



July 20, 2009

Mr. Frank Hagar  
Northgate Environmental Management, Inc.  
1100 Quail St., Suite 102  
Newport Beach, California 92660

Re: Tronox Henderson  
Work Order: 231217

Dear Mr. Hagar:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on June 06, 2009, June 11, 2009, June 12, 2009 and June 17, 2009. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

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. 4453.

Sincerely,

Edith Kent  
Project Manager

Chain of Custody: 2027.001.00049, 2027.001.00054, 2027.001.00067 and 2027.001.00084

Enclosures

**Tronox LLC**  
**Tronox Henderson**  
**SDG:231217**

## Table of Contents

<b>Case Narrative</b> .....	<b>1</b>
<b>Chain of Custody and Supporting Documentaion</b> .....	<b>4</b>
<b>Laboratory Certifications</b> .....	<b>17</b>
<b>Radiological Analysis</b> .....	<b>19</b>
Sample Data Summary .....	33
Quality Control Data .....	73
Raw Data .....	77
Uranium.....	78
Thorium .....	104
Radium 228 .....	130
Radium 226.....	142
Method Calibration Data .....	148
Gas Flow Proportional Counters .....	149
Alpha Spectroscopy .....	233
Lucas Cell Counters .....	465
Lucas1 .....	466
Lucas2.....	489
Lucas3.....	509
Lucas4.....	529
Lucas5.....	544
Lucas7.....	565
Background and Efficiency Data .....	581
Runlogs .....	766

# **Case Narrative**



**CASE NARRATIVE**  
**for**  
**Tronox LLC**  
**Tronox Henderson**  
**SDG:231217**

**July 20, 2009**

**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 June 06, 2009, June 11, 2009, June 12, 2009 and June 17, 2009 for analysis. Shipping container temperatures were checked, documented, and within specifications. 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.

**Items of Note**

All samples under this project were logged in an open SDG until a sufficient number of samples were received by GEL. The client was notified that this SDG was closed on June 17, 2009 and the turnaround time would begin on that date. The following samples exceed the Tronox QA program sample result uncertainty limit of 30% when activity is between 2 and 5 times the MDA for U-235: 231217001, 231217005, 231217006, 231217008, 231217009, 231217010, 231217011, 231217018, 231217019, 12018712303. The following samples exceed the Tronox QA program sample result uncertainty limit of 30% when activity is greater than 5 times the MDA for U-235: 231217007, 231217012, 231217013, 231217014, 231217015, 231217016, 231217017. The following sample exceeded the Tronox QA program sample result uncertainty limit of 30% when activity is between 2 and 5 times the MDA for Th-230: 231217010. The following samples exceed the Tronox QA program sample result uncertainty limit of 30% when activity is between 2 and 5 times the MDA for Ra-226: 231217001, 231217003, 231217005, 231217007, 231217008, 231217009, 231217011, 231217013, 231217015 and lab DUP, 231217016, 231217017, 231217019. The Lucas cell Detector 7's daily did not run on July 9th. Samples 231217006, 231217012, 231217018 were counted on this detector. Please refer to the attached e-mails for further details.

**Sample Identification**

The laboratory received the following samples:

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
231217001	RSAK8-0.5B
231217002	RSAL7-0.5B
231217003	RSAL8-0.5B
231217004	SA56-0.5B
231217005	SA35-0.5B
231217006	RSA03-0.5B
231217007	SA176-0.5B
231217008	SA55-0.5B
231217009	SA166-0.5B
231217010	SA201-0.5B
231217011	SA134-0.5B

231217012	SA182-0.5B
231217013	RSAK4-0.5B
231217014	RSAK4009-0.5B
231217015	SA85-0.5B
231217016	SA71-0.5B
231217017	SA144-0.5B
231217018	SA61-0.5B
231217019	SA62-0.5B

**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: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Radiochemistry.

This data package, to the best of my knowledge, is in compliance with technical and administrative requirements.



Edith Kent

Project Manager

**Chain of Custody  
and  
Supporting  
Documentation**

2312178



1100 Quail Street, Suite 102, Newport Beach, CA 92660 (949) 260-9293

### CHAIN-OF-CUSTODY / Analytical Request Document

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

COC No. 2027.001.00049 Page: 1 of 1 Cooler # \_\_\_\_\_ of \_\_\_\_\_

<b>Required Ship to Lab:</b> Lab Name: GEL Laboratories, LLC Address: 2040 Savage Road Charleston, SC 29407			<b>Required Project Information:</b> Site ID #: TRONOX LLC, HENDERSON Project #: 2027.001 Site Address: 560 W. Lake Mead Drive City: Henderson State: NV			<b>Required Invoice Information:</b> Send Invoice to: Susan Crowley Tronox LLC Address: PO Box 55 City/State: Henderson, NV 89009 Phone #: (949) 260-9293			TAT: Standard 30 day <input checked="" type="checkbox"/> Rush	Mark One													
Lab PM: Edith M. Kent Phone/Fax: (843) 556-8171 Lab PM email: emk@gel.com			City/State: Henderson, NV Reimbursement project? <input checked="" type="checkbox"/> Non-reimbursement project?			Phone #: (949) 260-9293			QC level Required: Standard	EPA Stage Mark one													
Applicable Lab Quote #:			Site PM Name: Derrick Willis Phone/Fax: 949-375-7004 Site PM Email: derrick.willis@ngem.com			Send EDD to: frank.hagar@ngem.com			NJ Reduced Deliverable Package?	Special EPA Stage 4													
<b>Requested Analyses</b> EPA03 1 Radium-226 EPA04 0 Radium-228 Radionuclides*																							
ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / -)	Matrix Codes	Matrix	Matrix Code	SAMPLE TYPE	G-GRAB C-COMP	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	FIELD FILTERED? (Y/N)	Preservatives	Requested	Comments/Lab Sample I.D.										
1	SA127-0.5B	W	WATER	SO	G		6/5/2009	9:30	1	N	X	X	250 ml Plastic jar										
2	SA127-0.5BMS	WS	SURFACE WATER	SO	G		6/5/2009	9:30	1	N	X	X	250 ml Plastic jar										
3	SA127-0.5BMSD	WS	SURFACE WATER	SO	G		6/5/2009	9:30	1	N	X	X	250 ml Plastic jar										
4	RSAJ6-0.5B	WS	SURFACE WATER	SO	G		6/5/2009	10:40	1	N	X	X	250 ml Plastic jar										
5	RSKAK6-0.5B	WS	SURFACE WATER	SO	G		6/5/2009	11:30	1	N	X	X	250 ml Plastic jar										
6	RSKAK8-0.5B	WS	SURFACE WATER	SO	G		6/5/2009	12:15	1	N	X	X	250 ml Plastic jar										
7	RSAL7-0.5B	WS	SURFACE WATER	SO	G		6/5/2009	12:55	1	N	X	X	250 ml Plastic jar										
9	RSAL8-0.5B	WS	SURFACE WATER	SO	G		6/5/2009	13:30	1	N	X	X	250 ml Plastic jar										
10																							
11																							
12																							
<b>Additional Comments/Special Instructions:</b> FULL DIGESTION SPECIFICATION Radionuclides* includes Thorium (isotopic) and Uranium (isotopic) and Uranium (isotopic) by EML HASL 300 modified(alpha spectroscopy)																							
RELEASING BY / AFFILIATION			DATE			TIME			ACCEPTED BY / AFFILIATION			DATE			TIME			SAMPLE RECEIPT CONDITIONS					
[Signature]			6-5-09			6:55			[Signature]			6-6-09			0900			[Signature]			3:30		
SHIPPING METHOD: (mark as appropriate) <b>UPS COURIER FEDEX</b>											SIGNATURE OF SAMPLER: PHIL BRINKHOFF DATE SIGNED: 6/5/2009 TIME: 1:500												



SAMPLE RECEIPT & REVIEW FORM

Client: <u>Yell/NorKorte</u>		SDG/ARCOC/Work Order: <u>2312171</u>	
Received By: <u>MK</u>		Date Received: <u>6-6-09</u>	
Suspected Hazard Information	Yes	No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Counts Observed*: <u>CM 20</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken    damaged container    leaking container    other (describe)
2 Samples requiring cold preservation within 0 ≤ 6 deg. C?	<input checked="" type="checkbox"/>			Preservation Method: <u>3</u> ice bags    blue ice    dry ice    none    other (describe)
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken    damaged container    leaking container    other (describe)
5 Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7 Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>			Id's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?			<input checked="" type="checkbox"/>	Sample ID's affected: <u>NO DATE OR TIME ON RSAK6-0.5B</u>
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments:

FX    7966    7156    7395

PM (or PMA) review: Initials EM    Date 6/8/09    rec'd 6/6/09

20090650644

231217%



1100 Quail Street, Suite 102, Newport Beach, CA 92660 (949) 260-9233

### CHAIN-OF-CUSTODY / Analytical Request Document

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

COC No. 2027.001.00054  
Page: 1 of 1  
Cooler # 1 of 1

<b>Required Ship to Lab:</b>		<b>Required Project Information:</b>				<b>Required Invoice Information:</b>				<b>TAT: Standard 30 day</b>		<b>Rush</b>	<b>Mark One</b>
Lab Name: GEL Laboratories, LLC		Site ID #: TRONOX LLC - HENDERSON		Send Invoice to: Susan Crowley		Address: PO Box 55		City/State: Henderson, NV 89009		Phone #: (949)260-9293		Special EPA Stage	
Address: 2040 Savage Road		Project #: 2027.001		Address: PO Box 55		City/State: Henderson, NV 89009		Phone #: (949)260-9293		Non-reimbursement project?		EPA Stage	
Charleston, SC 29407		Site Address: 560 W. Lake Mead Drive		City/State: Henderson, NV		Reimbursement project?		Send EDD to: Frank Hagar Northgate Environmental Management, Inc		Mark one		4	
Lab PM: Edith M. Kent		City: Henderson		State: NV		Site PM Name: Derrick Willis		Phone/Fax: 949-375-7004		CC Hardcopy report to PDF Electronic Version Only		Mark One	
Phone/Fax: (643)556-9171		Site PM Email: derrick.willis@ngem.com		CC Hardcopy report to PDF Electronic Version Only		See additional comments below							
Lab PM email: emk@gel.com		Applicable Lab Quote #:											

ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / -)	Valid Matrix Codes	MATRIX TYPE	SAMPLE TYPE	G-GRAB C-COMP	MATRIX CODE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	FIELD FILTERED? (Y/N)	Preservatives								Requested Analyses	Comments/Lab Sample I.D.			
											Unpreserved	H2SO4	HNO3	HCl	NaOH	MnSO4	Methanol	Other					
2	SA56-0.5B	W, WS, SURFACE WATER	SO	G	G	SO	6/10/2009	10:25	1	N	X							X	X	250 ml Plastic jar			
3	SA35-0.5B	W, WS, SURFACE WATER	SO	G	G	SO	6/10/2009	11:15	1	N	X							X	X	250 ml Plastic jar			
5	RSA03-0.5B	W, WS, SURFACE WATER	SO	G	G	SO	6/10/2009	13:20	1	N	X							X	X	250 ml Plastic jar			
6	SA176-0.5B	W, WS, SURFACE WATER	SO	G	G	SO	6/10/2009	12:40	1	N	X							X	X	250 ml Plastic jar			
7	SA55-0.5B	W, WS, SURFACE WATER	SO	G	G	SO	6/10/2009	11:50	1	N	X							X	X	250 ml Plastic jar			
8																							
9																							
10																							
11																							
12																							

<b>RELINQUISHED BY:</b> [Signature]	<b>AFFILIATION:</b> [Signature]	<b>DATE:</b> 6/10/09	<b>TIME:</b> 1500	<b>ACCEPTED BY:</b> [Signature]	<b>AFFILIATION:</b> [Signature]	<b>DATE:</b> 6/10/09	<b>TIME:</b> 1010	<b>SAMPLE RECEIPT CONDITIONS:</b>	Temp in 00	Samples on Ice?	Sample Intact?	Trip Blank?
UPSI COURIER FEDEX			SIGNATURE OF SAMPLER: [Signature]			DATE SIGNED: 6/10			Time: 1500			

**Additional Comments/Special Instructions:**  
**Full DIGESTION SPECIFICATION**  
**Radionuclides\* includes Thorium (isotopic) and Uranium (isotopic)**  
 by EML HASL 300 modified(alpha spectroscopy)

All PDF reports and EDDs will be uploaded to:  
 Northgate Environmental Management, Inc.  
 FTP site address provided to labs  
 Notifications provided to:  
 cindy.amold@ngem.com  
 frank.hagar@ngem.com



SAMPLE RECEIPT & REVIEW FORM

Client: <u>Ironox</u>		SDG/ARCOC/Work Order: <u>2312171</u>	
Received By: <u>C. Duffy</u>		Date Received: <u>6-11-09</u>	
Suspected Hazard Information	Yes	No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Counts Observed*: <u>10</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken    damaged container    leaking container    other (describe)
2	Samples requiring cold preservation within 0 ≤ 6 deg. C?	<input checked="" type="checkbox"/>			Preservation Method: <u>ice bags</u> blue ice    dry ice    none    other (describe) <u>5°</u>
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken    damaged container    leaking container    other (describe)
5	Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7	Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments:

FX 7976 7115 0123

PM (or PMA) review: Initials ED Date 6/11/09

20090650614

2312472



1100 Quail Street, Suite 102, Newport Beach, CA 92660 (949) 260-9293

### CHAIN-OF-CUSTODY / Analytical Request Document

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

COC No. 2027.001.00067  
Page: 1 of 1  
Cooler # 1 of 1

Required Ship to Lab:		Required Project Information:		Required Invoice Information:		TAT: Standard 30 day		Rush		Mark One									
Lab Name:	GEL Laboratories, LLC	Site ID #:	TRONOX LLC, HENDERSON	Send Invoice to:	Susan Crowley Tronox LLC	City/State:	Henderson, NV 89009	Phone #:	(949)260-9293	QC level Required:	Standard	Special	EPA Stage	Mark one					
Address:	2040 Savage Road Charleston, SC 29407	Project #:	2027.001	Address:	PO Box 55	City/State:	Henderson, NV 89009	Phone #:	(949)260-9293	Reimbursement project?	<input checked="" type="checkbox"/>	Non-reimbursement project?	<input type="checkbox"/>	Mark one					
Lab P.M.:	Edith M. Kent	City:	Henderson	State:	NV	Site P.M. Name:	Derrick Willis	Phone/Fax:	949-375-7004	Send EDD to:	frank.hagar@ngem.com	Send EDD to:	frank.hagar@ngem.com	Mark one					
Lab P.M. email:	emk@gel.com	Site P.M. Email:	derrick.willis@ngem.com	Applicable Lab Quote #:		Matrix Code:		Sample Type:	G-GRAB C-COMP	Sample Date:		Sample Time:		Field Filtered? (Y/N)					
2	SA166-0.5B	Matrix:	WATER	Matrix Code:	SO	Sample Type:	G	Sample Date:	6/11/2009	Sample Time:	12:15	Field Filtered?	N	Preservatives:	Unpreserved	Requested:	EP903, Radium-228	Comments/Lab Sample I.D.:	250 ml Plastic jar
3	SA201-0.5B	Matrix:	WATER	Matrix Code:	SO	Sample Type:	G	Sample Date:	6/11/2009	Sample Time:	8:40	Field Filtered?	N	Preservatives:	Unpreserved	Requested:	EP903, Radium-228	Comments/Lab Sample I.D.:	250 ml Plastic jar
4	SA134-0.5B	Matrix:	WATER	Matrix Code:	SO	Sample Type:	G	Sample Date:	6/11/2009	Sample Time:	9:25	Field Filtered?	N	Preservatives:	Unpreserved	Requested:	EP903, Radium-228	Comments/Lab Sample I.D.:	250 ml Plastic jar
5	SA182-0.5B	Matrix:	WATER	Matrix Code:	SO	Sample Type:	G	Sample Date:	6/11/2009	Sample Time:	11:20	Field Filtered?	N	Preservatives:	Unpreserved	Requested:	EP903, Radium-228	Comments/Lab Sample I.D.:	250 ml Plastic jar
6	RSKA4-0.5B	Matrix:	WATER	Matrix Code:	SO	Sample Type:	G	Sample Date:	6/11/2009	Sample Time:	10:20	Field Filtered?	N	Preservatives:	Unpreserved	Requested:	EP903, Radium-228	Comments/Lab Sample I.D.:	250 ml Plastic jar
7	RSKA4009-0.5B	Matrix:	WATER	Matrix Code:	SO	Sample Type:	G	Sample Date:	6/11/2009	Sample Time:	10:20	Field Filtered?	N	Preservatives:	Unpreserved	Requested:	EP903, Radium-228	Comments/Lab Sample I.D.:	250 ml Plastic jar
8																			
9																			
10																			
11																			
12																			

**Additional Comments/Special Instructions:**  
**FULL DIGESTION SPECIFICATION**  
**Radionuclides\* includes Thorium (Isotopic) and Uranium (Isotopic)**  
**by EML HASL 300 modified(alpha spectroscopy)**

All PDF reports and EDDs will be uploaded to:  
 Northgate Environmental Management, Inc.  
 FTP site address provided to labs  
 Notifications provided to:  
 cindy.armold@ngem.com  
 frank.hagar@ngem.com

RETURNSHIPPED BY AFFILIATION: *Phil Brintnerhoff*  
 DATE: 6-11-09  
 TIME: 1:50

DATE SHIPPED: 6-11-09  
 TIME: 1:50

Temp in °C	Samples on Ice?	Sample Intact?	Trip Blank?
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SHIPPING METHOD: (mark as appropriate)  
 UPS COURIER FEDEX  
 SIGNATURE OF SAMPLER: *Phil Brintnerhoff*  
 SIGNATURE OF SAMPLER: *Phil Brintnerhoff*  
 DATE SHIPPED: 6-11-09  
 TIME: 1:50





SAMPLE RECEIPT & REVIEW FORM

Client: <u>TRONOX</u>		SDG/ARCO/Work Order: <u>231217</u>	
Received By: <u>C. Duffy</u>		Date Received: <u>6-12-09</u>	
Suspected Hazard Information	Yes	No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Counts Observed*: <u>20</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken    damaged container    leaking container    other (describe)
2	Samples requiring cold preservation within 0 ≤ 6 deg. C?		<input checked="" type="checkbox"/>		Preservation Method: <u>ice bags</u> blue ice    dry ice    none    other (describe) <u>40</u>
3	Chain of custody documents included with shipment?				
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken    damaged container    leaking container    other (describe)
5	Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7	Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	<input checked="" type="checkbox"/>			Id's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments: 7966 8766 6015

PM (or PMA) review: Initials ED Date 6/12/09

200906506/14

231217%



1100 Quail Street, Suite 102, Newport Beach, CA 92660  
(949) 260-9293

### CHAIN-OF-CUSTODY / Analytical Request Document

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

COC No. 2027.001.00084  
Page: 1 of 1  
Cooler # 1 of 1

Required Ship to Lab:		Required Project Information:		Required Invoice Information:		TAT: Standard 30 day		Rush		Mark One				
Lab Name: GEL Laboratories, LLC		Site ID #: TRONOX LLC, HENDERSON		Send Invoice to: Susan Crowley Tronox LLC		Address: PO Box 55								
Address: 2040 Savage Road		Project #: 2027.001		City/State: Henderson, NV 89009		Phone #: (949)260-9293		Special EPA Stage		Mark one				
Charleston, SC 29407		Site Address: 560 W. Lake Mead Drive		Reimbursement project? <input checked="" type="checkbox"/>		Non-reimbursement project? <input type="checkbox"/>		Standard		4				
Lab PM: Edith M. Kent		City: Henderson		State: NV		Send EDD to: frank.hagar@ngem.com		NJ Reduced Deliverable Package?		Mark One				
Phone/Fax: (843)556-8171		Site PM Name: Derrick Willis		Phone/Fax: 949-375-7004		CC Hardcopy report to: PDF Electronic Version Only		MA MCP Cert?		CT RCP Cert?				
Lab PM email: emk@gel.com		Phone/Fax: 949-375-7004		Site PM Email: derrick.willis@ngem.com		CC Hardcopy report to: see additional comments below		Lab Project ID (lab use)						
Applicable Lab Quote #:														
#	ITEM	SAMPLE ID	One Character per box. (A-Z, 0-9 / , , )	SAMPLES IDS MUST BE UNIQUE	MATRIX CODE	SAMPLE TYPE	G=GRAB C=COMP	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	FIELD FILTERED? (Y/N)	Preservatives	Requested Analyses	Comments/Lab Sample I.D.
1		SA85-0.5B			SO	G	G	6/16/2009	8:40	1	N	Unpreserved	X X X	250 ml Plastic jar
2		SA85-0.5BMS			SO	G	G	6/16/2009	8:40	1	N	H2SO4	X X X	250 ml Plastic jar
3		SA85-0.5BMSD			SO	G	G	6/16/2009	8:40	1	N	HNO3	X X X	250 ml Plastic jar
4		SA71-0.5B			SO	G	G	6/16/2009	10:03	1	N	HCl	X X X	250 ml Plastic jar
5		SA144-0.5B			SO	G	G	6/16/2009	10:55	1	N	Na2S2O3	X X X	250 ml Plastic jar
6		SA61-0.5B			SO	G	G	6/16/2009	11:45	1	N	MeOH	X X X	250 ml Plastic jar
7		SA62-0.5B			SO	G	G	6/16/2009	13:05	1	N	Methanol	X X X	250 ml Plastic jar
8														
9														
10														
11														
12														

Additional Comments/Special Instructions:  
**FULL DIGESTION SPECIFICATION**  
*Radiocytides*\* includes Thorium (isotopic) and Uranium (isotopic) by EML HASL 300 modified(alpha spectroscopy)

All PDF reports and EDDs will be uploaded to:  
 Northgate Environmental Management, Inc.  
 FTP site address provided to labs  
 Notifications provided to:  
 cindy.amold@ngem.com  
 frank.hagar@ngem.com

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE RECEIPT CONDITIONS
<i>Phil Brinkbecker</i>	6/16/2009	1:50	<i>Phil Brinkbecker</i>	6/16/2009	1:50	Temp in Ice? Y/N Samples on Ice? Y/N Sample Intact? Y/N Trip Blank? Y/N

SHIPPING METHOD (mark as appropriate)  
 UPS COURIER FEDEX  
 SIGNATURE OF SAMPLER: *Phil Brinkbecker*  
 DATE SIGNED: 6/16/2009  
 TIME: 1:50



# SAMPLE RECEIPT & REVIEW FORM

Client: <u>KEPP / northgate</u>		SDG/ARCOC/Work Order: <u>2312171</u>	
Received By: <u>mk</u>		Date Received: <u>6-17-09</u>	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?			<input checked="" type="checkbox"/>
Classified Radioactive II or III by RSO?			<input checked="" type="checkbox"/>
COC/Samples marked containing PCBs?			<input checked="" type="checkbox"/>
Shipped as a DOT Hazardous?			<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>

\*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.

Maximum Counts Observed\*: 6m 20

Hazard Class Shipped: \_\_\_\_\_ UN#: \_\_\_\_\_

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken    damaged container    leaking container    other (describe)
2	Samples requiring cold preservation within 0 ≤ 6 deg. C?	<input checked="" type="checkbox"/>			ice bags    blue ice    dry ice    none    other (describe) <u>3°C</u>
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken    damaged container    leaking container    other (describe)
5	Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7	Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	<input checked="" type="checkbox"/>			Id's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments:

FX 7976 8691 7986

PM (or PMA) review: Initials EA Date 6/17/09

**Subject:** SDG 231217 To Close

**From:** Edie Kent <emk@gel.com>

**Date:** Wed, 17 Jun 2009 15:14:13 -0400

**To:** Cindy Arnold <Cindy.Arnold@ngem.com>, Frank Hagar <Frank.Hagar@ngem.com>, Derrick Willis <Derrick.Willis@ngem.com>

**CC:** Team Kent <Team.Kent@gel.com>

We received a QC sample today for soils and with the remaining soil samples received today, we have 19 samples total in SDG 231217 so I am going to close it as of today. The samples contained in this SDG are listed below. You will receive a copy of the chain and the login review paperwork as soon as the login review has been performed.

Edie

RSAK8-0.5B  
RSAL7-0.5B  
RSAL8-0.5B  
SA56-0.5B  
SA35-0.5B  
RSA03-0.5B  
SA176-0.5B  
SA55-0.5B  
SA166-0.5B  
SA201-0.5B  
SA134-0.5B  
SA182-0.5B  
RSAK4-0.5B  
RSAK4009-0.5B  
SA85-0.5B  
SA71-0.5B  
SA144-0.5B  
SA61-0.5B  
SA62-0.5B

--

Edith M. Kent  
Project Manager  
GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC (USA) 29407  
Direct: 843.769.7385 x4453  
Main: 843.556.8171  
Fax: 843.766.1178  
E-mail: [emk@gel.com](mailto:emk@gel.com)  
Web: [www.gel.com](http://www.gel.com)

**Subject:** SDG 231217, Alpha Spec U Uncertainty Issue

**From:** Edie Kent <emk@gel.com>

**Date:** Tue, 14 Jul 2009 13:39:16 -0400

**To:** Cindy Arnold <Cindy.Arnold@ngem.com>, Frank Hagar <Frank.Hagar@ngem.com>, Derrick Willis <Derrick.Willis@ngem.com>, Team Kent <Team.Kent@gel.com>

**CC:** Martha Harrison <Martha.Harrison@gel.com>

The following samples have uncertainty greater than 30 percent of the U-235 result, U-235 activity between 2 and 5 times the MDA, and were counted for the maximum count time of 1000 minutes:

RSAK8-0.5B, GEL ID 231217001  
SA35-0.5B, GEL ID 231217005  
RSA03-0.5B, GEL ID 231217006  
SA55-0.5B, GEL ID 231217008  
SA166-0.5B, GEL ID 231217009  
SA201-0.5B, GEL ID 213217010  
SA134-0.5B, GEL ID 231217011  
SA61-0.5B, GEL ID 231217018  
SA62-0.5B, GEL ID 231217019  
SA85-0.5B, GEL ID 1201871203 (Duplicate of 231217015)

The following samples have uncertainty greater than 30 percent of the U-235 result, U-235 activity greater than 5 times the MDA, and were counted for the maximum count time of 1000 minutes:

SA176-0.5B, GEL ID 231217007  
SA182-0.5B, GEL ID 231217012  
RSAK4-0.5B, GEL ID 231217013  
RSAK4009-0.5B, GEL ID 231217014  
SA85-0.5B, GEL ID 231217015  
SA71-0.5B, GEL ID 231217016  
SA144-0.5B, GEL ID 231217017

With regards to the uncertainty requirements of <30% for U-235, GEL is not meeting these requirements for U-235 in many of the samples we have analyzed to date due to the absence of significant U-235 activity in the samples. If the samples were to be prepped with larger aliquots to improve the uncertainty, this would result in tailing from the U-233/234 region of interest into the U-235 region of interest (especially due to the levels of U-233/234 activity being much higher than the U-235 levels in each sample) and also likely lower tracer yield recoveries. GEL has counted each sample being reported for the maximum possible count time to ensure that the best possible data Uncertainties are being reported.

Edie

--

Edith M. Kent  
Project Manager  
GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC (USA) 29407  
Direct: 843.769.7385 x4453  
Main: 843.556.8171  
Fax: 843.766.1178  
E-mail: [emk@gel.com](mailto:emk@gel.com)  
Web: [www.gel.com](http://www.gel.com)

**Subject:** SDG 231217, Alpha Spec Thorium Uncertainty Issue

**From:** Edie Kent <emk@gel.com>

**Date:** Tue, 14 Jul 2009 17:41:42 -0400

**To:** Cindy Arnold <Cindy.Arnold@ngem.com>, Frank Hagar <Frank.Hagar@ngem.com>, Derrick Willis <Derrick.Willis@ngem.com>, Team Kent <Team.Kent@gel.com>

**CC:** Martha Harrison <Martha.Harrison@gel.com>

Sample SA201-0.5B, GEL ID 231217010, has an uncertainty of greater than 30% for the Th-230 result, the Th-230 activity is between 2 and 5 times the MDA, and the sample was counted for the maximum count time of 1000 minutes.

Edie

--

Edith M. Kent  
Project Manager  
GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC (USA) 29407  
Direct: 843.769.7385 x4453  
Main: 843.556.8171  
Fax: 843.766.1178  
E-mail: [emk@gel.com](mailto:emk@gel.com)  
Web: [www.gel.com](http://www.gel.com)

**Subject:** SDG 231217 Ra-226 Issues

**From:** Edie Kent <emk@gel.com>

**Date:** Mon, 20 Jul 2009 10:38:27 -0400

**To:** Cindy Arnold <Cindy.Arnold@ngem.com>, Frank Hagar <Frank.Hagar@ngem.com>, Derrick Willis <Derrick.Willis@ngem.com>, Team Kent <Team.Kent@gel.com>

The following samples exceed the Tronox QA program sample result uncertainty limit of 30% with an activity between 2 times and five times the MDA. The samples were counted the maximum count time.

RSAK8-0.5B	GEL ID 231217001
RSAL8-0.5B	GEL ID 231217003
SA35-0.5B	GEL ID 231217005
SA176-0.5B	GEL ID 231217007
SA55-0.5B	GEL ID 231217008
SA166-0.5B	GEL ID 231217009
SA134-0.5B	GEL ID 231217011
RSAK4-0.5B	GEL ID 231217013
SA85-0.5B	GEL ID 231217015 and lab DUP on this sample
SA71-0.5B	GEL ID 231217016
SA144-0.5B	GEL ID 231217017
SA62-0.5B	GEL ID 231217019

Additionally, Lucas cell Detector seven's daily did not run on July 9th. Samples RSA03-0.5B (GEL ID 231217006), SA182-0.5B (GEL ID 231217012), and SA61-0.5B (GEL ID 231217018) were counted on Detector 7. Detector 7 was verified for 7/9/09 with an LCS count that ran at 18:05 on 7/9/09 with a passing recovery of 81%. Additionally, the dailies for Dectector 7 paseed on 7/8/09 at 07:15 and on 07/10/09 at 04:45.

Edie

--

Edith M. Kent  
Project Manager  
GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC (USA) 29407  
Direct: 843.769.7385 x4453  
Main: 843.556.8171  
Fax: 843.766.1178  
E-mail: [emk@gel.com](mailto:emk@gel.com)  
Web: [www.gel.com](http://www.gel.com)

# **Laboratory Certifications**



**List of current GEL Certifications as of 14 July 2009**

<b>State</b>	<b>Certification</b>
Arizona	AZ0668
Arkansas	88-0651
CLIA	42D0904046
California – NELAP	01151CA
Colorado	GEL
Connecticut	PH-0169
Dept. of Navy	NFESC 413
EPA Region 5	WG-15J
Florida – NELAP	E87156
Georgia	E87156 (FL/NELAP)
Georgia DW	967
Hawaii	N/A
ISO 17025	2567.01
Idaho	SC00012
Illinois – NELAP	200029
Indiana	C-SC-01
Kansas – NELAP	E-10332
Kentucky	90129
Louisiana – NELAP	03046
Maryland	270
Massachusetts	M-SC012
Nevada	SC00012
New Jersey – NELAP	SC002
New Mexico	FL NELAP E87156
New York – NELAP	11501
North Carolina	233
North Carolina DW	45709
Oklahoma	9904
Pennsylvania – NELAP	68-00485
South Carolina	10120001/10120002
Tennessee	TN 02934
Texas – NELAP	T104704235-07B-TX
U.S. Dept. of Agriculture	S-52597
Utah – NELAP	GEL
Vermont	VT87156
Virginia	00151
Washington	C1641

# RADIOLOGICAL ANALYSIS

**Radiochemistry Case Narrative  
Tronox LLC (KERR)  
SDG 231217**

**Method/Analysis Information**

**Product:** Alphaspec Th, Solid  
Analytical Method: DOE EML HASL-300, Th-01-RC Modified  
Prep Method: Dry Soil Prep  
Analytical Batch Number: 883985  
Prep Batch Number: 877872

<b>Sample ID</b>	<b>Client ID</b>
231217001	RSAK8-0.5B
231217002	RSAL7-0.5B
231217003	RSAL8-0.5B
231217004	SA56-0.5B
231217005	SA35-0.5B
231217006	RSA03-0.5B
231217007	SA176-0.5B
231217008	SA55-0.5B
231217009	SA166-0.5B
231217010	SA201-0.5B
231217011	SA134-0.5B
231217012	SA182-0.5B
231217013	RSAK4-0.5B
231217014	RSAK4009-0.5B
231217015	SA85-0.5B
231217016	SA71-0.5B
231217017	SA144-0.5B
231217018	SA61-0.5B
231217019	SA62-0.5B
1201877937	Method Blank (MB)
1201877938	231217015(SA85-0.5B) Sample Duplicate (DUP)
1201877939	231217015(SA85-0.5B) Matrix Spike (MS)
1201877940	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-038 REV# 12.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

The blank volume is representative of the sample volume in this batch.

**Designated QC**

The following sample was used for QC: 231217015 (SA85-0.5B).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**

Samples were reprepared due to low carrier/tracer yield.

**Miscellaneous Information:**

**NCR Documentation**

The following NCR was generated for this SDG: 711292 The following NCR was generated for this SDG:

NCR 711292 was generated due to Other. 1. Sample 231217010 has Uncertainty greater than 30 percent of the Th-230 result, the Th-230 activity is between 2 and 5 times the MDA, and the sample was counted for the maximum count time of 1000 minutes. 1. Notifying Project Manager, reporting results.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

The sample and the duplicate, 1201877938 (SA85-0.5B) and 231217015 (SA85-0.5B), did not meet the relative percent difference requirement for Th-232, however they do meet the relative error ratio requirement with a value of 2.03. The blank, 1201877937 (MB), did not meet the detection limit for

Th-228 or Th-230 due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** Alphaspec U, Solid  
Analytical Method: DOE EML HASL-300, U-02-RC Modified  
Prep Method: Dry Soil Prep  
Analytical Batch Number: 881150  
Prep Batch Number: 877872

<b>Sample ID</b>	<b>Client ID</b>
231217001	RSAK8-0.5B
231217002	RSAL7-0.5B
231217003	RSAL8-0.5B
231217004	SA56-0.5B
231217005	SA35-0.5B
231217006	RSA03-0.5B
231217007	SA176-0.5B
231217008	SA55-0.5B
231217009	SA166-0.5B
231217010	SA201-0.5B
231217011	SA134-0.5B
231217012	SA182-0.5B
231217013	RSAK4-0.5B
231217014	RSAK4009-0.5B
231217015	SA85-0.5B
231217016	SA71-0.5B
231217017	SA144-0.5B
231217018	SA61-0.5B
231217019	SA62-0.5B
1201871202	Method Blank (MB)
1201871203	231217015(SA85-0.5B) Sample Duplicate (DUP)
1201871204	231217015(SA85-0.5B) Matrix Spike (MS)
1201871205	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 17.

### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met.

#### **Standards Information**

Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

### **Quality Control (QC) Information:**

#### **Blank Information**

The blank volume is representative of the sample volume in this batch.

#### **Designated QC**

The following sample was used for QC: 231217015 (SA85-0.5B).

#### **QC Information**

Refer to Non-Conformance Report.

### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Sample Re-prep/Re-analysis**

Sample 1201871205 (LCS) was recounted due to poor resolution.

