# Paragon Analytics
## Radiochemistry Case Narrative
## Gross Alpha/Beta

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## Cordilleran Compliance Services, Inc.
### Rulison Area Well monitoring
PA WO 0811110

1. This report consists of the analytical results and supporting documentation for two water samples received by Paragon on 11/14/08.
2. These samples were prepared according to Paragon Analytics procedures PA SOP702R19.
3. The samples were analyzed for gross alpha and beta activity by gas flow proportional counting according to Paragon Analytics procedure SOP724R10. The analyses were completed on 12/08/08. 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. The samples were flamed, as prescribed in EPA Methods 900.0 and 9310 for samples that demonstrate hygroscopicity. This could reduce the beta activity if the samples contained $^{137}$Cs, or other beta emitters, that may be volatile under the conditions associated with flaming.
6. The requested MDC for these samples was not achieved due to the presence of elevated levels of dissolved / suspended solids native to the samples. The requested method limits the amount of sample solids residue taken for analysis to 5 mg/cm$^2$. If desired, alternative methodologies for gross alpha are available this can generally address solids interference in water samples. These samples are identified with an "M" or "M3" qualifier on the final reports. The reported gross alpha/beta activity for samples with an "M3" qualifier exceeds the achieved MDC.
7. No further anomalous situations were encountered during the preparation or analysis of these samples. All remaining 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.

Rhonda Miller — 12/10/08
Rhonda Miller
Radiochemistry Primary Reviewer — Date

12/10/08
Radiochemistry Final Reviewer — Date

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PARAGON ANALYTICS
Radiochemistry Data Package

Section 1

# CHAIN OF CUSTODY

# ALS Paragon

## Sample Number(s) Cross-Reference Table

**Paragon OrderNum:** 0811110
**Client Name:** Cordilleran Compliance Services, Inc.
**Client Project Name:** Rulison Area Well monitoring
**Client Project Number:**
**Client PO Number:**

| Client Sample Number | Lab Sample Number | COC Number | Matrix | Date Collected | Time Collected |
|---|---|---|---|---|---|
| A11-15D | 0811110-1 | | WATER | 13-Nov-08 | 8:40 |
| A11-15B | 0811110-2 | | WATER | 13-Nov-08 | 8:30 |

**Paragon Analytics**
A Division of DataChem Laboratories, Inc.

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

Accession Number (LAB ID) 081110

## Chain-of-Custody

Date 11/13/08 Page 1 of 1

**Originator: Retain pink copy!**

**Project Name/No.:** BULLISON AREA WELL MONITORING **Sampler(s):** TPD Turnaround (circle one) **Standard** or **Rush (Due ______ )** Dispose: **Date** ______ or **Return to Client**

**Report To:** JAMES HIX
**Phone:** (303) 237.2072
**Fax:** (303). 237 2659
**E-mail:** jameshix@cordcomp.com
**Company:** Cordilleran Compliance Services, Inc.
**Address:** ~~826 21½ Road~~
4690 TABLE MOUNTAIN DR. #200
GOLDEN, CO 80403

**Circle method (right); provide additional information as needed (comments).**

| Sample ID | Date | Time * | Lab ID | Matrix | Preservative (indicate type... HCl, etc.) | No. of Containers | VOCs SW8260B | BTEX ~~(only)~~ MTBE SW8021B | SVOCs SW8270C | OC Pesticides SW8081A | PCBs SW8082 | Herbicides SW8151A | Explosives SW8330 | TCLP Organics SW1311 SW8260B 8270C 8081A 8151A | TCLP Metals • SW1311 Hg SW6010B 7470 | Total Metals by ICP Hg SW6010B 7470 7471 E200.7 | Dissolved Metals by ICP Hg SW6010B 7470 E200.7 | Total Metals by ICP/MS SW6020A E200.8 | Dissolved Metals by ICP/MS SW6020A E200.8 | Hexavalent Chromium SW7196A Alkaline Digest? Y / N | Inorganic Anions SW9056 E300.0 (specify in comments) | Solids: Total E160.3 TDS E160.1 TSS E160.2 | pH SW9040B SW9045C | TPH SW8015B GRO DRO (circle one or both) | Gross Alpha / Beta SW9310 E900.0 | Actinides by Paragon SOP Pu / U / Am / Th / Cm / __ | Tritium E906.0 | Total Alpha-Emitting Radium SW9315 E903.0 | Radium 226 E903.1 | Radium 228 SW9320 E904.0 | Strontium 90 (Total RadioSr) D5811-00 | Gamma Isotopes E901.1 | Radon 222 SM7510Rn | RSK | $NH_3$, $NO_x$, T.Phos |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A11-15D | 11/13/08 | 0840 | 1 | W | $HNO_3$, HCl, $H_2SO_4$ | 17 | | X | | | | | | | | | | X | | | X | | | X | X | | X | | | | | X | | X | X |
| A11-15B | 11/13/08 | 0830 | 2 | W | " | 17 | | X | | | | | | | | | | X | | | X | | | X | X | | X | | | | | X | | X | X |

* Time Zone: EST CST MST PST **Matrix Key:** O = oil, S = soil, NS = non-soil solid, W = water, L = liquid, E = extract, F = filter

**Comments:**

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Form 202r6.xls (6/16/06)

| Relinquished By: (1) | Relinquished By: (2) |
|---|---|
| Signature [signature] | Signature |
| Printed Name TIM DOBRANSKY | Printed Name |
| Date 11/13/08 Time 1600 | Date Time |
| Company CORDILLERAN COMPLIANCE | Company |

| Received By: (1) | Received By: (2) |
|---|---|
| Signature [signature] | Signature |
| Printed Name BOuchard | Printed Name |
| Date 11/14/08 Time 0950 | Date Time |
| Company PA | Company |

CONDITION OF SAMPLE UPON RECEIPT FORM **Paragon Analytics**

Client: Cordilleran Workorder No: 0811110

Project Manager: LS Initials: [illegible] Date: 11-14-08

| | | | | |
|---|---|---|---|---|
| 1. Does this project require any **special handling** in addition to standard Paragon procedures? | | YES | NO | |
| 2. Are custody seals on **shipping containers** intact? | NONE | YES | NO | |
| 3. Are Custody seals on **sample containers** intact? | NONE | YES | NO | |
| 4. Is there a **COC (Chain-of-Custody) present** or other representative documents? | | YES | NO | |
| 5. Are the **COC and bottle labels complete and legible**? | | YES | NO | |
| 6. Is the **COC in agreement** with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.) | | YES | NO | |
| 7. Were **airbills / shipping documents** present and/or removable? | DROP OFF | YES | NO | |
| 8. Are all aqueous **samples requiring preservation preserved correctly?** (excluding volatiles) | N/A | YES | NO | |
| 9. Are all aqueous **non-preserved samples** pH 4-9? | N/A | YES | NO | |
| 10. Is there **sufficient sample** for the requested analyses? | | YES | NO | |
| 11. Were all samples placed in the **proper containers** for the requested analyses? | | YES | NO | |
| 12. Are all samples within **holding times** for the requested analyses? | | YES | NO | |
| 13. Were all sample containers received **intact**? (not broken or leaking, etc.) | | YES | NO | |
| 14. Are all samples requiring **no** headspace (**VOC, GRO, RSK/MEE, Rx CN/S, radon**) headspace free? **Size of bubble**: ✓ < green pea ___ > green pea | N/A | YES | NO | |
| 15. Do perchlorate LCMS-MS samples **have** headspace? (at least 1/3 of container required) | N/A | YES | NO | |
| 16. Were samples checked for and free from the presence of **residual chlorine?** (Applicable when PM has indicated samples are from a chlorinated water source; note if field preservation with sodium thiosulfate was not observed.) | N/A | YES | NO | |
| 17. Were the samples **shipped on ice**? | | YES | NO | |
| 18. Were cooler temperatures **measured at 0.1-6.0°C**? **IR gun used***: #2 #4 | RAD ONLY | YES | NO | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cooler #: | 1 | | | | | | | |
| Temperature (°C): | 3.4 | | | | | | | |
| No. of custody seals on cooler: | 1 | | | | | | | |
| External µR/hr reading: | 14 | | | | | | | |
| Background µR/hr reading: | 13 | | | | | | | |

DOT Survey/ Acceptance Information

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

**Additional Information:** PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

Headspace Bottle # -1 - 1,2,3,6,7,9
#2 - 1,2

Slime layer in -1-15 & -1-16 (Organic?)

If applicable, was the client contacted? YES / NO / NA Contact: J. Hix Date/Time: ____

**Project Manager Signature / Date:** [signature] 11/17/08

*IR Gun #2: Oakton, SN 29922500201-0066 *IR Gun #4: Oakton, SN 2372220101-0002

CONDITION OF SAMPLE UPON RECEIPT FORM **Paragon Analytics**

Client: Cordilleran Workorder No: 0811110

Project Manager: LS Initials: OO Date: 11-14-08

**Additional Information:**

Was the laboratory directed to proceed with the analysis of any samples yielding the presence of residual chlorine? YES / NO / NA

**NOTE:**

**No pH adjustments shall be made without prior consent of Project Manager. After pH adjustments, hold metals and radchem samples ≥ 24 hrs. before analysis.**

Was the pH of any sample adjusted by the laboratory? **YES** (See Table below) / **NO**

**pH Excursion:**

| Paragon Sample ID | Client Sample ID | Initial pH | Final pH | Reagent Used | Volume Added (mL) | Lot No. of Reagent | Requested Analysis | Initials / Date / Time |
|---|---|---|---|---|---|---|---|---|
| -1-12 | | 7 | 1.6 | conc $HNO_3$ | 1mL | | | OO 11/14/08 1030 |
| -1-15 | | | | | | | | |
| -1-16 | | | | | | | | |
| -1-17 | | | | | | | | |
| -2-12 | | | | | | | | |
| -2-15 | | | | | | | | |
| -2-16 | | | | | | | | |
| -2-17 | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

If applicable, was the client contacted? YES / NO / NA Contact: Date/Time:

**Project Manager Signature / Date:** [signature] 11/17/08

Form 201r20.xls (12/27/07)

ORIGIN ID: GJTA (970) 270-2986
TIM DOBRANSKY
CORDILLERAN COMPLIANCE SERVICES, IN
826 21 1/2 ROAD

GRAND JUNCTION, CO 81505
UNITED STATES US

Ship Date: 13NOV08
ActWgt: 20.0 LB MAN
System#: 390082/CAFE2358
Account: S 235727234

TO

**PARAGON ANALYTICS**
**225 COMMERCE DRIVE**

**FORT COLLINS, CO 80524**

3.4

14

(800) 443-1511
**FedEx**
Express

E

CLS050107/22/23

**Ref: 8360**

Delivery Address Barcode

BILL SENDER

**PRIORITY OVERNIGHT**

FRI
Deliver By:
14NOV08

TRK# **9660 0451 2332** Form 0201

DEN AA

**80524 -CO-US** **72 FTCA**

AT **611 A**

2332
11.14

FZ

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PARAGON ANALYTICS
Radiochemistry Data Package

Section 2

# SAMPLE RESULTS SUMMARY

# Gross Alpha/Beta Analysis by GFPC Sample Results Summary

**Client Name:** Cordilleran Compliance Services, Inc.
**Client Project Name:** Rulison Area Well monitoring
**Client Project Number:**

**Laboratory Name:** ALS Paragon
**PAI Work Order:** 0811110


**Reported on:** Tuesday, December 09, 2008 3:38:55 PM

| Lab Sample ID | Client Sample ID | Sample Type | Nuclide | Result +/- 2 s TPU | MDC | Units | Matrix | Prep Batch | Date Analyzed | Flags |
|---|---|---|---|---|---|---|---|---|---|---|
| 0811110-1 | A11-15D | Sample | GROSS ALPHA | 35 +/- 24 | 37 | pCi/l | WATER | AB081202-1 | 12/8/2008 | U,M |
| 0811110-1 | A11-15D | Sample | GROSS BETA | 96 +/- 37 | 54 | pCi/l | WATER | AB081202-1 | 12/8/2008 | M3 |
| 0811110-2 | A11-15B | Sample | GROSS ALPHA | 23 +/- 20 | 31 | pCi/l | WATER | AB081202-1 | 12/8/2008 | U,M |
| 0811110-2 | A11-15B | Sample | GROSS BETA | 96 +/- 35 | 50 | pCi/l | WATER | AB081202-1 | 12/8/2008 | M3 |

**Comments:**

**Data Package ID:** *AB0811110-1*

**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

Section 3

# QC RESULTS SUMMARY

# Gross Alpha/Beta Analysis by GFPC

## PAI 724 Rev 10

## Method Blank Results

**Lab Name:** ALS Paragon
**Work Order Number:** 0811110
**Client Name:** Cordilleran Compliance Services, Inc.
**ClientProject ID:** Rulison Area Well monitoring

**Lab ID:** AB081202-1MB

**Sample Matrix:** WATER
**Prep SOP:** PAI 702 Rev 19
**Date Collected:** 02-Dec-08
**Date Prepared:** 02-Dec-08
**Date Analyzed:** 08-Dec-08

**Prep Batch:** AB081202-1
**QCBatchID:** AB081202-1-2
**Run ID:** AB081202-1A
**Count Time:** 1000 minutes

**Final Aliquot:** 170 ml
**Result Units:** pCi/l
**File Name:** ABC1208C

| CASNO | Target Nuclide | Result +/- 2 s TPU | MDC | Requested MDC | Lab Qualifier |
|---|---|---|---|---|---|
| 12587-46-1 | GROSS ALPHA | -0.04 +/- 0.28 | 0.50 | 3 | U |
| 12587-47-2 | GROSS BETA | 0.57 +/- 0.72 | 1.18 | 4 | 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:** *AB0811110-1*

# Gross Alpha/Beta Analysis by GFPC

## PAI 724 Rev 10

## Laboratory Control Sample(s)

**Lab Name:** ALS Paragon
**Work Order Number:** 0811110
**Client Name:** Cordilleran Compliance Services, Inc.
**ClientProject ID:** Rulison Area Well monitoring

**Lab ID:** AB081202-1LCS

**Sample Matrix:** WATER
**Prep SOP:** PAI 702 Rev 19
**Date Collected:** 02-Dec-08
**Date Prepared:** 02-Dec-08
**Date Analyzed:** 08-Dec-08

**Prep Batch:** AB081202-1
**QCBatchID:** AB081202-1-2
**Run ID:** AB081202-1A
**Count Time:** 1000 minutes

**Final Aliquot:** 170 ml
**Result Units:** pCi/l
**File Name:** ABC1208C

| CASNO | Target Nuclide | Results +/- 2s TPU | MDC | Spike Added | % Rec | Control Limits | Lab Qualifier |
|---|---|---|---|---|---|---|---|
| 12587-46-1 | GROSS ALPHA | 260 +/- 42 | 1 | 267 | 97.5 | 70 - 130 | P |
| 12587-47-2 | GROSS BETA | 262 +/- 42 | 2 | 261 | 100 | 70 - 130 | P |

**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:** *AB0811110-1*

PARAGON ANALYTICS
Radiochemistry Data Package

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Section 4

# INDIVIDUAL SAMPLE RESULTS

# Gross Alpha/Beta Analysis by GFPC

## PAI 724 Rev 10

## Sample Results

**Lab Name:** ALS Paragon
**Work Order Number:** 0811110
**Client Name:** Cordilleran Compliance Services, Inc.
**ClientProject ID:** Rulison Area Well monitoring

**Field ID:** A11-15D
**Lab ID:** 0811110-1

**Sample Matrix:** WATER
**Prep SOP:** PAI 702 Rev 19
**Date Collected:** 13-Nov-08
**Date Prepared:** 02-Dec-08
**Date Analyzed:** 08-Dec-08

**Prep Batch:** AB081202-1
**QCBatchID:** AB081202-1-2
**Run ID:** AB081202-1A
**Count Time:** 1000 minutes
**Report Basis:** Unfiltered

**Final Aliquot:** 4.00 ml
**Prep Basis:** Unfiltered
**Moisture(%):** NA
**Result Units:** pCi/l
**File Name:** ABC1208C

| CASNO | Target Nuclide | Result +/- 2 s TPU | MDC | Requested MDC | Lab Qualifier |
|---|---|---|---|---|---|
| 12587-46-1 | GROSS ALPHA | 35 +/- 24 | 37 | 3 | U,M |
| 12587-47-2 | GROSS BETA | 96 +/- 37 | 54 | 4 | M3 |

**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:** *AB0811110-1*

# Gross Alpha/Beta Analysis by GFPC

## PAI 724 Rev 10

## Sample Results

**Lab Name:** ALS Paragon
**Work Order Number:** 0811110
**Client Name:** Cordilleran Compliance Services, Inc.
**ClientProject ID:** Rulison Area Well monitoring

**Field ID:** A11-15B
**Lab ID:** 0811110-2

**Sample Matrix:** WATER
**Prep SOP:** PAI 702 Rev 19
**Date Collected:** 13-Nov-08
**Date Prepared:** 02-Dec-08
**Date Analyzed:** 08-Dec-08

**Prep Batch:** AB081202-1
**QCBatchID:** AB081202-1-2
**Run ID:** AB081202-1A
**Count Time:** 1000 minutes
**Report Basis:** Unfiltered

**Final Aliquot:** 4.00 ml
**Prep Basis:** Unfiltered
**Moisture(%):** NA
**Result Units:** pCi/l
**File Name:** ABC1208C

| CASNO | Target Nuclide | Result +/- 2 s TPU | MDC | Requested MDC | Lab Qualifier |
|---|---|---|---|---|---|
| 12587-46-1 | GROSS ALPHA | 23 +/- 20 | 31 | 3 | U,M |
| 12587-47-2 | GROSS BETA | 96 +/- 35 | 50 | 4 | M3 |

**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:** *AB0811110-1*

PARAGON ANALYTICS
Radiochemistry Data Package

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Section 5

# RAW DATA

# Gross Alpha/Beta Analysis by GFPC Raw Data Report

**Laboratory Name:** ALS Paragon
**PAI Work Order:** 0811110

**Prep SOP:** PAI 702
**Analytical SOP:** PAI 724

**Reported on:** Tuesday, December 09, 2008 11:16:49 AM

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0811110-1 | GROSS ALPHA | 11/13/2008 | AB081202-1 | NA | NA | WATER | 4 ml | LB4100-C | AB081202-1A | 12/8/2008 | 0.111 | 22.05% | 1000 | 35 | 37 | pCi/l | NA | |
| SMP | Trg. Analyte | 8:40:00 AM | AB081202-1-2 | NA | NA | NA | 4 ml | C1 | ABC1208C | 2:44 PM | 0.071 | NA | NA | 24 | NA | Unfiltered | NA | U,M |
| 0811110-1 | GROSS BETA | 11/13/2008 | AB081202-1 | NA | NA | WATER | 4 ml | LB4100-C | AB081202-1A | 12/8/2008 | 2.132 | 39.21% | 1000 | 96 | 54 | pCi/l | NA | |
| SMP | Trg. Analyte | 8:40:00 AM | AB081202-1-2 | NA | NA | NA | 4 ml | C1 | ABC1208C | 2:44 PM | 1.766 | NA | NA | 37 | NA | Unfiltered | NA | M3 |
| 0811110-2 | GROSS ALPHA | 11/13/2008 | AB081202-1 | NA | NA | WATER | 4 ml | LB4100-C | AB081202-1A | 12/8/2008 | 0.084 | 24.65% | 1000 | 23 | 31 | pCi/l | NA | |
| SMP | Trg. Analyte | 8:30:00 AM | AB081202-1-2 | NA | NA | NA | 4 ml | C2 | ABC1208C | 2:44 PM | 0.056 | NA | NA | 20 | NA | Unfiltered | NA | U,M |
| 0811110-2 | GROSS BETA | 11/13/2008 | AB081202-1 | NA | NA | WATER | 4 ml | LB4100-C | AB081202-1A | 12/8/2008 | 1.901 | 39.22% | 1000 | 96 | 50 | pCi/l | NA | |
| SMP | Trg. Analyte | 8:30:00 AM | AB081202-1-2 | NA | NA | NA | 4 ml | C2 | ABC1208C | 2:44 PM | 1.538 | NA | NA | 35 | NA | Unfiltered | NA | M3 |
| AB081202-1 | GROSS ALPHA | 12/2/2008 | AB081202-1 | NA | NA | WATER | 170 ml | LB4100-C | AB081202-1A | 12/8/2008 | 0.052 | 23.82% | 1000 | -0.04 | 0.50 | pCi/l | NA | |
| MB | Trg. Analyte | 2:43:00 PM | AB081202-1-2 | NA | NA | NA | 170 ml | C4 | ABC1208C | 2:44 PM | 0.055 | NA | NA | 0.28 | NA | Unfiltered | NA | U |
| AB081202-1 | GROSS BETA | 12/2/2008 | AB081202-1 | NA | NA | WATER | 170 ml | LB4100-C | AB081202-1A | 12/8/2008 | 1.733 | 39.58% | 1000 | 0.57 | 1.18 | pCi/l | NA | |
| MB | Trg. Analyte | 2:43:00 PM | AB081202-1-2 | NA | NA | NA | 170 ml | C4 | ABC1208C | 2:44 PM | 1.641 | NA | NA | 0.72 | NA | Unfiltered | NA | U |
| AB081202-1 | GROSS ALPHA | 12/2/2008 | AB081202-1 | NA | NA | WATER | 170 ml | LB4100-C | AB081202-1A | 12/8/2008 | 18.293 | 22.51% | 1000 | 260 | 1 | pCi/l | NA | 97.5 |
| LCS | Trg. Analyte | 2:43:00 PM | AB081202-1-2 | NA | NA | NA | 170 ml | D1 | ABC1208C | 2:44 PM | 0.058 | NA | NA | 42 | NA | Unfiltered | NA | P |
| AB081202-1 | GROSS BETA | 12/2/2008 | AB081202-1 | NA | NA | WATER | 170 ml | LB4100-C | AB081202-1A | 12/8/2008 | 48.114 | 38.96% | 1000 | 262 | 2 | pCi/l | NA | 100 |
| LCS | Trg. Analyte | 2:43:00 PM | AB081202-1-2 | NA | NA | NA | 170 ml | D1 | ABC1208C | 2:44 PM | 1.683 | NA | NA | 42 | NA | Unfiltered | NA | P |

**Comments:**

## Data Package ID: *AB0811110-1*

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

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-C

| Alpha Attenuation Calibration $y = b^*m^\wedge(a^*(mass-x0))$ | | Beta Attenuation Calibration $y = b^*m^\wedge(a^*(mass-x0))$ | |
|---|---|---|---|
| Alpha b= | 1.16000 | Beta b= | 1.1056 |
| m= | 0.88900 | m= | 0.9995 |
| a= | 0.7500 | a= | 0.9921 |
| x0= | 0.0000 | x0= | 0.0000 |
| Alpha to Beta X-talk $y = b^*m^\wedge$-mass | | Beta to Alpha X-talk $y = b^*mass + m$ | |
| a ->b xtalk b= | 0.2475 | b ->a xtalk b= | -2.00E-08 |
| a ->b xtalk m= | 0.9991 | b ->a xtalk m= | 0.0021 |

Unit Type: LB4100 -C
Counting Unit ID: Magenta
High Voltage Mode: Simultaneous
Application Revision: 2
Application Version: Standard
Rev.12/01/08 JCP

Data file name: ABC1208C
Batch ID: AB081202-1
Count Preset (m): 1000
Batch Ended: 12/9/2008 7:23

Background logfile: BKGABW
Date of Bkg. Cal: 12/4/2008
Alpha efficiency logfile: Am241R-11/08
Alpha attenuation calibration: AAM1118
Beta efficiency logfile: Sr90R-11/08
Beta attenuation calibration: ASR1117

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

| Det. ID | Sample ID | Count End Date & Time | Count Dur. (min) | Resid. Mass (mg) | Alpha Activity Gross CPM | Bkg. CPM | b>a xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. | Beta Activity Gross CPM | Bkg. CPM | a>b xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 0811110-1 | 12/9/2008 7:22 | 1000.00 | 82.4 | 0.111 | 0.071 | 0.001 | 0.2205 | 0.581 | n/a | n/a | 2.132 | 1.766 | 0.0107 | 0.3921 | 1.062 | n/a | n/a |
| C2 | 0811110-2 | 12/9/2008 7:22 | 1000.00 | 88.8 | 0.084 | 0.056 | 0.001 | 0.2465 | 0.551 | n/a | n/a | 1.901 | 1.538 | 0.0075 | 0.3922 | 1.058 | n/a | n/a |
| C3 | 0811186-4 | 12/9/2008 7:22 | 1000.00 | 51.0 | 0.408 | 0.064 | 0.001 | 0.2305 | 0.753 | n/a | n/a | 2.209 | 1.562 | 0.0891 | 0.4018 | 1.078 | n/a | n/a |
| C4 | AB081202-1MB | 12/9/2008 7:22 | 1000.00 | 40.4 | 0.052 | 0.055 | 0.000 | 0.2382 | 0.823 | n/a | n/a | 1.733 | 1.641 | 0.0000 | 0.3958 | 1.084 | n/a | n/a |
| A1 | 0811102-1 | 12/9/2008 7:22 | 1000.00 | 75.6 | 0.144 | 0.043 | 0.001 | 0.2202 | 0.614 | n/a | n/a | 1.953 | 1.497 | 0.0268 | 0.3944 | 1.065 | n/a | n/a |
| A2 | 0811102-2 | 12/9/2008 7:22 | 1000.00 | 72.9 | 0.271 | 0.043 | 0.002 | 0.2458 | 0.628 | n/a | n/a | 2.348 | 1.507 | 0.0603 | 0.3975 | 1.067 | n/a | n/a |
| A3 | 0811102-2D | 12/9/2008 7:22 | 1000.00 | 72.7 | 0.302 | 0.046 | 0.001 | 0.2377 | 0.629 | n/a | n/a | 2.249 | 1.488 | 0.0678 | 0.4031 | 1.067 | n/a | n/a |
| A4 | 0811102-2MS | 12/9/2008 7:22 | 1000.00 | 80.9 | 14.696 | 0.039 | 0.089 | 0.2441 | 0.588 | n/a | n/a | 47.484 | 1.487 | 3.9017 | 0.3958 | 1.062 | n/a | n/a |
| B1 | 0811102-3 | 12/9/2008 7:23 | 1000.00 | 79.0 | 0.068 | 0.063 | 0.000 | 0.2150 | 0.597 | n/a | n/a | 1.771 | 1.584 | 0.0013 | 0.3877 | 1.063 | n/a | n/a |
| B2 | 0811102-4 | 12/9/2008 7:23 | 1000.00 | 42.5 | 0.473 | 0.040 | 0.002 | 0.2403 | 0.808 | n/a | n/a | 2.312 | 1.540 | 0.1113 | 0.3877 | 1.083 | n/a | n/a |
| B3 | 0811102-5 | 12/9/2008 7:23 | 1000.00 | 55.4 | 0.071 | 0.066 | 0.001 | 0.2327 | 0.726 | n/a | n/a | 1.839 | 1.572 | 0.0013 | 0.3931 | 1.076 | n/a | n/a |
| B4 | 0811102-6 | 12/9/2008 7:23 | 1000.00 | 91.1 | 0.076 | 0.051 | 0.000 | 0.2313 | 0.540 | n/a | n/a | 1.777 | 1.554 | 0.0067 | 0.3818 | 1.057 | n/a | n/a |
| D1 | AB081202-1LCS | 12/9/2008 7:23 | 1000.00 | 40.6 | 18.293 | 0.058 | 0.094 | 0.2251 | 0.821 | n/a | n/a | 48.114 | 1.683 | 4.6812 | 0.3896 | 1.084 | n/a | n/a |

JP 12/9/08

Date 12/8/08 SOP 724r 10

**Paragon Analytics**
Low Background Gas Flow Proportional Counter Log
**Instrument: LB4100C**

*Instrument Daily Response and Background Checks*

| Det. | Daily Response Check Start 1 | Status | Start 2 | Status | Background Check Start 1 | Status | Start 2 | Status | Det. Status |
|---|---|---|---|---|---|---|---|---|---|
| 1 | JP | P | | | JP | | | | P |
| 2 | ↓ | ↓ | | | ↓ | | | | ↓ |
| 3 | | | | | | | | | |
| 4 | | | | | | Hα | JP | P | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | Hβ | JP | P | |
| 8 | | | | | | Hα | JP | ↓ | |
| 9 | | | | | | | | | |
| 10 | | | | | | Hα | JP | P | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | ↓ | ↓ | | | ↓ | | | | ↓ |

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

*Weekly Background Calibration*

| | Current Calib. File ID | Weekly Calib. Started | Status | File ID |
|---|---|---|---|---|
| Dr A | BKC1203W | | | |
| Dr B | ↓ | | | |
| Dr C | | | | |
| Dr D | ↓ | | | |

Dr = Drawer

*Gas Supply*

| | P-10 Supply | | P-10 Flow |
|---|---|---|---|
| Tank 1 | 1100 | Dr A | 0.15 |
| | ↓ | Dr B | ↓ |
| Tank 2 | 300 | Dr C | |
| | ↓ | Dr D | ↓ |

Comments:

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Date 12/8/08

SOP 724r 10

**Paragon Analytics**
Low Background Gas Flow Proportional Counter Log
**Instrument: LB4100C**

| Det. | Sample ID | Batch | Test | Count Dur. (min) | Start Time | Analyst Initials | File ID | Output Initials |
|---|---|---|---|---|---|---|---|---|
| 13 | 0812018-50 | AB081205-4 | αIB | 75 | 13:16 | JP | ABC1208B | JP |
| 14 | -51 | | | | | | | |
| 15 | -53 | | | | | | | |
| 16 | -54 | | | | | | | |
| 1 | 0811102-1 | AB081202-1 | αIB | 1000 | 14:38 | JP | ABC1208C | JP |
| 2 | -2 | | | | | | | |
| 3 | -2D | | | | | | | |
| 4 | -2MS | | | | | | | |
| 5 | -3 | | | | | | | |
| 6 | -4 | | | | | | | |
| 7 | -5 | | | | | | | |
| 8 | -6 | | | | | | | |
| 9 | 0811110-1 | | | | | | | |
| 10 | -2 | | | | | | | |
| 11 | 0811186-4 | | | | | | | |
| 12 | AB081202-1MB | | | | | | | |
| 13 | LCS | | | | | | | |

JP 12/9/08

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Form 780r8.doc (6/23/06)

Reviewed By / Date JP 12/9/08

PARAGON ANALYTICS
Radiochemistry Data Package

Section 6

6

# QUALITY ASSURANCE SUMMARY REPORTS

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

PARAGON ANALYTICS
Radiochemistry Data Package

Section 7

# LABORATORY BENCH SHEETS

7

# Radiochemistry Instrument Worksheet

**ALS Paragon**

**Prep Batch:** AB081202-1

**Prep Procedure:** GAB

**Analytical QASS / NCR?** Y / N NA

| Prep Num | LabID | QC Type | Init Alq | Fin Alq | Units | Report 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 | 0811102-1 | SMP | 80 | 80 | ml | PCI/L | 75.6 | ABC1208C | 1 | JP | | | | | | | |
| 1 | 0811102-2 | SMP | 10 | 10 | ml | PCI/L | 72.9 | | 2 | | | | | | | | |
| 1 | 0811102-2 | DUP | 10 | 10 | ml | PCI/L | 72.7 | | 3 | | | | | | | | |
| 1 | 0811102-2 | MS | 10 | 10 | ml | PCI/L | 80.9 | | 4 | | | | | | | | |
| 1 | 0811102-3 | SMP | 10 | 10 | ml | PCI/L | 79 | | 5 | | | | | | | | |
| 1 | 0811102-4 | SMP | 100 | 100 | ml | PCI/L | 42.5 | | 6 | | | | | | | | |
| 1 | 0811102-5 | SMP | 120 | 120 | ml | PCI/L | 55.4 | | 7 | | | | | | | | |
| 1 | 0811102-6 | SMP | 4 | 4 | ml | PCI/L | 91.1 | | 8 | | | | | | | | |
| 1 | 0811110-1 | SMP | 4 | 4 | ml | PCI/L | 82.4 | | 9 | | | | | | | | |
| 1 | 0811110-2 | SMP | 4 | 4 | ml | PCI/L | 88.8 | | 10 | | | | | | | | |
| 1 | 0811186-4 | SMP | 170 | 170 | ml | PCI/L | 51 | | 11 | | | | | | | | |
| 1 | AB081202-1 | MB | 170 | 170 | ml | PCI/L | 40.4 | | 12 | | | | | | | | JP 12/9/08 |
| 1 | AB081202-1 | LCS | 170 | 170 | ml | PCI/L | 40.6 | | 13 | | | | | | | | |

**Spike Solution Information**

| Soln # | Nuclide | SolnID | Prep Conc | Units | Prep Date | Aliquot | Units | Pipet ID |
|---|---|---|---|---|---|---|---|---|
| S1 | Sr-90 | 600.3610.01 | 49.223 | DPM/ml | 12/02/08 | 1 | ml | RS-005 |
| S2 | AM-241 | 616.3610.13 | 100.687 | DPM/ml | 12/02/08 | 1 | ml | RS-005 |

## Reporting Units

| LabID: | TstGrpName: | RptUnits: |
|---|---|---|
| 0811110-1 | GrossAlpha/Beta | PCI/L |
| 0811102-1 | GrossAlpha/Beta | PCI/L |
| 0811110-2 | GrossAlpha/Beta | PCI/L |
| 0811102-2 | GrossAlpha/Beta | PCI/L |
| 0811102-3 | GrossAlpha/Beta | PCI/L |
| 0811186-4 | GrossAlpha/Beta | PCI/L |
| 0811102-4 | GrossAlpha/Beta | PCI/L |
| 0811102-5 | GrossAlpha/Beta | PCI/L |
| 0811102-6 | GrossAlpha/Beta | PCI/L |

## Sample Barcodes

0811102-1
AB081202-1PS1

0811102-2
AB081202-1PS2

0811102-2DUP
AB081202-1PS3

0811102-2MS
AB081202-1PS4

0811102-3
AB081202-1PS5

0811102-4
AB081202-1PS6

0811102-5
AB081202-1PS7

0811102-6
AB081202-1PS8

0811110-1
AB081202-1PS9

0811110-2
AB081202-1PS10

0811186-4
AB081202-1PS11

AB081202-1MB
AB081202-1PS12

AB081202-1LCS
AB081202-1PS13

# Radiochemistry Prep Worksheet

**ALS Paragon**

**Prep Batch: AB081202-1**

**Prep Procedure:** GAB

**Reviewed By:** LJF

**Review Date:** 12/8/2008

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: 19
Prep SOP: NONE
Matrix Class: liquid

Prep Analyst: Jay Fielding
Prep Date: 12/2/2008
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 | 0811102-1 | SMP | N/A | 80 | 80 | Unfiltered | N/A | |
| 2 | 1 | 0811102-2 | SMP | | 10 | 10 | Unfiltered | | |
| 3 | 1 | 0811102-2 | DUP | | 10 | 10 | Unfiltered | | |
| 4 | 1 | 0811102-2 | MS | | 10 | 10 | Unfiltered | S1,S2 | |
| 5 | 1 | 0811102-3 | SMP | | 10 | 10 | Unfiltered | N/A | |
| 6 | 1 | 0811102-4 | SMP | | 100 | 100 | Unfiltered | | |
| 7 | 1 | 0811102-5 | SMP | | 120 | 120 | Unfiltered | | 12/8/08 |
| 8 | 1 | 0811102-6 | SMP | | 4 | 4 | Unfiltered | | |
| 9 | 1 | 0811110-1 | SMP | | 4 | 4 | Unfiltered | | |
| 10 | 1 | 0811110-2 | SMP | | 4 | 4 | Unfiltered | | |
| 11 | 1 | 0811186-4 | SMP | | 170 | 170 | Unfiltered | | |
| 12 | 1 | AB081202-1 | MB | | 170 | 170 | Unfiltered | | |
| 13 | 1 | AB081202-1 | LCS | | 170 | 170 | Unfiltered | S1,S2 | |

Comments

Into the desiccator on 12-4-08 @ 1830. Samples 0811110-1, and -2 were flamed.

Spiked By: Jay Fielding  Date: 12/3/2005

Witnessed By: Gabriel D. Wagner  Date: 12/3/2008

**Spike Solution Information**

| Soln # | Nuclide | SolnID | Prep Conc | Units | Prep Date | Aliquot | Units | Pipet ID |
|---|---|---|---|---|---|---|---|---|
| S1 | Sr-90 | 600.3610.01 | 49.223 | DPM/ml | 12/02/08 | 1 | ml | RS-005 |
| S2 | AM-241 | 616.3610.13 | 100.687 | DPM/ml | 12/02/08 | 1 | ml | RS-005 |

**Paragon Analytics**

# Radiochemistry Prep Worksheet

Prep Batch: AB081202-1

**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:** 19
**Prep SOP:** NONE
**Matrix Class:** liquid

**Prep Analyst:** Jay Fielding JF
**Prep Date:** 12/2/2008
**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 | 0811102-1 | SMP | | 200 | 200 | Unfiltered | | |
| 2 | 1 | 0811102-2 | SMP | | 200 | 200 | Unfiltered | | |
| 3 | 1 | 0811102-2 | DUP | | 200 | 200 | Unfiltered | | |
| 4 | 1 | 0811102-2 | MS | | 200 | 200 | Unfiltered | S1,S2 | |
| 5 | 1 | 0811102-3 | SMP | | 200 | 200 | Unfiltered | | |
| 6 | 1 | 0811102-4 | SMP | | 200 | 200 | Unfiltered | | |
| 7 | 1 | 0811102-5 | SMP | | 200 | 200 | Unfiltered | | |
| 8 | 1 | 0811102-6 | SMP | | 200 | 200 | Unfiltered | | |
| 9 | 1 | 0811110-1 | SMP | | 200 | 200 | Unfiltered | | |
| 10 | 1 | 0811110-2 | SMP | | 200 | 200 | Unfiltered | | |
| 11 | 1 | 0811186-4 | SMP | | 200 | 200 | Unfiltered | | |
| 12 | 1 | AB081202-1 | MB | | 200 | 200 | Unfiltered | | |
| 13 | 1 | AB081202-1 | LCS | | 200 | 200 | Unfiltered | S1,S2 | |

Comments

**Spiked By:** Jay Fielding JF **Date:** 12/3/08
**Witnessed By:** GDW **Date:** 12-3-08

**Spike Solution Information**

| Soln # | Nuclide | SolnID | Prep Conc | Units | Prep Date | Aliquot | Units | Pipet ID | |
|---|---|---|---|---|---|---|---|---|---|
| S1 | Sr-90 | 600.3610.01 | 49.223 | DPM/ml | 12/02/08 | 1 | ml | RS-005 | exp. 4/9/09 |
| S2 | AM-241 | 616.3610.13 | 100.687 | DPM/ml | 12/02/08 | 1 | ml | RS-005 | exp. 9/25/09 |

## SAMPLE CONDITION FORM (LIQUID)

ANALYST: S

ANALYSIS DATE: 12/2/08 METHOD: GAB

| WORK ORDER | SAMPLE ID | SAMPLE CONDITION pH | Color | Remarks |
|---|---|---|---|---|
| 0811102 | 1 | <2 | CLEAR | NONE |
| ↓ | 2 | <2 | BROWN | ↓ |
| | 3 | <2 | CLEAR | |
| | 4 | <2 | ↓ | |
| | 5 | <2 | | |
| | 6 | <2 | | ↓ |
| 0811110 | 1 | <2 | | Bi-phasic, aqueous phase Analyzed |
| ↓ | 2 | <2 | | NONE |
| 0811186 | 4 | <2 | ↓ | ↓ |
| | | | | |
| | | | | |
| | | | | |
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| | | | | |
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S 12/2/08

# Radiochemistry Gravimetric Worksheet

**ALS Paragon**

Prep Batch: AB081202-1

Prep Procedure: **GAB**

Reviewed By: LJF

Review Date: 12/8/2008

| 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 | 0811102-1 | SMP | 10 | 9.2585 | 9.2669 | 8.4 | 89 | 200 | 80 | 9.3341 | 75.6 | 0 | |
| 1 | 2 | 0811102-2 | SMP | 10 | 9.2646 | 9.3372 | 72.6 | 10 | 200 | 10 | 9.3375 | 72.9 | 0 | |
| 1 | 3 | 0811102-2 | DUP | 10 | 9.2517 | 0.0000 | 0 | 200 | 200 | 10 | 9.3244 | 72.7 | 0 | |
| 1 | 4 | 0811102-2 | MS | 10 | 9.2589 | 0.0000 | 0 | 200 | 200 | 10 | 9.3398 | 80.9 | 0 | |
| 1 | 5 | 0811102-3 | SMP | 10 | 9.2402 | 9.3190 | 78.8 | 10 | 200 | 10 | 9.3192 | 79 | 0 | |
| 1 | 6 | 0811102-4 | SMP | 10 | 9.2638 | 9.2710 | 7.2 | 104 | 200 | 100 | 9.3063 | 42.5 | 0 | |
| 1 | 7 | 0811102-5 | SMP | 10 | 9.2656 | 9.2715 | 5.9 | 127 | 200 | 120 | 9.3210 | 55.4 | 0 | |
| 1 | 8 | 0811102-6 | SMP | 10 | 9.2720 | 0.0000 | 0 | 200 | 200 | 4 | 9.3631 | 91.1 | 0 | |
| 1 | 9 | 0811110-1 | SMP | 10 | 9.2690 | 0.0000 | 0 | 200 | 200 | 4 | 9.3514 | 82.4 | 0 | |
| 1 | 10 | 0811110-2 | SMP | 10 | 9.2567 | 0.0000 | 0 | 200 | 200 | 4 | 9.3455 | 88.8 | 0 | |
| 1 | 11 | 0811186-4 | SMP | 10 | 9.2806 | 9.2850 | 4.4 | 170 | 200 | 170 | 9.3316 | 51 | 0 | |
| 1 | 12 | AB081202-1 | MB | 10 | 9.2515 | 0.0000 | 0 | 200 | 200 | 170 | 9.2919 | 40.4 | 1 | |
| 1 | 13 | AB081202-1 | LCS | 10 | 9.2698 | 0.0000 | 0 | 200 | 200 | 170 | 9.3104 | 40.6 | 1 | |



Supersedes: 12/3/08 1348

# Radiochemistry Gravimetric Worksheet

**Paragon Analytics**

**Prep Batch: AB081202-1**

Prep Procedure: **GAB**

## Prep Batch Not Validated!!!

Reviewed By: Review Date:

| 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 | 0811102-1 | SMP | 10 | 9.2585 | 9.2669 | 8.4 | 89 | 200 | 80 | 0.0000 | -9258.5 | 0 | |
| 1 | 2 | 0811102-2 | SMP | 10 | 9.2646 | 9.3372 | 72.6 | 10 | 200 | 10 | 0.0000 | -9264.6 | 0 | |
| 1 | 3 | 0811102-2 | DUP | 10 | 9.2517 | 0.0000 | 0 | 200 | 200 | 10 | 0.0000 | -9251.7 | 0 | |
| 1 | 4 | 0811102-2 | MS | 10 | 9.2589 | 0.0000 | 0 | 200 | 200 | 10 | 0.0000 | -9258.9 | 0 | |
| 1 | 5 | 0811102-3 | SMP | 10 | 9.2402 | 9.3190 | 78.8 | 10 | 200 | 10 | 0.0000 | -9240.2 | 0 | |
| 1 | 6 | 0811102-4 | SMP | 10 | 9.2638 | 9.2710 | 7.2 | 104 | 200 | 100 | 0.0000 | -9263.8 | 0 | |
| 1 | 7 | 0811102-5 | SMP | 10 | 9.2656 | 9.2715 | 5.9 | 127 | 200 | 120 | 0.0000 | -9265.6 | 0 | |
| 1 | 8 | 0811102-6 * | SMP | 10 | 9.2571 | 9.4277 | 170.6 | 4 | 200 | 4 | 0.0000 | -9257.1 | 0 | |
| 1 | 9 | 0811110-1 * | SMP | 10 | 9.2478 | 9.4375 | 189.7 | 4 | 200 | 4 | 0.0000 | -9247.8 | 0 | |
| 1 | 10 | 0811110-2 * | SMP | 10 | 9.2736 | 9.4728 | 199.2 | 4 | 200 | 4 | 0.0000 | -9273.6 | 0 | |
| 1 | 11 | 0811186-4 | SMP | 10 | 9.2606 | 9.2650 | 4.4 | 170 | 200 | 170 | 0.0000 | -9280.6 | 0 | |
| 1 | 12 | AB081202-1 | MB | 10 | 9.2515 | 0.0000 | 0 | 200 | 200 | 170 | 0.0000 | -9251.5 | 0 | |
| 1 | 13 | AB081202-1 | LCS | 10 | 9.2698 | 0.0000 | 0 | 0 | 200 | 170 | 0.0000 | 0 | 0 | |

* Initial mass was high after the spotcheck. A new planchet was used and a smaller aliquot was taken.

PARAGON ANALYTICS
Radiochemistry Data Package

Section 8

# STANDARDS TRACEABILITY DOCUMENTS

8

Prepare a working standard from intermediate dilution standard 600.2613.30 of approximately 50 dpm/ml

1) Determine density of 0.1 M HCl
diluent Lot # 068438 — Bal. ID
Mass of volumetric flask: 68.2969 g — #12
Mass of flask with 100ml diluent: 168.1454 g
Net Mass of diluent: 99.8485 g
$\rho$ = 0.9985 g/ml

2) Determine mass of standard 600.2613.30
Mass of empty Nalgene without lid: 74.6622 g — #12
Mass of Nalgene and standard: 77.2779 g
Net mass of standard: ~~1073.3 g~~ 2.6157 g DC 4/4/08

3) Dilute with acid
Mass of empty Nalgene without lid: 74.6622 g — #12
Mass of Nalgene, standard, & diluent: 1073.3 g — #26
Net mass of standard & diluent: 998.6398 g

4) Final activity calculation:

$$\frac{(\cancel{21,390.967}\ 22,279.914\ \text{dpm/g})(2.6157\text{g})(0.9985\text{g/ml})}{998.6398\text{g}} = \cancel{58.56}\ 58.269\ \text{dpm/ml}$$

MC 7/10/08

Stnd ID: 600.3610.01 MC 7/10/08

Description: Sr-90
Expiration: 4/9/2009
Activity: 58.27 dpm/mL
2s Uncertainty: 2.91 dpm/mL MC 7/10/08
Ref. Date: 12/1/2001
Ref Time: N/A
Prep Date: 4/7/2008 Prep by: dc
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01

| Reverification Log | | |
|---|---|---|
| Analysis Date | Initials | Expiration Date |
| | | |
| | | |
| | | |
| | | |
| | | |

MC 7/10/08

MC 7/10/08

Continued on Page

Signed: [signature] Date: 4/7/08
Read and Understood By
Signed: [signature] Date: 7/10/08

30
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 | |

RG 4/26/05

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

2) Final Activity Calculation

$$\frac{(1.868\times10^4\ dps)(60\ dpm/dps)}{\cancel{50.0559}\ 50.3054\ \cancel{50.3054}\ g} = \left(\cancel{22,390.967}\ \cancel{22,279.914}\ 22,279.914\ \frac{dpm}{g}\right)(0.9978\ g/mL)$$

CW 12/10/03 MC 7/10/08 SD 12/10/03 RG 4/26/05

$$= \cancel{22,311.767}\ \cancel{22,230.898}\ 22,230.898\ dpm/mL$$

CW 12/10/03 MC 7/10/08 SD 12/10/03

CW 12/1/03

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 MC 7/10/08
Activity: ~~22341.71~~ dpm/mL 22,230.898
2s Uncertainty: ~~744.72~~ MC dpm/mL 1/111
Ref. Date: 12/1/01 7/10/08
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

RG 12/13/04
Stnd ID: 600.2613.30
Description: Sr-90 MC 7/10/08
Expiration: 11/29/05 22,230.898
Activity: ~~22341.71~~ dpm/mL
REQUIRES NCR FOR ICPT WORK.
2s Uncertainty: ~~744.72~~ dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 12/1/03 Prep by: CRW
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01
RG 12/13/04 RG 12/13/04 RG 12/13/04

RG 4/26/05
Stnd ID: 600.2613.30
Description: Sr-90
Expiration: 12/28/05 MC 7/10/08
Activity: ~~22341.71~~ 22,230.898 dpm/mL
2s Uncertainty: ~~744.72~~ 1/111 dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 12/1/03 Prep by: CRW
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01
Requires NCR for ICPT Work
RG 4/26/05

RG 3/9/06
Stnd ID: 600.2613.30
Description: Sr-90
Expiration: 2/27/07 MC 7/10/08
Activity: ~~22341.71~~ 22,230.898 dpm/mL
2s Uncertainty: ~~744.72~~ 1/111 dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 12/1/03 Prep by: CRW
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01
DC 3/9/N 30/6/5 98

Continued on Page

Signed [signature] Date 12/1/03 RG 12/13/04
Read and Understood By
Signed [signature] Date 12/10/03

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: 12-4-01

Prepare a working dilution of Am-241 from Intermediate dilution 616.2382.91 of approximately 100 dpm/ml.

1) Prepare 1M HCl. 83 ml of HCl and 917 ml DI Water
Lot#: 074725

Bal.

2) Determine Density of 1M HCl.

| | | |
|---|---|---|
| Mass of 100ml volumetric flask: | 68.3004 g | 12 |
| Mass of flask & 100ml 1M HCl: | 169.5480 g | ↓ |
| Net mass of 1M HCl: | 101.2~~836~~ 476 g DBC 9/22/08 | |

$\rho$ = 1.012~~8~~ 5 g/ml DBC 9/22/08

3) Determine mass of standard 616.2382.91.

| | | |
|---|---|---|
| Mass of empty bottle without lid | 74.3436 g | 12 |
| Mass of bottle and standard: | 78.0860 g | ↓ |
| Net mass of standard: | 3.7424 g | |

4) Dilute with acid.

| | | |
|---|---|---|
| Mass of empty bottle without lid: | 74.3436 g | 12 |
| Mass of bottle, standard, and diluent: | 1087.2 g | 26 |
| Net mass of standard and diluent: | 1012.8~~37~~ 56 g DBC 9/22/08 | |

5) Final Activity Calculation

$$\frac{\cancel{27,168.64}\ 27,201.49 \text{ dpm/g} \cdot 3.7424\text{g} \cdot 1.012\cancel{8}5 \text{ g/ml}}{1012.8\cancel{37}56\text{ g}} = 101.\cancel{67}76 \text{ dpm/ml}$$

DBC 9/22/08 DBC 9/22/08 DBC 9/22/08

JRK 9/29/08

Stnd ID: **616.3610.13**

Description: **Am-241**
Expiration: **9/25/2009**
Activity: **101.76** **dpm/mL**
Uncertainty: **2.37** **dpm/mL** JRK 9/29/08
Ref. Date: **4/18/2002**
Ref Time: **N/A**
Prep Date: **9/22/2008** Prep by: **DBC**
Matrix/Comp. **1.0M HCl**
Half Life (y): **4.32E+02**

| Reverification Log | | |
|---|---|---|
| Analysis Date | Initials | Expiration Date |
| | | |
| | | |
| | | |
| | | |
| | | |

JRK 9/25/08

JRK 9/29/08

Signed: [signature] Date: 9/22/08 Signed: [signature] Date: 9/23/08

Am-241 intermediary dilution

Prepare an intermediate dilution of 616.2382.38 by diluting with 1M HCL (lot 43015)

(1) Determine the density of 1M HCL

| | |
|---|---|
| mass of 100 ml Class A volumetric flask | 67.5757 g (bal 12 |
| mass of flask and 1M HCl | 168.8580 g |
| net mass of 1M HCL | 101.2823 |
| | ρ = 1.0128 g/ml |

(2) Transfer Am-241 (616.2382.38) to a 40 ml VOA vial

| | |
|---|---|
| mass of empty VOA vial with cut lid + 50 ml beaker | 54.0248 g (bal |
| mass of standard, transfer pipet + 50 ml beaker (initial) | 95.0640 g |
| mass of standard, transfer pipet + 50 ml beaker after transfer) | CM 4/25/03 ~~74~~ 75.0076 g |
| net mass of standard transferred | 20.0564 g |

(3) Dilute to final volume with 1M HCL

| | |
|---|---|
| mass of empty VOA VIAL w/o lid + 50 ml beaker (from above) | 54.0248 g bal |
| mass of standard, 1M HCL VOA vial + 50 ml beaker | 92.4609 g |
| net mass of standard | 38.4361 g |

(4) final activity calculation

SD 8/1/03 $\frac{(\cancel{52{,}066}\ 52{,}128.96\ dpm/g)(20.0564\ g)}{38.4361\ g} = \cancel{27168.64}\ 27{,}201.49\ dpm/g$ MC 11/1/07

Continued on Page

Read and Understood By

Signed C Moncavage Date 4/25/03 Signed Renee Vallejos Date 5/5/03

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

PARAGON ANALYTICS
Radiochemistry Data Package

Section 9

# ADDITIONAL SUPPORTING DOCUMENTATION

9

# Gas Proportional Counter

# Instrument Calibration

# Background Calibration

## LB4100-C

**Weekly Instrument Calibration and Check**
**Background Determination**

| Detector ID | Alpha CPM | Alpha LCL | Alpha UCL | Alpha Flag | Beta CPM | Beta LCL | Beta UCL | Beta Flag | Detector ID |
|---|---|---|---|---|---|---|---|---|---|
| A1 (01) | 0.043 | 0.0280 | 0.0893 | PASS | 1.497 | 1.330 | 1.638 | PASS | A1 (01) |
| A2 (02) | 0.043 | 0.0258 | 0.0855 | PASS | 1.507 | 1.370 | 1.682 | PASS | A2 (02) |
| A3 (03) | 0.046 | 0.0307 | 0.0938 | PASS | 1.488 | 1.359 | 1.670 | PASS | A3 (03) |
| A4 (04) | 0.039 | 0.0315 | 0.0952 | PASS | 1.487 | 1.374 | 1.688 | PASS | A4 (04) |
| B1 (05) | 0.063 | 0.0320 | 0.0960 | PASS | 1.584 | 1.445 | 1.765 | PASS | B1 (05) |
| B2 (06) | 0.040 | 0.0251 | 0.0842 | PASS | 1.540 | 1.372 | 1.685 | PASS | B2 (06) |
| B3 (07) | 0.066 | 0.0446 | 0.1164 | PASS | 1.572 | 1.440 | 1.760 | PASS | B3 (07) |
| B4 (08) | 0.051 | 0.0330 | 0.0977 | PASS | 1.554 | 1.464 | 1.787 | PASS | B4 (08) |
| C1 (09) | 0.071 | 0.0309 | 0.0941 | PASS | 1.766 | 1.630 | 1.969 | PASS | C1 (09) |
| C2 (10) | 0.056 | 0.0343 | 0.0997 | PASS | 1.538 | 1.416 | 1.733 | PASS | C2 (10) |
| C3 (11) | 0.064 | 0.0313 | 0.0947 | PASS | 1.562 | 1.504 | 1.831 | PASS | C3 (11) |
| C4 (12) | 0.055 | 0.0358 | 0.1022 | PASS | 1.641 | 1.479 | 1.803 | PASS | C4 (12) |
| D1 (13) | 0.058 | 0.0375 | 0.1050 | PASS | 1.683 | 1.512 | 1.840 | PASS | D1 (13) |
| D2 (14) | 0.049 | 0.0270 | 0.0876 | PASS | 1.558 | 1.371 | 1.684 | PASS | D2 (14) |
| D3 (15) | 0.054 | 0.0308 | 0.0939 | PASS | 1.549 | 1.471 | 1.794 | PASS | D3 (15) |
| D4 (16) | 0.053 | 0.0208 | 0.0766 | PASS | 1.662 | 1.452 | 1.773 | PASS | D4 (16) |

Reviewed by: JP                                        Date: 12/4/08

Interim Control Limits Set 11/12/08 by JCP

# Gas Proportional Counter

# Quality Control Data

# Daily Background Checks

**LB4100-C**

**Daily Instrument Performance Checks**
**Background Checks**

| Detector ID | Alpha CPM | Alpha LCL | Alpha UCL | Alpha Flag | Beta CPM | Beta LCL | Beta UCL | Beta Flag | Detector ID |
|---|---|---|---|---|---|---|---|---|---|
| A1 (01) | 0.117 | -0.037 | 0.123 | PASS | 1.733 | 1.023 | 1.971 | PASS | A1 (01) |
| A2 (02) | 0.100 | -0.037 | 0.123 | PASS | 1.950 | 1.032 | 1.982 | PASS | A2 (02) |
| A3 (03) | 0.017 | -0.037 | 0.129 | PASS | 1.700 | 1.016 | 1.960 | PASS | A3 (03) |
| * A4 (04) | 0.167 | -0.037 | 0.115 | FLAG-HIGH | 1.717 | 1.015 | 1.959 | PASS | A4 (04) |
| B1 (05) | 0.067 | -0.034 | 0.160 | PASS | 1.883 | 1.097 | 2.071 | PASS | B1 (05) |
| B2 (06) | 0.100 | -0.037 | 0.117 | PASS | 1.933 | 1.059 | 2.021 | PASS | B2 (06) |
| B3 (07) | 0.067 | -0.033 | 0.165 | PASS | 2.117 | 1.086 | 2.058 | FLAG-HIGH | B3 (07) * |
| * B4 (08) | 0.167 | -0.036 | 0.138 | FLAG-HIGH | 1.750 | 1.071 | 2.037 | PASS | B4 (08) |
| C1 (09) | 0.133 | -0.032 | 0.174 | PASS | 2.200 | 1.251 | 2.281 | PASS | C1 (09) |
| * C2 (10) | 0.167 | -0.036 | 0.148 | FLAG-HIGH | 1.667 | 1.058 | 2.018 | PASS | C2 (10) |
| C3 (11) | 0.083 | -0.034 | 0.162 | PASS | 1.567 | 1.078 | 2.046 | PASS | C3 (11) |
| C4 (12) | 0.067 | -0.036 | 0.146 | PASS | 1.533 | 1.145 | 2.137 | PASS | C4 (12) |
| D1 (13) | 0.083 | -0.035 | 0.151 | PASS | 1.750 | 1.181 | 2.185 | PASS | D1 (13) |
| D2 (14) | 0.117 | -0.037 | 0.135 | PASS | 1.900 | 1.075 | 2.041 | PASS | D2 (14) |
| D3 (15) | 0.117 | -0.036 | 0.144 | PASS | 1.833 | 1.067 | 2.031 | PASS | D3 (15) |
| D4 (16) | 0.050 | -0.036 | 0.142 | PASS | 1.683 | 1.163 | 2.161 | PASS | D4 (16) |

*Recount in file BKC1208R.

