2	11/19/03 12:47	16.7	8367	167.2	105.7	0.0020	0.000489	0.002	75.47%	2.00%
BTC1119	C4	10	17	10105	1.23	11/19/03 12:51	13.8	8215	163.6	105.7	0.0017	0.000489	0.001	70.96%	1.99%
BTC1119	D1	10	19	10037	1.19	11/19/03 12:54	16.0	8434	168.5	105.7	0.0019	0.000489	0.001	74.19%	2.00%
BTC1119	D2	10	8	10118	1.19	11/19/03 12:58	6.7	8503	169.1	105.7	0.0008	0.000489	0.000	38.20%	1.99%
BTC1119	D3	10	19	10057	1.21	11/19/03 13:01	15.7	8312	165.9	105.7	0.0019	0.000489	0.001	74.14%	2.00%

000219

Beta to Alpha Crosstalk Calibration Worksheet - LB4100AB

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
BTC1119	D4	10	17	10055	1.21	11/19/03 13:05	14.0	8310	165.9	105.7	0.0017	0.000489	0.001	71.10%	2.00%
BTC1119	A1	12	11	10071	1.24	11/19/03 13:15	8.9	8122	162.0	124.2	0.0011	0.000452	0.001	58.65%	1.99%
BTC1119	A2	12	17	10065	1.25	11/19/03 13:18	13.6	8052	160.7	124.2	0.0017	0.000452	0.001	73.26%	2.00%
BTC1119	A3	12	25	10143	1.25	11/19/03 13:22	20.0	8114	161.3	124.2	0.0025	0.000452	0.002	81.68%	1.99%
BTC1119	A4	12	21	10095	1.26	11/19/03 13:25	16.7	8012	159.6	124.2	0.0021	0.000452	0.002	78.29%	1.99%
BTC1119	B1	12	15	10087	1.22	11/19/03 13:33	12.3	8268	164.8	124.2	0.0015	0.000452	0.001	69.63%	1.99%
BTC1119	B2	12	19	10126	1.23	11/19/03 13:37	15.4	8233	163.8	124.2	0.0019	0.000452	0.001	75.93%	1.99%
BTC1119	B3	12	8	10146	1.24	11/19/03 13:41	6.5	8182	162.5	124.2	0.0008	0.000452	0.000	42.73%	1.99%
BTC1119	B4	12	13	10061	1.24	11/19/03 13:44	10.5	8114	161.9	124.2	0.0013	0.000452	0.001	65.05%	2.00%
BTC1119	C1	12	15	10048	1.22	11/19/03 15:15	12.3	8236	164.5	124.2	0.0015	0.000452	0.001	69.75%	2.00%
BTC1119	C2	12	15	10100	1.22	11/19/03 15:20	12.3	8279	164.9	124.2	0.0015	0.000452	0.001	69.59%	1.99%
BTC1119	C3	12	10	10031	1.23	11/19/03 15:23	8.1	8155	162.9	124.2	0.0010	0.000452	0.001	54.70%	2.00%
BTC1119	C4	12	7	10010	1.24	11/19/03 12:44	5.6	8073	161.4	124.2	0.0007	0.000452	0.000	35.42%	2.00%
BTC1119	D1	12	19	10023	1.22	11/19/03 12:47	15.6	8216	164.3	124.2	0.0019	0.000452	0.001	76.18%	2.00%
BTC1119	D2	12	12	10033	1.24	11/19/03 12:51	9.7	8091	161.7	124.2	0.0012	0.000452	0.001	62.24%	2.00%
BTC1119	D3	12	12	10022	1.2	11/19/03 12:54	10.0	8352	166.9	124.2	0.0012	0.000452	0.001	62.28%	2.00%
BTC1119	D4	12	20	10067	1.23	11/19/03 12:58	16.3	8185	163.3	124.2	0.0020	0.000452	0.002	77.27%	2.00%
BTC1119	A1	11	10	10034	1.23	11/19/03 13:18	8.1	8158	163.0	124.8	0.0010	0.00045	0.001	54.81%	2.00%
BTC1119	A2	11	20	10084	1.26	11/19/03 13:22	15.9	8003	159.6	124.8	0.0020	0.00045	0.002	77.29%	1.99%
BTC1119	A3	11	21	10039	1.24	11/19/03 13:25	16.9	8096	161.8	124.8	0.0021	0.00045	0.002	78.47%	2.00%
BTC1119	A4	11	17	10145	1.25	11/19/03 13:33	13.6	8116	161.3	124.8	0.0017	0.00045	0.001	73.12%	1.99%
BTC1119	B1	11	10	10041	1.19	11/19/03 13:37	8.4	8438	168.5	124.8	0.0010	0.00045	0.001	54.78%	2.00%
BTC1119	B2	11	19	10057	1.21	11/19/03 13:41	15.7	8312	165.9	124.8	0.0019	0.00045	0.001	76.16%	2.00%
BTC1119	B3	11	4	10147	1.21	11/19/03 13:44	3.3	8386	166.5	124.8	0.0004	0.00045	0.000	-14.26%	1.99%
BTC1119	B4	11	13	10007	1.24	11/19/03 15:15	10.5	8070	161.5	124.8	0.0013	0.00045	0.001	65.33%	2.00%
BTC1119	C1	11	18	10127	1.21	11/19/03 15:20	14.9	8369	166.5	124.8	0.0018	0.00045	0.001	74.66%	1.99%
BTC1119	C2	11	9	10050	1.21	11/19/03 15:23	7.4	8306	165.8	124.8	0.0009	0.00045	0.000	49.71%	2.00%
BTC1119	C3	11	19	10078	1.24	11/19/03 12:44	15.3	8127	162.1	124.8	0.0019	0.00045	0.001	76.11%	1.99%
BTC1119	C4	11	11	10051	1.21	11/19/03 12:47	9.1	8307	165.8	124.8	0.0011	0.00045	0.001	58.85%	2.00%
BTC1119	D1	11	10	10090	1.24	11/19/03 12:51	8.1	8137	162.1	124.8	0.0010	0.00045	0.001	54.55%	1.99%
BTC1119	D2	11	15	10154	1.22	11/19/03 12:54	12.3	8323	165.3	124.8	0.0015	0.00045	0.001	69.51%	1.99%
BTC1119	D3	11	15	10072	1.23	11/19/03 12:58	12.2	8189	163.3	124.8	0.0015	0.00045	0.001	69.76%	1.99%
BTC1119	D4	11	13	10090	1.24	11/19/03 13:01	10.5	8137	162.1	124.8	0.0013	0.00045	0.001	65.04%	1.99%
BTC1119	A1	14	14	10095	1.24	11/19/03 13:08	11.3	8141	162.2	144.8	0.0014	0.00041	0.001	70.41%	1.99%
BTC1119	A2	14	16	10055	1.26	11/19/03 13:11	12.7	7980	159.3	144.8	0.0016	0.00041	0.001	74.21%	2.00%

