Field Split Wipe Data

SEVERN TRENT STL

STL Denver
4955 Yarrow Street
Arvada, CO 80002

Tel: 303 736 0100 Fax: 303 431 7171
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ANALYTICAL REPORT

Project No. 101115

EPA NEIC EDDP

Lot #: D4C090319

Eddie Weaver

Shaw E&I Inc.
312 Directors Drive
Knoxville, TN 37923

STL DENVER

Linda L. Benkers
Project Manager

March 24, 2004

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Standard Deliverables with Supporting Documentation

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- **Methods Summary**
- **Method/Analyst Summary**
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- **Analytical Results**
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- **Chain-of-Custody**

Supporting Documentation *(Note: A one-page "Description of Supporting Documentation" is provided at the beginning of this section.).*	**Check below when supporting documentation is present.**
• **Volatile GC/MS**	
• **Semivolatile GC/MS**	
• **Volatile GC**	
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• **LC/MS or HPLC**	
• **Metals**	
• **General Chemistry**	
• **Radiochemistry**	X

Case Narrative
Lot D4C090319

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted.

The test results presented in this report meet all requirements of NELAC, and any exceptions are noted. This report shall not be reproduced, except in full, without written permission from the laboratory.

Sample Receiving

Samples D4C090319-001 through 011 were received under chain of custody on March 8, 2004. Samples 012 through 014 were received under chain of custody on March 10, 2004. The samples were received in good condition at ambient temperature.

Radiochemistry – Gross Alpha/Gross Beta, Method 900.0

The client requested a MDA of less than 1.1 dpm/smear for gross alpha and a MDA of less than 100 dpm/smear for gross beta. The laboratory is reporting in units of pCi/filter. The requested MDA of 1.1 dpm/smear for gross alpha is equal to a MDA of 0.495 pCi/filter. The requested MDA of 100 dpm/smear for gross beta is equal to a MDA of 45.0 pCi/filer. The reported MDA for all samples is at or below the requested MDA.

The gross alpha/beta duplicate performed on sample D4C090319-001 was in control.

No anomalies were observed.

METHODS SUMMARY

D4C090319

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Gross Alpha/Beta (900.0)	CFR136A 900.0	

References:

CFR136A "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

METHOD / ANALYST SUMMARY

D4C090319

ANALYTICAL METHOD	ANALYST	ANALYST ID
CFR136A 900.0	James Preston	006157

References:

CFR136A "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

SAMPLE SUMMARY

D4C090319

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
GAXM3	001	030204-31-20FS	03/03/04	14:32
GAXNW	002	030204-31-35FS	03/03/04	14:32
GAXN1	003	030204-31-45FS	03/03/04	14:32
GAXN3	004	030104-28-20FS	03/02/04	11:17
GAXN5	005	030104-28-36FS	03/02/04	11:17
GAXN8	006	030104-28-45FS	03/02/04	11:17
GAXN9	007	022704-24-08FS	02/26/04	15:03
GAXPA	008	022704-24-11FS	02/26/04	15:03
GAXPC	009	022604-20-20FS	02/26/04	14:27
GAXPD	010	022604-20-25FS	02/26/04	14:27
GAXPE	011	022604-20-41FS	02/26/04	14:27
GA2P3	012	030404-36-01FS	03/04/04	15:03
GA2P9	013	030404-36-08FS	03/04/04	15:03
GA2QA	014	030404-36-10FS	03/04/04	15:03

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.

sults for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, int filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

QC DATA ASSOCIATION SUMMARY

D4C090319

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WIPE	CFR136A 900.0		4070319	4070133
002	WIPE	CFR136A 900.0		4070319	4070133
003	WIPE	CFR136A 900.0		4070319	4070133
004	WIPE	CFR136A 900.0		4070319	4070133
005	WIPE	CFR136A 900.0		4070319	4070133
006	WIPE	CFR136A 900.0		4070319	4070133
007	WIPE	CFR136A 900.0		4070319	4070133
008	WIPE	CFR136A 900.0		4070319	4070133
009	WIPE	CFR136A 900.0		4070319	4070133
010	WIPE	CFR136A 900.0		4070319	4070133
011	WIPE	CFR136A 900.0		4070319	4070133
012	WIPE	CFR136A 900.0		4070319	4070133
013	WIPE	CFR136A 900.0		4070319	4070133
014	WIPE	CFR136A 900.0		4070319	4070133

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PREP BATCH QC REPORT

Sorted By: Analysis Type, Batch ID, then Sample Type
Printed: 03/24/04 09:26

Analyte	Result	Uncertainty	Report Limit or MDA	Dilution Factor	Spike Amount	Expected Result	Expected Uncertainty	Percent Recovery	Lower Limit	Upper Limit	RPD or RER	Dup Limit	Qualifiers	Analyzed	Work Orde
RADIOCHEMISTRY															
Client: SHAW E & I INC			Batch ID: 4070319					Lab Sample ID: D4C100000-319B					Method: CFR136A 900.0		
Client Project: 101115			Method Blank					Matrix: Wipe					Prepped: 03/10/04		
Lab Project: D4C090319								Unit: pCi/filter							
Gross Alpha	0.0371±0.122		0.300	1									U	03/11/04	GA05G1A
Gross Beta	0.261±0.789		0.515	1									U	03/11/04	GA05G1A

Radiochemistry qualifier definition for sample D4C100000-319B:
U = Result is less than the minimum detectable activity (MDA).

Analyte	Result	Uncertainty	Report Limit or MDA	Dilution Factor	Spike Amount	Expected Result	Expected Uncertainty	Percent Recovery	Lower Limit	Upper Limit	RPD or RER	Dup Limit	Qualifiers	Analyzed	Work Orde
Client: SHAW E & I INC			Batch ID: 4070319					Lab Sample ID: D4C100000-319C					Method: CFR136A 900.0		
Client Project: 101115			Laboratory Control Standard					Matrix: Wipe					Prepped: 03/10/04		
Lab Project: D4C090319								Unit: pCi/filter							
Gross Alpha	13.0±1.04		0.520	1	11.00	11.0		118	75	125				03/11/04	GA05G1A
Gross Beta	21.2±1.78		0.758	1	21.60	21.6		98	75	125				03/11/04	GA05G1A

Analyte	Result	Uncertainty	Report Limit or MDA	Dilution Factor	Spike Amount	Expected Result	Expected Uncertainty	Percent Recovery	Lower Limit	Upper Limit	RPD or RER	Dup Limit	Qualifiers	Analyzed	Work Orde
Client: SHAW E & I INC			Batch ID: 4070319					Lab Sample ID: D4C090319-001X					Method: CFR136A 900.0		
Client Project: 101115			Duplicate					Matrix: Wipe					Prepped: 03/10/04		
Lab Project: D4C090319								Unit: pCi/filter							
Gross Alpha	0.0156±0.134		0.336	1		-0.0619±0.102					0.9		U	03/15/04	GAXM31A
Gross Beta	0.417±3.18		0.600	1		0.154±0.345					0.2		U	03/15/04	GAXM31A

Radiochemistry qualifier definition for sample D4C090319-001X:
U = Result is less than the minimum detectable activity (MDA).

Note: Uncertainty, MDA, and RER are only applicable to radiochemistry analyses. Uncertainty is reported as total propogated uncertainty.

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CLIENT SAMPLE REPORT

Sorted By: Lab Sample ID then Analysis Type
Printed: 03/24/04 09:26

Analyte	CAS #	Prep Type	Method	Result	Uncertainty	Qualifiers	MDL or MDA	Report Limit	Unit	Dilution Factor	Prep Date	Analysis Date	Prep Batch ID	Work Orde
Client: SHAW E & I INC				**Client Sample ID: 030204-31-20FS**						**Collection Date: 03/03/04 14:32**				
Client Project: 101115				**Lab Sample ID: D4C090319-001**						**Matrix: Wipe**				
Lab Project: D4C090319										**Aliquot Type: Normal Sample**				
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	-0.0619	±0.102	U	0.297	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXM31A
Gross Beta			CFR136A 900.0	0.154	±0.345	U	0.611	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXM31A

Radiochemistry qualifier definition for sample D4C090319-001:
U = Result is less than the minimum detectable activity (MDA).

Client: SHAW E & I INC				**Client Sample ID: 030204-31-35FS**						**Collection Date: 03/03/04 14:32**				
Client Project: 101115				**Lab Sample ID: D4C090319-002**						**Matrix: Wipe**				
Lab Project: D4C090319										**Aliquot Type: Normal Sample**				
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	-0.0481	±0.103	U	0.293	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXNW1A
Gross Beta			CFR136A 900.0	0.259	±0.540	U	0.520	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXNW1A

Radiochemistry qualifier definition for sample D4C090319-002:
U = Result is less than the minimum detectable activity (MDA).

Client: SHAW E & I INC				**Client Sample ID: 030204-31-45FS**						**Collection Date: 03/03/04 14:32**				
Client Project: 101115				**Lab Sample ID: D4C090319-003**						**Matrix: Wipe**				
Lab Project: D4C090319										**Aliquot Type: Normal Sample**				
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	0.0315	±0.106	U	0.264	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXN11A
Gross Beta			CFR136A 900.0	0.341	±1.04	U	0.518	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXN11A

Radiochemistry qualifier definition for sample D4C090319-003:
U = Result is less than the minimum detectable activity (MDA).

Client: SHAW E & I INC				**Client Sample ID: 030104-28-20FS**						**Collection Date: 03/02/04 11:17**				
Client Project: 101115				**Lab Sample ID: D4C090319-004**						**Matrix: Wipe**				
Lab Project: D4C090319										**Aliquot Type: Normal Sample**				
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	-0.00225	±0.105	U	0.280	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXN31A
Gross Beta			CFR136A 900.0	0.399	±16.3	U	0.487	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXN31A

Radiochemistry qualifier definition for sample D4C090319-004:
U = Result is less than the minimum detectable activity (MDA).

Note: Uncertainty MDA are only applicable to radiochemistry analyses. Uncertainty is reported as propogated uncertainty.

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CLIENT SAMPLE REPORT

Sorted By: Lab Sample ID then Analysis Type
Printed: 03/24/04 09:26

Analyte	CAS #	Prep Type	Method	Result	Uncertainty	Qualifiers	MDL or MDA	Report Limit	Unit	Dilution Factor	Prep Date	Analysis Date	Prep Batch ID	Work Order
Client: SHAW E & I INC — Client Sample ID: 030104-28-36FS — Collection Date: 03/02/04 11:17														
Client Project: 101115 — Lab Sample ID: D4C090319-005 — Matrix: Wipe														
Lab Project: D4C090319 — Aliquot Type: Normal Sample														
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	-0.0724	±0.121	U	0.336	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXN51A
Gross Beta			CFR136A 900.0	0.129	±0.320	U	0.600	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXN51A

Radiochemistry qualifier definition for sample D4C090319-005:
U = Result is less than the minimum detectable activity (MDA).

Client: SHAW E & I INC — Client Sample ID: 030104-28-45FS — Collection Date: 03/02/04 11:17														
Client Project: 101115 — Lab Sample ID: D4C090319-006 — Matrix: Wipe														
Lab Project: D4C090319 — Aliquot Type: Normal Sample														
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	0.109	±0.128	U	0.283	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXN81A
Gross Beta			CFR136A 900.0	0.581	±0.656	J	0.552	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXN81A

Radiochemistry qualifier definition for sample D4C090319-006:
J = Result is greater than the minimum detectable activity (MDA) but less than the required detection limit.
U = Result is less than the minimum detectable activity (MDA).

Client: SHAW E & I INC — Client Sample ID: 022704-24-08FS — Collection Date: 02/26/04 15:03														
Client Project: 101115 — Lab Sample ID: D4C090319-007 — Matrix: Wipe														
Lab Project: D4C090319 — Aliquot Type: Normal Sample														
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	-0.0371	±0.124	U	0.336	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXN91A
Gross Beta			CFR136A 900.0	0.0646	±0.329	U	0.634	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXN91A

Radiochemistry qualifier definition for sample D4C090319-007:
U = Result is less than the minimum detectable activity (MDA).

Client: SHAW E & I INC — Client Sample ID: 022704-24-11FS — Collection Date: 02/26/04 15:03														
Client Project: 101115 — Lab Sample ID: D4C090319-008 — Matrix: Wipe														
Lab Project: D4C090319 — Aliquot Type: Normal Sample														
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	-0.219	±0.0961	U	0.336	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXPA1A
Gross Beta			CFR136A 900.0	-0.136	±0.247	U	0.600	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXPA1A

Radiochemistry qualifier definition for sample D4C090319-008:
U = Result is less than the minimum detectable activity (MDA).

Note: Uncertainty and MDA are only applicable to radiochemistry analyses. Uncertainty is reported as total propogated uncertainty.

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CLIENT SAMPLE REPORT

Sorted By: Lab Sample ID then Analysis Type
Printed: 03/24/04 09:26

Analyte	CAS #	Prep Type	Method	Result	Uncertainty	Qualifiers	MDL or MDA	Report Limit	Unit	Dilution Factor	Prep Date	Analysis Date	Prep Batch ID	Work Ord
Client: SHAW E & I INC — Client Sample ID: 022604-20-20FS — Collection Date: 02/26/04 14:27														
Client Project: 101115 — Lab Sample ID: D4C090319-009 — Matrix: Wipe														
Lab Project: D4C090319 — Aliquot Type: Normal Sample														
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	0.0297	±0.113	U	0.283	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXPC1A
Gross Beta			CFR136A 900.0	0.246	±0.864	U	0.552	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXPC1A

Radiochemistry qualifier definition for sample D4C090319-009:
U = Result is less than the minimum detectable activity (MDA).

Client: SHAW E & I INC — Client Sample ID: 022604-20-25FS — Collection Date: 02/26/04 14:27														
Client Project: 101115 — Lab Sample ID: D4C090319-010 — Matrix: Wipe														
Lab Project: D4C090319 — Aliquot Type: Normal Sample														
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	-0.184	±0.0952	U	0.336	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXPD1A
Gross Beta			CFR136A 900.0	0.0386	±0.266	U	0.634	4	pCi/filter	1	03/10/04	03/11/04	4070319	GAXPD1A

Radiochemistry qualifier definition for sample D4C090319-010:
U = Result is less than the minimum detectable activity (MDA).

Client: SHAW E & I INC — Client Sample ID: 022604-20-41FS — Collection Date: 02/26/04 14:27														
Client Project: 101115 — Lab Sample ID: D4C090319-011 — Matrix: Wipe														
Lab Project: D4C090319 — Aliquot Type: Normal Sample														
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	-0.0619	±0.102	U	0.297	4	pCi/filter	1	03/10/04	03/12/04	4070319	GAXPE1A
Gross Beta			CFR136A 900.0	-0.0698	±0.271	U	0.611	4	pCi/filter	1	03/10/04	03/12/04	4070319	GAXPE1A

Radiochemistry qualifier definition for sample D4C090319-011:
U = Result is less than the minimum detectable activity (MDA).

Client: SHAW E & I INC — Client Sample ID: 030404-36-01FS — Collection Date: 03/04/04 15:03														
Client Project: 101115 — Lab Sample ID: D4C090319-012 — Matrix: Wipe														
Lab Project: D4C090319 — Aliquot Type: Normal Sample														
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	-0.103	±0.0911	U	0.293	4	pCi/filter	1	03/10/04	03/12/04	4070319	GA2P31A
Gross Beta			CFR136A 900.0	0.285	±0.322	U	0.520	4	pCi/filter	1	03/10/04	03/12/04	4070319	GA2P31A

Radiochemistry qualifier definition for sample D4C090319-012:
U = Result is less than the minimum detectable activity (MDA).

Note: Uncertaint[illegible] MDA are only applicable to radiochemistry analyses. Uncertainty is reported as [illegible] propogated uncertainty.

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CLIENT SAMPLE REPORT

Sorted By: Lab Sample ID then Analysis Type
Printed: 03/24/04 09:26

Analyte	CAS #	Prep Type	Method	Result	Uncertainty	Qualifiers	MDL or MDA	Report Limit	Unit	Dilution Factor	Prep Date	Analysis Date	Prep Batch ID	Work Order
Client: SHAW E & I INC				**Client Sample ID: 030404-36-08FS**						**Collection Date: 03/04/04 15:03**				
Client Project: 101115				**Lab Sample ID: D4C090319-013**						**Matrix: Wipe**				
Lab Project: D4C090319										**Aliquot Type: Normal Sample**				
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	-0.00176±0.0993		U	0.264	4	pCi/filter	1	03/10/04	03/12/04	4070319	GA2P91AA
Gross Beta			CFR136A 900.0	0.0264±1.33		U	0.518	4	pCi/filter	1	03/10/04	03/12/04	4070319	GA2P91AA

Radiochemistry qualifier definition for sample D4C090319-013:
U = Result is less than the minimum detectable activity (MDA).

Analyte	CAS #	Prep Type	Method	Result	Uncertainty	Qualifiers	MDL or MDA	Report Limit	Unit	Dilution Factor	Prep Date	Analysis Date	Prep Batch ID	Work Order
Client: SHAW E & I INC				**Client Sample ID: 030404-36-10FS**						**Collection Date: 03/04/04 15:03**				
Client Project: 101115				**Lab Sample ID: D4C090319-014**						**Matrix: Wipe**				
Lab Project: D4C090319										**Aliquot Type: Normal Sample**				
RADIOCHEMISTRY														
Gross Alpha			CFR136A 900.0	-0.0382±0.0964		U	0.280	4	pCi/filter	1	03/10/04	03/12/04	4070319	GA2QA1AA
Gross Beta			CFR136A 900.0	0.327±0.763		U	0.487	4	pCi/filter	1	03/10/04	03/12/04	4070319	GA2QA1AA

Radiochemistry qualifier definition for sample D4C090319-014:
U = Result is less than the minimum detectable activity (MDA).

Note: Uncertainty and MDA are only applicable to radiochemistry analyses. Uncertainty is reported as total propogated uncertainty.

Shaw
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ANALYSIS REQU(T AND CHAIN-OF-CUSTODY RECORD

Reference Document No: 415(230204-31
PAGE 1 of 1

Bill to:

Project No.	101115	Sample Shipment Date	3-08-04
Project name	EPA NEIC EDDP	Lab Destination	STL Denver
Sample Coordinator	James Nelson / 303-233-1279	Lab Contact	Lyn Benkers
Project Manager	Randy Rodgers / 865-694-7457	Project Contact/phone	Ben Dettorre / 865-670-2669
Sample Team Members	T. TRENT	Carrier Waybill No.	
	J. STEPHENS		

Report to: Ben Dettore
312 Directors Drive
Knoxville, TN 37923

ONE SAMPLE PER LINE

Sample Number (Client ID)	Sample Description	Date/Time Collected	Sample Type	Condition on Receipt	Disposal Record
030204-31-20 FS	Rm A150T FSS Loc. A-20 Field Split	3-3-04 1432	Smear		
35 FS	-35 Field Split	↓	↓		
45 FS	B5-1507-6 Field Split	↓	↓		
	N				
	A				

Special Instructions:

Possible Hazard Identification:
Non-haz ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal:
Return to Client ☐ Disposal by Lab ☒ Archive ☐

Turnaround Time Required:
Normal ☒ Rush ☐

QC Level:
I. ☐ II. ☐ III. ☐ Project Specific: Defined in QAPP

1. Relinquished by (Signature/Affiliation)	Date: 3-5-04 Time: 0805	1. Received by (Signature/Affiliation)	Date: 3.5.04 Time: 0805
2. Relinquished by (Signature/Affiliation)	Date: 3-8-04 Time: 1011	2. Received by (Signature/Affiliation)	Date: 3-8-04 Time: 101
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: 3/8/04 Time: 1600

Comments:
ANALYSIS: Gross Alpha/Beta - MDC (reporting limits) < 1.1 dpm/smear for alpha
< 100 dpm/smear for beta

STL Denver

Shaw
Shaw Environmental & Infrastructure, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

Reference Document No: 41209-030104-28
PAGE 1 of 1

Bill to:

Project No.	101115	Sample Shipment Date	3-8-04		
Project name	EPA NEIC EDDP	Lab Destination	STL Denver		
Sample Coordinator	James Nelson / 303-233-1279	Lab Contact	Lyn Benkers		
Project Manager	Randy Rodgers / 865-694-7457	Project Contact/phone	Ben Dettorre / 865-670-2669	Report to:	Ben Dettore
Sample Team Members	T. TRENT	Carrier Waybill No.			312 Directors Drive
	J. STEPHENS				Knoxville, TN 37923

ONE SAMPLE PER LINE

Sample Number (Client ID)	Sample Description	Date/Time Collected	Sample Type	Condition on Receipt	Disposal Record
030104-28-20FS	Rm1209 FSS Loc. C-20 Field Split	3-2-04 1117	Smear		
-36FS	C-36 Field Split				
-45FS	RS-1209-09 Field Split				
	N				
	A				

Special Instructions:

Possible Hazard Identification:
Non-haz ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal:
Return to Client ☐ Disposal by Lab ☒ Archive ☐

Turnaround Time Required:
Normal ☒ Rush ☐

QC Level:
I. ☐ II. ☐ III. ☐ Project Specific: Defined in QAPP

1. Relinquished by (Signature/Affiliation)	Date: 3-5-04 Time: 0800	1. Received by (Signature/Affiliation)	Date: 3.5.04 Time: 0800
2. Relinquished by (Signature/Affiliation)	Date: 3-8-04 Time: 1011	2. Received by (Signature/Affiliation)	Date: 3-8-04 Time: 1011
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: 3/8/04 Time: 1600

Comments:

STL Denver

Shaw
Shaw Environmental & Infrastructure, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

Reference Document No: B2L 022704-24
PAGE 1 of 1

Bill to:

Project No.	101115	Sample Shipment Date	3-8-04.		
Project name	EPA NEIC EDDP	Lab Destination	STL Denver		
Sample Coordinator	James Nelson / 303-233-1279	Lab Contact	Lyn Benkers		
Project Manager	Randy Rodgers / 865-694-7457	Project Contact/phone	Ben Dettorre / 865-670-2669	Report to:	Ben Dettore
Sample Team Members	T. TRENT	Carrier Waybill No.			312 Directors Drive
	K. WISE				Knoxville, TN 37923

ONE SAMPLE PER LINE

Sample Number (Client ID)	Sample Description	Date/Time Collected	Sample Type	Condition on Receipt	Disposal Record
022704-24-08 FS	Rm B2109 FSS Loc. B-08 Field Split	2/26/04 1503	Smear		
022704-24-11 FS	Rm B2109 FSS Loc. B-11 Field Split	↓	↓		
	N				
	A				

Special Instructions:

Possible Hazard Identification:
Non-haz ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal:
Return to Client ☐ Disposal by Lab ☐ Archive ☐

Turnaround Time Required:
Normal ☒ Rush ☐

QC Level:
I. ☐ II. ☐ III. ☐ Project Specific: Defined in QAPP

1. Relinquished by (Signature/Affiliation)	Date: 3-1-04 Time: 1042	1. Received by (Signature/Affiliation) SHAW SOT	Date: 3-1-04 Time: 1042
2. Relinquished by (Signature/Affiliation)	Date: 3-8-04 Time: 1010	2. Received by (Signature/Affiliation) Paul Swanson	Date: 3-8-04 Time: 1010
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation) Harry Bindl	Date: 3/8/04 Time: 1600

Comments:

STL Denver

Shaw
Shaw Environmental & Infrastructure, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

Reference Document No: 122205-022604-20
PAGE 1 of 1

Bill to:

Project No.	101115	Sample Shipment Date	3-8-04		
Project name	EPA NEIC EDDP	Lab Destination	STL Denver		
Sample Coordinator	James Nelson / 303-233-1279	Lab Contact	Lyn Benkers		
Project Manager	Randy Rodgers / 865-694-7457	Project Contact/phone	Ben Dettorre / 865-670-2669	Report to:	Ben Dettore
Sample Team Members	T Trent	Carrier Waybill No.			312 Directors Drive
	K Wise				Knoxville, TN 37923

ONE SAMPLE PER LINE

Sample Number (Client ID)	Sample Description	Date/Time Collected	Sample Type	Condition on Receipt	Disposal Record
022604-20-20FS	RmD2205 FSSLoc. D-20 Field Split	02/26/04 14:27	Smear		
-25 FS	D-25 Field Split				
-41 FS	BS-2205-10 Field Split				
	N				
	A				

Special Instructions:

Possible Hazard Identification:
Non-haz ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal:
Return to Client ☐ Disposal by Lab ☐ Archive ☐

Turnaround Time Required:
Normal ☒ Rush ☐

QC Level:
I. ☐ II. ☐ III. ☐ Project Specific: Defined in QAPP

1. Relinquished by (Signature/Affiliation)	Date: 3-1-04 Time: 1040	1. Received by (Signature/Affiliation)	Date: 3-1-04 Time: 1040
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: 3-8-04 Time: 1010
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: 3/8/04 Time: 1600

Comments:

Shaw
Shaw Environmental & Infrastructure, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

Reference Document No: A19 030404-36
PAGE 1 of 1

Bill to:

Project No.	101115	Sample Shipment Date			
Project name	EPA NEIC EDDP	Lab Destination	STL Denver		
Sample Coordinator	James Nelson / 303-233-1279	Lab Contact	Lyn Benkers 303-736-0100		
Project Manager	Randy Rodgers / 865-694-7457	Project Contact/phone	Ben Dettorre / 865-670-2669	Report to:	Ben Dettore
Sample Team Members	T. TRENT	Carrier Waybill No.			312 Directors Drive
	J. STEPHENS				Knoxville, TN 37923

ONE SAMPLE PER LINE

Sample Number (Client ID)	Sample Description	Date/Time Collected	Sample Type	Condition on Receipt	Disposal Record
030404-36-01 FS	Rm A1902 FSS LOC. B-01 Field Split	3-4-04/1503	Smear		
030404-36-08 FS	↓ B-08 Field Split	↓	Smear		
030404-36-10 FS	↓ B-10 Field Split	↓	Smear		

Special Instructions:

Possible Hazard Identification:
Non-haz ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal:
Return to Client ☐ Disposal by Lab ☒ Archive ☐

Turnaround Time Required:
Normal ☒ Rush ☐

QC Level:
I. ☐ II. ☐ III. ☐ Project Specific: Defined in QAPP

1. Relinquished by (Signature/Affiliation)	Date: 3-10-05 Time: 1737	1. Received by (Signature/Affiliation)	Date: 3/10/04 Time: 1737
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: ANALYSIS: GROSS Alpha/Beta - MDC (Reporting limits) < 1.1 dpm/smear for alpha
< 100 dpm/smear for beta

STL Denver

Shaw
Shaw Environmental & Infrastructure, Inc.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

Reference Document No: A-1902-030404-36
PAGE 1 of 1

Bill to:

Project No.	101115	Sample Shipment Date	3-8-04
Project name	EPA NEIC EDDP	Lab Destination	STL Denver
Sample Coordinator	James Nelson / 303-233-1279	Lab Contact	Lyn Benkers
Project Manager	Randy Rodgers / 865-694-7457	Project Contact/phone	Ben Dettorre / 865-670-2669
Sample Team Members	T. TRENT	Carrier Waybill No.	
	J. STEPHENS		

Report to: Ben Dettore
312 Directors Drive
Knoxville, TN 37923

ONE SAMPLE PER LINE

Sample Number (Client ID)	Sample Description	Date/Time Collected	Sample Type	Condition on Receipt	Disposal Record
030404-36-01FS	BmA1902 ESS Loc. B-01 Field split	3-4-04 1503	Swear		
-08 FS	B-08 Field split	↓	↓		
-10 FS	B-10 Field split	↓	↓		
	N				
	A				

Special Instructions:

Possible Hazard Identification:
Non-haz ☒ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal:
Return to Client ☐ Disposal by Lab ☒ Archive ☐

Turnaround Time Required:
Normal ☒ Rush ☐

QC Level:
I. ☐ II. ☐ III. ☐ Project Specific: Defined in QAPP

1. Relinquished by (Signature/Affiliation)	Date: 3-5-04 Time: 0810	1. Received by (Signature/Affiliation)	Date: 3.5.04 Time: 0810
2. Relinquished by (Signature/Affiliation)	Date: 3-8-04 Time: 1011	2. Received by (Signature/Affiliation)	Date: 3-8-04 Time: 1011
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: ANALYSIS: Gross Alpha/Beta - MDC (Reporting Limits) < 1.1 dpm/smear for alpha
< 100 dpm/smear for beta

ANALYTICAL RAW DATA

FOR

Shaw E&I Inc.

SEVERN TRENT LABORATORIES

DENVER NO. D4C090319

Description of Supporting Documentation

The enclosed expanded raw data package is arranged in the order in which the initial calibration curve, internal quality control samples, and the samples for this lot were analyzed. Also included are any client requested batch quality control samples. When applicable, the data is organized alphabetically by instrument ID, then chronologically by analysis date.

GC/MS

I. Organic Extraction Log Sheets
II. Instrument Log Sheets
III. Standard Data
   A. Initial calibration raw data. Initial calibration raw data includes tuning data, the initial calibration summary (listing response factors, % RSDs), target compound reports, internal standard summaries, and chromatograms (RIC).
   B. Continuing calibration raw data. Continuing calibration raw data includes tuning data, the continuing calibration summary (listing response factors, % Ds), target compound reports, initial standard summaries, and chromatograms (RIC).
IV. Sample Data
   A. Quality control sample raw data and sample raw data. Raw data includes the target compound report, IS summary, surrogate recovery report, chromatograms (RIC), spectra, and Tentatively Identified Compounds (TIC) report with library searches (when applicable).

GC

I. Organic Extraction Log Sheets
II. Instrument Log Sheets
III. Standard Data
   A. Initial calibration raw data. Initial calibration raw data includes the initial calibration summary, analysis report, and chromatograms for each column used in analysis.
   B. Continuing calibration raw data. Continuing calibration raw data includes the continuing calibration summary, analysis report, and chromatograms for each column used in analysis.
IV. Sample Data
   A. Quality control sample raw data and sample raw data. Raw data includes the analysis report and chromatograms for each column.

Metals

I. Preparation Logs
II. ICP and/or ICP/MS Data
   A. Computer printouts listing all calibrations.
   B. Quality control sample raw data and sample raw data.
III. CFAA and/or CVAA Raw Data
   A. Analysis bench sheets listing all calibrations.
   B. Quality control sample raw data and sample raw data.

Wet chemistry

I. Preparation Logs
II. Sample Data
   A. Analysis bench sheets listing all calibration.
   B. Quality control sample raw data and sample raw data.

Radiochemistry
Supporting Documentation

Sample Sequence, Bench Sheets, Instrument Printouts, Initial Calibration, Daily Calibration Checks and Radiological Standard Data

SEVERN TRENT STL

Denver Laboratory

Lot ID: D4C090319

Client: SHAW

Associated Samples: 1-14

I certify, to the best of my knowledge, the attached package represents a complete and accurate copy of the original data.

Signature/Date: 3/17/04

SAMPLE SEQUENCE

SEVERN TRENT STL

Denver Laboratory

SEVERN TRENT STL

GFPC Run Log

	A Drawer			B Drawer			
Date	Sample ID	Det. #	Batch ID	Sample ID	Det. #	Batch ID	Initials
3/10/04	D4C090319-5	1	4070319	D4C090319-8		4070319	
	MT	2		MT			
	-6	3		-9			
	-7	4		-10			
	1X	1					
	MT	2					
	-11	3				3/10	
	MT	4	MT				
	D4C09000-235C	1	4069235	D4C030342-7X	1	4069235	
	MT	2		MT	2	MT	
	-235B	3			3		
	D4C030542-7	4			4		
3/11/04	STD/BKGD	1-4	DAILY	STD/BKGD	1-4	DAILY	
	3/11 D4C100319-317C	1	4070319	D4C090319-2	1	4070319	
	MT-317A	2		MT	2		
	-317B	3		-3	3		
	D4C090319-1	4		-4	4		
	D4C110000-305C	1	4071303	D4C100248-1X	1	4071303	
	MT	2		MT	2	MT	
	-305B	3		D4C100233-1	3	4071303	
	D4C100248-1	4		MT	4	MT	
3/12/04	STD/BKGD	1-4	DAILY	STD/BKGD	1-4	DAILY	
	D4C090319-1X	1	4070319	D4C090319-12	1	4070319	
	MT	2		MT	2		
		3		-13	3		
	-11	4		-14	4		
3/15/04	STD/BKGD	1-4	DAILY	STD/BKGD	1-4	DAILY	3/15
						3/15	

SEVERN TRENT STL

GFPC Run Log

	C Drawer			D Drawer			
Date	Sample ID	Det. #	Batch ID	Sample ID	Det. #	Batch ID	Initials
3/25/04	STD/BKG	1-4	DAILY	STD/BKG	1-4	DAILY	
3/26/04	STD/BKG	1-4	DAILY	STD/BKG	1-4	DAILY	
3/5/04	BKGD	1-4	WEEKLY	BKGD	1-4	WEEKLY	
3/6/04	STD/BKGD	1-4	DAILY	STD/BKGD	1-4	DAILY	
3/7/04	STD/BKGD	1-4	DAILY	STD/BKGD	1-4	DAILY	
3/11/04	STD/BKGD	1-4	DAILY	STD/BKGD	1-4	DAILY	
	MT	1	4L-70319				
	D4C070319-5	2					
	-6	3					
	-7	4					
	-8	2		3/11			
	-9	3					
	-10	4					
3/15/04	STD/BKGD	1-4	DAILY	STD/BKGD	1-4	DAILY	
	MT	1	MT				
	DAC020319-1X	2	4070319			3/15	
	MT	3	MT				
		4					
3/17/04	STD/BKGD	1-4	DAILY	STD/BKGD	1-4	DAILY	

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BENCH SHEETS AND INSTRUMENT PRINTOUTS

SEVERN TRENT

Denver Laboratory

STL

STL - Denver

Gross Alpha/Beta Technical Data Review Checklist

Lab Project ID Number(s): see attached cover sheet SOP # DEN-RAD-002 Check Method Used: 900.0 / DIRECT COU.

Review Items	Level 1 Yes	Level 1 No	Level 1 N/A	Level 2	Comments & Samples Affected
Data Review					
1. Where NIST traceable standards used?	✓			✓	
2. Was the final residue weight alpha/beta samples less than 100mg?	✓			✓	
3. Was the final residue weight for beta only samples less than 200mg?	✓			✓	
4. Was the balance used to weigh the planchets calibrated the day of use?	✓			✓	
5. Were the detectors used to count the samples in control?	✓			✓	
6. Does the batch have a LCS, blank, dup and spike?	✓			✓	SPIKE NOT REQUIRED
7. Was the LCS recovery between 75 – 125%	✓			✓	
8. Was the spike recovery between 60 – 140%?			✓	✓	
9. Was the duplicate RER less than or equal to 3?	✓			✓	
10. Were there any significant negative results on the batch?		✓		✓	
11. Are the alpha and beta absorption curves current?	✓			✓	
12. Is the blank less than the RDL?	✓			✓	
13. Is the TPU less than 10% for the samples on the batch?			✓	✓	
14. Are the reults in the correct units?	✓			✓	
15. Are cross outs dated and initialed	✓			✓	
16. Are non-conformances documented on an NCM?			✓	✓	
17. Is the appropriate raw data included?	✓			✓	
18. Was the sample detection limit achieved?	✓			✓	
19. Is the final report accurate and complete?	✓			✓	

1st Level Reviewer: [signature] Date: 3/15/04

2nd Level Reviewer: [signature] Date: 3/16/04

STL DENVER

GROSS ALPHA/BETA

DEN-RAD-002

ISOTOPE	STL#	LCS, MATRIX SPIKE ACTIVITY (pCi/ml), mls added	REF. DATE	HALF LIFE
Am 241	AM241ALA1	11.0, 1ml	6/1/01	432.7 years
Sr90/Y90	SR9001ALA1	21.6, 1ml	5/1/01	28.5 years

BATCH# 4070319

DATE STARTED 3/10/04
ANALYST
PEER REVIEW TCAH
DATE 3/16/04

INST. MODEL No.: TENNELEC LB 4110
ALPHA ABSORPTION CURVE DATE 7/03
BETA ABSORPTION CURVE DATE 7/03

BALANCE IDENTIFIER AE160 Background count time 3893 MIN.
PIPETTE IDENTIFIER N/A

SPL. #	SAMPLE ID	Alpha counts	Beta counts	Count Date/time	DET.	Volume g or l	Count time(min.)	File ID	COMMENTS
1	DAC10000-318C	826	3486	3/11/04 1316	A1	1.0	180		
2	-318B	31	327	↓	A3	↓	↓		
3	DAC080319-1	22	419	↓	A4	↓	↓		
4	-1x	47	438	3/15/04 1158	C2	↓	↓		
5	-2	22	308	3/11/04 1316	B1	↓	↓		
6	-3	23	361	↓	B3	↓	↓		
7	-4	19	302	↓	B4	↓	↓		
8	-5	38	393	↓	C2	↓	↓		
9	-6	32	340	↓	C3	↓	↓		
10	-7	30	426	↓	C4	↓	↓		
11	-8	23	352	3/11/04 1625	C2	↓	↓		
12	-9	25	291	↓	C3	↓	↓		
13	-10	17	422	↓	C4	↓	↓		
14	-11	22	384	3/12/04 1211	A4	↓	↓		
15	-12	17	312	↓	B1	↓	↓		
16	-13	20	309	↓	B3	↓	↓		
17	-14	16	291	↓	B4	↓	↓		
18									
19									
20									

N:/QA/FORMS/RAD/GAB

SEVERN TRENT SERVICES

GROSS ALPHA / BETA

WEIGHT SHEET

Date Started 3/10/04
Analyst [illegible]
Peer Review RAH
Review Date 3/10/04

INITIAL 10 ML ALIQUOT

SPL. #	SAMPLE ID	PLANCHET FINAL WT.(g)	PLANCHET TARE WT.(g)	SAMPLE WT.(g)
1				
2				
3				
4				
5				
6				
7				
8				
9		3/10/04 [illegible]		
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

SAMPLE ALIQUOT

SPL. #	SAMPLE ID	PLANCHET FINAL WT.(g)	PLANCHET TARE WT.(g)	SAMPLE WT.(g)
1	DAC10000 - 319C	2.0497	2.0153	0.0344
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

N:/RADIOCHEMISTRY/JIM/GROSS AB WEIGHT

RQC053

Parent Batch:
Associated Batches:
:
:
:
:

Severn Trent Laboratories, Inc.
Information Sheet Rad Prep

****
* *
* QC BATCH: 4070319 *
* *
****

Run Date: 3/15/04
Time: 8:26:25

Page: 1

VW: Gross Alpha/Beta (900.0)
TL: Direct GFPC Counting
01: STANDARD TEST SET

Analytical Due Date: 3/26/04

Project Manager: LLB

Lot# / Work Order	Client	Analyt Due / Matrix	Client / Aliquot	Name / Geometry	Count Time	Mid/Ave Date/Time	Tracer ID / Spike ID	CRDL	Units	Screen Info - (Ci) Alpha	Beta	PM / Bin
D4C090319-001	GAXM3-1-AA	3/26/04 WIPE	Shaw E & I Inc .0000		.000	3/03/04 14:32		4.00E+00	pCi/fi	**NA 153	**NA	LLB
Comments:												
D4C090319-001 X	GAXM3-1-AC	3/26/04 WIPE	Shaw E & I Inc .0000		.000	3/03/04 14:32		4.00E+00	pCi/fi	**NA 153	**NA	LLB
Comments:												
D4C090319-002	GAXNW-1-AA	3/26/04 WIPE	Shaw E & I Inc .0000		.000	3/03/04 14:32		4.00E+00	pCi/fi	**NA 153	**NA	LLB
Comments:												
D4C090319-003	GAXN1-1-AA	3/26/04 WIPE	Shaw E & I Inc .0000		.000	3/03/04 14:32		4.00E+00	pCi/fi	**NA 153	**NA	LLB
Comments:												
D4C090319-004	GAXN3-1-AA	3/26/04 WIPE	Shaw E & I Inc .0000		.000	3/02/04 11:17		4.00E+00	pCi/fi	**NA 153	**NA	LLB
Comments:												
D4C090319-005	GAXN5-1-AA	3/26/04 WIPE	Shaw E & I Inc .0000		.000	3/02/04 11:17		4.00E+00	pCi/fi	**NA 153	**NA	LLB
Comments:												
D4C090319-006	GAXN8-1-AA	3/26/04 WIPE	Shaw E & I Inc .0000		.000	3/02/04 11:17		4.00E+00	pCi/fi	**NA 153	**NA	LLB
Comments:												
D4C090319-007	GAXN9-1-AA	3/26/04 WIPE	Shaw E & I Inc .0000		.000	2/26/04 15:03		4.00E+00	pCi/fi	**NA 153	**NA	LLB
Comments:												
D4C090319-008	GAXPA-1-AA	3/26/04 WIPE	Shaw E & I Inc .0000		.000	2/26/04 15:03		4.00E+00	pCi/fi	**NA 153	**NA	LLB
Comments:												

****
* QC BATCH: 4070319 *
****

Lot# Work Order	Client Matrix	Analyt Due Aliquot	Client Name Geometry	Count Time	Mid/Ave Date/Time	Tracer ID Spike ID	CRDL	Units	Screen Info - (Ci) Alpha	Beta	PM Bin
D4C090319-009 GAXPC-1-AA WIPE Comments:	3/26/04		Shaw E & I Inc .0000	.000	2/26/04 14:27		4.00E+00	pCi/fi	**NA 153	**NA	LLB
D4C090319-010 GAXPD-1-AA WIPE Comments:	3/26/04		Shaw E & I Inc .0000	.000	2/26/04 14:27		4.00E+00	pCi/fi	**NA 153	**NA	LLB
D4C090319-011 GAXPE-1-AA WIPE Comments:	3/26/04		Shaw E & I Inc .0000	.000	2/26/04 14:27		4.00E+00	pCi/fi	**NA 153	**NA	LLB
D4C100000-319 B GA05G-1-AA WIPE Comments:	3/26/04		Shaw E & I Inc		3/03/04 14:32		4.00E+00	pCi/fi	**NA	**NA	LLB
D4C100000-319 C GA05G-1-AC WIPE Comments:	3/26/04		Shaw E & I Inc		3/03/04 14:32		4.0	pCi/fi	**NA	**NA	LLB
D4C090319-012 GA2P3-1-AA WIPE Comments:	3/26/04		Shaw E & I Inc .0000	.000	3/04/04 15:03		4.00E+00	pCi/fi	**NA 153	**NA	LLB
D4C090319-013 GA2P9-1-AA WIPE Comments:	3/26/04		Shaw E & I Inc .0000	.000	3/04/04 15:03		4.00E+00	pCi/fi	**NA 153	**NA	LLB
D4C090319-014 GA2QA-1-AA WIPE Comments:	3/26/04		Shaw E & I Inc .0000	.000	3/04/04 15:03		4.00E+00	pCi/fi	**NA 153	**NA	LLB

****
* QC BATCH: 4070319 *
****

Total Number of Samples In Batch: 00017

Batch Information: Dry Wt: N | Decay Correct: N | Blank Sub: | Call In:

Uncert: Both | Sigma: 2.000 | ODR:

BLANK CRDL		Tracer Yield	Type	QC Control Limits
Gross Alpha	4.00E+00		RPD	
Gross Beta	4.00E+00		RPD	

** NYS - Not Yet Screened
** NA - Not Applicable
** Other - Other than Gross Alpha or Gross Beta
++ Indicates that Batch Information has changed for this sample. Print worksheet for details.

RQC054

Severn Trent Laboratories, Inc.
Analysis Worksheet - Non-Actinides Alpha & Beta

Run Date: 3/15/04
Time: 8:26:25

QC Batch: 4070319

Page: 1

Filter: Y / N

VW:Gross Alpha/Beta (900.0)
TL:Direct GFPC Counting
01:STANDARD TEST SET

Balance #: _____

Pipet #: _____

Sep1 Dt/Tm/Person: _____

Sep2 Dt/Tm/Person: _____

Tracer Vial	Work Order#	Total Sample	Volume Analyzed	PPT.Wt.	Tracer Yield	Dish Size	Count Time(min)	Detector ID	Time Off	CR Analyst Init/Date
	GAXM31AA									
	GAXM31AC X									
	GAXNW1AA									
	GAXN11AA									
	GAXN31AA									
	GAXN51AA									
	GAXN81AA									
	GAXN91AA									
	GAXPA1AA									
	GAXPC1AA									
	GAXPD1AA									

QC Batch: 4070319

Tracer Vial	Work Order#	Total Sample	Volume Analyzed	PPT.Wt.	Tracer Yield	Dish Size	Count Time(min)	Detector ID	Time Off	CR Analyst Init/Date
	GAXPE1AA									
	GA05G1AA B									
	GA05G1AC C									
	GA2P31AA									
	GA2P91AA									
	GA2QA1AA									

Comments:

Gross Alpha/Beta Data Calculation Report

BATCH INFORMATION

Prep Batch	Prep Date/Time	Counting Analyst
4070319	03/10/2004 11:30	PRESTONJ

ISOTOPE INFORMATION

Isotope	Isotope Type	STL Standard ID	LCS Milliliters Added	MS Milliliters Added	Reference Date	Activity pCi/ml	Halflife Years	Lambda yr-1
GAlpha	Target 1	AM24101ALA1	1		06/01/2001 13:00	11.0	432.7	0.001601912
GBeta	Target 2	SR9001ALA1	1		05/01/2001 13:00	21.6	28.5	0.024320954

BACKGROUNDS

Detector	Total Counts		Count Duration (min.)	Background CPM	
	GAlpha	GBeta		GAlpha	GBeta
A1	820	9574	3893	0.2106	2.45929
A2					
A3	597	6159	3893	0.1534	1.58207
A4	600	8541	3893	0.1541	2.19394
B1	571	5804	3890	0.1468	1.49203
B2					
B3	436	6590	3893	0.112	1.69278
B4	415	5202	3893	0.1066	1.33624
C1					
C2	982	8068	3893	0.2522	2.07244
C3	484	5531	3893	0.1243	1.42076
C4	720	8998	3893	0.1849	2.31133
D1					
D2					
D3					
D4					

ABSORPTION CURVES

Detector	GAlpha		GBeta	
	A	B	A	B
A1	0.218	-0.0103	0.367	-8E-04
A2	0.224	-0.0106	0.378	-8E-04
A3	0.229	-0.0106	0.396	-8E-04
A4	0.232	-0.0103	0.391	-8E-04
B1	0.23	-0.0103	0.381	-8E-04
B2	0.228	-0.01	0.374	0.0009
B3	0.226	-0.0099	0.407	0.0007
B4	0.209	-0.0096	0.386	-5E-04
C1	0.226	-0.0104	0.395	-6E-04
C2	0.256	-0.0112	0.387	-8E-04
C3	0.221	-0.0103	0.351	-8E-04
C4	0.222	-0.0093	0.386	-8E-04
D1				
D2				
D3				
D4				

Gross Alpha/Beta Data Calculation Report

CROSS TALK

Detector	Alpha To Beta Slope	Alpha To Beta Intercept	Beta To Alpha Ratio
A1	-2E-05	0.2835	0
A2	0.0002	0.2843	0.0002
A3	-0.0001	0.2791	0.0012
A4	-4E-05	0.2849	0.0005
B1	-7E-05	0.2709	0.0002
B2	-6E-05	0.2169	0.0003
B3	-2E-05	0.2672	0.0037
B4	0.0002	0.2823	0.0002
C1			
C2	0.0003	0.2667	0.0017
C3	0.0002	0.2911	0.0005
C4	0.00007	0.2923	0.0022
D1			
D2			
D3			
D4			

EFFICIENCY UNCERTAINTY

Detector	GAlpha u(E)	GAlpha u2(E)	GBeta u(E)	GBeta u2(E)
A1	0.008	4.05E-05	0.006	3.92E-05
A2	0.006	4.17E-05	0.007	5.38E-05
A3	0.007	4.37E-05	0.006	4.16E-05
A4	0.007	4.41E-05	0.008	5.8E-05
B1	0.007	4.54E-05	0.006	3.89E-05
B2	0.006	3.5E-05	0.006	4.1E-05
B3	0.007	4.7E-05	0.008	6.96E-05
B4	0.005	2.81E-05	0.003	8.03E-06
C1		0		0
C2	0.006	4.01E-05	0.007	4.89E-05
C3	0.006	3.94E-05	0.008	6.67E-05
C4	0.006	3.46E-05	0.007	5.08E-05
D1		0		0
D2		0		0
D3		0		0
D4		0		0

LCS DECAY DATA

LCS Type	Decay Days	Decay Years	Decay Factor GAlpha	Decay Factor GBeta
Orig	1014.073611	2.776382234	0.995562356	0.932777611
Recount	-37043.54167	-101.4196897	1.176407596	11.75830003

Gross Alpha/Beta Data Calculation Report

RESULT SUMMARY

Sample Index	Sample Type	STL Sample ID	Work Order	Counts GAlpha	Counts GBeta	Count Duration Minutes	Detector	Count Date/Time
1	LCS	D4C100000319C	GA05G1AC	826	3486	180	A1	03/11/2004 13:16
2	MB	D4C100000319B	GA05G1AA	31	327	180	A3	03/11/2004 13:16
3	Samp	D4C090319001	GAXM31AA	22	419	180	A4	03/11/2004 13:16
4	DUP	D4C090319001X	GAXM31AC	47	438	180	C2	03/15/2004 11:58
5	Samp	D4C090319002	GAXNW1AA	22	308	180	B1	03/11/2004 13:16
6	Samp	D4C090319003	GAXN11AA	23	361	180	B3	03/11/2004 13:16
7	Samp	D4C090319004	GAXN31AA	19	302	180	B4	03/11/2004 13:16
8	Samp	D4C090319005	GAXN51AA	38	393	180	C2	03/11/2004 13:16
9	Samp	D4C090319006	GAXN81AA	32	340	180	C3	03/11/2004 13:16
10	Samp	D4C090319007	GAXN91AA	30	426	180	C4	03/11/2004 13:16
11	Samp	D4C090319008	GAXPA1AA	23	352	180	C2	03/11/2004 16:25
12	Samp	D4C090319009	GAXPC1AA	25	291	180	C3	03/11/2004 16:25
13	Samp	D4C090319010	GAXPD1AA	17	422	180	C4	03/11/2004 16:25
14	Samp	D4C090319011	GAXPE1AA	22	384	180	A4	03/12/2004 12:11
15	Samp	D4C090319012	GA2P31AA	17	312	180	B1	03/12/2004 12:11
16	Samp	D4C090319013	GA2P91AA	20	309	180	B3	03/12/2004 12:11
17	Samp	D4C090319014	GA2QA1AA	16	291	180	B4	03/12/2004 12:11
18	Samp							
19	Samp							
20	Samp							
21	Samp							
22	Samp							
23	Samp							
24	MS							

Gross Alpha/Beta Data Calculation Report

RESULT SUMMARY - Continued

Sample Index	Report Matrix	PrePrep	Report Basis	Aliquot Mass g/f/wipe	Density Factor (g/ml)	Dig/Lch Factor (gs/gdl)	Total Filter Wt. (g/f/wipe)	Total Filter Vol. (m3)	Receipt To Dry Factor	Receipt To Ash Factor	Alpha Efficiency	Beta Efficiency	Final Result Factor
1	Wipe	None	pCi/wipe	1							0.152959788	0.357037868	1
2	Wipe	None	pCi/wipe	1							0.229	0.396	1
3	Wipe	None	pCi/wipe	1							0.232	0.391	1
4	Wipe	None	pCi/wipe	1	0	0	0	0	0	0	0.256	0.387	1
5	Wipe	None	pCi/wipe	1							0.23	0.381	1
6	Wipe	None	pCi/wipe	1							0.226	0.407	1
7	Wipe	None	pCi/wipe	1							0.209	0.386	1
8	Wipe	None	pCi/wipe	1							0.256	0.387	1
9	Wipe	None	pCi/wipe	1							0.221	0.351	1
10	Wipe	None	pCi/wipe	1							0.222	0.386	1
11	Wipe	None	pCi/wipe	1							0.256	0.387	1
12	Wipe	None	pCi/wipe	1							0.221	0.351	1
13	Wipe	None	pCi/wipe	1							0.222	0.386	1
14	Wipe	None	pCi/wipe	1							0.232	0.391	1
15	Wipe	None	pCi/wipe	1							0.23	0.381	1
16	Wipe	None	pCi/wipe	1							0.226	0.407	1
17	Wipe	None	pCi/wipe	1							0.209	0.386	1
18													
19													
20													
21													
22													
23													
24	0	0	0		0	0	0	0	0	0			

Gross Alpha/Beta Data Calculation Report

RESULT SUMMARY - Continued

Sample Index	GAlpha Result pCi/aliquot unit	GAlpha 2s Count Uncert pCi/aliquot unit	GAlpha 2s TPU pCi/aliquot unit	GBeta Result pCi/aliquot unit	GBeta 2s Count Uncert pCi/aliquot unit	GBeta 2s TPU pCi/aliquot unit
1	12.95096949	0.946716965	1.041634744	21.19338308	0.94895019	1.78235393
2	0.037118006	0.163967012	0.121688649	0.260862741	0.30659613	0.788961265
3	-0.061938029	0.149109279	0.102025907	0.154189927	0.357523681	0.344734972
4	0.015595944	0.184177832	0.134254841	0.417314678	0.361039179	3.183173679
5	-0.048108911	0.148396035	0.102775582	0.259015231	0.308800768	0.539985585
6	0.031455568	0.142580177	0.108175972	0.341497575	0.311116582	1.044191649
7	-0.002254487	0.145027177	0.104657713	0.398559068	0.295958962	16.33655066
8	-0.072382659	0.174978849	0.121337826	0.129077478	0.350335778	0.319502497
9	0.108947994	0.163663729	0.127591945	0.580803613	0.341876205	0.655767504
10	-0.037092514	0.175770891	0.124083465	0.064578539	0.368520137	0.328808709
11	-0.219013665	0.158464941	0.096108154	-0.136045526	0.339862498	0.247259073
12	0.029683209	0.152767003	0.11324633	0.245979472	0.326975451	0.86359293
13	-0.183635454	0.15668257	0.095228357	0.038645871	0.366807384	0.266084203
14	-0.061938029	0.149109279	0.102025907	-0.069819248	0.349736205	0.270842335
15	-0.10251114	0.140525661	0.091073487	0.285288223	0.309509875	0.321616186
16	-0.001763491	0.137535561	0.09929528	0.026434635	0.298537884	1.331841778
17	-0.038175576	0.139214146	0.096445115	0.32724423	0.292709432	0.762503578
18						
19						
20						
21						
22						
23						
24						

MDA CALCULATIONS

Sample Index	MDA pCi/aliquot unit GAlpha	MDA pCi/aliquot unit GBeta
1	0.519825361	0.757692365
2	0.299760481	0.514843887
3	0.29654556	0.610625036
4	0.335619364	0.600154975
5	0.292704681	0.520231908
6	0.264402291	0.517525569
7	0.279814061	0.48699017
8	0.335619364	0.600154975
9	0.283058121	0.551560238
10	0.336254515	0.634353353
11	0.335619364	0.600154975
12	0.283058121	0.551560238
13	0.336254515	0.634353353
14	0.29654556	0.610625036
15	0.292704681	0.520231908
16	0.264402291	0.517525569
17	0.279814061	0.48699017
18		
19		
20		
21		
22		
23		
24		

Gross Alpha/Beta Data Calculation Report

TPU CALCULATIONS

Sample Index	GAlpha Term 1	GAlpha Term 2	GAlpha TPU	GBeta Term 1	GBeta Term 2	GBeta TPU
1	1.101702388	0.290251091	1.0416347	1.031722594	3.04378498	1.78235393
2	0.018996241	1.14893E-06	0.1216886	0.067137638	0.73141808	0.788961265
3	0.01335096	3.14344E-06	0.1020259	0.08794531	0.0645177	0.344734972
4	0.023123359	1.48761E-07	0.1342548	0.09390462	12.905231	3.183173679
5	0.013549087	1.98636E-06	0.1027756	0.067874697	0.30619983	0.539985585
6	0.014461686	9.11381E-07	0.106176	0.070028975	1.32876656	1.044191649
7	0.014051937	3.26485E-09	0.1046577	0.084851338	342.319994	16.33655066
8	0.018884807	3.2043E-06	0.1213378	0.084136429	0.04682467	0.319502497
9	0.020875699	9.58153E-06	0.1275919	0.088840369	0.4628477	0.655767504
10	0.019751513	9.66522E-07	0.1240835	0.092030499	0.04667077	0.328808709
11	0.011820552	2.93364E-05	0.0961082	0.074862785	0.00357012	0.247259073
12	0.016452174	7.11243E-07	0.1132463	0.076054453	0.88072527	0.86359293
13	0.011610239	2.36893E-05	0.0952284	0.090414767	0.00040214	0.266064203
14	0.01335096	3.14344E-06	0.1020259	0.080879377	0.0132287	0.270842335
15	0.010631866	9.01879E-06	0.0910735	0.068437184	0.06426241	0.321616186
16	0.012648846	2.86452E-09	0.0992953	0.06019083	2.21542567	1.331841778
17	0.011932191	9.36135E-07	0.0964451	0.062397279	0.68349752	0.782503578
18						
19						
20						
21						
22						
23						
24						

CORRECTED COUNTS

Sample Index	Alpha Net CPM	Non-Negative Alpha Net CPM	Beta Corrected CPM
1	4.378254417	4.378254417	15.66915788
2	0.018870052	0.018870052	0.229329653
3	-0.031900562	0	0.133839941
4	0.008863487	0.008863487	0.358531733
5	-0.02456441	0	0.219080263
6	0.015781888	0.015781888	0.308556719
7	-0.001046037	0	0.341533236
8	-0.041136513	0	0.110895625
9	0.053452065	0.053452065	0.452573791
10	-0.018280675	0	0.055338642
11	-0.124469846	0	-0.116882153
12	0.014563176	0.014563176	0.191672124
13	-0.090502897	0	0.03311842
14	-0.031900562	0	-0.060604504
15	-0.052342188	0	0.241302485
16	-0.000884779	0	0.02388475
17	-0.017712704	0	0.280422125
18			
19			
20			
21			
22			
23			
24			

RESIDUE CALCULATION

Sample Index	Planchet Final Mass (g)	Planchet Tare Mass (g)	Residue Mass (g)
1	9.0497	9.0153	0.0344
2			0
3			0
4			0
5			0
6			0
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0
21			0
22			0
23			0
24			0

3-11-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	180.00	22	308	330	0.12	1.71	1.83	0.00	0.00	0.00	0.00	1380.0	13:15:37
B	3	180.00	23	361	384	0.13	2.01	2.13	0.00	0.00	0.00	0.00	1380.0	13:15:37
	4	180.00	19	302	321	0.11	1.68	1.78	0.00	0.00	0.00	0.00	1380.0	13:15:37
C	2	180.00	38	393	431	0.21	2.18	2.39	0.00	0.00	0.00	0.00	1380.0	13:15:37
C	3	180.00	32	340	372	0.18	1.89	2.07	0.00	0.00	0.00	0.00	1380.0	13:15:37
C	4	180.00	30	426	456	0.17	2.37	2.53	0.00	0.00	0.00	0.00	1380.0	13:15:37
A	1	180.00	826	3486	4312	4.59	19.37	23.96	0.00	0.00	0.00	0.00	1372.5	13:15:37
A	3	180.00	31	327	358	0.17	1.82	1.99	0.00	0.00	0.00	0.00	1372.5	13:15:37
A	4	180.00	22	419	441	0.12	2.33	2.45	0.00	0.00	0.00	0.00	1372.5	13:15:37

[TENNELEC LB4000] [PAGE 1]

16:21:53		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D4C100000-319C	180.00	826	3486	0.00	0.00	0.00	0.00
13:15:37	2		0.00	0	0	0.00	0.00	0.00	0.00
180.00	3	-319B	180.00	31	327	0.00	0.00	0.00	0.00
	4	D4C090319-001	180.00	22	419	0.00	0.00	0.00	0.00
GROUP B	1	-002	180.00	22	308	0.00	0.00	0.00	0.00
13:15:37	2		0.00	0	0	0.00	0.00	0.00	0.00
180.00	3	-003	180.00	23	361	0.00	0.00	0.00	0.00
	4	-004	180.00	19	302	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
13:15:37	2	-005	180.00	38	393	0.00	0.00	0.00	0.00
180.00	3	-006	180.00	32	340	0.00	0.00	0.00	0.00
	4	-007	180.00	30	426	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
4.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 1 COUNT TERMINATED ////

3-11-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	2	180.00	23	352	375	0.13	1.96	2.08	0.00	0.00	0.00	0.00	1380.0	16:25:20
C	3	180.00	25	291	316	0.14	1.62	1.76	0.00	0.00	0.00	0.00	1380.0	16:25:20
C	4	180.00	17	422	439	0.09	2.34	2.44	0.00	0.00	0.00	0.00	1380.0	16:25:20
B	1	720.00	363	1866	2229	0.50	2.59	3.10	0.00	0.00	0.00	0.00	1380.0	16:25:20
B	3	720.00	2014	2265	4279	2.80	3.15	5.94	0.00	0.00	0.00	0.00	1380.0	16:25:20
A	1	720.00	1664	7329	8993	2.31	10.18	12.49	0.00	0.00	0.00	0.00	1372.5	16:25:20
A	3	720.00	102	1124	1226	0.14	1.56	1.70	0.00	0.00	0.00	0.00	1372.5	16:25:20
A	4	720.00	403	2504	2907	0.56	3.48	4.04	0.00	0.00	0.00	0.00	1372.5	16:25:20

[TENNELEC LB4000] [PAGE 1]

9:00:55		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D4C110000-303C	720.00	1664	7329	0.00	0.00	0.00	0.00
16:25:20	2		0.00	0	0	0.00	0.00	0.00	0.00
720.00	3	-303B	720.00	102	1124	0.00	0.00	0.00	0.00

[TENNELEC LB4000] [PAGE 1]

9:01:31		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D4C110000-303C	720.00	1664	7329	0.00	0.00	0.00	0.00
16:25:20	2		0.00	0	0	0.00	0.00	0.00	0.00
720.00	3	-303B	720.00	102	1124	0.00	0.00	0.00	0.00
	4	D4C100248-001	720.00	403	2504	0.00	0.00	0.00	0.00
GROUP B	1	-001X	720.00	363	1866	0.00	0.00	0.00	0.00
16:25:20	2		0.00	0	0	0.00	0.00	0.00	0.00
720.00	3	D4C100233-001	720.00	2014	2265	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
16:25:20	2	D4C090319-008	180.00	23	352	0.00	0.00	0.00	0.00
180.00	3	-009	180.00	25	291	0.00	0.00	0.00	0.00
	4	-010	180.00	17	422	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
4.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 1 COUNT TERMINATED ////

3-12-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	180.00	17	312	329	0.09	1.73	1.83	0.00	0.00	0.00	0.00	1380.0	12:10:51
B	3	180.00	20	309	329	0.11	1.72	1.83	0.00	0.00	0.00	0.00	1380.0	12:10:51
B	4	180.00	16	291	307	0.09	1.62	1.71	0.00	0.00	0.00	0.00	1380.0	12:10:51
A	1	180.00	66	415	481	0.37	2.31	2.67	0.00	0.00	0.00	0.00	1372.5	12:10:51
A	4	180.00	22	384	406	0.12	2.13	2.26	0.00	0.00	0.00	0.00	1372.5	12:10:51

[TENNELEC LB4000] [PAGE 1]

15:14:03		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D4C090319-001X	180.00	66	415		0.00	0.00	0.00	0.00
12:10:51	2		0.00	0	0		0.00	0.00	0.00	0.00
180.00	3		0.00	0	0		0.00	0.00	0.00	0.00
	4	-011	180.00	22	384		0.00	0.00	0.00	0.00
GROUP B	1	-012	180.00	17	312		0.00	0.00	0.00	0.00
12:10:51	2		0.00	0	0		0.00	0.00	0.00	0.00
180.00	3	-013	180.00	20	309		0.00	0.00	0.00	0.00
	4	-014	180.00	16	291		0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0		0.00	0.00	0.00	0.00
14:07:09	2		66.54	41	272		0.00	0.00	0.00	0.00
180.00	3		0.00	0	0		0.00	0.00	0.00	0.00
	4		0.00	0	0		0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0		0.00	0.00	0.00	0.00
	2		0.00	0	0		0.00	0.00	0.00	0.00
4.00	3		0.00	0	0		0.00	0.00	0.00	0.00
	4		0.00	0	0		0.00	0.00	0.00	0.00

Group A channel 1 COUNT TERMINATED ////

[TENNELEC LB4000] [PAGE 1]

15:04:52		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1		60.00	821	1011	0.00	0.00	0.00	0.00
11:57:49	2		0.00	0	0	0.00	0.00	0.00	0.00
60.00	3		60.00	8	256	0.00	0.00	0.00	0.00
	4		60.00	1048	2258	0.00	0.00	0.00	0.00
GROUP B	1		60.00	1108	2011	0.00	0.00	0.00	0.00
11:57:49	2		0.00	0	0	0.00	0.00	0.00	0.00
60.00	3		60.00	1203	2354	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP C	1		180.00	78	1304	0.00	0.00	0.00	0.00
11:57:49	2	D4C090319-001X	180.00	47	438	0.00	0.00	0.00	0.00
180.00	3		180.00	35	383	0.00	0.00	0.00	0.00
	4		180.00	45	499	0.00	0.00	0.00	0.00
GROUP D	1		4.00	1	5	0.00	0.00	0.00	0.00
11:57:49	2		4.00	0	13	0.00	0.00	0.00	0.00
4.00	3		4.00	0	11	0.00	0.00	0.00	0.00
	4		4.00	0	7	0.00	0.00	0.00	0.00

DAILY / WEEKLY BACKGROUND AND STANDARD CONTROL CHARTS

SEVERN TRENT

Denver Laboratory

STL

DAILY STANDARD & BACKGROUND SUMMARY FOR GFPC.

03/11/04

SEVERN TRENT STL

ALPHA

STANDARD CPM (20 Min CT)

A1	A2	A3	A4	
2653.73	3714.71	3293.20	3110.71	UPPER LIMIT CPM
2480.93	3536.26	3056.04	2959.86	LOWER LIMIT CPM
2585.65	3653.70	3238.35	3084.80	DAILY CPM
IN	IN	IN	IN	
0.298	0.301	0.303	0.301	DET EFF.

B1	B2	B3	B4	
3309.13	3818.53	3078.49	3695.38	UPPER LIMIT CPM
3128.34	2895.75	2921.47	3500.12	LOWER LIMIT CPM
3224.80	3399.00	3012.75	3616.05	DAILY CPM
IN	IN	IN	IN	
0.305	0.297	0.261	0.303	DET EFF.

BACKGROUND CPM (60 Min CT)

A1	A2	A3	A4
0.40	0.45	0.38	0.34
0.22	0.05	0.05	0.30
IN	IN	IN	IN

B1	B2	B3	B4
0.41	0.30	0.32	0.34
0.25	0.13	0.07	0.15
IN	IN	IN	IN

BETA

STANDARD CPM (4 Min CT)

A1	A2	A3	A4	
29649.17	26222.31	29804.93	28945.35	UPPER LIMIT CPM
21625.35	21469.97	26494.14	25016.10	LOWER LIMIT CPM
27526.75	24905.00	29098.75	28206.25	DAILY CPM
IN	IN	IN	IN	
0.321	0.291	0.347	0.326	DET EFF.

B1	B2	B3	B4	
29787.46	36218.22	32390.01	27769.80	UPPER LIMIT CPM
21289.75	10274.69	30961.66	22349.31	LOWER LIMIT CPM
27099.25	22614.50	31770.75	26075.25	DAILY CPM
IN	IN	IN	IN	
0.317	0.279	0.377	0.299	DET EFF.

BACKGROUND CPM (60 Min CT)

A1	A2	A3	A4
3.96	4.71	2.14	3.31
2.47	2.53	1.60	2.27
IN	IN	IN	IN

B1	B2	B3	B4
3.39	2.18	2.35	1.96
1.50	1.13	1.58	1.47
IN	IN	IN	IN

Alpha Recounts

STANDARD CPM (20 Min CT)

A1	A2	A3	A4

B1	B2	B3	B4

DET #
CPM
CPM

BACKGROUND CPM (60 Min CT)

A1	A2	A3	A4

B1	B2	B3	B4

Beta Recounts

STANDARD CPM (4 Min CT)

A1	A2	A3	A4

B1	B2	B3	B4

DET #
CPM
CPM

BACKGROUND CPM (60 Min CT)

A1	A2	A3	A4

B1	B2	B3	B4

DET #
CPM
CPM
IN OUT

REVIEWED BY [signature] APPROVED BY [signature]

SEVERN TRENT STL

STANDARDS FOR DAILY CALIBRATION CHECK			
	REF DATE=	07/01/93	
	DAYS DECAYED	3906.00	

Am241 STD#	CORRECT ACT	DECAY
Am24100AP	3877.01	0.98
Am24100BP	5433.12	0.98
Am24100CP	4723.39	0.98
Am24100DP	4549.39	0.98

Am241 STD#	CORRECT ACT	DECAY
Am24100EP	4754.84	0.98
Am24100FP	5099.88	0.98
Am24100GP	5168.69	0.98
Am24100HP	5348.58	0.98

Cs 137 STD#	CORRECT ACT	DECAY
Cs13700AP	35945.04	0.78
Cs13700BP	36905.76	0.78
Cs13700CP	36585.52	0.78
Cs13700DP	37226.00	0.78

Cs 137 STD#	CORRECT ACT	DECAY
Cs13700EP	36265.28	0.78
Cs13700FP	37468.14	0.78
Cs13700HP	37866.49	0.78
Cs13700IP	37764.95	0.78

	03/11/04 DAILY EFF	
	ALPHA	BETA
A1	0.300	0.345
A2	0.303	0.304
A3	0.309	0.358
A4	0.305	0.341
B1	0.306	0.337
B2	0.300	0.272
B3	0.263	0.378
B4	0.305	0.311

ALPHA BACKGROUND TOLERANCE (120 MIN COUNT TIME)
CPM = 0.70
REQUIRED FOR SDL OF 3 pCi/SAMPLE OR LESS

BETA BACKGROUND TOLERANCE (120 MIN COUNT TIME)
CPM = 3.10
REQUIRED FOR SDL OF 4 pCi/SAMPLE OR LESS

	03/11/04 average bkgd cpm			03/11/04 average bkgd cpm	
	ALPHA	BETA		ALPHA	BETA
A1	0.22	2.54	B1	0.17	1.85
A2	0.18	2.72	B2	0.14	1.32
A3	0.17	1.68	B3	0.15	1.81
A4	0.16	2.16	B4	0.15	1.41

3-11-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	60.00	15	90	105	0.25	1.50	1.75	0.00	0.00	0.00	0.00	1380.0	10:57:13
B	2	60.00	8	68	76	0.13	1.13	1.27	0.00	0.00	0.00	0.00	1380.0	10:57:13
B	3	60.00	4	95	99	0.07	1.58	1.65	0.00	0.00	0.00	0.00	1380.0	10:57:13
B	4	60.00	9	88	97	0.15	1.47	1.62	0.00	0.00	0.00	0.00	1380.0	10:57:13
C	1	60.00	21	380	401	0.35	6.33	6.68	0.00	0.00	0.00	0.00	1380.0	10:57:13
C	2	60.00	9	117	126	0.15	1.95	2.10	0.00	0.00	0.00	0.00	1380.0	10:57:13
C	3	60.00	11	77	88	0.18	1.28	1.47	0.00	0.00	0.00	0.00	1380.0	10:57:13
C	4	60.00	10	129	139	0.17	2.15	2.32	0.00	0.00	0.00	0.00	1380.0	10:57:13
A	1	60.00	13	148	161	0.22	2.47	2.68	0.00	0.00	0.00	0.00	1372.5	10:57:13
A	2	60.00	3	152	155	0.05	2.53	2.58	0.00	0.00	0.00	0.00	1372.5	10:57:13
A	3	60.00	3	96	99	0.05	1.60	1.65	0.00	0.00	0.00	0.00	1372.5	10:57:13
A	4	60.00	18	136	154	0.30	2.27	2.57	0.00	0.00	0.00	0.00	1372.5	10:57:13
D	1	60.00	7	101	108	0.12	1.68	1.80	0.00	0.00	0.00	0.00	1290.0	10:57:13
D	2	60.00	3	101	104	0.05	1.68	1.73	0.00	0.00	0.00	0.00	1290.0	10:57:13
D	3	60.00	5	101	106	0.08	1.68	1.77	0.00	0.00	0.00	0.00	1290.0	10:57:13
D	4	60.00	3	126	129	0.05	2.10	2.15	0.00	0.00	0.00	0.00	1290.0	10:57:13

3-11-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	20.00	64496	23507	88003	3224.80	1175.35	4400.15	0.00	0.00	0.00	0.00	1380.0	11:59:07
B	2	20.00	67980	22307	90287	3399.00	1115.35	4514.35	0.00	0.00	0.00	0.00	1380.0	11:59:07
B	3	20.00	60255	21743	81998	3012.75	1087.15	4099.90	0.00	0.00	0.00	0.00	1380.0	11:59:07
B	4	20.00	72321	24222	96543	3616.05	1211.10	4827.15	0.00	0.00	0.00	0.00	1380.0	11:59:07
A	1	20.00	51713	18812	70525	2585.65	940.60	3526.25	0.00	0.00	0.00	0.00	1372.5	11:59:07
A	2	20.00	73074	26666	99740	3653.70	1333.30	4987.00	0.00	0.00	0.00	0.00	1372.5	11:59:07
A	3	20.00	64767	22657	87424	3238.35	1132.85	4371.20	0.00	0.00	0.00	0.00	1372.5	11:59:07
A	4	20.00	61696	20464	82160	3084.80	1023.20	4108.00	0.00	0.00	0.00	0.00	1372.5	11:59:07

3-11-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	4.00	1	108397	108398	0.25	27099.25	27099.50	0.00	0.00	0.00	0.00	1380.0	12:21:02
B	2	4.00	4	90458	90462	1.00	22614.50	22615.50	0.00	0.00	0.00	0.00	1380.0	12:21:02
B	3	4.00	598	127083	127681	149.50	31770.75	31920.25	0.00	0.00	0.00	0.00	1380.0	12:21:02
B	4	4.00	12	104301	104313	3.00	26075.25	26078.25	0.00	0.00	0.00	0.00	1380.0	12:21:02
A	1	4.00	14	110107	110121	3.50	27526.75	27530.25	0.00	0.00	0.00	0.00	1372.5	12:21:02
A	2	4.00	34	99620	99654	8.50	24905.00	24913.50	0.00	0.00	0.00	0.00	1372.5	12:21:02
A	3	4.00	243	116395	116638	60.75	29098.75	29159.50	0.00	0.00	0.00	0.00	1372.5	12:21:02
A	4	4.00	106	112825	112931	26.50	28206.25	28232.75	0.00	0.00	0.00	0.00	1372.5	12:21:02

3-11-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	20.00	52597	19401	71998	2629.85	970.05	3599.90	0.00	0.00	0.00	0.00	1380.0	12:26:38
C	2	20.00	75362	27601	102963	3768.10	1380.05	5148.15	0.00	0.00	0.00	0.00	1380.0	12:26:38
C	3	20.00	53607	22762	76369	2680.35	1138.10	3818.45	0.00	0.00	0.00	0.00	1380.0	12:26:38
C	4	20.00	60690	21718	82408	3034.50	1085.90	4120.40	0.00	0.00	0.00	0.00	1380.0	12:26:38
D	1	20.00	66678	24623	91301	3333.90	1231.15	4565.05	0.00	0.00	0.00	0.00	1290.0	12:26:38
D	2	20.00	73424	26807	100231	3671.20	1340.35	5011.55	0.00	0.00	0.00	0.00	1290.0	12:26:38
D	3	20.00	62520	22841	85361	3126.00	1142.05	4268.05	0.00	0.00	0.00	0.00	1290.0	12:26:38
D	4	20.00	74502	27479	101981	3725.10	1373.95	5099.05	0.00	0.00	0.00	0.00	1290.0	12:26:38

C	1	4.00	719	119884	120603	179.75	29971.00	30150.75	0.00	0.00	0.00	0.00	1380.0	12:52:15
C	2	4.00	75	101788	101863	18.75	25447.00	25465.75	0.00	0.00	0.00	0.00	1380.0	12:52:15
C	3	4.00	4	97393	97397	1.00	24348.25	24349.25	0.00	0.00	0.00	0.00	1380.0	12:52:15
C	4	4.00	213	110051	110264	53.25	27512.75	27566.00	0.00	0.00	0.00	0.00	1380.0	12:52:15
D	1	4.00	360	128982	129342	90.00	32245.50	32335.50	0.00	0.00	0.00	0.00	1290.0	12:52:15
D	2	4.00	276	135807	136083	69.00	33951.75	34020.75	0.00	0.00	0.00	0.00	1290.0	12:52:15
D	3	4.00	222	129895	130117	55.50	32473.75	32529.25	0.00	0.00	0.00	0.00	1290.0	12:52:15
D	4	4.00	241	126101	126342	60.25	31525.25	31585.50	0.00	0.00	0.00	0.00	1290.0	12:52:15

DAILY STANDARD & BACKGROUND SUMMARY FOR GFPC.

03/12/04

SEVERN TRENT STL

ALPHA

STANDARD CPM (20 Min CT)

A1	A2	A3	A4	
2653.73	3713.04	3297.98	3116.29	UPPER LIMIT CPM
2480.93	3537.20	3053.26	2956.56	LOWER LIMIT CPM
2569.40	3655.45	3200.45	3006.50	DAILY CPM
IN	IN	IN	IN	
0.298	0.301	0.303	0.301	DET EFF.

B1	B2	B3	B4	
3309.45	3819.58	3079.06	3695.92	UPPER LIMIT CPM
3128.53	2905.59	2923.15	3500.03	LOWER LIMIT CPM
3191.35	3364.10	3029.15	3639.95	DAILY CPM
IN	IN	IN	IN	
0.305	0.297	0.262	0.303	DET EFF.

BACKGROUND CPM (60 Min CT)

A1	A2	A3	A4
0.39	0.46	0.39	0.36
0.28	0.32	0.23	0.08
IN	IN	IN	IN

B1	B2	B3	B4
0.41	0.29	0.32	0.34
0.12	0.10	0.13	0.05
IN	IN	IN	IN

BETA

STANDARD CPM (4 Min CT)

A1	A2	A3	A4	
29840.23	26332.93	29918.22	29103.92	UPPER LIMIT CPM
21632.19	21456.76	26442.53	24945.03	LOWER LIMIT CPM
27683.75	24804.00	29322.75	28172.50	DAILY CPM
IN	IN	IN	IN	
0.323	0.292	0.347	0.327	DET EFF.

B1	B2	B3	B4	
29769.98	36217.93	32384.24	27770.76	UPPER LIMIT CPM
21299.56	10376.95	30963.10	22348.77	LOWER LIMIT CPM
26382.75	20047.50	31956.50	26434.25	DAILY CPM
IN	IN	IN	IN	
0.317	0.280	0.377	0.299	DET EFF.

BACKGROUND CPM (60 Min CT)

A1	A2	A3	A4
3.96	4.71	2.13	3.31
2.47	2.58	2.20	2.17
IN	IN	OUT	IN

B1	B2	B3	B4
3.28	2.17	2.31	1.95
1.82	1.20	1.62	1.40
IN	IN	IN	IN

STANDARD CPM (20 Min CT)

A1	A2	A3	A4

B1	B2	B3	B4

Alpha Recounts

DET #
CPM
CPM

DET #
CPM
CPM

BACKGROUND CPM (60 Min CT)

A1	A2	A3	A4

B1	B2	B3	B4

STANDARD CPM (4 Min CT)

A1	A2	A3	A4

B1	B2	B3	B4

Beta Recounts

DET #
CPM
CPM

DET #
CPM
CPM

BACKGROUND CPM (60 Min CT)

A1	A2	A3	A4

B1	B2	B3	B4

IN OUT

REVIEWED BY [signature]

APPROVED BY [signature]

SEVERN TRENT STL

STANDARDS FOR DAILY CALIBRATION CHECK			
	REF DATE=	07/01/93	
	DAYS DECAYED	3907.00	

Am241 STD#	CORRECT ACT	DECAY
Am24100AP	3876.99	0.98
Am24100BP	5433.10	0.98
Am24100CP	4723.37	0.98
Am24100DP	4549.37	0.98

Am241 STD#	CORRECT ACT	DECAY
Am24100EP	4754.82	0.98
Am24100FP	5099.86	0.98
Am24100GP	5168.67	0.98
Am24100HP	5348.56	0.98

Cs 137 STD#	CORRECT ACT	DECAY
Cs13700AP	35942.77	0.78
Cs13700BP	36903.43	0.78
Cs13700CP	36583.21	0.78
Cs13700DP	37223.65	0.78

Cs 137 STD#	CORRECT ACT	DECAY
Cs13700EP	36262.99	0.78
Cs13700FP	37465.77	0.78
Cs13700HP	37864.09	0.78
Cs13700IP	37762.56	0.78

	03/12/04 DAILY EFF	
	ALPHA	BETA
A1	0.299	0.347
A2	0.303	0.303
A3	0.305	0.361
A4	0.298	0.341
B1	0.302	0.328
B2	0.297	0.241
B3	0.264	0.380
B4	0.307	0.315

ALPHA BACKGROUND TOLERANCE (120 MIN COUNT TIME)
CPM = 0.70
REQUIRED FOR SDL OF 3 pCi/SAMPLE OR LESS

BETA BACKGROUND TOLERANCE (120 MIN COUNT TIME)
CPM = 3.10
REQUIRED FOR SDL OF 4 pCi/SAMPLE OR LESS

	03/12/04 average bkgd cpm			03/12/04 average bkgd cpm	
	ALPHA	BETA		ALPHA	BETA
A1	0.22	2.54	B1	0.18	1.81
A2	0.17	2.73	B2	0.14	1.31
A3	0.17	1.67	B3	0.15	1.79
A4	0.17	2.18	B4	0.15	1.40

3-12-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	60.00	7	109	116	0.12	1.82	1.93	0.00	0.00	0.00	0.00	1380.0	9:41:02
B	2	60.00	6	72	78	0.10	1.20	1.30	0.00	0.00	0.00	0.00	1380.0	9:41:02
	3	60.00	8	97	105	0.13	1.62	1.75	0.00	0.00	0.00	0.00	1380.0	9:41:02
B	4	60.00	3	84	87	0.05	1.40	1.45	0.00	0.00	0.00	0.00	1380.0	9:41:02
A	1	60.00	17	148	165	0.28	2.47	2.75	0.00	0.00	0.00	0.00	1372.5	9:41:02
A	2	60.00	19	155	174	0.32	2.58	2.90	0.00	0.00	0.00	0.00	1372.5	9:41:02
A	3	60.00	14	132	146	0.23	2.20	2.43	0.00	0.00	0.00	0.00	1372.5	9:41:02
A	4	60.00	5	130	135	0.08	2.17	2.25	0.00	0.00	0.00	0.00	1372.5	9:41:02

3-12-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	20.00	63877	24542	88369	3191.35	1227.10	4418.45	0.00	0.00	0.00	0.00	1380.0	10:57:35
B	2	20.00	67282	23356	90638	3364.10	1167.80	4531.90	0.00	0.00	0.00	0.00	1380.0	10:57:35
B	3	20.00	60583	21485	82068	3029.15	1074.25	4103.40	0.00	0.00	0.00	0.00	1380.0	10:57:35
B	4	20.00	72799	24444	97243	3639.95	1222.20	4862.15	0.00	0.00	0.00	0.00	1380.0	10:57:35
A	1	20.00	51388	18792	70180	2569.40	939.60	3509.00	0.00	0.00	0.00	0.00	1372.5	10:57:35
A	2	20.00	73109	26065	99174	3655.45	1303.25	4958.70	0.00	0.00	0.00	0.00	1372.5	10:57:35
A	3	20.00	64009	22120	86129	3200.45	1106.00	4306.45	0.00	0.00	0.00	0.00	1372.5	10:57:35
A	4	20.00	60130	20528	80658	3006.50	1026.40	4032.90	0.00	0.00	0.00	0.00	1372.5	10:57:35

3-12-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	4.00	6	105531	105537	1.50	26382.75	26384.25	0.00	0.00	0.00	0.00	1380.0	11:27:34
	2	4.00	2	80190	80192	0.50	20047.50	20048.00	0.00	0.00	0.00	0.00	1380.0	11:27:34
	3	4.00	672	127826	128498	168.00	31956.50	32124.50	0.00	0.00	0.00	0.00	1380.0	11:27:34
B	4	4.00	10	105737	105747	2.50	26434.25	26436.75	0.00	0.00	0.00	0.00	1380.0	11:27:34
A	1	4.00	19	110735	110754	4.75	27683.75	27688.50	0.00	0.00	0.00	0.00	1372.5	11:27:34
A	2	4.00	33	99216	99249	8.25	24804.00	24812.25	0.00	0.00	0.00	0.00	1372.5	11:27:34
A	3	4.00	279	117291	117570	69.75	29322.75	29392.50	0.00	0.00	0.00	0.00	1372.5	11:27:34
A	4	4.00	117	112690	112807	29.25	28172.50	28201.75	0.00	0.00	0.00	0.00	1372.5	11:27:34

DAILY STANDARD & BACKGROUND SUMMARY FOR GFPC.

03/11/04

SEVERN TRENT STL

ALPHA

STANDARD CPM (20 Min CT)

C1	C2	C3	C4	
2715.28	3889.11	3003.51	3084.02	UPPER LIMIT CPM
2609.61	3698.62	2584.38	2949.72	LOWER LIMIT CPM
2629.85	3768.10	2680.35	3034.50	DAILY CPM
IN	IN	IN	IN	
0.309	0.315	0.266	0.299	DET EFF.

D1	D2	D3	D4	
3422.86	3753.15	3183.58	3772.25	UPPER LIMIT CPM
3266.96	3553.57	3091.19	3682.71	LOWER LIMIT CPM
3333.90	3671.20	3126.00	3725.10	DAILY CPM
IN	IN	IN	IN	
0.317	0.323	0.273	0.314	DET EFF.

BACKGROUND CPM (60 Min CT)

C1	C2	C3	C4
0.45	0.42	0.29	0.32
0.35	0.15	0.18	0.17
IN	IN	IN	IN

D1	D2	D3	D4
0.27	0.27	0.21	0.26
0.12	0.05	0.08	0.05
IN	IN	IN	IN

BETA

STANDARD CPM (4 Min CT)

C1	C2	C3	C4	
31475.74	30031.07	31571.39	31940.20	UPPER LIMIT CPM
29143.37	21684.49	12637.27	24835.03	LOWER LIMIT CPM
29971.00	25447.00	24348.25	27512.75	DAILY CPM
IN	IN	IN	IN	
0.380	0.316	0.272	0.344	DET EFF.

D1	D2	D3	D4	
33167.87	34984.57	33333.70	32633.94	UPPER LIMIT CPM
31667.78	32812.43	32003.55	30982.61	LOWER LIMIT CPM
32245.50	33951.75	32473.75	31525.25	DAILY CPM
IN	IN	IN	IN	
0.403	0.408	0.389	0.379	DET EFF.

BACKGROUND CPM (60 Min CT)

C1	C2	C3	C4
15.13	2.75	2.39	3.44
6.33	1.95	1.28	2.15
IN	IN	IN	IN

D1	D2	D3	D4
2.39	2.46	1.95	2.28
1.68	1.68	1.68	2.10
IN	IN	IN	IN

STANDARD CPM (20 Min CT) — Alpha Recounts — BACKGROUND CPM (60 Min CT)

C1	C2	C3	C4		C1	C2	C3	C4
				DET #				
				CPM				
				CPM				

D1	D2	D3	D4		D1	D2	D3	D4
				DET #				
				CPM				
				CPM				

STANDARD CPM (4 Min CT) — Beta Recounts — BACKGROUND CPM (60 Min CT)

C1	C2	C3	C4		C1	C2	C3	C4
				DET #				
				CPM				
				CPM				

D1	D2	D3	D4		D1	D2	D3	D4
				DET #				
				CPM				
				CPM				

IN OUT

REVIEWED BY [signature] APPROVED BY [signature]

SEVERN TRENT STL

STANDARDS FOR DAILY CALIBRATION CHECK			
	REF DATE=	07/01/93	
	DAYS DECAYED	3906.00	

Am241 STD#	CORRECT ACT	DECAY
Am24100AP	3877.01	0.98
Am24100BP	5433.12	0.98
Am24100CP	4723.39	0.98
Am24100DP	4549.39	0.98

Am241 STD#	CORRECT ACT	DECAY
Am24100EP	4754.84	0.98
Am24100FP	5099.88	0.98
Am24100GP	5168.69	0.98
Am24100HP	5348.58	0.98

Cs 137 STD#	CORRECT ACT	DECAY
Cs13700AP	35945.04	0.78
Cs13700BP	36905.76	0.78
Cs13700CP	36585.52	0.78
Cs13700DP	37226.00	0.78

Cs 137 STD#	CORRECT ACT	DECAY
Cs13700EP	36265.28	0.78
Cs13700FP	37468.14	0.78
Cs13700HP	37866.49	0.78
Cs13700IP	37764.95	0.78

	03/11/04 DAILY EFF	
	ALPHA	BETA
C1	0.306	0.376
C2	0.312	0.311
C3	0.256	0.300
C4	0.300	0.333
D1	0.316	0.401
D2	0.324	0.408
D3	0.272	0.386
D4	0.314	0.376

ALPHA BACKGROUND TOLERANCE (120 MIN COUNT TIME)
CPM = 0.70
REQUIRED FOR SDL OF 3 pCi/SAMPLE OR LESS

BETA BACKGROUND TOLERANCE (120 MIN COUNT TIME)
CPM = 3.10
REQUIRED FOR SDL OF 4 pCi/SAMPLE OR LESS

	03/11/04 average bkgd cpm			03/11/04 average bkgd cpm	
	ALPHA	BETA		ALPHA	BETA
C1	0.22	3.54	D1	0.11	1.79
C2	0.19	2.15	D2	0.11	1.85
C3	0.12	1.53	D3	0.09	1.48
C4	0.16	2.38	D4	0.09	1.84

DAILY STANDARD & BACKGROUND SUMMARY FOR GFPC.

03/15/04

SEVERN TRENT STL

ALPHA

STANDARD CPM (20 Min CT)

C1	C2	C3	C4	
2716.81	3888.75	2995.39	3084.97	UPPER LIMIT CPM
2605.40	3696.52	2577.18	2949.47	LOWER LIMIT CPM
2669.10	3787.50	2709.85	3039.60	DAILY CPM
IN	IN	IN	IN	
0.309	0.314	0.266	0.299	DET EFF.

D1	D2	D3	D4	
3414.15	3751.40	3183.68	3772.23	UPPER LIMIT CPM
3279.76	3560.25	3090.87	3682.66	LOWER LIMIT CPM
3348.60	3691.55	3146.85	3754.70	DAILY CPM
IN	IN	IN	IN	
0.317	0.323	0.273	0.314	DET EFF.

BACKGROUND CPM (60 Min CT)

C1	C2	C3	C4
0.47	0.42	0.29	0.32
0.35	0.27	0.13	0.20
IN	IN	IN	IN

D1	D2	D3	D4
0.27	0.27	0.21	0.24
0.05	0.05	0.02	0.05
IN	IN	IN	IN

BETA

STANDARD CPM (4 Min CT)

C1	C2	C3	C4	
31475.37	30024.40	31687.08	31949.93	UPPER LIMIT CPM
29116.76	21666.09	12615.65	24797.97	LOWER LIMIT CPM
30224.75	25597.25	24624.25	27500.75	DAILY CPM
IN	IN	IN	IN	
0.380	0.316	0.273	0.343	DET EFF.

D1	D2	D3	D4	
33123.91	34955.64	33286.61	32640.23	UPPER LIMIT CPM
31736.50	32885.11	32072.91	30967.92	LOWER LIMIT CPM
32363.25	33976.75	32758.00	31377.00	DAILY CPM
IN	IN	IN	IN	
0.403	0.408	0.389	0.379	DET EFF.

BACKGROUND CPM (60 Min CT)

C1	C2	C3	C4
15.34	2.75	2.39	3.42
6.35	2.03	1.63	2.23
IN	IN	IN	IN

D1	D2	D3	D4
2.39	2.46	1.93	2.29
1.67	2.20	1.68	1.78
IN	IN	IN	IN

STANDARD CPM (20 Min CT)

C1	C2	C3	C4

D1	D2	D3	D4

Alpha Recounts

DET #	
CPM	
CPM	
DET #	
CPM	
CPM	

BACKGROUND CPM (60 Min CT)

C1	C2	C3	C4

D1	D2	D3	D4

STANDARD CPM (4 Min CT)

C1	C2	C3	C4

D1	D2	D3	D4

Beta Recounts

DET #	
CPM	
CPM	
DET #	
CPM	
CPM	
IN	OUT

BACKGROUND CPM (60 Min CT)

C1	C2	C3	C4

D1	D2	D3	D4

REVIEWED BY

APPROVED BY

SEVERN TRENT STL

STANDARDS FOR DAILY CALIBRATION CHECK			
	REF DATE=	07/01/93	
	DAYS DECAYED	3910.00	

Am241 STD#	CORRECT ACT	DECAY
Am24100AP	3876.94	0.98
Am24100BP	5433.03	0.98
Am24100CP	4723.30	0.98
Am24100DP	4549.31	0.98

Am241 STD#	CORRECT ACT	DECAY
Am24100EP	4754.76	0.98
Am24100FP	5099.79	0.98
Am24100GP	5168.60	0.98
Am24100HP	5348.49	0.98

Cs 137 STD#	CORRECT ACT	DECAY
Cs13700AP	35935.95	0.78
Cs13700BP	36896.43	0.78
Cs13700CP	36576.27	0.78
Cs13700DP	37216.59	0.78

Cs 137 STD#	CORRECT ACT	DECAY
Cs13700EP	36256.11	0.78
Cs13700FP	37458.66	0.78
Cs13700HP	37856.91	0.78
Cs13700IP	37755.39	0.78

	03/15/04 DAILY EFF	
	ALPHA	BETA
C1	0.310	0.379
C2	0.314	0.313
C3	0.258	0.303
C4	0.301	0.333
D1	0.317	0.402
D2	0.326	0.409
D3	0.274	0.390
D4	0.316	0.374

ALPHA BACKGROUND TOLERANCE (120 MIN COUNT TIME)
CPM = 0.70
REQUIRED FOR SDL OF 3 pCi/SAMPLE OR LESS

BETA BACKGROUND TOLERANCE (120 MIN COUNT TIME)
CPM = 3.10
REQUIRED FOR SDL OF 4 pCi/SAMPLE OR LESS

	03/15/04 average bkgd cpm			03/15/04 average bkgd cpm	
	ALPHA	BETA		ALPHA	BETA
C1	0.22	3.69	D1	0.11	1.79
C2	0.20	2.14	D2	0.10	1.85
C3	0.13	1.52	D3	0.09	1.50
C4	0.16	2.39	D4	0.09	1.84

WEEKLY LONG TERM BACKGROUND SUMMARY FOR GFPC.

SEVERN TRENT STL

DATE 03/08/04

COUNT START DATE: 3/5/2004

COUNT TIME (min):

C	3893.00
D	3893.00

ALPHA BACKGROUND CPM

	C1	C2	C3	C4
UPPER LIMIT CPM	0.408	0.332	0.226	0.262
LOWER LIMIT CPM				
DAILY CPM	0.39	0.25	0.12	0.18
	IN	IN	IN	IN

	D1	D2	D3	D4
UPPER LIMIT CPM	0.206	0.174	0.143	0.147
LOWER LIMIT CPM				
DAILY CPM	0.07	0.06	0.05	0.06
	IN	IN	IN	IN

BETA BACKGROUND CPM

	C1	C2	C3	C4
UPPER LIMIT CPM	12.821	2.406	2.250	2.707
LOWER LIMIT CPM				
DAILY CPM	14.91	2.07	1.42	2.31
	OUT	IN	IN	IN

	D1	D2	D3	D4
UPPER LIMIT CPM	3.034	2.119	2.728	2.091
LOWER LIMIT CPM				
DAILY CPM	1.73	1.81	1.48	1.90
	IN	IN	IN	IN

Alpha Recounts

DET #	C1	C2	C3	C4
CPM				
CPM				

DET #	D1	D2	D3	D4
CPM				
CPM				

Beta Recounts

DET #	C1	C2	C3	C4
CPM				
CPM				

DET #	D1	D2	D3	D4
CPM				
CPM				

REVIEWED BY James Preston

APPROVED BY EM

3-04-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	2	60.00	11	115	126	0.18	1.92	2.10	0.00	0.00	0.00	0.00	1380.0	15:07:58
[illegible]	4	60.00	9	148	157	0.15	2.47	2.62	0.00	0.00	0.00	0.00	1380.0	15:07:58

3-05-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	2	60.00	22	198	220	0.37	3.30	3.67	0.00	0.00	0.00	0.00	1380.0	11:20:41

3-08-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	3893.00	571	5804	6375	0.15	1.49	1.64	0.00	0.00	0.00	0.00	1380.0	16:35:15
B	2	3893.00	450	5265	5715	0.12	1.35	1.47	0.00	0.00	0.00	0.00	1380.0	16:35:15
B	3	3893.00	436	6590	7026	0.11	1.69	1.80	0.00	0.00	0.00	0.00	1380.0	16:35:15
B	4	3893.00	415	5202	5617	0.11	1.34	1.44	0.00	0.00	0.00	0.00	1380.0	16:35:15
C	1	3893.00	1502	58042	59544	0.39	14.91	15.30	0.00	0.00	0.00	0.00	1380.0	16:35:15
C	2	3893.00	982	8068	9050	0.25	2.07	2.32	0.00	0.00	0.00	0.00	1380.0	16:35:15
C	3	3893.00	484	5531	6015	0.12	1.42	1.55	0.00	0.00	0.00	0.00	1380.0	16:35:15
C	4	3893.00	720	8998	9718	0.18	2.31	2.50	0.00	0.00	0.00	0.00	1380.0	16:35:15
A	1	3893.00	820	9574	10394	0.21	2.46	2.67	0.00	0.00	0.00	0.00	1350.0	16:35:15
A	2	3893.00	843	10169	11012	0.22	2.61	2.83	0.00	0.00	0.00	0.00	1350.0	16:35:15
A	3	3893.00	597	6159	6756	0.15	1.58	1.74	0.00	0.00	0.00	0.00	1350.0	16:35:15
A	4	3893.00	600	8541	9141	0.15	2.19	2.35	0.00	0.00	0.00	0.00	1350.0	16:35:15
[illegible]	1	3893.00	279	6737	7016	0.07	1.73	1.80	0.00	0.00	0.00	0.00	1290.0	16:35:15
[illegible]	2	3893.00	224	7033	7257	0.06	1.81	1.86	0.00	0.00	0.00	0.00	1290.0	16:35:15
D	3	3893.00	211	5743	5954	0.05	1.48	1.53	0.00	0.00	0.00	0.00	1290.0	16:35:15
D	4	3893.00	223	7390	7613	0.06	1.90	1.96	0.00	0.00	0.00	0.00	1290.0	16:35:15

3-08-04

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	60.00	7	84	91	0.12	1.40	1.52	0.00	0.00	0.00	0.00	1380.0	10:02:33
B	2	60.00	9	66	75	0.15	1.10	1.25	0.00	0.00	0.00	0.00	1380.0	10:02:33
B	3	60.00	9	96	105	0.15	1.60	1.75	0.00	0.00	0.00	0.00	1380.0	10:02:33
B	4	60.00	5	73	78	0.08	1.22	1.30	0.00	0.00	0.00	0.00	1380.0	10:02:33
C	1	60.00	14	915	929	0.23	15.25	15.48	0.00	0.00	0.00	0.00	1380.0	10:02:33
C	2	60.00	17	129	146	0.28	2.15	2.43	0.00	0.00	0.00	0.00	1380.0	10:02:33
C	3	60.00	11	70	81	0.18	1.17	1.35	0.00	0.00	0.00	0.00	1380.0	10:02:33
C	4	60.00	12	139	151	0.20	2.32	2.52	0.00	0.00	0.00	0.00	1380.0	10:02:33
A	1	60.00	17	149	166	0.28	2.48	2.77	0.00	0.00	0.00	0.00	1350.0	10:02:33
A	2	60.00	10	190	200	0.17	3.17	3.33	0.00	0.00	0.00	0.00	1350.0	10:02:33
A	3	60.00	10	101	111	0.17	1.68	1.85	0.00	0.00	0.00	0.00	1350.0	10:02:33
A	4	60.00	3	128	131	0.05	2.13	2.18	0.00	0.00	0.00	0.00	1350.0	10:02:33
D	1	60.00	6	101	107	0.10	1.68	1.78	0.00	0.00	0.00	0.00	1290.0	10:02:33
D	2	60.00	5	126	131	0.08	2.10	2.18	0.00	0.00	0.00	0.00	1290.0	10:02:33
[illegible]	3	60.00	4	92	96	0.07	1.53	1.60	0.00	0.00	0.00	0.00	1290.0	10:02:33
[illegible]	4	60.00	3	104	107	0.05	1.73	1.78	0.00	0.00	0.00	0.00	1290.0	10:02:33

INITIAL CALIBRATION AND ABSORPTION CURVES FOR THE GFPC COUNTER
SOP# DEN-RAD-0002
SOP# DEN-RAD-0003
SOFTWARE: NATIONAL INSTRUMENTS v2.0

SEVERN TRENT

Denver Laboratory

STL

ABSORPTION CURVE FOR GROSS BETA

STL DENVER

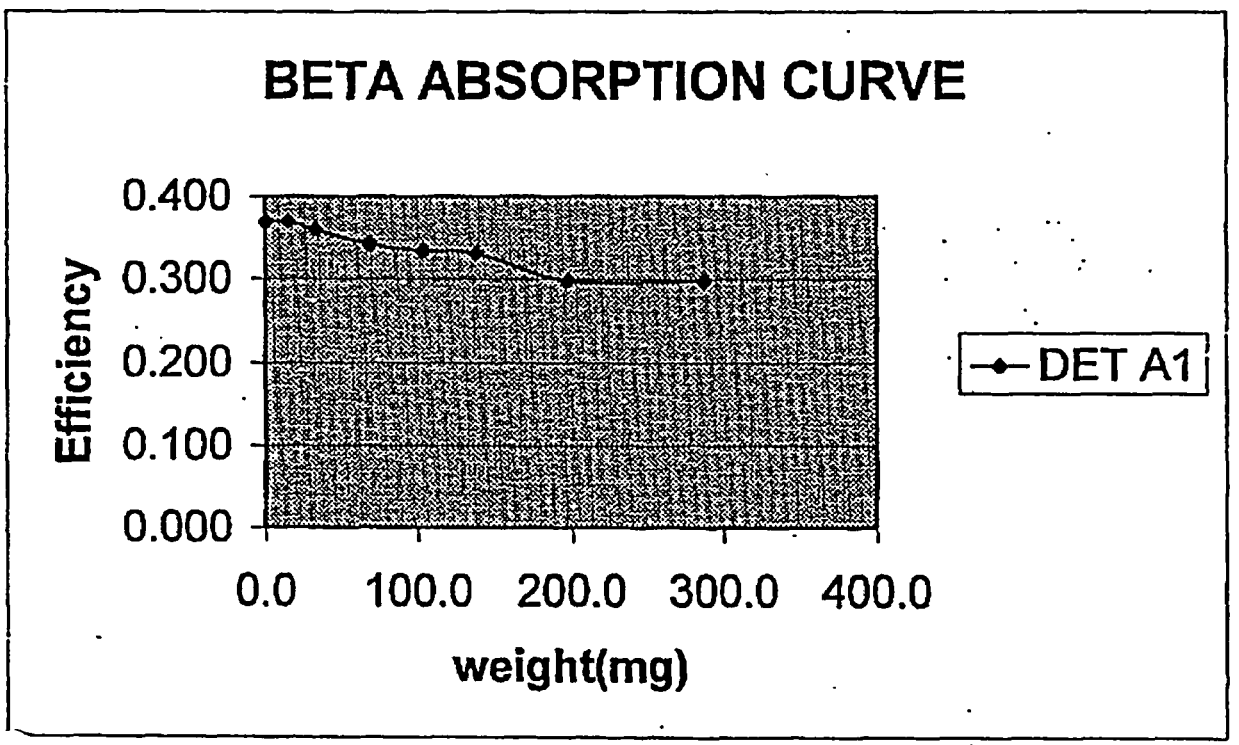
DET A1

Beta Source: Sr 90/Y90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml 219.2 219.2
mls used: 5
corr.activity: 213.72 pCi/ml
Curve Date: 7/16/03
t 1/2 = 28.50 years
Count time 15 min.

ANALYST [signature] 7/18/03

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	known dpm	EFF	ln EFF
1	0.7	13123	2.79	872.08	2372	0.368	-1.001
2	15.0	13150	2.79	873.88	2372	0.368	-0.999
3	33.6	12790	2.79	849.88	2372	0.358	-1.027
4	68.8	12176	2.79	808.94	2372	0.341	-1.076
5	103.3	11914	2.79	791.48	2372	0.334	-1.098
6	138.2	11807	2.79	784.34	2372	0.331	-1.107
7	197.5	10609	2.79	704.48	2372	0.297	-1.214
8	287.0	10632	2.79	706.01	2372	0.298	-1.212

EFF. = 0.367exp(-0.0008mg) FORMULA FOR BETA EFFICIENCY
R2= -0.9618 CORRELATION COEFICIENT



R:/Radiochemistry/Radiochemistry/2003 GAB curves/Beta absorption curves

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years))	Decay
380.00	1.0404	0.0243	years-1	0.0253	0.9750

ln(EFF)= b-mx

b intercept =	-1.0037	
m slope =	-0.0008	
exp(-1.0037)=	0.367	(ZERO THICKNESS EFFICIENCY)

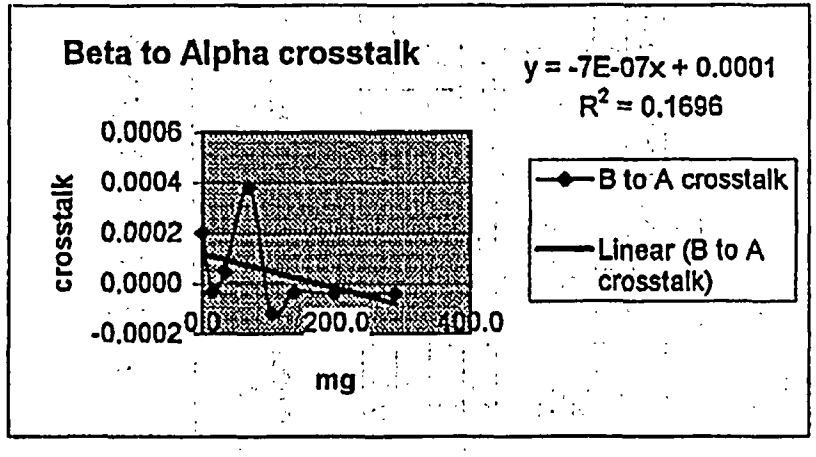
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

A1

ANALYST _____ 7/18/03

Beta source: Sr 90/Y 90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml: 219.2
mls used: 5
corr. Activity: 214 pCi/ml
Curve Date: 7/16/03
t 1/2: 28.5 years
Count time: 15 min.

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	gross alpha counts	alpha bkgd cpm	net alpha cpm	B to A crosstalk
1	0.7	13123	2.79	872.08	5	0.16	0.17	0.0002
2	15.0	13150	2.79	873.88	2	0.16	-0.03	0.0000
3	33.6	12790	2.79	849.88	3	0.16	0.04	0.0000
4	68.8	12176	2.79	808.94	7	0.16	0.31	0.0004
5	103.3	11914	2.79	791.48	1	0.16	-0.09	-0.0001
6	138.2	11807	2.79	784.34	2	0.16	-0.03	0.0000
7	197.5	10609	2.79	704.48	2	0.16	-0.03	0.0000
8	287.0	10632	2.79	706.01	2	0.16	-0.03	0.0000
							AVE.=	0.0000



FORMULA FOR CROSSTALK RATIO
CT = -7E-07mg + 0.0001

CORRELATION COEFICIENT
R2 = 0.1696

ABSORPTION CURVE FOR GROSS BETA

STL DENVER

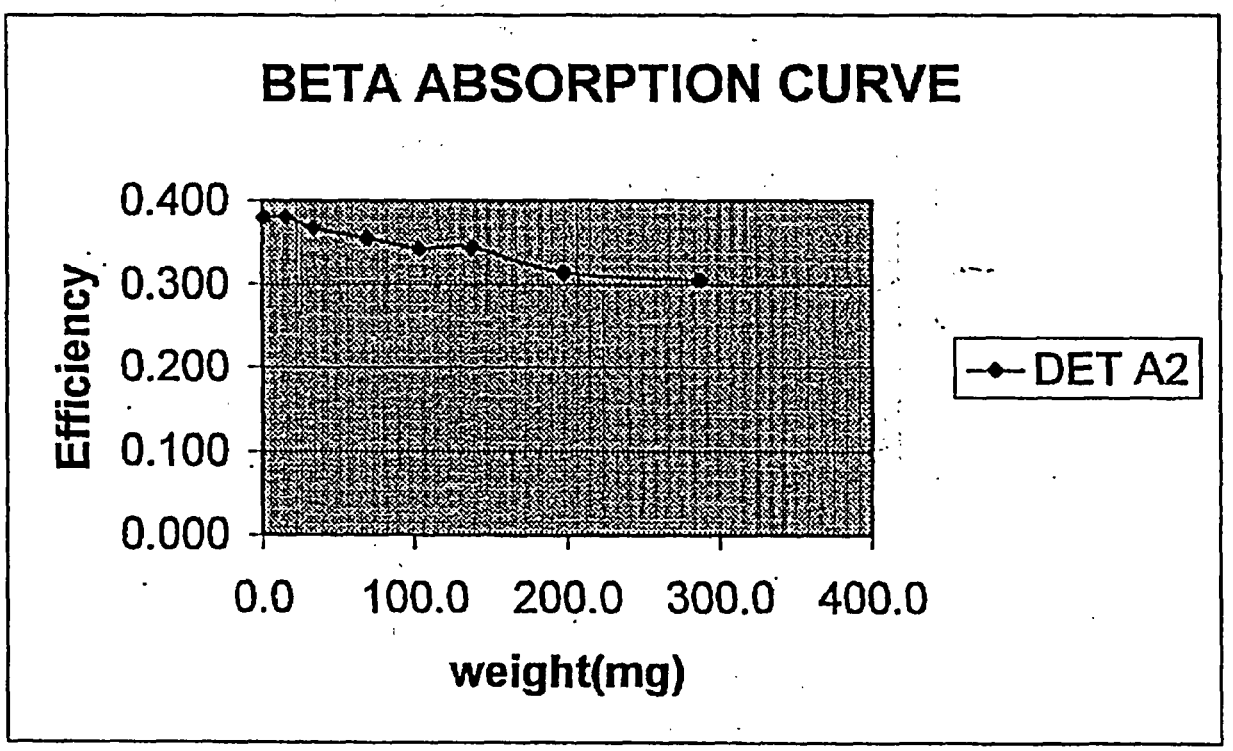
DET A2

Beta Source: Sr 90/Y90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml 219.2 219.2
mls used: 5
corr.activity: 213.72 pCi/ml
Curve Date: 7/16/03
t 1/2 = 28.50 years
Count time 15 min.

ANALYST [signature] 7/18/03

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	known dpm	EFF	ln EFF
1	0.7	13509	1.65	898.95	2372	0.379	-0.970
2	15.0	13575	1.65	903.35	2372	0.381	-0.966
3	33.6	13080	1.65	870.35	2372	0.367	-1.003
4	68.8	12648	1.65	841.55	2372	0.355	-1.036
5	103.3	12207	1.65	812.15	2372	0.342	-1.072
6	138.2	12278	1.65	816.88	2372	0.344	-1.066
7	197.5	11199	1.65	744.95	2372	0.314	-1.158
8	287.0	10865	1.65	722.68	2372	0.305	-1.189

EFF. = 0.378exp(-0.0008mg) FORMULA FOR BETA EFFICIENCY
R2= -0.9790 CORRELATION COEFICIENT



R:/Radiochemistry/Radiochemistry/2003 GAB curves/Beta absorption curves

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years))	Decay
380.00	1.0404	0.0243	years-1	0.0253	0.9750

ln(EFF)= b-mx

b intercept =	-0.9716	
m slope =	-0.0008	
exp(-0.9716)=	0.378	(ZERO THICKNESS EFFICIENCY)

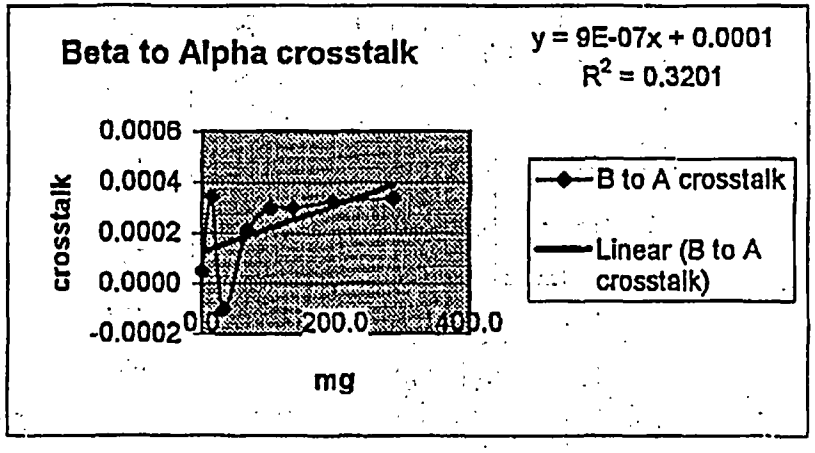
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

A2

ANALYST [signature] 7/18/03

Beta source: Sr 90/Y 90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml: 219.2
mls used: 5
corr. Activity: 214 pCi/ml
Curve Date: 7/16/03
t 1/2: 28.5 years
Count time: 15 min.

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	gross alpha counts	alpha bkgd cpm	net alpha cpm	B to A crosstalk
1	0.7	13509	1.65	898.95	2	0.09	0.04	0.0000
2	15.0	13575	1.65	903.35	6	0.09	0.31	0.0003
3	33.6	13080	1.65	870.35	0	0.09	-0.09	-0.0001
4	68.8	12648	1.65	841.55	4	0.09	0.18	0.0002
5	103.3	12207	1.65	812.15	5	0.09	0.24	0.0003
6	138.2	12278	1.65	816.88	5	0.09	0.24	0.0003
7	197.5	11199	1.65	744.95	5	0.09	0.24	0.0003
8	287.0	10865	1.65	722.68	5	0.09	0.24	0.0003
							AVE.=	0.0002



FORMULA FOR CROSSTALK RATIO
CT = 9E-07mg + 0.0001

CORRELATION COEFICIENT
R2 = 0.3201

ABSORPTION CURVE FOR GROSS BETA STL DENVER

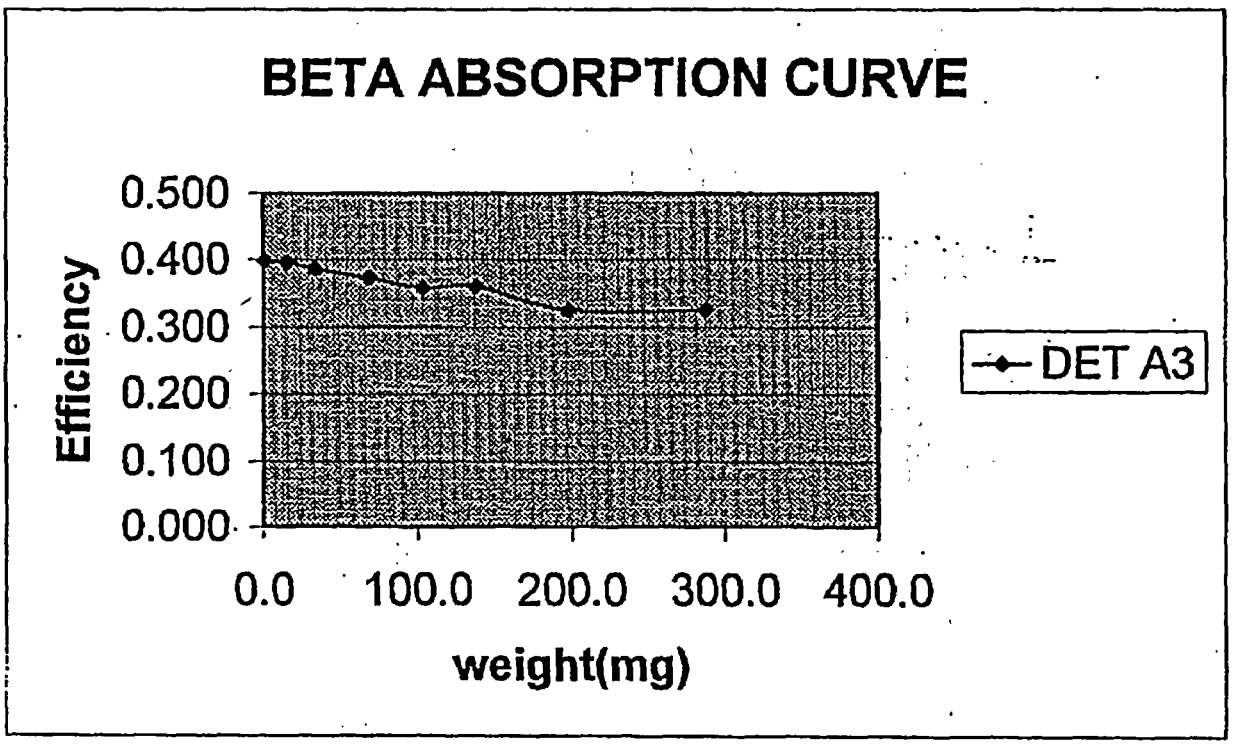
DET A3

Beta Source: Sr 90/Y90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml 219.2 219.2
mls used: 5
corr.activity: 213.72 pCi/ml
Curve Date: 7/16/03
t 1/2 = 28.50 years
Count time 15 min.

ANALYST 7/18/03

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	known dpm	EFF	ln EFF
1	0.7	14176	1.57	943.50	2372	0.398	-0.922
2	15.0	14091	1.57	937.83	2372	0.395	-0.928
3	33.6	13791	1.57	917.83	2372	0.387	-0.950
4	68.8	13304	1.57	885.36	2372	0.373	-0.986
5	103.3	12788	1.57	850.96	2372	0.359	-1.025
6	138.2	12878	1.57	856.96	2372	0.361	-1.018
7	197.5	11603	1.57	771.96	2372	0.325	-1.123
8	287.0	11601	1.57	771.83	2372	0.325	-1.123

EFF. = 0.396exp(-0.0008mg) FORMULA FOR BETA EFFICIENCY
R2= -0.9623 CORRELATION COEFICIENT



R:/Radiochemistry/Radiochemistry/2003 GAB curves/Beta absorption curves

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years))	Decay
380.00	1.0404	0.0243	years-1	0.0253	0.9750

ln(EFF)= b-mx

b Intercept = -0.9273
m slope = -0.0008

exp(-0.9273)= 0.396 (ZERO THICKNESS EFFICIENCY)

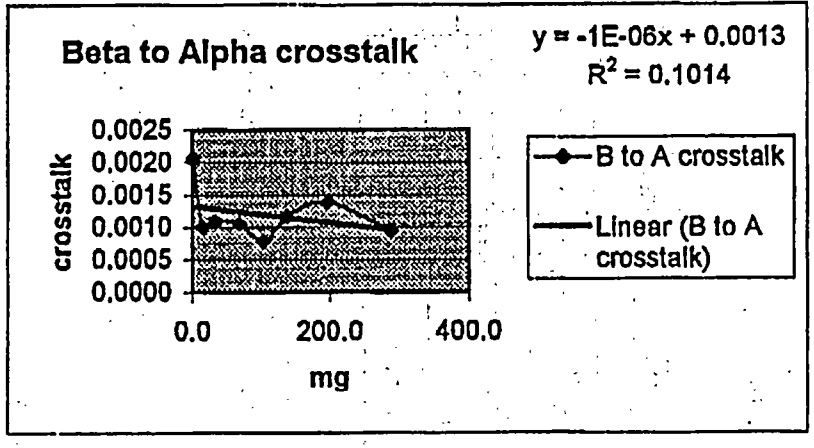
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

A3

ANALYST 7/18/03

Beta source: Sr 90/Y 90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml: 219.2
mls used: 5
corr. Activity: 214 pCi/ml
Curve Date: 7/16/03
t 1/2: 28.5 years
Count time: 15 min.

