GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
F 843.766.1178

gel.com

August 28, 2019

TVA Deliverables
Environmental Standards, Inc.
1140 Valley Forge Road
Valley Forge, Pennsylvania 19482

Re: JSF EIP GW
Work Order: 487777

Dear TVA Deliverables:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 15, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4504.

Sincerely,

Erin B Trent

Erin Trent
Project Manager

Purchase Order: 5372407
Chain of Custody: JSF_GW_20190814_1B
Enclosures

Table of Contents

Case Narrative.....3

Data Review Qualifier Definitions.....5

Chain of Custody and Supporting Documentation.....8

Laboratory Certifications.....17

Radiological Analysis.....19

Case Narrative.....20

Sample Data Summary.....24

Quality Control Summary.....30

Gas Flow Raw Data.....33

Continuing Calibration Data.....50

Background Counts Data.....83

Method Calibration Data.....90

RAD Standards Traceability.....363

Runlogs.....383

Case Narrative

Case Narrative
for
Tennessee Valley Authority (13723)
SDG: 487777

August 28, 2019

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample Receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on August 15, 2019 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

Laboratory ID	Client ID
487777001	JSF-GW-023-20190814
487777002	JSF-GW-024-20190814
487777003	JSF-GW-025-20190814
487777004	JSF-GW-FB03-20190814
487777005	JSF-GW-031-20190814

Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Radiochemistry.

Erin B Trent

Erin Trent
Project Manager

Data Review Qualifier Definitions

Data Review Qualifier Definitions

Qualifier	Explanation
*	A quality control analyte recovery is outside of specified acceptance criteria
**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL
A	The TIC is a suspected aldol-condensation product
B	Target analyte was detected in the associated blank
B	Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
d	5-day BOD-The 2:1 depletion requirement was not met for this sample
E	Organics-Concentration of the target analyte exceeds the instrument calibration range
E	Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
H	Analytical holding time was exceeded
h	Preparation or preservation holding time was exceeded
J	Value is estimated
N	Metals-The Matrix spike sample recovery is not within specified control limits
N	Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
ND	Analyte concentration is not detected above the reporting limit
UI	Gamma Spectroscopy-Uncertain identification
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference. For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Chain of Custody and Supporting Documentation

TVA Environmental Investigations

Tennessee Valley Authority

487777

COOLER No.:	1	of	2
COC No:	JSF_GW_20190814_1B		
1 of 1 Pages			
Task Desc:	JSF_GW		

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

Required Ship to Lab:		Required Project Information:		Required Sampler Information	
Lab Name:	GEL Laboratories LLC	Site ID #:	John Sevier Fossil Plant	Sampler:	A. Wilson / S. Stahl
Lab Address:	2040 Savage Road Charleston, SC 29407	Project #:	175568225	Sampling Company:	Stantec
		Site Address	PLANT 611 OLD HWY 70 S	Address	601 Grassmere Park Rd, Suite 22
		City	Rogersville State, Zip: TN, 37857	City/State	Nashville, TN Phone: (615) 885-1144
Lab Manager Contact Information		Site PM Name:	Roy Quinn		
Lab PM:	Erin Trent	Phone/Fax:	423-751-3753	Sampling Team Number:	1
Phone/Fax:	843-769-7374/843-766-1178	Site PM Email:		Send EDD/Hard Copy to:	
Lab Email:					

Analysis Turnaround Time: ☐ CALENDAR DAYS ☐ WORKING DAYS

TAT if different from Below _____
- 24 Hours
- 3 Business Days
- 5 Business Days
- ✓ 10 Business Days

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Depth Unit / Start Depth	Sample Depth: Select Unit / End Depth	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Analysis: Filtered N	Preserve HNO3	Analysis: GW_RAD
1	JSF-GW-023-20190814	JSF-107	37.5'	NA	GW	G	N	8/14/2019	0818	3	pH: 6.30	☐			X
2	JSF-GW-024-20190814	JSF-108	50.0'	NA	GW	G	N	8/14/2019	1105	3	pH: 6.85	☐			X
3	JSF-GW-025-20190814	JSF-109	45.0'	NA	GW	G	N	8/14/2019	1305	3	pH: 6.45	☐			X
4	JSF-GW-FB03-20190814	JSF-210	NA	NA	AQ	G	FB	8/14/2019	1425	3	None	☐			X
5	JSF-GW-031-20190814	JSF-210	46.5'	NA	GW	G	N	8/14/2019	1445	3	pH: 7.01	☐			X

AW 8-14-19

AW 8-14-19

Additional Comments/Special Instructions:

Additional volume collected should be used for laboratory duplicate analysis.

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Anna Wilson / Stantec	8/14/2019	1700		8/15/19	0845

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
Fedex	Anna Wilson /
	Stefan Stahl /

Sample Receipt Conditions

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Form TVA 30067A

TVA Environmental Investigations

Tennessee Valley Authority

Chain-of-Custody / Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate

COOLER No.:	2 of 2
COC No:	JSF_GW_20190814_1B
1 of 1 Pages	
Task Desc:	JSF_GW

Required Ship to Lab:

Lab Name:	GEL Laboratories LLC
Lab Address:	2040 Savage Road Charleston, SC 29407

Lab Manager Contact Information

Lab PM:	Erin Trent
Phone/Fax:	843-769-7374/843-766-1178
Lab Email:	

Required Project Information:

Site ID #:	John Sevier Fossil Plant
Project #:	175568225
Site Address	PLANT 611 OLD HWY 70 S
City	Rogersville State, Zip: TN, 37857
Site PM Name:	Roy Quinn
Phone/Fax:	423-751-3753
Site PM Email:	

Required Sampler Information

Sampler:	A. Wilson / S. Stahl
Sampling Company:	Stantec
Address	601 Grassmere Park Rd, Suite 22
City/State	Nashville, TN Phone: (615) 885-1144
Sampling Team Number:	1
Send EDD/Hard Copy to:	

Analysis Turnaround Time

☐ CALENDAR DAYS ☑ WORKING DAYS

TAT if different from Below _____

24 Hours

3 Business Days

5 Business Days

✓ 10 Business Days

ITEMS #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth: Start Depth (Depth Unit)	Sample Depth: End Depth (Select Unit)	MATRIX CODE	G= GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	Comments/ Lab Sample I.D.	MS/MSD	Filtered N	Preserve HNO3	Analysis GW_RAD
1	JSF-GW-023-20190814	JSF-107	37.5'	NA	GW	G	N	8/14/2019	0818	3	pH: 6.30	☐			X
2	JSF-GW-024-20190814	JSF-108	50.0'	NA	GW	G	N	8/14/2019	1105	3	pH: 6.85	☐			X
3	JSF-GW-025-20190814	JSF-109	45.0'	NA	GW	G	N	8/14/2019	1305	3	pH: 6.45	☐			X
4	JSF-GW-FB03-20190814	JSF-210	NA	NA	AQ	G	FB	8/14/2019	1425	3	None	☐			X
5	JSF-GW-031-20190814	JSF-210	46.5'	NA	GW	G	N	8/14/2019	1445	3	pH: 7.01	☐			X

AW 8-14-19

AW 8-14-19

Additional Comments/Special Instructions:

Additional volume collected should be used for laboratory duplicate analysis.

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Anna Wilson / Stantec	8/14/2019	1700		8/15/19	8:45

SHIPPING METHOD	SAMPLER NAME AND SIGNATURE
Fedex	Anna Wilson /
	Stefan Stahl /

Sample Receipt Conditions

Temperature in °C	Sample on Ice?	Sample Intact?	Trip Blank?
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Form TVA 30067A

GEL Laboratories LLC

ET

SAMPLE RECEIPT & REVIEW FORM

Client: TVAC	**SDG/AR/COC/Work Order:** 487777
Received By: AJA	**Date Received:** 8/15/19
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other 7909 7442 3153 7909 7442 3164

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		✓	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 **CPM / mR/Hr** **Classified as: Rad 1 Rad 2 Rad 3**
D) Did the client designate samples are hazardous?		✓	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		✓	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	✓			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		✓		Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius **TEMP:** 1°
4	Daily check performed and passed on IR temperature gun?	✓			**Temperature Device Serial #:** IR4-16 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	✓			Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			✓	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	✓			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials WO Date 8/16 Page 1 of 1

GL-CHL-SR-001 Rev 6

Work Order Containers

Sample ID: **487777001**
Client Sample ID: **JSF−GW−023−20190814**
Description: **JSF−107 Ground Water**

Label: 487777001.01 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage
16−AUG−19 15:08:43	Lois Buist	Transfered custody to batch 1907789
16−AUG−19 15:08:43	Lois Buist	Changed sample location from Radiochemistry Storage to Radiochemistry Prep Laboratory
16−AUG−19 15:09:36	Lois Buist	Transfered custody to batch 1907787
19−AUG−19 11:47:21	Lois Buist	Transfered custody to batch 1907789
20−AUG−19 09:22:52	Lois Buist	Changed batch_id from 1907789 to
20−AUG−19 09:22:52	Lois Buist	Changed sample location from Radiochemistry Prep Laboratory to Return Shelf Radiochemisty Samples
20−AUG−19 11:56:59	Caroline Gause	Changed sample location from Return Shelf Radiochemisty Samples to Consumed By Analysis/Laboratory

Label: 487777001.02 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage
16−AUG−19 15:08:43	Lois Buist	Transfered custody to batch 1907789
16−AUG−19 15:08:43	Lois Buist	Changed sample location from Radiochemistry Storage to Radiochemistry Prep Laboratory
16−AUG−19 15:09:36	Lois Buist	Transfered custody to batch 1907787
19−AUG−19 11:47:21	Lois Buist	Transfered custody to batch 1907789
20−AUG−19 09:22:52	Lois Buist	Changed batch_id from 1907789 to
20−AUG−19 09:22:52	Lois Buist	Changed sample location from Radiochemistry Prep Laboratory to Return Shelf Radiochemisty Samples
20−AUG−19 09:43:19	Caroline Gause	Changed sample location from Return Shelf Radiochemisty Samples to Radiochemistry Storage

Label: 487777001.03 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage

Sample ID: **487777002**
Client Sample ID: **JSF−GW−024−20190814**
Description: **JSF−108 Ground Water**

Label: 487777002.01 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage
16−AUG−19 15:08:43	Lois Buist	Transfered custody to batch 1907789

Work Order Containers

Sample ID: **487777002**
Client Sample ID: **JSF−GW−024−20190814**
Description: **JSF−108 Ground Water**

Label: 487777002.01 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

16−AUG−19 15:08:43	Lois Buist	Changed sample location from Radiochemistry Storage to Radiochemistry Prep Laboratory
16−AUG−19 15:09:36	Lois Buist	Transfered custody to batch 1907787
19−AUG−19 11:47:21	Lois Buist	Transfered custody to batch 1907789
20−AUG−19 09:22:52	Lois Buist	Changed batch_id from 1907789 to
20−AUG−19 09:22:52	Lois Buist	Changed sample location from Radiochemistry Prep Laboratory to Return Shelf Radiochemisty Samples
20−AUG−19 11:56:59	Caroline Gause	Changed sample location from Return Shelf Radiochemisty Samples to Consumed By Analysis/Laboratory

Label: 487777002.02 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage

Label: 487777002.03 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage
16−AUG−19 15:08:43	Lois Buist	Transfered custody to batch 1907789
16−AUG−19 15:08:43	Lois Buist	Changed sample location from Radiochemistry Storage to Radiochemistry Prep Laboratory
16−AUG−19 15:09:36	Lois Buist	Transfered custody to batch 1907787
19−AUG−19 11:47:21	Lois Buist	Transfered custody to batch 1907789
20−AUG−19 09:43:20	Caroline Gause	Changed batch_id from 1907789 to
20−AUG−19 09:43:20	Caroline Gause	Changed sample location from Radiochemistry Prep Laboratory to Radiochemistry Storage

Sample ID: **487777003**
Client Sample ID: **JSF−GW−025−20190814**
Description: **JSF−109 Ground Water**

Label: 487777003.01 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage
16−AUG−19 15:08:43	Lois Buist	Transfered custody to batch 1907789
16−AUG−19 15:08:43	Lois Buist	Changed sample location from Radiochemistry Storage to Radiochemistry Prep Laboratory
16−AUG−19 15:09:36	Lois Buist	Transfered custody to batch 1907787
19−AUG−19 11:47:21	Lois Buist	Transfered custody to batch 1907789
20−AUG−19 09:43:19	Caroline Gause	Changed batch_id from 1907789 to

Work Order Containers

Sample ID: **487777003**
Client Sample ID: **JSF−GW−025−20190814**
Description: **JSF−109 Ground Water**

Label: 487777003.01 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

20−AUG−19 09:43:19	Caroline Gause	Changed sample location from Radiochemistry Prep Laboratory to Radiochemistry Storage

Label: 487777003.02 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage
16−AUG−19 15:08:43	Lois Buist	Transfered custody to batch 1907789
16−AUG−19 15:08:43	Lois Buist	Changed sample location from Radiochemistry Storage to Radiochemistry Prep Laboratory
16−AUG−19 15:09:36	Lois Buist	Transfered custody to batch 1907787
19−AUG−19 11:47:21	Lois Buist	Transfered custody to batch 1907789
20−AUG−19 09:22:52	Lois Buist	Changed batch_id from 1907789 to
20−AUG−19 09:22:52	Lois Buist	Changed sample location from Radiochemistry Prep Laboratory to Return Shelf Radiochemisty Samples
20−AUG−19 11:56:59	Caroline Gause	Changed sample location from Return Shelf Radiochemisty Samples to Consumed By Analysis/Laboratory

Label: 487777003.03 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage
16−AUG−19 15:08:43	Lois Buist	Transfered custody to batch 1907789
16−AUG−19 15:08:43	Lois Buist	Changed sample location from Radiochemistry Storage to Radiochemistry Prep Laboratory
16−AUG−19 15:09:36	Lois Buist	Transfered custody to batch 1907787
19−AUG−19 11:47:21	Lois Buist	Transfered custody to batch 1907789
20−AUG−19 09:22:52	Lois Buist	Changed batch_id from 1907789 to
20−AUG−19 09:22:52	Lois Buist	Changed sample location from Radiochemistry Prep Laboratory to Return Shelf Radiochemisty Samples
20−AUG−19 11:56:59	Caroline Gause	Changed sample location from Return Shelf Radiochemisty Samples to Consumed By Analysis/Laboratory

Sample ID: **487777004**
Client Sample ID: **JSF−GW−FB03−20190814**
Description: **JSF−210 Water**

Label: 487777004.01 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage
16−AUG−19 15:08:43	Lois Buist	Transfered custody to batch 1907789
16−AUG−19 15:08:43	Lois Buist	Changed sample location from Radiochemistry Storage to Radiochemistry Prep Laboratory

Work Order Containers

Sample ID: **487777004**
Client Sample ID: **JSF−GW−FB03−20190814**
Description: **JSF−210 Water**

Label: 487777004.01 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

16−AUG−19 15:09:36	Lois Buist	Transfered custody to batch 1907787
19−AUG−19 11:47:21	Lois Buist	Transfered custody to batch 1907789
20−AUG−19 09:43:20	Caroline Gause	Changed batch_id from 1907789 to
20−AUG−19 09:43:20	Caroline Gause	Changed sample location from Radiochemistry Prep Laboratory to Radiochemistry Storage

Label: 487777004.02 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage

Label: 487777004.03 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage
16−AUG−19 15:08:43	Lois Buist	Transfered custody to batch 1907789
16−AUG−19 15:08:43	Lois Buist	Changed sample location from Radiochemistry Storage to Radiochemistry Prep Laboratory
16−AUG−19 15:09:36	Lois Buist	Transfered custody to batch 1907787
19−AUG−19 11:47:21	Lois Buist	Transfered custody to batch 1907789
20−AUG−19 11:56:59	Caroline Gause	Changed batch_id from 1907789 to
20−AUG−19 11:56:59	Caroline Gause	Changed sample location from Radiochemistry Prep Laboratory to Consumed By Analysis/Laboratory

Sample ID: **487777005**
Client Sample ID: **JSF−GW−031−20190814**
Description: **JSF−210 Ground Water**

Label: 487777005.01 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage
16−AUG−19 15:08:43	Lois Buist	Transfered custody to batch 1907789
16−AUG−19 15:08:43	Lois Buist	Changed sample location from Radiochemistry Storage to Radiochemistry Prep Laboratory
16−AUG−19 15:09:36	Lois Buist	Transfered custody to batch 1907787
19−AUG−19 11:47:21	Lois Buist	Transfered custody to batch 1907789
20−AUG−19 09:43:19	Caroline Gause	Changed batch_id from 1907789 to
20−AUG−19 09:43:19	Caroline Gause	Changed sample location from Radiochemistry Prep Laboratory to Radiochemistry Storage

Work Order Containers

Sample ID: **487777005**
Client Sample ID: **JSF−GW−031−20190814**
Description: **JSF−210 Ground Water**

Label: 487777005.02 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage
16−AUG−19 15:08:43	Lois Buist	Transfered custody to batch 1907789
16−AUG−19 15:08:43	Lois Buist	Changed sample location from Radiochemistry Storage to Radiochemistry Prep Laboratory
16−AUG−19 15:09:36	Lois Buist	Transfered custody to batch 1907787
19−AUG−19 11:47:21	Lois Buist	Transfered custody to batch 1907789
20−AUG−19 11:56:59	Caroline Gause	Changed batch_id from 1907789 to
20−AUG−19 11:56:59	Caroline Gause	Changed sample location from Radiochemistry Prep Laboratory to Consumed By Analysis/Laboratory

Label: 487777005.03 **Type: Plastic 1000 mL** **Preservative: Nitric pH<2**

15−AUG−19 16:05:53	Alexandra Almers	Changed sample location from Barcode Generated to Radiochemistry Staging
16−AUG−19 08:01:47	Stacy Boone	Changed sample location from Radiochemistry Staging to Radiochemistry Storage
16−AUG−19 15:08:43	Lois Buist	Transfered custody to batch 1907789
16−AUG−19 15:08:43	Lois Buist	Changed sample location from Radiochemistry Storage to Radiochemistry Prep Laboratory
16−AUG−19 15:09:36	Lois Buist	Transfered custody to batch 1907787
19−AUG−19 11:47:21	Lois Buist	Transfered custody to batch 1907789
20−AUG−19 09:43:19	Caroline Gause	Changed batch_id from 1907789 to
20−AUG−19 09:43:19	Caroline Gause	Changed sample location from Radiochemistry Prep Laboratory to Radiochemistry Storage

Laboratory Certifications

List of current GEL Certifications as of 28 August 2019

State	Certification
Alaska	17−018
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M−SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122020−1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	9904
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−19−15
Utah NELAP	SC000122019−28
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Radiological Analysis

Case Narrative

Radiochemistry
Technical Case Narrative
Tennessee Valley Authority
SDG #: 487777

Product: **GFPC Radium-228, Liquid**
Analytical Method: EPA 904.0
Analytical Procedure: GL-RAD-A-009 REV# 17
Analytical Batch: 1907787

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
487777001	JSF-GW-023-20190814
487777002	JSF-GW-024-20190814
487777003	JSF-GW-025-20190814
487777004	JSF-GW-FB03-20190814
487777005	JSF-GW-031-20190814
1204358679	Method Blank (MB)
1204358681	487777003(JSF-GW-025-20190814) Sample Duplicate (DUP)
1204358684	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: **GFPC Radium-226, Liquid**
Analytical Method: EPA 903.0
Analytical Procedure: GL-RAD-A-010 REV# 18
Analytical Batch: 1907789

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
487777001	JSF-GW-023-20190814
487777002	JSF-GW-024-20190814
487777003	JSF-GW-025-20190814
487777004	JSF-GW-FB03-20190814
487777005	JSF-GW-031-20190814
1204358685	Method Blank (MB)
1204358687	487777005(JSF-GW-031-20190814) Sample Duplicate (DUP)
1204358690	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Recounts
Sample 1204358685 (MB) was recounted due to high MDC. The recount is reported.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report
for

TVAC008 Tennessee Valley Authority (13723)

Client SDG: 487777 GEL Work Order: 487777

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria
** Analyte is a Tracer compound
U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: Heather M. McCarty **Name: Heather McCarty**

Date: 29 AUG 2019 **Title: Analyst II**

Sample Data Summary

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Environmental Standards, Inc.
Address : 1140 Valley Forge Road

Valley Forge, Pennsylvania 19482 — Report Date: August 29, 2019

Contact: TVA Deliverables
Project: JSF EIP GW

Client Sample ID: JSF-GW-023-20190814
Sample ID: 487777001
Matrix: GW
Collect Date: 14-AUG-19
Receive Date: 15-AUG-19
Collector: Client

Project: TVAC00105
Client ID: TVAC008

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gas Flow Proportional Counting														
GFPC Radium-226, Liquid "As Received"														
Radium-226		0.763	+/-0.547	0.702	+/-0.562	1.00	pCi/L			KSD1	08/20/19	1613	1907789	1
GFPC Radium-228, Liquid "As Received"														
Radium-228	U	0.120	+/-0.359	0.640	+/-0.360	1.00	pCi/L			LXB3	08/21/19	1322	1907787	2
Radium-226+Radium-228 Calculation "See Parent Products"														
Radium-226+228 Sum		0.884	+/-0.654		+/-0.668		pCi/L		1	AEA	08/22/19	0836	1907785	3

The following Analytical Methods were performed

Method	Description
1	EPA 903.0
2	EPA 904.0
3	Calculation

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium Carrier	GFPC Radium-226, Liquid "As Received"	1907789	94.7	(30%-110%)
Barium-133 Tracer	GFPC Radium-228, Liquid "As Received"	1907787	84.7	(30%-110%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Environmental Standards, Inc.
Address : 1140 Valley Forge Road

Valley Forge, Pennsylvania 19482 — Report Date: August 29, 2019

Contact: TVA Deliverables
Project: JSF EIP GW

Client Sample ID: JSF-GW-024-20190814
Sample ID: 487777002
Matrix: GW
Collect Date: 14-AUG-19
Receive Date: 15-AUG-19
Collector: Client

Project: TVAC00105
Client ID: TVAC008

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gas Flow Proportional Counting														
GFPC Radium-226, Liquid "As Received"														
Radium-226	U	0.392	+/-0.430	0.671	+/-0.435	1.00	pCi/L			KSD1	08/20/19	1613	1907789	1
GFPC Radium-228, Liquid "As Received"														
Radium-228	U	0.0808	+/-0.418	0.751	+/-0.418	1.00	pCi/L			LXB3	08/21/19	1322	1907787	2
Radium-226+Radium-228 Calculation "See Parent Products"														
Radium-226+228 Sum		0.472	+/-0.599		+/-0.603		pCi/L		1	AEA	08/22/19	0836	1907785	3

The following Analytical Methods were performed

Method	Description
1	EPA 903.0
2	EPA 904.0
3	Calculation

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium Carrier	GFPC Radium-226, Liquid "As Received"	1907789	92.1	(30%-110%)
Barium-133 Tracer	GFPC Radium-228, Liquid "As Received"	1907787	82	(30%-110%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Environmental Standards, Inc.
Address : 1140 Valley Forge Road

Valley Forge, Pennsylvania 19482 Report Date: August 29, 2019

Contact: TVA Deliverables
Project: JSF EIP GW

Client Sample ID: JSF-GW-025-20190814 Project: TVAC00105
Sample ID: 487777003 Client ID: TVAC008
Matrix: GW
Collect Date: 14-AUG-19
Receive Date: 15-AUG-19
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gas Flow Proportional Counting														
GFPC Radium-226, Liquid "As Received"														
Radium-226		0.761	+/-0.562	0.740	+/-0.577	1.00	pCi/L			KSD1	08/20/19	1613	1907789	1
GFPC Radium-228, Liquid "As Received"														
Radium-228	U	-0.195	+/-0.386	0.750	+/-0.386	1.00	pCi/L			LXB3	08/21/19	1322	1907787	2
Radium-226+Radium-228 Calculation "See Parent Products"														
Radium-226+228 Sum		0.761	+/-0.682		+/-0.694		pCi/L		1	AEA	08/22/19	0836	1907785	3

The following Analytical Methods were performed

Method	Description
1	EPA 903.0
2	EPA 904.0
3	Calculation

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium Carrier	GFPC Radium-226, Liquid "As Received"	1907789	91	(30%-110%)
Barium-133 Tracer	GFPC Radium-228, Liquid "As Received"	1907787	79.4	(30%-110%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Environmental Standards, Inc.
Address : 1140 Valley Forge Road

Valley Forge, Pennsylvania 19482

Report Date: August 29, 2019

Contact: TVA Deliverables
Project: JSF EIP GW

Client Sample ID: JSF-GW-FB03-20190814
Sample ID: 487777004
Matrix: AQ
Collect Date: 14-AUG-19
Receive Date: 15-AUG-19
Collector: Client

Project: TVAC00105
Client ID: TVAC008

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gas Flow Proportional Counting														
GFPC Radium-226, Liquid "As Received"														
Radium-226	U	0.436	+/-0.532	0.887	+/-0.538	1.00	pCi/L			KSD1	08/20/19	1613	1907789	1
GFPC Radium-228, Liquid "As Received"														
Radium-228	U	-0.183	+/-0.378	0.731	+/-0.378	1.00	pCi/L			LXB3	08/21/19	1322	1907787	2
Radium-226+Radium-228 Calculation "See Parent Products"														
Radium-226+228 Sum		0.436	+/-0.653		+/-0.657		pCi/L		1	AEA	08/22/19	0836	1907785	3

The following Analytical Methods were performed

Method	Description
1	EPA 903.0
2	EPA 904.0
3	Calculation

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium Carrier	GFPC Radium-226, Liquid "As Received"	1907789	92.1	(30%-110%)
Barium-133 Tracer	GFPC Radium-228, Liquid "As Received"	1907787	78.3	(30%-110%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Company : Environmental Standards, Inc.
Address : 1140 Valley Forge Road

Valley Forge, Pennsylvania 19482

Report Date: August 29, 2019

Contact: TVA Deliverables
Project: JSF EIP GW

Client Sample ID: JSF-GW-031-20190814
Sample ID: 487777005
Matrix: GW
Collect Date: 14-AUG-19
Receive Date: 15-AUG-19
Collector: Client

Project: TVAC00105
Client ID: TVAC008

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	PF	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gas Flow Proportional Counting														
GFPC Radium-226, Liquid "As Received"														
Radium-226	U	0.581	+/-0.500	0.702	+/-0.510	1.00	pCi/L			KSD1	08/20/19	1613	1907789	1
GFPC Radium-228, Liquid "As Received"														
Radium-228	U	0.0917	+/-0.252	0.455	+/-0.253	1.00	pCi/L			LXB3	08/21/19	1323	1907787	2
Radium-226+Radium-228 Calculation "See Parent Products"														
Radium-226+228 Sum		0.673	+/-0.560		+/-0.569		pCi/L		1	AEA	08/22/19	0836	1907785	3

The following Analytical Methods were performed

Method	Description
1	EPA 903.0
2	EPA 904.0
3	Calculation

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Barium Carrier	GFPC Radium-226, Liquid "As Received"	1907789	94.7	(30%-110%)
Barium-133 Tracer	GFPC Radium-228, Liquid "As Received"	1907787	91.7	(30%-110%)

Notes:

The MDC is a sample specific MDC.
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
Lc/LC: Critical Level
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Mtd.: Method
PF: Prep Factor
RL: Reporting Limit
TPU: Total Propagated Uncertainty

Quality Control Summary

QC Summary

Report Date: August 29, 2019
Page 1 of 2

Client : **Environmental Standards, Inc.**
1140 Valley Forge Road

Valley Forge, Pennsylvania

Contact: **TVA Deliverables**

Workorder: **487777**

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
Rad Gas Flow										
Batch 1907787										
QC1204358681 487777003 DUP										
Radium-228	U	-0.195	U	0.302	pCi/L	1.85		(0-2)	LXB3	08/21/19 13:21
	Uncert:	+/-0.386		+/-0.351						
	TPU:	+/-0.386		+/-0.359						
	MDC:	0.750		0.591						
QC1204358684 LCS										
Radium-228	20.8			20.0	pCi/L		96.6	(80%-120%)	LXB3	08/21/19 13:21
	Uncert:			+/-1.18						
	TPU:			+/-5.21						
	MDC:			0.475						
QC1204358679 MB										
Radium-228			U	0.0357	pCi/L				LXB3	08/21/19 13:22
	Uncert:			+/-0.176						
	TPU:			+/-0.176						
	MDC:			0.338						
Batch 1907789										
QC1204358687 487777005 DUP										
Radium-226	U	0.581	U	0.302	pCi/L	0.82		(0-2)	KSD1	08/20/19 15:14
	Uncert:	+/-0.500		+/-0.428						
	TPU:	+/-0.510		+/-0.432						
	MDC:	0.702		0.745						
QC1204358690 LCS										
Radium-226	555			534	pCi/L		96.2	(80%-120%)	KSD1	08/20/19 15:14
	Uncert:			+/-13.6						
	TPU:			+/-93.8						
	MDC:			0.948						
QC1204358685 MB										
Radium-226			U	0.384	pCi/L				KSD1	08/20/19 18:43
	Uncert:			+/-0.473						
	TPU:			+/-0.477						
	MDC:			0.785						

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

**	Analyte is a Tracer compound
<	Result is less than value reported
>	Result is greater than value reported
BD	Results are either below the MDC or tracer recovery is low
FA	Failed analysis.

QC Summary

Workorder: **487777**

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time

H	Analytical holding time was exceeded
J	See case narrative for an explanation
J	Value is estimated
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
M	M if above MDC and less than LLD
M	REMP Result > MDC/CL and < RDL
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UI	Gamma Spectroscopy--Uncertain identification
UJ	Gamma Spectroscopy--Uncertain identification
UL	Not considered detected. The associated number is the reported concentration, which may be inaccurate due to a low bias.
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
** Indicates analyte is a surrogate/tracer compound.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptence criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

Gas Flow Raw Data

Batch 1907789 Check-list

This check-list was completed on 21-AUG-19 by Kenshalla Oston

This batch was reviewed by Kenshalla Oston on 21-AUG-19 and Nat Long on 21-AUG-19.

Batch ID:	**Product:**	**Description:** Gas Flow Total Radium
1907789	GFCTORAL	GL-RAD-A-010

#	Criteria	Yes	No	Comments
Preparation Information				
1	Were all of the samples homogenous? Include sample description if not homogenous	Yes		
2	Was the preservation correct for this analysis?	Yes		
Internal Checklist Information				
3	Are instrument source checks within limits?	Yes		
4	Has an Aliquot Correction been completed for this batch?		No	
5	Have sample historical results been reviewed for this batch?	Yes		
Technical Information				
6	Were all the samples prepared/analyzed within the required holding time period?	Yes		
7	Are any sample results more negative than 3xTPU?		No	
Quality Control (QC) Information				
8	Was the method blank (MB) within the acceptance criteria?	Yes		
9	Were all tracer/carrier recoveries within the required acceptance limits?	Yes		
10	Were the laboratory control sample (LCS/LCSD) recoveries within the acceptance limits?	Yes		
11	Were the relative percent differences and/or error (RPD/RER) between the sample and its duplicate within acceptable limits?	Yes		
12	Has the method required detection limit been met?	Yes		
Miscellaneous Information				
13	Are sample-specific MDA/MDC calculated and reported?	Yes		

Prep Logbook

Total Radium in Liquid

Batch ID: **1907789**
Analyst: Kelli Dorrell (KSD1)
Method: EPA 900.1 Mod/ EPA 903.0 Mod
Lab SOP: GL−RAD−A−010 REV# 18
Instrument: GFC−51204863

Due Dates for Lab: 25−AUG−2019 **Package: 27−AUG−2019** **SDG: 28−AUG−2019**

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1204358690	Radium−226 SPIKE	0299−H	.1	mL

#	Sample ID	Prep Date	Min RDL (pCi/L)	Aliquot (mL)	Precipitation (date)	Initial Weight (g)	Final Weight (g)	Net Weight (mg)	Barium Carrier Yield (percent)
1	487569001	19−AUG−2019	1	200	08/19/19 11:33	0.0781	0.1033	25.2	93
2	487569002	19−AUG−2019	1	200	08/19/19 11:33	0.0772	0.1027	25.5	94
3	487569003	19−AUG−2019	1	200	08/19/19 11:33	0.077	0.103	26	96
4	487569004	19−AUG−2019	1	200	08/19/19 11:33	0.0769	0.1024	25.5	94
5	487569005	19−AUG−2019	1	200	08/19/19 11:33	0.0767	0.1025	25.8	95
6	487569006	19−AUG−2019	1	200	08/19/19 11:33	0.0771	0.103	25.9	95
7	487569007	19−AUG−2019	1	200	08/19/19 11:33	0.0771	0.101	23.9	88
8	487575001	19−AUG−2019	1	200	08/19/19 11:33	0.0772	0.1025	25.3	93
9	487575002	19−AUG−2019	1	200	08/19/19 11:33	0.0766	0.1025	25.9	95
10	487575003	19−AUG−2019	1	200	08/19/19 11:33	0.0771	0.1023	25.2	93
11	487575004	19−AUG−2019	1	200	08/19/19 11:33	0.0769	0.1031	26.2	97
12	487575005	19−AUG−2019	1	200	08/19/19 11:33	0.0767	0.1031	26.4	97
13	487575006	19−AUG−2019	1	200	08/19/19 11:33	0.0766	0.101	24.4	90
14	487575007	19−AUG−2019	1	200	08/19/19 11:33	0.0769	0.102	25.1	92
15	487777001	19−AUG−2019	1	200	08/19/19 11:33	0.077	0.1027	25.7	95
16	487777002	19−AUG−2019	1	200	08/19/19 11:33	0.077	0.102	25	92
17	487777003	19−AUG−2019	1	200	08/19/19 11:33	0.0771	0.1018	24.7	91
18	487777004	19−AUG−2019	1	200	08/19/19 11:33	0.0764	0.1014	25	92
19	487777005	19−AUG−2019	1	200	08/19/19 11:33	0.077	0.1027	25.7	95
20	1204358685 MB	19−AUG−2019	1	200	08/19/19 11:33	0.0772	0.1024	25.2	93
21	1204358686 DUP (487569001)	19−AUG−2019	1	200	08/19/19 11:33	0.0766	0.1034	26.8	99
22	1204358687 DUP (487777005)	19−AUG−2019	1	200	08/19/19 11:33	0.0769	0.1032	26.3	97
23	1204358690 LCS	19−AUG−2019	1	200	08/19/19 11:33	0.0771	0.1021	25	92

Reagent/Solvent Lot ID	Description	Amount
CARR 2948176	RGF−Barium Carrier 1mL=27.15	1 mL
REGNT 2932352	RGF−1:1 Sulfuric Acid	10 mL
REGNT 2964807.23	RGF−Hydrochloric Acid	10 mL

Comments:
Pipette 1: RAD−GFC−1795419
Pipette 2: RAD−GFC−1608405
Data Entry Date2: 19−AUG−2019 09:58 GFC−F30560 Kelli Dorrell
Data Entry Date3: 19−AUG−2019 00:00

Total Radium Liquid

Filename : TOTRA.XLS
File type : Excel
Version # : 1.3.9

Batch : 1907789
Analyst : KEL01237
Prep Date : 8/19/2019
Method Uncertainty: 0.0859

Geometry: 47mm Filter

Carrier S/N : 2948176
Carrier Exp Date : 6/25/2020
Carrier Volume Added: 1.00
Carrier Weight (mg/ml): 27.15
Carrier Weight StDev.: 0.13

Procedure Code : GFCTORAL
Parmname : Radium-226
Required MDA : 1 pCi/L
Halflife of Rn-222 : 3.8235 days

Sample Characteristics					Carrier Calculations				
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Sample Date/Time	Carrier Weight (mg) (Standard)	Residue Weight (mg) (Sample)	Residue Weight StDev. (mg)	Carrier Aliquot (mL)	Carrier Aliquot StDev. (mL)
1	487569001.1	0.2000	1.6007E-05	8/13/2019 9:17	27.15	25.20	0.115640	1.0	0.002000
2	487569002.1	0.2000	1.6007E-05	8/13/2019 10:15	27.15	25.50	0.116929	1.0	0.002000
3	487569003.1	0.2000	1.6007E-05	8/13/2019 10:30	27.15	26.00	0.119078	1.0	0.002000
4	487569004.1	0.2000	1.6007E-05	8/13/2019 13:49	27.15	25.50	0.116929	1.0	0.002000
5	487569005.1	0.2000	1.6007E-05	8/13/2019 15:06	27.15	25.80	0.118218	1.0	0.002000
6	487569006.1	0.2000	1.6007E-05	8/13/2019 15:25	27.15	25.90	0.118648	1.0	0.002000
7	487569007.1	0.2000	1.6007E-05	8/13/2019 16:35	27.15	23.90	0.110052	1.0	0.002000
8	487575001.1	0.2000	1.6007E-05	8/12/2019 15:50	27.15	25.30	0.116069	1.0	0.002000
9	487575002.1	0.2000	1.6007E-05	8/12/2019 16:05	27.15	25.90	0.118648	1.0	0.002000
10	487575003.1	0.2000	1.6007E-05	8/13/2019 8:20	27.15	25.20	0.115640	1.0	0.002000
11	487575004.1	0.2000	1.6007E-05	8/13/2019 12:00	27.15	26.20	0.119938	1.0	0.002000
12	487575005.1	0.2000	1.6007E-05	8/13/2019 11:20	27.15	26.40	0.120797	1.0	0.002000
13	487575006.1	0.2000	1.6007E-05	8/13/2019 15:10	27.15	24.40	0.112201	1.0	0.002000
14	487575007.1	0.2000	1.6007E-05	8/13/2019 15:48	27.15	25.10	0.115210	1.0	0.002000
15	487777001.1	0.2000	1.6007E-05	8/14/2019 8:18	27.15	25.70	0.117789	1.0	0.002000
16	487777002.1	0.2000	1.6007E-05	8/14/2019 11:05	27.15	25.00	0.114780	1.0	0.002000
17	487777003.1	0.2000	1.6007E-05	8/14/2019 13:05	27.15	24.70	0.113491	1.0	0.002000
18	487777004.1	0.2000	1.6007E-05	8/14/2019 14:25	27.15	25.00	0.114780	1.0	0.002000
19	487777005.1	0.2000	1.6007E-05	8/14/2019 14:45	27.15	25.70	0.117789	1.0	0.002000
20	1204358685.1	0.2000	1.6007E-05	8/19/2019 0:00	27.15	25.20	0.115640	1.0	0.002000
21	1204358686.1	0.2000	1.6007E-05	8/13/2019 9:17	27.15	26.80	0.122516	1.0	0.002000
22	1204358687.1	0.2000	1.6007E-05	8/14/2019 14:45	27.15	26.30	0.120367	1.0	0.002000
23	1204358690.1	0.2000	1.6007E-05	8/19/2019 0:00	27.15	25.00	0.114780	1.0	0.002000

Pipet, 0.1 ml Stdev : +/-	0.000200	ml
Pipet, 0.5 ml Stdev : +/-	0.001000	ml
Pipet, 1 ml Stdev : +/-	0.002000	ml
Pipet, 5 ml Stdev : +/-	0.010000	ml

Analytical SOP: GL-RAD-A-010
Instrument SOP: GL-RAD-I-016, GL-RAD-I-006

Count Raw Data

Pos.	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Gross Alpha CPM	Count Start Date/Time	Precipitation Date/Time	Ingrowth factor	Calculated Sample Recovery %	Sample Recovery Error %
1	7D	60	11	37	0.183	8/20/2019 16:13	8/19/2019 11:33	1.593	92.8%	0.83%
2	9A	60	9	69	0.150	8/20/2019 16:13	8/19/2019 11:33	1.593	93.9%	0.83%
3	11A	60	11	54	0.183	8/20/2019 18:43	8/19/2019 11:33	1.638	95.8%	0.83%
4	9D	60	12	30	0.200	8/20/2019 16:13	8/19/2019 11:33	1.593	93.9%	0.83%
5	10A	60	8	28	0.133	8/20/2019 16:13	8/19/2019 11:33	1.593	95.0%	0.83%
6	10C	60	2	35	0.033	8/20/2019 16:13	8/19/2019 11:33	1.593	95.4%	0.83%
7	11C	60	5	29	0.083	8/20/2019 18:43	8/19/2019 11:33	1.638	88.0%	0.83%
8	11A	60	6	65	0.100	8/20/2019 16:13	8/19/2019 11:33	1.593	93.2%	0.83%
9	12A	60	14	45	0.233	8/20/2019 18:43	8/19/2019 11:33	1.638	95.4%	0.83%
10	11C	60	14	47	0.233	8/20/2019 16:13	8/19/2019 11:33	1.593	92.8%	0.83%
11	12B	60	14	76	0.233	8/20/2019 18:43	8/19/2019 11:33	1.638	96.5%	0.83%
12	12A	60	7	46	0.117	8/20/2019 16:13	8/19/2019 11:33	1.593	97.2%	0.83%
13	12B	60	15	56	0.250	8/20/2019 16:13	8/19/2019 11:33	1.593	89.9%	0.83%
14	12D	60	7	104	0.117	8/20/2019 16:13	8/19/2019 11:33	1.593	92.4%	0.83%
15	13A	60	14	97	0.233	8/20/2019 16:13	8/19/2019 11:33	1.593	94.7%	0.83%
16	13B	60	8	58	0.133	8/20/2019 16:13	8/19/2019 11:33	1.593	92.1%	0.83%
17	13D	60	14	122	0.233	8/20/2019 16:13	8/19/2019 11:33	1.593	91.0%	0.83%
18	14A	60	11	121	0.183	8/20/2019 16:13	8/19/2019 11:33	1.593	92.1%	0.83%
19	14B	60	11	63	0.183	8/20/2019 16:13	8/19/2019 11:33	1.593	94.7%	0.83%
20	12D	60	9	103	0.150	8/20/2019 18:43	8/19/2019 11:33	1.638	92.8%	0.83%
21	14D	60	5	33	0.083	8/20/2019 16:13	8/19/2019 11:33	1.593	98.7%	0.83%
22	G1	60	7	56	0.117	8/20/2019 15:14	8/19/2019 11:33	1.575	96.9%	0.83%
23	G4	60	5933	3670	98.883	8/20/2019 15:14	8/19/2019 11:33	1.575	92.1%	0.83%

Calibration Data

Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Beta X-Talk	Weekly Bkg CPM	Weekly Bkg Count Start Date/Time	Weekly Bkg Count Time (min.)
PIC	5/1/2018	5/31/2020	0.3243	0.00619	0.00039	0.064	8/16/2019 18:03	500
PIC	5/1/2018	5/31/2020	0.3245	0.00726	0.00102	0.122	8/16/2019 18:04	500
PIC	5/1/2018	5/31/2020	0.3214	0.00693	0.00021	0.088	8/16/2019 18:01	500
PIC	5/1/2018	5/31/2020	0.3272	0.02427	0.00202	0.124	8/16/2019 18:04	500
PIC	5/1/2018	5/31/2020	0.3136	0.01461	0.00021	0.064	8/16/2019 18:04	500
PIC	5/1/2018	5/31/2020	0.3128	0.00710	0.00035	0.052	8/16/2019 18:04	500
PIC	5/1/2018	5/31/2020	0.3296	0.01271	0.00018	0.042	8/16/2019 18:01	500
PIC	5/1/2018	5/31/2020	0.3235	0.00693	0.00021	0.088	8/16/2019 18:01	500
PIC	5/1/2018	5/31/2020	0.2941	0.01685	0.00015	0.092	8/16/2019 18:01	500
PIC	5/1/2018	5/31/2020	0.3255	0.01271	0.00018	0.042	8/16/2019 18:01	500
PIC	5/1/2018	5/31/2020	0.3211	0.01035	0.00025	0.092	8/16/2019 18:01	500
PIC	5/1/2018	5/31/2020	0.2928	0.01685	0.00015	0.092	8/16/2019 18:01	500
PIC	5/1/2018	5/31/2020	0.3265	0.01035	0.00025	0.092	8/16/2019 18:01	500
PIC	5/1/2018	5/31/2020	0.3157	0.01863	0.00019	0.068	8/16/2019 18:01	500
PIC	5/1/2018	5/31/2020	0.3363	0.00669	0.00030	0.061	8/16/2019 18:01	1000
PIC	5/1/2018	5/31/2020	0.3337	0.01043	0.00022	0.048	8/16/2019 18:01	1000
PIC	5/1/2018	5/31/2020	0.3408	0.01236	0.00024	0.066	8/16/2019 18:01	1000
PIC	5/1/2018	5/31/2020	0.3172	0.02505	0.00017	0.093	8/17/2019 14:46	1000
PIC	5/1/2018	5/31/2020	0.3265	0.01557	0.00027	0.056	8/17/2019 14:46	1000
PIC	5/1/2018	5/31/2020	0.3154	0.01863	0.00019	0.068	8/16/2019 18:01	500
PIC	5/1/2018	5/31/2020	0.2943	0.01512	0.00023	0.021	8/16/2019 18:01	1000
LB4100	5/1/2018	5/31/2020	0.3060	0.03411	0.00015	0.054	8/16/2019 18:01	500
LB4100	5/1/2018	5/31/2020	0.2875	0.02077	0.00016	0.078	8/16/2019 18:01	500

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

* - RPD changed to 0% due to sample & dup activity below MDA

Spike S/N : N/A
Spike Exp Date : N/A
Spike Activity (dpm/ml): N/A
Spike Volume Added: N/A

LCS S/N : 0299-H
LCS Exp Date : 12/4/2019
LCS Activity (dpm/ml): 2462.14
LCS Volume Added: 0.10

Results

Pos.	Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error %	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA Counting Uncertainty pCi/L	2 SIGMA Total Prop. Uncertainty pCi/L	Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
1	0.3782	0.2670	1	0.7689	**0.5593**	47.29%	0.1193	0.0564	0.5194	0.5280		SAMPLE				
2	0.5157	0.3641	1	0.9601	**0.1244**	187.09%	0.0280	0.0524	0.4762	0.4767		SAMPLE				
3	0.4217	0.2978	1	0.8188	**0.4249**	59.64%	0.0953	0.0568	0.4976	0.5028		SAMPLE				
4	0.5155	0.3640	1	0.9579	**0.3449**	78.78%	0.0760	0.0598	0.5394	0.5429		SAMPLE				
5	0.3820	0.2697	1	0.7765	**0.3284**	69.94%	0.0693	0.0485	0.4507	0.4542		SAMPLE				
6	0.3438	0.2427	1	0.7223	**-0.0894**	137.59%	-0.0187	0.0257	0.2384	0.2388		SAMPLE				
7	0.3091	0.2182	1	0.6734	**0.1954**	92.86%	0.0413	0.0384	0.3564	0.3580		SAMPLE				
8	0.4429	0.3127	1	0.8599	**0.0552**	357.72%	0.0120	0.0429	0.3946	0.3948		SAMPLE				
9	0.4730	0.3340	1	0.9128	**0.6918**	45.19%	0.1413	0.0638	0.6128	0.6243		SAMPLE				
10	0.3052	0.2155	1	0.6649	**0.8945**	32.98%	0.1913	0.0630	0.5780	0.5979		SAMPLE				
11	0.4284	0.3024	1	0.8267	**0.6257**	45.17%	0.1413	0.0638	0.5549	0.5651		SAMPLE				
12	0.4795	0.3385	1	0.9253	**0.1219**	187.04%	0.0247	0.0461	0.4490	0.4495		SAMPLE				
13	0.4652	0.3284	1	0.8978	**0.7601**	41.77%	0.1580	0.0660	0.6229	0.6362		SAMPLE				
14	0.4021	0.2839	1	0.8099	**0.2341**	93.75%	0.0487	0.0456	0.4330	0.4349		SAMPLE				
15	0.3397	0.2398	1	0.7017	**0.7632**	36.48%	0.1723	0.0628	0.5470	0.5622		SAMPLE				
16	0.3122	0.2204	1	0.6708	**0.3916**	55.85%	0.0853	0.0476	0.4296	0.4348		SAMPLE				
17	0.3627	0.2561	1	0.7401	**0.7605**	37.61%	0.1673	0.0629	0.5619	0.5768		SAMPLE				
18	0.4570	0.3227	1	0.8873	**0.4355**	62.17%	0.0903	0.0561	0.5322	0.5378		SAMPLE				
19	0.3352	0.2367	1	0.7020	**0.5811**	43.84%	0.1273	0.0558	0.5001	0.5100		SAMPLE				
20	0.3898	0.2752	1	0.7852	**0.3835**	62.65%	0.0820	0.0513	0.4725	0.4772		MB				
21	0.2184	0.1542	1	0.5516	**0.3027**	60.26%	0.0623	0.0375	0.3581	0.3619	487569001.1	DUP	* 0.0%	0.7857		
22	0.3568	0.2519	1	0.7449	**0.3015**	72.38%	0.0627	0.0453	0.4282	0.4318	487777005.1	DUP	* 0.0%	0.8200		
23	0.4802	0.3390	1	0.9481	**533.5789**	2.59%	98.8053	1.2838	13.5902	93.8319		LCS			554.5350	96.2%

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
487569001	7D	60	11	37	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487569002	9A	60	9	69	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487569003	11A	60	11	54	8/20/2019 18:43	8/20/2019 19:43	PIC	1907789
487569004	9D	60	12	30	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487569005	10A	60	8	28	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487569006	10C	60	2	35	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487569007	11C	60	5	29	8/20/2019 18:43	8/20/2019 19:43	PIC	1907789
487575001	11A	60	6	65	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487575002	12A	60	14	45	8/20/2019 18:43	8/20/2019 19:43	PIC	1907789
487575003	11C	60	14	47	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487575004	12B	60	14	76	8/20/2019 18:43	8/20/2019 19:43	PIC	1907789
487575005	12A	60	7	46	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487575006	12B	60	15	56	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487575007	12D	60	7	104	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487777001	13A	60	14	97	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487777002	13B	60	8	58	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487777003	13D	60	14	122	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487777004	14A	60	11	121	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
487777005	14B	60	11	63	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
1204358685	12D	60	9	103	8/20/2019 18:43	8/20/2019 19:43	PIC	1907789
1204358686	14D	60	5	33	8/20/2019 16:13	8/20/2019 17:13	PIC	1907789
1204358687	G1	60	7	56	8/20/2019 15:14	8/20/2019 16:14	LB4100	1907789
1204358690	G4	60	5933	3670	8/20/2019 15:14	8/20/2019 16:14	LB4100	1907789

Batch 1907787 Check-list

This check-list was completed on 22-AUG-19 by Kenshalla Oston

This batch was reviewed by Kenshalla Oston on 22-AUG-19 and Nat Long on 22-AUG-19.

Batch ID: 1907787

Product: GFC28RAL

Description: Gas Flow Radium 228 GL-RAD-A-009

#	Criteria	Yes	No	Comments
Preparation Information				
1	Were all of the samples homogenous? Include sample description if not homogenous	Yes		
2	Was the preservation correct for this analysis?	Yes		
Internal Checklist Information				
3	Are instrument source checks within limits?	Yes		
4	Has an Aliquot Correction been completed for this batch?		No	
5	Have sample historical results been reviewed for this batch?	Yes		
Technical Information				
6	Were all the samples prepared/analyzed within the required holding time period?	Yes		
7	Are any sample results more negative than 3xTPU?		No	
Quality Control (QC) Information				
8	Was the method blank (MB) within the acceptance criteria?	Yes		
9	Were the laboratory control sample (LCS/LCSD) recoveries within the acceptance limits?	Yes		
10	Were the relative percent differences and/or error (RPD/RER) between the sample and its duplicate within acceptable limits?	Yes		
11	Has the method required detection limit been met?	Yes		
Miscellaneous Information				
12	Are sample-specific MDA/MDC calculated and reported?	Yes		

Prep Logbook

Radium−228 in Liquid

Batch ID: **1907787**
Analyst: Lois Buist (LXB3)
Method: EPA 904.0/SW846 9320 Modified
Lab SOP: GL−RAD−A−009 REV# 17
Instrument: GFC−51204863

Due Dates for Lab: 25−AUG−2019 **Package: 27−AUG−2019** **SDG: 28−AUG−2019**

Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
LCS	1204358684	Radium−228 SPIKE	1905−A	.2	mL

#	Sample ID	Prep Date	Min RDL (pCi/L)	Aliquot (mL)	Ac−228 Ingrow (date)	Ac−228 Separation (date)
1	487569001	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
2	487569002	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
3	487569003	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
4	487569004	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
5	487569005	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
6	487569006	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
7	487569007	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
8	487575001	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
9	487575002	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
10	487575003	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
11	487575004	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
12	487575005	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
13	487575006	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
14	487575007	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
15	487777001	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
16	487777002	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
17	487777003	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
18	487777004	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
19	487777005	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
20	1204358679 MB	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
21	1204358680 DUP (487569001)	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
22	1204358681 DUP (487777003)	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26
23	1204358684 LCS	16−AUG−2019	1	900	08/19/19 14:15	08/21/19 11:26

Reagent/Solvent Lot ID	Description	Amount
WORK 0487−E	Barium−133 Tracer	.2 mL
REGNT 2672182	RGF−1.5 Ammonium Sulfate	10 mL
REGNT 2896780.11	RGF−Hydrofluoric Acid	4 mL
REGNT 2911219	Barium Carrier Ra228−REG	1 mL
REGNT 2913096.3	Acetic Acid Glacial ACS Poly Coated Bottle	10 mL
REGNT 2924781	Lot #DGA0006	2 g
REGNT 2931663	RGF−50% Potassium Carbonate	2 mL
REGNT 2936697	RGF−Neodymium Subtrate	5 mL
REGNT 2947553	RGF−Neodymium 500mg/L	.2 mL
REGNT 2957135.8	RGF−Nitric Acid	5 mL
REGNT 2959978	RGF−7M Nitric Acid	25 mL
REGNT 2959984	RGF−1M Citric Acid	5 mL

Comments:

Pipet Id: RAD−GFC−1795419
Data Entry Date2: 16−AUG−2019 00:00

Prep Logbook

#	Sample ID	Prep Date	Min RDL (pCi/L)	Aliquot (mL)	Ac−228 Ingrow (date)	Ac−228 Separation (date)

Reagent/Solvent Lot ID	Description	Amount
REGNT 2965866	RGF−2M Hydrochloric Acid	20 mL

Comments:

Radium-228 Liquid

Filename : RA228.XLS
File type : Excel
Version # : 1.4.2

Tracer S/N : 0487-E
Tracer Exp Date : 1/14/2020
Tracer Volume Added: 0.20

Batch : 1907787
Analyst : LOI02092
Prep Date : 8/16/2019
Ra-228 Method Uncertainty : 0.1268

Geometry: 25mm Filter

Procedure Code : GFC28RAL
Parmname : Radium-228
Required MDA : 1 pCi/L
Ra-228 Abundance : 1.00
Halflife of Ra-228 : 5.75 years
Halflife of Ac-228 : 6.15 hours

Sample Characteristics					**Tracer Calculations**					
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Sample Date/Time	Tracer Ref. Activity (CPM)	Tracer Ref. Count Uncertainty (%)	Tracer Samp. Activity (CPM)	Tracer Samp. Count Uncertainty (%)	Tracer Aliquot (mL)	Tracer Aliquot StDev. (mL)
1	487569001.1	0.9000	2.0768E-05	8/13/2019 9:17	386.6	3.16%	355.4	3.31%	0.2	0.000200
2	487569002.1	0.9000	2.0768E-05	8/13/2019 10:15	386.6	3.16%	323.9	3.49%	0.2	0.000200
3	487569003.1	0.9000	2.0768E-05	8/13/2019 10:30	386.6	3.16%	326.9	3.48%	0.2	0.000200
4	487569004.1	0.9000	2.0768E-05	8/13/2019 13:49	386.6	3.16%	328.4	3.47%	0.2	0.000200
5	487569005.1	0.9000	2.0768E-05	8/13/2019 15:06	386.6	3.16%	313.3	3.56%	0.2	0.000200
6	487569006.1	0.9000	2.0768E-05	8/13/2019 15:25	386.6	3.16%	218.8	4.41%	0.2	0.000200
7	487569007.1	0.9000	2.0768E-05	8/13/2019 16:35	386.6	3.16%	319.9	3.52%	0.2	0.000200
8	487575001.1	0.9000	2.0768E-05	8/12/2019 15:50	386.6	3.16%	289.4	3.73%	0.2	0.000200
9	487575002.1	0.9000	2.0768E-05	8/12/2019 16:05	386.6	3.16%	363.9	3.27%	0.2	0.000200
10	487575003.1	0.9000	2.0768E-05	8/13/2019 8:20	386.6	3.16%	353.9	3.32%	0.2	0.000200
11	487575004.1	0.9000	2.0768E-05	8/13/2019 12:00	386.6	3.16%	352.6	3.33%	0.2	0.000200
12	487575005.1	0.9000	2.0768E-05	8/13/2019 11:20	386.6	3.16%	354.5	3.32%	0.2	0.000200
13	487575006.1	0.9000	2.0768E-05	8/13/2019 15:10	386.6	3.16%	326.2	3.48%	0.2	0.000200
14	487575007.1	0.9000	2.0768E-05	8/13/2019 15:48	386.6	3.16%	343.2	3.38%	0.2	0.000200
15	487777001.1	0.9000	2.0768E-05	8/14/2019 8:18	386.6	3.16%	327.5	3.47%	0.2	0.000200
16	487777002.1	0.9000	2.0768E-05	8/14/2019 11:05	386.6	3.16%	317.1	3.54%	0.2	0.000200
17	487777003.1	0.9000	2.0768E-05	8/14/2019 13:05	386.6	3.16%	307.0	3.60%	0.2	0.000200
18	487777004.1	0.9000	2.0768E-05	8/14/2019 14:25	386.6	3.16%	302.8	3.63%	0.2	0.000200
19	487777005.1	0.9000	2.0768E-05	8/14/2019 14:45	386.6	3.16%	354.6	3.32%	0.2	0.000200
20	1204358679.1	0.9000	2.0768E-05	8/16/2019 0:00	386.6	3.16%	354.8	3.32%	0.2	0.000200
21	1204358680.1	0.9000	2.0768E-05	8/13/2019 9:17	386.6	3.16%	343.3	3.38%	0.2	0.000200
22	1204358681.1	0.9000	2.0768E-05	8/14/2019 13:05	386.6	3.16%	311.2	3.58%	0.2	0.000200
23	1204358684.1	0.9000	2.0768E-05	8/16/2019 0:00	386.6	3.16%	367.2	3.25%	0.2	0.000200

Pipet, 0.1 ml Stdev : +/-	0.000200	ml
Pipet, 0.5 ml Stdev : +/-	0.001000	ml
Pipet, 1 ml Stdev : +/-	0.002000	ml

Analytical SOP: GL-RAD-A-009
Instrument SOP: GL-RAD-I-016

Count raw Data

Pos.	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Beta cpm	Count Start Date/Time	Ac-228 Ingrowth Date/Time	Ac-228 Decay Date/Time	Ra-228 Decay	Ac-228 Decay	Ac-228 Ingrowth	Ac-228 Count Correction	Calculated Sample Recovery %	Sample Recovery Error %
1	1B	60	7	40	0.667	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.804	0.994	1.057	91.9%	2.29%
2	1C	60	5	83	1.383	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.804	0.994	1.057	83.8%	2.36%
3	1D	60	13	98	1.633	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.804	0.994	1.057	84.6%	2.35%
4	2A	60	1	37	0.617	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.804	0.994	1.057	84.9%	2.35%
5	2B	60	13	62	1.033	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.804	0.994	1.057	81.0%	2.38%
6	3C	60	8	65	1.083	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.804	0.994	1.057	56.6%	2.72%
7	3D	60	6	75	1.250	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.804	0.994	1.057	82.7%	2.37%
8	4A	60	5	71	1.183	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.803	0.994	1.057	74.9%	2.45%
9	4B	60	13	86	1.433	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.803	0.994	1.057	94.1%	2.28%
10	4C	60	7	26	0.433	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.803	0.994	1.057	91.5%	2.30%
11	4D	60	9	51	0.850	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.803	0.994	1.057	91.2%	2.30%
12	5A	60	6	44	0.733	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.803	0.994	1.057	91.7%	2.30%
13	5B	60	2	26	0.433	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.803	0.994	1.057	84.4%	2.35%
14	5C	60	7	39	0.650	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.803	0.994	1.057	88.8%	2.32%
15	5D	60	3	77	1.283	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.998	0.803	0.994	1.057	84.7%	2.35%
16	6A	60	7	94	1.567	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.998	0.803	0.994	1.057	82.0%	2.38%
17	6B	60	8	70	1.167	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.998	0.803	0.994	1.057	79.4%	2.40%
18	6C	60	8	70	1.167	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.998	0.803	0.994	1.057	78.3%	2.41%
19	7A	60	4	45	0.750	8/21/2019 13:23	8/19/2019 14:15	8/21/2019 11:26	0.998	0.803	0.994	1.057	91.7%	2.30%
20	7B	60	0	21	0.350	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.998	0.803	0.994	1.057	91.8%	2.30%
21	7D	60	5	42	0.700	8/21/2019 13:22	8/19/2019 14:15	8/21/2019 11:26	0.997	0.803	0.994	1.057	88.8%	2.32%
22	13A	60	3	77	1.283	8/21/2019 13:21	8/19/2019 14:15	8/21/2019 11:26	0.998	0.804	0.994	1.057	80.5%	2.39%
23	13B	60	7	1225	20.417	8/21/2019 13:21	8/19/2019 14:15	8/21/2019 11:26	0.998	0.804	0.994	1.057	95.0%	2.27%

Calibration Data

Pos.	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Bkg cpm	Weekly Bkg Count Start Date/Time	Bkg Count Time (min.)
1	PIC	6/1/2019	5/31/2020	0.6666	0.00711	0.776	8/16/2019 18:04	500
2	PIC	6/1/2019	5/31/2020	0.6300	0.00847	0.552	8/16/2019 18:04	500
3	PIC	6/1/2019	5/31/2020	0.6495	0.00692	1.660	8/16/2019 18:05	500
4	PIC	6/1/2019	5/31/2020	0.6348	0.01914	0.428	8/16/2019 18:04	500
5	PIC	6/1/2019	5/31/2020	0.6569	0.02111	0.580	8/16/2019 18:04	500
6	PIC	6/1/2019	5/31/2020	0.6567	0.00988	1.194	8/16/2019 18:04	500
7	PIC	6/1/2019	5/31/2020	0.6533	0.02297	0.568	8/16/2019 18:04	500
8	PIC	6/1/2019	5/31/2020	0.6625	0.01123	1.278	8/16/2019 18:05	500
9	PIC	6/1/2019	5/31/2020	0.6400	0.01519	0.592	8/16/2019 18:05	500
10	PIC	6/1/2019	5/31/2020	0.6541	0.00889	0.426	8/16/2019 18:05	500
11	PIC	6/1/2019	5/31/2020	0.6083	0.00773	0.926	8/16/2019 18:05	500
12	PIC	6/1/2019	5/31/2020	0.6776	0.00851	0.520	8/16/2019 18:05	500
13	PIC	6/1/2019	5/31/2020	0.6707	0.00426	0.514	8/16/2019 18:05	500
14	PIC	6/1/2019	5/31/2020	0.6748	0.00657	0.520	8/16/2019 18:05	500
15	PIC	6/1/2019	5/31/2020	0.6606	0.00925	1.182	8/16/2019 18:05	500
16	PIC	6/1/2019	5/31/2020	0.6489	0.02228	1.502	8/16/2019 18:03	500
17	PIC	6/1/2019	5/31/2020	0.6310	0.00851	1.314	8/16/2019 18:04	500
18	PIC	6/1/2019	5/31/2020	0.6546	0.01970	1.308	8/16/2019 18:03	500
19	PIC	6/1/2019	5/31/2020	0.6638	0.00594	0.666	8/16/2019 18:03	500
20	PIC	6/1/2019	5/31/2020	0.6492	0.00627	0.318	8/16/2019 18:03	500
21	PIC	6/1/2019	5/31/2020	0.6555	0.01113	0.494	8/16/2019 18:03	500
22	PIC	6/1/2019	5/31/2020	0.6889	0.00714	1.031	8/16/2019 18:01	1000
23	PIC	6/1/2019	5/31/2020	0.6801	0.00967	0.889	8/16/2019 18:01	1000

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

* - RPD changed to 0% due to sample & dup activity below MDA

Spike S/N : N/A
Spike Exp Date : N/A
Spike Activity (dpm/ml): N/A
Spike Volume Added: N/A

LCS S/N : 1905-A
LCS Exp Date : 6/13/2020
LCS Activity (dpm/ml): 207.31
LCS Volume Added: 0.20

Results

Pos.	Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error %	Net Count Rate CPM	Net Count Rate Error CPM	**2 SIGMA** Counting Uncertainty pCi/L	**2 SIGMA** Total Prop. Uncertainty pCi/L	Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
1	0.3040	0.2146	1	0.4834	**-0.1185**	102.95%	-0.1093	0.1125	0.2391	0.2391		SAMPLE				
2	0.2976	0.2101	1	0.4832	**1.0461**	18.86%	0.8313	0.1554	0.3834	0.4661		SAMPLE				
3	0.4961	0.3502	1	0.7609	**-0.0323**	655.37%	-0.0267	0.1748	0.4143	0.4143		SAMPLE				
4	0.2565	0.1811	1	0.4238	**0.2324**	56.01%	0.1887	0.1055	0.2548	0.2616		SAMPLE				
5	0.3026	0.2136	1	0.4896	**0.5658**	30.08%	0.4533	0.1356	0.3316	0.3619		SAMPLE				
6	0.6218	0.4390	1	0.9674	**-0.1978**	129.23%	-0.1107	0.1430	0.5010	0.5010		SAMPLE				
7	0.2949	0.2082	1	0.4778	**0.8382**	21.98%	0.6820	0.1482	0.3571	0.4169		SAMPLE				
8	0.4824	0.3406	1	0.7481	**-0.1269**	157.69%	-0.0947	0.1493	0.3921	0.3922		SAMPLE				
9	0.2703	0.1908	1	0.4368	**0.9283**	19.02%	0.8413	0.1583	0.3424	0.4159		SAMPLE				
10	0.2306	0.1628	1	0.3811	**8.140E-03**	1225.32%	0.0073	0.0899	0.1955	0.1955		SAMPLE				
11	0.3670	0.2591	1	0.5781	**-0.0911**	166.55%	-0.0760	0.1266	0.2972	0.2972		SAMPLE				
12	0.2456	0.1734	1	0.4003	**0.2282**	54.04%	0.2133	0.1152	0.2415	0.2483		SAMPLE				
13	0.2681	0.1893	1	0.4373	**-0.0948**	112.63%	-0.0807	0.0908	0.2091	0.2092		SAMPLE				
14	0.2548	0.1799	1	0.4152	**0.1443**	83.85%	0.1300	0.1090	0.2370	0.2398		SAMPLE				
15	0.4111	0.2902	1	0.6398	**0.1204**	152.11%	0.1013	0.1541	0.3588	0.3601		SAMPLE				
16	0.4873	0.3440	1	0.7505	**0.0808**	263.88%	0.0647	0.1706	0.4177	0.4182		SAMPLE				
17	0.4841	0.3418	1	0.7499	**-0.1955**	100.87%	-0.1473	0.1486	0.3863	0.3864		SAMPLE				
18	0.4721	0.3333	1	0.7315	**-0.1833**	105.14%	-0.1413	0.1485	0.3775	0.3775		SAMPLE				
19	0.2837	0.2003	1	0.4552	**0.0917**	140.03%	0.0840	0.1176	0.2517	0.2528		SAMPLE				
20	0.2001	0.1413	1	0.3384	**0.0357**	251.36%	0.0320	0.0804	0.1758	0.1760		MB				
21	0.2556	0.1804	1	0.4180	**0.2353**	54.67%	0.2060	0.1125	0.2518	0.2588	487569001.1	DUP	* 0.0%	1.9680		
22	0.3762	0.2656	1	0.5911	**0.3019**	59.39%	0.2523	0.1497	0.3511	0.3594	487777003.1	DUP	* 0.0%	1.8475		
23	0.2998	0.2117	1	0.4746	**20.0482**	3.88%	19.5277	0.5841	1.1753	5.2104		LCS			20.7520	96.6%

1907787.xls

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
487569001	1B	60	7	40	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487569002	1C	60	5	83	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487569003	1D	60	13	98	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487569004	2A	60	1	37	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487569005	2B	60	13	62	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487569006	3C	60	8	65	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487569007	3D	60	6	75	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487575001	4A	60	5	71	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487575002	4B	60	13	86	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487575003	4C	60	7	26	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487575004	4D	60	9	51	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487575005	5A	60	6	44	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487575006	5B	60	2	26	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487575007	5C	60	7	39	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487777001	5D	60	3	77	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487777002	6A	60	7	94	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487777003	6B	60	8	70	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487777004	6C	60	8	70	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
487777005	7A	60	4	45	8/21/2019 13:23	8/21/2019 14:23	PIC	1907787
1204358679	7B	60	0	21	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
1204358680	7D	60	5	42	8/21/2019 13:22	8/21/2019 14:22	PIC	1907787
1204358681	13A	60	3	77	8/21/2019 13:21	8/21/2019 14:21	PIC	1907787
1204358684	13B	60	7	1225	8/21/2019 13:21	8/21/2019 14:21	PIC	1907787

ASSAY 21-Aug-19 12:19:09

Protocol	id	8	228_REC
Time	limit	180	
Count	limit	50000	
Isotope	Ba-133		
Protocol	date	22-Jul-19	12:58:22
Run	id.	9	

Samp_ID	POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
REF	1	74	1	180	1299	386.6	3.16		12:19:16
487569001	2	74	2	180	1205	355.4	3.31	91.93	12:22:27
487569002	3	74	3	180	1111	323.9	3.49	83.78	12:25:38
487569003	4	74	4	180	1120	326.9	3.48	84.56	12:28:50
487569004	5	74	5	180	1124	328.4	3.47	84.95	12:32:01
487569005	6	75	6	180	1079	313.3	3.56	81.04	12:35:26
487569006	7	75	7	180	796	218.8	4.41	56.60	12:38:37
487569007	8	75	8	180	1099	319.9	3.52	82.75	12:41:49
487575001	9	75	9	180	1008	289.4	3.73	74.86	12:45:00
487575002	10	75	10	180	1231	363.9	3.27	94.13	12:48:11
487575003	11	66	11	180	1201	353.9	3.32	91.54	12:51:41
487575004	12	66	12	180	1197	352.6	3.33	91.21	12:54:53
487575005	13	66	13	180	1203	354.5	3.32	91.70	12:58:04
487575006	14	66	14	180	1118	326.2	3.48	84.38	13:01:15
487575007	15	66	15	180	1169	343.2	3.38	88.77	13:04:27
487777001	16	38	16	180	1122	327.5	3.47	84.71	13:07:46
487777002	17	38	17	180	1091	317.1	3.54	82.02	13:10:57
487777003	18	38	18	180	1060	307	3.6	79.41	13:14:08
487777004	19	38	19	180	1048	302.8	3.63	78.32	13:17:20
487777005	20	38	20	180	1203	354.6	3.32	91.72	13:20:31
1204358679	21	39	21	180	1204	354.8	3.32	91.77	13:23:56
1204358680	22	39	22	180	1169	343.3	3.38	88.80	13:27:07
1204358681	23	39	23	180	1073	311.2	3.58	80.50	13:30:18
1204358684	24	39	24	180	1241	367.2	3.25	94.98	13:33:30

END OF ASSAY

Continuing Calibration Data

Gas Flow Proportional Counter Checks for 20-Aug-2019

Short Name	Status	Parmname	Run Time	Count Time	CPM or dec	Low Limit	High Limit	Stdev
G5400W1W		Alpha bkg	20-Aug 04:42	60	0.050	-1.08E-1	0.244	-0.30
G5400W1W		Alpha eff	20-Aug 08:56	5	10285	9243	10360	+2.60
G5400W1W		Alpha XTalk	20-Aug 08:56	5	0.320	0.315	0.385	-2.55
G5400W1W		Beta bkg	20-Aug 04:42	60	0.900	0.468	1.988	-1.29
G5400W1W		Beta eff	20-Aug 09:02	5	11721	10660	14690	-1.42
G5400W1W		Beta XTalk	20-Aug 09:02	5	7.00E-4	1.79E-4	0.002	-1.09
G5400W1X		Alpha bkg	20-Aug 04:42	60	0.050	-7.73E-2	0.185	-0.08
G5400W1X		Alpha eff	20-Aug 08:56	5	12185	11650	13220	-0.96
G5400W1X		Alpha XTalk	20-Aug 08:56	5	0.325	0.293	0.358	-0.04
G5400W1X		Beta bkg	20-Aug 04:42	60	1.100	0.627	1.812	-0.61
G5400W1X		Beta eff	20-Aug 09:02	5	13737	11700	15100	+0.59
G5400W1X		Beta XTalk	20-Aug 09:02	5	4.95E-4	1.27E-4	0.001	-0.68
G5400W1Y		Alpha bkg	20-Aug 04:42	60	0.033	-1.58E-1	0.421	-1.01
G5400W1Y		Alpha eff	20-Aug 08:56	5	8528	7198	10460	-0.55
G5400W1Y		Alpha XTalk	20-Aug 08:56	5	0.358	0.233	0.471	+0.16
G5400W1Y		Beta bkg	20-Aug 04:42	60	1.167	0.588	1.905	-0.36
G5400W1Y		Beta eff	20-Aug 09:02	5	12734	11890	15630	-1.65
G5400W1Y		Beta XTalk	20-Aug 09:02	5	3.61E-4	8.82E-5	0.001	-1.25
G5400W1Z		Alpha bkg	20-Aug 04:42	60	0.067	-1.21E-1	0.229	+0.22
G5400W1Z		Alpha eff	20-Aug 08:56	5	9986	9611	10680	-0.89
G5400W1Z		Alpha XTalk	20-Aug 08:56	5	0.317	0.294	0.349	-0.52
G5400W1Z		Beta bkg	20-Aug 04:42	60	1.083	0.499	1.662	+0.02
G5400W1Z		Beta eff	20-Aug 09:02	5	14637	9613	19430	+0.07
G5400W1Z		Beta XTalk	20-Aug 09:02	5	7.38E-4	-5.21E-1	0.543	-0.06
LB4100A1		Alpha bkg	20-Aug 03:46	60	0.050	-7.07E-2	0.226	-0.56
LB4100A1	Below	Alpha eff	20-Aug 05:30	5	8342	8585	10270	-3.87
LB4100A1	Above	Alpha XTalk	20-Aug 05:30	5	0.331	0.251	0.301	+6.55
LB4100A1		Beta bkg	20-Aug 03:46	60	1.083	0.695	1.730	-0.75
LB4100A1		Beta eff	20-Aug 05:22	5	21159	19500	22490	+0.33
LB4100A1		Beta XTalk	20-Aug 05:22	5	3.86E-4	1.92E-4	6.61E-4	-0.52
LB4100A2		Alpha bkg	20-Aug 03:46	60	0.133	-2.67E-1	0.448	+0.36
LB4100A2		Alpha eff	20-Aug 05:30	5	9500	8462	11400	-0.88
LB4100A2		Alpha XTalk	20-Aug 05:30	5	0.348	0.278	0.383	+1.02
LB4100A2		Beta bkg	20-Aug 03:46	60	1.050	-8.28E-1	3.179	-0.19
LB4100A2		Beta eff	20-Aug 05:22	5	21932	20130	23100	+0.64
LB4100A2		Beta XTalk	20-Aug 05:22	5	3.35E-4	9.55E-5	5.44E-4	+0.21
LB4100A3		Alpha bkg	20-Aug 03:46	60	0.050	-4.17E-2	0.225	-0.94
LB4100A3		Alpha eff	20-Aug 05:30	5	8201	8053	10250	-2.60
LB4100A3	Above	Alpha XTalk	20-Aug 05:30	5	0.278	0.208	0.269	+3.92
LB4100A3		Beta bkg	20-Aug 03:46	60	1.267	0.051	2.562	-0.09
LB4100A3		Beta eff	20-Aug 05:22	5	21341	18910	22810	+0.74
LB4100A3		Beta XTalk	20-Aug 05:22	5	1.91E-4	7.21E-5	4.64E-4	-1.17

LB4100B1		Alpha bkg				-5.04E-2	0.323	-2.19
LB4100B1		Alpha eff				10030	12040	-32.94
LB4100B1		Alpha XTalk				0.142	0.253	-10.70
LB4100B1		Beta bkg				0.690	1.634	-7.39
LB4100B1		Beta eff				50540	59850	-35.57
LB4100B1		Beta XTalk				6.15E-5	2.28E-4	-5.22
LB4100B2		Alpha bkg				-1.89E-1	0.467	-1.27
LB4100B2		Alpha eff				7003	10510	-14.98
LB4100B2		Alpha XTalk				0.245	0.294	-32.68
LB4100B2		Beta bkg				0.418	1.814	-4.80
LB4100B2		Beta eff				18980	25790	-19.72
LB4100B2		Beta XTalk				1.57E-4	5.67E-4	-5.29
LB4100B3		Alpha bkg				-6.61E-2	0.276	-1.84
LB4100B3		Alpha eff				8427	16450	-9.30
LB4100B3		Alpha XTalk				0.270	0.653	-7.22
LB4100B3		Beta bkg				-2.44E+2	261	-0.10
LB4100B3		Beta eff				22590	31610	-18.03
LB4100B3		Beta XTalk				-4.93E-1	0.516	-0.07
LB4100B4		Alpha bkg				-5.19E-2	0.218	-1.85
LB4100B4		Alpha eff				10140	15160	-15.12
LB4100B4		Alpha XTalk				0.251	0.384	-14.36
LB4100B4		Beta bkg				0.529	1.722	-5.66
LB4100B4		Beta eff				35650	40530	-46.83
LB4100B4		Beta XTalk				7.36E-5	3.38E-4	-4.67
LB4100C1		Alpha bkg	20-Aug 06:16	60	0.150	-7.52E-3	0.336	-0.25
LB4100C1		Alpha eff	20-Aug 05:22	5	10981	10960	11760	-2.85
LB4100C1		Alpha XTalk	20-Aug 05:22	5	0.188	0.170	0.205	+0.02
LB4100C1	Above	Beta bkg	20-Aug 06:16	60	2.233	0.070	3.594	+0.68
LB4100C1		Beta eff	20-Aug 05:30	5	15609	15330	16900	-1.93
LB4100C1		Beta XTalk	20-Aug 05:30	5	4.87E-4	2.67E-4	7.37E-4	-0.19
LB4100C2		Alpha bkg	20-Aug 03:48	60	0.117	-8.52E-2	0.312	+0.05
LB4100C2		Alpha eff	20-Aug 05:22	5	11509	10750	12990	-0.97
LB4100C2		Alpha XTalk	20-Aug 05:22	5	0.281	0.248	0.301	+0.82
LB4100C2		Beta bkg	20-Aug 03:48	60	0.950	0.511	1.777	-0.92
LB4100C2		Beta eff	20-Aug 05:30	5	16820	15090	19370	-0.57
LB4100C2		Beta XTalk	20-Aug 05:30	5	1.55E-4	1.13E-4	4.85E-4	-2.33
LB4100C3		Alpha bkg	20-Aug 03:48	60	0.067	-6.31E-2	0.282	-0.74
LB4100C3		Alpha eff	20-Aug 05:22	5	7976	7243	8653	+0.12
LB4100C3		Alpha XTalk	20-Aug 05:22	5	0.309	0.289	0.331	-0.12
LB4100C3		Beta bkg	20-Aug 03:48	60	1.950	0.776	2.251	+1.78
LB4100C3		Beta eff	20-Aug 05:30	5	16545	13900	18670	+0.33
LB4100C3		Beta XTalk	20-Aug 05:30	5	1.93E-4	7.94E-5	4.16E-4	-0.97
LB4100C4		Alpha bkg	20-Aug 03:48	60	0.050	-1.09E-1	0.257	-0.39
LB4100C4		Alpha eff	20-Aug 05:22	5	7630	5861	8515	+1.00

LB4100C4	Above	Alpha XTalk	20-Aug 05:22	5	2.627	0.311	0.445	+100.41
LB4100C4	Above	Beta bkg	20-Aug 03:48	60	7223	-2.26E+0	8.835	+3,904.97
LB4100C4	Above	Beta eff	20-Aug 05:30	5	32702	16060	22510	+12.48
LB4100C4		Beta XTalk	20-Aug 05:30	5	1.16E-4	5.74E-5	3.48E-4	-1.79
LB4100D1		Alpha bkg				-6.92E-2	0.073	-0.08
LB4100D1		Alpha eff				-2.16E+3	2344	-0.12
LB4100D1		Alpha XTalk				-1.59E+0	53.770	-2.83
LB4100D1		Beta bkg				-7.61E-1	1.773	-1.20
LB4100D1		Beta eff				2672	27110	-3.66
LB4100D1		Beta XTalk				-5.07E-5	5.70E-5	-0.17
LB4100D2		Alpha bkg				0.100	0.528	-4.40
LB4100D2		Alpha eff				5391	14880	-6.41
LB4100D2		Alpha XTalk				-9.09E+2	960	-0.08
LB4100D2		Beta bkg				0.309	2.710	-3.77
LB4100D2		Beta eff				19300	47980	-7.04
LB4100D2		Beta XTalk				1.43E-4	4.77E-4	-5.57
LB4100D3		Alpha bkg				-1.55E-2	0.582	-2.84
LB4100D3		Alpha eff				11660	37470	-5.71
LB4100D3		Alpha XTalk				-1.31E+3	1383	-0.08
LB4100D3		Beta bkg				-1.53E+0	4.943	-1.58
LB4100D3		Beta eff				17260	61720	-5.33
LB4100D3		Beta XTalk				-1.60E-3	0.002	-0.37
LB4100D4		Alpha bkg				-6.65E-2	0.307	-1.93
LB4100D4		Alpha eff				8864	26240	-6.06
LB4100D4		Alpha XTalk				-1.73E+3	1829	-0.08
LB4100D4		Beta bkg				0.746	2.239	-6.00
LB4100D4		Beta eff				33390	97650	-6.12
LB4100D4		Beta XTalk				8.04E-5	2.34E-4	-6.14
LB4100E1		Alpha bkg	20-Aug 03:47	60	0.167	-5.45E-2	0.290	+0.86
LB4100E1		Alpha eff	20-Aug 05:08	5	10914	10380	11370	+0.24
LB4100E1		Alpha XTalk	20-Aug 05:08	5	0.213	0.186	0.223	+1.40
LB4100E1		Beta bkg	20-Aug 03:47	60	1.900	0.697	2.033	+2.40
LB4100E1		Beta eff	20-Aug 05:01	5	15204	14740	17130	-1.84
LB4100E1		Beta XTalk	20-Aug 05:01	5	6.05E-4	2.29E-4	7.39E-4	+1.43
LB4100E2		Alpha bkg	20-Aug 03:47	60	0.133	-1.97E-2	0.222	+0.80
LB4100E2		Alpha eff	20-Aug 05:08	5	7716	5846	8521	+1.19
LB4100E2		Alpha XTalk	20-Aug 05:08	5	0.408	0.341	0.542	-0.99
LB4100E2	Above	Beta bkg	20-Aug 03:47	60	3.650	1.005	2.203	+10.25
LB4100E2		Beta eff	20-Aug 05:01	5	15873	15340	16820	-0.84
LB4100E2		Beta XTalk	20-Aug 05:01	5	2.65E-4	1.39E-4	5.04E-4	-0.94
LB4100E3		Alpha bkg	20-Aug 03:47	60	0.050	-4.15E-2	0.198	-0.71
LB4100E3		Alpha eff	20-Aug 05:08	5	8566	7895	9089	+0.37
LB4100E3		Alpha XTalk	20-Aug 05:08	5	0.249	0.230	0.285	-0.96
LB4100E3	Above	Beta bkg	20-Aug 03:47	60	3.983	1.790	2.114	+37.62
LB4100E3		Beta eff	20-Aug 05:01	5	15273	15110	16360	-2.22

LB4100E3		Beta XTalk	20-Aug 05:01	5	2.10E-4	1.08E-4	4.52E-4	-1.23
LB4100E4		Alpha bkg	20-Aug 03:47	60	0.067	-5.75E-2	0.174	+0.22
LB4100E4		Alpha eff	20-Aug 05:08	5	9840	9238	10300	+0.40
LB4100E4		Alpha XTalk	20-Aug 05:08	5	0.248	0.228	0.263	+0.34
LB4100E4		Beta bkg	20-Aug 03:47	60	1.517	0.455	2.172	+0.71
LB4100E4		Beta eff	20-Aug 05:01	5	17927	17000	20330	-1.33
LB4100E4		Beta XTalk	20-Aug 05:01	5	3.24E-4	6.94E-5	3.54E-4	+2.37
LB4100F1		Alpha bkg	20-Aug 03:47	60	0.067	-5.23E-2	0.181	+0.06
LB4100F1		Alpha eff	20-Aug 05:08	5	9653	9414	10300	-1.38
LB4100F1		Alpha XTalk	20-Aug 05:08	5	0.268	0.248	0.284	+0.43
LB4100F1		Beta bkg	20-Aug 03:47	60	0.983	0.602	1.924	-1.27
LB4100F1		Beta eff	20-Aug 05:01	5	41342	40590	43880	-1.63
LB4100F1		Beta XTalk	20-Aug 05:01	5	9.68E-5	4.22E-5	2.06E-4	-1.00
LB4100F2		Alpha bkg	20-Aug 03:47	60	0.267	0.039	0.317	+1.92
LB4100F2		Alpha eff	20-Aug 05:08	5	5028	4033	5271	+1.82
LB4100F2		Alpha XTalk	20-Aug 05:08	5	0.478	0.431	0.588	-1.19
LB4100F2		Beta bkg	20-Aug 03:47	60	1.233	0.714	1.605	+0.50
LB4100F2		Beta eff	20-Aug 05:01	5	16552	16140	17120	-0.48
LB4100F2		Beta XTalk	20-Aug 05:01	5	4.71E-4	1.34E-4	5.31E-4	+2.10
LB4100F3		Alpha bkg	20-Aug 03:47	60	0.117	-4.66E-2	0.248	+0.32
LB4100F3		Alpha eff	20-Aug 05:08	5	15136	13520	17440	-0.53
LB4100F3		Alpha XTalk	20-Aug 05:08	5	0.341	0.288	0.379	+0.53
LB4100F3		Beta bkg	20-Aug 03:47	60	1.200	0.636	1.613	+0.46
LB4100F3		Beta eff	20-Aug 05:01	5	26867	26340	27710	-0.69
LB4100F3		Beta XTalk	20-Aug 05:01	5	2.63E-4	9.36E-5	3.81E-4	+0.54
LB4100F4		Alpha bkg	20-Aug 03:47	60	0.100	-4.01E-2	0.180	+0.83
LB4100F4		Alpha eff	20-Aug 05:08	5	7570	5406	9284	+0.35
LB4100F4		Alpha XTalk	20-Aug 05:08	5	0.564	0.425	0.745	-0.38
LB4100F4		Beta bkg	20-Aug 03:47	60	1.000	0.704	1.854	-1.46
LB4100F4		Beta eff	20-Aug 05:01	5	32230	31480	34030	-1.24
LB4100F4		Beta XTalk	20-Aug 05:01	5	1.80E-4	7.46E-5	3.07E-4	-0.28
LB4100G1		Alpha bkg	20-Aug 03:47	60	0.067	-4.19E-2	0.157	+0.28
LB4100G1		Alpha eff	20-Aug 05:15	5	10664	7467	11340	+1.95
LB4100G1		Alpha XTalk	20-Aug 05:15	5	0.249	0.224	0.315	-1.32
LB4100G1		Beta bkg	20-Aug 03:47	60	0.933	0.375	1.637	-0.35
LB4100G1		Beta eff	20-Aug 05:08	5	16159	14840	16920	+0.80
LB4100G1		Beta XTalk	20-Aug 05:08	5	4.83E-4	1.64E-4	6.43E-4	+0.99
LB4100G2		Alpha bkg	20-Aug 03:47	60	0.133	-5.80E-2	0.275	+0.45
LB4100G2		Alpha eff	20-Aug 05:15	5	10946	8815	11510	+1.74
LB4100G2	Above	Alpha XTalk	20-Aug 05:15	5	0.477	0.272	0.365	+10.27
LB4100G2	Above	Beta bkg	20-Aug 03:47	60	1429	-5.43E+1	80.770	+62.86
LB4100G2	Above	Beta eff	20-Aug 05:08	5	17960	15800	17170	+6.46
LB4100G2		Beta XTalk	20-Aug 05:08	5	2.78E-4	1.23E-4	5.12E-4	-0.60
LB4100G3		Alpha bkg	20-Aug 03:47	60	0.117	0.002	0.276	-0.49

LB4100G3		Alpha eff	20-Aug 05:15	5	7084	6620	7779	-0.60
LB4100G3		Alpha XTalk	20-Aug 05:15	5	0.352	0.309	0.375	+0.94
LB4100G3	Above	Beta bkg	20-Aug 03:47	60	2.483	0.810	1.674	+8.62
LB4100G3		Beta eff	20-Aug 05:08	5	22163	21640	22870	-0.45
LB4100G3		Beta XTalk	20-Aug 05:08	5	2.33E-4	7.49E-5	4.02E-4	-0.09
LB4100G4		Alpha bkg	20-Aug 03:47	60	0.067	-1.09E-1	0.250	-0.06
LB4100G4		Alpha eff	20-Aug 05:15	5	9808	9560	10390	-1.21
LB4100G4		Alpha XTalk	20-Aug 05:15	5	0.252	0.231	0.262	+1.08
LB4100G4		Beta bkg	20-Aug 03:47	60	0.833	0.468	1.527	-0.93
LB4100G4		Beta eff	20-Aug 05:08	5	18497	17900	19720	-1.03
LB4100G4		Beta XTalk	20-Aug 05:08	5	1.62E-4	5.50E-5	3.52E-4	-0.83
LB4100H1		Alpha bkg	20-Aug 03:47	60	0.050	-7.22E-2	0.211	-0.41
LB4100H1		Alpha eff	20-Aug 05:15	5	8573	8144	10440	-1.88
LB4100H1		Alpha XTalk	20-Aug 05:15	5	0.315	0.240	0.334	+1.78
LB4100H1		Beta bkg	20-Aug 03:47	60	0.883	0.507	1.476	-0.67
LB4100H1		Beta eff	20-Aug 06:11	5	39621	38960	41820	-1.61
LB4100H1		Beta XTalk	20-Aug 06:11	5	1.06E-4	3.54E-5	2.04E-4	-0.49
LB4100H2		Alpha bkg	20-Aug 03:47	60	0.183	-4.85E-2	0.203	+2.52
LB4100H2		Alpha eff	20-Aug 05:15	5	7372	6938	8446	-1.27
LB4100H2		Alpha XTalk	20-Aug 05:15	5	0.336	0.280	0.366	+0.95
LB4100H2	Above	Beta bkg	20-Aug 03:47	60	10.183	0.225	2.317	+25.56
LB4100H2		Beta eff	20-Aug 05:08	5	15734	15690	17100	-2.81
LB4100H2		Beta XTalk	20-Aug 05:08	5	2.42E-4	1.28E-4	4.99E-4	-1.16
LB4100H3		Alpha bkg	20-Aug 03:47	60	0.050	-4.20E-2	0.255	-1.14
LB4100H3		Alpha eff	20-Aug 06:11	5	17788	17570	22670	-2.74
LB4100H3		Alpha XTalk	20-Aug 06:11	5	0.295	0.268	0.306	+1.27
LB4100H3		Beta bkg	20-Aug 03:47	60	1.150	-6.23E+1	90.230	-0.51
LB4100H3		Beta eff	20-Aug 05:08	5	19648	18890	22560	-1.76
LB4100H3		Beta XTalk	20-Aug 05:08	5	2.24E-4	8.81E-5	3.81E-4	-0.22
LB4100H4		Alpha bkg	20-Aug 03:47	60	0.067	-3.73E-2	0.238	-0.73
LB4100H4		Alpha eff	20-Aug 05:15	5	12186	11030	14300	-0.88
LB4100H4		Alpha XTalk	20-Aug 05:15	5	0.353	0.297	0.385	+0.80
LB4100H4		Beta bkg	20-Aug 03:47	60	0.783	0.370	1.614	-1.00
LB4100H4		Beta eff	20-Aug 05:08	5	31724	30860	34020	-1.36
LB4100H4		Beta XTalk	20-Aug 05:08	5	1.95E-4	1.00E-4	3.28E-4	-0.49
LB4100I1		Alpha bkg	20-Aug 03:46	60	0.083	-8.66E-2	0.291	-0.30
LB4100I1		Alpha eff	20-Aug 05:01	5	10755	9278	11600	+0.82
LB4100I1		Alpha XTalk	20-Aug 05:01	5	0.179	0.155	0.201	+0.09
LB4100I1		Beta bkg	20-Aug 03:46	60	0.933	0.438	1.615	-0.47
LB4100I1		Beta eff	20-Aug 05:15	5	14395	13480	16690	-1.29
LB4100I1		Beta XTalk	20-Aug 05:15	5	4.58E-4	2.38E-4	7.83E-4	-0.58
LB4100I2		Alpha bkg	20-Aug 03:46	60	0.117	-1.86E-1	0.386	+0.17
LB4100I2		Alpha eff	20-Aug 05:01	5	13038	12430	13470	+0.51
LB4100I2		Alpha XTalk	20-Aug 05:01	5	0.227	0.208	0.252	-0.35
LB4100I2	Above	Beta bkg	20-Aug 03:46	60	3.300	0.180	2.594	+4.75

LB4100I2		Beta eff	20-Aug 05:15	5	16066	15820	17140	-1.88
LB4100I2		Beta XTalk	20-Aug 05:15	5	3.11E-4	1.38E-4	5.25E-4	-0.32
LB4100I3		Alpha bkg	20-Aug 03:46	60	0.117	-4.16E-2	0.204	+0.87
LB4100I3		Alpha eff	20-Aug 05:01	5	9667	9187	10140	+0.02
LB4100I3		Alpha XTalk	20-Aug 05:01	5	0.202	0.180	0.230	-0.31
LB4100I3	Above	Beta bkg	20-Aug 03:46	60	2.717	-4.28E-1	3.673	+1.60
LB4100I3		Beta eff	20-Aug 05:15	5	16009	14870	16650	+0.84
LB4100I3		Beta XTalk	20-Aug 05:15	5	4.12E-4	1.08E-4	4.81E-4	+1.90
LB4100I4		Alpha bkg	20-Aug 03:46	60	0.150	0.031	0.326	-0.58
LB4100I4		Alpha eff	20-Aug 05:01	5	11164	10640	11580	+0.34
LB4100I4		Alpha XTalk	20-Aug 05:01	5	0.207	0.185	0.220	+0.89
LB4100I4		Beta bkg	20-Aug 03:46	60	0.867	0.490	2.301	-1.75
LB4100I4		Beta eff	20-Aug 05:15	5	19144	18150	19980	+0.26
LB4100I4		Beta XTalk	20-Aug 05:15	5	2.61E-4	1.10E-4	4.02E-4	+0.11
LB4100J1		Alpha bkg	20-Aug 03:46	60	0.050	0.018	0.372	-2.46
LB4100J1		Alpha eff	20-Aug 05:01	5	10877	10460	11370	-0.25
LB4100J1		Alpha XTalk	20-Aug 05:01	5	0.168	0.155	0.187	-0.60
LB4100J1		Beta bkg	20-Aug 03:46	60	1.683	0.056	2.016	+1.98
LB4100J1		Beta eff	20-Aug 05:15	5	39250	35630	41690	+0.58
LB4100J1		Beta XTalk	20-Aug 05:15	5	1.38E-4	5.93E-5	2.38E-4	-0.37
LB4100J2		Alpha bkg	20-Aug 03:46	60	0.100	-8.17E-2	0.539	-1.24
LB4100J2		Alpha eff	20-Aug 05:01	5	9496	9114	10090	-0.65
LB4100J2		Alpha XTalk	20-Aug 05:01	5	0.159	0.141	0.180	-0.20
LB4100J2		Beta bkg	20-Aug 03:46	60	1.050	0.775	1.935	-1.58
LB4100J2		Beta eff	20-Aug 05:15	5	15372	14440	16130	+0.31
LB4100J2		Beta XTalk	20-Aug 05:15	5	3.77E-4	1.82E-4	6.77E-4	-0.63
LB4100J3		Alpha bkg	20-Aug 03:46	60	0.100	-5.72E-2	0.305	-0.39
LB4100J3		Alpha eff	20-Aug 05:01	5	22073	19850	22740	+1.62
LB4100J3		Alpha XTalk	20-Aug 05:01	5	0.198	0.183	0.218	-0.46
LB4100J3		Beta bkg	20-Aug 03:46	60	0.767	0.431	1.507	-1.13
LB4100J3		Beta eff	20-Aug 05:15	5	18871	16720	20260	+0.65
LB4100J3		Beta XTalk	20-Aug 05:15	5	2.33E-4	1.15E-4	4.64E-4	-0.97
LB4100J4		Alpha bkg	20-Aug 03:46	60	0.167	0.014	0.314	+0.05
LB4100J4		Alpha eff	20-Aug 05:01	5	17650	16250	18210	+1.29
LB4100J4		Alpha XTalk	20-Aug 05:01	5	0.170	0.156	0.182	+0.35
LB4100J4		Beta bkg	20-Aug 03:46	60	0.717	0.504	1.329	-1.45
LB4100J4		Beta eff	20-Aug 05:15	5	31053	28300	32430	+1.00
LB4100J4		Beta XTalk	20-Aug 05:15	5	1.55E-4	1.05E-4	3.69E-4	-1.88
PIC1A		Alpha bkg	20-Aug 05:24	60	0.250	0.052	0.386	+0.56
PIC1A		Alpha eff	20-Aug 07:23	5	10427	10070	10770	+0.06
PIC1A		Alpha XTalk	20-Aug 07:23	5	0.296	0.264	0.303	+1.96
PIC1A		Beta bkg	20-Aug 05:24	60	0.883	-3.41E-2	1.327	+1.04
PIC1A		Beta eff	20-Aug 05:14	5	20087	19700	21670	-1.82
PIC1A		Beta XTalk	20-Aug 05:14	5	7.32E-4	2.91E-4	0.002	-1.59

PIC1B		Alpha bkg	20-Aug 05:24	60	0.233	-2.93E-2	0.323	+1.47
PIC1B		Alpha eff	20-Aug 05:05	5	12665	12150	13170	+0.03
PIC1B		Alpha XTalk	20-Aug 05:05	5	0.281	0.265	0.293	+0.33
PIC1B		Beta bkg	20-Aug 05:24	60	0.750	0.382	1.951	-1.59
PIC1B		Beta eff	20-Aug 05:14	5	21428	21060	21800	-0.01
PIC1B		Beta XTalk	20-Aug 05:14	5	9.28E-4	2.63E-4	0.002	-0.48
PIC1C		Alpha bkg	20-Aug 05:25	60	0.167	-4.39E-2	0.359	+0.14
PIC1C		Alpha eff	20-Aug 05:05	5	9425	9319	9845	-1.79
PIC1C		Alpha XTalk	20-Aug 05:05	5	0.255	0.244	0.267	-0.04
PIC1C		Beta bkg	20-Aug 05:25	60	0.633	-4.73E-1	1.906	-0.21
PIC1C		Beta eff	20-Aug 05:14	5	21058	20780	21480	-0.62
PIC1C		Beta XTalk	20-Aug 05:14	5	0.011	0.007	0.018	-0.96
PIC1D		Alpha bkg	20-Aug 08:34	60	0.300	-1.82E-2	0.348	+2.21
PIC1D	Below	Alpha eff	20-Aug 10:16	5	10302	10400	10830	-4.37
PIC1D		Alpha XTalk	20-Aug 10:16	5	0.263	0.252	0.269	+0.72
PIC1D		Beta bkg	20-Aug 08:34	60	1.650	0.554	1.860	+2.04
PIC1D		Beta eff	20-Aug 05:14	5	24748	24250	25490	-0.59
PIC1D		Beta XTalk	20-Aug 05:14	5	0.010	0.003	0.012	+1.73
PIC2A		Alpha bkg	20-Aug 05:25	60	0.117	-5.03E-2	0.376	-0.65
PIC2A		Alpha eff	20-Aug 05:05	5	9832	9582	11210	-2.08
PIC2A		Alpha XTalk	20-Aug 05:05	5	0.280	0.254	0.286	+1.77
PIC2A		Beta bkg	20-Aug 05:25	60	0.467	-6.28E-1	1.918	-0.42
PIC2A		Beta eff	20-Aug 05:15	5	52451	51660	54000	-0.97
PIC2A		Beta XTalk	20-Aug 05:15	5	0.003	-1.97E-3	0.010	-0.30
PIC2B		Alpha bkg	20-Aug 05:25	60	0.133	-7.50E-2	0.308	+0.27
PIC2B		Alpha eff	20-Aug 05:05	5	9193	8942	9351	+0.68
PIC2B		Alpha XTalk	20-Aug 05:05	5	0.269	0.252	0.291	-0.36
PIC2B		Beta bkg	20-Aug 05:25	60	0.717	-1.82E-1	1.434	+0.34
PIC2B		Beta eff	20-Aug 05:15	5	21135	20010	21260	+2.40
PIC2B		Beta XTalk	20-Aug 05:15	5	8.37E-4	2.80E-4	0.002	-0.67
PIC2C		Alpha bkg	20-Aug 05:25	60	0.267	0.076	0.278	+2.68
PIC2C	need 2nd	Alpha eff	20-Aug 05:05	5	21005	20510	21080	+2.21
PIC2C	Below	Alpha XTalk	20-Aug 05:05	5	0.259	0.260	0.281	-3.09
PIC2C		Beta bkg	20-Aug 05:25	60	0.800	0.327	1.518	-0.62
PIC2C		Beta eff	20-Aug 05:15	5	25184	23700	26000	+0.87
PIC2C	Above	Beta XTalk	20-Aug 05:15	5	0.004	0.001	0.004	+3.81
PIC2D		Alpha bkg	20-Aug 05:25	60	0.200	-3.02E-2	0.384	+0.33
PIC2D		Alpha eff	20-Aug 07:23	5	15788	15390	16780	-1.28
PIC2D		Alpha XTalk	20-Aug 07:23	5	0.274	0.255	0.279	+1.84
PIC2D		Beta bkg	20-Aug 05:25	60	0.833	0.234	1.525	-0.22
PIC2D	Below	Beta eff	20-Aug 07:56	5	40707	40780	41690	-3.48
PIC2D	Below	Beta XTalk	20-Aug 07:56	5	0.004	0.005	0.015	-3.60
PIC3A		Alpha bkg				-7.50E-2	0.354	-1.95
PIC3A		Alpha eff				10170	11310	-56.53
PIC3A		Alpha XTalk				0.233	0.292	-26.54

PIC3A	Beta bkg				-5.41E-1	2.245	-1.83
PIC3A	Beta eff				19370	21150	-68.29
PIC3A	Beta XTalk				-1.78E-2	0.036	-1.01
PIC3B	Alpha bkg	20-Aug 05:25	60	0.233	-1.95E-2	0.376	+0.84
PIC3B	Alpha eff	20-Aug 05:15	5	12916	12510	13770	-1.07
PIC3B	Alpha XTalk	20-Aug 05:15	5	0.263	0.228	0.273	+1.70
PIC3B	Beta bkg	20-Aug 05:25	60	1.350	0.306	2.452	-0.08
PIC3B	Beta eff	20-Aug 05:05	5	21303	20470	21910	+0.47
PIC3B	Beta XTalk	20-Aug 05:05	5	0.009	0.005	0.016	-0.75
PIC3C	Alpha bkg	20-Aug 05:25	60	0.267	-9.57E-4	0.359	+1.46
PIC3C	Alpha eff	20-Aug 05:15	5	9412	9302	10490	-2.44
PIC3C	Alpha XTalk	20-Aug 05:15	5	0.271	0.254	0.277	+1.45
PIC3C	Beta bkg	20-Aug 05:25	60	1.167	0.008	1.299	+2.39
PIC3C	Beta eff	20-Aug 05:05	5	21250	20730	22020	-0.58
PIC3C	Beta XTalk	20-Aug 05:05	5	0.004	0.002	0.010	-1.34
PIC3D	Alpha bkg	20-Aug 08:34	60	0.100	-4.97E-2	0.369	-0.85
PIC3D	Alpha eff	20-Aug 05:15	5	10484	10210	10880	-0.55
PIC3D	Alpha XTalk	20-Aug 05:15	5	0.277	0.236	0.280	+2.48
PIC3D	Beta bkg	20-Aug 08:34	60	0.950	-8.46E-3	1.311	+1.36
PIC3D	Beta eff	20-Aug 05:05	5	24166	22540	25320	+0.51
PIC3D	Beta XTalk	20-Aug 05:05	5	0.004	-6.80E-4	0.007	+0.31
PIC4A	Alpha bkg	20-Aug 05:25	60	0.117	-9.48E-2	0.384	-0.35
PIC4A	Alpha eff	20-Aug 05:15	5	10365	10180	10710	-0.91
PIC4A	Alpha XTalk	20-Aug 05:15	5	0.286	0.262	0.290	+2.24
PIC4A	Beta bkg	20-Aug 05:25	60	1.517	-1.75E-1	2.154	+1.36
PIC4A	Beta eff	20-Aug 05:05	5	51680	50950	54660	-1.82
PIC4A	Beta XTalk	20-Aug 05:05	5	9.80E-4	1.57E-4	0.002	-0.33
PIC4B	Alpha bkg	20-Aug 05:25	60	0.250	-5.36E-2	0.301	+2.14
PIC4B	Alpha eff	20-Aug 05:15	5	8002	7995	9186	-2.97
PIC4B	Alpha XTalk	20-Aug 05:15	5	0.360	0.298	0.434	-0.26
PIC4B	Beta bkg	20-Aug 05:25	60	0.567	0.072	1.413	-0.79
PIC4B	Beta eff	20-Aug 05:05	5	20440	19520	21820	-0.60
PIC4B	Beta XTalk	20-Aug 05:05	5	3.33E-4	1.54E-4	5.60E-4	-0.36
PIC4C	Alpha bkg	20-Aug 05:25	60	0.300	-3.49E-2	0.385	+1.78
PIC4C	Alpha eff	20-Aug 05:15	5	20824	20410	21520	-0.76
PIC4C	Alpha XTalk	20-Aug 05:15	5	0.270	0.244	0.291	+0.25
PIC4C	Beta bkg	20-Aug 05:25	60	0.633	0.053	1.027	+0.57
PIC4C	Beta eff	20-Aug 05:05	5	25387	24500	26770	-0.66
PIC4C	Beta XTalk	20-Aug 05:05	5	0.002	4.19E-4	0.005	-0.98
PIC4D	Alpha bkg	20-Aug 05:26	60	0.233	-1.06E-2	0.363	+0.92
PIC4D	Alpha eff	20-Aug 05:15	5	16946	16410	17490	-0.02
PIC4D	Alpha XTalk	20-Aug 05:15	5	0.247	0.231	0.286	-1.28
PIC4D	Beta bkg	20-Aug 05:26	60	0.917	0.115	1.249	+1.24
PIC4D	Beta eff	20-Aug 05:05	5	40497	39260	43390	-1.20
PIC4D	Beta XTalk	20-Aug 05:05	5	0.010	0.003	0.019	-0.51

PIC5A		Alpha bkg	20-Aug 08:35	60	0.100	0.055	0.368	-2.14
PIC5A		Alpha eff	20-Aug 05:24	5	10990	10560	11170	+1.23
PIC5A		Alpha XTalk	20-Aug 05:24	5	0.260	0.253	0.269	-0.50
PIC5A		Beta bkg	20-Aug 08:35	60	0.617	-1.06E-1	1.405	-0.13
PIC5A		Beta eff	20-Aug 05:31	5	15779	15410	16830	-1.44
PIC5A		Beta XTalk	20-Aug 05:31	5	0.003	0.001	0.006	-1.31
PIC5B		Alpha bkg	20-Aug 05:40	60	0.117	-1.14E-2	0.414	-1.19
PIC5B		Alpha eff	20-Aug 05:24	5	13159	12880	14070	-1.59
PIC5B		Alpha XTalk	20-Aug 05:24	5	0.267	0.252	0.271	+1.93
PIC5B		Beta bkg	20-Aug 05:40	60	0.417	-2.27E-1	1.609	-0.90
PIC5B		Beta eff	20-Aug 05:31	5	22165	21840	23210	-1.58
PIC5B		Beta XTalk	20-Aug 05:31	5	0.002	4.11E-4	0.006	-0.85
PIC5C		Alpha bkg	20-Aug 05:40	60	0.150	-6.28E-2	0.409	-0.29
PIC5C		Alpha eff	20-Aug 05:24	5	9460	9266	10200	-1.75
PIC5C		Alpha XTalk	20-Aug 05:24	5	0.267	0.256	0.276	+0.29
PIC5C		Beta bkg	20-Aug 05:40	60	0.633	-2.06E-1	1.558	-0.14
PIC5C		Beta eff	20-Aug 05:31	5	21553	21210	22460	-1.35
PIC5C		Beta XTalk	20-Aug 05:31	5	0.002	5.78E-4	0.004	-1.18
PIC5D		Alpha bkg	20-Aug 05:40	60	0.167	0.009	0.365	-0.34
PIC5D		Alpha eff	20-Aug 05:24	5	10892	10450	11610	-0.71
PIC5D		Alpha XTalk	20-Aug 05:24	5	0.267	0.251	0.274	+1.19
PIC5D		Beta bkg	20-Aug 05:40	60	1.217	0.019	2.073	+0.50
PIC5D		Beta eff	20-Aug 07:51	5	25067	24750	26620	-1.98
PIC5D		Beta XTalk	20-Aug 07:51	5	0.002	0.001	0.006	-2.49
PIC6A		Alpha bkg	20-Aug 05:41	60	0.267	-1.35E-2	0.358	+1.53
PIC6A	Below	Alpha eff	20-Aug 05:25	5	9233	9324	9973	-3.84
PIC6A	Above	Alpha XTalk	20-Aug 05:25	5	0.343	0.282	0.335	+3.93
PIC6A		Beta bkg	20-Aug 05:41	60	1.683	0.884	2.267	+0.47
PIC6A		Beta eff	20-Aug 05:32	5	46075	45260	52230	-2.30
PIC6A		Beta XTalk	20-Aug 05:32	5	1.36E-4	5.52E-5	2.22E-4	-0.09
PIC6B		Alpha bkg	20-Aug 05:41	60	0.283	-1.33E-1	0.383	+1.84
PIC6B		Alpha eff	20-Aug 05:25	5	8328	8240	9583	-2.61
PIC6B		Alpha XTalk	20-Aug 05:25	5	0.303	0.266	0.367	-0.75
PIC6B		Beta bkg	20-Aug 05:41	60	1.550	-6.80E-2	2.279	+1.14
PIC6B		Beta eff	20-Aug 05:32	5	19052	16700	20640	+0.58
PIC6B		Beta XTalk	20-Aug 05:32	5	3.72E-4	1.76E-4	6.31E-4	-0.42
PIC6C		Alpha bkg	20-Aug 05:41	60	0.183	0.008	0.328	+0.29
PIC6C		Alpha eff	20-Aug 05:25	5	20655	20430	21520	-1.76
PIC6C		Alpha XTalk	20-Aug 05:25	5	0.277	0.257	0.278	+2.62
PIC6C		Beta bkg	20-Aug 05:41	60	1.867	0.914	2.103	+1.81
PIC6C	Below	Beta eff	20-Aug 05:32	5	23664	23680	25020	-3.07
PIC6C		Beta XTalk	20-Aug 05:32	5	3.22E-4	1.24E-4	4.41E-4	+0.75
PIC6D		Alpha bkg				-8.26E-2	0.335	-1.81
PIC6D		Alpha eff				17280	18850	-69.04

PIC6D		Alpha XTalk				0.051	0.542	-3.62
PIC6D		Beta bkg				0.019	2.434	-3.05
PIC6D		Beta eff				43700	47280	-76.24
PIC6D		Beta XTalk				-1.81E-3	0.004	-1.25
PIC7A		Alpha bkg	20-Aug 05:41	60	0.117	-3.46E-2	0.391	-0.87
PIC7A		Alpha eff	20-Aug 05:32	5	10785	10220	11180	+0.53
PIC7A		Alpha XTalk	20-Aug 05:32	5	0.273	0.249	0.293	+0.22
PIC7A		Beta bkg	20-Aug 05:41	60	0.833	-8.85E-2	1.924	-0.25
PIC7A		Beta eff	20-Aug 05:25	5	20756	20360	21720	-1.25
PIC7A		Beta XTalk	20-Aug 05:25	5	6.82E-4	6.75E-5	0.002	-1.22
PIC7B		Alpha bkg	20-Aug 05:41	60	0.033	-2.50E-2	0.372	-2.12
PIC7B		Alpha eff	20-Aug 05:32	5	12027	11990	13590	-2.86
PIC7B		Alpha XTalk	20-Aug 05:32	5	0.276	0.259	0.278	+2.36
PIC7B		Beta bkg	20-Aug 05:41	60	0.250	-6.64E-1	1.763	-0.74
PIC7B		Beta eff	20-Aug 05:25	5	21343	20950	22600	-1.57
PIC7B		Beta XTalk	20-Aug 05:25	5	4.21E-4	3.44E-4	0.002	-2.72
PIC7C		Alpha bkg	20-Aug 05:41	60	0.150	-4.17E-2	0.294	+0.43
PIC7C		Alpha eff	20-Aug 05:32	5	9107	9044	9654	-2.38
PIC7C		Alpha XTalk	20-Aug 05:32	5	0.308	0.255	0.313	+2.53
PIC7C		Beta bkg	20-Aug 05:41	60	0.617	-1.93E-1	1.388	+0.07
PIC7C		Beta eff	20-Aug 05:25	5	20030	19720	21610	-2.02
PIC7C		Beta XTalk	20-Aug 05:25	5	2.99E-4	6.91E-5	7.54E-4	-0.98
PIC7D		Alpha bkg	20-Aug 05:42	60	0.067	-3.52E-2	0.285	-1.09
PIC7D		Alpha eff	20-Aug 05:32	5	10557	10290	10720	+0.73
PIC7D		Alpha XTalk	20-Aug 05:32	5	0.272	0.252	0.283	+0.83
PIC7D		Beta bkg	20-Aug 05:42	60	0.750	0.109	1.041	+1.13
PIC7D		Beta eff	20-Aug 05:25	5	23973	23170	25350	-0.79
PIC7D		Beta XTalk	20-Aug 05:25	5	3.07E-4	3.99E-5	7.85E-4	-0.85
PIC8A		Alpha bkg	20-Aug 05:42	60	0.133	-4.66E-2	0.309	+0.03
PIC8A	Below	Alpha eff	20-Aug 08:08	5	9982	9989	11030	-3.04
PIC8A		Alpha XTalk	20-Aug 08:08	5	0.278	0.226	0.342	-0.32
PIC8A		Beta bkg	20-Aug 05:42	60	0.733	-2.25E-2	1.320	+0.38
PIC8A		Beta eff	20-Aug 05:25	5	53372	49890	55620	+0.65
PIC8A		Beta XTalk	20-Aug 05:25	5	0.002	-3.65E-3	0.006	+0.52
PIC8B		Alpha bkg	20-Aug 05:42	60	0.067	-1.18E-1	0.335	-0.55
PIC8B		Alpha eff	20-Aug 05:33	5	8713	8562	9505	-2.04
PIC8B		Alpha XTalk	20-Aug 05:33	5	0.295	0.261	0.297	+2.73
PIC8B		Beta bkg	20-Aug 05:42	60	0.467	-2.49E-1	1.166	+0.03
PIC8B		Beta eff	20-Aug 05:24	5	21305	20990	22140	-1.36
PIC8B		Beta XTalk	20-Aug 05:24	5	5.11E-4	2.49E-4	0.001	-1.69
PIC8C		Alpha bkg	20-Aug 08:47	60	0.167	-2.61E-2	0.365	-0.04
PIC8C		Alpha eff	20-Aug 05:33	5	21611	20820	22080	+0.77
PIC8C		Alpha XTalk	20-Aug 05:33	5	0.254	0.251	0.282	-2.42
PIC8C		Beta bkg	20-Aug 08:47	60	0.533	-1.90E-1	1.144	+0.25
PIC8C		Beta eff	20-Aug 05:25	5	26422	25290	27010	+0.95

PIC8C	Beta XTalk	20-Aug 05:25	5	0.003	-7.70E-4	0.007	+0.28
PIC8D	Alpha bkg	20-Aug 05:42	60	0.200	-5.65E-2	0.438	+0.11
PIC8D	Alpha eff	20-Aug 05:33	5	16281	15120	17000	+0.71
PIC8D	Alpha XTalk	20-Aug 05:33	5	0.268	0.249	0.290	-0.20
PIC8D	Beta bkg	20-Aug 05:42	60	0.717	0.236	2.611	-1.79
PIC8D	Beta eff	20-Aug 05:25	5	41947	40720	43630	-0.47
PIC8D	Beta XTalk	20-Aug 05:25	5	0.005	-1.54E-3	0.012	-0.16
PIC9A	Alpha bkg	20-Aug 05:55	60	0.083	-2.15E-2	0.339	-1.26
PIC9A	Alpha eff	20-Aug 05:40	5	10835	10180	11170	+0.97
PIC9A	Alpha XTalk	20-Aug 05:40	5	0.268	0.249	0.304	-0.96
PIC9A	Beta bkg	20-Aug 05:55	60	1.283	0.178	1.390	+2.47
PIC9A	Beta eff	20-Aug 05:46	5	20957	20680	21950	-1.69
PIC9A	Beta XTalk	20-Aug 05:46	5	0.001	3.54E-4	0.003	-0.79
PIC9B	Alpha bkg	20-Aug 05:55	60	0.067	-5.14E-2	0.189	-0.06
PIC9B	Alpha eff	20-Aug 05:40	5	11965	11850	12570	-2.04
PIC9B	Alpha XTalk	20-Aug 05:40	5	0.282	0.267	0.287	+1.44
PIC9B	Beta bkg	20-Aug 05:55	60	1.050	0.216	1.395	+1.24
PIC9B	Beta eff	20-Aug 05:47	5	21460	21220	22080	-1.32
PIC9B	Beta XTalk	20-Aug 05:47	5	0.001	-4.93E-1	0.513	-0.05
PIC9C	Alpha bkg	20-Aug 05:55	60	0.200	0.010	0.330	+0.56
PIC9C	Alpha eff	20-Aug 05:40	5	9307	9161	9836	-1.70
PIC9C	Alpha XTalk	20-Aug 05:40	5	0.267	0.244	0.268	+2.74
PIC9C	Beta bkg	20-Aug 05:55	60	0.717	0.148	1.310	-0.06
PIC9C	Beta eff	20-Aug 05:47	5	21149	20810	21570	-0.33
PIC9C	Beta XTalk	20-Aug 05:47	5	0.002	7.26E-4	0.004	-0.60
PIC9D	Alpha bkg	20-Aug 05:55	60	0.133	0.017	0.351	-0.91
PIC9D	Alpha eff	20-Aug 07:53	5	10465	10280	10720	-0.47
PIC9D	Alpha XTalk	20-Aug 07:53	5	0.286	0.257	0.290	+2.31
PIC9D	Beta bkg	20-Aug 05:55	60	0.433	0.118	1.182	-1.22
PIC9D	Beta eff	20-Aug 05:47	5	24677	24330	25440	-1.12
PIC9D	Beta XTalk	20-Aug 05:47	5	0.002	3.66E-4	0.005	-1.51
PIC10A	Alpha bkg	20-Aug 05:55	60	0.067	-1.88E-2	0.299	-1.38
PIC10A	Alpha eff	20-Aug 05:40	5	10046	9912	10720	-2.00
PIC10A	Alpha XTalk	20-Aug 05:40	5	0.336	0.257	0.353	+1.92
PIC10A	Beta bkg	20-Aug 05:55	60	0.500	4.53E-4	1.191	-0.48
PIC10A	Beta eff	20-Aug 05:47	5	52224	52180	54540	-2.89
PIC10A	Beta XTalk	20-Aug 05:47	5	1.20E-4	5.75E-5	3.23E-4	-1.59
PIC10B	Alpha bkg	20-Aug 05:55	60	0.083	-4.93E-2	0.308	-0.77
PIC10B	Alpha eff	20-Aug 05:40	5	9286	9076	9507	-0.08
PIC10B	Alpha XTalk	20-Aug 05:40	5	0.273	0.253	0.285	+0.63
PIC10B	Beta bkg	20-Aug 05:55	60	1.650	-6.98E-1	2.876	+0.94
PIC10B	Beta eff	20-Aug 05:47	5	21012	20490	22130	-1.09
PIC10B	Beta XTalk	20-Aug 05:47	5	5.31E-4	2.11E-4	9.75E-4	-0.49
PIC10C	Alpha bkg	20-Aug 05:55	60	0.050	-6.52E-2	0.282	-1.01

PIC10C		Alpha eff	20-Aug 05:40	5	19812	19630	20950	-2.17
PIC10C		Alpha XTalk	20-Aug 05:40	5	0.321	0.270	0.324	+2.58
PIC10C		Beta bkg	20-Aug 05:55	60	0.667	-7.77E-3	0.924	+1.34
PIC10C	Below	Beta eff	20-Aug 07:53	5	25197	25320	26180	-3.86
PIC10C		Beta XTalk	20-Aug 07:53	5	2.92E-4	9.52E-5	5.71E-4	-0.52
PIC10D		Alpha bkg	20-Aug 05:55	60	0.150	-9.81E-3	0.389	-0.60
PIC10D		Alpha eff	20-Aug 05:40	5	15433	14970	16930	-1.58
PIC10D		Alpha XTalk	20-Aug 05:40	5	0.310	0.267	0.339	+0.60
PIC10D		Beta bkg	20-Aug 05:55	60	1.067	-3.76E-1	2.164	+0.41
PIC10D		Beta eff	20-Aug 05:47	5	41366	40970	42500	-1.45
PIC10D		Beta XTalk	20-Aug 05:47	5	2.63E-4	5.50E-5	5.63E-4	-0.54
PIC11A		Alpha bkg	20-Aug 06:02	60	0.117	-5.28E-2	0.231	+0.59
PIC11A		Alpha eff	20-Aug 05:53	5	10294	10090	10810	-1.30
PIC11A		Alpha XTalk	20-Aug 05:53	5	0.334	0.280	0.359	+1.12
PIC11A		Beta bkg	20-Aug 06:02	60	1.133	0.522	1.773	-0.07
PIC11A		Beta eff	20-Aug 05:39	5	19787	19270	20640	-0.74
PIC11A		Beta XTalk	20-Aug 05:39	5	4.68E-4	2.30E-4	6.98E-4	+0.05
PIC11B		Alpha bkg	20-Aug 06:02	60	0.083	-2.01E-2	0.388	-1.48
PIC11B		Alpha eff	20-Aug 05:53	5	12987	12090	14430	-0.70
PIC11B		Alpha XTalk	20-Aug 05:53	5	0.274	0.238	0.295	+0.80
PIC11B		Beta bkg	20-Aug 06:02	60	1.200	-8.50E-2	1.719	+1.27
PIC11B		Beta eff	20-Aug 05:39	5	21386	19550	24160	-0.61
PIC11B		Beta XTalk	20-Aug 05:39	5	2.93E-4	1.32E-4	5.22E-4	-0.53
PIC11C		Alpha bkg	20-Aug 06:03	60	0.017	-5.75E-2	0.306	-1.78
PIC11C		Alpha eff	20-Aug 05:53	5	9250	9157	9745	-2.06
PIC11C		Alpha XTalk	20-Aug 05:53	5	0.301	0.271	0.301	+2.98
PIC11C		Beta bkg	20-Aug 06:03	60	0.483	-5.67E-2	1.194	-0.41
PIC11C		Beta eff	20-Aug 05:39	5	21098	20960	21740	-1.94
PIC11C		Beta XTalk	20-Aug 05:39	5	3.36E-4	9.37E-5	4.37E-4	+1.23
PIC11D		Alpha bkg	20-Aug 06:03	60	0.183	0.016	0.350	+0.01
PIC11D		Alpha eff	20-Aug 08:35	5	10804	10560	11390	-1.24
PIC11D		Alpha XTalk	20-Aug 08:35	5	0.288	0.243	0.305	+1.39
PIC11D		Beta bkg	20-Aug 06:03	60	1.533	0.436	2.296	+0.54
PIC11D		Beta eff	20-Aug 05:39	5	24050	23830	27150	-2.60
PIC11D		Beta XTalk	20-Aug 05:39	5	1.36E-4	8.26E-5	3.85E-4	-1.94
PIC12A		Alpha bkg	20-Aug 06:03	60	0.150	-2.85E-2	0.394	-0.46
PIC12A		Alpha eff	20-Aug 05:53	5	9664	9536	10660	-2.32
PIC12A		Alpha XTalk	20-Aug 05:53	5	0.317	0.265	0.355	+0.47
PIC12A		Beta bkg	20-Aug 06:03	60	0.850	-7.27E-3	2.082	-0.54
PIC12A		Beta eff	20-Aug 05:39	5	38216	36650	40990	-0.83
PIC12A		Beta XTalk	20-Aug 05:39	5	1.36E-4	6.06E-5	2.14E-4	-0.04
PIC12B		Alpha bkg	20-Aug 06:03	60	0.133	-5.03E-2	0.300	+0.15
PIC12B		Alpha eff	20-Aug 05:53	5	8699	8551	8934	-0.68
PIC12B		Alpha XTalk	20-Aug 05:53	5	0.289	0.278	0.304	-0.47
PIC12B		Beta bkg	20-Aug 06:03	60	0.933	0.100	1.734	+0.06

PIC12B		Beta eff	20-Aug 05:38	5	21307	20940	21550	+0.61
PIC12B		Beta XTalk	20-Aug 05:38	5	2.17E-4	1.66E-4	6.28E-4	-2.33
PIC12C		Alpha bkg	20-Aug 06:03	60	0.150	0.009	0.357	-0.56
PIC12C		Alpha eff	20-Aug 05:53	5	20240	20010	22040	-2.32
PIC12C		Alpha XTalk	20-Aug 05:53	5	0.284	0.255	0.290	+1.91
PIC12C	Above	Beta bkg	20-Aug 06:03	60	1.533	0.175	1.408	+3.61
PIC12C		Beta eff	20-Aug 05:38	5	25931	24320	26650	+1.15
PIC12C		Beta XTalk	20-Aug 05:38	5	2.20E-4	7.36E-5	6.09E-4	-1.35
PIC12D		Alpha bkg	20-Aug 06:03	60	0.100	-5.51E-2	0.306	-0.42
PIC12D		Alpha eff	20-Aug 05:53	5	16805	14580	17560	+1.48
PIC12D		Alpha XTalk	20-Aug 05:53	5	0.295	0.232	0.450	-1.27
PIC12D		Beta bkg	20-Aug 06:03	60	1.650	0.482	2.608	+0.30
PIC12D		Beta eff	20-Aug 05:39	5	41748	36440	43510	+1.50
PIC12D		Beta XTalk	20-Aug 05:39	5	2.15E-4	8.59E-5	3.39E-4	+0.07
PIC13A		Alpha bkg	20-Aug 06:03	60	0.233	-4.80E-2	0.311	+1.71
PIC13A		Alpha eff	20-Aug 05:45	5	10863	10610	11110	+0.04
PIC13A		Alpha XTalk	20-Aug 05:45	5	0.271	0.259	0.279	+0.50
PIC13A		Beta bkg	20-Aug 06:03	60	1.367	0.689	1.949	+0.23
PIC13A		Beta eff	20-Aug 05:53	5	21060	20940	21540	-1.80
PIC13A		Beta XTalk	20-Aug 05:53	5	5.04E-4	3.50E-4	0.001	-1.70
PIC13B		Alpha bkg	20-Aug 06:03	60	0.100	-1.04E-1	0.346	-0.28
PIC13B		Alpha eff	20-Aug 05:45	5	12949	12490	13510	-0.30
PIC13B		Alpha XTalk	20-Aug 05:45	5	0.275	0.261	0.286	+0.39
PIC13B		Beta bkg	20-Aug 06:03	60	1.033	-2.10E-1	1.369	+1.72
PIC13B		Beta eff	20-Aug 05:53	5	21667	21380	22380	-1.28
PIC13B		Beta XTalk	20-Aug 05:53	5	3.27E-4	1.69E-4	6.48E-4	-1.02
PIC13C		Alpha bkg				-1.03E-1	0.365	-1.68
PIC13C		Alpha eff				10670	10960	-223.76
PIC13C		Alpha XTalk				0.271	0.286	-109.82
PIC13C		Beta bkg				-3.09E-1	1.393	-1.91
PIC13C		Beta eff				22280	22830	-246.05
PIC13C		Beta XTalk				1.09E-4	3.59E-4	-5.62
PIC13D		Alpha bkg	20-Aug 08:46	60	0.167	-4.18E-2	0.346	+0.23
PIC13D		Alpha eff	20-Aug 05:45	5	10348	10280	11260	-2.59
PIC13D		Alpha XTalk	20-Aug 05:45	5	0.292	0.252	0.299	+2.04
PIC13D		Beta bkg	20-Aug 08:46	60	1.667	-2.59E-1	1.892	+2.37
PIC13D		Beta eff	20-Aug 05:53	5	24457	24410	26670	-2.87
PIC13D		Beta XTalk	20-Aug 05:53	5	2.56E-4	9.76E-5	5.02E-4	-0.65
PIC14A		Alpha bkg	20-Aug 07:28	60	0.167	-3.05E-2	0.301	+0.57
PIC14A		Alpha eff	20-Aug 05:45	5	9817	9579	11000	-2.00
PIC14A		Alpha XTalk	20-Aug 05:45	5	0.437	0.264	0.452	+2.52
PIC14A		Beta bkg	20-Aug 07:28	60	1.417	-2.05E-2	1.626	+2.24
PIC14A	Below	Beta eff	20-Aug 09:05	5	52432	52580	56370	-3.23
PIC14A		Beta XTalk	20-Aug 09:05	5	8.83E-5	5.50E-5	2.20E-4	-1.79

PIC14B		Alpha bkg	20-Aug 06:03	60	0.083	-9.73E-2	0.263	+0.01
PIC14B		Alpha eff	20-Aug 05:45	5	8632	8386	9525	-1.70
PIC14B		Alpha XTalk	20-Aug 05:45	5	0.301	0.260	0.308	+2.16
PIC14B		Beta bkg	20-Aug 06:03	60	0.917	-2.72E-1	1.433	+1.18
PIC14B		Beta eff	20-Aug 05:53	5	21566	21130	21880	+0.49
PIC14B		Beta XTalk	20-Aug 05:53	5	5.05E-4	3.16E-4	0.001	-1.61
PIC14C		Alpha bkg	20-Aug 06:03	60	0.083	0.016	0.343	-1.76
PIC14C		Alpha eff	20-Aug 07:30	5	20628	20400	21620	-1.88
PIC14C		Alpha XTalk	20-Aug 07:30	5	0.300	0.270	0.314	+1.06
PIC14C		Beta bkg	20-Aug 06:03	60	1.567	0.566	2.220	+0.63
PIC14C		Beta eff	20-Aug 05:53	5	26085	25600	27170	-1.15
PIC14C		Beta XTalk	20-Aug 05:53	5	4.38E-4	1.33E-4	5.68E-4	+1.21
PIC14D		Alpha bkg	20-Aug 06:04	60	0.183	-4.24E-2	0.190	+2.84
PIC14D		Alpha eff	20-Aug 07:40	5	14303	13990	15730	-1.92
PIC14D	Above	Alpha XTalk	20-Aug 07:40	5	0.400	0.344	0.400	+3.05
PIC14D		Beta bkg	20-Aug 06:04	60	0.350	0.151	0.800	-1.16
PIC14D		Beta eff	20-Aug 05:53	5	41607	41370	42020	-0.82
PIC14D		Beta XTalk	20-Aug 05:53	5	2.94E-4	8.25E-5	3.18E-4	+2.41

Reviewed by R. Beck-Harman

Date 8-20-19

GEL Laboratories LLC

Gas Flow Proportional Counter Checks for 20-Aug-2019

Detectors LB4100 A1 through J4 and PIC 1A through 14D and G5400W 1W through 1Z

Short Name	Status	Parmname	Run Time	Count Time	CPM or dec	Low Limit	High Limit	Stdev
LB4100C1	Above	Beta bkg	20-Aug 06:16	60	2.233	0.070	3.594	+0.68
LB4100C4	Above	Alpha XTalk	20-Aug 05:22	5	2.627	0.311	0.445	+100.41
LB4100C4	Above	Beta bkg	20-Aug 03:48	60	7223	-2.26E+0	8.835	+3,904.97
LB4100C4	Above	Beta eff	20-Aug 05:30	5	32702	16060	22510	+12.48
LB4100E2	Above	Beta bkg	20-Aug 03:47	60	3.650	1.005	2.203	+10.25
LB4100E3	Above	Beta bkg	20-Aug 03:47	60	3.983	1.790	2.114	+37.62
LB4100G2	Above	Alpha XTalk	20-Aug 05:15	5	0.477	0.272	0.365	+10.27
LB4100G2	Above	Beta bkg	20-Aug 03:47	60	1429	-5.43E+1	80.770	+62.86
LB4100G2	Above	Beta eff	20-Aug 05:08	5	17960	15800	17170	+6.46
LB4100G3	Above	Beta bkg	20-Aug 03:47	60	2.483	0.810	1.674	+8.62
LB4100H2	Above	Beta bkg	20-Aug 03:47	60	10.183	0.225	2.317	+25.56
LB4100I2	Above	Beta bkg	20-Aug 03:46	60	3.300	0.180	2.594	+4.75
LB4100I3	Above	Beta bkg	20-Aug 03:46	60	2.717	-4.28E-1	3.673	+1.60
PIC12C	Above	Beta bkg	20-Aug 06:03	60	1.533	0.175	1.408	+3.61

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

LB4100B1	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100B2	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100B3	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100B4	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D1	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D2	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D3	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D4	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC3A	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC6D	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC13C	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

Reviewed by _____

Date 8/20/19

Gas Flow Proportional Counter Checks for 21-Aug-2019

Short Name	Status	Parmname	Run Time	Count Time	CPM or dec	Low Limit	High Limit	Stdev
G5400W1W		Alpha bkg	21-Aug 03:32	60	0.017	-1.08E-1	0.244	-0.87
G5400W1W		Alpha eff	21-Aug 05:33	5	10249	9243	10360	+2.41
G5400W1W		Alpha XTalk	21-Aug 05:33	5	0.332	0.315	0.385	-1.57
G5400W1W		Beta bkg	21-Aug 03:32	60	1.733	0.468	1.988	+2.00
G5400W1W		Beta eff	21-Aug 05:38	5	12107	10660	14690	-0.85
G5400W1W		Beta XTalk	21-Aug 05:38	5	9.25E-4	1.79E-4	0.002	-0.26
G5400W1X		Alpha bkg	21-Aug 03:32	60	0.050	-7.73E-2	0.185	-0.08
G5400W1X		Alpha eff	21-Aug 05:33	5	12297	11650	13220	-0.53
G5400W1X		Alpha XTalk	21-Aug 05:33	5	0.327	0.293	0.358	+0.11
G5400W1X		Beta bkg	21-Aug 03:32	60	0.867	0.627	1.812	-1.79
G5400W1X		Beta eff	21-Aug 05:38	5	13404	11700	15100	+0.01
G5400W1X		Beta XTalk	21-Aug 05:38	5	8.65E-4	1.27E-4	0.001	+1.65
G5400W1Y		Alpha bkg	21-Aug 03:32	60	0.083	-1.58E-1	0.421	-0.50
G5400W1Y		Alpha eff	21-Aug 05:33	5	8567	7198	10460	-0.48
G5400W1Y		Alpha XTalk	21-Aug 05:33	5	0.349	0.233	0.471	-0.08
G5400W1Y		Beta bkg	21-Aug 03:32	60	1.317	0.588	1.905	+0.32
G5400W1Y		Beta eff	21-Aug 05:38	5	14105	11890	15630	+0.55
G5400W1Y		Beta XTalk	21-Aug 05:38	5	5.67E-4	8.82E-5	0.001	+0.07
G5400W1Z		Alpha bkg	21-Aug 03:32	60	0.00E+0	-1.21E-1	0.229	-0.93
G5400W1Z		Alpha eff	21-Aug 05:33	5	9847	9611	10680	-1.68
G5400W1Z		Alpha XTalk	21-Aug 05:33	5	0.330	0.294	0.349	+0.93
G5400W1Z		Beta bkg	21-Aug 03:32	60	0.883	0.499	1.662	-1.02
G5400W1Z		Beta eff	21-Aug 05:38	5	15826	9613	19430	+0.80
G5400W1Z		Beta XTalk	21-Aug 05:38	5	4.42E-4	-5.21E-1	0.543	-0.06
LB4100A1		Alpha bkg	21-Aug 03:45	60	0.017	-9.59E-2	0.252	-1.06
LB4100A1		Alpha eff	21-Aug 05:20	5	7931	7787	10420	-2.67
LB4100A1		Alpha XTalk	21-Aug 05:20	5	0.342	0.245	0.345	+2.79
LB4100A1		Beta bkg	21-Aug 03:45	60	1.333	0.588	1.928	+0.34
LB4100A1		Beta eff	21-Aug 05:12	5	19752	19040	22660	-1.82
LB4100A1		Beta XTalk	21-Aug 05:12	5	2.34E-4	1.76E-4	6.44E-4	-2.25
LB4100A2		Alpha bkg	21-Aug 03:45	60	0.067	-2.67E-1	0.448	-0.20
LB4100A2		Alpha eff	21-Aug 05:21	5	9251	8462	11400	-1.39
LB4100A2		Alpha XTalk	21-Aug 05:21	5	0.351	0.278	0.383	+1.16
LB4100A2		Beta bkg	21-Aug 03:45	60	1.167	-8.28E-1	3.179	-0.01
LB4100A2		Beta eff	21-Aug 05:12	5	20584	20130	23100	-2.08
LB4100A2		Beta XTalk	21-Aug 05:12	5	3.17E-4	9.55E-5	5.44E-4	-0.03
LB4100A3		Alpha bkg	21-Aug 03:45	60	0.117	-3.71E-2	0.206	+0.79
LB4100A3		Alpha eff	21-Aug 05:21	5	7942	7538	10210	-2.09
LB4100A3		Alpha XTalk	21-Aug 05:21	5	0.280	0.200	0.289	+2.38
LB4100A3		Beta bkg	21-Aug 03:45	60	1.350	-3.71E+2	399	-0.10
LB4100A3		Beta eff	21-Aug 05:12	5	20125	18460	23140	-0.87
LB4100A3		Beta XTalk	21-Aug 05:12	5	2.84E-4	4.76E-5	4.91E-4	+0.20

LB4100B1	Alpha bkg				-5.04E-2	0.323	-2.19
LB4100B1	Alpha eff				10030	12040	-32.94
LB4100B1	Alpha XTalk				0.142	0.253	-10.70
LB4100B1	Beta bkg				0.690	1.634	-7.39
LB4100B1	Beta eff				50540	59850	-35.57
LB4100B1	Beta XTalk				6.15E-5	2.28E-4	-5.22
LB4100B2	Alpha bkg				-1.89E-1	0.467	-1.27
LB4100B2	Alpha eff				7003	10510	-14.98
LB4100B2	Alpha XTalk				0.245	0.294	-32.68
LB4100B2	Beta bkg				0.418	1.814	-4.80
LB4100B2	Beta eff				18980	25790	-19.72
LB4100B2	Beta XTalk				1.57E-4	5.67E-4	-5.29
LB4100B3	Alpha bkg				-6.61E-2	0.276	-1.84
LB4100B3	Alpha eff				8427	16450	-9.30
LB4100B3	Alpha XTalk				0.270	0.653	-7.22
LB4100B3	Beta bkg				-2.44E+2	261	-0.10
LB4100B3	Beta eff				22590	31610	-18.03
LB4100B3	Beta XTalk				-4.93E-1	0.516	-0.07
LB4100B4	Alpha bkg				-5.19E-2	0.218	-1.85
LB4100B4	Alpha eff				10140	15160	-15.12
LB4100B4	Alpha XTalk				0.251	0.384	-14.36
LB4100B4	Beta bkg				0.529	1.722	-5.66
LB4100B4	Beta eff				35650	40530	-46.83
LB4100B4	Beta XTalk				7.36E-5	3.38E-4	-4.67
LB4100C1	Alpha bkg	21-Aug 05:51	60	0.083	-7.52E-3	0.336	-1.41
LB4100C1	Alpha eff	21-Aug 05:12	5	11004	10960	11760	-2.67
LB4100C1	Alpha XTalk	21-Aug 05:12	5	0.187	0.170	0.205	-0.10
LB4100C1	Beta bkg	21-Aug 05:51	60	1.750	0.070	3.594	-0.14
LB4100C1	Beta eff	21-Aug 05:20	5	15568	15330	16900	-2.09
LB4100C1	Beta XTalk	21-Aug 05:20	5	4.75E-4	2.67E-4	7.37E-4	-0.34
LB4100C2	Alpha bkg	21-Aug 03:47	60	0.100	-8.52E-2	0.312	-0.20
LB4100C2	Alpha eff	21-Aug 05:12	5	11316	10750	12990	-1.48
LB4100C2	Alpha XTalk	21-Aug 05:12	5	0.283	0.248	0.301	+1.02
LB4100C2	Beta bkg	21-Aug 03:47	60	1.017	0.511	1.777	-0.60
LB4100C2	Beta eff	21-Aug 05:20	5	16703	15090	19370	-0.74
LB4100C2	Beta XTalk	21-Aug 05:20	5	2.39E-4	1.13E-4	4.85E-4	-0.96
LB4100C3	Alpha bkg	21-Aug 03:47	60	0.033	-6.31E-2	0.282	-1.32
LB4100C3	Alpha eff	21-Aug 05:12	5	7893	7243	8653	-0.23
LB4100C3	Alpha XTalk	21-Aug 05:12	5	0.312	0.289	0.331	+0.23
LB4100C3	Beta bkg	21-Aug 03:47	60	1.267	0.776	2.251	-1.00
LB4100C3	Beta eff	21-Aug 05:20	5	16503	13900	18670	+0.27
LB4100C3	Beta XTalk	21-Aug 05:20	5	1.21E-4	7.94E-5	4.16E-4	-2.25
LB4100C4	Alpha bkg	21-Aug 03:47	60	0.117	-1.09E-1	0.257	+0.70
LB4100C4	Alpha eff	21-Aug 05:12	5	7564	5861	8515	+0.85

LB4100C4	Above	Alpha XTalk	21-Aug 05:12	5	2.296	0.311	0.445	+85.62
LB4100C4	Above	Beta bkg	21-Aug 03:47	60	4885	-2.26E+0	8.835	+2,640.67
LB4100C4	Above	Beta eff	21-Aug 05:20	5	27894	16060	22510	+8.01
LB4100C4		Beta XTalk	21-Aug 05:20	5	1.08E-4	5.74E-5	3.48E-4	-1.97
LB4100D1		Alpha bkg				-6.92E-2	0.073	-0.08
LB4100D1		Alpha eff				-2.16E+3	2344	-0.12
LB4100D1		Alpha XTalk				-1.59E+0	53.770	-2.83
LB4100D1		Beta bkg				-7.61E-1	1.773	-1.20
LB4100D1		Beta eff				2672	27110	-3.66
LB4100D1		Beta XTalk				-5.07E-5	5.70E-5	-0.17
LB4100D2		Alpha bkg				0.100	0.528	-4.40
LB4100D2		Alpha eff				5391	14880	-6.41
LB4100D2		Alpha XTalk				-9.09E+2	960	-0.08
LB4100D2		Beta bkg				0.309	2.710	-3.77
LB4100D2		Beta eff				19300	47980	-7.04
LB4100D2		Beta XTalk				1.43E-4	4.77E-4	-5.57
LB4100D3		Alpha bkg				-1.55E-2	0.582	-2.84
LB4100D3		Alpha eff				11660	37470	-5.71
LB4100D3		Alpha XTalk				-1.31E+3	1383	-0.08
LB4100D3		Beta bkg				-1.53E+0	4.943	-1.58
LB4100D3		Beta eff				17260	61720	-5.33
LB4100D3		Beta XTalk				-1.60E-3	0.002	-0.37
LB4100D4		Alpha bkg				-6.65E-2	0.307	-1.93
LB4100D4		Alpha eff				8864	26240	-6.06
LB4100D4		Alpha XTalk				-1.73E+3	1829	-0.08
LB4100D4		Beta bkg				0.746	2.239	-6.00
LB4100D4		Beta eff				33390	97650	-6.12
LB4100D4		Beta XTalk				8.04E-5	2.34E-4	-6.14
LB4100E1		Alpha bkg	21-Aug 03:46	60	0.183	-5.45E-2	0.290	+1.15
LB4100E1		Alpha eff	21-Aug 04:57	5	10989	10380	11370	+0.69
LB4100E1		Alpha XTalk	21-Aug 04:57	5	0.211	0.186	0.223	+1.06
LB4100E1		Beta bkg	21-Aug 03:46	60	1.767	0.697	2.033	+1.80
LB4100E1		Beta eff	21-Aug 04:51	5	15481	14740	17130	-1.14
LB4100E1		Beta XTalk	21-Aug 04:51	5	4.26E-4	2.29E-4	7.39E-4	-0.68
LB4100E2		Alpha bkg	21-Aug 03:46	60	0.067	-1.97E-2	0.222	-0.86
LB4100E2		Alpha eff	21-Aug 04:57	5	7709	5846	8521	+1.18
LB4100E2		Alpha XTalk	21-Aug 04:57	5	0.419	0.341	0.542	-0.66
LB4100E2	Above	Beta bkg	21-Aug 03:46	60	3.283	1.005	2.203	+8.41
LB4100E2		Beta eff	21-Aug 04:51	5	15844	15340	16820	-0.96
LB4100E2		Beta XTalk	21-Aug 04:51	5	2.65E-4	1.39E-4	5.04E-4	-0.93
LB4100E3		Alpha bkg	21-Aug 03:46	60	0.017	-4.15E-2	0.198	-1.54
LB4100E3		Alpha eff	21-Aug 04:57	5	8623	7895	9089	+0.66
LB4100E3		Alpha XTalk	21-Aug 04:57	5	0.244	0.230	0.285	-1.45
LB4100E3	Above	Beta bkg	21-Aug 03:46	60	4.000	1.790	2.114	+37.93
LB4100E3		Beta eff	21-Aug 04:51	5	15365	15110	16360	-1.77

LB4100E3		Beta XTalk	21-Aug 04:51	5	2.47E-4	1.08E-4	4.52E-4	-0.57
LB4100E4		Alpha bkg	21-Aug 03:46	60	0.100	-5.75E-2	0.174	+1.08
LB4100E4		Alpha eff	21-Aug 04:57	5	9857	9238	10300	+0.50
LB4100E4		Alpha XTalk	21-Aug 04:57	5	0.249	0.228	0.263	+0.59
LB4100E4		Beta bkg	21-Aug 03:46	60	1.583	0.455	2.172	+0.94
LB4100E4		Beta eff	21-Aug 04:51	5	18232	17000	20330	-0.78
LB4100E4		Beta XTalk	21-Aug 04:51	5	2.63E-4	6.94E-5	3.54E-4	+1.09
LB4100F1		Alpha bkg	21-Aug 03:46	60	0.050	-5.23E-2	0.181	-0.37
LB4100F1		Alpha eff	21-Aug 04:57	5	9651	9414	10300	-1.40
LB4100F1		Alpha XTalk	21-Aug 04:57	5	0.269	0.248	0.284	+0.59
LB4100F1		Beta bkg	21-Aug 03:46	60	1.083	0.602	1.924	-0.82
LB4100F1		Beta eff	21-Aug 04:51	5	41238	40590	43880	-1.82
LB4100F1		Beta XTalk	21-Aug 04:51	5	1.70E-4	4.22E-5	2.06E-4	+1.67
LB4100F2		Alpha bkg	21-Aug 03:46	60	0.167	0.039	0.317	-0.24
LB4100F2		Alpha eff	21-Aug 04:57	5	4939	4033	5271	+1.39
LB4100F2		Alpha XTalk	21-Aug 04:57	5	0.486	0.431	0.588	-0.90
LB4100F2		Beta bkg	21-Aug 03:46	60	1.300	0.714	1.605	+0.95
LB4100F2		Beta eff	21-Aug 04:51	5	16688	16140	17120	+0.36
LB4100F2		Beta XTalk	21-Aug 04:51	5	3.95E-4	1.34E-4	5.31E-4	+0.95
LB4100F3		Alpha bkg	21-Aug 03:46	60	0.150	-4.66E-2	0.248	+1.00
LB4100F3		Alpha eff	21-Aug 04:57	5	15098	13520	17440	-0.58
LB4100F3		Alpha XTalk	21-Aug 04:57	5	0.341	0.288	0.379	+0.49
LB4100F3		Beta bkg	21-Aug 03:46	60	1.283	0.636	1.613	+0.98
LB4100F3		Beta eff	21-Aug 04:51	5	27061	26340	27710	+0.16
LB4100F3		Beta XTalk	21-Aug 04:51	5	2.01E-4	9.36E-5	3.81E-4	-0.75
LB4100F4		Alpha bkg	21-Aug 03:46	60	0.100	-4.01E-2	0.180	+0.83
LB4100F4		Alpha eff	21-Aug 04:57	5	7679	5406	9284	+0.52
LB4100F4		Alpha XTalk	21-Aug 04:57	5	0.559	0.425	0.745	-0.47
LB4100F4		Beta bkg	21-Aug 03:46	60	1.017	0.704	1.854	-1.37
LB4100F4		Beta eff	21-Aug 04:51	5	32482	31480	34030	-0.64
LB4100F4		Beta XTalk	21-Aug 04:51	5	1.54E-4	7.46E-5	3.07E-4	-0.95
LB4100G1		Alpha bkg	21-Aug 03:46	60	0.033	-4.19E-2	0.157	-0.73
LB4100G1		Alpha eff	21-Aug 05:06	5	10617	7467	11340	+1.88
LB4100G1		Alpha XTalk	21-Aug 05:06	5	0.255	0.224	0.315	-0.94
LB4100G1		Beta bkg	21-Aug 03:46	60	0.717	0.375	1.637	-1.38
LB4100G1		Beta eff	21-Aug 04:57	5	16153	14840	16920	+0.79
LB4100G1		Beta XTalk	21-Aug 04:57	5	3.84E-4	1.64E-4	6.43E-4	-0.25
LB4100G2		Alpha bkg	21-Aug 03:46	60	0.083	-5.80E-2	0.275	-0.45
LB4100G2		Alpha eff	21-Aug 05:06	5	10948	8815	11510	+1.75
LB4100G2	Above	Alpha XTalk	21-Aug 05:06	5	0.679	0.272	0.365	+23.34
LB4100G2	Above	Beta bkg	21-Aug 03:46	60	918	-5.43E+1	80.770	+40.20
LB4100G2	need 2nd	Beta eff	21-Aug 04:57	5	16705	15800	17170	+0.96
LB4100G2		Beta XTalk	21-Aug 04:57	5	2.99E-4	1.23E-4	5.12E-4	-0.28
LB4100G3		Alpha bkg	21-Aug 03:46	60	0.083	0.002	0.276	-1.22

LB4100G3		Alpha eff	21-Aug 05:06	5	7071	6620	7779	-0.67
LB4100G3		Alpha XTalk	21-Aug 05:06	5	0.350	0.309	0.375	+0.76
LB4100G3	Above	Beta bkg	21-Aug 03:46	60	2.800	0.810	1.674	+10.82
LB4100G3		Beta eff	21-Aug 04:57	5	22317	21640	22870	+0.30
LB4100G3		Beta XTalk	21-Aug 04:57	5	1.46E-4	7.49E-5	4.02E-4	-1.69
LB4100G4		Alpha bkg	21-Aug 03:46	60	0.050	-1.09E-1	0.250	-0.34
LB4100G4		Alpha eff	21-Aug 05:06	5	9844	9560	10390	-0.95
LB4100G4		Alpha XTalk	21-Aug 05:06	5	0.254	0.231	0.262	+1.35
LB4100G4		Beta bkg	21-Aug 03:46	60	1.200	0.468	1.527	+1.15
LB4100G4		Beta eff	21-Aug 04:57	5	18797	17900	19720	-0.04
LB4100G4		Beta XTalk	21-Aug 04:57	5	1.49E-4	5.50E-5	3.52E-4	-1.10
LB4100H1		Alpha bkg	21-Aug 03:46	60	0.083	-7.22E-2	0.211	+0.30
LB4100H1		Alpha eff	21-Aug 05:06	5	8486	8144	10440	-2.11
LB4100H1		Alpha XTalk	21-Aug 05:06	5	0.325	0.240	0.334	+2.42
LB4100H1		Beta bkg	21-Aug 03:46	60	0.917	0.507	1.476	-0.46
LB4100H1		Beta eff	21-Aug 04:57	5	39019	38960	41820	-2.88
LB4100H1		Beta XTalk	21-Aug 04:57	5	9.74E-5	3.54E-5	2.04E-4	-0.80
LB4100H2		Alpha bkg	21-Aug 03:46	60	0.067	-4.85E-2	0.203	-0.26
LB4100H2		Alpha eff	21-Aug 05:06	5	7304	6938	8446	-1.55
LB4100H2		Alpha XTalk	21-Aug 05:06	5	0.340	0.280	0.366	+1.22
LB4100H2	Above	Beta bkg	21-Aug 03:46	60	14.467	0.225	2.317	+37.84
LB4100H2		Beta eff	21-Aug 04:57	5	15701	15690	17100	-2.95
LB4100H2		Beta XTalk	21-Aug 04:57	5	2.80E-4	1.28E-4	4.99E-4	-0.54
LB4100H3		Alpha bkg	21-Aug 03:46	60	0.083	-4.20E-2	0.255	-0.47
LB4100H3		Alpha eff	21-Aug 05:06	5	17692	17570	22670	-2.86
LB4100H3		Alpha XTalk	21-Aug 05:06	5	0.301	0.268	0.306	+2.22
LB4100H3		Beta bkg	21-Aug 03:46	60	0.983	-6.23E+1	90.230	-0.51
LB4100H3		Beta eff	21-Aug 04:57	5	19555	18890	22560	-1.91
LB4100H3		Beta XTalk	21-Aug 04:57	5	1.43E-4	8.81E-5	3.81E-4	-1.87
LB4100H4		Alpha bkg	21-Aug 03:46	60	0.083	-3.73E-2	0.238	-0.37
LB4100H4		Alpha eff	21-Aug 05:06	5	12159	11030	14300	-0.93
LB4100H4		Alpha XTalk	21-Aug 05:06	5	0.351	0.297	0.385	+0.64
LB4100H4		Beta bkg	21-Aug 03:46	60	0.883	0.370	1.614	-0.52
LB4100H4		Beta eff	21-Aug 04:57	5	31494	30860	34020	-1.80
LB4100H4		Beta XTalk	21-Aug 04:57	5	2.48E-4	1.00E-4	3.28E-4	+0.89
LB4100I1		Alpha bkg	21-Aug 03:45	60	0.133	-8.66E-2	0.291	+0.49
LB4100I1		Alpha eff	21-Aug 04:51	5	10777	9278	11600	+0.87
LB4100I1		Alpha XTalk	21-Aug 04:51	5	0.178	0.155	0.201	+0.06
LB4100I1		Beta bkg	21-Aug 03:45	60	1.183	0.438	1.615	+0.80
LB4100I1		Beta eff	21-Aug 05:06	5	14401	13480	16690	-1.28
LB4100I1		Beta XTalk	21-Aug 05:06	5	5.14E-4	2.38E-4	7.83E-4	+0.03
LB4100I2		Alpha bkg	21-Aug 03:46	60	0.133	-1.86E-1	0.386	+0.35
LB4100I2		Alpha eff	21-Aug 04:51	5	12962	12430	13470	+0.07
LB4100I2		Alpha XTalk	21-Aug 04:51	5	0.230	0.208	0.252	+0.01
LB4100I2	Above	Beta bkg	21-Aug 03:46	60	4.667	0.180	2.594	+8.15

LB4100I2		Beta eff	21-Aug 05:06	5	16309	15820	17140	-0.78
LB4100I2		Beta XTalk	21-Aug 05:06	5	2.94E-4	1.38E-4	5.25E-4	-0.58
LB4100I3		Alpha bkg	21-Aug 03:46	60	0.067	-4.16E-2	0.204	-0.35
LB4100I3		Alpha eff	21-Aug 04:51	5	9669	9187	10140	+0.04
LB4100I3		Alpha XTalk	21-Aug 04:51	5	0.199	0.180	0.230	-0.70
LB4100I3	Above	Beta bkg	21-Aug 03:46	60	2.850	-4.28E-1	3.673	+1.80
LB4100I3		Beta eff	21-Aug 05:06	5	16042	14870	16650	+0.95
LB4100I3		Beta XTalk	21-Aug 05:06	5	2.49E-4	1.08E-4	4.81E-4	-0.72
LB4100I4		Alpha bkg	21-Aug 03:46	60	0.100	0.031	0.326	-1.60
LB4100I4		Alpha eff	21-Aug 04:51	5	11233	10640	11580	+0.79
LB4100I4		Alpha XTalk	21-Aug 04:51	5	0.202	0.185	0.220	-0.06
LB4100I4		Beta bkg	21-Aug 03:46	60	1.100	0.490	2.301	-0.98
LB4100I4		Beta eff	21-Aug 05:06	5	19024	18150	19980	-0.13
LB4100I4		Beta XTalk	21-Aug 05:06	5	2.73E-4	1.10E-4	4.02E-4	+0.36
LB4100J1	Below	Alpha bkg	21-Aug 06:56	60	0.017	0.018	0.372	-3.02
LB4100J1		Alpha eff	21-Aug 04:51	5	10825	10460	11370	-0.59
LB4100J1		Alpha XTalk	21-Aug 04:51	5	0.171	0.155	0.187	-0.10
LB4100J1	Above	Beta bkg	21-Aug 06:56	60	2.367	0.056	2.016	+4.07
LB4100J1		Beta eff	21-Aug 05:06	5	39050	35630	41690	+0.39
LB4100J1		Beta XTalk	21-Aug 05:06	5	1.28E-4	5.93E-5	2.38E-4	-0.69
LB4100J2		Alpha bkg	21-Aug 06:56	60	0.033	-8.17E-2	0.539	-1.89
LB4100J2		Alpha eff	21-Aug 04:51	5	9550	9114	10090	-0.32
LB4100J2		Alpha XTalk	21-Aug 04:51	5	0.158	0.141	0.180	-0.38
LB4100J2		Beta bkg	21-Aug 06:56	60	1.317	0.775	1.935	-0.20
LB4100J2		Beta eff	21-Aug 05:06	5	15377	14440	16130	+0.33
LB4100J2		Beta XTalk	21-Aug 05:06	5	2.86E-4	1.82E-4	6.77E-4	-1.74
LB4100J3		Alpha bkg	21-Aug 03:46	60	0.067	-5.72E-2	0.305	-0.95
LB4100J3		Alpha eff	21-Aug 04:51	5	21882	19850	22740	+1.22
LB4100J3		Alpha XTalk	21-Aug 04:51	5	0.198	0.183	0.218	-0.52
LB4100J3		Beta bkg	21-Aug 03:46	60	0.767	0.431	1.507	-1.13
LB4100J3		Beta eff	21-Aug 05:06	5	19056	16720	20260	+0.96
LB4100J3		Beta XTalk	21-Aug 05:06	5	3.78E-4	1.15E-4	4.64E-4	+1.52
LB4100J4		Alpha bkg	21-Aug 03:46	60	0.267	0.014	0.314	+2.05
LB4100J4		Alpha eff	21-Aug 04:51	5	17841	16250	18210	+1.87
LB4100J4		Alpha XTalk	21-Aug 04:51	5	0.170	0.156	0.182	+0.38
LB4100J4		Beta bkg	21-Aug 03:46	60	0.983	0.504	1.329	+0.49
LB4100J4		Beta eff	21-Aug 05:06	5	30902	28300	32430	+0.78
LB4100J4		Beta XTalk	21-Aug 05:06	5	1.81E-4	1.05E-4	3.69E-4	-1.27
PIC1A		Alpha bkg	21-Aug 04:56	60	0.200	0.052	0.386	-0.34
PIC1A		Alpha eff	21-Aug 06:27	5	10359	10070	10770	-0.52
PIC1A	Above	Alpha XTalk	21-Aug 06:27	5	0.313	0.264	0.303	+4.54
PIC1A		Beta bkg	21-Aug 04:56	60	0.883	-3.41E-2	1.327	+1.04
PIC1A		Beta eff	21-Aug 04:47	5	20091	19700	21670	-1.81
PIC1A		Beta XTalk	21-Aug 04:47	5	7.18E-4	2.91E-4	0.002	-1.64

PIC1B	Alpha bkg	21-Aug 04:56	60	0.117	-2.93E-2	0.323	-0.52
PIC1B	Alpha eff	21-Aug 04:40	5	12684	12150	13170	+0.14
PIC1B	Alpha XTalk	21-Aug 04:40	5	0.280	0.265	0.293	+0.27
PIC1B	Beta bkg	21-Aug 04:56	60	0.717	0.382	1.951	-1.72
PIC1B	Beta eff	21-Aug 04:47	5	21274	21060	21800	-1.26
PIC1B	Beta XTalk	21-Aug 04:47	5	9.98E-4	2.63E-4	0.002	-0.21
PIC1C	Alpha bkg	21-Aug 04:56	60	0.117	-4.39E-2	0.359	-0.61
PIC1C	Alpha eff	21-Aug 06:44	5	9423	9319	9845	-1.81
PIC1C	Alpha XTalk	21-Aug 06:44	5	0.250	0.244	0.267	-1.28
PIC1C	Beta bkg	21-Aug 04:56	60	0.467	-4.73E-1	1.906	-0.63
PIC1C	Beta eff	21-Aug 04:47	5	21203	20780	21480	+0.63
PIC1C	Beta XTalk	21-Aug 04:47	5	0.010	0.007	0.018	-1.28
PIC1D	Alpha bkg	21-Aug 04:56	60	0.167	-8.40E-2	0.474	-0.30
PIC1D	Alpha eff	21-Aug 04:40	5	10329	10270	10880	-2.42
PIC1D	Alpha XTalk	21-Aug 04:40	5	0.257	0.252	0.270	-1.20
PIC1D	Beta bkg	21-Aug 04:56	60	1.683	0.265	2.212	+1.37
PIC1D	Beta eff	21-Aug 04:47	5	24143	24080	25520	-2.74
PIC1D	Beta XTalk	21-Aug 04:47	5	0.010	0.002	0.013	+1.36
PIC2A	Alpha bkg	21-Aug 04:56	60	0.100	-5.03E-2	0.376	-0.88
PIC2A	Alpha eff	21-Aug 04:39	5	9892	9582	11210	-1.86
PIC2A	Alpha XTalk	21-Aug 04:39	5	0.280	0.254	0.286	+1.81
PIC2A	Beta bkg	21-Aug 04:56	60	0.617	-6.28E-1	1.918	-0.07
PIC2A	Beta eff	21-Aug 04:47	5	52321	51660	54000	-1.31
PIC2A	Beta XTalk	21-Aug 04:47	5	0.003	-1.97E-3	0.010	-0.41
PIC2B	Alpha bkg	21-Aug 04:56	60	0.267	-7.50E-2	0.308	+2.36
PIC2B	Alpha eff	21-Aug 04:39	5	9277	8942	9351	+1.92
PIC2B	Alpha XTalk	21-Aug 04:39	5	0.268	0.252	0.291	-0.52
PIC2B	Beta bkg	21-Aug 04:56	60	0.783	-1.82E-1	1.434	+0.58
PIC2B	Beta eff	21-Aug 04:47	5	21010	20010	21260	+1.80
PIC2B	Beta XTalk	21-Aug 04:47	5	9.07E-4	2.80E-4	0.002	-0.38
PIC2C	Alpha bkg	21-Aug 04:56	60	0.100	0.027	0.357	-1.67
PIC2C	Alpha eff	21-Aug 04:40	5	21041	20500	21250	+1.33
PIC2C	Alpha XTalk	21-Aug 04:40	5	0.261	0.249	0.284	-1.00
PIC2C	Beta bkg	21-Aug 04:56	60	0.833	0.397	1.420	-0.44
PIC2C	Beta eff	21-Aug 04:47	5	25328	24460	25780	+0.94
PIC2C	Beta XTalk	21-Aug 04:47	5	0.003	5.48E-4	0.005	+0.60
PIC2D	Alpha bkg	21-Aug 04:56	60	0.200	-3.13E-2	0.367	+0.49
PIC2D	Alpha eff	21-Aug 04:40	5	15592	15280	16780	-1.75
PIC2D	Alpha XTalk	21-Aug 04:40	5	0.281	0.253	0.282	+2.80
PIC2D	Beta bkg	21-Aug 04:56	60	1.183	0.279	1.490	+1.48
PIC2D	Beta eff	21-Aug 04:48	5	40889	40700	41690	-1.85
PIC2D	Beta XTalk	21-Aug 04:48	5	0.003	0.003	0.015	-2.82
PIC3A	Alpha bkg				-7.50E-2	0.354	-1.95
PIC3A	Alpha eff				10170	11310	-56.53
PIC3A	Alpha XTalk				0.233	0.292	-26.54

PIC3A	Beta bkg				-5.41E-1	2.245	-1.83
PIC3A	Beta eff				19370	21150	-68.29
PIC3A	Beta XTalk				-1.78E-2	0.036	-1.01
PIC3B	Alpha bkg	21-Aug 04:56	60	0.117	-1.95E-2	0.376	-0.93
PIC3B	Alpha eff	21-Aug 04:48	5	12875	12510	13770	-1.26
PIC3B	Alpha XTalk	21-Aug 04:48	5	0.266	0.228	0.273	+2.19
PIC3B	Beta bkg	21-Aug 04:56	60	1.650	0.306	2.452	+0.76
PIC3B	Beta eff	21-Aug 04:40	5	21406	20470	21910	+0.90
PIC3B	Beta XTalk	21-Aug 04:40	5	0.008	0.005	0.016	-1.17
PIC3C	Alpha bkg	21-Aug 04:57	60	0.183	-9.57E-4	0.359	+0.07
PIC3C	Alpha eff	21-Aug 04:48	5	9439	9302	10490	-2.31
PIC3C	Alpha XTalk	21-Aug 04:48	5	0.276	0.254	0.277	+2.83
PIC3C	Beta bkg	21-Aug 04:57	60	1.183	0.008	1.299	+2.46
PIC3C	Beta eff	21-Aug 04:40	5	21391	20730	22020	+0.07
PIC3C	Beta XTalk	21-Aug 04:40	5	0.004	0.002	0.010	-1.91
PIC3D	Alpha bkg	21-Aug 04:57	60	0.183	-4.97E-2	0.369	+0.34
PIC3D	Alpha eff	21-Aug 04:48	5	10544	10210	10880	-0.01
PIC3D	Alpha XTalk	21-Aug 04:48	5	0.275	0.236	0.280	+2.27
PIC3D	Beta bkg	21-Aug 04:57	60	1.000	-8.46E-3	1.311	+1.59
PIC3D	Beta eff	21-Aug 04:40	5	25005	22540	25320	+2.32
PIC3D	Beta XTalk	21-Aug 04:40	5	0.004	-6.80E-4	0.007	+0.17
PIC4A	Alpha bkg	21-Aug 04:57	60	0.200	-9.48E-2	0.384	+0.70
PIC4A	Alpha eff	21-Aug 04:48	5	10309	10180	10710	-1.54
PIC4A	Alpha XTalk	21-Aug 04:48	5	0.288	0.262	0.290	+2.63
PIC4A	Beta bkg	21-Aug 04:57	60	1.200	-1.75E-1	2.154	+0.54
PIC4A	Beta eff	21-Aug 06:29	5	51871	50950	54660	-1.51
PIC4A	Beta XTalk	21-Aug 06:29	5	9.71E-4	1.57E-4	0.002	-0.36
PIC4B	Alpha bkg	21-Aug 04:57	60	0.167	-5.36E-2	0.301	+0.73
PIC4B	Alpha eff	21-Aug 04:48	5	8080	7995	9186	-2.57
PIC4B	Alpha XTalk	21-Aug 04:48	5	0.361	0.298	0.434	-0.22
PIC4B	Beta bkg	21-Aug 04:57	60	0.550	0.072	1.413	-0.86
PIC4B	Beta eff	21-Aug 04:40	5	20434	19520	21820	-0.62
PIC4B	Beta XTalk	21-Aug 04:40	5	3.86E-4	1.54E-4	5.60E-4	+0.43
PIC4C	Alpha bkg	21-Aug 04:57	60	0.300	-3.49E-2	0.385	+1.78
PIC4C	Alpha eff	21-Aug 04:48	5	20743	20410	21520	-1.20
PIC4C	Alpha XTalk	21-Aug 04:48	5	0.273	0.244	0.291	+0.72
PIC4C	Beta bkg	21-Aug 04:57	60	0.600	0.053	1.027	+0.37
PIC4C	Beta eff	21-Aug 04:40	5	25533	24500	26770	-0.27
PIC4C	Beta XTalk	21-Aug 04:40	5	0.002	4.19E-4	0.005	-0.94
PIC4D	Alpha bkg	21-Aug 04:57	60	0.233	-1.06E-2	0.363	+0.92
PIC4D	Alpha eff	21-Aug 04:48	5	16979	16410	17490	+0.16
PIC4D	Alpha XTalk	21-Aug 04:48	5	0.246	0.231	0.286	-1.38
PIC4D	Beta bkg	21-Aug 04:57	60	0.783	0.115	1.249	+0.54
PIC4D	Beta eff	21-Aug 04:40	5	40365	39260	43390	-1.39
PIC4D	Beta XTalk	21-Aug 04:40	5	0.011	0.003	0.019	-0.15

PIC5A	Alpha bkg	21-Aug 05:09	60	0.250	0.055	0.368	+0.74
PIC5A	Alpha eff	21-Aug 04:55	5	11006	10560	11170	+1.39
PIC5A	Alpha XTalk	21-Aug 04:55	5	0.261	0.253	0.269	+0.06
PIC5A	Beta bkg	21-Aug 05:09	60	0.550	-1.06E-1	1.405	-0.40
PIC5A	Beta eff	21-Aug 05:01	5	15713	15410	16830	-1.72
PIC5A	Beta XTalk	21-Aug 05:01	5	0.003	0.001	0.006	-1.37
PIC5B	Alpha bkg	21-Aug 05:09	60	0.133	-1.14E-2	0.414	-0.96
PIC5B	Alpha eff	21-Aug 04:55	5	13076	12880	14070	-2.01
PIC5B	Alpha XTalk	21-Aug 04:55	5	0.264	0.252	0.271	+0.70
PIC5B	Beta bkg	21-Aug 05:09	60	0.583	-2.27E-1	1.609	-0.35
PIC5B	Beta eff	21-Aug 05:01	5	22159	21840	23210	-1.60
PIC5B	Beta XTalk	21-Aug 05:01	5	0.002	4.11E-4	0.006	-0.86
PIC5C	Alpha bkg	21-Aug 05:09	60	0.233	-6.28E-2	0.409	+0.77
PIC5C	Alpha eff	21-Aug 04:55	5	9502	9266	10200	-1.48
PIC5C	Alpha XTalk	21-Aug 04:55	5	0.271	0.256	0.276	+1.56
PIC5C	Beta bkg	21-Aug 05:09	60	0.517	-2.06E-1	1.558	-0.54
PIC5C	Beta eff	21-Aug 05:01	5	21617	21210	22460	-1.05
PIC5C	Beta XTalk	21-Aug 05:01	5	0.001	5.78E-4	0.004	-1.61
PIC5D	Alpha bkg	21-Aug 05:09	60	0.133	0.009	0.365	-0.90
PIC5D	Alpha eff	21-Aug 04:55	5	10828	10450	11610	-1.05
PIC5D	Alpha XTalk	21-Aug 04:55	5	0.266	0.251	0.274	+0.89
PIC5D	Beta bkg	21-Aug 05:09	60	1.333	0.019	2.073	+0.84
PIC5D	Beta eff	21-Aug 05:01	5	25276	24750	26620	-1.31
PIC5D	Beta XTalk	21-Aug 05:01	5	0.001	0.001	0.006	-2.71
PIC6A	Alpha bkg	21-Aug 05:11	60	0.150	-1.32E-2	0.360	-0.38
PIC6A	Alpha eff	21-Aug 04:56	5	9405	9161	10030	-1.31
PIC6A	Alpha XTalk	21-Aug 04:56	5	0.345	0.272	0.356	+2.20
PIC6A	Beta bkg	21-Aug 05:11	60	1.400	0.899	2.245	-0.77
PIC6A	Beta eff	21-Aug 05:03	5	45616	44350	52630	-2.08
PIC6A	Beta XTalk	21-Aug 05:03	5	1.01E-4	4.47E-5	2.34E-4	-1.20
PIC6B	Alpha bkg	21-Aug 05:11	60	0.267	-1.33E-1	0.383	+1.65
PIC6B	Alpha eff	21-Aug 04:56	5	8322	8240	9583	-2.63
PIC6B	Alpha XTalk	21-Aug 04:56	5	0.310	0.266	0.367	-0.38
PIC6B	Beta bkg	21-Aug 05:11	60	1.400	-6.80E-2	2.279	+0.75
PIC6B	Beta eff	21-Aug 05:03	5	19078	16700	20640	+0.62
PIC6B	Beta XTalk	21-Aug 05:03	5	3.28E-4	1.76E-4	6.31E-4	-0.99
PIC6C	Alpha bkg	21-Aug 05:11	60	0.200	0.009	0.328	+0.60
PIC6C	Alpha eff	21-Aug 04:56	5	20774	20270	21680	-0.86
PIC6C	Alpha XTalk	21-Aug 04:56	5	0.277	0.257	0.279	+2.37
PIC6C	Beta bkg	21-Aug 05:11	60	1.683	0.899	2.097	+0.93
PIC6C	Beta eff	21-Aug 05:03	5	23661	23410	25140	-2.13
PIC6C	Beta XTalk	21-Aug 05:03	5	2.99E-4	1.25E-4	4.43E-4	+0.28
PIC6D	Alpha bkg				-8.26E-2	0.335	-1.81
PIC6D	Alpha eff				17280	18850	-69.04

PIC6D		Alpha XTalk				0.051	0.542	-3.62
PIC6D		Beta bkg				0.019	2.434	-3.05
PIC6D		Beta eff				43700	47280	-76.24
PIC6D		Beta XTalk				-1.81E-3	0.004	-1.25
PIC7A		Alpha bkg	21-Aug 05:11	60	0.050	-3.46E-2	0.391	-1.81
PIC7A		Alpha eff	21-Aug 05:03	5	10821	10220	11180	+0.75
PIC7A		Alpha XTalk	21-Aug 05:03	5	0.270	0.249	0.293	-0.16
PIC7A		Beta bkg	21-Aug 05:11	60	0.600	-8.85E-2	1.924	-0.95
PIC7A		Beta eff	21-Aug 04:56	5	20560	20360	21720	-2.12
PIC7A		Beta XTalk	21-Aug 04:56	5	5.16E-4	6.75E-5	0.002	-1.70
PIC7B		Alpha bkg	21-Aug 05:11	60	0.017	-2.50E-2	0.372	-2.37
PIC7B		Alpha eff	21-Aug 05:03	5	12035	11990	13590	-2.83
PIC7B		Alpha XTalk	21-Aug 05:03	5	0.277	0.259	0.278	+2.69
PIC7B		Beta bkg	21-Aug 05:11	60	0.267	-6.64E-1	1.763	-0.70
PIC7B		Beta eff	21-Aug 04:56	5	21352	20950	22600	-1.54
PIC7B		Beta XTalk	21-Aug 04:56	5	5.10E-4	3.44E-4	0.002	-2.39
PIC7C		Alpha bkg	21-Aug 05:11	60	0.117	-4.17E-2	0.294	-0.17
PIC7C	Below	Alpha eff	21-Aug 07:28	5	9031	9044	9654	-3.13
PIC7C		Alpha XTalk	21-Aug 07:28	5	0.308	0.255	0.313	+2.57
PIC7C		Beta bkg	21-Aug 05:11	60	0.717	-1.93E-1	1.388	+0.45
PIC7C		Beta eff	21-Aug 04:56	5	19783	19720	21610	-2.80
PIC7C		Beta XTalk	21-Aug 04:56	5	3.58E-4	6.91E-5	7.54E-4	-0.47
PIC7D		Alpha bkg	21-Aug 05:11	60	0.183	-3.52E-2	0.285	+1.10
PIC7D		Alpha eff	21-Aug 05:03	5	10549	10290	10720	+0.61
PIC7D		Alpha XTalk	21-Aug 05:03	5	0.278	0.252	0.283	+2.05
PIC7D		Beta bkg	21-Aug 05:11	60	0.450	0.109	1.041	-0.80
PIC7D		Beta eff	21-Aug 04:56	5	23817	23170	25350	-1.22
PIC7D		Beta XTalk	21-Aug 04:56	5	2.29E-4	3.99E-5	7.85E-4	-1.48
PIC8A		Alpha bkg	21-Aug 05:11	60	0.133	-4.64E-2	0.301	+0.10
PIC8A		Alpha eff	21-Aug 05:03	5	10012	9573	11160	-1.34
PIC8A		Alpha XTalk	21-Aug 05:03	5	0.275	0.232	0.331	-0.37
PIC8A		Beta bkg	21-Aug 05:11	60	0.783	0.033	1.296	+0.56
PIC8A		Beta eff	21-Aug 04:56	5	53220	50170	55770	+0.27
PIC8A		Beta XTalk	21-Aug 04:56	5	0.002	-3.39E-3	0.006	+0.35
PIC8B		Alpha bkg	21-Aug 05:11	60	0.100	-1.18E-1	0.335	-0.11
PIC8B		Alpha eff	21-Aug 06:30	5	8639	8562	9505	-2.51
PIC8B		Alpha XTalk	21-Aug 06:30	5	0.297	0.261	0.297	+2.98
PIC8B		Beta bkg	21-Aug 05:11	60	0.450	-2.49E-1	1.166	-0.04
PIC8B		Beta eff	21-Aug 04:56	5	21185	20990	22140	-1.98
PIC8B		Beta XTalk	21-Aug 04:56	5	5.01E-4	2.49E-4	0.001	-1.74
PIC8C		Alpha bkg	21-Aug 07:28	60	0.133	-2.61E-2	0.365	-0.55
PIC8C		Alpha eff	21-Aug 05:03	5	21427	20820	22080	-0.11
PIC8C		Alpha XTalk	21-Aug 05:03	5	0.259	0.251	0.282	-1.56
PIC8C		Beta bkg	21-Aug 07:28	60	0.317	-1.90E-1	1.144	-0.72
PIC8C		Beta eff	21-Aug 04:56	5	26195	25290	27010	+0.16