000220

Beta to Alpha Crosstalk Calibration Worksheet - LB4100AB

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
BTC1119	A3	14	21	10078	1.25	11/19/03 13:15	16.8	8062	160.8	144.8	0.0021	0.00041	0.002	80.30%	1.99%
BTC1119	A4	14	14	10066	1.27	11/19/03 13:18	11.0	7926	158.1	144.8	0.0014	0.00041	0.001	70.49%	1.99%
BTC1119	B1	14	16	10183	1.25	11/19/03 13:22	12.8	8146	161.6	144.8	0.0016	0.00041	0.001	73.88%	1.98%
BTC1119	B2	14	9	10048	1.21	11/19/03 13:25	7.4	8304	165.8	144.8	0.0009	0.00041	0.000	54.18%	2.00%
BTC1119	B3	14	14	10084	1.23	11/19/03 13:33	11.4	8198	163.4	144.8	0.0014	0.00041	0.001	70.44%	1.99%
BTC1119	B4	14	19	10153	1.23	11/19/03 13:37	15.4	8254	164.0	144.8	0.0019	0.00041	0.001	78.07%	1.99%
BTC1119	C1	14	13	10079	1.23	11/19/03 13:41	10.6	8194	163.3	144.8	0.0013	0.00041	0.001	68.18%	1.99%
BTC1119	C2	14	10	10097	1.24	11/19/03 13:44	8.1	8143	162.2	144.8	0.0010	0.00041	0.001	58.56%	1.99%
BTC1119	C3	14	17	10125	1.22	11/19/03 15:15	13.9	8299	165.1	144.8	0.0017	0.00041	0.001	75.56%	1.99%
BTC1119	C4	14	11	10107	1.24	11/19/03 15:20	8.9	8151	162.2	144.8	0.0011	0.00041	0.001	62.29%	1.99%
BTC1119	D1	14	23	10111	1.25	11/19/03 15:23	18.4	8089	161.1	144.8	0.0023	0.00041	0.002	81.96%	1.99%
BTC1119	D2	14	10	10073	1.24	11/19/03 12:44	8.1	8123	162.0	144.8	0.0010	0.00041	0.001	58.66%	1.99%
BTC1119	D3	14	12	10170	1.23	11/19/03 12:47	9.8	8268	164.1	144.8	0.0012	0.00041	0.001	65.22%	1.98%
BTC1119	D4	14	23	10067	1.24	11/19/03 12:51	18.5	8119	162.0	144.8	0.0023	0.00041	0.002	82.04%	2.00%
BTC1119	A1	13	16	10048	1.26	11/19/03 13:11	12.7	7975	159.2	146.3	0.0016	0.000407	0.001	74.42%	2.00%
BTC1119	A2	13	12	10050	1.26	11/19/03 13:15	9.5	7976	159.2	146.3	0.0012	0.000407	0.001	65.88%	2.00%
BTC1119	A3	13	13	10104	1.27	11/19/03 13:18	10.2	7956	158.4	146.3	0.0013	0.000407	0.001	68.34%	1.99%
BTC1119	A4	13	21	10061	1.23	11/19/03 13:22	17.1	8180	163.3	146.3	0.0021	0.000407	0.002	80.48%	2.00%
BTC1119	B1	13	16	10095	1.21	11/19/03 13:25	13.2	8343	166.2	146.3	0.0016	0.000407	0.001	74.30%	1.99%
BTC1119	B2	13	21	10097	1.22	11/19/03 13:33	17.2	8276	164.9	146.3	0.0021	0.000407	0.002	80.41%	1.99%
BTC1119	B3	13	7	10092	1.21	11/19/03 13:37	5.8	8340	166.1	146.3	0.0007	0.000407	0.000	41.26%	1.99%
BTC1119	B4	13	12	10090	1.22	11/19/03 13:41	9.8	8270	164.8	146.3	0.0012	0.000407	0.001	65.74%	1.99%
BTC1119	C1	13	12	10106	1.23	11/19/03 13:44	9.8	8216	163.6	146.3	0.0012	0.000407	0.001	65.69%	1.99%
BTC1119	C2	13	20	10052	1.23	11/19/03 15:15	16.3	8172	163.2	146.3	0.0020	0.000407	0.002	79.52%	2.00%
BTC1119	C3	13	11	10130	1.23	11/19/03 15:20	8.9	8236	163.7	146.3	0.0011	0.000407	0.001	62.48%	1.99%
BTC1119	C4	13	10	10065	1.2	11/19/03 15:23	8.3	8388	167.3	146.3	0.0010	0.000407	0.001	59.00%	1.99%
BTC1119	D1	13	18	10019	1.23	11/19/03 12:44	14.6	8146	162.9	146.3	0.0018	0.000407	0.001	77.32%	2.00%
BTC1119	D2	13	16	10083	1.22	11/19/03 12:47	13.1	8265	164.7	146.3	0.0016	0.000407	0.001	74.33%	1.99%
BTC1119	D3	13	16	10085	1.2	11/19/03 12:51	13.3	8404	167.5	146.3	0.0016	0.000407	0.001	74.32%	1.99%
BTC1119	D4	13	27	10040	1.24	11/19/03 12:54	21.8	8097	161.8	146.3	0.0027	0.000407	0.002	84.85%	2.00%
BTC1119	A1	15	13	10035	1.28	11/19/03 13:05	10.2	7840	156.6	166.1	0.0013	0.000368	0.001	71.61%	2.00%
BTC1119	A2	15	9	10054	1.28	11/19/03 13:08	7.0	7855	156.7	166.1	0.0009	0.000368	0.001	58.91%	2.00%
BTC1119	A3	15	16	10016	1.24	11/19/03 13:11	12.9	8077	161.5	166.1	0.0016	0.000368	0.001	76.98%	2.00%
BTC1119	A4	15	11	10006	1.27	11/19/03 13:15	8.7	7879	157.6	166.1	0.0011	0.000368	0.001	66.54%	2.00%
BTC1119	B1	15	17	10089	1.22	11/19/03 13:18	13.9	8270	164.8	166.1	0.0017	0.000368	0.001	78.17%	1.99%