Reviewed by: JP

Date: 12/8/08

Control Limits established from previous weekly background determinations.
Weekly Background File: BKC1203W Date: 12/3/2008 Analyst: JCP

## LB4100-C

**Daily Instrument Performance Checks**
**Background Checks**

| Detector ID | Alpha CPM | Alpha LCL | Alpha UCL | Alpha Flag | Beta CPM | Beta LCL | Beta UCL | Beta Flag | Detector ID |
|---|---|---|---|---|---|---|---|---|---|
| A1 (01) | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | A1 (01) |
| A2 (02) | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | A2 (02) |
| A3 (03) | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | A3 (03) |
| A4 (04) | 0.083 | -0.037 | 0.115 | PASS | 1.817 | 1.015 | 1.959 | PASS | A4 (04) |
| B1 (05) | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | B1 (05) |
| B2 (06) | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | B2 (06) |
| B3 (07) | 0.083 | -0.033 | 0.165 | PASS | 1.500 | 1.086 | 2.058 | PASS | B3 (07) |
| B4 (08) | 0.033 | -0.036 | 0.138 | PASS | 1.600 | 1.071 | 2.037 | PASS | B4 (08) |
| C1 (09) | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | C1 (09) |
| C2 (10) | 0.133 | -0.036 | 0.148 | PASS | 1.800 | 1.058 | 2.018 | PASS | C2 (10) |
| C3 (11) | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | C3 (11) |
| C4 (12) | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | C4 (12) |
| D1 (13) | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | D1 (13) |
| D2 (14) | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | D2 (14) |
| D3 (15) | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | D3 (15) |
| D4 (16) | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | #REF! | D4 (16) |

Reviewed by: JP Date: 12/8/08

Control Limits established from previous weekly background determinations.
Weekly Background File: BKC1203W Date: 12/3/2008 Analyst: JCP

# LB4100-C

**Daily Instrument Performance Checks**
**Background Checks**

| Detector ID | Alpha CPM | Alpha LCL | Alpha UCL | Alpha Flag | Beta CPM | Beta LCL | Beta UCL | Beta Flag | Detector ID |
|---|---|---|---|---|---|---|---|---|---|
| A1 (01) | 0.067 | -0.037 | 0.123 | PASS | 1.383 | 1.023 | 1.971 | PASS | A1 (01) |
| A2 (02) | 0.117 | -0.037 | 0.123 | PASS | 1.533 | 1.032 | 1.982 | PASS | A2 (02) |
| A3 (03) | 0.050 | -0.037 | 0.129 | PASS | 1.567 | 1.016 | 1.960 | PASS | A3 (03) |
| A4 (04) | 0.000 | -0.037 | 0.115 | PASS | 1.700 | 1.015 | 1.959 | PASS | A4 (04) |
| B1 (05) | 0.033 | -0.034 | 0.160 | PASS | 1.400 | 1.097 | 2.071 | PASS | B1 (05) |
| B2 (06) | 0.067 | -0.037 | 0.117 | PASS | 1.517 | 1.059 | 2.021 | PASS | B2 (06) |
| B3 (07) | 0.100 | -0.033 | 0.165 | PASS | 1.333 | 1.086 | 2.058 | PASS | B3 (07) |
| B4 (08) | 0.033 | -0.036 | 0.138 | PASS | 1.683 | 1.071 | 2.037 | PASS | B4 (08) |
| C1 (09) | 0.033 | -0.032 | 0.174 | PASS | 1.717 | 1.251 | 2.281 | PASS | C1 (09) |
| C2 (10) | 0.050 | -0.036 | 0.148 | PASS | 1.733 | 1.058 | 2.018 | PASS | C2 (10) |
| C3 (11) | 0.033 | -0.034 | 0.162 | PASS | 1.567 | 1.078 | 2.046 | PASS | C3 (11) |
| C4 (12) | 0.083 | -0.036 | 0.146 | PASS | 1.783 | 1.145 | 2.137 | PASS | C4 (12) |
| D1 (13) | 0.083 | -0.035 | 0.151 | PASS | 1.667 | 1.181 | 2.185 | PASS | D1 (13) |
| D2 (14) | 0.017 | -0.037 | 0.135 | PASS | 1.550 | 1.075 | 2.041 | PASS | D2 (14) |
| D3 (15) | 0.067 | -0.036 | 0.144 | PASS | 1.567 | 1.067 | 2.031 | PASS | D3 (15) |
| D4 (16) | 0.050 | -0.036 | 0.142 | PASS | 1.583 | 1.163 | 2.161 | PASS | D4 (16) |

Reviewed by: JP  Date: 12/9/08

Control Limits established from previous weekly background determinations.
Weekly Background File: BKC1203W  Date: 12/3/2008  Analyst: JCP

# Gas Proportional Counter

# Quality Control Data

# Daily Instrument Performance Checks

## LB4100-C

**Daily Instrument Preformance Check-Efficiency Determination**

| Detector ID | Alpha Eff. | Alpha LCL | Alpha UCL | Alpha Flag | Beta Eff. | Beta LCL | Beta UCL | Beta Flag | Detector ID |
|---|---|---|---|---|---|---|---|---|---|
| A1 (01) | 0.2057 | 0.1852 | 0.2263 | PASS | 0.4625 | 0.4339 | 0.5303 | PASS | A1 (01) |
| A2 (02) | 0.2195 | 0.1953 | 0.2387 | PASS | 0.4767 | 0.4355 | 0.5323 | PASS | A2 (02) |
| A3 (03) | 0.2207 | 0.1992 | 0.2434 | PASS | 0.4866 | 0.4296 | 0.5251 | PASS | A3 (03) |
| A4 (04) | 0.2222 | 0.1972 | 0.2410 | PASS | 0.4970 | 0.4478 | 0.5473 | PASS | A4 (04) |
| B1 (05) | 0.2268 | 0.2079 | 0.2541 | PASS | 0.5003 | 0.4451 | 0.5440 | PASS | B1 (05) |
| B2 (06) | 0.2074 | 0.1873 | 0.2289 | PASS | 0.4722 | 0.4234 | 0.5174 | PASS | B2 (06) |
| B3 (07) | 0.2271 | 0.1958 | 0.2393 | PASS | 0.4850 | 0.4396 | 0.5373 | PASS | B3 (07) |
| B4 (08) | 0.2207 | 0.2011 | 0.2458 | PASS | 0.4703 | 0.4290 | 0.5243 | PASS | B4 (08) |
| C1 (09) | 0.2150 | 0.1967 | 0.2404 | PASS | 0.4872 | 0.4380 | 0.5353 | PASS | C1 (09) |
| C2 (10) | 0.2249 | 0.2022 | 0.2471 | PASS | 0.4888 | 0.4433 | 0.5418 | PASS | C2 (10) |
| C3 (11) | 0.2171 | 0.1952 | 0.2386 | PASS | 0.4816 | 0.4337 | 0.5301 | PASS | C3 (11) |
| C4 (12) | 0.2334 | 0.2080 | 0.2542 | PASS | 0.4954 | 0.4480 | 0.5476 | PASS | C4 (12) |
| D1 (13) | 0.2238 | 0.1991 | 0.2433 | PASS | 0.4780 | 0.4479 | 0.5474 | PASS | D1 (13) |
| D2 (14) | 0.2196 | 0.2029 | 0.2480 | PASS | 0.4771 | 0.4435 | 0.5420 | PASS | D2 (14) |
| D3 (15) | 0.2225 | 0.2039 | 0.2492 | PASS | 0.4958 | 0.4486 | 0.5483 | PASS | D3 (15) |
| D4 (16) | 0.2318 | 0.2035 | 0.2487 | PASS | 0.5032 | 0.4413 | 0.5393 | PASS | D4 (16) |

Reviewed by: JP

Date: 12/8/08

Interim Control Limits Established 11/12/2008 by JCP



EFC1208.XLD

Printed 12/8/2008 7:57 AM

## LB4100-C

**Daily Instrument Preformance Check-Efficiency Determination**

| Detector ID | Alpha Eff. | Alpha LCL | Alpha UCL | Alpha Flag | Beta Eff. | Beta LCL | Beta UCL | Beta Flag | Detector ID |
|---|---|---|---|---|---|---|---|---|---|
| A1 (01) | 0.2079 | 0.1852 | 0.2263 | PASS | 0.4763 | 0.4339 | 0.5303 | PASS | A1 (01) |
| A2 (02) | 0.2175 | 0.1953 | 0.2387 | PASS | 0.4780 | 0.4355 | 0.5323 | PASS | A2 (02) |
| A3 (03) | 0.2247 | 0.1992 | 0.2434 | PASS | 0.4937 | 0.4296 | 0.5251 | PASS | A3 (03) |
| A4 (04) | 0.2276 | 0.1972 | 0.2410 | PASS | 0.4958 | 0.4478 | 0.5473 | PASS | A4 (04) |
| B1 (05) | 0.2334 | 0.2079 | 0.2541 | PASS | 0.4914 | 0.4451 | 0.5440 | PASS | B1 (05) |
| B2 (06) | 0.2065 | 0.1873 | 0.2289 | PASS | 0.4769 | 0.4234 | 0.5174 | PASS | B2 (06) |
| B3 (07) | 0.2201 | 0.1958 | 0.2393 | PASS | 0.4746 | 0.4396 | 0.5373 | PASS | B3 (07) |
| B4 (08) | 0.2173 | 0.2011 | 0.2458 | PASS | 0.4867 | 0.4290 | 0.5243 | PASS | B4 (08) |
| C1 (09) | 0.2163 | 0.1967 | 0.2404 | PASS | 0.4882 | 0.4380 | 0.5353 | PASS | C1 (09) |
| C2 (10) | 0.2278 | 0.2022 | 0.2471 | PASS | 0.4879 | 0.4433 | 0.5418 | PASS | C2 (10) |
| C3 (11) | 0.2123 | 0.1952 | 0.2386 | PASS | 0.4823 | 0.4337 | 0.5301 | PASS | C3 (11) |
| C4 (12) | 0.2332 | 0.2080 | 0.2542 | PASS | 0.5033 | 0.4480 | 0.5476 | PASS | C4 (12) |
| D1 (13) | 0.2211 | 0.1991 | 0.2433 | PASS | 0.4800 | 0.4479 | 0.5474 | PASS | D1 (13) |
| D2 (14) | 0.2192 | 0.2029 | 0.2480 | PASS | 0.4874 | 0.4435 | 0.5420 | PASS | D2 (14) |
| D3 (15) | 0.2253 | 0.2039 | 0.2492 | PASS | 0.4967 | 0.4486 | 0.5483 | PASS | D3 (15) |
| D4 (16) | 0.2329 | 0.2035 | 0.2487 | PASS | 0.5099 | 0.4413 | 0.5393 | PASS | D4 (16) |

Reviewed by: JP                                        Date: 12/9/08

Interim Control Limits Established 11/12/2008 by JCP

# Gas Proportional Counter

# Instrument Calibration

# Initial Efficiency Calibration
# Standards Traceability

**Instrument: LB4100-C**

Calibration: Gross Alpha / Beta

Date of Calibration: 11/17/2008

Efficiency Log Files: Am241R-11/08
Sr90R-11/08

Efficiency Files: EAM1117, EAM1117A,
EAM1117B, EAM1117C,
ESR1117, ESR1117A,
ESR1117B, ESR1117C

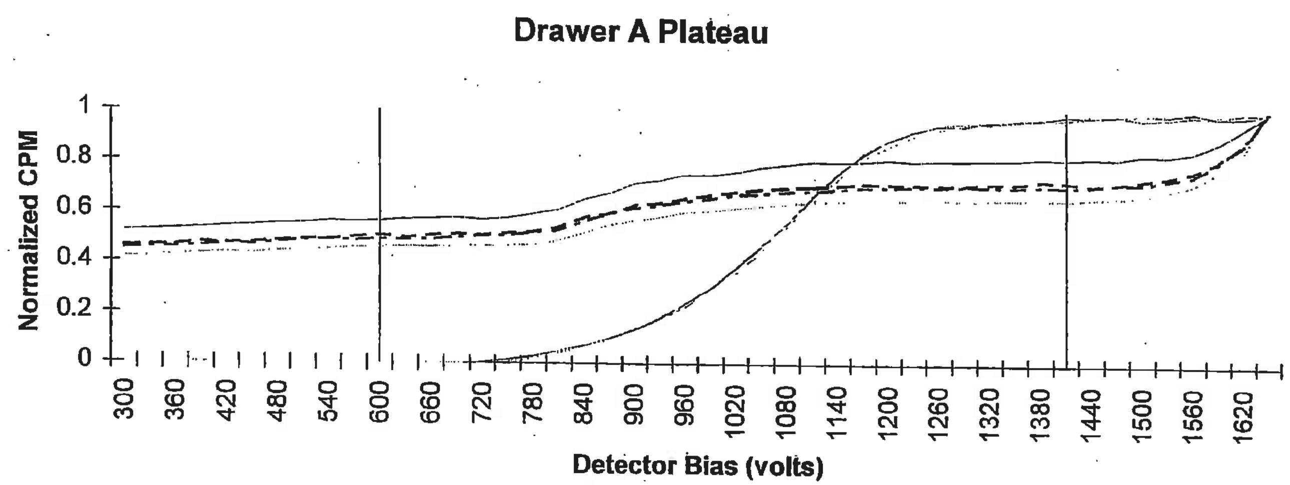
Source ID's: Am-241 – 585.1320.27
Sr-90 – 777.3020.11

RG 12/8/08

# Instrument Plateaus

Unit Type: LB4100/W
Date Performed: 11/3/08 14:45
FileName: PTC1103A
Batch ID: DRAWER A PLATAEU

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




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 600

| | A1 | A2 | A3 | A4 |
|---|---|---|---|---|
| Beta slope at beta voltage | 1.59% | 1.56% | 2.10% | 1.28% |
| Alpha slope at beta voltage | 0.58% | -0.47% | 1.11% | 1.49% |
| Alpha slope at alpha voltage | 1.66% | 1.97% | 2.03% | 0.65% |

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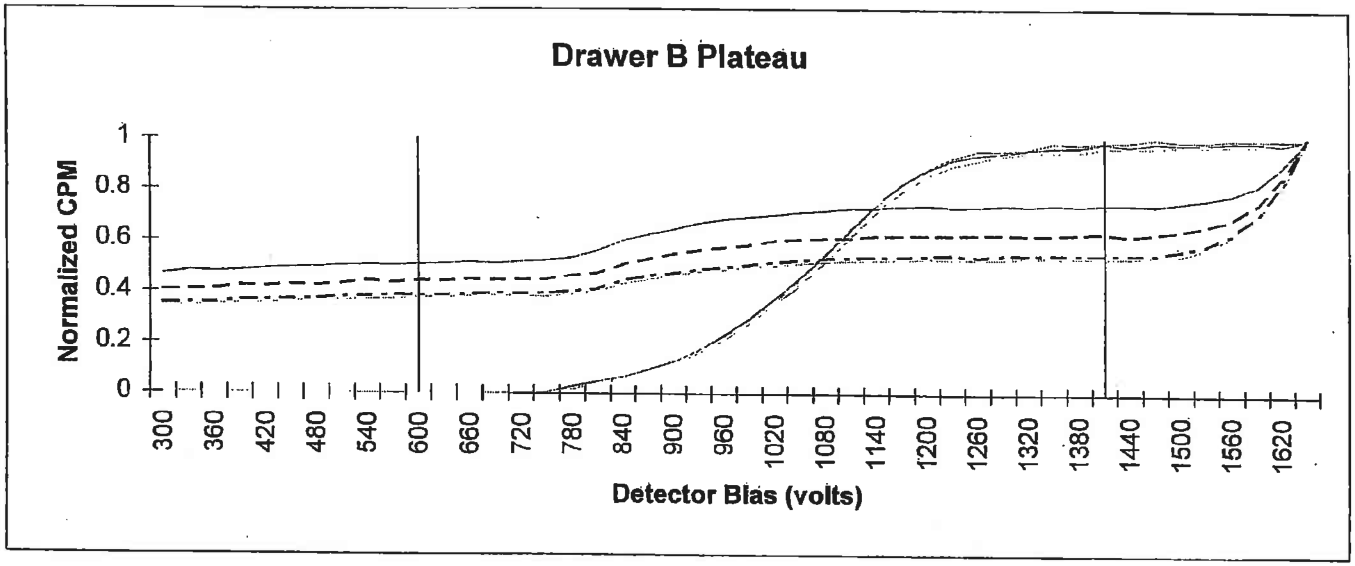
Unit Type: LB4100/W
Date Performed: 11/3/08 14:46
FileName: PTC1103B
Batch ID: DRAWER B PLATEAU

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




Optimum alpha beta simultaneous operating voltage: 1402.5

Optimum alpha only operating voltage: 600

| | B1 | B2 | B3 | B4 |
|---|---|---|---|---|
| Beta slope at beta voltage | 1.42% | 1.48% | 1.77% | 1.13% |
| Alpha slope at beta voltage | 0.02% | 0.43% | 1.38% | 0.28% |
| Alpha slope at alpha voltage | 1.75% | 1.24% | 2.45% | 1.29% |

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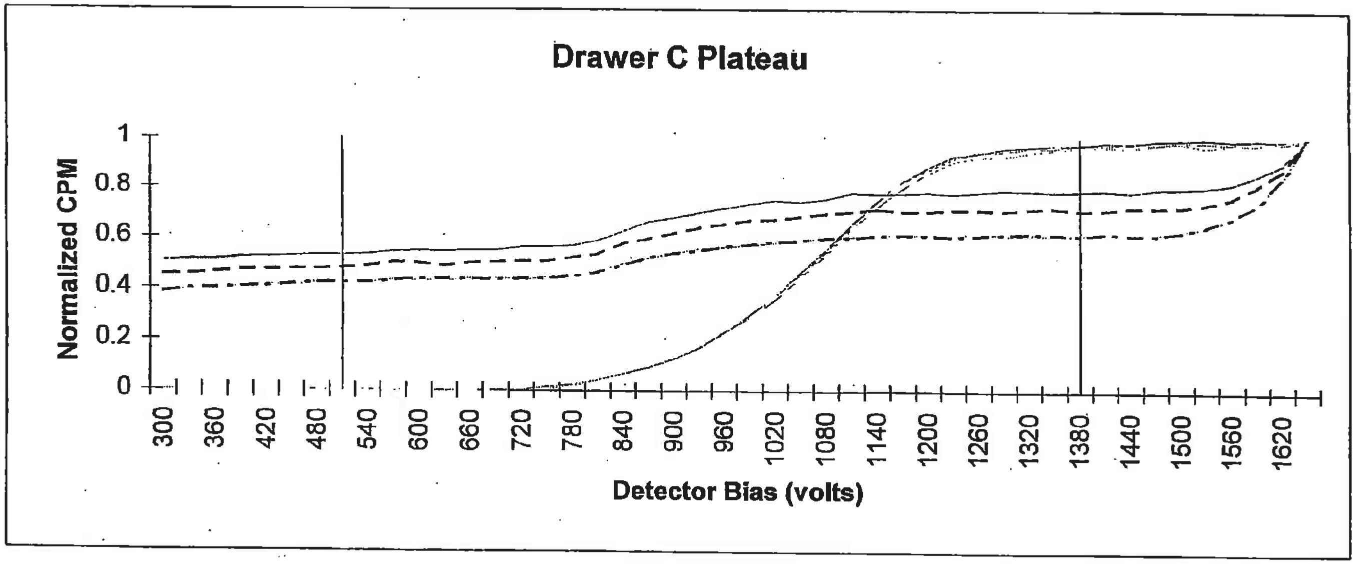
Unit Type: LB4100/W
Date Performed: 11/10/08 07:17
FileName: PTC1110C
Batch ID: DRAWER C PLATEAU

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




Optimum alpha beta simultaneous operating voltage: 1380

Optimum alpha only operating voltage: 502.5

| | C1 | C2 | C3 | C4 |
|---|---|---|---|---|
| Beta slope at beta voltage | 1.24% | 1.84% | 1.83% | 1.73% |
| Alpha slope at beta voltage | -0.20% | 0.22% | 0.68% | -0.31% |
| Alpha slope at alpha voltage | 2.43% | 4.62% | 3.87% | 2.67% |

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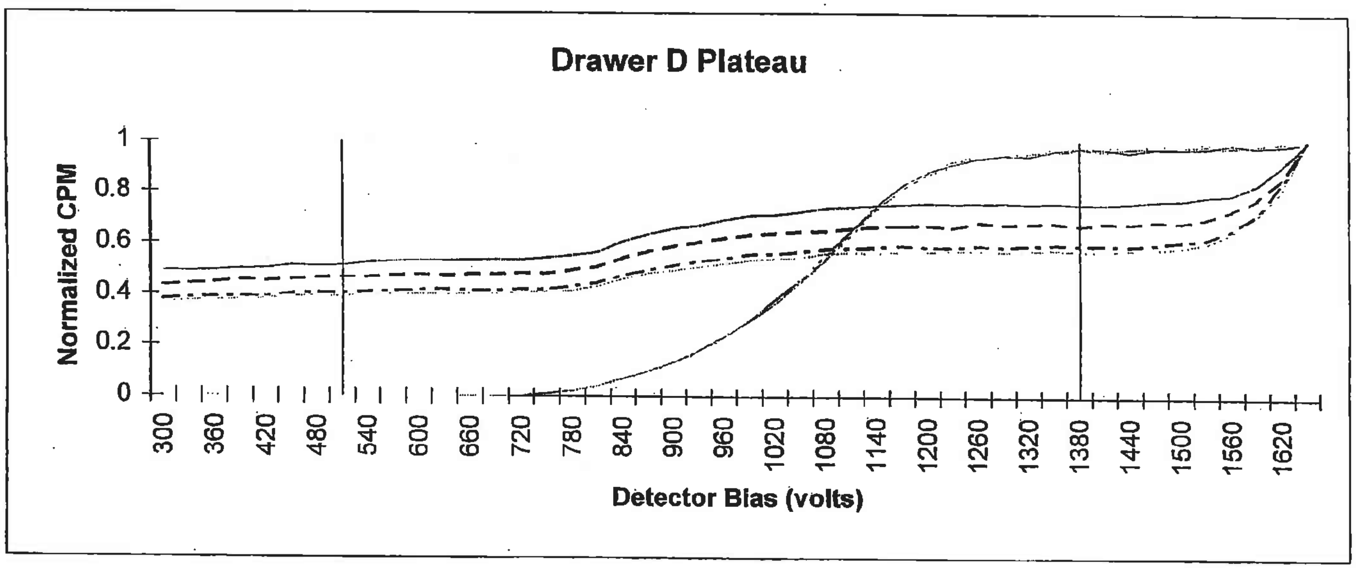
| | |
|---|---|
| Unit Type: LB4100/W | Unit Id: Magenta |
| Date Performed: 11/10/08 07:17 | Application Revision: 2 |
| FileName: PTC1110D | Application Version: Standard |
| Batch ID: DRAWER D PLATEAU | |




Optimum alpha beta simultaneous operating voltage: 1372.5

Optimum alpha only operating voltage: 517.5

| | D1 | D2 | D3 | D4 |
|---|---|---|---|---|
| Beta slope at beta voltage | 1.36% | 1.41% | 1.33% | 1.85% |
| Alpha slope at beta voltage | 0.08% | -0.08% | 0.26% | -0.33% |
| Alpha slope at alpha voltage | 3.06% | 2.67% | 2.49% | 2.10% |

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11/3/08
11/10/08 Plateaus For Drawers A, B, C, & D

| α Sources Used | | Detectors | | | | β Sources Used | |
|---|---|---|---|---|---|---|---|
| 410 | Am241 | A1 | B1 | C1 | D1 | 406 | Sr/Y-90 |
| 411 | 17,800 dpm | A2 | B2 | C2 | D2 | 407 | 29,600 dpm |
| 412 | 2/06/95 | A3 | B3 | C3 | D3 | 408 | 9/15/02 |
| 413 | ↓ | A4 | B4 | C4 | D4 | 409 | ↓ |

Parameters

Start Voltage: 300
Ending Voltage: 1650
30 Volts/Step
5 min/Step
Count Preset: 40,000
Weak Check Time: 0.1 min
Weak Counts Limit: 20

Filenames

PTC1103A
PTC1103B
PTC1110C
PTC1110D

11/12/08 ROI's Set Using Sr/Y-90 Plateau Sources

11/13/08 Am 241 Wipe Calibration

Source: #746 Source ID: 1001 Log File: Am241Wipe-11/08

Filenames: EAW1113, A→O

α to β Crosstalk Calculated for each detector using the following equation: $\frac{\text{counts in Beta Channel}}{\text{counts in Alpha Channel}}$

11/12/08 Interim ~~Coon~~ TP 11/13/08 Control Limits established for daily efficiency and weekly background calibrations. Efficiency limits are ± 10% of 11/12/08 check and background limits are ±3σ Counting Uncertainty of 11/11/08 check (1000 min count)

Continued on Page

Read and Understood By

Signed [signature] Date 11/17/08 Signed [signature] Date 11/19/08 RS

Date 11/3/08

SOP 724r 10

**Paragon Analytics**
Low Background Gas Flow Proportional Counter Log
**Instrument: LB4100C**

| Det. | Sample ID | Batch | Test | Count Dur. (min) | Start Time | Analyst Initials | File ID | Output Initials |
|---|---|---|---|---|---|---|---|---|
| 1-4 | Alpha/Beta | DrawerA Plateau | Plateau | 5 min/Step | 14:45 | JP | PTC1103A | JP |
| 5-8 | Beta/Alpha | DrawerB Plateau | ↓ | ↓ | ↓ | ↓ | PTC1103B | JP |

JP 11/4/08

Comments:

Page No.: 370901 B
(cont. from page NA B)

Form 780r8.doc (6/23/06)

Reviewed By / Date JP 11/4/08

Date 11/10/08

SOP 724r 10

**Paragon Analytics**

Low Background Gas Flow Proportional Counter Log

**Instrument: LB4100C**

| Det. | Sample ID | Batch | Test | Count Dur. (min) | Start Time | Analyst Initials | File ID | Output Initials |
|---|---|---|---|---|---|---|---|---|
| 9-12 | Alpha/Beta | Drawer C Plateau | Plateau | 5 min/Step | 7:17 | JP | PTC1110C | JP |
| 13-16 | Beta/Alpha | Drawer D Plateau | ↓ | ↓ | ↓ | JP | PTC1110D | JP |

JP 11/11/08

Comments:

Page No.: 370902 B

(cont. from page NA B)

Form 780r8.doc (6/23/06)

Reviewed By / Date JP 11/11/08

# Instrument ROIs

Batch Specific:

| | Event | Recycle |
|---|---|---|
| Magenta | 1 | 0.01 |

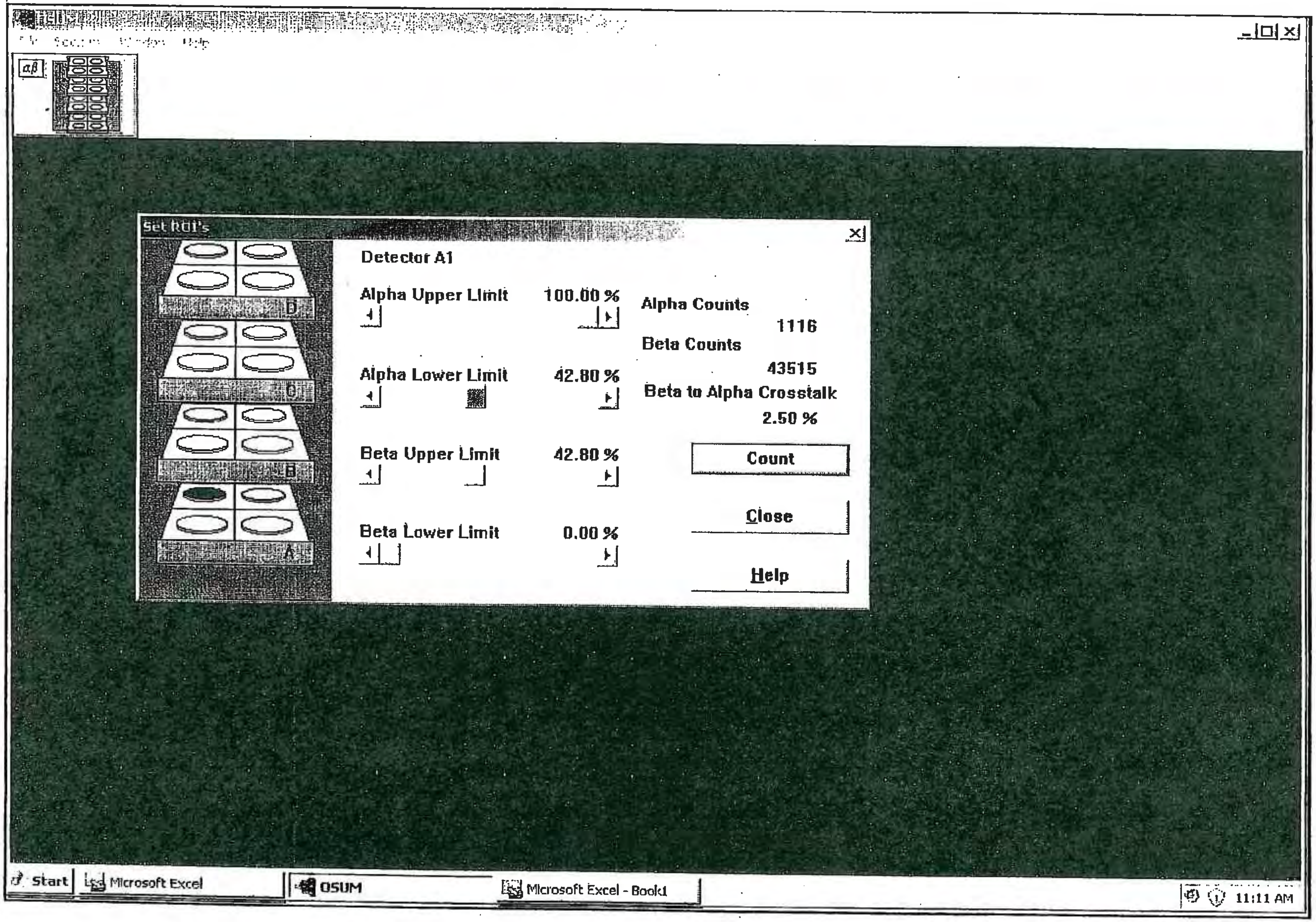
Drawer Specific:

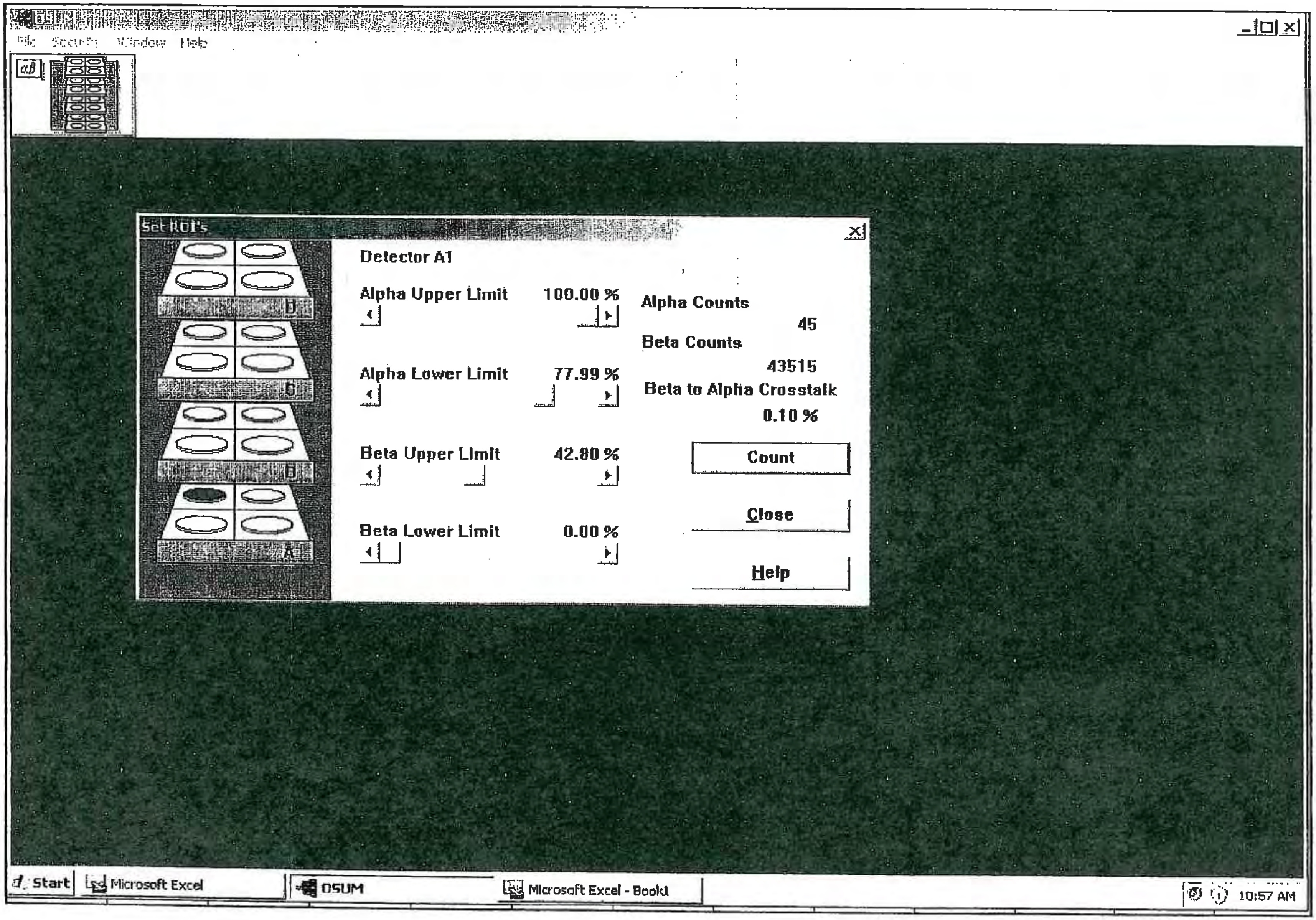
| | Date/Time | Official | Bias | Step |
|---|---|---|---|---|
| A | 11-3-08 14:45 | TRUE | 1402.6 | 0 |
| B | 11-3-08 14:48 | TRUE | 1402.5 | 0 |
| C | 11-10-08 7:17 | TRUE | 1380 | 0 |
| D | 11-10-08 7:17 | TRUE | 1372.5 | 0 |

Detector Specific:

| | Date/Time | Official | Thres | bLL | bUL | aLL | aUL | Time | bCntPst | bPstTm | aCntPst | aPstTm | bWkCnt | bWkTm | aWkCnt | aWkTm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 42.8 | 77.99 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| A2 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 44.27 | 78.29 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| A3 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 42.22 | 78.48 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| A4 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 41.7 | 82.12 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| B1 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 43.9 | 84.88 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| B2 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 43.1 | 79.92 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| B3 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 42.58 | 79.02 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| B4 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 41.68 | 75.77 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| C1 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 34.08 | 63.58 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| C2 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 32.88 | 64.59 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| C3 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 33.43 | 61.92 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| C4 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 34.4 | 64.17 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| D1 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 31.69 | 59.31 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| D2 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 31.37 | 59.38 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| D3 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 30.06 | 58.73 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| D4 | 11-11-08 0:00 | TRUE | 0.1 | 0 | 31.2 | 57.36 | 100 | 30 | 10000 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |

Printed 11/19/2008 12:00 PM


Set ROI's
D
C
B
A
Detector A1
Alpha Upper Limit
100.00 %
Alpha Lower Limit
42.80 %
Beta Upper Limit
42.80 %
Beta Lower Limit
0.00 %
Alpha Counts
1116
Beta Counts
43515
Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
11:11 AM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Set ROI's
Detector A1
Alpha Upper Limit
100.00 %
Alpha Lower Limit
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42.80 %
Beta Lower Limit
0.00 %
Alpha Counts
45
Beta Counts
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Beta to Alpha Crosstalk
0.10 %
Count
Close
Help
D
C
B
A
Start
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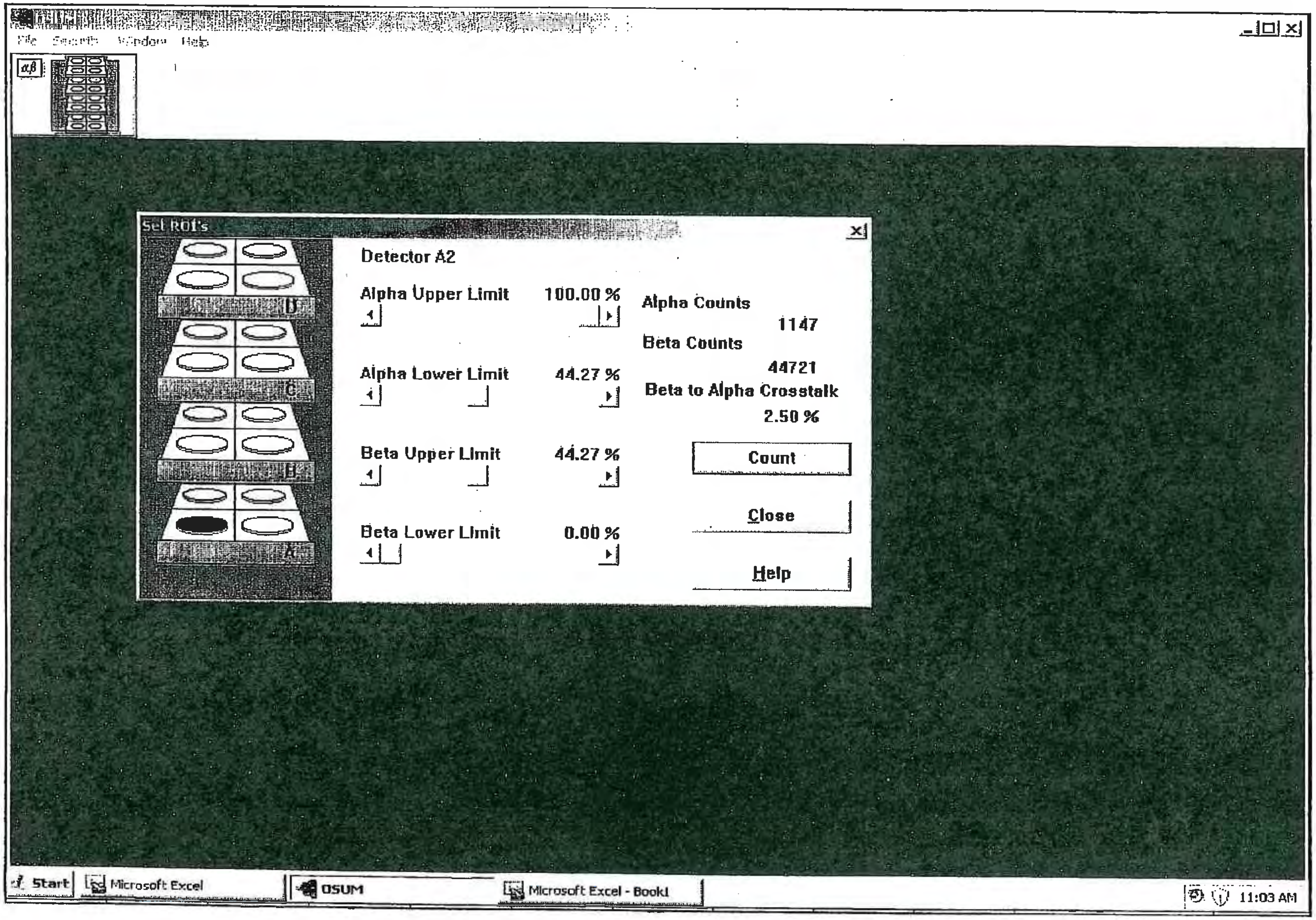
10:57 AM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Alpha Lower Limit
44.27 %
Beta Upper Limit
44.27 %
Beta Lower Limit
0.00 %
Alpha Counts
1147
Beta Counts
44721
Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
D
C
B
A
Start
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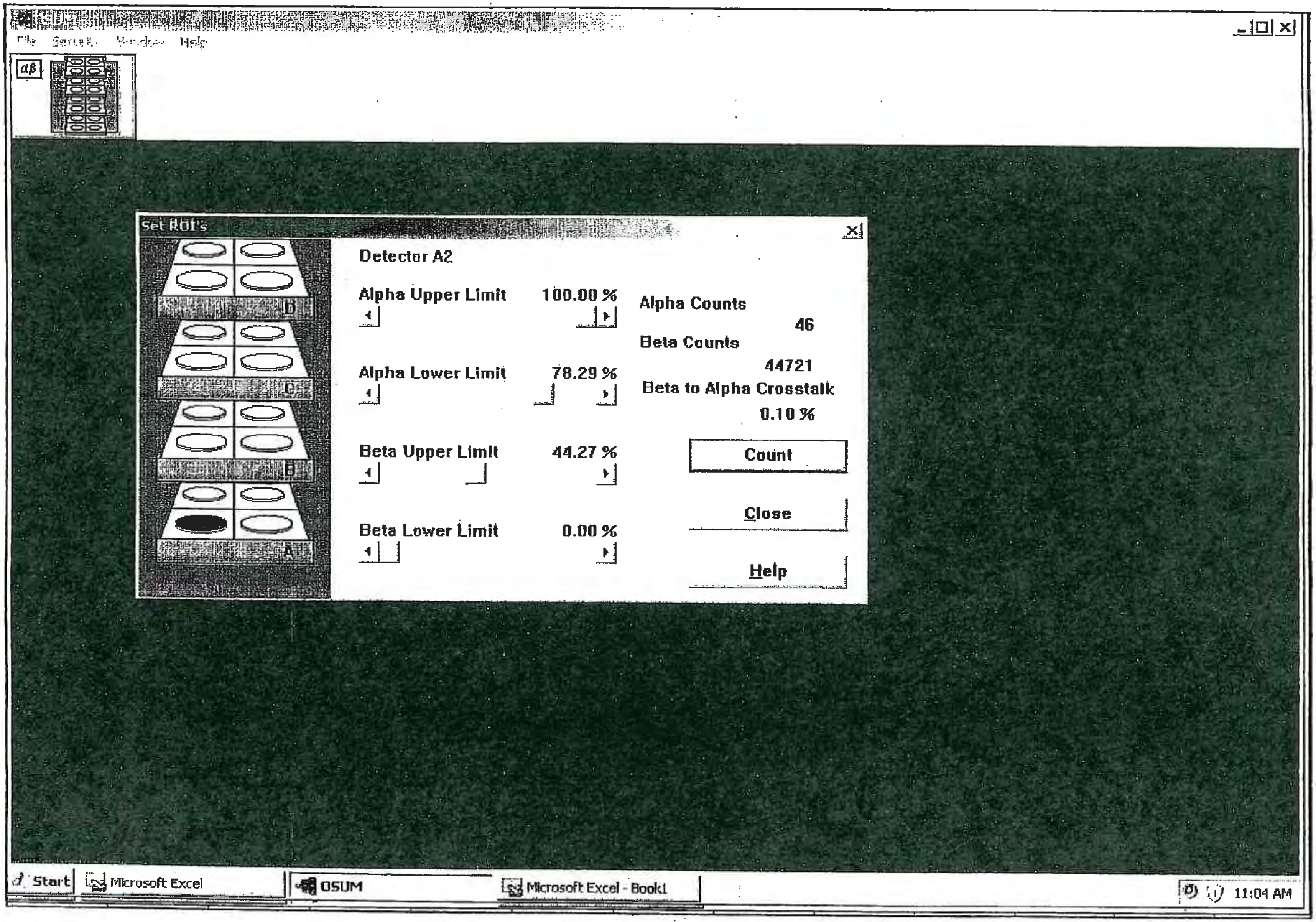
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Detector A2
Alpha Upper Limit 100.00 %
Alpha Lower Limit 78.29 %
Beta Upper Limit 44.27 %
Beta Lower Limit 0.00 %
Alpha Counts
46
Beta Counts
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Beta to Alpha Crosstalk
0.10 %
Count
Close
Help
Start
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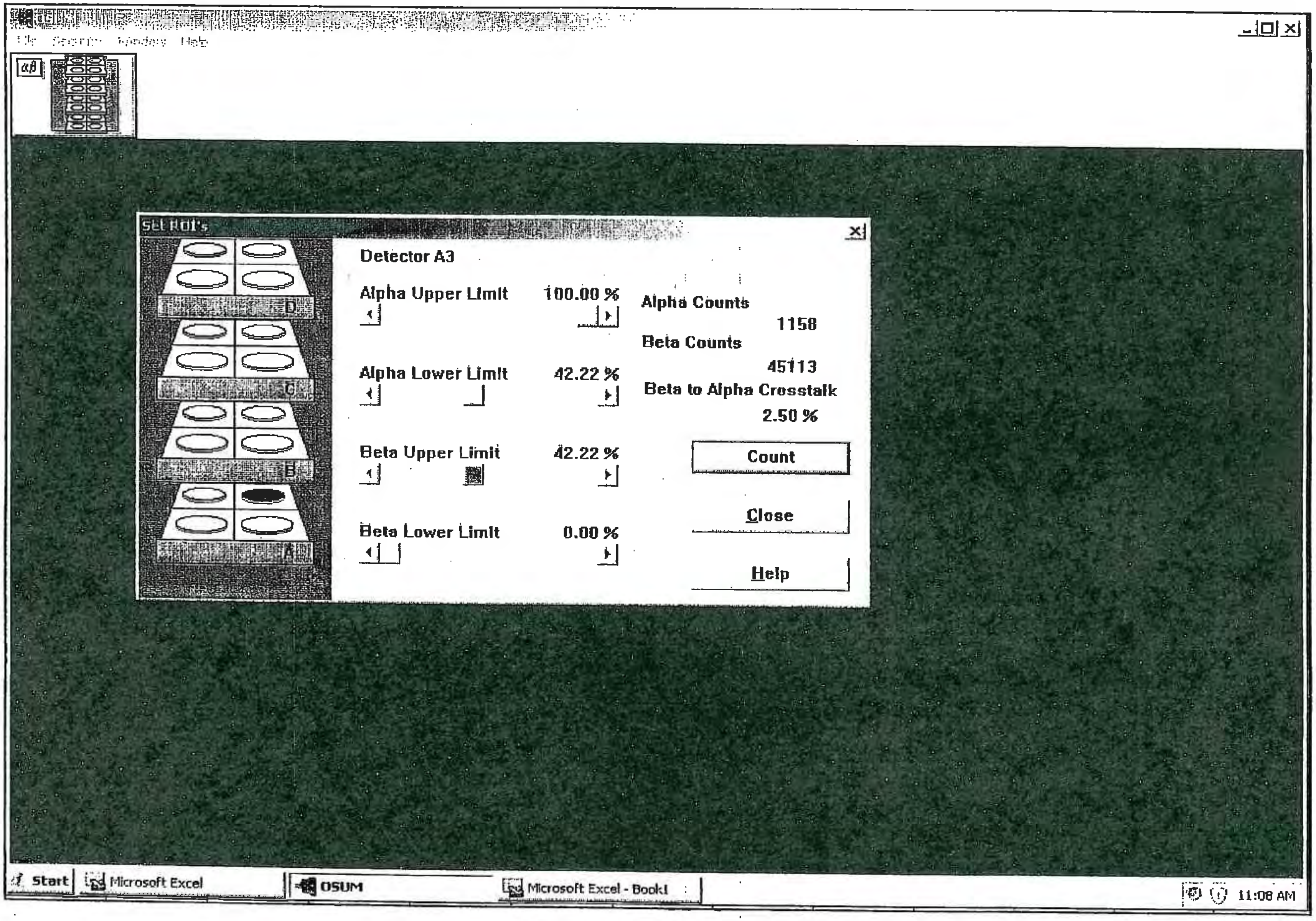
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Alpha Lower Limit
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Beta Upper Limit
42.22 %
Beta Lower Limit
0.00 %
Alpha Counts
1158
Beta Counts
45113
Beta to Alpha Crosstalk
2.50 %
Count
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Help
D
C
B
A
Start
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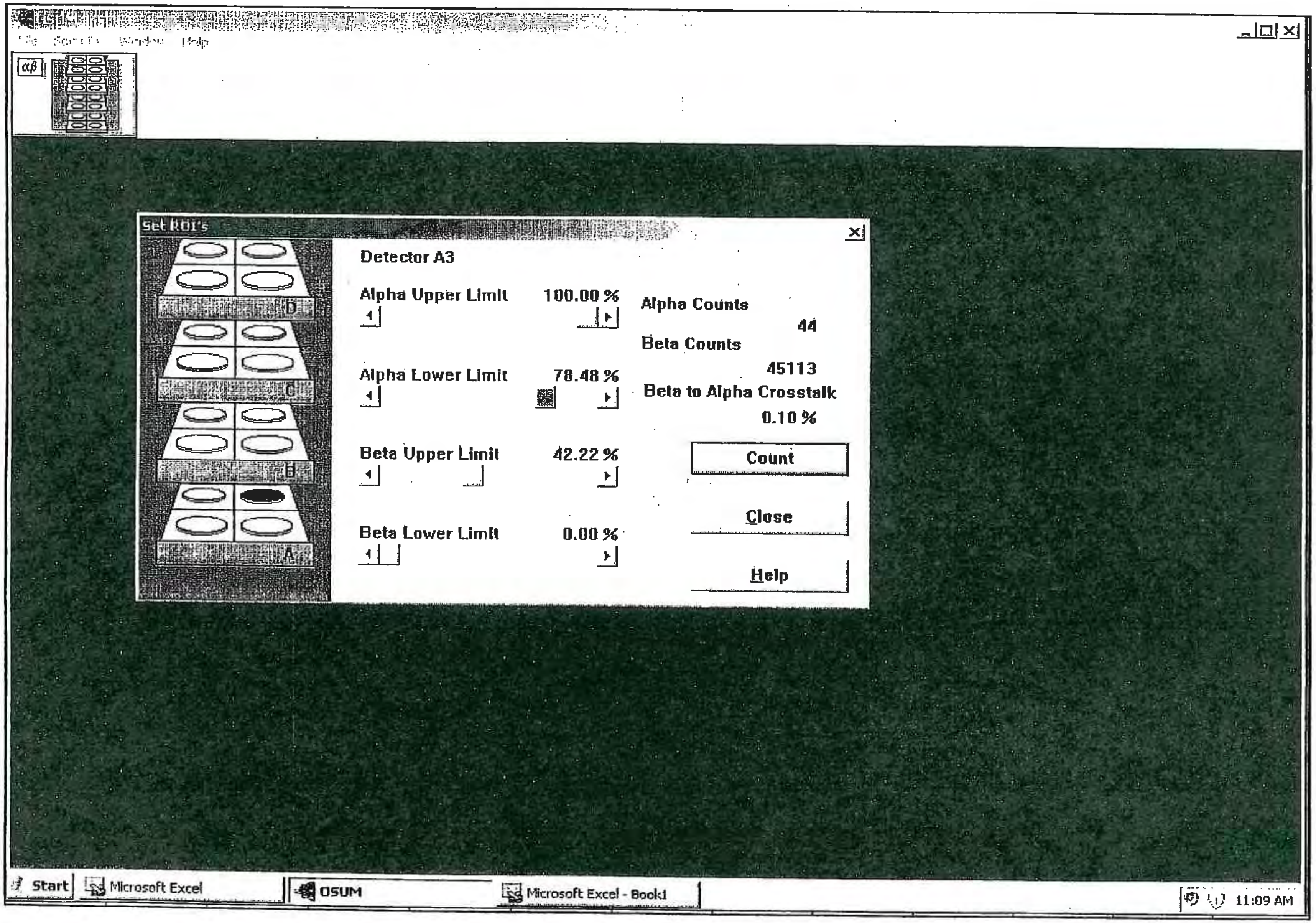
11:08 AM


Set ROI's
D
C
B
A
Detector A3
Alpha Upper Limit
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Alpha Lower Limit
78.48 %
Beta Upper Limit
42.22 %
Beta Lower Limit
0.00 %
Alpha Counts
44
Beta Counts
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Beta to Alpha Crosstalk
0.10 %
Count
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Help
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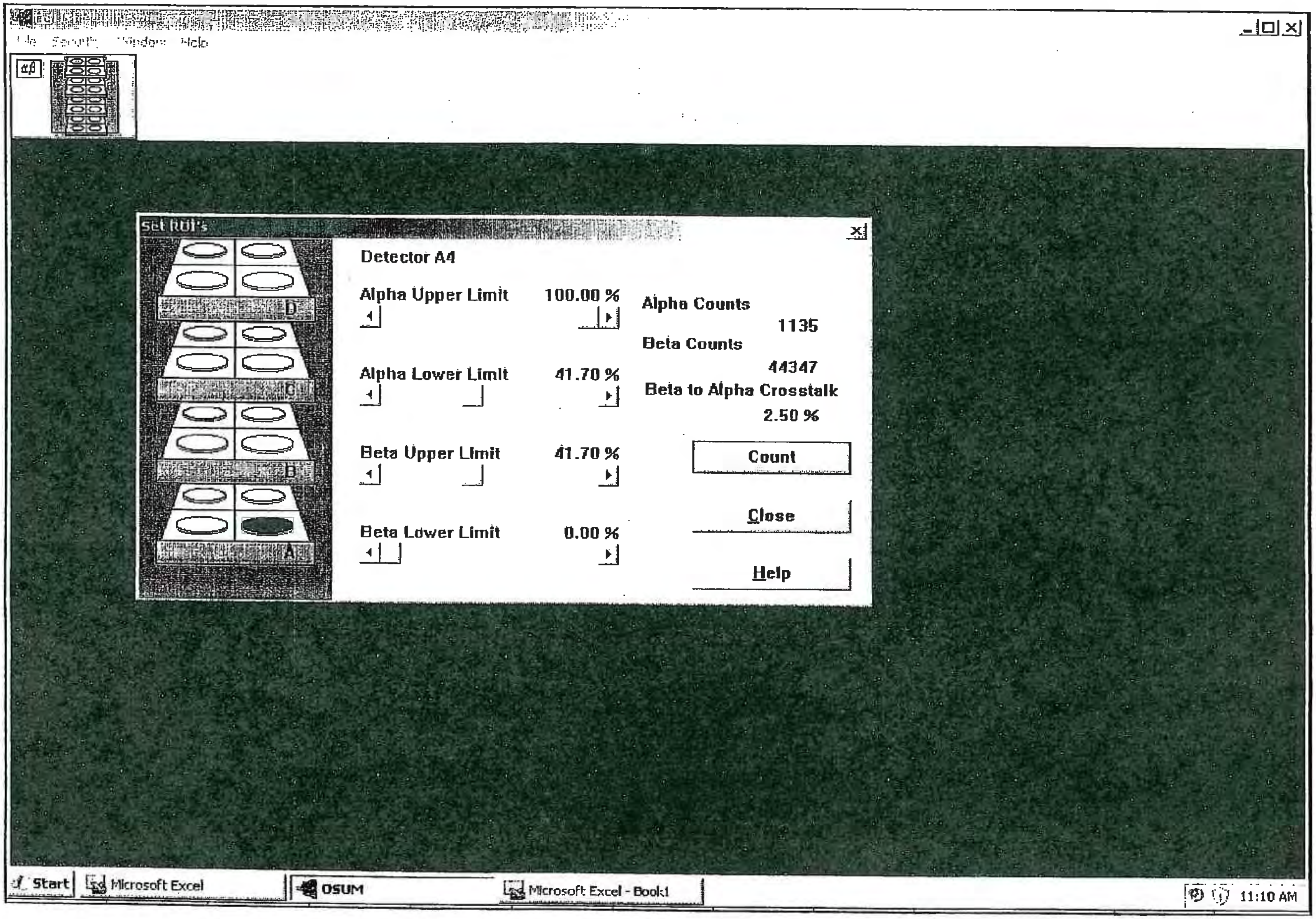
Set ROI's
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100.00 %
Alpha Lower Limit
41.70 %
Beta Upper Limit
41.70 %
Beta Lower Limit
0.00 %
Alpha Counts
1135
Beta Counts
44347
Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
D
C
B
A
Start
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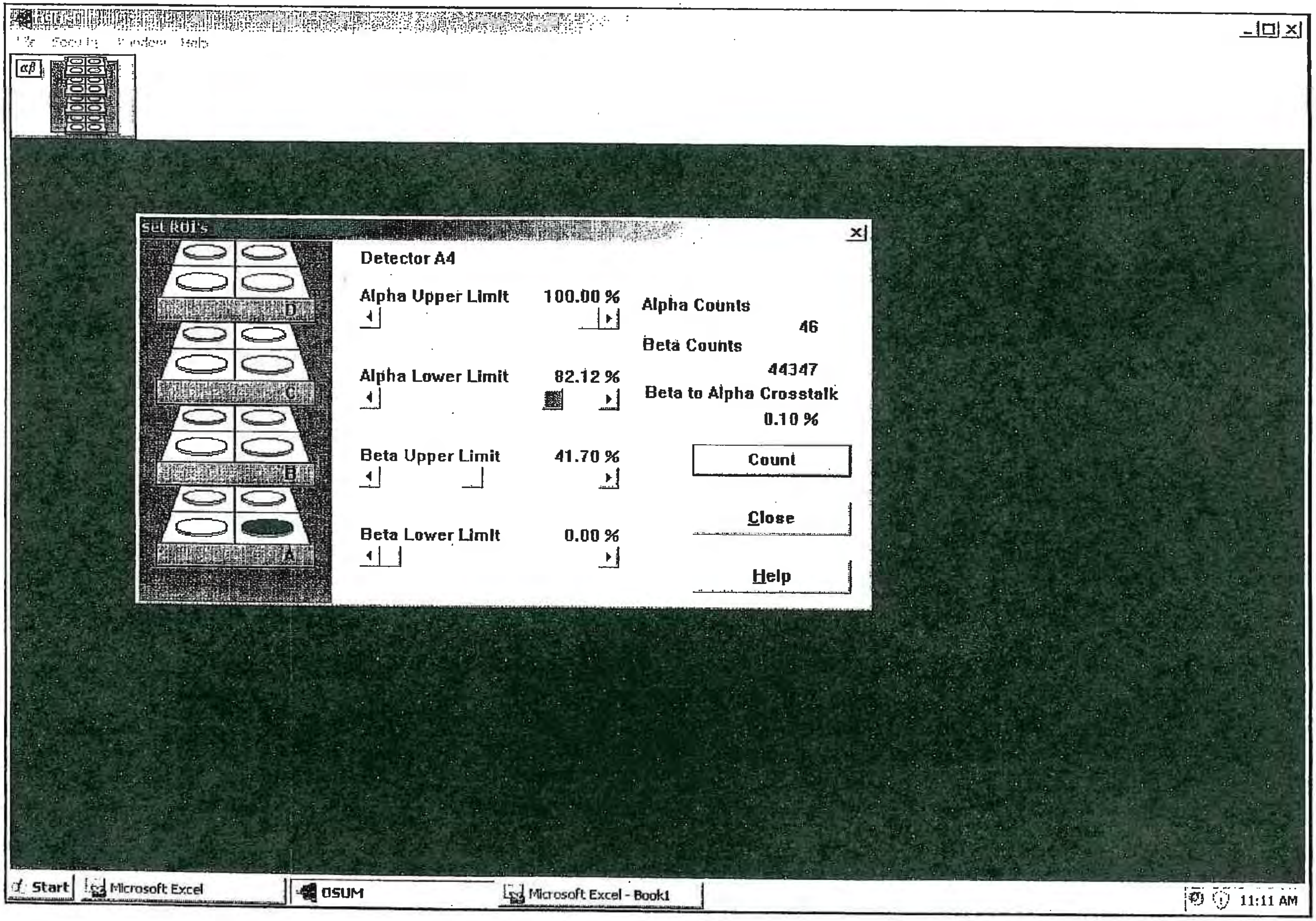
11:10 AM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Alpha Lower Limit
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Beta Upper Limit
41.70 %
Beta Lower Limit
0.00 %
Alpha Counts
46
Beta Counts
44347
Beta to Alpha Crosstalk
0.10 %
Count
Close
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D
C
B
A
Start
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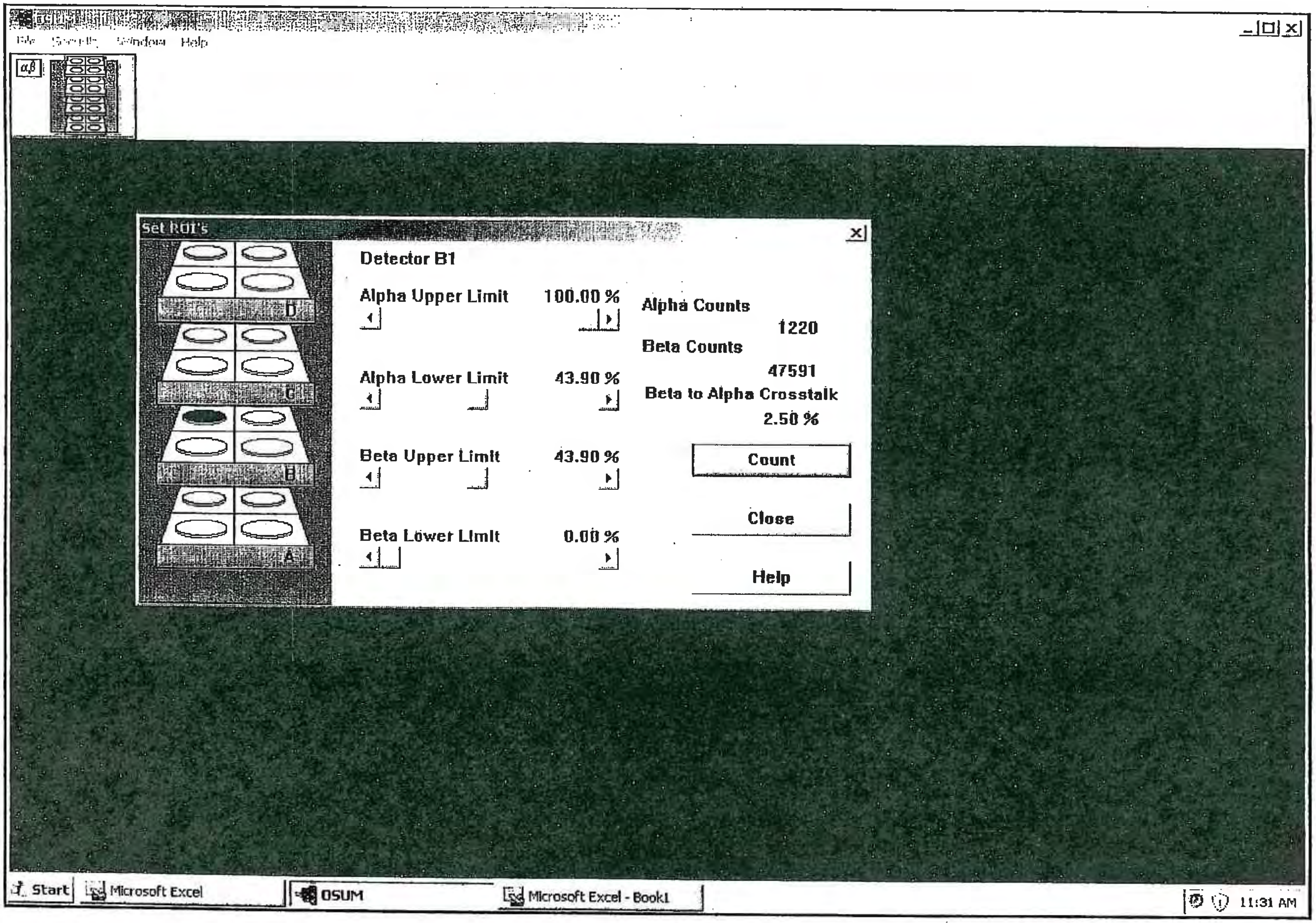
Microsoft Excel - Book1
11:11 AM


Set ROI's
D
C
B
A
Detector B1
Alpha Upper Limit
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Alpha Lower Limit
43.90 %
Beta Upper Limit
43.90 %
Beta Lower Limit
0.00 %
Alpha Counts
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Count
Close
Help
Start
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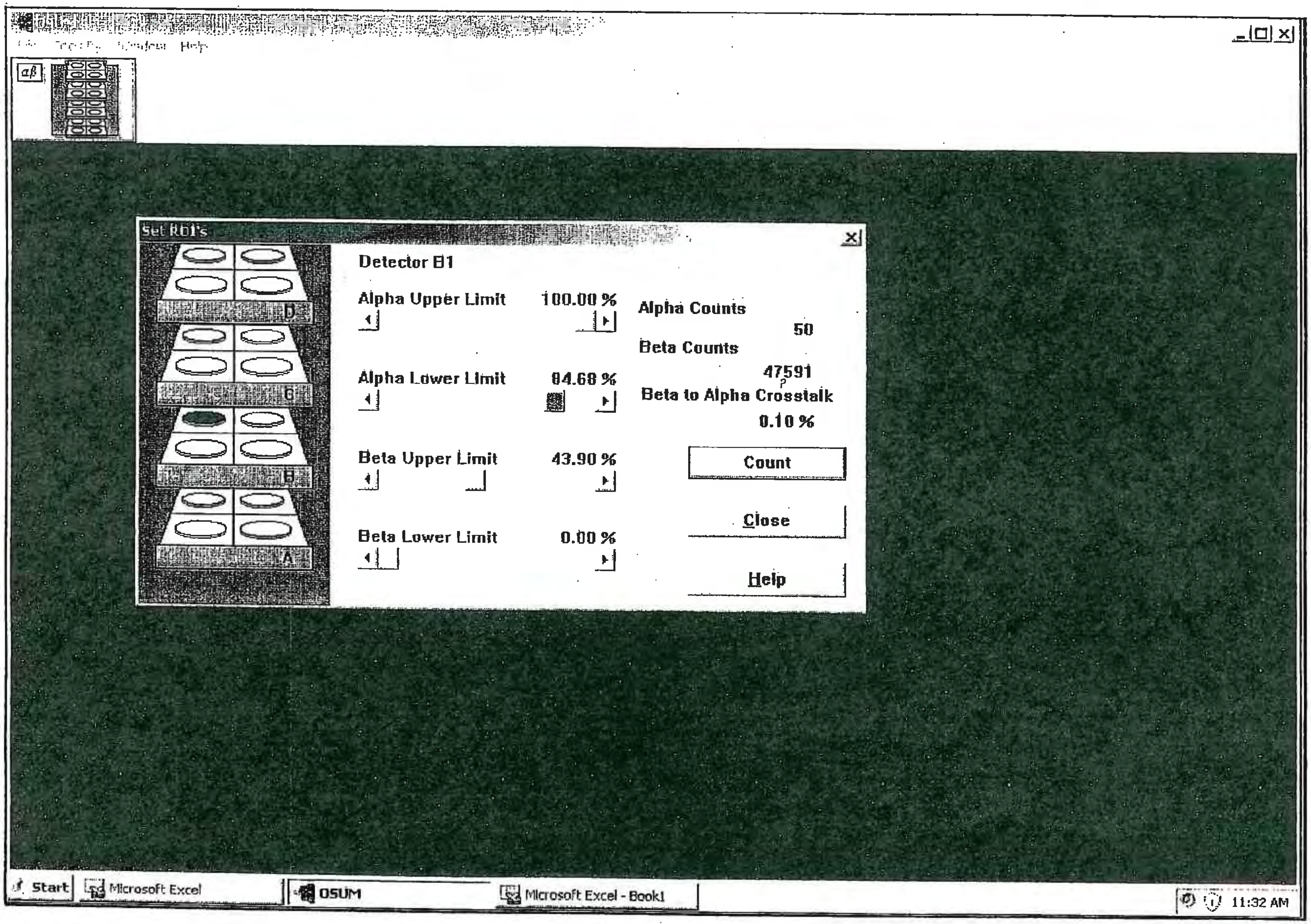
Microsoft Excel - Book1
11:31 AM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Alpha Lower Limit
84.68 %
Beta Upper Limit
43.90 %
Beta Lower Limit
0.00 %
Alpha Counts
50
Beta Counts
47591
Beta to Alpha Crosstalk
0.10 %
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Close
Help
D
C
B
A
Start
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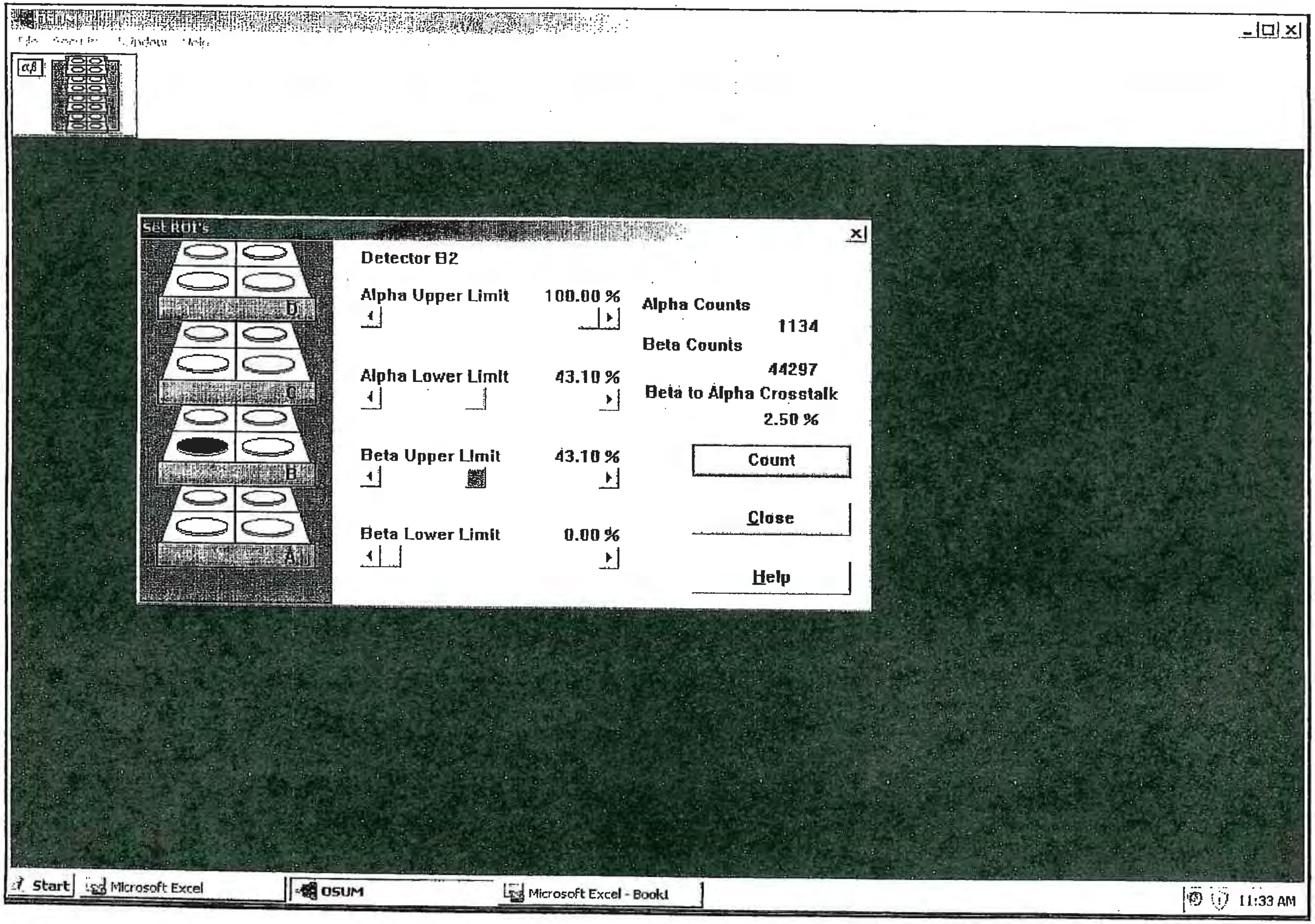
11:32 AM


Set ROI's
Detector B2
Alpha Upper Limit
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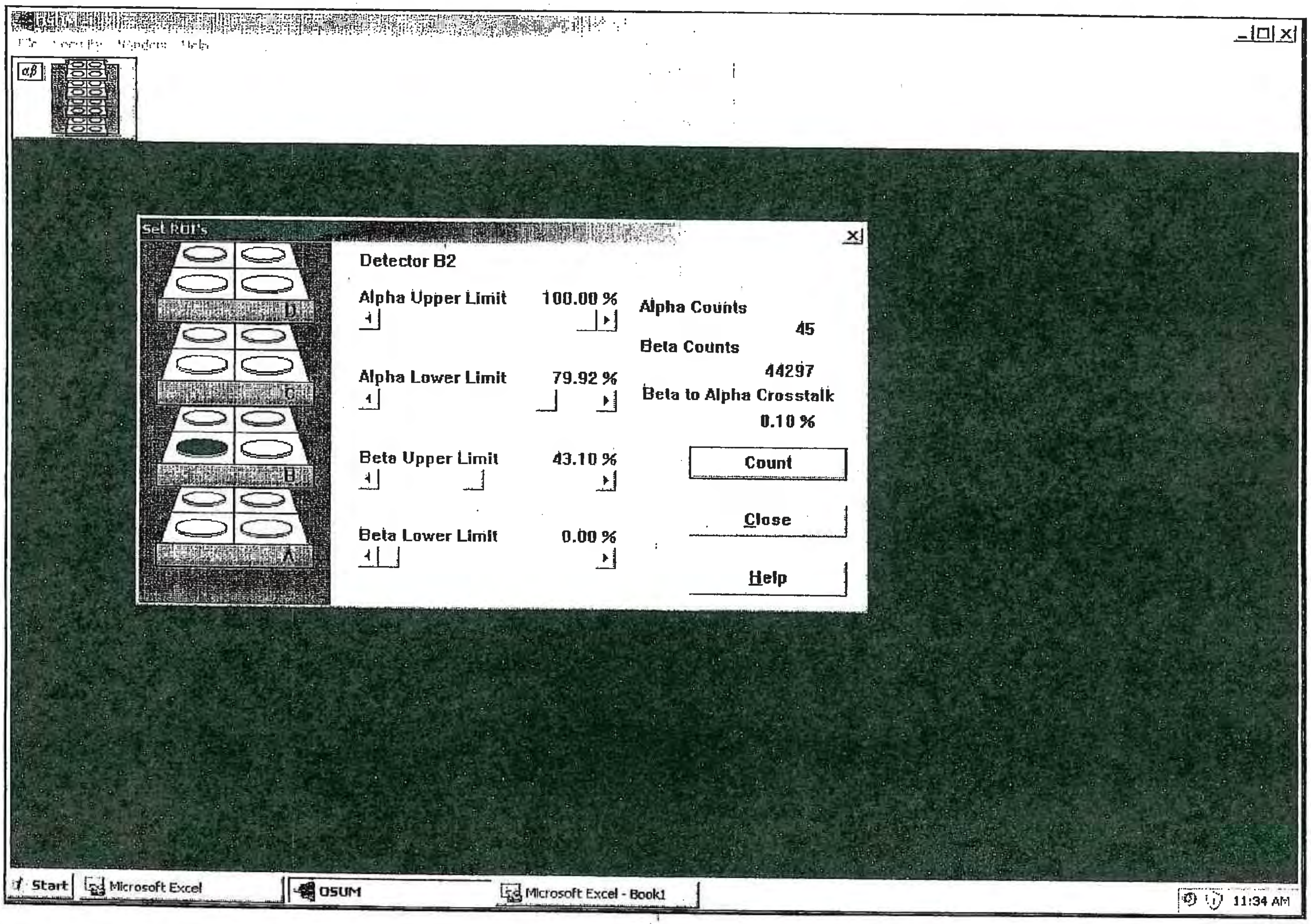
Alpha Lower Limit
43.10 %
Beta Upper Limit
43.10 %
Beta Lower Limit
0.00 %
Alpha Counts
1134
Beta Counts
44297
Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
11:33 AM