PIC8C	Beta XTalk	21-Aug 04:56	5	0.003	-7.70E-4	0.007	+0.10
PIC8D	Alpha bkg	21-Aug 05:12	60	0.133	-5.65E-2	0.438	-0.70
PIC8D	Alpha eff	21-Aug 05:03	5	16317	15120	17000	+0.82
PIC8D	Alpha XTalk	21-Aug 05:03	5	0.263	0.249	0.290	-0.88
PIC8D	Beta bkg	21-Aug 05:12	60	0.700	0.236	2.611	-1.83
PIC8D	Beta eff	21-Aug 04:56	5	42102	40720	43630	-0.15
PIC8D	Beta XTalk	21-Aug 04:56	5	0.005	-1.54E-3	0.012	-0.16
PIC9A	Alpha bkg	21-Aug 05:27	60	0.150	-2.15E-2	0.339	-0.15
PIC9A	Alpha eff	21-Aug 05:09	5	10832	10180	11170	+0.95
PIC9A	Alpha XTalk	21-Aug 05:09	5	0.268	0.249	0.304	-0.94
PIC9A	Beta bkg	21-Aug 05:27	60	0.817	0.178	1.390	+0.16
PIC9A	Beta eff	21-Aug 06:46	5	20869	20680	21950	-2.11
PIC9A	Beta XTalk	21-Aug 06:46	5	0.002	3.54E-4	0.003	+0.15
PIC9B	Alpha bkg	21-Aug 05:27	60	0.083	-5.14E-2	0.189	+0.36
PIC9B	Alpha eff	21-Aug 05:09	5	12150	11850	12570	-0.50
PIC9B	Alpha XTalk	21-Aug 05:09	5	0.282	0.267	0.287	+1.61
PIC9B	Beta bkg	21-Aug 05:27	60	1.083	0.216	1.395	+1.41
PIC9B	Beta eff	21-Aug 05:16	5	21424	21220	22080	-1.57
PIC9B	Beta XTalk	21-Aug 05:16	5	8.51E-4	-4.93E-1	0.513	-0.05
PIC9C	Alpha bkg	21-Aug 05:27	60	0.133	0.010	0.330	-0.69
PIC9C	Alpha eff	21-Aug 05:09	5	9222	9161	9836	-2.46
PIC9C	Alpha XTalk	21-Aug 05:09	5	0.265	0.244	0.268	+2.27
PIC9C	Beta bkg	21-Aug 05:27	60	0.867	0.148	1.310	+0.71
PIC9C	Beta eff	21-Aug 05:16	5	21291	20810	21570	+0.80
PIC9C	Beta XTalk	21-Aug 05:16	5	0.002	7.26E-4	0.004	-1.19
PIC9D	Alpha bkg	21-Aug 05:27	60	0.067	0.017	0.351	-2.11
PIC9D	Alpha eff	21-Aug 05:09	5	10568	10280	10720	+0.93
PIC9D	Alpha XTalk	21-Aug 05:09	5	0.282	0.257	0.290	+1.61
PIC9D	Beta bkg	21-Aug 05:27	60	0.467	0.118	1.182	-1.03
PIC9D	Beta eff	21-Aug 05:16	5	25121	24330	25440	+1.27
PIC9D	Beta XTalk	21-Aug 05:16	5	0.002	3.66E-4	0.005	-1.45
PIC10A	Alpha bkg	21-Aug 05:27	60	0.083	-1.88E-2	0.299	-1.07
PIC10A	Alpha eff	21-Aug 05:09	5	10011	9912	10720	-2.26
PIC10A	Alpha XTalk	21-Aug 05:09	5	0.337	0.257	0.353	+1.96
PIC10A	Beta bkg	21-Aug 05:27	60	0.617	4.53E-4	1.191	+0.11
PIC10A	Beta eff	21-Aug 07:00	5	52727	52180	54540	-1.61
PIC10A	Beta XTalk	21-Aug 07:00	5	8.78E-5	5.75E-5	3.23E-4	-2.31
PIC10B	Alpha bkg	21-Aug 05:27	60	0.100	-4.93E-2	0.308	-0.49
PIC10B	Alpha eff	21-Aug 05:09	5	9246	9076	9507	-0.64
PIC10B	Alpha XTalk	21-Aug 05:09	5	0.276	0.253	0.285	+1.29
PIC10B	Beta bkg	21-Aug 05:27	60	1.417	-6.98E-1	2.876	+0.55
PIC10B	Beta eff	21-Aug 05:16	5	21127	20490	22130	-0.67
PIC10B	Beta XTalk	21-Aug 05:16	5	5.03E-4	2.11E-4	9.75E-4	-0.71
PIC10C	Alpha bkg	21-Aug 05:28	60	0.083	-6.14E-2	0.277	-0.43

PIC10C	Alpha eff	21-Aug 05:09	5	19779	19530	20870	-1.89
PIC10C	Alpha XTalk	21-Aug 05:09	5	0.321	0.271	0.326	+2.42
PIC10C	Beta bkg	21-Aug 05:28	60	0.683	-1.32E-1	1.289	+0.44
PIC10C	Beta eff	21-Aug 05:16	5	25236	25130	26180	-2.40
PIC10C	Beta XTalk	21-Aug 05:16	5	2.70E-4	1.14E-4	5.60E-4	-0.91
PIC10D	Alpha bkg	21-Aug 05:28	60	0.167	-9.81E-3	0.389	-0.34
PIC10D	Alpha eff	21-Aug 05:09	5	15457	14970	16930	-1.51
PIC10D	Alpha XTalk	21-Aug 05:09	5	0.309	0.267	0.339	+0.49
PIC10D	Beta bkg	21-Aug 05:28	60	0.567	-3.76E-1	2.164	-0.77
PIC10D	Beta eff	21-Aug 05:17	5	41748	40970	42500	+0.05
PIC10D	Beta XTalk	21-Aug 05:17	5	2.22E-4	5.50E-5	5.63E-4	-1.03
PIC11A	Alpha bkg	21-Aug 05:43	60	0.117	-5.28E-2	0.231	+0.59
PIC11A	Alpha eff	21-Aug 05:25	5	10228	10090	10810	-1.85
PIC11A	Alpha XTalk	21-Aug 05:25	5	0.337	0.280	0.359	+1.37
PIC11A	Beta bkg	21-Aug 05:43	60	0.933	0.522	1.773	-1.03
PIC11A	Beta eff	21-Aug 05:08	5	19555	19270	20640	-1.75
PIC11A	Beta XTalk	21-Aug 05:08	5	5.29E-4	2.30E-4	6.98E-4	+0.84
PIC11B	Alpha bkg	21-Aug 05:43	60	0.200	-2.01E-2	0.388	+0.23
PIC11B	Alpha eff	21-Aug 05:25	5	12958	12090	14430	-0.77
PIC11B	Alpha XTalk	21-Aug 05:25	5	0.274	0.238	0.295	+0.80
PIC11B	Beta bkg	21-Aug 05:43	60	1.233	-8.50E-2	1.719	+1.38
PIC11B	Beta eff	21-Aug 05:08	5	21703	19550	24160	-0.20
PIC11B	Beta XTalk	21-Aug 05:08	5	3.64E-4	1.32E-4	5.22E-4	+0.57
PIC11C	Alpha bkg	21-Aug 05:43	60	0.100	-5.75E-2	0.306	-0.40
PIC11C	Alpha eff	21-Aug 07:55	5	9194	9157	9745	-2.62
PIC11C	Alpha XTalk	21-Aug 07:55	5	0.297	0.271	0.301	+2.16
PIC11C	Beta bkg	21-Aug 05:43	60	0.583	-5.67E-2	1.194	+0.07
PIC11C	Beta eff	21-Aug 05:08	5	21312	20960	21740	-0.29
PIC11C	Beta XTalk	21-Aug 05:08	5	2.56E-4	9.37E-5	4.37E-4	-0.17
PIC11D	Alpha bkg	21-Aug 05:43	60	0.167	0.016	0.350	-0.29
PIC11D	Alpha eff	21-Aug 05:25	5	10656	10560	11390	-2.31
PIC11D	Alpha XTalk	21-Aug 05:25	5	0.304	0.243	0.305	+2.97
PIC11D	Beta bkg	21-Aug 05:43	60	1.083	0.436	2.296	-0.91
PIC11D	Beta eff	21-Aug 05:08	5	24283	23830	27150	-2.18
PIC11D	Beta XTalk	21-Aug 05:08	5	2.24E-4	8.26E-5	3.85E-4	-0.19
PIC12A	Alpha bkg	21-Aug 05:43	60	0.100	-2.85E-2	0.394	-1.17
PIC12A	Alpha eff	21-Aug 05:25	5	9581	9536	10660	-2.76
PIC12A	Alpha XTalk	21-Aug 05:25	5	0.317	0.265	0.355	+0.48
PIC12A	Beta bkg	21-Aug 05:43	60	0.600	-7.27E-3	2.082	-1.26
PIC12A	Beta eff	21-Aug 05:08	5	37822	36650	40990	-1.38
PIC12A	Beta XTalk	21-Aug 05:08	5	1.06E-4	6.06E-5	2.14E-4	-1.23
PIC12B	Alpha bkg	21-Aug 05:44	60	0.133	-5.03E-2	0.300	+0.15
PIC12B	Alpha eff	21-Aug 05:25	5	8661	8551	8934	-1.28
PIC12B	Alpha XTalk	21-Aug 05:25	5	0.296	0.278	0.304	+1.10
PIC12B	Beta bkg	21-Aug 05:44	60	1.100	0.100	1.734	+0.67

PIC12B		Beta eff	21-Aug 05:08	5	21214	20940	21550	-0.31
PIC12B		Beta XTalk	21-Aug 05:08	5	3.08E-4	1.66E-4	6.28E-4	-1.15
PIC12C		Alpha bkg	21-Aug 05:44	60	0.167	0.009	0.357	-0.27
PIC12C		Alpha eff	21-Aug 05:25	5	20403	20010	22040	-1.84
PIC12C		Alpha XTalk	21-Aug 05:25	5	0.280	0.255	0.290	+1.21
PIC12C	Above	Beta bkg	21-Aug 05:44	60	1.667	0.175	1.408	+4.26
PIC12C		Beta eff	21-Aug 05:08	5	25752	24320	26650	+0.69
PIC12C		Beta XTalk	21-Aug 05:08	5	3.28E-4	7.36E-5	6.09E-4	-0.15
PIC12D		Alpha bkg	21-Aug 05:44	60	0.117	-5.51E-2	0.306	-0.15
PIC12D		Alpha eff	21-Aug 05:25	5	16693	14580	17560	+1.25
PIC12D		Alpha XTalk	21-Aug 05:25	5	0.297	0.232	0.450	-1.22
PIC12D		Beta bkg	21-Aug 05:44	60	1.667	0.482	2.608	+0.34
PIC12D		Beta eff	21-Aug 05:08	5	41862	36440	43510	+1.60
PIC12D		Beta XTalk	21-Aug 05:08	5	2.21E-4	8.59E-5	3.39E-4	+0.21
PIC13A		Alpha bkg	21-Aug 05:44	60	0.167	-4.80E-2	0.311	+0.59
PIC13A		Alpha eff	21-Aug 05:14	5	10814	10610	11110	-0.56
PIC13A		Alpha XTalk	21-Aug 05:14	5	0.272	0.259	0.279	+0.81
PIC13A		Beta bkg	21-Aug 05:44	60	1.117	0.689	1.949	-0.96
PIC13A		Beta eff	21-Aug 05:25	5	21258	20940	21540	+0.18
PIC13A		Beta XTalk	21-Aug 05:25	5	6.53E-4	3.50E-4	0.001	-0.44
PIC13B		Alpha bkg	21-Aug 05:44	60	0.083	-1.04E-1	0.346	-0.51
PIC13B		Alpha eff	21-Aug 05:14	5	12885	12490	13510	-0.68
PIC13B		Alpha XTalk	21-Aug 05:14	5	0.280	0.261	0.286	+1.59
PIC13B		Beta bkg	21-Aug 05:44	60	0.800	-2.10E-1	1.369	+0.84
PIC13B		Beta eff	21-Aug 05:25	5	21632	21380	22380	-1.49
PIC13B		Beta XTalk	21-Aug 05:25	5	3.78E-4	1.69E-4	6.48E-4	-0.39
PIC13C		Alpha bkg				-1.03E-1	0.365	-1.68
PIC13C		Alpha eff				10670	10960	-223.76
PIC13C		Alpha XTalk				0.271	0.286	-109.82
PIC13C		Beta bkg				-3.09E-1	1.393	-1.91
PIC13C		Beta eff				22280	22830	-246.05
PIC13C		Beta XTalk				1.09E-4	3.59E-4	-5.62
PIC13D		Alpha bkg	21-Aug 05:44	60	0.083	-4.18E-2	0.346	-1.06
PIC13D		Alpha eff	21-Aug 05:14	5	10297	10280	11260	-2.89
PIC13D		Alpha XTalk	21-Aug 05:14	5	0.295	0.252	0.299	+2.51
PIC13D		Beta bkg	21-Aug 05:44	60	1.683	-2.59E-1	1.892	+2.42
PIC13D		Beta eff	21-Aug 05:25	5	24613	24410	26670	-2.46
PIC13D		Beta XTalk	21-Aug 05:25	5	2.54E-4	9.76E-5	5.02E-4	-0.67
PIC14A		Alpha bkg	21-Aug 05:44	60	0.083	-4.32E-3	0.227	-0.72
PIC14A		Alpha eff	21-Aug 05:14	5	9673	9464	10150	-1.17
PIC14A		Alpha XTalk	21-Aug 05:14	5	0.453	0.384	0.473	+1.68
PIC14A		Beta bkg	21-Aug 05:44	60	1.917	-7.82E-2	2.536	+1.58
PIC14A		Beta eff	21-Aug 05:26	5	51522	49980	55690	-1.38
PIC14A		Beta XTalk	21-Aug 05:26	5	7.93E-5	3.31E-5	1.93E-4	-1.26

PIC14B	Alpha bkg	21-Aug 05:44	60	0.033	-9.73E-2	0.263	-0.82
PIC14B	Alpha eff	21-Aug 05:14	5	8604	8386	9525	-1.85
PIC14B	Alpha XTalk	21-Aug 05:14	5	0.300	0.260	0.308	+2.07
PIC14B	Beta bkg	21-Aug 05:44	60	1.000	-2.72E-1	1.433	+1.48
PIC14B	Beta eff	21-Aug 05:25	5	21610	21130	21880	+0.84
PIC14B	Beta XTalk	21-Aug 05:25	5	5.17E-4	3.16E-4	0.001	-1.53
PIC14C	Alpha bkg	21-Aug 05:44	60	0.117	0.016	0.343	-1.15
PIC14C	Alpha eff	21-Aug 05:14	5	20774	20400	21620	-1.16
PIC14C	Alpha XTalk	21-Aug 05:14	5	0.302	0.270	0.314	+1.36
PIC14C	Beta bkg	21-Aug 05:44	60	1.683	0.566	2.220	+1.05
PIC14C	Beta eff	21-Aug 05:26	5	26136	25600	27170	-0.95
PIC14C	Beta XTalk	21-Aug 05:26	5	2.81E-4	1.33E-4	5.68E-4	-0.96
PIC14D	Alpha bkg	21-Aug 05:44	60	0.050	-5.06E-2	0.184	-0.43
PIC14D	Alpha eff	21-Aug 05:14	5	14405	13930	15520	-1.21
PIC14D	Alpha XTalk	21-Aug 05:14	5	0.403	0.345	0.411	+2.23
PIC14D	Beta bkg	21-Aug 05:44	60	0.500	0.145	0.770	+0.41
PIC14D	Beta eff	21-Aug 05:26	5	41508	41010	42340	-0.76
PIC14D	Beta XTalk	21-Aug 05:26	5	2.10E-4	8.35E-5	3.21E-4	+0.20

Reviewed by R. Beck-Harman

Date 8-21-19

GEL Laboratories LLC

Gas Flow Proportional Counter Checks for 21-Aug-2019

Detectors LB4100 A1 through J4 and PIC 1A through 14D and G5400W 1W through 1Z

Short Name	Status	Parmname	Run Time	Count Time	CPM or dec	Low Limit	High Limit	Stdev
LB4100C4	Above	Alpha XTalk	21-Aug 05:12	5	2.296	0.311	0.445	+85.62
LB4100C4	Above	Beta bkg	21-Aug 03:47	60	4885	-2.26E+0	8.835	+2,640.67
LB4100C4	Above	Beta eff	21-Aug 05:20	5	27894	16060	22510	+8.01
LB4100E2	Above	Beta bkg	21-Aug 03:46	60	3.283	1.005	2.203	+8.41
LB4100E3	Above	Beta bkg	21-Aug 03:46	60	4.000	1.790	2.114	+37.93
LB4100G2	Above	Alpha XTalk	21-Aug 05:06	5	0.679	0.272	0.365	+23.34
LB4100G2	Above	Beta bkg	21-Aug 03:46	60	918	-5.43E+1	80.770	+40.20
LB4100G2	need 2nd	Beta eff	21-Aug 04:57	5	16705	15800	17170	+0.96
LB4100G3	Above	Beta bkg	21-Aug 03:46	60	2.800	0.810	1.674	+10.82
LB4100H2	Above	Beta bkg	21-Aug 03:46	60	14.467	0.225	2.317	+37.84
LB4100I2	Above	Beta bkg	21-Aug 03:46	60	4.667	0.180	2.594	+8.15
LB4100I3	Above	Beta bkg	21-Aug 03:46	60	2.850	-4.28E-1	3.673	+1.80
LB4100J1	Below	Alpha bkg	21-Aug 06:56	60	0.017	0.018	0.372	-3.02
LB4100J1	Above	Beta bkg	21-Aug 06:56	60	2.367	0.056	2.016	+4.07
PIC1A	Above	Alpha XTalk	21-Aug 06:27	5	0.313	0.264	0.303	+4.54
PIC7C	Below	Alpha eff	21-Aug 07:28	5	9031	9044	9654	-3.13
PIC12C	Above	Beta bkg	21-Aug 05:44	60	1.667	0.175	1.408	+4.26

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

LB4100B1	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100B2	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100B3	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100B4	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D1	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D2	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D3	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
LB4100D4	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC3A	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC6D	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk
PIC13C	Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

Reviewed by R. David Harmon

Date 8-21-19

GEL Laboratories LLC

Background Counts Data

Gas Flow Proportional Counter Backgrounds as of 19-Aug-2019

Short Name	Status	Parmname	Run Time	Count Time	CPM	Low Limit	High Limit	Stdev
G5400W1W		Alpha bkg	16-Aug 09:46	500	0.042	-1.08E-1	0.244	-0.44
G5400W1W		Beta bkg	16-Aug 09:46	500	1.098	0.468	1.988	-0.51
G5400W1X		Alpha bkg	16-Aug 09:46	500	0.052	-7.73E-2	0.185	-0.04
G5400W1X		Beta bkg	16-Aug 09:46	500	1.028	0.627	1.812	-0.97
G5400W1Y		Alpha bkg	16-Aug 09:46	500	0.078	-1.58E-1	0.421	-0.55
G5400W1Y		Beta bkg	16-Aug 09:46	500	1.194	0.588	1.905	-0.24
G5400W1Z		Alpha bkg	16-Aug 09:46	500	0.126	-1.21E-1	0.229	+1.24
G5400W1Z		Beta bkg	16-Aug 09:46	500	1.258	0.499	1.662	+0.92
LB4100A1		Alpha bkg	16-Aug 20:09	500	0.054	-7.07E-2	0.226	-0.48
LB4100A1		Beta bkg	16-Aug 20:09	500	1.254	0.695	1.730	+0.24
LB4100A2		Alpha bkg	16-Aug 20:09	500	0.094	-2.67E-1	0.448	+0.03
LB4100A2		Beta bkg	16-Aug 20:09	500	1.178	-8.28E-1	3.179	+0.00
LB4100A3		Alpha bkg	16-Aug 20:09	500	0.058	-4.17E-2	0.225	-0.76
LB4100A3		Beta bkg	16-Aug 20:09	500	1.246	0.051	2.562	-0.14
LB4100B1		Alpha bkg				-5.04E-2	0.323	-2.19
LB4100B1		Beta bkg				0.690	1.634	-7.39
LB4100B2		Alpha bkg				-1.89E-1	0.467	-1.27
LB4100B2		Beta bkg				0.418	1.814	-4.80
LB4100B3		Alpha bkg				-6.61E-2	0.276	-1.84
LB4100B3		Beta bkg				-2.44E+2	261	-0.10
LB4100B4		Alpha bkg				-5.19E-2	0.218	-1.85
LB4100B4		Beta bkg				0.529	1.722	-5.66
LB4100C1		Alpha bkg	16-Aug 18:05	500	0.068	-7.52E-3	0.336	-1.68
LB4100C1		Beta bkg	16-Aug 18:05	500	1.954	0.070	3.594	+0.21
LB4100C2		Alpha bkg	16-Aug 18:05	500	0.034	-8.52E-2	0.312	-1.20
LB4100C2		Beta bkg	16-Aug 18:05	500	0.876	0.511	1.777	-1.27
LB4100C3		Alpha bkg	16-Aug 18:05	500	0.080	-6.31E-2	0.282	-0.51
LB4100C3		Beta bkg	16-Aug 18:05	500	1.130	0.776	2.251	-1.56
LB4100C4		Alpha bkg	16-Aug 18:05	500	0.082	-1.09E-1	0.257	+0.13
LB4100C4	Above	Beta bkg	16-Aug 18:05	500	11.176	-2.26E+0	8.835	+4.27
LB4100D1		Alpha bkg				-6.92E-2	0.073	-0.08
LB4100D1		Beta bkg				-7.61E-1	1.773	-1.20

LB4100D2		Alpha bkg				0.100	0.528	-4.40
LB4100D2		Beta bkg				0.309	2.710	-3.77
LB4100D3		Alpha bkg				-1.55E-2	0.582	-2.84
LB4100D3		Beta bkg				-1.53E+0	4.943	-1.58
LB4100D4		Alpha bkg				-6.65E-2	0.307	-1.93
LB4100D4		Beta bkg				0.746	2.239	-6.00
LB4100E1		Alpha bkg	16-Aug 18:01	500	0.212	-5.45E-2	0.290	+1.65
LB4100E1		Beta bkg	16-Aug 18:01	500	1.566	0.697	2.033	+0.90
LB4100E2		Alpha bkg	16-Aug 18:01	500	0.134	-1.97E-2	0.222	+0.82
LB4100E2	Above	Beta bkg	16-Aug 18:01	500	3.206	1.005	2.203	+8.02
LB4100E3		Alpha bkg	16-Aug 18:01	500	0.036	-4.15E-2	0.198	-1.06
LB4100E3	Above	Beta bkg	16-Aug 18:01	500	2.938	1.790	2.114	+18.26
LB4100E4		Alpha bkg	16-Aug 18:01	500	0.084	-5.75E-2	0.174	+0.66
LB4100E4		Beta bkg	16-Aug 18:01	500	1.596	0.455	2.172	+0.99
LB4100F1		Alpha bkg	16-Aug 18:01	500	0.078	-5.23E-2	0.181	+0.35
LB4100F1		Beta bkg	16-Aug 18:01	500	1.452	0.602	1.924	+0.86
LB4100F2		Alpha bkg	16-Aug 18:01	500	0.164	0.039	0.317	-0.30
LB4100F2		Beta bkg	16-Aug 18:01	500	1.078	0.714	1.605	-0.55
LB4100F3		Alpha bkg	16-Aug 18:01	500	0.104	-4.66E-2	0.248	+0.06
LB4100F3		Beta bkg	16-Aug 18:01	500	1.276	0.636	1.613	+0.93
LB4100F4		Alpha bkg	16-Aug 18:02	500	0.066	-4.01E-2	0.180	-0.10
LB4100F4		Beta bkg	16-Aug 18:02	500	1.130	0.704	1.854	-0.78
LB4100G1		Alpha bkg	16-Aug 18:01	500	0.054	-4.19E-2	0.157	-0.10
LB4100G1		Beta bkg	16-Aug 18:01	500	0.948	0.375	1.637	-0.28
LB4100G2		Alpha bkg	16-Aug 18:01	500	0.060	-5.80E-2	0.275	-0.87
LB4100G2	Above	Beta bkg	16-Aug 18:01	500	1389	-5.43E+1	80.770	+61.11
LB4100G3		Alpha bkg	16-Aug 18:01	500	0.132	0.002	0.276	-0.16
LB4100G3	Above	Beta bkg	16-Aug 18:01	500	2.508	0.810	1.674	+8.79
LB4100G4		Alpha bkg	16-Aug 18:01	500	0.078	-1.09E-1	0.250	+0.13
LB4100G4		Beta bkg	16-Aug 18:01	500	0.906	0.468	1.527	-0.52
LB4100H1		Alpha bkg	16-Aug 18:01	500	0.042	-7.22E-2	0.211	-0.58
LB4100H1		Beta bkg	16-Aug 18:01	500	0.964	0.507	1.476	-0.17
LB4100H2		Alpha bkg	16-Aug 18:01	500	0.090	-4.85E-2	0.203	+0.30
LB4100H2	Above	Beta bkg	16-Aug 18:01	500	2.278	0.225	2.317	+2.89
LB4100H3		Alpha bkg	16-Aug 18:01	500	0.060	-4.20E-2	0.255	-0.94

LB4100H3		Beta bkg	16-Aug 18:01	500	1.176	-6.23E+1	90.230	-0.50
LB4100H4		Alpha bkg	16-Aug 18:01	500	0.096	-3.73E-2	0.238	-0.09
LB4100H4		Beta bkg	16-Aug 18:01	500	0.998	0.370	1.614	+0.03
LB4100I1		Alpha bkg	16-Aug 18:01	500	0.042	-8.66E-2	0.291	-0.96
LB4100I1		Beta bkg	16-Aug 18:01	500	1.006	0.438	1.615	-0.10
LB4100I2		Alpha bkg	16-Aug 18:01	500	0.102	-1.86E-1	0.386	+0.02
LB4100I2	Above	Beta bkg	16-Aug 18:01	500	28.922	0.180	2.594	+68.43
LB4100I3		Alpha bkg	16-Aug 18:01	500	0.078	-4.16E-2	0.204	-0.07
LB4100I3	Above	Beta bkg	16-Aug 18:01	500	2.506	-4.28E-1	3.673	+1.29
LB4100I4		Alpha bkg	16-Aug 18:01	500	0.164	0.031	0.326	-0.30
LB4100I4		Beta bkg	16-Aug 18:01	500	0.962	0.490	2.301	-1.44
LB4100J1		Alpha bkg	16-Aug 18:01	500	0.056	0.018	0.372	-2.35
LB4100J1		Beta bkg	16-Aug 18:01	500	1.710	0.056	2.016	+2.06
LB4100J2		Alpha bkg	16-Aug 18:01	500	0.090	-8.17E-2	0.539	-1.34
LB4100J2		Beta bkg	16-Aug 18:01	500	1.054	0.775	1.935	-1.55
LB4100J3		Alpha bkg	16-Aug 18:01	500	0.118	-5.72E-2	0.305	-0.09
LB4100J3		Beta bkg	16-Aug 18:01	500	0.910	0.431	1.507	-0.33
LB4100J4		Alpha bkg	16-Aug 18:01	500	0.154	0.014	0.314	-0.20
LB4100J4		Beta bkg	16-Aug 18:01	500	0.916	0.504	1.329	-0.00
PIC1A		Alpha bkg	16-Aug 18:04	500	0.246	0.052	0.386	+0.49
PIC1A		Beta bkg	16-Aug 18:04	500	0.616	-3.41E-2	1.327	-0.13
PIC1B		Alpha bkg	16-Aug 18:04	500	0.118	-2.93E-2	0.323	-0.49
PIC1B		Beta bkg	16-Aug 18:04	500	0.776	0.382	1.951	-1.49
PIC1C		Alpha bkg	16-Aug 18:04	500	0.080	-4.39E-2	0.359	-1.15
PIC1C		Beta bkg	16-Aug 18:04	500	0.552	-4.73E-1	1.906	-0.41
PIC1D		Alpha bkg	16-Aug 18:05	500	0.286	-1.82E-2	0.348	+1.98
PIC1D		Beta bkg	16-Aug 18:05	500	1.660	0.554	1.860	+2.08
PIC2A		Alpha bkg	16-Aug 18:04	500	0.104	-5.03E-2	0.376	-0.83
PIC2A		Beta bkg	16-Aug 18:04	500	0.428	-6.28E-1	1.918	-0.51
PIC2B		Alpha bkg	16-Aug 18:04	500	0.160	-7.50E-2	0.308	+0.68
PIC2B		Beta bkg	16-Aug 18:04	500	0.580	-1.82E-1	1.434	-0.17
PIC2C		Alpha bkg	16-Aug 18:04	500	0.156	0.076	0.278	-0.61
PIC2C		Beta bkg	16-Aug 18:04	500	0.872	0.327	1.518	-0.25
PIC2D		Alpha bkg	16-Aug 18:04	500	0.078	-3.02E-2	0.384	-1.43
PIC2D		Beta bkg	16-Aug 18:04	500	0.790	0.234	1.525	-0.42

PIC3A	Alpha bkg				-7.50E-2	0.354	-1.95
PIC3A	Beta bkg				-5.41E-1	2.245	-1.83
PIC3B	Alpha bkg	16-Aug 18:04	500	0.200	-1.95E-2	0.376	+0.33
PIC3B	Beta bkg	16-Aug 18:04	500	1.206	0.306	2.452	-0.48
PIC3C	Alpha bkg	16-Aug 18:04	500	0.288	-9.57E-4	0.359	+1.81
PIC3C	Beta bkg	16-Aug 18:04	500	1.194	0.008	1.299	+2.51
PIC3D	Alpha bkg	16-Aug 18:04	500	0.136	-4.97E-2	0.369	-0.34
PIC3D	Beta bkg	16-Aug 18:04	500	0.568	-8.46E-3	1.311	-0.38
PIC4A	Alpha bkg	16-Aug 18:05	500	0.144	-9.48E-2	0.384	-0.00
PIC4A	Beta bkg	16-Aug 18:05	500	1.278	-1.75E-1	2.154	+0.74
PIC4B	Alpha bkg	16-Aug 18:05	500	0.202	-5.36E-2	0.301	+1.32
PIC4B	Beta bkg	16-Aug 18:05	500	0.592	0.072	1.413	-0.67
PIC4C	Alpha bkg	16-Aug 18:05	500	0.204	-3.49E-2	0.385	+0.41
PIC4C	Beta bkg	16-Aug 18:05	500	0.426	0.053	1.027	-0.70
PIC4D	Alpha bkg	16-Aug 18:05	500	0.168	-1.06E-2	0.363	-0.13
PIC4D	Beta bkg	16-Aug 18:05	500	0.926	0.115	1.249	+1.29
PIC5A	Alpha bkg	16-Aug 18:05	500	0.154	0.055	0.368	-1.10
PIC5A	Beta bkg	16-Aug 18:05	500	0.520	-1.06E-1	1.405	-0.51
PIC5B	Alpha bkg	16-Aug 18:05	500	0.104	-1.14E-2	0.414	-1.37
PIC5B	Beta bkg	16-Aug 18:05	500	0.514	-2.27E-1	1.609	-0.58
PIC5C	Alpha bkg	16-Aug 18:05	500	0.148	-6.28E-2	0.409	-0.32
PIC5C	Beta bkg	16-Aug 18:05	500	0.520	-2.06E-1	1.558	-0.53
PIC5D	Alpha bkg	16-Aug 18:05	500	0.096	0.009	0.365	-1.53
PIC5D	Beta bkg	16-Aug 18:05	500	1.182	0.019	2.073	+0.40
PIC6A	Alpha bkg	16-Aug 18:03	500	0.204	-1.35E-2	0.358	+0.51
PIC6A	Beta bkg	16-Aug 18:03	500	1.502	0.884	2.267	-0.32
PIC6B	Alpha bkg	16-Aug 18:04	500	0.246	-1.33E-1	0.383	+1.41
PIC6B	Beta bkg	16-Aug 18:04	500	1.314	-6.80E-2	2.279	+0.53
PIC6C	Alpha bkg	16-Aug 18:03	500	0.120	0.008	0.328	-0.90
PIC6C	Beta bkg	16-Aug 18:03	500	1.308	0.914	2.103	-1.01
PIC6D	Alpha bkg				-8.26E-2	0.335	-1.81
PIC6D	Beta bkg				0.019	2.434	-3.05
PIC7A	Alpha bkg	16-Aug 18:03	500	0.086	-3.46E-2	0.391	-1.30
PIC7A	Beta bkg	16-Aug 18:03	500	0.666	-8.85E-2	1.924	-0.75

PIC7B	Alpha bkg	16-Aug 18:03	500	0.026	-2.50E-2	0.372	-2.23
PIC7B	Beta bkg	16-Aug 18:03	500	0.318	-6.64E-1	1.763	-0.57
PIC7C	Alpha bkg	16-Aug 18:03	500	0.100	-4.17E-2	0.294	-0.47
PIC7C	Beta bkg	16-Aug 18:03	500	0.522	-1.93E-1	1.388	-0.29
PIC7D	Alpha bkg	16-Aug 18:03	500	0.064	-3.52E-2	0.285	-1.14
PIC7D	Beta bkg	16-Aug 18:03	500	0.494	0.109	1.041	-0.52
PIC8A	Alpha bkg	16-Aug 18:03	500	0.088	-4.66E-2	0.309	-0.73
PIC8A	Beta bkg	16-Aug 18:03	500	0.788	-2.25E-2	1.320	+0.62
PIC8B	Alpha bkg	16-Aug 18:03	500	0.064	-1.18E-1	0.335	-0.59
PIC8B	Beta bkg	16-Aug 18:03	500	0.426	-2.49E-1	1.166	-0.14
PIC8C	Alpha bkg	16-Aug 18:03	500	0.156	-2.61E-2	0.365	-0.20
PIC8C	Beta bkg	16-Aug 18:03	500	0.474	-1.90E-1	1.144	-0.01
PIC8D	Alpha bkg	16-Aug 18:04	500	0.132	-5.65E-2	0.438	-0.71
PIC8D	Beta bkg	16-Aug 18:04	500	0.506	0.236	2.611	-2.32
PIC9A	Alpha bkg	16-Aug 18:04	500	0.122	-2.15E-2	0.339	-0.61
PIC9A	Beta bkg	16-Aug 18:04	500	1.344	0.178	1.390	+2.77
PIC9B	Alpha bkg	16-Aug 18:04	500	0.046	-5.14E-2	0.189	-0.57
PIC9B	Beta bkg	16-Aug 18:04	500	0.730	0.216	1.395	-0.38
PIC9C	Alpha bkg	16-Aug 18:04	500	0.152	0.010	0.330	-0.34
PIC9C	Beta bkg	16-Aug 18:04	500	0.706	0.148	1.310	-0.12
PIC9D	Alpha bkg	16-Aug 18:04	500	0.124	0.017	0.351	-1.08
PIC9D	Beta bkg	16-Aug 18:04	500	0.492	0.118	1.182	-0.89
PIC10A	Alpha bkg	16-Aug 18:04	500	0.064	-1.88E-2	0.299	-1.43
PIC10A	Beta bkg	16-Aug 18:04	500	0.578	4.53E-4	1.191	-0.09
PIC10B	Alpha bkg	16-Aug 18:04	500	0.040	-4.93E-2	0.308	-1.50
PIC10B	Beta bkg	16-Aug 18:04	500	1.226	-6.98E-1	2.876	+0.23
PIC10C	Alpha bkg	16-Aug 18:04	500	0.052	-6.52E-2	0.282	-0.98
PIC10C	Beta bkg	16-Aug 18:04	500	0.744	-7.77E-3	0.924	+1.84
PIC10D	Alpha bkg	16-Aug 18:04	500	0.190	-9.81E-3	0.389	+0.01
PIC10D	Beta bkg	16-Aug 18:04	500	0.616	-3.76E-1	2.164	-0.66
PIC11A	Alpha bkg	16-Aug 18:01	500	0.088	-5.28E-2	0.231	-0.02
PIC11A	Beta bkg	16-Aug 18:01	500	1.158	0.522	1.773	+0.05
PIC11B	Alpha bkg	16-Aug 18:01	500	0.148	-2.01E-2	0.388	-0.53
PIC11B	Beta bkg	16-Aug 18:01	500	1.106	-8.50E-2	1.719	+0.96
PIC11C	Alpha bkg	16-Aug 18:01	500	0.042	-5.75E-2	0.306	-1.36

PIC11C		Beta bkg	16-Aug 18:01	500	0.594	-5.67E-2	1.194	+0.12
PIC11D		Alpha bkg	16-Aug 18:01	500	0.180	0.016	0.350	-0.05
PIC11D		Beta bkg	16-Aug 18:01	500	1.190	0.436	2.296	-0.57
PIC12A		Alpha bkg	16-Aug 18:01	500	0.092	-2.85E-2	0.394	-1.29
PIC12A		Beta bkg	16-Aug 18:01	500	0.672	-7.27E-3	2.082	-1.05
PIC12B		Alpha bkg	16-Aug 18:01	500	0.092	-5.03E-2	0.300	-0.56
PIC12B		Beta bkg	16-Aug 18:01	500	0.962	0.100	1.734	+0.16
PIC12C		Alpha bkg	16-Aug 18:01	500	0.102	0.009	0.357	-1.39
PIC12C	Above	Beta bkg	16-Aug 18:01	500	1.454	0.175	1.408	+3.22
PIC12D		Alpha bkg	16-Aug 18:01	500	0.068	-5.51E-2	0.306	-0.96
PIC12D		Beta bkg	16-Aug 18:01	500	1.712	0.482	2.608	+0.47
PIC13A		Alpha bkg	16-Aug 18:01	1000	0.061	-4.80E-2	0.311	-1.18
PIC13A		Beta bkg	16-Aug 18:01	1000	1.031	0.689	1.949	-1.37
PIC13B		Alpha bkg	16-Aug 18:01	1000	0.048	-1.04E-1	0.346	-0.98
PIC13B		Beta bkg	16-Aug 18:01	1000	0.889	-2.10E-1	1.369	+1.18
PIC13C		Alpha bkg				-1.03E-1	0.365	-1.68
PIC13C		Beta bkg				-3.09E-1	1.393	-1.91
PIC13D		Alpha bkg	16-Aug 18:01	1000	0.066	-4.18E-2	0.346	-1.33
PIC13D		Beta bkg	16-Aug 18:01	1000	1.683	-2.59E-1	1.892	+2.42
PIC14A		Alpha bkg	17-Aug 14:46	1000	0.093	-3.05E-2	0.301	-0.76
PIC14A		Beta bkg	17-Aug 14:46	1000	1.586	-2.05E-2	1.626	+2.85
PIC14B		Alpha bkg	17-Aug 14:46	1000	0.056	-9.73E-2	0.263	-0.44
PIC14B		Beta bkg	17-Aug 14:46	1000	0.931	-2.72E-1	1.433	+1.23
PIC14C		Alpha bkg	17-Aug 14:46	1000	0.135	0.016	0.343	-0.81
PIC14C		Beta bkg	17-Aug 14:46	1000	1.649	0.566	2.220	+0.93
PIC14D		Alpha bkg	16-Aug 18:01	1000	0.021	-4.24E-2	0.190	-1.36
PIC14D		Beta bkg	16-Aug 18:01	1000	0.450	0.151	0.800	-0.24

Reviewed by KDat

Date 8/19/19

GEL Laboratories LLC

Method Calibration Data

Gas Flow Proportional Counter Calibration Package

Method: Total Radium

Instrument (circle one): LB4100 / Protean / G5400W

	Part 1: Efficiency determination	Included/ Acceptable	Comments
1	Efficiency spreadsheet (eff pts, graphs, trendline equation)	✓	
2	Applicable portion of GFPC_Machines.XLS	✓	
3	Raw Data for Calibration standards	✓	
4	Verification Spreadsheet and Raw Data (recoveries 75%-125%)	✓	
5	Plateau graph and raw data	✓	
6	Standardization of Carrier (if applicable)	✓	

	Part 2. Documentation for Calibration Source		
1	Vendor Certificate	✓	
2	Standard Traceability Log (from LIMS)	✓	
3	Current Verification of Source	✓	
4	Source preparation sheet	✓	

	Part 3. Documentation for Verification Source		
1	Vendor Certificate	✓	
2	Standard Traceability Log (from LIMS)	✓	
3	Current Verification of Source	✓	
4	Source preparation sheet	✓	

	Part 4. Enter into LIMS		
1	Alpha LIMS instrument calibration updated	✓	

Primary Review of Package Nathaniel Ivey III

Secondary Review of Package Angela A Gil

Effective Date: 5/1/2018

*Verified 5/21/19

Expiration Date: 5/31/2020

GEL Laboratories
2040 Savage Road, Charleston, SC 29407
(843)556-8171

Rev 7 SSC 8/3/09

Total Radium Calibration - LB4100 - May 2018

Standard Data	Isotope	Ra-226
	Standard ID number	1541-A
	Half Life (days)	584400
	Std. Act. (dpm/mL)	19243.8853
	Reference Date	4/25/2011
	Volume of spike (mL)	0.5
	Std. Nominal (dpm)	9592.73
	Decay Date	5/2/2018

Precipitation Date/Time 4/11/2018 14:40
Rn-222 Half Life (days) 3.8235
The following detectors were not calibrated:
A4, D1, D2, D3, D4

Carrier Data		Std ID Std weight	2628181 26.48	mg/mL
Source	Measured weight (mg)	Vol. Carrier Added (mL)	Theoretical weight (mg)	***Recovery
1	6.8	0.4	10.59	64.2%
2	12.7	0.6	15.89	79.9%
3	16.2	0.8	21.18	76.5%
4	24.1	1	26.48	91.0%
5	37.9	1.5	39.72	95.4%
6	52.2	2	52.96	98.6%
7	79.1	3	79.44	99.6%
8	92.7	3.5	92.68	100.0%

***Recovery values exceeding 100% will be evaluated at 100%.

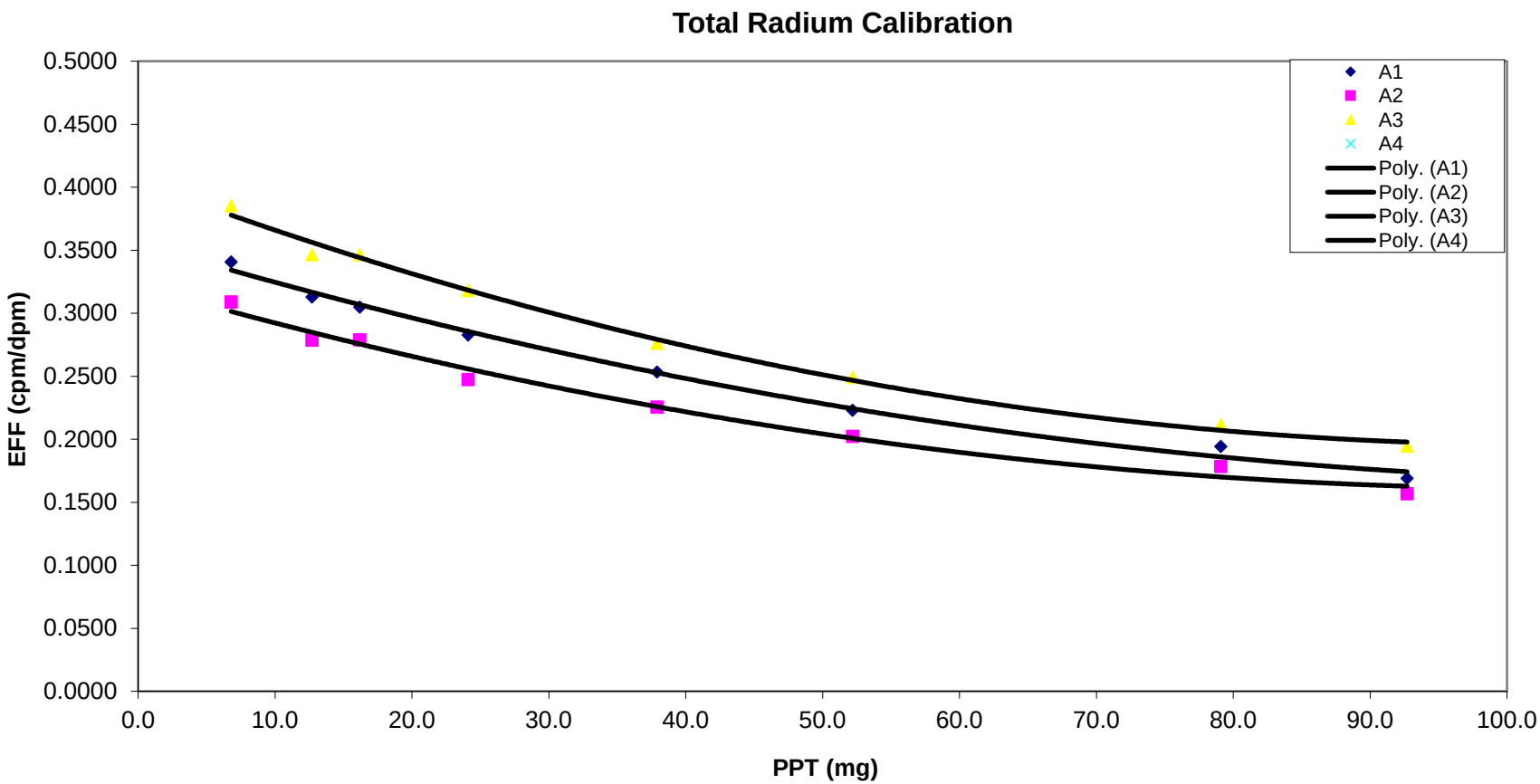
*Background is considered neglible.
**Decay corrected to mid-point of cou

Raw Count Data											
Detector (#)	Source ID (#)	Start Time	Count Time (min)	Alpha (counts)	Raw Alpha (cpm)	Recovery (%)	Rn-222 Ingrowth	Corrected Ra-226 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-226 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
A1	1	5/2/2018 12:26	3	24753	8251	64.2%	3.93224	3268.41	9592.72	**0.3407**	0.3342
A1	2	5/2/2018 12:40	3	28306	9435.33333	79.9%	3.93236	3001.72	9592.72	**0.3129**	0.3167
A1	3	5/2/2018 12:36	3	26378	8792.66667	76.5%	3.93232	2923.91	9592.72	**0.3048**	0.3068
A1	4	5/2/2018 12:31	3	29116	9705.33333	91.0%	3.93228	2711.86	9592.72	**0.2827**	0.2856
A1	5	5/2/2018 12:44	3	27350	9116.66667	95.4%	3.93239	2429.68	9592.72	**0.2533**	0.2527
A1	6	5/2/2018 12:56	3	24868	8289.33333	98.6%	3.93250	2138.60	9592.72	**0.2229**	0.2243
A1	7	5/2/2018 12:52	3	21884	7294.66667	99.6%	3.93246	1862.96	9592.72	**0.1942**	0.1860
A1	8	5/2/2018 12:48	3	19109	6369.66667	100.0%	3.93243	1619.78	9592.72	**0.1689**	0.1742
A2	1	5/2/2018 12:31	3	22450	7483.33333	64.2%	3.93228	2964.28	9592.72	**0.3090**	0.3014
A2	2	5/2/2018 12:26	3	25213	8404.33333	79.9%	3.93224	2673.80	9592.72	**0.2787**	0.2849
A2	3	5/2/2018 12:40	3	24127	8042.33333	76.5%	3.93236	2674.37	9592.72	**0.2788**	0.2755
A2	4	5/2/2018 12:36	3	25487	8495.66667	91.0%	3.93232	2373.83	9592.72	**0.2475**	0.2558
A2	5	5/2/2018 12:48	3	24355	8118.33333	95.4%	3.93243	2163.59	9592.72	**0.2255**	0.2258
A2	6	5/2/2018 12:44	3	22565	7521.66667	98.6%	3.93239	1940.59	9592.72	**0.2023**	0.2008
A2	7	5/2/2018 12:56	3	20098	6699.33333	99.6%	3.93250	1710.90	9592.72	**0.1784**	0.1701
A2	8	5/2/2018 12:52	3	17743	5914.33333	100.0%	3.93246	1503.98	9592.72	**0.1568**	0.1627
A3	1	5/2/2018 12:36	3	27990	9330	64.2%	3.93232	3695.74	9592.72	**0.3853**	0.3779
A3	2	5/2/2018 12:31	3	31342	10447.3333	79.9%	3.93228	3323.73	9592.72	**0.3465**	0.3562
A3	3	5/2/2018 12:26	3	29990	9996.66667	76.5%	3.93224	3324.36	9592.72	**0.3466**	0.3441
A3	4	5/2/2018 12:40	3	32748	10916	91.0%	3.93236	3050.08	9592.72	**0.3180**	0.3183
A3	5	5/2/2018 12:52	3	29813	9937.66667	95.4%	3.93246	2648.44	9592.72	**0.2761**	0.2793
A3	6	5/2/2018 12:48	3	27774	9258	98.6%	3.93243	2388.55	9592.72	**0.2490**	0.2467
A3	7	5/2/2018 12:44	3	23833	7944.33333	99.6%	3.93239	2028.91	9592.72	**0.2115**	0.2070
A3	8	5/2/2018 12:56	3	22000	7333.33333	100.0%	3.93250	1864.80	9592.72	**0.1944**	0.1978
B1	1	5/2/2018 12:44	3	30038	10012.6667	64.2%	3.93239	3966.08	9592.72	**0.4134**	0.4062
B1	2	5/2/2018 12:56	3	34172	11390.6667	79.9%	3.93250	3623.65	9592.72	**0.3777**	0.3855
B1	3	5/2/2018 12:52	3	32744	10914.6667	76.5%	3.93246	3629.43	9592.72	**0.3784**	0.3738
B1	4	5/2/2018 12:48	3	35367	11789	91.0%	3.93243	3293.95	9592.72	**0.3434**	0.3487
B1	5	5/2/2018 12:26	3	33021	11007	95.4%	3.93224	2933.59	9592.72	**0.3058**	0.3099
B1	6	5/2/2018 12:40	3	31131	10377	98.6%	3.93236	2677.29	9592.72	**0.2791**	0.2761
B1	7	5/2/2018 12:36	3	26915	8971.66667	99.6%	3.93232	2291.33	9592.72	**0.2389**	0.2306
B1	8	5/2/2018 12:31	3	23842	7947.33333	100.0%	3.93228	2021.05	9592.72	**0.2107**	0.2166
B2	1	5/2/2018 12:48	3	26882	8960.66667	64.2%	3.93243	3549.35	9592.72	**0.3700**	0.3625
B2	2	5/2/2018 12:44	3	29890	9963.33333	79.9%	3.93239	3169.66	9592.72	**0.3304**	0.3426
B2	3	5/2/2018 12:56	3	29343	9781	76.5%	3.93250	3252.43	9592.72	**0.3391**	0.3313
B2	4	5/2/2018 12:52	3	31319	10439.6667	91.0%	3.93246	2916.91	9592.72	**0.3041**	0.3074
B2	5	5/2/2018 12:31	3	28852	9617.33333	95.4%	3.93228	2563.19	9592.72	**0.2672**	0.2707
B2	6	5/2/2018 12:26	3	26848	8949.33333	98.6%	3.93224	2309.02	9592.72	**0.2407**	0.2394
B2	7	5/2/2018 12:40	3	23339	7779.66667	99.6%	3.93236	1986.88	9592.72	**0.2071**	0.1994
B2	8	5/2/2018 12:36	3	20721	6907	100.0%	3.93232	1756.47	9592.72	**0.1831**	0.1884
B3	1	5/2/2018 12:52	3	18197	6065.66667	64.2%	3.93246	2402.61	9592.72	**0.2505**	0.2373
B3	2	5/2/2018 12:48	3	19966	6655.33333	79.9%	3.93243	2117.26	9592.72	**0.2207**	0.2196
B3	3	5/2/2018 12:44	3	19155	6385	76.5%	3.93239	2123.23	9592.72	**0.2213**	0.2098
B3	4	5/2/2018 12:56	3	14584	4861.33333	91.0%	3.93250	1358.28	9592.72	**0.1416**	0.1896
B3	5	5/2/2018 12:36	3	18503	6167.66667	95.4%	3.93232	1643.77	9592.72	**0.1714**	0.1607
B3	6	5/2/2018 12:31	3	17035	5678.33333	98.6%	3.93228	1465.05	9592.72	**0.1527**	0.1394
B3	7	5/2/2018 12:26	3	14517	4839	99.6%	3.93224	1235.89	9592.72	**0.1288**	0.1231
B3	8	5/2/2018 12:40	3	13492	4497.33333	100.0%	3.93236	1143.67	9592.72	**0.1192**	0.1266
B4	1	5/2/2018 12:56	3	21955	7318.33333	64.2%	3.93250	2898.76	9592.72	**0.3022**	0.2965
B4	2	5/2/2018 12:52	3	24735	8245	79.9%	3.93246	2622.96	9592.72	**0.2734**	0.2783
B4	3	5/2/2018 12:48	3	23380	7793.33333	76.5%	3.93243	2591.52	9592.72	**0.2702**	0.2681
B4	4	5/2/2018 12:44	3	24960	8320	91.0%	3.93239	2324.70	9592.72	**0.2423**	0.2466
B4	5	5/2/2018 12:40	3	22882	7627.33333	95.4%	3.93236	2032.78	9592.72	**0.2119**	0.2143
B4	6	5/2/2018 12:36	3	21183	7061	98.6%	3.93232	1821.77	9592.72	**0.1899**	0.1881
B4	7	5/2/2018 12:31	3	18583	6194.33333	99.6%	3.93228	1582.02	9592.72	**0.1649**	0.1583
B4	8	5/2/2018 12:26	3	16783	5594.33333	100.0%	3.93224	1422.68	9592.72	**0.1483**	0.1530

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Alpha (counts)	Raw Alpha (cpm)	Recovery (%)	Rn-222 Ingrowth	Corrected Ra-226 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-226 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
C1	1	5/2/2018 13:02	3	31586	10528.6667	64.2%	3.93255	4170.31	9592.72	**0.4347**	0.4239
C1	2	5/2/2018 13:14	3	35181	11727	79.9%	3.93265	3730.50	9592.72	**0.3889**	0.4010
C1	3	5/2/2018 13:10	3	34171	11390.3333	76.5%	3.93262	3787.46	9592.72	**0.3948**	0.3880
C1	4	5/2/2018 13:06	3	36117	12039	91.0%	3.93258	3363.67	9592.72	**0.3506**	0.3605
C1	5	5/2/2018 13:18	3	34331	11443.6667	95.4%	3.93268	3049.62	9592.72	**0.3179**	0.3183
C1	6	5/2/2018 13:30	3	31789	10596.3333	98.6%	3.93278	2733.59	9592.72	**0.2850**	0.2825
C1	7	5/2/2018 13:26	3	27700	9233.33333	99.6%	3.93275	2357.90	9592.72	**0.2458**	0.2369
C1	8	5/2/2018 13:22	3	24682	8227.33333	100.0%	3.93272	2092.02	9592.72	**0.2181**	0.2246
C2	1	5/2/2018 13:06	3	26524	8841.33333	64.2%	3.93258	3501.94	9592.72	**0.3651**	0.3565
C2	2	5/2/2018 13:02	3	29490	9830	79.9%	3.93255	3127.12	9592.72	**0.3260**	0.3370
C2	3	5/2/2018 13:14	3	28616	9538.66667	76.5%	3.93265	3171.73	9592.72	**0.3306**	0.3259
C2	4	5/2/2018 13:10	3	30786	10262	91.0%	3.93262	2867.16	9592.72	**0.2989**	0.3026
C2	5	5/2/2018 13:22	3	28527	9509	95.4%	3.93272	2534.03	9592.72	**0.2642**	0.2669
C2	6	5/2/2018 13:18	3	26635	8878.33333	98.6%	3.93268	2290.44	9592.72	**0.2388**	0.2367
C2	7	5/2/2018 13:30	3	23183	7727.66667	99.6%	3.93278	1973.38	9592.72	**0.2057**	0.1987
C2	8	5/2/2018 13:26	3	20802	6934	100.0%	3.93275	1763.14	9592.72	**0.1838**	0.1889
C3	1	5/2/2018 13:10	3	24925	8308.33333	64.2%	3.93262	3290.80	9592.72	**0.3431**	0.3353
C3	2	5/2/2018 13:06	3	27821	9273.66667	79.9%	3.93258	2950.12	9592.72	**0.3075**	0.3168
C3	3	5/2/2018 13:02	3	26727	8909	76.5%	3.93255	2962.43	9592.72	**0.3088**	0.3063
C3	4	5/2/2018 13:14	3	28954	9651.33333	91.0%	3.93265	2696.52	9592.72	**0.2811**	0.2841
C3	5	5/2/2018 13:26	3	26998	8999.33333	95.4%	3.93275	2398.19	9592.72	**0.2500**	0.2501
C3	6	5/2/2018 13:22	3	24736	8245.33333	98.6%	3.93272	2127.12	9592.72	**0.2217**	0.2215
C3	7	5/2/2018 13:18	3	21603	7201	99.6%	3.93268	1838.94	9592.72	**0.1917**	0.1857
C3	8	5/2/2018 13:30	3	19512	6504	100.0%	3.93278	1653.79	9592.72	**0.1724**	0.1766
C4	1	5/2/2018 13:14	3	19059	6353	64.2%	3.93265	2516.30	9592.72	**0.2623**	0.2586
C4	2	5/2/2018 13:10	3	22116	7372	79.9%	3.93262	2345.14	9592.72	**0.2445**	0.2418
C4	3	5/2/2018 13:06	3	20536	6845.33333	76.5%	3.93258	2276.20	9592.72	**0.2373**	0.2323
C4	4	5/2/2018 13:02	3	20632	6877.33333	91.0%	3.93255	1921.53	9592.72	**0.2003**	0.2127
C4	5	5/2/2018 13:30	3	18448	6149.33333	95.4%	3.93278	1638.69	9592.72	**0.1708**	0.1837
C4	6	5/2/2018 13:26	3	19441	6480.33333	98.6%	3.93275	1671.78	9592.72	**0.1743**	0.1609
C4	7	5/2/2018 13:22	3	16327	5442.33333	99.6%	3.93272	1389.81	9592.72	**0.1449**	0.1376
C4	8	5/2/2018 13:18	3	14594	4864.66667	100.0%	3.93268	1236.98	9592.72	**0.1290**	0.1357
E1	1	5/2/2018 13:34	3	28588	9529.33333	64.2%	3.93282	3774.22	9592.72	**0.3934**	0.3881
E1	2	5/2/2018 13:46	3	32708	10902.6667	79.9%	3.93292	3468.03	9592.72	**0.3615**	0.3674
E1	3	5/2/2018 13:42	3	31220	10406.6667	76.5%	3.93289	3460.14	9592.72	**0.3607**	0.3557
E1	4	5/2/2018 13:38	3	33482	11160.6667	91.0%	3.93285	3118.05	9592.72	**0.3250**	0.3308
E1	5	5/2/2018 13:50	3	31440	10480	95.4%	3.93295	2792.63	9592.72	**0.2911**	0.2925
E1	6	5/2/2018 14:02	3	28778	9592.66667	98.6%	3.93305	2474.50	9592.72	**0.2580**	0.2597
E1	7	5/2/2018 13:58	3	25777	8592.33333	99.6%	3.93302	2194.06	9592.72	**0.2287**	0.2171
E1	8	5/2/2018 13:54	3	22386	7462	100.0%	3.93299	1897.29	9592.72	**0.1978**	0.2051
E2	1	5/2/2018 13:38	3	17368	5789.33333	64.2%	3.93285	2292.93	9592.72	**0.2390**	0.2362
E2	2	5/2/2018 13:34	3	19552	6517.33333	79.9%	3.93282	2073.15	9592.72	**0.2161**	0.2215
E2	3	5/2/2018 13:46	3	18996	6332	76.5%	3.93292	2105.32	9592.72	**0.2195**	0.2132
E2	4	5/2/2018 13:42	3	19847	6615.66667	91.0%	3.93289	1848.26	9592.72	**0.1927**	0.1958
E2	5	5/2/2018 13:54	3	17962	5987.33333	95.4%	3.93299	1595.44	9592.72	**0.1663**	0.1697
E2	6	5/2/2018 13:50	3	16528	5509.33333	98.6%	3.93295	1421.21	9592.72	**0.1482**	0.1483
E2	7	5/2/2018 14:02	3	14825	4941.66667	99.6%	3.93305	1261.85	9592.72	**0.1315**	0.1237
E2	8	5/2/2018 13:58	3	12904	4301.33333	100.0%	3.93302	1093.65	9592.72	**0.1140**	0.1190
E3	1	5/2/2018 13:42	3	27334	9111.33333	64.2%	3.93289	3608.61	9592.72	**0.3762**	0.3653
E3	2	5/2/2018 13:38	3	30351	10117	79.9%	3.93285	3218.17	9592.72	**0.3355**	0.3458
E3	3	5/2/2018 13:34	3	29143	9714.33333	76.5%	3.93282	3230.00	9592.72	**0.3367**	0.3348
E3	4	5/2/2018 13:46	3	31394	10464.6667	91.0%	3.93292	2923.56	9592.72	**0.3048**	0.3114
E3	5	5/2/2018 13:58	3	29906	9968.66667	95.4%	3.93302	2656.32	9592.72	**0.2769**	0.2754
E3	6	5/2/2018 13:54	3	27197	9065.66667	98.6%	3.93299	2338.59	9592.72	**0.2438**	0.2446
E3	7	5/2/2018 13:50	3	24227	8075.66667	99.6%	3.93295	2062.16	9592.72	**0.2150**	0.2047
E3	8	5/2/2018 14:02	3	21109	7036.33333	100.0%	3.93306	1789.02	9592.72	**0.1865**	0.1935
E4	1	5/2/2018 13:46	3	25914	8638	64.2%	3.93292	3421.11	9592.72	**0.3566**	0.3487
E4	2	5/2/2018 13:42	3	29058	9686	79.9%	3.93289	3081.05	9592.72	**0.3212**	0.3283
E4	3	5/2/2018 13:38	3	27678	9226	76.5%	3.93285	3067.60	9592.72	**0.3198**	0.3169
E4	4	5/2/2018 13:34	3	29477	9825.66667	91.0%	3.93282	2745.10	9592.72	**0.2862**	0.2928
E4	5	5/2/2018 14:02	3	27557	9185.66667	95.4%	3.93306	2447.66	9592.72	**0.2552**	0.2563
E4	6	5/2/2018 13:58	3	25460	8486.66667	98.6%	3.93302	2189.21	9592.72	**0.2282**	0.2262
E4	7	5/2/2018 13:54	3	22319	7439.66667	99.6%	3.93299	1899.74	9592.72	**0.1980**	0.1906
E4	8	5/2/2018 13:50	3	20103	6701	100.0%	3.93295	1703.81	9592.72	**0.1776**	0.1831
F1	1	5/2/2018 13:50	3	26594	8864.66667	64.2%	3.93295	3510.85	9592.72	**0.3660**	0.3549
F1	2	5/2/2018 14:02	3	29113	9704.33333	79.9%	3.93306	3086.75	9592.72	**0.3218**	0.3344
F1	3	5/2/2018 13:58	3	28264	9421.33333	76.5%	3.93302	3132.41	9592.72	**0.3265**	0.3229
F1	4	5/2/2018 13:54	3	30156	10052	91.0%	3.93299	2808.22	9592.72	**0.2927**	0.2986
F1	5	5/2/2018 13:34	3	28427	9475.66667	95.4%	3.93282	2525.08	9592.72	**0.2632**	0.2618
F1	6	5/2/2018 13:46	3	25751	8583.66667	98.6%	3.93292	2214.29	9592.72	**0.2308**	0.2310
F1	7	5/2/2018 13:42	3	22775	7591.66667	99.6%	3.93289	1938.60	9592.72	**0.2021**	0.1938
F1	8	5/2/2018 13:38	3	20303	6767.66667	100.0%	3.93285	1720.80	9592.72	**0.1794**	0.1852
F2	1	5/2/2018 13:54	3	20491	6830.33333	64.2%	3.93299	2705.13	9592.72	**0.2820**	0.2789
F2	2	5/2/2018 13:50	3	22833	7611	79.9%	3.93295	2420.97	9592.72	**0.2524**	0.2601
F2	3	5/2/2018 14:02	3	22349	7449.66667	76.5%	3.93306	2476.85	9592.72	**0.2582**	0.2496

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Alpha (counts)	Raw Alpha (cpm)	Recovery (%)	Rn-222 Ingrowth	Corrected Ra-226 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-226 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
F2	4	5/2/2018 13:58	3	23335	7778.33333	91.0%	3.93302	2173.01	9592.72	**0.2265**	0.2277
F2	5	5/2/2018 13:38	3	20331	6777	95.4%	3.93285	1805.93	9592.72	**0.1883**	0.1954
F2	6	5/2/2018 13:34	3	19067	6355.66667	98.6%	3.93282	1639.59	9592.72	**0.1709**	0.1702
F2	7	5/2/2018 13:46	3	17460	5820	99.6%	3.93292	1486.18	9592.72	**0.1549**	0.1451
F2	8	5/2/2018 13:42	3	15535	5178.33333	100.0%	3.93289	1316.68	9592.72	**0.1373**	0.1435
F3	1	5/2/2018 13:58	3	25217	8405.66667	64.2%	3.93302	3329.01	9592.72	**0.3470**	0.3381
F3	2	5/2/2018 13:54	3	27979	9326.33333	79.9%	3.93299	2966.56	9592.72	**0.3093**	0.3188
F3	3	5/2/2018 13:50	3	26867	8955.66667	76.5%	3.93295	2977.64	9592.72	**0.3104**	0.3080
F3	4	5/2/2018 14:02	3	28875	9625	91.0%	3.93306	2688.88	9592.72	**0.2803**	0.2850
F3	5	5/2/2018 13:42	3	27059	9019.66667	95.4%	3.93289	2403.53	9592.72	**0.2506**	0.2500
F3	6	5/2/2018 13:38	3	24668	8222.66667	98.6%	3.93285	2121.20	9592.72	**0.2211**	0.2208
F3	7	5/2/2018 13:34	3	21656	7218.66667	99.6%	3.93282	1843.38	9592.72	**0.1922**	0.1852
F3	8	5/2/2018 13:46	3	19444	6481.33333	100.0%	3.93292	1647.97	9592.72	**0.1718**	0.1767
F4	1	5/2/2018 14:02	3	20389	6796.33333	64.2%	3.93306	2691.62	9592.72	**0.2806**	0.2752
F4	2	5/2/2018 13:58	3	22742	7580.66667	79.9%	3.93302	2411.27	9592.72	**0.2514**	0.2567
F4	3	5/2/2018 13:54	3	21754	7251.33333	76.5%	3.93299	2410.95	9592.72	**0.2513**	0.2464
F4	4	5/2/2018 13:50	3	22390	7463.33333	91.0%	3.93295	2085.04	9592.72	**0.2174**	0.2245
F4	5	5/2/2018 13:46	3	20562	6854	95.4%	3.93292	1826.41	9592.72	**0.1904**	0.1917
F4	6	5/2/2018 13:42	3	18521	6173.66667	98.6%	3.93289	1592.61	9592.72	**0.1660**	0.1648
F4	7	5/2/2018 13:38	3	15923	5307.66667	99.6%	3.93285	1355.37	9592.72	**0.1413**	0.1338
F4	8	5/2/2018 13:34	3	13895	4631.66667	100.0%	3.93282	1177.70	9592.72	**0.1228**	0.1280
G1	1	5/2/2018 14:07	3	27655	9218.33333	64.2%	3.93310	3650.79	9592.72	**0.3806**	0.3702
G1	2	5/2/2018 14:20	3	30846	10282	79.9%	3.93320	3270.37	9592.72	**0.3409**	0.3493
G1	3	5/2/2018 14:15	3	29186	9728.66667	76.5%	3.93316	3234.48	9592.72	**0.3372**	0.3376
G1	4	5/2/2018 14:11	3	31552	10517.3333	91.0%	3.93313	2938.11	9592.72	**0.3063**	0.3126
G1	5	5/2/2018 14:48	3	29547	9849	95.4%	3.93344	2624.16	9592.72	**0.2736**	0.2744
G1	6	5/2/2018 14:44	3	27785	9261.66667	98.6%	3.93340	2388.90	9592.72	**0.2490**	0.2420
G1	7	5/2/2018 14:40	3	22690	7563.33333	99.6%	3.93337	1931.13	9592.72	**0.2013**	0.2012
G1	8	5/2/2018 14:35	3	21367	7122.33333	100.0%	3.93333	1810.77	9592.72	**0.1888**	0.1904
G2	1	5/2/2018 14:11	3	24852	8284	64.2%	3.93313	3280.73	9592.72	**0.3420**	0.3388
G2	2	5/2/2018 14:07	3	28211	9403.66667	79.9%	3.93310	2991.08	9592.72	**0.3118**	0.3196
G2	3	5/2/2018 14:20	3	27474	9158	76.5%	3.93320	3044.72	9592.72	**0.3174**	0.3087
G2	4	5/2/2018 14:15	3	28862	9620.66667	91.0%	3.93316	2687.60	9592.72	**0.2802**	0.2856
G2	5	5/2/2018 14:35	3	27021	9007	95.4%	3.93333	2399.88	9592.72	**0.2502**	0.2502
G2	6	5/2/2018 14:48	3	24556	8185.33333	98.6%	3.93344	2111.26	9592.72	**0.2201**	0.2201
G2	7	5/2/2018 14:44	3	20934	6978	99.6%	3.93340	1781.66	9592.72	**0.1857**	0.1818
G2	8	5/2/2018 14:40	3	19114	6371.33333	100.0%	3.93337	1619.82	9592.72	**0.1689**	0.1715
G3	1	5/2/2018 14:15	3	21042	7014	64.2%	3.93316	2777.75	9592.72	**0.2896**	0.2823
G3	2	5/2/2018 14:11	3	23018	7672.66667	79.9%	3.93313	2440.47	9592.72	**0.2544**	0.2662
G3	3	5/2/2018 14:07	3	22893	7631	76.5%	3.93310	2537.11	9592.72	**0.2645**	0.2571
G3	4	5/2/2018 14:20	3	23983	7994.33333	91.0%	3.93320	2233.25	9592.72	**0.2328**	0.2379
G3	5	5/2/2018 14:40	3	22298	7432.66667	95.4%	3.93337	1980.39	9592.72	**0.2064**	0.2083
G3	6	5/2/2018 14:35	3	21020	7006.66667	98.6%	3.93333	1807.29	9592.72	**0.1884**	0.1832
G3	7	5/2/2018 14:48	3	17006	5668.66667	99.6%	3.93344	1447.34	9592.72	**0.1509**	0.1511
G3	8	5/2/2018 14:44	3	16020	5340	100.0%	3.93340	1357.60	9592.72	**0.1415**	0.1424
G4	1	5/2/2018 14:20	3	25807	8602.33333	64.2%	3.93320	3406.74	9592.72	**0.3551**	0.3443
G4	2	5/2/2018 14:15	3	28559	9519.66667	79.9%	3.93316	3027.93	9592.72	**0.3156**	0.3246
G4	3	5/2/2018 14:11	3	27133	9044.33333	76.5%	3.93313	3006.98	9592.72	**0.3135**	0.3135
G4	4	5/2/2018 14:07	3	29200	9733.33333	91.0%	3.93310	2719.12	9592.72	**0.2835**	0.2900
G4	5	5/2/2018 14:44	3	27348	9116	95.4%	3.93340	2428.88	9592.72	**0.2532**	0.2542
G4	6	5/2/2018 14:40	3	25799	8599.66667	98.6%	3.93337	2218.17	9592.72	**0.2312**	0.2241
G4	7	5/2/2018 14:35	3	21116	7038.66667	99.6%	3.93333	1797.19	9592.72	**0.1873**	0.1868
G4	8	5/2/2018 14:48	3	19869	6623	100.0%	3.93344	1683.77	9592.72	**0.1755**	0.1775
H1	1	5/2/2018 14:48	3	28430	9476.66667	64.2%	3.93344	3752.77	9592.72	**0.3912**	0.3725
H1	2	5/2/2018 14:44	3	29867	9955.66667	79.9%	3.93340	3166.41	9592.72	**0.3301**	0.3522
H1	3	5/2/2018 14:40	3	29545	9848.33333	76.5%	3.93337	3274.09	9592.72	**0.3413**	0.3407
H1	4	5/2/2018 14:35	3	32425	10808.3333	91.0%	3.93333	3019.25	9592.72	**0.3147**	0.3166
H1	5	5/2/2018 14:07	3	30395	10131.6667	95.4%	3.93310	2699.70	9592.72	**0.2814**	0.2797
H1	6	5/2/2018 14:52	3	27881	9293.66667	98.6%	3.93347	2397.11	9592.72	**0.2499**	0.2487
H1	7	5/2/2018 14:20	3	24536	8178.66667	99.6%	3.93320	2088.33	9592.72	**0.2177**	0.2105
H1	8	5/2/2018 14:11	3	22145	7381.66667	100.0%	3.93313	1876.79	9592.72	**0.1956**	0.2011
H2	1	5/2/2018 14:35	3	24754	8251.33333	64.2%	3.93333	3267.63	9592.72	**0.3406**	0.3326
H2	2	5/2/2018 14:48	3	27045	9015	79.9%	3.93344	2867.20	9592.72	**0.2989**	0.3126
H2	3	5/2/2018 14:44	3	27333	9111	76.5%	3.93340	3028.94	9592.72	**0.3158**	0.3013
H2	4	5/2/2018 14:40	3	27107	9035.66667	91.0%	3.93337	2524.04	9592.72	**0.2631**	0.2774
H2	5	5/2/2018 14:11	3	26034	8678	95.4%	3.93313	2312.34	9592.72	**0.2411**	0.2410
H2	6	5/2/2018 14:07	3	24201	8067	98.6%	3.93310	2080.92	9592.72	**0.2169**	0.2106
H2	7	5/2/2018 14:52	3	19668	6556	99.6%	3.93347	1673.89	9592.72	**0.1745**	0.1733
H2	8	5/2/2018 14:20	3	18356	6118.66667	100.0%	3.93320	1555.65	9592.72	**0.1622**	0.1643
H3	1	5/2/2018 14:40	3	24240	8080	64.2%	3.93337	3199.75	9592.72	**0.3336**	0.3252
H3	2	5/2/2018 14:35	3	27477	9159	79.9%	3.93333	2913.09	9592.72	**0.3037**	0.3064
H3	3	5/2/2018 14:48	3	26869	8956.33333	76.5%	3.93344	2977.49	9592.72	**0.3104**	0.2959
H3	4	5/2/2018 14:44	3	24598	8199.33333	91.0%	3.93340	2290.40	9592.72	**0.2388**	0.2736
H3	5	5/2/2018 14:20	3	26785	8928.33333	95.4%	3.93320	2379.00	9592.72	**0.2480**	0.2401
H3	6	5/2/2018 14:11	3	24345	8115	98.6%	3.93313	2093.28	9592.72	**0.2182**	0.2125

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Alpha (counts)	Raw Alpha (cpm)	Recovery (%)	Rn-222 Ingrowth	Corrected Ra-226 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-226 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
H3	7	5/2/2018 14:07	3	21232	7077.33333	99.6%	3.93310	1807.16	9592.72	**0.1884**	0.1801
H3	8	5/2/2018 14:52	3	18819	6273	100.0%	3.93347	1594.77	9592.72	**0.1662**	0.1735
H4	1	5/2/2018 14:44	3	23327	7775.66667	64.2%	3.93340	3079.20	9592.72	**0.3210**	0.2957
H4	2	5/2/2018 14:40	3	22977	7659	79.9%	3.93337	2435.97	9592.72	**0.2539**	0.2735
H4	3	5/2/2018 14:35	3	21840	7280	76.5%	3.93333	2420.27	9592.72	**0.2523**	0.2612
H4	4	5/2/2018 14:48	3	23592	7864	91.0%	3.93344	2196.71	9592.72	**0.2290**	0.2356
H4	5	5/2/2018 14:52	3	21893	7297.66667	95.4%	3.93347	1944.37	9592.72	**0.2027**	0.1984
H4	6	5/2/2018 14:20	3	19481	6493.66667	98.6%	3.93320	1675.02	9592.72	**0.1746**	0.1699
H4	7	5/2/2018 14:11	3	17075	5691.66667	99.6%	3.93313	1453.33	9592.72	**0.1515**	0.1440
H4	8	5/2/2018 14:07	3	15611	5203.66667	100.0%	3.93310	1323.05	9592.72	**0.1379**	0.1447
I1	1	5/2/2018 7:51	3	27656	9218.66667	64.2%	3.92985	3653.93	9592.72	**0.3809**	0.3843
I1	2	5/2/2018 8:20	3	32547	10849	79.9%	3.93011	3453.43	9592.72	**0.3600**	0.3644
I1	3	5/2/2018 8:13	3	31100	10366.6667	76.5%	3.93005	3449.32	9592.72	**0.3596**	0.3532
I1	4	5/2/2018 8:07	3	34857	11619	91.0%	3.93000	3248.46	9592.72	**0.3386**	0.3292
I1	5	5/2/2018 8:25	3	30753	10251	95.4%	3.93015	2733.55	9592.72	**0.2850**	0.2921
I1	6	5/2/2018 8:44	3	28419	9473	98.6%	3.93032	2445.33	9592.72	**0.2549**	0.2602
I1	7	5/2/2018 8:36	3	25479	8493	99.6%	3.93025	2170.22	9592.72	**0.2262**	0.2180
I1	8	5/2/2018 8:31	3	22805	7601.66667	100.0%	3.93021	1934.17	9592.72	**0.2016**	0.2055
I2	1	5/2/2018 8:07	3	31453	10484.3333	64.2%	3.93000	4155.45	9592.72	**0.4332**	0.4244
I2	2	5/2/2018 7:51	3	35528	11842.6667	79.9%	3.92985	3769.98	9592.72	**0.3930**	0.4018
I2	3	5/2/2018 8:20	3	33264	11088	76.5%	3.93011	3689.28	9592.72	**0.3846**	0.3890
I2	4	5/2/2018 8:13	3	37644	12548	91.0%	3.93005	3508.14	9592.72	**0.3657**	0.3618
I2	5	5/2/2018 8:31	3	34611	11537	95.4%	3.93021	3076.43	9592.72	**0.3207**	0.3201
I2	6	5/2/2018 8:25	3	31401	10467	98.6%	3.93015	2702.03	9592.72	**0.2817**	0.2846
I2	7	5/2/2018 8:44	3	27726	9242	99.6%	3.93032	2361.57	9592.72	**0.2462**	0.2392
I2	8	5/2/2018 8:36	3	25165	8388.33333	100.0%	3.93025	2134.30	9592.72	**0.2225**	0.2268
I3	1	5/2/2018 8:13	3	32281	10760.3333	64.2%	3.93005	4264.78	9592.72	**0.4446**	0.4350
I3	2	5/2/2018 8:07	3	36728	12242.6667	79.9%	3.93000	3897.17	9592.72	**0.4063**	0.4113
I3	3	5/2/2018 7:51	3	34265	11421.6667	76.5%	3.92985	3800.55	9592.72	**0.3962**	0.3978
I3	4	5/2/2018 8:20	3	37380	12460	91.0%	3.93011	3483.49	9592.72	**0.3631**	0.3693
I3	5	5/2/2018 8:36	3	35068	11689.3333	95.4%	3.93025	3117.02	9592.72	**0.3249**	0.3256
I3	6	5/2/2018 8:31	3	32161	10720.3333	98.6%	3.93021	2767.39	9592.72	**0.2885**	0.2884
I3	7	5/2/2018 8:25	3	28471	9490.33333	99.6%	3.93015	2425.13	9592.72	**0.2528**	0.2408
I3	8	5/2/2018 8:44	3	24844	8281.33333	100.0%	3.93032	2107.04	9592.72	**0.2196**	0.2278
I4	1	5/2/2018 8:20	3	31207	10402.3333	64.2%	3.93011	4122.83	9592.72	**0.4298**	0.4236
I4	2	5/2/2018 8:13	3	35598	11866	79.9%	3.93005	3777.22	9592.72	**0.3938**	0.4020
I4	3	5/2/2018 8:07	3	33505	11168.3333	76.5%	3.93000	3716.11	9592.72	**0.3874**	0.3897
I4	4	5/2/2018 7:51	3	38195	12731.6667	91.0%	3.92985	3559.67	9592.72	**0.3711**	0.3635
I4	5	5/2/2018 8:44	3	34462	11487.3333	95.4%	3.93032	3063.10	9592.72	**0.3193**	0.3228
I4	6	5/2/2018 8:36	3	31559	10519.6667	98.6%	3.93025	2715.56	9592.72	**0.2831**	0.2874
I4	7	5/2/2018 8:31	3	28173	9391	99.6%	3.93021	2399.71	9592.72	**0.2502**	0.2397
I4	8	5/2/2018 8:25	3	24753	8251	100.0%	3.93015	2099.41	9592.72	**0.2189**	0.2249
J1	1	5/2/2018 8:25	3	29984	9994.66667	64.2%	3.93015	3961.21	9592.72	**0.4129**	0.4053
J1	2	5/2/2018 8:44	3	33733	11244.3333	79.9%	3.93032	3579.08	9592.72	**0.3731**	0.3838
J1	3	5/2/2018 8:36	3	32560	10853.3333	76.5%	3.93025	3611.07	9592.72	**0.3764**	0.3716
J1	4	5/2/2018 8:31	3	35123	11707.6667	91.0%	3.93021	3273.08	9592.72	**0.3412**	0.3458
J1	5	5/2/2018 7:51	3	33328	11109.3333	95.4%	3.92986	2962.66	9592.72	**0.3088**	0.3058
J1	6	5/2/2018 8:20	3	29876	9958.66667	98.6%	3.93011	2570.83	9592.72	**0.2680**	0.2714
J1	7	5/2/2018 8:13	3	26379	8793	99.6%	3.93005	2246.99	9592.72	**0.2342**	0.2260
J1	8	5/2/2018 8:07	3	23475	7825	100.0%	3.93000	1991.10	9592.72	**0.2076**	0.2127
J2	1	5/2/2018 8:31	3	30437	10145.6667	64.2%	3.93021	4021.00	9592.72	**0.4192**	0.4103
J2	2	5/2/2018 8:25	3	34322	11440.6667	79.9%	3.93015	3641.73	9592.72	**0.3796**	0.3876
J2	3	5/2/2018 8:44	3	32033	10677.6667	76.5%	3.93032	3552.56	9592.72	**0.3703**	0.3748
J2	4	5/2/2018 8:36	3	36158	12052.6667	91.0%	3.93025	3369.49	9592.72	**0.3513**	0.3477
J2	5	5/2/2018 8:07	3	32826	10942	95.4%	3.93000	2917.93	9592.72	**0.3042**	0.3064
J2	6	5/2/2018 7:51	3	30334	10111.3333	98.6%	3.92986	2610.41	9592.72	**0.2721**	0.2715
J2	7	5/2/2018 8:20	3	26318	8772.66667	99.6%	3.93011	2241.76	9592.72	**0.2337**	0.2282
J2	8	5/2/2018 8:13	3	24142	8047.33333	100.0%	3.93005	2047.64	9592.72	**0.2135**	0.2173
J3	1	5/2/2018 8:36	3	31226	10408.6667	64.2%	3.93025	4125.19	9592.72	**0.4300**	0.4126
J3	2	5/2/2018 8:31	3	33549	11183	79.9%	3.93021	3559.66	9592.72	**0.3711**	0.3874
J3	3	5/2/2018 8:25	3	32023	10674.3333	76.5%	3.93015	3551.60	9592.72	**0.3702**	0.3732
J3	4	5/2/2018 8:44	3	35069	11689.6667	91.0%	3.93032	3267.95	9592.72	**0.3407**	0.3435
J3	5	5/2/2018 8:13	3	32541	10847	95.4%	3.93005	2892.55	9592.72	**0.3015**	0.2991
J3	6	5/2/2018 8:08	3	29125	9708.33333	98.6%	3.93000	2506.28	9592.72	**0.2613**	0.2630
J3	7	5/2/2018 7:51	3	26472	8824	99.6%	3.92986	2255.03	9592.72	**0.2351**	0.2227
J3	8	5/2/2018 8:20	3	23477	7825.66667	100.0%	3.93011	1991.21	9592.72	**0.2076**	0.2160
J4	1	5/2/2018 8:44	3	30141	10047	64.2%	3.93032	3981.78	9592.72	**0.4151**	0.4153
J4	2	5/2/2018 8:36	3	35606	11868.6667	79.9%	3.93025	3777.87	9592.72	**0.3938**	0.3920
J4	3	5/2/2018 8:31	3	32875	10958.3333	76.5%	3.93021	3646.05	9592.72	**0.3801**	0.3789
J4	4	5/2/2018 8:25	3	35770	11923.3333	91.0%	3.93015	3333.41	9592.72	**0.3475**	0.3511
J4	5	5/2/2018 8:20	3	33248	11082.6667	95.4%	3.93011	2955.35	9592.72	**0.3081**	0.3086
J4	6	5/2/2018 8:13	3	30440	10146.6667	98.6%	3.93005	2619.41	9592.72	**0.2731**	0.2729
J4	7	5/2/2018 8:08	3	26079	8693	99.6%	3.93000	2221.47	9592.72	**0.2316**	0.2283
J4	8	5/2/2018 7:51	3	24310	8103.33333	100.0%	3.92986	2061.99	9592.72	**0.2150**	0.2171

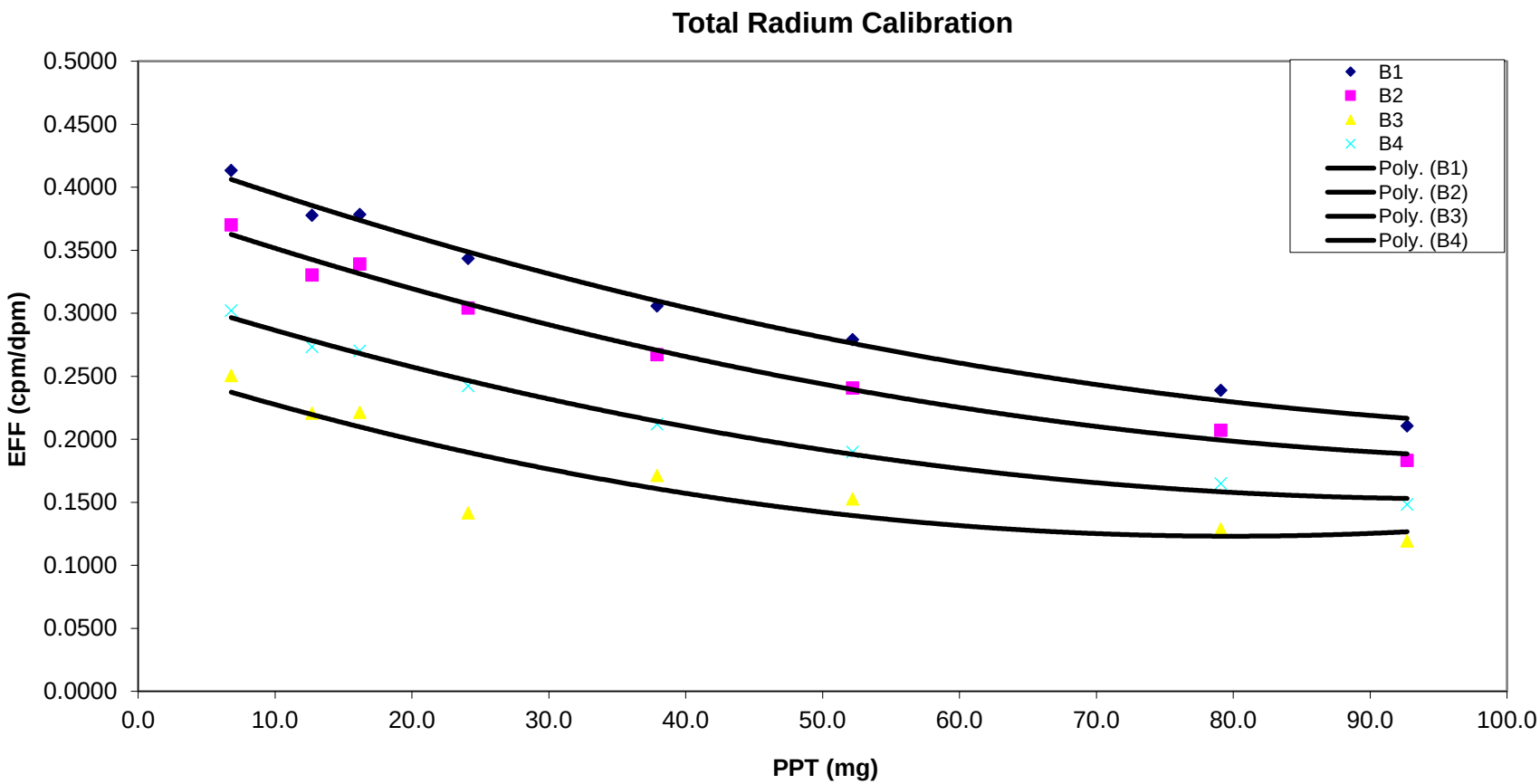


A1 $y = 1.381330E\text{-}05x^2 - 3.236618E\text{-}03x + 3.555648E\text{-}01$

A2 $y = 1.486658E\text{-}05x^2 - 3.093556E\text{-}03x + 3.217404E\text{-}01$

A3 $y = 1.959151E\text{-}05x^2 - 4.045808E\text{-}03x + 4.044669E\text{-}01$

A4

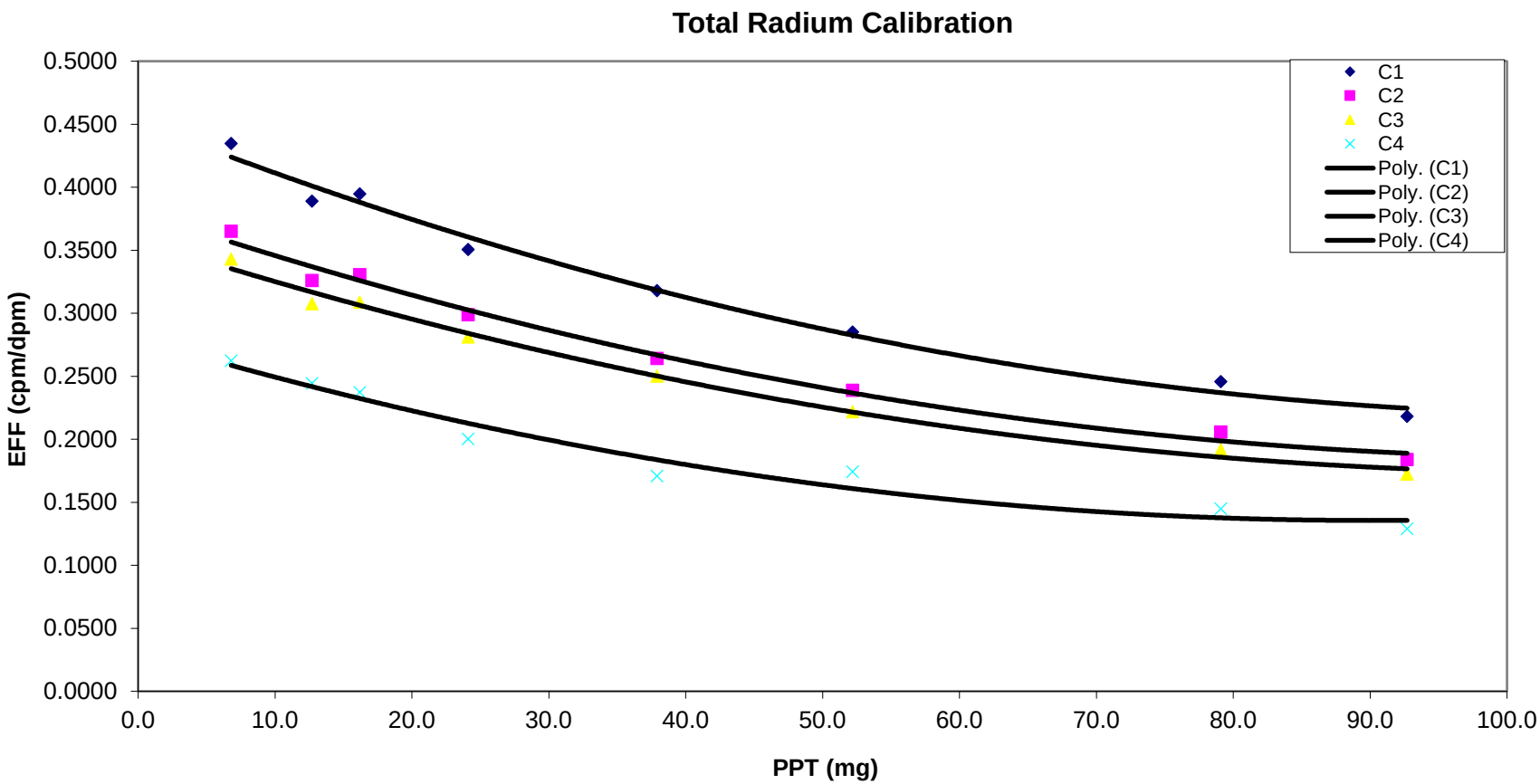


B1 $y = 1.625473E\text{-}05x^2 - 3.824314E\text{-}03x + 4.314456E\text{-}01$

B2 $y = 1.691687E\text{-}05x^2 - 3.710225E\text{-}03x + 3.869851E\text{-}01$

B3 $y = 2.141749E\text{-}05x^2 - 3.420138E\text{-}03x + 2.596035E\text{-}01$

B4 $y = 1.774765E\text{-}05x^2 - 3.436389E\text{-}03x + 3.190738E\text{-}01$

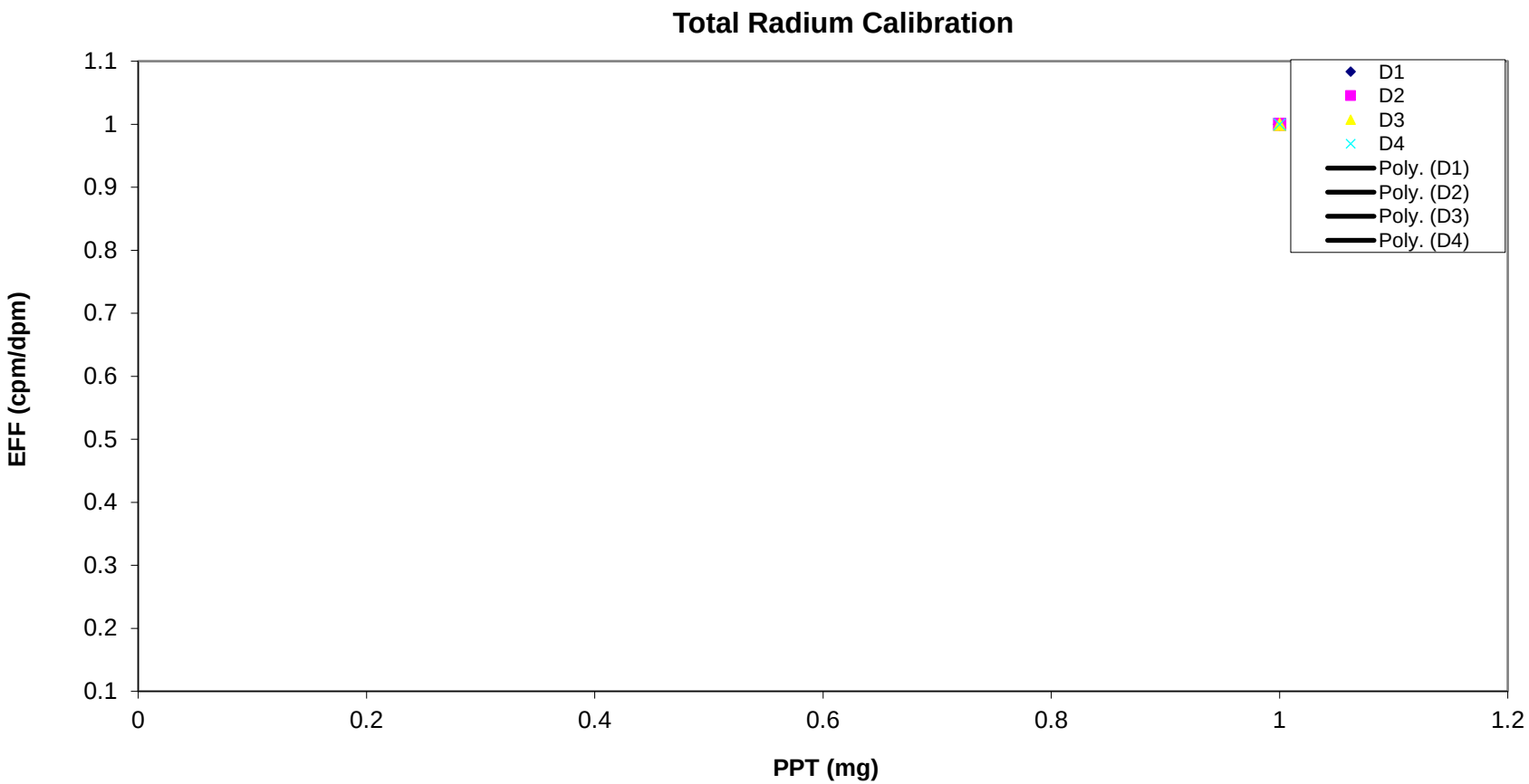


C1 $y = 1.962687E\text{-}05x^2 - 4.273012E\text{-}03x + 4.520915E\text{-}01$

C2 $y = 1.697846E\text{-}05x^2 - 3.640746E\text{-}03x + 3.804539E\text{-}01$

C3 $y = 1.625138E\text{-}05x^2 - 3.465414E\text{-}03x + 3.581429E\text{-}01$

C4 $y = 1.784434E\text{-}05x^2 - 3.206258E\text{-}03x + 2.795965E\text{-}01$

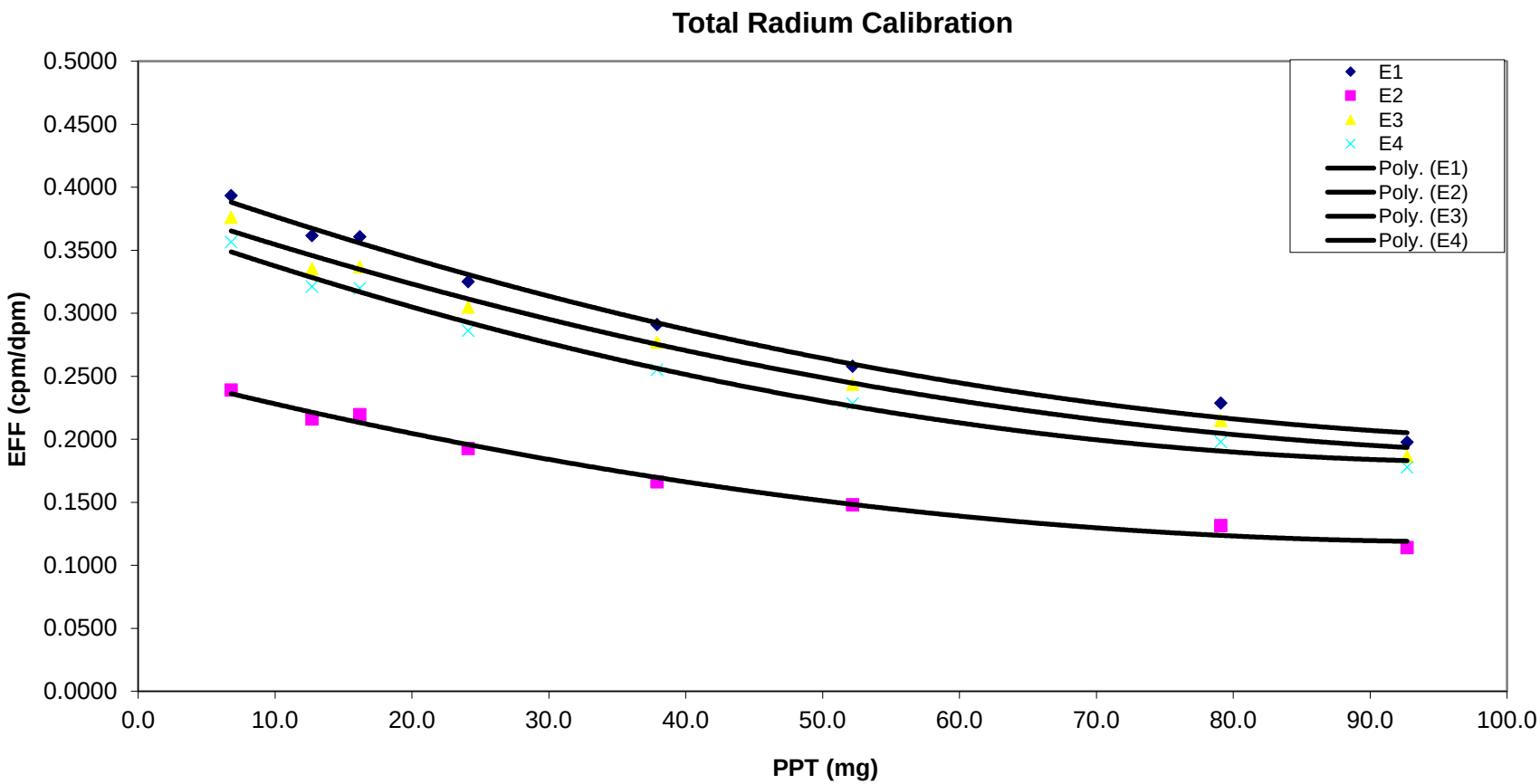

Total Radium Calibration
EFF (cpm/dpm)
PPT (mg)
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.2
0.4
0.6
0.8
1
1.2
D1
D2
D3
D4
Poly. (D1)
Poly. (D2)
Poly. (D3)
Poly. (D4)

D1

D2

D3

D4

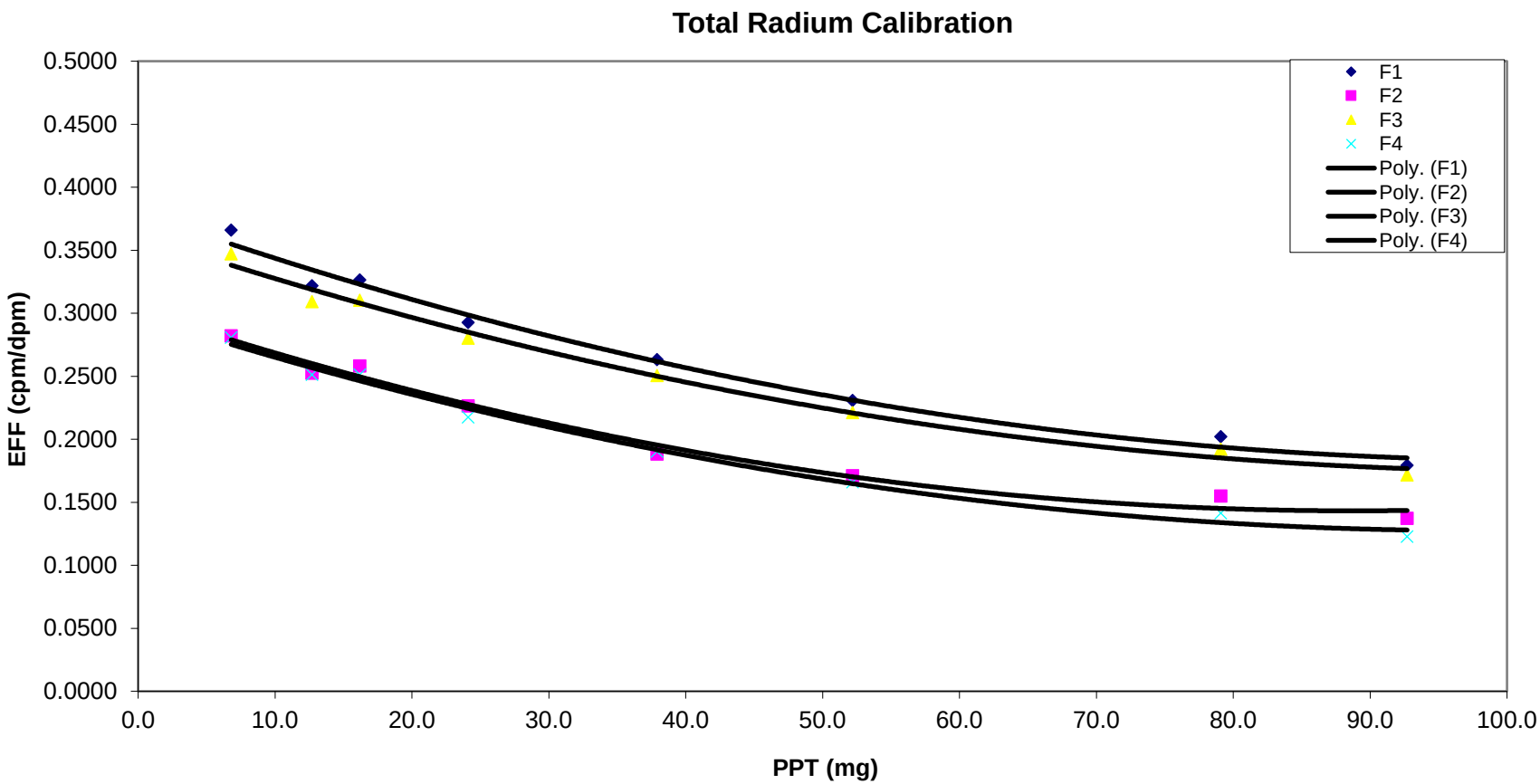


E1 $y = 1.724352E\text{-}05x^2 - 3.845549E\text{-}03x + 4.134342E\text{-}01$

E2 $y = 1.411992E\text{-}05x^2 - 2.768701E\text{-}03x + 2.543410E\text{-}01$

E3 $y = 1.626205E\text{-}05x^2 - 3.618027E\text{-}03x + 3.891225E\text{-}01$

E4 $y = 1.901914E\text{-}05x^2 - 3.820685E\text{-}03x + 3.737938E\text{-}01$

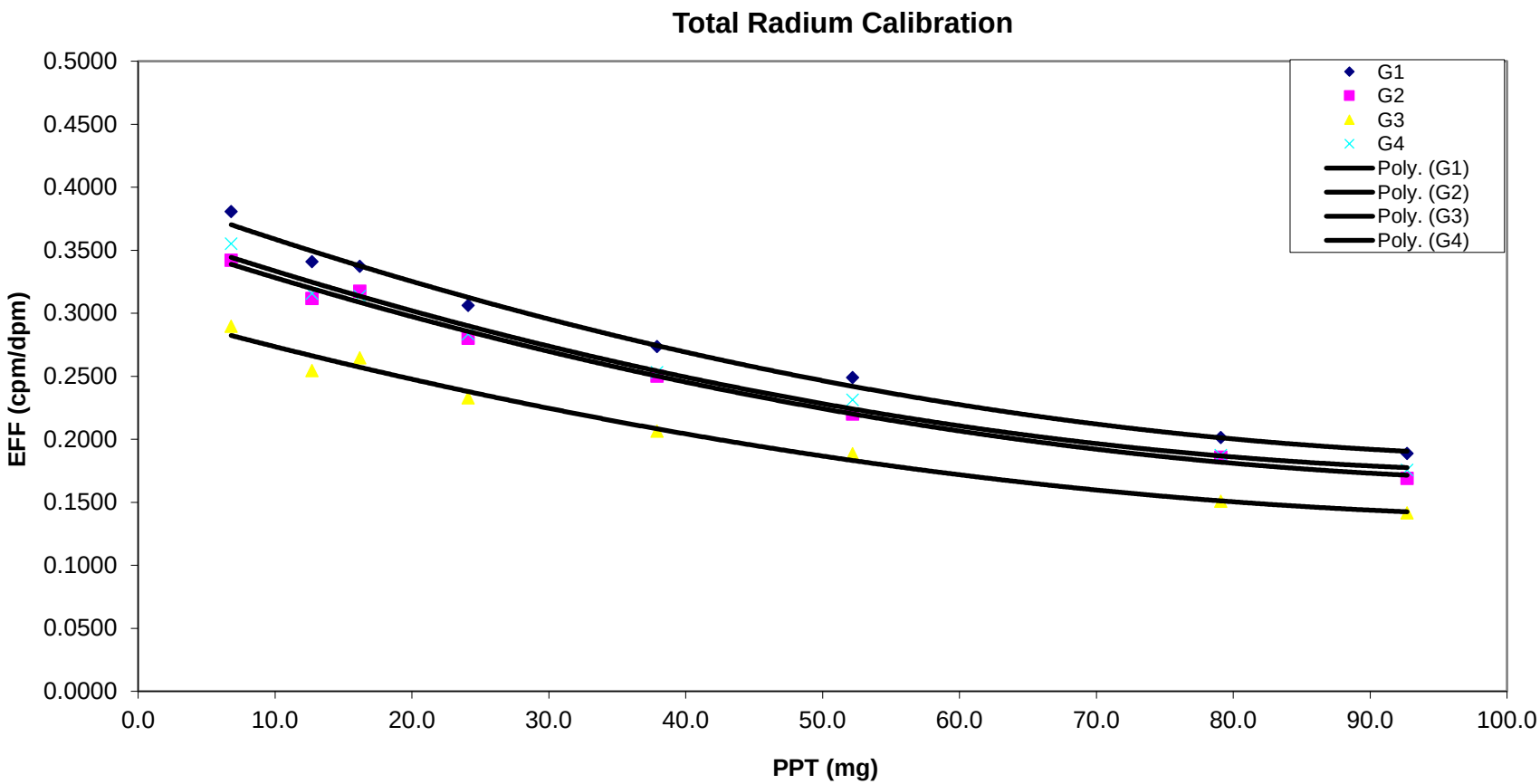


F1 $y = 1.858912E\text{-}05x^2 - 3.825184E\text{-}03x + 3.800274E\text{-}01$

F2 $y = 2.021428E\text{-}05x^2 - 3.587621E\text{-}03x + 3.023829E\text{-}01$

F3 $y = 1.739418E\text{-}05x^2 - 3.610005E\text{-}03x + 3.618768E\text{-}01$

F4 $y = 1.775248E\text{-}05x^2 - 3.480751E\text{-}03x + 2.980910E\text{-}01$

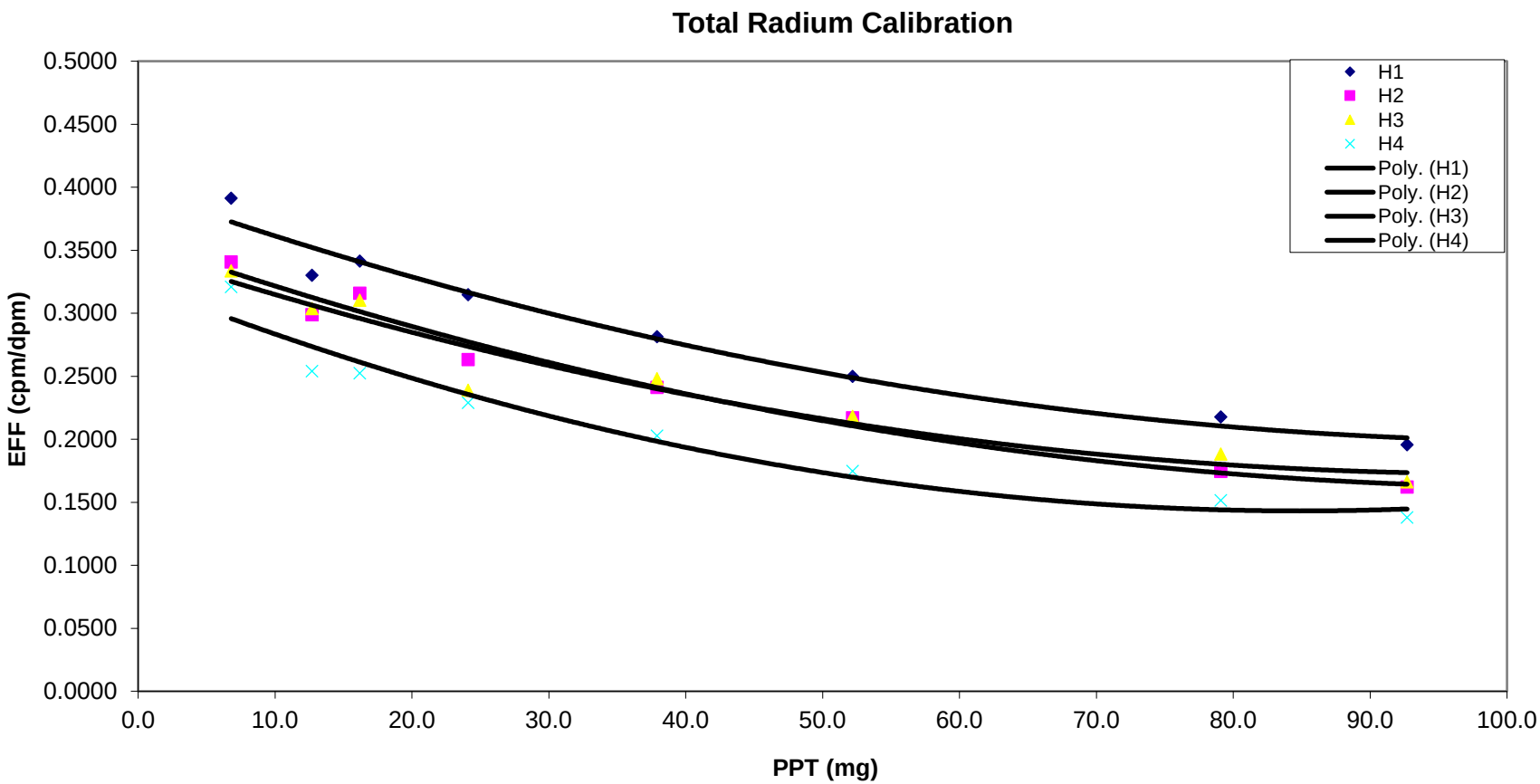


G1 $y = 1.805013E\text{-}05x^2 - 3.888767E\text{-}03x + 3.958158E\text{-}01$

G2 $y = 1.646424E\text{-}05x^2 - 3.586270E\text{-}03x + 3.624539E\text{-}01$

G3 $y = 1.372045E\text{-}05x^2 - 2.993705E\text{-}03x + 3.020417E\text{-}01$

G4 $y = 1.744998E\text{-}05x^2 - 3.678280E\text{-}03x + 3.685295E\text{-}01$

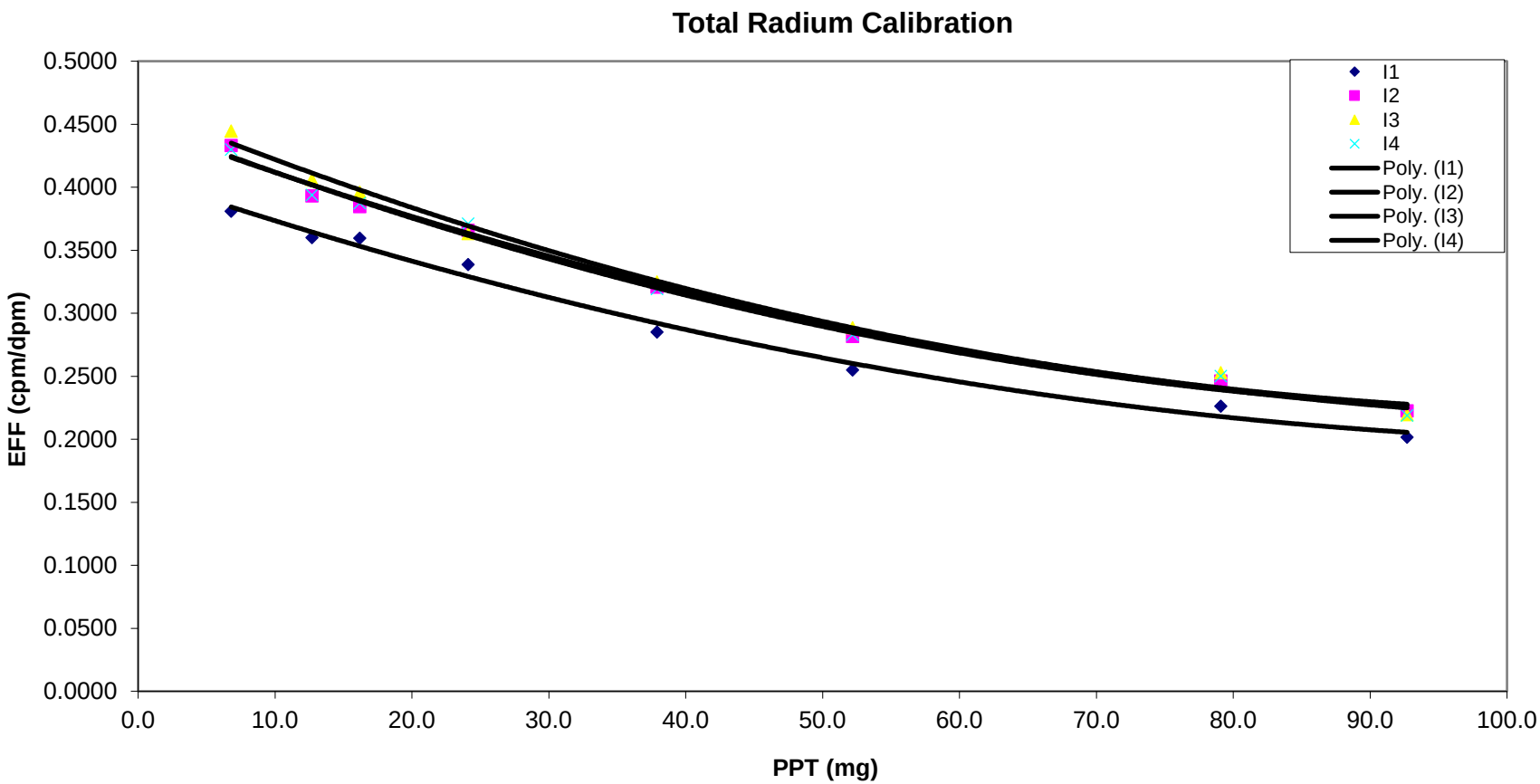


H1 $y = 1.804540E\text{-}05x^2 - 3.790334E\text{-}03x + 3.974174E\text{-}01$

H2 $y = 1.800972E\text{-}05x^2 - 3.751122E\text{-}03x + 3.573088E\text{-}01$

H3 $y = 1.771011E\text{-}05x^2 - 3.527961E\text{-}03x + 3.483610E\text{-}01$

H4 $y = 2.503334E\text{-}05x^2 - 4.249274E\text{-}03x + 3.234668E\text{-}01$

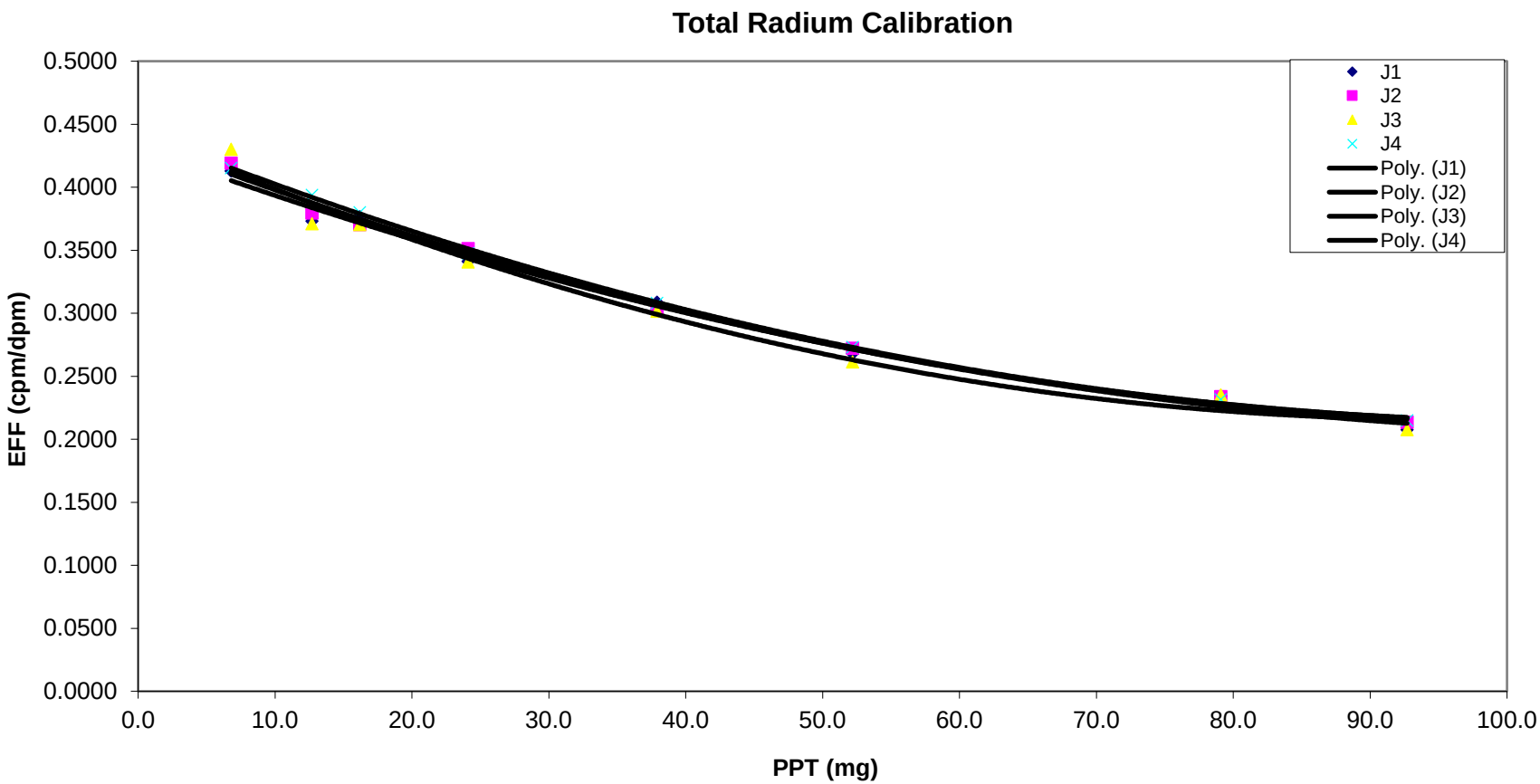


I1 $y = 1.611618E\text{-}05x^2 - 3.685102E\text{-}03x + 4.086300E\text{-}01$

I2 $y = 1.924187E\text{-}05x^2 - 4.215154E\text{-}03x + 4.521911E\text{-}01$

I3 $y = 2.019721E\text{-}05x^2 - 4.421876E\text{-}03x + 4.641725E\text{-}01$

I4 $y = 1.694948E\text{-}05x^2 - 4.000113E\text{-}03x + 4.500279E\text{-}01$



J1 $y = 1.743711E\text{-}05x^2 - 3.976990E\text{-}03x + 4.314879E\text{-}01$

J2 $y = 1.999784E\text{-}05x^2 - 4.236995E\text{-}03x + 4.382126E\text{-}01$

J3 $y = 2.485559E\text{-}05x^2 - 4.762411E\text{-}03x + 4.438613E\text{-}01$

J4 $y = 2.045516E\text{-}05x^2 - 4.342231E\text{-}03x + 4.438361E\text{-}01$

Current Calibration - LB4100

Geometry	Tuffryn Filter				
Total Radium	**Cal Date**	5/1/2018	**Exp Date**	5/31/2020	
LB4100	A0	A1	A2	A3	A4
A1	3.55565E-01	-3.23662E-03	1.38133E-05		
A2	3.21740E-01	-3.09356E-03	1.48666E-05		
A3	4.04467E-01	-4.04581E-03	1.95915E-05		
A4	#N/A	#N/A	#N/A		
B1	4.31446E-01	-3.82431E-03	1.62547E-05		
B2	3.86985E-01	-3.71023E-03	1.69169E-05		
B3	2.59603E-01	-3.42014E-03	2.14175E-05		
B4	3.19074E-01	-3.43639E-03	1.77477E-05		
C1	4.52091E-01	-4.27301E-03	1.96269E-05		
C2	3.80454E-01	-3.64075E-03	1.69785E-05		
C3	3.58143E-01	-3.46541E-03	1.62514E-05		
C4	2.79597E-01	-3.20626E-03	1.78443E-05		
D1	#N/A	#N/A	#N/A		
D2	#N/A	#N/A	#N/A		
D3	#N/A	#N/A	#N/A		
D4	#N/A	#N/A	#N/A		
E1	4.13434E-01	-3.84555E-03	1.72435E-05		
E2	2.54341E-01	-2.76870E-03	1.41199E-05		
E3	3.89123E-01	-3.61803E-03	1.62621E-05		
E4	3.73794E-01	-3.82068E-03	1.90191E-05		
F1	3.80027E-01	-3.82518E-03	1.85891E-05		
F2	3.02383E-01	-3.58762E-03	2.02143E-05		
F3	3.61877E-01	-3.61000E-03	1.73942E-05		
F4	2.98091E-01	-3.48075E-03	1.77525E-05		
G1	3.95816E-01	-3.88877E-03	1.80501E-05		
G2	3.62454E-01	-3.58627E-03	1.64642E-05		
G3	3.02042E-01	-2.99370E-03	1.37204E-05		
G4	3.68530E-01	-3.67828E-03	1.74500E-05		
H1	3.97417E-01	-3.79033E-03	1.80454E-05		
H2	3.57309E-01	-3.75112E-03	1.80097E-05		
H3	3.48361E-01	-3.52796E-03	1.77101E-05		
H4	3.23467E-01	-4.24927E-03	2.50333E-05		
I1	4.08630E-01	-3.68510E-03	1.61162E-05		
I2	4.52191E-01	-4.21515E-03	1.92419E-05		
I3	4.64172E-01	-4.42188E-03	2.01972E-05		
I4	4.50028E-01	-4.00011E-03	1.69495E-05		
J1	4.31488E-01	-3.97699E-03	1.74371E-05		
J2	4.38213E-01	-4.23699E-03	1.99978E-05		
J3	4.43861E-01	-4.76241E-03	2.48556E-05		
J4	4.43836E-01	-4.34223E-03	2.04552E-05		

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
C1	A1	3	24753	29496	5/2/2018 12:26	5/2/2018 12:29	LB4100	TRADC18
C2	A1	3	28306	33530	5/2/2018 12:40	5/2/2018 12:43	LB4100	TRADC18
C3	A1	3	26378	31327	5/2/2018 12:36	5/2/2018 12:39	LB4100	TRADC18
C4	A1	3	29116	36420	5/2/2018 12:31	5/2/2018 12:34	LB4100	TRADC18
C5	A1	3	27350	36767	5/2/2018 12:44	5/2/2018 12:47	LB4100	TRADC18
C6	A1	3	24868	37284	5/2/2018 12:56	5/2/2018 12:59	LB4100	TRADC18
C7	A1	3	21884	35624	5/2/2018 12:52	5/2/2018 12:55	LB4100	TRADC18
C8	A1	3	19109	35460	5/2/2018 12:48	5/2/2018 12:51	LB4100	TRADC18
C1	A2	3	22450	29305	5/2/2018 12:31	5/2/2018 12:34	LB4100	TRADC18
C2	A2	3	25213	33540	5/2/2018 12:26	5/2/2018 12:29	LB4100	TRADC18
C3	A2	3	24127	31248	5/2/2018 12:40	5/2/2018 12:43	LB4100	TRADC18
C4	A2	3	25487	35955	5/2/2018 12:36	5/2/2018 12:39	LB4100	TRADC18
C5	A2	3	24355	36680	5/2/2018 12:48	5/2/2018 12:51	LB4100	TRADC18
C6	A2	3	22565	37485	5/2/2018 12:44	5/2/2018 12:47	LB4100	TRADC18
C7	A2	3	20098	36465	5/2/2018 12:56	5/2/2018 12:59	LB4100	TRADC18
C8	A2	3	17743	35935	5/2/2018 12:52	5/2/2018 12:55	LB4100	TRADC18
C1	A3	3	27990	28678	5/2/2018 12:36	5/2/2018 12:39	LB4100	TRADC18
C2	A3	3	31342	32710	5/2/2018 12:31	5/2/2018 12:34	LB4100	TRADC18
C3	A3	3	29990	30971	5/2/2018 12:26	5/2/2018 12:29	LB4100	TRADC18
C4	A3	3	32748	35602	5/2/2018 12:40	5/2/2018 12:43	LB4100	TRADC18
C5	A3	3	29813	35750	5/2/2018 12:52	5/2/2018 12:55	LB4100	TRADC18
C6	A3	3	27774	36534	5/2/2018 12:48	5/2/2018 12:51	LB4100	TRADC18
C7	A3	3	23833	35080	5/2/2018 12:44	5/2/2018 12:47	LB4100	TRADC18
C8	A3	3	22000	35487	5/2/2018 12:56	5/2/2018 12:59	LB4100	TRADC18
C1	B1	3	30038	28569	5/2/2018 12:44	5/2/2018 12:47	LB4100	TRADC18
C2	B1	3	34172	33269	5/2/2018 12:56	5/2/2018 12:59	LB4100	TRADC18
C3	B1	3	32744	31579	5/2/2018 12:52	5/2/2018 12:55	LB4100	TRADC18
C4	B1	3	35367	36300	5/2/2018 12:48	5/2/2018 12:51	LB4100	TRADC18
C5	B1	3	33021	36589	5/2/2018 12:26	5/2/2018 12:29	LB4100	TRADC18
C6	B1	3	31131	37329	5/2/2018 12:40	5/2/2018 12:43	LB4100	TRADC18
C7	B1	3	26915	35548	5/2/2018 12:36	5/2/2018 12:39	LB4100	TRADC18
C8	B1	3	23842	35606	5/2/2018 12:31	5/2/2018 12:34	LB4100	TRADC18
C1	B2	3	26882	30461	5/2/2018 12:48	5/2/2018 12:51	LB4100	TRADC18
C2	B2	3	29890	34274	5/2/2018 12:44	5/2/2018 12:47	LB4100	TRADC18
C3	B2	3	29343	32938	5/2/2018 12:56	5/2/2018 12:59	LB4100	TRADC18
C4	B2	3	31319	37074	5/2/2018 12:52	5/2/2018 12:55	LB4100	TRADC18
C5	B2	3	28852	37448	5/2/2018 12:31	5/2/2018 12:34	LB4100	TRADC18
C6	B2	3	26848	38349	5/2/2018 12:26	5/2/2018 12:29	LB4100	TRADC18
C7	B2	3	23339	36283	5/2/2018 12:40	5/2/2018 12:43	LB4100	TRADC18
C8	B2	3	20721	36886	5/2/2018 12:36	5/2/2018 12:39	LB4100	TRADC18
C1	B3	3	18197	29664	5/2/2018 12:52	5/2/2018 12:55	LB4100	TRADC18
C2	B3	3	19966	33840	5/2/2018 12:48	5/2/2018 12:51	LB4100	TRADC18
C3	B3	3	19155	31640	5/2/2018 12:44	5/2/2018 12:47	LB4100	TRADC18
C4	B3	3	14584	34796	5/2/2018 12:56	5/2/2018 12:59	LB4100	TRADC18
C5	B3	3	18503	36795	5/2/2018 12:36	5/2/2018 12:39	LB4100	TRADC18
C6	B3	3	17035	37031	5/2/2018 12:31	5/2/2018 12:34	LB4100	TRADC18
C7	B3	3	14517	35586	5/2/2018 12:26	5/2/2018 12:29	LB4100	TRADC18
C8	B3	3	13492	35691	5/2/2018 12:40	5/2/2018 12:43	LB4100	TRADC18
C1	B4	3	21955	26938	5/2/2018 12:56	5/2/2018 12:59	LB4100	TRADC18
C2	B4	3	24735	30936	5/2/2018 12:52	5/2/2018 12:55	LB4100	TRADC18
C3	B4	3	23380	28805	5/2/2018 12:48	5/2/2018 12:51	LB4100	TRADC18
C4	B4	3	24960	33671	5/2/2018 12:44	5/2/2018 12:47	LB4100	TRADC18
C5	B4	3	22882	33733	5/2/2018 12:40	5/2/2018 12:43	LB4100	TRADC18
C6	B4	3	21183	34631	5/2/2018 12:36	5/2/2018 12:39	LB4100	TRADC18
C7	B4	3	18583	33613	5/2/2018 12:31	5/2/2018 12:34	LB4100	TRADC18
C8	B4	3	16783	33348	5/2/2018 12:26	5/2/2018 12:29	LB4100	TRADC18
C1	C1	3	31586	29049	5/2/2018 13:02	5/2/2018 13:05	LB4100	TRADC18
C2	C1	3	35181	33469	5/2/2018 13:14	5/2/2018 13:17	LB4100	TRADC18
C3	C1	3	34171	31588	5/2/2018 13:10	5/2/2018 13:13	LB4100	TRADC18
C4	C1	3	36117	35580	5/2/2018 13:06	5/2/2018 13:09	LB4100	TRADC18

C5	C1	3	34331	36290	5/2/2018 13:18	5/2/2018 13:21	LB4100	TRADC18
C6	C1	3	31789	36665	5/2/2018 13:30	5/2/2018 13:33	LB4100	TRADC18
C7	C1	3	27700	35383	5/2/2018 13:26	5/2/2018 13:29	LB4100	TRADC18
C8	C1	3	24682	35472	5/2/2018 13:22	5/2/2018 13:25	LB4100	TRADC18
C1	C2	3	26524	29862	5/2/2018 13:06	5/2/2018 13:09	LB4100	TRADC18
C2	C2	3	29490	34121	5/2/2018 13:02	5/2/2018 13:05	LB4100	TRADC18
C3	C2	3	28616	32194	5/2/2018 13:14	5/2/2018 13:17	LB4100	TRADC18
C4	C2	3	30786	36508	5/2/2018 13:10	5/2/2018 13:13	LB4100	TRADC18
C5	C2	3	28527	37316	5/2/2018 13:22	5/2/2018 13:25	LB4100	TRADC18
C6	C2	3	26635	37742	5/2/2018 13:18	5/2/2018 13:21	LB4100	TRADC18
C7	C2	3	23183	36237	5/2/2018 13:30	5/2/2018 13:33	LB4100	TRADC18
C8	C2	3	20802	36162	5/2/2018 13:26	5/2/2018 13:29	LB4100	TRADC18
C1	C3	3	24925	30267	5/2/2018 13:10	5/2/2018 13:13	LB4100	TRADC18
C2	C3	3	27821	34302	5/2/2018 13:06	5/2/2018 13:09	LB4100	TRADC18
C3	C3	3	26727	32416	5/2/2018 13:02	5/2/2018 13:05	LB4100	TRADC18
C4	C3	3	28954	36615	5/2/2018 13:14	5/2/2018 13:17	LB4100	TRADC18
C5	C3	3	26998	37182	5/2/2018 13:26	5/2/2018 13:29	LB4100	TRADC18
C6	C3	3	24736	37686	5/2/2018 13:22	5/2/2018 13:25	LB4100	TRADC18
C7	C3	3	21603	36634	5/2/2018 13:18	5/2/2018 13:21	LB4100	TRADC18
C8	C3	3	19512	36320	5/2/2018 13:30	5/2/2018 13:33	LB4100	TRADC18
C1	C4	3	19059	28943	5/2/2018 13:14	5/2/2018 13:17	LB4100	TRADC18
C2	C4	3	22116	33401	5/2/2018 13:10	5/2/2018 13:13	LB4100	TRADC18
C3	C4	3	20536	31521	5/2/2018 13:06	5/2/2018 13:09	LB4100	TRADC18
C4	C4	3	20632	35706	5/2/2018 13:02	5/2/2018 13:05	LB4100	TRADC18
C5	C4	3	18448	36192	5/2/2018 13:30	5/2/2018 13:33	LB4100	TRADC18
C6	C4	3	19441	36960	5/2/2018 13:26	5/2/2018 13:29	LB4100	TRADC18
C7	C4	3	16327	35577	5/2/2018 13:22	5/2/2018 13:25	LB4100	TRADC18
C8	C4	3	14594	35626	5/2/2018 13:18	5/2/2018 13:21	LB4100	TRADC18
C1	E1	3	28588	28209	5/2/2018 13:34	5/2/2018 13:37	LB4100	TRADC18
C2	E1	3	32708	32415	5/2/2018 13:46	5/2/2018 13:49	LB4100	TRADC18
C3	E1	3	31220	31195	5/2/2018 13:42	5/2/2018 13:45	LB4100	TRADC18
C4	E1	3	33482	34760	5/2/2018 13:38	5/2/2018 13:41	LB4100	TRADC18
C5	E1	3	31440	35443	5/2/2018 13:50	5/2/2018 13:53	LB4100	TRADC18
C6	E1	3	28778	35917	5/2/2018 14:02	5/2/2018 14:05	LB4100	TRADC18
C7	E1	3	25777	35314	5/2/2018 13:58	5/2/2018 14:01	LB4100	TRADC18
C8	E1	3	22386	35136	5/2/2018 13:54	5/2/2018 13:57	LB4100	TRADC18
C1	E2	3	17368	28437	5/2/2018 13:38	5/2/2018 13:41	LB4100	TRADC18
C2	E2	3	19552	32973	5/2/2018 13:34	5/2/2018 13:37	LB4100	TRADC18
C3	E2	3	18996	30767	5/2/2018 13:46	5/2/2018 13:49	LB4100	TRADC18
C4	E2	3	19847	35370	5/2/2018 13:42	5/2/2018 13:45	LB4100	TRADC18
C5	E2	3	17962	35756	5/2/2018 13:54	5/2/2018 13:57	LB4100	TRADC18
C6	E2	3	16528	36551	5/2/2018 13:50	5/2/2018 13:53	LB4100	TRADC18
C7	E2	3	14825	35608	5/2/2018 14:02	5/2/2018 14:05	LB4100	TRADC18
C8	E2	3	12904	34666	5/2/2018 13:58	5/2/2018 14:01	LB4100	TRADC18
C1	E3	3	27334	28893	5/2/2018 13:42	5/2/2018 13:45	LB4100	TRADC18
C2	E3	3	30351	33292	5/2/2018 13:38	5/2/2018 13:41	LB4100	TRADC18
C3	E3	3	29143	31497	5/2/2018 13:34	5/2/2018 13:37	LB4100	TRADC18
C4	E3	3	31394	35686	5/2/2018 13:46	5/2/2018 13:49	LB4100	TRADC18
C5	E3	3	29906	36367	5/2/2018 13:58	5/2/2018 14:01	LB4100	TRADC18
C6	E3	3	27197	36497	5/2/2018 13:54	5/2/2018 13:57	LB4100	TRADC18
C7	E3	3	24227	35771	5/2/2018 13:50	5/2/2018 13:53	LB4100	TRADC18
C8	E3	3	21109	35253	5/2/2018 14:02	5/2/2018 14:05	LB4100	TRADC18
C1	E4	3	25914	29153	5/2/2018 13:46	5/2/2018 13:49	LB4100	TRADC18
C2	E4	3	29058	33041	5/2/2018 13:42	5/2/2018 13:45	LB4100	TRADC18
C3	E4	3	27678	31303	5/2/2018 13:38	5/2/2018 13:41	LB4100	TRADC18
C4	E4	3	29477	34922	5/2/2018 13:34	5/2/2018 13:37	LB4100	TRADC18
C5	E4	3	27557	35947	5/2/2018 14:02	5/2/2018 14:05	LB4100	TRADC18
C6	E4	3	25460	36661	5/2/2018 13:58	5/2/2018 14:01	LB4100	TRADC18
C7	E4	3	22319	35517	5/2/2018 13:54	5/2/2018 13:57	LB4100	TRADC18
C8	E4	3	20103	35667	5/2/2018 13:50	5/2/2018 13:53	LB4100	TRADC18
C1	F1	3	26594	30419	5/2/2018 13:50	5/2/2018 13:53	LB4100	TRADC18

C2	F1	3	29113	34080	5/2/2018 14:02	5/2/2018 14:05	LB4100	TRADC18
C3	F1	3	28264	32471	5/2/2018 13:58	5/2/2018 14:01	LB4100	TRADC18
C4	F1	3	30156	36655	5/2/2018 13:54	5/2/2018 13:57	LB4100	TRADC18
C5	F1	3	28427	37487	5/2/2018 13:34	5/2/2018 13:37	LB4100	TRADC18
C6	F1	3	25751	37642	5/2/2018 13:46	5/2/2018 13:49	LB4100	TRADC18
C7	F1	3	22775	36386	5/2/2018 13:42	5/2/2018 13:45	LB4100	TRADC18
C8	F1	3	20303	36347	5/2/2018 13:38	5/2/2018 13:41	LB4100	TRADC18
C1	F2	3	20491	30506	5/2/2018 13:54	5/2/2018 13:57	LB4100	TRADC18
C2	F2	3	22833	34463	5/2/2018 13:50	5/2/2018 13:53	LB4100	TRADC18
C3	F2	3	22349	32655	5/2/2018 14:02	5/2/2018 14:05	LB4100	TRADC18
C4	F2	3	23335	37405	5/2/2018 13:58	5/2/2018 14:01	LB4100	TRADC18
C5	F2	3	20331	37175	5/2/2018 13:38	5/2/2018 13:41	LB4100	TRADC18
C6	F2	3	19067	38149	5/2/2018 13:34	5/2/2018 13:37	LB4100	TRADC18
C7	F2	3	17460	37211	5/2/2018 13:46	5/2/2018 13:49	LB4100	TRADC18
C8	F2	3	15535	37033	5/2/2018 13:42	5/2/2018 13:45	LB4100	TRADC18
C1	F3	3	25217	31003	5/2/2018 13:58	5/2/2018 14:01	LB4100	TRADC18
C2	F3	3	27979	34974	5/2/2018 13:54	5/2/2018 13:57	LB4100	TRADC18
C3	F3	3	26867	32592	5/2/2018 13:50	5/2/2018 13:53	LB4100	TRADC18
C4	F3	3	28875	37261	5/2/2018 14:02	5/2/2018 14:05	LB4100	TRADC18
C5	F3	3	27059	37833	5/2/2018 13:42	5/2/2018 13:45	LB4100	TRADC18
C6	F3	3	24668	38342	5/2/2018 13:38	5/2/2018 13:41	LB4100	TRADC18
C7	F3	3	21656	37253	5/2/2018 13:34	5/2/2018 13:37	LB4100	TRADC18
C8	F3	3	19444	37127	5/2/2018 13:46	5/2/2018 13:49	LB4100	TRADC18
C1	F4	3	20389	30711	5/2/2018 14:02	5/2/2018 14:05	LB4100	TRADC18
C2	F4	3	22742	34395	5/2/2018 13:58	5/2/2018 14:01	LB4100	TRADC18
C3	F4	3	21754	32865	5/2/2018 13:54	5/2/2018 13:57	LB4100	TRADC18
C4	F4	3	22390	36318	5/2/2018 13:50	5/2/2018 13:53	LB4100	TRADC18
C5	F4	3	20562	37410	5/2/2018 13:46	5/2/2018 13:49	LB4100	TRADC18
C6	F4	3	18521	37723	5/2/2018 13:42	5/2/2018 13:45	LB4100	TRADC18
C7	F4	3	15923	36163	5/2/2018 13:38	5/2/2018 13:41	LB4100	TRADC18
C8	F4	3	13895	36487	5/2/2018 13:34	5/2/2018 13:37	LB4100	TRADC18
C1	G1	3	27655	29807	5/2/2018 14:07	5/2/2018 14:10	LB4100	TRADC18
C2	G1	3	30846	33553	5/2/2018 14:20	5/2/2018 14:23	LB4100	TRADC18
C3	G1	3	29186	32071	5/2/2018 14:15	5/2/2018 14:18	LB4100	TRADC18
C4	G1	3	31552	36078	5/2/2018 14:11	5/2/2018 14:14	LB4100	TRADC18
C5	G1	3	29547	36313	5/2/2018 14:48	5/2/2018 14:51	LB4100	TRADC18
C6	G1	3	27785	37471	5/2/2018 14:44	5/2/2018 14:47	LB4100	TRADC18
C7	G1	3	22690	34880	5/2/2018 14:40	5/2/2018 14:43	LB4100	TRADC18
C8	G1	3	21367	35766	5/2/2018 14:35	5/2/2018 14:38	LB4100	TRADC18
C1	G2	3	24852	29991	5/2/2018 14:11	5/2/2018 14:14	LB4100	TRADC18
C2	G2	3	28211	34145	5/2/2018 14:07	5/2/2018 14:10	LB4100	TRADC18
C3	G2	3	27474	32374	5/2/2018 14:20	5/2/2018 14:23	LB4100	TRADC18
C4	G2	3	28862	37129	5/2/2018 14:15	5/2/2018 14:18	LB4100	TRADC18
C5	G2	3	27021	37335	5/2/2018 14:35	5/2/2018 14:38	LB4100	TRADC18
C6	G2	3	24556	37199	5/2/2018 14:48	5/2/2018 14:51	LB4100	TRADC18
C7	G2	3	20934	35903	5/2/2018 14:44	5/2/2018 14:47	LB4100	TRADC18
C8	G2	3	19114	36183	5/2/2018 14:40	5/2/2018 14:43	LB4100	TRADC18
C1	G3	3	21042	30132	5/2/2018 14:15	5/2/2018 14:18	LB4100	TRADC18
C2	G3	3	23018	34002	5/2/2018 14:11	5/2/2018 14:14	LB4100	TRADC18
C3	G3	3	22893	32512	5/2/2018 14:07	5/2/2018 14:10	LB4100	TRADC18
C4	G3	3	23983	36833	5/2/2018 14:20	5/2/2018 14:23	LB4100	TRADC18
C5	G3	3	22298	37217	5/2/2018 14:40	5/2/2018 14:43	LB4100	TRADC18
C6	G3	3	21020	38141	5/2/2018 14:35	5/2/2018 14:38	LB4100	TRADC18
C7	G3	3	17006	35866	5/2/2018 14:48	5/2/2018 14:51	LB4100	TRADC18
C8	G3	3	16020	36354	5/2/2018 14:44	5/2/2018 14:47	LB4100	TRADC18
C1	G4	3	25807	29118	5/2/2018 14:20	5/2/2018 14:23	LB4100	TRADC18
C2	G4	3	28559	32903	5/2/2018 14:15	5/2/2018 14:18	LB4100	TRADC18
C3	G4	3	27133	31152	5/2/2018 14:11	5/2/2018 14:14	LB4100	TRADC18
C4	G4	3	29200	35482	5/2/2018 14:07	5/2/2018 14:10	LB4100	TRADC18
C5	G4	3	27348	35988	5/2/2018 14:44	5/2/2018 14:47	LB4100	TRADC18
C6	G4	3	25799	36936	5/2/2018 14:40	5/2/2018 14:43	LB4100	TRADC18

C7	G4	3	21116	34940	5/2/2018 14:35	5/2/2018 14:38	LB4100	TRADC18
C8	G4	3	19869	35392	5/2/2018 14:48	5/2/2018 14:51	LB4100	TRADC18
C1	H1	3	28430	29534	5/2/2018 14:48	5/2/2018 14:51	LB4100	TRADC18
C2	H1	3	29867	31417	5/2/2018 14:44	5/2/2018 14:47	LB4100	TRADC18
C3	H1	3	29545	31211	5/2/2018 14:40	5/2/2018 14:43	LB4100	TRADC18
C4	H1	3	32425	35839	5/2/2018 14:35	5/2/2018 14:38	LB4100	TRADC18
C5	H1	3	30395	36685	5/2/2018 14:07	5/2/2018 14:10	LB4100	TRADC18
C6	H1	3	27881	37064	5/2/2018 14:52	5/2/2018 14:55	LB4100	TRADC18
C7	H1	3	24536	35787	5/2/2018 14:20	5/2/2018 14:23	LB4100	TRADC18
C8	H1	3	22145	36078	5/2/2018 14:11	5/2/2018 14:14	LB4100	TRADC18
C1	H2	3	24754	30363	5/2/2018 14:35	5/2/2018 14:38	LB4100	TRADC18
C2	H2	3	27045	33946	5/2/2018 14:48	5/2/2018 14:51	LB4100	TRADC18
C3	H2	3	27333	35760	5/2/2018 14:44	5/2/2018 14:47	LB4100	TRADC18
C4	H2	3	27107	35792	5/2/2018 14:40	5/2/2018 14:43	LB4100	TRADC18
C5	H2	3	26034	37295	5/2/2018 14:11	5/2/2018 14:14	LB4100	TRADC18
C6	H2	3	24201	37624	5/2/2018 14:07	5/2/2018 14:10	LB4100	TRADC18
C7	H2	3	19668	35517	5/2/2018 14:52	5/2/2018 14:55	LB4100	TRADC18
C8	H2	3	18356	36103	5/2/2018 14:20	5/2/2018 14:23	LB4100	TRADC18
C1	H3	3	24240	30490	5/2/2018 14:40	5/2/2018 14:43	LB4100	TRADC18
C2	H3	3	27477	34705	5/2/2018 14:35	5/2/2018 14:38	LB4100	TRADC18
C3	H3	3	26869	33037	5/2/2018 14:48	5/2/2018 14:51	LB4100	TRADC18
C4	H3	3	24598	30371	5/2/2018 14:44	5/2/2018 14:47	LB4100	TRADC18
C5	H3	3	26785	37959	5/2/2018 14:20	5/2/2018 14:23	LB4100	TRADC18
C6	H3	3	24345	38337	5/2/2018 14:11	5/2/2018 14:14	LB4100	TRADC18
C7	H3	3	21232	36995	5/2/2018 14:07	5/2/2018 14:10	LB4100	TRADC18
C8	H3	3	18819	36931	5/2/2018 14:52	5/2/2018 14:55	LB4100	TRADC18
C1	H4	3	23327	32677	5/2/2018 14:44	5/2/2018 14:47	LB4100	TRADC18
C2	H4	3	22977	32734	5/2/2018 14:40	5/2/2018 14:43	LB4100	TRADC18
C3	H4	3	21840	31023	5/2/2018 14:35	5/2/2018 14:38	LB4100	TRADC18
C4	H4	3	23592	34598	5/2/2018 14:48	5/2/2018 14:51	LB4100	TRADC18
C5	H4	3	21893	35881	5/2/2018 14:52	5/2/2018 14:55	LB4100	TRADC18
C6	H4	3	19481	36139	5/2/2018 14:20	5/2/2018 14:23	LB4100	TRADC18
C7	H4	3	17075	35010	5/2/2018 14:11	5/2/2018 14:14	LB4100	TRADC18
C8	H4	3	15611	35251	5/2/2018 14:07	5/2/2018 14:10	LB4100	TRADC18
C1	I1	3	27656	26895	5/2/2018 7:51	5/2/2018 7:54	LB4100	TRADC18
C2	I1	3	32547	31758	5/2/2018 8:20	5/2/2018 8:23	LB4100	TRADC18
C3	I1	3	31100	29803	5/2/2018 8:13	5/2/2018 8:16	LB4100	TRADC18
C4	I1	3	34857	34831	5/2/2018 8:07	5/2/2018 8:10	LB4100	TRADC18
C5	I1	3	30753	34163	5/2/2018 8:25	5/2/2018 8:28	LB4100	TRADC18
C6	I1	3	28419	34826	5/2/2018 8:44	5/2/2018 8:47	LB4100	TRADC18
C7	I1	3	25479	34251	5/2/2018 8:36	5/2/2018 8:39	LB4100	TRADC18
C8	I1	3	22805	33967	5/2/2018 8:31	5/2/2018 8:34	LB4100	TRADC18
C1	I2	3	31453	29884	5/2/2018 8:07	5/2/2018 8:10	LB4100	TRADC18
C2	I2	3	35528	34223	5/2/2018 7:51	5/2/2018 7:54	LB4100	TRADC18
C3	I2	3	33264	31952	5/2/2018 8:20	5/2/2018 8:23	LB4100	TRADC18
C4	I2	3	37644	37703	5/2/2018 8:13	5/2/2018 8:16	LB4100	TRADC18
C5	I2	3	34611	37270	5/2/2018 8:31	5/2/2018 8:34	LB4100	TRADC18
C6	I2	3	31401	37558	5/2/2018 8:25	5/2/2018 8:28	LB4100	TRADC18
C7	I2	3	27726	36086	5/2/2018 8:44	5/2/2018 8:47	LB4100	TRADC18
C8	I2	3	25165	36256	5/2/2018 8:36	5/2/2018 8:39	LB4100	TRADC18
C1	I3	3	32281	29531	5/2/2018 8:13	5/2/2018 8:16	LB4100	TRADC18
C2	I3	3	36728	34626	5/2/2018 8:07	5/2/2018 8:10	LB4100	TRADC18
C3	I3	3	34265	31901	5/2/2018 7:51	5/2/2018 7:54	LB4100	TRADC18
C4	I3	3	37380	36955	5/2/2018 8:20	5/2/2018 8:23	LB4100	TRADC18
C5	I3	3	35068	37243	5/2/2018 8:36	5/2/2018 8:39	LB4100	TRADC18
C6	I3	3	32161	37391	5/2/2018 8:31	5/2/2018 8:34	LB4100	TRADC18
C7	I3	3	28471	35837	5/2/2018 8:25	5/2/2018 8:28	LB4100	TRADC18
C8	I3	3	24844	35879	5/2/2018 8:44	5/2/2018 8:47	LB4100	TRADC18
C1	I4	3	31207	29270	5/2/2018 8:20	5/2/2018 8:23	LB4100	TRADC18
C2	I4	3	35598	34131	5/2/2018 8:13	5/2/2018 8:16	LB4100	TRADC18
C3	I4	3	33505	31663	5/2/2018 8:07	5/2/2018 8:10	LB4100	TRADC18

C4	I4	3	38195	37243	5/2/2018 7:51	5/2/2018 7:54	LB4100	TRADC18
C5	I4	3	34462	36998	5/2/2018 8:44	5/2/2018 8:47	LB4100	TRADC18
C6	I4	3	31559	37276	5/2/2018 8:36	5/2/2018 8:39	LB4100	TRADC18
C7	I4	3	28173	35929	5/2/2018 8:31	5/2/2018 8:34	LB4100	TRADC18
C8	I4	3	24753	35849	5/2/2018 8:25	5/2/2018 8:28	LB4100	TRADC18
C1	J1	3	29984	27804	5/2/2018 8:25	5/2/2018 8:28	LB4100	TRADC18
C2	J1	3	33733	31928	5/2/2018 8:44	5/2/2018 8:47	LB4100	TRADC18
C3	J1	3	32560	29988	5/2/2018 8:36	5/2/2018 8:39	LB4100	TRADC18
C4	J1	3	35123	34657	5/2/2018 8:31	5/2/2018 8:34	LB4100	TRADC18
C5	J1	3	33328	35189	5/2/2018 7:51	5/2/2018 7:54	LB4100	TRADC18
C6	J1	3	29876	35439	5/2/2018 8:20	5/2/2018 8:23	LB4100	TRADC18
C7	J1	3	26379	34547	5/2/2018 8:13	5/2/2018 8:16	LB4100	TRADC18
C8	J1	3	23475	34399	5/2/2018 8:07	5/2/2018 8:10	LB4100	TRADC18
C1	J2	3	30437	27959	5/2/2018 8:31	5/2/2018 8:34	LB4100	TRADC18
C2	J2	3	34322	32116	5/2/2018 8:25	5/2/2018 8:28	LB4100	TRADC18
C3	J2	3	32033	29613	5/2/2018 8:44	5/2/2018 8:47	LB4100	TRADC18
C4	J2	3	36158	35247	5/2/2018 8:36	5/2/2018 8:39	LB4100	TRADC18
C5	J2	3	32826	34975	5/2/2018 8:07	5/2/2018 8:10	LB4100	TRADC18
C6	J2	3	30334	35675	5/2/2018 7:51	5/2/2018 7:54	LB4100	TRADC18
C7	J2	3	26318	34216	5/2/2018 8:20	5/2/2018 8:23	LB4100	TRADC18
C8	J2	3	24142	34311	5/2/2018 8:13	5/2/2018 8:16	LB4100	TRADC18
C1	J3	3	31226	29240	5/2/2018 8:36	5/2/2018 8:39	LB4100	TRADC18
C2	J3	3	33549	32526	5/2/2018 8:31	5/2/2018 8:34	LB4100	TRADC18
C3	J3	3	32023	30388	5/2/2018 8:25	5/2/2018 8:28	LB4100	TRADC18
C4	J3	3	35069	34948	5/2/2018 8:44	5/2/2018 8:47	LB4100	TRADC18
C5	J3	3	32541	35660	5/2/2018 8:13	5/2/2018 8:16	LB4100	TRADC18
C6	J3	3	29125	35903	5/2/2018 8:08	5/2/2018 8:11	LB4100	TRADC18
C7	J3	3	26472	34834	5/2/2018 7:51	5/2/2018 7:54	LB4100	TRADC18
C8	J3	3	23477	34882	5/2/2018 8:20	5/2/2018 8:23	LB4100	TRADC18
C1	J4	3	30141	27835	5/2/2018 8:44	5/2/2018 8:47	LB4100	TRADC18
C2	J4	3	35606	33249	5/2/2018 8:36	5/2/2018 8:39	LB4100	TRADC18
C3	J4	3	32875	30261	5/2/2018 8:31	5/2/2018 8:34	LB4100	TRADC18
C4	J4	3	35770	35041	5/2/2018 8:25	5/2/2018 8:28	LB4100	TRADC18
C5	J4	3	33248	35348	5/2/2018 8:20	5/2/2018 8:23	LB4100	TRADC18
C6	J4	3	30440	35708	5/2/2018 8:13	5/2/2018 8:16	LB4100	TRADC18
C7	J4	3	26079	33990	5/2/2018 8:08	5/2/2018 8:11	LB4100	TRADC18
C8	J4	3	24310	34761	5/2/2018 7:51	5/2/2018 7:54	LB4100	TRADC18

Total Radium Liquid

Filename : TOTRA.XLS
File type : Excel
Version # : 1.3.9

Batch : 1562969
Analyst : NXL1
Prep Date : 4/11/2018
Method Uncertainty: 0.0829

Geometry: Tuffryn Filter

Carrier S/N : 2628181
Carrier Exp Date : 12/7/2018
Carrier Volume Added: 0.50
Carrier Weight (mg/ml): 26.48
Carrier Weight StDev.: 0.10

Procedure Code : GFCGANBL
Parmname : Total Radium
Required MDA : 1 pCi/L
Halflife of Rn-222 : 3.8235 days

Sample Characteristics					Carrier Calculations				
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Sample Date/Time	Carrier Weight (mg) (Standard)	Residue Weight (mg) (Sample)	Residue Weight StDev. (mg)	Carrier Aliquot (mL)	Carrier Aliquot StDev. (mL)
1	1203536991.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
2	1203536992.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	10.30	0.051599	0.5	0.001000
3	1203536993.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	19.40	0.090711	0.8	0.000200
~~4~~	~~1203536994.1~~	~~1.0000~~	~~2.0399E-05~~	~~4/11/2018 0:00~~	~~26.48~~	~~25.10~~	~~0.115210~~	~~1.0~~	~~0.002000~~
5	1203536995.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	39.20	0.175812	1.5	0.000200
6	1203536996.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	50.90	0.226098	2.0	0.000200
~~7~~	~~1203536997.1~~	~~1.0000~~	~~2.0399E-05~~	~~4/11/2018 0:00~~	~~26.48~~	~~66.50~~	~~0.293147~~	~~2.5~~	~~0.000200~~
8	1203536998.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
9	1203536999.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
10	1203537000.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	10.30	0.051599	0.5	0.001000
11	1203537001.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	19.40	0.090711	0.8	0.000200
12	1203537002.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
~~13~~	~~1203537003.1~~	~~1.0000~~	~~2.0399E-05~~	~~4/11/2018 0:00~~	~~26.48~~	~~39.20~~	~~0.175812~~	~~1.5~~	~~0.000200~~
~~14~~	~~1203537004.1~~	~~1.0000~~	~~2.0399E-05~~	~~4/11/2018 0:00~~	~~26.48~~	~~50.90~~	~~0.226098~~	~~2.0~~	~~0.000200~~
~~15~~	~~1203537005.1~~	~~1.0000~~	~~2.0399E-05~~	~~4/11/2018 0:00~~	~~26.48~~	~~66.50~~	~~0.293147~~	~~2.5~~	~~0.000200~~
~~16~~	~~1203537006.1~~	~~1.0000~~	~~2.0399E-05~~	~~4/11/2018 0:00~~	~~26.48~~	~~94.10~~	~~0.411772~~	~~3.5~~	~~0.000200~~
17	1203537007.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
~~18~~	~~1203537008.1~~	~~1.0000~~	~~2.0399E-05~~	~~4/11/2018 0:00~~	~~26.48~~	~~8.00~~	~~0.041714~~	~~0.4~~	~~0.000200~~
19	1203537009.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	19.40	0.090711	0.8	0.000200
20	1203537010.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	25.10	0.115210	1.0	0.002000
21	1203537011.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	39.20	0.175812	1.5	0.000200
22	1203537012.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	50.90	0.226098	2.0	0.000200
23	1203537013.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	66.50	0.293147	2.5	0.000200
24	1203537014.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	94.10	0.411772	3.5	0.000200
25	1203537015.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
26	1203537016.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	10.30	0.051599	0.5	0.001000
27	1203537017.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	19.40	0.090711	0.8	0.000200
28	1203537018.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	25.10	0.115210	1.0	0.002000
29	1203537019.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	39.20	0.175812	1.5	0.000200
30	1203537020.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	50.90	0.226098	2.0	0.000200
31	1203537021.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	66.50	0.293147	2.5	0.000200
32	1203537022.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	94.10	0.411772	3.5	0.000200
33	1203537023.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
34	1203537024.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	10.30	0.051599	0.5	0.001000
35	1203537025.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	19.40	0.090711	0.8	0.000200
36	1203537026.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	25.10	0.115210	1.0	0.002000
37	1203537027.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	39.20	0.175812	1.5	0.000200
38	1203537028.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	50.90	0.226098	2.0	0.000200
39	1203537029.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	66.50	0.293147	2.5	0.000200
40	1203537030.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200

Pipet, 0.1 ml Stdev : +/-	0.000200	ml
Pipet, 0.5 ml Stdev : +/-	0.001000	ml
Pipet, 1 ml Stdev : +/-	0.002000	ml
Pipet, 5 ml Stdev : +/-	0.010000	ml

Analytical SOP: GL-RAD-A-001
Instrument SOP: GL-RAD-I-006

Count Raw Data

Pos.	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Gross Alpha CPM	Count Start Date/Time	Precipitation Date/Time	Ingrowth factor	Calculated Sample Recovery %	Sample Recovery Error %
1	A1	2	2317	2930	1158.500	5/17/2019 13:08	4/11/2018 14:40	4.000	75.5%	0.83%
2	A2	2	2486	2806	1243.000	5/17/2019 13:08	4/11/2018 14:40	4.000	77.8%	0.83%
3	A3	2	2996	2989	1498.000	5/17/2019 13:08	4/11/2018 14:40	4.000	91.6%	0.76%
~~4~~	~~A4~~	~~2~~	~~0~~	~~0~~	~~0.000~~	~~5/17/2019 13:08~~	~~4/11/2018 14:40~~	~~4.000~~	~~94.8%~~	~~0.78%~~
5	B1	2	2739	2953	1369.500	5/17/2019 13:08	4/11/2018 14:40	4.000	98.7%	0.74%
6	B2	2	2357	2975	1178.500	5/17/2019 13:08	4/11/2018 14:40	4.000	96.1%	0.73%
~~7~~	~~B3~~	~~2~~	~~0~~	~~0~~	~~0.000~~	~~5/17/2019 13:08~~	~~4/11/2018 14:40~~	~~4.000~~	~~100%~~	~~0.73%~~
8	B4	2	2397	2635	1198.500	5/21/2019 12:09	4/11/2018 14:40	4.000	75.5%	0.83%
9	C1	2	3169	2993	1584.500	5/17/2019 13:18	4/11/2018 14:40	4.000	75.5%	0.83%
10	C2	2	2787	2969	1393.500	5/17/2019 13:18	4/11/2018 14:40	4.000	77.8%	0.83%
11	C3	2	2713	3126	1356.500	5/17/2019 13:18	4/11/2018 14:40	4.000	91.6%	0.76%
12	C4	2	2352	3000	1176.000	5/21/2019 12:16	4/11/2018 14:40	4.000	75.5%	0.83%
~~13~~	~~D1~~	~~2~~	~~0~~	~~0~~	~~0.000~~	~~5/17/2019 13:18~~	~~4/11/2018 14:40~~	~~4.000~~	~~98.7%~~	~~0.74%~~
~~14~~	~~D2~~	~~2~~	~~0~~	~~0~~	~~0.000~~	~~5/17/2019 13:18~~	~~4/11/2018 14:40~~	~~4.000~~	~~96.1%~~	~~0.73%~~
~~15~~	~~D3~~	~~2~~	~~0~~	~~0~~	~~0.000~~	~~5/17/2019 13:18~~	~~4/11/2018 14:40~~	~~4.000~~	~~100%~~	~~0.73%~~
~~16~~	~~D4~~	~~2~~	~~0~~	~~0~~	~~0.000~~	~~5/17/2019 13:18~~	~~4/11/2018 14:40~~	~~4.000~~	~~102%~~	~~0.72%~~
17	E1	2	2751	2874	1375.500	5/17/2019 13:12	4/11/2018 14:40	4.000	75.5%	0.83%
~~18~~	~~E2~~	~~2~~	~~2327~~	~~2870~~	~~1163.500~~	~~5/21/2019 12:19~~	~~4/11/2018 14:40~~	~~4.000~~	~~75.5%~~	~~0.83%~~
19	E3	2	2821	2921	1410.500	5/17/2019 13:12	4/11/2018 14:40	4.000	91.6%	0.76%
20	E4	2	2699	2971	1349.500	5/17/2019 13:12	4/11/2018 14:40	4.000	94.8%	0.78%
21	F1	2	2480	3190	1240.000	5/17/2019 13:12	4/11/2018 14:40	4.000	98.7%	0.74%
22	F2	2	1985	3175	992.500	5/17/2019 13:12	4/11/2018 14:40	4.000	96.1%	0.73%
23	F3	2	2057	3100	1028.500	5/17/2019 13:12	4/11/2018 14:40	4.000	100%	0.73%
24	F4	2	1032	1782	516.000	5/17/2019 13:12	4/11/2018 14:40	4.000	102%	0.72%
25	G1	2	2649	2861	1324.500	5/17/2019 13:15	4/11/2018 14:40	4.000	75.5%	0.83%
26	G2	2	2508	2863	1254.000	5/17/2019 13:15	4/11/2018 14:40	4.000	77.8%	0.83%
27	G3	2	2245	3089	1122.500	5/17/2019 13:15	4/11/2018 14:40	4.000	91.6%	0.76%
28	G4	2	2640	3048	1320.000	5/17/2019 13:15	4/11/2018 14:40	4.000	94.8%	0.78%
29	H1	2	2212	3008	1106.000	5/17/2019 13:15	4/11/2018 14:40	4.000	98.7%	0.74%
30	H2	2	1983	2948	991.500	5/17/2019 13:15	4/11/2018 14:40	4.000	96.1%	0.73%
31	H3	2	2163	3357	1081.500	5/17/2019 13:15	4/11/2018 14:40	4.000	100%	0.73%
32	H4	2	1132	1788	566.000	5/17/2019 13:15	4/11/2018 14:40	4.000	102%	0.72%
33	I1	2	2687	2609	1343.500	5/17/2019 13:04	4/11/2018 14:40	4.000	75.5%	0.83%
34	I2	2	2788	2826	1394.000	5/17/2019 13:04	4/11/2018 14:40	4.000	77.8%	0.83%
35	I3	2	2973	2821	1486.500	5/17/2019 13:04	4/11/2018 14:40	4.000	91.6%	0.76%
36	I4	2	2967	2897	1483.500	5/17/2019 13:04	4/11/2018 14:40	4.000	94.8%	0.78%
37	J1	2	2852	2921	1426.000	5/17/2019 13:04	4/11/2018 14:40	4.000	98.7%	0.74%
38	J2	2	2820	2823	1410.000	5/17/2019 13:04	4/11/2018 14:40	4.000	96.1%	0.73%
39	J3	2	2655	2904	1327.500	5/17/2019 13:04	4/11/2018 14:40	4.000	100%	0.73%
40	J4	2	3012	2686	1506.000	5/21/2019 12:13	4/11/2018 14:40	4.000	75.5%	0.83%

Calibration Data

Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Beta X-Talk	Weekly Bkg CPM	Weekly Bkg Count Start Date/Time	Weekly Bkg Count Time (min.)
LB4100	5/1/2018	5/31/2019	0.3306	0.02769	0.00019	0.082	5/10/2019 17:05	500
LB4100	5/1/2018	5/31/2019	0.2915	0.02957	0.00015	0.090	5/10/2019 17:05	500
LB4100	5/1/2018	5/31/2019	0.3334	0.02881	0.00017	0.084	5/10/2019 17:05	500
~~LB4100~~	~~5/1/2018~~	~~5/31/2019~~	~~0.0000~~	~~0.00000~~	~~0.00000~~	~~FAIL~~	~~12:00:00 AM~~	~~0~~
LB4100	5/1/2018	5/31/2019	0.3065	0.01406	0.00010	0.040	5/10/2019 17:03	500
LB4100	5/1/2018	5/31/2019	0.2420	0.03002	0.00011	0.150	5/10/2019 17:03	500
~~LB4100~~	~~5/1/2018~~	~~5/31/2019~~	~~0.1269~~	~~0.03025~~	~~0.00000~~	~~FAIL~~	~~12:00:00 AM~~	~~0~~
LB4100	5/1/2018	5/31/2019	0.2927	0.02055	0.00014	0.078	5/17/2019 15:22	500
LB4100	5/1/2018	5/31/2019	0.4192	0.02356	0.00016	0.148	5/10/2019 17:29	500
LB4100	5/1/2018	5/31/2019	0.3448	0.02436	0.00013	0.068	5/10/2019 17:29	500
LB4100	5/1/2018	5/31/2019	0.2970	0.02695	0.00014	0.076	5/10/2019 17:29	500
LB4100	5/1/2018	5/31/2019	0.2551	0.03542	0.00013	0.060	5/17/2019 15:42	500
~~LB4100~~	~~5/1/2018~~	~~5/31/2019~~	~~0.0000~~	~~0.03038~~	~~0.00000~~	~~FAIL~~	~~12:00:00 AM~~	~~0~~
~~LB4100~~	~~5/1/2018~~	~~5/31/2019~~	~~0.0000~~	~~0.03665~~	~~0.00000~~	~~FAIL~~	~~12:00:00 AM~~	~~0~~
~~LB4100~~	~~5/1/2018~~	~~5/31/2019~~	~~0.0000~~	~~0.04268~~	~~0.00000~~	~~FAIL~~	~~12:00:00 AM~~	~~0~~
~~LB4100~~	~~5/1/2018~~	~~5/31/2019~~	~~0.0000~~	~~0.03190~~	~~0.00000~~	~~FAIL~~	~~12:00:00 AM~~	~~0~~
LB4100	5/1/2018	5/31/2019	0.3838	0.01842	0.00014	0.064	5/10/2019 17:02	500
~~LB4100~~	~~5/1/2018~~	~~5/31/2019~~	~~0.2331~~	~~0.03047~~	~~0.00013~~	~~0.082~~	~~5/17/2019 15:22~~	~~500~~
LB4100	5/1/2018	5/31/2019	0.3251	0.02055	0.00013	0.038	5/10/2019 17:02	500
LB4100	5/1/2018	5/31/2019	0.2899	0.00769	0.00016	0.094	5/10/2019 17:02	500
LB4100	5/1/2018	5/31/2019	0.2586	0.01144	0.00021	0.048	5/10/2019 17:03	500
LB4100	5/1/2018	5/31/2019	0.1721	0.03128	0.00015	0.180	5/10/2019 17:03	500
LB4100	5/1/2018	5/31/2019	0.1987	0.02244	0.00021	0.086	5/10/2019 17:03	500
LB4100	5/1/2018	5/31/2019	0.1277	0.02862	0.00015	0.066	5/10/2019 17:03	500
LB4100	5/1/2018	5/31/2019	0.3659	0.03411	0.00015	0.024	5/10/2019 17:11	500
LB4100	5/1/2018	5/31/2019	0.3273	0.01976	0.00017	0.118	5/10/2019 17:11	500
LB4100	5/1/2018	5/31/2019	0.2491	0.02238	0.00009	0.124	5/10/2019 17:11	500
LB4100	5/1/2018	5/31/2019	0.2872	0.02077	0.00016	0.130	5/10/2019 17:11	500
LB4100	5/1/2018	5/31/2019	0.2766	0.01393	0.00009	0.060	5/10/2019 17:02	500
LB4100	5/1/2018	5/31/2019	0.2130	0.01701	0.00012	0.042	5/10/2019 17:02	500
LB4100	5/1/2018	5/31/2019	0.1921	0.01513	0.00016	0.084	5/10/2019 17:02	500
LB4100	5/1/2018	5/31/2019	0.1453	0.02054	0.00012	0.094	5/10/2019 17:02	500
LB4100	5/1/2018	5/31/2019	0.3802	0.00598	0.00017	0.052	5/10/2019 17:02	500
LB4100	5/1/2018	5/31/2019	0.4108	0.00564	0.00010	0.058	5/10/2019 17:02	500
LB4100	5/1/2018	5/31/2019	0.3860	0.01009	0.00021	0.060	5/10/2019 17:02	500
LB4100	5/1/2018	5/31/2019	0.3603	0.00692	0.00023	0.124	5/10/2019 17:02	500
LB4100	5/1/2018	5/31/2019	0.3024	0.01256	0.00016	0.202	5/10/2019 17:03	500
LB4100	5/1/2018	5/31/2019	0.2744	0.00765	0.00021	0.444	5/10/2019 17:03	500
LB4100	5/1/2018	5/31/2019	0.2371	0.01198	0.00016	0.152	5/10/2019 17:03	500
LB4100	5/1/2018	5/31/2019	0.4104	0.01086	0.00016	0.134	5/17/2019 15:17	500

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

Spike S/N : N/A
Spike Exp Date : N/A
Spike Activity (dpm/ml): N/A
Spike Volume Added: N/A

LCS S/N : 0299-H
LCS Exp Date : 12/4/2019
LCS Activity (dpm/ml): 2463.58
LCS Volume Added: 0.50

Results

Pos.	Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error %	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA Counting Uncertainty pCi/L	2 SIGMA Total Prop. Uncertainty pCi/L	Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
1	0.2132	0.1505	1	0.9777	**522.3825**	3.56%	1158.4180	24.0676	21.2774	92.3950		LCS			554.8607	94.1%
2	0.2460	0.1737	1	1.0923	**617.2126**	3.67%	1242.9100	24.9299	24.2686	109.6810		LCS			554.8607	111.2%
3	0.1765	0.1246	1	0.8025	**552.4649**	3.50%	1497.9160	27.3679	19.7874	97.4367		LCS			554.8607	99.6%
~~4~~	~~#DIV/0!~~	~~#DIV/0!~~	~~1~~	~~#DIV/0!~~	~~**#VALUE!**~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~		~~LCS~~			~~554.8607~~	~~#VALUE!~~
5	0.1229	0.0868	1	0.7320	**509.7644**	2.48%	1369.4600	26.1677	19.0936	86.4772		LCS			554.8607	91.9%
6	0.3096	0.2186	1	1.1636	**570.5321**	3.71%	1178.3500	24.2745	23.0396	101.5937		LCS			554.8607	102.8%
~~7~~	~~#DIV/0!~~	~~#DIV/0!~~	~~1~~	~~#DIV/0!~~	~~**#VALUE!**~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~		~~LCS~~			~~554.8607~~	~~#VALUE!~~
8	0.2348	0.1658	1	1.0956	**610.3333**	3.01%	1198.4220	24.4796	24.4391	105.5355		LCS			554.8607	110.0%
9	0.2259	0.1595	1	0.8525	**563.4774**	3.07%	1584.3520	28.1469	19.6236	97.6295		LCS			554.8607	101.6%
10	0.1808	0.1276	1	0.8851	**584.9951**	3.19%	1393.4320	26.3960	21.7231	101.8808		LCS			554.8607	105.4%
11	0.1884	0.1330	1	0.8870	**561.4611**	3.40%	1356.4240	26.0432	21.1322	98.6009		LCS			554.8607	101.2%
12	0.2364	0.1669	1	1.2105	**687.2262**	4.18%	1175.9400	24.2487	27.7798	125.0879		LCS			554.8607	123.9%
~~13~~	~~#DIV/0!~~	~~#DIV/0!~~	~~1~~	~~#DIV/0!~~	~~**#VALUE!**~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~		~~LCS~~			~~554.8607~~	~~#VALUE!~~
~~14~~	~~#DIV/0!~~	~~#DIV/0!~~	~~1~~	~~#DIV/0!~~	~~**#VALUE!**~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~		~~LCS~~			~~554.8607~~	~~#VALUE!~~
~~15~~	~~#DIV/0!~~	~~#DIV/0!~~	~~1~~	~~#DIV/0!~~	~~**#VALUE!**~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~		~~LCS~~			~~554.8607~~	~~#VALUE!~~
~~16~~	~~#DIV/0!~~	~~#DIV/0!~~	~~1~~	~~#DIV/0!~~	~~**#VALUE!**~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~		~~LCS~~			~~554.8607~~	~~#VALUE!~~
17	0.1623	0.1146	1	0.8119	**534.2891**	2.78%	1375.4360	26.2250	19.9697	91.5709		LCS			554.8607	96.3%
~~18~~	~~0.3024~~	~~0.2135~~	~~1~~	~~1.3864~~	~~**744.0639**~~	~~3.78%~~	~~1163.4180~~	~~24.1195~~	~~30.2389~~	~~132.8799~~		~~LCS~~			~~554.8607~~	~~134.1%~~
19	0.1217	0.0860	1	0.7394	**533.5087**	2.89%	1410.4620	26.5565	19.6909	91.8128		LCS			554.8607	96.2%
20	0.2074	0.1465	1	0.9077	**552.9504**	2.21%	1349.4060	25.9760	20.8663	93.0102		LCS			554.8607	99.7%
21	0.1596	0.1127	1	0.8871	**546.8839**	2.43%	1239.9520	24.8998	21.5307	92.6121		LCS			554.8607	98.6%
22	0.4767	0.3366	1	1.6941	**675.2607**	3.92%	992.3200	22.2767	29.7188	121.3914		LCS			554.8607	121.7%
23	0.2731	0.1928	1	1.2318	**579.9449**	3.23%	1028.4140	22.6771	25.0725	101.1617		LCS			554.8607	104.5%
24	0.3682	0.2600	1	1.8223	**447.8273**	4.29%	515.9340	16.0624	27.3337	81.9549		LCS			554.8607	80.7%
25	0.1042	0.0736	1	0.7585	**539.6739**	4.01%	1324.4760	25.7342	20.5554	97.4345		LCS			554.8607	97.3%
26	0.2508	0.1771	1	1.0177	**554.5153**	2.93%	1253.8820	25.0400	21.7086	95.5758		LCS			554.8607	99.9%
27	0.2869	0.2026	1	1.1456	**553.9326**	3.17%	1122.3760	23.6907	22.9195	96.3703		LCS			554.8607	99.8%
28	0.2462	0.1738	1	0.9682	**545.8808**	2.95%	1319.8700	25.6905	20.8294	94.1666		LCS			554.8607	98.4%
29	0.1668	0.1178	1	0.8545	**456.2349**	2.65%	1105.9400	23.5160	19.0165	77.8283		LCS			554.8607	82.2%
30	0.1861	0.1314	1	1.0877	**545.2084**	2.91%	991.4580	22.2654	24.0022	93.9073		LCS			554.8607	98.3%
31	0.2793	0.1972	1	1.2698	**631.0234**	2.73%	1081.4160	23.2540	26.6022	107.9686		LCS			554.8607	113.7%
32	0.3864	0.2728	1	1.6908	**431.9666**	3.69%	565.9060	16.8226	25.1733	76.8256		LCS			554.8607	77.9%
33	0.1476	0.1042	1	0.7967	**526.7866**	2.18%	1343.4480	25.9181	19.9226	88.5288		LCS			554.8607	94.9%
34	0.1401	0.0989	1	0.7264	**491.1249**	2.14%	1393.9420	26.4008	18.2332	82.4297		LCS			554.8607	88.5%
35	0.1288	0.0910	1	0.6598	**473.4554**	2.23%	1486.4400	27.2626	17.0232	79.6740		LCS			554.8607	85.3%
36	0.1917	0.1353	1	0.7653	**489.0080**	2.11%	1483.3760	27.2351	17.6014	82.0087		LCS			554.8607	88.1%
37	0.2800	0.1977	1	0.9614	**537.9463**	2.37%	1425.7980	26.7021	19.7493	90.9313		LCS			554.8607	97.0%
38	0.4698	0.3317	1	1.3039	**601.8508**	2.16%	1409.5560	26.5519	22.2253	101.0807		LCS			554.8607	108.5%
39	0.3043	0.2149	1	1.1390	**627.5394**	2.39%	1327.3480	25.7634	23.8775	106.1520		LCS			554.8607	113.1%
40	0.2195	0.1550	1	0.8549	**546.9944**	2.28%	1505.8660	27.4409	19.5395	92.1861		LCS			554.8607	98.6%