000221

Beta to Alpha Crosstalk Calibration Worksheet - LB4100AB

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
BTC1119	B2	15	21	10091	1.24	11/19/03 13:22	16.9	8138	162.2	166.1	0.0021	0.000368	0.002	82.33%	1.99%
BTC1119	B3	15	9	10087	1.23	11/19/03 13:25	7.3	8201	163.4	166.1	0.0009	0.000368	0.001	58.78%	1.99%
BTC1119	B4	15	16	10074	1.25	11/19/03 13:33	12.8	8059	160.7	166.1	0.0016	0.000368	0.001	76.84%	1.99%
BTC1119	C1	15	16	10148	1.26	11/19/03 13:37	12.7	8054	160.0	166.1	0.0016	0.000368	0.001	76.67%	1.99%
BTC1119	C2	15	13	10135	1.25	11/19/03 13:41	10.4	8108	161.2	166.1	0.0013	0.000368	0.001	71.33%	1.99%
BTC1119	C3	15	10	10095	1.27	11/19/03 13:44	7.9	7949	158.3	166.1	0.0010	0.000368	0.001	62.87%	1.99%
BTC1119	C4	15	7	10119	1.27	11/19/03 15:15	5.5	7968	158.5	166.1	0.0007	0.000368	0.000	46.83%	1.99%
BTC1119	D1	15	15	10107	1.25	11/19/03 15:20	12.0	8086	161.0	166.1	0.0015	0.000368	0.001	75.22%	1.99%
BTC1119	D2	15	13	10045	1.25	11/19/03 15:23	10.4	8036	160.5	166.1	0.0013	0.000368	0.001	71.58%	2.00%
BTC1119	D3	15	11	10041	1.25	11/19/03 12:44	8.8	8033	160.4	166.1	0.0011	0.000368	0.001	66.43%	2.00%
BTC1119	D4	15	15	10068	1.27	11/19/03 12:47	11.8	7928	158.1	166.1	0.0015	0.000368	0.001	75.31%	1.99%
BTC1119	A1	16	11	10082	1.28	11/19/03 13:01	8.6	7877	157.0	168.7	0.0011	0.000363	0.001	66.77%	1.99%
BTC1119	A2	16	20	10113	1.29	11/19/03 13:05	15.5	7840	156.1	168.7	0.0020	0.000363	0.002	81.67%	1.99%
BTC1119	A3	16	16	10032	1.27	11/19/03 13:08	12.6	7899	157.9	168.7	0.0016	0.000363	0.001	77.26%	2.00%
BTC1119	A4	16	15	10001	1.27	11/19/03 13:11	11.8	7875	157.6	168.7	0.0015	0.000363	0.001	75.82%	2.00%
BTC1119	B1	16	17	10050	1.24	11/19/03 13:15	13.7	8105	161.8	168.7	0.0017	0.000363	0.001	78.56%	2.00%
BTC1119	B2	16	19	10042	1.24	11/19/03 13:18	15.3	8098	161.8	168.7	0.0019	0.000363	0.002	80.84%	2.00%
BTC1119	B3	16	9	10032	1.27	11/19/03 13:22	7.1	7899	157.8	168.7	0.0009	0.000363	0.001	59.58%	2.00%
BTC1119	B4	16	20	10035	1.27	11/19/03 13:25	15.7	7902	157.9	168.7	0.0020	0.000363	0.002	81.81%	2.00%
BTC1119	C1	16	16	10035	1.28	11/19/03 13:33	12.5	7840	156.6	168.7	0.0016	0.000363	0.001	77.26%	2.00%
BTC1119	C2	16	18	10078	1.28	11/19/03 13:37	14.1	7873	157.0	168.7	0.0018	0.000363	0.001	79.70%	1.99%
BTC1119	C3	16	19	10122	1.26	11/19/03 13:41	15.1	8033	159.8	168.7	0.0019	0.000363	0.002	80.68%	1.99%
BTC1119	C4	16	16	10099	1.29	11/19/03 13:44	12.4	7829	155.9	168.7	0.0016	0.000363	0.001	77.11%	1.99%
BTC1119	D1	16	18	10111	1.28	11/19/03 15:16	14.1	7899	157.3	168.7	0.0018	0.000363	0.001	79.63%	1.99%
BTC1119	D2	16	13	10070	1.27	11/19/03 15:20	10.2	7929	158.1	168.7	0.0013	0.000363	0.001	71.91%	1.99%
BTC1119	D3	16	21	10060	1.24	11/19/03 15:23	16.9	8113	161.9	168.7	0.0021	0.000363	0.002	82.63%	2.00%
BTC1119	D4	16	20	10019	1.26	11/19/03 12:44	15.9	7952	159.0	168.7	0.0020	0.000363	0.002	81.84%	2.00%
BTC1119	A1	17	10	10090	1.27	11/19/03 12:58	7.9	7945	158.3	186	0.0010	0.000328	0.001	66.90%	1.99%
BTC1119	A2	17	17	10044	1.29	11/19/03 13:01	13.2	7786	155.5	186	0.0017	0.000328	0.001	80.62%	2.00%
BTC1119	A3	17	14	10094	1.29	11/19/03 13:05	10.9	7825	155.9	186	0.0014	0.000328	0.001	76.35%	1.99%
BTC1119	A4	17	19	10048	1.28	11/19/03 13:08	14.8	7850	156.8	186	0.0019	0.000328	0.002	82.65%	2.00%
BTC1119	B1	17	13	10152	1.24	11/19/03 13:11	10.5	8187	162.6	186	0.0013	0.000328	0.001	74.39%	1.99%
BTC1119	B2	17	15	10159	1.25	11/19/03 13:15	12.0	8127	161.4	186	0.0015	0.000328	0.001	77.79%	1.99%
BTC1119	B3	17	6	10017	1.25	11/19/03 13:18	4.8	8014	160.2	186	0.0006	0.000328	0.000	45.24%	2.00%
BTC1119	B4	17	10	10062	1.24	11/19/03 13:22	8.1	8115	161.9	186	0.0010	0.000328	0.001	67.00%	1.99%