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	gross alpha counts	alpha bkgd cpm	net alpha cpm	B to A crosstalk
1	0.7	14176	1.57	943.50	31	0.13	1.94	0.0021
2	15.0	14091	1.57	937.83	16	0.13	0.94	0.0010
3	33.6	13791	1.57	917.83	17	0.13	1.00	0.0011
4	68.8	13304	1.57	885.36	16	0.13	0.94	0.0011
5	103.3	12788	1.57	850.96	12	0.13	0.67	0.0008
6	138.2	12878	1.57	856.96	17	0.13	1.00	0.0012
7	197.5	11603	1.57	771.96	18	0.13	1.07	0.0014
8	287.0	11601	1.57	771.83	13	0.13	0.74	0.0010
							AVE.=	0.0012



FORMULA FOR CROSSTALK RATIO
CT = -1E-06mg + 0.0013

CORRELATION COEFICIENT
R2 = 0.1014

ABSORPTION CURVE FOR GROSS BETA STL DENVER

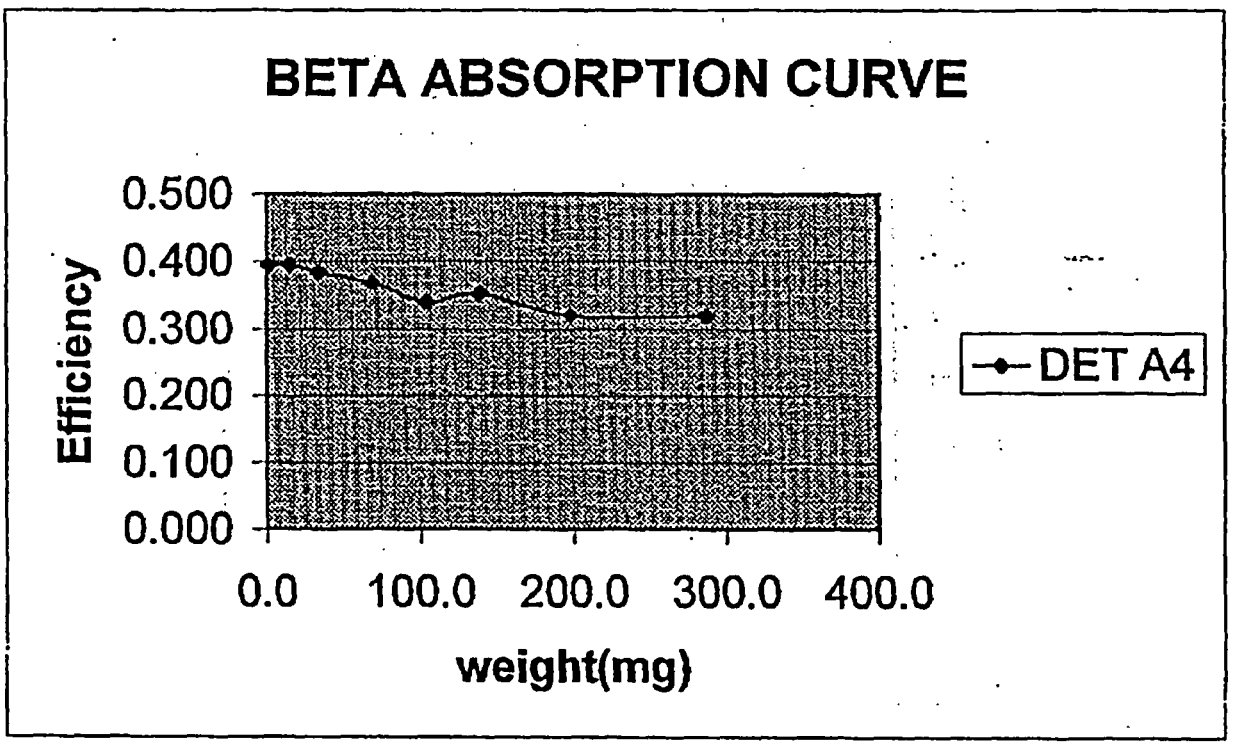
DET A4

Beta Source: Sr 90/Y90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml 219.2 219.2
mls used: 5
corr.activity: 213.72 pCi/ml
Curve Date: 7/16/03
t 1/2 = 28.50 years
Count time 15 min.

ANALYST 7/18/03

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	known dpm	EFF	ln EFF
1	0.7	14067	1.81	935.99	2372	0.395	-0.930
2	15.0	14073	1.81	936.39	2372	0.395	-0.930
3	33.6	13708	1.81	912.06	2372	0.384	-0.956
4	68.8	13106	1.81	871.92	2372	0.368	-1.001
5	103.3	12144	1.81	807.79	2372	0.341	-1.077
6	138.2	12563	1.81	835.72	2372	0.352	-1.043
7	197.5	11399	1.81	758.12	2372	0.320	-1.141
8	287.0	11382	1.81	756.99	2372	0.319	-1.142

EFF. = 0.391exp(-0.0008mg) FORMULA FOR BETA EFFICIENCY
R2= -0.9401 CORRELATION COEFICIENT



R:/Radiochemistry/Radiochemistry/2003 GAB curves/Beta absorption curves

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years))	Decay
380.00	1.0404	0.0243	years-1	0.0253	0.9750

ln(EFF)= b-mx

b intercept = -0.9395
m slope = -0.0008

exp(-0.9395)= 0.391 (ZERO THICKNESS EFFICIENCY)

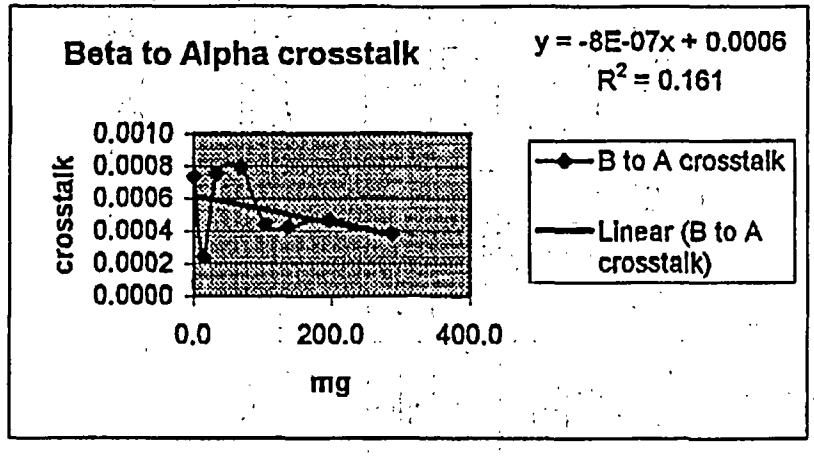
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

A4

ANALYST 7/18/03

Beta source: Sr 90/Y 90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml: 219.2
mls used: 5
corr. Activity: 214 pCi/ml
Curve Date: 7/16/03
t 1/2: 28.5 years
Count time: 15 min.

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	gross alpha counts	alpha bkgd cpm	net alpha cpm	B to A crosstalk
1	0.7	14067	1.81	935.99	12	0.11	0.69	0.0007
2	15.0	14073	1.81	936.39	5	0.11	0.22	0.0002
3	33.6	13708	1.81	912.06	12	0.11	0.69	0.0008
4	68.8	13106	1.81	871.92	12	0.11	0.69	0.0008
5	103.3	12144	1.81	807.79	7	0.11	0.36	0.0004
6	138.2	12563	1.81	835.72	7	0.11	0.36	0.0004
7	197.5	11399	1.81	758.12	7	0.11	0.36	0.0005
8	287.0	11382	1.81	756.99	6	0.11	0.29	0.0004
							AVE.=	0.0005



FORMULA FOR CROSSTALK RATIO
CT = -8E-07mg + 0.0006

CORRELATION COEFICIENT
R2 = 0.161

ABSORPTION CURVE FOR GROSS BETA

STL DENVER

Beta Source: Sr 90/Y90

DET B1

STL# SR9002AL

Ref Date: 7/1/02

pCi/ml 219.2 219.2

ANALYST 7/18/03

mls used: 5

corr.activity: 213.72 pCi/ml

Curve Date: 7/16/03

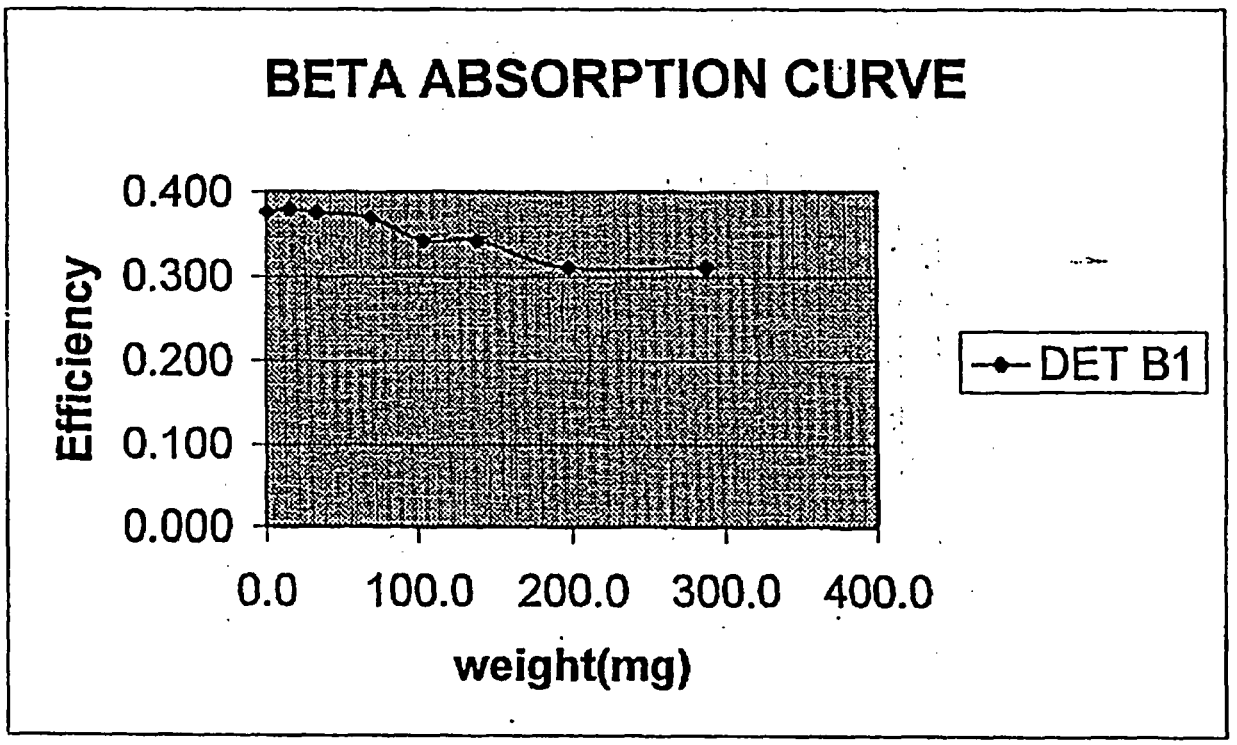
t 1/2 = 28.50 years

Count time 15 min.

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	known dpm	EFF	ln EFF
1	0.7	13423	1.81	893.06	2372	0.376	-0.977
2	15.0	13524	1.81	899.79	2372	0.379	-0.969
3	33.6	13381	1.81	890.26	2372	0.375	-0.980
4	68.8	13166	1.81	875.92	2372	0.369	-0.996
5	103.3	12197	1.81	811.32	2372	0.342	-1.073
6	138.2	12182	1.81	810.32	2372	0.342	-1.074
7	197.5	11067	1.81	735.99	2372	0.310	-1.170
8	287.0	11076	1.81	736.59	2372	0.310	-1.170

EFF. = 0.381exp(-0.0008mg) FORMULA FOR BETA EFFICIENCY

R2= -0.9549 CORRELATION COEFICIENT



R:/Radiochemistry/Radiochemistry/2003 GAB curves/Beta absorption curves

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years))	Decay
380.00	1.0404	0.0243	years-1	0.0253	0.9750

ln(EFF)= b-mx

b intercept =	-0.9654	
m slope =	-0.0008	
exp(-0.9654)=	0.381	(ZERO THICKNESS EFFICIENCY)

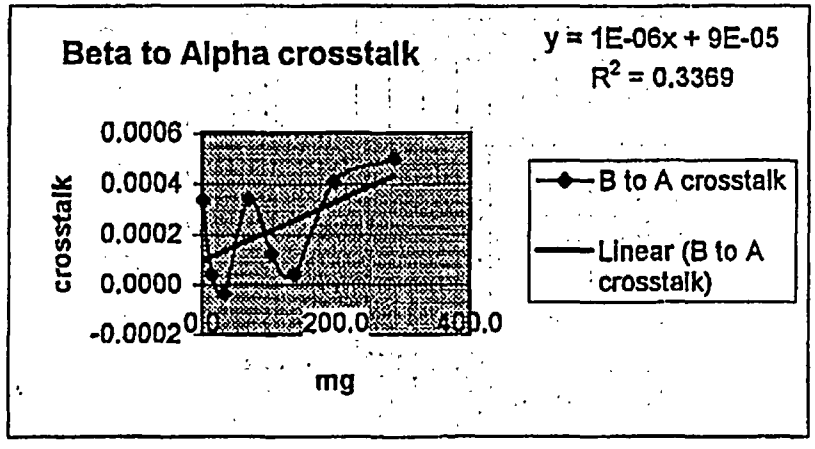
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

B1

ANALYST 7/18/03

Beta source: Sr 90/Y 90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml: 219.2
mls used: 5
corr. Activity: 214 pCi/ml
Curve Date: 7/16/03
t 1/2: 28.5 years
Count time: 15 min.

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	gross alpha counts	alpha bkgd cpm	net alpha cpm	B to A crosstalk
1	0.7	13423	1.81	893.06	6	0.10	0.30	0.0003
2	15.0	13524	1.81	899.79	2	0.10	0.03	0.0000
3	33.6	13381	1.81	890.26	1	0.10	-0.03	0.0000
4	68.8	13166	1.81	875.92	6	0.10	0.30	0.0003
5	103.3	12197	1.81	811.32	3	0.10	0.10	0.0001
6	138.2	12182	1.81	810.32	2	0.10	0.03	0.0000
7	197.5	11067	1.81	735.99	6	0.10	0.30	0.0004
8	287.0	11076	1.81	736.59	7	0.10	0.37	0.0005
							AVE.=	0.0002



FORMULA FOR CROSSTALK RATIO
CT = 1E-06mg + 9E-05

CORRELATION COEFICIENT
R2 = 0.3369

ABSORPTION CURVE FOR GROSS BETA

STL DENVER

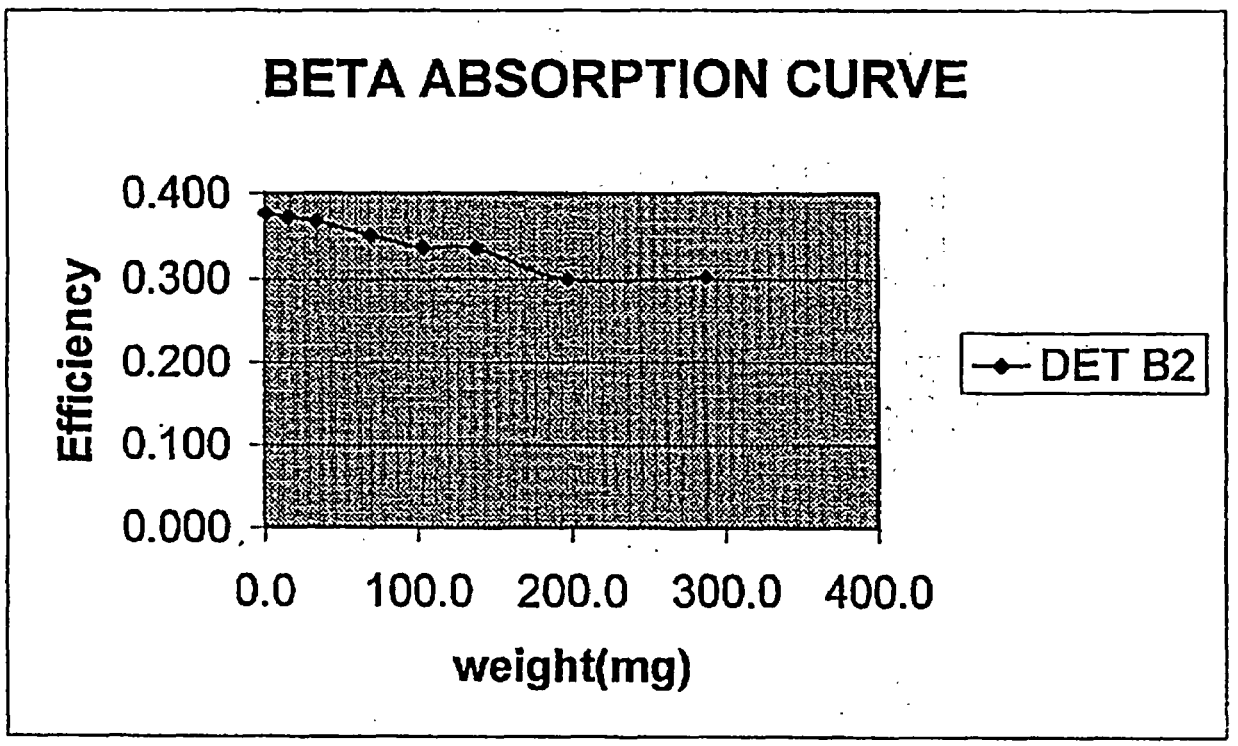
DET B2

Beta Source: Sr 90/Y90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml 219.2
mls used: 5
corr.activity: 213.72 pCi/ml
Curve Date: 7/16/03
t 1/2 = 28.50 years
Count time 15 min.

ANALYST 7/18/03

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	known dpm	EFF	ln EFF
1	0.7	13429	1.88	893.39	2372	0.377	-0.977
2	15.0	13248	1.88	881.32	2372	0.372	-0.990
3	33.6	13089	1.88	870.72	2372	0.367	-1.002
4	68.8	12482	1.88	830.25	2372	0.350	-1.050
5	103.3	11991	1.88	797.52	2372	0.336	-1.090
6	138.2	11971	1.88	796.19	2372	0.336	-1.092
7	197.5	10686	1.88	710.52	2372	0.300	-1.206
8	287.0	10784	1.88	717.05	2372	0.302	-1.196

EFF. = 0.374exp(-0.0009mg) FORMULA FOR BETA EFFICIENCY
R2= -0.9579 CORRELATION COEFICIENT



R:/Radiochemistry/Radiochemistry/2003 GAB curves/Beta absorption curves

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years))	Decay
380.00	1.0404	0.0243	years-1	0.0253	0.9750

ln(EFF)= b-mx

b intercept = -0.9845
m slope = -0.0009

exp(-0.9845)= 0.374 (ZERO THICKNESS EFFICIENCY)

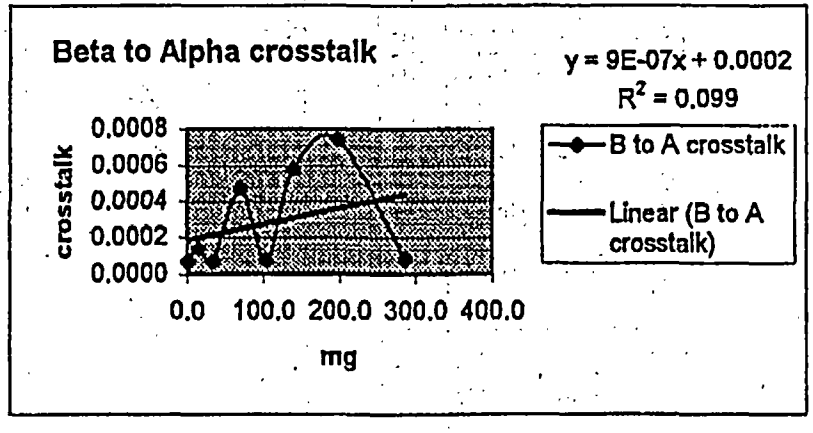
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

B2

ANALYST 7/18/03

Beta source: Sr 90/Y 90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml: 219.2
mls used: 5
corr. Activity: 214 pCi/ml
Curve Date: 7/16/03
t 1/2: 28.5 years
Count time: 15 min.

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	gross alpha counts	alpha bkgd cpm	net alpha cpm	B to A crosstalk
1	0.7	13429	1.88	893.39	3	0.14	0.06	0.0001
2	15.0	13248	1.88	881.32	4	0.14	0.13	0.0001
3	33.6	13089	1.88	870.72	3	0.14	0.06	0.0001
4	68.8	12482	1.88	830.25	8	0.14	0.39	0.0005
5	103.3	11991	1.88	797.52	3	0.14	0.06	0.0001
6	138.2	11971	1.88	796.19	9	0.14	0.46	0.0006
7	197.5	10686	1.88	710.52	10	0.14	0.53	0.0007
8	287.0	10784	1.88	717.05	3	0.14	0.06	0.0001
							AVE.=	0.0003



FORMULA FOR CROSSTALK RATIO
CT = 9E-07mg + 0.0002

CORRELATION COEFICIENT
R2 = 0.099

ABSORPTION CURVE FOR GROSS BETA

STL DENVER

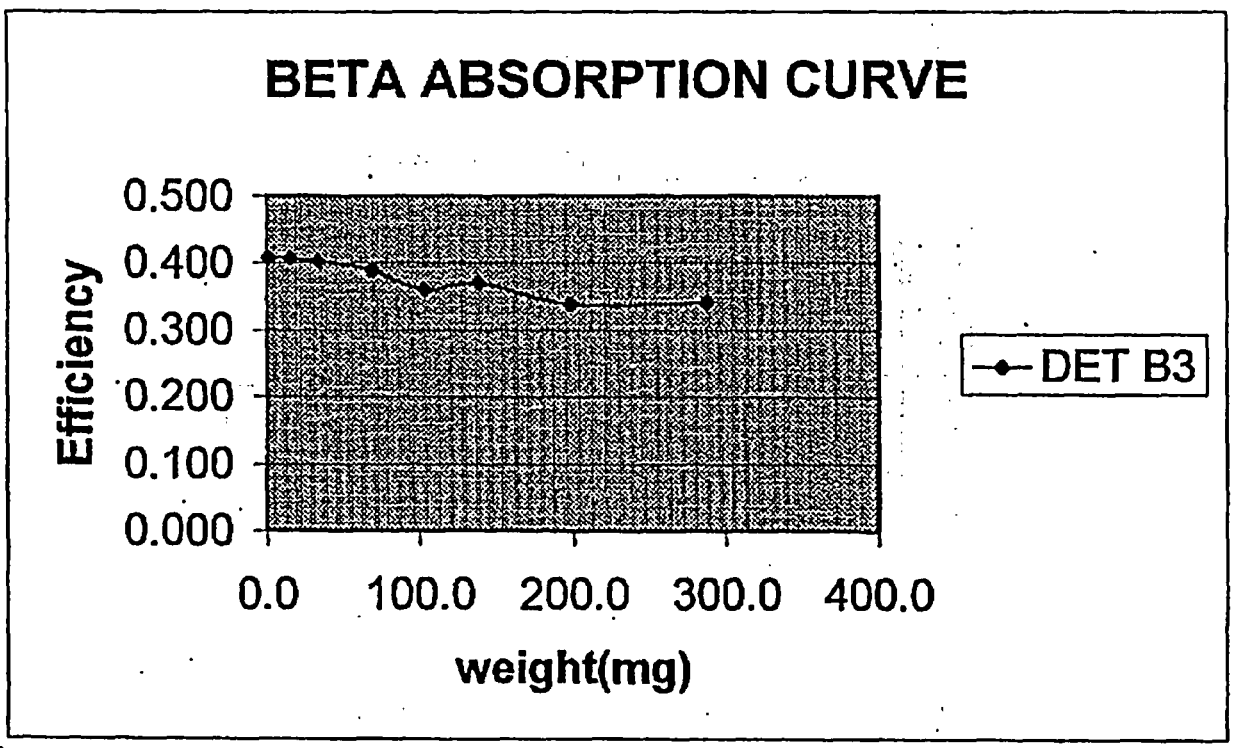
DET B3

Beta Source: Sr 90/Y90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml 219.2
mls used: 5
corr.activity: 213.72 pCi/ml
Curve Date: 7/16/03
t 1/2 = 28.50 years
Count time 15 min.

ANALYST 7/18/03

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	known dpm	EFF	ln EFF
1	0.7	14587	2.09	970.38	2372	0.409	-0.894
2	15.0	14535	2.09	966.91	2372	0.408	-0.898
3	33.6	14391	2.09	957.31	2372	0.404	-0.907
4	68.8	13888	2.09	923.78	2372	0.389	-0.943
5	103.3	12840	2.09	853.91	2372	0.360	-1.022
6	138.2	13208	2.09	878.44	2372	0.370	-0.993
7	197.5	12100	2.09	804.58	2372	0.339	-1.081
8	287.0	12166	2.09	808.98	2372	0.341	-1.076

EFF. = 0.407exp(-0.0007mg) FORMULA FOR BETA EFFICIENCY
R2= -0.9352 CORRELATION COEFICIENT



R:/Radiochemistry/Radiochemistry/2003 GAB curves/Beta absorption curves

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years))	Decay
380.00	1.0404	0.0243	years-1	0.0253	0.9750

ln(EFF)= b-mx

b Intercept = -0.8993
m slope = -0.0007

exp(-0.8993)= 0.407 (ZERO THICKNESS EFFICIENCY)

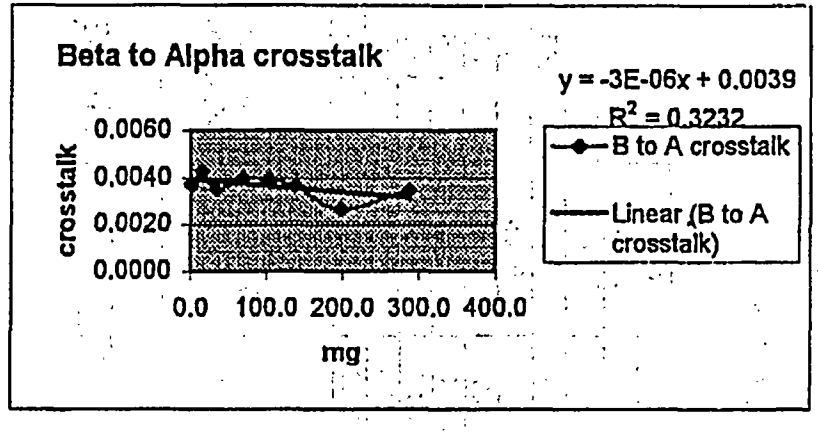
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

B3

Beta source: Sr 90/Y 90
STL# SR9002AL
Ref Date: 7/1/03
pCi/ml: 219.2
mls used: 5
corr. Activity: 219 pCi/ml
Curve Date: 7/16/03
t 1/2: 28.5 years
Count time: 15 min.

ANALYST 7/18/03

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	gross alpha counts	alpha bkgd cpm	net alpha cpm	B to A crosstalk
1	0.7	14587	2.09	970.38	56	0.12	3.61	0.0037
2	15.0	14535	2.09	966.91	64	0.12	4.15	0.0043
3	33.6	14391	2.09	957.31	52	0.12	3.35	0.0035
4	68.8	13888	2.09	923.78	57	0.12	3.68	0.0040
5	103.3	12840	2.09	853.91	52	0.12	3.35	0.0039
6	138.2	13208	2.09	878.44	50	0.12	3.21	0.0037
7	197.5	12100	2.09	804.58	34	0.12	2.15	0.0027
8	287.0	12166	2.09	808.98	44	0.12	2.81	0.0035
							AVE.=	0.0037



FORMULA FOR CROSSTALK RATIO
CT = -3E-06mg + 0.0039

CORRELATION COEFICIENT
R2 = 0.3232

ABSORPTION CURVE FOR GROSS BETA

STL DENVER

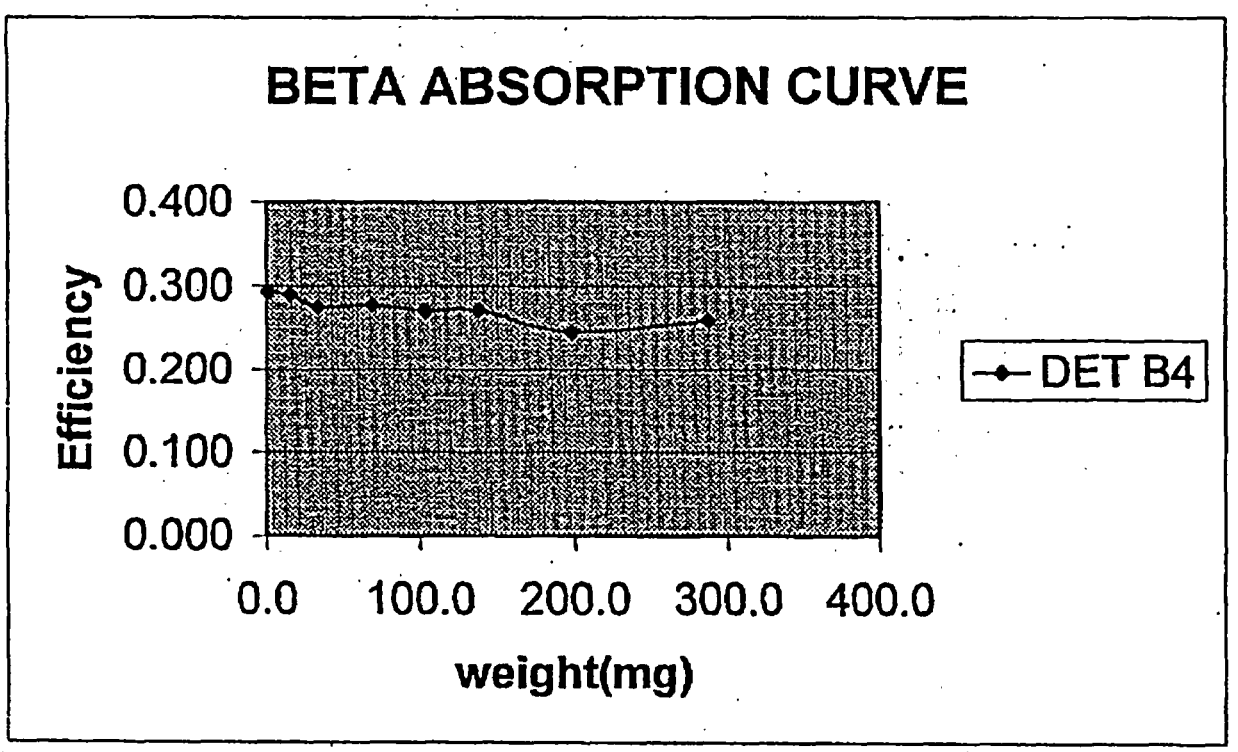
DET B4

Beta Source: Sr 90/Y90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml 219.2
mls used: 5
corr.activity: 213.72 pCi/ml
Curve Date: 7/16/03
t 1/2 = 28.50 years
Count time 15 min.

ANALYST 7/18/03

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	known dpm	EFF	ln EFF
1	0.7	10446	1.85	694.55	2372	0.293	-1.228
2	15.0	10322	1.85	686.28	2372	0.289	-1.240
3	33.6	9805	1.85	651.82	2372	0.275	-1.292
4	68.8	9892	1.85	657.62	2372	0.277	-1.283
5	103.3	9648	1.85	641.35	2372	0.270	-1.308
6	138.2	9693	1.85	644.35	2372	0.272	-1.303
7	197.5	8745	1.85	581.15	2372	0.245	-1.407
8	287.0	9253	1.85	615.02	2372	0.259	-1.350

EFF. = 0.386exp(-0.0005mg) FORMULA FOR BETA EFFICIENCY
R2= -0.8362 CORRELATION COEFICIENT



R:/Radiochemistry/Radiochemistry/2003 GAB curves/Beta absorption curves

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years))	Decay
380.00	1.0404	0.0243	years-1	0.0253	0.9750

ln(EFF)= b-mx

b intercept = -1.2502
m slope = -0.0005

exp(-1.2502)= 0.286 (ZERO THICKNESS EFFICIENCY)

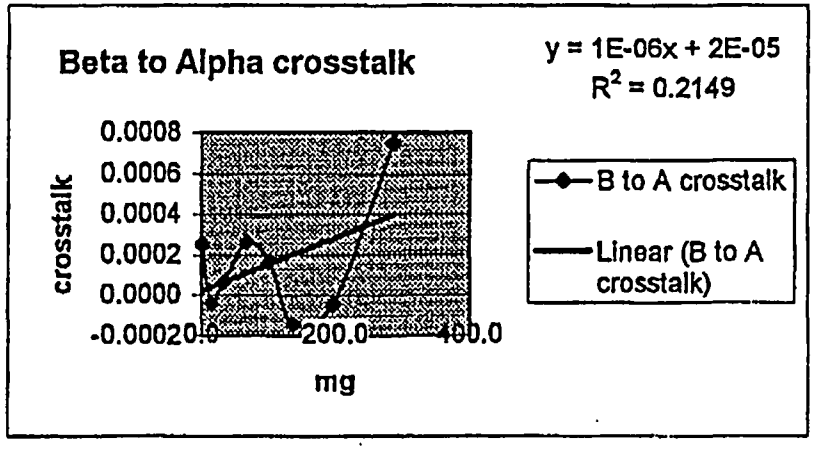
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

B4

Beta source: Sr 90/Y 90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml: 219.2
mls used: 5
corr. Activity: 214 pCi/ml
Curve Date: 7/16/03
t 1/2: 28.5 years
Count time: 15 min.

ANALYST 7/18/03

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	gross alpha counts	alpha bkgd cpm	net alpha cpm	B to A crosstalk
1	0.7	10446	1.85	694.55	5	0.16	0.17	0.0002
2	15.0	10322	1.85	686.28	2	0.16	-0.03	0.0000
3	33.6	9805	1.85	651.82	3	0.16	0.04	0.0001
4	68.8	9892	1.85	657.62	5	0.16	0.17	0.0003
5	103.3	9648	1.85	641.35	4	0.16	0.11	0.0002
6	138.2	9693	1.85	644.35	1	0.16	-0.09	-0.0001
7	197.5	8745	1.85	581.15	2	0.16	-0.03	0.0000
8	287.0	9253	1.85	615.02	9	0.14	0.46	0.0007
							AVE.=	0.0002



FORMULA FOR CROSSTALK RATIO
CT = 1E-06mg + 2E-05

CORRELATION COEFICIENT
R2 = 0.2149

7-16-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	15.00	3	12197	12200	0.20	813.13	813.33	0.00	0.00	0.00	0.00	1380.0	9:57:35
[illegible]	[illegible]	15.00	9	11971	11980	0.60	798.07	798.67	0.00	0.00	0.00	0.00	1380.0	9:57:35
[illegible]	[illegible]	15.00	34	12100	12134	2.27	806.67	808.93	0.00	0.00	0.00	0.00	1380.0	9:57:35
[illegible]	4	15.00	9	9253	9262	0.60	616.87	617.47	0.00	0.00	0.00	0.00	1380.0	9:57:35
A	1	15.00	5	13123	13128	0.33	874.87	875.20	0.00	0.00	0.00	0.00	1357.5	9:57:35
A	2	15.00	6	13575	13581	0.40	905.00	905.40	0.00	0.00	0.00	0.00	1357.5	9:57:35
A	3	15.00	17	13791	13808	1.13	919.40	920.53	0.00	0.00	0.00	0.00	1357.5	9:57:35
A	4	15.00	12	13106	13118	0.80	873.73	874.53	0.00	0.00	0.00	0.00	1357.5	9:57:35

[TENNELEC LB4000] [PAGE 1]

10:14:03		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	1 beta curve	15.00	5	13123	0.00	0.00	0.00	0.00
9:57:35	2	2	15.00	6	13575	0.00	0.00	0.00	0.00
15.00	3	3	15.00	17	13791	0.00	0.00	0.00	0.00
	4	4	15.00	12	13106	0.00	0.00	0.00	0.00
GROUP B	1	5	15.00	3	12197	0.00	0.00	0.00	0.00
9:57:35	2	6	15.00	9	11971	0.00	0.00	0.00	0.00
15.00	3	7	15.00	34	12100	0.00	0.00	0.00	0.00
	4	8	15.00	9	9253	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 3 COUNT TERMINATED ////

7-16-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
A	1	15.00	2	10632	10634	0.13	708.80	708.93	0.00	0.00	0.00	0.00	1357.5	10:14:16
A	2	15.00	2	13509	13511	0.13	900.60	900.73	0.00	0.00	0.00	0.00	1357.5	10:14:16
A	3	15.00	16	14091	14107	1.07	939.40	940.47	0.00	0.00	0.00	0.00	1357.5	10:14:16
A	4	15.00	12	13708	13720	0.80	913.87	914.67	0.00	0.00	0.00	0.00	1357.5	10:14:16
B	1	15.00	6	13166	13172	0.40	877.73	878.13	0.00	0.00	0.00	0.00	1380.0	10:14:16
B	2	15.00	3	11991	11994	0.20	799.40	799.60	0.00	0.00	0.00	0.00	1380.0	10:14:16
B	3	15.00	50	13208	13258	3.33	880.53	883.87	0.00	0.00	0.00	0.00	1380.0	10:14:16
B	4	15.00	2	8745	8747	0.13	583.00	583.13	0.00	0.00	0.00	0.00	1380.0	10:14:16

[TENNELEC LB4000] [PAGE 1]

10:30:10		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
[illegible]P A	1	8 beta curve	15.00	2	10632	0.00	0.00	0.00	0.00
10:14:16	2	1	15.00	2	13509	0.00	0.00	0.00	0.00
15.00	3	2	15.00	16	14091	0.00	0.00	0.00	0.00
	4	3	15.00	12	13708	0.00	0.00	0.00	0.00
GROUP B	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 4 COUNT TERMINATED ////

7-16-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
A	1	15.00	2	10609	10611	0.13	707.27	707.40	0.00	0.00	0.00	0.00	1357.5	10:31:02
A	2	15.00	5	10865	10870	0.33	724.33	724.67	0.00	0.00	0.00	0.00	1357.5	10:31:02
A	3	15.00	31	14176	14207	2.07	945.07	947.13	0.00	0.00	0.00	0.00	1357.5	10:31:02
A	4	15.00	5	14073	14078	0.33	938.20	938.53	0.00	0.00	0.00	0.00	1357.5	10:31:02
B	1	15.00	1	13381	13382	0.07	892.07	892.13	0.00	0.00	0.00	0.00	1380.0	10:31:02
B	2	15.00	8	12482	12490	0.53	832.13	832.67	0.00	0.00	0.00	0.00	1380.0	10:31:02
B	3	15.00	52	12840	12892	3.47	856.00	859.47	0.00	0.00	0.00	0.00	1380.0	10:31:02
B	4	15.00	1	9693	9694	0.07	646.20	646.27	0.00	0.00	0.00	0.00	1380.0	10:31:02

[TENNELEC LB4000] [PAGE 1]

10:46:21		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	7 beta curve	15.00	2	10609	0.00	0.00	0.00	0.00
31:02	2	8	15.00	5	10865	0.00	0.00	0.00	0.00
15.00	3	1	15.00	31	14176	0.00	0.00	0.00	0.00
	4	2	15.00	5	14073	0.00	0.00	0.00	0.00
GROUP B	1	3	15.00	1	13381	0.00	0.00	0.00	0.00
10:31:02	2	4	15.00	8	12482	0.00	0.00	0.00	0.00
15.00	3	5	15.00	52	12840	0.00	0.00	0.00	0.00
	4	6	15.00	1	9693	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 4 COUNT TERMINATED ////

7-16-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	15.00	2	13524	13526	0.13	901.60	901.73	0.00	0.00	0.00	0.00	1380.0	10:46:56
[illegible]	3	15.00	3	13089	13092	0.20	872.60	872.80	0.00	0.00	0.00	0.00	1380.0	10:46:56
[illegible]	[illegible]	15.00	57	13888	13945	3.80	925.87	929.67	0.00	0.00	0.00	0.00	1380.0	10:46:56
B	4	15.00	4	9648	9652	0.27	643.20	643.47	0.00	0.00	0.00	0.00	1380.0	10:46:56
A	1	15.00	2	11807	11809	0.13	787.13	787.27	0.00	0.00	0.00	0.00	1357.5	10:46:56
A	2	15.00	5	11199	11204	0.33	746.60	746.93	0.00	0.00	0.00	0.00	1357.5	10:46:56

[TENNELEC LB4000] [PAGE 1]

11:29:30		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	6 beta curve	15.00	2	11807	0.00	0.00	0.00	0.00
10:46:56	2	7	15.00	5	11199	0.00	0.00	0.00	0.00
5.00	3	8	15.00	13	11601	0.00	0.00	0.00	0.00
	4	1	15.00	12	14067	0.00	0.00	0.00	0.00
GROUP B	1	2	15.00	2	13524	0.00	0.00	0.00	0.00
10:46:56	2	3	15.00	3	13089	0.00	0.00	0.00	0.00
15.00	3	4	15.00	57	13888	0.00	0.00	0.00	0.00
	4	5	15.00	4	9648	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 4 COUNT TERMINATED ////

7-16-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
A	1	15.00	1	11914	11915	0.07	794.27	794.33	0.00	0.00	0.00	0.00	1357.5	11:30:21
A	2	15.00	5	12278	12283	0.33	818.53	818.87	0.00	0.00	0.00	0.00	1357.5	11:30:21
A	[illegible]	15.00	18	11603	11621	1.20	773.53	774.73	0.00	0.00	0.00	0.00	1357.5	11:30:21
[illegible]	[illegible]	15.00	6	11382	11388	0.40	758.80	759.20	0.00	0.00	0.00	0.00	1357.5	11:30:21
B	1	15.00	6	13423	13429	0.40	894.87	895.27	0.00	0.00	0.00	0.00	1380.0	11:30:21
B	2	15.00	4	13248	13252	0.27	883.20	883.47	0.00	0.00	0.00	0.00	1380.0	11:30:21
B	3	15.00	52	14391	14443	3.47	959.40	962.87	0.00	0.00	0.00	0.00	1380.0	11:30:21
B	4	15.00	5	9892	9897	0.33	659.47	659.80	0.00	0.00	0.00	0.00	1380.0	11:30:21

[TENNELEC LB4000] [PAGE 1]

12:48:47		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	5 beta curve	15.00	1	11914	0.00	0.00	0.00	0.00
11:30:21	2	6	15.00	5	12278	0.00	0.00	0.00	0.00
15.00	3	7	15.00	18	11603	0.00	0.00	0.00	0.00
	4	8	15.00	6	11382	0.00	0.00	0.00	0.00
GROUP B	1	1	15.00	6	13423	0.00	0.00	0.00	0.00
11:30:21	2	2	15.00	4	13248	0.00	0.00	0.00	0.00
15.00	3	3	15.00	52	14391	0.00	0.00	0.00	0.00
	4	4	15.00	5	9892	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
[illegible] D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
A	1	15.00	7	12176	12183	0.47	811.73	812.20	0.00	0.00	0.00	0.00	1357.5	12:49:37
A	2	15.00	5	12207	12212	0.33	813.80	814.13	0.00	0.00	0.00	0.00	1357.5	12:49:37
A	3	15.00	17	12878	12895	1.13	858.53	859.67	0.00	0.00	0.00	0.00	1357.5	12:49:37
A	4	15.00	7	11399	11406	0.47	759.93	760.40	0.00	0.00	0.00	0.00	1357.5	12:49:37
B	1	15.00	7	11076	11083	0.47	738.40	738.87	0.00	0.00	0.00	0.00	1380.0	12:49:37
B	2	15.00	3	13429	13432	0.20	895.27	895.47	0.00	0.00	0.00	0.00	1380.0	12:49:37
B	3	15.00	64	14535	14599	4.27	969.00	973.27	0.00	0.00	0.00	0.00	1380.0	12:49:37
B	4	15.00	3	9805	9808	0.20	653.67	653.87	0.00	0.00	0.00	0.00	1380.0	12:49:37

[TENNELEC LB4000] [PAGE 1]

13:12:38		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	4 beta curve	15.00	7	12176	0.00	0.00	0.00	0.00
12:49:37	2	5	15.00	5	12207	0.00	0.00	0.00	0.00
15.00	3	6	15.00	17	12878	0.00	0.00	0.00	0.00
	4	7	15.00	7	11399	0.00	0.00	0.00	0.00
GROUP B	1	8	15.00	7	11076	0.00	0.00	0.00	0.00
12:49:37	2	1	15.00	3	13429	0.00	0.00	0.00	0.00
15.00	3	2	15.00	64	14535	0.00	0.00	0.00	0.00
	4	3	15.00	3	9805	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 3 COUNT TERMINATED ////

7-16-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
A	1	15.00	3	12790	12793	0.20	852.67	852.87	0.00	0.00	0.00	0.00	1357.5	13:13:13
A	2	15.00	4	12648	12652	0.27	843.20	843.47	0.00	0.00	0.00	0.00	1357.5	13:13:13
A	3	15.00	12	12788	12800	0.80	852.53	853.33	0.00	0.00	0.00	0.00	1357.5	13:13:13
A	4	15.00	7	12563	12570	0.47	837.53	838.00	0.00	0.00	0.00	0.00	1357.5	13:13:13
B	1	15.00	6	11067	11073	0.40	737.80	738.20	0.00	0.00	0.00	0.00	1380.0	13:13:13
B	2	15.00	3	10784	10787	0.20	718.93	719.13	0.00	0.00	0.00	0.00	1380.0	13:13:13
B	3	15.00	56	14587	14643	3.73	972.47	976.20	0.00	0.00	0.00	0.00	1380.0	13:13:13
B	4	15.00	2	10322	10324	0.13	688.13	688.27	0.00	0.00	0.00	0.00	1380.0	13:13:13

[TENNELEC LB4000] [PAGE 1]

13:34:08		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	3 beta curve	15.00	3	12790	0.00	0.00	0.00	0.00
13:13:13	2	4	15.00	4	12648	0.00	0.00	0.00	0.00
15.00	3	5	15.00	12	12788	0.00	0.00	0.00	0.00
	4	6	15.00	7	12563	0.00	0.00	0.00	0.00
GROUP B	1	7	15.00	6	11067	0.00	0.00	0.00	0.00
13:13:13	2	8	15.00	3	10784	0.00	0.00	0.00	0.00
15.00	3	1	15.00	56	14587	0.00	0.00	0.00	0.00

0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 3 COUNT TERMINATED ////

7-16-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
A	1	15.00	2	13150	13152	0.13	876.67	876.80	0.00	0.00	0.00	0.00	1357.5	13:34:47
A	2	15.00	0	13080	13080	0.00	872.00	872.00	0.00	0.00	0.00	0.00	1357.5	13:34:47
A	3	15.00	16	13304	13320	1.07	886.93	888.00	0.00	0.00	0.00	0.00	1357.5	13:34:47
A	4	15.00	7	12144	12151	0.47	809.60	810.07	0.00	0.00	0.00	0.00	1357.5	13:34:47
B	1	15.00	2	12182	12184	0.13	812.13	812.27	0.00	0.00	0.00	0.00	1380.0	13:34:47
B	2	15.00	10	10686	10696	0.67	712.40	713.07	0.00	0.00	0.00	0.00	1380.0	13:34:47
B	3	15.00	44	12166	12210	2.93	811.07	814.00	0.00	0.00	0.00	0.00	1380.0	13:34:47
B	4	15.00	5	10446	10451	0.33	696.40	696.73	0.00	0.00	0.00	0.00	1380.0	13:34:47

[TENNELEC LB4000] [PAGE 1]

13:50:06		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	2 beta curve	15.00	2	13150	0.00	0.00	0.00	0.00
13:34:47	2	3	15.00	0	13080	0.00	0.00	0.00	0.00
15.00	3	4	15.00	16	13304	0.00	0.00	0.00	0.00
	4	5	15.00	7	12144	0.00	0.00	0.00	0.00
GROUP B	1	6	15.00	2	12182	0.00	0.00	0.00	0.00
13:34:47	2	7	15.00	10	10686	0.00	0.00	0.00	0.00
15.00	3	8	15.00	44	12166	0.00	0.00	0.00	0.00
	4	1	15.00	5	10446	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 2 COUNT TERMINATED ////

ABSORPTION CURVE FOR GROSS ALPHA

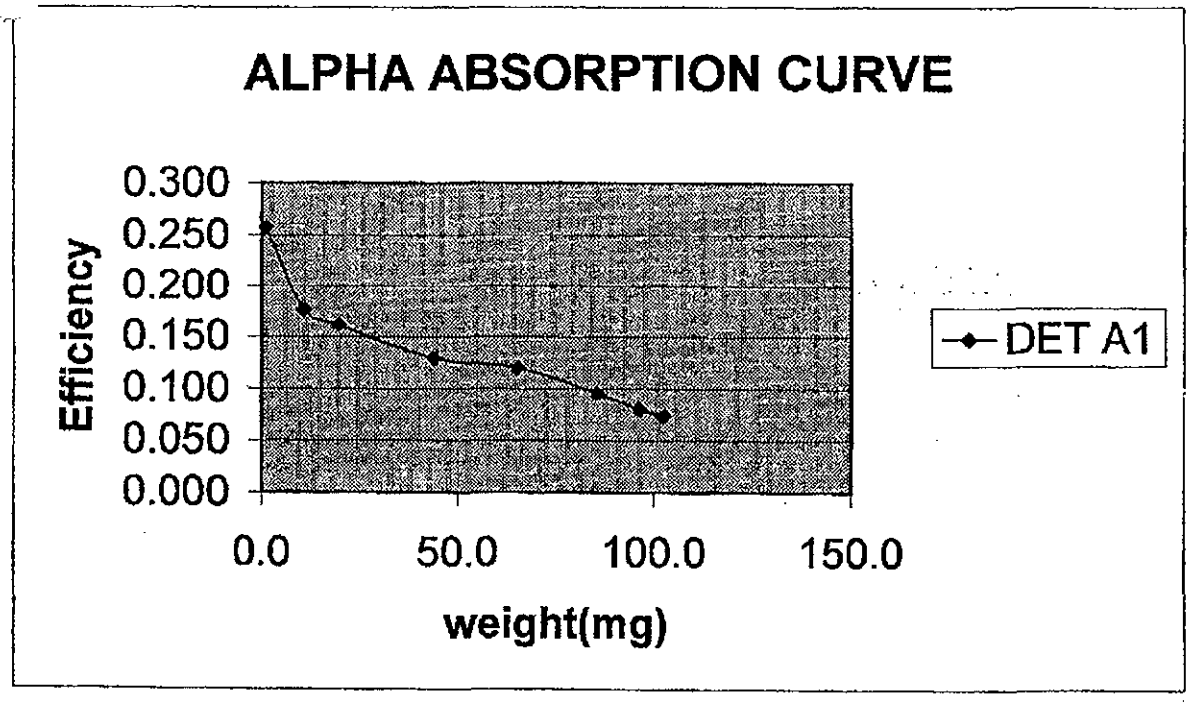
Alpha Source: Am 241
STL# AM24101AL
Ref Date: 5/1/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 7/17/03
t 1/2 = 432.20 years
Count time 90 min.

DET A1

ANALYST James Preston 7/18/03

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	known dpm	EFF	ln EFF
1	1.2	28214	0.16	313.33	1217	0.258	-1.357
2	10.5	19299	0.16	214.27	1217	0.176	-1.737
3	19.7	17707	0.16	196.58	1217	0.162	-1.823
4	43.9	14216	0.16	157.80	1217	0.130	-2.043
5	65.4	13201	0.16	146.52	1217	0.120	-2.117
6	85.7	10485	0.16	116.34	1217	0.096	-2.347
7	96.3	8807	0.16	97.70	1217	0.080	-2.522
8	102.6	8092	0.16	89.75	1217	0.074	-2.607

EFF. = 0.218exp(-0.0103mg) FORMULA FOR ALPHA EFFICIENCY
R2= -0.9727 CORRELATION COEFICIENT



N:/prestonj/absorption curve template(alpha)

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years)	Decay
807.00	2.2094	0.0016	years-1	0.0035	0.9965

ln(EFF)= b-mx		
b intercept =	-1.5228	
m slope =	-0.0103	
exp(-1.5228)=	0.218	ZERO THICKNESS EFFICIENCY

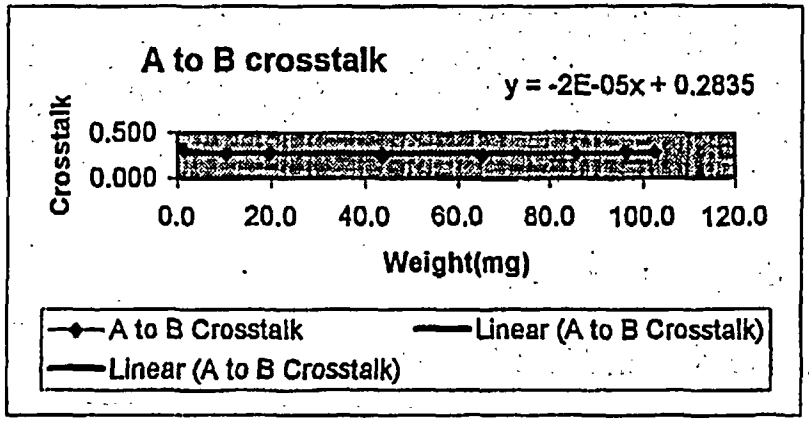
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

DET A1

Alpha Source: Am 241
STL# AM24101AL
Ref Date: 05/01/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 7/17/03
t 1/2 = 432.2 years
Count time 90 min.

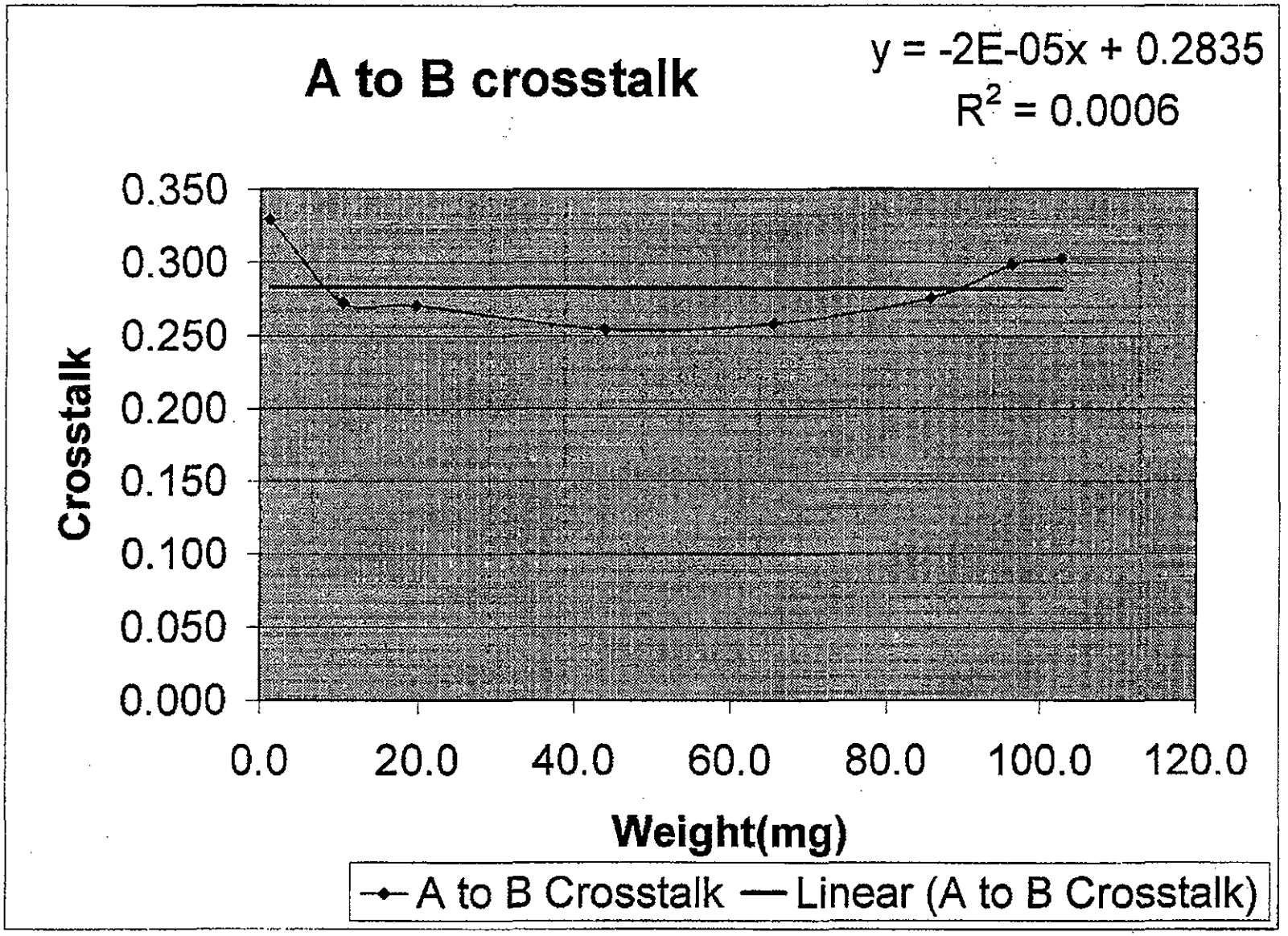
ANALYST [signature] 7/18/03

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	gross beta counts	beta bkgd cpm	net beta cpm	A to B crosstalk
1	1.2	28214	0.07	313.42	9541	2.79	103.22	0.329
2	10.5	19299	0.07	214.36	5506	2.79	58.39	0.272
3	19.7	17707	0.07	196.67	5036	2.79	53.17	0.270
4	43.9	14216	0.07	157.89	3862	2.79	40.12	0.254
5	65.4	13201	0.07	146.61	3657	2.79	37.84	0.258
6	85.7	10485	0.07	116.43	3139	2.79	32.09	0.276
7	96.3	8807	0.07	97.79	2877	2.79	29.18	0.298
8	102.6	8092	0.07	89.84	2697	2.79	27.18	0.302



FORMULA FOR CROSSTALK RATIO
CT = -2E-05mg + 0.2835

CORRELATION COEFICIENT
R2 = 0.0006


A to B crosstalk
y = -2E-05x + 0.2835
R2 = 0.0006
Crosstalk
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Weight(mg)
A to B Crosstalk
Linear (A to B Crosstalk)

ABSORPTION CURVE FOR GROSS ALPHA

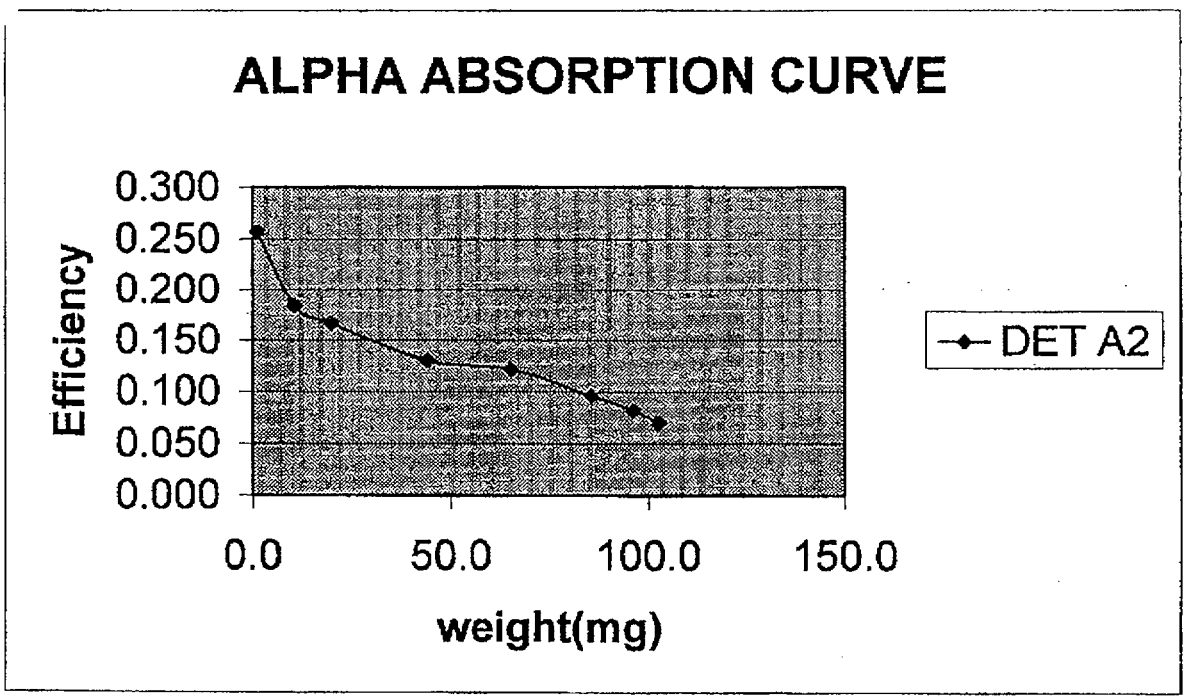
Alpha Source: Am 241
STL# AM24101AL
Ref Date: 5/1/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 7/17/03
t 1/2 = 432.20 years
Count time 90 min.

DET A2

ANALYST James Preston 7/18/03

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	known dpm	EFF	ln EFF
1	1.2	28088	0.09	312.00	1217	0.256	-1.361
2	10.5	20134	0.09	223.62	1217	0.184	-1.694
3	19.7	18283	0.09	203.05	1217	0.167	-1.790
4	43.9	14313	0.09	158.94	1217	0.131	-2.035
5	65.4	13319	0.09	147.90	1217	0.122	-2.107
6	85.7	10568	0.09	117.33	1217	0.096	-2.339
7	96.3	9023	0.09	100.17	1217	0.082	-2.497
8	102.6	7709	0.09	85.57	1217	0.070	-2.655

EFF. = 0.224exp(-0.0106mg) FORMULA FOR ALPHA EFFICIENCY
R2= -0.9776 CORRELATION COEFICIENT



N:/prestonj/absorption curve template(alpha)

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years)	Decay
807.00	2.2094	0.0016	years-1	0.0035	0.9965

ln(EFF)= b-mx		
b intercept =	-1.4965	
m slope =	-0.0106	
exp(-1.4965)=	0.224	ZERO THICKNESS EFFICIENCY

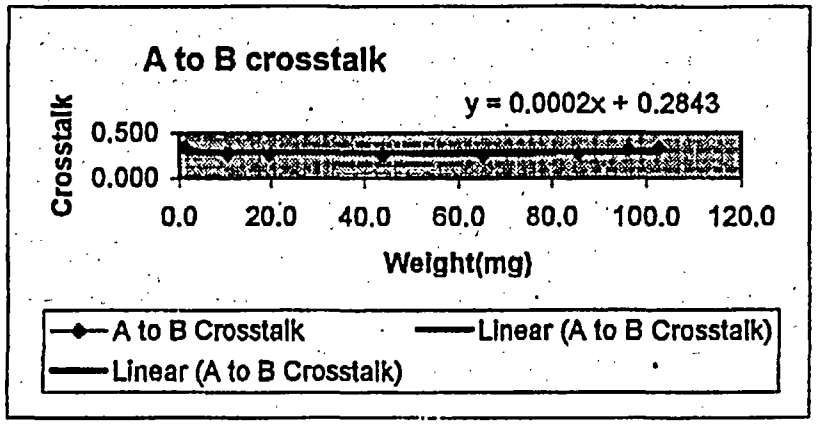
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

DET A2

ANALYST 7/18/03

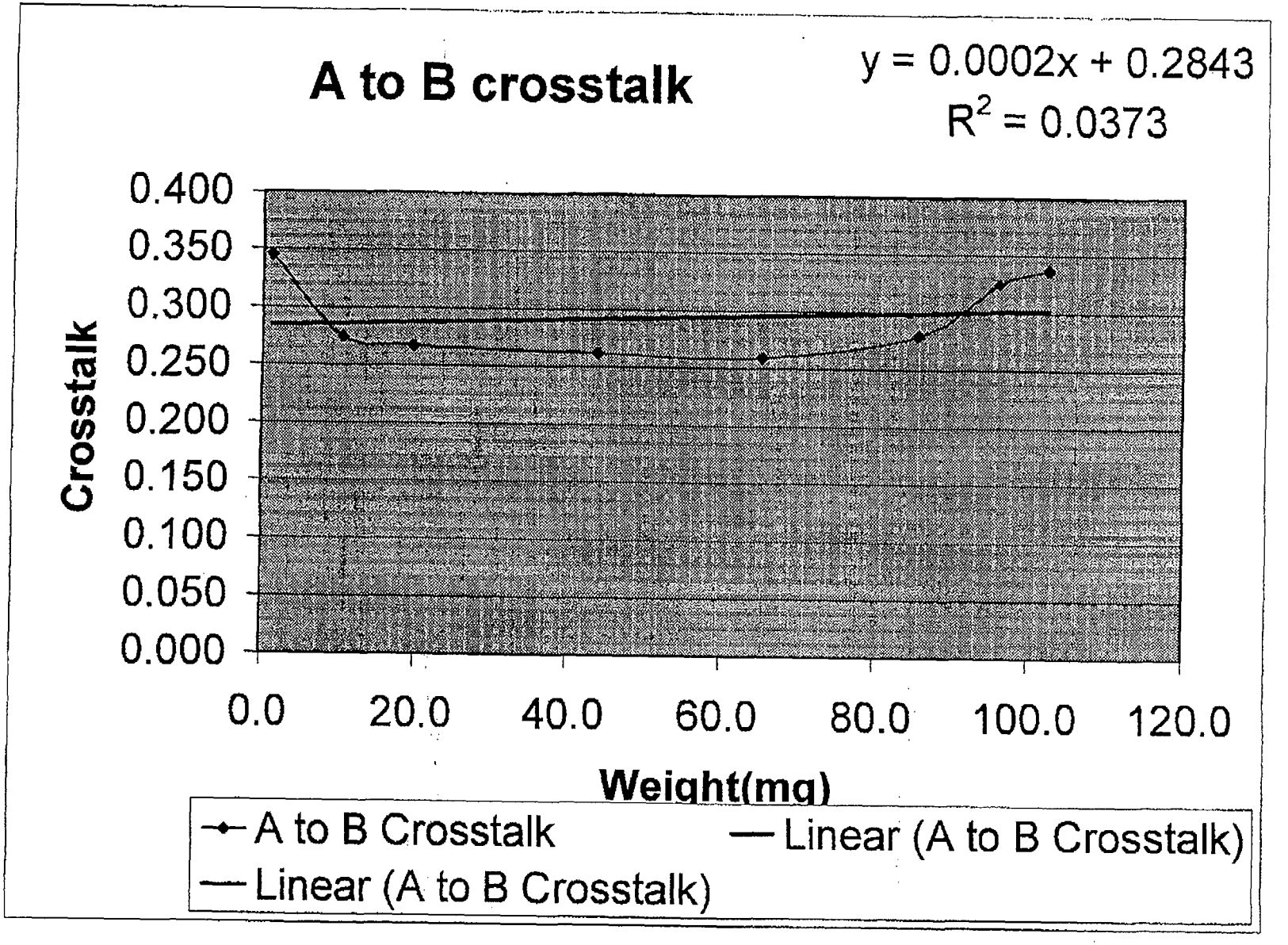
Alpha Source:	Am 241	
STL#	AM24101AL	
Ref Date:	05/01/01	
pCi/ml	110	
mls used:	5	
corr.activity:	110	pCi/ml
Curve Date:	7/17/03	
t 1/2 =	432.2	years
Count time	90	min.

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	gross beta counts	beta bkgd cpm	net beta cpm	A to B crosstalk
1	1.2	28088	0.09	312.00	9827	1.65	107.54	0.345
2	10.5	20134	0.09	223.62	5668	1.65	61.33	0.274
3	19.7	18283	0.09	203.05	5030	1.65	54.24	0.267
4	43.9	14313	0.09	158.94	3896	1.65	41.64	0.262
5	65.4	13319	0.09	147.90	3597	1.65	38.32	0.259
6	85.7	10568	0.09	117.33	3099	1.65	32.78	0.279
7	96.3	9023	0.09	100.17	3076	1.65	32.53	0.325
8	102.6	7709	0.09	85.57	2740	1.65	28.79	0.337



FORMULA FOR CROSSTALK RATIO
CT = 0.0002mg + 0.2843

CORRELATION COEFICIENT
R2 = 0.0373


A to B crosstalk
y = 0.0002x + 0.2843
R2 = 0.0373
Crosstalk
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Weight(mg)
A to B Crosstalk
Linear (A to B Crosstalk)
Linear (A to B Crosstalk)

ABSORPTION CURVE FOR GROSS ALPHA

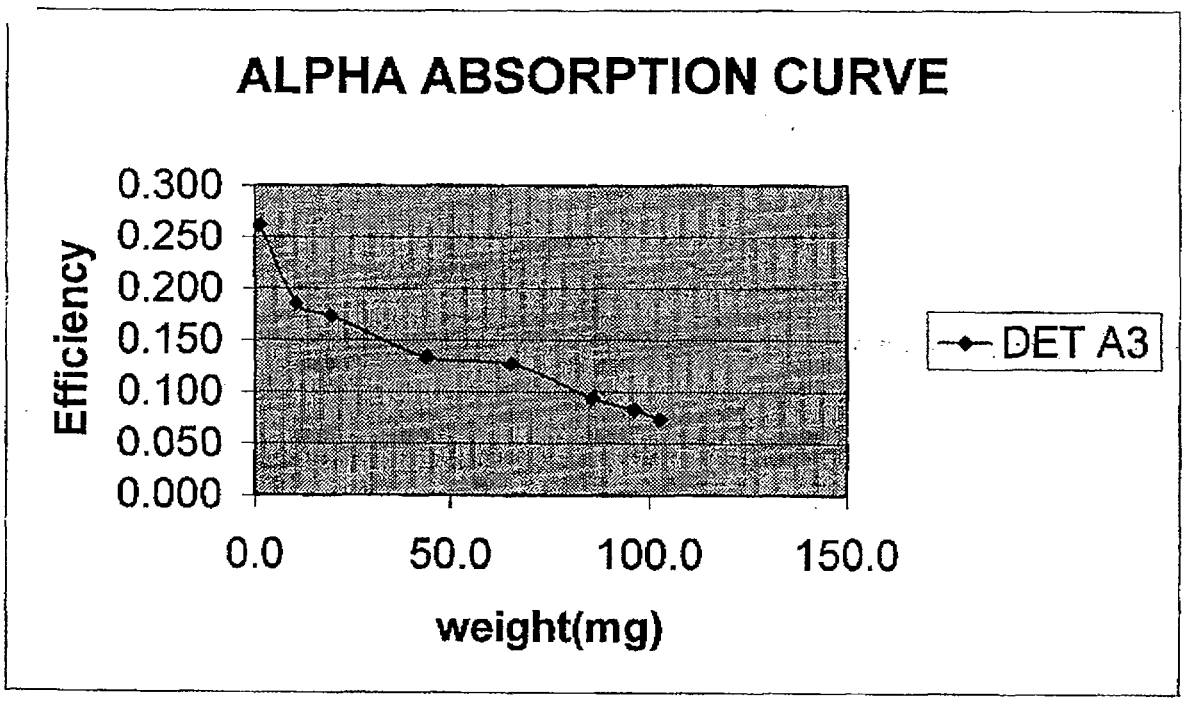
DET A3

ANALYST James C. Preston 7/18/03

Alpha Source: Am 241
STL# AM24101AL
Ref Date: 5/1/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 7/17/03
t 1/2 = 432.20 years
Count time 90 min.

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	known dpm	EFF	ln EFF
1	1.2	28623	0.13	317.90	1217	0.261	-1.342
2	10.5	20308	0.13	225.51	1217	0.185	-1.685
3	19.7	19042	0.13	211.45	1217	0.174	-1.750
4	43.9	14693	0.13	163.13	1217	0.134	-2.009
5	65.4	13936	0.13	154.71	1217	0.127	-2.062
6	85.7	10372	0.13	115.11	1217	0.095	-2.358
7	96.3	9133	0.13	101.35	1217	0.083	-2.485
8	102.6	8116	0.13	90.05	1217	0.074	-2.604

EFF. = 0.229exp(-0.0106mg) FORMULA FOR ALPHA EFFICIENCY
R2= -0.9793 CORRELATION COEFICIENT



N:/prestonj/absorption curve template(alpha)

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years)	Decay
807.00	2.2094	0.0016	years-1	0.0035	0.9965

ln(EFF)= b-mx		
b intercept =	-1.4738	
m slope =	-0.0106	
exp(-1.4738)=	0.229	ZERO THICKNESS EFFICIENCY

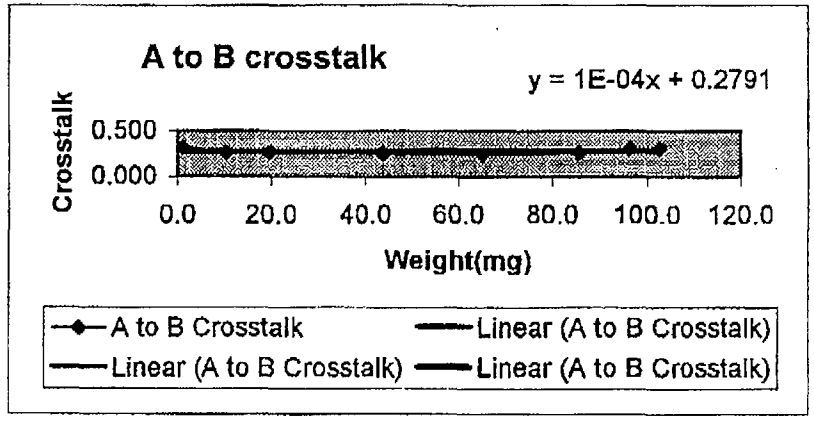
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

DET A3

ANALYST 7/18/03

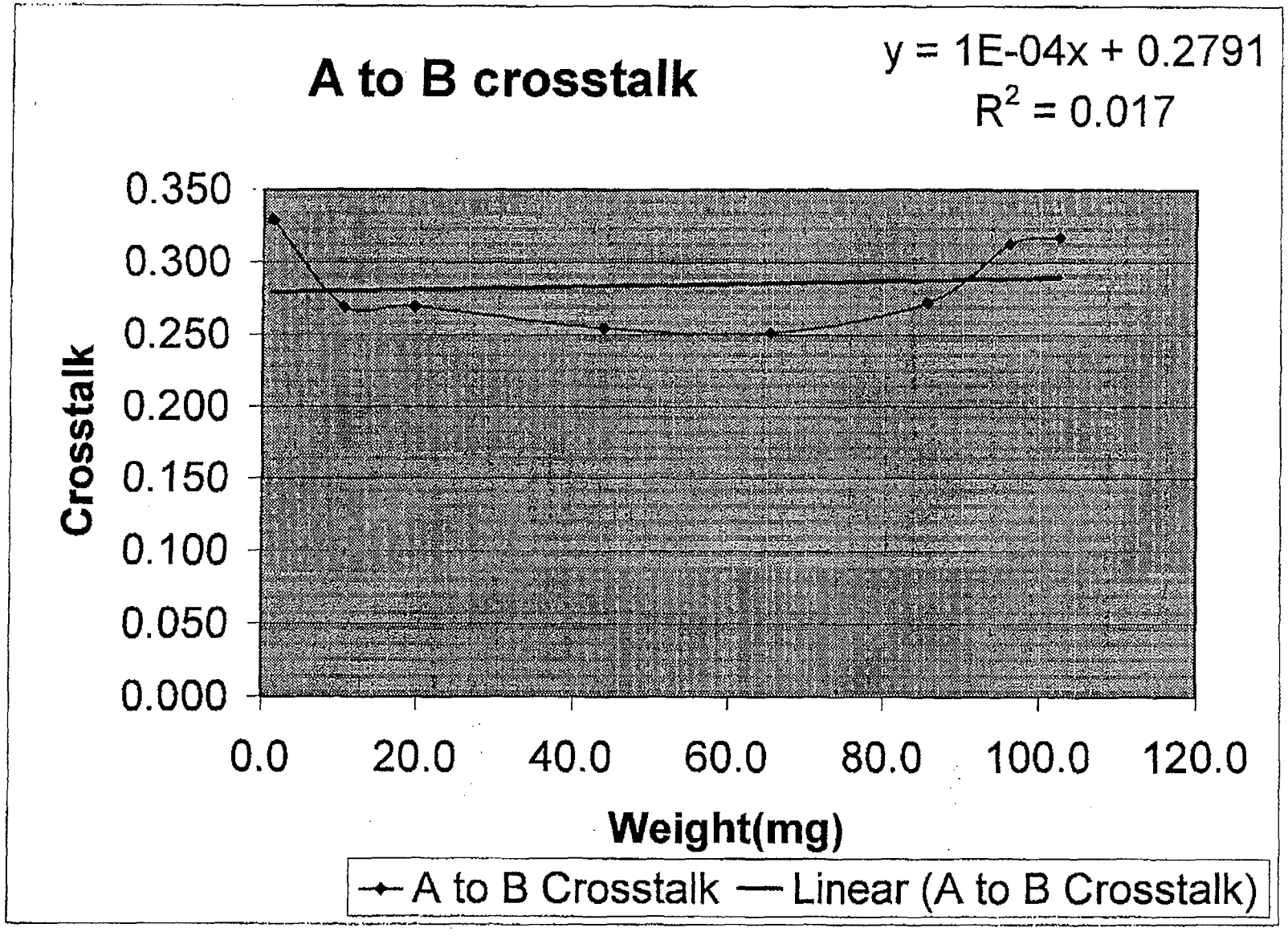
Alpha Source:	Am 241	
STL#	AM24101AL	
Ref Date:	05/01/01	
pCi/ml	110	
mls used:	5	
corr.activity:	110	pCi/ml
Curve Date:	7/17/03	
t 1/2 =	432.2	years
Count time	90	min.

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	gross beta counts	beta bkgd cpm	net beta cpm	A to B crosstalk
1	1.2	28623	0.13	317.90	9569	1.57	104.75	0.330
2	10.5	20308	0.13	225.51	5605	1.57	60.71	0.269
3	19.7	19042	0.13	211.45	5264	1.57	56.92	0.269
4	43.9	14693	0.13	163.13	3876	1.57	41.50	0.254
5	65.4	13936	0.13	154.71	3638	1.57	38.85	0.251
6	85.7	10372	0.13	115.11	2959	1.57	31.31	0.272
7	96.3	9133	0.13	101.35	2994	1.57	31.70	0.313
8	102.6	8116	0.13	90.05	2711	1.57	28.55	0.317



FORMULA FOR CROSSTALK RATIO
CT = 1E-04mg + 0.2791

CORRELATION COEFICIENT
R2 = 0.017


A to B crosstalk
y = 1E-04x + 0.2791
R2 = 0.017
Crosstalk
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Weight(mg)
A to B Crosstalk
Linear (A to B Crosstalk)

^BSORPTION CURVE FOR GROSS ALPHA

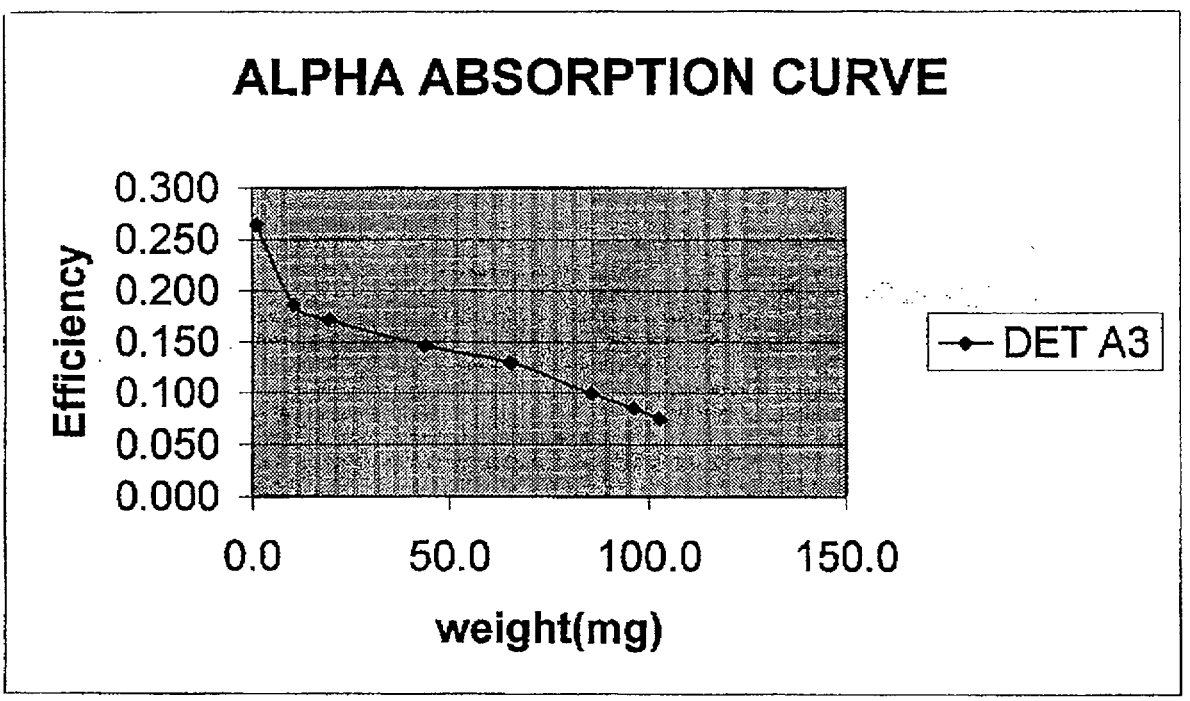
Alpha Source: Am 241
STL# AM24101AL
Ref Date: 5/1/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 7/17/03
t 1/2 = 432.20 years
Count time 90 min.

DET A4

ANALYST James Preston 7/18/03

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	known dpm	EFF	ln EFF
1	1.2	28925	0.11	321.28	1217	0.264	-1.332
2	10.5	20394	0.11	226.49	1217	0.186	-1.681
3	19.7	18820	0.11	209.00	1217	0.172	-1.762
4	43.9	15986	0.11	177.51	1217	0.146	-1.925
5	65.4	14209	0.11	157.77	1217	0.130	-2.043
6	85.7	10942	0.11	121.47	1217	0.100	-2.304
7	96.3	9373	0.11	104.03	1217	0.086	-2.459
8	102.6	8240	0.11	91.45	1217	0.075	-2.588

EFF. = 0.232exp(-0.0103mg) FORMULA FOR ALPHA EFFICIENCY
R2= -0.9771 CORRELATION COEFICIENT



N:/prestonj/absorption curve template(alpha)

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years)	Decay
807.00	2.2094	0.0016	years-1	0.0035	0.9965

ln(EFF)= b-mx		
b intercept =	-1.4615	
m slope =	-0.0103	
exp(-1.4615)=	0.232	ZERO THICKNESS EFFICIENCY

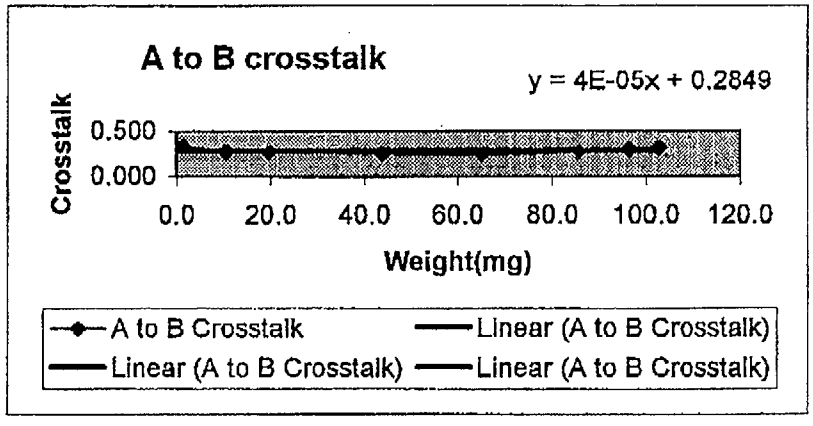
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

DET A4

ANALYST 7/18/03

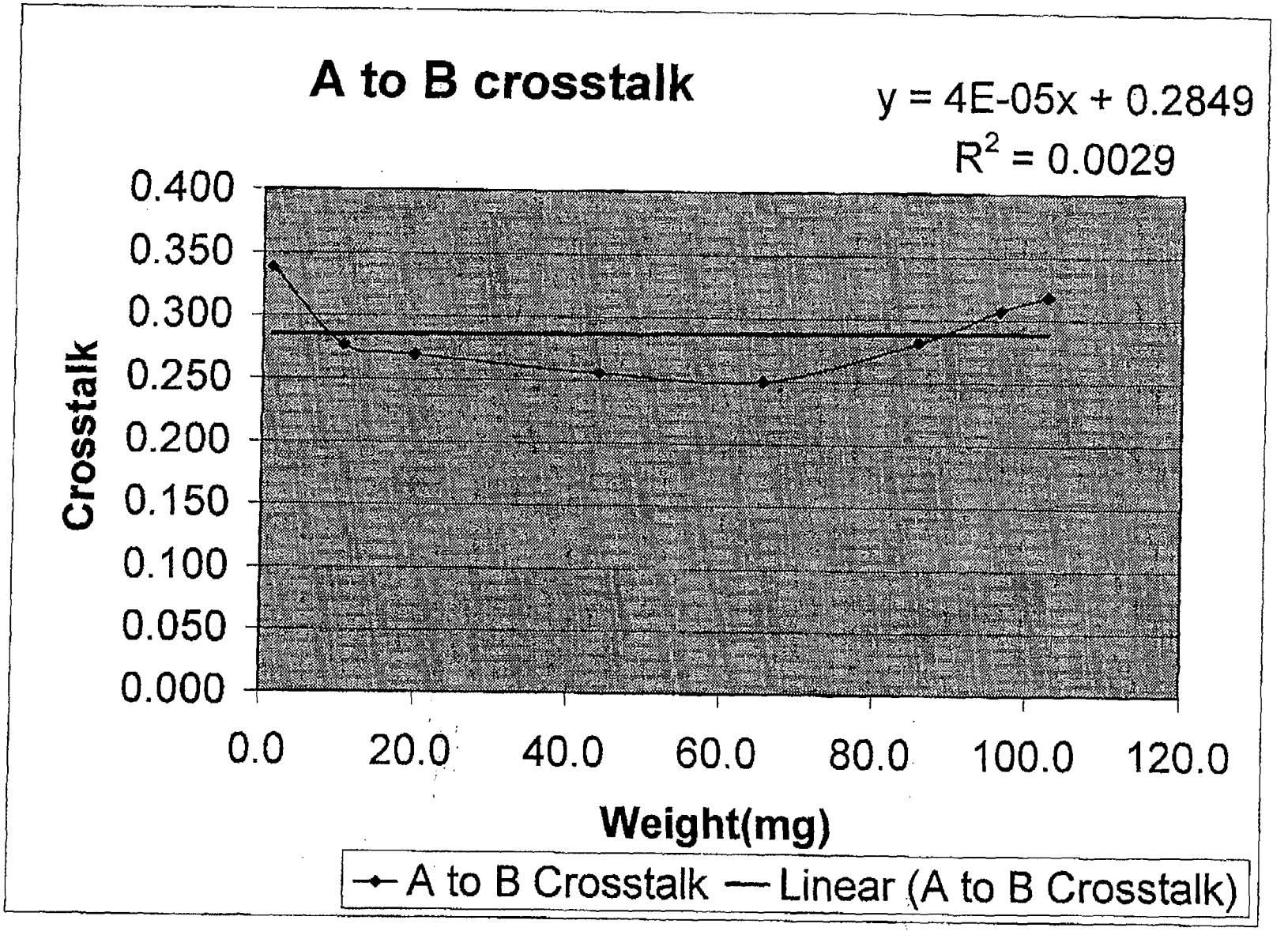
Alpha Source:	Am 241	
STL#	AM24101AL	
Ref Date:	05/01/01	
pCi/ml	110	
mls used:	5	
corr.activity:	110	pCi/ml
Curve Date:	7/17/03	
t 1/2 =	432.2	years
Count time	90	min.

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	gross beta counts	beta bkgd cpm	net beta cpm	A to B crosstalk
1	1.2	28925	0.11	321.28	9944	1.81	108.68	0.338
2	10.5	20394	0.11	226.49	5799	1.81	62.62	0.276
3	19.7	18820	0.11	209.00	5229	1.81	56.29	0.269
4	43.9	15986	0.11	177.51	4247	1.81	45.38	0.256
5	65.4	14209	0.11	157.77	3714	1.81	39.46	0.250
6	85.7	10942	0.11	121.47	3240	1.81	34.19	0.281
7	96.3	9373	0.11	104.03	3042	1.81	31.99	0.307
8	102.6	8240	0.11	91.45	2783	1.81	29.11	0.318



FORMULA FOR CROSSTALK RATIO
CT = -4E-05mg + 0.2849

CORRELATION COEFICIENT
R2 = 0.0029


A to B crosstalk
y = 4E-05x + 0.2849
R2 = 0.0029
Crosstalk
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Weight(mg)
A to B Crosstalk
Linear (A to B Crosstalk)

^BSORPTION CURVE FOR GROSS ALPHA

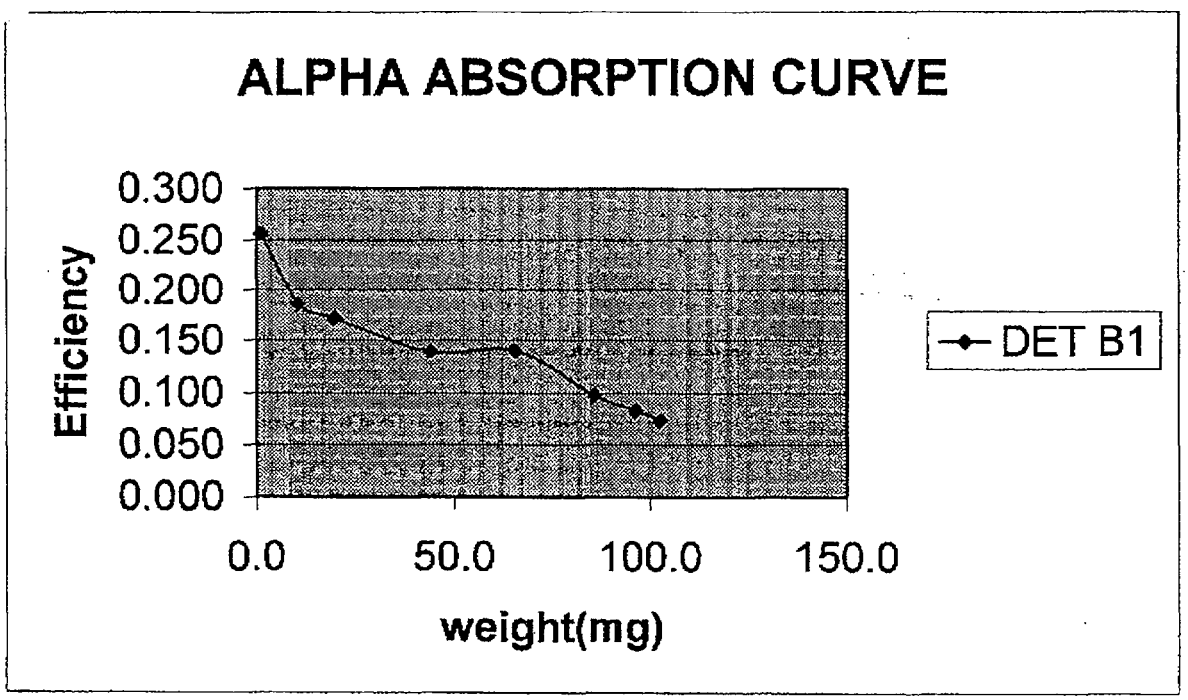
DET B1

ANALYST James Preston 7/18/03

Alpha Source: Am 241
STL# AM24101AL
Ref Date: 5/1/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 7/17/03
t 1/2 = 432.20 years
Count time 90 min.

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	known dpm	EFF	ln EFF
1	1.2	28040	0.10	311.46	1217	0.256	-1.363
2	10.5	20399	0.10	226.56	1217	0.186	-1.681
3	19.7	18851	0.10	209.36	1217	0.172	-1.760
4	43.9	15227	0.10	169.09	1217	0.139	-1.973
5	65.4	15352	0.10	170.48	1217	0.140	-1.965
6	85.7	10810	0.10	120.01	1217	0.099	-2.316
7	96.3	9179	0.10	101.89	1217	0.084	-2.480
8	102.6	8051	0.10	89.36	1217	0.073	-2.611

EFF. = 0.230exp(-0.0103mg) FORMULA FOR ALPHA EFFICIENCY
R2= -0.9697 CORRELATION COEFICIENT



N:/prestonj/absorption curve template(alpha)

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years)	Decay
807.00	2.2094	0.0016	years-1	0.0035	0.9965

ln(EFF)= b-mx		
b intercept =	-1.4709	
m slope =	-0.0103	
exp(-1.4709)=	0.230	ZERO THICKNESS EFFICIENCY

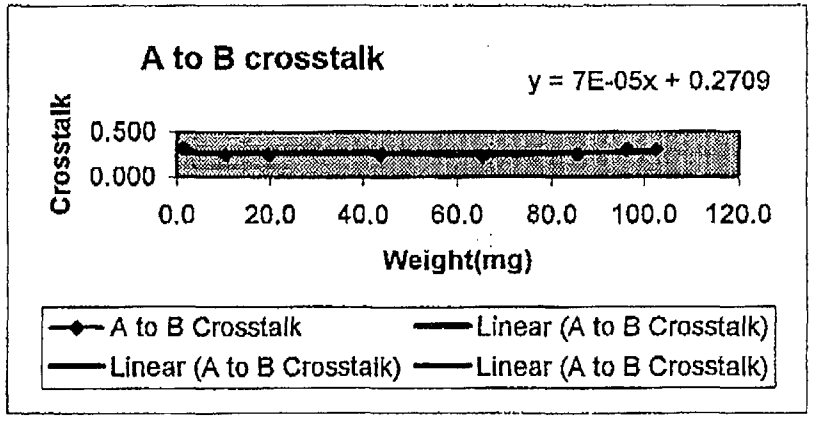
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

DET B1

ANALYST 7/18/03

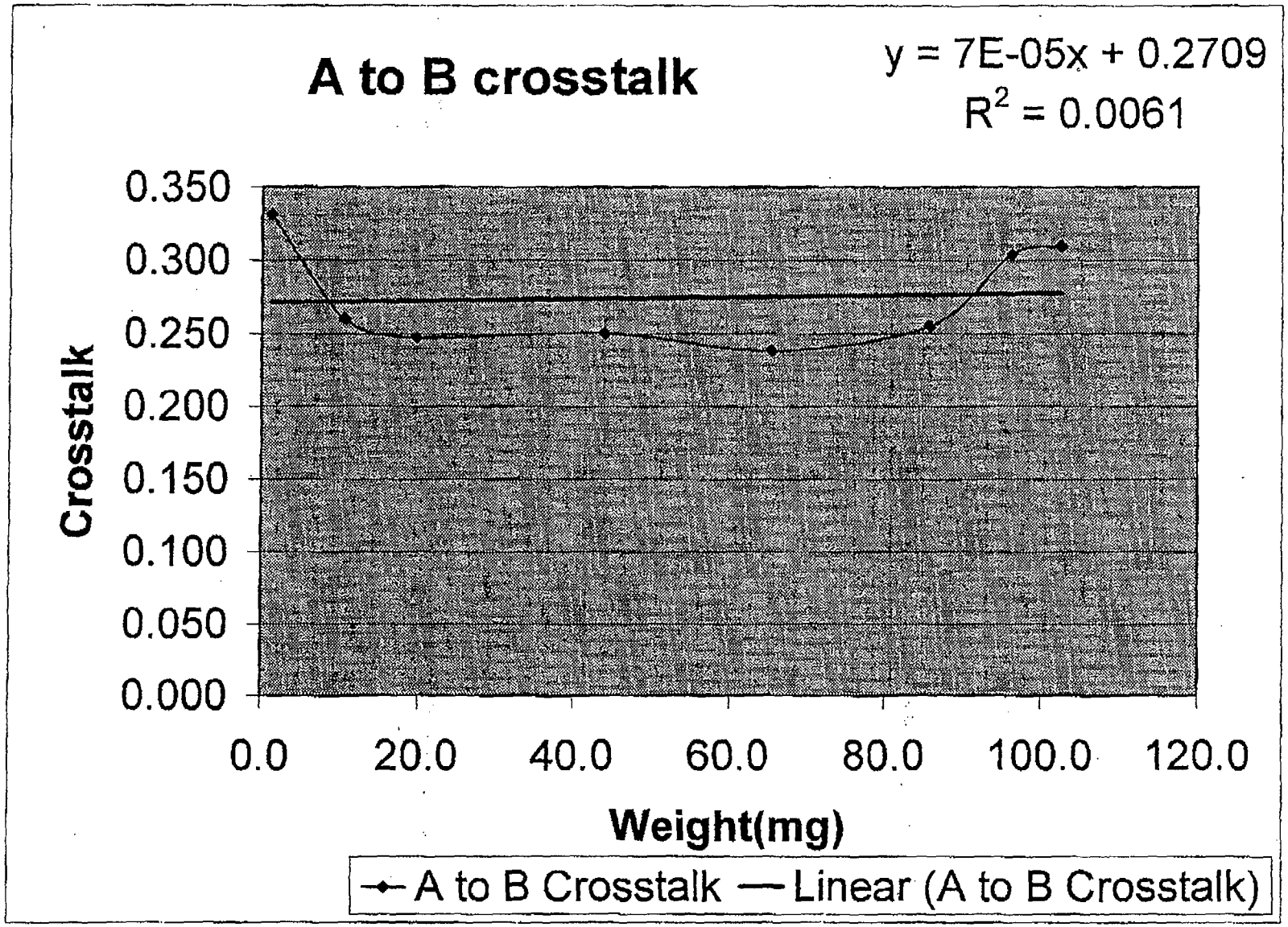
Alpha Source:	Am 241	
STL#	AM24101AL	
Ref Date:	05/01/01	
pCi/ml	110	
mls used:	5	
corr.activity:	110	pCi/ml
Curve Date:	7/17/03	
t 1/2 =	432.2	years
Count time	90	min.

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	gross beta counts	beta bkgd cpm	net beta cpm	A to B crosstalk
1	1.2	28040	0.10	311.46	9430	1.66	103.12	0.331
2	10.5	20399	0.10	226.56	5454	1.66	58.94	0.260
3	19.7	18851	0.10	209.36	4811	1.66	51.80	0.247
4	43.9	15227	0.10	169.09	3956	1.66	42.30	0.250
5	65.4	15352	0.10	170.48	3805	1.66	40.62	0.238
6	85.7	10810	0.10	120.01	2905	1.66	30.62	0.255
7	96.3	9179	0.10	101.89	2941	1.66	31.02	0.304
8	102.6	8051	0.10	89.36	2641	1.66	27.68	0.310



FORMULA FOR CROSSTALK RATIO
CT = -7E-05mg + 0.2709

CORRELATION COEFICIENT
R2 = 0.0061


A to B crosstalk
y = 7E-05x + 0.2709
R2 = 0.0061
Crosstalk
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Weight(mg)
A to B Crosstalk
Linear (A to B Crosstalk)

ABSORPTION CURVE FOR GROSS ALPHA

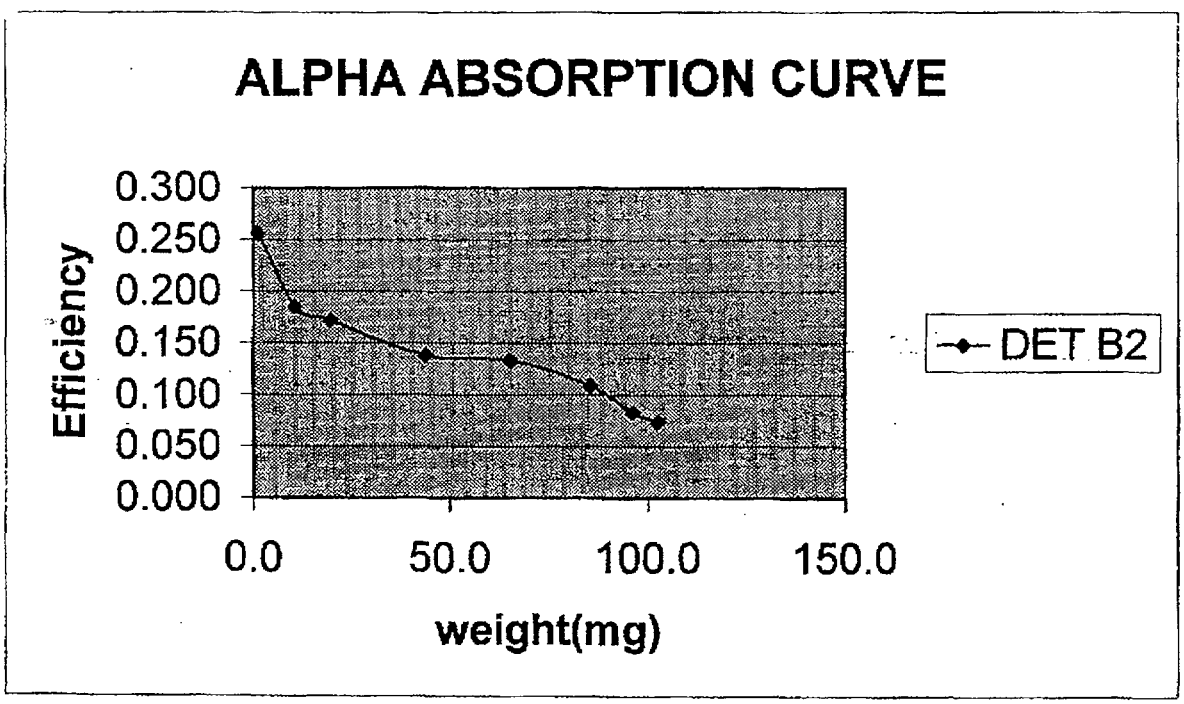
DET B2

ANALYST James E. Preston 7/18/03

Alpha Source: Am 241
STL# AM24101AL
Ref Date: 5/1/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 7/17/03
t 1/2 = 432.20 years
Count time 90 min.

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	known dpm	EFF	ln EFF
1	1.2	28052	0.10	311.59	1217	0.256	-1.362
2	10.5	20261	0.10	225.02	1217	0.185	-1.688
3	19.7	18833	0.10	209.16	1217	0.172	-1.761
4	43.9	15192	0.10	168.70	1217	0.139	-1.976
5	65.4	14628	0.10	162.43	1217	0.134	-2.014
6	85.7	11967	0.10	132.87	1217	0.109	-2.215
7	96.3	9134	0.10	101.39	1217	0.083	-2.485
8	102.6	8113	0.10	90.04	1217	0.074	-2.604

EFF. = 0.228exp(-0.0100mg) FORMULA FOR ALPHA EFFICIENCY
R2= -0.9670 CORRELATION COEFICIENT



N:/prestonj/absorption curve template(alpha)

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years)	Decay
807.00	2.2094	0.0016	years-1	0.0035	0.9965

ln(EFF)= b-mx		
b intercept =	-1.4803	
m slope =	-0.0100	
exp(-1.4803)=	0.228	ZERO THICKNESS EFFICIENCY

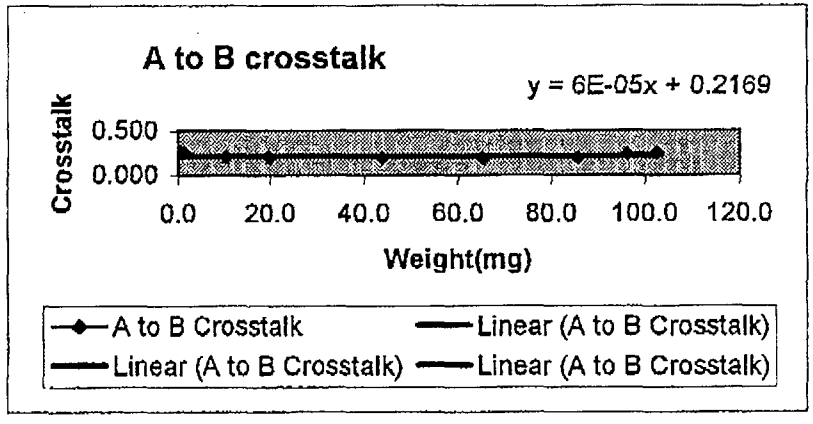
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

DET B2

ANALYST 7/18/03

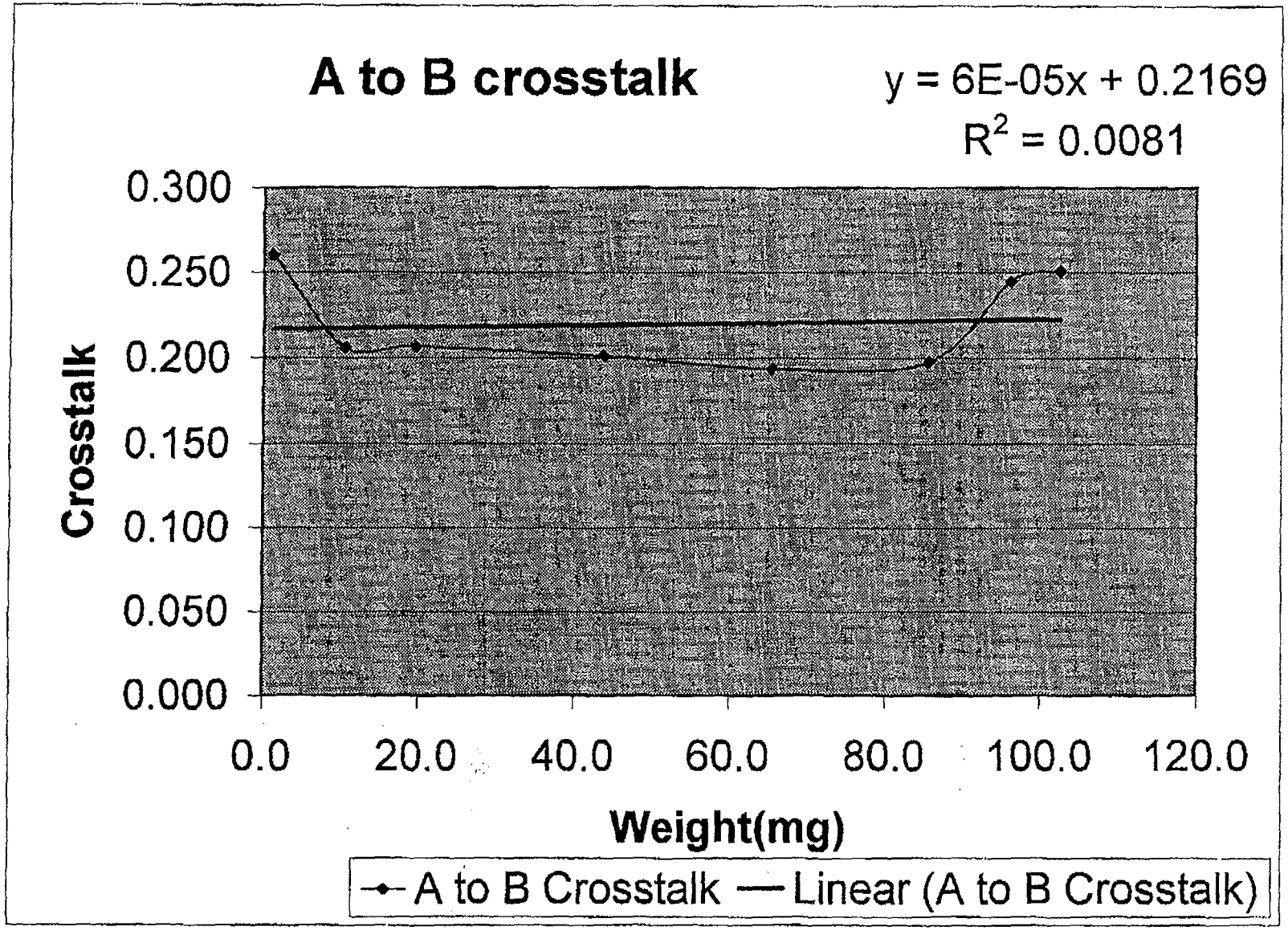
Alpha Source:	Am 241	
STL#	AM24101AL	
Ref Date:	05/01/01	
pCi/ml	110	
mls used:	5	
corr.activity:	110	pCi/ml
Curve Date:	7/17/03	
t 1/2 =	432.2	years
Count time	90	min.

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	gross beta counts	beta bkgd cpm	net beta cpm	A to B crosstalk
1	1.2	28052	0.10	311.59	7497	2.22	81.08	0.260
2	10.5	20261	0.10	225.02	4370	2.22	46.34	0.206
3	19.7	18833	0.10	209.16	4088	2.22	43.20	0.207
4	43.9	15192	0.10	168.70	3251	2.22	33.90	0.201
5	65.4	14628	0.10	162.43	3032	2.22	31.47	0.194
6	85.7	11967	0.10	132.87	2563	2.22	26.26	0.198
7	96.3	9134	0.10	101.39	2433	2.22	24.81	0.245
8	102.6	8113	0.10	90.04	2233	2.22	22.59	0.251



FORMULA FOR CROSSTALK RATIO
CT = -6E-05mg + 0.2169

CORRELATION COEFICIENT
R2 = 0.0081


A to B crosstalk
y = 6E-05x + 0.2169
R2 = 0.0081
Crosstalk
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Weight(mg)
A to B Crosstalk
Linear (A to B Crosstalk)

ABSORPTION CURVE FOR GROSS ALPHA

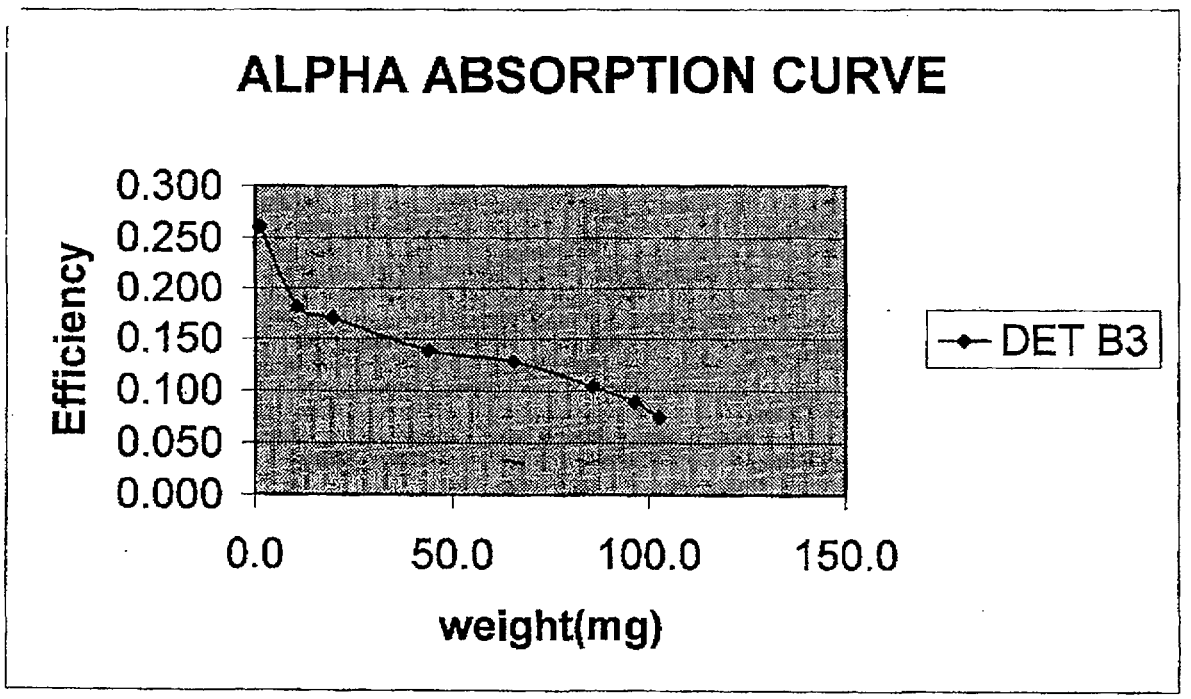
Alpha Source: Am 241
STL# AM24101AL
Ref Date: 5/1/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 7/17/03
t 1/2 = 432.20 years
Count time 90 min.

DET B3

ANALYST 7/18/03

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	known dpm	EFF	ln EFF
1	1.2	28518	0.13	316.74	1217	0.260	-1.346
2	10.5	19939	0.13	221.41	1217	0.182	-1.704
3	19.7	18713	0.13	207.79	1217	0.171	-1.767
4	43.9	15267	0.13	169.50	1217	0.139	-1.971
5	65.4	14086	0.13	156.38	1217	0.129	-2.052
6	85.7	11441	0.13	126.99	1217	0.104	-2.260
7	96.3	9836	0.13	109.16	1217	0.090	-2.411
8	102.6	8195	0.13	90.93	1217	0.075	-2.594

EFF. = 0.226exp(-0.0099mg) FORMULA FOR ALPHA EFFICIENCY
R2= -0.9704 CORRELATION COEFICIENT



N:/prestonj/absorption curve template(alpha)

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years)	Decay
807.00	2.2094	0.0016	years-1	0.0035	0.9965

ln(EFF)= b-mx		
b intercept =	-1.4887	
m slope =	-0.0099	
exp(-1.4887)=	0.226	ZERO THICKNESS EFFICIENCY

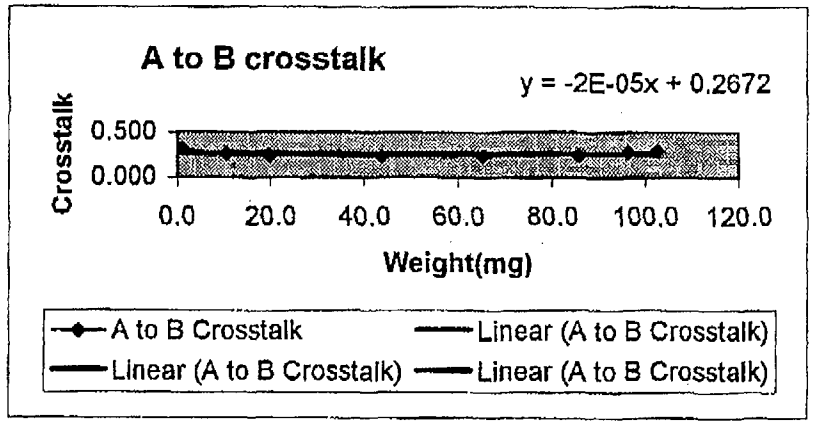
CR STALK CURVE AS A FUNCTION OF WEIGHT

DET B3

ANALYST 7/18/03

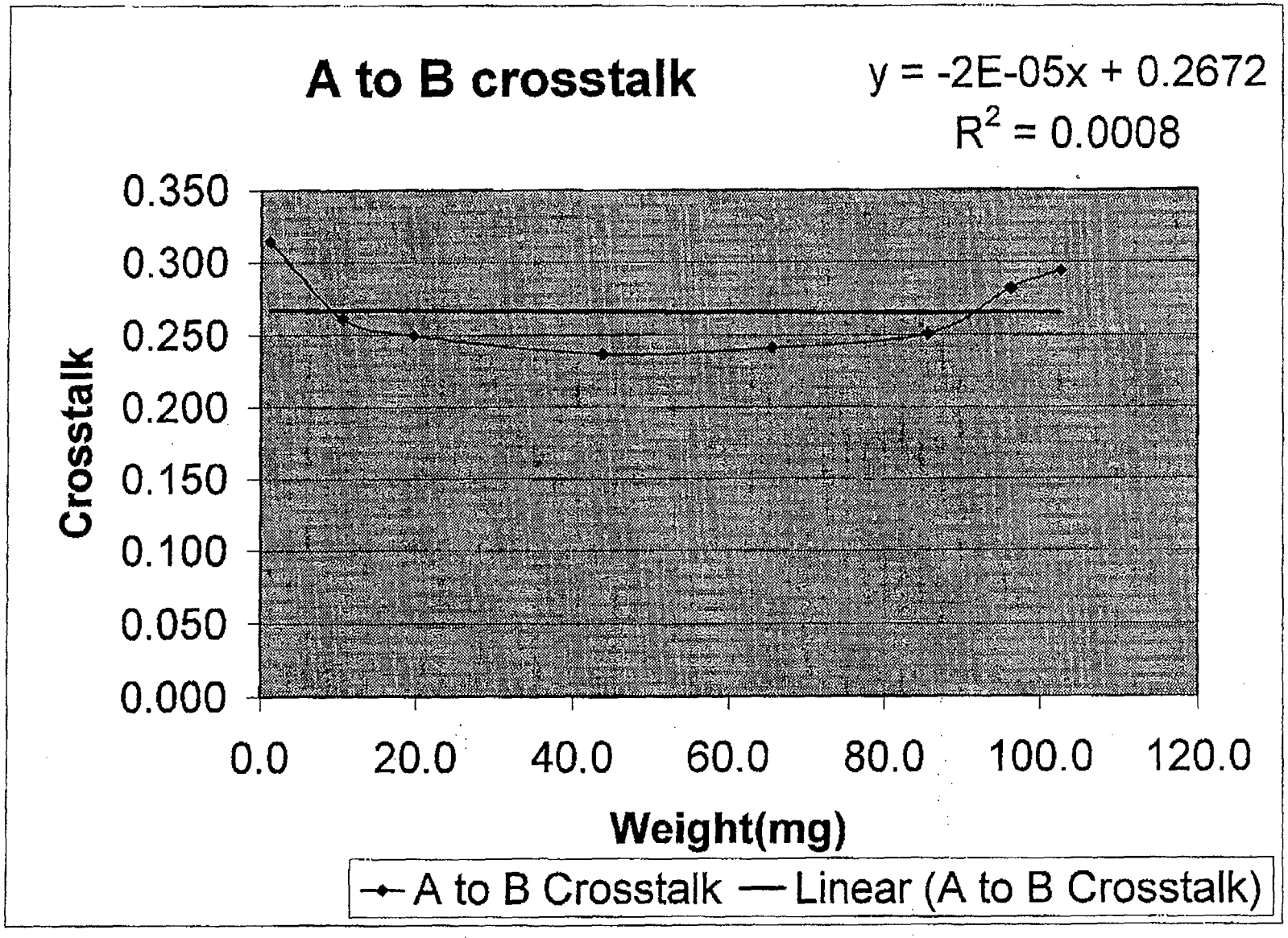
Alpha Source:	Am 241	
STL#	AM24101AL	
Ref Date:	05/01/01	
pCi/ml	110	
mls used:	5	
corr.activity:	110	pCi/ml
Curve Date:	7/17/03	
t 1/2 =	432.2	years
Count time	90	min.

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	gross beta counts	beta bkgd cpm	net beta cpm	A to B crosstalk
1	1.2	28518	0.13	316.74	9145	2.00	99.61	0.314
2	10.5	19939	0.13	221.41	5387	2.00	57.86	0.261
3	19.7	18713	0.13	207.79	4846	2.00	51.84	0.250
4	43.9	15267	0.13	169.50	3791	2.00	40.12	0.237
5	65.4	14086	0.13	156.38	3570	2.00	37.67	0.241
6	85.7	11441	0.13	126.99	3043	2.00	31.81	0.250
7	96.3	9836	0.13	109.16	2950	2.00	30.78	0.282
8	102.6	8195	0.13	90.93	2588	2.00	26.76	0.294



FORMULA FOR CROSSTALK RATIO
CT = -2E-05mg + 0.2672

CORRELATION COEFICIENT
R2 = 0.0008


A to B crosstalk
y = -2E-05x + 0.2672
R2 = 0.0008
Crosstalk
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Weight(mg)
A to B Crosstalk
Linear (A to B Crosstalk)

ABSORPTION CURVE FOR GROSS ALPHA

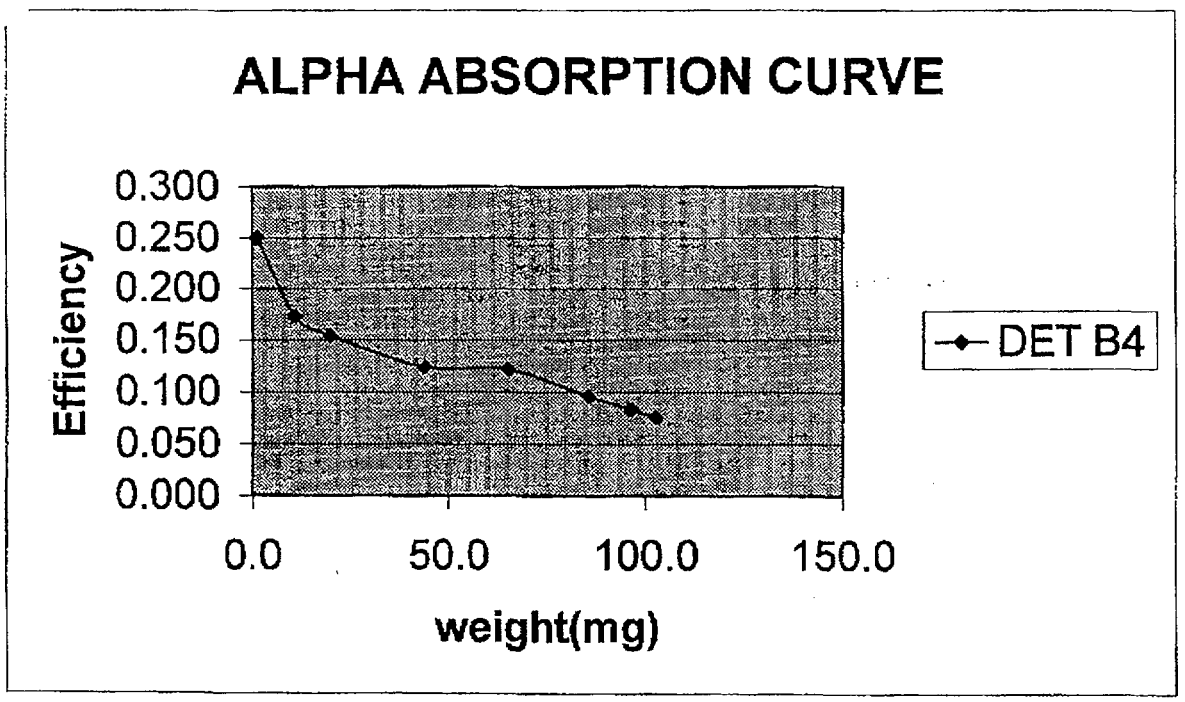
DET B4

Alpha Source: Am 241
STL# AM24101AL
Ref Date: 5/1/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 7/17/03
t 1/2 = 432.20 years
Count time 90 min.