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
R1	A1	2	2317	2930	5/17/2019 13:08	5/17/2019 13:10	LB4100	TRADV19
R2	A2	2	2486	2806	5/17/2019 13:08	5/17/2019 13:10	LB4100	TRADV19
R3	A3	2	2996	2989	5/17/2019 13:08	5/17/2019 13:10	LB4100	TRADV19
R4	A4	2	0	0	5/17/2019 13:08	5/17/2019 13:10	LB4100	TRADV19
R5	B1	2	2739	2953	5/17/2019 13:08	5/17/2019 13:10	LB4100	TRADV19
R6	B2	2	2357	2975	5/17/2019 13:08	5/17/2019 13:10	LB4100	TRADV19
R7	B3	2	0	0	5/17/2019 13:08	5/17/2019 13:10	LB4100	TRADV19
R1	B4	2	2397	2635	5/21/2019 12:09	5/21/2019 12:11	LB4100	TRADV19
R1	C1	2	3169	2993	5/17/2019 13:18	5/17/2019 13:20	LB4100	TRADV19
R2	C2	2	2787	2969	5/17/2019 13:18	5/17/2019 13:20	LB4100	TRADV19
R3	C3	2	2713	3126	5/17/2019 13:18	5/17/2019 13:20	LB4100	TRADV19
R1	C4	2	2352	3000	5/21/2019 12:16	5/21/2019 12:18	LB4100	TRADV19
R5	D1	2	0	0	5/17/2019 13:18	5/17/2019 13:20	LB4100	TRADV19
R6	D2	2	0	0	5/17/2019 13:18	5/17/2019 13:20	LB4100	TRADV19
R7	D3	2	0	0	5/17/2019 13:18	5/17/2019 13:20	LB4100	TRADV19
R8	D4	2	0	0	5/17/2019 13:18	5/17/2019 13:20	LB4100	TRADV19
R1	E1	2	2751	2874	5/17/2019 13:12	5/17/2019 13:14	LB4100	TRADV19
R1	E2	2	2327	2870	5/21/2019 12:19	5/21/2019 12:21	LB4100	TRADV19
R3	E3	2	2821	2921	5/17/2019 13:12	5/17/2019 13:14	LB4100	TRADV19
R4	E4	2	2699	2971	5/17/2019 13:12	5/17/2019 13:14	LB4100	TRADV19
R5	F1	2	2480	3190	5/17/2019 13:12	5/17/2019 13:14	LB4100	TRADV19
R6	F2	2	1985	3175	5/17/2019 13:12	5/17/2019 13:14	LB4100	TRADV19
R7	F3	2	2057	3100	5/17/2019 13:12	5/17/2019 13:14	LB4100	TRADV19
R8	F4	2	1032	1782	5/17/2019 13:12	5/17/2019 13:14	LB4100	TRADV19
R1	G1	2	2649	2861	5/17/2019 13:15	5/17/2019 13:17	LB4100	TRADV19
R2	G2	2	2508	2863	5/17/2019 13:15	5/17/2019 13:17	LB4100	TRADV19
R3	G3	2	2245	3089	5/17/2019 13:15	5/17/2019 13:17	LB4100	TRADV19
R4	G4	2	2640	3048	5/17/2019 13:15	5/17/2019 13:17	LB4100	TRADV19
R5	H1	2	2212	3008	5/17/2019 13:15	5/17/2019 13:17	LB4100	TRADV19
R6	H2	2	1983	2948	5/17/2019 13:15	5/17/2019 13:17	LB4100	TRADV19
R7	H3	2	2163	3357	5/17/2019 13:15	5/17/2019 13:17	LB4100	TRADV19
R8	H4	2	1132	1788	5/17/2019 13:15	5/17/2019 13:17	LB4100	TRADV19
R1	I1	2	2687	2609	5/17/2019 13:04	5/17/2019 13:06	LB4100	TRADV19

R2	I2	2	2788	2826	5/17/2019 13:04	5/17/2019 13:06	LB4100	TRADV19
R3	I3	2	2973	2821	5/17/2019 13:04	5/17/2019 13:06	LB4100	TRADV19
R4	I4	2	2967	2897	5/17/2019 13:04	5/17/2019 13:06	LB4100	TRADV19
R5	J1	2	2852	2921	5/17/2019 13:04	5/17/2019 13:06	LB4100	TRADV19
R6	J2	2	2820	2823	5/17/2019 13:04	5/17/2019 13:06	LB4100	TRADV19
R7	J3	2	2655	2904	5/17/2019 13:04	5/17/2019 13:06	LB4100	TRADV19
R1	J4	2	3012	2686	5/21/2019 12:13	5/21/2019 12:15	LB4100	TRADV19

Detector #	Sample I.D.	Pgm time (min)	Total (counts)	Voltage	%slope/100V	Date/Time
A1	Sr-90'	0.11	1	750	1.2	7/1/2009 15:09
A1	Sr-90'	0.12	1	780	2.2	7/1/2009 15:09
A1	Sr-90'	0.5	71	810	3.6	7/1/2009 15:10
A1	Sr-90'	0.5	197	840	6.3	7/1/2009 15:11
A1	Sr-90'	0.5	436	870	9.1	7/1/2009 15:11
A1	Sr-90'	0.5	768	900	11.7	7/1/2009 15:12
A1	Sr-90'	0.5	1146	930	14.3	7/1/2009 15:12
A1	Sr-90'	0.5	1601	960	17.2	7/1/2009 15:13
A1	Sr-90'	0.5	2167	990	20.3	7/1/2009 15:14
A1	Sr-90'	0.5	2839	1020	23.6	7/1/2009 15:14
A1	Sr-90'	0.5	3575	1050	27.3	7/1/2009 15:15
A1	Sr-90'	0.5	4430	1080	33.0	7/1/2009 15:16
A1	Sr-90'	0.5	5461	1110	38.9	7/1/2009 15:16
A1	Sr-90'	0.5	6850	1140	44.3	7/1/2009 15:17
A1	Sr-90'	0.5	8198	1170	46.9	7/1/2009 15:18
A1	Sr-90'	0.5	9713	1200	44.5	7/1/2009 15:18
A1	Sr-90'	0.5	11070	1230	40.2	7/1/2009 15:19
A1	Sr-90'	0.5	12096	1260	32.3	7/1/2009 15:20
A1	Sr-90'	0.5	13036	1290	23.4	7/1/2009 15:20
A1	Sr-90'	0.5	13569	1320	14.3	7/1/2009 15:21
A1	Sr-90'	0.5	13839	1350	7.0	7/1/2009 15:21
A1	Sr-90'	0.5	13834	1380	5.3	7/1/2009 15:22
A1	Sr-90'	0.5	13947	1410	3.7	7/1/2009 15:23
A1	Sr-90'	0.5	14310	1440	4.9	7/1/2009 15:23
A1	Sr-90'	0.5	14159	1470	1.6	7/1/2009 15:24
A1	Sr-90'	0.5	14463	1500	-0.7	7/1/2009 15:25
A1	Sr-90'	0.5	14107	1530	0.8	7/1/2009 15:25
A1	Sr-90'	0.5	14237	1560	-1.5	7/1/2009 15:53
A1	Sr-90'	0.5	14392	1590	0.1	7/1/2009 15:53
A1	Sr-90'	0.5	14095	1620	16.5	7/1/2009 15:54
A1	Sr-90'	0.5	14197	1650	16.6	7/1/2009 15:55
A2	Sr-90'	0.11	5	750	16.4	7/1/2009 15:09
A2	Sr-90'	0.5	52	780	16.3	7/1/2009 15:09
A2	Sr-90'	0.5	164	810	5.3	7/1/2009 15:10
A2	Sr-90'	0.5	362	840	8.4	7/1/2009 15:11
A2	Sr-90'	0.5	643	870	11.5	7/1/2009 15:11
A2	Sr-90'	0.5	1065	900	15.3	7/1/2009 15:12
A2	Sr-90'	0.5	1537	930	19.4	7/1/2009 15:12
A2	Sr-90'	0.5	2206	960	23.9	7/1/2009 15:13
A2	Sr-90'	0.5	2982	990	29.1	7/1/2009 15:14
A2	Sr-90'	0.5	3922	1020	32.4	7/1/2009 15:14
A2	Sr-90'	0.5	5045	1050	38.2	7/1/2009 15:15
A2	Sr-90'	0.5	6034	1080	44.5	7/1/2009 15:16
A2	Sr-90'	0.5	7649	1110	49.6	7/1/2009 15:16
A2	Sr-90'	0.5	9297	1140	57.5	7/1/2009 15:17
A2	Sr-90'	0.5	10846	1170	55.5	7/1/2009 15:18
A2	Sr-90'	0.5	13066	1200	52.9	7/1/2009 15:18
A2	Sr-90'	0.5	14085	1230	46.3	7/1/2009 15:19
A2	Sr-90'	0.5	15618	1260	35.4	7/1/2009 15:20
A2	Sr-90'	0.5	16518	1290	29.3	7/1/2009 15:20
A2	Sr-90'	0.5	17153	1320	18.3	7/1/2009 15:21
A2	Sr-90'	0.5	17712	1350	9.3	7/1/2009 15:21
A2	Sr-90'	0.5	17772	1380	1.8	7/1/2009 15:22
A2	Sr-90'	0.5	17602	1410	-1.3	7/1/2009 15:23
A2	Sr-90'	0.5	17483	1440	-1.1	7/1/2009 15:23
A2	Sr-90'	0.5	17666	1470	1.0	7/1/2009 15:24
A2	Sr-90'	0.5	17571	1500	2.6	7/1/2009 15:25
A2	Sr-90'	0.5	17710	1530	2.0	7/1/2009 15:25
A2	Sr-90'	0.5	17851	1560	1.0	7/1/2009 15:53
A2	Sr-90'	0.5	17830	1590	-1.5	7/1/2009 15:53
A2	Sr-90'	0.5	17655	1620	20.6	7/1/2009 15:54
A2	Sr-90'	0.5	17586	1650	20.6	7/1/2009 15:55
A3	Sr-90'	0.12	2	750	20.5	7/1/2009 15:09
A3	Sr-90'	0.11	10	780	20.3	7/1/2009 15:09
A3	Sr-90'	0.5	158	810	6.3	7/1/2009 15:10
A3	Sr-90'	0.5	412	840	9.8	7/1/2009 15:11
A3	Sr-90'	0.5	752	870	13.1	7/1/2009 15:11
A3	Sr-90'	0.5	1186	900	16.1	7/1/2009 15:12

A3	Sr-90'	0.5	1743	930		20.3	7/1/2009 15:12
A3	Sr-90'	0.5	2332	960		24.4	7/1/2009 15:13
A3	Sr-90'	0.5	3228	990		28.2	7/1/2009 15:14
A3	Sr-90'	0.5	4102	1020		33.6	7/1/2009 15:14
A3	Sr-90'	0.5	5082	1050		38.9	7/1/2009 15:15
A3	Sr-90'	0.5	6439	1080		47.4	7/1/2009 15:16
A3	Sr-90'	0.5	7892	1110		54.0	7/1/2009 15:16
A3	Sr-90'	0.5	9804	1140		56.5	7/1/2009 15:17
A3	Sr-90'	0.5	11495	1170		55.1	7/1/2009 15:18
A3	Sr-90'	0.5	13109	1200		49.0	7/1/2009 15:18
A3	Sr-90'	0.5	14504	1230		41.8	7/1/2009 15:19
A3	Sr-90'	0.5	15649	1260		31.8	7/1/2009 15:20
A3	Sr-90'	0.5	16497	1290		21.3	7/1/2009 15:20
A3	Sr-90'	0.5	16882	1320		11.8	7/1/2009 15:21
A3	Sr-90'	0.5	17082	1350		6.1	7/1/2009 15:21
A3	Sr-90'	0.5	17120	1380		5.1	7/1/2009 15:22
A3	Sr-90'	0.5	17292	1410		4.4	7/1/2009 15:23
A3	Sr-90'	0.5	17541	1440		3.6	7/1/2009 15:23
A3	Sr-90'	0.5	17524	1470		1.1	7/1/2009 15:24
A3	Sr-90'	0.5	17542	1500		-0.5	7/1/2009 15:25
A3	Sr-90'	0.5	17462	1530		-0.2	7/1/2009 15:25
A3	Sr-90'	0.5	17501	1560		-0.4	7/1/2009 15:53
A3	Sr-90'	0.5	17517	1590		0.0	7/1/2009 15:53
A3	Sr-90'	0.5	17449	1620		-0.4	7/1/2009 15:54
A3	Sr-90'	0.5	17488	1650		-0.5	7/1/2009 15:55
A4	Sr-90'	0.12	0			1.3	7/1/2009 15:09
A4	Sr-90'	0.11	0		#DIV/0!		7/1/2009 15:09
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:10
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:11
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:11
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:12
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:12
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:13
A4	Sr-90'	0.11	0		#DIV/0!		7/1/2009 15:14
A4	Sr-90'	0.11	0		#DIV/0!		7/1/2009 15:14
A4	Sr-90'	0.11	0		#DIV/0!		7/1/2009 15:15
A4	Sr-90'	0.11	0		#DIV/0!		7/1/2009 15:16
A4	Sr-90'	0.11	0		#DIV/0!		7/1/2009 15:16
A4	Sr-90'	0.11	0		#DIV/0!		7/1/2009 15:17
A4	Sr-90'	0.11	0		#DIV/0!		7/1/2009 15:18
A4	Sr-90'	0.11	0		#DIV/0!		7/1/2009 15:18
A4	Sr-90'	0.11	0		#DIV/0!		7/1/2009 15:19
A4	Sr-90'	0.11	0		#DIV/0!		7/1/2009 15:20
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:20
A4	Sr-90'	0.11	0		#DIV/0!		7/1/2009 15:21
A4	Sr-90'	0.11	0		#DIV/0!		7/1/2009 15:21
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:22
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:23
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:23
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:24
A4	Sr-90'	0.13	0		#DIV/0!		7/1/2009 15:25
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:25
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:26
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:53
A4	Sr-90'	0.12	0		#DIV/0!		7/1/2009 15:54
A4	Sr-90'	0.12	0			0.1	7/1/2009 15:55
B1	Sr-90'	0.11	2	750		1.2	7/1/2009 15:09
B1	Sr-90'	0.12	5	780		2.8	7/1/2009 15:09
B1	Sr-90'	0.5	74	810		4.9	7/1/2009 15:10
B1	Sr-90'	0.5	259	840		8.8	7/1/2009 15:10
B1	Sr-90'	0.5	604	870		12.3	7/1/2009 15:11
B1	Sr-90'	0.5	1066	900		16.1	7/1/2009 15:12
B1	Sr-90'	0.5	1521	930		20.5	7/1/2009 15:12
B1	Sr-90'	0.5	2215	960		24.7	7/1/2009 15:13
B1	Sr-90'	0.5	3106	990		29.4	7/1/2009 15:14
B1	Sr-90'	0.5	3985	1020		34.3	7/1/2009 15:14
B1	Sr-90'	0.5	5047	1050		39.2	7/1/2009 15:15
B1	Sr-90'	0.5	6386	1080		46.0	7/1/2009 15:16
B1	Sr-90'	0.5	7782	1110		53.3	7/1/2009 15:16
B1	Sr-90'	0.5	9521	1140		58.8	7/1/2009 15:17

B1	Sr-90'	0.5	11467	1170	61.3	7/1/2009 15:18
B1	Sr-90'	0.5	13368	1200	60.4	7/1/2009 15:18
B1	Sr-90'	0.5	15059	1230	52.4	7/1/2009 15:19
B1	Sr-90'	0.5	16782	1260	40.4	7/1/2009 15:20
B1	Sr-90'	0.5	17615	1290	27.3	7/1/2009 15:20
B1	Sr-90'	0.5	18143	1320	17.5	7/1/2009 15:21
B1	Sr-90'	0.5	18471	1350	17.1	7/1/2009 15:22
B1	Sr-90'	0.5	18973	1380	14.4	7/1/2009 15:22
B1	Sr-90'	0.5	19758	1410	12.4	7/1/2009 15:23
B1	Sr-90'	0.5	19657	1440	11.1	7/1/2009 15:24
B1	Sr-90'	0.5	19984	1470	5.9	7/1/2009 15:25
B1	Sr-90'	0.49	20518	1500	4.2	7/1/2009 15:26
B1	Sr-90'	0.47	20211	1530	1.5	7/1/2009 15:54
B1	Sr-90'	0.43	20172	1560	0.2	7/1/2009 15:55
B1	Sr-90'	0.41	20383	1590	1.5	7/1/2009 15:57
B1	Sr-90'	0.4	20465	1620		7/1/2009 15:58
B1	Sr-90'	0.39	20290	1650		7/1/2009 16:00
B2	Sr-90'	0.11	0	750		7/1/2009 15:09
B2	Sr-90'	0.11	9	780		7/1/2009 15:09
B2	Sr-90'	0.5	109	810	5.8	7/1/2009 15:10
B2	Sr-90'	0.5	325	840	9.8	7/1/2009 15:10
B2	Sr-90'	0.5	717	870	13.6	7/1/2009 15:11
B2	Sr-90'	0.5	1181	900	17.1	7/1/2009 15:12
B2	Sr-90'	0.5	1714	930	21.6	7/1/2009 15:12
B2	Sr-90'	0.5	2393	960	26.7	7/1/2009 15:13
B2	Sr-90'	0.5	3345	990	34.1	7/1/2009 15:14
B2	Sr-90'	0.5	4370	1020	41.0	7/1/2009 15:14
B2	Sr-90'	0.5	5845	1050	47.3	7/1/2009 15:15
B2	Sr-90'	0.5	7288	1080	53.3	7/1/2009 15:16
B2	Sr-90'	0.5	8981	1110	59.1	7/1/2009 15:16
B2	Sr-90'	0.5	10794	1140	66.4	7/1/2009 15:17
B2	Sr-90'	0.5	12959	1170	70.8	7/1/2009 15:18
B2	Sr-90'	0.5	15256	1200	68.7	7/1/2009 15:18
B2	Sr-90'	0.5	17372	1230	55.6	7/1/2009 15:19
B2	Sr-90'	0.5	18895	1260	39.3	7/1/2009 15:20
B2	Sr-90'	0.5	19482	1290	27.6	7/1/2009 15:20
B2	Sr-90'	0.49	20099	1320	15.3	7/1/2009 15:21
B2	Sr-90'	0.5	20913	1350	7.7	7/1/2009 15:22
B2	Sr-90'	0.48	20468	1380	0.8	7/1/2009 15:22
B2	Sr-90'	0.46	20449	1410	-1.9	7/1/2009 15:23
B2	Sr-90'	0.46	20458	1440	1.9	7/1/2009 15:24
B2	Sr-90'	0.45	20631	1470	-0.2	7/1/2009 15:25
B2	Sr-90'	0.43	20659	1500	-0.4	7/1/2009 15:26
B2	Sr-90'	0.4	20326	1530	-4.0	7/1/2009 15:54
B2	Sr-90'	0.37	20546	1560	-1.6	7/1/2009 15:55
B2	Sr-90'	0.35	20090	1590	1.1	7/1/2009 15:57
B2	Sr-90'	0.34	20530	1620		7/1/2009 15:58
B2	Sr-90'	0.33	20505	1650		7/1/2009 16:00
B3	Sr-90'	0.16	4	750		7/1/2009 15:09
B3	Sr-90'	0.11	7	780		7/1/2009 15:09
B3	Sr-90'	0.5	123	810	5.1	7/1/2009 15:10
B3	Sr-90'	0.5	351	840	8.9	7/1/2009 15:10
B3	Sr-90'	0.5	602	870	12.1	7/1/2009 15:11
B3	Sr-90'	0.5	1104	900	16.3	7/1/2009 15:12
B3	Sr-90'	0.5	1561	930	20.0	7/1/2009 15:12
B3	Sr-90'	0.5	2320	960	23.4	7/1/2009 15:13
B3	Sr-90'	0.5	3001	990	28.5	7/1/2009 15:14
B3	Sr-90'	0.5	3889	1020	32.8	7/1/2009 15:14
B3	Sr-90'	0.5	5051	1050	39.8	7/1/2009 15:15
B3	Sr-90'	0.5	6217	1080	46.0	7/1/2009 15:16
B3	Sr-90'	0.5	7803	1110	53.0	7/1/2009 15:16
B3	Sr-90'	0.5	9410	1140	58.7	7/1/2009 15:17
B3	Sr-90'	0.5	11403	1170	61.2	7/1/2009 15:18
B3	Sr-90'	0.5	13228	1200	58.5	7/1/2009 15:18
B3	Sr-90'	0.5	15074	1230	47.7	7/1/2009 15:19
B3	Sr-90'	0.5	16346	1260	34.9	7/1/2009 15:20
B3	Sr-90'	0.5	17002	1290	21.9	7/1/2009 15:20
B3	Sr-90'	0.5	17498	1320	17.0	7/1/2009 15:21
B3	Sr-90'	0.5	17784	1350	19.0	7/1/2009 15:22
B3	Sr-90'	0.5	18505	1380	19.3	7/1/2009 15:22

B3	Sr-90'	0.5	19344	1410	19.5	7/1/2009 15:23
B3	Sr-90'	0.5	19614	1440	14.7	7/1/2009 15:24
B3	Sr-90'	0.5	20160	1470	8.1	7/1/2009 15:25
B3	Sr-90'	0.49	20302	1500	4.3	7/1/2009 15:26
B3	Sr-90'	0.46	20220	1530	0.7	7/1/2009 15:54
B3	Sr-90'	0.42	20225	1560	1.2	7/1/2009 15:55
B3	Sr-90'	0.4	20304	1590	1.4	7/1/2009 15:57
B3	Sr-90'	0.39	20442	1620		7/1/2009 15:58
B3	Sr-90'	0.38	20327	1650		7/1/2009 16:00
B4	Sr-90'	0.12	0	750		7/1/2009 15:09
B4	Sr-90'	0.11	6	780		7/1/2009 15:09
B4	Sr-90'	0.5	96	810	5.1	7/1/2009 15:10
B4	Sr-90'	0.5	302	840	8.3	7/1/2009 15:10
B4	Sr-90'	0.5	616	870	11.7	7/1/2009 15:11
B4	Sr-90'	0.5	992	900	15.1	7/1/2009 15:12
B4	Sr-90'	0.5	1511	930	18.6	7/1/2009 15:12
B4	Sr-90'	0.5	2118	960	22.1	7/1/2009 15:13
B4	Sr-90'	0.5	2837	990	26.1	7/1/2009 15:14
B4	Sr-90'	0.5	3650	1020	32.3	7/1/2009 15:14
B4	Sr-90'	0.5	4667	1050	38.3	7/1/2009 15:15
B4	Sr-90'	0.5	6052	1080	44.6	7/1/2009 15:16
B4	Sr-90'	0.5	7378	1110	51.6	7/1/2009 15:16
B4	Sr-90'	0.5	8977	1140	54.8	7/1/2009 15:17
B4	Sr-90'	0.5	10948	1170	57.4	7/1/2009 15:18
B4	Sr-90'	0.5	12490	1200	54.0	7/1/2009 15:18
B4	Sr-90'	0.5	14225	1230	42.7	7/1/2009 15:19
B4	Sr-90'	0.5	15436	1260	31.5	7/1/2009 15:20
B4	Sr-90'	0.5	15887	1290	20.5	7/1/2009 15:20
B4	Sr-90'	0.5	16380	1320	16.2	7/1/2009 15:21
B4	Sr-90'	0.5	16833	1350	18.5	7/1/2009 15:22
B4	Sr-90'	0.5	17391	1380	17.3	7/1/2009 15:22
B4	Sr-90'	0.5	18163	1410	16.2	7/1/2009 15:23
B4	Sr-90'	0.5	18306	1440	15.9	7/1/2009 15:24
B4	Sr-90'	0.5	18799	1470	17.1	7/1/2009 15:25
B4	Sr-90'	0.5	19464	1500	16.9	7/1/2009 15:53
B4	Sr-90'	0.48	20148	1530	13.5	7/1/2009 15:54
B4	Sr-90'	0.45	20170	1560	7.4	7/1/2009 15:55
B4	Sr-90'	0.43	20474	1590	1.8	7/1/2009 15:57
B4	Sr-90'	0.42	20404	1620	23.6	7/1/2009 15:58
B4	Sr-90'	0.4	20306	1650	23.8	7/1/2009 16:00
C1	Sr-90'	0.11	3	750	23.7	7/1/2009 15:09
C1	Sr-90'	0.12	8	780	23.5	7/1/2009 15:09
C1	Sr-90'	0.5	135	810	5.9	7/1/2009 15:10
C1	Sr-90'	0.5	353	840	9.2	7/1/2009 15:10
C1	Sr-90'	0.5	711	870	12.0	7/1/2009 15:11
C1	Sr-90'	0.5	1103	900	14.8	7/1/2009 15:11
C1	Sr-90'	0.5	1565	930	18.4	7/1/2009 15:12
C1	Sr-90'	0.5	2153	960	22.0	7/1/2009 15:13
C1	Sr-90'	0.5	2943	990	26.8	7/1/2009 15:13
C1	Sr-90'	0.5	3707	1020	31.9	7/1/2009 15:14
C1	Sr-90'	0.5	4809	1050	37.8	7/1/2009 15:15
C1	Sr-90'	0.5	6002	1080	44.8	7/1/2009 15:15
C1	Sr-90'	0.5	7464	1110	49.4	7/1/2009 15:16
C1	Sr-90'	0.5	9096	1140	54.5	7/1/2009 15:16
C1	Sr-90'	0.5	10669	1170	56.4	7/1/2009 15:17
C1	Sr-90'	0.5	12567	1200	51.0	7/1/2009 15:18
C1	Sr-90'	0.5	14181	1230	44.2	7/1/2009 15:18
C1	Sr-90'	0.5	14993	1260	33.0	7/1/2009 15:19
C1	Sr-90'	0.5	16093	1290	22.2	7/1/2009 15:20
C1	Sr-90'	0.5	16566	1320	14.2	7/1/2009 15:20
C1	Sr-90'	0.5	16722	1350	6.5	7/1/2009 15:21
C1	Sr-90'	0.5	16806	1380	5.5	7/1/2009 15:22
C1	Sr-90'	0.5	16948	1410	4.8	7/1/2009 15:22
C1	Sr-90'	0.5	17275	1440	1.1	7/1/2009 15:23
C1	Sr-90'	0.5	17203	1470	-0.4	7/1/2009 15:23
C1	Sr-90'	0.5	16846	1500	-1.1	7/1/2009 15:24
C1	Sr-90'	0.5	17103	1530	-1.1	7/1/2009 15:25
C1	Sr-90'	0.5	17160	1560	0.7	7/1/2009 15:25
C1	Sr-90'	0.5	16887	1590	-1.3	7/1/2009 15:26
C1	Sr-90'	0.5	17065	1620		7/1/2009 15:27

C1	Sr-90'	0.5	16958	1650		7/1/2009 15:27
C2	Sr-90'	0.11	0	750		7/1/2009 15:09
C2	Sr-90'	0.12	1	780		7/1/2009 15:09
C2	Sr-90'	0.5	47	810	3.2	7/1/2009 15:10
C2	Sr-90'	0.5	176	840	5.8	7/1/2009 15:10
C2	Sr-90'	0.5	397	870	9.0	7/1/2009 15:11
C2	Sr-90'	0.5	700	900	12.3	7/1/2009 15:11
C2	Sr-90'	0.5	1129	930	15.6	7/1/2009 15:12
C2	Sr-90'	0.5	1653	960	19.5	7/1/2009 15:13
C2	Sr-90'	0.5	2258	990	24.3	7/1/2009 15:13
C2	Sr-90'	0.5	3063	1020	28.9	7/1/2009 15:14
C2	Sr-90'	0.5	4071	1050	33.8	7/1/2009 15:15
C2	Sr-90'	0.5	5074	1080	39.0	7/1/2009 15:15
C2	Sr-90'	0.5	6319	1110	46.0	7/1/2009 15:16
C2	Sr-90'	0.5	7785	1140	53.8	7/1/2009 15:17
C2	Sr-90'	0.5	9615	1170	56.3	7/1/2009 15:17
C2	Sr-90'	0.5	11493	1200	55.4	7/1/2009 15:18
C2	Sr-90'	0.5	12903	1230	51.4	7/1/2009 15:18
C2	Sr-90'	0.5	14448	1260	43.4	7/1/2009 15:19
C2	Sr-90'	0.5	15845	1290	36.3	7/1/2009 15:20
C2	Sr-90'	0.5	16538	1320	26.0	7/1/2009 15:20
C2	Sr-90'	0.5	17303	1350	16.2	7/1/2009 15:21
C2	Sr-90'	0.5	17622	1380	8.3	7/1/2009 15:22
C2	Sr-90'	0.5	17729	1410	1.2	7/1/2009 15:22
C2	Sr-90'	0.5	17572	1440	-0.5	7/1/2009 15:23
C2	Sr-90'	0.5	17507	1470	0.5	7/1/2009 15:23
C2	Sr-90'	0.5	17657	1500	2.7	7/1/2009 15:24
C2	Sr-90'	0.5	17758	1530	1.4	7/1/2009 15:25
C2	Sr-90'	0.5	17852	1560	1.7	7/1/2009 15:25
C2	Sr-90'	0.5	17621	1590	0.7	7/1/2009 15:26
C2	Sr-90'	0.5	17984	1620		7/1/2009 15:27
C2	Sr-90'	0.5	17797	1650		7/1/2009 15:27
C3	Sr-90'	0.11	0	750		7/1/2009 15:09
C3	Sr-90'	0.11	1	780		7/1/2009 15:09
C3	Sr-90'	0.11	5	810	3.3	7/1/2009 15:10
C3	Sr-90'	0.5	146	840	6.5	7/1/2009 15:10
C3	Sr-90'	0.5	419	870	10.9	7/1/2009 15:11
C3	Sr-90'	0.5	776	900	14.3	7/1/2009 15:11
C3	Sr-90'	0.5	1319	930	17.7	7/1/2009 15:12
C3	Sr-90'	0.5	1837	960	21.7	7/1/2009 15:13
C3	Sr-90'	0.5	2548	990	25.2	7/1/2009 15:13
C3	Sr-90'	0.5	3420	1020	31.1	7/1/2009 15:14
C3	Sr-90'	0.5	4313	1050	36.7	7/1/2009 15:15
C3	Sr-90'	0.5	5621	1080	42.8	7/1/2009 15:15
C3	Sr-90'	0.5	6946	1110	51.9	7/1/2009 15:16
C3	Sr-90'	0.5	8517	1140	58.5	7/1/2009 15:17
C3	Sr-90'	0.5	10649	1170	64.5	7/1/2009 15:17
C3	Sr-90'	0.5	12537	1200	67.2	7/1/2009 15:18
C3	Sr-90'	0.5	14612	1230	64.4	7/1/2009 15:18
C3	Sr-90'	0.5	16617	1260	56.7	7/1/2009 15:19
C3	Sr-90'	0.5	18266	1290	44.5	7/1/2009 15:20
C3	Sr-90'	0.5	19218	1320	30.5	7/1/2009 15:20
C3	Sr-90'	0.5	19990	1350	17.2	7/1/2009 15:21
C3	Sr-90'	0.5	20330	1380	9.3	7/1/2009 15:22
C3	Sr-90'	0.5	20293	1410	3.9	7/1/2009 15:22
C3	Sr-90'	0.5	20457	1440	1.2	7/1/2009 15:23
C3	Sr-90'	0.49	20504	1470	2.9	7/1/2009 15:23
C3	Sr-90'	0.49	20402	1500	-0.1	7/1/2009 15:24
C3	Sr-90'	0.5	20751	1530	-0.7	7/1/2009 15:25
C3	Sr-90'	0.49	20326	1560	1.1	7/1/2009 15:25
C3	Sr-90'	0.49	20435	1590	1.3	7/1/2009 15:26
C3	Sr-90'	0.5	20730	1620		7/1/2009 15:27
C3	Sr-90'	0.5	20748	1650		7/1/2009 15:27
C4	Sr-90'	0.12	0	750		7/1/2009 15:09
C4	Sr-90'	0.11	0	780		7/1/2009 15:09
C4	Sr-90'	0.11	2	810	2.1	7/1/2009 15:10
C4	Sr-90'	0.5	103	840	4.3	7/1/2009 15:10
C4	Sr-90'	0.5	259	870	6.9	7/1/2009 15:11
C4	Sr-90'	0.5	521	900	9.3	7/1/2009 15:11
C4	Sr-90'	0.5	831	930	11.9	7/1/2009 15:12

C4	Sr-90'	0.5	1210	960	14.4	7/1/2009 15:13
C4	Sr-90'	0.5	1699	990	17.6	7/1/2009 15:13
C4	Sr-90'	0.5	2244	1020	21.6	7/1/2009 15:14
C4	Sr-90'	0.5	2955	1050	25.8	7/1/2009 15:15
C4	Sr-90'	0.5	3821	1080	31.0	7/1/2009 15:15
C4	Sr-90'	0.5	4783	1110	35.5	7/1/2009 15:16
C4	Sr-90'	0.5	5977	1140	38.8	7/1/2009 15:17
C4	Sr-90'	0.5	7204	1170	43.3	7/1/2009 15:17
C4	Sr-90'	0.5	8425	1200	44.9	7/1/2009 15:18
C4	Sr-90'	0.5	10053	1230	42.6	7/1/2009 15:18
C4	Sr-90'	0.5	11280	1260	36.6	7/1/2009 15:19
C4	Sr-90'	0.5	12165	1290	28.3	7/1/2009 15:20
C4	Sr-90'	0.5	12855	1320	20.1	7/1/2009 15:20
C4	Sr-90'	0.5	13515	1350	13.9	7/1/2009 15:21
C4	Sr-90'	0.5	13616	1380	8.4	7/1/2009 15:22
C4	Sr-90'	0.5	13872	1410	4.0	7/1/2009 15:22
C4	Sr-90'	0.5	13942	1440	3.0	7/1/2009 15:23
C4	Sr-90'	0.5	13948	1470	1.3	7/1/2009 15:23
C4	Sr-90'	0.5	14027	1500	3.1	7/1/2009 15:24
C4	Sr-90'	0.5	14021	1530	2.0	7/1/2009 15:25
C4	Sr-90'	0.5	14373	1560	0.9	7/1/2009 15:25
C4	Sr-90'	0.5	14078	1590	0.1	7/1/2009 15:26
C4	Sr-90'	0.5	14134	1620		7/1/2009 15:27
C4	Sr-90'	0.5	14161	1650		7/1/2009 15:27
D1	Sr-90'	0.11	0	750		7/1/2009 15:09
D1	Sr-90'	0.11	1	780		7/1/2009 15:09
D1	Sr-90'	0.5	72	810	5.0	7/1/2009 15:10
D1	Sr-90'	0.5	270	840	8.8	7/1/2009 15:11
D1	Sr-90'	0.5	615	870	13.4	7/1/2009 15:11
D1	Sr-90'	0.5	1053	900	17.1	7/1/2009 15:12
D1	Sr-90'	0.5	1693	930	20.6	7/1/2009 15:13
D1	Sr-90'	0.5	2291	960	23.8	7/1/2009 15:14
D1	Sr-90'	0.5	3080	990	28.2	7/1/2009 15:15
D1	Sr-90'	0.5	3936	1020	34.8	7/1/2009 15:15
D1	Sr-90'	0.5	5093	1050	40.1	7/1/2009 15:16
D1	Sr-90'	0.5	6502	1080	48.6	7/1/2009 15:17
D1	Sr-90'	0.5	7816	1110	56.3	7/1/2009 15:18
D1	Sr-90'	0.5	9861	1140	62.6	7/1/2009 15:19
D1	Sr-90'	0.5	11853	1170	66.5	7/1/2009 15:19
D1	Sr-90'	0.5	13871	1200	63.1	7/1/2009 15:20
D1	Sr-90'	0.5	15783	1230	56.3	7/1/2009 15:21
D1	Sr-90'	0.5	17367	1260	45.6	7/1/2009 15:22
D1	Sr-90'	0.5	18552	1290	32.7	7/1/2009 15:22
D1	Sr-90'	0.5	19322	1320	19.4	7/1/2009 15:23
D1	Sr-90'	0.5	19713	1350	10.4	7/1/2009 15:24
D1	Sr-90'	0.5	19695	1380	5.3	7/1/2009 15:25
D1	Sr-90'	0.5	19923	1410	2.4	7/1/2009 15:26
D1	Sr-90'	0.5	20015	1440	-0.9	7/1/2009 15:26
D1	Sr-90'	0.5	19909	1470	-2.8	7/1/2009 15:27
D1	Sr-90'	0.5	19560	1500	-3.0	7/1/2009 15:28
D1	Sr-90'	0.5	19731	1530	-0.4	7/1/2009 15:29
D1	Sr-90'	0.5	19656	1560	1.3	7/1/2009 15:30
D1	Sr-90'	0.5	19805	1590	0.8	7/1/2009 15:30
D1	Sr-90'	0.5	19711	1620		7/1/2009 15:31
D1	Sr-90'	0.5	19827	1650		7/1/2009 15:32
D2	Sr-90'	0.11	2	750		7/1/2009 15:09
D2	Sr-90'	0.11	0	780		7/1/2009 15:09
D2	Sr-90'	0.12	8	810	3.7	7/1/2009 15:10
D2	Sr-90'	0.5	183	840	7.3	7/1/2009 15:11
D2	Sr-90'	0.5	461	870	11.1	7/1/2009 15:11
D2	Sr-90'	0.5	873	900	14.3	7/1/2009 15:12
D2	Sr-90'	0.5	1331	930	17.1	7/1/2009 15:13
D2	Sr-90'	0.5	1899	960	20.1	7/1/2009 15:14
D2	Sr-90'	0.5	2520	990	24.9	7/1/2009 15:15
D2	Sr-90'	0.5	3298	1020	30.4	7/1/2009 15:15
D2	Sr-90'	0.5	4359	1050	36.7	7/1/2009 15:16
D2	Sr-90'	0.5	5534	1080	42.9	7/1/2009 15:17
D2	Sr-90'	0.5	6912	1110	48.8	7/1/2009 15:18
D2	Sr-90'	0.5	8458	1140	55.7	7/1/2009 15:19
D2	Sr-90'	0.5	10221	1170	60.7	7/1/2009 15:19

D2	Sr-90'	0.5	12229	1200	59.3	7/1/2009 15:20
D2	Sr-90'	0.5	14132	1230	54.2	7/1/2009 15:21
D2	Sr-90'	0.5	15397	1260	44.8	7/1/2009 15:22
D2	Sr-90'	0.5	16761	1290	32.3	7/1/2009 15:22
D2	Sr-90'	0.5	17632	1320	23.4	7/1/2009 15:23
D2	Sr-90'	0.5	17862	1350	14.5	7/1/2009 15:24
D2	Sr-90'	0.5	18357	1380	8.4	7/1/2009 15:25
D2	Sr-90'	0.5	18569	1410	4.9	7/1/2009 15:26
D2	Sr-90'	0.5	18543	1440	-2.0	7/1/2009 15:26
D2	Sr-90'	0.5	18507	1470	-1.9	7/1/2009 15:27
D2	Sr-90'	0.5	18087	1500	-0.4	7/1/2009 15:28
D2	Sr-90'	0.5	18508	1530	1.2	7/1/2009 15:29
D2	Sr-90'	0.5	18487	1560	2.0	7/1/2009 15:30
D2	Sr-90'	0.5	18483	1590		7/1/2009 15:30
D2	Sr-90'	0.5	18406	1620		7/1/2009 15:31
D2	Sr-90'	0.5	18558	1650		7/1/2009 15:32
D3	Sr-90'	0.11	0	750		7/1/2009 15:09
D3	Sr-90'	0.11	2	780		7/1/2009 15:09
D3	Sr-90'	0.11	13	810	3.5	7/1/2009 15:10
D3	Sr-90'	0.5	180	840	7.3	7/1/2009 15:11
D3	Sr-90'	0.5	443	870	11.9	7/1/2009 15:11
D3	Sr-90'	0.5	889	900	16.7	7/1/2009 15:12
D3	Sr-90'	0.5	1450	930	21.0	7/1/2009 15:13
D3	Sr-90'	0.5	2177	960	24.5	7/1/2009 15:14
D3	Sr-90'	0.5	2948	990	29.5	7/1/2009 15:15
D3	Sr-90'	0.5	3811	1020	35.9	7/1/2009 15:15
D3	Sr-90'	0.5	5065	1050	43.8	7/1/2009 15:16
D3	Sr-90'	0.5	6499	1080	51.6	7/1/2009 15:17
D3	Sr-90'	0.5	8172	1110	58.7	7/1/2009 15:18
D3	Sr-90'	0.5	10000	1140	67.5	7/1/2009 15:19
D3	Sr-90'	0.5	12119	1170	72.7	7/1/2009 15:19
D3	Sr-90'	0.5	14648	1200	75.0	7/1/2009 15:20
D3	Sr-90'	0.5	16756	1230	69.6	7/1/2009 15:21
D3	Sr-90'	0.5	18932	1260	50.7	7/1/2009 15:22
D3	Sr-90'	0.49	20419	1290	28.7	7/1/2009 15:22
D3	Sr-90'	0.47	20417	1320	7.9	7/1/2009 15:23
D3	Sr-90'	0.45	20316	1350	1.1	7/1/2009 15:24
D3	Sr-90'	0.44	20172	1380	-0.5	7/1/2009 15:25
D3	Sr-90'	0.45	20699	1410	3.2	7/1/2009 15:26
D3	Sr-90'	0.44	20157	1440	0.3	7/1/2009 15:26
D3	Sr-90'	0.45	20796	1470	-3.9	7/1/2009 15:27
D3	Sr-90'	0.44	20171	1500	-0.2	7/1/2009 15:28
D3	Sr-90'	0.44	20106	1530	0.5	7/1/2009 15:29
D3	Sr-90'	0.44	20476	1560	4.9	7/1/2009 15:30
D3	Sr-90'	0.45	20713	1590	3.7	7/1/2009 15:30
D3	Sr-90'	0.45	20599	1620		7/1/2009 15:31
D3	Sr-90'	0.45	20602	1650		7/1/2009 15:32
D4	Sr-90'	0.11	1	750		7/1/2009 15:09
D4	Sr-90'	0.11	1	780		7/1/2009 15:09
D4	Sr-90'	0.11	7	810	3.2	7/1/2009 15:10
D4	Sr-90'	0.5	147	840	7.0	7/1/2009 15:11
D4	Sr-90'	0.5	404	870	11.2	7/1/2009 15:11
D4	Sr-90'	0.5	853	900	15.0	7/1/2009 15:12
D4	Sr-90'	0.5	1327	930	17.8	7/1/2009 15:13
D4	Sr-90'	0.5	1936	960	20.5	7/1/2009 15:14
D4	Sr-90'	0.5	2527	990	24.2	7/1/2009 15:15
D4	Sr-90'	0.5	3323	1020	29.1	7/1/2009 15:15
D4	Sr-90'	0.5	4264	1050	36.1	7/1/2009 15:16
D4	Sr-90'	0.5	5435	1080	42.7	7/1/2009 15:17
D4	Sr-90'	0.5	6888	1110	51.1	7/1/2009 15:18
D4	Sr-90'	0.5	8412	1140	56.9	7/1/2009 15:19
D4	Sr-90'	0.5	10433	1170	59.9	7/1/2009 15:19
D4	Sr-90'	0.5	12204	1200	61.4	7/1/2009 15:20
D4	Sr-90'	0.5	13978	1230	56.9	7/1/2009 15:21
D4	Sr-90'	0.5	15844	1260	49.4	7/1/2009 15:22
D4	Sr-90'	0.5	17152	1290	38.6	7/1/2009 15:22
D4	Sr-90'	0.5	18022	1320	24.6	7/1/2009 15:23
D4	Sr-90'	0.5	18681	1350	14.6	7/1/2009 15:24
D4	Sr-90'	0.5	18775	1380	10.1	7/1/2009 15:25
D4	Sr-90'	0.5	18959	1410	5.8	7/1/2009 15:26

D4	Sr-90'	0.5	19392	1440	2.8	7/1/2009 15:26
D4	Sr-90'	0.5	19243	1470	-2.5	7/1/2009 15:27
D4	Sr-90'	0.5	19058	1500	-4.4	7/1/2009 15:28
D4	Sr-90'	0.5	18753	1530	-2.5	7/1/2009 15:29
D4	Sr-90'	0.5	18970	1560	2.3	7/1/2009 15:30
D4	Sr-90'	0.5	18909	1590	2.7	7/1/2009 15:30
D4	Sr-90'	0.5	19318	1620		7/1/2009 15:31
D4	Sr-90'	0.5	18979	1650		7/1/2009 15:32
E1	Sr-90'	0.11	2	750		7/1/2009 16:53
E1	Sr-90'	0.11	5	780		7/1/2009 16:54
E1	Sr-90'	0.5	105	810	4.8	7/1/2009 16:54
E1	Sr-90'	0.5	272	840	7.7	7/1/2009 16:55
E1	Sr-90'	0.5	586	870	10.2	7/1/2009 16:55
E1	Sr-90'	0.5	917	900	12.7	7/1/2009 16:56
E1	Sr-90'	0.5	1310	930	15.1	7/1/2009 16:57
E1	Sr-90'	0.5	1822	960	17.8	7/1/2009 16:57
E1	Sr-90'	0.5	2394	990	21.9	7/1/2009 16:58
E1	Sr-90'	0.5	3047	1020	26.4	7/1/2009 16:59
E1	Sr-90'	0.5	3979	1050	30.7	7/1/2009 16:59
E1	Sr-90'	0.5	4991	1080	36.2	7/1/2009 17:00
E1	Sr-90'	0.5	6025	1110	40.8	7/1/2009 17:00
E1	Sr-90'	0.5	7460	1140	44.7	7/1/2009 17:01
E1	Sr-90'	0.5	8857	1170	46.7	7/1/2009 17:02
E1	Sr-90'	0.5	10283	1200	42.6	7/1/2009 17:02
E1	Sr-90'	0.5	11614	1230	36.4	7/1/2009 17:03
E1	Sr-90'	0.5	12474	1260	28.4	7/1/2009 17:04
E1	Sr-90'	0.5	13226	1290	20.6	7/1/2009 17:04
E1	Sr-90'	0.5	13737	1320	14.1	7/1/2009 17:05
E1	Sr-90'	0.5	14075	1350	7.7	7/1/2009 17:05
E1	Sr-90'	0.5	14159	1380	3.5	7/1/2009 17:06
E1	Sr-90'	0.5	14167	1410	2.0	7/1/2009 17:07
E1	Sr-90'	0.5	14219	1440	3.8	7/1/2009 17:07
E1	Sr-90'	0.5	14348	1470	3.2	7/1/2009 17:08
E1	Sr-90'	0.5	14643	1500	0.4	7/1/2009 17:09
E1	Sr-90'	0.5	14432	1530	-0.1	7/1/2009 17:09
E1	Sr-90'	0.5	14241	1560	-0.1	7/1/2009 17:10
E1	Sr-90'	0.5	14536	1590	2.5	7/1/2009 17:10
E1	Sr-90'	0.5	14569	1620		7/1/2009 17:11
E1	Sr-90'	0.5	14650	1650		7/1/2009 17:12
E2	Sr-90'	0.11	1	750		7/1/2009 16:53
E2	Sr-90'	0.11	3	780		7/1/2009 16:54
E2	Sr-90'	0.5	81	810	4.5	7/1/2009 16:54
E2	Sr-90'	0.5	238	840	7.9	7/1/2009 16:55
E2	Sr-90'	0.5	551	870	11.3	7/1/2009 16:55
E2	Sr-90'	0.5	958	900	15.1	7/1/2009 16:56
E2	Sr-90'	0.5	1416	930	18.1	7/1/2009 16:57
E2	Sr-90'	0.5	2066	960	21.2	7/1/2009 16:57
E2	Sr-90'	0.5	2713	990	25.8	7/1/2009 16:58
E2	Sr-90'	0.5	3496	1020	30.6	7/1/2009 16:59
E2	Sr-90'	0.5	4569	1050	37.2	7/1/2009 16:59
E2	Sr-90'	0.5	5734	1080	44.5	7/1/2009 17:00
E2	Sr-90'	0.5	7168	1110	50.7	7/1/2009 17:00
E2	Sr-90'	0.5	8866	1140	56.4	7/1/2009 17:01
E2	Sr-90'	0.5	10605	1170	58.5	7/1/2009 17:02
E2	Sr-90'	0.5	12472	1200	55.9	7/1/2009 17:02
E2	Sr-90'	0.5	14141	1230	48.8	7/1/2009 17:03
E2	Sr-90'	0.5	15488	1260	37.9	7/1/2009 17:04
E2	Sr-90'	0.5	16420	1290	27.4	7/1/2009 17:04
E2	Sr-90'	0.5	17015	1320	19.0	7/1/2009 17:05
E2	Sr-90'	0.5	17485	1350	12.1	7/1/2009 17:05
E2	Sr-90'	0.5	17805	1380	6.0	7/1/2009 17:06
E2	Sr-90'	0.5	17843	1410	2.5	7/1/2009 17:07
E2	Sr-90'	0.5	17729	1440	0.6	7/1/2009 17:07
E2	Sr-90'	0.5	17899	1470	0.2	7/1/2009 17:08
E2	Sr-90'	0.5	17869	1500	1.8	7/1/2009 17:09
E2	Sr-90'	0.5	17806	1530	0.0	7/1/2009 17:09
E2	Sr-90'	0.5	18040	1560	2.2	7/1/2009 17:10
E2	Sr-90'	0.5	17819	1590	1.9	7/1/2009 17:10
E2	Sr-90'	0.5	18188	1620		7/1/2009 17:11
E2	Sr-90'	0.5	18023	1650		7/1/2009 17:12

E3	Sr-90'	0.11	6	750		7/1/2009 16:53
E3	Sr-90'	0.5	100	780		7/1/2009 16:54
E3	Sr-90'	0.5	299	810	8.2	7/1/2009 16:54
E3	Sr-90'	0.5	562	840	12.0	7/1/2009 16:55
E3	Sr-90'	0.5	998	870	15.3	7/1/2009 16:55
E3	Sr-90'	0.5	1557	900	18.2	7/1/2009 16:56
E3	Sr-90'	0.5	2103	930	21.5	7/1/2009 16:57
E3	Sr-90'	0.5	2734	960	25.7	7/1/2009 16:57
E3	Sr-90'	0.5	3637	990	32.2	7/1/2009 16:58
E3	Sr-90'	0.5	4648	1020	38.0	7/1/2009 16:59
E3	Sr-90'	0.5	5981	1050	43.0	7/1/2009 16:59
E3	Sr-90'	0.5	7264	1080	48.2	7/1/2009 17:00
E3	Sr-90'	0.5	8773	1110	52.4	7/1/2009 17:00
E3	Sr-90'	0.5	10478	1140	56.1	7/1/2009 17:01
E3	Sr-90'	0.5	12239	1170	54.1	7/1/2009 17:02
E3	Sr-90'	0.5	13953	1200	47.1	7/1/2009 17:02
E3	Sr-90'	0.5	15145	1230	37.8	7/1/2009 17:03
E3	Sr-90'	0.5	16088	1260	27.2	7/1/2009 17:04
E3	Sr-90'	0.5	16835	1290	18.2	7/1/2009 17:04
E3	Sr-90'	0.5	17187	1320	9.6	7/1/2009 17:05
E3	Sr-90'	0.5	17323	1350	4.3	7/1/2009 17:05
E3	Sr-90'	0.5	17281	1380	4.2	7/1/2009 17:06
E3	Sr-90'	0.5	17438	1410	2.2	7/1/2009 17:07
E3	Sr-90'	0.5	17763	1440	1.7	7/1/2009 17:07
E3	Sr-90'	0.5	17411	1470	-0.9	7/1/2009 17:08
E3	Sr-90'	0.5	17545	1500	-0.4	7/1/2009 17:09
E3	Sr-90'	0.5	17408	1530	2.9	7/1/2009 17:09
E3	Sr-90'	0.5	17704	1560	1.8	7/1/2009 17:10
E3	Sr-90'	0.5	17768	1590	0.6	7/1/2009 17:10
E3	Sr-90'	0.5	17641	1620		7/1/2009 17:11
E3	Sr-90'	0.5	17535	1650		7/1/2009 17:12
E4	Sr-90'	0.12	0	750		7/1/2009 16:53
E4	Sr-90'	0.12	1	780		7/1/2009 16:54
E4	Sr-90'	0.5	62	810	3.5	7/1/2009 16:54
E4	Sr-90'	0.5	205	840	6.0	7/1/2009 16:55
E4	Sr-90'	0.5	428	870	8.7	7/1/2009 16:55
E4	Sr-90'	0.5	712	900	12.1	7/1/2009 16:56
E4	Sr-90'	0.5	1114	930	15.5	7/1/2009 16:57
E4	Sr-90'	0.5	1670	960	17.6	7/1/2009 16:57
E4	Sr-90'	0.5	2269	990	21.0	7/1/2009 16:58
E4	Sr-90'	0.5	2774	1020	25.3	7/1/2009 16:59
E4	Sr-90'	0.5	3713	1050	30.9	7/1/2009 16:59
E4	Sr-90'	0.5	4742	1080	38.0	7/1/2009 17:00
E4	Sr-90'	0.5	5922	1110	41.9	7/1/2009 17:00
E4	Sr-90'	0.5	7364	1140	46.6	7/1/2009 17:01
E4	Sr-90'	0.5	8687	1170	48.0	7/1/2009 17:02
E4	Sr-90'	0.5	10345	1200	46.5	7/1/2009 17:02
E4	Sr-90'	0.5	11633	1230	42.6	7/1/2009 17:03
E4	Sr-90'	0.5	12867	1260	35.1	7/1/2009 17:04
E4	Sr-90'	0.5	13814	1290	27.5	7/1/2009 17:04
E4	Sr-90'	0.5	14521	1320	17.8	7/1/2009 17:05
E4	Sr-90'	0.5	14937	1350	11.4	7/1/2009 17:05
E4	Sr-90'	0.5	14976	1380	6.8	7/1/2009 17:06
E4	Sr-90'	0.5	15298	1410	4.0	7/1/2009 17:07
E4	Sr-90'	0.5	15356	1440	3.4	7/1/2009 17:07
E4	Sr-90'	0.5	15348	1470	2.5	7/1/2009 17:08
E4	Sr-90'	0.5	15467	1500	1.5	7/1/2009 17:09
E4	Sr-90'	0.5	15614	1530	-0.3	7/1/2009 17:09
E4	Sr-90'	0.5	15441	1560	-2.2	7/1/2009 17:10
E4	Sr-90'	0.5	15310	1590	-0.7	7/1/2009 17:10
E4	Sr-90'	0.5	15285	1620		7/1/2009 17:11
E4	Sr-90'	0.5	15594	1650		7/1/2009 17:12
F1	Sr-90'	0.11	1	750		7/1/2009 16:53
F1	Sr-90'	0.5	41	780		7/1/2009 16:54
F1	Sr-90'	0.5	140	810	5.8	7/1/2009 16:54
F1	Sr-90'	0.5	386	840	9.6	7/1/2009 16:55
F1	Sr-90'	0.5	692	870	13.4	7/1/2009 16:55
F1	Sr-90'	0.5	1203	900	17.5	7/1/2009 16:56
F1	Sr-90'	0.5	1739	930	22.0	7/1/2009 16:57
F1	Sr-90'	0.5	2486	960	24.4	7/1/2009 16:57

F1	Sr-90'	0.5	3345	990	28.5	7/1/2009 16:58
F1	Sr-90'	0.5	4063	1020	33.4	7/1/2009 16:59
F1	Sr-90'	0.5	5218	1050	39.9	7/1/2009 16:59
F1	Sr-90'	0.5	6559	1080	49.9	7/1/2009 17:00
F1	Sr-90'	0.5	8089	1110	56.9	7/1/2009 17:00
F1	Sr-90'	0.5	10105	1140	63.2	7/1/2009 17:01
F1	Sr-90'	0.5	11973	1170	63.6	7/1/2009 17:02
F1	Sr-90'	0.5	14100	1200	60.5	7/1/2009 17:02
F1	Sr-90'	0.5	15625	1230	51.4	7/1/2009 17:03
F1	Sr-90'	0.5	17349	1260	40.8	7/1/2009 17:04
F1	Sr-90'	0.5	18058	1290	29.0	7/1/2009 17:04
F1	Sr-90'	0.5	19007	1320	16.9	7/1/2009 17:05
F1	Sr-90'	0.5	19153	1350	11.1	7/1/2009 17:05
F1	Sr-90'	0.5	19337	1380	4.5	7/1/2009 17:06
F1	Sr-90'	0.5	19560	1410	4.6	7/1/2009 17:07
F1	Sr-90'	0.5	19474	1440	2.9	7/1/2009 17:07
F1	Sr-90'	0.5	19777	1470	2.2	7/1/2009 17:08
F1	Sr-90'	0.5	19660	1500	2.0	7/1/2009 17:09
F1	Sr-90'	0.5	19795	1530	1.4	7/1/2009 17:09
F1	Sr-90'	0.5	19765	1560	1.5	7/1/2009 17:10
F1	Sr-90'	0.5	19927	1590	-0.9	7/1/2009 17:10
F1	Sr-90'	0.5	19825	1620		7/1/2009 17:11
F1	Sr-90'	0.5	19634	1650		7/1/2009 17:12
F2	Sr-90'	0.11	3	750		7/1/2009 16:53
F2	Sr-90'	0.5	75	780		7/1/2009 16:54
F2	Sr-90'	0.5	255	810	8.6	7/1/2009 16:54
F2	Sr-90'	0.5	549	840	12.8	7/1/2009 16:55
F2	Sr-90'	0.5	1053	870	16.1	7/1/2009 16:56
F2	Sr-90'	0.5	1600	900	20.7	7/1/2009 16:56
F2	Sr-90'	0.5	2150	930	24.4	7/1/2009 16:57
F2	Sr-90'	0.5	3108	960	30.2	7/1/2009 16:57
F2	Sr-90'	0.5	3956	990	37.2	7/1/2009 16:58
F2	Sr-90'	0.5	5225	1020	43.1	7/1/2009 16:59
F2	Sr-90'	0.5	6673	1050	52.0	7/1/2009 16:59
F2	Sr-90'	0.5	8221	1080	57.9	7/1/2009 17:00
F2	Sr-90'	0.5	10263	1110	65.3	7/1/2009 17:00
F2	Sr-90'	0.5	12122	1140	70.5	7/1/2009 17:01
F2	Sr-90'	0.5	14514	1170	70.5	7/1/2009 17:02
F2	Sr-90'	0.5	16669	1200	64.7	7/1/2009 17:02
F2	Sr-90'	0.5	18558	1230	50.8	7/1/2009 17:03
F2	Sr-90'	0.5	19798	1260	30.8	7/1/2009 17:04
F2	Sr-90'	0.5	20571	1290	14.2	7/1/2009 17:04
F2	Sr-90'	0.48	20276	1320	4.2	7/1/2009 17:05
F2	Sr-90'	0.48	20444	1350	-2.3	7/1/2009 17:05
F2	Sr-90'	0.48	20498	1380	-0.7	7/1/2009 17:06
F2	Sr-90'	0.47	20110	1410	0.6	7/1/2009 17:07
F2	Sr-90'	0.47	20341	1440	0.6	7/1/2009 17:07
F2	Sr-90'	0.48	20608	1470	2.6	7/1/2009 17:08
F2	Sr-90'	0.47	20343	1500	1.8	7/1/2009 17:09
F2	Sr-90'	0.48	20506	1530	-0.2	7/1/2009 17:09
F2	Sr-90'	0.48	20655	1560	1.8	7/1/2009 17:10
F2	Sr-90'	0.47	20420	1590	-0.3	7/1/2009 17:10
F2	Sr-90'	0.48	20663	1620		7/1/2009 17:11
F2	Sr-90'	0.47	20459	1650		7/1/2009 17:12
F3	Sr-90'	0.11	4	750		7/1/2009 16:53
F3	Sr-90'	0.5	50	780		7/1/2009 16:54
F3	Sr-90'	0.5	177	810	6.3	7/1/2009 16:54
F3	Sr-90'	0.5	380	840	10.6	7/1/2009 16:55
F3	Sr-90'	0.5	779	870	14.1	7/1/2009 16:56
F3	Sr-90'	0.5	1332	900	17.5	7/1/2009 16:56
F3	Sr-90'	0.5	1821	930	21.0	7/1/2009 16:57
F3	Sr-90'	0.5	2490	960	24.7	7/1/2009 16:57
F3	Sr-90'	0.5	3348	990	30.7	7/1/2009 16:58
F3	Sr-90'	0.5	4268	1020	37.1	7/1/2009 16:59
F3	Sr-90'	0.5	5535	1050	43.6	7/1/2009 16:59
F3	Sr-90'	0.5	6954	1080	49.9	7/1/2009 17:00
F3	Sr-90'	0.5	8548	1110	54.8	7/1/2009 17:00
F3	Sr-90'	0.5	10239	1140	59.6	7/1/2009 17:01
F3	Sr-90'	0.5	12114	1170	60.8	7/1/2009 17:02
F3	Sr-90'	0.5	14106	1200	57.4	7/1/2009 17:02

F3	Sr-90'	0.5	15735	1230	48.0	7/1/2009 17:03
F3	Sr-90'	0.5	17035	1260	35.4	7/1/2009 17:04
F3	Sr-90'	0.5	17852	1290	25.4	7/1/2009 17:04
F3	Sr-90'	0.5	18355	1320	15.1	7/1/2009 17:05
F3	Sr-90'	0.5	18889	1350	7.9	7/1/2009 17:05
F3	Sr-90'	0.5	18778	1380	4.9	7/1/2009 17:06
F3	Sr-90'	0.5	18827	1410	2.1	7/1/2009 17:07
F3	Sr-90'	0.5	19124	1440	2.7	7/1/2009 17:07
F3	Sr-90'	0.5	19026	1470	1.2	7/1/2009 17:08
F3	Sr-90'	0.5	19090	1500	-0.3	7/1/2009 17:09
F3	Sr-90'	0.5	19021	1530	0.7	7/1/2009 17:09
F3	Sr-90'	0.5	19089	1560	1.2	7/1/2009 17:10
F3	Sr-90'	0.5	19128	1590	2.1	7/1/2009 17:10
F3	Sr-90'	0.5	19221	1620		7/1/2009 17:11
F3	Sr-90'	0.5	19274	1650		7/1/2009 17:12
F4	Sr-90'	0.12	0	750		7/1/2009 16:53
F4	Sr-90'	0.11	0	780		7/1/2009 16:54
F4	Sr-90'	0.5	125	810	5.6	7/1/2009 16:54
F4	Sr-90'	0.5	346	840	9.4	7/1/2009 16:55
F4	Sr-90'	0.5	671	870	13.3	7/1/2009 16:56
F4	Sr-90'	0.5	1133	900	16.8	7/1/2009 16:56
F4	Sr-90'	0.5	1726	930	20.4	7/1/2009 16:57
F4	Sr-90'	0.5	2343	960	24.5	7/1/2009 16:57
F4	Sr-90'	0.5	3123	990	28.7	7/1/2009 16:58
F4	Sr-90'	0.5	4105	1020	34.6	7/1/2009 16:59
F4	Sr-90'	0.5	5144	1050	40.7	7/1/2009 16:59
F4	Sr-90'	0.5	6524	1080	46.8	7/1/2009 17:00
F4	Sr-90'	0.5	8020	1110	53.6	7/1/2009 17:00
F4	Sr-90'	0.5	9687	1140	59.4	7/1/2009 17:01
F4	Sr-90'	0.5	11603	1170	59.9	7/1/2009 17:02
F4	Sr-90'	0.5	13644	1200	58.2	7/1/2009 17:02
F4	Sr-90'	0.5	15027	1230	50.3	7/1/2009 17:03
F4	Sr-90'	0.5	16711	1260	38.9	7/1/2009 17:04
F4	Sr-90'	0.5	17608	1290	27.3	7/1/2009 17:04
F4	Sr-90'	0.5	18185	1320	15.4	7/1/2009 17:05
F4	Sr-90'	0.5	18391	1350	9.8	7/1/2009 17:05
F4	Sr-90'	0.5	18626	1380	5.6	7/1/2009 17:06
F4	Sr-90'	0.5	18863	1410	3.4	7/1/2009 17:07
F4	Sr-90'	0.5	18792	1440	2.1	7/1/2009 17:07
F4	Sr-90'	0.5	18816	1470	-0.5	7/1/2009 17:08
F4	Sr-90'	0.5	18962	1500	1.5	7/1/2009 17:09
F4	Sr-90'	0.5	18700	1530	1.6	7/1/2009 17:09
F4	Sr-90'	0.5	19073	1560	0.5	7/1/2009 17:10
F4	Sr-90'	0.5	18996	1590	1.6	7/1/2009 17:10
F4	Sr-90'	0.5	18893	1620		7/1/2009 17:11
F4	Sr-90'	0.5	19035	1650		7/1/2009 17:12
G1	Sr-90'	0.11	2	750		7/1/2009 16:53
G1	Sr-90'	0.11	8	780		7/1/2009 16:54
G1	Sr-90'	0.5	142	810	5.3	7/1/2009 16:54
G1	Sr-90'	0.5	309	840	8.5	7/1/2009 16:54
G1	Sr-90'	0.5	643	870	11.6	7/1/2009 16:55
G1	Sr-90'	0.5	1029	900	14.5	7/1/2009 16:56
G1	Sr-90'	0.5	1529	930	17.1	7/1/2009 16:56
G1	Sr-90'	0.5	2045	960	20.8	7/1/2009 16:57
G1	Sr-90'	0.5	2698	990	24.9	7/1/2009 16:58
G1	Sr-90'	0.5	3567	1020	30.5	7/1/2009 16:58
G1	Sr-90'	0.5	4501	1050	34.9	7/1/2009 16:59
G1	Sr-90'	0.5	5717	1080	42.1	7/1/2009 16:59
G1	Sr-90'	0.5	6865	1110	49.7	7/1/2009 17:00
G1	Sr-90'	0.5	8707	1140	54.5	7/1/2009 17:01
G1	Sr-90'	0.5	10467	1170	57.3	7/1/2009 17:01
G1	Sr-90'	0.5	12095	1200	52.8	7/1/2009 17:02
G1	Sr-90'	0.5	13759	1230	47.4	7/1/2009 17:03
G1	Sr-90'	0.5	14976	1260	37.0	7/1/2009 17:03
G1	Sr-90'	0.5	16137	1290	25.1	7/1/2009 17:04
G1	Sr-90'	0.5	16455	1320	16.0	7/1/2009 17:04
G1	Sr-90'	0.5	16791	1350	8.1	7/1/2009 17:05
G1	Sr-90'	0.5	17045	1380	5.8	7/1/2009 17:06
G1	Sr-90'	0.5	17060	1410	2.2	7/1/2009 17:06
G1	Sr-90'	0.5	17183	1440	0.5	7/1/2009 17:07

G1	Sr-90'	0.5	17051	1470	-0.1	7/1/2009 17:08
G1	Sr-90'	0.5	17124	1500	0.2	7/1/2009 17:08
G1	Sr-90'	0.5	17071	1530	1.3	7/1/2009 17:09
G1	Sr-90'	0.5	17202	1560	0.7	7/1/2009 17:09
G1	Sr-90'	0.5	17214	1590	1.5	7/1/2009 17:10
G1	Sr-90'	0.5	17159	1620		7/1/2009 17:11
G1	Sr-90'	0.5	17321	1650		7/1/2009 17:11
G2	Sr-90'	0.11	2	750		7/1/2009 16:53
G2	Sr-90'	0.11	8	780		7/1/2009 16:54
G2	Sr-90'	0.5	148	810	5.7	7/1/2009 16:54
G2	Sr-90'	0.5	324	840	9.1	7/1/2009 16:54
G2	Sr-90'	0.5	700	870	12.3	7/1/2009 16:55
G2	Sr-90'	0.5	1101	900	15.5	7/1/2009 16:56
G2	Sr-90'	0.5	1601	930	18.8	7/1/2009 16:56
G2	Sr-90'	0.5	2197	960	23.0	7/1/2009 16:57
G2	Sr-90'	0.5	2979	990	28.0	7/1/2009 16:58
G2	Sr-90'	0.5	3866	1020	33.2	7/1/2009 16:58
G2	Sr-90'	0.5	4971	1050	38.4	7/1/2009 16:59
G2	Sr-90'	0.5	6177	1080	44.0	7/1/2009 16:59
G2	Sr-90'	0.5	7579	1110	50.4	7/1/2009 17:00
G2	Sr-90'	0.5	9156	1140	56.2	7/1/2009 17:01
G2	Sr-90'	0.5	11042	1170	59.0	7/1/2009 17:01
G2	Sr-90'	0.5	12872	1200	58.2	7/1/2009 17:02
G2	Sr-90'	0.5	14577	1230	50.9	7/1/2009 17:03
G2	Sr-90'	0.5	16124	1260	38.8	7/1/2009 17:03
G2	Sr-90'	0.5	17054	1290	26.4	7/1/2009 17:04
G2	Sr-90'	0.5	17456	1320	16.4	7/1/2009 17:04
G2	Sr-90'	0.5	17867	1350	9.5	7/1/2009 17:05
G2	Sr-90'	0.5	18172	1380	5.6	7/1/2009 17:06
G2	Sr-90'	0.5	18119	1410	3.2	7/1/2009 17:06
G2	Sr-90'	0.5	18174	1440	2.4	7/1/2009 17:07
G2	Sr-90'	0.5	18347	1470	2.6	7/1/2009 17:08
G2	Sr-90'	0.5	18411	1500	2.6	7/1/2009 17:08
G2	Sr-90'	0.5	18383	1530	0.5	7/1/2009 17:09
G2	Sr-90'	0.5	18551	1560	0.4	7/1/2009 17:09
G2	Sr-90'	0.5	18352	1590	-1.0	7/1/2009 17:10
G2	Sr-90'	0.5	18482	1620		7/1/2009 17:11
G2	Sr-90'	0.5	18274	1650		7/1/2009 17:11
G3	Sr-90'	0.11	1	750		7/1/2009 16:53
G3	Sr-90'	0.12	0	780		7/1/2009 16:54
G3	Sr-90'	0.5	43	810	2.8	7/1/2009 16:54
G3	Sr-90'	0.5	140	840	6.1	7/1/2009 16:54
G3	Sr-90'	0.5	346	870	10.0	7/1/2009 16:55
G3	Sr-90'	0.5	770	900	13.8	7/1/2009 16:56
G3	Sr-90'	0.5	1233	930	17.3	7/1/2009 16:56
G3	Sr-90'	0.5	1759	960	21.4	7/1/2009 16:57
G3	Sr-90'	0.5	2451	990	25.6	7/1/2009 16:58
G3	Sr-90'	0.5	3366	1020	31.4	7/1/2009 16:58
G3	Sr-90'	0.5	4276	1050	35.9	7/1/2009 16:59
G3	Sr-90'	0.5	5558	1080	42.3	7/1/2009 16:59
G3	Sr-90'	0.5	6744	1110	49.0	7/1/2009 17:00
G3	Sr-90'	0.5	8480	1140	55.9	7/1/2009 17:01
G3	Sr-90'	0.5	10165	1170	63.6	7/1/2009 17:01
G3	Sr-90'	0.5	12235	1200	67.0	7/1/2009 17:02
G3	Sr-90'	0.5	14404	1230	67.4	7/1/2009 17:03
G3	Sr-90'	0.5	16407	1260	59.3	7/1/2009 17:03
G3	Sr-90'	0.5	18185	1290	47.6	7/1/2009 17:04
G3	Sr-90'	0.5	19233	1320	33.5	7/1/2009 17:04
G3	Sr-90'	0.5	20131	1350	19.1	7/1/2009 17:05
G3	Sr-90'	0.5	20459	1380	9.5	7/1/2009 17:06
G3	Sr-90'	0.49	20432	1410	3.7	7/1/2009 17:06
G3	Sr-90'	0.49	20500	1440	1.6	7/1/2009 17:07
G3	Sr-90'	0.49	20665	1470	-0.3	7/1/2009 17:08
G3	Sr-90'	0.49	20578	1500	-1.6	7/1/2009 17:08
G3	Sr-90'	0.48	20348	1530	-1.6	7/1/2009 17:09
G3	Sr-90'	0.48	20420	1560	1.5	7/1/2009 17:09
G3	Sr-90'	0.48	20503	1590	3.3	7/1/2009 17:10
G3	Sr-90'	0.48	20725	1620		7/1/2009 17:11
G3	Sr-90'	0.48	20692	1650		7/1/2009 17:11
G4	Sr-90'	0.12	0	750		7/1/2009 16:53

G4	Sr-90'	0.12	2	780		7/1/2009 16:54
G4	Sr-90'	0.12	10	810	2.1	7/1/2009 16:54
G4	Sr-90'	0.5	96	840	4.3	7/1/2009 16:54
G4	Sr-90'	0.5	266	870	7.1	7/1/2009 16:55
G4	Sr-90'	0.5	522	900	9.6	7/1/2009 16:56
G4	Sr-90'	0.5	858	930	11.1	7/1/2009 16:56
G4	Sr-90'	0.5	1238	960	13.8	7/1/2009 16:57
G4	Sr-90'	0.5	1580	990	16.0	7/1/2009 16:58
G4	Sr-90'	0.5	2232	1020	19.4	7/1/2009 16:58
G4	Sr-90'	0.5	2756	1050	24.6	7/1/2009 16:59
G4	Sr-90'	0.5	3567	1080	28.0	7/1/2009 16:59
G4	Sr-90'	0.5	4603	1110	33.4	7/1/2009 17:00
G4	Sr-90'	0.5	5501	1140	38.6	7/1/2009 17:01
G4	Sr-90'	0.5	6802	1170	41.7	7/1/2009 17:01
G4	Sr-90'	0.5	8262	1200	44.3	7/1/2009 17:02
G4	Sr-90'	0.5	9472	1230	42.5	7/1/2009 17:03
G4	Sr-90'	0.5	10818	1260	38.5	7/1/2009 17:03
G4	Sr-90'	0.5	11904	1290	32.4	7/1/2009 17:04
G4	Sr-90'	0.5	12821	1320	23.7	7/1/2009 17:04
G4	Sr-90'	0.5	13335	1350	16.3	7/1/2009 17:05
G4	Sr-90'	0.5	13662	1380	8.9	7/1/2009 17:06
G4	Sr-90'	0.5	13925	1410	5.9	7/1/2009 17:06
G4	Sr-90'	0.5	13865	1440	2.8	7/1/2009 17:07
G4	Sr-90'	0.5	14125	1470	0.9	7/1/2009 17:08
G4	Sr-90'	0.5	13975	1500	2.0	7/1/2009 17:08
G4	Sr-90'	0.5	14009	1530	2.4	7/1/2009 17:09
G4	Sr-90'	0.5	14226	1560	3.7	7/1/2009 17:09
G4	Sr-90'	0.5	14366	1590	2.1	7/1/2009 17:10
G4	Sr-90'	0.5	14354	1620		7/1/2009 17:11
G4	Sr-90'	0.5	14254	1650		7/1/2009 17:11
H1	Sr-90'	0.11	3	750		7/1/2009 16:53
H1	Sr-90'	0.12	4	780		7/1/2009 16:54
H1	Sr-90'	0.5	120	810	5.0	7/1/2009 16:54
H1	Sr-90'	0.5	277	840	8.3	7/1/2009 16:55
H1	Sr-90'	0.5	613	870	11.3	7/1/2009 16:55
H1	Sr-90'	0.5	1000	900	15.1	7/1/2009 16:56
H1	Sr-90'	0.5	1459	930	18.3	7/1/2009 16:56
H1	Sr-90'	0.5	2112	960	22.4	7/1/2009 16:57
H1	Sr-90'	0.5	2797	990	26.1	7/1/2009 16:58
H1	Sr-90'	0.5	3684	1020	31.3	7/1/2009 16:58
H1	Sr-90'	0.5	4585	1050	36.5	7/1/2009 16:59
H1	Sr-90'	0.5	5908	1080	43.0	7/1/2009 17:00
H1	Sr-90'	0.5	7164	1110	49.9	7/1/2009 17:00
H1	Sr-90'	0.5	8847	1140	54.0	7/1/2009 17:01
H1	Sr-90'	0.5	10607	1170	56.0	7/1/2009 17:01
H1	Sr-90'	0.5	12293	1200	52.8	7/1/2009 17:02
H1	Sr-90'	0.5	13845	1230	45.0	7/1/2009 17:03
H1	Sr-90'	0.5	15147	1260	35.9	7/1/2009 17:03
H1	Sr-90'	0.5	15927	1290	24.6	7/1/2009 17:04
H1	Sr-90'	0.5	16632	1320	15.7	7/1/2009 17:05
H1	Sr-90'	0.5	16799	1350	10.3	7/1/2009 17:05
H1	Sr-90'	0.5	17067	1380	6.6	7/1/2009 17:06
H1	Sr-90'	0.5	17254	1410	5.4	7/1/2009 17:06
H1	Sr-90'	0.5	17390	1440	2.6	7/1/2009 17:07
H1	Sr-90'	0.5	17444	1470	-1.0	7/1/2009 17:08
H1	Sr-90'	0.5	17357	1500	-0.5	7/1/2009 17:08
H1	Sr-90'	0.5	17121	1530	1.8	7/1/2009 17:09
H1	Sr-90'	0.5	17478	1560	3.5	7/1/2009 17:10
H1	Sr-90'	0.5	17655	1590	2.8	7/1/2009 17:10
H1	Sr-90'	0.5	17621	1620	20.4	7/1/2009 17:11
H1	Sr-90'	0.5	17476	1650		7/1/2009 17:11
H2	Sr-90'	0.11	0	750		7/1/2009 16:53
H2	Sr-90'	0.11	2	780		7/1/2009 16:54
H2	Sr-90'	0.11	9	810	3.0	7/1/2009 16:54
H2	Sr-90'	0.5	130	840	5.7	7/1/2009 16:55
H2	Sr-90'	0.5	386	870	8.8	7/1/2009 16:55
H2	Sr-90'	0.5	671	900	11.9	7/1/2009 16:56
H2	Sr-90'	0.5	1065	930	14.0	7/1/2009 16:56
H2	Sr-90'	0.5	1570	960	18.0	7/1/2009 16:57
H2	Sr-90'	0.5	2032	990	22.2	7/1/2009 16:58

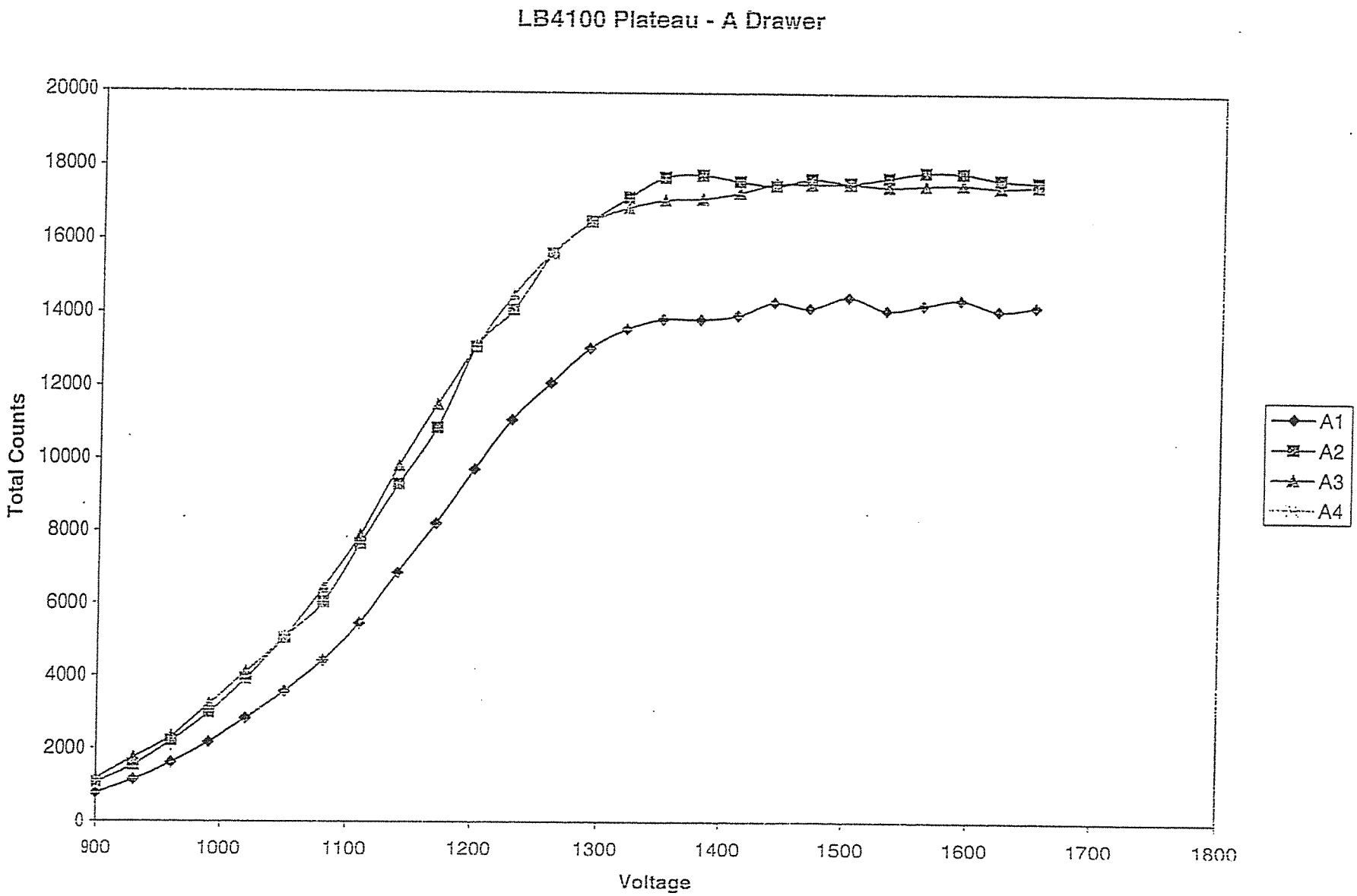
H2	Sr-90'	0.5	2889	1020	26.1	7/1/2009 16:58
H2	Sr-90'	0.5	3732	1050	31.4	7/1/2009 16:59
H2	Sr-90'	0.5	4634	1080	34.9	7/1/2009 17:00
H2	Sr-90'	0.5	5875	1110	40.7	7/1/2009 17:00
H2	Sr-90'	0.5	7057	1140	46.8	7/1/2009 17:01
H2	Sr-90'	0.5	8628	1170	52.3	7/1/2009 17:01
H2	Sr-90'	0.5	10272	1200	54.8	7/1/2009 17:02
H2	Sr-90'	0.5	12110	1230	50.3	7/1/2009 17:03
H2	Sr-90'	0.5	13536	1260	42.6	7/1/2009 17:03
H2	Sr-90'	0.5	14535	1290	31.4	7/1/2009 17:04
H2	Sr-90'	0.5	15451	1320	21.6	7/1/2009 17:05
H2	Sr-90'	0.5	15866	1350	13.4	7/1/2009 17:05
H2	Sr-90'	0.5	16110	1380	7.8	7/1/2009 17:06
H2	Sr-90'	0.5	16214	1410	5.3	7/1/2009 17:06
H2	Sr-90'	0.5	16443	1440	2.9	7/1/2009 17:07
H2	Sr-90'	0.5	16489	1470	1.2	7/1/2009 17:08
H2	Sr-90'	0.5	16408	1500	0.0	7/1/2009 17:08
H2	Sr-90'	0.5	16413	1530	1.6	7/1/2009 17:09
H2	Sr-90'	0.5	16476	1560	0.9	7/1/2009 17:10
H2	Sr-90'	0.5	16689	1590	0.2	7/1/2009 17:10
H2	Sr-90'	0.5	16407	1620		7/1/2009 17:11
H2	Sr-90'	0.5	16470	1650		7/1/2009 17:11
H3	Sr-90'	0.11	0	750		7/1/2009 16:53
H3	Sr-90'	0.11	2	780		7/1/2009 16:54
H3	Sr-90'	0.11	10	810	2.2	7/1/2009 16:54
H3	Sr-90'	0.5	107	840	5.0	7/1/2009 16:55
H3	Sr-90'	0.5	281	870	8.6	7/1/2009 16:55
H3	Sr-90'	0.5	620	900	12.4	7/1/2009 16:56
H3	Sr-90'	0.5	1041	930	16.8	7/1/2009 16:56
H3	Sr-90'	0.5	1590	960	20.0	7/1/2009 16:57
H3	Sr-90'	0.5	2316	990	24.3	7/1/2009 16:58
H3	Sr-90'	0.5	2989	1020	29.6	7/1/2009 16:58
H3	Sr-90'	0.5	3989	1050	35.8	7/1/2009 16:59
H3	Sr-90'	0.5	5187	1080	42.4	7/1/2009 17:00
H3	Sr-90'	0.5	6593	1110	48.1	7/1/2009 17:00
H3	Sr-90'	0.5	8042	1140	56.1	7/1/2009 17:01
H3	Sr-90'	0.5	9778	1170	62.8	7/1/2009 17:01
H3	Sr-90'	0.5	12005	1200	68.0	7/1/2009 17:02
H3	Sr-90'	0.5	14024	1230	67.5	7/1/2009 17:03
H3	Sr-90'	0.5	16121	1260	59.0	7/1/2009 17:03
H3	Sr-90'	0.5	17840	1290	49.1	7/1/2009 17:04
H3	Sr-90'	0.5	18952	1320	33.9	7/1/2009 17:05
H3	Sr-90'	0.5	19970	1350	20.2	7/1/2009 17:05
H3	Sr-90'	0.5	20148	1380	11.3	7/1/2009 17:06
H3	Sr-90'	0.5	20279	1410	3.1	7/1/2009 17:06
H3	Sr-90'	0.5	20488	1440	1.9	7/1/2009 17:07
H3	Sr-90'	0.49	20260	1470	1.2	7/1/2009 17:08
H3	Sr-90'	0.5	20448	1500	0.3	7/1/2009 17:08
H3	Sr-90'	0.49	20478	1530	0.5	7/1/2009 17:09
H3	Sr-90'	0.49	20420	1560	-1.7	7/1/2009 17:10
H3	Sr-90'	0.49	20351	1590	-1.3	7/1/2009 17:10
H3	Sr-90'	0.49	20252	1620		7/1/2009 17:11
H3	Sr-90'	0.49	20370	1650		7/1/2009 17:11
H4	Sr-90'	0.12	1	750		7/1/2009 16:53
H4	Sr-90'	0.11	3	780		7/1/2009 16:54
H4	Sr-90'	0.11	6	810	2.6	7/1/2009 16:54
H4	Sr-90'	0.5	150	840	5.2	7/1/2009 16:55
H4	Sr-90'	0.5	313	870	8.6	7/1/2009 16:55
H4	Sr-90'	0.5	632	900	11.7	7/1/2009 16:56
H4	Sr-90'	0.5	1050	930	16.1	7/1/2009 16:56
H4	Sr-90'	0.5	1541	960	19.0	7/1/2009 16:57
H4	Sr-90'	0.5	2266	990	21.7	7/1/2009 16:58
H4	Sr-90'	0.5	2881	1020	26.3	7/1/2009 16:58
H4	Sr-90'	0.5	3633	1050	31.4	7/1/2009 16:59
H4	Sr-90'	0.5	4798	1080	36.1	7/1/2009 17:00
H4	Sr-90'	0.5	6014	1110	42.2	7/1/2009 17:00
H4	Sr-90'	0.5	7109	1140	46.2	7/1/2009 17:01
H4	Sr-90'	0.5	8810	1170	50.5	7/1/2009 17:01
H4	Sr-90'	0.5	10328	1200	53.0	7/1/2009 17:02
H4	Sr-90'	0.5	11973	1230	48.7	7/1/2009 17:03

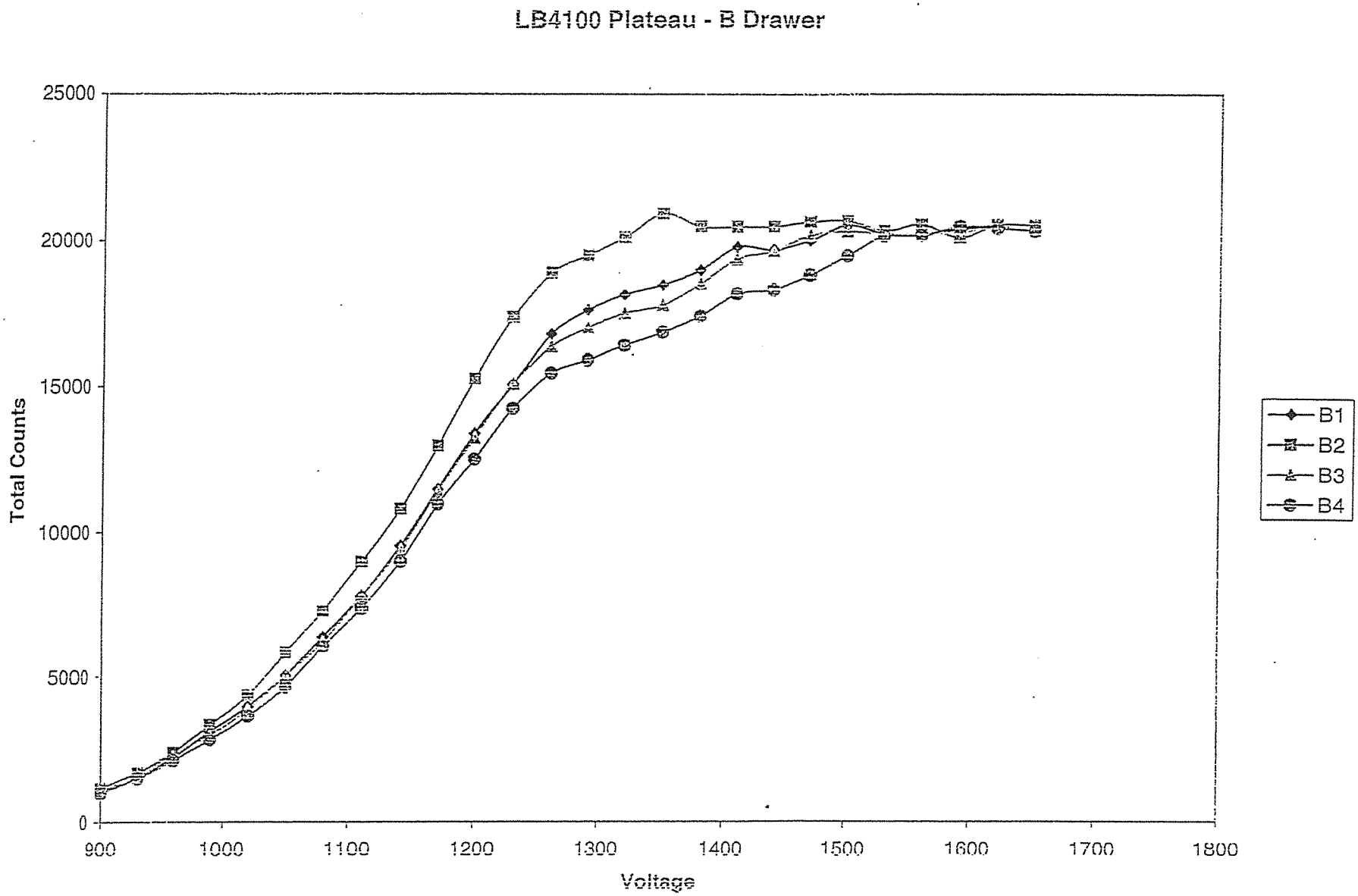
H4	Sr-90'	0.5	13484	1260	43.5	7/1/2009 17:03
H4	Sr-90'	0.5	14544	1290	33.5	7/1/2009 17:04
H4	Sr-90'	0.5	15574	1320	21.0	7/1/2009 17:05
H4	Sr-90'	0.5	15946	1350	13.2	7/1/2009 17:05
H4	Sr-90'	0.5	15928	1380	8.1	7/1/2009 17:06
H4	Sr-90'	0.5	16344	1410	7.2	7/1/2009 17:06
H4	Sr-90'	0.5	16589	1440	5.8	7/1/2009 17:07
H4	Sr-90'	0.5	16693	1470	1.0	7/1/2009 17:08
H4	Sr-90'	0.5	16624	1500	0.0	7/1/2009 17:08
H4	Sr-90'	0.5	16474	1530	-1.0	7/1/2009 17:09
H4	Sr-90'	0.5	16692	1560	-0.1	7/1/2009 17:10
H4	Sr-90'	0.5	16507	1590	-0.7	7/1/2009 17:10
H4	Sr-90'	0.5	16597	1620		7/1/2009 17:11
H4	Sr-90'	0.5	16414	1650		7/1/2009 17:11
I1	Sr-90	0.5	123	750	18.9	1/27/2011 10:01
I1	Sr-90	0.5	268	780	18.6	1/27/2011 10:01
I1	Sr-90	0.5	584	810	9.6	1/27/2011 10:02
I1	Sr-90	0.5	867	840	12.4	1/27/2011 10:03
I1	Sr-90	0.5	1256	870	15.1	1/27/2011 10:03
I1	Sr-90	0.5	1797	900	17.5	1/27/2011 10:04
I1	Sr-90	0.5	2382	930	20.8	1/27/2011 10:05
I1	Sr-90	0.5	2927	960	24.5	1/27/2011 10:05
I1	Sr-90	0.5	3808	990	29.9	1/27/2011 10:06
I1	Sr-90	0.5	4757	1020	34.4	1/27/2011 10:07
I1	Sr-90	0.5	5949	1050	39.8	1/27/2011 10:07
I1	Sr-90	0.5	7017	1080	42.7	1/27/2011 10:08
I1	Sr-90	0.5	8641	1110	43.8	1/27/2011 10:08
I1	Sr-90	0.5	9823	1140	43.7	1/27/2011 10:09
I1	Sr-90	0.5	11116	1170	36.7	1/27/2011 10:10
I1	Sr-90	0.5	12334	1200	28.5	1/27/2011 10:10
I1	Sr-90	0.5	12896	1230	18.7	1/27/2011 10:11
I1	Sr-90	0.5	13215	1260	9.7	1/27/2011 10:12
I1	Sr-90	0.5	13483	1290	6.5	1/27/2011 10:12
I1	Sr-90	0.5	13490	1320	4.5	1/27/2011 10:13
I1	Sr-90	0.5	13739	1350	2.2	1/27/2011 10:13
I1	Sr-90	0.5	13768	1380	1.8	1/27/2011 10:14
I1	Sr-90	0.5	13669	1410	0.0	1/27/2011 10:15
I1	Sr-90	0.5	13797	1440	0.7	1/27/2011 10:15
I1	Sr-90	0.5	13731	1470	0.1	1/27/2011 10:16
I1	Sr-90	0.5	13846	1500	-0.1	1/27/2011 10:17
I1	Sr-90	0.5	13654	1530	1.1	1/27/2011 10:17
I1	Sr-90	0.5	13826	1560	1.5	1/27/2011 10:18
I1	Sr-90	0.5	13901	1590	3.2	1/27/2011 10:18
I1	Sr-90	0.5	13942	1620	16.1	1/27/2011 10:19
I1	Sr-90	0.5	14075	1650	16.2	1/27/2011 10:20
I2	Sr-90	0.5	59	750	16.1	1/27/2011 10:01
I2	Sr-90	0.5	171	780	16.0	1/27/2011 10:01
I2	Sr-90	0.5	413	810	10.2	1/27/2011 10:02
I2	Sr-90	0.5	765	840	14.7	1/27/2011 10:03
I2	Sr-90	0.5	1299	870	18.6	1/27/2011 10:03
I2	Sr-90	0.5	1931	900	22.6	1/27/2011 10:04
I2	Sr-90	0.5	2626	930	26.9	1/27/2011 10:05
I2	Sr-90	0.5	3495	960	32.0	1/27/2011 10:05
I2	Sr-90	0.5	4556	990	36.2	1/27/2011 10:06
I2	Sr-90	0.5	5768	1020	42.1	1/27/2011 10:07
I2	Sr-90	0.5	6917	1050	50.6	1/27/2011 10:07
I2	Sr-90	0.5	8632	1080	59.4	1/27/2011 10:08
I2	Sr-90	0.5	10708	1110	64.5	1/27/2011 10:08
I2	Sr-90	0.5	12783	1140	63.6	1/27/2011 10:09
I2	Sr-90	0.5	14516	1170	56.5	1/27/2011 10:10
I2	Sr-90	0.5	16266	1200	43.1	1/27/2011 10:10
I2	Sr-90	0.5	17438	1230	28.9	1/27/2011 10:11
I2	Sr-90	0.5	17789	1260	16.6	1/27/2011 10:12
I2	Sr-90	0.5	18087	1290	10.0	1/27/2011 10:12
I2	Sr-90	0.5	18433	1320	5.9	1/27/2011 10:13
I2	Sr-90	0.5	18610	1350	2.4	1/27/2011 10:13
I2	Sr-90	0.5	18415	1380	0.5	1/27/2011 10:14
I2	Sr-90	0.5	18457	1410	-1.2	1/27/2011 10:15
I2	Sr-90	0.5	18578	1440	-2.3	1/27/2011 10:15
I2	Sr-90	0.5	18346	1470	-1.8	1/27/2011 10:16

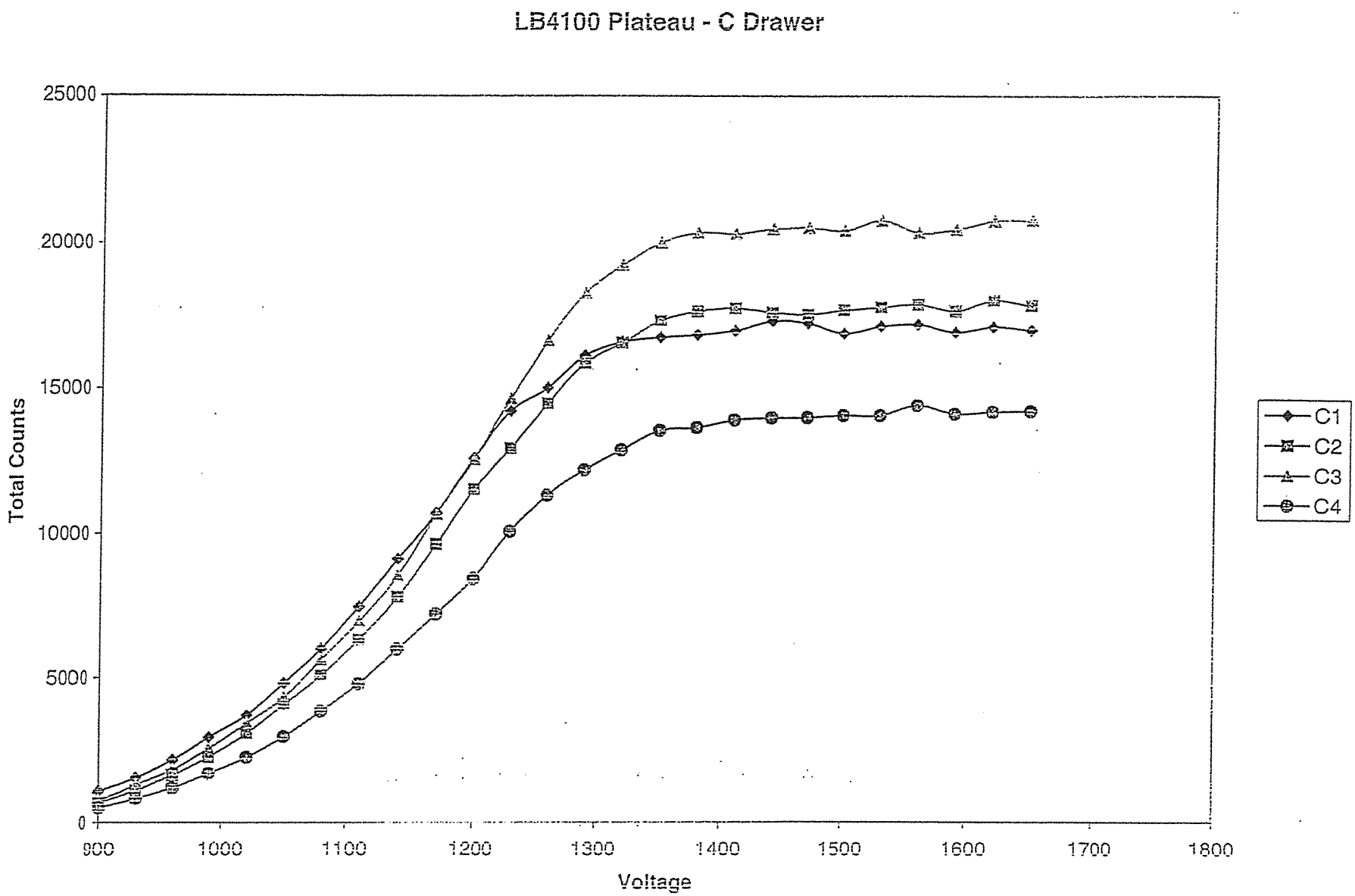
I2	Sr-90	0.5	18133	1500	-0.7	1/27/2011 10:17
I2	Sr-90	0.5	18411	1530	1.6	1/27/2011 10:17
I2	Sr-90	0.5	18435	1560	3.5	1/27/2011 10:18
I2	Sr-90	0.5	18432	1590	-0.2	1/27/2011 10:18
I2	Sr-90	0.5	18646	1620	21.2	1/27/2011 10:19
I2	Sr-90	0.5	18270	1650	21.2	1/27/2011 10:20
I3	Sr-90	0.5	154	750	21.1	1/27/2011 10:01
I3	Sr-90	0.5	362	780	20.6	1/27/2011 10:01
I3	Sr-90	0.5	717	810	14.2	1/27/2011 10:02
I3	Sr-90	0.5	1227	840	18.8	1/27/2011 10:03
I3	Sr-90	0.5	1845	870	22.1	1/27/2011 10:03
I3	Sr-90	0.5	2619	900	26.4	1/27/2011 10:04
I3	Sr-90	0.5	3329	930	31.0	1/27/2011 10:05
I3	Sr-90	0.5	4448	960	38.6	1/27/2011 10:05
I3	Sr-90	0.5	5579	990	45.8	1/27/2011 10:06
I3	Sr-90	0.5	7283	1020	53.0	1/27/2011 10:07
I3	Sr-90	0.5	8786	1050	61.6	1/27/2011 10:07
I3	Sr-90	0.5	10788	1080	66.6	1/27/2011 10:08
I3	Sr-90	0.5	13064	1110	66.9	1/27/2011 10:08
I3	Sr-90	0.5	15140	1140	60.2	1/27/2011 10:09
I3	Sr-90	0.5	16644	1170	46.6	1/27/2011 10:10
I3	Sr-90	0.5	18029	1200	34.2	1/27/2011 10:10
I3	Sr-90	0.5	18614	1230	23.1	1/27/2011 10:11
I3	Sr-90	0.5	19281	1260	10.6	1/27/2011 10:12
I3	Sr-90	0.5	19484	1290	6.5	1/27/2011 10:12
I3	Sr-90	0.5	19183	1320	0.8	1/27/2011 10:13
I3	Sr-90	0.5	19645	1350	1.1	1/27/2011 10:13
I3	Sr-90	0.5	19325	1380	2.4	1/27/2011 10:14
I3	Sr-90	0.5	19574	1410	-1.1	1/27/2011 10:15
I3	Sr-90	0.5	19575	1440	-1.2	1/27/2011 10:15
I3	Sr-90	0.5	19349	1470	-2.3	1/27/2011 10:16
I3	Sr-90	0.5	19263	1500	-0.8	1/27/2011 10:17
I3	Sr-90	0.5	19381	1530	0.7	1/27/2011 10:17
I3	Sr-90	0.5	19438	1560	2.1	1/27/2011 10:18
I3	Sr-90	0.5	19369	1590	0.5	1/27/2011 10:18
I3	Sr-90	0.5	19577	1620	22.6	1/27/2011 10:19
I3	Sr-90	0.5	19380	1650	22.6	1/27/2011 10:20
I4	Sr-90	0.11	7	750	22.5	1/27/2011 10:00
I4	Sr-90	0.5	130	780	22.2	1/27/2011 10:01
I4	Sr-90	0.5	348	810	8.9	1/27/2011 10:02
I4	Sr-90	0.5	686	840	11.9	1/27/2011 10:03
I4	Sr-90	0.5	1062	870	15.7	1/27/2011 10:03
I4	Sr-90	0.5	1562	900	19.2	1/27/2011 10:04
I4	Sr-90	0.5	2268	930	23.3	1/27/2011 10:05
I4	Sr-90	0.5	2966	960	28.2	1/27/2011 10:05
I4	Sr-90	0.5	3857	990	32.2	1/27/2011 10:06
I4	Sr-90	0.5	4995	1020	38.9	1/27/2011 10:07
I4	Sr-90	0.5	6078	1050	45.5	1/27/2011 10:07
I4	Sr-90	0.5	7697	1080	52.2	1/27/2011 10:08
I4	Sr-90	0.5	9336	1110	56.5	1/27/2011 10:08
I4	Sr-90	0.5	11190	1140	54.7	1/27/2011 10:09
I4	Sr-90	0.5	12811	1170	48.6	1/27/2011 10:10
I4	Sr-90	0.5	14166	1200	37.6	1/27/2011 10:10
I4	Sr-90	0.5	15132	1230	24.1	1/27/2011 10:11
I4	Sr-90	0.5	15674	1260	13.8	1/27/2011 10:12
I4	Sr-90	0.5	15676	1290	6.6	1/27/2011 10:12
I4	Sr-90	0.5	15961	1320	3.5	1/27/2011 10:13
I4	Sr-90	0.5	15975	1350	4.1	1/27/2011 10:13
I4	Sr-90	0.5	16050	1380	1.2	1/27/2011 10:14
I4	Sr-90	0.5	16239	1410	2.5	1/27/2011 10:15
I4	Sr-90	0.5	16010	1440	1.1	1/27/2011 10:15
I4	Sr-90	0.5	16371	1470	0.1	1/27/2011 10:16
I4	Sr-90	0.5	16155	1500	0.4	1/27/2011 10:17
I4	Sr-90	0.5	16176	1530	0.2	1/27/2011 10:17
I4	Sr-90	0.5	16160	1560	0.4	1/27/2011 10:18
I4	Sr-90	0.5	16393	1590	-0.8	1/27/2011 10:18
I4	Sr-90	0.5	16100	1620	18.8	1/27/2011 10:19
I4	Sr-90	0.5	16079	1650	18.8	1/27/2011 10:20
J1	Sr-90	0.11	10	750	18.6	1/27/2011 10:00
J1	Sr-90	0.5	119	780	18.4	1/27/2011 10:01

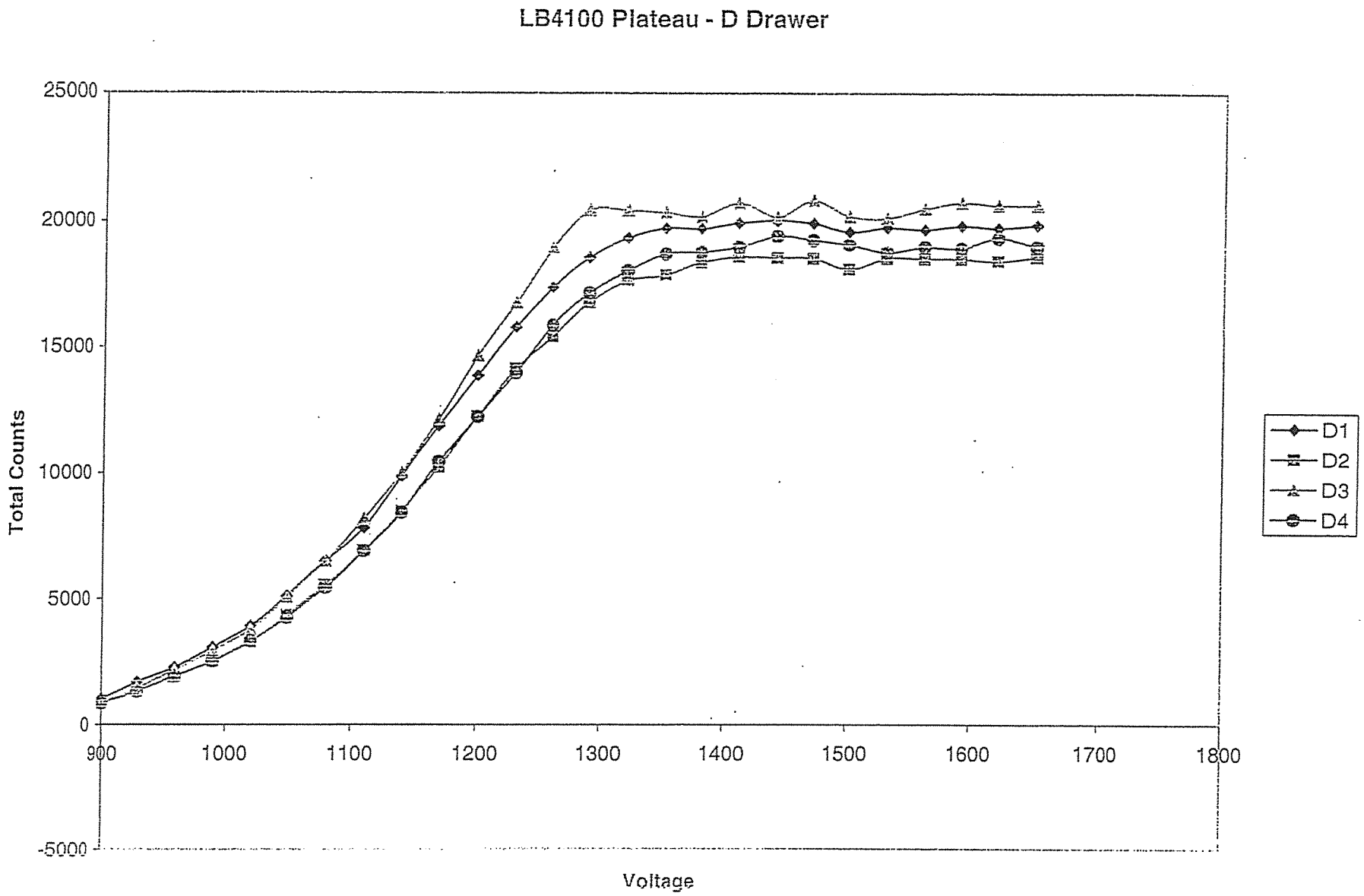
J1	Sr-90	0.5	316	810	9.1	1/27/2011 10:01
J1	Sr-90	0.5	660	840	12.9	1/27/2011 10:02
J1	Sr-90	0.5	1111	870	15.9	1/27/2011 10:03
J1	Sr-90	0.5	1652	900	19.2	1/27/2011 10:03
J1	Sr-90	0.5	2205	930	22.2	1/27/2011 10:04
J1	Sr-90	0.5	2986	960	26.6	1/27/2011 10:05
J1	Sr-90	0.5	3780	990	32.8	1/27/2011 10:05
J1	Sr-90	0.5	4856	1020	39.1	1/27/2011 10:06
J1	Sr-90	0.5	6195	1050	47.2	1/27/2011 10:06
J1	Sr-90	0.5	7645	1080	54.9	1/27/2011 10:07
J1	Sr-90	0.5	9463	1110	58.6	1/27/2011 10:08
J1	Sr-90	0.5	11453	1140	61.1	1/27/2011 10:08
J1	Sr-90	0.5	13083	1170	58.1	1/27/2011 10:09
J1	Sr-90	0.5	15007	1200	48.1	1/27/2011 10:10
J1	Sr-90	0.5	16406	1230	38.0	1/27/2011 10:10
J1	Sr-90	0.5	17006	1260	27.4	1/27/2011 10:11
J1	Sr-90	0.5	17784	1290	17.1	1/27/2011 10:11
J1	Sr-90	0.5	18433	1320	10.7	1/27/2011 10:12
J1	Sr-90	0.5	18263	1350	4.1	1/27/2011 10:13
J1	Sr-90	0.5	18375	1380	1.6	1/27/2011 10:13
J1	Sr-90	0.5	18431	1410	2.0	1/27/2011 10:14
J1	Sr-90	0.5	18585	1440	2.8	1/27/2011 10:15
J1	Sr-90	0.5	18462	1470	3.2	1/27/2011 10:15
J1	Sr-90	0.5	18776	1500	1.2	1/27/2011 10:16
J1	Sr-90	0.5	18813	1530	0.4	1/27/2011 10:16
J1	Sr-90	0.5	18590	1560	-1.2	1/27/2011 10:17
J1	Sr-90	0.5	18619	1590	-0.3	1/27/2011 10:18
J1	Sr-90	0.5	18698	1620		1/27/2011 10:18
J1	Sr-90	0.5	18719	1650		1/27/2011 10:19
J2	Sr-90	0.11	7	750		1/27/2011 10:00
J2	Sr-90	0.5	151	780		1/27/2011 10:01
J2	Sr-90	0.5	376	810	10.4	1/27/2011 10:01
J2	Sr-90	0.5	774	840	14.1	1/27/2011 10:02
J2	Sr-90	0.5	1253	870	18.2	1/27/2011 10:03
J2	Sr-90	0.5	1832	900	21.4	1/27/2011 10:03
J2	Sr-90	0.5	2579	930	25.4	1/27/2011 10:04
J2	Sr-90	0.5	3318	960	31.3	1/27/2011 10:05
J2	Sr-90	0.5	4327	990	36.3	1/27/2011 10:05
J2	Sr-90	0.5	5659	1020	44.2	1/27/2011 10:06
J2	Sr-90	0.5	6856	1050	52.5	1/27/2011 10:06
J2	Sr-90	0.5	8683	1080	60.2	1/27/2011 10:07
J2	Sr-90	0.5	10687	1110	66.9	1/27/2011 10:08
J2	Sr-90	0.5	12771	1140	66.8	1/27/2011 10:08
J2	Sr-90	0.5	14852	1170	62.4	1/27/2011 10:09
J2	Sr-90	0.5	16623	1200	52.8	1/27/2011 10:10
J2	Sr-90	0.5	18114	1230	40.3	1/27/2011 10:10
J2	Sr-90	0.5	19058	1260	29.0	1/27/2011 10:11
J2	Sr-90	0.5	19679	1290	15.5	1/27/2011 10:11
J2	Sr-90	0.5	20190	1320	8.0	1/27/2011 10:12
J2	Sr-90	0.5	19875	1350	5.8	1/27/2011 10:13
J2	Sr-90	0.5	20157	1380	5.4	1/27/2011 10:13
J2	Sr-90	0.5	20567	1410	5.1	1/27/2011 10:14
J2	Sr-90	0.5	20653	1440	1.2	1/27/2011 10:15
J2	Sr-90	0.5	20388	1470	-3.0	1/27/2011 10:15
J2	Sr-90	0.5	20423	1500	-0.6	1/27/2011 10:16
J2	Sr-90	0.5	20233	1530	2.6	1/27/2011 10:16
J2	Sr-90	0.5	20634	1560	2.0	1/27/2011 10:17
J2	Sr-90	0.5	20666	1590	-0.5	1/27/2011 10:18
J2	Sr-90	0.5	20509	1620		1/27/2011 10:18
J2	Sr-90	0.49	20221	1650		1/27/2011 10:19
J3	Sr-90	0.12	4	750		1/27/2011 10:00
J3	Sr-90	0.5	71	780		1/27/2011 10:01
J3	Sr-90	0.5	221	810	7.7	1/27/2011 10:01
J3	Sr-90	0.5	519	840	11.8	1/27/2011 10:02
J3	Sr-90	0.5	931	870	14.8	1/27/2011 10:03
J3	Sr-90	0.5	1493	900	18.2	1/27/2011 10:03
J3	Sr-90	0.5	1958	930	21.6	1/27/2011 10:04
J3	Sr-90	0.5	2731	960	26.1	1/27/2011 10:05
J3	Sr-90	0.5	3550	990	31.0	1/27/2011 10:05
J3	Sr-90	0.5	4617	1020	37.8	1/27/2011 10:06

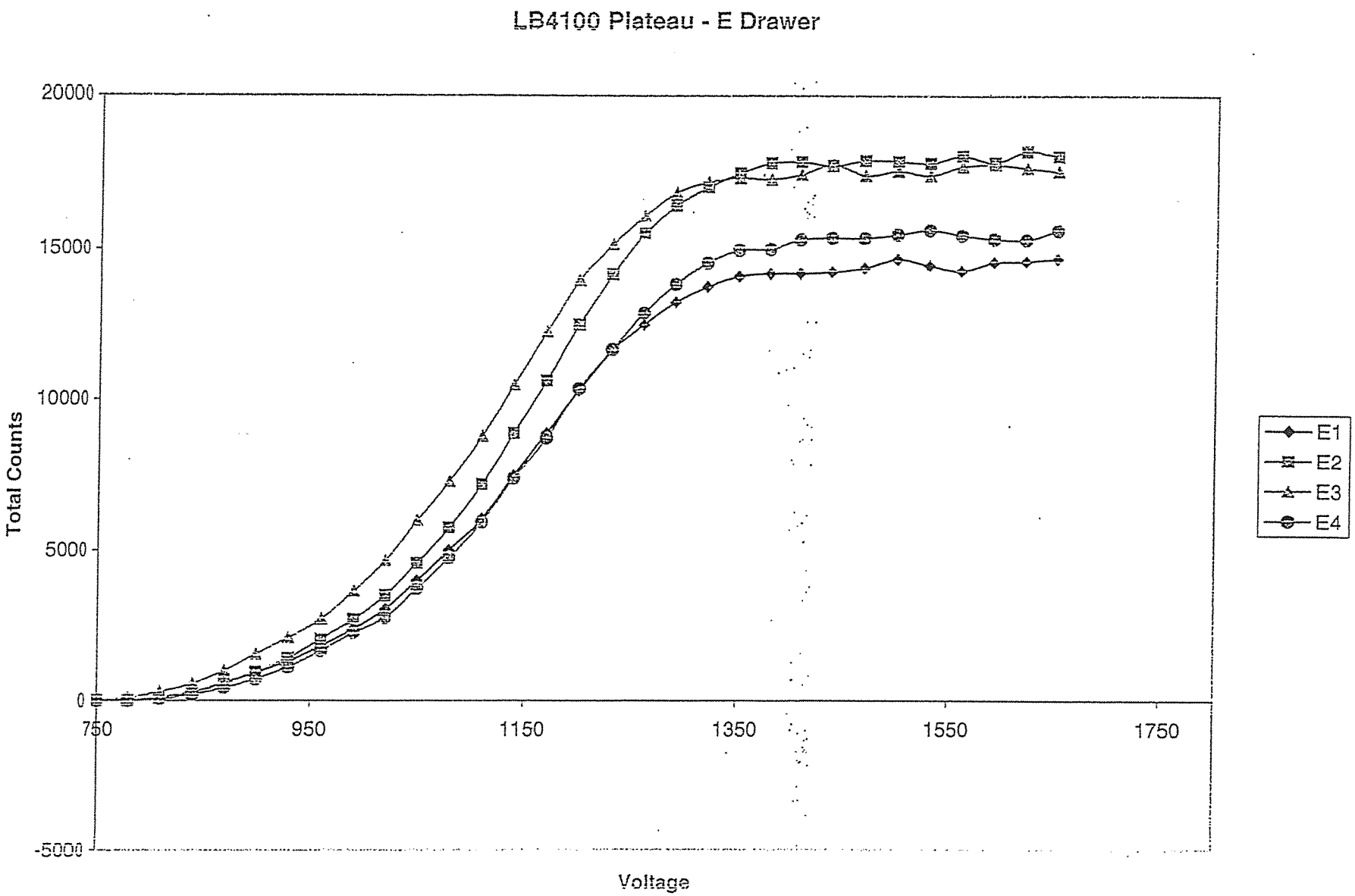
J3	Sr-90	0.5	5670	1050	46.7	1/27/2011 10:06
J3	Sr-90	0.5	7343	1080	51.9	1/27/2011 10:07
J3	Sr-90	0.5	9190	1110	57.7	1/27/2011 10:08
J3	Sr-90	0.5	10644	1140	60.1	1/27/2011 10:08
J3	Sr-90	0.5	12673	1170	58.4	1/27/2011 10:09
J3	Sr-90	0.5	14621	1200	51.6	1/27/2011 10:10
J3	Sr-90	0.5	15968	1230	39.6	1/27/2011 10:10
J3	Sr-90	0.5	16732	1260	27.0	1/27/2011 10:11
J3	Sr-90	0.5	17556	1290	18.2	1/27/2011 10:11
J3	Sr-90	0.5	17875	1320	12.6	1/27/2011 10:12
J3	Sr-90	0.5	18126	1350	6.3	1/27/2011 10:13
J3	Sr-90	0.5	18337	1380	4.4	1/27/2011 10:13
J3	Sr-90	0.5	18271	1410	1.5	1/27/2011 10:14
J3	Sr-90	0.5	18460	1440	0.5	1/27/2011 10:15
J3	Sr-90	0.5	18291	1470	-0.4	1/27/2011 10:15
J3	Sr-90	0.5	18399	1500	-0.1	1/27/2011 10:16
J3	Sr-90	0.5	18247	1530	0.5	1/27/2011 10:16
J3	Sr-90	0.5	18472	1560	1.1	1/27/2011 10:17
J3	Sr-90	0.5	18335	1590	1.3	1/27/2011 10:18
J3	Sr-90	0.5	18525	1620		1/27/2011 10:18
J3	Sr-90	0.5	18422	1650		1/27/2011 10:19
J4	Sr-90	0.11	1	750		1/27/2011 10:00
J4	Sr-90	0.5	49	780		1/27/2011 10:01
J4	Sr-90	0.5	166	810	6.8	1/27/2011 10:01
J4	Sr-90	0.5	433	840	10.9	1/27/2011 10:02
J4	Sr-90	0.5	836	870	14.1	1/27/2011 10:03
J4	Sr-90	0.5	1347	900	17.4	1/27/2011 10:03
J4	Sr-90	0.5	1829	930	20.3	1/27/2011 10:04
J4	Sr-90	0.5	2543	960	23.8	1/27/2011 10:05
J4	Sr-90	0.5	3284	990	29.9	1/27/2011 10:05
J4	Sr-90	0.5	4184	1020	36.4	1/27/2011 10:06
J4	Sr-90	0.5	5494	1050	42.5	1/27/2011 10:06
J4	Sr-90	0.5	6895	1080	48.2	1/27/2011 10:07
J4	Sr-90	0.5	8310	1110	54.0	1/27/2011 10:08
J4	Sr-90	0.5	10001	1140	58.7	1/27/2011 10:08
J4	Sr-90	0.5	12034	1170	59.7	1/27/2011 10:09
J4	Sr-90	0.5	13840	1200	53.3	1/27/2011 10:10
J4	Sr-90	0.5	15343	1230	44.8	1/27/2011 10:10
J4	Sr-90	0.5	16337	1260	31.9	1/27/2011 10:11
J4	Sr-90	0.5	17505	1290	20.0	1/27/2011 10:11
J4	Sr-90	0.5	17549	1320	9.7	1/27/2011 10:12
J4	Sr-90	0.5	17735	1350	1.4	1/27/2011 10:13
J4	Sr-90	0.5	17679	1380	2.4	1/27/2011 10:13
J4	Sr-90	0.5	17657	1410	1.5	1/27/2011 10:14
J4	Sr-90	0.5	17945	1440	2.6	1/27/2011 10:15
J4	Sr-90	0.5	17829	1470	2.9	1/27/2011 10:15
J4	Sr-90	0.5	17979	1500	-0.3	1/27/2011 10:16
J4	Sr-90	0.5	18069	1530	1.1	1/27/2011 10:17
J4	Sr-90	0.5	17773	1560	2.5	1/27/2011 10:17
J4	Sr-90	0.5	18094	1590	2.2	1/27/2011 10:18
J4	Sr-90	0.5	18340	1620	4.2	1/27/2011 10:18
J4	Sr-90	0.5	18112	1650	0.3	1/27/2011 10:19

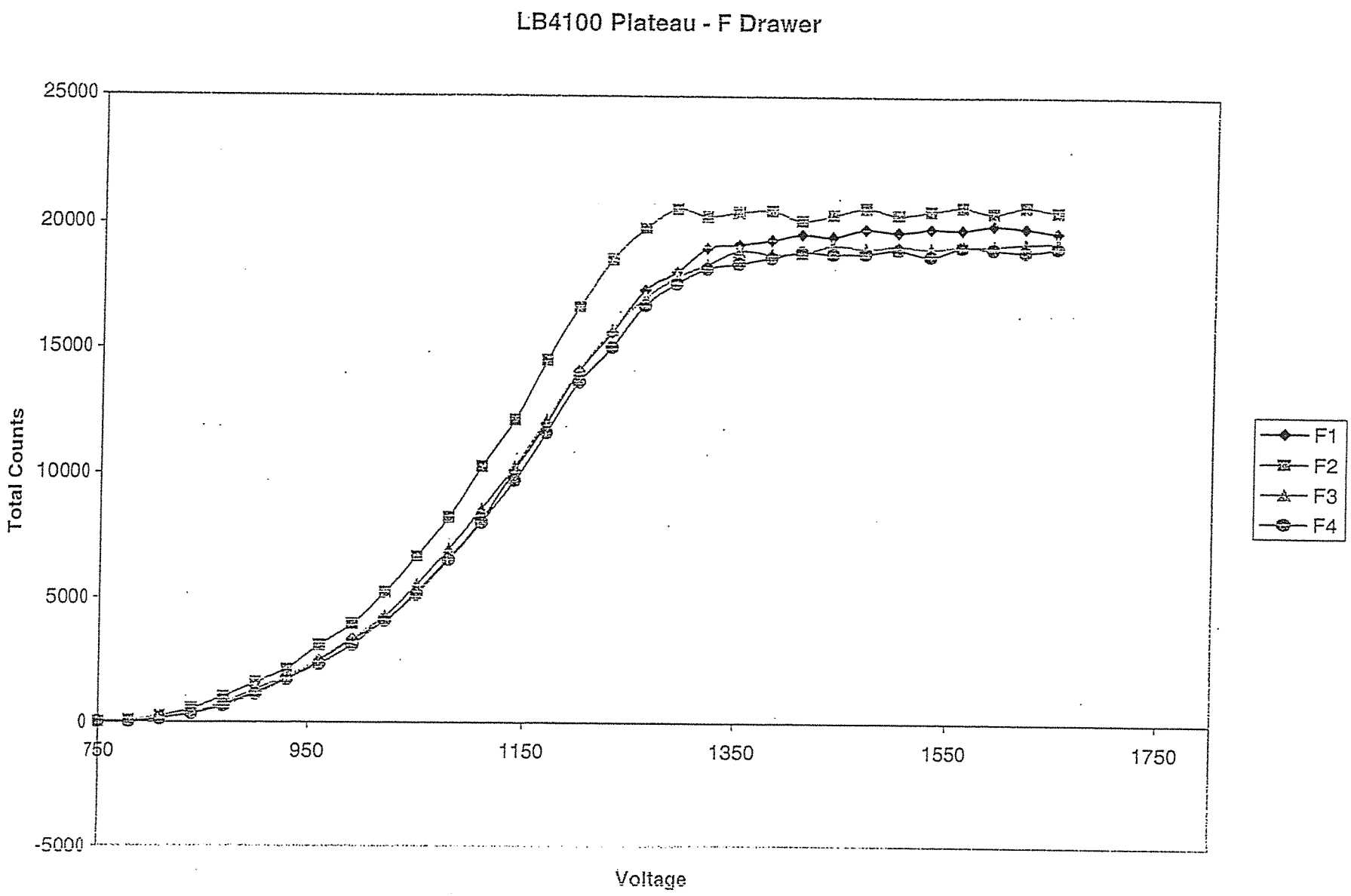

LB4100 Plateau - A Drawer
Total Counts
Voltage
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
A1
A2
A3
A4

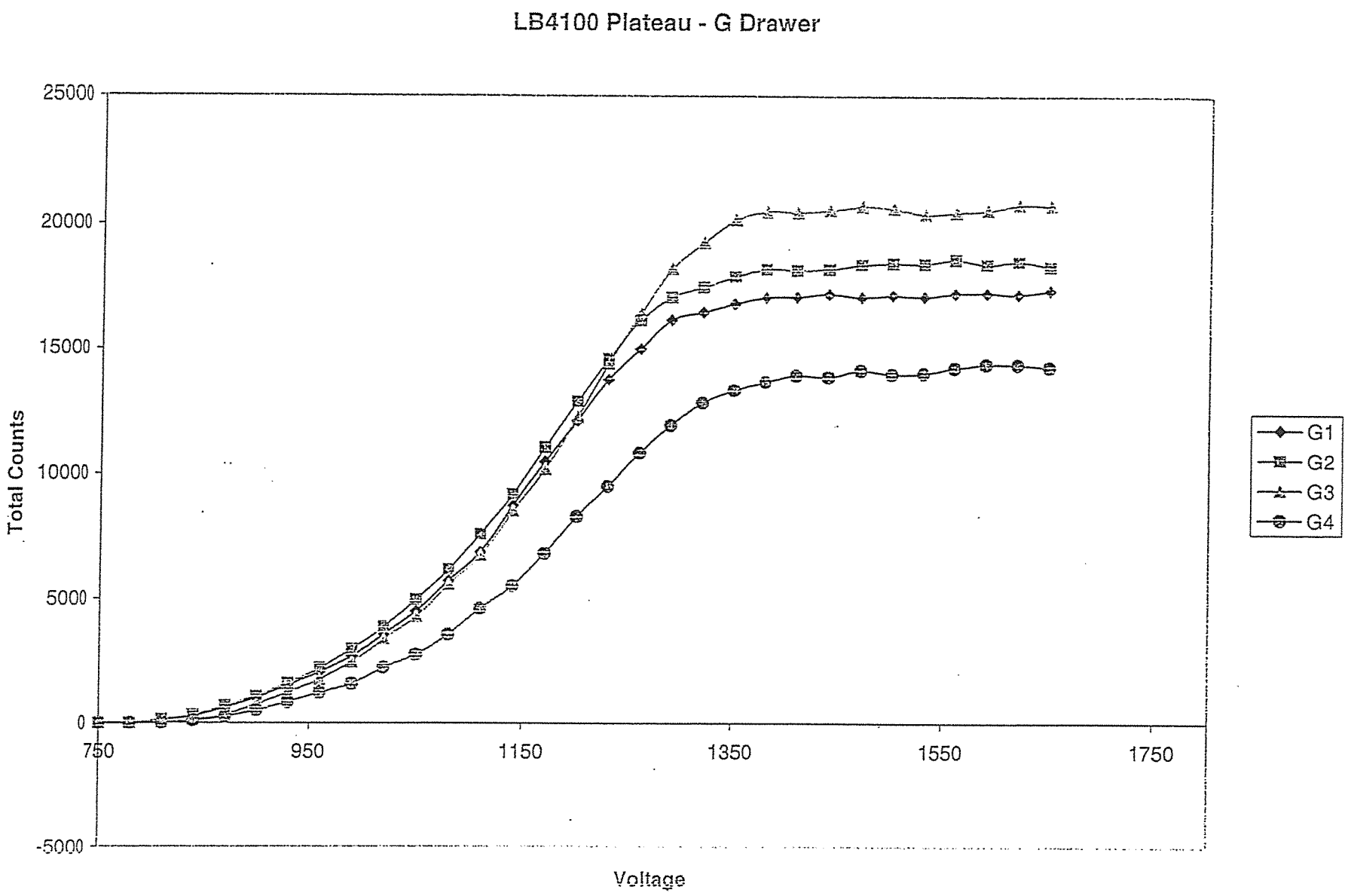

LB4100 Plateau - B Drawer
Total Counts
25000
20000
15000
10000
5000
0
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
Voltage
B1
B2
B3
B4

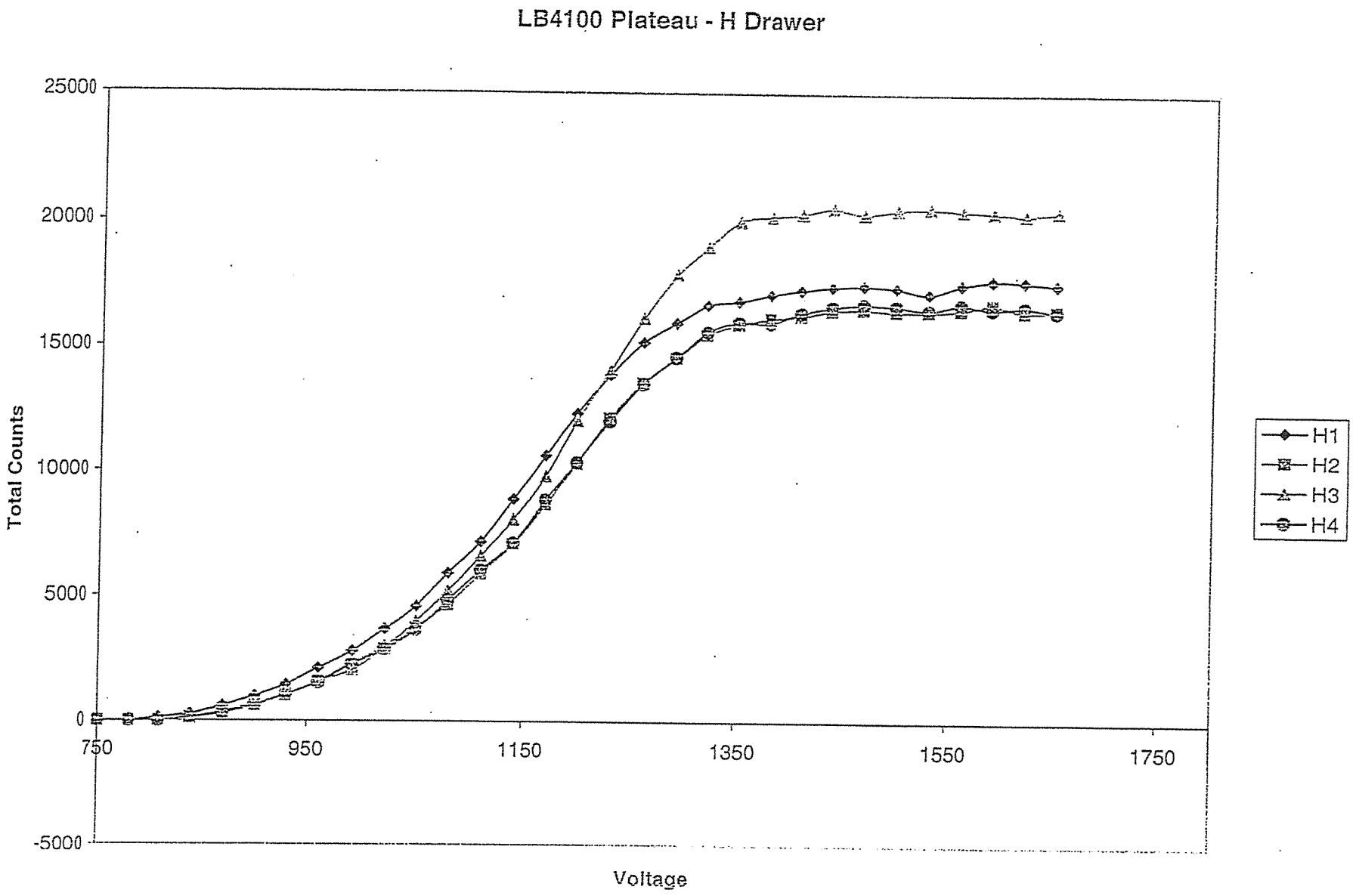

LB4100 Plateau - C Drawer
Total Counts
25000
20000
15000
10000
5000
0
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
Voltage
C1
C2
C3
C4

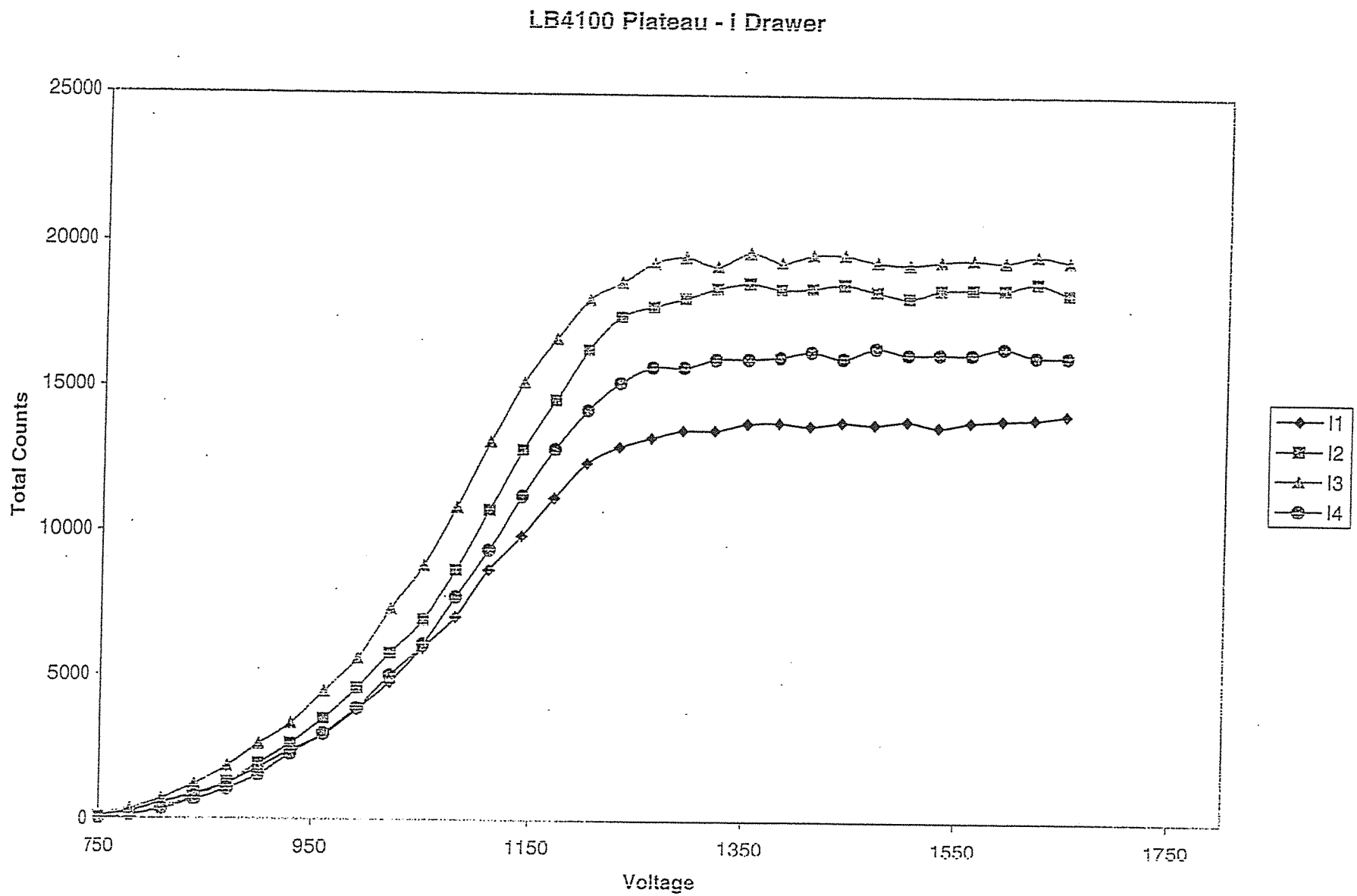

LB4100 Plateau - D Drawer
25000
20000
15000
10000
5000
0
-5000
Total Counts
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
Voltage
D1
D2
D3
D4

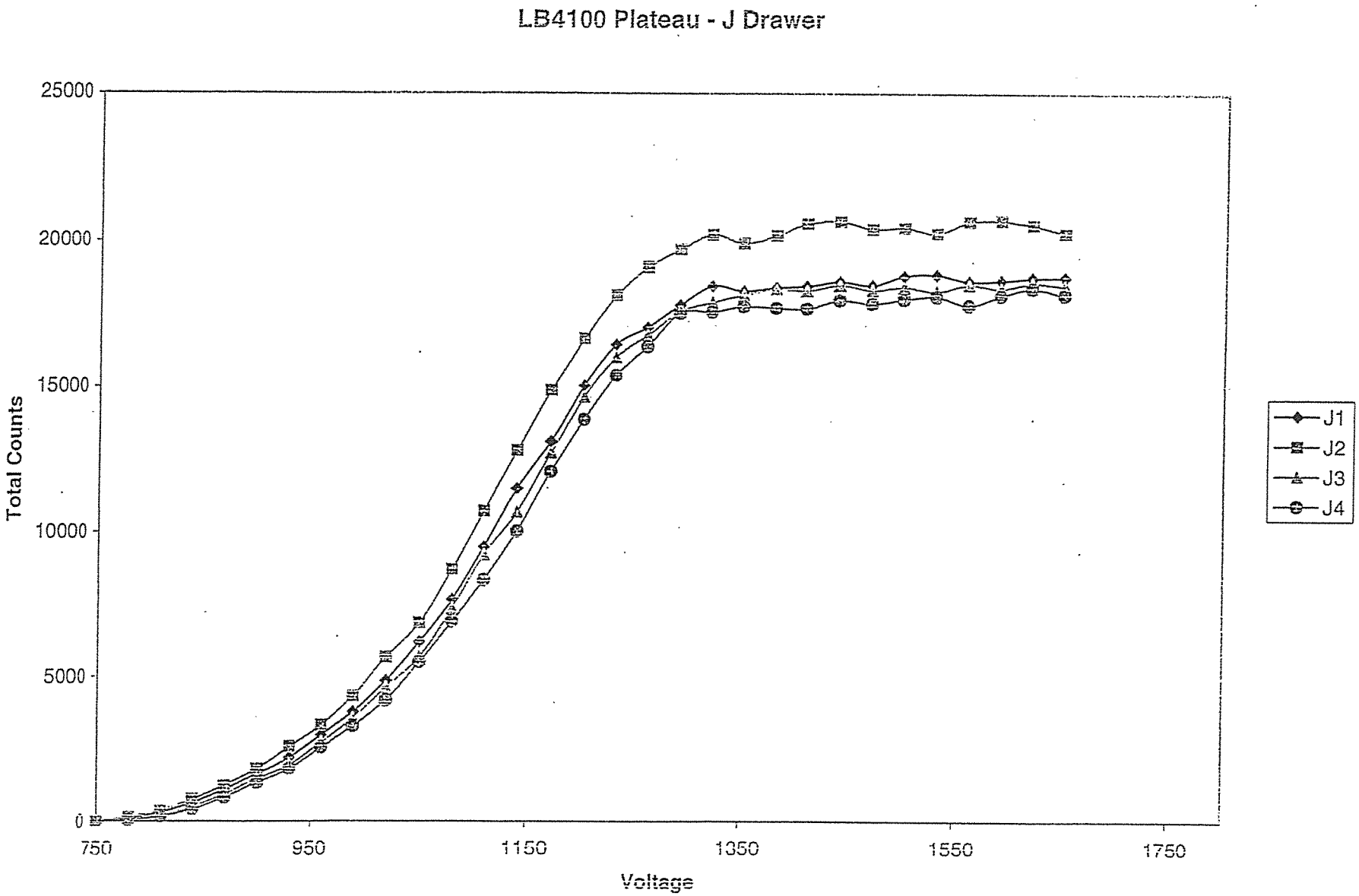

LB4100 Plateau - E Drawer
20000
15000
10000
5000
0
-5000
Total Counts
750
950
1150
1350
1550
1750
Voltage
E1
E2
E3
E4


LB4100 Plateau - F Drawer
25000
20000
15000
10000
5000
0
-5000
Total Counts
750
950
1150
1350
1550
1750
Voltage
F1
F2
F3
F4


LB4100 Plateau - G Drawer
25000
20000
15000
10000
5000
0
-5000
Total Counts
750
950
1150
1350
1550
1750
Voltage
G1
G2
G3
G4


LB4100 Plateau - H Drawer
25000
20000
15000
10000
5000
0
-5000
Total Counts
750
950
1150
1350
1550
1750
Voltage
H1
H2
H3
H4


LB4100 Plateau - I Drawer
Total Counts
25000
20000
15000
10000
5000
0
750
950
1150
1350
1550
1750
Voltage
I1
I2
I3
I4


LB4100 Plateau - J Drawer
Total Counts
25000
20000
15000
10000
5000
0
750
950
1150
1350
1550
1750
Voltage
J1
J2
J3
J4

Standardization of Barium Carrier 2628181

v1.2.1

Analyst	BXF1

Standard Information	
Isotope	Barium
Serial Number	2628181
Amount of Std. (mL)	1.0
Standard Prepared	12/7/2017

Parent Information	
Parent Serial #	2494363
Parent Exp. Date	5/11/2019

Std #	Weight of carrier added (g)	Weight of crucible or filter (g)	Weight of crucible or filter + ppt. (g)	Weight of ppt. (g)	mg Barium/mL	mg Barium/g
1	1.0100	0.0744	0.1008	0.0264	26.40	26.14
2	1.0200	0.0745	0.1010	0.0265	26.50	25.98
3	1.0300	0.0741	0.1005	0.0264	26.40	25.63
4	1.0100	0.0743	0.1009	0.0266	26.60	26.34

Mean Value (mg/mL) =	26.48
Stdev (mg/mL) =	± 0.10
1.0% of Mean Value =	0.264750
	Pass
Expiration Date	**12/7/2018**
Mean Value (mg/1.0mL) =	26.48

Standardization Rule

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

12-8-17

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

15541

84468-278
5 mL Liquid in Flame Sealed Vial

Customer: General Engineering Labs, LLC/Charleston, SC
P.O. No.: 936808RD, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution calibrated by Eckert & Ziegler Analytics, using a germanium gamma spectrometer system. Radionuclide purity and calibration were checked with a germanium gamma spectrometer system. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Ra-226	5.844E+05	3.786E+04	0.5	2.4	4.9	04/25/2011

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities (other than decay products) < 0.1 %. 5.04904 grams 0.1M HCl solution with approximately 50 μg/g Ba carrier.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 4/25/11
J. D. McCorvey, QA Manager Alternate

RECEIVED 4/27/11

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

RC-S-060-086

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355
Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1541
Prepared By:	Gregory Ramsay
Carrier Conc:	0.1M HCl
Reference Date:	04/25/2011
Ampoule Mass (g):	5.04904 g
Uncertainty:	+/- 4.9 %
LogBook No:	RC-S-060-086

A Solution Material Info	
Isotope:	Radium-226
Prepared By:	Gregory Ramsay
Prep Date:	03/06/2012
Verification Date:	04/11/2018
Expiration Date:	04/11/2019
Primary Code:	1541-A
Dilution(mL):	100 mL
Mass of Parent(g):	4.2773 g
Density(g/mL):	0.9971
Balance ID:	38080204

Calculations Converting parent activity to dpm/mL|dpm/g

(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(4.2773 g) * (37860 Bq) * (60 dpm/Bq) / (5.04904 g * 100 mL) = 19243.8853 dpm/mL
(4.2773 g) * (37860 Bq) * (60 dpm/Bq) / (0.9971 g/mL)/ (5.04904 g * 100 mL) = 19299.1388 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Ra-226 Standard 1541-A

v1.0.2

Instrument	Red
Analyst	GXR1
Verification Prep Date	4/11/2018

Standard Information	
Isotope	Ra-226
Serial Number	1541-A
Isotope Halflife	1.6000E+03 Y
Reference Date	4/25/2011
Ref. Act. (DPM/mL)	19243.8853
Amount of Std. (mL)	0.1
Standard Prep Date	3/6/2012

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	5/2/2018	79.40	7826.15	7.47
2	5/2/2018	79.50	7775.38	7.47
3	5/2/2018	79.60	7714.07	7.47

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	7818.68	4.145457	18860.84	1886.08
2	7767.91	4.145457	18738.37	1873.84
3	7706.60	4.145457	18590.47	1859.05

	dpm/mL
Mean Value =	18729.90
Stdev =	135.3832494
Certificate Value* =	**19185.5**
Two sigma =	270.766
10 % of Mean =	1872.990
Rule A (Pass/Fail)	**Pass**
% Recovery	97.63%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**4/11/2019**

Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Ra-226 source 1541-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Mineral Oil liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Mineral Oil liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCRed for Ra-226 source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 4/11/2018 using Ra-226 source 0299-J.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

5/3/18

5/2/18

General Engineering Laboratories
GFC Calibration Source Preparation Sheet

Total Radium

Applicable SOP Number	GL-RAD-A-010 / GL-RAD-A-044	Isotope	Ra-226
Date Standards Prepared	4/11/2018		
Standard ID	1541-A	Matrix of Planchett/Filter	Barium Sulfate ppt on 47 mm 0.45 filter
Amount Used (g or ml)	0.5 mL		
Standard Activity (DPM/g or mL)	* 19243.89 dpm/mL	Residue/Carrier Agent	Barium Carrier - 2628181
Reference Date	4/25/2011	Pipette ID Used	2154115
Expiration Date	4/11/2019	Balance ID Used	F30560

*** Not Decay Corrected**

Separation Date / Time: 4/11/2018 14:40

	Standard Number	Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
	C1	0.4	0.0657	0.0725	6.8
	C2	0.6	0.0660	0.0787	12.7
	C3	0.8	0.0653	0.0815	16.2
	C4	1.0	0.0660	0.0901	24.1
	C5	1.5	0.0660	0.1039	37.9
	C6	2.0	0.0651	0.1173	52.2
	C7	3.0	0.0654	0.1445	79.1
	C8	3.5	0.0657	0.1584	92.7

Prepared By: Date 5/4/2018

Reviewed By: Date 5/4/2018

Nycomed Amersham plc
Amersham Laboratories

[redacted]

NAMAS
CALIBRATION
No. 0146

ISSUED BY:	Nycomed Amersham plc Radiation & Radioactivity Calibration Laboratory Amersham Laboratories White Lion Road Amersham Buckinghamshire HP7 9LL	ISSUED FOR:	AEA Technology plc Isotrak Amersham Laboratories White Lion Road Amersham Buckinghamshire HP7 9LL

Description Principal radionuclide: Radium-226

Product code: RAY44
Solution number: R4/131/89

Measurement Reference time: 1200 GMT on 15 December 1999

Nuclear data Nuclear data quoted on this certificate are taken from the Joint European File, Version 2.2.

Expression of uncertainties The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2.00, which for a *t*-distribution with $\nu_{eff} = \infty$ effective degrees of freedom corresponds to a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Unless indicated, all other uncertainties are expressed at the confidence level associated with one standard uncertainty.

The format used for the uncertainties in the values of radionuclidic purity is illustrated in the following examples;

6.5(21)	=	6.5 ± 2.1
6.54(21)	=	6.54 ± 0.21
6.543(21)	=	6.543 ± 0.021

Approved Signatory

Date of issue 17th December 1999

Nycomed Amersham

B D D Singleton

This certificate is issued in accordance with the requirements of the United Kingdom Accreditation Service as specified in the NAMAS Accreditation Standard and NAMAS regulations. It provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not

RC-S-028-128 A

0299

[redacted]

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

Measurement	Reference time for solution number R4/131/89:	1200 GMT on 15 December 1999	
	Radioactive concentration of radium-226:	43.75	kilobecquerels per gram of solution
	which is equivalent to:	1.183	microcuries per gram of solution
	Mass of solution:	5.0368	grams
	Total activity of radium-226:	220.4	kilobecquerels
	which is equivalent to:	5.956	microcuries
	Recommended half life:	1600	years

Method of measurement:
The activity of the solution was measured using a high pressure re-entrant ionisation chamber calibrated with a large number of absolutely standardised solutions.

Calibration date: 15 December 1999
The calibration date is provided for added information only, and must not be confused with the reference date on pages 1 and 2 of the certificate. It is the reference date that must be used in all calculations relating to the values of activity.

Accuracy

Expanded uncertainty in the radioactive concentration quoted above: ± 2.5 %

Combined Type A uncertainty: ± 0.2 %

Combined Type B uncertainty: ± 1.3 %

Radionuclidic purity

The estimated activities of any radioactive impurities found by high-resolution gamma ray spectrometry, or in any other examination of the solution, are listed below expressed as percentages of the activity of the principal radionuclide at the reference time.

Chemical composition

Carrier free in 0.5M HCl.

Remarks

This product meets the quality assurance requirements for achieving traceability to NIST as defined in ANSI N42.22-1995.

1 year = 365.25 days

At the reference date radium-226 was shown to be in radioactive equilibrium with its daughter nuclides down the decay chain to polonium-214 and thallium-210, the precursors of lead-210. The ionisation chamber was calibrated using a standard supplied by the National Institute of Standards and Technology, Washington DC, USA.