00022

Beta to Alpha Crosstalk Calibration Worksheet - LB4100A B

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
BTC1119	C1	17	15	10109	1.26	11/19/03 13:25	11.9	8023	159.7	186	0.0015	0.000328	0.001	77.89%	1.99%
BTC1119	C2	17	12	10078	1.25	11/19/03 13:33	9.6	8062	160.7	186	0.0012	0.000328	0.001	72.45%	1.99%
BTC1119	C3	17	20	10051	1.27	11/19/03 13:37	15.7	7914	158.0	186	0.0020	0.000328	0.002	83.52%	2.00%
BTC1119	C4	17	8	10053	1.24	11/19/03 13:41	6.5	8107	161.8	186	0.0008	0.000328	0.000	58.78%	2.00%
BTC1119	D1	17	15	10063	1.28	11/19/03 13:44	11.7	7862	156.9	186	0.0015	0.000328	0.001	78.00%	2.00%
BTC1119	D2	17	11	10103	1.24	11/19/03 15:15	8.9	8148	162.2	186	0.0011	0.000328	0.001	69.87%	1.99%
BTC1119	D3	17	16	10126	1.23	11/19/03 15:20	13.0	8233	163.8	186	0.0016	0.000328	0.001	79.24%	1.99%
BTC1119	D4	17	19	10046	1.25	11/19/03 15:23	15.2	8037	160.5	186	0.0019	0.000328	0.002	82.66%	2.00%
BTC1119	A1	18	12	10025	1.28	11/19/03 12:54	9.4	7832	156.5	186.3	0.0012	0.000327	0.001	72.65%	2.00%
BTC1119	A2	18	15	10119	1.27	11/19/03 12:58	11.8	7968	158.5	186.3	0.0015	0.000327	0.001	77.91%	1.99%
BTC1119	A3	18	20	10138	1.27	11/19/03 13:01	15.7	7983	158.7	186.3	0.0020	0.000327	0.002	83.40%	1.99%
BTC1119	A4	18	13	10044	1.26	11/19/03 13:05	10.3	7971	159.2	186.3	0.0013	0.000327	0.001	74.70%	2.00%
BTC1119	B1	18	14	10097	1.23	11/19/03 13:08	11.4	8209	163.5	186.3	0.0014	0.000327	0.001	76.39%	1.99%
BTC1119	B2	18	13	10090	1.26	11/19/03 13:11	10.3	8008	159.5	186.3	0.0013	0.000327	0.001	74.59%	1.99%
BTC1119	B3	18	9	10200	1.24	11/19/03 13:15	7.3	8226	163.0	186.3	0.0009	0.000327	0.001	62.89%	1.98%
BTC1119	B4	18	15	10040	1.26	11/19/03 13:18	11.9	7968	159.2	186.3	0.0015	0.000327	0.001	78.09%	2.00%
BTC1119	C1	18	15	10059	1.25	11/19/03 13:22	12.0	8047	160.6	186.3	0.0015	0.000327	0.001	78.04%	2.00%
BTC1119	C2	18	19	10106	1.27	11/19/03 13:25	15.0	7957	158.5	186.3	0.0019	0.000327	0.002	82.59%	1.99%
BTC1119	C3	18	14	10061	1.24	11/19/03 13:33	11.3	8114	161.9	186.3	0.0014	0.000327	0.001	76.47%	2.00%
BTC1119	C4	18	11	10080	1.25	11/19/03 13:37	8.8	8064	160.7	186.3	0.0011	0.000327	0.001	70.00%	1.99%
BTC1119	D1	18	15	10047	1.26	11/19/03 13:41	11.9	7974	159.2	186.3	0.0015	0.000327	0.001	78.07%	2.00%
BTC1119	D2	18	8	10112	1.26	11/19/03 13:44	6.3	8025	159.7	186.3	0.0008	0.000327	0.000	58.62%	1.99%
BTC1119	D3	18	15	10084	1.24	11/19/03 15:15	12.1	8132	162.1	186.3	0.0015	0.000327	0.001	77.99%	1.99%
BTC1119	D4	18	11	10046	1.26	11/19/03 15:20	8.7	7973	159.2	186.3	0.0011	0.000327	0.001	70.10%	2.00%
BTC1119	A1	19	12	10060	1.33	11/19/03 12:51	9.0	7564	150.9	214.9	0.0012	0.00027	0.001	77.35%	2.00%
BTC1119	A2	19	12	10040	1.34	11/19/03 12:54	9.0	7493	149.6	214.9	0.0012	0.00027	0.001	77.39%	2.00%
BTC1119	A3	19	11	10073	1.31	11/19/03 12:58	8.4	7689	153.3	214.9	0.0011	0.00027	0.001	75.26%	1.99%
BTC1119	A4	19	16	10053	1.34	11/19/03 13:01	11.9	7502	149.8	214.9	0.0016	0.00027	0.001	83.02%	2.00%
BTC1119	B1	19	13	10078	1.3	11/19/03 13:05	10.0	7752	154.5	214.9	0.0013	0.00027	0.001	79.05%	1.99%
BTC1119	B2	19	14	10029	1.28	11/19/03 13:08	10.9	7835	156.6	214.9	0.0014	0.00027	0.001	80.64%	2.00%
BTC1119	B3	19	7	10032	1.29	11/19/03 13:11	5.4	7777	155.3	214.9	0.0007	0.00027	0.000	61.28%	2.00%
BTC1119	B4	19	13	10035	1.3	11/19/03 13:15	10.0	7719	154.2	214.9	0.0013	0.00027	0.001	79.14%	2.00%
BTC1119	C1	19	16	10008	1.29	11/19/03 13:18	12.4	7758	155.2	214.9	0.0016	0.00027	0.001	83.10%	2.00%
BTC1119	C2	19	9	10031	1.31	11/19/03 13:22	6.9	7657	153.0	214.9	0.0009	0.00027	0.001	69.88%	2.00%
BTC1119	C3	19	12	10056	1.29	11/19/03 13:25	9.3	7795	155.6	214.9	0.0012	0.00027	0.001	77.36%	2.00%