### **Miscellaneous Information:**

#### **NCR Documentation**

The following NCR was generated for this SDG: 711177 The following NCR was generated for this SDG:

NCR 711177 was generated due to Other. 1. Samples 231217001, 231217005, 231217006, 231217008, 231217009, 231217010, 231217011, 231217018, 231217019, and 1201871203 have uncertainty greater than 30 percent of the U-235 result, U-235 activity between 2 and 5 times the MDA, and were counted for the maximum count time of 1000 minutes. Samples 231217007, 231217012, 231217013, 231217014, 231217015, 231217016, and 231217017 have uncertainty greater than 30 percent of the U-235 result, U-235 activity greater than 5 times the MDA, and were counted for the maximum count time of 1000 minutes. The Uncertainty requirements for U-235 in many of the samples are not being met due to the absence of significant U-235 activity in the samples. If the samples were to be prepped with larger aliquots to improve the uncertainty, this would result in tailing from the U-233/234 region of interest into the U-235 region of interest (especially due to the levels of U-233/234 activity being much higher than the U-235 levels in each sample) and also likely lower tracer yield recoveries. GEL has counted each sample being reported for the maximum possible count

time of 1000 minutes to ensure that the best possible Uncertainties are being reported. 1. Client notified. Reporting results.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>Gas Flow Radium 228</b>
Analytical Method:	EPA 904.0/SW846 9320 Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	877893
Prep Batch Number:	877872

<b>Sample ID</b>	<b>Client ID</b>
231217001	RSAK8-0.5B
231217002	RSAL7-0.5B
231217003	RSAL8-0.5B
231217004	SA56-0.5B
231217005	SA35-0.5B
231217006	RSA03-0.5B
231217007	SA176-0.5B
231217008	SA55-0.5B
231217009	SA166-0.5B
231217010	SA201-0.5B
231217011	SA134-0.5B
231217012	SA182-0.5B
231217013	RSAK4-0.5B
231217014	RSAK4009-0.5B
231217015	SA85-0.5B
231217016	SA71-0.5B
231217017	SA144-0.5B
231217018	SA61-0.5B
231217019	SA62-0.5B
1201863606	Method Blank (MB)
1201863607	231217015(SA85-0.5B) Sample Duplicate (DUP)
1201863608	231217015(SA85-0.5B) Matrix Spike (MS)
1201863609	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-009 REV# 15.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

The blank volume is representative of the sample volume in this batch.

**Designated QC**



The following sample was used for QC: 231217015 (SA85-0.5B).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**

Samples were re-precipitated due to high blank activity. Samples 231217003 (RSAL8-0.5B), 231217005 (SA35-0.5B), 231217006 (RSA03-0.5B), 231217010 (SA201-0.5B), 231217011 (SA134-0.5B), 231217014 (RSAK4009-0.5B) and 231217015 (SA85-0.5B) were re-elute due to activity greater than 2 times the MDA.

**Chemical Recoveries**

All chemical recoveries meet the required acceptance limits for this sample set.

**Miscellaneous Information:**

**NCR Documentation**

Nonconformance reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A nonconformance report (NCR) was not generated for this SDG.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>Lucas Cell, Ra226, solid</b>
Analytical Method:	EPA 903.1 Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	877942
Prep Batch Number:	877872

<b>Sample ID</b>	<b>Client ID</b>
231217001	RSAK8-0.5B
231217002	RSAL7-0.5B
231217003	RSAL8-0.5B
231217004	SA56-0.5B
231217005	SA35-0.5B
231217006	RSA03-0.5B
231217007	SA176-0.5B
231217008	SA55-0.5B
231217009	SA166-0.5B
231217010	SA201-0.5B
231217011	SA134-0.5B
231217012	SA182-0.5B
231217013	RSAK4-0.5B
231217014	RSAK4009-0.5B
231217015	SA85-0.5B
231217016	SA71-0.5B
231217017	SA144-0.5B
231217018	SA61-0.5B
231217019	SA62-0.5B
1201863717	Method Blank (MB)
1201863718	231217015(SA85-0.5B) Sample Duplicate (DUP)
1201863719	231217015(SA85-0.5B) Matrix Spike (MS)
1201863720	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on a "dry weight" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-008 REV# 12.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

The blank volume is representative of the sample volume in this batch.

**Designated QC**

The following sample was used for QC: 231217015 (SA85-0.5B).

### **QC Information**

All of the QC samples met the required acceptance limits.

### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Sample Re-prep/Re-analysis**

Samples 231217001 (RSAK8-0.5B), 231217004 (SA56-0.5B), 231217005 (SA35-0.5B), 231217006 (RSA03-0.5B), 231217007 (SA176-0.5B), 231217008 (SA55-0.5B), 231217010 (SA201-0.5B), 231217011 (SA134-0.5B), 231217013 (RSAK4-0.5B), 231217015 (SA85-0.5B) and 231217016 (SA71-0.5B) were recounted due to activity greater than 2 times the correlating MDA.

### **Miscellaneous Information:**

#### **NCR Documentation**

Nonconformance reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following NCR was generated for this SDG: NCR 711124 was generated due to Other. 1. Samples 231217001, 231217003, 231217005, 231217007, 231217008, 231217009, 231217011, 231217013, 231217015, 231217016, 231217017, 231217019, 1201863718, have activity between 2 times and 5 times the MDA. Samples were counted the maximum time. 2. Samples 231217006, 231217012 and 231217018 counted on detector 7. Lucas cell detector seven's daily did not run on July 9th, however the dailies ran on July 8th at 07:15 and July 10th at 04:45 and met requirements. Detector 7 was considered a valid instrument for 7/9/09 based on a LCS count at 18:05 on detector 7 that met requirements. 1. Reporting results 2. Reporting results.

#### **Additional Comments**

The blank result 1201863717 (MB) is greater than the MDC but less than the detection limit.

### **Qualifier information**

Manual qualifiers were not required.

### **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.

### **Review Validation:**

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

**The following data validator verified the information presented in this case narrative:**

Reviewer/Date: 2/ eumel . McCarty 7/20/09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 14-JUL-09	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> LSC	<b>Test / Method:</b> EPA 903.1 Modified	<b>Matrix Type:</b> Solid	<b>Client Code:</b> KERR
<b>Batch ID:</b> 877942	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 231217</b>			
<b>Application Issues:</b> Other			
<b>Specification and Requirements</b>		<b>NRG Disposition:</b>	
<b>Nonconformance Description:</b>			
<p>1. Samples 231217001, 231217003, 231217005, 231217007, 231217008, 231217009, 231217011, 231217013, 231217015, 231217016, 231217017, 231217019, 1201863718, have activity between 2 times and 5 times the MDA. Samples were counted the maximum time.</p> <p>2. Samples 231217006, 231217012 and 231217018 counted on detector 7. Lucas cell detector seven's daily did not run on July 9th, however the dailies ran on July 8th at 07:15 and July 10th at 04:45 and met requirements. Detector 7 was considered a valid instrument for 7/9/09 based on a LCS count at 18:05 on detector 7 that met requirements.</p>		<p>1. Reporting results</p> <p>2. Reporting results.</p>	

**Originator's Name:**

Takesha Mungo 14-JUL-09

**Data Validator/Group Leader:**

Angela Johnson 20-JUL-09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 14-JUL-09	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ALPHA SPECTROMETER	<b>Test / Method:</b> DOE EML HASL-300, U-02-RC Modified	<b>Matrix Type:</b> Solid	<b>Client Code:</b> KERR
<b>Batch ID:</b> 881150	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 231217</b>			
<b>Application Issues:</b> Other			
<b>Specification and Requirements Nonconformance Description:</b>		<b>NRG Disposition:</b>	
<p>1. Samples 231217001, 231217005, 231217006, 231217008, 231217009, 213217010, 231217011, 231217018, 231217019, and 1201871203 have uncertainty greater than 30 percent of the U-235 result, U-235 activity between 2 and 5 times the MDA, and were counted for the maximum count time of 1000 minutes.</p> <p>Samples 231217007, 231217012, 231217013, 231217014, 231217015, 231217016, and 231217017 have uncertainty greater than 30 percent of the U-235 result, U-235 activity greater than 5 times the MDA, and were counted for the maximum count time of 1000 minutes.</p> <p>The Uncertainty requirements for U-235 in many of the samples are not being met due to the absence of significant U-235 activity in the samples. If the samples were to be prepped with larger aliquots to improve the uncertainty, this would result in tailing from the U-233/234 region of interest into the U-235 region of interest (especially due to the levels of U-233/234 activity being much higher than the U-235 levels in each sample) and also likely lower tracer yield recoveries. GEL has counted each sample being reported for the maximum possible count time of 1000 minutes to ensure that the best possible Uncertainties are being reported.</p>		<p>1. Client notified. Reporting results.</p>	

**Originator's Name:**  
Jessica Downey      14-JUL-09

**Data Validator/Group Leader:**  
Jessica Downey

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 14-JUL-09	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ALPHA SPECTROMETER	<b>Test / Method:</b> DOE EML HASL-300, Th-01-RC Modified	<b>Matrix Type:</b> Solid	<b>Client Code:</b> KERR
<b>Batch ID:</b> 883985	<b>Sample Numbers:</b> See below		
<b>Potentially affected work order(s)(SDG): 231217</b>			
<b>Application Issues:</b> Other			
<b>Specification and Requirements Nonconformance Description:</b>		<b>NRG Disposition:</b>	
1. Sample 231217010 has Uncertainty greater than 30 percent of the Th-230 result, the Th-230 activity is between 2 and 5 times the MDA, and the sample was counted for the maximum count time of 1000 minutes.		1. Notifying Project Manager, reporting results.	

**Originator's Name:**

Jessica Downey 14-JUL-09

**Data Validator/Group Leader:**

Eric Brimstin 14-JUL-09

# SAMPLE DATA SUMMARY



# GEL LABORATORIES LLC

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

## Certificate of Analysis Report for

KERR003 Tronox LLC

Client SDG: 231217 GEL Work Order: 231217

**The Qualifiers in this report are defined as follows:**

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

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 Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the detection limit.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Edith Kent.



---

Reviewed by

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID:	RSAK8-0.5B	Project:	KERRHenderson
Sample ID:	231217001	Client ID:	KERR003
Matrix:	SO		
Collect Date:	05-JUN-09 12:15		
Receive Date:	06-JUN-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.71	+/-0.281	0.176	0.050	pCi/g		KXM	07/13/09	1304	883985	1
											4	
Thorium-230		1.44	+/-0.249	0.104	0.050	pCi/g						
Thorium-232		1.73	+/-0.269	0.0326	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.30	+/-0.0933	0.0191	0.040	pCi/g		KXM	07/08/09	1717	881150	2
											4	
Uranium-235/236		0.064	+/-0.0237	0.0163	0.040	pCi/g						
Uranium-238		1.22	+/-0.0899	0.00518	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.619	+/-0.338	0.474	0.500	pCi/g		DXM	07/08/09	1517	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.979	+/-0.320	0.330	0.500	pCi/g		KSD1	07/09/09	1915	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			79.4	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			101	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			86.8	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: RSAK8-0.5B  
Sample ID: 231217001

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID:	RSAL7-0.5B	Project:	KERRHenderson
Sample ID:	231217002	Client ID:	KERR003
Matrix:	SO		
Collect Date:	05-JUN-09 12:55		
Receive Date:	06-JUN-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.89	+/-0.288	0.199	0.050	pCi/g		KXM	07/13/09	1304	883985	1
											4	
Thorium-230		1.28	+/-0.229	0.123	0.050	pCi/g						
Thorium-232		1.47	+/-0.244	0.123	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.757	+/-0.0706	0.0291	0.040	pCi/g		KXM	07/08/09	1717	881150	2
											4	
Uranium-235/236		0.0365	+/-0.021	0.0272	0.040	pCi/g						
Uranium-238		0.773	+/-0.0713	0.0291	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.61	+/-0.401	0.470	0.500	pCi/g		DXM	07/08/09	1439	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.447	+/-0.224	0.289	0.500	pCi/g		KSD1	07/09/09	1410	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			87.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			106	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			83.6	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: RSAL7-0.5B  
Sample ID: 231217002

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: RSAL8-0.5B  
Sample ID: 231217003  
Matrix: SO  
Collect Date: 05-JUN-09 13:30  
Receive Date: 06-JUN-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.52	+/-0.232	0.137	0.050	pCi/g		KXM	07/13/09	1304	883985	1
											4	
Thorium-230		0.954	+/-0.176	0.0253	0.050	pCi/g						
Thorium-232		1.54	+/-0.227	0.0934	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.755	+/-0.0713	0.0246	0.040	pCi/g		KXM	07/08/09	1717	881150	2
											4	
Uranium-235/236		0.0316	+/-0.017	0.0161	0.040	pCi/g						
Uranium-238		0.747	+/-0.0706	0.021	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.889	+/-0.151	0.177	0.500	pCi/g		DXM	07/13/09	1652	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.678	+/-0.294	0.354	0.500	pCi/g		KSD1	07/09/09	1410	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			85.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			106	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			81.8	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

---

Client Sample ID: RSAL8-0.5B  
Sample ID: 231217003

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID:	SA56-0.5B	Project:	KERRHenderson
Sample ID:	231217004	Client ID:	KERR003
Matrix:	SO		
Collect Date:	10-JUN-09 10:25		
Receive Date:	11-JUN-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.55	+/-0.252	0.156	0.050	pCi/g		KXM	07/13/09	1304	883985	1
											4	
Thorium-230		2.33	+/-0.294	0.0736	0.050	pCi/g						
Thorium-232		1.19	+/-0.213	0.0921	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		2.35	+/-0.127	0.0255	0.040	pCi/g		KXM	07/08/09	1717	881150	2
											4	
Uranium-235/236		0.142	+/-0.0367	0.0269	0.040	pCi/g						
Uranium-238		2.28	+/-0.124	0.00532	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.784	+/-0.373	0.515	0.500	pCi/g		DXM	07/08/09	1439	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226	U	0.197	+/-0.197	0.318	0.500	pCi/g		KSD1	07/09/09	1410	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			79.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			98.5	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			84.3	(25%-125%)



# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA56-0.5B  
Sample ID: 231217004

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID:	SA35-0.5B	Project:	KERRHenderson
Sample ID:	231217005	Client ID:	KERR003
Matrix:	SO		
Collect Date:	10-JUN-09 11:15		
Receive Date:	11-JUN-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.96	+/-0.263	0.176	0.050	pCi/g		KXM	07/13/09	1304	883985	1
											4	
Thorium-230		1.05	+/-0.189	0.117	0.050	pCi/g						
Thorium-232		1.70	+/-0.239	0.131	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.742	+/-0.0727	0.0242	0.040	pCi/g		KXM	07/08/09	1717	881150	2
											4	
Uranium-235/236		0.0313	+/-0.0164	0.00671	0.040	pCi/g						
Uranium-238		0.805	+/-0.075	0.0138	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.00	+/-0.168	0.201	0.500	pCi/g		DXM	07/13/09	1652	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.721	+/-0.262	0.178	0.500	pCi/g		KSD1	07/09/09	1915	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			87.4	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			96.4	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			77.5	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA35-0.5B  
Sample ID: 231217005

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: RSA03-0.5B	Project: KERRHenderson
Sample ID: 231217006	Client ID: KERR003
Matrix: SO	
Collect Date: 10-JUN-09 13:20	
Receive Date: 11-JUN-09	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.93	+/-0.270	0.126	0.050	pCi/g		KXM	07/13/09	1304	883985	1
											4	
Thorium-230		1.18	+/-0.208	0.0717	0.050	pCi/g						
Thorium-232		1.72	+/-0.249	0.0281	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.960	+/-0.0785	0.0263	0.040	pCi/g		KXM	07/08/09	1717	881150	2
											4	
Uranium-235/236		0.0463	+/-0.0212	0.0222	0.040	pCi/g						
Uranium-238		0.851	+/-0.0732	0.0156	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.14	+/-0.219	0.299	0.500	pCi/g		DXM	07/13/09	1653	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.36	+/-0.335	0.236	0.500	pCi/g		KSD1	07/09/09	1915	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			84.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			104	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			76.0	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

---

Client Sample ID: RSA03-0.5B  
Sample ID: 231217006

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID:	SA176-0.5B	Project:	KERRHenderson
Sample ID:	231217007	Client ID:	KERR003
Matrix:	SO		
Collect Date:	10-JUN-09 12:40		
Receive Date:	11-JUN-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.65	+/-0.264	0.193	0.050	pCi/g		KXM	07/13/09	1304	883985	1
											4	
Thorium-230		0.990	+/-0.195	0.104	0.050	pCi/g						
Thorium-232		1.66	+/-0.248	0.0903	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.944	+/-0.0779	0.0221	0.040	pCi/g		KXM	07/08/09	1724	881150	2
											4	
Uranium-235/236		0.0529	+/-0.0203	0.0061	0.040	pCi/g						
Uranium-238		0.849	+/-0.0737	0.0182	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.35	+/-0.349	0.488	0.500	pCi/g		DXM	07/08/09	1440	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.18	+/-0.370	0.348	0.500	pCi/g		KSD1	07/09/09	1915	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			85.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			109	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			80.0	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

---

Client Sample ID: SA176-0.5B  
Sample ID: 231217007

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID:	SA55-0.5B	Project:	KERRHenderson
Sample ID:	231217008	Client ID:	KERR003
Matrix:	SO		
Collect Date:	10-JUN-09 11:50		
Receive Date:	11-JUN-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		2.04	+/-0.281	0.0763	0.050	pCi/g		KXM	07/13/09	1304	883985	1
												4
Thorium-230		0.914	+/-0.189	0.076	0.050	pCi/g						
Thorium-232		1.76	+/-0.259	0.0298	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.807	+/-0.0741	0.0193	0.040	pCi/g		KXM	07/08/09	1718	881150	2
												4
Uranium-235/236		0.0497	+/-0.0212	0.0165	0.040	pCi/g						
Uranium-238		0.736	+/-0.0703	0.00524	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.57	+/-0.438	0.449	0.500	pCi/g		DXM	07/08/09	1440	877893	3
												2
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.657	+/-0.233	0.218	0.500	pCi/g		KSD1	07/09/09	2210	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			81.0	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			104	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			82.0	(25%-125%)



# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA55-0.5B  
Sample ID: 231217008

Project: KERRHenderson  
Client ID: KERR003

---

<b>Parameter</b>	<b>Qualifier</b>	<b>Result</b>	<b>Uncertainty</b>	<b>DL</b>	<b>RL</b>	<b>Units</b>	<b>DF</b>	<b>AnalystDate</b>	<b>Time</b>	<b>Batch</b>	<b>Method</b>
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID:	SA166-0.5B	Project:	KERRHenderson
Sample ID:	231217009	Client ID:	KERR003
Matrix:	SO		
Collect Date:	11-JUN-09 12:15		
Receive Date:	12-JUN-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.67	+/-0.248	0.129	0.050	pCi/g		KXM	07/13/09	1304	883985	1
											4	
Thorium-230		1.08	+/-0.195	0.0685	0.050	pCi/g						
Thorium-232		1.56	+/-0.233	0.0685	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.840	+/-0.0768	0.0199	0.040	pCi/g		KXM	07/08/09	1718	881150	2
											4	
Uranium-235/236		0.0557	+/-0.0235	0.0213	0.040	pCi/g						
Uranium-238		0.860	+/-0.0773	0.0138	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.711	+/-0.317	0.408	0.500	pCi/g		DXM	07/08/09	1440	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.254	+/-0.151	0.174	0.500	pCi/g		KSD1	07/09/09	1515	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			83.0	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			99.4	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			87.5	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA166-0.5B  
Sample ID: 231217009

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA201-0.5B  
Sample ID: 231217010  
Matrix: SO  
Collect Date: 11-JUN-09 08:40  
Receive Date: 12-JUN-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		2.24	+/-0.329	0.214	0.050	pCi/g		KXM	07/13/09	1304	883985	1
											4	
Thorium-230		0.872	+/-0.272	0.354	0.050	pCi/g						
Thorium-232		1.65	+/-0.287	0.214	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.988	+/-0.0807	0.0131	0.040	pCi/g		KXM	07/10/09	2120	881150	2
											4	
Uranium-235/236		0.0549	+/-0.0227	0.0202	0.040	pCi/g						
Uranium-238		0.980	+/-0.0802	0.00512	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.21	+/-0.179	0.212	0.500	pCi/g		DXM	07/13/09	1653	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226	U	0.0433	+/-0.159	0.312	0.500	pCi/g		KSD1	07/09/09	2210	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			77.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			98.3	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			87.5	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA201-0.5B  
Sample ID: 231217010

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID:	SA134-0.5B	Project:	KERRHenderson
Sample ID:	231217011	Client ID:	KERR003
Matrix:	SO		
Collect Date:	11-JUN-09 09:25		
Receive Date:	12-JUN-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.63	+/-0.274	0.160	0.050	pCi/g		KXM	07/13/09	1304	883985	1
											4	
Thorium-230		1.52	+/-0.256	0.0846	0.050	pCi/g						
Thorium-232		1.34	+/-0.244	0.122	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.14	+/-0.0871	0.023	0.040	pCi/g		KXM	07/10/09	2120	881150	2
											4	
Uranium-235/236		0.0445	+/-0.0207	0.0203	0.040	pCi/g						
Uranium-238		0.980	+/-0.0803	0.00514	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.939	+/-0.176	0.230	0.500	pCi/g		DXM	07/13/09	1653	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.527	+/-0.265	0.309	0.500	pCi/g		KSD1	07/09/09	1945	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			76.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			99.4	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			84.1	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

---

Client Sample ID: SA134-0.5B  
Sample ID: 231217011

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental Management, Inc.  
 Address : 1100 Quail St., Suite 102  
 Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
 Project: **Tronox Henderson**

Client Sample ID:	SA182-0.5B	Project:	KERRHenderson
Sample ID:	231217012	Client ID:	KERR003
Matrix:	SO		
Collect Date:	11-JUN-09 11:20		
Receive Date:	12-JUN-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		0.963	+/-0.207	0.106	0.050	pCi/g		KXM	07/13/09	1304	883985	1
												4
Thorium-230		0.938	+/-0.199	0.0331	0.050	pCi/g						
Thorium-232		0.684	+/-0.170	0.0331	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.976	+/-0.0816	0.0194	0.040	pCi/g		KXM	07/10/09	2120	881150	2
												4
Uranium-235/236		0.0522	+/-0.0209	0.00652	0.040	pCi/g						
Uranium-238		0.884	+/-0.0774	0.0135	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.512	+/-0.301	0.430	0.500	pCi/g		DXM	07/08/09	1424	877893	3
												2
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.540	+/-0.239	0.278	0.500	pCi/g		KSD1	07/09/09	1515	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			75.0	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			101	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			82.6	(25%-125%)



# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

---

Client Sample ID: SA182-0.5B  
Sample ID: 231217012

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID:	RSAK4-0.5B	Project:	KERRHenderson
Sample ID:	231217013	Client ID:	KERR003
Matrix:	SO		
Collect Date:	11-JUN-09 10:20		
Receive Date:	12-JUN-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		2.09	+/-0.269	0.0685	0.050	pCi/g		KXM	07/13/09	1305	883985	1
											4	
Thorium-230		0.972	+/-0.183	0.0268	0.050	pCi/g						
Thorium-232		1.65	+/-0.238	0.0268	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.848	+/-0.0807	0.028	0.040	pCi/g		KXM	07/10/09	2120	881150	2
											4	
Uranium-235/236		0.0409	+/-0.0195	0.00722	0.040	pCi/g						
Uranium-238		0.929	+/-0.0837	0.0187	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.54	+/-0.435	0.477	0.500	pCi/g		DXM	07/08/09	1424	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.568	+/-0.293	0.383	0.500	pCi/g		KSD1	07/09/09	2040	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			88.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			90.2	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			84.6	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

---

Client Sample ID: RSAK4-0.5B  
Sample ID: 231217013

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID:	RSAK4009-0.5B	Project:	KERRHenderson
Sample ID:	231217014	Client ID:	KERR003
Matrix:	SO		
Collect Date:	11-JUN-09 10:20		
Receive Date:	12-JUN-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.86	+/-0.261	0.0893	0.050	pCi/g		KXM	07/13/09	1305	883985	1
											4	
Thorium-230		1.02	+/-0.200	0.125	0.050	pCi/g						
Thorium-232		1.47	+/-0.232	0.089	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.779	+/-0.0701	0.0156	0.040	pCi/g		KXM	07/10/09	2120	881150	2
											4	
Uranium-235/236		0.0423	+/-0.0181	0.00605	0.040	pCi/g						
Uranium-238		0.796	+/-0.071	0.018	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.791	+/-0.230	0.353	0.500	pCi/g		DXM	07/13/09	1653	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.433	+/-0.201	0.246	0.500	pCi/g		KSD1	07/09/09	1620	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			86.4	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			110	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			85.3	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

---

Client Sample ID: RSAK4009-0.5B  
Sample ID: 231217014

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA85-0.5B  
Sample ID: 231217015  
Matrix: SO  
Collect Date: 16-JUN-09 08:40  
Receive Date: 17-JUN-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.76	+/-0.259	0.149	0.050	pCi/g		KXM	07/13/09	1305	883985	1
											4	
Thorium-230		1.03	+/-0.202	0.140	0.050	pCi/g						
Thorium-232		1.89	+/-0.270	0.162	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.874	+/-0.073	0.0174	0.040	pCi/g		KXM	07/10/09	2120	881150	2
											4	
Uranium-235/236		0.0466	+/-0.0186	0.00582	0.040	pCi/g						
Uranium-238		0.779	+/-0.0689	0.0174	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.922	+/-0.152	0.172	0.500	pCi/g		DXM	07/13/09	1653	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.952	+/-0.314	0.317	0.500	pCi/g		KSD1	07/09/09	1915	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			79.5	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			112	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			84.9	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA85-0.5B  
Sample ID: 231217015

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA71-0.5B  
Sample ID: 231217016  
Matrix: SO  
Collect Date: 16-JUN-09 10:03  
Receive Date: 17-JUN-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.83	+/-0.249	0.0827	0.050	pCi/g		KXM	07/13/09	1305	883985	1
											4	
Thorium-230		0.964	+/-0.182	0.0825	0.050	pCi/g						
Thorium-232		1.64	+/-0.233	0.0258	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.831	+/-0.0729	0.0127	0.040	pCi/g		KXM	07/10/09	2120	881150	2
											4	
Uranium-235/236		0.0431	+/-0.0184	0.00615	0.040	pCi/g						
Uranium-238		0.899	+/-0.076	0.0159	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.698	+/-0.309	0.482	0.500	pCi/g		DXM	07/08/09	1424	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.712	+/-0.279	0.320	0.500	pCi/g		KSD1	07/09/09	1915	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			86.1	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			105	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			83.8	(25%-125%)



# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

---

Client Sample ID: SA71-0.5B  
Sample ID: 231217016

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA144-0.5B  
Sample ID: 231217017  
Matrix: SO  
Collect Date: 16-JUN-09 10:55  
Receive Date: 17-JUN-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.96	+/-0.268	0.0724	0.050	pCi/g		KXM	07/13/09	1305	883985	1
											4	
Thorium-230		1.03	+/-0.193	0.0283	0.050	pCi/g						
Thorium-232		1.46	+/-0.233	0.0904	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.836	+/-0.0726	0.0216	0.040	pCi/g		KXM	07/10/09	2120	881150	2
											4	
Uranium-235/236		0.0517	+/-0.0199	0.00597	0.040	pCi/g						
Uranium-238		0.942	+/-0.0764	0.0123	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228	U	0.377	+/-0.261	0.383	0.500	pCi/g		DXM	07/08/09	1424	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.717	+/-0.292	0.341	0.500	pCi/g		KSD1	07/09/09	1620	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			79.2	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			106	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			79.6	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA144-0.5B  
Sample ID: 231217017

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID:	SA61-0.5B	Project:	KERRHenderson
Sample ID:	231217018	Client ID:	KERR003
Matrix:	SO		
Collect Date:	16-JUN-09 11:45		
Receive Date:	17-JUN-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.72	+/-0.256	0.0299	0.050	pCi/g		KXM	07/13/09	1305	883985	1
											4	
Thorium-230		0.746	+/-0.171	0.0761	0.050	pCi/g						
Thorium-232		1.58	+/-0.247	0.0761	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.26	+/-0.0912	0.0228	0.040	pCi/g		KXM	07/10/09	2120	881150	2
											4	
Uranium-235/236		0.0694	+/-0.0257	0.0233	0.040	pCi/g						
Uranium-238		1.33	+/-0.0934	0.013	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.52	+/-0.352	0.453	0.500	pCi/g		DXM	07/08/09	1424	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.865	+/-0.255	0.144	0.500	pCi/g		KSD1	07/09/09	1620	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			83.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			101	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			76.0	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA61-0.5B  
Sample ID: 231217018

Project: KERRHenderson  
Client ID: KERR003

---

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
		Corrected"									

---

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA62-0.5B  
Sample ID: 231217019  
Matrix: SO  
Collect Date: 16-JUN-09 13:05  
Receive Date: 17-JUN-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		2.03	+/-0.272	0.113	0.050	pCi/g		KXM	07/13/09	1305	883985	1
											4	
Thorium-230		0.996	+/-0.199	0.140	0.050	pCi/g						
Thorium-232		1.80	+/-0.257	0.113	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.754	+/-0.0696	0.0219	0.040	pCi/g		KXM	07/10/09	2120	881150	2
											4	
Uranium-235/236		0.0324	+/-0.0168	0.0155	0.040	pCi/g						
Uranium-238		0.797	+/-0.0712	0.0181	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.834	+/-0.343	0.419	0.500	pCi/g		DXM	07/08/09	1424	877893	3
											2	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.07	+/-0.347	0.347	0.500	pCi/g		KSD1	07/09/09	1655	877942	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	06/18/09	1435	877872

**The following Analytical Methods were performed**

Method	Description	Analyst Comments
1	DOE EML HASL-300, Th-01-RC Modified	
2	DOE EML HASL-300, U-02-RC Modified	
3	EPA 904.0/SW846 9320 Modified	
4	EPA 903.1 Modified	

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			84.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			108	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight			79.3	(25%-125%)

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Company : Northgate Environmental  
Management, Inc.  
Address : 1100 Quail St., Suite 102  
Newport Beach, California 92660

Report Date: July 14, 2009

Contact: Mr. Frank Hagar  
Project: **Tronox Henderson**

Client Sample ID: SA62-0.5B  
Sample ID: 231217019

Project: KERRHenderson  
Client ID: KERR003

---

<b>Parameter</b>	<b>Qualifier</b>	<b>Result</b>	<b>Uncertainty</b>	<b>DL</b>	<b>RL</b>	<b>Units</b>	<b>DF</b>	<b>AnalystDate</b>	<b>Time</b>	<b>Batch</b>	<b>Method</b>
		Corrected"									

---

# QUALITY CONTROL DATA



# GEL LABORATORIES LLC

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

## QC Summary

Report Date: July 14, 2009  
Page 1 of 3

Northgate Environmental Management, Inc.

1100 Quail St., Suite 102  
Newport Beach, California

Contact: Mr. Frank Hagar

Workorder: 231217

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	881150										
QC1201871203	231217015	DUP									
Uranium-233/234		0.874		0.884	pCi/g	1.13		(0% - 20%)	KXM4	07/10/09	21:20
		+/-0.073		+/-0.0798							
Uranium-235/236		0.0466		0.0404	pCi/g	14.1		(0% - 100%)			
		+/-0.0186		+/-0.0216							
Uranium-238		0.779		0.893	pCi/g	13.6		(0% - 20%)			
		+/-0.0689		+/-0.0794							
QC1201871205	LCS										
Uranium-233/234				2.31	pCi/g					07/13/09	13:34
				+/-0.124							
Uranium-235/236				0.127	pCi/g						
				+/-0.0322							
Uranium-238	2.47			2.46	pCi/g		99.6	(75%-125%)			
				+/-0.128							
QC1201871202	MB										
Uranium-233/234			U	0.00764	pCi/g					07/10/09	21:20
				+/-0.0105							
Uranium-235/236			U	0.00	pCi/g						
				+/-0.0056							
Uranium-238			U	0.00654	pCi/g						
				+/-0.0101							
QC1201871204	231217015	MS									
Uranium-233/234		0.874		3.00	pCi/g					07/10/09	21:20
		+/-0.073		+/-0.142							
Uranium-235/236		0.0466		0.191	pCi/g						
		+/-0.0186		+/-0.0402							
Uranium-238	2.51	0.779		3.02	pCi/g		89.3	(75%-125%)			
		+/-0.0689		+/-0.142							
Batch	883985										
QC1201877938	231217015	DUP									
Thorium-228		1.76		2.04	pCi/g	14.7		(0% - 20%)	KXM4	07/13/09	13:05
		+/-0.259		+/-0.294							
Thorium-230		1.03		1.15	pCi/g	11.0		(0% - 20%)			
		+/-0.202		+/-0.221							
Thorium-232		1.89		1.48	pCi/g	24.3*		(0% - 20%)			
		+/-0.270		+/-0.250							
QC1201877940	LCS										
Thorium-228				0.111	pCi/g					07/13/09	13:05
				+/-0.0769							
Thorium-230	8.84			9.88	pCi/g		112	(75%-125%)			
				+/-0.619							
Thorium-232			U	-0.0202	pCi/g			(75%-125%)			

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 231217

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	883985										
QC1201877937	MB			+/-0.0343							
Thorium-228			U	0.0293	pCi/g				KXM4	07/13/09	13:05
				+/-0.0574							
Thorium-230			U	-0.00973	pCi/g						
				+/-0.027							
Thorium-232			U	0.00973	pCi/g						
				+/-0.0191							
QC1201877939	231217015	MS									
Thorium-228				1.76	pCi/g					07/13/09	13:05
				+/-0.259							
Thorium-230	10.6			1.03	pCi/g		117	(75%-125%)			
				+/-0.202							
Thorium-232				1.89	pCi/g			(75%-125%)			
				+/-0.270							
<b>Rad Gas Flow</b>											
Batch	877893										
QC1201863607	231217015	DUP									
Radium-228				0.922	pCi/g	5.16		(0% - 100%)	DXM2	07/08/09	15:30
				+/-0.152							
QC1201863609	LCS										
Radium-228	8.17			8.47	pCi/g		104	(75%-125%)		07/08/09	15:30
				+/-1.01							
QC1201863606	MB										
Radium-228			U	0.271	pCi/g					07/08/09	15:30
				+/-0.263							
QC1201863608	231217015	MS									
Radium-228	77.9			0.922	pCi/g		117	(75%-125%)		07/08/09	14:43
				+/-0.152							
				+/-10.4							
<b>Rad Ra-226</b>											
Batch	877942										
QC1201863718	231217015	DUP									
Radium-226				0.952	pCi/g	94.3		(0% - 100%)	KSD1	07/09/09	16:55
				+/-0.314							
QC1201863720	LCS										
Radium-226	21.2			25.2	pCi/g		119	(75%-125%)		07/09/09	16:55
				+/-1.37							
QC1201863717	MB										
Radium-226				0.304	pCi/g					07/09/09	16:55
				+/-0.193							
QC1201863719	231217015	MS									
Radium-226	21.5			0.952	pCi/g		97.3	(75%-125%)		07/09/09	16:55
				+/-0.314							
				+/-1.31							

Notes:  
The Qualifiers in this report are defined as follows:

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 231217

Page 3 of 3

Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
**		Analyte is a surrogate compound								
<		Result is less than value reported								
>		Result is greater than value reported								
A		The TIC is a suspected aldol-condensation product								
B		For General Chemistry and Organic analysis the target analyte was detected in the associated blank.								
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								
F		Estimated Value								
H		Analytical holding time was exceeded								
J		Value is estimated								
M		M if above MDC and less than LLD								
M		Matrix Related Failure								
N/A		RPD or %Recovery limits do not apply.								
ND		Analyte concentration is not detected above the detection limit								
NJ		Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier								
R		Sample results are rejected								
U		Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.								
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								
^		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.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance 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.

\* Indicates that a Quality Control parameter was not within specifications.

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.