RC-S-028-128 B

Standard Traceability Log Rad

Source Material Info	
Parent Code:	0299
Prepared By:	Angela Johnson
Carrier Conc:	0.5 M HCL
Reference Date:	12/15/1999
Ampoule Mass (g):	5.0368 g
Uncertainty:	+/- 2.5 %
LogBook No:	RC S 027 128

A Solution Material Info	
Isotope:	Radium-226
Prepared By:	Angela Johnson
Prep Date:	09/15/2000
Verification Date:	04/14/2016
Expiration Date:	04/14/2017
Primary Code:	0299-A
Dilution(mL):	100 mL
Mass of Parent(g):	4.6634 g
Density(g/mL):	1.0011
Balance ID:	C31514

Calculations Converting parent activity to dpm/mL|dpm/g

(Mass of parent(g)) * (Parm Activity (kBq/g)) * (conversion dpm to kBq) / (Dilution Vol) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (kBq/g)) * (conversion dpm to kBq) / Density (g/mL)/ (Dilution Vol) = Parent Activity (dpm/g)
(4.6634 g) * (43.75 kBq/g) * (60000 dpm/kBq) / (100 mL) = 122414.2500 dpm/mL
(4.6634 g) * (43.75 kBq/g) * (60000 dpm/kBq) / (1.0011 g/mL) / (100 mL) = 122280.0000 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
08/26/2003	Angela Johnson	1.9909	100	0299-E	2434.34 dpm/mL	11/04/2004	11/04/2005
08/26/2003	Angela Johnson	1.9872	100	0299-F	2429.82 dpm/mL	08/26/2004	08/26/2005
04/05/2005	Amanda Fehr	5.0018	250	0299-G	2446.3471 dpm/mL	01/26/2009	01/26/2010
08/07/2009	Mary Aders	5.0767	250	0299-H	2483.2133 dpm/mL	12/20/2017	12/20/2018
03/15/2011	Gregory Ramsay	5.0716	250	0299-I	2480.4858 dpm/mL	01/08/2016	01/08/2017
05/29/2012	Gregory Ramsay	1.5087	100	0299-J	1844.73785 dpm/mL	06/16/2017	06/16/2018

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Ra-226 Standard 0299-H

v1.0.2

Instrument	Yellow
Analyst	GXR1
Verification Prep Date	12/20/2017

Standard Information	
Isotope	Ra-226
Serial Number	0299-H
Isotope Halflife	1.6000E+03 Y
Reference Date	12/15/1999
Ref. Act. (DPM/mL)	2483.2133
Amount of Std. (mL)	0.5
Standard Prep Date	8/7/2009

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	12/21/2017	769.07	526.30	10.20
2	12/21/2017	769.61	534.20	10.20
3	12/21/2017	768.82	523.10	10.20

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	516.10	0.418431	2466.83	1233.42
2	524.00	0.418431	2504.60	1252.30
3	512.90	0.418431	2451.54	1225.77

	dpm/mL
Mean Value =	2474.32
Stdev =	27.30885385
Certificate Value* =	**2463.9**
Two sigma =	54.618
10 % of Mean =	247.432
Rule A (Pass/Fail)	**Pass**
% Recovery	100.42%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**12/20/2018**

Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Ra-226 source 0299-H by transferring 0.5 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCYellow for Ra-226 source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 12/19/2017 using Ra-226 source 1715-D.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

2-5-18

2/2/18

General Engineering Laboratories
GFC Verification Source Preparation Sheet

Total Radium

Applicable SOP Number	GL-RAD-A-010 / GL-RAD-A-044	Isotope	Ra-226
Date Standards Prepared	4/11/2018		
Standard ID	0299-H	Matrix of Planchett/Filter	Barium Sulfate ppt on 47 mm 0.45 filter
Amount Used (g or ml)	0.5 mL		
Standard Activity (DPM/g or mL)	* 2483.21 dpm/mL	Residue/Carrier Agent	Barium Carrier - 2628181
Reference Date	12/15/1999	Pipette ID Used	2154115
Expiration Date	12/20/2018	Balance ID Used	F30560

*** Not Decay Corrected**

Separation Date / Time: 4/11/2018 14:40

	Standard Number	Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
	V1	0.4	0.0652	0.0732	8.0
	V2	0.5	0.0657	0.0760	10.3
	V3	0.8	0.0658	0.0852	19.4
	V4	1.0	0.0654	0.0905	25.1
	V5	1.5	0.0655	0.1047	39.2
	V6	2.0	0.0651	0.1160	50.9
	V7	2.5	0.0654	0.1319	66.5
	V8	3.5	0.0656	0.1597	94.1

Prepared By: Date 5/4/2018

Reviewed By: Date 5/4/2018

Gas Flow Proportional Counter Calibration Package

Method: Total Radium

Instrument (circle one): LB4100 / Protean / G5400W

	Part 1: Efficiency determination	Included/ Acceptable	Comments
1	Efficiency spreadsheet (eff pts, graphs, trendline equation)	✓	
2	Applicable portion of GFPC_Machines.XLS	✓	
3	Raw Data for Calibration standards	✓	
4	Verification Spreadsheet and Raw Data (recoveries 75%-125%)	✓	
5	Plateau graph and raw data	✓	
6	Standardization of Carrier (if applicable)	✓	

	Part 2. Documentation for Calibration Source		
1	Vendor Certificate	✓	
2	Standard Traceability Log (from LIMS)	✓	
3	Current Verification of Source	✓	
4	Source preparation sheet	✓	

	Part 3. Documentation for Verification Source		
1	Vendor Certificate	✓	
2	Standard Traceability Log (from LIMS)	✓	
3	Current Verification of Source	✓	
4	Source preparation sheet	✓	

	Part 4. Enter into LIMS		
1	Alpha LIMS instrument calibration updated	✓	

Primary Review of Package Nathaniel Ivey III

Secondary Review of Package Angela A Gill

Effective Date: 5/1/2018

*Verified 5/21/19

Expiration Date: 5/31/2020

GEL Laboratories
2040 Savage Road, Charleston, SC 29407
(843)556-8171

Rev 7 SSC 8/3/09

Total Radium Calibration - PIC - May 2018

Standard Data	Isotope	Ra-226
	Standard ID number	1541-A
	Half Life (days)	584400
	Std. Act. (dpm/mL)	19243.8853
	Reference Date	4/25/2011
	Volume of spike (mL)	0.5
	Std. Nominal (dpm)	9592.73
	Decay Date	5/2/2018

Precipitation Date/Time 4/11/2018 14:40
Rn-222 Half Life (days) 3.8235
The following detectors were not calibrated:
3A, 6D, 13C

Carrier Data	Std ID 2628181	Std weight 26.48	mg/mL
Source	Measured weight (mg)	Vol. Carrier Added (mL)	Theoretical weight (mg)	***Recovery
1	6.8	0.4	10.59	64.2%
2	12.7	0.6	15.89	79.9%
3	16.2	0.8	21.18	76.5%
4	24.1	1	26.48	91.0%
5	37.9	1.5	39.72	95.4%
6	52.2	2	52.96	98.6%
7	79.1	3	79.44	99.6%
8	92.7	3.5	92.68	100.0%

***Recovery values exceeding 100% will be evaluated at 100%.

*Background is considered neglible.
**Decay corrected to mid-point of cou

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Alpha (counts)	Raw Alpha (cpm)	Recovery (%)	Rn-222 Ingrowth	Corrected Ra-226 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-226 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
1A	1	5/2/2018 17:26	2	18792	9396	64.2%	3.93475	3719.59	9592.72	**0.3878**	0.3771
1A	2	5/2/2018 17:35	2	20702	10351	79.9%	3.93482	3290.97	9592.72	**0.3431**	0.3574
1A	3	5/2/2018 17:32	2	20092	10046	76.5%	3.93479	3338.60	9592.72	**0.3480**	0.3462
1A	4	5/2/2018 17:29	2	21877	10938.5	91.0%	3.93477	3054.49	9592.72	**0.3184**	0.3223
1A	5	5/2/2018 17:38	2	20887	10443.5	95.4%	3.93484	2781.56	9592.72	**0.2900**	0.2851
1A	6	5/2/2018 17:47	2	19127	9563.5	98.6%	3.93492	2465.80	9592.72	**0.2570**	0.2528
1A	7	5/2/2018 17:44	2	15244	7622	99.6%	3.93489	1945.35	9592.72	**0.2028**	0.2090
1A	8	5/2/2018 17:41	2	14952	7476	100.0%	3.93487	1899.94	9592.72	**0.1981**	0.1953
1B	1	5/2/2018 17:29	2	18852	9426	64.2%	3.93477	3731.45	9592.72	**0.3890**	0.3809
1B	2	5/2/2018 17:26	2	21038	10519	79.9%	3.93475	3344.44	9592.72	**0.3486**	0.3599
1B	3	5/2/2018 17:35	2	20090	10045	76.5%	3.93482	3338.25	9592.72	**0.3480**	0.3480
1B	4	5/2/2018 17:32	2	22184	11092	91.0%	3.93479	3097.34	9592.72	**0.3229**	0.3227
1B	5	5/2/2018 17:41	2	20723	10361.5	95.4%	3.93487	2759.70	9592.72	**0.2877**	0.2840
1B	6	5/2/2018 17:38	2	18702	9351	98.6%	3.93484	2411.06	9592.72	**0.2513**	0.2510
1B	7	5/2/2018 17:47	2	15554	7777	99.6%	3.93492	1984.90	9592.72	**0.2069**	0.2087
1B	8	5/2/2018 17:44	2	14935	7467.5	100.0%	3.93490	1897.76	9592.72	**0.1978**	0.1971
1C	1	5/2/2018 17:32	2	19965	9982.5	64.2%	3.93479	3951.72	9592.72	**0.4120**	0.4016
1C	2	5/2/2018 17:29	2	22372	11186	79.9%	3.93477	3556.48	9592.72	**0.3707**	0.3799
1C	3	5/2/2018 17:26	2	21077	10538.5	76.5%	3.93475	3502.31	9592.72	**0.3651**	0.3677
1C	4	5/2/2018 17:35	2	23123	11561.5	91.0%	3.93482	3228.42	9592.72	**0.3365**	0.3417
1C	5	5/2/2018 17:44	2	22244	11122	95.4%	3.93489	2962.24	9592.72	**0.3088**	0.3019
1C	6	5/2/2018 17:41	2	20036	10018	98.6%	3.93487	2583.02	9592.72	**0.2693**	0.2682
1C	7	5/2/2018 17:38	2	16851	8425.5	99.6%	3.93484	2150.46	9592.72	**0.2242**	0.2255
1C	8	5/2/2018 17:47	2	16176	8088	100.0%	3.93492	2055.44	9592.72	**0.2143**	0.2142
1D	1	5/2/2018 17:34	2	19900	9950	64.2%	3.93482	3938.83	9592.72	**0.4106**	0.4008
1D	2	5/2/2018 17:32	2	22017	11008.5	79.9%	3.93479	3500.03	9592.72	**0.3649**	0.3786
1D	3	5/2/2018 17:29	2	21223	10611.5	76.5%	3.93477	3526.55	9592.72	**0.3676**	0.3660
1D	4	5/2/2018 17:26	2	23218	11609	91.0%	3.93475	3241.74	9592.72	**0.3379**	0.3393
1D	5	5/2/2018 17:47	2	21784	10892	95.4%	3.93492	2900.96	9592.72	**0.3024**	0.2984
1D	6	5/2/2018 17:44	2	19655	9827.5	98.6%	3.93489	2533.89	9592.72	**0.2641**	0.2637
1D	7	5/2/2018 17:41	2	16449	8224.5	99.6%	3.93487	2099.14	9592.72	**0.2188**	0.2195
1D	8	5/2/2018 17:38	2	15679	7839.5	100.0%	3.93484	1992.33	9592.72	**0.2077**	0.2077
2A	1	5/2/2018 17:38	2	19010	9505	64.2%	3.93484	3762.65	9592.72	**0.3922**	0.3853
2A	2	5/2/2018 17:47	2	21420	10710	79.9%	3.93492	3405.01	9592.72	**0.3550**	0.3656
2A	3	5/2/2018 17:44	2	20585	10292.5	76.5%	3.93490	3420.43	9592.72	**0.3566**	0.3544
2A	4	5/2/2018 17:41	2	22430	11215	91.0%	3.93487	3131.63	9592.72	**0.3265**	0.3304
2A	5	5/2/2018 17:26	2	21710	10855	95.4%	3.93475	2891.23	9592.72	**0.3014**	0.2931
2A	6	5/2/2018 17:35	2	19326	9663	98.6%	3.93482	2491.52	9592.72	**0.2597**	0.2603
2A	7	5/2/2018 17:32	2	15805	7902.5	99.6%	3.93480	2017.00	9592.72	**0.2103**	0.2152
2A	8	5/2/2018 17:29	2	15359	7679.5	100.0%	3.93477	1951.70	9592.72	**0.2035**	0.2007
2B	1	5/2/2018 17:41	2	18508	9254	64.2%	3.93487	3663.27	9592.72	**0.3819**	0.3747
2B	2	5/2/2018 17:38	2	20801	10400.5	79.9%	3.93485	3306.68	9592.72	**0.3447**	0.3550
2B	3	5/2/2018 17:47	2	20040	10020	76.5%	3.93492	3329.85	9592.72	**0.3471**	0.3439
2B	4	5/2/2018 17:44	2	21648	10824	91.0%	3.93490	3022.42	9592.72	**0.3151**	0.3202
2B	5	5/2/2018 17:29	2	20777	10388.5	95.4%	3.93477	2766.96	9592.72	**0.2884**	0.2836
2B	6	5/2/2018 17:26	2	18965	9482.5	98.6%	3.93475	2445.03	9592.72	**0.2549**	0.2522
2B	7	5/2/2018 17:35	2	15509	7754.5	99.6%	3.93482	1979.21	9592.72	**0.2063**	0.2109
2B	8	5/2/2018 17:32	2	15170	7585	100.0%	3.93480	1927.67	9592.72	**0.2010**	0.1989
2C	1	5/2/2018 17:44	2	19309	9654.5	64.2%	3.93490	3821.78	9592.72	**0.3984**	0.3885
2C	2	5/2/2018 17:41	2	21392	10696	79.9%	3.93487	3400.61	9592.72	**0.3545**	0.3670
2C	3	5/2/2018 17:38	2	20416	10208	76.5%	3.93485	3392.39	9592.72	**0.3536**	0.3549
2C	4	5/2/2018 17:47	2	22624	11312	91.0%	3.93492	3158.67	9592.72	**0.3293**	0.3291
2C	5	5/2/2018 17:32	2	21254	10627	95.4%	3.93480	2830.47	9592.72	**0.2951**	0.2895
2C	6	5/2/2018 17:29	2	18886	9443	98.6%	3.93477	2434.83	9592.72	**0.2538**	0.2557
2C	7	5/2/2018 17:26	2	15974	7987	99.6%	3.93475	2038.59	9592.72	**0.2125**	0.2120
2C	8	5/2/2018 17:35	2	15053	7526.5	100.0%	3.93482	1912.79	9592.72	**0.1994**	0.1999
2D	1	5/2/2018 17:47	2	19272	9636	64.2%	3.93492	3814.43	9592.72	**0.3976**	0.3864
2D	2	5/2/2018 17:44	2	21273	10636.5	79.9%	3.93490	3381.67	9592.72	**0.3525**	0.3658

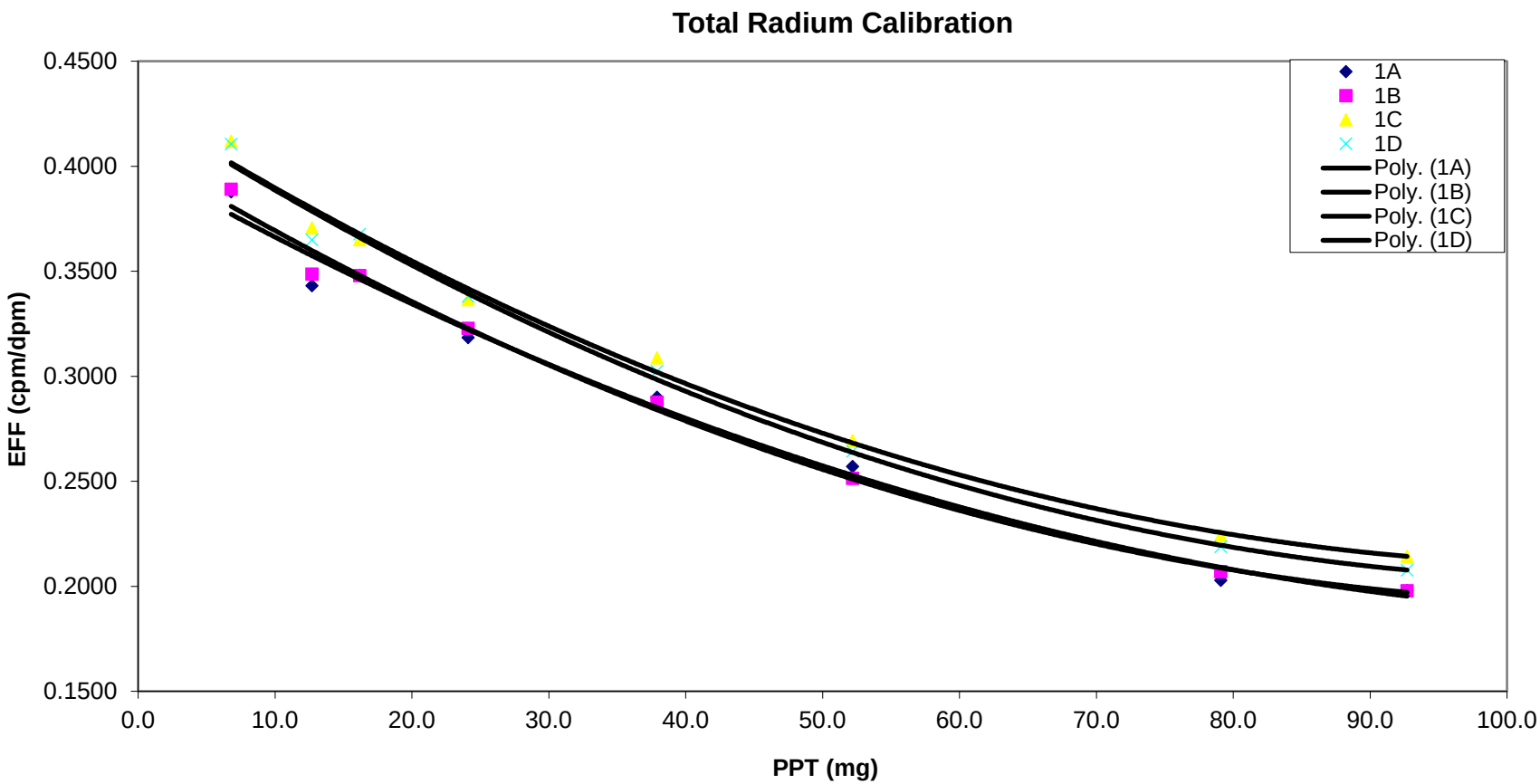
Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Alpha (counts)	Raw Alpha (cpm)	Recovery (%)	Rn-222 Ingrowth	Corrected Ra-226 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-226 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
2D	3	5/2/2018 17:41	2	20458	10229	76.5%	3.93487	3399.35	9592.72	**0.3544**	0.3542
2D	4	5/2/2018 17:38	2	22354	11177	91.0%	3.93485	3121.03	9592.72	**0.3254**	0.3293
2D	5	5/2/2018 17:35	2	21328	10664	95.4%	3.93482	2840.31	9592.72	**0.2961**	0.2907
2D	6	5/2/2018 17:32	2	19316	9658	98.6%	3.93480	2490.25	9592.72	**0.2596**	0.2572
2D	7	5/2/2018 17:29	2	15743	7871.5	99.6%	3.93477	2009.10	9592.72	**0.2094**	0.2123
2D	8	5/2/2018 17:26	2	15046	7523	100.0%	3.93475	1911.94	9592.72	**0.1993**	0.1985
3B	1	5/2/2018 17:04	2	20011	10005.5	64.2%	3.93457	3961.05	9592.72	**0.4129**	0.4018
3B	2	5/2/2018 17:02	2	22060	11030	79.9%	3.93455	3507.09	9592.72	**0.3656**	0.3804
3B	3	5/2/2018 17:11	2	21395	10697.5	76.5%	3.93462	3555.27	9592.72	**0.3706**	0.3682
3B	4	5/2/2018 17:07	2	23274	11637	91.0%	3.93459	3249.69	9592.72	**0.3388**	0.3425
3B	5	5/2/2018 17:17	2	22091	11045.5	95.4%	3.93467	2942.03	9592.72	**0.3067**	0.3029
3B	6	5/2/2018 17:14	2	20258	10129	98.6%	3.93465	2611.79	9592.72	**0.2723**	0.2691
3B	7	5/2/2018 17:23	2	16758	8379	99.6%	3.93472	2138.66	9592.72	**0.2229**	0.2255
3B	8	5/2/2018 17:20	2	16156	8078	100.0%	3.93470	2053.02	9592.72	**0.2140**	0.2134
3C	1	5/2/2018 17:07	2	19611	9805.5	64.2%	3.93459	3881.85	9592.72	**0.4047**	0.3981
3C	2	5/2/2018 17:04	2	22128	11064	79.9%	3.93457	3517.88	9592.72	**0.3667**	0.3775
3C	3	5/2/2018 17:02	2	21262	10631	76.5%	3.93455	3533.23	9592.72	**0.3683**	0.3659
3C	4	5/2/2018 17:11	2	23378	11689	91.0%	3.93462	3264.19	9592.72	**0.3403**	0.3412
3C	5	5/2/2018 17:20	2	22124	11062	95.4%	3.93469	2946.41	9592.72	**0.3072**	0.3031
3C	6	5/2/2018 17:17	2	20067	10033.5	98.6%	3.93467	2587.15	9592.72	**0.2697**	0.2704
3C	7	5/2/2018 17:14	2	17003	8501.5	99.6%	3.93465	2169.96	9592.72	**0.2262**	0.2274
3C	8	5/2/2018 17:23	2	16272	8136	100.0%	3.93472	2067.74	9592.72	**0.2156**	0.2150
3D	1	5/2/2018 17:11	2	19092	9546	64.2%	3.93462	3779.09	9592.72	**0.3940**	0.3891
3D	2	5/2/2018 17:07	2	21630	10815	79.9%	3.93459	3438.68	9592.72	**0.3585**	0.3692
3D	3	5/2/2018 17:04	2	20953	10476.5	76.5%	3.93457	3481.86	9592.72	**0.3630**	0.3579
3D	4	5/2/2018 17:02	2	22763	11381.5	91.0%	3.93455	3178.38	9592.72	**0.3313**	0.3337
3D	5	5/2/2018 17:23	2	21662	10831	95.4%	3.93472	2884.86	9592.72	**0.3007**	0.2960
3D	6	5/2/2018 17:20	2	19595	9797.5	98.6%	3.93470	2526.28	9592.72	**0.2634**	0.2631
3D	7	5/2/2018 17:17	2	16041	8020.5	99.6%	3.93467	2047.18	9592.72	**0.2134**	0.2179
3D	8	5/2/2018 17:14	2	15559	7779.5	100.0%	3.93465	1977.18	9592.72	**0.2061**	0.2035
4A	1	5/2/2018 17:14	2	19333	9666.5	64.2%	3.93465	3826.77	9592.72	**0.3989**	0.3908
4A	2	5/2/2018 17:23	2	21583	10791.5	79.9%	3.93472	3431.10	9592.72	**0.3577**	0.3697
4A	3	5/2/2018 17:20	2	20799	10399.5	76.5%	3.93470	3456.16	9592.72	**0.3603**	0.3577
4A	4	5/2/2018 17:17	2	22625	11312.5	91.0%	3.93467	3159.01	9592.72	**0.3293**	0.3322
4A	5	5/2/2018 17:02	2	21350	10675	95.4%	3.93455	2843.43	9592.72	**0.2964**	0.2929
4A	6	5/2/2018 17:11	2	19542	9771	98.6%	3.93462	2519.50	9592.72	**0.2626**	0.2593
4A	7	5/2/2018 17:08	2	15818	7909	99.6%	3.93460	2018.76	9592.72	**0.2104**	0.2155
4A	8	5/2/2018 17:05	2	15497	7748.5	100.0%	3.93457	1969.34	9592.72	**0.2053**	0.2030
4B	1	5/2/2018 17:17	2	16934	8467	64.2%	3.93467	3351.89	9592.72	**0.3494**	0.3427
4B	2	5/2/2018 17:14	2	18595	9297.5	79.9%	3.93465	2956.15	9592.72	**0.3082**	0.3233
4B	3	5/2/2018 17:23	2	18505	9252.5	76.5%	3.93472	3074.95	9592.72	**0.3206**	0.3123
4B	4	5/2/2018 17:20	2	19642	9821	91.0%	3.93470	2742.49	9592.72	**0.2859**	0.2890
4B	5	5/2/2018 17:05	2	18521	9260.5	95.4%	3.93457	2466.65	9592.72	**0.2571**	0.2531
4B	6	5/2/2018 17:02	2	16633	8316.5	98.6%	3.93455	2144.49	9592.72	**0.2236**	0.2226
4B	7	5/2/2018 17:11	2	13482	6741	99.6%	3.93462	1720.62	9592.72	**0.1794**	0.1832
4B	8	5/2/2018 17:08	2	13160	6580	100.0%	3.93460	1672.34	9592.72	**0.1743**	0.1723
4C	1	5/2/2018 17:20	2	19344	9672	64.2%	3.93470	3828.90	9592.72	**0.3991**	0.3907
4C	2	5/2/2018 17:17	2	21724	10862	79.9%	3.93467	3453.56	9592.72	**0.3600**	0.3702
4C	3	5/2/2018 17:14	2	20762	10381	76.5%	3.93465	3450.06	9592.72	**0.3597**	0.3585
4C	4	5/2/2018 17:23	2	22743	11371.5	91.0%	3.93472	3175.44	9592.72	**0.3310**	0.3338
4C	5	5/2/2018 17:08	2	21395	10697.5	95.4%	3.93460	2849.39	9592.72	**0.2970**	0.2957
4C	6	5/2/2018 17:05	2	19802	9901	98.6%	3.93457	2553.05	9592.72	**0.2661**	0.2630
4C	7	5/2/2018 17:02	2	16476	8238	99.6%	3.93455	2102.76	9592.72	**0.2192**	0.2200
4C	8	5/2/2018 17:11	2	15649	7824.5	100.0%	3.93462	1988.63	9592.72	**0.2073**	0.2076
4D	1	5/2/2018 17:23	2	19764	9882	64.2%	3.93472	3912.01	9592.72	**0.4078**	0.3973
4D	2	5/2/2018 17:20	2	21971	10985.5	79.9%	3.93470	3492.80	9592.72	**0.3641**	0.3767
4D	3	5/2/2018 17:17	2	20953	10476.5	76.5%	3.93467	3481.77	9592.72	**0.3630**	0.3650
4D	4	5/2/2018 17:14	2	23298	11649	91.0%	3.93465	3253.00	9592.72	**0.3391**	0.3402
4D	5	5/2/2018 17:11	2	22127	11063.5	95.4%	3.93462	2946.86	9592.72	**0.3072**	0.3017
4D	6	5/2/2018 17:08	2	20217	10108.5	98.6%	3.93460	2606.54	9592.72	**0.2717**	0.2685
4D	7	5/2/2018 17:05	2	16380	8190	99.6%	3.93457	2090.49	9592.72	**0.2179**	0.2245
4D	8	5/2/2018 17:02	2	16201	8100.5	100.0%	3.93455	2058.81	9592.72	**0.2146**	0.2114
5A	1	5/2/2018 16:36	2	20027	10013.5	64.2%	3.93434	3964.45	9592.72	**0.4133**	0.4114
5A	2	5/2/2018 16:46	2	23130	11565	79.9%	3.93442	3677.32	9592.72	**0.3833**	0.3898
5A	3	5/2/2018 16:43	2	22137	11068.5	76.5%	3.93439	3678.78	9592.72	**0.3835**	0.3776
5A	4	5/2/2018 16:40	2	24034	12017	91.0%	3.93437	3356.00	9592.72	**0.3498**	0.3516
5A	5	5/2/2018 16:49	2	22440	11220	95.4%	3.93444	2988.68	9592.72	**0.3116**	0.3115
5A	6	5/2/2018 16:58	2	20684	10342	98.6%	3.93452	2666.80	9592.72	**0.2780**	0.2769
5A	7	5/2/2018 16:55	2	17309	8654.5	99.6%	3.93449	2209.11	9592.72	**0.2303**	0.2315
5A	8	5/2/2018 16:52	2	16517	8258.5	100.0%	3.93447	2099.01	9592.72	**0.2188**	0.2182
5B	1	5/2/2018 16:40	2	19726	9863	64.2%	3.93436	3904.84	9592.72	**0.4071**	0.3918
5B	2	5/2/2018 16:46	2	21224	10612	79.9%	3.93442	3374.29	9592.72	**0.3518**	0.3728
5B	4	5/2/2018 16:43	2	23357	11678.5	91.0%	3.93439	3261.45	9592.72	**0.3400**	0.3390
5B	5	5/2/2018 16:52	2	22164	11082	95.4%	3.93447	2951.91	9592.72	**0.3077**	0.3030
5B	6	5/2/2018 16:49	2	20348	10174	98.6%	3.93444	2623.53	9592.72	**0.2735**	0.2714
5B	7	5/2/2018 16:58	2	16877	8438.5	99.6%	3.93452	2153.95	9592.72	**0.2245**	0.2279
5B	8	5/2/2018 16:55	2	16225	8112.5	100.0%	3.93449	2061.89	9592.72	**0.2149**	0.2137

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Alpha (counts)	Raw Alpha (cpm)	Recovery (%)	Rn-222 Ingrowth	Corrected Ra-226 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-226 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
5C	1	5/2/2018 16:43	2	20005	10002.5	64.2%	3.93439	3960.05	9592.72	**0.4128**	0.4145
5C	2	5/2/2018 16:40	2	22364	11182	79.9%	3.93436	3555.58	9592.72	**0.3707**	0.3919
5C	3	5/2/2018 16:46	2	23458	11729	76.5%	3.93442	3898.29	9592.72	**0.4064**	0.3791
5C	5	5/2/2018 16:55	2	22189	11094.5	95.4%	3.93449	2955.22	9592.72	**0.3081**	0.3099
5C	6	5/2/2018 16:52	2	20136	10068	98.6%	3.93447	2596.18	9592.72	**0.2706**	0.2738
5C	7	5/2/2018 16:49	2	16939	8469.5	99.6%	3.93444	2161.91	9592.72	**0.2254**	0.2260
5C	8	5/2/2018 16:58	2	16107	8053.5	100.0%	3.93452	2046.88	9592.72	**0.2134**	0.2120
5D	1	5/2/2018 16:46	2	20249	10124.5	64.2%	3.93441	4008.32	9592.72	**0.4179**	0.4054
5D	2	5/2/2018 16:43	2	22381	11190.5	79.9%	3.93439	3558.26	9592.72	**0.3709**	0.3846
5D	3	5/2/2018 16:40	2	21579	10789.5	76.5%	3.93437	3586.08	9592.72	**0.3738**	0.3728
5D	4	5/2/2018 16:36	2	23338	11669	91.0%	3.93434	3258.84	9592.72	**0.3397**	0.3476
5D	5	5/2/2018 16:58	2	22765	11382.5	95.4%	3.93452	3031.91	9592.72	**0.3161**	0.3086
5D	6	5/2/2018 16:55	2	20655	10327.5	98.6%	3.93449	2663.08	9592.72	**0.2776**	0.2748
5D	7	5/2/2018 16:52	2	17017	8508.5	99.6%	3.93447	2171.85	9592.72	**0.2264**	0.2294
5D	8	5/2/2018 16:49	2	16331	8165.5	100.0%	3.93445	2075.39	9592.72	**0.2164**	0.2156
6A	1	5/2/2018 16:51	2	17097	8548.5	64.2%	3.93446	3384.34	9592.72	**0.3528**	0.3434
6A	2	5/2/2018 17:01	2	18941	9470.5	79.9%	3.93454	3011.24	9592.72	**0.3139**	0.3244
6A	3	5/2/2018 16:57	2	18075	9037.5	76.5%	3.93451	3003.66	9592.72	**0.3131**	0.3136
6A	4	5/2/2018 16:54	2	19884	9942	91.0%	3.93449	2776.43	9592.72	**0.2894**	0.2908
6A	5	5/2/2018 16:38	2	18506	9253	95.4%	3.93436	2464.78	9592.72	**0.2569**	0.2557
6A	6	5/2/2018 16:48	2	16985	8492.5	98.6%	3.93444	2189.93	9592.72	**0.2283**	0.2259
6A	7	5/2/2018 16:45	2	14130	7065	99.6%	3.93441	1803.41	9592.72	**0.1880**	0.1876
6A	8	5/2/2018 16:42	2	13287	6643.5	100.0%	3.93439	1688.57	9592.72	**0.1760**	0.1771
6B	1	5/2/2018 16:54	2	18124	9062	64.2%	3.93449	3587.61	9592.72	**0.3740**	0.3658
6B	2	5/2/2018 16:51	2	20133	10066.5	79.9%	3.93446	3200.80	9592.72	**0.3337**	0.3466
6B	3	5/2/2018 17:01	2	19429	9714.5	76.5%	3.93454	3228.64	9592.72	**0.3366**	0.3357
6B	4	5/2/2018 16:57	2	21660	10830	91.0%	3.93451	3024.40	9592.72	**0.3153**	0.3125
6B	5	5/2/2018 16:42	2	20075	10037.5	95.4%	3.93438	2673.74	9592.72	**0.2787**	0.2764
6B	6	5/2/2018 16:38	2	18092	9046	98.6%	3.93436	2332.71	9592.72	**0.2432**	0.2450
6B	7	5/2/2018 16:48	2	15355	7677.5	99.6%	3.93444	1959.75	9592.72	**0.2043**	0.2026
6B	8	5/2/2018 16:45	2	14213	7106.5	100.0%	3.93441	1806.24	9592.72	**0.1883**	0.1894
6C	1	5/2/2018 16:57	2	19160	9580	64.2%	3.93451	3792.66	9592.72	**0.3954**	0.3881
6C	2	5/2/2018 16:54	2	21414	10707	79.9%	3.93449	3404.44	9592.72	**0.3549**	0.3664
6C	3	5/2/2018 16:51	2	20581	10290.5	76.5%	3.93446	3420.14	9592.72	**0.3565**	0.3541
6C	4	5/2/2018 17:01	2	22483	11241.5	91.0%	3.93454	3139.29	9592.72	**0.3273**	0.3281
6C	5	5/2/2018 16:45	2	20946	10473	95.4%	3.93441	2789.73	9592.72	**0.2908**	0.2882
6C	6	5/2/2018 16:42	2	19010	9505	98.6%	3.93438	2451.05	9592.72	**0.2555**	0.2543
6C	7	5/2/2018 16:38	2	15704	7852	99.6%	3.93436	2004.33	9592.72	**0.2089**	0.2109
6C	8	5/2/2018 16:48	2	15091	7545.5	100.0%	3.93444	1917.81	9592.72	**0.1999**	0.1991
7A	1	5/2/2018 16:13	2	19270	9635	64.2%	3.93414	3814.79	9592.72	**0.3977**	0.3907
7A	2	5/2/2018 16:23	2	21647	10823.5	79.9%	3.93422	3441.71	9592.72	**0.3588**	0.3700
7A	3	5/2/2018 16:19	2	21012	10506	76.5%	3.93420	3492.00	9592.72	**0.3640**	0.3582
7A	4	5/2/2018 16:16	2	22423	11211.5	91.0%	3.93417	3131.20	9592.72	**0.3264**	0.3330
7A	5	5/2/2018 16:26	2	21585	10792.5	95.4%	3.93425	2874.95	9592.72	**0.2997**	0.2941
7A	6	5/2/2018 16:35	2	19378	9689	98.6%	3.93433	2498.54	9592.72	**0.2605**	0.2602
7A	7	5/2/2018 16:32	2	16044	8022	99.6%	3.93430	2047.75	9592.72	**0.2135**	0.2146
7A	8	5/2/2018 16:29	2	15163	7581.5	100.0%	3.93428	1927.04	9592.72	**0.2009**	0.2006
7B	1	5/2/2018 16:16	2	19541	9770.5	64.2%	3.93417	3868.41	9592.72	**0.4033**	0.4016
7B	2	5/2/2018 16:13	2	21884	10942	79.9%	3.93414	3479.46	9592.72	**0.3627**	0.3794
7B	3	5/2/2018 16:23	2	22310	11155	76.5%	3.93422	3707.69	9592.72	**0.3865**	0.3669
7B	4	5/2/2018 16:19	2	22939	11469.5	91.0%	3.93420	3203.24	9592.72	**0.3339**	0.3402
7B	5	5/2/2018 16:29	2	21880	10940	95.4%	3.93428	2914.22	9592.72	**0.3038**	0.2990
7B	6	5/2/2018 16:26	2	19407	9703.5	98.6%	3.93425	2502.33	9592.72	**0.2609**	0.2637
7B	7	5/2/2018 16:35	2	16209	8104.5	99.6%	3.93433	2068.80	9592.72	**0.2157**	0.2173
7B	8	5/2/2018 16:32	2	15500	7750	100.0%	3.93430	1969.85	9592.72	**0.2053**	0.2039
7C	1	5/2/2018 16:19	2	18963	9481.5	64.2%	3.93419	3753.97	9592.72	**0.3913**	0.3793
7C	2	5/2/2018 16:16	2	20691	10345.5	79.9%	3.93417	3289.76	9592.72	**0.3429**	0.3579
7C	3	5/2/2018 16:13	2	20122	10061	76.5%	3.93414	3344.14	9592.72	**0.3486**	0.3459
7C	4	5/2/2018 16:23	2	21599	10799.5	91.0%	3.93422	3016.10	9592.72	**0.3144**	0.3203
7C	5	5/2/2018 16:32	2	20593	10296.5	95.4%	3.93430	2742.79	9592.72	**0.2859**	0.2814
7C	6	5/2/2018 16:29	2	18751	9375.5	98.6%	3.93428	2417.73	9592.72	**0.2520**	0.2487
7C	7	5/2/2018 16:26	2	15507	7753.5	99.6%	3.93425	1979.24	9592.72	**0.2063**	0.2081
7C	8	5/2/2018 16:35	2	14955	7477.5	100.0%	3.93433	1900.58	9592.72	**0.1981**	0.1981
7D	1	5/2/2018 16:23	2	19339	9669.5	64.2%	3.93422	3828.37	9592.72	**0.3991**	0.3872
7D	2	5/2/2018 16:19	2	21173	10586.5	79.9%	3.93420	3366.37	9592.72	**0.3509**	0.3657
7D	3	5/2/2018 16:16	2	20296	10148	76.5%	3.93417	3373.03	9592.72	**0.3516**	0.3535
7D	4	5/2/2018 16:13	2	22483	11241.5	91.0%	3.93414	3139.60	9592.72	**0.3273**	0.3277
7D	5	5/2/2018 16:35	2	21204	10602	95.4%	3.93433	2824.15	9592.72	**0.2944**	0.2879
7D	6	5/2/2018 16:32	2	18938	9469	98.6%	3.93430	2441.82	9592.72	**0.2545**	0.2539
7D	7	5/2/2018 16:29	2	15523	7761.5	99.6%	3.93428	1981.27	9592.72	**0.2065**	0.2099
7D	8	5/2/2018 16:26	2	15027	7513.5	100.0%	3.93425	1909.77	9592.72	**0.1991**	0.1976
8A	1	5/2/2018 16:26	2	19789	9894.5	64.2%	3.93425	3917.43	9592.72	**0.4084**	0.4004
8A	2	5/2/2018 16:35	2	22042	11021	79.9%	3.93433	3504.42	9592.72	**0.3653**	0.3781
8A	3	5/2/2018 16:32	2	21426	10713	76.5%	3.93430	3560.71	9592.72	**0.3712**	0.3656
8A	4	5/2/2018 16:29	2	22930	11465	91.0%	3.93428	3201.92	9592.72	**0.3338**	0.3389
8A	5	5/2/2018 16:13	2	21767	10883.5	95.4%	3.93414	2899.27	9592.72	**0.3022**	0.2980
8A	6	5/2/2018 16:23	2	19644	9822	98.6%	3.93423	2532.90	9592.72	**0.2640**	0.2631

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Alpha (counts)	Raw Alpha (cpm)	Recovery (%)	Rn-222 Ingrowth	Corrected Ra-226 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-226 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
8A	7	5/2/2018 16:19	2	16333	8166.5	99.6%	3.93420	2084.69	9592.72	**0.2173**	0.2183
8A	8	5/2/2018 16:17	2	15552	7776	100.0%	3.93417	1976.53	9592.72	**0.2060**	0.2060
8B	1	5/2/2018 16:29	2	20013	10006.5	64.2%	3.93428	3961.74	9592.72	**0.4130**	0.4026
8B	2	5/2/2018 16:26	2	22182	11091	79.9%	3.93425	3526.74	9592.72	**0.3676**	0.3791
8B	3	5/2/2018 16:36	2	21044	10522	76.5%	3.93433	3497.20	9592.72	**0.3646**	0.3659
8B	4	5/2/2018 16:32	2	23078	11539	91.0%	3.93431	3222.56	9592.72	**0.3359**	0.3381
8B	5	5/2/2018 16:16	2	21613	10806.5	95.4%	3.93417	2878.74	9592.72	**0.3001**	0.2957
8B	6	5/2/2018 16:13	2	19450	9725	98.6%	3.93414	2507.94	9592.72	**0.2614**	0.2604
8B	7	5/2/2018 16:23	2	16307	8153.5	99.6%	3.93423	2081.36	9592.72	**0.2170**	0.2174
8B	8	5/2/2018 16:20	2	15618	7809	100.0%	3.93420	1984.90	9592.72	**0.2069**	0.2073
8C	1	5/2/2018 16:32	2	19597	9798.5	64.2%	3.93430	3879.37	9592.72	**0.4044**	0.4001
8C	2	5/2/2018 16:29	2	22147	11073.5	79.9%	3.93428	3521.16	9592.72	**0.3671**	0.3785
8C	3	5/2/2018 16:26	2	21497	10748.5	76.5%	3.93425	3572.55	9592.72	**0.3724**	0.3662
8C	4	5/2/2018 16:36	2	23302	11651	91.0%	3.93433	3253.82	9592.72	**0.3392**	0.3402
8C	5	5/2/2018 16:19	2	21932	10966	95.4%	3.93420	2921.21	9592.72	**0.3045**	0.2999
8C	6	5/2/2018 16:16	2	19541	9770.5	98.6%	3.93417	2519.65	9592.72	**0.2627**	0.2652
8C	7	5/2/2018 16:13	2	16404	8202	99.6%	3.93414	2093.79	9592.72	**0.2183**	0.2193
8C	8	5/2/2018 16:23	2	15592	7796	100.0%	3.93423	1981.58	9592.72	**0.2066**	0.2057
8D	1	5/2/2018 16:35	2	20078	10039	64.2%	3.93433	3974.56	9592.72	**0.4143**	0.4063
8D	2	5/2/2018 16:32	2	22413	11206.5	79.9%	3.93430	3563.42	9592.72	**0.3715**	0.3844
8D	3	5/2/2018 16:29	2	21792	10896	76.5%	3.93428	3621.55	9592.72	**0.3775**	0.3721
8D	4	5/2/2018 16:26	2	23380	11690	91.0%	3.93425	3264.77	9592.72	**0.3403**	0.3458
8D	5	5/2/2018 16:23	2	22402	11201	95.4%	3.93423	2983.79	9592.72	**0.3110**	0.3053
8D	6	5/2/2018 16:19	2	20153	10076.5	98.6%	3.93420	2598.55	9592.72	**0.2709**	0.2707
8D	7	5/2/2018 16:16	2	16832	8416	99.6%	3.93417	2148.40	9592.72	**0.2240**	0.2255
8D	8	5/2/2018 16:13	2	16087	8043.5	100.0%	3.93414	2044.54	9592.72	**0.2131**	0.2126
9A	1	5/2/2018 15:49	2	19175	9587.5	64.2%	3.93394	3796.17	9592.72	**0.3957**	0.3886
9A	2	5/2/2018 15:58	2	21493	10746.5	79.9%	3.93402	3417.40	9592.72	**0.3562**	0.3670
9A	3	5/2/2018 15:55	2	20679	10339.5	76.5%	3.93399	3436.84	9592.72	**0.3583**	0.3548
9A	4	5/2/2018 15:52	2	22266	11133	91.0%	3.93397	3109.44	9592.72	**0.3241**	0.3288
9A	5	5/2/2018 16:01	2	21206	10603	95.4%	3.93404	2824.62	9592.72	**0.2945**	0.2890
9A	6	5/2/2018 16:10	2	19057	9528.5	98.6%	3.93412	2457.28	9592.72	**0.2562**	0.2551
9A	7	5/2/2018 16:07	2	15675	7837.5	99.6%	3.93409	2000.76	9592.72	**0.2086**	0.2117
9A	8	5/2/2018 16:04	2	15193	7596.5	100.0%	3.93407	1930.95	9592.72	**0.2013**	0.1999
9B	1	5/2/2018 15:52	2	19702	9851	64.2%	3.93397	3900.49	9592.72	**0.4066**	0.4000
9B	2	5/2/2018 15:49	2	22292	11146	79.9%	3.93395	3544.51	9592.72	**0.3695**	0.3784
9B	3	5/2/2018 15:58	2	21325	10662.5	76.5%	3.93402	3544.18	9592.72	**0.3695**	0.3662
9B	4	5/2/2018 15:55	2	23023	11511.5	91.0%	3.93400	3215.13	9592.72	**0.3352**	0.3403
9B	5	5/2/2018 16:04	2	21954	10977	95.4%	3.93407	2924.23	9592.72	**0.3048**	0.3003
9B	6	5/2/2018 16:01	2	19770	9885	98.6%	3.93404	2549.26	9592.72	**0.2657**	0.2660
9B	7	5/2/2018 16:10	2	16698	8349	99.6%	3.93412	2131.33	9592.72	**0.2222**	0.2215
9B	8	5/2/2018 16:07	2	15699	7849.5	100.0%	3.93409	1995.25	9592.72	**0.2080**	0.2088
9C	1	5/2/2018 15:55	2	19317	9658.5	64.2%	3.93399	3824.24	9592.72	**0.3987**	0.3920
9C	2	5/2/2018 15:52	2	21681	10840.5	79.9%	3.93397	3447.34	9592.72	**0.3594**	0.3709
9C	3	5/2/2018 15:49	2	21052	10526	76.5%	3.93394	3498.87	9592.72	**0.3647**	0.3590
9C	4	5/2/2018 15:58	2	22588	11294	91.0%	3.93402	3154.37	9592.72	**0.3288**	0.3335
9C	5	5/2/2018 16:07	2	21443	10721.5	95.4%	3.93409	2856.15	9592.72	**0.2977**	0.2941
9C	6	5/2/2018 16:04	2	19472	9736	98.6%	3.93407	2510.82	9592.72	**0.2617**	0.2600
9C	7	5/2/2018 16:01	2	15944	7972	99.6%	3.93405	2035.12	9592.72	**0.2122**	0.2147
9C	8	5/2/2018 16:10	2	15246	7623	100.0%	3.93412	1937.66	9592.72	**0.2020**	0.2010
9D	1	5/2/2018 15:58	2	19334	9667	64.2%	3.93402	3827.58	9592.72	**0.3990**	0.3916
9D	2	5/2/2018 15:55	2	21673	10836.5	79.9%	3.93399	3446.04	9592.72	**0.3592**	0.3700
9D	3	5/2/2018 15:52	2	20825	10412.5	76.5%	3.93397	3461.12	9592.72	**0.3608**	0.3577
9D	4	5/2/2018 15:49	2	22626	11313	91.0%	3.93394	3159.73	9592.72	**0.3294**	0.3316
9D	5	5/2/2018 16:10	2	21022	10511	95.4%	3.93412	2800.06	9592.72	**0.2919**	0.2914
9D	6	5/2/2018 16:07	2	19367	9683.5	98.6%	3.93409	2497.27	9592.72	**0.2603**	0.2569
9D	7	5/2/2018 16:04	2	15785	7892.5	99.6%	3.93407	2014.81	9592.72	**0.2100**	0.2117
9D	8	5/2/2018 16:01	2	15016	7508	100.0%	3.93405	1908.47	9592.72	**0.1989**	0.1987
10A	1	5/2/2018 16:01	2	18722	9361	64.2%	3.93405	3706.40	9592.72	**0.3864**	0.3782
10A	2	5/2/2018 16:10	2	20688	10344	79.9%	3.93412	3289.32	9592.72	**0.3429**	0.3567
10A	3	5/2/2018 16:07	2	20252	10126	76.5%	3.93410	3365.78	9592.72	**0.3509**	0.3446
10A	4	5/2/2018 16:04	2	21679	10839.5	91.0%	3.93407	3027.39	9592.72	**0.3156**	0.3188
10A	5	5/2/2018 15:49	2	20163	10081.5	95.4%	3.93394	2685.76	9592.72	**0.2800**	0.2795
10A	6	5/2/2018 15:58	2	18579	9289.5	98.6%	3.93402	2395.70	9592.72	**0.2497**	0.2463
10A	7	5/2/2018 15:55	2	15297	7648.5	99.6%	3.93400	1952.56	9592.72	**0.2035**	0.2048
10A	8	5/2/2018 15:52	2	14654	7327	100.0%	3.93397	1862.49	9592.72	**0.1942**	0.1942
10B	1	5/2/2018 16:04	2	19004	9502	64.2%	3.93407	3762.20	9592.72	**0.3922**	0.3858
10B	2	5/2/2018 16:01	2	21194	10597	79.9%	3.93405	3369.84	9592.72	**0.3513**	0.3653
10B	3	5/2/2018 16:10	2	20884	10442	76.5%	3.93412	3470.80	9592.72	**0.3618**	0.3537
10B	4	5/2/2018 16:07	2	22418	11209	91.0%	3.93410	3130.57	9592.72	**0.3263**	0.3289
10B	5	5/2/2018 15:52	2	21042	10521	95.4%	3.93397	2802.83	9592.72	**0.2922**	0.2903
10B	6	5/2/2018 15:49	2	19165	9582.5	98.6%	3.93394	2471.31	9592.72	**0.2576**	0.2567
10B	7	5/2/2018 15:58	2	15796	7898	99.6%	3.93402	2016.24	9592.72	**0.2102**	0.2113
10B	8	5/2/2018 15:55	2	14909	7454.5	100.0%	3.93400	1894.89	9592.72	**0.1975**	0.1972
10C	1	5/2/2018 16:07	2	18477	9238.5	64.2%	3.93409	3657.85	9592.72	**0.3813**	0.3759
10C	2	5/2/2018 16:04	2	20845	10422.5	79.9%	3.93407	3314.33	9592.72	**0.3455**	0.3551
10C	3	5/2/2018 16:01	2	20101	10050.5	76.5%	3.93405	3340.73	9592.72	**0.3483**	0.3433

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Alpha (counts)	Raw Alpha (cpm)	Recovery (%)	Rn-222 Ingrowth	Corrected Ra-226 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-226 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
10C	4	5/2/2018 16:10	2	21606	10803	91.0%	3.93412	3017.15	9592.72	**0.3145**	0.3182
10C	5	5/2/2018 15:55	2	20301	10150.5	95.4%	3.93400	2704.11	9592.72	**0.2819**	0.2797
10C	6	5/2/2018 15:52	2	18540	9270	98.6%	3.93397	2390.71	9592.72	**0.2492**	0.2469
10C	7	5/2/2018 15:49	2	15168	7584	99.6%	3.93394	1936.12	9592.72	**0.2018**	0.2045
10C	8	5/2/2018 15:58	2	14635	7317.5	100.0%	3.93402	1860.06	9592.72	**0.1939**	0.1928
10D	1	5/2/2018 16:10	2	18175	9087.5	64.2%	3.93412	3598.04	9592.72	**0.3751**	0.3661
10D	2	5/2/2018 16:07	2	20240	10120	79.9%	3.93410	3218.11	9592.72	**0.3355**	0.3462
10D	3	5/2/2018 16:04	2	19508	9754	76.5%	3.93407	3242.15	9592.72	**0.3380**	0.3349
10D	4	5/2/2018 16:01	2	20883	10441.5	91.0%	3.93405	2916.25	9592.72	**0.3040**	0.3109
10D	5	5/2/2018 15:58	2	20045	10022.5	95.4%	3.93402	2669.99	9592.72	**0.2783**	0.2738
10D	6	5/2/2018 15:55	2	18165	9082.5	98.6%	3.93400	2342.33	9592.72	**0.2442**	0.2418
10D	7	5/2/2018 15:52	2	14913	7456.5	99.6%	3.93397	1903.56	9592.72	**0.1984**	0.1995
10D	8	5/2/2018 15:49	2	14105	7052.5	100.0%	3.93394	1792.73	9592.72	**0.1869**	0.1871
11A	1	5/2/2018 15:23	2	19043	9521.5	64.2%	3.93373	3770.25	9592.72	**0.3930**	0.3834
11A	2	5/2/2018 15:32	2	20990	10495	79.9%	3.93380	3337.61	9592.72	**0.3479**	0.3631
11A	3	5/2/2018 15:29	2	20555	10277.5	76.5%	3.93378	3416.42	9592.72	**0.3561**	0.3516
11A	4	5/2/2018 15:26	2	22274	11137	91.0%	3.93375	3110.73	9592.72	**0.3243**	0.3270
11A	5	5/2/2018 15:36	2	21002	10501	95.4%	3.93384	2797.59	9592.72	**0.2916**	0.2888
11A	6	5/2/2018 15:46	2	19180	9590	98.6%	3.93392	2473.27	9592.72	**0.2578**	0.2555
11A	7	5/2/2018 15:43	2	15649	7824.5	99.6%	3.93390	1997.54	9592.72	**0.2082**	0.2102
11A	8	5/2/2018 15:40	2	14827	7413.5	100.0%	3.93387	1884.53	9592.72	**0.1965**	0.1959
11B	1	5/2/2018 15:26	2	19419	9709.5	64.2%	3.93375	3844.67	9592.72	**0.4008**	0.3909
11B	2	5/2/2018 15:23	2	21583	10791.5	79.9%	3.93373	3431.97	9592.72	**0.3578**	0.3700
11B	3	5/2/2018 15:32	2	20796	10398	76.5%	3.93380	3456.45	9592.72	**0.3603**	0.3582
11B	4	5/2/2018 15:29	2	22555	11277.5	91.0%	3.93378	3149.95	9592.72	**0.3284**	0.3329
11B	5	5/2/2018 15:40	2	21370	10685	95.4%	3.93387	2846.59	9592.72	**0.2967**	0.2938
11B	6	5/2/2018 15:36	2	19596	9798	98.6%	3.93384	2526.96	9592.72	**0.2634**	0.2600
11B	7	5/2/2018 15:46	2	16018	8009	99.6%	3.93392	2044.63	9592.72	**0.2131**	0.2150
11B	8	5/2/2018 15:43	2	15217	7608.5	100.0%	3.93390	1934.09	9592.72	**0.2016**	0.2015
11C	1	5/2/2018 15:29	2	19141	9570.5	64.2%	3.93378	3789.61	9592.72	**0.3951**	0.3883
11C	2	5/2/2018 15:26	2	21641	10820.5	79.9%	3.93375	3441.17	9592.72	**0.3587**	0.3668
11C	3	5/2/2018 15:23	2	20526	10263	76.5%	3.93373	3411.64	9592.72	**0.3556**	0.3547
11C	4	5/2/2018 15:32	2	22317	11158.5	91.0%	3.93381	3116.69	9592.72	**0.3249**	0.3289
11C	5	5/2/2018 15:43	2	21203	10601.5	95.4%	3.93389	2824.32	9592.72	**0.2944**	0.2894
11C	6	5/2/2018 15:40	2	19039	9519.5	98.6%	3.93387	2455.12	9592.72	**0.2559**	0.2557
11C	7	5/2/2018 15:36	2	15890	7945	99.6%	3.93384	2028.34	9592.72	**0.2114**	0.2125
11C	8	5/2/2018 15:46	2	15160	7580	100.0%	3.93392	1926.83	9592.72	**0.2009**	0.2006
11D	1	5/2/2018 15:32	2	20289	10144.5	64.2%	3.93380	4016.86	9592.72	**0.4187**	0.4078
11D	2	5/2/2018 15:29	2	22506	11253	79.9%	3.93378	3578.69	9592.72	**0.3731**	0.3861
11D	3	5/2/2018 15:26	2	21493	10746.5	76.5%	3.93375	3572.34	9592.72	**0.3724**	0.3738
11D	4	5/2/2018 15:23	2	23825	11912.5	91.0%	3.93373	3327.36	9592.72	**0.3469**	0.3477
11D	5	5/2/2018 15:46	2	22441	11220.5	95.4%	3.93392	2989.21	9592.72	**0.3116**	0.3075
11D	6	5/2/2018 15:43	2	20421	10210.5	98.6%	3.93389	2633.31	9592.72	**0.2745**	0.2731
11D	7	5/2/2018 15:40	2	17069	8534.5	99.6%	3.93387	2178.82	9592.72	**0.2271**	0.2285
11D	8	5/2/2018 15:36	2	16311	8155.5	100.0%	3.93384	2073.17	9592.72	**0.2161**	0.2159
12A	1	5/2/2018 15:36	2	17383	8691.5	64.2%	3.93384	3441.50	9592.72	**0.3588**	0.3524
12A	2	5/2/2018 15:46	2	19507	9753.5	79.9%	3.93392	3101.71	9592.72	**0.3233**	0.3332
12A	3	5/2/2018 15:43	2	18882	9441	76.5%	3.93389	3138.26	9592.72	**0.3271**	0.3224
12A	4	5/2/2018 15:39	2	20196	10098	91.0%	3.93387	2820.44	9592.72	**0.2940**	0.2992
12A	5	5/2/2018 15:23	2	19133	9566.5	95.4%	3.93373	2548.70	9592.72	**0.2657**	0.2631
12A	6	5/2/2018 15:32	2	17462	8731	98.6%	3.93381	2251.79	9592.72	**0.2347**	0.2315
12A	7	5/2/2018 15:29	2	13939	6969.5	99.6%	3.93378	1779.32	9592.72	**0.1855**	0.1886
12A	8	5/2/2018 15:26	2	13290	6645	100.0%	3.93376	1689.23	9592.72	**0.1761**	0.1750
12B	1	5/2/2018 15:39	2	18902	9451	64.2%	3.93386	3742.20	9592.72	**0.3901**	0.3849
12B	2	5/2/2018 15:36	2	21353	10676.5	79.9%	3.93384	3395.30	9592.72	**0.3539**	0.3642
12B	3	5/2/2018 15:46	2	20791	10395.5	76.5%	3.93392	3455.52	9592.72	**0.3602**	0.3524
12B	4	5/2/2018 15:43	2	22005	11002.5	91.0%	3.93389	3073.05	9592.72	**0.3204**	0.3274
12B	5	5/2/2018 15:26	2	21107	10553.5	95.4%	3.93375	2811.64	9592.72	**0.2931**	0.2886
12B	6	5/2/2018 15:23	2	19026	9513	98.6%	3.93373	2453.53	9592.72	**0.2558**	0.2551
12B	7	5/2/2018 15:33	2	15730	7865	99.6%	3.93381	2007.93	9592.72	**0.2093**	0.2106
12B	8	5/2/2018 15:30	2	14911	7455.5	100.0%	3.93378	1895.25	9592.72	**0.1976**	0.1972
12C	1	5/2/2018 15:43	2	19460	9730	64.2%	3.93389	3852.65	9592.72	**0.4016**	0.3937
12C	2	5/2/2018 15:39	2	21810	10905	79.9%	3.93387	3467.94	9592.72	**0.3615**	0.3723
12C	3	5/2/2018 15:36	2	20841	10420.5	76.5%	3.93384	3463.90	9592.72	**0.3611**	0.3601
12C	4	5/2/2018 15:46	2	22912	11456	91.0%	3.93392	3199.70	9592.72	**0.3336**	0.3343
12C	5	5/2/2018 15:29	2	21373	10686.5	95.4%	3.93378	2847.05	9592.72	**0.2968**	0.2944
12C	6	5/2/2018 15:26	2	19443	9721.5	98.6%	3.93375	2507.28	9592.72	**0.2614**	0.2602
12C	7	5/2/2018 15:23	2	16119	8059.5	99.6%	3.93373	2057.63	9592.72	**0.2145**	0.2153
12C	8	5/2/2018 15:33	2	15274	7637	100.0%	3.93381	1941.38	9592.72	**0.2024**	0.2023
12D	1	5/2/2018 15:46	2	18332	9166	64.2%	3.93392	3629.31	9592.72	**0.3783**	0.3731
12D	2	5/2/2018 15:43	2	20881	10440.5	79.9%	3.93389	3320.20	9592.72	**0.3461**	0.3535
12D	3	5/2/2018 15:39	2	19915	9957.5	76.5%	3.93387	3309.97	9592.72	**0.3451**	0.3423
12D	4	5/2/2018 15:37	2	21636	10818	91.0%	3.93384	3021.56	9592.72	**0.3150**	0.3186
12D	5	5/2/2018 15:32	2	20405	10202.5	95.4%	3.93381	2718.09	9592.72	**0.2833**	0.2816
12D	6	5/2/2018 15:29	2	18716	9358	98.6%	3.93378	2413.52	9592.72	**0.2516**	0.2493
12D	7	5/2/2018 15:26	2	15316	7658	99.6%	3.93376	1955.11	9592.72	**0.2038**	0.2054
12D	8	5/2/2018 15:23	2	14477	7238.5	100.0%	3.93373	1840.11	9592.72	**0.1918**	0.1915

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Alpha (counts)	Raw Alpha (cpm)	Recovery (%)	Rn-222 Ingrowth	Corrected Ra-226 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-226 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
13A	1	5/2/2018 14:50	3	29561	9853.66667	64.2%	3.93346	3902.05	9592.72	**0.4068**	0.3974
13A	2	5/2/2018 15:02	3	33183	11061	79.9%	3.93356	3517.83	9592.72	**0.3667**	0.3772
13A	3	5/2/2018 14:58	3	31771	10590.3333	76.5%	3.93352	3520.63	9592.72	**0.3670**	0.3656
13A	4	5/2/2018 14:54	3	34662	11554	91.0%	3.93349	3227.42	9592.72	**0.3364**	0.3410
13A	5	5/2/2018 15:06	3	32961	10987	95.4%	3.93359	2927.25	9592.72	**0.3052**	0.3026
13A	6	5/2/2018 15:18	3	30243	10081	98.6%	3.93369	2600.04	9592.72	**0.2710**	0.2690
13A	7	5/2/2018 15:14	3	25232	8410.66667	99.6%	3.93366	2147.32	9592.72	**0.2238**	0.2227
13A	8	5/2/2018 15:10	3	23335	7778.33333	100.0%	3.93363	1977.40	9592.72	**0.2061**	0.2077
13B	1	5/2/2018 14:54	3	29591	9863.66667	64.2%	3.93349	3905.98	9592.72	**0.4072**	0.3969
13B	2	5/2/2018 14:50	3	32682	10894	79.9%	3.93346	3464.80	9592.72	**0.3612**	0.3751
13B	3	5/2/2018 15:02	3	31780	10593.3333	76.5%	3.93356	3521.60	9592.72	**0.3671**	0.3627
13B	4	5/2/2018 14:58	3	34229	11409.6667	91.0%	3.93352	3187.07	9592.72	**0.3322**	0.3365
13B	5	5/2/2018 15:10	3	32034	10678	95.4%	3.93362	2844.90	9592.72	**0.2966**	0.2962
13B	6	5/2/2018 15:06	3	29603	9867.66667	98.6%	3.93359	2545.09	9592.72	**0.2653**	0.2618
13B	7	5/2/2018 15:18	3	24664	8221.33333	99.6%	3.93369	2098.96	9592.72	**0.2188**	0.2174
13B	8	5/2/2018 15:14	3	22992	7664	100.0%	3.93366	1948.31	9592.72	**0.2031**	0.2050
13D	1	5/2/2018 15:02	3	30204	10068	64.2%	3.93356	3986.82	9592.72	**0.4156**	0.4054
13D	2	5/2/2018 14:58	3	33731	11243.6667	79.9%	3.93352	3575.95	9592.72	**0.3728**	0.3827
13D	3	5/2/2018 14:54	3	32194	10731.3333	76.5%	3.93349	3567.54	9592.72	**0.3719**	0.3699
13D	4	5/2/2018 14:50	3	34409	11469.6667	91.0%	3.93346	3203.89	9592.72	**0.3340**	0.3428
13D	5	5/2/2018 15:18	3	33009	11003	95.4%	3.93369	2931.44	9592.72	**0.3056**	0.3014
13D	6	5/2/2018 15:14	3	30043	10014.3333	98.6%	3.93366	2582.87	9592.72	**0.2693**	0.2664
13D	7	5/2/2018 15:10	3	25245	8415	99.6%	3.93363	2148.44	9592.72	**0.2240**	0.2226
13D	8	5/2/2018 15:06	3	23707	7902.33333	100.0%	3.93359	2008.94	9592.72	**0.2094**	0.2113
14A	1	5/2/2018 15:06	3	27992	9330.66667	64.2%	3.93359	3694.81	9592.72	**0.3852**	0.3753
14A	2	5/2/2018 15:18	3	30926	10308.6667	79.9%	3.93369	3278.44	9592.72	**0.3418**	0.3554
14A	3	5/2/2018 15:14	3	29958	9986	76.5%	3.93366	3319.61	9592.72	**0.3461**	0.3440
14A	4	5/2/2018 15:10	3	32760	10920	91.0%	3.93363	3050.21	9592.72	**0.3180**	0.3199
14A	5	5/2/2018 14:50	3	30682	10227.3333	95.4%	3.93346	2724.95	9592.72	**0.2841**	0.2821
14A	6	5/2/2018 15:02	3	28167	9389	98.6%	3.93356	2421.65	9592.72	**0.2524**	0.2491
14A	7	5/2/2018 14:58	3	22677	7559	99.6%	3.93353	1929.95	9592.72	**0.2012**	0.2036
14A	8	5/2/2018 14:54	3	21447	7149	100.0%	3.93349	1817.47	9592.72	**0.1895**	0.1889
14B	1	5/2/2018 15:10	3	28807	9602.33333	64.2%	3.93363	3802.36	9592.72	**0.3964**	0.3894
14B	2	5/2/2018 15:06	3	32518	10839.3333	79.9%	3.93359	3447.30	9592.72	**0.3594**	0.3684
14B	3	5/2/2018 15:18	3	31031	10343.6667	76.5%	3.93370	3438.48	9592.72	**0.3584**	0.3566
14B	4	5/2/2018 15:15	3	33804	11268	91.0%	3.93366	3147.39	9592.72	**0.3281**	0.3313
14B	5	5/2/2018 14:54	3	31850	10616.6667	95.4%	3.93349	2828.66	9592.72	**0.2949**	0.2923
14B	6	5/2/2018 14:50	3	29079	9693	98.6%	3.93346	2500.12	9592.72	**0.2606**	0.2586
14B	7	5/2/2018 15:02	3	23984	7994.66667	99.6%	3.93356	2041.16	9592.72	**0.2128**	0.2141
14B	8	5/2/2018 14:58	3	22755	7585	100.0%	3.93353	1928.30	9592.72	**0.2010**	0.2008
14C	1	5/2/2018 15:14	3	28417	9472.33333	64.2%	3.93366	3750.85	9592.72	**0.3910**	0.3812
14C	2	5/2/2018 15:10	3	31614	10538	79.9%	3.93363	3351.43	9592.72	**0.3494**	0.3602
14C	3	5/2/2018 15:06	3	30403	10134.3333	76.5%	3.93359	3368.98	9592.72	**0.3512**	0.3484
14C	4	5/2/2018 15:19	3	32531	10843.6667	91.0%	3.93370	3028.84	9592.72	**0.3157**	0.3232
14C	5	5/2/2018 14:58	3	31012	10337.3333	95.4%	3.93352	2754.21	9592.72	**0.2871**	0.2844
14C	6	5/2/2018 14:54	3	28506	9502	98.6%	3.93349	2450.84	9592.72	**0.2555**	0.2511
14C	7	5/2/2018 14:50	3	23297	7765.66667	99.6%	3.93346	1982.75	9592.72	**0.2067**	0.2076
14C	8	5/2/2018 15:02	3	22018	7339.33333	100.0%	3.93356	1865.82	9592.72	**0.1945**	0.1951
14D	1	5/2/2018 15:18	3	26524	8841.33333	64.2%	3.93369	3500.95	9592.72	**0.3650**	0.3585
14D	2	5/2/2018 15:14	3	29905	9968.33333	79.9%	3.93366	3170.23	9592.72	**0.3305**	0.3380
14D	3	5/2/2018 15:10	3	28445	9481.66667	76.5%	3.93363	3151.99	9592.72	**0.3286**	0.3265
14D	4	5/2/2018 15:06	3	30578	10192.6667	91.0%	3.93359	2847.08	9592.72	**0.2968**	0.3021
14D	5	5/2/2018 15:02	3	28900	9633.33333	95.4%	3.93356	2566.62	9592.72	**0.2676**	0.2651
14D	6	5/2/2018 14:58	3	26641	8880.33333	98.6%	3.93352	2290.47	9592.72	**0.2388**	0.2343
14D	7	5/2/2018 14:54	3	21734	7244.66667	99.6%	3.93349	1849.71	9592.72	**0.1928**	0.1969
14D	8	5/2/2018 14:50	3	21497	7165.66667	100.0%	3.93346	1821.72	9592.72	**0.1899**	0.1883

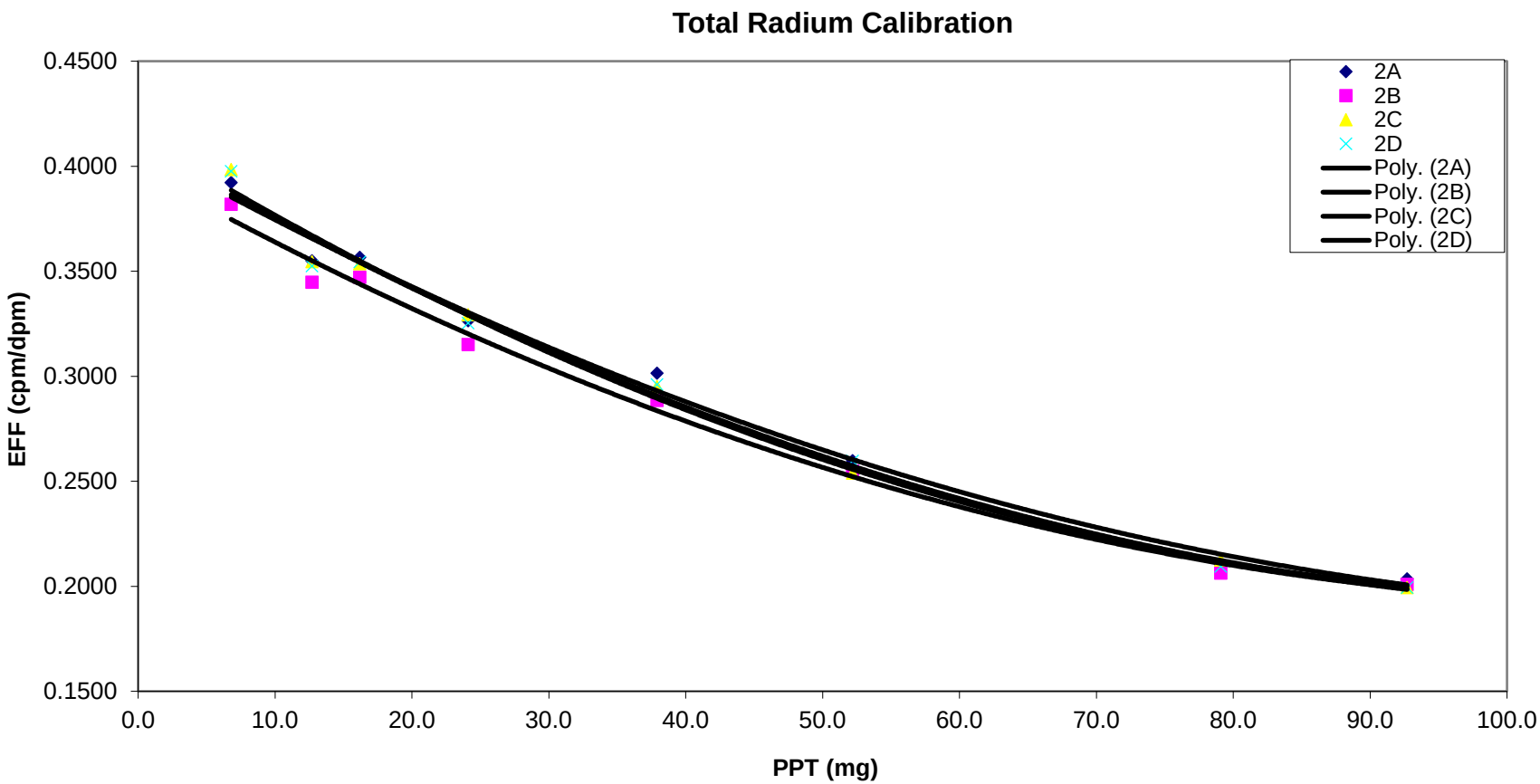


1A $y = 1.535278E\text{-}05x^2 - 3.644220E\text{-}03x + 4.011850E\text{-}01$

1B $y = 1.780150E\text{-}05x^2 - 3.910798E\text{-}03x + 4.066578E\text{-}01$

1C $y = 1.869126E\text{-}05x^2 - 4.041447E\text{-}03x + 4.282517E\text{-}01$

1D $y = 1.907682E\text{-}05x^2 - 4.146265E\text{-}03x + 4.281558E\text{-}01$

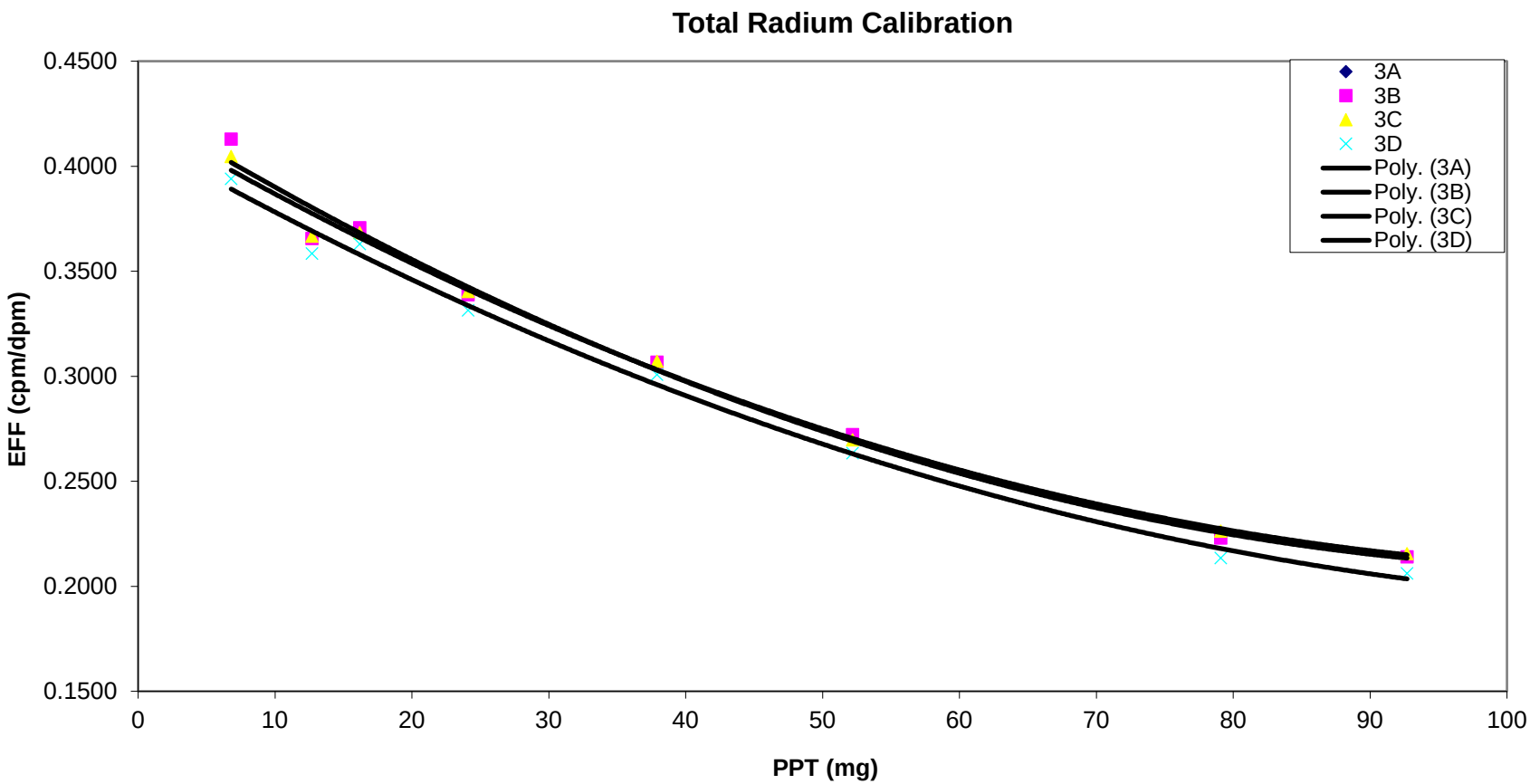


2A $y = 1.490025E\text{-}05x^2 - 3.632208E\text{-}03x + 4.093277E\text{-}01$

2B $y = 1.607214E\text{-}05x^2 - 3.645846E\text{-}03x + 3.987269E\text{-}01$

2C $y = 1.804089E\text{-}05x^2 - 3.990768E\text{-}03x + 4.148143E\text{-}01$

2D $y = 1.623654E\text{-}05x^2 - 3.803403E\text{-}03x + 4.115174E\text{-}01$

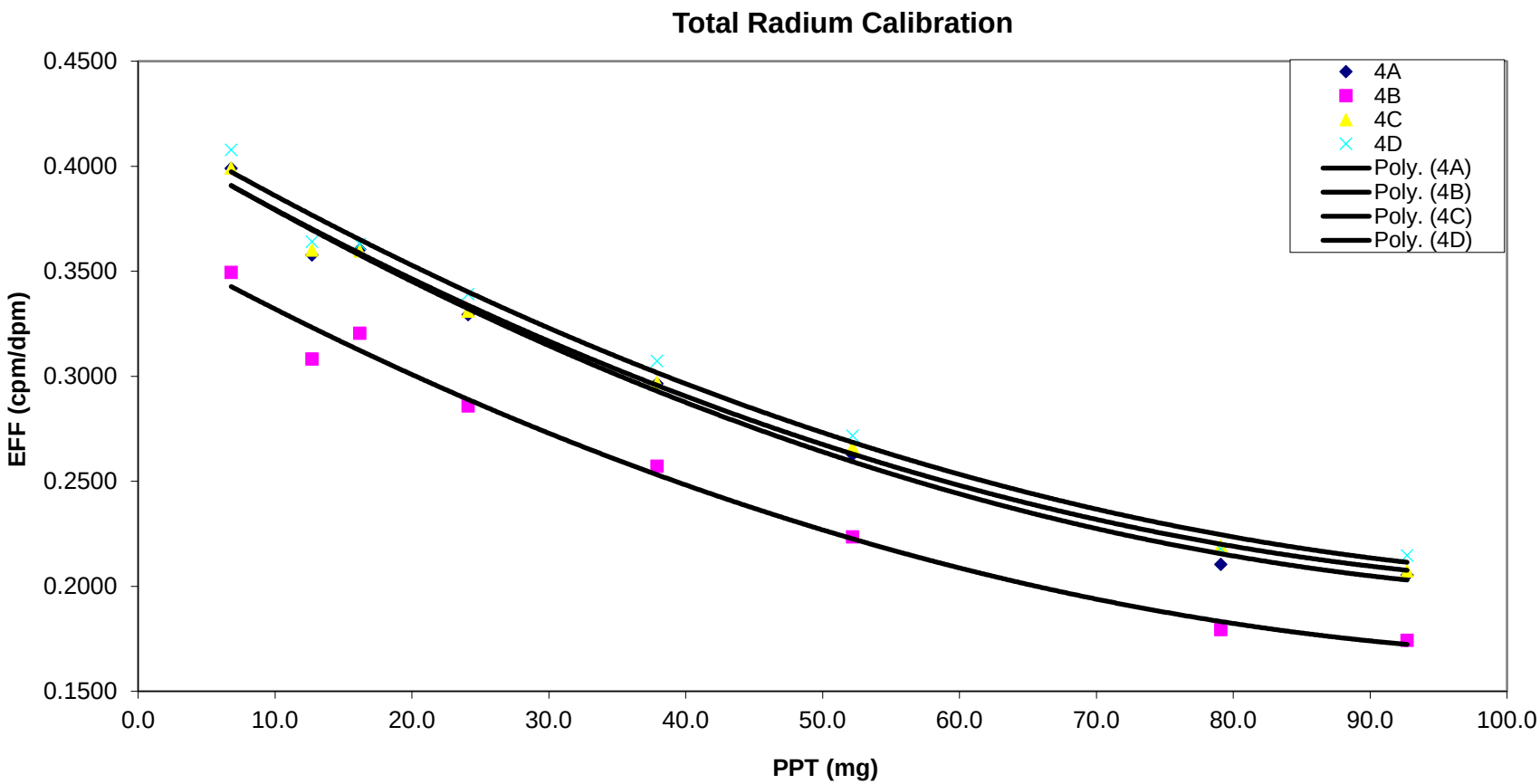


3A

3B $y = 1.799300E\text{-}05x^2 - 3.983793E\text{-}03x + 4.280556E\text{-}01$

3C $y = 1.682581E\text{-}05x^2 - 3.805455E\text{-}03x + 4.231573E\text{-}01$

3D $y = 1.520747E\text{-}05x^2 - 3.673624E\text{-}03x + 4.133807E\text{-}01$

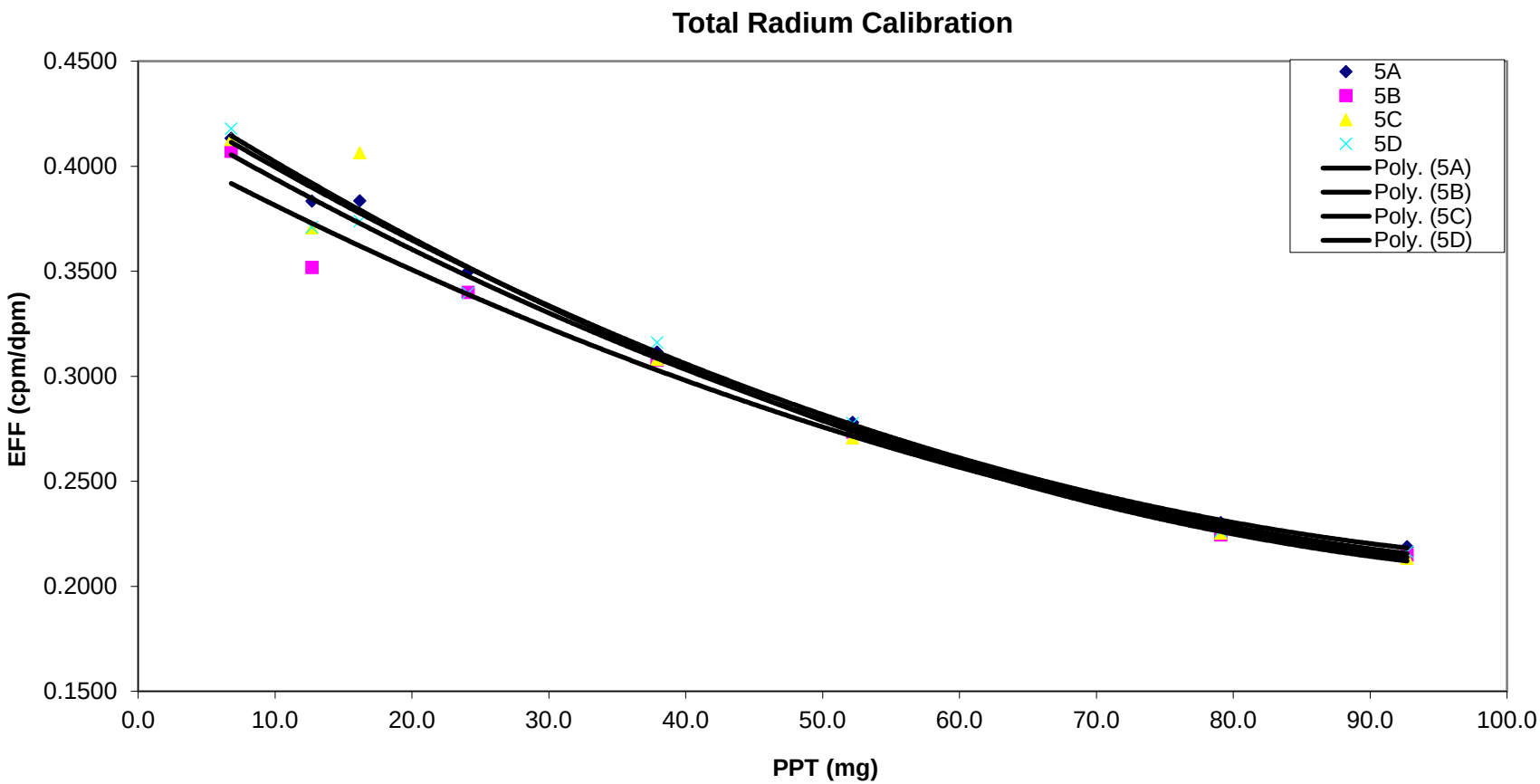


4A $y = 1.754284E\text{-}05x^2 - 3.932345E\text{-}03x + 4.167623E\text{-}01$

4B $y = 1.634512E\text{-}05x^2 - 3.609640E\text{-}03x + 3.664657E\text{-}01$

4C $y = 1.684458E\text{-}05x^2 - 3.807077E\text{-}03x + 4.157919E\text{-}01$

4D $y = 1.660767E\text{-}05x^2 - 3.816578E\text{-}03x + 4.225082E\text{-}01$

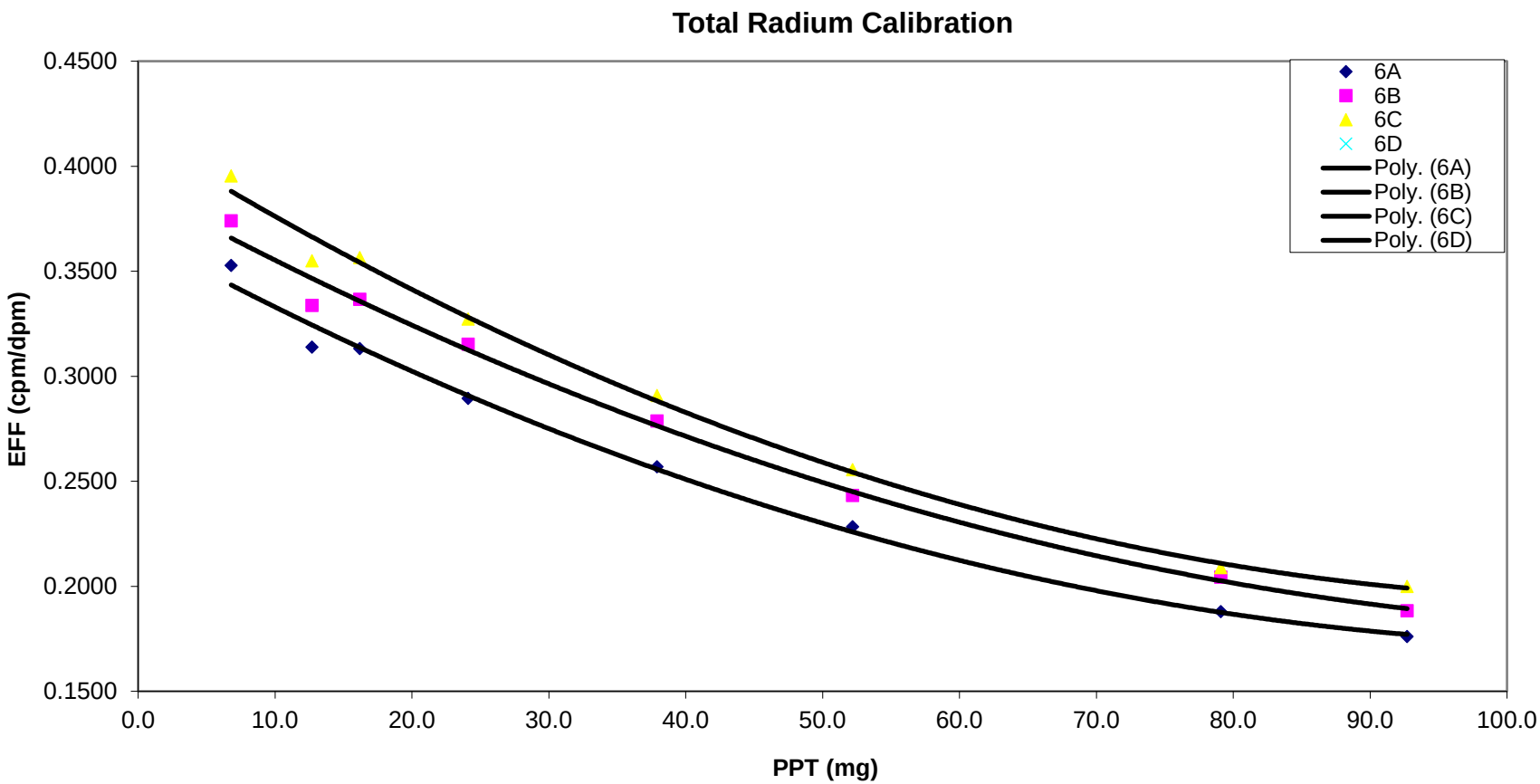


5A $y = 1.761283E\text{-}05x^2 - 4.001499E\text{-}03x + 4.378203E\text{-}01$

5B $y = 1.429847E\text{-}05x^2 - 3.495415E\text{-}03x + 4.148935E\text{-}01$

5C $y = 1.834541E\text{-}05x^2 - 4.182507E\text{-}03x + 4.420901E\text{-}01$

5D $y = 1.650464E\text{-}05x^2 - 3.851820E\text{-}03x + 4.308481E\text{-}01$

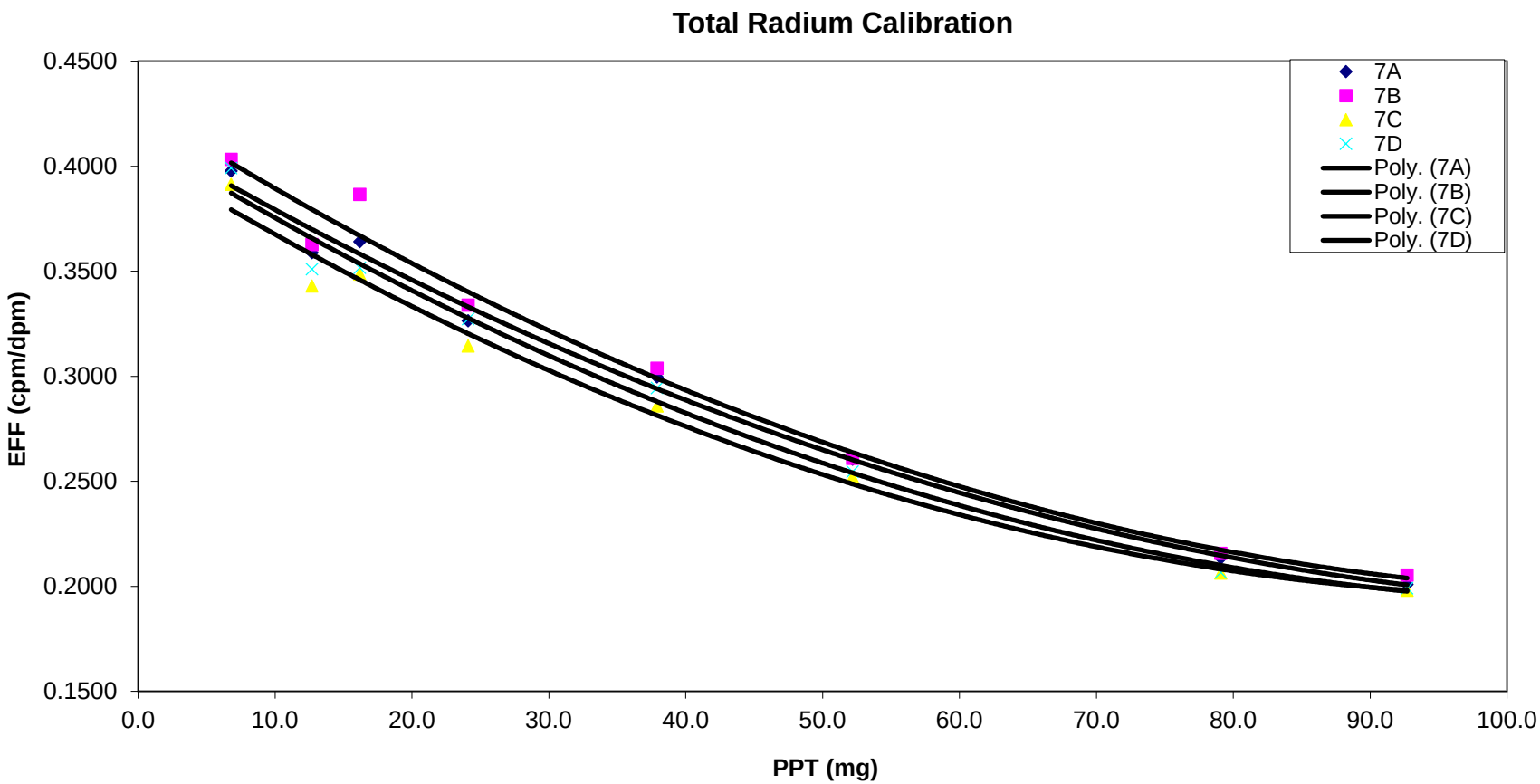


6A $y = 1.612309E\text{-}05x^2 - 3.541157E\text{-}03x + 3.667809E\text{-}01$

6B $y = 1.495681E\text{-}05x^2 - 3.542132E\text{-}03x + 3.891804E\text{-}01$

6C $y = 1.844348E\text{-}05x^2 - 4.034333E\text{-}03x + 4.146356E\text{-}01$

6D

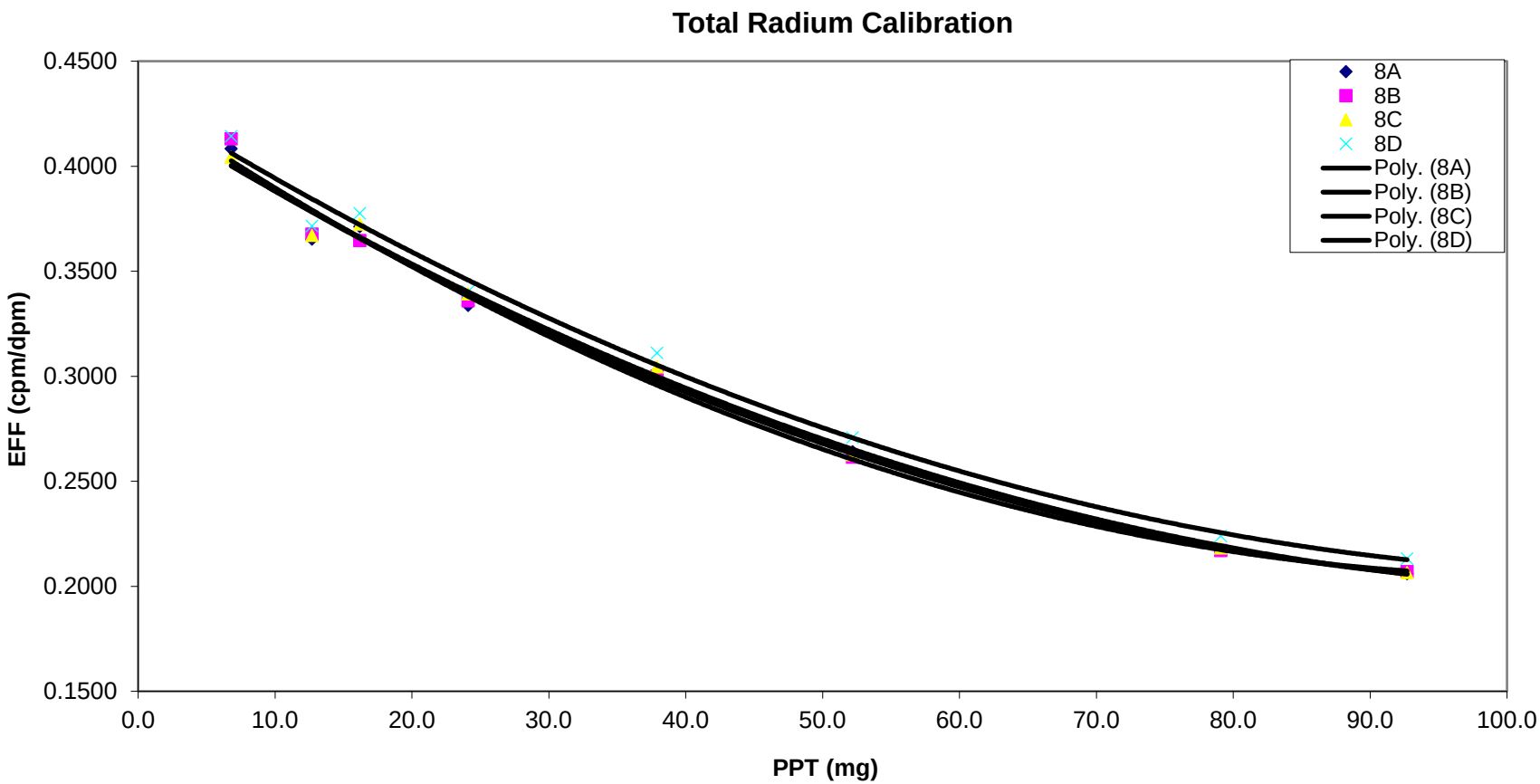


7A $y = 1.633605E\text{-}05x^2 - 3.838625E\text{-}03x + 4.160710E\text{-}01$

7B $y = 1.816994E\text{-}05x^2 - 4.109275E\text{-}03x + 4.286888E\text{-}01$

7C $y = 1.895346E\text{-}05x^2 - 3.995529E\text{-}03x + 4.056045E\text{-}01$

7D $y = 1.797059E\text{-}05x^2 - 3.995480E\text{-}03x + 4.135415E\text{-}01$

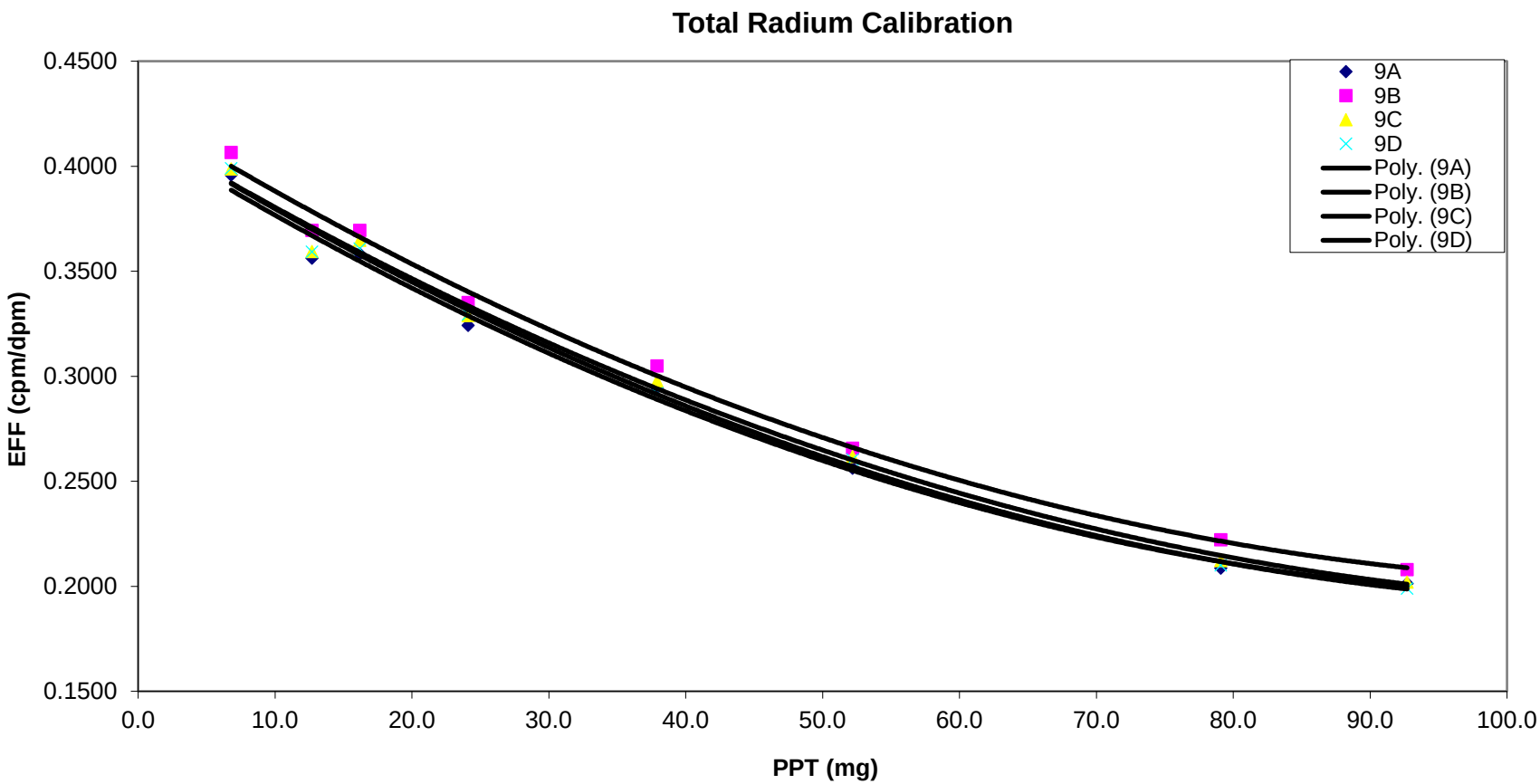


8A $y = 1.879093E\text{-}05x^2 - 4.132478E\text{-}03x + 4.275934E\text{-}01$

8B $y = 2.120594E\text{-}05x^2 - 4.382766E\text{-}03x + 4.313847E\text{-}01$

8C $y = 1.746905E\text{-}05x^2 - 4.000783E\text{-}03x + 4.264631E\text{-}01$

8D $y = 1.810152E\text{-}05x^2 - 4.055306E\text{-}03x + 4.330175E\text{-}01$

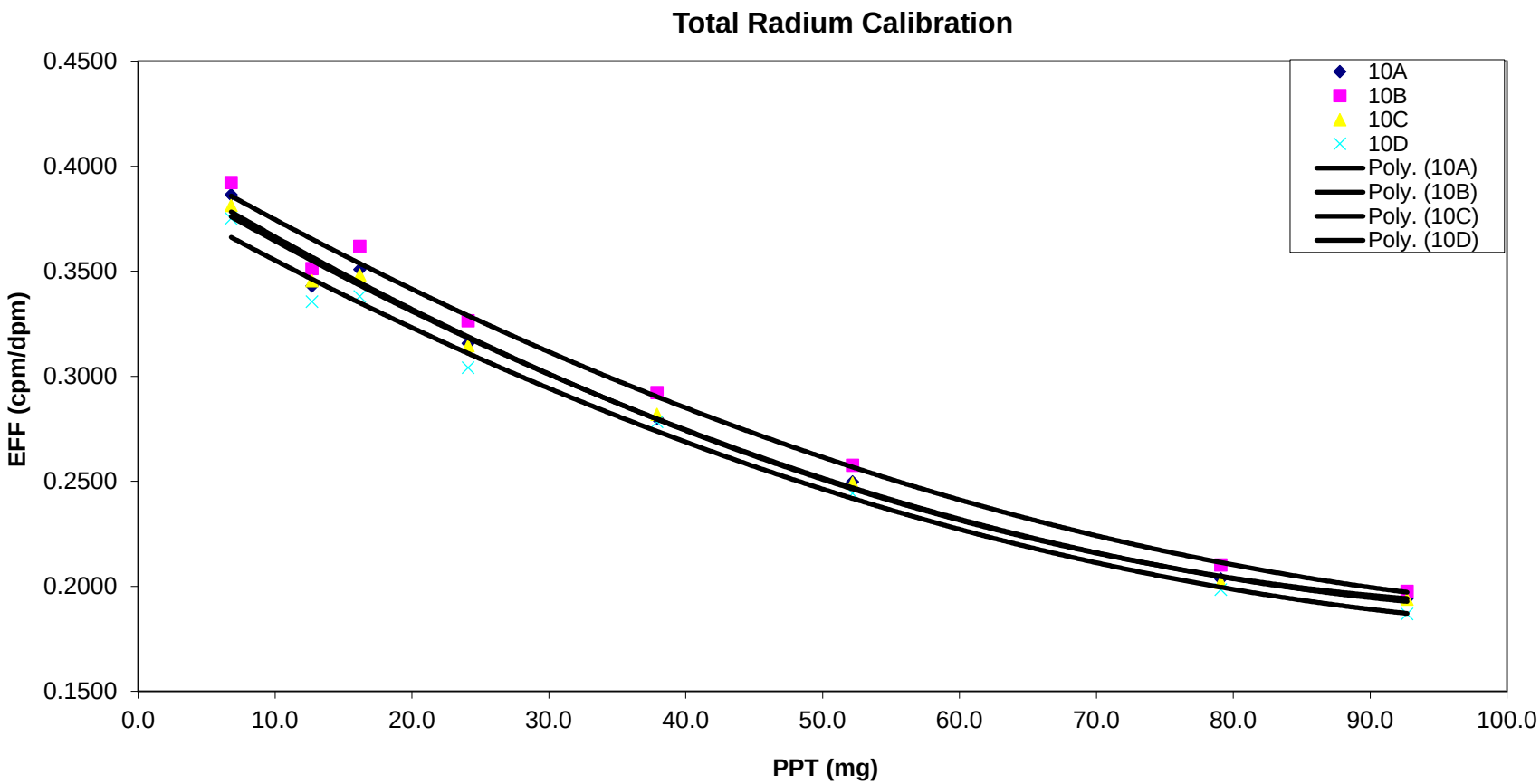


9A $y = 1.834204E\text{-}05x^2 - 4.022129E\text{-}03x + 4.151030E\text{-}01$

9B $y = 1.789593E\text{-}05x^2 - 4.006536E\text{-}03x + 4.264221E\text{-}01$

9C $y = 1.687108E\text{-}05x^2 - 3.902332E\text{-}03x + 4.177679E\text{-}01$

9D $y = 1.782061E\text{-}05x^2 - 4.019450E\text{-}03x + 4.181484E\text{-}01$

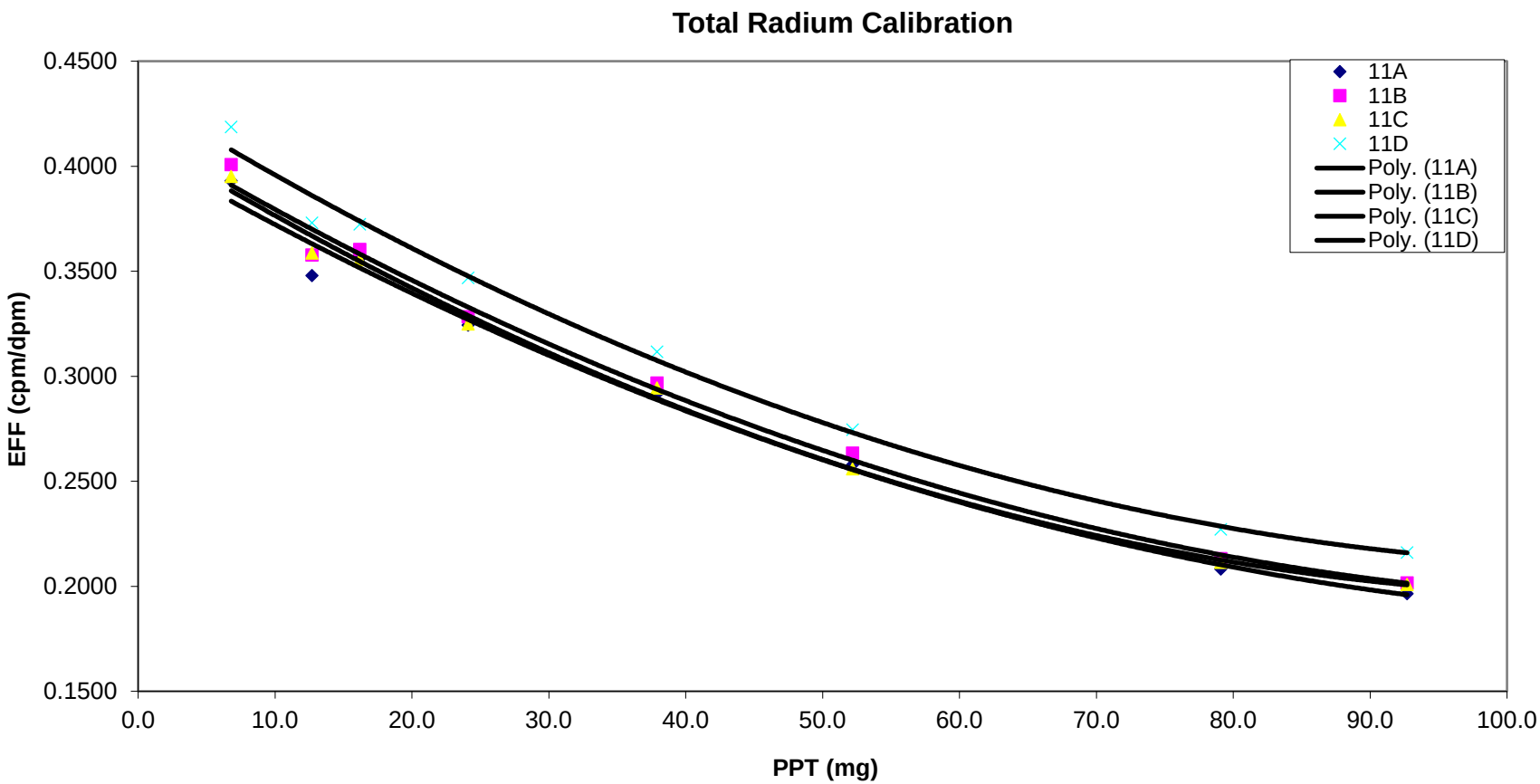


10A $y = 1.882677E\text{-}05x^2 - 4.016238E\text{-}03x + 4.046847E\text{-}01$

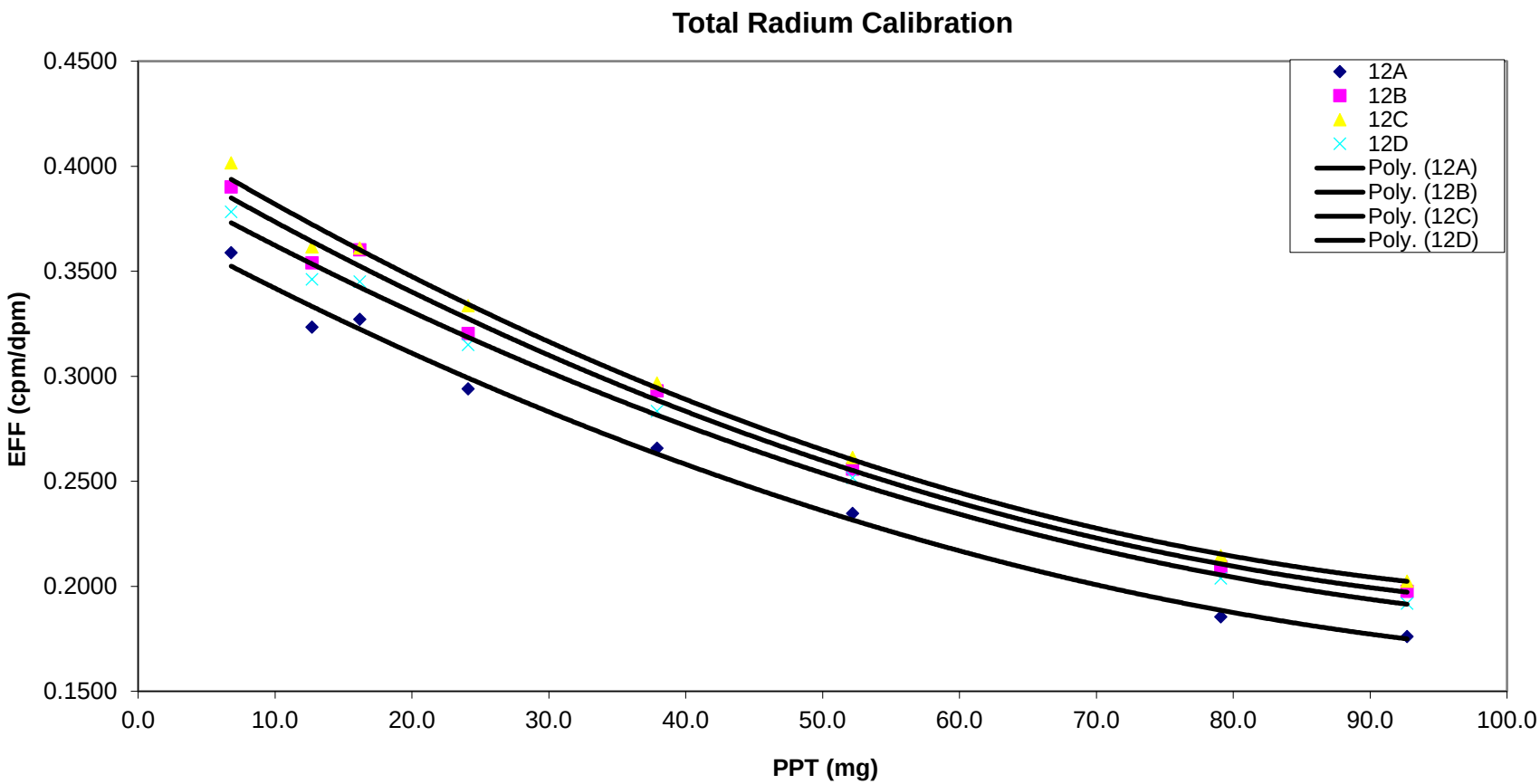
10B $y = 1.597513E\text{-}05x^2 - 3.785777E\text{-}03x + 4.108205E\text{-}01$

10C $y = 1.754359E\text{-}05x^2 - 3.877659E\text{-}03x + 4.014913E\text{-}01$

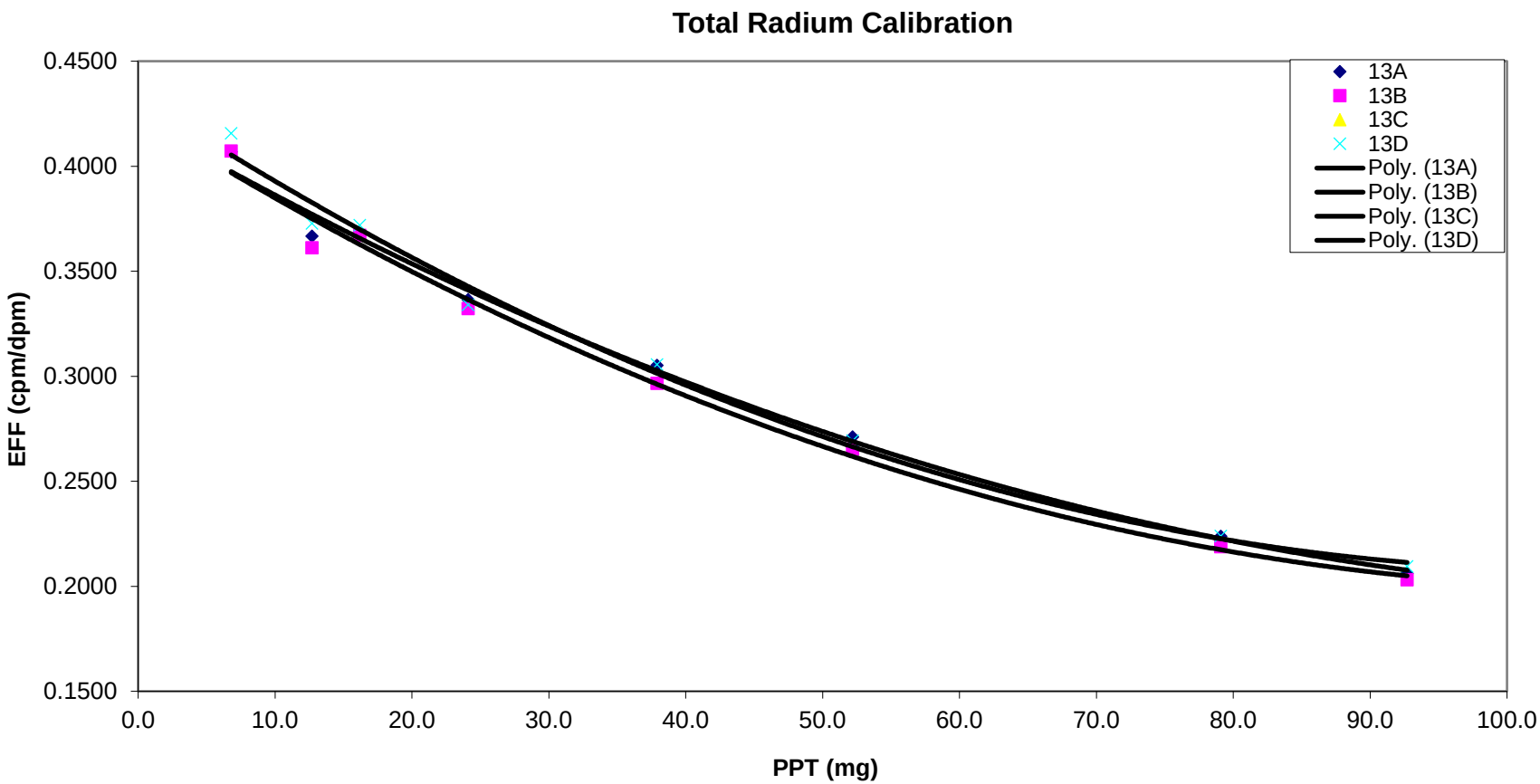
10D $y = 1.615427E\text{-}05x^2 - 3.691955E\text{-}03x + 3.904988E\text{-}01$



11A	$y = 1.566351E\text{-}05x^2 - 3.740331E\text{-}03x + 4.080708E\text{-}01$
11B	$y = 1.675605E\text{-}05x^2 - 3.873035E\text{-}03x + 4.164969E\text{-}01$
11C	$y = 1.815998E\text{-}05x^2 - 3.991252E\text{-}03x + 4.145818E\text{-}01$
11D	$y = 1.807426E\text{-}05x^2 - 4.031708E\text{-}03x + 4.343545E\text{-}01$



12A	$y = 1.472230E\text{-}05x^2 - 3.530352E\text{-}03x + 3.757044E\text{-}01$
12B	$y = 1.661469E\text{-}05x^2 - 3.838209E\text{-}03x + 4.102270E\text{-}01$
12C	$y = 1.760293E\text{-}05x^2 - 3.979673E\text{-}03x + 4.199932E\text{-}01$
12D	$y = 1.510562E\text{-}05x^2 - 3.617094E\text{-}03x + 3.969554E\text{-}01$

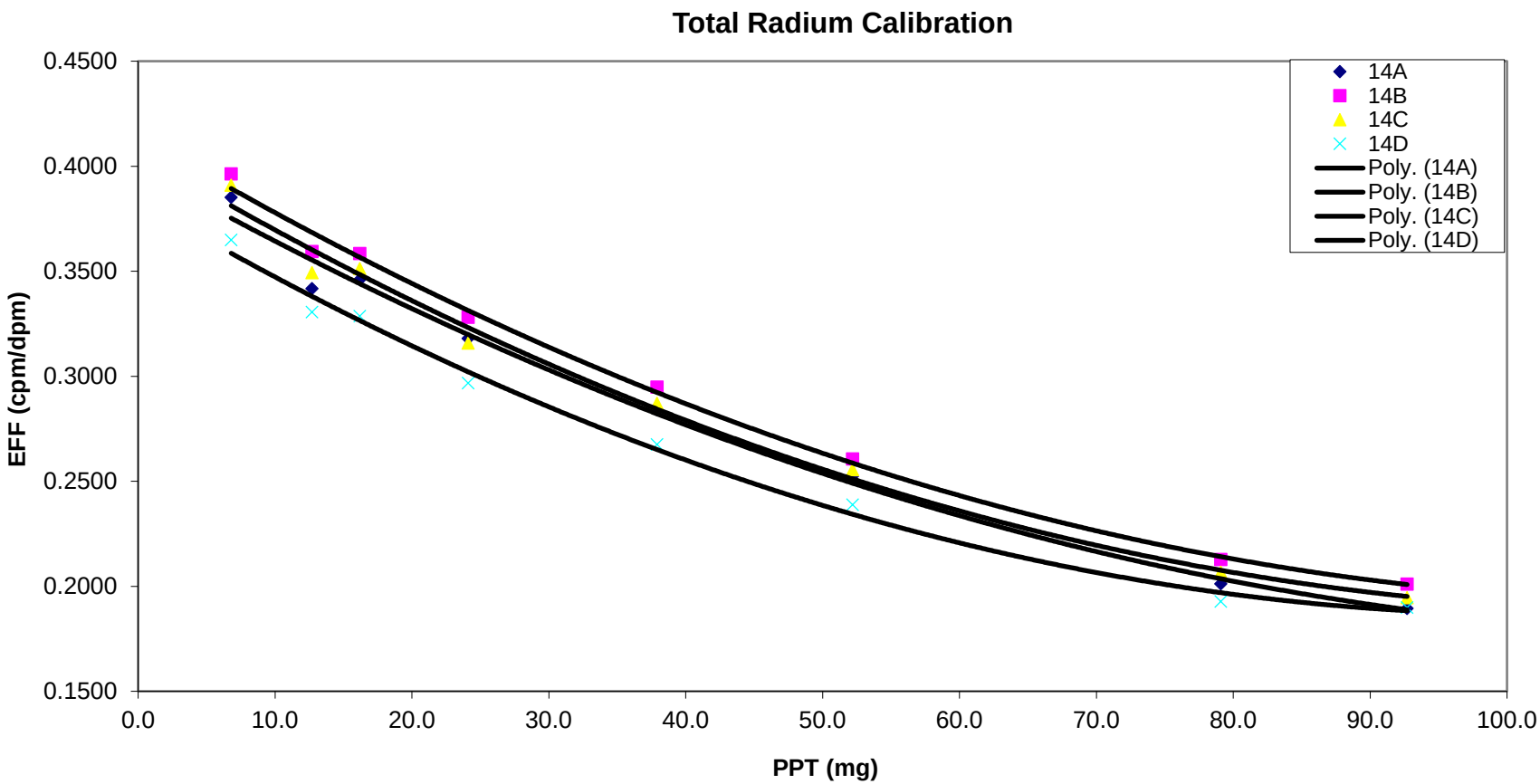


13A $y = 1.532986E\text{-}05x^2 - 3.734176E\text{-}03x + 4.221077E\text{-}01$

13B $y = 1.829142E\text{-}05x^2 - 4.054058E\text{-}03x + 4.235929E\text{-}01$

13C

13D $y = 1.978949E\text{-}05x^2 - 4.227611E\text{-}03x + 4.331893E\text{-}01$



14A $y = 1.505598E\text{-}05x^2 - 3.668065E\text{-}03x + 3.995104E\text{-}01$

14B $y = 1.691204E\text{-}05x^2 - 3.877500E\text{-}03x + 4.149620E\text{-}01$

14C $y = 1.728206E\text{-}05x^2 - 3.885160E\text{-}03x + 4.067837E\text{-}01$

14D $y = 1.866376E\text{-}05x^2 - 3.838463E\text{-}03x + 3.837850E\text{-}01$

Current Calibration - PIC

Geometry	47mm Filter				
Total Radium	**Cal Date**	5/1/2018	**Exp Date**	5/31/2020	
Protean	A0	A1	A2	A3	A4
1A	4.01185E-01	-3.64422E-03	1.53528E-05		
1B	4.06658E-01	-3.91080E-03	1.78015E-05		
1C	4.28252E-01	-4.04145E-03	1.86913E-05		
1D	4.28156E-01	-4.14627E-03	1.90768E-05		
2A	4.09328E-01	-3.63221E-03	1.49003E-05		
2B	3.98727E-01	-3.64585E-03	1.60721E-05		
2C	4.14814E-01	-3.99077E-03	1.80409E-05		
2D	4.11517E-01	-3.80340E-03	1.62365E-05		
3A	#N/A	#N/A	#N/A		
3B	4.28056E-01	-3.98379E-03	1.79930E-05		
3C	4.23157E-01	-3.80545E-03	1.68258E-05		
3D	4.13381E-01	-3.67362E-03	1.52075E-05		
4A	4.16762E-01	-3.93235E-03	1.75428E-05		
4B	3.66466E-01	-3.60964E-03	1.63451E-05		
4C	4.15792E-01	-3.80708E-03	1.68446E-05		
4D	4.22508E-01	-3.81658E-03	1.66077E-05		
5A	4.37820E-01	-4.00150E-03	1.76128E-05		
5B	4.14893E-01	-3.49542E-03	1.42985E-05		
5C	4.42090E-01	-4.18251E-03	1.83454E-05		
5D	4.30848E-01	-3.85182E-03	1.65046E-05		
6A	3.66781E-01	-3.54116E-03	1.61231E-05		
6B	3.89180E-01	-3.54213E-03	1.49568E-05		
6C	4.14636E-01	-4.03433E-03	1.84435E-05		
6D	#N/A	#N/A	#N/A		
7A	4.16071E-01	-3.83862E-03	1.63360E-05		
7B	4.28689E-01	-4.10928E-03	1.81699E-05		
7C	4.05605E-01	-3.99553E-03	1.89535E-05		
7D	4.13542E-01	-3.99548E-03	1.79706E-05		
8A	4.27593E-01	-4.13248E-03	1.87909E-05		
8B	4.31385E-01	-4.38277E-03	2.12059E-05		
8C	4.26463E-01	-4.00078E-03	1.74691E-05		
8D	4.33018E-01	-4.05531E-03	1.81015E-05		
9A	4.15103E-01	-4.02213E-03	1.83420E-05		
9B	4.26422E-01	-4.00654E-03	1.78959E-05		
9C	4.17768E-01	-3.90233E-03	1.68711E-05		
9D	4.18148E-01	-4.01945E-03	1.78206E-05		
10A	4.04685E-01	-4.01624E-03	1.88268E-05		
10B	4.10820E-01	-3.78578E-03	1.59751E-05		
10C	4.01491E-01	-3.87766E-03	1.75436E-05		
10D	3.90499E-01	-3.69195E-03	1.61543E-05		
11A	4.08071E-01	-3.74033E-03	1.56635E-05		
11B	4.16497E-01	-3.87303E-03	1.67560E-05		
11C	4.14582E-01	-3.99125E-03	1.81600E-05		
11D	4.34354E-01	-4.03171E-03	1.80743E-05		
12A	3.75704E-01	-3.53035E-03	1.47223E-05		
12B	4.10227E-01	-3.83821E-03	1.66147E-05		
12C	4.19993E-01	-3.97967E-03	1.76029E-05		
12D	3.96955E-01	-3.61709E-03	1.51056E-05		
13A	4.22108E-01	-3.73418E-03	1.53299E-05		
13B	4.23593E-01	-4.05406E-03	1.82914E-05		
13C	#N/A	#N/A	#N/A		
13D	4.33189E-01	-4.22761E-03	1.97895E-05		
14A	3.99510E-01	-3.66806E-03	1.50560E-05		
14B	4.14962E-01	-3.87750E-03	1.69120E-05		
14C	4.06784E-01	-3.88516E-03	1.72821E-05		
14D	3.83785E-01	-3.83846E-03	1.86638E-05		

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
C1	10A	2	18722	20225	5/2/2018 16:01	5/2/2018 16:03	PIC	TRADC18
C2	10A	2	20688	23272	5/2/2018 16:10	5/2/2018 16:12	PIC	TRADC18
C3	10A	2	20252	22148	5/2/2018 16:07	5/2/2018 16:09	PIC	TRADC18
C4	10A	2	21679	25230	5/2/2018 16:04	5/2/2018 16:06	PIC	TRADC18
C5	10A	2	20163	25877	5/2/2018 15:49	5/2/2018 15:51	PIC	TRADC18
C6	10A	2	18579	26142	5/2/2018 15:58	5/2/2018 16:00	PIC	TRADC18
C7	10A	2	15297	24302	5/2/2018 15:55	5/2/2018 15:57	PIC	TRADC18
C8	10A	2	14654	25239	5/2/2018 15:52	5/2/2018 15:54	PIC	TRADC18
C1	10B	2	19004	19465	5/2/2018 16:04	5/2/2018 16:06	PIC	TRADC18
C2	10B	2	21194	22402	5/2/2018 16:01	5/2/2018 16:03	PIC	TRADC18
C3	10B	2	20884	21177	5/2/2018 16:10	5/2/2018 16:12	PIC	TRADC18
C4	10B	2	22418	24166	5/2/2018 16:07	5/2/2018 16:09	PIC	TRADC18
C5	10B	2	21042	25086	5/2/2018 15:52	5/2/2018 15:54	PIC	TRADC18
C6	10B	2	19165	25398	5/2/2018 15:49	5/2/2018 15:51	PIC	TRADC18
C7	10B	2	15796	23929	5/2/2018 15:58	5/2/2018 16:00	PIC	TRADC18
C8	10B	2	14909	24637	5/2/2018 15:55	5/2/2018 15:57	PIC	TRADC18
C1	10C	2	18477	20231	5/2/2018 16:07	5/2/2018 16:09	PIC	TRADC18
C2	10C	2	20845	22810	5/2/2018 16:04	5/2/2018 16:06	PIC	TRADC18
C3	10C	2	20101	21557	5/2/2018 16:01	5/2/2018 16:03	PIC	TRADC18
C4	10C	2	21606	24795	5/2/2018 16:10	5/2/2018 16:12	PIC	TRADC18
C5	10C	2	20301	25375	5/2/2018 15:55	5/2/2018 15:57	PIC	TRADC18
C6	10C	2	18540	25947	5/2/2018 15:52	5/2/2018 15:54	PIC	TRADC18
C7	10C	2	15168	24103	5/2/2018 15:49	5/2/2018 15:51	PIC	TRADC18
C8	10C	2	14635	24813	5/2/2018 15:58	5/2/2018 16:00	PIC	TRADC18
C1	10D	2	18175	20557	5/2/2018 16:10	5/2/2018 16:12	PIC	TRADC18
C2	10D	2	20240	23365	5/2/2018 16:07	5/2/2018 16:09	PIC	TRADC18
C3	10D	2	19508	22075	5/2/2018 16:04	5/2/2018 16:06	PIC	TRADC18
C4	10D	2	20883	24965	5/2/2018 16:01	5/2/2018 16:03	PIC	TRADC18
C5	10D	2	20045	25946	5/2/2018 15:58	5/2/2018 16:00	PIC	TRADC18
C6	10D	2	18165	26070	5/2/2018 15:55	5/2/2018 15:57	PIC	TRADC18
C7	10D	2	14913	24302	5/2/2018 15:52	5/2/2018 15:54	PIC	TRADC18
C8	10D	2	14105	24839	5/2/2018 15:49	5/2/2018 15:51	PIC	TRADC18
C1	11A	2	19043	20052	5/2/2018 15:23	5/2/2018 15:25	PIC	TRADC18
C2	11A	2	20990	22505	5/2/2018 15:32	5/2/2018 15:34	PIC	TRADC18
C3	11A	2	20555	21590	5/2/2018 15:29	5/2/2018 15:31	PIC	TRADC18
C4	11A	2	22274	24390	5/2/2018 15:26	5/2/2018 15:28	PIC	TRADC18
C5	11A	2	21002	25390	5/2/2018 15:36	5/2/2018 15:38	PIC	TRADC18
C6	11A	2	19180	25394	5/2/2018 15:46	5/2/2018 15:48	PIC	TRADC18
C7	11A	2	15649	24026	5/2/2018 15:43	5/2/2018 15:45	PIC	TRADC18
C8	11A	2	14827	24270	5/2/2018 15:40	5/2/2018 15:42	PIC	TRADC18
C1	11B	2	19419	19740	5/2/2018 15:26	5/2/2018 15:28	PIC	TRADC18
C2	11B	2	21583	22640	5/2/2018 15:23	5/2/2018 15:25	PIC	TRADC18
C3	11B	2	20796	21423	5/2/2018 15:32	5/2/2018 15:34	PIC	TRADC18
C4	11B	2	22555	24414	5/2/2018 15:29	5/2/2018 15:31	PIC	TRADC18
C5	11B	2	21370	25255	5/2/2018 15:40	5/2/2018 15:42	PIC	TRADC18
C6	11B	2	19596	25335	5/2/2018 15:36	5/2/2018 15:38	PIC	TRADC18
C7	11B	2	16018	24208	5/2/2018 15:46	5/2/2018 15:48	PIC	TRADC18
C8	11B	2	15217	24543	5/2/2018 15:43	5/2/2018 15:45	PIC	TRADC18
C1	11C	2	19141	20022	5/2/2018 15:29	5/2/2018 15:31	PIC	TRADC18
C2	11C	2	21641	22948	5/2/2018 15:26	5/2/2018 15:28	PIC	TRADC18
C3	11C	2	20526	21840	5/2/2018 15:23	5/2/2018 15:25	PIC	TRADC18
C4	11C	2	22317	24494	5/2/2018 15:32	5/2/2018 15:34	PIC	TRADC18
C5	11C	2	21203	25988	5/2/2018 15:43	5/2/2018 15:45	PIC	TRADC18
C6	11C	2	19039	25590	5/2/2018 15:40	5/2/2018 15:42	PIC	TRADC18
C7	11C	2	15890	24128	5/2/2018 15:36	5/2/2018 15:38	PIC	TRADC18
C8	11C	2	15160	24881	5/2/2018 15:46	5/2/2018 15:48	PIC	TRADC18
C1	11D	2	20289	20224	5/2/2018 15:32	5/2/2018 15:34	PIC	TRADC18
C2	11D	2	22506	23218	5/2/2018 15:29	5/2/2018 15:31	PIC	TRADC18
C3	11D	2	21493	21909	5/2/2018 15:26	5/2/2018 15:28	PIC	TRADC18
C4	11D	2	23825	25172	5/2/2018 15:23	5/2/2018 15:25	PIC	TRADC18

C5	11D	2	22441	25948	5/2/2018 15:46	5/2/2018 15:48	PIC	TRADC18
C6	11D	2	20421	26045	5/2/2018 15:43	5/2/2018 15:45	PIC	TRADC18
C7	11D	2	17069	24465	5/2/2018 15:40	5/2/2018 15:42	PIC	TRADC18
C8	11D	2	16311	25127	5/2/2018 15:36	5/2/2018 15:38	PIC	TRADC18
C1	12A	2	17383	20826	5/2/2018 15:36	5/2/2018 15:38	PIC	TRADC18
C2	12A	2	19507	23762	5/2/2018 15:46	5/2/2018 15:48	PIC	TRADC18
C3	12A	2	18882	22870	5/2/2018 15:43	5/2/2018 15:45	PIC	TRADC18
C4	12A	2	20196	25768	5/2/2018 15:39	5/2/2018 15:41	PIC	TRADC18
C5	12A	2	19133	26715	5/2/2018 15:23	5/2/2018 15:25	PIC	TRADC18
C6	12A	2	17462	26139	5/2/2018 15:32	5/2/2018 15:34	PIC	TRADC18
C7	12A	2	13939	24668	5/2/2018 15:29	5/2/2018 15:31	PIC	TRADC18
C8	12A	2	13290	25714	5/2/2018 15:26	5/2/2018 15:28	PIC	TRADC18
C1	12B	2	18902	19407	5/2/2018 15:39	5/2/2018 15:41	PIC	TRADC18
C2	12B	2	21353	22150	5/2/2018 15:36	5/2/2018 15:38	PIC	TRADC18
C3	12B	2	20791	21071	5/2/2018 15:46	5/2/2018 15:48	PIC	TRADC18
C4	12B	2	22005	24200	5/2/2018 15:43	5/2/2018 15:45	PIC	TRADC18
C5	12B	2	21107	24789	5/2/2018 15:26	5/2/2018 15:28	PIC	TRADC18
C6	12B	2	19026	25180	5/2/2018 15:23	5/2/2018 15:25	PIC	TRADC18
C7	12B	2	15730	23557	5/2/2018 15:33	5/2/2018 15:35	PIC	TRADC18
C8	12B	2	14911	24443	5/2/2018 15:30	5/2/2018 15:32	PIC	TRADC18
C1	12C	2	19460	19467	5/2/2018 15:43	5/2/2018 15:45	PIC	TRADC18
C2	12C	2	21810	22413	5/2/2018 15:39	5/2/2018 15:41	PIC	TRADC18
C3	12C	2	20841	21351	5/2/2018 15:36	5/2/2018 15:38	PIC	TRADC18
C4	12C	2	22912	24261	5/2/2018 15:46	5/2/2018 15:48	PIC	TRADC18
C5	12C	2	21373	25099	5/2/2018 15:29	5/2/2018 15:31	PIC	TRADC18
C6	12C	2	19443	24834	5/2/2018 15:26	5/2/2018 15:28	PIC	TRADC18
C7	12C	2	16119	23582	5/2/2018 15:23	5/2/2018 15:25	PIC	TRADC18
C8	12C	2	15274	24365	5/2/2018 15:33	5/2/2018 15:35	PIC	TRADC18
C1	12D	2	18332	20502	5/2/2018 15:46	5/2/2018 15:48	PIC	TRADC18
C2	12D	2	20881	23208	5/2/2018 15:43	5/2/2018 15:45	PIC	TRADC18
C3	12D	2	19915	21792	5/2/2018 15:39	5/2/2018 15:41	PIC	TRADC18
C4	12D	2	21636	24782	5/2/2018 15:37	5/2/2018 15:39	PIC	TRADC18
C5	12D	2	20405	25536	5/2/2018 15:32	5/2/2018 15:34	PIC	TRADC18
C6	12D	2	18716	25924	5/2/2018 15:29	5/2/2018 15:31	PIC	TRADC18
C7	12D	2	15316	24384	5/2/2018 15:26	5/2/2018 15:28	PIC	TRADC18
C8	12D	2	14477	24914	5/2/2018 15:23	5/2/2018 15:25	PIC	TRADC18
C1	13A	3	29561	29607	5/2/2018 14:50	5/2/2018 14:53	PIC	TRADC18
C2	13A	3	33183	33432	5/2/2018 15:02	5/2/2018 15:05	PIC	TRADC18
C3	13A	3	31771	31916	5/2/2018 14:58	5/2/2018 15:01	PIC	TRADC18
C4	13A	3	34662	36316	5/2/2018 14:54	5/2/2018 14:57	PIC	TRADC18
C5	13A	3	32961	37208	5/2/2018 15:06	5/2/2018 15:09	PIC	TRADC18
C6	13A	3	30243	37602	5/2/2018 15:18	5/2/2018 15:21	PIC	TRADC18
C7	13A	3	25232	35728	5/2/2018 15:14	5/2/2018 15:17	PIC	TRADC18
C8	13A	3	23335	36414	5/2/2018 15:10	5/2/2018 15:13	PIC	TRADC18
C1	13B	3	29591	29834	5/2/2018 14:54	5/2/2018 14:57	PIC	TRADC18
C2	13B	3	32682	33944	5/2/2018 14:50	5/2/2018 14:53	PIC	TRADC18
C3	13B	3	31780	32096	5/2/2018 15:02	5/2/2018 15:05	PIC	TRADC18
C4	13B	3	34229	36913	5/2/2018 14:58	5/2/2018 15:01	PIC	TRADC18
C5	13B	3	32034	37527	5/2/2018 15:10	5/2/2018 15:13	PIC	TRADC18
C6	13B	3	29603	37951	5/2/2018 15:06	5/2/2018 15:09	PIC	TRADC18
C7	13B	3	24664	35731	5/2/2018 15:18	5/2/2018 15:21	PIC	TRADC18
C8	13B	3	22992	36742	5/2/2018 15:14	5/2/2018 15:17	PIC	TRADC18
C1	13D	3	30204	29975	5/2/2018 15:02	5/2/2018 15:05	PIC	TRADC18
C2	13D	3	33731	34409	5/2/2018 14:58	5/2/2018 15:01	PIC	TRADC18
C3	13D	3	32194	32525	5/2/2018 14:54	5/2/2018 14:57	PIC	TRADC18
C4	13D	3	34409	36991	5/2/2018 14:50	5/2/2018 14:53	PIC	TRADC18
C5	13D	3	33009	37730	5/2/2018 15:18	5/2/2018 15:21	PIC	TRADC18
C6	13D	3	30043	38265	5/2/2018 15:14	5/2/2018 15:17	PIC	TRADC18
C7	13D	3	25245	36703	5/2/2018 15:10	5/2/2018 15:13	PIC	TRADC18
C8	13D	3	23707	37162	5/2/2018 15:06	5/2/2018 15:09	PIC	TRADC18
C1	14A	3	27992	32534	5/2/2018 15:06	5/2/2018 15:09	PIC	TRADC18

C2	14A	3	30926	36952	5/2/2018 15:18	5/2/2018 15:21	PIC	TRADC18
C3	14A	3	29958	35357	5/2/2018 15:14	5/2/2018 15:17	PIC	TRADC18
C4	14A	3	32760	40340	5/2/2018 15:10	5/2/2018 15:13	PIC	TRADC18
C5	14A	3	30682	41374	5/2/2018 14:50	5/2/2018 14:53	PIC	TRADC18
C6	14A	3	28167	41328	5/2/2018 15:02	5/2/2018 15:05	PIC	TRADC18
C7	14A	3	22677	38646	5/2/2018 14:58	5/2/2018 15:01	PIC	TRADC18
C8	14A	3	21447	40022	5/2/2018 14:54	5/2/2018 14:57	PIC	TRADC18
C1	14B	3	28807	30695	5/2/2018 15:10	5/2/2018 15:13	PIC	TRADC18
C2	14B	3	32518	34761	5/2/2018 15:06	5/2/2018 15:09	PIC	TRADC18
C3	14B	3	31031	32788	5/2/2018 15:18	5/2/2018 15:21	PIC	TRADC18
C4	14B	3	33804	37723	5/2/2018 15:15	5/2/2018 15:18	PIC	TRADC18
C5	14B	3	31850	38749	5/2/2018 14:54	5/2/2018 14:57	PIC	TRADC18
C6	14B	3	29079	38817	5/2/2018 14:50	5/2/2018 14:53	PIC	TRADC18
C7	14B	3	23984	36919	5/2/2018 15:02	5/2/2018 15:05	PIC	TRADC18
C8	14B	3	22755	37199	5/2/2018 14:58	5/2/2018 15:01	PIC	TRADC18
C1	14C	3	28417	31464	5/2/2018 15:14	5/2/2018 15:17	PIC	TRADC18
C2	14C	3	31614	35903	5/2/2018 15:10	5/2/2018 15:13	PIC	TRADC18
C3	14C	3	30403	34255	5/2/2018 15:06	5/2/2018 15:09	PIC	TRADC18
C4	14C	3	32531	38995	5/2/2018 15:19	5/2/2018 15:22	PIC	TRADC18
C5	14C	3	31012	39805	5/2/2018 14:58	5/2/2018 15:01	PIC	TRADC18
C6	14C	3	28506	39951	5/2/2018 14:54	5/2/2018 14:57	PIC	TRADC18
C7	14C	3	23297	38196	5/2/2018 14:50	5/2/2018 14:53	PIC	TRADC18
C8	14C	3	22018	38807	5/2/2018 15:02	5/2/2018 15:05	PIC	TRADC18
C1	14D	3	26524	32628	5/2/2018 15:18	5/2/2018 15:21	PIC	TRADC18
C2	14D	3	29905	36736	5/2/2018 15:14	5/2/2018 15:17	PIC	TRADC18
C3	14D	3	28445	35422	5/2/2018 15:10	5/2/2018 15:13	PIC	TRADC18
C4	14D	3	30578	40280	5/2/2018 15:06	5/2/2018 15:09	PIC	TRADC18
C5	14D	3	28900	41317	5/2/2018 15:02	5/2/2018 15:05	PIC	TRADC18
C6	14D	3	26641	41150	5/2/2018 14:58	5/2/2018 15:01	PIC	TRADC18
C7	14D	3	21734	39032	5/2/2018 14:54	5/2/2018 14:57	PIC	TRADC18
C8	14D	3	21497	40825	5/2/2018 14:50	5/2/2018 14:53	PIC	TRADC18
C1	1A	2	18792	19851	5/2/2018 17:26	5/2/2018 17:28	PIC	TRADC18
C2	1A	2	20702	22436	5/2/2018 17:35	5/2/2018 17:37	PIC	TRADC18
C3	1A	2	20092	21108	5/2/2018 17:32	5/2/2018 17:34	PIC	TRADC18
C4	1A	2	21877	24396	5/2/2018 17:29	5/2/2018 17:31	PIC	TRADC18
C5	1A	2	20887	25113	5/2/2018 17:38	5/2/2018 17:40	PIC	TRADC18
C6	1A	2	19127	24864	5/2/2018 17:47	5/2/2018 17:49	PIC	TRADC18
C7	1A	2	15244	23416	5/2/2018 17:44	5/2/2018 17:46	PIC	TRADC18
C8	1A	2	14952	24321	5/2/2018 17:41	5/2/2018 17:43	PIC	TRADC18
C1	1B	2	18852	19928	5/2/2018 17:29	5/2/2018 17:31	PIC	TRADC18
C2	1B	2	21038	22316	5/2/2018 17:26	5/2/2018 17:28	PIC	TRADC18
C3	1B	2	20090	21185	5/2/2018 17:35	5/2/2018 17:37	PIC	TRADC18
C4	1B	2	22184	24441	5/2/2018 17:32	5/2/2018 17:34	PIC	TRADC18
C5	1B	2	20723	24799	5/2/2018 17:41	5/2/2018 17:43	PIC	TRADC18
C6	1B	2	18702	24908	5/2/2018 17:38	5/2/2018 17:40	PIC	TRADC18
C7	1B	2	15554	23742	5/2/2018 17:47	5/2/2018 17:49	PIC	TRADC18
C8	1B	2	14935	24278	5/2/2018 17:44	5/2/2018 17:46	PIC	TRADC18
C1	1C	2	19965	18885	5/2/2018 17:32	5/2/2018 17:34	PIC	TRADC18
C2	1C	2	22372	21519	5/2/2018 17:29	5/2/2018 17:31	PIC	TRADC18
C3	1C	2	21077	20310	5/2/2018 17:26	5/2/2018 17:28	PIC	TRADC18
C4	1C	2	23123	23508	5/2/2018 17:35	5/2/2018 17:37	PIC	TRADC18
C5	1C	2	22244	24124	5/2/2018 17:44	5/2/2018 17:46	PIC	TRADC18
C6	1C	2	20036	24248	5/2/2018 17:41	5/2/2018 17:43	PIC	TRADC18
C7	1C	2	16851	22557	5/2/2018 17:38	5/2/2018 17:40	PIC	TRADC18
C8	1C	2	16176	23385	5/2/2018 17:47	5/2/2018 17:49	PIC	TRADC18
C1	1D	2	19900	19216	5/2/2018 17:34	5/2/2018 17:36	PIC	TRADC18
C2	1D	2	22017	21944	5/2/2018 17:32	5/2/2018 17:34	PIC	TRADC18
C3	1D	2	21223	20578	5/2/2018 17:29	5/2/2018 17:31	PIC	TRADC18
C4	1D	2	23218	23753	5/2/2018 17:26	5/2/2018 17:28	PIC	TRADC18
C5	1D	2	21784	24026	5/2/2018 17:47	5/2/2018 17:49	PIC	TRADC18
C6	1D	2	19655	24388	5/2/2018 17:44	5/2/2018 17:46	PIC	TRADC18

C7	1D	2	16449	22973	5/2/2018 17:41	5/2/2018 17:43	PIC	TRADC18
C8	1D	2	15679	23457	5/2/2018 17:38	5/2/2018 17:40	PIC	TRADC18
C1	2A	2	19010	19459	5/2/2018 17:38	5/2/2018 17:40	PIC	TRADC18
C2	2A	2	21420	21967	5/2/2018 17:47	5/2/2018 17:49	PIC	TRADC18
C3	2A	2	20585	20818	5/2/2018 17:44	5/2/2018 17:46	PIC	TRADC18
C4	2A	2	22430	24057	5/2/2018 17:41	5/2/2018 17:43	PIC	TRADC18
C5	2A	2	21710	24338	5/2/2018 17:26	5/2/2018 17:28	PIC	TRADC18
C6	2A	2	19326	24648	5/2/2018 17:35	5/2/2018 17:37	PIC	TRADC18
C7	2A	2	15805	23203	5/2/2018 17:32	5/2/2018 17:34	PIC	TRADC18
C8	2A	2	15359	24132	5/2/2018 17:29	5/2/2018 17:31	PIC	TRADC18
C1	2B	2	18508	18943	5/2/2018 17:41	5/2/2018 17:43	PIC	TRADC18
C2	2B	2	20801	21823	5/2/2018 17:38	5/2/2018 17:40	PIC	TRADC18
C3	2B	2	20040	21089	5/2/2018 17:47	5/2/2018 17:49	PIC	TRADC18
C4	2B	2	21648	24062	5/2/2018 17:44	5/2/2018 17:46	PIC	TRADC18
C5	2B	2	20777	24802	5/2/2018 17:29	5/2/2018 17:31	PIC	TRADC18
C6	2B	2	18965	24439	5/2/2018 17:26	5/2/2018 17:28	PIC	TRADC18
C7	2B	2	15509	22948	5/2/2018 17:35	5/2/2018 17:37	PIC	TRADC18
C8	2B	2	15170	24095	5/2/2018 17:32	5/2/2018 17:34	PIC	TRADC18
C1	2C	2	19309	18932	5/2/2018 17:44	5/2/2018 17:46	PIC	TRADC18
C2	2C	2	21392	21400	5/2/2018 17:41	5/2/2018 17:43	PIC	TRADC18
C3	2C	2	20416	20389	5/2/2018 17:38	5/2/2018 17:40	PIC	TRADC18
C4	2C	2	22624	23257	5/2/2018 17:47	5/2/2018 17:49	PIC	TRADC18
C5	2C	2	21254	24349	5/2/2018 17:32	5/2/2018 17:34	PIC	TRADC18
C6	2C	2	18886	23929	5/2/2018 17:29	5/2/2018 17:31	PIC	TRADC18
C7	2C	2	15974	22838	5/2/2018 17:26	5/2/2018 17:28	PIC	TRADC18
C8	2C	2	15053	23516	5/2/2018 17:35	5/2/2018 17:37	PIC	TRADC18
C1	2D	2	19272	19032	5/2/2018 17:47	5/2/2018 17:49	PIC	TRADC18
C2	2D	2	21273	21676	5/2/2018 17:44	5/2/2018 17:46	PIC	TRADC18
C3	2D	2	20458	20732	5/2/2018 17:41	5/2/2018 17:43	PIC	TRADC18
C4	2D	2	22354	23369	5/2/2018 17:38	5/2/2018 17:40	PIC	TRADC18
C5	2D	2	21328	24211	5/2/2018 17:35	5/2/2018 17:37	PIC	TRADC18
C6	2D	2	19316	23871	5/2/2018 17:32	5/2/2018 17:34	PIC	TRADC18
C7	2D	2	15743	22536	5/2/2018 17:29	5/2/2018 17:31	PIC	TRADC18
C8	2D	2	15046	23568	5/2/2018 17:26	5/2/2018 17:28	PIC	TRADC18
C1	3B	2	20011	18928	5/2/2018 17:04	5/2/2018 17:06	PIC	TRADC18
C2	3B	2	22060	21563	5/2/2018 17:02	5/2/2018 17:04	PIC	TRADC18
C3	3B	2	21395	20356	5/2/2018 17:11	5/2/2018 17:13	PIC	TRADC18
C4	3B	2	23274	23572	5/2/2018 17:07	5/2/2018 17:09	PIC	TRADC18
C5	3B	2	22091	23996	5/2/2018 17:17	5/2/2018 17:19	PIC	TRADC18
C6	3B	2	20258	24453	5/2/2018 17:14	5/2/2018 17:16	PIC	TRADC18
C7	3B	2	16758	22797	5/2/2018 17:23	5/2/2018 17:25	PIC	TRADC18
C8	3B	2	16156	23806	5/2/2018 17:20	5/2/2018 17:22	PIC	TRADC18
C1	3C	2	19611	19247	5/2/2018 17:07	5/2/2018 17:09	PIC	TRADC18
C2	3C	2	22128	22093	5/2/2018 17:04	5/2/2018 17:06	PIC	TRADC18
C3	3C	2	21262	20888	5/2/2018 17:02	5/2/2018 17:04	PIC	TRADC18
C4	3C	2	23378	24026	5/2/2018 17:11	5/2/2018 17:13	PIC	TRADC18
C5	3C	2	22124	24344	5/2/2018 17:20	5/2/2018 17:22	PIC	TRADC18
C6	3C	2	20067	24674	5/2/2018 17:17	5/2/2018 17:19	PIC	TRADC18
C7	3C	2	17003	23083	5/2/2018 17:14	5/2/2018 17:16	PIC	TRADC18
C8	3C	2	16272	23872	5/2/2018 17:23	5/2/2018 17:25	PIC	TRADC18
C1	3D	2	19092	19078	5/2/2018 17:11	5/2/2018 17:13	PIC	TRADC18
C2	3D	2	21630	21679	5/2/2018 17:07	5/2/2018 17:09	PIC	TRADC18
C3	3D	2	20953	20598	5/2/2018 17:04	5/2/2018 17:06	PIC	TRADC18
C4	3D	2	22763	23422	5/2/2018 17:02	5/2/2018 17:04	PIC	TRADC18
C5	3D	2	21662	24132	5/2/2018 17:23	5/2/2018 17:25	PIC	TRADC18
C6	3D	2	19595	24514	5/2/2018 17:20	5/2/2018 17:22	PIC	TRADC18
C7	3D	2	16041	22948	5/2/2018 17:17	5/2/2018 17:19	PIC	TRADC18
C8	3D	2	15559	23605	5/2/2018 17:14	5/2/2018 17:16	PIC	TRADC18
C1	4A	2	19333	19552	5/2/2018 17:14	5/2/2018 17:16	PIC	TRADC18
C2	4A	2	21583	21976	5/2/2018 17:23	5/2/2018 17:25	PIC	TRADC18
C3	4A	2	20799	20841	5/2/2018 17:20	5/2/2018 17:22	PIC	TRADC18

C4	4A	2	22625	24108	5/2/2018 17:17	5/2/2018 17:19	PIC	TRADC18
C5	4A	2	21350	24562	5/2/2018 17:02	5/2/2018 17:04	PIC	TRADC18
C6	4A	2	19542	24567	5/2/2018 17:11	5/2/2018 17:13	PIC	TRADC18
C7	4A	2	15818	22969	5/2/2018 17:08	5/2/2018 17:10	PIC	TRADC18
C8	4A	2	15497	23863	5/2/2018 17:05	5/2/2018 17:07	PIC	TRADC18
C1	4B	2	16934	21673	5/2/2018 17:17	5/2/2018 17:19	PIC	TRADC18
C2	4B	2	18595	24741	5/2/2018 17:14	5/2/2018 17:16	PIC	TRADC18
C3	4B	2	18505	22920	5/2/2018 17:23	5/2/2018 17:25	PIC	TRADC18
C4	4B	2	19642	27036	5/2/2018 17:20	5/2/2018 17:22	PIC	TRADC18
C5	4B	2	18521	27502	5/2/2018 17:05	5/2/2018 17:07	PIC	TRADC18
C6	4B	2	16633	27585	5/2/2018 17:02	5/2/2018 17:04	PIC	TRADC18
C7	4B	2	13482	25512	5/2/2018 17:11	5/2/2018 17:13	PIC	TRADC18
C8	4B	2	13160	26392	5/2/2018 17:08	5/2/2018 17:10	PIC	TRADC18
C1	4C	2	19344	19143	5/2/2018 17:20	5/2/2018 17:22	PIC	TRADC18
C2	4C	2	21724	21877	5/2/2018 17:17	5/2/2018 17:19	PIC	TRADC18
C3	4C	2	20762	20425	5/2/2018 17:14	5/2/2018 17:16	PIC	TRADC18
C4	4C	2	22743	23891	5/2/2018 17:23	5/2/2018 17:25	PIC	TRADC18
C5	4C	2	21395	24223	5/2/2018 17:08	5/2/2018 17:10	PIC	TRADC18
C6	4C	2	19802	24917	5/2/2018 17:05	5/2/2018 17:07	PIC	TRADC18
C7	4C	2	16476	22779	5/2/2018 17:02	5/2/2018 17:04	PIC	TRADC18
C8	4C	2	15649	23966	5/2/2018 17:11	5/2/2018 17:13	PIC	TRADC18
C1	4D	2	19764	18661	5/2/2018 17:23	5/2/2018 17:25	PIC	TRADC18
C2	4D	2	21971	21418	5/2/2018 17:20	5/2/2018 17:22	PIC	TRADC18
C3	4D	2	20953	20629	5/2/2018 17:17	5/2/2018 17:19	PIC	TRADC18
C4	4D	2	23298	23295	5/2/2018 17:14	5/2/2018 17:16	PIC	TRADC18
C5	4D	2	22127	23960	5/2/2018 17:11	5/2/2018 17:13	PIC	TRADC18
C6	4D	2	20217	24107	5/2/2018 17:08	5/2/2018 17:10	PIC	TRADC18
C7	4D	2	16380	22775	5/2/2018 17:05	5/2/2018 17:07	PIC	TRADC18
C8	4D	2	16201	23300	5/2/2018 17:02	5/2/2018 17:04	PIC	TRADC18
C1	5A	2	20027	19500	5/2/2018 16:36	5/2/2018 16:38	PIC	TRADC18
C2	5A	2	23130	22233	5/2/2018 16:46	5/2/2018 16:48	PIC	TRADC18
C3	5A	2	22137	21321	5/2/2018 16:43	5/2/2018 16:45	PIC	TRADC18
C4	5A	2	24034	24121	5/2/2018 16:40	5/2/2018 16:42	PIC	TRADC18
C5	5A	2	22440	24709	5/2/2018 16:49	5/2/2018 16:51	PIC	TRADC18
C6	5A	2	20684	25183	5/2/2018 16:58	5/2/2018 17:00	PIC	TRADC18
C7	5A	2	17309	23386	5/2/2018 16:55	5/2/2018 16:57	PIC	TRADC18
C8	5A	2	16517	24125	5/2/2018 16:52	5/2/2018 16:54	PIC	TRADC18
C1	5B	2	19726	19779	5/2/2018 16:40	5/2/2018 16:42	PIC	TRADC18
C2	5B	2	22065	22492	5/2/2018 16:36	5/2/2018 16:38	PIC	TRADC18
C2	5B	2	21224	21301	5/2/2018 16:46	5/2/2018 16:48	PIC	TRADC18
C4	5B	2	23357	24049	5/2/2018 16:43	5/2/2018 16:45	PIC	TRADC18
C5	5B	2	22164	24950	5/2/2018 16:52	5/2/2018 16:54	PIC	TRADC18
C6	5B	2	20348	25229	5/2/2018 16:49	5/2/2018 16:51	PIC	TRADC18
C7	5B	2	16877	23679	5/2/2018 16:58	5/2/2018 17:00	PIC	TRADC18
C8	5B	2	16225	24214	5/2/2018 16:55	5/2/2018 16:57	PIC	TRADC18
C1	5C	2	20005	19793	5/2/2018 16:43	5/2/2018 16:45	PIC	TRADC18
C2	5C	2	22364	22672	5/2/2018 16:40	5/2/2018 16:42	PIC	TRADC18
C3	5C	2	21536	21455	5/2/2018 16:36	5/2/2018 16:38	PIC	TRADC18
C3	5C	2	23458	24674	5/2/2018 16:46	5/2/2018 16:48	PIC	TRADC18
C5	5C	2	22189	24907	5/2/2018 16:55	5/2/2018 16:57	PIC	TRADC18
C6	5C	2	20136	24749	5/2/2018 16:52	5/2/2018 16:54	PIC	TRADC18
C7	5C	2	16939	23976	5/2/2018 16:49	5/2/2018 16:51	PIC	TRADC18
C8	5C	2	16107	24391	5/2/2018 16:58	5/2/2018 17:00	PIC	TRADC18
C1	5D	2	20249	19359	5/2/2018 16:46	5/2/2018 16:48	PIC	TRADC18
C2	5D	2	22381	22449	5/2/2018 16:43	5/2/2018 16:45	PIC	TRADC18
C3	5D	2	21579	21299	5/2/2018 16:40	5/2/2018 16:42	PIC	TRADC18
C4	5D	2	23338	24107	5/2/2018 16:36	5/2/2018 16:38	PIC	TRADC18
C5	5D	2	22765	24876	5/2/2018 16:58	5/2/2018 17:00	PIC	TRADC18
C6	5D	2	20655	24984	5/2/2018 16:55	5/2/2018 16:57	PIC	TRADC18
C7	5D	2	17017	23405	5/2/2018 16:52	5/2/2018 16:54	PIC	TRADC18
C8	5D	2	16331	24431	5/2/2018 16:49	5/2/2018 16:51	PIC	TRADC18

C1	6A	2	17097	20218	5/2/2018 16:51	5/2/2018 16:53	PIC	TRADC18
C2	6A	2	18941	23262	5/2/2018 17:01	5/2/2018 17:03	PIC	TRADC18
C3	6A	2	18075	21738	5/2/2018 16:57	5/2/2018 16:59	PIC	TRADC18
C4	6A	2	19884	24521	5/2/2018 16:54	5/2/2018 16:56	PIC	TRADC18
C5	6A	2	18506	25359	5/2/2018 16:38	5/2/2018 16:40	PIC	TRADC18
C6	6A	2	16985	24976	5/2/2018 16:48	5/2/2018 16:50	PIC	TRADC18
C7	6A	2	14130	22962	5/2/2018 16:45	5/2/2018 16:47	PIC	TRADC18
C8	6A	2	13287	23963	5/2/2018 16:42	5/2/2018 16:44	PIC	TRADC18
C1	6B	2	18124	19049	5/2/2018 16:54	5/2/2018 16:56	PIC	TRADC18
C2	6B	2	20133	21524	5/2/2018 16:51	5/2/2018 16:53	PIC	TRADC18
C3	6B	2	19429	19971	5/2/2018 17:01	5/2/2018 17:03	PIC	TRADC18
C4	6B	2	21660	23161	5/2/2018 16:57	5/2/2018 16:59	PIC	TRADC18
C5	6B	2	20075	23726	5/2/2018 16:42	5/2/2018 16:44	PIC	TRADC18
C6	6B	2	18092	24268	5/2/2018 16:38	5/2/2018 16:40	PIC	TRADC18
C7	6B	2	15355	22088	5/2/2018 16:48	5/2/2018 16:50	PIC	TRADC18
C8	6B	2	14213	22648	5/2/2018 16:45	5/2/2018 16:47	PIC	TRADC18
C1	6C	2	19160	19279	5/2/2018 16:57	5/2/2018 16:59	PIC	TRADC18
C2	6C	2	21414	21719	5/2/2018 16:54	5/2/2018 16:56	PIC	TRADC18
C3	6C	2	20581	20909	5/2/2018 16:51	5/2/2018 16:53	PIC	TRADC18
C4	6C	2	22483	23575	5/2/2018 17:01	5/2/2018 17:03	PIC	TRADC18
C5	6C	2	20946	24370	5/2/2018 16:45	5/2/2018 16:47	PIC	TRADC18
C6	6C	2	19010	24438	5/2/2018 16:42	5/2/2018 16:44	PIC	TRADC18
C7	6C	2	15704	22772	5/2/2018 16:38	5/2/2018 16:40	PIC	TRADC18
C8	6C	2	15091	23904	5/2/2018 16:48	5/2/2018 16:50	PIC	TRADC18
C1	7A	2	19270	19896	5/2/2018 16:13	5/2/2018 16:15	PIC	TRADC18
C2	7A	2	21647	22303	5/2/2018 16:23	5/2/2018 16:25	PIC	TRADC18
C3	7A	2	21012	21442	5/2/2018 16:19	5/2/2018 16:21	PIC	TRADC18
C4	7A	2	22423	24501	5/2/2018 16:16	5/2/2018 16:18	PIC	TRADC18
C5	7A	2	21585	25324	5/2/2018 16:26	5/2/2018 16:28	PIC	TRADC18
C6	7A	2	19378	25241	5/2/2018 16:35	5/2/2018 16:37	PIC	TRADC18
C7	7A	2	16044	23661	5/2/2018 16:32	5/2/2018 16:34	PIC	TRADC18
C8	7A	2	15163	24376	5/2/2018 16:29	5/2/2018 16:31	PIC	TRADC18
C1	7B	2	19541	19664	5/2/2018 16:16	5/2/2018 16:18	PIC	TRADC18
C2	7B	2	21884	22515	5/2/2018 16:13	5/2/2018 16:15	PIC	TRADC18
C3	7B	2	22310	21982	5/2/2018 16:23	5/2/2018 16:25	PIC	TRADC18
C4	7B	2	22939	24130	5/2/2018 16:19	5/2/2018 16:21	PIC	TRADC18
C5	7B	2	21880	24844	5/2/2018 16:29	5/2/2018 16:31	PIC	TRADC18
C6	7B	2	19407	24962	5/2/2018 16:26	5/2/2018 16:28	PIC	TRADC18
C7	7B	2	16209	23063	5/2/2018 16:35	5/2/2018 16:37	PIC	TRADC18
C8	7B	2	15500	24016	5/2/2018 16:32	5/2/2018 16:34	PIC	TRADC18
C1	7C	2	18963	19783	5/2/2018 16:19	5/2/2018 16:21	PIC	TRADC18
C2	7C	2	20691	22317	5/2/2018 16:16	5/2/2018 16:18	PIC	TRADC18
C3	7C	2	20122	21372	5/2/2018 16:13	5/2/2018 16:15	PIC	TRADC18
C4	7C	2	21599	24157	5/2/2018 16:23	5/2/2018 16:25	PIC	TRADC18
C5	7C	2	20593	25081	5/2/2018 16:32	5/2/2018 16:34	PIC	TRADC18
C6	7C	2	18751	24919	5/2/2018 16:29	5/2/2018 16:31	PIC	TRADC18
C7	7C	2	15507	22957	5/2/2018 16:26	5/2/2018 16:28	PIC	TRADC18
C8	7C	2	14955	23837	5/2/2018 16:35	5/2/2018 16:37	PIC	TRADC18
C1	7D	2	19339	19582	5/2/2018 16:23	5/2/2018 16:25	PIC	TRADC18
C2	7D	2	21173	21966	5/2/2018 16:19	5/2/2018 16:21	PIC	TRADC18
C3	7D	2	20296	21006	5/2/2018 16:16	5/2/2018 16:18	PIC	TRADC18
C4	7D	2	22483	24000	5/2/2018 16:13	5/2/2018 16:15	PIC	TRADC18
C5	7D	2	21204	24829	5/2/2018 16:35	5/2/2018 16:37	PIC	TRADC18
C6	7D	2	18938	24698	5/2/2018 16:32	5/2/2018 16:34	PIC	TRADC18
C7	7D	2	15523	22889	5/2/2018 16:29	5/2/2018 16:31	PIC	TRADC18
C8	7D	2	15027	23927	5/2/2018 16:26	5/2/2018 16:28	PIC	TRADC18
C1	8A	2	19789	19857	5/2/2018 16:26	5/2/2018 16:28	PIC	TRADC18
C2	8A	2	22042	22451	5/2/2018 16:35	5/2/2018 16:37	PIC	TRADC18
C3	8A	2	21426	21422	5/2/2018 16:32	5/2/2018 16:34	PIC	TRADC18
C4	8A	2	22930	24358	5/2/2018 16:29	5/2/2018 16:31	PIC	TRADC18
C5	8A	2	21767	25121	5/2/2018 16:13	5/2/2018 16:15	PIC	TRADC18

C6	8A	2	19644	25177	5/2/2018 16:23	5/2/2018 16:25	PIC	TRADC18
C7	8A	2	16333	23605	5/2/2018 16:19	5/2/2018 16:21	PIC	TRADC18
C8	8A	2	15552	24544	5/2/2018 16:17	5/2/2018 16:19	PIC	TRADC18
C1	8B	2	20013	20041	5/2/2018 16:29	5/2/2018 16:31	PIC	TRADC18
C2	8B	2	22182	23132	5/2/2018 16:26	5/2/2018 16:28	PIC	TRADC18
C3	8B	2	21044	21490	5/2/2018 16:36	5/2/2018 16:38	PIC	TRADC18
C4	8B	2	23078	24671	5/2/2018 16:32	5/2/2018 16:34	PIC	TRADC18
C5	8B	2	21613	25282	5/2/2018 16:16	5/2/2018 16:18	PIC	TRADC18
C6	8B	2	19450	25276	5/2/2018 16:13	5/2/2018 16:15	PIC	TRADC18
C7	8B	2	16307	23823	5/2/2018 16:23	5/2/2018 16:25	PIC	TRADC18
C8	8B	2	15618	24597	5/2/2018 16:20	5/2/2018 16:22	PIC	TRADC18
C1	8C	2	19597	19953	5/2/2018 16:32	5/2/2018 16:34	PIC	TRADC18
C2	8C	2	22147	22784	5/2/2018 16:29	5/2/2018 16:31	PIC	TRADC18
C3	8C	2	21497	21322	5/2/2018 16:26	5/2/2018 16:28	PIC	TRADC18
C4	8C	2	23302	24341	5/2/2018 16:36	5/2/2018 16:38	PIC	TRADC18
C5	8C	2	21932	25189	5/2/2018 16:19	5/2/2018 16:21	PIC	TRADC18
C6	8C	2	19541	25181	5/2/2018 16:16	5/2/2018 16:18	PIC	TRADC18
C7	8C	2	16404	23533	5/2/2018 16:13	5/2/2018 16:15	PIC	TRADC18
C8	8C	2	15592	24121	5/2/2018 16:23	5/2/2018 16:25	PIC	TRADC18
C1	8D	2	20078	19164	5/2/2018 16:35	5/2/2018 16:37	PIC	TRADC18
C2	8D	2	22413	22152	5/2/2018 16:32	5/2/2018 16:34	PIC	TRADC18
C3	8D	2	21792	20993	5/2/2018 16:29	5/2/2018 16:31	PIC	TRADC18
C4	8D	2	23380	24133	5/2/2018 16:26	5/2/2018 16:28	PIC	TRADC18
C5	8D	2	22402	24687	5/2/2018 16:23	5/2/2018 16:25	PIC	TRADC18
C6	8D	2	20153	24891	5/2/2018 16:19	5/2/2018 16:21	PIC	TRADC18
C7	8D	2	16832	23205	5/2/2018 16:16	5/2/2018 16:18	PIC	TRADC18
C8	8D	2	16087	24172	5/2/2018 16:13	5/2/2018 16:15	PIC	TRADC18
C1	9A	2	19175	19871	5/2/2018 15:49	5/2/2018 15:51	PIC	TRADC18
C2	9A	2	21493	23022	5/2/2018 15:58	5/2/2018 16:00	PIC	TRADC18
C3	9A	2	20679	21756	5/2/2018 15:55	5/2/2018 15:57	PIC	TRADC18
C4	9A	2	22266	24682	5/2/2018 15:52	5/2/2018 15:54	PIC	TRADC18
C5	9A	2	21206	25459	5/2/2018 16:01	5/2/2018 16:03	PIC	TRADC18
C6	9A	2	19057	25344	5/2/2018 16:10	5/2/2018 16:12	PIC	TRADC18
C7	9A	2	15675	24031	5/2/2018 16:07	5/2/2018 16:09	PIC	TRADC18
C8	9A	2	15193	24421	5/2/2018 16:04	5/2/2018 16:06	PIC	TRADC18
C1	9B	2	19702	19359	5/2/2018 15:52	5/2/2018 15:54	PIC	TRADC18
C2	9B	2	22292	22137	5/2/2018 15:49	5/2/2018 15:51	PIC	TRADC18
C3	9B	2	21325	20945	5/2/2018 15:58	5/2/2018 16:00	PIC	TRADC18
C4	9B	2	23023	23915	5/2/2018 15:55	5/2/2018 15:57	PIC	TRADC18
C5	9B	2	21954	24597	5/2/2018 16:04	5/2/2018 16:06	PIC	TRADC18
C6	9B	2	19770	25036	5/2/2018 16:01	5/2/2018 16:03	PIC	TRADC18
C7	9B	2	16698	23451	5/2/2018 16:10	5/2/2018 16:12	PIC	TRADC18
C8	9B	2	15699	24150	5/2/2018 16:07	5/2/2018 16:09	PIC	TRADC18
C1	9C	2	19317	19172	5/2/2018 15:55	5/2/2018 15:57	PIC	TRADC18
C2	9C	2	21681	22082	5/2/2018 15:52	5/2/2018 15:54	PIC	TRADC18
C3	9C	2	21052	20878	5/2/2018 15:49	5/2/2018 15:51	PIC	TRADC18
C4	9C	2	22588	24078	5/2/2018 15:58	5/2/2018 16:00	PIC	TRADC18
C5	9C	2	21443	24609	5/2/2018 16:07	5/2/2018 16:09	PIC	TRADC18
C6	9C	2	19472	24865	5/2/2018 16:04	5/2/2018 16:06	PIC	TRADC18
C7	9C	2	15944	23530	5/2/2018 16:01	5/2/2018 16:03	PIC	TRADC18
C8	9C	2	15246	24015	5/2/2018 16:10	5/2/2018 16:12	PIC	TRADC18
C1	9D	2	19334	19310	5/2/2018 15:58	5/2/2018 16:00	PIC	TRADC18
C2	9D	2	21673	22079	5/2/2018 15:55	5/2/2018 15:57	PIC	TRADC18
C3	9D	2	20825	20998	5/2/2018 15:52	5/2/2018 15:54	PIC	TRADC18
C4	9D	2	22626	24093	5/2/2018 15:49	5/2/2018 15:51	PIC	TRADC18
C5	9D	2	21022	24815	5/2/2018 16:10	5/2/2018 16:12	PIC	TRADC18
C6	9D	2	19367	24651	5/2/2018 16:07	5/2/2018 16:09	PIC	TRADC18
C7	9D	2	15785	23366	5/2/2018 16:04	5/2/2018 16:06	PIC	TRADC18
C8	9D	2	15016	23684	5/2/2018 16:01	5/2/2018 16:03	PIC	TRADC18

Total Radium Liquid

Filename : TOTRA.XLS
File type : Excel
Version # : 1.3.9

Batch : 1562969
Analyst : NXL1
Prep Date : 4/11/2018
Method Uncertainty: 0.0829

Geometry: Tuffryn Filter

Carrier S/N : 2628181
Carrier Exp Date : 12/7/2018
Carrier Volume Added: 0.50
Carrier Weight (mg/ml): 26.48
Carrier Weight StDev.: 0.10

Procedure Code : GFCGANBL
Parmname : Total Radium
Required MDA : 1 pCi/L
Halflife of Rn-222 : 3.8235 days

Sample Characteristics					Carrier Calculations				
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Sample Date/Time	Carrier Weight (mg) (Standard)	Residue Weight (mg) (Sample)	Residue Weight StDev. (mg)	Carrier Aliquot (mL)	Carrier Aliquot StDev. (mL)
1	1203536991.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
2	1203536992.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	10.30	0.051599	0.5	0.001000
3	1203536993.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	19.40	0.090711	0.8	0.000200
4	1203536994.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	25.10	0.115210	1.0	0.002000
5	1203536995.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	39.20	0.175812	1.5	0.000200
6	1203536996.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	50.90	0.226098	2.0	0.000200
7	1203536997.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	66.50	0.293147	2.5	0.000200
8	1203536998.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
~~9~~	~~1203536999.1~~	~~1.0000~~	~~2.0399E-05~~	~~4/11/2018 0:00~~	~~26.48~~	~~8.00~~	~~0.041714~~	~~0.4~~	~~0.000200~~
10	1203537000.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	10.30	0.051599	0.5	0.001000
11	1203537001.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	19.40	0.090711	0.8	0.000200
12	1203537002.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	25.10	0.115210	1.0	0.002000
13	1203537003.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	39.20	0.175812	1.5	0.000200
14	1203537004.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	50.90	0.226098	2.0	0.000200
15	1203537005.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	66.50	0.293147	2.5	0.000200
16	1203537006.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
17	1203537007.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
18	1203537008.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	10.30	0.051599	0.5	0.001000
19	1203537009.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	19.40	0.090711	0.8	0.000200
20	1203537010.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	25.10	0.115210	1.0	0.002000
21	1203537011.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	39.20	0.175812	1.5	0.000200
22	1203537012.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	50.90	0.226098	2.0	0.000200
23	1203537013.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	66.50	0.293147	2.5	0.000200
~~24~~	~~1203537014.1~~	~~1.0000~~	~~2.0399E-05~~	~~4/11/2018 0:00~~	~~26.48~~	~~94.10~~	~~0.411772~~	~~3.5~~	~~0.000200~~
25	1203537015.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
26	1203537016.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	10.30	0.051599	0.5	0.001000
27	1203537017.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	19.40	0.090711	0.8	0.000200
28	1203537018.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	25.10	0.115210	1.0	0.002000
29	1203537019.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	39.20	0.175812	1.5	0.000200
30	1203537020.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	50.90	0.226098	2.0	0.000200
31	1203537021.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	66.50	0.293147	2.5	0.000200
32	1203537022.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
33	1203537023.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
34	1203537024.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	10.30	0.051599	0.5	0.001000
35	1203537025.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	19.40	0.090711	0.8	0.000200
36	1203537026.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	25.10	0.115210	1.0	0.002000
37	1203537027.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	39.20	0.175812	1.5	0.000200
38	1203537028.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	50.90	0.226098	2.0	0.000200
39	1203537029.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	66.50	0.293147	2.5	0.000200
40	1203537030.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200

Pipet, 0.1 ml Stdev : +/-	0.000200	ml
Pipet, 0.5 ml Stdev : +/-	0.001000	ml
Pipet, 1 ml Stdev : +/-	0.002000	ml
Pipet, 5 ml Stdev : +/-	0.010000	ml

Analytical SOP: GL-RAD-A-001
Instrument SOP: GL-RAD-I-016

Count Raw Data

Pos.	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Gross Alpha CPM	Count Start Date/Time	Precipitation Date/Time	Ingrowth factor	Calculated Sample Recovery %	Sample Recovery Error %
1	1A	2	2699	2974	1349.500	5/17/2019 13:40	4/11/2018 14:40	4.000	75.5%	0.83%
2	1B	2	2662	2819	1331.000	5/17/2019 13:40	4/11/2018 14:40	4.000	77.8%	0.83%
3	1C	2	3050	2966	1525.000	5/17/2019 13:40	4/11/2018 14:40	4.000	91.6%	0.76%
4	1D	2	2862	3087	1431.000	5/17/2019 13:40	4/11/2018 14:40	4.000	94.8%	0.78%
5	2A	2	2629	3074	1314.500	5/17/2019 13:41	4/11/2018 14:40	4.000	98.7%	0.74%
6	2B	2	2458	3012	1229.000	5/17/2019 13:41	4/11/2018 14:40	4.000	96.1%	0.73%
7	2C	2	2352	3113	1176.000	5/17/2019 13:41	4/11/2018 14:40	4.000	100%	0.73%
8	2D	2	2811	2701	1405.500	5/21/2019 11:41	4/11/2018 14:40	4.000	75.5%	0.83%
~~9~~	~~3A~~	~~2~~	~~0~~	~~0~~	~~0.000~~	~~5/17/2019 13:41~~	~~4/11/2018 14:40~~	~~4.000~~	~~75.5%~~	~~0.83%~~
10	3B	2	2781	2689	1390.500	5/17/2019 13:43	4/11/2018 14:40	4.000	77.8%	0.83%
11	3C	2	3085	3025	1542.500	5/17/2019 13:43	4/11/2018 14:40	4.000	91.6%	0.76%
12	3D	2	2908	3153	1454.000	5/17/2019 13:43	4/11/2018 14:40	4.000	94.8%	0.78%
13	4A	2	2569	3123	1284.500	5/17/2019 13:43	4/11/2018 14:40	4.000	98.7%	0.74%
14	4B	2	2111	3162	1055.500	5/17/2019 13:43	4/11/2018 14:40	4.000	96.1%	0.73%
15	4C	2	2430	2997	1215.000	5/17/2019 13:43	4/11/2018 14:40	4.000	100%	0.73%
16	4D	2	2805	2834	1402.500	5/21/2019 11:44	4/11/2018 14:40	4.000	75.5%	0.83%
17	5A	2	2982	2956	1491.000	5/17/2019 13:46	4/11/2018 14:40	4.000	75.5%	0.83%
18	5B	2	2776	2912	1388.000	5/17/2019 13:46	4/11/2018 14:40	4.000	77.8%	0.83%
19	5C	2	2962	2985	1481.000	5/17/2019 13:46	4/11/2018 14:40	4.000	91.6%	0.76%
20	5D	2	2962	3073	1481.000	5/17/2019 13:46	4/11/2018 14:40	4.000	94.8%	0.78%
21	6A	2	2270	3107	1135.000	5/17/2019 13:50	4/11/2018 14:40	4.000	98.7%	0.74%
22	6B	2	2246	3017	1123.000	5/17/2019 13:50	4/11/2018 14:40	4.000	96.1%	0.73%
23	6C	2	2305	3056	1152.500	5/17/2019 13:50	4/11/2018 14:40	4.000	100%	0.73%
~~24~~	~~6D~~	~~2~~	~~0~~	~~0~~	~~0.000~~	~~5/17/2019 13:50~~	~~4/11/2018 14:40~~	~~4.000~~	~~102%~~	~~0.72%~~
25	7A	2	2807	3011	1403.500	5/17/2019 13:52	4/11/2018 14:40	4.000	75.5%	0.83%
26	7B	2	2553	2685	1276.500	5/17/2019 13:52	4/11/2018 14:40	4.000	77.8%	0.83%
27	7C	2	2676	3164	1338.000	5/17/2019 13:52	4/11/2018 14:40	4.000	91.6%	0.76%
28	7D	2	2806	3189	1403.000	5/17/2019 13:52	4/11/2018 14:40	4.000	94.8%	0.78%
29	8A	2	2688	3032	1344.000	5/17/2019 13:52	4/11/2018 14:40	4.000	98.7%	0.74%
30	8B	2	2373	3090	1186.500	5/17/2019 13:52	4/11/2018 14:40	4.000	96.1%	0.73%
31	8C	2	2430	3048	1215.000	5/17/2019 13:52	4/11/2018 14:40	4.000	100%	0.73%
32	8D	2	2847	2926	1423.500	5/21/2019 11:52	4/11/2018 14:40	4.000	75.5%	0.83%
33	9A	2	2808	3176	1404.000	5/17/2019 13:55	4/11/2018 14:40	4.000	75.5%	0.83%
34	9B	2	2746	2837	1373.000	5/17/2019 13:55	4/11/2018 14:40	4.000	77.8%	0.83%
35	9C	2	2963	3045	1481.500	5/17/2019 13:55	4/11/2018 14:40	4.000	91.6%	0.76%
36	9D	2	2844	3025	1422.000	5/17/2019 13:55	4/11/2018 14:40	4.000	94.8%	0.78%
37	10A	2	2537	3259	1268.500	5/17/2019 13:55	4/11/2018 14:40	4.000	98.7%	0.74%
38	10B	2	2409	3010	1204.500	5/17/2019 13:55	4/11/2018 14:40	4.000	96.1%	0.73%
39	10C	2	2267	3350	1133.500	5/17/2019 13:55	4/11/2018 14:40	4.000	100%	0.73%
40	10D	2	2608	3042	1304.000	5/21/2019 11:56	4/11/2018 14:40	4.000	75.5%	0.83%

Calibration Data

Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Beta X-Talk	Weekly Bkg CPM	Weekly Bkg Count Start Date/Time	Weekly Bkg Count Time (min.)
PIC	5/1/2018	5/31/2019	0.3730	0.00667	0.00088	0.158	5/10/2019 18:02	500
PIC	5/1/2018	5/31/2019	0.3683	0.01356	0.00072	0.126	5/10/2019 18:03	500
PIC	5/1/2018	5/31/2019	0.3569	0.00967	0.00997	0.074	5/10/2019 18:03	500
PIC	5/1/2018	5/31/2019	0.3361	0.00996	0.00630	0.194	5/10/2019 18:03	500
PIC	5/1/2018	5/31/2019	0.2898	0.01946	0.00273	0.170	5/10/2019 18:03	500
PIC	5/1/2018	5/31/2019	0.2548	0.02011	0.00064	0.112	5/10/2019 18:03	500
PIC	5/1/2018	5/31/2019	0.2292	0.01156	0.00022	0.174	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.3821	0.01278	0.00091	0.468	5/18/2019 10:08	500
~~PIC~~	~~5/1/2018~~	~~5/31/2019~~	~~0.0000~~	~~0.02940~~	~~0.00000~~	~~FAIL~~	~~12:00:00 AM~~	~~0~~
PIC	5/1/2018	5/31/2019	0.3889	0.00853	0.00922	0.194	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.3557	0.00568	0.00412	0.236	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.3308	0.00657	0.00423	0.182	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.2896	0.01036	0.00116	0.166	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.2251	0.00704	0.00014	0.110	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.2371	0.01587	0.00288	0.216	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.3930	0.00613	0.01246	0.196	5/17/2019 16:08	500
PIC	5/1/2018	5/31/2019	0.4069	0.00491	0.00232	0.200	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.3804	0.01152	0.00269	0.088	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.3679	0.01161	0.00179	0.156	5/10/2019 18:05	500
PIC	5/1/2018	5/31/2019	0.3446	0.00639	0.00150	0.092	5/10/2019 18:05	500
PIC	5/1/2018	5/31/2019	0.2527	0.02108	0.00021	0.112	5/10/2019 18:03	500
PIC	5/1/2018	5/31/2019	0.2476	0.01195	0.00017	0.176	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.2279	0.01553	0.00029	0.126	5/10/2019 18:04	500
~~PIC~~	~~5/1/2018~~	~~5/31/2019~~	~~0.0000~~	~~0.01442~~	~~0.00000~~	~~FAIL~~	~~12:00:00 AM~~	~~0~~
PIC	5/1/2018	5/31/2019	0.3864	0.00525	0.00083	0.070	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.3883	0.00479	0.00080	0.038	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.3352	0.00790	0.00043	0.078	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.3246	0.00619	0.00039	0.070	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.2945	0.01473	0.00030	0.090	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.2632	0.01664	0.00036	0.048	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.2377	0.01321	0.00205	0.170	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.4017	0.00794	0.00319	0.182	5/17/2019 16:13	500
PIC	5/1/2018	5/31/2019	0.3841	0.00726	0.00102	0.130	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.3871	0.00633	0.00124	0.040	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.3484	0.01265	0.00160	0.130	5/10/2019 18:04	500
PIC	5/1/2018	5/31/2019	0.3285	0.02427	0.00202	0.134	5/10/2019 18:05	500
PIC	5/1/2018	5/31/2019	0.2762	0.01461	0.00021	0.118	5/10/2019 18:05	500
PIC	5/1/2018	5/31/2019	0.2595	0.00844	0.00041	0.076	5/10/2019 18:05	500
PIC	5/1/2018	5/31/2019	0.2212	0.00710	0.00035	0.088	5/10/2019 18:05	500
PIC	5/1/2018	5/31/2019	0.3620	0.00583	0.00024	0.144	5/17/2019 16:14	500

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

Spike S/N : N/A
Spike Exp Date : N/A
Spike Activity (dpm/ml): N/A
Spike Volume Added: N/A

LCS S/N : 0299-H
LCS Exp Date : 12/4/2019
LCS Activity (dpm/ml): 2463.58
LCS Volume Added: 0.50

Results

Pos.	Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error %	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA Counting Uncertainty pCi/L	2 SIGMA Total Prop. Uncertainty pCi/L	Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
1	0.2623	0.1852	1	0.9699	**538.8269**	2.20%	1349.3420	25.9760	20.3506	90.6694		LCS			554.8607	97.1%
2	0.2303	0.1626	1	0.9149	**522.7361**	2.51%	1330.8740	25.7973	19.8750	88.7999		LCS			554.8607	94.2%
3	0.1547	0.1092	1	0.7353	**520.3382**	2.19%	1524.9260	27.6134	18.6485	88.3019		LCS			554.8607	93.8%
4	0.2570	0.1815	1	0.8931	**502.3178**	2.26%	1430.8060	26.7488	18.5319	85.1659		LCS			554.8607	90.5%
5	0.2680	0.1892	1	0.9689	**515.7815**	2.85%	1314.3300	25.6369	19.7820	88.9130		LCS			554.8607	93.0%
6	0.2541	0.1794	1	1.0485	**564.6777**	2.94%	1228.8880	24.7891	22.3433	97.4320		LCS			554.8607	101.8%
7	0.3368	0.2378	1	1.2092	**574.9164**	2.47%	1175.8260	24.2487	23.2453	97.5151		LCS			554.8607	103.6%
8	0.4407	0.3111	1	1.2075	**547.7376**	2.43%	1405.0320	26.5094	20.2732	92.8092		LCS			554.8607	98.7%
~~9~~	~~#DIV/0!~~	~~#DIV/0!~~	~~1~~	~~#DIV/0!~~	~~**#VALUE!**~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~		~~LCS~~			~~554.8607~~	~~#VALUE!~~
10	0.2706	0.1911	1	0.9404	**512.8462**	2.24%	1390.3060	26.3676	19.2350	87.0886		LCS			554.8607	92.4%
11	0.2773	0.1958	1	0.9101	**531.0702**	2.04%	1542.2640	27.7714	18.8195	89.2161		LCS			554.8607	95.7%
12	0.2530	0.1786	1	0.8960	**519.8070**	2.12%	1453.8180	26.9629	18.9824	87.5684		LCS			554.8607	93.7%
13	0.2650	0.1871	1	0.9653	**505.3832**	2.35%	1284.3340	25.3427	19.5732	85.4663		LCS			554.8607	91.1%
14	0.2850	0.2012	1	1.1833	**549.2890**	2.40%	1055.3900	22.9728	23.4394	92.9414		LCS			554.8607	99.0%
15	0.3627	0.2561	1	1.2214	**572.2984**	2.68%	1214.7840	24.6475	22.8401	98.0665		LCS			554.8607	103.1%
16	0.2773	0.1957	1	0.9605	**525.2639**	2.15%	1402.3040	26.4811	19.6894	89.3004		LCS			554.8607	94.7%
17	0.2705	0.1910	1	0.9315	**544.9632**	2.07%	1490.8000	27.3039	19.6078	91.4766		LCS			554.8607	98.2%
18	0.1864	0.1316	1	0.8339	**526.6501**	2.37%	1387.9120	26.3439	19.6483	89.2509		LCS			554.8607	94.9%
19	0.2180	0.1539	1	0.8092	**494.1327**	2.30%	1480.8440	27.2121	17.8294	83.4806		LCS			554.8607	89.1%
20	0.1726	0.1219	1	0.7610	**509.8155**	2.09%	1480.9080	27.2121	18.3899	85.5736		LCS			554.8607	91.9%
21	0.2494	0.1761	1	1.0294	**512.2218**	3.07%	1134.8880	23.8223	21.0800	88.7607		LCS			554.8607	92.3%
22	0.3277	0.2314	1	1.1724	**531.1494**	2.53%	1122.8240	23.6960	21.9753	90.2647		LCS			554.8607	95.7%
23	0.2882	0.2035	1	1.1448	**566.6048**	2.70%	1152.3740	24.0052	23.1427	96.8563		LCS			554.8607	102.1%
~~24~~	~~#DIV/0!~~	~~#DIV/0!~~	~~1~~	~~#DIV/0!~~	~~**#VALUE!**~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~		~~LCS~~			~~554.8607~~	~~#VALUE!~~
25	0.1685	0.1190	1	0.8168	**541.0474**	2.13%	1403.4300	26.4906	20.0344	90.8413		LCS			554.8607	97.5%
26	0.1200	0.0847	1	0.7286	**475.4695**	2.20%	1276.4620	25.2636	18.4600	79.9930		LCS			554.8607	85.7%
27	0.1691	0.1194	1	0.7890	**490.5339**	2.22%	1337.9220	25.8650	18.5963	82.5618		LCS			554.8607	88.4%
28	0.1599	0.1129	1	0.7748	**513.2842**	2.13%	1402.9300	26.4858	19.0013	86.1559		LCS			554.8607	92.5%
29	0.1919	0.1355	1	0.8522	**520.5758**	2.54%	1343.9100	25.9230	19.6880	88.4872		LCS			554.8607	93.8%
30	0.1610	0.1137	1	0.8950	**527.8445**	2.74%	1186.4520	24.3567	21.2489	90.3807		LCS			554.8607	95.1%
31	0.3211	0.2267	1	1.1609	**571.5521**	2.53%	1214.8300	24.6475	22.7872	97.3417		LCS			554.8607	103.0%
32	0.2614	0.1845	1	0.9258	**526.5195**	2.20%	1423.3180	26.6786	19.4069	88.7987		LCS			554.8607	94.9%
33	0.2311	0.1631	1	0.9085	**544.3205**	2.19%	1403.8700	26.4953	20.1584	91.5720		LCS			554.8607	98.1%
34	0.1235	0.0872	1	0.7354	**512.8221**	2.17%	1372.9600	26.2011	19.2063	86.2545		LCS			554.8607	92.4%
35	0.2101	0.1483	1	0.8260	**521.9732**	2.36%	1481.3700	27.2167	18.8275	88.3189		LCS			554.8607	94.1%
36	0.2186	0.1543	1	0.8511	**513.1434**	3.16%	1421.8660	26.6646	18.9018	89.4354		LCS			554.8607	92.5%
37	0.2343	0.1654	1	0.9506	**523.9042**	2.57%	1268.3820	25.1843	20.3942	89.1580		LCS			554.8607	94.4%
38	0.2055	0.1451	1	0.9674	**543.5205**	2.32%	1204.4240	24.5408	21.7171	91.7650		LCS			554.8607	98.0%
39	0.2482	0.1752	1	1.1106	**574.0904**	2.33%	1133.4120	23.8065	23.6468	96.9577		LCS			554.8607	103.5%
40	0.2580	0.1822	1	0.9822	**536.8792**	2.21%	1303.8560	25.5343	20.6134	90.2944		LCS			554.8607	96.8%

Total Radium Liquid

Filename : TOTRA.XLS
File type : Excel
Version # : 1.3.9

Carrier S/N : 2628181
Carrier Exp Date : 12/7/2018
Carrier Volume Added: 0.50
Carrier Weight (mg/ml): 26.48
Carrier Weight StDev.: 0.10

Batch : 1562969
Analyst : NXL1
Prep Date : 4/11/2018
Method Uncertainty: 0.0829

Procedure Code : GFCGANBL
Parmname : Total Radium
Required MDA : 1 pCi/L
Halflife of Rn-222 : 3.8235 days

Geometry: Tuffryn Filter

Sample Characteristics					Carrier Calculations				
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Sample Date/Time	Carrier Weight (mg) (Standard)	Residue Weight (mg) (Sample)	Residue Weight StDev. (mg)	Carrier Aliquot (mL)	Carrier Aliquot StDev. (mL)
1	1203536991.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
2	1203536992.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	10.30	0.051599	0.5	0.001000
3	1203536993.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	19.40	0.090711	0.8	0.000200
4	1203536994.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	25.10	0.115210	1.0	0.002000
5	1203536995.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	39.20	0.175812	1.5	0.000200
6	1203536996.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	50.90	0.226098	2.0	0.000200
7	1203536997.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	66.50	0.293147	2.5	0.000200
8	1203536998.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
9	1203536999.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200
10	1203537000.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	10.30	0.051599	0.5	0.001000
~~11~~	~~1203537001.1~~	~~1.0000~~	~~2.0399E-05~~	~~4/11/2018 0:00~~	~~26.48~~	~~19.40~~	~~0.090711~~	~~0.8~~	~~0.000200~~
12	1203537002.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	25.10	0.115210	1.0	0.002000
13	1203537003.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	39.20	0.175812	1.5	0.000200
14	1203537004.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	50.90	0.226098	2.0	0.000200
15	1203537005.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	66.50	0.293147	2.5	0.000200
16	1203537006.1	1.0000	2.0399E-05	4/11/2018 0:00	26.48	8.00	0.041714	0.4	0.000200

Pipet, 0.1 ml Stdev : +/-	0.000200	ml
Pipet, 0.5 ml Stdev : +/-	0.001000	ml
Pipet, 1 ml Stdev : +/-	0.002000	ml
Pipet, 5 ml Stdev : +/-	0.010000	ml

Analytical SOP: GL-RAD-A-001
Instrument SOP: GL-RAD-I-016

Count Raw Data

Pos.	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Gross Alpha CPM	Count Start Date/Time	Precipitation Date/Time	Ingrowth factor	Calculated Sample Recovery %	Sample Recovery Error %
1	11A	2	2619	3241	1309.500	5/17/2019 13:56	4/11/2018 14:40	4.000	75.5%	0.83%
2	11B	2	2853	2963	1426.500	5/17/2019 13:56	4/11/2018 14:40	4.000	77.8%	0.83%
3	11C	2	3009	3167	1504.500	5/17/2019 13:56	4/11/2018 14:40	4.000	91.6%	0.76%
4	11D	2	2713	3282	1356.500	5/17/2019 13:56	4/11/2018 14:40	4.000	94.8%	0.78%
5	12A	2	2502	3114	1251.000	5/17/2019 13:56	4/11/2018 14:40	4.000	98.7%	0.74%
6	12B	2	2409	3113	1204.500	5/17/2019 13:56	4/11/2018 14:40	4.000	96.1%	0.73%
7	12C	2	2329	3073	1164.500	5/17/2019 13:56	4/11/2018 14:40	4.000	100%	0.73%
8	12D	2	2707	3016	1353.500	5/21/2019 11:59	4/11/2018 14:40	4.000	75.5%	0.83%
9	13A	2	2985	3028	1492.500	5/17/2019 13:59	4/11/2018 14:40	4.000	75.5%	0.83%
10	13B	2	2728	2993	1364.000	5/17/2019 13:59	4/11/2018 14:40	4.000	77.8%	0.83%
~~11~~	~~13C~~	~~2~~	~~0~~	~~0~~	~~0.000~~	~~5/17/2019 13:59~~	~~4/11/2018 14:40~~	~~4.000~~	~~91.6%~~	~~0.76%~~
12	13D	2	2899	3067	1449.500	5/17/2019 13:59	4/11/2018 14:40	4.000	94.8%	0.78%
13	14A	2	2164	3575	1082.000	5/17/2019 13:59	4/11/2018 14:40	4.000	98.7%	0.74%
14	14B	2	2244	3052	1122.000	5/17/2019 13:59	4/11/2018 14:40	4.000	96.1%	0.73%
15	14C	2	2290	3328	1145.000	5/17/2019 13:59	4/11/2018 14:40	4.000	100%	0.73%
16	14D	2	2418	3292	1209.000	5/21/2019 12:04	4/11/2018 14:40	4.000	75.5%	0.83%

Calibration Data

Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Beta X-Talk	Weekly Bkg CPM	Weekly Bkg Count Start Date/Time	Weekly Bkg Count Time (min.)
PIC	5/1/2018	5/31/2019	0.3792	0.00693	0.00021	0.042	5/10/2019 18:02	500
PIC	5/1/2018	5/31/2019	0.3784	0.00743	0.00017	0.146	5/10/2019 18:02	500
PIC	5/1/2018	5/31/2019	0.3440	0.01271	0.00018	0.094	5/10/2019 18:02	500
PIC	5/1/2018	5/31/2019	0.3445	0.01128	0.00019	0.148	5/10/2019 18:02	500
PIC	5/1/2018	5/31/2019	0.2599	0.01685	0.00015	0.078	5/10/2019 18:02	500
PIC	5/1/2018	5/31/2019	0.2579	0.01035	0.00025	0.076	5/10/2019 18:02	500
PIC	5/1/2018	5/31/2019	0.2332	0.02199	0.00021	0.158	5/10/2019 18:02	500
PIC	5/1/2018	5/31/2019	0.3690	0.01863	0.00019	0.084	5/17/2019 16:14	500
PIC	5/1/2018	5/31/2019	0.3932	0.00669	0.00030	0.052	5/10/2019 18:02	1000
PIC	5/1/2018	5/31/2019	0.3838	0.01043	0.00022	0.065	5/10/2019 18:02	1000
~~PIC~~	~~5/1/2018~~	~~5/31/2019~~	~~0.0000~~	~~0.02157~~	~~0.00000~~	~~FAIL~~	~~12:00:00 AM~~	~~0~~
PIC	5/1/2018	5/31/2019	0.3395	0.01236	0.00024	0.082	5/10/2019 18:02	1000
PIC	5/1/2018	5/31/2019	0.2789	0.02505	0.00017	0.067	5/10/2019 18:02	1000
PIC	5/1/2018	5/31/2019	0.2614	0.01557	0.00027	0.039	5/10/2019 18:02	1000
PIC	5/1/2018	5/31/2019	0.2248	0.02173	0.00027	0.127	5/10/2019 18:02	1000
PIC	5/1/2018	5/31/2019	0.3543	0.01512	0.00023	0.025	5/17/2019 16:15	1000

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

Spike S/N : N/A
Spike Exp Date : N/A
Spike Activity (dpm/ml): N/A
Spike Volume Added: N/A

LCS S/N : 0299-H
LCS Exp Date : 12/4/2019
LCS Activity (dpm/ml): 2463.58
LCS Volume Added: 0.50