000223

Beta to Alpha Crosstalk Calibration Worksheet - LB4100A B

Crosstalk equation
y=bx+m
b: -2.000E-06
m: 0.0007

Standard ID 514.1572.72
Cert Act (pCi/g) 4969.8
To 3/18/99
Act. at Ct. Date 4437.76
4437.75

File ID	Detector ID	w.o. 02-23-010 Sample ID	Alpha cnts	Beta cnts	Count Time min	TOD	Alpha cpm	Beta cpm	Composite 2s CntUnc CPM	Mass mg	Crosstalk a->b actual	Crosstalk a->b fitted	Crosstalk a->b abs dev	Crosstalk a->b %diff	Crosstalk Count Uncertainty
BTC1119	C4	19	12	10087	1.31	11/19/03 13:33	9.2	7700	153.4	214.9	0.0012	0.00027	0.001	77.29%	1.99%
BTC1119	D1	19	15	10087	1.32	11/19/03 13:38	11.4	7642	152.3	214.9	0.0015	0.00027	0.001	81.83%	1.99%
BTC1119	D2	19	16	10047	1.29	11/19/03 13:42	12.4	7788	155.5	214.9	0.0016	0.00027	0.001	83.03%	2.00%
BTC1119	D3	19	19	10059	1.28	11/19/03 13:44	14.8	7859	156.9	214.9	0.0019	0.00027	0.002	85.70%	2.00%
BTC1119	D4	19	18	10017	1.31	11/19/03 15:16	13.7	7647	152.9	214.9	0.0018	0.00027	0.002	84.96%	2.00%
BTC1119	A1	20	15	10021	1.35	11/19/03 12:47	11.1	7423	148.4	218.2	0.0015	0.000264	0.001	82.39%	2.00%
BTC1119	A2	20	16	10065	1.33	11/19/03 12:51	12.0	7568	151.0	218.2	0.0016	0.000264	0.001	83.42%	2.00%
BTC1119	A3	20	19	10024	1.34	11/19/03 12:54	14.2	7481	149.6	218.2	0.0019	0.000264	0.002	86.09%	2.00%
BTC1119	A4	20	14	10038	1.33	11/19/03 12:58	10.5	7547	150.8	218.2	0.0014	0.000264	0.001	81.10%	2.00%
BTC1119	B1	20	5	10014	1.29	11/19/03 13:01	3.9	7763	155.2	218.2	0.0005	0.000264	0.000	47.21%	2.00%
BTC1119	B2	20	12	10110	1.31	11/19/03 13:05	9.2	7718	153.6	218.2	0.0012	0.000264	0.001	77.79%	1.99%
BTC1119	B3	20	17	10081	1.32	11/19/03 13:08	12.9	7637	152.3	218.2	0.0017	0.000264	0.001	84.37%	1.99%
BTC1119	B4	20	12	10062	1.34	11/19/03 13:12	9.0	7509	149.8	218.2	0.0012	0.000264	0.001	77.90%	2.00%
BTC1119	C1	20	14	10015	1.28	11/19/03 13:15	10.9	7824	156.5	218.2	0.0014	0.000264	0.001	81.14%	2.00%
BTC1119	C2	20	13	10053	1.32	11/19/03 13:18	9.8	7616	152.0	218.2	0.0013	0.000264	0.001	79.62%	2.00%
BTC1119	C3	20	9	10037	1.31	11/19/03 13:22	6.9	7662	153.0	218.2	0.0009	0.000264	0.001	70.60%	2.00%
BTC1119	C4	20	9	10057	1.3	11/19/03 13:25	6.9	7736	154.4	218.2	0.0009	0.000264	0.001	70.54%	2.00%
BTC1119	D1	20	17	10034	1.29	11/19/03 13:33	13.2	7778	155.4	218.2	0.0017	0.000264	0.001	84.44%	2.00%
BTC1119	D2	20	15	10115	1.3	11/19/03 13:38	11.5	7781	154.8	218.2	0.0015	0.000264	0.001	82.22%	1.99%
BTC1119	D3	20	20	10084	1.29	11/19/03 13:42	15.5	7817	155.8	218.2	0.0020	0.000264	0.002	86.71%	1.99%
BTC1119	D4	20	20	10037	1.31	11/19/03 13:44	15.3	7662	153.1	218.2	0.0020	0.000264	0.002	86.77%	2.00%