**RAW DATA**

# URANIUM

**Radiochemistry Batch Checklist, Rev 9**

Batch# 881150 Product: U Date: 7/14/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required)			NA
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	/		
Instrument source check is within limits.	/		
Instrument bkg check is within limits.	/		
Method RDL/ LLD has been met.	/		
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	/		
Or meets the client's required RER acceptance criteria.	/		
Tracer yield is 15-125% . Carrier yield 25-125%.	/		
Or meets the client's contract acceptance criteria.	/		
Method blank is less than the RDL/ LLD.	/		
(If rad samples, < 5% of lowest activity)	/		
Sample was run within hold time.	/		
Sample was correctly preserved if required.			NA
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	/		
No blank spaces on data forms.	/		
All line outs initialed and dated.	/		
No transcription errors are apparent.	/		
Aux data is correct.			NA
Client Special requirements page has been checked.	/		
Raw Data and/ or spectrum are included and properly stated.	/		
QC data entered into QC database and batch is in REVW.	/		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	/		
Batch non-conformances completed, if applicable.	/		NCR# 711177
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCR# 711177
Aliquot Correction completed if required.			NA
Review sample historical results if available (If REMF, results above MDC have been verified by historical results, recount or re-analysis.)	/		

GEL Laboratories, LLC

revised 8/1/08

Primary Review Performed By: [Signature] 7/14/09

Secondary Review Performed By: [Signature] 7/14/09

7/14/09  
KERR

# Uranium Que Sheet

29-JUN-09

Batch #: 881150 Analyst: KXM4 First Client Due Date: 15-JUL-09 Internal Due Date: 04-JUL-09  
 Tracer Isotope: U-232/U-236 Tracer Code: 1782-B Expiration Date: 12-16-09 Vol: 0.1nL  
 LCS Isotope: U-238 LCS Code: 1163-G Expiration Date: 4-10-10 Vol: 0.1nL  
 Spike Isotope: U-238 Spike Code: 1163-G Expiration Date: 4-16-10 Vol: 0.1nL  
 Prep Date: 7-1-09 Initials: KM Pipet ID: 197058 Balance ID: 5040277 Witness: MDA 7/1/09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g/L)	U Det #
231217001-1	RSAL8-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	05-JUN-09	1	11	1.010	137
231217002-1	RSAL7-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	05-JUN-09	2	12	1.008	138
231217003-1	RSAL8-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	05-JUN-09	3	13	1.006	139
231217004-1	SA56-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	10-JUN-09	4	14	1.006	140
231217005-1	SA35-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	10-JUN-09	5	15	1.007	141
231217006-1	RSA03-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	10-JUN-09	6	16	1.014	142
231217007-1	SA176-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	10-JUN-09	7	17	1.009	144
231217008-1	SA55-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	10-JUN-09	8	18	1.001	145
231217009-1	SA166-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	11-JUN-09	9	19	1.006	146
231217010-1	SA201-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	11-JUN-09	10	20	1.015	115
231217011-1	SA134-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	11-JUN-09	11	21	1.006	116
231217012-1	SA182-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	11-JUN-09	12	22	1.004	117
231217013-1	RSAL4-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	11-JUN-09	13	23	1.003	118
231217014-1	RSAL4009-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	11-JUN-09	14	24	1.012	121
231217015-1	SA85-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	16-JUN-09	15	25	1.014	122
231217016-1	SA71-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	16-JUN-09	16	26	1.000	123
231217017-1	SA144-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	16-JUN-09	17	27	1.014	124
231217018-1	SA61-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	16-JUN-09	18	28	1.018	125
231217019-1	SA62-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	16-JUN-09	19	29	1.001	126
1201871202-1	MB for batch 881150	MB		.04 pCi/g	SOIL	QC ACCOUNT	16-JUN-09	20	30	1.018	129
1201871203-1	SA85-0.5B(231217015DUP)	DUP		.04 pCi/g	SOIL	QC ACCOUNT	16-JUN-09	21	31	1.006	130
1201871204-1	SA85-0.5B(231217015MS)	MS		.04 pCi/g	SOIL	QC ACCOUNT	16-JUN-09	22	32	1.002	131
1201871205-1	LCS for batch 881150	LCS		.04 pCi/g	SOIL	QC ACCOUNT	16-JUN-09	23	33	1.018	127

Data Reviewed By: Julia 7/14/09

Solid Sample Dissolution by: LEACH or DIGESTION  
 Circle One

Choose SOP used: GL-RAD-A-011  
GL-RAD-A-038  
 GL-RAD-A-045  
 GL-RAD-A-043

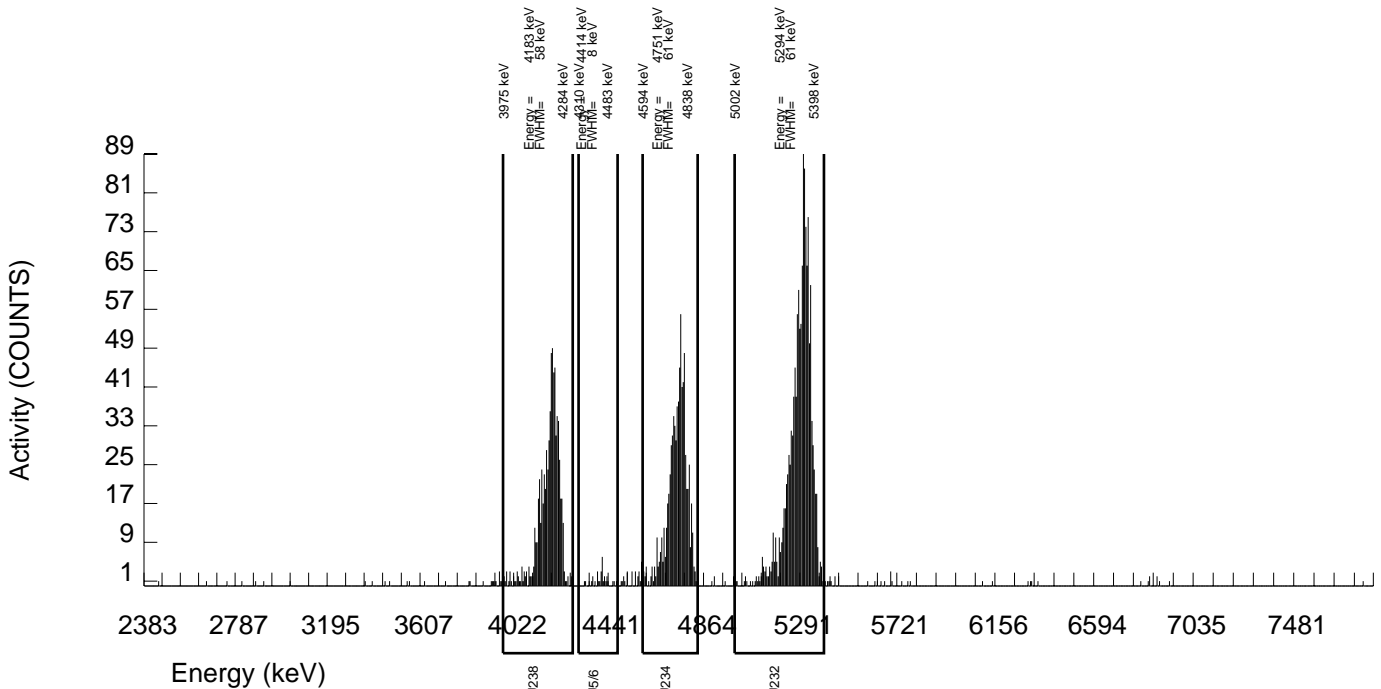
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 5-JUN-2009 00:00:00.		SAMPLE ID : S0231217001_UU SAMPLE QTY: 1.010 G	
DETECTOR NUMBER :64288 AVERAGE %EFFICIENCY :25.5715 % YIELD : 101.051		COUNT DATE: 8-JUL-2009 17:17:45 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.494E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.494E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29880 dpm RESULTS : 5.35451 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B137.CNF;326 BKG DATE : 5-JUL-2009 EFF FILE : W137.CNF;88 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	762.000	754.873	3.000	1.7321	100.0000	1.30E+00	2.00E-01	1.91E-02	6.95E-03	9.33E-02
U232	5302.100	1375.000	1368.000	7.000	2.6458	100.0000	2.36E+00	3.44E-01	2.64E-02	1.06E-02	1.26E-01
U-235	4391.000	31.000	30.000	1.000	1.0000	80.90000	6.40E-02	2.52E-02	1.63E-02	4.96E-03	2.37E-02
U-238	4184.730	706.000	706.000	0.000	0.0000	100.0000	1.22E+00	1.88E-01	5.18E-03	0.00E+00	8.99E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity





GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150  
SAMPLE DATE : 5-JUN-2009 00:00:00.

SAMPLE ID : S0231217002\_UU  
SAMPLE QTY: 1.008 G

DETECTOR NUMBER :65877  
AVERAGE %EFFICIENCY :25.7486  
% YIELD : 105.785

COUNT DATE: 8-JUL-2009 17:17:48  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/G : 2.499E+00

LCS/LCSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/G : 2.499E+00

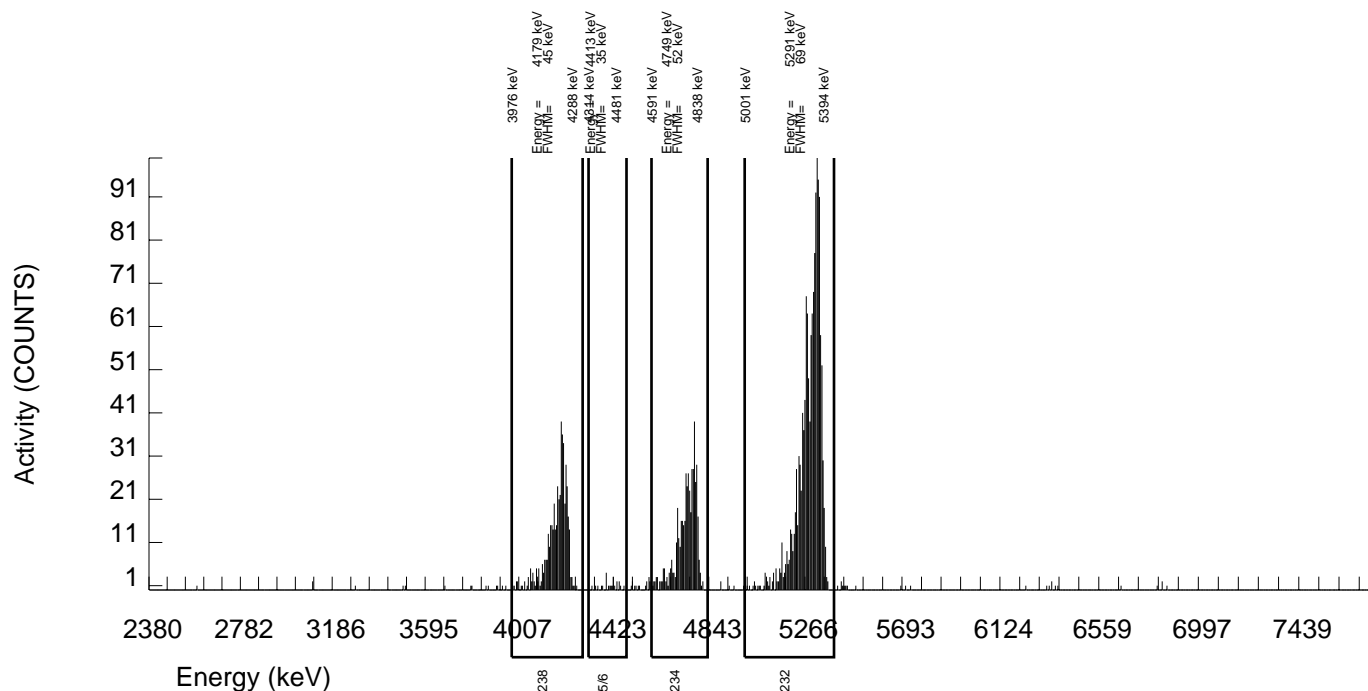
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29880 dpm  
RESULTS : 5.60534 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B138.CNF;331  
BKG DATE : 5-JUL-2009  
EFF FILE : W138.CNF;88  
CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	476.000	461.650	10.000	3.1623	100.0000	7.57E-01	1.24E-01	2.91E-02	1.21E-02	7.06E-02
U232	5302.100	1452.000	1442.000	10.000	3.1623	100.0000	2.37E+00	3.42E-01	2.91E-02	1.21E-02	1.23E-01
U-235	4391.000	23.000	18.000	5.000	2.2361	80.90000	3.65E-02	2.16E-02	2.72E-02	1.05E-02	2.10E-02
U-238	4184.730	481.000	471.000	10.000	3.1623	100.0000	7.73E-01	1.26E-01	2.91E-02	1.21E-02	7.13E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



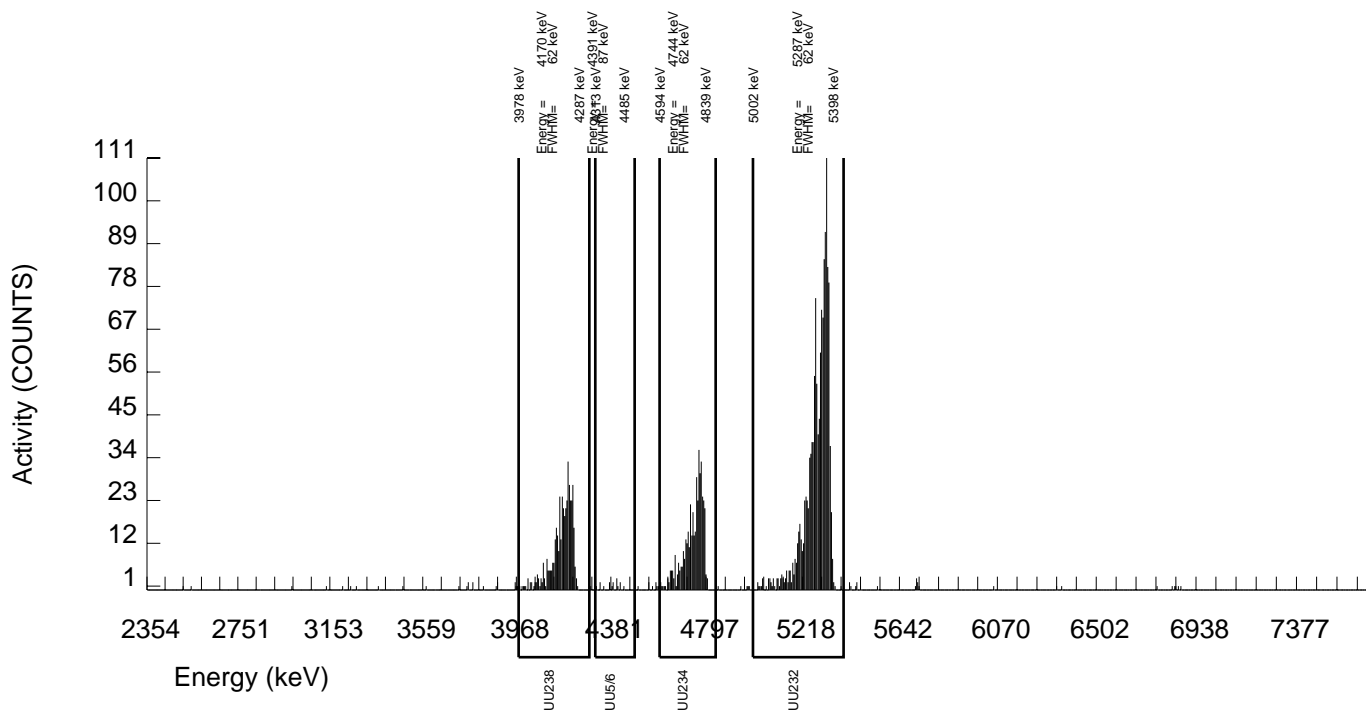
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 5-JUN-2009 00:00:00.		SAMPLE ID : S0231217003_UU SAMPLE QTY: 1.006 G	
DETECTOR NUMBER :76231 AVERAGE %EFFICIENCY :24.8825 % YIELD : 105.520		COUNT DATE: 8-JUL-2009 17:17:50 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.504E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.504E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29880 dpm RESULTS : 5.59127 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B139.CNF;328 BKG DATE : 5-JUL-2009 EFF FILE : W139.CNF;88 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	453.000	442.807	6.000	2.4495	100.0000	7.55E-01	1.26E-01	2.46E-02	9.72E-03	7.13E-02
U232	5302.100	1393.000	1390.000	3.000	1.7321	100.0000	2.37E+00	3.50E-01	1.89E-02	6.88E-03	1.25E-01
U-235	4391.000	16.000	15.000	1.000	1.0000	80.90000	3.16E-02	1.76E-02	1.61E-02	4.90E-03	1.70E-02
U-238	4184.730	442.000	438.000	4.000	2.0000	100.0000	7.47E-01	1.25E-01	2.10E-02	7.93E-03	7.06E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150  
SAMPLE DATE : 10-JUN-2009 00:00:00

SAMPLE ID : S0231217004\_UU  
SAMPLE QTY: 1.006 G

DETECTOR NUMBER :78771  
AVERAGE %EFFICIENCY :25.6478  
% YIELD : 98.541

COUNT DATE: 8-JUL-2009 17:17:53  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/G : 2.504E+00

LCS/LCSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/G : 2.504E+00

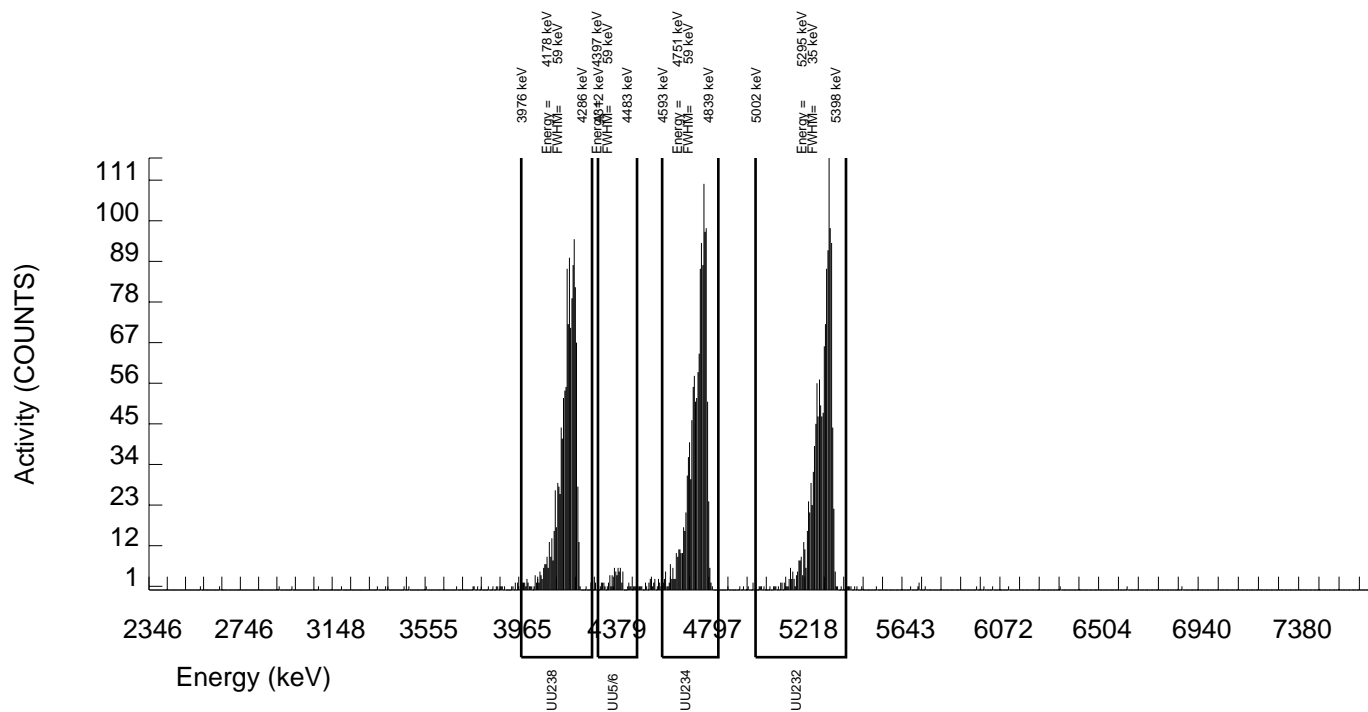
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29810 dpm  
RESULTS : 5.22081 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B140.CNF;328  
BKG DATE : 5-JUL-2009  
EFF FILE : W140.CNF;93  
CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	1336.000	1325.964	6.000	2.4495	100.0000	2.35E+00	3.43E-01	2.55E-02	1.01E-02	1.27E-01
U232	5302.100	1341.000	1338.000	3.000	1.7321	100.0000	2.37E+00	3.46E-01	1.96E-02	7.14E-03	1.27E-01
U-235	4391.000	69.000	65.000	4.000	2.0000	80.90000	1.42E-01	4.14E-02	2.69E-02	1.02E-02	3.67E-02
U-238	4184.730	1285.000	1285.000	0.000	0.0000	100.0000	2.28E+00	3.33E-01	5.31E-03	0.00E+00	1.24E-01

NOTE: Corrections made to U-3/4 net area due to tracer impurity



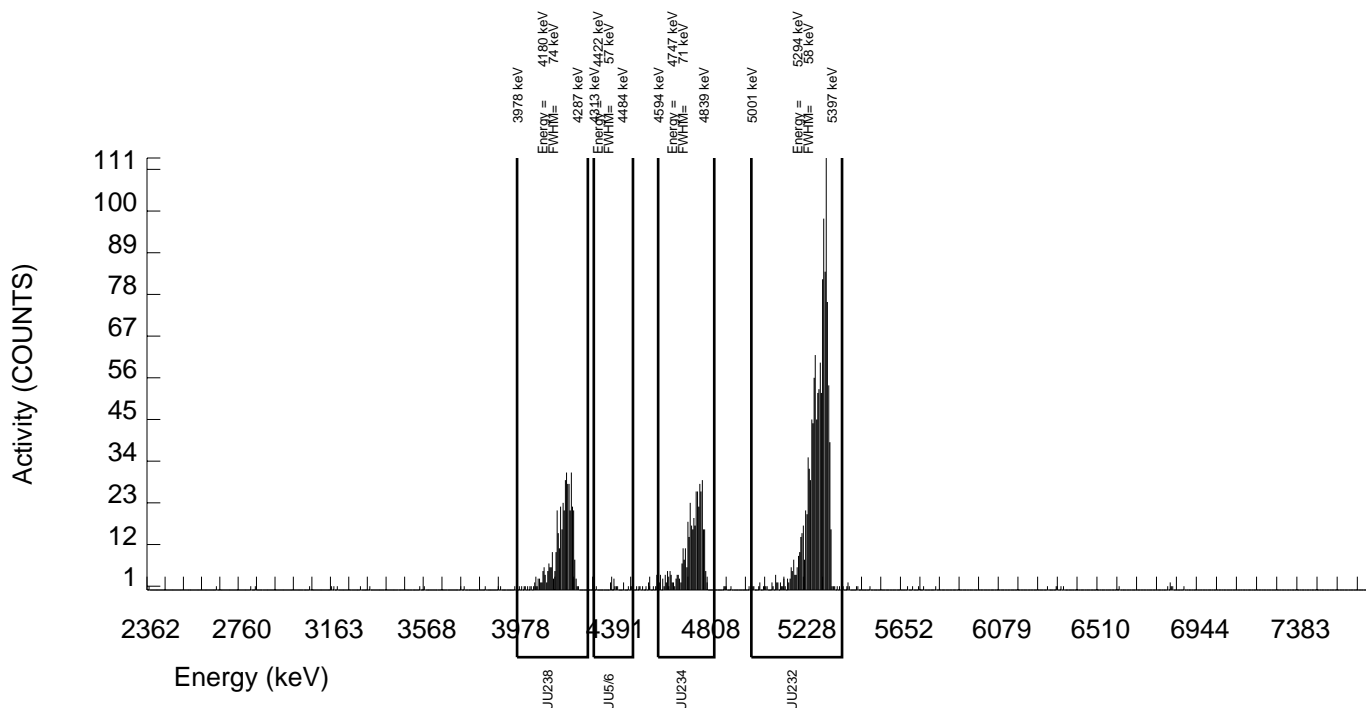
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 10-JUN-2009 00:00:00		SAMPLE ID : S0231217005_UU SAMPLE QTY: 1.007 G	
DETECTOR NUMBER :76232 AVERAGE %EFFICIENCY :25.6623 % YIELD : 96.351		COUNT DATE: 8-JUL-2009 17:17:56 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.501E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.501E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29811 dpm RESULTS : 5.10477 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B141.CNF;331 BKG DATE : 5-JUL-2009 EFF FILE : W141.CNF;91 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	419.000	410.051	5.000	2.2361	100.0000	7.42E-01	1.26E-01	2.42E-02	9.41E-03	7.27E-02
U232	5302.100	1316.000	1309.000	7.000	2.6458	100.0000	2.37E+00	3.53E-01	2.77E-02	1.11E-02	1.29E-01
U-235	4391.000	14.000	14.000	0.000	0.0000	80.90000	3.13E-02	1.70E-02	6.71E-03	0.00E+00	1.64E-02
U-238	4184.730	446.000	445.000	1.000	1.0000	100.0000	8.05E-01	1.34E-01	1.38E-02	4.21E-03	7.50E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



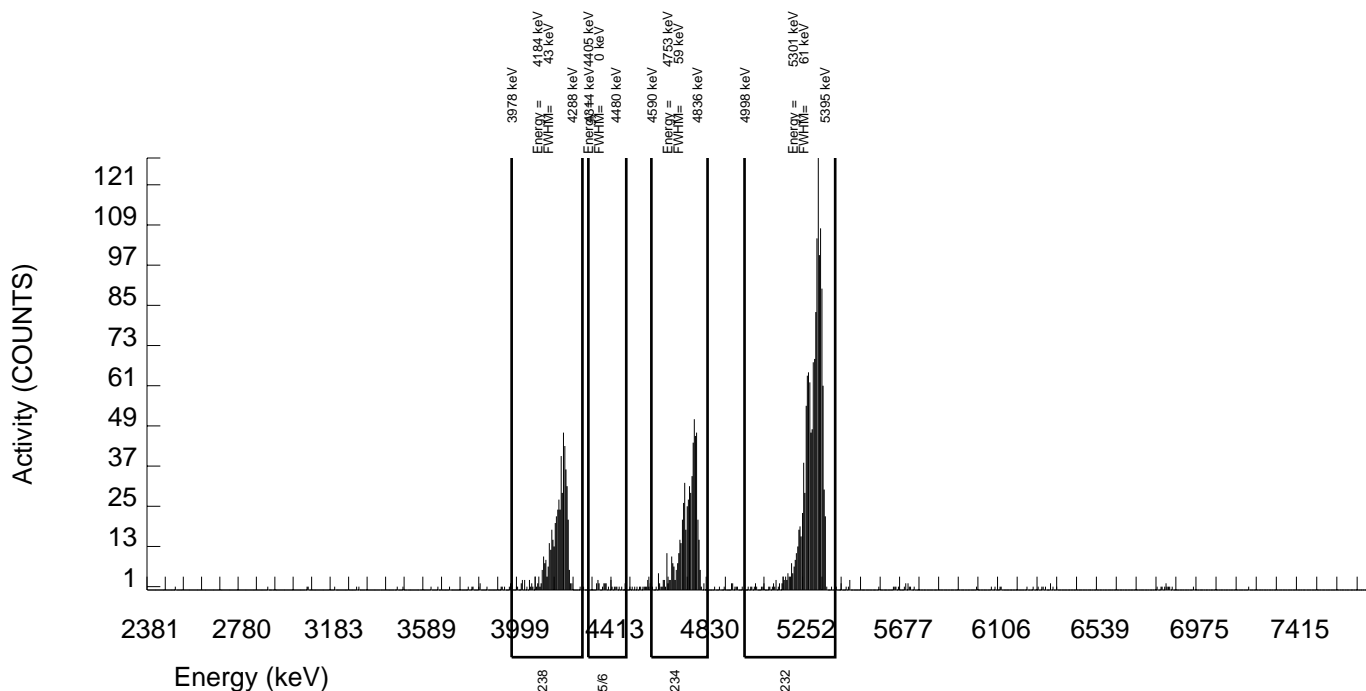
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 10-JUN-2009 00:00:00		SAMPLE ID : S0231217006_UU SAMPLE QTY: 1.014 G	
DETECTOR NUMBER :64261 AVERAGE %EFFICIENCY :26.1225 % YIELD : 104.487		COUNT DATE: 8-JUL-2009 17:17:58 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.484E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.484E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29811 dpm RESULTS : 5.53586 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B142.CNF;325 BKG DATE : 5-JUL-2009 EFF FILE : W142.CNF;95 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	602.000	589.641	8.000	2.8284	100.0000	9.60E-01	1.51E-01	2.63E-02	1.07E-02	7.85E-02
U232	5302.100	1456.000	1445.000	11.000	3.3166	100.0000	2.35E+00	3.40E-01	3.00E-02	1.26E-02	1.22E-01
U-235	4391.000	26.000	23.000	3.000	1.7321	80.90000	4.63E-02	2.21E-02	2.22E-02	8.11E-03	2.12E-02
U-238	4184.730	525.000	523.000	2.000	1.4142	100.0000	8.51E-01	1.36E-01	1.56E-02	5.35E-03	7.32E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



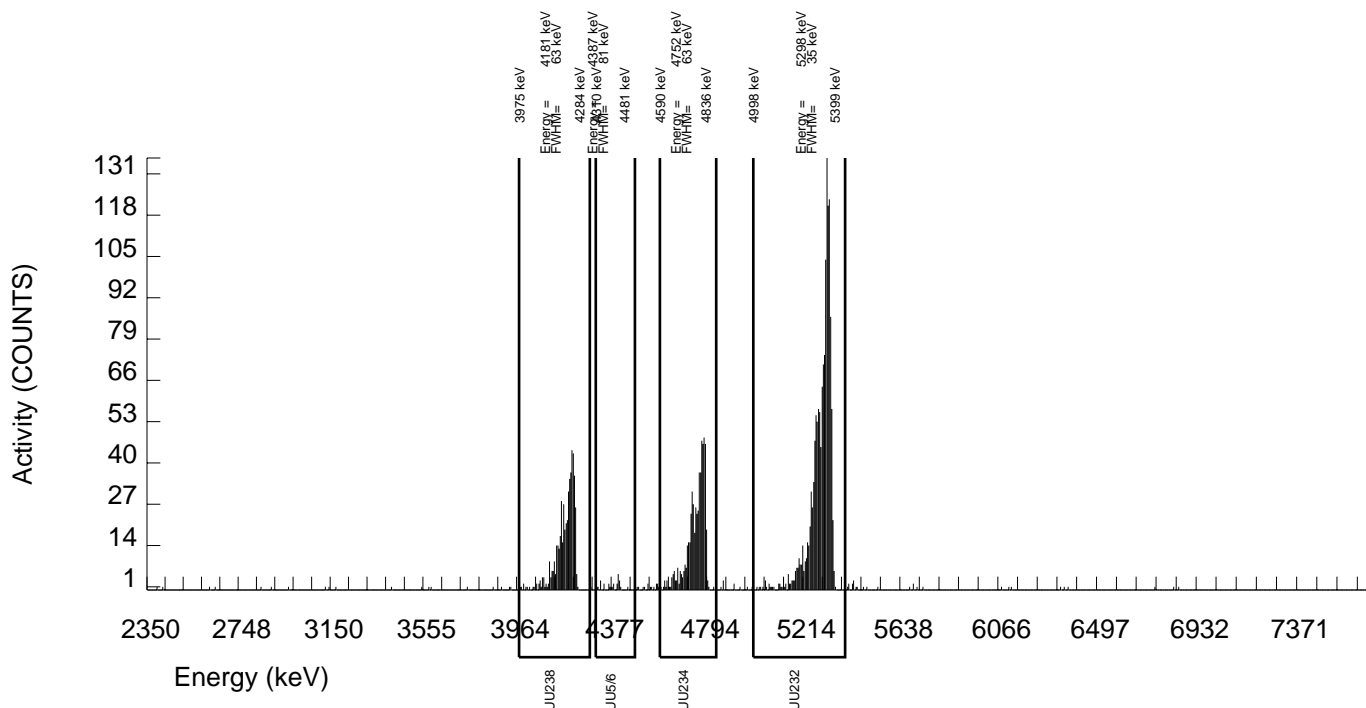
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 10-JUN-2009 00:00:00		SAMPLE ID : S0231217007_UU SAMPLE QTY: 1.009 G	
DETECTOR NUMBER :75551 AVERAGE %EFFICIENCY :24.7777 % YIELD : 109.473		COUNT DATE: 8-JUL-2009 17:24:47 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.496E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.496E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29810 dpm RESULTS : 5.79998 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B144.CNF;327 BKG DATE : 5-JUL-2009 EFF FILE : W144.CNF;92 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	583.000	573.668	5.000	2.2361	100.0000	9.44E-01	1.49E-01	2.21E-02	8.56E-03	7.79E-02
U232	5302.100	1451.000	1436.000	15.000	3.8730	100.0000	2.37E+00	3.43E-01	3.46E-02	1.48E-02	1.24E-01
U-235	4391.000	26.000	26.000	0.000	0.0000	80.90000	5.29E-02	2.16E-02	6.10E-03	0.00E+00	2.03E-02
U-238	4184.730	519.000	516.000	3.000	1.7321	100.0000	8.49E-01	1.36E-01	1.82E-02	6.63E-03	7.37E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



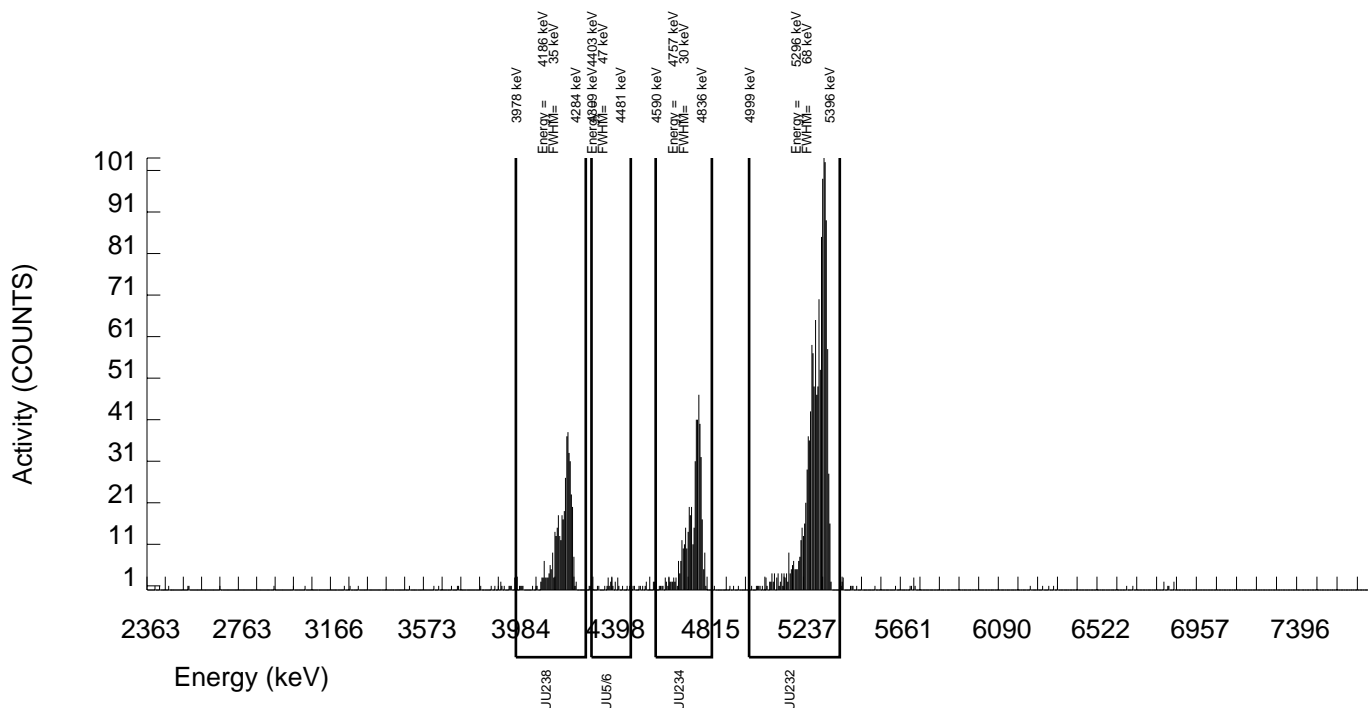
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 10-JUN-2009 00:00:00		SAMPLE ID : S0231217008_UU SAMPLE QTY: 1.001 G	
DETECTOR NUMBER :72526 AVERAGE %EFFICIENCY :24.8445 % YIELD : 103.628		COUNT DATE: 8-JUL-2009 17:18:01 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.516E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.516E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29811 dpm RESULTS : 5.49032 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B145.CNF;325 BKG DATE : 5-JUL-2009 EFF FILE : W145.CNF;97 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	469.000	461.888	3.000	1.7321	100.0000	8.07E-01	1.34E-01	1.93E-02	7.04E-03	7.41E-02
U232	5302.100	1368.000	1363.000	5.000	2.2361	100.0000	2.38E+00	3.53E-01	2.34E-02	9.10E-03	1.27E-01
U-235	4391.000	24.000	23.000	1.000	1.0000	80.90000	4.97E-02	2.23E-02	1.65E-02	5.03E-03	2.12E-02
U-238	4184.730	421.000	421.000	0.000	0.0000	100.0000	7.36E-01	1.24E-01	5.24E-03	0.00E+00	7.03E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