ANALYST James E. Preston

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	known dpm	EFF	ln EFF
1	1.2	27360	0.16	303.84	1217	0.250	-1.387
2	10.5	18984	0.16	210.77	1217	0.173	-1.753
3	19.7	16925	0.16	187.90	1217	0.154	-1.868
4	43.9	13643	0.16	151.43	1217	0.124	-2.084
5	65.4	13448	0.16	149.26	1217	0.123	-2.098
6	85.7	10550	0.16	117.06	1217	0.096	-2.341
7	96.3	9180	0.16	101.84	1217	0.084	-2.480
8	102.6	8324	0.16	92.33	1217	0.076	-2.579

EFF. = 0.209exp(-0.0096mg) FORMULA FOR ALPHA EFFICIENCY
R2= -0.9643 CORRELATION COEFICIENT



N:/prestonj/absorption curve template(alpha)

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years)	Decay
807.00	2.2094	0.0016	years-1	0.0035	0.9965

ln(EFF)= b-mx		
b intercept =	-1.5647	
m slope =	-0.0096	
exp(-1.5647)=	0.209	ZERO THICKNESS EFFICIENCY

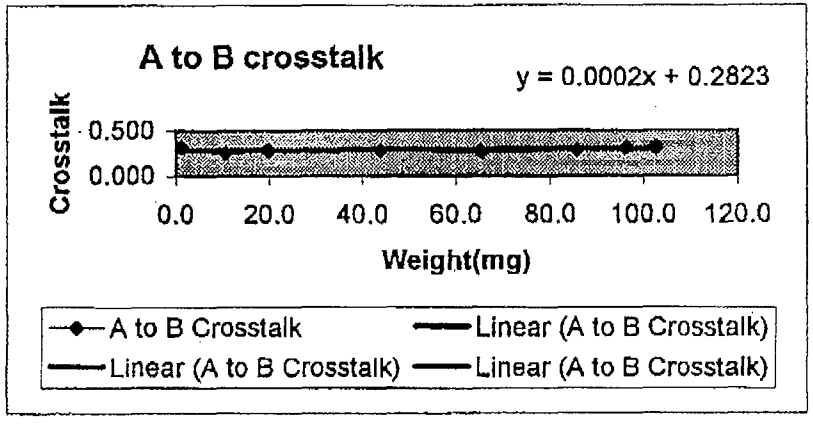
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

DET B4

ANALYST 7/18/03

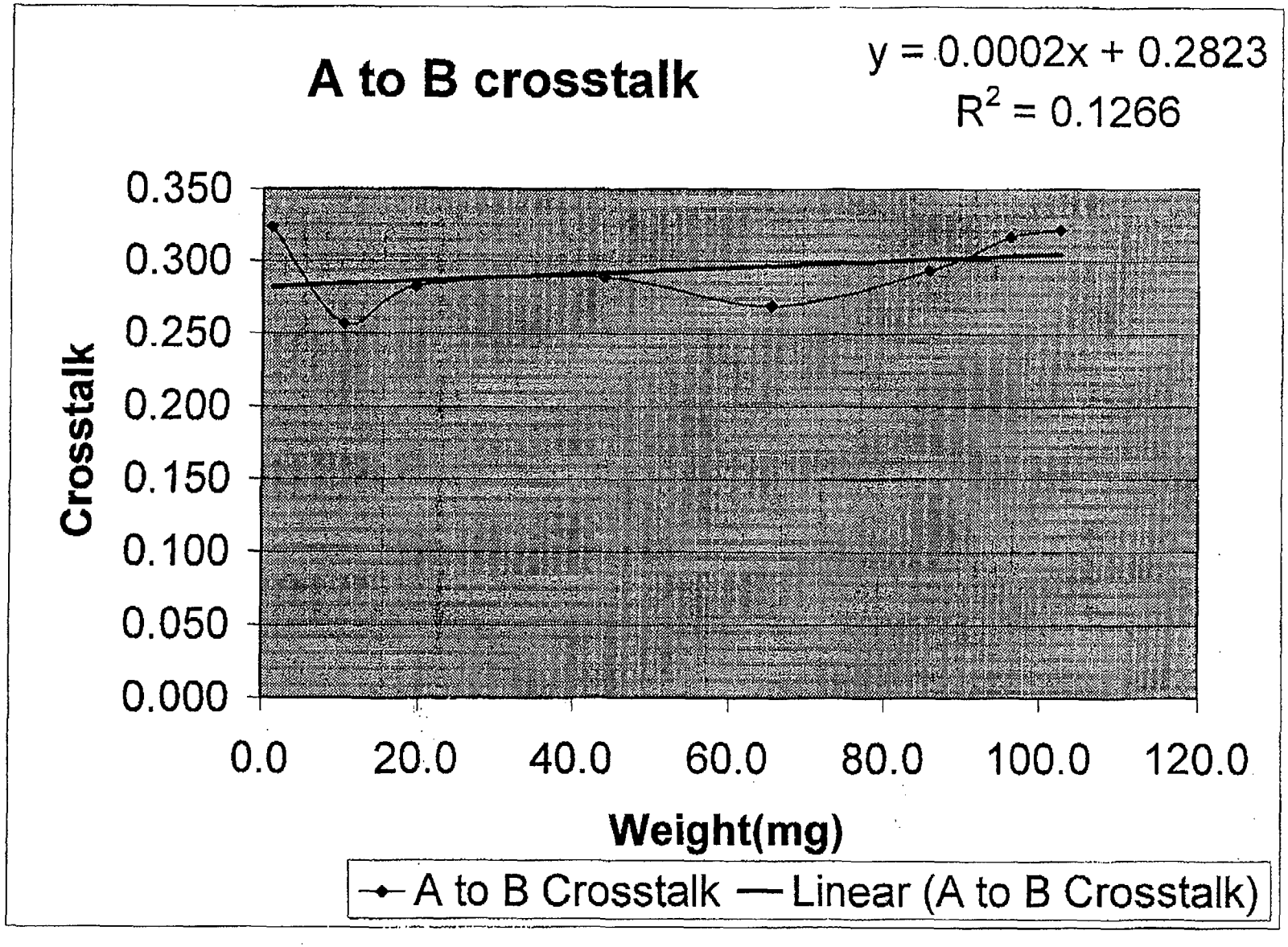
Alpha Source:	Am 241	
STL#	AM24101AL	
Ref Date:	05/01/01	
pCi/ml	110	
mls used:	5	
corr.activity:	110	pCi/ml
Curve Date:	7/17/03	
t 1/2 =	432.2	years
Count time	90	min.

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	gross beta counts	beta bkgd cpm	net beta cpm	A to B crosstalk
1	1.2	27360	0.16	303.84	9022	1.85	98.39	0.324
2	10.5	18984	0.16	210.77	5036	1.85	54.11	0.257
3	19.7	16925	0.16	187.90	4947	1.85	53.12	0.283
4	43.9	13643	0.16	151.43	4101	1.85	43.72	0.289
5	65.4	13448	0.16	149.26	3778	1.85	40.13	0.269
6	85.7	10550	0.16	117.06	3257	1.85	34.34	0.293
7	96.3	9180	0.16	101.84	3068	1.85	32.24	0.317
8	102.6	8324	0.16	92.33	2841	1.85	29.72	0.322



FORMULA FOR CROSSTALK RATIO
CT = 0.0002mg + 0.2823

CORRELATION COEFICIENT
R2 = 0.1266


A to B crosstalk
y = 0.0002x + 0.2823
R² = 0.1266
Crosstalk
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Weight(mg)
A to B Crosstalk
Linear (A to B Crosstalk)

7-17-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	90.00	15352	3805	19157	170.58	42.28	212.86	0.00	0.00	0.00	0.00	1380.0	8:27:53
B	2	90.00	11967	2563	14530	132.97	28.48	161.44	0.00	0.00	0.00	0.00	1380.0	8:27:53
B	[illegible]	90.00	9836	2950	12786	109.29	32.78	142.07	0.00	0.00	0.00	0.00	1380.0	8:27:53
[illegible]	[illegible]	90.00	8324	2841	11165	92.49	31.57	124.06	0.00	0.00	0.00	0.00	1380.0	8:27:53
A	1	90.00	28214	9541	37755	313.49	106.01	419.50	0.00	0.00	0.00	0.00	1357.5	8:27:53
A	2	90.00	20134	5668	25802	223.71	62.98	286.69	0.00	0.00	0.00	0.00	1357.5	8:27:53
A	3	90.00	19042	5264	24306	211.58	58.49	270.07	0.00	0.00	0.00	0.00	1357.5	8:27:53
A	4	90.00	15986	4247	20233	177.62	47.19	224.81	0.00	0.00	0.00	0.00	1357.5	8:27:53

[TENNELEC LB4000] [PAGE 1]

10:17:36		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	alpha curve 1	90.00	313.49	106.01	0.00	0.00	0.00	0.00
8:27:53	2	2	90.00	223.71	62.98	0.00	0.00	0.00	0.00
90.00	3	3	90.00	211.58	58.49	0.00	0.00	0.00	0.00
	4	4	90.00	177.62	47.19	0.00	0.00	0.00	0.00
GROUP B	1	5	90.00	170.58	42.28	0.00	0.00	0.00	0.00
8:27:53	2	6	90.00	132.97	28.48	0.00	0.00	0.00	0.00
90.00	3	7	90.00	109.29	32.78	0.00	0.00	0.00	0.00
	4	8	90.00	92.49	31.57	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00
[illegible]OUP D	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00

Group A channel 1 COUNT TERMINATED]]]]

7-17-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	90.00	15227	3956	19183	169.19	43.96	213.14	0.00	0.00	0.00	0.00	1380.0	10:18:15
B	2	90.00	14628	3032	17660	162.53	33.69	196.22	0.00	0.00	0.00	0.00	1380.0	10:18:15
B	3	90.00	11441	3043	14484	127.12	33.81	160.93	0.00	0.00	0.00	0.00	1380.0	10:18:15
B	4	90.00	9180	3068	12248	102.00	34.09	136.09	0.00	0.00	0.00	0.00	1380.0	10:18:15
A	1	90.00	8092	2697	10789	89.91	29.97	119.88	0.00	0.00	0.00	0.00	1357.5	10:18:15
A	2	90.00	28088	9827	37915	312.09	109.19	421.28	0.00	0.00	0.00	0.00	1357.5	10:18:15
A	3	90.00	20308	5605	25913	225.64	62.28	287.92	0.00	0.00	0.00	0.00	1357.5	10:18:15
A	4	90.00	18820	5229	24049	209.11	58.10	267.21	0.00	0.00	0.00	0.00	1357.5	10:18:15

[TENNELEC LB4000] [PAGE 1]

12:18:29		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
[illegible]	1	alpha curve 8	90.00	89.91	29.97	0.00	0.00	0.00	0.00
[illegible]15	2	1	90.00	312.09	109.19	0.00	0.00	0.00	0.00
90.00	3	2	90.00	225.64	62.28	0.00	0.00	0.00	0.00
	4	3	90.00	209.11	58.10	0.00	0.00	0.00	0.00
GROUP B	1	4	90.00	169.19	43.96	0.00	0.00	0.00	0.00

GROUP C	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00

Group A channel 2 COUNT TERMINATED ////

7-17-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	90.00	18851	4811	23662	209.46	53.46	262.91	0.00	0.00	0.00	0.00	1380.0	12:18:58
B	2	90.00	15192	3251	18443	168.80	36.12	204.92	0.00	0.00	0.00	0.00	1380.0	12:18:58
B	3	90.00	14086	3570	17656	156.51	39.67	196.18	0.00	0.00	0.00	0.00	1380.0	12:18:58
B	4	90.00	10550	3257	13807	117.22	36.19	153.41	0.00	0.00	0.00	0.00	1380.0	12:18:58
A	1	90.00	8807	2877	11684	97.86	31.97	129.82	0.00	0.00	0.00	0.00	1357.5	12:18:58
A	2	90.00	7709	2740	10449	85.66	30.44	116.10	0.00	0.00	0.00	0.00	1357.5	12:18:58
A	3	90.00	28623	9569	38192	318.03	106.32	424.36	0.00	0.00	0.00	0.00	1357.5	12:18:58
A	4	90.00	20394	5799	26193	226.60	64.43	291.03	0.00	0.00	0.00	0.00	1357.5	12:18:58

[TENNELEC LB4000] [PAGE 1]

13:49:43		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	alpha curve 7	90.00	97.86	31.97	0.00	0.00	0.00	0.00
12:18:58	2	8	90.00	85.66	30.44	0.00	0.00	0.00	0.00
90.00	3	1	90.00	318.03	106.32	0.00	0.00	0.00	0.00
	4	2	90.00	226.60	64.43	0.00	0.00	0.00	0.00
GROUP B	1	3	90.00	209.46	53.46	0.00	0.00	0.00	0.00
12:18:58	2	4	90.00	168.80	36.12	0.00	0.00	0.00	0.00
90.00	3	5	90.00	156.51	39.67	0.00	0.00	0.00	0.00
	4	6	90.00	117.22	36.19	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00

Group A channel 3 COUNT TERMINATED ////

7-17-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	90.00	20399	5454	25853	226.66	60.60	287.26	0.00	0.00	0.00	0.00	1380.0	13:51:31
B	2	90.00	18833	4089	22921	209.26	45.42	254.68	0.00	0.00	0.00	0.00	1380.0	13:51:31
B	3	90.00	15267	3791	19058	169.63	42.12	211.76	0.00	0.00	0.00	0.00	1380.0	13:51:31
B	4	90.00	13448	3778	17226	149.42	41.98	191.40	0.00	0.00	0.00	0.00	1380.0	13:51:31
A	1	90.00	10485	3139	13624	116.50	34.88	151.38	0.00	0.00	0.00	0.00	1357.5	13:51:31
A	2	90.00	9023	3076	12099	100.26	34.18	134.43	0.00	0.00	0.00	0.00	1357.5	13:51:31
A	3	90.00	8116	2711	10827	90.18	30.12	120.30	0.00	0.00	0.00	0.00	1357.5	13:51:31

15:30:31		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	alpha curve 6	90.00	116.50	34.88	0.00	0.00	0.00	0.00
13:51:31	2	7	90.00	100.26	34.18	0.00	0.00	0.00	0.00
90.00	3	8	90.00	90.18	30.12	0.00	0.00	0.00	0.00
	4	1	90.00	321.39	110.49	0.00	0.00	0.00	0.00
GROUP B	1	2	90.00	226.66	60.60	0.00	0.00	0.00	0.00
13:51:31	2	3	90.00	209.26	45.42	0.00	0.00	0.00	0.00
90.00	3	4	90.00	169.63	42.12	0.00	0.00	0.00	0.00
	4	5	90.00	149.42	41.98	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00

Group A channel 4 COUNT TERMINATED ////

7-17-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	90.00	28040	9430	37470	311.56	104.78	416.33	0.00	0.00	0.00	0.00	1380.0	15:31:27
B	2	90.00	20261	4370	24631	225.12	48.56	273.68	0.00	0.00	0.00	0.00	1380.0	15:31:27
B	3	90.00	18713	4846	23559	207.92	53.84	261.77	0.00	0.00	0.00	0.00	1380.0	15:31:27
B	4	90.00	13643	4101	17744	151.59	45.57	197.16	0.00	0.00	0.00	0.00	1380.0	15:31:27
A	1	90.00	13201	3657	16858	146.68	40.63	187.31	0.00	0.00	0.00	0.00	1357.5	15:31:27
A	2	90.00	10568	3099	13667	117.42	34.43	151.86	0.00	0.00	0.00	0.00	1357.5	15:31:27
A	3	90.00	9133	2994	12127	101.48	33.27	134.74	0.00	0.00	0.00	0.00	1357.5	15:31:27
A	4	90.00	8240	2783	11023	91.56	30.92	122.48	0.00	0.00	0.00	0.00	1357.5	15:31:27

[TENNELEC LB4000] [PAGE 1]

17:02:12		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	alpha curve 5	90.00	146.68	40.63	0.00	0.00	0.00	0.00
15:31:27	2	6	90.00	117.42	34.43	0.00	0.00	0.00	0.00
90.00	3	7	90.00	101.48	33.27	0.00	0.00	0.00	0.00
	4	8	90.00	91.56	30.92	0.00	0.00	0.00	0.00
GROUP B	1	1	90.00	311.56	104.78	0.00	0.00	0.00	0.00
15:31:27	2	2	90.00	225.12	48.56	0.00	0.00	0.00	0.00
90.00	3	3	90.00	207.92	53.84	0.00	0.00	0.00	0.00
	4	4	90.00	151.59	45.57	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00

B	1	90.00	8051	2641	10692	89.46	29.34	118.80	0.00	0.00	0.00	0.00	1380.0	17:03:17
B	2	90.00	28052	7497	35549	311.69	83.30	394.99	0.00	0.00	0.00	0.00	1380.0	17:03:17
B	3	90.00	19939	5387	25326	221.54	59.86	281.40	0.00	0.00	0.00	0.00	1380.0	17:03:17
B	4	90.00	16925	4947	21872	188.06	54.97	243.02	0.00	0.00	0.00	0.00	1380.0	17:03:17
A	1	90.00	14216	3862	18078	157.96	42.91	200.87	0.00	0.00	0.00	0.00	1357.5	17:03:17
	2	90.00	13319	3597	16916	147.99	39.97	187.96	0.00	0.00	0.00	0.00	1357.5	17:03:17
	3	90.00	10372	2959	13331	115.24	32.88	148.12	0.00	0.00	0.00	0.00	1357.5	17:03:17
A	4	90.00	9373	3042	12415	104.14	33.80	137.94	0.00	0.00	0.00	0.00	1357.5	17:03:17

[TENNELEC LB4000] [PAGE 1]

7:46:25		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	alpha curve 4	90.00	157.96	42.91	0.00	0.00	0.00	0.00
17:03:17	2	5	90.00	147.99	39.97	0.00	0.00	0.00	0.00
90.00	3	6	90.00	115.24	32.88	0.00	0.00	0.00	0.00
	4	7	90.00	104.14	33.80	0.00	0.00	0.00	0.00
GROUP B	1	8	90.00	89.46	29.34	0.00	0.00	0.00	0.00
17:03:17	2	1	90.00	311.69	83.30	0.00	0.00	0.00	0.00
90.00	3	2	90.00	221.54	59.86	0.00	0.00	0.00	0.00
	4	3	90.00	188.06	54.97	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00

Group A channel 2 COUNT TERMINATED ////

7-18-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	90.00	9179	2941	12120	101.99	32.68	134.67	0.00	0.00	0.00	0.00	1380.0	7:47:53
B	2	90.00	8113	2233	10346	90.14	24.81	114.96	0.00	0.00	0.00	0.00	1380.0	7:47:53
B	3	90.00	28518	9145	37663	316.87	101.61	418.48	0.00	0.00	0.00	0.00	1380.0	7:47:53
B	4	90.00	18984	5449	24433	210.93	60.54	271.48	0.00	0.00	0.00	0.00	1380.0	7:47:53
A	1	90.00	17707	5036	22743	196.74	55.96	252.70	0.00	0.00	0.00	0.00	1357.5	7:47:53
A	2	90.00	14313	3896	18209	159.03	43.29	202.32	0.00	0.00	0.00	0.00	1357.5	7:47:53
A	3	90.00	13936	3638	17574	154.84	40.42	195.27	0.00	0.00	0.00	0.00	1357.5	7:47:53
A	4	90.00	10942	3240	14182	121.58	36.00	157.58	0.00	0.00	0.00	0.00	1357.5	7:47:53

[TENNELEC LB4000] [PAGE 1]

9:28:39		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	alpha curve 3	90.00	196.74	55.96	0.00	0.00	0.00	0.00
7:47:53	2	4	90.00	159.03	43.29	0.00	0.00	0.00	0.00
90.00	3	5	90.00	154.84	40.42	0.00	0.00	0.00	0.00
	4	6	90.00	121.58	36.00	0.00	0.00	0.00	0.00
GROUP B	1	7	90.00	101.99	32.68	0.00	0.00	0.00	0.00
7:47:53	2	8	90.00	90.14	24.81	0.00	0.00	0.00	0.00
90.00	3	1	90.00	316.87	101.61	0.00	0.00	0.00	0.00
	4	2	90.00	210.93	60.54	0.00	0.00	0.00	0.00

	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00

Group A channel 3 COUNT TERMINATED ////

7-18-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	90.00	10810	2905	13715	120.11	32.28	152.39	0.00	0.00	0.00	0.00	1380.0	9:29:16
B	2	90.00	9134	2433	11567	101.49	27.03	128.52	0.00	0.00	0.00	0.00	1380.0	9:29:16
B	3	90.00	8195	2588	10783	91.06	28.76	119.81	0.00	0.00	0.00	0.00	1380.0	9:29:16
B	4	90.00	27360	9022	36382	304.00	100.24	404.24	0.00	0.00	0.00	0.00	1380.0	9:29:16
A	1	90.00	19299	5506	24805	214.43	61.18	275.61	0.00	0.00	0.00	0.00	1357.5	9:29:16
A	2	90.00	18283	5030	23313	203.14	55.89	259.03	0.00	0.00	0.00	0.00	1357.5	9:29:16
A	3	90.00	14693	3876	18569	163.26	43.07	206.32	0.00	0.00	0.00	0.00	1357.5	9:29:16
A	4	90.00	14209	3714	17923	157.88	41.27	199.14	0.00	0.00	0.00	0.00	1357.5	9:29:16

[TENNELEC LB4000] [PAGE 1]

11:01:14		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	alpha curve 2	90.00	214.43	61.18	0.00	0.00	0.00	0.00
9:29:16	2	3	90.00	203.14	55.89	0.00	0.00	0.00	0.00
90.00	3	4	90.00	163.26	43.07	0.00	0.00	0.00	0.00
	4	5	90.00	157.88	41.27	0.00	0.00	0.00	0.00
B	1	6	90.00	120.11	32.28	0.00	0.00	0.00	0.00
9:29:16	2	7	90.00	101.49	27.03	0.00	0.00	0.00	0.00
90.00	3	8	90.00	91.06	28.76	0.00	0.00	0.00	0.00
	4	1	90.00	304.00	100.24	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00

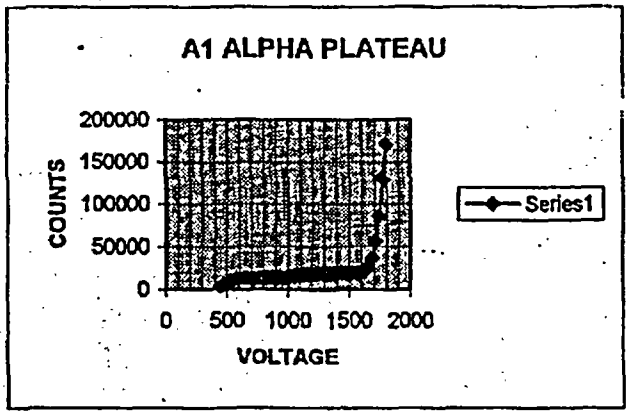
Group A channel 1 COUNT TERMINATED ////

DETECTOR A1 ALPHA PLATEAU

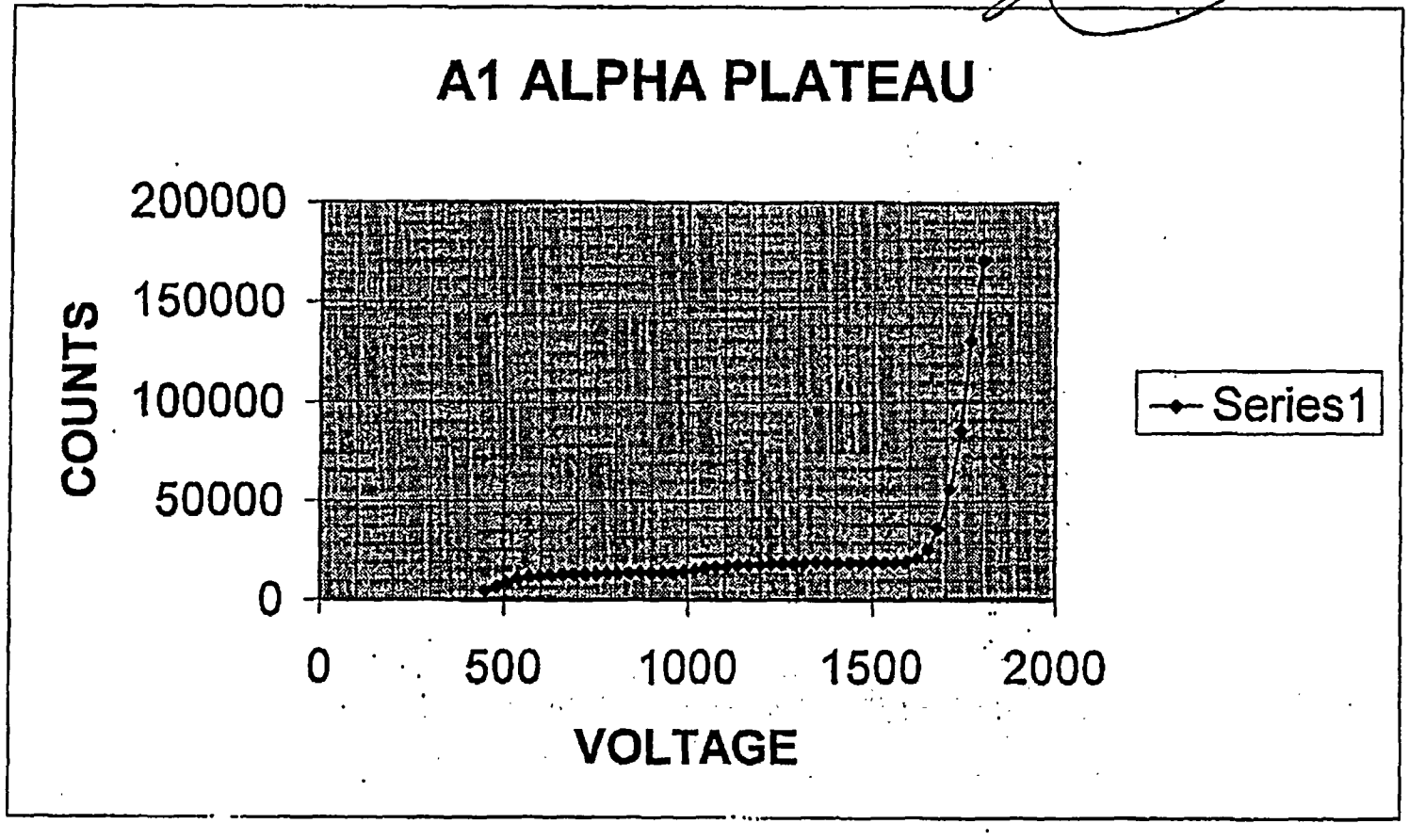
ALPHA	VOLTAGE	BETA	SUM
0	450	4582	4582
0	480	6516	6516
0	510	9168	9168
0	540	10795	10795
0	570	11885	11885
0	600	12100	12100
0	630	12822	12822
0	660	12876	12876
0	690	13035	13035
0	720	13233	13233
0	750	13223	13223
0	780	13710	13710
0	810	13636	13636
0	840	13650	13650
0	870	13825	13825
0	900	13924	13924
0	930	13942	13942
42	960	13804	13846
365	990	14035	14400
1009	1020	14143	15152
2310	1050	13715	16025
4603	1080	12016	16619
7910	1110	9399	17309
11089	1140	6373	17462
12461	1170	5526	17987
12647	1200	5575	18222
12842	1230	5543	18385
13160	1260	5415	18575
13341	1290	5428	18769
13324	1320	5418	18742
13658	1350	5276	18934
13759	1380	5407	19166
13645	1410	5251	18896
13966	1440	5151	19117
14349	1470	4619	18968
15648	1500	3668	19316
16382	1530	2789	19171
16867	1560	2315	19182
17344	1590	2120	19464
17892	1620	3295	21187
18030	1650	7561	25591
18643	1680	17801	36444
18757	1710	37198	55955
18951	1740	66851	85802
22670	1770	107997	130667
60771	1800	110110	170881

SOURCE #	92AM4702122
ISOTOPE	AM-241
DPM	23100
REF. DATE	5/26/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 540



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05
SIGNATURE James Whelan

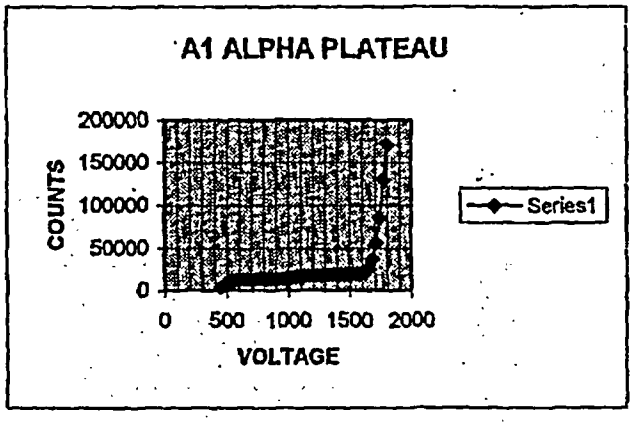


DETECTOR A1 ALPHA PLATEAU

ALPHA	VOLTAGE	BETA	SUM
0	450	4582	4582
0	480	6516	6516
0	510	9168	9168
0	540	10795	10795
0	570	11885	11885
0	600	12100	12100
0	630	12822	12822
0	660	12876	12876
0	690	13035	13035
0	720	13233	13233
0	750	13223	13223
0	780	13710	13710
0	810	13636	13636
0	840	13650	13650
0	870	13825	13825
0	900	13924	13924
0	930	13942	13942
42	960	13804	13846
365	990	14035	14400
1009	1020	14143	15152
2310	1050	13715	16025
4603	1080	12016	16619
7910	1110	9399	17309
11089	1140	6373	17462
12461	1170	5526	17987
12647	1200	5575	18222
12842	1230	5543	18385
13160	1260	5415	18575
13341	1290	5428	18769
13324	1320	5418	18742
13658	1350	5276	18934
13759	1380	5407	19166
13645	1410	5251	18896
13966	1440	5151	19117
14349	1470	4619	18968
15648	1500	3668	19316
16382	1530	2789	19171
16867	1560	2315	19182
17344	1590	2120	19464
17892	1620	3295	21187
18030	1650	7561	25591
18643	1680	17801	36444
18757	1710	37198	55955
18951	1740	66851	85802
22670	1770	107997	130667
60771	1800	110110	170881

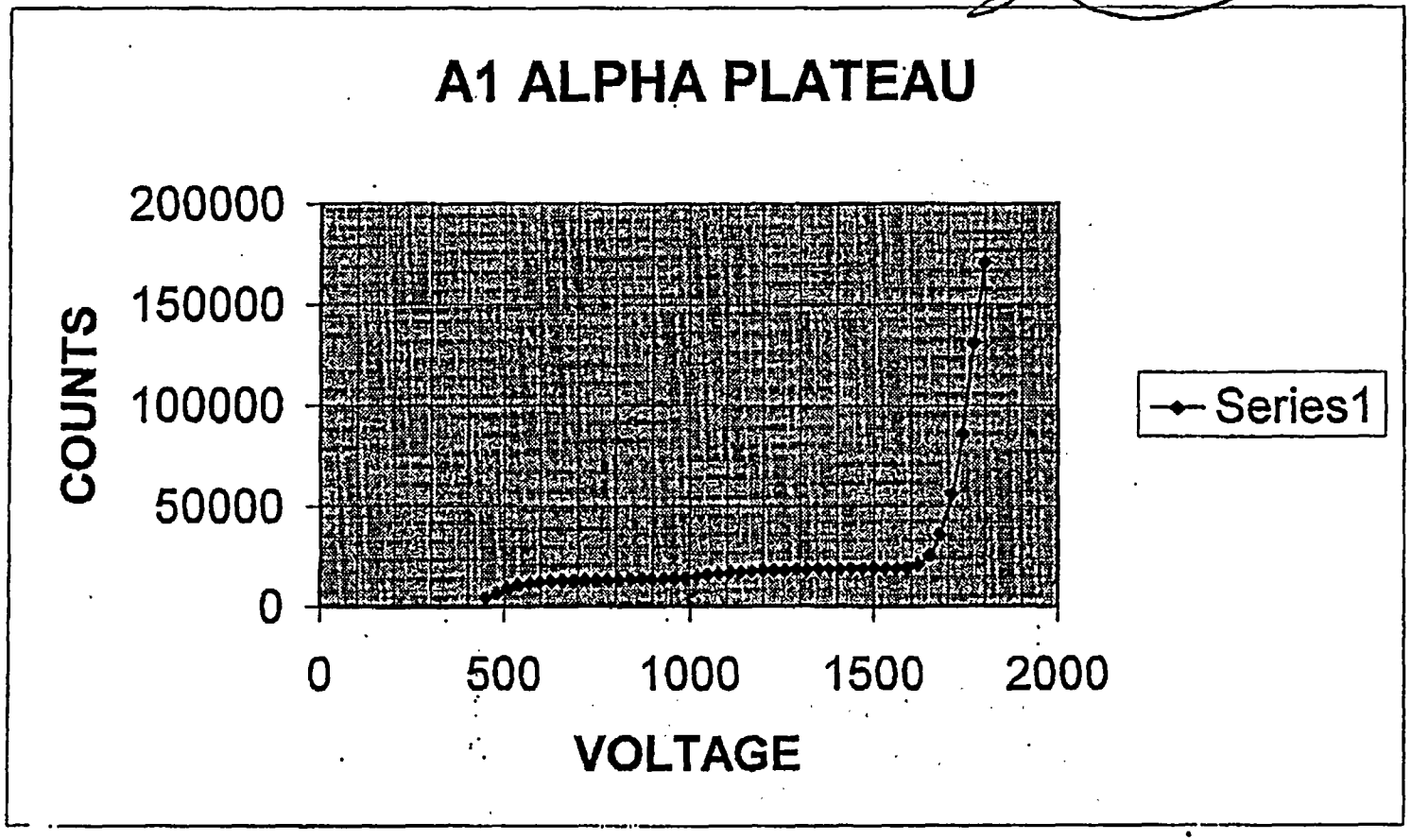
SOURCE #	92AM4702122
ISOTOPE	AM-241
DPM	23100
REF. DATE	5/26/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 540



STL Denver

DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05
SIGNATURE:

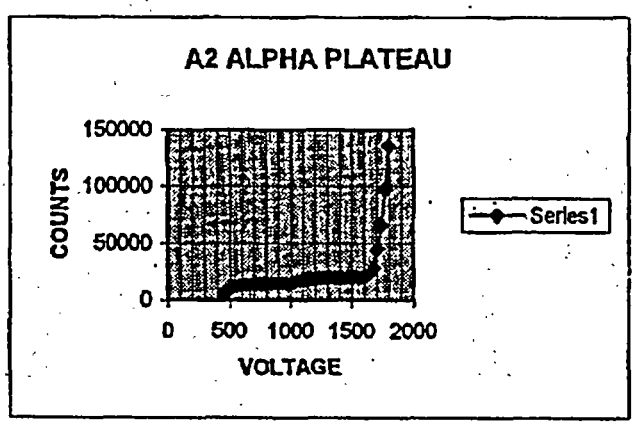


DETECTOR A2 ALPHA PLATEAU

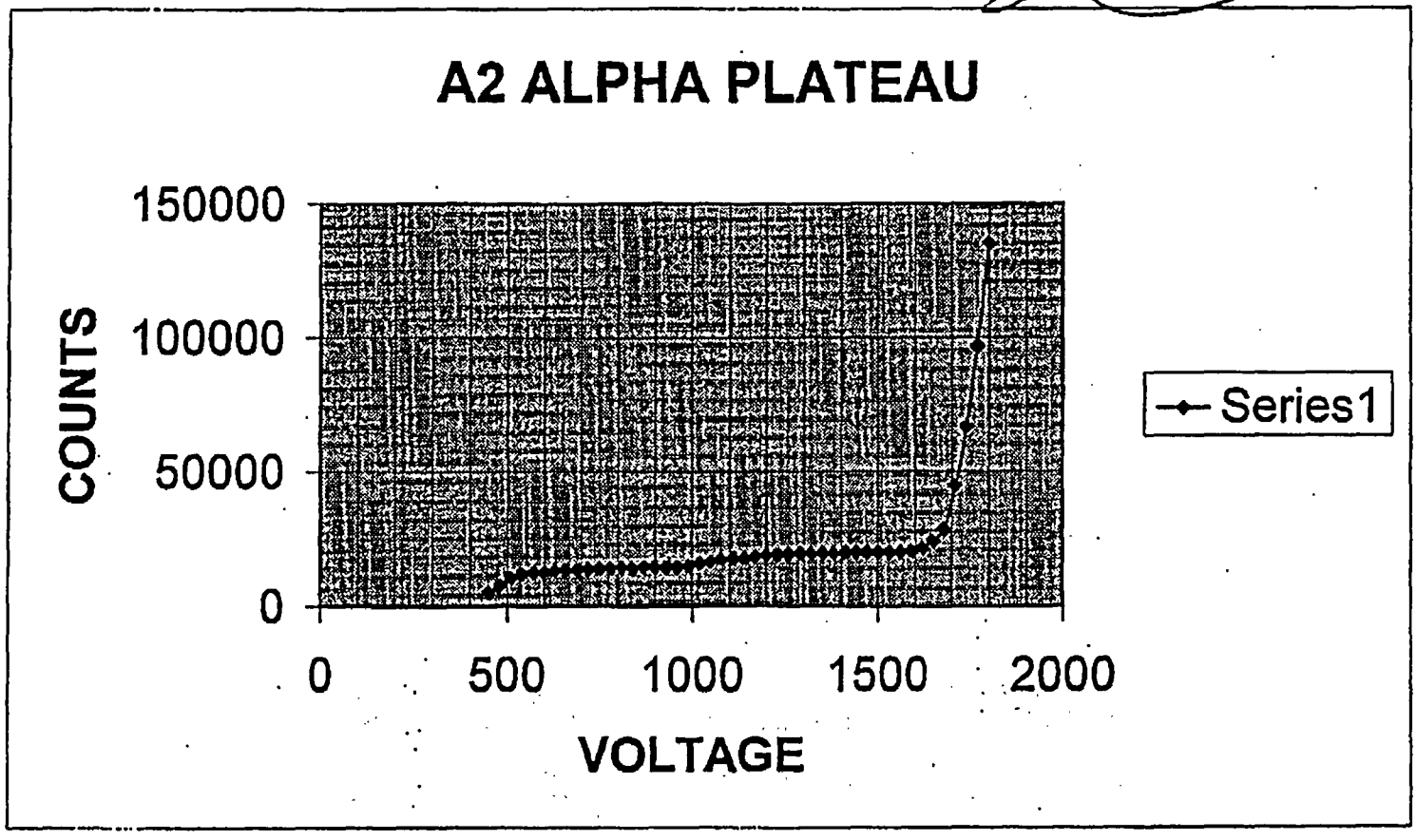
ALPHA	VOLTAGE	BETA	SUM
0	450	5539	5539
0	480	7800	7800
0	510	10687	10687
0	540	12021	12021
0	570	12736	12736
0	600	12991	12991
0	630	13480	13480
0	660	13539	13539
0	690	13685	13685
0	720	14028	14028
0	750	14063	14063
0	780	14193	14193
0	810	14522	14522
0	840	14158	14158
0	870	14717	14717
0	900	14489	14489
1	930	14568	14569
58	960	14703	14761
420	990	14628	15048
1259	1020	14790	16049
2565	1050	14213	16778
5076	1080	12703	17779
8471	1110	9491	17962
11659	1140	6575	18234
12698	1170	5982	18680
13229	1200	5792	19021
13664	1230	5699	19363
13658	1260	5764	19422
14080	1290	5666	19746
13893	1320	5738	19631
14256	1350	5715	19971
14341	1380	5665	20006
14616	1410	5533	20149
14609	1440	5508	20117
15187	1470	5005	20192
16205	1500	4113	20318
17024	1530	3188	20212
17729	1560	2439	20168
18302	1590	2186	20488
18895	1620	2845	21740
18854	1650	5375	24229
16554	1680	12270	28824
19450	1710	25190	44640
19882	1740	46794	66676
22822	1770	74207	97029
50500	1800	85051	135551

SOURCE #	92AM4702123
ISOTOPE	AM-241
DPM	23900
REF. DATE	5/26/92
4 PI GEOMETRY	YES

OPTIMUMVOLTAGE 540



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05
SIGNATURE:

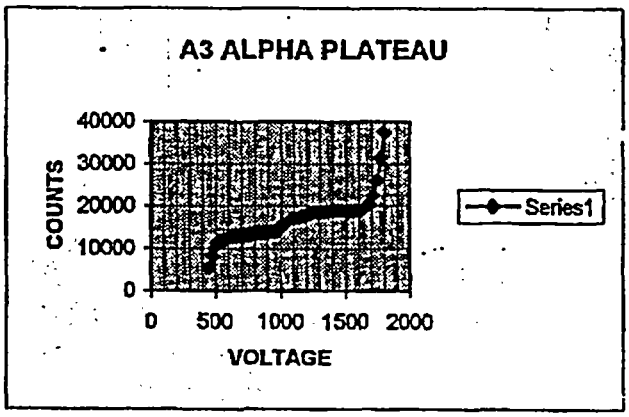


DETECTOR A3 ALPHA PLATEAU

ALPHA	VOLTAGE	BETA	SUM
0	450	5379	5379
0	480	8191	8191
0	510	10771	10771
0	540	11798	11798
0	570	12013	12013
0	600	12426	12426
0	630	12674	12674
0	660	12820	12820
0	690	13025	13025
0	720	13153	13153
0	750	13288	13288
0	780	13160	13160
0	810	13497	13497
0	840	13624	13624
0	870	13565	13565
0	900	13762	13762
0	930	13805	13805
207	960	13802	14009
728	990	13891	14619
1761	1020	13508	15269
3507	1050	12582	16089
6415	1080	10487	16902
9853	1110	7268	17121
11737	1140	5609	17346
12441	1170	5328	17769
12738	1200	5172	17910
12894	1230	5193	18087
12996	1260	5434	18430
13280	1290	5215	18495
13547	1320	5108	18655
13541	1350	5032	18573
13583	1380	5134	18717
13852	1410	5035	18887
14050	1440	4824	18874
14820	1470	4121	18941
15618	1500	3337	18955
16292	1530	2566	18858
16903	1560	1949	18852
17388	1590	1671	19059
17598	1620	1365	18963
18143	1650	1629	19772
18180	1680	2290	20470
18515	1710	3926	22441
18844	1740	7180	26024
20570	1770	10784	31354
24641	1800	12716	37357

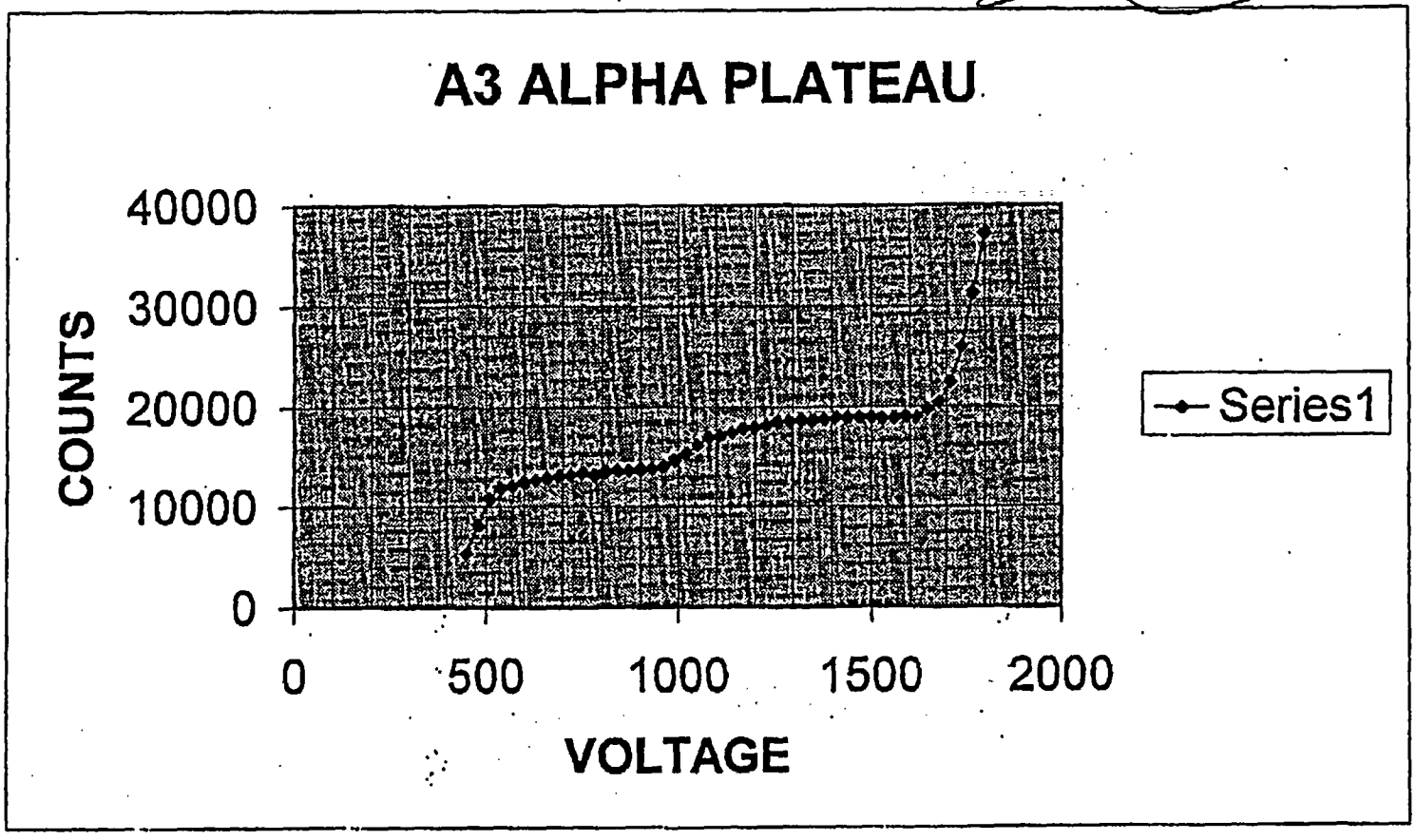
SOURCE #	92AM4702122
ISOTOPE	AM-241
DPM	23100
REF. DATE	5/26/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 540



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# ~~12439-1~~
GOOD UNTIL: 7/5/05

SIGNATURE:

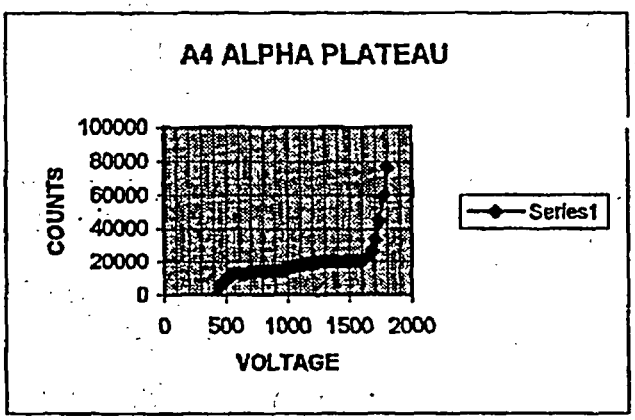


DETECTOR A4 ALPHA PLATEAU

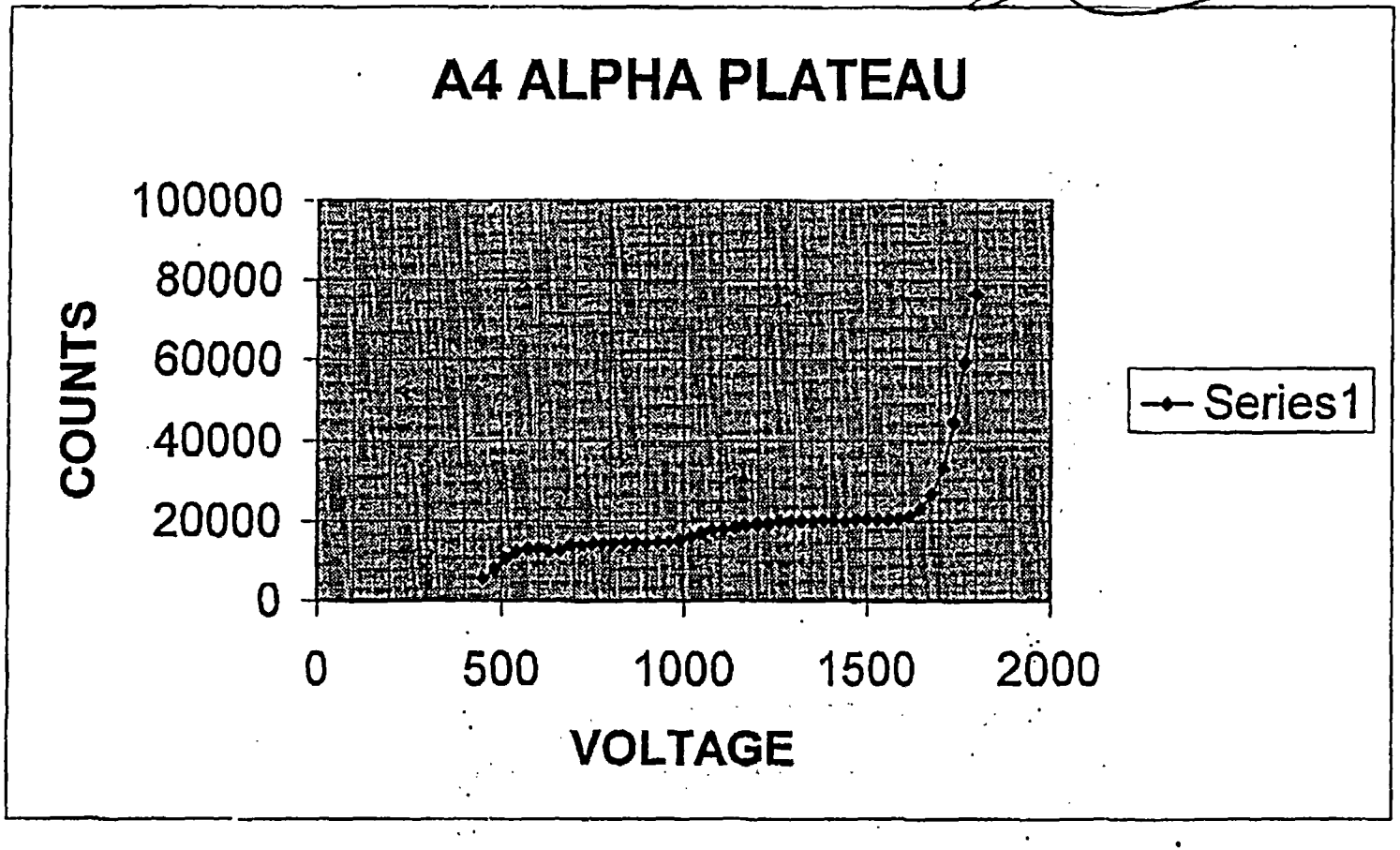
ALPHA	VOLTAGE	BETA	SUM
0	450	5724	5724
0	480	7973	7973
0	510	10710	10710
0	540	12449	12449
0	570	12994	12994
0	600	13260	13260
0	630	12588	12588
0	660	12659	12659
0	690	14035	14035
0	720	14021	14021
0	750	14297	14297
0	780	14468	14468
0	810	14566	14566
0	840	14806	14806
0	870	14661	14661
0	900	14582	14582
1	930	14859	14860
100	960	14658	14758
511	990	14789	15300
1433	1020	14820	16253
3068	1050	14128	17196
5879	1080	12055	17934
9576	1110	8621	18197
12158	1140	6337	18495
13022	1170	6021	19043
13322	1200	5834	19156
13647	1230	5776	19423
13938	1260	6011	19949
14194	1290	5827	20021
14187	1320	5879	20066
14389	1350	5799	20188
14673	1380	5711	20384
14620	1410	5628	20248
14899	1440	5277	20176
15723	1470	4677	20400
16876	1500	3476	20352
17613	1530	2849	20462
18130	1560	2239	20369
18669	1590	1928	20597
19191	1620	2071	21262
19543	1650	3560	23103
19883	1680	6917	26800
19730	1710	13563	33293
19875	1740	24741	44616
21763	1770	37649	59412
37594	1800	38951	76545

SOURCE #	92AM4702123
ISOTOPE	AM-241
DPM	23900
REF. DATE	5/26/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 540



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05
SIGNATURE:

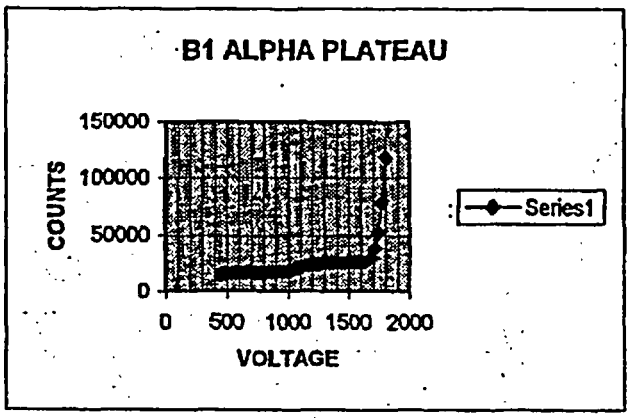


DETECTOR B1 ALPHA PLATEAU

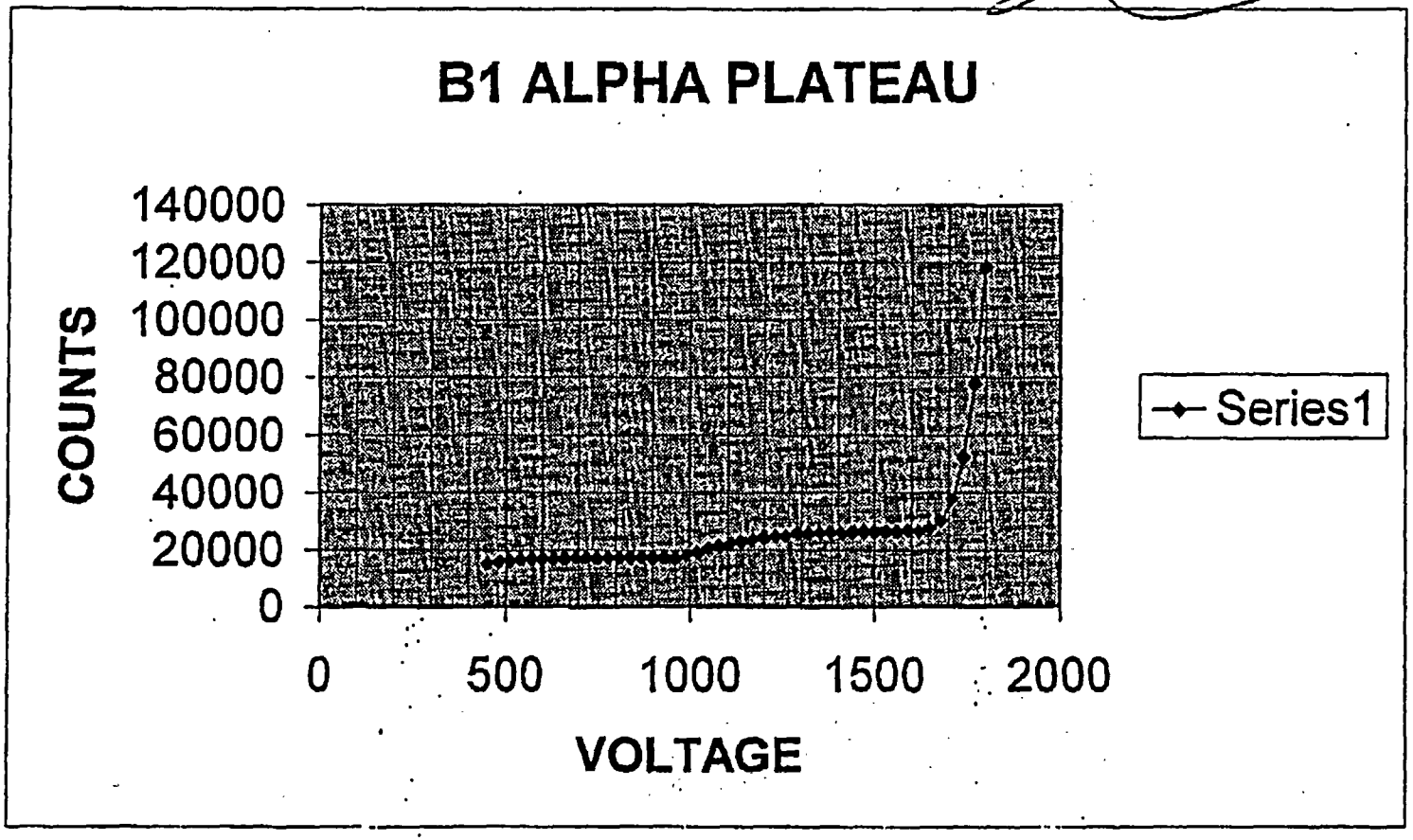
ALPHA	VOLTAGE	BETA	SUM
n/a	450	n/a	15226
n/a	480	n/a	15829
n/a	510	n/a	16311
n/a	540	n/a	16662
n/a	570	n/a	16946
n/a	600	n/a	17111
n/a	630	n/a	16986
n/a	660	n/a	17038
n/a	690	n/a	17348
n/a	720	n/a	17088
n/a	750	n/a	17073
n/a	780	n/a	17327
n/a	810	n/a	17315
n/a	840	n/a	17414
n/a	870	n/a	17489
n/a	900	n/a	17345
n/a	930	n/a	17657
n/a	960	n/a	17356
n/a	990	n/a	18115
n/a	1020	n/a	19025
n/a	1050	n/a	20679
n/a	1080	n/a	21482
n/a	1110	n/a	22358
n/a	1140	n/a	23090
n/a	1170	n/a	23600
n/a	1200	n/a	24319
n/a	1230	n/a	24953
n/a	1260	n/a	24951
n/a	1290	n/a	25888
n/a	1320	n/a	25854
n/a	1350	n/a	26053
n/a	1380	n/a	26182
n/a	1410	n/a	26008
n/a	1440	n/a	26342
n/a	1470	n/a	26396
n/a	1500	n/a	26433
n/a	1530	n/a	26580
n/a	1560	n/a	26475
n/a	1590	n/a	26843
n/a	1620	n/a	26776
n/a	1650	n/a	27771
n/a	1680	n/a	30421
n/a	1710	n/a	37916
n/a	1740	n/a	52379
n/a	1770	n/a	78224
n/a	1800	n/a	118473

SOURCE #	92AM4702122
ISOTOPE	AM-241
DPM	23100
REF. DATE	5/26/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 510



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/8/05
SIGNATURE:

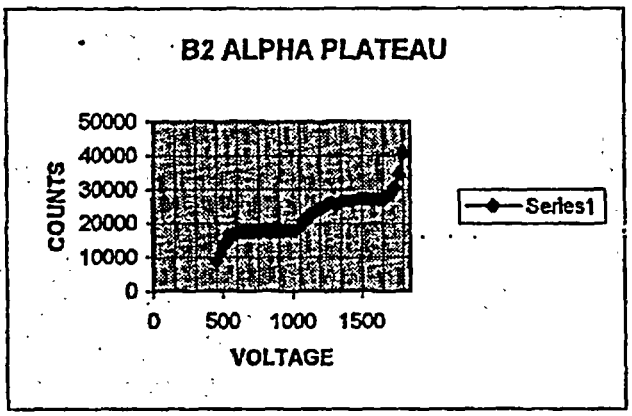


DETECTOR B2 ALPHA PLATEAU

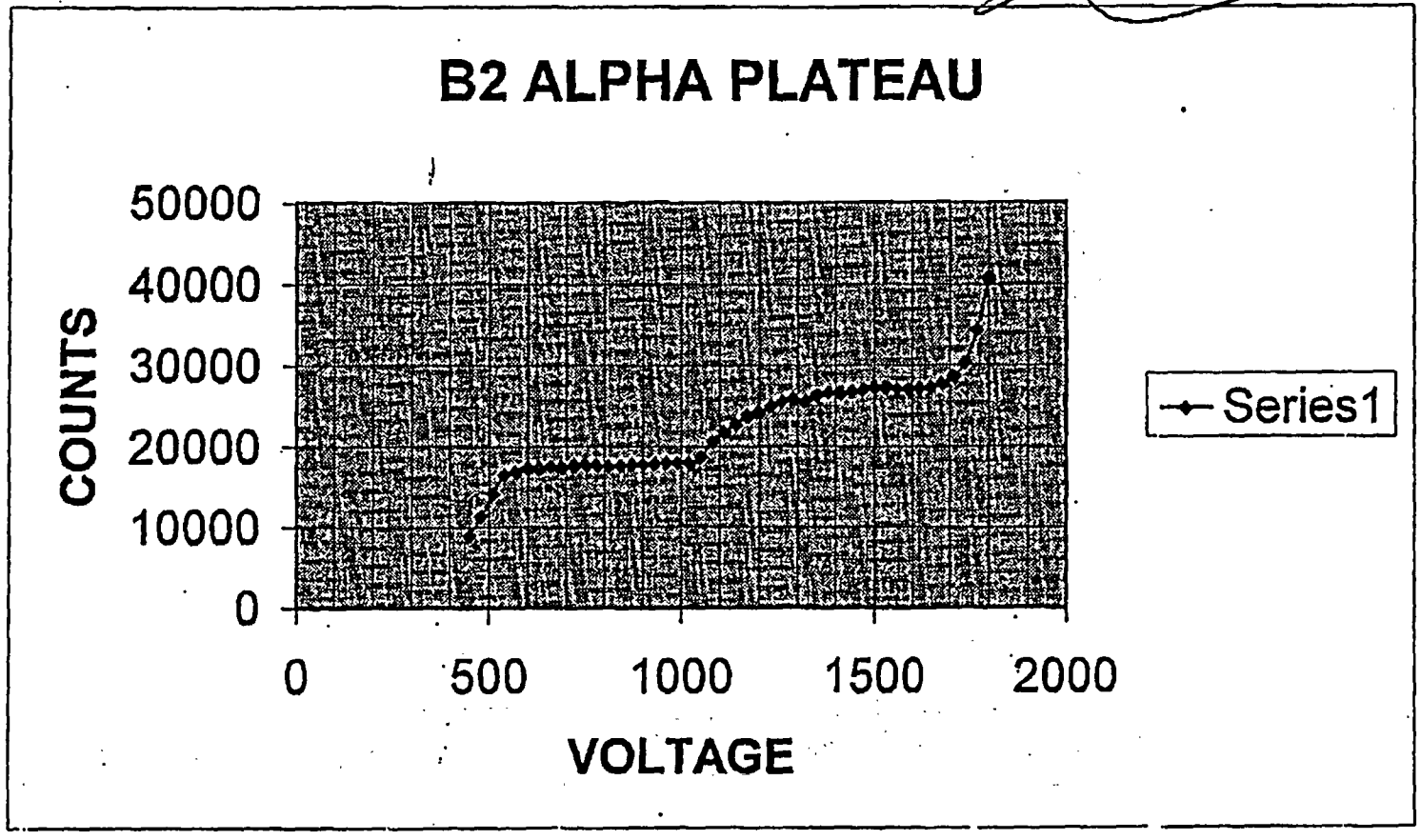
ALPHA	VOLTAGE	BETA	SUM
n/a	450	n/a	8925
n/a	480	n/a	11263
n/a	510	n/a	14139
n/a	540	n/a	16522
n/a	570	n/a	16860
n/a	600	n/a	17340
n/a	630	n/a	17341
n/a	660	n/a	17540
n/a	690	n/a	17418
n/a	720	n/a	17637
n/a	750	n/a	17813
n/a	780	n/a	17721
n/a	810	n/a	17534
n/a	840	n/a	17610
n/a	870	n/a	17694
n/a	900	n/a	17764
n/a	930	n/a	17829
n/a	960	n/a	18024
n/a	990	n/a	17993
n/a	1020	n/a	17921
n/a	1050	n/a	18682
n/a	1080	n/a	20611
n/a	1110	n/a	21777
n/a	1140	n/a	22690
n/a	1170	n/a	23722
n/a	1200	n/a	24180
n/a	1230	n/a	24988
n/a	1260	n/a	25542
n/a	1290	n/a	25856
n/a	1320	n/a	25622
n/a	1350	n/a	26347
n/a	1380	n/a	26680
n/a	1410	n/a	26605
n/a	1440	n/a	26809
n/a	1470	n/a	27032
n/a	1500	n/a	27300
n/a	1530	n/a	27298
n/a	1560	n/a	27101
n/a	1590	n/a	27054
n/a	1620	n/a	27122
n/a	1650	n/a	27344
n/a	1680	n/a	27743
n/a	1710	n/a	28635
n/a	1740	n/a	30434
n/a	1770	n/a	34439
n/a	1800	n/a	40713

SOURCE #	92AM4702123
ISOTOPE	AM-241
DPM	23900
REF. DATE	5/26/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 510



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05
SIGNATURE:

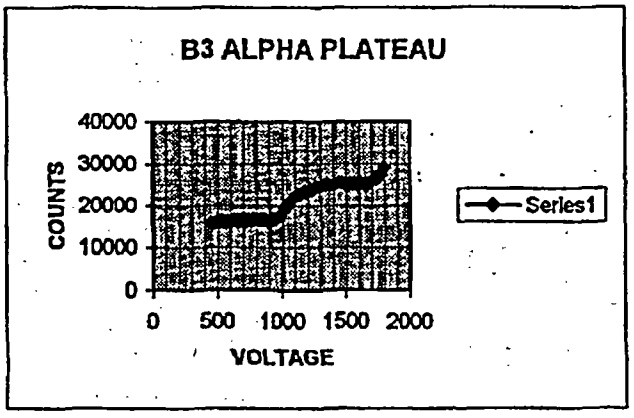


DETECTOR B3 ALPHA PLATEAU

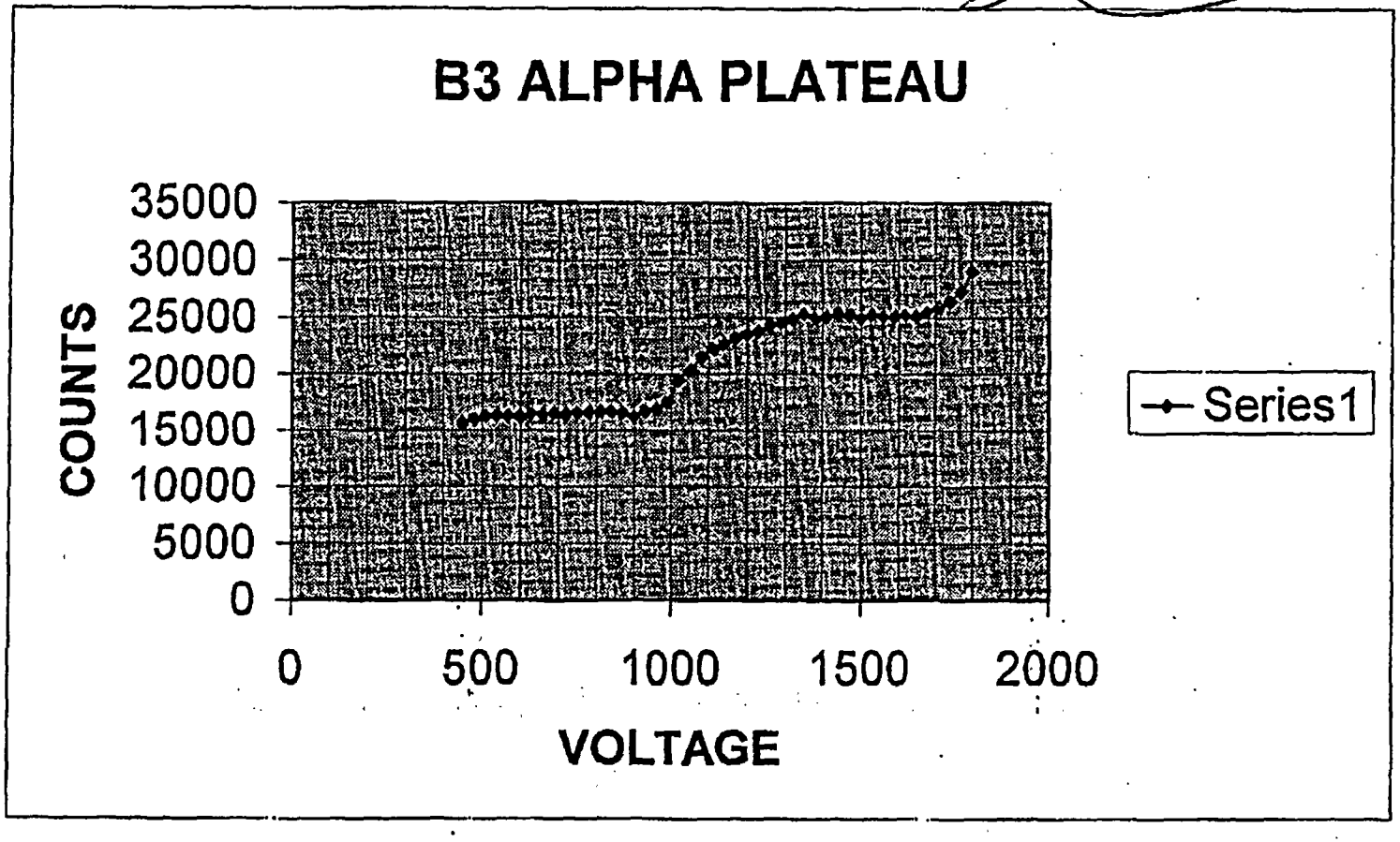
ALPHA	VOLTAGE	BETA	SUM
0	450	15724	15724
0	480	15968	15968
0	510	16286	16286
0	540	16362	16362
0	570	16286	16286
0	600	16233	16233
0	630	16448	16448
0	660	16400	16400
0	690	16571	16571
0	720	16473	16473
0	750	16576	16576
0	780	16620	16620
0	810	16660	16660
0	840	16684	16684
0	870	16595	16595
2	900	16279	16281
75	930	16647	16722
849	960	16072	16921
2353	990	15190	17543
4734	1020	14705	19439
7956	1050	12380	20336
11929	1080	9555	21484
15171	1110	7072	22243
15905	1140	6823	22728
16008	1170	7199	23207
16074	1200	7477	23551
16300	1230	7518	23818
16321	1260	8039	24360
16484	1290	8075	24559
16550	1320	8357	24907
16717	1350	8614	25331
16551	1380	8407	24958
16420	1410	8704	25124
16618	1440	8711	25329
17003	1470	8281	25284
17313	1500	7682	24995
18753	1530	6518	25271
20014	1560	5109	25123
20977	1590	4106	25083
22010	1620	3219	25229
22519	1650	2554	25073
23503	1680	2026	25529
23980	1710	1860	25840
24276	1740	2160	26436
24555	1770	2834	27389
24659	1800	4431	29090

SOURCE #	92AM4702122
ISOTOPE	AM-241
DPM	23100
REF. DATE	5/26/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 510



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05
SIGNATURE:

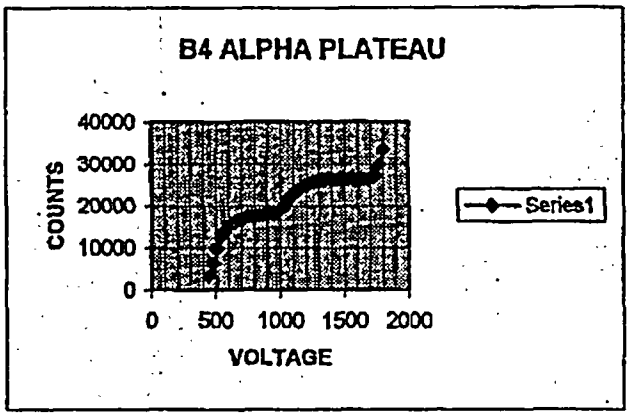


DETECTOR B4 ALPHA PLATEAU

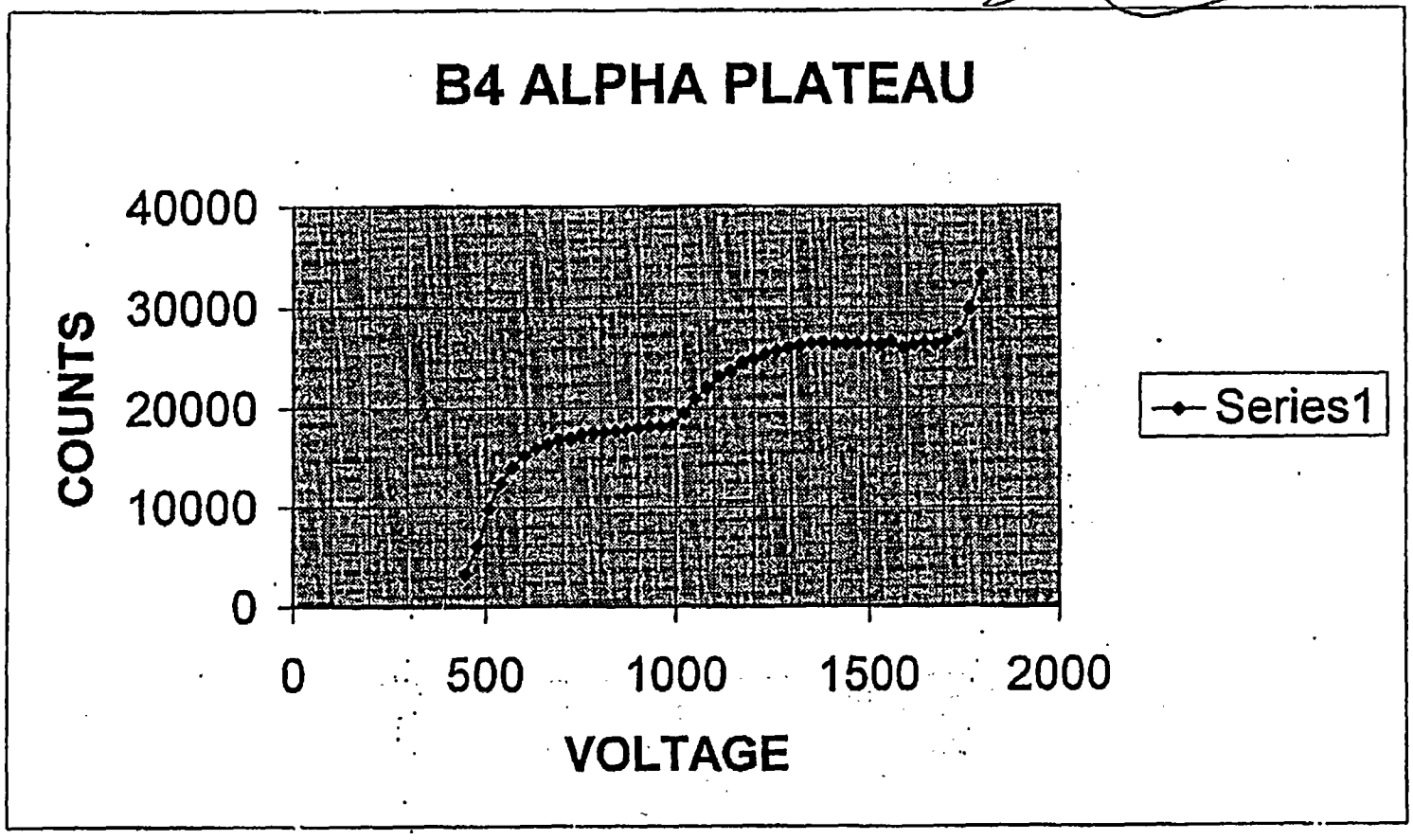
ALPHA	VOLTAGE	BETA	SUM
0	450	3293	3293
0	480	6138	6138
0	510	9826	9826
0	540	12380	12380
0	570	14012	14012
0	600	15204	15204
0	630	15920	15920
0	660	16356	16356
0	690	16818	16818
0	720	16971	16971
0	750	17366	17366
0	780	17483	17483
0	810	17628	17628
0	840	17671	17671
0	870	17871	17871
0	900	17990	17990
0	930	18157	18157
86	960	18074	18160
700	990	17715	18415
2200	1020	17288	19488
4720	1050	16237	20957
8187	1080	13867	22054
12152	1110	10962	23114
15638	1140	8002	23640
16767	1170	7767	24534
17196	1200	7710	24906
17281	1230	8114	25395
17563	1260	8162	25725
17711	1290	8246	25957
17756	1320	8503	26259
17634	1350	8783	26417
17842	1380	8675	26517
17667	1410	8753	26420
17635	1440	8753	26388
17800	1470	8649	26449
18225	1500	8180	26405
18893	1530	7400	26293
20744	1560	5919	26663
21422	1590	4624	26046
22469	1620	3770	26239
23411	1650	3142	26553
23664	1680	2665	26329
24098	1710	2676	26774
23986	1740	3463	27449
24236	1770	5666	29902
23882	1800	9533	33415

SOURCE #	92AM4702123
ISOTOPE	AM-241
DPM	23900
REF. DATE	5/26/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 510



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05
SIGNATURE:

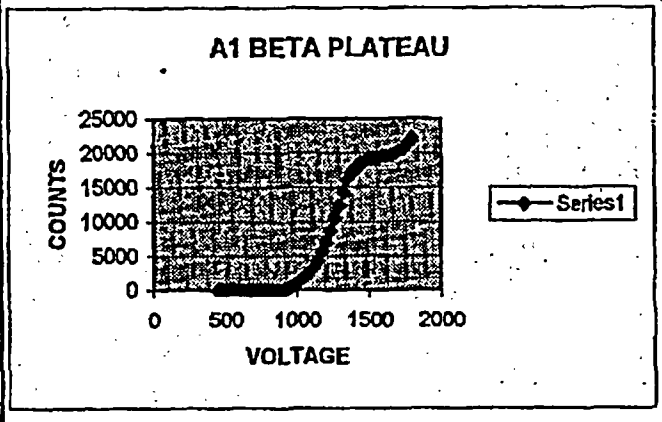


DETECTOR A1 BETA PLATEAU

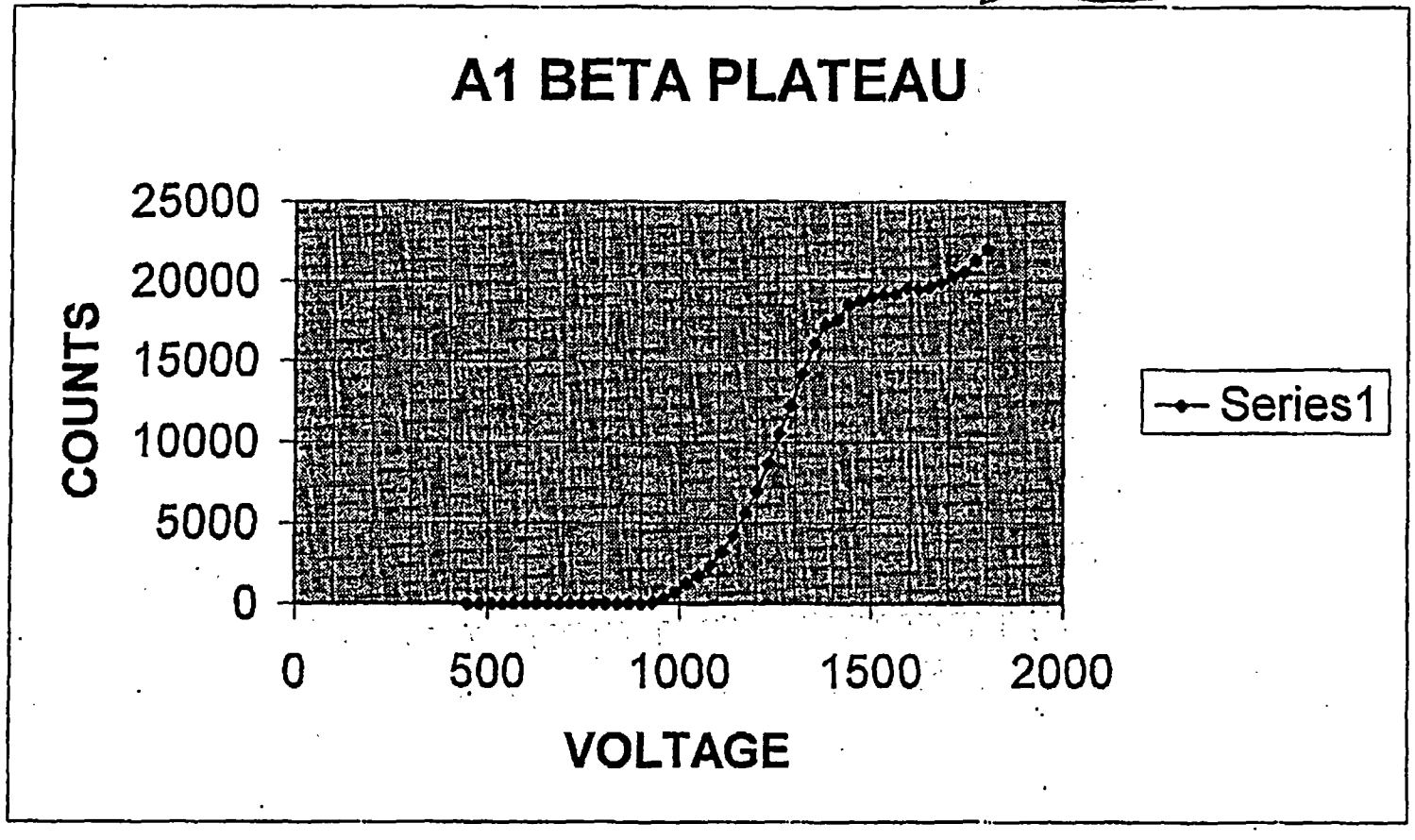
ALPHA	VOLTAGE	BETA	SUM
n/a	450	n/a	0
n/a	480	n/a	0
n/a	510	n/a	0
n/a	540	n/a	0
n/a	570	n/a	0
n/a	600	n/a	0
n/a	630	n/a	0
n/a	660	n/a	0
n/a	690	n/a	0
n/a	720	n/a	0
n/a	750	n/a	1
n/a	780	n/a	0
n/a	810	n/a	0
n/a	840	n/a	0
n/a	870	n/a	5
n/a	900	n/a	23
n/a	930	n/a	97
n/a	960	n/a	362
n/a	990	n/a	721
n/a	1020	n/a	1265
n/a	1050	n/a	1780
n/a	1080	n/a	2421
n/a	1110	n/a	3253
n/a	1140	n/a	4265
n/a	1170	n/a	5632
n/a	1200	n/a	6986
n/a	1230	n/a	8697
n/a	1260	n/a	10540
n/a	1290	n/a	12250
n/a	1320	n/a	14203
n/a	1350	n/a	16128
n/a	1380	n/a	17307
n/a	1410	n/a	17650
n/a	1440	n/a	18575
n/a	1470	n/a	18800
n/a	1500	n/a	19107
n/a	1530	n/a	19216
n/a	1560	n/a	19249
n/a	1590	n/a	19613
n/a	1620	n/a	19563
n/a	1650	n/a	19662
n/a	1680	n/a	19924
n/a	1710	n/a	20322
n/a	1740	n/a	20608
n/a	1770	n/a	21326
n/a	1800	n/a	22046

SOURCE #	92SR4702140
ISOTOPE	SR-90/Y-90
DPM	26500
REF. DATE	6/3/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 1372.5



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05
SIGNATURE:

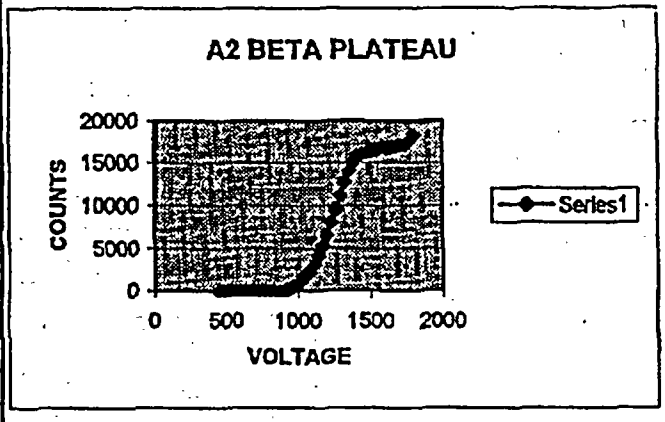


DETECTOR A2 BETA PLATEAU

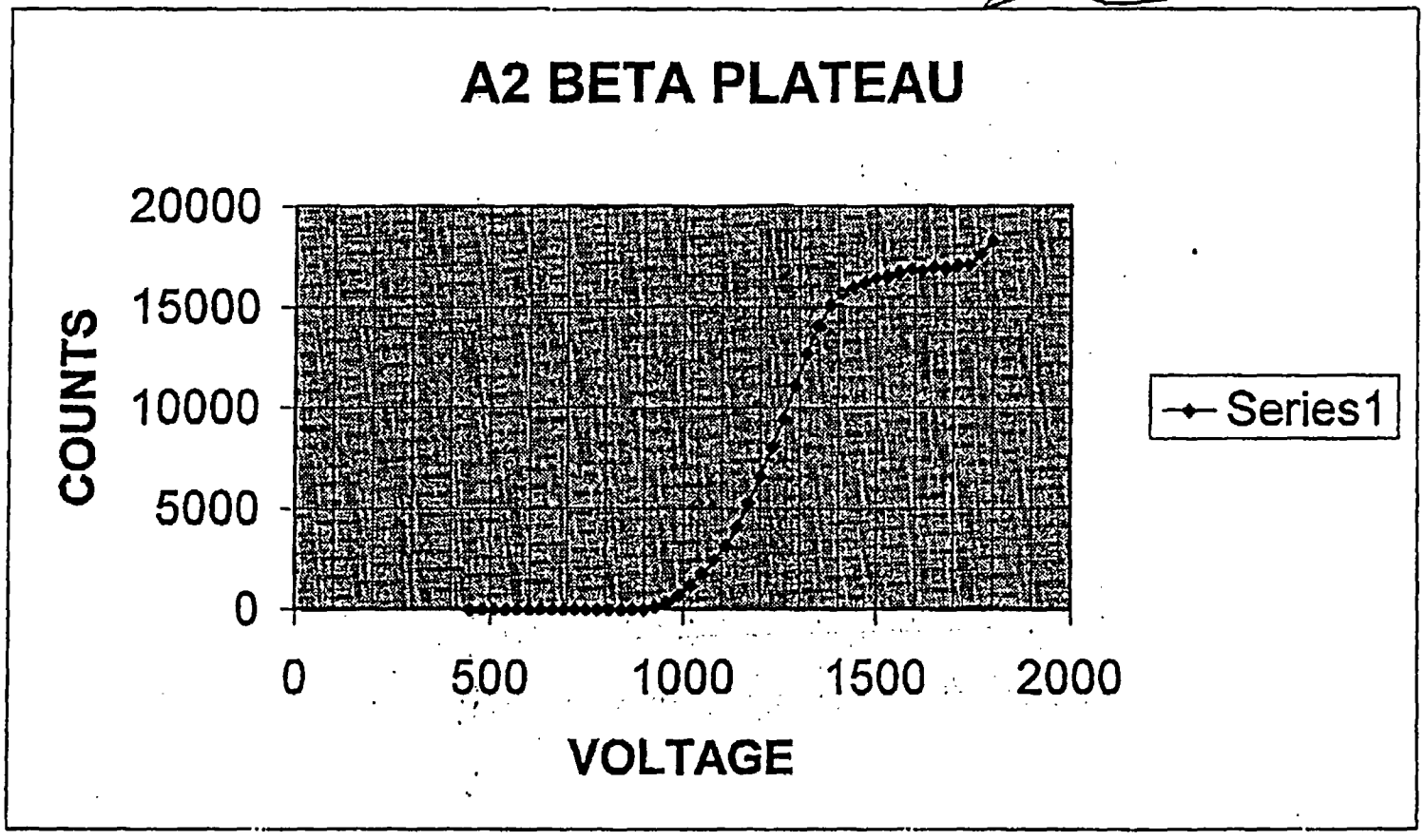
ALPHA	VOLTAGE	BETA	SUM
n/a	450	n/a	1
n/a	480	n/a	0
n/a	510	n/a	1
n/a	540	n/a	0
n/a	570	n/a	0
n/a	600	n/a	0
n/a	630	n/a	0
n/a	660	n/a	1
n/a	690	n/a	1
n/a	720	n/a	0
n/a	750	n/a	0
n/a	780	n/a	0
n/a	810	n/a	1
n/a	840	n/a	1
n/a	870	n/a	7
n/a	900	n/a	24
n/a	930	n/a	138
n/a	960	n/a	360
n/a	990	n/a	712
n/a	1020	n/a	1165
n/a	1050	n/a	1777
n/a	1080	n/a	2455
n/a	1110	n/a	3146
n/a	1140	n/a	4140
n/a	1170	n/a	5250
n/a	1200	n/a	6579
n/a	1230	n/a	8025
n/a	1260	n/a	9471
n/a	1290	n/a	11074
n/a	1320	n/a	12687
n/a	1350	n/a	14057
n/a	1380	n/a	15065
n/a	1410	n/a	15684
n/a	1440	n/a	15978
n/a	1470	n/a	16199
n/a	1500	n/a	16412
n/a	1530	n/a	16508
n/a	1560	n/a	16705
n/a	1590	n/a	16887
n/a	1620	n/a	16784
n/a	1650	n/a	16940
n/a	1680	n/a	16907
n/a	1710	n/a	17062
n/a	1740	n/a	17089
n/a	1770	n/a	17627
n/a	1800	n/a	18260

SOURCE #	92SR4702141
ISOTOPE	SR-90/Y-90
DPM	24100
REF. DATE	6/3/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 1372.5



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05
SIGNATURE:

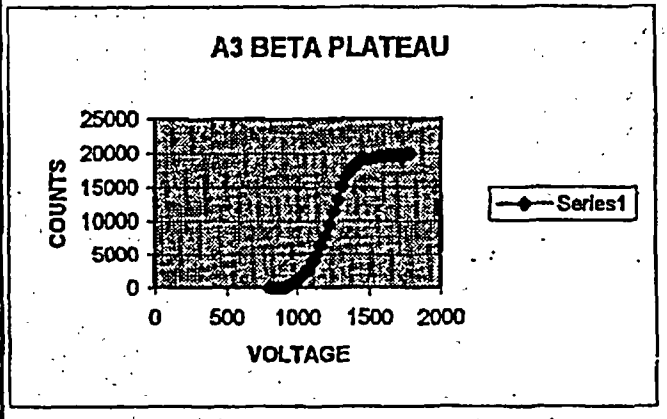


DETECTOR A3 BETA PLATEAU

ALPHA	VOLTAGE	BETA	SUM
0	802.5	0	0
0	832.5	1	1
0	862.5	3	3
0	892.5	36	36
0	922.5	170	170
0	952.5	427	427
0	982.5	860	860
0	1012.5	1390	1390
0	1042.5	1985	1985
0	1072.5	2801	2801
2	1102.5	3749	3751
0	1132.5	4930	4930
0	1162.5	6280	6280
1	1192.5	7723	7724
2	1222.5	9458	9460
0	1252.5	11312	11312
1	1282.5	13178	13179
1	1312.5	15142	15143
7	1342.5	16582	16589
69	1372.5	17629	17698
254	1402.5	17856	18110
707	1432.5	17936	18643
1311	1462.5	18075	19386
2000	1492.5	17066	19066
2924	1522.5	16296	19220
4163	1552.5	15194	19357
5856	1582.5	13726	19582
7726	1612.5	11832	19558
10401	1642.5	9300	19701
13088	1672.5	6455	19543
16158	1702.5	3679	19837
17783	1732.5	1653	19436
19140	1762.5	738	19878
19403	1792.5	478	19881
n/a		n/a	
n/a		n/a	
n/a		n/a	
n/a		n/a	
n/a		n/a	
n/a		n/a	
n/a		n/a	
n/a		n/a	
n/a		n/a	
n/a		n/a	
n/a		n/a	
n/a		n/a	

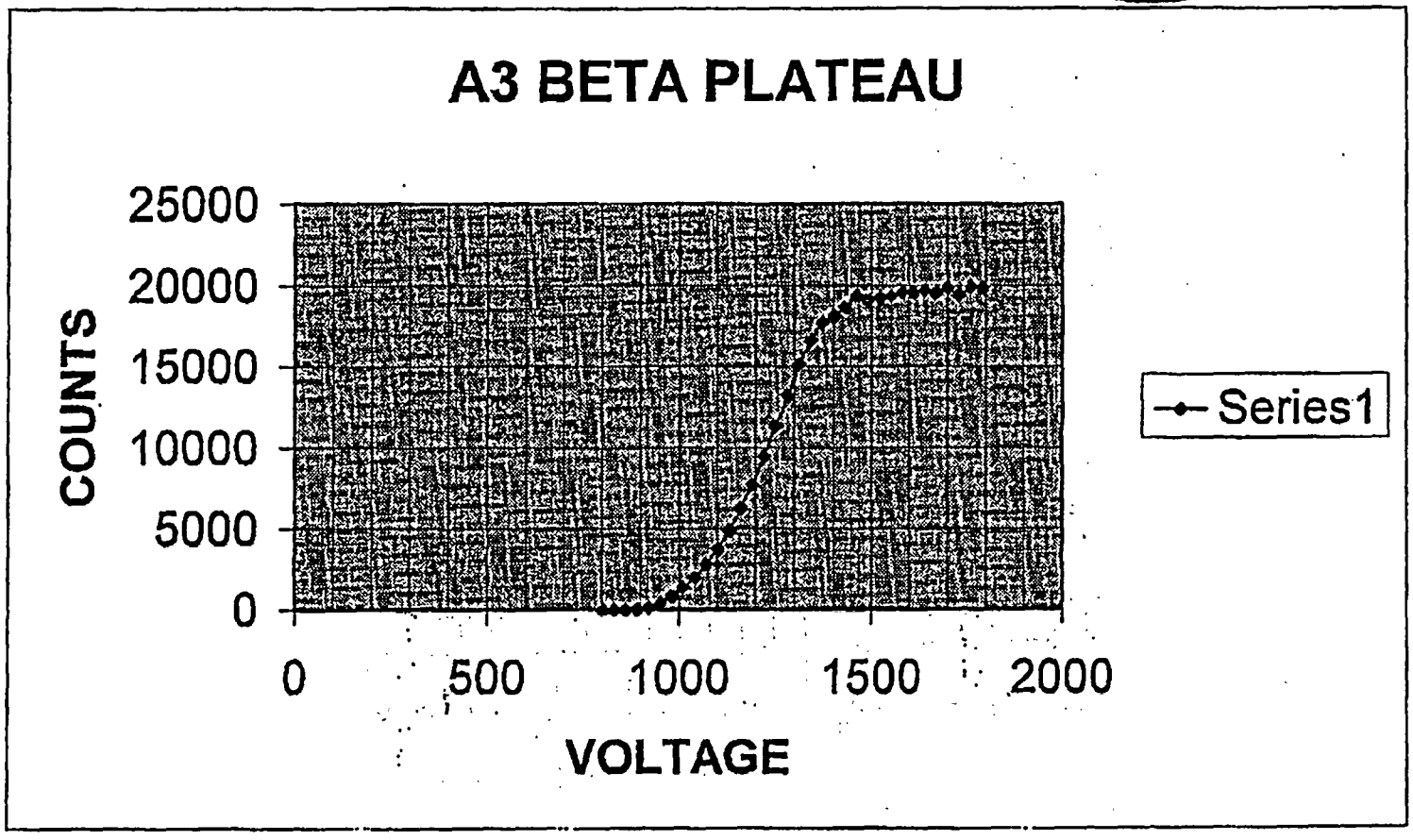
SOURCE #	92SR4702140
ISOTOPE	SR-90/Y-90
DPM	26500
REF. DATE	6/3/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 1372.5



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05

SIGNATURE:

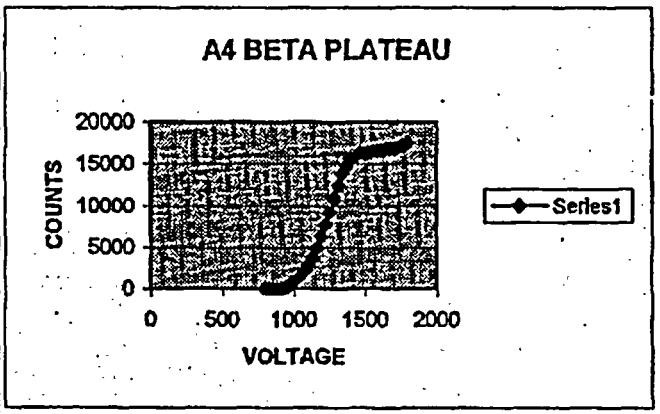


DETECTOR A4 BETA PLATEAU

ALPHA	VOLTAGE	BETA	SUM
0	802.5	0	0
0	832.5	1	1
0	862.5	2	2
0	892.5	20	20
0	922.5	98	98
0	952.5	269	269
0	982.5	613	613
0	1012.5	1027	1027
0	1042.5	1483	1483
0	1072.5	2080	2080
0	1102.5	2939	2939
2	1132.5	3780	3782
0	1162.5	4936	4936
0	1192.5	6311	6311
1	1222.5	7733	7734
1	1252.5	9199	9200
1	1282.5	10878	10879
1	1312.5	12437	12438
2	1342.5	13848	13850
23	1372.5	14701	14724
157	1402.5	15546	15703
398	1432.5	15447	15845
891	1462.5	15427	16318
1471	1492.5	14888	16359
2234	1522.5	14194	16428
3138	1552.5	13379	16517
4536	1582.5	12076	16612
6096	1612.5	10503	16599
8192	1642.5	8639	16831
10836	1672.5	6059	16895
13448	1702.5	3483	16931
15313	1732.5	1675	16988
16231	1762.5	932	17163
16741	1792.5	698	17439

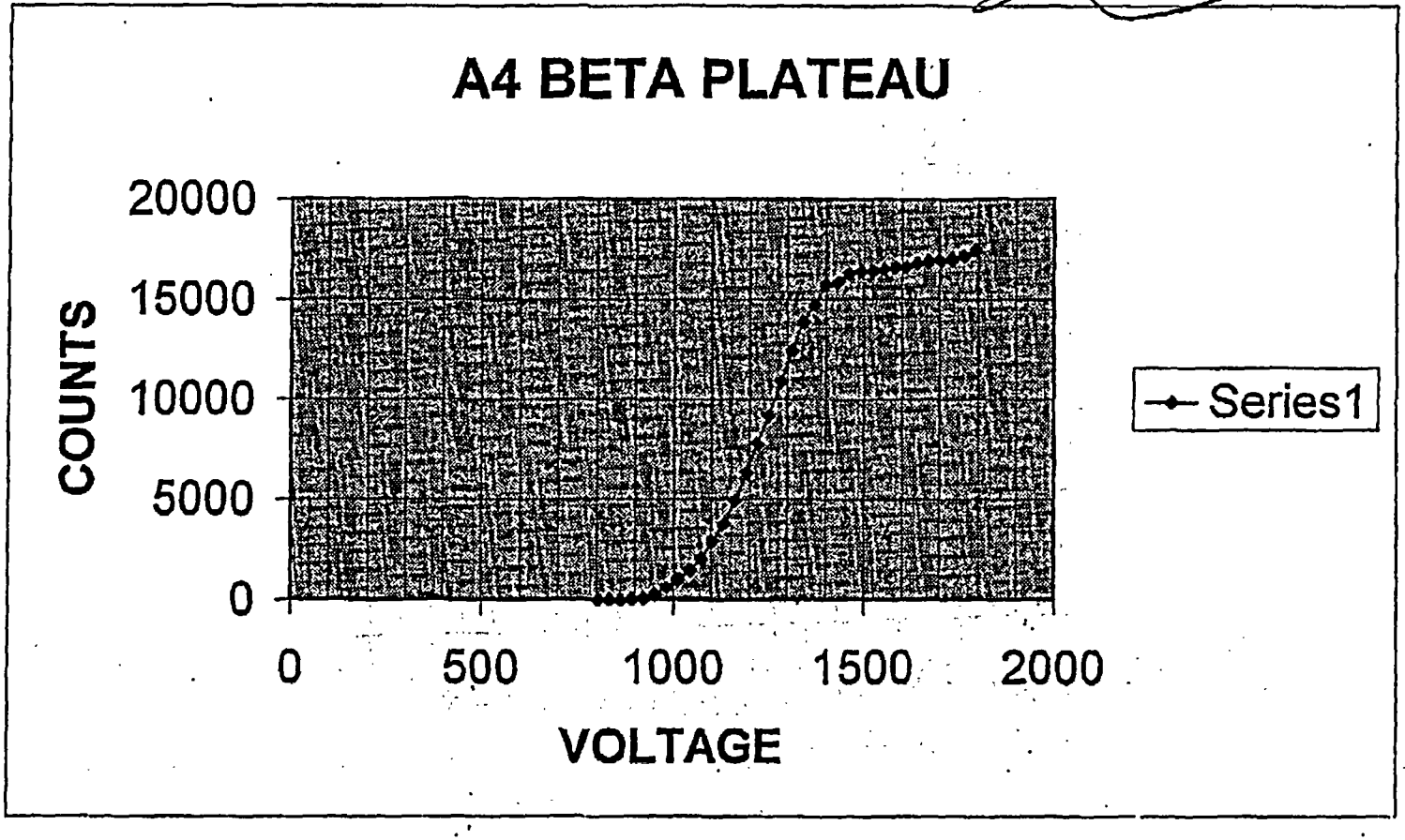
SOURCE #	92SR4702141
ISOTOPE	SR-90/Y-90
DPM	24100
REF. DATE	6/3/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 1372.5



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05

SIGNATURE:

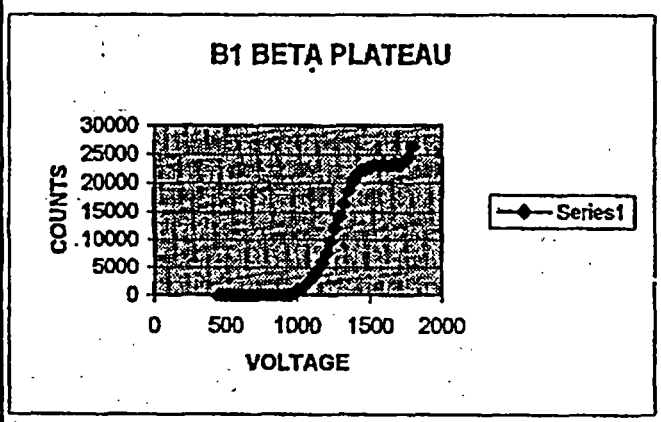


DETECTOR B1 BETA PLATEAU

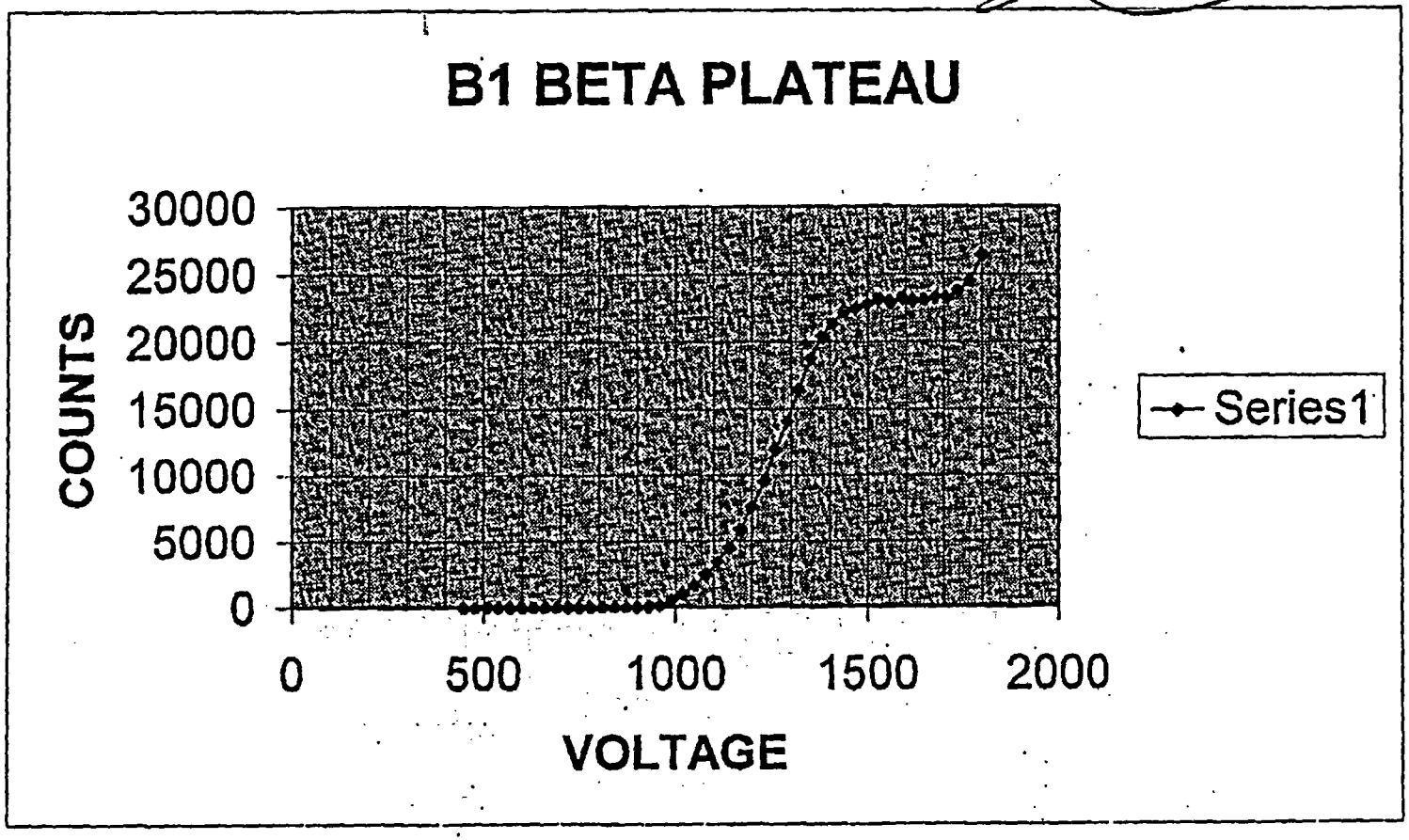
ALPHA	VOLTAGE	BETA	SUM
0	450	1	1
0	480	0	0
0	510	1	1
0	540	0	0
0	570	0	0
0	600	1	1
0	630	1	1
0	660	0	0
0	690	0	0
0	720	0	0
2	750	0	2
0	780	0	0
0	810	1	1
0	840	0	0
0	870	3	3
0	900	9	9
0	930	42	42
0	960	192	192
0	990	536	536
0	1020	1017	1017
0	1050	1622	1622
0	1080	2490	2490
1	1110	3415	3416
1	1140	4506	4507
1	1170	5860	5861
1	1200	7605	7606
0	1230	9574	9574
0	1260	11949	11949
1	1290	14007	14008
2	1320	16399	16401
2	1350	18721	18723
1	1380	20350	20351
3	1410	21340	21343
26	1440	22239	22265
148	1470	22309	22457
535	1500	22257	22792
1151	1530	22036	23187
1983	1560	20964	22947
3025	1590	20263	23288
4441	1620	18630	23071
6234	1650	16917	23151
8564	1680	14759	23323
11460	1710	11801	23261
15058	1740	8697	23755
18703	1770	5825	24528
21538	1800	4883	26421

SOURCE #	92SR4702140
ISOTOPE	SR-90/Y-90
DPM	26500
REF. DATE	6/3/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 1380



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05
SIGNATURE:

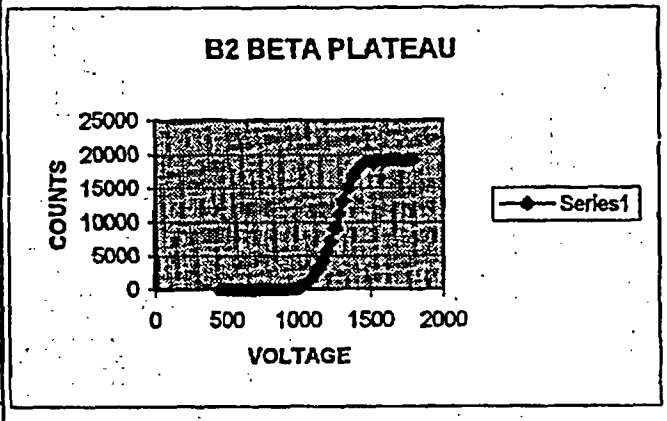


DETECTOR B2 BETA PLATEAU

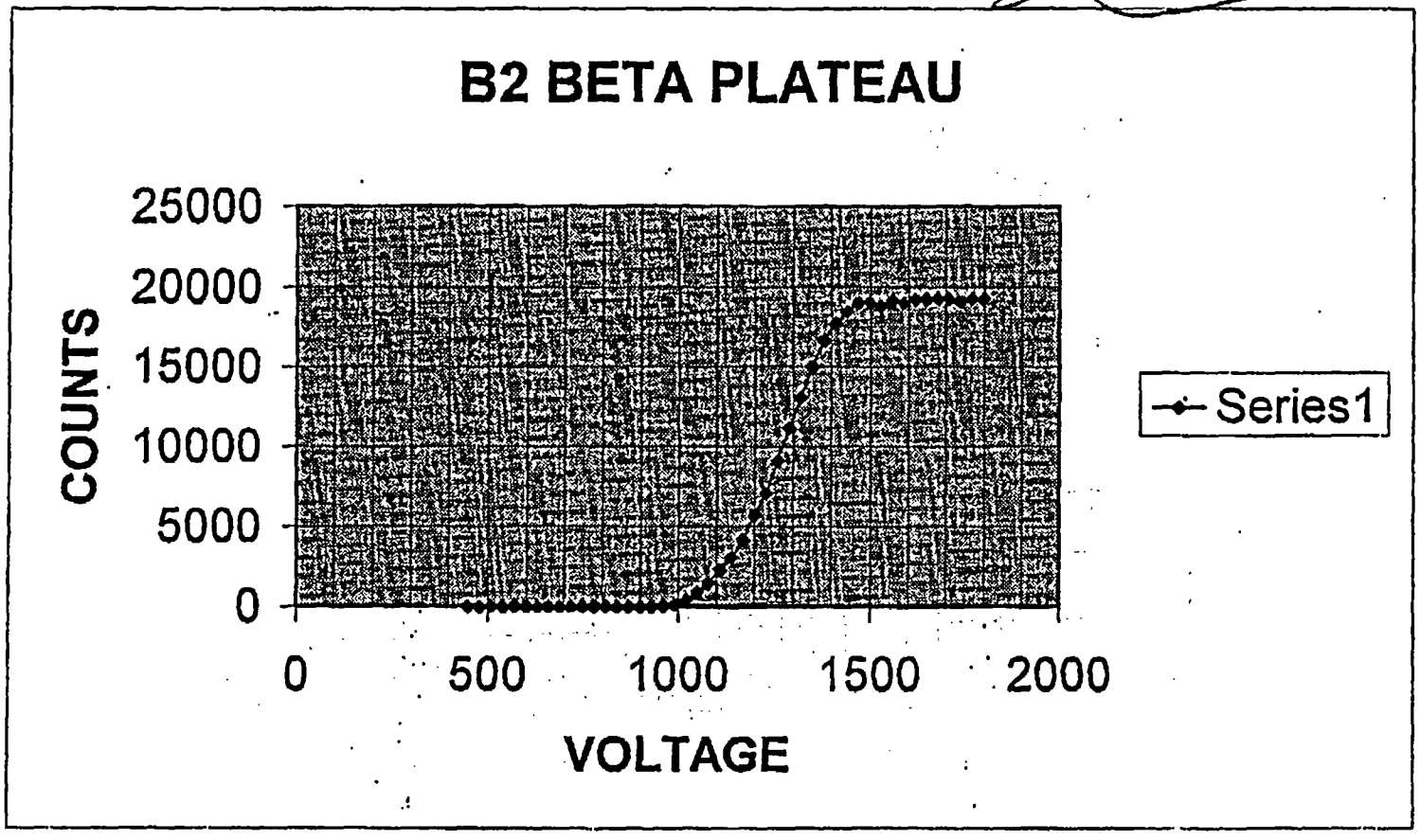
ALPHA	VOLTAGE	BETA	SUM
0	450	0	0
0	480	1	1
0	510	1	1
0	540	1	1
0	570	1	1
0	600	0	0
0	630	1	1
0	660	1	1
0	690	1	1
0	720	2	2
0	750	1	1
0	780	0	0
0	810	1	1
0	840	3	3
0	870	1	1
0	900	2	2
0	930	2	2
0	960	32	32
0	990	168	168
0	1020	421	421
0	1050	891	891
0	1080	1458	1458
1	1110	2260	2261
1	1140	3062	3063
1	1170	4180	4181
0	1200	5674	5674
2	1230	7073	7075
1	1260	9096	9097
0	1290	11147	11147
2	1320	13078	13080
1	1350	14996	14997
2	1380	16634	16636
2	1410	17644	17646
9	1440	18424	18433
84	1470	18881	18965
356	1500	18649	19005
798	1530	18007	18805
1527	1560	17606	19133
2403	1590	16609	19012
3569	1620	15627	19196
5114	1650	14120	19234
7390	1680	11900	19290
11143	1710	8141	19284
17133	1740	1965	19098
18458	1770	771	19229
18933	1800	359	19292

SOURCE #	92SR4702141
ISOTOPE	SR-90/Y-90
DPM	24100
REF. DATE	6/3/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 1380



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05
SIGNATURE:

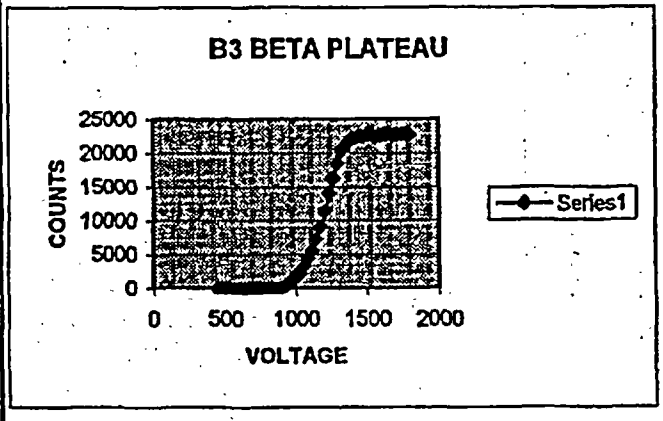


DETECTOR B3 BETA PLATEAU

ALPHA	VOLTAGE	BETA	SUM
0	450	2	2
0	480	0	0
0	510	0	0
0	540	2	2
0	570	2	2
0	600	0	0
0	630	0	0
0	660	0	0
0	690	0	0
0	720	0	0
0	750	0	0
0	780	2	2
0	810	1	1
0	840	3	3
0	870	23	23
0	900	71	71
0	930	371	371
1	960	839	840
0	990	1472	1472
0	1020	2160	2160
1	1050	3144	3145
1	1080	4387	4388
2	1110	5572	5574
0	1140	7311	7311
0	1170	9074	9074
0	1200	11374	11374
0	1230	14024	14024
2	1260	16330	16332
1	1290	18510	18511
1	1320	20371	20372
9	1350	21178	21187
32	1380	21942	21974
169	1410	22004	22173
626	1440	21964	22590
1232	1470	21259	22491
2209	1500	20388	22597
3305	1530	19659	22964
4631	1560	17798	22429
6513	1590	16165	22678
8736	1620	13982	22718
11806	1650	11257	23063
14663	1680	7970	22633
17871	1710	4887	22758
20570	1740	2283	22853
21923	1770	917	22840
22388	1800	364	22752

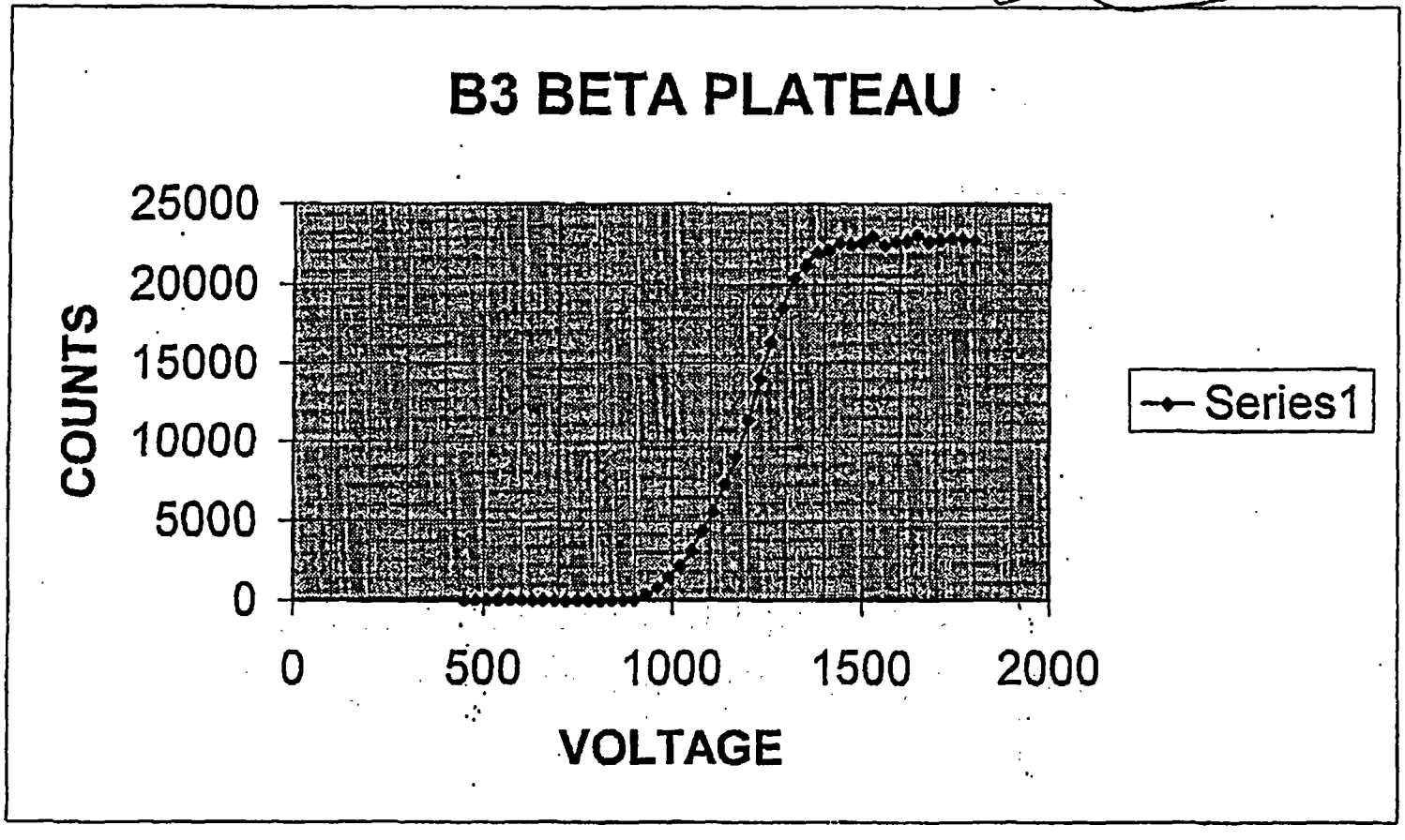
SOURCE #	92SR4702140
ISOTOPE	SR-90/Y-90
DPM	26500
REF. DATE	6/3/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 1380



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05

SIGNATURE:

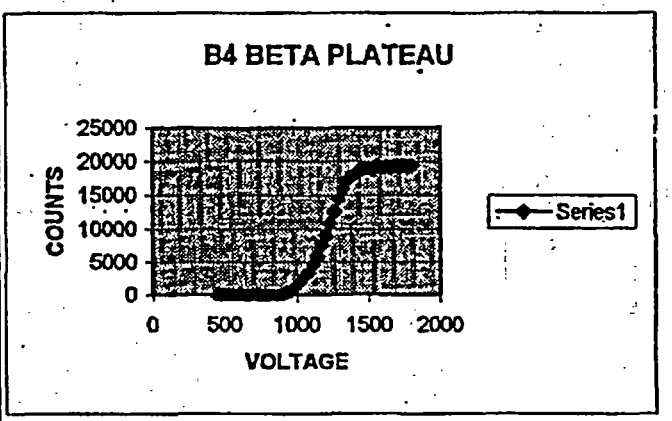


DETECTOR B4 BETA PLATEAU

ALPHA	VOLTAGE	BETA	SUM
0	450	0	0
0	480	1	1
0	510	2	2
0	540	1	1
0	570	2	2
0	600	0	0
0	630	2	2
0	660	0	0
0	690	1	1
0	720	1	1
0	750	1	1
0	780	1	1
0	810	1	1
0	840	2	2
0	870	34	34
0	900	108	108
0	930	394	394
1	960	697	698
0	990	1243	1243
0	1020	1794	1794
0	1050	2543	2543
0	1080	3397	3397
1	1110	4666	4667
1	1140	5862	5863
5	1170	7529	7534
0	1200	8987	8987
0	1230	10794	10794
0	1260	12584	12584
1	1290	14419	14420
2	1320	15892	15894
0	1350	17129	17129
5	1380	17816	17821
44	1410	18155	18199
216	1440	18605	18821
548	1470	18375	18923
1055	1500	18007	19062
1739	1530	17257	18996
2695	1560	16659	19354
3742	1590	15436	19178
5022	1620	14238	19260
6829	1650	12366	19195
9109	1680	10282	19391
11556	1710	7736	19292
14172	1740	5210	19382
16269	1770	2955	19224
17778	1800	1543	19321

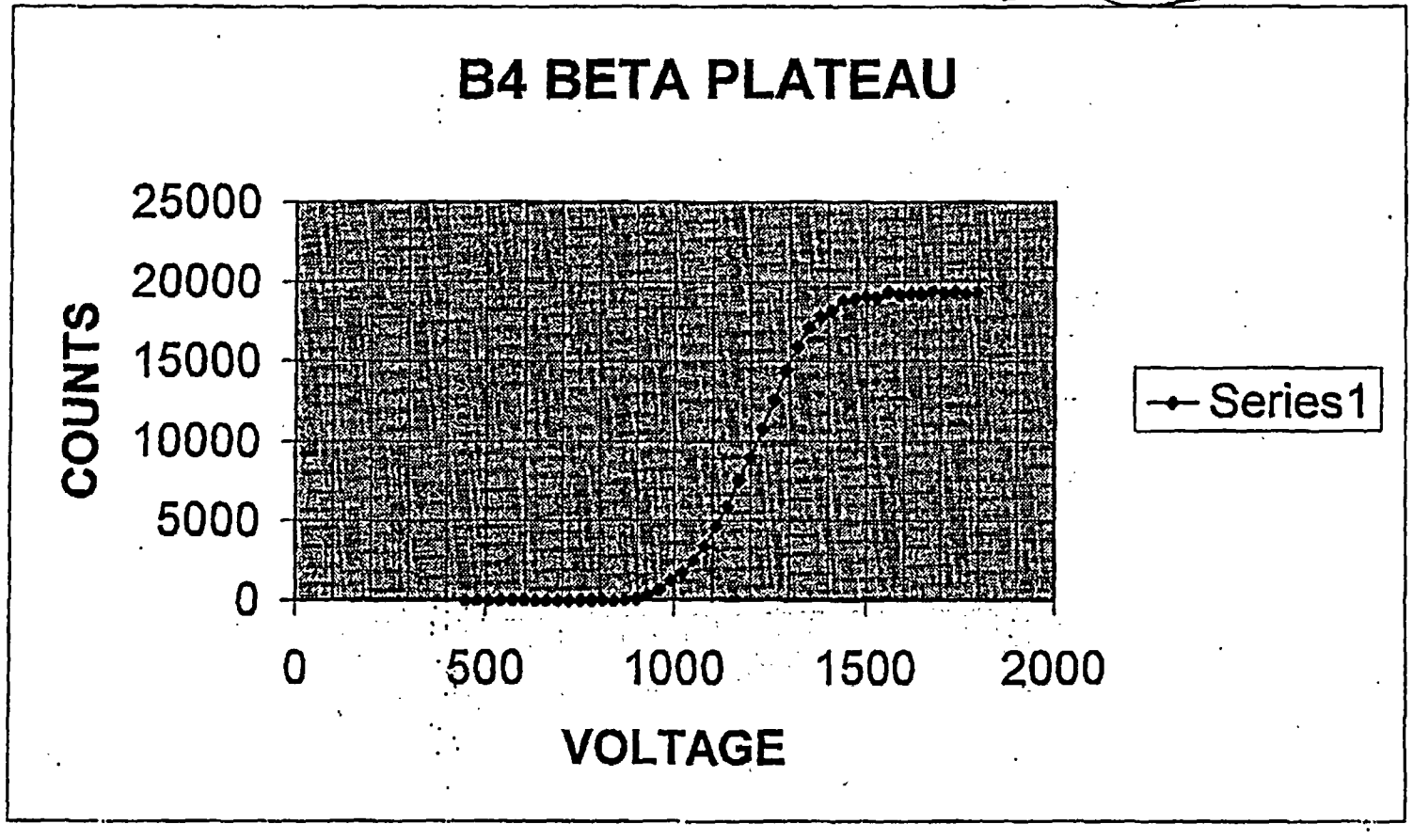
SOURCE #	92SR4702141
ISOTOPE	SR-90/Y-90
DPM	24100
REF. DATE	6/3/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 1380



DATE: 7/5/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/5/05

SIGNATURE:



UNCERTAINTY IN EFFICIENCY FOR DETECTOR A1

ZERO MASS

COUNT TIME = Alpha (45 MIN). Beta (30 MIN).