002224

PROJECT LB4100-B

11/19/03
JE

Beta Attenuation Curve (Sr-90)
Sr-90 on ringed planchets

Benchsheet: 23010SR.XLS File name: BTC1119

Det X	1243	1246	1249	1253	1256	1300	1303	1306	1310	1313	1316	1320	1324	1331	1336	1340	1343	1346	1518	1522
1	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
2	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3
3	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4
4	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5
5	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6
6	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8	7
7	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9	8
8	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10	9
9	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11	10
10	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12	11
11	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13	12
12	12	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14	13
13	13	12	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15	14
14	14	13	12	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16	15
15	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17	16
16	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	20	19	18	17

12/1/03

Continued on Page

Read and Understood By

Clare Lenich 12/1/03
Signed Date

Lilie Ellingson 12/1/03
Signed Date

265846

pg _____ a
(cont. from pg NA b)

Paragon Analytics, Inc.

Low Background Gas Flow Proportional Counter Log

Instrument: LB4100B

SOP 724 Rev 9

Date: JE 11/19/03

Instrument Background and Response Checklist

P-10 Supply	P-10 Flow
1 1000	A 0.1
2 0	B
	C
	D

Bkg.	Cal. File ID
Dr A	BKB1116W
Dr B	
Dr C	
Dr D	

Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On line	Det	DR 1	DR 2	DR Stat	cmnt	Bkg 1	Bkg 2	Bkg Stat	cmnt	On-line
1	JE		P		JE		P		✓	9	JE		P		JE		P		✓
2									✓	10									✓
3									✓	11									✓
4									✓	12									✓
5									✓	13					JE		P		✓
6									✓	14									✓
7									✓	15									✓
8									✓	16									✓

P = passes; R = Recount, H = high; L = low; W = weekly; α = Alpha; B = Beta; DR = Daily Response Check; Stat = Status; Det = Detector; Bkg = Background; OL = Offline; NP = Not Processed.

Runlog

Det	SmpID	Batch	Test	File ID	Cnt Dur. (minutes)	Start Time	Anal. Init.	Outp .Init.	Outp. Date	Cmnt Below
1-16	DR Checks	NA	NA	EFB1119	30	0914	JE	JE	11/19/03	NA
1-16	BKG Checks	NA	NA	BKB1119	60	0938	JE	JE	11/19/03	
13-16	BKG Checks	NA	NA	BKB1119A	60	1128	JE	JE	11/19/03	
1-16	6223010-1920	23010SR.XLS	Sr-90 Check	ATBTC1119	5/step	1243	JE	JE	11/19/03	

11/20/03 JE

Reviewed by JE Date 11/20/03

Form 780r6.frm (4/6/2001)

Comments:

000226

Sr 90 Mass Attenuation Curve

Analyst: JRK
Prep. Date:S. 11/13/02
Prep. Date:C

Analytical Balance No:13
SOP Used:702 Rev15

Data Filename:
Count Date/Time:

W.O.#	Sample #	Gravimetric Aliquot Determination Tare PC (g)	Gross PC (g)	Solid Mass (g)	Remarks	CAR GRP	Pos Car No.	POS Ckd by
0223010	1	9.0609	9.0778	16.9	0.3 ml Salt Used			
0223010	2	9.0665	9.084	17.5	0.3 ml Salt Used			
0223010	3	9.0579	9.098	40.1	0.7 ml Salt Used			
0223010	4	9.0563	9.0963	40	0.7 ml Salt Used			
0223010	5	9.0778	9.1396	61.8	1.1 ml Salt Used			
0223010	6	9.1144	9.1786	64.2	1.1 ml Salt Used			
0223010	7	9.0731	9.1582	85.1	1.5 ml Salt Used			
0223010	8	9.059	9.1428	83.8	1.5 ml Salt Used			
0223010	9	9.0622	9.1661	103.9	1.9 ml Salt Used			
0223010	10	9.0717	9.1774	105.7	1.9 ml Salt Used			
0223010	11	9.0634	9.1882	124.8	2.3 ml Salt Used			
0223010	12	9.0671	9.1913	124.2	2.3 ml Salt Used			
0223010	13	9.0761	9.2224	146.3	2.7 ml Salt Used			
0223010	14	9.0851	9.2299	144.8	2.7 ml Salt Used			
0223010	15	9.0872	9.2533	166.1	3.1 ml Salt Used			
0223010	16	9.0635	9.2322	168.7	3.1 ml Salt Used			
0223010	17	9.0622	9.2482	186	3.5 ml Salt Used			
0223010	18	9.082	9.2683	186.3	3.5 ml Salt Used			
0223010	19	9.0549	9.2698	214.9	3.9 ml Salt Used			
0223010	20	9.0719	9.2901	218.2	3.9 ml Salt Used			