Set ROI's
D
C
B
A
Detector B2
Alpha Upper Limit
100.00 %
Alpha Lower Limit
79.92 %
Beta Upper Limit
43.10 %
Beta Lower Limit
0.00 %
Alpha Counts
45
Beta Counts
44297
Beta to Alpha Crosstalk
0.10 %
Count
Close
Help
Start
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OSUM
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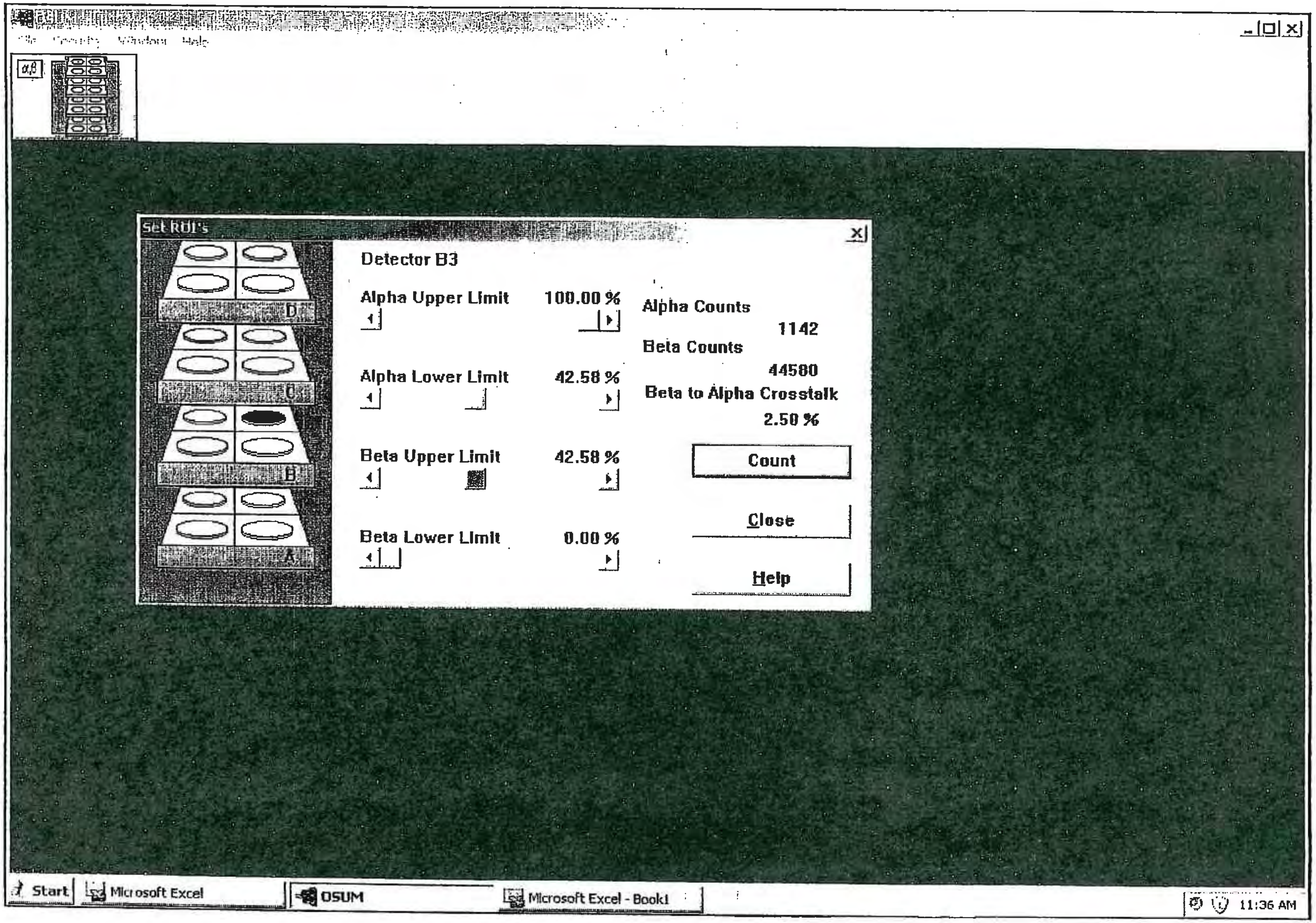
11:34 AM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Detector B3
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Alpha Lower Limit
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42.58 %
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0.00 %
Alpha Counts
1142
Beta Counts
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Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
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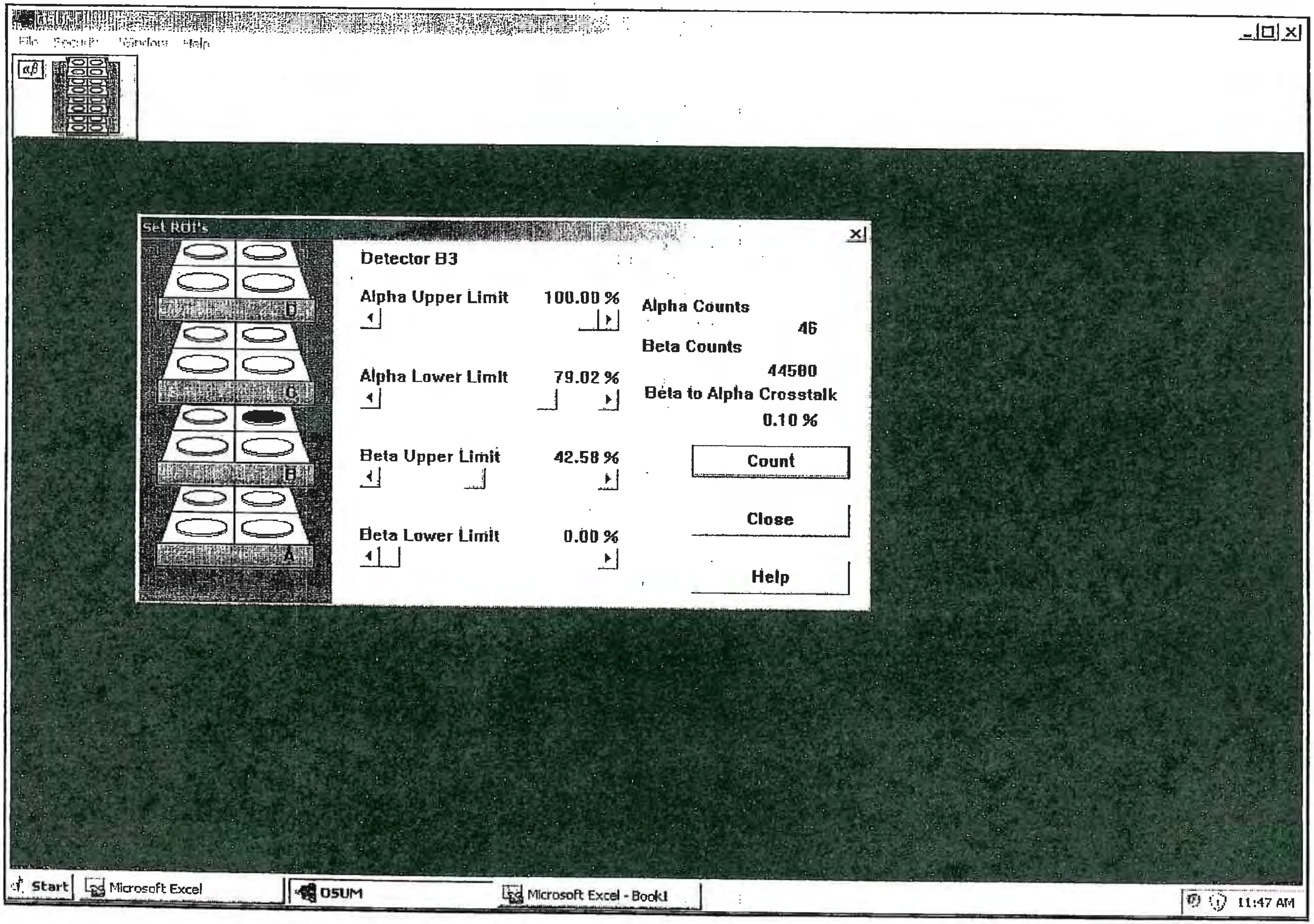
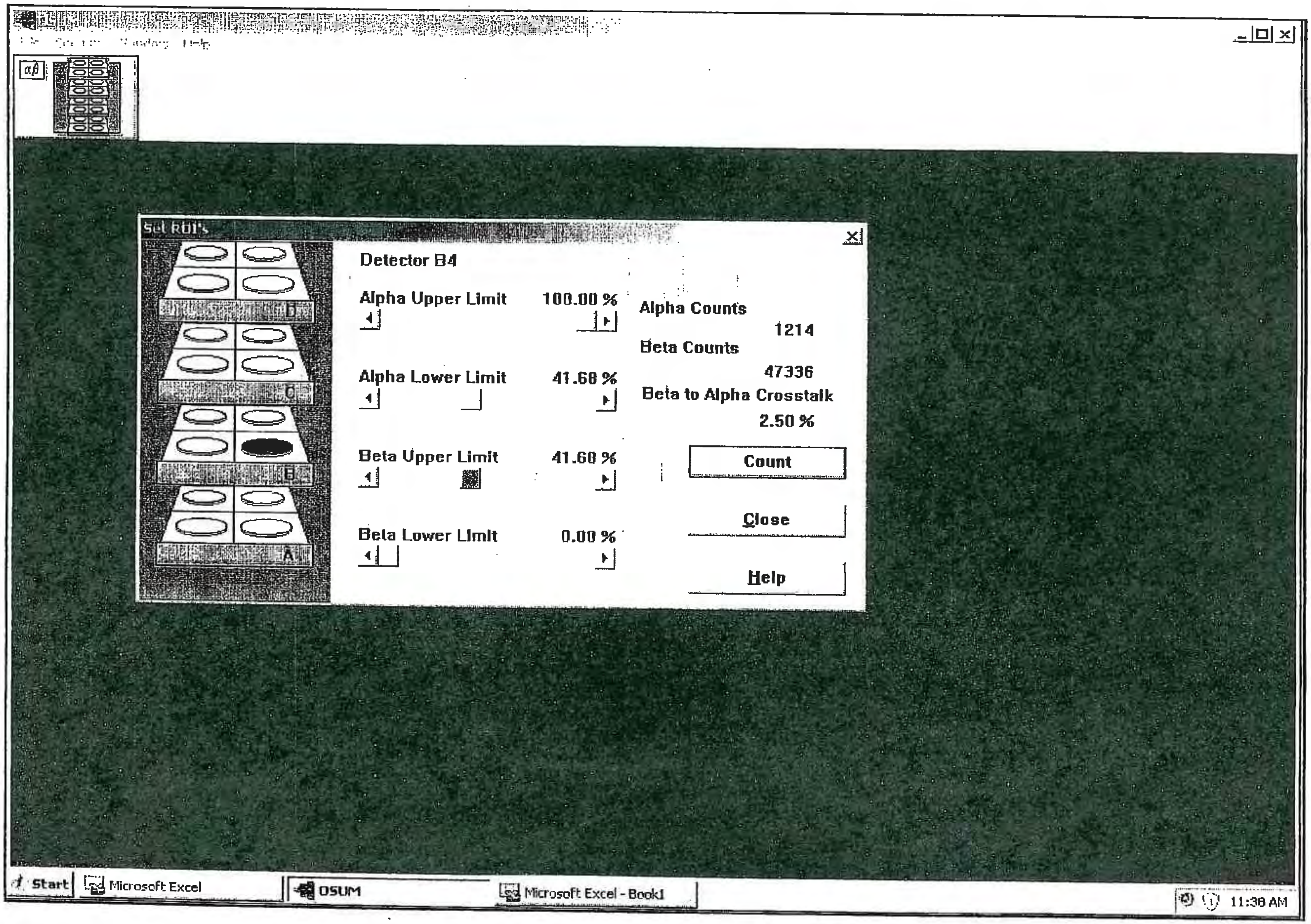
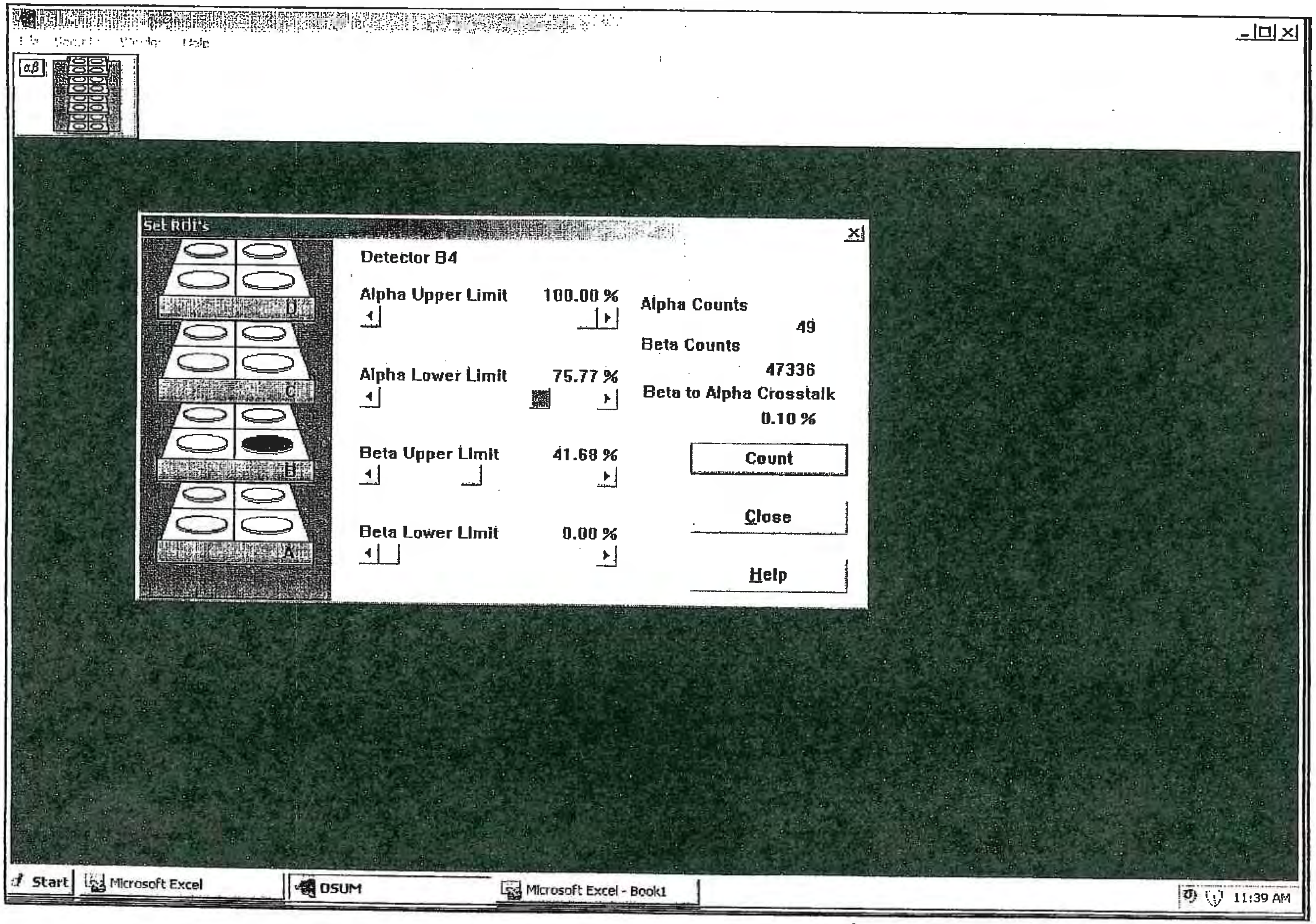
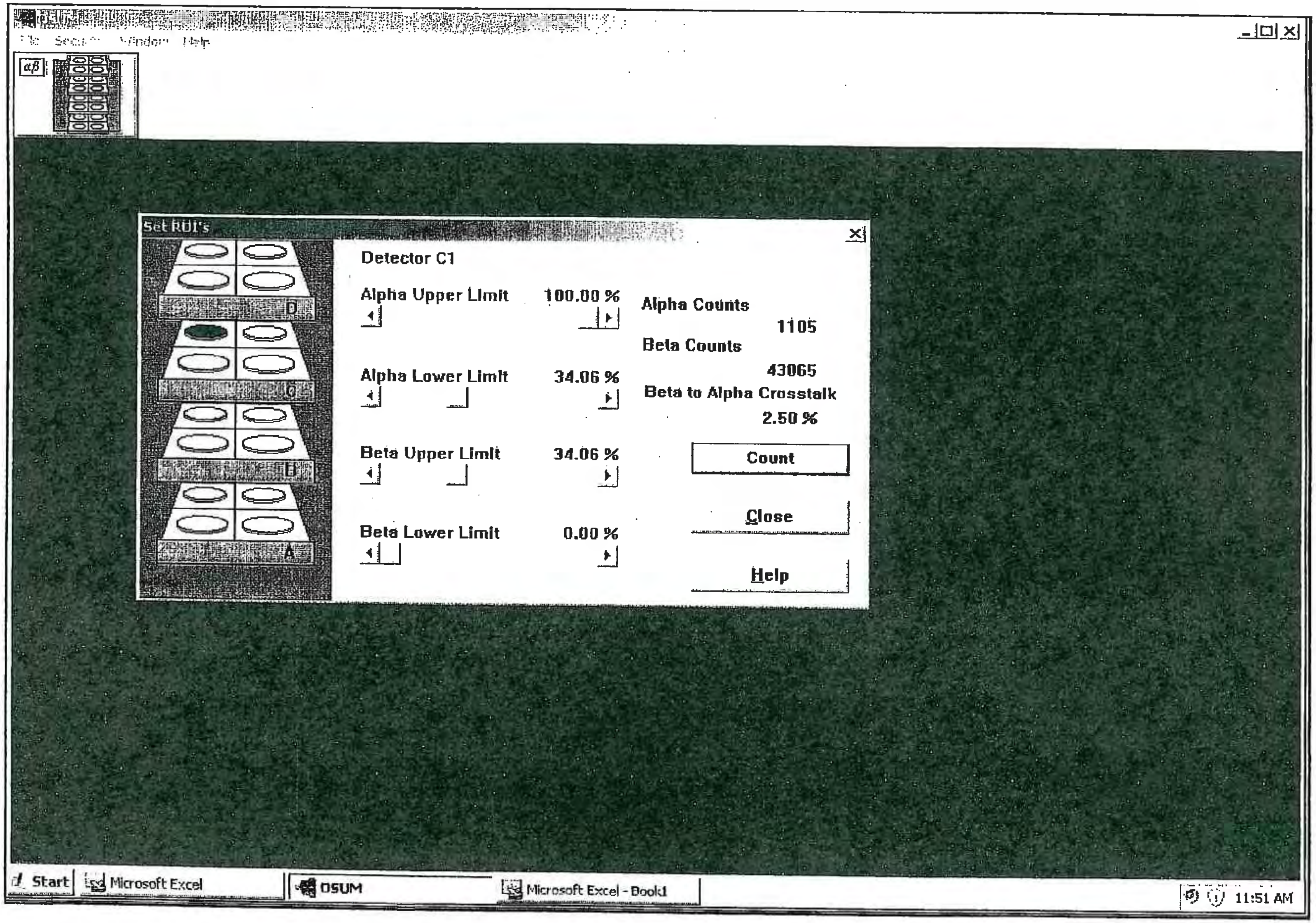
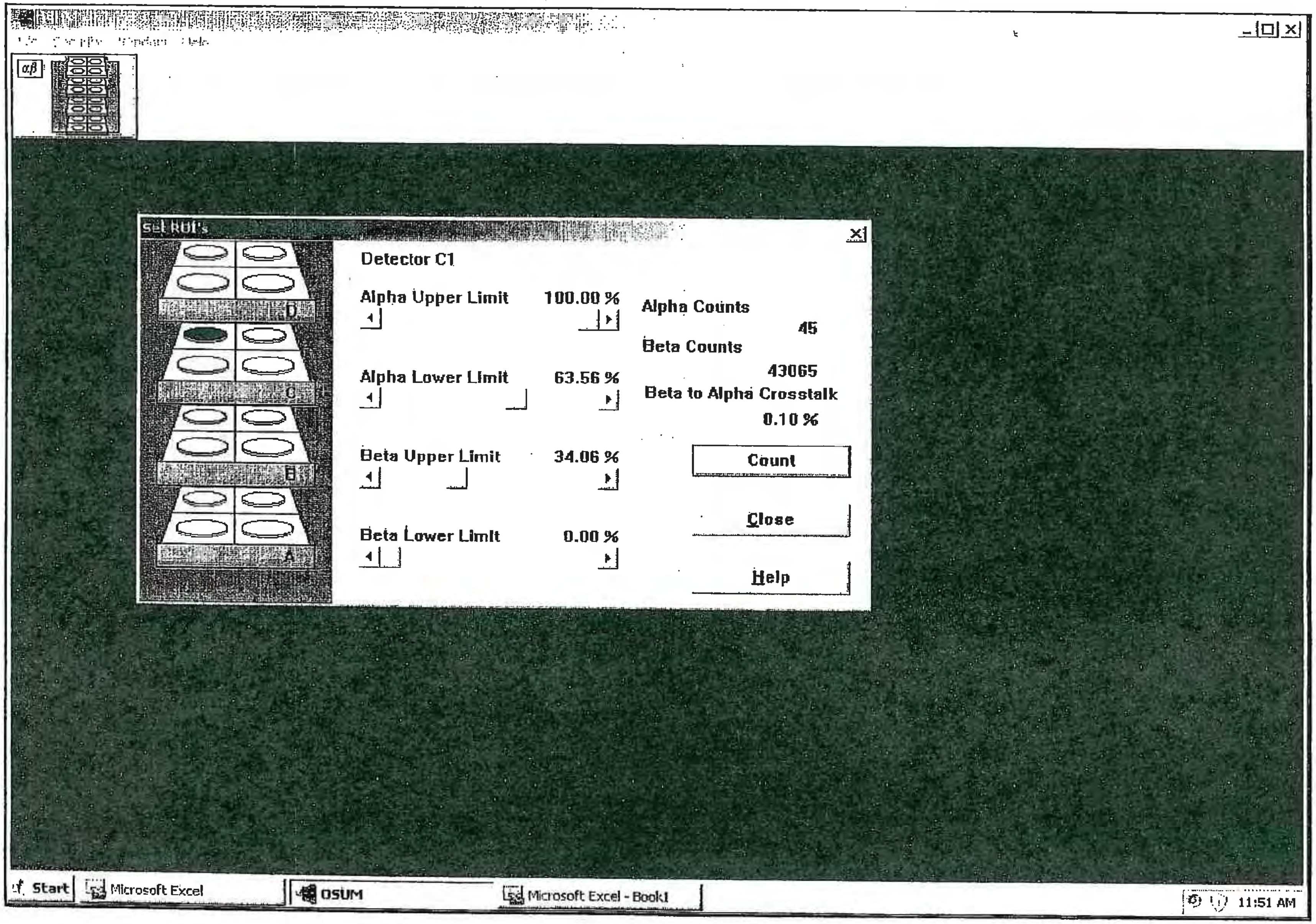
Microsoft Excel - Book1
11:36 AM

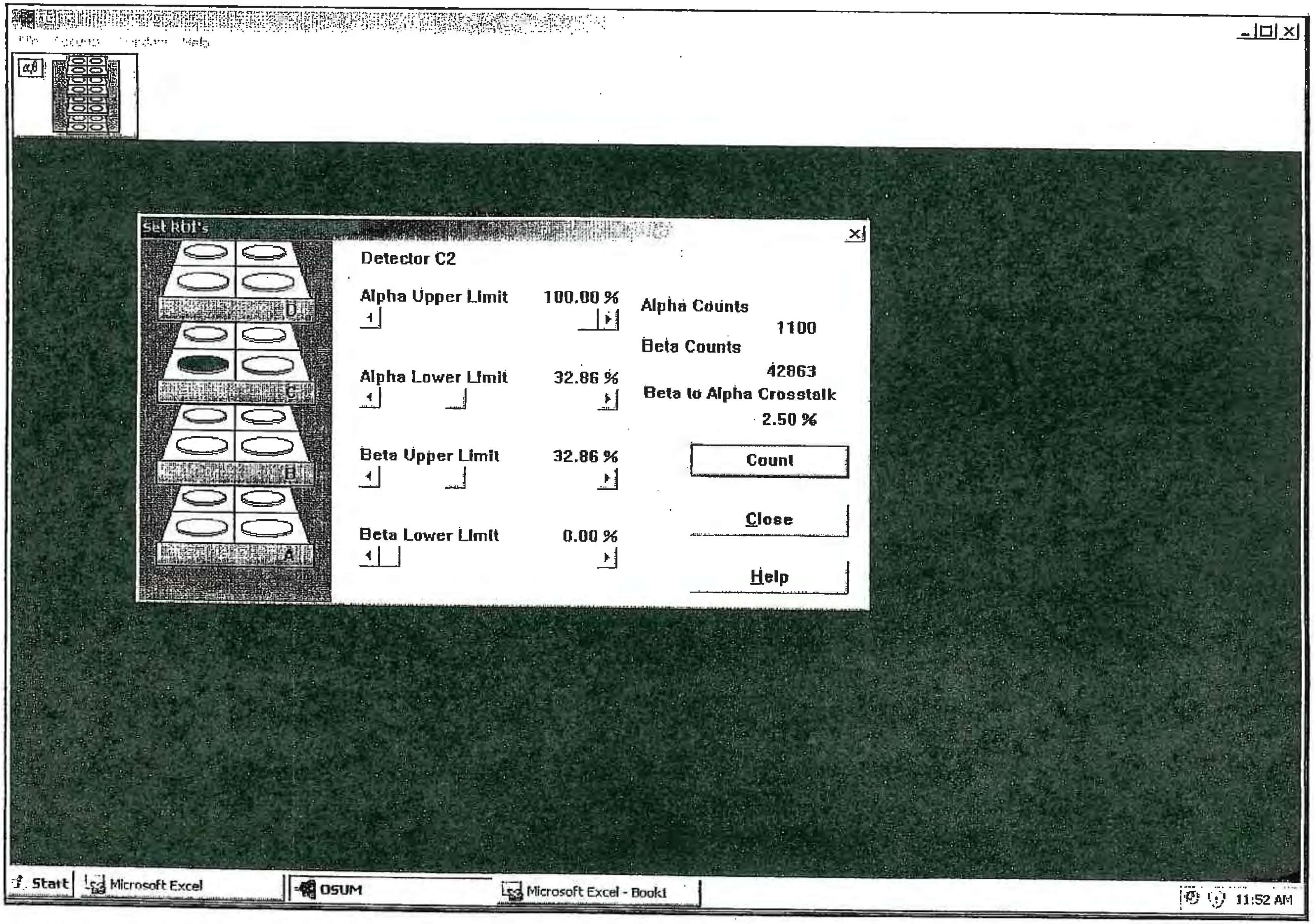

Set ROI's
D
C
B
A
Detector B3
Alpha Upper Limit
100.00 %
Alpha Lower Limit
79.02 %
Beta Upper Limit
42.58 %
Beta Lower Limit
0.00 %
Alpha Counts
46
Beta Counts
44580
Beta to Alpha Crosstalk
0.10 %
Count
Close
Help
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
11:47 AM

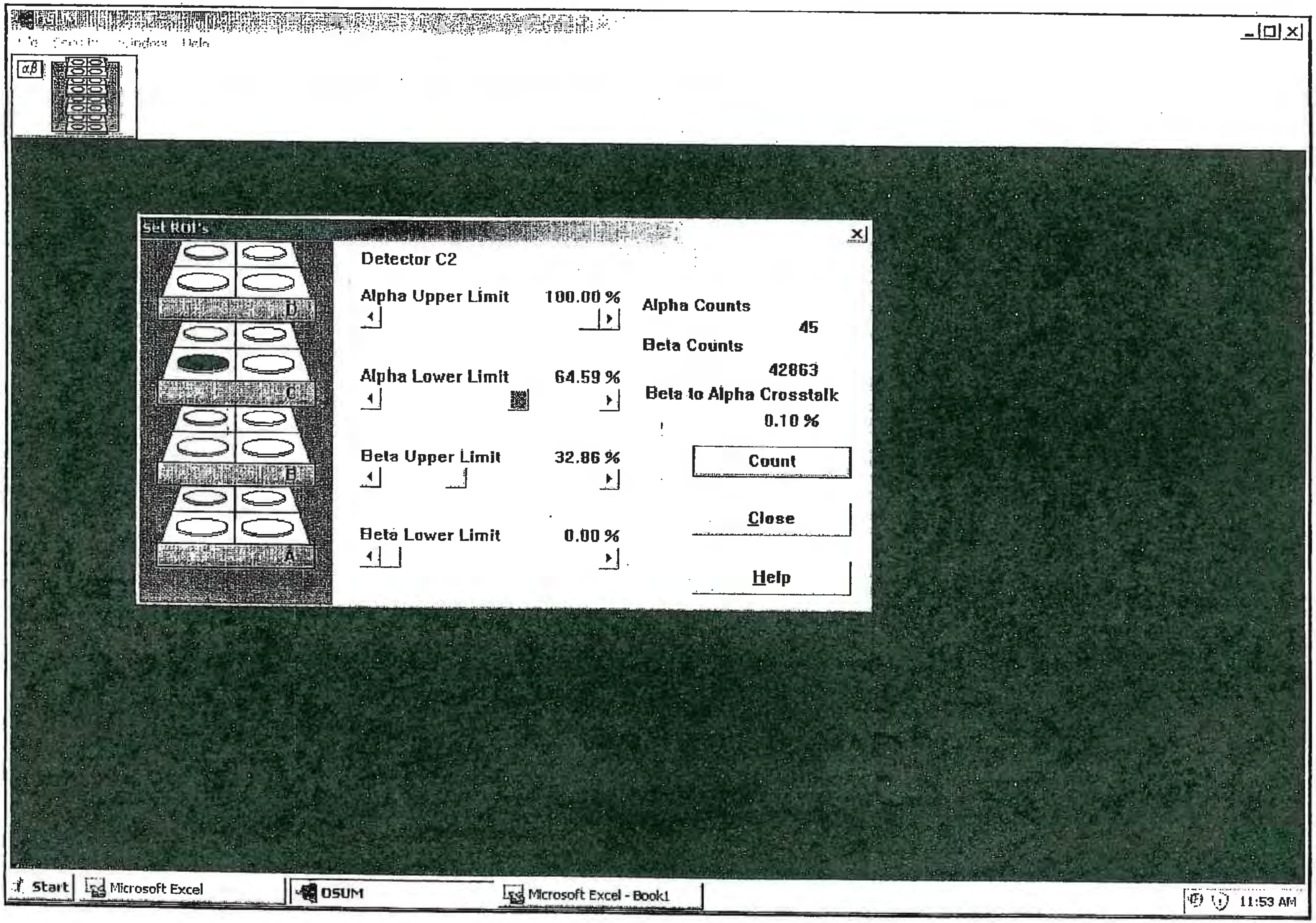

Set ROI's
Detector B4
Alpha Upper Limit
100.00 %
Alpha Lower Limit
41.60 %
Beta Upper Limit
41.60 %
Beta Lower Limit
0.00 %
Alpha Counts
1214
Beta Counts
47336
Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
11:38 AM

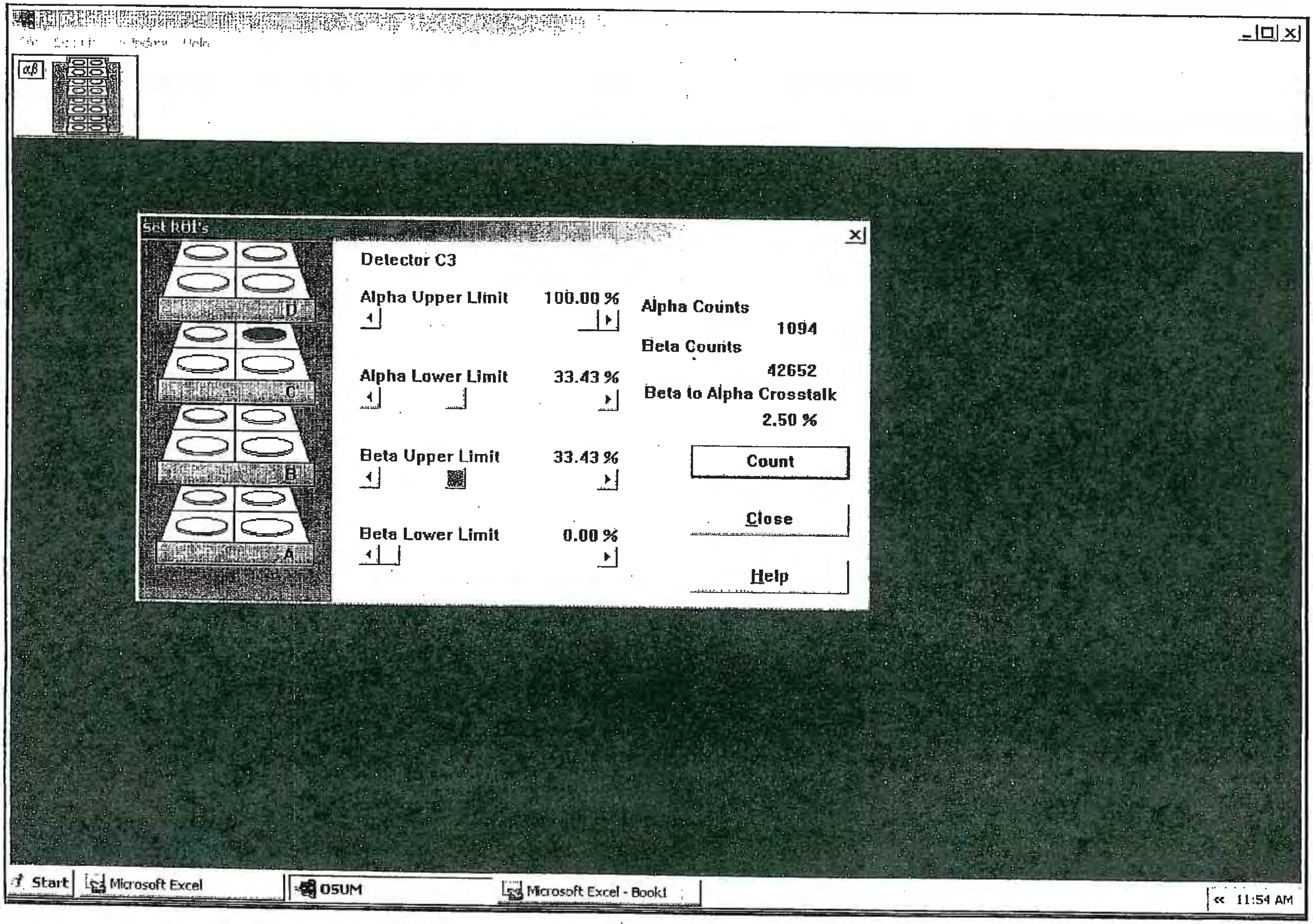

Set ROI's
Detector B4
Alpha Upper Limit
100.00 %
Alpha Lower Limit
75.77 %
Beta Upper Limit
41.68 %
Beta Lower Limit
0.00 %
Alpha Counts
49
Beta Counts
47336
Beta to Alpha Crosstalk
0.10 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
11:39 AM

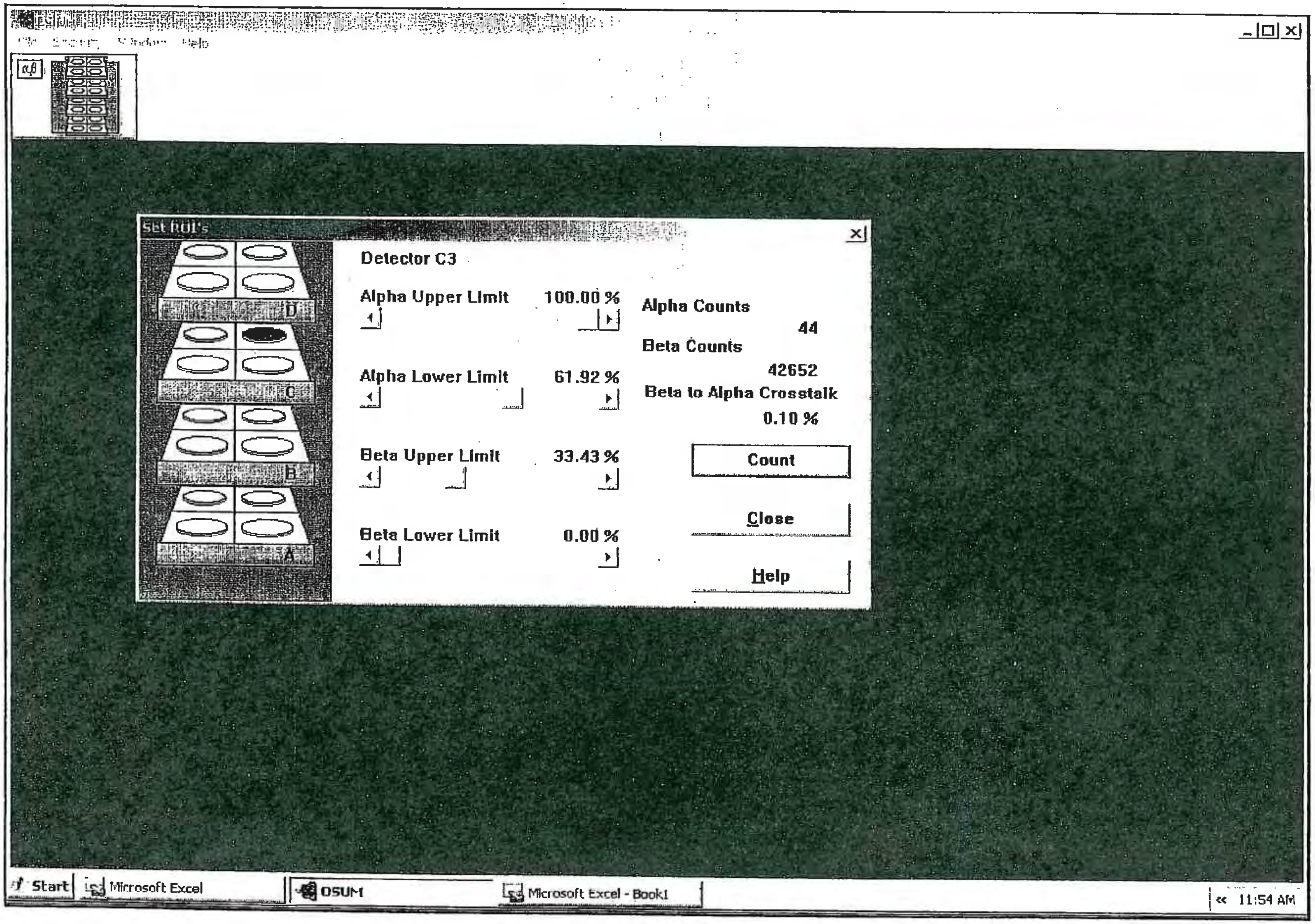

Set ROI's
Detector C1
Alpha Upper Limit
100.00 %
Alpha Lower Limit
34.06 %
Beta Upper Limit
34.06 %
Beta Lower Limit
0.00 %
Alpha Counts
1105
Beta Counts
43065
Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
11:51 AM

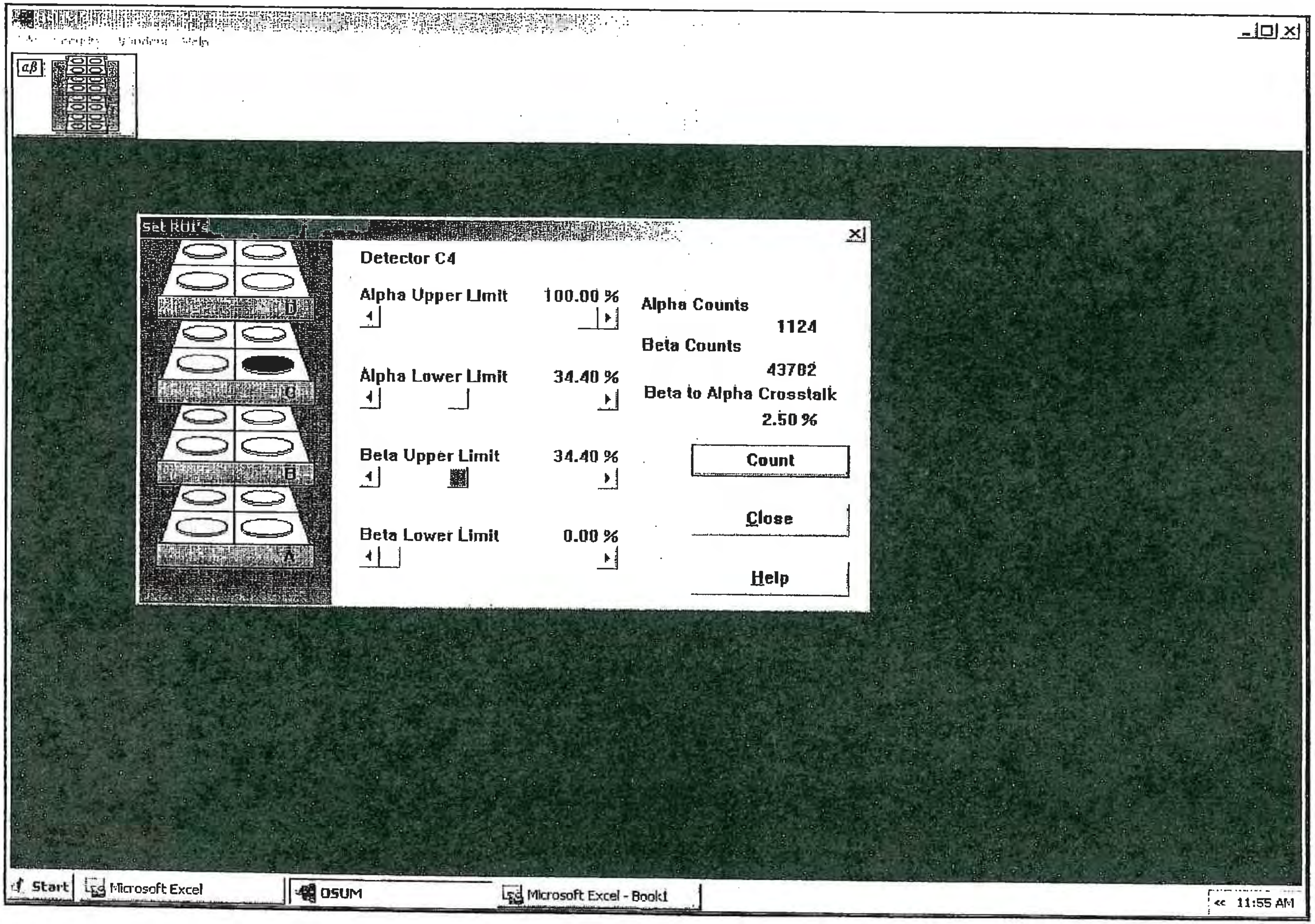

set ROI's
D
C
B
A
Detector C1
Alpha Upper Limit
100.00 %
Alpha Lower Limit
63.56 %
Beta Upper Limit
34.06 %
Beta Lower Limit
0.00 %
Alpha Counts
45
Beta Counts
43065
Beta to Alpha Crosstalk
0.10 %
Count
Close
Help
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
11:51 AM

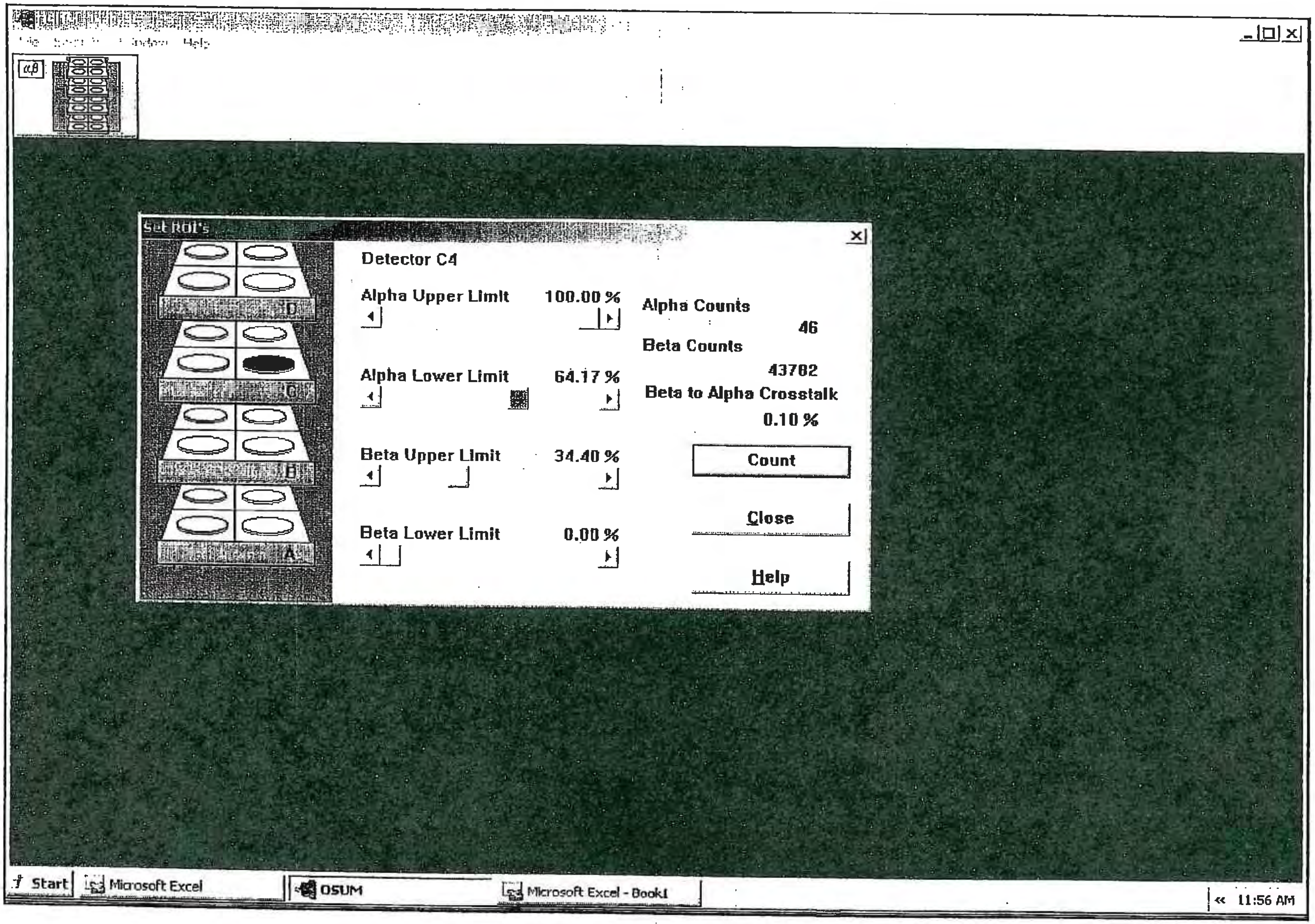

Set ROI's
Detector C2
Alpha Upper Limit
100.00 %
Alpha Lower Limit
32.86 %
Beta Upper Limit
32.86 %
Beta Lower Limit
0.00 %
Alpha Counts
1100
Beta Counts
42863
Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
11:52 AM

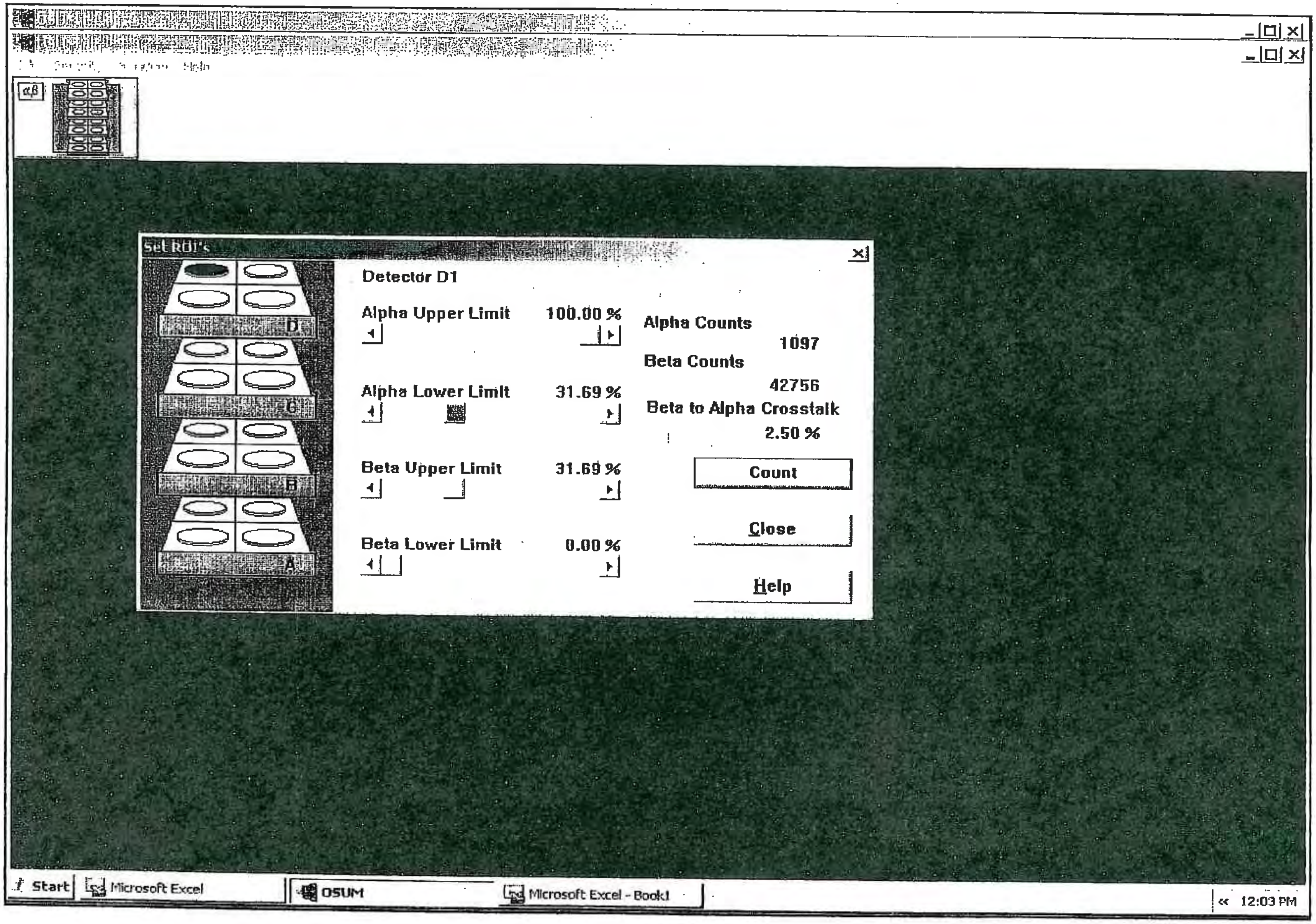

Set ROI's
Detector C2
Alpha Upper Limit
100.00 %
Alpha Lower Limit
64.59 %
Beta Upper Limit
32.86 %
Beta Lower Limit
0.00 %
Alpha Counts
45
Beta Counts
42863
Beta to Alpha Crosstalk
0.10 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
11:53 AM

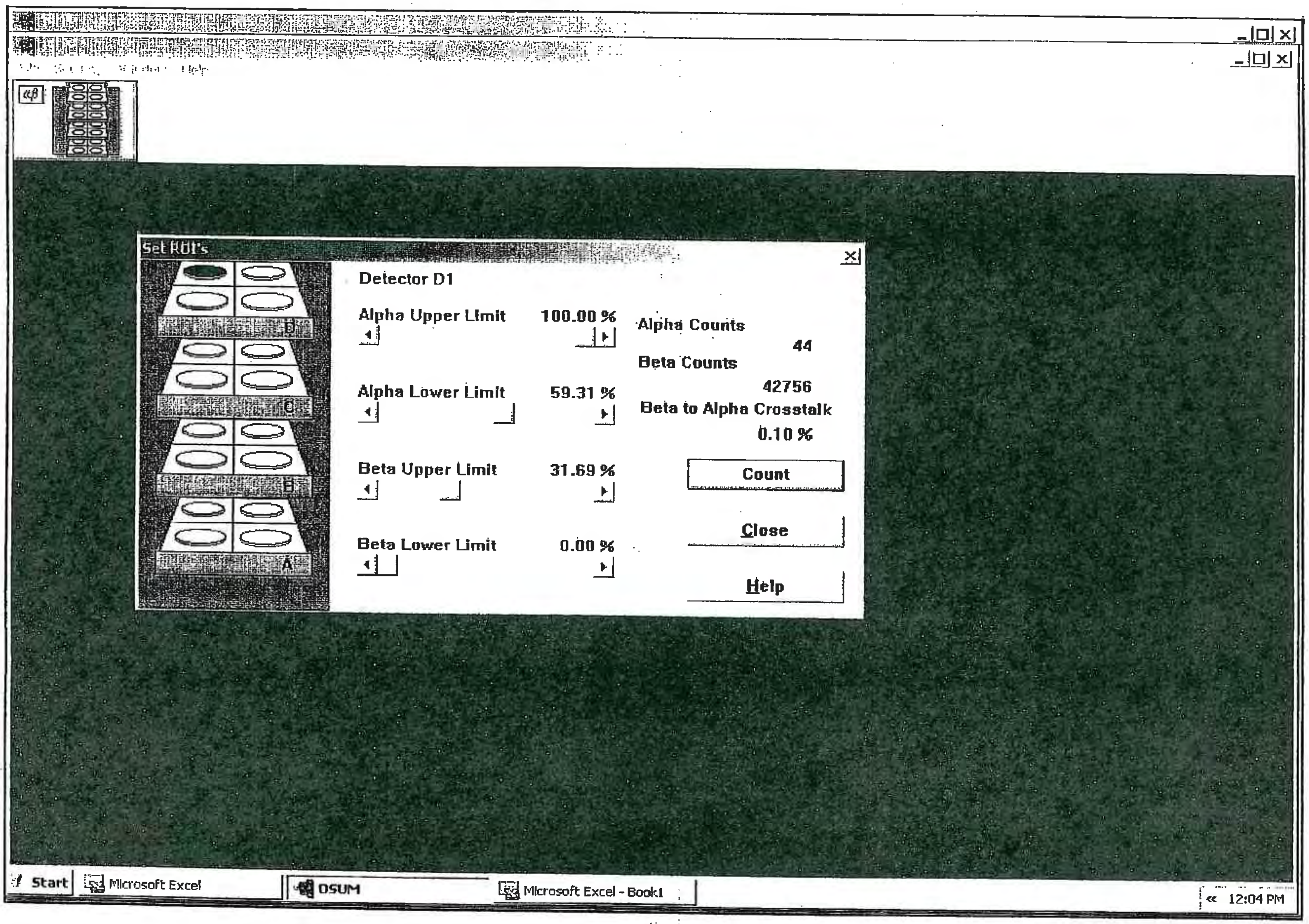

Set ROI's
Detector C3
Alpha Upper Limit
100.00 %
Alpha Lower Limit
33.43 %
Beta Upper Limit
33.43 %
Beta Lower Limit
0.00 %
Alpha Counts
1094
Beta Counts
42652
Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
11:54 AM

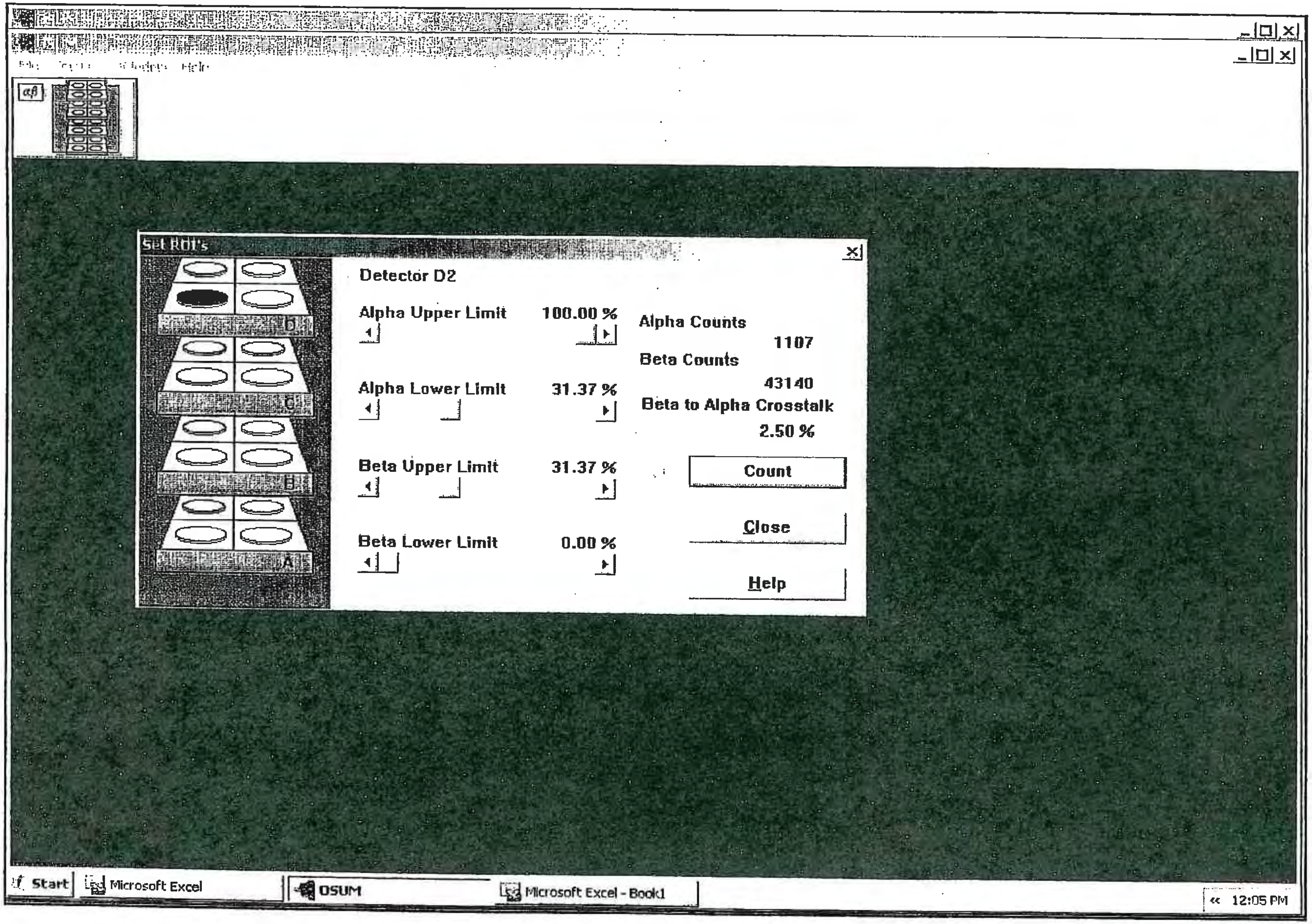

Set ROI's
Detector C3
Alpha Upper Limit
100.00 %
Alpha Lower Limit
61.92 %
Beta Upper Limit
33.43 %
Beta Lower Limit
0.00 %
Alpha Counts
44
Beta Counts
42652
Beta to Alpha Crosstalk
0.10 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
11:54 AM

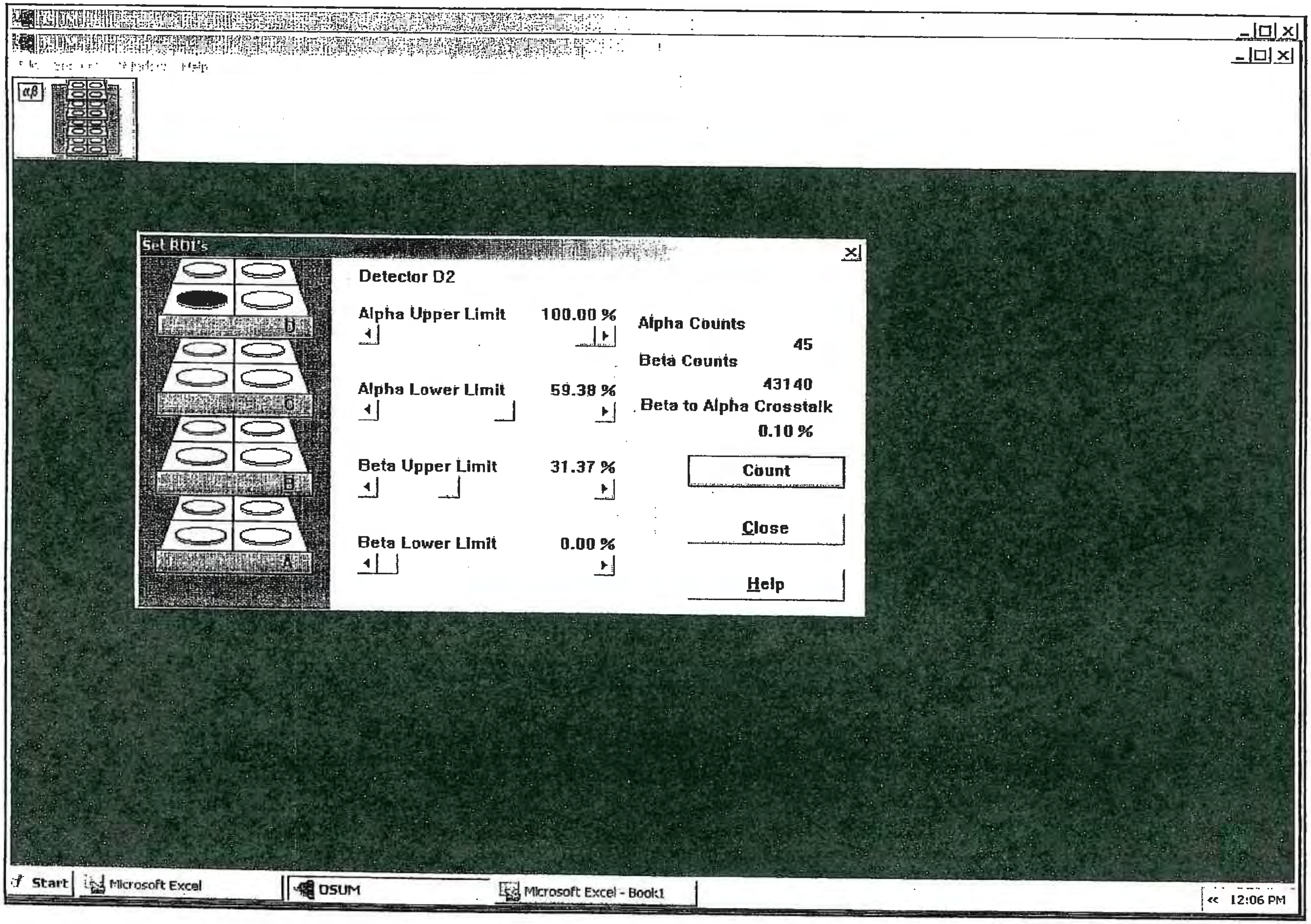

Set ROI's
Detector C4
Alpha Upper Limit
100.00 %
Alpha Lower Limit
34.40 %
Beta Upper Limit
34.40 %
Beta Lower Limit
0.00 %
Alpha Counts
1124
Beta Counts
43702
Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
11:55 AM

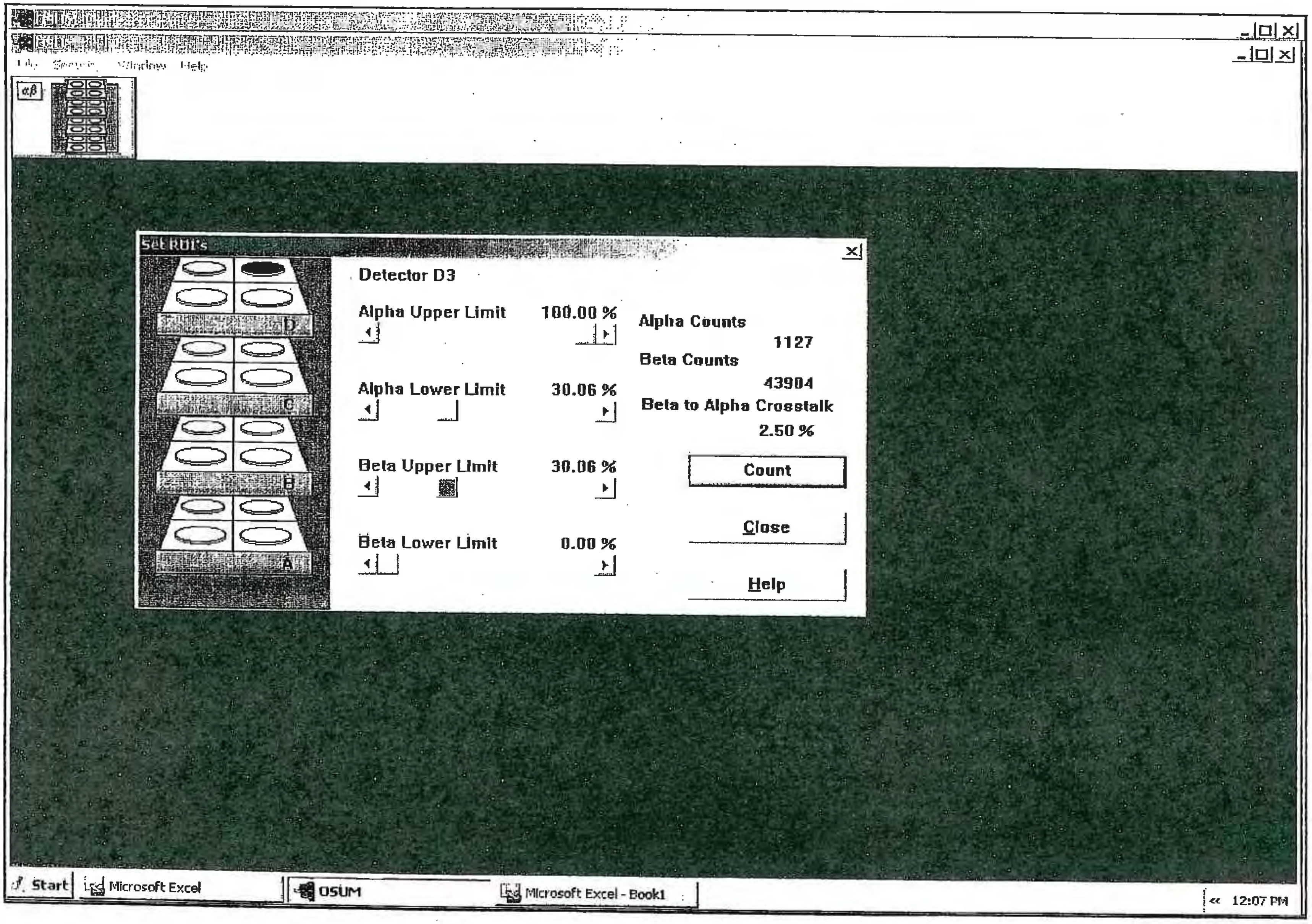

Detector C4
Alpha Upper Limit
100.00 %
Alpha Lower Limit
64.17 %
Beta Upper Limit
34.40 %
Beta Lower Limit
0.00 %
Alpha Counts
46
Beta Counts
43782
Beta to Alpha Crosstalk
0.10 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
11:56 AM

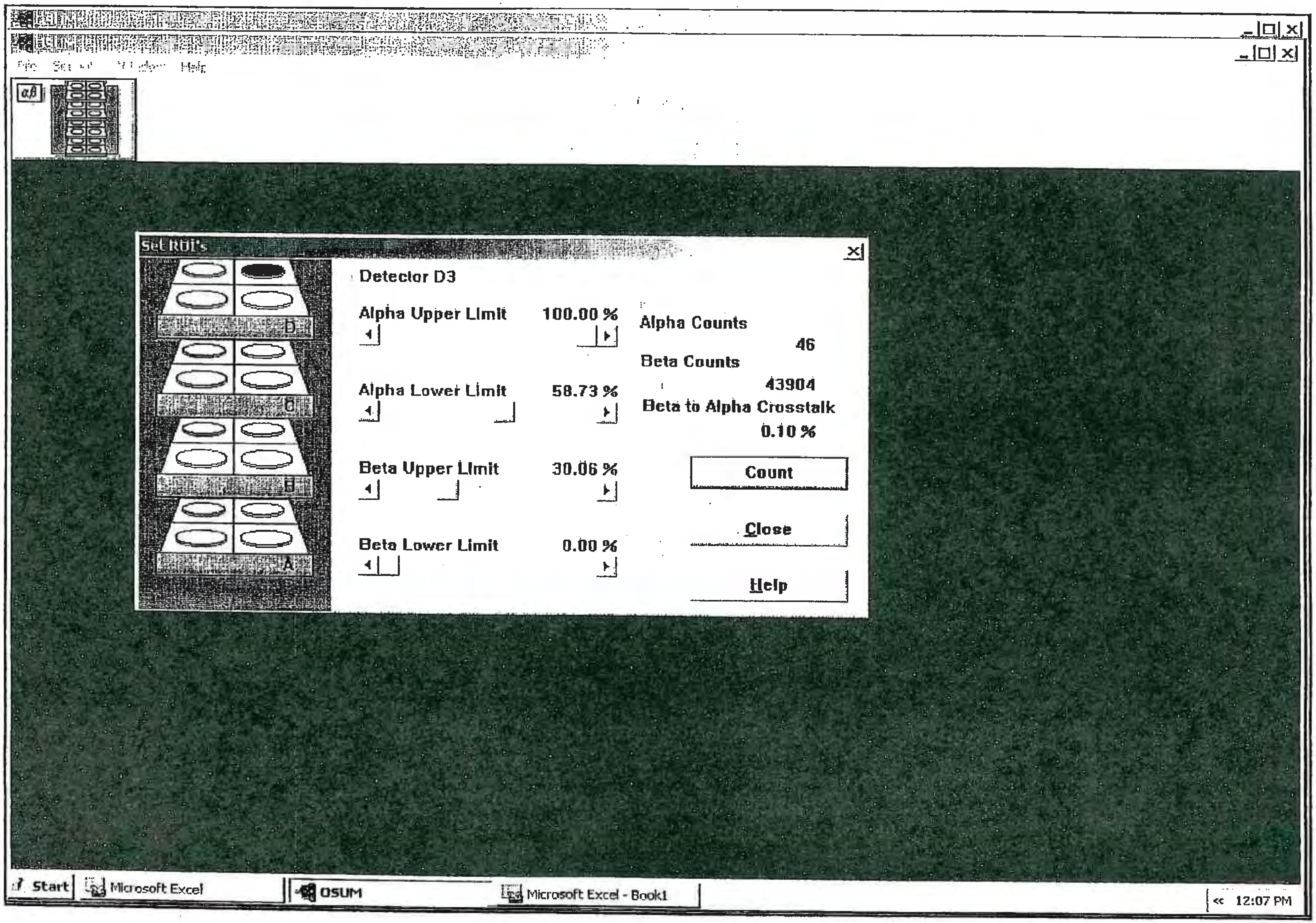

Set ROI's
Detector D1
Alpha Upper Limit
100.00 %
Alpha Lower Limit
31.69 %
Beta Upper Limit
31.69 %
Beta Lower Limit
0.00 %
Alpha Counts
1097
Beta Counts
42756
Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
12:03 PM