Results

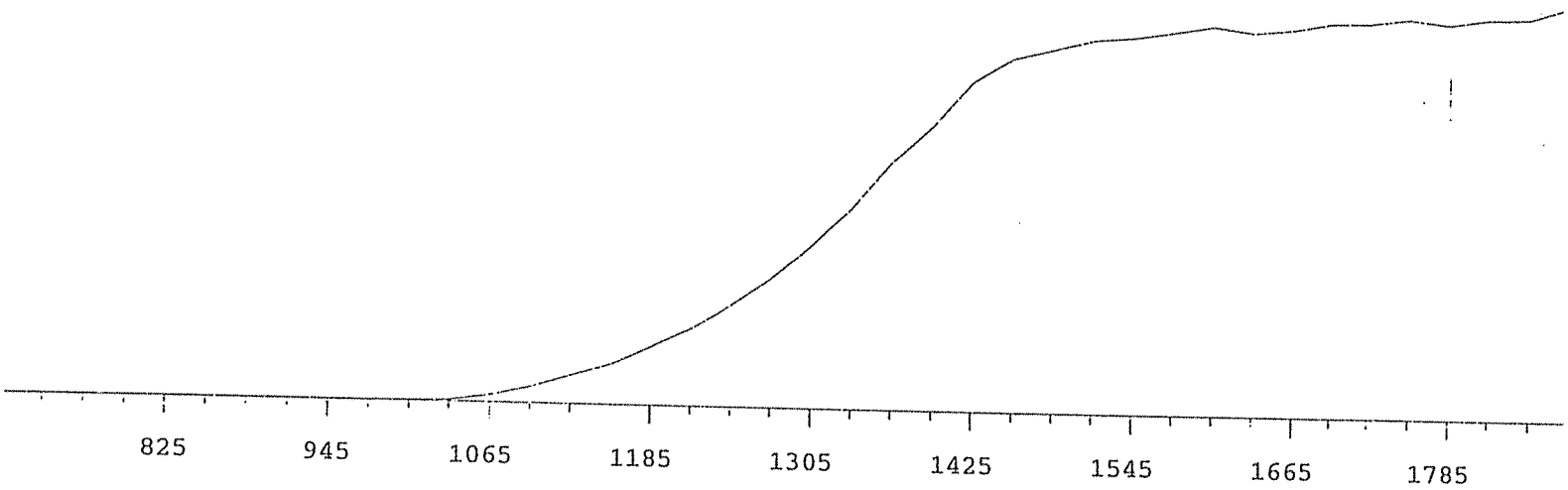
Pos.	Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error %	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA Counting Uncertainty pCi/L	2 SIGMA Total Prop. Uncertainty pCi/L	Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
1	0.1330	0.0939	1	0.7777	**514.8055**	2.23%	1309.4580	25.5881	19.7223	86.6521		LCS			554.8607	92.8%
2	0.2413	0.1704	1	0.9146	**545.5767**	2.18%	1426.3540	26.7067	20.0255	91.6718		LCS			554.8607	98.3%
3	0.1809	0.1277	1	0.7917	**537.6949**	2.35%	1504.4060	27.4272	19.2172	90.8241		LCS			554.8607	96.9%
4	0.2190	0.1546	1	0.8264	**467.5821**	2.36%	1356.3520	26.0432	17.6009	79.0079		LCS			554.8607	84.3%
5	0.2024	0.1429	1	0.9442	**549.0215**	2.72%	1250.9220	25.0100	21.5185	93.8936		LCS			554.8607	98.9%
6	0.2068	0.1460	1	0.9734	**547.0094**	2.40%	1204.4240	24.5408	21.8523	92.5591		LCS			554.8607	98.6%
7	0.3155	0.2227	1	1.1666	**559.5938**	3.11%	1164.3420	24.1299	22.7366	97.1349		LCS			554.8607	100.9%
8	0.1933	0.1365	1	0.8791	**546.7699**	2.80%	1353.4160	26.0144	20.6033	93.8018		LCS			554.8607	98.5%
9	0.1426	0.1007	1	0.7701	**565.7329**	2.12%	1492.4480	27.3176	20.3022	94.9049		LCS			554.8607	102.0%
10	0.1586	0.1120	1	0.7897	**514.3356**	2.33%	1363.9350	26.1151	19.3067	86.8360		LCS			554.8607	92.7%
~~11~~	~~#DIV/0!~~	~~#DIV/0!~~	~~1~~	~~#DIV/0!~~	**#VALUE!**	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~		~~LCS~~			~~554.8607~~	~~#VALUE!~~
12	0.1652	0.1167	1	0.7582	**507.0105**	2.36%	1449.4180	26.9212	18.4623	85.6833		LCS			554.8607	91.4%
13	0.1747	0.1233	1	0.8604	**442.5964**	3.38%	1081.9330	23.2594	18.6544	77.6932		LCS			554.8607	79.8%
14	0.1460	0.1031	1	0.8785	**502.6978**	2.72%	1121.9610	23.6854	20.8079	86.0074		LCS			554.8607	90.6%
15	0.2930	0.2069	1	1.1616	**570.5942**	3.10%	1144.8730	23.9270	23.3820	99.0291		LCS			554.8607	102.8%
16	0.1097	0.0775	1	0.7863	**508.6541**	2.67%	1208.9750	24.5866	20.2812	86.8459		LCS			554.8607	91.7%

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
R1	1A	2	2699	2974	5/17/2019 13:40	5/17/2019 13:42	PIC	TRADV19
R2	1B	2	2662	2819	5/17/2019 13:40	5/17/2019 13:42	PIC	TRADV19
R3	1C	2	3050	2966	5/17/2019 13:40	5/17/2019 13:42	PIC	TRADV19
R4	1D	2	2862	3087	5/17/2019 13:40	5/17/2019 13:42	PIC	TRADV19
R5	2A	2	2629	3074	5/17/2019 13:41	5/17/2019 13:43	PIC	TRADV19
R6	2B	2	2458	3012	5/17/2019 13:41	5/17/2019 13:43	PIC	TRADV19
R7	2C	2	2352	3113	5/17/2019 13:41	5/17/2019 13:43	PIC	TRADV19
R1	2D	2	2811	2701	5/21/2019 11:41	5/21/2019 11:43	PIC	TRADV19
R1	3A	2	0	0	5/17/2019 13:41	5/17/2019 13:43	PIC	TRADV19
R2	3B	2	2781	2689	5/17/2019 13:43	5/17/2019 13:45	PIC	TRADV19
R3	3C	2	3085	3025	5/17/2019 13:43	5/17/2019 13:45	PIC	TRADV19
R4	3D	2	2908	3153	5/17/2019 13:43	5/17/2019 13:45	PIC	TRADV19
R5	4A	2	2569	3123	5/17/2019 13:43	5/17/2019 13:45	PIC	TRADV19
R6	4B	2	2111	3162	5/17/2019 13:43	5/17/2019 13:45	PIC	TRADV19
R7	4C	2	2430	2997	5/17/2019 13:43	5/17/2019 13:45	PIC	TRADV19
R1	4D	2	2805	2834	5/21/2019 11:44	5/21/2019 11:46	PIC	TRADV19
R1	5A	2	2982	2956	5/17/2019 13:46	5/17/2019 13:48	PIC	TRADV19
R2	5B	2	2776	2912	5/17/2019 13:46	5/17/2019 13:48	PIC	TRADV19
R3	5C	2	2962	2985	5/17/2019 13:46	5/17/2019 13:48	PIC	TRADV19
R4	5D	2	2962	3073	5/17/2019 13:46	5/17/2019 13:48	PIC	TRADV19
R5	6A	2	2270	3107	5/17/2019 13:50	5/17/2019 13:52	PIC	TRADV19
R6	6B	2	2246	3017	5/17/2019 13:50	5/17/2019 13:52	PIC	TRADV19
R7	6C	2	2305	3056	5/17/2019 13:50	5/17/2019 13:52	PIC	TRADV19
R8	6D	2	0	0	5/17/2019 13:50	5/17/2019 13:52	PIC	TRADV19
R1	7A	2	2807	3011	5/17/2019 13:52	5/17/2019 13:54	PIC	TRADV19
R2	7B	2	2553	2685	5/17/2019 13:52	5/17/2019 13:54	PIC	TRADV19
R3	7C	2	2676	3164	5/17/2019 13:52	5/17/2019 13:54	PIC	TRADV19
R4	7D	2	2806	3189	5/17/2019 13:52	5/17/2019 13:54	PIC	TRADV19
R5	8A	2	2688	3032	5/17/2019 13:52	5/17/2019 13:54	PIC	TRADV19
R6	8B	2	2373	3090	5/17/2019 13:52	5/17/2019 13:54	PIC	TRADV19
R7	8C	2	2430	3048	5/17/2019 13:52	5/17/2019 13:54	PIC	TRADV19
R1	8D	2	2847	2926	5/21/2019 11:52	5/21/2019 11:54	PIC	TRADV19
R1	9A	2	2808	3176	5/17/2019 13:55	5/17/2019 13:57	PIC	TRADV19

R2	9B	2	2746	2837	5/17/2019 13:55	5/17/2019 13:57	PIC	TRADV19
R3	9C	2	2963	3045	5/17/2019 13:55	5/17/2019 13:57	PIC	TRADV19
R4	9D	2	2844	3025	5/17/2019 13:55	5/17/2019 13:57	PIC	TRADV19
R5	10A	2	2537	3259	5/17/2019 13:55	5/17/2019 13:57	PIC	TRADV19
R6	10B	2	2409	3010	5/17/2019 13:55	5/17/2019 13:57	PIC	TRADV19
R7	10C	2	2267	3350	5/17/2019 13:55	5/17/2019 13:57	PIC	TRADV19
R1	10D	2	2608	3042	5/21/2019 11:56	5/21/2019 11:58	PIC	TRADV19
R1	11A	2	2619	3241	5/17/2019 13:56	5/17/2019 13:58	PIC	TRADV19
R2	11B	2	2853	2963	5/17/2019 13:56	5/17/2019 13:58	PIC	TRADV19
R3	11C	2	3009	3167	5/17/2019 13:56	5/17/2019 13:58	PIC	TRADV19
R4	11D	2	2713	3282	5/17/2019 13:56	5/17/2019 13:58	PIC	TRADV19
R5	12A	2	2502	3114	5/17/2019 13:56	5/17/2019 13:58	PIC	TRADV19
R6	12B	2	2409	3113	5/17/2019 13:56	5/17/2019 13:58	PIC	TRADV19
R7	12C	2	2329	3073	5/17/2019 13:56	5/17/2019 13:58	PIC	TRADV19
R1	12D	2	2707	3016	5/21/2019 11:59	5/21/2019 12:01	PIC	TRADV19
R1	13A	2	2985	3028	5/17/2019 13:59	5/17/2019 14:01	PIC	TRADV19
R2	13B	2	2728	2993	5/17/2019 13:59	5/17/2019 14:01	PIC	TRADV19
R3	13C	2	0	0	5/17/2019 13:59	5/17/2019 14:01	PIC	TRADV19
R4	13D	2	2899	3067	5/17/2019 13:59	5/17/2019 14:01	PIC	TRADV19
R5	14A	2	2164	3575	5/17/2019 13:59	5/17/2019 14:01	PIC	TRADV19
R6	14B	2	2244	3052	5/17/2019 13:59	5/17/2019 14:01	PIC	TRADV19
R7	14C	2	2290	3328	5/17/2019 13:59	5/17/2019 14:01	PIC	TRADV19
R1	14D	2	2418	3292	5/21/2019 12:04	5/21/2019 12:06	PIC	TRADV19

MPC 9600 Plateau Instrument 1 MPC 9604 Detector A 7/1/2009

Alpha Volts: 1575 Beta Volts: 1575

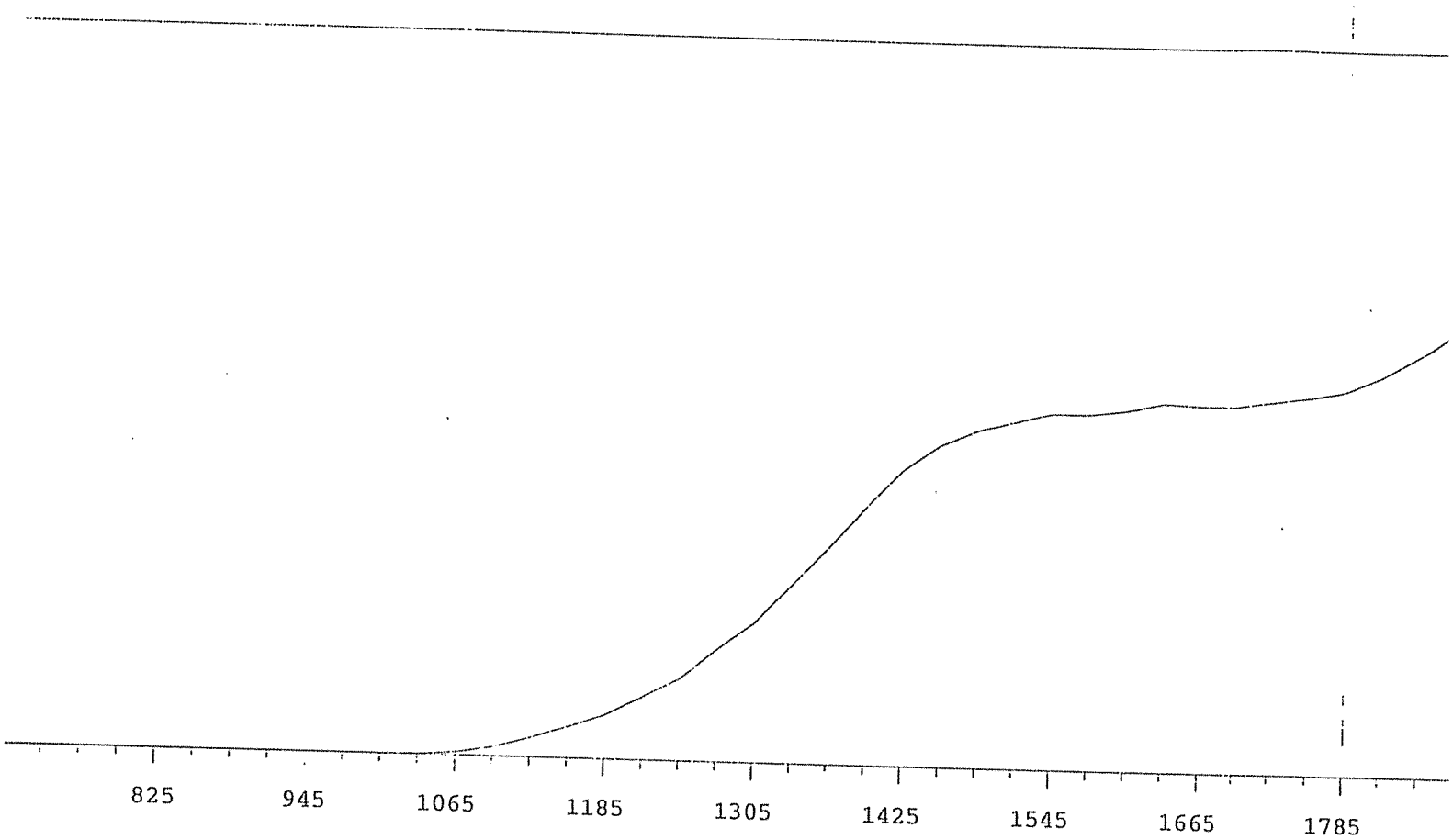


VOLTS	COUNTS	%/100 Volts
705	1	
735	1	
765	0	
795	0	+0.00
825	0	>100
855	1	>100
885	0	+55.56
915	2	+66.67
945	0	>100
975	2	>100
1005	42	>100
1035	145	>100
1065	544	>100
1095	1136	>100
1125	1967	>100
1155	2845	>100
1185	4078	>100
1215	5483	+93.18
1245	7400	+83.35
1275	9328	+75.40

VOLTS	COUNTS	%/100 Volts
1305	11640	+69.78
1335	14241	+62.88
1365	17534	+55.91
1395	20127	+45.04
1425	23254	+31.29
1455	24902	+20.41
1485	25605	+10.49
1515	26310	+6.44
1545	26535	+5.31
1575	26953	+2.79
1605	27399	+1.83
1635	27000	+1.71
1665	27255	+1.62
1695	27723	+3.14
1725	27705	+1.56
1755	28072	+1.15
1785	27729	+1.43
1815	28194	+3.24
1845	28243	
1875	29191	

MPC 9600 Plateau Instrument 1 MPC 9604 Detector B 7/1/2009

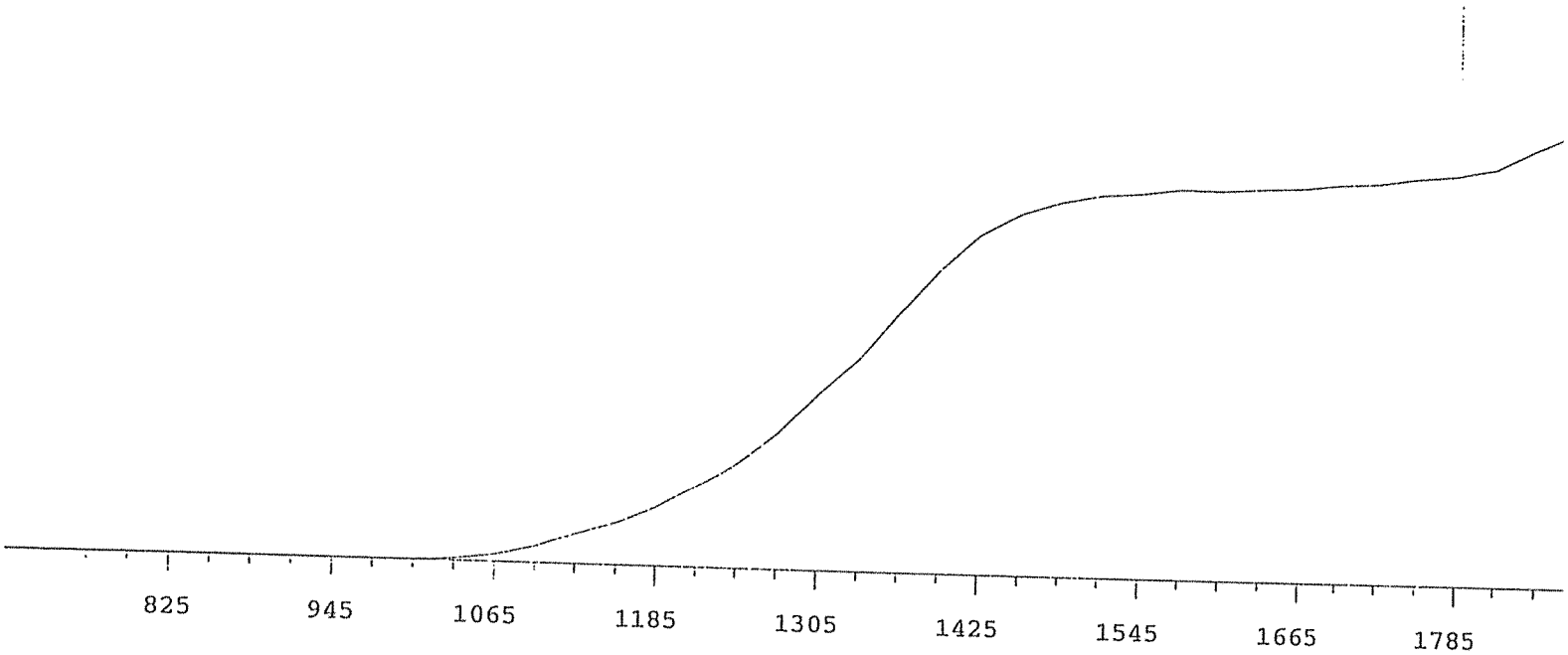
Alpha Volts: 1575 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	+55.56
795	1	+83.33
825	1	+55.56
855	0	>100
885	1	+0.00
915	0	+0.00
945	1	>100
975	0	>100
1005	4	>100
1035	56	>100
1065	292	>100
1095	890	>100
1125	1841	>100
1155	2936	>100
1185	4179	>100
1215	5837	>100
1245	7821	+91.28
1275	10638	+83.88

VOLTS	COUNTS	%/100 Volts
1305	13188	+75.92
1335	16818	+67.60
1365	20420	+59.86
1395	24341	+47.85
1425	27854	+35.51
1455	30288	+23.26
1485	31798	+14.54
1515	32622	+8.32
1545	33496	+5.11
1575	33475	+4.43
1605	33903	+3.09
1635	34654	+2.46
1665	34485	+1.74
1695	34445	+1.84
1725	34908	+3.91
1755	35401	+6.80
1785	36062	+10.27
1815	37505	+14.30
1845	39508	
1875	41843	

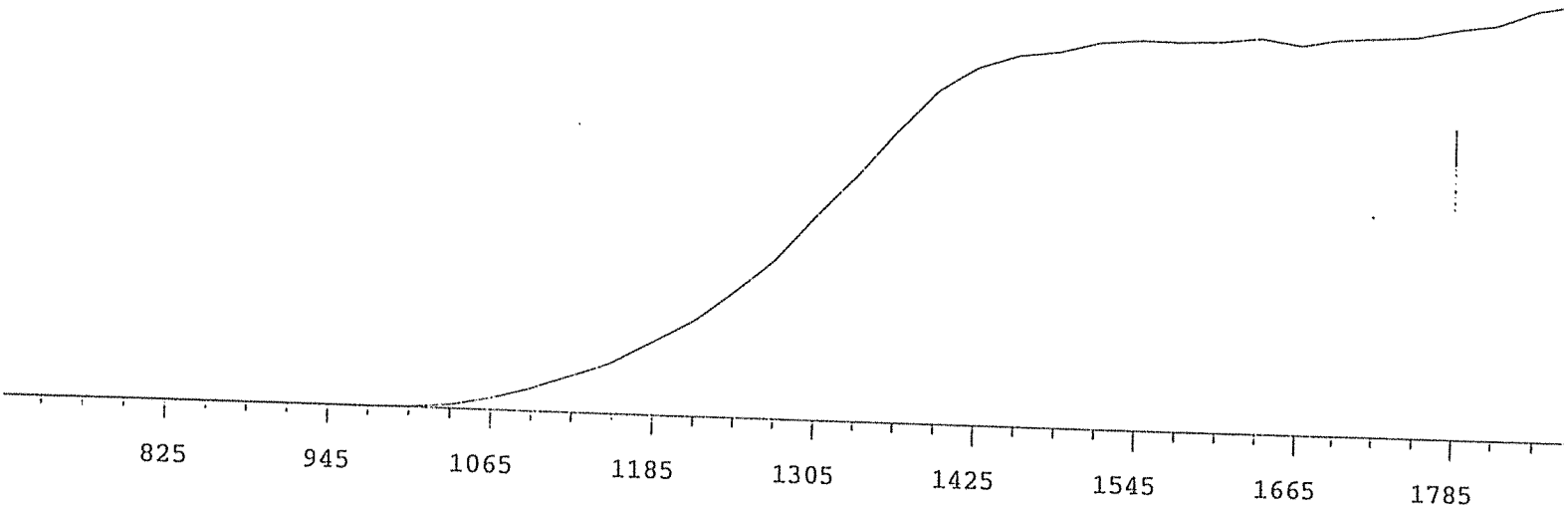
MPC 9600 Plateau Instrument 1 MPC 9604 Detector C 7/1/2009
Alpha Volts: 1575 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	1	+0.00
795	0	>100
825	1	-55.56
855	1	+55.56
885	0	>100
915	1	>100
945	0	>100
975	4	>100
1005	32	>100
1035	206	>100
1065	639	>100
1095	1416	>100
1125	2551	>100
1155	3619	>100
1185	5037	+98.68
1215	6875	+91.19
1245	8915	+85.53
1275	11519	+77.28

VOLTS	COUNTS	%/100 Volts
1305	14817	+71.06
1335	17823	+63.34
1365	21704	+53.63
1395	25422	+42.55
1425	28424	+29.21
1455	30244	+18.11
1485	31305	+10.10
1515	31989	+6.07
1545	32223	+3.43
1575	32671	+2.15
1605	32621	+1.68
1635	32837	+1.52
1665	32961	+2.01
1695	33249	+2.64
1725	33409	+3.21
1755	33931	+4.07
1785	34234	+7.20
1815	34909	+10.28
1845	36660	
1875	38205	

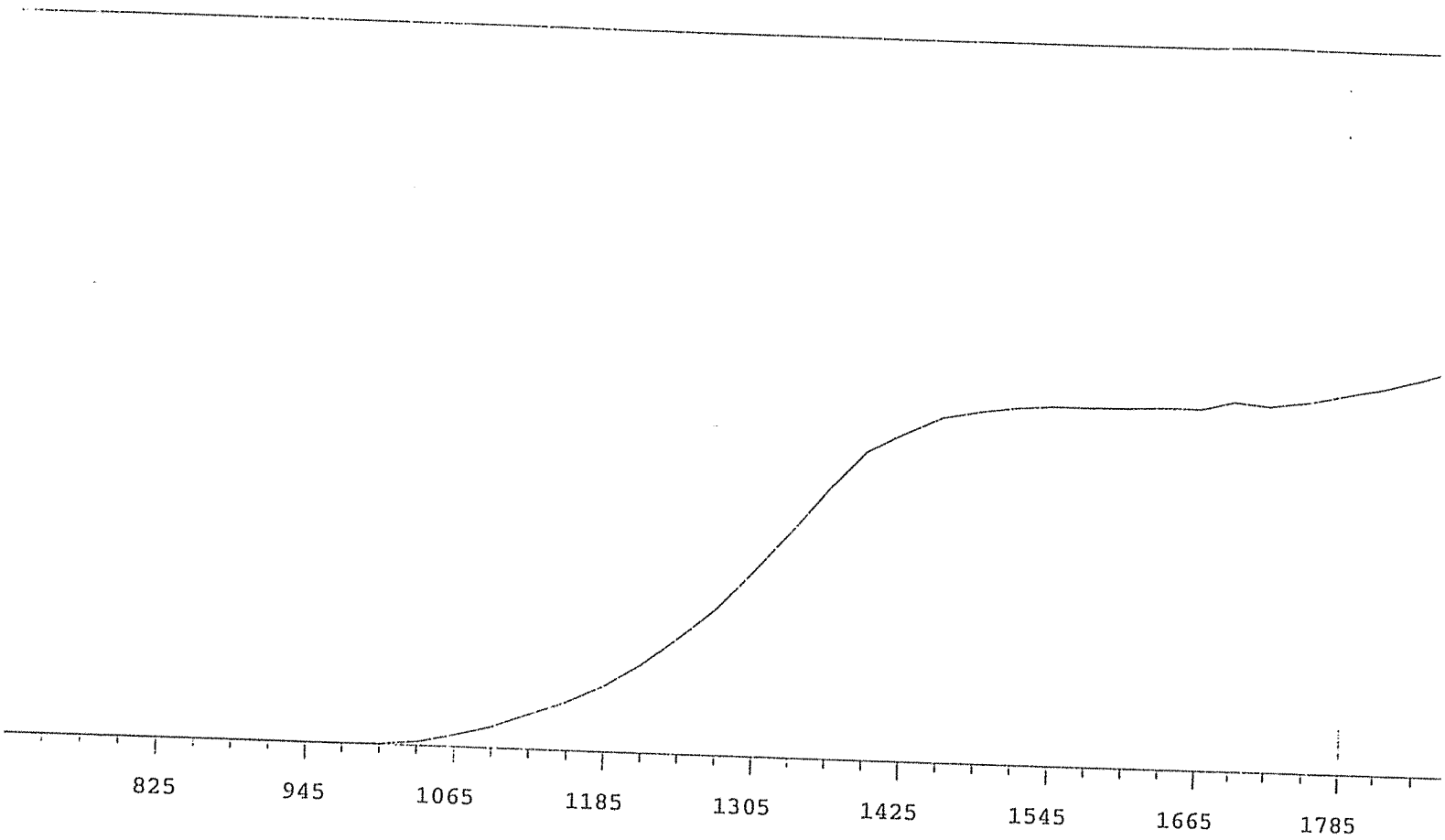
MPC 9600 Plateau Instrument 1 MPC 9604 Detector D 7/1/2009
Alpha Volts: 1575 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+0.00
795	1	+0.00
825	0	+0.00
855	1	>100
885	0	>100
915	0	>100
945	0	>100
975	8	>100
1005	75	>100
1035	303	>100
1065	872	>100
1095	1656	>100
1125	2729	>100
1155	3862	>100
1185	5425	+98.19
1215	7256	+88.82
1245	9510	+81.89
1275	11944	+74.07

VOLTS	COUNTS	%/100 Volts
1305	15202	+66.36
1335	18216	+57.86
1365	21597	+45.58
1395	24648	+32.96
1425	26505	+19.92
1455	27475	+11.42
1485	27836	+7.08
1515	28609	+4.51
1545	28896	+2.93
1575	28862	+1.66
1605	28969	+0.36
1635	29292	+0.80
1665	28836	+1.06
1695	29279	+1.48
1725	29439	+3.59
1755	29642	+4.07
1785	30243	+6.51
1815	30699	+7.79
1845	31876	
1875	32444	

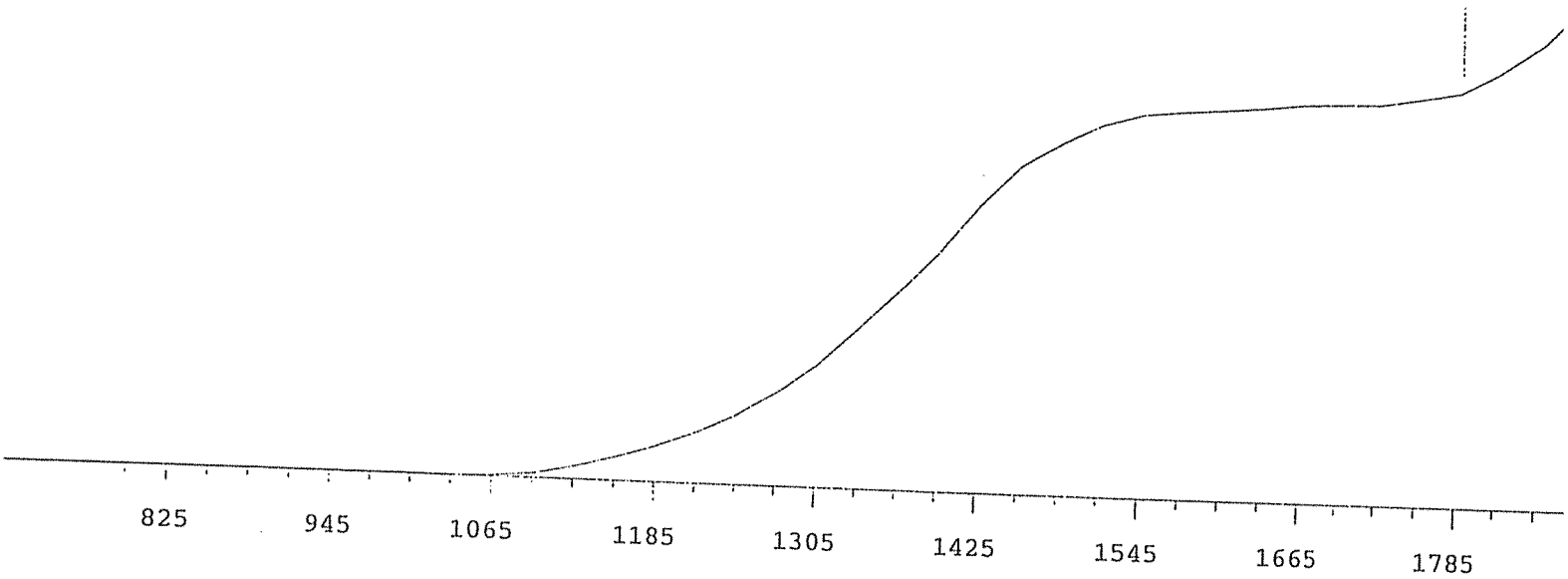
MPC 9600 Plateau Instrument 2 MPC 9604 Detector A 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+83.33
795	0	-83.33
825	1	>100
855	0	>100
885	1	+100.00
915	1	>100
945	2	>100
975	12	>100
1005	91	>100
1035	421	>100
1065	1239	>100
1095	2155	>100
1125	3527	>100
1155	4974	>100
1185	6647	+97.44
1215	9250	+89.00
1245	12041	+82.15
1275	15094	+73.81

VOLTS	COUNTS	%/100 Volts
1305	19017	+67.45
1335	23157	+59.23
1365	27625	+45.78
1395	31465	+32.72
1425	33352	+20.41
1455	35084	+11.74
1485	35819	+7.11
1515	36292	+3.35
1545	36527	+1.63
1575	36540	+0.87
1605	36585	+0.48
1635	36742	+1.76
1665	36691	+1.53
1695	37461	+1.89
1725	37073	+3.07
1755	37603	+4.02
1785	38346	+6.58
1815	39111	+7.95
1845	40115	
1875	41409	

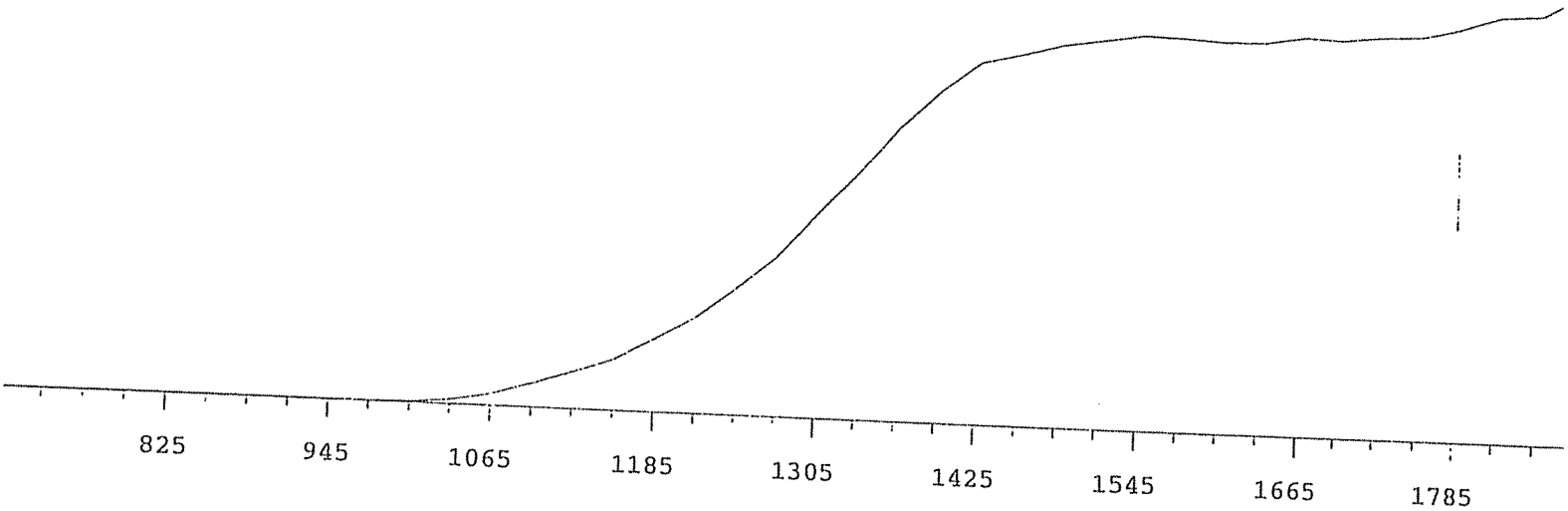
MPC 9600 Plateau Instrument 2 MPC 9604 Detector B 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	>100
975	2	>100
1005	3	>100
1035	14	>100
1065	127	>100
1095	500	>100
1125	1332	>100
1155	2373	>100
1185	3614	>100
1215	5227	>100
1245	7060	+97.33
1275	9574	+90.30

VOLTS	COUNTS	%/100 Volts
1305	12541	+83.18
1335	16192	+74.48
1365	20083	+67.17
1395	24273	+58.43
1425	29090	+46.86
1455	33223	+34.56
1485	35608	+22.67
1515	37581	+13.63
1545	38762	+8.18
1575	39185	+4.42
1605	39484	+3.06
1635	39806	+2.61
1665	40264	+2.03
1695	40353	+2.32
1725	40431	+3.28
1755	41127	+7.09
1785	41882	+12.40
1815	44049	+18.52
1845	46950	
1875	51097	

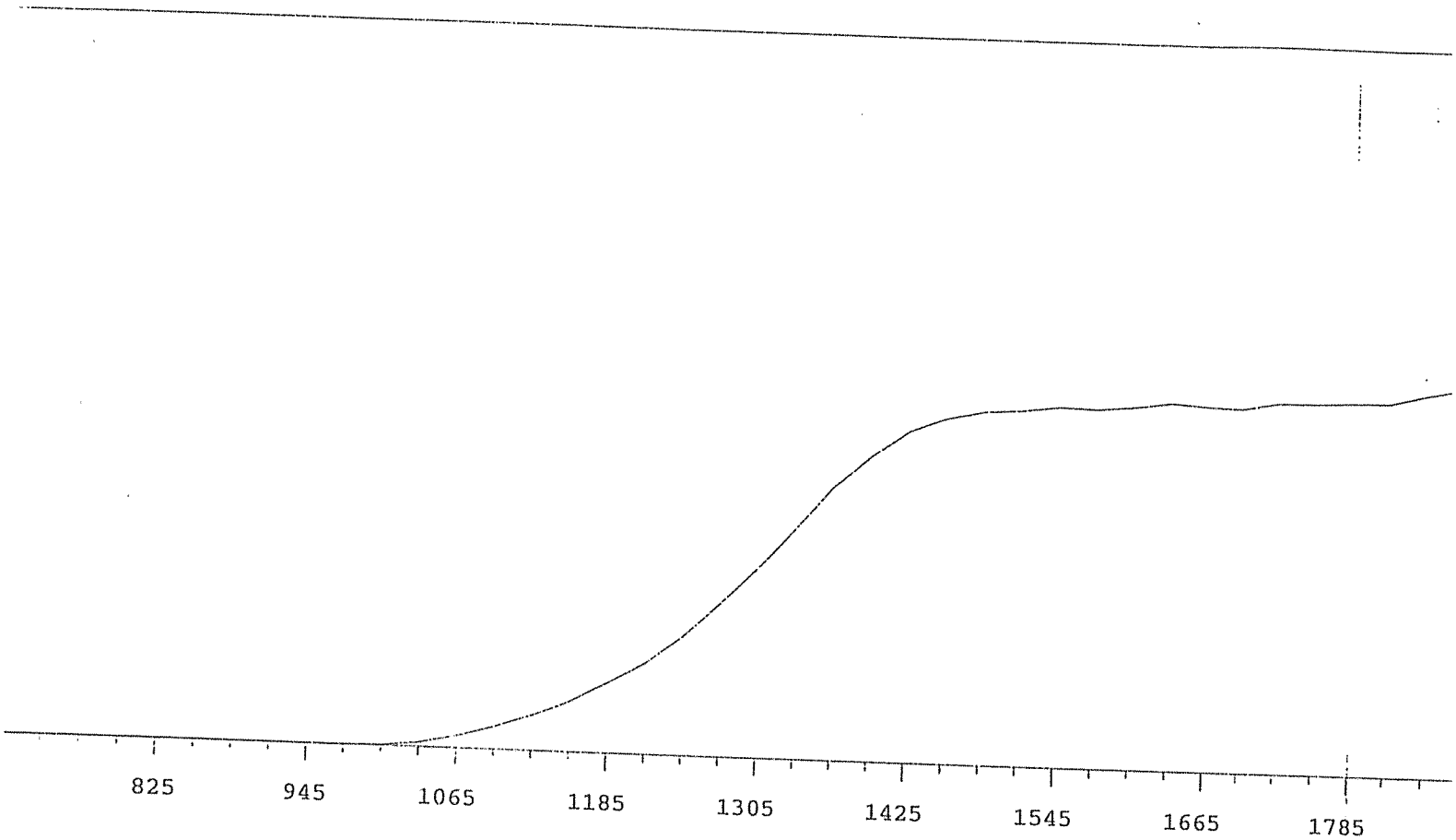
MPC 9600 Plateau Instrument 2 MPC 9604 Detector C 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	17	>100
1005	87	>100
1035	438	>100
1065	1055	>100
1095	2114	>100
1125	3282	>100
1155	4625	>100
1185	6554	+97.66
1215	8743	+88.09
1245	11345	+81.31
1275	14261	+74.60

VOLTS	COUNTS	%/100 Volts
1305	18216	+67.74
1335	21995	+58.11
1365	26173	+46.11
1395	29479	+32.75
1425	32186	+20.62
1455	33022	+12.13
1485	33981	+7.22
1515	34520	+4.95
1545	35095	+2.07
1575	35014	+0.38
1605	34812	+0.55
1635	34859	+1.11
1665	35460	+1.94
1695	35273	+1.95
1725	35629	+2.73
1755	35811	+5.77
1785	36656	+6.44
1815	37896	+9.21
1845	38145	
1875	40283	

MPC 9600 Plateau Instrument 2 MPC 9604 Detector D 7/1/2009
Alpha Volts: 705 Beta Volts: 1575

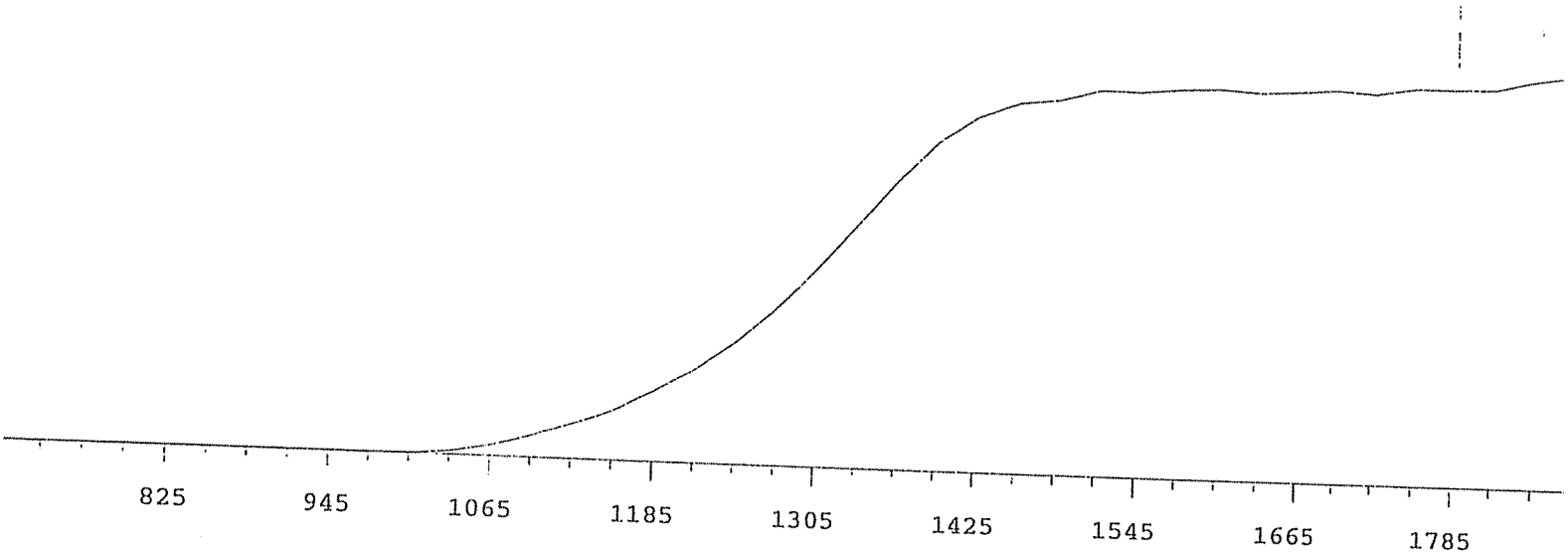


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	+83.33
795	2	+55.56
825	1	>100
855	0	>100
885	0	>100
915	0	>100
945	2	>100
975	9	>100
1005	89	>100
1035	439	>100
1065	1198	>100
1095	2164	>100
1125	3436	>100
1155	4917	>100
1185	6762	+96.59
1215	9006	+89.14
1245	11800	+81.34
1275	15132	+73.59

VOLTS	COUNTS	%/100 Volts
1305	18675	+65.94
1335	22620	+55.69
1365	26869	+44.63
1395	29957	+32.08
1425	32494	+20.49
1455	33836	+11.98
1485	34627	+6.45
1515	34849	+3.22
1545	35298	+1.98
1575	35180	+2.37
1605	35503	+1.57
1635	36006	+0.99
1665	35722	+0.89
1695	35597	+0.93
1725	36188	+1.86
1755	36272	+1.90
1785	36389	+2.55
1815	36529	+4.39
1845	37459	
1875	38170	

MPC 9600 Plateau Instrument 3 MPC 9604 Detector A 7/1/2009

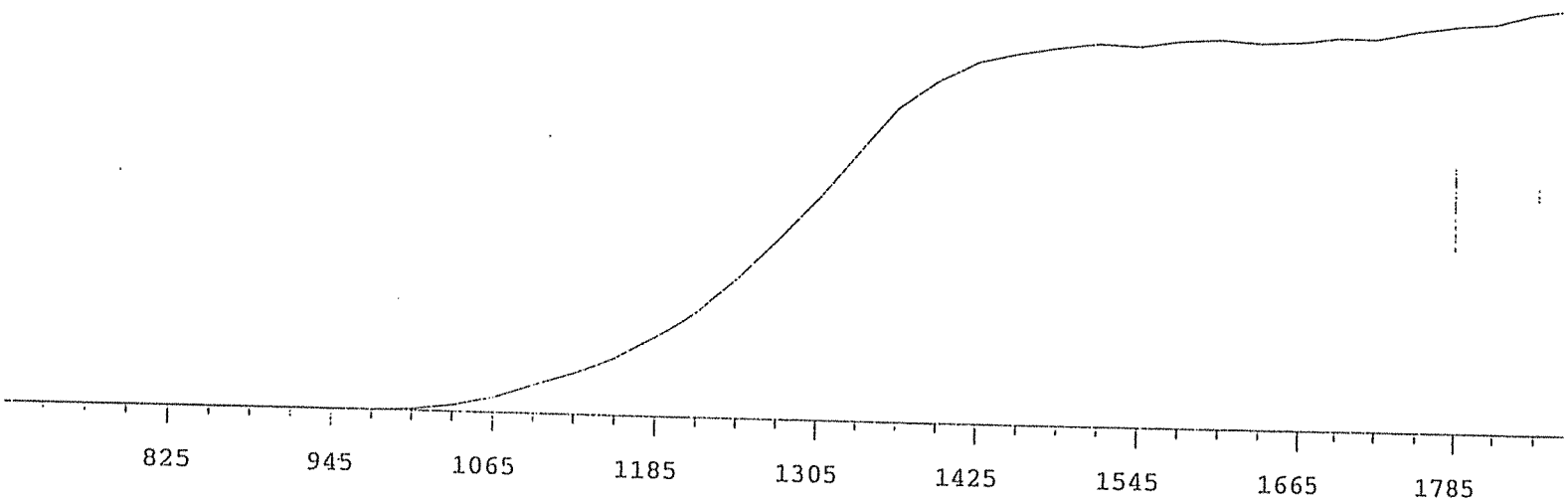
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	+55.56
795	1	>100
825	1	+0.00
855	1	>100
885	0	>100
915	0	>100
945	0	>100
975	9	>100
1005	53	>100
1035	302	>100
1065	878	>100
1095	1805	>100
1125	2887	>100
1155	4163	>100
1185	5842	+99.81
1215	7959	+90.90
1245	10323	+83.03
1275	13250	+75.91

VOLTS	COUNTS	%/100 Volts
1305	16654	+68.57
1335	20416	+59.26
1365	24191	+47.28
1395	27643	+34.04
1425	29891	+21.08
1455	31183	+12.30
1485	31558	+6.67
1515	32444	+4.05
1545	32413	+2.90
1575	32704	+0.81
1605	32837	+0.71
1635	32629	+0.49
1665	32797	+0.16
1695	32964	+1.32
1725	32746	+1.40
1755	33308	+1.56
1785	33318	+3.21
1815	33456	+3.92
1845	34283	
1875	34815	

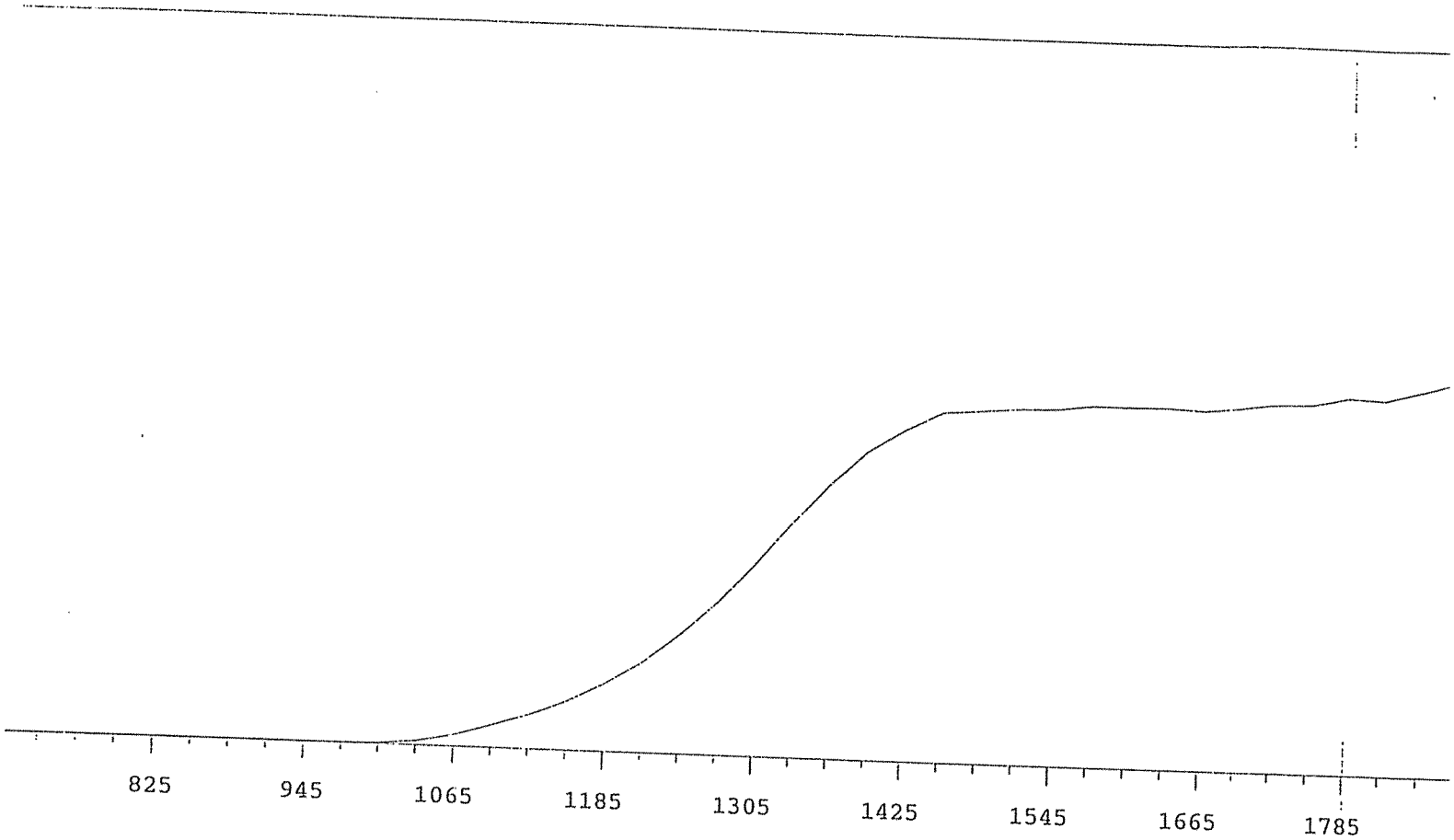
MPC 9600 Plateau Instrument 3 MPC 9604 Detector B 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	1	
735	1	
765	0	-55.56
795	0	>100
825	1	>100
855	3	+33.33
885	0	+0.00
915	1	>100
945	2	>100
975	29	>100
1005	165	>100
1035	613	>100
1065	1394	>100
1095	2558	>100
1125	3702	>100
1155	5222	>100
1185	7161	+96.06
1215	9507	+89.18
1245	12552	+81.52
1275	16030	+73.64

VOLTS	COUNTS	%/100 Volts
1305	19810	+64.73
1335	23962	+52.62
1365	28091	+39.27
1395	30594	+25.61
1425	32381	+14.86
1455	33206	+8.91
1485	33832	+4.41
1515	34260	+3.01
1545	34071	+2.33
1575	34623	+1.34
1605	34848	+1.22
1635	34564	+0.89
1665	34733	+1.01
1695	35144	+2.76
1725	35084	+3.66
1755	35839	+3.97
1785	36332	+5.39
1815	36654	+5.35
1845	37609	
1875	38164	

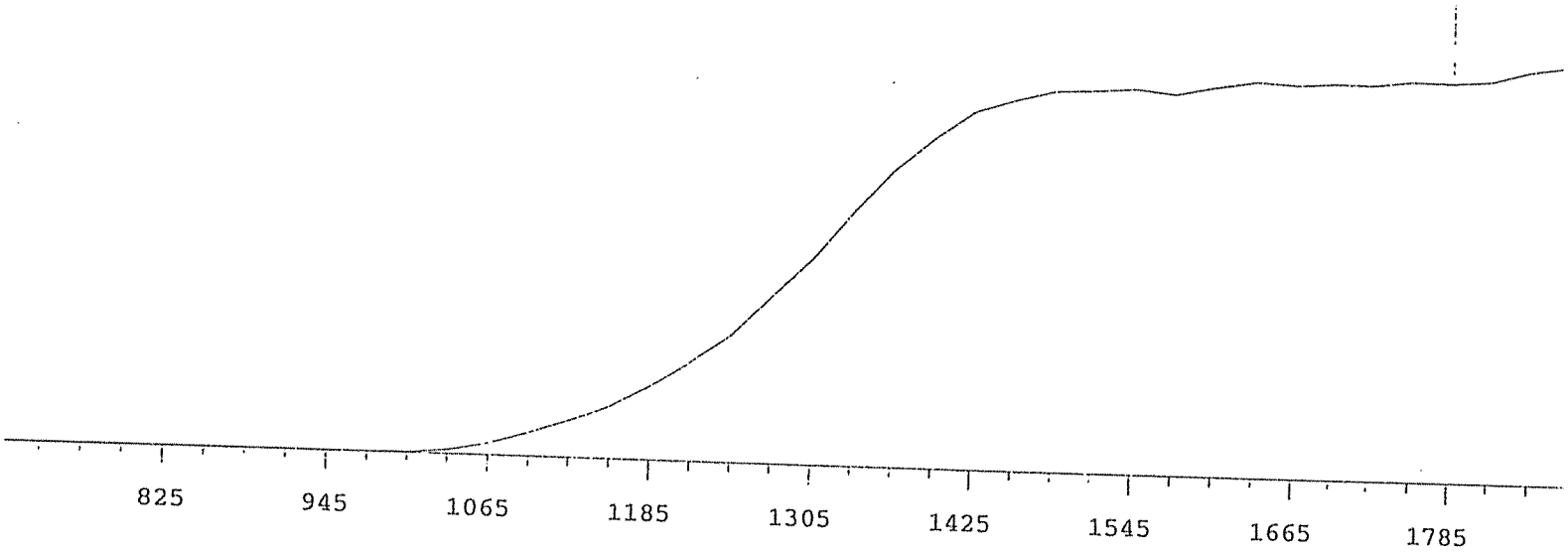
MPC 9600 Plateau Instrument 3 MPC 9604 Detector C 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	1	
735	1	
765	1	
795	0	>100
825	0	+0.00
855	0	>100
885	1	>100
915	1	>100
945	1	>100
975	17	>100
1005	122	>100
1035	533	>100
1065	1287	>100
1095	2493	>100
1125	3753	>100
1155	5482	>100
1185	7538	+99.39
1215	10305	+90.31
1245	13415	+82.57
1275	17141	+75.13

VOLTS	COUNTS	%/100 Volts
1305	21412	+66.80
1335	26262	+56.32
1365	30679	+43.71
1395	34466	+31.61
1425	36949	+20.14
1455	38998	+11.16
1485	39313	+5.34
1515	39625	+2.44
1545	39751	+2.04
1575	40227	+1.45
1605	40228	+0.56
1635	40255	+0.13
1665	40075	+1.22
1695	40384	+1.95
1725	40900	+3.50
1755	41028	+3.05
1785	41899	+3.71
1815	41767	+5.64
1845	42852	
1875	44132	

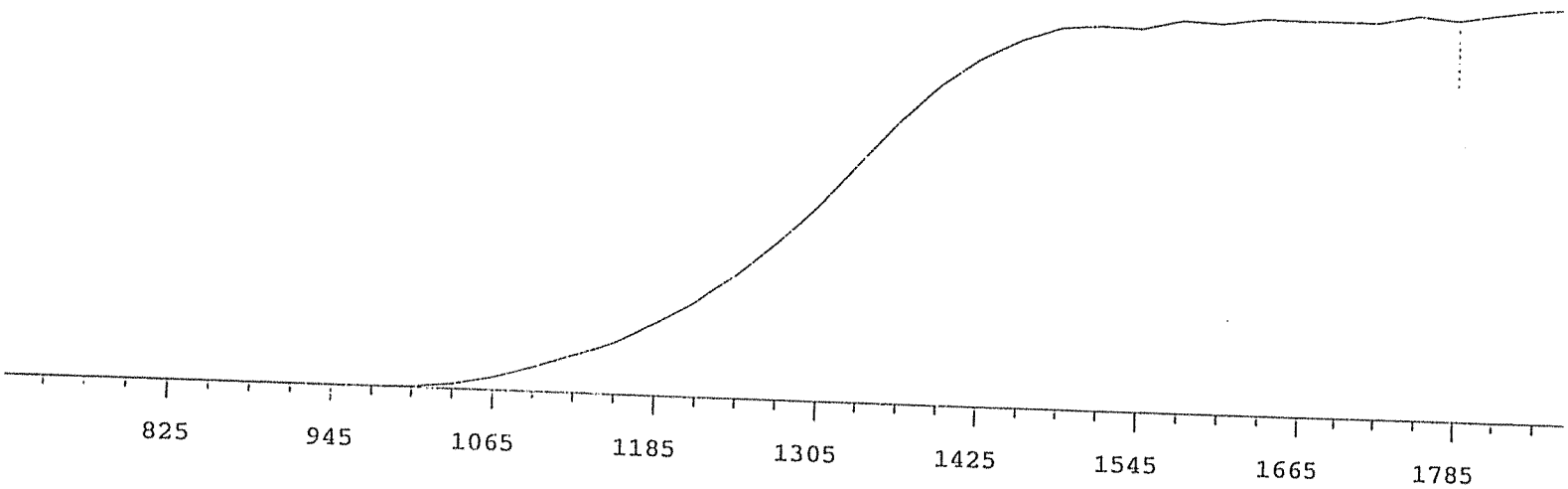
MPC 9600 Plateau Instrument 3 MPC 9604 Detector D 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+0.00
795	1	>100
825	0	+83.33
855	0	-83.33
885	1	>100
915	0	>100
945	1	>100
975	12	>100
1005	51	>100
1035	298	>100
1065	848	>100
1095	1649	>100
1125	2535	>100
1155	3602	>100
1185	5036	+98.31
1215	6880	+91.37
1245	8822	+82.29
1275	11546	+74.61

VOLTS	COUNTS	%/100 Volts
1305	14171	+66.45
1335	17362	+54.90
1365	20310	+43.83
1395	22647	+30.82
1425	24551	+20.19
1455	25440	+11.69
1485	26124	+5.90
1515	26245	+2.21
1545	26428	+1.39
1575	26151	+2.69
1605	26721	+2.72
1635	27168	+2.80
1665	27007	+0.87
1695	27135	+0.70
1725	27089	+1.24
1755	27414	+1.43
1785	27373	+3.21
1815	27581	+4.34
1845	28332	
1875	28750	

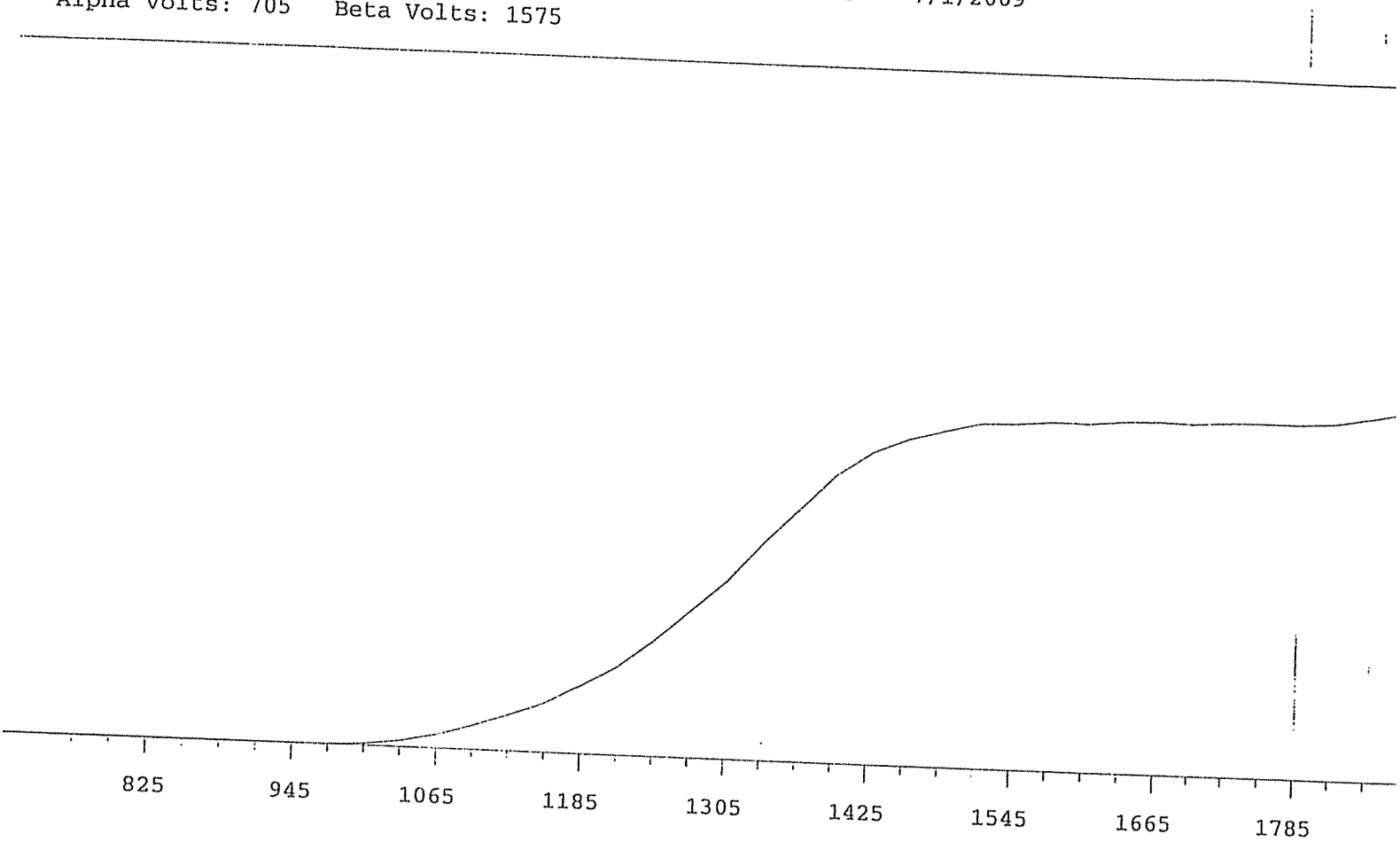
MPC 9600 Plateau Instrument 4 MPC 9604 Detector A 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	2	+55.56
855	1	>100
885	0	-55.56
915	3	>100
945	0	>100
975	16	>100
1005	114	>100
1035	451	>100
1065	1100	>100
1095	2068	>100
1125	3189	>100
1155	4386	>100
1185	6094	+94.81
1215	8184	+87.09
1245	10489	+78.88
1275	13273	+72.66

VOLTS	COUNTS	%/100 Volts
1305	16442	+66.24
1335	20146	+57.40
1365	23769	+46.40
1395	26926	+34.68
1425	29276	+24.40
1455	31037	+15.28
1485	32197	+7.91
1515	32425	+4.33
1545	32314	+2.14
1575	33071	+2.66
1605	32918	+2.52
1635	33435	+1.02
1665	33382	+0.73
1695	33349	+1.07
1725	33324	+1.28
1755	34001	+2.26
1785	33701	+3.08
1815	34304	+2.97
1845	34744	
1875	35012	

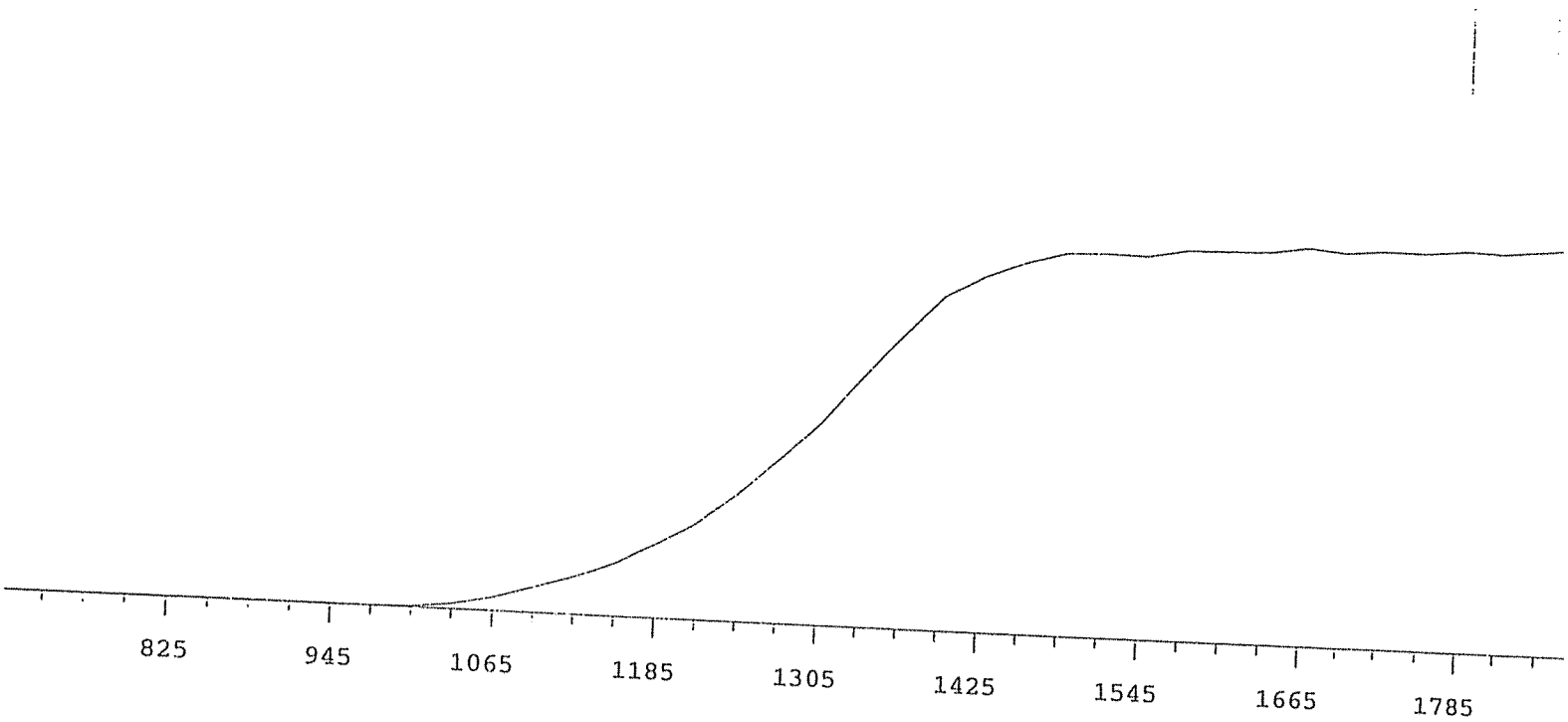
MPC 9600 Plateau Instrument 4 MPC 9604 Detector B 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+0.00
795	1	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	2	>100
975	31	>100
1005	176	>100
1035	550	>100
1065	1218	>100
1095	2114	>100
1125	3212	>100
1155	4416	>100
1185	6066	+92.28
1215	7936	+85.60
1245	10288	+76.79
1275	13020	+70.59

VOLTS	COUNTS	%/100 Volts
1305	15747	+62.38
1335	19230	+54.19
1365	22255	+44.46
1395	25299	+32.45
1425	27370	+22.24
1455	28625	+14.10
1485	29467	+8.56
1515	30213	+5.29
1545	30326	+2.77
1575	30564	+1.57
1605	30548	+1.52
1635	30820	+0.85
1665	30898	+0.79
1695	30779	+0.44
1725	30934	+0.45
1755	31008	+0.96
1785	30991	+2.01
1815	31196	+3.80
1845	31781	
1875	32406	

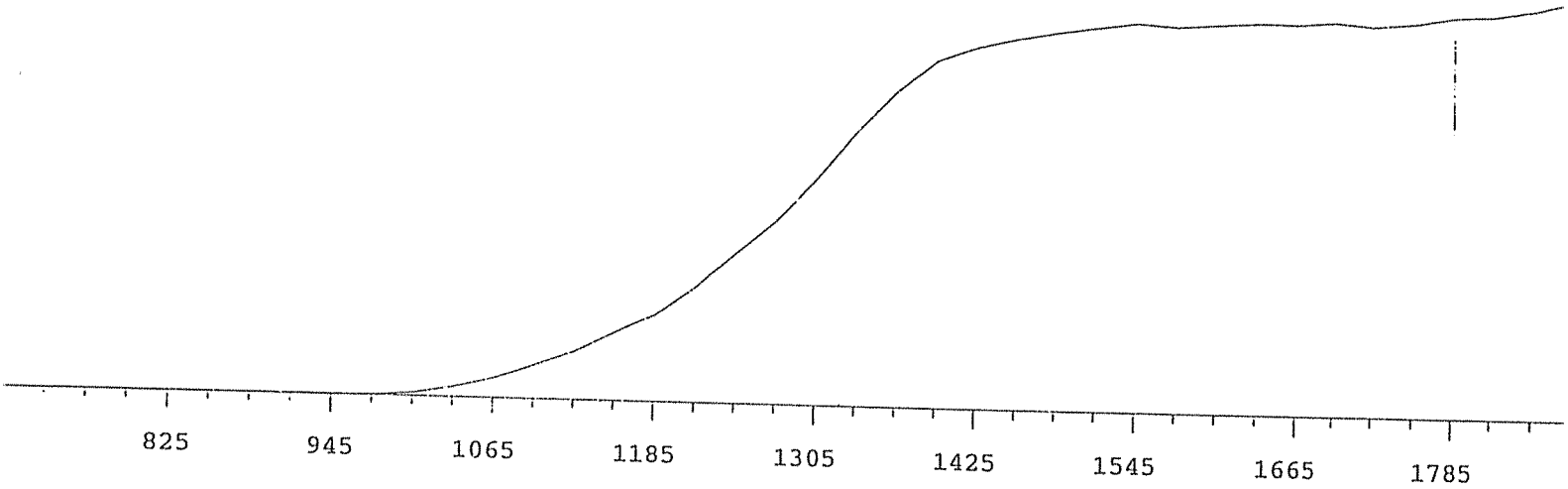
MPC 9600 Plateau Instrument 4 MPC 9604 Detector C 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+55.56
795	2	+0.00
825	0	-55.56
855	1	>100
885	0	>100
915	0	>100
945	2	>100
975	24	>100
1005	134	>100
1035	558	>100
1065	1361	>100
1095	2511	>100
1125	3762	>100
1155	5246	>100
1185	7268	+96.29
1215	9733	+88.98
1245	12701	+79.94
1275	16176	+73.13

VOLTS	COUNTS	%/100 Volts
1305	19796	+65.77
1335	24338	+57.55
1365	28686	+45.86
1395	32750	+32.27
1425	34919	+20.83
1455	36434	+11.45
1485	37487	+5.80
1515	37623	+3.32
1545	37528	+2.07
1575	38277	+2.12
1605	38338	+2.70
1635	38426	+1.12
1665	39007	+1.06
1695	38592	+0.64
1725	38870	+0.63
1755	38868	+1.30
1785	39238	+1.45
1815	39169	+2.34
1845	39570	
1875	40086	

MPC 9600 Plateau Instrument 4 MPC 9604 Detector D 7/1/2009
Alpha Volts: 705 Beta Volts: 1575

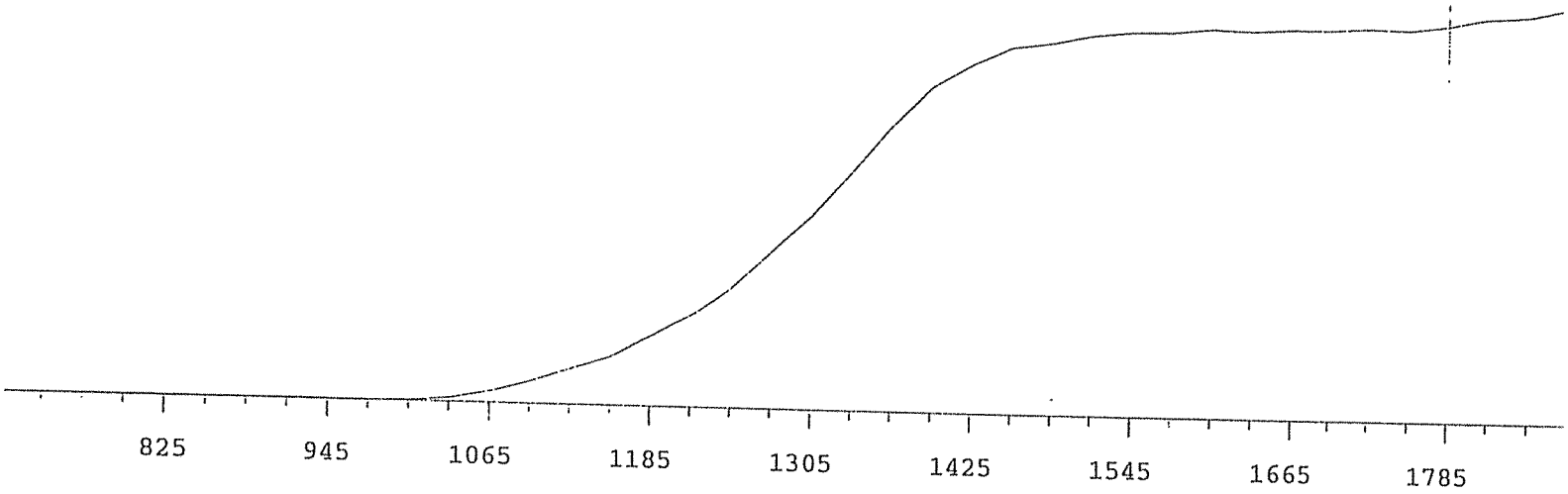


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	+0.00
795	0	>100
825	1	+83.33
855	1	+55.56
885	0	+0.00
915	1	>100
945	1	>100
975	60	>100
1005	297	>100
1035	855	>100
1065	1647	>100
1095	2700	>100
1125	3921	>100
1155	5471	+96.54
1185	7042	+90.21
1215	9405	+82.23
1245	12266	+76.33
1275	14989	+69.38

VOLTS	COUNTS	%/100 Volts
1305	18491	+61.09
1335	22444	+51.56
1365	25756	+37.44
1395	28379	+23.82
1425	29517	+14.00
1455	30309	+8.08
1485	30874	+6.03
1515	31345	+3.66
1545	31782	+2.17
1575	31567	+1.31
1605	31789	+0.78
1635	31963	+1.34
1665	31956	+0.29
1695	32123	+0.20
1725	31850	+1.46
1755	32114	+2.39
1785	32665	+3.95
1815	32876	+4.96
1845	33399	
1875	34206	

MPC 9600 Plateau Instrument 5 MPC 9604 Detector A 7/1/2009

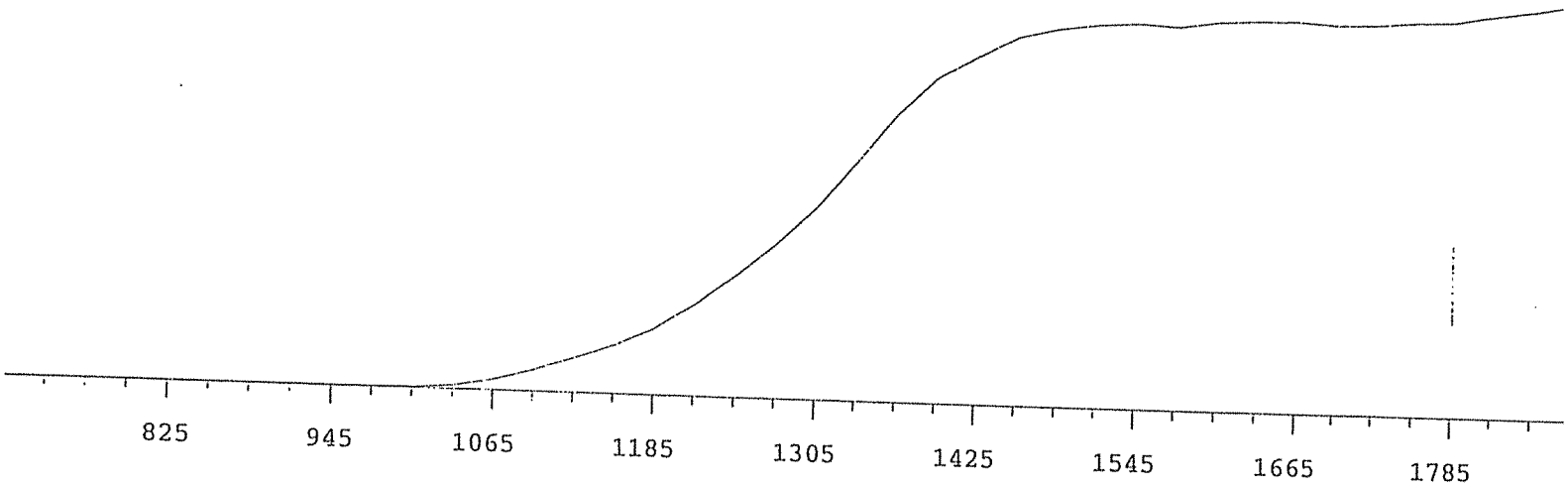
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	
795	1	+83.33
825	1	-83.33
855	1	>100
885	0	-55.56
915	0	>100
945	1	>100
975	9	>100
1005	76	>100
1035	308	>100
1065	814	>100
1095	1600	>100
1125	2598	>100
1155	3596	>100
1185	5065	+96.05
1215	6773	+90.23
1245	8717	+81.43
1275	11391	+74.83

VOLTS	COUNTS	%/100 Volts
1305	13974	+68.00
1335	17170	+58.62
1365	20456	+47.04
1395	23332	+33.83
1425	24996	+21.10
1455	26290	+12.40
1485	26683	+7.74
1515	27270	+4.43
1545	27590	+3.48
1575	27635	+1.71
1605	27932	+1.20
1635	27807	+0.88
1665	28006	+0.62
1695	27964	+0.63
1725	28112	+0.98
1755	28020	+2.84
1785	28392	+3.76
1815	29028	+5.17
1845	29220	
1875	29849	

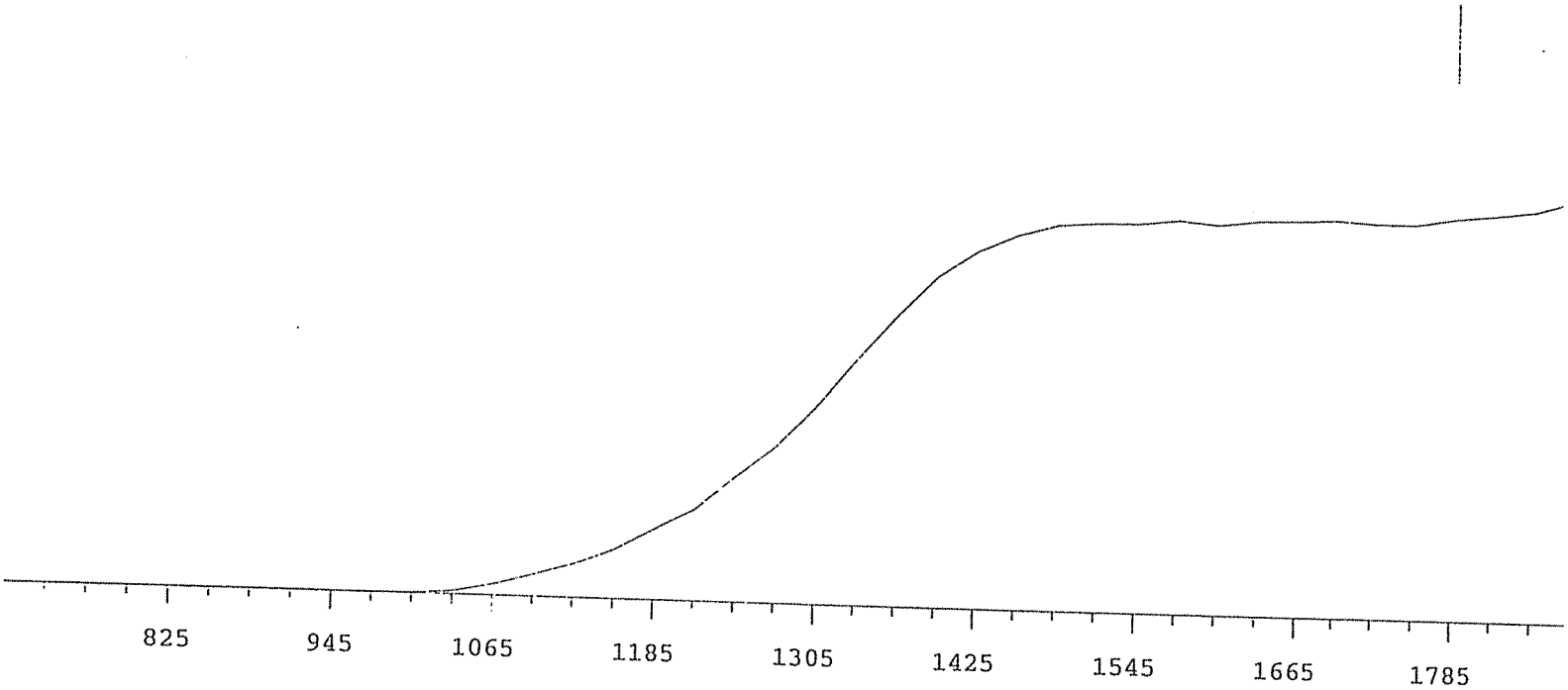
MPC 9600 Plateau Instrument 5 MPC 9604 Detector B 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	1	>100
855	1	+41.67
885	2	-33.33
915	0	>100
945	1	>100
975	17	>100
1005	87	>100
1035	336	>100
1065	1010	>100
1095	1955	>100
1125	3124	>100
1155	4486	>100
1185	6017	>100
1215	8507	+91.20
1245	11148	+82.59
1275	14003	+74.21

VOLTS	COUNTS	%/100 Volts
1305	17414	+68.46
1335	21540	+59.98
1365	25854	+46.75
1395	29222	+33.38
1425	31128	+21.52
1455	32995	+13.26
1485	33846	+8.09
1515	34289	+3.25
1545	34528	+2.00
1575	34311	+1.78
1605	34866	+1.78
1635	35046	+1.14
1665	35087	-0.26
1695	34795	+0.11
1725	34857	+0.93
1755	35220	+2.81
1785	35363	+3.98
1815	36028	+4.79
1845	36577	
1875	37207	

MPC 9600 Plateau Instrument 5 MPC 9604 Detector C 7/1/2009
Alpha Volts: 705 Beta Volts: 1575

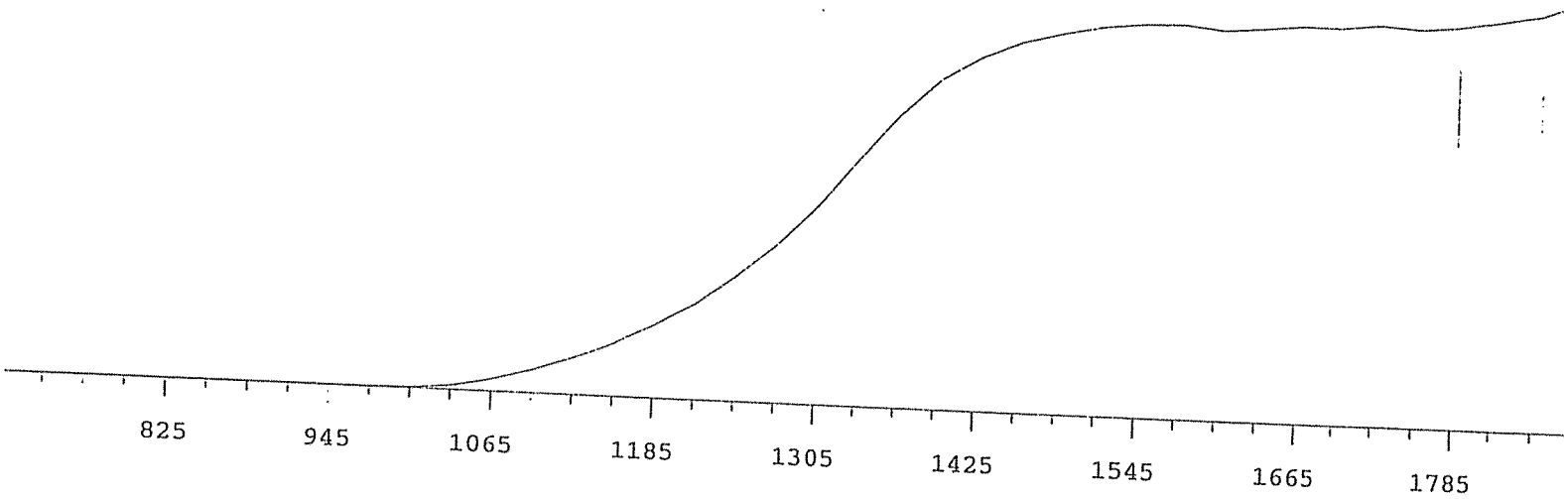


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	1	>100
885	0	>100
915	1	>100
945	2	>100
975	7	>100
1005	56	>100
1035	305	>100
1065	982	>100
1095	1874	>100
1125	2890	>100
1155	4260	>100
1185	6001	>100
1215	8050	+91.54
1245	10895	+82.98
1275	13556	+76.26

VOLTS	COUNTS	%/100 Volts
1305	17085	+68.24
1335	21135	+59.99
1365	25066	+47.39
1395	28530	+33.93
1425	30823	+22.30
1455	32287	+12.93
1485	33217	+6.71
1515	33474	+3.57
1545	33517	+1.17
1575	33921	+1.13
1605	33584	+1.27
1635	34014	+1.12
1665	34116	+0.98
1695	34225	-0.22
1725	33980	+0.58
1755	33971	+1.96
1785	34541	+3.64
1815	34954	+5.38
1845	35375	
1875	36384	

MPC 9600 Plateau Instrument 5 MPC 9604 Detector D 7/1/2009

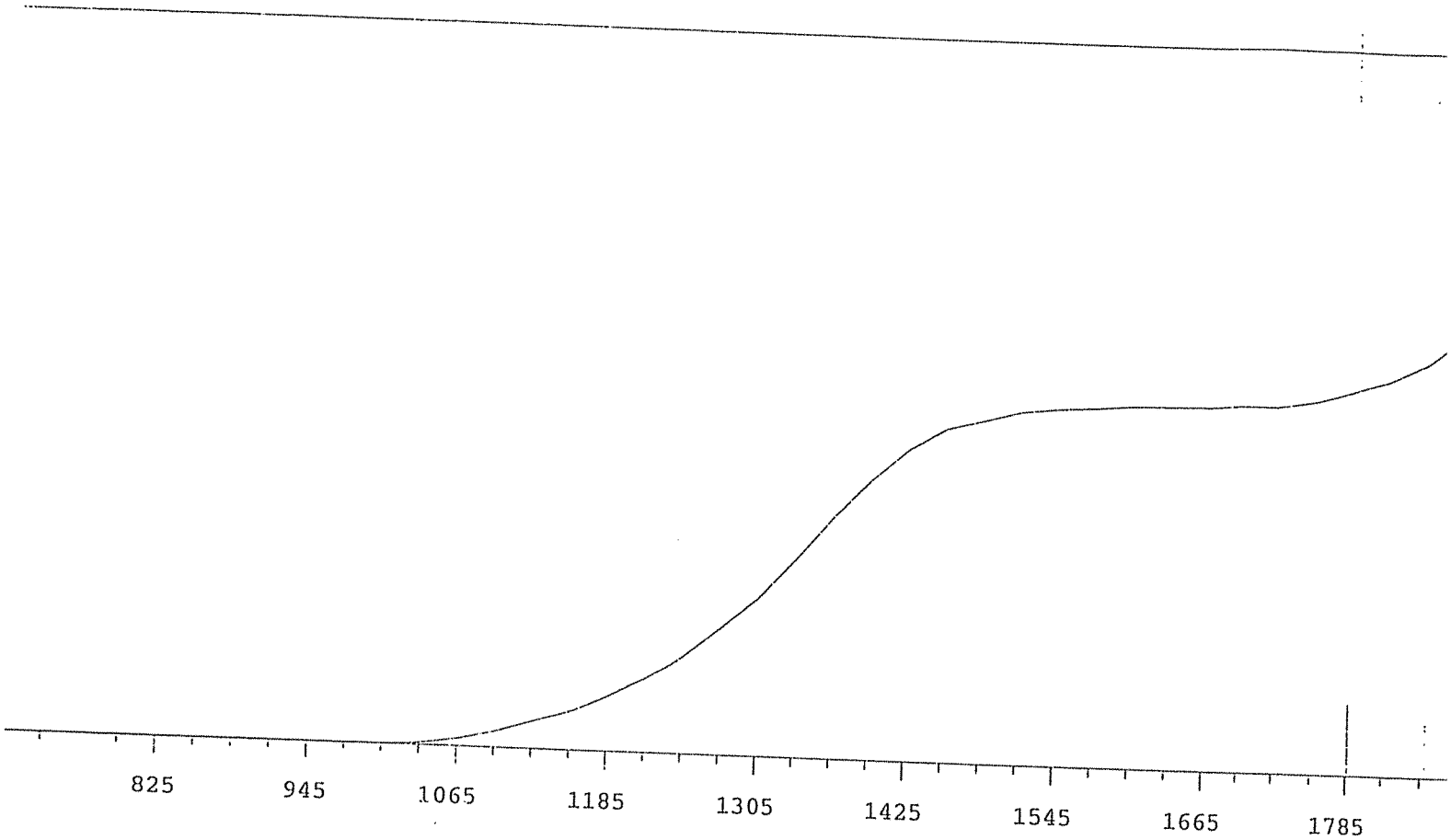
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	6	>100
1005	81	>100
1035	318	>100
1065	897	>100
1095	1710	>100
1125	2714	>100
1155	3925	>100
1185	5395	+97.31
1215	7282	+88.49
1245	9426	+81.36
1275	12007	+75.65

VOLTS	COUNTS	%/100 Volts
1305	15025	+68.87
1335	18640	+58.97
1365	22048	+45.84
1395	24877	+32.08
1425	26653	+20.83
1455	27899	+13.08
1485	28670	+8.43
1515	29257	+5.13
1545	29568	+2.06
1575	29683	+0.52
1605	29362	+0.57
1635	29589	+0.80
1665	29870	+1.82
1695	29783	+0.90
1725	30077	+0.75
1755	29889	+2.02
1785	30152	+3.33
1815	30656	+6.54
1845	31211	
1875	32389	

MPC 9600 Plateau Instrument 6 MPC 9604 Detector A 7/1/2009
Alpha Volts: 705 Beta Volts: 1575

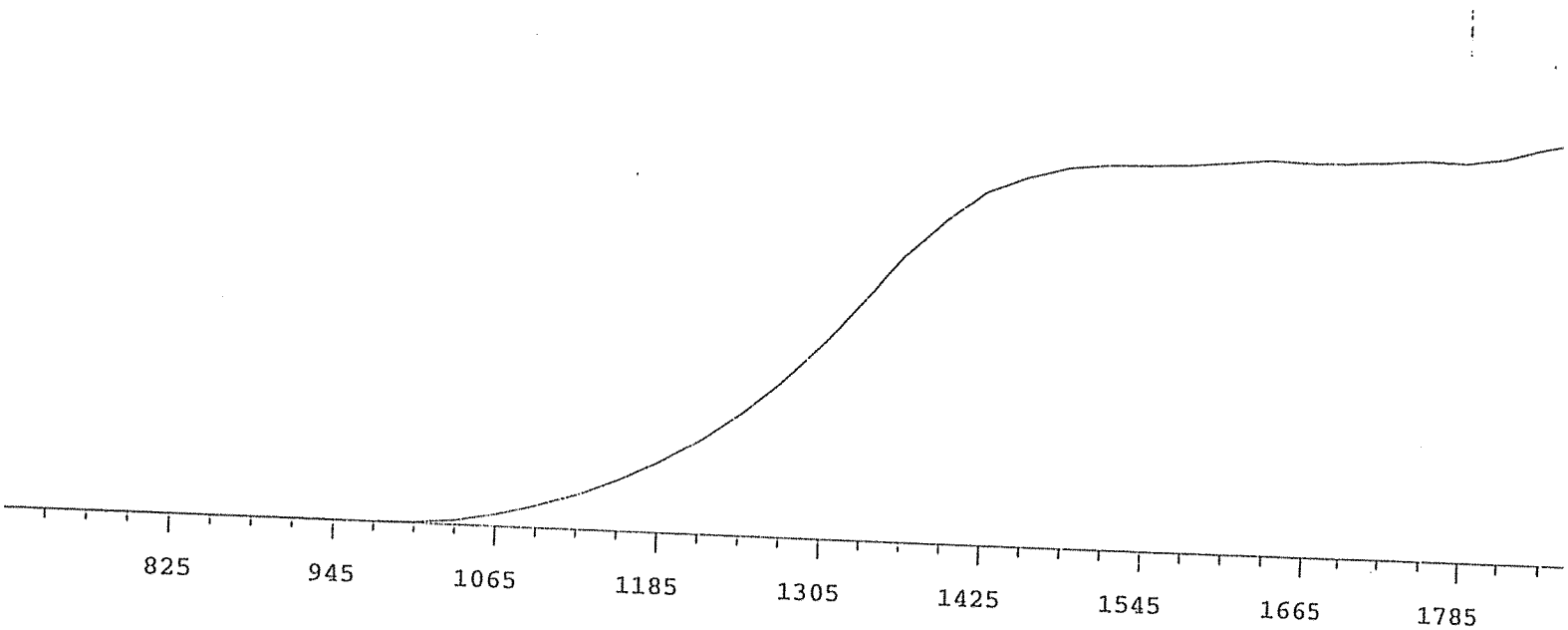


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	7	>100
1005	31	>100
1035	238	>100
1065	810	>100
1095	1637	>100
1125	2743	>100
1155	3932	>100
1185	5579	>100
1215	7602	+94.41
1245	10078	+84.86
1275	13091	+77.67

VOLTS	COUNTS	%/100 Volts
1305	16217	+71.57
1335	20184	+63.76
1365	24605	+53.98
1395	28528	+41.40
1425	31675	+28.02
1455	33899	+17.93
1485	34826	+10.65
1515	35815	+6.13
1545	36225	+4.15
1575	36456	+2.28
1605	36747	+1.47
1635	36801	+1.26
1665	36859	+0.85
1695	37095	+1.85
1725	37072	+4.01
1755	37724	+6.65
1785	38802	+10.33
1815	40036	+14.71
1845	41975	
1875	45123	

MPC 9600 Plateau Instrument 6 MPC 9604 Detector B 7/1/2009

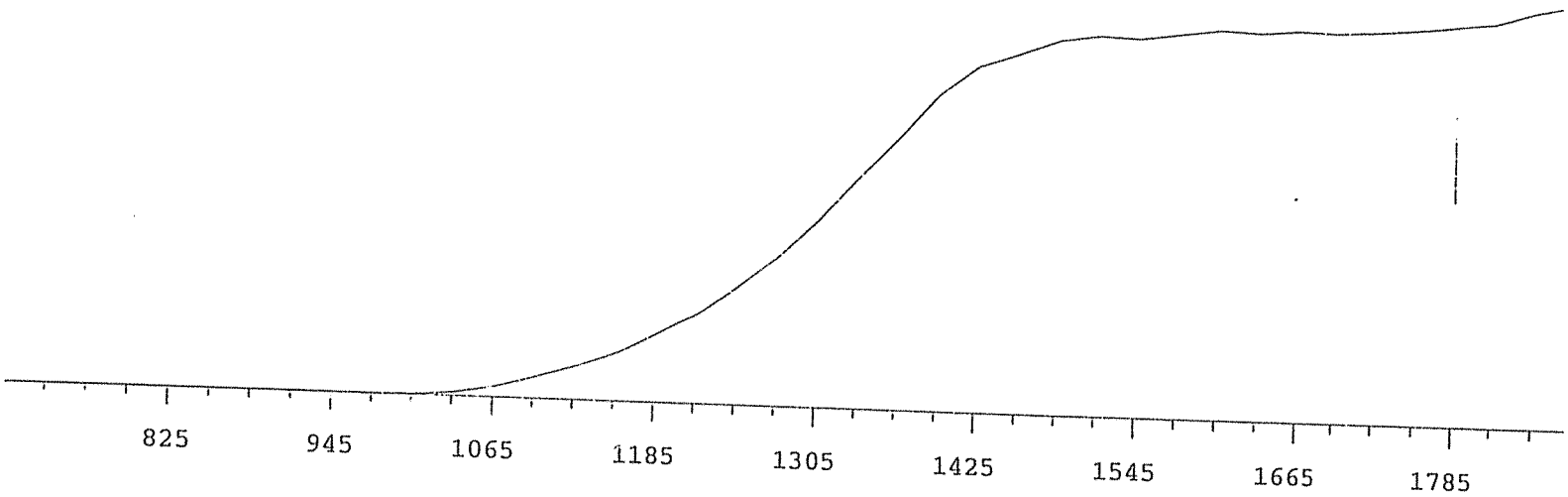
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	1	+83.33
855	1	-83.33
885	0	>100
915	0	>100
945	5	>100
975	18	>100
1005	125	>100
1035	482	>100
1065	1255	>100
1095	2318	>100
1125	3540	>100
1155	5288	>100
1185	7168	+98.51
1215	9760	+88.48
1245	12656	+81.52
1275	16065	+74.58

VOLTS	COUNTS	%/100 Volts
1305	20094	+68.67
1335	24665	+59.40
1365	29591	+47.86
1395	33376	+34.51
1425	36440	+22.50
1455	38024	+13.58
1485	39187	+7.04
1515	39608	+3.63
1545	39722	+2.10
1575	39894	+2.32
1605	40298	+2.09
1635	40711	+1.41
1665	40574	+0.80
1695	40608	+1.02
1725	40839	+1.28
1755	41201	+1.97
1785	41065	+3.74
1815	41711	+5.42
1845	42917	
1875	43699	

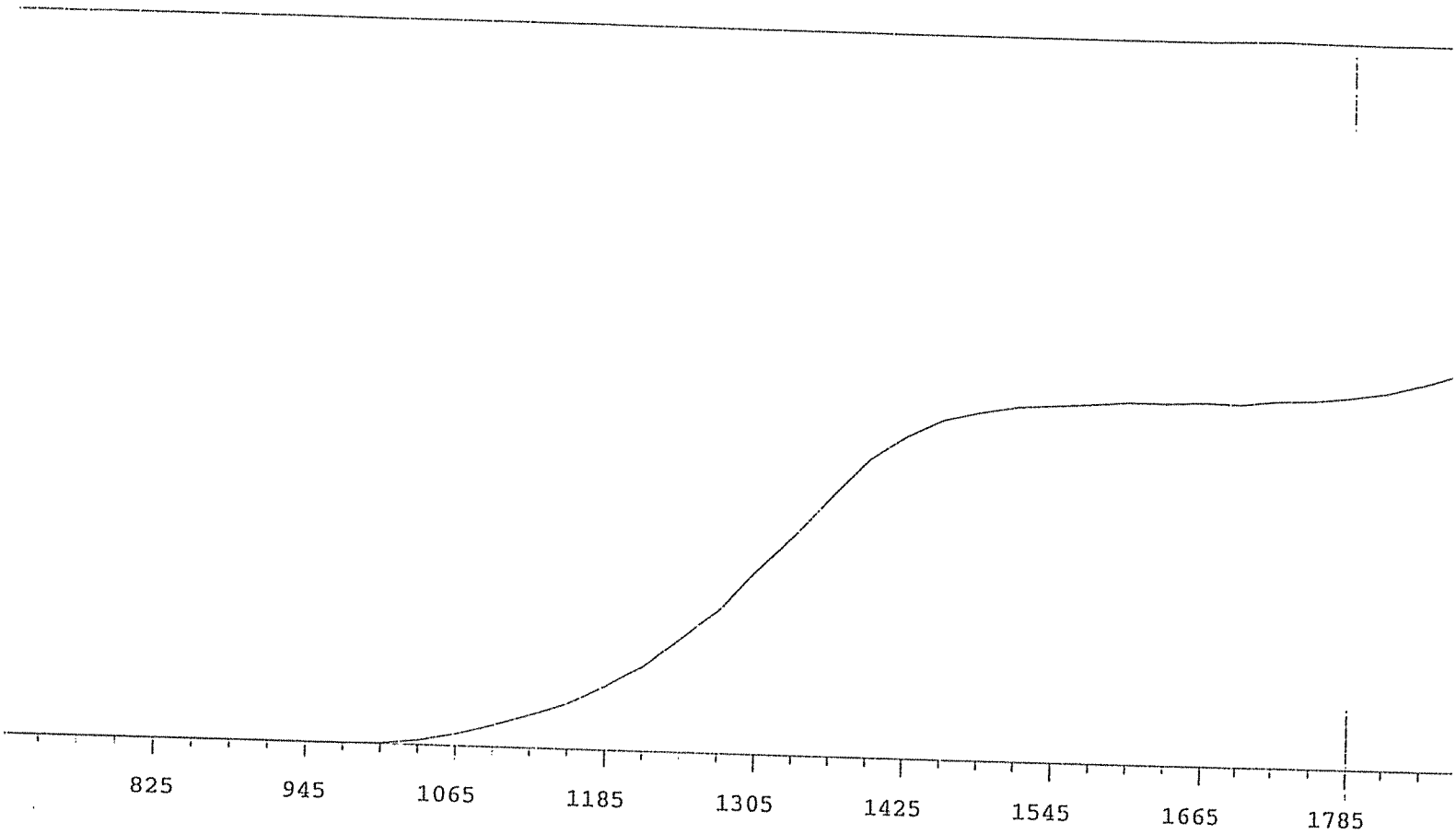
MPC 9600 Plateau Instrument 6 MPC 9604 Detector C 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	+0.00
795	0	>100
825	0	+0.00
855	0	>100
885	1	>100
915	1	>100
945	2	>100
975	8	>100
1005	70	>100
1035	353	>100
1065	990	>100
1095	1956	>100
1125	3024	>100
1155	4400	>100
1185	6173	+99.75
1215	8230	+89.85
1245	10904	+82.36
1275	13747	+76.18

VOLTS	COUNTS	%/100 Volts
1305	17350	+67.80
1335	21371	+60.27
1365	25084	+49.32
1395	29177	+36.15
1425	31927	+24.86
1455	33217	+14.70
1485	34545	+7.74
1515	35097	+4.64
1545	34927	+2.96
1575	35439	+2.21
1605	35939	+2.41
1635	35763	+0.94
1665	36053	+0.35
1695	35886	+1.15
1725	36066	+1.77
1755	36379	+3.03
1785	36768	+4.80
1815	37193	+6.14
1845	38320	
1875	39061	

MPC 9600 Plateau Instrument 6 MPC 9604 Detector D 7/1/2009
Alpha Volts: 705 Beta Volts: 1575

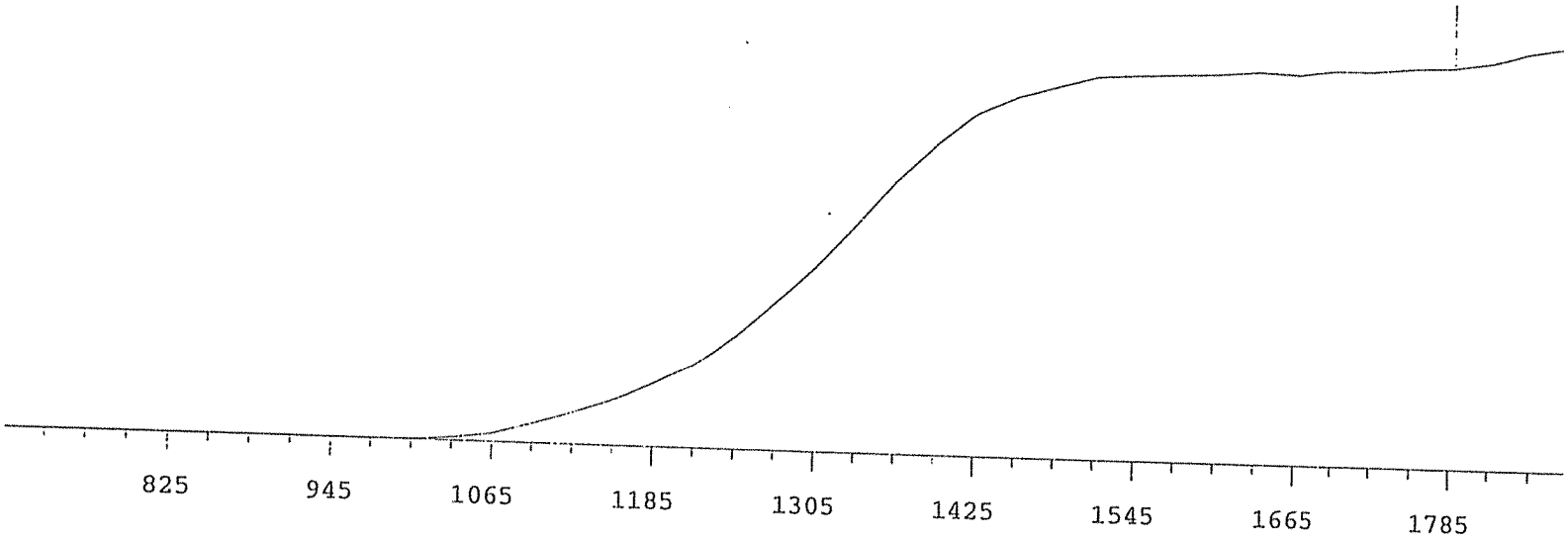


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	1	+0.00
825	0	>100
855	0	+0.00
885	0	>100
915	1	>100
945	0	>100
975	14	>100
1005	109	>100
1035	481	>100
1065	1177	>100
1095	2133	>100
1125	3243	>100
1155	4554	>100
1185	6285	+98.38
1215	8468	+89.75
1245	11266	+83.13
1275	14088	+74.43

VOLTS	COUNTS	%/100 Volts
1305	17954	+65.82
1335	21482	+57.64
1365	25373	+45.78
1395	29042	+34.80
1425	31373	+23.29
1455	33143	+14.25
1485	34006	+8.49
1515	34662	+4.71
1545	34892	+3.14
1575	35129	+1.86
1605	35411	+1.49
1635	35380	+0.62
1665	35554	+0.65
1695	35385	+1.18
1725	35755	+1.89
1755	35907	+3.26
1785	36305	+4.62
1815	36870	+6.98
1845	37807	
1875	39047	

MPC 9600 Plateau Instrument 7 MPC 9604 Detector A 7/1/2009

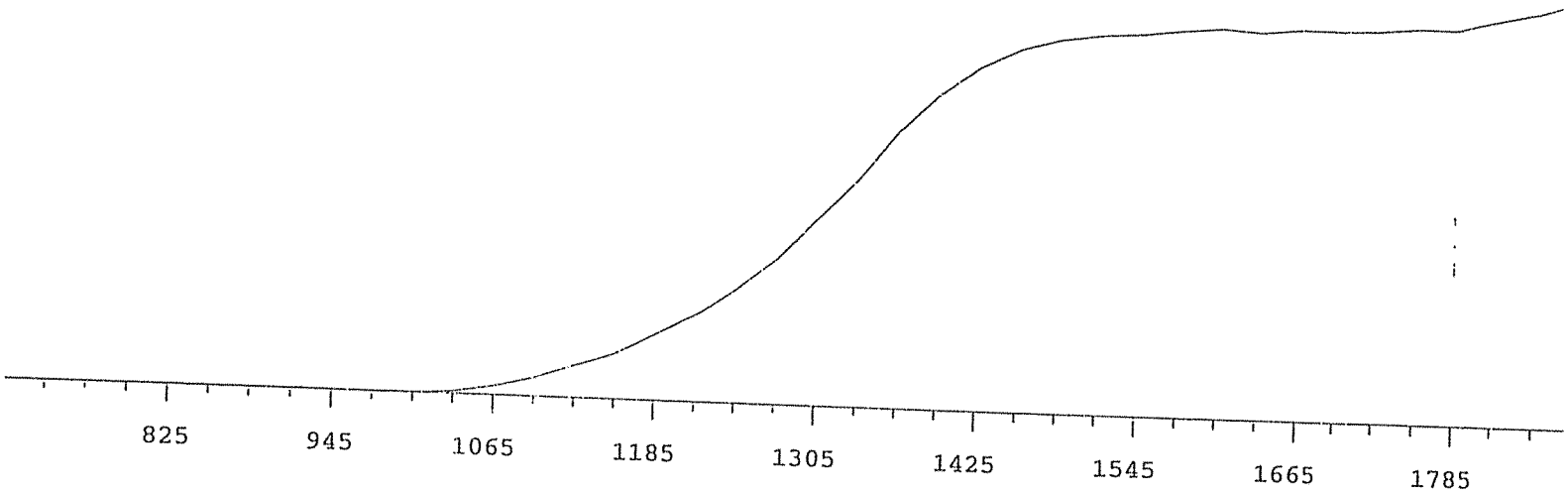
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	1	+83.33
855	1	-83.33
885	0	-55.56
915	0	>100
945	1	>100
975	3	>100
1005	42	>100
1035	242	>100
1065	613	>100
1095	1353	>100
1125	2213	>100
1155	3256	>100
1185	4474	>100
1215	5932	+94.10
1245	8072	+87.32
1275	10579	+79.61

VOLTS	COUNTS	%/100 Volts
1305	13228	+70.36
1335	16271	+60.12
1365	19506	+49.19
1395	22188	+36.46
1425	24373	+24.43
1455	25649	+15.99
1485	26433	+9.58
1515	27195	+5.74
1545	27367	+3.24
1575	27490	+1.86
1605	27608	+1.22
1635	27841	+1.33
1665	27695	+1.11
1695	27999	+1.42
1725	27992	+2.04
1755	28289	+2.52
1785	28408	+4.56
1815	28863	+5.70
1845	29664	
1875	30148	

MPC 9600 Plateau Instrument 7 MPC 9604 Detector B 7/1/2009
Alpha Volts: 705 Beta Volts: 1575

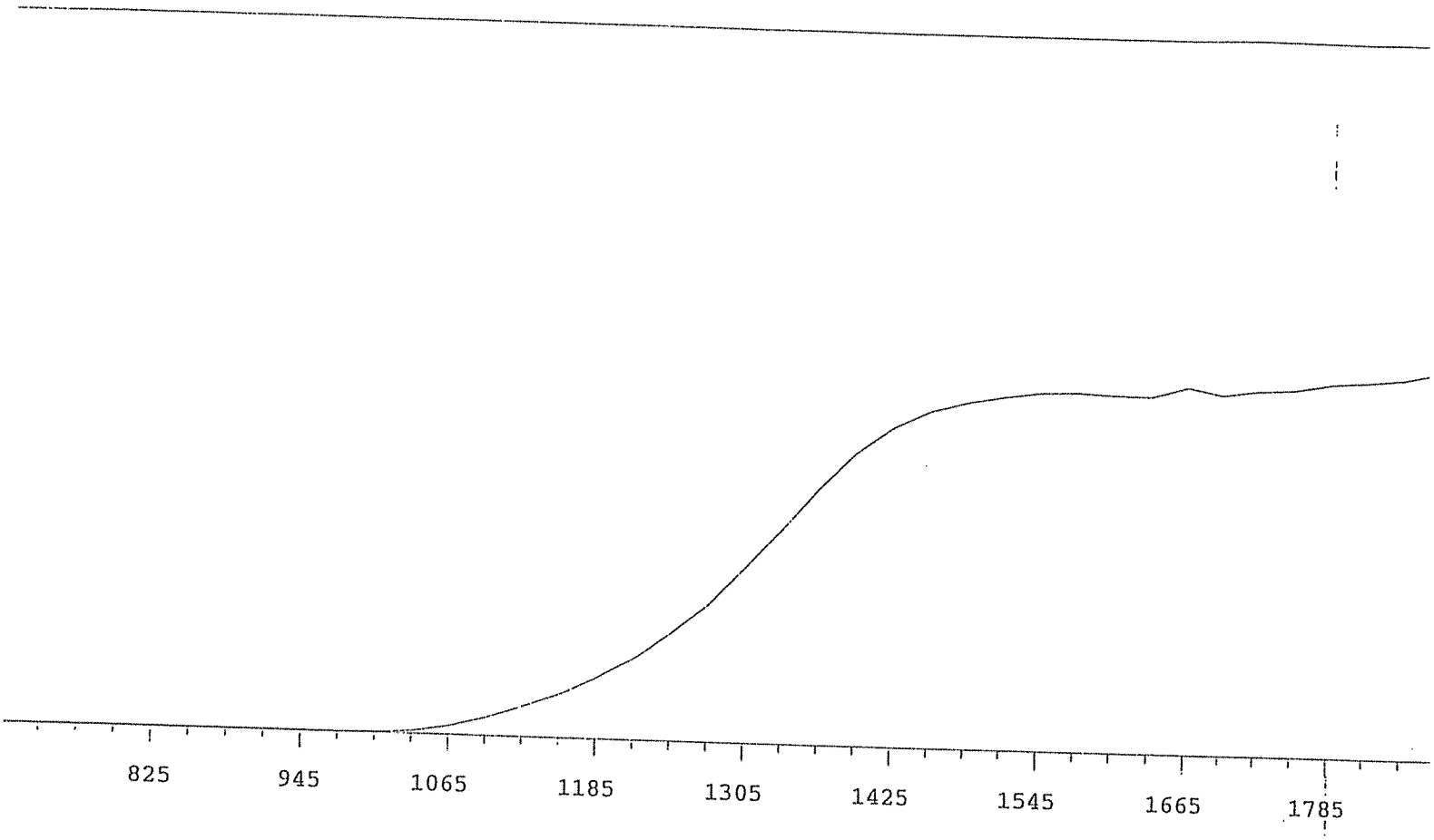


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	1	>100
975	3	>100
1005	34	>100
1035	221	>100
1065	825	>100
1095	1709	>100
1125	2873	>100
1155	4078	>100
1185	5858	>100
1215	7809	+91.82
1245	10336	+85.02
1275	13215	+77.79

VOLTS	COUNTS	%/100 Volts
1305	16978	+70.97
1335	20569	+61.39
1365	24989	+48.97
1395	28389	+36.69
1425	30977	+24.05
1455	32727	+14.93
1485	33697	+8.42
1515	34195	+4.89
1545	34437	+3.49
1575	34850	+2.11
1605	35174	+1.62
1635	34923	+0.68
1665	35250	+0.35
1695	35171	+1.24
1725	35237	+1.02
1755	35584	+2.79
1785	35587	+4.59
1815	36485	+6.74
1845	37270	
1875	38453	

MPC 9600 Plateau Instrument 7 MPC 9604 Detector C 7/1/2009

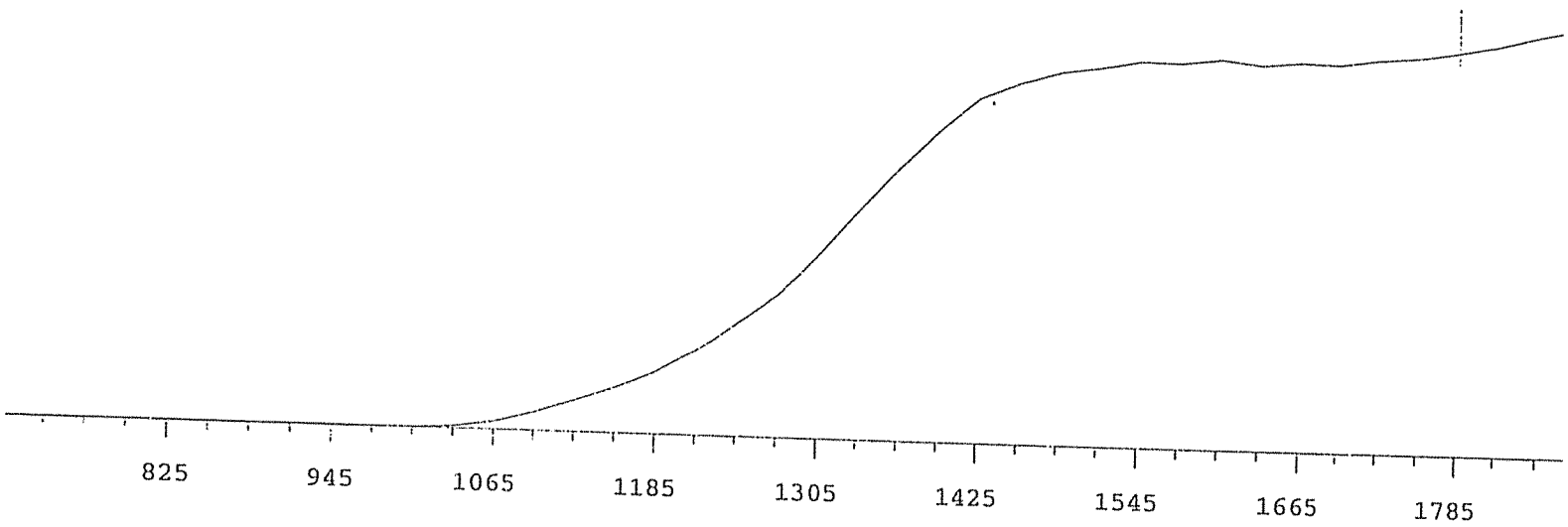
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	4	>100
1005	57	>100
1035	277	>100
1065	817	>100
1095	1666	>100
1125	2766	>100
1155	4077	>100
1185	5667	>100
1215	7694	+91.50
1245	10209	+84.83
1275	12950	+77.50

VOLTS	COUNTS	%/100 Volts
1305	16543	+70.03
1335	20257	+60.71
1365	24245	+48.17
1395	27602	+35.50
1425	30019	+23.48
1455	31614	+14.53
1485	32522	+8.91
1515	33103	+5.28
1545	33572	+2.60
1575	33695	+0.70
1605	33525	+1.48
1635	33477	+0.99
1665	34432	+1.49
1695	33745	+1.43
1725	34149	+1.60
1755	34350	+3.69
1785	34955	+3.62
1815	35251	+4.44
1845	35592	
1875	36382	

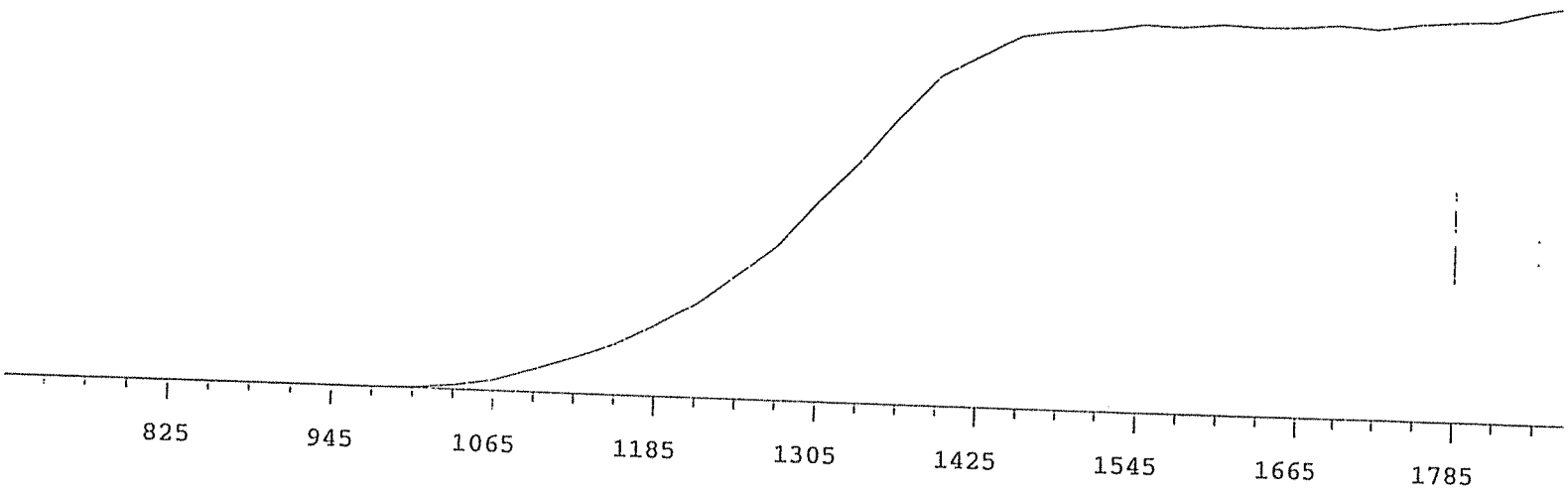
MPC 9600 Plateau Instrument 7 MPC 9604 Detector D 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	5	>100
1005	29	>100
1035	204	>100
1065	609	>100
1095	1354	>100
1125	2316	>100
1155	3418	>100
1185	4654	>100
1215	6455	+92.99
1245	8669	+86.45
1275	10931	+79.15

VOLTS	COUNTS	%/100 Volts
1305	14016	+71.42
1335	17436	+62.21
1365	20814	+50.32
1395	23760	+36.91
1425	26302	+24.91
1455	27519	+15.17
1485	28410	+8.91
1515	28843	+5.41
1545	29396	+3.58
1575	29357	+1.54
1605	29719	+0.51
1635	29358	+0.23
1665	29623	+0.57
1695	29509	+2.12
1725	29896	+2.84
1755	30165	+4.42
1785	30570	+5.65
1815	31180	+6.95
1845	31995	
1875	32717	

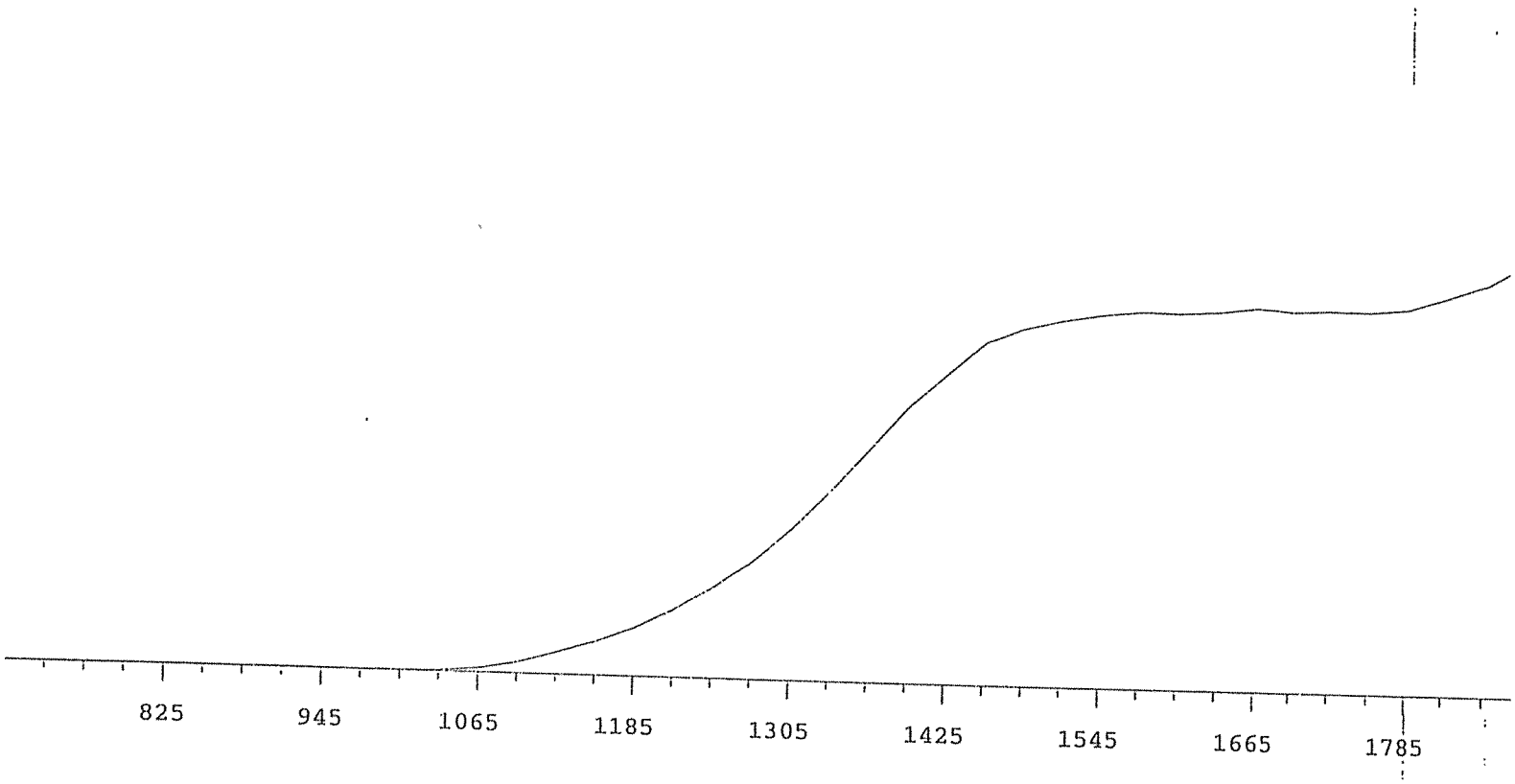
MPC 9600 Plateau Instrument 8 MPC 9604 Detector A 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	>100
975	9	>100
1005	96	>100
1035	468	>100
1065	1084	>100
1095	2286	>100
1125	3479	>100
1155	4912	>100
1185	6819	+98.23
1215	9153	+89.05
1245	12105	+83.21
1275	15122	+75.24

VOLTS	COUNTS	%/100 Volts
1305	19482	+67.45
1335	23344	+59.35
1365	27793	+45.86
1395	31916	+34.29
1425	33979	+21.61
1455	35993	+11.71
1485	36530	+7.04
1515	36796	+3.11
1545	37393	+2.44
1575	37279	+1.41
1605	37650	+0.49
1635	37458	+0.91
1665	37579	+0.12
1695	37828	+1.10
1725	37535	+1.72
1755	38104	+2.18
1785	38416	+4.12
1815	38633	+4.92
1845	39649	
1875	40366	

MPC 9600 Plateau Instrument 8 MPC 9604 Detector B 7/1/2009
Alpha Volts: 705 Beta Volts: 1575

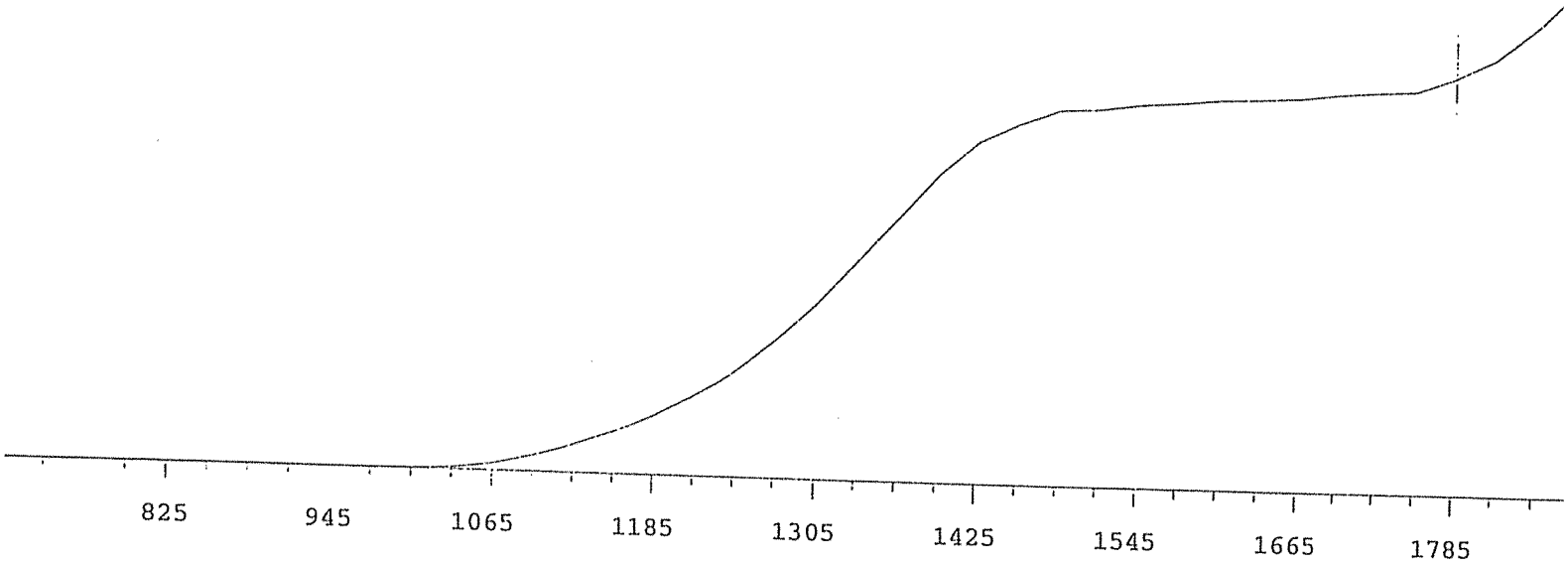


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	0	>100
1005	20	>100
1035	122	>100
1065	511	>100
1095	1263	>100
1125	2390	>100
1155	3641	>100
1185	5246	>100
1215	7212	+98.32
1245	9897	+89.80
1275	12742	+82.40

VOLTS	COUNTS	%/100 Volts
1305	16337	+74.91
1335	20471	+68.07
1365	25012	+57.86
1395	29694	+47.48
1425	33409	+35.17
1455	37013	+23.27
1485	38629	+14.35
1515	39529	+7.69
1545	40284	+4.34
1575	40711	+2.52
1605	40642	+1.97
1635	40879	+1.11
1665	41405	+0.98
1695	41011	+0.30
1725	41182	+0.41
1755	41178	+3.28
1785	41573	+6.47
1815	42858	+10.82
1845	44440	
1875	46780	

MPC 9600 Plateau Instrument 8 MPC 9604 Detector C 7/1/2009

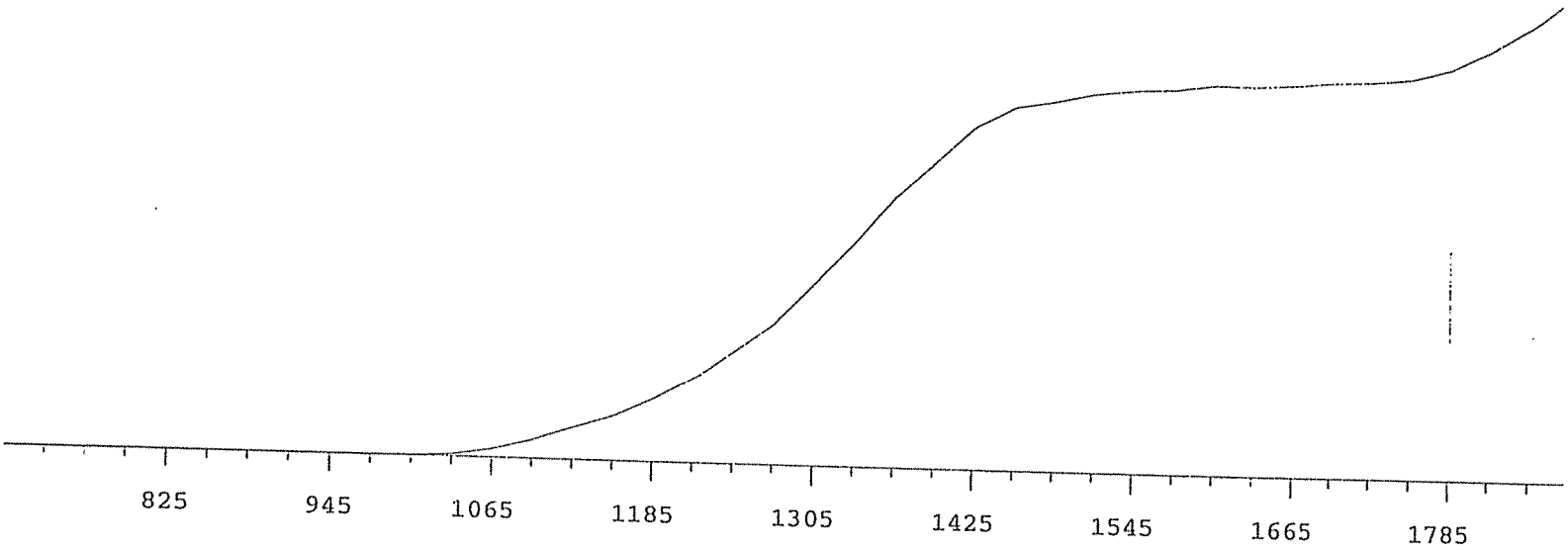
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	4	>100
1005	46	>100
1035	202	>100
1065	697	>100
1095	1532	>100
1125	2614	>100
1155	3953	>100
1185	5474	>100
1215	7466	+93.09
1245	9842	+86.73
1275	12814	+80.29

VOLTS	COUNTS	%/100 Volts
1305	16303	+72.82
1335	20309	+64.32
1365	24364	+53.82
1395	28527	+40.95
1425	31774	+28.74
1455	33631	+16.87
1485	35030	+9.25
1515	35208	+5.21
1545	35741	+3.27
1575	36019	+2.95
1605	36373	+2.21
1635	36484	+2.27
1665	36713	+2.28
1695	37093	+2.46
1725	37325	+4.17
1755	37543	+7.52
1785	38833	+13.43
1815	40656	+19.49
1845	43753	
1875	47246	

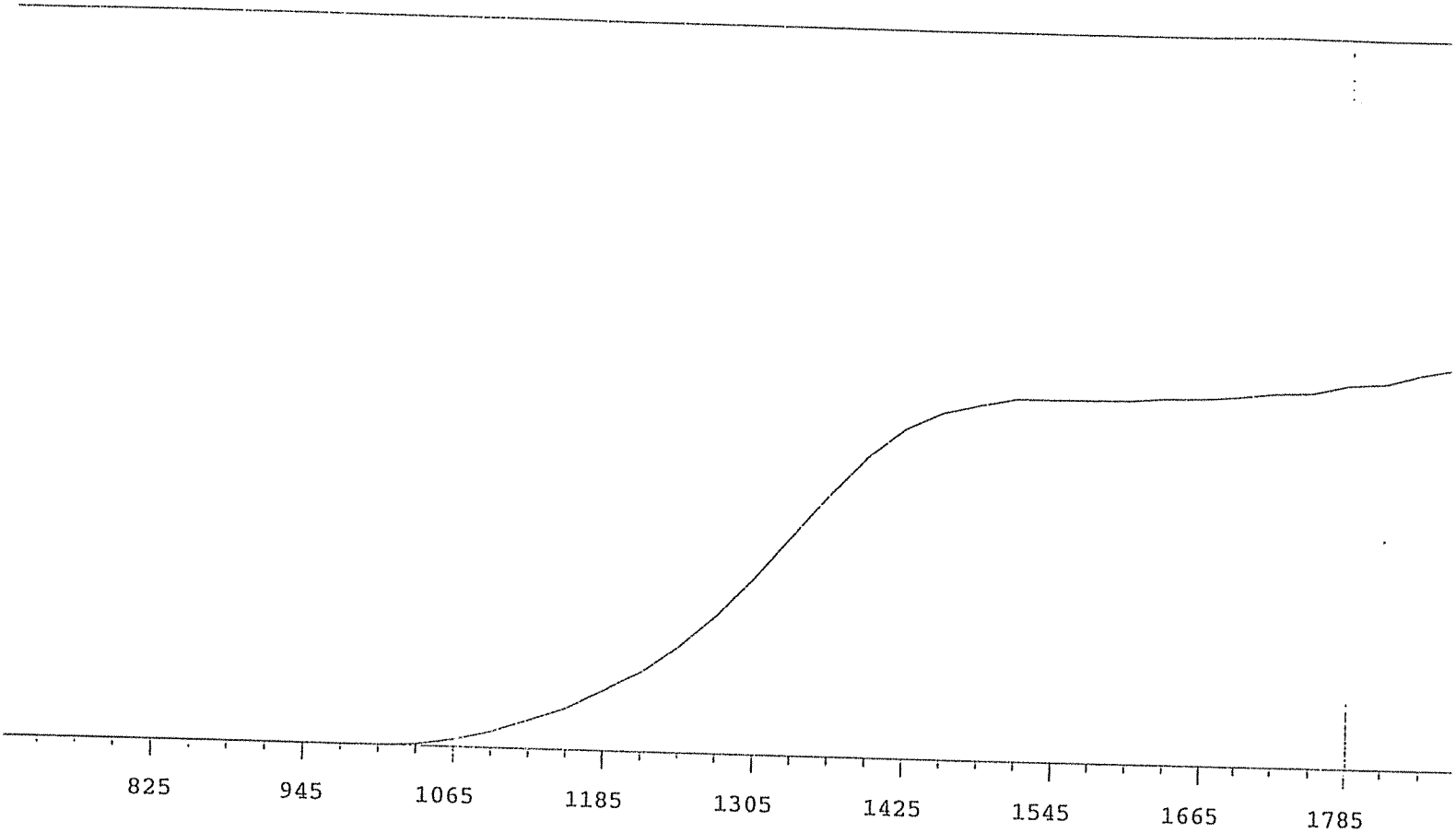
MPC 9600 Plateau Instrument 8 MPC 9604 Detector D 7/1/2009
Alpha Volts: 705 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	+0.00
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	5	>100
1005	47	>100
1035	243	>100
1065	792	>100
1095	1744	>100
1125	2933	>100
1155	4123	>100
1185	5780	>100
1215	7791	+91.58
1245	10478	+84.93
1275	13118	+77.50

VOLTS	COUNTS	%/100 Volts
1305	16889	+70.18
1335	20600	+61.29
1365	24824	+50.40
1395	28208	+38.85
1425	31539	+25.79
1455	33391	+16.06
1485	33991	+8.60
1515	34782	+5.01
1545	35201	+4.10
1575	35380	+2.50
1605	35849	+1.87
1635	35784	+1.79
1665	36000	+1.43
1695	36269	+2.10
1725	36381	+3.46
1755	36733	+6.86
1785	37669	+11.78
1815	39465	+16.64
1845	41803	
1875	44665	

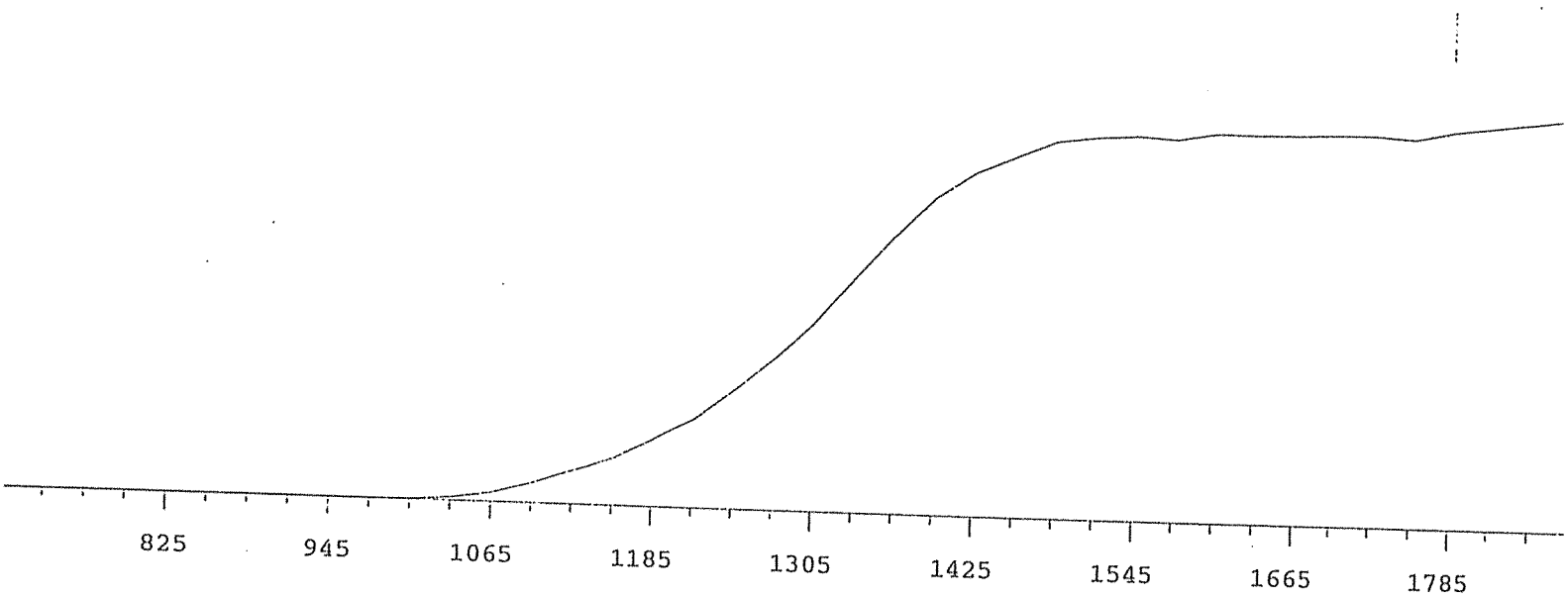
MPC 9600 Plateau Instrument 9 MPC 9604 Detector A 7/1/2009
Alpha Volts: 870 Beta Volts: 1530



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	+0.00
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	2	>100
1005	33	>100
1035	203	>100
1065	668	>100
1095	1403	>100
1125	2545	>100
1155	3800	>100
1185	5363	>100
1215	7355	+95.00
1245	9807	+87.69
1275	12700	+80.28

VOLTS	COUNTS	%/100 Volts
1305	16226	+71.71
1335	20083	+61.95
1365	23913	+49.99
1395	27526	+36.97
1425	30193	+24.54
1455	31747	+14.71
1485	32544	+7.71
1515	33198	+3.66
1545	33188	+1.51
1575	33227	+0.73
1605	33278	+1.04
1635	33518	+1.38
1665	33565	+1.95
1695	33774	+1.99
1725	34135	+3.30
1755	34244	+3.67
1785	35022	+4.84
1815	35229	+5.93
1845	36179	
1875	36821	

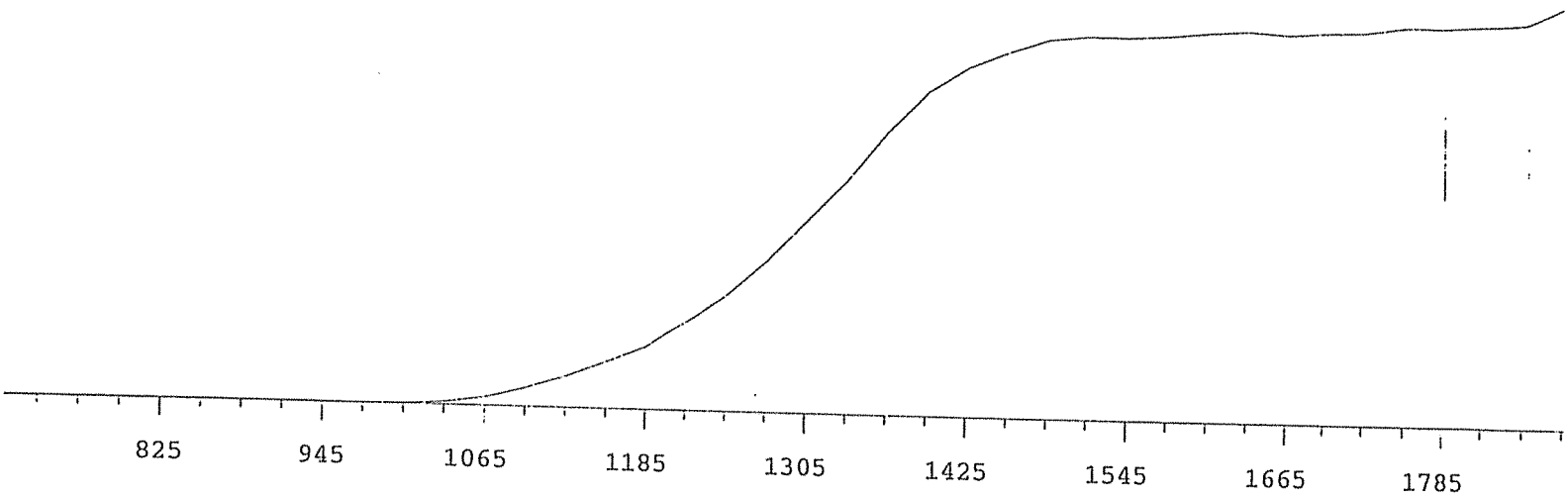
MPC 9600 Plateau Instrument 9 MPC 9604 Detector B 7/1/2009
Alpha Volts: 870 Beta Volts: 1530



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	4	>100
1005	45	>100
1035	300	>100
1065	836	>100
1095	1742	>100
1125	2896	>100
1155	4198	>100
1185	5849	>100
1215	7887	+92.20
1245	10561	+83.55
1275	13442	+76.62

VOLTS	COUNTS	%/100 Volts
1305	16723	+68.78
1335	20749	+60.55
1365	24686	+48.78
1395	28343	+35.24
1425	30657	+24.31
1455	32208	+15.22
1485	33662	+9.32
1515	34098	+4.47
1545	34326	+2.17
1575	34133	+1.60
1605	34758	+1.41
1635	34706	+1.35
1665	34769	+0.30
1695	34830	-0.10
1725	34850	+0.90
1755	34613	+2.41
1785	35351	+3.87
1815	35849	+4.97
1845	36285	
1875	36814	

MPC 9600 Plateau Instrument 9 MPC 9604 Detector C 7/1/2009
Alpha Volts: 870 Beta Volts: 1530

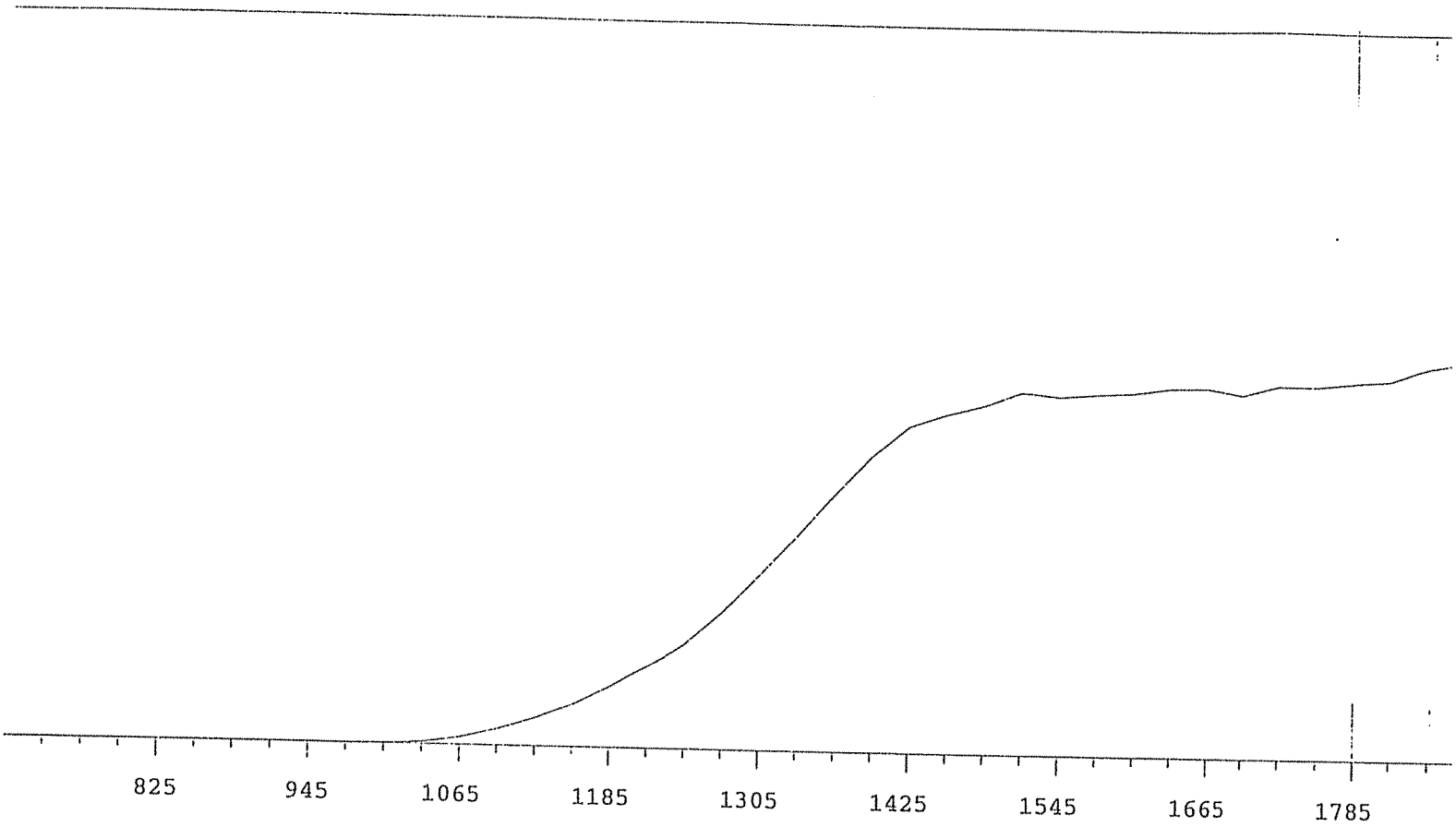


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	>100
915	1	>100
945	2	>100
975	3	>100
1005	64	>100
1035	349	>100
1065	970	>100
1095	1982	>100
1125	3328	>100
1155	5012	>100
1185	6669	>100
1215	9448	+92.67
1245	12293	+86.58
1275	15917	+76.99

VOLTS	COUNTS	%/100 Volts
1305	20192	+70.39
1335	24524	+60.97
1365	29650	+48.44
1395	33904	+35.09
1425	36549	+22.73
1455	38217	+13.58
1485	39628	+7.51
1515	40035	+3.73
1545	40020	+1.92
1575	40236	+2.06
1605	40680	+1.62
1635	40953	+1.03
1665	40643	+0.43
1695	40882	+1.41
1725	40979	+2.18
1755	41654	+2.20
1785	41602	+2.27
1815	41935	+4.50
1845	42259	
1875	44183	

MPC 9600 Plateau Instrument 9 MPC 9604 Detector D 7/1/2009

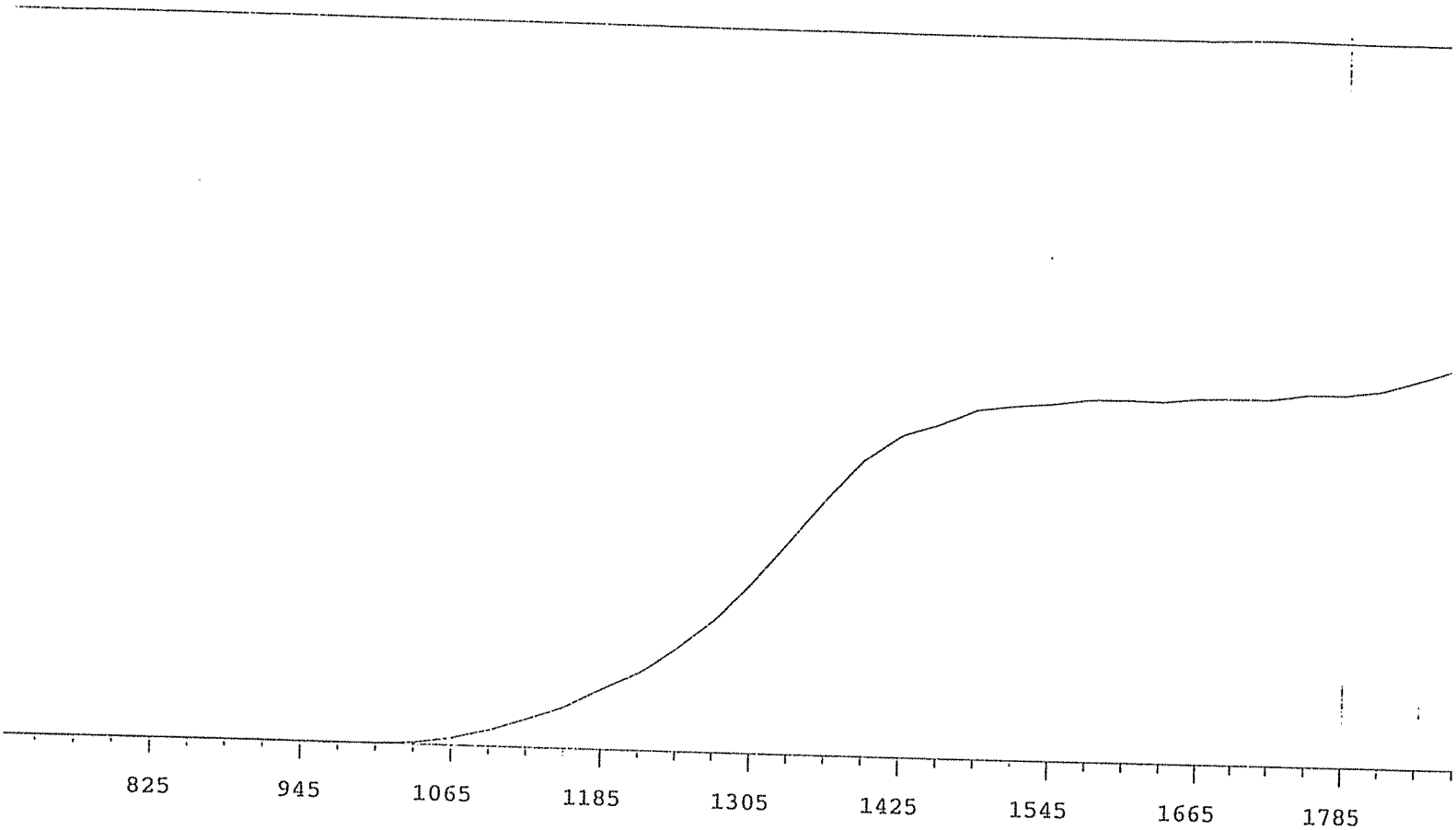
Alpha Volts: 870 Beta Volts: 1530



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	5	>100
1005	35	>100
1035	186	>100
1065	618	>100
1095	1280	>100
1125	2141	>100
1155	3268	>100
1185	4659	>100
1215	6343	+90.68
1245	8064	+83.46
1275	10497	+77.03

VOLTS	COUNTS	%/100 Volts
1305	13319	+70.94
1335	16319	+61.35
1365	19577	+50.27
1395	22498	+36.85
1425	24782	+23.90
1455	25761	+15.37
1485	26486	+8.38
1515	27503	+5.11
1545	27223	+2.67
1575	27453	+1.71
1605	27604	+2.70
1635	28021	+0.78
1665	28059	+1.05
1695	27548	+0.90
1725	28280	+2.16
1755	28290	+3.51
1785	28600	+4.46
1815	28879	+6.35
1845	29913	
1875	30417	

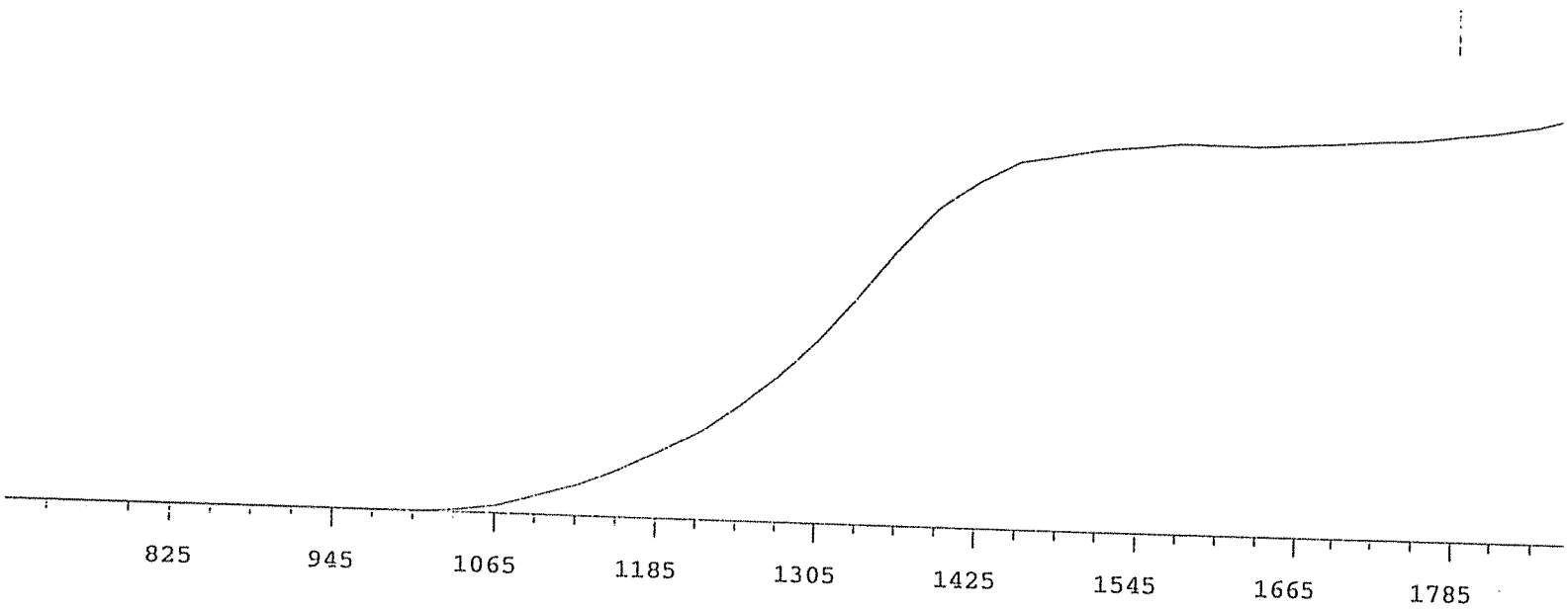
MPC 9600 Plateau Instrument 10 MPC 9604 Detector A 7/1/2009
Alpha Volts: 870 Beta Volts: 1552



VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	1	>100
1005	37	>100
1035	198	>100
1065	687	>100
1095	1491	>100
1125	2580	>100
1155	3920	>100
1185	5588	>100
1215	7384	+91.32
1245	9794	+84.81
1275	12572	+79.73

VOLTS	COUNTS	%/100 Volts
1305	16076	+72.76
1335	19985	+63.85
1365	24102	+50.95
1395	27819	+36.01
1425	30228	+23.86
1455	31343	+14.40
1485	32811	+8.77
1515	33243	+6.10
1545	33518	+3.25
1575	34010	+1.98
1605	34061	+1.59
1635	33973	+0.97
1665	34346	+0.93
1695	34366	+1.72
1725	34341	+1.54
1755	34860	+2.47
1785	34897	+4.50
1815	35377	+6.60
1845	36458	
1875	37630	

MPC 9600 Plateau Instrument 10 MPC 9604 Detector B 7/1/2009
Alpha Volts: 870 Beta Volts: 1552

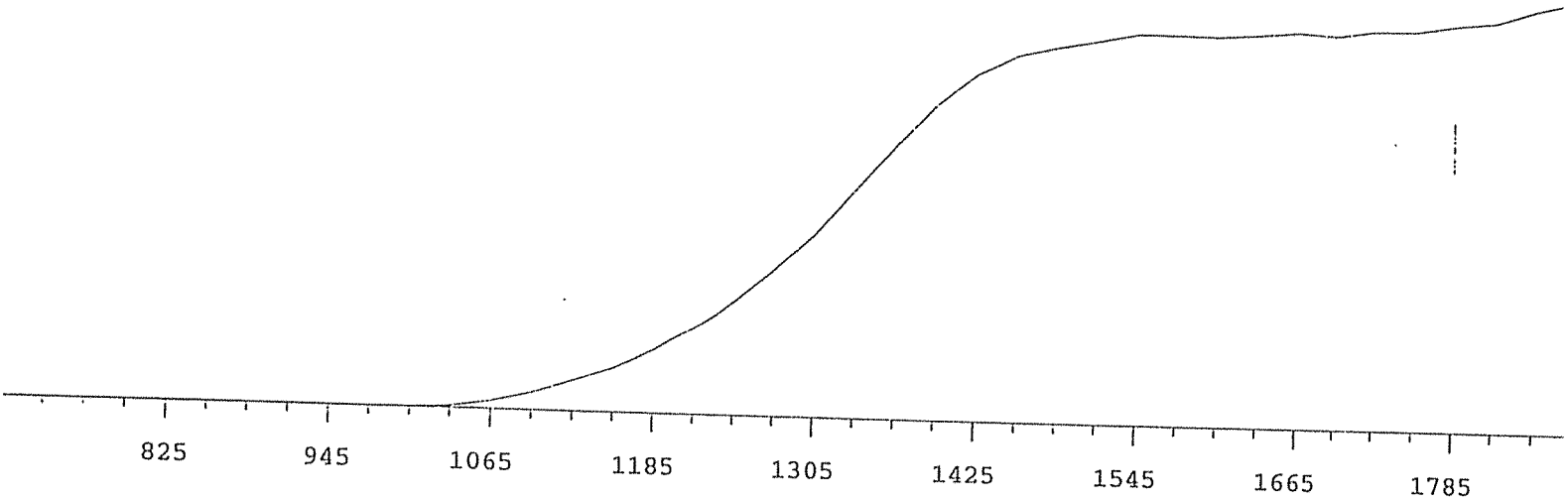


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	>100
975	7	>100
1005	28	>100
1035	190	>100
1065	597	>100
1095	1474	>100
1125	2383	>100
1155	3680	>100
1185	5131	>100
1215	6808	+89.95
1245	8990	+83.03
1275	11493	+77.30

VOLTS	COUNTS	%/100 Volts
1305	14469	+71.08
1335	17904	+63.07
1365	21677	+51.20
1395	25027	+38.06
1425	27237	+24.55
1455	28914	+14.61
1485	29480	+8.48
1515	30075	+5.06
1545	30374	+3.42
1575	30738	+1.68
1605	30703	+1.08
1635	30679	+0.77
1665	30902	+1.46
1695	30992	+1.89
1725	31224	+2.40
1755	31397	+3.27
1785	31826	+4.13
1815	32236	+5.59
1845	32782	
1875	33632	

MPC 9600 Plateau Instrument 10 MPC 9604 Detector C 7/1/2009

Alpha Volts: 870 Beta Volts: 1552

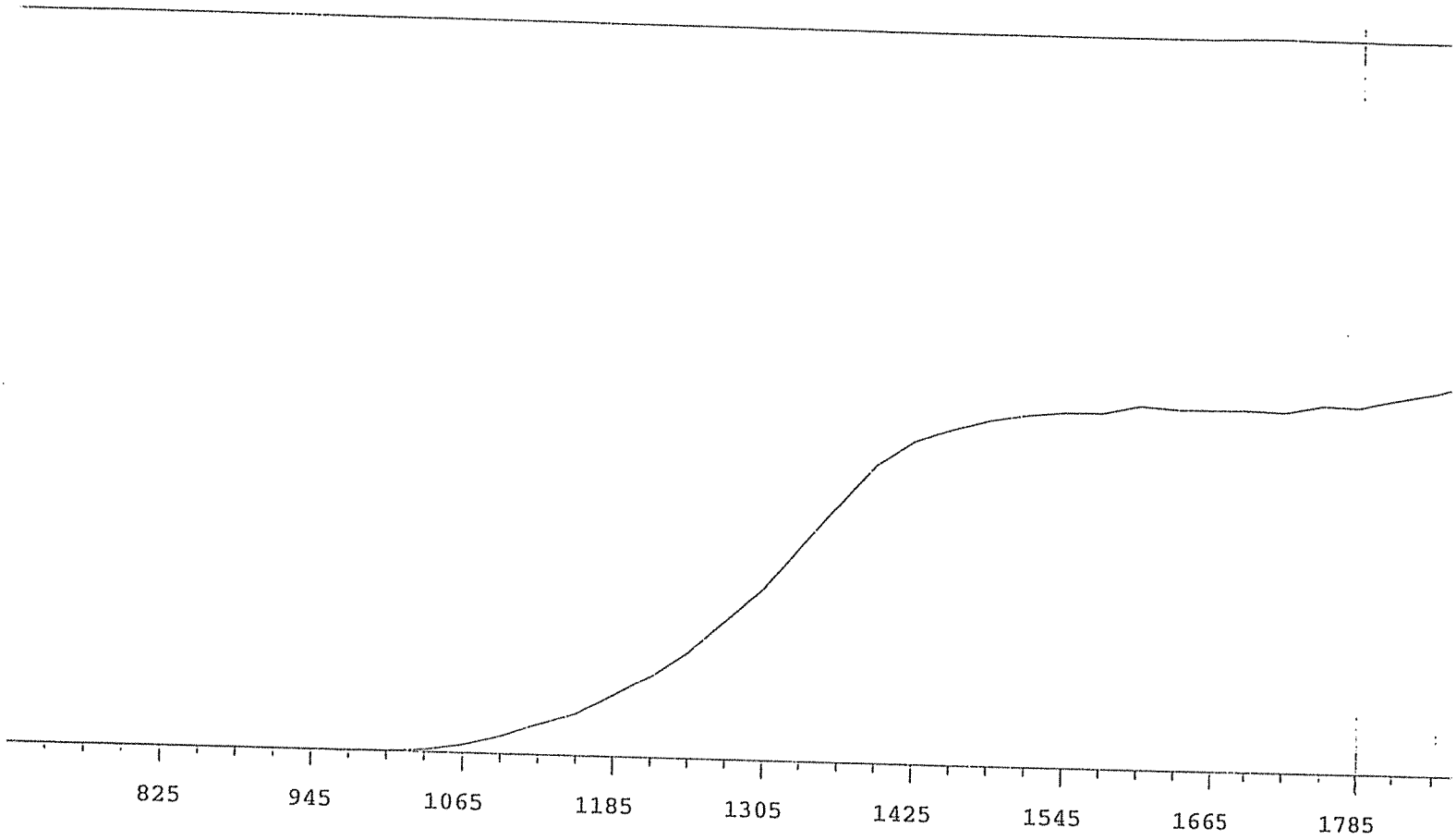


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	>100
915	0	>100
945	2	>100
975	2	>100
1005	36	>100
1035	220	>100
1065	780	>100
1095	1712	>100
1125	2926	>100
1155	4297	>100
1185	6097	>100
1215	8397	+95.11
1245	11155	+85.84
1275	14430	+78.79

VOLTS	COUNTS	%/100 Volts
1305	18051	+71.16
1335	22586	+62.34
1365	26973	+51.47
1395	31137	+38.24
1425	34321	+25.70
1455	36267	+15.37
1485	37197	+9.21
1515	37851	+5.38
1545	38622	+3.00
1575	38600	+1.55
1605	38538	+1.03
1635	38786	+0.91
1665	39129	+1.38
1695	38832	+1.20
1725	39323	+2.00
1755	39390	+3.35
1785	40031	+4.86
1815	40466	+6.64
1845	41713	
1875	42620	

MPC 9600 Plateau Instrument 10 MPC 9604 Detector D 7/1/2009

Alpha Volts: 870 Beta Volts: 1552

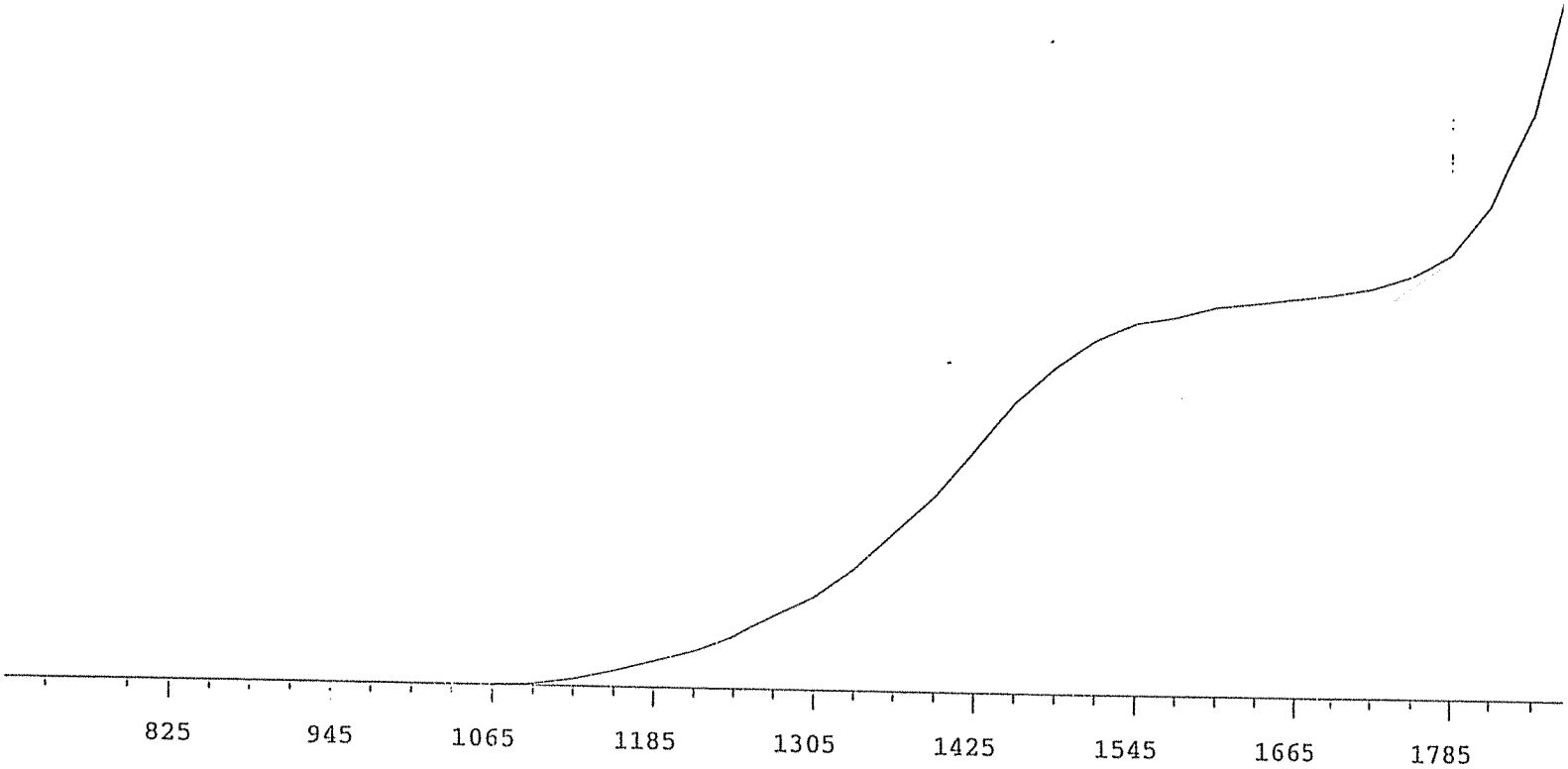


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	3	>100
1005	49	>100
1035	244	>100
1065	764	>100
1095	1584	>100
1125	2677	>100
1155	3763	>100
1185	5395	>100
1215	7350	+93.71
1245	9655	+83.52
1275	12504	+76.82

VOLTS	COUNTS	%/100 Volts
1305	15430	+69.87
1335	19258	+61.49
1365	23018	+50.06
1395	26562	+35.34
1425	28750	+22.67
1455	29911	+13.20
1485	30798	+8.01
1515	31375	+4.83
1545	31684	+3.74
1575	31721	+2.38
1605	32398	+1.44
1635	32154	+0.64
1665	32157	-0.77
1695	32152	+0.99
1725	32029	+1.41
1755	32699	+3.00
1785	32566	+4.71
1815	33351	+5.92
1845	34031	
1875	34941	

Plateau 7/1/09 Instrument 11 MPC 9604 Detector A 7/1/2009

Alpha Volts: 1515 Beta Volts: 1515

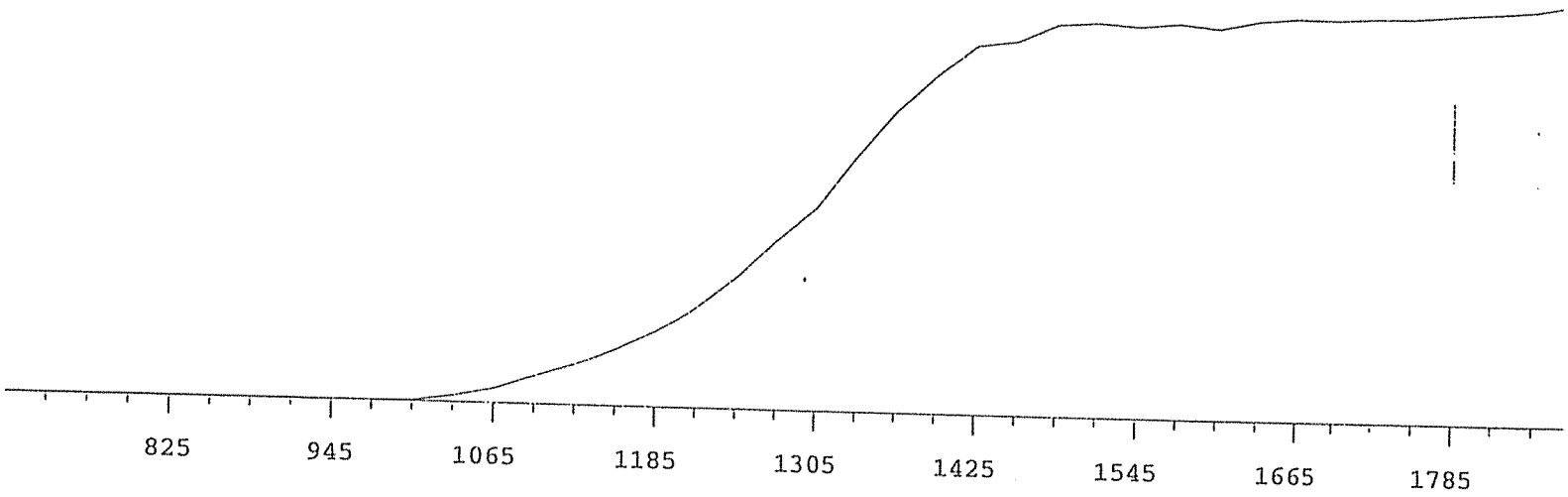


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	+0.00
975	0	>100
1005	0	>100
1035	2	>100
1065	9	>100
1095	61	>100
1125	248	>100
1155	528	>100
1185	882	>100
1215	1270	>100
1245	1786	>100
1275	2478	+93.67

VOLTS	COUNTS	%/100 Volts
1305	3225	+87.64
1335	4189	+80.15
1365	5428	+75.12
1395	6662	+68.60
1425	8241	+58.14
1455	9857	+46.65
1485	11018	+33.24
1515	11953	+21.01
1545	12538	+13.57
1575	12760	+8.35
1605	13114	+5.84
1635	13258	+4.78
1665	13430	+3.99
1695	13551	+5.46
1725	13771	+8.65
1755	14204	+16.44
1785	14916	+30.03
1815	16579	+48.74
1845	19717	
1875	25029	

Plateau 7/1/09 Instrument 11 MPC 9604 Detector B 7/1/2009

Alpha Volts: 1515 Beta Volts: 1515

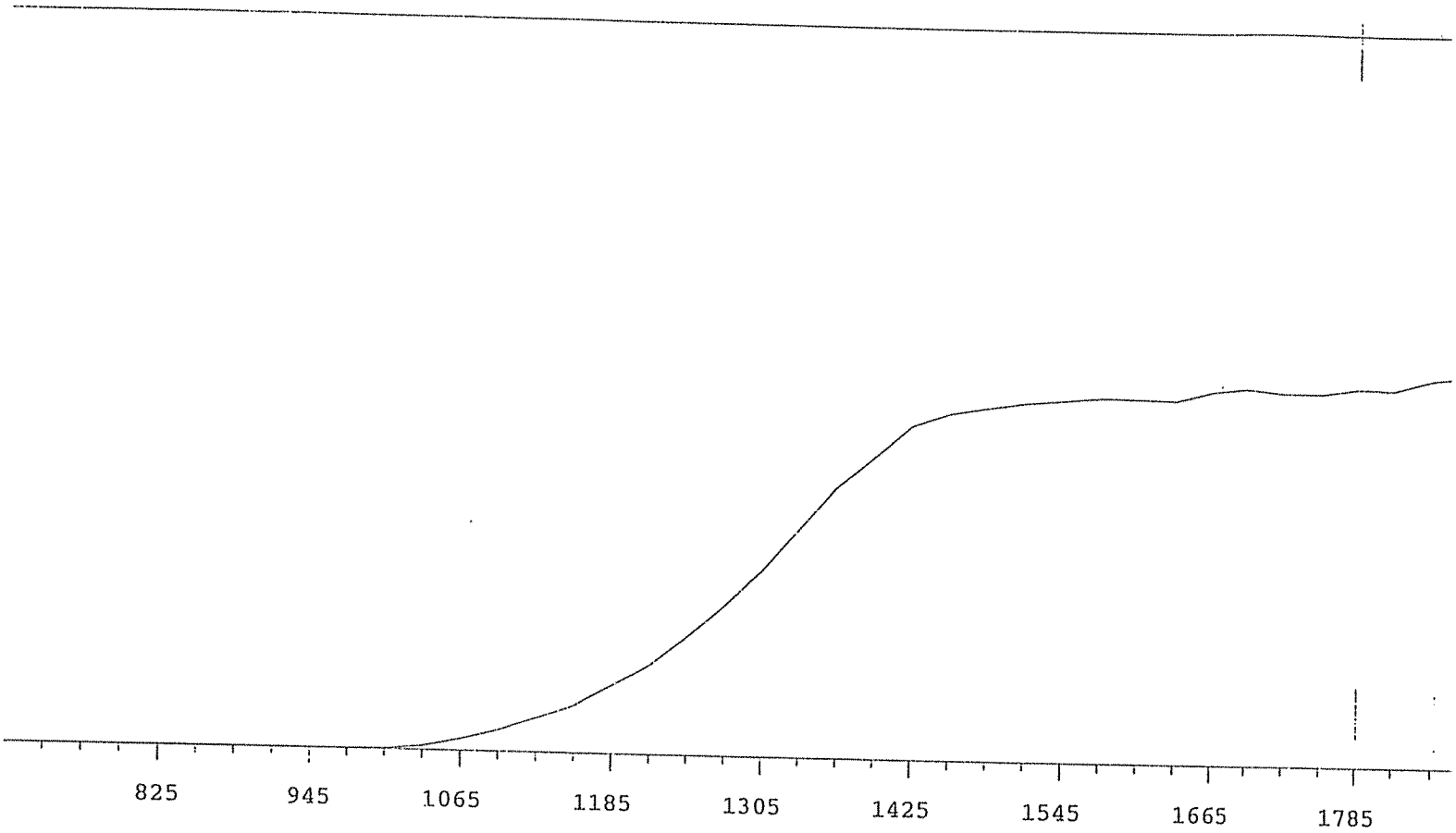


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	11	>100
1005	47	>100
1035	280	>100
1065	610	>100
1095	1192	>100
1125	1789	>100
1155	2466	>100
1185	3337	+94.91
1215	4526	+88.85
1245	5885	+78.40
1275	7518	+72.09