Std. No.	Std. Type	Spike Vol (ml)	Spike Act./ml
514.1572.72	Sr-90	1.0	11033.0

Spiked by: JRK 11/13/02
Spike Witness: NT 11/13/02
Reviewed by: [illegible] 11/13/02

000227

11/14/02.....10:42 AM

R/BENCH-SH/23010SR.XLS

Sr 90 Mass Attenuation Curve

DRAFT

Analyst: _____

Prep. Date:S. _____

Prep. Date:C

Analytical Balance No:13

SOP Used:702 Rev15

Data Filename: _____

Count Date/Time:

W.O.#	Sample #	Gravimetric Aliquot Determination Tare PC (g)	Gross PC (g)	Solid Mass (g)	Remarks	CAR GRP	Pos Car No.	POS Ckd by
0223010	1	9.0609		-9060.9	11/13 @ 1200			
0223010	1-D1	9.0665		-9066.5				
0223010	2	9.0579		-9057.9				
0223010	2-D1	9.0563		-9056.3				
0223010	3	9.0778		-9077.8				
0223010	2-D1	9.1144		-9114.4				
0223010	4	9.0731		-9073.1				
0223010	4-D1	9.059		-9059				
0223010	5	9.0622		-9062.2				
0223010	5-D1	9.0717		-9071.7				
0223010	6	9.0634		-9063.4				
0223010	6-D1	9.0671		-9067.1				
0223010	7	9.0761		-9076.1				
0223010	7-D1	9.0851		-9085.1				
0223010	8	9.0872		-9087.2				
0223010	8-D1	9.0635		-9063.5				
0223010	9	9.0622		-9062.2				
0223010	9-D1	9.082		-9082				
0223010	10	9.0549		-9054.9				
0223010	10-D1	9.0719		-9071.9				

Std. No.	Std. Type	Spike Vol (ml)	Spike Act./ml
514.1572.72	Sr-90	1.0	11033.0

Spiked by: RK 11/13/02

Spike Witness: NT 11/13/02

11/13/02.....9:25 AM

R/BENCH-SH/23010SR.XLS

000228

Paragon Analytics, Inc.

QUALITY ASSURANCE SUMMARY SHEET

PAI W.O. # / BATCH 0223010

TEST

246143 METHOD Sr 90 Mass Attenuation

SOP/REV (PREP) 702 R15

SOP/REV (ANAL)

Briefly document any QA or other problems or deviations associated with the analysis of samples. Problems could result from: log-in, color, odor, dilution, consistency, scheduling, equipment, or instrumentation, or may include documentation of minor deviations necessary due to unique DQO's or sample characteristics.

JRK 11/14/02

JRK 11/14/02

Work order number 0223010 was used for a Sr90 mass attenuation curve. It was found that 10 mg of salt was approx. 0.3 ml of solution and 15 mg was approx. 0.4 ml. A range of 10 ringed planchets was created with 0.3 ml salt solution and increasing in 0.4 ml increments. A duplicate for each planchet was also created. Each planchet was spiked with approx. 11,000 dpm of Sr90 standard. The salt and Sr90 solution was converted to a nitric system with 5 ml concentrated nitric acid. It was then dried down and the steam bath and dissolved in 1N nitric acid. The samples where then transferred to the labeled planchets and dried down on the hot plate. The ringed planchets where then weighed and submitted for counting.

JRK 11/14/02

JRK 11/14/02

JRK 11/14/02

TECHNICIAN/ANALYST [signature] DATE 11/14/02

DEPARTMENT MANAGER [signature] DATE 11/14/02

FORM 302r5.FRM (04/30/01)

72
PROJECT 514.1572.72

Notebook No. _____
Continued From Page _____

S-90 Primary Standard

1) Transfer RSO# 514 (Analytics 57370-307) to a a 250 ml poly bottle + dilute to final conc. of approx 5000 pCi/ml w/ 0.1 M HCl.

a) Ampule, full w/ beaker 36.5911 g (Bal 12)
Ampule, empty w/ beaker 31.7310
Net std. transferred 4.8601 g

b) 250 ml poly, empty 26.4116 g (Bal 12)
bottle w/ std, 0.1 M HCl 223.6 g (Bal 16)
Total diluted std mass 197.2 g

2) Density of 0.1 M HCl using 100 ml class A flask.

99.7100 g / 100 ml = .9971 g/ml.

3) Calculations

orig. std: $\left(\frac{3.757E4 \text{ dps}}{5.02081 \text{ g}}\right)\left(\frac{60 \text{ s/m}}{2.22 \text{ dpm/pCi}}\right) = 202{,}239.4$ pCi/g

dil. std by mass $\frac{(202{,}239.4 \text{ pCi/g})(4.8601 \text{ g})}{(197.2 \text{ g})} = 4984.3$ pCi/g

dil std by vol (4984.3 pCi/g)(.9971 g/ml) = 4969.8 pCi/ml.

Ref Date = 3/18/99
Exp Date = 3/23/04

Verified 3/25/99 DCB

Continued on Page

Read and Understood By

[signature] 3/23/99 [signature] 3/24/99

Signed Date Signed Date

000230

ANALYTICS

DAI 514
rcd 3-23-99

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.
Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

57370-307

Sr-90 5 mL Liquid in Flame Sealed Vial

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.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ISOTOPE:	Sr-90
ACTIVITY (dps):	3.757 E+04
HALF-LIFE:	28.74 years
CALIBRATION DATE:	March 18, 1999 12:00 EST
TOTAL UNCERTAINTY:	4.0%
SYSTEMATIC:	3.5%
RANDOM:	0.5%

5.02081 grams of solution 30 ppm Sr carrier in 0.1M HCl.