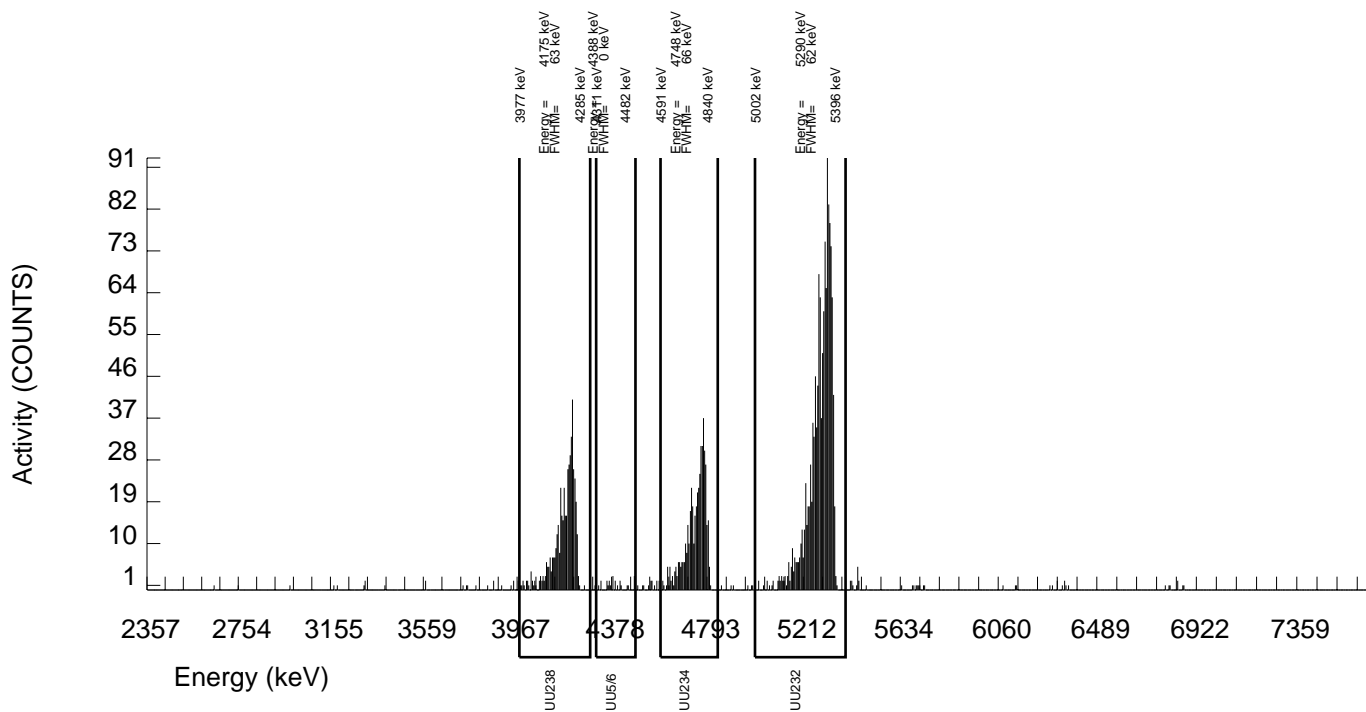
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 11-JUN-2009 00:00:00		SAMPLE ID : S0231217009_UU SAMPLE QTY: 1.006 G	
DETECTOR NUMBER :72527 AVERAGE %EFFICIENCY :24.9899 % YIELD : 99.397		COUNT DATE: 8-JUL-2009 17:18:04 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.504E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.504E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29797 dpm RESULTS : 5.26602 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B146.CNF;330 BKG DATE : 5-JUL-2009 EFF FILE : W146.CNF;99 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	473.000	466.033	3.000	1.7321	100.0000	8.40E-01	1.38E-01	1.99E-02	7.26E-03	7.68E-02
U232	5302.100	1320.000	1315.000	5.000	2.2361	100.0000	2.37E+00	3.47E-01	2.42E-02	9.38E-03	1.29E-01
U-235	4391.000	27.000	25.000	2.000	1.4142	80.90000	5.57E-02	2.47E-02	2.13E-02	7.33E-03	2.35E-02
U-238	4184.730	478.000	477.000	1.000	1.0000	100.0000	8.60E-01	1.40E-01	1.38E-02	4.19E-03	7.73E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity





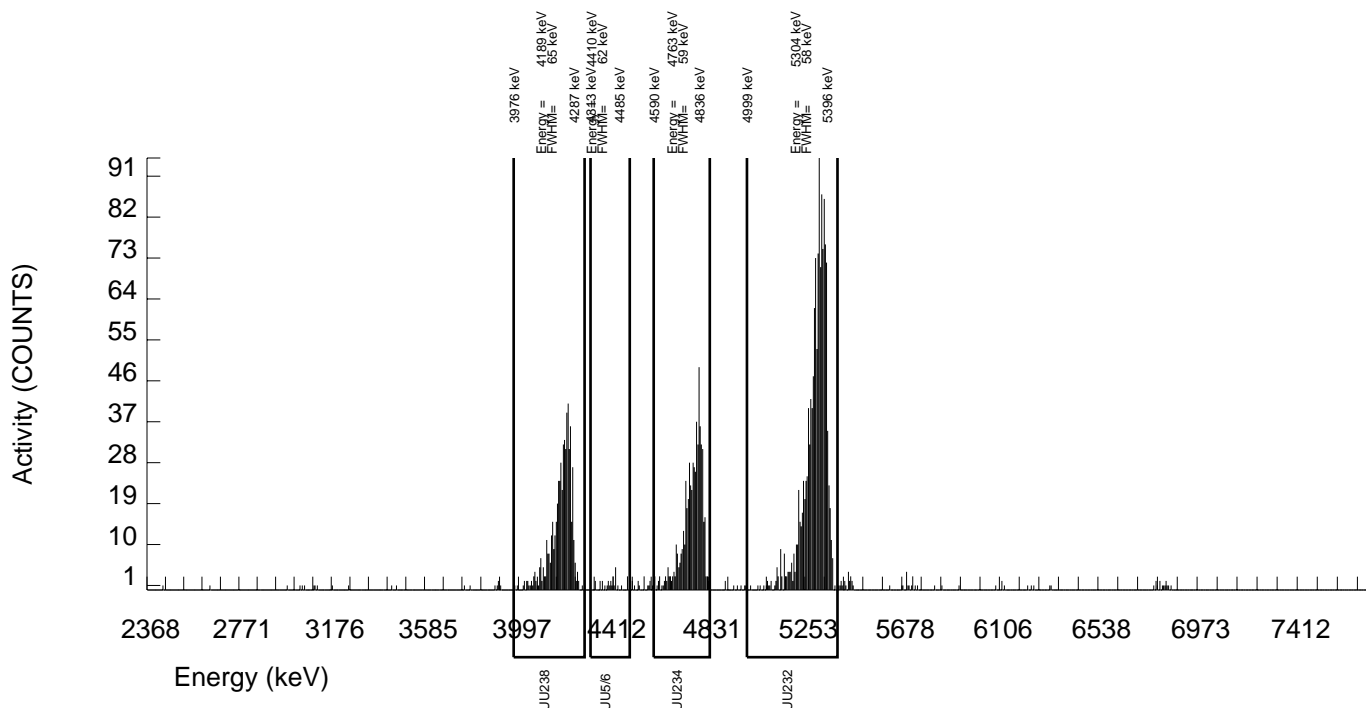
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 11-JUN-2009 00:00:00		SAMPLE ID : S0231217010_UU SAMPLE QTY: 1.015 G	
DETECTOR NUMBER :45-132FF4 AVERAGE %EFFICIENCY :26.4313 % YIELD : 98.342		COUNT DATE:10-JUL-2009 21:20:14 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.482E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.482E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29796 dpm RESULTS : 5.21011 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B115.CNF;377 BKG DATE : 5-JUL-2009 EFF FILE : W115.CNF;124 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	584.000	578.849	1.000	1.0000	100.0000	9.88E-01	1.56E-01	1.31E-02	3.97E-03	8.07E-02
U232	5302.100	1383.000	1376.000	7.000	2.6458	100.0000	2.35E+00	3.42E-01	2.62E-02	1.05E-02	1.25E-01
U-235	4391.000	28.000	26.000	2.000	1.4142	80.90000	5.49E-02	2.38E-02	2.02E-02	6.94E-03	2.27E-02
U-238	4184.730	574.000	574.000	0.000	0.0000	100.0000	9.80E-01	1.55E-01	5.12E-03	0.00E+00	8.02E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



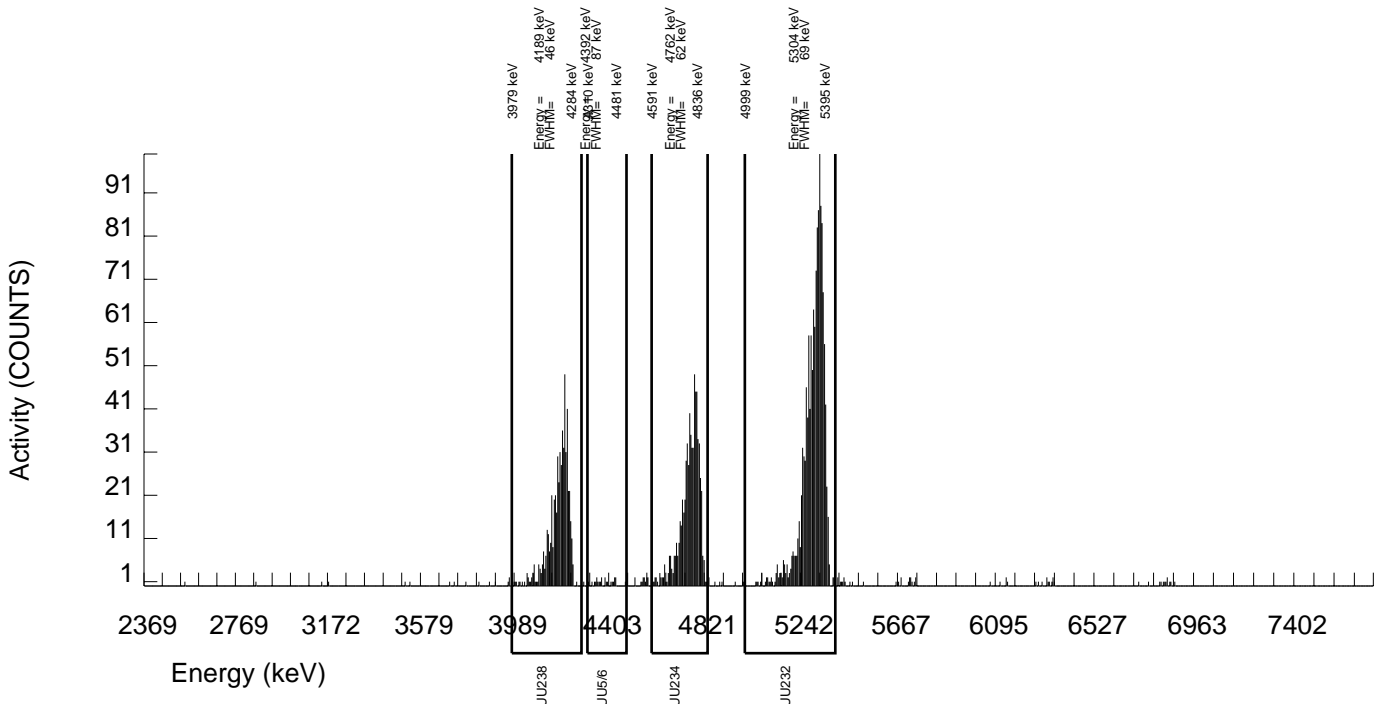
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 11-JUN-2009 00:00:00		SAMPLE ID : S0231217011_UU SAMPLE QTY: 1.006 G	
DETECTOR NUMBER :45-132FF2 AVERAGE %EFFICIENCY :26.3113 % YIELD : 99.365		COUNT DATE:10-JUL-2009 21:20:16 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.504E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.504E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29796 dpm RESULTS : 5.26430 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B116.CNF;368 BKG DATE : 5-JUL-2009 EFF FILE : W116.CNF;92 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	673.000	663.824	5.000	2.2361	100.0000	1.14E+00	1.77E-01	2.30E-02	8.91E-03	8.71E-02
U232	5302.100	1394.000	1384.000	10.000	3.1623	100.0000	2.37E+00	3.45E-01	3.04E-02	1.26E-02	1.26E-01
U-235	4391.000	23.000	21.000	2.000	1.4142	80.90000	4.45E-02	2.16E-02	2.03E-02	6.97E-03	2.07E-02
U-238	4184.730	572.000	572.000	0.000	0.0000	100.0000	9.80E-01	1.55E-01	5.14E-03	0.00E+00	8.03E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



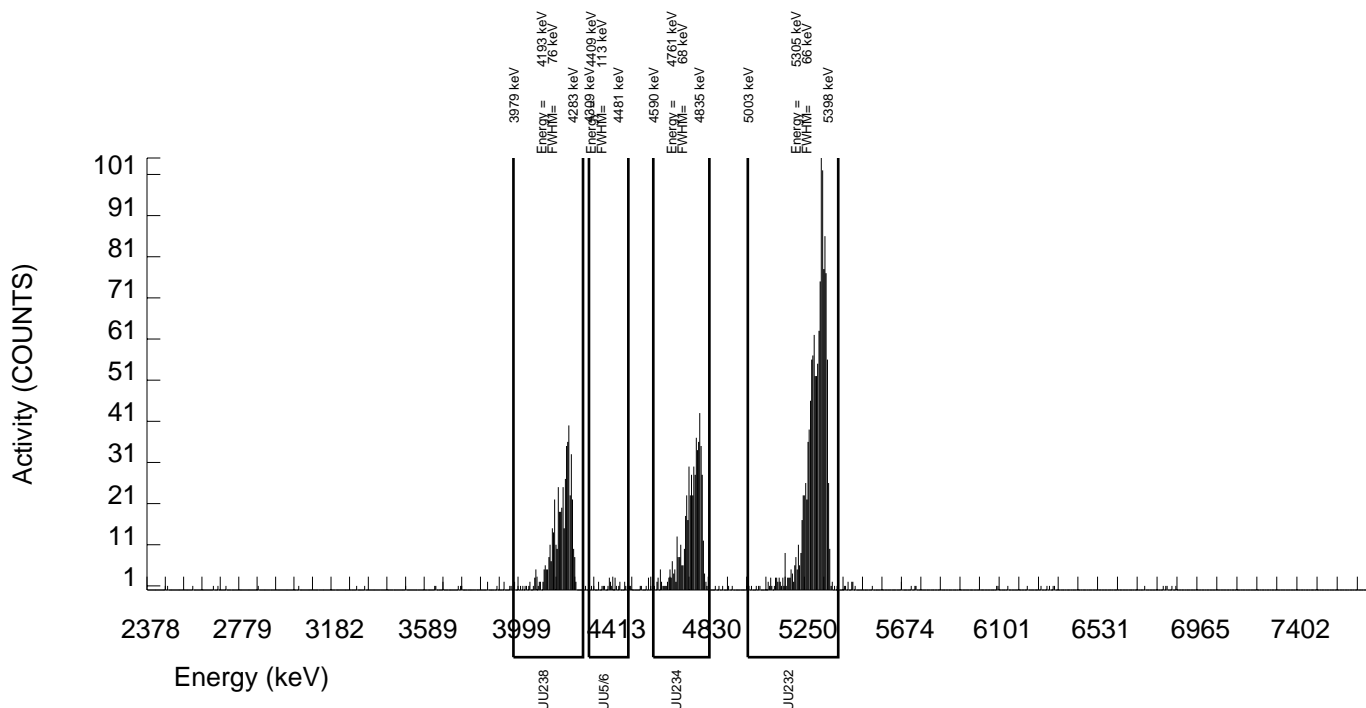
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 11-JUN-2009 00:00:00		SAMPLE ID : S0231217012_UU SAMPLE QTY: 1.004 G	
DETECTOR NUMBER :33450 AVERAGE %EFFICIENCY :25.3521 % YIELD : 100.665		COUNT DATE:10-JUL-2009 21:20:18 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.509E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.509E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29796 dpm RESULTS : 5.33319 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B117.CNF;378 BKG DATE : 5-JUL-2009 EFF FILE : W117.CNF;104 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	562.000	554.924	3.000	1.7321	100.0000	9.76E-01	1.55E-01	1.94E-02	7.08E-03	8.16E-02
U232	5302.100	1356.000	1351.000	5.000	2.2361	100.0000	2.38E+00	3.46E-01	2.36E-02	9.15E-03	1.27E-01
U-235	4391.000	24.000	24.000	0.000	0.0000	80.90000	5.22E-02	2.20E-02	6.52E-03	0.00E+00	2.09E-02
U-238	4184.730	504.000	503.000	1.000	1.0000	100.0000	8.84E-01	1.43E-01	1.35E-02	4.09E-03	7.74E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



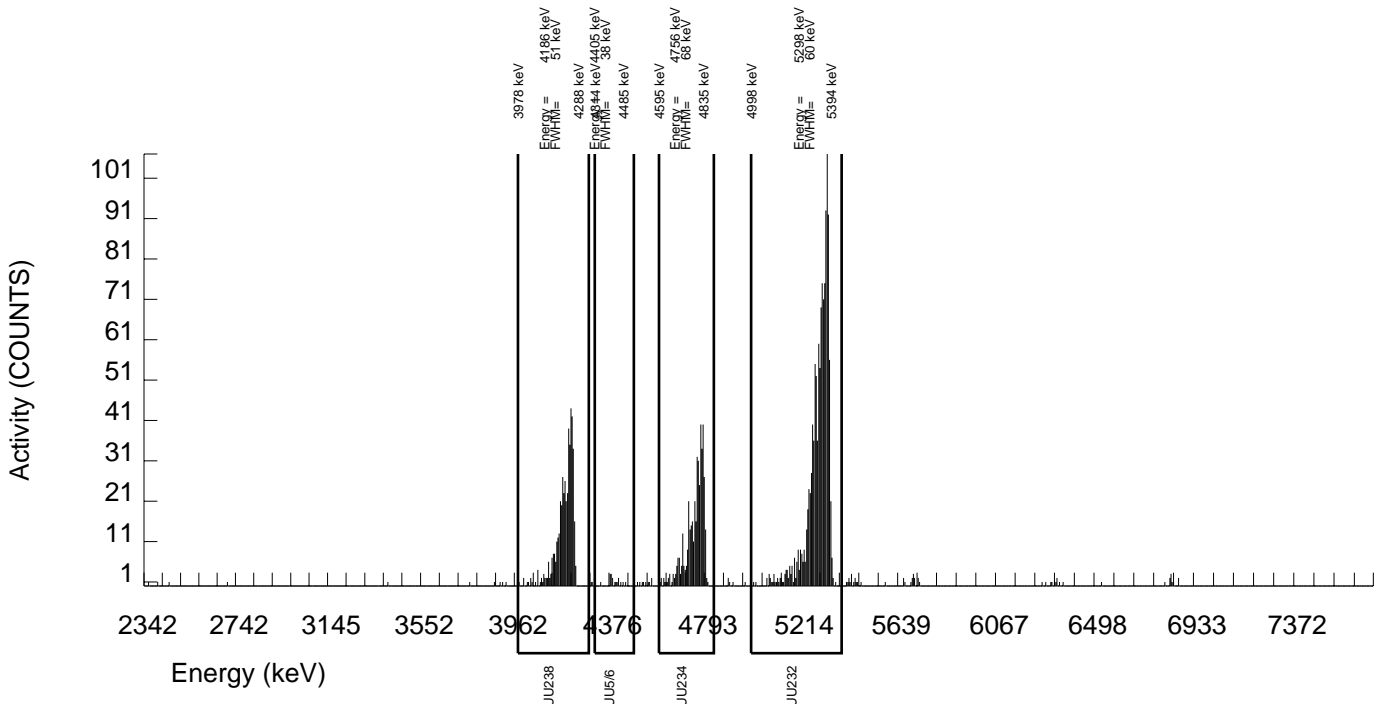
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 11-JUN-2009 00:00:00		SAMPLE ID : S0231217013_UU SAMPLE QTY: 1.003 G	
DETECTOR NUMBER :75544 AVERAGE %EFFICIENCY :25.5694 % YIELD : 90.206		COUNT DATE:10-JUL-2009 21:20:20 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.511E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.511E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29796 dpm RESULTS : 4.77905 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B118.CNF;373 BKG DATE : 5-JUL-2009 EFF FILE : W118.CNF;101 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	445.000	435.316	6.000	2.4495	100.0000	8.48E-01	1.41E-01	2.80E-02	1.11E-02	8.07E-02
U232	5302.100	1228.000	1221.000	7.000	2.6458	100.0000	2.38E+00	3.52E-01	2.98E-02	1.20E-02	1.34E-01
U-235	4391.000	17.000	17.000	0.000	0.0000	80.90000	4.09E-02	2.02E-02	7.22E-03	0.00E+00	1.95E-02
U-238	4184.730	479.000	477.000	2.000	1.4142	100.0000	9.29E-01	1.52E-01	1.87E-02	6.41E-03	8.37E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



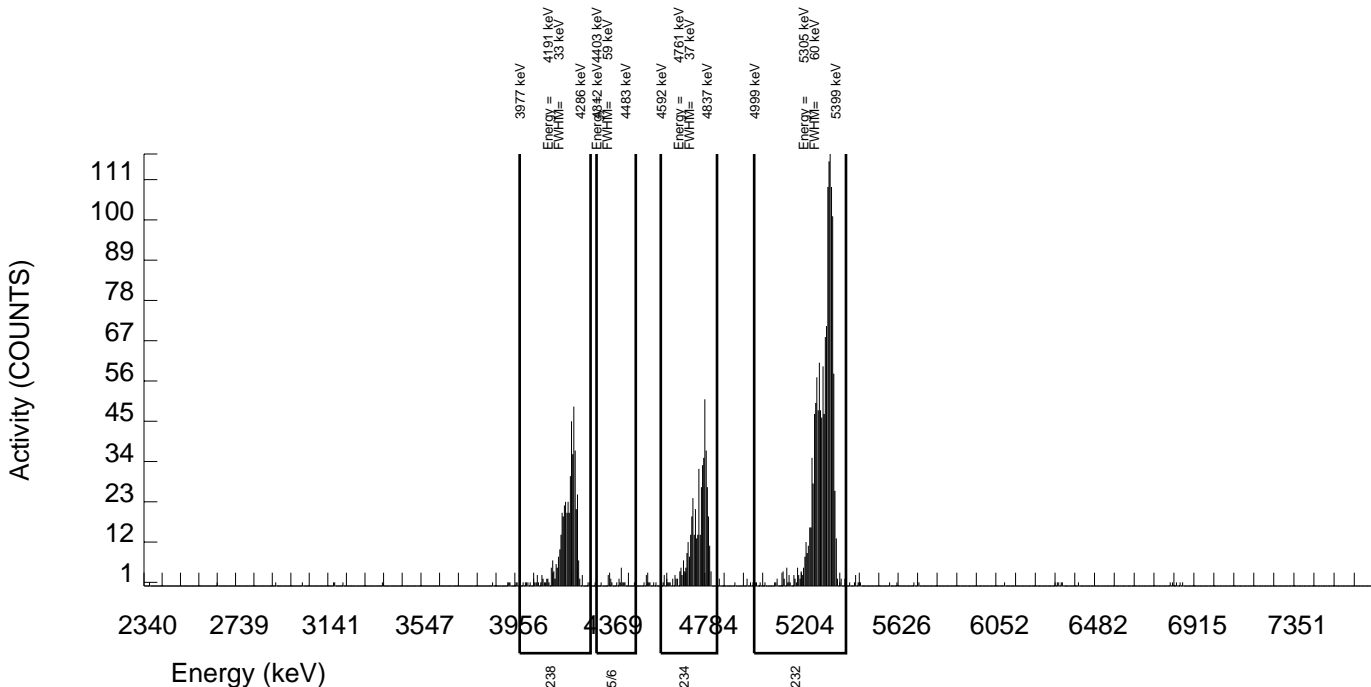
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 11-JUN-2009 00:00:00		SAMPLE ID : S0231217014_UU SAMPLE QTY: 1.012 G	
DETECTOR NUMBER :75545 AVERAGE %EFFICIENCY :24.7219 % YIELD : 110.414		COUNT DATE:10-JUL-2009 21:20:23 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.489E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.489E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29796 dpm RESULTS : 5.84967 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B121.CNF;373 BKG DATE : 5-JUL-2009 EFF FILE : W121.CNF;102 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	484.000	477.640	2.000	1.4142	100.0000	7.79E-01	1.26E-01	1.56E-02	5.36E-03	7.01E-02
U232	5302.100	1448.000	1445.000	3.000	1.7321	100.0000	2.36E+00	3.40E-01	1.80E-02	6.58E-03	1.22E-01
U-235	4391.000	21.000	21.000	0.000	0.0000	80.90000	4.23E-02	1.90E-02	6.05E-03	0.00E+00	1.81E-02
U-238	4184.730	491.000	488.000	3.000	1.7321	100.0000	7.96E-01	1.29E-01	1.80E-02	6.57E-03	7.10E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



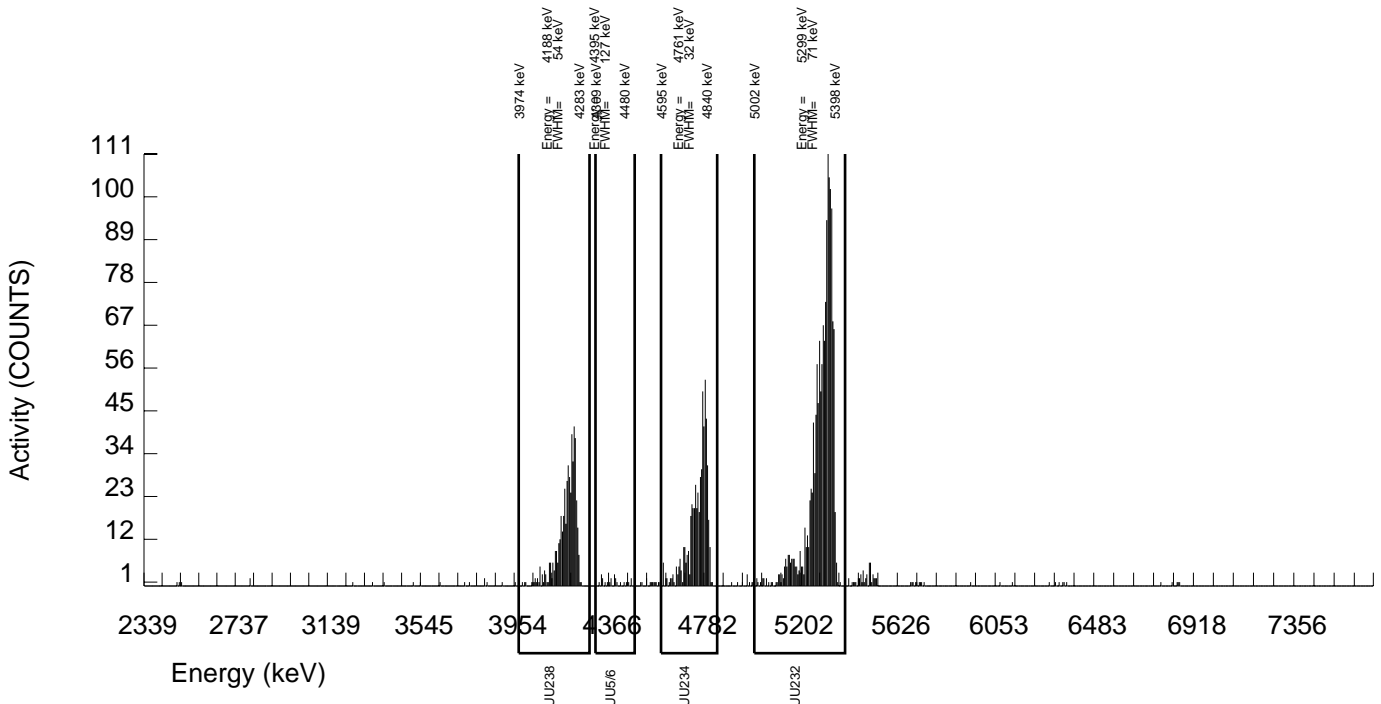
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 16-JUN-2009 00:00:00		SAMPLE ID : S0231217015_UU SAMPLE QTY: 1.014 G	
DETECTOR NUMBER :75546 AVERAGE %EFFICIENCY :25.3247 % YIELD : 111.739		COUNT DATE:10-JUL-2009 21:20:26 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.484E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.484E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29726 dpm RESULTS : 5.91911 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B122.CNF;375 BKG DATE : 5-JUL-2009 EFF FILE : W122.CNF;105 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	564.000	556.481	3.000	1.7321	100.0000	8.74E-01	1.38E-01	1.74E-02	6.33E-03	7.30E-02
U232	5302.100	1508.000	1498.000	10.000	3.1623	100.0000	2.35E+00	3.38E-01	2.78E-02	1.16E-02	1.20E-01
U-235	4391.000	24.000	24.000	0.000	0.0000	80.90000	4.66E-02	1.97E-02	5.82E-03	0.00E+00	1.86E-02
U-238	4184.730	499.000	496.000	3.000	1.7321	100.0000	7.79E-01	1.25E-01	1.74E-02	6.33E-03	6.89E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



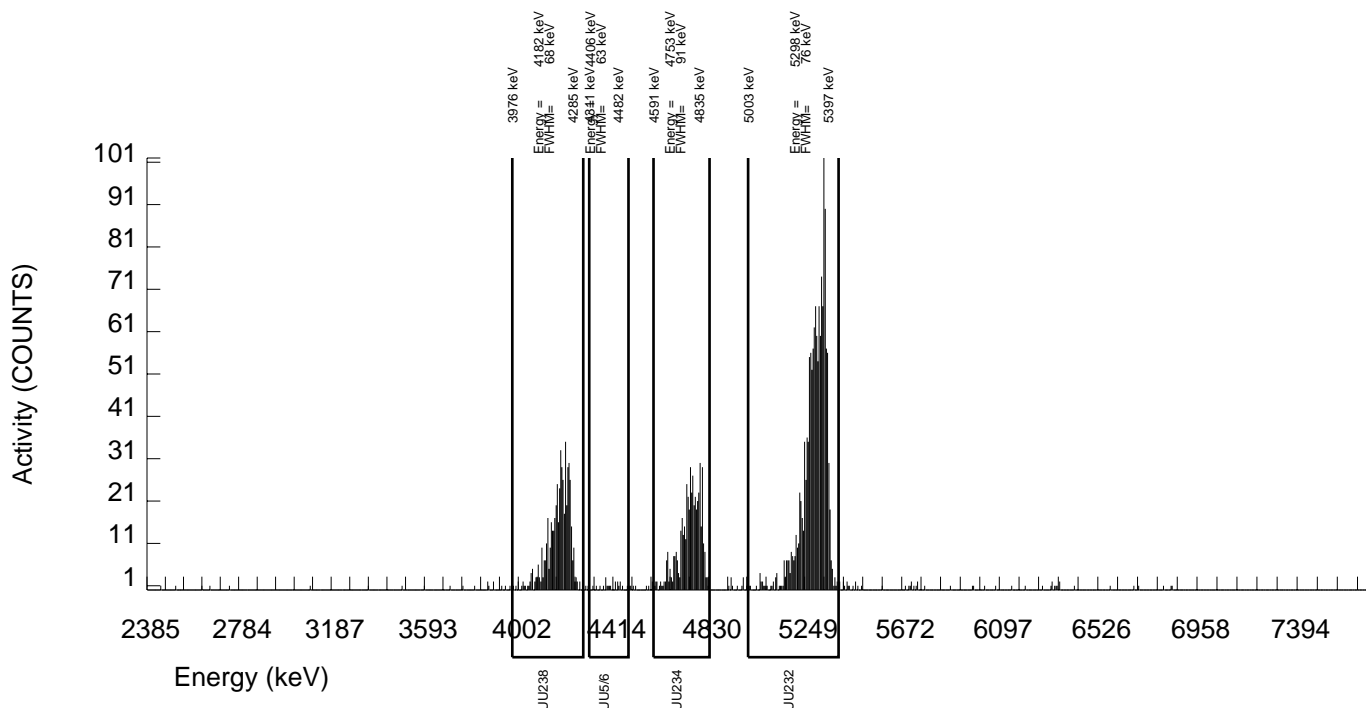
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 16-JUN-2009 00:00:00		SAMPLE ID : S0231217016_UU SAMPLE QTY: 1.000 G	
DETECTOR NUMBER :45-142V3 AVERAGE %EFFICIENCY :25.9082 % YIELD : 104.775		COUNT DATE:10-JUL-2009 21:20:28 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.519E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.519E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29726 dpm RESULTS : 5.55020 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B123.CNF;373 BKG DATE : 5-JUL-2009 EFF FILE : W123.CNF;101 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	506.000	500.665	1.000	1.0000	100.0000	8.31E-01	1.34E-01	1.27E-02	3.86E-03	7.29E-02
U232	5302.100	1443.000	1437.000	6.000	2.4495	100.0000	2.39E+00	3.45E-01	2.39E-02	9.46E-03	1.24E-01
U-235	4391.000	21.000	21.000	0.000	0.0000	80.90000	4.31E-02	1.93E-02	6.15E-03	0.00E+00	1.84E-02
U-238	4184.730	544.000	542.000	2.000	1.4142	100.0000	8.99E-01	1.43E-01	1.59E-02	5.46E-03	7.60E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