SEVERN TRENT SERVICES

Std #	Alpha cts	eff	Beta cts	eff	Alpha $(E_i-E_m)^2$	Beta $(E_i-E_m)^2$
1	12431	0.227	11187	0.404	2.817E-05	4.583E-04
2	13481	0.246	10932	0.395	5.994E-04	1.489E-04
3	12495	0.228	11012	0.398	4.194E-05	2.277E-04
4	12047	0.220	10223	0.369	2.908E-06	1.796E-04
5	12491	0.228	10159	0.367	4.100E-05	2.469E-04
6	12743	0.233	10869	0.392	1.211E-04	9.852E-05
7	10367	0.189	10578	0.382	1.049E-03	3.391E-07
8	11068	0.202	9793	0.354	3.835E-04	8.369E-04
MEAN	12140		10594			
1 sigma	985		491			
RSD	0.081		0.046			
AVE. EFF.	0.222		0.383			
ERROR	0.006		0.014			

Analyst [signature] 7/22/03

Count Date 7/22/03 thru 7/23/03

E_i= Std# eff

E_m= Average eff

$$u(E_{zero}) = \sqrt{\frac{\sum(E_{zero,i} - \overline{E})^2}{n(n-1)}}$$

SOURCE DATA

	Alpha	Am24101AL
	Ref Date	6/1/01
	Beta	Sr9001AL
	Ref Date	7/1/02
	ACTIVITIES	Decay Corrected pCi
Alpha	550 pCi	548.12
Beta	438 pCi	415.81
		Decay Corrected Dpm
Alpha	1221 dpm	1216.82
Beta	972 dpm	923.09

	Alpha
sum$(E_i-E_m)^2$=	2.267E-03
n(n-1)=	56
u(E)=	6.363E-03
u^2(E)=	4.048E-05

	Beta
sum$(E_i-E_m)^2$=	2.197E-03
n(n-1)=	56
u(E)=	6.2638E-03
u^2(E)=	3.9235E-05

CERTIFICATE UNCERTAINTY

Am 241	2.54%
Sr90/Y90	3.55%

UNCERTAINTY IN EFFICIENCY FOR DETECTOR A2

ZERO MASS

COUNT TIME = Alpha (45 MIN). Beta (30 MIN).

SEVERN TRENT SERVICES

Std #	Alpha cts	eff	Beta cts	eff	Alpha $(E_i-E_m)^2$	Beta $(E_i-E_m)^2$
1	12755	0.233	11595	0.419	1.166E-04	4.712E-04
2	13630	0.249	10526	0.380	7.170E-04	2.854E-04
3	12108	0.221	11330	0.409	1.037E-06	1.473E-04
4	12191	0.223	10756	0.388	2.477E-07	7.378E-05
5	12591	0.230	10852	0.392	6.088E-05	2.625E-05
6	12476	0.228	11610	0.419	3.252E-05	4.950E-04
7	10341	0.189	11316	0.409	1.108E-03	1.353E-04
8	11218	0.205	9966	0.360	2.983E-04	1.378E-03
MEAN	12164		10994			
1 sigma	1000		574			
RSD	0.082		0.052			
AVE. EFF.	0.222		0.397			
ERROR	0.006		0.014			

Analyst [signature] 7/23/03

Count Date 7/22/03 thru 7/23/03

E_i= Std# eff

E_m= Average eff

$$u(E_{zero}) = \sqrt{\frac{\sum(E_{zero,i} - \overline{E})^2}{n(n-1)}}$$

	Alpha
sum$(E_i-E_m)^2$=	2.335E-03
n(n-1)=	56
u(E)=	6.457E-03
u^2(E)=	4.169E-05

	Beta
sum$(E_i-E_m)^2$=	3.012E-03
n(n-1)=	56
u(E)=	7.3339E-03
u^2(E)=	5.3785E-05

SOURCE DATA

	Alpha	Am24101AL
	Ref Date	6/1/01
	Beta	Sr9001AL
	Ref Date	7/1/02
	ACTIVITIES	Decay Corrected pCi
Alpha	550 pCi	548.12
Beta	438 pCi	415.81
		Decay Corrected Dpm
Alpha	1221 dpm	1216.82
Beta	972 dpm	923.09

CERTIFICATE UNCERTAINTY

Am 241	2.54%
Sr90/Y90	3.55%

UNCERTAINTY IN EFFICIENCY FOR DETECTOR A3

ZERO MASS

COUNT TIME = Alpha (45 MIN). Beta (30 MIN).

SEVERN TRENT SERVICES

Std #	Alpha cts	eff	Beta cts	eff	Alpha $(E_i-E_m)^2$	Beta $(E_i-E_m)^2$
1	12785	0.233	12147	0.439	5.125E-05	4.332E-04
2	13861	0.253	11127	0.402	7.187E-04	2.566E-04
3	12700	0.232	11671	0.421	3.143E-05	1.314E-05
4	12169	0.222	11164	0.403	1.673E-05	2.156E-04
5	12785	0.233	11427	0.413	5.125E-05	2.690E-05
6	12939	0.236	12255	0.443	9.943E-05	6.107E-04
7	10573	0.193	11899	0.430	1.105E-03	1.406E-04
8	11332	0.207	10875	0.393	3.754E-04	6.310E-04
MEAN	12393		11571			
1 sigma	1024		505			
RSD	0.083		0.044			
AVE. EFF.	0.226		0.418			
ERROR	0.006		0.015			

Analyst [signature] 7/23/03

Count Date 7/22/03 thru 7/23/03

E_i= Std# eff

E_m= Average eff

$$u(E_{zero}) = \sqrt{\frac{\sum(E_{zero,i} - \overline{E})^2}{n(n-1)}}$$

SOURCE DATA

	Alpha	Am24101AL
	Ref Date	6/1/01
	Beta	Sr9001AL
	Ref Date	7/1/02
	ACTIVITIES	Decay Corrected pCi
Alpha	550 pCi	548.12
Beta	438 pCi	415.81
		Decay Corrected Dpm
Alpha	1221 dpm	1216.82
Beta	972 dpm	923.09

	Alpha
sum$(E_i-E_m)^2$=	2.449E-03
n(n-1)=	56
u(E)=	6.613E-03
u^2(E)=	4.373E-05

	Beta
sum$(E_i-E_m)^2$=	2.328E-03
n(n-1)=	56
u(E)=	6.4473E-03
u^2(E)=	4.1568E-05

CERTIFICATE UNCERTAINTY

Am 241	2.54%
Sr90/Y90	3.55%

UNCERTAINTY IN EFFICIENCY FOR DETECTOR A4

ZERO MASS

COUNT TIME = Alpha (45 MIN). Beta (30 MIN).

SEVERN TRENT SERVICES

Std #	Alpha cts	eff	Beta cts	eff	Alpha $(E_i-E_m)^2$	Beta $(E_i-E_m)^2$
1	12923	0.236	12151	0.439	8.242E-05	7.066E-04
2	14091	0.257	11044	0.399	9.247E-04	1.794E-04
3	12610	0.230	11475	0.414	1.131E-05	4.714E-06
4	12192	0.223	10860	0.392	1.824E-05	4.015E-04
5	12772	0.233	11398	0.412	3.996E-05	3.713E-07
6	12766	0.233	12217	0.441	3.858E-05	8.390E-04
7	10757	0.196	11653	0.421	9.289E-04	7.394E-05
8	11296	0.206	10521	0.380	4.258E-04	1.042E-03
MEAN	12426		11415			
1 sigma	1029		596			
RSD	0.083		0.052			
AVE. EFF.	0.227		0.412			
ERROR	0.006		0.015			

Analyst 7/23/03

Count Date 7/22/03 thru 7/23/03

E_i= Std# eff

E_m= Average eff

$$u(E_{zero}) = \sqrt{\frac{\sum(E_{zero,i} - \overline{E})^2}{n(n-1)}}$$

	Alpha
sum$(E_i-E_m)^2$=	2.470E-03
n(n-1)=	56
u(E)=	6.641E-03
u^2(E)=	4.411E-05

	Beta
sum$(E_i-E_m)^2$=	3.247E-03
n(n-1)=	56
u(E)=	7.6150E-03
u^2(E)=	5.7988E-05

SOURCE DATA

	Alpha	Am24101AL
	Ref Date	6/1/01
	Beta	Sr9001AL
	Ref Date	7/1/02
	ACTIVITIES	Decay Corrected pCi
Alpha	550 pCi	548.12
Beta	438 pCi	415.81
		Decay Corrected Dpm
Alpha	1221 dpm	1216.82
Beta	972 dpm	923.09

CERTIFICATE UNCERTAINTY

Am 241	2.54%
Sr90/Y90	3.55%

UNCERTAINTY IN EFFICIENCY FOR DETECTOR B1

ZERO MASS

COUNT TIME = Alpha (45 MIN). Beta (30 MIN).

SEVERN TRENT SERVICES

Std #	Alpha cts	eff	Beta cts	eff	Alpha $(E_i-E_m)^2$	Beta $(E_i-E_m)^2$
1	12847	0.235	11233	0.406	9.223E-05	1.958E-04
2	13651	0.249	10618	0.383	5.898E-04	6.749E-05
3	12875	0.235	11027	0.398	1.023E-04	4.296E-05
4	12095	0.221	10308	0.372	1.705E-05	3.767E-04
5	12670	0.231	10847	0.392	4.059E-05	2.934E-09
6	12792	0.234	11590	0.419	7.395E-05	7.228E-04
7	10391	0.190	11041	0.399	1.242E-03	4.984E-05
8	11248	0.205	10100	0.365	3.841E-04	7.247E-04
MEAN	12321		10846			
1 sigma	.1044		489			
RSD	0.085		0.045			
AVE. EFF.	0.225		0.392			
ERROR	0.006		0.014			

Analyst 7/23/03

Count Date 7/22/03 thru 7/23/03

E_i= Std# eff

E_m= Average eff

$$u(E_{zero}) = \sqrt{\frac{\sum(E_{zero,i} - \overline{E})^2}{n(n-1)}}$$

	Alpha
sum$(E_i-E_m)^2$=	2.543E-03
n(n-1)=	56
u(E)=	6.738E-03
u^2(E)=	4.540E-05

	Beta
sum$(E_i-E_m)^2$=	2.180E-03
n(n-1)=	56
u(E)=	6.2397E-03
u^2(E)=	3.8934E-05

SOURCE DATA

Alpha	Am24101AL
Ref Date	6/1/01
Beta	Sr9001AL
Ref Date	7/1/02

	ACTIVITIES	Decay Corrected pCi
Alpha	550 pCi	548.12
Beta	438 pCi	415.81
		Decay Corrected Dpm
Alpha	1221 dpm	1216.82
Beta	972 dpm	923.09

CERTIFICATE UNCERTAINTY

Am 241	2.54%
Sr90/Y90	3.55%

UNCERTAINTY IN EFFICIENCY FOR DETECTOR B2

ZERO MASS

COUNT TIME = Alpha (45 MIN). Beta (30 MIN).

SEVERN TRENT SERVICES

Std #	Alpha cts	eff	Beta cts	eff	Alpha $(E_i-E_m)^2$	Beta $(E_i-E_m)^2$
1	12657	0.231	11462	0.414	7.379E-05	4.884E-04
2	13529	0.247	10357	0.374	6.010E-04	3.169E-04
3	12449	0.227	11141	0.402	2.296E-05	1.104E-04
4	12086	0.221	10466	0.378	3.377E-06	1.923E-04
5	12528	0.229	10637	0.384	3.887E-05	5.916E-05
6	12452	0.227	11536	0.417	2.349E-05	6.136E-04
7	10539	0.192	10967	0.396	9.054E-04	1.785E-05
8	11253	0.206	10234	0.370	2.907E-04	4.948E-04
MEAN	12187		10850			
1 sigma	916		501			
RSD	0.075		0.046			
AVE. EFF.	0.223		0.392			
ERROR	0.006		0.014			

Analyst 7/24/03

Count Date 7/22/03 thru 7/23/03

E_i= Std# eff

E_m= Average eff

$$u(E_{zero}) = \sqrt{\frac{\sum(E_{zero,i} - \overline{E})^2}{n(n-1)}}$$

	Alpha
sum$(E_i-E_m)^2$=	1.960E-03
n(n-1)=	56
u(E)=	5.915E-03
u^2(E)=	3.499E-05

	Beta
sum$(E_i-E_m)^2$=	2.293E-03
n(n-1)=	56
u(E)=	6.3996E-03
u^2(E)=	4.0955E-05

SOURCE DATA

	Alpha	Am24101AL
	Ref Date	6/1/01
	Beta	Sr9001AL
	Ref Date	7/1/02
	ACTIVITIES	Decay Corrected pCi
Alpha	550 pCi	548.12
Beta	438 pCi	415.81
		Decay Corrected Dpm
Alpha	1221 dpm	1216.82
Beta	972 dpm	923.09

CERTIFICATE UNCERTAINTY

Am 241	2.54%
Sr90/Y90	3.55%

UNCERTAINTY IN EFFICIENCY FOR DETECTOR B3

ZERO MASS

COUNT TIME = Alpha (45 MIN). Beta (30 MIN).

SEVERN TRENT SERVICES

Std #	Alpha cts	eff	Beta cts	eff	Alpha $(E_i-E_m)^2$	Beta $(E_i-E_m)^2$
1	12839	0.234	12558	0.453	7.403E-05	3.870E-04
2	13714	0.250	11770	0.425	6.044E-04	7.716E-05
3	12970	0.237	12262	0.443	1.209E-04	8.069E-05
4	12099	0.221	11419	0.412	2.411E-05	4.605E-04
5	12918	0.236	11951	0.432	1.009E-04	5.053E-06
6	12726	0.232	12888	0.465	4.277E-05	9.978E-04
7	10438	0.191	12389	0.447	1.242E-03	1.841E-04
8	11239	0.205	10869	0.392	4.250E-04	1.707E-03
MEAN	12368		12013			
1 sigma	1062		654			
RSD	0.086		0.054			
AVE. EFF.	0.226		0.434			
ERROR	0.006		0.015			

Analyst [signature] 7/28/03

Count Date 7/22/03 thru 7/23/03

E_i= Std# eff

E_m= Average eff

$$u(E_{zero}) = \sqrt{\frac{\sum(E_{zero,i} - \overline{E})^2}{n(n-1)}}$$

	Alpha
sum$(E_i-E_m)^2$=	2.634E-03
n(n-1)=	56
u(E)=	6.859E-03
u^2(E)=	4.704E-05

	Beta
sum$(E_i-E_m)^2$=	3.900E-03
n(n-1)=	56
u(E)=	8.3447E-03
u^2(E)=	6.9634E-05

SOURCE DATA

	Alpha	Am24101AL
	Ref Date	6/1/01
	Beta	Sr9001AL
	Ref Date	7/1/02
	ACTIVITIES	Decay Corrected pCi
Alpha	550 pCi	548.12
Beta	438 pCi	415.81
		Decay Corrected Dpm
Alpha	1221 dpm	1216.82
Beta	972 dpm	923.09

CERTIFICATE UNCERTAINTY

Am 241	2.54%
Sr90/Y90	3.55%

UNCERTAINTY IN EFFICIENCY FOR DETECTOR B4

ZERO MASS

COUNT TIME = Alpha (45 MIN). Beta (30 MIN).

SEVERN TRENT SERVICES

Std #	Alpha cts	eff	Beta cts	eff	Alpha $(E_i-E_m)^2$	Beta $(E_i-E_m)^2$
1	12687	0.232	8829	0.319	6.003E-05	3.179E-06
2	13304	0.243	8674	0.313	3.616E-04	5.447E-05
3	12548	0.229	8790	0.317	2.714E-05	1.018E-05
4	12182	0.222	8547	0.309	2.175E-06	1.432E-04
5	12719	0.232	8823	0.319	6.943E-05	3.998E-06
6	12537	0.229	9101	0.329	2.508E-05	6.463E-05
7	10750	0.196	9097	0.328	7.632E-04	6.233E-05
8	11375	0.208	9166	0.331	2.628E-04	1.079E-04
MEAN	12263		8878			
1 sigma	820		222			
RSD	0.067		0.025			
AVE. EFF.	0.224		0.321			
ERROR	0.006		0.011			

Analyst [signature] 7/23/03

Count Date 7/22/03 thru 7/23/03

E_i= Std# eff

E_m= Average eff

$$u(E_{zero}) = \sqrt{\frac{\sum(E_{zero,i} - \overline{E})^2}{n(n-1)}}$$

	Alpha
sum$(E_i-E_m)^2$=	1.572E-03
n(n-1)=	56
u(E)=	5.297E-03
u^2(E)=	2.806E-05

	Beta
sum$(E_i-E_m)^2$=	4.498E-04
n(n-1)=	56
u(E)=	2.8342E-03
u^2(E)=	8.0329E-06

SOURCE DATA

	Alpha	Am24101AL
	Ref Date	6/1/01
	Beta	Sr9001AL
	Ref Date	7/1/02
	ACTIVITIES	Decay Corrected pCi
Alpha	550 pCi	548.12
Beta	438 pCi	415.81
		Decay Corrected Dpm
Alpha	1221 dpm	1216.82
Beta	972 dpm	923.09

CERTIFICATE UNCERTAINTY

Am 241	2.54%
Sr90/Y90	3.55%

7-23-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	30.00	3	10847	10850	0.10	361.57	361.67	0.00	0.00	0.00	0.00	1380.0	10:27:00
B	2	30.00	9	11536	11545	0.30	384.53	384.83	0.00	0.00	0.00	0.00	1380.0	10:27:00
	3	30.00	48	12389	12437	1.60	412.97	414.57	0.00	0.00	0.00	0.00	1380.0	10:27:00
	4	30.00	6	9166	9172	0.20	305.53	305.73	0.00	0.00	0.00	0.00	1380.0	10:27:00
A	1	30.00	8	11187	11195	0.27	372.90	373.17	0.00	0.00	0.00	0.00	1357.5	10:27:00
A	2	30.00	12	10526	10538	0.40	350.87	351.27	0.00	0.00	0.00	0.00	1357.5	10:27:00
A	3	30.00	25	11671	11696	0.83	389.03	389.87	0.00	0.00	0.00	0.00	1357.5	10:27:00
A	4	30.00	8	10860	10868	0.27	362.00	362.27	0.00	0.00	0.00	0.00	1357.5	10:27:00

[TENNELEC LB4000] [PAGE 1]

10:57:37		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF BETA-1	30.00	8	11187	0.00	0.00	0.00	0.00
10:27:00	2	uEFF BETA-2	30.00	12	10526	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-3	30.00	25	11671	0.00	0.00	0.00	0.00
	4	uEFF BETA-4	30.00	8	10860	0.00	0.00	0.00	0.00
GROUP B	1	uEFF BETA-5	30.00	3	10847	0.00	0.00	0.00	0.00
10:27:00	2	uEFF BETA-6	30.00	9	11536	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-7	30.00	48	12389	0.00	0.00	0.00	0.00
	4	uEFF BETA-8	30.00	6	9166	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 3 COUNT TERMINATED ////

7-23-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	30.00	5	10308	10313	0.17	343.60	343.77	0.00	0.00	0.00	0.00	1380.0	10:58:15
B	2	30.00	4	10637	10641	0.13	354.57	354.70	0.00	0.00	0.00	0.00	1380.0	10:58:15
B	3	30.00	43	12888	12931	1.43	429.60	431.03	0.00	0.00	0.00	0.00	1380.0	10:58:15
B	4	30.00	9	9097	9106	0.30	303.23	303.53	0.00	0.00	0.00	0.00	1380.0	10:58:15
A	1	30.00	3	9793	9796	0.10	326.43	326.53	0.00	0.00	0.00	0.00	1357.5	10:58:15
A	2	30.00	6	11595	11601	0.20	386.50	386.70	0.00	0.00	0.00	0.00	1357.5	10:58:15
A	3	30.00	18	11127	11145	0.60	370.90	371.50	0.00	0.00	0.00	0.00	1357.5	10:58:15
A	4	30.00	21	11475	11496	0.70	382.50	383.20	0.00	0.00	0.00	0.00	1357.5	10:58:15

[TENNELEC LB4000] [PAGE 1]

11:28:57		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
A	1	uEFF BETA-8	30.00	3	9793	0.00	0.00	0.00	0.00
:58:15	2	uEFF BETA-1	30.00	6	11595	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-2	30.00	18	11127	0.00	0.00	0.00	0.00
	4	uEFF BETA-3	30.00	21	11475	0.00	0.00	0.00	0.00
GROUP B	1	uEFF BETA-4	30.00	5	10308	0.00	0.00	0.00	0.00

GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 3 COUNT TERMINATED ////

7-23-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	30.00	13	11027	11040	0.43	367.57	368.00	0.00	0.00	0.00	0.00	1380.0	11:29:50
B	2	30.00	5	10466	10471	0.17	348.87	349.03	0.00	0.00	0.00	0.00	1380.0	11:29:50
B	3	30.00	40	11951	11991	1.33	398.37	399.70	0.00	0.00	0.00	0.00	1380.0	11:29:50
B	4	30.00	4	9101	9105	0.13	303.37	303.50	0.00	0.00	0.00	0.00	1380.0	11:29:50
A	1	30.00	3	10578	10581	0.10	352.60	352.70	0.00	0.00	0.00	0.00	1357.5	11:29:50
A	2	30.00	5	9966	9971	0.17	332.20	332.37	0.00	0.00	0.00	0.00	1357.5	11:29:50
A	3	30.00	25	12147	12172	0.83	404.90	405.73	0.00	0.00	0.00	0.00	1357.5	11:29:50
A	4	30.00	7	11044	11051	0.23	368.13	368.37	0.00	0.00	0.00	0.00	1357.5	11:29:50

[TENNELEC LB4000] [PAGE 1]

12:10:40		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF BETA-7	30.00	3	10578	0.00	0.00	0.00	0.00
11:29:50	2	uEFF BETA-8	30.00	5	9966	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-1	30.00	25	12147	0.00	0.00	0.00	0.00
	4	uEFF BETA-2	30.00	7	11044	0.00	0.00	0.00	0.00
GROUP B	1	uEFF BETA-3	30.00	13	11027	0.00	0.00	0.00	0.00
11:29:50	2	uEFF BETA-4	30.00	5	10466	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-5	30.00	40	11951	0.00	0.00	0.00	0.00
	4	uEFF BETA-6	30.00	4	9101	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 1 COUNT TERMINATED ////

7-23-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	30.00	1	10618	10619	0.03	353.93	353.97	0.00	0.00	0.00	0.00	1380.0	12:11:08
B	2	30.00	11	11141	11152	0.37	371.37	371.73	0.00	0.00	0.00	0.00	1380.0	12:11:08
	3	30.00	36	11419	11455	1.20	380.63	381.83	0.00	0.00	0.00	0.00	1380.0	12:11:08
	4	30.00	0	8823	8823	0.00	294.10	294.10	0.00	0.00	0.00	0.00	1380.0	12:11:08
A	1	30.00	1	10869	10870	0.03	362.30	362.33	0.00	0.00	0.00	0.00	1357.5	12:11:08
A	2	30.00	9	11316	11325	0.30	377.20	377.50	0.00	0.00	0.00	0.00	1357.5	12:11:08
A	3	30.00	18	10875	10893	0.60	362.50	363.10	0.00	0.00	0.00	0.00	1357.5	12:11:08

12:41:55		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF BETA-6	30.00	1	10869	0.00	0.00	0.00	0.00
12:11:08	2	uEFF BETA-7	30.00	9	11316	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-8	30.00	18	10975	0.00	0.00	0.00	0.00
	4	uEFF BETA-1	30.00	13	12151	0.00	0.00	0.00	0.00
GROUP B	1	uEFF BETA-2	30.00	1	10618	0.00	0.00	0.00	0.00
12:11:08	2	uEFF BETA-3	30.00	11	11141	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-4	30.00	36	11419	0.00	0.00	0.00	0.00
	4	uEFF BETA-5	30.00	0	8823	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 4 COUNT TERMINATED ////

7-23-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	30.00	5	11233	11238	0.17	374.43	374.60	0.00	0.00	0.00	0.00	1380.0	12:42:02
B	2	30.00	5	10357	10362	0.17	345.23	345.40	0.00	0.00	0.00	0.00	1380.0	12:42:02
B	3	30.00	45	12262	12307	1.50	408.73	410.23	0.00	0.00	0.00	0.00	1380.0	12:42:02
B	4	30.00	4	8547	8551	0.13	284.90	285.03	0.00	0.00	0.00	0.00	1380.0	12:42:02
A	1	30.00	4	10159	10163	0.13	338.63	338.77	0.00	0.00	0.00	0.00	1357.5	12:42:02
A	2	30.00	8	11610	11618	0.27	387.00	387.27	0.00	0.00	0.00	0.00	1357.5	12:42:02
A	3	30.00	24	11899	11923	0.80	396.63	397.43	0.00	0.00	0.00	0.00	1357.5	12:42:02
A	4	30.00	10	10521	10531	0.33	350.70	351.03	0.00	0.00	0.00	0.00	1357.5	12:42:02

[TENNELEC LB4000] [PAGE 1]

13:12:56		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF BETA-5	30.00	4	10159	0.00	0.00	0.00	0.00
12:42:02	2	uEFF BETA-6	30.00	8	11610	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-7	30.00	24	11899	0.00	0.00	0.00	0.00
	4	uEFF BETA-8	30.00	10	10521	0.00	0.00	0.00	0.00
GROUP B	1	uEFF BETA-1	30.00	5	11233	0.00	0.00	0.00	0.00
12:42:02	2	uEFF BETA-2	30.00	5	10357	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-3	30.00	45	12262	0.00	0.00	0.00	0.00
	4	uEFF BETA-4	30.00	4	8547	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

B	1	30.00	3	10100	10103	0.10	336.67	336.77	0.00	0.00	0.00	0.00	1380.0	13:13:23
B	2	30.00	7	11462	11469	0.23	382.07	382.30	0.00	0.00	0.00	0.00	1380.0	13:13:23
B	3	30.00	50	11770	11820	1.67	392.33	394.00	0.00	0.00	0.00	0.00	1380.0	13:13:23
B	4	30.00	6	8790	8796	0.20	293.00	293.20	0.00	0.00	0.00	0.00	1380.0	13:13:23
A	1	30.00	5	10223	10228	0.17	340.77	340.93	0.00	0.00	0.00	0.00	1357.5	13:13:23
A	2	30.00	3	10852	10855	0.10	361.73	361.83	0.00	0.00	0.00	0.00	1357.5	13:13:23
A	3	30.00	11	12255	12266	0.37	408.50	408.87	0.00	0.00	0.00	0.00	1357.5	13:13:23
A	4	30.00	6	11653	11659	0.20	388.43	388.63	0.00	0.00	0.00	0.00	1357.5	13:13:23

[TENNELEC LB4000] [PAGE 1]

13:44:28		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF BETA-4	30.00	5	10223	0.00	0.00	0.00	0.00
13:13:23	2	uEFF BETA-5	30.00	3	10852	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-6	30.00	11	12255	0.00	0.00	0.00	0.00
	4	uEFF BETA-7	30.00	6	11653	0.00	0.00	0.00	0.00
GROUP B	1	uEFF BETA-8	30.00	3	10100	0.00	0.00	0.00	0.00
13:13:23	2	uEFF BETA-1	30.00	7	11462	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-2	30.00	50	11770	0.00	0.00	0.00	0.00
	4	uEFF BETA-3	30.00	6	8790	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 3 COUNT TERMINATED ////

7-23-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
A	1	30.00	15	11012	11027	0.50	367.07	367.57	0.00	0.00	0.00	0.00	1357.5	13:44:32
A	2	30.00	3	10756	10759	0.10	358.53	358.63	0.00	0.00	0.00	0.00	1357.5	13:44:32
A	3	30.00	24	11427	11451	0.80	380.90	381.70	0.00	0.00	0.00	0.00	1357.5	13:44:32
A	4	30.00	8	12217	12225	0.27	407.23	407.50	0.00	0.00	0.00	0.00	1357.5	13:44:32
B	1	30.00	7	11041	11048	0.23	368.03	368.27	0.00	0.00	0.00	0.00	1380.0	13:44:32
B	2	30.00	5	10234	10239	0.17	341.13	341.30	0.00	0.00	0.00	0.00	1380.0	13:44:32
B	3	30.00	48	12558	12606	1.60	418.60	420.20	0.00	0.00	0.00	0.00	1380.0	13:44:32
B	4	30.00	1	8674	8675	0.03	289.13	289.17	0.00	0.00	0.00	0.00	1380.0	13:44:32

[TENNELEC LB4000] [PAGE 1]

14:15:00		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF BETA-3	30.00	15	11012	0.00	0.00	0.00	0.00
13:44:32	2	uEFF BETA-4	30.00	3	10756	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-5	30.00	24	11427	0.00	0.00	0.00	0.00
	4	uEFF BETA-6	30.00	8	12217	0.00	0.00	0.00	0.00
GROUP B	1	uEFF BETA-7	30.00	7	11041	0.00	0.00	0.00	0.00
13:44:32	2	uEFF BETA-8	30.00	5	10234	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-1	30.00	48	12558	0.00	0.00	0.00	0.00
	4	uEFF BETA-2	30.00	1	8674	0.00	0.00	0.00	0.00

	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 1 COUNT TERMINATED IIII

7-23-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	30.00	4	11590	11594	0.13	386.33	386.47	0.00	0.00	0.00	0.00	1380.0	14:18:46
B	2	30.00	4	10967	10971	0.13	365.57	365.70	0.00	0.00	0.00	0.00	1380.0	14:18:46
B	3	30.00	38	10869	10907	1.27	362.30	363.57	0.00	0.00	0.00	0.00	1380.0	14:18:46
B	4	30.00	7	8829	8836	0.23	294.30	294.53	0.00	0.00	0.00	0.00	1380.0	14:18:46
A	1	30.00	4	10932	10936	0.13	364.40	364.53	0.00	0.00	0.00	0.00	1357.5	14:18:46
A	2	30.00	6	11330	11336	0.20	377.67	377.87	0.00	0.00	0.00	0.00	1357.5	14:18:46
A	3	30.00	15	11164	11179	0.50	372.13	372.63	0.00	0.00	0.00	0.00	1357.5	14:18:46
A	4	30.00	9	11398	11407	0.30	379.93	380.23	0.00	0.00	0.00	0.00	1357.5	14:18:46

[TENNELEC LB4000] [PAGE 1]

14:51:10		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF BETA-2	30.00	4	10932	0.00	0.00	0.00	0.00
14:18:46	2	uEFF BETA-3	30.00	6	11330	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-4	30.00	15	11164	0.00	0.00	0.00	0.00
	4	uEFF BETA-5	30.00	9	11398	0.00	0.00	0.00	0.00
UP B	1	uEFF BETA-6	30.00	4	11590	0.00	0.00	0.00	0.00
14:18:46	2	uEFF BETA-7	30.00	4	10967	0.00	0.00	0.00	0.00
30.00	3	uEFF BETA-8	30.00	38	10869	0.00	0.00	0.00	0.00
	4	uEFF BETA-1	30.00	7	8829	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 4 COUNT TERMINATED IIII

7-22-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	45.00	12670	5029	17699	281.56	111.76	393.31	0.00	0.00	0.00	0.00	1380.0	10:23:15
B	2	45.00	12452	4199	16651	276.71	93.31	370.02	0.00	0.00	0.00	0.00	1380.0	10:23:15
B	3	45.00	10438	4619	15057	231.96	102.64	334.60	0.00	0.00	0.00	0.00	1380.0	10:23:15
B	4	45.00	11375	4475	15850	252.78	99.44	352.22	0.00	0.00	0.00	0.00	1380.0	10:23:15
A	1	45.00	12431	5417	17848	276.24	120.38	396.62	0.00	0.00	0.00	0.00	1357.5	10:23:15
A	2	45.00	13630	5653	19283	302.89	125.62	428.51	0.00	0.00	0.00	0.00	1357.5	10:23:15
A	3	45.00	12700	5189	17889	282.22	115.31	397.53	0.00	0.00	0.00	0.00	1357.5	10:23:15
A	4	45.00	12192	5458	17650	270.93	121.29	392.22	0.00	0.00	0.00	0.00	1357.5	10:23:15

[TENNELEC LB4000] [PAGE 1]

11:09:03		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF ALPHA-1	45.00	12431	5417	0.00	0.00	0.00	0.00
10:23:15	2	uEFF ALPHA-2	45.00	13630	5653	0.00	0.00	0.00	0.00
45.00	3	uEFF APLHA-3	45.00	12700	5169	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-4	45.00	12192	5458	0.00	0.00	0.00	0.00
GROUP B	1	uEFF ALPHA-5	45.00	12670	5029	0.00	0.00	0.00	0.00
10:23:15	2	uEFF ALPHA-6	45.00	12452	4199	0.00	0.00	0.00	0.00
45.00	3	uEFF ALPHA-7	45.00	10438	4619	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-8	45.00	11375	4475	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 3 COUNT TERMINATED ////

7-22-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	45.00	12095	4966	17061	268.78	110.36	379.13	0.00	0.00	0.00	0.00	1380.0	11:09:09
B	2	45.00	12528	4209	16737	278.40	93.53	371.93	0.00	0.00	0.00	0.00	1380.0	11:09:09
B	3	45.00	12726	5148	17874	282.80	114.40	397.20	0.00	0.00	0.00	0.00	1380.0	11:09:09
B	4	45.00	10750	4311	15061	238.89	95.80	334.69	0.00	0.00	0.00	0.00	1380.0	11:09:09
A	1	45.00	11068	4982	16050	245.96	110.71	356.67	0.00	0.00	0.00	0.00	1357.5	11:09:09
A	2	45.00	12755	5432	18187	283.44	120.71	404.16	0.00	0.00	0.00	0.00	1357.5	11:09:09
A	3	45.00	13861	5436	19297	308.02	120.80	428.82	0.00	0.00	0.00	0.00	1357.5	11:09:09
A	4	45.00	12610	5517	18127	280.22	122.60	402.82	0.00	0.00	0.00	0.00	1357.5	11:09:09

[TENNELEC LB4000] [PAGE 1]

11:55:11		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF ALPHA-8	45.00	11068	4982	0.00	0.00	0.00	0.00
11:09:09	2	uEFF ALPHA-1	45.00	12755	5432	0.00	0.00	0.00	0.00
45.00	3	uEFF APLHA-2	45.00	13861	5436	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-3	45.00	12610	5517	0.00	0.00	0.00	0.00
GROUP B	1	uEFF ALPHA-4	45.00	12095	4966	0.00	0.00	0.00	0.00

GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
OUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 4 COUNT TERMINATED ////

7-22-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	45.00	12875	5238	18113	286.11	116.40	402.51	0.00	0.00	0.00	0.00	1380.0	11:55:50
B	2	45.00	12086	4463	16549	268.58	99.18	367.76	0.00	0.00	0.00	0.00	1380.0	11:55:50
B	3	45.00	12918	5045	17963	287.07	112.11	399.18	0.00	0.00	0.00	0.00	1380.0	11:55:50
B	4	45.00	12537	4783	17320	278.60	106.29	384.89	0.00	0.00	0.00	0.00	1380.0	11:55:50
A	1	45.00	10367	4733	15100	230.38	105.18	335.56	0.00	0.00	0.00	0.00	1357.5	11:55:50
A	2	45.00	11218	5032	16250	249.29	111.82	361.11	0.00	0.00	0.00	0.00	1357.5	11:55:50
A	3	45.00	12785	5450	18235	284.11	121.11	405.22	0.00	0.00	0.00	0.00	1357.5	11:55:50
A	4	45.00	14091	5737	19828	313.13	127.49	440.62	0.00	0.00	0.00	0.00	1357.5	11:55:50

[TENNELEC LB4000] [PAGE 1]

12:41:17		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF ALPHA-7	45.00	10367	4733	0.00	0.00	0.00	0.00
55:50	2	uEFF ALPHA-8	45.00	11218	5032	0.00	0.00	0.00	0.00
45.00	3	uEFF ALPHA-1	45.00	12785	5450	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-2	45.00	14091	5737	0.00	0.00	0.00	0.00
GROUP B	1	uEFF ALPHA-3	45.00	12875	5238	0.00	0.00	0.00	0.00
11:55:50	2	uEFF ALPHA-4	45.00	12086	4463	0.00	0.00	0.00	0.00
45.00	3	uEFF ALPHA-5	45.00	12918	5045	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-6	45.00	12537	4783	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 4 COUNT TERMINATED ////

7-22-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	45.00	13651	5468	19119	303.36	121.51	424.87	0.00	0.00	0.00	0.00	1380.0	12:41:58
B	2	45.00	12449	4115	16564	276.64	91.44	368.09	0.00	0.00	0.00	0.00	1380.0	12:41:58
		45.00	12099	5105	17204	268.87	113.44	382.31	0.00	0.00	0.00	0.00	1380.0	12:41:58
		45.00	12719	4751	17470	282.64	105.58	388.22	0.00	0.00	0.00	0.00	1380.0	12:41:58
A	1	45.00	12743	5109	17852	283.18	113.53	396.71	0.00	0.00	0.00	0.00	1357.5	12:41:58
A	2	45.00	10341	4730	15071	229.80	105.11	334.91	0.00	0.00	0.00	0.00	1357.5	12:41:58
A	3	45.00	11332	5112	16444	251.82	113.60	365.42	0.00	0.00	0.00	0.00	1357.5	12:41:58

13:27:54		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF ALPHA-6	45.00	12743	5109	0.00	0.00	0.00	0.00
12:41:58	2	uEFF ALPHA-7	45.00	10341	4730	0.00	0.00	0.00	0.00
45.00	3	uEFF ALPHA-8	45.00	11332	5112	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-1	45.00	12923	5551	0.00	0.00	0.00	0.00
GROUP B	1	uEFF ALPHA-2	45.00	13651	5468	0.00	0.00	0.00	0.00
12:41:58	2	uEFF ALPHA-3	45.00	12449	4115	0.00	0.00	0.00	0.00
45.00	3	uEFF ALPHA-4	45.00	12099	5105	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-5	45.00	12719	4751	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 4 COUNT TERMINATED ////

7-22-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	45.00	12847	5293	18140	285.49	117.62	403.11	0.00	0.00	0.00	0.00	1380.0	13:28:12
B	2	45.00	13529	4439	17968	300.64	98.64	399.29	0.00	0.00	0.00	0.00	1380.0	13:28:12
B	3	45.00	12970	5208	18178	288.22	115.73	403.96	0.00	0.00	0.00	0.00	1380.0	13:28:12
B	4	45.00	12182	4698	16880	270.71	104.40	375.11	0.00	0.00	0.00	0.00	1380.0	13:28:12
A	1	45.00	12491	5001	17492	277.58	111.13	388.71	0.00	0.00	0.00	0.00	1357.5	13:28:12
A	2	45.00	12476	5067	17543	277.24	112.60	389.84	0.00	0.00	0.00	0.00	1357.5	13:28:12
A	3	45.00	10573	4582	15155	234.96	101.82	336.78	0.00	0.00	0.00	0.00	1357.5	13:28:12
A	4	45.00	11296	5142	16438	251.02	114.27	365.29	0.00	0.00	0.00	0.00	1357.5	13:28:12

[TENNELEC LB4000] [PAGE 1]

14:13:59		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF ALPHA-5	45.00	12491	5001	0.00	0.00	0.00	0.00
13:28:12	2	uEFF ALPHA-6	45.00	12476	5067	0.00	0.00	0.00	0.00
45.00	3	uEFF ALPHA-7	45.00	10573	4582	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-8	45.00	11296	5142	0.00	0.00	0.00	0.00
GROUP B	1	uEFF ALPHA-1	45.00	12847	5293	0.00	0.00	0.00	0.00
13:28:12	2	uEFF ALPHA-2	45.00	13529	4439	0.00	0.00	0.00	0.00
45.00	3	uEFF ALPHA-3	45.00	12970	5208	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-4	45.00	12182	4698	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

B	1	45.00	11248	4816	16064	249.96	107.02	356.98	0.00	0.00	0.00	0.00	1380.0	14:14:03
B	2	45.00	12657	4381	17038	281.27	97.36	378.62	0.00	0.00	0.00	0.00	1380.0	14:14:03
B	3	45.00	13714	5080	18794	304.76	112.89	417.64	0.00	0.00	0.00	0.00	1380.0	14:14:03
B	4	45.00	12548	4806	17354	278.84	106.80	385.64	0.00	0.00	0.00	0.00	1380.0	14:14:03
	1	45.00	12047	5097	17144	267.71	113.27	380.98	0.00	0.00	0.00	0.00	1357.5	14:14:03
	2	45.00	12591	5241	17832	279.80	116.47	396.27	0.00	0.00	0.00	0.00	1357.5	14:14:03
A	3	45.00	12939	5327	18266	287.53	118.38	405.91	0.00	0.00	0.00	0.00	1357.5	14:14:03
A	4	45.00	10757	4916	15673	239.04	109.24	348.29	0.00	0.00	0.00	0.00	1357.5	14:14:03

[TENNELEC LB4000] [PAGE 1]

15:01:49		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF ALPHA-4	45.00	12047	5097	0.00	0.00	0.00	0.00
14:14:03	2	uEFF ALPHA-5	45.00	12591	5241	0.00	0.00	0.00	0.00
45.00	3	uEFF ALPHA-6	45.00	12939	5327	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-7	45.00	10757	4916	0.00	0.00	0.00	0.00
GROUP B	1	uEFF ALPHA-8	45.00	11248	4816	0.00	0.00	0.00	0.00
14:14:03	2	uEFF ALPHA-1	45.00	12657	4381	0.00	0.00	0.00	0.00
45.00	3	uEFF ALPHA-2	45.00	13714	5080	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-3	45.00	12548	4806	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 2 COUNT TERMINATED ////

7-22-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	45.00	10391	4670	15061	230.91	103.78	334.69	0.00	0.00	0.00	0.00	1380.0	15:01:57
B	2	45.00	11253	3944	15197	250.07	87.64	337.71	0.00	0.00	0.00	0.00	1380.0	15:01:57
B	3	45.00	12839	5142	17981	285.31	114.27	399.58	0.00	0.00	0.00	0.00	1380.0	15:01:57
B	4	45.00	13304	4989	18293	295.64	110.87	406.51	0.00	0.00	0.00	0.00	1380.0	15:01:57
A	1	45.00	12495	5206	17701	277.67	115.69	393.36	0.00	0.00	0.00	0.00	1357.5	15:01:57
A	2	45.00	12191	5229	17420	270.91	116.20	387.11	0.00	0.00	0.00	0.00	1357.5	15:01:57
A	3	45.00	12785	5044	17829	284.11	112.09	396.20	0.00	0.00	0.00	0.00	1357.5	15:01:57
A	4	45.00	12766	5553	18319	283.69	123.40	407.09	0.00	0.00	0.00	0.00	1357.5	15:01:57

[TENNELEC LB4000] [PAGE 1]

15:47:45		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF ALPHA-3	45.00	12495	5206	0.00	0.00	0.00	0.00
15:01:57	2	uEFF ALPHA-4	45.00	12191	5229	0.00	0.00	0.00	0.00
45.00	3	uEFF ALPHA-5	45.00	12785	5044	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-6	45.00	12766	5553	0.00	0.00	0.00	0.00
GROUP B	1	uEFF ALPHA-7	45.00	10391	4670	0.00	0.00	0.00	0.00
15:01:57	2	uEFF ALPHA-8	45.00	11253	3944	0.00	0.00	0.00	0.00
45.00	3	uEFF ALPHA-1	45.00	12839	5142	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-2	45.00	13304	4989	0.00	0.00	0.00	0.00

	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group A channel 2 COUNT TERMINATED ////

7-22-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	45.00	12792	5314	18106	284.27	118.09	402.36	0.00	0.00	0.00	0.00	1380.0	15:47:51
B	2	45.00	10539	3744	14283	234.20	83.20	317.40	0.00	0.00	0.00	0.00	1380.0	15:47:51
B	3	45.00	11239	4806	16045	249.76	106.80	356.56	0.00	0.00	0.00	0.00	1380.0	15:47:51
B	4	45.00	12687	4807	17494	281.93	106.82	388.76	0.00	0.00	0.00	0.00	1380.0	15:47:51
A	1	45.00	13481	5429	18910	299.58	120.64	420.22	0.00	0.00	0.00	0.00	1357.5	15:47:51
A	2	45.00	12108	5053	17161	269.07	112.29	381.36	0.00	0.00	0.00	0.00	1357.5	15:47:51
A	3	45.00	12169	5105	17274	270.42	113.44	383.87	0.00	0.00	0.00	0.00	1357.5	15:47:51
A	4	45.00	12772	5373	18145	283.82	119.40	403.22	0.00	0.00	0.00	0.00	1357.5	15:47:51

[TENNELEC LB4000] [PAGE 1]

16:37:45		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	uEFF ALPHA-2	45.00	13481	5429	0.00	0.00	0.00	0.00
15:47:51	2	uEFF ALPHA-3	45.00	12108	5053	0.00	0.00	0.00	0.00
45.00	3	uEFF ALPHA-4	45.00	12169	5105	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-5	45.00	12772	5373	0.00	0.00	0.00	0.00
GROUP B	1	uEFF ALPHA-6	45.00	12792	5314	0.00	0.00	0.00	0.00
15:47:51	2	uEFF ALPHA-7	45.00	10539	3744	0.00	0.00	0.00	0.00
45.00	3	uEFF ALPHA-8	45.00	11239	4806	0.00	0.00	0.00	0.00
	4	uEFF ALPHA-1	45.00	12687	4807	0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
0.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

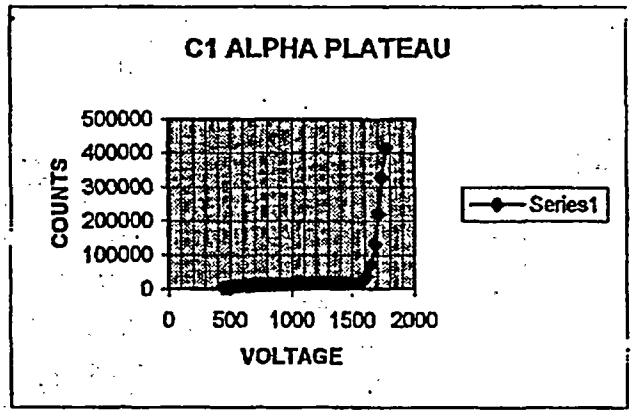
Group A channel 3 COUNT TERMINATED ////

ETECTOR C1 ALPHA PLATEAU

ALPHA	VOLTAGE	BETA	SUM
0	450	4144	4144
0	480	5902	5902
0	510	7856	7856
0	540	9325	9325
0	570	10113	10113
0	600	11098	11098
0	630	12009	12009
0	660	12149	12149
0	690	12618	12618
0	720	12941	12941
0	750	13073	13073
0	780	13563	13563
0	810	13498	13498
0	840	13543	13543
0	870	13830	13830
0	900	13918	13918
0	930	13715	13715
14	960	14072	14086
211	990	14222	14433
660	1020	14553	15213
1849	1050	14298	16147
3586	1080	13189	16775
6610	1110	10815	17425
9735	1140	8076	17811
11531	1170	6694	18225
12324	1200	6177	18501
13055	1230	5958	19013
13047	1260	5860	18907
13278	1290	5716	18994
13616	1320	5656	19272
13734	1350	5732	19466
13786	1380	5559	19345
13875	1410	5589	19464
13989	1440	5408	19397
14600	1470	4866	19466
15657	1500	3942	19599
16280	1530	3178	19458
16994	1560	3265	20259
17825	1590	7181	25006
18441	1620	20771	39212
18604	1650	53552	72156
18643	1680	114272	132915
18931	1710	202957	221888
19875	1740	307832	327707
70311	1770	342144	412455
			0

SOURCE #	92AM4702122
ISOTOPE	AM-241
DPM	23100
REF. DATE	5/26/92
4 PI GEOMETRY	YES

OPTIMUN VOLTAGE 540



DATE: 7/24/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/24/05

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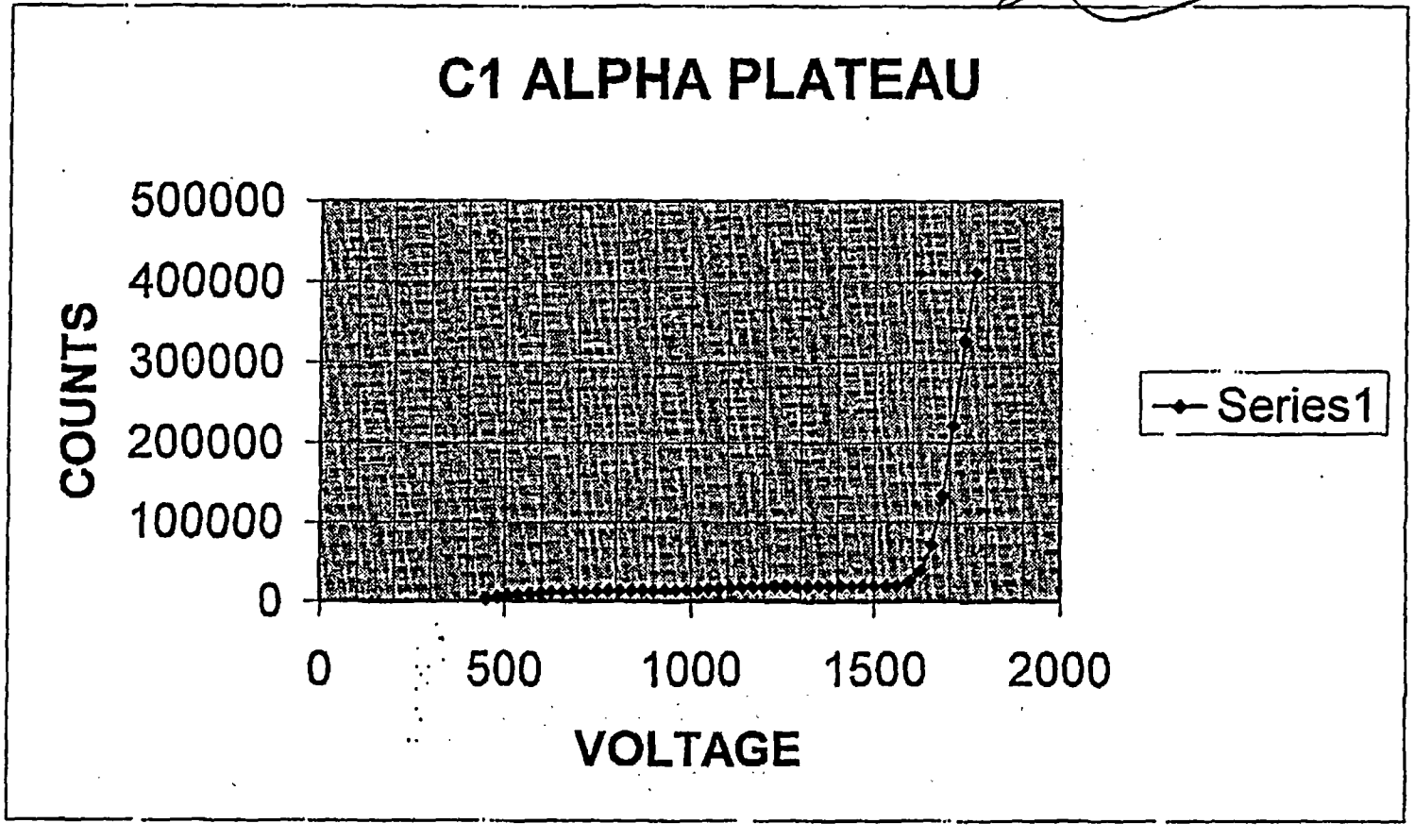
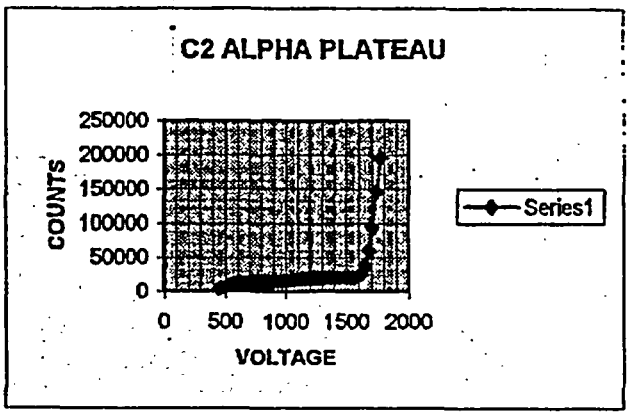


DETECTOR C2 ALPHA PLATEAU

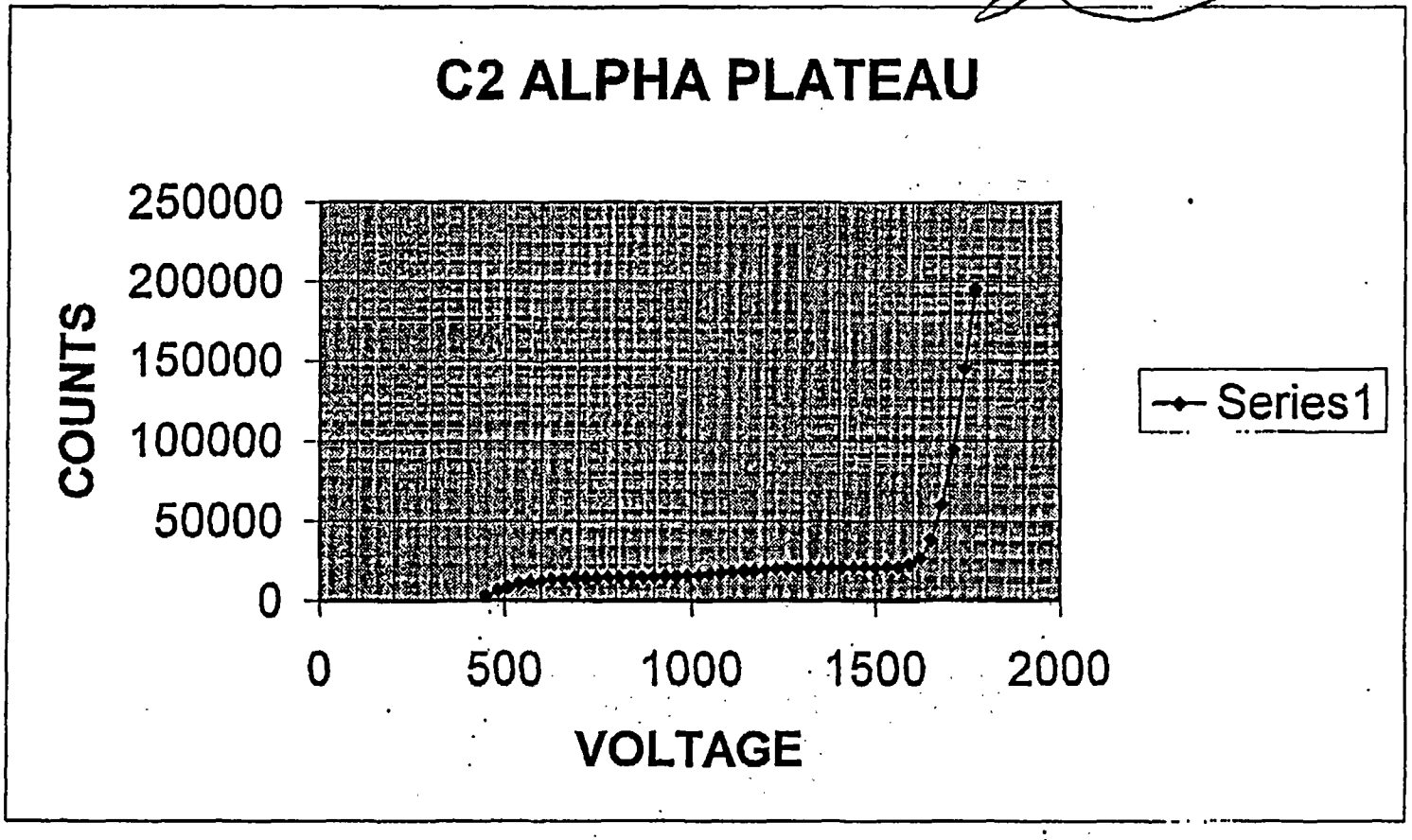
ALPHA	VOLTAGE	BETA	SUM
0	450	3544	3544
0	480	6458	6458
0	510	8786	8786
0	540	10873	10873
0	570	12290	12290
0	600	12855	12855
0	630	13534	13534
0	660	13788	13788
0	690	14207	14207
0	720	14330	14330
0	750	14540	14540
0	780	14747	14747
0	810	14793	14793
0	840	15072	15072
0	870	14889	14889
0	900	15109	15109
0	930	15086	15086
20	960	15131	15151
171	990	15541	15712
574	1020	15687	16261
1436	1050	15405	16841
2908	1080	14557	17465
5423	1110	12842	18265
8038	1140	10799	18837
10484	1170	8610	19094
12416	1200	7131	19547
13655	1230	6406	20061
14193	1260	6071	20264
14012	1290	6022	20034
14308	1320	6029	20337
14589	1350	6053	20642
14846	1380	5872	20718
14870	1410	5900	20770
14913	1440	5857	20770
15499	1470	5607	21106
15884	1500	4812	20696
16667	1530	4497	21164
17296	1560	3850	21146
18150	1590	4542	22692
18801	1620	8150	26951
19526	1650	19221	38747
19791	1680	40414	60205
19944	1710	74497	94441
20994	1740	124389	145383
43475	1770	151665	195140

SOURCE #	92AM4702123
ISOTOPE	AM-241
DPM	23900
REF. DATE	5/26/92
4 PI GEOMETRY	YES

OPTIMUN VOLTAGE 510



DATE: 7/24/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/24/05
SIGNATURE:

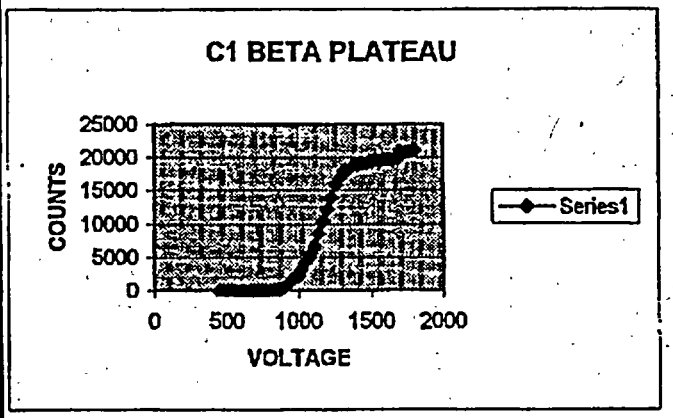


DETECTOR C1 BETA PLATEAU

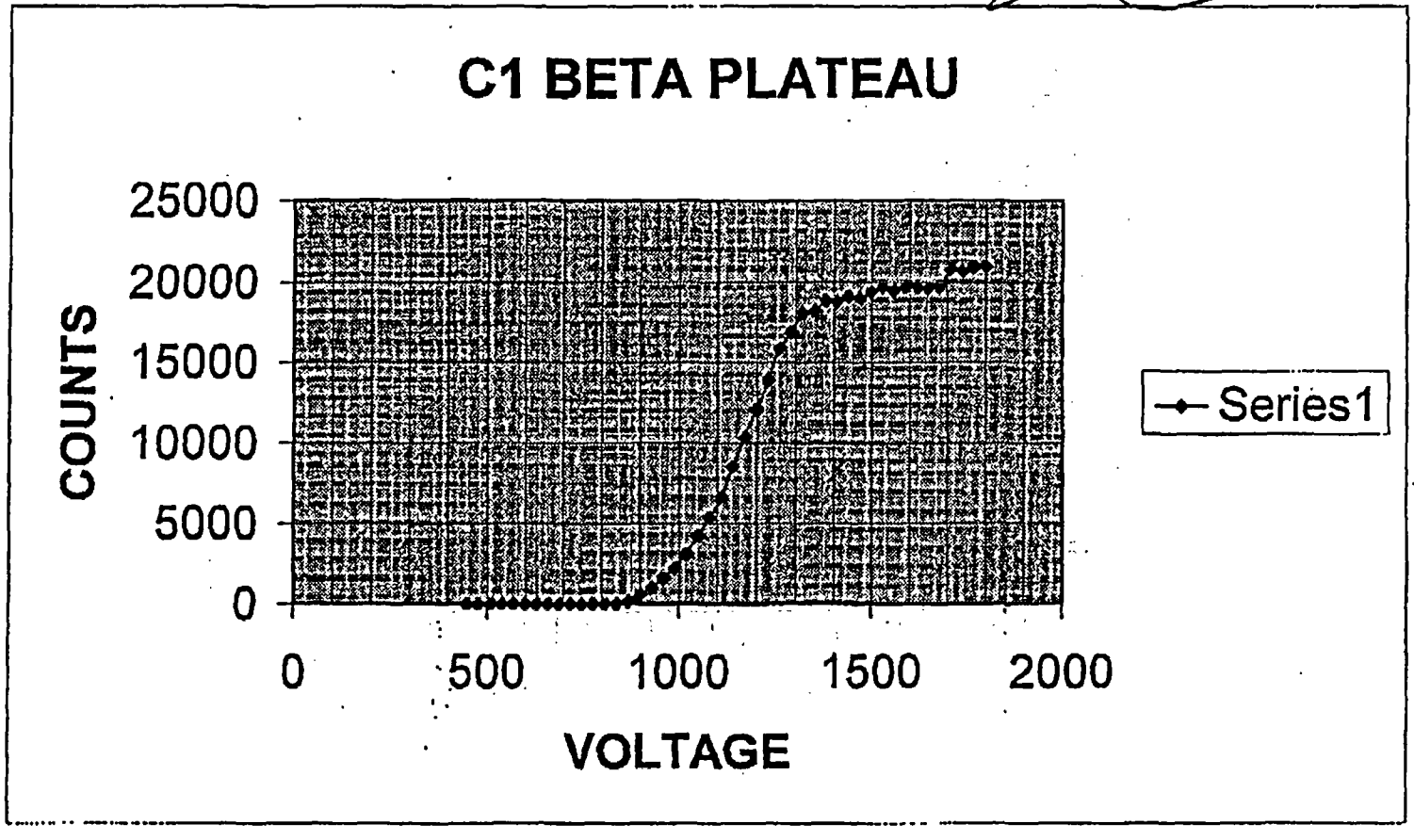
ALPHA	VOLTAGE	BETA	SUM
n/a	450	n/a	0
n/a	480	n/a	0
n/a	510	n/a	2
n/a	540	n/a	0
n/a	570	n/a	0
n/a	600	n/a	0
n/a	630	n/a	1
n/a	660	n/a	0
n/a	690	n/a	0
n/a	720	n/a	1
n/a	750	n/a	0
n/a	780	n/a	1
n/a	810	n/a	10
n/a	840	n/a	51
n/a	870	n/a	186
n/a	900	n/a	549
n/a	930	n/a	1003
n/a	960	n/a	1604
n/a	990	n/a	2247
n/a	1020	n/a	3088
n/a	1050	n/a	4187
n/a	1080	n/a	5378
n/a	1110	n/a	6654
n/a	1140	n/a	8515
n/a	1170	n/a	10368
n/a	1200	n/a	12141
n/a	1230	n/a	13922
n/a	1260	n/a	15875
n/a	1290	n/a	16946
n/a	1320	n/a	18149
n/a	1350	n/a	18241
n/a	1380	n/a	18884
n/a	1410	n/a	18820
n/a	1440	n/a	19160
n/a	1470	n/a	19028
n/a	1500	n/a	19421
n/a	1530	n/a	19717
n/a	1560	n/a	19479
n/a	1590	n/a	19694
n/a	1620	n/a	19697
n/a	1650	n/a	19634
n/a	1680	n/a	19801
n/a	1710	n/a	20838
n/a	1740	n/a	20718
n/a	1770	n/a	20968
n/a	1800	n/a	21034

SOURCE #	92SR4702140
ISOTOPE	SR-90/Y-90
DPM	26500
REF. DATE	6/3/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 1380



DATE: 7/25/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/25/05
SIGNATURE:

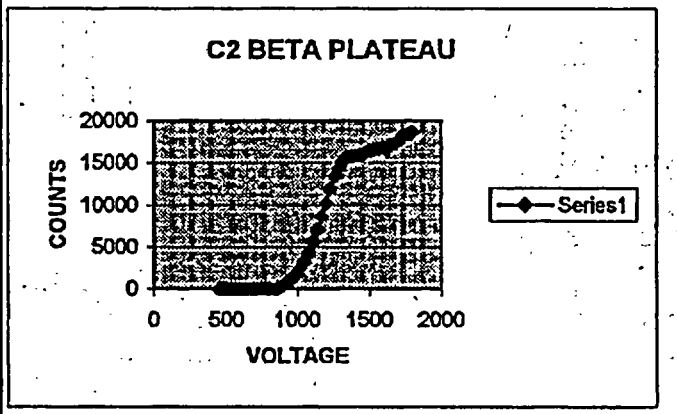


DETECTOR C2 BETA PLATEAU

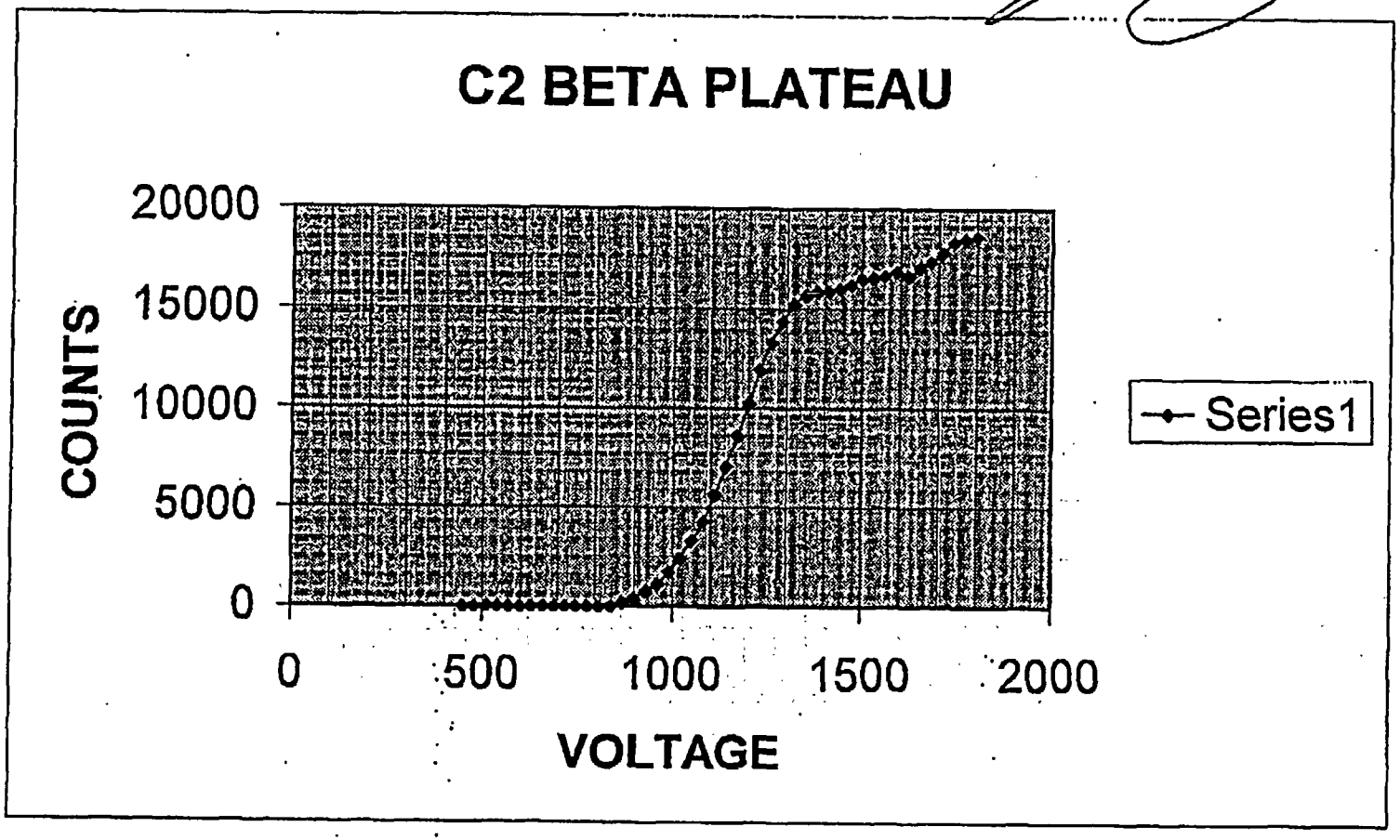
ALPHA	VOLTAGE	BETA	SUM
n/a	450	n/a	1
n/a	480	n/a	4
n/a	510	n/a	0
n/a	540	n/a	3
n/a	570	n/a	0
n/a	600	n/a	4
n/a	630	n/a	2
n/a	660	n/a	0
n/a	690	n/a	1
n/a	720	n/a	0
n/a	750	n/a	1
n/a	780	n/a	0
n/a	810	n/a	3
n/a	840	n/a	33
n/a	870	n/a	174
n/a	900	n/a	390
n/a	930	n/a	779
n/a	960	n/a	1150
n/a	990	n/a	1732
n/a	1020	n/a	2432
n/a	1050	n/a	3315
n/a	1080	n/a	4274
n/a	1110	n/a	5613
n/a	1140	n/a	7027
n/a	1170	n/a	8578
n/a	1200	n/a	10200
n/a	1230	n/a	11882
n/a	1260	n/a	13313
n/a	1290	n/a	14362
n/a	1320	n/a	15185
n/a	1350	n/a	15645
n/a	1380	n/a	15820
n/a	1410	n/a	15844
n/a	1440	n/a	15977
n/a	1470	n/a	16196
n/a	1500	n/a	16480
n/a	1530	n/a	16535
n/a	1560	n/a	16637
n/a	1590	n/a	16836
n/a	1620	n/a	16627
n/a	1650	n/a	17082
n/a	1680	n/a	17347
n/a	1710	n/a	17780
n/a	1740	n/a	18326
n/a	1770	n/a	18462
n/a	1800	n/a	18602

SOURCE #	92SR4702141
ISOTOPE	SR-90/Y-90
DPM	24100
REF. DATE	6/3/92
4 PI GEOMETRY	YES

OPTIMUM VOLTAGE 1380



DATE: 7/25/03
INSTRUMENT ID: LB4100 SN# 12439-1
GOOD UNTIL: 7/25/05
SIGNATURE:



C12A34B

α 1,2 β 3,4

7-24-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	1.99	0	4144	4144	0.00	2082.41	2082.41	0.00	0.00	0.00	0.00	450.0	
C	2	1.99	0	3544	3544	0.00	1780.90	1780.90	0.00	0.00	0.00	0.00	450.0	
C	3	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	450.0	
C	4	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	450.0	
C	1	1.99	0	5902	5902	0.00	2965.83	2965.83	0.00	0.00	0.00	0.00	480.0	
C	2	1.99	0	6458	6458	0.00	3245.23	3245.23	0.00	0.00	0.00	0.00	480.0	
C	3	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	480.0	
C	4	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	480.0	
C	1	1.99	0	7856	7856	0.00	3947.74	3947.74	0.00	0.00	0.00	0.00	510.0	
C	2	1.99	0	8786	8786	0.00	4415.08	4415.08	0.00	0.00	0.00	0.00	510.0	
C	3	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	510.0	
C	4	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	510.0	
C	1	1.99	0	9235	9235	0.00	4640.70	4640.70	0.00	0.00	0.00	0.00	540.0	
C	2	1.99	0	10873	10873	0.00	5463.82	5463.82	0.00	0.00	0.00	0.00	540.0	
C	3	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	540.0	
C	4	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	540.0	
C	1	1.99	0	10113	10113	0.00	5081.91	5081.91	0.00	0.00	0.00	0.00	570.0	
C	2	1.99	0	12290	12290	0.00	6175.88	6175.88	0.00	0.00	0.00	0.00	570.0	
C	3	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	570.0	
C	4	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	570.0	
C	1	1.99	0	11098	11098	0.00	5576.88	5576.88	0.00	0.00	0.00	0.00	600.0	
C	2	1.99	0	12855	12855	0.00	6459.80	6459.80	0.00	0.00	0.00	0.00	600.0	
C	3	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	600.0	
C	4	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	600.0	
C	1	1.99	0	12009	12009	0.00	6034.67	6034.67	0.00	0.00	0.00	0.00	630.0	
C	2	1.99	0	13534	13534	0.00	6801.01	6801.01	0.00	0.00	0.00	0.00	630.0	
C	3	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	630.0	
C	4	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	630.0	
C	1	1.99	0	12149	12149	0.00	6105.03	6105.03	0.00	0.00	0.00	0.00	660.0	
C	2	1.99	0	13788	13788	0.00	6928.64	6928.64	0.00	0.00	0.00	0.00	660.0	
C	3	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	660.0	
C	4	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	660.0	
C	1	1.99	0	12618	12618	0.00	6340.70	6340.70	0.00	0.00	0.00	0.00	690.0	
C	2	1.99	0	14207	14207	0.00	7139.20	7139.20	0.00	0.00	0.00	0.00	690.0	
C	3	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	690.0	
C	4	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	690.0	
C	1	1.99	0	12941	12941	0.00	6503.02	6503.02	0.00	0.00	0.00	0.00	720.0	
C	2	1.99	0	14330	14330	0.00	7201.01	7201.01	0.00	0.00	0.00	0.00	720.0	
C	3	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	720.0	
C	4	1.99	0	3	3	0.00	1.51	1.51	0.00	0.00	0.00	0.00	720.0	
C	1	1.99	0	13073	13073	0.00	6569.35	6569.35	0.00	0.00	0.00	0.00	750.0	
C	2	1.99	0	14540	14540	0.00	7306.53	7306.53	0.00	0.00	0.00	0.00	750.0	
C	3	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	750.0	
C	4	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	750.0	
C	1	1.99	0	13563	13563	0.00	6815.58	6815.58	0.00	0.00	0.00	0.00	780.0	
C	2	1.99	0	14747	14747	0.00	7410.55	7410.55	0.00	0.00	0.00	0.00	780.0	
C	3	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	780.0	
C	4	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	780.0	

C	4	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	810.0
C	1	1.99	0	13543	13543	0.00	6805.53	6805.53	0.00	0.00	0.00	0.00	0.00	840.0
C	2	1.99	0	15072	15072	0.00	7573.87	7573.87	0.00	0.00	0.00	0.00	0.00	840.0
C	3	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	0.00	840.0
C	4	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	0.00	840.0
C	1	1.99	0	13830	13830	0.00	6949.75	6949.75	0.00	0.00	0.00	0.00	0.00	870.0
C	2	1.99	0	14889	14889	0.00	7481.91	7481.91	0.00	0.00	0.00	0.00	0.00	870.0
C	3	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	870.0
C	4	1.99	0	4	4	0.00	2.01	2.01	0.00	0.00	0.00	0.00	0.00	870.0
C	1	1.99	0	13918	13918	0.00	6993.97	6993.97	0.00	0.00	0.00	0.00	0.00	900.0
C	2	1.99	0	15109	15109	0.00	7592.46	7592.46	0.00	0.00	0.00	0.00	0.00	900.0
C	3	1.99	0	7	7	0.00	3.52	3.52	0.00	0.00	0.00	0.00	0.00	900.0
C	4	1.99	0	24	24	0.00	12.06	12.06	0.00	0.00	0.00	0.00	0.00	900.0
C	1	1.99	0	13715	13715	0.00	6891.96	6891.96	0.00	0.00	0.00	0.00	0.00	930.0
C	2	1.99	0	15086	15086	0.00	7580.90	7580.90	0.00	0.00	0.00	0.00	0.00	930.0
C	3	1.99	0	31	31	0.00	15.58	15.58	0.00	0.00	0.00	0.00	0.00	930.0
C	4	1.99	0	113	113	0.00	56.78	56.78	0.00	0.00	0.00	0.00	0.00	930.0
C	1	1.99	14	14072	14086	7.04	7071.36	7078.39	0.00	0.00	0.00	0.00	0.00	960.0
C	2	1.99	20	15131	15151	10.05	7603.52	7613.57	0.00	0.00	0.00	0.00	0.00	960.0
C	3	1.99	0	155	155	0.00	77.89	77.89	0.00	0.00	0.00	0.00	0.00	960.0
C	4	1.99	0	313	313	0.00	157.29	157.29	0.00	0.00	0.00	0.00	0.00	960.0
C	1	1.99	211	14222	14433	106.03	7146.73	7252.76	0.00	0.00	0.00	0.00	0.00	990.0
C	2	1.99	171	15541	15712	85.93	7809.55	7895.48	0.00	0.00	0.00	0.00	0.00	990.0
C	3	1.99	0	336	336	0.00	168.84	168.84	0.00	0.00	0.00	0.00	0.00	990.0
C	4	1.99	0	632	632	0.00	317.59	317.59	0.00	0.00	0.00	0.00	0.00	990.0
C	1	1.99	660	14553	15213	331.66	7313.07	7644.72	0.00	0.00	0.00	0.00	0.00	1020.0
C	2	1.99	574	15687	16261	288.44	7882.91	8171.36	0.00	0.00	0.00	0.00	0.00	1020.0
C	3	1.99	0	640	640	0.00	321.61	321.61	0.00	0.00	0.00	0.00	0.00	1020.0
C	4	1.99	0	990	990	0.00	497.49	497.49	0.00	0.00	0.00	0.00	0.00	1020.0
C	1	1.99	1849	14298	16147	929.15	7184.92	8114.07	0.00	0.00	0.00	0.00	0.00	1050.0
C	2	1.99	1436	15405	16841	721.61	7741.21	8462.81	0.00	0.00	0.00	0.00	0.00	1050.0
C	3	1.99	0	1137	1137	0.00	571.36	571.36	0.00	0.00	0.00	0.00	0.00	1050.0
C	4	1.99	0	1509	1509	0.00	758.29	758.29	0.00	0.00	0.00	0.00	0.00	1050.0
C	1	1.99	3586	13189	16775	1802.01	6627.64	8429.65	0.00	0.00	0.00	0.00	0.00	1080.0
C	2	1.99	2908	14557	17465	1461.31	7315.08	8776.38	0.00	0.00	0.00	0.00	0.00	1080.0
C	3	1.99	0	1648	1648	0.00	828.14	828.14	0.00	0.00	0.00	0.00	0.00	1080.0
C	4	1.99	0	2091	2091	0.00	1050.75	1050.75	0.00	0.00	0.00	0.00	0.00	1080.0
C	1	1.99	6610	10815	17425	3321.61	5434.67	8756.28	0.00	0.00	0.00	0.00	0.00	1110.0
C	2	1.99	5423	12842	18265	2725.13	6453.27	9178.39	0.00	0.00	0.00	0.00	0.00	1110.0
C	3	1.99	0	2302	2302	0.00	1156.78	1156.78	0.00	0.00	0.00	0.00	0.00	1110.0
C	4	1.99	1	2767	2768	0.50	1390.45	1390.95	0.00	0.00	0.00	0.00	0.00	1110.0
C	1	1.99	9735	8076	17811	4891.96	4058.29	8950.25	0.00	0.00	0.00	0.00	0.00	1140.0
C	2	1.99	8038	10799	18837	4039.20	5426.63	9465.83	0.00	0.00	0.00	0.00	0.00	1140.0
C	3	1.99	0	3241	3241	0.00	1628.64	1628.64	0.00	0.00	0.00	0.00	0.00	1140.0
C	4	1.99	1	3671	3672	0.50	1844.72	1845.23	0.00	0.00	0.00	0.00	0.00	1140.0
C	1	1.99	11531	6694	18225	5794.47	3363.82	9158.29	0.00	0.00	0.00	0.00	0.00	1170.0
C	2	1.99	10484	8610	19094	5268.34	4326.63	9594.97	0.00	0.00	0.00	0.00	0.00	1170.0
C	3	1.99	2	4219	4221	1.01	2120.10	2121.11	0.00	0.00	0.00	0.00	0.00	1170.0
C	4	1.99	1	4638	4639	0.50	2330.65	2331.16	0.00	0.00	0.00	0.00	0.00	1170.0
C	1	1.99	17374	6177	18501	4193.84	3104.07	8201.08	0.00	0.00	0.00	0.00	0.00	[illegible]

[illegible]	1.77	1	[illegible]	[illegible]	0.30	[illegible]	[illegible]	0.00	0.00	0.00	0.00	1200.0
C	1	1.99	13055	5958	19013	6560.30	2993.97	9554.27	0.00	0.00	0.00	0.00	1230.0
C	2	1.99	13655	6406	20061	6861.81	3219.10	10080.90	0.00	0.00	0.00	0.00	1230.0
C	3	1.99	0	6340	6340	0.00	3185.93	3185.93	0.00	0.00	0.00	0.00	1230.0
C	4	1.99	0	7113	7113	0.00	3574.37	3574.37	0.00	0.00	0.00	0.00	1230.0
C	1	1.98	13047	5860	18907	6589.39	2959.60	9548.99	0.00	0.00	0.00	0.00	1260.0
C	2	1.98	14193	6071	20264	7168.18	3066.16	10234.34	0.00	0.00	0.00	0.00	1260.0
C	3	1.99	0	8071	8071	0.00	4055.78	4055.78	0.00	0.00	0.00	0.00	1260.0
C	4	1.99	0	8525	8525	0.00	4283.92	4283.92	0.00	0.00	0.00	0.00	1260.0
C	1	1.98	13278	5716	18994	6706.06	2886.87	9592.93	0.00	0.00	0.00	0.00	1290.0
C	2	1.98	14012	6022	20034	7076.77	3041.41	10118.18	0.00	0.00	0.00	0.00	1290.0
C	3	1.99	0	9417	9417	0.00	4732.16	4732.16	0.00	0.00	0.00	0.00	1290.0
C	4	1.99	0	10103	10103	0.00	5076.88	5076.88	0.00	0.00	0.00	0.00	1290.0
C	1	1.98	13616	5656	19272	6876.77	2856.57	9733.33	0.00	0.00	0.00	0.00	1320.0
C	2	1.98	14308	6029	20337	7226.26	3044.95	10271.21	0.00	0.00	0.00	0.00	1320.0
C	3	1.99	1	11026	11027	0.50	5540.70	5541.21	0.00	0.00	0.00	0.00	1320.0
C	4	1.99	1	11483	11484	0.50	5770.35	5770.85	0.00	0.00	0.00	0.00	1320.0
C	1	1.98	13734	5732	19466	6936.36	2894.95	9831.31	0.00	0.00	0.00	0.00	1350.0
C	2	1.98	14589	6053	20642	7368.18	3057.07	10425.25	0.00	0.00	0.00	0.00	1350.0
C	3	1.98	1	12600	12601	0.51	6363.64	6364.14	0.00	0.00	0.00	0.00	1350.0
C	4	1.98	3	12839	12842	1.52	6484.34	6485.86	0.00	0.00	0.00	0.00	1350.0
C	1	1.99	13786	5559	19345	6927.64	2793.47	9721.11	0.00	0.00	0.00	0.00	1380.0
C	2	1.98	14846	5872	20718	7497.98	2965.66	10463.64	0.00	0.00	0.00	0.00	1380.0
C	3	1.99	6	14116	14122	3.02	7093.47	7096.48	0.00	0.00	0.00	0.00	1380.0
C	4	1.99	21	13821	13842	10.55	6945.23	6955.78	0.00	0.00	0.00	0.00	1380.0
C	1	1.98	13875	5589	19464	7007.58	2822.73	9830.30	0.00	0.00	0.00	0.00	1410.0
C	2	1.98	14870	5900	20770	7510.10	2979.80	10489.90	0.00	0.00	0.00	0.00	1410.0
C	3	1.98	25	15452	15477	12.63	7804.04	7816.67	0.00	0.00	0.00	0.00	1410.0
C	4	1.98	79	14748	14827	39.90	7448.48	7488.38	0.00	0.00	0.00	0.00	1410.0
C	1	1.98	13989	5408	19397	7065.15	2731.31	9796.46	0.00	0.00	0.00	0.00	1440.0
C	2	1.98	14913	5857	20770	7531.82	2958.08	10489.90	0.00	0.00	0.00	0.00	1440.0
C	3	1.98	118	16286	16404	59.60	8225.25	8284.85	0.00	0.00	0.00	0.00	1440.0
C	4	1.99	257	15299	15556	129.15	7687.94	7817.09	0.00	0.00	0.00	0.00	1440.0
C	1	1.98	14600	4866	19466	7373.74	2457.58	9831.31	0.00	0.00	0.00	0.00	1470.0
C	2	1.98	15499	5607	21106	7827.78	2831.82	10659.60	0.00	0.00	0.00	0.00	1470.0
C	3	1.98	337	16995	17332	170.20	8583.33	8753.54	0.00	0.00	0.00	0.00	1470.0
C	4	1.98	599	15367	15966	302.53	7761.11	8063.64	0.00	0.00	0.00	0.00	1470.0
C	1	1.98	15657	3942	19599	7907.58	1990.91	9898.48	0.00	0.00	0.00	0.00	1500.0
C	2	1.98	15884	4812	20696	8022.22	2430.30	10452.53	0.00	0.00	0.00	0.00	1500.0
C	3	1.98	684	16764	17448	345.45	8466.67	8812.12	0.00	0.00	0.00	0.00	1500.0
C	4	1.98	969	14773	15742	489.39	7461.11	7950.51	0.00	0.00	0.00	0.00	1500.0
C	1	1.98	16280	3178	19458	8222.22	1605.05	9827.27	0.00	0.00	0.00	0.00	1530.0
C	2	1.98	16667	4497	21164	8417.68	2271.21	10688.89	0.00	0.00	0.00	0.00	1530.0
C	3	1.98	1184	16759	17943	597.98	8464.14	9062.12	0.00	0.00	0.00	0.00	1530.0
C	4	1.98	1607	14778	16385	811.62	7463.64	8275.25	0.00	0.00	0.00	0.00	1530.0
C	1	1.98	16994	3265	20259	8582.83	1648.99	10231.82	0.00	0.00	0.00	0.00	1560.0
C	2	1.98	17296	3850	21146	8735.35	1944.44	10679.80	0.00	0.00	0.00	0.00	1560.0
C	3	1.98	1796	16303	18099	907.07	8233.84	9140.91	0.00	0.00	0.00	0.00	1560.0
C	4	1.98	2453	14113	16566	1238.89	7127.78	8366.67	0.00	0.00	0.00	0.00	1560.0
C	1	1.98	17825	7181	25006	9002.53	3626.77	12629.29	0.00	0.00	0.00	0.00	1590.0

C	1	1.98	18441	20771	39212	9313.64	10490.40	19804.04	0.00	0.00	0.00	0.00	1620.0
C	2	1.98	18801	8150	26951	9495.45	4116.16	13611.62	0.00	0.00	0.00	0.00	1620.0
C	3	1.98	3825	14406	18231	1931.82	7275.76	9207.58	0.00	0.00	0.00	0.00	1620.0
C	4	1.98	5005	11619	16624	2527.78	5868.18	8395.96	0.00	0.00	0.00	0.00	1620.0
	1	1.97	18604	53552	72156	9443.65	27183.76	36627.41	0.00	0.00	0.00	0.00	1650.0
	2	1.98	19526	19221	38747	9861.62	9707.58	19569.19	0.00	0.00	0.00	0.00	1650.0
C	3	1.98	5229	13177	18406	2640.91	6655.05	9295.96	0.00	0.00	0.00	0.00	1650.0
C	4	1.98	6805	10158	16963	3436.87	5130.30	8567.17	0.00	0.00	0.00	0.00	1650.0
C	1	1.96	18643	114272	132915	9511.73	58302.04	67813.78	0.00	0.00	0.00	0.00	1680.0
C	2	1.97	19791	40414	60205	10046.19	20514.72	30560.91	0.00	0.00	0.00	0.00	1680.0
C	3	1.98	6999	11515	18514	3534.85	5815.66	9350.51	0.00	0.00	0.00	0.00	1680.0
C	4	1.98	8883	8045	16928	4486.36	4063.13	8549.49	0.00	0.00	0.00	0.00	1680.0
C	1	1.94	18931	202957	221888	9758.25	104617.01	114375.26	0.00	0.00	0.00	0.00	1710.0
C	2	1.96	19944	74497	94441	10175.51	38008.67	48184.18	0.00	0.00	0.00	0.00	1710.0
C	3	1.98	9379	9387	18766	4736.87	4740.91	9477.78	0.00	0.00	0.00	0.00	1710.0
C	4	1.98	11217	6165	17382	5665.15	3113.64	8778.79	0.00	0.00	0.00	0.00	1710.0
C	1	1.91	19875	307832	327707	10405.76	161168.59	171574.35	0.00	0.00	0.00	0.00	1740.0
C	2	1.95	20994	124389	145383	10766.15	63789.23	74555.38	0.00	0.00	0.00	0.00	1740.0
C	3	1.98	11633	6968	18601	5875.25	3519.19	9394.44	0.00	0.00	0.00	0.00	1740.0
C	4	1.98	13135	4484	17619	6633.84	2264.65	8898.48	0.00	0.00	0.00	0.00	1740.0
C	1	1.90	70311	342144	412455	37005.79	180075.79	217081.58	0.00	0.00	0.00	0.00	1770.0
C	2	1.94	43475	151665	195140	22409.79	78177.84	100587.63	0.00	0.00	0.00	0.00	1770.0
C	3	1.98	14053	4911	18964	7097.47	2480.30	9577.78	0.00	0.00	0.00	0.00	1770.0
C	4	1.98	15183	3299	18482	7668.18	1666.16	9334.34	0.00	0.00	0.00	0.00	1770.0

VKAWEK C12534A

α 3,4 β 1,2

7-24-03

BF	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
	1.98	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	450.0	
C 2	1.98	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	450.0	
C 3	1.98	0	1924	1924	0.00	971.72	971.72	0.00	0.00	0.00	0.00	450.0	
C 4	1.98	0	4599	4599	0.00	2322.73	2322.73	0.00	0.00	0.00	0.00	450.0	
C 1	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	480.0	
C 2	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	480.0	
C 3	1.99	0	6711	6711	0.00	3372.36	3372.36	0.00	0.00	0.00	0.00	480.0	
C 4	1.99	0	7848	7848	0.00	3943.72	3943.72	0.00	0.00	0.00	0.00	480.0	
C 1	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	510.0	
C 2	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	510.0	
C 3	1.99	0	9983	9983	0.00	5016.58	5016.58	0.00	0.00	0.00	0.00	510.0	
C 4	1.99	0	10563	10563	0.00	5308.04	5308.04	0.00	0.00	0.00	0.00	510.0	
C 1	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	540.0	
C 2	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	540.0	
C 3	1.99	0	11002	11002	0.00	5528.64	5528.64	0.00	0.00	0.00	0.00	540.0	
C 4	1.99	0	12106	12106	0.00	6083.42	6083.42	0.00	0.00	0.00	0.00	540.0	
C 1	1.99	0	2	2	0.00	1.01	1.01	0.00	0.00	0.00	0.00	570.0	
C 2	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	570.0	
C 3	1.99	0	11590	11590	0.00	5824.12	5824.12	0.00	0.00	0.00	0.00	570.0	
C 4	1.99	0	12794	12794	0.00	6429.15	6429.15	0.00	0.00	0.00	0.00	570.0	
	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	600.0	
2	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	600.0	
C 3	1.99	0	12144	12144	0.00	6102.51	6102.51	0.00	0.00	0.00	0.00	600.0	
C 4	1.99	0	13329	13329	0.00	6697.99	6697.99	0.00	0.00	0.00	0.00	600.0	
C 1	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	630.0	
C 2	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	630.0	
C 3	1.99	0	12395	12395	0.00	6228.64	6228.64	0.00	0.00	0.00	0.00	630.0	
C 4	1.99	0	13658	13658	0.00	6863.32	6863.32	0.00	0.00	0.00	0.00	630.0	
C 1	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	660.0	
C 2	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	660.0	
C 3	1.99	0	12754	12754	0.00	6409.05	6409.05	0.00	0.00	0.00	0.00	660.0	
C 4	1.99	0	13694	13694	0.00	6881.41	6881.41	0.00	0.00	0.00	0.00	660.0	
C 1	1.99	0	2	2	0.00	1.01	1.01	0.00	0.00	0.00	0.00	690.0	
C 2	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	690.0	
C 3	1.99	0	12816	12816	0.00	6440.20	6440.20	0.00	0.00	0.00	0.00	690.0	
C 4	1.99	0	14114	14114	0.00	7092.46	7092.46	0.00	0.00	0.00	0.00	690.0	
C 1	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	720.0	
C 2	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	720.0	
C 3	1.99	0	13078	13078	0.00	6571.86	6571.86	0.00	0.00	0.00	0.00	720.0	
C 4	1.99	0	14445	14445	0.00	7258.79	7258.79	0.00	0.00	0.00	0.00	720.0	
	1.99	0	2	2	0.00	1.01	1.01	0.00	0.00	0.00	0.00	750.0	
2	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	750.0	
C 3	1.99	0	13259	13259	0.00	6662.81	6662.81	0.00	0.00	0.00	0.00	750.0	
C 4	1.99	0	14309	14309	0.00	7190.45	7190.45	0.00	0.00	0.00	0.00	750.0	
C 1	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	780.0	
C 2	1.99	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	780.0	

C	1	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	810.0
C	2	1.99	0	2	2	0.00	1.01	1.01	0.00	0.00	0.00	0.00	810.0
C	3	1.99	0	13280	13280	0.00	6673.37	6673.37	0.00	0.00	0.00	0.00	810.0
C	4	1.99	0	14443	14443	0.00	7257.79	7257.79	0.00	0.00	0.00	0.00	810.0
C	1	1.99	0	2	2	0.00	1.01	1.01	0.00	0.00	0.00	0.00	840.0
C	2	1.99	0	1	1	0.00	0.50	0.50	0.00	0.00	0.00	0.00	840.0
C	3	1.99	0	13528	13528	0.00	6797.99	6797.99	0.00	0.00	0.00	0.00	840.0
C	4	1.99	0	14681	14681	0.00	7377.39	7377.39	0.00	0.00	0.00	0.00	840.0
C	1	1.99	0	4	4	0.00	2.01	2.01	0.00	0.00	0.00	0.00	870.0
C	2	1.99	0	2	2	0.00	1.01	1.01	0.00	0.00	0.00	0.00	870.0
C	3	1.99	0	13588	13588	0.00	6828.14	6828.14	0.00	0.00	0.00	0.00	870.0
C	4	1.99	0	14690	14690	0.00	7381.91	7381.91	0.00	0.00	0.00	0.00	870.0
C	1	1.99	0	23	23	0.00	11.56	11.56	0.00	0.00	0.00	0.00	900.0
C	2	1.99	0	9	9	0.00	4.52	4.52	0.00	0.00	0.00	0.00	900.0
C	3	1.99	0	13446	13446	0.00	6756.78	6756.78	0.00	0.00	0.00	0.00	900.0
C	4	1.99	0	14554	14554	0.00	7313.57	7313.57	0.00	0.00	0.00	0.00	900.0
C	1	1.99	0	105	105	0.00	52.76	52.76	0.00	0.00	0.00	0.00	930.0
C	2	1.99	0	67	67	0.00	33.67	33.67	0.00	0.00	0.00	0.00	930.0
C	3	1.99	0	13828	13828	0.00	6948.74	6948.74	0.00	0.00	0.00	0.00	930.0
C	4	1.99	1	14648	14649	0.50	7360.80	7361.31	0.00	0.00	0.00	0.00	930.0
C	1	1.99	0	344	344	0.00	172.86	172.86	0.00	0.00	0.00	0.00	960.0
C	2	1.99	0	184	184	0.00	92.46	92.46	0.00	0.00	0.00	0.00	960.0
C	3	1.99	23	13649	13672	11.56	6858.79	6870.35	0.00	0.00	0.00	0.00	960.0
C	4	1.99	63	15039	15102	31.66	7557.29	7588.94	0.00	0.00	0.00	0.00	960.0
C	1	1.99	0	687	687	0.00	345.23	345.23	0.00	0.00	0.00	0.00	990.0
C	2	1.99	0	368	368	0.00	184.92	184.92	0.00	0.00	0.00	0.00	990.0
C	3	1.99	127	14129	14256	63.82	7100.00	7163.82	0.00	0.00	0.00	0.00	990.0
C	4	1.99	295	15433	15728	148.24	7755.28	7903.52	0.00	0.00	0.00	0.00	990.0
C	1	1.99	0	1114	1114	0.00	559.80	559.80	0.00	0.00	0.00	0.00	1020.0
C	2	1.99	0	768	768	0.00	385.93	385.93	0.00	0.00	0.00	0.00	1020.0
C	3	1.99	522	14322	14844	262.31	7196.98	7459.30	0.00	0.00	0.00	0.00	1020.0
C	4	1.99	813	15401	16214	408.54	7739.20	8147.74	0.00	0.00	0.00	0.00	1020.0
C	1	1.99	0	1632	1632	0.00	820.10	820.10	0.00	0.00	0.00	0.00	1050.0
C	2	1.99	1	1149	1150	0.50	577.39	577.89	0.00	0.00	0.00	0.00	1050.0
C	3	1.99	1330	14058	15388	668.34	7064.32	7732.66	0.00	0.00	0.00	0.00	1050.0
C	4	1.99	1928	14848	16776	968.84	7461.31	8430.15	0.00	0.00	0.00	0.00	1050.0
C	1	1.99	0	2317	2317	0.00	1164.32	1164.32	0.00	0.00	0.00	0.00	1080.0
C	2	1.99	0	1769	1769	0.00	888.94	888.94	0.00	0.00	0.00	0.00	1080.0
C	3	1.99	2759	13389	16148	1386.43	6728.14	8114.57	0.00	0.00	0.00	0.00	1080.0
C	4	1.99	3774	13872	17646	1896.48	6970.85	8867.34	0.00	0.00	0.00	0.00	1080.0
C	1	1.99	0	3136	3136	0.00	1575.88	1575.88	0.00	0.00	0.00	0.00	1110.0
C	2	1.99	0	2325	2325	0.00	1168.34	1168.34	0.00	0.00	0.00	0.00	1110.0
C	3	1.99	4885	11632	16517	2454.77	5845.23	8300.00	0.00	0.00	0.00	0.00	1110.0
C	4	1.99	6517	11560	18077	3274.87	5809.05	9083.92	0.00	0.00	0.00	0.00	1110.0
C	1	1.99	1	4144	4145	0.50	2082.41	2082.91	0.00	0.00	0.00	0.00	1140.0
C	2	1.99	1	3120	3121	0.50	1567.84	1568.34	0.00	0.00	0.00	0.00	1140.0
C	3	1.99	7734	9420	17154	3886.43	4733.67	8620.10	0.00	0.00	0.00	0.00	1140.0
C	4	1.99	9043	9245	18288	4544.22	4645.73	9189.95	0.00	0.00	0.00	0.00	1140.0
C	1	1.99	2	5332	5334	1.01	2679.40	2680.40	0.00	0.00	0.00	0.00	1170.0
C	2	1.99	0	4035	4035	0.00	2027.64	2027.64	0.00	0.00	0.00	0.00	1170.0
C	3	1.99	7419	7056	17475	5235.68	3545.73	8781.41	0.00	0.00	0.00	0.00	1170.0

C	2	1.99	1	5170	5171	0.50	2597.99	2598.49	0.00	0.00	0.00	0.00	1200.0
C	3	1.99	12000	5706	17706	6030.15	2867.34	8897.49	0.00	0.00	0.00	0.00	1200.0
C	4	1.99	13044	6300	19344	6554.77	3165.83	9720.60	0.00	0.00	0.00	0.00	1200.0
C	1	1.99	0	8264	8264	0.00	4152.76	4152.76	0.00	0.00	0.00	0.00	1230.0
	2	1.99	1	6593	6594	0.50	3313.07	3313.57	0.00	0.00	0.00	0.00	1230.0
	3	1.99	12492	5415	17907	6277.39	2721.11	8998.49	0.00	0.00	0.00	0.00	1230.0
C	4	1.99	13551	6142	19693	6809.55	3086.43	9895.98	0.00	0.00	0.00	0.00	1230.0
C	1	1.99	2	10126	10128	1.01	5088.44	5089.45	0.00	0.00	0.00	0.00	1260.0
C	2	1.99	0	7995	7995	0.00	4017.59	4017.59	0.00	0.00	0.00	0.00	1260.0
C	3	1.99	12775	5398	18173	6419.60	2712.56	9132.16	0.00	0.00	0.00	0.00	1260.0
C	4	1.99	13565	5997	19562	6816.58	3013.57	9830.15	0.00	0.00	0.00	0.00	1260.0
C	1	1.99	0	11913	11913	0.00	5986.43	5986.43	0.00	0.00	0.00	0.00	1290.0
C	2	1.99	0	9373	9373	0.00	4710.05	4710.05	0.00	0.00	0.00	0.00	1290.0
C	3	1.98	12930	5430	18360	6530.30	2742.42	9272.73	0.00	0.00	0.00	0.00	1290.0
C	4	1.99	14167	5937	20104	7119.10	2983.42	10102.51	0.00	0.00	0.00	0.00	1290.0
C	1	1.99	1	13612	13613	0.50	6840.20	6840.70	0.00	0.00	0.00	0.00	1320.0
C	2	1.99	3	10994	10997	1.51	5524.62	5526.13	0.00	0.00	0.00	0.00	1320.0
C	3	1.99	13238	5353	18591	6652.26	2689.95	9342.21	0.00	0.00	0.00	0.00	1320.0
C	4	1.99	14251	5912	20163	7161.31	2970.85	10132.16	0.00	0.00	0.00	0.00	1320.0
C	1	1.99	2	15240	15242	1.01	7658.29	7659.30	0.00	0.00	0.00	0.00	1350.0
C	2	1.99	1	12541	12542	0.50	6302.01	6302.51	0.00	0.00	0.00	0.00	1350.0
C	3	1.98	13294	5448	18742	6714.14	2751.52	9465.66	0.00	0.00	0.00	0.00	1350.0
C	4	1.98	14899	5955	20854	7524.75	3007.58	10532.32	0.00	0.00	0.00	0.00	1350.0
C	1	1.99	8	16815	16823	4.02	8449.75	8453.77	0.00	0.00	0.00	0.00	1380.0
	2	1.99	9	13511	13520	4.52	6789.45	6793.97	0.00	0.00	0.00	0.00	1380.0
	3	1.98	13312	5302	18614	6723.23	2677.78	9401.01	0.00	0.00	0.00	0.00	1380.0
	4	1.98	14554	5786	20340	7350.51	2922.22	10272.73	0.00	0.00	0.00	0.00	1380.0
C	1	1.98	93	17389	17482	46.97	8782.32	8829.29	0.00	0.00	0.00	0.00	1410.0
C	2	1.99	52	14623	14675	26.13	7348.24	7374.37	0.00	0.00	0.00	0.00	1410.0
C	3	1.98	13537	5310	18847	6836.87	2681.82	9518.69	0.00	0.00	0.00	0.00	1410.0
C	4	1.98	14500	5641	20141	7323.23	2848.99	10172.22	0.00	0.00	0.00	0.00	1410.0
C	1	1.98	373	17705	18078	188.38	8941.92	9130.30	0.00	0.00	0.00	0.00	1440.0
C	2	1.98	180	15352	15532	90.91	7753.54	7844.44	0.00	0.00	0.00	0.00	1440.0
C	3	1.99	13673	5293	18966	6870.85	2659.80	9530.65	0.00	0.00	0.00	0.00	1440.0
C	4	1.98	14724	5624	20348	7436.36	2840.40	10276.77	0.00	0.00	0.00	0.00	1440.0
C	1	1.98	790	17702	18492	398.99	8940.40	9339.39	0.00	0.00	0.00	0.00	1470.0
C	2	1.98	429	15595	16024	216.67	7876.26	8092.93	0.00	0.00	0.00	0.00	1470.0
C	3	1.98	13932	5125	19057	7036.36	2588.38	9624.75	0.00	0.00	0.00	0.00	1470.0
C	4	1.98	15427	5070	20497	7791.41	2560.61	10352.02	0.00	0.00	0.00	0.00	1470.0
C	1	1.98	1395	17271	18666	704.55	8722.73	9427.27	0.00	0.00	0.00	0.00	1500.0
C	2	1.98	857	15563	16420	432.83	7860.10	8292.93	0.00	0.00	0.00	0.00	1500.0
C	3	1.98	14106	4848	18954	7124.24	2448.48	9572.73	0.00	0.00	0.00	0.00	1500.0
C	4	1.98	15763	4446	20209	7961.11	2245.45	10206.57	0.00	0.00	0.00	0.00	1500.0
C	1	1.98	2176	16782	18958	1098.99	8475.76	9574.75	0.00	0.00	0.00	0.00	1530.0
C	2	1.99	1394	14934	16328	700.50	7504.52	8205.03	0.00	0.00	0.00	0.00	1530.0
		1.99	14642	4361	19003	7357.79	2191.46	9549.25	0.00	0.00	0.00	0.00	1530.0
		1.98	16640	3833	20473	8404.04	1935.86	10339.90	0.00	0.00	0.00	0.00	1530.0
C	1	1.98	3165	15693	18858	1598.48	7925.76	9524.24	0.00	0.00	0.00	0.00	1560.0
C	2	1.99	2121	14346	16467	1065.83	7209.05	8274.87	0.00	0.00	0.00	0.00	1560.0
C	3	1.98	15209	3642	18851	7681.31	1839.39	9520.71	0.00	0.00	0.00	0.00	1560.0
C	4	1.98	17562	3467	21029	8869.70	1751.01	10620.71	0.00	0.00	0.00	0.00	1560.0

C	3	1.98	16230	3047	19277	8196.97	1538.89	9735.86	0.00	0.00	0.00	0.00	1590.0
C	4	1.98	18238	3873	22111	9211.11	1956.06	11167.17	0.00	0.00	0.00	0.00	1590.0
C	1	1.98	6538	13101	19639	3302.02	6616.67	9918.69	0.00	0.00	0.00	0.00	1620.0
C	2	1.98	4545	12542	17087	2295.45	6334.34	8629.80	0.00	0.00	0.00	0.00	1620.0
C	3	1.98	16593	2496	19089	8380.30	1260.61	9640.91	0.00	0.00	0.00	0.00	1620.0
C	4	1.98	18646	6086	24732	9417.17	3073.74	12490.91	0.00	0.00	0.00	0.00	1620.0
C	1	1.98	8986	10925	19911	4538.38	5517.68	10056.06	0.00	0.00	0.00	0.00	1650.0
C	2	1.98	6314	10936	17250	3188.89	5523.23	8712.12	0.00	0.00	0.00	0.00	1650.0
C	3	1.98	16986	2349	19335	8578.79	1186.36	9765.15	0.00	0.00	0.00	0.00	1650.0
C	4	1.98	19374	12089	31463	9784.85	6105.56	15890.40	0.00	0.00	0.00	0.00	1650.0
C	1	1.98	11966	8575	20541	6043.43	4330.81	10374.24	0.00	0.00	0.00	0.00	1680.0
C	2	1.98	8414	9060	17474	4249.49	4575.76	8825.25	0.00	0.00	0.00	0.00	1680.0
C	3	1.98	17687	2526	20213	8932.83	1275.76	10208.59	0.00	0.00	0.00	0.00	1680.0
C	4	1.98	19384	24656	44040	9789.90	12452.53	22242.42	0.00	0.00	0.00	0.00	1680.0
C	1	1.98	15773	6687	22460	7966.16	3377.27	11343.43	0.00	0.00	0.00	0.00	1710.0
C	2	1.98	10925	6903	17828	5517.68	3486.36	9004.04	0.00	0.00	0.00	0.00	1710.0
C	3	1.98	18038	3327	21365	9110.10	1680.30	10790.40	0.00	0.00	0.00	0.00	1710.0
C	4	1.97	19704	44445	64149	10002.03	22560.91	32562.94	0.00	0.00	0.00	0.00	1710.0
C	1	1.98	18209	6355	24564	9196.46	3209.60	12406.06	0.00	0.00	0.00	0.00	1740.0
C	2	1.98	13053	5401	18454	6592.42	2727.78	9320.20	0.00	0.00	0.00	0.00	1740.0
C	3	1.98	18123	5055	23178	9153.03	2553.03	11706.06	0.00	0.00	0.00	0.00	1740.0
C	4	1.96	22607	70582	93189	11534.18	36011.22	47545.41	0.00	0.00	0.00	0.00	1740.0
C	1	1.98	20115	7005	27120	10159.09	3537.88	13696.97	0.00	0.00	0.00	0.00	1770.0
C	2	1.98	15079	4367	19446	7615.66	2205.56	9821.21	0.00	0.00	0.00	0.00	1770.0
C	3	1.98	18636	8117	26753	9412.12	4099.49	13511.62	0.00	0.00	0.00	0.00	1770.0
C	4	1.96	42422	82205	124627	21643.88	41941.33	63585.20	0.00	0.00	0.00	0.00	1770.0
C	1	1.97	24549	5598	30147	12461.42	2841.62	15303.05	0.00	0.00	0.00	0.00	1800.0
C	2	1.97	17109	3108	20217	8684.77	1577.66	10262.44	0.00	0.00	0.00	0.00	1800.0
C	3	1.97	19963	10985	30948	10133.50	5576.14	15709.64	0.00	0.00	0.00	0.00	1800.0
C	4	1.95	72537	70078	142615	37198.46	35937.44	73135.90	0.00	0.00	0.00	0.00	1800.0

'NITIAL 2003 STANDARD & BACKGROUND SUMMARY FOR GFPC.

08/07/03

STL

ALPHA

STANDARD CPM (20 Min CT)

C1	C2	C3	C4	
2679.47	3835.81	3147.10	3041.63	UPPER LIMIT CPM
2586.93	3765.19	3064.12	2966.64	LOWER LIMIT CPM
2619.10	3783.45	3105.37	3023.05	DAILY CPM
IN	IN	IN	IN	
0.306	0.315	0.296	0.297	DET EFF.

D1	D2	D3	D4	
3314.17	3944.94	3099.50	3700.43	UPPER LIMIT CPM
3240.64	3191.16	3023.04	3615.56	LOWER LIMIT CPM
3277.20	3585.95	3067.55	3667.55	DAILY CPM
IN	IN	IN	IN	
0.310	0.315	0.267	0.308	DET EFF.

BACKGROUND CPM (120 Min CT)

C1	C2	C3	C4
0.27	0.32	0.26	0.25
0.23	0.23	0.12	0.18
IN	IN	IN	IN

D1	D2	D3	D4
0.10	0.11	0.11	0.10
0.03	0.03	0.01	0.03
IN	IN	IN	IN

BETA

STANDARD CPM (4 Min CT)

C1	C2	C3	C4	
30971.48	26346.92	27936.62	28407.31	UPPER LIMIT CPM
30387.60	25783.19	27402.04	27895.25	LOWER LIMIT CPM
30756.75	26264.75	27571.50	28425.25	DAILY CPM
IN	IN	IN	OUT	
0.379	0.314	0.336	0.336	DET EFF.

D1	D2	D3	D4	
32348.85	33246.47	31656.95	31122.26	UPPER LIMIT CPM
31075.62	32622.82	31090.00	30574.48	LOWER LIMIT CPM
31656.00	32880.25	31214.50	31026.75	DAILY CPM
IN	IN	IN	IN	
0.389	0.391	0.368	0.363	DET EFF.