VOLTS	COUNTS	%/100 Volts
1305	8947	+65.63
1335	11238	+56.58
1365	13246	+46.66
1395	14838	+30.69
1425	16166	+20.11
1455	16396	+11.95
1485	17161	+5.61
1515	17274	+3.59
1545	17144	-0.00
1575	17323	+0.80
1605	17136	+2.21
1635	17484	+1.94
1665	17638	+2.16
1695	17580	+0.85
1725	17655	+1.05
1755	17700	+1.98
1785	17857	+2.38
1815	18006	+3.36
1845	18140	
1875	18468	

Plateau 7/1/09 Instrument 11 MPC 9604 Detector C 7/1/2009

Alpha Volts: 1515 Beta Volts: 1515

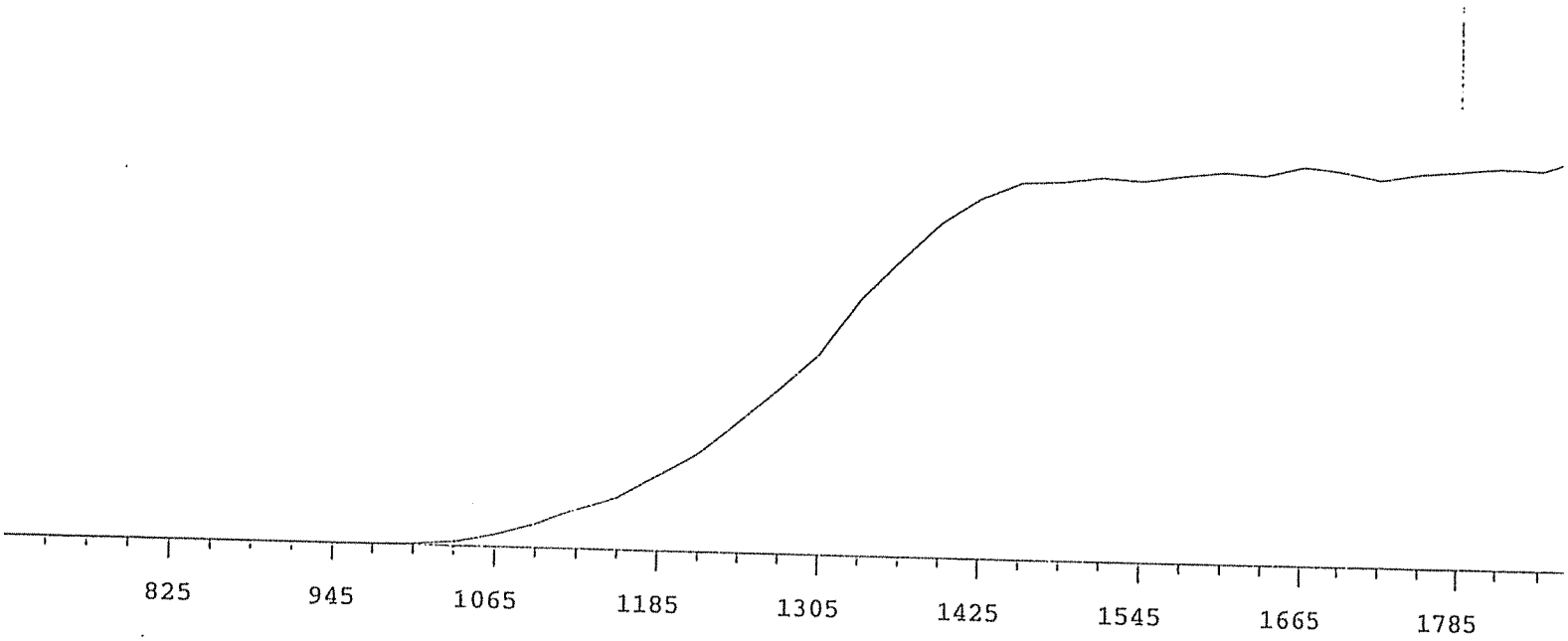


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	+0.00
795	0	>100
825	1	+0.00
855	0	>100
885	0	+0.00
915	0	>100
945	1	>100
975	7	>100
1005	46	>100
1035	191	>100
1065	540	>100
1095	957	>100
1125	1597	>100
1155	2217	>100
1185	3154	+98.74
1215	4239	+89.75
1245	5550	+79.98
1275	6980	+73.12

VOLTS	COUNTS	%/100 Volts
1305	8636	+66.44
1335	10593	+56.56
1365	12582	+46.23
1395	13957	+33.45
1425	15443	+21.49
1455	16048	+13.14
1485	16331	+6.45
1515	16603	+4.19
1545	16736	+2.73
1575	16884	+1.11
1605	16875	+1.91
1635	16813	+2.86
1665	17257	+2.60
1695	17425	+1.58
1725	17238	+0.49
1755	17230	+0.63
1785	17482	+3.27
1815	17468	+4.46
1845	17977	
1875	18163	

Plateau 7/1/09 Instrument 11 MPC 9604 Detector D 7/1/2009

Alpha Volts: 1515 Beta Volts: 1515

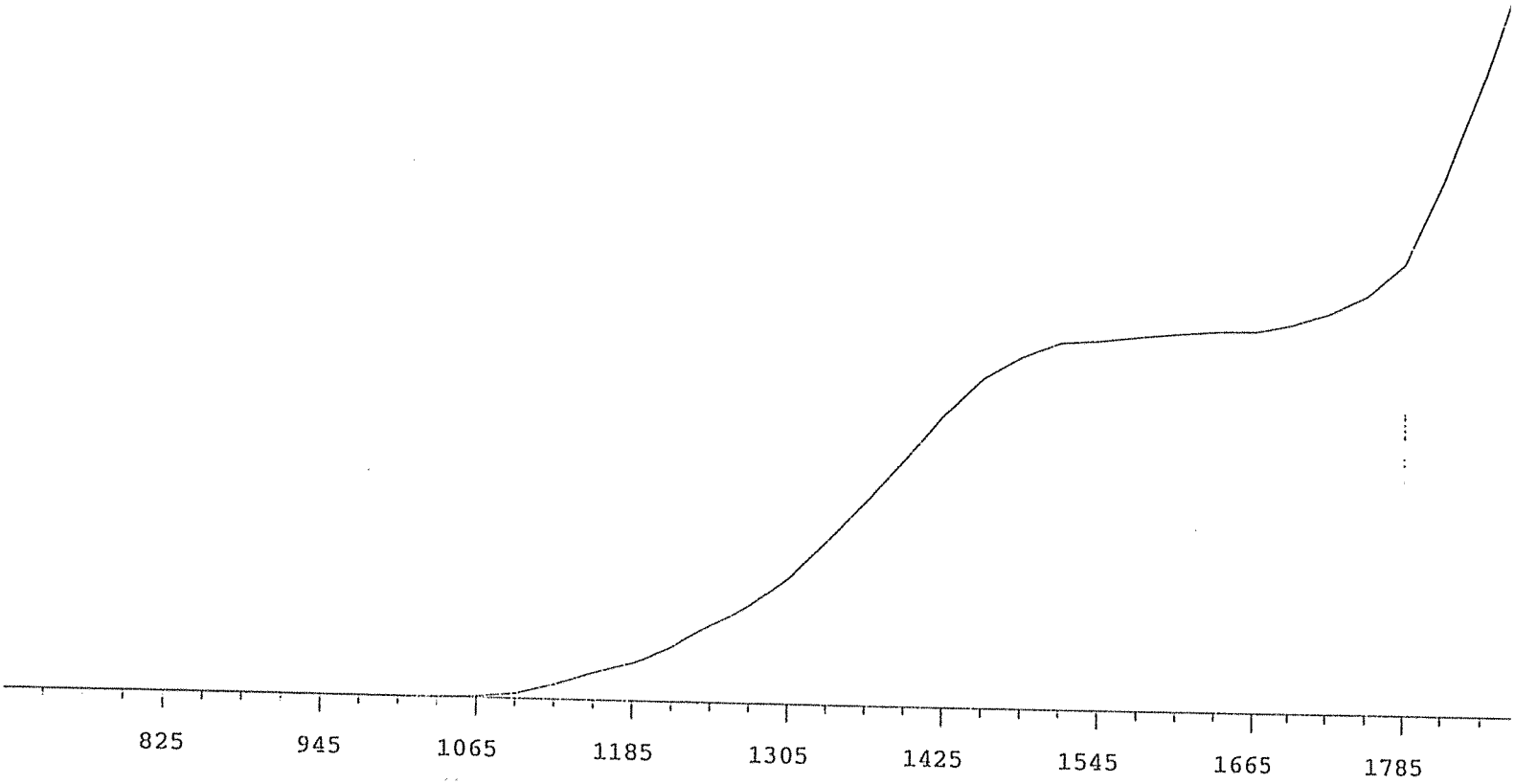


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	1	+83.33
885	1	+55.56
915	0	>100
945	1	>100
975	9	>100
1005	60	>100
1035	173	>100
1065	480	>100
1095	911	>100
1125	1508	>100
1155	2024	>100
1185	2872	+97.38
1215	3858	+89.30
1245	5070	+78.02
1275	6322	+73.30

VOLTS	COUNTS	%/100 Volts
1305	7679	+65.97
1335	9737	+57.57
1365	11301	+45.87
1395	12767	+31.71
1425	13767	+19.90
1455	14399	+10.72
1485	14467	+4.38
1515	14671	+2.12
1545	14576	+2.61
1575	14808	+1.80
1605	14974	+3.15
1635	14872	+1.76
1665	15248	-0.41
1695	15067	-0.27
1725	14784	-0.43
1755	15044	+2.01
1785	15163	+2.82
1815	15333	+3.61
1845	15278	
1875	15817	

Plateau 7/1/09 Instrument 12 MPC 9604 Detector A 7/1/2009

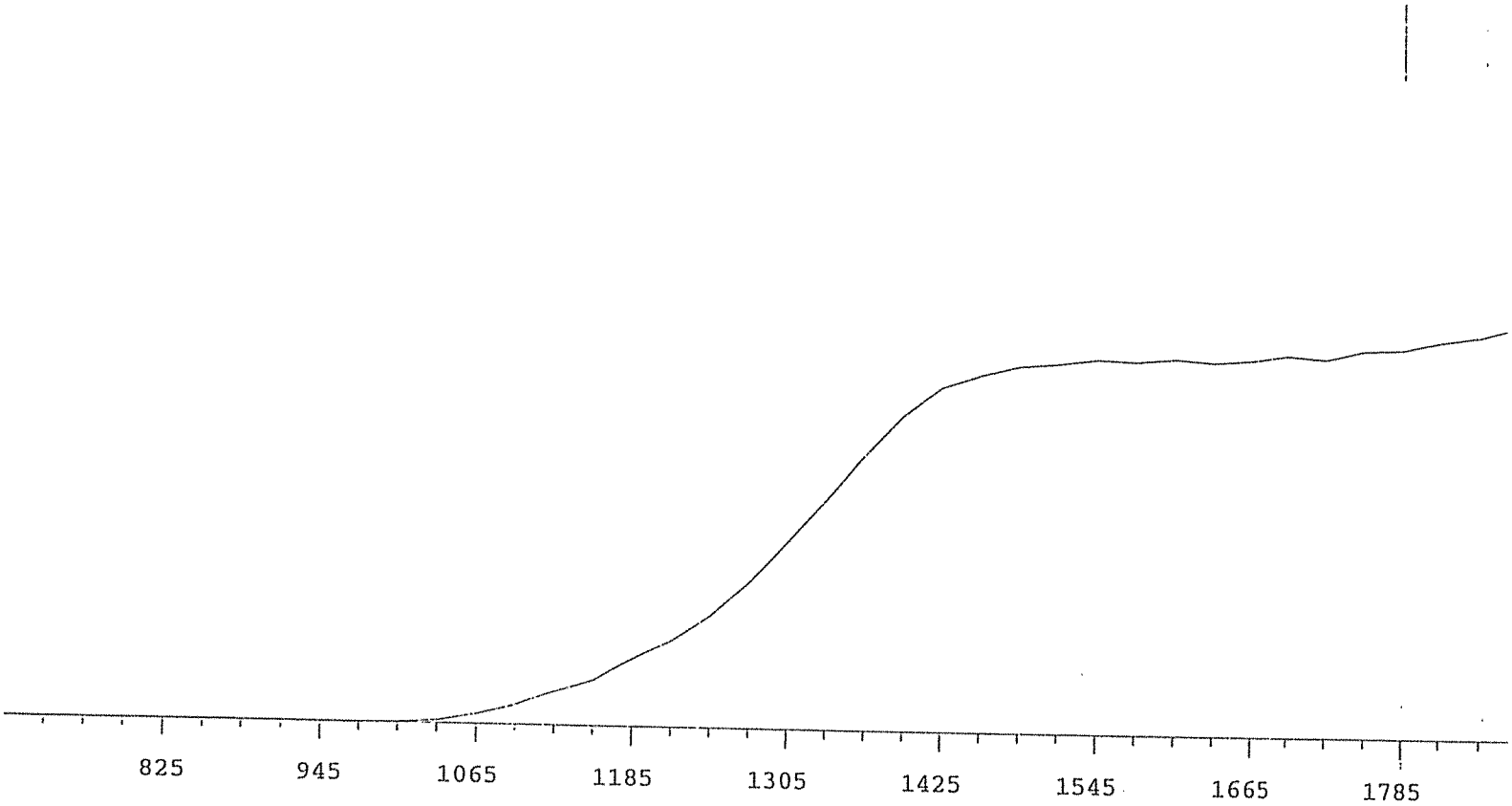
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	1	>100
1005	3	>100
1035	17	>100
1065	84	>100
1095	267	>100
1125	709	>100
1155	1299	>100
1185	1813	>100
1215	2638	>100
1245	3777	+96.47
1275	4915	+87.98

VOLTS	COUNTS	%/100 Volts
1305	6302	+80.03
1335	8191	+73.78
1365	10140	+66.18
1395	12247	+55.83
1425	14468	+43.92
1455	16303	+31.28
1485	17411	+18.64
1515	18150	+9.87
1545	18275	+5.30
1575	18496	+3.16
1605	18685	+2.66
1635	18820	+2.63
1665	18855	+4.16
1695	19152	+7.70
1725	19706	+13.90
1755	20640	+26.51
1785	22308	+40.92
1815	26460	+51.46
1845	31616	
1875	37348	

Plateau 7/1/09 Instrument 12 MPC 9604 Detector B 7/1/2009
Alpha Volts: 705 Beta Volts: 1515

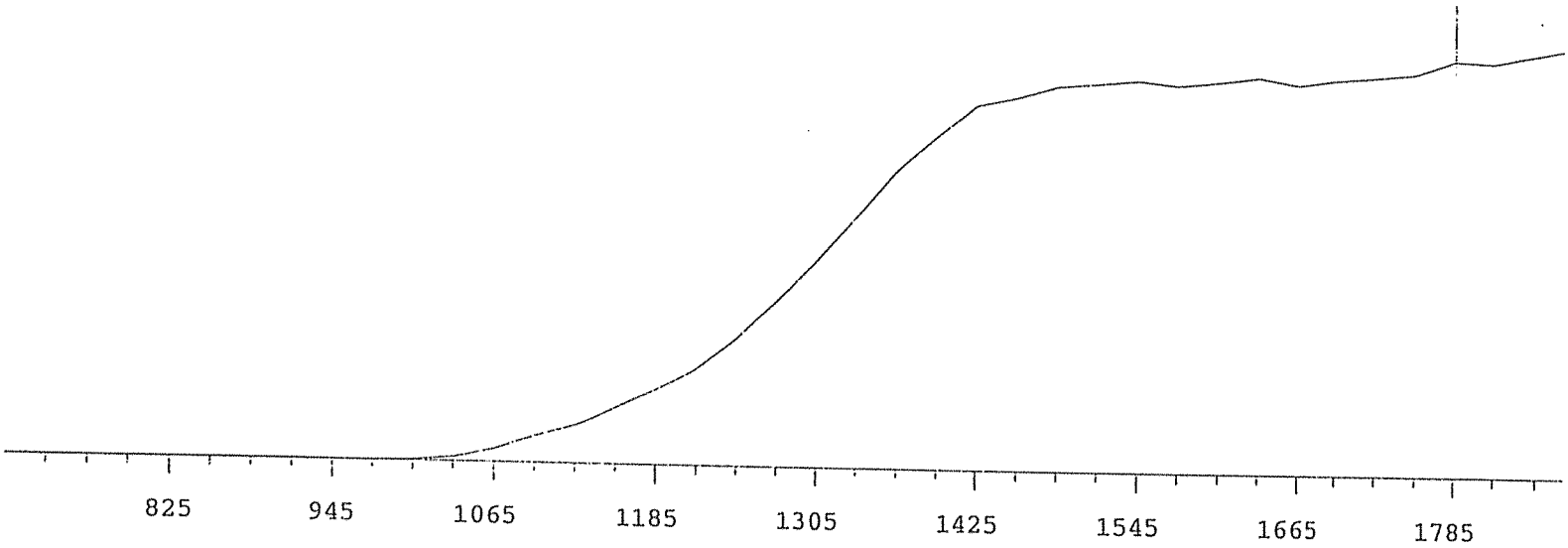


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	1	+83.33
885	1	-83.33
915	0	-55.56
945	0	>100
975	1	>100
1005	43	>100
1035	165	>100
1065	557	>100
1095	1055	>100
1125	1775	>100
1155	2470	>100
1185	3617	+98.46
1215	4757	+90.95
1245	6186	+83.59
1275	8021	+77.85

VOLTS	COUNTS	%/100 Volts
1305	10207	+70.42
1335	12473	+60.75
1365	14900	+48.87
1395	17101	+35.36
1425	18643	+22.53
1455	19350	+12.34
1485	19848	+6.68
1515	20014	+3.51
1545	20278	+2.03
1575	20186	+0.80
1605	20375	+0.32
1635	20209	+1.36
1665	20364	+0.83
1695	20607	+2.43
1725	20429	+2.51
1755	20924	+3.64
1785	20984	+5.11
1815	21470	+5.63
1845	21773	
1875	22346	

Plateau 7/1/09 Instrument 12 MPC 9604 Detector C 7/1/2009

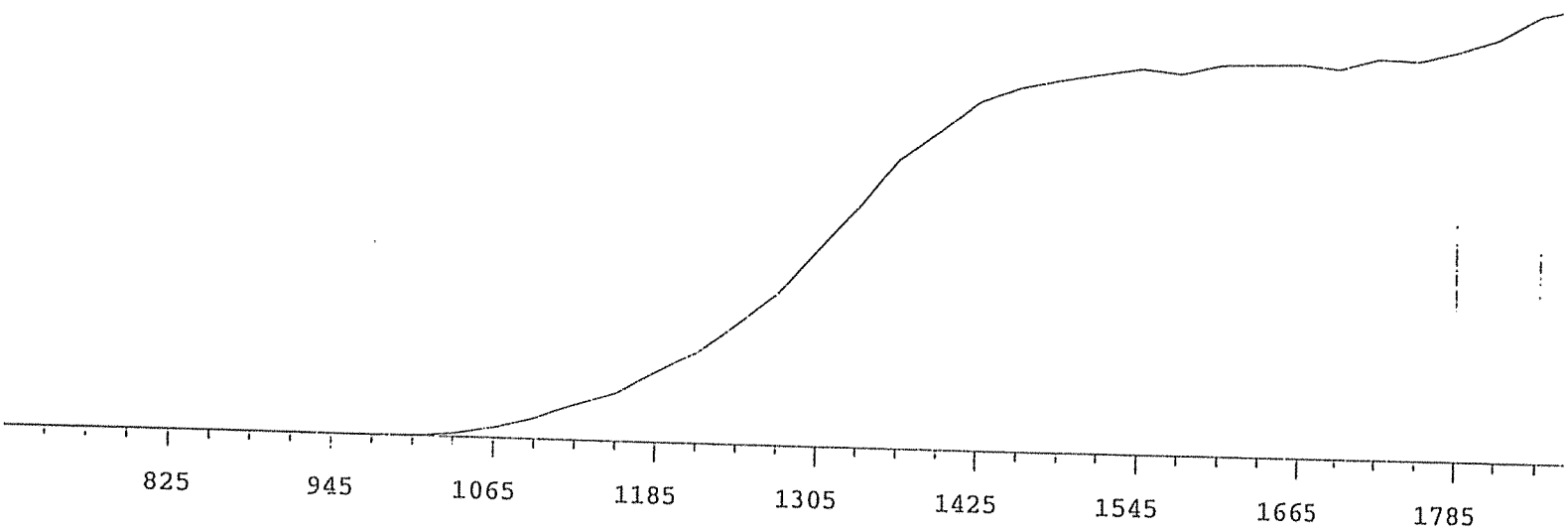
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	+0.00
915	0	>100
945	0	>100
975	7	>100
1005	52	>100
1035	214	>100
1065	590	>100
1095	1201	>100
1125	1759	>100
1155	2569	>100
1185	3440	+95.13
1215	4583	+87.74
1245	5985	+81.67
1275	7682	+74.54

VOLTS	COUNTS	%/100 Volts
1305	9543	+67.01
1335	11617	+56.47
1365	13791	+45.47
1395	15387	+31.66
1425	16819	+20.02
1455	17210	+11.63
1485	17742	+6.05
1515	17892	+3.04
1545	18070	+1.09
1575	17856	+1.43
1605	18054	+0.42
1635	18287	+1.06
1665	17969	+0.78
1695	18187	+1.48
1725	18317	+4.89
1755	18518	+4.76
1785	19156	+5.18
1815	19100	+5.18
1845	19496	
1875	19842	

Plateau 7/1/09 Instrument 12 MPC 9604 Detector D 7/1/2009
Alpha Volts: 705 Beta Volts: 1515

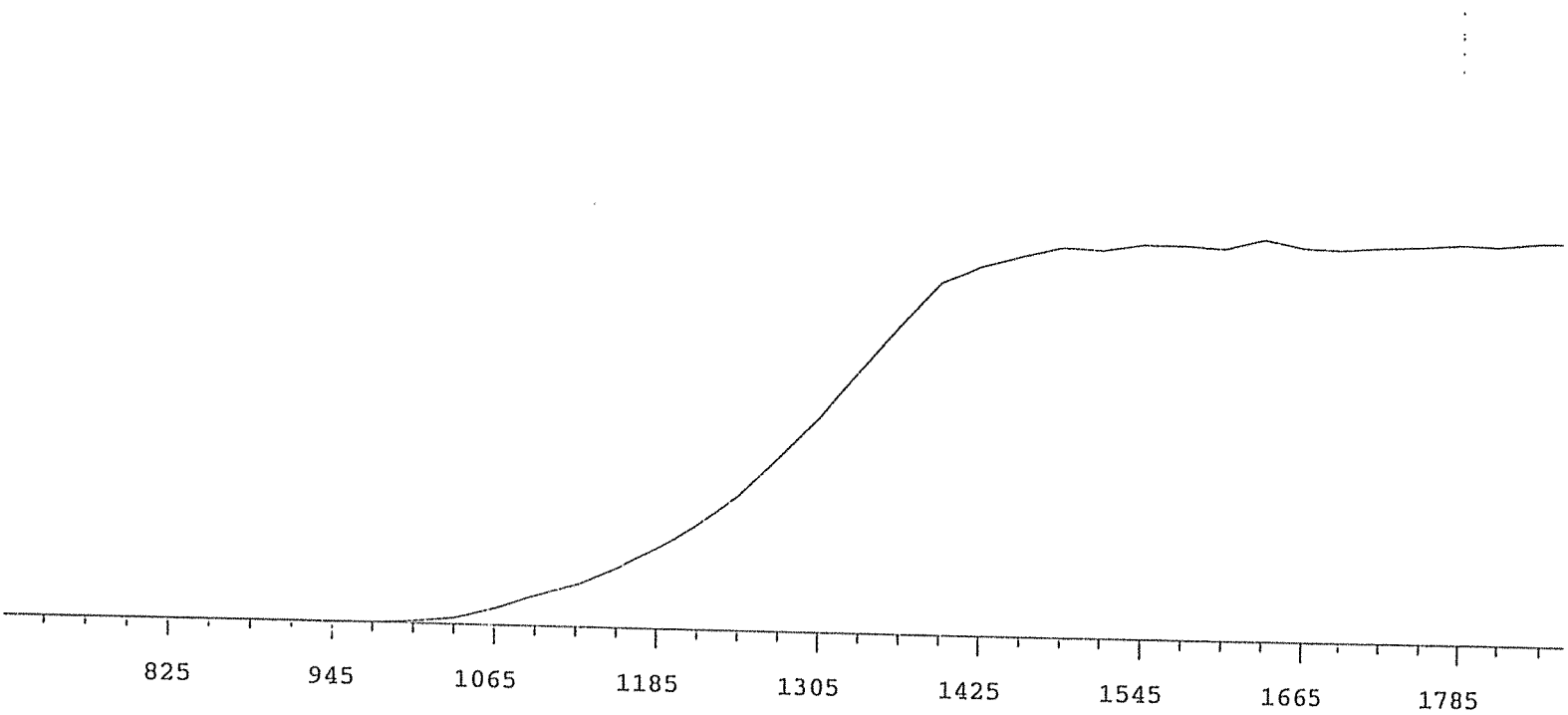


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	4	>100
1005	26	>100
1035	169	>100
1065	483	>100
1095	955	>100
1125	1639	>100
1155	2233	>100
1185	3262	+98.61
1215	4306	+89.77
1245	5662	+82.36
1275	7113	+76.36

VOLTS	COUNTS	%/100 Volts
1305	9144	+69.92
1335	11120	+58.43
1365	13399	+45.40
1395	14711	+32.57
1425	16134	+20.69
1455	16805	+13.46
1485	17209	+7.90
1515	17500	+4.31
1545	17812	+3.48
1575	17629	+2.80
1605	18066	+2.23
1635	18122	+1.44
1665	18166	+1.20
1695	17967	+1.60
1725	18469	+3.41
1755	18409	+6.35
1785	18884	+9.47
1815	19535	+11.98
1845	20630	
1875	21076	

Plateau 7/1/09 Instrument 13 MPC 9604 Detector A 7/1/2009

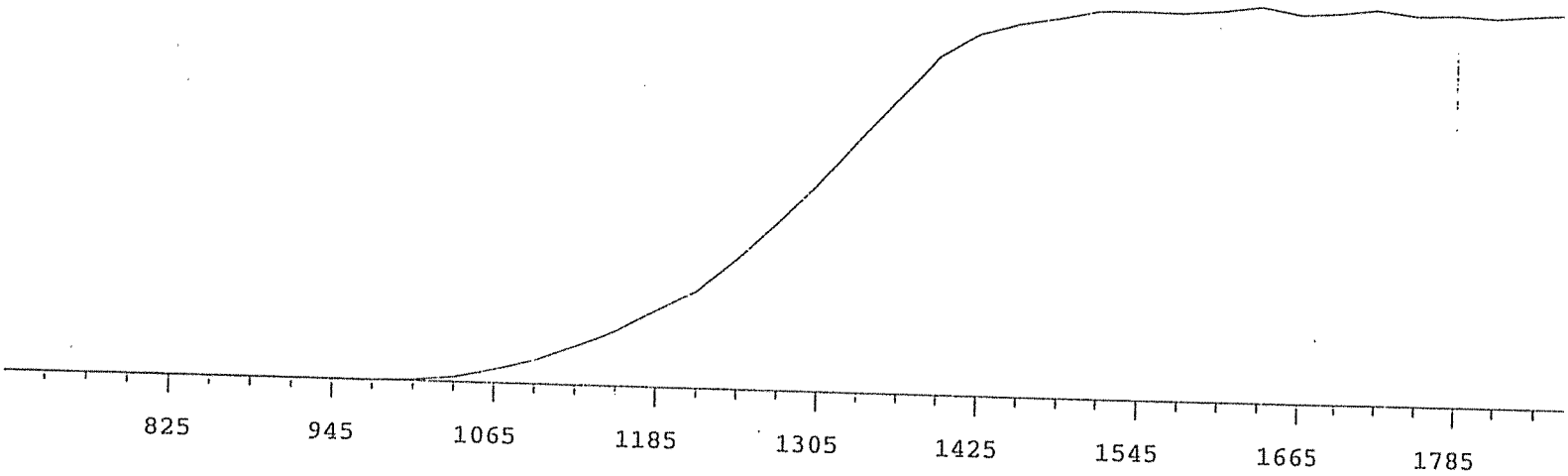
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+55.56
795	2	>100
825	0	+0.00
855	0	>100
885	1	>100
915	0	>100
945	1	>100
975	14	>100
1005	104	>100
1035	281	>100
1065	720	>100
1095	1302	>100
1125	1834	>100
1155	2544	>100
1185	3485	+92.28
1215	4624	+85.50
1245	5878	+77.82
1275	7515	+71.49

VOLTS	COUNTS	%/100 Volts
1305	9209	+64.55
1335	11200	+55.94
1365	13123	+43.27
1395	14957	+29.04
1425	15658	+17.41
1455	16123	+8.01
1485	16530	+4.92
1515	16437	+2.71
1545	16704	+0.83
1575	16707	+2.14
1605	16602	+0.55
1635	17024	-0.28
1665	16684	-0.42
1695	16597	-0.85
1725	16711	+1.27
1755	16796	+1.51
1785	16903	+1.57
1815	16880	+1.46
1845	17066	
1875	17085	

Plateau 7/1/09 Instrument 13 MPC 9604 Detector B 7/1/2009
Alpha Volts: 705 Beta Volts: 1515

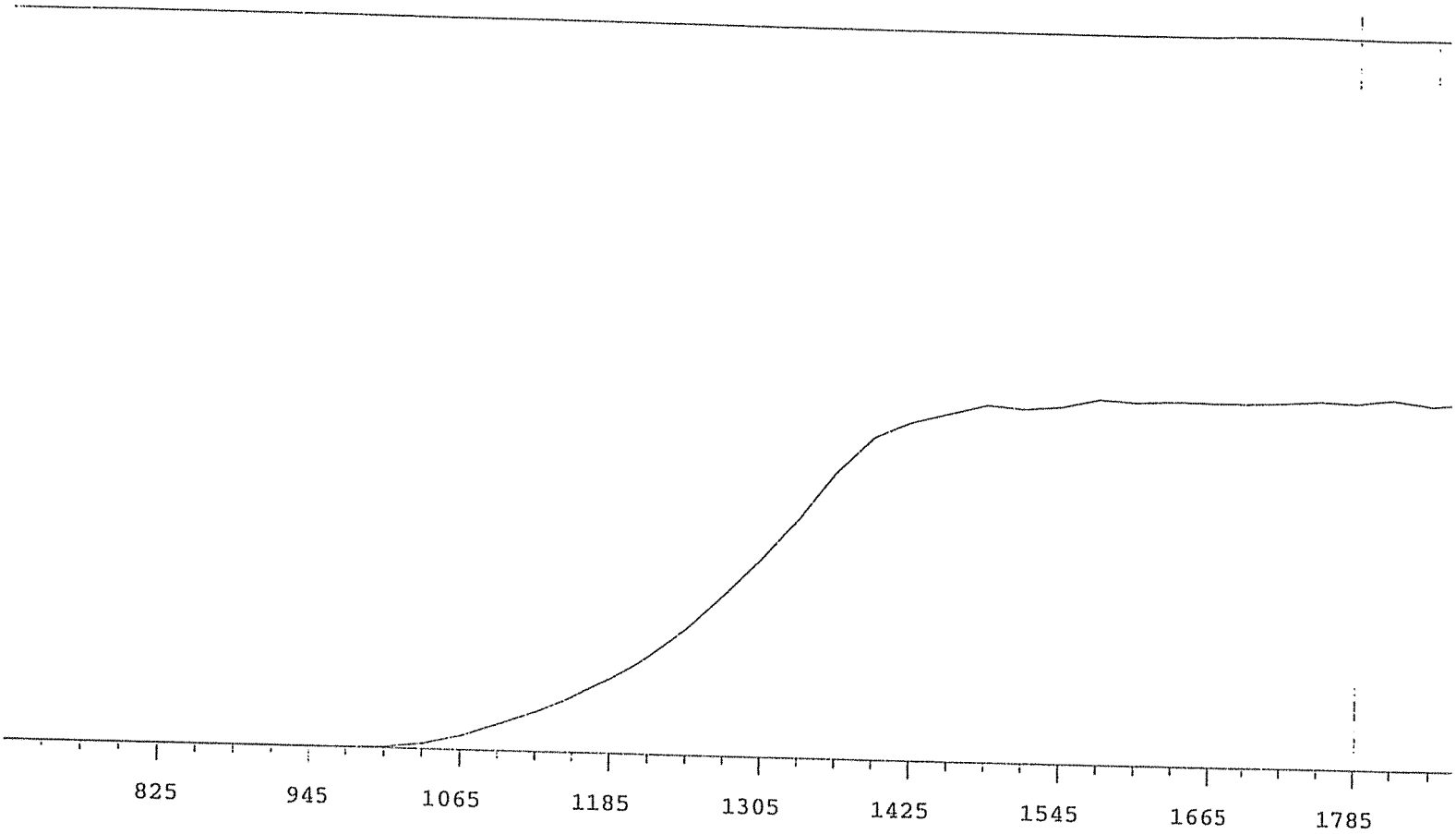


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	4	>100
1005	70	>100
1035	257	>100
1065	648	>100
1095	1116	>100
1125	1784	>100
1155	2560	>100
1185	3531	+96.11
1215	4568	+89.22
1245	6137	+81.65
1275	7855	+74.42

VOLTS	COUNTS	%/100 Volts
1305	9666	+64.39
1335	11722	+55.91
1365	13680	+44.91
1395	15677	+31.56
1425	16786	+19.46
1455	17283	+10.57
1485	17608	+5.95
1515	17972	+3.32
1545	18006	+1.84
1575	17970	+1.58
1605	18104	+0.74
1635	18351	+0.24
1665	18016	+0.16
1695	18080	-0.63
1725	18283	+0.29
1755	18047	-0.47
1785	18110	-0.32
1815	18040	+1.17
1845	18200	
1875	18320	

Plateau 7/1/09 Instrument 13 MPC 9604 Detector C 7/1/2009

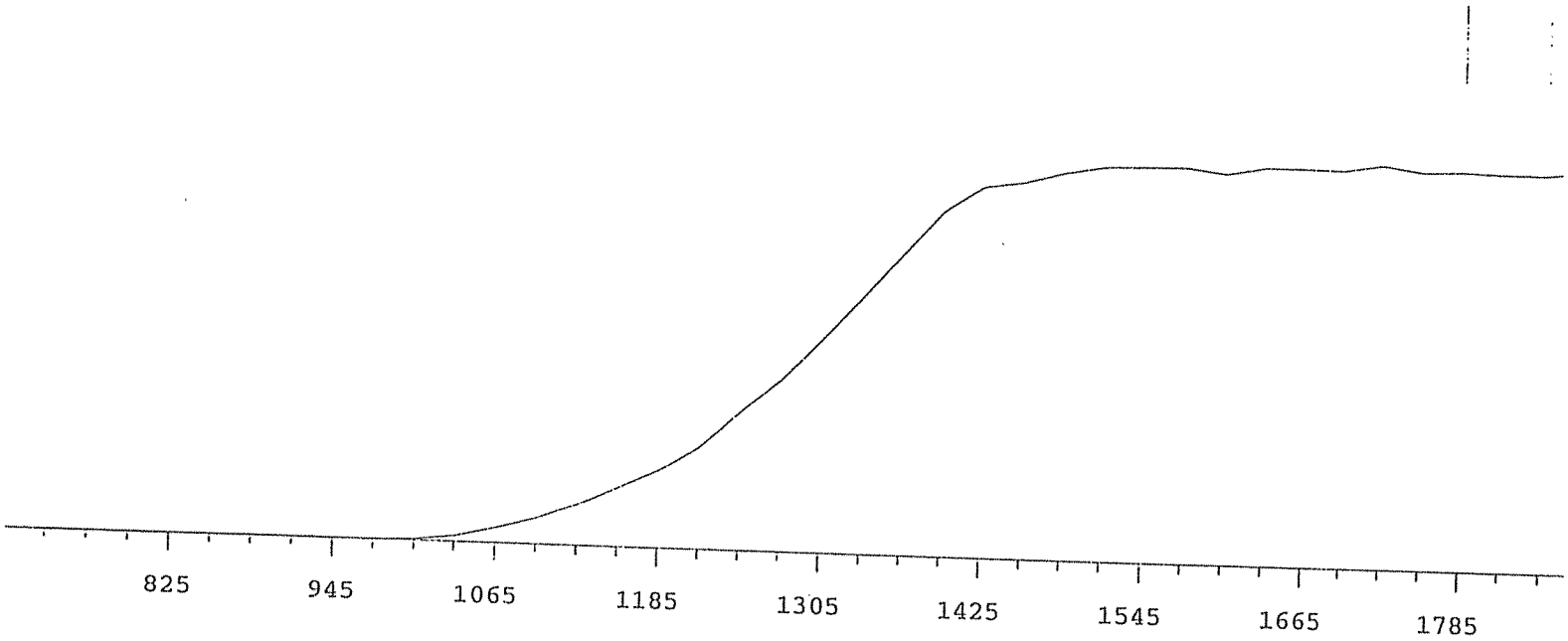
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	9	>100
1005	93	>100
1035	325	>100
1065	834	>100
1095	1525	>100
1125	2318	>100
1155	3233	>100
1185	4357	+92.07
1215	5755	+85.64
1245	7438	+78.35
1275	9463	+70.89

VOLTS	COUNTS	%/100 Volts
1305	11573	+64.95
1335	13929	+56.47
1365	16726	+43.82
1395	18834	+29.38
1425	19743	+16.84
1455	20314	+7.95
1485	20860	+4.16
1515	20670	+3.23
1545	20844	+2.09
1575	21330	+2.48
1605	21188	+1.16
1635	21280	-0.32
1665	21237	+0.08
1695	21202	+0.42
1725	21254	+0.60
1755	21406	+1.41
1785	21326	+0.42
1815	21619	+0.16
1845	21282	
1875	21478	

Plateau 7/1/09 Instrument 13 MPC 9604 Detector D 7/1/2009
Alpha Volts: 705 Beta Volts: 1515

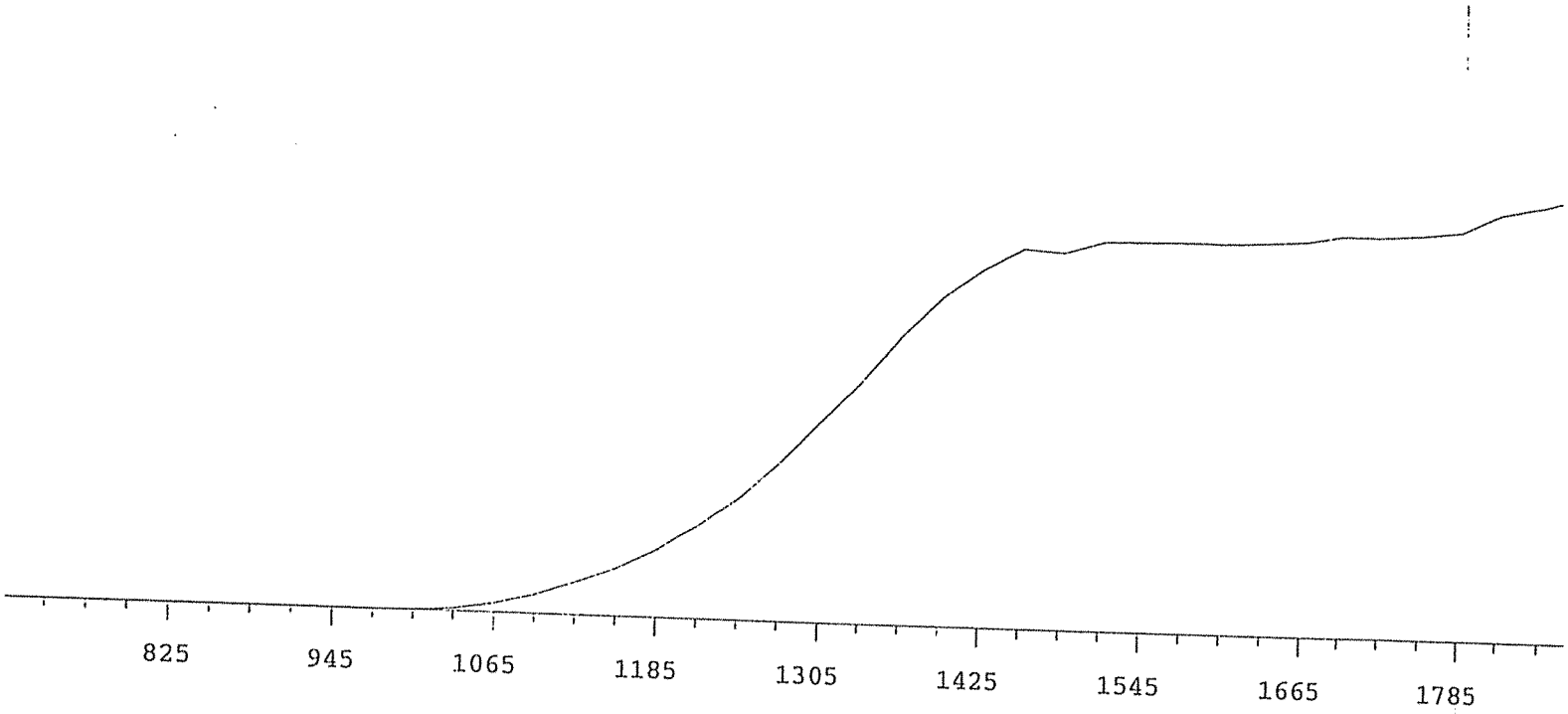


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	9	>100
1005	58	>100
1035	228	>100
1065	544	>100
1095	936	>100
1125	1468	>100
1155	2110	>100
1185	2770	+94.71
1215	3670	+85.91
1245	4937	+79.46
1275	6066	+70.79

VOLTS	COUNTS	%/100 Volts
1305	7524	+61.93
1335	9002	+55.36
1365	10542	+44.70
1395	12064	+31.21
1425	12981	+19.20
1455	13192	+10.41
1485	13570	+5.93
1515	13820	+4.08
1545	13866	+0.75
1575	13880	+0.21
1605	13695	+0.59
1635	13950	+0.77
1665	13954	+1.92
1695	13911	+0.19
1725	14116	+0.02
1755	13908	-0.24
1785	13960	-0.81
1815	13939	+0.71
1845	13931	
1875	14071	

Plateau 7/1/09 Instrument 14 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

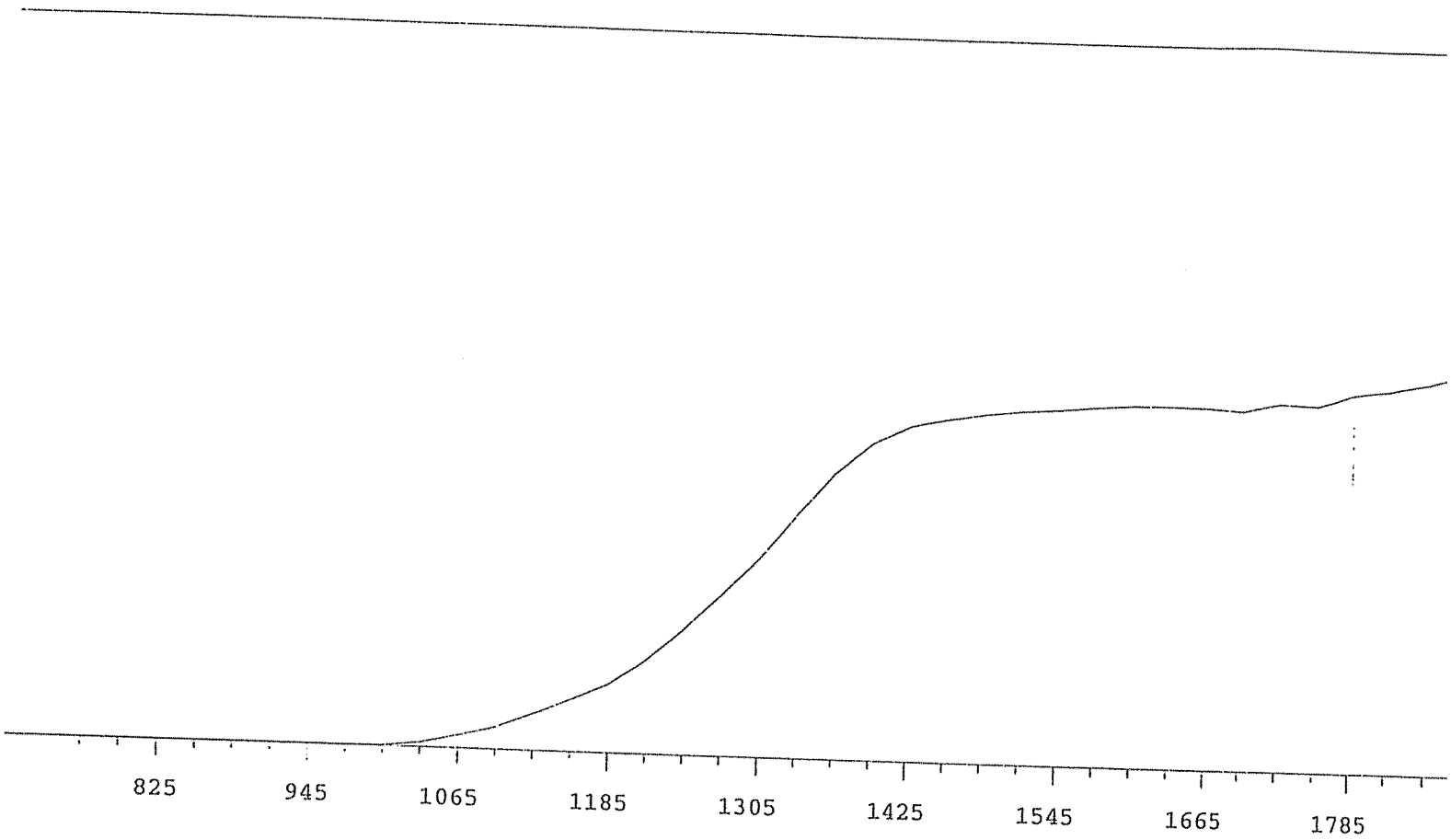


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	+0.00
915	0	>100
945	0	>100
975	0	>100
1005	18	>100
1035	137	>100
1065	430	>100
1095	865	>100
1125	1444	>100
1155	2151	>100
1185	2981	>100
1215	4168	+92.14
1245	5377	+84.73
1275	6924	+74.92

VOLTS	COUNTS	%/100 Volts
1305	8778	+67.49
1335	10502	+57.68
1365	12516	+46.36
1395	14215	+35.88
1425	15472	+22.01
1455	16469	+12.99
1485	16342	+6.70
1515	16874	+3.07
1545	16918	+2.53
1575	16950	+0.58
1605	16943	+0.95
1635	17008	+2.13
1665	17130	+2.45
1695	17403	+2.43
1725	17377	+2.43
1755	17515	+4.88
1785	17710	+7.54
1815	18533	+9.04
1845	18905	
1875	19415	

Plateau 7/1/09 Instrument 14 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

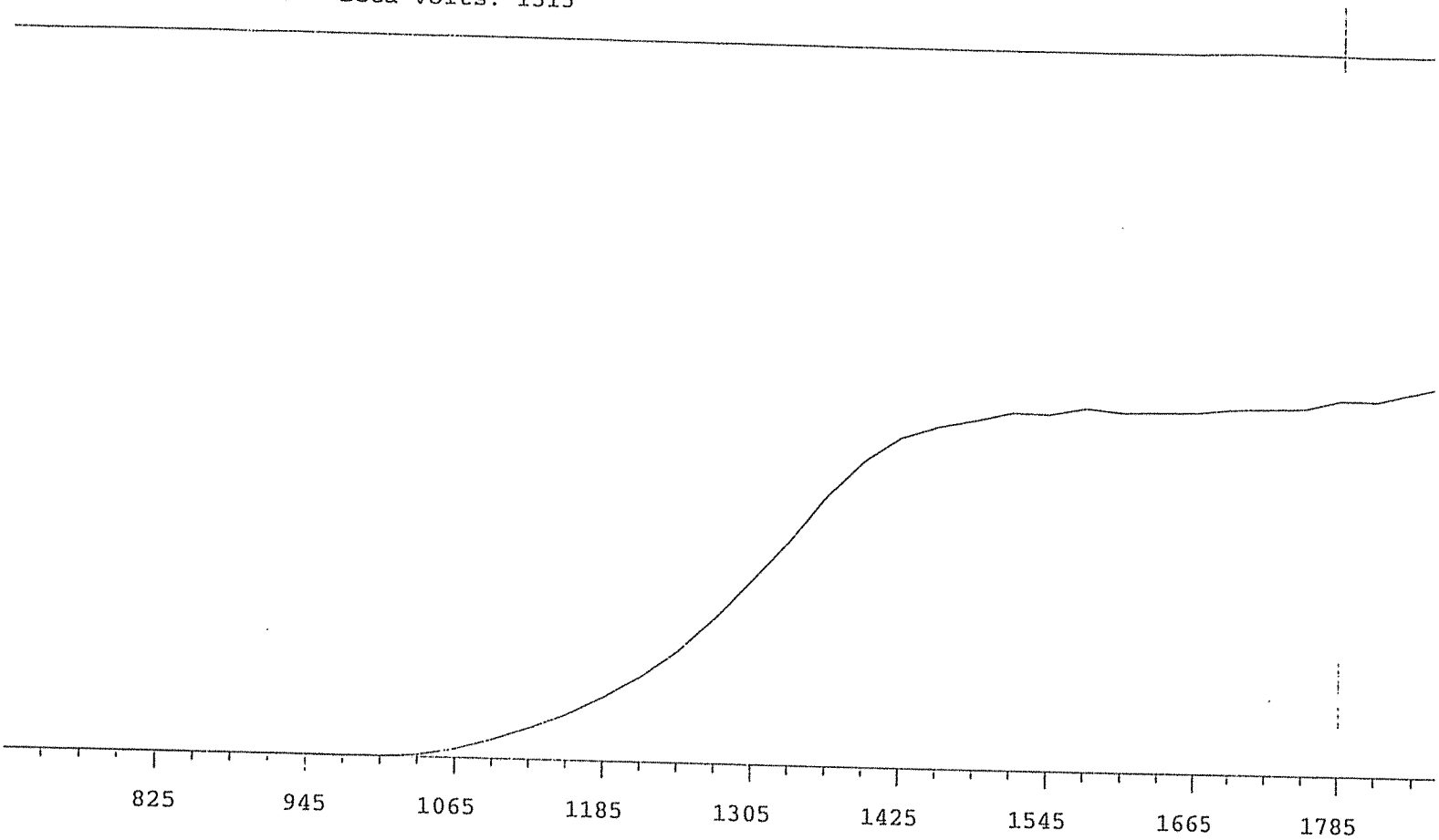


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	1	+0.00
885	0	>100
915	0	>100
945	0	>100
975	3	>100
1005	40	>100
1035	210	>100
1065	590	>100
1095	983	>100
1125	1645	>100
1155	2342	>100
1185	3045	+96.43
1215	4201	+90.42
1245	5579	+83.64
1275	7121	+74.44

VOLTS	COUNTS	%/100 Volts
1305	8797	+65.44
1335	10726	+54.47
1365	12570	+41.11
1395	13917	+26.79
1425	14687	+15.44
1455	15048	+8.47
1485	15318	+5.00
1515	15494	+3.76
1545	15606	+3.04
1575	15776	+2.35
1605	15889	+1.44
1635	15907	-0.16
1665	15881	+0.64
1695	15741	+1.21
1725	16124	+3.63
1755	16076	+5.41
1785	16588	+5.79
1815	16830	+7.53
1845	17185	
1875	17682	

Plateau 7/1/09 Instrument 14 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

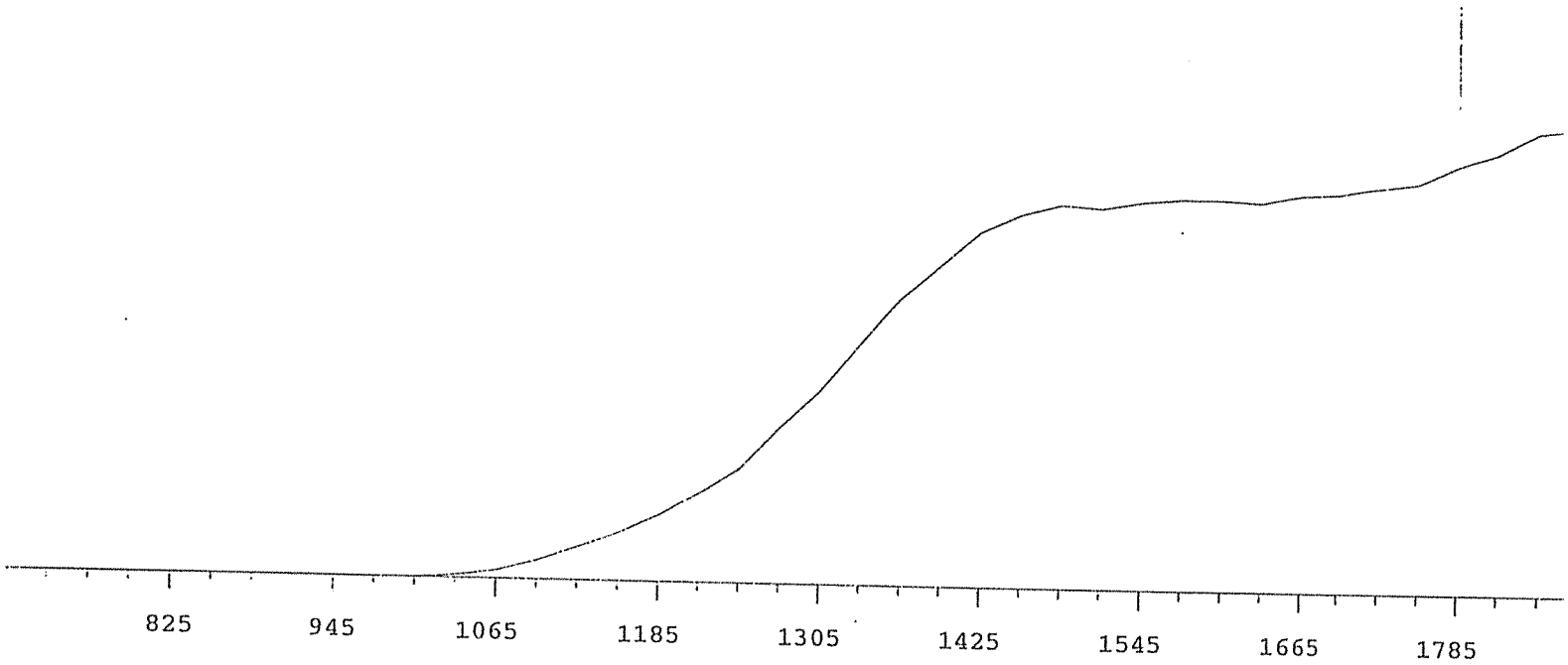


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	+0.00
915	0	>100
945	0	>100
975	2	>100
1005	21	>100
1035	132	>100
1065	491	>100
1095	1036	>100
1125	1698	>100
1155	2517	>100
1185	3468	>100
1215	4721	+91.83
1245	6175	+85.13
1275	8025	+76.82

VOLTS	COUNTS	%/100 Volts
1305	10118	+69.76
1335	12269	+59.65
1365	14810	+47.35
1395	16773	+33.46
1425	18104	+20.13
1455	18720	+11.98
1485	19122	+6.50
1515	19580	+4.77
1545	19527	+2.48
1575	19902	+0.81
1605	19690	+0.53
1635	19739	+0.23
1665	19765	+1.29
1695	19932	+1.40
1725	19976	+2.72
1755	20051	+2.92
1785	20523	+4.26
1815	20542	+5.57
1845	21035	
1875	21528	

Plateau 7/1/09 Instrument 14 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	1	>100
1005	14	>100
1035	130	>100
1065	363	>100
1095	785	>100
1125	1357	>100
1155	1996	>100
1185	2735	+99.45
1215	3785	+94.20
1245	4857	+86.43
1275	6571	+78.80

VOLTS	COUNTS	%/100 Volts
1305	8095	+71.16
1335	10052	+58.38
1365	11990	+47.92
1395	13400	+35.01
1425	14808	+23.58
1455	15554	+13.45
1485	15987	+6.39
1515	15861	+3.45
1545	16156	+2.18
1575	16297	+1.72
1605	16297	+1.33
1635	16208	+1.62
1665	16526	+2.92
1695	16581	+3.94
1725	16832	+5.91
1755	17039	+8.68
1785	17800	+11.53
1815	18351	+11.46
1845	19265	
1875	19468	

Standardization of Barium Carrier 2628181

v1.2.1

Analyst	BXF1

Standard Information	
Isotope	Barium
Serial Number	2628181
Amount of Std. (mL)	1.0
Standard Prepared	12/7/2017

Parent Information	
Parent Serial #	2494363
Parent Exp. Date	5/11/2019

Std #	Weight of carrier added (g)	Weight of crucible or filter (g)	Weight of crucible or filter + ppt. (g)	Weight of ppt. (g)	mg Barium/mL	mg Barium/g
1	1.0100	0.0744	0.1008	0.0264	26.40	26.14
2	1.0200	0.0745	0.1010	0.0265	26.50	25.98
3	1.0300	0.0741	0.1005	0.0264	26.40	25.63
4	1.0100	0.0743	0.1009	0.0266	26.60	26.34

Mean Value (mg/mL) =	26.48
Stdev (mg/mL) =	± 0.10
1.0% of Mean Value =	0.264750
	Pass
Expiration Date	**12/7/2018**
Mean Value (mg/1.0mL) =	26.48

Standardization Rule

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

12-8-17

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

15541

84468-278
5 mL Liquid in Flame Sealed Vial

Customer: General Engineering Labs, LLC/Charleston, SC
P.O. No.: 936808RD, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution calibrated by Eckert & Ziegler Analytics, using a germanium gamma spectrometer system. Radionuclide purity and calibration were checked with a germanium gamma spectrometer system. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Ra-226	5.844E+05	3.786E+04	0.5	2.4	4.9	04/25/2011

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities (other than decay products) < 0.1 %. 5.04904 grams 0.1M HCl solution with approximately 50 μg/g Ba carrier.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 4/25/11
J. D. McCorvey, QA Manager Alternate

RECEIVED 4/27/11

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

RC-S-060-086

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355
Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1541
Prepared By:	Gregory Ramsay
Carrier Conc:	0.1M HCl
Reference Date:	04/25/2011
Ampoule Mass (g):	5.04904 g
Uncertainty:	+/- 4.9 %
LogBook No:	RC-S-060-086

A Solution Material Info	
Isotope:	Radium-226
Prepared By:	Gregory Ramsay
Prep Date:	03/06/2012
Verification Date:	04/11/2018
Expiration Date:	04/11/2019
Primary Code:	1541-A
Dilution(mL):	100 mL
Mass of Parent(g):	4.2773 g
Density(g/mL):	0.9971
Balance ID:	38080204

Calculations Converting parent activity to dpm/mL|dpm/g

(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq)) * (conversion dpm to Bq) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(4.2773 g) * (37860 Bq) * (60 dpm/Bq) / (5.04904 g * 100 mL) = 19243.8853 dpm/mL
(4.2773 g) * (37860 Bq) * (60 dpm/Bq) / (0.9971 g/mL)/ (5.04904 g * 100 mL) = 19299.1388 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Ra-226 Standard 1541-A

v1.0.2

Instrument	Red
Analyst	GXR1
Verification Prep Date	4/11/2018

Standard Information	
Isotope	Ra-226
Serial Number	1541-A
Isotope Halflife	1.6000E+03 Y
Reference Date	4/25/2011
Ref. Act. (DPM/mL)	19243.8853
Amount of Std. (mL)	0.1
Standard Prep Date	3/6/2012

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	5/2/2018	79.40	7826.15	7.47
2	5/2/2018	79.50	7775.38	7.47
3	5/2/2018	79.60	7714.07	7.47

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	7818.68	4.145457	18860.84	1886.08
2	7767.91	4.145457	18738.37	1873.84
3	7706.60	4.145457	18590.47	1859.05

	dpm/mL
Mean Value =	18729.90
Stdev =	135.3832494
Certificate Value* =	**19185.5**
Two sigma =	270.766
10 % of Mean =	1872.990
Rule A (Pass/Fail)	**Pass**
% Recovery	97.63%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**4/11/2019**

Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Ra-226 source 1541-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Mineral Oil liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Mineral Oil liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCRed for Ra-226 source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 4/11/2018 using Ra-226 source 0299-J.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

5/3/18

5/2/18

General Engineering Laboratories
GFC Calibration Source Preparation Sheet

Total Radium

Applicable SOP Number	GL-RAD-A-010 / GL-RAD-A-044	Isotope	Ra-226
Date Standards Prepared	4/11/2018		
Standard ID	1541-A	Matrix of Planchett/Filter	Barium Sulfate ppt on 47 mm 0.45 filter
Amount Used (g or ml)	0.5 mL		
Standard Activity (DPM/g or mL)	* 19243.89 dpm/mL	Residue/Carrier Agent	Barium Carrier - 2628181
Reference Date	4/25/2011	Pipette ID Used	2154115
Expiration Date	4/11/2019	Balance ID Used	F30560

*** Not Decay Corrected**

Separation Date / Time: 4/11/2018 14:40

	Standard Number	Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
	C1	0.4	0.0657	0.0725	6.8
	C2	0.6	0.0660	0.0787	12.7
	C3	0.8	0.0653	0.0815	16.2
	C4	1.0	0.0660	0.0901	24.1
	C5	1.5	0.0660	0.1039	37.9
	C6	2.0	0.0651	0.1173	52.2
	C7	3.0	0.0654	0.1445	79.1
	C8	3.5	0.0657	0.1584	92.7

Prepared By: Date 5/4/2018

Reviewed By: Date 5/4/2018

Nycomed Amersham plc
Amersham Laboratories

[redacted]

NAMAS
CALIBRATION
No. 0146

ISSUED BY:	Nycomed Amersham plc Radiation & Radioactivity Calibration Laboratory Amersham Laboratories White Lion Road Amersham Buckinghamshire HP7 9LL	ISSUED FOR:	AEA Technology plc Isotrak Amersham Laboratories White Lion Road Amersham Buckinghamshire HP7 9LL

Description Principal radionuclide: Radium-226

Product code: RAY44
Solution number: R4/131/89

Measurement Reference time: 1200 GMT on 15 December 1999

Nuclear data Nuclear data quoted on this certificate are taken from the Joint European File, Version 2.2.

Expression of uncertainties The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2.00, which for a *t*-distribution with $\nu_{eff} = \infty$ effective degrees of freedom corresponds to a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Unless indicated, all other uncertainties are expressed at the confidence level associated with one standard uncertainty.

The format used for the uncertainties in the values of radionuclidic purity is illustrated in the following examples;

6.5(21)	=	6.5 ± 2.1
6.54(21)	=	6.54 ± 0.21
6.543(21)	=	6.543 ± 0.021

Approved Signatory

Date of issue 17th December 1999

Nycomed Amersham

B D D Singleton

This certificate is issued in accordance with the requirements of the United Kingdom Accreditation Service as specified in the NAMAS Accreditation Standard and NAMAS regulations. It provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not

RC-S-028-128 A

0299

[redacted]

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

Measurement	Reference time for solution number R4/131/89:	1200 GMT on 15 December 1999	
	Radioactive concentration of radium-226:	43.75	kilobecquerels per gram of solution
	which is equivalent to:	1.183	microcuries per gram of solution
	Mass of solution:	5.0368	grams
	Total activity of radium-226:	220.4	kilobecquerels
	which is equivalent to:	5.956	microcuries
	Recommended half life:	1600	years

Method of measurement:
The activity of the solution was measured using a high pressure re-entrant ionisation chamber calibrated with a large number of absolutely standardised solutions.

Calibration date: 15 December 1999
The calibration date is provided for added information only, and must not be confused with the reference date on pages 1 and 2 of the certificate. It is the reference date that must be used in all calculations relating to the values of activity.

Accuracy

Expanded uncertainty in the radioactive concentration quoted above: ± 2.5 %

Combined Type A uncertainty: ± 0.2 %

Combined Type B uncertainty: ± 1.3 %

Radionuclidic purity

The estimated activities of any radioactive impurities found by high-resolution gamma ray spectrometry, or in any other examination of the solution, are listed below expressed as percentages of the activity of the principal radionuclide at the reference time.

Chemical composition

Carrier free in 0.5M HCl.

Remarks

This product meets the quality assurance requirements for achieving traceability to NIST as defined in ANSI N42.22-1995.

1 year = 365.25 days

At the reference date radium-226 was shown to be in radioactive equilibrium with its daughter nuclides down the decay chain to polonium-214 and thallium-210, the precursors of lead-210. The ionisation chamber was calibrated using a standard supplied by the National Institute of Standards and Technology, Washington DC, USA.

RC-S-028-128 B

Standard Traceability Log Rad

Source Material Info	
Parent Code:	0299
Prepared By:	Angela Johnson
Carrier Conc:	0.5 M HCL
Reference Date:	12/15/1999
Ampoule Mass (g):	5.0368 g
Uncertainty:	+/- 2.5 %
LogBook No:	RC S 027 128

A Solution Material Info	
Isotope:	Radium-226
Prepared By:	Angela Johnson
Prep Date:	09/15/2000
Verification Date:	04/14/2016
Expiration Date:	04/14/2017
Primary Code:	0299-A
Dilution(mL):	100 mL
Mass of Parent(g):	4.6634 g
Density(g/mL):	1.0011
Balance ID:	C31514

Calculations Converting parent activity to dpm/mL|dpm/g

(Mass of parent(g)) * (Parm Activity (kBq/g)) * (conversion dpm to kBq) / (Dilution Vol) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (kBq/g)) * (conversion dpm to kBq) / Density (g/mL)/ (Dilution Vol) = Parent Activity (dpm/g)
(4.6634 g) * (43.75 kBq/g) * (60000 dpm/kBq) / (100 mL) = 122414.2500 dpm/mL
(4.6634 g) * (43.75 kBq/g) * (60000 dpm/kBq) / (1.0011 g/mL) / (100 mL) = 122280.0000 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
08/26/2003	Angela Johnson	1.9909	100	0299-E	2434.34 dpm/mL	11/04/2004	11/04/2005
08/26/2003	Angela Johnson	1.9872	100	0299-F	2429.82 dpm/mL	08/26/2004	08/26/2005
04/05/2005	Amanda Fehr	5.0018	250	0299-G	2446.3471 dpm/mL	01/26/2009	01/26/2010
08/07/2009	Mary Aders	5.0767	250	0299-H	2483.2133 dpm/mL	12/20/2017	12/20/2018
03/15/2011	Gregory Ramsay	5.0716	250	0299-I	2480.4858 dpm/mL	01/08/2016	01/08/2017
05/29/2012	Gregory Ramsay	1.5087	100	0299-J	1844.73785 dpm/mL	06/16/2017	06/16/2018

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Ra-226 Standard 0299-H

v1.0.2

Instrument	Yellow
Analyst	GXR1
Verification Prep Date	12/20/2017

Standard Information	
Isotope	Ra-226
Serial Number	0299-H
Isotope Halflife	1.6000E+03 Y
Reference Date	12/15/1999
Ref. Act. (DPM/mL)	2483.2133
Amount of Std. (mL)	0.5
Standard Prep Date	8/7/2009

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	12/21/2017	769.07	526.30	10.20
2	12/21/2017	769.61	534.20	10.20
3	12/21/2017	768.82	523.10	10.20

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	516.10	0.418431	2466.83	1233.42
2	524.00	0.418431	2504.60	1252.30
3	512.90	0.418431	2451.54	1225.77

	dpm/mL
Mean Value =	2474.32
Stdev =	27.30885385
Certificate Value* =	**2463.9**
Two sigma =	54.618
10 % of Mean =	247.432
Rule A (Pass/Fail)	**Pass**
% Recovery	100.42%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**12/20/2018**

Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Ra-226 source 0299-H by transferring 0.5 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCYellow for Ra-226 source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 12/19/2017 using Ra-226 source 1715-D.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

2-5-18

2/2/18

General Engineering Laboratories
GFC Verification Source Preparation Sheet

Total Radium

Applicable SOP Number	GL-RAD-A-010 / GL-RAD-A-044	Isotope	Ra-226
Date Standards Prepared	4/11/2018		
Standard ID	0299-H	Matrix of Planchett/Filter	Barium Sulfate ppt on 47 mm 0.45 filter
Amount Used (g or ml)	0.5 mL		
Standard Activity (DPM/g or mL)	* 2483.21 dpm/mL	Residue/Carrier Agent	Barium Carrier - 2628181
Reference Date	12/15/1999	Pipette ID Used	2154115
Expiration Date	12/20/2018	Balance ID Used	F30560

*** Not Decay Corrected**

Separation Date / Time: 4/11/2018 14:40

	Standard Number	Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
	V1	0.4	0.0652	0.0732	8.0
	V2	0.5	0.0657	0.0760	10.3
	V3	0.8	0.0658	0.0852	19.4
	V4	1.0	0.0654	0.0905	25.1
	V5	1.5	0.0655	0.1047	39.2
	V6	2.0	0.0651	0.1160	50.9
	V7	2.5	0.0654	0.1319	66.5
	V8	3.5	0.0656	0.1597	94.1

Prepared By: Date 5/4/2018

Reviewed By: Date 5/4/2018

Gas Flow Proportional Counter Calibration Package

Method: Radium 228

Instrument (circle one): LB4100 / Protean / G5400W

	Part 1: Efficiency determination	Included/ Acceptable	Comments
1	Efficiency spreadsheet (eff pts, graphs, trendline equation)	✓	
2	Applicable portion of GFPC_Machines.XLS	✓	
3	Raw Data for Calibration standards	✓	
4	Verification Spreadsheet and Raw Data (recoveries 75%-125%)	✓	
5	Plateau graph and raw data	✓	
6	Standardization of Carrier (if applicable)	NA	

	Part 2. Documentation for Calibration Source		
1	Vendor Certificate	✓	
2	Standard Traceability Log (from LIMS)	✓	
3	Current Verification of Source	✓	
4	Source preparation sheet	✓	

	Part 3. Documentation for Verification Source		
1	Vendor Certificate	✓	
2	Standard Traceability Log (from LIMS)	✓	
3	Current Verification of Source	✓	
4	Source preparation sheet	✓	

	Part 4. Enter into LIMS		
1	Alpha LIMS instrument calibration updated	✓	

Primary Review of Package Nathaniel Ivey III

Secondary Review of Package Angela A Gil

Effective Date: 6/1/2019

Expiration Date: 5/31/2020

GEL Laboratories
2040 Savage Road, Charleston, SC 29407
(843)556-8171

Rev 7 SSC 8/3/09

Ra-228 Calibration - PIC - May 2019

Standard Data		
	Isotope	**Ra-228**
	Standard ID number	1835-A
	Half Life (days)	2100.1875
	Std. Act. (dpm/mL)	602.7021
	Reference Date	10/7/2010
	Volume of spike (mL)	5.0
	Std. Nominal (dpm)	1068.35
	Decay Date	5/15/2019

Separation Date/Time 5/15/2019 9:05
Ac-228 Half Life (days) 0.25625
The following detectors were not calibrated:
3A, 6D, 13C

*Background is considered neglible.
**Decay corrected to mid-point of count

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Beta (counts)	Raw Beta (cpm)	Ac-228 Decay	Decay Corrected Ra-228 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-228 Efficiency (cpm/dpm)	Average Efficiency (cpm/dpm)
1A	1	5/15/2019 10:53	3	1764	588.00	0.81312	723.14	1068.19	**0.6770**	
1A	2	5/15/2019 11:06	3	1702	567.33	0.79437	714.19	1068.19	**0.6686**	
1A	3	5/15/2019 11:02	3	1712	570.67	0.80034	713.03	1068.19	**0.6675**	
1A	4	5/15/2019 10:57	3	1709	569.67	0.80665	706.21	1068.19	**0.6611**	
1A	5	5/15/2019 11:10	3	1603	534.33	0.78830	677.83	1068.19	**0.6346**	
1A	6	5/15/2019 11:23	3	1549	516.33	0.76849	671.88	1068.19	**0.6290**	
1A	7	5/15/2019 11:18	3	1649	549.67	0.77640	707.97	1068.19	**0.6628**	
1A	8	5/15/2019 11:14	3	1784	594.67	0.78257	759.89	1068.19	**0.7114**	0.6640
1B	1	5/15/2019 10:57	3	1681	560.33	0.80660	694.68	1068.19	**0.6503**	
1B	2	5/15/2019 10:53	3	1659	553.00	0.81296	680.23	1068.19	**0.6368**	
1B	3	5/15/2019 11:06	3	1759	586.33	0.79427	738.20	1068.19	**0.6911**	
1B	4	5/15/2019 11:02	3	1655	551.67	0.80029	689.34	1068.19	**0.6453**	
1B	5	5/15/2019 11:14	3	1606	535.33	0.78238	684.24	1068.19	**0.6406**	
1B	6	5/15/2019 11:10	3	1680	560.00	0.78820	710.48	1068.19	**0.6651**	
1B	7	5/15/2019 11:23	3	1725	575.00	0.76839	748.31	1068.19	**0.7005**	
1B	8	5/15/2019 11:18	3	1748	582.67	0.77630	750.57	1068.19	**0.7027**	0.6666
1C	1	5/15/2019 11:02	3	1608	536.00	0.80011	669.91	1068.19	**0.6271**	
1C	2	5/15/2019 10:58	3	1554	518.00	0.80642	642.34	1068.19	**0.6013**	
1C	3	5/15/2019 10:53	3	1672	557.33	0.81276	685.73	1068.19	**0.6420**	
1C	4	5/15/2019 11:06	3	1577	525.67	0.79415	661.93	1068.19	**0.6197**	
1C	5	5/15/2019 11:18	3	1512	504.00	0.77616	649.35	1068.19	**0.6079**	
1C	6	5/15/2019 11:14	3	1551	517.00	0.78228	660.89	1068.19	**0.6187**	
1C	7	5/15/2019 11:10	3	1638	546.00	0.78808	692.82	1068.19	**0.6486**	
1C	8	5/15/2019 11:23	3	1661	553.67	0.76830	720.64	1068.19	**0.6746**	0.6300
1D	1	5/15/2019 11:06	3	1747	582.33	0.79407	733.35	1068.19	**0.6865**	
1D	2	5/15/2019 11:02	3	1611	537.00	0.80004	671.22	1068.19	**0.6284**	
1D	3	5/15/2019 10:58	3	1653	551.00	0.80635	683.33	1068.19	**0.6397**	
1D	4	5/15/2019 10:53	3	1696	565.33	0.81258	695.72	1068.19	**0.6513**	
1D	5	5/15/2019 11:23	3	1635	545.00	0.76820	709.45	1068.19	**0.6642**	
1D	6	5/15/2019 11:18	3	1509	503.00	0.77611	648.11	1068.19	**0.6067**	
1D	7	5/15/2019 11:14	3	1638	546.00	0.78218	698.05	1068.19	**0.6535**	
1D	8	5/15/2019 11:10	3	1681	560.33	0.78798	711.10	1068.19	**0.6657**	0.6495
2A	1	5/15/2019 11:10	3	1570	523.33	0.78788	664.23	1068.19	**0.6218**	
2A	2	5/15/2019 11:23	3	1574	524.67	0.76813	683.04	1068.19	**0.6394**	
2A	3	5/15/2019 11:18	3	1594	531.33	0.77591	684.79	1068.19	**0.6411**	
2A	4	5/15/2019 11:14	3	1543	514.33	0.78208	657.65	1068.19	**0.6157**	
2A	5	5/15/2019 10:54	3	1661	553.67	0.81240	681.52	1068.19	**0.6380**	
2A	6	5/15/2019 11:06	3	1573	524.33	0.79395	660.41	1068.19	**0.6183**	
2A	7	5/15/2019 11:02	3	1744	581.33	0.79991	726.75	1068.19	**0.6804**	
2A	8	5/15/2019 10:58	3	1612	537.33	0.80622	666.48	1068.19	**0.6239**	0.6348
2B	1	5/15/2019 11:14	3	1667	555.67	0.78157	710.96	1068.19	**0.6656**	
2B	2	5/15/2019 11:10	3	1704	568.00	0.78773	721.06	1068.19	**0.6750**	
2B	3	5/15/2019 11:24	3	1643	547.67	0.76801	713.10	1068.18	**0.6676**	
2B	4	5/15/2019 11:18	3	1559	519.67	0.77586	669.79	1068.19	**0.6270**	
2B	5	5/15/2019 10:58	3	1612	537.33	0.80612	666.57	1068.19	**0.6240**	
2B	6	5/15/2019 10:54	3	1607	535.67	0.81228	659.46	1068.19	**0.6174**	
2B	7	5/15/2019 11:06	3	1741	580.33	0.79385	731.04	1068.19	**0.6844**	
2B	8	5/15/2019 11:02	3	1779	593.00	0.79986	741.38	1068.19	**0.6941**	0.6569

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Beta (counts)	Raw Beta (cpm)	Ac-228 Decay	Decay Corrected Ra-228 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-228 Efficiency (cpm/dpm)	Average Efficiency (cpm/dpm)
2C	1	5/15/2019 11:18	3	1635	545.00	0.77577	702.53	1068.19	**0.6577**	
2C	2	5/15/2019 11:14	3	1668	556.00	0.78152	711.43	1068.19	**0.6660**	
2C	3	5/15/2019 11:10	3	1647	549.00	0.78766	697.00	1068.19	**0.6525**	
2C	4	5/15/2019 11:24	3	1597	532.33	0.76796	693.18	1068.18	**0.6489**	
2C	5	5/15/2019 11:02	3	1664	554.67	0.79971	693.58	1068.19	**0.6493**	
2C	6	5/15/2019 10:58	3	1595	531.67	0.80602	659.62	1068.19	**0.6175**	
2C	7	5/15/2019 10:54	3	1799	599.67	0.81210	738.41	1068.19	**0.6913**	
2C	8	5/15/2019 11:06	3	1736	578.67	0.79375	729.03	1068.19	**0.6825**	0.6582
2D	1	5/15/2019 11:24	3	1511	503.67	0.76789	655.91	1068.18	**0.6140**	
2D	2	5/15/2019 11:18	3	1527	509.00	0.77569	656.19	1068.19	**0.6143**	
2D	3	5/15/2019 11:14	3	1584	528.00	0.78140	675.71	1068.19	**0.6326**	
2D	4	5/15/2019 11:10	3	1625	541.67	0.78756	687.78	1068.19	**0.6439**	
2D	5	5/15/2019 11:06	3	1591	530.33	0.79365	668.22	1068.19	**0.6256**	
2D	6	5/15/2019 11:02	3	1622	540.67	0.79961	676.16	1068.19	**0.6330**	
2D	7	5/15/2019 10:58	3	1703	567.67	0.80592	704.37	1068.19	**0.6594**	
2D	8	5/15/2019 10:54	3	1689	563.00	0.81192	693.42	1068.19	**0.6491**	0.6340
3B	1	5/15/2019 11:31	3	1551	517.00	0.75710	682.87	1068.18	**0.6393**	
3B	2	5/15/2019 11:27	3	1557	519.00	0.76291	680.29	1068.18	**0.6369**	
3B	3	5/15/2019 11:45	3	1544	514.67	0.73814	697.25	1068.18	**0.6527**	
3B	4	5/15/2019 11:41	3	1584	528.00	0.74385	709.82	1068.18	**0.6645**	
3B	5	5/15/2019 11:53	3	1445	481.67	0.72672	662.79	1068.18	**0.6205**	
3B	6	5/15/2019 11:49	3	1495	498.33	0.73234	680.47	1068.18	**0.6370**	
3B	7	5/15/2019 12:01	3	1540	513.33	0.71568	717.27	1068.18	**0.6715**	
3B	8	5/15/2019 11:57	3	1601	533.67	0.72121	739.96	1068.18	**0.6927**	0.6519
3C	1	5/15/2019 11:41	3	1613	537.67	0.74387	722.79	1068.18	**0.6767**	
3C	2	5/15/2019 11:31	3	1621	540.33	0.75700	713.78	1068.18	**0.6682**	
3C	3	5/15/2019 11:27	3	1623	541.00	0.76291	709.13	1068.18	**0.6639**	
3C	4	5/15/2019 11:45	3	1453	484.33	0.73807	656.21	1068.18	**0.6143**	
3C	5	5/15/2019 11:57	3	1520	506.67	0.72110	702.63	1068.18	**0.6578**	
3C	6	5/15/2019 11:53	3	1530	510.00	0.72638	702.11	1068.18	**0.6573**	
3C	7	5/15/2019 11:49	3	1594	531.33	0.73225	725.62	1068.18	**0.6793**	
3C	8	5/15/2019 12:01	3	1459	486.33	0.71557	679.65	1068.18	**0.6363**	0.6567
3D	1	5/15/2019 11:45	3	1471	490.33	0.73798	664.43	1068.18	**0.6220**	
3D	2	5/15/2019 11:41	3	1520	506.67	0.74387	681.12	1068.18	**0.6376**	
3D	3	5/15/2019 11:31	3	1622	540.67	0.75696	714.26	1068.18	**0.6687**	
3D	4	5/15/2019 11:27	3	1469	489.67	0.76291	641.84	1068.18	**0.6009**	
3D	5	5/15/2019 12:01	3	1496	498.67	0.71550	696.95	1068.18	**0.6525**	
3D	6	5/15/2019 11:57	3	1492	497.33	0.72099	689.79	1068.18	**0.6458**	
3D	7	5/15/2019 11:53	3	1613	537.67	0.72629	740.29	1068.18	**0.6930**	
3D	8	5/15/2019 11:49	3	1656	552.00	0.73218	753.91	1068.18	**0.7058**	0.6533
4A	1	5/15/2019 11:49	3	1612	537.33	0.73204	734.02	1068.18	**0.6872**	
4A	2	5/15/2019 12:01	3	1492	497.33	0.71528	695.30	1068.18	**0.6509**	
4A	3	5/15/2019 11:57	3	1528	509.33	0.72090	706.53	1068.18	**0.6614**	
4A	4	5/15/2019 11:53	3	1502	500.67	0.72620	689.43	1068.18	**0.6454**	
4A	5	5/15/2019 11:27	3	1511	503.67	0.76283	660.26	1068.18	**0.6181**	
4A	6	5/15/2019 11:45	3	1522	507.33	0.73786	687.57	1068.18	**0.6437**	
4A	7	5/15/2019 11:41	3	1654	551.33	0.74387	741.17	1068.18	**0.6939**	
4A	8	5/15/2019 11:31	3	1696	565.33	0.75686	746.94	1068.18	**0.6993**	0.6625
4B	1	5/15/2019 11:53	3	1460	486.67	0.72613	670.22	1068.18	**0.6274**	
4B	2	5/15/2019 11:49	3	1467	489.00	0.73197	668.06	1068.18	**0.6254**	
4B	3	5/15/2019 12:01	3	1446	482.00	0.71519	673.95	1068.18	**0.6309**	
4B	4	5/15/2019 11:57	3	1420	473.33	0.72083	656.65	1068.18	**0.6147**	
4B	5	5/15/2019 11:31	3	1600	533.33	0.75677	704.75	1068.18	**0.6598**	
4B	6	5/15/2019 11:27	3	1513	504.33	0.76283	661.13	1068.18	**0.6189**	
4B	7	5/15/2019 11:45	3	1553	517.67	0.73777	701.66	1068.18	**0.6569**	
4B	8	5/15/2019 11:41	3	1636	545.33	0.74389	733.08	1068.18	**0.6863**	0.6400
4C	1	5/15/2019 11:57	3	1460	486.67	0.72072	675.25	1068.18	**0.6322**	
4C	2	5/15/2019 11:53	3	1465	488.33	0.72597	672.66	1068.18	**0.6297**	
4C	3	5/15/2019 11:49	3	1584	528.00	0.73184	721.47	1068.18	**0.6754**	
4C	4	5/15/2019 12:02	3	1477	492.33	0.71510	688.48	1068.18	**0.6445**	
4C	5	5/15/2019 11:41	3	1611	537.00	0.74389	721.88	1068.18	**0.6758**	
4C	6	5/15/2019 11:31	3	1523	507.67	0.75665	670.94	1068.18	**0.6281**	
4C	7	5/15/2019 11:27	3	1647	549.00	0.76283	719.69	1068.18	**0.6737**	
4C	8	5/15/2019 11:45	3	1592	530.67	0.73768	719.37	1068.18	**0.6735**	0.6541
4D	1	5/15/2019 12:02	3	1384	461.33	0.71501	645.21	1068.18	**0.6040**	
4D	2	5/15/2019 11:57	3	1349	449.67	0.72063	623.99	1068.18	**0.5842**	
4D	3	5/15/2019 11:54	3	1452	484.00	0.72590	666.76	1068.18	**0.6242**	

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Beta (counts)	Raw Beta (cpm)	Ac-228 Decay	Decay Corrected Ra-228 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-228 Efficiency (cpm/dpm)	Average Efficiency (cpm/dpm)
4D	4	5/15/2019 11:49	3	1421	473.67	0.73177	647.29	1068.18	**0.6060**	
4D	5	5/15/2019 11:45	3	1432	477.33	0.73749	647.24	1068.18	**0.6059**	
4D	6	5/15/2019 11:41	3	1366	455.33	0.74389	612.09	1068.18	**0.5730**	
4D	7	5/15/2019 11:32	3	1556	518.67	0.75655	685.56	1068.18	**0.6418**	
4D	8	5/15/2019 11:27	3	1533	511.00	0.76283	669.87	1068.18	**0.6271**	0.6083
5A	1	5/15/2019 12:05	3	1470	490.00	0.70999	690.15	1068.17	**0.6461**	
5A	2	5/15/2019 12:20	3	1442	480.67	0.69059	696.02	1068.17	**0.6516**	
5A	3	5/15/2019 12:16	3	1533	511.00	0.69551	734.71	1068.17	**0.6878**	
5A	4	5/15/2019 12:12	3	1528	509.33	0.70100	726.58	1068.17	**0.6802**	
5A	5	5/15/2019 12:24	3	1510	503.33	0.68559	734.16	1068.17	**0.6873**	
5A	6	5/15/2019 12:35	3	1413	471.00	0.67113	701.80	1068.17	**0.6570**	
5A	7	5/15/2019 12:31	3	1469	489.67	0.67617	724.18	1068.17	**0.6780**	
5A	8	5/15/2019 12:28	3	1598	532.67	0.68069	782.54	1068.17	**0.7326**	0.6776
5B	1	5/15/2019 12:12	3	1417	472.33	0.70085	673.95	1068.17	**0.6309**	
5B	2	5/15/2019 12:05	3	1502	500.67	0.70999	705.17	1068.17	**0.6602**	
5B	3	5/15/2019 12:20	3	1510	503.33	0.69046	728.98	1068.17	**0.6825**	
5B	4	5/15/2019 12:16	3	1455	485.00	0.69538	697.46	1068.17	**0.6529**	
5B	5	5/15/2019 12:28	3	1428	476.00	0.68097	699.00	1068.17	**0.6544**	
5B	6	5/15/2019 12:24	3	1541	513.67	0.68559	749.23	1068.17	**0.7014**	
5B	7	5/15/2019 12:35	3	1512	504.00	0.67104	751.07	1068.17	**0.7031**	
5B	8	5/15/2019 12:31	3	1474	491.33	0.67606	726.76	1068.17	**0.6804**	0.6707
5C	1	5/15/2019 12:16	3	1409	469.67	0.69564	675.15	1068.17	**0.6321**	
5C	2	5/15/2019 12:12	3	1508	502.67	0.70078	717.29	1068.17	**0.6715**	
5C	3	5/15/2019 12:09	3	1609	536.33	0.70549	760.23	1068.17	**0.7117**	
5C	4	5/15/2019 12:20	3	1450	483.33	0.69037	700.11	1068.17	**0.6554**	
5C	5	5/15/2019 12:31	3	1490	496.67	0.67596	734.76	1068.17	**0.6879**	
5C	6	5/15/2019 12:28	3	1371	457.00	0.68093	671.14	1068.17	**0.6283**	
5C	7	5/15/2019 12:24	3	1536	512.00	0.68559	746.80	1068.17	**0.6991**	
5C	8	5/15/2019 12:35	3	1532	510.67	0.67094	761.12	1068.17	**0.7125**	0.6748
5D	1	5/15/2019 12:20	3	1419	473.00	0.69068	684.84	1068.17	**0.6411**	
5D	2	5/15/2019 12:16	3	1411	470.33	0.69560	676.15	1068.17	**0.6330**	
5D	3	5/15/2019 12:12	3	1498	499.33	0.70069	712.63	1068.17	**0.6671**	
5D	4	5/15/2019 12:05	3	1489	496.33	0.71001	699.05	1068.17	**0.6544**	
5D	5	5/15/2019 12:35	3	1417	472.33	0.67090	704.03	1068.17	**0.6591**	
5D	6	5/15/2019 12:32	3	1444	481.33	0.67585	712.19	1068.17	**0.6667**	
5D	7	5/15/2019 12:28	3	1466	488.67	0.68078	717.81	1068.17	**0.6720**	
5D	8	5/15/2019 12:24	3	1519	506.33	0.68559	738.54	1068.17	**0.6914**	0.6606
6A	1	5/15/2019 12:27	3	1447	482.33	0.68133	707.93	1068.17	**0.6627**	
6A	2	5/15/2019 12:39	3	1337	445.67	0.66636	668.81	1068.17	**0.6261**	
6A	3	5/15/2019 12:35	3	1318	439.33	0.67144	654.31	1068.17	**0.6126**	
6A	4	5/15/2019 12:31	3	1353	451.00	0.67655	666.62	1068.17	**0.6241**	
6A	5	5/15/2019 12:09	3	1430	476.67	0.70556	675.59	1068.17	**0.6325**	
6A	6	5/15/2019 12:23	3	1454	484.67	0.68624	706.27	1068.17	**0.6612**	
6A	7	5/15/2019 12:20	3	1503	501.00	0.69098	725.06	1068.17	**0.6788**	
6A	8	5/15/2019 12:16	3	1547	515.67	0.69628	740.61	1068.17	**0.6933**	0.6489
6B	1	5/15/2019 12:31	3	1422	474.00	0.67640	700.77	1068.17	**0.6560**	
6B	2	5/15/2019 12:27	3	1327	442.33	0.68123	649.32	1068.17	**0.6079**	
6B	3	5/15/2019 12:39	3	1360	453.33	0.66629	680.38	1068.17	**0.6370**	
6B	4	5/15/2019 12:35	3	1333	444.33	0.67136	661.84	1068.17	**0.6196**	
6B	5	5/15/2019 12:16	3	1379	459.67	0.69630	660.16	1068.17	**0.6180**	
6B	6	5/15/2019 12:09	3	1381	460.33	0.70556	652.44	1068.17	**0.6108**	
6B	7	5/15/2019 12:24	3	1404	468.00	0.68617	682.05	1068.17	**0.6385**	
6B	8	5/15/2019 12:20	3	1462	487.33	0.69089	705.37	1068.17	**0.6604**	0.6310
6C	1	5/15/2019 12:35	3	1274	424.67	0.67128	632.63	1068.17	**0.5923**	
6C	2	5/15/2019 12:31	3	1352	450.67	0.67632	666.35	1068.17	**0.6238**	
6C	3	5/15/2019 12:27	3	1497	499.00	0.68114	732.59	1068.17	**0.6858**	
6C	4	5/15/2019 12:39	3	1400	466.67	0.66621	700.48	1068.17	**0.6558**	
6C	5	5/15/2019 12:20	3	1473	491.00	0.69106	710.50	1068.17	**0.6652**	
6C	6	5/15/2019 12:16	3	1474	491.33	0.69630	705.64	1068.17	**0.6606**	
6C	7	5/15/2019 12:09	3	1479	493.00	0.70556	698.74	1068.17	**0.6541**	
6C	8	5/15/2019 12:24	3	1537	512.33	0.68593	746.91	1068.17	**0.6992**	0.6546
7A	1	5/15/2019 12:43	3	1364	454.67	0.66209	686.71	1068.17	**0.6429**	
7A	2	5/15/2019 12:54	3	1393	464.33	0.64790	716.67	1068.16	**0.6709**	
7A	3	5/15/2019 12:50	3	1356	452.00	0.65289	692.31	1068.16	**0.6481**	
7A	4	5/15/2019 12:46	3	1364	454.67	0.65757	691.44	1068.16	**0.6473**	
7A	5	5/15/2019 12:58	3	1351	450.33	0.64285	700.53	1068.16	**0.6558**	
7A	6	5/15/2019 13:11	3	1284	428.00	0.62809	681.43	1068.16	**0.6379**	

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Beta (counts)	Raw Beta (cpm)	Ac-228 Decay	Decay Corrected Ra-228 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-228 Efficiency (cpm/dpm)	Average Efficiency (cpm/dpm)
7A	7	5/15/2019 13:07	3	1380	460.00	0.63273	727.01	1068.16	**0.6806**	
7A	8	5/15/2019 13:03	3	1485	495.00	0.63758	776.37	1068.16	**0.7268**	0.6638
7B	1	5/15/2019 12:46	3	1263	421.00	0.65753	640.28	1068.16	**0.5994**	
7B	2	5/15/2019 12:43	3	1330	443.33	0.66209	669.59	1068.17	**0.6269**	
7B	3	5/15/2019 12:54	3	1358	452.67	0.64780	698.77	1068.16	**0.6542**	
7B	4	5/15/2019 12:50	3	1355	451.67	0.65281	691.88	1068.16	**0.6477**	
7B	5	5/15/2019 13:03	3	1336	445.33	0.63752	698.54	1068.16	**0.6540**	
7B	6	5/15/2019 12:58	3	1308	436.00	0.64279	678.29	1068.16	**0.6350**	
7B	7	5/15/2019 13:11	3	1381	460.33	0.62801	733.00	1068.16	**0.6862**	
7B	8	5/15/2019 13:07	3	1400	466.67	0.63265	737.64	1068.16	**0.6906**	0.6492
7C	1	5/15/2019 12:50	3	1345	448.33	0.65275	686.84	1068.16	**0.6430**	
7C	2	5/15/2019 12:46	3	1378	459.33	0.65742	698.69	1068.16	**0.6541**	
7C	3	5/15/2019 12:43	3	1355	451.67	0.66207	682.20	1068.17	**0.6387**	
7C	4	5/15/2019 12:54	3	1361	453.67	0.64770	700.43	1068.16	**0.6557**	
7C	5	5/15/2019 13:07	3	1285	428.33	0.63263	677.07	1068.16	**0.6339**	
7C	6	5/15/2019 13:03	3	1351	450.33	0.63744	706.47	1068.16	**0.6614**	
7C	7	5/15/2019 12:58	3	1438	479.33	0.64267	745.85	1068.16	**0.6983**	
7C	8	5/15/2019 13:11	3	1375	458.33	0.62793	729.91	1068.16	**0.6833**	0.6585
7D	1	5/15/2019 12:54	3	1316	438.67	0.64764	677.33	1068.16	**0.6341**	
7D	2	5/15/2019 12:50	3	1377	459.00	0.65269	703.25	1068.16	**0.6584**	
7D	3	5/15/2019 12:46	3	1375	458.33	0.65734	697.25	1068.16	**0.6528**	
7D	4	5/15/2019 12:43	3	1362	454.00	0.66207	685.73	1068.17	**0.6420**	
7D	5	5/15/2019 13:11	3	1280	426.67	0.62787	679.54	1068.16	**0.6362**	
7D	6	5/15/2019 13:07	3	1274	424.67	0.63255	671.36	1068.16	**0.6285**	
7D	7	5/15/2019 13:03	3	1444	481.33	0.63738	755.17	1068.16	**0.7070**	
7D	8	5/15/2019 12:58	3.01	1416	470.43	0.64254	732.14	1068.16	**0.6854**	0.6555
8A	1	5/15/2019 12:58	3	1262	420.67	0.64253	654.70	1068.16	**0.6129**	
8A	2	5/15/2019 13:11	3	1249	416.33	0.62781	663.15	1068.16	**0.6208**	
8A	3	5/15/2019 13:07	3	1308	436.00	0.63245	689.38	1068.16	**0.6454**	
8A	4	5/15/2019 13:03	3	1351	450.33	0.63728	706.65	1068.16	**0.6616**	
8A	5	5/15/2019 12:43	3	1389	463.00	0.66203	699.36	1068.17	**0.6547**	
8A	6	5/15/2019 12:54	3	1347	449.00	0.64754	693.40	1068.16	**0.6491**	
8A	7	5/15/2019 12:50	3	1326	442.00	0.65260	677.29	1068.16	**0.6341**	
8A	8	5/15/2019 12:46	3	1393	464.33	0.65726	706.47	1068.16	**0.6614**	0.6425
8B	1	5/15/2019 13:03	3	1295	431.67	0.63718	677.46	1068.16	**0.6342**	
8B	2	5/15/2019 12:59	3	1358	452.67	0.64247	704.57	1068.16	**0.6596**	
8B	3	5/15/2019 13:11	3	1304	434.67	0.62740	692.80	1068.16	**0.6486**	
8B	4	5/15/2019 13:07	3	1297	432.33	0.63233	683.71	1068.16	**0.6401**	
8B	5	5/15/2019 12:46	3	1358	452.67	0.65720	688.78	1068.16	**0.6448**	
8B	6	5/15/2019 12:43	3	1458	486.00	0.66203	734.11	1068.17	**0.6873**	
8B	7	5/15/2019 12:54	3	1471	490.33	0.64744	757.35	1068.16	**0.7090**	
8B	8	5/15/2019 12:50	3	1416	472.00	0.65250	723.37	1068.16	**0.6772**	0.6626
8C	1	5/15/2019 13:07	3	1316	438.67	0.63223	693.84	1068.16	**0.6496**	
8C	2	5/15/2019 13:03	3	1412	470.67	0.63712	738.74	1068.16	**0.6916**	
8C	3	5/15/2019 12:59	3	1347	449.00	0.64237	698.98	1068.16	**0.6544**	
8C	4	5/15/2019 13:11	3	1346	448.67	0.62732	715.21	1068.16	**0.6696**	
8C	5	5/15/2019 12:50	3	1343	447.67	0.65244	686.14	1068.16	**0.6424**	
8C	6	5/15/2019 12:47	3	1400	466.67	0.65709	710.20	1068.16	**0.6649**	
8C	7	5/15/2019 12:43	3	1439	479.67	0.66203	724.54	1068.17	**0.6783**	
8C	8	5/15/2019 12:55	3	1444	481.33	0.64733	743.56	1068.16	**0.6961**	0.6683
8D	1	5/15/2019 13:11	3	1284	428.00	0.62726	682.33	1068.16	**0.6388**	
8D	2	5/15/2019 13:07	3	1271	423.67	0.63215	670.20	1068.16	**0.6274**	
8D	3	5/15/2019 13:03	3	1317	439.00	0.63704	689.12	1068.16	**0.6451**	
8D	4	5/15/2019 12:59	3	1345	448.33	0.64231	698.00	1068.16	**0.6535**	
8D	5	5/15/2019 12:55	3	1328	442.67	0.64723	683.94	1068.16	**0.6403**	
8D	6	5/15/2019 12:51	3	1350	450.00	0.65211	690.06	1068.16	**0.6460**	
8D	7	5/15/2019 12:47	3	1375	458.33	0.65701	697.60	1068.16	**0.6531**	
8D	8	5/15/2019 12:43	3	1377	459.00	0.66201	693.34	1068.17	**0.6491**	0.6442
9A	1	5/15/2019 13:15	3	1323	441.00	0.62341	707.40	1068.16	**0.6623**	
9A	2	5/15/2019 13:26	3	1281	427.00	0.61064	699.27	1068.16	**0.6546**	
9A	3	5/15/2019 13:22	3	1364	454.67	0.61486	739.46	1068.16	**0.6923**	
9A	4	5/15/2019 13:18	3	1267	422.33	0.61905	682.23	1068.16	**0.6387**	
9A	5	5/15/2019 13:30	3	1280	426.67	0.60609	703.97	1068.15	**0.6591**	
9A	6	5/15/2019 13:42	3	1366	455.33	0.59243	768.59	1068.15	**0.7195**	
9A	7	5/15/2019 13:38	3	1306	435.33	0.59649	729.83	1068.15	**0.6833**	
9A	8	5/15/2019 13:34	3	1438	479.33	0.60129	797.18	1068.15	**0.7463**	0.6820
9B	1	5/15/2019 13:18	3	1229	409.67	0.61924	661.56	1068.16	**0.6193**	

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Beta (counts)	Raw Beta (cpm)	Ac-228 Decay	Decay Corrected Ra-228 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-228 Efficiency (cpm/dpm)	Average Efficiency (cpm/dpm)
9B	2	5/15/2019 13:15	3	1286	428.67	0.62341	687.62	1068.16	**0.6437**	
9B	3	5/15/2019 13:26	3	1234	411.33	0.61058	673.67	1068.16	**0.6307**	
9B	4	5/15/2019 13:22	3	1261	420.33	0.61480	683.69	1068.16	**0.6401**	
9B	5	5/15/2019 13:34	3	1245	415.00	0.60151	689.93	1068.15	**0.6459**	
9B	6	5/15/2019 13:30	3	1242	414.00	0.60601	683.16	1068.15	**0.6396**	
9B	7	5/15/2019 13:42	3	1294	431.33	0.59236	728.17	1068.15	**0.6817**	
9B	8	5/15/2019 13:38	3	1399	466.33	0.59637	781.95	1068.15	**0.7321**	0.6541
9C	1	5/15/2019 13:22	3	1214	404.67	0.61503	657.96	1068.16	**0.6160**	
9C	2	5/15/2019 13:18	3	1248	416.00	0.61919	671.85	1068.16	**0.6290**	
9C	3	5/15/2019 13:15	3	1291	430.33	0.62339	690.31	1068.16	**0.6463**	
9C	4	5/15/2019 13:26	3	1261	420.33	0.61052	688.48	1068.16	**0.6445**	
9C	5	5/15/2019 13:38	3	1231	410.33	0.59664	687.74	1068.15	**0.6439**	
9C	6	5/15/2019 13:34	3	1198	399.33	0.60144	663.97	1068.15	**0.6216**	
9C	7	5/15/2019 13:30	3	1311	437.00	0.60595	721.18	1068.15	**0.6752**	
9C	8	5/15/2019 13:42	3	1332	444.00	0.59230	749.62	1068.15	**0.7018**	0.6473
9D	1	5/15/2019 13:25	3	1189	396.33	0.61075	648.92	1068.16	**0.6075**	
9D	2	5/15/2019 13:22	3	1304	434.67	0.61496	706.83	1068.16	**0.6617**	
9D	3	5/15/2019 13:18	3	1329	443.00	0.61911	715.54	1068.16	**0.6699**	
9D	4	5/15/2019 13:15	3	1296	432.00	0.62343	692.94	1068.16	**0.6487**	
9D	5	5/15/2019 13:42	3	1225	408.33	0.59249	689.19	1068.15	**0.6452**	
9D	6	5/15/2019 13:38	3	1265	421.67	0.59654	706.85	1068.15	**0.6618**	
9D	7	5/15/2019 13:34	3	1281	427.00	0.60136	710.05	1068.15	**0.6648**	
9D	8	5/15/2019 13:30	3	1332	444.00	0.60592	732.77	1068.15	**0.6860**	0.6557
10A	1	5/15/2019 13:30	3	1163	387.67	0.60584	639.88	1068.15	**0.5991**	
10A	2	5/15/2019 13:42	3	1254	418.00	0.59217	705.88	1068.15	**0.6608**	
10A	3	5/15/2019 13:38	3	1298	432.67	0.59679	725.00	1068.15	**0.6787**	
10A	4	5/15/2019 13:34	3	1273	424.33	0.60099	706.06	1068.15	**0.6610**	
10A	5	5/15/2019 13:15	3	1294	431.33	0.62335	691.96	1068.16	**0.6478**	
10A	6	5/15/2019 13:26	3	1235	411.67	0.61037	674.45	1068.16	**0.6314**	
10A	7	5/15/2019 13:22	3	1397	465.67	0.61457	757.71	1068.16	**0.7094**	
10A	8	5/15/2019 13:19	3	1421	473.67	0.61874	765.53	1068.16	**0.7167**	0.6631
10B	1	5/15/2019 13:34	3	1135	378.33	0.60121	629.29	1068.15	**0.5891**	
10B	2	5/15/2019 13:30	3	1276	425.33	0.60578	702.12	1068.15	**0.6573**	
10B	3	5/15/2019 13:42	3	1290	430.00	0.59211	726.21	1068.15	**0.6799**	
10B	4	5/15/2019 13:38	3	1264	421.33	0.59671	706.09	1068.15	**0.6610**	
10B	5	5/15/2019 13:18	3	1319	439.67	0.61897	710.32	1068.16	**0.6650**	
10B	6	5/15/2019 13:15	3	1380	460.00	0.62335	737.95	1068.16	**0.6909**	
10B	7	5/15/2019 13:26	3	1323	441.00	0.61030	722.60	1068.16	**0.6765**	
10B	8	5/15/2019 13:22	3	1393	464.33	0.61449	755.64	1068.16	**0.7074**	0.6659
10C	1	5/15/2019 13:38	3	1237	412.33	0.59692	690.77	1068.15	**0.6467**	
10C	2	5/15/2019 13:34	3	1188	396.00	0.60112	658.77	1068.15	**0.6167**	
10C	3	5/15/2019 13:30	3	1271	423.67	0.60571	699.46	1068.15	**0.6548**	
10C	4	5/15/2019 13:42	3	1258	419.33	0.59204	708.29	1068.15	**0.6631**	
10C	5	5/15/2019 13:22	3	1286	428.67	0.61471	697.35	1068.16	**0.6529**	
10C	6	5/15/2019 13:18	3	1286	428.67	0.61892	692.61	1068.16	**0.6484**	
10C	7	5/15/2019 13:15	3	1399	466.33	0.62335	748.11	1068.16	**0.7004**	
10C	8	5/15/2019 13:26	3	1366	455.33	0.61022	746.18	1068.16	**0.6986**	0.6602
10D	1	5/15/2019 13:42	3	1152	384.00	0.59223	648.40	1068.15	**0.6070**	
10D	2	5/15/2019 13:38	3	1284	428.00	0.59684	717.11	1068.15	**0.6714**	
10D	3	5/15/2019 13:34	3	1236	412.00	0.60106	685.45	1068.15	**0.6417**	
10D	4	5/15/2019 13:30	3	1289	429.67	0.60565	709.43	1068.15	**0.6642**	
10D	5	5/15/2019 13:26	3	1267	422.33	0.61043	691.86	1068.16	**0.6477**	
10D	6	5/15/2019 13:22	3	1279	426.33	0.61465	693.62	1068.16	**0.6494**	
10D	7	5/15/2019 13:19	3	1322	440.67	0.61882	712.11	1068.16	**0.6667**	
10D	8	5/15/2019 13:15	3	1351	450.33	0.62333	722.46	1068.16	**0.6764**	0.6530
11A	1	5/15/2019 13:44	3	1220	406.67	0.58951	689.84	1068.15	**0.6458**	
11A	2	5/15/2019 13:57	3	1235	411.67	0.57604	714.65	1068.15	**0.6691**	
11A	3	5/15/2019 13:53	3	1182	394.00	0.58031	678.94	1068.15	**0.6356**	
11A	4	5/15/2019 13:49	3	1292	430.67	0.58453	736.78	1068.15	**0.6898**	
11A	5	5/15/2019 14:01	3	1192	397.33	0.57175	694.95	1068.15	**0.6506**	
11A	6	5/15/2019 14:13	3	1206	402.00	0.55820	720.17	1068.14	**0.6742**	
11A	7	5/15/2019 14:09	3	1276	425.33	0.56246	756.20	1068.14	**0.7080**	
11A	8	5/15/2019 14:05	3	1319	439.67	0.56725	775.08	1068.15	**0.7256**	0.6748
11B	1	5/15/2019 13:49	3	1148	382.67	0.58471	654.46	1068.15	**0.6127**	
11B	2	5/15/2019 13:44	3	1185	395.00	0.58951	670.05	1068.15	**0.6273**	
11B	3	5/15/2019 13:57	3	1231	410.33	0.57597	712.42	1068.15	**0.6670**	
11B	4	5/15/2019 13:53	3	1210	403.33	0.58024	695.11	1068.15	**0.6508**	

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Beta (counts)	Raw Beta (cpm)	Ac-228 Decay	Decay Corrected Ra-228 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-228 Efficiency (cpm/dpm)	Average Efficiency (cpm/dpm)
11B	5	5/15/2019 14:05	3	1198	399.33	0.56749	703.69	1068.15	**0.6588**	
11B	6	5/15/2019 14:01	3	1185	395.00	0.57169	690.93	1068.15	**0.6468**	
11B	7	5/15/2019 14:13	3	1247	415.67	0.55813	744.75	1068.14	**0.6972**	
11B	8	5/15/2019 14:09	3	1283	427.67	0.56241	760.42	1068.14	**0.7119**	0.6591
11C	1	5/15/2019 13:53	3	1221	407.00	0.58042	701.21	1068.15	**0.6565**	
11C	2	5/15/2019 13:49	3	1241	413.67	0.58464	707.56	1068.15	**0.6624**	
11C	3	5/15/2019 13:44	3	1298	432.67	0.58951	733.95	1068.15	**0.6871**	
11C	4	5/15/2019 13:57	3	1213	404.33	0.57592	702.07	1068.15	**0.6573**	
11C	5	5/15/2019 14:09	3	1209	403.00	0.56259	716.34	1068.14	**0.6706**	
11C	6	5/15/2019 14:05	3	1194	398.00	0.56740	701.45	1068.15	**0.6567**	
11C	7	5/15/2019 14:01	3	1277	425.67	0.57162	744.66	1068.15	**0.6972**	
11C	8	5/15/2019 14:14	3	1317	439.00	0.55808	786.63	1068.14	**0.7364**	0.6780
11D	1	5/15/2019 13:57	3	1178	392.67	0.57610	681.60	1068.15	**0.6381**	
11D	2	5/15/2019 13:53	3	1285	428.33	0.58039	738.01	1068.15	**0.6909**	
11D	3	5/15/2019 13:49	3	1305	435.00	0.58456	744.15	1068.15	**0.6967**	
11D	4	5/15/2019 13:44	3	1340	446.67	0.58951	757.70	1068.15	**0.7094**	
11D	5	5/15/2019 14:13	3	1222	407.33	0.55825	729.66	1068.14	**0.6831**	
11D	6	5/15/2019 14:09	3	1213	404.33	0.56252	718.80	1068.14	**0.6729**	
11D	7	5/15/2019 14:05	3	1320	440.00	0.56733	775.57	1068.15	**0.7261**	
11D	8	5/15/2019 14:01	3	1335	445.00	0.57155	778.58	1068.15	**0.7289**	0.6933
12A	1	5/15/2019 14:01	3	1139	379.67	0.57148	664.36	1068.15	**0.6220**	
12A	2	5/15/2019 14:13	3	1161	387.00	0.55850	692.93	1068.14	**0.6487**	
12A	3	5/15/2019 14:10	3	1114	371.33	0.56220	660.50	1068.14	**0.6184**	
12A	4	5/15/2019 14:05	3	1174	391.33	0.56701	690.17	1068.15	**0.6461**	
12A	5	5/15/2019 13:44	3	1224	408.00	0.58947	692.15	1068.15	**0.6480**	
12A	6	5/15/2019 13:57	3	1136	378.67	0.57575	657.69	1068.15	**0.6157**	
12A	7	5/15/2019 13:53	3	1224	408.00	0.58001	703.44	1068.15	**0.6586**	
12A	8	5/15/2019 13:49	3	1309	436.33	0.58420	746.89	1068.15	**0.6992**	0.6446
12B	1	5/15/2019 14:05	3	1173	391.00	0.56720	689.35	1068.15	**0.6454**	
12B	2	5/15/2019 14:01	3	1161	387.00	0.57143	677.25	1068.15	**0.6340**	
12B	3	5/15/2019 14:13	3	1174	391.33	0.55843	700.78	1068.14	**0.6561**	
12B	4	5/15/2019 14:10	3	1210	403.33	0.56215	717.49	1068.14	**0.6717**	
12B	5	5/15/2019 13:49	3	1191	397.00	0.58445	679.27	1068.15	**0.6359**	
12B	6	5/15/2019 13:44	3	1216	405.33	0.58947	687.62	1068.15	**0.6438**	
12B	7	5/15/2019 13:57	3	1256	418.67	0.57568	727.25	1068.15	**0.6809**	
12B	8	5/15/2019 13:53	3	1281	427.00	0.57993	736.29	1068.15	**0.6893**	0.6571
12C	1	5/15/2019 14:09	3	1176	392.00	0.56232	697.11	1068.14	**0.6526**	
12C	2	5/15/2019 14:05	3	1172	390.67	0.56711	688.87	1068.15	**0.6449**	
12C	3	5/15/2019 14:01	3	1284	428.00	0.57126	749.21	1068.15	**0.7014**	
12C	4	5/15/2019 14:13	3	1198	399.33	0.55834	715.22	1068.14	**0.6696**	
12C	5	5/15/2019 13:53	3	1236	412.00	0.58017	710.14	1068.15	**0.6648**	
12C	6	5/15/2019 13:49	3	1239	413.00	0.58436	706.75	1068.15	**0.6617**	
12C	7	5/15/2019 13:44	3	1271	423.67	0.58947	718.73	1068.15	**0.6729**	
12C	8	5/15/2019 13:57	3	1338	446.00	0.57559	774.86	1068.15	**0.7254**	0.6742
12D	1	5/15/2019 14:13	3	1171	390.33	0.55855	698.83	1068.14	**0.6543**	
12D	2	5/15/2019 14:10	3	1212	404.00	0.56227	718.52	1068.14	**0.6727**	
12D	3	5/15/2019 14:05	3	1203	401.00	0.56706	707.16	1068.15	**0.6620**	
12D	4	5/15/2019 14:01	3	1232	410.67	0.57119	718.96	1068.15	**0.6731**	
12D	5	5/15/2019 13:57	3	1238	412.67	0.57586	716.61	1068.15	**0.6709**	
12D	6	5/15/2019 13:53	3	1271	423.67	0.58006	730.38	1068.15	**0.6838**	
12D	7	5/15/2019 13:49	3	1321	440.33	0.58429	753.62	1068.15	**0.7055**	
12D	8	5/15/2019 13:44	3	1353	451.00	0.58945	765.12	1068.15	**0.7163**	0.6798
13A	1	5/15/2019 14:17	3	1129	376.33	0.55449	678.70	1068.14	**0.6354**	
13A	2	5/15/2019 14:29	3	1260	420.00	0.54194	774.99	1068.14	**0.7255**	
13A	3	5/15/2019 14:25	3	1147	382.33	0.54644	699.68	1068.14	**0.6550**	
13A	4	5/15/2019 14:21	3	1260	420.00	0.55065	762.74	1068.14	**0.7141**	
13A	5	5/15/2019 14:33	3	1145	381.67	0.53797	709.46	1068.14	**0.6642**	
13A	6	5/15/2019 14:46	3	1152	384.00	0.52511	731.28	1068.14	**0.6846**	
13A	7	5/15/2019 14:42	3	1203	401.00	0.52927	757.65	1068.14	**0.7093**	
13A	8	5/15/2019 14:37	3	1237	412.33	0.53403	772.12	1068.14	**0.7229**	0.6889
13B	1	5/15/2019 14:21	3	1123	374.33	0.55079	679.63	1068.14	**0.6363**	
13B	2	5/15/2019 14:17	3	1143	381.00	0.55449	687.12	1068.14	**0.6433**	
13B	3	5/15/2019 14:29	3	1210	403.33	0.54188	744.33	1068.14	**0.6968**	
13B	4	5/15/2019 14:25	3	1157	385.67	0.54639	705.84	1068.14	**0.6608**	
13B	5	5/15/2019 14:37	3	1131	377.00	0.53413	705.82	1068.14	**0.6608**	
13B	6	5/15/2019 14:33	3	1213	404.33	0.53792	751.66	1068.14	**0.7037**	
13B	7	5/15/2019 14:46	3	1218	406.00	0.52506	773.25	1068.14	**0.7239**	

Detector (#)	Source ID (#)	Raw Count Data Start Time	Count Time (min)	Beta (counts)	Raw Beta (cpm)	Ac-228 Decay	Decay Corrected Ra-228 (cpm)*	Decay Corrected Nominal (dpm)**	Ra-228 Efficiency (cpm/dpm)	Average Efficiency (cpm/dpm)
13B	8	5/15/2019 14:42	3	1213	404.33	0.52923	764.00	1068.14	**0.7153**	0.6801
13D	1	5/15/2019 14:29	3	1103	367.67	0.54199	678.36	1068.14	**0.6351**	
13D	2	5/15/2019 14:25	3	1144	381.33	0.54653	697.74	1068.14	**0.6532**	
13D	3	5/15/2019 14:21	3	1230	410.00	0.55072	744.48	1068.14	**0.6970**	
13D	4	5/15/2019 14:17	3	1216	405.33	0.55452	730.96	1068.14	**0.6843**	
13D	5	5/15/2019 14:46	3	1188	396.00	0.52516	754.06	1068.14	**0.7060**	
13D	6	5/15/2019 14:42	3	1100	366.67	0.52933	692.69	1068.14	**0.6485**	
13D	7	5/15/2019 14:37	3	1187	395.67	0.53408	740.84	1068.14	**0.6936**	
13D	8	5/15/2019 14:33	3	1212	404.00	0.53787	751.11	1068.14	**0.7032**	0.6776
14A	1	5/15/2019 14:33	3	1181	393.67	0.53782	731.97	1068.14	**0.6853**	
14A	2	5/15/2019 14:46	3	1220	406.67	0.52534	774.10	1068.14	**0.7247**	
14A	3	5/15/2019 14:42	3	1193	397.67	0.52904	751.68	1068.14	**0.7037**	
14A	4	5/15/2019 14:37	3	1156	385.33	0.53378	721.90	1068.14	**0.6758**	
14A	5	5/15/2019 14:17	3	1147	382.33	0.55454	689.46	1068.14	**0.6455**	
14A	6	5/15/2019 14:29	3	1143	381.00	0.54176	703.27	1068.14	**0.6584**	
14A	7	5/15/2019 14:25	3	1265	421.67	0.54617	772.05	1068.14	**0.7228**	
14A	8	5/15/2019 14:21	3	1289	429.67	0.55041	780.63	1068.14	**0.7308**	0.6934
14B	1	5/15/2019 14:37	3	1042	347.33	0.53396	650.48	1068.14	**0.6090**	
14B	2	5/15/2019 14:33	3	1067	355.67	0.53779	661.35	1068.14	**0.6192**	
14B	3	5/15/2019 14:46	3	1054	351.33	0.52529	668.84	1068.14	**0.6262**	
14B	4	5/15/2019 14:42	3	1158	386.00	0.52899	729.70	1068.14	**0.6832**	
14B	5	5/15/2019 14:21	3	1152	384.00	0.55061	697.40	1068.14	**0.6529**	
14B	6	5/15/2019 14:17	3	1089	363.00	0.55454	654.59	1068.14	**0.6128**	
14B	7	5/15/2019 14:29	3	1183	394.33	0.54171	727.95	1068.14	**0.6815**	
14B	8	5/15/2019 14:25	3	1216	405.33	0.54610	742.23	1068.14	**0.6949**	0.6475
14C	1	5/15/2019 14:42	3	1128	376.00	0.52915	710.57	1068.14	**0.6652**	
14C	2	5/15/2019 14:37	3	1173	391.00	0.53388	732.38	1068.14	**0.6857**	
14C	3	5/15/2019 14:33	3	1155	385.00	0.53768	716.03	1068.14	**0.6704**	
14C	4	5/15/2019 14:46	3	1097	365.67	0.52522	696.21	1068.14	**0.6518**	
14C	5	5/15/2019 14:25	3	1124	374.67	0.54630	685.82	1068.14	**0.6421**	
14C	6	5/15/2019 14:21	3	1178	392.67	0.55053	713.25	1068.14	**0.6678**	
14C	7	5/15/2019 14:17	3	1238	412.67	0.55454	744.16	1068.14	**0.6967**	
14C	8	5/15/2019 14:29	3	1205	401.67	0.54162	741.60	1068.14	**0.6943**	0.6717
14D	1	5/15/2019 14:46	3	1049	349.67	0.52539	665.54	1068.14	**0.6231**	
14D	2	5/15/2019 14:42	3	1092	364.00	0.52912	687.94	1068.14	**0.6441**	
14D	3	5/15/2019 14:37	3	1123	374.33	0.53381	701.25	1068.14	**0.6565**	
14D	4	5/15/2019 14:33	3	1056	352.00	0.53763	654.72	1068.14	**0.6130**	
14D	5	5/15/2019 14:29	3	1043	347.67	0.54182	641.66	1068.14	**0.6007**	
14D	6	5/15/2019 14:25	3	1109	369.67	0.54624	676.75	1068.14	**0.6336**	
14D	7	5/15/2019 14:21	3	1228	409.33	0.55046	743.62	1068.14	**0.6962**	
14D	8	5/15/2019 14:17	3	1276	425.33	0.55452	767.02	1068.14	**0.7181**	0.6481

Current Calibration - PIC

Geometry 25mm Filter

Ra-228	**Cal Date**	6/1/2019	**Exp Date**	5/31/2020	
Protean	A0	A1	A2	A3	A4
1A	6.639910E-01				
1B	6.665543E-01				
1C	6.299927E-01				
1D	6.495017E-01				
2A	6.348198E-01				
2B	6.568773E-01				
2C	6.582157E-01				
2D	6.339886E-01				
3A	#N/A				
3B	6.518933E-01				
3C	6.567156E-01				
3D	6.532844E-01				
4A	6.624843E-01				
4B	6.400489E-01				
4C	6.541204E-01				
4D	6.082799E-01				
5A	6.775764E-01				
5B	6.707283E-01				
5C	6.748224E-01				
5D	6.606185E-01				
6A	6.489122E-01				
6B	6.310231E-01				
6C	6.546055E-01				
6D	#N/A				
7A	6.638115E-01				
7B	6.492463E-01				
7C	6.585438E-01				
7D	6.555388E-01				
8A	6.425051E-01				
8B	6.626052E-01				
8C	6.683442E-01				
8D	6.441668E-01				
9A	6.820087E-01				
9B	6.541350E-01				
9C	6.472739E-01				
9D	6.556994E-01				
10A	6.631152E-01				
10B	6.658929E-01				
10C	6.601972E-01				
10D	6.530485E-01				
11A	6.748378E-01				
11B	6.590655E-01				
11C	6.780284E-01				
11D	6.932639E-01				
12A	6.445906E-01				
12B	6.571321E-01				
12C	6.741681E-01				
12D	6.798230E-01				
13A	6.888862E-01				
13B	6.801141E-01				
13C	#N/A				
13D	6.776087E-01				
14A	6.933857E-01				
14B	6.474522E-01				
14C	6.717322E-01				
14D	6.481484E-01				

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
C1	10A	3	2	1163	5/15/2019 13:30	5/15/2019 13:33	PIC	R228C19
C2	10A	3	6	1254	5/15/2019 13:42	5/15/2019 13:45	PIC	R228C19
C3	10A	3	9	1298	5/15/2019 13:38	5/15/2019 13:41	PIC	R228C19
C4	10A	3	9	1273	5/15/2019 13:34	5/15/2019 13:37	PIC	R228C19
C5	10A	3	7	1294	5/15/2019 13:15	5/15/2019 13:18	PIC	R228C19
C6	10A	3	3	1235	5/15/2019 13:26	5/15/2019 13:29	PIC	R228C19
C7	10A	3	6	1397	5/15/2019 13:22	5/15/2019 13:25	PIC	R228C19
C8	10A	3	3	1421	5/15/2019 13:19	5/15/2019 13:22	PIC	R228C19
C1	10B	3	5	1135	5/15/2019 13:34	5/15/2019 13:37	PIC	R228C19
C2	10B	3	7	1276	5/15/2019 13:30	5/15/2019 13:33	PIC	R228C19
C3	10B	3	7	1290	5/15/2019 13:42	5/15/2019 13:45	PIC	R228C19
C4	10B	3	7	1264	5/15/2019 13:38	5/15/2019 13:41	PIC	R228C19
C5	10B	3	7	1319	5/15/2019 13:18	5/15/2019 13:21	PIC	R228C19
C6	10B	3	8	1380	5/15/2019 13:15	5/15/2019 13:18	PIC	R228C19
C7	10B	3	12	1323	5/15/2019 13:26	5/15/2019 13:29	PIC	R228C19
C8	10B	3	11	1393	5/15/2019 13:22	5/15/2019 13:25	PIC	R228C19
C1	10C	3	8	1237	5/15/2019 13:38	5/15/2019 13:41	PIC	R228C19
C2	10C	3	7	1188	5/15/2019 13:34	5/15/2019 13:37	PIC	R228C19
C3	10C	3	8	1271	5/15/2019 13:30	5/15/2019 13:33	PIC	R228C19
C4	10C	3	5	1258	5/15/2019 13:42	5/15/2019 13:45	PIC	R228C19
C5	10C	3	3	1286	5/15/2019 13:22	5/15/2019 13:25	PIC	R228C19
C6	10C	3	7	1286	5/15/2019 13:18	5/15/2019 13:21	PIC	R228C19
C7	10C	3	3	1399	5/15/2019 13:15	5/15/2019 13:18	PIC	R228C19
C8	10C	3	1	1366	5/15/2019 13:26	5/15/2019 13:29	PIC	R228C19
C1	10D	3	5	1152	5/15/2019 13:42	5/15/2019 13:45	PIC	R228C19
C2	10D	3	3	1284	5/15/2019 13:38	5/15/2019 13:41	PIC	R228C19
C3	10D	3	12	1236	5/15/2019 13:34	5/15/2019 13:37	PIC	R228C19
C4	10D	3	6	1289	5/15/2019 13:30	5/15/2019 13:33	PIC	R228C19
C5	10D	3	8	1267	5/15/2019 13:26	5/15/2019 13:29	PIC	R228C19
C6	10D	3	6	1279	5/15/2019 13:22	5/15/2019 13:25	PIC	R228C19
C7	10D	3	8	1322	5/15/2019 13:19	5/15/2019 13:22	PIC	R228C19
C8	10D	3	8	1351	5/15/2019 13:15	5/15/2019 13:18	PIC	R228C19
C1	11A	3	2	1220	5/15/2019 13:44	5/15/2019 13:47	PIC	R228C19

C2	11A	3	3	1235	5/15/2019 13:57	5/15/2019 14:00	PIC	R228C19
C3	11A	3	4	1182	5/15/2019 13:53	5/15/2019 13:56	PIC	R228C19
C4	11A	3	2	1292	5/15/2019 13:49	5/15/2019 13:52	PIC	R228C19
C5	11A	3	1	1192	5/15/2019 14:01	5/15/2019 14:04	PIC	R228C19
C6	11A	3	3	1206	5/15/2019 14:13	5/15/2019 14:16	PIC	R228C19
C7	11A	3	8	1276	5/15/2019 14:09	5/15/2019 14:12	PIC	R228C19
C8	11A	3	5	1319	5/15/2019 14:05	5/15/2019 14:08	PIC	R228C19
C1	11B	3	6	1148	5/15/2019 13:49	5/15/2019 13:52	PIC	R228C19
C2	11B	3	5	1185	5/15/2019 13:44	5/15/2019 13:47	PIC	R228C19
C3	11B	3	3	1231	5/15/2019 13:57	5/15/2019 14:00	PIC	R228C19
C4	11B	3	3	1210	5/15/2019 13:53	5/15/2019 13:56	PIC	R228C19
C5	11B	3	6	1198	5/15/2019 14:05	5/15/2019 14:08	PIC	R228C19
C6	11B	3	3	1185	5/15/2019 14:01	5/15/2019 14:04	PIC	R228C19
C7	11B	3	4	1247	5/15/2019 14:13	5/15/2019 14:16	PIC	R228C19
C8	11B	3	4	1283	5/15/2019 14:09	5/15/2019 14:12	PIC	R228C19
C1	11C	3	1	1221	5/15/2019 13:53	5/15/2019 13:56	PIC	R228C19
C2	11C	3	3	1241	5/15/2019 13:49	5/15/2019 13:52	PIC	R228C19
C3	11C	3	1	1298	5/15/2019 13:44	5/15/2019 13:47	PIC	R228C19
C4	11C	3	1	1213	5/15/2019 13:57	5/15/2019 14:00	PIC	R228C19
C5	11C	3	9	1209	5/15/2019 14:09	5/15/2019 14:12	PIC	R228C19
C6	11C	3	4	1194	5/15/2019 14:05	5/15/2019 14:08	PIC	R228C19
C7	11C	3	4	1277	5/15/2019 14:01	5/15/2019 14:04	PIC	R228C19
C8	11C	3	1	1317	5/15/2019 14:14	5/15/2019 14:17	PIC	R228C19
C1	11D	3	4	1178	5/15/2019 13:57	5/15/2019 14:00	PIC	R228C19
C2	11D	3	3	1285	5/15/2019 13:53	5/15/2019 13:56	PIC	R228C19
C3	11D	3	5	1305	5/15/2019 13:49	5/15/2019 13:52	PIC	R228C19
C4	11D	3	4	1340	5/15/2019 13:44	5/15/2019 13:47	PIC	R228C19
C5	11D	3	12	1222	5/15/2019 14:13	5/15/2019 14:16	PIC	R228C19
C6	11D	3	4	1213	5/15/2019 14:09	5/15/2019 14:12	PIC	R228C19
C7	11D	3	3	1320	5/15/2019 14:05	5/15/2019 14:08	PIC	R228C19
C8	11D	3	4	1335	5/15/2019 14:01	5/15/2019 14:04	PIC	R228C19
C1	12A	3	4	1139	5/15/2019 14:01	5/15/2019 14:04	PIC	R228C19
C2	12A	3	2	1161	5/15/2019 14:13	5/15/2019 14:16	PIC	R228C19
C3	12A	3	2	1114	5/15/2019 14:10	5/15/2019 14:13	PIC	R228C19

C4	12A	3	4	1174	5/15/2019 14:05	5/15/2019 14:08	PIC	R228C19
C5	12A	3	1	1224	5/15/2019 13:44	5/15/2019 13:47	PIC	R228C19
C6	12A	3	3	1136	5/15/2019 13:57	5/15/2019 14:00	PIC	R228C19
C7	12A	3	2	1224	5/15/2019 13:53	5/15/2019 13:56	PIC	R228C19
C8	12A	3	3	1309	5/15/2019 13:49	5/15/2019 13:52	PIC	R228C19
C1	12B	3	5	1173	5/15/2019 14:05	5/15/2019 14:08	PIC	R228C19
C2	12B	3	3	1161	5/15/2019 14:01	5/15/2019 14:04	PIC	R228C19
C3	12B	3	4	1174	5/15/2019 14:13	5/15/2019 14:16	PIC	R228C19
C4	12B	3	7	1210	5/15/2019 14:10	5/15/2019 14:13	PIC	R228C19
C5	12B	3	6	1191	5/15/2019 13:49	5/15/2019 13:52	PIC	R228C19
C6	12B	3	3	1216	5/15/2019 13:44	5/15/2019 13:47	PIC	R228C19
C7	12B	3	5	1256	5/15/2019 13:57	5/15/2019 14:00	PIC	R228C19
C8	12B	3	7	1281	5/15/2019 13:53	5/15/2019 13:56	PIC	R228C19
C1	12C	3	7	1176	5/15/2019 14:09	5/15/2019 14:12	PIC	R228C19
C2	12C	3	9	1172	5/15/2019 14:05	5/15/2019 14:08	PIC	R228C19
C3	12C	3	8	1284	5/15/2019 14:01	5/15/2019 14:04	PIC	R228C19
C4	12C	3	3	1198	5/15/2019 14:13	5/15/2019 14:16	PIC	R228C19
C5	12C	3	6	1236	5/15/2019 13:53	5/15/2019 13:56	PIC	R228C19
C6	12C	3	11	1239	5/15/2019 13:49	5/15/2019 13:52	PIC	R228C19
C7	12C	3	6	1271	5/15/2019 13:44	5/15/2019 13:47	PIC	R228C19
C8	12C	3	5	1338	5/15/2019 13:57	5/15/2019 14:00	PIC	R228C19
C1	12D	3	3	1171	5/15/2019 14:13	5/15/2019 14:16	PIC	R228C19
C2	12D	3	8	1212	5/15/2019 14:10	5/15/2019 14:13	PIC	R228C19
C3	12D	3	3	1203	5/15/2019 14:05	5/15/2019 14:08	PIC	R228C19
C4	12D	3	4	1232	5/15/2019 14:01	5/15/2019 14:04	PIC	R228C19
C5	12D	3	2	1238	5/15/2019 13:57	5/15/2019 14:00	PIC	R228C19
C6	12D	3	4	1271	5/15/2019 13:53	5/15/2019 13:56	PIC	R228C19
C7	12D	3	3	1321	5/15/2019 13:49	5/15/2019 13:52	PIC	R228C19
C8	12D	3	7	1353	5/15/2019 13:44	5/15/2019 13:47	PIC	R228C19
C1	13A	3	8	1129	5/15/2019 14:17	5/15/2019 14:20	PIC	R228C19
C2	13A	3	5	1260	5/15/2019 14:29	5/15/2019 14:32	PIC	R228C19
C3	13A	3	6	1147	5/15/2019 14:25	5/15/2019 14:28	PIC	R228C19
C4	13A	3	8	1260	5/15/2019 14:21	5/15/2019 14:24	PIC	R228C19
C5	13A	3	6	1145	5/15/2019 14:33	5/15/2019 14:36	PIC	R228C19

C6	13A	3	4	1152	5/15/2019 14:46	5/15/2019 14:49	PIC	R228C19
C7	13A	3	6	1203	5/15/2019 14:42	5/15/2019 14:45	PIC	R228C19
C8	13A	3	12	1237	5/15/2019 14:37	5/15/2019 14:40	PIC	R228C19
C1	13B	3	8	1123	5/15/2019 14:21	5/15/2019 14:24	PIC	R228C19
C2	13B	3	3	1143	5/15/2019 14:17	5/15/2019 14:20	PIC	R228C19
C3	13B	3	5	1210	5/15/2019 14:29	5/15/2019 14:32	PIC	R228C19
C4	13B	3	5	1157	5/15/2019 14:25	5/15/2019 14:28	PIC	R228C19
C5	13B	3	7	1131	5/15/2019 14:37	5/15/2019 14:40	PIC	R228C19
C6	13B	3	7	1213	5/15/2019 14:33	5/15/2019 14:36	PIC	R228C19
C7	13B	3	6	1218	5/15/2019 14:46	5/15/2019 14:49	PIC	R228C19
C8	13B	3	9	1213	5/15/2019 14:42	5/15/2019 14:45	PIC	R228C19
C1	13D	3	4	1103	5/15/2019 14:29	5/15/2019 14:32	PIC	R228C19
C2	13D	3	10	1144	5/15/2019 14:25	5/15/2019 14:28	PIC	R228C19
C3	13D	3	6	1230	5/15/2019 14:21	5/15/2019 14:24	PIC	R228C19
C4	13D	3	3	1216	5/15/2019 14:17	5/15/2019 14:20	PIC	R228C19
C5	13D	3	2	1188	5/15/2019 14:46	5/15/2019 14:49	PIC	R228C19
C6	13D	3	4	1100	5/15/2019 14:42	5/15/2019 14:45	PIC	R228C19
C7	13D	3	5	1187	5/15/2019 14:37	5/15/2019 14:40	PIC	R228C19
C8	13D	3	4	1212	5/15/2019 14:33	5/15/2019 14:36	PIC	R228C19
C1	14A	3	4	1181	5/15/2019 14:33	5/15/2019 14:36	PIC	R228C19
C2	14A	3	4	1220	5/15/2019 14:46	5/15/2019 14:49	PIC	R228C19
C3	14A	3	4	1193	5/15/2019 14:42	5/15/2019 14:45	PIC	R228C19
C4	14A	3	2	1156	5/15/2019 14:37	5/15/2019 14:40	PIC	R228C19
C5	14A	3	2	1147	5/15/2019 14:17	5/15/2019 14:20	PIC	R228C19
C6	14A	3	5	1143	5/15/2019 14:29	5/15/2019 14:32	PIC	R228C19
C7	14A	3	4	1265	5/15/2019 14:25	5/15/2019 14:28	PIC	R228C19
C8	14A	3	7	1289	5/15/2019 14:21	5/15/2019 14:24	PIC	R228C19
C1	14B	3	8	1042	5/15/2019 14:37	5/15/2019 14:40	PIC	R228C19
C2	14B	3	8	1067	5/15/2019 14:33	5/15/2019 14:36	PIC	R228C19
C3	14B	3	10	1054	5/15/2019 14:46	5/15/2019 14:49	PIC	R228C19
C4	14B	3	12	1158	5/15/2019 14:42	5/15/2019 14:45	PIC	R228C19
C5	14B	3	16	1152	5/15/2019 14:21	5/15/2019 14:24	PIC	R228C19
C6	14B	3	12	1089	5/15/2019 14:17	5/15/2019 14:20	PIC	R228C19
C7	14B	3	15	1183	5/15/2019 14:29	5/15/2019 14:32	PIC	R228C19

C8	14B	3	9	1216	5/15/2019 14:25	5/15/2019 14:28	PIC	R228C19
C1	14C	3	4	1128	5/15/2019 14:42	5/15/2019 14:45	PIC	R228C19
C2	14C	3	4	1173	5/15/2019 14:37	5/15/2019 14:40	PIC	R228C19
C3	14C	3	6	1155	5/15/2019 14:33	5/15/2019 14:36	PIC	R228C19
C4	14C	3	6	1097	5/15/2019 14:46	5/15/2019 14:49	PIC	R228C19
C5	14C	3	3	1124	5/15/2019 14:25	5/15/2019 14:28	PIC	R228C19
C6	14C	3	2	1178	5/15/2019 14:21	5/15/2019 14:24	PIC	R228C19
C7	14C	3	11	1238	5/15/2019 14:17	5/15/2019 14:20	PIC	R228C19
C8	14C	3	12	1205	5/15/2019 14:29	5/15/2019 14:32	PIC	R228C19
C1	14D	3	4	1049	5/15/2019 14:46	5/15/2019 14:49	PIC	R228C19
C2	14D	3	9	1092	5/15/2019 14:42	5/15/2019 14:45	PIC	R228C19
C3	14D	3	8	1123	5/15/2019 14:37	5/15/2019 14:40	PIC	R228C19
C4	14D	3	5	1056	5/15/2019 14:33	5/15/2019 14:36	PIC	R228C19
C5	14D	3	2	1043	5/15/2019 14:29	5/15/2019 14:32	PIC	R228C19
C6	14D	3	6	1109	5/15/2019 14:25	5/15/2019 14:28	PIC	R228C19
C7	14D	3	3	1228	5/15/2019 14:21	5/15/2019 14:24	PIC	R228C19
C8	14D	3	3	1276	5/15/2019 14:17	5/15/2019 14:20	PIC	R228C19
C1	1A	3	19	1764	5/15/2019 10:53	5/15/2019 10:56	PIC	R228C19
C2	1A	3	13	1702	5/15/2019 11:06	5/15/2019 11:09	PIC	R228C19
C3	1A	3	18	1712	5/15/2019 11:02	5/15/2019 11:05	PIC	R228C19
C4	1A	3	20	1709	5/15/2019 10:57	5/15/2019 11:00	PIC	R228C19
C5	1A	3	21	1603	5/15/2019 11:10	5/15/2019 11:13	PIC	R228C19
C6	1A	3	23	1549	5/15/2019 11:23	5/15/2019 11:26	PIC	R228C19
C7	1A	3	19	1649	5/15/2019 11:18	5/15/2019 11:21	PIC	R228C19
C8	1A	3	21	1784	5/15/2019 11:14	5/15/2019 11:17	PIC	R228C19
C1	1B	3	13	1681	5/15/2019 10:57	5/15/2019 11:00	PIC	R228C19
C2	1B	3	10	1659	5/15/2019 10:53	5/15/2019 10:56	PIC	R228C19
C3	1B	3	22	1759	5/15/2019 11:06	5/15/2019 11:09	PIC	R228C19
C4	1B	3	13	1655	5/15/2019 11:02	5/15/2019 11:05	PIC	R228C19
C5	1B	3	24	1606	5/15/2019 11:14	5/15/2019 11:17	PIC	R228C19
C6	1B	3	16	1680	5/15/2019 11:10	5/15/2019 11:13	PIC	R228C19
C7	1B	3	13	1725	5/15/2019 11:23	5/15/2019 11:26	PIC	R228C19
C8	1B	3	20	1748	5/15/2019 11:18	5/15/2019 11:21	PIC	R228C19
C1	1C	3	80	1608	5/15/2019 11:02	5/15/2019 11:05	PIC	R228C19

C2	1C	3	94	1554	5/15/2019 10:58	5/15/2019 11:01	PIC	R228C19
C3	1C	3	88	1672	5/15/2019 10:53	5/15/2019 10:56	PIC	R228C19
C4	1C	3	87	1577	5/15/2019 11:06	5/15/2019 11:09	PIC	R228C19
C5	1C	3	65	1512	5/15/2019 11:18	5/15/2019 11:21	PIC	R228C19
C6	1C	3	89	1551	5/15/2019 11:14	5/15/2019 11:17	PIC	R228C19
C7	1C	3	96	1638	5/15/2019 11:10	5/15/2019 11:13	PIC	R228C19
C8	1C	3	104	1661	5/15/2019 11:23	5/15/2019 11:26	PIC	R228C19
C1	1D	3	73	1747	5/15/2019 11:06	5/15/2019 11:09	PIC	R228C19
C2	1D	3	62	1611	5/15/2019 11:02	5/15/2019 11:05	PIC	R228C19
C3	1D	3	55	1653	5/15/2019 10:58	5/15/2019 11:01	PIC	R228C19
C4	1D	3	58	1696	5/15/2019 10:53	5/15/2019 10:56	PIC	R228C19
C5	1D	3	52	1635	5/15/2019 11:23	5/15/2019 11:26	PIC	R228C19
C6	1D	3	60	1509	5/15/2019 11:18	5/15/2019 11:21	PIC	R228C19
C7	1D	3	68	1638	5/15/2019 11:14	5/15/2019 11:17	PIC	R228C19
C8	1D	3	68	1681	5/15/2019 11:10	5/15/2019 11:13	PIC	R228C19
C1	2A	3	33	1570	5/15/2019 11:10	5/15/2019 11:13	PIC	R228C19
C2	2A	3	35	1574	5/15/2019 11:23	5/15/2019 11:26	PIC	R228C19
C3	2A	3	44	1594	5/15/2019 11:18	5/15/2019 11:21	PIC	R228C19
C4	2A	3	40	1543	5/15/2019 11:14	5/15/2019 11:17	PIC	R228C19
C5	2A	3	53	1661	5/15/2019 10:54	5/15/2019 10:57	PIC	R228C19
C6	2A	3	47	1573	5/15/2019 11:06	5/15/2019 11:09	PIC	R228C19
C7	2A	3	46	1744	5/15/2019 11:02	5/15/2019 11:05	PIC	R228C19
C8	2A	3	48	1612	5/15/2019 10:58	5/15/2019 11:01	PIC	R228C19
C1	2B	3	23	1667	5/15/2019 11:14	5/15/2019 11:17	PIC	R228C19
C2	2B	3	14	1704	5/15/2019 11:10	5/15/2019 11:13	PIC	R228C19
C3	2B	3	16	1643	5/15/2019 11:24	5/15/2019 11:27	PIC	R228C19
C4	2B	3	14	1559	5/15/2019 11:18	5/15/2019 11:21	PIC	R228C19
C5	2B	3	19	1612	5/15/2019 10:58	5/15/2019 11:01	PIC	R228C19
C6	2B	3	20	1607	5/15/2019 10:54	5/15/2019 10:57	PIC	R228C19
C7	2B	3	14	1741	5/15/2019 11:06	5/15/2019 11:09	PIC	R228C19
C8	2B	3	22	1779	5/15/2019 11:02	5/15/2019 11:05	PIC	R228C19
C1	2C	3	28	1635	5/15/2019 11:18	5/15/2019 11:21	PIC	R228C19
C2	2C	3	22	1668	5/15/2019 11:14	5/15/2019 11:17	PIC	R228C19
C3	2C	3	22	1647	5/15/2019 11:10	5/15/2019 11:13	PIC	R228C19

C4	2C	3	28	1597	5/15/2019 11:24	5/15/2019 11:27	PIC	R228C19
C5	2C	3	27	1664	5/15/2019 11:02	5/15/2019 11:05	PIC	R228C19
C6	2C	3	27	1595	5/15/2019 10:58	5/15/2019 11:01	PIC	R228C19
C7	2C	3	32	1799	5/15/2019 10:54	5/15/2019 10:57	PIC	R228C19
C8	2C	3	27	1736	5/15/2019 11:06	5/15/2019 11:09	PIC	R228C19
C1	2D	3	67	1511	5/15/2019 11:24	5/15/2019 11:27	PIC	R228C19
C2	2D	3	71	1527	5/15/2019 11:18	5/15/2019 11:21	PIC	R228C19
C3	2D	3	68	1584	5/15/2019 11:14	5/15/2019 11:17	PIC	R228C19
C4	2D	3	86	1625	5/15/2019 11:10	5/15/2019 11:13	PIC	R228C19
C5	2D	3	61	1591	5/15/2019 11:06	5/15/2019 11:09	PIC	R228C19
C6	2D	3	80	1622	5/15/2019 11:02	5/15/2019 11:05	PIC	R228C19
C7	2D	3	66	1703	5/15/2019 10:58	5/15/2019 11:01	PIC	R228C19
C8	2D	3	83	1689	5/15/2019 10:54	5/15/2019 10:57	PIC	R228C19
C1	3B	3	76	1551	5/15/2019 11:31	5/15/2019 11:34	PIC	R228C19
C2	3B	3	73	1557	5/15/2019 11:27	5/15/2019 11:30	PIC	R228C19
C3	3B	3	79	1544	5/15/2019 11:45	5/15/2019 11:48	PIC	R228C19
C4	3B	3	79	1584	5/15/2019 11:41	5/15/2019 11:44	PIC	R228C19
C5	3B	3	73	1445	5/15/2019 11:53	5/15/2019 11:56	PIC	R228C19
C6	3B	3	63	1495	5/15/2019 11:49	5/15/2019 11:52	PIC	R228C19
C7	3B	3	75	1540	5/15/2019 12:01	5/15/2019 12:04	PIC	R228C19
C8	3B	3	80	1601	5/15/2019 11:57	5/15/2019 12:00	PIC	R228C19
C1	3C	3	54	1613	5/15/2019 11:41	5/15/2019 11:44	PIC	R228C19
C2	3C	3	66	1621	5/15/2019 11:31	5/15/2019 11:34	PIC	R228C19
C3	3C	3	49	1623	5/15/2019 11:27	5/15/2019 11:30	PIC	R228C19
C4	3C	3	43	1453	5/15/2019 11:45	5/15/2019 11:48	PIC	R228C19
C5	3C	3	40	1520	5/15/2019 11:57	5/15/2019 12:00	PIC	R228C19
C6	3C	3	56	1530	5/15/2019 11:53	5/15/2019 11:56	PIC	R228C19
C7	3C	3	56	1594	5/15/2019 11:49	5/15/2019 11:52	PIC	R228C19
C8	3C	3	47	1459	5/15/2019 12:01	5/15/2019 12:04	PIC	R228C19
C1	3D	3	46	1471	5/15/2019 11:45	5/15/2019 11:48	PIC	R228C19
C2	3D	3	41	1520	5/15/2019 11:41	5/15/2019 11:44	PIC	R228C19
C3	3D	3	50	1622	5/15/2019 11:31	5/15/2019 11:34	PIC	R228C19
C4	3D	3	55	1469	5/15/2019 11:27	5/15/2019 11:30	PIC	R228C19
C5	3D	3	63	1496	5/15/2019 12:01	5/15/2019 12:04	PIC	R228C19

C6	3D	3	57	1492	5/15/2019 11:57	5/15/2019 12:00	PIC	R228C19
C7	3D	3	51	1613	5/15/2019 11:53	5/15/2019 11:56	PIC	R228C19
C8	3D	3	58	1656	5/15/2019 11:49	5/15/2019 11:52	PIC	R228C19
C1	4A	3	20	1612	5/15/2019 11:49	5/15/2019 11:52	PIC	R228C19
C2	4A	3	16	1492	5/15/2019 12:01	5/15/2019 12:04	PIC	R228C19
C3	4A	3	24	1528	5/15/2019 11:57	5/15/2019 12:00	PIC	R228C19
C4	4A	3	27	1502	5/15/2019 11:53	5/15/2019 11:56	PIC	R228C19
C5	4A	3	29	1511	5/15/2019 11:27	5/15/2019 11:30	PIC	R228C19
C6	4A	3	21	1522	5/15/2019 11:45	5/15/2019 11:48	PIC	R228C19
C7	4A	3	28	1654	5/15/2019 11:41	5/15/2019 11:44	PIC	R228C19
C8	4A	3	23	1696	5/15/2019 11:31	5/15/2019 11:34	PIC	R228C19
C1	4B	3	4	1460	5/15/2019 11:53	5/15/2019 11:56	PIC	R228C19
C2	4B	3	4	1467	5/15/2019 11:49	5/15/2019 11:52	PIC	R228C19
C3	4B	3	1	1446	5/15/2019 12:01	5/15/2019 12:04	PIC	R228C19
C4	4B	3	9	1420	5/15/2019 11:57	5/15/2019 12:00	PIC	R228C19
C5	4B	3	4	1600	5/15/2019 11:31	5/15/2019 11:34	PIC	R228C19
C6	4B	3	2	1513	5/15/2019 11:27	5/15/2019 11:30	PIC	R228C19
C7	4B	3	6	1553	5/15/2019 11:45	5/15/2019 11:48	PIC	R228C19
C8	4B	3	4	1636	5/15/2019 11:41	5/15/2019 11:44	PIC	R228C19
C1	4C	3	38	1460	5/15/2019 11:57	5/15/2019 12:00	PIC	R228C19
C2	4C	3	29	1465	5/15/2019 11:53	5/15/2019 11:56	PIC	R228C19
C3	4C	3	38	1584	5/15/2019 11:49	5/15/2019 11:52	PIC	R228C19
C4	4C	3	42	1477	5/15/2019 12:02	5/15/2019 12:05	PIC	R228C19
C5	4C	3	48	1611	5/15/2019 11:41	5/15/2019 11:44	PIC	R228C19
C6	4C	3	44	1523	5/15/2019 11:31	5/15/2019 11:34	PIC	R228C19
C7	4C	3	55	1647	5/15/2019 11:27	5/15/2019 11:30	PIC	R228C19
C8	4C	3	40	1592	5/15/2019 11:45	5/15/2019 11:48	PIC	R228C19
C1	4D	3	102	1384	5/15/2019 12:02	5/15/2019 12:05	PIC	R228C19
C2	4D	3	99	1349	5/15/2019 11:57	5/15/2019 12:00	PIC	R228C19
C3	4D	3	110	1452	5/15/2019 11:54	5/15/2019 11:57	PIC	R228C19
C4	4D	3	121	1421	5/15/2019 11:49	5/15/2019 11:52	PIC	R228C19
C5	4D	3	102	1432	5/15/2019 11:45	5/15/2019 11:48	PIC	R228C19
C6	4D	3	106	1366	5/15/2019 11:41	5/15/2019 11:44	PIC	R228C19
C7	4D	3	116	1556	5/15/2019 11:32	5/15/2019 11:35	PIC	R228C19

C8	4D	3	135	1533	5/15/2019 11:27	5/15/2019 11:30	PIC	R228C19
C1	5A	3	38	1470	5/15/2019 12:05	5/15/2019 12:08	PIC	R228C19
C2	5A	3	35	1442	5/15/2019 12:20	5/15/2019 12:23	PIC	R228C19
C3	5A	3	39	1533	5/15/2019 12:16	5/15/2019 12:19	PIC	R228C19
C4	5A	3	34	1528	5/15/2019 12:12	5/15/2019 12:15	PIC	R228C19
C5	5A	3	28	1510	5/15/2019 12:24	5/15/2019 12:27	PIC	R228C19
C6	5A	3	41	1413	5/15/2019 12:35	5/15/2019 12:38	PIC	R228C19
C7	5A	3	35	1469	5/15/2019 12:31	5/15/2019 12:34	PIC	R228C19
C8	5A	3	34	1598	5/15/2019 12:28	5/15/2019 12:31	PIC	R228C19
C1	5B	3	36	1417	5/15/2019 12:12	5/15/2019 12:15	PIC	R228C19
C2	5B	3	33	1502	5/15/2019 12:05	5/15/2019 12:08	PIC	R228C19
C3	5B	3	35	1510	5/15/2019 12:20	5/15/2019 12:23	PIC	R228C19
C4	5B	3	33	1455	5/15/2019 12:16	5/15/2019 12:19	PIC	R228C19
C5	5B	3	30	1428	5/15/2019 12:28	5/15/2019 12:31	PIC	R228C19
C6	5B	3	41	1541	5/15/2019 12:24	5/15/2019 12:27	PIC	R228C19
C7	5B	3	25	1512	5/15/2019 12:35	5/15/2019 12:38	PIC	R228C19
C8	5B	3	43	1474	5/15/2019 12:31	5/15/2019 12:34	PIC	R228C19
C1	5C	3	27	1409	5/15/2019 12:16	5/15/2019 12:19	PIC	R228C19
C2	5C	3	20	1508	5/15/2019 12:12	5/15/2019 12:15	PIC	R228C19
C3	5C	3	23	1609	5/15/2019 12:09	5/15/2019 12:12	PIC	R228C19
C4	5C	3	29	1450	5/15/2019 12:20	5/15/2019 12:23	PIC	R228C19
C5	5C	3	26	1490	5/15/2019 12:31	5/15/2019 12:34	PIC	R228C19
C6	5C	3	24	1371	5/15/2019 12:28	5/15/2019 12:31	PIC	R228C19
C7	5C	3	39	1536	5/15/2019 12:24	5/15/2019 12:27	PIC	R228C19
C8	5C	3	26	1532	5/15/2019 12:35	5/15/2019 12:38	PIC	R228C19
C1	5D	3	19	1419	5/15/2019 12:20	5/15/2019 12:23	PIC	R228C19
C2	5D	3	30	1411	5/15/2019 12:16	5/15/2019 12:19	PIC	R228C19
C3	5D	3	28	1498	5/15/2019 12:12	5/15/2019 12:15	PIC	R228C19
C4	5D	3	18	1489	5/15/2019 12:05	5/15/2019 12:08	PIC	R228C19
C5	5D	3	25	1417	5/15/2019 12:35	5/15/2019 12:38	PIC	R228C19
C6	5D	3	23	1444	5/15/2019 12:32	5/15/2019 12:35	PIC	R228C19
C7	5D	3	32	1466	5/15/2019 12:28	5/15/2019 12:31	PIC	R228C19
C8	5D	3	27	1519	5/15/2019 12:24	5/15/2019 12:27	PIC	R228C19
C1	6A	3	1	1447	5/15/2019 12:27	5/15/2019 12:30	PIC	R228C19

C2	6A	3	5	1337	5/15/2019 12:39	5/15/2019 12:42	PIC	R228C19
C3	6A	3	2	1318	5/15/2019 12:35	5/15/2019 12:38	PIC	R228C19
C4	6A	3	6	1353	5/15/2019 12:31	5/15/2019 12:34	PIC	R228C19
C5	6A	3	3	1430	5/15/2019 12:09	5/15/2019 12:12	PIC	R228C19
C6	6A	3	0	1454	5/15/2019 12:23	5/15/2019 12:26	PIC	R228C19
C7	6A	3	5	1503	5/15/2019 12:20	5/15/2019 12:23	PIC	R228C19
C8	6A	3	4	1547	5/15/2019 12:16	5/15/2019 12:19	PIC	R228C19
C1	6B	3	4	1422	5/15/2019 12:31	5/15/2019 12:34	PIC	R228C19
C2	6B	3	5	1327	5/15/2019 12:27	5/15/2019 12:30	PIC	R228C19
C3	6B	3	3	1360	5/15/2019 12:39	5/15/2019 12:42	PIC	R228C19
C4	6B	3	6	1333	5/15/2019 12:35	5/15/2019 12:38	PIC	R228C19
C5	6B	3	6	1379	5/15/2019 12:16	5/15/2019 12:19	PIC	R228C19
C6	6B	3	2	1381	5/15/2019 12:09	5/15/2019 12:12	PIC	R228C19
C7	6B	3	0	1404	5/15/2019 12:24	5/15/2019 12:27	PIC	R228C19
C8	6B	3	3	1462	5/15/2019 12:20	5/15/2019 12:23	PIC	R228C19
C1	6C	3	2	1274	5/15/2019 12:35	5/15/2019 12:38	PIC	R228C19
C2	6C	3	4	1352	5/15/2019 12:31	5/15/2019 12:34	PIC	R228C19
C3	6C	3	3	1497	5/15/2019 12:27	5/15/2019 12:30	PIC	R228C19
C4	6C	3	8	1400	5/15/2019 12:39	5/15/2019 12:42	PIC	R228C19
C5	6C	3	4	1473	5/15/2019 12:20	5/15/2019 12:23	PIC	R228C19
C6	6C	3	5	1474	5/15/2019 12:16	5/15/2019 12:19	PIC	R228C19
C7	6C	3	4	1479	5/15/2019 12:09	5/15/2019 12:12	PIC	R228C19
C8	6C	3	0	1537	5/15/2019 12:24	5/15/2019 12:27	PIC	R228C19
C1	7A	3	6	1364	5/15/2019 12:43	5/15/2019 12:46	PIC	R228C19
C2	7A	3	5	1393	5/15/2019 12:54	5/15/2019 12:57	PIC	R228C19
C3	7A	3	7	1356	5/15/2019 12:50	5/15/2019 12:53	PIC	R228C19
C4	7A	3	6	1364	5/15/2019 12:46	5/15/2019 12:49	PIC	R228C19
C5	7A	3	6	1351	5/15/2019 12:58	5/15/2019 13:01	PIC	R228C19
C6	7A	3	10	1284	5/15/2019 13:11	5/15/2019 13:14	PIC	R228C19
C7	7A	3	5	1380	5/15/2019 13:07	5/15/2019 13:10	PIC	R228C19
C8	7A	3	3	1485	5/15/2019 13:03	5/15/2019 13:06	PIC	R228C19
C1	7B	3	18	1263	5/15/2019 12:46	5/15/2019 12:49	PIC	R228C19
C2	7B	3	10	1330	5/15/2019 12:43	5/15/2019 12:46	PIC	R228C19
C3	7B	3	9	1358	5/15/2019 12:54	5/15/2019 12:57	PIC	R228C19

C4	7B	3	10	1355	5/15/2019 12:50	5/15/2019 12:53	PIC	R228C19
C5	7B	3	8	1336	5/15/2019 13:03	5/15/2019 13:06	PIC	R228C19
C6	7B	3	16	1308	5/15/2019 12:58	5/15/2019 13:01	PIC	R228C19
C7	7B	3	11	1381	5/15/2019 13:11	5/15/2019 13:14	PIC	R228C19
C8	7B	3	8	1400	5/15/2019 13:07	5/15/2019 13:10	PIC	R228C19
C1	7C	3	4	1345	5/15/2019 12:50	5/15/2019 12:53	PIC	R228C19
C2	7C	3	6	1378	5/15/2019 12:46	5/15/2019 12:49	PIC	R228C19
C3	7C	3	3	1355	5/15/2019 12:43	5/15/2019 12:46	PIC	R228C19
C4	7C	3	1	1361	5/15/2019 12:54	5/15/2019 12:57	PIC	R228C19
C5	7C	3	6	1285	5/15/2019 13:07	5/15/2019 13:10	PIC	R228C19
C6	7C	3	4	1351	5/15/2019 13:03	5/15/2019 13:06	PIC	R228C19
C7	7C	3	6	1438	5/15/2019 12:58	5/15/2019 13:01	PIC	R228C19
C8	7C	3	6	1375	5/15/2019 13:11	5/15/2019 13:14	PIC	R228C19
C1	7D	3	8	1316	5/15/2019 12:54	5/15/2019 12:57	PIC	R228C19
C2	7D	3	5	1377	5/15/2019 12:50	5/15/2019 12:53	PIC	R228C19
C3	7D	3	12	1375	5/15/2019 12:46	5/15/2019 12:49	PIC	R228C19
C4	7D	3	5	1362	5/15/2019 12:43	5/15/2019 12:46	PIC	R228C19
C5	7D	3	6	1280	5/15/2019 13:11	5/15/2019 13:14	PIC	R228C19
C6	7D	3	2	1274	5/15/2019 13:07	5/15/2019 13:10	PIC	R228C19
C7	7D	3	1	1444	5/15/2019 13:03	5/15/2019 13:06	PIC	R228C19
C8	7D	3.01	8	1416	5/15/2019 12:58	5/15/2019 13:01	PIC	R228C19
C1	8A	3	24	1262	5/15/2019 12:58	5/15/2019 13:01	PIC	R228C19
C2	8A	3	27	1249	5/15/2019 13:11	5/15/2019 13:14	PIC	R228C19
C3	8A	3	31	1308	5/15/2019 13:07	5/15/2019 13:10	PIC	R228C19
C4	8A	3	29	1351	5/15/2019 13:03	5/15/2019 13:06	PIC	R228C19
C5	8A	3	23	1389	5/15/2019 12:43	5/15/2019 12:46	PIC	R228C19
C6	8A	3	38	1347	5/15/2019 12:54	5/15/2019 12:57	PIC	R228C19
C7	8A	3	26	1326	5/15/2019 12:50	5/15/2019 12:53	PIC	R228C19
C8	8A	3	44	1393	5/15/2019 12:46	5/15/2019 12:49	PIC	R228C19
C1	8B	3	4	1295	5/15/2019 13:03	5/15/2019 13:06	PIC	R228C19
C2	8B	3	10	1358	5/15/2019 12:59	5/15/2019 13:02	PIC	R228C19
C3	8B	3	11	1304	5/15/2019 13:11	5/15/2019 13:14	PIC	R228C19
C4	8B	3	6	1297	5/15/2019 13:07	5/15/2019 13:10	PIC	R228C19
C5	8B	3	9	1358	5/15/2019 12:46	5/15/2019 12:49	PIC	R228C19

C6	8B	3	10	1458	5/15/2019 12:43	5/15/2019 12:46	PIC	R228C19
C7	8B	3	8	1471	5/15/2019 12:54	5/15/2019 12:57	PIC	R228C19
C8	8B	3	11	1416	5/15/2019 12:50	5/15/2019 12:53	PIC	R228C19
C1	8C	3	25	1316	5/15/2019 13:07	5/15/2019 13:10	PIC	R228C19
C2	8C	3	23	1412	5/15/2019 13:03	5/15/2019 13:06	PIC	R228C19
C3	8C	3	33	1347	5/15/2019 12:59	5/15/2019 13:02	PIC	R228C19
C4	8C	3	46	1346	5/15/2019 13:11	5/15/2019 13:14	PIC	R228C19
C5	8C	3	34	1343	5/15/2019 12:50	5/15/2019 12:53	PIC	R228C19
C6	8C	3	27	1400	5/15/2019 12:47	5/15/2019 12:50	PIC	R228C19
C7	8C	3	35	1439	5/15/2019 12:43	5/15/2019 12:46	PIC	R228C19
C8	8C	3	37	1444	5/15/2019 12:55	5/15/2019 12:58	PIC	R228C19
C1	8D	3	55	1284	5/15/2019 13:11	5/15/2019 13:14	PIC	R228C19
C2	8D	3	42	1271	5/15/2019 13:07	5/15/2019 13:10	PIC	R228C19
C3	8D	3	34	1317	5/15/2019 13:03	5/15/2019 13:06	PIC	R228C19
C4	8D	3	38	1345	5/15/2019 12:59	5/15/2019 13:02	PIC	R228C19
C5	8D	3	36	1328	5/15/2019 12:55	5/15/2019 12:58	PIC	R228C19
C6	8D	3	44	1350	5/15/2019 12:51	5/15/2019 12:54	PIC	R228C19
C7	8D	3	46	1375	5/15/2019 12:47	5/15/2019 12:50	PIC	R228C19
C8	8D	3	44	1377	5/15/2019 12:43	5/15/2019 12:46	PIC	R228C19
C1	9A	3	9	1323	5/15/2019 13:15	5/15/2019 13:18	PIC	R228C19
C2	9A	3	12	1281	5/15/2019 13:26	5/15/2019 13:29	PIC	R228C19
C3	9A	3	10	1364	5/15/2019 13:22	5/15/2019 13:25	PIC	R228C19
C4	9A	3	17	1267	5/15/2019 13:18	5/15/2019 13:21	PIC	R228C19
C5	9A	3	16	1280	5/15/2019 13:30	5/15/2019 13:33	PIC	R228C19
C6	9A	3	10	1366	5/15/2019 13:42	5/15/2019 13:45	PIC	R228C19
C7	9A	3	6	1306	5/15/2019 13:38	5/15/2019 13:41	PIC	R228C19
C8	9A	3	7	1438	5/15/2019 13:34	5/15/2019 13:37	PIC	R228C19
C1	9B	3	10	1229	5/15/2019 13:18	5/15/2019 13:21	PIC	R228C19
C2	9B	3	16	1286	5/15/2019 13:15	5/15/2019 13:18	PIC	R228C19
C3	9B	3	15	1234	5/15/2019 13:26	5/15/2019 13:29	PIC	R228C19
C4	9B	3	10	1261	5/15/2019 13:22	5/15/2019 13:25	PIC	R228C19
C5	9B	3	14	1245	5/15/2019 13:34	5/15/2019 13:37	PIC	R228C19
C6	9B	3	14	1242	5/15/2019 13:30	5/15/2019 13:33	PIC	R228C19
C7	9B	3	19	1294	5/15/2019 13:42	5/15/2019 13:45	PIC	R228C19

C8	9B	3	20	1399	5/15/2019 13:38	5/15/2019 13:41	PIC	R228C19
C1	9C	3	16	1214	5/15/2019 13:22	5/15/2019 13:25	PIC	R228C19
C2	9C	3	14	1248	5/15/2019 13:18	5/15/2019 13:21	PIC	R228C19
C3	9C	3	19	1291	5/15/2019 13:15	5/15/2019 13:18	PIC	R228C19
C4	9C	3	22	1261	5/15/2019 13:26	5/15/2019 13:29	PIC	R228C19
C5	9C	3	13	1231	5/15/2019 13:38	5/15/2019 13:41	PIC	R228C19
C6	9C	3	18	1198	5/15/2019 13:34	5/15/2019 13:37	PIC	R228C19
C7	9C	3	14	1311	5/15/2019 13:30	5/15/2019 13:33	PIC	R228C19
C8	9C	3	17	1332	5/15/2019 13:42	5/15/2019 13:45	PIC	R228C19
C1	9D	3	19	1189	5/15/2019 13:25	5/15/2019 13:28	PIC	R228C19
C2	9D	3	28	1304	5/15/2019 13:22	5/15/2019 13:25	PIC	R228C19
C3	9D	3	16	1329	5/15/2019 13:18	5/15/2019 13:21	PIC	R228C19
C4	9D	3	13	1296	5/15/2019 13:15	5/15/2019 13:18	PIC	R228C19
C5	9D	3	23	1225	5/15/2019 13:42	5/15/2019 13:45	PIC	R228C19
C6	9D	3	16	1265	5/15/2019 13:38	5/15/2019 13:41	PIC	R228C19
C7	9D	3	32	1281	5/15/2019 13:34	5/15/2019 13:37	PIC	R228C19
C8	9D	3	26	1332	5/15/2019 13:30	5/15/2019 13:33	PIC	R228C19

Radium-228 Liquid

Filename : RA228.XLS
File type : Excel
Version # : 1.4.2

Tracer S/N : 0487-E
Tracer Exp Date : 1/14/2020
Tracer Volume Added: 0.20

Batch : 1562969
Analyst : NXL1
Prep Date : 5/16/2019
Ra-228 Method Uncertainty : 0.0829

Geometry: CeF on 25mm Filter

Procedure Code : GFCGANBL
Parmname : Radium-228
Required MDA : 1 pCi/L
Ra-228 Abundance : 1.00
Halflife of Ra-228 : 5.75 years
Halflife of Ac-228 : 6.15 hours

Sample Characteristics					Tracer Calculations					
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Sample Date/Time	Tracer Ref. Activity (CPM)	Tracer Ref. Count Uncertainty (%)	Tracer Samp. Activity (CPM)	Tracer Samp. Count Uncertainty (%)	Tracer Aliquot (mL)	Tracer Aliquot StDev. (mL)
1	1203536991.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	341.5	5.41%	0.2	0.000200
2	1203536992.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	343.6	5.39%	0.2	0.000200
3	1203536993.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	342.6	5.40%	0.2	0.000200
4	1203536994.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	362.8	5.25%	0.2	0.000200
5	1203536995.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	360.0	5.27%	0.2	0.000200
6	1203536996.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	355.0	5.31%	0.2	0.000200
7	1203536997.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	349.0	5.35%	0.2	0.000200
8	1203536998.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	333.4	5.48%	0.2	0.000200
~~9~~	~~1203536999.1~~	~~1.0000~~	~~2.0399E-05~~	~~5/16/2019 0:00~~	~~309.5~~	~~5.68%~~	~~329.8~~	~~5.51%~~	~~0.2~~	~~0.000200~~
10	1203537000.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	347.3	5.37%	0.2	0.000200
11	1203537001.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	341.5	5.41%	0.2	0.000200
12	1203537002.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	343.6	5.39%	0.2	0.000200
13	1203537003.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	342.6	5.40%	0.2	0.000200
14	1203537004.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	362.8	5.25%	0.2	0.000200
15	1203537005.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	360.0	5.27%	0.2	0.000200
16	1203537006.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	355.0	5.31%	0.2	0.000200
17	1203537007.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	349.0	5.35%	0.2	0.000200
18	1203537008.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	333.4	5.48%	0.2	0.000200
19	1203537009.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	329.8	5.51%	0.2	0.000200
20	1203537010.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	347.3	5.37%	0.2	0.000200
21	1203537011.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	341.5	5.41%	0.2	0.000200
22	1203537012.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	343.6	5.39%	0.2	0.000200
23	1203537013.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	342.6	5.40%	0.2	0.000200
~~24~~	~~1203537014.1~~	~~1.0000~~	~~2.0399E-05~~	~~5/16/2019 0:00~~	~~309.5~~	~~5.68%~~	~~362.8~~	~~5.25%~~	~~0.2~~	~~0.000200~~
25	1203537015.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	360.0	5.27%	0.2	0.000200
26	1203537016.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	355.0	5.31%	0.2	0.000200
27	1203537017.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	349.0	5.35%	0.2	0.000200
28	1203537018.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	333.4	5.48%	0.2	0.000200
29	1203537019.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	329.8	5.51%	0.2	0.000200
30	1203537020.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	347.3	5.37%	0.2	0.000200
31	1203537021.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	341.5	5.41%	0.2	0.000200
32	1203537022.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	343.6	5.39%	0.2	0.000200
33	1203537023.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	342.6	5.40%	0.2	0.000200
34	1203537024.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	362.8	5.25%	0.2	0.000200

Pipet, 0.1 ml Stdev : +/-	0.000200	ml
Pipet, 0.5 ml Stdev : +/-	0.001000	ml
Pipet, 1 ml Stdev : +/-	0.002000	ml

Analytical SOP: GL-RAD-A-001
Instrument SOP: GL-RAD-I-016

Count raw Data

Pos.	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Beta cpm	Count Start Date/Time	Ac-228 Ingrowth Date/Time	Ac-228 Decay Date/Time	Ra-228 Decay	Ac-228 Decay	Ac-228 Ingrowth	Ac-228 Count Correction	Calculated Sample Recovery %	Sample Recovery Error %
1	1A	5	5	501	100.200	5/16/2019 10:07	5/14/2019 0:00	5/16/2019 8:35	1.000	0.841	0.998	1.005	100%	3.92%
2	1B	5	5	558	111.600	5/16/2019 10:07	5/14/2019 0:00	5/16/2019 8:35	1.000	0.841	0.998	1.005	100%	3.92%
3	1C	5	25	548	109.600	5/16/2019 10:07	5/14/2019 0:00	5/16/2019 8:35	1.000	0.841	0.998	1.005	100%	3.92%
4	1D	5	11	534	106.800	5/16/2019 10:07	5/14/2019 0:00	5/16/2019 8:35	1.000	0.841	0.998	1.005	100%	3.87%
5	2A	5	14	595	119.000	5/16/2019 10:14	5/14/2019 0:00	5/16/2019 8:35	1.000	0.829	0.998	1.005	100%	3.88%
6	2B	5	3	489	97.800	5/16/2019 10:07	5/14/2019 0:00	5/16/2019 8:35	1.000	0.840	0.998	1.005	100%	3.89%
7	2C	5	5	452	90.400	5/16/2019 10:14	5/14/2019 0:00	5/16/2019 8:35	1.000	0.829	0.998	1.005	100%	3.90%
8	2D	5	29	586	117.200	5/21/2019 9:59	5/14/2019 0:00	5/21/2019 8:50	0.998	0.878	1.000	1.005	100%	3.95%
~~9~~	~~3A~~	~~5~~	~~0~~	~~0~~	~~0.000~~	~~5/16/2019 10:14~~	~~5/14/2019 0:00~~	~~5/16/2019 8:35~~	~~1.000~~	~~0.829~~	~~0.998~~	~~1.005~~	~~100%~~	~~3.96%~~
10	3B	5	25	524	104.800	5/16/2019 10:20	5/14/2019 0:00	5/16/2019 8:35	1.000	0.820	0.998	1.005	100%	3.91%
11	3C	5	12	577	115.400	5/16/2019 10:20	5/14/2019 0:00	5/16/2019 8:35	1.000	0.820	0.998	1.005	100%	3.92%
12	3D	5	14	470	94.000	5/16/2019 10:20	5/14/2019 0:00	5/16/2019 8:35	1.000	0.820	0.998	1.005	100%	3.92%
13	4A	5	11	592	118.400	5/16/2019 10:20	5/14/2019 0:00	5/16/2019 8:35	1.000	0.820	0.998	1.005	100%	3.92%
14	4B	5	1	464	92.800	5/16/2019 10:20	5/14/2019 0:00	5/16/2019 8:35	1.000	0.820	0.998	1.005	100%	3.87%
15	4C	5	14	448	89.600	5/16/2019 10:20	5/14/2019 0:00	5/16/2019 8:35	1.000	0.820	0.998	1.005	100%	3.88%
16	4D	5	35	515	103.000	5/16/2019 10:20	5/14/2019 0:00	5/16/2019 8:35	1.000	0.820	0.998	1.005	100%	3.89%
17	5A	5	15	513	102.600	5/16/2019 10:26	5/14/2019 0:00	5/16/2019 8:35	1.000	0.810	0.998	1.005	100%	3.90%
18	5B	5	14	544	108.800	5/16/2019 10:26	5/14/2019 0:00	5/16/2019 8:35	1.000	0.810	0.998	1.005	100%	3.95%
19	5C	5	8	581	116.200	5/16/2019 10:26	5/14/2019 0:00	5/16/2019 8:35	1.000	0.810	0.998	1.005	100%	3.96%
20	5D	5	11	541	108.200	5/16/2019 10:26	5/14/2019 0:00	5/16/2019 8:35	1.000	0.810	0.998	1.005	100%	3.91%
21	6A	5	2	526	105.200	5/16/2019 10:30	5/14/2019 0:00	5/16/2019 8:35	1.000	0.805	0.998	1.005	100%	3.92%
22	6B	5	1	510	102.000	5/16/2019 10:30	5/14/2019 0:00	5/16/2019 8:35	1.000	0.805	0.998	1.005	100%	3.92%
23	6C	5	1	437	87.400	5/16/2019 10:30	5/14/2019 0:00	5/16/2019 8:35	1.000	0.805	0.998	1.005	100%	3.92%
~~24~~	~~6D~~	~~5~~	~~0~~	~~0~~	~~0.000~~	~~5/16/2019 10:30~~	~~5/14/2019 0:00~~	~~5/16/2019 8:35~~	~~1.000~~	~~0.805~~	~~0.998~~	~~1.005~~	~~100%~~	~~3.87%~~
25	7A	5	0	501	100.200	5/16/2019 10:36	5/14/2019 0:00	5/16/2019 8:35	1.000	0.797	0.998	1.005	100%	3.88%
26	7B	5	2	470	94.000	5/16/2019 10:36	5/14/2019 0:00	5/16/2019 8:35	1.000	0.797	0.998	1.005	100%	3.89%
27	7C	5	2	569	113.800	5/16/2019 10:36	5/14/2019 0:00	5/16/2019 8:35	1.000	0.797	0.998	1.005	100%	3.90%
28	7D	5	6	524	104.800	5/16/2019 10:36	5/14/2019 0:00	5/16/2019 8:35	1.000	0.797	0.998	1.005	100%	3.95%
29	8A	5	7	532	106.400	5/16/2019 10:36	5/14/2019 0:00	5/16/2019 8:35	1.000	0.797	0.998	1.005	100%	3.96%
30	8B	5	6	456	91.200	5/16/2019 10:36	5/14/2019 0:00	5/16/2019 8:35	1.000	0.797	0.998	1.005	100%	3.91%
31	8C	5	11	476	95.200	5/16/2019 10:36	5/14/2019 0:00	5/16/2019 8:35	1.000	0.797	0.998	1.005	100%	3.92%
32	8D	5	15	549	109.800	5/16/2019 10:36	5/14/2019 0:00	5/16/2019 8:35	1.000	0.797	0.998	1.005	100%	3.92%
33	9A	5	1	505	101.000	5/16/2019 10:43	5/14/2019 0:00	5/16/2019 8:35	1.000	0.786	0.998	1.005	100%	3.92%
34	9B	5	6	485	97.000	5/16/2019 10:43	5/14/2019 0:00	5/16/2019 8:35	1.000	0.786	0.998	1.005	100%	3.87%