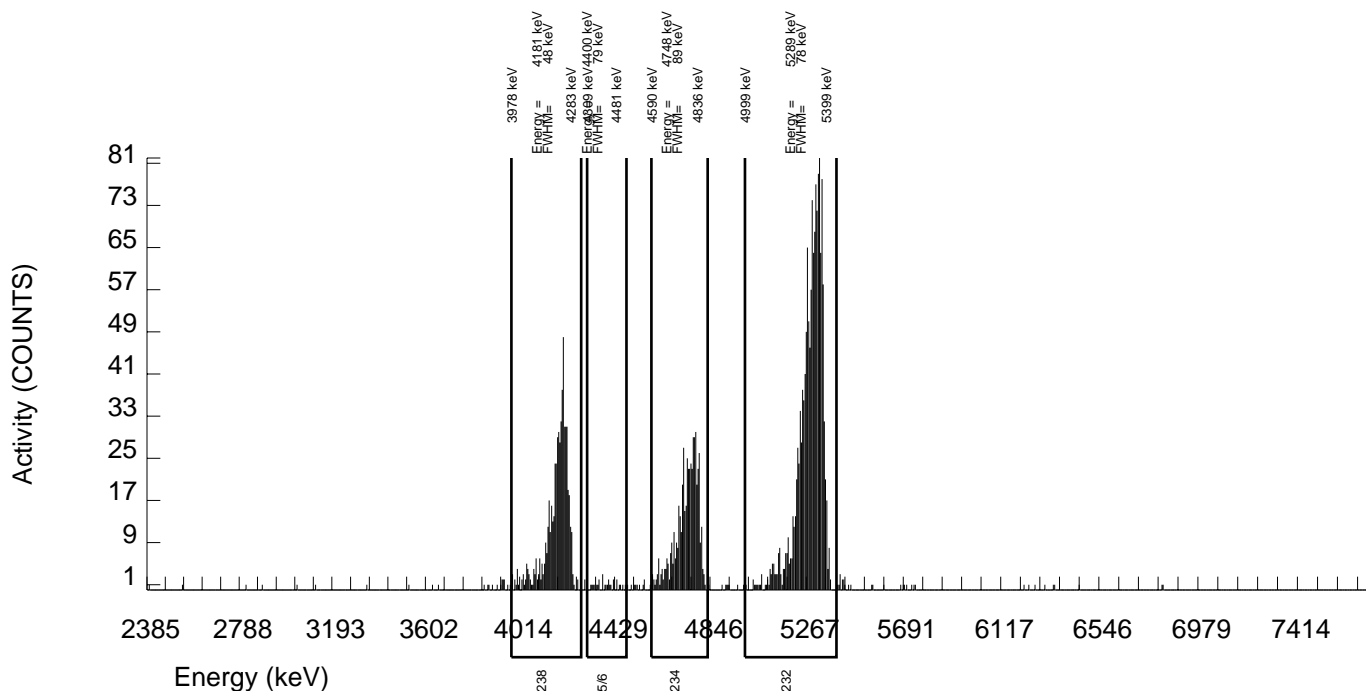
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 16-JUN-2009 00:00:00		SAMPLE ID : S0231217017_UU SAMPLE QTY: 1.014 G	
DETECTOR NUMBER :45-142V2 AVERAGE %EFFICIENCY :26.0503 % YIELD : 105.944		COUNT DATE:10-JUL-2009 21:20:30 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.484E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.484E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29726 dpm RESULTS : 5.61212 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B124.CNF;369 BKG DATE : 5-JUL-2009 EFF FILE : W124.CNF;97 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	529.000	519.592	5.000	2.2361	100.0000	8.36E-01	1.34E-01	2.16E-02	8.37E-03	7.26E-02
U232	5302.100	1469.000	1461.000	8.000	2.8284	100.0000	2.35E+00	3.39E-01	2.60E-02	1.06E-02	1.21E-01
U-235	4391.000	26.000	26.000	0.000	0.0000	80.90000	5.17E-02	2.11E-02	5.97E-03	0.00E+00	1.99E-02
U-238	4184.730	586.000	585.000	1.000	1.0000	100.0000	9.42E-01	1.48E-01	1.23E-02	3.74E-03	7.64E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity





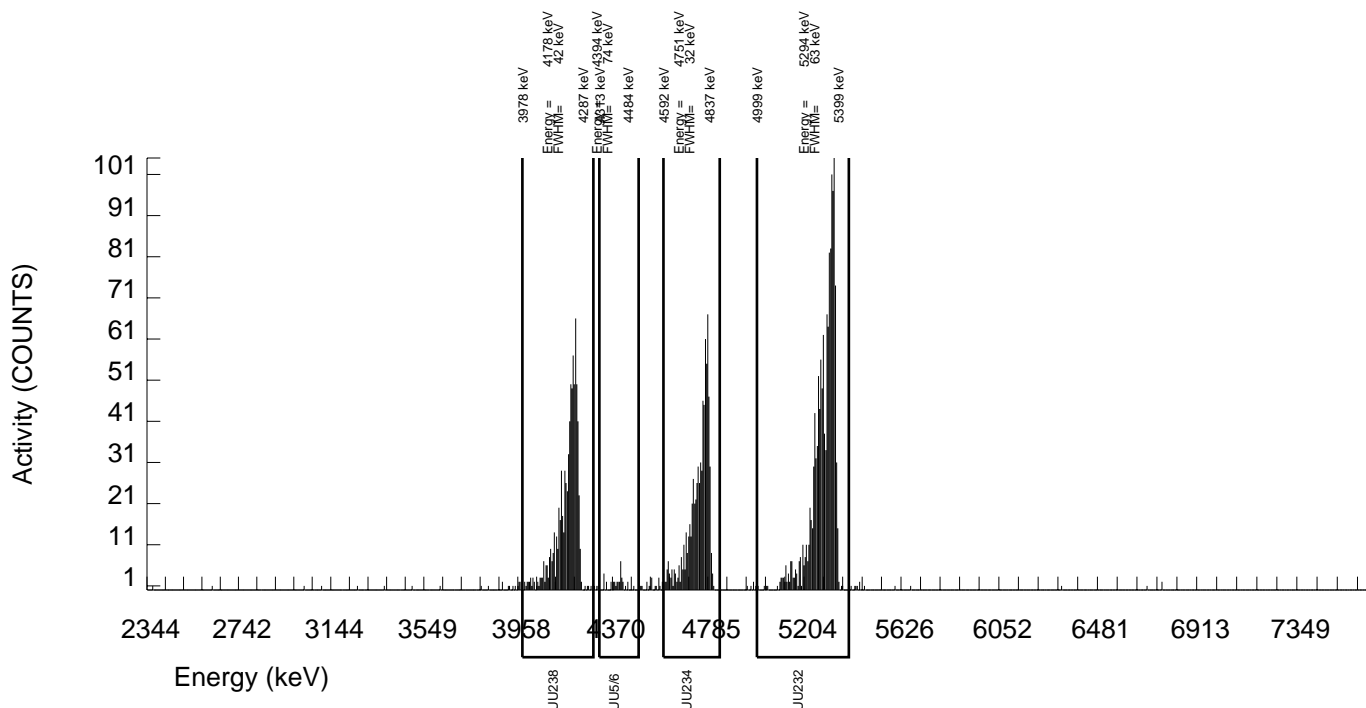
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 16-JUN-2009 00:00:00		SAMPLE ID : S0231217018_UU SAMPLE QTY: 1.018 G	
DETECTOR NUMBER :75547 AVERAGE %EFFICIENCY :25.7650 % YIELD : 100.958		COUNT DATE:10-JUL-2009 21:20:33 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.474E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.474E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29727 dpm RESULTS : 5.34802 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B125.CNF;379 BKG DATE : 5-JUL-2009 EFF FILE : W125.CNF;115 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	747.000	737.846	5.000	2.2361	100.0000	1.26E+00	1.93E-01	2.28E-02	8.85E-03	9.12E-02
U232	5302.100	1383.000	1377.000	6.000	2.4495	100.0000	2.34E+00	3.40E-01	2.45E-02	9.70E-03	1.24E-01
U-235	4391.000	36.000	33.000	3.000	1.7321	80.90000	6.94E-02	2.74E-02	2.33E-02	8.47E-03	2.57E-02
U-238	4184.730	783.000	782.000	1.000	1.0000	100.0000	1.33E+00	2.03E-01	1.30E-02	3.96E-03	9.34E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



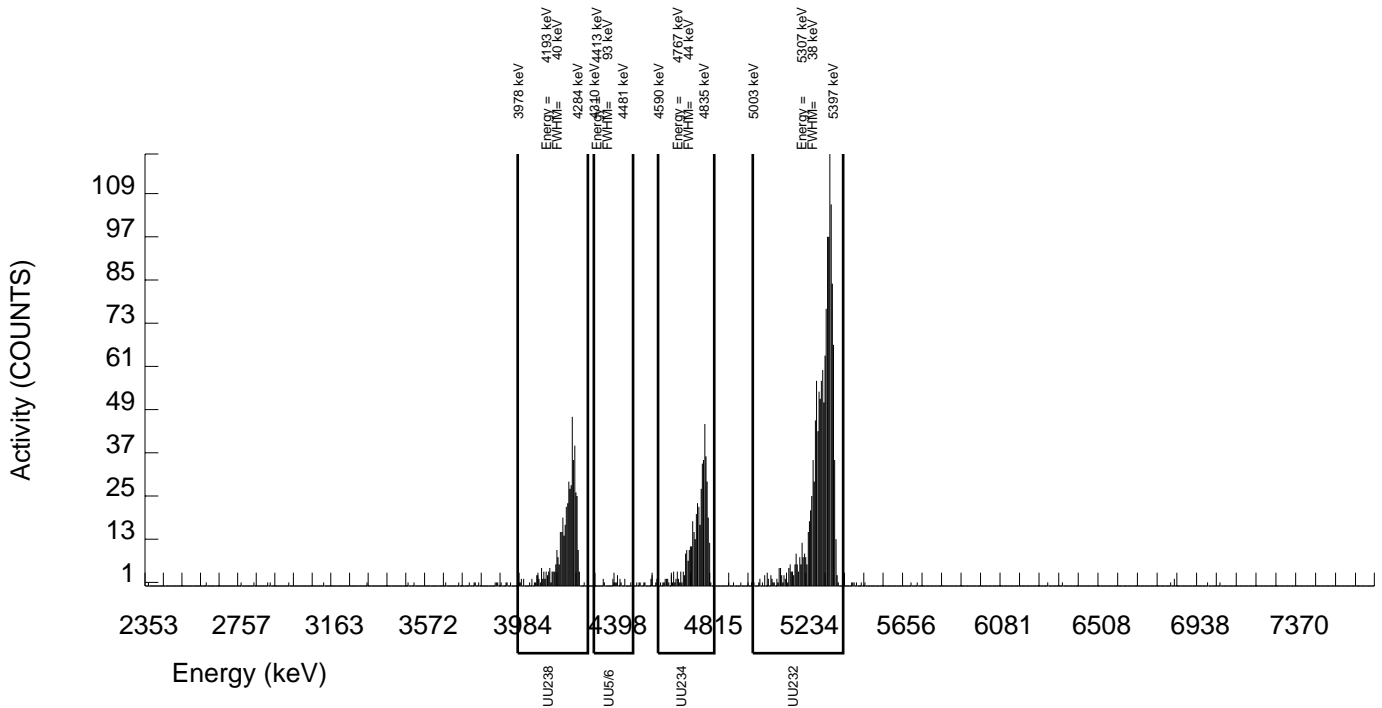
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 16-JUN-2009 00:00:00		SAMPLE ID : S0231217019_UU SAMPLE QTY: 1.001 G	
DETECTOR NUMBER :75548 AVERAGE %EFFICIENCY :25.4638 % YIELD : 108.013		COUNT DATE:10-JUL-2009 21:20:35 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.516E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.516E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29727 dpm RESULTS : 5.72172 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B126.CNF;378 BKG DATE : 5-JUL-2009 EFF FILE : W126.CNF;117 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	470.000	460.607	5.000	2.2361	100.0000	7.54E-01	1.23E-01	2.19E-02	8.51E-03	6.96E-02
U232	5302.100	1473.000	1456.000	17.000	4.1231	100.0000	2.38E+00	3.44E-01	3.63E-02	1.57E-02	1.24E-01
U-235	4391.000	17.000	16.000	1.000	1.0000	80.90000	3.24E-02	1.74E-02	1.55E-02	4.70E-03	1.68E-02
U-238	4184.730	490.000	487.000	3.000	1.7321	100.0000	7.97E-01	1.29E-01	1.81E-02	6.59E-03	7.12E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



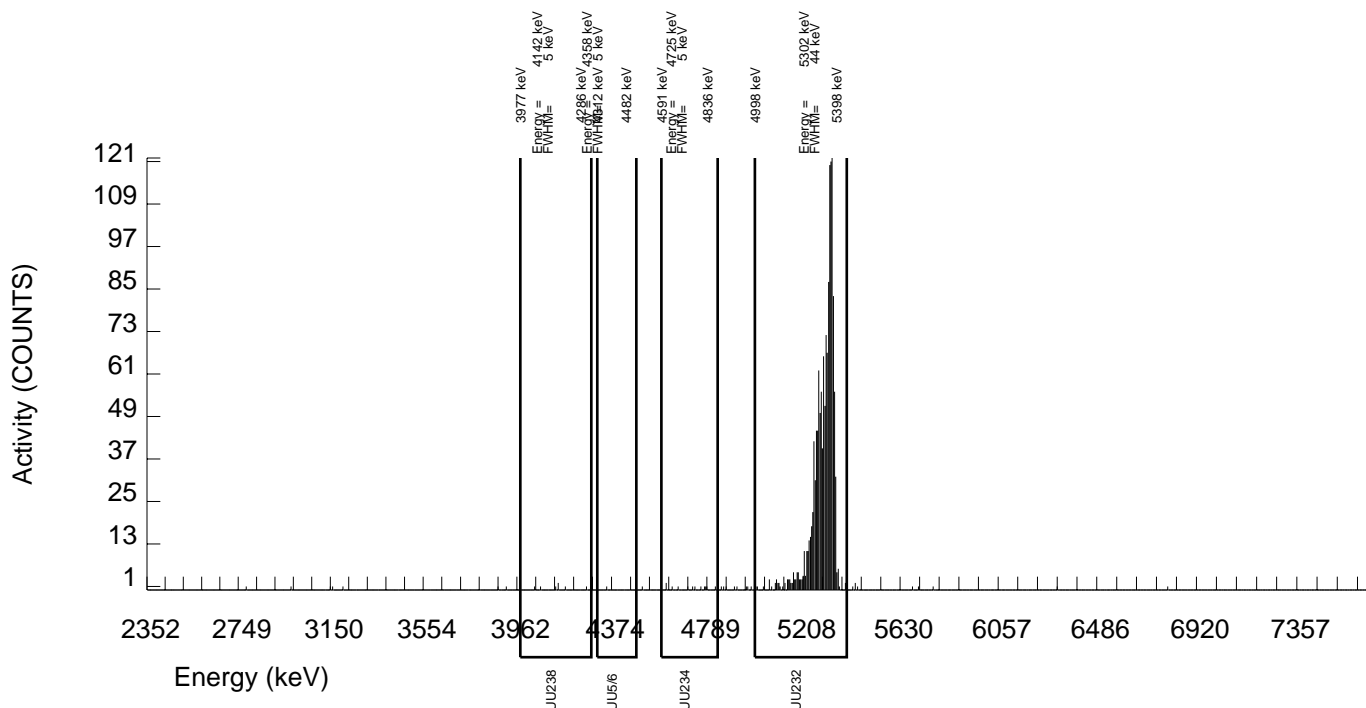
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 1-JUL-2009 00:00:00.		SAMPLE ID : S1201871202_UU SAMPLE QTY: 1.018 G	
DETECTOR NUMBER :76227 AVERAGE %EFFICIENCY :26.3822 % YIELD : 102.606		COUNT DATE:10-JUL-2009 21:20:37 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.474E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.474E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29518 dpm RESULTS : 5.43315 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B129.CNF;377 BKG DATE : 5-JUL-2009 EFF FILE : W129.CNF;113 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	12.000	4.677	3.000	1.7321	100.0000	7.64E-03	1.05E-02	1.81E-02	6.59E-03	1.05E-02
U232	5302.100	1436.000	1433.000	3.000	1.7321	100.0000	2.34E+00	3.38E-01	1.81E-02	6.59E-03	1.22E-01
U-235	4391.000	1.000	0.000	1.000	1.0000	80.90000	0.00E+00	5.61E-03	1.55E-02	4.70E-03	5.60E-03
U-238	4184.730	7.000	4.000	3.000	1.7321	100.0000	6.54E-03	1.02E-02	1.81E-02	6.59E-03	1.01E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



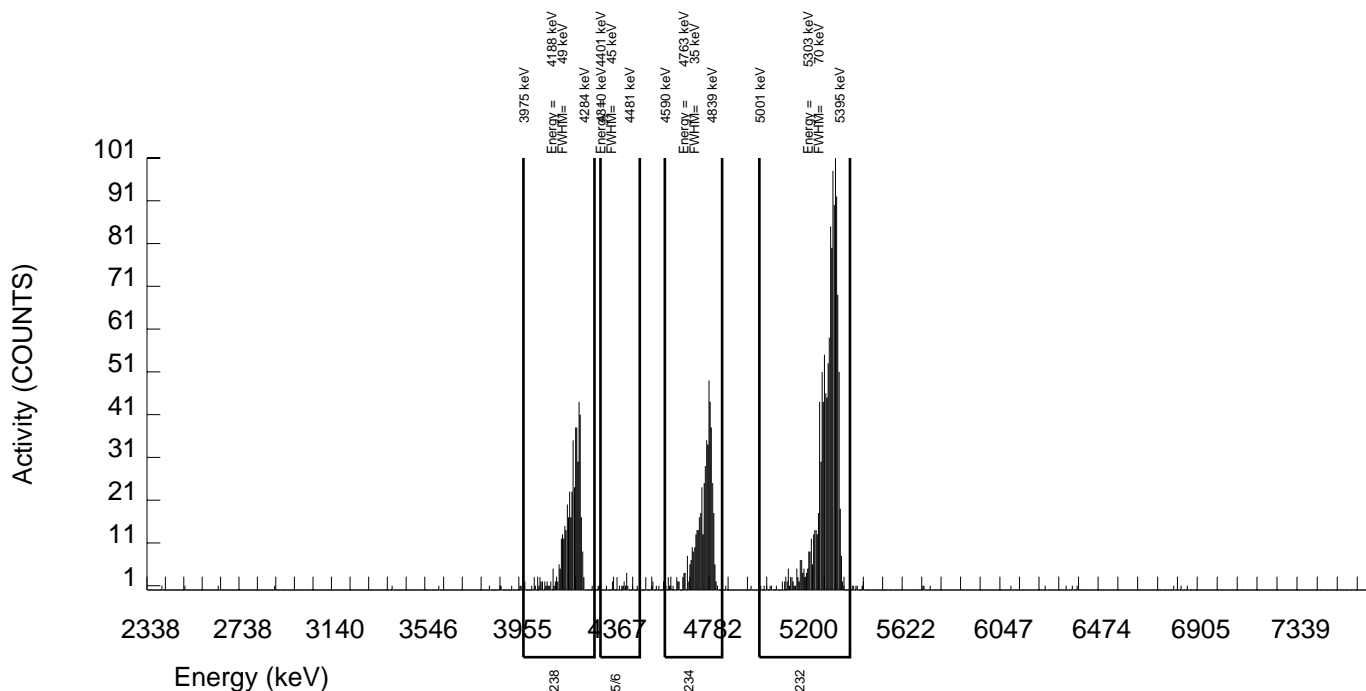
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 16-JUN-2009 00:00:00		SAMPLE ID : S1201871203_UU SAMPLE QTY: 1.006 G	
DETECTOR NUMBER :76228 AVERAGE %EFFICIENCY :24.6764 % YIELD : 99.824		COUNT DATE:10-JUL-2009 21:20:40 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.504E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.504E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29727 dpm RESULTS : 5.28792 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B130.CNF;377 BKG DATE : 5-JUL-2009 EFF FILE : W130.CNF;115 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	498.000	486.066	8.000	2.8284	100.0000	8.84E-01	1.44E-01	2.94E-02	1.20E-02	7.98E-02
U232	5302.100	1304.000	1304.000	0.000	0.0000	100.0000	2.37E+00	3.47E-01	5.46E-03	0.00E+00	1.29E-01
U-235	4391.000	21.000	18.000	3.000	1.7321	80.90000	4.04E-02	2.23E-02	2.48E-02	9.05E-03	2.16E-02
U-238	4184.730	494.000	491.000	3.000	1.7321	100.0000	8.93E-01	1.45E-01	2.01E-02	7.32E-03	7.94E-02

NOTE: Corrections made to U-3/4 net area due to tracer impurity



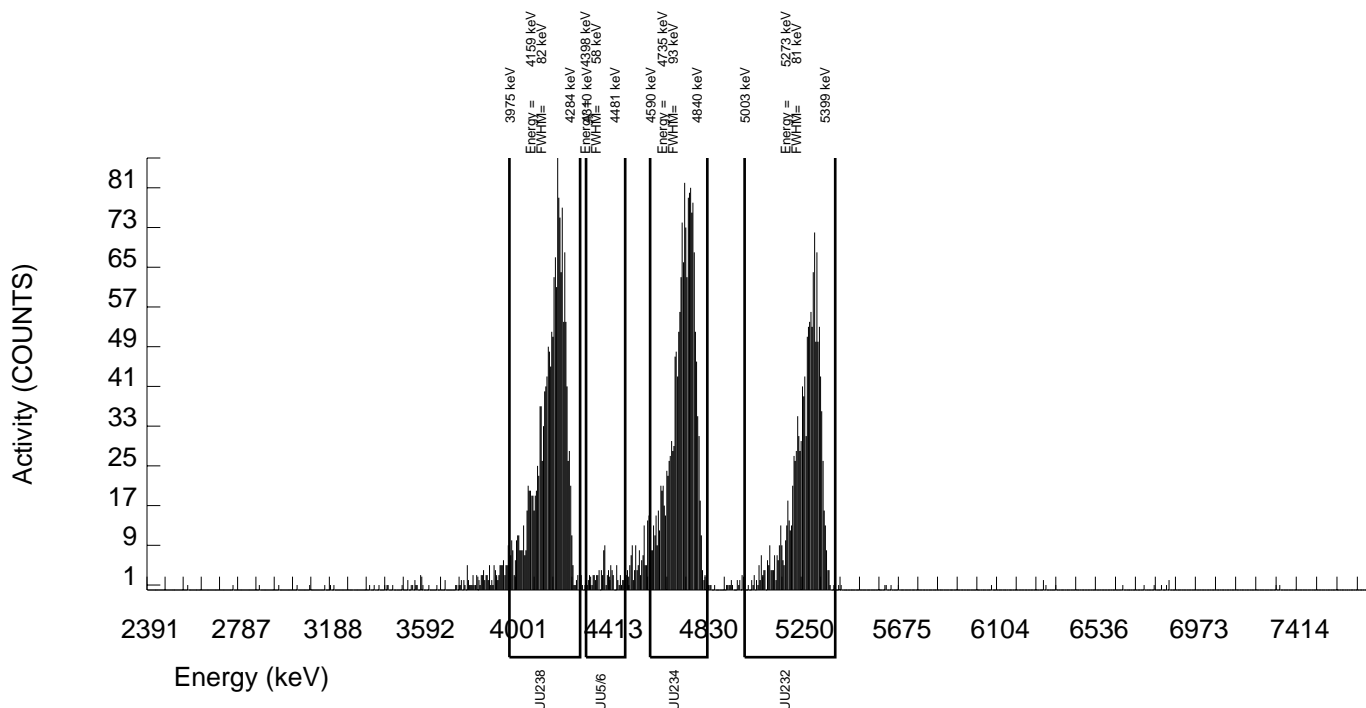
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 16-JUN-2009 00:00:00		SAMPLE ID : S1201871204_UU SAMPLE QTY: 1.002 G	
DETECTOR NUMBER :33448 AVERAGE %EFFICIENCY :25.4349 % YIELD : 101.600		COUNT DATE:10-JUL-2009 21:20:43 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.514E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.514E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29727 dpm RESULTS : 5.38202 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B131.CNF;373 BKG DATE : 5-JUL-2009 EFF FILE : W131.CNF;112 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	1730.000	1722.873	3.000	1.7321	100.0000	3.00E+00	4.29E-01	1.92E-02	7.01E-03	1.42E-01
U232	5302.100	1370.000	1368.000	2.000	1.4142	100.0000	2.38E+00	3.46E-01	1.67E-02	5.73E-03	1.26E-01
U-235	4391.000	90.000	89.000	1.000	1.0000	80.90000	1.91E-01	4.78E-02	1.65E-02	5.00E-03	4.02E-02
U-238	4184.730	1740.000	1736.000	4.000	2.0000	100.0000	3.02E+00	4.33E-01	2.14E-02	8.09E-03	1.42E-01

NOTE: Corrections made to U-3/4 net area due to tracer impurity



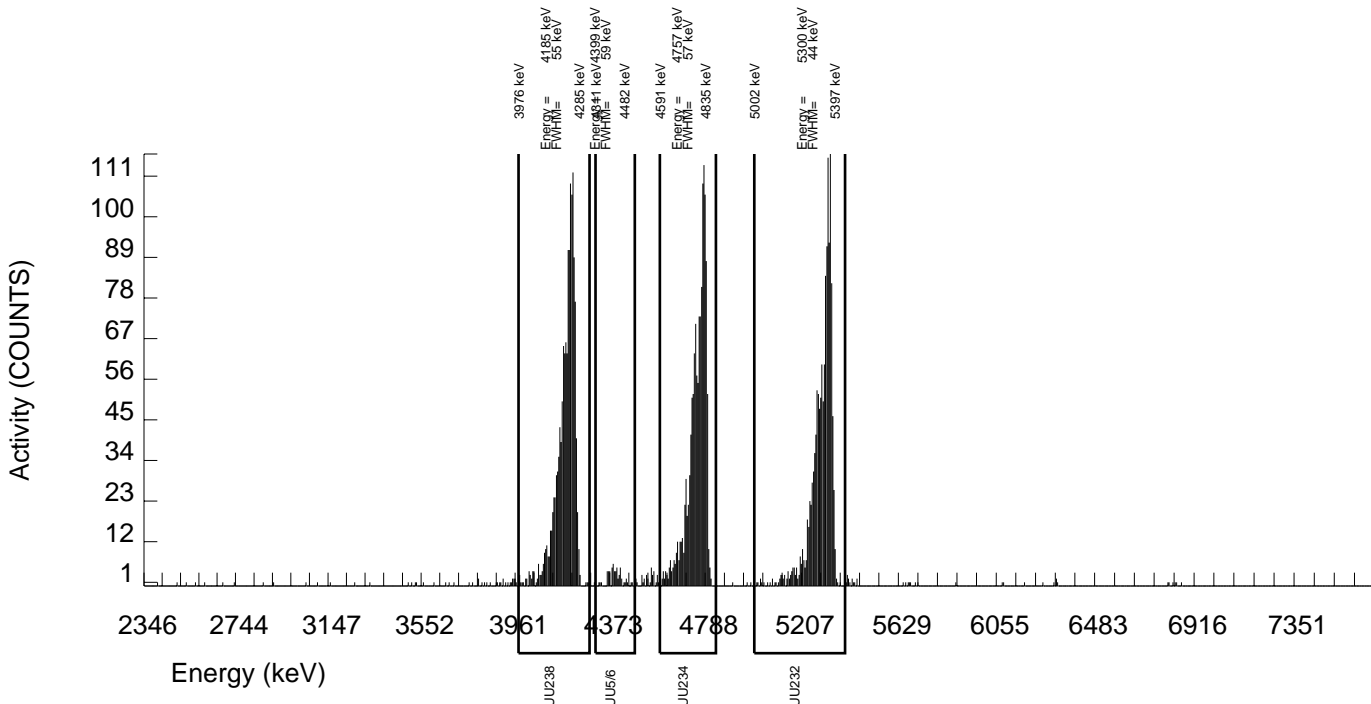
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 881150 SAMPLE DATE : 1-JUL-2009 00:00:00.		SAMPLE ID : S1201871205_UU SAMPLE QTY: 1.018 G	
DETECTOR NUMBER :78770 AVERAGE %EFFICIENCY :24.7595 % YIELD : 103.997		COUNT DATE:13-JUL-2009 13:34:47 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.474E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.474E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29517 dpm RESULTS : 5.50683 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B127.CNF;384 BKG DATE : 12-JUL-2009 EFF FILE : W127.CNF;108 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	1352.000	1343.888	4.000	2.0000	100.0000	2.31E+00	3.36E-01	2.11E-02	8.00E-03	1.24E-01
U232	5302.100	1366.000	1363.000	3.000	1.7321	100.0000	2.34E+00	3.41E-01	1.90E-02	6.93E-03	1.25E-01
U-235	4391.000	60.000	60.000	0.000	0.0000	80.90000	1.27E-01	3.66E-02	6.37E-03	0.00E+00	3.22E-02
U-238	4184.730	1433.000	1432.000	1.000	1.0000	100.0000	2.46E+00	3.57E-01	1.32E-02	4.00E-03	1.28E-01

NOTE: Corrections made to U-3/4 net area due to tracer impurity



# THORIUM

### Radiochemistry Batch Checklist, Rev 9

Batch# 883985      Product: Th      Date: 7/14/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			N/A
Samples have been blank corrected (if required)			N/A
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.	✓		case narrative
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%. Or meets the client's required RER acceptance criteria.	✓		Case narrative
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.	✓		
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Sample was correctly preserved if required.			N/A
Smears Taken for Radioactive batches.	✓		
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent.	✓		
Aux data is correct.			N/A
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly stasured.	✓		
QC data entered into QC database and batch is in REVW	✓		
Hit notification complete (if necessary)			N/A
Batch entered into Case Narrative.	✓		
Batch non-conformances completed, if applicable.			N/A
Batch non-conformances second reviewed and disposition verified to be completed.			N/A
Aliquot Correction completed if required.			N/A
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC

revised 8/1/08

Primary Review Performed By: Jsp/MLC 7/14/09

Secondary Review Performed By: [Signature] 7/14/09

715

KERR



# Thorium (Ac-227 Tracer) Que Sheet

Batch #: 883985

Analyst: KXM4 First Client Due Date: 15-JUL-09 Internal Due Date: 09-JUL-09

Tracer Isotope: Ac-227

Tracer Code: 0837-B-102 Expiration Date: 7/13/10

LCS Isotope: Th-230

LCS Code: A2796-3 Expiration Date: 4/12/10

Spike Isotope: Th-230

Spike Code: A2796-3 Expiration Date: 4/13/10

Prep Date: 7/10/09

Initials: MLK Pipet ID: 27155 Balance ID: SD110272

Vol: 0.1ml (Ac-227 Separation Date/Time: 7/11/09 AT 0830 AM)

Vol: 0.1ml

Vol: 0.1ml

Witness: AND 7/10/09

Wet/Dry  
Aliquot  
(g) (1/f)

Th  
Det #

Label  
#

Pos.

Collection  
Date

Client

Matrix

Hazard  
Code

Type

Min  
CRDL

Sample ID

Sample ID	Client Description	Hazard Code	Type	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g) (1/f)	Th Det #
231217001-2	RSK8-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	05-JUN-09	1	1	0.205	186
231217002-2	RSAL7-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	05-JUN-09	2	2	0.207	187
231217003-2	RSAL8-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	05-JUN-09	3	3	0.242	188
231217004-2	SA56-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	10-JUN-09	4	4	0.225	189
231217005-2	SA35-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	10-JUN-09	5	5	0.242	190
231217006-2	RSA03-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	10-JUN-09	6	6	0.216	191
231217007-2	SA176-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	10-JUN-09	7	7	0.220	192
231217008-2	SA55-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	10-JUN-09	8	8	0.214	193
231217009-2	SA166-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	11-JUN-09	9	9	0.238	194
231217010-2	SA201-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	11-JUN-09	10	10	0.202	195
231217011-2	SA134-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	11-JUN-09	11	11	0.200	196
231217012-2	SA182-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	11-JUN-09	12	12	0.212	197
231217013-2	RSK4-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	11-JUN-09	13	13	0.222	198
231217014-2	RSK4009-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	11-JUN-09	14	14	0.224	199
231217015-2	SA85-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	16-JUN-09	15	15	0.230	200
231217016-2	SA71-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	16-JUN-09	16	16	0.233	201
231217017-2	SA144-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	16-JUN-09	17	17	0.228	202
231217018-2	SA61-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	16-JUN-09	18	18	0.213	203
231217019-2	SA62-0.5B		SAMPLE	.05 pCi/g	SOIL	KERR003	16-JUN-09	19	19	0.229	204
1201877937-1	MB for batch 883985		MB	UCF pCi/g to 1	SOIL	QC ACCOUNT	16-JUN-09	20	20	0.242	205
1201877938-2	SA85-0.5B(231217015DUP)		DUP	.05 pCi/g	SOIL	QC ACCOUNT	16-JUN-09	21	21	0.220	206
1201877939-2	SA85-0.5B(231217015MS)		MS	.05 pCi/g	SOIL	QC ACCOUNT	16-JUN-09	22	22	0.202	207
1201877940-1	LCS for batch 883985		LCS	UCF pCi/g to 1	SOIL	QC ACCOUNT	16-JUN-09	23	23	0.242	208

Choose SOP Used: GL-RAD-A-038

- GL-RAD-A-045
- GL-RAD-A-043
- GL-RAD-A-032

Solid Sample Dissolution by: LEACH or DIGESTION  
Circle One

Data Reviewed By: Joel M. C. - 7/14/09

GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217001\_TH  
SAMPLE QTY: 0.205 G

DETECTOR NUMBER :68616  
AVERAGE %EFFICIENCY :25.4593  
% YIELD : 79.351

COUNT DATE:13-JUL-2009 13:04:30  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.044E+01

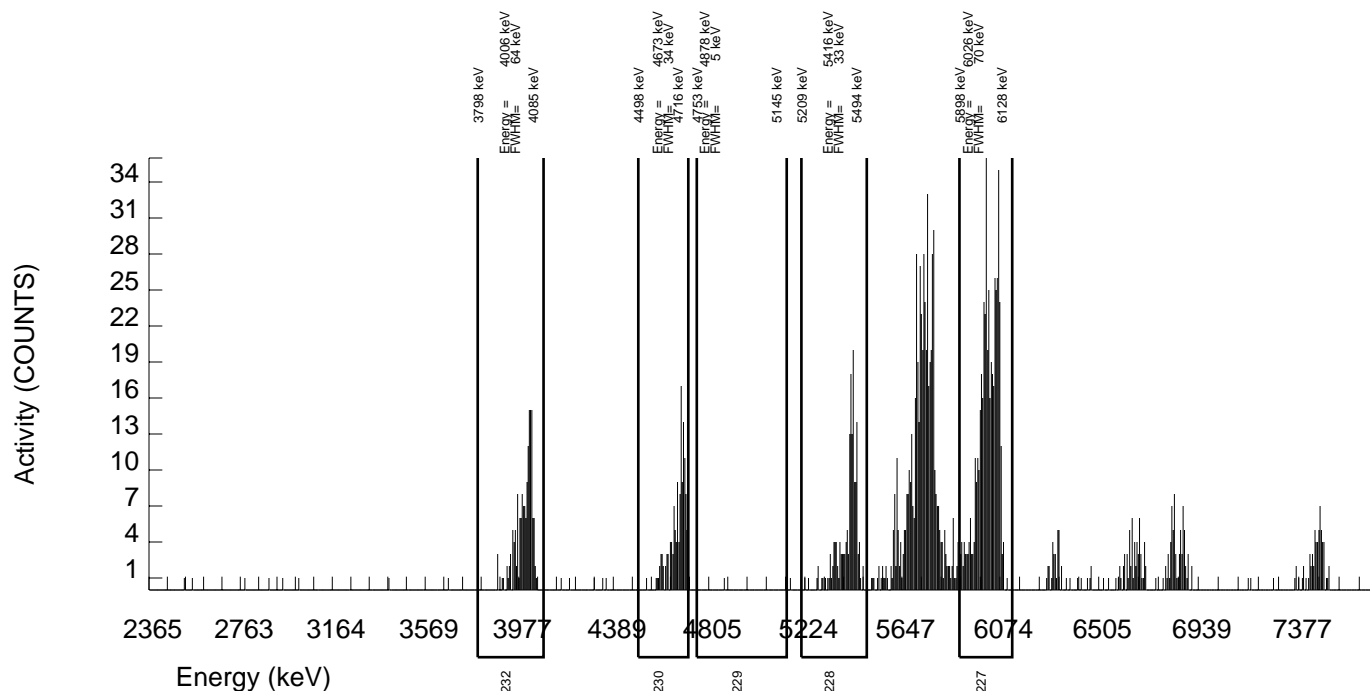
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.044E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.11724 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B186.CNF;89  
BKG DATE : 12-JUL-2009  
EFF FILE : W186.CNF;34  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	493.000	492.000	1.000	1.0000	68.10000	8.63E+00	9.35E-01	1.34E-01	4.08E-02	7.64E-01
TH-228	5363.000	165.000	157.000	8.000	2.8284	99.94000	1.71E+00	3.01E-01	1.76E-01	7.18E-02	2.81E-01
TH229	4900.000	1.000	1.000	0.000	0.0000	99.52000	1.09E-02	2.14E-02	3.28E-02	0.00E+00	2.14E-02
TH-230	4625.000	134.000	132.000	2.000	1.4142	100.0000	1.44E+00	2.64E-01	1.04E-01	3.58E-02	2.49E-01
TH-232	3972.000	159.000	159.000	0.000	0.0000	100.0000	1.73E+00	2.90E-01	3.26E-02	0.00E+00	2.69E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217002\_TH  
SAMPLE QTY: 0.207 G