BACKGROUND CPM (120 Min CT)

C1	C2	C3	C4
2.60	2.52	2.35	2.33
1.87	2.23	1.65	2.02
IN	IN	IN	IN

D1	D2	D3	D4
2.70	2.11	2.41	1.92
2.22	1.85	2.07	1.62
IN	IN	IN	IN

Alpha Recounts

STANDARD CPM (20 Min CT)

C1	C2	C3	C4

D1	D2	D3	D4

DET #
CPM
CPM

BACKGROUND CPM (120 Min CT)

C1	C2	C3	C4

D1	D2	D3	D4

Beta Recounts

STANDARD CPM (4 Min CT)

C1	C2	C3	C4

D1	D2	D3	D4

DET #
CPM
CPM

BACKGROUND CPM (120 Min CT)

C1	C2	C3	C4

D1	D2	D3	D4

DET #
CPM
CPM

REVIEWED BY

APPROVED BY

SEVERN TRENT STL

STANDARDS FOR DAILY CALIBRATION CHECK			
	REF DATE=	07/01/93	
	DAYS DECAYED	3689.00	

Am241 STD#	CORRECT ACT	DECAY
Am24100AP	3880.70	0.98
Am24100BP	5438.30	0.98
Am24100CP	4727.88	0.98
Am24100DP	4553.73	0.98

Am241 STD#	CORRECT ACT	DECAY
Am24100EP	4759.37	0.98
Am24100FP	5104.74	0.98
Am24100GP	5173.61	0.98
Am24100HP	5353.68	0.98

Cs 137 STD#	CORRECT ACT	DECAY
Cs13700AP	36441.86	0.79
Cs13700BP	37415.86	0.79
Cs13700CP	37091.19	0.79
Cs13700DP	37740.53	0.79

Cs 137 STD#	CORRECT ACT	DECAY
Cs13700EP	36766.53	0.79
Cs13700FP	37986.01	0.79
Cs13700HP	38389.86	0.79
Cs13700IP	38286.92	0.79

	08/07/03 DAILY EFF	
	ALPHA	BETA
C1	0.304	0.380
C2	0.313	0.316
C3	0.296	0.335
C4	0.299	0.339
D1	0.310	0.388
D2	0.316	0.390
D3	0.267	0.366
D4	0.309	0.365

ALPHA BACKGROUND TOLERANCE (120 MIN COUNT TIME)
CPM = 0.70
REQUIRED FOR SDL OF 3 pCi/SAMPLE OR LESS

BETA BACKGROUND TOLERANCE (120 MIN COUNT TIME)
CPM = 3.10
REQUIRED FOR SDL OF 4 pCi/SAMPLE OR LESS

	08/07/03 average bkgd cpm			08/07/03 average bkgd cpm	
	ALPHA	BETA		ALPHA	BETA
C1	0.16	2.20	D1	0.04	2.36
C2	0.18	2.03	D2	0.04	1.70
C3	0.13	1.97	D3	0.04	2.02
C4	0.15	1.98	D4	0.04	1.64

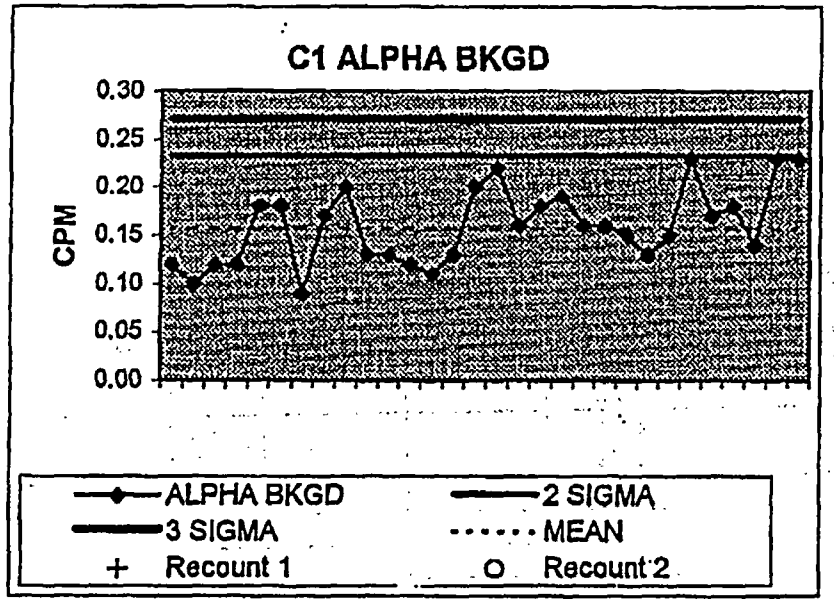
DAILY BACKGROUNDS FOR GFPC CONTROL CHARTS

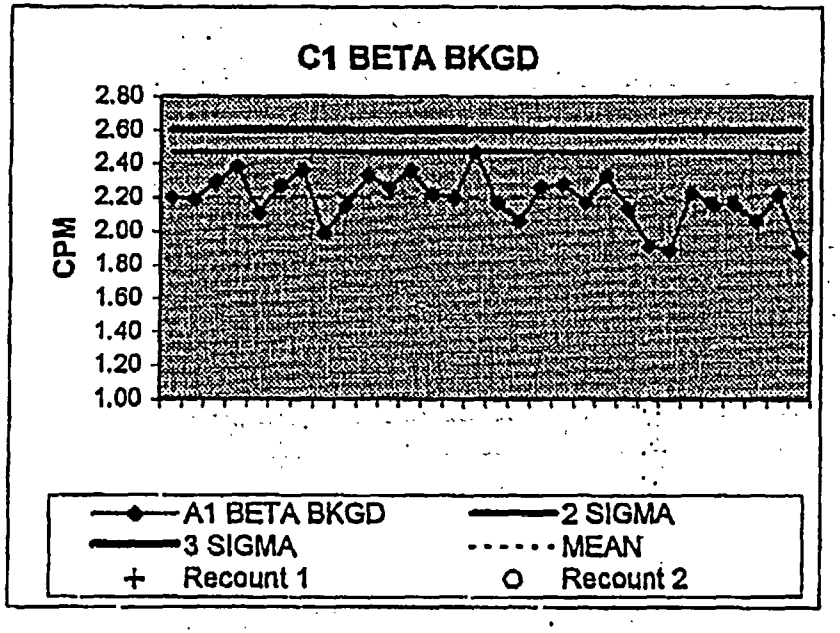
8/7/03

C1 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	0.12			2.20		
	0.10			2.19		
	0.12			2.29		
	0.12			2.38		
	0.18			2.11		
	0.18			2.27		
	0.09			2.36		
	0.17			1.99		
	0.20			2.15		
	0.13			2.33		
	0.13			2.26		
	0.12			2.36		
	0.11			2.22		
	0.13			2.20		
	0.20			2.47		
	0.22			2.17		
	0.16			2.06		
	0.18			2.26		
	0.19			2.28		
	0.16			2.17		
	0.16			2.33		
	0.15			2.13		
	0.13			1.91		
	0.15			1.89		
	0.23			2.23		
	0.17			2.16		
	0.18			2.16		
	0.14			2.06		
	0.23			2.22		
	0.23			1.87		

SEVERN TRENT SERVICES

ALPHA MEAN CPM=	0.157
1 STD DEV. CPM=	0.038
2 STD DEV. CPM=	0.076
3 STD DEV. CPM=	0.114
ALPHA BKGD CPM "UL"=	0.271
BETA MEAN CPM=	2.200
1 STD DEV. CPM=	0.134
2 STD DEV. CPM=	0.268
3 STD DEV. CPM=	0.402
BETA BKGD CPM "UL"=	2.602


C1 ALPHA BKGD
CPM
0.30
0.25
0.20
0.15
0.10
0.05
0.00
ALPHA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2


C1 BETA BKGD
CPM
2.80
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
A1 BETA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2

DAILY STD CAL. FOR GFPC CONTROL CHARTS

8/7/03

C1 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	2626.70			30470.50		
	2624.75			30644.25		
	2626.10			30636.50		
	2635.05			30802.75		
	2626.10			30749.75		
	2630.20			30638.75		
	2639.30			30571.00		
	2622.30			30823.50		
	2640.40			30811.75		
	2659.90			30695.00		
	2635.10			30659.00		
	2643.40			30732.50		
	2602.50			30765.75		
	2639.40			30761.50		
	2611.55			30586.00		
	2652.10			30641.25		
	2656.45			30582.75		
	2611.65			30754.50		
	2647.85			30584.25		
	2619.10			30756.75		

SEVERN TRENT SERVICES

ALPHA EFF.= 0.3056473

ALPHA MEAN CPM= 2633.200
1 STD DEV. CPM= 15.423
2 STD DEV. CPM= 30.846
3 STD DEV. CPM= 46.270

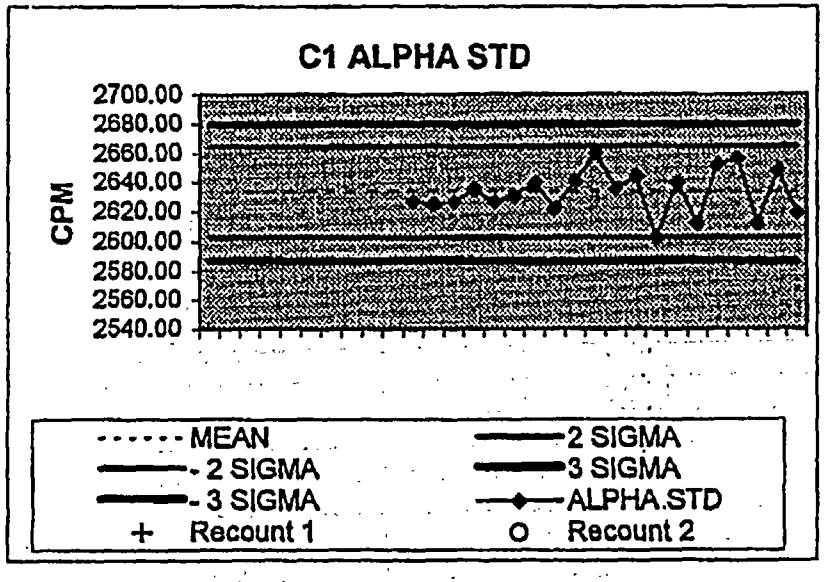
ALPHA STD CPM "UL"= 2679.470
ALPHA STD CPM "LL"= 2586.930

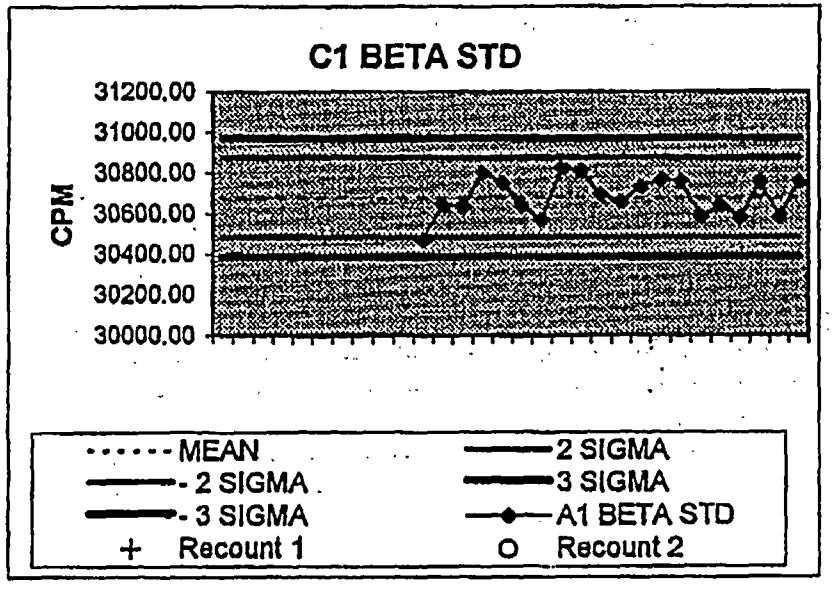
BETA MEAN CPM= 30679.539
1 STD DEV. CPM= 97.312
2 STD DEV. CPM= 194.624
3 STD DEV. CPM= 291.936

BETA STD CPM "UL"= 30971.475
BETA STD CPM "LL"= 30387.604

BETA EFF. = 0.3792236

NEG. SIGMA NEG. SIGMA NE


C1 ALPHA STD
CPM
2700.00
2680.00
2660.00
2640.00
2620.00
2600.00
2580.00
2560.00
2540.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
ALPHA.STD
+ Recount 1
O Recount 2


C1 BETA STD
CPM
31200.00
31000.00
30800.00
30600.00
30400.00
30200.00
30000.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
A1 BETA STD
+ Recount 1
O Recount 2

SEVERN TF I' SERVICES

DAILY BACKGROUNDS FOR GFPC CONTROL CHARTS

8/7/03

C2 (CPM)						
	ALPHA			BETA		
Date	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	0.18			1.93		
	0.18			2.13		
	0.18			2.15		
	0.14			1.68		
	0.13			1.95		
	0.08			2.08		
	0.12			2.08		
	0.21			1.98		
	0.09			1.75		
	0.13			2.20		
	0.18			1.80		
	0.19			2.20		
	0.14			2.14		
	0.23			1.99		
	0.19			2.24		
	0.21			1.91		
	0.22			1.90		
	0.13			1.77		
	0.24			2.03		
	0.14			1.97		
	0.16			2.10		
	0.23			2.26		
	0.15			1.92		
	0.28			2.09		
	0.23			2.02		
	0.15			2.12		
	0.18			2.33		
	0.19			2.01		
	0.23			2.26		
	0.23			2.23		

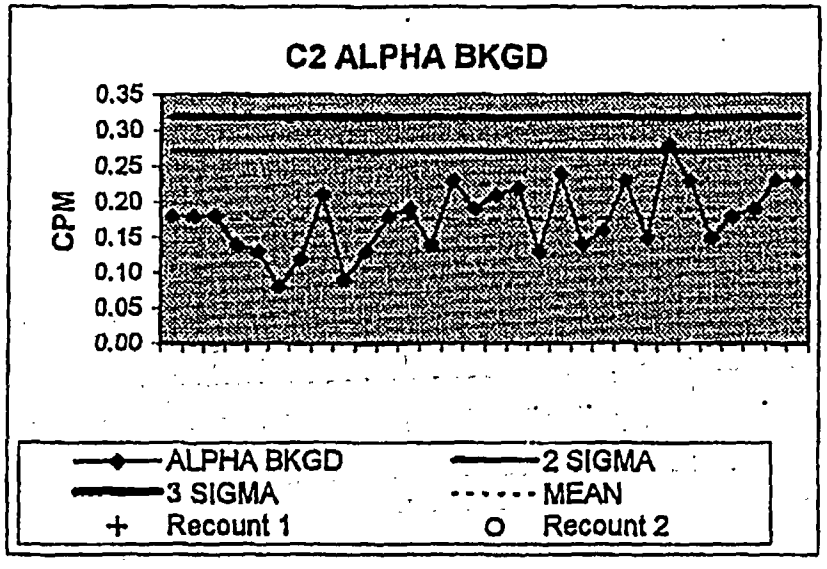
SEVERN TRENT SERVICES

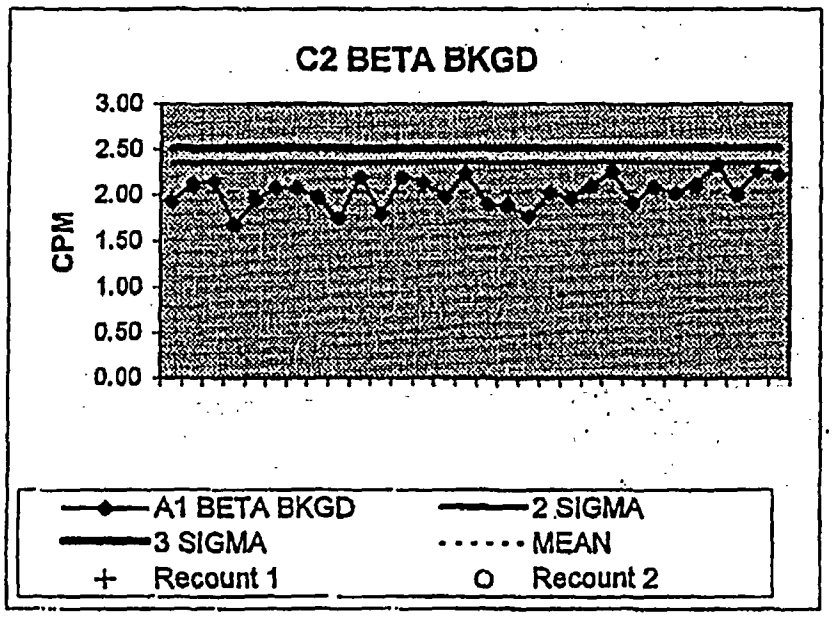
ALPHA MEAN CPM= 0.176
1 STD DEV. CPM= 0.047
2 STD DEV. CPM= 0.095
3 STD DEV. CPM= 0.142

ALPHA BKGD CPM "UL"= 0.319

BETA MEAN CPM= 2.034
1 STD DEV. CPM= 0.163
2 STD DEV. CPM= 0.326
3 STD DEV. CPM= 0.489

BETA BKGD CPM "UL"= 2.523


C2 ALPHA BKGD
CPM
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
ALPHA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2


C2 BETA BKGD
CPM
3.00
2.50
2.00
1.50
1.00
0.50
0.00
A1 BETA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2

SEVERN TRENT SERVICES

DAILY STD CAL. FOR GFPC CONTROL CHARTS

8/7/03

C2 (CPM)						
	ALPHA			BETA		
Date	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	3804.15			25869.00		
	3805.80			26273.50		
	3789.45			26018.75		
	3808.50			26125.25		
	3791.80			26148.00		
	3792.65			26099.25		
	3793.10			26051.00		
	3782.20			26059.00		
	3806.15			26140.50		
	3813.30			26018.75		
	3797.60			25972.25		
	3798.25			25981.25		
	3788.95			26071.25		
	3798.20			26004.75		
	3824.35			26070.25		
	3802.95			26107.00		
	3798.75			26212.25		
	3789.00			25954.00		
	3826.35			26060.00		
	3783.45			26264.75		

SEVERN TRENT SERVICES

ALPHA EFF.= 0.3147928

ALPHA MEAN CPM= 3800.500
1 STD DEV. CPM= 11.771
2 STD DEV. CPM= 23.542
3 STD DEV. CPM= 35.313

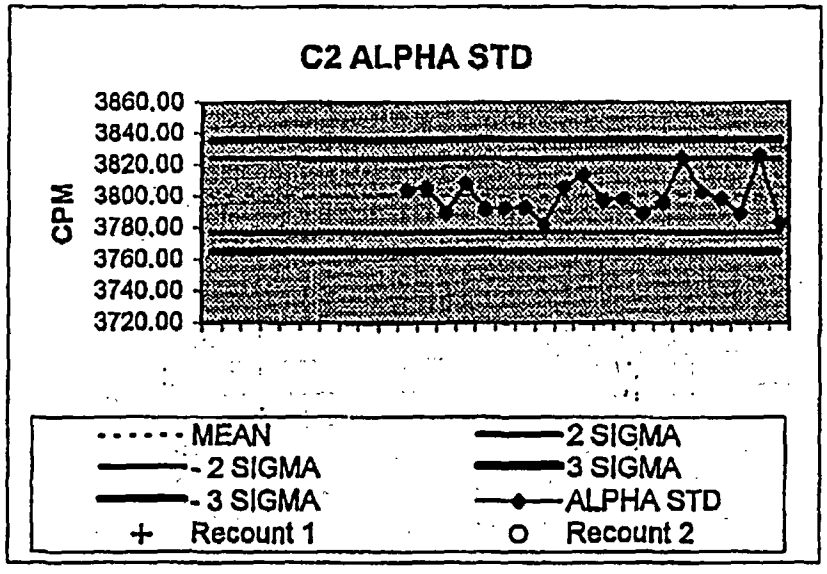
ALPHA STD CPM "UL"= 3835.813
ALPHA STD CPM "LL"= 3765.187

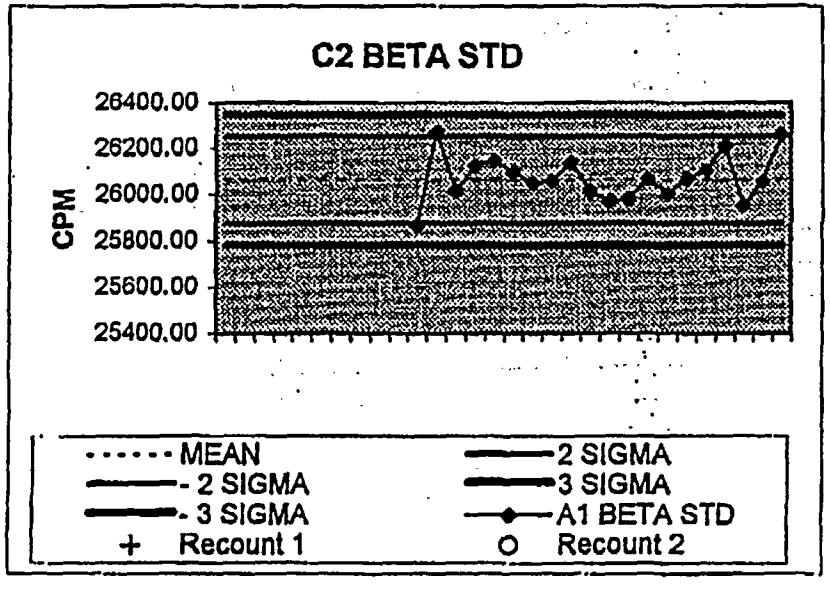
BETA MEAN CPM= 26065.053
1 STD DEV. CPM= 93.955
2 STD DEV. CPM= 187.910
3 STD DEV. CPM= 281.866

BETA STD CPM "UL"= 26346.918
BETA STD CPM "LL"= 25783.187

BETA EFF. = 0.3137978

NEG. SIGMA NEG. SIGMA NE


C2 ALPHA STD
CPM
3860.00
3840.00
3820.00
3800.00
3780.00
3760.00
3740.00
3720.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
ALPHA STD
Recount 1
Recount 2


C2 BETA STD
CPM
26400.00
26200.00
26000.00
25800.00
25600.00
25400.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
A1 BETA STD
Recount 1
Recount 2

DAILY BACKGROUNDS FOR GFPC CONTROL CHARTS

8/7/03

C3 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	0.12			2.04		
	0.13			1.98		
	0.09			1.88		
	0.08			2.08		
	0.14			1.92		
	0.10			2.07		
	0.18			1.99		
	0.14			2.08		
	0.18			2.17		
	0.09			1.77		
	0.08			1.81		
	0.11			2.17		
	0.14			2.12		
	0.08			1.98		
	0.08			2.08		
	0.12			2.08		
	0.18			1.96		
	0.08			1.92		
	0.16			1.98		
	0.18			2.00		
	0.12			1.97		
	0.16			1.76		
	0.09			1.77		
	0.17			1.70		
	0.13			1.79		
	0.22			2.01		
	0.19			2.00		
	0.13			2.10		
	0.18			1.95		
	0.12			1.65		

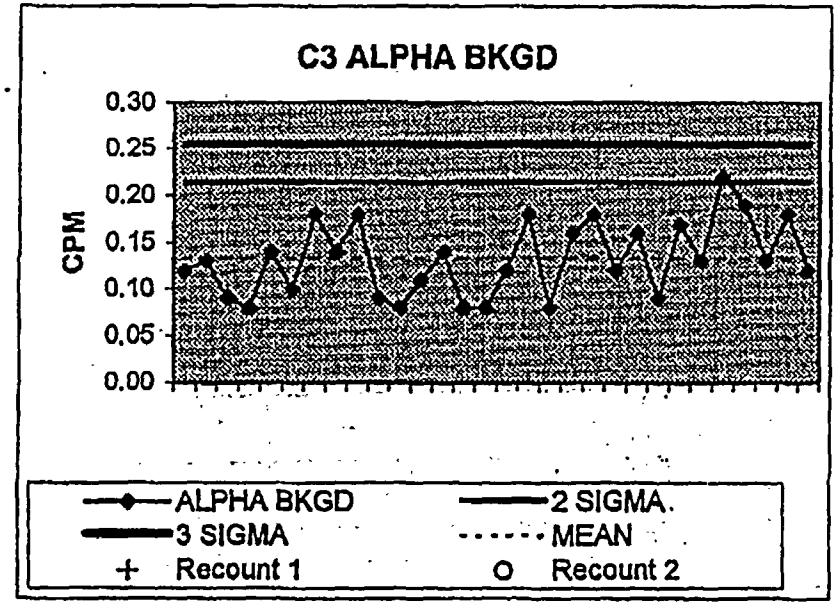
SEVERN TRENT SERVICES

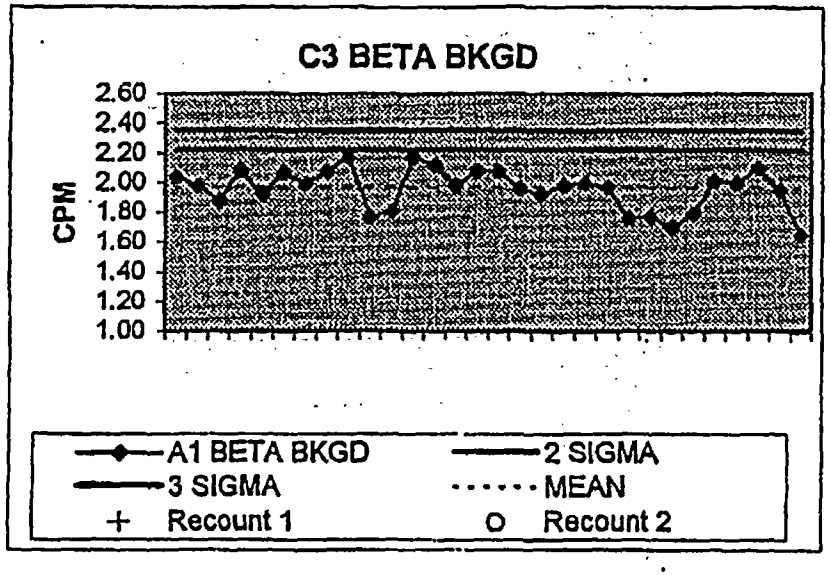
ALPHA MEAN CPM= 0.133
1 STD DEV. CPM= 0.041
2 STD DEV. CPM= 0.082
3 STD DEV. CPM= 0.122

ALPHA BKGD CPM "UL"= 0.255

BETA MEAN CPM= 1.970
1 STD DEV. CPM= 0.128
2 STD DEV. CPM= 0.255
3 STD DEV. CPM= 0.383

BETA BKGD CPM "UL"= 2.353


C3 ALPHA BKGD
CPM
0.30
0.25
0.20
0.15
0.10
0.05
0.00
ALPHA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2


C3 BETA BKGD
CPM
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
A1 BETA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2

DAILY STD CAL. FOR GFPC CONTROL CHARTS

8/7/03

C3 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	3094.20			27709.75		
	3105.05			27657.50		
	3127.95			27651.00		
	3100.04			27730.50		
	3115.35			27570.75		
	3088.65			27576.25		
	3080.90			27758.25		
	3084.60			27599.50		
	3100.45			27630.50		
	3107.80			27677.50		
	3129.75			27596.00		
	3126.55			27747.75		
	3108.50			27639.75		
	3115.75			27561.25		
	3105.00			27841.50		
	3106.70			27587.25		
	3113.25			27621.50		
	3095.75			27688.50		
	3100.40			27872.25		
	3105.37			27571.50		

SEVERN TRENT SERVICES

ALPHA EFF = 0.2958881

ALPHA MEAN CPM= 3105.613
1 STD DEV. CPM= 13.831
2 STD DEV. CPM= 27.662
3 STD DEV. CPM= 41.492

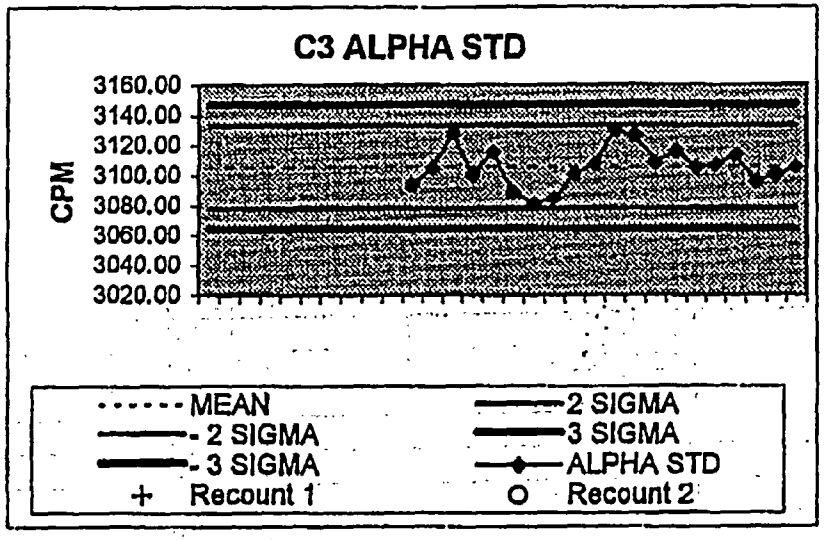
ALPHA STD CPM "UL"= 3147.105
ALPHA STD CPM "LL"= 3064.120

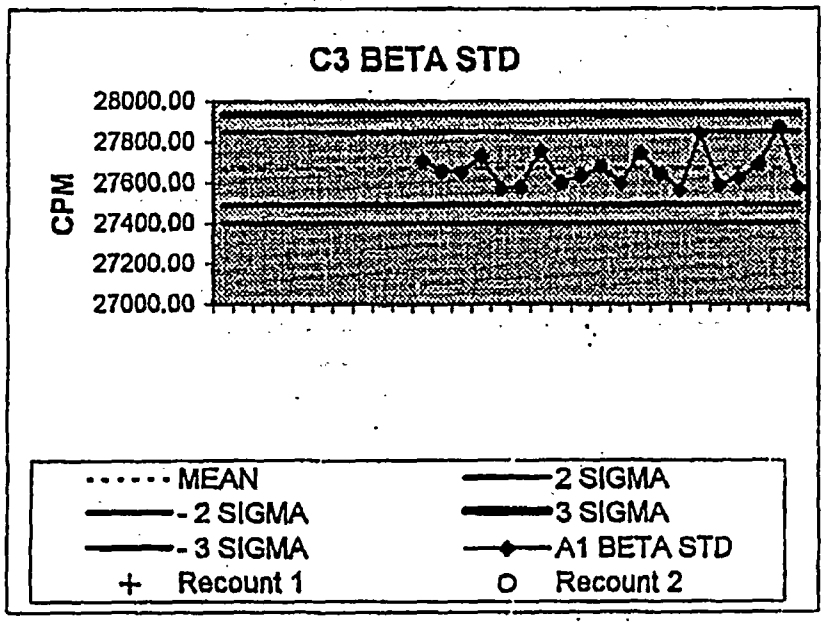
BETA MEAN CPM= 27669.329
1 STD DEV. CPM= 89.096
2 STD DEV. CPM= 178.192
3 STD DEV. CPM= 267.288

BETA STD CPM "UL"= 27936.617
BETA STD CPM "LL"= 27402.041

BETA EFF = 0.3360275

NEG. SIGMA NEG. SIGMA NE


C3 ALPHA STD
CPM
3160.00
3140.00
3120.00
3100.00
3080.00
3060.00
3040.00
3020.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
ALPHA STD
+ Recount 1
O Recount 2


C3 BETA STD
CPM
28000.00
27800.00
27600.00
27400.00
27200.00
27000.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
A1 BETA STD
+ Recount 1
O Recount 2

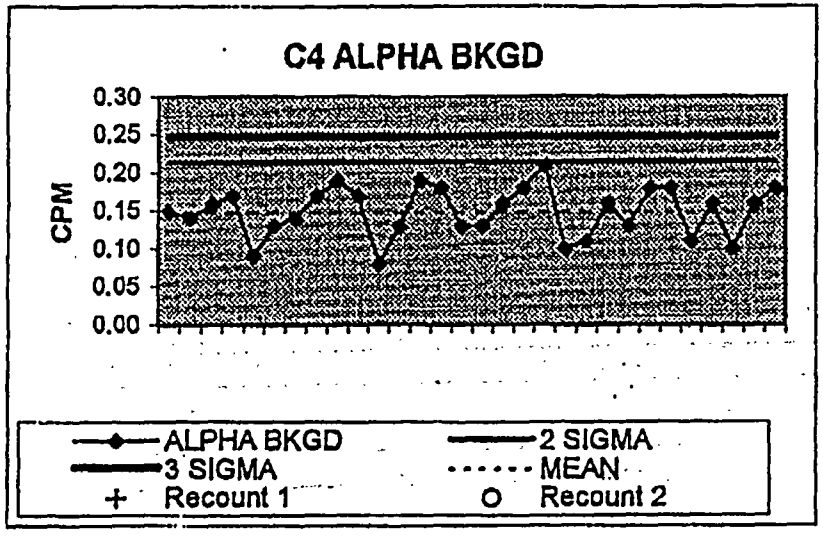
DAILY BACKGROUNDS FOR GFPC CONTROL CHARTS

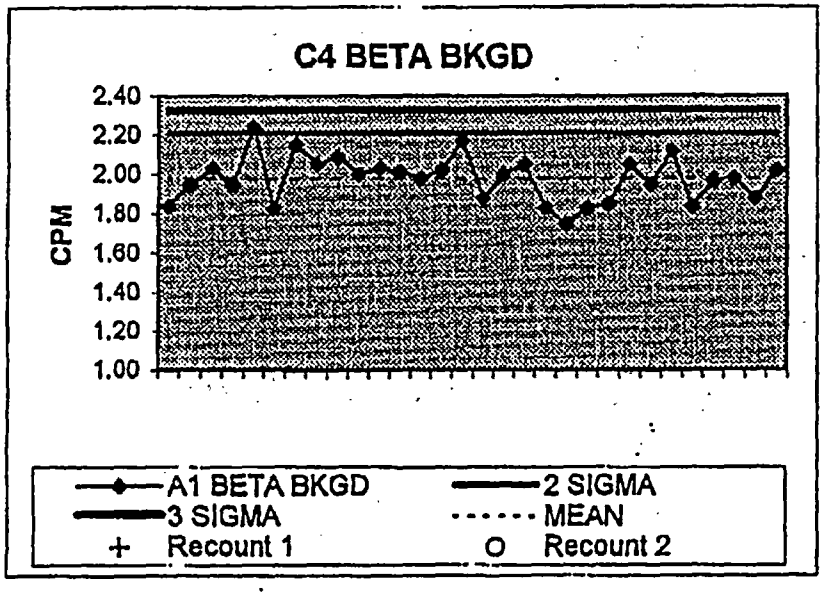
8/7/03

C4 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	0.15			1.84		
	0.14			1.95		
	0.16			2.03		
	0.17			1.95		
	0.09			2.24		
	0.13			1.83		
	0.14			2.15		
	0.17			2.05		
	0.19			2.09		
	0.17			2.00		
	0.08			2.03		
	0.13			2.01		
	0.19			1.98		
	0.18			2.02		
	0.13			2.17		
	0.13			1.88		
	0.16			2.00		
	0.18			2.05		
	0.21			1.83		
	0.10			1.75		
	0.11			1.83		
	0.16			1.85		
	0.13			2.05		
	0.18			1.95		
	0.18			2.12		
	0.11			1.84		
	0.16			1.97		
	0.10			1.98		
	0.16			1.88		
	0.18			2.02		

SEVERN TRENT SERVICES

ALPHA MEAN CPM=	0.148
1 STD DEV. CPM=	0.033
2 STD DEV. CPM=	0.066
3 STD DEV. CPM=	0.100
ALPHA BKGD CPM "UL"=	0.248
BETA MEAN CPM=	1.977
1 STD DEV. CPM=	0.117
2 STD DEV. CPM=	0.235
3 STD DEV. CPM=	0.352
BETA BKGD CPM "UL"=	2.329


C4 ALPHA BKGD
CPM
0.30
0.25
0.20
0.15
0.10
0.05
0.00
ALPHA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2


C4 BETA BKGD
CPM
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
A1 BETA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2

C	2	120.00	17	217	238	0.14	1.83	1.77	0.00	0.00	0.00	0.00	1380.0	6:33:23
C	3	120.00	22	240	262	0.18	2.00	2.18	0.00	0.00	0.00	0.00	1380.0	6:33:23
C	4	120.00	12	210	222	0.10	1.75	1.85	0.00	0.00	0.00	0.00	1380.0	6:33:23
C	1	120.00	19	279	298	0.16	2.33	2.48	0.00	0.00	0.00	0.00	1380.0	8:34:03
C	2	120.00	19	233	252	0.16	1.94	2.10	0.00	0.00	0.00	0.00	1380.0	8:34:03
C	3	120.00	14	236	250	0.12	1.97	2.08	0.00	0.00	0.00	0.00	1380.0	8:34:03
C	4	120.00	13	220	233	0.11	1.83	1.94	0.00	0.00	0.00	0.00	1380.0	8:34:03
		120.00	18	256	274	0.15	2.13	2.28	0.00	0.00	0.00	0.00	1380.0	10:34:43
	2	120.00	27	244	271	0.23	2.03	2.26	0.00	0.00	0.00	0.00	1380.0	10:34:43
C	3	120.00	19	211	230	0.16	1.76	1.92	0.00	0.00	0.00	0.00	1380.0	10:34:43
C	4	120.00	19	222	241	0.16	1.85	2.01	0.00	0.00	0.00	0.00	1380.0	10:34:43
C	1	120.00	16	229	245	0.13	1.91	2.04	0.00	0.00	0.00	0.00	1380.0	12:35:23
C	2	120.00	18	212	230	0.15	1.77	1.92	0.00	0.00	0.00	0.00	1380.0	12:35:23
C	3	120.00	11	229	240	0.09	1.91	2.00	0.00	0.00	0.00	0.00	1380.0	12:35:23
C	4	120.00	16	246	262	0.13	2.05	2.18	0.00	0.00	0.00	0.00	1380.0	12:35:23
C	1	120.00	18	227	245	0.15	1.89	2.04	0.00	0.00	0.00	0.00	1380.0	14:36:02
C	2	120.00	34	217	251	0.28	1.81	2.09	0.00	0.00	0.00	0.00	1380.0	14:36:02
C	3	120.00	20	204	224	0.17	1.70	1.87	0.00	0.00	0.00	0.00	1380.0	14:36:02
C	4	120.00	22	234	256	0.18	1.95	2.13	0.00	0.00	0.00	0.00	1380.0	14:36:02
C	1	120.00	27	268	295	0.23	2.23	2.46	0.00	0.00	0.00	0.00	1380.0	16:36:43
C	2	120.00	27	215	242	0.23	1.79	2.02	0.00	0.00	0.00	0.00	1380.0	16:36:43
C	3	120.00	16	215	231	0.13	1.79	1.92	0.00	0.00	0.00	0.00	1380.0	16:36:43
C	4	120.00	22	254	276	0.18	2.12	2.30	0.00	0.00	0.00	0.00	1380.0	16:36:43
C	1	120.00	20	259	279	0.17	2.16	2.33	0.00	0.00	0.00	0.00	1380.0	18:37:22
C	2	120.00	18	236	254	0.15	1.97	2.12	0.00	0.00	0.00	0.00	1380.0	18:37:22
C	3	120.00	26	241	267	0.22	2.01	2.22	0.00	0.00	0.00	0.00	1380.0	18:37:22
C	4	120.00	13	221	234	0.11	1.84	1.95	0.00	0.00	0.00	0.00	1380.0	18:37:22
C	1	120.00	21	259	280	0.18	2.16	2.33	0.00	0.00	0.00	0.00	1380.0	20:38:03
C	2	120.00	22	258	280	0.18	2.15	2.33	0.00	0.00	0.00	0.00	1380.0	20:38:03
C	3	120.00	23	240	263	0.19	2.00	2.19	0.00	0.00	0.00	0.00	1380.0	20:38:03
C	4	120.00	19	236	255	0.16	1.97	2.13	0.00	0.00	0.00	0.00	1380.0	20:38:03
C	1	120.00	17	247	264	0.14	2.06	2.20	0.00	0.00	0.00	0.00	1380.0	22:38:42
C	2	120.00	23	218	241	0.19	1.82	2.01	0.00	0.00	0.00	0.00	1380.0	22:38:42
C	3	120.00	16	252	268	0.13	2.10	2.23	0.00	0.00	0.00	0.00	1380.0	22:38:42
C	4	120.00	12	237	249	0.10	1.98	2.08	0.00	0.00	0.00	0.00	1380.0	22:38:42
C	1	120.00	28	266	294	0.23	2.22	2.45	0.00	0.00	0.00	0.00	1380.0	0:39:22
C	2	120.00	27	244	271	0.23	2.03	2.26	0.00	0.00	0.00	0.00	1380.0	0:39:22
		120.00	21	234	255	0.18	1.95	2.13	0.00	0.00	0.00	0.00	1380.0	0:39:22
		120.00	19	226	245	0.16	1.88	2.04	0.00	0.00	0.00	0.00	1380.0	0:39:22
C	1	120.00	27	224	251	0.23	1.87	2.09	0.00	0.00	0.00	0.00	1380.0	2:40:03
C	2	120.00	27	241	268	0.23	2.01	2.23	0.00	0.00	0.00	0.00	1380.0	2:40:03
C	3	120.00	14	198	212	0.12	1.65	1.77	0.00	0.00	0.00	0.00	1380.0	2:40:03
C	4	120.00	21	242	263	0.18	2.02	2.19	0.00	0.00	0.00	0.00	1380.0	2:40:03
C	1	3600.00	567	7880	8447	0.16	2.19	2.35	0.00	0.00	0.00	0.00	1380.0	2:40:03 *
C	2	3600.00	641	7086	7727	0.18	1.97	2.15	0.00	0.00	0.00	0.00	1380.0	2:40:03 *
C	3	3600.00	476	7066	7542	0.13	1.96	2.10	0.00	0.00	0.00	0.00	1380.0	2:40:03 *
C	4	3600.00	534	7122	7656	0.15	1.98	2.13	0.00	0.00	0.00	0.00	1380.0	2:40:03 *

B3 OUT

D	2	120.00	4	200	204	0.03	1.67	1.70	0.00	0.00	0.00	0.00	1290.0	11:48:01
D	3	120.00	4	213	217	0.03	1.77	1.81	0.00	0.00	0.00	0.00	1290.0	11:48:01
D	4	120.00	3	185	188	0.03	1.54	1.57	0.00	0.00	0.00	0.00	1290.0	11:48:01

7-28-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
D	1	120.00	7	261	268	0.06	2.17	2.23	0.00	0.00	0.00	0.00	1290.0	14:19:20
D	2	120.00	0	198	198	0.00	1.65	1.65	0.00	0.00	0.00	0.00	1290.0	14:19:20
D	3	120.00	7	236	243	0.06	1.97	2.03	0.00	0.00	0.00	0.00	1290.0	14:19:20
D	4	120.00	4	179	183	0.03	1.49	1.52	0.00	0.00	0.00	0.00	1290.0	14:19:20
B	1	90.00	7	13273	13280	0.08	147.48	147.56	0.00	0.00	0.00	0.00	1380.0	14:19:20
B	2	90.00	9	13777	13786	0.10	153.08	153.18	0.00	0.00	0.00	0.00	1380.0	14:19:20
B	3	90.00	25	14901	14926	0.28	165.57	165.84	0.00	0.00	0.00	0.00	1380.0	14:19:20
B	4	90.00	16	10944	10960	0.18	121.60	121.78	0.00	0.00	0.00	0.00	1380.0	14:19:20
A	1	90.00	6	13905	13911	0.07	154.50	154.57	0.00	0.00	0.00	0.00	1372.5	14:19:20
A	2	90.00	11	15576	15587	0.12	173.07	173.19	0.00	0.00	0.00	0.00	1372.5	14:19:20
A	3	90.00	30	16152	16182	0.33	179.47	179.80	0.00	0.00	0.00	0.00	1372.5	14:19:20
A	4	90.00	12	15344	15356	0.13	170.49	170.62	0.00	0.00	0.00	0.00	1372.5	14:19:20

[TENNELEC LB4000] [PAGE 1]

16:56:51		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A 14:19:20 90.00	1	RA 228 EFF 1	90.00	6	13905	0.00	0.00	0.00	0.00
	2	2	90.00	11	15576	0.00	0.00	0.00	0.00
	3	3	90.00	30	16152	0.00	0.00	0.00	0.00
	4	4	90.00	12	15344	0.00	0.00	0.00	0.00
GROUP B 14:19:20 90.00	1	5	90.00	7	13273	0.00	0.00	0.00	0.00
	2	6	90.00	9	13777	0.00	0.00	0.00	0.00
	3	7	90.00	25	14901	0.00	0.00	0.00	0.00
	4	8	90.00	16	10944	0.00	0.00	0.00	0.00
GROUP C 120.00	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP D 15:49:37 120.00 LEFT 25	1		66.83	4	147	0.00	0.00	0.00	0.00
	2		66.83	3	104	0.00	0.00	0.00	0.00
	3		66.84	1	122	0.00	0.00	0.00	0.00
	4		66.84	2	101	0.00	0.00	0.00	0.00

ap A channel 4 COUNT TERMINATED ////

BKGD "D"

7-28-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
D	1	120.00	5	275	280	0.04	2.29	2.33	0.00	0.00	0.00	0.00	1290.0	16:58:30
D	2	120.00	4	190	194	0.03	1.58	1.62	0.00	0.00	0.00	0.00	1290.0	16:58:30
D	3	120.00	3	233	236	0.03	1.94	1.97	0.00	0.00	0.00	0.00	1290.0	16:58:30
D	4	120.00	3	195	198	0.03	1.63	1.65	0.00	0.00	0.00	0.00	1290.0	16:58:30
B	1	90.00	6	14098	14104	0.07	156.64	156.71	0.00	0.00	0.00	0.00	1380.0	16:58:30
B	2	90.00	5	13673	13678	0.06	151.92	151.98	0.00	0.00	0.00	0.00	1380.0	16:58:30
B	3	90.00	48	16081	16129	0.53	178.68	179.21	0.00	0.00	0.00	0.00	1380.0	16:58:30
B	4	90.00	12	10525	10537	0.13	116.94	117.08	0.00	0.00	0.00	0.00	1380.0	16:58:30
A	1	90.00	9	13312	13321	0.10	147.91	148.01	0.00	0.00	0.00	0.00	1372.5	16:58:30
A	2	90.00	8	14615	14623	0.09	162.39	162.48	0.00	0.00	0.00	0.00	1372.5	16:58:30
A	3	90.00	26	16617	16643	0.29	184.63	184.92	0.00	0.00	0.00	0.00	1372.5	16:58:30
A	4	90.00	18	15713	15731	0.20	174.59	174.79	0.00	0.00	0.00	0.00	1372.5	16:58:30
D	1	120.00	3	290	293	0.03	2.42	2.44	0.00	0.00	0.00	0.00	1290.0	17:50:25
D	2	120.00	8	210	218	0.07	1.75	1.82	0.00	0.00	0.00	0.00	1290.0	17:50:25
D	3	120.00	5	224	229	0.04	1.87	1.91	0.00	0.00	0.00	0.00	1290.0	17:50:25
D	4	120.00	7	175	182	0.06	1.46	1.52	0.00	0.00	0.00	0.00	1290.0	17:50:25
D	1	120.00	5	298	303	0.04	2.48	2.53	0.00	0.00	0.00	0.00	1290.0	19:51:15
D	2	120.00	3	215	218	0.03	1.79	1.82	0.00	0.00	0.00	0.00	1290.0	19:51:15
D	3	120.00	1	238	239	0.01	1.98	1.99	0.00	0.00	0.00	0.00	1290.0	19:51:15
D	4	120.00	2	178	180	0.02	1.48	1.50	0.00	0.00	0.00	0.00	1290.0	19:51:15
D	1	120.00	7	305	312	0.06	2.54	2.60	0.00	0.00	0.00	0.00	1290.0	21:52:03
D	2	120.00	6	192	198	0.05	1.60	1.65	0.00	0.00	0.00	0.00	1290.0	21:52:03
D	3	120.00	3	218	221	0.03	1.82	1.84	0.00	0.00	0.00	0.00	1290.0	21:52:03
D	4	120.00	2	192	194	0.02	1.60	1.62	0.00	0.00	0.00	0.00	1290.0	21:52:03
D	1	120.00	7	267	274	0.06	2.22	2.28	0.00	0.00	0.00	0.00	1290.0	23:52:52
D	2	120.00	8	188	196	0.07	1.57	1.63	0.00	0.00	0.00	0.00	1290.0	23:52:52
D	3	120.00	7	223	230	0.06	1.86	1.92	0.00	0.00	0.00	0.00	1290.0	23:52:52
D	4	120.00	3	215	218	0.03	1.79	1.82	0.00	0.00	0.00	0.00	1290.0	23:52:52
D	1	120.00	4	306	310	0.03	2.55	2.58	0.00	0.00	0.00	0.00	1290.0	1:53:41
D	2	120.00	5	233	238	0.04	1.94	1.98	0.00	0.00	0.00	0.00	1290.0	1:53:41
D	3	120.00	8	246	254	0.07	2.05	2.12	0.00	0.00	0.00	0.00	1290.0	1:53:41
D	4	120.00	2	196	198	0.02	1.63	1.65	0.00	0.00	0.00	0.00	1290.0	1:53:41
D	1	120.00	3	307	310	0.03	2.56	2.58	0.00	0.00	0.00	0.00	1290.0	3:54:29
D	2	120.00	11	180	191	0.09	1.50	1.59	0.00	0.00	0.00	0.00	1290.0	3:54:29
D	3	120.00	10	255	265	0.08	2.13	2.21	0.00	0.00	0.00	0.00	1290.0	3:54:29

D	4	120.00	7	195	202	0.06	1.63	1.68	0.00	0.00	0.00	0.00	1290.0	5:55:18

7-29-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
D	1	120.00	10	264	274	0.08	2.20	2.28	0.00	0.00	0.00	0.00	1290.0	9:56:56
D	2	120.00	2	188	190	0.02	1.57	1.58	0.00	0.00	0.00	0.00	1290.0	9:56:56
D	3	120.00	7	249	256	0.06	2.08	2.13	0.00	0.00	0.00	0.00	1290.0	9:56:56
D	4	120.00	7	191	198	0.06	1.59	1.65	0.00	0.00	0.00	0.00	1290.0	9:56:56

7-29-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
D	1	120.00	2	276	278	0.02	2.30	2.32	0.00	0.00	0.00	0.00	1290.0	15:59:23
D	2	120.00	2	207	209	0.02	1.73	1.74	0.00	0.00	0.00	0.00	1290.0	15:59:23
D	3	120.00	5	215	220	0.04	1.79	1.83	0.00	0.00	0.00	0.00	1290.0	15:59:23
D	4	120.00	0	198	198	0.00	1.65	1.65	0.00	0.00	0.00	0.00	1290.0	15:59:23
	1	120.00	3	282	285	0.03	2.35	2.38	0.00	0.00	0.00	0.00	1290.0	18:00:11
	2	120.00	3	193	196	0.03	1.61	1.63	0.00	0.00	0.00	0.00	1290.0	18:00:11
	3	120.00	3	252	255	0.03	2.10	2.13	0.00	0.00	0.00	0.00	1290.0	18:00:11
D	4	120.00	2	199	201	0.02	1.66	1.67	0.00	0.00	0.00	0.00	1290.0	18:00:11
D	1	120.00	5	273	278	0.04	2.28	2.32	0.00	0.00	0.00	0.00	1290.0	20:01:00
D	2	120.00	1	207	208	0.01	1.73	1.73	0.00	0.00	0.00	0.00	1290.0	20:01:00
D	3	120.00	1	249	250	0.01	2.08	2.08	0.00	0.00	0.00	0.00	1290.0	20:01:00
D	4	120.00	4	211	215	0.03	1.76	1.79	0.00	0.00	0.00	0.00	1290.0	20:01:00
D	1	120.00	5	273	282	0.08	2.28	2.35	0.00	0.00	0.00	0.00	1290.0	22:01:49
D	2	120.00	6	198	204	0.05	1.65	1.70	0.00	0.00	0.00	0.00	1290.0	22:01:49
D	3	120.00	5	247	252	0.04	2.06	2.10	0.00	0.00	0.00	0.00	1290.0	22:01:49
D	4	120.00	4	187	191	0.03	1.56	1.59	0.00	0.00	0.00	0.00	1290.0	22:01:49
D	1	120.00	6	295	301	0.05	2.46	2.51	0.00	0.00	0.00	0.00	1290.0	0:02:37
D	2	120.00	2	191	193	0.02	1.59	1.61	0.00	0.00	0.00	0.00	1290.0	0:02:37
D	3	120.00	12	241	253	0.10	2.01	2.11	0.00	0.00	0.00	0.00	1290.0	0:02:37
D	4	120.00	6	190	196	0.05	1.58	1.63	0.00	0.00	0.00	0.00	1290.0	0:02:37
D	1	120.00	7	286	293	0.06	2.38	2.44	0.00	0.00	0.00	0.00	1290.0	2:03:26
D	2	120.00	8	221	229	0.07	1.84	1.91	0.00	0.00	0.00	0.00	1290.0	2:03:26
D	3	120.00	5	271	276	0.04	2.26	2.30	0.00	0.00	0.00	0.00	1290.0	2:03:26
D	4	120.00	5	206	211	0.04	1.72	1.76	0.00	0.00	0.00	0.00	1290.0	2:03:26
B	3	720.00	243	5616	5859	0.34	7.80	8.14	0.00	0.00	0.00	0.00	1380.0	16:40:03
A	1	720.00	1528	7399	8927	2.12	10.28	12.40	0.00	0.00	0.00	0.00	1372.5	16:40:03
A	2	720.00	96	2435	2531	0.13	3.38	3.52	0.00	0.00	0.00	0.00	1372.5	16:40:03
A	3	720.00	86940	103247	190187	120.75	143.40	264.15	0.00	0.00	0.00	0.00	1372.5	16:40:03
A	4	720.00	90921	104393	195314	126.28	144.99	271.27	0.00	0.00	0.00	0.00	1372.5	16:40:03
D	1	120.00	4	288	292	0.03	2.40	2.43	0.00	0.00	0.00	0.00	1290.0	4:04:15
D	2	120.00	4	215	219	0.03	1.79	1.83	0.00	0.00	0.00	0.00	1290.0	4:04:15
D	3	120.00	4	229	233	0.03	1.91	1.94	0.00	0.00	0.00	0.00	1290.0	4:04:15
D	4	120.00	3	190	193	0.03	1.58	1.61	0.00	0.00	0.00	0.00	1290.0	4:04:15
D	1	120.00	3	273	276	0.03	2.28	2.30	0.00	0.00	0.00	0.00	1290.0	6:05:04
		120.00	7	216	223	0.06	1.80	1.86	0.00	0.00	0.00	0.00	1290.0	6:05:04
		120.00	6	250	256	0.05	2.08	2.13	0.00	0.00	0.00	0.00	1290.0	6:05:04
	4	120.00	4	216	220	0.03	1.80	1.83	0.00	0.00	0.00	0.00	1290.0	6:05:04

7-30-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
D	1	120.00	9	275	284	0.08	2.29	2.37	0.00	0.00	0.00	0.00	1290.0	10:57:11
D	2	120.00	5	240	245	0.04	2.00	2.04	0.00	0.00	0.00	0.00	1290.0	10:57:11
D	3	120.00	3	254	257	0.03	2.12	2.14	0.00	0.00	0.00	0.00	1290.0	10:57:11
D	4	120.00	8	201	209	0.07	1.67	1.74	0.00	0.00	0.00	0.00	1290.0	10:57:11

7-30-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
D	1	120.00	2	276	278	0.02	2.30	2.32	0.00	0.00	0.00	0.00	1290.0	11:10:18
D	2	120.00	3	192	195	0.03	1.60	1.63	0.00	0.00	0.00	0.00	1290.0	11:10:18
D	3	120.00	2	243	245	0.02	2.03	2.04	0.00	0.00	0.00	0.00	1290.0	11:10:18
D	4	120.00	4	206	210	0.03	1.72	1.75	0.00	0.00	0.00	0.00	1290.0	11:10:18

7-30-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
D	1	120.00	3	267	270	0.03	2.22	2.25	0.00	0.00	0.00	0.00	1290.0	13:11:07
D	2	120.00	4	222	226	0.03	1.85	1.88	0.00	0.00	0.00	0.00	1290.0	13:11:07
D	3	120.00	1	248	249	0.01	2.07	2.08	0.00	0.00	0.00	0.00	1290.0	13:11:07
D	4	120.00	4	194	198	0.03	1.62	1.65	0.00	0.00	0.00	0.00	1290.0	13:11:07

8-04-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	20.00	52534	19493	72027	2626.70	974.65	3601.35	0.00	0.00	0.00	0.00	1380.0	14:00:09
C	2	20.00	76083	28037	104120	3804.15	1401.85	5206.00	0.00	0.00	0.00	0.00	1380.0	14:00:09
C	3	20.00	61884	22958	84842	3094.20	1147.90	4242.10	0.00	0.00	0.00	0.00	1380.0	14:00:09
C	4	20.00	59685	22112	81797	2984.25	1105.60	4089.85	0.00	0.00	0.00	0.00	1380.0	14:00:09
D	1	20.00	65797	24163	89960	3289.85	1208.15	4498.00	0.00	0.00	0.00	0.00	1290.0	14:00:09
D	2	20.00	71913	25724	97637	3595.65	1286.20	4881.85	0.00	0.00	0.00	0.00	1290.0	14:00:09
D	3	20.00	61579	22525	84104	3078.95	1126.25	4205.20	0.00	0.00	0.00	0.00	1290.0	14:00:09
D	4	20.00	72549	26902	99451	3627.45	1345.10	4972.55	0.00	0.00	0.00	0.00	1290.0	14:00:09
C	1	20.00	52495	19802	72297	2624.75	990.10	3614.85	0.00	0.00	0.00	0.00	1380.0	14:20:22
C	2	20.00	76116	27774	103890	3805.80	1388.70	5194.50	0.00	0.00	0.00	0.00	1380.0	14:20:22
C	3	20.00	62101	23149	85250	3105.05	1157.45	4262.50	0.00	0.00	0.00	0.00	1380.0	14:20:22
C	4	20.00	59797	21816	81613	2989.85	1090.80	4080.65	0.00	0.00	0.00	0.00	1380.0	14:20:22
D	1	20.00	65832	24054	89886	3291.60	1202.70	4494.30	0.00	0.00	0.00	0.00	1290.0	14:20:22
D	2	20.00	72094	26434	98528	3604.70	1321.70	4926.40	0.00	0.00	0.00	0.00	1290.0	14:20:22
D	3	20.00	61238	22508	83746	3061.90	1125.40	4187.30	0.00	0.00	0.00	0.00	1290.0	14:20:22
D	4	20.00	73527	26819	100346	3676.35	1340.95	5017.30	0.00	0.00	0.00	0.00	1290.0	14:20:22
C	1	20.00	52522	19098	71620	2626.10	954.90	3581.00	0.00	0.00	0.00	0.00	1380.0	14:40:34
C	2	20.00	75789	27836	103625	3789.45	1391.80	5181.25	0.00	0.00	0.00	0.00	1380.0	14:40:34
C	3	20.00	62559	23074	85633	3127.95	1153.70	4281.65	0.00	0.00	0.00	0.00	1380.0	14:40:34
C	4	20.00	60321	21947	82268	3016.05	1097.35	4113.40	0.00	0.00	0.00	0.00	1380.0	14:40:34
D	1	20.00	65731	23853	89584	3286.55	1192.65	4479.20	0.00	0.00	0.00	0.00	1290.0	14:40:36
D	2	20.00	72056	25947	98003	3602.80	1297.35	4900.15	0.00	0.00	0.00	0.00	1290.0	14:40:36
D	3	20.00	60945	22567	83512	3047.25	1128.35	4175.60	0.00	0.00	0.00	0.00	1290.0	14:40:36
D	4	20.00	72772	26893	99665	3638.60	1344.65	4983.25	0.00	0.00	0.00	0.00	1290.0	14:40:36
C	1	20.00	52701	19375	72076	2635.05	968.75	3603.80	0.00	0.00	0.00	0.00	1380.0	15:00:47
C	2	20.00	76170	27584	103754	3808.50	1379.20	5187.70	0.00	0.00	0.00	0.00	1380.0	15:00:47
C	3	20.00	62008	23300	85308	3100.40	1165.00	4265.40	0.00	0.00	0.00	0.00	1380.0	15:00:47
C	4	20.00	60333	22121	82454	3016.65	1106.05	4122.70	0.00	0.00	0.00	0.00	1380.0	15:00:47
D	1	20.00	65319	23796	89115	3265.95	1189.80	4455.75	0.00	0.00	0.00	0.00	1290.0	15:00:51
D	2	20.00	72332	25792	98124	3616.60	1289.60	4906.20	0.00	0.00	0.00	0.00	1290.0	15:00:51
D	3	20.00	61081	22564	83645	3054.05	1128.20	4182.25	0.00	0.00	0.00	0.00	1290.0	15:00:51
D	4	20.00	73355	26796	100151	3667.75	1339.80	5007.55	0.00	0.00	0.00	0.00	1290.0	15:00:51
C	1	20.00	52522	19132	71654	2626.10	956.60	3582.70	0.00	0.00	0.00	0.00	1380.0	15:21:00
C	2	20.00	75836	27741	103577	3791.80	1387.05	5178.85	0.00	0.00	0.00	0.00	1380.0	15:21:00
C	3	20.00	62307	23424	85731	3115.35	1171.20	4286.55	0.00	0.00	0.00	0.00	1380.0	15:21:00
C	4	20.00	60020	22283	82303	3001.00	1114.15	4115.15	0.00	0.00	0.00	0.00	1380.0	15:21:00
D	1	20.00	65856	24141	89997	3292.80	1207.05	4499.85	0.00	0.00	0.00	0.00	1290.0	15:21:05
D	2	20.00	71961	26189	98150	3598.05	1309.45	4907.50	0.00	0.00	0.00	0.00	1290.0	15:21:05
D	3	20.00	61123	22814	83937	3056.15	1140.70	4196.85	0.00	0.00	0.00	0.00	1290.0	15:21:05
D	4	20.00	72860	26966	99826	3643.00	1348.30	4991.30	0.00	0.00	0.00	0.00	1290.0	15:21:05

8-04-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	20.00	52604	19373	71977	2630.20	968.65	3598.85	0.00	0.00	0.00	0.00	1380.0	15:41:12
C	2	20.00	75853	27631	103484	3792.65	1381.55	5174.20	0.00	0.00	0.00	0.00	1380.0	15:41:12
C	3	20.00	61773	23080	84853	3088.65	1154.00	4242.65	0.00	0.00	0.00	0.00	1380.0	15:41:12
C	4	20.00	60429	22152	82581	3021.45	1107.60	4129.05	0.00	0.00	0.00	0.00	1380.0	15:41:12
D	1	20.00	65205	24101	89306	3260.25	1205.05	4465.30	0.00	0.00	0.00	0.00	1290.0	15:41:20
D	2	20.00	71915	25933	97848	3595.75	1296.65	4892.40	0.00	0.00	0.00	0.00	1290.0	15:41:20
D	3	20.00	61306	22546	83852	3065.30	1127.30	4192.60	0.00	0.00	0.00	0.00	1290.0	15:41:20
D	4	20.00	73347	26949	100296	3667.35	1347.45	5014.80	0.00	0.00	0.00	0.00	1290.0	15:41:20
C	1	20.00	52786	19272	72058	2639.30	963.60	3602.90	0.00	0.00	0.00	0.00	1380.0	16:01:25
C	2	20.00	75862	27747	103609	3793.10	1387.35	5180.45	0.00	0.00	0.00	0.00	1380.0	16:01:25
C	3	20.00	61618	23272	84890	3080.90	1163.60	4244.50	0.00	0.00	0.00	0.00	1380.0	16:01:25
C	4	20.00	59960	21705	81665	2998.00	1085.25	4083.25	0.00	0.00	0.00	0.00	1380.0	16:01:25
D	1	20.00	65384	23795	89179	3269.20	1189.75	4458.95	0.00	0.00	0.00	0.00	1290.0	16:01:34
D	2	20.00	71949	26107	98056	3597.45	1305.35	4902.80	0.00	0.00	0.00	0.00	1290.0	16:01:34
D	3	20.00	61136	22707	83843	3056.80	1135.35	4192.15	0.00	0.00	0.00	0.00	1290.0	16:01:34
D	4	20.00	73416	26721	100137	3670.80	1336.05	5006.85	0.00	0.00	0.00	0.00	1290.0	16:01:34
C	1	20.00	52446	19394	71840	2622.30	969.70	3592.00	0.00	0.00	0.00	0.00	1380.0	16:21:37
C	2	20.00	75644	27701	103345	3782.20	1385.05	5167.25	0.00	0.00	0.00	0.00	1380.0	16:21:37
C	3	20.00	61692	23004	84696	3084.60	1150.20	4234.80	0.00	0.00	0.00	0.00	1380.0	16:21:37
C	4	20.00	59827	22129	81956	2991.35	1106.45	4097.80	0.00	0.00	0.00	0.00	1380.0	16:21:37
D	1	20.00	65242	23891	89133	3262.10	1194.55	4456.65	0.00	0.00	0.00	0.00	1290.0	16:21:48
D	2	20.00	71769	26489	98258	3588.45	1324.45	4912.90	0.00	0.00	0.00	0.00	1290.0	16:21:48
D	3	20.00	61022	22398	83420	3051.10	1119.90	4171.00	0.00	0.00	0.00	0.00	1290.0	16:21:48
D	4	20.00	73040	26997	100037	3652.00	1349.85	5001.85	0.00	0.00	0.00	0.00	1290.0	16:21:48
C	1	20.00	52808	19539	72347	2640.40	976.95	3617.35	0.00	0.00	0.00	0.00	1380.0	16:41:50
C	2	20.00	76123	27853	103976	3806.15	1392.65	5198.80	0.00	0.00	0.00	0.00	1380.0	16:41:50
C	3	20.00	62009	23239	85248	3100.45	1161.95	4262.40	0.00	0.00	0.00	0.00	1380.0	16:41:50
C	4	20.00	59863	22123	81986	2993.15	1106.15	4099.30	0.00	0.00	0.00	0.00	1380.0	16:41:50
D	1	20.00	65140	23923	89063	3257.00	1196.15	4453.15	0.00	0.00	0.00	0.00	1290.0	16:42:03
D	2	20.00	71707	26250	97957	3585.35	1312.50	4897.85	0.00	0.00	0.00	0.00	1290.0	16:42:03
D	3	20.00	60994	22643	83637	3049.70	1132.15	4181.85	0.00	0.00	0.00	0.00	1290.0	16:42:03
D	4	20.00	73409	26942	100351	3670.45	1347.10	5017.55	0.00	0.00	0.00	0.00	1290.0	16:42:03

D	1	20.00	65713	24156	89869	3285.65	1207.80	4493.45	0.00	0.00	0.00	0.00	1290.0	17:02:17
D	2	20.00	72249	26127	98376	3612.45	1306.35	4918.80	0.00	0.00	0.00	0.00	1290.0	17:02:17
D	3	20.00	61833	22412	84245	3091.65	1120.60	4212.25	0.00	0.00	0.00	0.00	1290.0	17:02:17
D	4	20.00	73119	26904	100023	3655.95	1345.20	5001.15	0.00	0.00	0.00	0.00	1290.0	17:02:17
C	1	20.00	52702	19058	71760	2635.10	952.90	3588.00	0.00	0.00	0.00	0.00	1380.0	17:22:15
C	[illegible]	20.00	75952	27993	103945	3797.60	1399.65	5197.25	0.00	0.00	0.00	0.00	1380.0	17:22:15
[illegible]	[illegible]	20.00	62595	22770	85365	3129.75	1138.50	4268.25	0.00	0.00	0.00	0.00	1380.0	17:22:15
[illegible]	[illegible]	20.00	59953	21767	81720	2997.65	1088.35	4086.00	0.00	0.00	0.00	0.00	1380.0	17:22:15
D	1	20.00	65618	24019	89637	3280.90	1200.95	4481.85	0.00	0.00	0.00	0.00	1290.0	17:22:32
D	2	20.00	72107	26107	98214	3605.35	1305.35	4910.70	0.00	0.00	0.00	0.00	1290.0	17:22:32
D	3	20.00	60947	22606	83553	3047.35	1130.30	4177.65	0.00	0.00	0.00	0.00	1290.0	17:22:32
D	4	20.00	73075	27304	100379	3653.75	1365.20	5018.95	0.00	0.00	0.00	0.00	1290.0	17:22:32
C	1	20.00	52868	19169	72037	2643.40	958.45	3601.85	0.00	0.00	0.00	0.00	1380.0	17:42:28
C	2	20.00	75965	27618	103583	3798.25	1380.90	5179.15	0.00	0.00	0.00	0.00	1380.0	17:42:28
C	3	20.00	62531	22885	85416	3126.55	1144.25	4270.80	0.00	0.00	0.00	0.00	1380.0	17:42:28
C	4	20.00	60339	22141	82480	3016.95	1107.05	4124.00	0.00	0.00	0.00	0.00	1380.0	17:42:28
D	1	20.00	65774	24009	89783	3288.70	1200.45	4489.15	0.00	0.00	0.00	0.00	1290.0	17:42:46
D	2	20.00	71966	26090	98056	3598.30	1304.50	4902.80	0.00	0.00	0.00	0.00	1290.0	17:42:46
D	3	20.00	61304	22551	83855	3065.20	1127.55	4192.75	0.00	0.00	0.00	0.00	1290.0	17:42:46
D	4	20.00	72980	26666	99646	3649.00	1333.30	4982.30	0.00	0.00	0.00	0.00	1290.0	17:42:46
C	1	20.00	52050	19332	71382	2602.50	966.60	3569.10	0.00	0.00	0.00	0.00	1380.0	18:02:40
C	2	20.00	75779	27723	103502	3788.95	1386.15	5175.10	0.00	0.00	0.00	0.00	1380.0	18:02:40
C	3	20.00	62170	22828	84998	3108.50	1141.40	4249.90	0.00	0.00	0.00	0.00	1380.0	18:02:40
C	4	20.00	60529	22050	82579	3026.45	1102.50	4128.95	0.00	0.00	0.00	0.00	1380.0	18:02:40
D	1	20.00	65799	23915	89714	3289.95	1195.75	4485.70	0.00	0.00	0.00	0.00	1290.0	18:03:01
D	2	20.00	71760	25982	97742	3588.00	1299.10	4887.10	0.00	0.00	0.00	0.00	1290.0	18:03:01
D	3	20.00	61572	22475	84047	3078.60	1123.75	4202.35	0.00	0.00	0.00	0.00	1290.0	18:03:01
D	4	20.00	73039	27052	100091	3651.95	1352.60	5004.55	0.00	0.00	0.00	0.00	1290.0	18:03:01
C	1	20.00	52788	19328	72116	2639.40	966.40	3605.80	0.00	0.00	0.00	0.00	1380.0	18:22:53
C	2	20.00	75924	27717	103641	3796.20	1385.85	5182.05	0.00	0.00	0.00	0.00	1380.0	18:22:53
C	3	20.00	62315	22975	85290	3115.75	1148.75	4264.50	0.00	0.00	0.00	0.00	1380.0	18:22:53
C	4	20.00	60036	22007	82043	3001.80	1100.35	4102.15	0.00	0.00	0.00	0.00	1380.0	18:22:53
D	1	20.00	65458	23788	89246	3272.90	1189.40	4462.30	0.00	0.00	0.00	0.00	1290.0	18:23:16
D	2	20.00	71678	25832	97510	3583.90	1291.60	4875.50	0.00	0.00	0.00	0.00	1290.0	18:23:16
D	3	20.00	61461	22531	83992	3073.05	1126.55	4199.60	0.00	0.00	0.00	0.00	1290.0	18:23:16
D	[illegible]	20.00	73503	27085	100588	3675.15	1354.25	5029.40	0.00	0.00	0.00	0.00	1290.0	18:23:16
[illegible]	[illegible]	20.00	52231	19364	71595	2611.55	968.20	3579.75	0.00	0.00	0.00	0.00	1380.0	18:43:06
[illegible]	2	20.00	76487	27864	104351	3824.35	1393.20	5217.55	0.00	0.00	0.00	0.00	1380.0	18:43:06
C	3	20.00	62100	23063	85163	3105.00	1153.15	4258.15	0.00	0.00	0.00	0.00	1380.0	18:43:06
C	4	20.00	59877	21862	81739	2993.85	1093.10	4086.95	0.00	0.00	0.00	0.00	1380.0	18:43:06
D	1	20.00	65486	24014	89500	3274.30	1200.70	4475.00	0.00	0.00	0.00	0.00	1290.0	18:43:30
D	2	20.00	72175	26202	98377	3608.75	1310.10	4918.85	0.00	0.00	0.00	0.00	1290.0	18:43:30
D	3	20.00	60960	22573	83533	3048.00	1128.65	4176.65	0.00	0.00	0.00	0.00	1290.0	18:43:30
D	4	20.00	72768	26688	99456	3638.40	1334.40	4972.80	0.00	0.00	0.00	0.00	1290.0	18:43:30
C	1	20.00	53042	19323	72365	2652.10	966.15	3618.25	0.00	0.00	0.00	0.00	1380.0	19:03:18
C	2	20.00	76059	27779	103838	3802.95	1388.95	5191.90	0.00	0.00	0.00	0.00	1380.0	19:03:18
C	3	20.00	62134	23031	85165	3106.70	1151.55	4258.25	0.00	0.00	0.00	0.00	1380.0	19:03:18
C	4	20.00	60333	22000	82333	3016.65	1100.00	4116.65	0.00	0.00	0.00	0.00	1380.0	19:03:18
D	1	20.00	65816	24102	89918	3290.80	1205.10	4495.90	0.00	0.00	0.00	0.00	1290.0	19:03:45
D	2	20.00	71642	26238	97880	3582.10	1311.90	4894.00	0.00	0.00	0.00	0.00	1290.0	19:03:45
D	3	20.00	60937	22443	83380	3046.85	1122.15	4169.00	0.00	0.00	0.00	0.00	1290.0	19:03:45
D	4	20.00	73403	26799	100202	3670.15	1339.95	5010.10	0.00	0.00	0.00	0.00	1290.0	19:03:45
C	1	20.00	53129	19361	72490	2656.45	968.05	3624.50	0.00	0.00	0.00	0.00	1380.0	19:23:31
C	2	20.00	75975	27983	103958	3798.75	1399.15	5197.90	0.00	0.00	0.00	0.00	1380.0	19:23:31
C	3	20.00	62265	23275	85540	3113.25	1163.75	4277.00	0.00	0.00	0.00	0.00	1380.0	19:23:31
C	4	20.00	59869	22035	81904	2993.45	1101.75	4095.20	0.00	0.00	0.00	0.00	1380.0	19:23:31
D	1	20.00	65205	24136	89341	3260.25	1206.80	4467.05	0.00	0.00	0.00	0.00	1290.0	19:24:00
D	2	20.00	71882	26305	98187	3594.10	1315.25	4909.35	0.00	0.00	0.00	0.00	1290.0	19:24:00
D	3	20.00	61200	22532	83732	3060.00	1126.60	4186.60	0.00	0.00	0.00	0.00	1290.0	19:24:00
D	4	20.00	73437	26925	100362	3671.85	1346.25	5018.10	0.00	0.00	0.00	0.00	1290.0	19:24:00
C	1	20.00	52233	19298	71531	2611.65	964.90	3576.55	0.00	0.00	0.00	0.00	1380.0	19:43:43
C	2	20.00	75780	27635	103415	3789.00	1381.75	5170.75	0.00	0.00	0.00	0.00	1380.0	19:43:43
C	3	20.00	61915	22919	84834	3095.75	1145.95	4241.70	0.00	0.00	0.00	0.00	1380.0	19:43:43
C	4	20.00	59983	21872	81855	2999.15	1093.60	4092.75	0.00	0.00	0.00	0.00	1380.0	19:43:43
D	1	20.00	65475	24240	89715	3273.75	1212.00	4485.75	0.00	0.00	0.00	0.00	1290.0	19:44:15
D	[illegible]	20.00	71511	25965	97476	3575.55	1298.25	4873.80	0.00	0.00	0.00	0.00	1290.0	19:44:15
[illegible]	[illegible]	20.00	61216	22574	83790	3060.80	1128.70	4189.50	0.00	0.00	0.00	0.00	1290.0	19:44:15
[illegible]	[illegible]	20.00	73278	26989	100267	3663.90	1349.45	5013.35	0.00	0.00	0.00	0.00	1290.0	19:44:15
C	1	20.00	52957	19385	72342	2647.85	969.25	3617.10	0.00	0.00	0.00	0.00	1380.0	20:03:56
C	2	20.00	76527	27947	104474	3826.35	1397.35	5223.70	0.00	0.00	0.00	0.00	1380.0	20:03:56
C	3	20.00	62008	22899	84907	3100.40	1144.95	4245.35	0.00	0.00	0.00	0.00	1380.0	20:03:56
C	4	20.00	60071	21901	81972	3003.55	1095.05	4098.60	0.00	0.00	0.00	0.00	1380.0	20:03:56
D	1	20.00	65565	24044	89609	3278.25	1202.20	4480.45	0.00	0.00	0.00	0.00	1290.0	20:04:28
D	2	20.00	71941	26065	98006	3597.05	1303.25	4900.30	0.00	0.00	0.00	0.00	1290.0	20:04:28
D	3	20.00	61430	22172	83607	3071.50	1108.60	4180.10	0.00	0.00	0.00	0.00	1290.0	20:04:28

C	4	20.00	60461	22104	82565	3023.05	1105.20	4128.25	0.00	0.00	0.00	0.00	1380.0	20:24:09	
C	1	400.00	1052998	386963	1439961	2632.50	967.41	3599.90	0.00	0.00	0.00	0.00	1380.0	20:24:09	↑
C	2	400.00	1519859	555424	2075283	3799.65	1388.56	5188.21	0.00	0.00	0.00	0.00	1380.0	20:24:09	↑
C	3	400.00	1242147	460974	1703121	3105.37	1152.43	4257.80	0.00	0.00	0.00	0.00	1380.0	20:24:09	↑
C	4	400.00	1202030	440166	1642196	3005.08	1100.41	4105.49	0.00	0.00	0.00	0.00	1380.0	20:24:09	↑
D	1	20.00	65544	23759	89303	3277.20	1187.95	4465.15	0.00	0.00	0.00	0.00	1290.0	20:24:43	
D	2	20.00	71719	26135	97854	3585.95	1306.75	4892.70	0.00	0.00	0.00	0.00	1290.0	20:24:43	
D	3	20.00	61351	22574	83925	3067.55	1128.70	4196.25	0.00	0.00	0.00	0.00	1290.0	20:24:43	
D	4	20.00	73351	26815	100166	3667.55	1340.75	5008.30	0.00	0.00	0.00	0.00	1290.0	20:24:43	
D	1	400.00	1310959	479899	1790858	3277.40	1199.75	4477.15	0.00	0.00	0.00	0.00	1290.0	20:24:43	↑
D	2	400.00	1438326	521913	1960239	3595.82	1304.78	4900.60	0.00	0.00	0.00	0.00	1290.0	20:24:43	↑
D	3	400.00	1224635	450715	1675350	3061.59	1126.79	4188.37	0.00	0.00	0.00	0.00	1290.0	20:24:43	↑
D	4	400.00	1463389	538165	2001554	3658.47	1345.41	5003.88	0.00	0.00	0.00	0.00	1290.0	20:24:43	↑

8-04-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	4.00	308	121882	122190	77.00	30470.50	30547.50	0.00	0.00	0.00	0.00	1380.0	12:25:54
C	2	4.00	102	103476	103578	25.50	25869.00	25894.50	0.00	0.00	0.00	0.00	1380.0	12:25:54
C	3	4.00	40	110839	110879	10.00	27709.75	27719.75	0.00	0.00	0.00	0.00	1380.0	12:25:54
C	4	4.00	239	112701	112940	59.75	28175.25	28235.00	0.00	0.00	0.00	0.00	1380.0	12:25:54
D		4.00	251	126630	126881	62.75	31657.50	31720.25	0.00	0.00	0.00	0.00	1290.0	12:25:54
D	2	4.00	133	131196	131329	33.25	32799.00	32832.25	0.00	0.00	0.00	0.00	1290.0	12:25:54
D	3	4.00	56	124847	124903	14.00	31211.75	31225.75	0.00	0.00	0.00	0.00	1290.0	12:25:54
D	4	4.00	68	123017	123085	17.00	30754.25	30771.25	0.00	0.00	0.00	0.00	1290.0	12:25:54
C	1	4.00	363	122537	122940	90.75	30644.25	30735.00	0.00	0.00	0.00	0.00	1380.0	12:30:03
C	2	4.00	114	105094	105208	28.50	26273.50	26302.00	0.00	0.00	0.00	0.00	1380.0	12:30:03
C	3	4.00	41	110630	110671	10.25	27657.50	27667.75	0.00	0.00	0.00	0.00	1380.0	12:30:03
C	4	4.00	278	112636	112914	69.50	28159.00	28228.50	0.00	0.00	0.00	0.00	1380.0	12:30:03
D	1	4.00	252	127115	127367	63.00	31778.75	31841.75	0.00	0.00	0.00	0.00	1290.0	12:30:03
D	2	4.00	127	131505	131632	31.75	32876.25	32908.00	0.00	0.00	0.00	0.00	1290.0	12:30:03
D	3	4.00	62	125565	125627	15.50	31391.25	31406.75	0.00	0.00	0.00	0.00	1290.0	12:30:03
D	4	4.00	78	123011	123089	19.50	30752.75	30772.25	0.00	0.00	0.00	0.00	1290.0	12:30:03
C	1	4.00	350	122546	122896	87.50	30636.50	30724.00	0.00	0.00	0.00	0.00	1380.0	12:34:12
C	2	4.00	152	104075	104227	38.00	26018.75	26056.75	0.00	0.00	0.00	0.00	1380.0	12:34:12
C	3	4.00	42	110604	110646	10.50	27651.00	27661.50	0.00	0.00	0.00	0.00	1380.0	12:34:12
C	4	4.00	277	112983	113260	69.25	28245.75	28315.00	0.00	0.00	0.00	0.00	1380.0	12:34:12
D	1	4.00	268	126770	127038	67.00	31692.50	31759.50	0.00	0.00	0.00	0.00	1290.0	12:34:12
D	2	4.00	147	131886	132033	36.75	32971.50	33008.25	0.00	0.00	0.00	0.00	1290.0	12:34:12
D	3	4.00	58	125953	126011	14.50	31488.25	31502.75	0.00	0.00	0.00	0.00	1290.0	12:34:12
D	4	4.00	85	123474	123559	21.25	30868.50	30889.75	0.00	0.00	0.00	0.00	1290.0	12:34:12
C	1	4.00	399	123211	123610	99.75	30802.75	30902.50	0.00	0.00	0.00	0.00	1380.0	12:38:22
C	2	4.00	106	104501	104607	26.50	26125.25	26151.75	0.00	0.00	0.00	0.00	1380.0	12:38:22
C	3	4.00	50	110922	110972	12.50	27730.50	27743.00	0.00	0.00	0.00	0.00	1380.0	12:38:22
C	4	4.00	255	112591	112846	63.75	28147.75	28211.50	0.00	0.00	0.00	0.00	1380.0	12:38:22
D	1	4.00	272	126959	127231	68.00	31739.75	31807.75	0.00	0.00	0.00	0.00	1290.0	12:38:22
D	2	4.00	127	131378	131505	31.75	32844.50	32876.25	0.00	0.00	0.00	0.00	1290.0	12:38:22
D	3	4.00	55	125050	125105	13.75	31262.50	31276.25	0.00	0.00	0.00	0.00	1290.0	12:38:22
D	4	4.00	89	122973	123062	22.25	30743.25	30765.50	0.00	0.00	0.00	0.00	1290.0	12:38:22
C	1	4.00	398	122999	123397	99.50	30749.75	30849.25	0.00	0.00	0.00	0.00	1380.0	12:42:32
C	2	4.00	136	104592	104728	34.00	26148.00	26182.00	0.00	0.00	0.00	0.00	1380.0	12:42:32
C	3	4.00	48	110283	110331	12.00	27570.75	27582.75	0.00	0.00	0.00	0.00	1380.0	12:42:32
C	4	4.00	269	112749	113018	67.25	28187.25	28254.50	0.00	0.00	0.00	0.00	1380.0	12:42:32
D	1	4.00	244	127612	127856	61.00	31903.00	31964.00	0.00	0.00	0.00	0.00	1290.0	12:42:32
D	2	4.00	137	131920	132057	34.25	32980.00	33014.25	0.00	0.00	0.00	0.00	1290.0	12:42:32
D	3	4.00	65	125788	125853	16.25	31447.00	31463.25	0.00	0.00	0.00	0.00	1290.0	12:42:32
D	4	4.00	84	123101	123185	21.00	30775.25	30796.25	0.00	0.00	0.00	0.00	1290.0	12:42:32
C	1	4.00	404	122555	122959	101.00	30638.75	30739.75	0.00	0.00	0.00	0.00	1380.0	12:46:41
C	2	4.00	143	104397	104540	35.75	26099.25	26135.00	0.00	0.00	0.00	0.00	1380.0	12:46:41
C	3	4.00	47	110305	110352	11.75	27576.25	27588.00	0.00	0.00	0.00	0.00	1380.0	12:46:41
C	4	4.00	284	112621	112905	71.00	28155.25	28226.25	0.00	0.00	0.00	0.00	1380.0	12:46:41
D	1	4.00	288	127405	127693	72.00	31851.25	31923.25	0.00	0.00	0.00	0.00	1290.0	12:46:41
D	2	4.00	149	131935	132084	37.25	32983.75	33021.00	0.00	0.00	0.00	0.00	1290.0	12:46:41
D	3	4.00	74	125237	125311	18.50	31309.25	31327.75	0.00	0.00	0.00	0.00	1290.0	12:46:41
D	4	4.00	92	123316	123408	23.00	30829.00	30852.00	0.00	0.00	0.00	0.00	1290.0	12:46:41
C	1	4.00	419	122284	122703	104.75	30571.00	30675.75	0.00	0.00	0.00	0.00	1380.0	12:50:51
C	2	4.00	134	104204	104338	33.50	26051.00	26084.50	0.00	0.00	0.00	0.00	1380.0	12:50:51
C	3	4.00	45	111033	111078	11.25	27758.25	27769.50	0.00	0.00	0.00	0.00	1380.0	12:50:51
C	4	4.00	256	112634	112890	64.00	28158.50	28222.50	0.00	0.00	0.00	0.00	1380.0	12:50:51
D	1	4.00	263	127346	127609	65.75	31836.50	31902.25	0.00	0.00	0.00	0.00	1290.0	12:50:51
D	2	4.00	140	131751	131891	35.00	32937.75	32972.75	0.00	0.00	0.00	0.00	1290.0	12:50:51
D	3	4.00	63	125289	125352	15.75	31322.25	31338.00	0.00	0.00	0.00	0.00	1290.0	12:50:51
D	4	4.00	95	123386	123481	23.75	30846.50	30870.25	0.00	0.00	0.00	0.00	1290.0	12:50:51
C	1	4.00	388	123294	123682	97.00	30823.50	30920.50	0.00	0.00	0.00	0.00	1380.0	12:55:00
C	2	4.00	130	104236	104366	32.50	26059.00	26091.50	0.00	0.00	0.00	0.00	1380.0	12:55:00
C	3	4.00	42	110398	110440	10.50	27599.50	27610.00	0.00	0.00	0.00	0.00	1380.0	12:55:00
C	4	4.00	263	112918	113181	65.75	28229.50	28295.25	0.00	0.00	0.00	0.00	1380.0	12:55:00
D	1	4.00	265	126794	127059	66.25	31698.50	31764.75	0.00	0.00	0.00	0.00	1290.0	12:55:00
D	2	4.00	154	131095	131249	38.50	32773.75	32812.25	0.00	0.00	0.00	0.00	1290.0	12:55:00
D	3	4.00	68	124936	125004	17.00	31234.00	31251.00	0.00	0.00	0.00	0.00	1290.0	12:55:00
D	4	4.00	87	123253	123340	21.75	30813.25	30835.00	0.00	0.00	0.00	0.00	1290.0	12:55:00
C	1	4.00	384	123247	123631	96.00	30811.75	30907.75	0.00	0.00	0.00	0.00	1380.0	12:59:10
C	2	4.00	126	104562	104688	31.50	26140.50	26172.00	0.00	0.00	0.00	0.00	1380.0	12:59:10
C	3	4.00	49	110522	110571	12.25	27630.50	27642.75	0.00	0.00	0.00	0.00	1380.0	12:59:10
C	4	4.00	279	112933	113212	69.75	28233.25	28303.00	0.00	0.00	0.00	0.00	1380.0	12:59:10
D	1	4.00	251	127324	127575	62.75	31831.00	31893.75	0.00	0.00	0.00	0.00	1290.0	12:59:10
D	2	4.00	168	131588	131756	42.00	32897.00	32939.00	0.00	0.00	0.00	0.00	1290.0	12:59:10
D	3	4.00	83	125756	125839	20.75	31439.00	31459.75	0.00	0.00	0.00	0.00	1290.0	12:59:10
D	4	4.00	73	123698	123771	18.25	30924.50	30942.75	0.00	0.00	0.00	0.00	1290.0	12:59:10
C	1	4.00	380	122780	123160	95.00	30695.00	30790.00	0.00	0.00	0.00	0.00	1380.0	13:03:15
C	2	4.00	124	104075	104199	31.00	26018.75	26049.75	0.00	0.00	0.00	0.00	1380.0	13:03:19

D	3	4.00	60	125319	125379	15.00	31329.75	31344.75	0.00	0.00	0.00	0.00	1290.0	13:03:20
D	4	4.00	73	123194	123267	18.25	30798.50	30816.75	0.00	0.00	0.00	0.00	1290.0	13:03:20
C	1	4.00	441	122636	123077	110.25	30659.00	30769.25	0.00	0.00	0.00	0.00	1380.0	13:07:29
C	2	4.00	137	103889	104026	34.25	25972.25	26006.50	0.00	0.00	0.00	0.00	1380.0	13:07:29
C	3	4.00	44	110384	110428	11.00	27596.00	27607.00	0.00	0.00	0.00	0.00	1380.0	13:07:29
C	4	4.00	290	113275	113565	72.50	28318.75	28391.25	0.00	0.00	0.00	0.00	1380.0	13:07:29
D	1	4.00	272	127088	127360	68.00	31772.00	31840.00	0.00	0.00	0.00	0.00	1290.0	13:07:29
D	2	4.00	166	131896	132062	41.50	32974.00	33015.50	0.00	0.00	0.00	0.00	1290.0	13:07:29
D	3	4.00	70	125211	125281	17.50	31302.75	31320.25	0.00	0.00	0.00	0.00	1290.0	13:07:29
D	4	4.00	89	123644	123733	22.25	30911.00	30933.25	0.00	0.00	0.00	0.00	1290.0	13:07:29
C	1	4.00	434	122930	123364	108.50	30732.50	30841.00	0.00	0.00	0.00	0.00	1380.0	13:11:39
C	2	4.00	128	103925	104053	32.00	25981.25	26013.25	0.00	0.00	0.00	0.00	1380.0	13:11:39
C	3	4.00	44	110991	111035	11.00	27747.75	27758.75	0.00	0.00	0.00	0.00	1380.0	13:11:39
C	4	4.00	300	112307	112607	75.00	28076.75	28151.75	0.00	0.00	0.00	0.00	1380.0	13:11:39
D	1	4.00	272	126597	126869	68.00	31649.25	31717.25	0.00	0.00	0.00	0.00	1290.0	13:11:39
D	2	4.00	172	131878	132050	43.00	32969.50	33012.50	0.00	0.00	0.00	0.00	1290.0	13:11:39
D	3	4.00	66	125522	125588	16.50	31380.50	31397.00	0.00	0.00	0.00	0.00	1290.0	13:11:39
D	4	4.00	109	124179	124288	27.25	31044.75	31072.00	0.00	0.00	0.00	0.00	1290.0	13:11:39
C	1	4.00	438	123063	123501	109.50	30765.75	30875.25	0.00	0.00	0.00	0.00	1380.0	13:15:48
C	2	4.00	141	104285	104426	35.25	26071.25	26106.50	0.00	0.00	0.00	0.00	1380.0	13:15:48
C	3	4.00	42	110559	110601	10.50	27639.75	27650.25	0.00	0.00	0.00	0.00	1380.0	13:15:48
C	4	4.00	268	112506	112774	67.00	28126.50	28193.50	0.00	0.00	0.00	0.00	1380.0	13:15:48
D	1	4.00	271	127414	127685	67.75	31853.50	31921.25	0.00	0.00	0.00	0.00	1290.0	13:15:49
D	2	4.00	149	131953	132102	37.25	32988.25	33025.50	0.00	0.00	0.00	0.00	1290.0	13:15:49
D	3	4.00	80	125142	125222	20.00	31285.50	31305.50	0.00	0.00	0.00	0.00	1290.0	13:15:49
D	4	4.00	72	123405	123477	18.00	30851.25	30869.25	0.00	0.00	0.00	0.00	1290.0	13:15:49
C	1	4.00	428	123046	123474	107.00	30761.50	30868.50	0.00	0.00	0.00	0.00	1380.0	13:19:58
C	2	4.00	134	104019	104153	33.50	26004.75	26038.25	0.00	0.00	0.00	0.00	1380.0	13:19:58
C	3	4.00	26	110245	110271	6.50	27561.25	27567.75	0.00	0.00	0.00	0.00	1380.0	13:19:58
C	4	4.00	264	112436	112700	66.00	28109.00	28175.00	0.00	0.00	0.00	0.00	1380.0	13:19:58
D	1	4.00	309	127527	127836	77.25	31881.75	31959.00	0.00	0.00	0.00	0.00	1290.0	13:19:58
D	2	4.00	150	132152	132302	37.50	33038.00	33075.50	0.00	0.00	0.00	0.00	1290.0	13:19:58
D	3	4.00	81	125333	125414	20.25	31333.25	31353.50	0.00	0.00	0.00	0.00	1290.0	13:19:58
D	4	4.00	90	123279	123369	22.50	30819.75	30842.25	0.00	0.00	0.00	0.00	1290.0	13:19:58
C	1	4.00	471	122344	122815	117.75	30586.00	30703.75	0.00	0.00	0.00	0.00	1380.0	13:24:08
C	2	4.00	133	104281	104414	33.25	26070.25	26103.50	0.00	0.00	0.00	0.00	1380.0	13:24:08
C	3	4.00	52	111366	111418	13.00	27841.50	27854.50	0.00	0.00	0.00	0.00	1380.0	13:24:08
C	4	4.00	283	112255	112538	70.75	28063.75	28134.50	0.00	0.00	0.00	0.00	1380.0	13:24:08
D	1	4.00	286	127056	127342	71.50	31764.00	31835.50	0.00	0.00	0.00	0.00	1290.0	13:24:08
D	2	4.00	173	131446	131619	43.25	32861.50	32904.75	0.00	0.00	0.00	0.00	1290.0	13:24:08
D	3	4.00	71	126026	126097	17.75	31506.50	31524.25	0.00	0.00	0.00	0.00	1290.0	13:24:08
D	4	4.00	96	122964	123060	24.00	30741.00	30765.00	0.00	0.00	0.00	0.00	1290.0	13:24:08
C	1	4.00	404	122565	122969	101.00	30641.25	30742.25	0.00	0.00	0.00	0.00	1380.0	13:28:17
C	2	4.00	136	104428	104564	34.00	26107.00	26141.00	0.00	0.00	0.00	0.00	1380.0	13:28:17
C	3	4.00	52	110349	110401	13.00	27587.25	27600.25	0.00	0.00	0.00	0.00	1380.0	13:28:17
C	4	4.00	311	113093	113404	77.75	28273.25	28351.00	0.00	0.00	0.00	0.00	1380.0	13:28:17
D	1	4.00	295	126703	126998	73.75	31675.75	31749.50	0.00	0.00	0.00	0.00	1290.0	13:28:17
D	2	4.00	171	131567	131738	42.75	32891.75	32934.50	0.00	0.00	0.00	0.00	1290.0	13:28:17
D	3	4.00	70	125873	125943	17.50	31468.25	31485.75	0.00	0.00	0.00	0.00	1290.0	13:28:17
D	4	4.00	102	123155	123257	25.50	30788.75	30814.25	0.00	0.00	0.00	0.00	1290.0	13:28:17
C	1	4.00	435	122331	122766	108.75	30582.75	30691.50	0.00	0.00	0.00	0.00	1380.0	13:32:27
C	2	4.00	139	104849	104988	34.75	26212.25	26247.00	0.00	0.00	0.00	0.00	1380.0	13:32:27
C	3	4.00	54	110486	110540	13.50	27621.50	27635.00	0.00	0.00	0.00	0.00	1380.0	13:32:27
C	4	4.00	276	111926	112202	69.00	27981.50	28050.50	0.00	0.00	0.00	0.00	1380.0	13:32:27
D	1	4.00	311	127224	127535	77.75	31806.00	31883.75	0.00	0.00	0.00	0.00	1290.0	13:32:27
D	2	4.00	183	132368	132551	45.75	33092.00	33137.75	0.00	0.00	0.00	0.00	1290.0	13:32:27
D	3	4.00	77	126112	126189	19.25	31528.00	31547.25	0.00	0.00	0.00	0.00	1290.0	13:32:27
D	4	4.00	92	123638	123730	23.00	30909.50	30932.50	0.00	0.00	0.00	0.00	1290.0	13:32:27
C	1	4.00	431	123018	123449	107.75	30754.50	30862.25	0.00	0.00	0.00	0.00	1380.0	13:36:36
C	2	4.00	130	103816	103946	32.50	25954.00	25986.50	0.00	0.00	0.00	0.00	1380.0	13:36:36
C	3	4.00	62	110754	110816	15.50	27688.50	27704.00	0.00	0.00	0.00	0.00	1380.0	13:36:36
C	4	4.00	303	112147	112450	75.75	28036.75	28112.50	0.00	0.00	0.00	0.00	1380.0	13:36:36
D	1	4.00	282	126677	126959	70.50	31669.25	31739.75	0.00	0.00	0.00	0.00	1290.0	13:36:36
D	2	4.00	171	131673	131844	42.75	32918.25	32961.00	0.00	0.00	0.00	0.00	1290.0	13:36:36
D	3	4.00	65	125720	125785	16.25	31430.00	31446.25	0.00	0.00	0.00	0.00	1290.0	13:36:36
D	4	4.00	85	123587	123672	21.25	30896.75	30918.00	0.00	0.00	0.00	0.00	1290.0	13:36:36
C	1	4.00	442	122337	122779	110.50	30584.25	30694.75	0.00	0.00	0.00	0.00	1380.0	13:40:45
C	2	4.00	151	104240	104391	37.75	26060.00	26097.75	0.00	0.00	0.00	0.00	1380.0	13:40:45
C	3	4.00	39	111489	111528	9.75	27872.25	27882.00	0.00	0.00	0.00	0.00	1380.0	13:40:45
C	4	4.00	306	112492	112798	76.50	28123.00	28199.50	0.00	0.00	0.00	0.00	1380.0	13:40:45
D	1	4.00	300	127401	127701	75.00	31850.25	31925.25	0.00	0.00	0.00	0.00	1290.0	13:40:45
D	2	4.00	165	132716	132881	41.25	33179.00	33220.25	0.00	0.00	0.00	0.00	1290.0	13:40:45
D	3	4.00	86	125705	125791	21.50	31426.25	31447.75	0.00	0.00	0.00	0.00	1290.0	13:40:45
D	4	4.00	93	124202	124295	23.25	31050.50	31073.75	0.00	0.00	0.00	0.00	1290.0	13:40:45

SEVERN TRI[illegible]ERVICES

DAILY STD CAL. FOR GFPC CONTROL CHARTS

8/7/03

C4 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	2984.25			28175.25		
	2989.85			28159.00		
	3016.05			28245.75		
	3016.65			28147.75		
	3001.00			28187.25		
	3021.45			28155.25		
	2998.00			28158.50		
	2991.35			28229.50		
	2993.15			28233.25		
	3017.20			28073.50		
	2997.65			28318.75		
	3016.95			28076.75		
	3026.45			28126.50		
	3001.80			28109.00		
	2993.85			28063.75		
	3016.65			28273.25		
	2993.45			27981.50		
	2999.15			28036.75		
	3003.65			28123.00		
	3023.05			28425.25		

SEVERN TRENT SERVICES

ALPHA EFF = 0.2971663

ALPHA MEAN CPM= 3004.134
1 STD DEV. CPM= 12.498
2 STD DEV. CPM= 24.996
3 STD DEV. CPM= 37.493

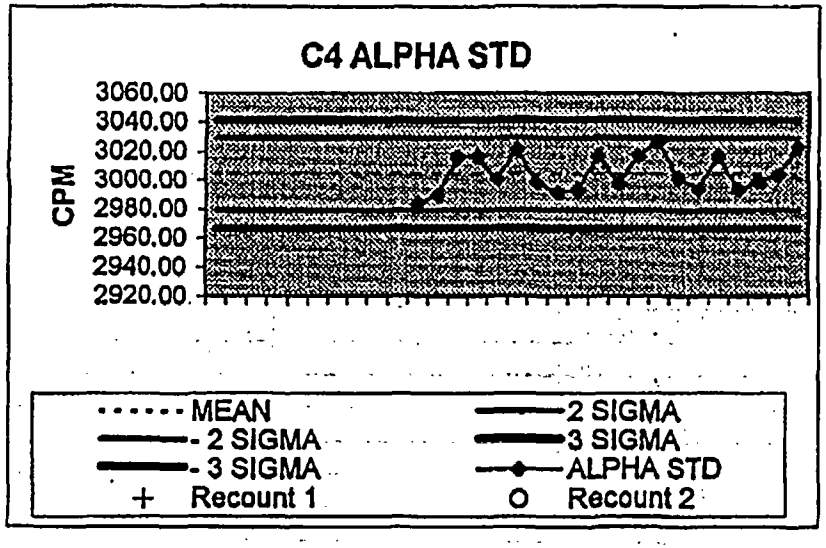
ALPHA STD CPM "UL"= 3041.628
ALPHA STD CPM "LL"= 2966.641

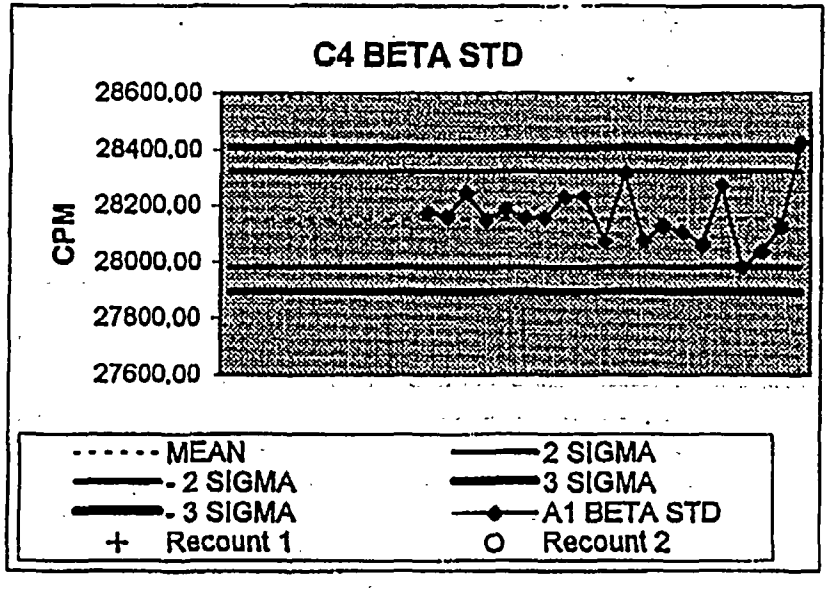
BETA MEAN CPM= 28151.276
1 STD DEV. CPM= 85.343
2 STD DEV. CPM= 170.687
3 STD DEV. CPM= 256.030

BETA STD CPM "UL"= 28407.307
BETA STD CPM "LL"= 27895.246

BETA EFF = 0.3359984

NEG. SIGMA NEG. SIGMA NE


C4 ALPHA STD
CPM
3060.00
3040.00
3020.00
3000.00
2980.00
2960.00
2940.00
2920.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
ALPHA STD
+ Recount 1
O Recount 2


C4 BETA STD
CPM
28600.00
28400.00
28200.00
28000.00
27800.00
27600.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
A1 BETA STD
+ Recount 1
O Recount 2

SEVERN TR[illegible] SERVICES

DAILY BACKGROUNDS FOR GFPC CONTROL CHARTS

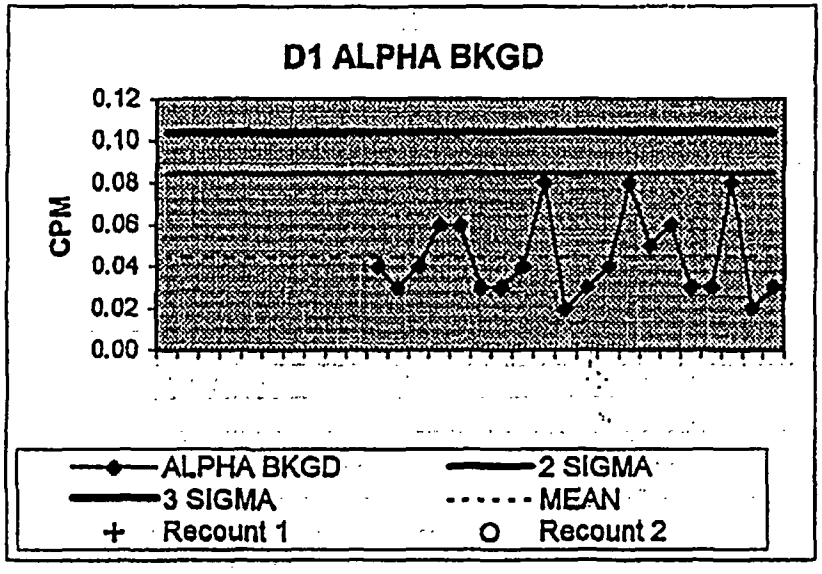
8/7/03

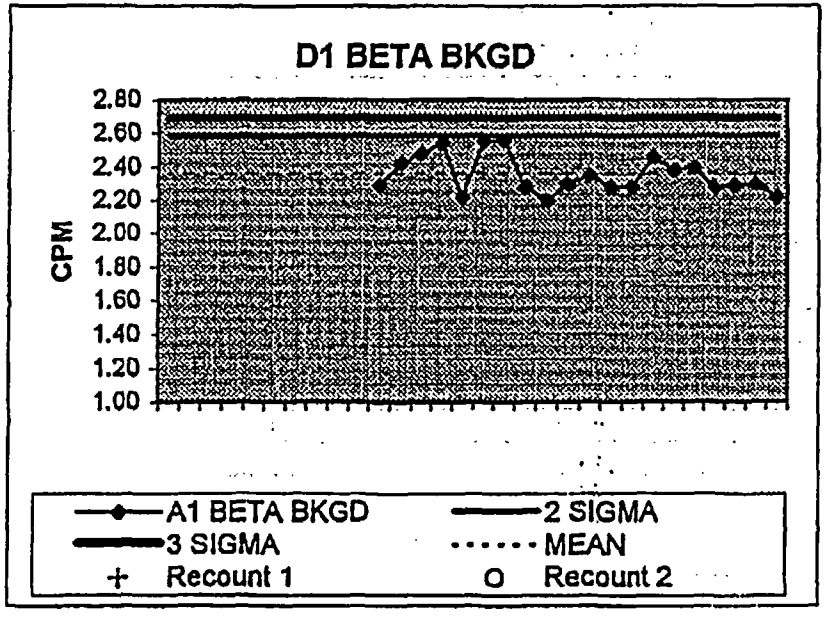
D1 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	0.04			2.29		
	0.03			2.42		
	0.04			2.48		
	0.06			2.54		
	0.06			2.22		
	0.03			2.55		
	0.03			2.56		
	0.04			2.28		
	0.08			2.20		
	0.02			2.30		
	0.03			2.35		
	0.04			2.28		
	0.08			2.28		
	0.05			2.46		
	0.06			2.38		
	0.03			2.40		
	0.03			2.28		
	0.08			2.29		
	0.02			2.30		
	0.03			2.22		

SEVERN TRENT SERVICES

ALPHA MEAN CPM=	0.045
1 STD DEV. CPM=	0.020
2 STD DEV. CPM=	0.040
3 STD DEV. CPM=	0.059
ALPHA BKGD CPM "UL	0.104

BETA MEAN CPM=	2.361
1 STD DEV. CPM=	0.112
2 STD DEV. CPM=	0.224
3 STD DEV. CPM=	0.336
BETA BKGD CPM "UL"	2.697


D1 ALPHA BKGD
CPM
0.12
0.10
0.08
0.06
0.04
0.02
0.00
ALPHA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2


D1 BETA BKGD
CPM
2.80
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
A1 BETA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2

SEVERN TR[illegible] SERVICES

DAILY STD CAL. FOR GFPC CONTROL CHARTS

8/7/03

D1 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	3289.85			31657.50		
	3291.60			31778.75		
	3288.55			31692.50		
	3265.95			31739.75		
	3292.80			30903.00		
	3260.25			31851.25		
	3269.20			31836.50		
	3262.10			31698.50		
	3257.00			31831.00		
	3285.65			31622.00		
	3280.90			31772.00		
	3288.70			31649.25		
	3289.95			31853.50		
	3272.90			31881.75		
	3274.30			31764.00		
	3290.80			31675.75		
	3260.25			31806.00		
	3273.75			31669.25		
	3278.25			31850.25		
	3277.20			31656.00		

SEVERN TRENT SERVICES

ALPHA EFF = 0.3101901

ALPHA MEAN CPM= 3277.408
1 STD DEV. CPM= 12.255
2 STD DEV. CPM= 24.510
3 STD DEV. CPM= 36.765

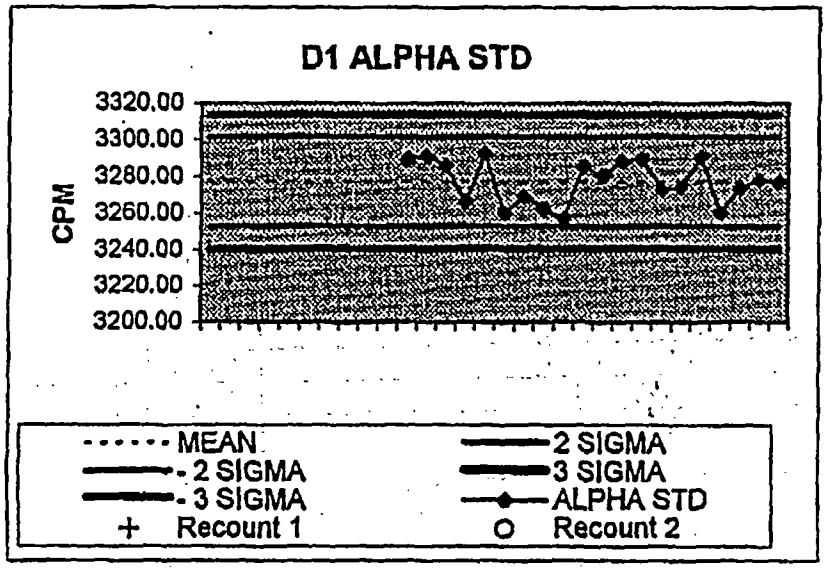
ALPHA STD CPM "UL"= 3314.173
ALPHA STD CPM "LL"= 3240.643

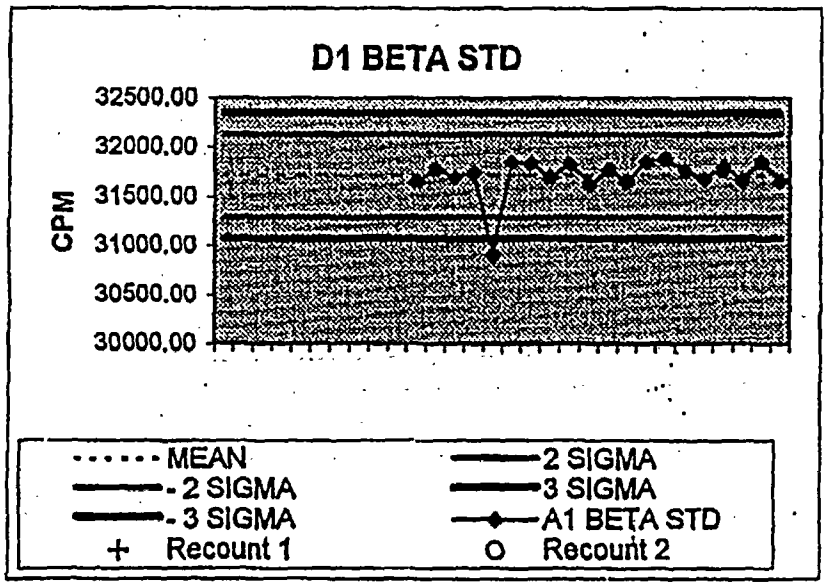
BETA MEAN CPM= 31712.237
1 STD DEV. CPM= 212.205
2 STD DEV. CPM= 424.411
3 STD DEV. CPM= 636.616

BETA STD CPM "UL"= 32348.853
BETA STD CPM "LL"= 31075.621

BETA EFF = 0.3885271

NEG. SIGMA NEG. SIGMA NE


D1 ALPHA STD
CPM
3320.00
3300.00
3280.00
3260.00
3240.00
3220.00
3200.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
ALPHA STD
+ Recount 1
O Recount 2


D1 BETA STD
CPM
32500.00
32000.00
31500.00
31000.00
30500.00
30000.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
A1 BETA STD
+ Recount 1
O Recount 2

DAILY BACKGROUNDS FOR GFPC CONTROL CHARTS

8/7/03

D2 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	0.03			1.58		
	0.07			1.75		
	0.03			1.79		
	0.05			1.60		
	0.07			1.57		
	0.04			1.94		
	0.09			1.50		
	0.02			1.65		
	0.02			1.57		
	0.02			1.73		
	0.03			1.61		
	0.01			1.73		
	0.05			1.65		
	0.02			1.59		
	0.07			1.84		
	0.03			1.79		
	0.06			1.80		
	0.04			2.00		
	0.03			1.60		
	0.03			1.85		

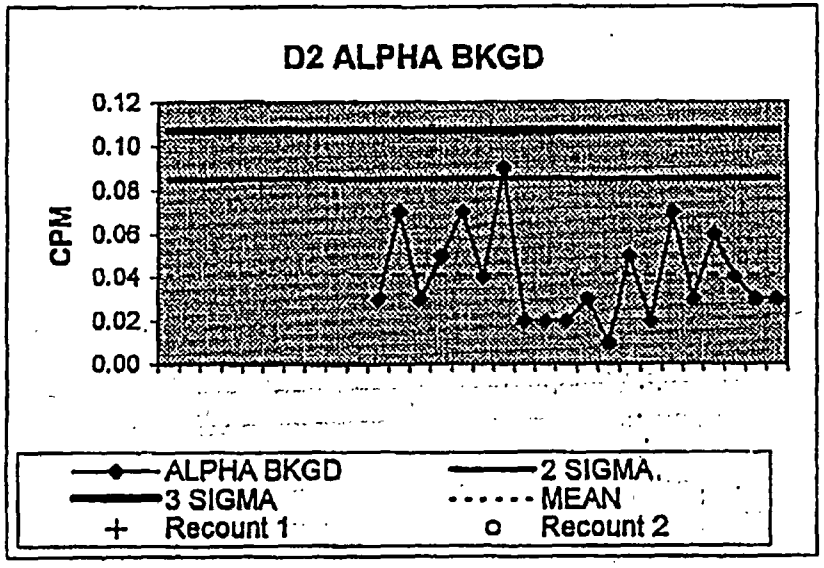
SEVERN TRENT SERVICES

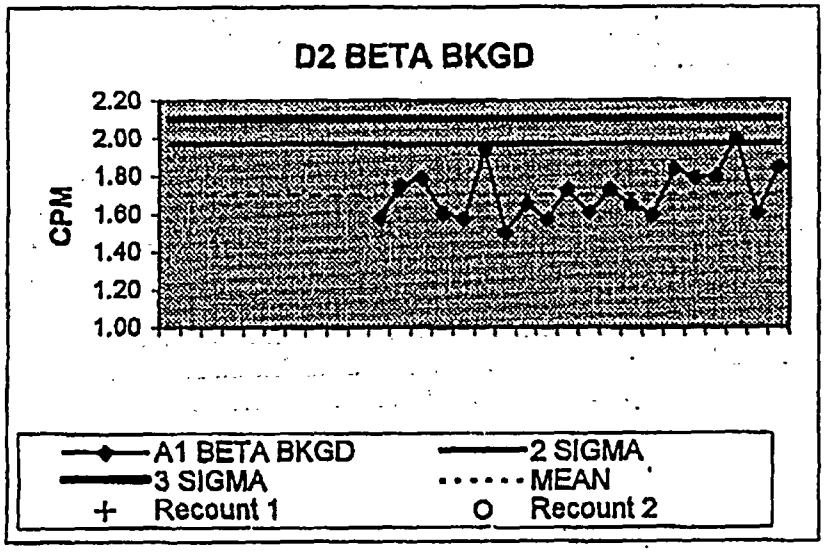
ALPHA MEAN CPM= 0.041
1 STD DEV. CPM= 0.022
2 STD DEV. CPM= 0.044
3 STD DEV. CPM= 0.066

ALPHA BKGD CPM "UL"= 0.107

BETA MEAN CPM= 1.699
1 STD DEV. CPM= 0.136
2 STD DEV. CPM= 0.271
3 STD DEV. CPM= 0.407

BETA BKGD CPM "UL"= 2.106


D2 ALPHA BKGD
CPM
0.12
0.10
0.08
0.06
0.04
0.02
0.00
ALPHA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2


D2 BETA BKGD
CPM
2.20
2.00
1.80
1.60
1.40
1.20
1.00
A1 BETA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2

DAILY STD CAL. FOR GFPC CONTROL CHARTS

8/7/03

D2 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	3595.65			32799.00		
	3604.70			32876.25		
	3602.80			32971.50		
	3616.60			32844.50		
	3598.05			32980.00		
	3595.75			32983.75		
	3597.45			32937.75		
	3051.10			32773.75		
	3585.35			32897.00		
	3612.45			32782.50		
	3605.35			32974.00		
	3598.30			32969.50		
	3588.00			32988.25		
	3583.90			33038.00		
	3608.75			32861.50		
	3582.10			32891.75		
	3594.10			33092.00		
	3575.55			32918.25		
	3597.05			33179.00		
	3585.95			32880.25		

SEVERN TRENT SERVICES

ALPHA EFF = 0.3148508

ALPHA MEAN CPM= 3568.053
1 STD DEV. CPM= 125.631
2 STD DEV. CPM= 251.261
3 STD DEV. CPM= 376.892

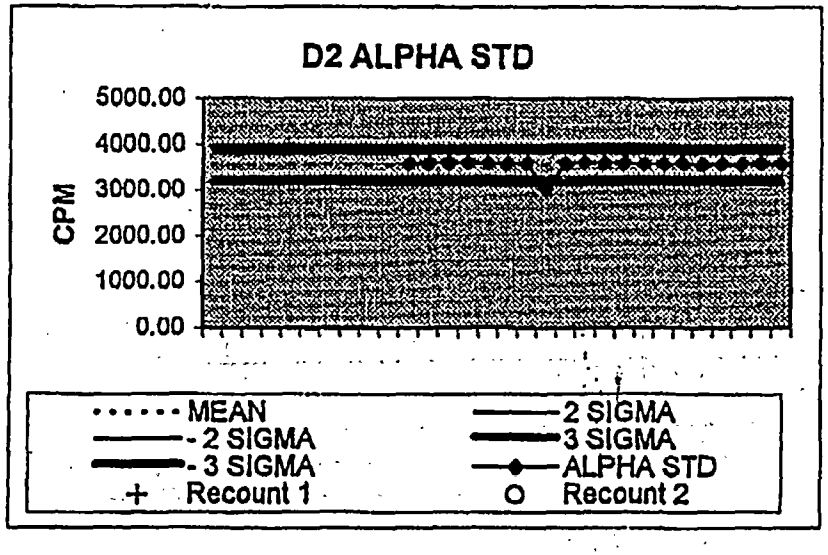
ALPHA STD CPM "UL"= 3944.944
ALPHA STD CPM "LL"= 3191.161

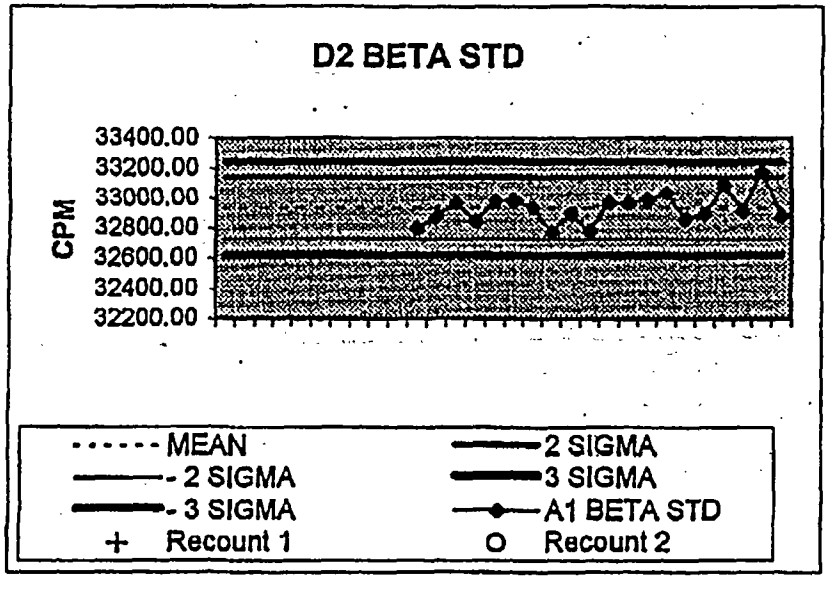
BETA MEAN CPM= 32934.645
1 STD DEV. CPM= 103.943
2 STD DEV. CPM= 207.885
3 STD DEV. CPM= 311.828

BETA STD CPM "UL"= 33246.472
BETA STD CPM "LL"= 32622.817

BETA EFF = 0.3905498

NEG. SIGMA NEG. SIGMA NE


D2 ALPHA STD
CPM
5000.00
4000.00
3000.00
2000.00
1000.00
0.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
ALPHA STD
Recount 1
Recount 2


D2 BETA STD
CPM
33400.00
33200.00
33000.00
32800.00
32600.00
32400.00
32200.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
A1 BETA STD
Recount 1
Recount 2

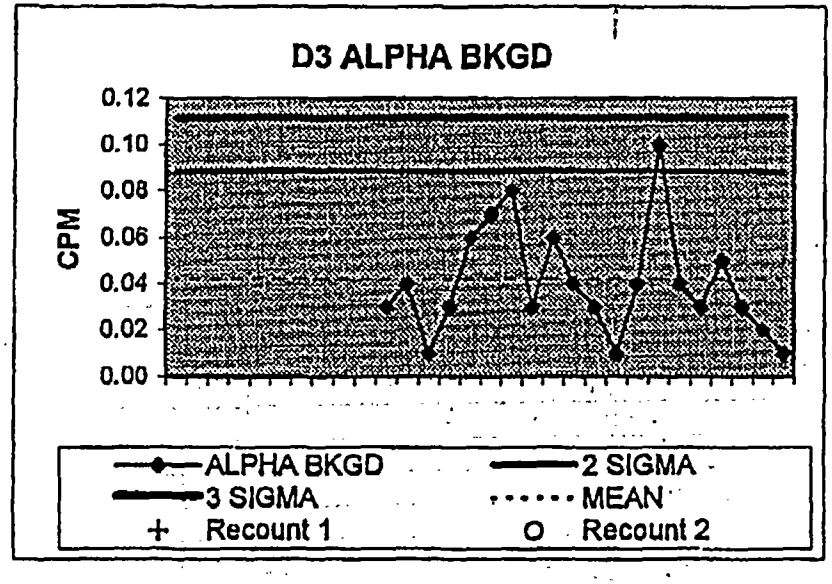
DAILY BACKGROUNDS FOR GFPC CONTROL CHARTS