P O NUMBER 22170, Item 2

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

Q A APPROVED: _____ 3-18-99

STANDARD VERIFICATION FORM

Code #: 514.1572.72 Name of Standard: Sr 90 - Primary Std

Date: 3/24/99 Analyst: DCB / BP

Aliquot for verification: 3ea - 1ml std on a ringed planchet

Work up: Std. converted to HNO_3 matrix in glass beaker + quantitatively transferred to planchet. See attached benchsheet.

Expected activity and uncertainty: 4969.8 ± 198.8 pCi/ml

Results of Counting and counting uncertainty: 4821 ± 60.8 pCi/ml
(= 97.01 % of expected value)

Radiochemistry Technical Manager: David C Burns Date: 3/25/99

Radiochemistry QA Manager: [signature] Date: 3/25/99

Standard Verification for Sr 90

Analyst: KH P

Prep. Date: 3/24/99

Prep. Date: 3/24/99

Data Filename: WAT0323A

Count Date/Time: 3/24/99

W.O.#	Sample #	Aliquot ML	Final Gross PC (g)	Final Solid Mass (mg)	Filtered or Unfiltered	Remarks	CAR GRP	Pos Car No.	POS Ckd by
99-15-019	1	1	NA	NA	NA			7	CM
99-15-019	2	1	NA	NA	NA			8	
99-15-019	3	1	NA	NA	NA			9	

Std. NO:	Std. type	Pipet Used	Vol. mL
514.1572.72	Sr-90	RS-009	1.0043

KH 3-30-99

Spike Witne BP 3/24/99

Reviewed b KH 3/24/99

Relinquishe KH 3/24/99

Received by: CM 3/24/99

3/24/99.....12:48 PM

R/BENCH-SH/15019STD.XLS

000233

PAI - Gross Alpha/Beta in Water Sample Analysis

Unit Type: LB4100/W
Counting Unit ID: Orange

Alpha efficiency logfile: AM241RNG
Alpha attenuation calibration: ATAM518R.XLD
Certainty level for MDA and flags: 95.00%
High Voltage Mode: Simultaneous

Beta Calibration Factors
Beta mM: 0.999056
polyn. a=>B xtalk A: 6.574E-06
polyn. a=>B xtalk B: -8.291E-04
polyn. a=>B xtalk C: 3.086E-01
Alpha mM 0.991587892
polyn. B=>a xtalk A: -2.353E-09
polyn. B=>a xtalk B: 3.880E-08
polyn. B=>a xtalk C: 7.064E-04

Beta efficiency logfile: SR90RJNG
Beta attenuation calibration: AT520SRY.XLD
Application Revision: C
Application Version: PAI

Offsets per QASS 151168
alpha B= 1.00000
beta B= 1.00000

Data file name: WAT0323a
Batch ID: 15021std, 15
Count Duration (m): 10
Batch Ended: #########
Activity Units: pCi
Date of Bkg. Cal: 3/19/99

Rev. 6/2/98 rts

Det. ID	Sample ID	Count End Date & Time	Count Duration (min)	Resid. Mass (mg)	Sample Volume (g / L)	Alpha Activity Gross CPM	Alpha Activity Activity Concentration	Alpha Activity 2σ	Alpha Activity MDC	Beta Activity Gross CPM	Beta Activity Activity Concentration	Beta Activity MDC	Alpha Calibrations bkg CPM	Alpha Calibrations effM	Alpha Calibrations b=>a x-tlk (fract.)	Beta Calibrations bkg CPM	Beta Calibrations effM	Beta Calibrations a=>b x-tlk (fract.)
C1	99-15-019-03	3/24/99 14:27	10.00	0.0	0.0010	6.900	-185.271	4037.160	7271.774	9786.200	9615332.110	3184.991	0.0930	0.25678	0.00071	1.9480	0.45630	0.30861
A1	99-15-021-01	3/24/99 14:27	10.00	0.0	0.0010	2794.000	4950611.388	58077.031	2910.358	974.400	109585.582	43421.997	0.1810	0.25306	0.00071	2.3400	0.44941	0.30861
A2	99-15-021-02	3/24/99 14:27	10.00	0.0	0.0010	2811.300	5024686.758	58765.180	2978.879	1037.900	167552.471	43428.023	0.1670	0.25087	0.00071	1.9640	0.45063	0.30861
A3	99-15-021-03	3/24/99 14:27	10.00	0.0	0.0010	2806.700	4982226.619	58315.123	2902.748	1001.000	132409.235	43492.575	0.1530	0.25259	0.00071	2.0880	0.44963	0.30861
B3	99-15-019-01	3/24/99 14:28	10.00	0.0	0.0010	5.200	-3032.660	3944.621	7553.667	9550.300	9686761.655	3089.243	0.1080	0.24469	0.00071	1.9530	0.44204	0.30861
B4	99-15-019-02	3/24/99 14:28	10.00	0.0	0.0010	4.400	-4548.044	3702.056	7356.203	9693.000	9623989.176	2900.815	0.1200	0.25318	0.00071	1.8890	0.45159	0.30861

Average Am Act.= 4.986E+06 pCi/l
Average Am Unc.= 5.839E+04 pCi/l (2 sigma)

Expected Am Act.= 5.000E+06

Relative Recovey= 99.72%

Average Sr/Y Act.= 9.642E+06 pCi/l
Average Sr/Y Unc.= 6.079E+04 pCi/l (2 sigma)

Expected Sr/Y Act.= 9.940E+06

Relative Recovey= 97.01%

000234