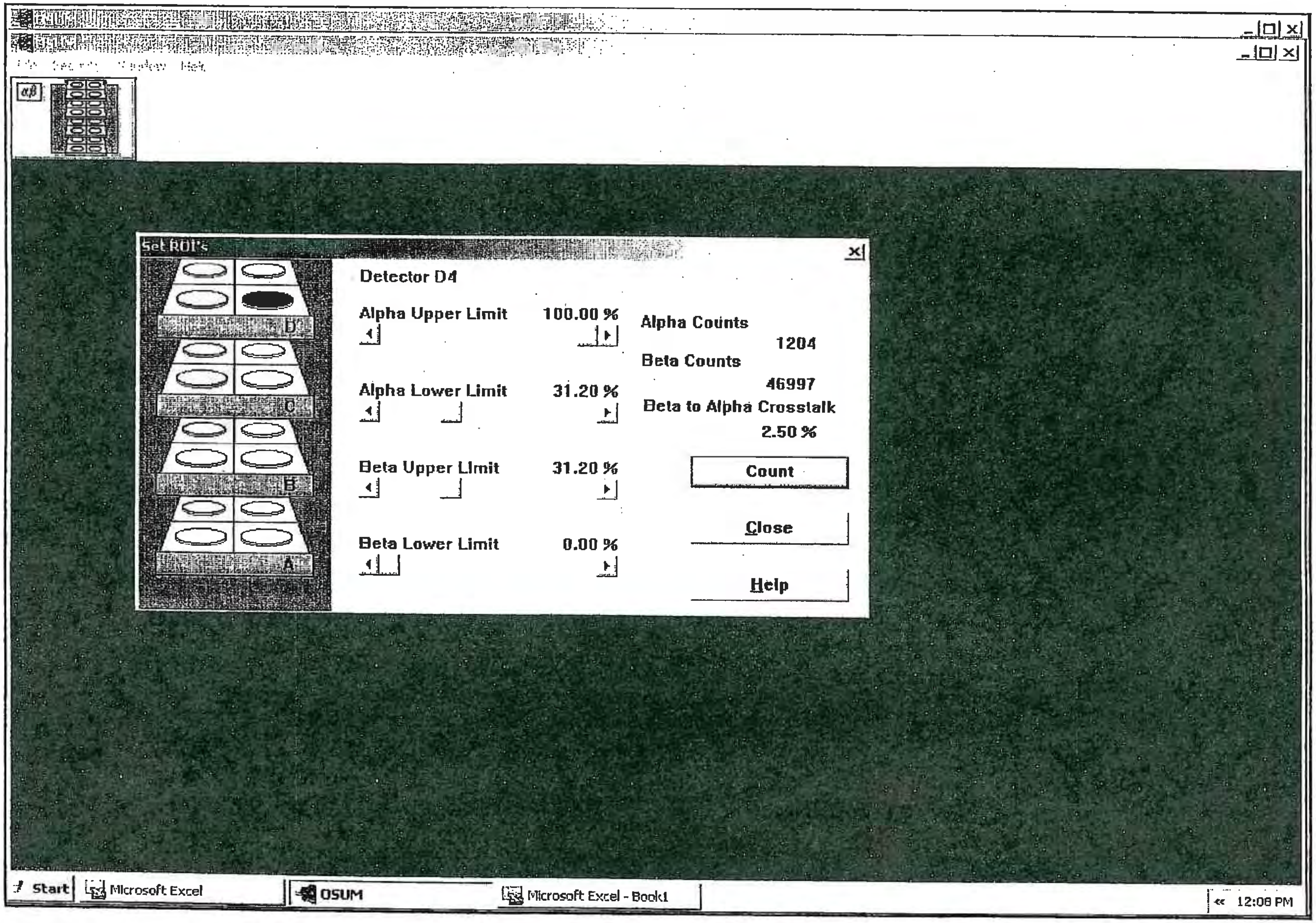

Set ROI's
Detector D1
Alpha Upper Limit
100.00 %
Alpha Lower Limit
59.31 %
Beta Upper Limit
31.69 %
Beta Lower Limit
0.00 %
Alpha Counts
44
Beta Counts
42756
Beta to Alpha Crosstalk
0.10 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
12:04 PM

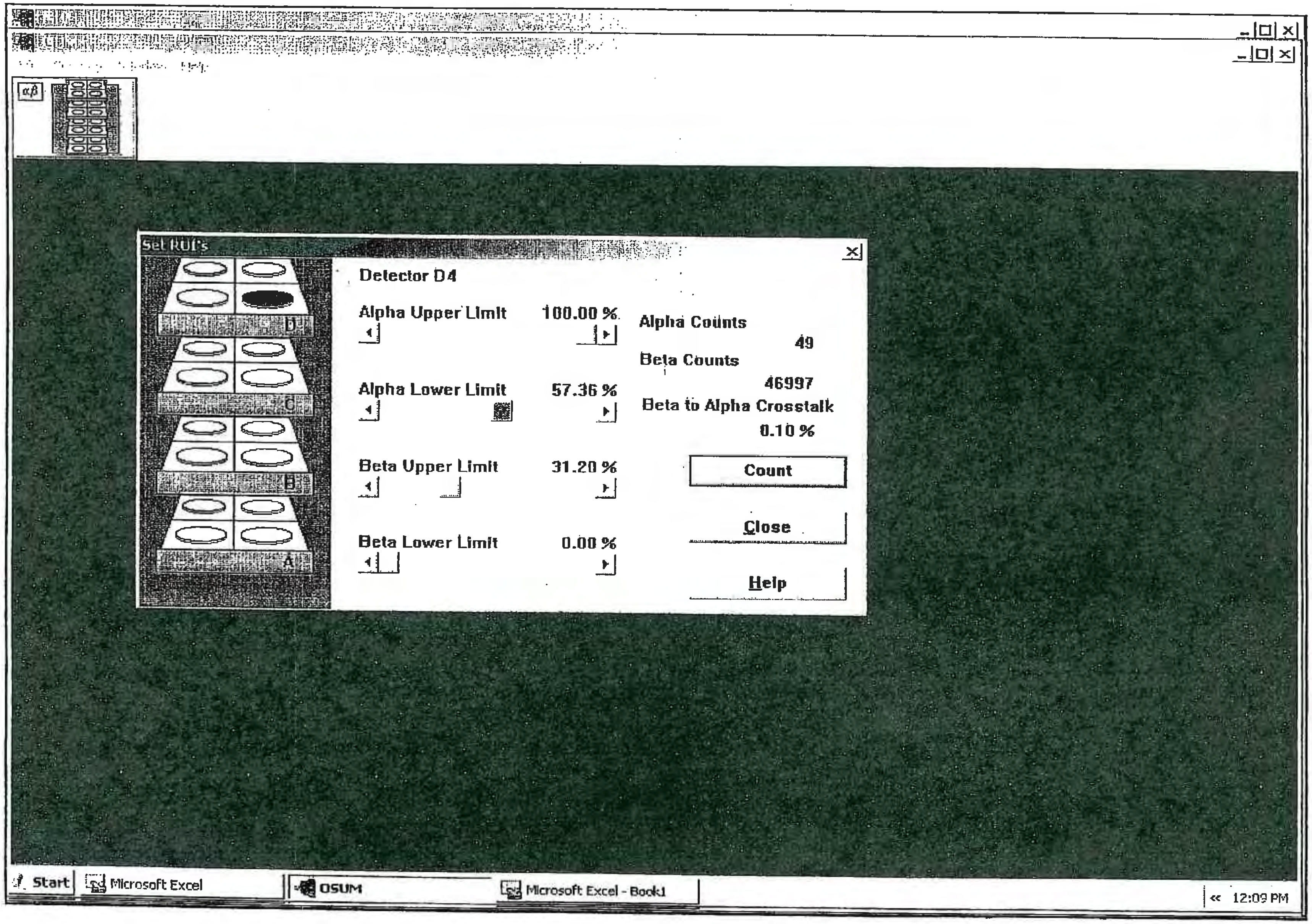

Set ROI's
Detector D2
Alpha Upper Limit
100.00 %
Alpha Lower Limit
31.37 %
Beta Upper Limit
31.37 %
Beta Lower Limit
0.00 %
Alpha Counts
1107
Beta Counts
43140
Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
12:05 PM


Set ROI's
Detector D2
Alpha Upper Limit
100.00 %
Alpha Lower Limit
59.38 %
Beta Upper Limit
31.37 %
Beta Lower Limit
0.00 %
Alpha Counts
45
Beta Counts
43140
Beta to Alpha Crosstalk
0.10 %
Count
Close
Help
Start
Microsoft Excel
DSUM
Microsoft Excel - Book1
12:06 PM


Set ROI's
Detector D3
Alpha Upper Limit
100.00 %
Alpha Lower Limit
30.06 %
Beta Upper Limit
30.06 %
Beta Lower Limit
0.00 %
Alpha Counts
1127
Beta Counts
43904
Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
12:07 PM


Set ROI's
Detector D3
Alpha Upper Limit 100.00 %
Alpha Lower Limit 58.73 %
Beta Upper Limit 30.06 %
Beta Lower Limit 0.00 %
Alpha Counts
46
Beta Counts
43904
Beta to Alpha Crosstalk
0.10 %
Count
Close
Help
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
12:07 PM


Set ROI's
D
C
B
A
Detector D4
Alpha Upper Limit 100.00 %
Alpha Lower Limit 31.20 %
Beta Upper Limit 31.20 %
Beta Lower Limit 0.00 %
Alpha Counts
1204
Beta Counts
46997
Beta to Alpha Crosstalk
2.50 %
Count
Close
Help
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
12:08 PM


Set ROI's
Detector D4
Alpha Upper Limit
100.00 %
Alpha Lower Limit
57.36 %
Beta Upper Limit
31.20 %
Beta Lower Limit
0.00 %
Alpha Counts
49
Beta Counts
46997
Beta to Alpha Crosstalk
0.10 %
Count
Close
Help
D
C
B
A
Start
Microsoft Excel
OSUM
Microsoft Excel - Book1
12:09 PM

11/3/08
11/10/08 Plateaus For Drawers A, B, C, & D

| α Sources Used | | Detectors | | | | β Sources Used | |
|---|---|---|---|---|---|---|---|
| 410 | Am241 | A1 | B1 | C1 | D1 | 406 | Sr/Y-90 |
| 411 | 17,800 dpm | A2 | B2 | C2 | D2 | 407 | 29,600 dpm |
| 412 | 2/06/95 | A3 | B3 | C3 | D3 | 408 | 9/15/02 |
| 413 | ↓ | A4 | B4 | C4 | D4 | 409 | ↓ |

Parameters

Start Voltage: 300
Ending Voltage: 1650
30 Volts/Step
5 min/Step
Count Preset: 40,000
Weak Check Time: 0.1 min
Weak Counts Limit: 20

Filenames

PTC1103A
PTC1103B
PTC1110C
PTC1110D

11/12/08 ROI's Set using Sr/Y-90 Plateau Sources

11/13/08 Am 241 Wipe Calibration

Source #746 Source ID: 1001 LogFile: Am241Wipe-11/08

Filenames: EAW1113, A→D

α to β Crosstalk Calculated for each detector using the following equation: $\frac{\text{counts in Beta Channel}}{\text{counts in Alpha Channel}}$

11/12/08 Interim ~~Con~~ TP 11/13/08 Control Limits established for daily efficiency and weekly background calibrations. Efficiency limits are ± 10% of 11/12/08 check and background limits are ± 3σ Counting Uncertainty of 11/11/08 check (1000 min count)

Continued on Page

Read and Understood By

Signed [signature] Date 11/17/08 Signed Renee [signature] Date 11/19/08 RB

# Calibration Efficiencies

| Control ID | Isotope | Type | Half-Life | DPM | Std dev | Date | Status | Alpha/Beta Archive File |
|---|---|---|---|---|---|---|---|---|
| 1000 | Am-241 | Alpha | 157861.05 | 5450.0115 | 272.50 | 27-Oct-08 | Systems | Daily-11/08 |
| 1001 | Am-241 | Alpha | 157861.05 | 9342 | 467.10 | 6-Apr-04 | PA | Am241Wipe-11/08 |
| 1002 | Sr-90/Y-90 | Beta | 10518.912 | 37044 | 1852.20 | 10-Dec-01 | PA | Sr90Wipe-11/08 |
| 1003 | Sr-90/Y-90 | Beta | 10518.912 | 1110 | 55.50 | 18-Mar-99 | PA | Sr90F-11/08 |
| 1004 | Sr-89 | Beta | 50.53 | 10512.56 | 525.63 | 1-Oct-08 | PA | Sr89-11/08 |
| 1005 | Am-241 | Alpha | 157861.05 | 5514.295 | 275.71 | 6-Jun-01 | PA | Am241R-11/08 |
| 1006 | Sr-90/Y-90 | Beta | 10518.912 | 19986.92 | 999.35 | 2-Dec-04 | PA | Sr90R-11/08 |
| 1007 | Sr-89 | Beta | 50.53 | 1599.916 | 80.00 | 20-Nov-08 | PA | Ra228-11/08 |

Am-241 Ringed Planchet Efficiency Calibration
LB4100-C
Date: 11/17/2008
Source ID: 1005

| Det ID | A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 |
|---|---|---|---|---|---|---|---|---|
| File Name | EAM1117 | EAM1117 | EAM1117 | EAM1117 | EAM1117A | EAM1117A | EAM1117A | EAM1117A |
| Cnt Time | 8.34 | 7.47 | 7.73 | 7.53 | 8.55 | 7.65 | 7.89 | 7.94 |
| Tot Cnts | 10008 | 10007 | 10012 | 10015 | 10018 | 10015 | 10005 | 10009 |
| Bkg CPM | 0.036 | 0.050 | 0.045 | 0.060 | 0.067 | 0.054 | 0.055 | 0.058 |
| CPM | 1199.964 | 1339.575 | 1295.168 | 1329.953 | 1171.629 | 1309.096 | 1268.006 | 1260.521 |
| Alpha Efficiency | 0.220226 | 0.245848 | 0.237698 | 0.244082 | 0.215025 | 0.240254 | 0.232713 | 0.23134 |
| Beta Efficiency | 0.092862 | 0.093328 | 0.098085 | 0.102524 | 0.090527 | 0.0907 | 0.09499 | 0.092277 |
| **Efficiency** | **0.2202** | **0.2458** | **0.2377** | **0.2441** | **0.2150** | **0.2403** | **0.2327** | **0.2313** |

| Det ID | C1 | C2 | C3 | C4 | D1 | D2 | D3 | D4 |
|---|---|---|---|---|---|---|---|---|
| File Name | EAM1117B | EAM1117B | EAM1117B | EAM1117B | EAM1117C | EAM1117C | EAM1117C | EAM1117C |
| Cnt Time | 8.33 | 7.45 | 7.97 | 7.71 | 8.16 | 7.52 | 7.61 | 7.56 |
| Tot Cnts | 10009 | 10008 | 10010 | 10007 | 10011 | 10008 | 10001 | 10014 |
| Bkg CPM | 0.046 | 0.067 | 0.056 | 0.064 | 0.056 | 0.063 | 0.061 | 0.048 |
| CPM | 1201.515 | 1343.289 | 1255.904 | 1297.861 | 1226.782 | 1330.788 | 1314.131 | 1324.555 |
| Alpha Efficiency | 0.220510 | 0.246530 | 0.230492 | 0.238192 | 0.225147 | 0.244235 | 0.241178 | 0.243091 |
| Beta Efficiency | 0.092040 | 0.100048 | 0.090958 | 0.097674 | 0.088546 | 0.093602 | 0.09481 | 0.098516 |
| **Efficiency** | **0.2205** | **0.2465** | **0.2305** | **0.2382** | **0.2251** | **0.2442** | **0.2412** | **0.2431** |

11/17/08 Am241 Calibration (Gross Alpha) - Ringed Planchet

Benchsheet: 290486A SourceID: 1005 Logfile: Am241-11/08

| Sources | Detectors | Filenames |
|---|---|---|
| 0615044-S2 | A1 B1 C1 D1 | EAM1117 |
| -S3 | A2 B2 C2 D2 | EAM1117A |
| -S4 | A3 B3 C3 D3 | EAM1117B |
| -S5 | A4 B4 C4 D4 | EAM1117C |

11/17/08 Sr 90 Calibration (Gross Beta) - Ringed Planchet

Benchsheet: 290476A SourceID: 1006 Logfile: Sr90R-11/08

| Sources | Detectors | Filenames |
|---|---|---|
| 0614030-S1 | A1 B1 C1 D1 | ESR1117 |
| -S2 | A2 B2 C2 D2 | ESR1117A |
| -S3 | A3 B3 C3 D3 | ESR1117B |
| -S4 | A4 B4 C4 D4 | ESR1117C |

JP 11/18/08

Continued on Page

Read and Understood By

Signed 11/18/08 Date

Signed 11/19/08 Date

Date 11/17/08 SOP 724r 10

# Paragon Analytics

Low Background Gas Flow Proportional Counter Log

**Instrument: LB4100C**

*Instrument Daily Response and Background Checks*

| Det. | Daily Response Check Start 1 | Status | Start 2 | Status | Background Check Start 1 | Status | Start 2 | Status | Det. Status |
|---|---|---|---|---|---|---|---|---|---|
| 1 | JP | P | | | JP | Hα | JP | P | P |
| 2 | | | | | | P | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

*Weekly Background Calibration*

| | Current Calib. File ID | Weekly Calib. Started | Status | File ID |
|---|---|---|---|---|
| Dr A | BKC1111W | | | |
| Dr B | | | | |
| Dr C | | | | |
| Dr D | | | | |

Dr = Drawer

*Gas Supply*

| P-10 Supply | | P-10 Flow | |
|---|---|---|---|
| Tank 1 | 1450 | Dr A | 0.15 |
| | | Dr B | |
| Tank 2 | 550 | Dr C | |
| | | Dr D | |

Comments:

Page No.: 370907 A Form 780r8.doc (6/23/06) Reviewed By / Date JP 11/17/08

Date 11/17/08

SOP 724r10

## Paragon Analytics

Low Background Gas Flow Proportional Counter Log

**Instrument: LB4100C**

| Det. | Sample ID | Batch | Test | Count Dur. (min) | Start Time | Analyst Initials | File ID | Output Initials |
|---|---|---|---|---|---|---|---|---|
| 1-16 | Daily Eff | — | — | 30 | 7:16 | JP | EFC1117 | JP |
| 1-16 | Daily BKg | — | — | 60 | 7:31 | JP | BKC1117 | JP |
| 1 | Daily BKg | — | — | 60 | 8:39 | JP | BKC1117R | JP |
| 1-4 | 1005 | Am241 Eff | α | 30 | 10:14 | JP | EAM1117 | JP |
| 5-8 | 1005 | ↓ | ↓ | ↓ | 10:29 | JP | EAM1117A | JP |
| 9-12 | 1005 | ↓ | ↓ | ↓ | 10:40 | JP | EAM1117B | JP |
| 13-16 | 1005 | ↓ | ↓ | ↓ | 10:50 | JP | EAM1117C | JP |
| 13-16 | 1006 | Sr90 Eff | B | 30 | 10:14 | JP | ESR1117 | JP |
| 9-12 | 1006 | ↓ | ↓ | ↓ | 10:29 | JP | ESR1117A | JP |
| 5-8 | 1006 | ↓ | ↓ | ↓ | 10:40 | JP | ESR1117B | JP |
| 1-4 | 1006 | ↓ | ↓ | ↓ | 10:50 | JP | ESR1117C | JP |
| 1-16 | 0717504-S1→S16 | Beta Attn Curve | Attn | 60 | 11:07 | JP | ASR1117 | JP |

JP 11/17/08

Comments:

Page No.: **370907 B**
(cont. from page NA B)

Form 780r8.doc (6/23/06)

Reviewed By / Date JP 11/17/08

Date 11/18/08 SOP 724r 10

# Paragon Analytics
## Low Background Gas Flow Proportional Counter Log
**Instrument: LB4100C**

*Instrument Daily Response and Background Checks*

| Det. | Daily Response Check | | | | Background Check | | | | Det. |
|---|---|---|---|---|---|---|---|---|---|
| | Start 1 | Status | Start 2 | Status | Start 1 | Status | Start 2 | Status | Status |
| 1 | JP | P | | | JP | P | | | P |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

*Weekly Background Calibration*

| | Current Calib. File ID | Weekly Calib. Started | Status | File ID |
|---|---|---|---|---|
| Dr A | BKC1111W | | | |
| Dr B | | | | |
| Dr C | | | | |
| Dr D | | | | |

Dr = Drawer

*Gas Supply*

| P-10 Supply | | P-10 Flow | |
|---|---|---|---|
| Tank 1 | 1100 | Dr A | 0.15 |
| | | Dr B | |
| Tank 2 | 550 | Dr C | |
| | | Dr D | |

Comments:

290486

A

# WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES / Ra/Sr Lab

*Paragon Analytics*

Matrix NA Prep Analyst JLL Prep Date 3/15/06 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 |
|---|---|---|---|---|---|---|---|---|
| 0615044 - S1 | NA | NA | NA | S1 | None | | | |
| - S2 | | | | | | | | |
| - S3 | | | | | | | | |
| - S4 | | | | | | | | |
| - S5 | | | | | | | | |
| - S6 | | | | | | | | |
| - S7 | | | | S2 | | | | |
| - S8 | | | | | | | | |
| | | | | | JLL 3/15/06 | | | |

Balance No. NA Spiked By JLL Date 3/15/06 Spike Witness [illegible] Date 3/15/06 QASS? ( Y / N ) No. NA

| | Isotope | ~~NEW~~ ~~Std~~ No | Act / mL | Vol | P | Total Act (dpm) | P: Dat ~~Decay~~ Corrected JLL 3/15/06 | | Relinquished by / Date | Received by / Date |
|---|---|---|---|---|---|---|---|---|---|---|
| Spike 1 | 241 Am | 585.3020.27 | 55,142.95 | 0.1 | | 5,514.295 | RS-071 | 1 | | |
| Spike 2 | 241 Am | 616.2613.100 Ex: 012506 | 107.70 | 5.0 | | 538.5 | RS-011 | | | |
| Spike 3 | | | | | | JLL 3/15/06 | | | | |
| Spike 4 | | | | | | | | 2 | | |

Benchsheet No. (If / when generated) NA Reviewed by / Date [illegible] 3/15/06

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290486 B

# WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES / Ra/Sr Lab

*Paragon Analytics*

Initials JRK  Date 3/15/06  Method (SOP / Rev) NA  Matrix NA

**COMMENTS**

$^{241}$Am Standard Verification / Efficiency Calibration

- 5 mL 16 N $HNO_3$ added to each planchet
- Appropriate spike and volume added to each planchet
- Dried on a hot plate
- Labeled and submitted for analysis

Reviewed by / Date 3/15/06

## *Gross Alpha / Beta Calculations*

| Atten. Constants | | b | m | a | x0 | | b | m |
|---|---|---|---|---|---|---|---|---|
| Alpha | y = b*m^(a*(x-x0)) | 1.1697 | 0.9930 | 0.7986 | 0 | y = b*m^-x | 0.2318 | 0.9997 |
| Beta | y = b*m^(a*(x-x0)) | 0.9791 | 0.9998 | 1.3098 | 0.0 | y = b*x+m | -2.71E-06 | 0.0005 |

| Sample ID | Initial Aliquot | Final Sam. Size | Count Date | Count Dur. | Residual Mass (mg) | Alpha Gross CPM | Bkg CPM | Atten. | Efficiency |
|---|---|---|---|---|---|---|---|---|---|
| 0615044-S1 | 0.200 | 0.200 | 11/11/2006 | 10 | 0.0 | 1239.500 | 0.036 | 1.170 | 0.2296 |
| 0615044-S2 | 0.200 | 0.200 | 11/11/2006 | 10 | 0.0 | 1300.700 | 0.036 | 1.170 | 0.2296 |
| 0615044-S3 | 0.200 | 0.200 | 11/11/2006 | 10 | 0.0 | 1409.500 | 0.036 | 1.170 | 0.2296 |
| 0615044-S4 | 0.200 | 0.200 | 11/11/2006 | 10 | 0.0 | 1369.900 | 0.036 | 1.170 | 0.2296 |
| 0615044-S5 | 0.200 | 0.200 | 11/11/2006 | 10 | 0.0 | 1381.700 | 0.036 | 1.170 | 0.2296 |
| | | | | | Mean= | 1340.260 | | | |
| | | | | | StDev= | 69.115 | | | |
| | | | | | 2 Sig LCL= | 1202.030 | 1 Sig LCL= | 1271.145 | |
| | | | | | 2 Sig UCL= | 1478.490 | 1 Sig UCL= | 1409.375 | |

0615044-S1 was rejected as the outlier

| Spike Information | | | | | | |
|---|---|---|---|---|---|---|
| Sample ID | Alpha Std ID | Ref. Date | Halflife Yrs | Act (pCi/ml) | Spike Vol (mL) | Decay Corr. Spike Act. Added |
| 0615044-S1 | 585.3020.27 | 7/6/2001 | 432 | 24839.17 | 0.1 | 12313.4 |
| 0615044-S2 | 585.3020.27 | 7/6/2001 | 432 | 24839.17 | 0.1 | 12313.4 |
| 0615044-S3 | 585.3020.27 | 7/6/2001 | 432 | 24839.17 | 0.1 | 12313.4 |
| 0615044-S4 | 585.3020.27 | 7/6/2001 | 432 | 24839.17 | 0.1 | 12313.4 |
| 0615044-S5 | 585.3020.27 | 7/6/2001 | 432 | 24839.17 | 0.1 | 12313.4 |

# PAI - Gas Flow Proportional Sample Analysis LB4100-B

Unit Type: LB4100 -B
Counting Unit ID: Aqua
High Voltage Mode: Simultaneous
Application Revision: 2
Application Version: Standard
Rev.12/29/03 JE

Data file name: ABB1111E
Batch ID: OUTLIER
Count Preset (m): 10
Batch Ended: 11/11/06 13:20

Background logfile: BKGABW
Date of Bkg. Cal: 11/11/06
Alpha efficiency logfile: AmR-11/05
Alpha attenuation calibration: AM0106
Beta efficiency logfile: Sr90R-11/05
Beta attenuation calibration: SR1105

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= | 1.16870 | Beta b= | 0.9191 |
| m= | 0.99300 | m= | 0.9998 |
| a= | 0.7986 | a= | 1.3098 |
| 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= | 0.2319 | b -> a xtalk b= | -2.71E-08 |
| a -> b xtalk m= | 0.9997 | b -> a xtalk m= | 0.0005 |

| Det. ID | Sample ID | Count End Date & Time | Count Dur. (min) | Resid. Mass (mg) | Alpha Activity: Gross CPM | Alpha Activity: Bkg. CPM | Alpha Activity: b>a xtlk CPM | Alpha Activity: Base Eff | Alpha Activity: Base Cor.Fact. | Alpha Activity: Progeny Eff | Alpha Activity: Progeny Cor.Fact. | Beta Activity: Gross CPM | Beta Activity: Bkg. CPM | Beta Activity: a>b xtlk CPM | Beta Activity: Base Eff | Beta Activity: Base Cor.Fact. | Beta Activity: Progeny Eff | Beta Activity: Progeny Cor.Fact. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B1 | 0615044-S1 | 11/11/06 13:20 | 10.00 | 0.0 | 1239.500 | 0.036 | 0.247 | 0.2296 | 1.170 | n/a | n/a | 494.500 | 1.499 | 287.3161 | 0.4385 | 0.979 | n/a | n/a |

# PAI - Gas Flow Proportional Sample Analysis LB4100-B

Unit Type: LB4100 -B
Counting Unit ID: Aqua
High Voltage Mode: Simultaneous
Application Revision: 2
Application Version: Standard
Rev.12/29/03 JE

Data file name: ABB1110
Batch ID: OUTLIER
Count Preset (m): 10
Batch Ended: 11/11/06 15:01

Background logfile: BKGABW
Date of Bkg. Cal: 11/11/06
Alpha efficiency logfile: AmR-11/05
Alpha attenuation calibration: AM0106
Beta efficiency logfile: Sr90R-11/05
Beta attenuation calibration: SR1105

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

| Alpha Attenuation Calibration $y = b^*m^\wedge(a^*(mass-x0))$ | | Beta Attenuation Calibration $y = b^*m^\wedge(a^*(mass-x0))$ | |
|---|---|---|---|
| Alpha b= | 1.16970 | Beta b= | 0.9751 |
| m= | 0.99300 | m= | 0.9998 |
| a= | 0.7986 | a= | 1.3098 |
| x0= | 0.0000 | x0= | 0.0000 |
| Alpha to Beta X-talk $y = b^*m^\wedge$-mass | | Beta to Alpha X-talk $y = b^*mass + m$ | |
| a->b xtalk b= | 0.2318 | b->a xtalk b= | -2.71E-06 |
| a->b xtalk m= | 0.9997 | b->a xtalk m= | 0.0009 |

| Det. ID | Sample ID | Count End Date & Time | Count Dur. (min) | Resid. Mass (mg) | Alpha Activity Gross CPM | Bkg. CPM | b>a xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. | Beta Activity Gross CPM | Bkg. CPM | a>b xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B1 | 0615044-S2 | 11/11/06 15:01 | 10.00 | 0.0 | 1300.700 | 0.036 | 0.252 | 0.2298 | 1.170 | n/a | n/a | 503.100 | 1.499 | 301.5023 | 0.4385 | 0.979 | n/a | n/a |

# PAI - Gas Flow Proportional Sample Analysis LB4100-B

Unit Type: LB4100 -B
Counting Unit ID: Aqua
High Voltage Mode: Simultaneous
Application Revision: 2
Application Version: Standard
Rev.12/29/03 JE

Data file name: ABB1111I
Batch ID: OUTLIER
Count Preset (m): 10
Batch Ended: 11/11/06 15:21

Background logfile: BKGABW
Date of Bkg. Cal: 11/11/06
Alpha efficiency logfile: AmR-11/05
Alpha attenuation calibration: AM0105
Beta efficiency logfile: Sr90R-11/05
Beta attenuation calibration: SR1105

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= | 1.16970 | Beta b= | 0.9791 |
| m= | 0.99360 | m= | 0.9998 |
| a= | 0.7866 | a= | 1.3038 |
| 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= | 0.2319 | b->a xtalk b= | -2.71E-06 |
| a->b xtalk m= | 0.9997 | b->a xtalk m= | 0.0005 |

| 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. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B1 | 0615044-S3 | 11/11/06 15:21 | 10.00 | 0.0 | 1409.500 | 0.038 | 0.262 | 0.2298 | 1.170 | n/a | n/a | 524.700 | 1.499 | 326.7221 | 0.4385 | 0.979 | n/a | n/a |

# PAI - Gas Flow Proportional Sample Analysis LB4100-B

Unit Type: LB4100 -B
Counting Unit ID: Aqua
High Voltage Mode: Simultaneous
Application Revision: 2
Application Version: Standard
Rev.12/29/03 JE

Data file name: ABB1111K
Batch ID: OUTLIER
Count Preset (m): 10
Batch Ended: 11/11/06 15:38

Background logfile: BKGABW
Date of Bkg. Cal: 11/11/06
Alpha efficiency logfile: AmR-11/05
Alpha attenuation calibration: AM0106
Beta efficiency logfile: Sr90R-11/05
Beta attenuation calibration: SR1105

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= | 1.15970 | Beta b= | 0.9791 |
| m= | 0.99300 | m= | 0.9938 |
| a= | 0.7996 | a= | 1.3099 |
| 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= | 0.2310 | b -> a xtalk b= | -2.71E-06 |
| a -> b xtalk m= | 0.9897 | b -> a xtalk m= | 0.0005 |

| Det. ID | Sample ID | Count End Date & Time | Count Dur. (min) | Resid. Mass (mg) | Alpha Activity: Gross CPM | Bkg. CPM | b>a xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B1 | 0615044-S4 | 11/11/06 15:38 | 10.00 | 0.0 | 1369.900 | 0.036 | 0.261 | 0.2296 | 1.170 | n/a | n/a |

| Det. ID | Beta Activity: Gross CPM | Bkg. CPM | a>b xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. |
|---|---|---|---|---|---|---|---|
| B1 | 522.200 | 1.499 | 317.5428 | 0.4385 | 0.979 | n/a | n/a |

# PAI - Gas Flow Proportional Sample Analysis LB4100-B

Unit Type: LB4100 -B
Counting Unit ID: Aqua
High Voltage Mode: Simultaneous
Application Revision: 2
Application Version: Standard
Rev.12/29/03 JE

Data file name: ABB1111M
Batch ID: OUTLIER
Count Preset (m): 10
Batch Ended: 11/11/06 15:56

Background logfile: BKGABW
Date of Bkg. Cal: 11/11/06
Alpha efficiency logfile: AmR-11/05
Alpha attenuation calibration: AM0106
Beta efficiency logfile: Sr90R-11/05
Beta attenuation calibration: SR1105

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= | 1.16970 | Beta b= | 0.9791 |
| m= | 0.93300 | m= | 0.9989 |
| a= | 0.7966 | a= | 1.3098 |
| x0= | 0.0000 | x0= | 0.0000 |
| Alpha to Beta X-talk<br>y = b *m^-mass | | Beta to Alpha X-talk<br>y = b*mass + m | |
| a -> b xtalk b= | 0.2310 | b -> a xtalk b= | -2.71E-08 |
| a -> b xtalk m= | 0.9997 | b -> a xtalk m= | 0.0005 |

| Det. ID | Sample ID | Count End Date & Time | Count Dur. (min) | Resid. Mass (mg) | Alpha Activity Gross CPM | Alpha Activity Bkg. CPM | Alpha Activity b>a xtlk CPM | Alpha Activity Base Eff | Alpha Activity Base Cor.Fact. | Alpha Activity Progeny Eff | Alpha Activity Progeny Cor.Fact. | Beta Activity Gross CPM | Beta Activity Bkg. CPM | Beta Activity a>b xtlk CPM | Beta Activity Base Eff | Beta Activity Base Cor.Fact. | Beta Activity Progeny Eff | Beta Activity Progeny Cor.Fact. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B1 | 0615044-S5 | 11/11/06 15:56 | 10.00 | 0.0 | 1381.700 | 0.036 | 0.260 | 0.2298 | 1.170 | n/a | n/a | 520.400 | 1.499 | 320.2781 | 0.4385 | 0.979 | n/a | n/a |

Date 11/11/06 SOP 724r 9

**Paragon Analytics**
Low Background Gas Flow Proportional Counter Log
**Instrument: LB4100B**

*Instrument Daily Response and Background Checks*

| Det. | Daily Response Check Start 1 | Status | Start 2 | Status | ★ Background Check Start 1 | Status | Start 2 | Status | Det. Status |
|---|---|---|---|---|---|---|---|---|---|
| 1 | LO | P | | | | | | | P |
| 2 | | | | | | | | | Hα |
| 3 | | | | | | | | | P |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | Lo | | | | |
| 8 | | | | | 11/11/06 | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | Hα |
| 15 | | | | | | | | | P |
| 16 | | | | | | | | | HB |

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

*Weekly Background Calibration*

| | Current Calib. File ID | Weekly Calib. Started | Status | File ID |
|---|---|---|---|---|
| Dr A | BKB1110W | Lo | 2HB | BKB1111W |
| Dr B | | | | |
| Dr C | | | | |
| Dr D | | Lo | 14P 16HB | BKB1111W |

Dr = Drawer

★ Daily Bkg not run due to Weekly Bkg run the night before. LO 11/11/06

*Gas Supply*

| | P-10 Supply | | P-10 Flow |
|---|---|---|---|
| Tank 1 | 2000 | Dr A | 6.15 |
| | | Dr B | |
| Tank 2 | 1200 | Dr C | |
| | | Dr D | |

Comments:

Date 11/11/06

SOP 724r 9

**Paragon Analytics**
Low Background Gas Flow Proportional Counter Log
**Instrument: LB4100B**

| Det. | Sample ID | Batch | Test | Count Dur. (min) | Start Time | Analyst Initials | File ID | Output Initials |
|---|---|---|---|---|---|---|---|---|
| 1-16 | Daily EFF | — | — | 30 | 1039 | LO | EFB1111 | LO |
| 1 | 1156 | Ra226 Eff | Ra226 | 30 | 1103 | LO | ERA1111A | LO |
| 2 | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | 1156 | Ra226Eff | Ra226 | 30 | 1118 | LO | ERA1111B | LO |
| 6 | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | 1156 | Ra226Eff | Ra226 | 30 | 1130 | LO | ERA1111C | LO |
| 10 | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | 1156 | Ra226EFF | Ra226 | 30 | 1141 | LO | ERA1111D | LO |
| 14 | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 1 | Alpha | ROI Test | α | 10 | 1117 | LO | ABB1111 | LO |
| 2 | Alpha | ROI Test | α | 10 | 1130 | LO | ABB1111A | LO |
| 1 | Beta | ROI Test | β | 10 | 1143 | LO | ABB1111B | LO |
| 3 | Alpha | ↓ | α | ↓ | ↓ | ↓ | ↓ | ↓ |
| 7 | Beta | ROI Test | β | 10 | 1200 | LO | ABB1111C | LO |
| 4 | Alpha | ↓ | α | ↓ | ↓ | ↓ | ↓ | ↓ |
| 3 | Beta | ↓ | ↓ | ↓ | 1216 | LO | ABB1111D | LO |
| 5 | Alpha | | | | ↓ | ↓ | ↓ | ↓ |
| 1 | 0424028-S1 | Outlier | Sr90 | 10 | 1308 | LO | SRB1111 | LO |
| 5 | 0615044-S1 | Outlier | α ~~β~~ LO 11/11/06 | 10 | 1310 | LO | ABB1111E | ↓ |
| 9 | 0614030-S1 | Outlier | β | 10 | 1312 | LO | ABB1111F | |
| 13 | 0615038-S1 | Outlier | Sr89 | 10 | 1314 | LO | SRB1111A | |
| LO 11/11/06 1 | 0~~6~~424028-S2 | ↓ | Sr90 | ↓ | 1450 | LO | SRB1111B | LO |
| 5 | 0615044-S2 | | α | | 1451 | ↓ | ABB1111G | ↓ |
| 9 | 0614030-S2 | | β | | 1452 | | ABB1111H | |
| 13 | 0615038-S2 | | Sr89 | | 1453 | | SRB1111C | |
| LO 11/11/06 1 | 0~~6~~424028-S3 | ↓ | Sr90 | ↓ | 1511 | LO | SRB1111D | LO |
| LO 11/11/06 5 | 0615044-S~~2~~3 | | α | | ↓ | ↓ | ABB1111I | ↓ |
| 9 | 0614030-S3 | | β | | 1512 | | ABB1111J | |
| 13 | 0615038-S3 | | Sr89 | | ↓ | | SRB1111E | |
| 1 | 0424028-S4 | | Sr90 | | 1527 | | SRB1111F | LO |
| 5 | 0615044-S4 | | α | | ↓ | | ABB1111K | ↓ |
| 9 | 0614030-S4 | | β | | 1528 | | ABB1111L | |
| 13 | 0615038-S4 | | Sr89 | | ↓ | | SRB1111G | |
| 1 | 0424028-S5 | | Sr90 | | 1544 | | SRB1111H | LO |
| 5 | 0615044-S5 | | α | | ↓ | | ABB1111M | ↓ |
| 9 | 0614030-S5 | | β | | 1546 | | ABB1111N | |
| 13 | 0615038-S5 | | Sr89 | | ↓ | | SRB1111I | |
| | | | | | | | | LO 11/11/06 |

Comments:

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Form 780r8.doc (6/23/06)

Reviewed By / Date LO 11/12/06

Date 9/27/07 SOP 724r10

# Paragon Analytics

Low Background Gas Flow Proportional Counter Log

**Instrument: LB4100A**

| Det. | Sample ID | Batch | Test | Count Dur. (min) | Start Time | Analyst Initials | File ID | Output Initials |
|---|---|---|---|---|---|---|---|---|
| 1-8 | 1130 | Daily EFF | – | 30 | 947 | LO | EFA0927 | LO |
| 1-8 | Daily BKG | – | – | 100 | 1021 | LO | BKA0927 | LO |
| 1 | 1171 | Am Wipe EFF | α | 30 | 1140 | LO | EAW0927 | LO |
| 2 | | | | | 1147 | | A | |
| 3 | | | | | 1154 | | B | |
| 4 | | | | | 1201 | | C | ↓ |
| 5 | | | | | 1506 | | D | LO |
| 6 | | | | | 1512 | | E | |
| 7 | | | | | 1519 | | F | |
| 8 | ↓ | ↓ | ↓ | | 1532 | | ↓ G | ↓ |
| 1 | 1172 | Sr Wipe EFF | β | | 1219 | | ESW0927 | LO |
| 2 | | | | | 1215 | | A | |
| 3 | | | | | 1211 | | B | |
| 4 | | | | | 1208 | | C | ↓ |
| 5 | | | | | 1154 | | D | LO |
| 6 | | | | | 1151 | | E | |
| 7 | | | | | 1146 | | F | |
| 8 | ↓ | ↓ | ↓ | ↓ | 1140 | ↓ | ↓ G | ↓ |
| 1-4 | 1173 | Sr89 EFF | β | ~~30~~ 60 | 1349 | LO | ESE0927A | LO |
| 5-8 | ↓ | ↓ | ↓ | ↓ | 1158 | ↓ | ↓ B | ↓ |
| 1-4 | 1174 | Am241 EFF | α | 60 | 1303 | LO | EAM0927A | LO |
| 5-8 | ↓ | ↓ | ↓ | ↓ | 1250 | ↓ | EAM0927B | ↓ |
| 1-4 | 1175 | Sr90R EFF | β | 60 | 1223 | LO | ESR0927A | LO |
| 5-8 | ↓ | ↓ | ↓ | ↓ | 1245 | ↓ | ↓ B | ↓ |
| 1-4 | 1176 | Sr90F EFF | β | 60 | 1230 | LO | ESF0927A | LO |
| 5-8 | ↓ | ↓ | ↓ | ↓ | 1303 | ↓ | ↓ B | ↓ |
| 1-4 | 1177 | Th230 EFF | α | 60 | 1323 | LO | ETH0927A | LO |
| 5-8 | ↓ | ↓ | ↓ | ↓ | 1439 | ↓ | ↓ B | ↓ |
| 1-4 | 1178 | Cl36 EFF | β | 60 | 1316 | LO | ECL0927A | LO |
| 5-8 | ↓ | ↓ | ↓ | ↓ | 1334 | ↓ | ↓ B | ↓ |
| 1-4 | 1179 | I129 EFF | β | 60 | 1437 | LO | EI0927A | LO |
| 5-8 | ↓ | ↓ | ↓ | ↓ | 1341 | ↓ | ↓ B | ↓ |
| 1 | 0714506-B1MB | SR070220-1 | Sr90 | 30 | 1548 | LO | SRB0927 A LO 9/27/07 | LO |
| 7 | -B2MB | | | | | | | |
| 4 | -B3MB | | | | | | | |
| 2 | -S1LCS | | | | | | | |
| 3 | -S2LCS | | | | | | | |
| 8 | ↓ -S3LCS | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 6 | 0714506-B1MB | SR070220-1 | Sr90 | 30 | 1623 | LO | SRA0927A | LO |
| 2 | 601 | Wipe ICVs | αβ | 10 | 1714 | LO | ABA0927 | LO |
| 4 | 729 | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 1 | 729 | Wipe ICVs | αβ | 10 | 1729 | LO | ABA0927A | LO |
| 3 | 601 | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 5 | 601 | Wipe ICVs | αβ | 10 | 1743 | LO | ABA0927B | LO |
| 8 | 729 | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |

LO 9/27/07

LO 9/28/07

Comments:

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Form 780r8.doc (6/23/06)

Reviewed By/ Date LO 9/28/07

Am-241

585, 3020. 27 Notebook No. Continued From Page 27

Prepare a primary dilution of RSO#585 (Analytics #62034-307) to a final volume of approx 40 mL.

1) Prepare 1.0M HCl by diluting 42mL conc. HCl (12N) (Fisher lot # 041145) to a final volume of 500mL.

2) Determine density of 1.0M HCl

| | Bal 12 |
|---|---|
| Mass of empty VMF (100mL) | 62.4693g |
| Mass of VMF + 100mL 1.0M HCl | 163.9500g |
| Mass of 100mL HCl (1.0M) | 101.4807g |
| ÷ 100mL = density = | 1.0148 g/mL |

3) Transfer RSO #585 to a 40mL VOA vial

| | Bal 12 |
|---|---|
| Mass of empty vial (w/ lid) | 24.7400g |
| Mass of vial + std | 29.7998g |
| Mass of std transfered | 5.0598g |

4) Dilute to volume w/ 1.0M HCl

| | Bal 12 |
|---|---|
| Mass of vial (w/ lid) + std + soln | 66.7165g |
| Mass of empty vial (from above) | 24.7400g |
| Mass of primary dilution | 41.9765g |

5) Final activity calculation (dpm/g)

$$\frac{(3.88\times10^{4}\,d/s)(60\,s/min)(5.0598g)}{(5.16417g)(41.9765g)} = 54338.74\,\frac{dpm}{g}$$

6) Final activity calculation (dpm/mL)

$$54338.74\,\frac{dpm}{g} \times 1.0148\,\frac{g}{mL} = \boxed{55142.95\,\frac{dpm}{mL}}$$

Std Verified on 3/~~19~~ 17/06. RG Expiration Date: 3/~~19~~ 17/07. RG 3/27/06 RG

Continued on Page

Read and Understood By

Oleathia Barber 3/13/06 Renee Gallegos 3/27/06

Signed Date Signed 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 ID 00585
recd 7-09-01

62034-307

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): | 3.880 E4 |
| HALF-LIFE: | 4.322 E2 years |
| CALIBRATION DATE: | July 6, 2001 12:00 EST |
| TOTAL UNCERTAINTY*: | 3.5% |
| SYSTEMATIC: | 3.0% |
| RANDOM: | 0.5% |

*99% confidence level.

Impurities: $\gamma$-impurities <0.1%

5.16417 grams 1M HCl solution.

P O NUMBER EW062801, Item 1

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

Q A APPROVED: [illegible] 7/5/01

Sr-90 Ringed Planchet Efficiency Calibration
LB4100-C
Date: 11/17/2008
Source ID: 1006

| Det ID<br>File Name | A1<br>ESR1117C | A2<br>ESR1117C | A3<br>ESR1117C | A4<br>ESR1117C | B1<br>ESR1117B | B2<br>ESR1117B | B3<br>ESR1117B | B4<br>ESR1117B |
|---|---|---|---|---|---|---|---|---|
| Cnt Time | 1.40 | 1.39 | 1.37 | 1.40 | 1.43 | 1.43 | 1.41 | 1.45 |
| Tot Cnts | 10035 | 10041 | 10037 | 10071 | 10076 | 10076 | 10072 | 10062 |
| Bkg CPM | 1.446 | 1.516 | 1.521 | 1.525 | 1.706 | 1.479 | 1.556 | 1.607 |
| CPM | 7166.411 | 7222.225 | 7324.756 | 7192.046 | 7044.448 | 7044.675 | 7141.706 | 6937.703 |
| Alpha Efficiency | 0.000273 | 0.000908 | 0.00048 | 0.000311 | 0.000266 | 0.000305 | 0.000348 | 0.00528 |
| Beta Efficiency | 0.394412 | 0.39748 | 0.403127 | 0.395823 | 0.3877 | 0.387712 | 0.393052 | 0.381825 |
| **Efficiency** | **0.3944** | **0.3975** | **0.4031** | **0.3958** | **0.3877** | **0.3877** | **0.3931** | **0.3818** |

| Det ID<br>File Name | C1<br>ESR1117A | C2<br>ESR1117A | C3<br>ESR1117A | C4<br>ESR1117A | D1<br>ESR1117 | D2<br>ESR1117 | D3<br>ESR1117 | D4<br>ESR1117 |
|---|---|---|---|---|---|---|---|---|
| Cnt Time | 1.41 | 1.41 | 1.38 | 1.40 | 1.42 | 1.4 | 1.37 | 1.43 |
| Tot Cnts | 10048 | 10049 | 10078 | 10070 | 10055 | 10081 | 10045 | 10073 |
| Bkg CPM | 1.737 | 1.568 | 1.628 | 1.646 | 1.722 | 1.550 | 1.664 | 1.700 |
| CPM | 7124.504 | 7125.382 | 7301.271 | 7191.211 | 7079.264 | 7199.164 | 7330.453 | 7042.356 |
| Alpha Efficiency | 0.000193 | 0.000270 | 0.000316 | 0.000272 | 0.000423 | 0.000311 | 0.000077 | 0.000575 |
| Beta Efficiency | 0.392105 | 0.392154 | 0.401834 | 0.395777 | 0.389615 | 0.396214 | 0.40344 | 0.387584 |
| **Efficiency** | **0.3921** | **0.3922** | **0.4018** | **0.3958** | **0.3896** | **0.3962** | **0.4034** | **0.3876** |

PROJECT LB4100C

Notebook No. 3710

Continued From Page

11/17/08 Am241 Calibration (Gross Alpha) - Ringed Planchet

Benchsheet: 290486A Source ID: 1005 Logfile: Am241-11/08

| Sources | Detectors | Filenames |
|---|---|---|
| 0615044-S2 | A1 B1 C1 D1 | EAM1117 |
| -S3 | A2 B2 C2 D2 | EAM1117A |
| -S4 | A3 B3 C3 D3 | EAM1117B |
| -S5 | A4 B4 C4 D4 | EAM1117C |

11/17/08 Sr90 Calibration (Gross Beta) - Ringed Planchet

Benchsheet: 290476A Source ID: 1006 Logfile: Sr90R-11/08

| Sources | Detectors | Filenames |
|---|---|---|
| 0614030-S1 | A1 B1 C1 D1 | ESR1117 |
| -S2 | A2 B2 C2 D2 | ESR1117A |
| -S3 | A3 B3 C3 D3 | ESR1117B |
| -S4 | A4 B4 C4 D4 | ESR1117C |

JP 11/18/08

Continued on Page

Signed [signature] Date 11/18/08

Read and Understood By

Signed [signature] Date 11/19/08

Date 11/17/08

SOP 724r 10

**Paragon Analytics**
Low Background Gas Flow Proportional Counter Log
**Instrument: LB4100C**

*Instrument Daily Response and Background Checks*

| | Daily Response Check | | | | Background Check | | | | Det. |
|---|---|---|---|---|---|---|---|---|---|
| Det. | Start 1 | Status | Start 2 | Status | Start 1 | Status | Start 2 | Status | Status |
| 1 | JP | P | | | JP | Hα | JP | P | P |
| 2 | | | | | | P | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

*Weekly Background Calibration*

| | Current Calib. File ID | Weekly Calib. Started | Status | File ID |
|---|---|---|---|---|
| Dr A | BKC1111W | | | |
| Dr B | | | | |
| Dr C | | | | |
| Dr D | | | | |

Dr = Drawer

*Gas Supply*

| P-10 Supply | | P-10 Flow | |
|---|---|---|---|
| Tank 1 | 1450 | Dr A | 0.15 |
| | | Dr B | |
| Tank 2 | 550 | Dr C | |
| | | Dr D | |

Comments:

Date 11/17/08

SOP 724r 10

**Paragon Analytics**

Low Background Gas Flow Proportional Counter Log

**Instrument: LB4100C**

| Det. | Sample ID | Batch | Test | Count Dur. (min) | Start Time | Analyst Initials | File ID | Output Initials |
|---|---|---|---|---|---|---|---|---|
| 1-16 | Daily Eff | — | — | 30 | 7:16 | JP | EFC1117 | JP |
| 1-16 | Daily BKg | — | — | 60 | 7:31 | JP | BKC1117 | JP |
| 1 | Daily BKg | — | — | 60 | 8:39 | JP | BKC1117R | JP |
| 1-4 | 1005 | Am241 Eff | α | 30 | 10:14 | JP | EAM1117 | JP |
| 5-8 | 1005 | ↓ | ↓ | ↓ | 10:29 | JP | EAM1117A | JP |
| 9-12 | 1005 | ↓ | ↓ | ↓ | 10:40 | JP | EAM1117B | JP |
| 13-16 | 1005 | ↓ | ↓ | ↓ | 10:50 | JP | EAM1117C | JP |
| 13-16 | 1006 | Sr90 Eff | β | 30 | 10:14 | JP | ESR1117 | JP |
| 9-12 | 1006 | ↓ | ↓ | ↓ | 10:29 | JP | ESR1117A | JP |
| 5-8 | 1006 | ↓ | ↓ | ↓ | 10:40 | JP | ESR1117B | JP |
| 1-4 | 1006 | ↓ | ↓ | ↓ | 10:50 | JP | ESR1117C | JP |
| 1-16 | 0717504-S1→S16 | Beta Attn Curve | Attn | 60 | 11:07 | JP | ASR1117 | JP |

JP 11/17/08

Comments:

Page No.: **370907 B**
(cont. from page NA B)

Form 780r8.doc (6/23/06)

Reviewed By / Date JP 11/17/08

Date 11/18/08

SOP 724r 10

# Paragon Analytics

Low Background Gas Flow Proportional Counter Log

**Instrument: LB4100C**

*Instrument Daily Response and Background Checks*

| | Daily Response Check | | | | Background Check | | | | Det. |
|---|---|---|---|---|---|---|---|---|---|
| Det. | Start 1 | Status | Start 2 | Status | Start 1 | Status | Start 2 | Status | Status |
| 1 | JP | P | | | JP | P | | | P |
| 2 | ↓ | ↓ | | | ↓ | ↓ | | | ↓ |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | ↓ | ↓ | | | ↓ | ↓ | | | ↓ |

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

*Weekly Background Calibration*

| | Current Calib. File ID | Weekly Calib. Started | Status | File ID |
|---|---|---|---|---|
| Dr A | BKC1111W | | | |
| Dr B | ↓ | | | |
| Dr C | | | | |
| Dr D | ↓ | | | |

Dr = Drawer

*Gas Supply*

| P-10 Supply | | P-10 Flow | |
|---|---|---|---|
| Tank 1 | 1100 | Dr A | 0.15 |
| | ↓ | Dr B | ↓ |
| Tank 2 | 550 | Dr C | |
| | ↓ | Dr D | ↓ |

Comments:

Page No.: 370908 A

Form 780r8.doc (6/23/06)

Reviewed By / Date JP 11/18/08

290476 A

*Paragon Analytics*

# WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES / Ra/Sr Lab

Matrix water  Prep Analyst KAA  Prep Date 2/9/06  Analyte 90Sr  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: Tare wt(g) | Gross wt(g) | Net wt (mg) | Det. No. | Filename | POS Ckd By |
|---|---|---|---|---|---|---|---|---|---|---|
| 0614030 -S1 | NA | NA | NA | S1 | 8.9410 | NA | 0 | | | |
| -S2 | | | | | 8.9855 | | | | | |
| -S3 | | | | | 8.9196 | | | | | |
| -S4 | | | | | 8.9268 | | | | | |
| -S5 | | | | | 8.9227 | | | | | |
| -S6 | | | | S2 | 8.9545 | | | | | |
| -S7 | | | | | 9.1710 | | | | | |
| -S8 | | | | | 8.9544 | | | | | |

KAA 2/9/06

Balance No. 13  Spiked By KAA  Date 2/9/06  Spike Witness [illegible]  Date 2/9/06  QASS? ( Y / N ) No. NA

| | Isotope | No (new standard) | Act / mL | Vol | P | Total Act (dpm) | Decay Corrected (Pipet ID) | | Relinquished by / Date | Received by / Date |
|---|---|---|---|---|---|---|---|---|---|---|
| Spike 1 | Sr-90 | 777.3020.10 | ~~4999.42~~ 4996.73 | 2.0 | | ~~9998.84~~ 9993.46 | RS-011 | 1 | | |
| Spike 2 | Sr-90 | 600.2613.30 (EH ordered) | ~~444.72~~ 2234.71 | 0.5 | | ~~222.36~~ 1117.36 | T-201 | 2 | | |
| Spike 3 | | | | | | | | | | |
| Spike 4 | | | | | | | | | | |

KAA 2/9/06

Electronic Benchsheet No. (if / when generated) NA  Reviewed by / Date [initials] 2/9/06

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290476

B

# WORKSHEET FOR IN-HOUSE OR RUSH SAMPLES / Ra/Sr Lab

*Paragon Analytics*

Initials CAA Date 2/9/00

Method (SOP / Rev) CAA 2/9/00 $^{90}Sr$ 702 R17

Matrix water

**COMMENTS**

$^{90}Sr$ Efficiency / STD. VERIFICATION

- Spike added to cups
- 20 ml 16 N HNO3 added to cups
- Dried on steambath
- Transferred to ringed planchets with 1 M HNO3

CAA 2/9/00

Reviewed by / Date 2/9/00

## *Gross Alpha / Beta Calculations*

| Atten. Constants | | b | m | a | x0 | | b | m |
|---|---|---|---|---|---|---|---|---|
| Alpha | y = b*m^(a*(x-x0)) | 1.1697 | 0.9930 | 0.7986 | 0 | y = b*m^-x | 0.2318 | 0.9997 |
| Beta | y = b*m^(a*(x-x0)) | 0.9791 | 0.9998 | 1.3098 | 0.0 | y = b*x+m | -2.71E-06 | 0.0005 |

| Sample ID | Initial Aliquot | Final Sam. Size | Count Date | Count Dur. | Residual Mass (mg) | Beta Gross CPM | Bkg CPM | Atten. | Efficiency |
|---|---|---|---|---|---|---|---|---|---|
| 0614030-S1 | 0.200 | 0.200 | 11/11/2006 | 10 | 0.0 | 7724.900 | 1.573 | 0.979 | 0.4312 |
| 0614030-S2 | 0.200 | 0.200 | 11/11/2006 | 10 | 0.0 | 7797.200 | 1.573 | 0.979 | 0.4312 |
| 0614030-S3 | 0.200 | 0.200 | 11/11/2006 | 10 | 0.0 | 7781.300 | 1.573 | 0.979 | 0.4312 |
| 0614030-S4 | 0.200 | 0.200 | 11/11/2006 | 10 | 0.0 | 7621.900 | 1.573 | 0.979 | 0.4312 |
| 0614030-S5 | 0.200 | 0.200 | 11/11/2006 | 10 | 0.0 | 7617.100 | 1.573 | 0.979 | 0.4312 |
| | | | | | Mean= | 7708.480 | | | |
| | | | | | StDev= | 85.571619 | | | |
| | | | | | 2Sig LCL= | 7537.3368 | 1Sig LCL= | 7622.908 | |
| | | | | | 2Sig UCL= | 7879.6232 | 1Sig UCL= | 7794.052 | |

Spike Information

| Sample ID | Beta Std ID | Ref. Date | Halflife Yrs | Act (pCi/ml) | Spike Vol (mL) | Decay Corr. Spike Act. Added |
|---|---|---|---|---|---|---|
| 0614030-S1 | 777.3020.11 | 12/2/2004 | 28.8 | 2250.78 | 2.0 | 42960.9 |
| 0614030-S2 | 777.3020.11 | 12/2/2004 | 28.8 | 2250.78 | 2.0 | 42960.9 |
| 0614030-S3 | 777.3020.11 | 12/2/2004 | 28.8 | 2250.78 | 2.0 | 42960.9 |
| 0614030-S4 | 777.3020.11 | 12/2/2004 | 28.8 | 2250.78 | 2.0 | 42960.9 |
| 0614030-S5 | 777.3020.11 | 12/2/2004 | 28.8 | 2250.78 | 2.0 | 42960.9 |

0614030-S5 rejected as outlier

** Act. Is based on Sr-90 – Act. Multiplied by 2

# PAI - Gas Flow Proportional Sample Analysis LB4100-B

Unit Type: LB4100 -B
Counting Unit ID: Aqua
High Voltage Mode: Simultaneous
Application Revision: 2
Application Version: Standard
Rev.12/29/03 JE

Data file name: ABB1111F
Batch ID: OUTLIER
Count Preset (m): 10
Batch Ended: 11/11/06 13:22

Background logfile: BKGABW
Date of Bkg. Cal: 11/11/06
Alpha efficiency logfile: AmR-11/05
Alpha attenuation calibration: AM0106
Beta efficiency logfile: Sr90R-11/05
Beta attenuation calibration: SR1105

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= | 1.16570 | Beta b= | 0.9791 |
| m= | 0.99300 | m= | 0.9998 |
| a= | 0.7986 | a= | 1.3098 |
| 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= | 0.2318 | b->a xtalk b= | -2.71E-06 |
| a->b xtalk m= | 0.9997 | b->a xtalk m= | 0.0005 |

| Det. ID | Sample ID | Count End Date & Time | Count Dur. (min) | Resid. Mass (mg) | Alpha Activity: Gross CPM | Bkg. CPM | b>a xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. | Beta Activity: Gross CPM | Bkg. CPM | a>b xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 0614030-S1 | 11/11/06 13:22 | 10.00 | 0.0 | 7.500 | 0.099 | 3.862 | 0.2265 | 1.170 | n/a | n/a | 7724.900 | 1.573 | 1.7385 | 0.4312 | 0.979 | n/a | n/a |

# PAI - Gas Flow Proportional Sample Analysis LB4100-B

Unit Type: LB4100 -B
Counting Unit ID: Aqua
High Voltage Mode: Simultaneous
Application Revision: 2
Application Version: Standard
Rev.12/29/03 JE

Data file name: AB81111H
Batch ID: OUTLIER
Count Preset (m): 10
Batch Ended: 11/11/06 15:02

Background logfile: BKCABW
Date of Bkg. Cal: 11/11/06
Alpha efficiency logfile: AmR-11/05
Alpha attenuation calibration: AM0105
Beta efficiency logfile: Sr90R-11/05
Beta attenuation calibration: SR1105

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= | 1.16970 | Beta b= | 0.9791 |
| m= | 0.99300 | m= | 0.9998 |
| a= | 0.7986 | a= | 1.3098 |
| 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= | 0.2319 | b -> a xtalk b= | -2.71E-06 |
| a -> b xtalk m= | 0.9997 | b -> a xtalk m= | 0.0005 |

| Det. ID | Sample ID | Count End Date & Time | Count Dur. (min) | Resid. Mass (mg) | Alpha Activity | | | | | | | Beta Activity | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Gross CPM | Bkg. CPM | b>a xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. | Gross CPM | Bkg. CPM | a>b xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. |
| C1 | 0614030-S2 | 11/11/06 15:02 | 10.00 | 0.0 | 10.500 | 0.099 | 3.889 | 0.2265 | 1.170 | n/a | n/a | 7797.200 | 1.573 | 2.4339 | 0.4312 | 0.979 | n/a | n/a |

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# PAI - Gas Flow Proportional Sample Analysis LB4100-B

Unit Type: LB4100-B
Counting Unit ID: Aqua
High Voltage Mode: Simultaneous
Application Revision: 2
Application Version: Standard
Rev.12/29/03 JE

Data file name: ABB1111J
Batch ID: OUTLIER
Count Preset (m): 10
Batch Ended: 11/11/06 15:22

Background logfile: BKGABW
Date of Bkg. Cal: 11/11/06
Alpha efficiency logfile: AmR-11/05
Alpha attenuation calibration: AM0106
Beta efficiency logfile: Sr90R-11/05
Beta attenuation calibration: SR1105

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= | 1.18970 | Beta b= | 0.9791 |
| m= | 0.99300 | m= | 0.9998 |
| a= | 0.7986 | a= | 1.3098 |
| 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= | 0.2318 | b ->a xtalk b= | -2.71E-08 |
| a ->b xtalk m= | 0.9997 | b ->a xtalk m= | 0.0005 |

| Det. ID | Sample ID | Count End Date & Time | Count Dur. (min) | Resid. Mass (mg) | Alpha Activity Gross CPM | Bkg. CPM | b>a xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. | Beta Activity Gross CPM | Bkg. CPM | a>b xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 0614030-S3 | 11/11/06 15:22 | 10.00 | 0.0 | 9.200 | 0.099 | 3.881 | 0.2265 | 1.170 | n/a | n/a | 7781.300 | 1.573 | 2.1326 | 0.4312 | 0.979 | n/a | n/a |

# PAI - Gas Flow Proportional Sample Analysis LB4100-B

Unit Type: LB4100 -B
Counting Unit ID: Aqua
High Voltage Mode: Simultaneous
Application Revision: 2
Application Version: Standard
Rev.12/29/03 JE

Data file name: ABB1111L
Batch ID: OUTLIER
Count Preset (m): 10
Batch Ended: 11/11/06 15:38

Background logfile: BKGABW
Date of Bkg. Cal: 11/11/06
Alpha efficiency logfile: AmR-11/05
Alpha attenuation calibration: AM0106
Beta efficiency logfile: Sr90R-11/05
Beta attenuation calibration: SR1105

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= | 1.16970 | Beta b= | 0.9791 |
| m= | 0.95300 | m= | 0.9998 |
| a= | 0.7966 | a= | 1.3098 |
| 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= | 0.2318 | b->a xtalk b= | -2.71E-06 |
| a->b xtalk m= | 0.9997 | b->a xtalk m= | 0.0005 |

| Det. ID | Sample ID | Count End Date & Time | Count Dur. (min) | Resid. Mass (mg) | Alpha Activity | | | | | | | Beta Activity | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Gross CPM | Bkg. CPM | b>a xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. | Gross CPM | Bkg. CPM | a>b xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. |
| C1 | 0614030-S4 | 11/11/06 15:38 | 10.00 | 0.0 | 10.200 | 0.089 | 3.811 | 0.2265 | 1.170 | n/a | n/a | 7621.900 | 1.573 | 2.3644 | 0.4312 | 0.979 | n/a | n/a |

# PAI - Gas Flow Proportional Sample Analysis LB4100-B

Unit Type: LB4100 -B
Counting Unit ID: Aqua
High Voltage Mode: Simultaneous
Application Revision: . 2
Application Version: Standard
Rev.12/29/03 JE

Data file name: ABB1111N
Batch ID: OUTLIER
Count Preset (m): 10
Batch Ended: 11/11/06 15:56

Background logfile: BKGABW
Date of Bkg. Cal: 11/11/06
Alpha efficiency logfile: AmR-11/05
Alpha attenuation calibration: AM0106
Beta efficiency logfile: Sr90R-11/05
Beta attenuation calibration: SR1105

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

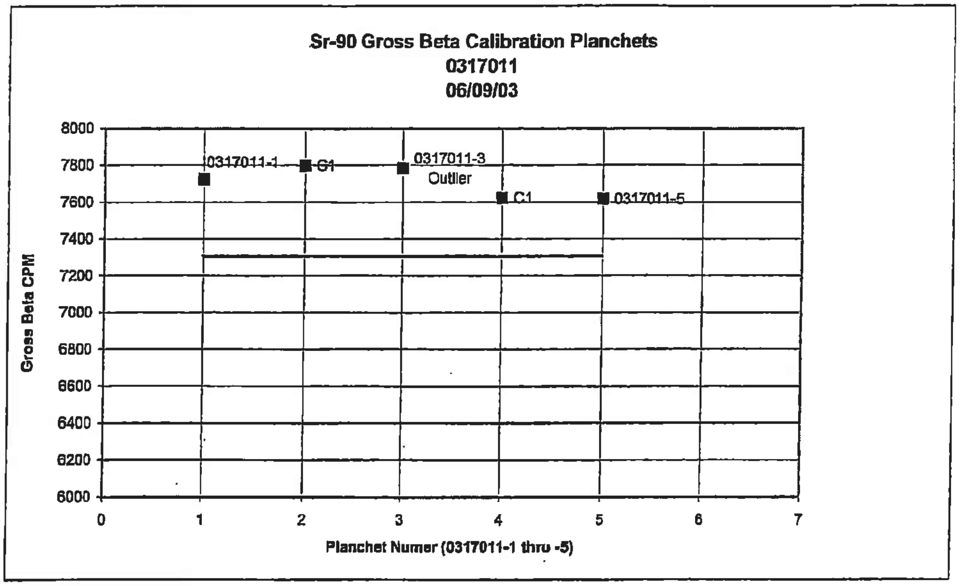
| Alpha Attenuation Calibration y = b*m^(a*(mass-x0)) | | Beta Attenuation Calibration y = b*m^(a*(mass-x0)) | |
|---|---|---|---|
| Alpha b= | 1.16970 | Beta b= | 0.9791 |
| m= | 0.99300 | m= | 0.9988 |
| a= | 0.7986 | a= | 1.3098 |
| x0= | 0.0000 | x0= | 0.0000 |
| **Alpha to Beta X-talk y = b *m^-mass** | | **Beta to Alpha X-talk y = b*mass + m** | |
| a -> b xtalk b= | 0.2318 | b -> a xtalk b= | -2.71E-06 |
| a -> b xtalk m= | 0.9997 | b -> a xtalk m= | 0.0005 |

| Det. ID | Sample ID | Count End Date & Time | Count Dur. (min) | Resid. Mass (mg) | Alpha Activity Gross CPM | Alpha Activity Bkg. CPM | Alpha Activity b>a xtlk CPM | Alpha Activity Base Eff | Alpha Activity Base Cor.Fact. | Alpha Activity Progeny Eff | Alpha Activity Progeny Cor.Fact. | Beta Activity Gross CPM | Beta Activity Bkg. CPM | Beta Activity a>b xtlk CPM | Beta Activity Base Eff | Beta Activity Base Cor.Fact. | Beta Activity Progeny Eff | Beta Activity Progeny Cor.Fact. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 0614030-S5 | 11/11/06 15:56 | 10.00 | 0.0 | 8.700 | 0.099 | 3.809 | 0.2265 | 1.170 | n/a | n/a | 7617.100 | 1.573 | 2.0167 | 0.4312 | 0.979 | n/a | n/a |

| | | Beta CPM | Mean 1 | Absolute Diff from mean1 | Mean 2 | Absolute Diff from mean2 | % Diff | UCL Mean+5% | LCL Mean-5% |
|---|---|---|---|---|---|---|---|---|---|
| C1 | 0614030-S1 | 7724.9 | 7708 | 16.42 | 7690.275 | 34.625 | 0.45% | 8074.78875 | 7305.76125 |
| C1 | 0614030-S2 | 7797.2 | 7708 | 88.72 | 7690.275 | 106.925 | 1.39% | 8074.78875 | 7305.76125 |
| C1 | 0614030-S3 | 7781.3 | 7708 | 72.82 | 7690.275 | 91.025 | 1.18% | 8074.78875 | 7305.76125 |
| C1 | 0614030-S4 | 7621.9 | 7708 | 86.58 | 7690.275 | 68.375 | 0.89% | 8074.78875 | 7305.76125 |
| C1 | 0614030-S5 | 7617.1 | 7708 | 91.38 | 7690.275 | 73.175 | 0.95% | 8074.78875 | 7305.76125 |

Mean of all five planchets:
Mean 1 7708.5
Mean of closest four planchets:
Mean 2 7690.3

Criteria: should be within 5%: SOP 743



Date 11/11/06

SOP 724r 9

# Paragon Analytics
Low Background Gas Flow Proportional Counter Log
**Instrument: LB4100B**

*Instrument Daily Response and Background Checks*

| Det. | Daily Response Check Start 1 | Status | Start 2 | Status | ★ Background Check Start 1 | Status | Start 2 | Status | Det. Status |
|---|---|---|---|---|---|---|---|---|---|
| 1 | LO | P | | | | | | | P |
| 2 | | | | | | | | | H α |
| 3 | | | | | | | | | P |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | Lo | | | |
| 8 | | | | | | | 11/11/06 | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | H α |
| 15 | | | | | | | | | P |
| 16 | | | | | | | | | H β |

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

*Weekly Background Calibration*

| | Current Calib. File ID | Weekly Calib. Started | Status | File ID |
|---|---|---|---|---|
| Dr A | BKB1110W | Lo | 2 H β | BKB1111W |
| Dr B | | | | |
| Dr C | | | | |
| Dr D | | Lo | 14 P 16 H β | BKB1111W |

Dr = Drawer

★ Daily Bkg not run due to Weekly Bkg run the night before. Lo 11/11/06

*Gas Supply*

| | P-10 Supply | | P-10 Flow |
|---|---|---|---|
| Tank 1 | 2000 | Dr A | 6.15 |
| | ↓ | Dr B | |
| Tank 2 | 1200 | Dr C | |
| | ↓ | Dr D | ↓ |

Comments:

Page No.: S18142 A

Form 780r8.doc (6/23/06)

Reviewed By / Date Lo 11/12/06

Date 11/11/06

SOP 724r 9

**Paragon Analytics**
Low Background Gas Flow Proportional Counter Log
**Instrument: LB4100B**

| Det. | Sample ID | Batch | Test | Count Dur. (min) | Start Time | Analyst Initials | File ID | Output Initials |
|---|---|---|---|---|---|---|---|---|
| 1-16 | Daily EFF | — | — | 30 | 1039 | LO | EFB1111 | LO |
| 1 | 1156 | Ra226 Eff | Ra226 | 30 | 1103 | LO | ERA1111A | LO |
| 2 | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | 1156 | Ra226Eff | Ra226 | 30 | 1118 | LO | ERA1111B | LO |
| 6 | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | 1156 | Ra226Eff | Ra226 | 30 | 1130 | LO | ERA1111C | LO |
| 10 | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | 1156 | Ra226Eff | Ra226 | 30 | 1141 | LO | ERA1111D | LO |
| 14 | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 1 | Alpha | ROI Test | α | 10 | 1117 | LO | ABB1111 | LO |
| 7 | Alpha | ROI Test | α | 10 | 1130 | LO | ABB1111A | LO |
| 1 | Beta | ROI Test | β | 10 | 1143 | LO | ABB1111B | LO |
| 3 | Alpha | ↓ | α | ↓ | ↓ | ↓ | ↓ | ↓ |
| 7 | Beta | ROI Test | β | 10 | 1200 | LO | ABB1111C | LO |
| 4 | Alpha | ↓ | α | ↓ | ↓ | ↓ | ↓ | ↓ |
| 3 | Beta | ↓ | ↓ | ↓ | 1216 | LO | ABB1111D | LO |
| 5 | Alpha | | | | ↓ | ↓ | ↓ | ↓ |
| 1 | 0424028-S1 | Outlier | Sr90 | 10 | 1308 | LO | SRB1111 | LO |
| 5 | 0615044-S1 | Outlier | α ~~β~~ LO 11/11/06 | 10 | 1310 | LO | ABB1111E | ↓ |
| 9 | 0614030-S1 | Outlier | β | 10 | 1312 | LO | ABB1111F | |
| 13 | 0615038-S1 | Outlier | Sr89 | 10 | 1314 | LO | SRB1111A | |
| 1 | ~~06~~ 0424028-S2 LO 11/11/06 | ↓ | Sr90 | ↓ | 1450 | LO | SRB1111B | LO |
| 5 | 0615044-S2 | | α | | 1451 | ↓ | ABB1111G | ↓ |
| 9 | 0614030-S2 | | β | | 1452 | | ABB1111H | |
| 13 | 0615038-S2 | | Sr89 | | 1453 | | SRB1111C | |
| 1 | ~~06~~ 0424028-S3 LO 11/11/06 | ↓ | Sr90 | ↓ | 1511 | LO | SRB1111D | LO |
| 5 | 0615044-S~~2~~3 LO 11/11/06 | | α | | ↓ | ↓ | ABB1111I | ↓ |
| 9 | 0614030-S3 | | β | | 1512 | | ABB1111J | |
| 13 | 0615038-S3 | | Sr89 | | ↓ | | SRB1111E | |
| 1 | 0424028-S4 | | Sr90 | | 1527 | | SRB1111F | LO |
| 5 | 0615044-S4 | | α | | ↓ | | ABB1111K | ↓ |
| 9 | 0614030-S4 | | β | | 1528 | | ABB1111L | |
| 13 | 0615038-S4 | | Sr89 | | ↓ | | SRB1111G | |
| 1 | 0424028-S5 | | Sr90 | | 1544 | | SRB1111H | LO |
| 5 | 0615044-S5 | | α | | ↓ | | ABB1111M | ↓ |
| 9 | 0614030-S5 | | β | | 1546 | | ABB1111N | |
| 13 | 0615038-S5 | | Sr89 | | ↓ | ↓ | SRB1111I | |
| | | | | | | | | LO 11/11/06 |

Comments:

Page No.: 318142 B (cont. from page NA B)

Form 780r8.doc (6/23/06)

Reviewed By / Date LO 11/12/06

Prepare a primary dilution of RSO #777 (Analytics #69573-307) in 0.1M HCl to a final volume of approx. 500mL.