DETECTOR NUMBER :68620  
AVERAGE %EFFICIENCY :24.8701  
% YIELD : 87.340

COUNT DATE:13-JUL-2009 13:04:32  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.034E+01

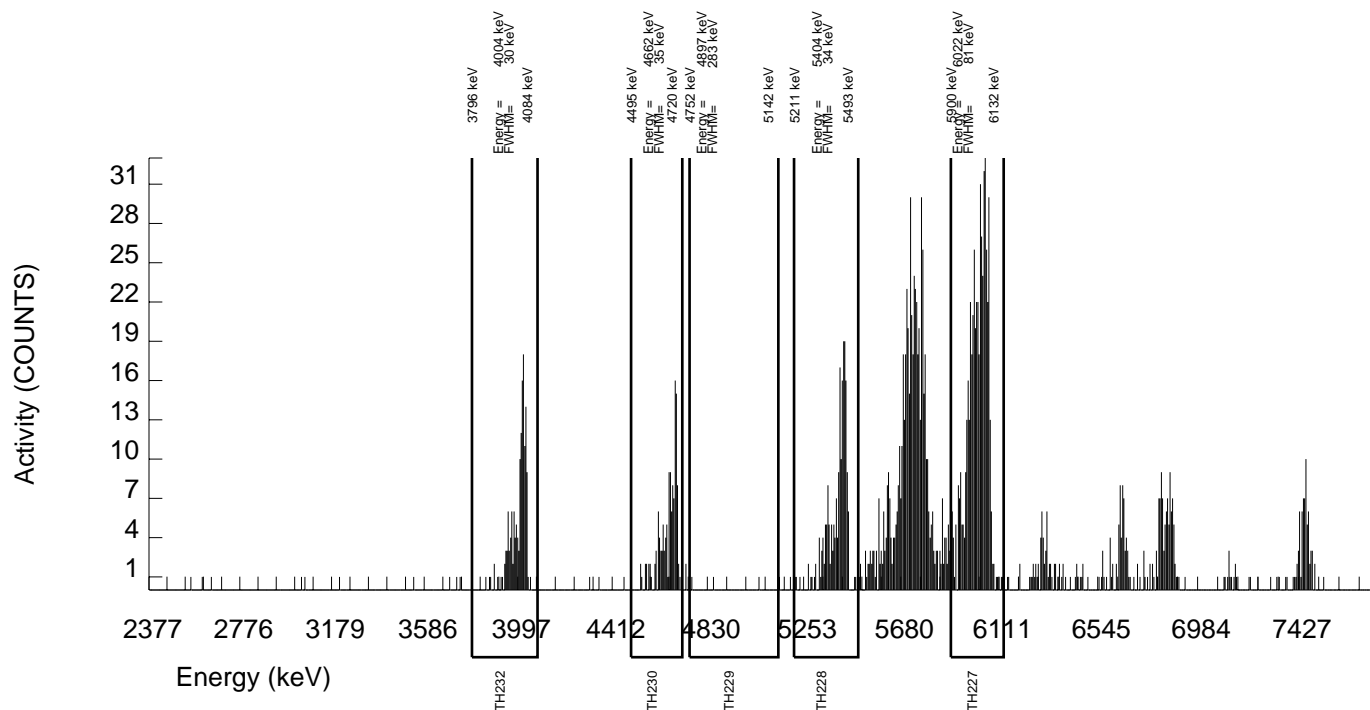
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.034E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.43108 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B187.CNF;89  
BKG DATE : 12-JUL-2009  
EFF FILE : W187.CNF;33  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	531.000	529.000	2.000	1.4142	68.10000	8.55E+00	9.19E-01	1.55E-01	5.32E-02	7.31E-01
TH-228	5363.000	201.000	188.000	13.000	3.6056	99.94000	1.89E+00	3.13E-01	1.99E-01	8.43E-02	2.88E-01
TH229	4900.000	3.000	-3.000	6.000	2.4495	99.52000	-3.02E-02	5.92E-02	1.45E-01	5.74E-02	5.92E-02
TH-230	4625.000	132.000	128.000	4.000	2.0000	100.0000	1.28E+00	2.44E-01	1.23E-01	4.66E-02	2.29E-01
TH-232	3972.000	151.000	147.000	4.000	2.0000	100.0000	1.47E+00	2.63E-01	1.23E-01	4.66E-02	2.44E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217003\_TH  
SAMPLE QTY: 0.242 G

DETECTOR NUMBER :68621  
AVERAGE %EFFICIENCY :25.8624  
% YIELD : 85.258

COUNT DATE:13-JUL-2009 13:04:35  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.844E+00

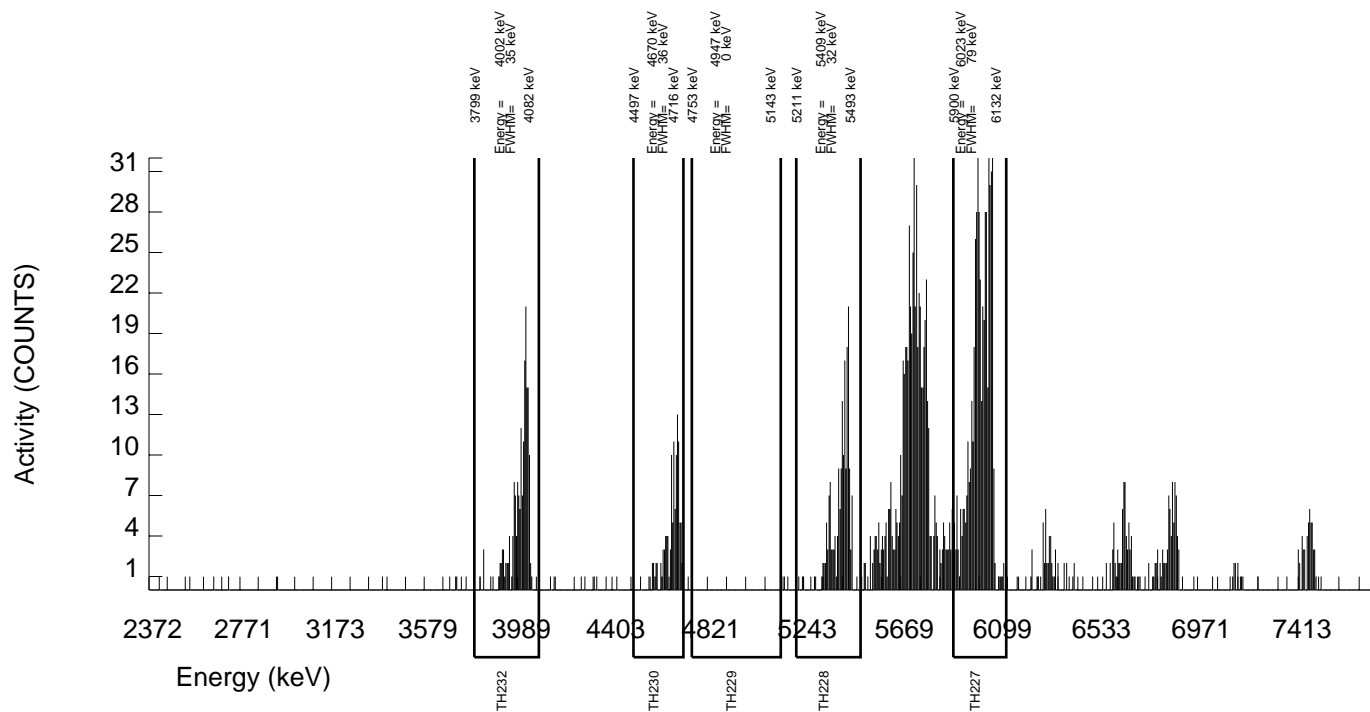
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.844E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.34932 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B188.CNF;89  
BKG DATE : 12-JUL-2009  
EFF FILE : W188.CNF;34  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	537.000	537.000	0.000	0.0000	68.10000	7.31E+00	7.59E-01	4.09E-02	0.00E+00	6.18E-01
TH-228	5363.000	188.000	180.000	8.000	2.8284	99.94000	1.52E+00	2.50E-01	1.37E-01	5.57E-02	2.32E-01
TH229	4900.000	0.000	-2.000	2.000	1.4142	99.52000	-1.70E-02	2.88E-02	8.13E-02	2.79E-02	2.88E-02
TH-230	4625.000	113.000	113.000	0.000	0.0000	100.0000	9.54E-01	1.85E-01	2.53E-02	0.00E+00	1.76E-01
TH-232	3972.000	185.000	182.000	3.000	1.7321	100.0000	1.54E+00	2.45E-01	9.34E-02	3.40E-02	2.27E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217004\_TH  
SAMPLE QTY: 0.225 G

DETECTOR NUMBER :68622  
AVERAGE %EFFICIENCY :26.0510  
% YIELD : 79.913

COUNT DATE:13-JUL-2009 13:04:38  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.512E+00

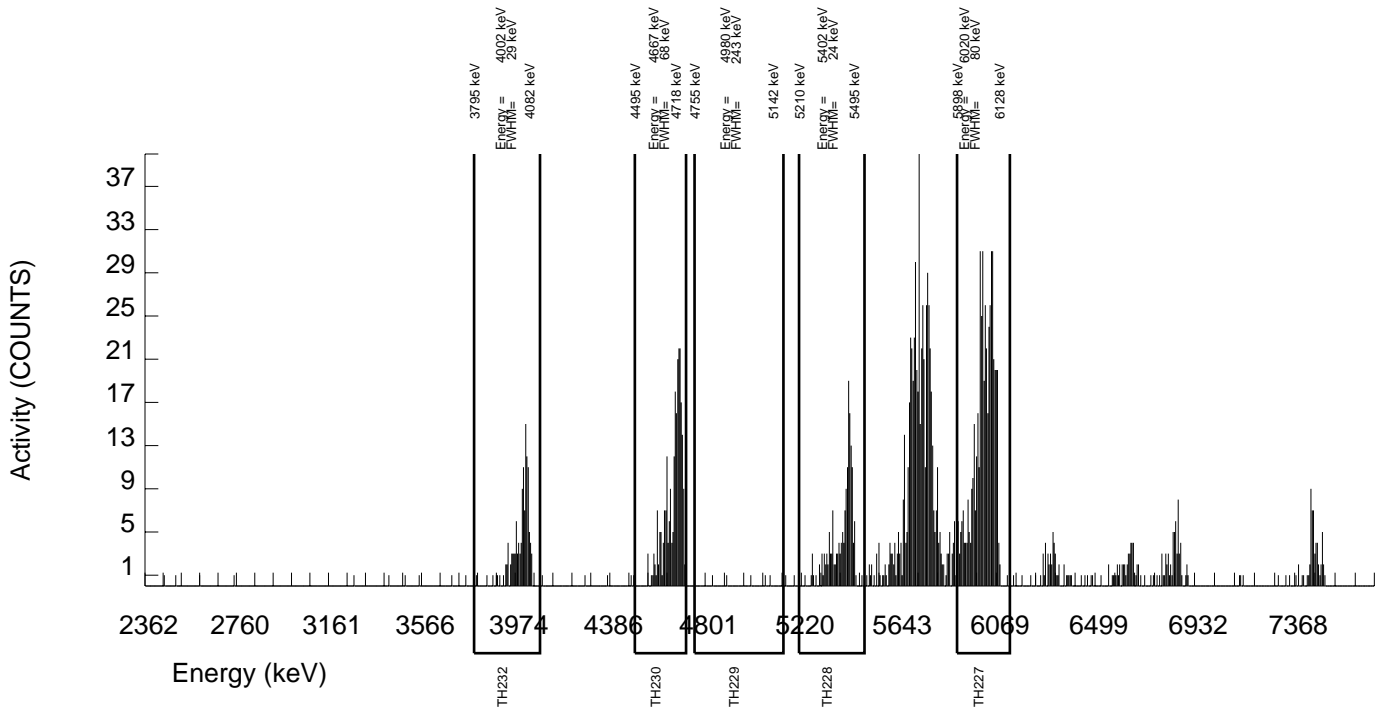
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.512E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.13932 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B189.CNF;89  
BKG DATE : 12-JUL-2009  
EFF FILE : W189.CNF;33  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	510.000	507.000	3.000	1.7321	68.10000	7.86E+00	8.53E-01	1.72E-01	6.25E-02	6.89E-01
TH-228	5363.000	169.000	161.000	8.000	2.8284	99.94000	1.55E+00	2.70E-01	1.56E-01	6.35E-02	2.52E-01
TH229	4900.000	5.000	4.000	1.000	1.0000	99.52000	3.87E-02	4.65E-02	7.39E-02	2.25E-02	4.64E-02
TH-230	4625.000	243.000	242.000	1.000	1.0000	100.0000	2.33E+00	3.30E-01	7.36E-02	2.24E-02	2.94E-01
TH-232	3972.000	126.000	124.000	2.000	1.4142	100.0000	1.19E+00	2.27E-01	9.21E-02	3.16E-02	2.13E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217005\_TH  
SAMPLE QTY: 0.242 G

DETECTOR NUMBER :68623  
AVERAGE %EFFICIENCY :26.2747  
% YIELD : 87.359

COUNT DATE:13-JUL-2009 13:04:41  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.844E+00

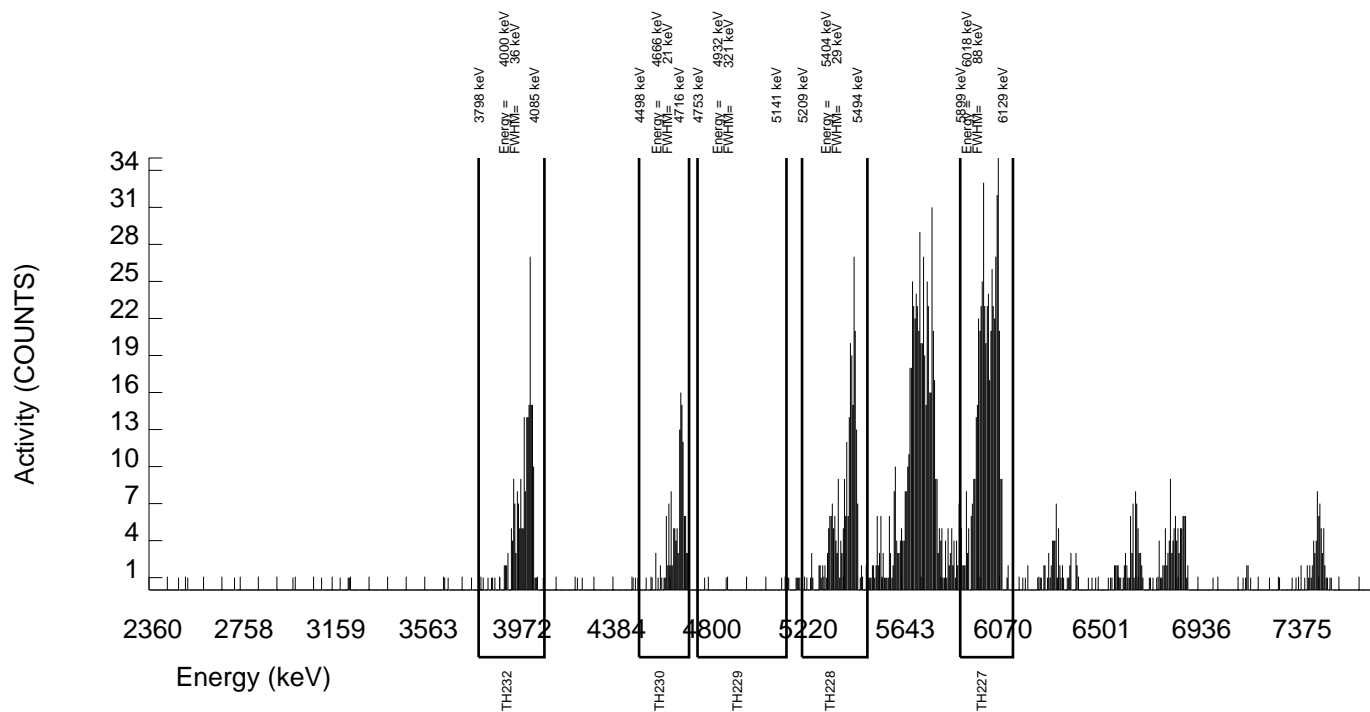
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.844E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.43184 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B190.CNF;89  
BKG DATE : 12-JUL-2009  
EFF FILE : W190.CNF;34  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	561.000	559.000	2.000	1.4142	68.10000	7.31E+00	7.50E-01	1.25E-01	4.30E-02	6.08E-01
TH-228	5363.000	257.000	241.000	16.000	4.0000	99.94000	1.96E+00	2.89E-01	1.76E-01	7.57E-02	2.63E-01
TH229	4900.000	3.000	-15.000	18.000	4.2426	99.52000	-1.22E-01	7.32E-02	1.85E-01	8.04E-02	7.32E-02
TH-230	4625.000	135.000	129.000	6.000	2.4495	100.0000	1.05E+00	1.99E-01	1.17E-01	4.62E-02	1.89E-01
TH-232	3972.000	218.000	210.000	8.000	2.8284	100.0000	1.70E+00	2.60E-01	1.31E-01	5.34E-02	2.39E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217006\_TH  
SAMPLE QTY: 0.216 G

DETECTOR NUMBER :68624  
AVERAGE %EFFICIENCY :26.2435  
% YIELD : 84.803

COUNT DATE:13-JUL-2009 13:04:43  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.908E+00

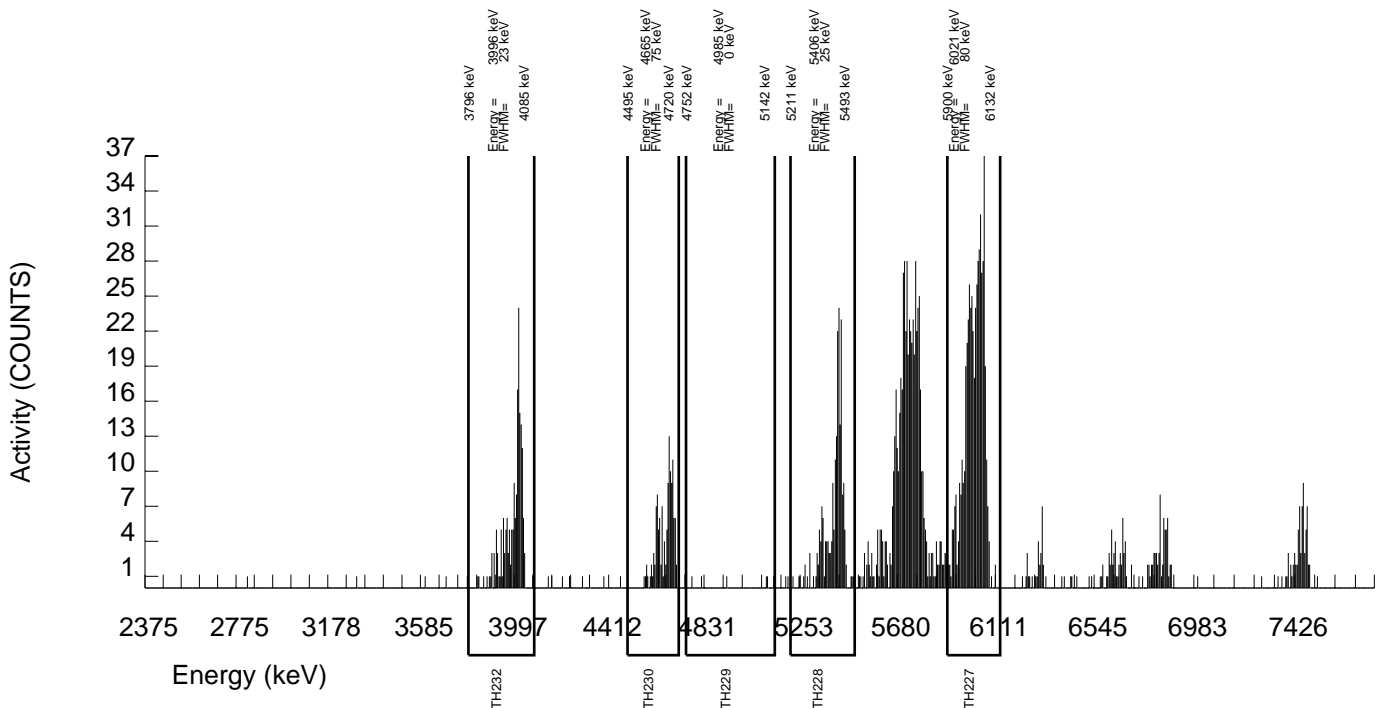
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.908E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.33143 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B191.CNF;91  
BKG DATE : 12-JUL-2009  
EFF FILE : W191.CNF;33  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	543.000	542.000	1.000	1.0000	68.10000	8.19E+00	8.70E-01	1.16E-01	3.52E-02	6.91E-01
TH-228	5363.000	210.000	205.000	5.000	2.2361	99.94000	1.93E+00	2.97E-01	1.26E-01	4.89E-02	2.70E-01
TH229	4900.000	6.000	2.000	4.000	2.0000	99.52000	1.88E-02	5.84E-02	1.16E-01	4.38E-02	5.84E-02
TH-230	4625.000	127.000	126.000	1.000	1.0000	100.0000	1.18E+00	2.21E-01	7.17E-02	2.18E-02	2.08E-01
TH-232	3972.000	184.000	184.000	0.000	0.0000	100.0000	1.72E+00	2.73E-01	2.81E-02	0.00E+00	2.49E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217007\_TH  
SAMPLE QTY: 0.220 G

DETECTOR NUMBER :74430  
AVERAGE %EFFICIENCY :25.2859  
% YIELD : 85.904

COUNT DATE:13-JUL-2009 13:04:45  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.728E+00

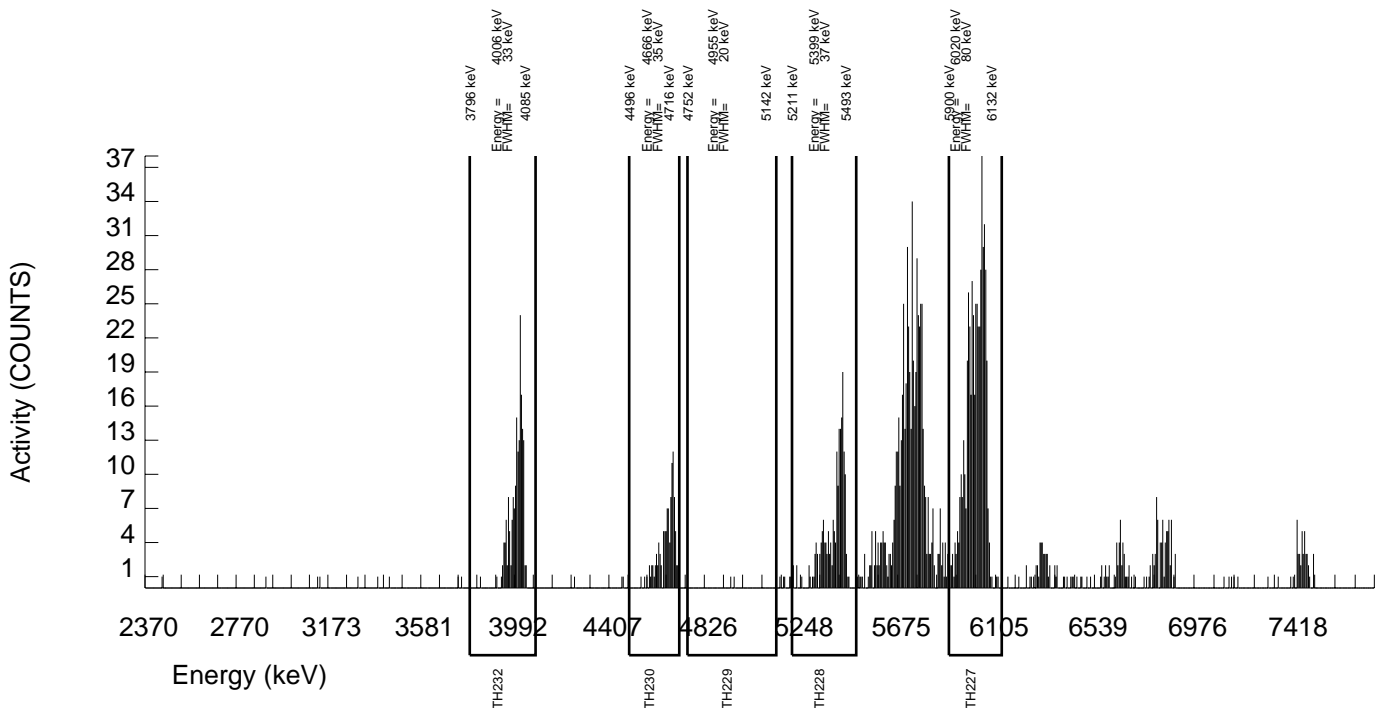
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.728E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.37467 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B192.CNF;89  
BKG DATE : 12-JUL-2009  
EFF FILE : W192.CNF;40  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	530.000	529.000	1.000	1.0000	68.10000	8.04E+00	8.45E-01	1.16E-01	3.54E-02	6.87E-01
TH-228	5363.000	189.000	175.000	14.000	3.7417	99.94000	1.65E+00	2.83E-01	1.93E-01	8.23E-02	2.64E-01
TH229	4900.000	2.000	-1.000	3.000	1.7321	99.52000	-9.47E-03	4.15E-02	1.05E-01	3.82E-02	4.15E-02
TH-230	4625.000	108.000	105.000	3.000	1.7321	100.0000	9.90E-01	2.04E-01	1.04E-01	3.80E-02	1.95E-01
TH-232	3972.000	178.000	176.000	2.000	1.4142	100.0000	1.66E+00	2.68E-01	9.03E-02	3.10E-02	2.48E-01





GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217008\_TH  
SAMPLE QTY: 0.214 G

DETECTOR NUMBER :68627  
AVERAGE %EFFICIENCY :26.1662  
% YIELD : 80.974

COUNT DATE:13-JUL-2009 13:04:48  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.000E+01

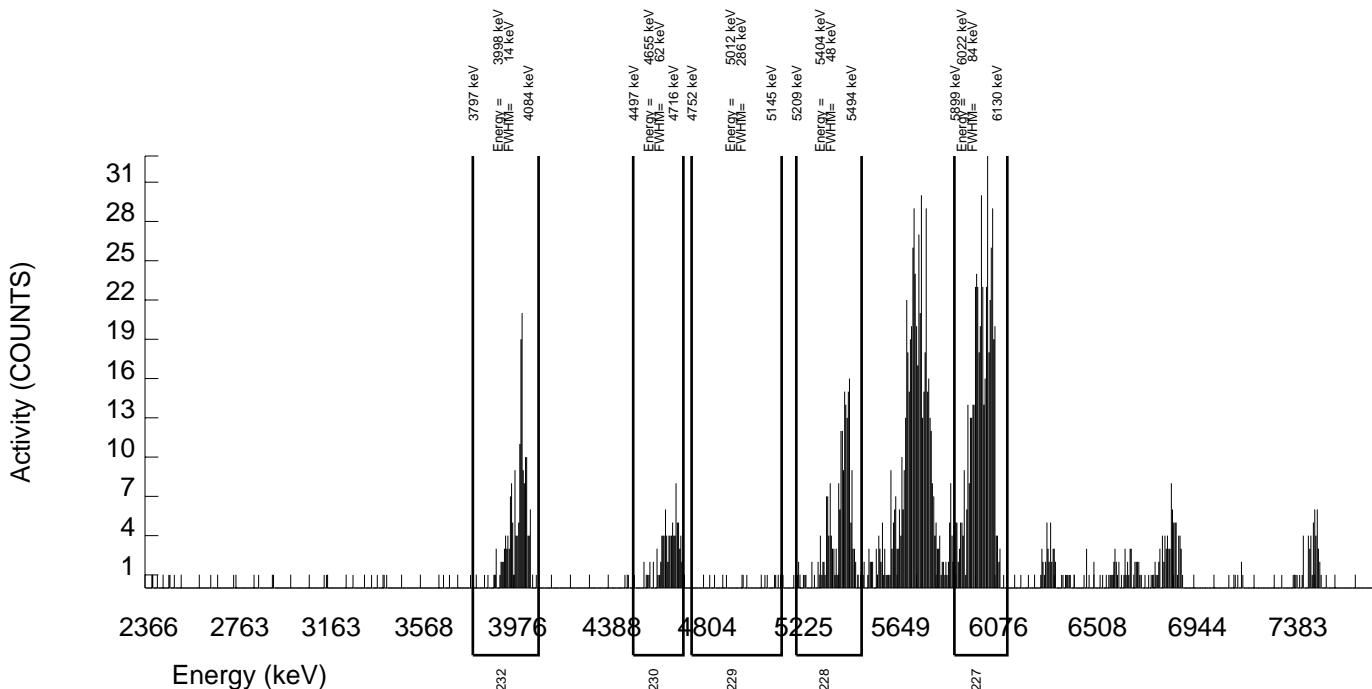
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.000E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.18099 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B193.CNF;91  
BKG DATE : 12-JUL-2009  
EFF FILE : W193.CNF;32  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	519.000	516.000	3.000	1.7321	68.10000	8.27E+00	8.95E-01	1.77E-01	6.46E-02	7.18E-01
TH-228	5363.000	206.000	205.000	1.000	1.0000	99.94000	2.04E+00	3.11E-01	7.63E-02	2.32E-02	2.81E-01
TH229	4900.000	10.000	7.000	3.000	1.7321	99.52000	6.99E-02	7.07E-02	1.10E-01	4.02E-02	7.05E-02
TH-230	4625.000	93.000	92.000	1.000	1.0000	100.0000	9.14E-01	1.98E-01	7.60E-02	2.31E-02	1.89E-01
TH-232	3972.000	177.000	177.000	0.000	0.0000	100.0000	1.76E+00	2.83E-01	2.98E-02	0.00E+00	2.59E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217009\_TH  
SAMPLE QTY: 0.236 G

DETECTOR NUMBER :68635  
AVERAGE %EFFICIENCY :25.6886  
% YIELD : 82.959

COUNT DATE:13-JUL-2009 13:04:50  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.069E+00

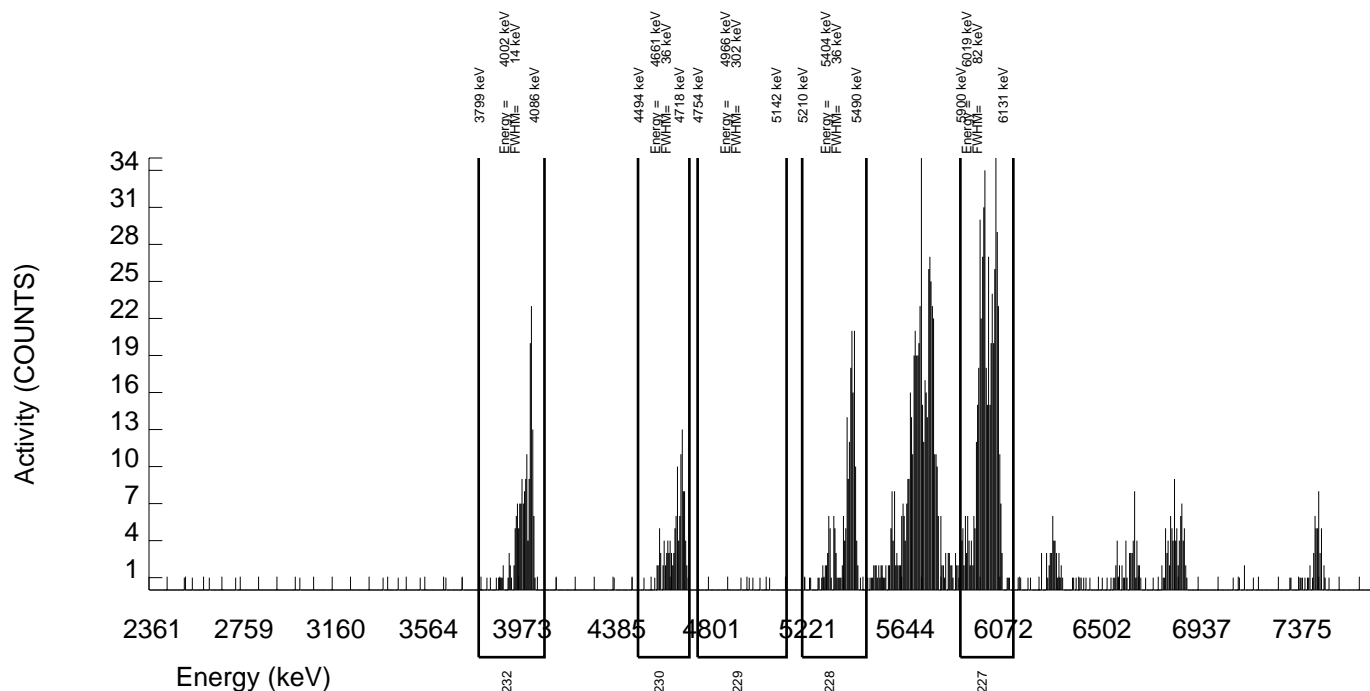
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.069E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.25898 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B194.CNF;89  
BKG DATE : 12-JUL-2009  
EFF FILE : W194.CNF;33  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	519.000	519.000	0.000	0.0000	68.10000	7.50E+00	7.88E-01	4.33E-02	0.00E+00	6.45E-01
TH-228	5363.000	192.000	186.000	6.000	2.4495	99.94000	1.67E+00	2.68E-01	1.29E-01	5.12E-02	2.48E-01
TH229	4900.000	6.000	4.000	2.000	1.4142	99.52000	3.60E-02	4.99E-02	8.62E-02	2.96E-02	4.99E-02
TH-230	4625.000	122.000	121.000	1.000	1.0000	100.0000	1.08E+00	2.05E-01	6.85E-02	2.08E-02	1.95E-01
TH-232	3972.000	175.000	174.000	1.000	1.0000	100.0000	1.56E+00	2.51E-01	6.85E-02	2.08E-02	2.33E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217010\_TH  
SAMPLE QTY: 0.202 G

DETECTOR NUMBER :68636  
AVERAGE %EFFICIENCY :25.6559  
% YIELD : 77.783

COUNT DATE:13-JUL-2009 13:04:53  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.060E+01