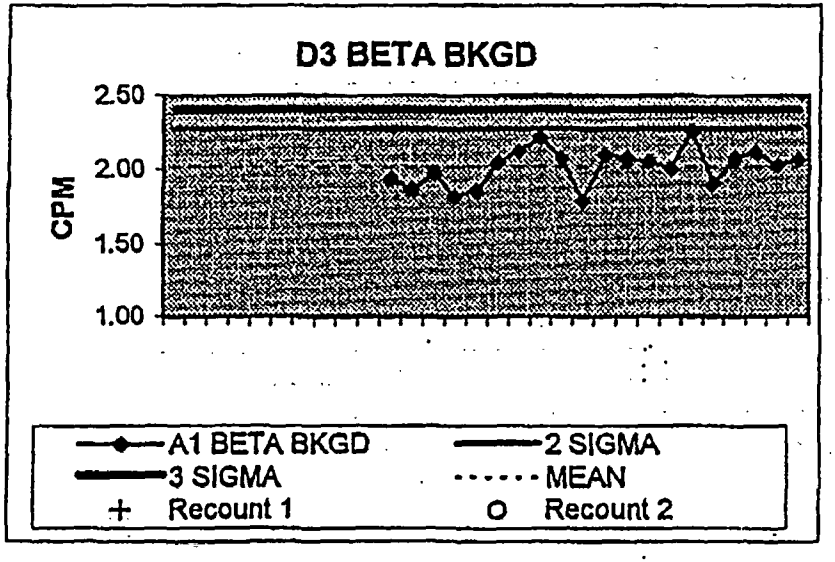
8/7/03

D3 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	0.03			1.94		
	0.04			1.87		
	0.01			1.98		
	0.03			1.82		
	0.08			1.86		
	0.07			2.05		
	0.08			2.13		
	0.03			2.22		
	0.06			2.08		
	0.04			1.79		
	0.03			2.10		
	0.01			2.08		
	0.04			2.06		
	0.10			2.01		
	0.04			2.26		
	0.03			1.91		
	0.05			2.08		
	0.03			2.12		
	0.02			2.03		
	0.01			2.07		

SEVERN TRENT SERVICES

ALPHA MEAN CPM=	0.042
1 STD DEV. CPM=	0.023
2 STD DEV. CPM=	0.046
3 STD DEV. CPM=	0.070
ALPHA BKGD CPM "UL"=	0.112
BETA MEAN CPM=	2.021
1 STD DEV. CPM=	0.129
2 STD DEV. CPM=	0.258
3 STD DEV. CPM=	0.388
BETA BKGD CPM "UL"=	2.408


D3 ALPHA BKGD
CPM
0.12
0.10
0.08
0.06
0.04
0.02
0.00
ALPHA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2


D3 BETA BKGD
CPM
2.50
2.00
1.50
1.00
A1 BETA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2

DAILY STD CAL. FOR GFPC CONTROL CHARTS

8/7/03

D3 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	3078.95			31211.75		
	3061.90			31391.25		
	3047.25			31488.25		
	3054.05			31262.50		
	3056.15			31447.00		
	3065.30			31309.25		
	3056.80			31322.25		
	3051.10			31234.00		
	3049.70			31439.00		
	3091.65			31329.75		
	3047.35			31302.75		
	3065.20			31380.50		
	3078.60			31285.50		
	3073.05			31333.25		
	3048.00			31506.50		
	3046.85			31468.25		
	3060.00			31528.00		
	3060.80			31430.00		
	3071.50			31426.25		
	3067.55			31214.50		

SEVERN TRENT SERVICES

ALPHA EFF = 0.2665355

ALPHA MEAN CPM= 3061.274
1 STD DEV. CPM= 12.744
2 STD DEV. CPM= 25.487
3 STD DEV. CPM= 38.231

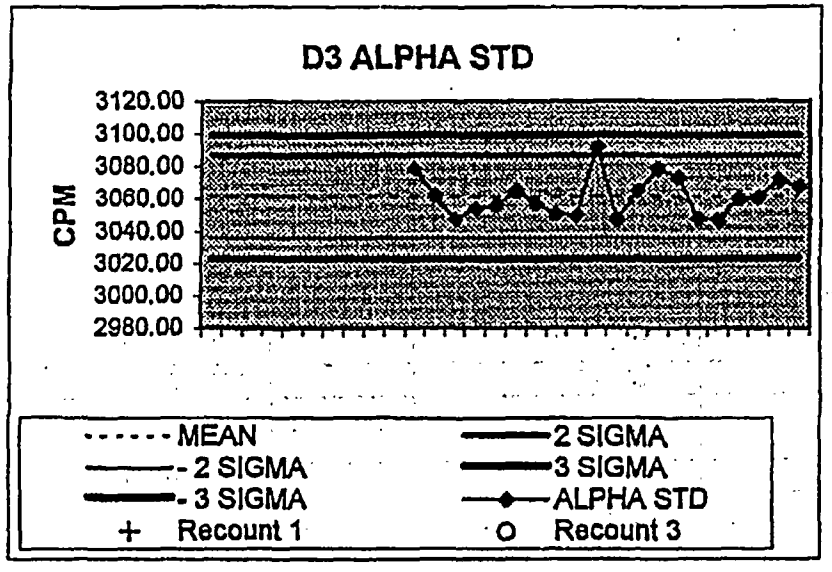
ALPHA STD CPM "UL"= 3099.504
ALPHA STD CPM "LL"= 3023.043

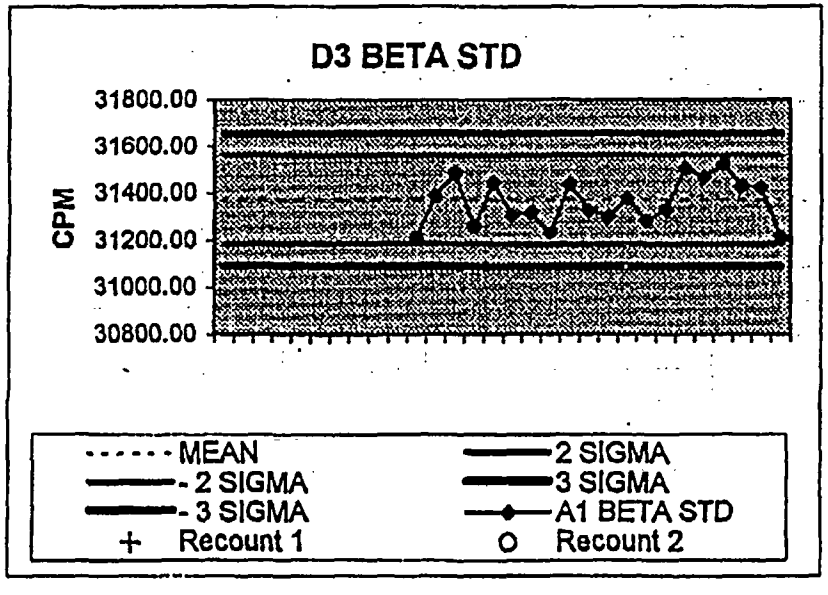
BETA MEAN CPM= 31373.474
1 STD DEV. CPM= 94.492
2 STD DEV. CPM= 188.985
3 STD DEV. CPM= 283.477

BETA STD CPM "UL"= 31656.951
BETA STD CPM "LL"= 31089.997

BETA EFF = 0.3681231

NEG. SIGMA NEG. SIGMA NE


D3 ALPHA STD
CPM
3120.00
3100.00
3080.00
3060.00
3040.00
3020.00
3000.00
2980.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
ALPHA STD
Recount 1
Recount 3


D3 BETA STD
CPM
31800.00
31600.00
31400.00
31200.00
31000.00
30800.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
A1 BETA STD
Recount 1
Recount 2

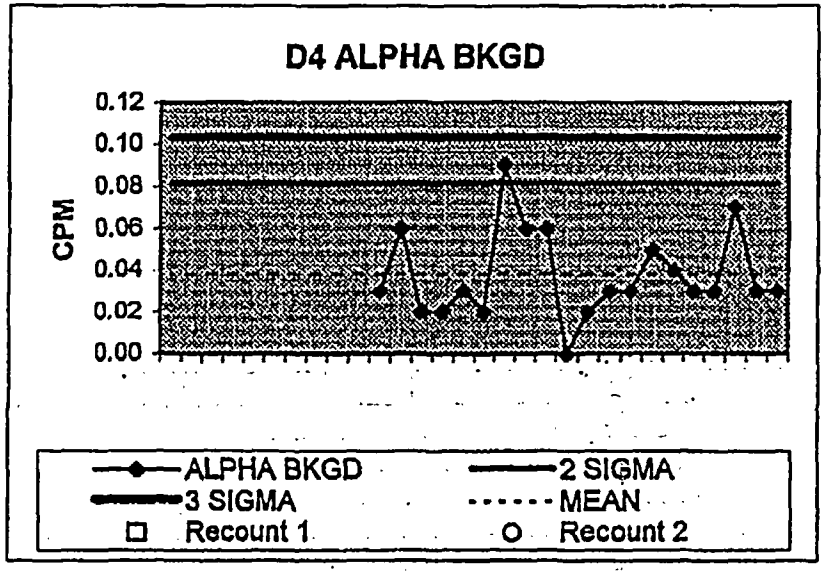
DAILY BACKGROUNDS FOR GFPC CONTROL CHARTS

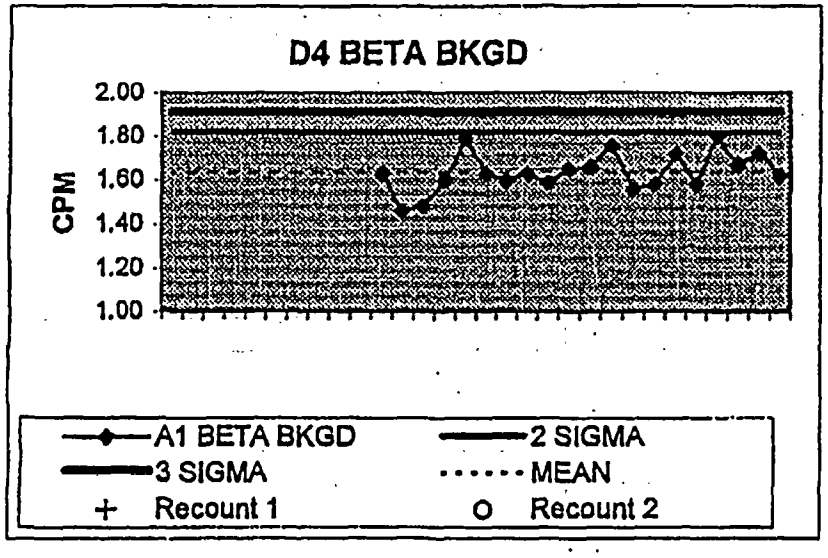
8/7/03

D4 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	0.03			1.63		
	0.06			1.46		
	0.02			1.48		
	0.02			1.60		
	0.03			1.79		
	0.02			1.63		
	0.09			1.60		
	0.06			1.63		
	0.06			1.59		
	0.00			1.65		
	0.02			1.66		
	0.03			1.76		
	0.03			1.56		
	0.05			1.58		
	0.04			1.72		
	0.03			1.58		
	0.03			1.80		
	0.07			1.67		
	0.03			1.72		
	0.03			1.62		

SEVERN TRENT SERVICES

ALPHA MEAN CPM=	0.038
1 STD DEV. CPM=	0.022
2 STD DEV. CPM=	0.044
3 STD DEV. CPM=	0.065
ALPHA BKGD CPM "UL"=	0.103
BETA MEAN CPM=	1.637
1 STD DEV. CPM=	0.093
2 STD DEV. CPM=	0.185
3 STD DEV. CPM=	0.278
BETA BKGD CPM "UL"=	1.915


D4 ALPHA BKGD
CPM
0.12
0.10
0.08
0.06
0.04
0.02
0.00
ALPHA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2


D4 BETA BKGD
CPM
2.00
1.80
1.60
1.40
1.20
1.00
A1 BETA BKGD
2 SIGMA
3 SIGMA
MEAN
Recount 1
Recount 2

DAILY STD CAL. FOR GFPC CONTROL CHARTS

8/7/03

D4 (CPM)						
	ALPHA			BETA		
DATE	Daily	Recount 1	Recount 2	Daily	Recount 1	Recount 2
	3627.45			30754.25		
	3676.35			30752.75		
	3638.60			30868.50		
	3667.75			30743.25		
	3643.00			30775.25		
	3667.35			30829.00		
	3670.80			30846.50		
	3652.00			30813.25		
	3670.45			30924.50		
	3655.95			30798.50		
	3653.75			30911.00		
	3649.00			31044.75		
	3651.95			30851.25		
	3675.15			30819.75		
	3638.40			30741.00		
	3670.15			30788.75		
	3671.85			30909.50		
	3663.90			30896.75		
	3658.05			31050.50		
	3667.55			31026.75		

SEVERN TRENT SERVICES

ALPHA EFF = 0.3077782

ALPHA MEAN CPM= 3657.995
1 STD DEV. CPM= 14.144
2 STD DEV. CPM= 28.289
3 STD DEV. CPM= 42.433

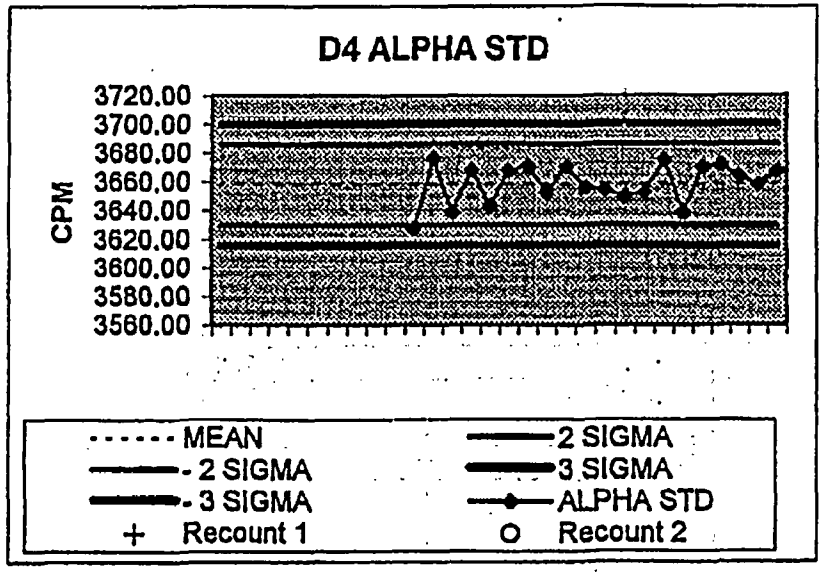
ALPHA STD CPM "UL"= 3700.428
ALPHA STD CPM "LL"= 3615.562

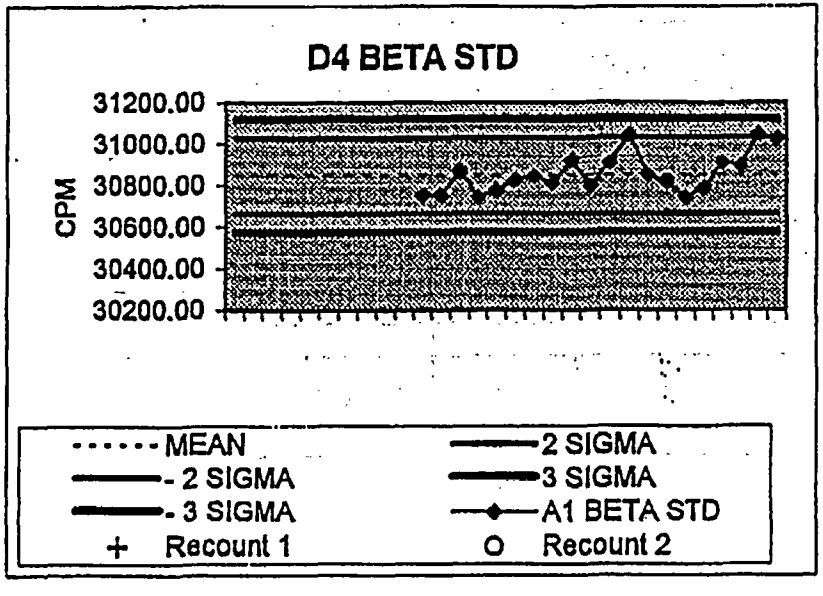
BETA MEAN CPM= 30848.368
1 STD DEV. CPM= 91.296
2 STD DEV. CPM= 182.593
3 STD DEV. CPM= 273.889

BETA STD CPM "UL"= 31122.258
BETA STD CPM "LL"= 30574.479

BETA EFF = 0.362935

NEG. SIGMA NEG. SIGMA NE


D4 ALPHA STD
CPM
3720.00
3700.00
3680.00
3660.00
3640.00
3620.00
3600.00
3580.00
3560.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
ALPHA STD
Recount 1
Recount 2


D4 BETA STD
CPM
31200.00
31000.00
30800.00
30600.00
30400.00
30200.00
MEAN
2 SIGMA
- 2 SIGMA
3 SIGMA
- 3 SIGMA
A1 BETA STD
Recount 1
Recount 2

ABSORPTION CURVE FOR GROSS BETA — STL DENVER

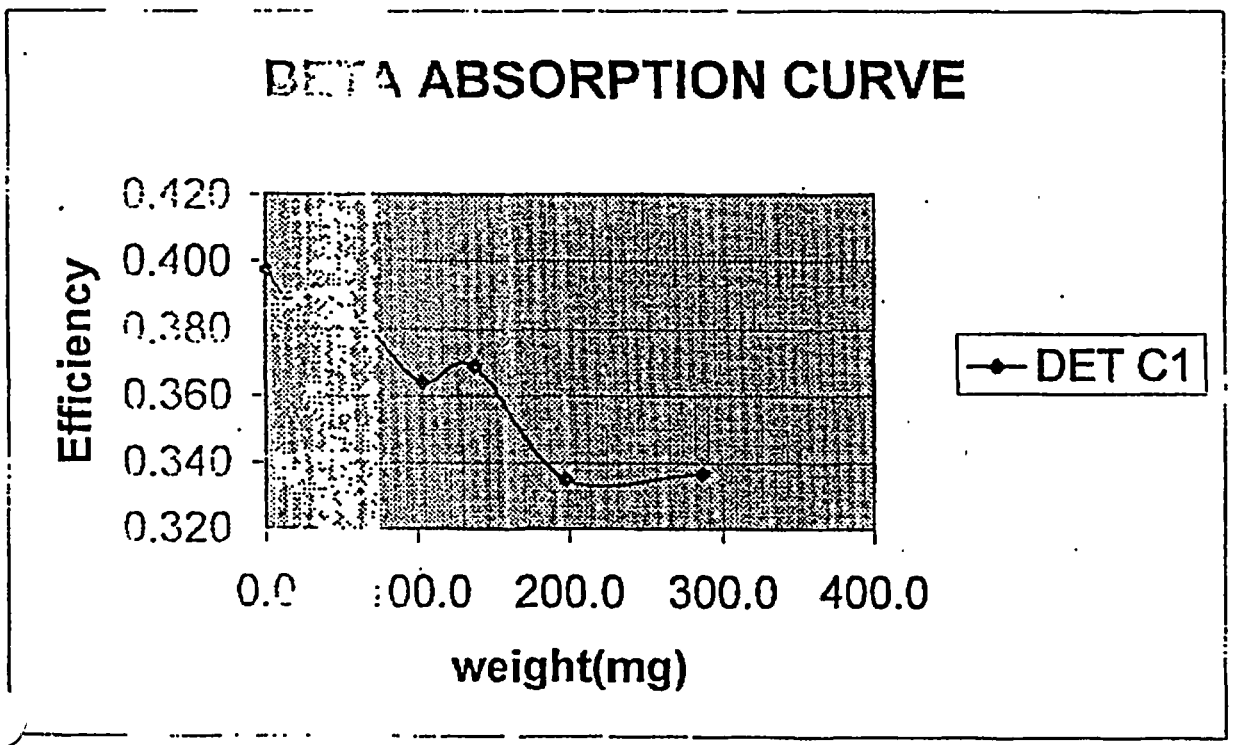
DET C1

Beta Source: Sr 90/Y90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml 219.2 219.2
mls used: 5
corr.activity: 213.40 pCi/ml
Curve Date: 8/8/03
t 1/2 = 28.50 years
Count time 15 min.

ANALYST

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	known dpm	EFF	ln EFF
1	10.7	14158	2.2	941.67	2369	0.398	-0.922
2	15.0	13854	2.2	921.40	2369	0.389	-0.944
3	33.6	13956	2.2	928.20	2369	0.392	-0.937
4	68.8	13542	2.2	900.60	2369	0.380	-0.967
5	103.3	12967	2.2	862.27	2369	0.364	-1.011
6	138.2	13146	2.2	874.20	2369	0.369	-0.997
7	197.5	11939	2.2	793.73	2369	0.335	-1.093
8	287.0	11994	2.2	797.40	2369	0.337	-1.089

EFF. = 0.395exp(-0.0006mg) FORMULA FOR BETA EFFICIENCY
R2= -0.9506 CORRELATION COEFICIENT



R:\Radiochemistry/Radiochemistry/2003 GAB curves/Beta absorption curves

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years))	Decay
403.00	1.1034	0.0243	years-1	0.0268	0.9735

ln(EFF)= b-mx

b intercept = -0.9277
m slope = -0.0006

exp(-0.9277)= 0.395 (ZERO THICKNESS EFFICIENCY)

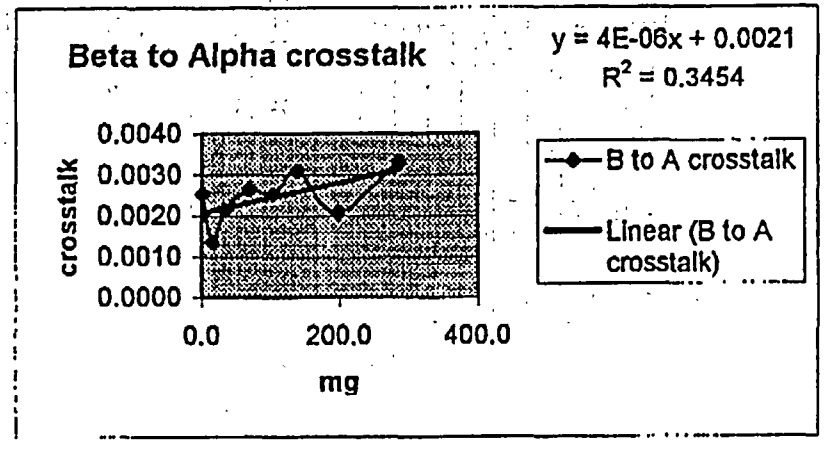
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

Beta source: Sr 90/Y 90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml: 219.2
mls used: 5
corr. Activity: 213 pCi/ml
Curve Date: 8/8/03
t 1/2: 28.5 years
Count time: 15 min.

C1

ANALYST

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	gross alpha counts	alpha bkgd cpm	net alpha cpm	B to A crosstalk
1	0.7	14158	2.2	941.67	38	0.16	2.37	0.0025
2	15.0	13854	2.2	921.40	21	0.16	1.24	0.0013
3	33.6	13956	2.2	928.20	32	0.16	1.97	0.0021
4	68.8	13542	2.2	900.60	38	0.16	2.37	0.0026
5	103.3	12967	2.2	862.27	35	0.16	2.17	0.0025
6	138.2	13146	2.2	874.20	43	0.16	2.71	0.0031
7	197.5	11939	2.2	793.73	27	0.16	1.64	0.0021
8	287.0	11994	2.2	797.40	42	0.16	2.64	0.0033
							AVE.=	0.0025



FORMULA FOR CROSSTALK RATIO
CT = 4E-06mg + 0.0021

CORRELATION COEFICIENT
R2 = 0.3456

ABSORPTION CURVE FOR GROSS BETA — STL DENVER

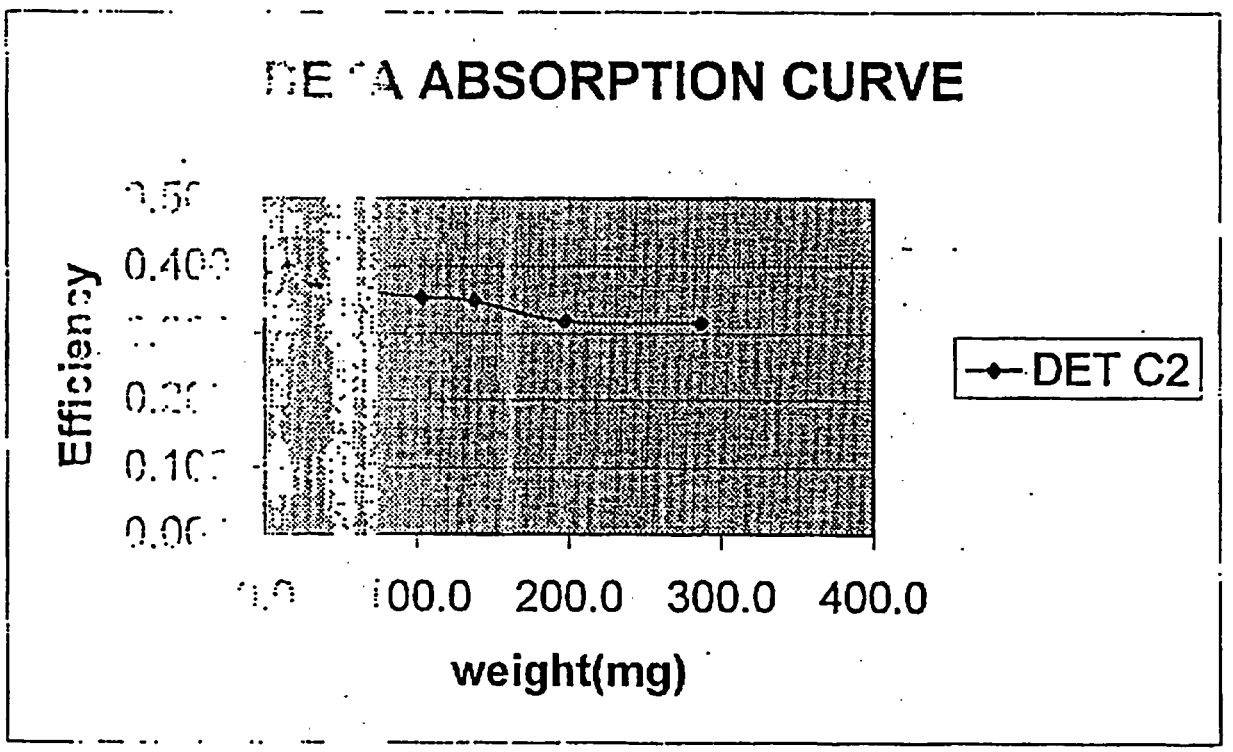
DET C2

Beta Source: Sr 90/Y90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml 219.2 219.2
mls used: 5
corr.activity: 213.40 pCi/ml
Curve Date: 8/8/03
t 1/2 = 28.50 years
Count time 15 min.

ANALYST

STD #	weight	gross beta counts	beta bkgd cpm	net beta cpm	known dpm	EFF	ln EFF
1	[illegible]	13776	2.03	916.37	2369	0.387	-0.950
2	[illegible]	14105	2.03	938.30	2369	0.396	-0.926
3	[illegible]	13216	2.03	879.04	2369	0.371	-0.991
4	[illegible]	12890	2.03	857.30	2369	0.362	-1.016
5	[illegible]	12596	2.03	837.70	2369	0.354	-1.039
6	[illegible]	12422	2.03	826.10	2369	0.349	-1.053
7	[illegible]	11332	2.03	753.44	2369	0.318	-1.145
8	[illegible]	11228	2.03	746.50	2369	0.315	-1.155

EFF. = 0.387exp(-0.0038mg) FORMULA FOR BETA EFFICIENCY
R2= [illegible] CORRELATION COEFICIENT



R:/[illegible]chemistry/Radiochemistry/2003 GAB curves/Beta absorption curves

[illegible]ays)	[illegible]lta time(years)	lambda		(lambda)(delta time(years))	Decay
[illegible]	1.1034	0.0243	years-1	0.0268	0.9735

[illegible]= b-mx		
b [illegible]rcept =	-0.9492	
[illegible] slope =	-0.0008	
[illegible]2)=	0.387	(ZERO THICKNESS EFFICIENCY)

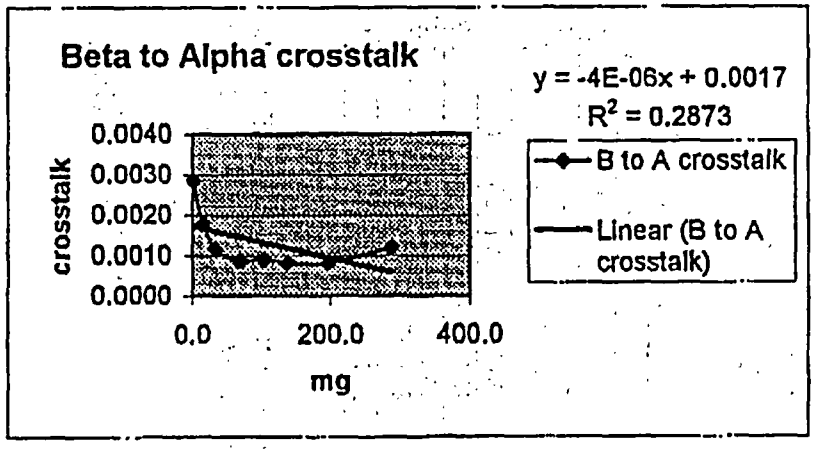
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

Beta source: Sr 90/Y 90
STL# [illegible]
Ref Date: 7/1/92
[illegible]
mls used: 5
corr. Activity: 213 pCi/ml
Curr. Date: [illegible]/93
t 1/2: 28.8 years
Count time: 15 min.

C2

ANALYST [illegible]

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	gross alpha counts	alpha bkgd cpm	net alpha cpm	B to A crosstalk
1	0.7	13776	2.03	916.37	42	0.18	2.62	0.0029
2	15.0	14105	2.03	938.30	28	0.18	1.69	0.0018
3	33.6	13216	2.03	879.04	18	0.18	1.02	0.0012
4	68.8	12890	2.03	857.30	14	0.18	0.75	0.0009
5	103.3	12596	2.03	837.70	14	0.18	0.75	0.0009
6	138.2	12422	2.03	826.10	13	0.18	0.69	0.0008
7	197.5	11332	2.03	753.44	12	0.18	0.62	0.0008
8	287.0	11228	2.03	746.50	16	0.18	0.89	0.0012
							AVE.=	0.0013



FORMULA FOR CROSSTALK RATIO
CT = -4E-06mg + 0.0017

CORRELATION COEFICIENT
R2 = 0.2873

ABSORPTION CURVE FOR GROSS BETA

STL DENVER

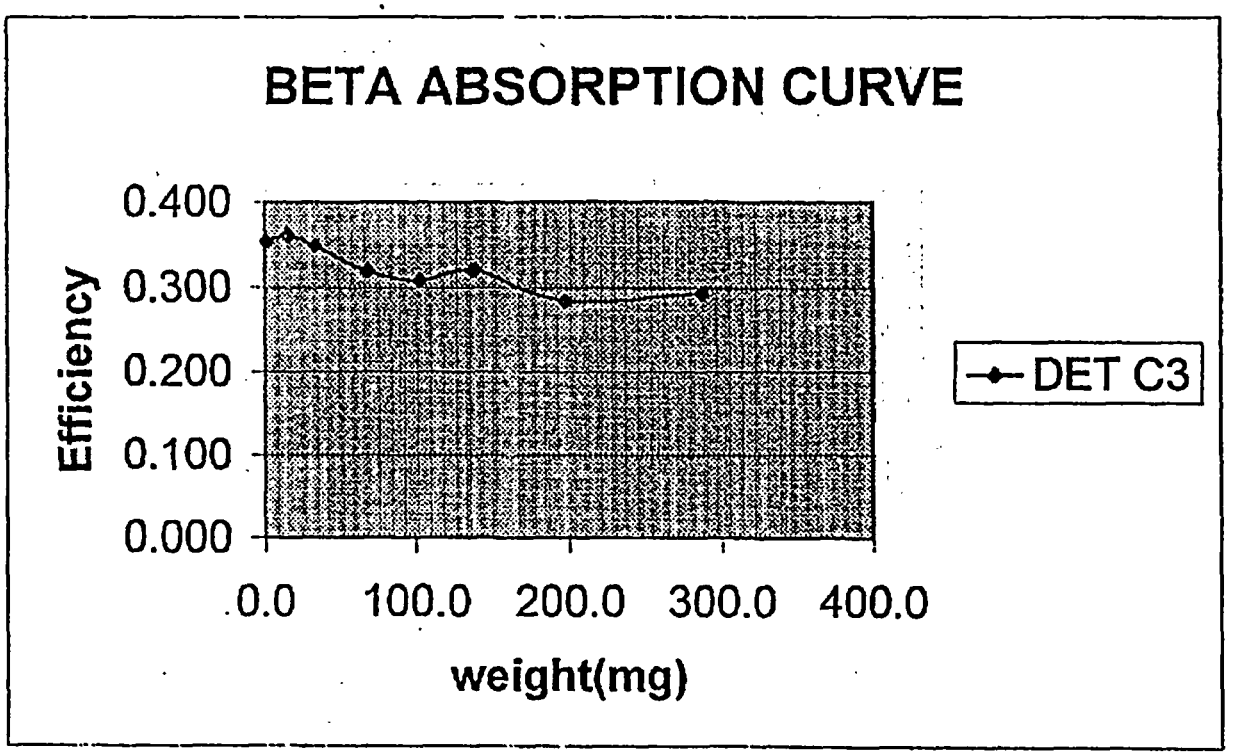
DET C3

Beta Source: Sr 90/Y90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml 219.2 219.2
mls used: 5
corr.activity: 213.40 pCi/ml
Curve Date: 8/8/03
t 1/2 = 28.50 years
Count time 15 min.

ANALYST

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	known dpm	EFF	ln EFF
1	0.7	12615	1.97	839.03	2369	0.354	-1.038
2	15.0	12854	1.97	854.96	2369	0.361	-1.019
3	33.6	12404	1.97	824.96	2369	0.348	-1.055
4	68.8	11366	1.97	755.76	2369	0.319	-1.142
5	103.3	10969	1.97	729.30	2369	0.308	-1.178
6	138.2	11397	1.97	757.83	2369	0.320	-1.140
7	197.5	10094	1.97	670.96	2369	0.283	-1.261
8	287.0	10440	1.97	694.03	2369	0.293	-1.228

EFF. = 0.351exp(-0.0008mg) FORMULA FOR BETA EFFICIENCY
R2= -0.8867 CORRELATION COEFICIENT



R:/Radiochemistry/Radiochemistry/2003 GAB curves/Beta absorption curves

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years))	Decay
403.00	1.1034	0.0243	years-1	0.0268	0.9735

ln(EFF)= b-mx

b intercept =	-1.0480	
m slope =	-0.0008	
exp(--1.0480)=	0.351	(ZERO THICKNESS EFFICIENCY)

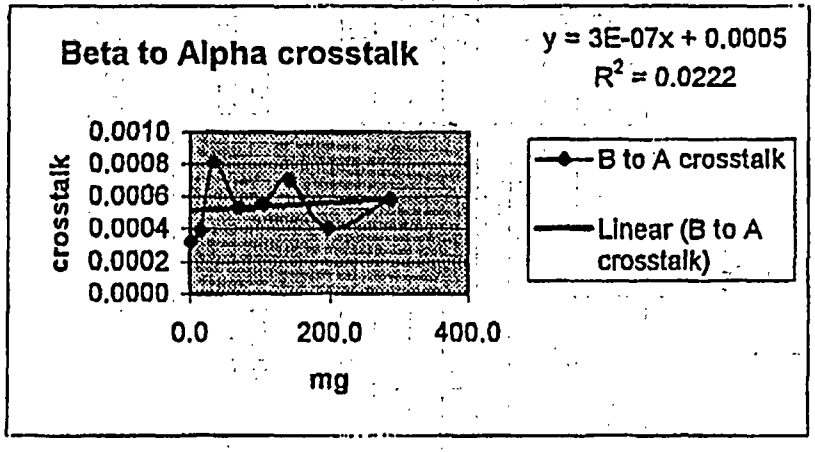
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

Beta source: Sr 90/Y 90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml: 219.2
mls used: 5
corr. Activity: 213 pCi/ml
Curve Date: 8/8/03
t 1/2: 28.5 years
Count time: 15 min.

C3

ANALYST

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	gross alpha counts	alpha bkgd cpm	net alpha cpm	B to A crosstalk
1	0.7	12615	1.97	839.03	6	0.13	0.27	0.0003
2	15.0	12854	1.97	854.96	7	0.13	0.34	0.0004
3	33.6	12404	1.97	824.96	12	0.13	0.67	0.0008
4	68.8	11366	1.97	755.76	8	0.13	0.40	0.0005
5	103.3	10969	1.97	729.30	8	0.13	0.40	0.0006
6	138.2	11397	1.97	757.83	10	0.13	0.54	0.0007
7	197.5	10094	1.97	670.96	6	0.13	0.27	0.0004
8	287.0	10440	1.97	694.03	8	0.13	0.40	0.0006
							AVE.=	0.0005



FORMULA FOR CROSSTALK RATIO
CT = 3E-07mg + 0.0005

CORRELATION COEFICIENT
R2 = 0.0222

ABSORPTION CURVE FOR GROSS BETA STL DENVER

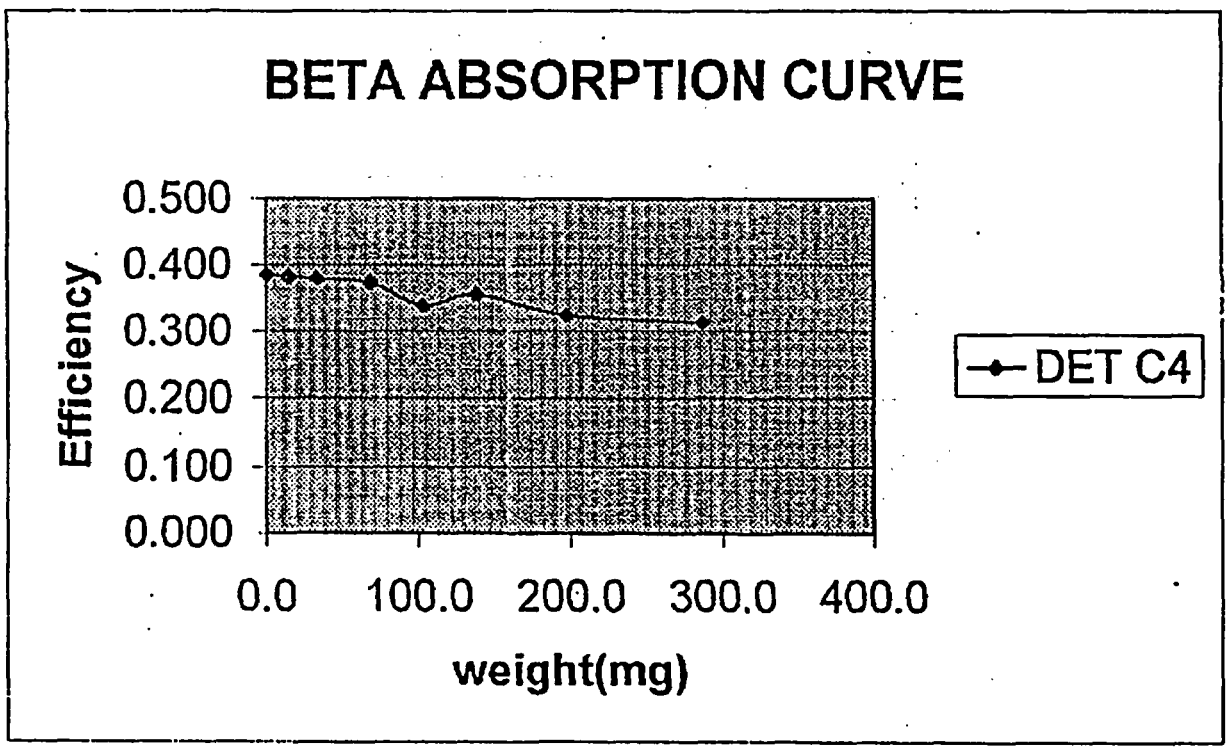
DET C4

Beta Source: Sr 90/Y90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml 219.2 219.2
mls used: 5
corr.activity: 213.40 pCi/ml
Curve Date: 8/8/03
t 1/2 = 28.50 years
Count time 15 min.

ANALYST

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	known dpm	EFF	ln EFF
1	0.7	13713	1.98	912.22	2369	0.385	-0.954
2	15.0	13620	1.98	906.02	2369	0.382	-0.961
3	33.6	13507	1.98	898.49	2369	0.379	-0.969
4	68.8	13290	1.98	884.02	2369	0.373	-0.986
5	103.3	12053	1.98	801.55	2369	0.338	-1.084
6	138.2	12662	1.98	842.15	2369	0.356	-1.034
7	197.5	11521	1.98	766.09	2369	0.323	-1.129
8	287.0	11146	1.98	741.09	2369	0.313	-1.162

EFF. = 0.386exp(-0.0008mg) FORMULA FOR BETA EFFICIENCY
R2= -0.9504 CORRELATION COEFICIENT



R:/Radiochemistry/Radiochemistry/2003 GAB curves/Beta absorption curves

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years))	Decay
403.00	1.1034	0.0243	years-1	0.0268	0.9735

ln(EFF)= b-mx

b intercept = -0.9524
m slope = -0.0008

exp(-0.9524)= 0.386 (ZERO THICKNESS EFFICIENCY)

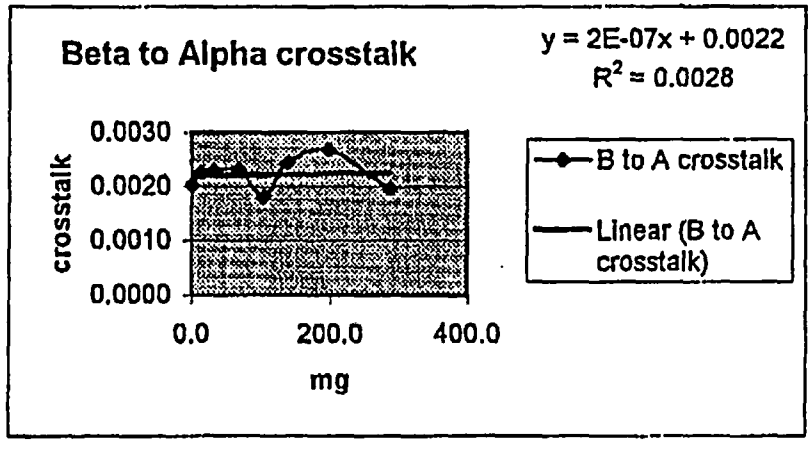
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

C4

ANALYST

Beta source: Sr 90/Y 90
STL# SR9002AL
Ref Date: 7/1/02
pCi/ml: 219.2
mls used: 5
corr. Activity: 213 pCi/ml
Curve Date: 8/8/03
t 1/2: 28.5 years
Count time: 15 min.

STD #	wt. mg	gross beta counts	beta bkgd cpm	net beta cpm	gross alpha counts	alpha bkgd cpm	net alpha cpm	B to A crosstalk
1	0.7	13713	1.98	912.22	30	0.15	1.85	0.0020
2	15.0	13620	1.98	906.02	33	0.15	2.05	0.0023
3	33.6	13507	1.98	898.49	33	0.15	2.05	0.0023
4	68.8	13290	1.98	884.02	33	0.15	2.05	0.0023
5	103.3	12053	1.98	801.55	24	0.15	1.45	0.0018
6	138.2	12662	1.98	842.15	33	0.15	2.05	0.0024
7	197.5	11521	1.98	766.09	33	0.15	2.05	0.0027
8	287.0	11146	1.98	741.09	24	0.15	1.45	0.0020
							AVE.=	0.0022



FORMULA FOR CROSSTALK RATIO
CT = 2E-07mg + 0.0022

CORRELATION COEFICIENT
R2 = 0.0028

03

		TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
	1	15.00	38	14158	14196	2.53	943.87	946.40	0.00	0.00	0.00	0.00	1380.0	15:29:49
C	2	15.00	28	14105	14133	1.87	940.33	942.20	0.00	0.00	0.00	0.00	1380.0	15:29:49
C	3	15.00	12	12404	12416	0.80	826.93	827.73	0.00	0.00	0.00	0.00	1380.0	15:29:49
C	4	15.00	33	13290	13323	2.20	886.00	888.20	0.00	0.00	0.00	0.00	1380.0	15:29:49
D	1	15.00	54	12854	12908	3.60	856.93	860.53	0.00	0.00	0.00	0.00	1290.0	15:29:49
D	2	15.00	27	13019	13046	1.80	867.93	869.73	0.00	0.00	0.00	0.00	1290.0	15:29:49
D	3	15.00	18	11633	11651	1.20	775.53	776.73	0.00	0.00	0.00	0.00	1290.0	15:29:49
D	4	15.00	28	12102	12130	1.87	806.80	808.67	0.00	0.00	0.00	0.00	1290.0	15:29:49

[TENNELEC LB4000] [PAGE 1]

15:45:36		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D36220343-006	124.86	2.07	7.60	0.00	0.00	0.00	0.00
13:40:04	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
720.00	3	-007	124.87	2.12	8.04	0.00	0.00	0.00	0.00
	4	-008	124.87	2.59	8.20	0.00	0.00	0.00	0.00
GROUP B	1	-009	124.93	2.65	8.59	0.00	0.00	0.00	0.00
13:40:04	2	-010	124.93	2.71	7.76	0.00	0.00	0.00	0.00
720.00	3	-011	124.93	5.26	16.49	0.00	0.00	0.00	0.00
	4	-012	124.92	3.96	10.81	0.00	0.00	0.00	0.00
GROUP C	1	BETA CURVE 1	15.00	2.53	943.87	0.00	0.00	0.00	0.00
15:29:49	2	2	15.00	1.87	940.33	0.00	0.00	0.00	0.00
15.00	3	3	15.00	0.80	826.93	0.00	0.00	0.00	0.00
	4	4	15.00	2.20	886.00	0.00	0.00	0.00	0.00
GROUP D	1	5	15.00	3.60	856.93	0.00	0.00	0.00	0.00
15:29:49	2	6	15.00	1.80	867.93	0.00	0.00	0.00	0.00
15.00	3	7	15.00	1.20	775.53	0.00	0.00	0.00	0.00
	4	8	15.00	1.87	806.80	0.00	0.00	0.00	0.00

F ~ D channel 1 COUNT TERMINATED ////

-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	15.00	42	11994	12036	2.80	799.60	802.40	0.00	0.00	0.00	0.00	1380.0	15:46:22
C	2	15.00	24	13776	13800	1.60	918.40	920.00	0.00	0.00	0.00	0.00	1380.0	15:46:22
C	3	15.00	7	12854	12861	0.47	856.93	857.40	0.00	0.00	0.00	0.00	1380.0	15:46:22
C	4	15.00	33	13507	13540	2.20	900.47	902.67	0.00	0.00	0.00	0.00	1380.0	15:46:22
D	1	15.00	40	13438	13478	2.67	895.87	898.53	0.00	0.00	0.00	0.00	1290.0	15:46:22
D	2	15.00	24	12798	12822	1.60	853.20	854.80	0.00	0.00	0.00	0.00	1290.0	15:46:22
D	3	15.00	23	12936	12959	1.53	862.40	863.93	0.00	0.00	0.00	0.00	1290.0	15:46:22
D	4	15.00	13	11660	11673	0.87	777.33	778.20	0.00	0.00	0.00	0.00	1290.0	15:46:22

[TENNELEC LB4000] [PAGE 1]

16:01:55		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D36220343-006	141.09	285	1061	0.00	0.00	0.00	0.00
13:40:04	2		0.00	0	0	0.00	0.00	0.00	0.00
720.00	3	-007	141.10	299	1128	0.00	0.00	0.00	0.00
	4	-008	141.10	372	1152	0.00	0.00	0.00	0.00
GROUP B	1	-009	141.17	376	1190	0.00	0.00	0.00	0.00
13:40:04	2	-010	141.16	382	1085	0.00	0.00	0.00	0.00
720.00	3	-011	141.16	741	2302	0.00	0.00	0.00	0.00
	4	-012	141.17	571	1520	0.00	0.00	0.00	0.00
GROUP C	1	BETA CURVE 8	15.00	42	11994	0.00	0.00	0.00	0.00
15:46:22	2	1	15.00	24	13776	0.00	0.00	0.00	0.00
15.00	3	2	15.00	7	12854	0.00	0.00	0.00	0.00
	4	3	15.00	33	13507	0.00	0.00	0.00	0.00
GROUP D	1	4	15.00	40	13438	0.00	0.00	0.00	0.00
15:46:22	2	5	15.00	24	12798	0.00	0.00	0.00	0.00
15.00	3	6	15.00	23	12936	0.00	0.00	0.00	0.00
	4	7	15.00	13	11660	0.00	0.00	0.00	0.00

D channel 1 COUNT TERMINATED ////

-07-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	15.00	27	11939	11966	1.80	795.93	797.73	0.00	0.00	0.00	0.00	1380.0	16:02:33
C	2	15.00	16	11228	11244	1.07	748.53	749.60	0.00	0.00	0.00	0.00	1380.0	16:02:33
C	3	15.00	6	12615	12621	0.40	841.00	841.40	0.00	0.00	0.00	0.00	1380.0	16:02:33
C	4	15.00	33	13620	13653	2.20	908.00	910.20	0.00	0.00	0.00	0.00	1380.0	16:02:33
D	1	15.00	29	14042	14071	1.93	936.13	938.07	0.00	0.00	0.00	0.00	1290.0	16:02:33
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[TENNELEC LB4000] [PAGE 1]

16:18:15		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D36220343-006	157.34	320	1183	0.00	0.00	0.00	0.00
13:40:04	2		0.00	0	0	0.00	0.00	0.00	0.00
720.00	3	-007	157.34	330	1255	0.00	0.00	0.00	0.00
	4	-008	157.35	403	1293	0.00	0.00	0.00	0.00
GROUP B	1	-009	157.43	411	1312	0.00	0.00	0.00	0.00
13:40:04	2	-010	157.43	431	1195	0.00	0.00	0.00	0.00
720.00	3	-011	157.42	829	2570	0.00	0.00	0.00	0.00
	4	-012	157.42	638	1665	0.00	0.00	0.00	0.00
GROUP C	1	BETA CURVE 7	15.00	27	11939	0.00	0.00	0.00	0.00
16:02:33	2	8	15.00	16	11228	0.00	0.00	0.00	0.00
15.00	3	1	15.00	6	12615	0.00	0.00	0.00	0.00
	4	2	15.00	33	13620	0.00	0.00	0.00	0.00
GROUP D	1	3	15.00	29	14042	0.00	0.00	0.00	0.00
16:02:33	2	4	15.00	23	13363	0.00	0.00	0.00	0.00
15.00	3	5	15.00	16	12762	0.00	0.00	0.00	0.00
	4	6	15.00	26	13182	0.00	0.00	0.00	0.00

Group D channel 3 COUNT TERMINATED ////

8-07-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	15.00	43	13146	13189	2.87	876.40	879.27	0.00	0.00	0.00	0.00	1380.0	16:18:59
C	2	15.00	12	11332	11344	0.80	755.47	756.27	0.00	0.00	0.00	0.00	1380.0	16:18:59
C	3	15.00	8	10440	10448	0.53	696.00	696.53	0.00	0.00	0.00	0.00	1380.0	16:18:59
C	4	15.00	30	13713	13743	2.00	914.20	916.20	0.00	0.00	0.00	0.00	1380.0	16:18:59
D	1	15.00	31	14332	14363	2.07	955.47	957.53	0.00	0.00	0.00	0.00	1290.0	16:18:59
D	2	15.00	16	13570	13586	1.07	904.67	905.73	0.00	0.00	0.00	0.00	1290.0	16:18:59
D	3	15.00	17	13247	13264	1.13	883.13	884.27	0.00	0.00	0.00	0.00	1290.0	16:18:59
D	4	15.00	19	12471	12490	1.27	831.40	832.67	0.00	0.00	0.00	0.00	1290.0	16:18:59

[TENNELEC LB4000] [PAGE 1]

16:36:51		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D36220343-006	175.84	365	1306	0.00	0.00	0.00	0.00
13:40:04	2		0.00	0	0	0.00	0.00	0.00	0.00
720.00	3	-007	175.84	377	1381	0.00	0.00	0.00	0.00
	4	-008	175.84	445	1439	0.00	0.00	0.00	0.00
GROUP B	1	-009	175.95	451	1442	0.00	0.00	0.00	0.00
13:40:04	2	-010	175.95	475	1328	0.00	0.00	0.00	0.00
720.00	3	-011	175.95	923	2836	0.00	0.00	0.00	0.00
	4	-012	175.95	709	1853	0.00	0.00	0.00	0.00
GROUP C	1	BETA CURVE 6	15.00	43	13146	0.00	0.00	0.00	0.00
16:18:59	2	7	15.00	12	11332	0.00	0.00	0.00	0.00
15.00	3	8	15.00	8	10440	0.00	0.00	0.00	0.00
	4	1	15.00	30	13713	0.00	0.00	0.00	0.00
GROUP D	1	2	15.00	31	14332	0.00	0.00	0.00	0.00
16:18:59	2	3	15.00	16	13570	0.00	0.00	0.00	0.00
15.00	3	4	15.00	17	13247	0.00	0.00	0.00	0.00
	4	5	15.00	19	12471	0.00	0.00	0.00	0.00

Group D channel 4 COUNT TERMINATED ////

8-07-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	15.00	35	12967	13002	2.33	864.47	866.80	0.00	0.00	0.00	0.00	1380.0	16:36:57
C	2	15.00	13	12422	12435	0.87	828.13	829.00	0.00	0.00	0.00	0.00	1380.0	16:36:57
C	3	15.00	6	10094	10100	0.40	672.93	673.33	0.00	0.00	0.00	0.00	1380.0	16:36:57
C	4	15.00	24	11146	11170	1.60	743.07	744.67	0.00	0.00	0.00	0.00	1380.0	16:36:57
D	1	15.00	24	14262	14286	1.60	950.80	952.40	0.00	0.00	0.00	0.00	1290.0	16:36:57
D	2	15.00	19	14263	14282	1.27	950.87	952.13	0.00	0.00	0.00	0.00	1290.0	16:36:57
D	3	15.00	13	13549	13562	0.87	903.27	904.13	0.00	0.00	0.00	0.00	1290.0	16:36:57
D	4	15.00	10	13234	13244	0.67	882.27	882.93	0.00	0.00	0.00	0.00	1290.0	16:36:57

[TENNELEC LB4000] [PAGE 1]

17:05:20		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D36220343-006	204.17	406	1511	0.00	0.00	0.00	0.00
13:40:04	2		0.00	0	0	0.00	0.00	0.00	0.00
720.00	3	-007	204.16	433	1591	0.00	0.00	0.00	0.00
	4	-008	204.17	517	1662	0.00	0.00	0.00	0.00
GROUP B	1	-009	204.29	523	1650	0.00	0.00	0.00	0.00
13:40:04	2	-010	204.29	551	1497	0.00	0.00	0.00	0.00
720.00	3	-011	204.29	1066	3237	0.00	0.00	0.00	0.00
	4	-012	204.29	811	2131	0.00	0.00	0.00	0.00
GROUP C	1	BETA CURVE 5	15.00	35	12967	0.00	0.00	0.00	0.00
16:36:57	2	6	15.00	13	12422	0.00	0.00	0.00	0.00
15.00	3	7	15.00	6	10094	0.00	0.00	0.00	0.00
	4	8	15.00	24	11146	0.00	0.00	0.00	0.00

	4	4	15.00	10	13234	0.00	0.00	0.00	0.00					

Group D channel 2 COUNT TERMINATED ////

B	1	720.00	1818	5514	7332	2.53	7.66	10.18	0.00	0.00	0.00	0.00	1380.0	13:40:04
B	2	720.00	1893	4785	6678	2.63	6.65	9.27	0.00	0.00	0.00	0.00	1380.0	13:40:04
B	3	720.00	3743	10790	14533	5.20	14.99	20.18	0.00	0.00	0.00	0.00	1380.0	13:40:04
B	4	720.00	2834	7057	9891	3.94	9.80	13.74	0.00	0.00	0.00	0.00	1380.0	13:40:04
		720.00	1409	5169	6578	1.96	7.18	9.14	0.00	0.00	0.00	0.00	1372.5	13:40:04
	3	720.00	1491	5272	6763	2.07	7.32	9.39	0.00	0.00	0.00	0.00	1372.5	13:40:04
A	4	720.00	1803	5828	7631	2.50	8.09	10.60	0.00	0.00	0.00	0.00	1372.5	13:40:04

[TENNELEC LB4000] [PAGE 1]

5:16:29		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D36220343-006	720.00	1409	5169	0.00	0.00	0.00	0.00
13:40:04	2		0.00	0	0	0.00	0.00	0.00	0.00
720.00	3	-007	720.00	1491	5272	0.00	0.00	0.00	0.00
	4	-008	720.00	1803	5828	0.00	0.00	0.00	0.00
GROUP B	1	-009	720.00	1818	5514	0.00	0.00	0.00	0.00
13:40:04	2	-010	720.00	1893	4785	0.00	0.00	0.00	0.00
720.00	3	-011	720.00	3743	10790	0.00	0.00	0.00	0.00
	4	-012	720.00	2834	7057	0.00	0.00	0.00	0.00
GROUP C	1	BETA CURVE 5	15.00	35	12967	0.00	0.00	0.00	0.00
16:36:57	2	6	15.00	13	12422	0.00	0.00	0.00	0.00
15.00	3	7	15.00	6	10094	0.00	0.00	0.00	0.00
	4	8	15.00	24	11146	0.00	0.00	0.00	0.00
GROUP D	1	1	15.00	24	14262	0.00	0.00	0.00	0.00
16:36:57	2	2	15.00	19	14263	0.00	0.00	0.00	0.00
15.00	3	3	15.00	13	13549	0.00	0.00	0.00	0.00
	4	4	15.00	10	13234	0.00	0.00	0.00	0.00

Group A channel 3 COUNT TERMINATED ////

8-06-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
B	1	60.00	1454	1209	2663	24.23	20.15	44.38	0.00	0.00	0.00	0.00	1380.0	8:20:13
B	2	60.00	951	690	1641	15.85	11.50	27.35	0.00	0.00	0.00	0.00	1380.0	8:20:13
B	3	60.00	1217	1076	2293	20.28	17.93	38.22	0.00	0.00	0.00	0.00	1380.0	8:20:13
B	4	60.00	859	735	1594	14.32	12.25	26.57	0.00	0.00	0.00	0.00	1380.0	8:20:13
A	1	60.00	1307	1046	2353	21.78	17.43	39.22	0.00	0.00	0.00	0.00	1372.5	8:20:13
A	2	60.00	1131	1122	2253	18.85	18.70	37.55	0.00	0.00	0.00	0.00	1372.5	8:20:13
A	3	60.00	1292	1113	2405	21.53	18.55	40.08	0.00	0.00	0.00	0.00	1372.5	8:20:13
A	4	60.00	1281	1119	2400	21.35	18.65	40.00	0.00	0.00	0.00	0.00	1372.5	8:20:13

[TENNELEC LB4000] [PAGE 1]

10:20:27		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A 8:20:13 60.00	1	D36220343-003	60.00	21.78	17.43	0.00	0.00	0.00	0.00
	2	004	60.00	18.85	18.70	0.00	0.00	0.00	0.00
	3	005	60.00	21.53	18.55	0.00	0.00	0.00	0.00
	4	006	60.00	21.35	18.65	0.00	0.00	0.00	0.00
GROUP B 8:20:13 60.00	1	007	60.00	24.23	20.15	0.00	0.00	0.00	0.00
	2	008	60.00	15.85	11.50	0.00	0.00	0.00	0.00
	3	009	60.00	20.28	17.93	0.00	0.00	0.00	0.00
	4	010	60.00	14.32	12.25	0.00	0.00	0.00	0.00
GROUP C 10:13:28 15.00	1	BETA CURVE 4	6.95	2.73	911.22	0.00	0.00	0.00	0.00
	2	5	6.95	1.30	835.11	0.00	0.00	0.00	0.00
	3	6	6.93	1.30	770.85	0.00	0.00	0.00	0.00
	4	7	6.94	2.59	767.87	0.00	0.00	0.00	0.00
GROUP D 10:13:28 15.00	1	8	6.93	2.45	809.52	0.00	0.00	0.00	0.00
	2	1	6.93	0.58	916.59	0.00	0.00	0.00	0.00
	3	2	6.93	0.14	948.92	0.00	0.00	0.00	0.00
	4	3	6.93	0.29	929.87	0.00	0.00	0.00	0.00

Group A channel 2 COUNT TERMINATED ////

8-08-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	15.00	38	13542	13580	2.53	902.80	905.33	0.00	0.00	0.00	0.00	1380.0	10:13:28
C	2	15.00	14	12596	12610	0.93	839.73	840.67	0.00	0.00	0.00	0.00	1380.0	10:13:28
C	3	15.00	10	11397	11407	0.67	759.80	760.47	0.00	0.00	0.00	0.00	1380.0	10:13:28
C	4	15.00	33	11521	11554	2.20	768.07	770.27	0.00	0.00	0.00	0.00	1380.0	10:13:28
D	1	15.00	40	12082	12122	2.67	805.47	808.13	0.00	0.00	0.00	0.00	1290.0	10:13:28
D	2	15.00	12	13767	13779	0.80	917.80	918.60	0.00	0.00	0.00	0.00	1290.0	10:13:28
D	3	15.00	11	14099	14110	0.73	939.93	940.67	0.00	0.00	0.00	0.00	1290.0	10:13:28
D	4	15.00	14	13867	13881	0.93	924.47	925.40	0.00	0.00	0.00	0.00	1290.0	10:13:28

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[TENNELEC LB4000] [PAGE 1]

10:28:45		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A 8:20:13 60.00	1	D36220343-003	60.00	21.78	17.43	0.00	0.00	0.00	0.00
	2	004	60.00	18.85	18.70	0.00	0.00	0.00	0.00
	3	005	60.00	21.53	18.55	0.00	0.00	0.00	0.00
	4	006	60.00	21.35	18.65	0.00	0.00	0.00	0.00
GROUP B 8:20:13 60.00	1	007	60.00	24.23	20.15	0.00	0.00	0.00	0.00
	2	008	60.00	15.85	11.50	0.00	0.00	0.00	0.00
	3	009	60.00	20.28	17.93	0.00	0.00	0.00	0.00
	4	010	60.00	14.32	12.25	0.00	0.00	0.00	0.00
GROUP C 10:13:28 15.00	1	BETA CURVE 4	15.00	2.53	902.80	0.00	0.00	0.00	0.00
	2	5	15.00	0.93	839.73	0.00	0.00	0.00	0.00
	3	6	15.00	0.67	759.80	0.00	0.00	0.00	0.00
	4	7	15.00	2.20	768.07	0.00	0.00	0.00	0.00
GROUP D 10:13:28 15.00	1	8	15.00	2.67	805.47	0.00	0.00	0.00	0.00
	2	1	15.00	0.80	917.80	0.00	0.00	0.00	0.00
	3	2	15.00	0.73	939.93	0.00	0.00	0.00	0.00
	4	3	15.00	0.93	924.47	0.00	0.00	0.00	0.00

Group D channel 2 COUNT TERMINATED ////

8-08-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	15.00	32	13956	13988	2.13	930.40	932.53	0.00	0.00	0.00	0.00	1380.0	10:29:28
C	2	15.00	14	12890	12904	0.93	859.33	860.27	0.00	0.00	0.00	0.00	1380.0	10:29:28
C	3	15.00	8	10969	10977	0.53	731.27	731.80	0.00	0.00	0.00	0.00	1380.0	10:29:28
C	4	15.00	33	12662	12695	2.20	844.13	846.33	0.00	0.00	0.00	0.00	1380.0	10:29:28
D	1	15.00	20	11868	11888	1.33	791.20	792.53	0.00	0.00	0.00	0.00	1290.0	10:29:28
D	2	15.00	25	11454	11479	1.67	763.60	765.27	0.00	0.00	0.00	0.00	1290.0	10:29:28
D	3	15.00	4	13637	13641	0.27	909.13	909.40	0.00	0.00	0.00	0.00	1290.0	10:29:28
D	4	15.00	15	14217	14232	1.00	947.80	948.80	0.00	0.00	0.00	0.00	1290.0	10:29:28

60.00	3	005	60.00	21.53	18.55	0.00	0.00	0.00	0.00
	4	006	60.00	21.35	18.65	0.00	0.00	0.00	0.00
GROUP B	1	007	60.00	24.23	20.15	0.00	0.00	0.00	0.00
8:20:13	2	008	60.00	15.85	11.50	0.00	0.00	0.00	0.00
60.00	3	009	60.00	20.28	17.93	0.00	0.00	0.00	0.00
	4	010	60.00	14.32	12.25	0.00	0.00	0.00	0.00
GROUP C	1	BETA CURVE 3	15.00	2.13	930.40	0.00	0.00	0.00	0.00
10:29:28	2	4	15.00	0.93	859.33	0.00	0.00	0.00	0.00
15.00	3	5	15.00	0.53	731.27	0.00	0.00	0.00	0.00
	4	6	15.00	2.20	844.13	0.00	0.00	0.00	0.00
GROUP D	1	7	15.00	1.33	791.20	0.00	0.00	0.00	0.00
10:29:28	2	8	15.00	1.67	763.60	0.00	0.00	0.00	0.00
15.00	3	1	15.00	0.27	909.13	0.00	0.00	0.00	0.00
	4	2	15.00	1.00	947.80	0.00	0.00	0.00	0.00

Group D channel 3 COUNT TERMINATED ////

8-08-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	15.00	21	13854	13875	1.40	923.60	925.00	0.00	0.00	0.00	0.00	1380.0	10:54:56
C	2	15.00	18	13216	13234	1.20	881.07	882.27	0.00	0.00	0.00	0.00	1380.0	10:54:56
C	3	15.00	8	11366	11374	0.53	757.73	758.27	0.00	0.00	0.00	0.00	1380.0	10:54:56
C	4	15.00	24	12053	12077	1.60	803.53	805.13	0.00	0.00	0.00	0.00	1380.0	10:54:56
D	1	15.00	21	12900	12921	1.40	860.00	861.40	0.00	0.00	0.00	0.00	1290.0	10:54:56
D	2	15.00	25	11876	11901	1.67	791.73	793.40	0.00	0.00	0.00	0.00	1290.0	10:54:56
D	3	15.00	14	11505	11519	0.93	767.00	767.93	0.00	0.00	0.00	0.00	1290.0	10:54:56
D	4	15.00	9	13891	13900	0.60	926.07	926.67	0.00	0.00	0.00	0.00	1290.0	10:54:56

3203402 [TENNELEC LB4000] [PAGE 1]

11:20:13		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D3S220343-003	60.00	21.78	17.43	0.00	0.00	0.00	0.00
8:20:13	2	004	60.00	18.85	18.70	0.00	0.00	0.00	0.00
60.00	3	005	60.00	21.53	18.55	0.00	0.00	0.00	0.00
	4	006	60.00	21.35	18.65	0.00	0.00	0.00	0.00
GROUP B	1	007	60.00	24.23	20.15	0.00	0.00	0.00	0.00
8:20:13	2	008	60.00	15.85	11.50	0.00	0.00	0.00	0.00
60.00	3	009	60.00	20.28	17.93	0.00	0.00	0.00	0.00
	4	010	60.00	14.32	12.25	0.00	0.00	0.00	0.00
GROUP C	1	BETA CURVE 2	15.00	1.40	923.60	0.00	0.00	0.00	0.00
10:54:56	2	3	15.00	1.20	881.07	0.00	0.00	0.00	0.00
15.00	3	4	15.00	0.53	757.73	0.00	0.00	0.00	0.00
	4	5	15.00	1.60	803.53	0.00	0.00	0.00	0.00
GROUP D	1	6	15.00	1.40	860.00	0.00	0.00	0.00	0.00
10:54:56	2	7	15.00	1.67	791.73	0.00	0.00	0.00	0.00
15.00	3	8	15.00	0.93	767.00	0.00	0.00	0.00	0.00
	4	1	15.00	0.60	926.07	0.00	0.00	0.00	0.00

Group B channel 1 COUNT TERMINATED ////

ABSORPTION CURVE FOR GROSS ALPHA

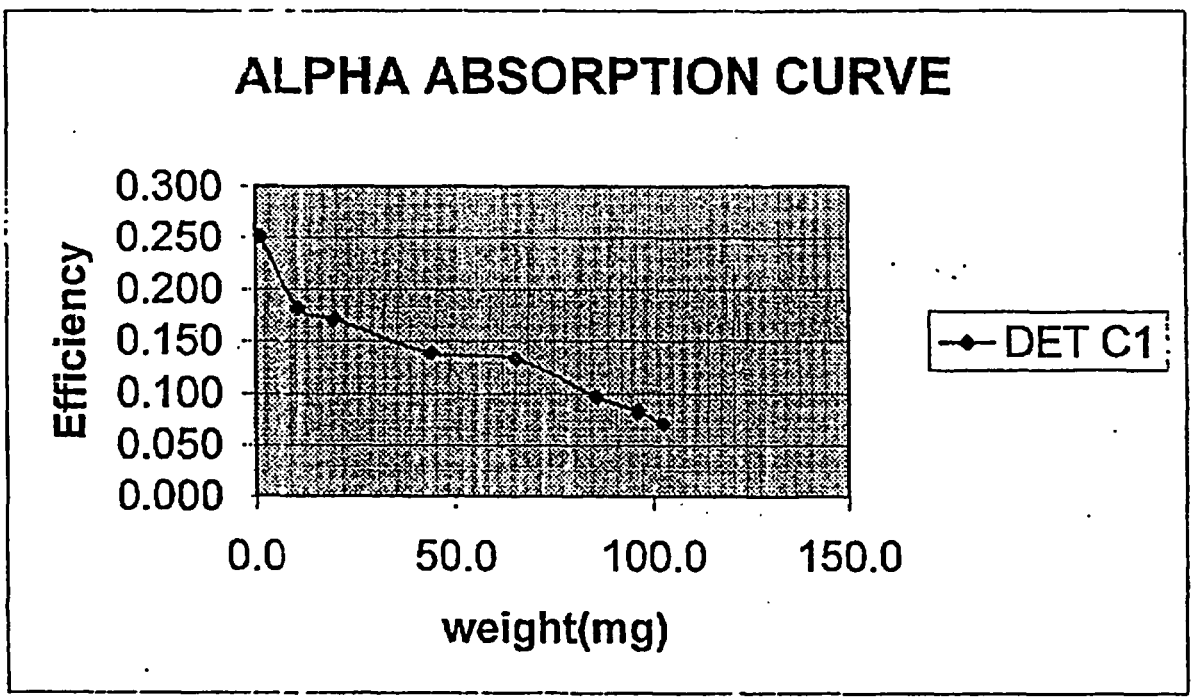
Alpha Source: Am 241
STL# AM24101AL
Ref Date: 5/1/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 8/22/03
t 1/2 = 432.20 years
Count time 90 min.

DET C1

ANALYST

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	known dpm	EFF	ln EFF
1	1.2	27524	0.16	305.66	1216	0.251	-1.381
2	10.5	19902	0.16	220.97	1216	0.182	-1.706
3	19.7	18769	0.16	208.38	1216	0.171	-1.764
4	43.9	15166	0.16	168.35	1216	0.138	-1.978
5	65.4	14589	0.16	161.94	1216	0.133	-2.016
6	85.7	10618	0.16	117.82	1216	0.097	-2.335
7	96.3	9085	0.16	100.78	1216	0.083	-2.491
8	102.6	7799	0.16	86.50	1216	0.071	-2.644

EFF. = 0.226exp(-0.0104mg) FORMULA FOR ALPHA EFFICIENCY
R2= -0.9743 CORRELATION COEFICIENT



N:/prestonj/absorption curve template(alpha)

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years)	Decay
843.00	2.3080	0.0016	years-1	0.0037	0.9963

ln(EFF)= b-mx

b intercept =	-1.4864	
m slope =	-0.0104	
exp(-1.4864)=	0.226	ZERO THICKNESS EFFICIENCY

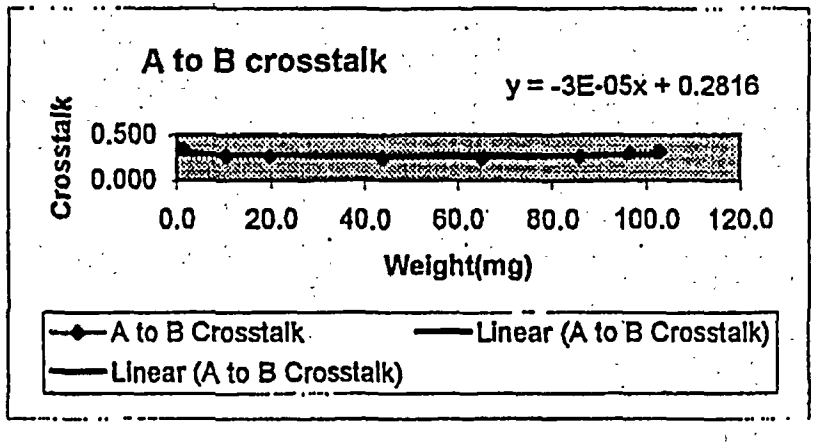
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

Alpha Source: Am 241
STL# AM24101AL
Ref Date: 05/01/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 8/22/03
t 1/2 = 432.2 years
Count time 90 min.

DET C1

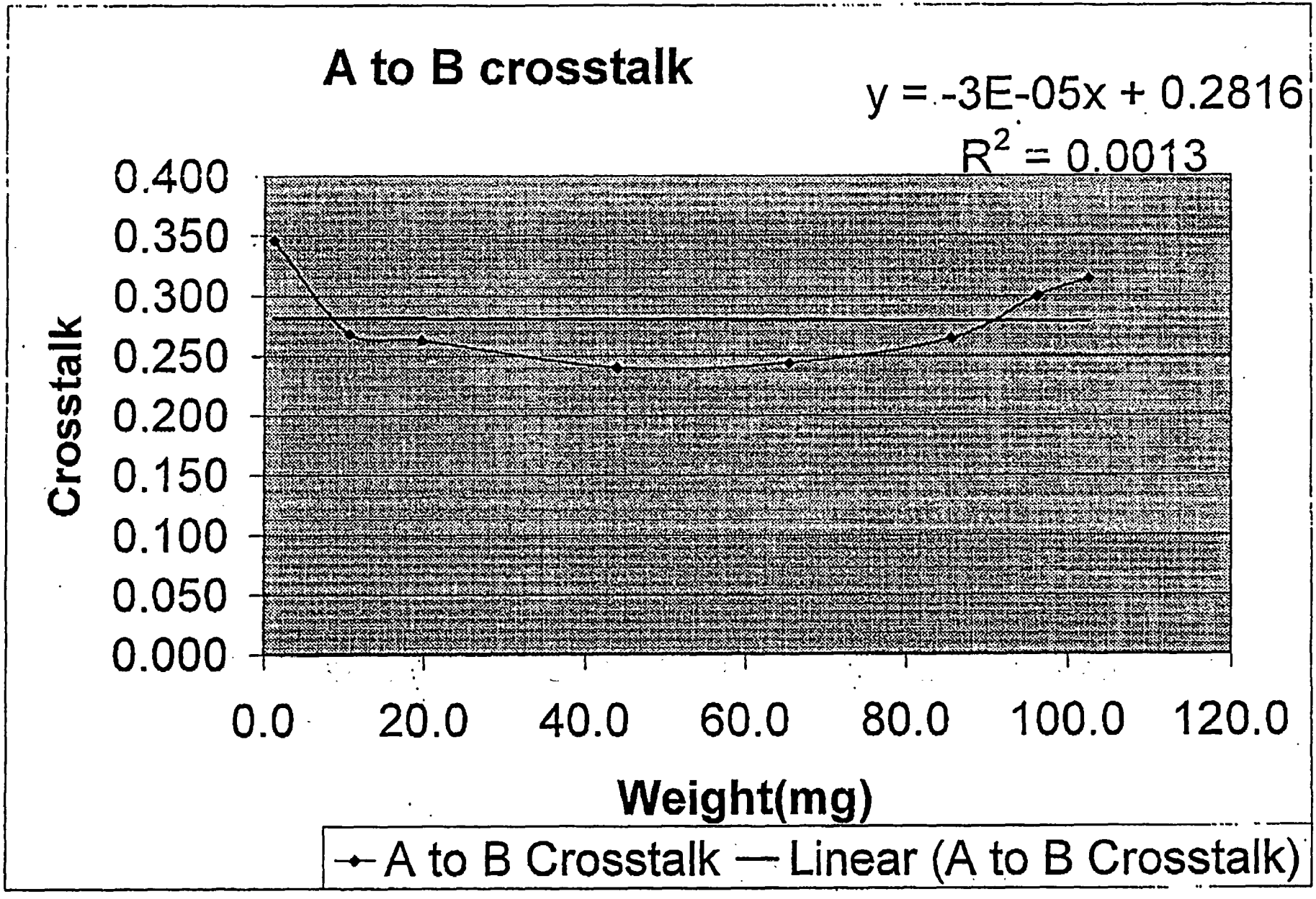
ANALYST

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	gross beta counts	beta bkgd cpm	net beta cpm	A to B crosstalk
1	1.2	27524	0.07	305.75	9772	2.79	105.79	0.346
2	10.5	19902	0.07	221.06	5586	2.79	59.28	0.268
3	19.7	18769	0.07	208.47	5181	2.79	54.78	0.263
4	43.9	15166	0.07	168.44	3885	2.79	40.38	0.240
5	65.4	14589	0.07	162.03	3805	2.79	39.49	0.244
6	85.7	10618	0.07	117.91	3053	2.79	31.13	0.264
7	96.3	9085	0.07	100.87	2975	2.79	30.27	0.300
8	102.6	7799	0.07	86.59	2700	2.79	27.21	0.314



FORMULA FOR CROSSTALK RATIO
CT = -3E-05mg + 0.2816

CORRELATION COEFICIENT
R2 = 0.0013


A to B crosstalk
y = -3E-05x + 0.2816
R2 = 0.0013
Crosstalk
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Weight(mg)
A to B Crosstalk
Linear (A to B Crosstalk)

ABSORPTION CURVE FOR GROSS ALPHA

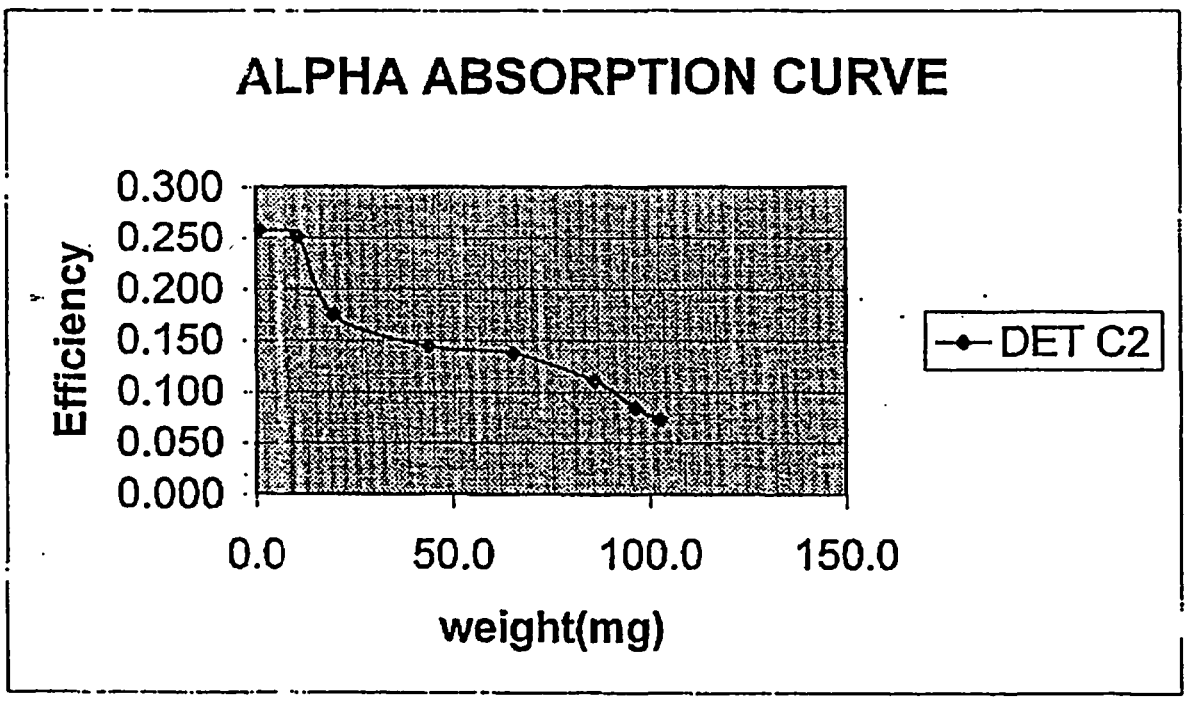
Alpha Source: Am 241
STL# AM24101AL
Ref Date: 5/1/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 8/22/03
t 1/2 = 432.20 years
Count time 90 min.

DET C2

ANALYST

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	known dpm	EFF	ln EFF
1	1.2	28247	0.09	313.77	1216	0.258	-1.355
2	10.5	27524	0.09	305.73	1216	0.251	-1.381
3	19.7	19184	0.09	213.07	1216	0.175	-1.742
4	43.9	15854	0.09	176.07	1216	0.145	-1.933
5	65.4	15096	0.09	167.64	1216	0.138	-1.982
6	85.7	12197	0.09	135.43	1216	0.111	-2.195
7	96.3	9290	0.09	103.13	1216	0.085	-2.468
8	102.6	8055	0.09	89.41	1216	0.073	-2.610

EFF. = 0.256exp(-0.0112mg) FORMULA FOR ALPHA EFFICIENCY
R2= -0.9723 CORRELATION COEFICIENT



N:/preston/absorption curve template(alpha)

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years)	Decay
843.00	2.3080	0.0016	years-1	0.0037	0.9963

ln(EFF)= b-mx

b intercept =	-1.3639	
m slope =	-0.0112	
exp(-1.3639)=	0.256	ZERO THICKNESS EFFICIENCY

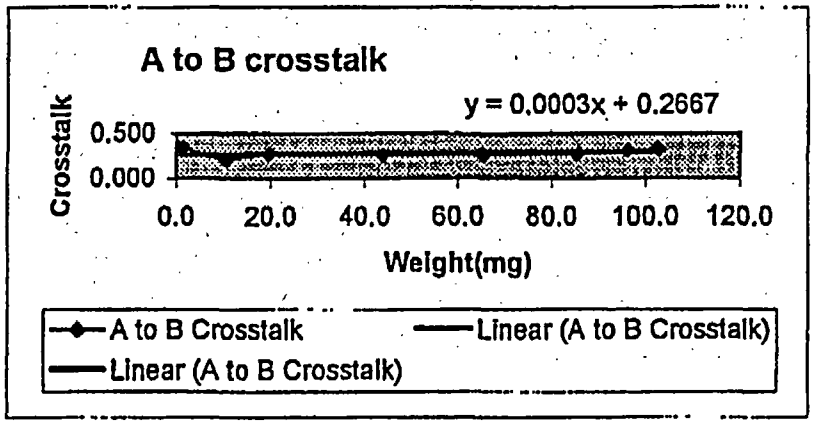
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

DET C2

ANALYST

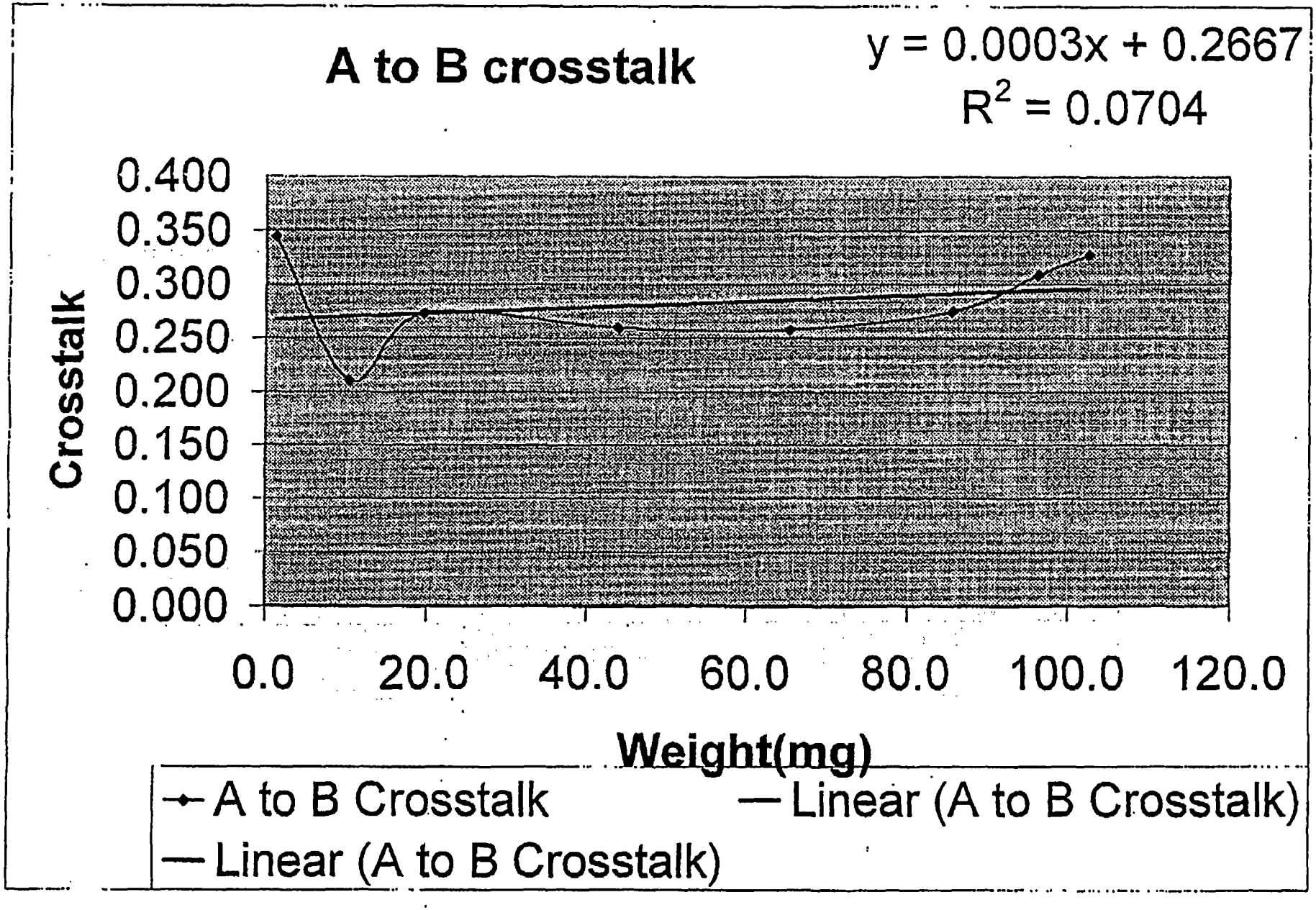
Alpha Source:	Am 241	
STL#	AM24101AL	
Ref Date:	05/01/01	
pCi/ml	110	
mls used:	5	
corr.activity:	110	pCi/ml
Curve Date:	8/22/03	
t 1/2 =	432.2	years
Count time	90	min.

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	gross beta counts	beta bkgd cpm	net beta cpm	A to B crosstalk
1	1.2	28247	0.09	313.77	9870	1.65	108.02	0.344
2	10.5	27524	0.09	305.73	5939	1.65	64.34	0.210
3	19.7	19184	0.09	213.07	5384	1.65	58.17	0.273
4	43.9	15854	0.09	176.07	4254	1.65	45.62	0.259
5	65.4	15096	0.09	167.64	4032	1.65	43.15	0.257
6	85.7	12197	0.09	135.43	3494	1.65	37.17	0.274
7	96.3	9290	0.09	103.13	3017	1.65	31.87	0.309
8	102.6	8055	0.09	89.41	2787	1.65	29.32	0.328



FORMULA FOR CROSSTALK RATIO
CT = 0.0003mg + 0.2667

CORRELATION COEFICIENT
R2 = 0.0704


A to B crosstalk
y = 0.0003x + 0.2667
R2 = 0.0704
Crosstalk
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Weight(mg)
A to B Crosstalk
Linear (A to B Crosstalk)
Linear (A to B Crosstalk)

ABSORPTION CURVE FOR GROSS ALPHA

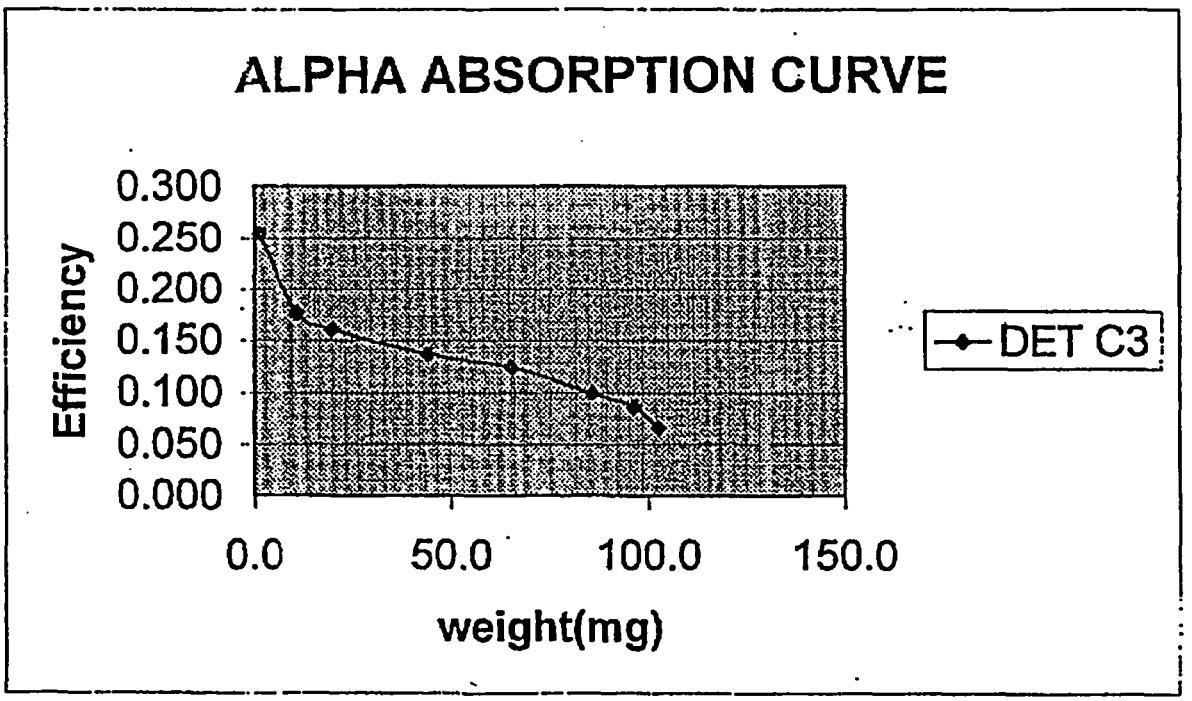
DET C3

Alpha Source: Am 241
STL# AM241C1AL
Ref Date: 5/1/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 8/22/03
t 1/2 = 432.20 years
Count time 90 min.

ANALYST

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	known dpm	EFF	ln EFF
1	1.2	27925	0.13	310.15	1216	0.255	-1.367
2	10.5	19407	0.13	215.50	1216	0.177	-1.731
3	19.7	17599	0.13	195.41	1216	0.161	-1.829
4	43.9	14965	0.13	166.15	1216	0.137	-1.991
5	65.4	13641	0.13	151.44	1216	0.124	-2.084
6	85.7	10902	0.13	121.00	1216	0.099	-2.308
7	96.3	9520	0.13	105.65	1216	0.087	-2.444
8	102.6	7283	0.13	80.79	1216	0.066	-2.712

EFF. = 0.221exp(-0.0103mg) FORMULA FOR ALPHA EFFICIENCY
R2= -0.9631 CORRELATION COEFICIENT



N:/prestonj/absorption curve template(alpha)

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years)	Decay
843.00	2.3080	0.0016	years-1	0.0037	0.9963

ln(EFF)= b-mx		
b intercept =	-1.5112	
m slope =	-0.0103	
exp(-1.5112)=	0.221	ZERO THICKNESS EFFICIENCY

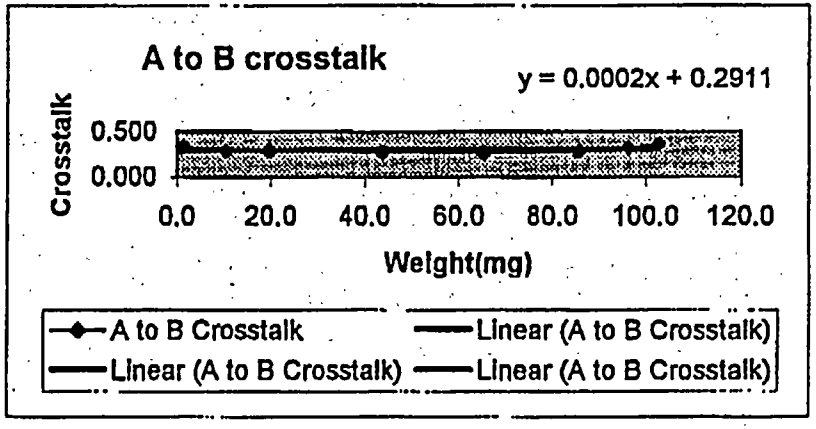
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

DET C3

ANALYST

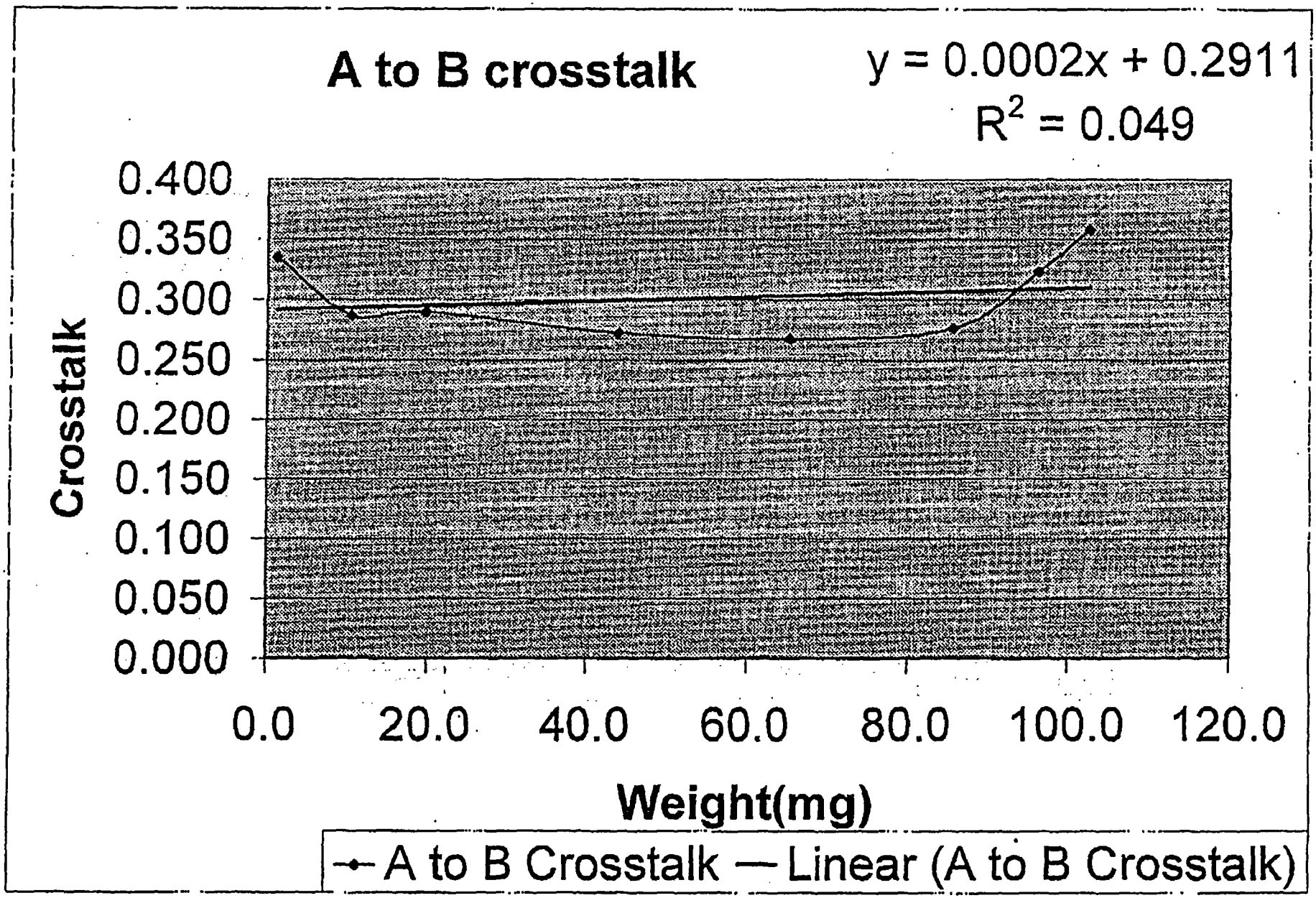
Alpha Source:	Am 241	
STL#	AM24101AL	
Ref Date:	05/01/01	
pCi/ml	110	
mls used:	5	
corr.activity:	110	pCi/ml
Curve Date:	8/22/03	
t 1/2 =	432.2	years
Count time	90	min.

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	gross beta counts	beta bkgd cpm	net beta cpm	A to B crosstalk
1	1.2	27925	0.13	310.15	9488	1.57	103.85	0.335
2	10.5	19407	0.13	215.50	5695	1.57	61.71	0.286
3	19.7	17599	0.13	195.41	5232	1.57	56.56	0.289
4	43.9	14965	0.13	166.15	4209	1.57	45.20	0.272
5	65.4	13641	0.13	151.44	3784	1.57	40.47	0.267
6	85.7	10902	0.13	121.00	3148	1.57	33.41	0.276
7	96.3	9520	0.13	105.65	3216	1.57	34.16	0.323
8	102.6	7283	0.13	80.79	2744	1.57	28.92	0.358



FORMULA FOR CROSSTALK RATIO
CT = 0.0002mg + 0.2911

CORRELATION COEFICIENT
R2 = 0.049


A to B crosstalk
y = 0.0002x + 0.2911
R2 = 0.049
Crosstalk
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Weight(mg)
A to B Crosstalk
Linear (A to B Crosstalk)

ABSORPTION CURVE FOR GROSS ALPHA

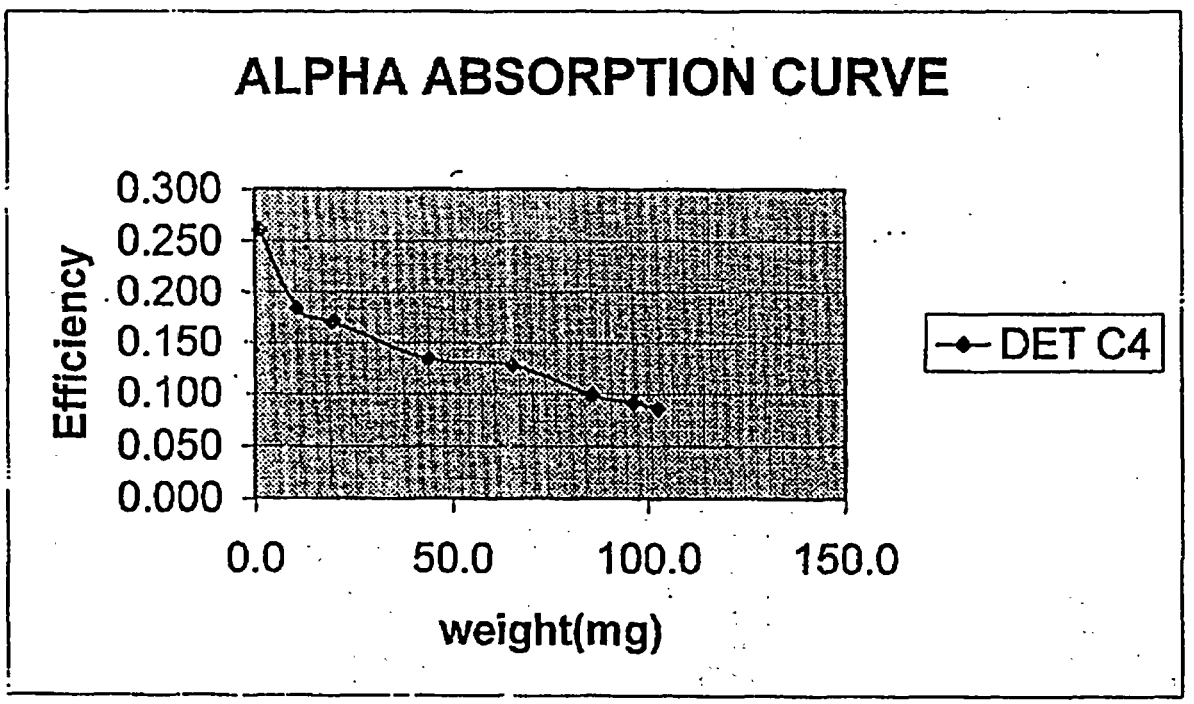
DET C4

ANALYST

Alpha Source: Am 241
STL# AM24101AL
Ref Date: 5/1/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 8/22/03
t 1/2 = 432.20 years
Count time 90 min.

STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	known dpm	EFF	ln EFF
1	1.2	28576	0.11	317.40	1216	0.261	-1.344
2	10.5	20153	0.11	223.81	1216	0.184	-1.693
3	19.7	18731	0.11	208.01	1216	0.171	-1.766
4	43.9	14672	0.11	162.91	1216	0.134	-2.011
5	65.4	14053	0.11	156.03	1216	0.128	-2.054
6	85.7	10869	0.11	120.66	1216	0.099	-2.311
7	96.3	10011	0.11	111.12	1216	0.091	-2.393
8	102.6	9435	0.11	104.72	1216	0.086	-2.452

EFF. = 0.222exp(-0.0093mg) FORMULA FOR ALPHA EFFICIENCY
R2= -0.9721 CORRELATION COEFICIENT



N:/prestonj/absorption curve template(alpha)

delta time(days)	delta time(years)	lambda		(lambda)(delta time(years)	Decay
843.00	2.3080	0.0016	years-1	0.0037	0.9963

ln(EFF)= b-mx		
b intercept =	-1.5061	
m slope =	-0.0093	
exp(-1.5061)=	0.222	ZERO THICKNESS EFFICIENCY

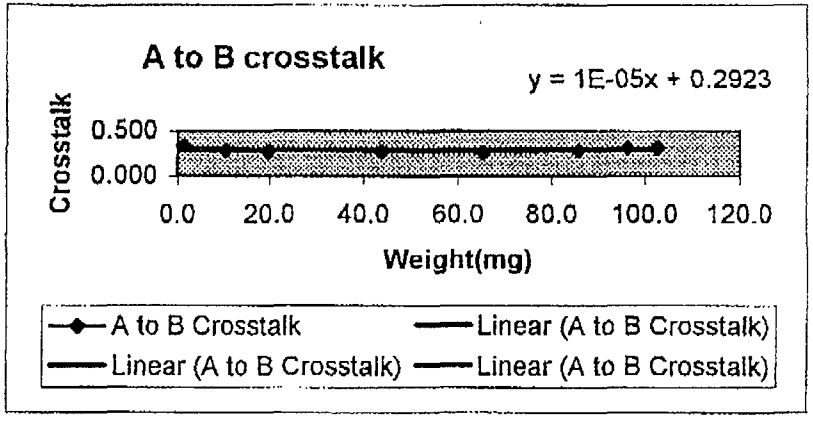
CROSSTALK CURVE AS A FUNCTION OF WEIGHT

Alpha Source: Am 241
STL# AM24101AL
Ref Date: 05/01/01
pCi/ml 110
mls used: 5
corr.activity: 110 pCi/ml
Curve Date: 8/22/03
t 1/2 = 432.2 years
Count time 90 min.

DET C4

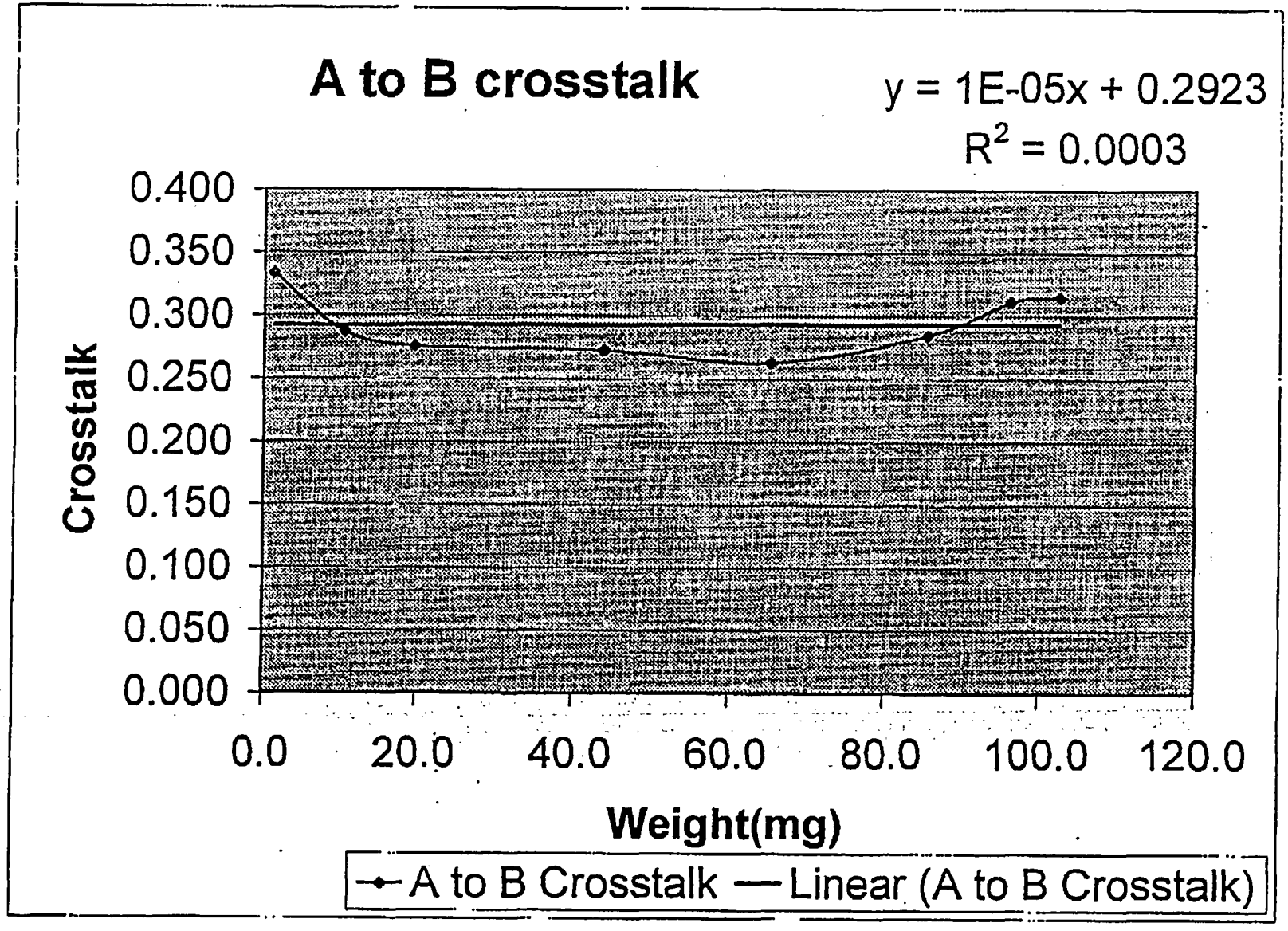
ANALYST

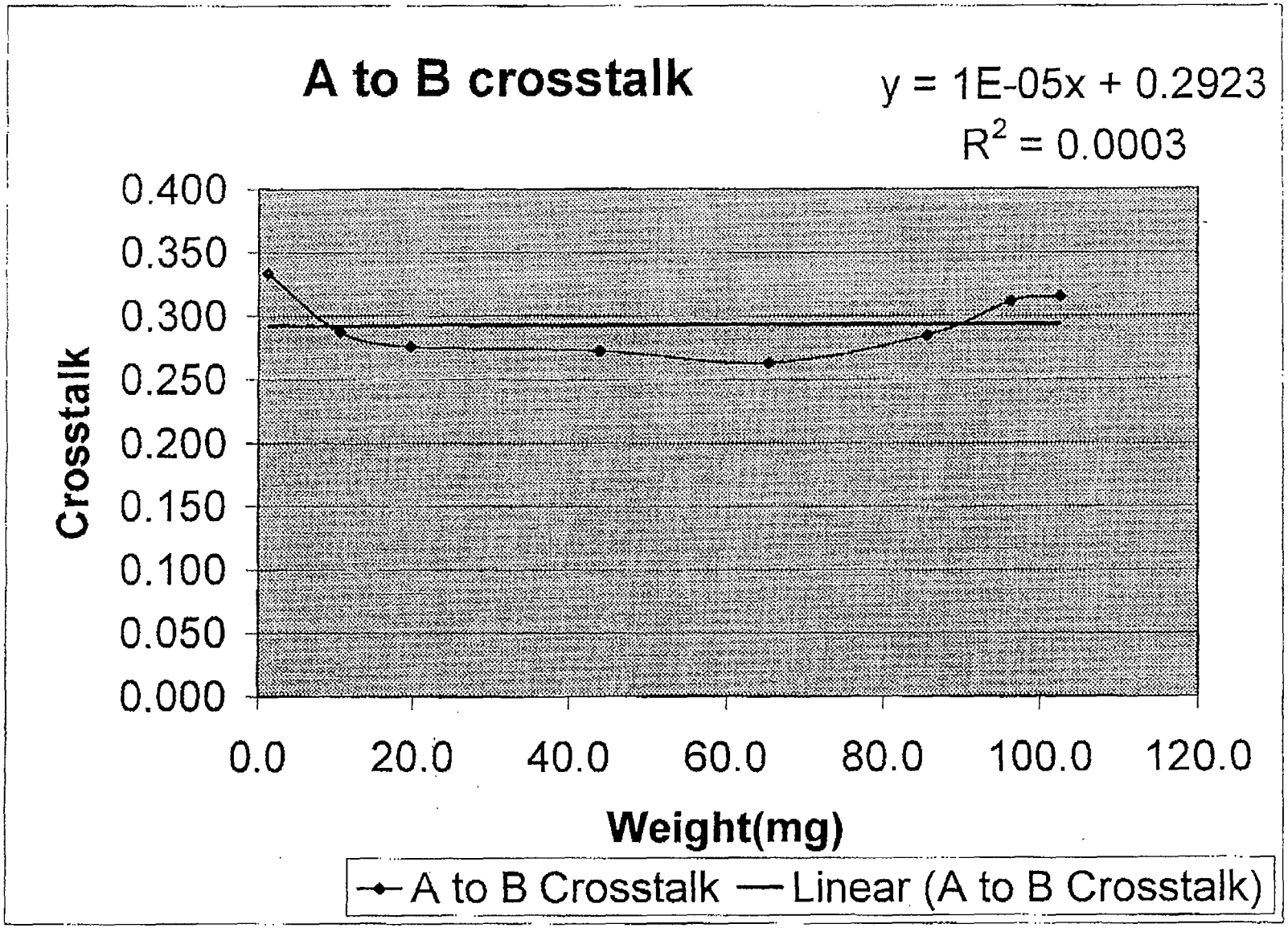
STD #	wt. mg	gross alpha counts	alpha bkgd cpm	net alpha cpm	gross beta counts	beta bkgd cpm	net beta cpm	A to B crosstalk
1	1.2	28576	0.11	317.40	9688	1.81	105.83	0.333
2	10.5	20153	0.11	223.81	5956	1.81	64.37	0.288
3	19.7	18731	0.11	208.01	5328	1.81	57.39	0.276
4	43.9	14672	0.11	162.91	4160	1.81	44.41	0.273
5	65.4	14053	0.11	156.03	3856	1.81	41.03	0.263
6	85.7	10869	0.11	120.66	3254	1.81	34.35	0.285
7	96.3	10011	0.11	111.12	3277	1.81	34.60	0.311
8	102.6	9435	0.11	104.72	3131	1.81	32.98	0.315



FORMULA FOR CROSSTALK RATIO
CT = 1E-05mg + 0.2923

CORRELATION COEFICIENT
R2 = 0.0003


A to B crosstalk
y = 1E-05x + 0.2923
R2 = 0.0003
Crosstalk
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Weight(mg)
A to B Crosstalk
Linear (A to B Crosstalk)


A to B crosstalk
y = 1E-05x + 0.2923
R2 = 0.0003
Crosstalk
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Weight(mg)
A to B Crosstalk
Linear (A to B Crosstalk)

8-26-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	4	90.00	10011	3277	13288	111.23	36.41	147.64	0.00	0.00	0.00	0.00	1380.0	10:44:42

[TENNELEC LB4000] [PAGE 1]

19:44		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1		0.00	0	0		0.00	0.00	0.00	0.00
11:44:37	2		0.00	0	0		0.00	0.00	0.00	0.00
0.00	3		34.92	360	341		0.00	0.00	0.00	0.00
	4		34.92	516	489		0.00	0.00	0.00	0.00
GROUP B	1	WEEKLY BKGD	99.02	11	287		0.00	0.00	0.00	0.00
10:40:14	2		99.01	7	174		0.00	0.00	0.00	0.00
0.00	3		99.01	9	173		0.00	0.00	0.00	0.00
	4		99.01	13	148		0.00	0.00	0.00	0.00
GROUP C	1		0.00	0	0		0.00	0.00	0.00	0.00
10:44:42	2		0.00	0	0		0.00	0.00	0.00	0.00
90.00	3		0.00	0	0		0.00	0.00	0.00	0.00
	4	ALPHA CURVE-7	90.00	10011	3277		0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0		0.00	0.00	0.00	0.00
	2		0.00	0	0		0.00	0.00	0.00	0.00
7.00	3		0.00	0	0		0.00	0.00	0.00	0.00
	4		0.00	0	0		0.00	0.00	0.00	0.00

Group C channel 4 COUNT TERMINATED ////

8-22-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	90.00	14589	3805	18394	162.10	42.28	204.38	0.00	0.00	0.00	0.00	1380.0	13:20:43
C	2	90.00	12197	3494	15691	135.52	38.82	174.34	0.00	0.00	0.00	0.00	1380.0	13:20:43
C	3	90.00	9520	3216	12736	105.78	35.73	141.51	0.00	0.00	0.00	0.00	1380.0	13:20:43
	4	90.00	8669	2972	11641	96.32	33.02	129.34	0.00	0.00	0.00	0.00	1380.0	13:20:43

{ TENNELEC LB4000 } {PAGE 1}

15:09:43		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
20.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP B	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
20.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00
GROUP C	1	ALPHA CURVE-5	90.00	14589	3805	0.00	0.00	0.00	0.00
13:20:43	2	6	90.00	12197	3494	0.00	0.00	0.00	0.00
90.00	3	7	90.00	9520	3216	0.00	0.00	0.00	0.00
	4	8	90.00	8669	2972	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0	0	0.00	0.00	0.00	0.00
	2		0.00	0	0	0.00	0.00	0.00	0.00
20.00	3		0.00	0	0	0.00	0.00	0.00	0.00
	4		0.00	0	0	0.00	0.00	0.00	0.00

Group C channel 1 COUNT TERMINATED ////

720.00	3 4	036Z20343-0135	115.91 0.00	6.85 0.00	20.23 0.00	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00
GROUP C 13:06:54 90.00	1 2 3 4	ALPHA CURVE B 1 2 3	90.00 90.00 90.00 90.00	86.66 313.86 215.63 208.12	30.00 109.67 63.28 59.20	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00
)P D :06:54 90.00	1 2 3 4	4 5 6 7	90.00 90.00 90.00 90.00	169.40 158.91 123.77 101.50	44.22 41.02 35.97 33.12	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00

Group D channel 1 COUNT TERMINATED

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8-05-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN.	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	90.00	27524	9772	37296	305.82	108.58	414.40	0.00	0.00	0.00	0.00	1380.0	11:26:15
C	2	90.00	20156	5939	26095	223.96	65.99	289.94	0.00	0.00	0.00	0.00	1380.0	11:26:15
C	3	90.00	17599	5232	22831	195.54	58.13	253.68	0.00	0.00	0.00	0.00	1380.0	11:26:15
C	4	90.00	14762	4160	18922	164.02	46.22	210.24	0.00	0.00	0.00	0.00	1380.0	11:26:15
D	1	90.00	14510	3747	18257	161.22	41.63	202.86	0.00	0.00	0.00	0.00	1290.0	11:26:15
D	2	90.00	10517	3177	13994	120.19	35.30	155.49	0.00	0.00	0.00	0.00	1290.0	11:26:15
D	3	90.00	9481	3032	12513	105.34	33.69	139.03	0.00	0.00	0.00	0.00	1290.0	11:26:15
D	4	90.00	8189	2728	10917	90.99	30.31	121.30	0.00	0.00	0.00	0.00	1290.0	11:26:15

[TENNELEC LB4000] [PAGE 1]

12:57:00		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A 12:00:18 60.00	1	D36220000-4839	56.38	0.23	4.15	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	D36210246-003	56.38	2.16	5.34	0.00	0.00	0.00	0.00
	4	D36220343-004	56.37	19.83	16.75	0.00	0.00	0.00	0.00
GROUP B 12:00:19 60.00	1	-008	56.41	16.77	15.14	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	-011	56.42	15.42	14.73	0.00	0.00	0.00	0.00
	4	-012	56.42	14.32	12.39	0.00	0.00	0.00	0.00
GROUP C 11:26:15 90.00	1	ALPHA CURVE 1	90.00	305.82	108.58	0.00	0.00	0.00	0.00
	2	2	90.00	223.96	65.99	0.00	0.00	0.00	0.00
	3	3	90.00	195.54	58.13	0.00	0.00	0.00	0.00
	4	4	90.00	164.02	46.22	0.00	0.00	0.00	0.00
GROUP D 11:26:15 90.00	1	5	90.00	161.22	41.63	0.00	0.00	0.00	0.00
	2	6	90.00	120.19	35.30	0.00	0.00	0.00	0.00
	3	7	90.00	105.34	33.69	0.00	0.00	0.00	0.00
	4	8	90.00	90.99	30.31	0.00	0.00	0.00	0.00

Group D channel 1 COUNT TERMINATED ////

B	1	60.00	1003	912	1915	16.72	15.20	31.92	0.00	0.00	0.00	0.00	1380.0	12:00:18
B	3	60.00	916	877	1793	15.27	14.62	29.88	0.00	0.00	0.00	0.00	1380.0	12:00:18
B	4	60.00	849	737	1586	14.15	12.28	26.43	0.00	0.00	0.00	0.00	1380.0	12:00:18
A	1	60.00	15	248	263	0.25	4.13	4.38	0.00	0.00	0.00	0.00	1372.5	12:00:18
	3	60.00	129	323	452	2.15	5.38	7.53	0.00	0.00	0.00	0.00	1372.5	12:00:18
	4	60.00	1189	1006	2195	19.82	16.77	36.58	0.00	0.00	0.00	0.00	1372.5	12:00:18

3203402

[TENNELEC LB4000] [PAGE 1]

13:00:51		I.D. 8/8/03	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A 12:00:18 60.00	1	D36220000-~~4838~~ 402B	60.00	0.25	4.13	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	D36210246-003	60.00	2.15	5.38	0.00	0.00	0.00	0.00
	4	D36220343-004	60.00	19.82	16.77	0.00	0.00	0.00	0.00
GROUP B 12:00:18 60.00	1	-008	60.00	16.72	15.20	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	-011	60.00	15.27	14.62	0.00	0.00	0.00	0.00
	4	-012	60.00	14.15	12.28	0.00	0.00	0.00	0.00
GROUP C 11:26:15 90.00	1	ALPHA CURVE 1	90.00	305.82	108.58	0.00	0.00	0.00	0.00
	2	2	90.00	223.96	65.99	0.00	0.00	0.00	0.00
	3	3	90.00	195.54	58.13	0.00	0.00	0.00	0.00
	4	4	90.00	164.02	46.22	0.00	0.00	0.00	0.00
GROUP D 11:26:15 90.00	1	5	90.00	161.22	41.63	0.00	0.00	0.00	0.00
	2	6	90.00	120.19	35.30	0.00	0.00	0.00	0.00
	3	7	90.00	105.34	33.69	0.00	0.00	0.00	0.00
	4	8	90.00	90.99	30.31	0.00	0.00	0.00	0.00

Group A channel 4 COUNT TERMINATED ////

8-08-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	90.00	7799	2700	10499	86.66	30.00	116.66	0.00	0.00	0.00	0.00	1380.0	13:06:54
C	2	90.00	28247	9870	38117	313.86	109.67	423.52	0.00	0.00	0.00	0.00	1380.0	13:06:54
C	3	90.00	19407	5695	25102	215.63	63.28	278.91	0.00	0.00	0.00	0.00	1380.0	13:06:54
C	4	90.00	18731	5328	24059	208.12	59.20	267.32	0.00	0.00	0.00	0.00	1380.0	13:06:54
D	1	90.00	15246	3980	19226	169.40	44.22	213.62	0.00	0.00	0.00	0.00	1290.0	13:06:54
D	2	90.00	14302	3692	17994	158.91	41.02	199.93	0.00	0.00	0.00	0.00	1290.0	13:06:54
D	3	90.00	11139	3237	14376	123.77	35.97	159.73	0.00	0.00	0.00	0.00	1290.0	13:06:54
D	4	90.00	9135	2981	12116	101.50	33.12	134.62	0.00	0.00	0.00	0.00	1290.0	13:06:54

3203402

[TENNELEC LB4000] [PAGE 1]

15:02:41		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A 13:04:12	1	D36330343-013	117.45	18.24	16.53	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00

720.00	3	D36220343-013S	115.91	6.85	20.23	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00
GROUP C	1	ALPHA CURVE B	90.00	86.66	30.00	0.00	0.00	0.00	0.00
13:06:54	2	1	90.00	313.86	109.67	0.00	0.00	0.00	0.00
90.00	3	2	90.00	215.63	63.28	0.00	0.00	0.00	0.00
	4	3	90.00	208.12	59.20	0.00	0.00	0.00	0.00
D	1	4	90.00	169.40	44.22	0.00	0.00	0.00	0.00
06:54	2	5	90.00	158.91	41.02	0.00	0.00	0.00	0.00
90.00	3	6	90.00	123.77	35.97	0.00	0.00	0.00	0.00
	4	7	90.00	101.50	33.12	0.00	0.00	0.00	0.00

Group D channel 1 COUNT TERMINATED ////

8-08-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	90.00	27524	9772	37296	305.82	108.58	414.40	0.00	0.00	0.00	0.00	1380.0	11:26:15
C	2	90.00	20156	5939	26095	223.96	65.99	289.94	0.00	0.00	0.00	0.00	1380.0	11:26:15
C	3	90.00	17599	5232	22831	195.54	58.13	253.68	0.00	0.00	0.00	0.00	1380.0	11:26:15
C	4	90.00	14762	4160	18922	164.02	46.22	210.24	0.00	0.00	0.00	0.00	1380.0	11:26:15
D	1	90.00	14510	3747	18257	161.22	41.63	202.86	0.00	0.00	0.00	0.00	1290.0	11:26:15
D	2	90.00	10817	3177	13994	120.19	35.30	155.49	0.00	0.00	0.00	0.00	1290.0	11:26:15
D	3	90.00	9481	3032	12513	105.34	33.69	139.03	0.00	0.00	0.00	0.00	1290.0	11:26:15
D	4	90.00	8189	2728	10917	90.99	30.31	121.30	0.00	0.00	0.00	0.00	1290.0	11:26:15

[TENNELEC LB4000] [PAGE 1]

12:57:00		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D36220000-4839	56.38	0.23	4.15		0.00	0.00	0.00	0.00
12:00:18	2		0.00	0.00	0.00		0.00	0.00	0.00	0.00
60.00	3	D36210246-003	56.38	2.16	5.34		0.00	0.00	0.00	0.00
	4	D36220343-004	56.37	19.83	16.75		0.00	0.00	0.00	0.00
GROUP B	1	-008	56.41	16.77	15.14		0.00	0.00	0.00	0.00
12:00:18	2		0.00	0.00	0.00		0.00	0.00	0.00	0.00
60.00	3	-011	56.42	15.42	14.73		0.00	0.00	0.00	0.00
	4	-012	56.42	14.32	12.39		0.00	0.00	0.00	0.00
GROUP C	1	ALPHA CURVE 1	90.00	305.82	108.58		0.00	0.00	0.00	0.00
11:26:15	2	2	90.00	223.96	65.99		0.00	0.00	0.00	0.00
90.00	3	3	90.00	195.54	58.13		0.00	0.00	0.00	0.00
	4	4	90.00	164.02	46.22		0.00	0.00	0.00	0.00
GROUP D	1	5	90.00	161.22	41.63		0.00	0.00	0.00	0.00
11:26:15	2	6	90.00	120.19	35.30		0.00	0.00	0.00	0.00
90.00	3	7	90.00	105.34	33.69		0.00	0.00	0.00	0.00
	4	8	90.00	90.99	30.31		0.00	0.00	0.00	0.00

Group B channel 1 COUNT TERMINATED ////

B	1	60.00	1003	912	1915	16.72	15.20	31.92	0.00	0.00	0.00	0.00	1380.0	12:00:18
B	3	60.00	916	877	1793	15.27	14.62	29.88	0.00	0.00	0.00	0.00	1380.0	12:00:18
B	4	60.00	849	737	1586	14.15	12.28	26.43	0.00	0.00	0.00	0.00	1380.0	12:00:18
A	1	60.00	15	248	263	0.25	4.13	4.38	0.00	0.00	0.00	0.00	1372.5	12:00:18
	3	60.00	129	323	452	2.15	5.38	7.53	0.00	0.00	0.00	0.00	1372.5	12:00:18
	4	60.00	1189	1006	2195	19.82	16.77	36.58	0.00	0.00	0.00	0.00	1372.5	12:00:18

[TENNELEC LB4000] [PAGE 1]

13:00:51		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D36220000-4838	60.00	0.25	4.13		0.00	0.00	0.00	0.00
12:00:18	2		0.00	0.00	0.00		0.00	0.00	0.00	0.00
60.00	3	D36210246-003	60.00	2.15	5.38		0.00	0.00	0.00	0.00
	4	D36220343-004	60.00	19.82	16.77		0.00	0.00	0.00	0.00
GROUP B	1	-008	60.00	16.72	15.20		0.00	0.00	0.00	0.00
12:00:18	2		0.00	0.00	0.00		0.00	0.00	0.00	0.00
60.00	3	-011	60.00	15.27	14.62		0.00	0.00	0.00	0.00
	4	-012	60.00	14.15	12.28		0.00	0.00	0.00	0.00
GROUP C	1	ALPHA CURVE 1	90.00	305.82	108.58		0.00	0.00	0.00	0.00
11:26:15	2	2	90.00	223.96	65.99		0.00	0.00	0.00	0.00
90.00	3	3	90.00	195.54	58.13		0.00	0.00	0.00	0.00
	4	4	90.00	164.02	46.22		0.00	0.00	0.00	0.00
GROUP D	1	5	90.00	161.22	41.63		0.00	0.00	0.00	0.00
11:26:15	2	6	90.00	120.19	35.30		0.00	0.00	0.00	0.00
90.00	3	7	90.00	105.34	33.69		0.00	0.00	0.00	0.00
	4	8	90.00	90.99	30.31		0.00	0.00	0.00	0.00

Group A channel 4 COUNT TERMINATED ////

8-08-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	90.00	7799	2700	10499	86.66	30.00	116.66	0.00	0.00	0.00	0.00	1380.0	13:06:54
C	2	90.00	28247	9870	38117	313.86	109.67	423.52	0.00	0.00	0.00	0.00	1380.0	13:06:54
C	3	90.00	19407	5695	25102	215.63	63.28	278.91	0.00	0.00	0.00	0.00	1380.0	13:06:54
C	4	90.00	18731	5328	24059	208.12	59.20	267.32	0.00	0.00	0.00	0.00	1380.0	13:06:54
D	1	90.00	15246	3980	19226	169.40	44.22	213.62	0.00	0.00	0.00	0.00	1290.0	13:06:54
	2	90.00	14302	3692	17994	158.91	41.02	199.93	0.00	0.00	0.00	0.00	1290.0	13:06:54
	3	90.00	11139	3237	14376	123.77	35.97	159.73	0.00	0.00	0.00	0.00	1290.0	13:06:54
D	4	90.00	9135	2981	12116	101.50	33.12	134.62	0.00	0.00	0.00	0.00	1290.0	13:06:54

[TENNELEC LB4000] [PAGE 1]

15:02:41		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D36330343-013	117.45	18.24	16.53		0.00	0.00	0.00	0.00
15:00:13	2		0.00	0.00	0.00		0.00	0.00	0.00	0.00

6-12-03

GR	CH	TIME	α COUNTS	β COUNTS	INTEGRAL	α CORR.	β CORR.	INT/MIN	α EFF	β EFF	α BKG	β BKG	HIGH V	TIME/DAY
C	1	90.00	19902	5586	25488	221.13	62.07	283.20	0.00	0.00	0.00	0.00	1380.0	15:28:37
C	2	90.00	19184	5384	24568	213.16	59.82	272.98	0.00	0.00	0.00	0.00	1380.0	15:28:37
		90.00	14965	4209	19174	166.28	46.77	213.04	0.00	0.00	0.00	0.00	1380.0	15:28:37
		90.00	28576	9688	38264	317.51	107.64	425.16	0.00	0.00	0.00	0.00	1380.0	15:28:37

[TENNELEC LB4000] [PAGE 1]

16:59:20		I.D.	TIME	COUNTS	α COUNTS	β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16:20:25	2	D36230281-003	38.69	0.28	4.57	0.00	0.00	0.00	0.00	0.00
720.00	3	-002	38.69	0.54	3.02	0.00	0.00	0.00	0.00	0.00
	4	-001	38.69	0.90	4.68	0.00	0.00	0.00	0.00	0.00
GROUP B	1	D36250149-003	38.72	0.44	3.20	0.00	0.00	0.00	0.00	0.00
16:20:25	2	-004	38.72	0.44	2.40	0.00	0.00	0.00	0.00	0.00
720.00	3	-005	38.71	0.34	2.92	0.00	0.00	0.00	0.00	0.00
	4	-006	38.71	0.05	2.66	0.00	0.00	0.00	0.00	0.00
GROUP C	1	ALPHA CURVE 2	90.00	221.13	62.07	0.00	0.00	0.00	0.00	0.00
15:28:37	2	3	90.00	213.16	59.82	0.00	0.00	0.00	0.00	0.00
90.00	3	4	90.00	166.28	46.77	0.00	0.00	0.00	0.00	0.00
	4	1	90.00	317.51	107.64	0.00	0.00	0.00	0.00	0.00
GROUP D	1		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20.00	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Group C channel 4 COUNT TERMINATED ////

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Equipment and Material Release Surveys

Contamination / Ra[illegible]ion Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115
LOCATION: EPA NEIC	SURVEYOR(S): K. WISE / J. STEPHENS / T. TRENT
Denver Federal Center, CO	SURVEY NUMBER: 022404-15
Denver, CO	MAP ID: LAB A1209

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS
$MDCR_{surveyor}$ Beta
$MDCR_{surveyor}$ Alpha

Source Check Data	Contamination Surveys				Radiation Surveys
	α (TOTAL)	α (TOTAL)	β-γ (TOTAL)	β-γ (TOTAL)	Beta-Gamma
Instrument	184904 / 185768	185774	184904 / 185768	185774	NA
Source Type and I.D.	Th-230, 1170/89	Th-230, 1170/89	Cs-137, 92CS5000	Cs-137, 92CS5000	
Source Strength in dpm	13600	13600	769565	769565	Ok
Efficiency	0.13 / 0.15	0.15	0.16 / 0.17	0.16	
MDC in dpm/100 cm²	See attached Instrument sheets for material specific backgrounds and MDC's.				Sat. ☐ Unsat. ☐
Background in cpm					mrem/hr or μrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO. _____
☐ SPECIAL _____
☒ ROUTINE MATERIAL RELEASE SURVEY

Contamination ☒ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS: See MAP for Survey Locations
Item No. 1-50, 160-170 • 2360 185774
51-99, 170-175 • 2360 185768
100-159 • 2360 184904

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #
ALPHA (TOTAL) 2360, 184904 BETA-GAMMA (TOTAL) 2360, 184904
ALPHA (TOTAL) 2360, 185768 BETA-GAMMA (TOTAL) 2360, 185768
ALPHA (TOTAL) 2360, 185774 BETA-GAMMA (TOTAL) 2360, 185774

THE KNOWING & WILLFUL RECORDING OF FALSE, FETITIOUS, OR FRAUDULENT STATEMENTS OR ENTRES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.