1) Prepare 0.1M HCl by diluting 8.3 mL HCl (12M) (Fisher Scientific Lot #055784) to a final volume of 1L.

2) Determine the density of 0.1M HCl

| | | |
|---|---|---|
| Weight of empty volumetric flask (100mL) | Bal 26 | 68.54g |
| Mass of flask + 100mL 0.1M HCl | | 168.31g |
| Mass of 100mL of 0.1M HCl | | 99.77g |
| ÷100mL = density = | | 0.9977 |

3) Transfer #777 to a 500mL

| | | |
|---|---|---|
| Mass of bottle | Bal 12 | 47.9687 |
| Mass of bottle + std. | | 52.9160 |
| mass of std. | | 4.9473 |

4) Dilute to volume w/ 0.1M HCl

| | | |
|---|---|---|
| Mass of bottle + std. + soln | Bal 26 | 494.52g |
| Mass of bottle (from above) | | -47.9687g |
| mass of soln | | ~~446.31g~~ HB 2/8/06 446.55g |

5) Final activity (dpm/mL)

$$\frac{(3.812 \times 10^4 \, dps)(60 \, sec/1 \, min)(4.9473g)}{(5.0596g)(\cancel{446.31g}\ 446.55g)} = \cancel{5010.94}\ 5008.25 \frac{dpm}{g} \quad \text{HB 2/8/06}$$

HB 2/8/06

$$\cancel{5010.94}\ 5008.25 \frac{dpm}{g} \times 0.9977 \frac{g}{mL} = \cancel{4999.42}\ 4996.73 \frac{dpm}{mL} \quad \text{HB 2/8/06}$$

RG 3/9/06
Stnd ID: 777.3020.11
Description: Sr-90
Expiration: 2/27/07
Activity: 4996.73 dpm/mL
2s Uncertainty: 99.93 dpm/mL
Ref. Date: 12/2/04
Ref Time: N/A
Prep Date: 2/8/06 Prep by: HB RG 3/9/06
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01
RG 3/9/06

Continued on Page

Read and Understood By

| Signed | Date | Signed | Date |
|---|---|---|---|
| Heather Barker | 2/8/06 | [signature] | 2/8/06 |

ANALYTICS

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

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

RSO #777
Rec'd 12/9/04
DCB

# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

69573-307

Sr-90 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: | Sr-90 |
| ACTIVITY (dps): | 3.812 E4 |
| HALF-LIFE: | 28.79 years |
| CALIBRATION DATE: | December 2, 2004 12:00 EST |
| RELATIVE EXPANDED UNCERTAINTY (k=2): | 2.0% |

Impurities: $\gamma$-impurities <0.1%

5.05960 grams in 0.1M HCl solution with 30 μg/g Sr carrier.

This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

P O NUMBER 71069, Item 1

SOURCE PREPARED BY: M Dimitrova
M. Dimitrova, Radiochemist

Q A APPROVED: [illegible signature] 12-6-04

# Mass Attenuation Curves

# LB4100C Alpha Attenuation Curve -- Am-241

| WO # 0718500 | | |
|---|---|---|
| Mass Range | | |
| Low | 20.3 | mg |
| High | 133.0 | mg |

| Spike Information | | |
|---|---|---|
| Std. ID | 585.3020.27 | |
| Ref. Date | 7/6/2001 | |
| Halflife | 432.2 | yrs |
| Activity | 55142.95 | dpm/mL |
| Vol. | 0.1 | mL |
| Act. Added | 5514.30 | dpm |

| Attenuation Equation | y=b*m^(a*x) |
|---|---|
| b = | 1.1500 |
| m = | 0.9890 |
| a = | 0.7500 |
| % Diff Max. = | 11.0% |

| Cross-Talk Equation | y=b*m^-x |
|---|---|
| b = | 0.2475 |
| m = | 0.9991 |
| % Diff Max. = | 9.7% |

| File ID | Detector ID | Sample ID | Mass (mg) | Count Date | Alpha Counts | Beta Counts | Count Time | Alpha CPM | Beta CPM | Base Alpha Eff. | Decay Corr. Act. added dpm/mL | Alpha Att. Actual | Alpha Att. Fitted | Actual/Fit Ratio | Obs Atten Fact. | Fitted Atten Fact. | % Diff. | α > β X Tlk Actual | > β X T Fitted | % Diff. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AAM1118 | A1 | 0718500-1 | 20.3 | 11/18/2008 | 10021 | 2528 | 8.32 | 1204.45 | 303.85 | 0.2202 | 5449.50 | 0.2210 | 0.2140 | 0.9682 | 1.0037 | 0.9718 | 3.2% | 0.2523 | 0.2521 | 0.1% |
| AAM1118 | A1 | 0718500-2 | 20.3 | 11/18/2008 | 10016 | 2518 | 8.29 | 1208.20 | 303.74 | 0.2202 | 5449.50 | 0.2217 | 0.2140 | 0.9652 | 1.0069 | 0.9718 | 3.5% | 0.2514 | 0.2521 | -0.3% |
| AAM1118 | A2 | 0718500-1 | 20.3 | 11/18/2008 | 10017 | 2489 | 8.20 | 1221.59 | 303.54 | 0.2458 | 5449.50 | 0.2242 | 0.2389 | 1.0656 | 0.9120 | 0.9718 | -6.6% | 0.2485 | 0.2521 | -1.4% |
| AAM1118 | A2 | 0718500-2 | 20.3 | 11/18/2008 | 10014 | 2430 | 8.15 | 1228.71 | 298.16 | 0.2458 | 5449.50 | 0.2255 | 0.2389 | 1.0594 | 0.9173 | 0.9718 | -5.9% | 0.2427 | 0.2521 | -3.9% |
| AAM1118 | A3 | 0718500-1 | 20.3 | 11/18/2008 | 10009 | 2497 | 8.23 | 1216.16 | 303.40 | 0.2377 | 5449.50 | 0.2232 | 0.2310 | 1.0350 | 0.9389 | 0.9718 | -3.5% | 0.2495 | 0.2521 | -1.0% |
| AAM1118 | A3 | 0718500-2 | 20.3 | 11/18/2008 | 10011 | 2474 | 8.21 | 1219.37 | 301.34 | 0.2377 | 5449.50 | 0.2238 | 0.2310 | 1.0323 | 0.9413 | 0.9718 | -3.2% | 0.2471 | 0.2521 | -2.0% |
| AAM1118 | A4 | 0718500-1 | 20.3 | 11/18/2008 | 9999 | 2553 | 8.06 | 1240.57 | 316.75 | 0.2441 | 5449.50 | 0.2276 | 0.2372 | 1.0420 | 0.9326 | 0.9718 | -4.2% | 0.2553 | 0.2521 | 1.3% |
| AAM1118 | A4 | 0718500-2 | 20.3 | 11/18/2008 | 10009 | 2519 | 8.11 | 1234.16 | 310.60 | 0.2441 | 5449.50 | 0.2265 | 0.2372 | 1.0474 | 0.9278 | 0.9718 | -4.7% | 0.2517 | 0.2521 | -0.2% |
| AAM1118 | B1 | 0718500-1 | 20.3 | 11/18/2008 | 10008 | 2570 | 8.44 | 1185.78 | 304.50 | 0.2150 | 5449.50 | 0.2176 | 0.2089 | 0.9602 | 1.0121 | 0.9718 | 4.0% | 0.2568 | 0.2521 | 1.8% |
| AAM1118 | B1 | 0718500-2 | 20.3 | 11/18/2008 | 10015 | 2408 | 8.43 | 1188.02 | 285.41 | 0.2150 | 5449.50 | 0.2180 | 0.2089 | 0.9584 | 1.0140 | 0.9718 | 4.2% | 0.2402 | 0.2521 | -4.9% |
| AAM1118 | B2 | 0718500-1 | 20.3 | 11/18/2008 | 10008 | 2545 | 8.51 | 1176.03 | 299.06 | 0.2403 | 5449.50 | 0.2158 | 0.2335 | 1.0821 | 0.8981 | 0.9718 | -8.2% | 0.2543 | 0.2521 | 0.9% |
| AAM1118 | B2 | 0718500-2 | 20.3 | 11/18/2008 | 10013 | 2446 | 8.37 | 1196.30 | 292.23 | 0.2403 | 5449.50 | 0.2195 | 0.2335 | 1.0637 | 0.9135 | 0.9718 | -6.4% | 0.2443 | 0.2521 | -3.2% |
| AAM1118 | B3 | 0718500-1 | 20.3 | 11/18/2008 | 10012 | 2511 | 8.43 | 1187.66 | 297.86 | 0.2327 | 5449.50 | 0.2179 | 0.2261 | 1.0376 | 0.9366 | 0.9718 | -3.6% | 0.2508 | 0.2521 | -0.5% |
| AAM1118 | B3 | 0718500-2 | 20.3 | 11/18/2008 | 10014 | 2423 | 8.41 | 1190.73 | 288.11 | 0.2327 | 5449.50 | 0.2185 | 0.2261 | 1.0349 | 0.9390 | 0.9718 | -3.5% | 0.2420 | 0.2521 | -4.2% |
| AAM1118 | B4 | 0718500-1 | 20.3 | 11/18/2008 | 10001 | 2420 | 8.48 | 1179.36 | 285.38 | 0.2313 | 5449.50 | 0.2164 | 0.2248 | 1.0386 | 0.9357 | 0.9718 | -3.9% | 0.2420 | 0.2521 | -4.2% |
| AAM1118 | B4 | 0718500-2 | 20.3 | 11/18/2008 | 10001 | 2415 | 8.41 | 1189.18 | 287.16 | 0.2313 | 5449.50 | 0.2182 | 0.2248 | 1.0300 | 0.9434 | 0.9718 | -3.0% | 0.2415 | 0.2521 | -4.4% |
| AAM1118 | C1 | 0718500-1 | 20.3 | 11/18/2008 | 10026 | 2652 | 8.38 | 1196.42 | 316.47 | 0.2205 | 5449.50 | 0.2195 | 0.2143 | 0.9760 | 0.9957 | 0.9718 | 2.4% | 0.2645 | 0.2521 | 4.7% |
| AAM1118 | C1 | 0718500-2 | 20.3 | 11/18/2008 | 10007 | 2521 | 8.27 | 1210.04 | 304.84 | 0.2205 | 5449.50 | 0.2220 | 0.2143 | 0.9650 | 1.0070 | 0.9718 | 3.5% | 0.2519 | 0.2521 | -0.1% |
| AAM1118 | C2 | 0718500-1 | 20.3 | 11/18/2008 | 10021 | 2589 | 8.37 | 1197.25 | 309.32 | 0.2465 | 5449.50 | 0.2197 | 0.2395 | 1.0903 | 0.8913 | 0.9718 | -9.0% | 0.2584 | 0.2521 | 2.4% |
| AAM1118 | C2 | 0718500-2 | 20.3 | 11/18/2008 | 10010 | 2476 | 8.07 | 1240.40 | 306.82 | 0.2465 | 5449.50 | 0.2276 | 0.2395 | 1.0524 | 0.9234 | 0.9718 | -5.2% | 0.2474 | 0.2521 | -1.9% |
| AAM1118 | C3 | 0718500-1 | 20.3 | 11/18/2008 | 10011 | 2414 | 8.33 | 1201.80 | 289.80 | 0.2305 | 5449.50 | 0.2205 | 0.2240 | 1.0157 | 0.9568 | 0.9718 | -1.6% | 0.2411 | 0.2521 | -4.5% |
| AAM1118 | C3 | 0718500-2 | 20:3 | 11/18/2008 | 10004 | 2338 | 8.21 | 1218.51 | 284.77 | 0.2305 | 5449.50 | 0.2236 | 0.2240 | 1.0017 | 0.9701 | 0.9718 | -0.2% | 0.2337 | 0.2521 | -7.9% |
| AAM1118 | C4 | 0718500-1 | 20.3 | 11/18/2008 | 10014 | 2418 | 8.23 | 1216.77 | 293.80 | 0.2382 | 5449.50 | 0.2233 | 0.2315 | 1.0367 | 0.9374 | 0.9718 | -3.7% | 0.2415 | 0.2521 | -4.4% |
| AAM1118 | C4 | 0718500-2 | 20.3 | 11/18/2008 | 10006 | 2474 | 8.05 | 1242.98 | 307.33 | 0.2382 | 5449.50 | 0.2281 | 0.2315 | 1.0148 | 0.9576 | 0.9718 | -1.5% | 0.2473 | 0.2521 | -1.9% |
| AAM1118 | D1 | 0718500-1 | 20.3 | 11/18/2008 | 10016 | 2509 | 8.31 | 1205.29 | 301.93 | 0.2251 | 5449.50 | 0.2212 | 0.2187 | 0.9890 | 0.9826 | 0.9718 | 1.1% | 0.2505 | 0.2521 | -0.6% |
| AAM1118 | D1 | 0718500-2 | 20.3 | 11/18/2008 | 10024 | 2470 | 8.19 | 1223.93 | 301.59 | 0.2251 | 5449.50 | 0.2246 | 0.2187 | 0.9739 | 0.9978 | 0.9718 | 2.6% | 0.2464 | 0.2521 | -2.3% |
| AAM1118 | D2 | 0718500-1 | 20.3 | 11/18/2008 | 10003 | 2454 | 8.27 | 1209.55 | 296.74 | 0.2442 | 5449.50 | 0.2220 | 0.2373 | 1.0692 | 0.9089 | 0.9718 | -6.9% | 0.2453 | 0.2521 | -2.7% |
| AAM1118 | D2 | 0718500-2 | 20.3 | 11/18/2008 | 10015 | 2402 | 8.23 | 1216.89 | 291.86 | 0.2442 | 5449.50 | 0.2233 | 0.2373 | 1.0627 | 0.9144 | 0.9718 | -6.3% | 0.2398 | 0.2521 | -5.1% |
| AAM1118 | D3 | 0718500-1 | 20.3 | 11/18/2008 | 10018 | 2478 | 8.2 | 1221.71 | 302.20 | 0.2412 | 5449.50 | 0.2242 | 0.2344 | 1.0455 | 0.9295 | 0.9718 | -4.6% | 0.2474 | 0.2521 | -1.9% |
| AAM1118 | D3 | 0718500-2 | 20.3 | 11/18/2008 | 10006 | 2475 | 8.09 | 1236.84 | 305.93 | 0.2412 | 5449.50 | 0.2270 | 0.2344 | 1.0327 | 0.9410 | 0.9718 | -3.3% | 0.2474 | 0.2521 | -1.9% |
| AAM1118 | D4 | 0718500-1 | 20.3 | 11/18/2008 | 10013 | 2491 | 8.26 | 1212.23 | 301.57 | 0.2431 | 5449.50 | 0.2224 | 0.2362 | 1.0620 | 0.9150 | 0.9718 | -6.2% | 0.2488 | 0.2521 | -1.3% |
| AAM1118 | D4 | 0718500-2 | 20:3 | 11/18/2008 | 10004 | 2434 | 8.02 | 1247.38 | 303.49 | 0.2431 | 5449.50 | 0.2289 | 0.2362 | 1.0321 | 0.9416 | 0.9718 | -3.2% | 0.2433 | 0.2521 | -3.6% |
| AAM1118 | A1 | 0718500-3 | 41.7 | 11/18/2008 | 10010 | 2449 | 9.84 | 1017.28 | 248.88 | 0.2202 | 5449.50 | 0.1867 | 0.1792 | 0.9598 | 0.8477 | 0.8137 | 4.0% | 0.2447 | 0.2570 | -5.0% |
| AAM1118 | A2 | 0718500-3 | 41.7 | 11/18/2008 | 10007 | 2501 | 9.74 | 1027.41 | 256.78 | 0.2458 | 5449.50 | 0.1885 | 0.2000 | 1.0609 | 0.7670 | 0.8137 | -6.1% | 0.2499 | 0.2570 | -2.8% |
| AAM1118 | A3 | 0718500-3 | 41.7 | 11/18/2008 | 10005 | 2405 | 9.67 | 1034.64 | 248.71 | 0.2377 | 5449.50 | 0.1899 | 0.1934 | 1.0187 | 0.7987 | 0.8137 | -1.9% | 0.2404 | 0.2570 | -6.9% |
| AAM1118 | A4 | 0718500-3 | 41.7 | 11/18/2008 | 10002 | 2536 | 9.75 | 1025.85 | 260.10 | 0.2441 | 5449.50 | 0.1882 | 0.1986 | 1.0551 | 0.7712 | 0.8137 | -5.5% | 0.2535 | 0.2570 | -1.3% |
| AAM1118 | B1 | 0718500-3 | 41.7 | 11/18/2008 | 10010 | 2483 | 9.93 | 1008.06 | 250.05 | 0.2150 | 5449.50 | 0.1850 | 0.1749 | 0.9457 | 0.8604 | 0.8137 | 5.4% | 0.2481 | 0.2570 | -3.6% |
| AAM1118 | B2 | 0718500-3 | 41.7 | 11/18/2008 | 10005 | 2448 | 10.04 | 996.51 | 243.82 | 0.2403 | 5449.50 | 0.1829 | 0.1955 | 1.0693 | 0.7610 | 0.8137 | -6.9% | 0.2447 | 0.2570 | -5.0% |
| AAM1118 | B3 | 0718500-3 | 41.7 | 11/18/2008 | 10002 | 2465 | 9.83 | 1017.50 | 250.76 | 0.2327 | 5449.50 | 0.1867 | 0.1893 | 1.0141 | 0.8024 | 0.8137 | -1.4% | 0.2465 | 0.2570 | -4.3% |
| AAM1118 | B4 | 0718500-3 | 41.7 | 11/18/2008 | 10007 | 2488 | 10.15 | 985.91 | 245.12 | 0.2313 | 5449.50 | 0.1809 | 0.1882 | 1.0403 | 0.7822 | 0.8137 | -4.0% | 0.2486 | 0.2570 | -3.4% |
| AAM1118 | C1 | 0718500-3 | 41.7 | 11/18/2008 | 10008 | 2460 | 9.74 | 1027.52 | 252.57 | 0.2205 | 5449.50 | 0.1886 | 0.1794 | 0.9516 | 0.8551 | 0.8137 | 4.8% | 0.2458 | 0.2570 | -4.5% |
| AAM1118 | C2 | 0718500-3 | 41.7 | 11/18/2008 | 10010 | 2476 | 9.83 | 1018.31 | 251.88 | 0.2465 | 5449.50 | 0.1869 | 0.2006 | 1.0734 | 0.7581 | 0.8137 | -7.3% | 0.2474 | 0.2570 | -3.9% |
| AAM1118 | C3 | 0718500-3 | 41.7 | 11/18/2008 | 10008 | 2344 | 9.76 | 1025.41 | 240.16 | 0.2305 | 5449.50 | 0.1882 | 0.1876 | 0.9968 | 0.8163 | 0.8137 | 0.3% | 0.2342 | 0.2570 | -9.7% |
| AAM1118 | C4 | 0718500-3 | 41.7 | 11/18/2008 | 10005 | 2383 | 9.59 | 1043.27 | 248.49 | 0.2382 | 5449.50 | 0.1914 | 0.1938 | 1.0124 | 0.8037 | 0.8137 | -1.2% | 0.2382 | 0.2570 | -7.9% |
| AAM1118 | D1 | 0718500-3 | 41.7 | 11/18/2008 | 10009 | 2455 | 9.89 | 1012.03 | 248.23 | 0.2251 | 5449.50 | 0.1857 | 0.1832 | 0.9863 | 0.8250 | 0.8137 | 1.4% | 0.2453 | 0.2570 | -4.8% |
| AAM1118 | D2 | 0718500-3 | 41.7 | 11/18/2008 | 10006 | 2371 | 9.65 | 1036.89 | 245.70 | 0.2442 | 5449.50 | 0.1903 | 0.1987 | 1.0443 | 0.7792 | 0.8137 | -4.4% | 0.2370 | 0.2570 | -8.4% |
| AAM1118 | D3 | 0718500-3 | 41.7 | 11/18/2008 | 10005 | 2419 | 9.80 | 1020.92 | 246.84 | 0.2412 | 5449.50 | 0.1873 | 0.1963 | 1.0476 | 0.7767 | 0.8137 | -4.8% | 0.2418 | 0.2570 | -6.3% |
| AAM1118 | D4 | 0718500-3 | 41.7 | 11/18/2008 | 10011 | 2487 | 9.54 | 1049.37 | 260.69 | 0.2431 | 5449.50 | 0.1926 | 0.1978 | 1.0272 | 0.7921 | 0.8137 | -2.7% | 0.2484 | 0.2570 | -3.4% |
| AAM1118 | A1 | 0718500-4 | 41.9 | 11/18/2008 | 10007 | 2504 | 9.68 | 1033.78 | 258.68 | 0.2202 | 5449.50 | 0.1897 | 0.1789 | 0.9429 | 0.8615 | 0.8123 | 5.7% | 0.2502 | 0.2570 | -2.7% |
| AAM1118 | A2 | 0718500-4 | 41.9 | 11/18/2008 | 10008 | 2514 | 9.55 | 1047.96 | 263.25 | 0.2458 | 5449.50 | 0.1923 | 0.1997 | 1.0383 | 0.7824 | 0.8123 | -3.8% | 0.2512 | 0.2570 | -2.3% |
| AAM1118 | A3 | 0718500-4 | 41.9 | 11/18/2008 | 10009 | 2420 | 9.41 | 1063.66 | 257.17 | 0.2377 | 5449.50 | 0.1952 | 0.1931 | 0.9893 | 0.8211 | 0.8123 | 1.1% | 0.2418 | 0.2570 | -6.3% |
| AAM1118 | A4 | 0718500-4 | 41.9 | 11/18/2008 | 10001 | 2390 | 9.29 | 1076.53 | 257.27 | 0.2441 | 5449.50 | 0.1975 | 0.1983 | 1.0038 | 0.8093 | 0.8123 | -0.4% | 0.2390 | 0.2570 | -7.5% |
| AAM1118 | B1 | 0718500-4 | 41.9 | 11/18/2008 | 10006 | 2525 | 9.64 | 1037.97 | 261.93 | 0.2150 | 5449.50 | 0.1905 | 0.1747 | 0.9170 | 0.8859 | 0.8123 | 8.3% | 0.2523 | 0.2570 | -1.8% |
| AAM1118 | B2 | 0718500-4 | 41.9 | 11/18/2008 | 10008 | 2467 | 9.91 | 1009.69 | 248.94 | 0.2403 | 5449.50 | 0.1853 | 0.1952 | 1.0534 | 0.7712 | 0.8123 | -5.3% | 0.2465 | 0.2570 | -4.3% |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AAM1118 | B3 | 0718500-4 | 41.9 | 11/18/2008 | 10014 | 2400 | 9.67 | 1035.57 | 248.19 | 0.2327 | 5449.50 | 0.1900 | 0.1890 | 0.9947 | 0.8166 | 0.8123 | 0.5% | 0.2397 | 0.2570 | -7.2% |
| AAM1118 | B4 | 0718500-4 | 41.9 | 11/18/2008 | 10015 | 2477 | 9.56 | 1045.41 | 258.56 | 0.2313 | 5449.50 | 0.1918 | 0.1879 | 0.9795 | 0.8294 | 0.8123 | 2.1% | 0.2473 | 0.2570 | -3.9% |
| AAM1118 | C1 | 0718500-4 | 41.9 | 11/18/2008 | 10011 | 2481 | 9.60 | 1042.81 | 258.44 | 0.2205 | 5449.50 | 0.1914 | 0.1791 | 0.9361 | 0.8678 | 0.8123 | 6.4% | 0.2476 | 0.2570 | -3.7% |
| AAM1118 | C2 | 0718500-4 | 41.9 | 11/18/2008 | 10011 | 2367 | 9.32 | 1074.14 | 253.97 | 0.2465 | 5449.50 | 0.1971 | 0.2002 | 1.0159 | 0.7996 | 0.8123 | -1.6% | 0.2364 | 0.2570 | -8.7% |
| AAM1118 | C3 | 0718500-4 | 41.9 | 11/18/2008 | 10005 | 2354 | 9.53 | 1049.84 | 247.01 | 0.2305 | 5449.50 | 0.1926 | 0.1872 | 0.9720 | 0.8356 | 0.8123 | 2.8% | 0.2353 | 0.2570 | -9.2% |
| AAM1118 | C4 | 0718500-4 | 41.9 | 11/18/2008 | 10017 | 2441 | 9.46 | 1056.88 | 258.03 | 0.2382 | 5449.50 | 0.1943 | 0.1935 | 0.9958 | 0.8157 | 0.8123 | 0.4% | 0.2437 | 0.2570 | -5.5% |
| AAM1118 | D1 | 0718500-4 | 41.9 | 11/18/2008 | 10012 | 2460 | 9.53 | 1050.56 | 258.13 | 0.2251 | 5449.50 | 0.1928 | 0.1829 | 0.9485 | 0.8564 | 0.8123 | 5.1% | 0.2457 | 0.2570 | -4.6% |
| AAM1118 | D2 | 0718500-4 | 41.9 | 11/18/2008 | 10014 | 2432 | 9.46 | 1058.56 | 257.08 | 0.2442 | 5449.50 | 0.1942 | 0.1984 | 1.0212 | 0.7955 | 0.8123 | -2.1% | 0.2429 | 0.2570 | -5.8% |
| AAM1118 | D3 | 0718500-4 | 41.9 | 11/18/2008 | 10000 | 2384 | 9.32 | 1072.96 | 255.79 | 0.2412 | 5449.50 | 0.1969 | 0.1959 | 0.9952 | 0.8163 | 0.8123 | 0.5% | 0.2384 | 0.2570 | -7.8% |
| AAM1118 | D4 | 0718500-4 | 41.9 | 11/18/2008 | 10014 | 2474 | 9.28 | 1079.09 | 266.59 | 0.2431 | 5449.50 | 0.1980 | 0.1975 | 0.9973 | 0.8146 | 0.8123 | 0.3% | 0.2471 | 0.2570 | -4.0% |
| AAM1118 | A1 | 0718500-6 | 59.7 | 11/18/2008 | 10009 | 2577 | 11.10 | 901.71 | 232.16 | 0.2202 | 5449.50 | 0.1655 | 0.1543 | 0.9326 | 0.7514 | 0.7008 | 6.7% | 0.2575 | 0.2612 | -1.4% |
| AAM1118 | A2 | 0718500-6 | 59.7 | 11/18/2008 | 10011 | 2485 | 10.84 | 923.52 | 229.24 | 0.2458 | 5449.50 | 0.1695 | 0.1723 | 1.0165 | 0.6895 | 0.7008 | -1.6% | 0.2482 | 0.2612 | -5.2% |
| AAM1118 | A3 | 0718500-6 | 59.7 | 11/18/2008 | 10009 | 2518 | 10.99 | 910.74 | 229.12 | 0.2377 | 5449.50 | 0.1671 | 0.1666 | 0.9968 | 0.7031 | 0.7008 | 0.3% | 0.2516 | 0.2612 | -3.8% |
| AAM1118 | A4 | 0718500-6 | 59.7 | 11/18/2008 | 10008 | 2577 | 10.71 | 934.45 | 240.62 | 0.2441 | 5449.50 | 0.1715 | 0.1711 | 0.9977 | 0.7025 | 0.7008 | 0.2% | 0.2575 | 0.2612 | -1.4% |
| AAM1118 | B1 | 0718500-6 | 59.7 | 11/18/2008 | 10004 | 2600 | 11.28 | 886.88 | 230.50 | 0.2150 | 5449.50 | 0.1627 | 0.1507 | 0.9259 | 0.7570 | 0.7008 | 7.4% | 0.2599 | 0.2612 | -0.5% |
| AAM1118 | B2 | 0718500-6 | 59.7 | 11/18/2008 | 10010 | 2564 | 11.22 | 892.16 | 228.52 | 0.2403 | 5449.50 | 0.1637 | 0.1684 | 1.0287 | 0.6813 | 0.7008 | -2.9% | 0.2561 | 0.2612 | -2.0% |
| AAM1118 | B3 | 0718500-6 | 59.7 | 11/18/2008 | 10010 | 2528 | 11.27 | 888.20 | 224.13 | 0.2327 | 5449.50 | 0.1630 | 0.1631 | 1.0006 | 0.7004 | 0.7008 | -0.1% | 0.2523 | 0.2612 | -3.5% |
| AAM1118 | B4 | 0718500-6 | 59.7 | 11/18/2008 | 10005 | 2744 | 11.42 | 876.09 | 240.28 | 0.2313 | 5449.50 | 0.1608 | 0.1621 | 1.0083 | 0.6951 | 0.7008 | -0.8% | 0.2743 | 0.2612 | 4.8% |
| AAM1118 | C1 | 0718500-6 | 59.7 | 11/18/2008 | 10001 | 2504 | 10.84 | 922.60 | 231.00 | 0.2205 | 5449.50 | 0.1693 | 0.1545 | 0.9128 | 0.7678 | 0.7008 | 8.7% | 0.2504 | 0.2612 | -4.3% |
| AAM1118 | C2 | 0718500-6 | 59.7 | 11/18/2008 | 10004 | 2533 | 11.09 | 902.07 | 228.40 | 0.2465 | 5449.50 | 0.1655 | 0.1728 | 1.0436 | 0.6715 | 0.7008 | -4.4% | 0.2532 | 0.2612 | -3.1% |
| AAM1118 | C3 | 0718500-6 | 59.7 | 11/18/2008 | 10005 | 2463 | 11.18 | 894.90 | 220.30 | 0.2305 | 5449.50 | 0.1642 | 0.1615 | 0.9837 | 0.7124 | 0.7008 | 1.6% | 0.2462 | 0.2612 | -6.1% |
| AAM1118 | C4 | 0718500-6 | 59.7 | 11/18/2008 | 10012 | 2425 | 10.97 | 912.67 | 221.06 | 0.2382 | 5449.50 | 0.1675 | 0.1669 | 0.9968 | 0.7031 | 0.7008 | 0.3% | 0.2422 | 0.2612 | -7.8% |
| AAM1118 | D1 | 0718500-6 | 59.7 | 11/18/2008 | 10005 | 2487 | 10.99 | 910.37 | 226.30 | 0.2251 | 5449.50 | 0.1671 | 0.1578 | 0.9443 | 0.7421 | 0.7008 | 5.6% | 0.2486 | 0.2612 | -5.1% |
| AAM1118 | D2 | 0718500-6 | 59.7 | 11/18/2008 | 10011 | 2519 | 11.07 | 904.34 | 227.55 | 0.2442 | 5449.50 | 0.1659 | 0.1711 | 1.0313 | 0.6796 | 0.7008 | -3.1% | 0.2518 | 0.2612 | -3.8% |
| AAM1118 | D3 | 0718500-6 | 59.7 | 11/18/2008 | 10008 | 2464 | 10.65 | 939.72 | 231.36 | 0.2412 | 5449.50 | 0.1724 | 0.1690 | 0.9803 | 0.7149 | 0.7008 | 2.0% | 0.2462 | 0.2612 | -6.1% |
| AAM1118 | D4 | 0718500-6 | 59.7 | 11/18/2008 | 10002 | 2567 | 10.90 | 917.61 | 235.50 | 0.2431 | 5449.50 | 0.1684 | 0.1704 | 1.0118 | 0.6927 | 0.7008 | -1.2% | 0.2566 | 0.2612 | -1.8% |
| AAM1118 | A1 | 0718500-5 | 70.7 | 11/18/2008 | 10009 | 2547 | 12.80 | 781.95 | 198.98 | 0.2202 | 5449.50 | 0.1435 | 0.1409 | 0.9817 | 0.6516 | 0.6397 | 1.8% | 0.2545 | 0.2638 | -3.7% |
| AAM1118 | A2 | 0718500-5 | 70.7 | 11/18/2008 | 10013 | 2621 | 12.57 | 796.58 | 208.51 | 0.2458 | 5449.50 | 0.1462 | 0.1572 | 1.0757 | 0.5947 | 0.6397 | -7.6% | 0.2618 | 0.2638 | -0.8% |
| AAM1118 | A3 | 0718500-5 | 70.7 | 11/18/2008 | 10003 | 2683 | 12.81 | 774.83 | 207.82 | 0.2377 | 5449.50 | 0.1422 | 0.1521 | 1.0695 | 0.5982 | 0.6397 | -6.9% | 0.2682 | 0.2638 | 1.7% |
| AAM1118 | A4 | 0718500-5 | 70.7 | 11/18/2008 | 10003 | 2671 | 12.6 | 793.89 | 211.98 | 0.2441 | 5449.50 | 0.1457 | 0.1562 | 1.0719 | 0.5968 | 0.6397 | -7.2% | 0.2670 | 0.2638 | 1.2% |
| AAM1118 | B1 | 0718500-5 | 70.7 | 11/18/2008 | 10002 | 2462 | 12.93 | 773.55 | 190.41 | 0.2150 | 5449.50 | 0.1419 | 0.1375 | 0.9689 | 0.6602 | 0.6397 | 3.1% | 0.2462 | 0.2638 | -7.2% |
| AAM1118 | B2 | 0718500-5 | 70.7 | 11/18/2008 | 10005 | 2650 | 13.01 | 769.02 | 203.69 | 0.2403 | 5449.50 | 0.1411 | 0.1537 | 1.0893 | 0.5873 | 0.6397 | -8.9% | 0.2649 | 0.2638 | 0.4% |
| AAM1118 | B3 | 0718500-5 | 70.7 | 11/18/2008 | 10000 | 2490 | 13.19 | 758.15 | 188.78 | 0.2327 | 5449.50 | 0.1391 | 0.1489 | 1.0700 | 0.5979 | 0.6397 | -7.0% | 0.2490 | 0.2638 | -5.9% |
| AAM1118 | B4 | 0718500-5 | 70.7 | 11/18/2008 | 10015 | 2537 | 12.97 | 772.17 | 195.61 | 0.2313 | 5449.50 | 0.1417 | 0.1480 | 1.0442 | 0.6126 | 0.6397 | -4.4% | 0.2533 | 0.2638 | -4.1% |
| AAM1118 | C1 | 0718500-5 | 70.7 | 11/18/2008 | 10012 | 2481 | 12.9 | 776.12 | 192.33 | 0.2205 | 5449.50 | 0.1424 | 0.1411 | 0.9904 | 0.6459 | 0.6397 | 1.0% | 0.2478 | 0.2638 | -6.4% |
| AAM1118 | C2 | 0718500-5 | 70.7 | 11/18/2008 | 10008 | 2543 | 12.68 | 789.27 | 200.55 | 0.2465 | 5449.50 | 0.1448 | 0.1577 | 1.0887 | 0.5876 | 0.6397 | -8.9% | 0.2541 | 0.2638 | -3.8% |
| AAM1118 | C3 | 0718500-5 | 70.7 | 11/18/2008 | 10004 | 2574 | 13.04 | 767.18 | 197.39 | 0.2305 | 5449.50 | 0.1408 | 0.1475 | 1.0474 | 0.6108 | 0.6397 | -4.7% | 0.2573 | 0.2638 | -2.5% |
| AAM1118 | C4 | 0718500-5 | 70.7 | 11/18/2008 | 10002 | 2471 | 12.67 | 789.42 | 195.03 | 0.2382 | 5449.50 | 0.1449 | 0.1524 | 1.0519 | 0.6082 | 0.6397 | -5.2% | 0.2471 | 0.2638 | -6.8% |
| AAM1118 | D1 | 0718500-5 | 70.7 | 11/18/2008 | 10002 | 2564 | 12.93 | 773.55 | 198.30 | 0.2251 | 5449.50 | 0.1419 | 0.1440 | 1.0144 | 0.6308 | 0.6397 | -1.4% | 0.2563 | 0.2638 | -2.9% |
| AAM1118 | D2 | 0718500-5 | 70.7 | 11/18/2008 | 10010 | 2574 | 12.79 | 782.64 | 201.25 | 0.2442 | 5449.50 | 0.1436 | 0.1562 | 1.0877 | 0.5881 | 0.6397 | -8.8% | 0.2571 | 0.2638 | -2.6% |
| AAM1118 | D3 | 0718500-5 | 70.7 | 11/18/2008 | 10005 | 2511 | 12:47 | 802.33 | 201.36 | 0.2412 | 5449.50 | 0.1472 | 0.1543 | 1.0480 | 0.6104 | 0.6397 | -4.8% | 0.2510 | 0.2638 | -5.1% |
| AAM1118 | D4 | 0718500-5 | 70.7 | 11/18/2008 | 10004 | 2410 | 12.41 | 806.12 | 194.20 | 0.2431 | 5449.50 | 0.1479 | 0.1555 | 1.0513 | 0.6085 | 0.6397 | -5.1% | 0.2409 | 0.2638 | -9.5% |
| AAM1118 | A1 | 0718500-8 | 76.4 | 11/18/2008 | 10010 | 2530 | 13.43 | 745.35 | 188.38 | 0.2202 | 5449.50 | 0.1368 | 0.1344 | 0.9823 | 0.6211 | 0.6102 | 1.8% | 0.2527 | 0.2651 | -4.9% |
| AAM1118 | A2 | 0718500-8 | 76.4 | 11/18/2008 | 10009 | 2611 | 13.59 | 736.50 | 192.13 | 0.2458 | 5449.50 | 0.1351 | 0.1500 | 1.1097 | 0.5498 | 0.6102 | -11.0% | 0.2609 | 0.2651 | -1.6% |
| AAM1118 | A3 | 0718500-8 | 76.4 | 11/18/2008 | 10000 | 2576 | 13.28 | 753.01 | 193.98 | 0.2377 | 5449.50 | 0.1382 | 0.1450 | 1.0496 | 0.5813 | 0.6102 | -5.0% | 0.2576 | 0.2651 | -2.9% |
| AAM1118 | A4 | 0718500-8 | 76.4 | 11/18/2008 | 10006 | 2658 | 13.15 | 760.91 | 202.13 | 0.2441 | 5449.50 | 0.1396 | 0.1489 | 1.0667 | 0.5720 | 0.6102 | -6.7% | 0.2656 | 0.2651 | 0.2% |
| AAM1118 | B1 | 0718500-8 | 76.4 | 11/18/2008 | 10004 | 2470 | 13:46 | 743.24 | 183.51 | 0.2150 | 5449.50 | 0.1364 | 0.1312 | 0.9619 | 0.6344 | 0.6102 | 3.8% | 0.2469 | 0.2651 | -7.4% |
| AAM1118 | B2 | 0718500-8 | 76.4 | 11/18/2008 | 10006 | 2604 | 13.61 | 735.19 | 191.33 | 0.2403 | 5449.50 | 0.1349 | 0.1466 | 1.0868 | 0.5614 | 0.6102 | -8.7% | 0.2602 | 0.2651 | -1.9% |
| AAM1118 | B3 | 0718500-8 | 76.4 | 11/18/2008 | 10005 | 2514 | 13.73 | 728.70 | 183.10 | 0.2327 | 5449.50 | 0.1337 | 0.1420 | 1.0618 | 0.5746 | 0.6102 | -6.2% | 0.2513 | 0.2651 | -5.5% |
| AAM1118 | B4 | 0718500-8 | 76.4 | 11/18/2008 | -10007 | 2608 | 13:63 | 734.19 | 181.34 | 0.2313 | 5449.50 | 0.1347 | 0.1411 | 1.0475 | 0.5825 | 0.6102 | -4.8% | 0.2606 | 0.2651 | -1.7% |
| AAM1118 | C1 | 0718500-8 | 76.4 | 11/18/2008 | 10012 | 2500 | 13.26 | 755.05 | 188.54 | 0.2205 | 5449.50 | 0.1386 | 0.1345 | 0.9710 | 0.6284 | 0.6102 | 2.9% | 0.2497 | 0.2651 | -6.2% |
| AAM1118 | C2 | 0718500-8 | 76.4 | 11/18/2008 | 10005 | 2644 | 13.49 | 741.66 | 196.00 | 0.2465 | 5449.50 | 0.1361 | 0.1504 | 1.1051 | 0.5521 | 0.6102 | -10.5% | 0.2643 | 0.2651 | -0.3% |
| AAM1118 | C3 | 0718500-8 | 76.4 | 11/18/2008 | 10004 | 2476 | 13.6 | 735.59 | 182.06 | 0.2305 | 5449.50 | 0.1350 | 0.1406 | 1.0419 | 0.5856 | 0.6102 | -4.2% | 0.2475 | 0.2651 | -7.1% |
| AAM1118 | C4 | 0718500-8 | 76.4 | 11/18/2008 | 10005 | 2564 | 13.43 | 744.97 | 190.92 | 0.2382 | 5449.50 | 0.1367 | 0.1453 | 1.0632 | 0.5739 | 0.6102 | -6.3% | 0.2563 | 0.2651 | -3.5% |
| AAM1118 | D1 | 0718500-8 | 76.4 | 11/18/2008 | 10008 | 2497 | 13.64 | 733.72 | 183.06 | 0.2251 | 5449.50 | 0.1346 | 0.1373 | 1.0201 | 0.5981 | 0.6102 | -2.0% | 0.2495 | 0.2651 | -6.3% |
| AAM1118 | D2 | 0718500-8 | 76.4 | 11/18/2008 | 10000 | 2587 | 13.67 | 731.53 | 189.25 | 0.2442 | 5449.50 | 0.1342 | 0.1490 | 1.1100 | 0.5497 | 0.6102 | -11.0% | 0.2587 | 0.2651 | -2.5% |
| AAM1118 | D3 | 0718500-8 | 76.4 | 11/18/2008 | 10000 | 2485 | 12.98 | 770.42 | 191.45 | 0.2412 | 5449.50 | 0.1414 | 0.1472 | 1.0410 | 0.5861 | 0.6102 | -4.1% | 0.2485 | 0.2651 | -6.7% |
| AAM1118 | D4 | 0718500-8 | 76.4 | 11/18/2008 | 10004 | 2595 | 13.35 | 749.36 | 194.38 | 0.2431 | 5449.50 | 0.1375 | 0.1483 | 1.0787 | 0.5657 | 0.6102 | -7.9% | 0.2594 | 0.2651 | -2.2% |
| AAM1118 | A1 | 0718500-7 | 82.9 | 11/18/2008 | 10003 | 2471 | 13.16 | 760.11 | 187.77 | 0.2202 | 5449.50 | 0.1395 | 0.1273 | 0.9127 | 0.6334 | 0.5781 | 8.7% | 0.2470 | 0.2667 | -8.0% |
| AAM1118 | A2 | 0718500-7 | 82.9 | 11/18/2008 | 10006 | 2616 | 13.22 | 756.88 | 197.88 | 0.2458 | 5449.50 | 0.1389 | 0.1421 | 1.0231 | 0.5651 | 0.5781 | -2.3% | 0.2614 | 0.2667 | -2.0% |
| AAM1118 | A3 | 0718500-7 | 82.9 | 11/18/2008 | 10003 | 2627 | 13.03 | 767.69 | 201.61 | 0.2377 | 5449.50 | 0.1409 | 0.1374 | 0.9755 | 0.5927 | 0.5781 | 2.5% | 0.2626 | 0.2667 | -1.5% |
| AAM1118 | A4 | 0718500-7 | 82.9 | 11/18/2008 | 10005 | 2701 | 12.87 | 777.39 | 209.87 | 0.2441 | 5449.50 | 0.1427 | 0.1411 | 0.9893 | 0.5844 | 0.5781 | 1.1% | 0.2700 | 0.2667 | 1.2% |
| AAM1118 | B1 | 0718500-7 | 82.9 | 11/18/2008 | 10001 | 2751 | 13.82 | 723.66 | 199.06 | 0.2150 | 5449.50 | 0.1328 | 0.1243 | 0.9360 | 0.6176 | 0.5781 | 6.4% | 0.2751 | 0.2667 | 3.1% |
| AAM1118 | B2 | 0718500-7 | 82.9 | 11/18/2008 | 10007 | 2594 | 13.58 | 736.89 | 191.02 | 0.2403 | 5449.50 | 0.1352 | 0.1389 | 1.0274 | 0.5627 | 0.5781 | -2.7% | 0.2592 | 0.2667 | -2.9% |
| AAM1118 | B3 | 0718500-7 | 82.9 | 11/18/2008 | 10003 | 2712 | 13.52 | 739.87 | 200.59 | 0.2327 | 5449.50 | 0.1358 | 0.1345 | 0.9909 | 0.5834 | 0.5781 | 0.9% | 0.2711 | 0.2667 | 1.6% |
| AAM1118 | B4 | 0718500-7 | 82.9 | 11/18/2008 | 10005 | 2591 | 13.41 | 746.09 | 193.21 | 0.2313 | 5449.50 | 0.1369 | 0.1337 | 0.9767 | 0.5919 | 0.5781 | 2.3% | 0.2590 | 0.2667 | -3.0% |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AAM1118 | C1 | 0718500-7 | 82.9 | 11/18/2008 | 10000 | 2699 | 13.2 | 757.58 | 204.47 | 0.2205 | 5449.50 | 0.1390 | 0.1275 | 0.9170 | 0.6305 | 0.5781 | 8.3% | 0.2699 | 0.2667 | 1.2% |
| AAM1118 | C2 | 0718500-7 | 82.9 | 11/18/2008 | 10001 | 2579 | 13.21 | 757.08 | 195.23 | 0.2465 | 5449.50 | 0.1389 | 0.1425 | 1.0258 | 0.5636 | 0.5781 | -2.6% | 0.2579 | 0.2667 | -3.4% |
| AAM1118 | C3 | 0718500-7 | 82.9 | 11/18/2008 | 9999 | 2569 | 13.31 | 751.24 | 193.01 | 0.2305 | 5449.50 | 0.1379 | 0.1333 | 0.9667 | 0.5981 | 0.5781 | 3.3% | 0.2569 | 0.2667 | -3.8% |
| AAM1118 | C4 | 0718500-7 | 82.9 | 11/18/2008 | 10003 | 2535 | 13.35 | 749.29 | 189.89 | 0.2382 | 5449.50 | 0.1375 | 0.1377 | 1.0016 | 0.5772 | 0.5781 | -0.2% | 0.2534 | 0.2667 | -5.2% |
| AAM1118 | D1 | 0718500-7 | 82.9 | 11/18/2008 | 10008 | 2632 | 13.47 | 742.84 | 195.40 | 0.2251 | 5449.50 | 0.1363 | 0.1301 | 0.9547 | 0.6056 | 0.5781 | 4.5% | 0.2630 | 0.2667 | -1.4% |
| AAM1118 | D2 | 0718500-7 | 82.9 | 11/18/2008 | 10003 | 2597 | 13.37 | 748.17 | 194.24 | 0.2442 | 5449.50 | 0.1373 | 0.1412 | 1.0283 | 0.5622 | 0.5781 | -2.8% | 0.2596 | 0.2667 | -2.7% |
| AAM1118 | D3 | 0718500-7 | 82.9 | 11/18/2008 | 10003 | 2493 | 13.04 | 767.10 | 191.18 | 0.2412 | 5449.50 | 0.1408 | 0.1394 | 0.9906 | 0.5836 | 0.5781 | 0.9% | 0.2492 | 0.2667 | -7.0% |
| AAM1118 | D4 | 0718500-7 | 82.9 | 11/18/2008 | 10001 | 2639 | 13.09 | 764.02 | 201.60 | 0.2431 | 5449.50 | 0.1402 | 0.1405 | 1.0025 | 0.5767 | 0.5781 | -0.2% | 0.2639 | 0.2667 | -1.1% |
| AAM1118 | A1 | 0718500-10 | 103.0 | 11/18/2008 | 10005 | 2949 | 17.20 | 581.69 | 171.45 | 0.2202 | 5449.50 | 0.1067 | 0.1078 | 1.0095 | 0.4847 | 0.4893 | -0.9% | 0.2948 | 0.2716 | 7.9% |
| AAM1118 | A2 | 0718500-10 | 103.0 | 11/18/2008 | 10007 | 2774 | 16.78 | 596.36 | 165.32 | 0.2458 | 5449.50 | 0.1094 | 0.1203 | 1.0991 | 0.4452 | 0.4893 | -9.9% | 0.2772 | 0.2716 | 2.0% |
| AAM1118 | A3 | 0718500-10 | 103.0 | 11/18/2008 | 10001 | 2804 | 16.53 | 605.02 | 169.63 | 0.2377 | 5449.50 | 0.1110 | 0.1163 | 1.0477 | 0.4671 | 0.4893 | -4.8% | 0.2804 | 0.2716 | 3.1% |
| AAM1118 | A4 | 0718500-10 | 103.0 | 11/18/2008 | 10003 | 2853 | 16.21 | 617.09 | 176.00 | 0.2441 | 5449.50 | 0.1132 | 0.1194 | 1.0548 | 0.4639 | 0.4893 | -5.5% | 0.2852 | 0.2716 | 4.8% |
| AAM1118 | B1 | 0718500-10 | 103.0 | 11/18/2008 | 10009 | 2798 | 16.96 | 590.15 | 164.98 | 0.2150 | 5449.50 | 0.1083 | 0.1052 | 0.9715 | 0.5037 | 0.4893 | 2.9% | 0.2795 | 0.2716 | 2.9% |
| AAM1118 | B2 | 0718500-10 | 103.0 | 11/18/2008 | 10003 | 2836 | 17.28 | 578.88 | 164.12 | 0.2403 | 5449.50 | 0.1062 | 0.1176 | 1.1070 | 0.4421 | 0.4893 | -10.7% | 0.2835 | 0.2716 | 4.2% |
| AAM1118 | B3 | 0718500-10 | 103.0 | 11/18/2008 | 10001 | 2932 | 17.27 | 579.10 | 169.77 | 0.2327 | 5449.50 | 0.1063 | 0.1139 | 1.0716 | 0.4567 | 0.4893 | -7.2% | 0.2932 | 0.2716 | 7.4% |
| AAM1118 | B4 | 0718500-10 | 103.0 | 11/18/2008 | 10000 | 2800 | 17.26 | 579.37 | 162.22 | 0.2313 | 5449.50 | 0.1063 | 0.1132 | 1.0646 | 0.4596 | 0.4893 | -6.5% | 0.2800 | 0.2716 | 3.0% |
| AAM1118 | C1 | 0718500-10 | 103.0 | 11/18/2008 | 9999 | 2788 | 16.87 | 592.71 | 165.26 | 0.2205 | 5449.50 | 0.1088 | 0.1079 | 0.9921 | 0.4933 | 0.4893 | 0.8% | 0.2788 | 0.2716 | 2.6% |
| AAM1118 | C2 | 0718500-10 | 103.0 | 11/18/2008 | 10002 | 2733 | 16.48 | 608.92 | 165.84 | 0.2465 | 5449.50 | 0.1114 | 0.1208 | 1.0831 | 0.4518 | 0.4893 | -8.3% | 0.2732 | 0.2716 | 0.6% |
| AAM1118 | C3 | 0718500-10 | 103.0 | 11/18/2008 | 10002 | 2825 | 16.54 | 604.72 | 170.80 | 0.2305 | 5449.50 | 0.1110 | 0.1128 | 1.0165 | 0.4814 | 0.4893 | -1.6% | 0.2824 | 0.2716 | 3.9% |
| AAM1118 | C4 | 0718500-10 | 103.0 | 11/18/2008 | 10001 | 2868 | 16.92 | 591.08 | 169.50 | 0.2382 | 5449.50 | 0.1085 | 0.1166 | 1.0746 | 0.4553 | 0.4893 | -7.5% | 0.2868 | 0.2716 | 5.3% |
| AAM1118 | D1 | 0718500-10 | 103.0 | 11/18/2008 | 10003 | 2780 | 16.86 | 593.30 | 164.89 | 0.2251 | 5449.50 | 0.1089 | 0.1102 | 1.0117 | 0.4837 | 0.4893 | -1.2% | 0.2779 | 0.2716 | 2.3% |
| AAM1118 | D2 | 0718500-10 | 103.0 | 11/18/2008 | 10000 | 2778 | 16.99 | 588.58 | 163.51 | 0.2442 | 5449.50 | 0.1080 | 0.1195 | 1.1064 | 0.4423 | 0.4893 | -10.6% | 0.2778 | 0.2716 | 2.2% |
| AAM1118 | D3 | 0718500-10 | 103.0 | 11/18/2008 | 10001 | 2745 | 16.48 | 606.86 | 166.57 | 0.2412 | 5449.50 | 0.1114 | 0.1180 | 1.0599 | 0.4617 | 0.4893 | -6.0% | 0.2745 | 0.2716 | 1.1% |
| AAM1118 | D4 | 0718500-10 | 103.0 | 11/18/2008 | 10003 | 2818 | 16.73 | 597.91 | 168.44 | 0.2431 | 5449.50 | 0.1097 | 0.1190 | 1.0842 | 0.4513 | 0.4893 | -8.4% | 0.2817 | 0.2716 | 3.6% |
| AAM1118 | A1 | 0718500-9 | 104.0 | 11/18/2008 | 10007 | 2765 | 16.55 | 604.65 | 167.07 | 0.2202 | 5449.50 | 0.1110 | 0.1069 | 0.9631 | 0.5039 | 0.4853 | 3.7% | 0.2763 | 0.2718 | 1.6% |
| AAM1118 | A2 | 0718500-9 | 104.0 | 11/18/2008 | 10000 | 2803 | 16.45 | 607.90 | 170.40 | 0.2458 | 5449.50 | 0.1116 | 0.1193 | 1.0693 | 0.4538 | 0.4853 | -6.9% | 0.2803 | 0.2718 | 3.0% |
| AAM1118 | A3 | 0718500-9 | 104.0 | 11/18/2008 | 10005 | 2799 | 16.22 | 616.83 | 172.56 | 0.2377 | 5449.50 | 0.1132 | 0.1154 | 1.0191 | 0.4762 | 0.4853 | -1.9% | 0.2798 | 0.2718 | 2.8% |
| AAM1118 | A4 | 0718500-9 | 104.0 | 11/18/2008 | 10003 | 2732 | 15.89 | 629.52 | 171.93 | 0.2441 | 5449.50 | 0.1155 | 0.1185 | 1.0255 | 0.4732 | 0.4853 | -2.5% | 0.2731 | 0.2718 | 0.5% |
| AAM1118 | B1 | 0718500-9 | 104.0 | 11/18/2008 | 10003 | 2716 | 16.93 | 590.84 | 160.43 | 0.2150 | 5449.50 | 0.1084 | 0.1043 | 0.9623 | 0.5043 | 0.4853 | 3.8% | 0.2715 | 0.2718 | -0.1% |
| AAM1118 | B2 | 0718500-9 | 104.0 | 11/18/2008 | 10006 | 2751 | 16.74 | 597.73 | 164.34 | 0.2403 | 5449.50 | 0.1097 | 0.1166 | 1.0632 | 0.4565 | 0.4853 | -6.3% | 0.2749 | 0.2718 | 1.1% |
| AAM1118 | B3 | 0718500-9 | 104.0 | 11/18/2008 | 10002 | 2702 | 16.86 | 593.24 | 160.26 | 0.2327 | 5449.50 | 0.1089 | 0.1129 | 1.0374 | 0.4678 | 0.4853 | -3.7% | 0.2701 | 0.2718 | -0.6% |
| AAM1118 | B4 | 0718500-9 | 104.0 | 11/18/2008 | 10007 | 2728 | 17 | 588.65 | 160.47 | 0.2313 | 5449.50 | 0.1080 | 0.1122 | 1.0392 | 0.4670 | 0.4853 | -3.9% | 0.2726 | 0.2718 | 0.3% |
| AAM1118 | C1 | 0718500-9 | 104.0 | 11/18/2008 | 10003 | 2790 | 16.51 | 605.88 | 168.99 | 0.2205 | 5449.50 | 0.1112 | 0.1070 | 0.9625 | 0.5042 | 0.4853 | 3.8% | 0.2789 | 0.2718 | 2.6% |
| AAM1118 | C2 | 0718500-9 | 104.0 | 11/18/2008 | 10006 | 2805 | 16.45 | 608.27 | 170.52 | 0.2465 | 5449.50 | 0.1116 | 0.1196 | 1.0717 | 0.4528 | 0.4853 | -7.2% | 0.2803 | 0.2718 | 3.0% |
| AAM1118 | C3 | 0718500-9 | 104.0 | 11/18/2008 | 10002 | 2749 | 16.82 | 594.65 | 163.44 | 0.2305 | 5449.50 | 0.1091 | 0.1119 | 1.0251 | 0.4734 | 0.4853 | -2.5% | 0.2746 | 0.2718 | 1.1% |
| AAM1118 | C4 | 0718500-9 | 104.0 | 11/18/2008 | 10001 | 2709 | 16.3 | 613.56 | 166.20 | 0.2382 | 5449.50 | 0.1126 | 0.1156 | 1.0267 | 0.4727 | 0.4853 | -2.7% | 0.2709 | 0.2718 | -0.3% |
| AAM1118 | D1 | 0718500-9 | 104.0 | 11/18/2008 | 10008 | 2826 | 16.41 | 609.67 | 172.21 | 0.2251 | 5449.50 | 0.1119 | 0.1092 | 0.9761 | 0.4972 | 0.4853 | 2.4% | 0.2824 | 0.2718 | 3.7% |
| AAM1118 | D2 | 0718500-9 | 104.0 | 11/18/2008 | 10005 | 2855 | 16.60 | 602.71 | 171.99 | 0.2442 | 5449.50 | 0.1106 | 0.1185 | 1.0715 | 0.4529 | 0.4853 | -7.2% | 0.2854 | 0.2718 | 4.8% |
| AAM1118 | D3 | 0718500-9 | 104.0 | 11/18/2008 | 10006 | 2735 | 16.51 | 606.06 | 165.68 | 0.2412 | 5449.50 | 0.1112 | 0.1171 | 1.0525 | 0.4611 | 0.4853 | -5.3% | 0.2733 | 0.2718 | 0.6% |
| AAM1118 | D4 | 0718500-9 | 104.0 | 11/18/2008 | 10000 | 2743 | 16.12 | 620.35 | 170.16 | 0.2431 | 5449.50 | 0.1138 | 0.1180 | 1.0364 | 0.4683 | 0.4853 | -3.6% | 0.2743 | 0.2718 | 0.9% |
| AAM1118 | A1 | 0718500-12 | 133.0 | 11/18/2008 | 10002 | 2977 | 20.20 | 495.15 | 147.38 | 0.2202 | 5449.50 | 0.0909 | 0.0840 | 0.9246 | 0.4126 | 0.3815 | 7.5% | 0.2976 | 0.2790 | 6.3% |
| AAM1118 | A2 | 0718500-12 | 133.0 | 11/18/2008 | 10004 | 2992 | 20.19 | 495.49 | 148.19 | 0.2458 | 5449.50 | 0.0909 | 0.0938 | 1.0314 | 0.3699 | 0.3815 | -3.1% | 0.2991 | 0.2790 | 6.7% |
| AAM1118 | A3 | 0718500-12 | 133.0 | 11/18/2008 | 10007 | 2988 | 19.57 | 511.34 | 152.68 | 0.2377 | 5449.50 | 0.0938 | 0.0907 | 0.9665 | 0.3948 | 0.3815 | 3.4% | 0.2986 | 0.2790 | 6.6% |
| AAM1118 | A4 | 0718500-12 | 133.0 | 11/18/2008 | 10007 | 3037 | 19.43 | 515.03 | 156.30 | 0.2441 | 5449.50 | 0.0945 | 0.0931 | 0.9854 | 0.3872 | 0.3815 | 1.5% | 0.3035 | 0.2790 | 8.1% |
| AAM1118 | B1 | 0718500-12 | 133.0 | 11/18/2008 | 10002 | 3026 | 20.48 | 488.38 | 147.75 | 0.2150 | 5449.50 | 0.0896 | 0.0820 | 0.9153 | 0.4168 | 0.3815 | 8.5% | 0.3025 | 0.2790 | 7.8% |
| AAM1118 | B2 | 0718500-12 | 133.0 | 11/18/2008 | 10004 | 3071 | 20.74 | 482.35 | 148.07 | 0.2403 | 5449.50 | 0.0885 | 0.0917 | 1.0358 | 0.3683 | 0.3815 | -3.6% | 0.3070 | 0.2790 | 9.1% |
| AAM1118 | B3 | 0718500-12 | 133.0 | 11/18/2008 | 10002 | 2999 | 20.71 | 482.86 | 144.81 | 0.2327 | 5449.50 | 0.0886 | 0.0888 | 1.0018 | 0.3808 | 0.3815 | -0.2% | 0.2998 | 0.2790 | 7.0% |
| AAM1118 | B4 | 0718500-12 | 133.0 | 11/18/2008 | 10001 | 2986 | 20.75 | 481.98 | 143.90 | 0.2313 | 5449.50 | 0.0884 | 0.0882 | 0.9978 | 0.3824 | 0.3815 | 0.2% | 0.2986 | 0.2790 | 6.6% |
| AAM1118 | C1 | 0718500-12 | 133.0 | 11/18/2008 | 10004 | 2975 | 20.32 | 492.32 | 146.41 | 0.2205 | 5449.50 | 0.0903 | 0.0841 | 0.9312 | 0.4097 | 0.3815 | 6.9% | 0.2974 | 0.2790 | 6.2% |
| AAM1118 | C2 | 0718500-12 | 133.0 | 11/18/2008 | 10003 | 2930 | 20.17 | 495.93 | 145.27 | 0.2465 | 5449.50 | 0.0910 | 0.0940 | 1.0334 | 0.3692 | 0.3815 | -3.3% | 0.2929 | 0.2790 | 4.8% |
| AAM1118 | C3 | 0718500-12 | 133.0 | 11/18/2008 | 10003 | 2990 | 20.53 | 487.24 | 145.64 | 0.2305 | 5449.50 | 0.0894 | 0.0879 | 0.9836 | 0.3879 | 0.3815 | 1.6% | 0.2989 | 0.2790 | 6.7% |
| AAM1118 | C4 | 0718500-12 | 133.0 | 11/18/2008 | 10002 | 3056 | 20.13 | 496.87 | 151.81 | 0.2382 | 5449.50 | 0.0912 | 0.0909 | 0.9967 | 0.3828 | 0.3815 | 0.3% | 0.3055 | 0.2790 | 8.7% |
| AAM1118 | D1 | 0718500-12 | 133.0 | 11/18/2008 | 10000 | 2954 | 20.18 | 495.54 | 146.38 | 0.2251 | 5449.50 | 0.0909 | 0.0859 | 0.9445 | 0.4040 | 0.3815 | 5.6% | 0.2954 | 0.2790 | 5.6% |
| AAM1118 | D2 | 0718500-12 | 133.0 | 11/18/2008 | 9999 | 3031 | 20.04 | 498.95 | 151.25 | 0.2442 | 5449.50 | 0.0916 | 0.0932 | 1.0176 | 0.3749 | 0.3815 | -1.8% | 0.3031 | 0.2790 | 8.0% |
| AAM1118 | D3 | 0718500-12 | 133.0 | 11/18/2008 | 10009 | 2888 | 19.88 | 503.47 | 145.27 | 0.2412 | 5449.50 | 0.0924 | 0.0920 | 0.9961 | 0.3830 | 0.3815 | 0.4% | 0.2885 | 0.2790 | 3.3% |
| AAM1118 | D4 | 0718500-12 | 133.0 | 11/18/2008 | 10003 | 3004 | 19.92 | 502.16 | 150.80 | 0.2431 | 5449.50 | 0.0921 | 0.0927 | 1.0065 | 0.3791 | 0.3815 | -0.7% | 0.3003 | 0.2790 | 7.1% |