Calibration Data

Pos.	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Bkg cpm	Weekly Bkg Count Start Date/Time	Bkg Count Time (min.)
1	PIC	5/1/2019	5/31/2020	0.6640	0.00738	0.960	5/10/2019 18:02	500
2	PIC	5/1/2019	5/31/2020	0.6666	0.00711	1.100	5/10/2019 18:03	500
3	PIC	5/1/2019	5/31/2020	0.6300	0.00847	0.500	5/10/2019 18:03	500
4	PIC	5/1/2019	5/31/2020	0.6495	0.00692	0.864	5/10/2019 18:03	500
5	PIC	5/1/2019	5/31/2020	0.6348	0.01914	2.106	5/10/2019 18:03	500
6	PIC	5/1/2019	5/31/2020	0.6569	0.02111	0.776	5/10/2019 18:03	500
7	PIC	5/1/2019	5/31/2020	0.6582	0.01274	0.828	5/10/2019 18:04	500
8	PIC	5/1/2019	5/31/2020	0.6340	0.00745	0.802	5/18/2019 10:08	500
~~9~~	~~PIC~~	~~5/1/2019~~	~~5/31/2020~~	~~0.0000~~	~~0.01401~~	~~FAIL~~	~~12:00:00 AM~~	~~0~~
10	PIC	5/1/2019	5/31/2020	0.6519	0.01614	1.042	5/10/2019 18:04	500
11	PIC	5/1/2019	5/31/2020	0.6567	0.00988	1.052	5/10/2019 18:04	500
12	PIC	5/1/2019	5/31/2020	0.6533	0.02297	0.542	5/10/2019 18:04	500
13	PIC	5/1/2019	5/31/2020	0.6625	0.01123	1.254	5/10/2019 18:04	500
14	PIC	5/1/2019	5/31/2020	0.6400	0.01519	0.596	5/10/2019 18:04	500
15	PIC	5/1/2019	5/31/2020	0.6541	0.00889	0.522	5/10/2019 18:04	500
16	PIC	5/1/2019	5/31/2020	0.6083	0.00773	0.970	5/10/2019 18:04	500
17	PIC	5/1/2019	5/31/2020	0.6776	0.00851	0.514	5/10/2019 18:04	500
18	PIC	5/1/2019	5/31/2020	0.6707	0.00426	0.480	5/10/2019 18:04	500
19	PIC	5/1/2019	5/31/2020	0.6748	0.00657	0.548	5/10/2019 18:05	500
20	PIC	5/1/2019	5/31/2020	0.6606	0.00925	1.262	5/10/2019 18:05	500
21	PIC	5/1/2019	5/31/2020	0.6489	0.02228	1.756	5/10/2019 18:03	500
22	PIC	5/1/2019	5/31/2020	0.6310	0.00851	1.594	5/10/2019 18:04	500
23	PIC	5/1/2019	5/31/2020	0.6546	0.01970	1.342	5/10/2019 18:04	500
~~24~~	~~PIC~~	~~5/1/2019~~	~~5/31/2020~~	~~0.0000~~	~~0.01311~~	~~FAIL~~	~~12:00:00 AM~~	~~0~~
25	PIC	5/1/2019	5/31/2020	0.6638	0.00594	0.634	5/10/2019 18:04	500
26	PIC	5/1/2019	5/31/2020	0.6492	0.00627	0.300	5/10/2019 18:04	500
27	PIC	5/1/2019	5/31/2020	0.6585	0.00790	0.522	5/10/2019 18:04	500
28	PIC	5/1/2019	5/31/2020	0.6555	0.01113	0.546	5/10/2019 18:04	500
29	PIC	5/1/2019	5/31/2020	0.6425	0.01579	0.568	5/10/2019 18:04	500
30	PIC	5/1/2019	5/31/2020	0.6626	0.02148	0.328	5/10/2019 18:04	500
31	PIC	5/1/2019	5/31/2020	0.6683	0.01955	0.562	5/10/2019 18:04	500
32	PIC	5/1/2019	5/31/2020	0.6442	0.00609	1.652	5/10/2019 18:04	500
33	PIC	5/1/2019	5/31/2020	0.6820	0.00758	0.794	5/10/2019 18:04	500
34	PIC	5/1/2019	5/31/2020	0.6541	0.00754	0.856	5/10/2019 18:04	500

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

Spike S/N : N/A
Spike Exp Date : N/A
Spike Activity (dpm/ml): N/A
Spike Volume Added: N/A

LCS S/N : 1809-A
LCS Exp Date : 4/23/2020
LCS Activity (dpm/ml): 106.86
LCS Volume Added: 2.00

Results

Pos.	Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error %	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA Counting Uncertainty pCi/L	2 SIGMA Total Prop. Uncertainty pCi/L	Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
1	0.8329	0.5880	1	1.6631	**80.5595**	6.02%	99.2400	4.4768	7.1229	16.1813		LCS			96.2704	83.7%
2	0.8883	0.6272	1	1.7396	**89.3746**	5.84%	110.5000	4.7246	7.4899	17.7661		LCS			96.2704	92.8%
3	0.6338	0.4475	1	1.4085	**93.3839**	5.87%	109.1000	4.6820	7.8548	18.5968		LCS			96.2704	97.0%
4	0.8083	0.5707	1	1.6396	**87.9686**	5.87%	105.9360	4.6219	7.5224	17.5167		LCS			96.2704	91.4%
5	1.3090	0.9241	1	2.3651	**100.6844**	6.01%	116.8940	4.8790	8.2367	20.2058		LCS			96.2704	104.6%
6	0.7578	0.5350	1	1.5630	**79.7059**	6.35%	97.0240	4.4228	7.1215	16.3172		LCS			96.2704	82.8%
7	0.7917	0.5589	1	1.6164	**74.4181**	6.28%	89.5720	4.2523	6.9244	15.1669		LCS			96.2704	77.3%
8	0.7635	0.5390	1	1.5665	**94.7609**	5.78%	116.3980	4.8417	7.7256	18.7739		LCS			96.2704	98.4%
~~9~~	~~#DIV/0!~~	~~#DIV/0!~~	~~1~~	~~#DIV/0!~~	~~**#VALUE!**~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~		~~LCS~~			~~96.2704~~	~~#VALUE!~~
10	0.9071	0.6404	1	1.7899	**88.0434**	6.11%	103.7580	4.5784	7.6146	17.7746		LCS			96.2704	91.5%
11	0.9047	0.6387	1	1.7829	**96.3170**	5.83%	114.3480	4.8044	7.9317	19.1364		LCS			96.2704	100.0%
12	0.6528	0.4609	1	1.4298	**79.1345**	6.49%	93.4580	4.3360	7.1961	16.3320		LCS			96.2704	82.2%
13	0.9791	0.6912	1	1.8834	**97.8054**	5.82%	117.1460	4.8665	7.9635	19.4192		LCS			96.2704	101.6%
14	0.6986	0.4932	1	1.5050	**79.6797**	6.25%	92.2040	4.3083	7.2972	16.2180		LCS			96.2704	82.8%
15	0.6398	0.4517	1	1.4107	**75.3223**	6.20%	89.0780	4.2333	7.0160	15.2803		LCS			96.2704	78.2%
16	0.9378	0.6621	1	1.8698	**92.7759**	5.96%	102.0300	4.5389	8.0894	18.5661		LCS			96.2704	96.4%
17	0.6199	0.4376	1	1.3707	**84.2886**	5.97%	102.0860	4.5300	7.3309	16.8785		LCS			96.2704	87.6%
18	0.6052	0.4272	1	1.3549	**90.3489**	5.86%	108.3200	4.6649	7.6262	17.9760		LCS			96.2704	93.8%
19	0.6427	0.4537	1	1.4049	**95.8792**	5.79%	115.6520	4.8209	7.8335	18.9986		LCS			96.2704	99.6%
20	0.9963	0.7034	1	1.9148	**90.5612**	5.92%	106.9380	4.6522	7.7218	18.0842		LCS			96.2704	94.1%
21	1.2038	0.8499	1	2.2202	**89.7344**	6.33%	103.4440	4.5873	7.7995	18.3417		LCS			96.2704	93.2%
22	1.1794	0.8327	1	2.2006	**89.5682**	6.03%	100.4060	4.5170	7.8977	17.9920		LCS			96.2704	93.0%
23	1.0432	0.7365	1	1.9890	**74.0033**	6.55%	86.0580	4.1812	7.0473	15.3221		LCS			96.2704	76.9%
~~24~~	~~#DIV/0!~~	~~#DIV/0!~~	~~1~~	~~#DIV/0!~~	~~**#VALUE!**~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~		~~LCS~~			~~96.2704~~	~~#VALUE!~~
25	0.7150	0.5048	1	1.5241	**85.3782**	5.97%	99.5660	4.4767	7.5241	17.0919		LCS			96.2704	88.7%
26	0.5029	0.3550	1	1.2361	**82.1506**	6.08%	93.7000	4.3360	7.4510	16.5514		LCS			96.2704	85.3%
27	0.6540	0.4617	1	1.4420	**97.9133**	5.80%	113.2780	4.7709	8.0825	19.4130		LCS			96.2704	101.7%
28	0.6719	0.4744	1	1.4697	**90.5263**	6.01%	104.2540	4.5783	7.7919	18.1677		LCS			96.2704	94.0%
29	0.6991	0.4936	1	1.5187	**93.7490**	6.10%	105.8320	4.6131	8.0095	18.9086		LCS			96.2704	97.4%
30	0.5152	0.3637	1	1.2428	**78.0576**	6.48%	90.8720	4.2709	7.1905	16.0987		LCS			96.2704	81.1%
31	0.6686	0.4720	1	1.4550	**80.5944**	6.36%	94.6380	4.3636	7.2835	16.5077		LCS			96.2704	83.7%
32	1.1893	0.8396	1	2.2094	**95.5564**	5.87%	108.1480	4.6865	8.1161	19.0284		LCS			96.2704	99.3%
33	0.7890	0.5570	1	1.6214	**84.7281**	6.01%	100.2060	4.4946	7.4487	17.0001		LCS			96.2704	88.0%
34	0.8542	0.6030	1	1.7350	**84.7603**	6.04%	96.1440	4.4047	7.6111	17.0441		LCS			96.2704	88.0%

Radium-228 Liquid

Filename : RA228.XLS
File type : Excel
Version # : 1.4.2

Tracer S/N : 0487-E
Tracer Exp Date : 1/14/2020
Tracer Volume Added: 0.20

Batch : 1562969
Analyst : NXL1
Prep Date : 5/16/2019
Ra-228 Method Uncertainty : 0.0829

Geometry: CeF on 25mm Filter

Procedure Code : GFCGANBL
Parmname : Radium-228
Required MDA : 1 pCi/L
Ra-228 Abundance : 1.00
Halflife of Ra-228 : 5.75 years
Halflife of Ac-228 : 6.15 hours

Sample Characteristics					Tracer Calculations					
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Sample Date/Time	Tracer Ref. Activity (CPM)	Tracer Ref. Count Uncertainty (%)	Tracer Samp. Activity (CPM)	Tracer Samp. Count Uncertainty (%)	Tracer Aliquot (mL)	Tracer Aliquot StDev. (mL)
1	1203536991.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	341.5	5.41%	0.2	0.000200
2	1203536992.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	343.6	5.39%	0.2	0.000200
3	1203536993.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	342.6	5.40%	0.2	0.000200
4	1203536994.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	362.8	5.25%	0.2	0.000200
5	1203536995.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	360.0	5.27%	0.2	0.000200
6	1203536996.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	355.0	5.31%	0.2	0.000200
7	1203536997.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	349.0	5.35%	0.2	0.000200
8	1203536998.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	333.4	5.48%	0.2	0.000200
9	1203536999.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	341.5	5.41%	0.2	0.000200
10	1203537000.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	343.6	5.39%	0.2	0.000200
~~11~~	~~1203537001.1~~	~~1.0000~~	~~2.0399E-05~~	~~5/16/2019 0:00~~	~~309.5~~	~~5.68%~~	~~342.6~~	~~5.40%~~	~~0.2~~	~~0.000200~~
12	1203537002.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	362.8	5.25%	0.2	0.000200
13	1203537003.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	360.0	5.27%	0.2	0.000200
14	1203537004.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	355.0	5.31%	0.2	0.000200
15	1203537005.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	349.0	5.35%	0.2	0.000200
16	1203537006.1	1.0000	2.0399E-05	5/16/2019 0:00	309.5	5.68%	333.4	5.48%	0.2	0.000200

Pipet, 0.1 ml Stdev : +/-	0.000200	ml
Pipet, 0.5 ml Stdev : +/-	0.001000	ml
Pipet, 1 ml Stdev : +/-	0.002000	ml

Analytical SOP: GL-RAD-A-001
Instrument SOP: GL-RAD-I-016

Count raw Data

Pos.	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Beta cpm	Count Start Date/Time	Ac-228 Ingrowth Date/Time	Ac-228 Decay Date/Time	Ra-228 Decay	Ac-228 Decay	Ac-228 Ingrowth	Ac-228 Count Correction	Calculated Sample Recovery %	Sample Recovery Error %
1	11A	5	0	529	105.800	5/16/2019 10:47	5/14/2019 0:00	5/16/2019 8:35	1.000	0.779	0.998	1.005	100%	3.92%
2	11B	5	4	483	96.600	5/16/2019 10:47	5/14/2019 0:00	5/16/2019 8:35	1.000	0.779	0.998	1.005	100%	3.92%
3	11C	5	0	588	117.600	5/16/2019 10:47	5/14/2019 0:00	5/16/2019 8:35	1.000	0.779	0.998	1.005	100%	3.92%
4	11D	5	3	517	103.400	5/16/2019 10:47	5/14/2019 0:00	5/16/2019 8:35	1.000	0.779	0.998	1.005	100%	3.87%
5	12A	5	4	533	106.600	5/16/2019 10:47	5/14/2019 0:00	5/16/2019 8:35	1.000	0.780	0.998	1.005	100%	3.88%
6	12B	5	2	502	100.400	5/16/2019 10:47	5/14/2019 0:00	5/16/2019 8:35	1.000	0.780	0.998	1.005	100%	3.89%
7	12C	5	5	674	134.800	5/21/2019 10:12	5/14/2019 0:00	5/21/2019 8:50	0.998	0.856	1.000	1.005	100%	3.90%
8	12D	5	0	566	113.200	5/16/2019 10:47	5/14/2019 0:00	5/16/2019 8:35	1.000	0.780	0.998	1.005	100%	3.95%
9	13A	5	1	458	91.600	5/16/2019 10:57	5/14/2019 0:00	5/16/2019 8:35	1.000	0.765	0.998	1.005	100%	3.92%
10	13B	5	2	473	94.600	5/16/2019 10:57	5/14/2019 0:00	5/16/2019 8:35	1.000	0.764	0.998	1.005	100%	3.92%
~~11~~	~~13C~~	~~5~~	~~0~~	~~0~~	~~0.000~~	~~5/16/2019 10:57~~	~~5/14/2019 0:00~~	~~5/16/2019 8:35~~	~~1.000~~	~~0.764~~	~~0.998~~	~~1.005~~	~~100%~~	~~3.92%~~
12	13D	5	7	497	99.400	5/16/2019 10:57	5/14/2019 0:00	5/16/2019 8:35	1.000	0.765	0.998	1.005	100%	3.87%
13	14A	5	2	470	94.000	5/16/2019 10:56	5/14/2019 0:00	5/16/2019 8:35	1.000	0.766	0.998	1.005	100%	3.88%
14	14B	5	3	453	90.600	5/16/2019 10:56	5/14/2019 0:00	5/16/2019 8:35	1.000	0.766	0.998	1.005	100%	3.89%
15	14C	5	2	619	123.800	5/21/2019 10:18	5/14/2019 0:00	5/21/2019 8:50	0.998	0.847	1.000	1.005	100%	3.90%
16	14D	5	2	469	93.800	5/16/2019 10:57	5/14/2019 0:00	5/16/2019 8:35	1.000	0.766	0.998	1.005	100%	3.95%

Calibration Data

Pos.	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Bkg cpm	Weekly Bkg Count Start Date/Time	Bkg Count Time (min.)
1	PIC	5/1/2019	5/31/2020	0.6748	0.01317	1.008	5/10/2019 18:02	500
2	PIC	5/1/2019	5/31/2020	0.6591	0.00697	1.144	5/10/2019 18:02	500
3	PIC	5/1/2019	5/31/2020	0.6780	0.01278	0.544	5/10/2019 18:02	500
4	PIC	5/1/2019	5/31/2020	0.6933	0.01068	1.100	5/10/2019 18:02	500
5	PIC	5/1/2019	5/31/2020	0.6446	0.01964	0.674	5/10/2019 18:02	500
6	PIC	5/1/2019	5/31/2020	0.6571	0.01114	0.448	5/10/2019 18:02	500
7	PIC	5/1/2019	5/31/2020	0.6742	0.01666	1.148	5/17/2019 16:14	500
8	PIC	5/1/2019	5/31/2020	0.6798	0.01845	1.550	5/10/2019 18:02	500
9	PIC	5/1/2019	5/31/2020	0.6889	0.00714	1.046	5/10/2019 18:02	1000
10	PIC	5/1/2019	5/31/2020	0.6801	0.00967	0.936	5/10/2019 18:02	1000
~~11~~	~~PIC~~	~~5/1/2019~~	~~5/31/2020~~	~~0.0000~~	~~0.01708~~	~~FAIL~~	~~12:00:00 AM~~	~~0~~
12	PIC	5/1/2019	5/31/2020	0.6776	0.01144	1.453	5/10/2019 18:02	1000
13	PIC	5/1/2019	5/31/2020	0.6934	0.02119	1.004	5/10/2019 18:02	1000
14	PIC	5/1/2019	5/31/2020	0.6475	0.01028	0.893	5/10/2019 18:02	1000
15	PIC	5/1/2019	5/31/2020	0.6717	0.01828	2.750	5/17/2019 16:15	1000
16	PIC	5/1/2019	5/31/2020	0.6481	0.00738	0.382	5/10/2019 18:02	1000

Notes:
1 - Results are decay corrected to Sample Date/Time
2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
3 - Spike Nominals are decay corrected to Sample Date/Time

Spike S/N : N/A
Spike Exp Date : N/A
Spike Activity (dpm/ml): N/A
Spike Volume Added: N/A

LCS S/N : 1809-A
LCS Exp Date : 4/23/2020
LCS Activity (dpm/ml): 106.86
LCS Volume Added: 2.00

Results

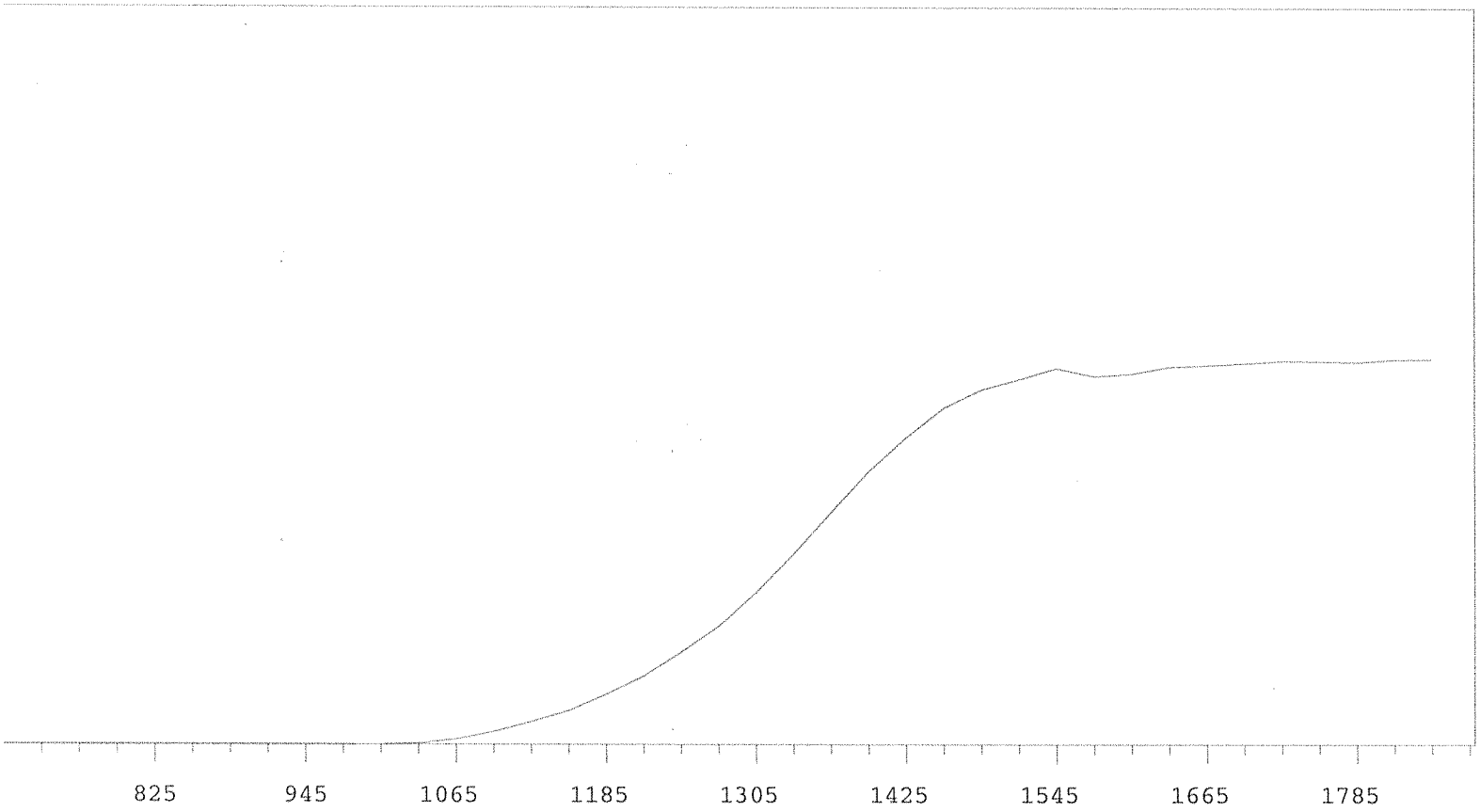
Pos.	Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error %	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA Counting Uncertainty pCi/L	2 SIGMA Total Prop. Uncertainty pCi/L	Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
1	0.9063	0.6398	1	1.7968	**90.3274**	6.03%	104.7920	4.6002	7.7719	18.1528		LCS			96.2704	93.8%
2	0.9886	0.6979	1	1.9254	**84.2491**	6.09%	95.4560	4.3957	7.6041	16.9821		LCS			96.2704	87.5%
3	0.6626	0.4678	1	1.4504	**100.4237**	5.85%	117.0560	4.8499	8.1551	19.9663		LCS			96.2704	104.3%
4	0.9216	0.6506	1	1.8047	**85.8356**	5.99%	102.3000	4.5478	7.4791	17.2067		LCS			96.2704	89.2%
5	0.7758	0.5477	1	1.6368	**95.5803**	6.16%	105.9260	4.6175	8.1664	19.3432		LCS			96.2704	99.3%
6	0.6204	0.4380	1	1.4071	**88.4685**	6.04%	99.9520	4.4812	7.7740	17.7850		LCS			96.2704	91.9%
7	0.8817	0.6225	1	1.7164	**105.0202**	5.75%	133.6520	5.1925	7.9971	20.7719		LCS			96.2704	109.1%
8	1.1155	0.7875	1	2.0884	**95.5270**	6.10%	111.6500	4.7585	7.9798	19.2663		LCS			96.2704	99.2%
9	0.9192	0.6490	1	1.8141	**77.9105**	6.19%	90.5540	4.2803	7.2180	15.7944		LCS			96.2704	80.9%
10	0.8813	0.6222	1	1.7677	**81.6794**	6.15%	93.6640	4.3498	7.4348	16.5271		LCS			96.2704	84.8%
~~11~~	~~#DIV/0!~~	~~#DIV/0!~~	~~1~~	~~#DIV/0!~~	~~**#VALUE!**~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~	~~#VALUE!~~		~~LCS~~			~~96.2704~~	~~#VALUE!~~
12	1.1012	0.7775	1	2.0797	**85.6604**	6.08%	97.9470	4.4589	7.6431	17.2640		LCS			96.2704	89.0%
13	0.8933	0.6307	1	1.7735	**79.3705**	6.42%	92.9960	4.3360	7.2534	16.3148		LCS			96.2704	82.4%
14	0.9025	0.6372	1	1.8230	**82.0183**	6.22%	89.7070	4.2569	7.6283	16.6624		LCS			96.2704	85.2%
15	1.3805	0.9746	1	2.4274	**96.4664**	5.96%	121.0500	4.9762	7.7726	19.3010		LCS			96.2704	100.2%
16	0.5899	0.4165	1	1.3812	**85.3569**	6.13%	93.4180	4.3313	7.7568	17.2537		LCS			96.2704	88.7%

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
V1	1A	5	5	501	5/16/2019 10:07	5/16/2019 10:12	PIC	R228V19
V2	1B	5	5	558	5/16/2019 10:07	5/16/2019 10:12	PIC	R228V19
V3	1C	5	25	548	5/16/2019 10:07	5/16/2019 10:12	PIC	R228V19
V4	1D	5	11	534	5/16/2019 10:07	5/16/2019 10:12	PIC	R228V19
V5	2A	5	14	595	5/16/2019 10:14	5/16/2019 10:19	PIC	R228V19
V6	2B	5	3	489	5/16/2019 10:07	5/16/2019 10:12	PIC	R228V19
V7	2C	5	5	452	5/16/2019 10:14	5/16/2019 10:19	PIC	R228V19
V12	2D	5	29	586	5/21/2019 9:59	5/21/2019 10:04	PIC	R228V19
V1	3A	5	0	0	5/16/2019 10:14	5/16/2019 10:19	PIC	R228V19
V2	3B	5	25	524	5/16/2019 10:20	5/16/2019 10:25	PIC	R228V19
V3	3C	5	12	577	5/16/2019 10:20	5/16/2019 10:25	PIC	R228V19
V4	3D	5	14	470	5/16/2019 10:20	5/16/2019 10:25	PIC	R228V19
V5	4A	5	11	592	5/16/2019 10:20	5/16/2019 10:25	PIC	R228V19
V6	4B	5	1	464	5/16/2019 10:20	5/16/2019 10:25	PIC	R228V19
V7	4C	5	14	448	5/16/2019 10:20	5/16/2019 10:25	PIC	R228V19
V8	4D	5	35	515	5/16/2019 10:20	5/16/2019 10:25	PIC	R228V19
V1	5A	5	15	513	5/16/2019 10:26	5/16/2019 10:31	PIC	R228V19
V2	5B	5	14	544	5/16/2019 10:26	5/16/2019 10:31	PIC	R228V19
V3	5C	5	8	581	5/16/2019 10:26	5/16/2019 10:31	PIC	R228V19
V4	5D	5	11	541	5/16/2019 10:26	5/16/2019 10:31	PIC	R228V19
V5	6A	5	2	526	5/16/2019 10:30	5/16/2019 10:35	PIC	R228V19
V6	6B	5	1	510	5/16/2019 10:30	5/16/2019 10:35	PIC	R228V19
V7	6C	5	1	437	5/16/2019 10:30	5/16/2019 10:35	PIC	R228V19
V8	6D	5	0	0	5/16/2019 10:30	5/16/2019 10:35	PIC	R228V19
V1	7A	5	0	501	5/16/2019 10:36	5/16/2019 10:41	PIC	R228V19
V2	7B	5	2	470	5/16/2019 10:36	5/16/2019 10:41	PIC	R228V19
V3	7C	5	2	569	5/16/2019 10:36	5/16/2019 10:41	PIC	R228V19
V4	7D	5	6	524	5/16/2019 10:36	5/16/2019 10:41	PIC	R228V19
V5	8A	5	7	532	5/16/2019 10:36	5/16/2019 10:41	PIC	R228V19
V6	8B	5	6	456	5/16/2019 10:36	5/16/2019 10:41	PIC	R228V19
V7	8C	5	11	476	5/16/2019 10:36	5/16/2019 10:41	PIC	R228V19
V8	8D	5	15	549	5/16/2019 10:36	5/16/2019 10:41	PIC	R228V19
V1	9A	5	1	505	5/16/2019 10:43	5/16/2019 10:48	PIC	R228V19

V2	9B	5	6	485	5/16/2019 10:43	5/16/2019 10:48	PIC	R228V19
V3	9C	5	10	509	5/16/2019 10:43	5/16/2019 10:48	PIC	R228V19
V4	9D	5	8	522	5/16/2019 10:43	5/16/2019 10:48	PIC	R228V19
V5	10A	5	1	582	5/16/2019 10:43	5/16/2019 10:48	PIC	R228V19
V6	10B	5	1	484	5/16/2019 10:43	5/16/2019 10:48	PIC	R228V19
V12	10C	5	1	607	5/21/2019 10:08	5/21/2019 10:13	PIC	R228V19
V8	10D	5	3	538	5/16/2019 10:43	5/16/2019 10:48	PIC	R228V19
V1	11A	5	0	529	5/16/2019 10:47	5/16/2019 10:52	PIC	R228V19
V2	11B	5	4	483	5/16/2019 10:47	5/16/2019 10:52	PIC	R228V19
V3	11C	5	0	588	5/16/2019 10:47	5/16/2019 10:52	PIC	R228V19
V4	11D	5	3	517	5/16/2019 10:47	5/16/2019 10:52	PIC	R228V19
V5	12A	5	4	533	5/16/2019 10:47	5/16/2019 10:52	PIC	R228V19
V6	12B	5	2	502	5/16/2019 10:47	5/16/2019 10:52	PIC	R228V19
V12	12C	5	5	674	5/21/2019 10:12	5/21/2019 10:17	PIC	R228V19
V8	12D	5	0	566	5/16/2019 10:47	5/16/2019 10:52	PIC	R228V19
V1	13A	5	1	458	5/16/2019 10:57	5/16/2019 11:02	PIC	R228V19
V2	13B	5	2	473	5/16/2019 10:57	5/16/2019 11:02	PIC	R228V19
V3	13C	5	0	0	5/16/2019 10:57	5/16/2019 11:02	PIC	R228V19
V4	13D	5	7	497	5/16/2019 10:57	5/16/2019 11:02	PIC	R228V19
V5	14A	5	2	470	5/16/2019 10:56	5/16/2019 11:01	PIC	R228V19
V6	14B	5	3	453	5/16/2019 10:56	5/16/2019 11:01	PIC	R228V19
V12	14C	5	2	619	5/21/2019 10:18	5/21/2019 10:23	PIC	R228V19
V8	14D	5	2	469	5/16/2019 10:57	5/16/2019 11:02	PIC	R228V19

MPC 9600 Plateau Instrument 1 MPC 9604 Detector A 6/13/2017

Alpha Volts: 1575 Beta Volts: 1575

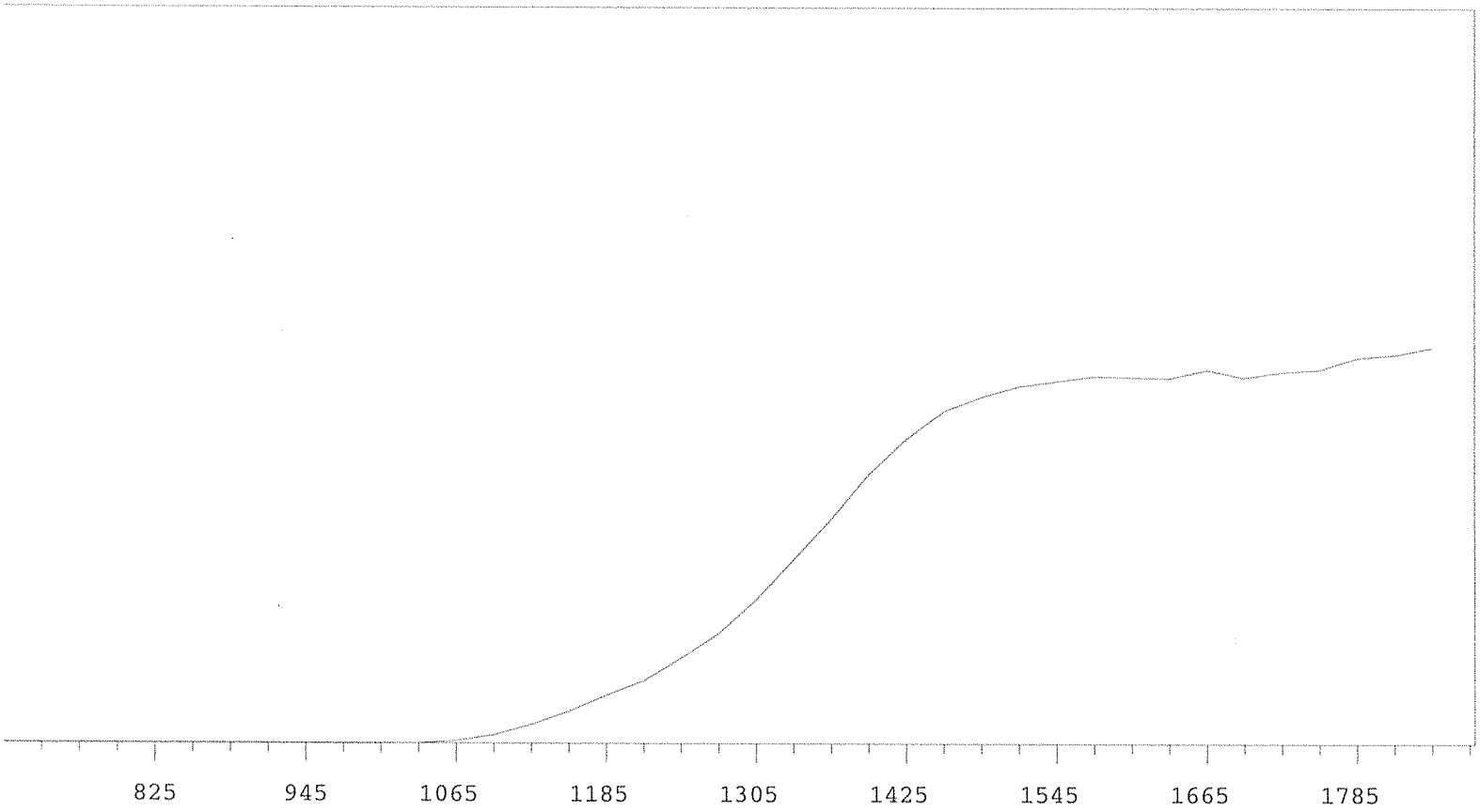


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	>100
975	0	>100
1005	7	>100
1035	47	>100
1065	224	>100
1095	537	>100
1125	959	>100
1155	1429	>100
1185	2102	>100
1215	2872	+96.01
1245	3852	+87.18
1275	4927	+80.94

VOLTS	COUNTS	%/100 Volts
1305	6326	+74.49
1335	7924	+67.06
1365	9658	+56.48
1395	11345	+45.57
1425	12749	+34.20
1455	13989	+23.71
1485	14747	+16.09
1515	15183	+7.90
1545	15643	+3.22
1575	15315	+1.74
1605	15418	+1.35
1635	15699	+3.04
1665	15767	+2.61
1695	15853	+1.42
1725	15958	+0.75
1755	15940	+0.56
1785	15902	+0.43
1815	16015	+47.68
1845	16024	

MPC 9600 Plateau Instrument 1 MPC 9604 Detector B 6/13/2017

Alpha Volts: 1575 Beta Volts: 1575

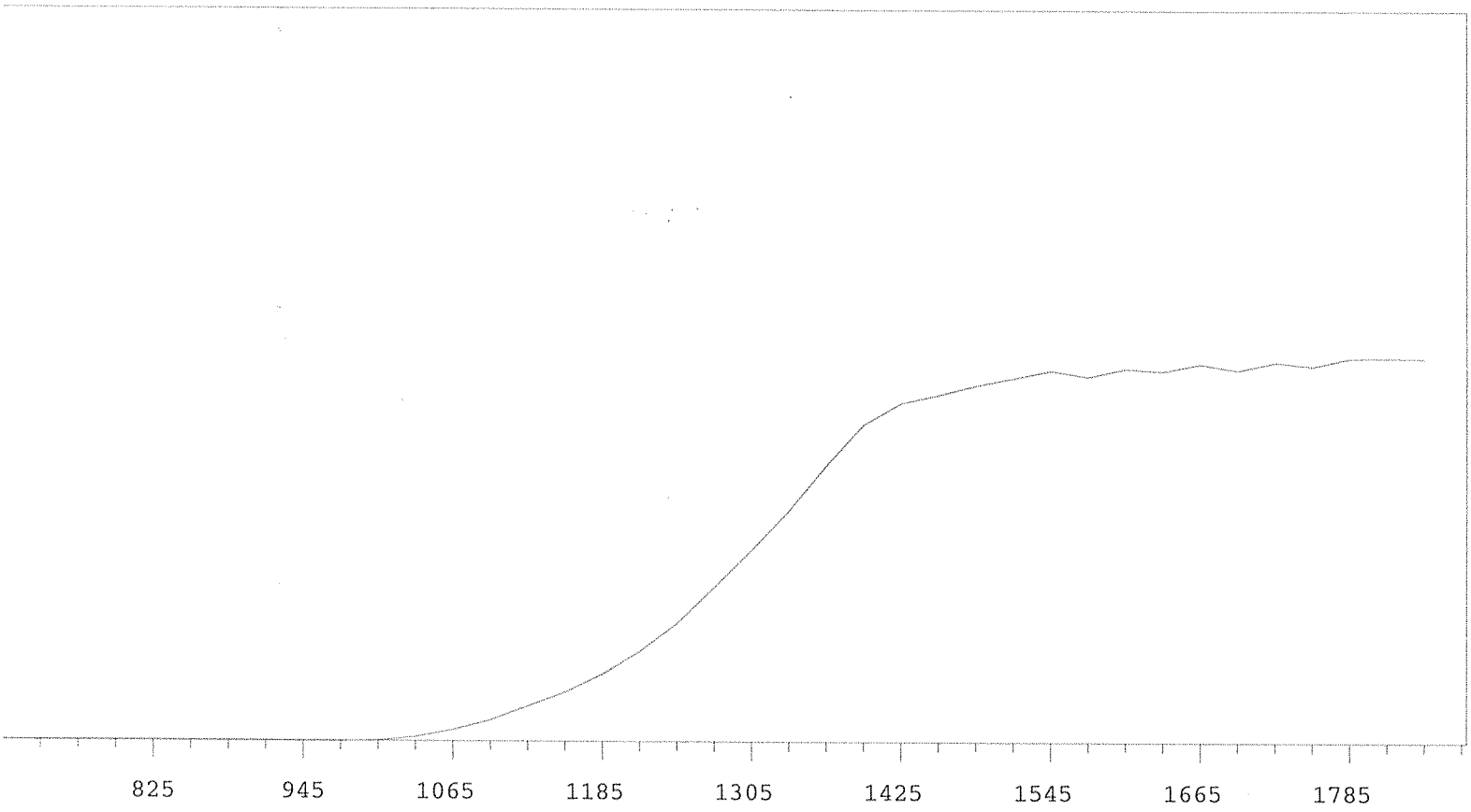


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	3	
795	3	-47.62
825	1	>100
855	0	>100
885	0	+0.00
915	0	>100
945	1	>100
975	1	>100
1005	6	>100
1035	17	>100
1065	116	>100
1095	340	>100
1125	763	>100
1155	1311	>100
1185	1955	>100
1215	2565	+95.09
1245	3476	+88.55
1275	4485	+85.68

VOLTS	COUNTS	%/100 Volts
1305	5870	+78.72
1335	7514	+71.50
1365	9167	+60.16
1395	10994	+47.62
1425	12427	+34.57
1455	13549	+22.46
1485	14141	+13.71
1515	14562	+8.11
1545	14778	+4.60
1575	14982	+1.93
1605	14944	+1.93
1635	14909	+0.43
1665	15248	+1.01
1695	14927	+1.35
1725	15163	+2.90
1755	15258	+5.36
1785	15747	+5.53
1815	15873	+85.14
1845	16152	

MPC 9600 Plateau Instrument 1 MPC 9604 Detector C 6/13/2017

Alpha Volts: 1575 Beta Volts: 1575

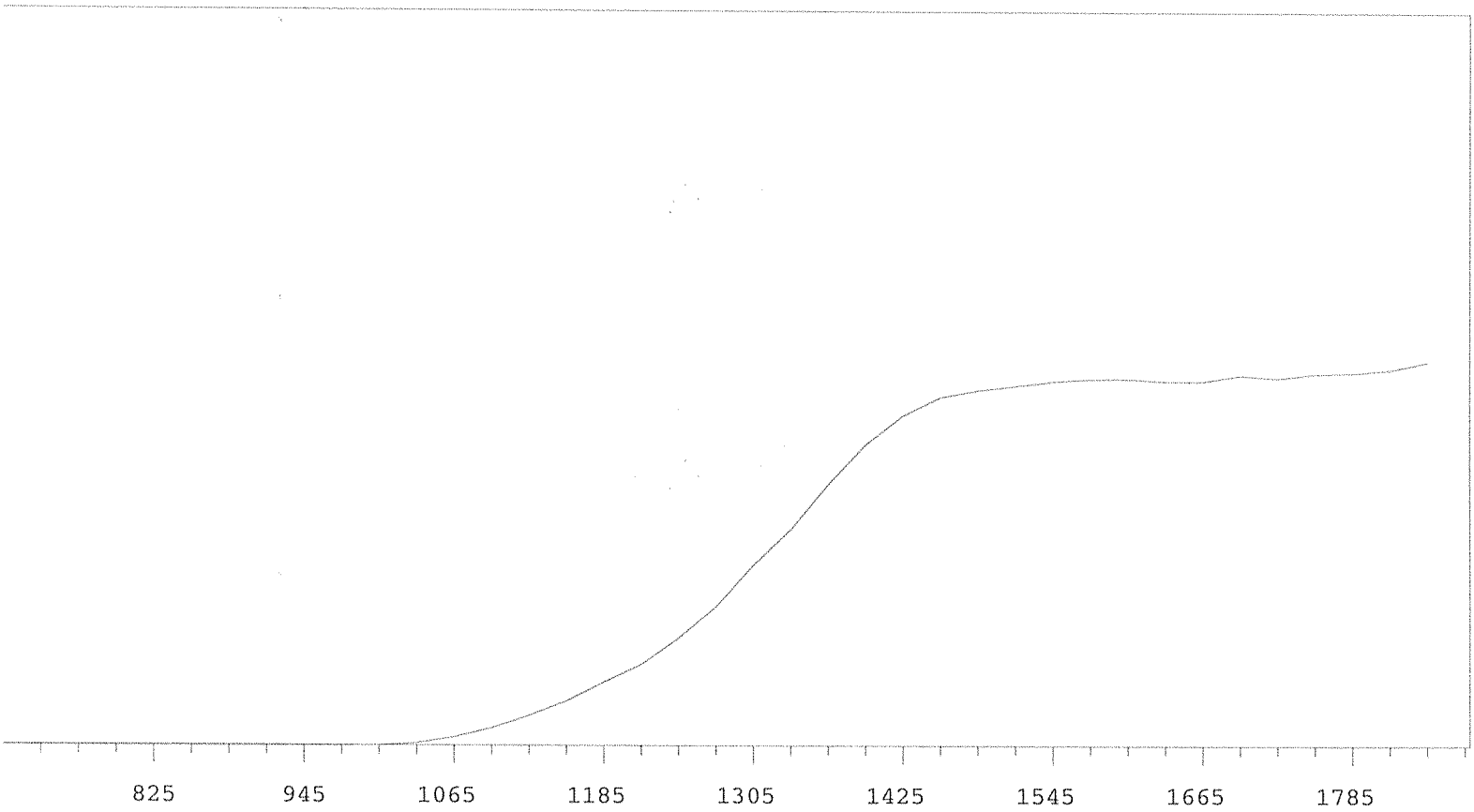


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	1	+100.00
795	1	>100
825	2	-27.78
855	2	-55.56
885	0	-83.33
915	1	-33.33
945	1	>100
975	1	>100
1005	28	>100
1035	164	>100
1065	445	>100
1095	839	>100
1125	1397	>100
1155	1949	>100
1185	2660	+95.70
1215	3574	+90.94
1245	4678	+84.01
1275	6118	+75.34

VOLTS	COUNTS	%/100 Volts
1305	7594	+67.34
1335	9148	+58.21
1365	10935	+46.49
1395	12539	+32.26
1425	13373	+19.16
1455	13706	+10.61
1485	14066	+7.64
1515	14358	+4.73
1545	14655	+3.27
1575	14422	+1.45
1605	14743	+1.73
1635	14631	+1.59
1665	14932	+1.25
1695	14677	+1.13
1725	14998	+1.43
1755	14849	+2.60
1785	15167	+1.41
1815	15177	+78.97
1845	15152	

MPC 9600 Plateau Instrument 1 MPC 9604 Detector D 6/13/2017

Alpha Volts: 1575 Beta Volts: 1575

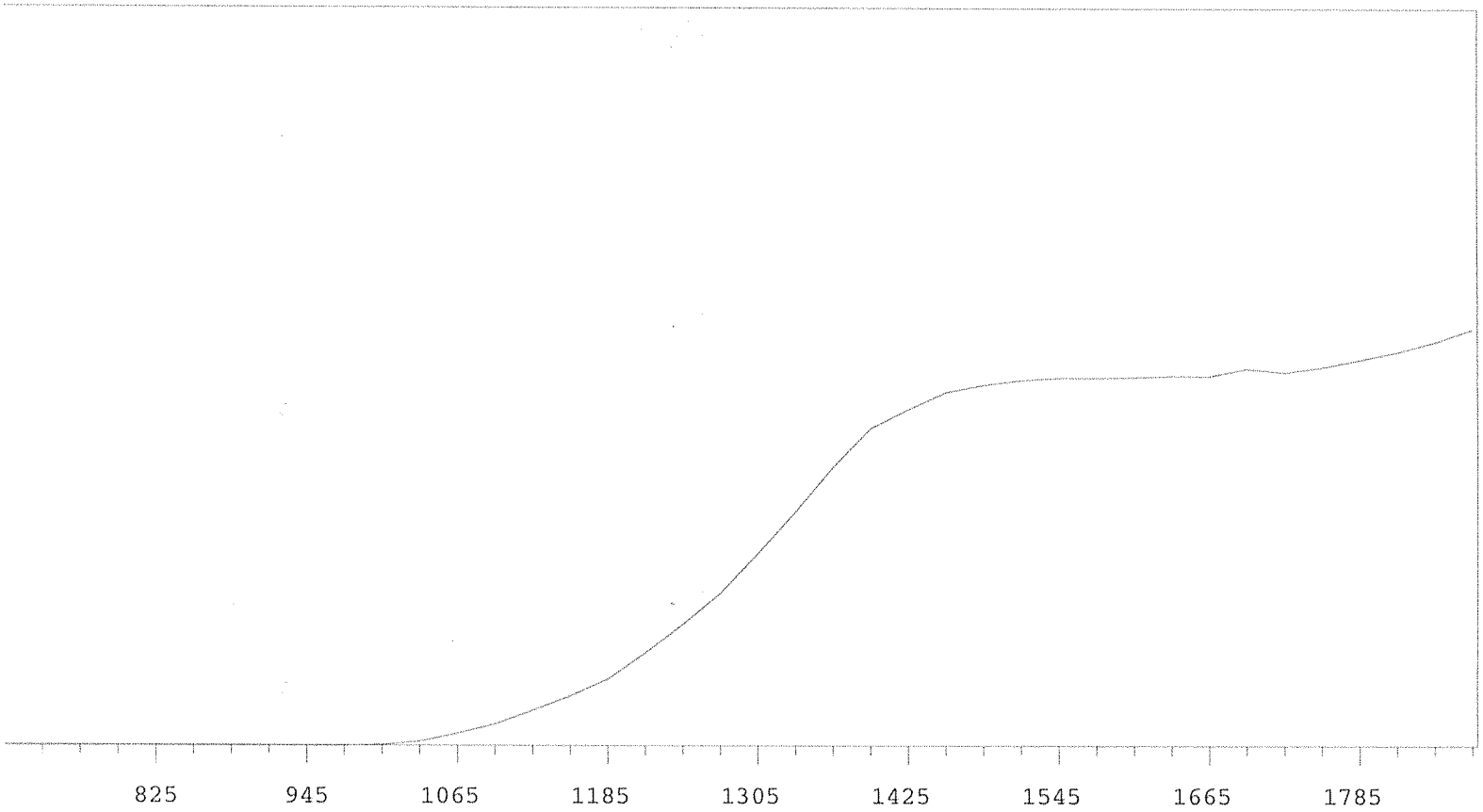


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	+0.00
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	+0.00
945	0	>100
975	0	>100
1005	16	>100
1035	97	>100
1065	329	>100
1095	679	>100
1125	1163	>100
1155	1736	>100
1185	2459	+97.85
1215	3157	+88.88
1245	4179	+85.22
1275	5387	+78.84

VOLTS	COUNTS	%/100 Volts
1305	7020	+71.03
1335	8391	+61.78
1365	10166	+49.83
1395	11726	+38.32
1425	12849	+24.61
1455	13568	+14.03
1485	13833	+7.57
1515	14012	+4.22
1545	14181	+2.80
1575	14278	+1.16
1605	14294	-0.10
1635	14202	+0.49
1665	14197	+0.66
1695	14431	+1.70
1725	14320	+1.72
1755	14505	+1.54
1785	14531	+3.33
1815	14661	+66.43
1845	14971	

MPC 9600 Plateau Instrument 2 MPC 9604 Detector A 7/1/2009

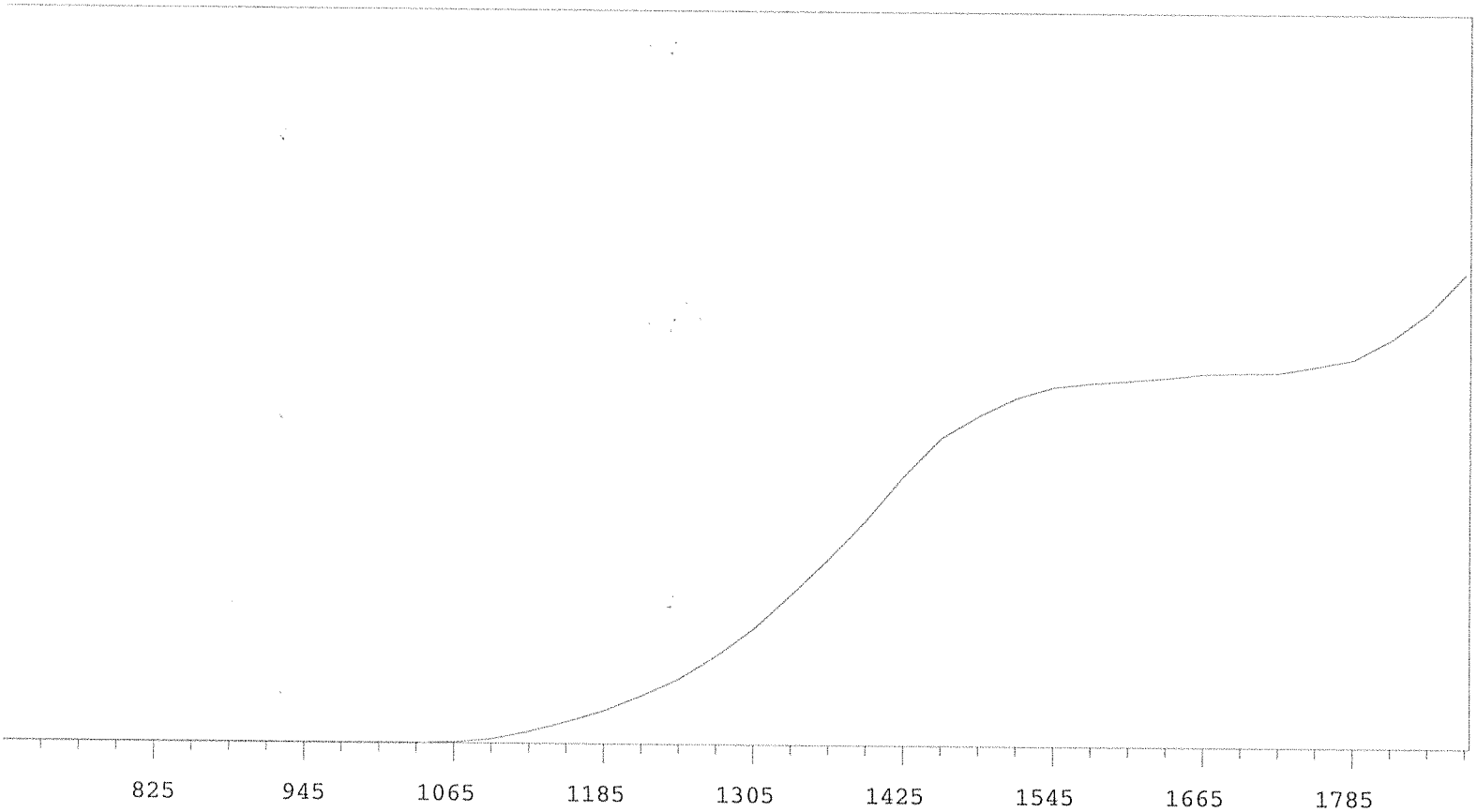
Alpha Volts: 1575 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19017	+67.45
735	1		1335	23157	+59.23
765	0	+83.33	1365	27625	+45.78
795	0	-83.33	1395	31465	+32.72
825	1	>100	1425	33352	+20.41
855	0	>100	1455	35084	+11.74
885	1	+100.00	1485	35819	+7.11
915	1	>100	1515	36292	+3.35
945	2	>100	1545	36527	+1.63
975	12	>100	1575	36540	+0.87
1005	91	>100	1605	36585	+0.48
1035	421	>100	1635	36742	+1.76
1065	1239	>100	1665	36691	+1.53
1095	2155	>100	1695	37461	+1.89
1125	3527	>100	1725	37073	+3.07
1155	4974	>100	1755	37603	+4.02
1185	6647	+97.44	1785	38346	+6.58
1215	9250	+89.00	1815	39111	+7.95
1245	12041	+82.15	1845	40115	
1275	15094	+73.81	1875	41409	

MPC 9600 Plateau Instrument 2 MPC 9604 Detector B 7/1/2009

Alpha Volts: 1575 Beta Volts: 1575

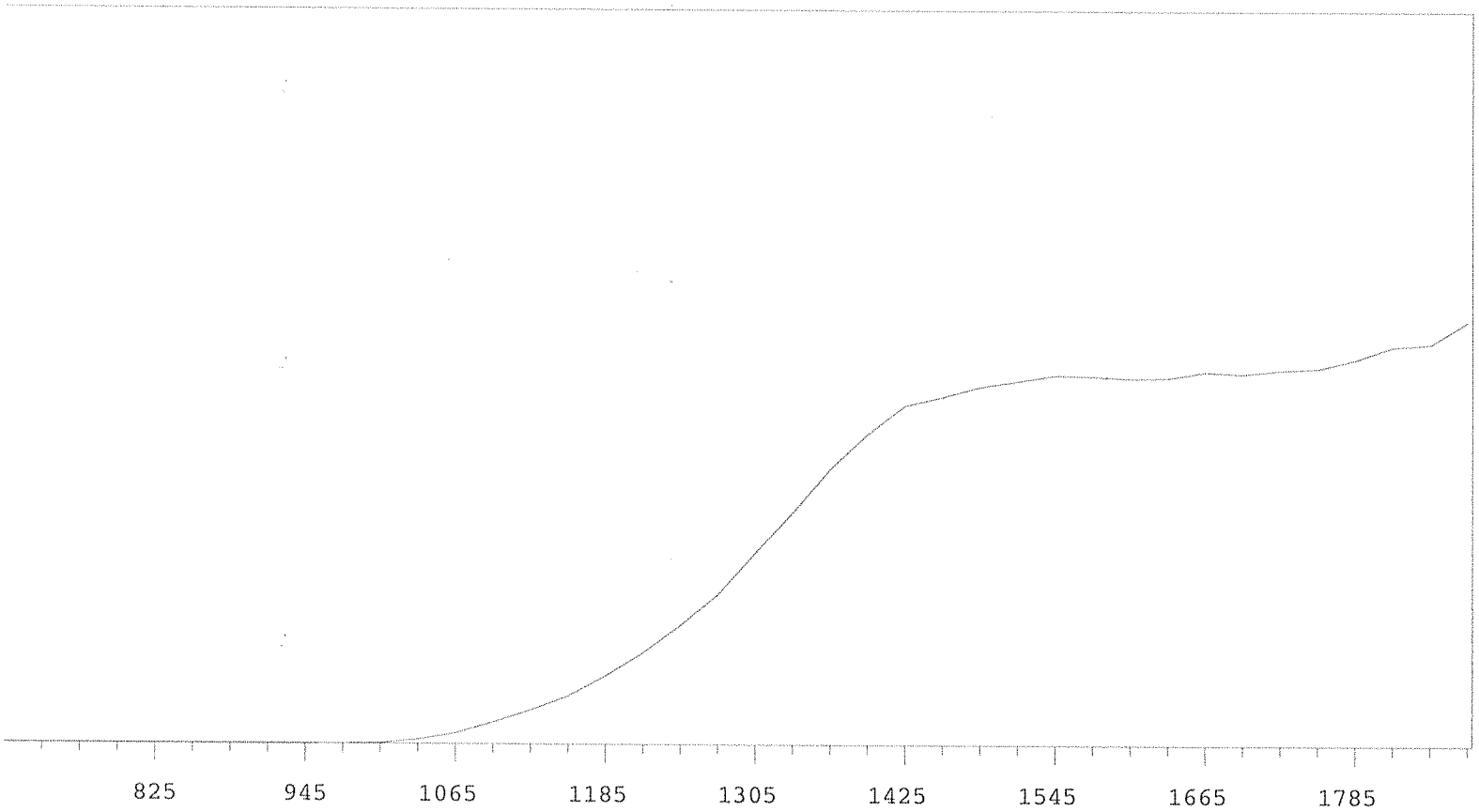


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	>100
975	2	>100
1005	3	>100
1035	14	>100
1065	127	>100
1095	500	>100
1125	1332	>100
1155	2373	>100
1185	3614	>100
1215	5227	>100
1245	7060	+97.33
1275	9574	+90.30

VOLTS	COUNTS	%/100 Volts
1305	12541	+83.18
1335	16192	+74.48
1365	20083	+67.17
1395	24273	+58.43
1425	29090	+46.86
1455	33223	+34.56
1485	35608	+22.67
1515	37581	+13.63
1545	38762	+8.18
1575	39185	+4.42
1605	39484	+3.06
1635	39806	+2.61
1665	40264	+2.03
1695	40353	+2.32
1725	40431	+3.28
1755	41127	+7.09
1785	41882	+12.40
1815	44049	+18.52
1845	46950	
1875	51097	

MPC 9600 Plateau Instrument 2 MPC 9604 Detector C 7/1/2009

Alpha Volts: 1575 Beta Volts: 1575

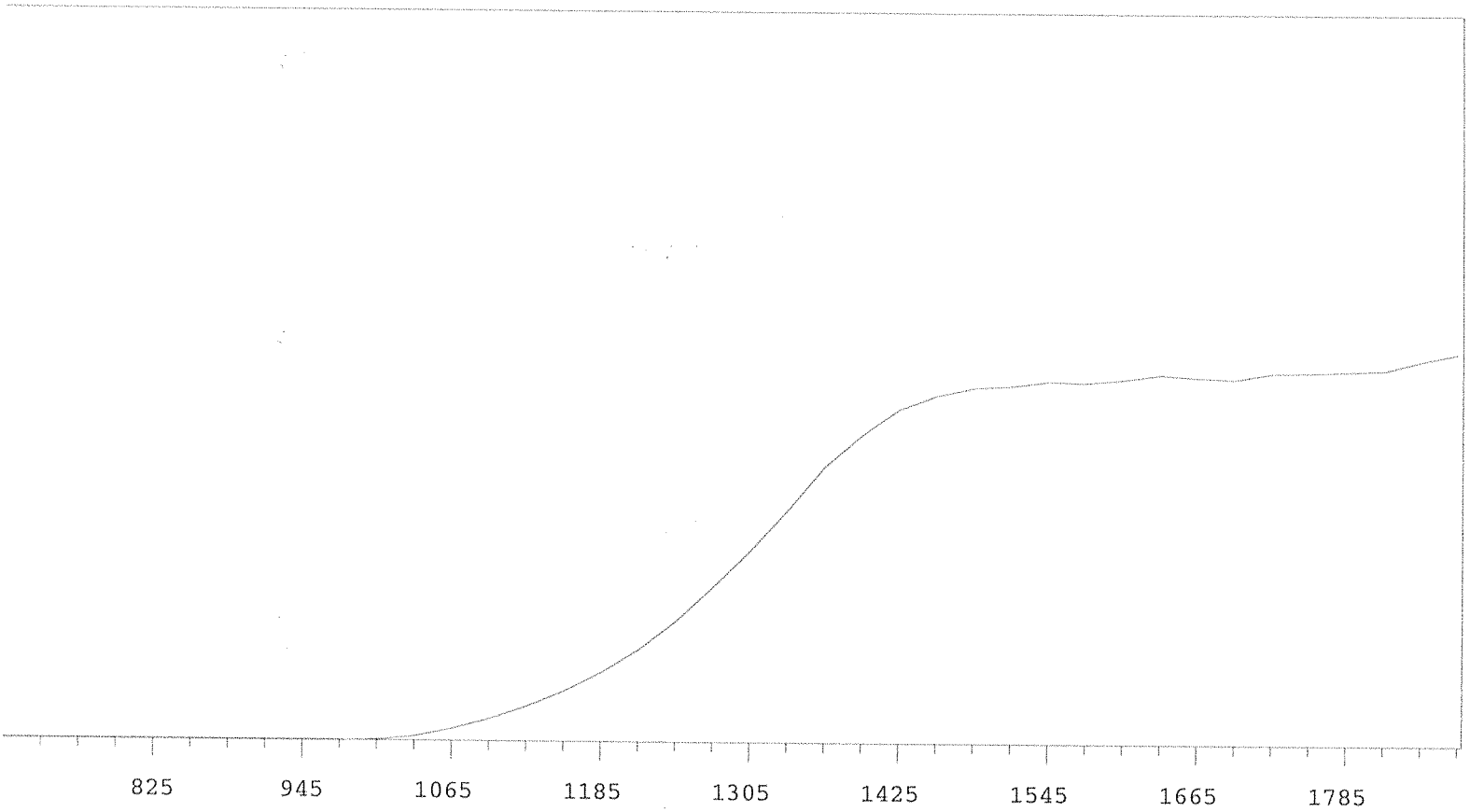


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	17	>100
1005	87	>100
1035	438	>100
1065	1055	>100
1095	2114	>100
1125	3282	>100
1155	4625	>100
1185	6554	+97.66
1215	8743	+88.09
1245	11345	+81.31
1275	14261	+74.60

VOLTS	COUNTS	%/100 Volts
1305	18216	+67.74
1335	21995	+58.11
1365	26173	+46.11
1395	29479	+32.75
1425	32186	+20.62
1455	33022	+12.13
1485	33981	+7.22
1515	34520	+4.95
1545	35095	+2.07
1575	35014	+0.38
1605	34812	+0.55
1635	34859	+1.11
1665	35460	+1.94
1695	35273	+1.95
1725	35629	+2.73
1755	35811	+5.77
1785	36656	+6.44
1815	37896	+9.21
1845	38145	
1875	40283	

MPC 9600 Plateau Instrument 2 MPC 9604 Detector D 7/1/2009

Alpha Volts: 1575 Beta Volts: 1575

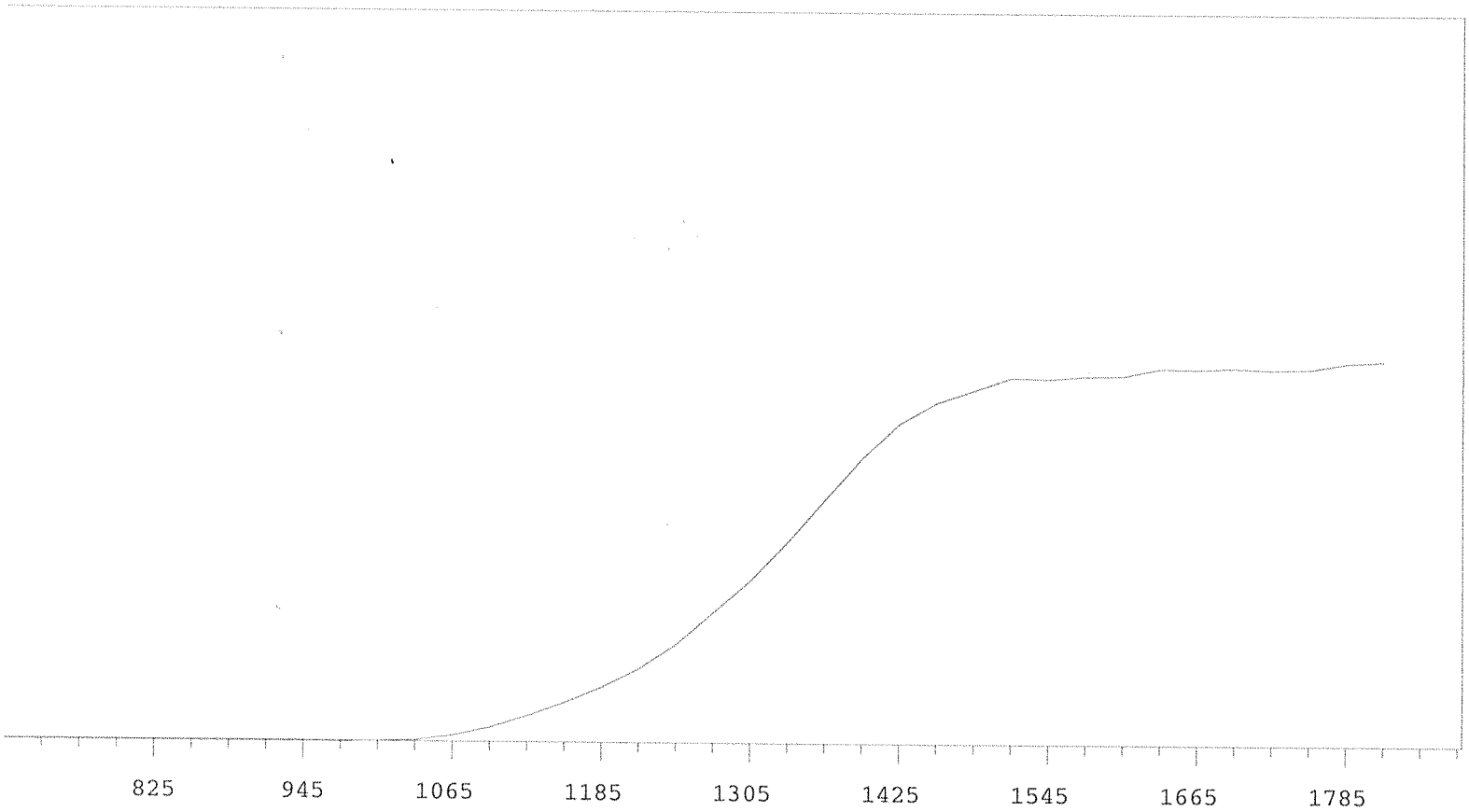


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	+83.33
795	2	+55.56
825	1	>100
855	0	>100
885	0	>100
915	0	>100
945	2	>100
975	9	>100
1005	89	>100
1035	439	>100
1065	1198	>100
1095	2164	>100
1125	3436	>100
1155	4917	>100
1185	6762	+96.59
1215	9006	+89.14
1245	11800	+81.34
1275	15132	+73.59

VOLTS	COUNTS	%/100 Volts
1305	18675	+65.94
1335	22620	+55.69
1365	26869	+44.63
1395	29957	+32.08
1425	32494	+20.49
1455	33836	+11.98
1485	34627	+6.45
1515	34849	+3.22
1545	35298	+1.98
1575	35180	+2.37
1605	35503	+1.57
1635	36006	+0.99
1665	35722	+0.89
1695	35597	+0.93
1725	36188	+1.86
1755	36272	+1.90
1785	36389	+2.55
1815	36529	+4.39
1845	37459	
1875	38170	

MPC 9600 Plateau Instrument 3 MPC 9604 Detector A 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

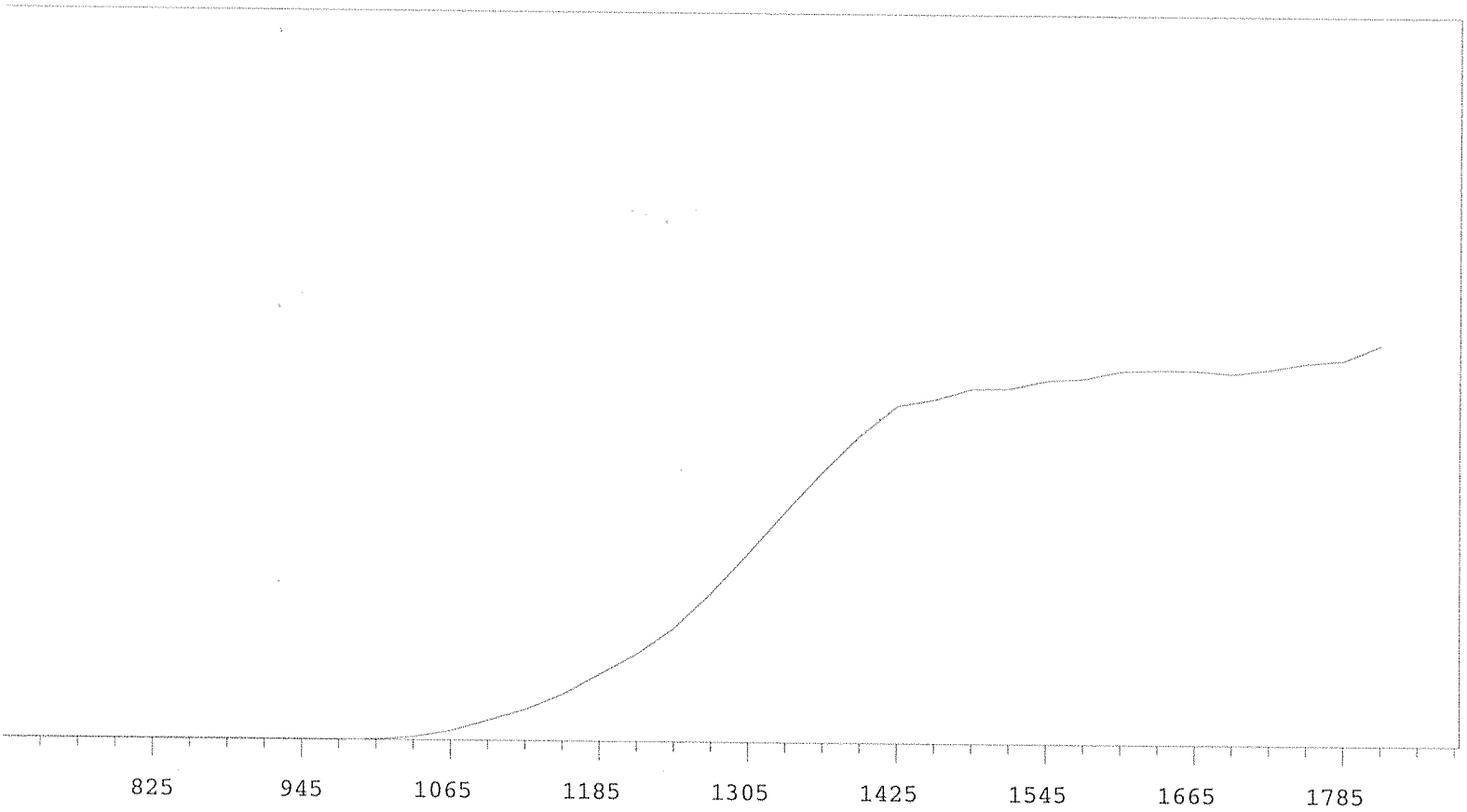


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	1	>100
825	2	-55.56
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	2	>100
1005	8	>100
1035	62	>100
1065	257	>100
1095	597	>100
1125	1089	>100
1155	1647	>100
1185	2293	>100
1215	3077	+94.67
1245	4110	+87.24
1275	5445	+80.06

VOLTS	COUNTS	%/100 Volts
1305	6793	+72.22
1335	8424	+63.90
1365	10197	+55.02
1395	11950	+42.77
1425	13411	+29.80
1455	14294	+19.59
1485	14805	+11.07
1515	15356	+6.20
1545	15310	+3.02
1575	15440	+2.16
1605	15455	+2.69
1635	15785	+2.30
1665	15765	+1.35
1695	15824	-0.00
1725	15753	+1.13
1755	15790	+1.90
1785	16050	+63.60
1815	16130	+80.13

MPC 9600 Plateau Instrument 3 MPC 9604 Detector B 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

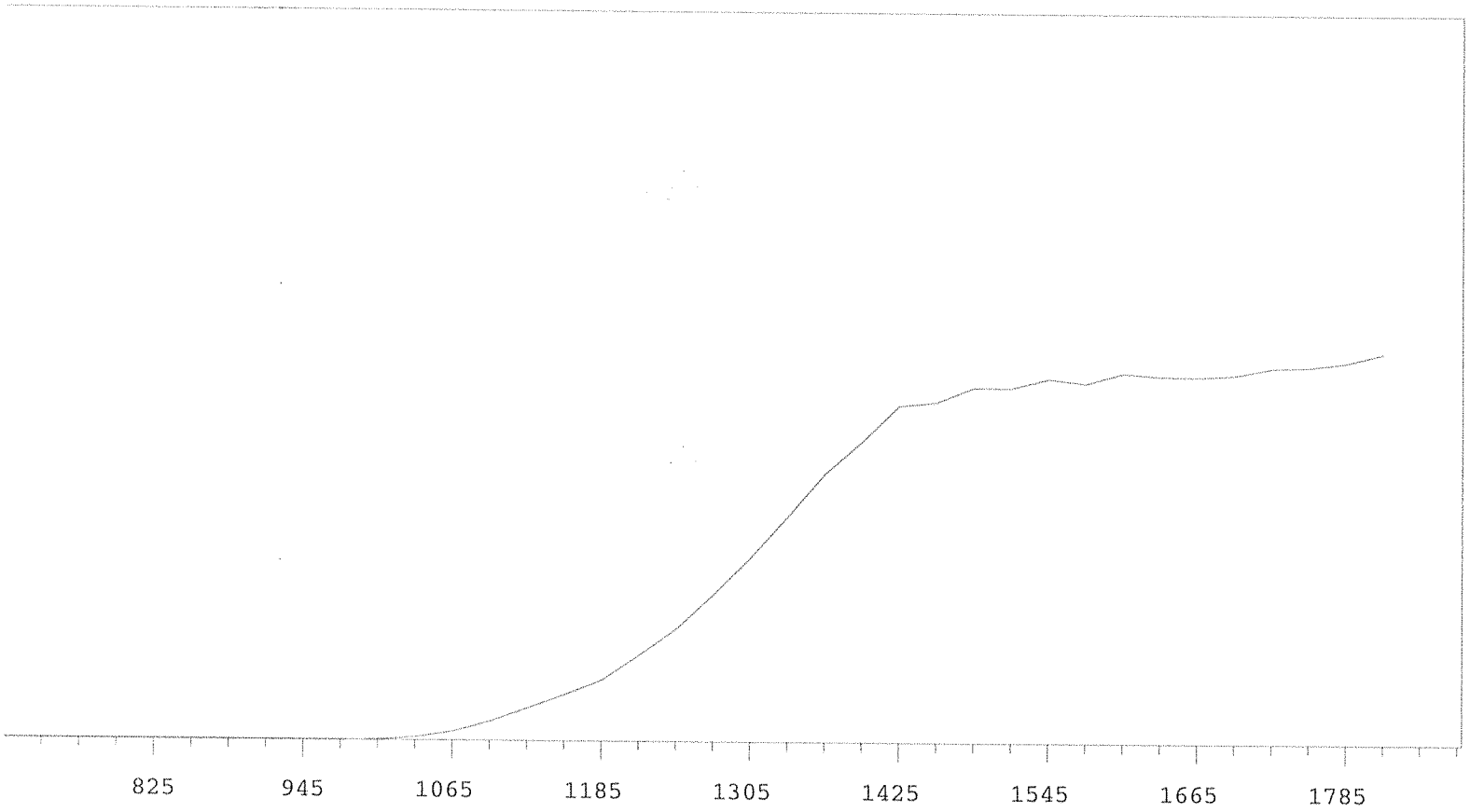


VOLTS	COUNTS	%/100 Volts
705	1	
735	2	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	5	>100
1005	27	>100
1035	126	>100
1065	377	>100
1095	785	>100
1125	1218	>100
1155	1817	>100
1185	2613	+98.98
1215	3403	+90.55
1245	4427	+84.39
1275	5822	+78.83

VOLTS	COUNTS	%/100 Volts
1305	7393	+69.59
1335	9033	+58.08
1365	10605	+46.52
1395	12037	+32.58
1425	13183	+20.95
1455	13442	+10.99
1485	13870	+6.04
1515	13883	+4.84
1545	14205	+4.41
1575	14286	+4.46
1605	14605	+2.79
1635	14642	+1.13
1665	14632	+0.11
1695	14518	+1.48
1725	14691	+2.91
1755	14939	+5.92
1785	15066	+79.21
1815	15660	+94.69

MPC 9600 Plateau Instrument 3 MPC 9604 Detector C 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

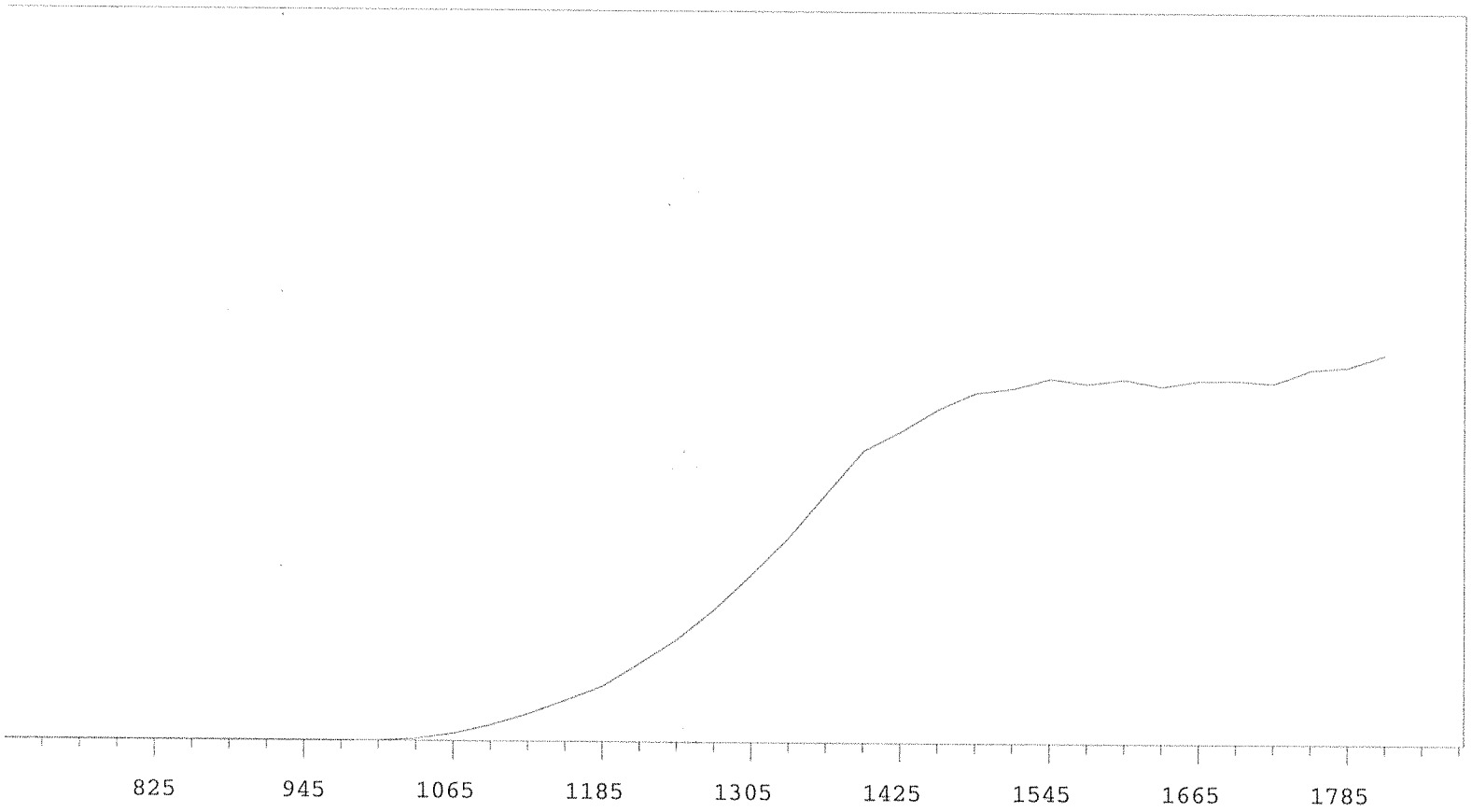


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	3	+0.00
795	1	>100
825	0	>100
855	0	+0.00
885	0	>100
915	1	>100
945	2	>100
975	1	>100
1005	22	>100
1035	132	>100
1065	361	>100
1095	792	>100
1125	1334	>100
1155	1898	>100
1185	2494	+97.73
1215	3507	+92.50
1245	4579	+86.31
1275	5977	+77.09

VOLTS	COUNTS	%/100 Volts
1305	7484	+69.37
1335	9155	+58.12
1365	10922	+48.50
1395	12240	+34.08
1425	13731	+22.36
1455	13877	+12.62
1485	14481	+6.63
1515	14469	+4.52
1545	14856	+3.27
1575	14670	+2.82
1605	15103	+1.10
1635	14972	+1.32
1665	14951	+1.16
1695	15042	+2.65
1725	15331	+3.43
1755	15384	+4.36
1785	15565	+88.19
1815	15936	

MPC 9600 Plateau Instrument 3 MPC 9604 Detector D 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

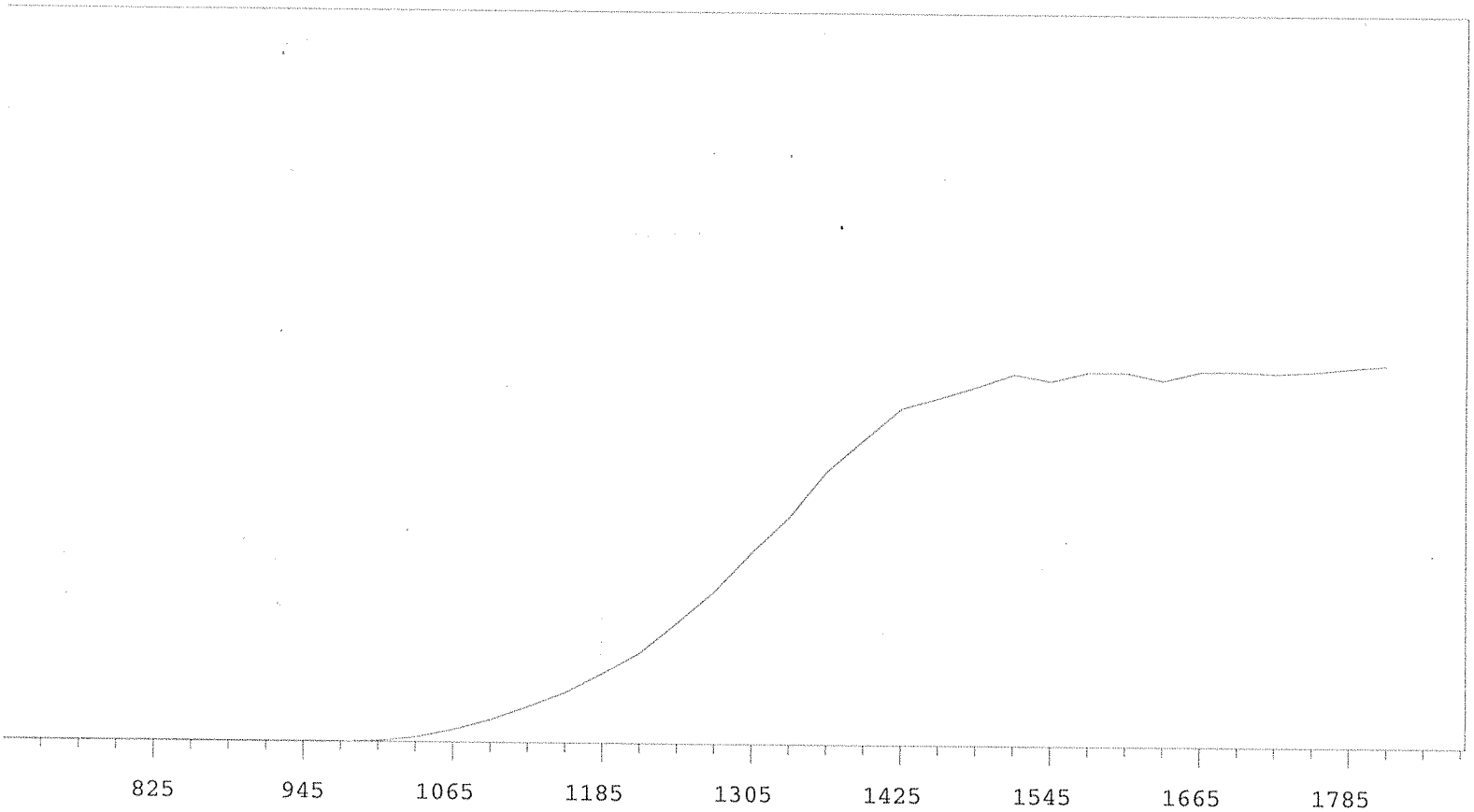


VOLTS	COUNTS	%/100 Volts
705	1	
735	1	
765	0	
795	0	+0.00
825	0	>100
855	1	>100
885	1	+100.00
915	2	+47.62
945	1	>100
975	2	>100
1005	6	>100
1035	90	>100
1065	299	>100
1095	658	>100
1125	1106	>100
1155	1652	>100
1185	2225	>100
1215	3151	+93.03
1245	4108	+85.91
1275	5297	+76.66

VOLTS	COUNTS	%/100 Volts
1305	6684	+70.65
1335	8166	+63.65
1365	9916	+50.98
1395	11645	+38.43
1425	12411	+26.60
1455	13312	+16.73
1485	13971	+12.51
1515	14151	+6.35
1545	14558	+3.08
1575	14358	+0.42
1605	14529	-0.48
1635	14256	+0.63
1665	14504	-0.02
1695	14507	+2.94
1725	14400	+3.51
1755	14948	+6.19
1785	15057	+53.75
1815	15562	+66.37

MPC 9600 Plateau Instrument 4 MPC 9604 Detector A 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

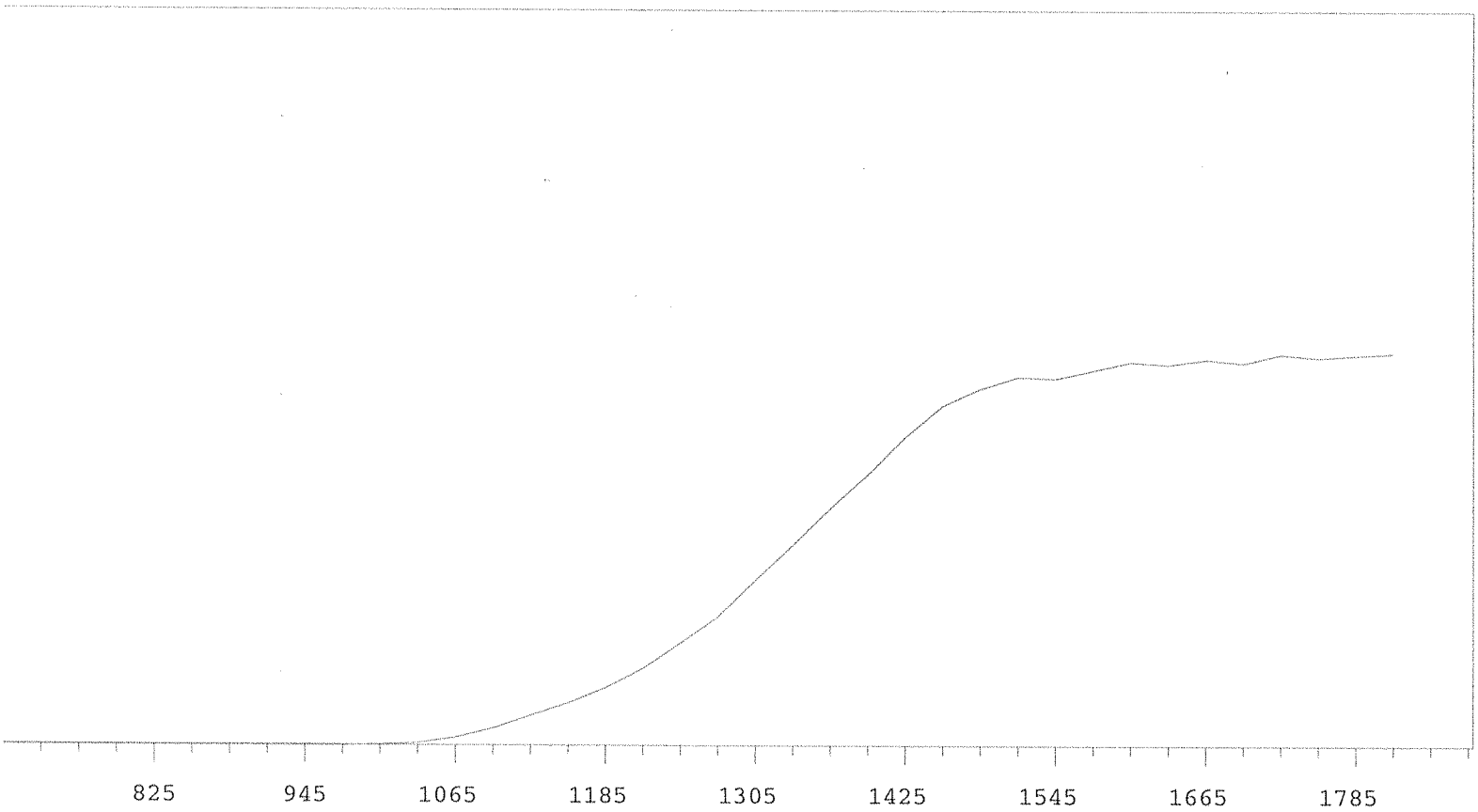


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	1	-55.56
825	1	-83.33
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	3	>100
1005	44	>100
1035	177	>100
1065	454	>100
1095	812	>100
1125	1287	>100
1155	1796	>100
1185	2471	+94.71
1215	3205	+87.75
1245	4290	+81.77
1275	5406	+73.53

VOLTS	COUNTS	%/100 Volts
1305	6813	+65.73
1335	8073	+56.39
1365	9720	+46.20
1395	10868	+34.10
1425	11995	+21.94
1455	12359	+14.98
1485	12774	+7.56
1515	13230	+5.52
1545	12996	+2.99
1575	13319	-0.14
1605	13318	+1.13
1635	13042	+0.36
1665	13358	+0.73
1695	13371	+1.50
1725	13299	+0.71
1755	13371	+1.64
1785	13500	+81.19
1815	13601	+97.56

MPC 9600 Plateau Instrument 4 MPC 9604 Detector B 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

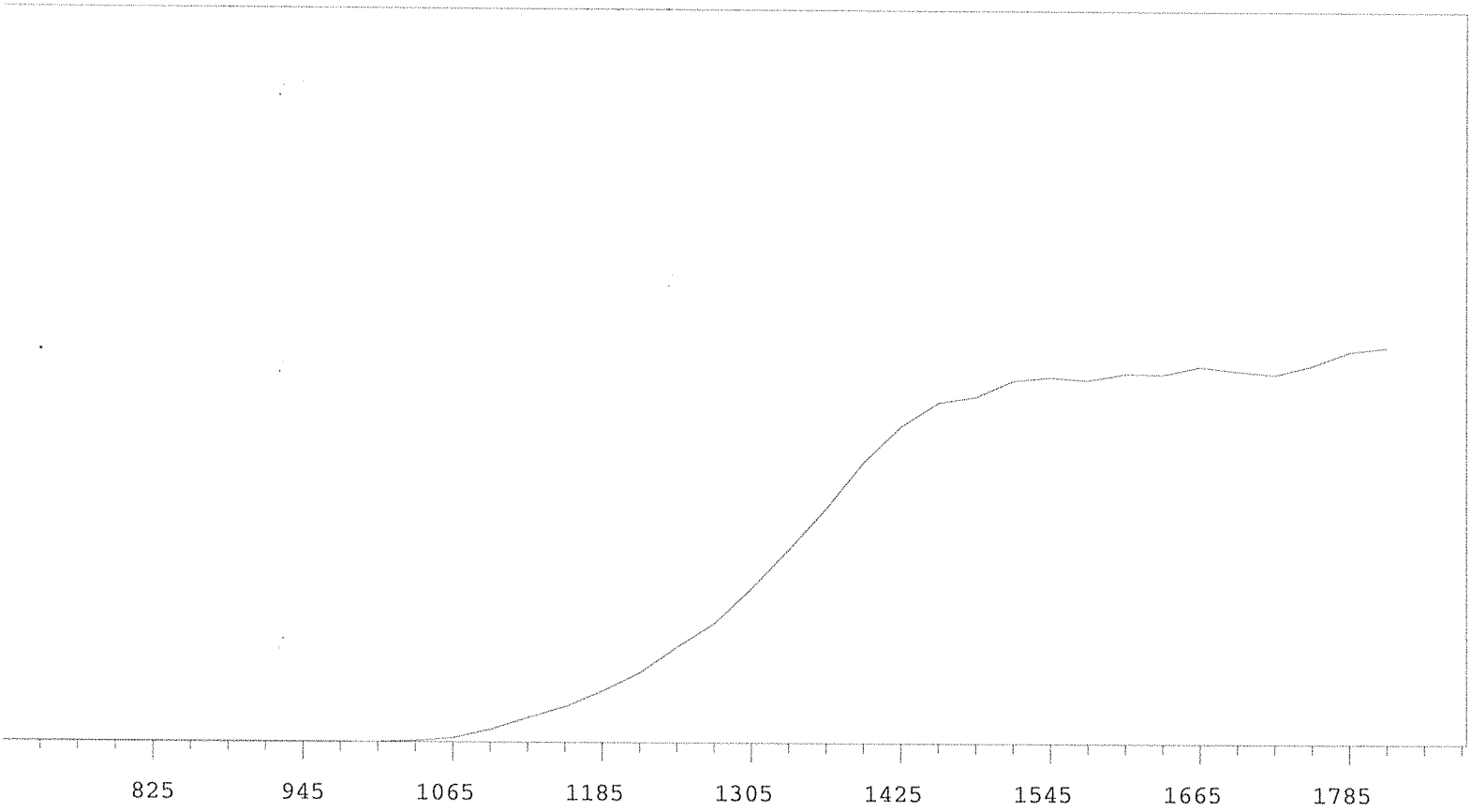


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	+0.00
825	0	>100
855	1	+0.00
885	0	>100
915	0	>100
945	0	>100
975	2	>100
1005	23	>100
1035	92	>100
1065	288	>100
1095	621	>100
1125	1100	>100
1155	1562	>100
1185	2118	+96.83
1215	2831	+88.57
1245	3772	+83.53
1275	4722	+76.32

VOLTS	COUNTS	%/100 Volts
1305	6060	+67.89
1335	7350	+59.12
1365	8689	+50.15
1395	9925	+42.83
1425	11289	+33.88
1455	12434	+24.66
1485	13066	+13.99
1515	13490	+7.48
1545	13436	+5.40
1575	13733	+3.64
1605	14043	+3.89
1635	13937	+1.56
1665	14142	+1.49
1695	14011	+1.67
1725	14321	+1.17
1755	14202	+1.62
1785	14295	+65.73
1815	14371	+83.90

MPC 9600 Plateau Instrument 4 MPC 9604 Detector C 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

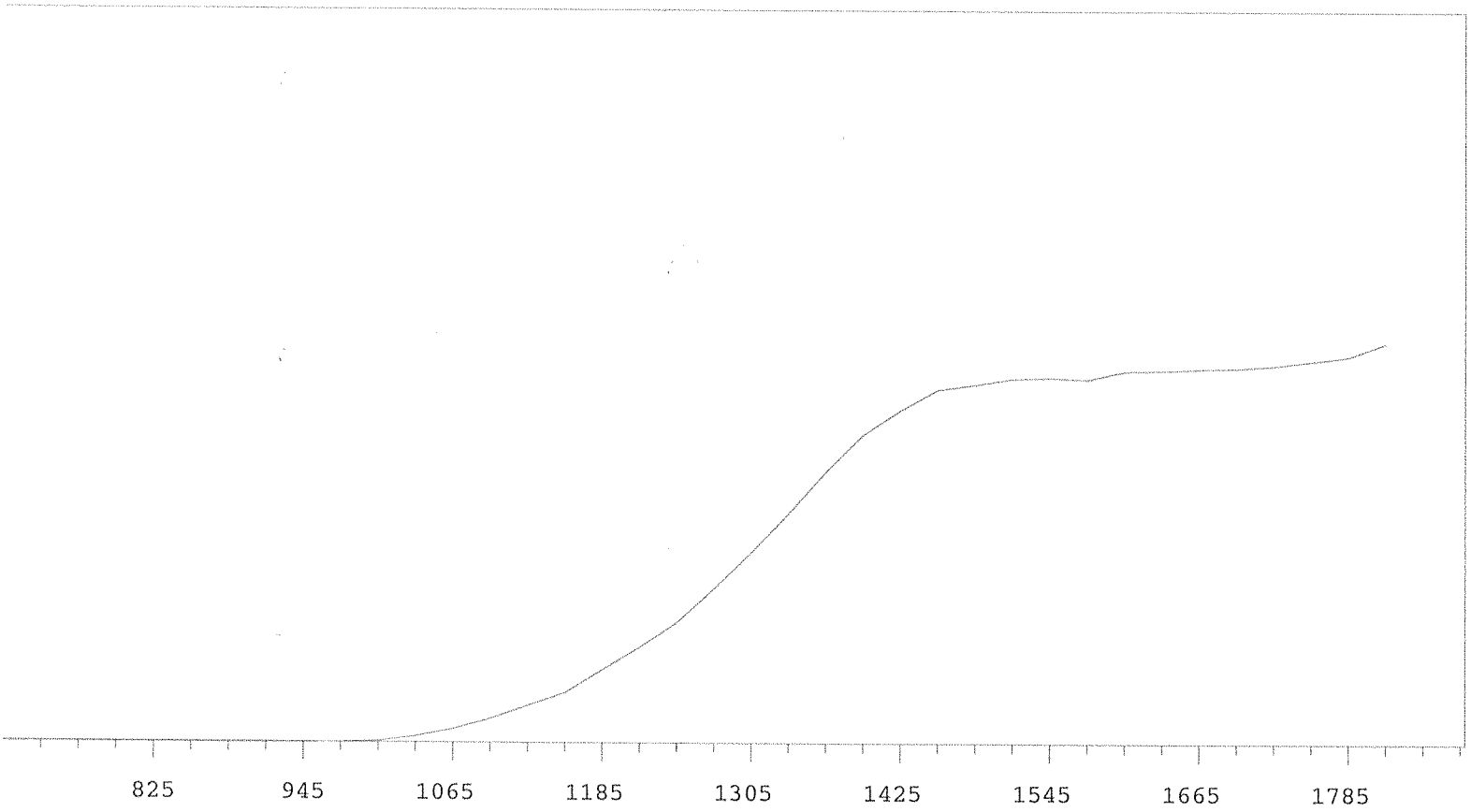


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	1	+55.56
795	0	>100
825	1	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	0	>100
1005	6	>100
1035	49	>100
1065	137	>100
1095	391	>100
1125	753	>100
1155	1097	>100
1185	1568	>100
1215	2119	+94.44
1245	2914	+87.11
1275	3635	+80.90

VOLTS	COUNTS	%/100 Volts
1305	4718	+73.54
1335	5897	+68.27
1365	7146	+57.98
1395	8555	+45.79
1425	9644	+30.98
1455	10364	+19.46
1485	10540	+11.54
1515	11034	+6.07
1545	11134	+4.39
1575	11052	+1.52
1605	11255	+2.54
1635	11228	+2.31
1665	11473	+0.19
1695	11334	+0.99
1725	11235	+3.23
1755	11516	+6.26
1785	11940	>100
1815	12072	

MPC 9600 Plateau Instrument 4 MPC 9604 Detector D 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

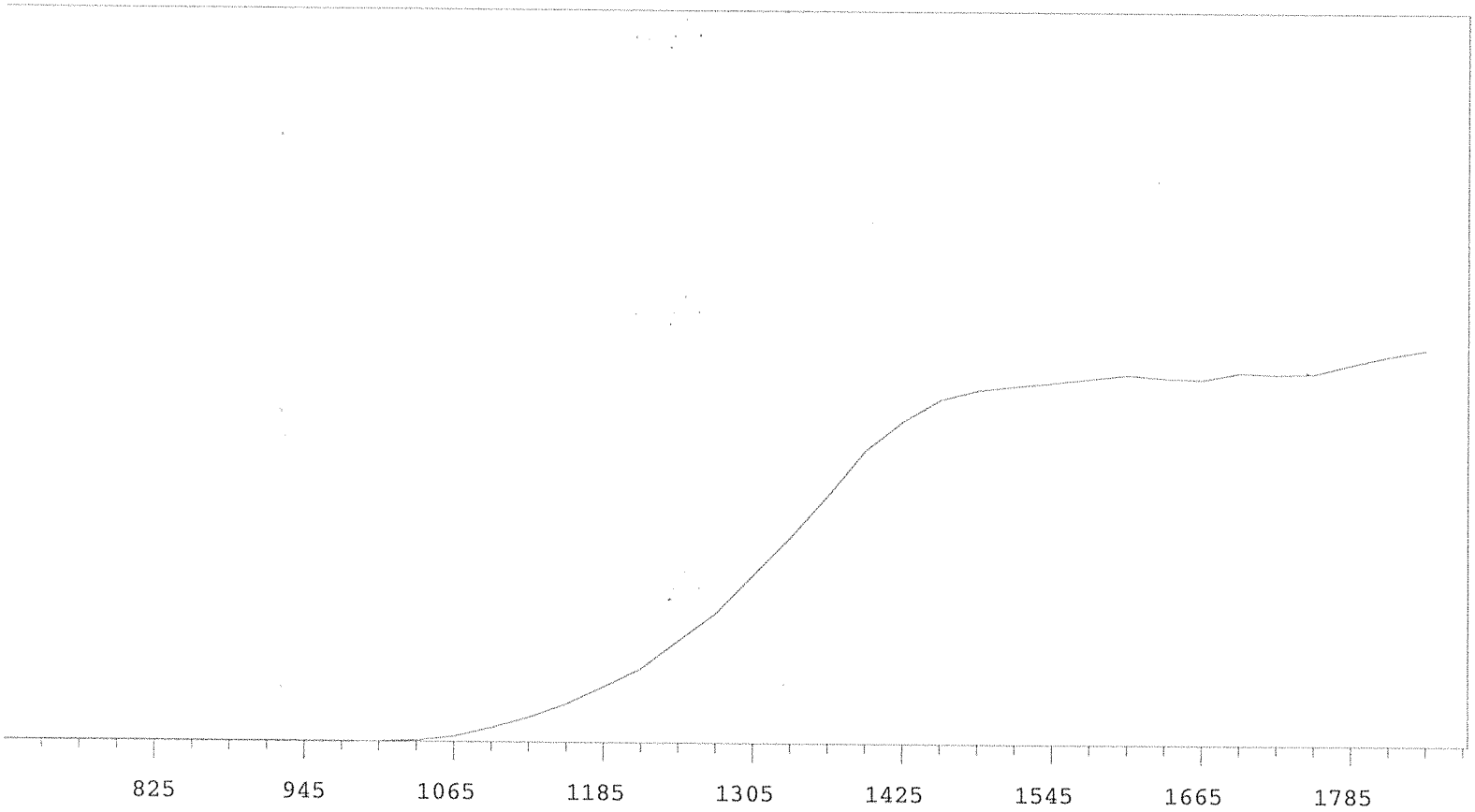


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	1	>100
885	0	+55.56
915	2	>100
945	0	>100
975	7	>100
1005	56	>100
1035	211	>100
1065	467	>100
1095	828	>100
1125	1282	>100
1155	1718	>100
1185	2507	+93.37
1215	3276	+85.96
1245	4116	+76.78
1275	5268	+71.00

VOLTS	COUNTS	%/100 Volts
1305	6502	+65.04
1335	7833	+56.32
1365	9271	+45.64
1395	10543	+34.63
1425	11381	+22.57
1455	12088	+13.41
1485	12259	+7.23
1515	12467	+2.61
1545	12509	+2.50
1575	12446	+2.12
1605	12738	+2.44
1635	12753	+2.32
1665	12818	+1.28
1695	12848	+2.04
1725	12936	+2.89
1755	13089	+5.16
1785	13260	+80.15
1815	13705	+96.56

MPC 9600 Plateau Instrument 5 MPC 9604 Detector A 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

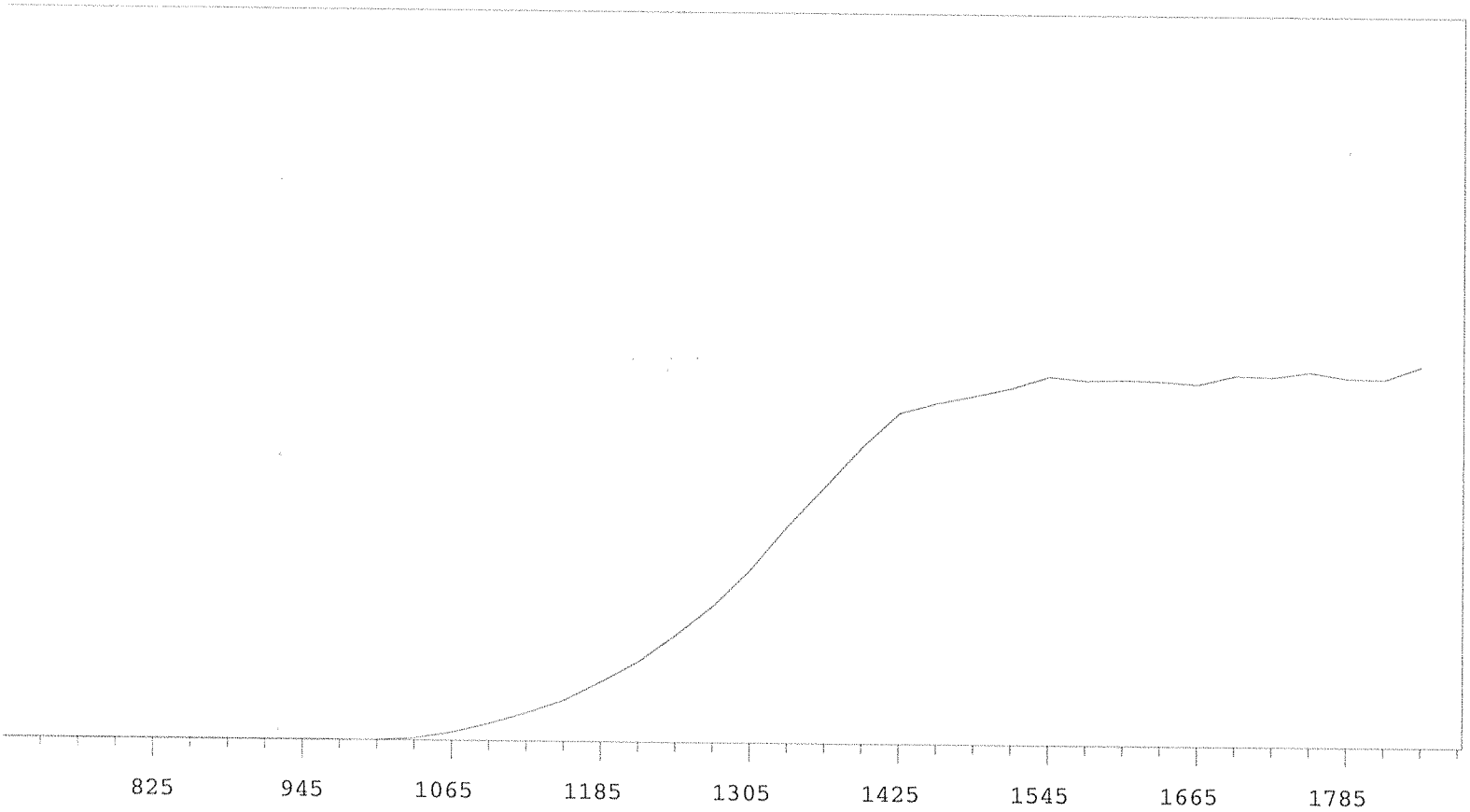


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	1	>100
1005	6	>100
1035	57	>100
1065	225	>100
1095	562	>100
1125	966	>100
1155	1494	>100
1185	2158	>100
1215	2867	+94.78
1245	3933	+87.94
1275	5000	+80.89

VOLTS	COUNTS	%/100 Volts
1305	6485	+72.12
1335	7960	+65.10
1365	9585	+53.45
1395	11333	+41.32
1425	12468	+27.96
1455	13292	+15.98
1485	13667	+8.74
1515	13830	+4.75
1545	13962	+3.68
1575	14126	+2.33
1605	14291	+0.79
1635	14157	+0.76
1665	14115	+0.66
1695	14377	+1.43
1725	14323	+2.74
1755	14359	+3.97
1785	14714	+5.96
1815	15049	+58.93
1845	15296	

MPC 9600 Plateau Instrument 5 MPC 9604 Detector B 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

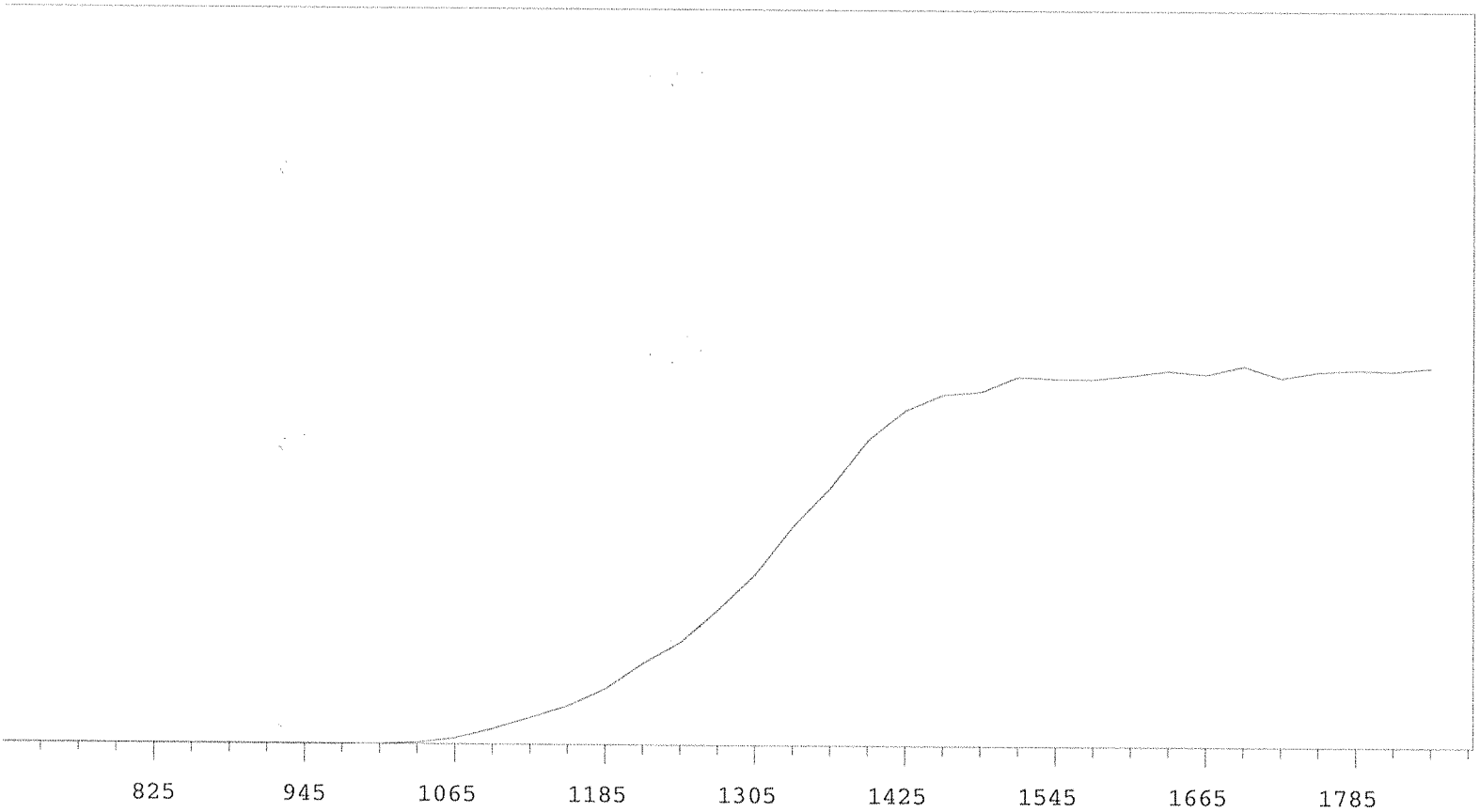


VOLTS	COUNTS	%/100 Volts
705	1	
735	1	
765	1	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	3	>100
1005	16	>100
1035	95	>100
1065	332	>100
1095	695	>100
1125	1131	>100
1155	1639	>100
1185	2374	>100
1215	3186	+92.75
1245	4237	+84.15
1275	5389	+79.03

VOLTS	COUNTS	%/100 Volts
1305	6831	+71.04
1335	8580	+62.44
1365	10138	+51.78
1395	11727	+37.26
1425	13080	+24.15
1455	13481	+13.62
1485	13767	+8.54
1515	14087	+6.23
1545	14543	+3.90
1575	14406	+1.19
1605	14441	-1.23
1635	14394	+0.70
1665	14283	+1.29
1695	14636	+2.59
1725	14600	+1.64
1755	14800	-0.62
1785	14559	+1.39
1815	14520	+78.54
1845	15046	

MPC 9600 Plateau Instrument 5 MPC 9604 Detector C 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

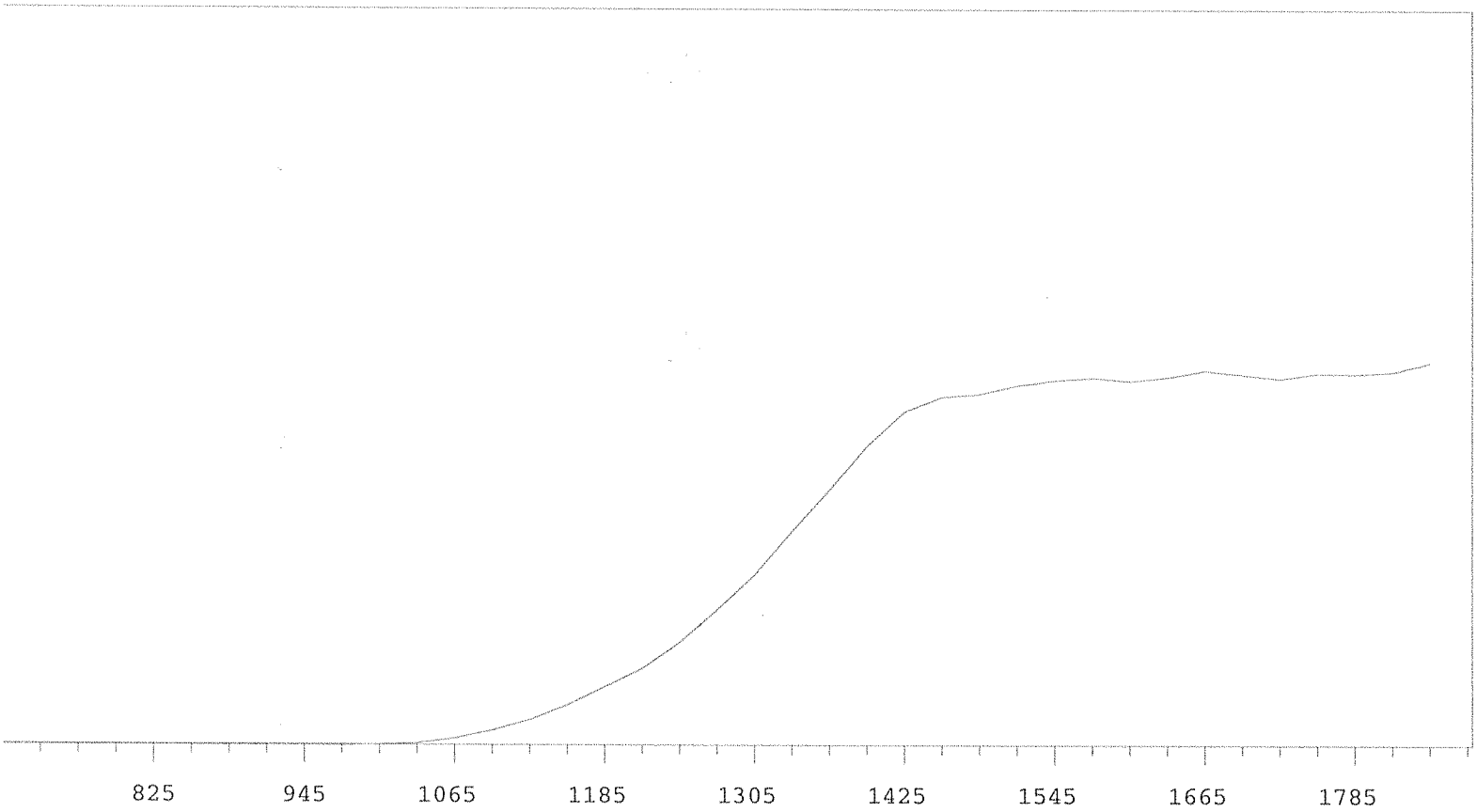


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	+0.00
825	0	>100
855	1	+0.00
885	0	+83.33
915	0	>100
945	1	>100
975	3	>100
1005	8	>100
1035	59	>100
1065	212	>100
1095	524	>100
1125	912	>100
1155	1304	>100
1185	1873	>100
1215	2732	+95.96
1245	3431	+86.17
1275	4513	+79.88

VOLTS	COUNTS	%/100 Volts
1305	5700	+73.51
1335	7262	+65.01
1365	8553	+53.56
1395	10141	+38.96
1425	11137	+24.85
1455	11669	+14.29
1485	11759	+7.77
1515	12273	+4.21
1545	12211	+2.96
1575	12203	+1.51
1605	12333	+1.67
1635	12491	+2.52
1665	12376	+0.07
1695	12650	-0.37
1725	12267	+0.40
1755	12476	-0.07
1785	12537	+1.92
1815	12501	+92.27
1845	12613	

MPC 9600 Plateau Instrument 5 MPC 9604 Detector D 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

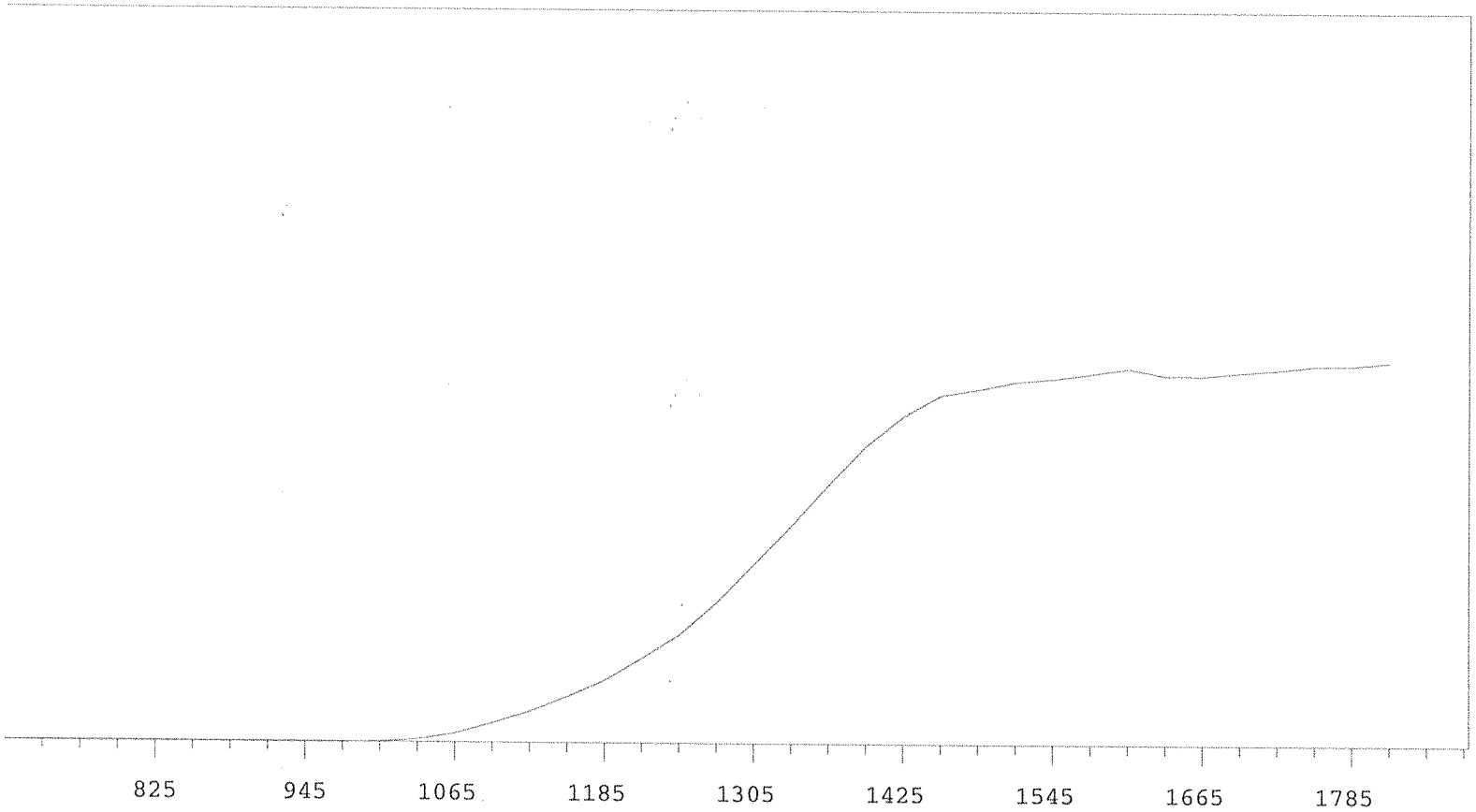


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	-83.33
795	1	+0.00
825	0	+83.33
855	0	-83.33
885	1	>100
915	0	>100
945	1	>100
975	1	>100
1005	13	>100
1035	65	>100
1065	255	>100
1095	556	>100
1125	960	>100
1155	1531	>100
1185	2225	>100
1215	2917	+94.37
1245	3906	+86.39
1275	5141	+81.41

VOLTS	COUNTS	%/100 Volts
1305	6466	+72.73
1335	8122	+63.87
1365	9686	+53.79
1395	11340	+39.81
1425	12644	+25.32
1455	13213	+13.76
1485	13323	+7.11
1515	13650	+4.90
1545	13848	+3.16
1575	13950	+1.49
1605	13824	+1.87
1635	13972	+1.53
1665	14228	+0.67
1695	14070	-0.01
1725	13916	-0.48
1755	14126	+0.97
1785	14099	+3.05
1815	14183	-81.41
1845	14536	

MPC 9600 Plateau Instrument 6 MPC 9604 Detector A 6/15/2017

Alpha Volts: 1455 Beta Volts: 1455

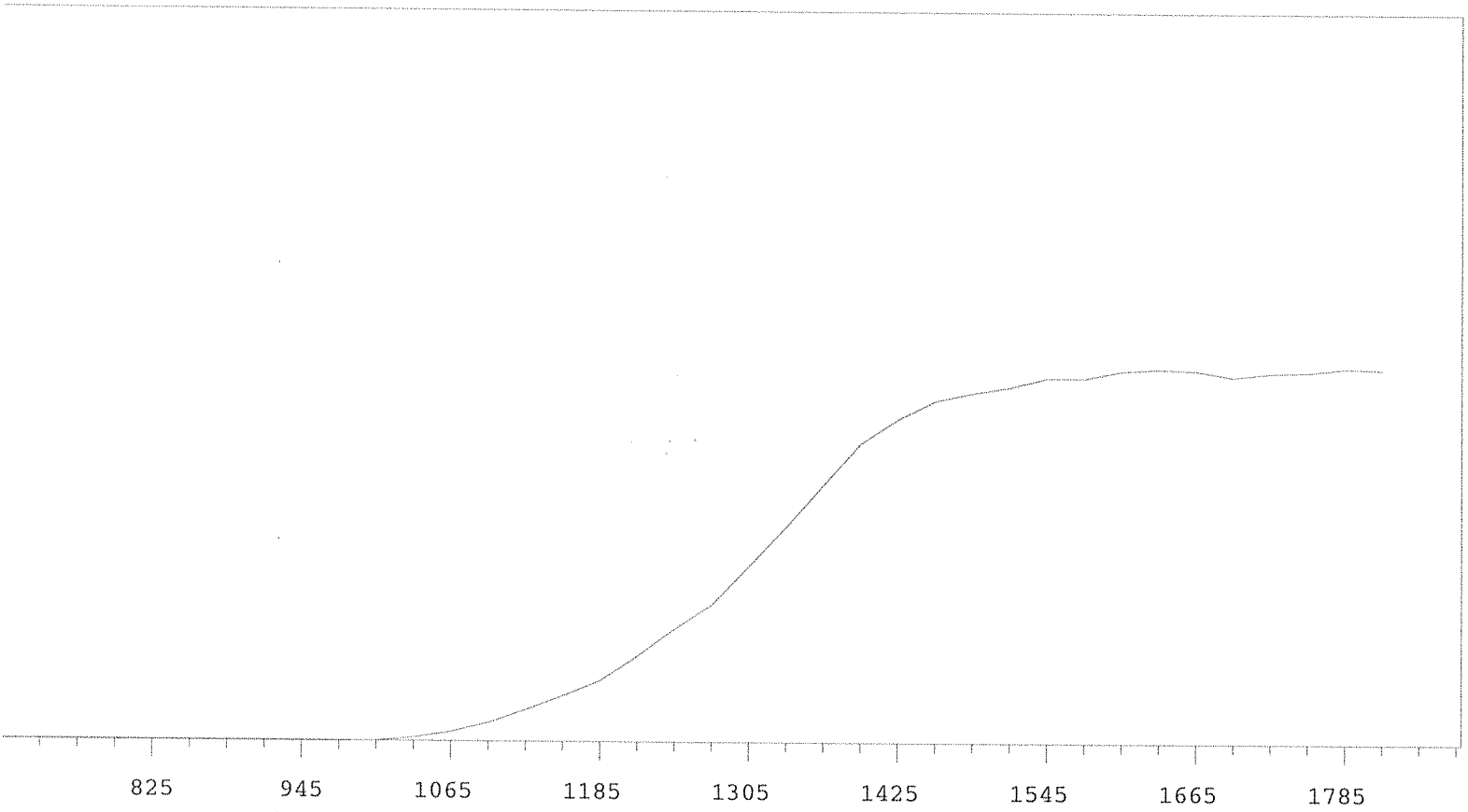


VOLTS	COUNTS	%/100 Volts
705	1	
735	2	
765	1	-27.78
795	1	+0.00
825	1	-33.33
855	2	>100
885	0	-83.33
915	0	+83.33
945	1	>100
975	3	>100
1005	22	>100
1035	116	>100
1065	330	>100
1095	720	>100
1125	1158	>100
1155	1701	>100
1185	2311	+96.48
1215	3127	+89.12
1245	4006	+84.49
1275	5232	+77.58

VOLTS	COUNTS	%/100 Volts
1305	6669	+70.16
1335	8114	+60.16
1365	9652	+48.95
1395	11098	+37.74
1425	12185	+25.21
1455	12962	+15.24
1485	13188	+8.44
1515	13473	+5.05
1545	13585	+4.60
1575	13779	+2.16
1605	13974	+0.46
1635	13722	-0.32
1665	13708	+0.11
1695	13845	+2.33
1725	13936	+2.49
1755	14092	+2.26
1785	14106	-81.98
1815	14237	

MPC 9600 Plateau Instrument 6 MPC 9604 Detector B 6/15/2017

Alpha Volts: 1455 Beta Volts: 1455

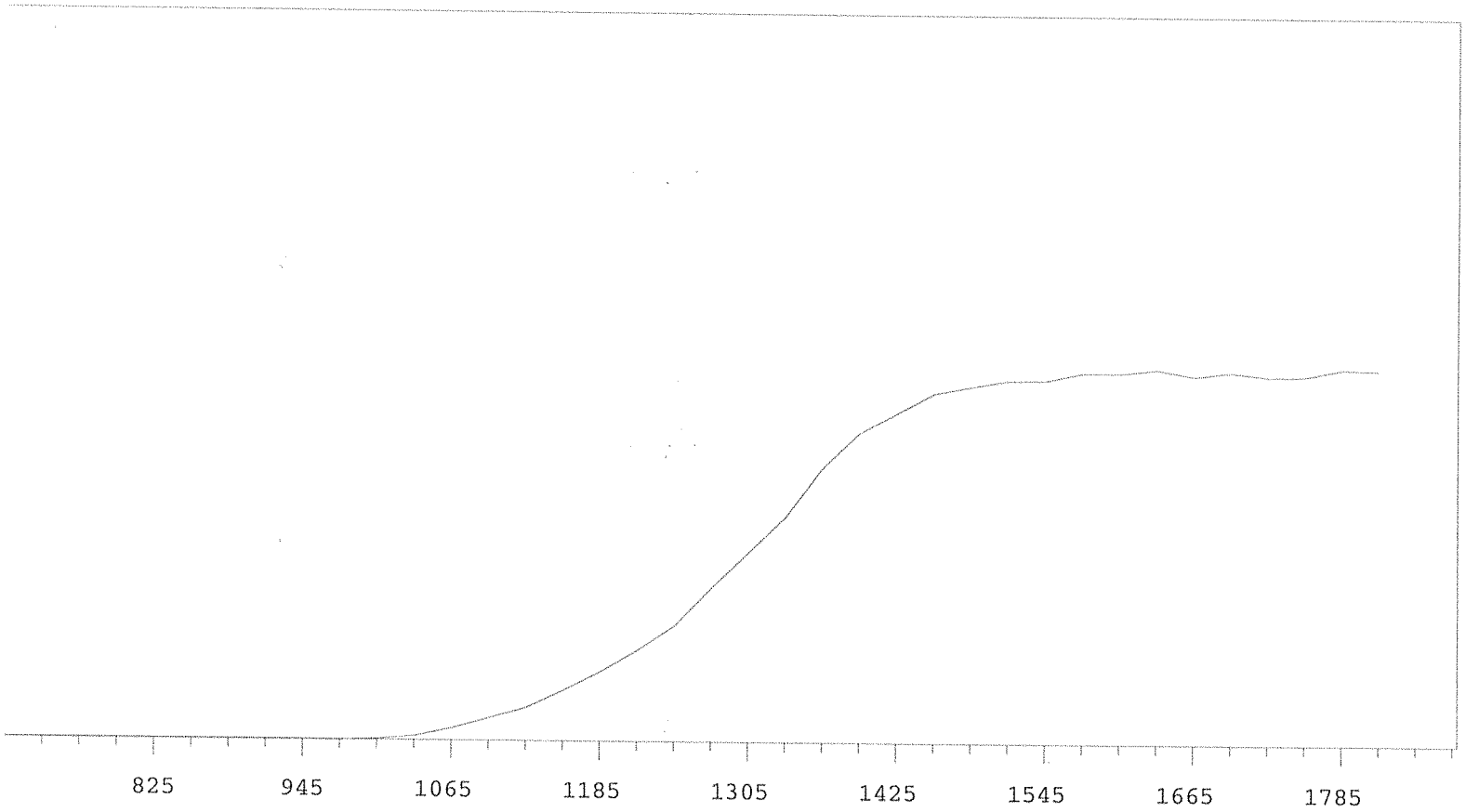


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	+0.00
915	0	>100
945	0	>100
975	3	>100
1005	15	>100
1035	141	>100
1065	364	>100
1095	723	>100
1125	1218	>100
1155	1767	>100
1185	2350	>100
1215	3296	+88.41
1245	4354	+81.87
1275	5289	+73.91

VOLTS	COUNTS	%/100 Volts
1305	6772	+67.97
1335	8297	+62.13
1365	9910	+49.54
1395	11506	+36.86
1425	12438	+24.13
1455	13148	+13.99
1485	13466	+9.38
1515	13688	+5.81
1545	14048	+4.99
1575	14050	+4.06
1605	14326	+2.22
1635	14408	+0.32
1665	14344	-0.97
1695	14110	-0.65
1725	14268	+1.02
1755	14306	+1.89
1785	14465	>100
1815	14418	

MPC 9600 Plateau Instrument 6 MPC 9604 Detector C 6/15/2017

Alpha Volts: 1455 Beta Volts: 1455

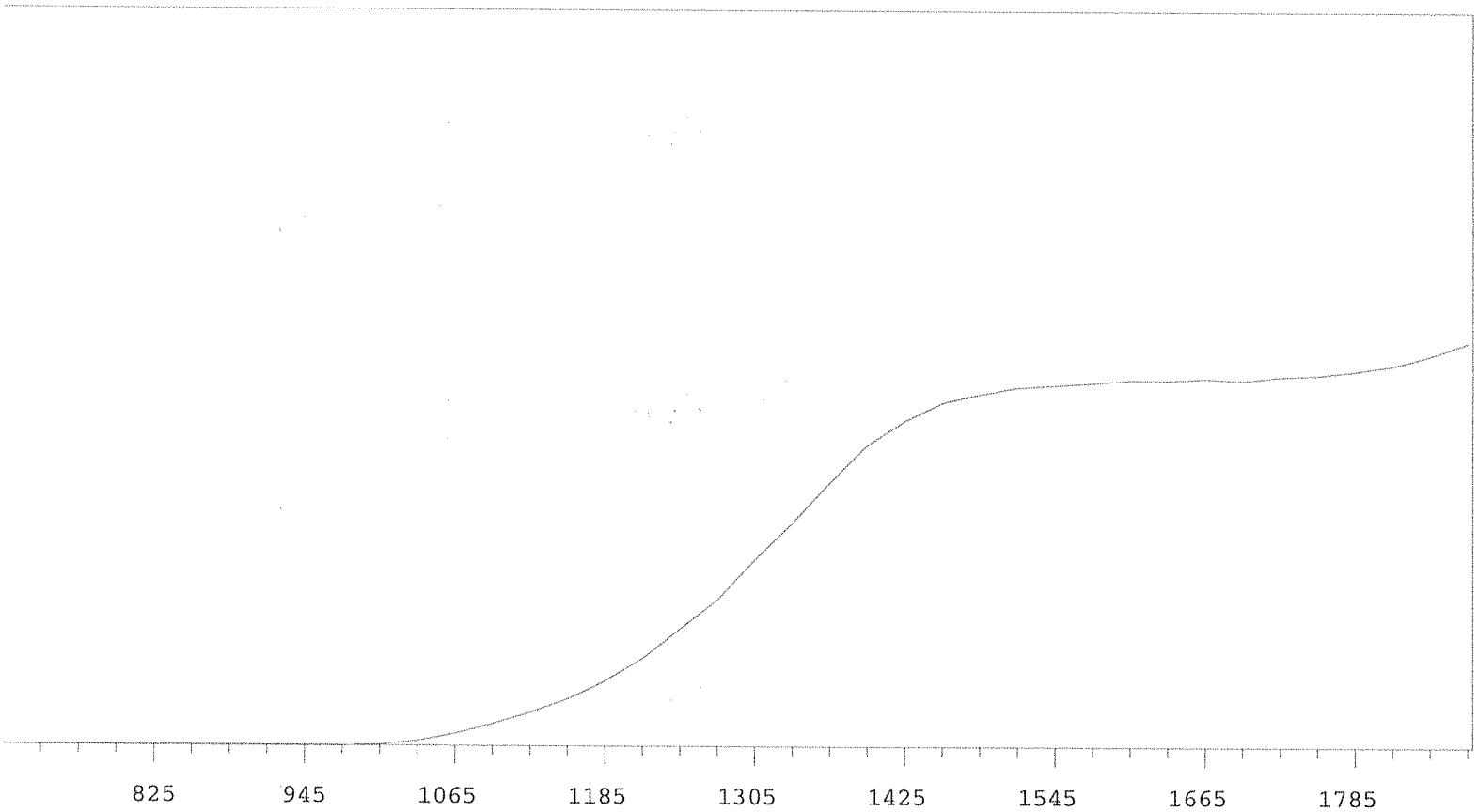


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	+0.00
795	0	+83.33
825	0	-83.33
855	1	+0.00
885	0	+83.33
915	0	+55.56
945	1	>100
975	1	>100
1005	42	>100
1035	134	>100
1065	407	>100
1095	742	>100
1125	1094	>100
1155	1670	>100
1185	2286	+94.95
1215	3004	+87.43
1245	3805	+81.53
1275	5062	+73.67

VOLTS	COUNTS	%/100 Volts
1305	6248	+67.92
1335	7429	+57.72
1365	9062	+45.88
1395	10243	+34.10
1425	10878	+21.00
1455	11550	+13.03
1485	11780	+7.76
1515	11999	+4.61
1545	12008	+3.37
1575	12261	+2.89
1605	12259	+1.28
1635	12401	+0.09
1665	12172	-0.69
1695	12322	-1.14
1725	12172	+1.13
1755	12191	+1.22
1785	12445	>100
1815	12411	

MPC 9600 Plateau Instrument 6 MPC 9604 Detector D 7/1/2009

Alpha Volts: 1455 Beta Volts: 1455

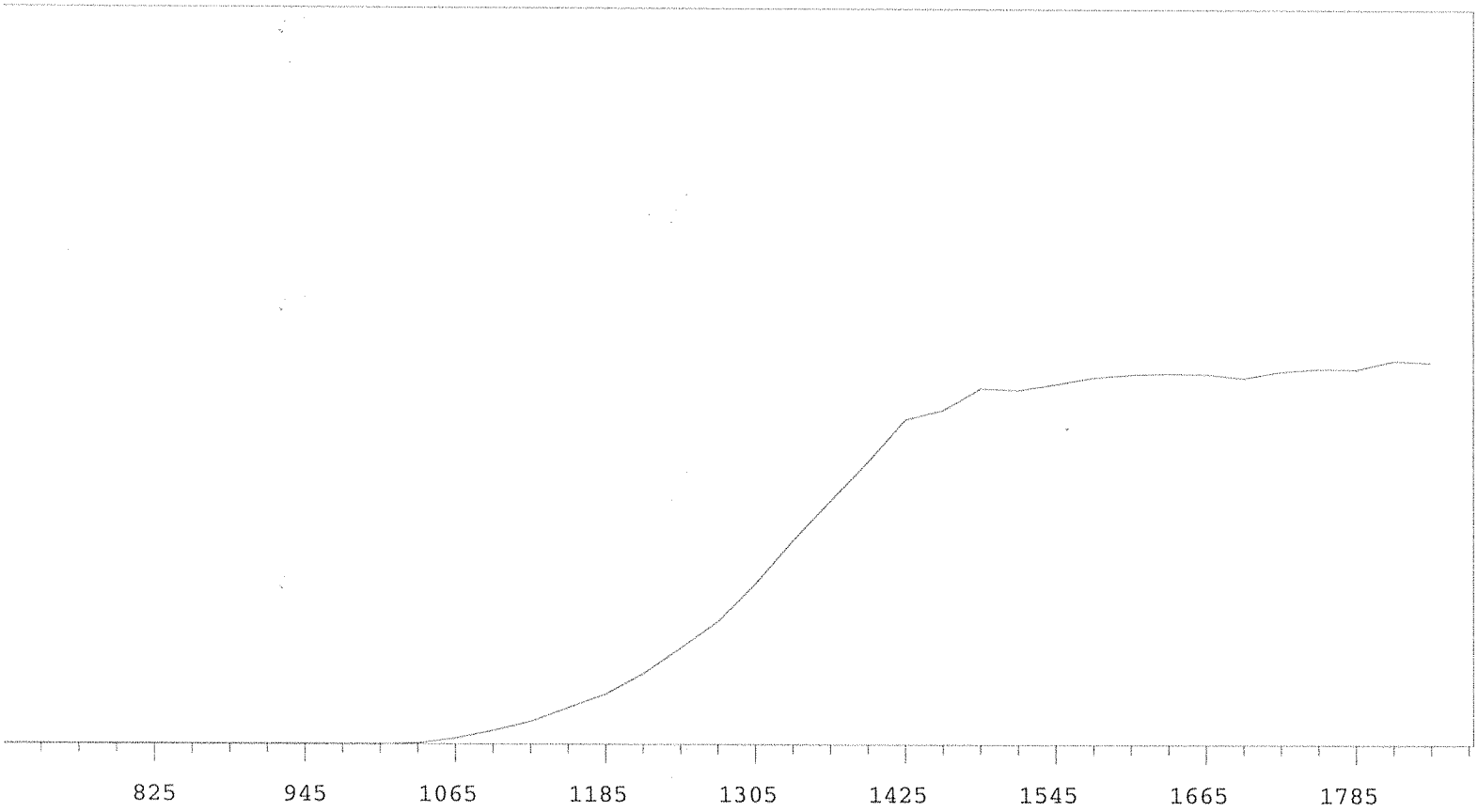


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	1	+0.00
825	0	>100
855	0	+0.00
885	0	>100
915	1	>100
945	0	>100
975	14	>100
1005	109	>100
1035	481	>100
1065	1177	>100
1095	2133	>100
1125	3243	>100
1155	4554	>100
1185	6285	+98.38
1215	8468	+89.75
1245	11266	+83.13
1275	14088	+74.43

VOLTS	COUNTS	%/100 Volts
1305	17954	+65.82
1335	21482	+57.64
1365	25373	+45.78
1395	29042	+34.80
1425	31373	+23.29
1455	33143	+14.25
1485	34006	+8.49
1515	34662	+4.71
1545	34892	+3.14
1575	35129	+1.86
1605	35411	+1.49
1635	35380	+0.62
1665	35554	+0.65
1695	35385	+1.18
1725	35755	+1.89
1755	35907	+3.26
1785	36305	+4.62
1815	36870	+6.98
1845	37807	
1875	39047	

MPC 9600 Plateau Instrument 7 MPC 9604 Detector A 6/15/2017

Alpha Volts: 1545 Beta Volts: 1545

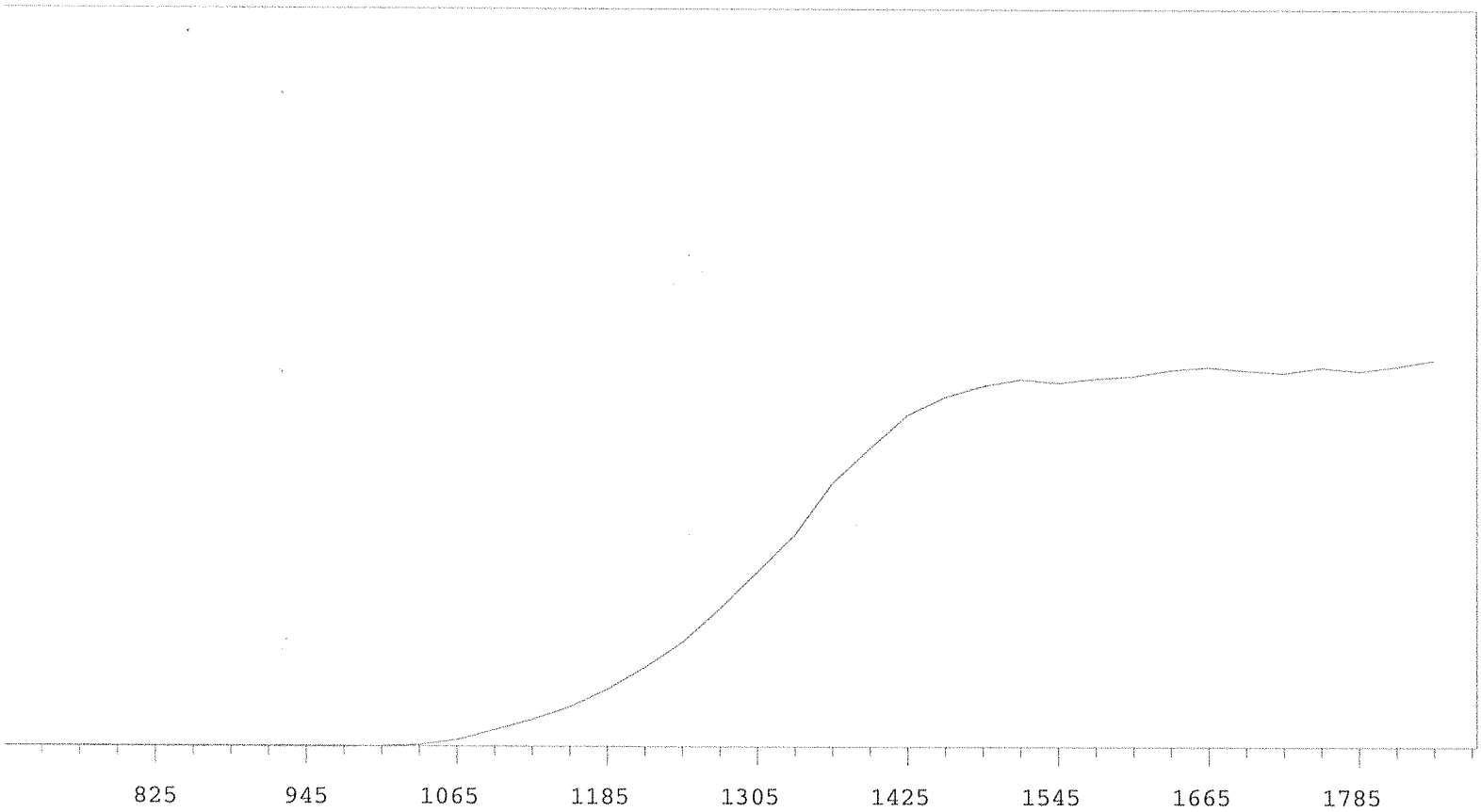


VOLTS	COUNTS	%/100 Volts
705	1	
735	1	
765	2	-33.33
795	0	>100
825	1	+55.56
855	0	>100
885	3	+71.43
915	1	+62.50
945	2	-16.67
975	2	>100
1005	2	>100
1035	49	>100
1065	228	>100
1095	526	>100
1125	869	>100
1155	1381	>100
1185	1909	>100
1215	2680	+96.74
1245	3646	+90.59
1275	4654	+84.23

VOLTS	COUNTS	%/100 Volts
1305	6076	+75.72
1335	7728	+66.18
1365	9226	+55.89
1395	10700	+40.99
1425	12309	+29.94
1455	12658	+17.67
1485	13491	+8.75
1515	13426	+6.54
1545	13645	+3.71
1575	13898	+3.94
1605	14017	+2.22
1635	14057	-0.03
1665	14030	+0.15
1695	13885	+1.13
1725	14135	+1.72
1755	14244	+3.29
1785	14215	+2.31
1815	14547	
1845	14480	

MPC 9600 Plateau Instrument 7 MPC 9604 Detector B 6/15/2017

Alpha Volts: 1545 Beta Volts: 1545

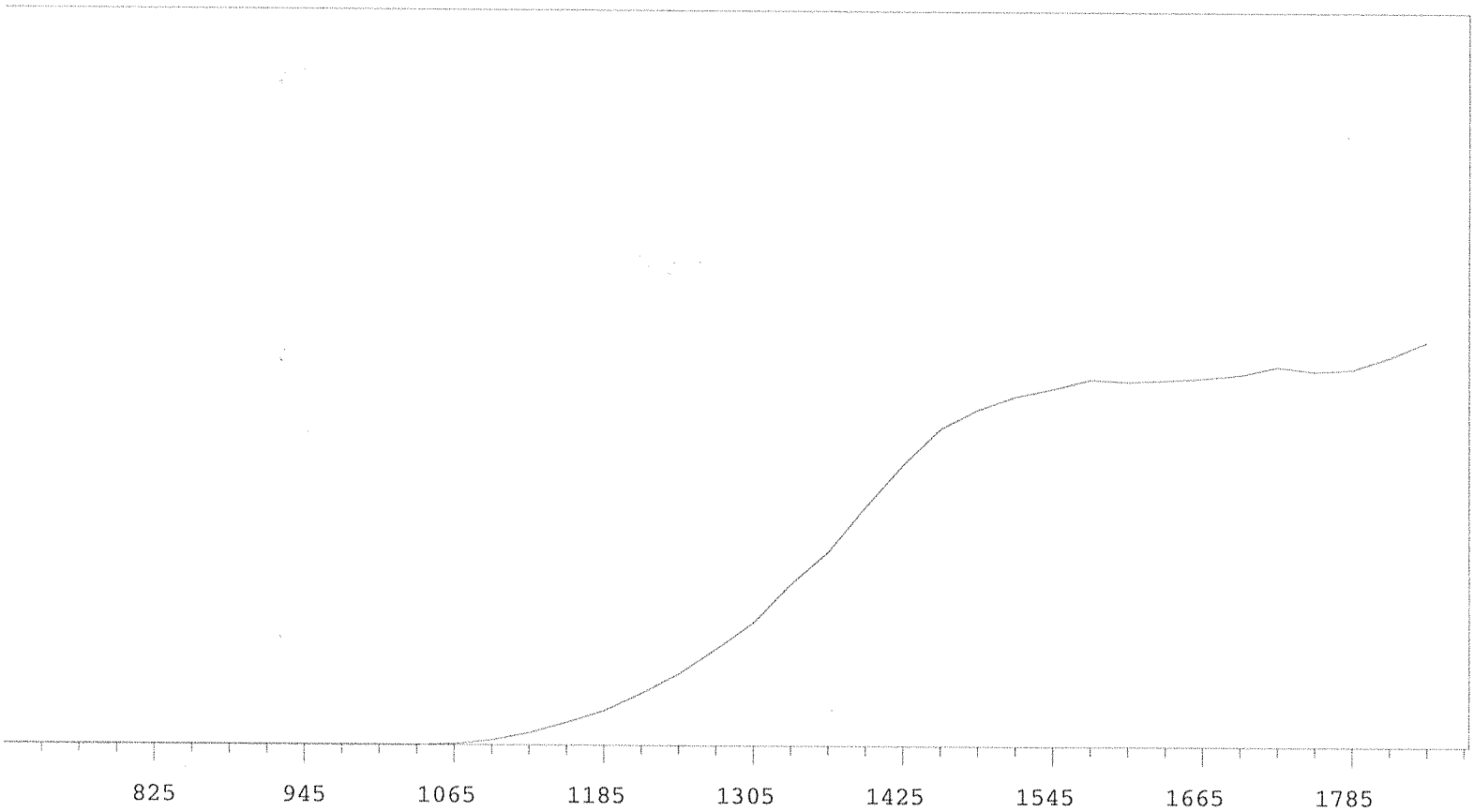


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	1	
795	0	>100
825	0	+0.00
855	0	>100
885	1	+0.00
915	0	+83.33
945	0	>100
975	1	>100
1005	14	>100
1035	66	>100
1065	256	>100
1095	653	>100
1125	1057	>100
1155	1543	>100
1185	2233	>100
1215	3076	+96.48
1245	4052	+87.79
1275	5333	+78.59

VOLTS	COUNTS	%/100 Volts
1305	6753	+72.78
1335	8185	+62.49
1365	10153	+51.84
1395	11491	+39.19
1425	12777	+25.54
1455	13466	+16.34
1485	13900	+7.78
1515	14154	+3.76
1545	14027	+1.91
1575	14190	+2.34
1605	14287	+3.56
1635	14523	+2.25
1665	14626	+0.53
1695	14508	-0.08
1725	14410	-0.45
1755	14614	+0.89
1785	14476	+2.41
1815	14670	+82.56
1845	14910	

MPC 9600 Plateau Instrument 7 MPC 9604 Detector C 6/15/2017

Alpha Volts: 1545 Beta Volts: 1545

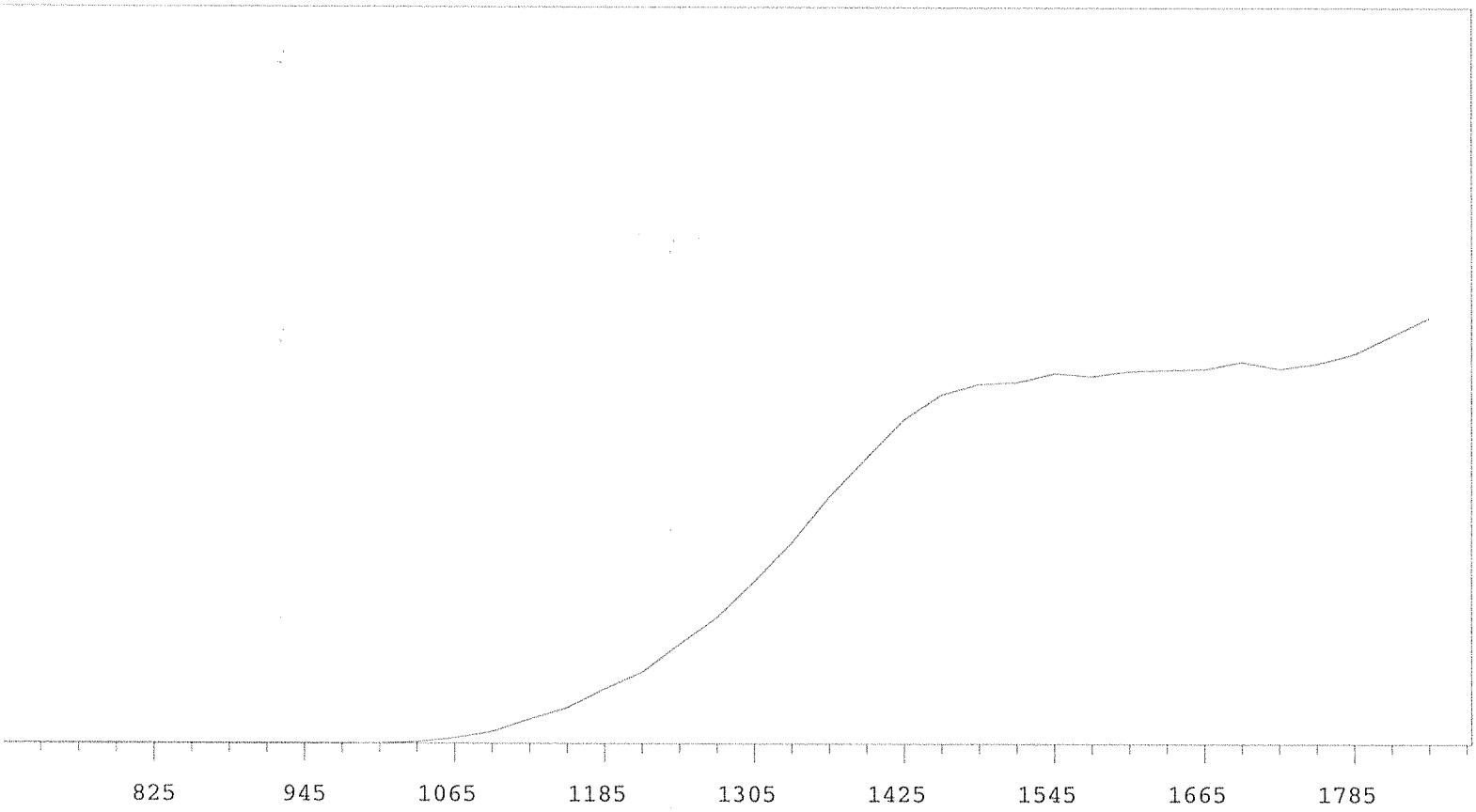


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	1	>100
855	0	+0.00
885	1	+0.00
915	0	+0.00
945	1	>100
975	0	>100
1005	0	>100
1035	4	>100
1065	35	>100
1095	169	>100
1125	413	>100
1155	767	>100
1185	1153	>100
1215	1726	>100
1245	2367	+97.13
1275	3187	+89.17

VOLTS	COUNTS	%/100 Volts
1305	4064	+79.76
1335	5341	+72.84
1365	6401	+65.60
1395	7894	+55.60
1425	9277	+44.27
1455	10472	+30.27
1485	11108	+18.85
1515	11546	+11.68
1545	11806	+7.00
1575	12122	+3.77
1605	12052	+1.97
1635	12098	+1.28
1665	12174	+3.28
1695	12294	+2.70
1725	12556	+1.95
1755	12405	+2.93
1785	12480	+5.62
1815	12883	
1845	13391	

MPC 9600 Plateau Instrument 7 MPC 9604 Detector D 6/15/2017

Alpha Volts: 1545 Beta Volts: 1545

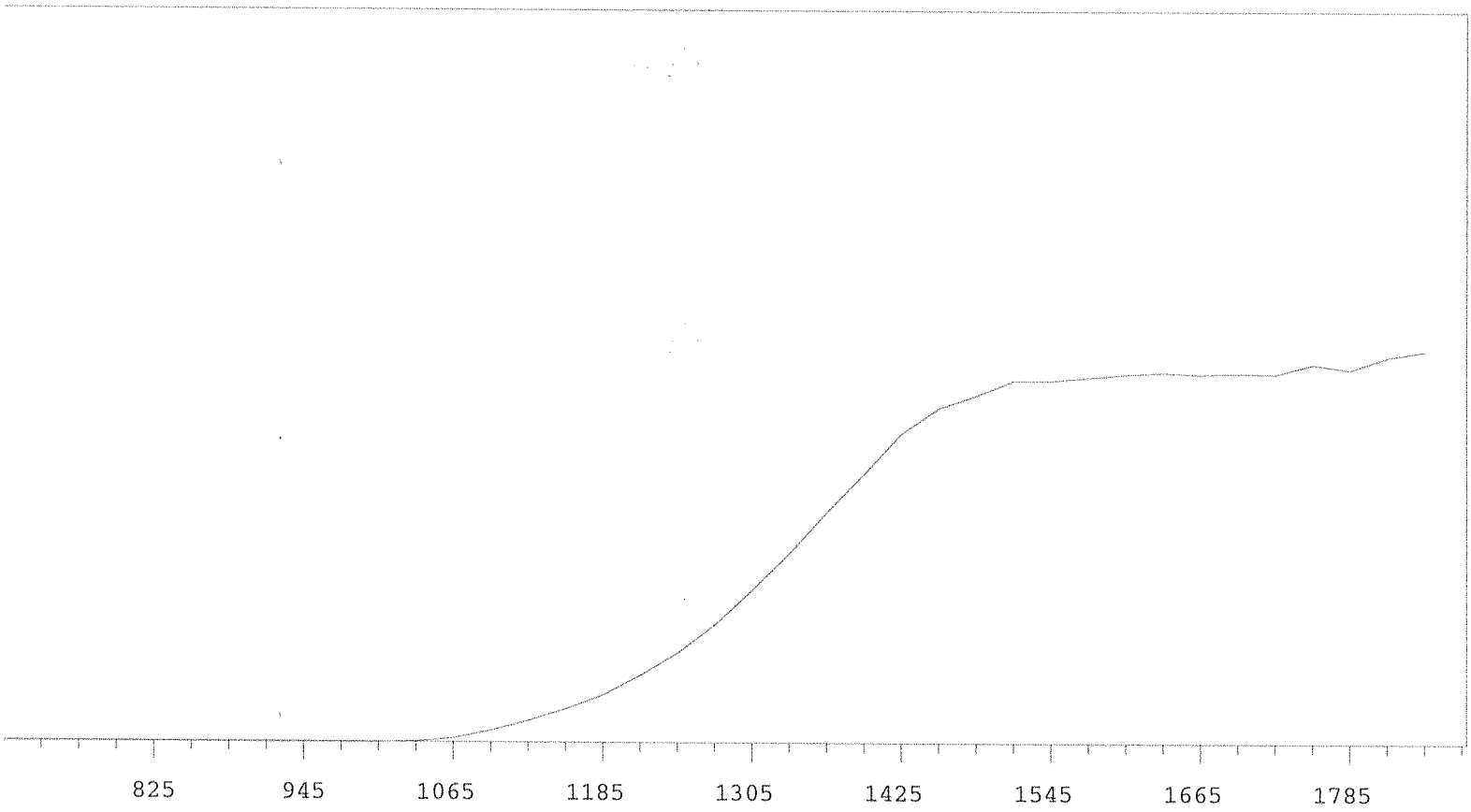


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	1	>100
855	0	+0.00
885	1	>100
915	0	>100
945	0	>100
975	0	>100
1005	6	>100
1035	61	>100
1065	205	>100
1095	444	>100
1125	898	>100
1155	1308	>100
1185	2006	>100
1215	2606	+96.85
1245	3630	+87.40
1275	4610	+81.49

VOLTS	COUNTS	%/100 Volts
1305	5928	+73.94
1335	7356	+66.14
1365	9036	+56.04
1395	10479	+44.25
1425	11878	+30.64
1455	12775	+18.37
1485	13157	+9.85
1515	13230	+4.41
1545	13560	+2.94
1575	13448	+2.44
1605	13640	+1.35
1635	13684	+2.74
1665	13717	+1.10
1695	13972	+1.08
1725	13722	+2.44
1755	13905	+5.74
1785	14259	+10.92
1815	14922	+71.04
1845	15586	

MPC 9600 Plateau Instrument 8 MPC 9604 Detector A 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

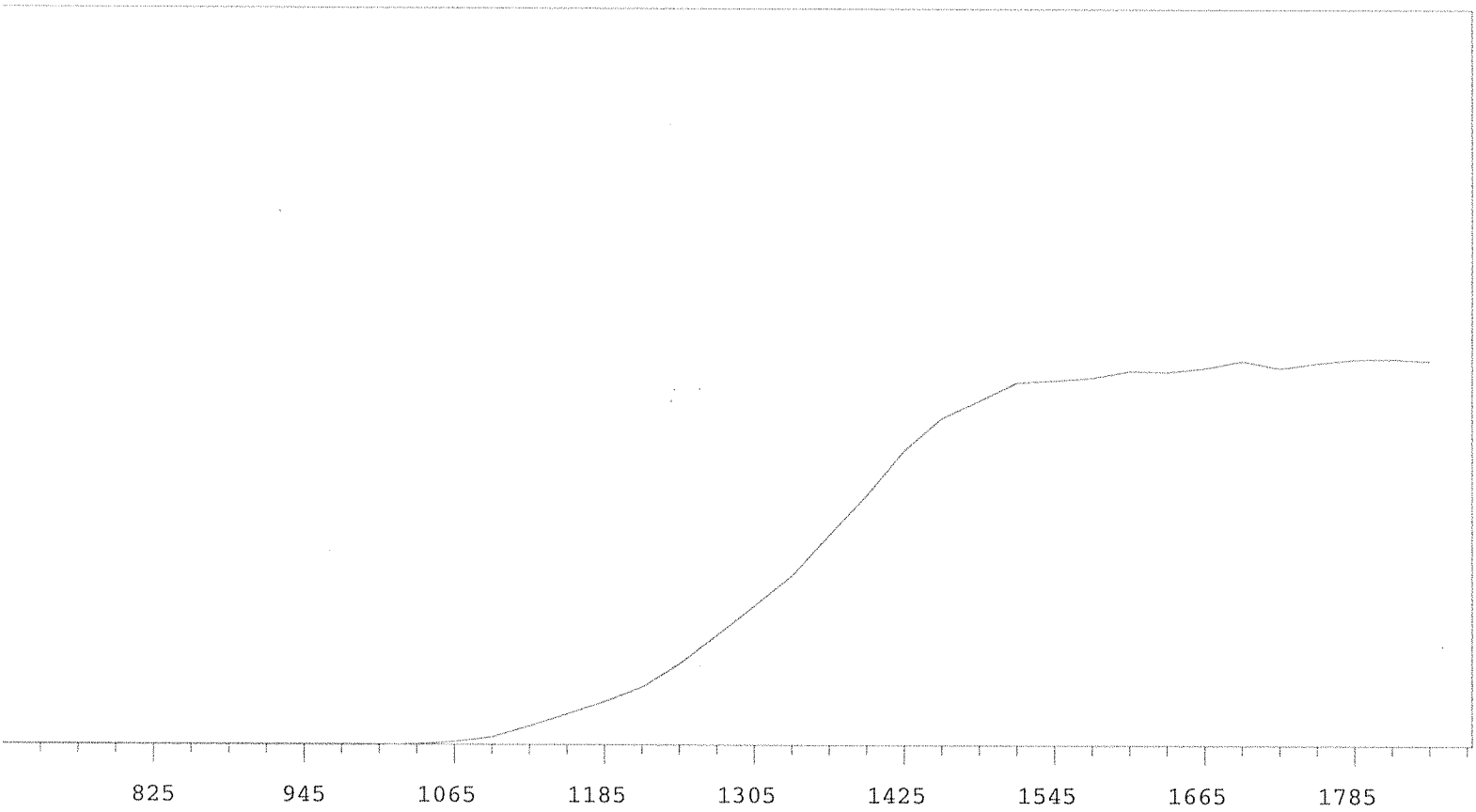


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	
795	0	+0.00
825	1	+0.00
855	0	+0.00
885	1	>100
915	0	+83.33
945	0	>100
975	1	>100
1005	4	>100
1035	43	>100
1065	185	>100
1095	510	>100
1125	934	>100
1155	1454	>100
1185	2042	>100
1215	2888	+98.18
1245	3845	+91.32
1275	5054	+83.14

VOLTS	COUNTS	%/100 Volts
1305	6539	+75.74
1335	8143	+66.31
1365	9910	+57.05
1395	11567	+46.07
1425	13291	+33.37
1455	14369	+22.97
1485	14921	+12.91
1515	15556	+7.19
1545	15551	+4.22
1575	15696	+2.10
1605	15833	+1.64
1635	15910	+0.80
1665	15831	+0.02
1695	15887	+1.54
1725	15850	+1.69
1755	16268	+3.28
1785	16045	+4.72
1815	16584	+76.96
1845	16848	

MPC 9600 Plateau Instrument 8 MPC 9604 Detector B 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

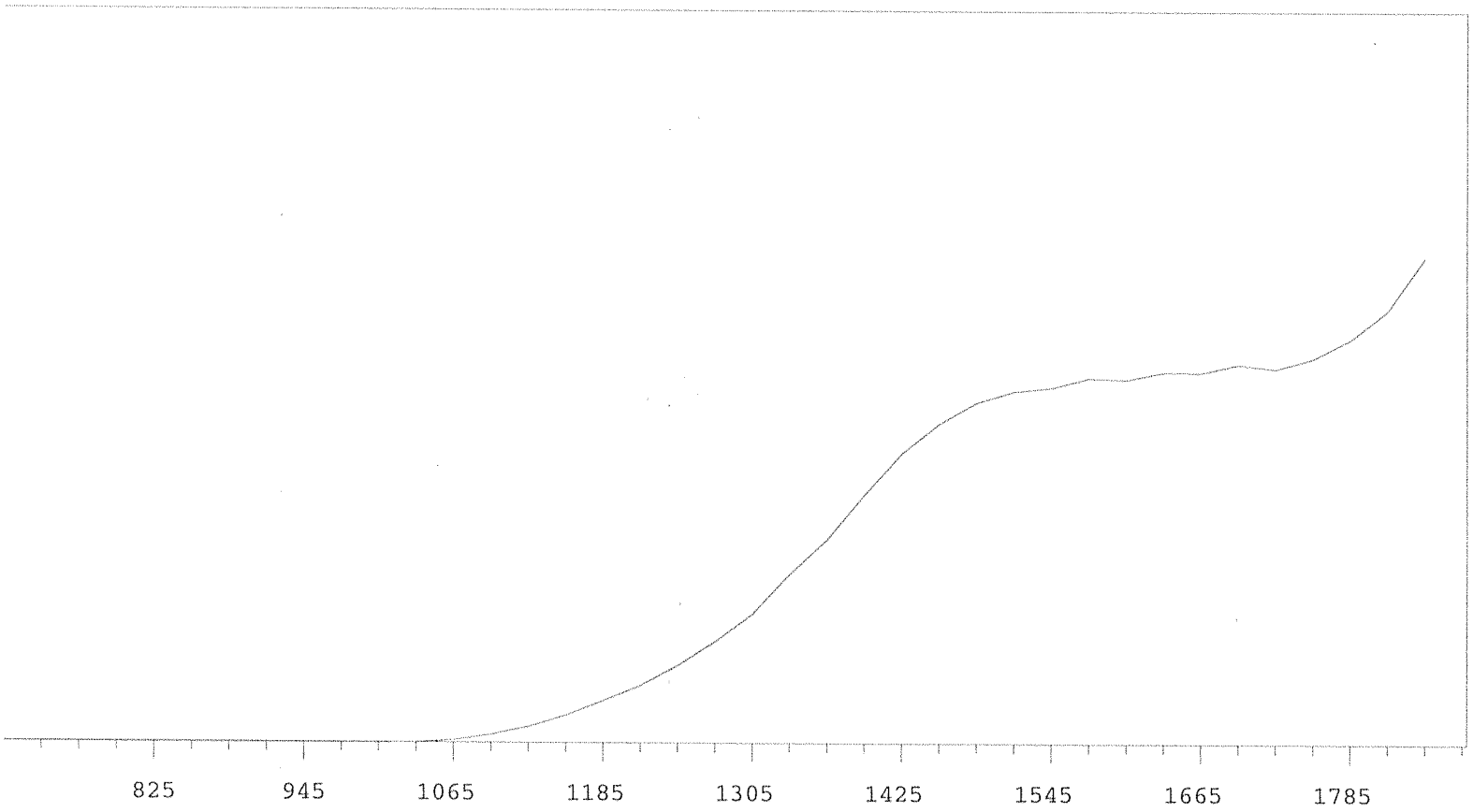


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	2	>100
825	1	-41.67
855	1	>100
885	0	>100
915	0	>100
945	0	>100
975	0	>100
1005	1	>100
1035	25	>100
1065	120	>100
1095	304	>100
1125	743	>100
1155	1212	>100
1185	1685	>100
1215	2250	>100
1245	3164	+94.24
1275	4280	+84.08

VOLTS	COUNTS	%/100 Volts
1305	5419	+74.53
1335	6599	+66.65
1365	8186	+61.47
1395	9739	+53.28
1425	11490	+40.38
1455	12739	+29.06
1485	13418	+17.32
1515	14139	+9.61
1545	14219	+5.97
1575	14324	+2.80
1605	14592	+2.80
1635	14555	+3.31
1665	14712	+1.52
1695	14990	+1.62
1725	14710	+1.38
1755	14914	+1.13
1785	15057	+1.63
1815	15069	+99.35
1845	14997	

MPC 9600 Plateau Instrument 8 MPC 9604 Detector C 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

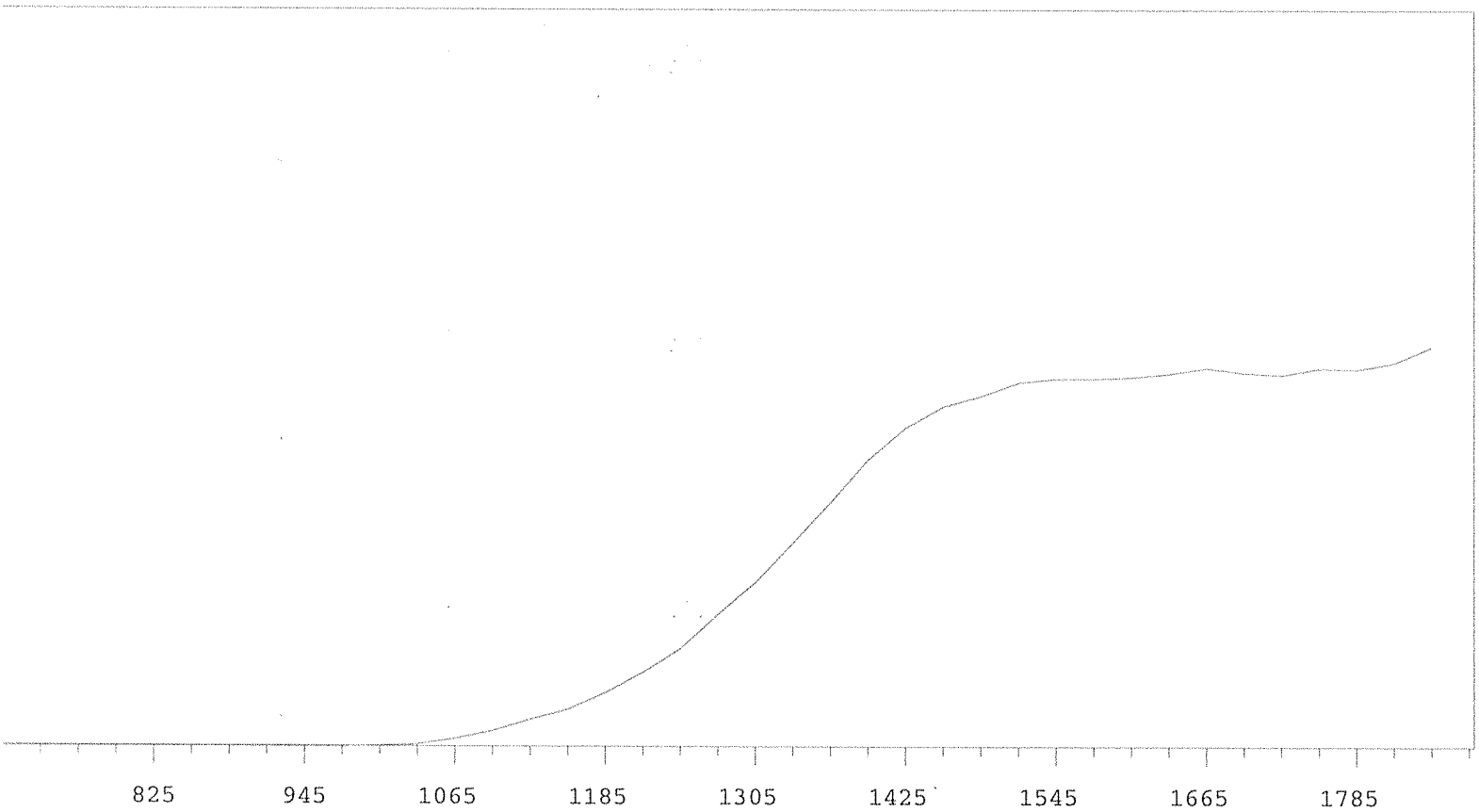


VOLTS	COUNTS	%/100 Volts
705	1	
735	1	
765	0	
795	4	+0.00
825	2	>100
855	0	>100
885	0	>100
915	0	>100
945	1	>100
975	2	>100
1005	4	>100
1035	16	>100
1065	113	>100
1095	334	>100
1125	657	>100
1155	1123	>100
1185	1722	>100
1215	2353	>100
1245	3180	+88.82
1275	4154	+85.12

VOLTS	COUNTS	%/100 Volts
1305	5264	+77.91
1335	6888	+72.05
1365	8310	+64.52
1395	10144	+52.80
1425	11855	+41.41
1455	13080	+28.00
1485	13967	+16.63
1515	14420	+10.28
1545	14573	+5.56
1575	14967	+4.34
1605	14909	+3.32
1635	15217	+3.16
1665	15194	+2.67
1695	15544	+2.81
1725	15356	+6.33
1755	15787	+11.53
1785	16561	+21.58
1815	17742	+94.20
1845	19903	

MPC 9600 Plateau Instrument 8 MPC 9604 Detector D 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

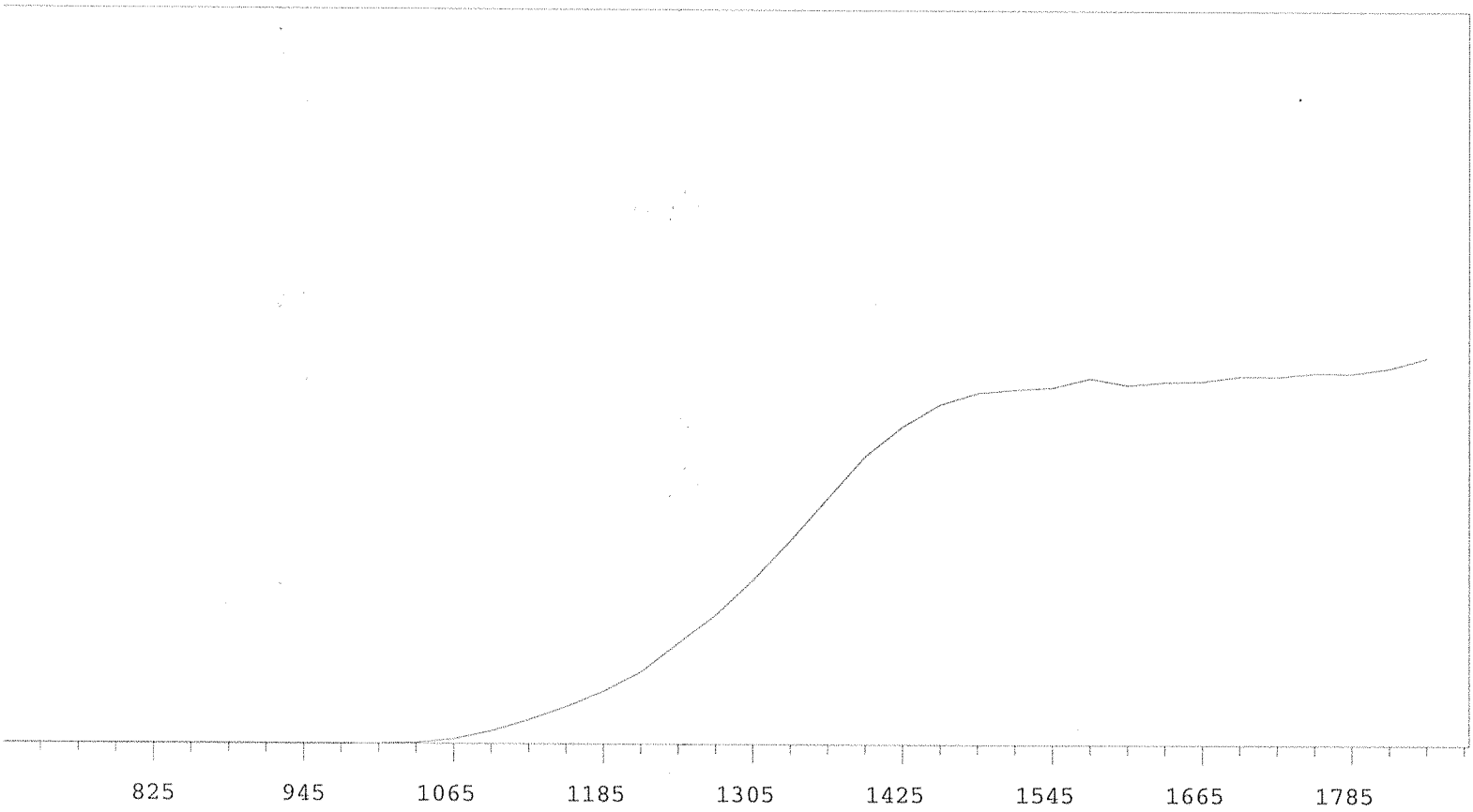


VOLTS	COUNTS	%/100 Volts
705	0	
735	2	
765	1	
795	0	>100
825	0	+55.56
855	1	>100
885	1	>100
915	1	>100
945	2	>100
975	4	>100
1005	25	>100
1035	87	>100
1065	319	>100
1095	622	>100
1125	1092	>100
1155	1496	>100
1185	2175	>100
1215	2991	+98.58
1245	3944	+88.49
1275	5322	+80.24