DATE: 02-24-04 TIME START: 0700 TIME COMPLETE: 1700 PAGE 1 OF 11

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ✓	Item or Location
1	NA	23	NA	567	ME	Hood
2		-6		434	CT	Countertop
3		6		-390	ME	DRAWER
4		-15		430		
5		-11		280		
6		15		308		
7		28		589		
8		-23		348	CT	Countertop
9		15		216	ME	Cabinet
10		-2		283		DRAWER
11		-2		227		
12		11		492		
13		2		38		Cabinet
14		19		148		
15		-6		-53		
16		-6		314	CT	Countertop
17		32		98	ME	
18		-11		278		Cabinet
19		-2		118		DRAWER
20		2		227		
21		-2		197		
22		19		283		
23		2		7		Cabinet
24		11		174		Cabinet
25		19		65		DRAWER

RCS REVIEW [signature] DATE 3-25-04

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-24-04 | PAGE 2 OF 11

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): K. WISE / J. STEPHENS / T. TRENT
SURVEY NUMBER: 022404-15
MAP ID: LAB A1209

COMMENTS:

RCS REVIEW [signature] DATE 3-25-04

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
26	NA	2	NA	262	ME	DRAWER
27		15		28		
28		6		186		
29		19		459	CT	Countertop
30		28		416	ME	DRAWER
31		2		257		
32		49		231		
33		28		308		
34		44		109		Cabinet
35		-15		321	CT	Countertop
36		28		195	ME	DRAWER
37		-2		310		
38		19		192		
39		-6		81		
40		2		59		
41		28		292		
42		15		497		
43		23		29		
44		2		272	CT	Countertop
45		6		24	ME	DRAWER
46		28		89		
47		23		125		
48		19		225		
49		15		-105		
50		-11		134		

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
51	NA	-9	NA	214	ME	DRAWER
52		-9		382	ME	DRAWER
53		-19		281	CT	Countertop
54		-30		247	ME	Sink
55		-22		348		Cabinet
56		25		-182		Cabinet
57		25		498		Junction Box
58		-5		132		Cabinet
59		16		300		
60		12		386		
61		12		148		Junction Box
62		33		-76		Cabinet
63		-2		511	CT	Countertop
64		3		-81	ME	DRAWER
65		12		578		Cabinet
66		-1		268		Shelf
67		-1		191		Drawer
68		-9		249		Shelf
69		16		442		Drawer
70		-9		358		
71		-1		451		
72		-1		479		
73		-2		640	CT	Countertop
74		16		335	ME	Cabinet
75		11		688	CT	Countertop

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-24-04 | PAGE 3 OF 11

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): K. WISE / J STEPHENS / T. TCENT
SURVEY NUMBER: 022404-15
MAP ID: LAB A1209

COMMENTS:

RCS REVIEW [signature] DATE 3-25-04

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ✓	Item or Location
76	NA	-1	NA	277	ME	DRAWER
77		3		197		SINK
78		-5		-268		CABINET
79		3		-770	CT	COUNTERTOP
80		3		-1067	ME	Cabinet Shelf
81		20		894	ME	Cabinet Shelf
82		-45		-143	CT	Countertop
83		-5		119	ME	DRAWERS
84		-1		324		
85		-1		492		
86		20		535		
87		-5		92		Cabinet
88		8		180		DRAWERS
89		-22		501		
90		8		225		
91		-14		475		
92		-14		352		
93		-5		606		
94		-14		167		SINK
95		-26		215	FT	FLOORING
96		12		49	ME	Junction Box
97		25		425		Lip on Hood
98		8		66		Louvers
99		12		292		Cabinet
100		-6		-395		Cabinet

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ✓	Item or Location
101	NA	18	NA	-297	ME	Regulator
102		23		976		Lip on Hood
103		23		-506		Louvers
104		28		97		Cabinet
105		-16		74		
106		-1		-502		
107		-15		-69	CT	Countertop
108		-6		-123	ME	Drawer
109		-21		-10	ME	Cabinet
110		-24		181	CT	Countertop
111		-1		60	ME	Cabinet
112		5		58	CT	Countertop
113		-11		-77	ME	DRAWERS
114		13		-135		
115		-1		58		
116		-11		-6		
117		-21		-47		
118		-31		-157		
119		-16		-65		
120		-11		-87		
121		33		-127		
122		-1		8		
123		-6		-202		
124		-11		-200		
125		-41		-206		

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-24-04 | PAGE 4 OF 11

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): K. WISE / T. TRENT / J. STEPHENS
SURVEY NUMBER: 022404-15
MAP ID: LAB A1209

COMMENTS:

RCS REVIEW [signature] DATE 3-25-04

Alpha cpm ☐ Beta cpm ☐ Material ☑

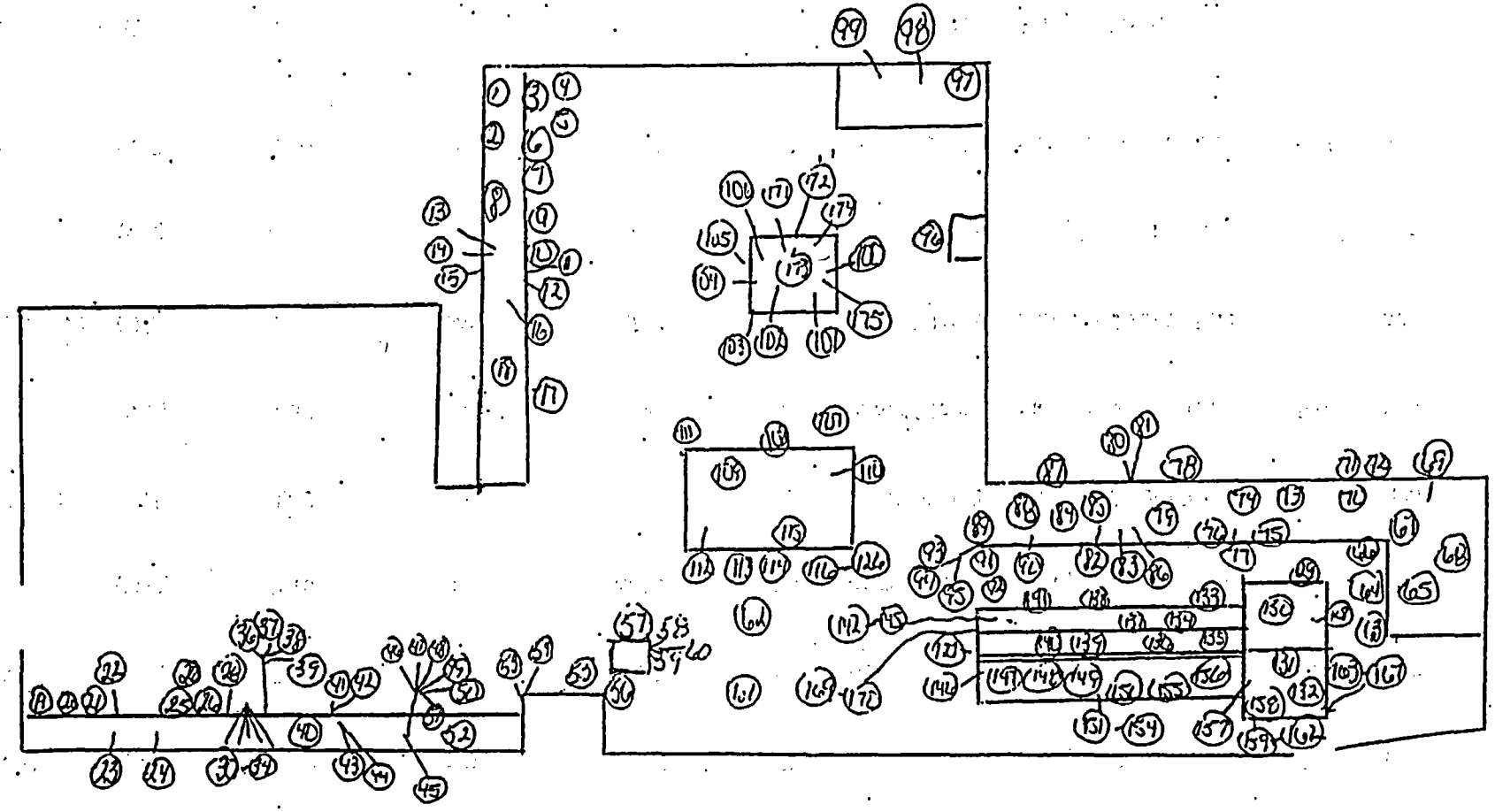
Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Material	Item or Location
126	NA	-11	NA	-260	ME	DRAWERS
127		62		-61		EYEWASH
128		23		-748		LOUVERS
129		77		-252		LIP
130		28		-284		EDGE
131		-6		-99		Cabinet
132		13		-39		
133		29		-471	CT	Countertop
134		-1		-440	ME	DRAWERS
135		3		-345		
136		-1		-353		
137		-21		-103		
138		5		-333	CT	Countertop
139		3		-47	ME	Cabinet
140		-16		-615	ME	Sink
141		-10		-517	CT	Countertop
142		-1		-611	ME	DRAWER
143		-1		-530		
144		8		-286		
145		-21		-284		
146		-24		-555	CT	Countertop
147		3		-202	ME	Cabinet
148		-24		-632	CT	Countertop
149		-11		-426	ME	Cabinet
150		-29		-525	CT	Countertop

Alpha cpm ☐ Beta cpm ☐ Material ☑

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Material	Item or Location
151	NA	-26	NA	518	ME	DRAWERS
152		-21		639		
153		-26		-230		
154		-16		-315		
155		-6		-34		Sink
156		-39		-333	CT	Countertop
157		-21		-502	ME	Cabinet
158		-29		-364	CT	Countertop
159		-21		-684	ME	Drawers
160		6		303		
161		19		-528		
162		11		-210		
163		19		-561		Louvers
164		23		336		Lip
165		28		29		Rim (edge)
166		6		412		Cabinet
167		28		417		Cabinet
168		-11		145	CT	Countertop
169		-6		187		
170		11		300		
171		-1		455	ME	Hood
172		8		373		
173		-5		317		
174		-9		199		
175		3		-27		

Contamination / Radiation Survey Report

PROJECT NUMBER: 101115	ACTIVITY / LOCATION: Release Survey	/ Laboratory-Room A1209	PAGE 5 OF 11
COMMENTS: (#) - Survey Location	SURVEYOR(S): K. WISE / T. TRENT / J STEPHENS	SURVEY NUMBER: 022404-15	DATE: 02-24-04
	NOTE: THE KNOWING AND WILLFUL RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.		
RCS REVIEW: [signature]	DATE: 3-25-04		



Pg 6 of 11
022404-15
3-25-04

Material Specific Background and MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 184904 Background Count Time 5.00 minutes

Probe/SN: Ludlum 43-68 / PR138731 Total Instrument Effciency 0.0325 dpm/cpm

Wall Board	**(WB)**	1.40	cpm	**MDC**	75	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	2.24	cpm	**MDC**	91	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	2.10	cpm	**MDC**	88	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	4.40	cpm	**MDC**	92	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	1.66	cpm	**MDC**	80	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	1.92	cpm	**MDC**	85	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	5.04	cpm	**MDC**	98	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	2.20	cpm	**MDC**	90	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	3.36	cpm	**MDC**	88	dpm/100cm2	**Sample Count Time**	10.00	min
Wall Board Downstairs	**(WBD)**	1.22	cpm	**MDC**	71	dpm/100cm2	**Sample Count Time**	5.00	min

3-25-04

Material Specific Background MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 184904

Probe/SN: Ludlum 43-68 / PR138731

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0800 dpm/cpm

Wall Board	**(WB)**	265.14	cpm	**MDC**	342	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	303.36	cpm	**MDC**	365	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	180.64	cpm	**MDC**	283	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	449.28	cpm	**MDC**	359	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	311.78	cpm	**MDC**	370	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	475.30	cpm	**MDC**	456	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	350.32	cpm	**MDC**	317	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	292.52	cpm	**MDC**	359	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	982.02	cpm	**MDC**	563	dpm/100cm2	**Sample Count Time**	10.00	min
Wall Board Downstairs	**(WBD)**	270.32	cpm	**MDC**	279	dpm/100cm2	**Sample Count Time**	5.00	min

022404-15
3-25-04

Material Specific Background and MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 185774 Background Count Time 5.00 minutes

Probe/SN: Ludlum 43-68 / RN012713 Total Instrument Effciency 0.0375 dpm/cpm

Wall Board	**(WB)**	2.30	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	1.96	cpm	**MDC**	74	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	2.24	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	3.54	cpm	**MDC**	78	dpm/100cm2	**Sample Count Time**	10.00	min
Metal	**(ME)**	1.10	cpm	**MDC**	59	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	1.72	cpm	**MDC**	70	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	3.74	cpm	**MDC**	80	dpm/100cm2	**Sample Count Time**	10.00	min
Counter Top	**(CT)**	2.30	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	5.04	cpm	**MDC**	92	dpm/100cm2	**Sample Count Time**	10.00	min
Wall Board Downstairs	**(WBD)**	2.06	cpm	**MDC**	76	dpm/100cm2	**Sample Count Time**	5.00	min

3-24-04

Material Specific Background MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 185774

Probe/SN: Ludlum 43-68 / RN012713

Background Count Time 5.00 minutes

Total Instrument Efficiency 0.0900 dpm/cpm

Wall Board	(WB)	271.18	cpm	MDC	307	dpm/100cm2	Sample Count Time	5.00	min
Floor Tile	(FT)	347.86	cpm	MDC	348	dpm/100cm2	Sample Count Time	5.00	min
Wood	(WO)	250.42	cpm	MDC	296	dpm/100cm2	Sample Count Time	5.00	min
Cement Floor	(CF)	498.62	cpm	MDC	357	dpm/100cm2	Sample Count Time	10.00	min
Metal	(ME)	325.46	cpm	MDC	336	dpm/100cm2	Sample Count Time	5.00	min
Concrete Block	(CB)	530.62	cpm	MDC	428	dpm/100cm2	Sample Count Time	5.00	min
Glass	(GL)	370.34	cpm	MDC	308	dpm/100cm2	Sample Count Time	10.00	min
Counter Top	(CT)	286.78	cpm	MDC	316	dpm/100cm2	Sample Count Time	5.00	min
Black&White Floor Tile	(BWFT)	393.98	cpm	MDC	318	dpm/100cm2	Sample Count Time	10.00	min
Wall Board Downstairs	(WBD)	306.64	cpm	MDC	327	dpm/100cm2	Sample Count Time	5.00	min

022404-15
3-25-04

Material Specific Background and MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 185768 Background Count Time 5.00 minutes

Probe/SN: Ludlum 43-68 / RN012714 Total Instrument Effciency 0.0375 dpm/cpm

Wall Board	**(WB)**	1.82	cpm	**MDC**	72	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	2.22	cpm	**MDC**	78	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	3.10	cpm	**MDC**	90	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	5.52	cpm	**MDC**	96	dpm/100cm2	**Sample Count Time**	10.00	min
Metal	**(ME)**	1.84	cpm	**MDC**	72	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	2.50	cpm	**MDC**	82	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	4.38	cpm	**MDC**	86	dpm/100cm2	**Sample Count Time**	10.00	min
Counter Top	**(CT)**	1.68	cpm	**MDC**	70	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	16.10	cpm	**MDC**	149	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	3.42	cpm	**MDC**	94	dpm/100cm2	**Sample Count Time**	5.00	min

22404-15

3-25-04

Material Specific Background MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 185768

Probe/SN: Ludlum 43-68 / RN012714

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0850 dpm/cpm

Wall Board	**(WB)**	230.00	cpm	**MDC**	300	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	275.22	cpm	**MDC**	328	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	210.12	cpm	**MDC**	287	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	357.50	cpm	**MDC**	321	dpm/100cm2	**Sample Count Time**	10.00	min
Metal	**(ME)**	256.10	cpm	**MDC**	317	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	446.00	cpm	**MDC**	416	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	304.00	cpm	**MDC**	296	dpm/100cm2	**Sample Count Time**	10.00	min
Counter Top	**(CT)**	232.08	cpm	**MDC**	302	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	385.38	cpm	**MDC**	313	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	285.78	cpm	**MDC**	334	dpm/100cm2	**Sample Count Time**	5.00	min

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115
LOCATION: EPA NEIC Rm A1209	SURVEYOR(S): Trent J. Stevenson
Denver Federal Center, CO	SURVEY NUMBER: 021404-01
Denver, CO	MAP ID: Rm A1209

DATE: 2/14/04 | TIME START: 10:00 | TIME COMPLETE: 1100 | PAGE 1 OF 45 (Rev 2/15/04)

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS

Source Check Data	Contamination Surveys				Radiation Surveys
[redacted]	α (LOOSE)	α (TOTAL)	β-γ (LOOSE)	β-γ (TOTAL)	Beta-Gamma
Instrument	69659 / 74076		69659 / 74076		
Source Type and I.D.	Th-230, 1170/89		Cs-137, 92CS5000		
Source Strength in dpm	13800	NA	769565	NA	NA µCi
Efficiency	0.24 / 0.27		0.23 / 0.22		[redacted]
MDC in dpm/100 cm²	17 / 19		179 / 187		Set. ☐ Unset. ☐
Background in cpm	0.4 / 0.8		97.2 / 95.4		mrem/hr or µrem/hr

REASON FOR SURVEY: ☐ PROCEDURE NO. ____ ☑ SPECIAL Material Release ☐ ROUTINE ____

Contamination ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS: Smear locations located on attached maps

69659 counted smears 1-80 74076 81-175

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #		
	ALPHA (LOOSE) 2929 / 69659	BETA-GAMMA (LOOSE) 2929 / 69659
	ALPHA ~~(TOTAL)~~ LOOSE 2929 / 74076	BETA-GAMMA ~~(TOTAL)~~ LOOSE 2929 / 74076
Radiation Survey INSTRUMENT / SERIAL #	BETA-GAMMA Mtr NA	BETA-GAMMA Probe NA

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Rm or Location
1	5	NA	25	NA	NA	Hood
2	7		12			Countertop
3	9		-1			Drawer
4	5		25			↓ ↓
5	0		6			↓ ↓
6	-2		12			↓ ↓
7	3		77			↓ ↓
8	0		1			Countertop
9	3		25			Cabinet
10	0		-5			Drawer
11	-2		-33			↓ ↓
12	3		21			↓ ↓
13	0		12			Cabinet
14	-2		36			↓ ↓
15	-2		6			↓ ↓
16	3		10			Countertop
17	0		-49			Countertop
18	7		10			Drawers
19	-2		-29			↓ ↓
20	-2		-16			↓ ↓
21	0		-23			↓ ↓
22	3		-29			Cabinet
23	5		6			↓ ↓
24	0		-49			Drawers
25	3	↓	14	↓	↓	↓ ↓

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RCS REVIEW [signature] DATE 2-15-04

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: Feb 15, 2004 | PAGE 2 OF ~~2~~ 5 2/15/04

LOCATION: EPA NEIC Rm A 1209
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): T Trent / F Stevenson
SURVEY NUMBER: 021404-01
MAP ID: Rm A1209

COMMENTS:

RCS REVIEW [signature] DATE 2-15-04

Alpha cpm ☐ Beta cpm ☐ Material ☐

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Item or Location
26	3	NA	-33	NA	Drawer
27	-2		14		
28	0		1		
29	3		-53		Countertop
30	0		-48		Drawers
31	3		-44		
32	5		-36		
33	0		-20		
34	5		45		Cabinet
35	0		14		Countertop
36	3		-14		Drawer
37	3		25		
38	0		-25		
39	0		3		
40	7		-37		
41	-2		17		
42	0		-37		
43	-2		12		Cabinet
44	3		47		Countertop
45	0		-12		Drawers
46	7		-33		
47	-2		40		
48	-2		27		
49	0		-40		
50	3		12		

Alpha cpm ☐ Beta cpm ☐ Material ☐

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Item or Location
51	7	NA	23	NA	Drawer
52	3		19		
53	3		-12		Countertop
54	-2		1		Sink
55	3		8		Cabinet Underside
56	7		34		Drain
57	3		25		Junction Box
58	0		-25		Flammable Box
59	0		25		Cabinet
60	0		-25		Countertop
61	-2		62		Countertop
62	-2		-5		Cabinet
63	-2		-29		Shelf
64	0		-31		Countertop
65	0		-18		Cabinet Shelf
66	3		25		Drawer Top
67	5		23		
68	3		-12		
69	-2		-37		Flammable Cabinet
70	0		14		
71	3		-7		
72	0		40		Junction Box
73	0		8		Countertop
74	0		-7		Cabinet
75	-2		34		Countertop

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: FEB 15 2004 | PAGE 13 OF 15 2/15/04

LOCATION: EPA NEIC Rm A1209
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): T Ward / J Stevenson
SURVEY NUMBER: 021404-01
MAP ID: Rm 1209

COMMENTS:

RCS REVIEW [signature] DATE 2-15-04

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
76	3	NA	-12	NA	NA	Drawer top
77	-2		54			sink
78	-2		-37			cabinet (under sink)
79	-2		67			counter top
80	0		12			cabinet shelf
81	1		37			cabinet shelf
82	6		83			counter top
83	3		19			Drawers
84	-1		111			↓ ↓
85	3		85			↓ ↓
86	5		58			↓ ↓
87	3		41			cabinet
88	3		5			↓ ↓
89	5		23			countertop
90	5		35			cabinet
91	1		42			Drawers
92	5		65			↓ ↓
93	5		67			↓ ↓
94	12		49			sink
95	-1		-18			floor under sink
96	1		12			Junction box
97	1		23			glass on door
98	6		53			Louvers
99	3		33			outside cabinet
100	5	↓	23	↓	↓	↓ ↓

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
101	12	NA	28	NA	NA	Regulator
102	3		115			flip out hood
103	1		-18			Louvers
104	8		85			cabinet
105	-1		74			↓ ↓
106	5		-6			West cabinet
107	3		21			countertop
108	6		44			Drawer
109	6		58			cabinet
110	6		39			countertop
111	1		30			cabinet
112	5		-20			countertop
113	5		20			Drawers
114	1		30			↓ ↓
115	1		60			↓ ↓
116	12		7			↓ ↓
117	6		17			↓ ↓
118	5		12			↓ ↓
119	3		44			↓ ↓
120	-1		23			↓ ↓
121	5		60			↓ ↓
122	6		69			↓ ↓
123	3		28			↓ ↓
124	5		51			↓ ↓
125	-1	↓	7	↓	↓	↓ ↓

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: Feb 15, 2004 | PAGE 4 OF 45 | 2/15/04

LOCATION: EPA NEIC RM A 1209
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): T Hent / T Stevenson
SURVEY NUMBER: 021404-01
MAP ID:

COMMENTS:

RCS REVIEW _____ DATE _____

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
126	3	NA	21	NA	NA	Drawer
127	3		21			Eyewash
128	-3		23			Covers
129	3		69			Lip on hood
130	-1		10			hood edge
131	1		-2			cabinet
132	3		-4			↓ ↓
133	-1		17			countertop
134	5		-4			Drawers
135	-3		-52			↓ ↓
136	6		-6			
137	-1		-13			↓ ↓
138	-1		-45			Countertop
139	-3		58			Cabinet
140	3		-20			Sink
141	5		-59			Countertop
142	6		-25			Drawers
143	3		-45			↓ ↓
144	-1		-50			
145	1		-45			↓ ↓
146	-1		-20			countertop
147	-1		-57			Cabinet
148	3		-52			countertop
149	1		39			Cabinet
150	5	↓	-18	↓	↓	Countertop

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
151	-1	NA	37	NA	NA	Drawers
152	1		-29			↓ ↓
153	1		12			
154	6		33			↓ ↓
155	1		0			Sink
156	6		-22			countertop
157	1		-34			Drawers
158	3		-34			↓ ↓
159	-3		-27			
160	3		-48			
161	1		-34			
162	3		5			↓ ↓
163	-3		17			
164	3		-34			Drawers
165	3		5			Rim on Hood
166	1		-27			Cabinet
167	10		-36			↓ ↓
168	-1		37			Sink countertop
169	1		-92			↓ ↓
170	-1		26			
171	1		29			N) Hood inside
172	1		-22			↓ ↓
173	3		-32			Top of Hood inside
174	3		-59			↓ ↓
175	5	↓	-32	↓	↓	Back wall

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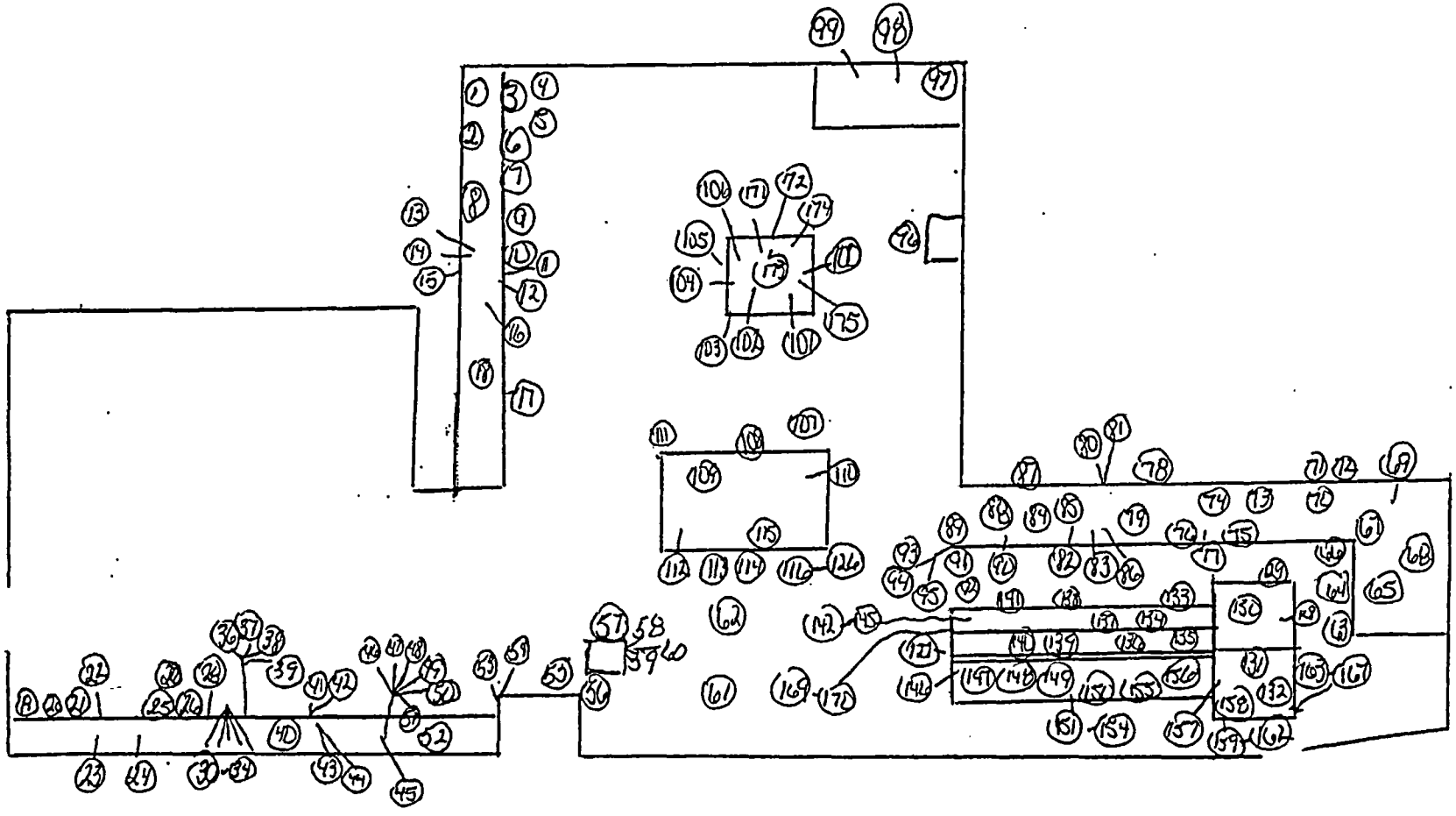
Contamination / Radiation Survey Report

PROJECT NUMBER: 101115	ACTIVITY / LOCATION: Denver Fed. Ctr, Co. EPA NEIC / Laboratory-Room A 1209		PAGE 5 OF 5
COMMENTS: #-Smear Number/Location	SURVEYOR(S): T. Pearl, J. Stevenson	SURVEY NUMBER: 021404-01	DATE: 2-14-04
	NOTE: THE KNOWING AND WILLFUL RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.		
RCS REVIEW: 2-15-04	DATE: 02-14-04		



Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115	DATE: 02-23-04	TIME START: 0700
LOCATION: EPA NEIC	SURVEYOR(S): K. WISE / T. TRENT	TIME COMPLETE: 1700	PAGE 1 OF 8
Denver Federal Center, CO	SURVEY NUMBER: 022404-13		
Denver, CO	MAP ID: LAB A1505/1507		

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS
$MDCR_{surveyor}$ Beta
$MDCR_{surveyor}$ Alpha

Source Check Data	Contamination Surveys				Radiation Surveys
[redacted]	α (TOTAL)	α (TOTAL)	β-γ (TOTAL)	β-γ (TOTAL)	Beta-Gamma
Instrument	184904 / 185768	185774	184904 / 185768	185774	NA
Source Type and I.D.	Th-230, 1170/89	Th-230, 1170/89	Cs-137, 92CS5000	Cs-137, 92CS5000	
Source Strength in dpm	13800	13800	789565	789565	Cs
Efficiency	0.13 / 0.15	0.15	0.16 / 0.17	0.16	[redacted]
MDC in dpm/100 cm²	See attached instrument sheets for material specific backgrounds and MDC's.				Set. ☐ Unset. ☐
Background in cpm					mR/hr or μrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO.
☐ SPECIAL
☒ ROUTINE MATERIAL RELEASE SURVEY

Contamination ☒ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS: See MAP For Locations

ITEM No. 1-50 - 2360 185768 51-100 · 2360 184904

BADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #
ALPHA (TOTAL) 2360 / 184904 BETA-GAMMA (TOTAL) 2360 / 184904
ALPHA (TOTAL) 2360 / 185768 BETA-GAMMA (TOTAL) 2360 / 185768
ALPHA (TOTAL) N/A BETA-GAMMA (TOTAL) N/A

[redacted]	Alpha Loose	Alpha Total	Beta-Gamma Loose	Beta-Gamma Total	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
Item #	dpm/100cm²	dpm/100cm²	dpm/100cm²	dpm/100cm²		
1	NA	-1	NA	130	ME	Cabinet
2		3		-77	ME	Cabinet
3		11		972	CT	Countertop
4		41		358	CT	Sink
5		-1		-165	ME	Towel Rack
6		20		-42	ME	Sink
7		36		240	CT	Countertop
8		-26		-117	ME	Cabinet
9		49		179	CT	Countertop
10		-18		-109	ME	Cabinet
11		8		-167	ME	Cabinet
12		36		266	CT	Countertop
13		3		-53	ME	Cabinet
14		-9		57	ME	Cabinet
15		15		304	CT	Countertop
16		16		137	ME	DRAWER
17		-18		231	ME	DRAWER
18		8		176	ME	DRAWER
19		-1		251	ME	DRAWER
20		3		126	ME	Cabinet
21		-14		130	ME	DRAWER
22		-18		162	ME	DRAWER
23		-14		147	ME	DRAWER
24		-18		274	ME	DRAWER
25		20		36	ME	DRAWER

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RCS REVIEW [signature] DATE 3-24-04

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-23-04 | PAGE 2 OF 8

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): K. WISE / T. TRENT
SURVEY NUMBER: 022404-13
MAP ID: LAB 1505/1507

COMMENTS:

RCS REVIEW [signature] DATE 3-24-04

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
26	NA	3	NA	44	ME	DRAWER
27		3		156		
28		-14		147		
29		12		21		
30		3		-175		
31		-22		160		Cabinet
32		-22		-12		DRAWER
33		-22		35		
34		-9		-61		
35		-14		156		
36		-22		20		
37		-1		184		Cabinet
38		3		257		Cabinet
39		-22		59		DRAWER
40		-5		199		
41		-18		115		
42		-18		315		
43		-9		666		Cabinet
44		-14		283		Vent
45		16		-501		Cabinet
46		16		227	ME	Cabinet
47		11		375	CT	Countertop
48		-1		51	ME	Cabinet
49		16		-64	ME	Cabinet
50		15		307	CT	Countertop

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
51	NA	23	NA	-559	ME	Cabinet
52		-11		-653	ME	Cabinet
53		15		-454	CT	Countertop
54		23		-553	ME	Cabinet
55		13		-682	ME	Cabinet
56		-5		-350	CT	Countertop
57		-15		-428	CT	Sink
58		47		-438	ME	Cabinet
59		3		-361		Cabinet
60		-16		-170		DRAWER
61		-21		-218		Cabinet
62		-1		-305		DRAWER
63		-31		-208		
64		-1		-135		
65		-21		-297		
66		3		-323		
67		-26		-389		
68		-1		-343		
69		-11		-286		
70		3		-236		
71		-1		-409		
72		-21		-252		Cabinet
73		-16		-315		DRAWER
74		-1		-230		
75		-16		-63	ME	

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-23-04 | PAGE 3 OF 8

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): K. WISE / T. TRENT
SURVEY NUMBER: 022404-13
MAP ID: LAB 1505/1507

COMMENTS:

RCS REVIEW [signature] DATE 3-24-04

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
76	NA	-39	NA	-25	CT	PVC
77		-29		-23		
78		-29		116		
79		-29		72		Countertop
80		-29		-90		Countertop
81		-16		-282	ME	Cabinent
82		-31		-436		DRAWER
83		-11		-230		
84		-11		-214		
85		-1		-166		
86		44		-894	CT	Countertop
87		-10		-1027	CT	Countertop
88		-21		-1155	ME	DRAWER
89		-16		-1123		
90		-21		-1220		
91		-26		-1188		
92		-31		-1458		
93		-31		-1476		Cabinet
94		-36		-1319		DRAWER
95		-21		-1454		
96		-26		-1395		
97		-26		-1278		Hood
98		-6		-226		Shelf
99		-26		24		Cabinent
100		-21		-83		Cabinet

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
101						
102						
103						
104						
105						
106						
107						
108						
109			NA			
110						
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112						
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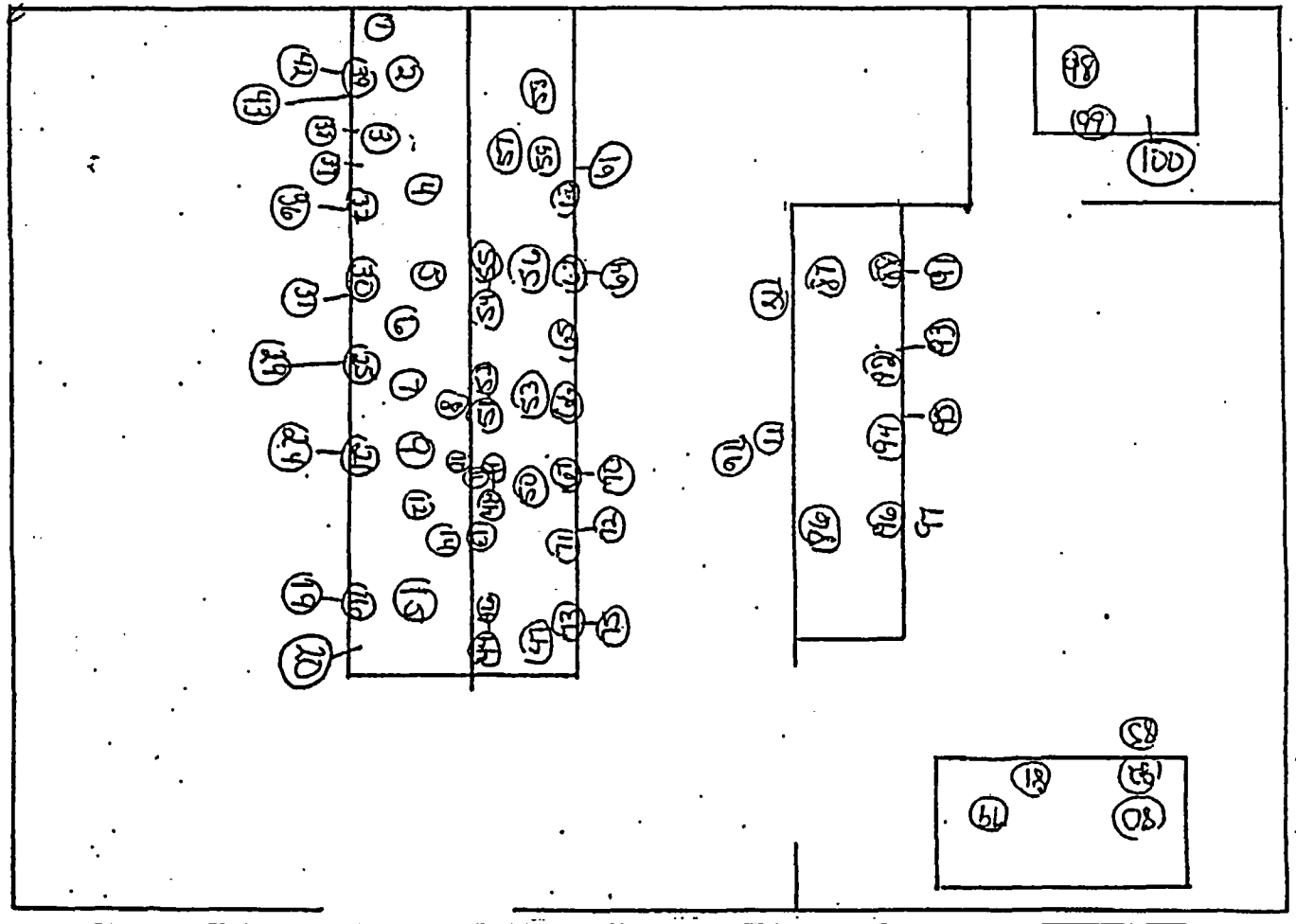
124						
125						

Contamination / Radiation Survey Report

PROJECT NUMBER: 101115	ACTIVITY / LOCATION: / Laboratory-Room		PAGE 4 OF 8
COMMENTS: (#) - Survey Location	SURVEYOR(S): K. WISE / T. TRENT	SURVEY NUMBER: 022404-13	DATE: 02-23-04
	NOTE: THE KNOWING AND WILLFUL RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.		
RCS REVIEW: [signature]	DATE: 3-24-04		



02-04-13

3-24-04

Material Specific Background and MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 185768

Probe/SN: Ludlum 43-68 / RN012714

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0375 dpm/cpm

Wall Board	**(WB)**	1.82	cpm	**MDC**	72	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	2.22	cpm	**MDC**	78	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	3.10	cpm	**MDC**	90	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	5.52	cpm	**MDC**	96	dpm/100cm2	**Sample Count Time**	10.00	min
Metal	**(ME)**	1.84	cpm	**MDC**	72	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	2.50	cpm	**MDC**	82	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	4.38	cpm	**MDC**	86	dpm/100cm2	**Sample Count Time**	10.00	min
Counter Top	**(CT)**	1.68	cpm	**MDC**	70	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	16.10	cpm	**MDC**	149	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	3.42	cpm	**MDC**	94	dpm/100cm2	**Sample Count Time**	5.00	min

022404-13

3-24-04

Material Specific Background and MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 185768

Probe/SN: Ludlum 43-68 / RN012714

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0850 dpm/cpm

Wall Board	**(WB)**	230.00	cpm	**MDC**	300	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	275.22	cpm	**MDC**	328	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	210.12	cpm	**MDC**	287	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	357.50	cpm	**MDC**	321	dpm/100cm2	**Sample Count Time**	10.00	min
Metal	**(ME)**	256.10	cpm	**MDC**	317	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	446.00	cpm	**MDC**	416	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	304.00	cpm	**MDC**	296	dpm/100cm2	**Sample Count Time**	10.00	min
Counter Top	**(CT)**	232.08	cpm	**MDC**	302	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	385.38	cpm	**MDC**	313	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	285.78	cpm	**MDC**	334	dpm/100cm2	**Sample Count Time**	5.00	min

404-13

3-24-04

Material Specific Background and MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 184904

Probe/SN: Ludlum 43-68 / PR138731

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0325 dpm/cpm

Wall Board	**(WB)**	1.40	cpm	**MDC**	75	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	2.24	cpm	**MDC**	91	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	2.10	cpm	**MDC**	88	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	4.40	cpm	**MDC**	92	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	1.66	cpm	**MDC**	80	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	1.92	cpm	**MDC**	85	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	5.04	cpm	**MDC**	98	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	2.20	cpm	**MDC**	90	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	3.36	cpm	**MDC**	88	dpm/100cm2	**Sample Count Time**	10.00	min
Wall Board Downstairs	**(WBD)**	1.22	cpm	**MDC**	71	dpm/100cm2	**Sample Count Time**	5.00	min

Q22404-13

3-24-04

Material Specific Background and MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 184904

Probe/SN: Ludlum 43-68 / PR138731

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0800 dpm/cpm

Wall Board	**(WB)**	265.14	cpm	**MDC**	342	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	303.36	cpm	**MDC**	365	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	180.64	cpm	**MDC**	283	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	449.28	cpm	**MDC**	359	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	311.78	cpm	**MDC**	370	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	475.30	cpm	**MDC**	456	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	350.32	cpm	**MDC**	317	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	292.52	cpm	**MDC**	359	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	982.02	cpm	**MDC**	563	dpm/100cm2	**Sample Count Time**	10.00	min
Wall Board Downstairs	**(WBD)**	270.32	cpm	**MDC**	279	dpm/100cm2	**Sample Count Time**	5.00	min

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115	DATE: 02/16/04	TIME START: 0700	TIME COMPLETE: 1700	PAGE 1 OF 4
LOCATION: EPA NEIC Rm 1505-1507	SURVEYOR(S): Trent / Stevenson				
Denver Federal Center, CO	SURVEY NUMBER: 021504-03				
Denver, CO	MAP ID: LAB 1505/1507				

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS

Source Check Data	Contamination Surveys				Radiation Surveys
	α (LOOSE)	α (TOTAL)	β-γ (LOOSE)	β-γ (TOTAL)	Beta-Gamma
Instrument	69659 / 74076		69659 / 74076		
Source Type and I.D.	Th-230, 1170/88		Cs-137, 92C55000		
Source Strength in dpm	13800	N/A	789565	N/A	N/A µCi
Efficiency	0.24 / 0.27		0.23 / 0.22		
MDC in dpm/100 cm²	17 / 19		178 / 187		Sat. ☐ Unsat. ☐
Background in cpm	0.4 / 0.8		97.2 / 95.4		mrem/hr or µrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO.
☑ SPECIAL Material Release Survey
☐ ROUTINE

Contamination ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS: See Attached Map for Smear Locations
Map is of Overhead View of Room
all Smears counted on 69659

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #	ALPHA (LOOSE) 2929 / 69659	BETA-GAMMA (LOOSE) 2929 / 69659
	ALPHA ~~(TOTAL)~~ LOOSE 2929 / 74076	BETA-GAMMA ~~(TOTAL)~~ LOOSE 2929 / 74076
Radiation Survey INSTRUMENT / SERIAL #	BETA-GAMMA Meter N/A	BETA-GAMMA Probe N/A

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
1	0		64			Cabinet
2	3		19			↓ ↓
3	-2		19			Counter top
4	7		8			Sink
5	7		17			Towel Rack
6	0		8			Sink
7	9		-16			Counter top
8	0		25			Cabinet
9	0		1			Counter top
10	-2		19			Cabinet
11	5		1			↓ ↓
12	3	N	-1			Counter top
13	3		6	N		Cabinet
14	7	A	45			↓ ↓
15	-2		32			Counter top
16	0		-10		A	Drawer
17	3		-16			↓ ↓
18	3		27			
19	-2		-3			↓ ↓
20	-2		71			Cabinet
21	3		-18			Drawer
22	-2		-3			↓ ↓
23	7		-40			
24	5		19			
25	0		19			↓ ↓

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RCS REVIEW [signature] DATE 2-19-04

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-16-04 | PAGE 2 OF 4

LOCATION: EPA NEIC RM 1505-1507 | SURVEYOR(S): Trent / Stevenson

Denver Federal Center, Building 53 | SURVEY NUMBER: 021504-03

Denver, CO | MAP ID: LAB 1505/1507

COMMENTS:

RCS REVIEW [signature] DATE 2-19-04

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
26	0		30			Drawers
27	7		36			↓ ↓
28	0		-25			↓ ↓
29	0		25			↓ ↓
30	3		27			↓ ↓
31	7		1			Cabinet
32	0		25			Drawers
33	3		34			↓ ↓
34	3		19			↓ ↓
35	3		6			↓ ↓
36	7	N	36	N		↓ ↓
37	3	A	-3			Cabinet
38	-2		19			↓ ↓
39	5		16			Drawers
40	7		1		A	↓ ↓
41	-2		45			↓ ↓
42	-2		-25			↓ ↓
43	0		-16			Cabinet
44	-2		3			Vent
45	5		-16			Cabinet
46	9		23			↓ ↓
47	0		38			counter top
48	7		10			Cabinet
49	7		8			↓ ↓
50	0		38			counter top

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
51	3		-7			Cabinet
52	3		-44			↓ ↓
53	-2		12			counter top
54	0		25			Cabinet
55	-2		-18			↓ ↓
56	3		-46			counter top
57	5		-12			Sink
58	-2		56			Cabinet
59	0		14			↓ ↓
60	-2		38			Drawers
61	5	N	-16			↓ ↓
62	-2	A	21	N		↓ ↓
63	3		47			↓ ↓
64	0		10			↓ ↓
65	0		43		A	↓ ↓
66	7		-42			↓ ↓
67	-2		-31			↓ ↓
68	0		-3			↓ ↓
69	-2		47			↓ ↓
70	0		14			↓ ↓
71	-2		23			↓ ↓
72	-2		19			Cabinet
73	3		-14			Drawers
74	-2		-1			↓ ↓
75	0		34			↓ ↓

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-16-04 | PAGE 3 OF 4

LOCATION: EPA NEIC RM A 1505-1507 | SURVEYOR(S): Trent / Stevenson | COMMENTS:

Denver Federal Center, Building 53 | SURVEY NUMBER: 02504-03

Denver, CO | MAP ID: LAB 1505/1507

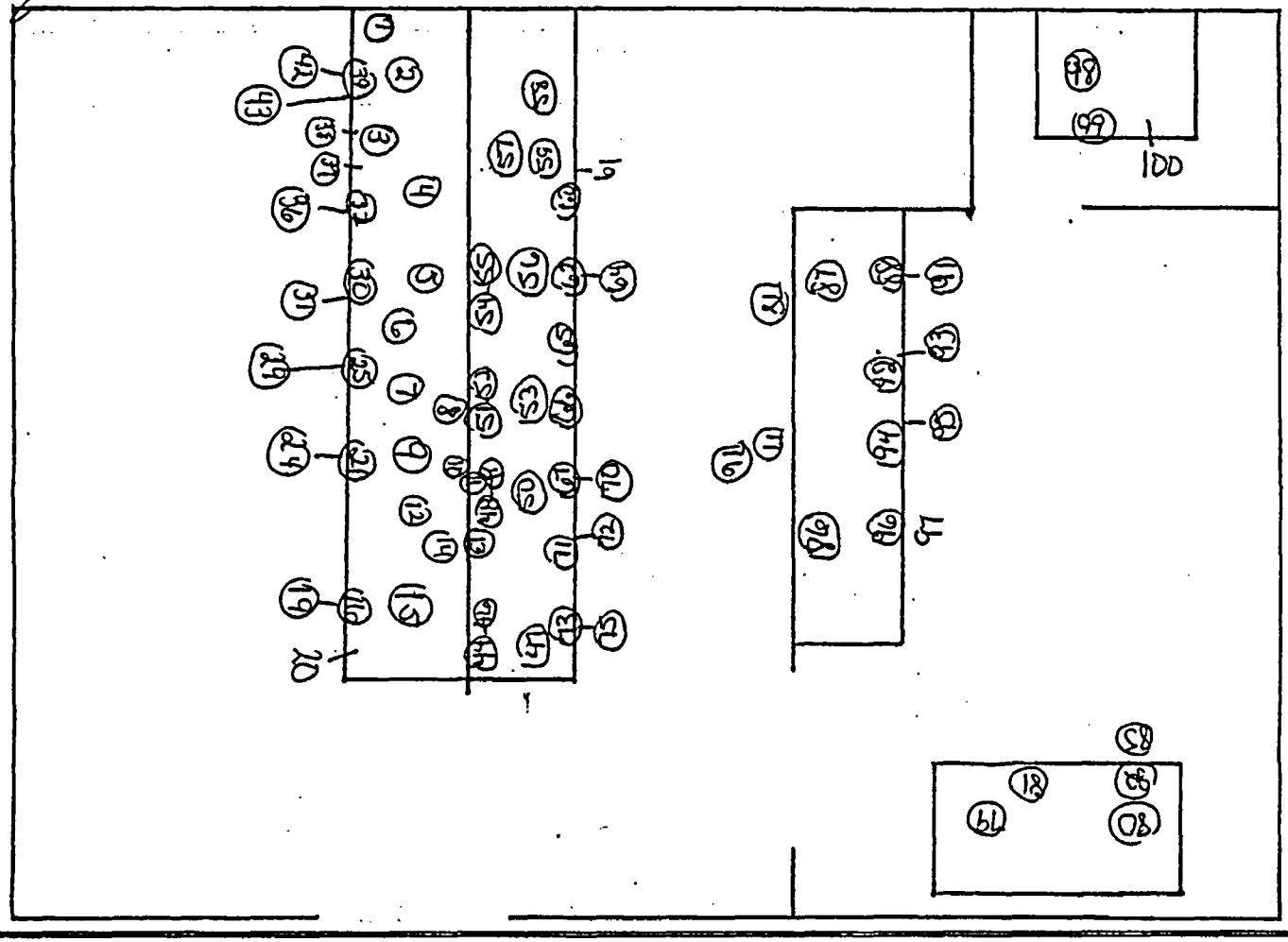
RCS REVIEW [signature] DATE 2-19-04

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
76	0		32			PVC connection
77	9		12			↓ ↓
78	3		23			↓ ↓
79	-2		-33			counter-top
80	5		17			↓ ↓
81	0		17			cabinet
82	3		-18			Drawers
83	-2		6			↓ ↓
84	0		47			↓ ↓
85	-2		-10			↓ ↓
86	0		25	N		counter-top
87	0	N/A	47			↓ ↓
88	0		-10			Drawers
89	3		25			↓ ↓
90	3		-7		A	↓ ↓
91	0		17			↓ ↓
92	3		-1			↓ ↓
93	7		-16			cabinet
94	0		27			Drawer
95	0		34			cabinet
96	3		62			Drawer
97	0		6			↓ ↓
98	0		-7			Hood Top
99	3		-5			shelf
100	-2		51			cabinet

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
101						
102						
103						
104						
105						
106						
107						
108						
109		N				
110						
111					A	
112						
113						
114						
115						
116						
117						
118						
119						
120						
121						
122						
123						
124						
125						

Contamination / Radiation Survey Report

PROJECT NUMBER: 101115	ACTIVITY / LOCATION: RM 1505-1507 / Laboratory-Room		PAGE 4 OF 4
COMMENTS: (#)-SMEAR Location/Number	SURVEYOR(S): Hart / Stevenson	SURVEY NUMBER: 021504-03	DATE: 02-16-04
	NOTE: THE KNOWING AND WILLFUL RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.		
RCS REVIEW:	DATE: 2-19-04		



Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115
LOCATION: EPA NEIC	SURVEYOR(S): T. TRENT / K. WISE / J. STEPHENS
Denver Federal Center, CO	SURVEY NUMBER: 022404-17
Denver, CO	MAP ID: LAB A1902

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS
$MDCR_{surveyor}$ Beta
$MDCR_{surveyor}$ Alpha

Source Check Data	Contamination Surveys				Radiation Surveys
[redacted]	α (TOTAL)	α (TOTAL)	β-γ (TOTAL)	β-γ (TOTAL)	Beta-Gamma
Instrument	184904 / 185768	185774	184904 / 185768	185774	NA
Source Type and I.D.	Th-230, 1170/89	Th-230, 1170/89	Cs-137, 92CS5000	Cs-137, 92CS5000	
Source Strength in dpm	13900	13900	769565	769565	Cs
Efficiency	0.13 / 0.15	0.16	0.16 / 0.17	0.16	[redacted]
MDC in dpm/100 cm²	See attached instrument sheets for material specific backgrounds and MDC's.				Set. ☐ Unset. ☐
Background in cpm					mR/hr or µrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO. _____
☐ SPECIAL _____
☑ ROUTINE MATERIAL RELEASE SURVEY

Contamination ☑ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS: See MAP for Survey Locations
Item No. 1-40, 101-125 - 2360 185774
41-70, 126-150 - 2360. 184904
71-100 - 2360 185768

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #		
	ALPHA (TOTAL) 2360 / 184904	BETA-GAMMA (TOTAL) 2360 / 184904
	ALPHA (TOTAL) 2360 / 185768	BETA-GAMMA (TOTAL) 2360 / 185768
	ALPHA (TOTAL) 2360 / 185774	BETA-GAMMA (TOTAL) 2360 / 185774

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DATE: 02-24-04 TIME START: 0700 TIME COMPLETE: 1700 PAGE 1 OF 11

[redacted]	Alpha		Beta-Gamma		Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
	Loose	Total	Loose	Total		
Item #	dpm/100cm²	dpm/100cm²	dpm/100cm²	dpm/100cm²		
1	NA	28	NA	-189	ME	Eyewash
2		23		-256	ME	Cabinet
3		-11		-164	CT	Countertop
4		-32		-169	CT	Countertop
5		28		-371	ME	Sink
6		-11		-96		DRAWER
7		6		-408		
8		-6		-431		
9		6		-389		
10		11		-244		
11		6		-239		
12		6		-366		
13		19		-323		Cabinet
14		15		-316		
15		19		-306		
16		19		-445		
17		-2		-429		
18		15		-292		
19		36		-791		Hood
20		11		-468		
21		6		-801		
22		11		-886		
23		6		-748		
24		6		-605		Sink
25		15		-577		Sink

RCS REVIEW [signature] DATE 3-24-04

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-24-04 | PAGE 2 OF 11

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): K WISE / J STEPHENS / T. TRENT
SURVEY NUMBER: 022404-17
MAP ID: LAB A1902

COMMENTS:

RCS REVIEW [signature] DATE 3-24-04

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
26	NA	-11	NA	-253	ME	Cabinet
27		23		-203	CT	Countertop
28		-19		-123	CT	
29		-11		-194	CT	
30		2		-267	ME	DRAWER
31		-2		-410		
32		15		-216		
33		-11		-297		
34		-11		-120		
35		11		17		
36		11		-341		Cabinet
37		2		-424		DRAWER
38		11		-332		
39		-2		-426		
40		6		-593		
41		-1		-303		
42		-1		-325		Cabinet
43		-16		-555		
44		3		-385		
45		-21		-365		
46		-6		-627		
47		-34		-388	CT	Countertop
48		-5		-297		
49		-10		-529		
50		-20		-489		

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
51	NA	-6	NA	-414	ME	Cabinet
52		-16		-301		Drawers
53		-26		-95		
54		-1		-361		
55		-21		-458		
56		-1		-252		
57		-6		-234		
58		-6		-155		
59		-16		-365		
60		-16		-266		
61		-1		-397		
62		-6		-397		
63		-11		-450		
64		-26		-460		
65		-21		-238		
66		-16		-180		
67		3		-442		
68		-11		-244		Cabinet
69		-16		-371		Hood
70		-26		-194		
71		12		1011		
72		36		748	CT	Sink
73		32		911	CT	Sink
74		3		780	ME	Cabinet
75		-10		871	CT	Countertop

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-24-04 | PAGE 3 OF 11

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): K. WISE / J. STEPHENS / T. TRENT
SURVEY NUMBER: 022404-17
MAP ID: LAB A1902

COMMENTS:

RCS REVIEW [signature] DATE 3-24-04

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
76	NA	-14	NA	1150	CT	Countertop
77		12		808	ME	Cabinet
78		-14		910		Cabinet
79		-18		830		Drawer
80		-9		668		
81		-9		817		
82		-22		847		
83		-9		884		
84		8		1131		
85		-18		821		
86		-18		922		
87		-18		832		
88		-30		976		
89		-5		1082		
90		-9		744		Cabinet
91		-22		615		
92		-14		615		
93		-9		890		
94		-22		1054		
95		-14		627		Hood
96		-9		819		
97		-1		727		
98		-9		824		
99		-18		610		
100		-26		109		

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
101	NA	11	NA	-667	ME	Cooler
102		-2		-542		
103		6		-680		
104		11		-468		
105		11		-348		
106		11		-568		
107		6		-644		
108		6		-579		
109		-6		-568		
110		11		-616		
111		-2		-611		
112		6		-554		
113		2		-598		
114		-2		-759		
115		2		-528		
116		15		-618		
117		19		-480		
118		15		-620		
119		-2		-417		
120		15		-526		
121		32		-563		
122		6		-561		
123		6		-609		
124		28		-431		
125		19		-530		

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-24-04 | PAGE 4 OF 11

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): K. WISE / J. STEPHENS / C. TRENT
SURVEY NUMBER: 022404-17
MAP ID: LAB A1902

COMMENTS:

RCS REVIEW [signature] DATE 3-24-04

Alpha cpm ☐ Beta cpm ☐ Material ☑

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Item or Location
126	NA	-11	NA	-508	Cooler
127		-26		-325	
128		-1		-543	
129		13		-643	
130		3		-387	
131		-1		-383	
132		-1		-401	
133		38		-593	
134		-31		-422	
135		-11		-532	
136		-21		-131	
137		-11		64	
138		8		38	
139		3		26	
140		-16		-240	Cooler Floor
141		-26		-230	
142		13		-147	
143		-1		-131	
144		-16		-57	
145		-21		-41	
146		18		-119	
147		-26		28	
148		-11		-226	
149		8		-16	
150		33		-280	

Alpha cpm ☐ Beta cpm ☐ Material ☐

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Item or Location
151					
152					
153					
154					
155					
156					
157					
158			NA		
159					
160					
161					
162					
163					
164					
165					
166					
167					
168					
169					
170					
171					
172					
173					
174					
175					

Pg 5 of 11

0224/04-17

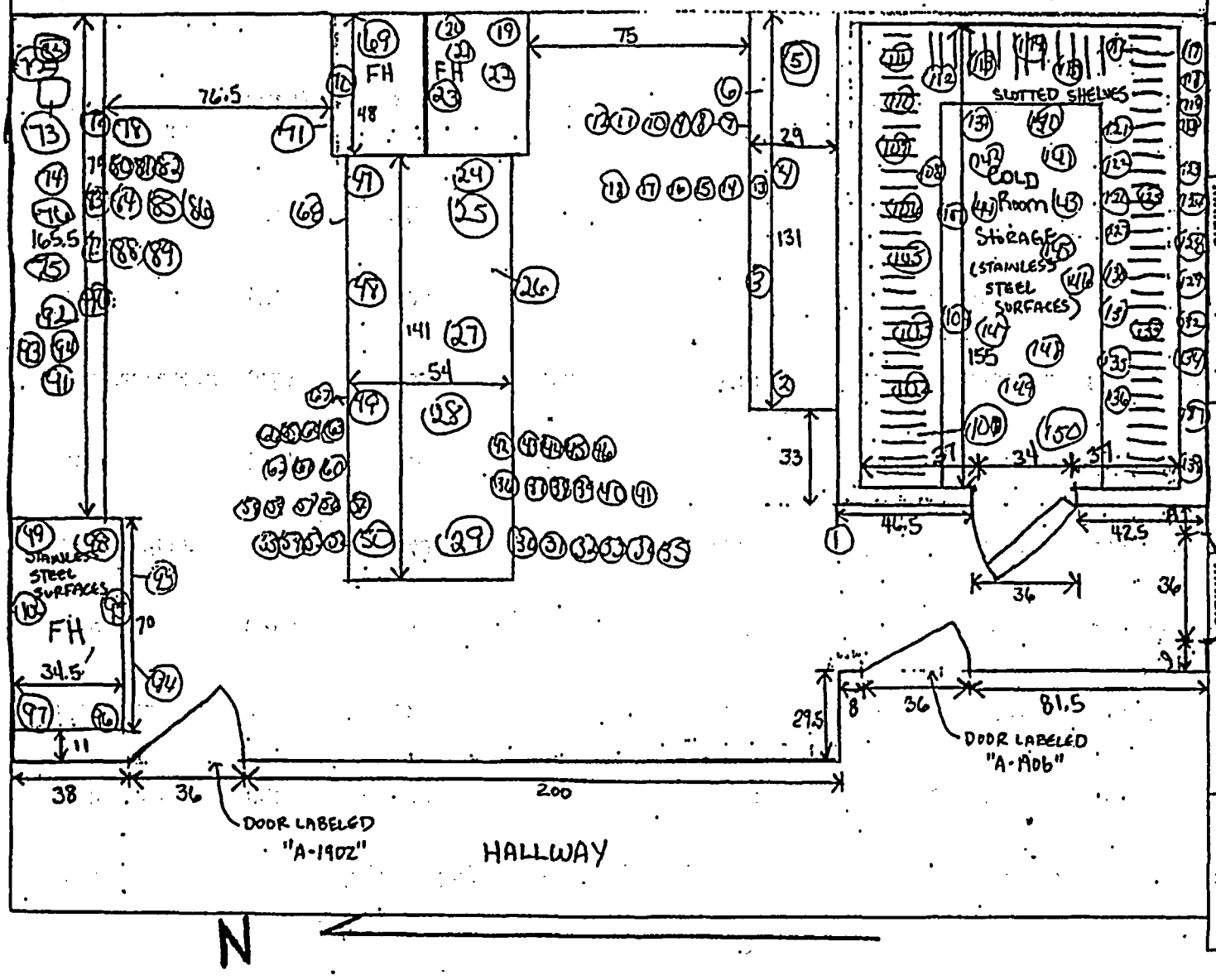
3-24-04

A-1902

(#) Survey Locations

MEASUREMENT IN INCHES

□ = 10 inches



Preparer's Initials	Proj. No.
	Client
Date	
Reviewer's Initials	Location RH A 1902
Date 2-16-04	
Approver's Initials	Subject
Date	Page ___ of ___

Form No. 0048
Midwest Tech. Servs.
Rev. 08/89

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022404-17

Material Specific Background and MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 184904 Background Count Time 5.00 minutes

Probe/SN: Ludlum 43-68 / PR138731 Total Instrument Effciency 0.0325 dpm/cpm

3-24-04

Wall Board	**(WB)**	1.40	cpm	**MDC**	75	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	2.24	cpm	**MDC**	91	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	2.10	cpm	**MDC**	88	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	4.40	cpm	**MDC**	92	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	1.66	cpm	**MDC**	80	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	1.92	cpm	**MDC**	85	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	5.04	cpm	**MDC**	98	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	2.20	cpm	**MDC**	90	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	3.36	cpm	**MDC**	88	dpm/100cm2	**Sample Count Time**	10.00	min
Wall Board Downstairs	**(WBD)**	1.22	cpm	**MDC**	71	dpm/100cm2	**Sample Count Time**	5.00	min

19 1 01 11

2404-17

3-24-04

Material Specific Background MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 184904

Probe/SN: Ludlum 43-68 / PR138731

Background Count Time 5.00 minutes

Total Instrument Efficiency 0.0800 dpm/cpm

Wall Board	(WB)	265.14	cpm	MDC	342	dpm/100cm2	Sample Count Time	5.00	min
Floor Tile	(FT)	303.36	cpm	MDC	365	dpm/100cm2	Sample Count Time	5.00	min
Wood	(WO)	180.64	cpm	MDC	283	dpm/100cm2	Sample Count Time	5.00	min
Cement Floor	(CF)	449.28	cpm	MDC	359	dpm/100cm2	Sample Count Time	15.00	min
Metal	(ME)	311.78	cpm	MDC	370	dpm/100cm2	Sample Count Time	5.00	min
Concrete Block	(CB)	475.30	cpm	MDC	456	dpm/100cm2	Sample Count Time	5.00	min
Glass	(GL)	350.32	cpm	MDC	317	dpm/100cm2	Sample Count Time	15.00	min
Counter Top	(CT)	292.52	cpm	MDC	359	dpm/100cm2	Sample Count Time	5.00	min
Black&White Floor Tile	(BWFT)	982.02	cpm	MDC	563	dpm/100cm2	Sample Count Time	10.00	min
Wall Board Downstairs	(WBD)	270.32	cpm	MDC	279	dpm/100cm2	Sample Count Time	5.00	min

Pg. 8 of 11
022404-17
3-24-04

Material Specific Background and MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 185774 Background Count Time 5.00 minutes

Probe/SN: Ludlum 43-68 / RN012713 Total Instrument Effciency 0.0375 dpm/cpm

Wall Board	**(WB)**	2.30	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	1.96	cpm	**MDC**	74	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	2.24	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	3.54	cpm	**MDC**	78	dpm/100cm2	**Sample Count Time**	10.00	min
Metal	**(ME)**	1.10	cpm	**MDC**	59	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	1.72	cpm	**MDC**	70	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	3.74	cpm	**MDC**	80	dpm/100cm2	**Sample Count Time**	10.00	min
Counter Top	**(CT)**	2.30	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	5.04	cpm	**MDC**	92	dpm/100cm2	**Sample Count Time**	10.00	min
Wall Board Downstairs	**(WBD)**	2.06	cpm	**MDC**	76	dpm/100cm2	**Sample Count Time**	5.00	min

Pg 1 of 11
022404-17
3-24-04

Material Specific Background MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 185774

Probe/SN: Ludlum 43-68 / RN012713

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0900 dpm/cpm

Wall Board	(WB)	271.18	cpm	MDC	307	dpm/100cm2	Sample Count Time	5.00	min
Floor Tile	(FT)	347.86	cpm	MDC	348	dpm/100cm2	Sample Count Time	5.00	min
Wood	(WO)	250.42	cpm	MDC	296	dpm/100cm2	Sample Count Time	5.00	min
Cement Floor	(CF)	498.62	cpm	MDC	357	dpm/100cm2	Sample Count Time	10.00	min
Metal	(ME)	325.46	cpm	MDC	336	dpm/100cm2	Sample Count Time	5.00	min
Concrete Block	(CB)	530.62	cpm	MDC	428	dpm/100cm2	Sample Count Time	5.00	min
Glass	(GL)	370.34	cpm	MDC	308	dpm/100cm2	Sample Count Time	10.00	min.
Counter Top	(CT)	286.78	cpm	MDC	316	dpm/100cm2	Sample Count Time	5.00	min
Black&White Floor Tile	(BWFT)	393.98	cpm	MDC	318	dpm/100cm2	Sample Count Time	10.00	min
Wall Board Downstairs	(WBD)	306.64	cpm	MDC	327	dpm/100cm2	Sample Count Time	5.00	min

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022404-17
3-24-04

Material Specific Background and MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 185768

Probe/SN: Ludlum 43-68 / RN012714

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0375 dpm/cpm

Wall Board	**(WB)**	1.82	cpm	**MDC**	72	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	2.22	cpm	**MDC**	78	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	3.10	cpm	**MDC**	90	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	5.52	cpm	**MDC**	96	dpm/100cm2	**Sample Count Time**	10.00	min
Metal	**(ME)**	1.84	cpm	**MDC**	72	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	2.50	cpm	**MDC**	82	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	4.38	cpm	**MDC**	86	dpm/100cm2	**Sample Count Time**	10.00	min
Counter Top	**(CT)**	1.68	cpm	**MDC**	70	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	16.10	cpm	**MDC**	149	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	3.42	cpm	**MDC**	94	dpm/100cm2	**Sample Count Time**	5.00	min

022404-17

3-24-04

Material Specific Background and MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 185768

Probe/SN: Ludlum 43-68 / RN012714

Background Count Time 5.00 minutes

Total Instrument Efficiency 0.0850 dpm/cpm

Wall Board	**(WB)**	230.00	cpm	**MDC**	300	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	275.22	cpm	**MDC**	328	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	210.12	cpm	**MDC**	287	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	357.50	cpm	**MDC**	321	dpm/100cm2	**Sample Count Time**	10.00	min
Metal	**(ME)**	256.10	cpm	**MDC**	317	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	446.00	cpm	**MDC**	416	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	304.00	cpm	**MDC**	296	dpm/100cm2	**Sample Count Time**	10.00	min
Counter Top	**(CT)**	232.08	cpm	**MDC**	302	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	385.38	cpm	**MDC**	313	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	285.78	cpm	**MDC**	334	dpm/100cm2	**Sample Count Time**	5.00	min

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115
LOCATION: EPA NEIC A 1902-04	SURVEYOR(S): T Mont / J. Stevenson
Denver Federal Center, CO	SURVEY NUMBER: 021604-04
Denver, CO	MAP ID: LAB A1902

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS

Source Check Data	Contamination Surveys				Radiation Surveys
	α (LOOSE)	α (TOTAL)	β-γ (LOOSE)	β-γ (TOTAL)	Beta-Gamma
Instrument	69659 / 74076		69659 / 74076		
Source Type and I.D.	Th-230, 1170/89		Cs-137, 92CS5000		
Source Strength in dpm	13800	N/A	769565	N/A	N/A µCi
Efficiency	0.24 / 0.27		0.23 / 0.22		
MDC in dpm/100 cm²	17 / 19		179 / 187		Sat. ☐ Unsat. ☐
Background in cpm	0.4 / 0.8		97.2 / 95.4		mrem/hr or µrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO. ____
☑ SPECIAL Interim Release Survey
☐ ROUTINE ____

Contamination ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS: See attached Map for Smear locations
Map w/ a overhead View
all Smears are on 74076

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #	ALPHA (LOOSE) 2929 / 69659	BETA-GAMMA (LOOSE) 2929 / 69659	
	ALPHA (~~TOTAL~~ LOOSE) 2929 / 74076	BETA-GAMMA (~~TOTAL~~ LOOSE) 2929 / 74076	
Radiation Survey INSTRUMENT / SERIAL #	BETA-GAMMA Meter N/A	BETA-GAMMA Probe N/A	

THE KNOWING & WILLFUL RECORDING OF FALSE, FCTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.

DATE: 02-16-04 TIME START: 0700 TIME COMPLETE: 1700 PAGE 1 OF 5

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
1	6		-20			Cleanup Station
2	3		-16			CABinet
3	1		-41			Countertop
4	3		-72			↓ ↓
5	1		-45			Sink
6	5		-29			under sink
7	-1		-25	N		Drawer
8	5		-88			↓ ↓
9	1		-22			
10	1	N	-20		A	
11	3	A	-55			
12	-1		-81			↓ ↓
13	-1		-45			CABinet
14	-1		-11			↓ ↓
15	-1		-39			
16	1		-27			
17	3		-45			
18	-1		-79			↓ ↓
19	3		-39			fume Hood
20	3		-22			↓ ↓
21	3		-13			
22	6		-63			
23	6		-57			↓ ↓
24	3		-41			Sink
25	1		-99			↓ ↓

RCS REVIEW [signature] DATE 8-19-04

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-16-04 | PAGE 2 OF 5

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): Hunt / J. Stevenson
SURVEY NUMBER: 021604-04
MAP ID: LAB A1902

COMMENTS:

RCS REVIEW [signature] DATE 2-19-04

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
26	-1		-60			Cabinet
27	-3		12			Countertop
28	1		-60			↓ ↓
29	5		-60			↓ ↓
30	-1		-2			Drawer
31	-3		-29			↓ ↓
32	-1		-2			↓ ↓
33	1		-63			↓ ↓
34	-1	N	-57	N		↓ ↓
35	1	A	-48			↓ ↓
36	1		-43			Cabinet
37	1		-16		A	Drawer
38	3		-95			↓ ↓
39	7		-129			↓ ↓
40	5		-72			↓ ↓
41	1		-43			↓ ↓
42	-1		-22			Cabinet
43	1		-41			↓ ↓
44	3		-22			↓ ↓
45	-1		-29			↓ ↓
46	3		-39			↓ ↓
47	5		-13			countertop
48	3		-50			↓ ↓
49	1		-43			↓ ↓
50	-1		-16			↓ ↓

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
51	-1		-59			Lower (cabinet)
52	1		0			Drawers
53	3		-11			↓ ↓
54	3		-95			↓ ↓
55	1		-52			↓ ↓
56	-1		-32			↓ ↓
57	5		-2			↓ ↓
58	-1	N	-13			↓ ↓
59	-3	A	-48	N		↓ ↓
60	5		-9			↓ ↓
61	-3		-25			↓ ↓
62	6		-42		A	↓ ↓
63	1		-52			↓ ↓
64	1		-52			↓ ↓
65	-1		0			↓ ↓
66	-1		-67			↓ ↓
67	-3		-50			↓ ↓
68	1		-2			Cabinet
69	3		-41			Hood
70	-1		-39			↓ ↓
71	-1		-25			↓ ↓
72	-3		-27			Sink
73	-3		-13			↓ ↓
74	-1		-74			Cabinet
75	3		-60			countertop

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-16-04 | PAGE 3 OF 5

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): T. Hunt / T. Stevenson
SURVEY NUMBER: 021604-04
MAP ID: LAB A1902

COMMENTS:

RCS REVIEW [signature] DATE 2-19-04

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
76	1		-32			Countertop
77	3		-72			cabinet
78	1		-57			↓ ↓
79	1		-63			drawers
80	3		-60			
81	1		-43			
82	5		-2			
83	8	N	3			
84	1	A	10			
85	1		-4	N		
86	1		-11			
87	-3		-2			
88	1		-11		A	
89	-3		-4			↓ ↓
90	3		-48			cabinet
91	5		-59			
92	5		56			
93	3		-57			
94	1		-36			↓ ↓
95	-1		-18			Hood
96	5		-43			
97	1		-6			
98	-1		19			
99	6		-52			
100	-1		-36			↓ ↓

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
101	1		-9			Equipment in cooler
102	-1		-45			parts
103	-1		-13			
104	1		-34			
105	-1		-52			
106	3		-63			
107	3		-36			
108	-3		-74			
109	-1	N	-34	N		
110	1	A	-79			
111	-1		-66			
112	5		-18			
113	5		-36		A	
114	3		-6			
115	5		-41			
116	-1		-36			
117	-3		23			
118	1		-83			
119	-3		14			
120	3		-4			
121	5		-13			
122	-3		-43			
123	-3		-6			
124	-3		-9			
125	-1		23			↓

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 2-16-04 | PAGE 4 OF 5

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): Frank L. Stevenson
SURVEY NUMBER: 021604-04
MAP ID: LAB A1902

COMMENTS:

RCS REVIEW [signature] DATE 2-19-04

Alpha cpm ☐ Beta cpm ☐ Material ☐

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Item or Location
126	1		19		Equipment
127	-1		5		Parts
128	-1		42		
129	1		28		
130	-1		81		
131	3		44		
132	3		12		
133	-3		-45		
134	-1	N/A	94		
135	1		-11	N	
136	-1		28		
137	5		53		A
138	5		-16		
139	3		5		
140	5		-29		
141	-1		-22		
142	-3		-9		
143	1		56		
144	-3		65		
145	3		-22		
146	5		33		
147	-3		67		
148	-3		14		
149	-3		-18		
150	1		-16		

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Item or Location
151					
152					
153					
154					
155					
156					
157					
158					
159			N		
160					
161					
162					A
163					
164					
165					
166					
167					
168					
169					
170					
171					
172					
173					
174					
175					

Pg 5 of 5
321604-04

[redacted]

2-19-04

COMPUTATION SHEET

Proj. No.	Client	Location	Subject
		RH A 1902	

Preparer's Initials	Date	Reviewer's Initials	Date	Approver's Initials	Date
			2-16-04		

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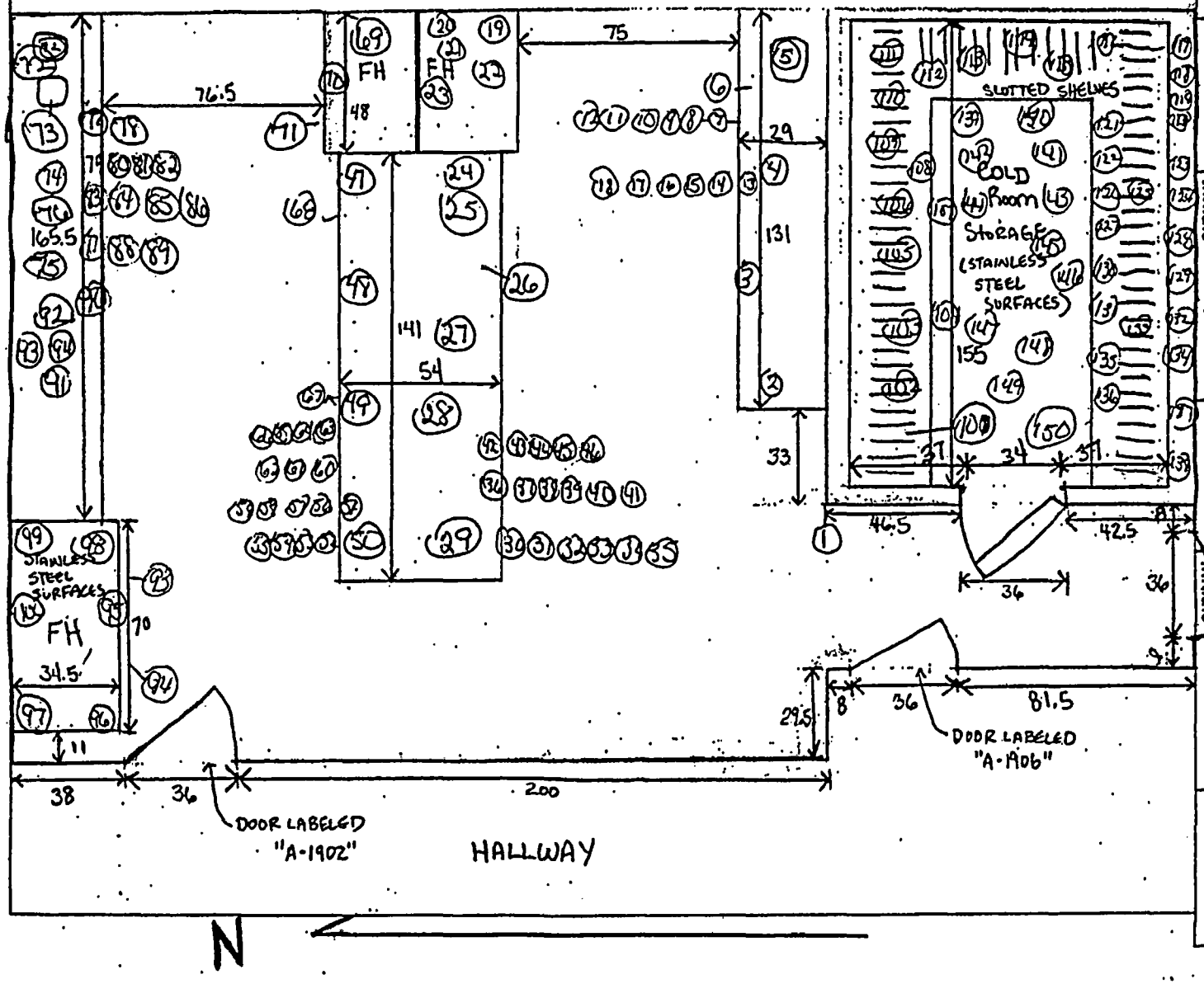
321604-04

MEASUREMENT IN INCHES

A-1902

□ = 10 inches

(#) = Smear Location/Number



Form No. 0048
Midwest Tech. Servs.
Rev. 08/89

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115
LOCATION: EPA NEIC	SURVEYOR(S): K. WISE / J. STEPHENS
Denver Federal Center, CO	SURVEY NUMBER: 022404-14
Denver, CO	MAP ID: LAB B2109

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS
MDCR$_{surveyor}$ Beta
MDCR$_{surveyor}$ Alpha

Source Check Data	Contamination Surveys				Radiation Surveys
	α (TOTAL)	α (TOTAL)	β-γ (TOTAL)	β-γ (TOTAL)	Beta-Gamma
Instrument	184904 / 185768	185774	184904 / 185768	185774	NA
Source Type and I.D.	Th-230, 1170/89	Th-230, 1170/89	Cs-137, 92C35000	Cs-137, 92C35000	
Source Strength in dpm	13800	13800	769565	769565	Ok
Efficiency	0.13 / 0.15	0.15	0.16 / 0.17	0.18	
MDC in dpm/100 cm²	See attached instrument sheets for material specific backgrounds and MDC's.				Set. ☐ Unset. ☐
Background in cpm					mrem/hr or μrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO. _____
☐ SPECIAL _____
☑ ROUTINE MATERIAL RELEASE SURVEY

Contamination ☑ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS: See MAP for Survey Locations

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #		
	ALPHA (TOTAL) 2360, 185774	BETA-GAMMA (TOTAL) 2360, 185774
	ALPHA (TOTAL) N/A	BETA-GAMMA (TOTAL) N/A
	ALPHA (TOTAL) N/A	BETA-GAMMA (TOTAL) N/A

THE KNOWING & WILLFUL RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.

DATE: 02-23-04 TIME START: 0800 TIME COMPLETE: 1700 PAGE 1 OF 5

Alpha cpm ☐ Beta cpm ☐ Material ☑

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Material	Item or Location
1	NA	8	NA	9	WO	DOOR
2		40		107	ME	Lip on hood
3		36		-314	CT	Countertop
4		19		160	ME	DRAWER
5		11		130		
6		32		-43		
7		36		-226		
8		19		254	CT	Countertop
9		28		-390	ME	DRAWER
10		49		139		
11		36		135		
12		28		8		
13		36		65		
14		44		201		
15		28		118		
16		57		395		
17		2		619	CT	Sink
18		11		404	CT	Countertop
19		40		370	ME	DRAWER
20		28		82		
21		23		306		
22		2		215		
23		15		343		
24		49		132		
25		-15		361		

RCS REVIEW [signature] DATE 3-25-04

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-24-04 | PAGE 2 OF 5

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): K. WISE / J. STEPHENS
SURVEY NUMBER: 022404-14
MAP ID: LAB B2109

COMMENTS:

RCS REVIEW: [signature] DATE 3-25-04

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
26	NA	6	NA	324	ME	DRAWER
27		28		313		
28		40		259		
29		23		308		
30		6		460		
31		2		298		
32		53		130		
33		36		349		
34		23		121		
35		6		391		Shelf
36		28		185		Shelf
37		28		368		H2O Reservoir
38		6		116		Switch Box
39		23		335		Cabinet
40		-23		148	CT	Countertop
41		15		176	ME	Under Counter
42		-2		287		Drawer
43		-2		215		
44		-2		368		
45		6		417		
46		2		315		
47		6		84		PARTITION
48		11		202		Cabinet
49		-11		5		
50		-6		81		

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
51						
52						
53						
54						
55						
56						
57						
58						
59						
60		NA				
61						
62						
63						
64						
65						
66						
67						
68						
69						
70						
71						
72						
73						
74						
75						

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022404-14
3-25-04

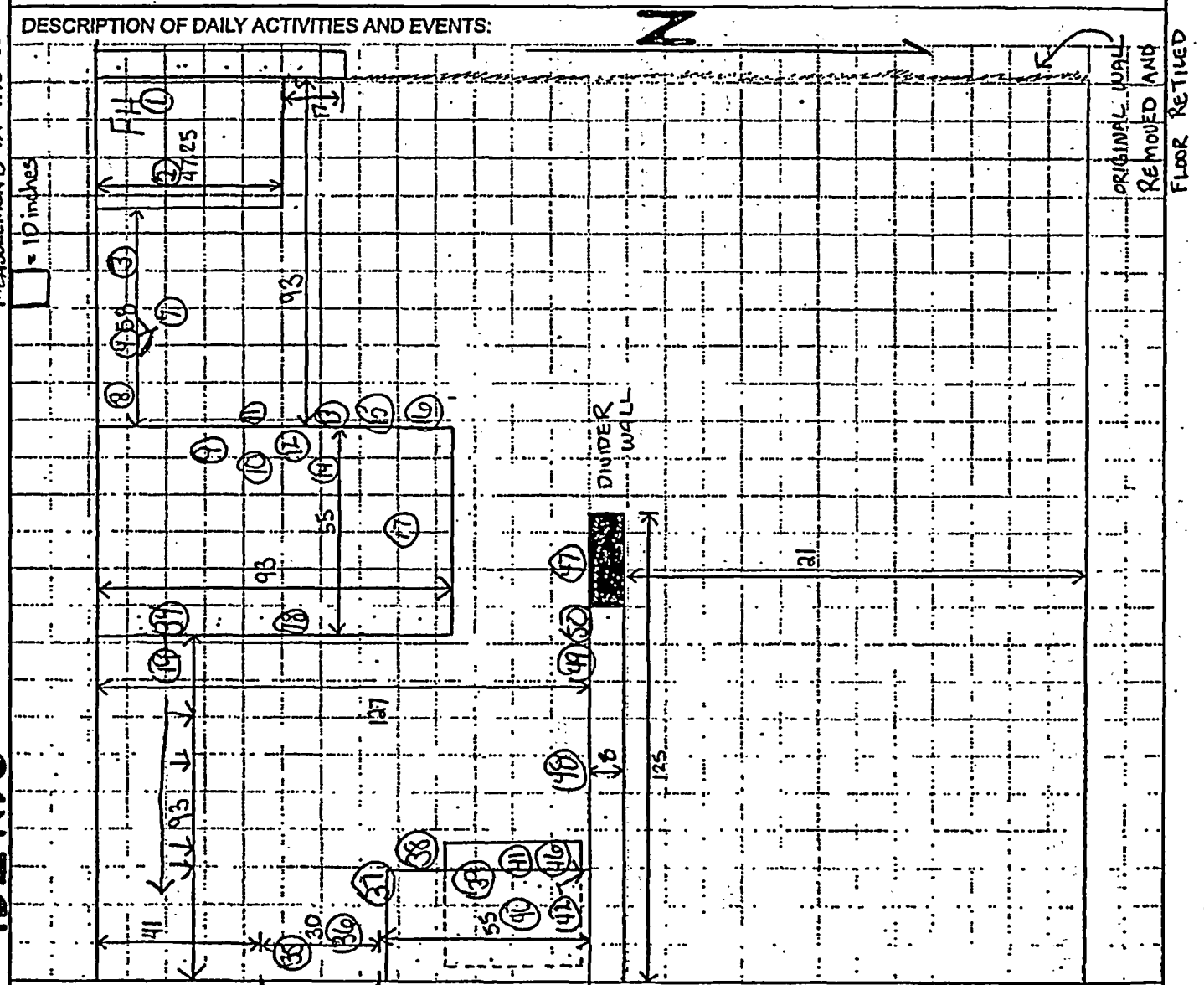
FIELD ACTIVITY DAILY LOG

DAILY LOG				
	DATE			
	NO.			
	SHEET	OF		

PROJECT NAME: | PROJECT NO.:

FIELD ACTIVITY SUBJECT:

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:



VISITORS ON SITE:

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:

WEATHER CONDITIONS:

IMPORTANT TELEPHONE CALLS:

IT PERSONNEL ON SITE:

SIGNATURE: DATE:

Survey Locations

B2109

Pg 4 of 5.
022404-14
3-25-04

Material Specific Background and MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 185774 Background Count Time 5.00 minutes

Probe/SN: Ludlum 43-68 / RN012713 Total Instrument Effciency 0.0375 dpm/cpm

Wall Board	**(WB)**	2.30	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	1.96	cpm	**MDC**	74	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	2.24	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	3.54	cpm	**MDC**	78	dpm/100cm2	**Sample Count Time**	10.00	min
Metal	**(ME)**	1.10	cpm	**MDC**	59	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	1.72	cpm	**MDC**	70	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	3.74	cpm	**MDC**	80	dpm/100cm2	**Sample Count Time**	10.00	min
Counter Top	**(CT)**	2.30	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	5.04	cpm	**MDC**	92	dpm/100cm2	**Sample Count Time**	10.00	min
Wall Board Downstairs	**(WBD)**	2.06	cpm	**MDC**	76	dpm/100cm2	**Sample Count Time**	5.00	min

022404-14

3-25-04

Material Specific Background and MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 185774

Probe/SN: Ludlum 43-68 / RN012713

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0900 dpm/cpm

Wall Board	**(WB)**	271.18	cpm	**MDC**	307	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	347.86	cpm	**MDC**	348	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	250.42	cpm	**MDC**	296	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	498.62	cpm	**MDC**	357	dpm/100cm2	**Sample Count Time**	10.00	min
Metal	**(ME)**	325.46	cpm	**MDC**	336	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	530.62	cpm	**MDC**	428	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	370.34	cpm	**MDC**	308	dpm/100cm2	**Sample Count Time**	10.00	min
Counter Top	**(CT)**	286.78	cpm	**MDC**	316	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	393.98	cpm	**MDC**	318	dpm/100cm2	**Sample Count Time**	10.00	min
Wall Board Downstairs	**(WBD)**	306.64	cpm	**MDC**	327	dpm/100cm2	**Sample Count Time**	5.00	min

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115
LOCATION: EPA NEIC B2109	SURVEYOR(S): Trent / K. Stevenson
Denver Federal Center, CO	SURVEY NUMBER: 021504-02
Denver, CO	MAP ID: LAB B2109

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS

Source Check Data	Contamination Surveys				Radiation Surveys
	α (LOOSE)	α (TOTAL)	β-γ (LOOSE)	β-γ (TOTAL)	Beta-Gamma
Instrument	69659 / 74076		69659 / 74076		
Source Type and I.D.	Th-230, 1170/89		Cs-137, 92CS5000		
Source Strength in dpm	13800	N/A	769565	N/A	N/A µCi
Efficiency	0.24 / 0.27		0.23 / 0.22		
MDC in dpm/100 cm²	17 / 19		179 / 187		Sat. ☐ Unsat. ☐
Background in cpm	0.4 / 0.8		87.2 / 95.4		mrem/hr or µrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO. _____
☑ SPECIAL Material Release
☐ ROUTINE _____

Contamination ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS: See Attached Map for Smear Locations
MAP is An Overhead View of Room
All Smears Done on 69659

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #		
	ALPHA (LOOSE) 2929 , 69659	BETA-GAMMA (LOOSE) 2929 , 69659
	ALPHA (TOTAL) LOOSE 2929 , 74076	BETA-GAMMA (TOTAL) LOOSE 2929 , 74076
Radiation Survey INSTRUMENT / SERIAL #	BETA-GAMMA Meter N/A	BETA-GAMMA Probe N/A

THE KNOWING & WILLFUL RECORDING OF FALSE, FCTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.

DATE: 021504 TIME START: 0800 TIME COMPLETE: 1500 PAGE 1 OF 3

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
1	1		5			glass door on Hood
2	-1		7			lip of hood
3	5		60			countertop
4	-1		-25			Drawer
5	3		19			↓ ↓
6	3		-48			
7	8		-57			↓ ↓
8	6		-36			Countertop
9	-1		-9			Drawer
10	5		58			↓ ↓
11	3		-39			
12	-1	N	5	N		
13	1		-4			
14	3	A	-29			
15	8		-27		A	
16	6		-25			↓ ↓
17	5		-41			Sink
18	6		-27			Countertop
19	5		-59			Drawer
20	1		-60			↓ ↓
21	1		-39			
22	5		-25			
23	6		-39			
24	-1		-20			
25	1		19			↓ ↓

RCS REVIEW [signature] DATE 2-19-04

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 021504 | PAGE 2 OF 3

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): Frank Fistoverson
SURVEY NUMBER: 021504-02
MAP ID: LAB B2109

COMMENTS:

RCS REVIEW [signature] DATE 2-19-04

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
26	3		-48			Drawer
27	8		-4			
28	6		-59			
29	3		10			
30	3		-9			
31	6		-48			
32	3		-55			
33	5		35			
34	5		-36			
35	3		7			Shelves
36	-1	N	-6	N		
37	6		-4			H_2O Reservoir
38	8	A	10			switch box
39	1		-11		A	glass cabinet
40	6		-29			counter
41	-3		-52			under counter
42	5		10			drawer underneath
43	-1		-81			
44	-3		-4			
45	1		-48			
46	3		-60			
47	1		19			partition
48	1		10			glass cabinet
49	10		-60			
50	1		-52			

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
51						
52						
53						
54						
55						
56						
57						
58						
59						
60			N			
61						
62						
63					A	
64						
65						
66						
67						
68						
69						
70						
71						
72						
73						
74						
75						

2215 04-02
2-18-04
[redacted]

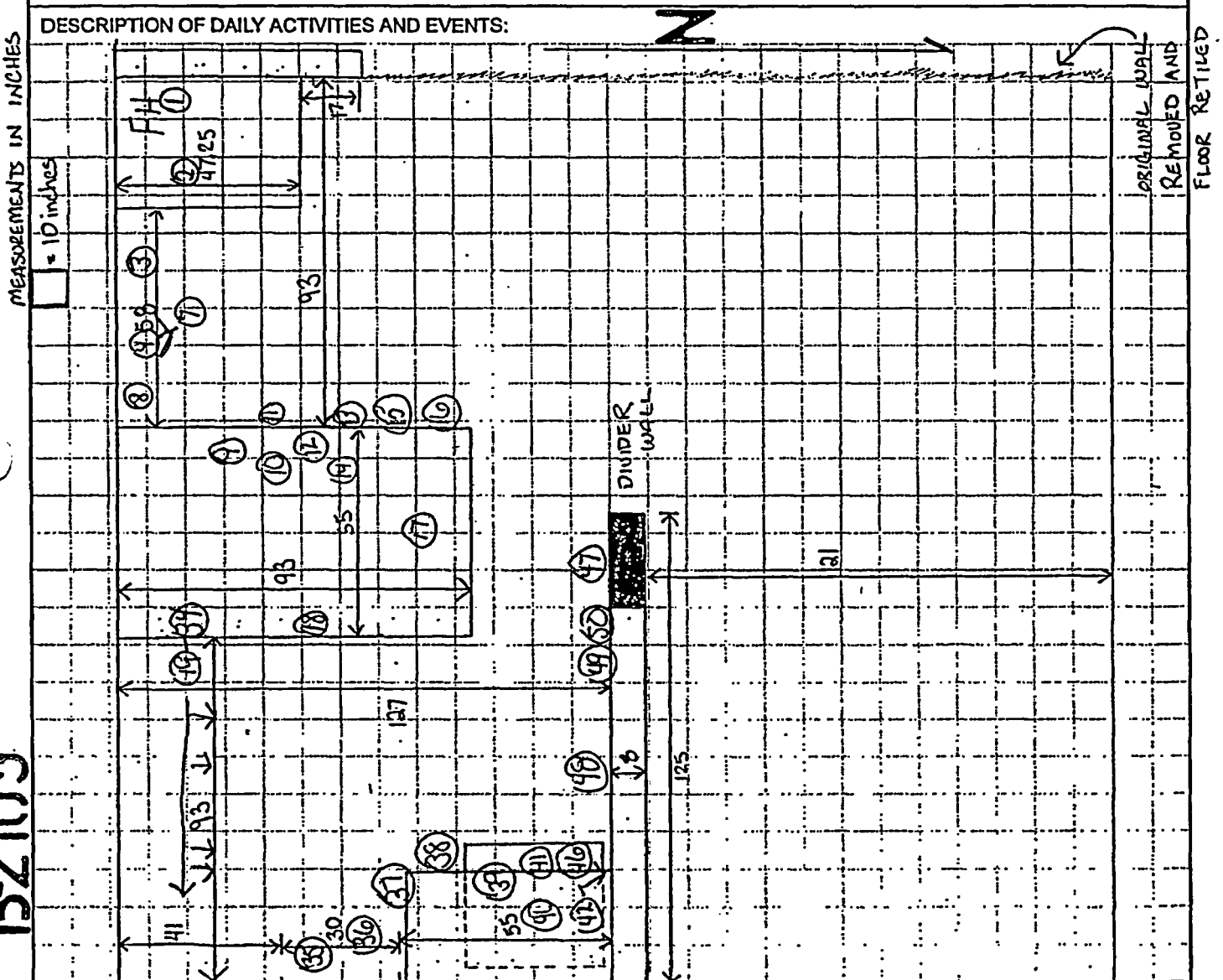
FIELD ACTIVITY DAILY LOG

DAILY LOG	DATE			
	NO.			
	SHEET	OF		

PROJECT NAME: | PROJECT NO.:

FIELD ACTIVITY SUBJECT:

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:



VISITORS ON SITE:

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:

WEATHER CONDITIONS:

IMPORTANT TELEPHONE CALLS:

IT PERSONNEL ON SITE:

SIGNATURE: | DATE:

B2109

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115	DATE: 02-23-04	TIME START: 0800 / TIME COMPLETE: 1700 / PAGE 1 OF 7
LOCATION: EPA NEIC	SURVEYOR(S): K. WISE / T. TRENT		
Denver Federal Center, CO	SURVEY NUMBER: 022404-12		
Denver, CO	MAP ID: LAB D2205		

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS
$MDCR_{surveyor}$ Beta
$MDCR_{surveyor}$ Alpha

Source Check Data	Contamination Surveys				Radiation Surveys
	α (TOTAL)	α (TOTAL)	β-γ (TOTAL)	β-γ (TOTAL)	Beta-Gamma
Instrument	184904 / 185768	185774	184904 / 185768	185774	NA
Source Type and I.D.	Th-230, 1170/89	Th-230, 1170/89	Cs-137, 92C85000	Cs-137, 92C85000	
Source Strength in dpm	13800	13800	769565	769565	Cs
Efficiency	0.13 / 0.15	0.15	0.16 / 0.17	0.16	
MDC in dpm/100 cm²	See attached instrument sheets for material specific backgrounds and MDC's.				Set. ☐ Unset. ☐
Background in cpm					mrem/hr or µrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO. _____
☐ SPECIAL _____
☒ ROUTINE MATERIAL RELEASE SURVEY

Contamination ☒ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS: See MAP for Survey Locations
Item No. 1-25 · 2360 184904
26-50 · 2360 185768

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #		
	ALPHA (TOTAL) 2360 , 184904	BETA-GAMMA (TOTAL) 2360 , 184904
	ALPHA (TOTAL) 2360 , 185768	BETA-GAMMA (TOTAL) 2360 , 185768
	ALPHA (TOTAL) NA	BETA-GAMMA (TOTAL) NA

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
1	NA	49	NA	-469	CT	Countertop
2		20		-382		
3		29		-319		
4		13		-466	ME	DRAWER
5		28		-391		DRAWER
6		-6		-448		Cabinet
7		3		-409		DRAWER
8		-6		-522		
9		-6		-551		
10		-1		-524		
11		-26		-496		
12		-6		40		
13		-29		-356	CT	Sink
14		-34		-243		Countertop
15		-10		-527		
16		0		648		
17		13		-690	ME	DRAWER
18		-6		-274		
19		8		-373		
20		-16		-666		
21		-16		-557		
22		-6		-379		
23		-39		-168	CT	Countertop
24		-34		-340		
25		-29		-233		

THE KNOWING & WILLFUL RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.