OUTLIERS

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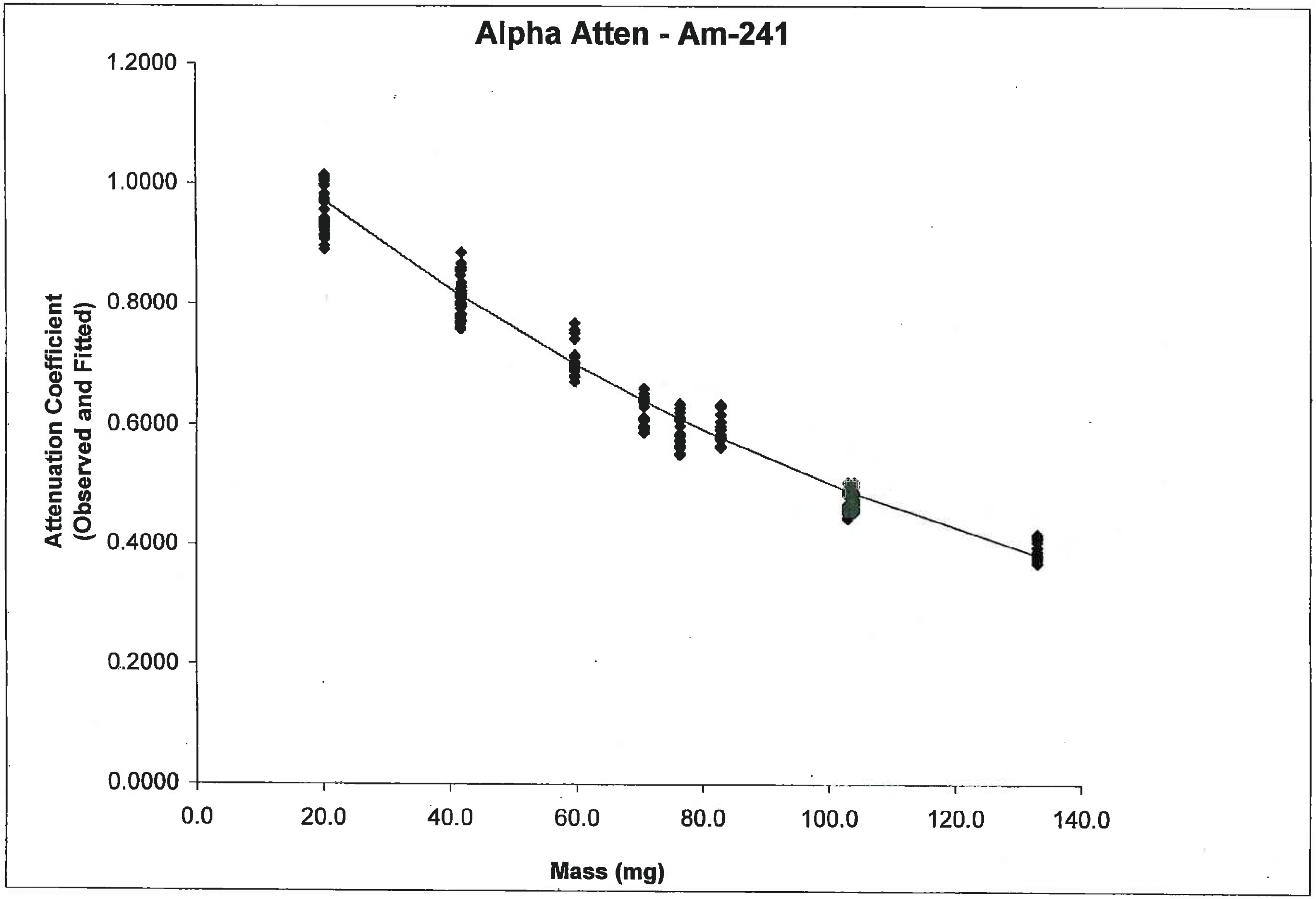
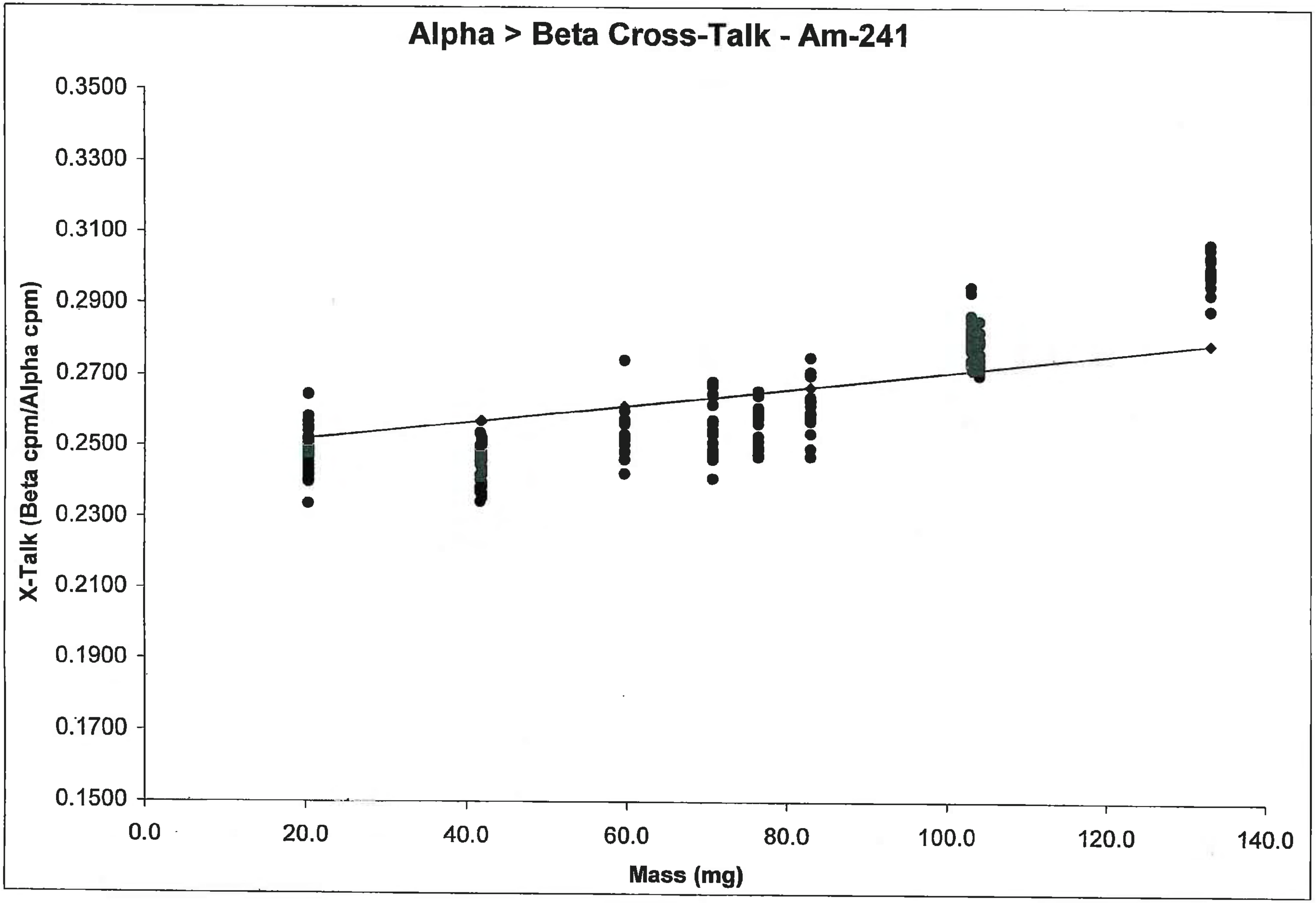
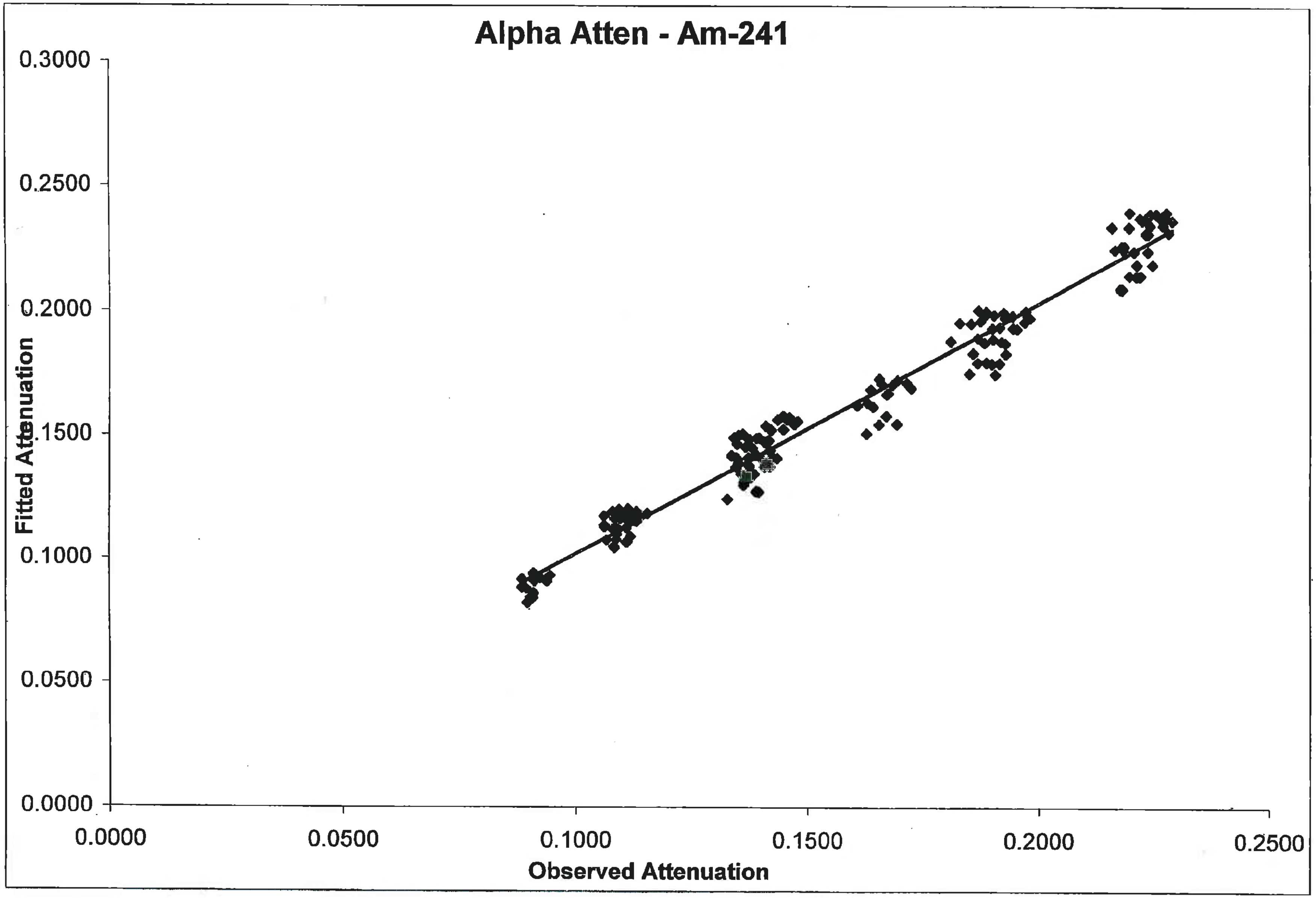
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AAM1118 | A1 | 0718500-13 | 141.9 | 11/18/2008 | 10003 | 2918 | 24.25 | 412.49 | 120.33 | 0.2202 | 5449.50 | 0.0757 | 0.0780 | 1.0309 | 0.3438 | 0.3544 | -3.1% | 0.2917 | 0.2812 | 3.6% |
| AAM1118 | A2 | 0718500-13 | 141.9 | 11/18/2008 | 10004 | 2915 | 23.96 | 417.53 | 121.66 | 0.2458 | 5449.50 | 0.0766 | 0.0871 | 1.1369 | 0.3117 | 0.3544 | -13.7% | 0.2914 | 0.2812 | 3.5% |
| AAM1118 | A3 | 0718500-13 | 141.9 | 11/18/2008 | 10003 | 2816 | 23.75 | 421.18 | 118.57 | 0.2377 | 5449.50 | 0.0773 | 0.0842 | 1.0899 | 0.3251 | 0.3544 | -9.0% | 0.2815 | 0.2812 | 0.1% |
| AAM1118 | A4 | 0718500-13 | 141.9 | 11/18/2008 | 10000 | 2837 | 22.93 | 436.11 | 123.72 | 0.2441 | 5449.50 | 0.0800 | 0.0865 | 1.0809 | 0.3278 | 0.3544 | -8.1% | 0.2837 | 0.2812 | 0.9% |
| AAM1118 | B1 | 0718500-13 | 141.9 | 11/18/2008 | 10005 | 2848 | 24.12 | 414.80 | 118.08 | 0.2150 | 5449.50 | 0.0761 | 0.0762 | 1.0010 | 0.3540 | 0.3544 | -0.1% | 0.2847 | 0.2812 | 1.2% |
| AAM1118 | B2 | 0718500-13 | 141.9 | 11/18/2008 | 10000 | 2855 | 24.99 | 400.16 | 114.25 | 0.2403 | 5449.50 | 0.0734 | 0.0852 | 1.1597 | 0.3056 | 0.3544 | -16.0% | 0.2855 | 0.2812 | 1.5% |
| AAM1118 | B3 | 0718500-13 | 141.9 | 11/18/2008 | 10001 | 2932 | 25.07 | 398.92 | 116.95 | 0.2327 | 5449.50 | 0.0732 | 0.0825 | 1.1265 | 0.3146 | 0.3544 | -12.6% | 0.2932 | 0.2812 | 4.1% |
| AAM1118 | B4 | 0718500-13 | 141.9 | 11/18/2008 | 9999 | 2830 | 24.33 | 410.97 | 116.32 | 0.2313 | 5449.50 | 0.0754 | 0.0820 | 1.0869 | 0.3260 | 0.3544 | -8.7% | 0.2830 | 0.2812 | 0.6% |
| AAM1118 | C1 | 0718500-13 | 141.9 | 11/18/2008 | 10003 | 2901 | 24.34 | 410.97 | 119.19 | 0.2205 | 5449.50 | 0.0754 | 0.0781 | 1.0361 | 0.3420 | 0.3544 | -3.6% | 0.2900 | 0.2812 | 3.0% |
| AAM1118 | C2 | 0718500-13 | 141.9 | 11/18/2008 | 10000 | 2873 | 24.05 | 415.80 | 119.46 | 0.2465 | 5449.50 | 0.0763 | 0.0874 | 1.1449 | 0.3095 | 0.3544 | -14.5% | 0.2873 | 0.2812 | 2.1% |
| AAM1118 | C3 | 0718500-13 | 141.9 | 11/18/2008 | 10003 | 2881 | 24.57 | 407.12 | 117.26 | 0.2305 | 5449.50 | 0.0747 | 0.0817 | 1.0934 | 0.3241 | 0.3544 | -9.3% | 0.2880 | 0.2812 | 2.4% |
| AAM1118 | C4 | 0718500-13 | 141.9 | 11/18/2008 | 10002 | 3030 | 24.45 | 409.08 | 123.93 | 0.2382 | 5449.50 | 0.0751 | 0.0844 | 1.1245 | 0.3151 | 0.3544 | -12.4% | 0.3029 | 0.2812 | 7.2% |
| AAM1118 | D1 | 0718500-13 | 141.9 | 11/18/2008 | 10003 | 2804 | 24.02 | 416.44 | 116.74 | 0.2251 | 5449.50 | 0.0764 | 0.0798 | 1.0438 | 0.3395 | 0.3544 | -4.4% | 0.2803 | 0.2812 | -0.3% |
| AAM1118 | D2 | 0718500-13 | 141.9 | 11/18/2008 | 10000 | 2820 | 24.19 | 413.39 | 116.56 | 0.2442 | 5449.50 | 0.0759 | 0.0865 | 1.1408 | 0.3106 | 0.3544 | -14.1% | 0.2820 | 0.2812 | 0.3% |
| AAM1118 | D3 | 0718500-13 | 141.9 | 11/18/2008 | 10000 | 2835 | 23.86 | 419.11 | 118.82 | 0.2412 | 5449.50 | 0.0769 | 0.0855 | 1.1114 | 0.3189 | 0.3544 | -11.1% | 0.2835 | 0.2812 | 0.8% |
| AAM1118 | D4 | 0718500-13 | 141.9 | 11/18/2008 | 10003 | 2999 | 24 | 416.79 | 124.96 | 0.2431 | 5449.50 | 0.0765 | 0.0861 | 1.1264 | 0.3146 | 0.3544 | -12.6% | 0.2998 | 0.2812 | 6.2% |
| AAM1118 | A1 | 0718500-11 | 147.5 | 11/18/2008 | 10006 | 2994 | 21.49 | 465.61 | 139.32 | 0.2202 | 5449.50 | 0.0854 | 0.0745 | 0.8718 | 0.3880 | 0.3383 | 12.8% | 0.2992 | 0.2827 | 5.5% |
| AAM1118 | A2 | 0718500-11 | 147.5 | 11/18/2008 | 10000 | 3028 | 21.31 | 469.26 | 142.09 | 0.2458 | 5449.50 | 0.0861 | 0.0832 | 0.9656 | 0.3503 | 0.3383 | 3.4% | 0.3028 | 0.2827 | 6.7% |
| AAM1118 | A3 | 0718500-11 | 147.5 | 11/18/2008 | 10000 | 3044 | 21.32 | 469.04 | 142.76 | 0.2377 | 5449.50 | 0.0861 | 0.0804 | 0.9342 | 0.3621 | 0.3383 | 6.6% | 0.3044 | 0.2827 | 7.1% |
| AAM1118 | A4 | 0718500-11 | 147.5 | 11/18/2008 | 10001 | 3191 | 21.05 | 475.11 | 151.59 | 0.2441 | 5449.50 | 0.0872 | 0.0826 | 0.9472 | 0.3572 | 0.3383 | 5.3% | 0.3191 | 0.2827 | 11.4% |
| AAM1118 | B1 | 0718500-11 | 147.5 | 11/18/2008 | 10002 | 3069 | 21.84 | 457.97 | 140.52 | 0.2150 | 5449.50 | 0.0840 | 0.0727 | 0.8655 | 0.3909 | 0.3383 | 13.5% | 0.3068 | 0.2827 | 7.9% |
| AAM1118 | B2 | 0718500-11 | 147.5 | 11/18/2008 | 10002 | 3025 | 21.85 | 457.76 | 138.44 | 0.2403 | 5449.50 | 0.0840 | 0.0813 | 0.9677 | 0.3496 | 0.3383 | 3.2% | 0.3024 | 0.2827 | 6.5% |
| AAM1118 | B3 | 0718500-11 | 147.5 | 11/18/2008 | 9999 | 2993 | 22.07 | 453.06 | 135.61 | 0.2327 | 5449.50 | 0.0831 | 0.0787 | 0.9469 | 0.3573 | 0.3383 | 5.3% | 0.2993 | 0.2827 | 5.6% |
| AAM1118 | B4 | 0718500-11 | 147.5 | 11/18/2008 | 10001 | 3077 | 21.92 | 456.25 | 140.37 | 0.2313 | 5449.50 | 0.0837 | 0.0782 | 0.9346 | 0.3620 | 0.3383 | 6.5% | 0.3077 | 0.2827 | 8.1% |
| AAM1118 | C1 | 0718500-11 | 147.5 | 11/18/2008 | 10000 | 3008 | 21.50 | 465.12 | 139.91 | 0.2205 | 5449.50 | 0.0854 | 0.0746 | 0.8740 | 0.3871 | 0.3383 | 12.6% | 0.3008 | 0.2827 | 6.0% |
| AAM1118 | C2 | 0718500-11 | 147.5 | 11/18/2008 | 10008 | 3118 | 21.44 | 466.79 | 145.43 | 0.2465 | 5449.50 | 0.0857 | 0.0834 | 0.9735 | 0.3475 | 0.3383 | 2.6% | 0.3116 | 0.2827 | 9.3% |
| AAM1118 | C3 | 0718500-11 | 147.5 | 11/18/2008 | 10007 | 3063 | 22.18 | 451.17 | 138.10 | 0.2305 | 5449.50 | 0.0828 | 0.0780 | 0.9418 | 0.3592 | 0.3383 | 5.8% | 0.3061 | 0.2827 | 7.7% |
| AAM1118 | C4 | 0718500-11 | 147.5 | 11/18/2008 | 9999 | 3140 | 21.37 | 467.90 | 146.93 | 0.2382 | 5449.50 | 0.0859 | 0.0806 | 0.9385 | 0.3605 | 0.3383 | 6.2% | 0.3140 | 0.2827 | 10.0% |
| AAM1118 | D1 | 0718500-11 | 147.5 | 11/18/2008 | 10002 | 2977 | 21.49 | 465.43 | 138.53 | 0.2251 | 5449.50 | 0.0854 | 0.0761 | 0.8916 | 0.3794 | 0.3383 | 10.8% | 0.2976 | 0.2827 | 5.0% |
| AAM1118 | D2 | 0718500-11 | 147.5 | 11/18/2008 | 10000 | 2950 | 21.58 | 463.39 | 136.70 | 0.2442 | 5449.50 | 0.0850 | 0.0826 | 0.9715 | 0.3482 | 0.3383 | 2.9% | 0.2950 | 0.2827 | 4.2% |
| AAM1118 | D3 | 0718500-11 | 147.5 | 11/18/2008 | 10002 | 2921 | 20.77 | 481.56 | 140.64 | 0.2412 | 5449.50 | 0.0884 | 0.0816 | 0.9234 | 0.3664 | 0.3383 | 7.7% | 0.2920 | 0.2827 | 3.2% |
| AAM1118 | D4 | 0718500-11 | 147.5 | 11/18/2008 | 10005 | 3044 | 21.06 | 475.07 | 144.54 | 0.2431 | 5449.50 | 0.0872 | 0.0822 | 0.9433 | 0.3586 | 0.3383 | 5.7% | 0.3042 | 0.2827 | 7.1% |
| AAM1118 | A1 | 0718500-14 | 150.2 | 11/18/2008 | 10007 | 2959 | 19.56 | 511.61 | 151.28 | 0.2202 | 5449.50 | 0.0939 | 0.0728 | 0.7759 | 0.4263 | 0.3308 | 22.4% | 0.2957 | 0.2833 | 4.2% |
| AAM1118 | A2 | 0718500-14 | 150.2 | 11/18/2008 | 10004 | 2866 | 18.98 | 527.08 | 151.00 | 0.2458 | 5449.50 | 0.0967 | 0.0813 | 0.8407 | 0.3935 | 0.3308 | 15.9% | 0.2865 | 0.2833 | 1.1% |
| AAM1118 | A3 | 0718500-14 | 150.2 | 11/18/2008 | 10008 | 2815 | 19.33 | 517.74 | 145.63 | 0.2377 | 5449.50 | 0.0950 | 0.0786 | 0.8276 | 0.3997 | 0.3308 | 17.2% | 0.2813 | 0.2833 | -0.7% |
| AAM1118 | A4 | 0718500-14 | 150.2 | 11/18/2008 | 10000 | 2919 | 19.15 | 522.19 | 152.43 | 0.2441 | 5449.50 | 0.0958 | 0.0807 | 0.8427 | 0.3926 | 0.3308 | 15.7% | 0.2919 | 0.2833 | 2.9% |
| AAM1118 | B1 | 0718500-14 | 150.2 | 11/18/2008 | 10002 | 2812 | 19.83 | 504.39 | 141.81 | 0.2150 | 5449.50 | 0.0926 | 0.0711 | 0.7684 | 0.4305 | 0.3308 | 23.2% | 0.2811 | 0.2833 | -0.8% |
| AAM1118 | B2 | 0718500-14 | 150.2 | 11/18/2008 | 10008 | 2961 | 20.10 | 497.91 | 147.31 | 0.2403 | 5449.50 | 0.0914 | 0.0795 | 0.8700 | 0.3802 | 0.3308 | 13.0% | 0.2959 | 0.2833 | 4.2% |
| AAM1118 | B3 | 0718500-14 | 150.2 | 11/18/2008 | 10004 | 2827 | 19.64 | 509.37 | 143.94 | 0.2327 | 5449.50 | 0.0935 | 0.0770 | 0.8235 | 0.4017 | 0.3308 | 17.6% | 0.2826 | 0.2833 | -0.3% |
| AAM1118 | B4 | 0718500-14 | 150.2 | 11/18/2008 | 10006 | 3018 | 20.19 | 495.59 | 149.48 | 0.2313 | 5449.50 | 0.0909 | 0.0765 | 0.8413 | 0.3932 | 0.3308 | 16.9% | 0.3016 | 0.2833 | 6.1% |
| AAM1118 | C1 | 0718500-14 | 150.2 | 11/18/2008 | 10001 | 2890 | 19.44 | 514.45 | 148.66 | 0.2205 | 5449.50 | 0.0944 | 0.0729 | 0.7726 | 0.4281 | 0.3308 | 22.7% | 0.2890 | 0.2833 | 1.9% |
| AAM1118 | C2 | 0718500-14 | 150.2 | 11/18/2008 | 10001 | 2752 | 19.15 | 522.25 | 143.71 | 0.2465 | 5449.50 | 0.0958 | 0.0815 | 0.8509 | 0.3888 | 0.3308 | 14.9% | 0.2752 | 0.2833 | -3.0% |
| AAM1118 | C3 | 0718500-14 | 150.2 | 11/18/2008 | 10001 | 2829 | 19.66 | 508.70 | 143.90 | 0.2305 | 5449.50 | 0.0933 | 0.0762 | 0.8168 | 0.4050 | 0.3308 | 18.3% | 0.2829 | 0.2833 | -0.2% |
| AAM1118 | C4 | 0718500-14 | 150.2 | 11/18/2008 | 10005 | 2911 | 19.77 | 506.07 | 147.24 | 0.2382 | 5449.50 | 0.0929 | 0.0788 | 0.8485 | 0.3899 | 0.3308 | 15.2% | 0.2910 | 0.2833 | 2.6% |
| AAM1118 | D1 | 0718500-14 | 150.2 | 11/18/2008 | 10012 | 2822 | 19.60 | 510.82 | 143.98 | 0.2251 | 5449.50 | 0.0937 | 0.0745 | 0.7944 | 0.4164 | 0.3308 | 20.6% | 0.2819 | 0.2833 | -0.5% |
| AAM1118 | D2 | 0718500-14 | 150.2 | 11/18/2008 | 10006 | 2894 | 19.96 | 501.30 | 144.99 | 0.2442 | 5449.50 | 0.0920 | 0.0808 | 0.8781 | 0.3767 | 0.3308 | 12.2% | 0.2892 | 0.2833 | 2.0% |
| AAM1118 | D3 | 0718500-14 | 150.2 | 11/18/2008 | 10002 | 2908 | 19.33 | 517.43 | 150.44 | 0.2412 | 5449.50 | 0.0950 | 0.0798 | 0.8403 | 0.3937 | 0.3308 | 16.0% | 0.2907 | 0.2833 | 2.5% |
| AAM1118 | D4 | 0718500-14 | 150.2 | 11/18/2008 | 10000 | 2882 | 19.32 | 517.60 | 149.17 | 0.2431 | 5449.50 | 0.0950 | 0.0804 | 0.8467 | 0.3907 | 0.3308 | 15.3% | 0.2882 | 0.2833 | 1.7% |
| AAM1118 | A1 | 0718500-15 | 171.5 | 11/18/2008 | 10002 | 3120 | 23.04 | 434.11 | 135.42 | 0.2202 | 5449.50 | 0.0797 | 0.0610 | 0.7663 | 0.3618 | 0.2772 | 23.4% | 0.3119 | 0.2888 | 7.4% |
| AAM1118 | A2 | 0718500-15 | 171.5 | 11/18/2008 | 10002 | 3104 | 22.82 | 438.30 | 136.02 | 0.2458 | 5449.50 | 0.0804 | 0.0681 | 0.8472 | 0.3272 | 0.2772 | 15.3% | 0.3103 | 0.2888 | 6.9% |
| AAM1118 | A3 | 0718500-15 | 171.5 | 11/18/2008 | 10001 | 3080 | 22.67 | 441.16 | 135.86 | 0.2377 | 5449.50 | 0.0810 | 0.0659 | 0.8140 | 0.3406 | 0.2772 | 18.6% | 0.3080 | 0.2888 | 6.2% |
| AAM1118 | A4 | 0718500-15 | 171.5 | 11/18/2008 | 10000 | 3071 | 22.21 | 450.25 | 138.27 | 0.2441 | 5449.50 | 0.0826 | 0.0677 | 0.8190 | 0.3385 | 0.2772 | 18.1% | 0.3071 | 0.2888 | 5.9% |
| AAM1118 | B1 | 0718500-15 | 171.5 | 11/18/2008 | 10002 | 3027 | 22.88 | 437.15 | 132.30 | 0.2150 | 5449.50 | 0.0802 | 0.0596 | 0.7430 | 0.3731 | 0.2772 | 25.7% | 0.3026 | 0.2888 | 4.6% |
| AAM1118 | B2 | 0718500-15 | 171.5 | 11/18/2008 | 10001 | 3056 | 23.01 | 434.64 | 132.81 | 0.2403 | 5449.50 | 0.0798 | 0.0666 | 0.8352 | 0.3319 | 0.2772 | 16.5% | 0.3056 | 0.2888 | 5.5% |
| AAM1118 | B3 | 0718500-15 | 171.5 | 11/18/2008 | 9999 | 3031 | 23.38 | 427.67 | 129.64 | 0.2327 | 5449.50 | 0.0785 | 0.0645 | 0.8220 | 0.3373 | 0.2772 | 17.8% | 0.3031 | 0.2888 | 4.7% |
| AAM1118 | B4 | 0718500-15 | 171.5 | 11/18/2008 | 10003 | 3165 | 23.38 | 427.84 | 135.37 | 0.2313 | 5449.50 | 0.0785 | 0.0641 | 0.8167 | 0.3394 | 0.2772 | 18.3% | 0.3164 | 0.2888 | 8.7% |
| AAM1118 | C1 | 0718500-15 | 171.5 | 11/18/2008 | 9999 | 3142 | 22.87 | 437.21 | 137.39 | 0.2205 | 5449.50 | 0.0802 | 0.0611 | 0.7619 | 0.3639 | 0.2772 | 23.8% | 0.3142 | 0.2888 | 8.1% |
| AAM1118 | C2 | 0718500-15 | 171.5 | 11/18/2008 | 10001 | 3094 | 22.53 | 443.90 | 137.33 | 0.2465 | 5449.50 | 0.0815 | 0.0683 | 0.8389 | 0.3305 | 0.2772 | 16.1% | 0.3094 | 0.2888 | 6.6% |
| AAM1118 | C3 | 0718500-15 | 171.5 | 11/18/2008 | 10001 | 3063 | 22.97 | 435.39 | 133.35 | 0.2305 | 5449.50 | 0.0799 | 0.0639 | 0.7998 | 0.3466 | 0.2772 | 20.0% | 0.3063 | 0.2888 | 5.7% |
| AAM1118 | C4 | 0718500-15 | 171.5 | 11/18/2008 | 10007 | 3146 | 23.07 | 433.77 | 136.37 | 0.2382 | 5449.50 | 0.0796 | 0.0660 | 0.8296 | 0.3342 | 0.2772 | 17.0% | 0.3144 | 0.2888 | 8.1% |
| AAM1118 | D1 | 0718500-15 | 171.5 | 11/18/2008 | 10005 | 2952 | 22.90 | 436.90 | 128.91 | 0.2251 | 5449.50 | 0.0802 | 0.0624 | 0.7783 | 0.3562 | 0.2772 | 22.2% | 0.2951 | 0.2888 | 2.1% |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AAM1118 | D2 | 0718500-15 | 171.5 | 11/18/2008 | 10002 | 3100 | 22.78 | 439.07 | 136.08 | 0.2442 | 5449.50 | 0.0806 | 0.0677 | 0.8402 | 0.3299 | 0.2772 | 16.0% | 0.3099 | 0.2888 | 6.8% |
| AAM1118 | D3 | 0718500-15 | 171.5 | 11/18/2008 | 10001 | 3070 | 22.44 | 445.68 | 136.81 | 0.2412 | 5449.50 | 0.0818 | 0.0669 | 0.8176 | 0.3391 | 0.2772 | 18.2% | 0.3070 | 0.2888 | 5.9% |
| AAM1118 | D4 | 0718500-15 | 171.5 | 11/18/2008 | 10002 | 3046 | 22.33 | 447.92 | 136.41 | 0.2431 | 5449.50 | 0.0822 | 0.0674 | 0.8199 | 0.3381 | 0.2772 | 18.0% | 0.3045 | 0.2888 | 5.2% |
| AAM1118 | A1 | 0718500-16 | 183.8 | 11/18/2008 | 10000 | 3348 | 24.15 | 414.08 | 138.63 | 0.2202 | 5449.50 | 0.0760 | 0.0551 | 0.7254 | 0.3451 | 0.2503 | 27.5% | 0.3348 | 0.2920 | 12.8% |
| AAM1118 | A2 | 0718500-16 | 183.8 | 11/18/2008 | 10002 | 3152 | 24.37 | 410.42 | 129.34 | 0.2458 | 5449.50 | 0.0753 | 0.0615 | 0.8170 | 0.3064 | 0.2503 | 18.3% | 0.3151 | 0.2920 | 7.3% |
| AAM1118 | A3 | 0718500-16 | 183.8 | 11/18/2008 | 10002 | 3179 | 23.96 | 417.45 | 132.68 | 0.2377 | 5449.50 | 0.0766 | 0.0595 | 0.7768 | 0.3223 | 0.2503 | 22.3% | 0.3178 | 0.2920 | 8.1% |
| AAM1118 | A4 | 0718500-16 | 183.8 | 11/18/2008 | 10001 | 3165 | 22.93 | 436.15 | 138.03 | 0.2441 | 5449.50 | 0.0800 | 0.0611 | 0.7635 | 0.3279 | 0.2503 | 23.7% | 0.3165 | 0.2920 | 7.7% |
| AAM1118 | B1 | 0718500-16 | 183.8 | 11/18/2008 | 10006 | 3195 | 24.52 | 408.08 | 130.30 | 0.2150 | 5449.50 | 0.0749 | 0.0538 | 0.7187 | 0.3483 | 0.2503 | 28.1% | 0.3193 | 0.2920 | 8.5% |
| AAM1118 | B2 | 0718500-16 | 183.8 | 11/18/2008 | 10001 | 3169 | 24.30 | 411.56 | 130.41 | 0.2403 | 5449.50 | 0.0755 | 0.0602 | 0.7965 | 0.3143 | 0.2503 | 20.4% | 0.3169 | 0.2920 | 7.8% |
| AAM1118 | B3 | 0718500-16 | 183.8 | 11/18/2008 | 10003 | 3155 | 24.77 | 403.84 | 127.37 | 0.2327 | 5449.50 | 0.0741 | 0.0583 | 0.7861 | 0.3185 | 0.2503 | 21.4% | 0.3154 | 0.2920 | 7.4% |
| AAM1118 | B4 | 0718500-16 | 183.8 | 11/18/2008 | 10001 | 3192 | 24.56 | 407.21 | 129.97 | 0.2313 | 5449.50 | 0.0747 | 0.0579 | 0.7749 | 0.3231 | 0.2503 | 22.5% | 0.3192 | 0.2920 | 8.5% |
| AAM1118 | C1 | 0718500-16 | 183.8 | 11/18/2008 | 10002 | 3136 | 23.86 | 419.20 | 131.43 | 0.2205 | 5449.50 | 0.0769 | 0.0552 | 0.7176 | 0.3489 | 0.2503 | 28.2% | 0.3135 | 0.2920 | 6.9% |
| AAM1118 | C2 | 0718500-16 | 183.8 | 11/18/2008 | 10002 | 3099 | 23.89 | 418.67 | 129.72 | 0.2465 | 5449.50 | 0.0768 | 0.0617 | 0.8032 | 0.3117 | 0.2503 | 19.7% | 0.3098 | 0.2920 | 5.7% |
| AAM1118 | C3 | 0718500-16 | 183.8 | 11/18/2008 | 10001 | 3135 | 24.14 | 414.29 | 129.87 | 0.2305 | 5449.50 | 0.0760 | 0.0577 | 0.7590 | 0.3298 | 0.2503 | 24.1% | 0.3135 | 0.2920 | 6.8% |
| AAM1118 | C4 | 0718500-16 | 183.8 | 11/18/2008 | 10002 | 3087 | 23.53 | 425.07 | 131.19 | 0.2382 | 5449.50 | 0.0780 | 0.0596 | 0.7644 | 0.3275 | 0.2503 | 23.6% | 0.3086 | 0.2920 | 5.4% |
| AAM1118 | D1 | 0718500-16 | 183.8 | 11/18/2008 | 10003 | 3118 | 23.99 | 416.97 | 129.97 | 0.2251 | 5449.50 | 0.0765 | 0.0563 | 0.7364 | 0.3399 | 0.2503 | 26.4% | 0.3117 | 0.2920 | 6.3% |
| AAM1118 | D2 | 0718500-16 | 183.8 | 11/18/2008 | 10002 | 3115 | 24.03 | 416.23 | 129.63 | 0.2442 | 5449.50 | 0.0764 | 0.0611 | 0.8003 | 0.3128 | 0.2503 | 20.0% | 0.3114 | 0.2920 | 6.2% |
| AAM1118 | D3 | 0718500-16 | 183.8 | 11/18/2008 | 9999 | 3037 | 23.69 | 422.08 | 128.20 | 0.2412 | 5449.50 | 0.0775 | 0.0604 | 0.7796 | 0.3211 | 0.2503 | 22.0% | 0.3037 | 0.2920 | 3.8% |
| AAM1118 | D4 | 0718500-16 | 183.8 | 11/18/2008 | 10010 | 3097 | 23.47 | 426.50 | 131.96 | 0.2431 | 5449.50 | 0.0783 | 0.0609 | 0.7775 | 0.3219 | 0.2503 | 22.2% | 0.3094 | 0.2920 | 5.6% |



Alpha Atten - Am-241
Attenuation Coefficient (Observed and Fitted)
1.2000
1.0000
0.8000
0.6000
0.4000
0.2000
0.0000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Mass (mg)


Alpha > Beta Cross-Talk - Am-241
X-Talk (Beta cpm/Alpha cpm)
0.3500
0.3300
0.3100
0.2900
0.2700
0.2500
0.2300
0.2100
0.1900
0.1700
0.1500
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Mass (mg)


Alpha Atten - Am-241
0.3000
0.2500
0.2000
0.1500
0.1000
0.0500
0.0000
Fitted Attenuation
0.0000
0.0500
0.1000
0.1500
0.2000
0.2500
Observed Attenuation

11/18/08 Am241 Ringed Planchet Mass Attenuation Curve

Benchsheet: AB070611-4 Sources: 0718500-1 → 16

| Det | 8:29 | 8:56 | 9:23 | 9:52 | 10:18 | 10:45 | 11:13 | 11:42 | 12:10 | 12:36 | 13:06 | 13:33 | 14:08 | 14:35 | 15:03 | 15:30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 |
| A2 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 |
| A3 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 |
| A4 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 |
| B1 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 |
| B2 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 |
| B3 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
| B4 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |
| C1 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 |
| C2 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 |
| C3 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 |
| C4 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 |
| D1 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 |
| D2 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 |
| D3 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 |
| D4 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

File: AAM1118

JP 11/18/08

Continued on Page

Signed: [signature] Date: 11/18/08

Read and Understood By

Signed: [signature] Date: 11/19/08

Date 11/18/08 SOP 724r 10

# Paragon Analytics

Low Background Gas Flow Proportional Counter Log

**Instrument: LB4100C**

*Instrument Daily Response and Background Checks*

| Det. | Daily Response Check: Start 1 | Status | Start 2 | Status | Background Check: Start 1 | Status | Start 2 | Status | Det. Status |
|---|---|---|---|---|---|---|---|---|---|
| 1 | JP | P | | | JP | P | | | P |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

*Weekly Background Calibration*

| | Current Calib. File ID | Weekly Calib. Started | Status | File ID |
|---|---|---|---|---|
| Dr A | BKC1111W | | | |
| Dr B | | | | |
| Dr C | | | | |
| Dr D | | | | |

Dr = Drawer

*Gas Supply*

| | P-10 Supply | | P-10 Flow |
|---|---|---|---|
| Tank 1 | 1100 | Dr A | 0.15 |
| | | Dr B | |
| Tank 2 | 550 | Dr C | |
| | | Dr D | |

Comments:

Page No.: 370908 A Form 780r8.doc (6/23/06) Reviewed By / Date JP 11/18/08

Date 11/18/08 SOP 724r 10

**Paragon Analytics**
Low Background Gas Flow Proportional Counter Log
**Instrument: LB4100C**

| Det. | Sample ID | Batch | Test | Count Dur. (min) | Start Time | Analyst Initials | File ID | Output Initials |
|---|---|---|---|---|---|---|---|---|
| 1-16 | Daily Eff | — | — | 30 | 7:09 | JP | EFC1118 | JP |
| 1-16 | Daily Bkg | — | — | 60 | 7:18 | JP | BKC1118 | JP |
| 1-16 | 0718500-1-516 | Alpha Attn Curve | Attn | 60 | 8:29 | JP | AAM1118 | JP |

JP 11/18/08

Comments:

Page No.: 370908 B
(cont. from page NA B)

Form 780r8.doc (6/23/06)

Reviewed By / Date: JP 11/18/08

Date 11/19/08 SOP 724r 10

# Paragon Analytics
Low Background Gas Flow Proportional Counter Log
**Instrument: LB4100C**

*Instrument Daily Response and Background Checks*

| Det. | Daily Response Check Start 1 | Status | Start 2 | Status | Background Check Start 1 | Status | Start 2 | Status | Det. Status |
|---|---|---|---|---|---|---|---|---|---|
| 1 | JP | P | | | JP | P | | | P |
| 2 | ↓ | ↓ | | | ↓ | ↓ | | | ↓ |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | ↓ | | | |
| 8 | | | | | | Hα | JP | P | |
| 9 | | | | | | P | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | ↓ | | | |
| 13 | | | | | | Hα | JP | P | |
| 14 | | | | | | P | | | |
| 15 | | | | | | | | | |
| 16 | ↓ | ↓ | | | ↓ | ↓ | | | ↓ |

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

*Weekly Background Calibration*

| | Current Calib. File ID | Weekly Calib. Started | Status | File ID |
|---|---|---|---|---|
| Dr A | BKC1111W | JP | P | BKC1119W |
| Dr B | ↓ | ↓ | ↓ | ↓ |
| Dr C | | | | |
| Dr D | ↓ | ↓ | ↓ | ↓ |

Dr = Drawer

*Gas Supply*

| P-10 Supply | | P-10 Flow | |
|---|---|---|---|
| Tank 1 | 850 | Dr A | 0.15 |
| | ↓ | Dr B | ↓ |
| Tank 2 | 556 | Dr C | |
| | ↓ | Dr D | ↓ |

Comments:

Page No.: 370909 A Form 780r8.doc (6/23/06) Reviewed By / Date JP 11/19/08

# Paragon Analytics

## Radiochemistry Instrument Worksheet

Prep Batch: AB070611-4

**Prep Procedure:** GAB

Analytical QASS / NCR? Y N NA

| Prep Num | LabID | QC Type | Init Alq | Fin Alq | Units | Report 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 | 0718500-10 | LCS | 200 | 200 | ml | PCi/L | 103 | | | | | | | | | | |
| * 1 | 0718500-11 | LCS | 200 | 200 | ml | PCi/L | 147.6 | | | | | | | | | | |
| 1 | 0718500-12 | LCS | 200 | 200 | ml | PCi/L | 133 | | | | | | | | | | |
| * 1 | 0718500-13 | LCS | 200 | 200 | ml | PCi/L | 141.9 | | | | | | | | | | |
| 1 | 0718500-14 | LCS | 200 | 200 | ml | PCi/L | 150.2 | | | | | | | | | | |
| 1 | 0718500-15 | LCS | 200 | 200 | ml | PCi/L | 171.5 | | | | | | | | | | |
| 1 | 0718500-16 | LCS | 200 | 200 | ml | PCi/L | 183.8 | | | | | | | | | | |
| 1 | 0718500-1 | LCS | 200 | 200 | ml | PCi/L | 20.3 | | | | | | | | | | |
| 1 | 0718500-2 | LCS | 200 | 200 | ml | PCi/L | 20.3 | | | | | | | | | | |
| 1 | 0718500-3 | LCS | 200 | 200 | ml | PCi/L | 41.7 | | | | | | | | | | |
| 1 | 0718500-4 | LCS | 200 | 200 | ml | PCi/L | 41.9 | | | | | | | | | | |
| 1 | 0718500-5 | LCS | 200 | 200 | ml | PCi/L | 70.7 | | | | | | | | | | |
| 1 | 0718500-6 | LCS | 200 | 200 | ml | PCi/L | 59.7 | | | | | | | | | | |
| 1 | 0718500-7 | LCS | 200 | 200 | ml | PCi/L | 82.9 | | | | | | | | | | |
| 1 | 0718500-8 | LCS | 200 | 200 | ml | PCi/L | 76.4 | | | | | | | | | | |
| 1 | 0718500-9 | LCS | 200 | 200 | ml | PCi/L | 104 | | | | | | | | | | |

JP 12/8/08

**Spike Solution Information**

| Soln # | Nuclide | SolnID | Prep Conc | Units | Prep Date | Aliquot | Units | Pipet ID |
|---|---|---|---|---|---|---|---|---|
| S1 | AM-241 | 585.3020.27 | 54,620.815 | DPM/ml | 06/11/07 | 0.1 | ml | RS-008 |

* Attenuation points Thrown out of Mass Attenuation curve due to 1) residual mass > 100 mg (EPA Method) 2) observed vs. fitted attenuation > 15%

## Paragon Analytics

# Radiochemistry Instrument Worksheet

Prep Batch: AB070611-4

### Reporting Units

### Sample Barcodes

| | |
|---|---|
| 0718500-10LCS<br>AB070611-4PS1 | 0718500-11LCS<br>AB070611-4PS2 |
| 0718500-12LCS<br>AB070611-4PS3 | 0718500-13LCS<br>AB070611-4PS4 |
| 0718500-14LCS<br>AB070611-4PS5 | 0718500-15LCS<br>AB070611-4PS6 |
| 0718500-16LCS<br>AB070611-4PS7 | 0718500-1LCS<br>AB070611-4PS8 |
| 0718500-2LCS<br>AB070611-4PS9 | 0718500-3LCS<br>AB070611-4PS10 |
| 0718500-4LCS<br>AB070611-4PS11 | 0718500-5LCS<br>AB070611-4PS12 |
| 0718500-6LCS<br>AB070611-4PS13 | 0718500-7LCS<br>AB070611-4PS14 |
| 0718500-8LCS<br>AB070611-4PS15 | 0718500-9LCS<br>AB070611-4PS16 |

**Paragon Analytics**

# Radiochemistry Prep Worksheet

**Prep Batch: AB070611-4**

**Prep Procedure:** GAB

**Reviewed By:** emf **Review Date:** 6/16/07

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

**Prep SOP:** PAI 702 **Rev:** 18
**Prep SOP:** NONE
**Matrix Class:** liquid

**Prep Analyst:** Erin Finsley SMF
**Prep Date:** 6/11/07
**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 | 0718500-10 | LCS | | 200 | 200 | Unfiltered | S1 | 2.5 ML OF SALT |
| 2 | 1 | 0718500-11 | LCS | | 200 | 200 | Unfiltered | S1 | 3.0 |
| 3 | 1 | 0718500-12 | LCS | | 200 | 200 | Unfiltered | S1 | 3.0 |
| 4 | 1 | 0718500-13 | LCS | | 200 | 200 | Unfiltered | S1 | 3.5 |
| 5 | 1 | 0718500-14 | LCS | | 200 | 200 | Unfiltered | S1 | 3.5 |
| 6 | 1 | 0718500-15 | LCS | | 200 | 200 | Unfiltered | S1 | 4.0 |
| 7 | 1 | 0718500-16 | LCS | | 200 | 200 | Unfiltered | S1 | 4.0 |
| 8 | 1 | 0718500-1 | LCS | | 200 | 200 | Unfiltered | S1 | 0.5 |
| 9 | 1 | 0718500-2 | LCS | | 200 | 200 | Unfiltered | S1 | 0.5 |
| 10 | 1 | 0718500-3 | LCS | | 200 | 200 | Unfiltered | S1 | 1.0 |
| 11 | 1 | 0718500-4 | LCS | | 200 | 200 | Unfiltered | S1 | 1.0 |
| 12 | 1 | 0718500-5 | LCS | | 200 | 200 | Unfiltered | S1 | 1.5 |
| 13 | 1 | 0718500-6 | LCS | | 200 | 200 | Unfiltered | S1 | 1.5 |
| 14 | 1 | 0718500-7 | LCS | | 200 | 200 | Unfiltered | S1 | 2.0 |
| 15 | 1 | 0718500-8 | LCS | | 200 | 200 | Unfiltered | S1 | 2.0 |
| 16 | 1 | 0718500-9 | LCS | | 200 | 200 | Unfiltered | S1 | 2.5 |

**Spiked By:** Erin Finsley **Date:** 6/11/07

**Witnessed By:** Melissa Cromer **Date:** 6/11/07

**Spike Solution Information**

| Soln # | Nuclide | SolnID | Prep Conc | Units | Prep Date | Aliquot | Units | Pipet ID |
|---|---|---|---|---|---|---|---|---|
| S1 | AM-241 | 585.3020.27 | 54,620.815 | DPM/ml | 06/11/07 | 0.1 | ml | RS-008 |

Comments

ALL SAMPLES DESICCATED AT 10:30 ON 6/15/2007.

# Radiochemistry Prep Worksheet

**Paragon Analytics**

**Prep Batch: AB070611-4**

| | |
|---|---|
| **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: 18
Prep SOP: NONE
Matrix Class: liquid

Prep Analyst: Erin Finsley EMF
Prep Date: 6/11/2007
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 (ml of salt) | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0718500-10 | LCS | | 200 | 200 | Unfiltered | S1 | ~~0.5~~ | 2.5 |
| 2 | 1 | 0718500-11 | LCS | | 200 | 200 | Unfiltered | S1 | ~~0.5~~ | 3.0 |
| 3 | 1 | 0718500-12 | LCS | | 200 | 200 | Unfiltered | S1 | ~~1.0~~ | 3.0 |
| 4 | 1 | 0718500-13 | LCS | | 200 | 200 | Unfiltered | S1 | ~~1.0~~ | 3.5 |
| 5 | 1 | 0718500-14 | LCS | | 200 | 200 | Unfiltered | S1 | ~~1.5~~ | 3.5 |
| 6 | 1 | 0718500-15 | LCS | | 200 | 200 | Unfiltered | S1 | ~~1.5~~ | 4.0 |
| 7 | 1 | 0718500-16 | LCS | | 200 | 200 | Unfiltered | S1 | ~~2.0~~ | 4.0 |
| 8 | 1 | 0718500-1 | LCS | | 200 | 200 | Unfiltered | S1 | ~~2.0~~ | 0.5 |
| 9 | 1 | 0718500-2 | LCS | | 200 | 200 | Unfiltered | S1 | ~~2.5~~ | 0.5 |
| 10 | 1 | 0718500-3 | LCS | | 200 | 200 | Unfiltered | S1 | ~~2.5~~ | 1.0 |
| 11 | 1 | 0718500-4 | LCS | | 200 | 200 | Unfiltered | S1 | ~~3.0~~ | 1.0 |
| 12 | 1 | 0718500-5 | LCS | | 200 | 200 | Unfiltered | S1 | ~~3.0~~ | 1.5 |
| 13 | 1 | 0718500-6 | LCS | | 200 | 200 | Unfiltered | S1 | ~~3.5~~ | 1.5 |
| 14 | 1 | 0718500-7 | LCS | | 200 | 200 | Unfiltered | S1 | ~~3.5~~ | 2.0 |
| 15 | 1 | 0718500-8 | LCS | | 200 | 200 | Unfiltered | S1 | ~~4.0~~ | 2.0 |
| 16 | 1 | 0718500-9 | LCS | | 200 | 200 | Unfiltered | S1 | ~~4.0~~ | 2.5 |

EMF 6/11/07

Spiked By: EMF Date: 6/11/07
Witnessed By: MOC Date: 6/11/07

**Spike Solution Information**

| Soln # | Nuclide | SolnID | Prep Conc | Units | Prep Date | Aliquot | Units | Pipet ID |
|---|---|---|---|---|---|---|---|---|
| S1 | AM-241 | 585.3020.27 | 54,620.815 | DPM/ml | 06/11/07 | 0.1 | ml | RS-008 |

exp 3/19/07

Comments
147 ALL SAMPLES DESICCATED AT 4:15 pm 6/11/07 EMF 6/12/07 10:30 am 6/12/07

**Paragon Analytics**

# Radiochemistry Gravimetric Worksheet

**Prep Batch: AB070611-4**

Prep Procedure: **GAB**

Reviewed By: jcp    Review Date: 10/20/2008

| 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 | 10 | 0718500-10 | LCS | 10 | 9.5062 | 0.0000 | 0 | 200 | 200 | 200 | 9.6092 | 103 | 0 | FM |
| 1 | 11 | 0718500-11 | LCS | 10 | 9.5258 | 0.0000 | 0 | 200 | 200 | 200 | 9.6733 | 147.5 | 0 | FM |
| 1 | 12 | 0718500-12 | LCS | 10 | 9.4912 | 0.0000 | 0 | 200 | 200 | 200 | 9.6242 | 133 | 0 | FM |
| 1 | 13 | 0718500-13 | LCS | 10 | 9.5032 | 0.0000 | 0 | 200 | 200 | 200 | 9.6451 | 141.9 | 0 | FM |
| 1 | 14 | 0718500-14 | LCS | 10 | 9.5121 | 0.0000 | 0 | 200 | 200 | 200 | 9.6623 | 150.2 | 0 | FM |
| 1 | 15 | 0718500-15 | LCS | 10 | 9.5038 | 0.0000 | 0 | 200 | 200 | 200 | 9.6753 | 171.5 | 0 | FM |
| 1 | 16 | 0718500-16 | LCS | 10 | 9.4899 | 0.0000 | 0 | 200 | 200 | 200 | 9.6737 | 183.8 | 0 | FM |
| 1 | 1 | 0718500-1 | LCS | 10 | 9.5398 | 0.0000 | 0 | 200 | 200 | 200 | 9.5601 | 20.3 | 0 | |
| 1 | 2 | 0718500-2 | LCS | 10 | 9.4674 | 0.0000 | 0 | 200 | 200 | 200 | 9.4877 | 20.3 | 0 | |
| 1 | 3 | 0718500-3 | LCS | 10 | 9.5284 | 0.0000 | 0 | 200 | 200 | 200 | 9.5701 | 41.7 | 0 | |
| 1 | 4 | 0718500-4 | LCS | 10 | 9.5228 | 0.0000 | 0 | 200 | 200 | 200 | 9.5647 | 41.9 | 0 | |
| 1 | 5 | 0718500-5 | LCS | 10 | 9.4974 | 0.0000 | 0 | 200 | 200 | 200 | 9.5681 | 70.7 | 0 | |
| 1 | 6 | 0718500-6 | LCS | 10 | 9.5289 | 0.0000 | 0 | 200 | 200 | 200 | 9.5886 | 59.7 | 0 | |
| 1 | 7 | 0718500-7 | LCS | 10 | 9.4902 | 0.0000 | 0 | 200 | 200 | 200 | 9.5731 | 82.9 | 0 | |
| 1 | 8 | 0718500-8 | LCS | 10 | 9.5275 | 0.0000 | 0 | 200 | 200 | 200 | 9.6039 | 76.4 | 0 | |
| 1 | 9 | 0718500-9 | LCS | 10 | 9.5341 | 0.0000 | 0 | 200 | 200 | 200 | 9.6381 | 104 | 0 | FM |

## LB4100C Beta Attenuation Curve – Sr-90

| WO # 0718500 | | |
|---|---|---|
| Mass Range | | |
| Low | 17.3 | mg |
| High | 168.3 | mg |

| Spike Information | | |
|---|---|---|
| Std. ID | 777.3020.11 | |
| Ref. Date | 5/25/2007 | |
| Halflife | 28.8 | yrs |
| Activity | 4707.46 | dpm/mL |
| Vol. | 0.4 | mL |
| Act. Added | 1882.98 | dpm |

| Attenuation Equation | y=b*m^(a*x) |
|---|---|
| b = | 1.1058 |
| m = | 0.9995 |
| a = | 0.9921 |
| % Diff Max. = | 4.8% |

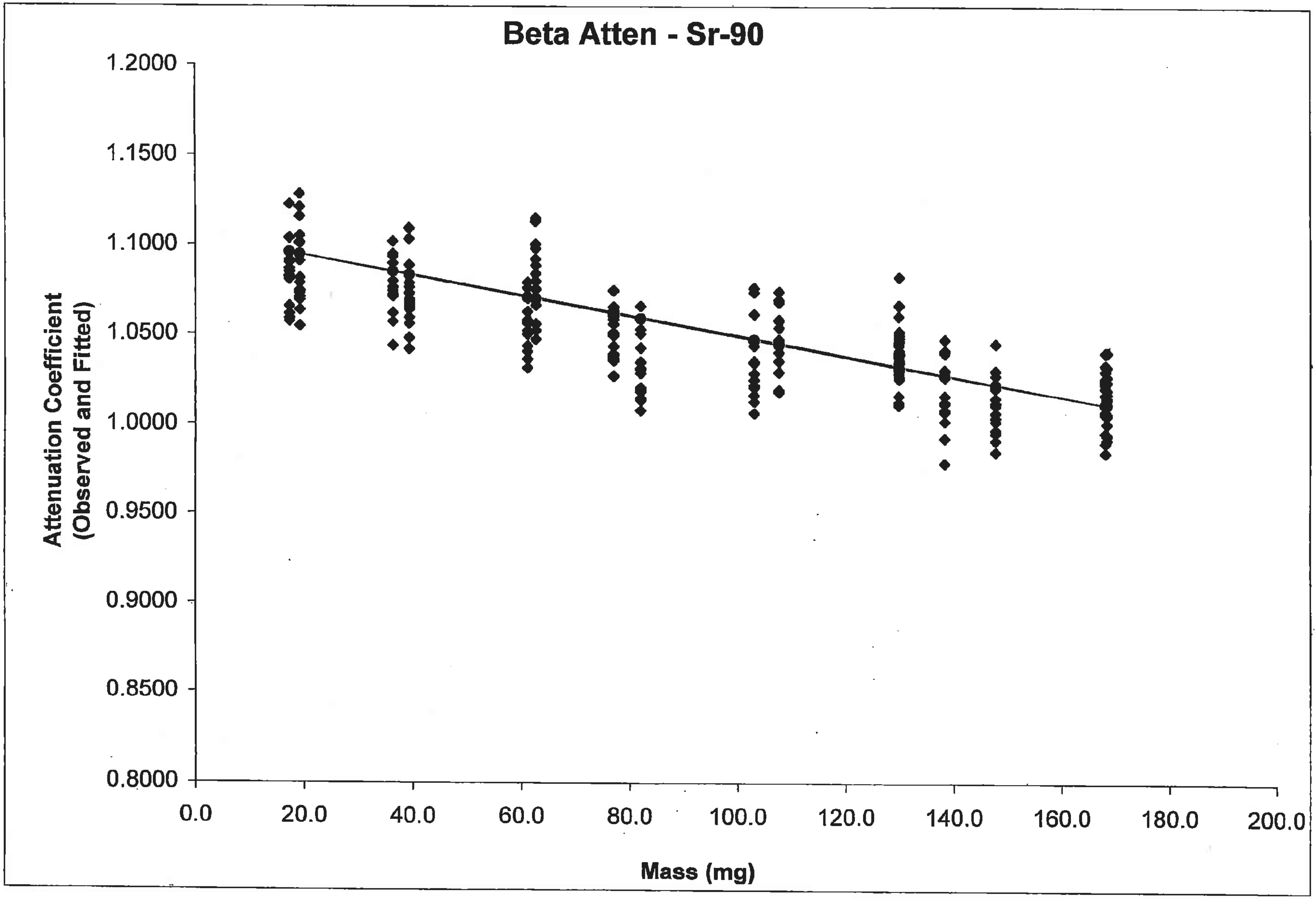
| Cross-Talk Equation | y=b*x+m |
|---|---|
| b = | -2.00E-06 |
| m = | 0.0021 |
| % Diff Max. = | 95.2% |