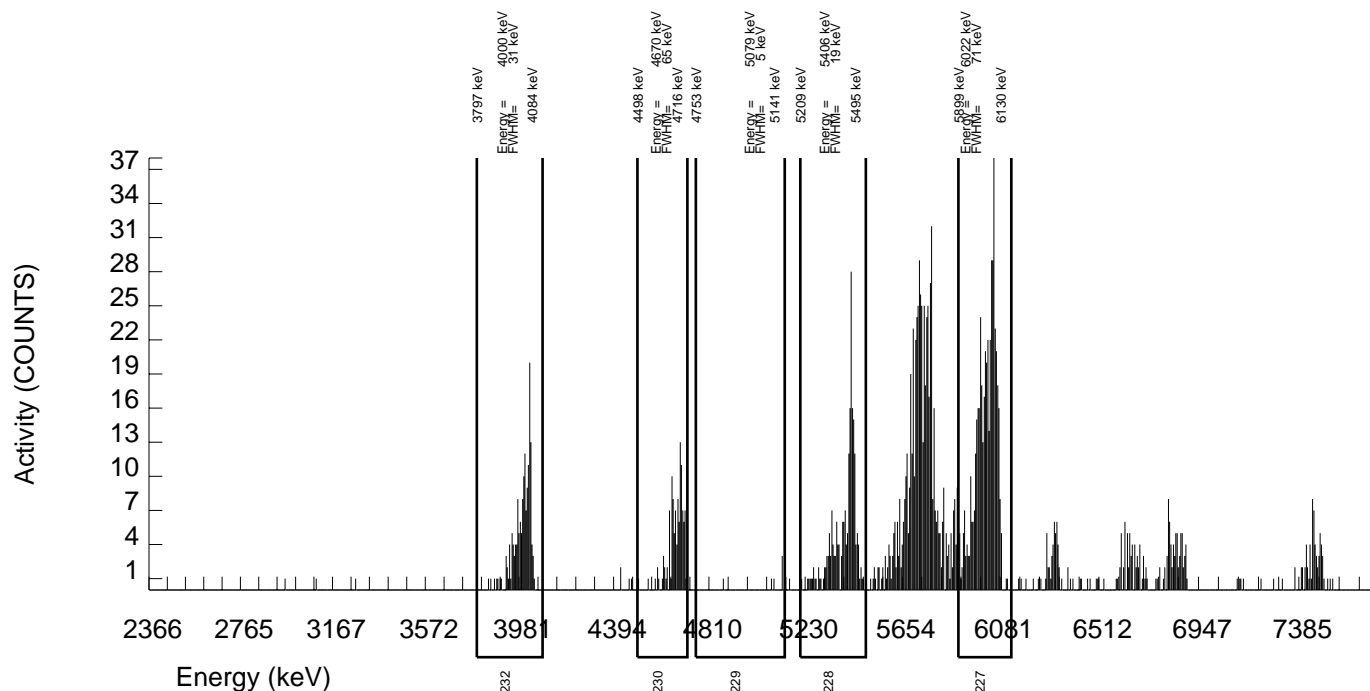
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.060E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.05566 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B195.CNF;95  
BKG DATE : 12-JUL-2009  
EFF FILE : W195.CNF;32  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	493.000	486.000	7.000	2.6458	68.10000	8.76E+00	9.76E-01	2.76E-01	1.11E-01	7.90E-01
TH-228	5363.000	212.000	200.000	12.000	3.4641	99.94000	2.24E+00	3.60E-01	2.14E-01	9.03E-02	3.29E-01
TH229	4900.000	6.000	0.000	6.000	2.4495	99.52000	0.00E+00	7.62E-02	1.62E-01	6.40E-02	7.62E-02
TH-230	4625.000	116.000	78.000	38.000	6.1644	100.0000	8.72E-01	2.78E-01	3.54E-01	1.60E-01	2.72E-01
TH-232	3972.000	160.000	148.000	12.000	3.4641	100.0000	1.65E+00	3.07E-01	2.14E-01	9.01E-02	2.87E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217011\_TH  
SAMPLE QTY: 0.206 G

DETECTOR NUMBER :68637  
AVERAGE %EFFICIENCY :25.7956  
% YIELD : 76.725

COUNT DATE:13-JUL-2009 13:04:56  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.039E+01

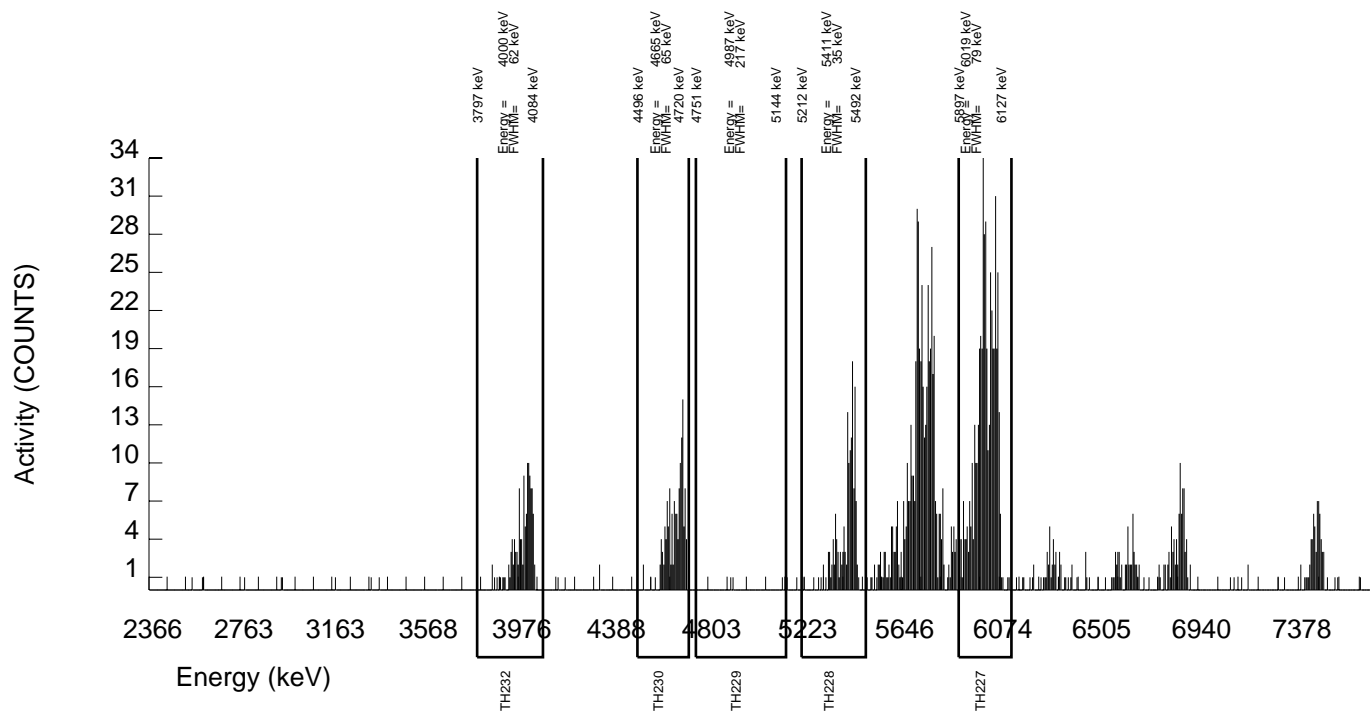
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.039E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.01410 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B196.CNF;90  
BKG DATE : 12-JUL-2009  
EFF FILE : W196.CNF;33  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	483.000	482.000	1.000	1.0000	68.10000	8.59E+00	9.36E-01	1.36E-01	4.15E-02	7.68E-01
TH-228	5363.000	153.000	147.000	6.000	2.4495	99.94000	1.63E+00	2.92E-01	1.60E-01	6.32E-02	2.74E-01
TH229	4900.000	3.000	0.000	3.000	1.7321	99.52000	0.00E+00	5.33E-02	1.23E-01	4.47E-02	5.33E-02
TH-230	4625.000	139.000	138.000	1.000	1.0000	100.0000	1.52E+00	2.73E-01	8.45E-02	2.57E-02	2.56E-01
TH-232	3972.000	124.000	121.000	3.000	1.7321	100.0000	1.34E+00	2.58E-01	1.22E-01	4.45E-02	2.44E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217012\_TH  
SAMPLE QTY: 0.212 G

DETECTOR NUMBER :78894  
AVERAGE %EFFICIENCY :25.6755  
% YIELD : 75.005

COUNT DATE:13-JUL-2009 13:04:59  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.010E+01

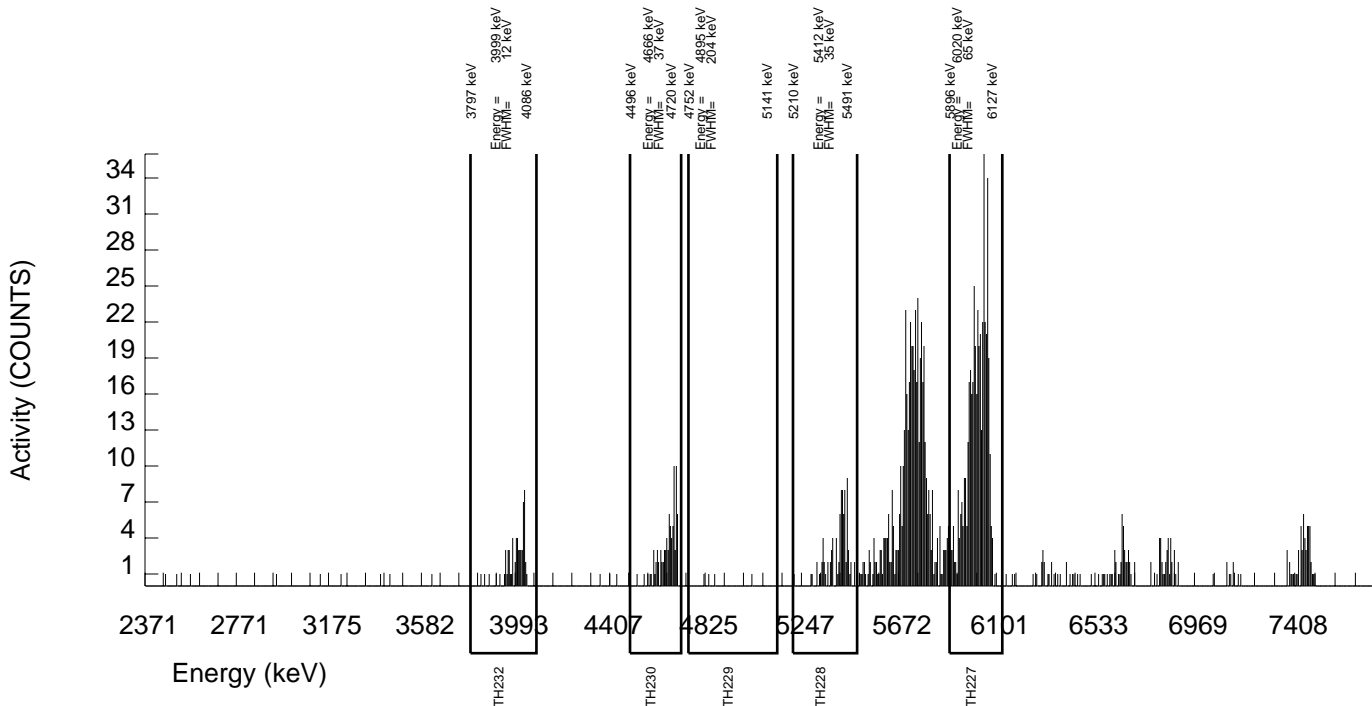
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.010E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 2.94653 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B197.CNF;35  
BKG DATE : 12-JUL-2009  
EFF FILE : W197.CNF;31  
CAL DATE : 23-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	469.000	469.000	0.000	0.0000	68.10000	8.35E+00	9.15E-01	5.34E-02	0.00E+00	7.55E-01
TH-228	5363.000	89.000	87.000	2.000	1.4142	99.94000	9.63E-01	2.15E-01	1.06E-01	3.64E-02	2.07E-01
TH229	4900.000	4.000	3.000	1.000	1.0000	99.52000	3.33E-02	4.86E-02	8.48E-02	2.58E-02	4.86E-02
TH-230	4625.000	85.000	85.000	0.000	0.0000	100.0000	9.38E-01	2.08E-01	3.31E-02	0.00E+00	1.99E-01
TH-232	3972.000	62.000	62.000	0.000	0.0000	100.0000	6.84E-01	1.75E-01	3.31E-02	0.00E+00	1.70E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217013\_TH  
SAMPLE QTY: 0.222 G

DETECTOR NUMBER :78895  
AVERAGE %EFFICIENCY :25.5828  
% YIELD : 88.920

COUNT DATE:13-JUL-2009 13:05:01  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.641E+00

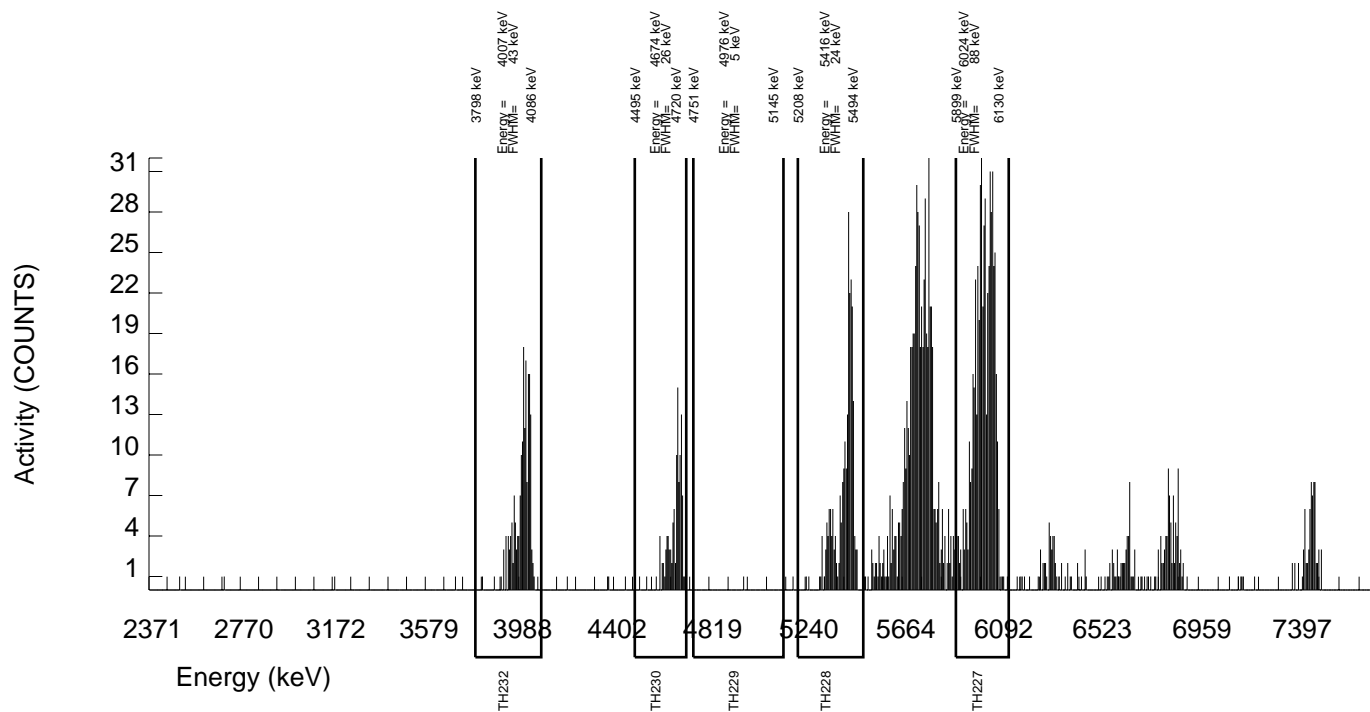
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.641E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.49316 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B198.CNF;35  
BKG DATE : 12-JUL-2009  
EFF FILE : W198.CNF;29  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	555.000	554.000	1.000	1.0000	68.10000	7.97E+00	8.24E-01	1.10E-01	3.35E-02	6.65E-01
TH-228	5363.000	235.000	234.000	1.000	1.0000	99.94000	2.09E+00	2.98E-01	6.85E-02	2.08E-02	2.69E-01
TH229	4900.000	1.000	1.000	0.000	0.0000	99.52000	8.96E-03	1.76E-02	2.69E-02	0.00E+00	1.76E-02
TH-230	4625.000	109.000	109.000	0.000	0.0000	100.0000	9.72E-01	1.92E-01	2.68E-02	0.00E+00	1.83E-01
TH-232	3972.000	185.000	185.000	0.000	0.0000	100.0000	1.65E+00	2.58E-01	2.68E-02	0.00E+00	2.38E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217014\_TH  
SAMPLE QTY: 0.224 G

DETECTOR NUMBER :78896  
AVERAGE %EFFICIENCY :25.0333  
% YIELD : 86.443

COUNT DATE:13-JUL-2009 13:05:04  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.555E+00

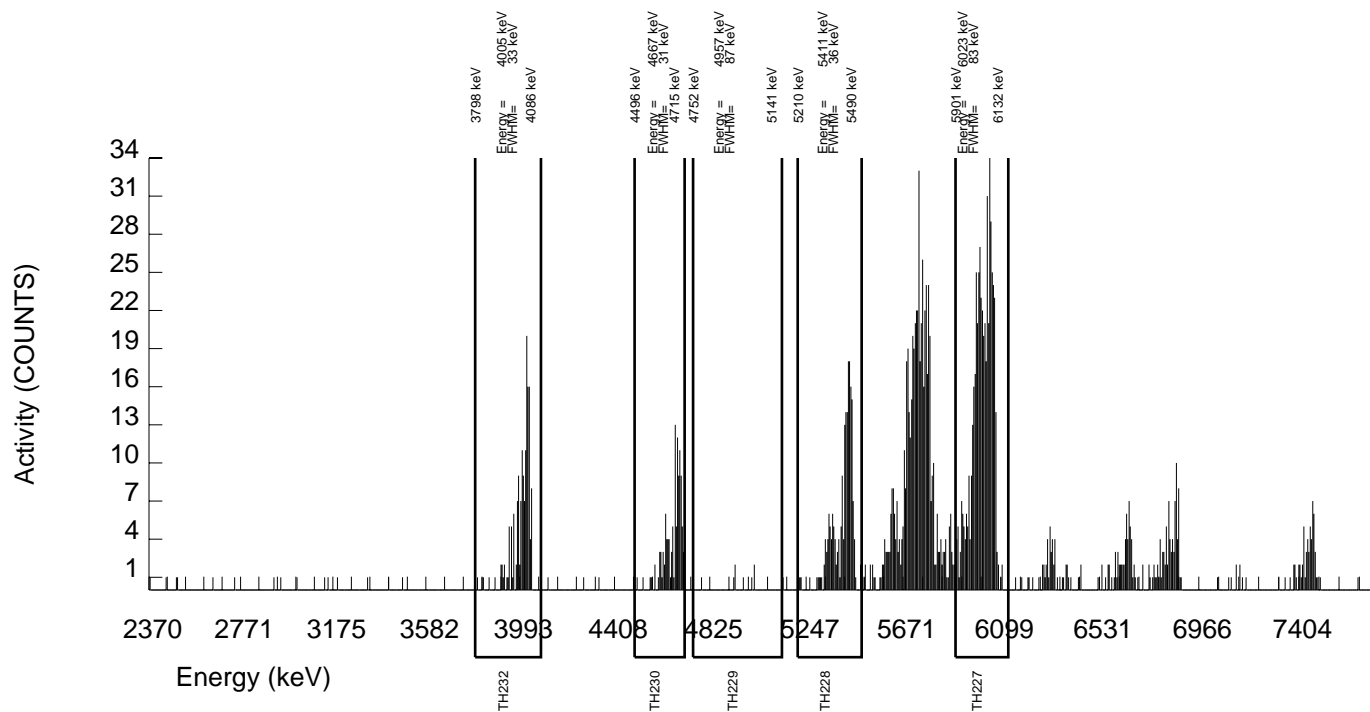
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.555E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.39586 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B199.CNF;35  
BKG DATE : 12-JUL-2009  
EFF FILE : W199.CNF;29  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	529.000	527.000	2.000	1.4142	68.10000	7.90E+00	8.31E-01	1.44E-01	4.93E-02	6.77E-01
TH-228	5363.000	202.000	200.000	2.000	1.4142	99.94000	1.86E+00	2.85E-01	8.93E-02	3.07E-02	2.61E-01
TH229	4900.000	8.000	6.000	2.000	1.4142	99.52000	5.60E-02	5.80E-02	8.95E-02	3.07E-02	5.79E-02
TH-230	4625.000	115.000	110.000	5.000	2.2361	100.0000	1.02E+00	2.09E-01	1.25E-01	4.83E-02	2.00E-01
TH-232	3972.000	160.000	158.000	2.000	1.4142	100.0000	1.47E+00	2.49E-01	8.90E-02	3.06E-02	2.32E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217015\_TH  
SAMPLE QTY: 0.230 G

DETECTOR NUMBER :78900  
AVERAGE %EFFICIENCY :26.8658  
% YIELD : 79.477

COUNT DATE:13-JUL-2009 13:05:07  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.305E+00

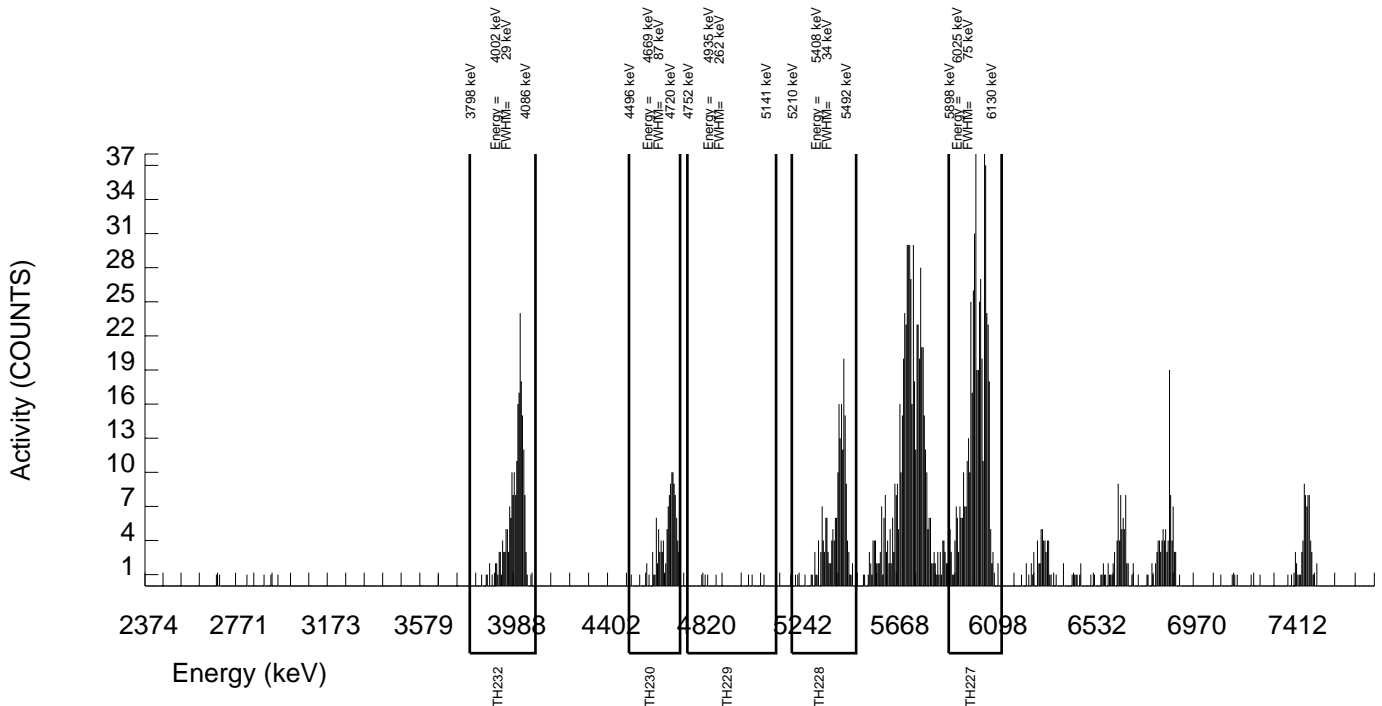
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.305E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.12221 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B200.CNF;35  
BKG DATE : 12-JUL-2009  
EFF FILE : W200.CNF;29  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	521.000	520.000	1.000	1.0000	68.10000	7.69E+00	8.10E-01	1.13E-01	3.44E-02	6.63E-01
TH-228	5363.000	199.000	191.000	8.000	2.8284	99.94000	1.76E+00	2.81E-01	1.49E-01	6.05E-02	2.59E-01
TH229	4900.000	7.000	0.000	7.000	2.6458	99.52000	0.00E+00	6.76E-02	1.41E-01	5.67E-02	6.76E-02
TH-230	4625.000	119.000	112.000	7.000	2.6458	100.0000	1.03E+00	2.11E-01	1.40E-01	5.65E-02	2.02E-01
TH-232	3972.000	216.000	206.000	10.000	3.1623	100.0000	1.89E+00	2.94E-01	1.62E-01	6.75E-02	2.70E-01





GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217016\_TH  
SAMPLE QTY: 0.233 G

DETECTOR NUMBER :78902  
AVERAGE %EFFICIENCY :26.0817  
% YIELD : 86.117

COUNT DATE:13-JUL-2009 13:05:09  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.186E+00

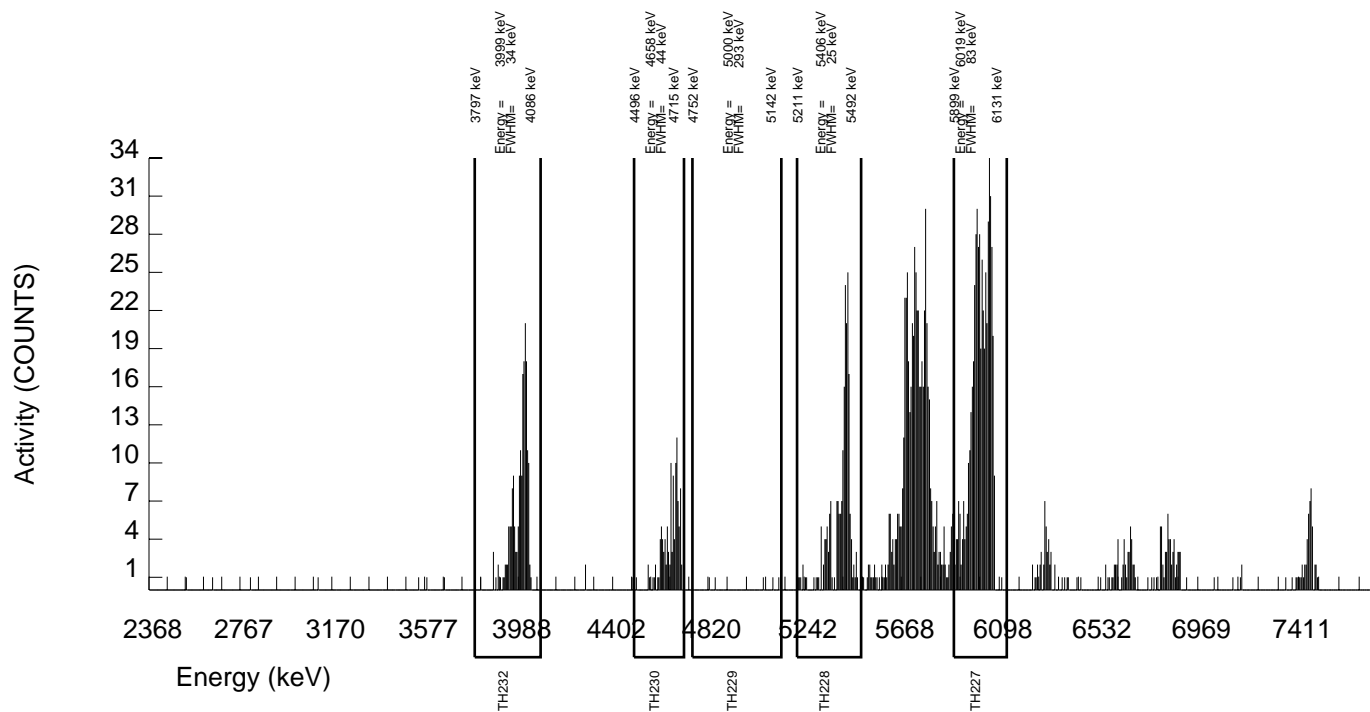
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.186E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.38306 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B201.CNF;35  
BKG DATE : 12-JUL-2009  
EFF FILE : W201.CNF;29  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	548.000	547.000	1.000	1.0000	68.10000	7.59E+00	7.86E-01	1.06E-01	3.23E-02	6.38E-01
TH-228	5363.000	214.000	212.000	2.000	1.4142	99.94000	1.83E+00	2.72E-01	8.27E-02	2.84E-02	2.49E-01
TH229	4900.000	5.000	2.000	3.000	1.7321	99.52000	1.73E-02	4.80E-02	9.56E-02	3.48E-02	4.79E-02
TH-230	4625.000	114.000	112.000	2.000	1.4142	100.0000	9.64E-01	1.91E-01	8.25E-02	2.83E-02	1.82E-01
TH-232	3972.000	191.000	191.000	0.000	0.0000	100.0000	1.64E+00	2.54E-01	2.58E-02	0.00E+00	2.33E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217017\_TH  
SAMPLE QTY: 0.228 G

DETECTOR NUMBER :78903  
AVERAGE %EFFICIENCY :26.4382  
% YIELD : 79.210

COUNT DATE:13-JUL-2009 13:05:13  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.387E+00

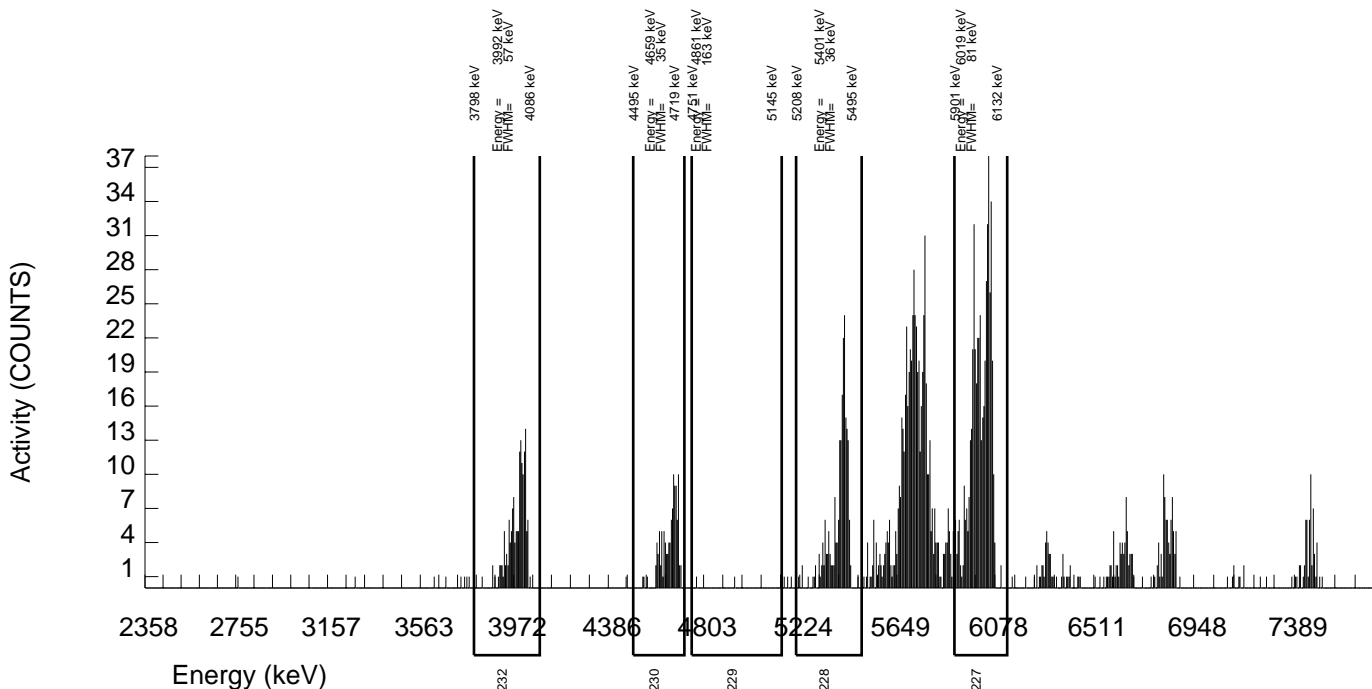
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.387E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.11169 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B202.CNF;35  
BKG DATE : 12-JUL-2009  
EFF FILE : W202.CNF;29  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	510.000	510.000	0.000	0.0000	68.10000	7.76E+00	8.23E-01	4.57E-02	0.00E+00	6.74E-01
TH-228	5363.000	208.000	207.000	1.000	1.0000	99.94000	1.96E+00	2.93E-01	7.24E-02	2.20E-02	2.68E-01
TH229	4900.000	2.000	1.000	1.000	1.0000	99.52000	9.48E-03	3.22E-02	7.25E-02	2.21E-02	3.22E-02
TH-230	4625.000	109.000	109.000	0.000	0.0000	100.0000	1.03E+00	2.03E-01	2.83E-02	0.00E+00	1.93E-01
TH-232	3972.000	157.000	155.000	2.000	1.4142	100.0000	1.46E+00	2.50E-01	9.04E-02	3.10E-02	2.33E-01



GEL Laboratories LLC  
 ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
 SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217018\_TH  
 SAMPLE QTY: 0.213 G

DETECTOR NUMBER :78905  
 AVERAGE %EFFICIENCY :25.4238  
 % YIELD : 83.662

COUNT DATE:13-JUL-2009 13:05:15  
 ELAPSED LIVE TIME(SEC): 60000.00  
 ANALYST :KXM4

MS/MSD  
 ID : A2796-J  
 ISOTOPE : TH-230  
 PCI/G : 1.005E+01

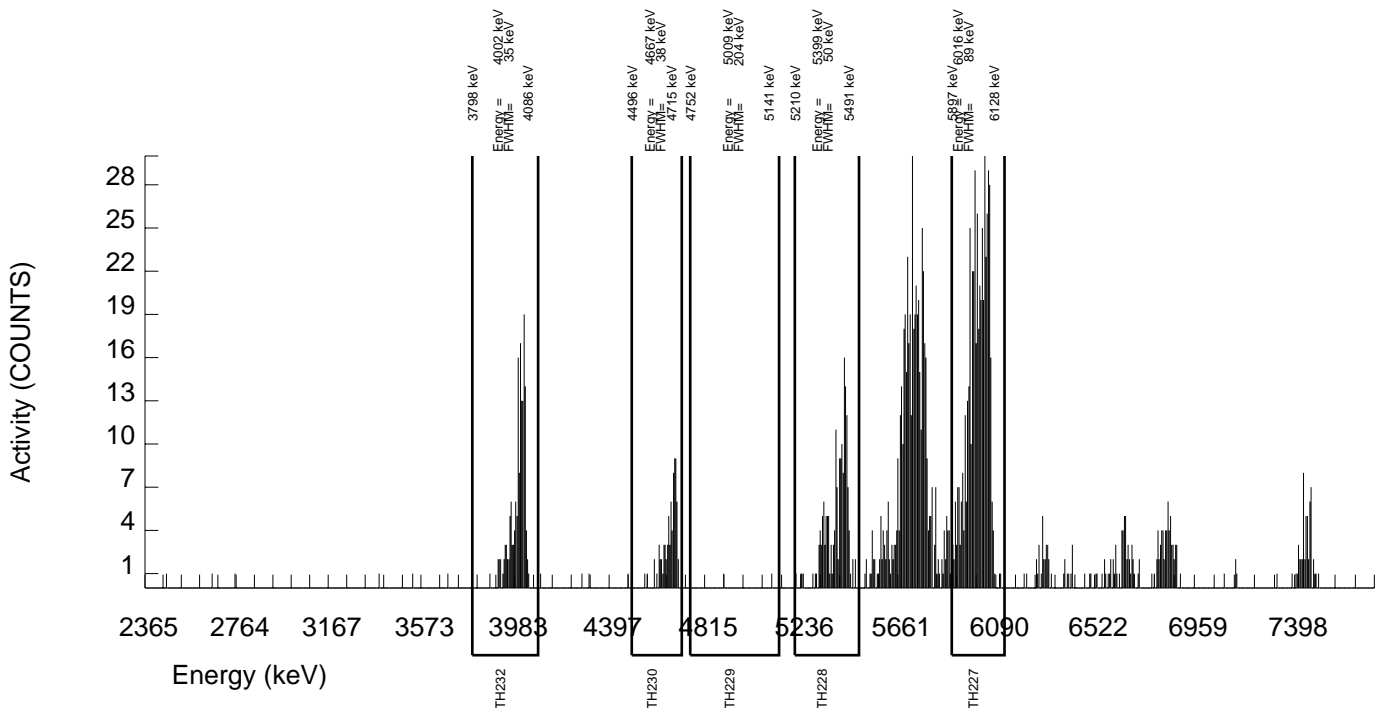
LCS/LCSD  
 ID : A2796-J  
 ISOTOPE : TH-230  
 PCI/G : 1.005E+01