RCS REVIEW [signature] DATE 3-25-04

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02 · 24 · 04 | PAGE 2 OF 7

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): R. WISE / T. TRENT
SURVEY NUMBER: 022404-12
MAP ID: LAB D2205

COMMENTS:

RCS REVIEW [signature] DATE 3-25-04

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
26	NA	24	NA	365	CT	Countertop
27		29		35	ME	DRAWER
28		8		94		DRAWER
29		29		175		Cabinet
30		12		148		DRAWER
31		16		44		
32		-1		53		
33		-9		25		
34		-5		81		
35		12		-167		
36		16		167		
37		-5		124		
38		-14		190		
39		-5		109		
40		33		-111		
41		-5		5		
42		8		85		
43		-9		201		
44		-18		128		Cabinet
45		-1		-16		
46		-26		16		
47		-5		-14		
48		-9		-191		
49		-5		-31		
50		-14		55		HOOD

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
51						
52						
53						
54						
55						
56						
57						
58						
59						
60		NA				
61						
62						
63						
64						
65						
66						
67						
68						
69						
70						
71						
72						
73						
74						
75						

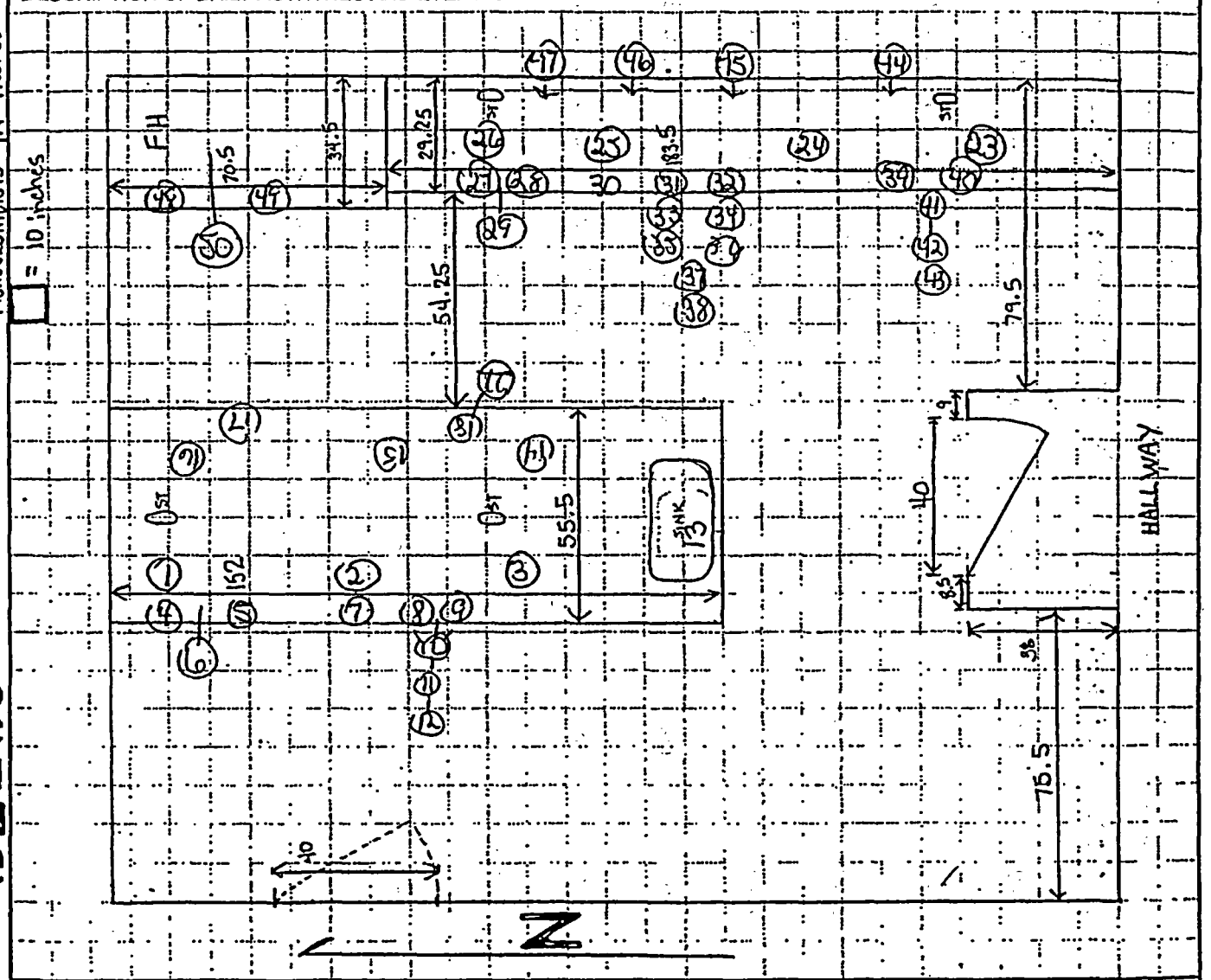
Pg 3 of 7
022404-12
3-25-04

FIELD ACTIVITY DAILY LOG

DAILY LOG				
	DATE			
	NO.			
	SHEET	OF		

PROJECT NAME:	PROJECT NO.:
FIELD ACTIVITY SUBJECT:	

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:



Survey Locations
MEASUREMENTS IN INCHES
= 10 inches

D-2205

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:
WEATHER CONDITIONS:	IMPORTANT TELEPHONE CALLS:
IT PERSONNEL ON SITE:	
SIGNATURE:	DATE:

022404-12

3-25-04

Material Specific Background and MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 184904

Probe/SN: Ludlum 43-68 / PR138731

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0325 dpm/cpm

Wall Board	**(WB)**	1.40	cpm	**MDC**	75	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	2.24	cpm	**MDC**	91	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	2.10	cpm	**MDC**	88	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	4.40	cpm	**MDC**	92	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	1.66	cpm	**MDC**	80	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	1.92	cpm	**MDC**	85	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	5.04	cpm	**MDC**	98	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	2.20	cpm	**MDC**	90	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	3.36	cpm	**MDC**	88	dpm/100cm2	**Sample Count Time**	10.00	min
Wall Board Downstairs	**(WBD)**	1.22	cpm	**MDC**	71	dpm/100cm2	**Sample Count Time**	5.00	min

Material Specific Background MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 184904

Probe/SN: Ludlum 43-68 / PR138731

Background Count Time 5.00 minutes

Total Instrument Efficiency 0.0800 dpm/cpm

3-25-04

Wall Board	**(WB)**	265.14	cpm	**MDC**	342	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	303.36	cpm	**MDC**	365	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	180.64	cpm	**MDC**	283	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	449.28	cpm	**MDC**	359	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	311.78	cpm	**MDC**	370	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	475.30	cpm	**MDC**	456	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	350.32	cpm	**MDC**	317	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	292.52	cpm	**MDC**	359	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	982.02	cpm	**MDC**	563	dpm/100cm2	**Sample Count Time**	10.00	min
Wall Board Downstairs	**(WBD)**	270.32	cpm	**MDC**	279	dpm/100cm2	**Sample Count Time**	5.00	min

Ig 6 of 1
022404-12

Material Specific Background and MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 185768

Probe/SN: Ludlum 43-68 / RN012714

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0375 dpm/cpm

3-25-04

Wall Board	**(WB)**	1.82	cpm	**MDC**	72	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	2.22	cpm	**MDC**	78	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	3.10	cpm	**MDC**	90	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	5.52	cpm	**MDC**	96	dpm/100cm2	**Sample Count Time**	10.00	min
Metal	**(ME)**	1.84	cpm	**MDC**	72	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	2.50	cpm	**MDC**	82	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	4.38	cpm	**MDC**	86	dpm/100cm2	**Sample Count Time**	10.00	min
Counter Top	**(CT)**	1.68	cpm	**MDC**	70	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	16.10	cpm	**MDC**	149	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	3.42	cpm	**MDC**	94	dpm/100cm2	**Sample Count Time**	5.00	min

2404-12

Material Specific Background and MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 185768

Probe/SN: Ludlum 43-68 / RN012714

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0850 dpm/cpm

3-25-04

Wall Board	**(WB)**	230.00	cpm	**MDC**	300	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	275.22	cpm	**MDC**	328	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	210.12	cpm	**MDC**	287	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	357.50	cpm	**MDC**	321	dpm/100cm2	**Sample Count Time**	10.00	min
Metal	**(ME)**	256.10	cpm	**MDC**	317	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	446.00	cpm	**MDC**	416	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	304.00	cpm	**MDC**	296	dpm/100cm2	**Sample Count Time**	10.00	min
Counter Top	**(CT)**	232.08	cpm	**MDC**	302	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	385.38	cpm	**MDC**	313	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	285.78	cpm	**MDC**	334	dpm/100cm2	**Sample Count Time**	5.00	min

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115
LOCATION: EPA NEIC Rm 2205	SURVEYOR(S): Frank K. Stevenson
Denver Federal Center, CO	SURVEY NUMBER: 021604-05
Denver, CO	MAP ID: LAB D-2205

DATE: 02-16-04 | TIME START: 0700 | TIME COMPLETE: 1700 | PAGE 1 OF 3

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS

Source Check Data	Contamination Surveys				Radiation Surveys
	α (LOOSE)	α (TOTAL)	β-γ (LOOSE)	β-γ (TOTAL)	Beta-Gamma
Instrument	69659 / 74076		69659 / 74076		
Source Type and I.D.	Th-230, 1170/89		Cs-137, 92CS5000		
Source Strength in dpm	13600	N/A	769565	N/A	N/A µCi
Efficiency	0.24 / 0.27		0.23 / 0.22		
MDC in dpm/100 cm²	17 / 19		178 / 187		Set. ☐ Const. ☐
Background in cpm	0.4 / 0.8		97.2 / 95.4		mrem/hr or µrem/hr

REASON FOR SURVEY: ☐ PROCEDURE NO. ☑ SPECIAL 11 Material Release Survey ☐ ROUTINE

Contamination ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS: See Attached Map for Smear locations

Map is An overhead view of ROOM
all Smears Done on 74076

SADS - See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #		
	ALPHA (LOOSE) 2929, 69659	BETA-GAMMA (LOOSE) 2929, 69659
	ALPHA ~~(TOTAL)~~ LOOSE 2929, 74076	BETA-GAMMA ~~(TOTAL)~~ LOOSE 2929, 74076
Radiation Survey INSTRUMENT / SERIAL #	BETA-GAMMA Meter N/A	BETA-GAMMA Probe N/A

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
1	3		5			Counter
2	6		-45			↓ ↓
3	1		-13			↓ ↓
4	-1		-59			Drawer
5	6		-57			↓ ↓
6	1		-27			CABinet
7	8		-22			Drawer
8	-1		33			↓ ↓
9	1		-16			↓ ↓
10	5		19			↓ ↓
11	1		-45			↓ ↓
12	-1		28			↓ ↓
13	6	N/A	-39	N		Sink
14	1		26			Countertop
15	1		12			↓ ↓
16	-1		-34		A	↓ ↓
17	1		-25			Drawers
18	5		-25			↓ ↓
19	-3		-11			↓ ↓
20	1		-104			↓ ↓
21	-5		-45			↓ ↓
22	-1		-6			↓ ↓
23	1		-74			Countertop
24	-1		12			↓ ↓
25	1		7			↓ ↓

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RCS REVIEW [signature] DATE 2-19-04

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-16-04 | PAGE 2 OF 3

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): Pont / Stevenson
SURVEY NUMBER: 021604-D5
MAP ID: LAD D2205

COMMENTS:

RCS REVIEW [signature] DATE 2-18-04

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
26	6		-59			Counter
27	-1		-18			Drawer
28	-1		46			↓ ↓
29	5		-55			Cabinet
30	-3		-45			Drawer
31	-1		-57			
32	5		-11			
33	5		-60			
34	1		-29			
35	-1		-25			
36	-1	N	-27			
37	5		0	N		
38	-1	A	-36			
39	6		-22			
40	6		42		A	
41	5		-45			
42	3		-45			
43	1		28			
44	6		-50			Cabinet
45	1		-18			↓ ↓
46	-1		-16			
47	1		-18			
48	-1		-43			
49	-1		-25			↓ ↓
50	3		-27			Hood

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
51						
52						
53						
54						
55						
56						
57						
58						
59						
60			N			
61						
62					A	
63						
64						
65						
66						
67						
68						
69						
70						
71						
72						
73						
74						
75						

02.16.04
3-2-3
8-...04-05

[redacted]

(#) - Smear Number/Location

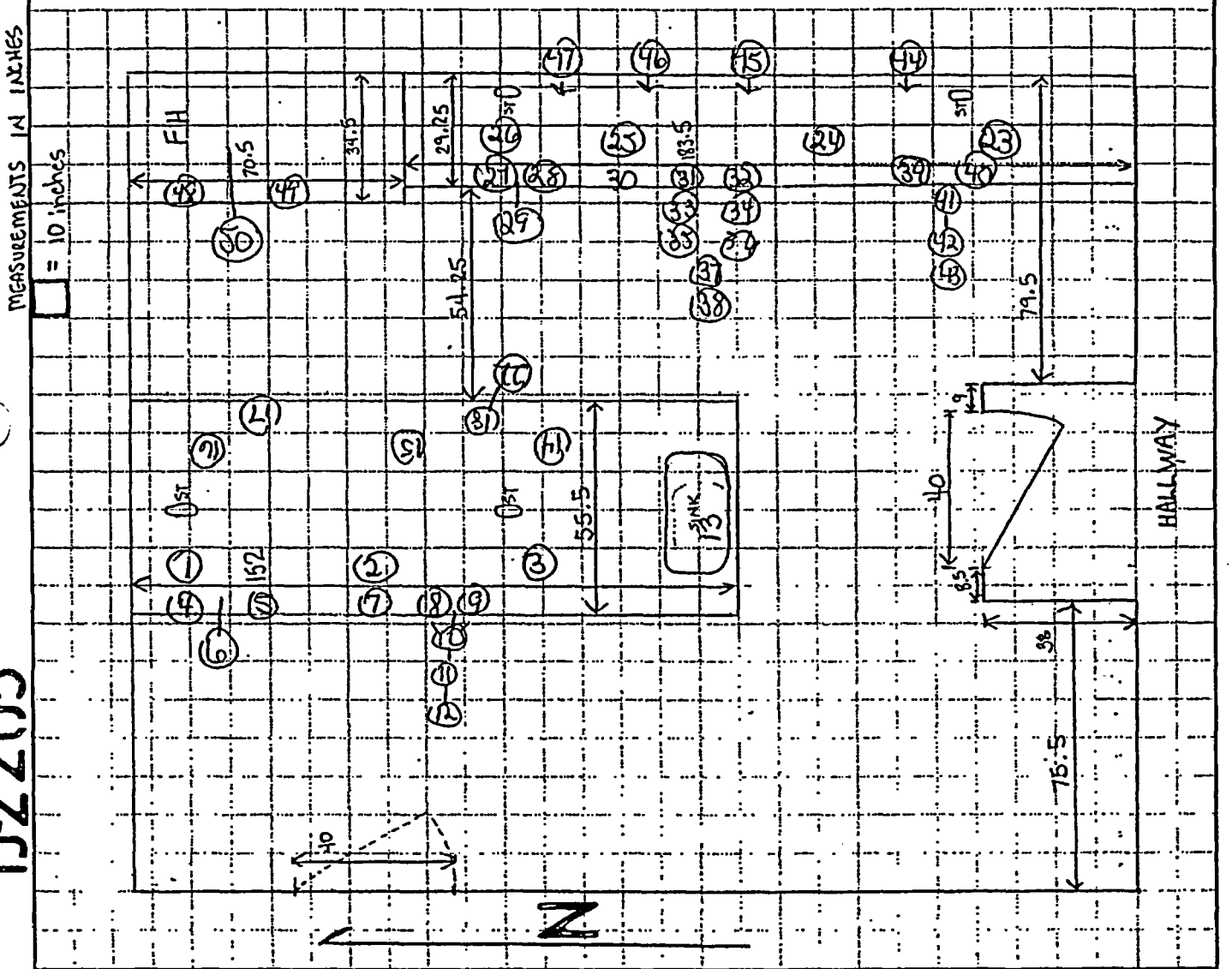
2-9-04

FIELD ACTIVITY DAILY LOG

DAILY LOG				
	DATE			
	NO.			
	SHEET	OF		

PROJECT NAME:	PROJECT NO.:
FIELD ACTIVITY SUBJECT:	

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:



VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:
WEATHER CONDITIONS:	IMPORTANT TELEPHONE CALLS:

IT PERSONNEL ON SITE:

SIGNATURE: DATE:

D-22005

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115	DATE: 022404	TIME START: 0700 / TIME COMPLETE: 1700 / PAGE 1 OF 5
LOCATION: EPA NEIC	SURVEYOR(S): K. WISE		
Denver Federal Center, CO	SURVEY NUMBER: 022404-18		
Denver, CO	MAP ID: ICPMS		

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS
$MDCR_{surveyor}$ Beta
$MDCR_{surveyor}$ Alpha

Source Check Data	Contamination Surveys				Radiation Surveys
	α (TOTAL)	α (TOTAL)	β-γ (TOTAL)	β-γ (TOTAL)	Beta-Gamma
Instrument	184904 / 185768	185774	184904 / 185768	185774	NA
Source Type and I.D.	Th-230, 1170/89	Th-230, 1170/89	Cs-137, 92CS5000	Cs-137, 92CS5000	
Source Strength in dpm	13900	13900	769565	769565	Cs
Efficiency	0.13 / 0.15	0.15	0.16 / 0.17	0.19	
MDC in dpm/100 cm²	See attached instrument sheets for material specific backgrounds and MDC's.				Set. ☐ Unset. ☐
Background in cpm					mrem/hr or µrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO. _____
☐ SPECIAL _____
☑ ROUTINE MATERIAL RELEASE SURVEY

Contamination ☑ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS: SEE MAP For Survey Locations

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #		
	ALPHA (TOTAL) 2360, 184904	BETA-GAMMA (TOTAL) 2360, 184904
	ALPHA (TOTAL) N/A	BETA-GAMMA (TOTAL) N/A
	ALPHA (TOTAL) N/A	BETA-GAMMA (TOTAL) N/A

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
1	NA	33	NA	-760	ME	ICPMS
2		18		-359		
3		47		629		
4		77		528		
5		52		697		
6		82		343		
7		52		746		
8		47		659		
9		8		12		
10		52		-274		
11		77		-163		
12		67		191		
13		42		-337		
14		86		800		
15		77		-186		
16		38		-67		
17		67		631		
18		42		62		
19		86		512		
20		23		6		
21		52		125		
22		86		113		
23		96		-232		
24		101		26		
25		67		427		

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RCS REVIEW [signature] DATE 3-24-04

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-24-04 | PAGE 2 OF 5

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): K. WISE
SURVEY NUMBER: 022404-18
MAP ID: ICPMS

COMMENTS:

RCS REVIEW [signature] DATE 3-24-04

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
26	NA	130	NA	322	ME	ICPMS
27	↓	116	↓	125	↓	↓
28	↓	77	↓	50	↓	↓
29	↓	77	↓	-155	↓	↓
30	↓	67	↓	443	↓	↓
31						
32						
33						
34						
35						
36						
37						
38				NA		
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
51						
52						
53						
54						
55						
56						
57						
58						
59			NA			
60						
61						
62						
63						
64						
65						
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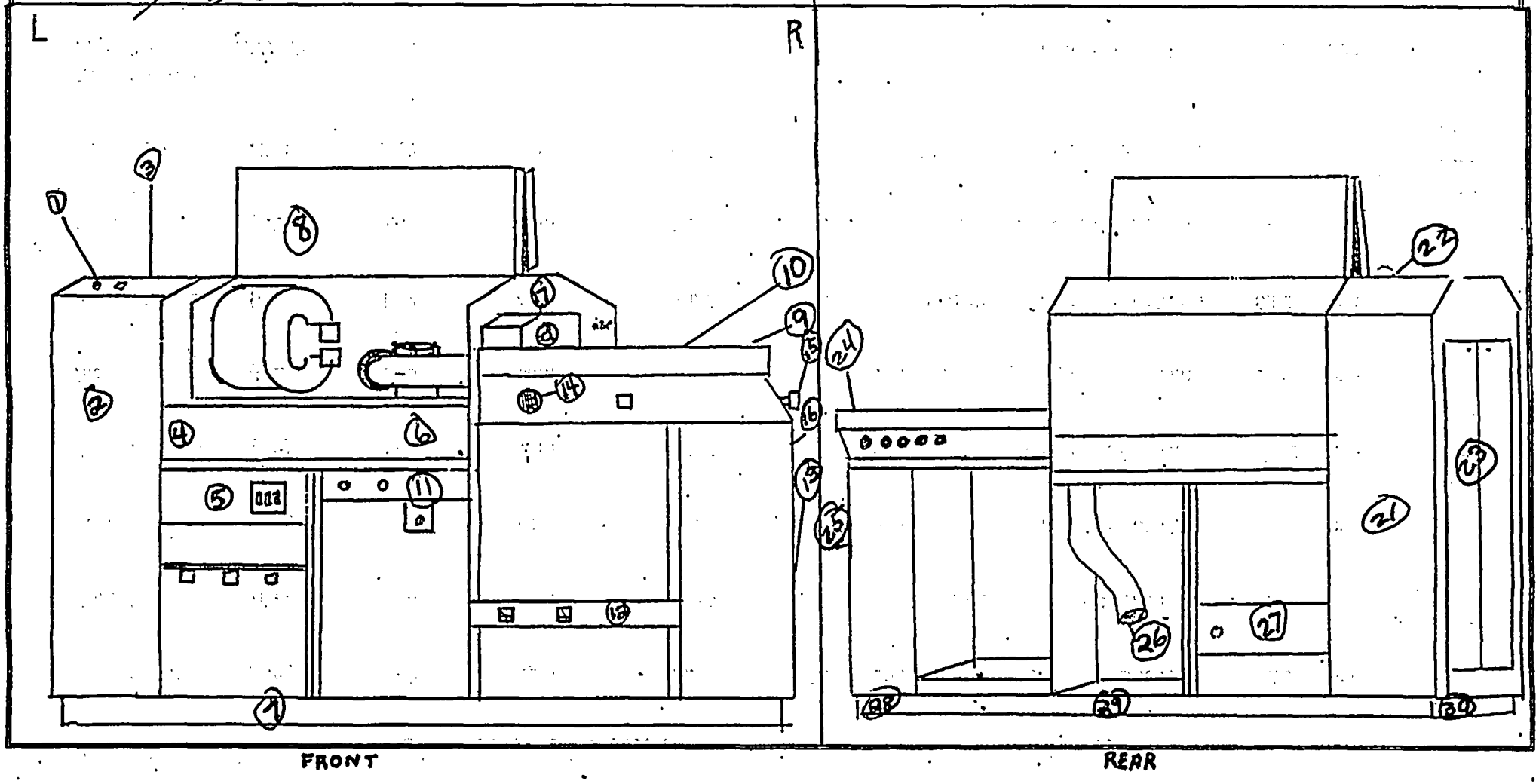
73						
74						
75						

Contamination / Radiation Survey Report

PROJECT NUMBER: 101115	ACTIVITY / LOCATION: Release Survey / Laboratory-Room		PAGE 3 OF 5
COMMENTS: (#) Survey Location	SURVEYOR(S): K. WISE	SURVEY NUMBER: 022404-18	DATE: 02-24-04
	NOTE: THE KNOWING AND WILLFUL RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.		
RCS REVIEW: [signature]	DATE: 3-24-04		



Material Specific Background and MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 184904 Background Count Time 5.00 minutes

Probe/SN: Ludlum 43-68 / PR138731 Total Instrument Effciency 0.0325 dpm/cpm

Wall Board	**(WB)**	1.40	cpm	**MDC**	75	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	2.24	cpm	**MDC**	91	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	2.10	cpm	**MDC**	88	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	4.40	cpm	**MDC**	92	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	1.66	cpm	**MDC**	80	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	1.92	cpm	**MDC**	85	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	5.04	cpm	**MDC**	98	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	2.20	cpm	**MDC**	90	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	3.36	cpm	**MDC**	88	dpm/100cm2	**Sample Count Time**	10.00	min
Wall Board Downstairs	**(WBD)**	1.22	cpm	**MDC**	71	dpm/100cm2	**Sample Count Time**	5.00	min

2404-18

3-24-04

Material Specific Background MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 184904

Probe/SN: Ludlum 43-68 / PR138731

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0800 dpm/cpm

Wall Board	**(WB)**	265.14	cpm	**MDC**	342	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	303.36	cpm	**MDC**	365	dpm/100cm2	**Sample Count Time**	5.00	min
Wood	**(WO)**	180.64	cpm	**MDC**	283	dpm/100cm2	**Sample Count Time**	5.00	min
Cement Floor	**(CF)**	449.28	cpm	**MDC**	359	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	311.78	cpm	**MDC**	370	dpm/100cm2	**Sample Count Time**	5.00	min
Concrete Block	**(CB)**	475.30	cpm	**MDC**	456	dpm/100cm2	**Sample Count Time**	5.00	min
Glass	**(GL)**	350.32	cpm	**MDC**	317	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	292.52	cpm	**MDC**	359	dpm/100cm2	**Sample Count Time**	5.00	min
Black&White Floor Tile	**(BWFT)**	982.02	cpm	**MDC**	563	dpm/100cm2	**Sample Count Time**	10.00	min
Wall Board Downstairs	**(WBD)**	270.32	cpm	**MDC**	279	dpm/100cm2	**Sample Count Time**	5.00	min

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115	DATE: 02-16-04	TIME START: 0700 / TIME COMPLETE: 1700 / PAGE 1 OF 3
LOCATION: EPA NEIC RMA1507 Addition	SURVEYOR(S): J. Stevenson		
Denver Federal Center, CO	SURVEY NUMBER: 021604-06		
Denver, CO	MAP ID: ICPMS		

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS

Source Check Data	Contamination Surveys				Radiation Surveys
[redacted]	α (LOOSE)	α (TOTAL)	β-γ (LOOSE)	β-γ (TOTAL)	Beta-Gamma
Instrument	69659 / 74076		69659 / 74076		
Source Type and I.D.	Th-230, 1170/89		Cs-137, 92CS5000		
Source Strength in dpm	13800	N A	769565	N A	N A µCi
Efficiency	0.24 / 0.27		0.23 / 0.22		[redacted]
MDC in dpm/100 cm²	17 / 19		179 / 187		Sat. ☐ Quest. ☐
Background in cpm	0.4 / 0.9		97.2 / 95.4		mrem/hr or µrem/hr

REASON FOR SURVEY: ☐ PROCEDURE NO. ____ ☑ SPECIAL Equipment Release Survey ☐ ROUTINE ____

Contamination ☐ By SNR ☐ Daily ☐ Weekly ☐ Monthly ☐

Radiation ☐ By SNR ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS: See Attached Map for Smear Locations
All Smears done on 69659

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #	ALPHA (LOOSE) 2929, 69659	BETA-GAMMA (LOOSE) 2929, 69659	
	ALPHA ~~(TOTAL)~~ LOOSE 2929, 74076	BETA-GAMMA ~~(TOTAL)~~ LOOSE 2929, 74076	
Radiation Survey INSTRUMENT / SERIAL #	BETA-GAMMA Meter N.A	BETA-GAMMA Probe N.A	

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[redacted]	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
Item #						
1	0		12			Lt side of Element
2	-2		49			Side Rt
3	0		1			Side Lt
4	0		-3			Panel
5	3		-7			Panel
6	-2		-10			Panel
7	-2		49			Lower Panel
8	-2		21			Cover
9	0		-53			Flat Surface
10	3		30			↓ ↓
11	-2		32			control Panel
12	-2	N A	8	N A	N A	Lower Panel
13	3		-23			Side Panel
14	-2		34			↓ ↓
15	0		1			KNOB
16	-2		-40			Panel
17	0		14			Housing opening
18	5		23			Panel
19	0		-33			↓
20	3		19			
21	0		14			↓
22	-2		8			inside Housing
23	3		-42			Front Air Panel
24	-2		12			Flat Panel
25	0		-12			Panel (side

RCS REVIEW [signature] DATE 2-19-04

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT (CONTINUATION SHEET)

PROJECT NUMBER: 101115 | DATE: 02-16-04 | PAGE 2 OF 3

LOCATION: EPA NEIC
Denver Federal Center, Building 53
Denver, CO

SURVEYOR(S): J. Stevenson
SURVEY NUMBER: 021604-06
MAP ID: LAB 1507 - ICPMS

COMMENTS:

RCS REVIEW [signature] DATE 2-19-04

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
26	-2		1			hose
27	-2		34			support
28	-2		8			Lower skid
29	-2	NA	36	NA	NA	↓ ↓
30	0		-35			lower skid
31						
32						
33						
34						
35						
36						
37		N				
38						N
39						
40						
41				A		A
42						
43						
44						
45						
46						
47						
48						
49						
50						

Item #	Alpha LOOSE dpm/100cm²	Alpha TOTAL dpm/100cm²	Beta-Gamma LOOSE dpm/100cm²	Beta-Gamma TOTAL dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
51						
52						
53						
54						
55						
56						
57						
58						
59		N				
60						
61						N
62						A
63				A		
64						
65						
66						
67						
68						
69						
70						
71						
72						
73						
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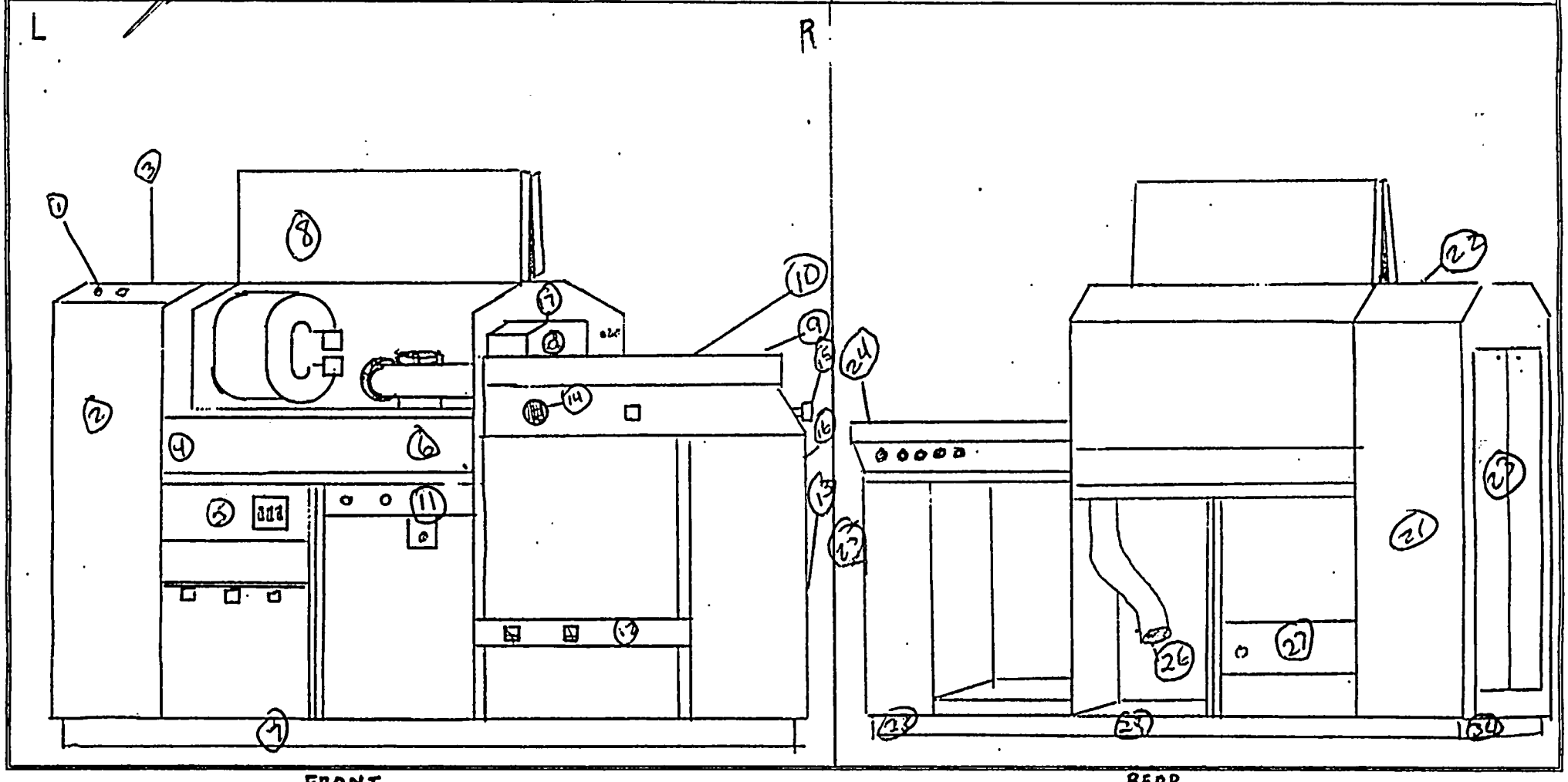
Contamination / R[illegible]tion Survey Report

PROJECT NUMBER: 101115	ACTIVITY / LOCATION: ICPMS	/ Laboratory-Room Rm A 1501 addition	PAGE 3 OF 3
COMMENTS: (#) Smear Number / Location		SURVEYOR(S): J Stevenson	SURVEY NUMBER: 0216-04-06 / DATE: 2-16-04
		NOTE: THE KNOWING AND WILLFUL RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.	
RCS REVIEW:	DATE: 2-18-04		



Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115	DATE: 03-05-04	TIME START: 0805	TIME COMPLETE: 0840
LOCATION: EPA NEIC	SURVEYOR(S): T. TRENT			PAGE 1 OF 4
Denver Federal Center, CO	SURVEY NUMBER: 030504-39			
Denver, CO	MAP ID: LAB A1209			

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS

Source Check Data	Contamination Surveys				Radiation Surveys
	α (LOOSE)	α (TOTAL)	β-γ (LOOSE)	β-γ (TOTAL)	Beta-Gamma
Instrument	69659	185774 / 185768	69659	185774 / 185768	NA
Source Type and I.D.	Th-230, 1170/89	Th-230, 1170/89	Cs-137, 92CS5000	Cs-137, 92CS5000	
Source Strength in dpm	13800	13800	769565	769565	µCi
Efficiency	0.24	0.15 / 0.15	0.23	0.18 / 0.17	
MDC in dpm/100 cm²	17	See attached sheets for data	179	See attached sheets for data	Sat. ☐ Unsat. ☐
Background in cpm	0.4		97.2		mrem/hr or µrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO.
☐ SPECIAL
☑ ROUTINE WALL PENETRATION Survey

Contamination ☑ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS:

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #
ALPHA (LOOSE) 2929 , 69659
ALPHA (TOTAL) 2360 , 185768
ALPHA (TOTAL) N/A
BETA-GAMMA (LOOSE) 2929 , 69659
BETA-GAMMA (TOTAL) 2360 , 185768
BETA-GAMMA (TOTAL) N/A

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
1	-2	-22	47	473	WBD	See Map
2	-2	-30	-19	172		
3	0	-26	-37	-45		
4	0	-5	58	181		
5	-2	4	21	379		
6	-2	-13	27	303		
7	3	-26	12	239	WBD	
8						
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14						
15			NA			
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RCS REVIEW [signature] DATE 3-17-04

030504-39
3-17-04

Material Specific Background and MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 185768 Background Count Time 5.00 minutes

Probe/SN: Ludlum 43-68 / RN012714 Total Instrument Effciency 0.0850 dpm/cpm

Wall Board	**(WB)**	230.00	cpm	**MDC**	242	dpm/100cm2	**Sample Count Time**	15.00	min
Floor Tile	**(FT)**	275.22	cpm	**MDC**	265	dpm/100cm2	**Sample Count Time**	15.00	min
Wood	**(WO)**	210.12	cpm	**MDC**	232	dpm/100cm2	**Sample Count Time**	15.00	min
Cement Floor	**(CF)**	357.50	cpm	**MDC**	302	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	256.10	cpm	**MDC**	256	dpm/100cm2	**Sample Count Time**	15.00	min
Concrete Block	**(CB)**	446.00	cpm	**MDC**	337	dpm/100cm2	**Sample Count Time**	15.00	min
Glass	**(GL)**	304.00	cpm	**MDC**	278	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	232.08	cpm	**MDC**	244	dpm/100cm2	**Sample Count Time**	15.00	min
Black&White Floor Tile	**(BWFT)**	385.38	cpm	**MDC**	313	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	285.78	cpm	**MDC**	334	dpm/100cm2	**Sample Count Time**	5.00	min

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3-17-04

Material Specific Background MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 185768

Probe/SN: Ludlum 43-68 / RN012714

Background count time 5 minutes

Total Instrument Effciency 0.0375 dpm/cpm

Wall Board	**WB**	1.82	cpm	**MDC**	53	dpm/100cm2	**Sample Count Time**	15.00	min
Floor Tile	**FT**	2.22	cpm	**MDC**	58	dpm/100cm2	**Sample Count Time**	15.00	min
Wood	**WO**	3.10	cpm	**MDC**	68	dpm/100cm2	**Sample Count Time**	15.00	min
Cement Floor	**CF**	5.52	cpm	**MDC**	89	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**ME**	1.84	cpm	**MDC**	53	dpm/100cm2	**Sample Count Time**	15.00	min
Concrete Block	**CB**	2.50	cpm	**MDC**	61	dpm/100cm2	**Sample Count Time**	15.00	min
Glass	**GL**	4.38	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**CT**	1.68	cpm	**MDC**	51	dpm/100cm2	**Sample Count Time**	15.00	min
Black&White Floor Tile	**(BWFT)**	16.10	cpm	**MDC**	149	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	3.42	cpm	**MDC**	94	dpm/100cm2	**Sample Count Time**	5.00	min

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3-17-04

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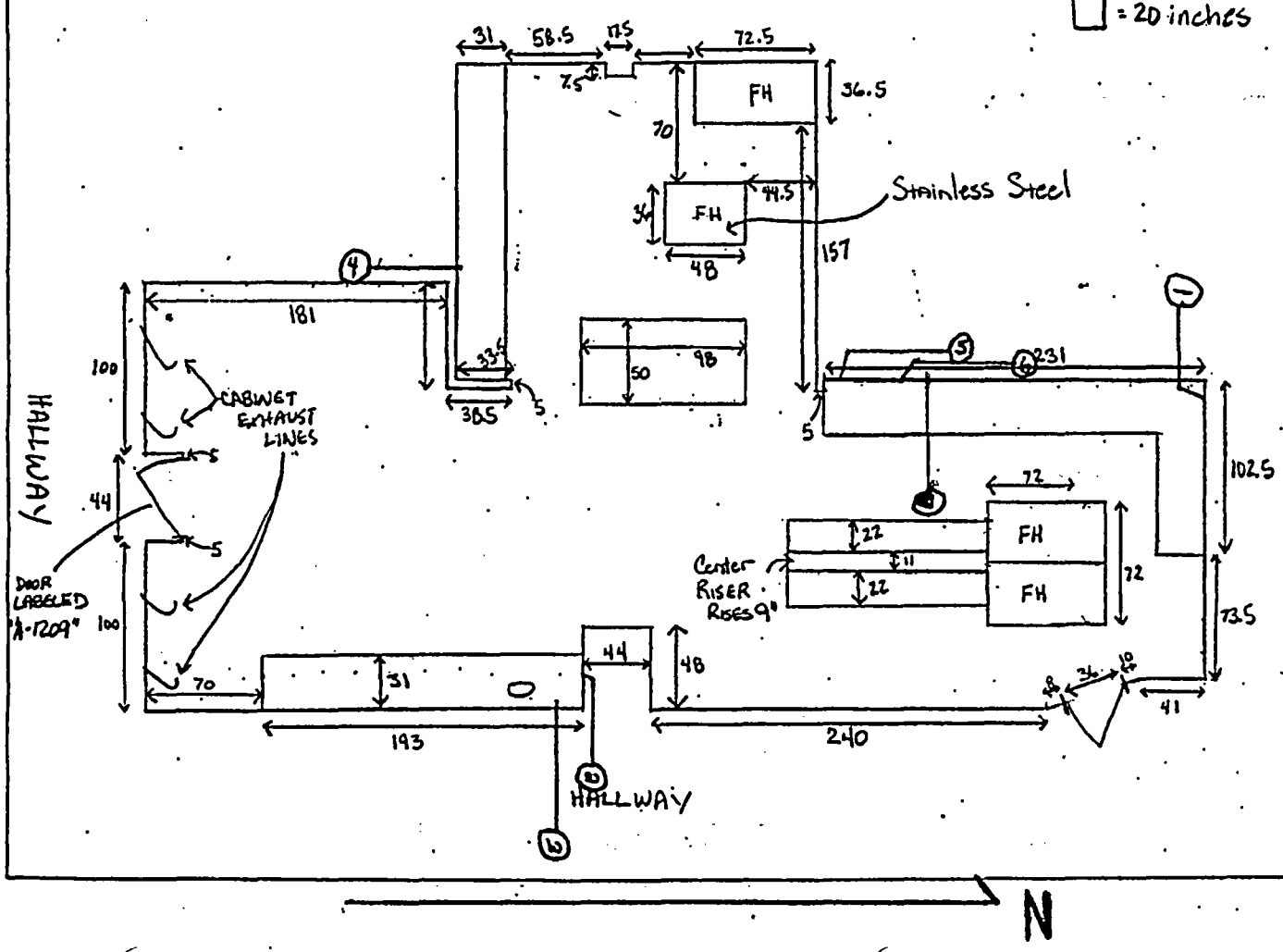
MEASUREMENTS IN INCHES

A-1209

"HIGH HAZARD PREP LAB"

"REGULATED LAB"



Preparer's Initials	Proj. No.	Client	Location	Subject	Page ___ of ___
Date					
Reviewer's Initials					
Date					
Approver's Initials					
Date					

COMPUTATION SHEET

Form No. 0048
Midwest Tech. Servs.
Rev. 08/89

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115
LOCATION: EPA NEIC	SURVEYOR(S): T. TRENT
Denver Federal Center, CO	SURVEY NUMBER: 030504-41
Denver, CO	MAP ID: LAB A1505/1507

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS

Source Check Data	Contamination Surveys				Radiation Surveys
	α (LOOSE)	α (TOTAL)	β-γ (LOOSE)	β-γ (TOTAL)	Beta-Gamma
Instrument	69659	185774 / 185768	69659	185774 / 185768	NA
Source Type and I.D.	Th-230, 1170/89	Th-230, 1170/89	Cs-137, 92CS5000	Cs-137, 92CS5000	
Source Strength in dpm	13800	13800	769565	769565	µCi
Efficiency	0.24	0.15 / 0.15	0.23	0.18 / 0.17	
MDC in dpm/100 cm²	17	See attached sheets for data	179	See attached sheets for data	Set. ☐ Unset. ☐
Background in cpm	0.4		97.2		mrem/hr or µrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO. _____
☐ SPECIAL: _____
☑ ROUTINE: WALL Penetration Survey

Contamination ☑ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS:

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #		
	ALPHA (LOOSE) 2929, 69659	BETA-GAMMA (LOOSE) 2929, 69659
	ALPHA (TOTAL) 2360, 185768	BETA-GAMMA (TOTAL) 2360, 185768
	ALPHA (TOTAL) N/A	BETA-GAMMA (TOTAL) N/A

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DATE: 03-05-04 TIME START: 1300 TIME COMPLETE: 1340 PAGE 1 OF 4

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
1	5	12	54	232	WBD	See MAP
2	-2	-9	56	284		
3	0	-22	23	273		
4	-2	-22	14	176		
5	0	-9	14	469		
6	3	-17	-27	437		
7	3	4	21	648		
8	0	4	47	398		
9	-2	8	19	650		
10	-2	-13	-12	402		
11	-2	4	-25	327		
12	0	8	73	568		
13	0	8	21	495		
14	0	-9	-18	488	WBD	
15						
16						
17						
18			N/A			
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RCS REVIEW [signature] DATE 3-17-04

Material Specific Background and MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 185768 Background Count Time 5.00 minutes

Probe/SN: Ludlum 43-68 / RN012714 Total Instrument Effciency 0.0850 dpm/cpm

Wall Board	**(WB)**	230.00	cpm	**MDC**	242	dpm/100cm2	**Sample Count Time**	15.00	min
Floor Tile	**(FT)**	275.22	cpm	**MDC**	265	dpm/100cm2	**Sample Count Time**	15.00	min
Wood	**(WO)**	210.12	cpm	**MDC**	232	dpm/100cm2	**Sample Count Time**	15.00	min
Cement Floor	**(CF)**	357.50	cpm	**MDC**	302	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	256.10	cpm	**MDC**	256	dpm/100cm2	**Sample Count Time**	15.00	min
Concrete Block	**(CB)**	446.00	cpm	**MDC**	337	dpm/100cm2	**Sample Count Time**	15.00	min
Glass	**(GL)**	304.00	cpm	**MDC**	278	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	232.08	cpm	**MDC**	244	dpm/100cm2	**Sample Count Time**	15.00	min
Black&White Floor Tile	**(BWFT)**	385.38	cpm	**MDC**	313	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	285.78	cpm	**MDC**	334	dpm/100cm2	**Sample Count Time**	5.00	min

Material Specific Background and MDC Sheet for Alpha Measurements

3-17-04

Instrument/SN: Ludlum 2360 / 185768

Background count time 5 minutes

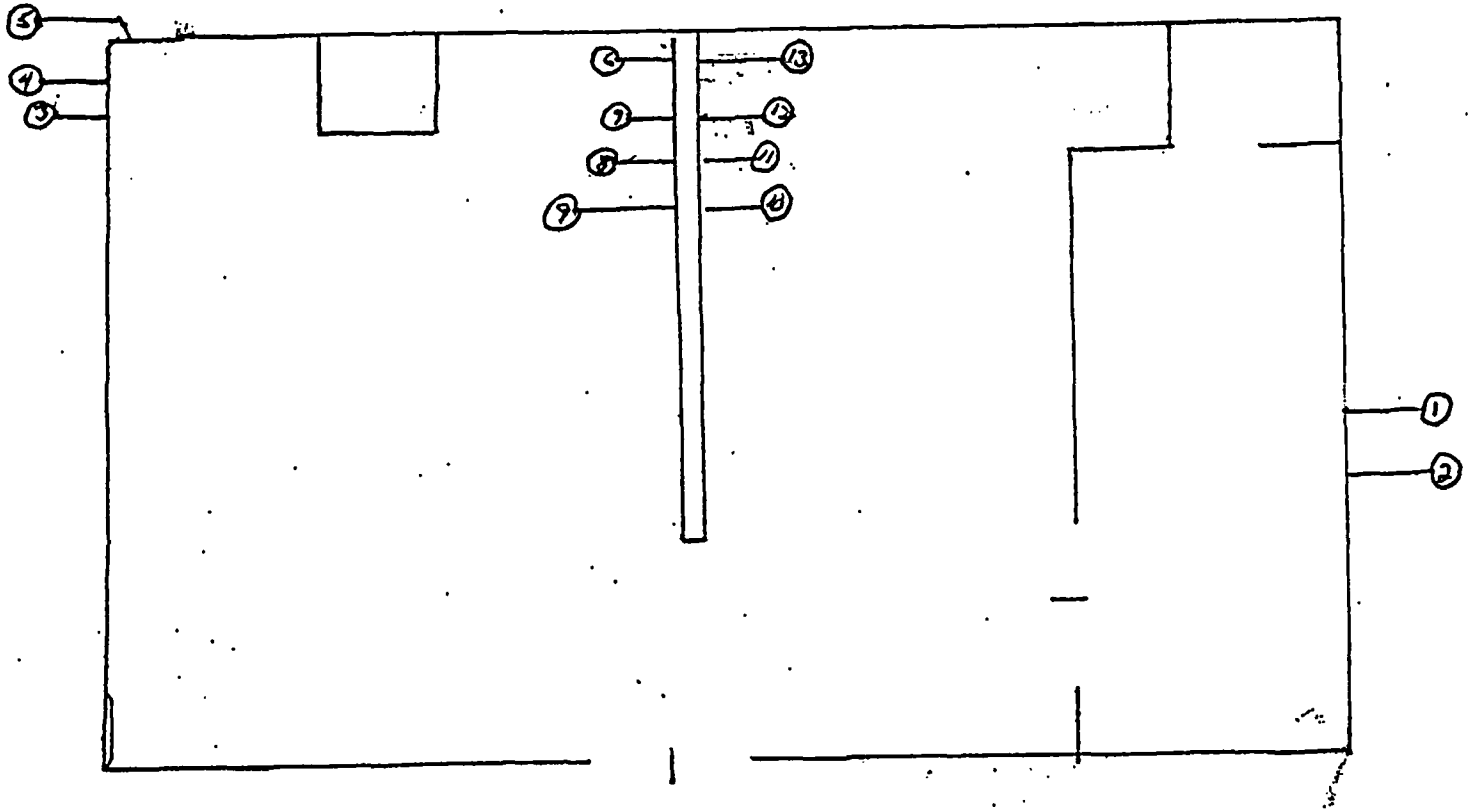
Probe/SN: Ludlum 43-68 / RN012714

Total Instrument Effciency 0.0375 dpm/cpm

Wall Board	**WB**	1.82	cpm	**MDC**	53	dpm/100cm2	**Sample Count Time**	15.00	min
Floor Tile	**FT**	2.22	cpm	**MDC**	58	dpm/100cm2	**Sample Count Time**	15.00	min
Wood	**WO**	3.10	cpm	**MDC**	68	dpm/100cm2	**Sample Count Time**	15.00	min
Cement Floor	**CF**	5.52	cpm	**MDC**	89	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**ME**	1.84	cpm	**MDC**	53	dpm/100cm2	**Sample Count Time**	15.00	min
Concrete Block	**CB**	2.50	cpm	**MDC**	61	dpm/100cm2	**Sample Count Time**	15.00	min
Glass	**GL**	4.38	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**CT**	1.68	cpm	**MDC**	51	dpm/100cm2	**Sample Count Time**	15.00	min
Black&White Floor Tile	**(BWFT)**	16.10	cpm	**MDC**	149	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	3.42	cpm	**MDC**	94	dpm/100cm2	**Sample Count Time**	5.00	min

Contamination / Radiation Survey Report

PROJECT NUMBER: 101115	ACTIVITY / LOCATION:	/ Laboratory-Room LAB A1505/1507	PAGE 4 OF 4
COMMENTS:	SURVEYOR(S): T. TRENT	SURVEY NUMBER: 030504-41	DATE: 03-05-04
	NOTE: THE KNOWING AND WILLFUL RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.		
RCS REVIEW:	DATE: 3-17-04		



Contamination / Ra[illegible]on Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115	DATE: 03-05-04	TIME START: 0900 / TIME COMPLETE: 0950 / PAGE 1 OF 4
LOCATION: EPA NEIC	SURVEYOR(S): T. TRENT		
Denver Federal Center, CO	SURVEY NUMBER: 030504-40		
Denver, CO	MAP ID: LAB A1902		

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS

Source Check Data	Contamination Surveys				Radiation Surveys
[redacted]	α (LOOSE)	α (TOTAL)	β-γ (LOOSE)	β-γ (TOTAL)	Beta-Gamma
Instrument	69659	185774 / 185768	69659	185774 / 185768	NA
Source Type and I.D.	Th-230, 1170/89	Th-230, 1170/89	Cs-137, 92CS5000	Cs-137, 92CS5000	
Source Strength in dpm	13800	13800	769565	769565	µCi
Efficiency	0.24	0.15 / 0.15	0.23	0.18 / 0.17	[redacted]
MDC in dpm/100 cm²	17	See attached sheets for data	179	See attached sheets for data	Sat. ☐ Unsat. ☐
Background in cpm	0.4		97.2		mrem/hr or µrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO. _____
☐ SPECIAL _____
☑ ROUTINE Wall Penetration Survey

Contamination ☑ By SNR ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By SNR ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS:

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #
ALPHA (LOOSE) 2929 , 69659
ALPHA (TOTAL) 2360 , 185768
ALPHA (TOTAL) N/A
BETA-GAMMA (LOOSE) 2929 , 69659
BETA-GAMMA (TOTAL) 2360 , 185768
BETA-GAMMA (TOTAL) N/A

[redacted]	Alpha		Beta-Gamma		Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
	Loose	Total	Loose	Total		
Item #	dpm/100cm²	dpm/100cm²	dpm/100cm²	dpm/100cm²		
1	5	-30	56	484	WBD	See map
2	-2	-47	-3	370		
3	0	-43	-33	374		
4	0	-39	-14	389		
5	-2	-47	3	402		
6	-2	-55	19	39		
7	3	-43	34	69		
8	-2	-51	-10	-41		
9	3	-39	-14	174		
10	3	-43	40	120	WBD	
11						
12						
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15						
16			NA			
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RCS REVIEW [signature] DATE 3-17-04

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3-17-04

Material Specific Background and MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 185768

Probe/SN: Ludlum 43-68 / RN012714

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0850 dpm/cpm

Wall Board	**(WB)**	230.00	cpm	**MDC**	242	dpm/100cm2	**Sample Count Time**	15.00	min
Floor Tile	**(FT)**	275.22	cpm	**MDC**	265	dpm/100cm2	**Sample Count Time**	15.00	min
Wood	**(WO)**	210.12	cpm	**MDC**	232	dpm/100cm2	**Sample Count Time**	15.00	min
Cement Floor	**(CF)**	357.50	cpm	**MDC**	302	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	256.10	cpm	**MDC**	256	dpm/100cm2	**Sample Count Time**	15.00	min
Concrete Block	**(CB)**	446.00	cpm	**MDC**	337	dpm/100cm2	**Sample Count Time**	15.00	min
Glass	**(GL)**	304.00	cpm	**MDC**	278	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	232.08	cpm	**MDC**	244	dpm/100cm2	**Sample Count Time**	15.00	min
Black&White Floor Tile	**(BWFT)**	385.38	cpm	**MDC**	313	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	285.78	cpm	**MDC**	334	dpm/100cm2	**Sample Count Time**	5.00	min

030504-40
3-17-04

Material Specific Background MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 185768

Background count time 5 minutes

Probe/SN: Ludlum 43-68 / RN012714

Total Instrument Effciency 0.0375 dpm/cpm

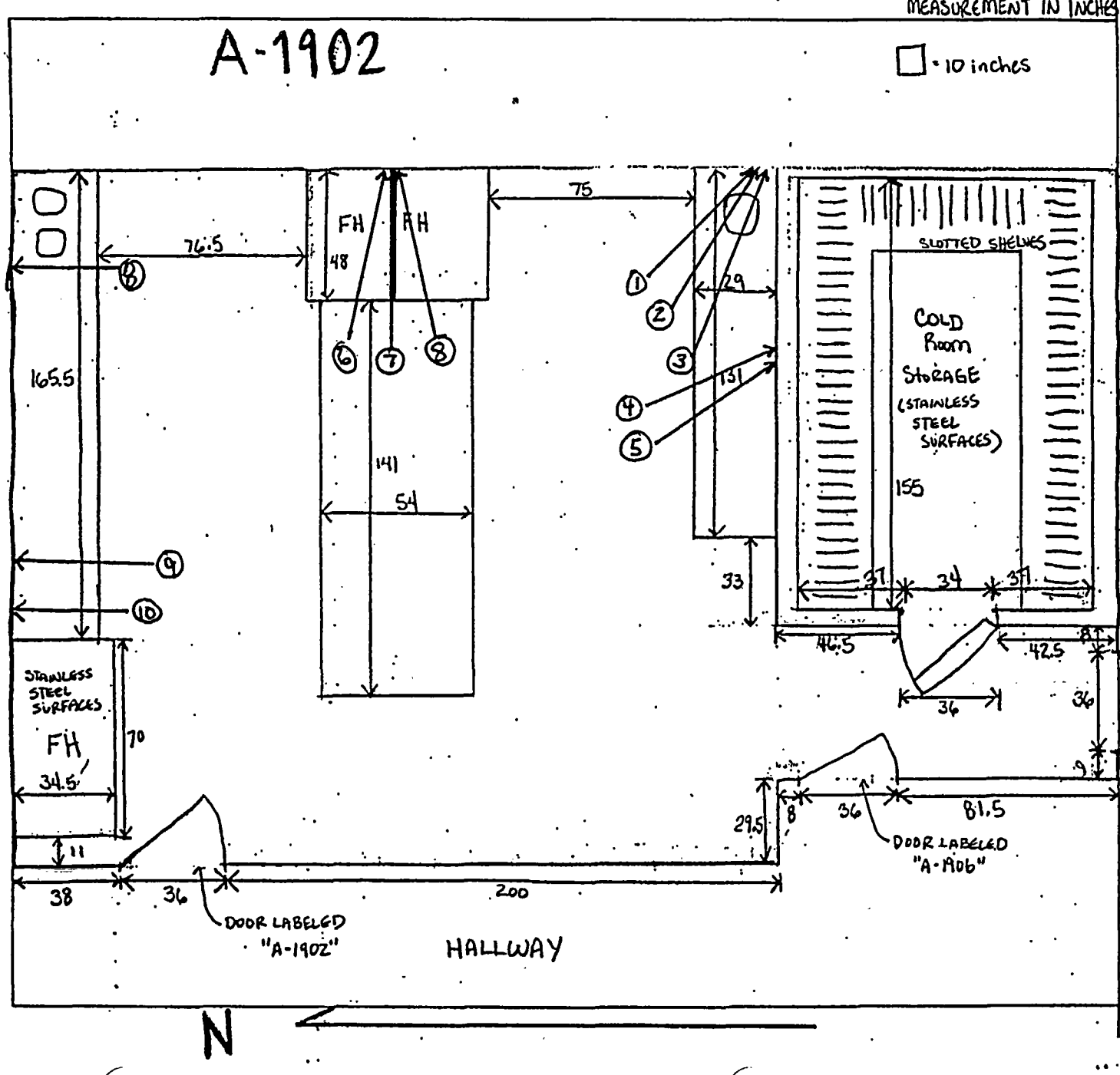
Wall Board	**WB**	1.82	cpm	**MDC**	53	dpm/100cm2	**Sample Count Time**	15.00	min
Floor Tile	**FT**	2.22	cpm	**MDC**	58	dpm/100cm2	**Sample Count Time**	15.00	min
Wood	**WO**	3.10	cpm	**MDC**	68	dpm/100cm2	**Sample Count Time**	15.00	min
Cement Floor	**CF**	5.52	cpm	**MDC**	89	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**ME**	1.84	cpm	**MDC**	53	dpm/100cm2	**Sample Count Time**	15.00	min
Concrete Block	**CB**	2.50	cpm	**MDC**	61	dpm/100cm2	**Sample Count Time**	15.00	min
Glass	**GL**	4.38	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**CT**	1.68	cpm	**MDC**	51	dpm/100cm2	**Sample Count Time**	15.00	min
Black&White Floor Tile	**(BWFT)**	16.10	cpm	**MDC**	149	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	3.42	cpm	**MDC**	94	dpm/100cm2	**Sample Count Time**	5.00	min

030504-40
3-17-04

COMPUTATION SHEET

Proj. No.	Client	Location	Subject
Preparer's Initials	Date	Reviewer's Initials	Date	Approver's Initials	Date

Page ____ of ____



Form No. 0048
Midwest Tech. Servs.
Rev. 08/89

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115	DATE: 03-03-04	TIME START: 1400 / TIME COMPLETE: 1430 / PAGE 1 OF 4
LOCATION: EPA NEIC	SURVEYOR(S): J. STEPHENS		
Denver Federal Center, CO	SURVEY NUMBER: D30304-38		
Denver, CO	MAP ID: LAB B2109		

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS

Source Check Data	Contamination Surveys				Radiation Surveys
	α (LOOSE)	α (TOTAL)	β-γ (LOOSE)	β-γ (TOTAL)	Beta-Gamma
Instrument	69659	185774 / 185768	69659	185774 / 185768	NA
Source Type and I.D.	Th-230, 1170/89	Th-230, 1170/89	Cs-137, 92CS5000	Cs-137, 92CS5000	
Source Strength in dpm	13800	13800	789565	789565	μCi
Efficiency	0.24	0.15 / 0.15	0.23	0.18 / 0.17	
MDC in dpm/100 cm²	17	See attached sheets for data	179	See attached sheets for data	Set. ☐ Unset. ☐
Background in cpm	0.4		97.2		mrem/hr or μrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO.
☐ SPECIAL
☑ ROUTINE WALL PENETRATION Survey

Contamination ☑ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS:

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #		
	ALPHA (LOOSE) 2929 / 69659	BETA-GAMMA (LOOSE) 2929 / 69659
	ALPHA (TOTAL) 2360 / 185774	BETA-GAMMA (TOTAL) 2360 / 185774
	ALPHA (TOTAL) N/A	BETA-GAMMA (TOTAL) NA

Item #	Alpha Loose dpm/100cm²	Alpha Total dpm/100cm²	Beta-Gamma Loose dpm/100cm²	Beta-Gamma Total dpm/100cm²	Alpha cpm ☐ Beta cpm ☐ Material ☐	Item or Location
1	-2	16	25	563	WB	See Map
2	3	20	-27	579	↓	↓
3	-2	-1	40	722	↓	↓
4	0	33	-16	637	↓	↓
5	0	11	12	593	WB	↓
6						
7						
8						
9						
10						
11						
12			NA			
13						
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15						
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THE KNOWING & WILLFUL RECORDING OF FALSE, FETITIOUS, OR FRAUDULENT STATEMENTS OR ENTRES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.

RCS REVIEW [signature] DATE 3-17-04

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JHlum 3-17-04

Material Specific Background and MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 185774

Probe/SN: Ludlum 43-68 / RN012713

Background Count Time 5.00 minutes

Total Instrument Effciency 0.0900 dpm/cpm

Wall Board	**(WB)**	271.18	cpm	**MDC**	307	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	347.86	cpm	**MDC**	281	dpm/100cm2	**Sample Count Time**	15.00	min
Wood	**(WO)**	250.42	cpm	**MDC**	239	dpm/100cm2	**Sample Count Time**	15.00	min
Cement Floor	**(CF)**	498.62	cpm	**MDC**	336	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	325.46	cpm	**MDC**	272	dpm/100cm2	**Sample Count Time**	15.00	min
Concrete Block	**(CB)**	530.62	cpm	**MDC**	347	dpm/100cm2	**Sample Count Time**	15.00	min
Glass	**(GL)**	370.34	cpm	**MDC**	290	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	286.78	cpm	**MDC**	255	dpm/100cm2	**Sample Count Time**	15.00	min
Black&White Floor Tile	**(BWFT)**	393.98	cpm	**MDC**	299	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	306.64	cpm	**MDC**	327	dpm/100cm2	**Sample Count Time**	5.00	min

Material Specific Background and MDC Sheet for Alpha Measurements

Ig 5 of 7
030304-3
3-17-04

Instrument/SN: Ludlum 2360 / 185774

Probe/SN: Ludlum 43-68 / RN012713

Background count time 5 minutes

Total Instrument Effciency 0.0375 dpm/cpm

Wall Board	**WB**	2.30	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**FT**	1.96	cpm	**MDC**	55	dpm/100cm2	**Sample Count Time**	15.00	min
Wood	**WO**	2.24	cpm	**MDC**	58	dpm/100cm2	**Sample Count Time**	15.00	min
Cement Floor	**CF**	3.54	cpm	**MDC**	72	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**ME**	1.10	cpm	**MDC**	42	dpm/100cm2	**Sample Count Time**	15.00	min
Concrete Block	**CB**	1.72	cpm	**MDC**	51	dpm/100cm2	**Sample Count Time**	15.00	min
Glass	**GL**	3.74	cpm	**MDC**	74	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**CT**	2.30	cpm	**MDC**	59	dpm/100cm2	**Sample Count Time**	15.00	min
Black&White Floor Tile	**(BWFT)**	5.04	cpm	**MDC**	85	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	2.06	cpm	**MDC**	76	dpm/100cm2	**Sample Count Time**	5.00	min

19 of 1
030304-38
3-17-04

[redacted]

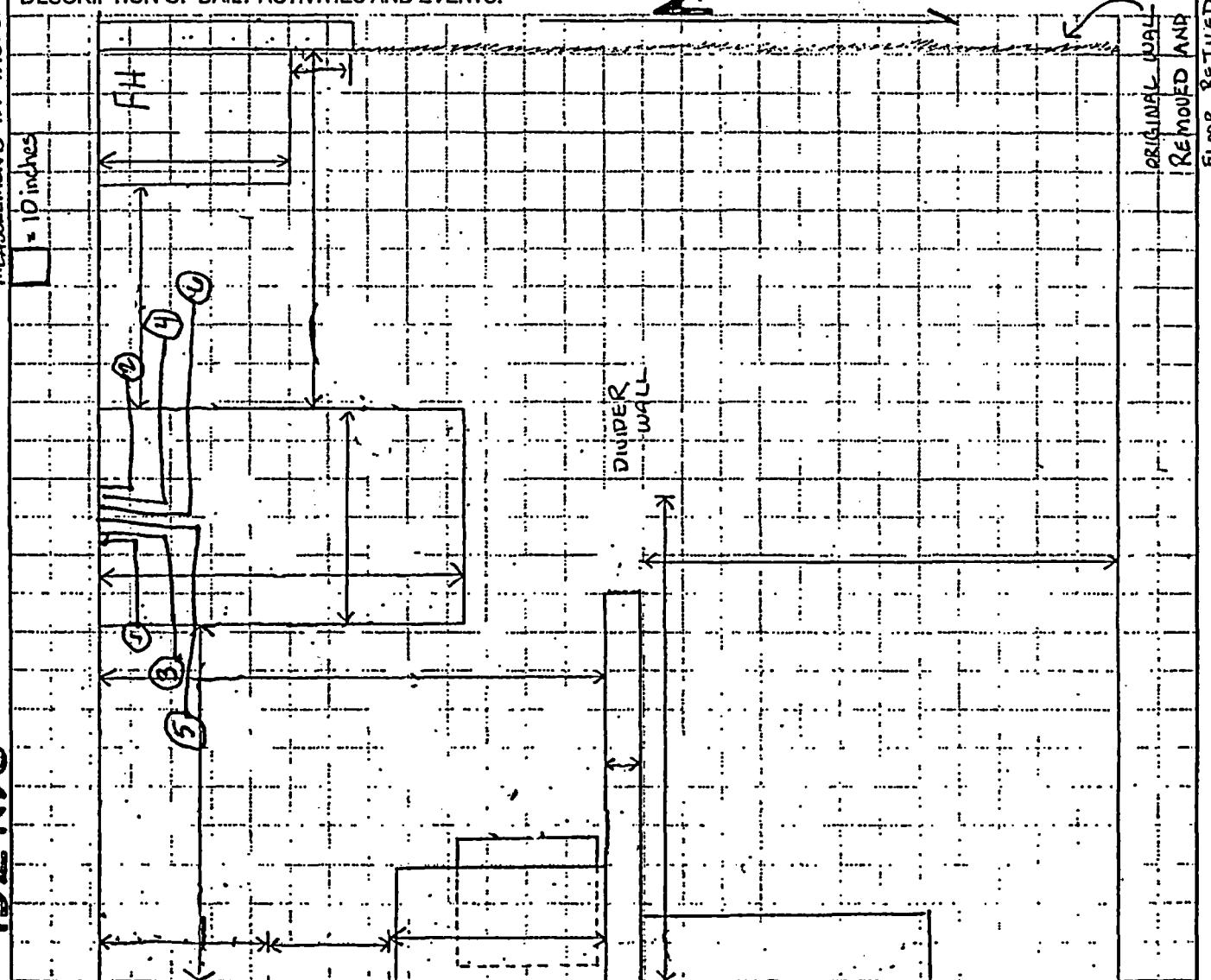
FIELD ACTIVITY DAILY LOG

DAILY LOG				
	DATE			
	NO.			
	SHEET	OF		

PROJECT NAME: | PROJECT NO.:

FIELD ACTIVITY SUBJECT:

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:



VISITORS ON SITE:

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:

WEATHER CONDITIONS:

IMPORTANT TELEPHONE CALLS:

IT PERSONNEL ON SITE:

SIGNATURE: DATE:

B-21009

Contamination / Radiation Survey Report

CONTAMINATION / RADIATION SURVEY REPORT	PROJECT NUMBER: 101115
LOCATION: EPA NEIC	SURVEYOR(S): J. STEPHENS
Denver Federal Center, CO	SURVEY NUMBER: 030504-42
Denver, CO	MAP ID: LA8 D2205

DATE: 03-05-04 | TIME START: 1400 | TIME COMPLETE: 1600 | PAGE 1 OF 4

ACCEPTABLE SURFACE CONTAMINATION LEVELS
Loose 20 dpm/100cm² Alpha 200 dpm/100cm² Beta-Gamma
Total 100 dpm/100cm² Alpha 1,000 dpm/100cm² Beta-Gamma

ACCEPTABLE SCAN LIMITS

Source Check Data	Contamination Surveys				Radiation Surveys
	α (LOOSE)	α (TOTAL)	β-γ (LOOSE)	β-γ (TOTAL)	Beta-Gamma
Instrument	69659	185774 / 185768	69659	185774 / 185768	NA
Source Type and I.D.	Th-230, 1170/89	Th-230, 1170/89	Cs-137, 92CS5000	Cs-137, 92CS5000	
Source Strength in dpm	13800	13800	769565	769565	µCi
Efficiency	0.24	0.15 / 0.15	0.23	0.18 / 0.17	
MDC in dpm/100 cm²	17	See attached sheets for data	179	See attached sheets for data	Sat. ☐ Unsat. ☐
Background in cpm	0.4		97.2		mrem/hr or µrem/hr

REASON FOR SURVEY
☐ PROCEDURE NO. _____
☐ SPECIAL _____
☑ ROUTINE WALL PENETRATION Survey

Contamination: ☑ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐
Radiation ☐ By Shift ☐ Daily ☐ Weekly ☐ Monthly ☐

COMMENTS:

SADS – See Attached Data Sheet

Contamination Survey INSTRUMENT / SERIAL #		
	ALPHA (LOOSE) 2929, 69659	BETA-GAMMA (LOOSE) 2929, 69659
	ALPHA (TOTAL) 2360, 185774	BETA-GAMMA (TOTAL) 2360, 185774
	ALPHA (TOTAL) N/A	BETA-GAMMA (TOTAL) N/A

[redacted]	Alpha		Beta-Gamma		Alpha cpm ☐ Beta cpm ☐ Material ☑	Item or Location
	Loose	Total	Loose	Total		
Item #	dpm/100cm²	dpm/100cm²	dpm/100cm²	dpm/100cm²		
1	0	11	14	464	WB	SEE MAP
2	-2	19	-23	559		
3	5	6	-5	677		
4	-2	2	12	635		
5	-2	19	-16	568		
6	0	19	36	446		
7	3	23	25	646		
8	3	15	10	596		
9	-2	2	-25	478		
10	-2	-6	6	565		
11	0	11	23	683		
12	0	23	-29	587		
13	-2	32	-33	632		
14	5	11	-10	496		
15	2	6	21	575	WB	
16						
17						
18						
19						
20			N/A			
21						
22						
23						
24						
25						

THE KNOWING & WILLFUL RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRES ON THIS DOCUMENT MAY BE PUNISHABLE AS A FELONY UNDER FEDERAL STATUTES.

RCS REVIEW [signature] DATE 3-17-04

Pg 2 of 7
030504.42
3-17-04

Material Specific Background and MDC Sheet for Beta Measurements

Instrument/SN: Ludlum 2360 / 185774 Background Count Time 5.00 minutes

Probe/SN: Ludlum 43-68 / RN012713 Total Instrument Effciency 0.0900 dpm/cpm

Wall Board	**(WB)**	271.18	cpm	**MDC**	307	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**(FT)**	347.86	cpm	**MDC**	281	dpm/100cm2	**Sample Count Time**	15.00	min
Wood	**(WO)**	250.42	cpm	**MDC**	239	dpm/100cm2	**Sample Count Time**	15.00	min
Cement Floor	**(CF)**	498.62	cpm	**MDC**	336	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**(ME)**	325.46	cpm	**MDC**	272	dpm/100cm2	**Sample Count Time**	15.00	min
Concrete Block	**(CB)**	530.62	cpm	**MDC**	347	dpm/100cm2	**Sample Count Time**	15.00	min
Glass	**(GL)**	370.34	cpm	**MDC**	290	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**(CT)**	286.78	cpm	**MDC**	255	dpm/100cm2	**Sample Count Time**	15.00	min
Black&White Floor Tile	**(BWFT)**	393.98	cpm	**MDC**	299	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	306.64	cpm	**MDC**	327	dpm/100cm2	**Sample Count Time**	5.00	min

0504-42
3-17-04

Material Specific Background MDC Sheet for Alpha Measurements

Instrument/SN: Ludlum 2360 / 185774

Probe/SN: Ludlum 43-68 / RN012713

Background count time 5 minutes

Total Instrument Effciency 0.0375 dpm/cpm

Wall Board	**WB**	2.30	cpm	**MDC**	79	dpm/100cm2	**Sample Count Time**	5.00	min
Floor Tile	**FT**	1.96	cpm	**MDC**	55	dpm/100cm2	**Sample Count Time**	15.00	min
Wood	**WO**	2.24	cpm	**MDC**	58	dpm/100cm2	**Sample Count Time**	15.00	min
Cement Floor	**CF**	3.54	cpm	**MDC**	72	dpm/100cm2	**Sample Count Time**	15.00	min
Metal	**ME**	1.10	cpm	**MDC**	42	dpm/100cm2	**Sample Count Time**	15.00	min
Concrete Block	**CB**	1.72	cpm	**MDC**	51	dpm/100cm2	**Sample Count Time**	15.00	min
Glass	**GL**	3.74	cpm	**MDC**	74	dpm/100cm2	**Sample Count Time**	15.00	min
Counter Top	**CT**	2.30	cpm	**MDC**	59	dpm/100cm2	**Sample Count Time**	15.00	min
Black&White Floor Tile	**(BWFT)**	5.04	cpm	**MDC**	85	dpm/100cm2	**Sample Count Time**	15.00	min
Wall Board Downstairs	**(WBD)**	2.06	cpm	**MDC**	76	dpm/100cm2	**Sample Count Time**	5.00	min

030504-42
3-17-04

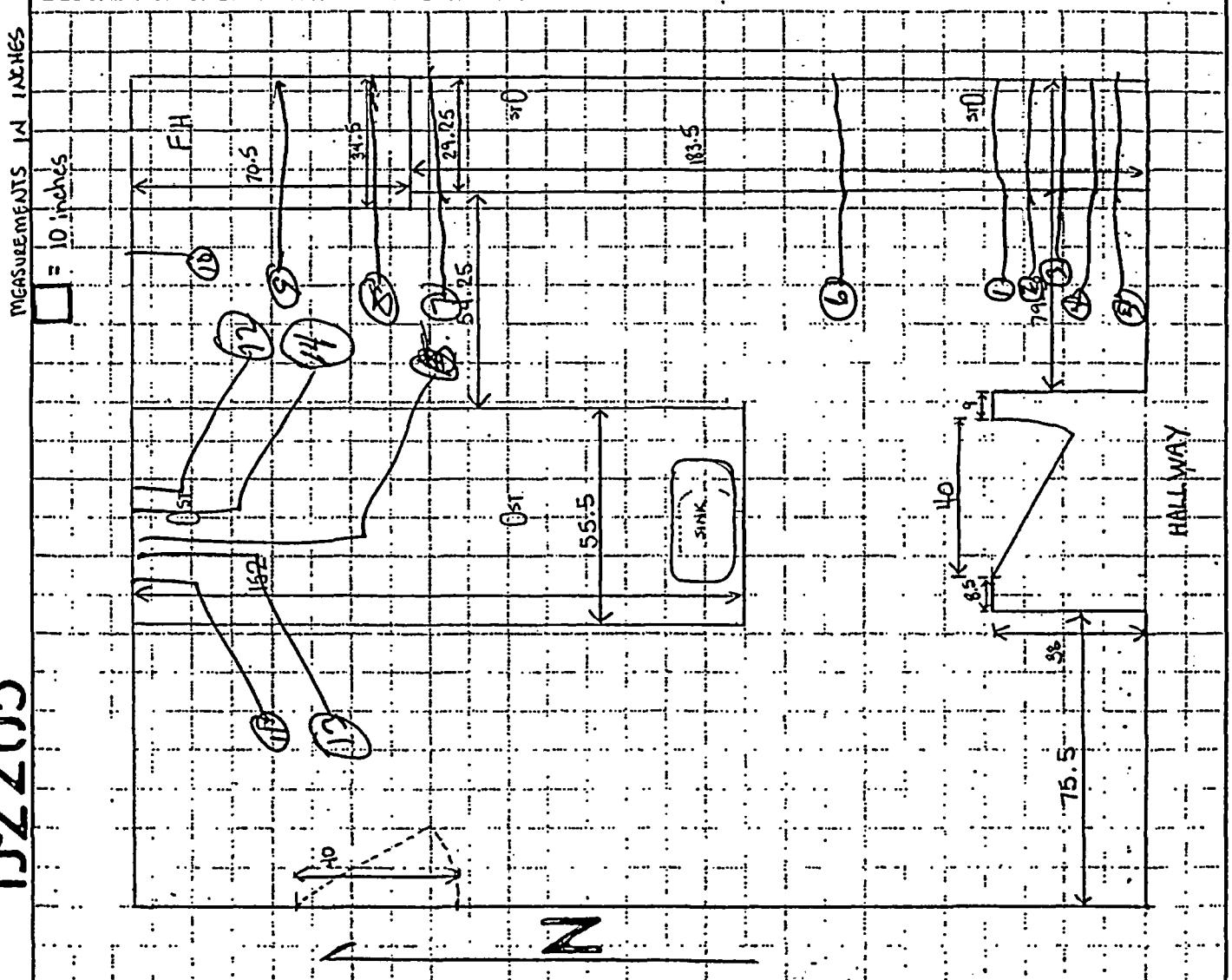
[redacted]

FIELD ACTIVITY DAILY LOG

DAILY LOG				
	DATE			
	NO.			
	SHEET	OF		

PROJECT NAME:	PROJECT NO.:
FIELD ACTIVITY SUBJECT:	

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:



VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:
WEATHER CONDITIONS:	IMPORTANT TELEPHONE CALLS:

IT PERSONNEL ON SITE:

SIGNATURE: DATE:

D-2205

Reference Material Background Data

Material Background Data Collection Sheet

Instrument/SN: 184904 / 2360 Survey Number: 021804-07

Probe/SN: 138731 / 4368 Surveyor: [illegible]

Date: 02-18-04

LABORATROY D2109E

Location	Alpha Data in cpm	Beta Data in cpm
Wall Board		
WB-1	8	1140
WB-2	9	1118
WB-3	9	1197
WB-4	4	1126
WB-5	8	1221
WB-6	9	1174
WB-7	5	1244
WB-8	7	1130
WB-9	6	1300
WB-10	5	1297
Floor tile		
FT-1	10	1501
FT-2	10	1520
FT-3	9	1562
FT-4	13	1658
FT-5	10	1471
FT-6	18	1532
FT-7	14	1390
FT-8	6	1411
FT-9	9	1742
FT-10	14	1459
Wood		
WO-1	5	1021
WO-2	7	1137
WO-3	13	1037
WO-4	24	1102
WO-5	19	1118
WO-6	11	1224
WO-7	7	823
WO-8	12	1142
WO-9	2	546
WO-10	6	687

[illegible] 2-18-04

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 184904 iP

Survey Number: Q1804-07

Probe/SN: 138731 1

Surveyor: [illegible]

Location	Alpha Data in cpm	Beta Data in cpm
LABORATROY D2109E		
Concrete Floor		
CF-6	17	1714
CF-7	11	1644
CF-8	17	1685
CF-9	15	1859
CF-10	15	2014
Metal		
ME-6	14	1206
ME-7	12	1173
ME-8	4	1895
ME-9	5	1421
ME-10	3	895
LABORATORY A1004		
Concrete Floor		
CF-1	30	2806
CF-2	28	2816
CF-3	39	2909
CF-4	19	2510
CF-5	29	2594
Metal		
ME-1	11	1808
ME-2	12	1799
ME-3	4	1711
ME-4	9	1875
ME-5	9	1849
Concret Block		
CB-1	11	2188
CB-2	7	2237
CB-3	4	2190
CB-4	7	2292
CB-5	8	2241
CB-6	9	2313
CB-7	19	2681
CB-8	7	2386
CB-9	5	2407
CB-10	6	2444

[illegible] 2-18-04

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 184904 / Survey Number: 021804-01

Probe/SN: 138731 / Surveyor: [illegible]

Location	Alpha Data in cpm	Beta Data in cpm
BUILDING LOBBY ON 6th STREET		
Glass		
GL-1	28	1748
GL-2	21	1746
GL-3	21	1738
GL-4	19	1823
GL-5	20	1661
GL-6	36	1751
GL-7	35	1657
GL-8	19	1777
GL-9	20	1751
GL-10	22	1765
Countertop		
	11	1572
	9	1512
	11	1378
	14	1455
	14	1532
	13	1510
	7	1444
	7	1320
	14	1427
	10	1476

[illegible] 2-18-04

Material Background Data Collection Sheet

Instrument/SN: 2360 1 #185774

Probe/SN: 43-68 #1RN012713

Survey Number: 021804-09

Surveyor: [illegible]

Date: 02-18-04

LABORATROY D2109E

Location	Alpha Data in cpm	Beta Data in cpm
Wall Board		
WB-1	9	1266
WB-2	9	1288
WB-3	10	1364
WB-4	14	1389
WB-5	11	1486
WB-6	15	1303
WB-7	15	1233
WB-8	12	1460
WB-9	15	1364
WB-10	7	1381
Floor tile		
FT-1	18	1796
FT-2	4	1702
FT-3	9	1792
FT-4	9	1745
FT-5	12	1695
FT-6	10	1795
FT-7	17	1695
FT-8	14	1701
FT-9	5	1690
FT-10	10	1782
Wood		
WO-1	14	1253
WO-2	7	1270
WO-3	14	1276
WO-4	11	1264
WO-5	6	1323
WO-6	10	1292
WO-7	14	1206
WO-8	11	1274
WO-9	9	1224
WO-10	7	1296

[illegible] 2-18-04

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 2360 1#185774 Survey Number: 021804-09

Probe/SN: 43-68 1#RN012713 Surveyor: JR

Location	Alpha Data in cpm	Beta Data in cpm
LABORATROY D2109E		
Concrete Floor		
CF-6	5	2481
CF-7	7	2047
CF-8	9	2367
CF-9	13	2450
CF-10	8	2439
Metal		
ME-6	2	1389
ME-7	5	1352
ME-8	2	1333
ME-9	10	1826
ME-10	6	1448
LABORATORY A1004		
Concrete Floor		
CF-1	30	2380
CF-2	32	2516
CF-3	26	2686
CF-4	26	2772
CF-5	17	2833
Metal		
ME-1	2	1383
ME-2	10	1927
ME-3	7	1853
ME-4	14	1939
ME-5	6	1829
Concret Block		
CB-1	7	2318
CB-2	5	2330
CB-3	12	2394
CB-4	9	2404
CB-5	6	2547
CB-6	12	2583
CB-7	12	2988
CB-8	7	2922
CB-9	11	2748
CB-10	7	3074

JR 2-18-04

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 2360 1 #185774 Survey Number: 021804-09

Probe/SN: 43-68 #RN012713 Surveyor: [illegible]

Location	Alpha Data in cpm	Beta Data in cpm
BUILDING LOBBY ON 6th STREET		
Glass		
GL-1	23	1808
GL-2	[illegible]	1833
GL-3	12	1845
GL-4	[illegible]	[illegible]
GL-5	16	1863
GL-6	[illegible]	1835
GL-7	24	1916
GL-8	[illegible]	[illegible]
GL-9	18	1852
GL-10	[illegible]	1804
LABORATROY D2109E		
Countertop		
CT-1	16	1108
CT-2	[illegible]	1138
CT-3	18	1382
CT-4	[illegible]	1504
CT-5	15	1389
CT-6	[illegible]	1938
CT-7	12	1658
CT-8	[illegible]	[illegible]
CT-9	1	1561
CT-10	[illegible]	[illegible]

[illegible] 2/18/04

Material Background Data Collection Sheet

Instrument/SN: 185768 / 2360

Probe/SN: RNO12714 / 4368

Survey Number: 021804-08

Surveyor: Trent

Date: 2-18-04

Location	Alpha Data in cpm	Beta Data in cpm
LABORATROY D2109E		
Wall Board		
WB-1	6	1126
WB-2		
WB-3	6	1191
WB-4		
WB-5	9	1141
WB-6		
WB-7	12	943
WB-8		
WB-9	7	1224
WB-10		
Floor tile		
FT-1	12	1468
FT-2		
FT-3	11	1449
FT-4		
FT-5	12	1353
FT-6		
FT-7	9	1313
FT-8		
FT-9	9	1381
FT-10		
Wood		
WO-1	14	678
WO-2		
WO-3	11	1026
WO-4		
WO-5	19	1193
WO-6		
WO-7	19	1101
WO-8		
WO-9	12	1086
WO-10		

JHolm 21804

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 185768 / 2360 Survey Number: 021804-08

Probe/SN: RN012714 / 4368 Surveyor: TRENT

Location	Alpha Data in cpm	Beta Data in cpm
LABORATROY D2109E		
Concrete Floor		
CF-6	25	1962
CF-7	[illegible]	[illegible]
CF-8	19	1944
CF-9	[illegible]	[illegible]
CF-10	17	2104
Metal		
ME-6	12	1236
ME-7	[illegible]	[illegible]
ME-8	5	1209
ME-9	[illegible]	[illegible]
ME-10	7	1784
LABORATORY A1004		
Concrete Floor		
CF-1	34	880
CF-2	[illegible]	[illegible]
CF-3	44	1643
CF-4	[illegible]	[illegible]
CF-5	27	2365
Metal		
ME-1	7	1051
ME-2	[illegible]	[illegible]
ME-3	12	1162
ME-4	[illegible]	[illegible]
ME-5	11	1551
Concret Block		
CB-1	8	2063
CB-2	[illegible]	[illegible]
CB-3	5	2220
CB-4	[illegible]	[illegible]
CB-5	10	2450
CB-6	[illegible]	[illegible]
CB-7	11	2179
CB-8	[illegible]	[illegible]
CB-9	14	2145
CB-10	[illegible]	[illegible]

2-18-04

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 185768 / 2360 Survey Number: 021804-08

Probe/SN: RN012714 / 4368 Surveyor: Trent

Location	Alpha Data in cpm	Beta Data in cpm
BUILDING LOBBY ON 6th STREET		
Glass		
GL-1	31	1421
GL-2	25	1636
GL-3	14	1582
GL-4	26	1628
GL-5	20	1508
GL-6	25	1409
GL-7	20	1300
GL-8	18	1506
GL-9	23	1551
GL-10	17	1359
LABORATROY D2109E		
Countertop		
CT-1	6	918
CT-2	9	1096
CT-3	13	1008
CT-4	10	1435
CT-5	9	1044
CT-6	9	1043
CT-7	9	1252
CT-8	7	1258
CT-9	4	1302
CT-10	8	1297

2-8-04

Material Background Data Collection Sheet

Instrument/SN: 2360 / 185768 Survey Number: 030804-45

Probe/SN: 43-68 / RN012714 Surveyor: Trent

Date: 3-5-04

Location	Alpha Data in cpm	Beta Data in cpm
	~~LABORATROY D2109E~~ A-1509	
Wall Board		
WB-1	23	1317
WB-2	[redacted]	[redacted]
WB-3	11	1429
WB-4	[redacted]	[redacted]
WB-5	20	1439
WB-6	[redacted]	[redacted]
WB-7	14	1517
WB-8	[redacted]	[redacted]
WB-9	17	1389
WB-10	[redacted]	[redacted]
Floor tile		
FT-1		
FT-2	[redacted]	[redacted]
FT-3		
FT-4	[redacted]	[redacted]
FT-5		
FT-6	[redacted]	[redacted]
FT-7		
FT-8	[redacted]	[redacted]
FT-9		
FT-10	[redacted]	[redacted]
Wood		
WO-1		
WO-2	[redacted]	[redacted]
WO-3		
WO-4	[redacted]	[redacted]
WO-5		
WO-6	[redacted]	[redacted]
WO-7		
WO-8	[redacted]	[redacted]
WO-9		
WO-10	[redacted]	[redacted]

3-9-04

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 2360 / 185768 Survey Number: 030804-45

Probe/SN: 43-68 / RN012714 Surveyor: Trent

Location	Alpha Data in cpm	Beta Data in cpm
LABORATROY D2109E		
Concrete Floor		
CF-6		
CF-7		
CF-8		
CF-9		
CF-10		
Metal		
ME-6		
ME-7		
ME-8		
ME-9		
ME-10		
LABORATORY A1004		
Concrete Floor		
CF-1		
CF-2		
CF-3		
CF-4		
CF-5		
Metal		
ME-1		
ME-2		
ME-3		
ME-4		
ME-5		
Concret Block		
CB-1		
CB-2		
CB-3		
CB-4		
CB-5		
CB-6		
CB-7		
CB-8		
CB-9		
CB-10		

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 2360 / 185768 Survey Number: 030804-45

Probe/SN: 43-68 / RN012714 Surveyor: Trent

Location	Alpha Data in cpm	Beta Data in cpm
BUILDING LOBBY ON 6th STREET		
Glass		
GL-1		
GL-2		
GL-3		
GL-4		
GL-5		
GL-6		
GL-7		
GL-8		
GL-9		
GL-10		
LABORATROY D2109E		
Countertop		
CT-1		
CT-2		
CT-3		
CT-4		
CT-5		
CT-6		
CT-7		
CT-8		
CT-9		
CT-10		
CLEAN HALLWAY		
Black & White Floor Tile		
FT-1	98	1848
FT-2	93	1947
FT-3	72	1884
FT-4	58	1922
FT-5	72	1919
FT-6	84	1921
FT-7	57	1910
FT-8	84	2028
FT-9	45	1949
FT-10	52	2010

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 2360 / 185768 Survey Number: 030804-45

Probe/SN: 43-68 / RN012714 Surveyor: Trent

Location	Alpha Data in cpm	Beta Data in cpm
	HALLWAY OUTSIDE OF LAB	
Sand Coating		
SC-1	80	2091
SC-2	68	2069
SC-3	49	1822
SC-4	77	1704
SC-5	61	1707
SC-6	75	1538
SC-7	29	1668
SC-8	29	1790
SC-9	18	1564
SC-10	29	1555

Material Background Data Collection Sheet

Instrument/SN: 2360 / 185774 Survey Number: 0308-04-46

Probe/SN: 43-68 / RN012713 Surveyor: STephens

Date: 3-8-04

~~LABORATROY D2109E~~ A-1509

Location	Alpha Data in cpm	Beta Data in cpm
Wall Board		
WB-1	11	1565
WB-2	9	1469
WB-3	16	1525
WB-4	15	1577
WB-5	10	1438
WB-6	7	1581
WB-7	7	1539
WB-8	15	1472
WB-9	10	1594
WB-10	10	1578
Floor tile		
FT-1		
FT-2		
FT-3		
FT-4		
FT-5		
FT-6		
FT-7		
FT-8		
FT-9		
FT-10		
Wood		
WO-1		
WO-2		
WO-3		
WO-4		
WO-5		
WO-6		
WO-7		
WO-8		
WO-9		
WO-10		

3-9-04

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 2360 185774 Survey Number: 030804-46

Probe/SN: 43e8 RNO 12713 Surveyor: Stephens

Location	Alpha Data in cpm	Beta Data in cpm
LABORATROY D2109E		
Concrete Floor		
CF-6		
CF-7		
CF-8		
CF-9		
CF-10		
Metal		
ME-6		
ME-7		
ME-8		
ME-9		
ME-10		
LABORATORY A1004		
Concrete Floor		
CF-1		
CF-2		
CF-3		
CF-4		
CF-5		
Metal		
ME-1		
ME-2		
ME-3		
ME-4		
ME-5		
Concret Block		
CB-1		
CB-2		
CB-3		
CB-4		
CB-5		
CB-6		
CB-7		
CB-8		
CB-9		
CB-10		

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 2360 / 185774 Survey Number: D30804-46

Probe/SN: 43-48 / RND12713 Surveyor: Wise/Stephens

Location	Alpha Data in cpm	Beta Data in cpm
BUILDING LOBBY ON 6th STREET		
Glass		
GL-1		
GL-2		
GL-3		
GL-4		
GL-5		
GL-6		
GL-7		
GL-8		
GL-9		
GL-10		
LABORATROY D2109E		
Countertop		
CT-1		
CT-2		
CT-3		
CT-4		
CT-5		
CT-6		
CT-7		
CT-8		
CT-9		
CT-10		
CLEAN HALLWAY		
Black & White Floor Tile		
FT-1	26	1926
FT-2		
FT-3	26	1840
FT-4		
FT-5	33	2017
FT-6		
FT-7	30	2101
FT-8		
FT-9	14	2061
FT-10		

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 2B16D 1185774 Survey Number: 020804-416

Probe/SN: 43-68 1RU012713 Surveyor: Stephens

Location	Alpha Data in cpm	Beta Data in cpm
	HALLWAY OUTSIDE OF LAB	
Sand Coating		
SC-1	66/2208	2208
SC-2	29/1858	1858
SC-3	22/2025	2025
SC-4	27/2178	2178
SC-5	19/1836	1836
SC-6	16/2025	2025
SC-7	25/2120	2120
SC-8	33/1915	1915
SC-9	29/1849	1849
SC-10	32/1955	1955

Material Background Data Collection Sheet

Instrument/SN: 2360 1 ~~184940~~ 184904 Survey Number: 030804-47

Probe/SN: 43-68 1 PR138731 Surveyor: Wise

Date: 3-8-04

Location	Alpha Data in cpm	Beta Data in cpm
LABORATROY D2109E		
Wall Board		
WB-1	[redacted]	[redacted]
WB-2	[redacted]	[redacted]
WB-3	[redacted]	[redacted]
WB-4	[redacted]	[redacted]
WB-5	[redacted]	[redacted]
WB-6	[redacted]	[redacted]
WB-7	[redacted]	[redacted]
WB-8	[redacted]	[redacted]
WB-9	[redacted]	[redacted]
WB-10	[redacted]	[redacted]
Floor tile		
FT-1	[redacted]	[redacted]
FT-2	[redacted]	[redacted]
FT-3	[redacted]	[redacted]
FT-4	[redacted]	[redacted]
FT-5	[redacted]	[redacted]
FT-6	[redacted]	[redacted]
FT-7	[redacted]	[redacted]
FT-8	[redacted]	[redacted]
FT-9	[redacted]	[redacted]
FT-10	[redacted]	[redacted]
Wood		
WO-1	[redacted]	[redacted]
WO-2	[redacted]	[redacted]
WO-3	[redacted]	[redacted]
WO-4	[redacted]	[redacted]
WO-5	[redacted]	[redacted]
WO-6	[redacted]	[redacted]
WO-7	[redacted]	[redacted]
WO-8	[redacted]	[redacted]
WO-9	[redacted]	[redacted]
WO-10	[redacted]	[redacted]

3.9.04

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 2360 / 184904 Survey Number: 030804-47

Probe/SN: 43-68 / PR138731 Surveyor: Wade

Location	Alpha Data in cpm	Beta Data in cpm
LABORATROY D2109E		
Concrete Floor		
CF-6		
CF-7		
CF-8		
CF-9		
CF-10		
Metal		
ME-6		
ME-7		
ME-8		
ME-9		
ME-10		
LABORATORY A1004		
Concrete Floor		
CF-1		
CF-2		
CF-3		
CF-4		
CF-5		
Metal		
ME-1		
ME-2		
ME-3		
ME-4		
ME-5		
Concret Block		
CB-1		
CB-2		
CB-3		
CB-4		
CB-5		
CB-6		
CB-7		
CB-8		
CB-9		
CB-10		

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 2360 / 184904 Survey Number: 030804-47

Probe/SN: 43-68 / PR 138731 Surveyor: WWW

Location	Alpha Data in cpm	Beta Data in cpm
BUILDING LOBBY ON 6th STREET		
Glass		
GL-1		
GL-2		
GL-3		
GL-4		
GL-5		
GL-6		
GL-7		
GL-8		
GL-9		
GL-10		
LABORATROY D2109E		
Countertop		
CT-1		
CT-2		
CT-3		
CT-4		
CT-5		
CT-6		
CT-7		
CT-8		
CT-9		
CT-10		
CLEAN HALLWAY		
Black & White Floor Tile		
FT-1	17	4825
FT-2	16	4903
FT-3	16	4894
FT-4	15	4861
FT-5	16	4911
FT-6	15	4875
FT-7	18	4921
FT-8	17	4916
FT-9	16	4902
FT-10	15	4897

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 2360 / 184904 Survey Number: 080804-47

Probe/SN: 43-68 / PR138731 Surveyor: Wue

Location	Alpha Data in cpm	Beta Data in cpm
HALLWAY OUTSIDE OF LAB		
Sand Coating		
SC-1		
SC-2		
SC-3		
SC-4		
SC-5		
SC-6		
SC-7		
SC-8		
SC-9		
SC-10		

Material Background Data Collection Sheet
Continuation Page

Instrument/SN: 2360 / 184904 Survey Number: 030904-49

Probe/SN: 4368 / PR138731 Surveyor: J Nelson

Location	Alpha Data in cpm	Beta Data in cpm
HALLWAY OUTSIDE OF LAB		
Sand Coating		
SC-1		
SC-2		
SC-3		
SC-4		
SC-5		
SC-6		
SC-7		
SC-8		
SC-9		
SC-10		
LAB A1509		
Wall Board Downstairs		
WBD-1	5	1225
WBD-2	[illegible]	1375
WBD-3	4	1335
WBD-4	13[illegible]	1382
WBD-5	2	1434
WBD-6	[illegible]	1368
WBD-7	12	1406
WBD-8	[illegible]	1336
WBD-9	0	1338
WBD-10	[illegible]	1328

3-9-04

Sealed Source Leak Test Data

SURVEY OF LABORATORY AREAS FOR RADIATION: January 11, 2000

Completed at 10:00 am.

No activity above background. [signature]

PORTABLE X-RAY UNITS TESTED JANUARY 2000

DEVICE	SOURCE	ACTIVITY	DATE ORIGIN	SOURCE SERIAL NO	TEST NUMBER	TEST DATE	TEST RESULT
SPECTRACE 9290	Am-241	5 mCi		LQ-0866	955581	01-18-2000	<0.005 μCi
Q-091	Cd-109	4 mCi		LY-2883	955379	01-18-2000	<0.005 μCi
	Fe-55	50 mCi		LG-6704	955360	01-18-2000	<0.005 μCi
NITON 722	Am-241	14 mCi	06-13-1998	5995LX	955389	01-14-2000	<0.005 μCi
1039	Cd-109	10 mCi	05-20-1998	4048LX	955375	01-14-2000	<0.005 μCi
NITON 722	Am-241	14 mCi		10262	955388	01-18-2000	<0.005 μCi
U1350	Cd-109	10 mCi		10261	955589	01-18-2000	<0.005 μCi
NITON 722	Am-241	14 mCi		10264	955590	01-18-2000	<0.009 μCi
U1351	Cd-109	10 mCi		10263	955373	01-18-2000	<0.005 μCi

JULY 2000

Nickel-63 ECD units of HP GC instruments in Room B2408

TESTED JULY 3, 2000; ANALYZED JULY 10, 2000

PO No. OU2357-NNSA Results received July 17, 2000

SERIAL NUMBER	GC UNIT	TEST RESULT
F 3681	AA	Less than 0.001 μCi
K 5369	AA	Less than 0.001 μCi
L 4731	CC	Less than 0.001 μCi
V0088	PP	Less than 0.001 μCi
U1225	PP	Less than 0.001 μCi

Cadmium-109, Americium-241, Iron 55 Portable X-ray Units

TESTED JULY 3 AND , 2000 VALLEY SAFETY SERVICE ASSOC. PO OU-2356 NASA

DEVICE	SOURCE	ACTIVITY	DATE ORIGINAL	SOURCE SERIAL NO.	TEST NUMBER	TEST DATE	TEST RESULT
SPECTRACE 9490	Am-241	5 mCi		LQ-08666	956534	July 5, 2000	<0.005 μCi
Q-091	Cd-109	4 mCi		LY-2883	956534	July 5, 2000	<0.005 μCi 7-13-2000
	Fe-55	50 mCi		LG-6704	956534	July 5, 2000	<0.005 μCi
NITON 722	Am-241	14 mCi	6-13-1998	5993 LX	956533	July 3, 2000	<0.005 μCi 7-13-2000
U1039	Cd-109	10 mCi	5-20-1999	4048LY	956533	July 3, 2000	<0.005 μCi
NITON 722	Am-241	14 mCi		10262	956734	July 5, 2000	<0.005 μCi 7-12-2000
U1350	Cd-109	10 mCi		10261	956734	July 5, 2000	<0.005 μCi
NITON 722	Am-241	14 mCi		10264	956732	July 5, 2000	<0.005 μCi 7-13-2000
U1351	Cd 109	10 mCi		10263	956532	July 5 2000	<0.005 μCi

JANUARY 2001

Nickel-63 ECD units of HP GC instruments in B53 Room B240:

TESTED January 9, 2001 RECEIVED at Spencer Scientific Laboratory 01/13/01

ANALYZED 01/13/01

SERIAL NUMBER	GC UNIT	TEST RESULT
U 0088	4491 PP "Franz"	Less than 0.001 µCi
U 1225	4491 PP "Franz"	Less than 0.001 µCi
U 2504	4967	Less than 0.001 µCi
U 2506	4967	Less Than 0.001 µCi

PORTABLE X-RAY UNITS WIPE TESTS AT NEIC January 11, 2001

TESTED January 17 and 18, 2001 at Valley Safety Services Associates, Rec'd January 26, 2001

DEVICE	SOURCE	ACTIVITY	DATE of ORIGIN	SOURCE SERIAL No.	TEST NUMBER	TEST DATE	TEST RESULT
SCIENCE 290	Am-241	5mCi		LQ-0866	957710	01-11-2001	Less than 0.005 µCi
Q-091	Cd-109	4mCi		LY-2883	957710	01-11-2001	"
	Fe-55	56mCi		LG-6704	957710	01-11-2001	"
NITRON 722	(Don Smith) Am-241	14mCi	06-15-1998	5995 LX	957549	01-11-2001	Less than 0.005 µCi
U1039	Cd-109	10mCi	05-21-1999	4048 LY	957549	01-11-2001	"
NITON 722	Am-241	14mCi		10262	957700	01-11-2001	Less than 0.005 µCi
U1350	Cd-109	10mCi		10261	957700	01-11-2001	"
NITON 722	Am-241	14mCi		10264	957705	01-11-2001	Less than 0.005 µCi
U1351	Cd-109	10mCi		10263	957705	01-11-2001	"

JULY 2001

The Nickel-63 ECD units of the Hewlett-Packard Gas Chromatography units, located in Bldg 53, Room B 2408, were tested on July 11, 2001, and tests sent to Spencer Scientific Laboratory on this date. They were received at Spencer and tested July 16, 2001

Test results were received back on July 23, 2001

SERIAL NUMBER	GC UNIT	TEST RESULT
U 0088	4491 PP	Less than 0.001 μCi
U 1225	4491 PP	"
U 2504	4967	"
U 2506	4967	"

The portable X-ray units – Spectrace and Niton – were wipe tested on July 11, 2001, for analysis by Valley Safety Service Associates, 330 Old Enfield Road, Belchertown, MA 01007.

Units received at VSSA, and tested on July 16, 2001

Test results received on July 26, 2001

DEVICE	SOURCE	ACTIVITY	DATE OF ORIGIN	SOURCE SERIAL NO.	TEST NUMBER	TEST DATE	TEST RESULT
SPECTRACE 9290	Am241	5 mCi		LQ 0866	999088	07-11-2001	Less than 0.005 μCi
	Cd109	4		LY 2883	"	"	✓
	Fe 55	50		LG 6704	"	"	✓
NITON 722	(DS) Am241	14	6-13-1998	5995LX	959143	"	✓
U 1039	Cd109	10	5-20-1999	4048 LY	"	"	✓
NITON 722	Am241	14		10262	959142	"	✓
U1350	Cd109	10		10261	"	"	✓
NITON 722	Am241	14		10264	959090	"	✓
U 1351	Cd109	10		10263	"	"	✓

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON Model: 722 Serial #: U1351 Manufacturer: NITON

Radioisotope Cd 109 Activity (mCi) 10

Source model: Source # : 16263 Manufacturer: NITON

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 959090

by: Albert Ossinger date: July 11, 2001

company: U.S. E.P.A. N.E.I.C. telephone: 303 236 [illegible]

address: Building 53, P.O. Box 25227 fax: 303 236.511.
Denver Federal Center Denver CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 16 July 01 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual, place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
16 January 2002
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 959090 BY: [signature] DATE: 16 July 01

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON Model: 722 Serial #: 01350 Manufacturer: NITON

Radioisotope Am-241 Activity (mCi) 14 mCi

Source model: _____ Source # : _____ Manufacturer: _____

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 957700

by: Al Ossinger date: 01-11-2001

company: U.S. E.P.A. N.E.I.C. telephone: (303) 236-6142

address: Bldg 53, P.O. Box 25227, Denver Federal Center fax: (303) 236-5116
Denver CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 18 JANUARY 2001 yielded the following:

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
18 July 2001
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 957700 BY: [signature] DATE: 18 JAN 01

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: Spectrace Model: 9290 Serial #: Q-091 Manufacturer: Spectrace

Radioisotope Am-241 Activity (mCi) 5mC.

Source model: _____ Source # : LQ-0866 Manufacturer: _____

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 957710

by: Al Ossinger date: 01-11-2001

company: U.S. E.P.A. N.E.I.C. telephone: (303) 236-6143

address: Bldg 53, P.O. Box 25227, Denver Federal Center fax: (303) 236-5116
Denver CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 18 January 2001 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
18 July 2001
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 957710 **BY:** [signature] **DATE:** 18 Jan 01

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON Model: 722 Serial #: U1039 Manufacturer: NITON

Radioisotope Cd-109 Activity (mCi) 10 mCi

Source model: _____ Source # : _____ Manufacturer: _____

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 957549

by: Al Ossinger date: 01-11-2001

company: U.S. E.P.A. N.E.I.C. telephone: (303) 236-6

address: Bldg 53, P.O. Box 25227, Denver Federal Center fax: (303) 236-5116
Denver, CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result

for above source/device:

Analysis of the above test on 17 January 2001 yielded the following:

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE

17 JULY 2001

ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 957546 **BY:** [illegible] **DATE:** 17 Jan 01

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON Model: 722 Serial #: U1350 Manufacturer: NITON

Radioisotope Cd-109 Activity (mCi) 10 mCi

Source model: _____ Source # : _____ Manufacturer: _____

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 957700

by: Al Ossinger date: 01-11-2001

company: U.S. EPA N.E.I.C. telephone: (303)236-6143

address: Bldg 53, P.O. Box 25227, Denver Federal Center fax: (303) 236-5116
Denver, CO. 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 17 January 2001 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
17 July 2001
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 957700 BY: [signature] DATE: 17 Jan 01

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON Model: 722 Serial #: 01351 Manufacturer: NITON

Radioisotope Am-241 Activity (mCi) 14 mCi

Source model: _____ Source # : _____ Manufacturer: _____

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 957705

by: Al Ossinger date: 01-11-2001

company: U.S. E.P.A. N.E.I.C. telephone: (303) 236-61

address: Bldg. 53, P.O. Box 25227 Denver Federal Center fax: (303) 236-5116
Denver, CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 18 January 2001 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
18 July 2001
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 957705 **BY:** Avis Tarr **DATE:** 10 Jan 01

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON Model: 722 Serial #: U 1039 Manufacturer: NITON

Radioisotope Cd-109 Activity (mCi) 10

Source model: Source # : 4048 LY Manufacturer: NITON

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 956533

by: Al Ossinger date: July 3, 2000

company: U.S. E.P.A. N.E.I.C. telephone: (303) 236-6143

address: Bldg 53 P.O. Box 25227 Denver Federal Center fax: (303) 236-5116
Denver, CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 7/12/00 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
12 Jan 01
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 956533 **BY:** [signature] **DATE:** 7/12/00

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON **Model:** 722 **Serial #:** U1351 **Manufacturer:** NITON

Radioisotope Am-241 **Activity (mCi)** 14

Source model: — **Source # :** 10264 **Manufacturer:** NITON

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 956532

by: Al Ossinger date: July 5, 2000

company: U.S. E.P.A. N.E.I.C. telephone: (303) 236-6

address: Bldg 53 P.O.Box 25227, Denver Federal Center fax: (303) 236-5116
Denver, CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 7/13/00 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
13 Jan 01
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 956532 **BY:** Jim Tocci **DATE:** 7/13/00

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON **Model:** 722 **Serial #:** U1350 **Manufacturer:** NITON

Radioisotope Cd-109 **Activity (mCi)** 10

Source model: _____ **Source #:** 10261 **Manufacturer:** NITON

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 956734

by: Al Ossinger date: July 5, 2000

company: U.S. EPA N.E.I.C. telephone: (303)236-6147

address: Bldg 53, P.O. Box 25227 Denver Federal Center fax: (303)236-5116
Denver, CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 7/12/00 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual, place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
12 Jan 01
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 956734 **BY:** [signature] **DATE:** 7/12/00

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: SPECTRACE **Model:** 9290 **Serial #:** Q-091 **Manufacturer:** Texas Nuclear

Radioisotope Am-241 **Activity (mCi)** 5

Source model: — **Source # :** LQ-0866 **Manufacturer:** Texas Nuclear

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 956534

by: Al Ossinger date: July 5, 2000

company: U.S. EPA NEIC telephone: (303) 236-6 3

address: Bldg 53, P.O Box 25227 Denver Federal Center fax: (303) 236-5116
Denver CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 7/13/00 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
13 Jan 01
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 956534 **BY:** [signature] **DATE:** 7/13/00

Dettorre, Ben

From: Ossinger.Albert@epamail.epa.gov
Sent: Tuesday, February 03, 2004 10:06 AM
To: Dettorre, Ben
Subject: Re: Leak Test Data

The Spectrace unit Q-091 was removed from service and returned to the manufacturer. Confirmation of this transfer was received on October 26, 2001. Al Ossinger

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF CRIMINAL ENFORCEMENT, FORENSICS AND TRAINING
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
DENVER, COLORADO

FACSIMILE COVER SHEET

TO BEN DETTORRE	MAIL CODE
OFFICE/PHONE SHAW ENVIRONMENTAL 865 670 2699	
~~REGION/LAB~~	
FROM AL OSSINGER, RSO	
OFFICE LABORATORY BRANCH EPA-NEIC	
PHONE 303-462-9120	MAIL CODE
DATE JANUARY 27, 2004	NUMBER OF PAGES (include cover sheet)

FAX NUMBER: 303-462-9028
VERIFICATION NUMBER: 303-462-9000

PLEASE REMEMBER TO NUMBER ALL PAGES 1 OF 7

Spencer Scientific Laboratory
13309 SE 159th Place
Renton, Washington 98058-7802
(425) 204-6167

NICKEL-63 SEALED SOURCE LEAK TEST CERTIFICATE

01/13/01

Mr. Al Ossinger
U.S. EPA NEIC
Denver Federal Center
Building 53
P.O. Box 25227
Denver, CO 80225-0227

Dear Mr. Ossinger:

Thank you for using Spencer Scientific Laboratory.

Leak Test Results on Wipes from Ni-63 Detectors received on 01/13/01:

Detector S/N	Results (Pass = Less than .005 microcuries)
U0088	Less than .001 microcuries
U1225	Less than .001 microcuries
U2504	Less than .001 microcuries
U2506	Less than .001 microcuries

Wipe Sample Date: 01/08/01 (Next Wipe Test Due: July 2001)

Analyst: Todd Aten Date Analyzed: 01/13/01

P.O. Number: 1U-0175 (SSL WA State Lic. No.: WN-I0494-1)

Thank You,

Todd J. Aten
Radiation Safety Officer

Save this report for your records!

Spencer Scientific Laboratory
13309 SE 159th Place
Renton, Washington 98058-7802
(425) 204-6167

NICKEL-63 SEALED SOURCE LEAK TEST CERTIFICATE

07/16/01

Mr. Al Ossinger
U.S. EPA NEIC
Denver Federal Center
Building 53
P.O. Box 25227
Denver, CO 80225-0227

Dear Mr. Ossinger:

Thank you for using Spencer Scientific Laboratory.

Leak Test Results on Wipes from Ni-63 Detectors received on 07/13/01:

Detector S/N	Results (Pass = Less than .005 microcuries)
U0088	Less than .001 microcuries
U1225	Less than .001 microcuries
U2504	Less than .001 microcuries
U2506	Less than .001 microcuries

Wipe Sample Date: 07/11/01 (Next Wipe Test Due: January 2002)

Analyst: Todd Aten Date Analyzed: 07/16/01

P.O. Number: 1U-0293-NNSA (SSL WA State Lic. No.: WN-I0494-1)

Thank You,

Todd J. Aten
Radiation Safety Officer

Save this report for your records!

Spencer Scientific Laboratory
13309 SE 159th Place
Renton, Washington 98058-7802
(425) 204-6167

NICKEL-63 SEALED SOURCE LEAK TEST CERTIFICATE

01/14/02

Mr. Al Ossinger
U.S. EPA NEIC
Denver Federal Center
Building 53
P.O. Box 25227
Denver, CO 80225-0227

Dear Mr. Ossinger:

Thank you for using Spencer Scientific Laboratory.

Leak test results on wipe samples from Ni-63 Detectors received on 01/14/02:

Detector S/N	Results (Pass = Less than .005 microcuries)
U0088	Less than .001 microcuries
U1225	Less than .001 microcuries
U2504	Less than .001 microcuries
U2506	Less than .001 microcuries

Wipe Sample Date: 01/11/02 (Next Wipe Test Due: July 2002)

Analyst: Todd Aten Date Analyzed: 01/14/02

P.O. Number: 2U-0198-NNSA (SSL WA State Lic. No.: WN-I0494-1)

Thank You,

Todd J. Aten
Radiation Safety Officer

Save this report for your records!

Spencer Scientific Laboratory
13309 SE 159th Place
Renton, Washington 98058-7802
(425) 204-6167

NICKEL-63 SEALED SOURCE LEAK TEST CERTIFICATE

07/08/02

Mr. Al Ossinger
U.S. EPA NEIC
Denver Federal Center
Building 53
P.O. Box 25227
Denver, CO 80225-0227

Dear Mr. Ossinger:

Thank you for using Spencer Scientific Laboratory.

Leak test results on wipe samples from Ni-63 Detectors received on 07/05/02:

Detector S/N	Results (Pass = Less than .005 microcuries)
U0088	Less than .001 microcuries
U1225	Less than .001 microcuries
U2504	Less than .001 microcuries
U2506	Less than .001 microcuries

Wipe Sample Date: 07/01/02 (Next Wipe Test Due: January 2003)

Analyst: Todd Aten Date Analyzed: 07/08/02

P.O. Number: 2U-0369-NASA (SSL WA State Lic. No.: WN-10494-1)

Thank You,

Todd J. Aten
Radiation Safety Officer

Save this report for your records!

Wipe Tests for Ni-63 ECD Units, Tested 01-23-2003, Results Received and Recorded 01-28-2003. From Spencer Scientific Laboratory, Renton, Washinton.

The original communication has apparently been mis-filed.

Results:	S/N U0088	Less than 0.001 microcurie
	S/N U1225	Less than 0.001 microcurie
	S/N U2504	Less than 0.001 microcurie
	S/N U2506	Less than 0.001 microcurie

01-27-2004

Spencer Scientific Laboratory
13309 SE 159th Place
Renton, Washington 98058-7802
(425) 204-6167

NICKEL-63 SEALED SOURCE LEAK TEST CERTIFICATE

07/18/03

Mr. Al Ossinger
U.S. EPA NEIC
Building 53, P.O. Box 25227
Denver Federal Center, Mail Drop 2214
Denver, CO 80225-0227

Dear Mr. Ossinger:

Thank you for using Spencer Scientific Laboratory.

Leak test results on wipe samples from Ni-63 Detectors received on 07/18/03:

Detector S/N	Results (Pass = Less than .005 microcuries)
U0088 -Inlet	Less than .0001 microcuries
U0088 -Body	Less than .0001 microcuries
U0088 -Exhaust	Less than .0001 microcuries
U1225 -Inlet	Less than .0001 microcuries
U1225 -Body	Less than .0001 microcuries
U1225 -Exhaust	Less than .0001 microcuries
U2504 -Inlet	Less than .0001 microcuries
U2504 -Body	Less than .0001 microcuries
U2504 -Exhaust	Less than .0001 microcuries
U2506 -Inlet	Less than .0001 microcuries
U2506 -Body	Less than .0001 microcuries
U2506 -Exhaust	Less than .0001 microcuries

Wipe Sample Date: 07/14/03 (Next Wipe Test Due: January 2004)

Analyst: Todd Aten Date Analyzed: 07/18/03

P.O. Number: 3U-0431-NASX (SSL WA State Lic. No.: WN-10494-1)

Thank You,

Todd J. Aten
Radiation Safety Officer

Save this report for your records!

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF CRIMINAL ENFORCEMENT, FORENSICS AND TRAINING
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
DENVER, COLORADO

FACSIMILE COVER SHEET

TO	BEN DETTORRE	MAIL CODE	
OFFICE/PHONE	SHAW ENVIRONMENTAL (865) 670-2699		
~~REGION/LAB~~			
FROM	AL OSSINGER, RSO		
OFFICE	LABORATORY BRANCH EPA-NEIC		
PHONE	303-462-9120	MAIL CODE	
DATE	JANUARY 28, 2004	NUMBER OF PAGES (include cover sheet)	21

FAX NUMBER: 303-462-9028
VERIFICATION NUMBER: 303-462-9000

PLEASE REMEMBER TO NUMBER ALL PAGES 1 OF ~~20~~ 21

FAX (865)690-3626

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON **Model:** 722 **Serial #:** U1039 **Manufacturer:** NITON

Radioisotope Am-241 / Cd-109 **Activity (mCi)** 14 mCi SN 5993 LX / 10 mCi SN 4048 LY

Source model: _____ **Source # :** _____ **Manufacturer:** _____

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 970067

by: Al Ossinger date: January 15, 2002

company: U.S. E.P.A. N.E.I.C. telephone: 303 236-6143

address: Bldg 53, P.O. Box 25227, Denver Federal Center fax: 303 236-5116
Denver, CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 23 January 2002 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
23 July 2002
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 970067 **BY:** Jim Tocci **DATE:** 23 JAN 02

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON **Model:** 722 **Serial #:** U 1350 **Manufacturer:** NITON

Radioisotope Am-241 / Cd-109 **Activity (mCi)** 14 mCi SN 10262 / 10 mCi SN 10261

Source model: _____ **Source # :** _____ **Manufacturer:** _____

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 970078

by: Al Ossinger date: January 14, 2002

company: U.S. E.P.A. N.E.I.C. telephone: 303 236-6143

address: Bldg 53, P.O. Box 25227, Denver Federal Center fax: 303 236-5116
Denver, CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 23 January 2002 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
23 July 2002
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 970078 **BY:** [signature] **DATE:** 23 JAN 02

Valley Safety Services Associates,
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON **Model:** 722 **Serial #:** U 1551 **Manufacturer:** NITON

Radioisotope Am-241 14 mCi SN 10264
Cd-109 **Activity (mCi)** 10 mCi SN 10263

Source model: _____ **Source #:** _____ **Manufacturer:** _____

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 970061

by: Al Ossinger date: January 14, 2002

company: U.S. E.P.A. N.E.I.C. telephone: 303 236-6143

address: Bldg 53, P.O. Box 25227, Denver Federal Center fax: 303 236-5116
Denver, CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 23 January 2002 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
23 July 2002
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 970061 **BY:** [signature] **DATE:** 23 JAN 02

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: Portable X-Ray **Model:** NITON 722 **Serial #:** U 1039 **Manufacturer:** Niton

~~Am-241~~ ~~10 mCi~~ ~~SN 5995 LY~~

Radioisotope Cd-109 **Activity (mCi)** 10 mCi SN 2048 LY

Source model: _____ **Source #:** _____ **Manufacturer:** Niton

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 981469

by: Al Ossinger date: July 2, 2002

company: U.S. E.P.A. N.E.I.C. telephone: (303) 236-6143

address: Building 53, P.O. Box 25227, Denver Federal Center fax: (303) 236-5116
Denver Colorado 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 8 July 2002 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
8 January 2003
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 981469 **BY:** Jim Tocci **DATE:** 9JUL02

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: Portable X-Ray **Model:** NITON 722 **Serial #:** U1351 **Manufacturer:** Niton

~~Am-241~~ ~~14mCi~~ ~~SN 10263~~

Radioisotope Cd-109 **Activity (mCi)** 10 mCi SN 10263

Source model: _____ **Source # :** _____ **Manufacturer:** _____

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 981465

by: Al Ossinger date: July 2, 2002

company: U.S. E.P.A. NEIC telephone: (303) 236-6143

address: Building 53, PO Box 25227, Denver Federal Center fax: (303) 236-5116
Denver, Colorado 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 8 July 2002 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
8 January 2003
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 981465 **BY:** [signature] **DATE:** 9 JUL 02

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: Portable X-Ray **Model:** NITON 722 **Serial #:** U 1350 **Manufacturer:** Niton

Radioisotope ~~Am-241~~ Cd-109 **Activity (mCi)** ~~44 mCi~~ 10 mCi ~~SN 10262~~ SN 10261

Source model: _____ **Source #:** _____ **Manufacturer:** Niton

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 981456

by: Al Ossinger date: July 2, 2002

company: US EPA NEIC telephone: (303) 236-6143

address: Building 53, P.O. Box 25227, Denver Federal Center fax: (303) 236-5116
Denver, Colorado 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 8 July 2002 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
8 January 2003
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 981456 **BY:** Jim Tacci **DATE:** 9 JUL 02

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: Portable X-Ray Model: NITON 722 Serial #: U 1039 Manufacturer: Niton

Radioisotope ~~Cd-109~~ Am-241 Activity (mCi) ~~10 mCi~~ 1.5 mCi SN 5995 LX ~~SN 5048 LX~~

Source model: _____ Source # : _____ Manufacturer: Niton

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 981469

by: Al Cessinger date: July 2, 2002

company: U.S. E.P.A N.E.I.C. telephone: (303) 236-6143

address: Building 53, P.O. Box 25227, Denver Federal Center fax: (303) 236-5116
Denver, Colorado 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 9 JULY 02 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
9 JANUARY 2003
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 981469 BY: Jim Tocci DATE: 9 JUL 02

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: Portable X-Ray Model: Niton 722 Serial #: U1351 Manufacturer: Niton

Radioisotope Am-241 ~~Cd-109~~ Activity (mCi) 14 mCi ~~10 mCi~~ SN 10264 ~~SN 10263~~

Source model: _____ Source # : _____ Manufacturer: _____

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 981465

by: Al Ossinger date: July 2, 2002

company: U.S. EPA NEIC telephone: (303) 236-6143

address: Building 53, PO Box 25227 Denver Federal Center fax: (303) 236-5116
Denver, Colorado 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 9 JUL 02 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
JANUARY 2003
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 981465 **BY:** Jim Tucci **DATE:** 9 JUL 02

Valley Safety Services Associates
330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: Portable X-Ray Model: NITON 722 Serial #: U1350 Manufacturer: Niton

Radioisotope Am-241 ~~Cd-109~~ Activity (mCi) 14 mCi ~~10 mCi~~ SN 10262 ~~SN 10261~~

Source model: _____ Source #: _____ Manufacturer: Niton

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 981456

by: Al Ossinger date: July 2, 2002

company: US EPA NEIC telephone: (303) 236-6143

address: Building 53, PO Box 25227, Denver Federal Center fax: (303) 236-5116
Denver, Colorado 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result
for above source/device:

Analysis of the above test on 9 JULY 02 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
9 JANUARY 2003
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 981456 BY: Jim Tucel DATE: 9 JUL 02

VSSA

Valley Safety Services Associates

330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON Model: 722 Serial #: V 1039 Manufacturer: NITON

Radioisotope Am-241 Activity (mCi) 14

Source model: _____ Source #: 5995 LX Manufacturer: NITON

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 982899

By: Al Ossinger Date: January 23, 2003

Company: U.S. E.P.A. N.E.I.C Telephone: (303) 236-6143

Address: Building 53, P.O. Box 25227, Denver Federal Center Fax: (303) 236-5116
Denver, CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result

Analysis of the above test on 29 JAN 03 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
29 JULY 2003
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 982899 BY: [signature] DATE: 29 JAN 03

VSSA

Valley Safety Services Associates, Inc.

330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: Portable X-Ray Model: 722 Serial #: U 1639 Manufacturer: NITON

Radioisotope Am 241 Activity (mCi) 14

Source model: _____ Source # : _____ Manufacturer: NITON

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 984664

By: Al Ossinger Date: July 15, 2003

Company: U.S. EPA N.E.I.C. Telephone: (303) 236-6143

Address: Bldg 53, PO Box 25227, Denver Federal Center Fax: (303) 236-5116
Denver, CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result

Analysis of the above test on 28 JULY 2003 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
28 JANUARY 2004
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 984664 BY: Jim Tolli DATE: 28 JULY 03

VSSA

Valley Safety Services Associates Inc.

330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: Portable X-Ray Model: 722 Serial #: U 1039 Manufacturer: NITON

Radioisotope Cd - 109 Activity (mCi) 10

Source model: _____ Source #: _____ Manufacturer: NITON

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 984664

By: Al Olsinger Date: July 15, 2003

Company: U.S. EPA NEIC Telephone: (303) 236-6143

Address: Bldg 53, PO Box 25227, Denver Federal Ctr. Fax: (303) 236 5116
Denver CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result

Analysis of the above test on 28 JULY 2003 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
28 JANUARY 2004
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 984664 BY: Jim Tran DATE: 28 July 03

VSSA

Valley Safety Services Associates Inc.

330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: Portable XRF Model: 722 Serial #: U1350 Manufacturer: NITON

Radioisotope Am-241 Activity (mCi) 14

Source model: _____ Source #: _____ Manufacturer: NITON

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 984652

By: Jerry Gregory per Al Ossinger Date: July 17 2003

Company: U.S. E.P.A. N.E.I.C. Telephone: (303) 236-6143

Address: Bldg 53, P.O. Box 25227, Denver Federal Center Fax: (303) 236-5116
Denver CO. 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result

Analysis of the above test on 28 JULY 2003 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
28 JANUARY 2004
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 984652 BY: [signature] DATE: 28 JUL 03

VSSA

Valley Safety Services Associates Inc.

330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: Portable X-Ray Model: 722 Serial #: U1350 Manufacturer: NITON

Radioisotope Cd-109 Activity (mCi) 10

Source model: _____ Source # : _____ Manufacturer: NITON

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 984652

By: Jerry Gregory per Al Ossinger Date: July 17, 2003

Company: U.S. EPA. N.E.I.C. Telephone: (303) 236-6143

Address: Bldg 53, P.O. Box 25227, Denver Federal Center Fax: (303) 236-5116
Denver CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result

Analysis of the above test on 28 JULY 2003 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
28 JANUARY 2004
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 984652 BY: Jim Torri DATE: 28 July 03

VSSA

Valley Safety Services Associates

330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON Model: 722 Serial #: U1350 Manufacturer: NITON

Radioisotope Am-241 Activity (mCi) 14

Source model: _____ Source #: 10262 Manufacturer: NITON

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 982889

By: Al Ossinger Date: January 23, 2003

Company: U.S. E.P.A. N.E.I.C. Telephone: (303) 236-6143

Address: Building 53, P.O. Box 25227, Denver Federal Center Fax: (303) 236-5116
Denver Co 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result

Analysis of the above test on 29 JAN 03 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
29 JULY 2003
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 982889 **BY:** [signature] **DATE:** 29 JAN 03

Instrument # 1350 **had a radiation survey conducted on it. The results of the survey are below 0.05 mR/hr for the XL. This survey was conducted by** T Kuyer **on** 9/5/03**. If you have any further questions, please contact Niton at (800) 875-1578.**

VSSA

Valley Safety Services Associates, Inc.

330 Old Enfield Road, Belchertown, MA 01007
http://www.vssa-inc.com
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: XRF Analyzer Model: XL 700 Serial #: U1350 Manufacturer: NITON

Radioisotope Cd-109 Activity (mCi) 10

Source model: CUC.P1 Source #: LU661 Manufacturer: Amersham-AEA

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 983699

By: MEYER Date: 8/22/03

Company: NITON Corporation (Ken Martin, RSO) Telephone: 401-294-1234

Address: 1130 Ten Rod Road - Suite C-207 Fax: 401-295-2090
North Kingstown, RI 02852

Do Not Write Below This Line

Leak Test Analysis Result

Analysis of the above test on 26 August 2003 yielded the following:

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
26 February 2004
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 983699 BY: Jim Tocci DATE: 26 Aug '03

VSSA

Valley Safety Services Associates

330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: NITON Model: 722 Serial #: U1351 Manufacturer: NITON

Radioisotope Am-241 Activity (mCi) 14

Source model: _____ Source # : 10264 Manufacturer: NITON

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 982890

By: Al Ossinger Date: January 23, 2003

Company: U.S. E.P.A. N.E.I.C. Telephone: (303) 236-6143

Address: Building 53, P.O. Box 25227, Denver Federal Center Fax: (303) 236-5116
Denver, CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result

Analysis of the above test on 29 JAN 03 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
29 JULY 2003
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 982890 BY: [signature] DATE: 29 JAN 03

VSSA

Valley Safety Services Associates, Inc.

330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: Portable X-Ray Model: 722 Serial #: U1351 Manufacturer: NITON

Radioisotope Am-241 Activity (mCi) 14

Source model: _____ Source # : _____ Manufacturer: NITON

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 98465 ~~B~~6

By: Jerry Gregory per Al Gessinger Date: July 17, 2003

Company: U.S. EPA N.E.I.C Telephone: (303) 236-6143

Address: Bldg 53, P.O. Box 25227, Denver Federal Center Fax: (303) 236-5116
Denver, CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result

Analysis of the above test on 28 JULY 2003 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
28 JANUARY 2004
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 984656 BY: [signature] DATE: 28 July 03

VSSA

Valley Safety Services Associates, Inc.

330 Old Enfield Road, Belchertown, MA 01007
(413)323-9571

Leak Test Data/Certificate

Complete the data requested on the top part of this form and return it with your leak test to the address in the above heading. Following our analysis of your leak test specimen we will return this form to you for your record of the test and results.

Source/Device Description

Device: Portable X-Ray Model: 722 Serial #: U1351 Manufacturer: NITON

Radioisotope Cd-109 Activity (mCi) 10

Source model: _____ Source #: — Manufacturer: NITON

The leak testing of this source/device was performed as indicated in manufacturer recommendations or LT-952 kit instructions using kit # 984656

By: Jerry Gregory per Al Ossinger Date: July 17, 2003

Company: U.S. E.P.A. N.E.I.C Telephone: (303) 236-6143

Address: Bldg 53; PO Box 25227, Denver Federal Center Fax: (303) 236-5116
Denver, CO 80225-0227

Do Not Write Below This Line

Leak Test Analysis Result

Analysis of the above test on 28 JULY 2003 yielded the following;

☒ Statistical analysis of the radioactive count data of this leak test specimen indicated any activity present is less than 0.005 µCi. The source maybe used as authorized.

☐ Statistical analysis of the radioactive count data of this leak test specimen indicated there is greater than 0.005 microcuries of activity present. This source should be considered leaking. Consult your device operations manual; place this unit in storage and make the required notification to your regulatory agency.

YOUR NEXT REQUIRED LEAK TEST FOR THIS DEVICE/SOURCE IS DUE ON OR BEFORE
28 JANUARY 2004
ANOTHER TEST KIT WILL BE SENT TO YOU 2 WEEKS BEFORE THIS DATE FOR YOUR USE AND RETURN FOR ANALYSIS.

THIS CERTIFICATE IS AN ESSENTIAL RECORD AND SHOULD BE MAINTAINED FOR INSPECTION BY THE REGULATORY AGENCY.

CERTIFICATE #: 984656 BY: Jim Torri DATE: 28 July 03