| File ID | Detector ID | Sample ID | Mass (mg) | Count Date | Alpha Counts | Beta Counts | Count Time | Alpha CPM | Beta CPM | Base Beta Eff. | Decay Corr. Act. added dpm/mL | Beta Att. Actual | Beta Att. Fitted | Actual/Fit Ratio | Obs Atten Fact. | Fitted Atten Fact. | % Diff. | β > α X Tlk Actual | β > α X Tlk Fitted | % Diff. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASR1117 | A1 | 0717509-10 | 17.3 | 11/17/2008 | 16 | 10005 | 6.45 | 2.48 | 1551.16 | 0.3944 | 3633.84 | 0.4269 | 0.4321 | 1.0823 | 1.0823 | 1.0957 | -1.2% | 0.0016 | 0.0021 | -22.6% |
| ASR1117 | A2 | 0717509-10 | 17.3 | 11/17/2008 | 8 | 10019 | 6.51 | 1.23 | 1539.02 | 0.3975 | 3633.84 | 0.4235 | 0.4355 | 1.0655 | 1.0655 | 1.0957 | -2.8% | 0.0008 | 0.0021 | -61.3% |
| ASR1117 | A3 | 0717509-10 | 17.3 | 11/17/2008 | 6 | 10013 | 6.44 | 0.93 | 1554.81 | 0.4031 | 3633.84 | 0.4279 | 0.4417 | 1.0615 | 1.0615 | 1.0957 | -3.1% | 0.0006 | 0.0021 | -71.0% |
| ASR1117 | A4 | 0717509-10 | 17.3 | 11/17/2008 | 6 | 10014 | 6.38 | 0.94 | 1569.59 | 0.3958 | 3633.84 | 0.4319 | 0.4337 | 1.0913 | 1.0913 | 1.0957 | -0.4% | 0.0006 | 0.0021 | -71.0% |
| ASR1117 | B1 | 0717509-10 | 17.3 | 11/17/2008 | 10 | 10031 | 6.45 | 1.55 | 1555.19 | 0.3877 | 3633.84 | 0.4280 | 0.4248 | 1.1039 | 1.1039 | 1.0957 | 0.7% | 0.0010 | 0.0021 | -51.7% |
| ASR1117 | B2 | 0717509-10 | 17.3 | 11/17/2008 | 10 | 10008 | 6.55 | 1.53 | 1527.94 | 0.3877 | 3633.84 | 0.4205 | 0.4248 | 1.0845 | 1.0845 | 1.0957 | -1.0% | 0.0010 | 0.0021 | -51.6% |
| ASR1117 | B3 | 0717509-10 | 17.3 | 11/17/2008 | 5 | 10013 | 6.48 | 0.77 | 1545.22 | 0.3931 | 3633.84 | 0.4252 | 0.4307 | 1.0817 | 1.0817 | 1.0957 | -1.3% | 0.0005 | 0.0021 | -75.8% |
| ASR1117 | B4 | 0717509-10 | 17.3 | 11/17/2008 | 9 | 10014 | 6.54 | 1.38 | 1531.19 | 0.3818 | 3633.84 | 0.4214 | 0.4183 | 1.1036 | 1.1036 | 1.0957 | 0.7% | 0.0009 | 0.0021 | -56.5% |
| ASR1117 | C1 | 0717509-10 | 17.3 | 11/17/2008 | 8 | 10021 | 6.51 | 1.23 | 1539.32 | 0.3921 | 3633.84 | 0.4236 | 0.4298 | 1.0804 | 1.0804 | 1.0957 | -1.4% | 0.0008 | 0.0021 | -61.3% |
| ASR1117 | C2 | 0717509-10 | 17.3 | 11/17/2008 | 5 | 10019 | 6.47 | 0.77 | 1548.53 | 0.3922 | 3633.84 | 0.4261 | 0.4297 | 1.0865 | 1.0865 | 1.0957 | -0.8% | 0.0005 | 0.0021 | -75.8% |
| ASR1117 | C3 | 0717509-10 | 17.3 | 11/17/2008 | 4 | 10018 | 6.49 | 0.62 | 1543.61 | 0.4018 | 3633.84 | 0.4248 | 0.4403 | 1.0572 | 1.0572 | 1.0957 | -3.5% | 0.0004 | 0.0021 | -80.7% |
| ASR1117 | C4 | 0717509-10 | 17.3 | 11/17/2008 | 3 | 10017 | 6.39 | 0.47 | 1567.61 | 0.3958 | 3633.84 | 0.4314 | 0.4337 | 1.0899 | 1.0899 | 1.0957 | -0.5% | 0.0003 | 0.0021 | -85.5% |
| ASR1117 | D1 | 0717509-10 | 17.3 | 11/17/2008 | 17 | 10014 | 6.52 | 2.61 | 1535.89 | 0.3896 | 3633.84 | 0.4227 | 0.4269 | 1.0849 | 1.0849 | 1.0957 | -1.0% | 0.0017 | 0.0021 | -17.8% |
| ASR1117 | D2 | 0717509-10 | 17.3 | 11/17/2008 | 13 | 10018 | 6.53 | 1.99 | 1534.15 | 0.3962 | 3633.84 | 0.4222 | 0.4341 | 1.0656 | 1.0656 | 1.0957 | -2.7% | 0.0013 | 0.0021 | -37.2% |
| ASR1117 | D3 | 0717509-10 | 17.3 | 11/17/2008 | 4 | 10013 | 6.45 | 0.62 | 1552.40 | 0.4034 | 3633.84 | 0.4272 | 0.4420 | 1.0590 | 1.0590 | 1.0957 | -3.3% | 0.0004 | 0.0021 | -80.7% |
| ASR1117 | D4 | 0717509-10 | 17.3 | 11/17/2008 | 9 | 10023 | 6.34 | 1.42 | 1580.91 | 0.3876 | 3633.84 | 0.4351 | 0.4247 | 1.1224 | 1.1224 | 1.0957 | 2.4% | 0.0009 | 0.0021 | -56.5% |
| ASR1117 | A1 | 0717509-11 | 19.2 | 11/17/2008 | 9 | 10010 | 6.48 | 1.39 | 1549.54 | 0.3944 | 3633.84 | 0.4264 | 0.4317 | 1.0812 | 1.0812 | 1.0946 | -1.2% | 0.0009 | 0.0021 | -56.4% |
| ASR1117 | A2 | 0717509-11 | 19.2 | 11/17/2008 | 9 | 10016 | 6.52 | 1.38 | 1536.20 | 0.3975 | 3633.84 | 0.4227 | 0.4351 | 1.0635 | 1.0635 | 1.0946 | -2.8% | 0.0009 | 0.0021 | -56.4% |
| ASR1117 | A3 | 0717509-11 | 19.2 | 11/17/2008 | 7 | 10028 | 6.38 | 1.10 | 1571.47 | 0.4031 | 3633.84 | 0.4325 | 0.4412 | 1.0728 | 1.0728 | 1.0946 | -2.0% | 0.0007 | 0.0021 | -66.1% |
| ASR1117 | A4 | 0717509-11 | 19.2 | 11/17/2008 | 8 | 10012 | 6.24 | 1.28 | 1604.49 | 0.3958 | 3633.84 | 0.4415 | 0.4332 | 1.1156 | 1.1156 | 1.0946 | 1.9% | 0.0008 | 0.0021 | -61.2% |
| ASR1117 | B1 | 0717509-11 | 19.2 | 11/17/2008 | 7 | 10017 | 6.46 | 1.08 | 1550.82 | 0.3877 | 3633.84 | 0.4267 | 0.4244 | 1.1006 | 1.1006 | 1.0946 | 0.6% | 0.0007 | 0.0021 | -66.1% |
| ASR1117 | B2 | 0717509-11 | 19.2 | 11/17/2008 | 9 | 10017 | 6.64 | 1.36 | 1508.58 | 0.3877 | 3633.84 | 0.4151 | 0.4244 | 1.0708 | 1.0708 | 1.0946 | -2.2% | 0.0009 | 0.0021 | -56.4% |
| ASR1117 | B3 | 0717509-11 | 19.2 | 11/17/2008 | 7 | 10008 | 6.34 | 1.10 | 1578.55 | 0.3931 | 3633.84 | 0.4344 | 0.4303 | 1.1051 | 1.1051 | 1.0946 | 1.0% | 0.0007 | 0.0021 | -66.1% |
| ASR1117 | B4 | 0717509-11 | 19.2 | 11/17/2008 | 19 | 10002 | 6.39 | 2.97 | 1565.26 | 0.3818 | 3633.84 | 0.4307 | 0.4179 | 1.1282 | 1.1282 | 1.0946 | 3.1% | 0.0019 | 0.0021 | -7.9% |
| ASR1117 | C1 | 0717509-11 | 19.2 | 11/17/2008 | 8 | 10003 | 6.51 | 1.23 | 1536.56 | 0.3921 | 3633.84 | 0.4228 | 0.4292 | 1.0784 | 1.0784 | 1.0946 | -1.5% | 0.0008 | 0.0021 | -61.2% |
| ASR1117 | C2 | 0717509-11 | 19.2 | 11/17/2008 | 10 | 10011 | 6.57 | 1.52 | 1523.74 | 0.3922 | 3633.84 | 0.4193 | 0.4293 | 1.0691 | 1.0691 | 1.0946 | -2.3% | 0.0010 | 0.0021 | -51.5% |
| ASR1117 | C3 | 0717509-11 | 19.2 | 11/17/2008 | 9 | 10024 | 6.51 | 1.38 | 1539.78 | 0.4018 | 3633.84 | 0.4237 | 0.4398 | 1.0546 | 1.0546 | 1.0946 | -3.7% | 0.0009 | 0.0021 | -56.4% |
| ASR1117 | C4 | 0717509-11 | 19.2 | 11/17/2008 | 4 | 10011 | 6.48 | 0.62 | 1544.91 | 0.3958 | 3633.84 | 0.4251 | 0.4332 | 1.0741 | 1.0741 | 1.0946 | -1.9% | 0.0004 | 0.0021 | -80.6% |
| ASR1117 | D1 | 0717509-11 | 19.2 | 11/17/2008 | 8 | 10010 | 6.42 | 1.25 | 1559.19 | 0.3896 | 3633.84 | 0.4291 | 0.4265 | 1.1013 | 1.1013 | 1.0946 | 0.6% | 0.0008 | 0.0021 | -61.2% |
| ASR1117 | D2 | 0717509-11 | 19.2 | 11/17/2008 | 7 | 10004 | 6.47 | 1.08 | 1546.21 | 0.3962 | 3633.84 | 0.4255 | 0.4337 | 1.0740 | 1.0740 | 1.0946 | -1.9% | 0.0007 | 0.0021 | -66.1% |
| ASR1117 | D3 | 0717509-11 | 19.2 | 11/17/2008 | 1 | 10026 | 6.27 | 0.16 | 1599.04 | 0.4034 | 3633.84 | 0.4400 | 0.4416 | 1.0908 | 1.0908 | 1.0946 | -0.3% | 0.0001 | 0.0021 | -95.2% |
| ASR1117 | D4 | 0717509-11 | 19.2 | 11/17/2008 | 14 | 10009 | 6.34 | 2.21 | 1578.71 | 0.3876 | 3633.84 | 0.4344 | 0.4243 | 1.1209 | 1.1209 | 1.0946 | 2.4% | 0.0014 | 0.0021 | -32.2% |
| ASR1117 | A1 | 0717509-12 | 36.3 | 11/17/2008 | 13 | 10053 | 6.53 | 1.99 | 1539.51 | 0.3944 | 3633.84 | 0.4237 | 0.4278 | 1.0742 | 1.0742 | 1.0847 | -1.0% | 0.0013 | 0.0020 | -36.2% |
| ASR1117 | A2 | 0717509-12 | 36.3 | 11/17/2008 | 11 | 10009 | 6.33 | 1.74 | 1581.20 | 0.3975 | 3633.84 | 0.4351 | 0.4312 | 1.0947 | 1.0947 | 1.0847 | 0.9% | 0.0011 | 0.0020 | -45.8% |
| ASR1117 | A3 | 0717509-12 | 36.3 | 11/17/2008 | 6 | 10021 | 6.38 | 0.94 | 1570.69 | 0.4031 | 3633.84 | 0.4322 | 0.4373 | 1.0723 | 1.0723 | 1.0847 | -1.1% | 0.0006 | 0.0020 | -70.5% |
| ASR1117 | A4 | 0717509-12 | 36.3 | 11/17/2008 | 7 | 10033 | 6.38 | 1.10 | 1572.57 | 0.3958 | 3633.84 | 0.4328 | 0.4293 | 1.0934 | 1.0934 | 1.0847 | 0.8% | 0.0007 | 0.0020 | -65.6% |
| ASR1117 | B1 | 0717509-12 | 36.3 | 11/17/2008 | 9 | 10018 | 6.64 | 1.36 | 1508.73 | 0.3877 | 3633.84 | 0.4152 | 0.4206 | 1.0709 | 1.0709 | 1.0847 | -1.3% | 0.0009 | 0.0020 | -55.7% |
| ASR1117 | B2 | 0717509-12 | 36.3 | 11/17/2008 | 13 | 10020 | 6.61 | 1.97 | 1515.89 | 0.3877 | 3633.84 | 0.4172 | 0.4206 | 1.0760 | 1.0760 | 1.0847 | -0.8% | 0.0013 | 0.0020 | -36.0% |
| ASR1117 | B3 | 0717509-12 | 36.3 | 11/17/2008 | 4 | 10019 | 6.72 | 0.60 | 1490.92 | 0.3931 | 3633.84 | 0.4103 | 0.4264 | 1.0437 | 1.0437 | 1.0847 | -3.8% | 0.0004 | 0.0020 | -80.3% |
| ASR1117 | B4 | 0717509-12 | 36.3 | 11/17/2008 | 12 | 10028 | 6.56 | 1.83 | 1528.66 | 0.3818 | 3633.84 | 0.4207 | 0.4142 | 1.1018 | 1.1018 | 1.0847 | 1.6% | 0.0012 | 0.0020 | -41.0% |
| ASR1117 | C1 | 0717509-12 | 36.3 | 11/17/2008 | 7 | 10014 | 6.53 | 1.07 | 1533.54 | 0.3921 | 3633.84 | 0.4220 | 0.4253 | 1.0763 | 1.0763 | 1.0847 | -0.8% | 0.0007 | 0.0020 | -65.5% |
| ASR1117 | C2 | 0717509-12 | 36.3 | 11/17/2008 | 6 | 10017 | 6.51 | 0.92 | 1538.71 | 0.3922 | 3633.84 | 0.4234 | 0.4254 | 1.0797 | 1.0797 | 1.0847 | -0.5% | 0.0006 | 0.0020 | -70.5% |
| ASR1117 | C3 | 0717509-12 | 36.3 | 11/17/2008 | 5 | 10016 | 6.46 | 0.77 | 1550.46 | 0.4018 | 3633.84 | 0.4267 | 0.4358 | 1.0619 | 1.0619 | 1.0847 | -2.1% | 0.0005 | 0.0020 | -75.4% |
| ASR1117 | C4 | 0717509-12 | 36.3 | 11/17/2008 | 6 | 10014 | 6.39 | 0.94 | 1567.14 | 0.3958 | 3633.84 | 0.4313 | 0.4293 | 1.0896 | 1.0896 | 1.0847 | 0.4% | 0.0006 | 0.0020 | -70.4% |
| ASR1117 | D1 | 0717509-12 | 36.3 | 11/17/2008 | 15 | 10017 | 6.52 | 2.30 | 1536.35 | 0.3896 | 3633.84 | 0.4228 | 0.4226 | 1.0852 | 1.0852 | 1.0847 | 0.0% | 0.0015 | 0.0020 | -26.1% |
| ASR1117 | D2 | 0717509-12 | 36.3 | 11/17/2008 | 5 | 10014 | 6.58 | 0.76 | 1521.88 | 0.3962 | 3633.84 | 0.4188 | 0.4298 | 1.0571 | 1.0571 | 1.0847 | -2.6% | 0.0005 | 0.0020 | -75.4% |
| ASR1117 | D3 | 0717509-12 | 36.3 | 11/17/2008 | 4 | 10010 | 6.37 | 0.63 | 1571.43 | 0.4034 | 3633.84 | 0.4324 | 0.4378 | 1.0720 | 1.0720 | 1.0847 | -1.2% | 0.0004 | 0.0020 | -80.3% |
| ASR1117 | D4 | 0717509-12 | 36.3 | 11/17/2008 | 11 | 10009 | 6.45 | 1.71 | 1551.78 | 0.3876 | 3633.84 | 0.4270 | 0.4204 | 1.1017 | 1.1017 | 1.0847 | 1.6% | 0.0011 | 0.0020 | -45.8% |
| ASR1117 | A1 | 0717509-13 | 39.3 | 11/17/2008 | 10 | 10017 | 6.57 | 1.52 | 1524.66 | 0.3944 | 3633.84 | 0.4196 | 0.4271 | 1.0638 | 1.0638 | 1.0830 | -1.8% | 0.0010 | 0.0020 | -50.6% |
| ASR1117 | A2 | 0717509-13 | 39.3 | 11/17/2008 | 10 | 10020 | 6.51 | 1.54 | 1539.17 | 0.3975 | 3633.84 | 0.4236 | 0.4305 | 1.0656 | 1.0656 | 1.0830 | -1.6% | 0.0010 | 0.0020 | -50.6% |
| ASR1117 | A3 | 0717509-13 | 39.3 | 11/17/2008 | 7 | 10020 | 6.41 | 1.09 | 1563.18 | 0.4031 | 3633.84 | 0.4302 | 0.4366 | 1.0672 | 1.0672 | 1.0830 | -1.5% | 0.0007 | 0.0020 | -65.4% |
| ASR1117 | A4 | 0717509-13 | 39.3 | 11/17/2008 | 9 | 10018 | 6.28 | 1.43 | 1595.22 | 0.3958 | 3633.84 | 0.4390 | 0.4287 | 1.1091 | 1.1091 | 1.0830 | 2.4% | 0.0009 | 0.0020 | -55.6% |
| ASR1117 | B1 | 0717509-13 | 39.3 | 11/17/2008 | 6 | 10012 | 6.65 | 0.90 | 1505.56 | 0.3877 | 3633.84 | 0.4143 | 0.4199 | 1.0687 | 1.0687 | 1.0830 | -1.3% | 0.0006 | 0.0020 | -70.4% |
| ASR1117 | B2 | 0717509-13 | 39.3 | 11/17/2008 | 9 | 10021 | 6.61 | 1.36 | 1516.04 | 0.3877 | 3633.84 | 0.4172 | 0.4199 | 1.0761 | 1.0761 | 1.0830 | -0.6% | 0.0009 | 0.0020 | -55.6% |
| ASR1117 | B3 | 0717509-13 | 39.3 | 11/17/2008 | 7 | 10022 | 6.56 | 1.07 | 1527.74 | 0.3931 | 3633.84 | 0.4204 | 0.4257 | 1.0695 | 1.0695 | 1.0830 | -1.2% | 0.0007 | 0.0020 | -65.4% |

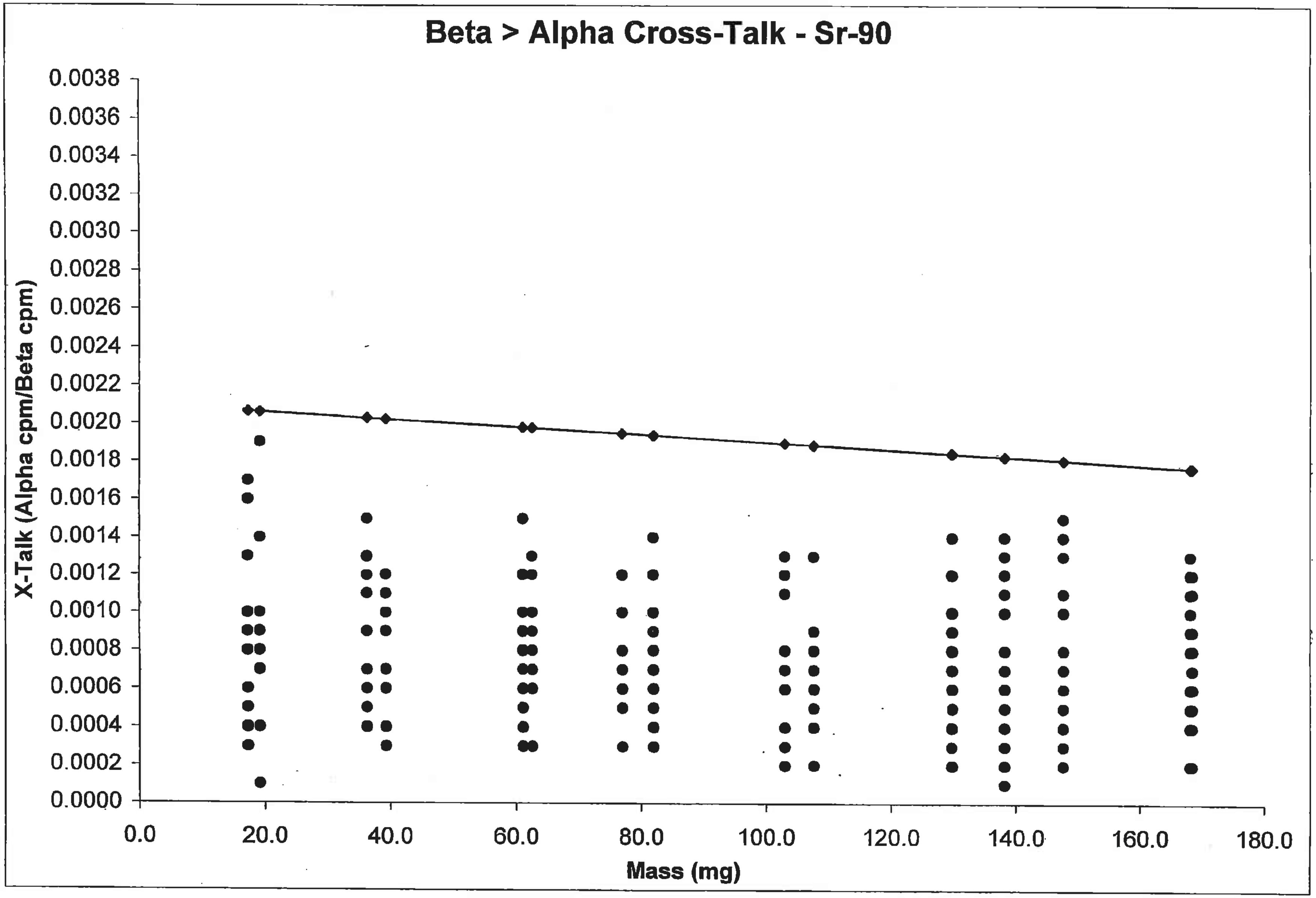
| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASR1117 | B4 | 0717509-13 | 39.3 | 11/17/2008 | 12 | 10004 | 6.72 | 1.79 | 1488.69 | 0.3818 | 3633.84 | 0.4097 | 0.4135 | 1.0730 | 1.0730 | 1.0830 | -0.9% | 0.0012 | 0.0020 | -40.7% |
| ASR1117 | C1 | 0717509-13 | 39.3 | 11/17/2008 | 4 | 10012 | 6.55 | 0.61 | 1528.55 | 0.3921 | 3633.84 | 0.4206 | 0.4247 | 1.0728 | 1.0728 | 1.0830 | -0.9% | 0.0004 | 0.0020 | -80.2% |
| ASR1117 | C2 | 0717509-13 | 39.3 | 11/17/2008 | 6 | 10007 | 6.7 | 0.90 | 1493.56 | 0.3922 | 3633.84 | 0.4110 | 0.4246 | 1.0480 | 1.0480 | 1.0830 | -3.2% | 0.0006 | 0.0020 | -70.3% |
| ASR1117 | C3 | 0717509-13 | 39.3 | 11/17/2008 | 7 | 10010 | 6.58 | 1.06 | 1521.28 | 0.4018 | 3633.84 | 0.4186 | 0.4352 | 1.0419 | 1.0419 | 1.0830 | -3.8% | 0.0007 | 0.0020 | -65.4% |
| ASR1117 | C4 | 0717509-13 | 39.3 | 11/17/2008 | 3 | 10004 | 6.39 | 0.47 | 1565.57 | 0.3958 | 3633.84 | 0.4308 | 0.4287 | 1.0885 | 1.0885 | 1.0830 | 0.5% | 0.0003 | 0.0020 | -85.2% |
| ASR1117 | D1 | 0717509-13 | 39.3 | 11/17/2008 | 11 | 10016 | 6.56 | 1.68 | 1526.83 | 0.3896 | 3633.84 | 0.4202 | 0.4219 | 1.0785 | 1.0785 | 1.0830 | -0.4% | 0.0011 | 0.0020 | -45.7% |
| ASR1117 | D2 | 0717509-13 | 39.3 | 11/17/2008 | 7 | 10004 | 6.58 | 1.06 | 1520.36 | 0.3962 | 3633.84 | 0.4184 | 0.4291 | 1.0560 | 1.0560 | 1.0830 | -2.5% | 0.0007 | 0.0020 | -65.4% |
| ASR1117 | D3 | 0717509-13 | 39.3 | 11/17/2008 | 7 | 10016 | 6.45 | 1.09 | 1552.87 | 0.4034 | 3633.84 | 0.4273 | 0.4369 | 1.0593 | 1.0593 | 1.0830 | -2.2% | 0.0007 | 0.0020 | -65.4% |
| ASR1117 | D4 | 0717509-13 | 39.3 | 11/17/2008 | 3 | 10007 | 6.44 | 0.47 | 1553.88 | 0.3876 | 3633.84 | 0.4276 | 0.4198 | 1.1032 | 1.1032 | 1.0830 | 1.9% | 0.0003 | 0.0020 | -85.2% |
| ASR1117 | A1 | 0717509-15 | 61.1 | 11/17/2008 | 12 | 10002 | 6.6 | 1.82 | 1515.45 | 0.3944 | 3633.84 | 0.4170 | 0.4222 | 1.0574 | 1.0574 | 1.0706 | -1.2% | 0.0012 | 0.0020 | -39.3% |
| ASR1117 | A2 | 0717509-15 | 61.1 | 11/17/2008 | 8 | 10025 | 6.65 | 1.20 | 1507.52 | 0.3975 | 3633.84 | 0.4149 | 0.4256 | 1.0437 | 1.0437 | 1.0706 | -2.5% | 0.0008 | 0.0020 | -59.7% |
| ASR1117 | A3 | 0717509-15 | 61.1 | 11/17/2008 | 6 | 10030 | 6.58 | 0.91 | 1524.32 | 0.4031 | 3633.84 | 0.4195 | 0.4316 | 1.0406 | 1.0406 | 1.0706 | -2.8% | 0.0006 | 0.0020 | -69.8% |
| ASR1117 | A4 | 0717509-15 | 61.1 | 11/17/2008 | 3 | 10010 | 6.5 | 0.46 | 1540.00 | 0.3958 | 3633.84 | 0.4238 | 0.4237 | 1.0707 | 1.0707 | 1.0706 | 0.0% | 0.0003 | 0.0020 | -84.8% |
| ASR1117 | B1 | 0717509-15 | 61.1 | 11/17/2008 | 5 | 10031 | 6.73 | 0.74 | 1490.49 | 0.3877 | 3633.84 | 0.4102 | 0.4151 | 1.0580 | 1.0580 | 1.0706 | -1.2% | 0.0005 | 0.0020 | -74.8% |
| ASR1117 | B2 | 0717509-15 | 61.1 | 11/17/2008 | 7 | 10000 | 6.76 | 1.04 | 1479.29 | 0.3877 | 3633.84 | 0.4071 | 0.4151 | 1.0500 | 1.0500 | 1.0706 | -1.9% | 0.0007 | 0.0020 | -64.6% |
| ASR1117 | B3 | 0717509-15 | 61.1 | 11/17/2008 | 8 | 10004 | 6.71 | 1.19 | 1490.91 | 0.3931 | 3633.84 | 0.4103 | 0.4209 | 1.0437 | 1.0437 | 1.0706 | -2.5% | 0.0008 | 0.0020 | -59.6% |
| ASR1117 | B4 | 0717509-15 | 61.1 | 11/17/2008 | 10 | 10007 | 6.74 | 1.48 | 1484.72 | 0.3818 | 3633.84 | 0.4086 | 0.4088 | 1.0701 | 1.0701 | 1.0706 | 0.0% | 0.0010 | 0.0020 | -49.5% |
| ASR1117 | C1 | 0717509-15 | 61.1 | 11/17/2008 | 4 | 10023 | 6.65 | 0.60 | 1507.22 | 0.3921 | 3633.84 | 0.4146 | 0.4198 | 1.0578 | 1.0578 | 1.0706 | -1.2% | 0.0004 | 0.0020 | -79.8% |
| ASR1117 | C2 | 0717509-15 | 61.1 | 11/17/2008 | 9 | 10032 | 6.69 | 1.35 | 1499.55 | 0.3922 | 3633.84 | 0.4127 | 0.4199 | 1.0522 | 1.0522 | 1.0706 | -1.7% | 0.0009 | 0.0020 | -54.6% |
| ASR1117 | C3 | 0717509-15 | 61.1 | 11/17/2008 | 6 | 10003 | 6.61 | 0.91 | 1513.31 | 0.4018 | 3633.84 | 0.4165 | 0.4302 | 1.0365 | 1.0365 | 1.0706 | -3.2% | 0.0006 | 0.0020 | -69.7% |
| ASR1117 | C4 | 0717509-15 | 61.1 | 11/17/2008 | 12 | 10008 | 6.45 | 1.86 | 1551.63 | 0.3958 | 3633.84 | 0.4270 | 0.4237 | 1.0788 | 1.0786 | 1.0706 | 0.8% | 0.0012 | 0.0020 | -39.4% |
| ASR1117 | D1 | 0717509-15 | 61.1 | 11/17/2008 | 9 | 10004 | 6.65 | 1.35 | 1504.36 | 0.3896 | 3633.84 | 0.4140 | 0.4171 | 1.0626 | 1.0626 | 1.0706 | -0.7% | 0.0009 | 0.0020 | -54.5% |
| ASR1117 | D2 | 0717509-15 | 61.1 | 11/17/2008 | 5 | 10006 | 6.58 | 0.76 | 1520.67 | 0.3962 | 3633.84 | 0.4185 | 0.4242 | 1.0562 | 1.0562 | 1.0706 | -1.3% | 0.0005 | 0.0020 | -74.7% |
| ASR1117 | D3 | 0717509-15 | 61.1 | 11/17/2008 | 3 | 10012 | 6.62 | 0.45 | 1512.39 | 0.4034 | 3633.84 | 0.4162 | 0.4319 | 1.0317 | 1.0317 | 1.0706 | -3.6% | 0.0003 | 0.0020 | -84.8% |
| ASR1117 | D4 | 0717509-15 | 61.1 | 11/17/2008 | 15 | 10015 | 6.61 | 2.27 | 1515.13 | 0.3876 | 3633.84 | 0.4169 | 0.4150 | 1.0757 | 1.0757 | 1.0706 | 0.5% | 0.0015 | 0.0020 | -24.3% |
| ASR1117 | A1 | 0717509-14 | 62.6 | 11/17/2008 | 7 | 10007 | 6.36 | 1.10 | 1573.43 | 0.3944 | 3633.84 | 0.4330 | 0.4219 | 1.0978 | 1.0979 | 1.0698 | 2.6% | 0.0007 | 0.0020 | -64.6% |
| ASR1117 | A2 | 0717509-14 | 62.6 | 11/17/2008 | 13 | 10025 | 6.43 | 2.02 | 1559.10 | 0.3975 | 3633.84 | 0.4290 | 0.4252 | 1.0794 | 1.0794 | 1.0698 | 0.9% | 0.0013 | 0.0020 | -34.3% |
| ASR1117 | A3 | 0717509-14 | 62.6 | 11/17/2008 | 6 | 10017 | 6.53 | 0.92 | 1534.00 | 0.4031 | 3633.84 | 0.4221 | 0.4312 | 1.0472 | 1.0472 | 1.0698 | -2.1% | 0.0006 | 0.0020 | -69.7% |
| ASR1117 | A4 | 0717509-14 | 62.6 | 11/17/2008 | 3 | 10020 | 6.26 | 0.46 | 1600.64 | 0.3958 | 3633.84 | 0.4405 | 0.4234 | 1.1129 | 1.1129 | 1.0698 | 4.0% | 0.0003 | 0.0020 | -84.8% |
| ASR1117 | B1 | 0717509-14 | 62.6 | 11/17/2008 | 6 | 10029 | 6.62 | 0.91 | 1514.95 | 0.3877 | 3633.84 | 0.4169 | 0.4147 | 1.0753 | 1.0753 | 1.0698 | 0.5% | 0.0006 | 0.0020 | -69.7% |
| ASR1117 | B2 | 0717509-14 | 62.6 | 11/17/2008 | 6 | 10013 | 6.46 | 0.93 | 1550.00 | 0.3877 | 3633.84 | 0.4265 | 0.4147 | 1.1002 | 1.1002 | 1.0698 | 2.8% | 0.0006 | 0.0020 | -69.7% |
| ASR1117 | B3 | 0717509-14 | 62.6 | 11/17/2008 | 7 | 10026 | 6.53 | 1.07 | 1535.38 | 0.3931 | 3633.84 | 0.4225 | 0.4205 | 1.0748 | 1.0748 | 1.0698 | 0.5% | 0.0007 | 0.0020 | -64.6% |
| ASR1117 | B4 | 0717509-14 | 62.6 | 11/17/2008 | 12 | 10013 | 6.66 | 1.80 | 1503.45 | 0.3818 | 3633.84 | 0.4137 | 0.4084 | 1.0836 | 1.0836 | 1.0698 | 1.3% | 0.0012 | 0.0020 | -39.3% |
| ASR1117 | C1 | 0717509-14 | 62.6 | 11/17/2008 | 3 | 10004 | 6.53 | 0.46 | 1532.01 | 0.3921 | 3633.84 | 0.4216 | 0.4195 | 1.0752 | 1.0752 | 1.0698 | 0.5% | 0.0003 | 0.0020 | -84.8% |
| ASR1117 | C2 | 0717509-14 | 62.6 | 11/17/2008 | 6 | 10021 | 6.46 | 0.93 | 1551.24 | 0.3922 | 3633.84 | 0.4269 | 0.4196 | 1.0884 | 1.0884 | 1.0698 | 1.7% | 0.0006 | 0.0020 | -69.7% |
| ASR1117 | C3 | 0717509-14 | 62.6 | 11/17/2008 | 9 | 10016 | 6.52 | 1.38 | 1536.20 | 0.4018 | 3633.84 | 0.4227 | 0.4298 | 1.0521 | 1.0521 | 1.0698 | -1.6% | 0.0009 | 0.0020 | -54.5% |
| ASR1117 | C4 | 0717509-14 | 62.6 | 11/17/2008 | 6 | 10003 | 6.37 | 0.94 | 1570.33 | 0.3958 | 3633.84 | 0.4321 | 0.4234 | 1.0918 | 1.0918 | 1.0698 | 2.1% | 0.0006 | 0.0020 | -69.6% |
| ASR1117 | D1 | 0717509-14 | 62.6 | 11/17/2008 | 7 | 10011 | 6.55 | 1.07 | 1528.40 | 0.3896 | 3633.84 | 0.4206 | 0.4168 | 1.0798 | 1.0796 | 1.0698 | 0.9% | 0.0007 | 0.0020 | -64.6% |
| ASR1117 | D2 | 0717509-14 | 62.6 | 11/17/2008 | 10 | 10002 | 6.58 | 1.52 | 1520.06 | 0.3962 | 3633.84 | 0.4183 | 0.4238 | 1.0558 | 1.0558 | 1.0698 | -1.3% | 0.0010 | 0.0020 | -49.4% |
| ASR1117 | D3 | 0717509-14 | 62.6 | 11/17/2008 | 6 | 10018 | 6.41 | 0.94 | 1562.87 | 0.4034 | 3633.84 | 0.4301 | 0.4315 | 1.0662 | 1.0662 | 1.0698 | -0.3% | 0.0006 | 0.0020 | -69.7% |
| ASR1117 | D4 | 0717509-14 | 62.6 | 11/17/2008 | 8 | 10017 | 6.38 | 1.25 | 1570.06 | 0.3876 | 3633.84 | 0.4321 | 0.4146 | 1.1147 | 1.1147 | 1.0698 | 4.2% | 0.0008 | 0.0020 | -59.6% |
| ASR1117 | A1 | 0717509-1 | 77.0 | 11/17/2008 | 12 | 10017 | 6.74 | 1.78 | 1466.20 | 0.3944 | 3633.84 | 0.4090 | 0.4187 | 1.0370 | 1.0370 | 1.0616 | -2.3% | 0.0012 | 0.0019 | -38.4% |
| ASR1117 | A2 | 0717509-1 | 77.0 | 11/17/2008 | 8 | 10014 | 6.53 | 1.23 | 1533.54 | 0.3975 | 3633.84 | 0.4220 | 0.4220 | 1.0617 | 1.0617 | 1.0616 | 0.0% | 0.0008 | 0.0019 | -58.9% |
| ASR1117 | A3 | 0717509-1 | 77.0 | 11/17/2008 | 10 | 10002 | 6.57 | 1.52 | 1522.37 | 0.4031 | 3633.84 | 0.4189 | 0.4279 | 1.0393 | 1.0393 | 1.0616 | -2.1% | 0.0010 | 0.0019 | -48.6% |
| ASR1117 | A4 | 0717509-1 | 77.0 | 11/17/2008 | 5 | 10014 | 6.48 | 0.77 | 1545.37 | 0.3958 | 3633.84 | 0.4253 | 0.4202 | 1.0745 | 1.0745 | 1.0616 | 1.2% | 0.0005 | 0.0019 | -74.3% |
| ASR1117 | B1 | 0717509-1 | 77.0 | 11/17/2008 | 5 | 10006 | 6.68 | 0.75 | 1497.90 | 0.3877 | 3633.84 | 0.4122 | 0.4116 | 1.0632 | 1.0632 | 1.0616 | 0.1% | 0.0005 | 0.0019 | -74.3% |
| ASR1117 | B2 | 0717509-1 | 77.0 | 11/17/2008 | 12 | 10009 | 6.76 | 1.78 | 1480.62 | 0.3877 | 3633.84 | 0.4075 | 0.4116 | 1.0510 | 1.0510 | 1.0616 | -1.0% | 0.0012 | 0.0019 | -38.4% |
| ASR1117 | B3 | 0717509-1 | 77.0 | 11/17/2008 | 7 | 10014 | 6.75 | 1.04 | 1483.56 | 0.3931 | 3633.84 | 0.4083 | 0.4173 | 1.0386 | 1.0386 | 1.0616 | -2.2% | 0.0007 | 0.0019 | -64.1% |
| ASR1117 | B4 | 0717509-1 | 77.0 | 11/17/2008 | 7 | 10003 | 6.8 | 1.03 | 1471.03 | 0.3818 | 3633.84 | 0.4048 | 0.4053 | 1.0603 | 1.0603 | 1.0616 | -0.1% | 0.0007 | 0.0019 | -64.0% |
| ASR1117 | C1 | 0717509-1 | 77.0 | 11/17/2008 | 5 | 10005 | 6.65 | 0.75 | 1504.51 | 0.3921 | 3633.84 | 0.4140 | 0.4163 | 1.0559 | 1.0559 | 1.0616 | -0.5% | 0.0005 | 0.0019 | -74.3% |
| ASR1117 | C2 | 0717509-1 | 77.0 | 11/17/2008 | 5 | 10006 | 6.69 | 0.75 | 1495.67 | 0.3922 | 3633.84 | 0.4116 | 0.4164 | 1.0494 | 1.0494 | 1.0616 | -1.1% | 0.0005 | 0.0019 | -74.3% |
| ASR1117 | C3 | 0717509-1 | 77.0 | 11/17/2008 | 6 | 10013 | 6.62 | 0.91 | 1512.54 | 0.4018 | 3633.84 | 0.4162 | 0.4266 | 1.0359 | 1.0359 | 1.0616 | -2.4% | 0.0006 | 0.0019 | -69.2% |
| ASR1117 | C4 | 0717509-1 | 77.0 | 11/17/2008 | 5 | 10021 | 6.54 | 0.76 | 1532.26 | 0.3958 | 3633.84 | 0.4217 | 0.4202 | 1.0653 | 1.0653 | 1.0616 | 0.3% | 0.0005 | 0.0019 | -74.4% |
| ASR1117 | D1 | 0717509-1 | 77.0 | 11/17/2008 | 8 | 10015 | 6.7 | 1.19 | 1494.78 | 0.3896 | 3633.84 | 0.4113 | 0.4136 | 1.0558 | 1.0558 | 1.0616 | -0.5% | 0.0008 | 0.0019 | -59.0% |
| ASR1117 | D2 | 0717509-1 | 77.0 | 11/17/2008 | 6 | 10029 | 6.78 | 0.88 | 1479.20 | 0.3962 | 3633.84 | 0.4071 | 0.4206 | 1.0274 | 1.0274 | 1.0616 | -3.2% | 0.0006 | 0.0019 | -69.3% |
| ASR1117 | D3 | 0717509-1 | 77.0 | 11/17/2008 | 3 | 10019 | 6.55 | 0.46 | 1529.62 | 0.4034 | 3633.84 | 0.4209 | 0.4283 | 1.0435 | 1.0435 | 1.0616 | -1.7% | 0.0003 | 0.0019 | -84.6% |
| ASR1117 | D4 | 0717509-1 | 77.0 | 11/17/2008 | 7 | 10003 | 6.71 | 1.04 | 1490.76 | 0.3876 | 3633.84 | 0.4102 | 0.4115 | 1.0584 | 1.0584 | 1.0616 | -0.3% | 0.0007 | 0.0019 | -64.0% |
| ASR1117 | A1 | 0717509-16 | 82.0 | 11/17/2008 | 9 | 10012 | 6.7 | 1.34 | 1494.33 | 0.3944 | 3633.84 | 0.4112 | 0.4176 | 1.0427 | 1.0427 | 1.0588 | -1.5% | 0.0009 | 0.0019 | -53.6% |
| ASR1117 | A2 | 0717509-16 | 82.0 | 11/17/2008 | 9 | 10016 | 6.84 | 1.32 | 1464.33 | 0.3975 | 3633.84 | 0.4030 | 0.4209 | 1.0136 | 1.0136 | 1.0588 | -4.3% | 0.0009 | 0.0019 | -53.6% |
| ASR1117 | A3 | 0717509-16 | 82.0 | 11/17/2008 | 7 | 10007 | 6.73 | 1.04 | 1486.92 | 0.4031 | 3633.84 | 0.4092 | 0.4268 | 1.0151 | 1.0151 | 1.0588 | -4.1% | 0.0007 | 0.0019 | -63.9% |
| ASR1117 | A4 | 0717509-16 | 82.0 | 11/17/2008 | 5 | 10017 | 6.63 | 0.75 | 1510.86 | 0.3958 | 3633.84 | 0.4156 | 0.4191 | 1.0505 | 1.0505 | 1.0588 | -0.8% | 0.0005 | 0.0019 | -74.2% |
| ASR1117 | B1 | 0717509-16 | 82.0 | 11/17/2008 | 7 | 10009 | 6.97 | 1.00 | 1436.01 | 0.3877 | 3633.84 | 0.3952 | 0.4105 | 1.0193 | 1.0193 | 1.0588 | -3.7% | 0.0007 | 0.0019 | -63.9% |
| ASR1117 | B2 | 0717509-16 | 82.0 | 11/17/2008 | 6 | 10016 | 6.87 | 0.87 | 1457.93 | 0.3877 | 3633.84 | 0.4012 | 0.4105 | 1.0348 | 1.0348 | 1.0588 | -2.3% | 0.0006 | 0.0019 | -69.1% |
| ASR1117 | B3 | 0717509-16 | 82.0 | 11/17/2008 | 7 | 10005 | 6.86 | 1.02 | 1458.45 | 0.3931 | 3633.84 | 0.4014 | 0.4162 | 1.0210 | 1.0210 | 1.0588 | -3.6% | 0.0007 | 0.0019 | -63.9% |
| ASR1117 | B4 | 0717509-16 | 82.0 | 11/17/2008 | 8 | 10008 | 6.85 | 1.17 | 1461.02 | 0.3818 | 3633.84 | 0.4021 | 0.4043 | 1.0531 | 1.0531 | 1.0588 | -0.5% | 0.0008 | 0.0019 | -58.7% |
| ASR1117 | C1 | 0717509-16 | 82.0 | 11/17/2008 | 3 | 10019 | 6.82 | 0.44 | 1469.06 | 0.3921 | 3633.84 | 0.4043 | 0.4152 | 1.0310 | 1.0310 | 1.0588 | -2.6% | 0.0003 | 0.0019 | -84.5% |
| ASR1117 | C2 | 0717509-16 | 82.0 | 11/17/2008 | 6 | 10001 | 6.78 | 0.88 | 1475.07 | 0.3922 | 3633.84 | 0.4059 | 0.4153 | 1.0350 | 1.0350 | 1.0588 | -2.3% | 0.0006 | 0.0019 | -69.0% |
| ASR1117 | C3 | 0717509-16 | 82.0 | 11/17/2008 | 4 | 10009 | 6.73 | 0.59 | 1487.22 | 0.4018 | 3633.84 | 0.4083 | 0.4254 | 1.0186 | 1.0186 | 1.0588 | -3.8% | 0.0004 | 0.0019 | -79.4% |

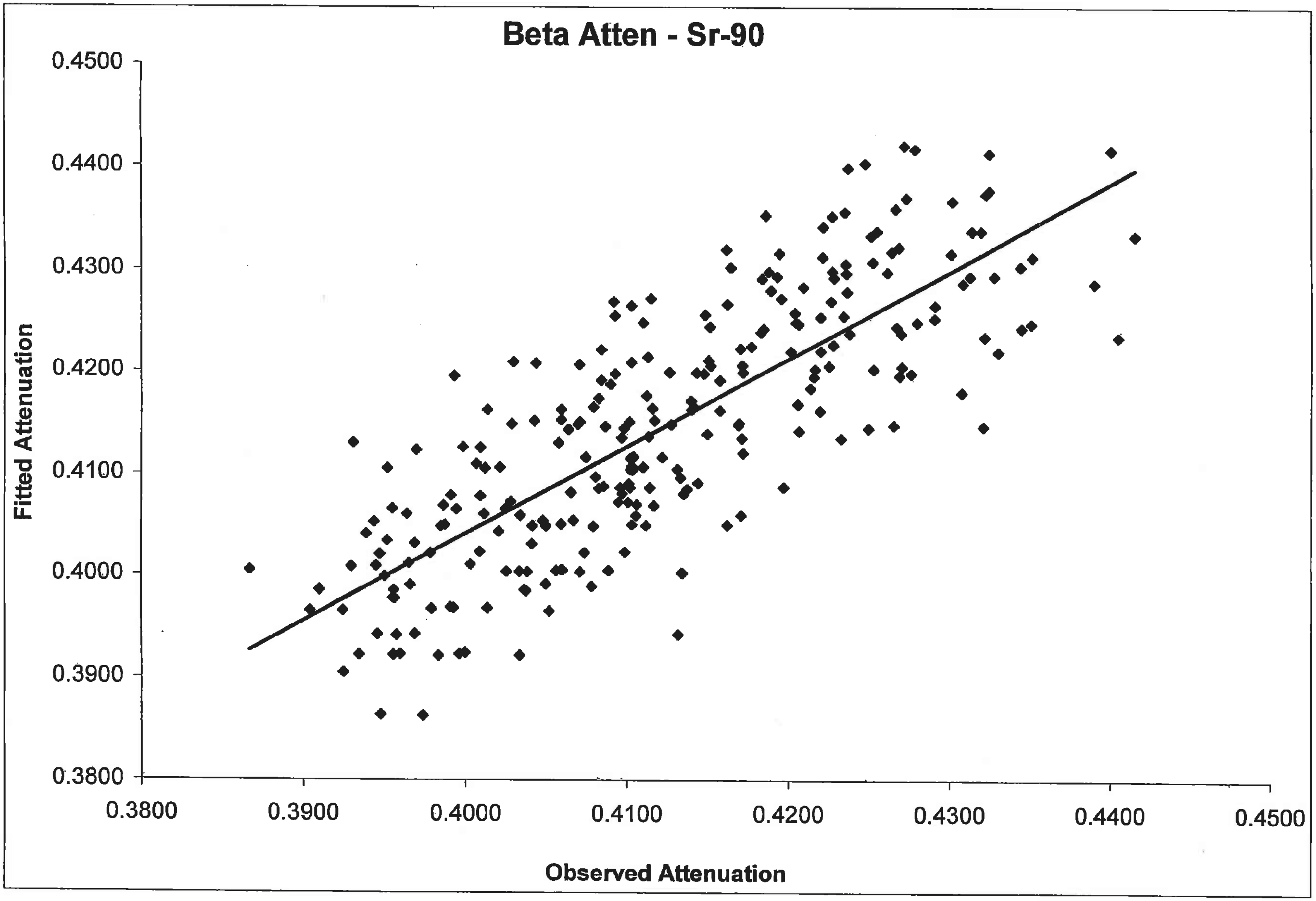
| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASR1117 | C4 | 0717509-16 | 82.0 | 11/17/2008 | 8 | 10003 | 6.74 | 1.19 | 1484.12 | 0.3958 | 3633.84 | 0.4084 | 0.4191 | 1.0319 | 1.0319 | 1.0588 | -2.5% | 0.0008 | 0.0019 | -58.7% |
| ASR1117 | D1 | 0717509-16 | 82.0 | 11/17/2008 | 14 | 10009 | 6.87 | 2.04 | 1456.91 | 0.3896 | 3633.84 | 0.4009 | 0.4125 | 1.0291 | 1.0291 | 1.0588 | -2.8% | 0.0014 | 0.0019 | -27.8% |
| ASR1117 | D2 | 0717509-16 | 82.0 | 11/17/2008 | 10 | 10012 | 6.9 | 1.45 | 1451.01 | 0.3962 | 3633.84 | 0.3993 | 0.4195 | 1.0078 | 1.0078 | 1.0588 | -4.8% | 0.0010 | 0.0019 | -48.4% |
| ASR1117 | D3 | 0717509-16 | 82.0 | 11/17/2008 | 12 | 10004 | 6.69 | 1.79 | 1495.37 | 0.4034 | 3633.84 | 0.4115 | 0.4271 | 1.0201 | 1.0201 | 1.0588 | -3.7% | 0.0012 | 0.0019 | -38.0% |
| ASR1117 | D4 | 0717509-16 | 82.0 | 11/17/2008 | 6 | 10013 | 6.67 | 0.90 | 1501.20 | 0.3876 | 3633.84 | 0.4131 | 0.4104 | 1.0658 | 1.0658 | 1.0588 | 0.7% | 0.0006 | 0.0019 | -69.0% |
| ASR1117 | A1 | 0717509-2 | 103.0 | 11/17/2008 | 11 | 10012 | 6.79 | 1.62 | 1474.52 | 0.3944 | 3633.84 | 0.4058 | 0.4130 | 1.0288 | 1.0288 | 1.0471 | -1.7% | 0.0011 | 0.0019 | -42.0% |
| ASR1117 | A2 | 0717509-2 | 103.0 | 11/17/2008 | 13 | 10016 | 6.79 | 1.91 | 1475.11 | 0.3975 | 3633.84 | 0.4059 | 0.4162 | 1.0212 | 1.0212 | 1.0471 | -2.5% | 0.0013 | 0.0019 | -31.5% |
| ASR1117 | A3 | 0717509-2 | 103.0 | 11/17/2008 | 3 | 10018 | 6.75 | 0.44 | 1484.15 | 0.4031 | 3633.84 | 0.4084 | 0.4221 | 1.0132 | 1.0132 | 1.0471 | -3.2% | 0.0003 | 0.0019 | -84.2% |
| ASR1117 | A4 | 0717509-2 | 103.0 | 11/17/2008 | 3 | 10022 | 6.49 | 0.46 | 1544.22 | 0.3958 | 3633.84 | 0.4250 | 0.4145 | 1.0737 | 1.0737 | 1.0471 | 2.5% | 0.0003 | 0.0019 | -84.2% |
| ASR1117 | B1 | 0717509-2 | 103.0 | 11/17/2008 | 7 | 10000 | 6.86 | 1.02 | 1457.73 | 0.3877 | 3633.84 | 0.4012 | 0.4060 | 1.0347 | 1.0347 | 1.0471 | -1.2% | 0.0007 | 0.0019 | -63.0% |
| ASR1117 | B2 | 0717509-2 | 103.0 | 11/17/2008 | 4 | 10011 | 6.95 | 0.58 | 1440.43 | 0.3877 | 3633.84 | 0.3964 | 0.4060 | 1.0224 | 1.0224 | 1.0471 | -2.4% | 0.0004 | 0.0019 | -78.9% |
| ASR1117 | B3 | 0717509-2 | 103.0 | 11/17/2008 | 8 | 10007 | 6.71 | 1.19 | 1491.36 | 0.3931 | 3633.84 | 0.4104 | 0.4116 | 1.0440 | 1.0440 | 1.0471 | -0.3% | 0.0008 | 0.0019 | -57.8% |
| ASR1117 | B4 | 0717509-2 | 103.0 | 11/17/2008 | 12 | 10005 | 6.97 | 1.72 | 1435.44 | 0.3818 | 3633.84 | 0.3950 | 0.3998 | 1.0348 | 1.0348 | 1.0471 | -1.2% | 0.0012 | 0.0019 | -36.7% |
| ASR1117 | C1 | 0717509-2 | 103.0 | 11/17/2008 | 8 | 10010 | 6.85 | 1.17 | 1461.31 | 0.3921 | 3633.84 | 0.4021 | 0.4106 | 1.0256 | 1.0256 | 1.0471 | -2.1% | 0.0008 | 0.0019 | -57.8% |
| ASR1117 | C2 | 0717509-2 | 103.0 | 11/17/2008 | 7 | 10005 | 6.71 | 1.04 | 1491.06 | 0.3922 | 3633.84 | 0.4103 | 0.4107 | 1.0462 | 1.0462 | 1.0471 | -0.1% | 0.0007 | 0.0019 | -63.1% |
| ASR1117 | C3 | 0717509-2 | 103.0 | 11/17/2008 | 7 | 10007 | 6.81 | 1.03 | 1469.46 | 0.4018 | 3633.84 | 0.4044 | 0.4207 | 1.0064 | 1.0064 | 1.0471 | -3.9% | 0.0007 | 0.0019 | -63.1% |
| ASR1117 | C4 | 0717509-2 | 103.0 | 11/17/2008 | 4 | 10008 | 6.72 | 0.60 | 1489.29 | 0.3958 | 3633.84 | 0.4098 | 0.4145 | 1.0355 | 1.0355 | 1.0471 | -1.1% | 0.0004 | 0.0019 | -78.9% |
| ASR1117 | D1 | 0717509-2 | 103.0 | 11/17/2008 | 8 | 10023 | 6.67 | 0.90 | 1502.70 | 0.3896 | 3633.84 | 0.4135 | 0.4080 | 1.0614 | 1.0614 | 1.0471 | 1.4% | 0.0006 | 0.0019 | -68.4% |
| ASR1117 | D2 | 0717509-2 | 103.0 | 11/17/2008 | 3 | 9999 | 6.83 | 0.44 | 1463.98 | 0.3962 | 3633.84 | 0.4029 | 0.4149 | 1.0168 | 1.0168 | 1.0471 | -2.9% | 0.0003 | 0.0019 | -84.2% |
| ASR1117 | D3 | 0717509-2 | 103.0 | 11/17/2008 | 2 | 10003 | 6.59 | 0.30 | 1517.91 | 0.4034 | 3633.84 | 0.4177 | 0.4224 | 1.0355 | 1.0355 | 1.0471 | -1.1% | 0.0002 | 0.0019 | -89.4% |
| ASR1117 | D4 | 0717509-2 | 103.0 | 11/17/2008 | 6 | 10003 | 6.6 | 0.91 | 1515.61 | 0.3876 | 3633.84 | 0.4171 | 0.4059 | 1.0761 | 1.0761 | 1.0471 | 2.8% | 0.0006 | 0.0019 | -68.3% |
| ASR1117 | A1 | 0717509-3 | 107.6 | 11/17/2008 | 8 | 10021 | 6.61 | 1.21 | 1516.04 | 0.3944 | 3633.84 | 0.4172 | 0.4120 | 1.0578 | 1.0578 | 1.0446 | 1.3% | 0.0008 | 0.0019 | -57.6% |
| ASR1117 | A2 | 0717509-3 | 107.6 | 11/17/2008 | 13 | 10024 | 6.70 | 1.94 | 1496.12 | 0.3975 | 3633.84 | 0.4117 | 0.4152 | 1.0358 | 1.0358 | 1.0446 | -0.8% | 0.0013 | 0.0019 | -31.2% |
| ASR1117 | A3 | 0717509-3 | 107.6 | 11/17/2008 | 6 | 10030 | 6.65 | 0.90 | 1508.27 | 0.4031 | 3633.84 | 0.4151 | 0.4211 | 1.0297 | 1.0297 | 1.0446 | -1.4% | 0.0006 | 0.0019 | -68.3% |
| ASR1117 | A4 | 0717509-3 | 107.6 | 11/17/2008 | 5 | 10013 | 6.51 | 0.77 | 1538.10 | 0.3958 | 3633.84 | 0.4233 | 0.4134 | 1.0694 | 1.0694 | 1.0446 | 2.4% | 0.0005 | 0.0019 | -73.5% |
| ASR1117 | B1 | 0717509-3 | 107.6 | 11/17/2008 | 7 | 10020 | 6.72 | 1.04 | 1491.07 | 0.3877 | 3633.84 | 0.4103 | 0.4050 | 1.0584 | 1.0584 | 1.0446 | 1.3% | 0.0007 | 0.0019 | -62.9% |
| ASR1117 | B2 | 0717509-3 | 107.6 | 11/17/2008 | 7 | 10016 | 6.79 | 1.03 | 1475.11 | 0.3877 | 3633.84 | 0.4059 | 0.4050 | 1.0470 | 1.0470 | 1.0446 | 0.2% | 0.0007 | 0.0019 | -62.9% |
| ASR1117 | B3 | 0717509-3 | 107.6 | 11/17/2008 | 9 | 10007 | 6.70 | 1.34 | 1493.58 | 0.3931 | 3633.84 | 0.4110 | 0.4106 | 1.0456 | 1.0456 | 1.0446 | 0.1% | 0.0009 | 0.0019 | -52.3% |
| ASR1117 | B4 | 0717509-3 | 107.6 | 11/17/2008 | 13 | 10018 | 6.76 | 1.92 | 1481.95 | 0.3818 | 3633.84 | 0.4078 | 0.3988 | 1.0682 | 1.0682 | 1.0446 | 2.3% | 0.0013 | 0.0019 | -31.2% |
| ASR1117 | C1 | 0717509-3 | 107.6 | 11/17/2008 | 6 | 10003 | 6.66 | 0.90 | 1501.95 | 0.3921 | 3633.84 | 0.4133 | 0.4098 | 1.0541 | 1.0541 | 1.0448 | 0.9% | 0.0006 | 0.0019 | -68.2% |
| ASR1117 | C2 | 0717509-3 | 107.6 | 11/17/2008 | 4 | 10009 | 6.75 | 0.59 | 1482.81 | 0.3922 | 3633.84 | 0.4081 | 0.4097 | 1.0404 | 1.0404 | 1.0446 | -0.4% | 0.0004 | 0.0019 | -78.8% |
| ASR1117 | C3 | 0717509-3 | 107.6 | 11/17/2008 | 7 | 10009 | 6.73 | 1.04 | 1487.22 | 0.4018 | 3633.84 | 0.4093 | 0.4197 | 1.0186 | 1.0186 | 1.0448 | -2.5% | 0.0007 | 0.0019 | -62.9% |
| ASR1117 | C4 | 0717509-3 | 107.6 | 11/17/2008 | 6 | 10004 | 6.60 | 0.91 | 1515.76 | 0.3958 | 3633.84 | 0.4171 | 0.4134 | 1.0539 | 1.0539 | 1.0446 | 0.9% | 0.0006 | 0.0019 | -68.2% |
| ASR1117 | D1 | 0717509-3 | 107.6 | 11/17/2008 | 8 | 10012 | 6.71 | 1.19 | 1492.10 | 0.3896 | 3633.84 | 0.4106 | 0.4070 | 1.0539 | 1.0539 | 1.0448 | 0.9% | 0.0008 | 0.0019 | -57.6% |
| ASR1117 | D2 | 0717509-3 | 107.6 | 11/17/2008 | 4 | 10013 | 6.64 | 0.60 | 1507.98 | 0.3962 | 3633.84 | 0.4150 | 0.4139 | 1.0474 | 1.0474 | 1.0446 | 0.3% | 0.0004 | 0.0019 | -78.8% |
| ASR1117 | D3 | 0717509-3 | 107.6 | 11/17/2008 | 2 | 9999 | 6.69 | 0.30 | 1494.62 | 0.4034 | 3633.84 | 0.4113 | 0.4214 | 1.0196 | 1.0196 | 1.0446 | -2.4% | 0.0002 | 0.0019 | -89.4% |
| ASR1117 | D4 | 0717509-3 | 107.6 | 11/17/2008 | 8 | 10013 | 6.62 | 1.21 | 1512.54 | 0.3876 | 3633.84 | 0.4162 | 0.4049 | 1.0739 | 1.0739 | 1.0448 | 2.8% | 0.0008 | 0.0019 | -57.6% |
| ASR1117 | A1 | 0717509-4 | 129.7 | 11/17/2008 | 7 | 10014 | 6.73 | 1.04 | 1487.96 | 0.3944 | 3633.84 | 0.4095 | 0.4072 | 1.0382 | 1.0382 | 1.0324 | 0.6% | 0.0007 | 0.0018 | -62.0% |
| ASR1117 | A2 | 0717509-4 | 129.7 | 11/17/2008 | 6 | 10003 | 6.71 | 0.89 | 1490.76 | 0.3975 | 3633.84 | 0.4102 | 0.4104 | 1.0321 | 1.0321 | 1.0324 | 0.0% | 0.0006 | 0.0018 | -67.4% |
| ASR1117 | A3 | 0717509-4 | 129.7 | 11/17/2008 | 7 | 10017 | 6.63 | 1.06 | 1510.86 | 0.4031 | 3633.84 | 0.4158 | 0.4162 | 1.0314 | 1.0314 | 1.0324 | -0.1% | 0.0007 | 0.0018 | -62.0% |
| ASR1117 | A4 | 0717509-4 | 129.7 | 11/17/2008 | 3 | 10021 | 6.57 | 0.46 | 1525.27 | 0.3958 | 3633.84 | 0.4197 | 0.4086 | 1.0605 | 1.0605 | 1.0324 | 2.7% | 0.0003 | 0.0018 | -83.7% |
| ASR1117 | B1 | 0717509-4 | 129.7 | 11/17/2008 | 6 | 10005 | 6.84 | 0.88 | 1462.72 | 0.3877 | 3633.84 | 0.4025 | 0.4003 | 1.0382 | 1.0382 | 1.0324 | 0.6% | 0.0006 | 0.0018 | -67.4% |
| ASR1117 | B2 | 0717509-4 | 129.7 | 11/17/2008 | 12 | 10011 | 6.83 | 1.76 | 1465.74 | 0.3877 | 3633.84 | 0.4034 | 0.4003 | 1.0404 | 1.0404 | 1.0324 | 0.8% | 0.0012 | 0.0018 | -34.9% |
| ASR1117 | B3 | 0717509-4 | 129.7 | 11/17/2008 | 8 | 10011 | 6.71 | 1.19 | 1491.95 | 0.3931 | 3633.84 | 0.4106 | 0.4059 | 1.0444 | 1.0444 | 1.0324 | 1.2% | 0.0008 | 0.0018 | -56.6% |
| ASR1117 | B4 | 0717509-4 | 129.7 | 11/17/2008 | 8 | 10009 | 6.94 | 1.15 | 1442.22 | 0.3818 | 3633.84 | 0.3969 | 0.3942 | 1.0395 | 1.0395 | 1.0324 | 0.7% | 0.0008 | 0.0018 | -56.6% |
| ASR1117 | C1 | 0717509-4 | 129.7 | 11/17/2008 | 9 | 10022 | 6.81 | 1.32 | 1471.66 | 0.3921 | 3633.84 | 0.4050 | 0.4048 | 1.0329 | 1.0329 | 1.0324 | 0.0% | 0.0009 | 0.0018 | -51.2% |
| ASR1117 | C2 | 0717509-4 | 129.7 | 11/17/2008 | 6 | 10012 | 6.91 | 0.87 | 1448.91 | 0.3922 | 3633.84 | 0.3987 | 0.4049 | 1.0166 | 1.0166 | 1.0324 | -1.5% | 0.0006 | 0.0018 | -67.4% |
| ASR1117 | C3 | 0717509-4 | 129.7 | 11/17/2008 | 9 | 10012 | 6.77 | 1.33 | 1478.88 | 0.4018 | 3633.84 | 0.4070 | 0.4148 | 1.0129 | 1.0129 | 1.0324 | -1.9% | 0.0009 | 0.0018 | -51.2% |
| ASR1117 | C4 | 0717509-4 | 129.7 | 11/17/2008 | 4 | 10017 | 6.73 | 0.59 | 1488.41 | 0.3958 | 3633.84 | 0.4096 | 0.4086 | 1.0349 | 1.0349 | 1.0324 | 0.2% | 0.0004 | 0.0018 | -78.3% |
| ASR1117 | D1 | 0717509-4 | 129.7 | 11/17/2008 | 10 | 10008 | 6.87 | 1.48 | 1456.77 | 0.3896 | 3633.84 | 0.4009 | 0.4022 | 1.0290 | 1.0290 | 1.0324 | -0.3% | 0.0010 | 0.0018 | -45.7% |
| ASR1117 | D2 | 0717509-4 | 129.7 | 11/17/2008 | 2 | 10014 | 6.65 | 0.30 | 1505.86 | 0.3962 | 3633.84 | 0.4144 | 0.4091 | 1.0459 | 1.0459 | 1.0324 | 1.3% | 0.0002 | 0.0018 | -89.1% |
| ASR1117 | D3 | 0717509-4 | 129.7 | 11/17/2008 | 4 | 10006 | 6.75 | 0.59 | 1482.37 | 0.4034 | 3633.84 | 0.4079 | 0.4165 | 1.0112 | 1.0112 | 1.0324 | -2.1% | 0.0004 | 0.0018 | -78.3% |
| ASR1117 | D4 | 0717509-4 | 129.7 | 11/17/2008 | 8 | 10020 | 6.67 | 1.20 | 1502.25 | 0.3876 | 3633.84 | 0.4134 | 0.4002 | 1.0686 | 1.0686 | 1.0324 | 3.3% | 0.0008 | 0.0018 | -56.6% |
| ASR1117 | A1 | 0717509-5 | 129.8 | 11/17/2008 | 14 | 10014 | 6.72 | 2.08 | 1490.18 | 0.3944 | 3633.84 | 0.4101 | 0.4072 | 1.0398 | 1.0398 | 1.0324 | 0.7% | 0.0014 | 0.0018 | -24.0% |
| ASR1117 | A2 | 0717509-5 | 129.8 | 11/17/2008 | 5 | 10006 | 6.71 | 0.75 | 1491.21 | 0.3975 | 3633.84 | 0.4104 | 0.4104 | 1.0324 | 1.0324 | 1.0324 | 0.0% | 0.0005 | 0.0018 | -72.8% |
| ASR1117 | A3 | 0717509-5 | 129.8 | 11/17/2008 | 5 | 10026 | 6.54 | 0.76 | 1533.33 | 0.4031 | 3633.84 | 0.4220 | 0.4162 | 1.0468 | 1.0468 | 1.0324 | 1.4% | 0.0005 | 0.0018 | -72.9% |
| ASR1117 | A4 | 0717509-5 | 129.8 | 11/17/2008 | 5 | 10002 | 6.69 | 0.75 | 1495.07 | 0.3958 | 3633.84 | 0.4114 | 0.4086 | 1.0395 | 1.0395 | 1.0324 | 0.7% | 0.0005 | 0.0018 | -72.8% |
| ASR1117 | B1 | 0717509-5 | 129.8 | 11/17/2008 | 6 | 10008 | 6.82 | 0.88 | 1467.45 | 0.3877 | 3633.84 | 0.4038 | 0.4003 | 1.0418 | 1.0418 | 1.0324 | 0.9% | 0.0006 | 0.0018 | -67.4% |
| ASR1117 | B2 | 0717509-5 | 129.8 | 11/17/2008 | 9 | 10015 | 6.77 | 1.33 | 1479.32 | 0.3877 | 3633.84 | 0.4071 | 0.4003 | 1.0500 | 1.0500 | 1.0324 | 1.7% | 0.0009 | 0.0018 | -51.2% |
| ASR1117 | B3 | 0717509-5 | 129.8 | 11/17/2008 | 10 | 10012 | 6.83 | 1.46 | 1465.69 | 0.3931 | 3633.84 | 0.4034 | 0.4058 | 1.0262 | 1.0262 | 1.0324 | -0.6% | 0.0010 | 0.0018 | -45.7% |
| ASR1117 | B4 | 0717509-5 | 129.8 | 11/17/2008 | 7 | 10014 | 6.67 | 1.05 | 1501.35 | 0.3818 | 3633.84 | 0.4132 | 0.3942 | 1.0821 | 1.0821 | 1.0324 | 4.8% | 0.0007 | 0.0018 | -62.0% |
| ASR1117 | C1 | 0717509-5 | 129.8 | 11/17/2008 | 10 | 10016 | 6.82 | 1.47 | 1468.62 | 0.3921 | 3633.84 | 0.4042 | 0.4048 | 1.0307 | 1.0307 | 1.0324 | -0.2% | 0.0010 | 0.0018 | -45.8% |
| ASR1117 | C2 | 0717509-5 | 129.8 | 11/17/2008 | 2 | 10011 | 6.70 | 0.30 | 1494.18 | 0.3922 | 3633.84 | 0.4112 | 0.4049 | 1.0484 | 1.0484 | 1.0324 | 1.6% | 0.0002 | 0.0018 | -89.1% |
| ASR1117 | C3 | 0717509-5 | 129.8 | 11/17/2008 | 12 | 10019 | 6.68 | 1.80 | 1499.85 | 0.4018 | 3633.84 | 0.4127 | 0.4148 | 1.0272 | 1.0272 | 1.0324 | -0.5% | 0.0012 | 0.0018 | -34.9% |
| ASR1117 | C4 | 0717509-5 | 129.8 | 11/17/2008 | 2 | 10017 | 6.72 | 0.30 | 1490.63 | 0.3958 | 3633.84 | 0.4102 | 0.4086 | 1.0364 | 1.0364 | 1.0324 | 0.4% | 0.0002 | 0.0018 | -89.2% |
| ASR1117 | D1 | 0717509-5 | 129.8 | 11/17/2008 | 9 | 10009 | 6.72 | 1.34 | 1489.43 | 0.3896 | 3633.84 | 0.4099 | 0.4022 | 1.0521 | 1.0521 | 1.0324 | 1.9% | 0.0009 | 0.0018 | -51.1% |
| ASR1117 | D2 | 0717509-5 | 129.8 | 11/17/2008 | 8 | 10015 | 6.72 | 1.19 | 1490.33 | 0.3962 | 3633.84 | 0.4101 | 0.4090 | 1.0351 | 1.0351 | 1.0324 | 0.3% | 0.0008 | 0.0018 | -56.6% |
| ASR1117 | D3 | 0717509-5 | 129.8 | 11/17/2008 | 4 | 10024 | 6.66 | 0.60 | 1505.11 | 0.4034 | 3633.84 | 0.4142 | 0.4165 | 1.0268 | 1.0268 | 1.0324 | -0.5% | 0.0004 | 0.0018 | -78.3% |