VOLTS	COUNTS	%/100 Volts
1305	6590	+71.71
1335	8172	+62.71
1365	9795	+53.64
1395	11505	+41.46
1425	12784	+28.66
1455	13628	+18.60
1485	14044	+11.65
1515	14588	+6.82
1545	14742	+3.87
1575	14747	+1.78
1605	14812	+2.43
1635	14948	+1.88
1665	15183	+0.50
1695	14983	+0.38
1725	14907	+0.20
1755	15171	+2.31
1785	15134	+5.43
1815	15394	+93.82
1845	16043	

MPC 9600 Plateau Instrument 9 MPC 9604 Detector A 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

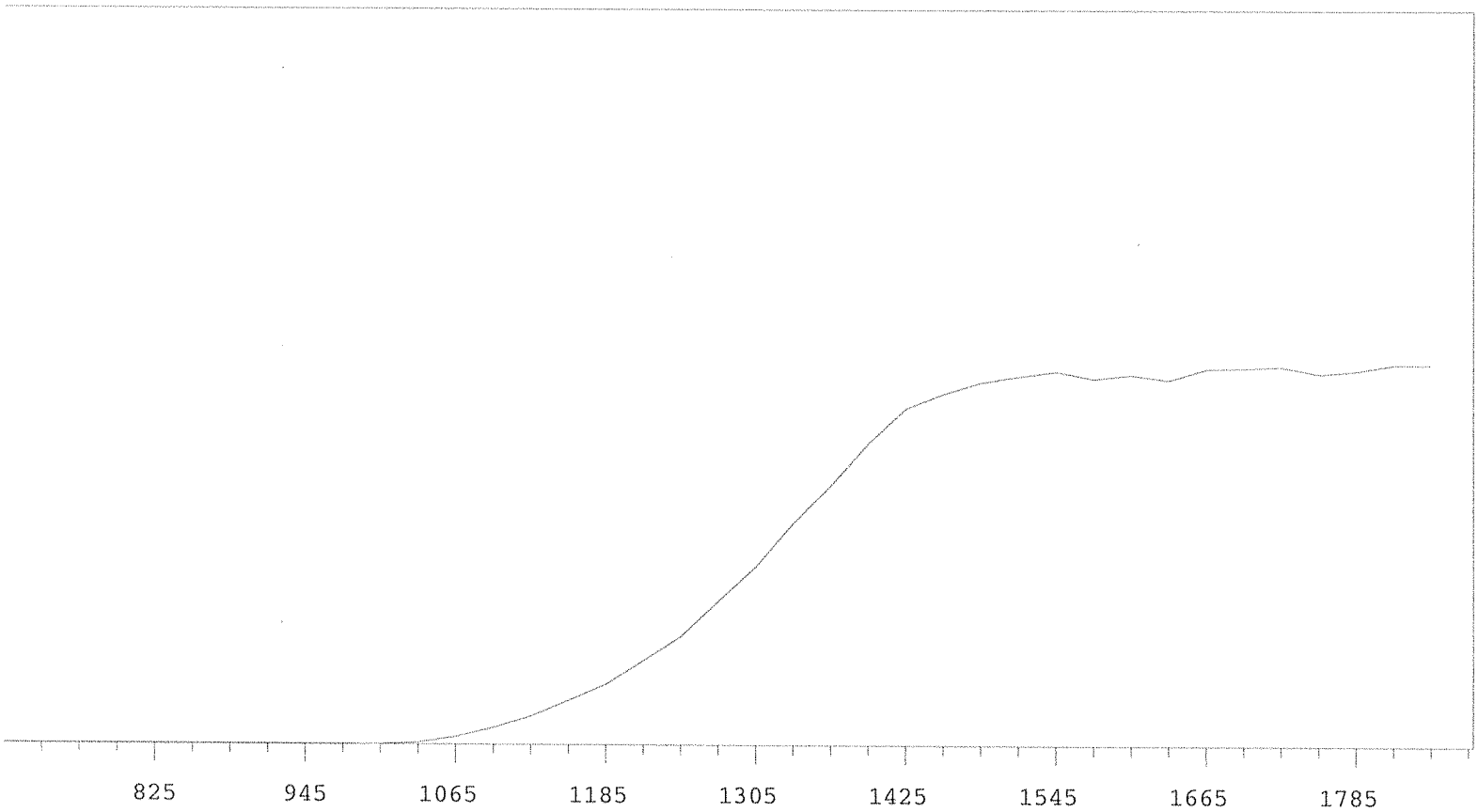


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	1	+0.00
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	0	>100
1005	14	>100
1035	51	>100
1065	196	>100
1095	497	>100
1125	930	>100
1155	1439	>100
1185	2020	>100
1215	2764	+97.68
1245	3861	+89.17
1275	4913	+80.38

VOLTS	COUNTS	%/100 Volts
1305	6242	+71.48
1335	7723	+64.38
1365	9334	+53.42
1395	10926	+41.22
1425	12057	+28.52
1455	12910	+17.07
1485	13354	+9.18
1515	13491	+5.52
1545	13567	+2.61
1575	13918	+1.66
1605	13673	+0.84
1635	13778	+0.77
1665	13811	+2.13
1695	14008	+2.13
1725	14001	+1.75
1755	14129	+1.79
1785	14118	+3.83
1815	14328	+81.44
1845	14721	

MPC 9600 Plateau Instrument 9 MPC 9604 Detector B 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

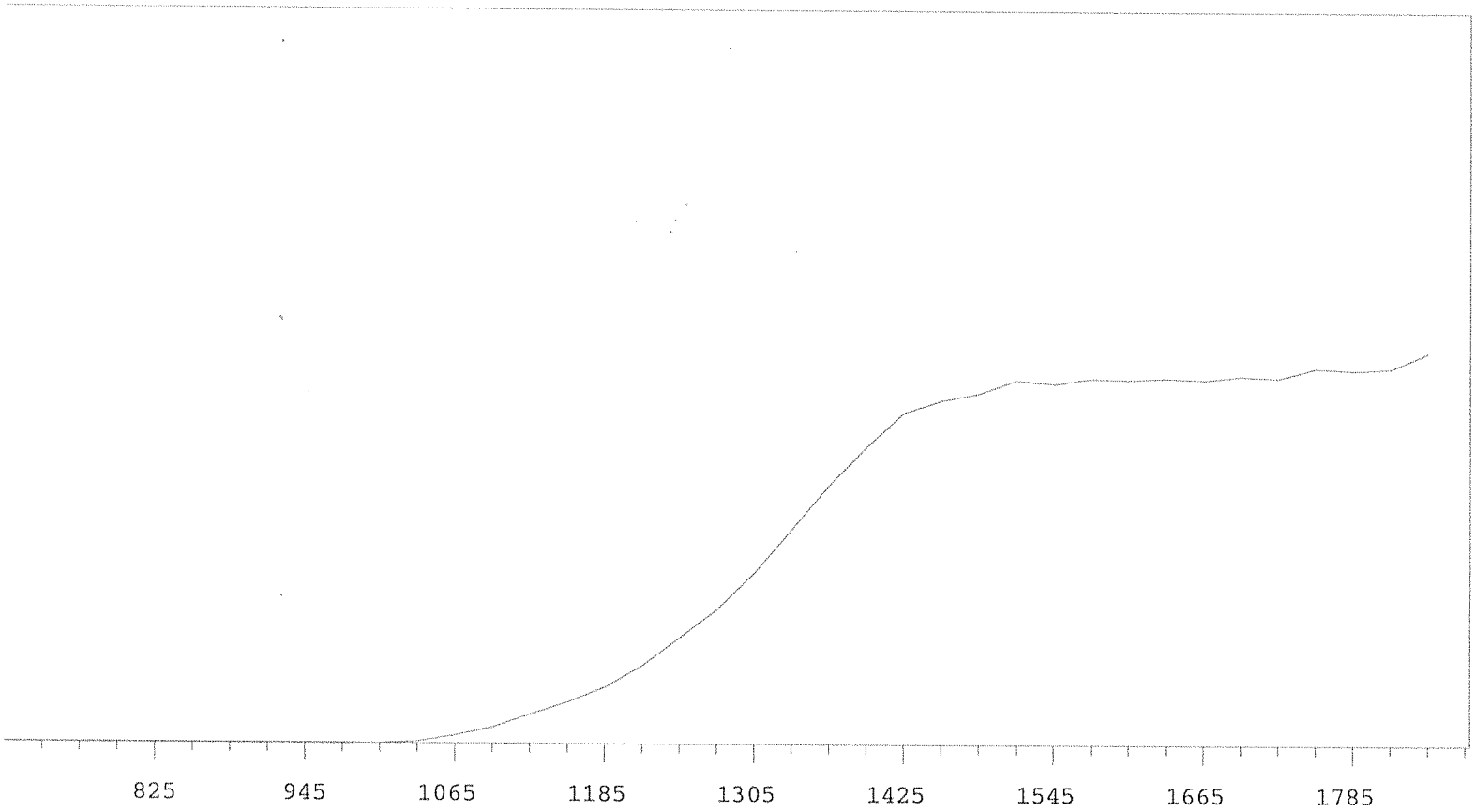


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	1	+41.67
825	1	+0.00
855	1	>100
885	0	-55.56
915	0	+55.56
945	1	>100
975	1	>100
1005	15	>100
1035	81	>100
1065	297	>100
1095	664	>100
1125	1109	>100
1155	1716	>100
1185	2349	>100
1215	3266	+93.15
1245	4210	+85.26
1275	5566	+77.91

VOLTS	COUNTS	%/100 Volts
1305	6901	+69.44
1335	8589	+60.01
1365	10057	+51.08
1395	11695	+38.19
1425	13055	+26.48
1455	13622	+15.48
1485	14058	+8.51
1515	14293	+3.81
1545	14494	+1.23
1575	14212	-0.88
1605	14363	+0.38
1635	14170	+2.50
1665	14596	+2.55
1695	14635	+1.28
1725	14684	-0.87
1755	14405	+0.26
1785	14521	+1.21
1815	14774	+78.82
1845	14765	

MPC 9600 Plateau Instrument 9 MPC 9604 Detector C 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

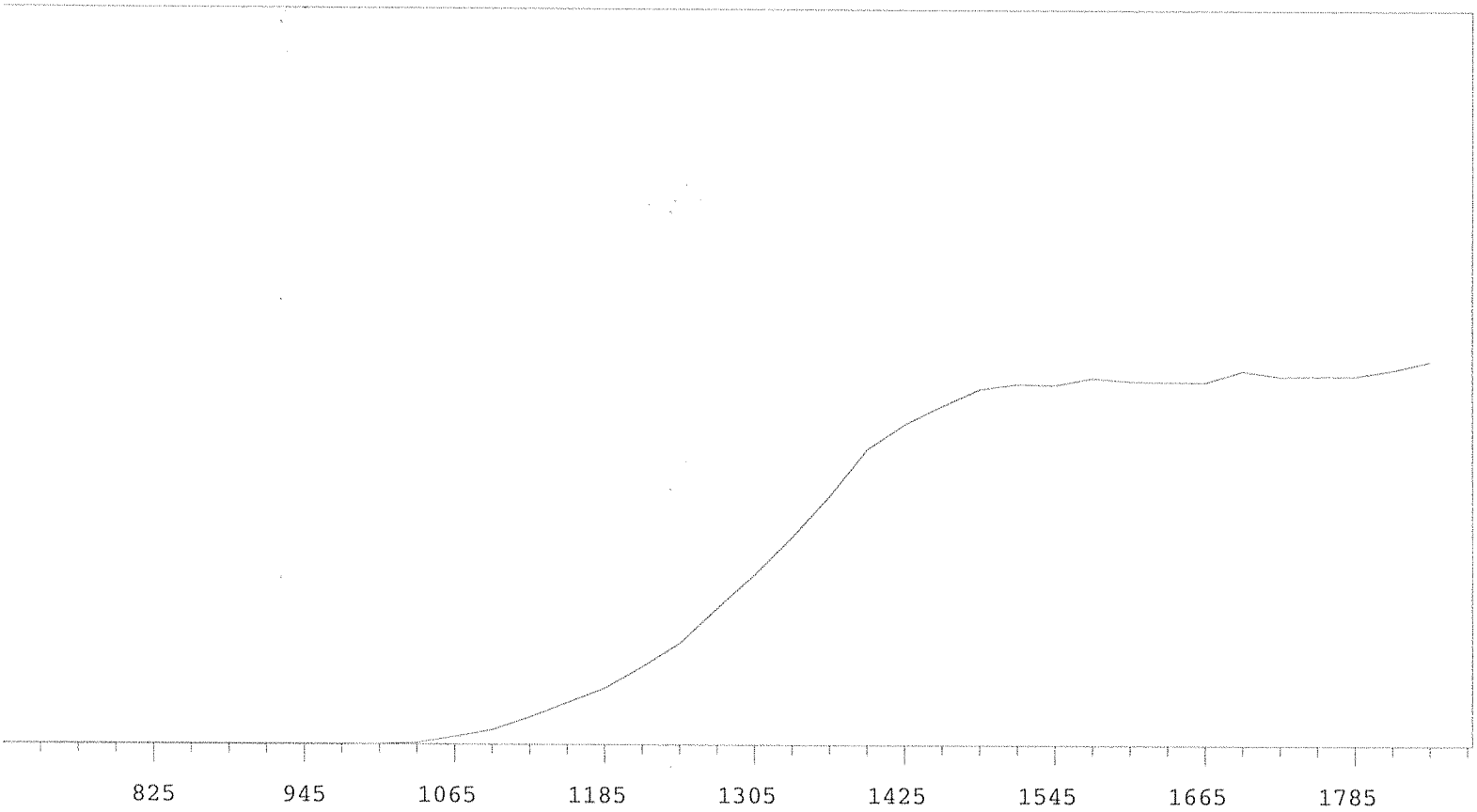


VOLTS	COUNTS	%/100 Volts
705	0	
735	2	
765	1	+33.33
795	1	+0.00
825	1	-33.33
855	2	-33.33
885	0	+27.78
915	1	+0.00
945	2	>100
975	1	>100
1005	10	>100
1035	68	>100
1065	293	>100
1095	568	>100
1125	1026	>100
1155	1443	>100
1185	1965	>100
1215	2709	+93.87
1245	3679	+86.83
1275	4656	+79.62

VOLTS	COUNTS	%/100 Volts
1305	5923	+72.26
1335	7410	+63.70
1365	8936	+52.54
1395	10255	+38.05
1425	11429	+24.27
1455	11859	+15.19
1485	12109	+7.57
1515	12569	+5.09
1545	12446	+2.76
1575	12632	+0.84
1605	12594	+0.80
1635	12653	+0.49
1665	12587	+0.57
1695	12729	+2.03
1725	12665	+2.50
1755	13002	+2.06
1785	12930	+4.45
1815	12994	
1845	13539	

MPC 9600 Plateau Instrument 9 MPC 9604 Detector D 6/15/2017

Alpha Volts: 1575 Beta Volts: 1575

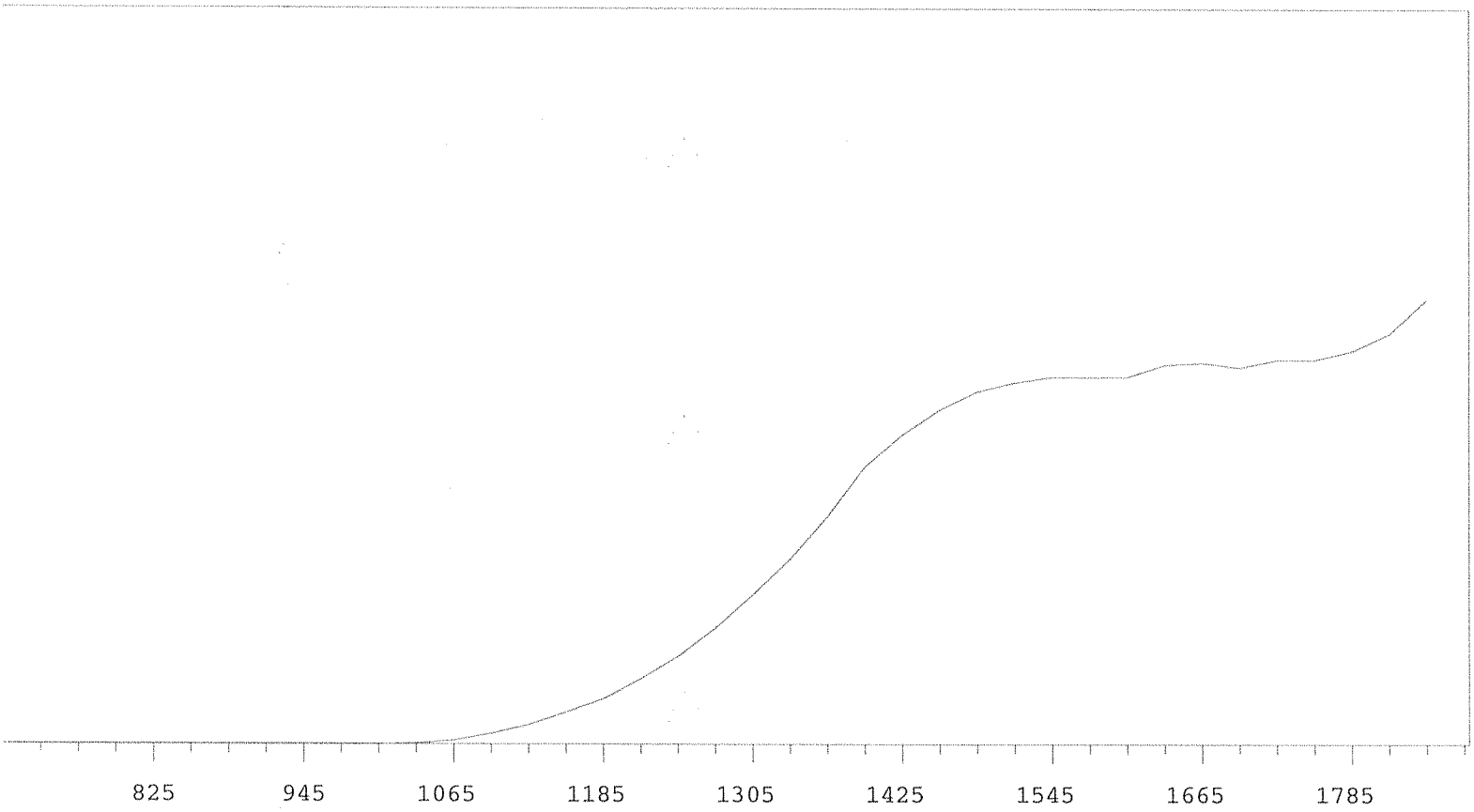


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	+83.33
915	1	+55.56
945	0	>100
975	1	>100
1005	5	>100
1035	56	>100
1065	251	>100
1095	465	>100
1125	862	>100
1155	1311	>100
1185	1760	+99.61
1215	2417	+93.51
1245	3147	+87.35
1275	4225	+78.39

VOLTS	COUNTS	%/100 Volts
1305	5261	+69.99
1335	6406	+62.00
1365	7663	+51.76
1395	9097	+39.28
1425	9861	+27.44
1455	10428	+16.57
1485	10949	+9.75
1515	11111	+5.71
1545	11082	+2.07
1575	11301	+0.78
1605	11200	+0.18
1635	11183	+1.24
1665	11171	+1.93
1695	11526	+1.68
1725	11355	+0.75
1755	11377	+0.24
1785	11374	+3.28
1815	11558	+83.90
1845	11831	

MPC 9600 Plateau Instrument 10 MPC 9604 Detector A 6/15/2017

Alpha Volts: 1552 Beta Volts: 1552

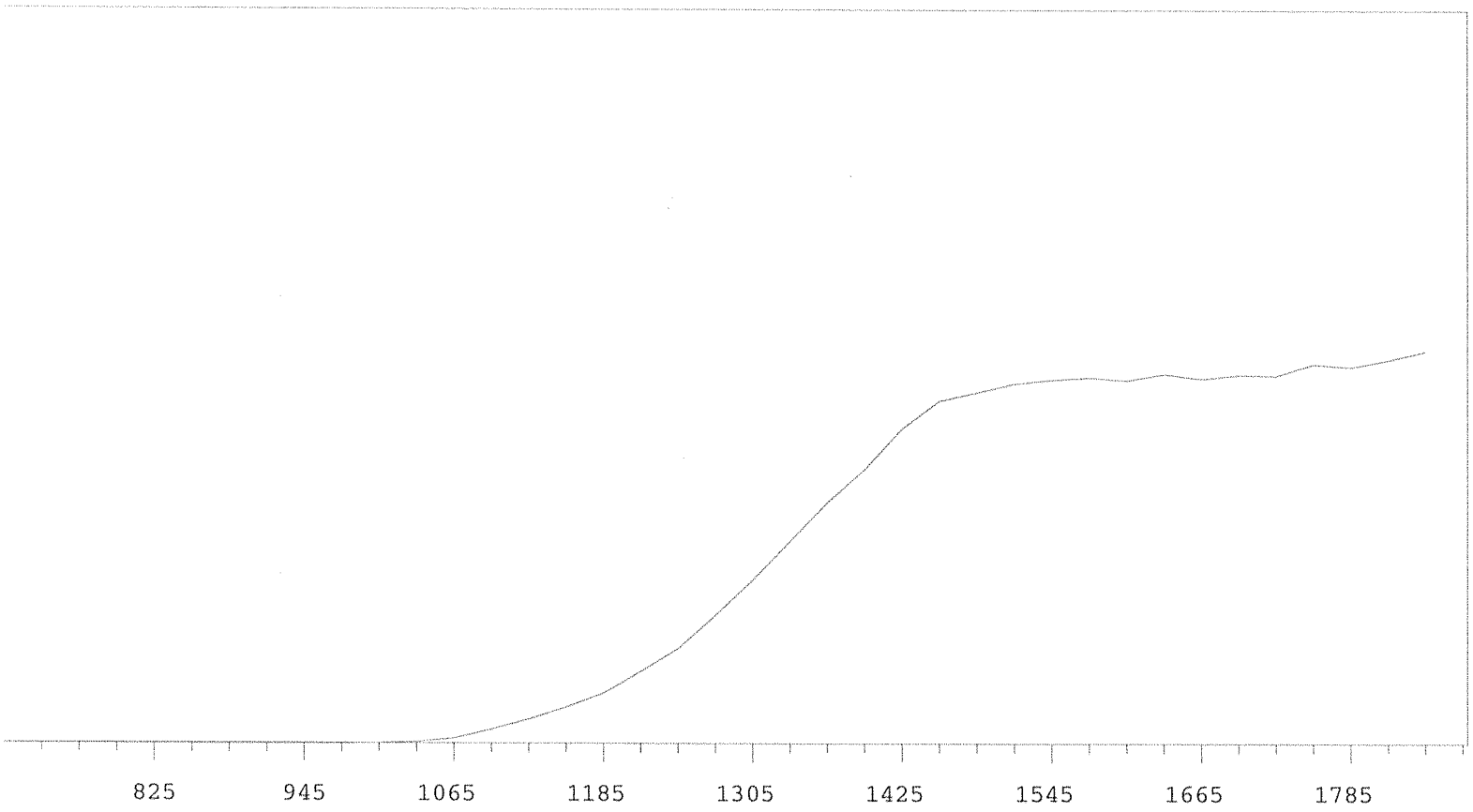


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	1	+0.00
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	1	>100
1005	3	>100
1035	30	>100
1065	142	>100
1095	399	>100
1125	708	>100
1155	1174	>100
1185	1647	>100
1215	2378	>100
1245	3191	+93.04
1275	4223	+83.36

VOLTS	COUNTS	%/100 Volts
1305	5434	+76.21
1335	6753	+70.11
1365	8306	+59.82
1395	10112	+47.37
1425	11270	+33.95
1455	12180	+21.54
1485	12845	+13.84
1515	13175	+7.51
1545	13382	+3.23
1575	13375	+3.24
1605	13387	+3.63
1635	13826	+2.96
1665	13896	+2.76
1695	13726	+1.13
1725	14008	+2.69
1755	14005	+6.52
1785	14322	+12.18
1815	14959	+84.33
1845	16216	

MPC 9600 Plateau Instrument 10 MPC 9604 Detector B 6/15/2017

Alpha Volts: 1552 Beta Volts: 1552

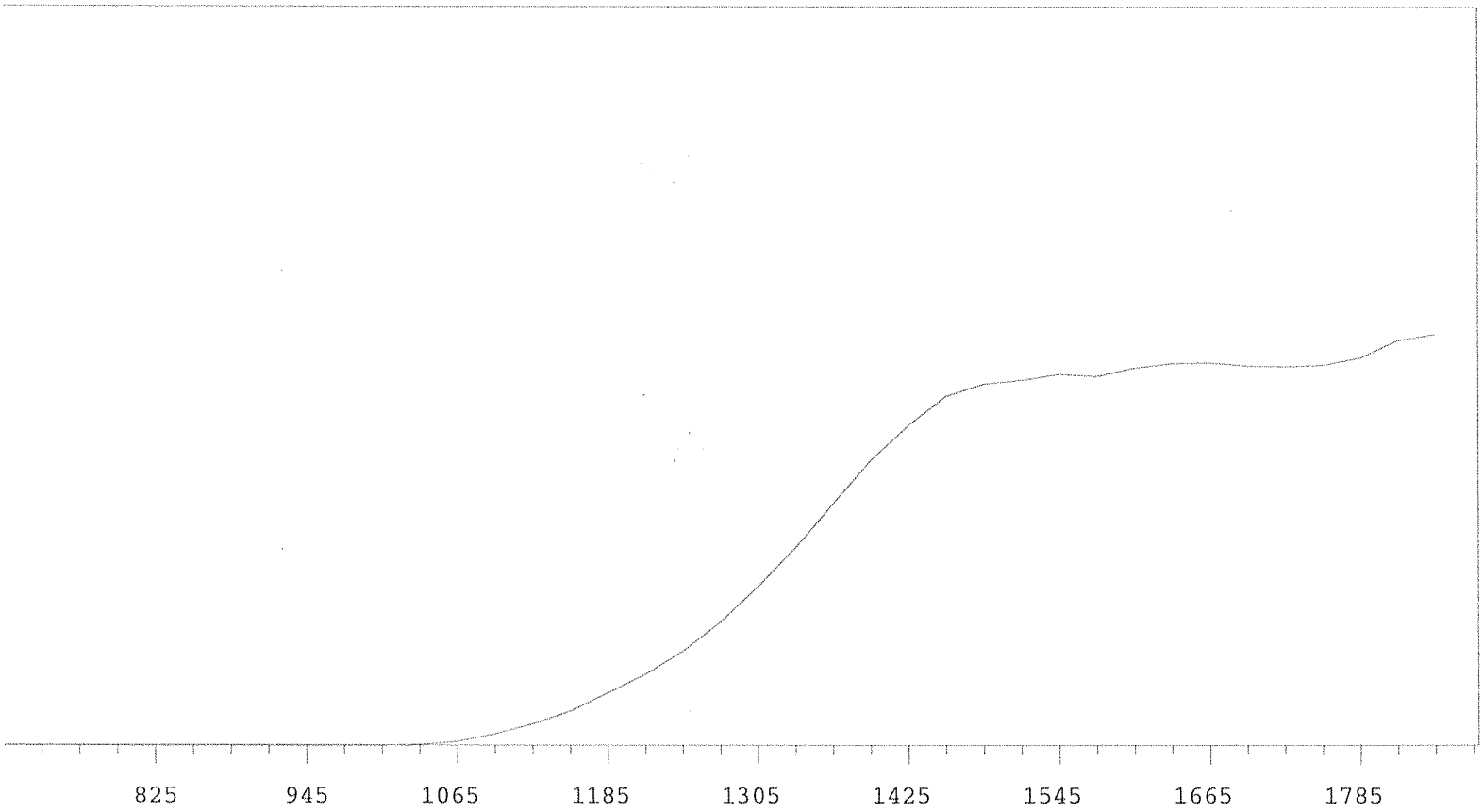


VOLTS	COUNTS	%/100 Volts
705	2	
735	0	
765	0	-41.67
795	1	+83.33
825	1	+55.56
855	0	>100
885	1	>100
915	0	+83.33
945	0	>100
975	1	>100
1005	8	>100
1035	57	>100
1065	201	>100
1095	547	>100
1125	942	>100
1155	1409	>100
1185	1956	>100
1215	2790	+99.31
1245	3671	+92.28
1275	4955	+83.03

VOLTS	COUNTS	%/100 Volts
1305	6327	+73.82
1335	7833	+61.30
1365	9348	+52.43
1395	10634	+43.16
1425	12219	+31.62
1455	13303	+21.13
1485	13622	+11.12
1515	13973	+5.62
1545	14128	+2.89
1575	14218	+1.76
1605	14107	+0.54
1635	14358	+0.66
1665	14173	+0.77
1695	14325	+2.06
1725	14288	+3.07
1755	14744	+3.43
1785	14629	+4.67
1815	14904	+68.69
1845	15242	

MPC 9600 Plateau Instrument 10 MPC 9604 Detector C 6/15/2017

Alpha Volts: 1552 Beta Volts: 1552

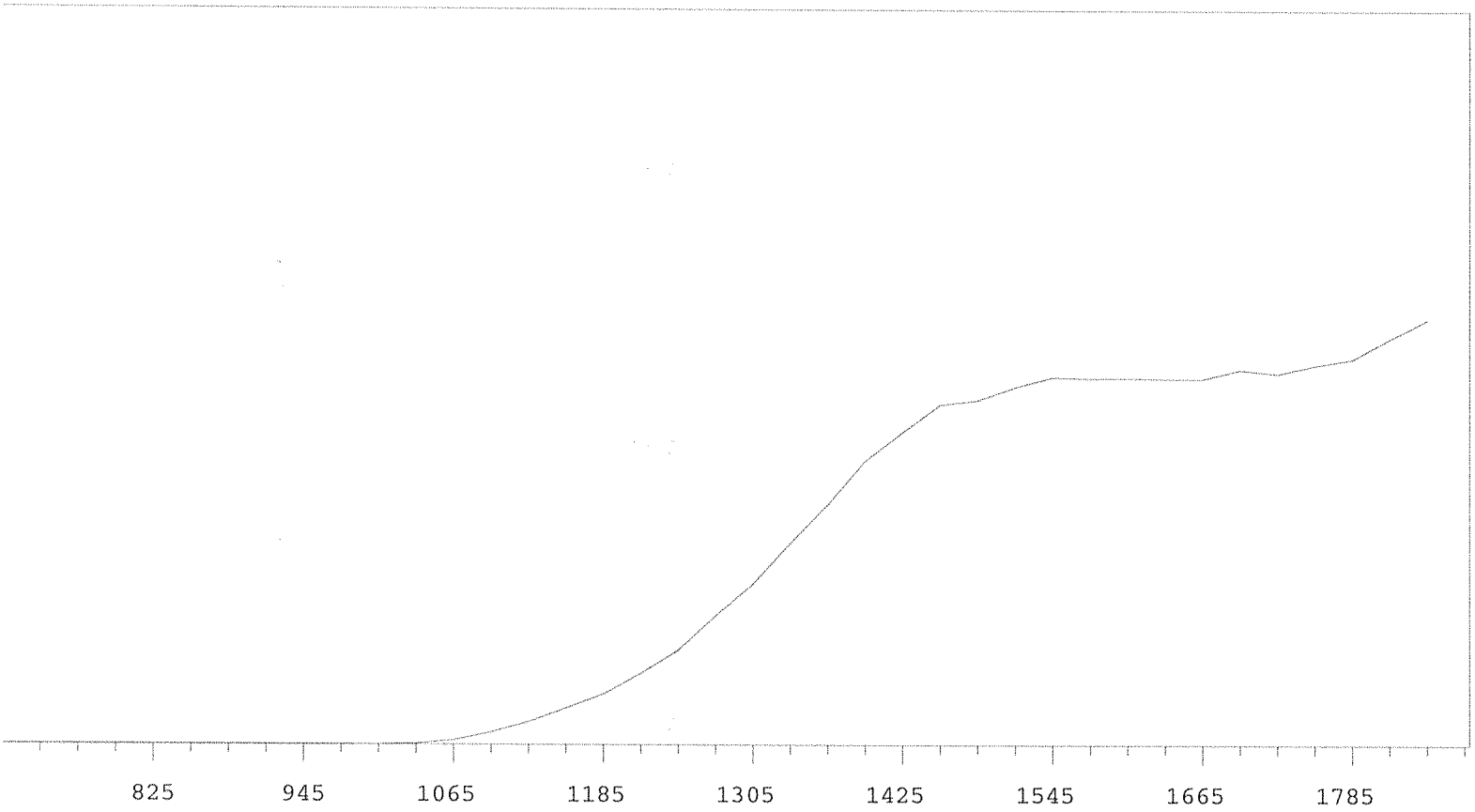


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	1	+83.33
825	1	+55.56
855	0	>100
885	1	>100
915	0	>100
945	0	>100
975	2	>100
1005	2	>100
1035	32	>100
1065	136	>100
1095	388	>100
1125	729	>100
1155	1162	>100
1185	1789	>100
1215	2404	+97.27
1245	3199	+88.00
1275	4170	+82.12

VOLTS	COUNTS	%/100 Volts
1305	5378	+75.32
1335	6697	+67.25
1365	8177	+56.61
1395	9643	+45.47
1425	10819	+32.40
1455	11806	+19.97
1485	12214	+11.23
1515	12351	+4.62
1545	12560	+3.31
1575	12484	+3.55
1605	12766	+3.17
1635	12920	+2.34
1665	12947	+0.07
1695	12843	-0.65
1725	12818	+0.89
1755	12858	+5.14
1785	13111	+7.53
1815	13703	
1845	13895	

MPC 9600 Plateau Instrument 10 MPC 9604 Detector D 6/15/2017

Alpha Volts: 1552 Beta Volts: 1552

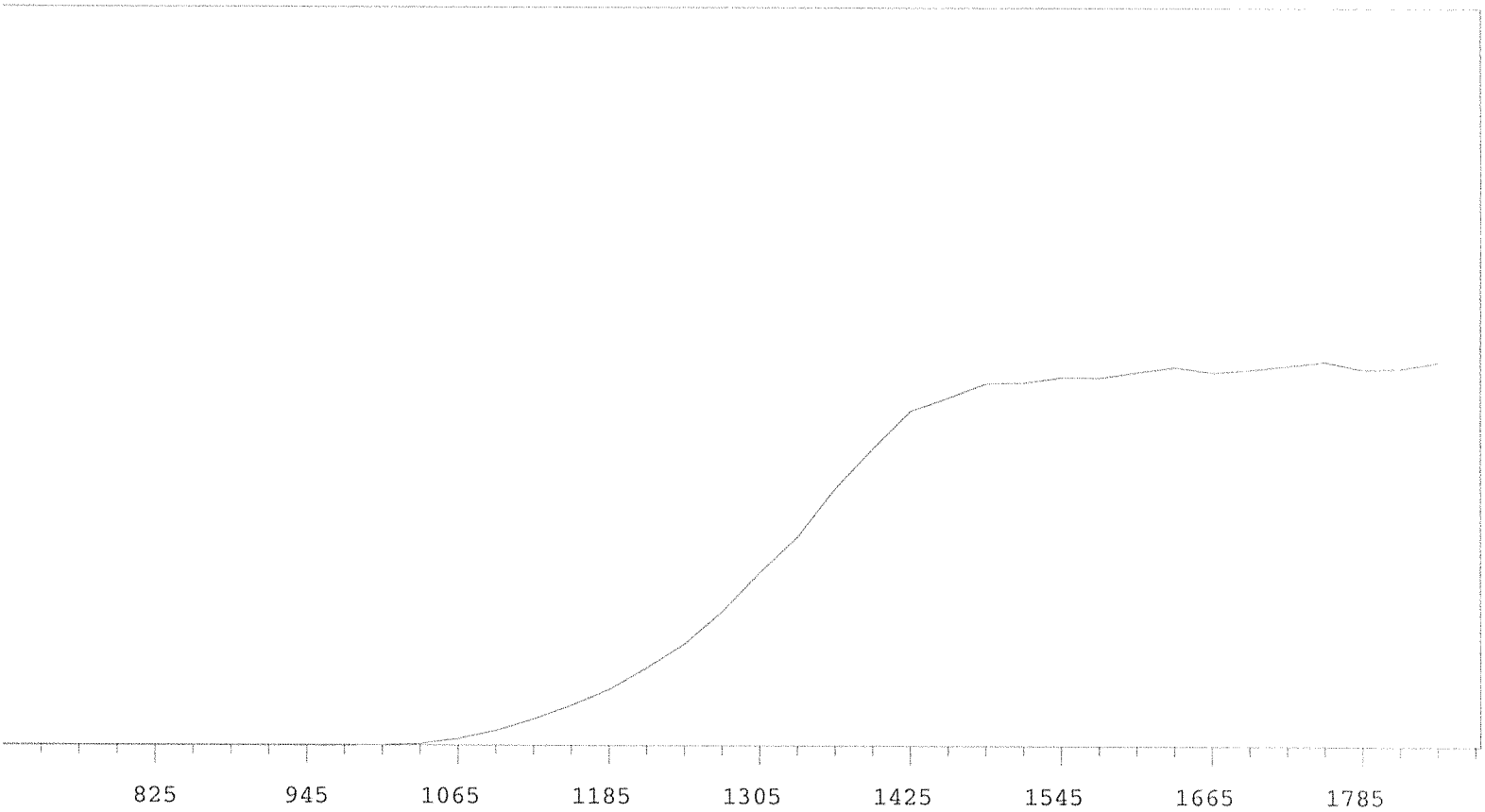


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	1	-55.56
825	1	+55.56
855	0	>100
885	1	>100
915	0	+83.33
945	0	>100
975	1	>100
1005	5	>100
1035	37	>100
1065	137	>100
1095	387	>100
1125	708	>100
1155	1135	>100
1185	1565	>100
1215	2210	+99.33
1245	2925	+91.00
1275	3974	+82.28

VOLTS	COUNTS	%/100 Volts
1305	4948	+72.80
1335	6198	+63.36
1365	7362	+53.26
1395	8693	+42.03
1425	9577	+29.05
1455	10418	+18.35
1485	10561	+12.46
1515	10966	+7.22
1545	11277	+4.99
1575	11240	+1.52
1605	11251	-0.28
1635	11235	+1.52
1665	11233	+1.62
1695	11506	+2.87
1725	11390	+3.91
1755	11647	+6.69
1785	11838	+11.38
1815	12463	+94.91
1845	13044	

MPC 9600 Plateau Instrument 11 MPC 9604 Detector A 6/15/2017

Alpha Volts: 1515 Beta Volts: 1515

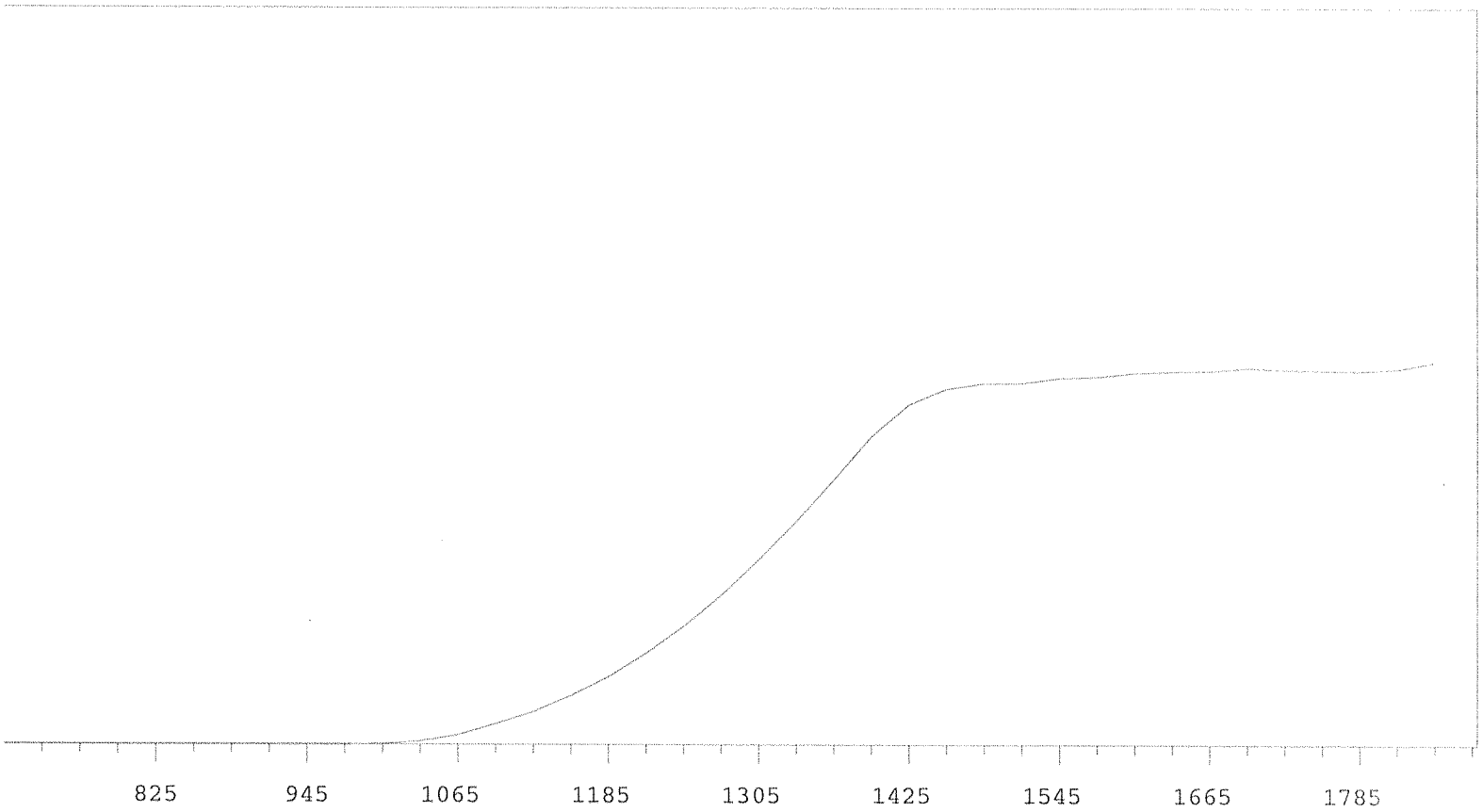


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	+0.00
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	3	>100
1005	12	>100
1035	74	>100
1065	275	>100
1095	587	>100
1125	1048	>100
1155	1574	>100
1185	2202	>100
1215	3050	+94.35
1245	3959	+88.70
1275	5228	+79.73

VOLTS	COUNTS	%/100 Volts
1305	6752	+73.57
1335	8143	+64.04
1365	10030	+54.17
1395	11613	+41.17
1425	13081	+27.27
1455	13590	+15.54
1485	14152	+7.76
1515	14183	+4.34
1545	14401	+2.53
1575	14386	+3.29
1605	14595	+1.85
1635	14801	+1.37
1665	14597	+0.92
1695	14686	+1.54
1725	14856	+1.30
1755	15013	-0.02
1785	14721	+0.06
1815	14748	-83.35
1845	15001	

MPC 9600 Plateau Instrument 11 MPC 9604 Detector B 6/15/2017

Alpha Volts: 1515 Beta Volts: 1515

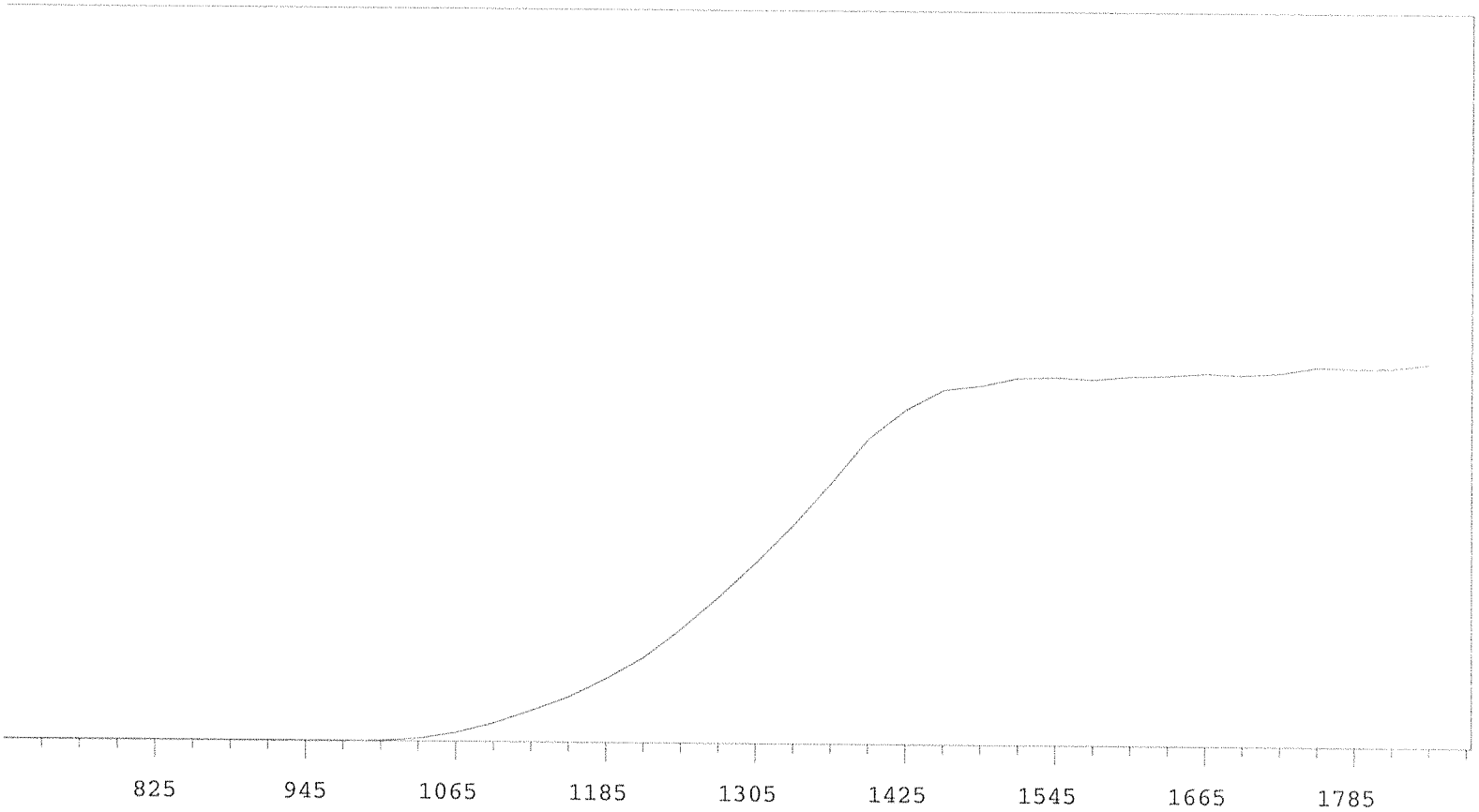


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+83.33
795	0	+55.56
825	1	+83.33
855	1	+55.56
885	0	+0.00
915	1	+41.67
945	1	>100
975	1	>100
1005	26	>100
1035	145	>100
1065	409	>100
1095	886	>100
1125	1408	>100
1155	2081	>100
1185	2898	+98.88
1215	3902	+88.07
1245	5047	+79.50
1275	6369	+71.92

VOLTS	COUNTS	%/100 Volts
1305	7891	+65.30
1335	9548	+58.87
1365	11330	+49.98
1395	13183	+37.97
1425	14544	+24.56
1455	15210	+12.35
1485	15453	+5.52
1515	15465	+2.72
1545	15680	+2.45
1575	15730	+2.58
1605	15896	+1.77
1635	15966	+1.79
1665	15983	+0.88
1695	16114	+0.31
1725	16033	-0.18
1755	16015	-0.30
1785	15989	+1.51
1815	16064	-81.84
1845	16374	

MPC 9600 Plateau Instrument 11 MPC 9604 Detector C 6/15/2017

Alpha Volts: 1515 Beta Volts: 1515

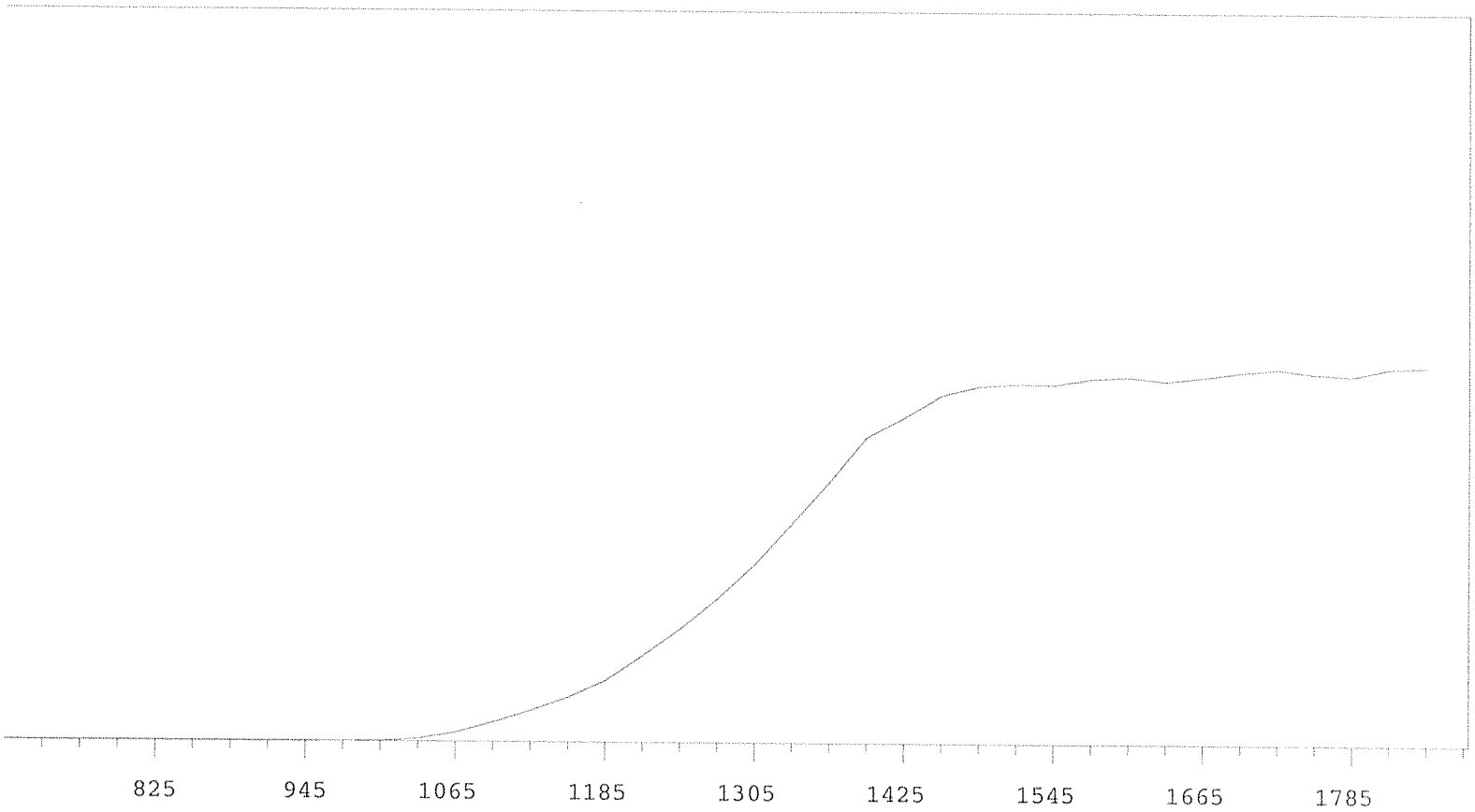


VOLTS	COUNTS	%/100 Volts
705	3	
735	0	
765	0	
795	0	>100
825	1	+83.33
855	1	-83.33
885	0	+41.67
915	0	>100
945	2	>100
975	2	>100
1005	19	>100
1035	127	>100
1065	368	>100
1095	776	>100
1125	1310	>100
1155	1880	>100
1185	2644	+99.77
1215	3519	+91.82
1245	4695	+83.13
1275	6022	+74.91

VOLTS	COUNTS	%/100 Volts
1305	7464	+66.61
1335	9043	+60.02
1365	10779	+50.67
1395	12637	+39.10
1425	13839	+25.34
1455	14664	+14.24
1485	14840	+7.34
1515	15177	+2.86
1545	15206	+1.76
1575	15125	+0.67
1605	15266	+1.19
1635	15301	+1.19
1665	15391	+0.82
1695	15336	+1.75
1725	15437	+1.76
1755	15683	+1.76
1785	15626	+1.59
1815	15652	-82.73
1845	15825	

MPC 9600 Plateau Instrument 11 MPC 9604 Detector D 6/15/2017

Alpha Volts: 1515 Beta Volts: 1515

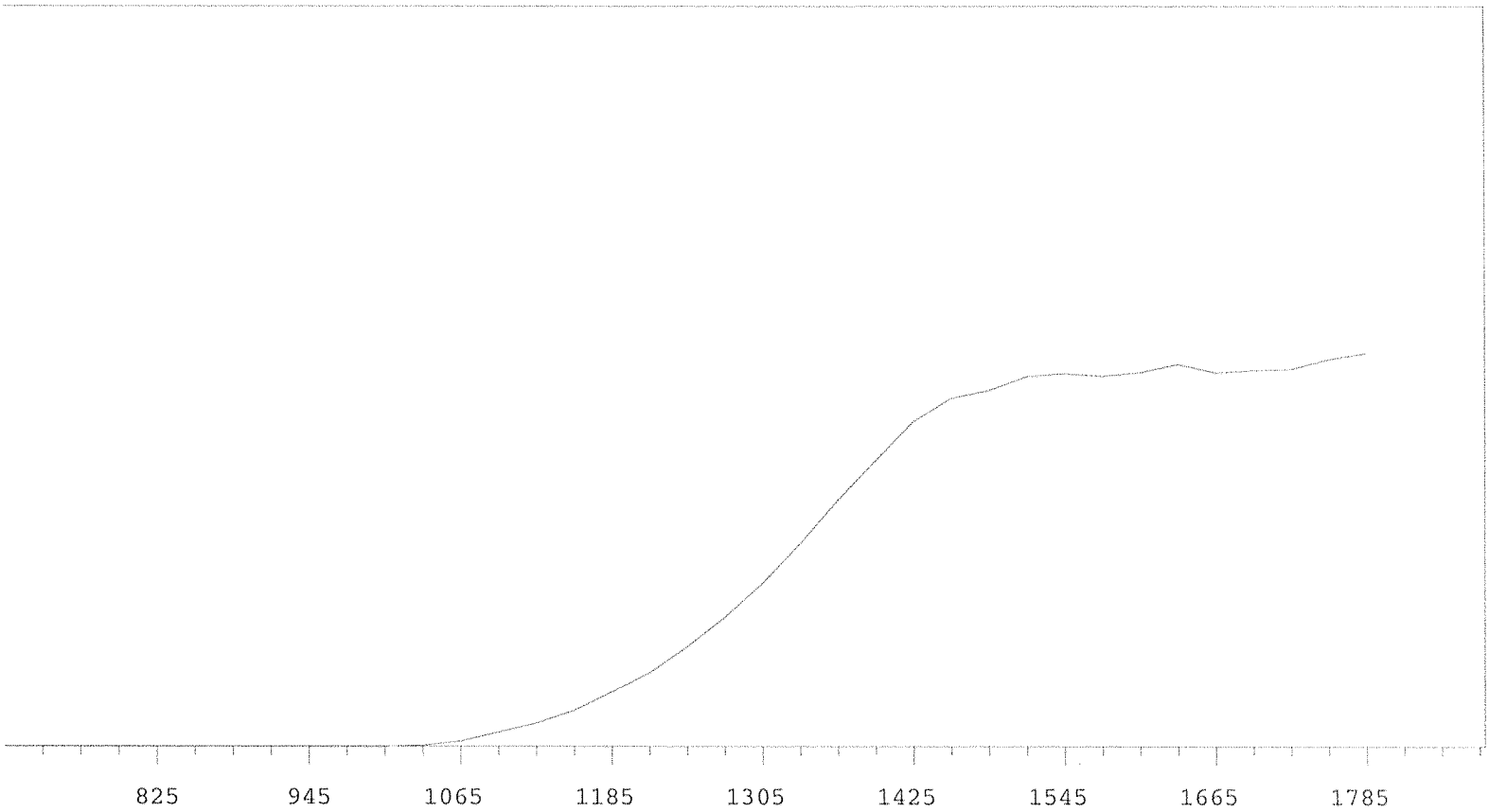


VOLTS	COUNTS	%/100 Volts
705	4	
735	0	
765	2	+0.00
795	0	+55.56
825	4	+0.00
855	0	-55.56
885	2	>100
915	0	>100
945	0	>100
975	8	>100
1005	22	>100
1035	129	>100
1065	379	>100
1095	818	>100
1125	1297	>100
1155	1855	>100
1185	2559	>100
1215	3613	+92.49
1245	4710	+82.75
1275	5970	+73.96

VOLTS	COUNTS	%/100 Volts
1305	7401	+67.31
1335	9100	+61.00
1365	10818	+48.97
1395	12673	+36.54
1425	13469	+24.34
1455	14402	+13.60
1485	14784	+7.48
1515	14879	+3.38
1545	14856	+2.34
1575	15116	+1.35
1605	15190	+1.26
1635	15015	+1.25
1665	15191	+2.34
1695	15401	+2.22
1725	15532	+0.16
1755	15353	+0.18
1785	15251	+0.92
1815	15583	-81.76
1845	15631	

MPC 9600 Plateau Instrument 12 MPC 9604 Detector A 6/13/2017

Alpha Volts: 1515 Beta Volts: 1515

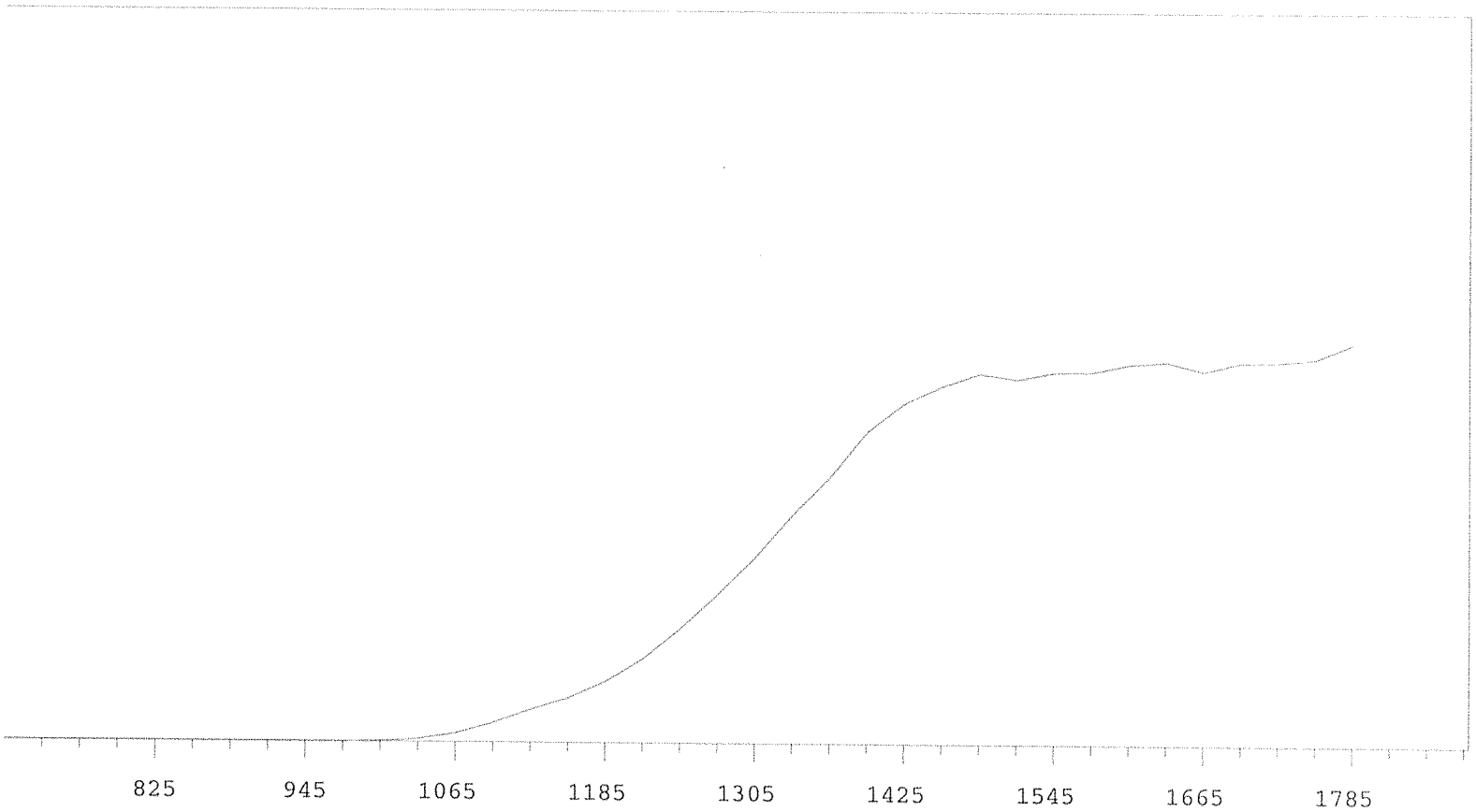


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	1	+83.33
885	1	-83.33
915	0	-55.56
945	0	>100
975	1	>100
1005	5	>100
1035	45	>100
1065	209	>100
1095	564	>100
1125	920	>100
1155	1418	>100
1185	2137	>100
1215	2883	+97.35
1245	3892	+86.85
1275	5025	+79.87

VOLTS	COUNTS	%/100 Volts
1305	6352	+72.57
1335	7894	+64.30
1365	9588	+55.26
1395	11118	+43.51
1425	12628	+29.89
1455	13520	+19.61
1485	13829	+11.01
1515	14368	+5.61
1545	14478	+3.27
1575	14383	+2.26
1605	14523	+1.17
1635	14838	+0.95
1665	14505	+0.03
1695	14599	+1.15
1725	14648	+4.38
1755	15021	-80.01
1785	15266	>100

MPC 9600 Plateau Instrument 12 MPC 9604 Detector B 6/13/2017

Alpha Volts: 1515 Beta Volts: 1515

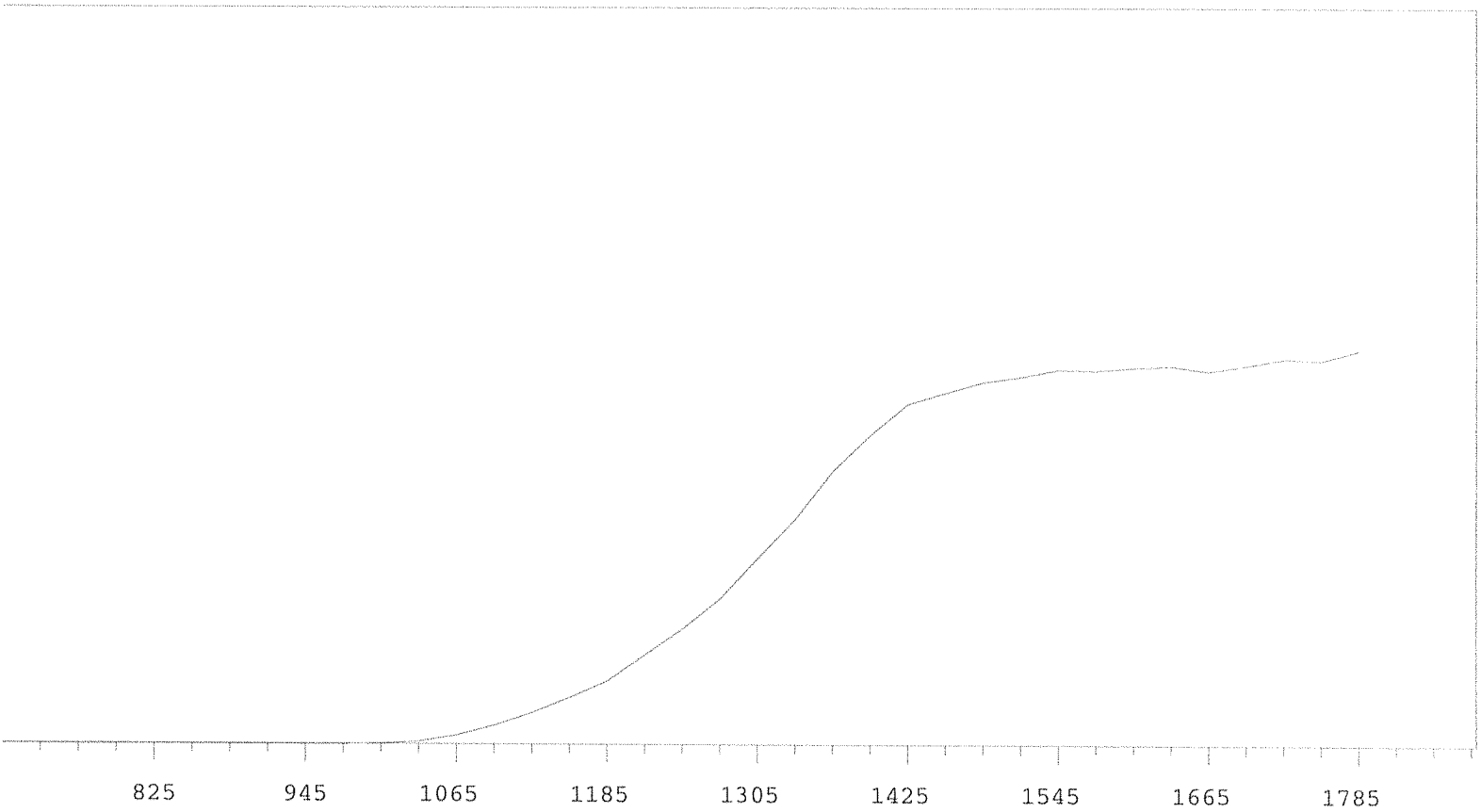


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	
795	0	+0.00
825	1	+0.00
855	0	+0.00
885	1	>100
915	0	+83.33
945	0	>100
975	1	>100
1005	34	>100
1035	134	>100
1065	393	>100
1095	855	>100
1125	1443	>100
1155	1952	>100
1185	2684	+99.79
1215	3675	+95.72
1245	4998	+87.67
1275	6477	+78.76

VOLTS	COUNTS	%/100 Volts
1305	8105	+67.75
1335	9972	+59.65
1365	11619	+49.28
1395	13632	+36.94
1425	14881	+25.84
1455	15626	+13.02
1485	16201	+6.55
1515	15953	+2.83
1545	16269	+2.36
1575	16273	+3.90
1605	16617	+1.20
1635	16737	+1.22
1665	16332	+0.43
1695	16717	+1.41
1725	16733	+5.13
1755	16889	-80.10
1785	17543	>100

MPC 9600 Plateau Instrument 12 MPC 9604 Detector C 6/13/2017

Alpha Volts: 1515 Beta Volts: 1515

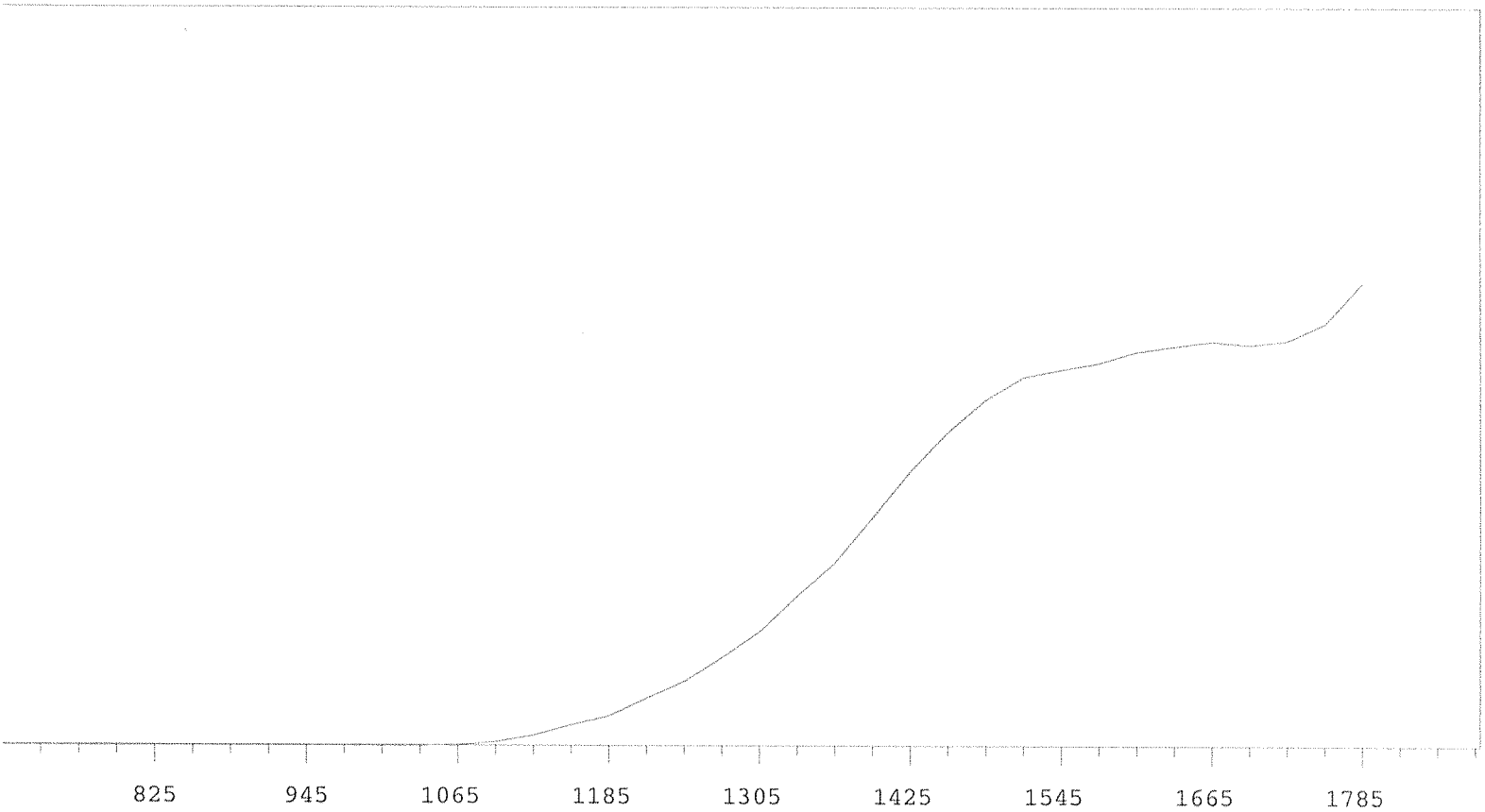


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	6	>100
1005	23	>100
1035	116	>100
1065	386	>100
1095	816	>100
1125	1367	>100
1155	2027	>100
1185	2726	>100
1215	3847	+89.76
1245	4953	+83.28
1275	6245	+74.40

VOLTS	COUNTS	%/100 Volts
1305	7954	+69.45
1335	9629	+60.65
1365	11694	+49.21
1395	13249	+35.70
1425	14574	+22.46
1455	15067	+13.31
1485	15507	+7.87
1515	15744	+5.19
1545	16051	+3.23
1575	16016	+2.09
1605	16141	+0.10
1635	16202	+0.59
1665	15983	+1.62
1695	16238	+2.06
1725	16516	+4.01
1755	16438	-81.04
1785	16871	>100

MPC 9600 Plateau Instrument 12 MPC 9604 Detector D 6/13/2017

Alpha Volts: 1515 Beta Volts: 1515

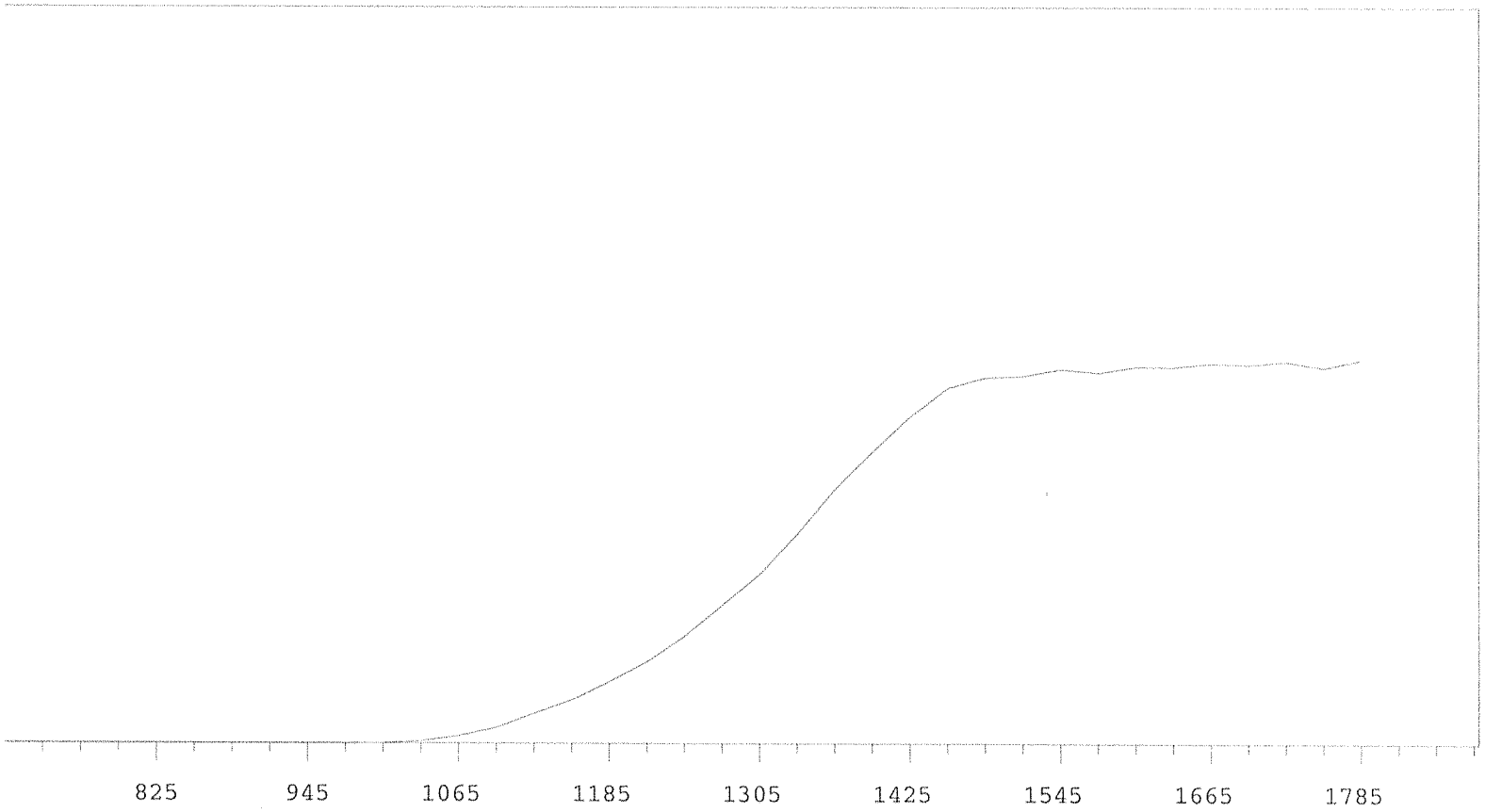


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	1	>100
1005	1	>100
1035	2	>100
1065	19	>100
1095	100	>100
1125	297	>100
1155	592	>100
1185	856	>100
1215	1366	>100
1245	1844	>100
1275	2530	+91.11

VOLTS	COUNTS	%/100 Volts
1305	3259	+83.04
1335	4291	+76.15
1365	5239	+70.06
1395	6532	+60.80
1425	7849	+51.04
1455	8986	+38.42
1485	9909	+25.68
1515	10554	+15.65
1545	10768	+9.83
1575	10960	+6.91
1605	11283	+6.23
1635	11437	+3.89
1665	11576	+1.93
1695	11475	+3.79
1725	11596	+11.10
1755	12089	-73.23
1785	13268	>100

MPC 9600 Plateau Instrument_13 MPC 9604 Detector A 6/12/2017

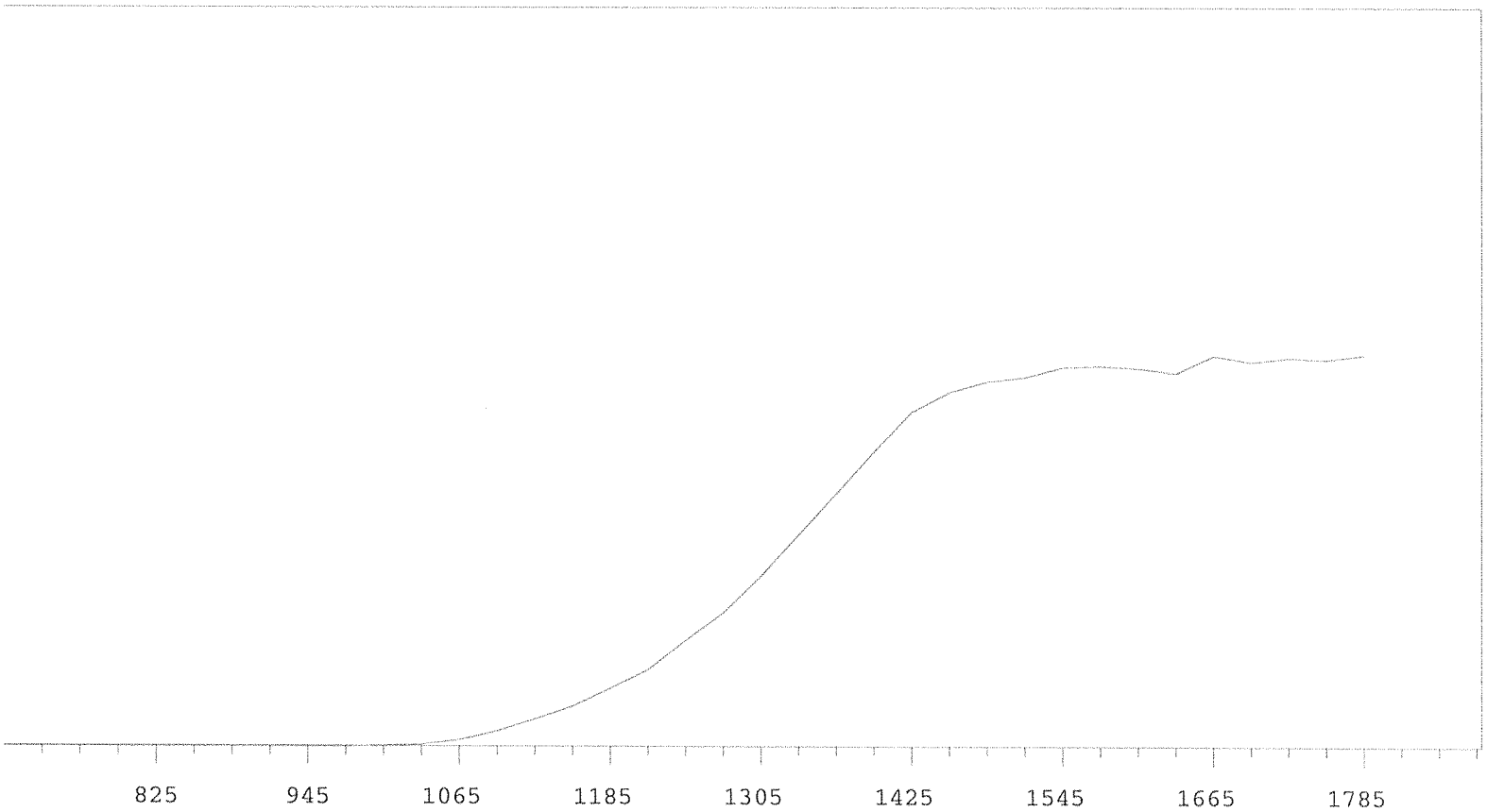
Alpha Volts: 1545 Beta Volts: 1545



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	1	>100
825	1	+66.67
855	3	-100.00
885	0	-100.00
915	0	-27.78
945	1	>100
975	2	>100
1005	14	>100
1035	94	>100
1065	314	>100
1095	650	>100
1125	1229	>100
1155	1782	>100
1185	2535	+99.27
1215	3360	+90.87
1245	4404	+81.26
1275	5693	+74.97
1305	6965	+69.18
1335	8609	+61.20
1365	10440	+52.65
1395	11976	+42.03
1425	13398	+29.89
1455	14569	+18.53
1485	15008	+9.98
1515	15064	+3.56
1545	15348	+2.22
1575	15202	+1.84
1605	15446	+1.50
1635	15438	+1.73
1665	15576	+1.14
1695	15537	+0.05
1725	15661	+0.35
1755	15407	-82.93
1785	15723	>100

MPC 9600 Plateau Instrument_13 MPC 9604 Detector B 6/12/2017

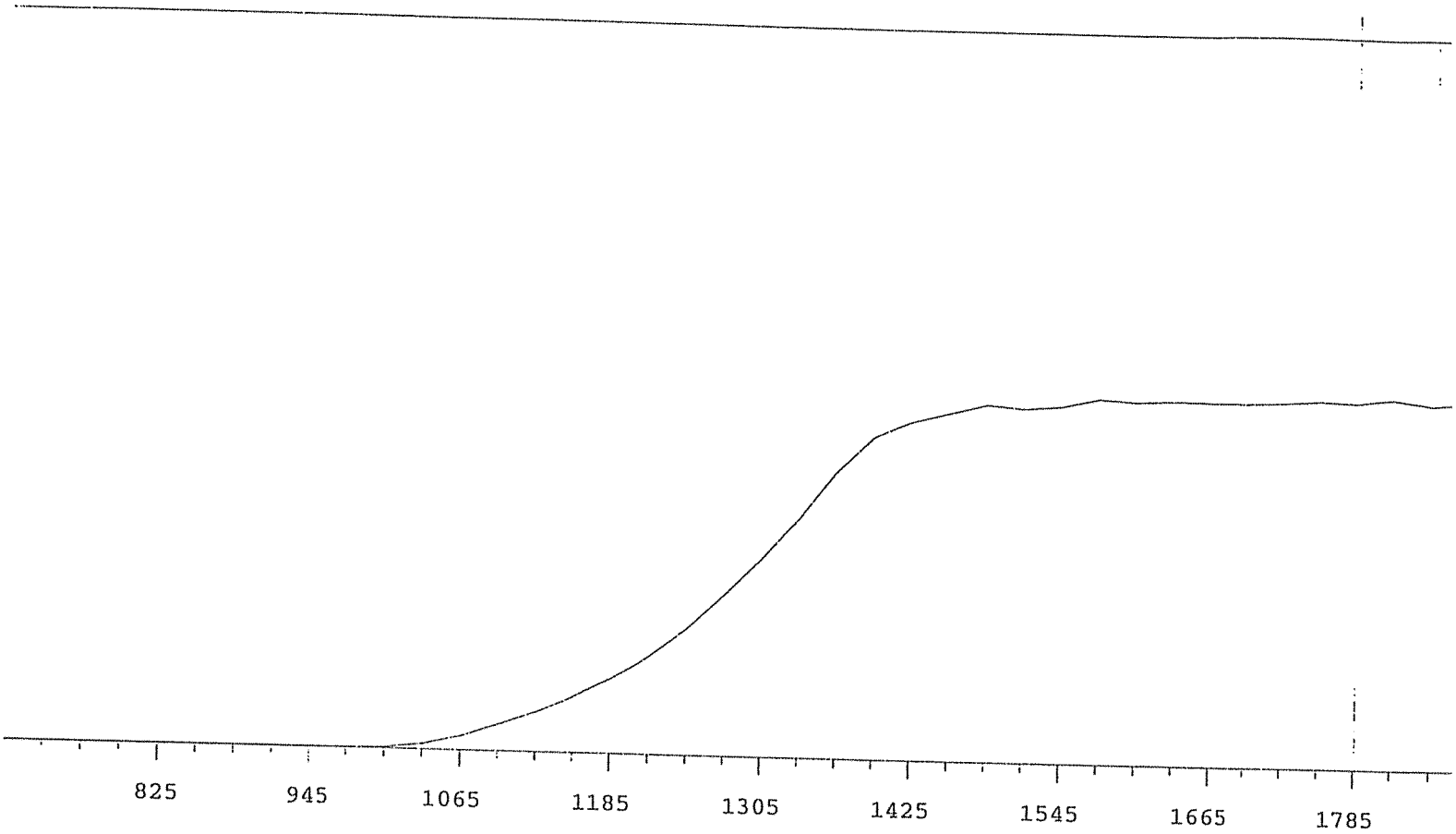
Alpha Volts: 1545 Beta Volts: 1545



VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	1	>100
1005	19	>100
1035	81	>100
1065	271	>100
1095	640	>100
1125	1154	>100
1155	1688	>100
1185	2434	>100
1215	3225	+94.28
1245	4436	+85.96
1275	5605	+79.54

VOLTS	COUNTS	%/100 Volts
1305	7132	+70.78
1335	8858	+63.33
1365	10585	+54.26
1395	12336	+42.24
1425	14007	+29.50
1455	14828	+17.40
1485	15271	+9.65
1515	15458	+6.02
1545	15877	+3.42
1575	15922	+0.67
1605	15842	+1.39
1635	15634	+1.75
1665	16352	+2.70
1695	16087	+2.11
1725	16265	+0.36
1755	16187	-82.27
1785	16389	>100

Plateau 7/1/09 Instrument 13 MPC 9604 Detector C 7/1/2009
Alpha Volts: 705 Beta Volts: 1515

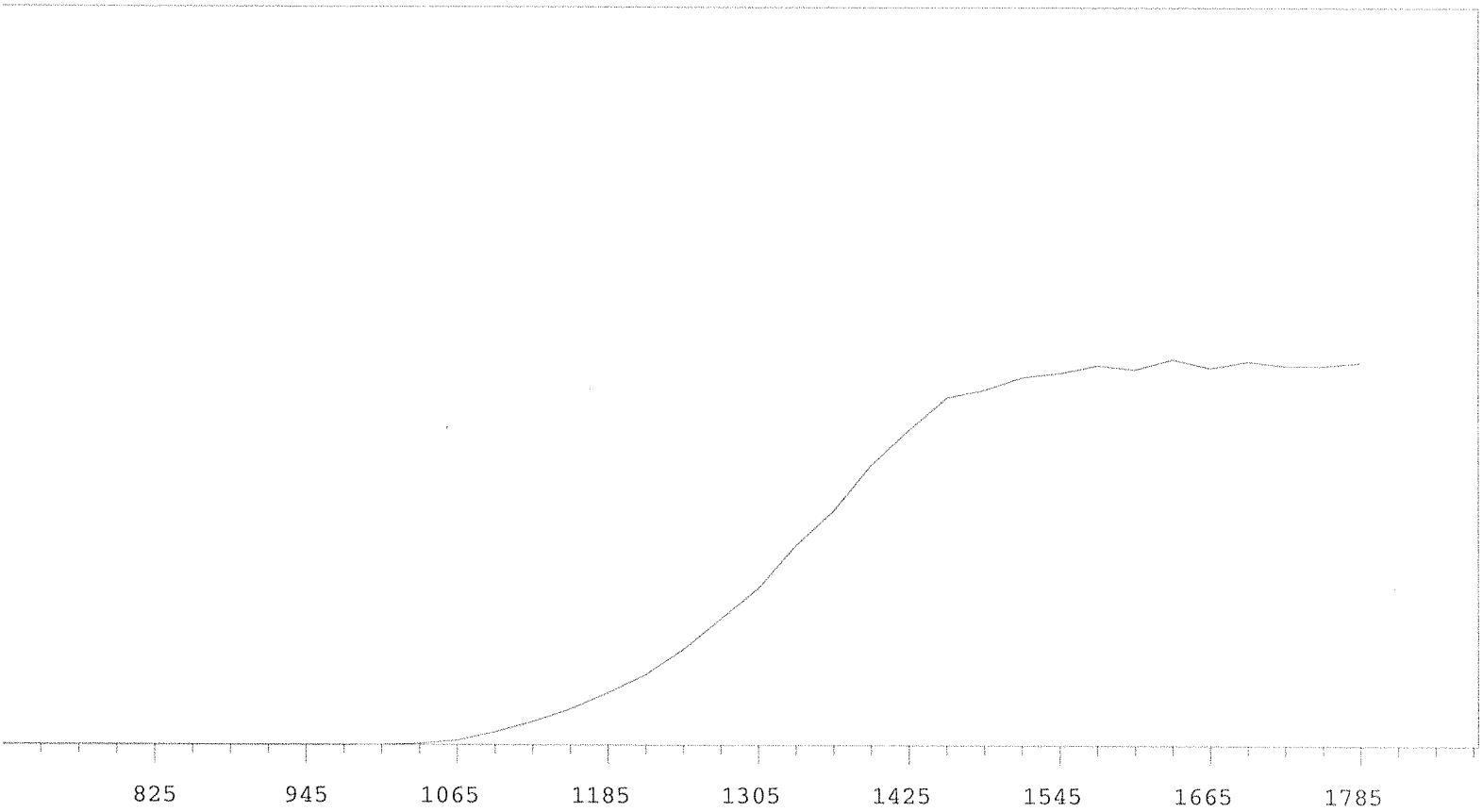


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	9	>100
1005	93	>100
1035	325	>100
1065	834	>100
1095	1525	>100
1125	2318	>100
1155	3233	>100
1185	4357	+92.07
1215	5755	+85.64
1245	7438	+78.35
1275	9463	+70.89

VOLTS	COUNTS	%/100 Volts
1305	11573	+64.95
1335	13929	+56.47
1365	16726	+43.82
1395	18834	+29.38
1425	19743	+16.84
1455	20314	+7.95
1485	20860	+4.16
1515	20670	+3.23
1545	20844	+2.09
1575	21330	+2.48
1605	21188	+1.16
1635	21280	-0.32
1665	21237	+0.08
1695	21202	+0.42
1725	21254	+0.60
1755	21406	+1.41
1785	21326	+0.42
1815	21619	+0.16
1845	21282	
1875	21478	

MPC 9600 Plateau Instrument_13 MPC 9604 Detector D 6/12/2017

Alpha Volts: 1545 Beta Volts: 1545

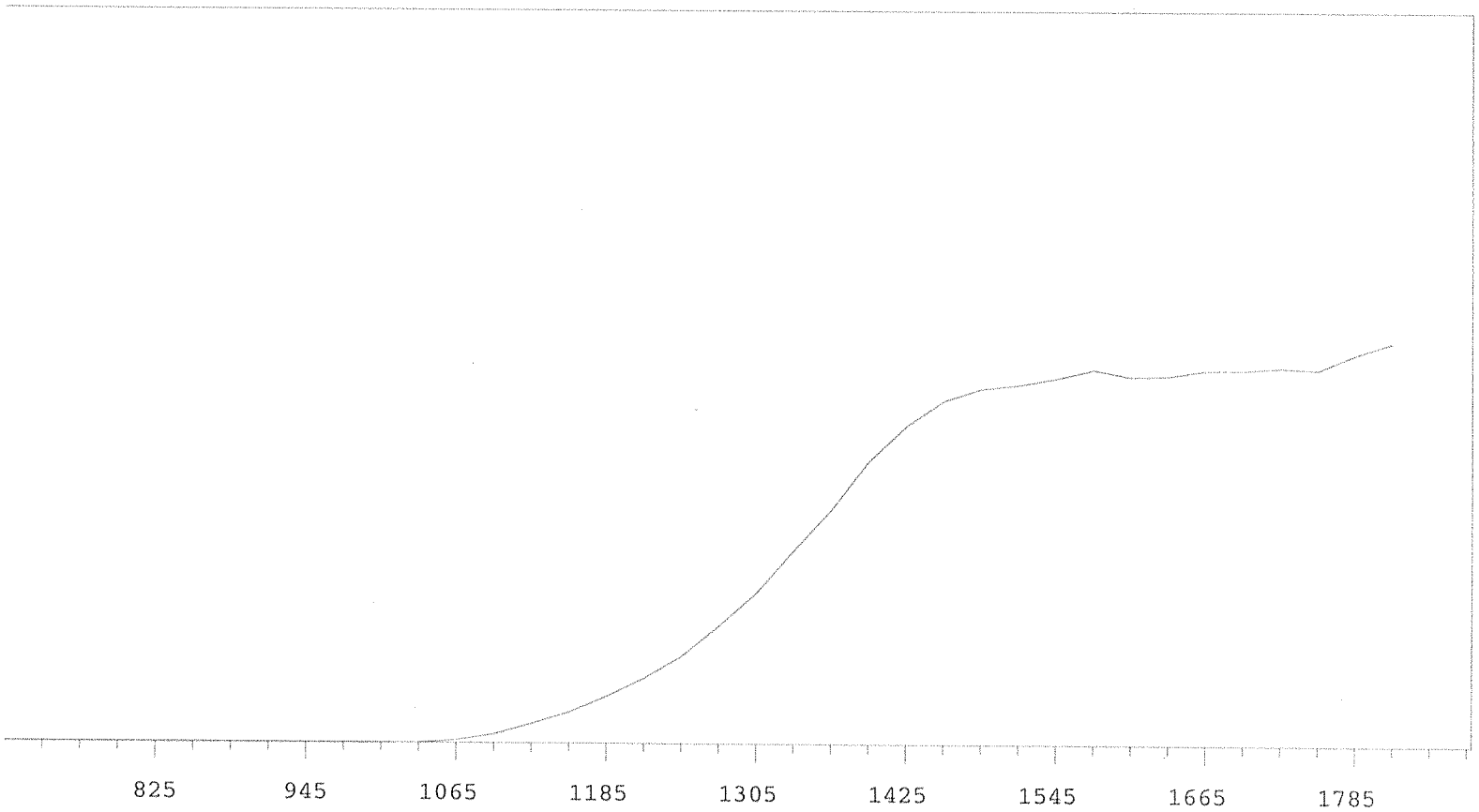


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	1	-55.56
795	1	-83.33
825	0	>100
855	0	>100
885	0	>100
915	3	+83.33
945	0	>100
975	1	>100
1005	6	>100
1035	60	>100
1065	184	>100
1095	519	>100
1125	926	>100
1155	1424	>100
1185	2066	>100
1215	2780	+97.30
1245	3754	+87.48
1275	4951	+81.99

VOLTS	COUNTS	%/100 Volts
1305	6151	+72.13
1335	7850	+64.83
1365	9211	+56.19
1395	11047	+45.82
1425	12422	+33.77
1455	13698	+21.53
1485	14002	+12.74
1515	14499	+7.40
1545	14670	+4.75
1575	14959	+3.50
1605	14811	+1.44
1635	15206	+0.87
1665	14868	+0.41
1695	15126	-0.97
1725	14944	+0.56
1755	14949	-83.51
1785	15083	>100

MPC 9600 Plateau Instrument 14 MPC 9604 Detector A 6/13/2017

Alpha Volts: 1545 Beta Volts: 1545

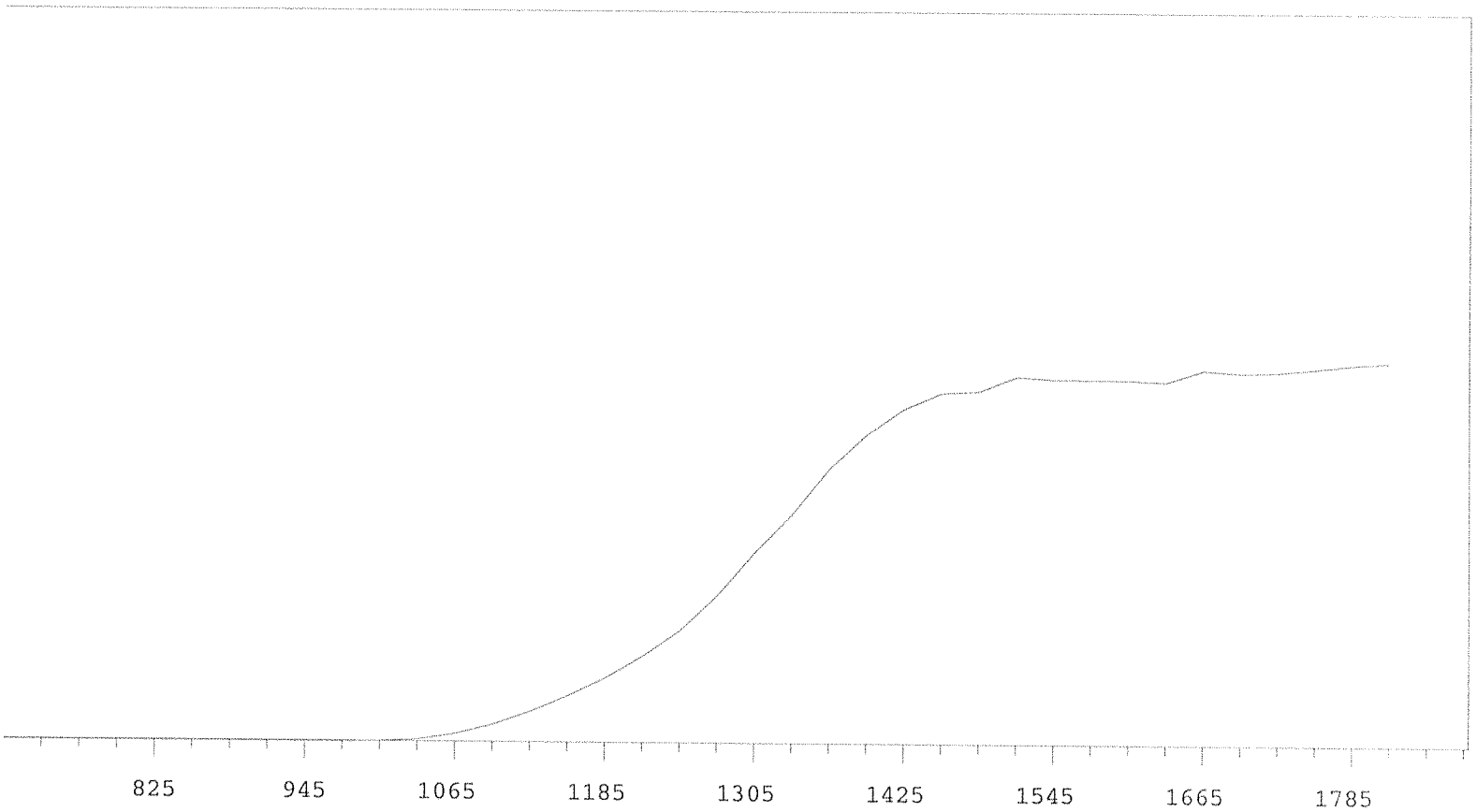


VOLTS	COUNTS	%/100 Volts
705	1	
735	1	
765	2	-66.67
795	1	>100
825	0	-33.33
855	0	+0.00
885	2	+0.00
915	0	>100
945	0	+0.00
975	0	>100
1005	2	>100
1035	18	>100
1065	122	>100
1095	361	>100
1125	805	>100
1155	1281	>100
1185	1928	>100
1215	2675	>100
1245	3556	+91.96
1275	4797	+86.30

VOLTS	COUNTS	%/100 Volts
1305	6133	+78.47
1335	7866	+70.42
1365	9526	+60.07
1395	11517	+46.82
1425	12957	+33.04
1455	13997	+19.22
1485	14479	+10.75
1515	14653	+6.81
1545	14918	+3.70
1575	15276	+1.84
1605	14992	+0.97
1635	15029	+0.58
1665	15262	+2.18
1695	15273	+1.42
1725	15366	+2.90
1755	15301	+6.01
1785	15918	-78.38
1815	16409	

MPC 9600 Plateau Instrument 14 MPC 9604 Detector B 6/13/2017

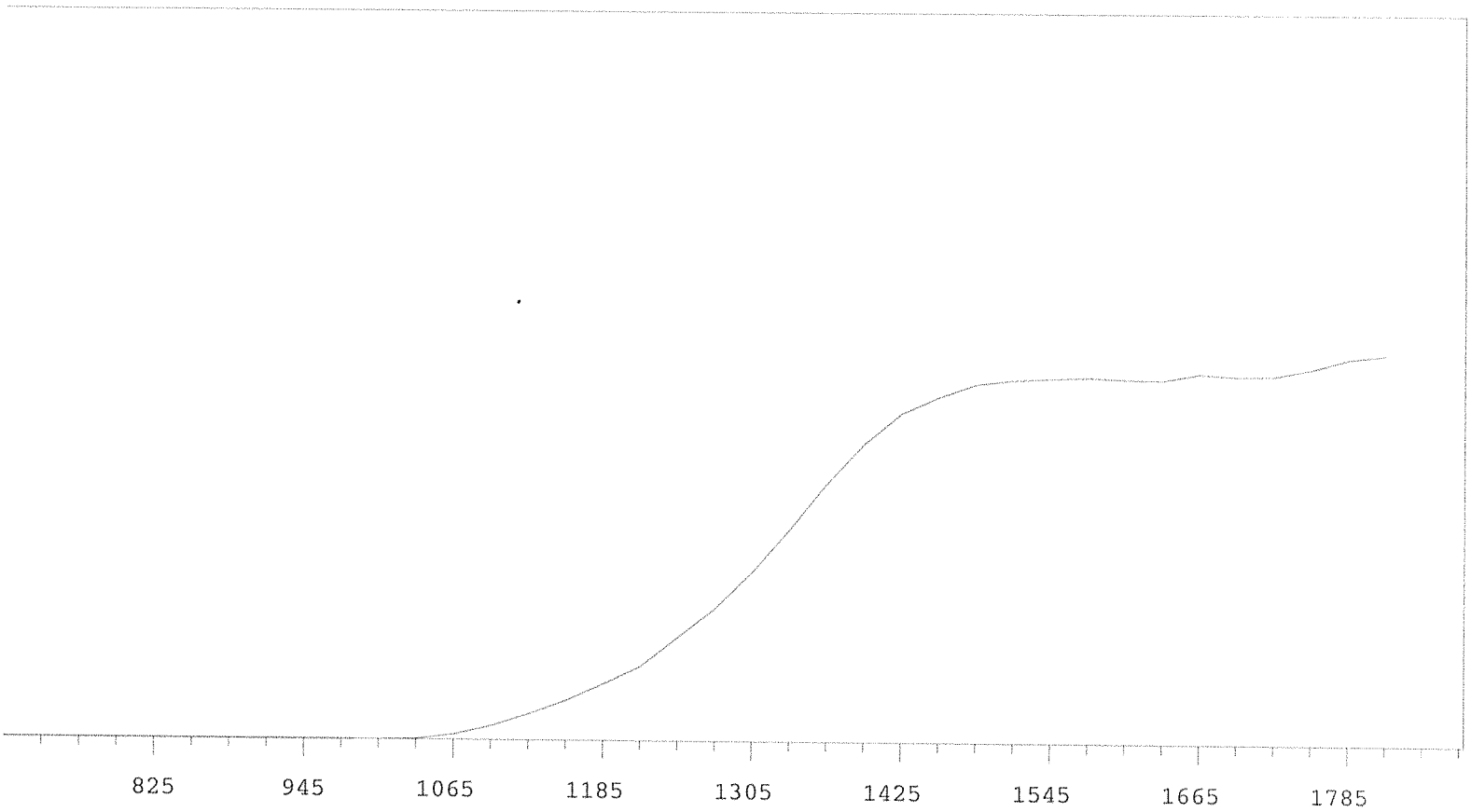
Alpha Volts: 1545 Beta Volts: 1545



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	1	>100
825	2	-55.56
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	1	>100
1005	19	>100
1035	95	>100
1065	358	>100
1095	805	>100
1125	1411	>100
1155	2143	>100
1185	2985	+99.86
1215	4005	+91.40
1245	5195	+87.03
1275	6843	+79.15

VOLTS	COUNTS	%/100 Volts
1305	8843	+71.07
1335	10610	+58.88
1365	12742	+45.79
1395	14318	+33.63
1425	15508	+20.16
1455	16229	+13.03
1485	16331	+7.24
1515	17010	+3.77
1545	16898	+1.91
1575	16887	-0.90
1605	16875	+1.55
1635	16794	+2.18
1665	17339	+2.31
1695	17211	+2.26
1725	17258	+1.45
1755	17418	+2.63
1785	17613	>100
1815	17722	

MPC 9600 Plateau Instrument 14 MPC 9604 Detector C 6/13/2017
Alpha Volts: 1545 Beta Volts: 1545

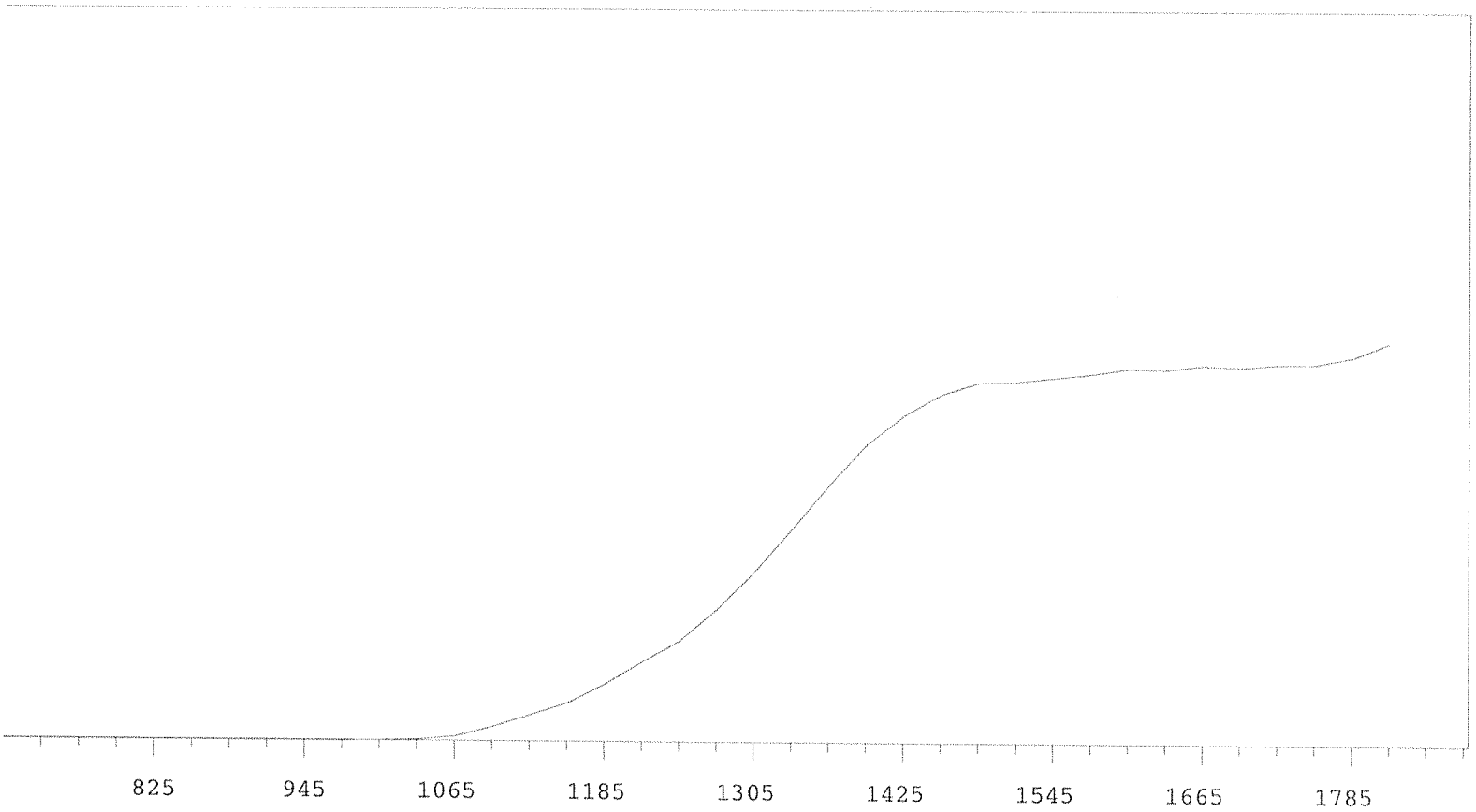


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	1	+0.00
825	0	>100
855	0	+0.00
885	0	>100
915	1	>100
945	0	>100
975	2	>100
1005	7	>100
1035	44	>100
1065	242	>100
1095	630	>100
1125	1183	>100
1155	1788	>100
1185	2527	>100
1215	3325	+94.91
1245	4628	+87.94
1275	5915	+81.86

VOLTS	COUNTS	%/100 Volts
1305	7549	+73.60
1335	9443	+65.10
1365	11478	+53.14
1395	13255	+38.97
1425	14627	+26.10
1455	15371	+15.74
1485	15955	+8.42
1515	16150	+4.33
1545	16216	+1.30
1575	16279	+0.11
1605	16206	+0.82
1635	16181	+0.89
1665	16465	+1.15
1695	16368	+1.98
1725	16394	+3.46
1755	16705	+5.41
1785	17159	-79.25
1815	17348	

MPC 9600 Plateau Instrument 14 MPC 9604 Detector D 6/13/2017

Alpha Volts: 1545 Beta Volts: 1545



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	+0.00
795	0	+83.33
825	0	-83.33
855	1	+0.00
885	0	+83.33
915	0	-83.33
945	1	>100
975	0	>100
1005	5	>100
1035	40	>100
1065	141	>100
1095	435	>100
1125	804	>100
1155	1180	>100
1185	1760	>100
1215	2459	+94.87
1245	3111	+86.23
1275	4091	+80.64

VOLTS	COUNTS	%/100 Volts
1305	5259	+75.53
1335	6588	+65.60
1365	7989	+53.03
1395	9257	+39.60
1425	10171	+26.90
1455	10822	+15.78
1485	11196	+8.47
1515	11238	+4.38
1545	11355	+3.36
1575	11480	+3.11
1605	11648	+2.75
1635	11626	+1.65
1665	11759	+1.12
1695	11712	+1.17
1725	11802	+1.83
1755	11811	+4.90
1785	12034	-79.45
1815	12475	

National Institute of Standards & Technology

Certificate

Received July 10, 2017

1835

Standard Reference Material® 4339b

Radium-228 Radioactivity Standard

This Standard Reference Material (SRM) consists of a solution of a standardized and certified quantity of radioactive radium-228 in a suitably stable and homogeneous matrix. It is intended primarily for the calibration of instruments that are used to measure radioactivity and for the monitoring of radiochemical procedures. A unit of SRM 4339b consists of approximately 5 mL of a solution, whose composition is specified in Tables 1 and 2, contained in a flame-sealed borosilicate-glass ampoule [1].

The certified **radium-228** massic activity value, at a **Reference Time of 1200 EST, 07 October 2010**, is:

$$(195 \pm 14)\ \mathrm{Bq \cdot g^{-1}}$$

A NIST certified value, as used within the context of this certificate, is a value for which NIST has the highest confidence in its uncertainty assessment. It is a "measurement result" [2] obtained directly or indirectly from a "primary reference measurement procedure" [3]. The certified value is traceable to the derived SI unit, Becquerel (Bq).

Additional physical, chemical, and radiological properties for this SRM, as well as details on the standardization method, are given in Tables 1 and 2. Uncertainties for the certified quantities are expanded ($k = 2$). The uncertainties are calculated according to the ISO and NIST Guides [4,5]. Table 3 contains a specification of the components that comprise the uncertainty analyses.

Expiration of Certification: The certification of **SRM 4339b** is valid indefinitely, within the measurement uncertainty specified, provided that the SRM is handled and stored properly and that no evaporation or change in composition has occurred. The solution matrix, in an unopened ampoule, is homogeneous and stable within its half-life-dependent useful lifetime provided the SRM is handled in accordance with instructions given in this certificate (see "Instructions for Handling and Storage"). Periodic recertification of this SRM is not required. The certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

Maintenance of SRM Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification, NIST will notify the purchaser. Registration (see attached sheet) will facilitate notification.

Radiological and Chemical Hazard: Consult the Safety Data Sheet (SDS), enclosed with the SRM shipment, for radiological and chemical hazard information.

This SRM was prepared in the Physical Measurement Laboratory, Radiation and Biomolecular Physics Division, Radioactivity Group, M.P. Unterweger, Group Leader. The overall technical direction and physical measurement leading to certification and photon-emitting impurity analyses were provided by L. Pibida of the NIST Radioactivity Group, with production assistance by J. LaRosa, R. Collé, and L. Laureano-Pérez. Alpha-emitting impurity analyses were provided by J. LaRosa.

Support aspects involved in the issuance of this SRM were coordinated through the NIST Office of Reference Materials.

Lisa R. Karam, Chief
Radiation and Biomolecular Physics Division

Robert L. Watters, Jr., Director
Office of Reference Materials

Gaithersburg, Maryland 20899
Certificate Issue Date: 14 November 2012
SRM 4339b

Table 1. Certified Massic Activity of SRM 4339b

Radionuclide	**Radium-228**[(a)]
Reference time	**1200 EST, 07 October 2010**
Massic activity of the solution	**195 Bq•g^{-1}**
Relative expanded uncertainty (k = 2)	**7.2 %**[(b)]

[(a)] The final ^{228}Ra purification from the ^{232}Th mother solution was performed on 02 September 2010 0920 EST.
[(b)] The uncertainties on certified values are expanded uncertainties, $U = ku_c$. The quantity u_c is the combined standard uncertainty calculated according to the ISO and NIST Guides [4,5]. The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ and was chosen to obtain what is assumed to be an approximate 95 % level of confidence.

Table 2. Uncertified Information of SRM 4339b

Source description	Liquid in a flame-sealed 5 mL borosilicate-glass ampoule [1]
Solution composition	1.3 mol L^{-1} HNO_3 with 19.8 µg g^{-1} Ba^{+2}
Solution density	(1.034 ± 0.002) g mL^{-1} at 20.8 °C[(a)]
Solution mass	(5.180 ± 0.003) g[(a)]
Photon-emitting impurities	^{226}Ra: < 0.5 Bq g^{-1}[(b)]
Alpha-emitting impurities	^{232}Th: < 0.08 Bq g^{-1}[(c)]
Half-lives used	^{228}Ra: (5.75 ± 0.04) a[(d)] [6] ^{228}Ac: (6.15 ± 0.02) h [7] ^{226}Ra: (1600 ± 7) a [8] ^{232}Th: (14.02 ± 0.06) x 10^9 a [9]
Calibration methods (and instruments)	The certified massic activity for ^{228}Ra was obtained by high-resolution gamma-ray spectrometry of three master solution ampoules (eleven separate determinations), as measured on three to five different spectrometers and geometries on each ampoule, and used assumed nuclear data for probabilities per decay for 16 gamma-ray transitions. Confirmatory measurements were performed by 2πα spectrometry of ingrown ^{228}Th with a planar, ion-implanted Si detector.

[(a)] The stated uncertainty is two times the standard uncertainty. See reference 5.
[(b)] Based on gamma-ray spectrometry of forced-fitted peak at 186.2 keV and assuming a probability per decay of 0.0355 [6].
[(c)] The maximum ^{232}Th activity concentration in ^{228}Ra.
[(d)] The stated uncertainty is the standard uncertainty. See reference 5.

Table 3. Uncertainty Evaluation for the Massic Activity of SRM 4339b

	Uncertainty component	Assessment Type[a]	Relative standard uncertainty contribution on massic activity of ^{228}Ra (%)
1	Gamma-ray spectrometry precision; relative standard deviation of the grand mean on the average massic gamma-ray emission rates for 16 measured ^{228}Ac gamma-ray transitions. Each mean in the grand mean is based on 11 determinations with three sources in three to five different detectors. The uncertainty in the determination of the massic gamma-ray emission rate for any one transition in a given determination ranged from typically 0.5 % to 1.5 %. The relative standard deviation of the mean for the average of the 16 lines, for any one determination, was typically 1 %; whereas the relative standard deviation of the grand mean for the average of the 16 lines across all 11 determinations is 0.34 %[b]. Data passes normality test.	A	0.84
2	Uncertainty due to assumed gamma-ray probabilities per decay for the measured ^{228}Ac transitions [7]. The uncertainty on each transition has a shared (correlated) component of 2.5 % (see comments in [7]).	B	3.5
3	Detection efficiencies not embodied within component 1	B	0.4
4	Mass determinations for dilution factors and counting source preparations	B	0.1
5	Decay corrections for ^{228}Ra half-life uncertainty of 0.7 % [6]	B	0.003
6	Effect of ^{228}Ra and ^{228}Ac half-life uncertainties on secular equilibrium ratio	B	0.02
Relative combined standard uncertainty			**3.6**
Relative expanded uncertainty (k = 2)			**7.2**

[a] Letter A denotes evaluation by statistical methods; B denotes evaluation by other methods.
[b] Average massic gamma-ray emission rates of 11 geometries (R_γ) for 16 measured ^{228}Ac gamma-ray transitions with their respective energy (E_γ); assumed gamma-ray probabilities per decay (I_γ) and standard deviation of the mean (S_m).

E_γ (keV)	Assumed I_γ (%) [1]	Mean R_γ ($s^{-1}\cdot g^{-1}$)[i]	S_m (%)[ii]
129.065	2.50	1347	0.38
153.967	0.754	421.6	0.40
209.249	3.97	2264	0.55
270.245	3.55	2014	0.33
328.004	3.04	1822	0.43
338.32	11.4	6712	0.43
409.46	2.02	1185	0.29
463.002	4.45	2645	0.33
755.313	1.03	593.3	0.46
772.291	1.52	899.2	0.53
794.942	4.31	2588	0.35
835.704	1.7	995.3	0.42
911.196	26.2	15609	0.29
964.786	4.99	3007	0.35
968.96	15.9	9582	0.30
1588.2	3.06	1889	0.28

(i) Grand mean for n = 11 determinations with three sources in three to five different detectors.
(ii) Relative standard deviation of the grand mean on R_γ for n = 11.

INSTRUCTIONS FOR HANDLING AND STORAGE

Handling: If the ampoule is transported, it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) because of both the radioactivity and the strong acid. The ampoule should be opened only by persons qualified to handle both radioactive material and alkaline and/or acidic solutions. Appropriate shielding and/or distance should be used to minimize personnel exposure. Refer to SDS for further information.

Storage: SRM 4339b should be stored and used at a temperature between 5 °C and 65 °C. The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material.

REFERENCES

[1] NIST Physical Measurement Laboratory; *Storage and Handling of Radioactive Standard Reference Materials, Ampoule Specifications and Opening Procedure*, available at http://www.nist.gov/pml/div682/grp04/srm.cfm (accessed Nov 2012). Note: This SRM is contained in a generic borosilicate-glass ampoule and not in the standard NIST ampoule.

[2] JCGM 200:2012; *International Vocabulary of Metrology - Basic and General Concepts and Associated Terms (VIM)* (2008 version with Minor Corrections), 3rd edition; Joint Committee for Guides in Metrology: BIPM, Sevres Cedex, France; p. 19 (2012); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_200_2012.pdf (accessed Nov 2012).

[3] JCGM 200:2012; *International Vocabulary of Metrology - Basic and General Concepts and Associated Terms (VIM)* (2008 version with Minor Corrections), 3rd edition; Joint Committee for Guides in Metrology: BIPM, Sevres Cedex, France; p. 18 (2012); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_200_2012.pdf (accessed Nov 2012).

[4] JCGM 100:2008; *Guide to the Expression of Uncertainty in Measurement;* (ISO GUM 1995 with Minor Corrections), Joint Committee for Guides in Metrology: BIPM, Sevres Cedex, France (2008); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_100_2008_E.pdf (accessed Nov 2012).

[5] Taylor, B.N.; Kuyatt, C.E.; *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*; NIST Technical Note 1297, U.S. Government Printing Office: Washington, DC (1994); available at http://physics.nist.gov/Pubs/ (accessed Nov 2012).

[6] Luca, A.; June 2009, ^{228}Ra. LNE-LNHB/CEA Table of Radionuclides, available at http://www.nucleide.org/DDEP_WG/Nuclides/Ra-228_tables.pdf (accessed Nov 2012).

[7] Pearce, A.; January 2010, ^{228}Ac. LNE-LNHB/CEA Table of Radionuclides, available at http://www.nucleide.org/DDEP_WG/Nuclides/Ac-228_tables.pdf (accessed Nov 2012).

[8] Christé, V. and M.M. Bé; December 2006, ^{226}Ra. LNE-LNHB/CEA Table of Radionuclides, available at http://www.nucleide.org/DDEP_WG/Nuclides/Ra-226_tables.pdf (accessed Nov 2012).

[9] Arinc, A.; September 2008, ^{232}Th. LNE-LNHB/CEA Table of Radionuclides, available at http://www.nucleide.org/DDEP_WG/Nuclides/Th-232_tables.pdf (accessed Nov 2012).

Users of this SRM should ensure that the Certificate in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srminfo@nist.gov; or via the Internet at http://www.nist.gov/srm.

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1835
Prepared By:	Tim Chandler
Carrier Conc:	1.3M HNO3
Reference Date:	10/07/2010
Ampoule Mass (g):	5.18 g
Uncertainty:	+/- 3.6 %
LogBook No:	GL-CED-297-128

A Solution Material Info	
Isotope:	Radium-228 SPIKE
Prepared By:	Bethany Fiem
Prep Date:	04/16/2019
Verification Date:	04/23/2019
Expiration Date:	04/23/2020
Primary Code:	1835-A
Dilution(mL):	100 mL
Mass of Parent(g):	5.1513 g
Density(g/mL):	1.0000
Balance ID:	B733529066

Calculations Converting parent activity to dpm/mL|dpm/g

(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / (Dilution Vol) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / Density (g/mL)/ (Dilution Vol) = Parent Activity (dpm/g)
(5.1513 g) * (195 Bq/g) * (60 dpm/Bq) / (100 mL) = 602.7021 dpm/mL
(5.1513 g) * (195 Bq/g) * (60 dpm/Bq) / (1.0000 g/mL) / (100 mL) = 602.7021 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Ra-228 Standard 1835-A

v1.0.2

Instrument	BLUE
Analyst	BXF1
Verification Prep Date	4/23/2019

Standard Information	
Isotope	Ra-228
Serial Number	1835-A
Isotope Halflife	5.7500 Y
Reference Date	10/7/2010
Ref. Act. (DPM/mL)	602.7021
Amount of Std. (mL)	2.0
Standard Prep Date	4/16/2019

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	4/24/2019	119.90	4486.22	44.20
2	4/24/2019	119.50	4488.00	44.20
3	4/24/2019	119.20	4402.61	44.20

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	4442.02	10.037126	221.28	442.56
2	4443.80	10.037126	221.37	442.74
3	4358.41	10.037126	217.11	434.23

	dpm/mL
Mean Value =	219.92
Stdev =	2.430686678
Certificate Value* =	**215.2**
Two sigma =	4.861
10 % of Mean =	21.992
Rule A (Pass/Fail)	**Pass**
% Recovery	102.21%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**4/23/2020**

Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Ra-228 source 1835-A by transferring 2 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCBLUE for Ra-228 source standard verification. The Ra-228 efficiency calibration which was used for verification calculations was performed on 4/23/2019 using Ra-228 source 1809-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

4-24-19

General Engineering Laboratories
GFC Calibration Source Preparation Sheet

Ra-228

Applicable SOP Number: GL-RAD-A-009

Isotope: Ra-228

Date Standards Prepared: 5/15/2019

Standard ID: 1835-A

Matrix of Planchett/Filter: NdF precipitate on 25 mm filter

Amount Used (g or ml): 5.0 mL

Standard Activity (DPM/g or mL): 602.7021

Residue/Carrier Agent: NA

Reference Date: 10/7/2010

Pipette ID Used: 15531079

Expiration Date: 4/23/2020

Balance ID Used: F30560

*** Not Decay Corrected**

want around 3000 dpm in each cal std

Separation Date/Time: 5/15/2019 9:05

	Standard Number	Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
	C1				
	C2				
	C3				
	C4				
	C5				
	C6				
	C7				
	C8				

Prepared By: [signature] Date 5/15/2019

Reviewed By: [signature] Date 5/15/2019

National Institute of Standards & Technology

Certificate

Received 3-9-17

Standard Reference Material® 4339b

1809

Radium-228 Radioactivity Standard

This Standard Reference Material (SRM) consists of a solution of a standardized and certified quantity of radioactive radium-228 in a suitably stable and homogeneous matrix. It is intended primarily for the calibration of instruments that are used to measure radioactivity and for the monitoring of radiochemical procedures. A unit of SRM 4339b consists of approximately 5 mL of a solution, whose composition is specified in Tables 1 and 2, contained in a flame-sealed borosilicate-glass ampoule [1].

The certified **radium-228** massic activity value, at a **Reference Time of 1200 EST, 07 October 2010**, is:

$$(195 \pm 14)\ \mathrm{Bq \cdot g^{-1}}$$

A NIST certified value, as used within the context of this certificate, is a value for which NIST has the highest confidence in its uncertainty assessment. It is a "measurement result" [2] obtained directly or indirectly from a "primary reference measurement procedure" [3]. The certified value is traceable to the derived SI unit, Becquerel (Bq).

Additional physical, chemical, and radiological properties for this SRM, as well as details on the standardization method, are given in Tables 1 and 2. Uncertainties for the certified quantities are expanded ($k = 2$). The uncertainties are calculated according to the ISO and NIST Guides [4,5]. Table 3 contains a specification of the components that comprise the uncertainty analyses.

Expiration of Certification: The certification of **SRM 4339b** is valid indefinitely, within the measurement uncertainty specified, provided that the SRM is handled and stored properly and that no evaporation or change in composition has occurred. The solution matrix, in an unopened ampoule, is homogeneous and stable within its half-life-dependent useful lifetime provided the SRM is handled in accordance with instructions given in this certificate (see "Instructions for Handling and Storage"). Periodic recertification of this SRM is not required. The certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

Maintenance of SRM Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification, NIST will notify the purchaser. Registration (see attached sheet) will facilitate notification.

Radiological and Chemical Hazard: Consult the Safety Data Sheet (SDS), enclosed with the SRM shipment, for radiological and chemical hazard information.

This SRM was prepared in the Physical Measurement Laboratory, Radiation and Biomolecular Physics Division, Radioactivity Group, M.P. Unterweger, Group Leader. The overall technical direction and physical measurement leading to certification and photon-emitting impurity analyses were provided by L. Pibida of the NIST Radioactivity Group, with production assistance by J. LaRosa, R. Collé, and L. Laureano-Pérez. Alpha-emitting impurity analyses were provided by J. LaRosa.

Support aspects involved in the issuance of this SRM were coordinated through the NIST Office of Reference Materials.

Lisa R. Karam, Chief
Radiation and Biomolecular Physics Division

Robert L. Watters, Jr., Director
Office of Reference Materials

Gaithersburg, Maryland 20899
Certificate Issue Date: 14 November 2012
SRM 4339b

GI-CED-297-10

Table 1. Certified Massic Activity of SRM 4339b

Radionuclide	**Radium-228[a]**
Reference time	**1200 EST, 07 October 2010**
Massic activity of the solution	**195 Bq g^{-1}**
Relative expanded uncertainty (k = 2)	**7.2 %[b]**

[a] The final ^{228}Ra purification from the ^{232}Th mother solution was performed on 02 September 2010 0920 EST.
[b] The uncertainties on certified values are expanded uncertainties, $U = ku_c$. The quantity u_c is the combined standard uncertainty calculated according to the ISO and NIST Guides [4,5]. The combined standard uncertainty is multiplied by a coverage factor of k = 2 and was chosen to obtain what is assumed to be an approximate 95 % level of confidence.

Table 2. Uncertified Information of SRM 4339b

Source description	Liquid in a flame-sealed 5 mL borosilicate-glass ampoule [1]
Solution composition	1.3 mol L^{-1} HNO_3 with 19.8 µg g^{-1} Ba^{+2}
Solution density	(1.034 ± 0.002) g mL^{-1} at 20.8 °C[a]
Solution mass	(5.180 ± 0.003) g[a]
Photon-emitting impurities	^{226}Ra: < 0.5 Bq g^{-1}[b]
Alpha-emitting impurities	^{232}Th: < 0.08 Bq g^{-1}[c]
Half-lives used	^{228}Ra: (5.75 ± 0.04) a[d] [6] ^{228}Ac: (6.15 ± 0.02) h [7] ^{226}Ra: (1600 ± 7) a [8] ^{232}Th: (14.02 ± 0.06) x 10^9 a [9]
Calibration methods (and instruments)	The certified massic activity for ^{228}Ra was obtained by high-resolution gamma-ray spectrometry of three master solution ampoules (eleven separate determinations), as measured on three to five different spectrometers and geometries on each ampoule, and used assumed nuclear data for probabilities per decay for 16 gamma-ray transitions. Confirmatory measurements were performed by 2πα spectrometry of ingrown ^{228}Th with a planar, ion-implanted Si detector.

[a] The stated uncertainty is two times the standard uncertainty. See reference 5.
[b] Based on gamma-ray spectrometry of forced-fitted peak at 186.2 keV and assuming a probability per decay of 0.0355 [6].
[c] The maximum ^{232}Th activity concentration in ^{228}Ra.
[d] The stated uncertainty is the standard uncertainty. See reference 5.

Table 3. Uncertainty Evaluation for the Massic Activity of SRM 4339b

	Uncertainty component	Assessment Type[a]	Relative standard uncertainty contribution on massic activity of ^{228}Ra (%)
1	Gamma-ray spectrometry precision; relative standard deviation of the grand mean on the average massic gamma-ray emission rates for 16 measured ^{228}Ac gamma-ray transitions. Each mean in the grand mean is based on 11 determinations with three sources in three to five different detectors. The uncertainty in the determination of the massic gamma-ray emission rate for any one transition in a given determination ranged from typically 0.5 % to 1.5 %. The relative standard deviation of the mean for the average of the 16 lines, for any one determination, was typically 1 %; whereas the relative standard deviation of the grand mean for the average of the 16 lines across all 11 determinations is 0.34 %[b]. Data passes normality test.	A	0.84
2	Uncertainty due to assumed gamma-ray probabilities per decay for the measured ^{228}Ac transitions [7]. The uncertainty on each transition has a shared (correlated) component of 2.5 % (see comments in [7]).	B	3.5
3	Detection efficiencies not embodied within component 1	B	0.4
4	Mass determinations for dilution factors and counting source preparations	B	0.1
5	Decay corrections for ^{228}Ra half-life uncertainty of 0.7 % [6]	B	0.003
6	Effect of ^{228}Ra and ^{228}Ac half-life uncertainties on secular equilibrium ratio	B	0.02
Relative combined standard uncertainty			**3.6**
Relative expanded uncertainty (k = 2)			**7.2**

[a] Letter A denotes evaluation by statistical methods; B denotes evaluation by other methods.
[b] Average massic gamma-ray emission rates of 11 geometries (R_γ) for 16 measured ^{228}Ac gamma-ray transitions with their respective energy (E_γ); assumed gamma-ray probabilities per decay (I_γ) and standard deviation of the mean (S_m).

E_γ (keV)	Assumed I_γ (%) [1]	Mean R_γ (s^{-1} g^{-1})[i]	S_m (%)[ii]
129.065	2.50	1347	0.38
153.967	0.754	421.6	0.40
209.249	3.97	2264	0.55
270.245	3.55	2014	0.33
328.004	3.04	1822	0.43
338.32	11.4	6712	0.43
409.46	2.02	1185	0.29
463.002	4.45	2645	0.33
755.313	1.03	593.3	0.46
772.291	1.52	899.2	0.53
794.942	4.31	2588	0.35
835.704	1.7	995.3	0.42
911.196	26.2	15609	0.29
964.786	4.99	3007	0.35
968.96	15.9	9582	0.30
1588.2	3.06	1889	0.28

(i) Grand mean for n = 11 determinations with three sources in three to five different detectors.
(ii) Relative standard deviation of the grand mean on R_γ for n = 11.

INSTRUCTIONS FOR HANDLING AND STORAGE

Handling: If the ampoule is transported, it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) because of both the radioactivity and the strong acid. The ampoule should be opened only by persons qualified to handle both radioactive material and alkaline and/or acidic solutions. Appropriate shielding and/or distance should be used to minimize personnel exposure. Refer to SDS for further information.

Storage: SRM 4339b should be stored and used at a temperature between 5 °C and 65 °C. The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material.

REFERENCES

[1] NIST Physical Measurement Laboratory; *Storage and Handling of Radioactive Standard Reference Materials, Ampoule Specifications and Opening Procedure*, available at http://www.nist.gov/pml/div682/grp04/srm.cfm (accessed Nov 2012). Note: This SRM is contained in a generic borosilicate-glass ampoule and not in the standard NIST ampoule.

[2] JCGM 200:2012; *International Vocabulary of Metrology - Basic and General Concepts and Associated Terms (VIM)* (2008 version with Minor Corrections), 3rd edition; Joint Committee for Guides in Metrology: BIPM, Sevres Cedex, France; p. 19 (2012); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_200_2012.pdf (accessed Nov 2012).

[3] JCGM 200:2012; *International Vocabulary of Metrology - Basic and General Concepts and Associated Terms (VIM)* (2008 version with Minor Corrections), 3rd edition; Joint Committee for Guides in Metrology: BIPM, Sevres Cedex, France; p. 18 (2012); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_200_2012.pdf (accessed Nov 2012).

[4] JCGM 100:2008; *Guide to the Expression of Uncertainty in Measurement;* (ISO GUM 1995 with Minor Corrections), Joint Committee for Guides in Metrology: BIPM, Sevres Cedex, France (2008); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_100_2008_E.pdf (accessed Nov 2012).

[5] Taylor, B.N.; Kuyatt, C.E.; *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*; NIST Technical Note 1297, U.S. Government Printing Office: Washington, DC (1994); available at http://physics.nist.gov/Pubs/ (accessed Nov 2012).

[6] Luca, A.; June 2009, ^{228}Ra. LNE-LNHB/CEA Table of Radionuclides, available at http://www.nucleide.org/DDEP_WG/Nuclides/Ra-228_tables.pdf (accessed Nov 2012).

[7] Pearce, A.; January 2010, ^{228}Ac. LNE-LNHB/CEA Table of Radionuclides, available at http://www.nucleide.org/DDEP_WG/Nuclides/Ac-228_tables.pdf (accessed Nov 2012).

[8] Christé, V. and M.M. Bé; December 2006, ^{226}Ra. LNE-LNHB/CEA Table of Radionuclides, available at http://www.nucleide.org/DDEP_WG/Nuclides/Ra-226_tables.pdf (accessed Nov 2012).

[9] Arinc, A.; September 2008, ^{232}Th. LNE-LNHB/CEA Table of Radionuclides, available at http://www.nucleide.org/DDEP_WG/Nuclides/Th-232_tables.pdf (accessed Nov 2012).

Users of this SRM should ensure that the Certificate in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srminfo@nist.gov; or via the Internet at http://www.nist.gov/srm.

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1809
Prepared By:	Tim Chandler
Carrier Conc:	1.3M HNO3
Reference Date:	10/07/2010
Ampoule Mass (g):	5.18 g
Uncertainty:	+/- 3.6 %
LogBook No:	GL-CED-297-102

A Solution Material Info	
Isotope:	Radium-228 SPIKE
Prepared By:	Bethany Fiem
Prep Date:	09/15/2017
Verification Date:	04/23/2019
Expiration Date:	04/23/2020
Primary Code:	1809-A
Dilution(mL):	200 mL
Mass of Parent(g):	5.1542 g
Density(g/mL):	1.0243
Balance ID:	C31514

Calculations Converting parent activity to dpm/mL|dpm/g

(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / (Dilution Vol) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / Density (g/mL)/ (Dilution Vol) = Parent Activity (dpm/g)
(5.1542 g) * (195 Bq/g) * (60 dpm/Bq) / (200 mL) = 301.5207 dpm/mL
(5.1542 g) * (195 Bq/g) * (60 dpm/Bq) / (1.0243 g/mL) / (200 mL) = 294.3819 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Ra-228 Standard 1809-A

v1.0.2

Instrument	BLUE
Analyst	BXF1
Verification Prep Date	4/23/2019

Standard Information	
Isotope	Ra-228
Serial Number	1809-A
Isotope Halflife	5.7500 Y
Reference Date	10/7/2010
Ref. Act. (DPM/mL)	301.5207
Amount of Std. (mL)	2.0
Standard Prep Date	9/15/2017

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	4/24/2019	119.30	2215.16	44.20
2	4/24/2019	118.80	2224.89	44.20
3	4/24/2019	119.50	2221.98	44.20

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	2170.96	10.087325	107.61	215.22
2	2180.69	10.087325	108.09	216.18
3	2177.78	10.087325	107.95	215.89

	dpm/mL
Mean Value =	107.88
Stdev =	0.247549278
Certificate Value* =	**107.6**
Two sigma =	0.495
10 % of Mean =	10.788
Rule A (Pass/Fail)	**Pass**
% Recovery	100.23%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**4/23/2020**

Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Ra-228 source 1809-A by transferring 2 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCBLUE for Ra-228 source standard verification. The Ra-228 efficiency calibration which was used for verification calculations was performed on 4/23/2019 using Ra-228 source 1810-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

4-24-19

General Engineering Laboratories
GFC Verification Source Preparation Sheet

Ra-228

Applicable SOP Number	GL-RAD-A-009	Isotope	Ra-228
Date Standards Prepared	5/16/2019		
Standard ID	1809-A	Matrix of Planchett/Filter	NdF precipitate on 25 mm filter
Amount Used (g or ml)	2.0 mL		
Standard Activity (DPM/g or mL)	301.5207	Residue/Carrier Agent	NA
Reference Date	10/7/2010	Pipette ID Used	15505391
Expiration Date	4/23/2020	Balance ID Used	F30560

*** Not Decay Corrected**

Separation Date/Time: 5/16/2019 8:35
* 5/21/2019 8:50

	Standard Number	Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
	V1				
	V2				
	V3				
	V4				
	V5				
	V6				
	V7				
	V8				
	* V12				

Prepared By: _____ Date 5/16/2019

Reviewed By: _____ Date 5/16/2019

RAD Standards Traceability

0487

National Institute of Standards & Technology

0487

Certificate

Standard Reference Material 4251C
Barium-133 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive barium-133 chloride, non-radioactive barium chloride, and hydrochloric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of ionization chambers and solid-state gamma-ray spectrometry systems.

Radiological Hazard

The SRM ampoule contains barium-133 with a total activity of approximately 2.5 MBq. Barium-133 decays by electron capture and during the decay process X-rays and gamma rays with energies from 4 to 400 keV are emitted. Most of these photons escape from the SRM ampoule and can represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. Appropriate shielding and/or distance should be used to minimize personnel exposure. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains hydrochloric acid (HCl) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least June 2004.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group and D.B. Golas, Nuclear Energy Institute Research Associate.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
October 1994

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

RC-S-035-002a

Recommended Procedure for Opening the SRM Ampoule

1) If the SRM solution is to be diluted, it is recommended that the diluting solution have an acid concentration and a carrier concentration comparable to that of the SRM solution.

2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it. Work in a fume hood. In addition to the radioactive material, the solution contains strong acid and is corrosive.

3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.

4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process.

5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.

6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.

7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.

8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle. NEVER PIPETTE BY MOUTH.

9) Seal any unused SRM solution in a flame-sealed glass ampoule, if possible, to minimize the evaporation loss.

See also reference [4]*.

*Notes and references are on pages 5 and 6.

RC-S-035-002b

PROPERTIES OF SRM 4251C
(Certified values are shown in bold type)

Source identification number	NIST SRM 4251C		
Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule		
Ampoule specifications	Body outside diameter Wall Thickness Barium content Lead-oxide content Other heavy elements	(16.5 ± 0.5) mm (0.60 ± 0.04) mm Less than 2.5% Less than 0.02% Trace quantities	
Solution density	**(1.015 ± 0.002) g•mL^{-1} at 22.1 °C [b]***		
Solution mass	**(5.054 ± 0.001) g [b]**		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration (mol•L^{-1})	Mass Fraction (g•g^{-1})
	H_2O	54	0.96
	HCl	1.0	0.04
	$BaCl_2$	6×10^{-4}	1.2×10^{-4}
	$^{133}BaCl_2$	4×10^{-7}	8×10^{-8}
Radiological Properties:			
Radionuclide	**Barium-133**		
Reference time	**1200 EST, 1 September 1993**		
Massic activity of the solution [c] (Activity per unit mass of solution)	**4.876×10^5 Bq•g^{-1}**		
Relative expanded uncertainty (k=2)	**0.52% [d]**		
Photon-emitting impurities	None detected [e]		
Half lives used	Barium-133: (10.52 ± 0.13) a [f] Radium-226: (1600 ± 7) a [f]		
Measuring instrument	Pressurized "4π"γ ionization chamber A calibrated using a barium-133 solution whose activity was determined by 4π(e+X)-γ-anticoincidence counting		

*Notes and references are on pages 5 and 6.

RC-S-035-002

EVALUATION OF THE UNCERTAINTY OF THE MASSIC ACTIVITY [d]*

Input Quantity x_i, the source of uncertainty (and individual uncertainty components where appropriate)	Method Used To Evaluate $u(x_i)$, the standard uncertainty of x_i (A) denotes evaluation by statistical methods (B) denotes evaluation by other methods	Relative Uncertainty Of Input Quantity, $u(x_i)/x_i$, (%) [g]	Relative Sensitivity Factor, $\lvert\partial y/\partial x_i\rvert \cdot (x_i/y)$ [h]	Relative Uncertainty Of Output Quantity, $u_i(y)/y$, (%) [i]
PIC A net response per gram of SRM 4251C, measured relative to RRS20 [j]	Standard deviation of the mean for 1000 repeated measurements (A)	0.008	1.0	0.01
PIC A background response, measured relative to RRS20	Standard deviation of the mean for >150 repeated measurements (A)	0.25	0.001 [k]	0.00
PIC A net response for RRS200, measured relative to RRS20	Standard deviation of the mean for >100 repeated measurements (A)	0.06	1.0	0.06
PIC A net response per Bq of barium-133 in solution, measured relative to RRS200.	Standard deviation of the mean for 240 repeated measurements (A)	0.02	1.0	0.02
Gravimetric measurements	Estimated (B)	0.01	1.0	0.01
Half life of barium-133 Half life of radium-226	Standard uncertainty of the half life (A)	1.24 [m] 0.44 [m]	0.004 [n] 0.004 [n]	0.00 0.00
Activity used to calibrate PIC A net response per Bq of barium-133 in solution	Standard uncertainty of the activity determined by $4\pi(e+X)$-γ-anticoincidence counting. (B)	0.22	1.0	0.22
Live-time [p]	Estimated (B)	0.10	1.0	0.10
PIC A charge collection	Estimated (B)	0.05	1.0	0.05
Source Positioning	Estimated (B)	0.05	1.0	0.05
Photon-emitting impurities	Limit of detection for Cs-134 (B) [q]	100.	0.00002	0.00
Relative Combined Standard Uncertainty of the Output Quantity, $u_c(y)/y$, (%)				0.26
Coverage Factor, k				x 2
Relative Expanded Uncertainty of the Output Quantity, U/y, (%)				0.52

*Notes and references are on pages 5 and 6.

RC-S-035-002

NOTES

[a] The Sievert is the SI unit for dose equivalent. See reference [1]. One μSv is equal to 0.1 mrem.

Distance from Ampoule (cm):	1	30	100
Approximate Dose Rate (μSv/h):	100	1.5	0.2

[b] The stated uncertainty is two times the standard uncertainty.

[c] **Massic activity** is the preferred name for the quantity activity divided by the total mass of the sample. See reference [1].

[d] The reported value, y, of massic activity (activity per unit mass) at the reference time was not measured directly but was derived from measurements and calculations of other quantities. This can be expressed as $y = f(x_1, x_2, x_3, \ldots x_n)$, where f is a mathematical function derived from the assumed model of the measurement process.

The value, x_i, used for each input quantity i has a **standard uncertainty**, $u(x_i)$, that generates a corresponding uncertainty in y, $u_i(y) \equiv |\partial y/\partial x_i| \cdot u(x_i)$, called a **component of combined standard uncertainty** of y.

The **combined standard uncertainty** of y, $u_c(y)$, is the positive square root of the sum of the squares of the components of combined standard uncertainty.

The combined standard uncertainty is multiplied by a **coverage factor** of $k = 2$ to obtain U, the **expanded uncertainty** of y.

Since it can be assumed that the possible estimated values of the massic activity are approximately normally distributed with approximate standard deviation $u_c(y)$, the unknown value of the massic activity is believed to lie in the interval $y \pm U$ with a level of confidence of approximately 95 percent.

For further information on the expression of uncertainties, see references [2] and [3].

[e] Estimated limits of detection for photon-emitting impurities are:
600 $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 12 and 75 keV,
150 $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 84 and 379 keV, and
3 $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 387 and 2700 keV, provided that the photons are separated in energy by 4 keV or more from photons emitted in the decay of barium-133.

[f] The stated uncertainty is the standard uncertainty. See reference [5].

[g] Relative standard uncertainty of the input quantity x_i.

[h] The relative change in the output quantity y divided by the relative change in the input quantity x_i. If $|\partial y/\partial x_i| \cdot (x_i/y) = 1.0$, then a 1% change in x_i results in a 1% change in y. If $|\partial y/\partial x_i| \cdot (x_i/y) = 0.05$, then a 1% change in x_i results in a 0.05% change in y.

[i] Relative component of combined standard uncertainty of output quantity y, rounded to two decimal places. The relative component of combined standard uncertainty of y is given by $u_i(y)/y \equiv |\partial y/\partial x_i| \cdot u(x_i)/y = |\partial y/\partial x_i| \cdot (x_i/y) \cdot u(x_i)/x_i$. The numerical values of $u(x_i)/x_i$, $|\partial y/\partial x_i| \cdot (x_i/y)$, and $u_i(y)/y$, all dimensionless quantities, are listed in columns 3, 4, and 5, respectively. Thus, the value in column 5 is equal to the value in column 4 multiplied by the value in column 3. The input quantities are independent, or very nearly so. Hence the covariances are zero or negligible.

RC-S-035-002e

[j] The response of pressurized ionization chamber A (PIC A) is determined from measurement of the time required to collect a given amount of charge on a stable fixed capacitor. All of the response measurements in the NIST pressurized ionization chambers are made relative to the response of one or more artifact standards. These artifact standards consist of microgram quantities of aged radium-226 in small welded stainless-steel capsules. These capsules are encapsulated in plastic rods whose dimensions are similar to those of the standard NIST ampoule. The artifact standards are called **Radium Reference Sources** and are designated as RRSx, where x is the nominal mass (in micrograms) of radium-226 in the capsule.

[k] $|\partial y/\partial x_i| \cdot (x_i/y)$ = (average background response)/(average net sample response)

[m] The relative standard uncertainty of $\lambda \cdot t$ is determined by the relative standard uncertainty of λ (i.e., of the half life). The relative standard uncertainty of t is negligible.

[n] $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$

[p] The live time is determined by counting the pulses from a gated oscillator.

[q] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e. $u(x_i)/x_i$ = 100%. $|\partial y/\partial x_i| \cdot (x_i/y)$ = {(response per Bq of impurity)/(response per Bq of Ba-133)}•{(Bq of impurity)/(Bq of Ba-133)}. Thus $u_i(y)/y$ is the relative change in y if the impurity were present with a massic activity equal to the estimated limit of detection.

REFERENCES

[1] International Organization for Standardization (ISO), *ISO Standards Handbook - Quantities and Units*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900.

[2] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900. (Listed under ISO miscellaneous publications as "ISO Guide to the Expression 1993".)

[3] B. N. Taylor and C. E. Kuyatt, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20407, U.S.A.

[4] National Council on Radiation Protection and Measurements Report No. 58, *A Handbook of Radioactivity Measurements Procedures*, Second Edition, 1985. Available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Bethesda, MD 20814 U.S.A.

[5] Evaluated Nuclear Structure Data File (ENSDF), April 1994.

RC-S-035-002f

Standard Traceability Log Rad

Source Material Info	
Parent Code:	0487
Prepared By:	Angela Johnson
Carrier Conc:	0.1 M HCL
Reference Date:	09/01/1993
Ampoule Mass (g):	5.054 g
Uncertainty:	+/- .26 %
LogBook No:	RC S 035 002

A Solution Material Info			
Isotope:	Barium-133		
Prepared By:	Angela Johnson		
Prep Date:	10/31/2002		
Verification Date:	01/14/2019		
Expiration Date:	01/14/2020		
Primary Code:	0487-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	4.7696 g		
Density(g/mL):	0.9984	Balance ID:	

Calculations Converting parent activity to dpm/mL|dpm/g

(Mass of parent(g)) * (Parm Activity (bq/g)) * (conversion dpm to bq) / (Dilution Vol) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (bq/g)) * (conversion dpm to bq) / Density (g/mL)/ (Dilution Vol) = Parent Activity (dpm/g)
(4.7696 g) * (487600 bq/g) * (60 dpm/bq) / (100 mL) = 1395394.1760 dpm/mL
(4.7696 g) * (487600 bq/g) * (60 dpm/bq) / (0.9984 g/mL) / (100 mL) = 1397609.3930 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
12/18/2015	Gregory Ramsay	15.0062	1000	0487-B	20972.806 dpm/mL	11/18/2016	11/18/2017
01/17/2017	Bethany Fiem	15.1795	1000	0487-C	21215.0117 dpm/mL	01/17/2017	01/17/2018
11/08/2017	Bethany Fiem	15.5573	1000	0487-D	21708.5658 dpm/mL	10/10/2018	10/10/2019
01/14/2019	Bethany Fiem	15.0723	1000	0487-E	21065.188 dpm/mL	01/14/2019	01/14/2020

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Ba-133 Standard 0487-E

v1.0.2

Instrument	SILVER
Analyst	BXF1
Verification Prep Date	1/14/2019

Standard Information	
Isotope	Ba-133
Serial Number	0487-E
Isotope Halflife	3.8410E+03 D
Reference Date	9/1/1993
Ref. Act. (DPM/mL)	21065.188
Amount of Std. (mL)	1.0
Standard Prep Date	1/14/2019

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	1/14/2019	90.80	3292.13	40.80
2	1/14/2019	91.40	3305.25	40.80
3	1/14/2019	92.60	3310.49	40.80

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	3251.33	0.826532	3933.70	3933.70
2	3264.45	0.826532	3949.58	3949.58
3	3269.69	0.826532	3955.92	3955.92

	dpm/mL
Mean Value =	3946.40
Stdev =	11.44255763
Certificate Value* =	**3957.0**
Two sigma =	22.885
10 % of Mean =	394.640
Rule A (Pass/Fail)	**Pass**
% Recovery	99.73%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**1/14/2020**

Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Ba-133 source 0487-E by transferring 1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCSILVER for Ba-133 source standard verification. The Ba-133 efficiency calibration which was used for verification calculations was performed on 1/14/2019 using Ba-133 source 1601-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

1-25-19

1/29/19

Standardization of Barium Carrier 2948176

v1.2.1

Analyst	BMF

Standard Information	
Isotope	Barium
Serial Number	2948176
Amount of Std. (mL)	1.0
Standard Prepared	6/25/2019

Parent Information	
Parent Serial #	2633844.1
Parent Exp. Date	3/12/2021

Std #	Weight of carrier added (g)	Weight of crucible or filter (g)	Weight of crucible or filter + ppt. (g)	Weight of ppt. (g)	mg Barium/mL	mg Barium/g
1	1.0100	0.0751	0.1023	0.0272	27.20	26.93
2	1.0300	0.0757	0.1030	0.0273	27.30	26.50
3	1.0300	0.0757	0.1028	0.0271	27.10	26.31
4	1.0200	0.0754	0.1024	0.0270	27.00	26.47

Mean Value (mg/mL) =	27.15
Stdev (mg/mL) =	± 0.13
1.0% of Mean Value =	0.271500
	Pass
Expiration Date	6/25/2020
Mean Value (mg/1.0mL) =	27.15

Standardization Rule

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

6-26-19

Nycomed Amersham plc
Amersham Laboratories

[redacted]

NAMAS
CALIBRATION
No. 0146

ISSUED BY:	Nycomed Amersham plc Radiation & Radioactivity Calibration Laboratory Amersham Laboratories White Lion Road Amersham Buckinghamshire HP7 9LL	ISSUED FOR:	AEA Technology plc Isotrak Amersham Laboratories White Lion Road Amersham Buckinghamshire HP7 9LL

Description Principal radionuclide: Radium-226

Product code: RAY44
Solution number: R4/131/89

Measurement Reference time: 1200 GMT on 15 December 1999

Nuclear data Nuclear data quoted on this certificate are taken from the Joint European File, Version 2.2.

Expression of uncertainties The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2.00, which for a *t*-distribution with $\nu_{eff} = \infty$ effective degrees of freedom corresponds to a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Unless indicated, all other uncertainties are expressed at the confidence level associated with one standard uncertainty.

The format used for the uncertainties in the values of radionuclidic purity is illustrated in the following examples;

6.5(21)	=	6.5 ± 2.1
6.54(21)	=	6.54 ± 0.21
6.543(21)	=	6.543 ± 0.021

Approved Signatory

Date of issue 17th December 1999

Nycomed Amersham

B D D Singleton

This certificate is issued in accordance with the requirements of the United Kingdom Accreditation Service as specified in the NAMAS Accreditation Standard and NAMAS regulations. It provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not

RC-S-028-128 A

0299

[redacted]

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

Measurement	Reference time for solution number R4/131/89:	1200 GMT on 15 December 1999	
	Radioactive concentration of radium-226:	43.75	kilobecquerels per gram of solution
	which is equivalent to:	1.183	microcuries per gram of solution
	Mass of solution:	5.0368	grams
	Total activity of radium-226:	220.4	kilobecquerels
	which is equivalent to:	5.956	microcuries
	Recommended half life:	1600	years

Method of measurement:
The activity of the solution was measured using a high pressure re-entrant ionisation chamber calibrated with a large number of absolutely standardised solutions.

Calibration date: 15 December 1999
The calibration date is provided for added information only, and must not be confused with the reference date on pages 1 and 2 of the certificate. It is the reference date that must be used in all calculations relating to the values of activity.

Accuracy

Expanded uncertainty in the radioactive concentration quoted above: ± 2.5 %

Combined Type A uncertainty: ± 0.2 %

Combined Type B uncertainty: ± 1.3 %

Radionuclidic purity

The estimated activities of any radioactive impurities found by high-resolution gamma ray spectrometry, or in any other examination of the solution, are listed below expressed as percentages of the activity of the principal radionuclide at the reference time.

Chemical composition

Carrier free in 0.5M HCl.

Remarks

This product meets the quality assurance requirements for achieving traceability to NIST as defined in ANSI N42.22-1995.

1 year = 365.25 days

At the reference date radium-226 was shown to be in radioactive equilibrium with its daughter nuclides down the decay chain to polonium-214 and thallium-210, the precursors of lead-210. The ionisation chamber was calibrated using a standard supplied by the National Institute of Standards and Technology, Washington DC, USA.

RC-S-028-128 B

Standard Traceability Log Rad

Source Material Info	
Parent Code:	0299
Prepared By:	Angela Johnson
Carrier Conc:	0.5 M HCL
Reference Date:	12/15/1999
Ampoule Mass (g):	5.0368 g
Uncertainty:	+/- 2.5 %
LogBook No:	RC S 027 128

A Solution Material Info			
Isotope:	Radium-226		
Prepared By:	Angela Johnson		
Prep Date:	09/15/2000		
Verification Date:	04/14/2016		
Expiration Date:	04/14/2017		
Primary Code:	0299-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	4.6634 g		
Density(g/mL):	1.0011	Balance ID:	C31514

Calculations Converting parent activity to dpm/mL|dpm/g

(Mass of parent(g)) * (Parm Activity (kBq/g)) * (conversion dpm to kBq) / (Dilution Vol) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (kBq/g)) * (conversion dpm to kBq) / Density (g/mL)/ (Dilution Vol) = Parent Activity (dpm/g)
(4.6634 g) * (43.75 kBq/g) * (60000 dpm/kBq) / (100 mL) = 122414.2500 dpm/mL
(4.6634 g) * (43.75 kBq/g) * (60000 dpm/kBq) / (1.0011 g/mL) / (100 mL) = 122280.0000 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
08/26/2003	Angela Johnson	1.9909	100	0299-E	2434.34 dpm/mL	11/04/2004	11/04/2005
08/26/2003	Angela Johnson	1.9872	100	0299-F	2429.82 dpm/mL	08/26/2004	08/26/2005
04/05/2005	Amanda Fehr	5.0018	250	0299-G	2446.3471 dpm/mL	01/26/2009	01/26/2010
08/07/2009	Mary Aders	5.0767	250	0299-H	2483.2133 dpm/mL	12/04/2018	12/04/2019
03/15/2011	Gregory Ramsay	5.0716	250	0299-I	2480.4858 dpm/mL	01/08/2016	01/08/2017
05/29/2012	Gregory Ramsay	1.5087	100	0299-J	1844.73785 dpm/mL	06/16/2018	07/01/2020

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Ra-226 Standard 0299-H

v1.0.2

Instrument	YELLOW
Analyst	BXF1
Verification Prep Date	12/4/2018

Standard Information	
Isotope	Ra-226
Serial Number	0299-H
Isotope Halflife	1.6000E+03 Y
Reference Date	12/15/1999
Ref. Act. (DPM/mL)	2483.2133
Amount of Std. (mL)	0.5
Standard Prep Date	8/7/2009

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	12/8/2018	759.82	932.10	4.70
2	12/8/2018	758.84	937.30	4.70
3	12/8/2018	758.71	933.30	4.70

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	927.40	0.721758	2569.84	1284.92
2	932.60	0.721758	2584.25	1292.12
3	928.60	0.721758	2573.16	1286.58

	dpm/mL
Mean Value =	2575.75
Stdev =	7.544753289
Certificate Value* =	**2462.9**
Two sigma =	15.090
10 % of Mean =	257.575
Rule A (Pass/Fail)	**Pass**
% Recovery	104.58%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**12/4/2019**

Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Ra-226 source 0299-H by transferring 0.5 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCYELLOW for Ra-226 source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 12/4/2018 using Ra-226 source 0024-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

12-10-18

12/11/18

1905

National Institute of Standards & Technology

Certificate

Received 6-10-2019 TOC

Standard Reference Material® 4339b

Radium-228 Radioactivity Standard

This Standard Reference Material (SRM) consists of a solution of a standardized and certified quantity of radioactive radium-228 in a suitably stable and homogeneous matrix. It is intended primarily for the calibration of instruments that are used to measure radioactivity and for the monitoring of radiochemical procedures. A unit of SRM 4339b consists of approximately 5 mL of a solution, whose composition is specified in Tables 1 and 2, contained in a flame-sealed borosilicate-glass ampoule [1].

The certified **radium-228** massic activity value, at a **Reference Time of 1200 EST, 07 October 2010**, is:

$$(195 \pm 14)\ \mathrm{Bq \cdot g^{-1}}$$

A NIST certified value, as used within the context of this certificate, is a value for which NIST has the highest confidence in its uncertainty assessment. It is a "measurement result" [2] obtained directly or indirectly from a "primary reference measurement procedure" [3]. The certified value is traceable to the derived SI unit, Becquerel (Bq).

Additional physical, chemical, and radiological properties for this SRM, as well as details on the standardization method, are given in Tables 1 and 2. Uncertainties for the certified quantities are expanded ($k = 2$). The uncertainties are calculated according to the ISO and NIST Guides [4,5]. Table 3 contains a specification of the components that comprise the uncertainty analyses.

Expiration of Certification: The certification of **SRM 4339b** is valid indefinitely, within the measurement uncertainty specified, provided that the SRM is handled and stored properly and that no evaporation or change in composition has occurred. The solution matrix, in an unopened ampoule, is homogeneous and stable within its half-life-dependent useful lifetime provided the SRM is handled in accordance with instructions given in this certificate (see "Instructions for Handling and Storage"). Periodic recertification of this SRM is not required. The certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

Maintenance of SRM Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification, NIST will notify the purchaser. Registration (see attached sheet) will facilitate notification.

Radiological and Chemical Hazard: Consult the Safety Data Sheet (SDS), enclosed with the SRM shipment, for radiological and chemical hazard information.

This SRM was prepared in the Physical Measurement Laboratory, Radiation and Biomolecular Physics Division, Radioactivity Group, M.P. Unterweger, Group Leader. The overall technical direction and physical measurement leading to certification and photon-emitting impurity analyses were provided by L. Pibida of the NIST Radioactivity Group, with production assistance by J. LaRosa, R. Collé, and L. Laureano-Pérez. Alpha-emitting impurity analyses were provided by J. LaRosa.

Support aspects involved in the issuance of this SRM were coordinated through the NIST Office of Reference Materials.

Lisa R. Karam, Chief
Radiation and Biomolecular Physics Division

Robert L. Watters, Jr., Director
Office of Reference Materials

Gaithersburg, Maryland 20899
Certificate Issue Date: 14 November 2012
SRM 4339b

TOC 6-10-19

GL-CED-297-198a

1905

Table 1. Certified Massic Activity of SRM 4339b

Radionuclide	**Radium-228[a]**
Reference time	**1200 EST, 07 October 2010**
Massic activity of the solution	**195 Bq•g^{-1}**
Relative expanded uncertainty (k = 2)	**7.2 %[b]**

[a] The final ^{228}Ra purification from the ^{232}Th mother solution was performed on 02 September 2010 0920 EST.
[b] The uncertainties on certified values are expanded uncertainties, $U = ku_c$. The quantity u_c is the combined standard uncertainty calculated according to the ISO and NIST Guides [4,5]. The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ and was chosen to obtain what is assumed to be an approximate 95 % level of confidence.

Table 2. Uncertified Information of SRM 4339b

Source description	Liquid in a flame-sealed 5 mL borosilicate-glass ampoule [1]
Solution composition	1.3 mol L^{-1} HNO_3 with 19.8 µg g^{-1} Ba^{+2}
Solution density	(1.034 ± 0.002) g mL^{-1} at 20.8 °C[a]
Solution mass	(5.180 ± 0.003) g[a]
Photon-emitting impurities	^{226}Ra: < 0.5 Bq g^{-1}[b]
Alpha-emitting impurities	^{232}Th: < 0.08 Bq g^{-1}[c]
Half-lives used	^{228}Ra: (5.75 ± 0.04) a[d] [6] ^{228}Ac: (6.15 ± 0.02) h [7] ^{226}Ra: (1600 ± 7) a [8] ^{232}Th: (14.02 ± 0.06) x 10^9 a [9]
Calibration methods (and instruments)	The certified massic activity for ^{228}Ra was obtained by high-resolution gamma-ray spectrometry of three master solution ampoules (eleven separate determinations), as measured on three to five different spectrometers and geometries on each ampoule, and used assumed nuclear data for probabilities per decay for 16 gamma-ray transitions. Confirmatory measurements were performed by 2πα spectrometry of ingrown ^{228}Th with a planar, ion-implanted Si detector.

[a] The stated uncertainty is two times the standard uncertainty. See reference 5.
[b] Based on gamma-ray spectrometry of forced-fitted peak at 186.2 keV and assuming a probability per decay of 0.0355 [6].
[c] The maximum ^{232}Th activity concentration in ^{228}Ra.
[d] The stated uncertainty is the standard uncertainty. See reference 5.

TJC 6-10-19

GL-CED-297-1986

Table 3. Uncertainty Evaluation for the Massic Activity of SRM 4339b

	Uncertainty component	Assessment Type[a]	Relative standard uncertainty contribution on massic activity of ^{228}Ra (%)
1	Gamma-ray spectrometry precision; relative standard deviation of the grand mean on the average massic gamma-ray emission rates for 16 measured ^{228}Ac gamma-ray transitions. Each mean in the grand mean is based on 11 determinations with three sources in three to five different detectors. The uncertainty in the determination of the massic gamma-ray emission rate for any one transition in a given determination ranged from typically 0.5 % to 1.5 %. The relative standard deviation of the mean for the average of the 16 lines, for any one determination, was typically 1 %; whereas the relative standard deviation of the grand mean for the average of the 16 lines across all 11 determinations is 0.34 %[b]. Data passes normality test.	A	0.84
2	Uncertainty due to assumed gamma-ray probabilities per decay for the measured ^{228}Ac transitions [7]. The uncertainty on each transition has a shared (correlated) component of 2.5 % (see comments in [7]).	B	3.5
3	Detection efficiencies not embodied within component 1	B	0.4
4	Mass determinations for dilution factors and counting source preparations	B	0.1
5	Decay corrections for ^{228}Ra half-life uncertainty of 0.7 % [6]	B	0.003
6	Effect of ^{228}Ra and ^{228}Ac half-life uncertainties on secular equilibrium ratio	B	0.02
Relative combined standard uncertainty			**3.6**
Relative expanded uncertainty (k = 2)			**7.2**

[a] Letter A denotes evaluation by statistical methods; B denotes evaluation by other methods.
[b] Average massic gamma-ray emission rates of 11 geometries (R_γ) for 16 measured ^{228}Ac gamma-ray transitions with their respective energy (E_γ); assumed gamma-ray probabilities per decay (I_γ) and standard deviation of the mean (S_m).

E_γ (keV)	Assumed I_γ (%) [1]	Mean R_γ ($s^{-1}\cdot g^{-1}$)[i]	S_m (%)[ii]
129.065	2.50	1347	0.38
153.967	0.754	421.6	0.40
209.249	3.97	2264	0.55
270.245	3.55	2014	0.33
328.004	3.04	1822	0.43
338.32	11.4	6712	0.43
409.46	2.02	1185	0.29
463.002	4.45	2645	0.33
755.313	1.03	593.3	0.46
772.291	1.52	899.2	0.53
794.942	4.31	2588	0.35
835.704	1.7	995.3	0.42
911.196	26.2	15609	0.29
964.786	4.99	3007	0.35
968.96	15.9	9582	0.30
1588.2	3.06	1889	0.28

(i) Grand mean for n = 11 determinations with three sources in three to five different detectors.
(ii) Relative standard deviation of the grand mean on R_γ for n = 11.

JDC 6-10-14

GL-CED-297-198c

INSTRUCTIONS FOR HANDLING AND STORAGE

1905

Handling: If the ampoule is transported, it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) because of both the radioactivity and the strong acid. The ampoule should be opened only by persons qualified to handle both radioactive material and alkaline and/or acidic solutions. Appropriate shielding and/or distance should be used to minimize personnel exposure. Refer to SDS for further information.

Storage: SRM 4339b should be stored and used at a temperature between 5 °C and 65 °C. The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material.

REFERENCES

[1] NIST Physical Measurement Laboratory; *Storage and Handling of Radioactive Standard Reference Materials, Ampoule Specifications and Opening Procedure*, available at http://www.nist.gov/pml/div682/grp04/srm.cfm (accessed Nov 2012). Note: This SRM is contained in a generic borosilicate-glass ampoule and not in the standard NIST ampoule.

[2] JCGM 200:2012; *International Vocabulary of Metrology - Basic and General Concepts and Associated Terms (VIM)* (2008 version with Minor Corrections), 3rd edition; Joint Committee for Guides in Metrology: BIPM, Sevres Cedex, France; p. 19 (2012); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_200_2012.pdf (accessed Nov 2012).

[3] JCGM 200:2012; *International Vocabulary of Metrology - Basic and General Concepts and Associated Terms (VIM)* (2008 version with Minor Corrections), 3rd edition; Joint Committee for Guides in Metrology: BIPM, Sevres Cedex, France; p. 18 (2012); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_200_2012.pdf (accessed Nov 2012).

[4] JCGM 100:2008; *Guide to the Expression of Uncertainty in Measurement;* (ISO GUM 1995 with Minor Corrections), Joint Committee for Guides in Metrology: BIPM, Sevres Cedex, France (2008); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_100_2008_E.pdf (accessed Nov 2012).

[5] Taylor, B.N.; Kuyatt, C.E.; *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*; NIST Technical Note 1297, U.S. Government Printing Office: Washington, DC (1994); available at http://physics.nist.gov/Pubs/ (accessed Nov 2012).

[6] Luca, A.; June 2009, ^{228}Ra. LNE-LNHB/CEA Table of Radionuclides, available at http://www.nucleide.org/DDEP_WG/Nuclides/Ra-228_tables.pdf (accessed Nov 2012).

[7] Pearce, A.; January 2010, ^{228}Ac. LNE-LNHB/CEA Table of Radionuclides, available at http://www.nucleide.org/DDEP_WG/Nuclides/Ac-228_tables.pdf (accessed Nov 2012).

[8] Christé, V. and M.M. Bé; December 2006, ^{226}Ra. LNE-LNHB/CEA Table of Radionuclides, available at http://www.nucleide.org/DDEP_WG/Nuclides/Ra-226_tables.pdf (accessed Nov 2012).

[9] Arinc, A.; September 2008, ^{232}Th. LNE-LNHB/CEA Table of Radionuclides, available at http://www.nucleide.org/DDEP_WG/Nuclides/Th-232_tables.pdf (accessed Nov 2012).

Users of this SRM should ensure that the Certificate in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srminfo@nist.gov; or via the Internet at http://www.nist.gov/srm.

Standard Traceability Log Rad

Source Material Info	
Parent Code:	1905
Prepared By:	Tim Chandler
Carrier Conc:	1.3M HNO3
Reference Date:	10/07/2010
Ampoule Mass (g):	5.18 g
Uncertainty:	+/- 3.6 %
LogBook No:	GL-CED-297-198

A Solution Material Info			
Isotope:	Radium-228 SPIKE		
Prepared By:	Bethany Fiem		
Prep Date:	06/13/2019		
Verification Date:	06/13/2019		
Expiration Date:	06/13/2020		
Primary Code:	1905-A		
Dilution(mL):	100 mL		
Mass of Parent(g):	5.1538 g		
Density(g/mL):	1.0000	Balance ID:	B733529066

Calculations Converting parent activity to dpm/mL|dpm/g

(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / (Dilution Vol) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (Bq/g)) * (conversion dpm to Bq) / Density (g/mL)/ (Dilution Vol) = Parent Activity (dpm/g)
(5.1538 g) * (195 Bq/g) * (60 dpm/Bq) / (100 mL) = 602.9946 dpm/mL
(5.1538 g) * (195 Bq/g) * (60 dpm/Bq) / (1.0000 g/mL) / (100 mL) = 602.9946 dpm/g

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Ra-228 Standard 1905-A

v1.0.2

Instrument	BLUE
Analyst	BXF1
Verification Prep Date	6/13/2019

Standard Information	
Isotope	Ra-228
Serial Number	1905-A
Isotope Halflife	5.7500 Y
Reference Date	10/7/2010
Ref. Act. (DPM/mL)	602.9946
Amount of Std. (mL)	1.0
Standard Prep Date	6/13/2019

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	6/13/2019	107.60	2187.83	44.20
2	6/13/2019	107.00	2240.44	44.20
3	6/13/2019	107.80	2227.11	44.20

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	2143.63	10.112440	211.98	211.98
2	2196.24	10.112440	217.18	217.18
3	2182.91	10.112440	215.86	215.86

	dpm/mL
Mean Value =	215.01
Stdev =	2.704675238
Certificate Value* =	**211.7**
Two sigma =	5.409
10 % of Mean =	21.501
Rule A (Pass/Fail)	**Pass**
% Recovery	101.54%
Rule B (Pass/Fail)	**Pass**
Expiration Date	**6/13/2020**

Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

*** Certificate Value is decay corrected to Count Date.**

The analyst prepared three standard verification sources for Ra-228 source 1905-A by transferring 1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCBLUE for Ra-228 source standard verification. The Ra-228 efficiency calibration which was used for verification calculations was performed on 6/13/2019 using Ra-228 source 1809-A.

Standard results for each verification source was calculated as follows:

Source dpm/mL = (A - B)/(C)(D)

where:

A = Ver. source cpm,
B = BKG cpm,
C = System efficiency (cpm/dpm), and
D = volume used for standard verification.

RAD-M-001

6-17-19

6/25/19

Runlogs

Instrument Run Log

Instrument Type: GFPC **Batch ID: 1907787**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
1204358681	DUP	LXB3	PIC13A	AUG-21-19 13:21:49	DONE	25mm Filter	01-JUN-19 00:00
1204358684	LCS	LXB3	PIC13B	AUG-21-19 13:21:52	DONE	25mm Filter	01-JUN-19 00:00
487569001	SAMPLE	LXB3	PIC1B	AUG-21-19 13:22:13	DONE	25mm Filter	01-JUN-19 00:00
487569002	SAMPLE	LXB3	PIC1C	AUG-21-19 13:22:13	DONE	25mm Filter	01-JUN-19 00:00
487569003	SAMPLE	LXB3	PIC1D	AUG-21-19 13:22:15	DONE	25mm Filter	01-JUN-19 00:00
487569004	SAMPLE	LXB3	PIC2A	AUG-21-19 13:22:18	DONE	25mm Filter	01-JUN-19 00:00
487569005	SAMPLE	LXB3	PIC2B	AUG-21-19 13:22:22	DONE	25mm Filter	01-JUN-19 00:00
487569006	SAMPLE	LXB3	PIC3C	AUG-21-19 13:22:25	DONE	25mm Filter	01-JUN-19 00:00
487569007	SAMPLE	LXB3	PIC3D	AUG-21-19 13:22:25	DONE	25mm Filter	01-JUN-19 00:00
487575001	SAMPLE	LXB3	PIC4A	AUG-21-19 13:22:29	DONE	25mm Filter	01-JUN-19 00:00
487575002	SAMPLE	LXB3	PIC4B	AUG-21-19 13:22:31	DONE	25mm Filter	01-JUN-19 00:00
487575003	SAMPLE	LXB3	PIC4C	AUG-21-19 13:22:33	DONE	25mm Filter	01-JUN-19 00:00
487575004	SAMPLE	LXB3	PIC4D	AUG-21-19 13:22:36	DONE	25mm Filter	01-JUN-19 00:00
487575005	SAMPLE	LXB3	PIC5A	AUG-21-19 13:22:38	DONE	25mm Filter	01-JUN-19 00:00
487575006	SAMPLE	LXB3	PIC5B	AUG-21-19 13:22:42	DONE	25mm Filter	01-JUN-19 00:00
487575007	SAMPLE	LXB3	PIC5C	AUG-21-19 13:22:45	DONE	25mm Filter	01-JUN-19 00:00
1204358679	MB	LXB3	PIC7B	AUG-21-19 13:22:45	DONE	25mm Filter	01-JUN-19 00:00
487777001	SAMPLE	LXB3	PIC5D	AUG-21-19 13:22:47	DONE	25mm Filter	01-JUN-19 00:00
1204358680	DUP	LXB3	PIC7D	AUG-21-19 13:22:47	DONE	25mm Filter	01-JUN-19 00:00
487777002	SAMPLE	LXB3	PIC6A	AUG-21-19 13:22:52	DONE	25mm Filter	01-JUN-19 00:00
487777003	SAMPLE	LXB3	PIC6B	AUG-21-19 13:22:54	DONE	25mm Filter	01-JUN-19 00:00
487777004	SAMPLE	LXB3	PIC6C	AUG-21-19 13:22:57	DONE	25mm Filter	01-JUN-19 00:00
487777005	SAMPLE	LXB3	PIC7A	AUG-21-19 13:23:01	DONE	25mm Filter	01-JUN-19 00:00

Instrument Run Log

Instrument Type: GFPC **Batch ID: 1907789**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
1204358687	DUP	KSD1	LB4100G1	AUG-20-19 15:14:20	DONE	47mm Filter	01-MAY-18 00:00
1204358690	LCS	KSD1	LB4100G4	AUG-20-19 15:14:20	DONE	47mm Filter	01-MAY-18 00:00
1204358686	DUP	KSD1	PIC14D	AUG-20-19 16:13:02	DONE	47mm Filter	01-MAY-18 00:00
487575001	SAMPLE	KSD1	PIC11A	AUG-20-19 16:13:04	DONE	47mm Filter	01-MAY-18 00:00
487575003	SAMPLE	KSD1	PIC11C	AUG-20-19 16:13:09	DONE	47mm Filter	01-MAY-18 00:00
487575005	SAMPLE	KSD1	PIC12A	AUG-20-19 16:13:14	DONE	47mm Filter	01-MAY-18 00:00
487575006	SAMPLE	KSD1	PIC12B	AUG-20-19 16:13:15	DONE	47mm Filter	01-MAY-18 00:00
487575007	SAMPLE	KSD1	PIC12D	AUG-20-19 16:13:19	DONE	47mm Filter	01-MAY-18 00:00
487777001	SAMPLE	KSD1	PIC13A	AUG-20-19 16:13:22	DONE	47mm Filter	01-MAY-18 00:00
487777002	SAMPLE	KSD1	PIC13B	AUG-20-19 16:13:24	DONE	47mm Filter	01-MAY-18 00:00
487777003	SAMPLE	KSD1	PIC13D	AUG-20-19 16:13:26	DONE	47mm Filter	01-MAY-18 00:00
487777004	SAMPLE	KSD1	PIC14A	AUG-20-19 16:13:28	DONE	47mm Filter	01-MAY-18 00:00
487777005	SAMPLE	KSD1	PIC14B	AUG-20-19 16:13:30	DONE	47mm Filter	01-MAY-18 00:00
487569001	SAMPLE	KSD1	PIC7D	AUG-20-19 16:13:35	DONE	47mm Filter	01-MAY-18 00:00
487569002	SAMPLE	KSD1	PIC9A	AUG-20-19 16:13:38	DONE	47mm Filter	01-MAY-18 00:00
487569004	SAMPLE	KSD1	PIC9D	AUG-20-19 16:13:44	DONE	47mm Filter	01-MAY-18 00:00
487569005	SAMPLE	KSD1	PIC10A	AUG-20-19 16:13:47	DONE	47mm Filter	01-MAY-18 00:00
487569006	SAMPLE	KSD1	PIC10C	AUG-20-19 16:13:49	DONE	47mm Filter	01-MAY-18 00:00
1204358685	MB	KSD1	PIC12D	AUG-20-19 18:43:43	DONE	47mm Filter	01-MAY-18 00:00
487569003	SAMPLE	KSD1	PIC11A	AUG-20-19 18:43:45	DONE	47mm Filter	01-MAY-18 00:00
487569007	SAMPLE	KSD1	PIC11C	AUG-20-19 18:43:48	DONE	47mm Filter	01-MAY-18 00:00
487575002	SAMPLE	KSD1	PIC12A	AUG-20-19 18:43:50	DONE	47mm Filter	01-MAY-18 00:00
487575004	SAMPLE	KSD1	PIC12B	AUG-20-19 18:43:53	DONE	47mm Filter	01-MAY-18 00:00