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASR1117 | D4 | 0717509-5 | 129.8 | 11/17/2008 | 6 | 10021 | 6.67 | 0.90 | 1502.40 | 0.3876 | 3633.84 | 0.4134 | 0.4002 | 1.0667 | 1.0667 | 1.0324 | 3.3% | 0.0006 | 0.0018 | -67.5% |
| ASR1117 | A1 | 0717509-6 | 138.2 | 11/17/2008 | 4 | 10005 | 6.77 | 0.59 | 1477.84 | 0.3944 | 3633.84 | 0.4067 | 0.4054 | 1.0312 | 1.0312 | 1.0278 | 0.3% | 0.0004 | 0.0018 | -78.1% |
| ASR1117 | A2 | 0717509-6 | 138.2 | 11/17/2008 | 10 | 10014 | 6.75 | 1.48 | 1463.56 | 0.3975 | 3633.84 | 0.4083 | 0.4086 | 1.0271 | 1.0271 | 1.0278 | -0.1% | 0.0010 | 0.0018 | -45.2% |
| ASR1117 | A3 | 0717509-6 | 138.2 | 11/17/2008 | 1 | 10012 | 6.78 | 0.15 | 1476.70 | 0.4031 | 3633.84 | 0.4064 | 0.4143 | 1.0081 | 1.0081 | 1.0278 | -1.9% | 0.0001 | 0.0018 | -94.5% |
| ASR1117 | A4 | 0717509-6 | 138.2 | 11/17/2008 | 7 | 10008 | 6.69 | 1.05 | 1495.96 | 0.3958 | 3633.84 | 0.4117 | 0.4068 | 1.0401 | 1.0401 | 1.0278 | 1.2% | 0.0007 | 0.0018 | -61.6% |
| ASR1117 | B1 | 0717509-6 | 138.2 | 11/17/2008 | 2 | 10018 | 6.83 | 0.29 | 1466.76 | 0.3877 | 3633.84 | 0.4036 | 0.3985 | 1.0411 | 1.0411 | 1.0278 | 1.3% | 0.0002 | 0.0018 | -89.1% |
| ASR1117 | B2 | 0717509-6 | 138.2 | 11/17/2008 | 13 | 10017 | 7.05 | 1.84 | 1420.65 | 0.3877 | 3633.84 | 0.3910 | 0.3985 | 1.0085 | 1.0085 | 1.0278 | -1.9% | 0.0013 | 0.0018 | -28.8% |
| ASR1117 | B3 | 0717509-6 | 138.2 | 11/17/2008 | 4 | 10005 | 6.99 | 0.57 | 1431.33 | 0.3931 | 3633.84 | 0.3939 | 0.4040 | 1.0020 | 1.0020 | 1.0278 | -2.5% | 0.0004 | 0.0018 | -78.1% |
| ASR1117 | B4 | 0717509-6 | 138.2 | 11/17/2008 | 6 | 10000 | 6.88 | 0.87 | 1453.49 | 0.3818 | 3633.84 | 0.4000 | 0.3924 | 1.0476 | 1.0476 | 1.0278 | 1.9% | 0.0006 | 0.0018 | -67.1% |
| ASR1117 | C1 | 0717509-6 | 138.2 | 11/17/2008 | 5 | 10015 | 6.82 | 0.73 | 1466.48 | 0.3921 | 3633.84 | 0.4041 | 0.4030 | 1.0306 | 1.0306 | 1.0278 | 0.3% | 0.0005 | 0.0018 | -72.6% |
| ASR1117 | C2 | 0717509-6 | 138.2 | 11/17/2008 | 7 | 10009 | 6.94 | 1.01 | 1442.22 | 0.3922 | 3633.84 | 0.3969 | 0.4031 | 1.0119 | 1.0119 | 1.0278 | -1.5% | 0.0007 | 0.0018 | -61.6% |
| ASR1117 | C3 | 0717509-6 | 138.2 | 11/17/2008 | 7 | 10013 | 7.01 | 1.00 | 1428.39 | 0.4018 | 3633.84 | 0.3931 | 0.4130 | 0.9783 | 0.9783 | 1.0278 | -4.8% | 0.0007 | 0.0018 | -61.7% |
| ASR1117 | C4 | 0717509-6 | 138.2 | 11/17/2008 | 11 | 10010 | 6.91 | 1.59 | 1448.63 | 0.3958 | 3633.84 | 0.3986 | 0.4068 | 1.0072 | 1.0072 | 1.0278 | -2.0% | 0.0011 | 0.0018 | -39.7% |
| ASR1117 | D1 | 0717509-6 | 138.2 | 11/17/2008 | 12 | 10005 | 7.12 | 1.69 | 1405.20 | 0.3896 | 3633.84 | 0.3867 | 0.4004 | 0.9925 | 0.9925 | 1.0278 | -3.4% | 0.0012 | 0.0018 | -34.2% |
| ASR1117 | D2 | 0717509-6 | 138.2 | 11/17/2008 | 8 | 10012 | 6.84 | 1.17 | 1463.74 | 0.3962 | 3633.84 | 0.4028 | 0.4072 | 1.0167 | 1.0167 | 1.0278 | -1.1% | 0.0008 | 0.0018 | -56.2% |
| ASR1117 | D3 | 0717509-6 | 138.2 | 11/17/2008 | 3 | 10009 | 6.74 | 0.45 | 1485.01 | 0.4034 | 3633.84 | 0.4087 | 0.4146 | 1.0130 | 1.0130 | 1.0278 | -1.4% | 0.0003 | 0.0018 | -83.6% |
| ASR1117 | D4 | 0717509-6 | 138.2 | 11/17/2008 | 14 | 10006 | 6.82 | 2.05 | 1467.16 | 0.3876 | 3633.84 | 0.4037 | 0.3984 | 1.0417 | 1.0417 | 1.0278 | 1.3% | 0.0014 | 0.0018 | -23.3% |
| ASR1117 | A1 | 0717509-7 | 147.6 | 11/17/2008 | 5 | 10009 | 6.97 | 0.72 | 1436.01 | 0.3944 | 3633.84 | 0.3952 | 0.4034 | 1.0020 | 1.0020 | 1.0227 | -2.0% | 0.0005 | 0.0018 | -72.3% |
| ASR1117 | A2 | 0717509-7 | 147.6 | 11/17/2008 | 8 | 10019 | 6.85 | 1.17 | 1462.63 | 0.3975 | 3633.84 | 0.4025 | 0.4065 | 1.0126 | 1.0126 | 1.0227 | -1.0% | 0.0008 | 0.0018 | -55.6% |
| ASR1117 | A3 | 0717509-7 | 147.6 | 11/17/2008 | 10 | 10011 | 6.94 | 1.44 | 1442.51 | 0.4031 | 3633.84 | 0.3970 | 0.4123 | 0.9848 | 0.9848 | 1.0227 | -3.7% | 0.0010 | 0.0018 | -44.7% |
| ASR1117 | A4 | 0717509-7 | 147.6 | 11/17/2008 | 2 | 10006 | 6.75 | 0.30 | 1482.37 | 0.3958 | 3633.84 | 0.4079 | 0.4048 | 1.0307 | 1.0307 | 1.0227 | 0.8% | 0.0002 | 0.0018 | -88.9% |
| ASR1117 | B1 | 0717509-7 | 147.6 | 11/17/2008 | 11 | 10011 | 7.02 | 1.57 | 1426.07 | 0.3877 | 3633.84 | 0.3924 | 0.3965 | 1.0122 | 1.0122 | 1.0227 | -1.0% | 0.0011 | 0.0018 | -39.1% |
| ASR1117 | B2 | 0717509-7 | 147.6 | 11/17/2008 | 8 | 10016 | 7.06 | 1.13 | 1418.70 | 0.3877 | 3633.84 | 0.3904 | 0.3965 | 1.0070 | 1.0070 | 1.0227 | -1.5% | 0.0008 | 0.0018 | -55.7% |
| ASR1117 | B3 | 0717509-7 | 147.6 | 11/17/2008 | 5 | 10012 | 6.98 | 0.72 | 1434.36 | 0.3931 | 3633.84 | 0.3947 | 0.4020 | 1.0041 | 1.0041 | 1.0227 | -1.8% | 0.0005 | 0.0018 | -72.3% |
| ASR1117 | B4 | 0717509-7 | 147.6 | 11/17/2008 | 13 | 10012 | 7.02 | 1.85 | 1426.21 | 0.3818 | 3633.84 | 0.3925 | 0.3905 | 1.0260 | 1.0260 | 1.0227 | 0.5% | 0.0013 | 0.0018 | -28.1% |
| ASR1117 | C1 | 0717509-7 | 147.6 | 11/17/2008 | 6 | 10008 | 6.88 | 0.87 | 1454.65 | 0.3921 | 3633.84 | 0.4003 | 0.4010 | 1.0209 | 1.0209 | 1.0227 | -0.2% | 0.0008 | 0.0018 | -66.8% |
| ASR1117 | C2 | 0717509-7 | 147.6 | 11/17/2008 | 7 | 10000 | 6.94 | 1.01 | 1440.92 | 0.3922 | 3633.84 | 0.3965 | 0.4011 | 1.0110 | 1.0110 | 1.0227 | -1.1% | 0.0007 | 0.0018 | -61.2% |
| ASR1117 | C3 | 0717509-7 | 147.6 | 11/17/2008 | 4 | 10017 | 6.88 | 0.58 | 1455.96 | 0.4018 | 3633.84 | 0.4007 | 0.4109 | 0.9972 | 0.9972 | 1.0227 | -2.5% | 0.0004 | 0.0018 | -77.9% |
| ASR1117 | C4 | 0717509-7 | 147.6 | 11/17/2008 | 4 | 10006 | 6.91 | 0.58 | 1448.05 | 0.3958 | 3633.84 | 0.3985 | 0.4048 | 1.0068 | 1.0068 | 1.0227 | -1.6% | 0.0004 | 0.0018 | -77.9% |
| ASR1117 | D1 | 0717509-7 | 147.6 | 11/17/2008 | 15 | 10005 | 6.96 | 2.16 | 1437.50 | 0.3896 | 3633.84 | 0.3956 | 0.3985 | 1.0154 | 1.0154 | 1.0227 | -0.7% | 0.0015 | 0.0018 | -16.9% |
| ASR1117 | D2 | 0717509-7 | 147.6 | 11/17/2008 | 5 | 10017 | 6.99 | 0.72 | 1433.05 | 0.3962 | 3633.84 | 0.3944 | 0.4052 | 0.9954 | 0.9954 | 1.0227 | -2.7% | 0.0005 | 0.0018 | -72.3% |
| ASR1117 | D3 | 0717509-7 | 147.6 | 11/17/2008 | 3 | 10011 | 6.89 | 0.44 | 1452.98 | 0.4034 | 3633.84 | 0.3998 | 0.4126 | 0.9912 | 0.9912 | 1.0227 | -3.1% | 0.0003 | 0.0018 | -83.4% |
| ASR1117 | D4 | 0717509-7 | 147.6 | 11/17/2008 | 14 | 10012 | 6.8 | 2.06 | 1472.35 | 0.3876 | 3633.84 | 0.4052 | 0.3984 | 1.0454 | 1.0454 | 1.0227 | 2.2% | 0.0014 | 0.0018 | -22.5% |
| ASR1117 | A1 | 0717509-9 | 168.0 | 11/17/2008 | 6 | 10022 | 6.81 | 0.88 | 1471.68 | 0.3944 | 3633.84 | 0.4050 | 0.3990 | 1.0288 | 1.0288 | 1.0117 | 1.5% | 0.0006 | 0.0018 | -66.1% |
| ASR1117 | A2 | 0717509-9 | 168.0 | 11/17/2008 | 9 | 10007 | 6.76 | 1.33 | 1460.33 | 0.3975 | 3633.84 | 0.4074 | 0.4022 | 1.0248 | 1.0248 | 1.0117 | 1.3% | 0.0009 | 0.0018 | -49.0% |
| ASR1117 | A3 | 0717509-9 | 168.0 | 11/17/2008 | 9 | 10007 | 6.9 | 1.30 | 1450.29 | 0.4031 | 3633.84 | 0.3991 | 0.4078 | 0.9901 | 0.9901 | 1.0117 | -2.1% | 0.0009 | 0.0018 | -49.0% |
| ASR1117 | A4 | 0717509-9 | 168.0 | 11/17/2008 | 2 | 10016 | 6.79 | 0.29 | 1475.11 | 0.3958 | 3633.84 | 0.4059 | 0.4004 | 1.0256 | 1.0256 | 1.0117 | 1.4% | 0.0002 | 0.0018 | -88.7% |
| ASR1117 | B1 | 0717509-9 | 168.0 | 11/17/2008 | 4 | 10005 | 6.89 | 0.58 | 1452.10 | 0.3877 | 3633.84 | 0.3996 | 0.3923 | 1.0307 | 1.0307 | 1.0117 | 1.9% | 0.0004 | 0.0018 | -77.3% |
| ASR1117 | B2 | 0717509-9 | 168.0 | 11/17/2008 | 8 | 10015 | 6.96 | 1.15 | 1438.94 | 0.3877 | 3633.84 | 0.3960 | 0.3923 | 1.0214 | 1.0214 | 1.0117 | 1.0% | 0.0008 | 0.0018 | -54.7% |
| ASR1117 | B3 | 0717509-9 | 168.0 | 11/17/2008 | 8 | 10018 | 6.97 | 0.86 | 1437.30 | 0.3931 | 3633.84 | 0.3955 | 0.3977 | 1.0062 | 1.0062 | 1.0117 | -0.5% | 0.0006 | 0.0018 | -66.0% |
| ASR1117 | B4 | 0717509-9 | 168.0 | 11/17/2008 | 13 | 10013 | 6.98 | 1.86 | 1434.53 | 0.3818 | 3633.84 | 0.3948 | 0.3863 | 1.0340 | 1.0340 | 1.0117 | 2.2% | 0.0013 | 0.0018 | -26.4% |
| ASR1117 | C1 | 0717509-9 | 168.0 | 11/17/2008 | 2 | 10005 | 6.86 | 0.29 | 1458.45 | 0.3921 | 3633.84 | 0.4014 | 0.3967 | 1.0236 | 1.0236 | 1.0117 | 1.2% | 0.0002 | 0.0018 | -88.7% |
| ASR1117 | C2 | 0717509-9 | 168.0 | 11/17/2008 | 5 | 10006 | 6.9 | 0.72 | 1450.14 | 0.3922 | 3633.84 | 0.3991 | 0.3968 | 1.0175 | 1.0175 | 1.0117 | 0.6% | 0.0005 | 0.0018 | -71.7% |
| ASR1117 | C3 | 0717509-9 | 168.0 | 11/17/2008 | 4 | 10003 | 6.96 | 0.57 | 1437.21 | 0.4018 | 3633.84 | 0.3955 | 0.4065 | 0.9843 | 0.9843 | 1.0117 | -2.7% | 0.0004 | 0.0018 | -77.3% |
| ASR1117 | C4 | 0717509-9 | 168.0 | 11/17/2008 | 11 | 10018 | 6.79 | 1.62 | 1475.41 | 0.3958 | 3633.84 | 0.4060 | 0.4004 | 1.0258 | 1.0258 | 1.0117 | 1.4% | 0.0011 | 0.0018 | -37.8% |
| ASR1117 | D1 | 0717509-9 | 168.0 | 11/17/2008 | 12 | 10008 | 6.98 | 1.72 | 1433.81 | 0.3896 | 3633.84 | 0.3946 | 0.3942 | 1.0128 | 1.0128 | 1.0117 | 0.1% | 0.0012 | 0.0018 | -32.0% |
| ASR1117 | D2 | 0717509-9 | 168.0 | 11/17/2008 | 12 | 10006 | 6.98 | 1.72 | 1433.52 | 0.3962 | 3633.84 | 0.3945 | 0.4009 | 0.9957 | 0.9957 | 1.0117 | -1.6% | 0.0012 | 0.0018 | -32.0% |
| ASR1117 | D3 | 0717509-9 | 168.0 | 11/17/2008 | 10 | 10016 | 6.78 | 1.47 | 1477.29 | 0.4034 | 3633.84 | 0.4065 | 0.4081 | 1.0078 | 1.0078 | 1.0117 | -0.4% | 0.0010 | 0.0018 | -43.4% |
| ASR1117 | D4 | 0717509-9 | 168.0 | 11/17/2008 | 6 | 10011 | 6.83 | 0.88 | 1465.74 | 0.3876 | 3633.84 | 0.4034 | 0.3921 | 1.0407 | 1.0407 | 1.0117 | 2.9% | 0.0006 | 0.0018 | -66.0% |
| ASR1117 | A1 | 0717509-8 | 168.3 | 11/17/2008 | 11 | 10002 | 6.94 | 1.59 | 1441.21 | 0.3944 | 3633.84 | 0.3966 | 0.3990 | 1.0056 | 1.0056 | 1.0116 | -0.6% | 0.0011 | 0.0018 | -37.6% |
| ASR1117 | A2 | 0717509-8 | 168.3 | 11/17/2008 | 11 | 10004 | 6.92 | 1.59 | 1445.66 | 0.3975 | 3633.84 | 0.3978 | 0.4021 | 1.0008 | 1.0008 | 1.0116 | -1.1% | 0.0011 | 0.0018 | -37.6% |
| ASR1117 | A3 | 0717509-8 | 168.3 | 11/17/2008 | 8 | 10009 | 6.87 | 1.16 | 1456.91 | 0.4031 | 3633.84 | 0.4009 | 0.4078 | 0.9946 | 0.9946 | 1.0116 | -1.7% | 0.0008 | 0.0018 | -54.7% |
| ASR1117 | A4 | 0717509-8 | 168.3 | 11/17/2008 | 4 | 10014 | 6.74 | 0.59 | 1485.76 | 0.3958 | 3633.84 | 0.4089 | 0.4004 | 1.0330 | 1.0330 | 1.0116 | 2.1% | 0.0004 | 0.0018 | -77.3% |
| ASR1117 | B1 | 0717509-8 | 168.3 | 11/17/2008 | 5 | 10004 | 6.96 | 0.72 | 1437.36 | 0.3877 | 3633.84 | 0.3955 | 0.3922 | 1.0202 | 1.0202 | 1.0116 | 0.9% | 0.0005 | 0.0018 | -71.7% |
| ASR1117 | B2 | 0717509-8 | 168.3 | 11/17/2008 | 9 | 10008 | 7 | 1.29 | 1429.71 | 0.3877 | 3633.84 | 0.3934 | 0.3922 | 1.0148 | 1.0148 | 1.0116 | 0.3% | 0.0009 | 0.0018 | -49.0% |
| ASR1117 | B3 | 0717509-8 | 168.3 | 11/17/2008 | 7 | 10006 | 6.96 | 1.01 | 1437.64 | 0.3931 | 3633.84 | 0.3956 | 0.3977 | 1.0064 | 1.0064 | 1.0116 | -0.5% | 0.0007 | 0.0018 | -60.3% |
| ASR1117 | B4 | 0717509-8 | 168.3 | 11/17/2008 | 12 | 10007 | 6.93 | 1.73 | 1444.01 | 0.3818 | 3633.84 | 0.3974 | 0.3862 | 1.0408 | 1.0408 | 1.0116 | 2.9% | 0.0012 | 0.0018 | -32.0% |
| ASR1117 | C1 | 0717509-8 | 168.3 | 11/17/2008 | 8 | 10006 | 6.92 | 1.16 | 1445.95 | 0.3921 | 3633.84 | 0.3979 | 0.3966 | 1.0148 | 1.0148 | 1.0116 | 0.3% | 0.0008 | 0.0018 | -54.7% |
| ASR1117 | C2 | 0717509-8 | 168.3 | 11/17/2008 | 7 | 10011 | 6.9 | 1.01 | 1450.87 | 0.3922 | 3633.84 | 0.3993 | 0.3967 | 1.0180 | 1.0180 | 1.0116 | 0.6% | 0.0007 | 0.0018 | -60.3% |
| ASR1117 | C3 | 0717509-8 | 168.3 | 11/17/2008 | 6 | 10001 | 6.89 | 0.87 | 1451.52 | 0.4018 | 3633.84 | 0.3994 | 0.4065 | 0.9941 | 0.9941 | 1.0116 | -1.7% | 0.0006 | 0.0018 | -66.0% |
| ASR1117 | C4 | 0717509-8 | 168.3 | 11/17/2008 | 6 | 10008 | 6.79 | 0.88 | 1473.93 | 0.3958 | 3633.84 | 0.4056 | 0.4004 | 1.0248 | 1.0248 | 1.0116 | 1.3% | 0.0006 | 0.0018 | -66.0% |
| ASR1117 | D1 | 0717509-8 | 168.3 | 11/17/2008 | 7 | 10009 | 6.96 | 1.01 | 1438.07 | 0.3896 | 3633.84 | 0.3957 | 0.3941 | 1.0158 | 1.0158 | 1.0116 | 0.4% | 0.0007 | 0.0018 | -60.3% |
| ASR1117 | D2 | 0717509-8 | 168.3 | 11/17/2008 | 8 | 10010 | 7.01 | 0.86 | 1427.96 | 0.3962 | 3633.84 | 0.3930 | 0.4008 | 0.9918 | 0.9918 | 1.0116 | -2.0% | 0.0006 | 0.0018 | -66.0% |
| ASR1117 | D3 | 0717509-8 | 168.3 | 11/17/2008 | 2 | 10005 | 6.72 | 0.30 | 1488.84 | 0.4034 | 3633.84 | 0.4097 | 0.4081 | 1.0157 | 1.0157 | 1.0116 | 0.4% | 0.0002 | 0.0018 | -88.7% |
| ASR1117 | D4 | 0717509-8 | 168.3 | 11/17/2008 | 5 | 10002 | 6.91 | 0.72 | 1447.47 | 0.3876 | 3633.84 | 0.3983 | 0.3921 | 1.0277 | 1.0277 | 1.0116 | 1.6% | 0.0005 | 0.0018 | -71.7% |



Beta Atten - Sr-90
Attenuation Coefficient
(Observed and Fitted)
1.2000
1.1500
1.1000
1.0500
1.0000
0.9500
0.9000
0.8500
0.8000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
200.0
Mass (mg)


Beta > Alpha Cross-Talk - Sr-90
X-Talk (Alpha cpm/Beta cpm)
0.0038
0.0036
0.0034
0.0032
0.0030
0.0028
0.0026
0.0024
0.0022
0.0020
0.0018
0.0016
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
Mass (mg)



Beta Atten - Sr-90
Fitted Attenuation
0.4500
0.4400
0.4300
0.4200
0.4100
0.4000
0.3900
0.3800
0.3800
0.3900
0.4000
0.4100
0.4200
0.4300
0.4400
0.4500
Observed Attenuation

PROJECT LB4100C

11/17/08 Sr90 Ringed Planchet Mass Attenuation Curve

Benchsheet: ~~AB08~~ AB070525-1 JP 11/18/08 Sources: 0717509-S1→S16

| Det | 11:17 | 11:34 | 11:44 | 11:54 | 12:05 | 12:14 | 12:28 | 12:41 | 13:05 | 13:16 | 13:28 | 13:39 | 13:53 | 14:03 | 14:22 | 14:31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 |
| A2 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 |
| A3 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 |
| A4 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 |
| B1 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 |
| B2 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 |
| B3 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
| B4 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |
| C1 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 |
| C2 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 |
| C3 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 |
| C4 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 |
| D1 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 |
| D2 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 |
| D3 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 |
| D4 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

Filename: ASR1117

JP 11/18/08

Continued on Page

Read and Understood By

[signature] 11/18/08 [signature] 11/19/08

Signed Date Signed Date

Date 11/17/08

SOP 724r 10

**Paragon Analytics**

Low Background Gas Flow Proportional Counter Log

**Instrument: LB4100C**

*Instrument Daily Response and Background Checks*

| Det. | Daily Response Check Start 1 | Status | Start 2 | Status | Background Check Start 1 | Status | Start 2 | Status | Det. Status |
|---|---|---|---|---|---|---|---|---|---|
| 1 | JP | P | | | JP | Hα | JP | P | P |
| 2 | | | | | | P | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

*Weekly Background Calibration*

| | Current Calib. File ID | Weekly Calib. Started | Status | File ID |
|---|---|---|---|---|
| Dr A | BKC1111W | | | |
| Dr B | | | | |
| Dr C | | | | |
| Dr D | | | | |

Dr = Drawer

*Gas Supply*

| P-10 Supply | | P-10 Flow | |
|---|---|---|---|
| Tank 1 | 1450 | Dr A | 0.15 |
| | | Dr B | |
| Tank 2 | 550 | Dr C | |
| | | Dr D | |

Comments:



Form 780r8.doc (6/23/06)

Reviewed By / Date JP 11/17/08

Date 11/17/08

SOP 724r10

## Paragon Analytics

Low Background Gas Flow Proportional Counter Log

**Instrument: LB4100C**

| Det. | Sample ID | Batch | Test | Count Dur. (min) | Start Time | Analyst Initials | File ID | Output Initials |
|---|---|---|---|---|---|---|---|---|
| 1-16 | Daily Eff | ——— | — | 30 | 7:16 | JP | EFC1117 | JP |
| 1-16 | Daily Bkg | ——— | — | 60 | 7:31 | JP | BKC1117 | JP |
| 1 | Daily Bkg | ——— | — | 60 | 8:39 | JP | BKC1117R | JP |
| 1-4 | 1005 | Am241 Eff | α | 30 | 10:14 | JP | EAM1117 | JP |
| 5-8 | 1005 | ↓ | ↓ | ↓ | 10:29 | JP | EAM1117A | JP |
| 9-12 | 1005 | ↓ | ↓ | ↓ | 10:40 | JP | EAM1117B | JP |
| 13-16 | 1005 | ↓ | ↓ | ↓ | 10:50 | JP | EAM1117C | JP |
| 13-16 | 1006 | Sr90 Eff | B | 30 | 10:14 | JP | ESR1117 | JP |
| 9-12 | 1006 | ↓ | ↓ | ↓ | 10:29 | JP | ESR1117A | JP |
| 5-8 | 1006 | ↓ | ↓ | ↓ | 10:40 | JP | ESR1117B | JP |
| 1-4 | 1006 | ↓ | ↓ | ↓ | 10:50 | JP | ESR1117C | JP |
| 1-16 | 0717504-S1→S16 | Beta Attn Curve | Attn | 60 | 11:07 | JP | ASR1117 | JP |

JP 11/17/08

Comments:

Page No.: **370907 B**

(cont. from page NA B)

Form 780r8.doc (6/23/06)

Reviewed By / Date JP 11/17/08

Date 11/18/08 SOP 724r10

# Paragon Analytics

Low Background Gas Flow Proportional Counter Log

**Instrument: LB4100C**

*Instrument Daily Response and Background Checks*

| Det. | Daily Response Check Start 1 | Status | Start 2 | Status | Background Check Start 1 | Status | Start 2 | Status | Det. Status |
|---|---|---|---|---|---|---|---|---|---|
| 1 | JP | P | | | JP | P | | | P |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

*Weekly Background Calibration*

| | Current Calib. File ID | Weekly Calib. Started | Status | File ID |
|---|---|---|---|---|
| Dr A | BKC1111W | | | |
| Dr B | | | | |
| Dr C | | | | |
| Dr D | | | | |

Dr = Drawer

*Gas Supply*

| P-10 Supply | | P-10 Flow | |
|---|---|---|---|
| Tank 1 | 1100 | Dr A | 0.15 |
| | | Dr B | |
| Tank 2 | 550 | Dr C | |
| | | Dr D | |

Comments:

# Radiochemistry Instrument Worksheet

**Prep Batch:** AB070525-1

**Prep Procedure:** GAB

Analytical QASS / NCR? Y N NA

| Prep Num | LabID | QC Type | Init Alq | Fin Alq | Units | Report 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 | 0717509-S10 | LCS | 200 | 200 | ml | PCI/L | 17.3 | | | | | | | | | | |
| 1 | 0717509-S11 | LCS | 200 | 200 | ml | PCI/L | 19.2 | | | | | | | | | | |
| 1 | 0717509-S12 | LCS | 200 | 200 | ml | PCI/L | 36.3 | | | | | | | | | | |
| 1 | 0717509-S13 | LCS | 200 | 200 | ml | PCI/L | 39.3 | | | | | | | | | | |
| 1 | 0717509-S14 | LCS | 200 | 200 | ml | PCI/L | 62.6 | | | | | | | | | | |
| 1 | 0717509-S15 | LCS | 200 | 200 | ml | PCI/L | 61.1 | | | | | | | | | | |
| 1 | 0717509-S16 | LCS | 200 | 200 | ml | PCI/L | 82 | | | | | | | | | | |
| 1 | 0717509-S1 | LCS | 200 | 200 | ml | PCI/L | 77 | | | | | | | | | | |
| 1 | 0717509-S2 | LCS | 200 | 200 | ml | PCI/L | 103 | | | | | | | | | | |
| 1 | 0717509-S3 | LCS | 200 | 200 | ml | PCI/L | 107.6 | | | | | | | | | | |
| 1 | 0717509-S4 | LCS | 200 | 200 | ml | PCI/L | 129.7 | | | | | | | | | | |
| 1 | 0717509-S5 | LCS | 200 | 200 | ml | PCI/L | 129.8 | | | | | | | | | | |
| 1 | 0717509-S6 | LCS | 200 | 200 | ml | PCI/L | 138.2 | | | | | | | | | | |
| 1 | 0717509-S7 | LCS | 200 | 200 | ml | PCI/L | 147.6 | | | | | | | | | | |
| 1 | 0717509-S8 | LCS | 200 | 200 | ml | PCI/L | 168.3 | | | | | | | | | | JP 12/8/08 |
| 1 | 0717509-S9 | LCS | 200 | 200 | ml | PCI/L | 168 | | | | | | | | | | NA |

**Spike Solution Information**

| Soln # | Nuclide | SolnID | Prep Conc | Units | Prep Date | Aliquot | Units | Pipet ID |
|---|---|---|---|---|---|---|---|---|
| S1 | Sr-90 | 777.3020.11 | 4,707.458 | DPM/ml | 05/25/07 | 0.4 | ml | RS-010 |



Supersedes: NA

# Radiochemistry Instrument Worksheet

**Prep Batch:** AB070525-1

## Reporting Units

## Sample Barcodes

| | |
|---|---|
| 0717509-S10LCS<br>AB070525-1PS1 | 0717509-S11LCS<br>AB070525-1PS2 |
| 0717509-S12LCS<br>AB070525-1PS3 | 0717509-S13LCS<br>AB070525-1PS4 |
| 0717509-S14LCS<br>AB070525-1PS5 | 0717509-S15LCS<br>AB070525-1PS6 |
| 0717509-S16LCS<br>AB070525-1PS7 | 0717509-S1LCS<br>AB070525-1PS8 |
| 0717509-S2LCS<br>AB070525-1PS9 | 0717509-S3LCS<br>AB070525-1PS10 |
| 0717509-S4LCS<br>AB070525-1PS11 | 0717509-S5LCS<br>AB070525-1PS12 |
| 0717509-S6LCS<br>AB070525-1PS13 | 0717509-S7LCS<br>AB070525-1PS14 |
| 0717509-S8LCS<br>AB070525-1PS15 | 0717509-S9LCS<br>AB070525-1PS16 |

# Radiochemistry Prep Worksheet

**Paragon Analytics**

**Prep Batch: AB070525-1**

**Prep Procedure:** GAB

**Reviewed By:** DBC DBC **Review Date:** 5/30/07

**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:** 18
**Prep SOP:** NONE
**Matrix Class:** liquid

**Prep Analyst:** Derek B. Caduff
**Prep Date:** 5/25/07
**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 | 0717509-S10 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 2 | 1 | 0717509-S11 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 3 | 1 | 0717509-S12 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 4 | 1 | 0717509-S13 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 5 | 1 | 0717509-S14 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 6 | 1 | 0717509-S15 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 7 | 1 | 0717509-S16 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 8 | 1 | 0717509-S1 | LCS | DBC 5/30/07 | 200 | 200 | Unfiltered | S1 | DBC 5/30/07 |
| 9 | 1 | 0717509-S2 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 10 | 1 | 0717509-S3 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 11 | 1 | 0717509-S4 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 12 | 1 | 0717509-S5 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 13 | 1 | 0717509-S6 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 14 | 1 | 0717509-S7 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 15 | 1 | 0717509-S8 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 16 | 1 | 0717509-S9 | LCS | | 200 | 200 | Unfiltered | S1 | |

**Spiked By:** Amanda Barlage **Date:** 5/26/07

**Witnessed By:** Tambrae Elhart **Date:** 5/26/07

**Spike Solution Information**

| Soln # | Nuclide | SolnID | Prep Conc | Units | Prep Date | Aliquot | Units | Pipet ID |
|---|---|---|---|---|---|---|---|---|
| S1 | Sr-90 | 777.3020.11 | 4,707.458 | DPM/ml | 05/25/07 | 0.4 | ml | RS-010 |

Comments
ALL SAMPLES DESICCATED AT 16:30 ON 5/29/2007.

**Paragon Analytics**

# Radiochemistry Gravimetric Worksheet

**Prep Batch: AB070525-1**

Prep Procedure: **GAB**

Reviewed By: jcp JCP

Review Date: 10/20/2008

| 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 | 0717509-S10 | LCS | 10 | 9.5115 | 0.0000 | 0 | 200 | 200 | 0 | 9.5288 | 17.3 | 0.5 | |
| 1 | 2 | 0717509-S11 | LCS | 10 | 9.5230 | 0.0000 | 0 | 200 | 200 | 0 | 9.5422 | 19.2 | 0.5 | |
| 1 | 3 | 0717509-S12 | LCS | 10 | 9.5018 | 0.0000 | 0 | 200 | 200 | 0 | 9.5381 | 36.3 | 1 | |
| 1 | 4 | 0717509-S13 | LCS | 10 | 9.5297 | 0.0000 | 0 | 200 | 200 | 0 | 9.5690 | 39.3 | 1 | |
| 1 | 5 | 0717509-S14 | LCS | 10 | 9.5259 | 0.0000 | 0 | 200 | 200 | 0 | 9.5885 | 62.6 | 1.5 | |
| 1 | 6 | 0717509-S15 | LCS | 10 | 9.5226 | 0.0000 | 0 | 200 | 200 | 0 | 9.5837 | 61.1 | 1.5 | |
| 1 | 7 | 0717509-S16 | LCS | 10 | 9.5314 | 0.0000 | 0 | 200 | 200 | 0 | 9.6134 | 82 | 2 | |
| 1 | 8 | 0717509-S1 | LCS | 10 | 9.5017 | 0.0000 | 0 | 200 | 200 | 0 | 9.5787 | 77 | 2 | |
| 1 | 9 | 0717509-S2 | LCS | 10 | 9.5032 | 0.0000 | 0 | 200 | 200 | 0 | 9.6062 | 103 | 2.5 | FM |
| 1 | 10 | 0717509-S3 | LCS | 10 | 9.5382 | 0.0000 | 0 | 200 | 200 | 0 | 9.6458 | 107.6 | 2.5 | FM |
| 1 | 11 | 0717509-S4 | LCS | 10 | 9.5424 | 0.0000 | 0 | 200 | 200 | 0 | 9.6721 | 129.7 | 3 | FM |
| 1 | 12 | 0717509-S5 | LCS | 10 | 9.5507 | 0.0000 | 0 | 200 | 200 | 0 | 9.6805 | 129.8 | 3 | FM |
| 1 | 13 | 0717509-S6 | LCS | 10 | 9.5523 | 0.0000 | 0 | 200 | 200 | 0 | 9.6905 | 138.2 | 3.5 | FM |
| 1 | 14 | 0717509-S7 | LCS | 10 | 9.5150 | 0.0000 | 0 | 200 | 200 | 0 | 9.6626 | 147.6 | 3.5 | FM |
| 1 | 15 | 0717509-S8 | LCS | 10 | 9.5501 | 0.0000 | 0 | 200 | 200 | 0 | 9.7184 | 168.3 | 4 | FM |
| 1 | 16 | 0717509-S9 | LCS | 10 | 9.5239 | 0.0000 | 0 | 200 | 200 | 0 | 9.6919 | 168 | 4 | FM |



Supersedes: NA

**Paragon Analytics**

# Radiochemistry Prep Worksheet

**Prep Batch: AB070525-1**

**Prep Procedure:** GAB

## Prep Batch Not Validated!!!

**Reviewed By:** **Review Date:**

**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:** 18
**Prep SOP:** NONE
**Matrix Class:** liquid

**Prep Analyst:** Derek B. Caduff DBC
**Prep Date:** 5/25/2007
**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 | 0717509-S10 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 2 | 1 | 0717509-S11 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 3 | 1 | 0717509-S12 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 4 | 1 | 0717509-S13 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 5 | 1 | 0717509-S14 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 6 | 1 | 0717509-S15 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 7 | 1 | 0717509-S16 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 8 | 1 | 0717509-S1 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 9 | 1 | 0717509-S2 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 10 | 1 | 0717509-S3 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 11 | 1 | 0717509-S4 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 12 | 1 | 0717509-S5 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 13 | 1 | 0717509-S6 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 14 | 1 | 0717509-S7 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 15 | 1 | 0717509-S8 | LCS | | 200 | 200 | Unfiltered | S1 | |
| 16 | 1 | 0717509-S9 | LCS | | 200 | 200 | Unfiltered | S1 | |

**Spiked By:** Amanda Barlage A **Date:** 5/26/2007

**Witnessed By:** Tambrae Elhart TE **Date:** 5/26/2007 5/26/07

Tray#3 1-16

**Spike Solution Information**

| Soln # | Nuclide | SolnID | Prep Conc | Units | Prep Date | Aliquot | Units | Pipet ID |
|---|---|---|---|---|---|---|---|---|
| S1 | Sr-90 | 777.3020.11 | 4,707.458 | DPM/ml | 05/25/07 | 0.4 | ml | RS-010 |

Exp 11/8/07

Comments
ALL SAMPLES DESICCATED AT 16:30 on 5/29/07.

## Internal Calculation Verifications

# ICBs
# &
# ICVs

## *Gross Alpha/Beta LB4100C ICV's/ICB's AM241/SR90*

| Atten. Constants | b | m | a | x0 |
|---|---|---|---|---|
| Alpha | 1.1500 | 0.9890 | 0.75 | 0 |
| Beta | 1.1058 | 0.9995 | 0.9921 | 0.0 |

| X-Talk Constants | m | b |
|---|---|---|
| $\alpha > \beta$ | 0.9991 | 0.2475 |
| $\beta > \alpha$ | 0.0021 | -2.000E-06 |

| | | | | | | | Alpha | | | | | | Beta | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detector | Sample ID | Initial Aliquot | Final Sam. Size | Count Date | Count Dur. | Residual Mass (mg) | Gross CPM | Bkg CPM | $\beta > \alpha$ X-Talk | Net CPM | Atten. | Efficiency | Gross CPM | Bkg CPM | $\alpha > \beta$ X-Talk | Net CPM | Atten. | Efficiency |
| A2 | 0823500-1MB | 0.200 | 0.200 | 12/4/2008 | 120 | 22.3 | 0.042 | 0.043 | 0.000 | -0.001 | 0.956 | 0.2458 | 1.608 | 1.507 | -0.0003 | 0.1013 | 1.0936 | 0.3975 |
| A4 | 0823500-2MB | 0.200 | 0.200 | 12/4/2008 | 120 | 70.7 | 0.058 | 0.039 | 0.000 | 0.019 | 0.640 | 0.2441 | 1.550 | 1.487 | 0.0050 | 0.0580 | 1.0677 | 0.3958 |
| B1 | 0823500-3MB | 0.200 | 0.200 | 12/4/2008 | 120 | 105.0 | 0.058 | 0.063 | 0.000 | -0.005 | 0.481 | 0.2150 | 1.608 | 1.584 | -0.0014 | 0.0254 | 1.0497 | 0.3877 |
| C1 | 0823500-1MB | 0.200 | 0.200 | 12/4/2008 | 120 | 22.3 | 0.083 | 0.071 | 0.000 | 0.012 | 0.956 | 0.2205 | 1.825 | 1.766 | 0.0030 | 0.0560 | 1.0936 | 0.3921 |
| C4 | 0823500-2MB | 0.200 | 0.200 | 12/4/2008 | 120 | 70.7 | 0.050 | 0.055 | -0.001 | -0.004 | 0.640 | 0.2382 | 1.325 | 1.641 | -0.0013 | -0.3147 | 1.0677 | 0.3958 |
| D2 | 0823500-3MB | 0.200 | 0.200 | 12/4/2008 | 120 | 105.0 | 0.067 | 0.049 | 0.000 | 0.018 | 0.481 | 0.2442 | 1.483 | 1.558 | 0.0049 | -0.0799 | 1.0497 | 0.3962 |
| A1 | 0823500-4LCS | 0.200 | 0.200 | 12/4/2008 | 120 | 21.5 | 20.800 | 0.043 | 0.100 | 20.757 | 0.962 | 0.2202 | 50.325 | 1.497 | 5.2630 | 43.5650 | 1.0941 | 0.3944 |
| B3 | 0823500-5LCS | 0.200 | 0.200 | 12/4/2008 | 120 | 72.8 | 14.092 | 0.086 | 0.084 | 13.942 | 0.629 | 0.2327 | 44.308 | 1.572 | 3.7066 | 39.0294 | 1.0666 | 0.3931 |
| B4 | 0823500-6LCS | 0.200 | 0.200 | 12/4/2008 | 120 | 101.4 | 10.108 | 0.051 | 0.080 | 9.977 | 0.496 | 0.2313 | 43.550 | 1.554 | 2.7271 | 39.2689 | 1.0515 | 0.3818 |
| C2 | 0823500-4LCS | 0.200 | 0.200 | 12/4/2008 | 120 | 21.5 | 20.458 | 0.056 | 0.099 | 20.303 | 0.962 | 0.2465 | 49.800 | 1.538 | 5.1482 | 43.1138 | 1.0941 | 0.3922 |
| D1 | 0823500-5LCS | 0.200 | 0.200 | 12/4/2008 | 120 | 72.8 | 14.892 | 0.058 | 0.086 | 14.748 | 0.629 | 0.2251 | 45.525 | 1.683 | 3.9201 | 39.9219 | 1.0666 | 0.3898 |
| D3 | 0823500-6LCS | 0.200 | 0.200 | 12/4/2008 | 120 | 101.4 | 10.775 | 0.070 | 0.082 | 10.623 | 0.496 | 0.2412 | 44.650 | 1.549 | 2.9026 | 40.1982 | 1.0515 | 0.4034 |

| Spike Information | | | | | |
|---|---|---|---|---|---|
| Sample ID | Alpha Std ID | Ref. Date | Act (pCi/ml) | Spike Vol (mL) | Decay Corr. Spike Act. Added |
| 0823500-4LCS | 616.3020.13 | 11/4/2008 | 100.700 | 1.0 | 100.599 |
| 0823500-5LCS | | | 100.700 | 1.0 | 100.599 |
| 0823500-6LCS | | | 100.700 | 1.0 | 100.599 |

| Spike Information | | | | | |
|---|---|---|---|---|---|
| Sample ID | Beta Std ID | Ref. Date | Act (pCi/ml) | Spike Vol (mL) | Decay Corr. Spike Act. Added |
| 0823500-4LCS | 600.3610.01 | 11/4/2008 | 49.314 | 1.0 | 49.217 |
| 0823500-5LCS | | | | 1.0 | 49.217 |
| 0823500-6LCS | | | | 1.0 | 49.217 |

| Sample ID | Alpha | | | | Beta | | | |
|---|---|---|---|---|---|---|---|---|
| | Act (pCi/ ) | TPU (2 sig) | MDC | % Recov. | Act (pCi/ ) | TPU (2 sig) | MDC | % Recov. |
| 0823500-1MB | -0.01 | 0.4 | 1.06 | | 0.52 | 1.3 | 2.82 | |
| 0823500-2MB | 0.27 | 0.7 | 1.54 | | 0.31 | 1.3 | 2.88 | |
| 0823500-3MB | -0.11 | 1.0 | 2.81 | | 0.14 | 1.4 | 3.08 | |
| 0823500-1MB | 0.13 | 0.6 | 1.45 | | 0.29 | 1.4 | 3.08 | |
| 0823500-2MB | -0.06 | 0.6 | 1.80 | | -1.68 | 1.2 | 3.02 | |
| 0823500-3MB | 0.35 | 0.9 | 2.23 | | -0.43 | 1.3 | 3.00 | |
| 0823500-4LCS | 220.66 | 36.2 | 1.95 | 98.8% | 227.39 | 36.9 | 5.88 | 104.1% |
| 0823500-5LCS | 214.66 | 35.8 | 2.87 | 96.1% | 209.66 | 34.1 | 5.36 | 95.9% |
| 0823500-6LCS | 195.92 | 33.2 | 3.46 | 87.7% | 220.29 | 35.8 | 5.05 | 100.8% |
| 0823500-4LCS | 192.80 | 31.7 | 1.80 | 86.3% | 226.30 | 36.7 | 5.88 | 103.6% |
| 0823500-5LCS | 234.73 | 39.0 | 2.92 | 105.1% | 216.38 | 35.2 | 5.57 | 99.0% |
| 0823500-6LCS | 200.04 | 33.8 | 3.54 | 89.6% | 213.43 | 34.6 | 4.88 | 97.7% |

| Alpha CU (1 sig) | Alpha TPU (1 sig) | Beta CU (1 sig) | Beta TPU (1 sig) |
|---|---|---|---|
| 0.1905 | 0.1905 | 0.6325 | 0.6339 |
| 0.3300 | 0.3307 | 0.6406 | 0.6410 |
| 0.5089 | 0.5090 | 0.6772 | 0.6773 |
| 0.2953 | 0.2955 | 0.6848 | 0.6852 |
| 0.3192 | 0.3193 | 0.6000 | 0.6146 |
| 0.4718 | 0.4726 | 0.6398 | 0.6407 |
| 4.4477 | 18.1231 | 3.5563 | 18.4514 |
| 5.2930 | 17.8920 | 3.4046 | 17.0370 |
| 5.7233 | 16.6161 | 3.4908 | 17.8840 |
| 3.9312 | 15.8466 | 3.5578 | 18.3660 |
| 5.6242 | 19.5173 | 3.4863 | 17.5776 |
| 5.6662 | 16.9053 | 3.3489 | 17.3205 |

# PAI - Gas Flow Proportional Sample Analysis LB4100-C

Unit Type: LB4100 -C
Counting Unit ID: Magenta
High Voltage Mode: Simultaneous
Application Revision: 2
Application Version: Standard
Rev.12/01/08 JCP

Data file name: ABC1204A
Batch ID: AB081104-1
Count Preset (m): 120
Batch Ended: 12/4/2008 11:46

Background logfile: BKGABW
Date of Bkg. Cal: 12/4/2008
Alpha efficiency logfile: Am241R-11/08
Alpha attenuation calibration: AAM1118
Beta efficiency logfile: Sr90R-11/08
Beta attenuation calibration: ASR1117

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= | 1.16000 | Beta b= | 1.1056 |
| m= | 0.96900 | m= | 0.9995 |
| a= | 0.7500 | a= | 0.9921 |
| 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= | 0.2475 | b ->a xtalk b= | -2.00E-08 |
| a ->b xtalk m= | 0.9991 | b ->a xtalk m= | 0.0021 |

| 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. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 0823500-1MB | 12/4/2008 11:46 | 120.00 | 22.3 | 0.083 | 0.071 | 0.000 | 0.2205 | 0.956 | n/a | n/a | 1.825 | 1.766 | 0.0031 | 0.3921 | 1.094 | n/a | n/a |
| C2 | 0823500-4LCS | 12/4/2008 11:46 | 120.00 | 21.5 | 20.458 | 0.056 | 0.099 | 0.2465 | 0.962 | n/a | n/a | 49.800 | 1.538 | 5.1483 | 0.3922 | 1.094 | n/a | n/a |
| C4 | 0823500-2MB | 12/4/2008 11:46 | 120.00 | 70.7 | 0.050 | 0.055 | 0.000 | 0.2382 | 0.640 | n/a | n/a | 1.325 | 1.641 | 0.0000 | 0.3958 | 1.068 | n/a | n/a |
| D1 | 0823500-5LCS | 12/4/2008 11:46 | 120.00 | 72.8 | 14.892 | 0.058 | 0.086 | 0.2251 | 0.629 | n/a | n/a | 45.525 | 1.683 | 3.9200 | 0.3896 | 1.067 | n/a | n/a |
| D2 | 0823500-3MB | 12/4/2008 11:46 | 120.00 | 105.0 | 0.067 | 0.049 | 0.000 | 0.2442 | 0.481 | n/a | n/a | 1.483 | 1.558 | 0.0048 | 0.3962 | 1.050 | n/a | n/a |
| D3 | 0823500-6LCS | 12/4/2008 11:46 | 120.00 | 101.4 | 10.775 | 0.054 | 0.082 | 0.2412 | 0.496 | n/a | n/a | 44.650 | 1.549 | 2.9071 | 0.4034 | 1.052 | n/a | n/a |

JP 12/5/08

# PAI - Gas Flow Proportional Sample Analysis LB4100-C

Unit Type: LB4100 -C
Counting Unit ID: Magenta
High Voltage Mode: Simultaneous
Application Revision: 2
Application Version: Standard
Rev.12/01/08 JCP

Data file name: ABC1204
Batch ID: AB081104-1
Count Preset (m): 120
Batch Ended: 12/4/2008 9:37

Background logfile: BKGABW
Date of Bkg. Cal: 12/4/2008
Alpha efficiency logfile: Am241R-11/08
Alpha attenuation calibration: AAM1118
Beta efficiency logfile: Sr90R-11/08
Beta attenuation calibration: ASR1117

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= | 1.15000 | Beta b= | 1.1068 |
| m= | 0.98900 | m= | 0.9986 |
| a= | 0.7500 | a= | 0.9921 |
| 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= | 0.2476 | b ->a xtalk b= | -2.00E-06 |
| a ->b xtalk m= | 0.9991 | b ->a xtalk m= | 0.0021 |

| Det. ID | Sample ID | Count End Date & Time | Count Dur. (min) | Resid. Mass (mg) | Alpha Activity | | | | | | | Beta Activity | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Gross CPM | Bkg. CPM | b>a xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. | Gross CPM | Bkg. CPM | a>b xtlk CPM | Base Eff | Base Cor.Fact. | Progeny Eff | Progeny Cor.Fact. |
| A1 | 0823500-4LCS | 12/4/2008 9:37 | 120.00 | 21.5 | 20.900 | 0.043 | 0.100 | 0.2202 | 0.962 | n/a | n/a | 50.325 | 1.497 | 5.2630 | 0.3944 | 1.094 | n/a | n/a |
| A2 | 0823500-1MB | 12/4/2008 9:37 | 120.00 | 22.3 | 0.042 | 0.043 | 0.000 | 0.2458 | 0.956 | n/a | n/a | 1.608 | 1.507 | 0.0000 | 0.3975 | 1.094 | n/a | n/a |
| A4 | 0823500-2MB | 12/4/2008 9:37 | 120.00 | 70.7 | 0.058 | 0.039 | 0.000 | 0.2441 | 0.640 | n/a | n/a | 1.550 | 1.487 | 0.0051 | 0.3958 | 1.068 | n/a | n/a |
| B1 | 0823500-3MB | 12/4/2008 9:37 | 120.00 | 105.0 | 0.058 | 0.063 | 0.000 | 0.2150 | 0.481 | n/a | n/a | 1.608 | 1.504 | 0.0000 | 0.3877 | 1.050 | n/a | n/a |
| B3 | 0823500-5LCS | 12/4/2008 9:37 | 120.00 | 72.8 | 14.092 | 0.066 | 0.084 | 0.2327 | 0.629 | n/a | n/a | 44.308 | 1.572 | 3.7065 | 0.3931 | 1.067 | n/a | n/a |
| B4 | 0823500-6LCS | 12/4/2008 9:37 | 120.00 | 101.4 | 10.108 | 0.051 | 0.080 | 0.2313 | 0.496 | n/a | n/a | 43.550 | 1.554 | 2.7272 | 0.3818 | 1.052 | n/a | n/a |

JP 12/5/08

Date 12/4/08

SOP 724r 10

# Paragon Analytics

Low Background Gas Flow Proportional Counter Log

**Instrument: LB4100C**

*Instrument Daily Response and Background Checks*

| Det. | Daily Response Check Start 1 | Status | Start 2 | Status | Background Check Start 1 | Status | Start 2 | Status | Det. Status |
|---|---|---|---|---|---|---|---|---|---|
| 1 | JP | P | | | * | | | | P |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

*Weekly Background Calibration*

| | Current Calib. File ID | Weekly Calib. Started | Status | File ID |
|---|---|---|---|---|
| Dr A | BKC1203W | | | |
| Dr B | | | | |
| Dr C | | | | |
| Dr D | | | | |

Dr = Drawer

*Gas Supply*

| P-10 Supply | | P-10 Flow | |
|---|---|---|---|
| Tank 1 | 200 | Dr A | 0.15 |
| | | Dr B | |
| Tank 2 | 400 | Dr C | |
| | | Dr D | |

Comments: * It is not necessary to run daily background checks on the morning following a weekly background calibration

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Reviewed By / Date JP 12/4/08

Date 12/4/08 SOP 724r10

# Paragon Analytics

Low Background Gas Flow Proportional Counter Log

**Instrument: LB4100C**

| Det. | Sample ID | Batch | Test | Count Dur. (min) | Start Time | Analyst Initials | File ID | Output Initials |
|---|---|---|---|---|---|---|---|---|
| 1-16 | Daily EFF | — | — | 30 | 7:28 | JP | EFC1204 | JP |
| 2 | 0823500-1MB | AB081104-1 | α/B | 120 | 7:36 | JP | ABC1204 | JP |
| 4 | 2MB | | | | | | | |
| 5 | 3MB | | | | | | | |
| 1 | 4LCS | | | | | | | |
| 7 | 5LCS | | | | | | | |
| 8 | 6LCS | | | | | | | |
| 9 | 0810245-1 | SR081121-1/Test | Sr90 | 60 | 7:38 | JP | SRC1204 * | JP |
| 10 | 0811093-3 | File | | | | | | |
| 11 | -3D | For LIMS | | | | | | |
| 12 | 0811155-1 | | | | | | | |
| 13 | -3 | | | | | | | |
| 14 | SR081121-1MB | | | | | | | |
| 15 | LCS | | | | | | | |
| 9 | 0823500-1MB | AB081104-1 | α/B | 120 | 9:46 | JP | ABC1204A | JP |
| 12 | 2MB | | | | | | | |
| 14 | 3MB | | | | | | | |
| 10 | 4LCS | | | | | | | |
| 13 | 5LCS | | | | | | | |
| 15 | 6LCS | | | | | | | |
| 1 | 0823010-1 | RA081203-1 | Ra228 | 250 | 14:03 | JP | RAC1204 | JP |
| 6 | -2 | | | | | | | |
| 3 | RA081203-1AMB | | | | | | | |
| 7 | BMB | | | | | | | |

JP 12/5/08

Comments: * Test file for IS department for LIMS. (LB4100C data Compatible w/ LIMS)

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(cont. from page NA B)

Date 12/5/08 SOP 724r 10

# Paragon Analytics

Low Background Gas Flow Proportional Counter Log

**Instrument: LB4100C**

*Instrument Daily Response and Background Checks*

| Det. | Daily Response Check Start 1 | Status | Start 2 | Status | Background Check Start 1 | Status | Start 2 | Status | Det. Status |
|---|---|---|---|---|---|---|---|---|---|
| 1 | JP | P | | | JP | Hα | JP | P | P |
| 2 | ↓ | ↓ | | | ↓ | Hα | ↓ | ↓ | ↓ |
| 3 | | | | | | P | | | |
| 4 | | | | | | ↓ | | | |
| 5 | | | | | | Hα | JP | P | |
| 6 | | | | | | P | | | |
| 7 | | | | | | Hα | JP | P | |
| 8 | | | | | | P | | | |
| 9 | | | | | | Hα | JP | P | |
| 10 | | | | | | ↓ | ↓ | ↓ | |
| 11 | | | | | | | | | |
| 12 | | | | | | P | | | |
| 13 | | | | | | P | | | |
| 14 | | | | | | ↓ | | | |
| 15 | | | | | | | | | |
| 16 | ↓ | ↓ | | | ↓ | Hα | JP | P | ↓ |

Det = Detector; α = Alpha; β = Beta; P = Pass; H = High; L = Low; OL = Offline; R = Recount; W = Weekly; NP = Not Processed

*Weekly Background Calibration*

| | Current Calib. File ID | Weekly Calib. Started | Status | File ID |
|---|---|---|---|---|
| Dr A | BKC1203W | | | |
| Dr B | ↓ | | | |
| Dr C | | | | |
| Dr D | ↓ | | | |

Dr = Drawer

*Gas Supply*

| P-10 Supply | | P-10 Flow | |
|---|---|---|---|
| Tank 1 | 2000 | Dr A | 0.15 |
| | ↓ | Dr B | ↓ |
| Tank 2 | 300 | Dr C | |
| | ↓ | Dr D | ↓ |

Comments:

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**Paragon Analytics**

# Radiochemistry Instrument Worksheet

**Prep Batch: AB081104-1**

**Prep Procedure:** GAB ICV's/ICB's

**Analytical QASS / NCR?** Y (N) NA

| Prep Num | LabID | QC Type | Init Alq | Fin Alq | Units | Report 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 | 0823500-1 | MB | 200 | 200 | ml | PCi/L | 22.3 | ABC1204 | 2 | JP | ABC1204A | 9 | JP | | | | |
| 1 | 0823500-2 | MB | 200 | 200 | ml | PCi/L | 70.7 | | 4 | | | 12 | | | | | |
| 1 | 0823500-3 | MB | 200 | 200 | ml | PCi/L | 105 | | 5 | | | 14 | | | | | |
| 1 | 0823500-4 | LCS | 200 | 200 | ml | PCi/L | 21.5 | | 1 | | | 10 | | | | | |
| 1 | 0823500-5 | LCS | 200 | 200 | ml | PCi/L | 72.8 | | 7 | | | ~~11~~ 13 | | | | | JP 12/8/08 |
| 1 | 0823500-6 | LCS | 200 | 200 | ml | PCi/L | 101.4 | | 8 | | | 15 | | | | | |

**Spike Solution Information**

| Soln # | Nuclide | SolnID | Prep Conc | Units | Prep Date | Aliquot | Units | Pipet ID |
|---|---|---|---|---|---|---|---|---|
| S1 | Sr-90 | 600.3610.01 | 49.314 | DPM/ml | 11/04/08 | 1 | ml | RS-005 |
| S2 | AM-241 | 616.3610.13 | 100.700 | DPM/g | 11/04/08 | 1 | g | RS-005 |

## Reporting Units

## Sample Barcodes

| | |
|---|---|
| 0823500-1MB<br>AB081104-1PS1 | 0823500-2MB<br>AB081104-1PS2 |
| 0823500-3MB<br>AB081104-1PS3 | 0823500-4LCS<br>AB081104-1PS4 |
| 0823500-5LCS<br>AB081104-1PS5 | 0823500-6LCS<br>AB081104-1PS6 |

# Paragon Analytics

# Radiochemistry Prep Worksheet

**Prep Batch: AB081104-1**

**Prep Procedure:** GAB

**Reviewed By:** DBC DBC **Review Date:** 11/6/2008

**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:** 19
**Prep SOP:** NONE
**Matrix Class:** liquid

**Prep Analyst:** Derek B. Caduff
**Prep Date:** 11/4/2008
**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 | 0823500-1 | MB | | 200 | 200 | Unfiltered | | |
| 2 | 1 | 0823500-2 | MB | | 200 | 200 | Unfiltered | DBC 11/6/08 | DBC 11/6/08 |
| 3 | 1 | 0823500-3 | MB | DBC 11/6/08 | 200 | 200 | Unfiltered | | |
| 4 | 1 | 0823500-4 | LCS | | 200 | 200 | Unfiltered | S1,S2 | |
| 5 | 1 | 0823500-5 | LCS | | 200 | 200 | Unfiltered | S1,S2 | |
| 6 | 1 | 0823500-6 | LCS | | 200 | 200 | Unfiltered | S1,S2 | |

Comments

ALL SAMPLES DESICCATED AT 8:35 ON 11/6/2008. SAMPLES 0823500-3 AND -6 WERE FLAMED.

**Spiked By:** Derek B. Caduff **Date:** 11/4/2008

**Witnessed By:** Gabriel D. Wagner **Date:** 11/4/2008

**Spike Solution Information**

| Soln # | Nuclide | SolnID | Prep Conc | Units | Prep Date | Aliquot | Units | Pipet ID |
|---|---|---|---|---|---|---|---|---|
| S1 | Sr-90 | 600.3610.01 | 49.314 | DPM/ml | 11/04/08 | 1 | ml | RS-005 |
| S2 | AM-241 | 616.3610.13 | 100.700 | DPM/g | 11/04/08 | 1 | g | RS-005 |

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## Paragon Analytics

# Radiochemistry Prep Worksheet

Prep Batch: AB081104-1

**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:** 19
**Prep SOP:** NONE
**Matrix Class:** liquid

**Prep Analyst:** Derek B. Caduff DBC
**Prep Date:** 11/4/2008
**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 Salt added |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0823500-1 | MB | | 200 | 200 | Unfiltered | | 0.5 |
| 2 | 1 | 0823500-2 | MB | | 200 | 200 | Unfiltered | | 1.5 |
| 3 | 1 | 0823500-3 | MB | | 200 | 200 | Unfiltered | | 3.0 |
| 4 | 1 | 0823500-4 | LCS | | 200 | 200 | Unfiltered | S1,S2 | 0.5 |
| 5 | 1 | 0823500-5 | LCS | | 200 | 200 | Unfiltered | S1,S2 | 1.5 |
| 6 | 1 | 0823500-6 | LCS | | 200 | 200 | Unfiltered | S1,S2 | 3.0 |

Comments
ALL SAMPLES DESICCATED AT ~~1515 on 11/5/08~~ 8:35 on 11/6/08. DBC 11/6/08.

**Spiked By:** Derek B. Caduff DBC **Date:** 11/4/2008

**Witnessed By:** GAW **Date:** 11/4/2008

**Spike Solution Information**

| Soln # | Nuclide | SolnID | Prep Conc | Units | Prep Date | Aliquot | Units | Pipet ID |
|---|---|---|---|---|---|---|---|---|
| S1 | Sr-90 | 600.3610.01 | 49.314 | DPM/ml | 11/04/08 | 1 | ml | RS-005 |
| S2 | AM-241 | 618.3610.13 | 100.700 | DPM/g | 11/04/08 | 1 | g | RS-005 |

S1 exp. 4/9/09
S2 exp. 9/25/09

## Paragon Analytics

# Radiochemistry Gravimetric Worksheet

Prep Batch: AB081104-1

Prep Procedure: GAB

Reviewed By: DBC DBC

Review Date: 11/6/2008

| 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 | 0823500-1 | MB | 10 | 9.2962 | 0.0000 | 0 | 200 | 200 | 200 | 9.3185 | 22.3 | 0.5 | |
| 1 | 2 | 0823500-2 | MB | 10 | 9.2666 | 0.0000 | 0 | 200 | 200 | 200 | 9.3373 | 70.7 | 1.5 | |
| 1 | 3 | 0823500-3 | MB | 10 | 9.2681 | 0.0000 | 0 | 200 | 200 | 200 | 9.3731 | 105 | 3 | FM |
| 1 | 4 | 0823500-4 | LCS | 10 | 9.2932 | 0.0000 | 0 | 200 | 200 | 200 | 9.3147 | 21.5 | 0.5 | |
| 1 | 5 | 0823500-5 | LCS | 10 | 9.2856 | 0.0000 | 0 | 200 | 200 | 200 | 9.3584 | 72.8 | 1.5 | |
| 1 | 6 | 0823500-6 | LCS | 10 | 9.2987 | 0.0000 | 0 | 200 | 200 | 200 | 9.4001 | 101.4 | 3 | FM |

PROJECT 600.3610.01 — Notebook No. 3610 — 1

Continued From Page

Prepare a working standard from intermediate dilution standard 600.2613.30 of approximately 50 dpm/ml

1) Determine density of 0.1 M HCl diluent Lot # 068438

Bal. ID

Mass of volumetric flask: 68.2969 g — #12

Mass of flask with 100ml diluent: 168.1454g

Net Mass of diluent: 99.8485g

$\rho$ = 0.9985 g/ml

2) Determine mass of standard 600.2613.30

Mass of empty Nalgene without lid: 74.6622 g — #12

Mass of Nalgene and standard: 77.2779g

Net mass of standard: ~~1073.3 g~~ DC 4/4/08 2.6157g

3) Dilute with acid

Mass of empty Nalgene without lid: 74.6622 g — #12

Mass of Nalgene, standard, & diluent: 1073.3g — #16

Net mass of standard & diluent: 998.6398g

4) Final activity calculation:

$$\frac{(\cancel{22,390.967}\ 22,279.914\ \text{dpm/g})(2.6157\text{g})(0.9985\text{g/ml})}{998.6398\text{g}} = \cancel{58.56}\ 58.269\ \text{dpm/ml}$$

MC 7/10/08 — MC 7/10/08

Stnd ID: 600.3610.01 — MC 7/10/08

Description: Sr-90

Expiration: 4/9/2009

Activity: 58.27 dpm/mL

MC 7/10/08 2s Uncertainty: 2.91 dpm/mL

Ref. Date: 12/1/2001

Ref Time: N/A

Prep Date: 4/7/2008 Prep by: dc

Matrix/Comp. 0.1 M HCl

Half Life (y): 2.88E+01

MC 7/10/08

**Reverification Log**

| Analysis Date | Initials | Expiration Date |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

MC 7/10/08

Continued on Page

Read and Understood By

Signed: [signature] — Date: 4/7/08 — Signed: [signature] — Date: 7/10/08

30
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 | |

RG 4/26/05

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

2) Final Activity Calculation

$$\frac{(1.868\times10^4\ dps)(60\ dpm/dps)}{\cancel{50.0559}\ 50.3054\ \cancel{50.3054}\ g}\ (0.9978\ g/mL)$$

CW 12/10/03

~~22,390.967~~ ~~22,279.914~~ dpm/g MC 7/10/08
CW 12/10/03
22,279.914

CW 12/10/03
= ~~22,311.707~~ ~~22,230.898~~ dpm/mL MC 7/10/08 SD 12/10/03
22,230.898 /mL

CW 12/11/03

ANALYTICS
1380 Seaboard Ind Blvd. Atlanta, GA 30318 USA 404.352.8677
Sr-90
SRS 62751-307 Amount 0.505 µCi QA MM
Date 12/01/01 12:00 EST Exp. —
PO# 001703, Item 1
50.3054 g 0.1M HCl solution
CAUTION RADIOACTIVE MATERIAL

CW 12/11/03

Stnd ID: 600.2613.30
Description: Sr-90
Expiration: 2/27/07 MC 7/10/08
Activity: ~~22341.71~~ 22,230.898 dpm/mL
2s Uncertainty: ~~744.72~~ 1,111 dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 12/1/03
Prep by: CRW
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01
RG 2/19/06 DC 3/9/N.

Stnd ID: 600.2613.30
Description: Sr-90
Expiration: 12/28/05 MC 7/10/08
Activity: ~~22341.71~~ 22,230.898 dpm/mL
2s Uncertainty: ~~744.72~~ 1,111 dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 12/1/03
Prep by: CRW
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01
Requires NCR for ICPT Work
RG 4/26/05

SD 12/11/03

Stnd ID: 600.2613.30
Description: Sr-90
Expiration: 12/2/04 MC 7/10/08
Activity: ~~22341.71~~ 22,230.898 dpm/mL
2s Uncertainty: ~~744.72~~ MC 1,111 dpm/mL
Ref. Date: 12/1/01 7/10/08
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

RG 12/13/04

Stnd ID: 600.2613.30
Description: Sr-90 MC 7/10/08
Expiration: 11/29/05
Activity: ~~22341.71~~ 22,230.898 dpm/mL
Requires NCR for ICPT work.
2s Uncertainty: ~~744.72~~ dpm/mL
Ref. Date: 12/1/01
Ref Time: N/A
Prep Date: 12/1/03 Prep by: CRW
Matrix/Comp. 0.1 M HCl
Half Life (y): 2.88E+01
RG 12/13/04

Continued on Page

Signed: Chad Waugh Date: 12/11/03 RG 12/13/04

~~Read and~~ Understood By

Signed Date 12/10/03

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: 12-4-01

Prepare a working dilution of Am-241 from Intermediate dilution 616.2382.91 of approximately 100 dpm/ml.

1) Prepare 1M HCl. 83 ml of HCl and 917 ml DI Water
Lot#: 074715

Bal.

2) Determine Density of 1M HCl.
Mass of 100ml volumetric flask: 68.3004 g 12
Mass of flask & 100ml 1M HCl: 169.5480 g
Net mass of 1M HCl: 101.2~~876~~476 g DBC 9/22/08
$\rho$ = 1.0128 ~~7~~5 g/ml DBC 9/22/08

3) Determine mass of standard 616.2382.91
Mass of empty bottle without lid: 74.3436 g 12
Mass of bottle and standard: 78.0860 g
Net mass of standard: 3.7424 g

4) Dilute with acid.
Mass of empty bottle without lid: 74.3436 g 12
Mass of bottle, standard, and diluent: 1087.2 g 26
Net mass of standard and diluent: 1012.8~~37~~560 g DBC 9/22/08

5) Final Activity Calculation

27,201.49
DBC 9/22/08 ~~27,168.64~~ dpm/g · 3.7424 g · 1.0128~~5~~ g/ml DBC 9/22/08 ÷ 1012.8~~37~~560 g DBC 9/22/08 = 101.~~67~~76 dpm/ml DBC 9/22/08

JRA 9/29/08

Stnd ID: 616.3610.13

| | | |
|---|---|---|
| Description: | Am-241 | |
| Expiration: | 9/25/2009 | |
| Activity: | 101.76 | dpm/mL |
| Uncertainty: | 2.37 | dpm/mL |
| Ref. Date: | 4/18/2002 | |
| Ref Time: | N/A | |
| Prep Date: | 9/22/2008 | Prep by: DBC |
| Matrix/Comp. | 1.0M HCl | |
| Half Life (y): | 4.32E+02 | |

Reverification Log

| Analysis Date | Initials | Expiration Date |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

JRA 9/29/08

Signed [signature] Date 9/22/08 Signed [signature] Date 9/23/08

Am-241 intermediary dilution

Prepare an intermediate dilution of 616.2382.38 by diluting with 1M HCL (Lot 43015)

(1) Determine the density of 1M HCL

| | |
|---|---|
| mass of 100 ml Class A volumetric flask | 67.5757 g (bal 2) |
| mass of flask and 1M HCl | 168.8580 g |
| net mass of 1M HCL | 101.2823 |
| | $\rho$ = 1.0128 g/ml |

(2) Transfer Am-241 (616.2382.38) to a 40 ml VOA vial

| | |
|---|---|
| mass of empty VOA vial without lid + 50 ml beaker | 54.0248 g (bal |
| mass of standard, transfer pipet + 50 ml beaker (initial) | 95.0640 g |
| mass of standard, transfer pipet + 50 ml beaker after transfer | ~~74~~ 75.0076 g |
| net mass of standard transferred | 20.0564 g |

(3) Dilute to final volume with 1M HCL

| | |
|---|---|
| mass of empty VOA VIAL w/o lid + 50 ml beaker (from above) | 54.0248 g bal |
| mass of standard, 1M HCL VOA vial + 50 ml beaker | 92.4609 g |
| net mass of standard | 38.4361 g |

(4) Final activity calculation

$$\frac{(\cancel{52,066}\ 52,128.96\ \text{dpm/g})(20.0564\ \text{g})}{38.4361\ \text{g}} = \cancel{27168.64}\ \text{dpm/g}\quad 27,201.49$$

SD 8/1/03 MC 11/1/07

Continued on Page

Read and Understood By

C Moncavage 4/25/03 Signed Date

Renee Halleeps 5/5/03 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: MTaskaeva
M. Taskaeva, Radiochemist

Q A APPROVED: [signature] 4-19-02