TRACER  
 ID : 0387-B-102  
 ISOTOPE : AC227  
 NOMINAL : 3.92843 dpm  
 RESULTS : 3.28662 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
 BKG FILE : B203.CNF;35  
 BKG DATE : 12-JUL-2009  
 EFF FILE : W203.CNF;29  
 CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	518.000	518.000	0.000	0.0000	68.10000	8.31E+00	8.80E-01	4.81E-02	0.00E+00	7.15E-01
TH-228	5363.000	172.000	172.000	0.000	0.0000	99.94000	1.72E+00	2.77E-01	2.99E-02	0.00E+00	2.56E-01
TH229	4900.000	2.000	-4.000	6.000	2.4495	99.52000	-4.00E-02	5.54E-02	1.44E-01	5.69E-02	5.54E-02
TH-230	4625.000	76.000	75.000	1.000	1.0000	100.0000	7.46E-01	1.77E-01	7.61E-02	2.31E-02	1.71E-01
TH-232	3972.000	160.000	159.000	1.000	1.0000	100.0000	1.58E+00	2.66E-01	7.61E-02	2.31E-02	2.47E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S0231217019\_TH  
SAMPLE QTY: 0.229 G

DETECTOR NUMBER :78907  
AVERAGE %EFFICIENCY :25.3810  
% YIELD : 84.774

COUNT DATE:13-JUL-2009 13:05:18  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.346E+00

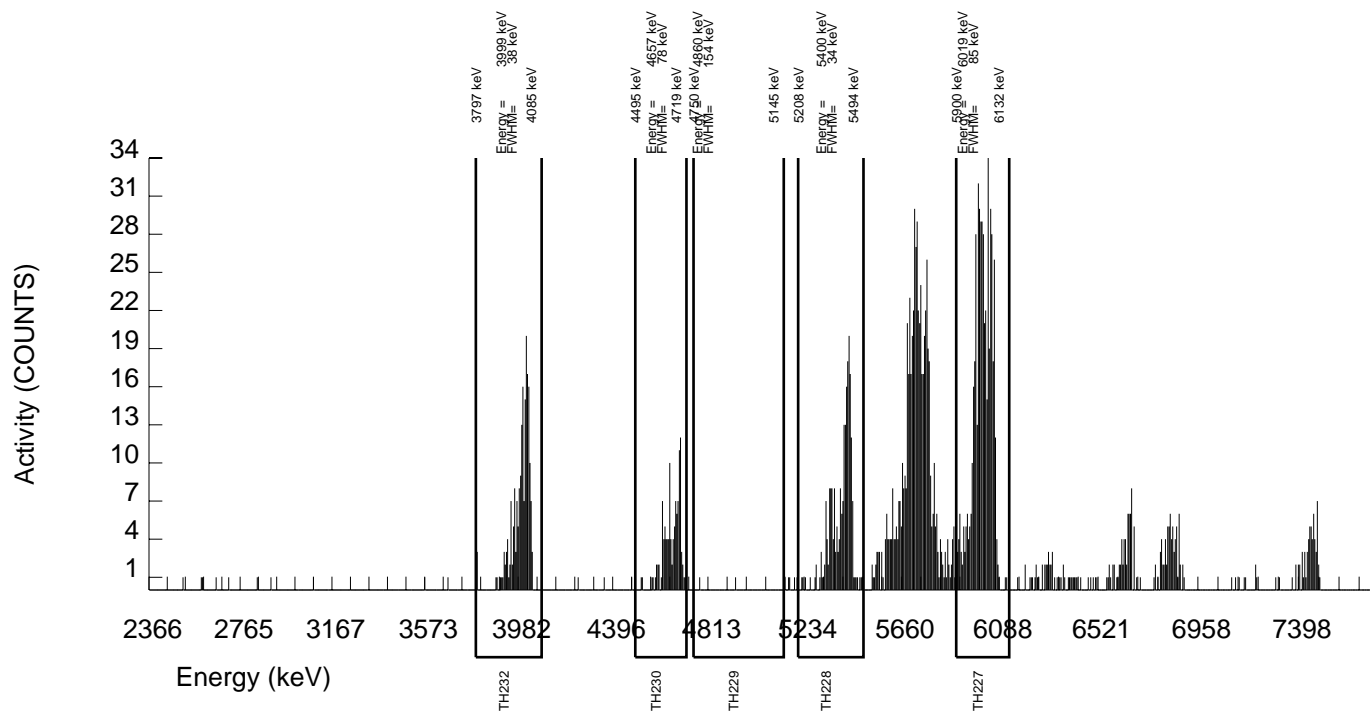
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.346E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.33029 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B204.CNF;35  
BKG DATE : 12-JUL-2009  
EFF FILE : W204.CNF;29  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	525.000	524.000	1.000	1.0000	68.10000	7.73E+00	8.12E-01	1.13E-01	3.43E-02	6.63E-01
TH-228	5363.000	225.000	221.000	4.000	2.0000	99.94000	2.03E+00	2.99E-01	1.13E-01	4.27E-02	2.72E-01
TH229	4900.000	2.000	-9.000	11.000	3.3166	99.52000	-8.27E-02	6.49E-02	1.69E-01	7.09E-02	6.49E-02
TH-230	4625.000	116.000	109.000	7.000	2.6458	100.0000	9.96E-01	2.08E-01	1.40E-01	5.63E-02	1.99E-01
TH-232	3972.000	201.000	197.000	4.000	2.0000	100.0000	1.80E+00	2.79E-01	1.12E-01	4.25E-02	2.57E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S1201877937\_TH  
SAMPLE QTY: 0.242 G

DETECTOR NUMBER :78908  
AVERAGE %EFFICIENCY :25.6150  
% YIELD : 74.702

COUNT DATE:13-JUL-2009 13:05:21  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.844E+00

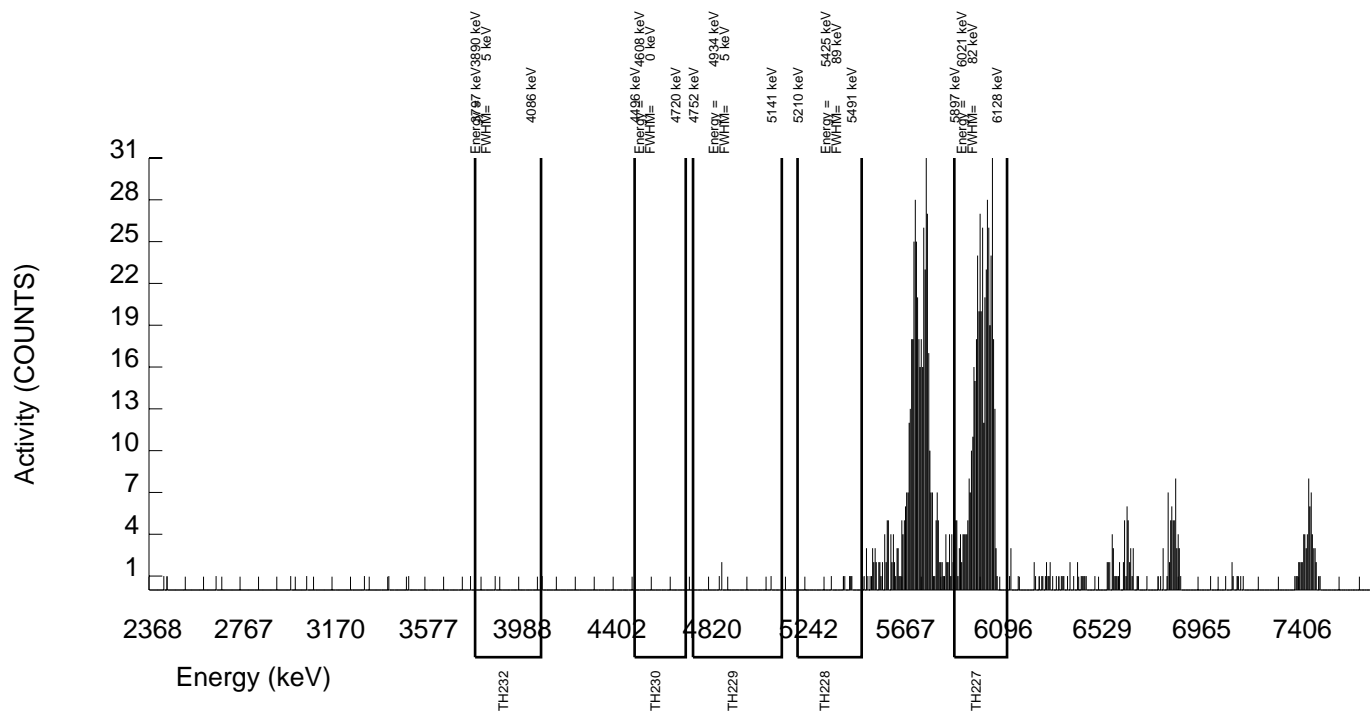
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.844E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 2.93463 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B205.CNF;35  
BKG DATE : 12-JUL-2009  
EFF FILE : W205.CNF;29  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	467.000	466.000	1.000	1.0000	68.10000	7.31E+00	7.97E-01	1.20E-01	3.65E-02	6.65E-01
TH-228	5363.000	6.000	3.000	3.000	1.7321	99.94000	2.93E-02	5.74E-02	1.08E-01	3.93E-02	5.74E-02
TH229	4900.000	4.000	1.000	3.000	1.7321	99.52000	9.77E-03	5.07E-02	1.08E-01	3.94E-02	5.07E-02
TH-230	4625.000	0.000	-1.000	1.000	1.0000	100.0000	-9.73E-03	2.70E-02	7.44E-02	2.26E-02	2.70E-02
TH-232	3972.000	1.000	1.000	0.000	0.0000	100.0000	9.73E-03	1.91E-02	2.92E-02	0.00E+00	1.91E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S1201877938\_TH  
SAMPLE QTY: 0.220 G

DETECTOR NUMBER :78909  
AVERAGE %EFFICIENCY :25.7401  
% YIELD : 73.223

COUNT DATE:13-JUL-2009 13:05:23  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.728E+00

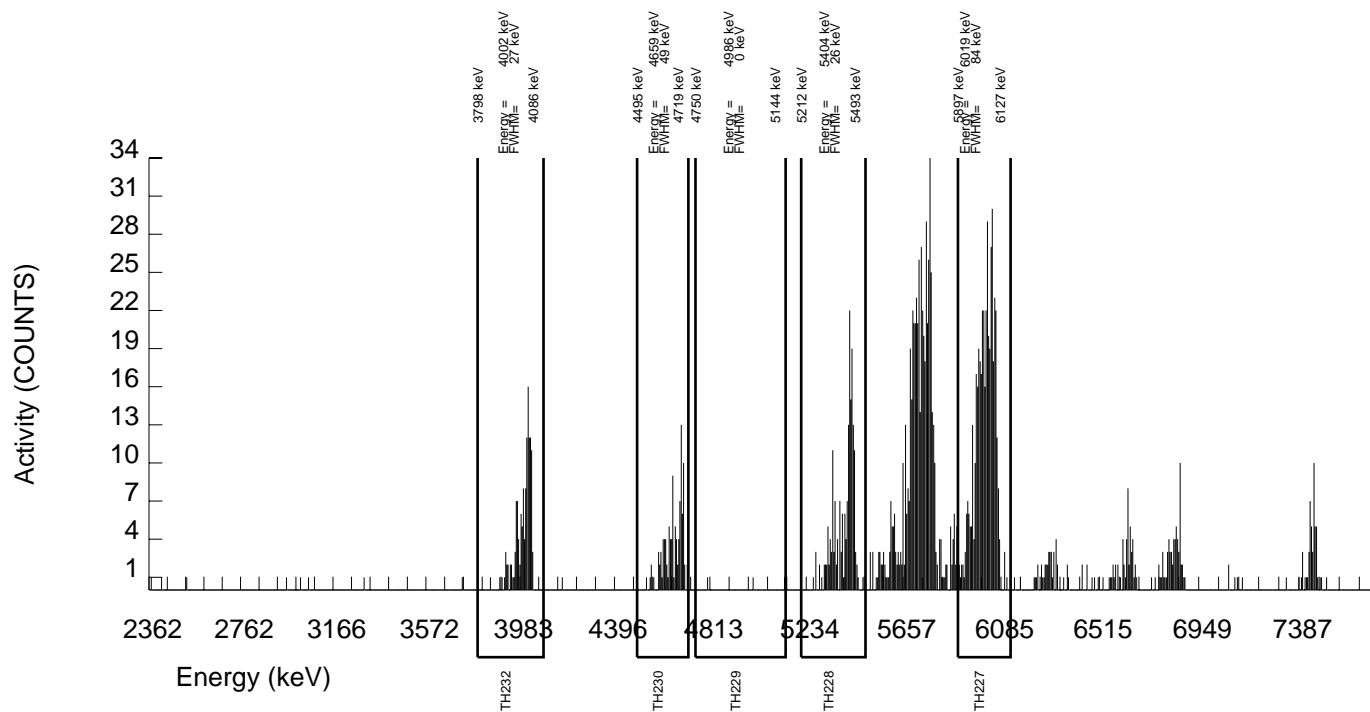
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.728E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 2.87650 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B206.CNF;35  
BKG DATE : 12-JUL-2009  
EFF FILE : W206.CNF;29  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	459.000	459.000	0.000	0.0000	68.10000	8.04E+00	8.86E-01	5.26E-02	0.00E+00	7.36E-01
TH-228	5363.000	188.000	187.000	1.000	1.0000	99.94000	2.04E+00	3.19E-01	8.34E-02	2.54E-02	2.94E-01
TH229	4900.000	3.000	2.000	1.000	1.0000	99.52000	2.18E-02	4.28E-02	8.35E-02	2.54E-02	4.28E-02
TH-230	4625.000	107.000	106.000	1.000	1.0000	100.0000	1.15E+00	2.32E-01	8.31E-02	2.53E-02	2.21E-01
TH-232	3972.000	137.000	136.000	1.000	1.0000	100.0000	1.48E+00	2.66E-01	8.31E-02	2.53E-02	2.50E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985  
SAMPLE DATE : 11-JUL-2009 08:30:00

SAMPLE ID : S1201877939\_TH  
SAMPLE QTY: 0.202 G

DETECTOR NUMBER :78910  
AVERAGE %EFFICIENCY :25.6132  
% YIELD : 80.800

COUNT DATE:13-JUL-2009 13:05:26  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :KXM4

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.060E+01

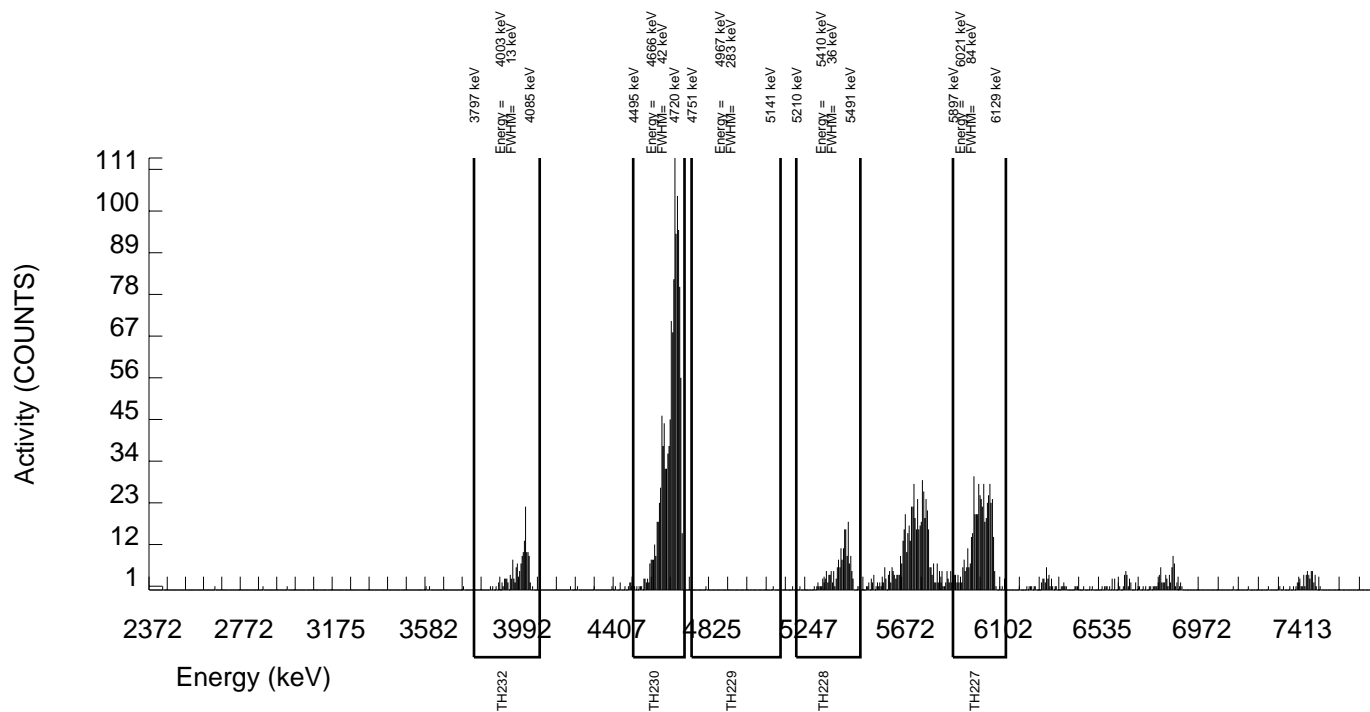
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.060E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92843 dpm  
RESULTS : 3.17416 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B207.CNF;35  
BKG DATE : 12-JUL-2009  
EFF FILE : W207.CNF;29  
CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	506.000	504.000	2.000	1.4142	68.10000	8.76E+00	9.43E-01	1.67E-01	5.72E-02	7.68E-01
TH-228	5363.000	182.000	173.000	9.000	3.0000	99.94000	1.87E+00	3.15E-01	1.83E-01	7.54E-02	2.93E-01
TH229	4900.000	2.000	-5.000	7.000	2.6458	99.52000	-5.41E-02	6.37E-02	1.66E-01	6.66E-02	6.37E-02
TH-230	4625.000	1247.000	1245.000	2.000	1.4142	100.0000	1.34E+01	1.12E+00	1.03E-01	3.55E-02	7.46E-01
TH-232	3972.000	153.000	148.000	5.000	2.2361	100.0000	1.59E+00	2.84E-01	1.44E-01	5.61E-02	2.65E-01

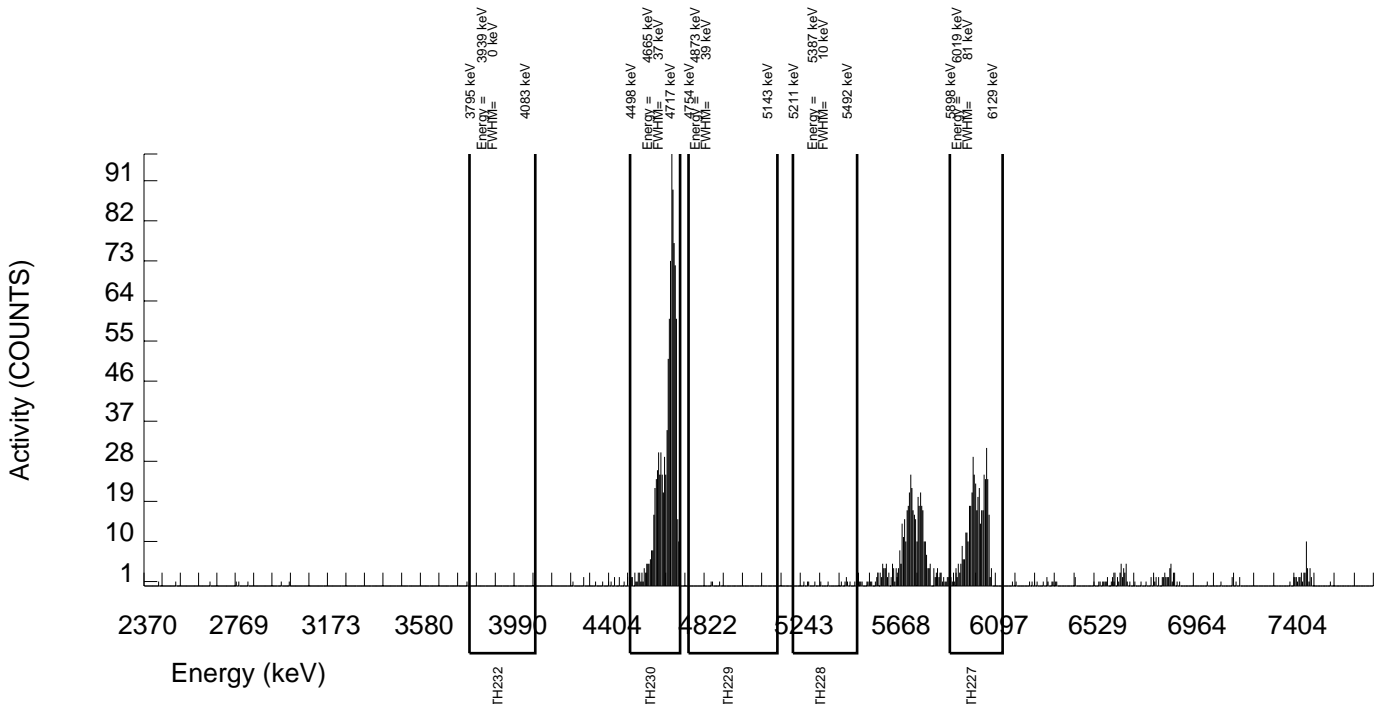


GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 883985 SAMPLE DATE : 11-JUL-2009 08:30:00		SAMPLE ID : S1201877940_TH SAMPLE QTY: 0.242 G	
DETECTOR NUMBER :78911 AVERAGE %EFFICIENCY :25.2428 % YIELD : 73.038		COUNT DATE:13-JUL-2009 13:05:28 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :KXM4	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.844E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.844E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92843 dpm RESULTS : 2.86927 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B208.CNF;35 BKG DATE : 12-JUL-2009 EFF FILE : W208.CNF;29 CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	452.000	449.000	3.000	1.7321	68.10000	7.31E+00	8.10E-01	1.80E-01	6.56E-02	6.81E-01
TH-228	5363.000	13.000	11.000	2.000	1.4142	99.94000	1.11E-01	7.72E-02	9.70E-02	3.33E-02	7.69E-02
TH229	4900.000	3.000	2.000	1.000	1.0000	99.52000	2.03E-02	3.98E-02	7.76E-02	2.36E-02	3.98E-02
TH-230	4625.000	979.000	979.000	0.000	0.0000	100.0000	9.88E+00	8.58E-01	3.03E-02	0.00E+00	6.19E-01
TH-232	3972.000	0.000	-2.000	2.000	1.4142	100.0000	-2.02E-02	3.43E-02	9.67E-02	3.32E-02	3.43E-02





# RADIUM 228

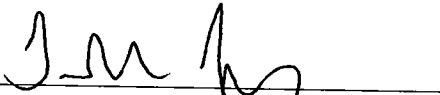
### Radiochemistry Batch Checklist, Rev 9

Batch# 877893 Product: Radium 228 Date: 7-14-09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required)			NA
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.	✓		
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	✓		
Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%.	✓		
Or meets the client's contract acceptance criteria.	✓		
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Sample was correctly preserved if required.	✓		
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms.	✓		
All line outs initialed and dated.	✓		
No transcription errors are apparent.	✓		
Aux data is correct.	✓		NA
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly stasured.	✓		
QC data entered into QC database and batch is in REVW	✓		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	✓		
Batch non-conformances completed, if applicable.			NA
Batch non-conformances second reviewed and disposition verified to be completed.			NA
Aliquot Correction completed if required.			NA
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC

revised 8/1/08

Primary Review Performed By: 

KERR 7-15-09

Secondary Review Performed By: 

# Radium-228 Que Sheet

General Engineering Laboratories, Radiochemistry Division  
06/18/2009

Batch #: 877893 Analyst: DXM2 First Client Due Date: 07/15/2009 Internal Due Date: 07/04/2009  
 Spike Isotope: Radium-228 Spike Code: 0503-B Expiration Date: 9-13-09  
 LCS Isotope: Radium-228 LCS Code: 0503-B Expiration Date: 9-13-09  
 Tracer Isotope: Barium-133 Tracer Code: 012-J Expiration Date: 2-11-10  
 Prep Date: 6-22-09 Initials: JVC Pipet ID: 2706953 Balance ID: 50410272  
 Ac-228 Ingrow: 6-24-09 10:10  
 Ac-228 Separation Date/Time: 6-26-09 1345  
 Witness: JLR 6-23-09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Pos. #	Vol (mL)	Ba Yield (%)	Gamma Det. #
231217001-1	RSAK8-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	05-JUN-09 12:15 PM	1	1.006	92.88	1A
231217002-1	RSAL7-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	05-JUN-09 12:55 PM	2	1.009	96.25	1B
231217003-1	RSAL8-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	05-JUN-09 01:30 PM	3	1.008	93.57	1D
231217004-1	SA56-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	10-JUN-09 10:25 AM	4	1.006	90.89	2A
231217005-1	SA35-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	10-JUN-09 11:15 AM	5	1.006	93.01	2C
231217006-1	RSA03-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	10-JUN-09 01:20 PM	6	1.004	92.49	2D
231217007-1	SA176-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	10-JUN-09 12:40 PM	7	1.009	92.06	7A
231217008-1	SA55-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	10-JUN-09 11:50 AM	8	1.009	89.21	7B
231217009-1	SA166-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	11-JUN-09 12:15 PM	9	1.006	107.89	9A
231217010-1	SA201-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	11-JUN-09 08:40 AM	10	1.005	108.42	9C
231217011-1	SA134-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	11-JUN-09 09:25 AM	11	1.008	90.55	10A
231217012-1	SA182-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	11-JUN-09 11:20 AM	12	1.007	99.01	10C
231217013-1	RSAK4-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	11-JUN-09 10:20 AM	13	1.007	101.55	10D
231217014-1	RSAK4009-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	11-JUN-09 10:20 AM	14	1.004	88.52	6B
231217015-1	SA85-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	16-JUN-09 08:40 AM	15	1.004	87.73	5C
231217016-1	SA71-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	16-JUN-09 10:03 AM	16	1.007	95.64	4A
231217017-1	SA144-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	16-JUN-09 10:55 AM	17	1.005	89.25	3C
231217018-1	SA61-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	16-JUN-09 11:45 AM	18	1.006	93.74	3D
231217019-1	SA62-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	16-JUN-09 01:05 PM	19	1.007	95.30	4D
1201863606-1	MB for batch 877893	MB		.5 pCi/g	SOIL	QC ACCOUNT		20	1.009	63.88	8A7C
1201863607-1	SA85-0.5B(231217015DUP)	DUP		.5 pCi/g	SOIL	QC ACCOUNT		21	1.005	88.86	5A
1201863608-1	SA85-0.5B(231217015MS)	MS		.5 pCi/g	SOIL	QC ACCOUNT		22	0.106	82.56	2B
1201863609-1	LCS for batch 877893	LCS		.5 pCi/g	SOIL	QC ACCOUNT		23	1.009	78.94	4C

\* SEE PRECIPITATE SHEET

dainties

Data Reviewed By: JLR 7/30/09

Comments:

# Radium 228 Re-Elute / Reprecipitate

Batch # 877893 *RE*  
 Ra 228 Spike Code 0503-B  
 LCS Code 0503-B  
 Ba-133 Tracer Code 012-J

Prep Date 6-22-09 Initials \_\_\_\_\_  
 Spike Vol (mls) 0.1 mL  
 LCS Vol (mls) 0.1 mL  
 Tracer Vol (mls) 2.1 mL  
*7-7-09*

Ingrow Start Time: 7-6-09/1615  
 Separation Time: 7-8-09 1100

Sample ID	Bkr #	Vol. <sup>g</sup> (mls)	Det #	% Yield	Gamma Det #
231217001	1	1.006	7B	86.84	
231217002	2	1.009	8A	83.63	
<del>231217003</del>	<del>3</del>	<del>1.008</del>	<del>7C</del>	<del>78.22</del>	
231217004	4	1.006	8C	84.26	
231217005	5	1.006	8D	82.5	
<del>231217006</del>	<del>6</del>	<del>1.004</del>	<del>9A</del>	<del>80.84</del>	
231217007	7	1.009	9B	79.97	
231217008	8	1.009	9C	81.97	
231217009	9	1.006	10A	87.46	
<del>231217010</del>	<del>10</del>	<del>1.005</del>	<del>10C</del>	<del>82.97</del>	
<del>231217011</del>	<del>11</del>	<del>1.008</del>	<del>11C</del>	<del>76.09</del>	
231217012	12	1.007	11D	82.59	
231217013	13	1.007	12B	84.59	
<del>231217014</del>	<del>14</del>	<del>1.004</del>	<del>12C</del>	<del>76.30</del>	
<del>231217015</del>	<del>15</del>	<del>1.004</del>	<del>13A</del>	<del>80.80</del>	
231217016	16	1.007	13B	83.76	
231217017	17	1.005	13C	79.63	
231217018	18	1.006	13D	76.01	
231217019	19	1.007	14C	79.30	
1201863606	20	1.009	1A	94.04	
1201863607	21	1.005	1B	80.72	
1201863608	22	0.106	8B	76.30	
1201863609	23	1.009	1D	76.88	

*AM 7/14/09*

Radium 228 Re-Elute / Reprecipitate

Batch # 877893  
Ra 228 Spike Code 0503-B  
LCS Code 0503-B  
Ba-133 Tracer Code 012-J

Prep Date 6-22-09  
Spike Vol (mls) 0.1 mL  
LCS Vol (mls) 0.1 mL  
Tracer Vol (mls) 0.1 mL

Initials MXS2  
Ingrow Start Time: 1100 7-8-09  
Separation Time: 1510 7-13-09

	Sample ID	Bkr #	Vol. (mls)	Det #	% Yield	Gamma Det #
1	231217003	3	1.008	1A	81.83	
2	231217005	5	1.006	1B	77.53	
3	231217006	6	1.004	1C	75.96	
4	231217010	10	1.005	1D	87.51	
5	231217011	11	1.008	2A	84.07	
6	231217014	14	1.004	2B	85.31	
7	231217015	15	1.004	2C	84.90	
<del>8</del>	<del>231217015</del>	<del>15</del>	<del>1.004</del>	<del>2C</del>	<del>84.90</del>	
8	<del>231217016</del>	<del>16</del>	<del>1.009</del>	<del>2D</del>	<del>71.67</del>	
9	1201863607	21	1.005	3A	82.46	
10	1201863609	23	1.009	3C	79.82	

ML 7/14/09

MS 7-13-09

ASSAY 7-Jul-09 4:54:37

Protocol id 8 228\_REC  
Time limit 180  
Count limit 50000  
Isotope Ba-133  
Protocol date 9-Apr-07 10:03:07  
Run id. 63

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	98	1	180	811	240.1	4.02		04:54:39
2	98	2	180	717	208.5	4.36	86.84	04:57:51
3	98	3	180	694	200.8	4.46	83.63	05:01:02
<del>4</del>	<del>98</del>	<del>4</del>	<del>180</del>	<del>655</del>	<del>187.8</del>	<del>4.64</del>	<del>78.22</del>	<del>05:04:13</del> ✗
5	98	5	180	698	202.3	4.44	84.26	05:07:25
<del>6</del>	<del>66</del>	<del>6</del>	<del>180</del>	<del>685</del>	<del>198.1</del>	<del>4.49</del>	<del>82.51</del>	<del>05:10:49</del> ✗
<del>7</del>	<del>66</del>	<del>7</del>	<del>180</del>	<del>673</del>	<del>194.1</del>	<del>4.55</del>	<del>80.84</del>	<del>05:14:01</del> ✗
8	66	8	180	667	192	4.58	79.97	05:17:12
9	66	9	180	682	196.8	4.51	81.97	05:20:23
10	66	10	180	721	210	4.34	87.46	05:23:35
<del>11</del>	<del>74</del>	<del>11</del>	<del>180</del>	<del>689</del>	<del>199.2</del>	<del>4.48</del>	<del>82.97</del>	<del>05:27:04</del> ✗
<del>12</del>	<del>74</del>	<del>12</del>	<del>180</del>	<del>639</del>	<del>182.7</del>	<del>4.71</del>	<del>76.09</del>	<del>05:30:15</del> ✗
13	74	13	180	686	198.3	4.49	82.59	05:33:27
14	74	14	180	700	203.1	4.43	84.59	05:36:38
<del>15</del>	<del>74</del>	<del>15</del>	<del>180</del>	<del>641</del>	<del>188.2</del>	<del>4.7</del>	<del>76.30</del>	<del>05:39:49</del> ✗
<del>16</del>	<del>74</del>	<del>16</del>	<del>180</del>	<del>673</del>	<del>194</del>	<del>4.55</del>	<del>80.80</del>	<del>05:43:14</del> ✗
17	74	17	180	694	201.1	4.45	83.76	05:46:25
18	74	18	180	665	191.2	4.59	79.63	05:49:37
19	74	19	180	639	182.5	4.71	76.01	05:52:48
20	74	20	180	662	190.4	4.6	79.30	05:55:59
<del>21</del>	<del>77</del>	<del>21</del>	<del>180</del>	<del>543</del>	<del>159.6</del>	<del>5.29</del>	<del>62.72</del>	<del>05:59:24</del> <i>are 71Mcs</i>
22	77	22	180	673	193.8	4.55	80.72	06:02:35
23	77	23	180	641	183.2	4.7	76.30	06:05:47
24	77	24	180	645	184.6	4.68	76.88	06:08:58

END OF ASSAY

ASSAY 13-Jul-09 11:42:10

Protocol id 9 228\_REC2  
Time limit 180  
Count limit 50000  
Isotope Ba-133  
Protocol date 9-Apr-07 10:02:22  
Run id. 56

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	90	1	180	705	204.7	4.41		11:42:18
2	90	2	180	594	167.5	4.96	81.83	11:45:29
3	90	3	180	567	158.7	5.12	77.53	11:48:40
4	90	4	180	558	155.5	5.19	75.96	11:51:52
5	90	5	180	629	179.2	4.76	87.54	11:55:03
6	66	6	180	607	172.1	4.88	84.07	11:58:28
7	66	7	180	615	174.7	4.84	85.34	12:01:39
8	66	8	180	613	173.8	4.85	84.90	12:04:51
<del>9</del>	<del>66</del>	<del>9</del>	<del>180</del>	<del>531</del>	<del>146.7</del>	<del>5.37</del>	<del>71.67</del>	<del>12:08:02</del>
10	66	10	180	598	168.8	4.94	82.46	12:11:13
11	72	11	180	582	163.4	5.03	79.82	12:14:43

27/11/07

END OF ASSAY

ASSAY 8-Jul-09 8:53:18

Protocol id 9 228\_REC2  
Time limit 180  
Count limit 50000  
Isotope Ba-133  
Protocol date 9-Apr-07 10:02:22  
Run id. 48

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	72	1	180	755	221.3	4.21		08:53:25
2	72	2	180	715	208.1	4.37	94.04	08:56:37

END OF ASSAY



# Radium-228 Solid

Filename : RA228.XLS  
 File type : Excel  
 Version # : 1.2.3

Spike S/N : 0503-B  
 Spike Exp Date : 9/13/2009  
 Spike Activity (dpm/ml): 182.96  
 Spike Volume Added: 0.10

Pipet, 0.1 ml Stdev : +/- 0.000701 ml  
 Pipet, 0.5 ml Stdev : +/- 0.002564 ml  
 Pipet, 1 ml Stdev : +/- 0.005480 ml

Batch : 877893  
 Analyst : DXM2  
 Prep Date : 6/22/2009

Procedure Code : GFC28BRAS  
 Parname : Radium-228

Required MDA : 0.5 pCi/G  
 Half-life of Ra-228 : 5.75 years  
 Half-life of Ac-228 : 6.13 hours  
 Batch counted on : PIC  
 BKG Count time : 1000 min

Ra-228 Abundance : 1  
 Ra-228 Method Uncertainty : 0

LCS S/N : 0503-B  
 LCS Exp Date : 9/13/2009  
 LCS Activity (dpm/ml): 182.96  
 LCS Volume Added: 0.10

Tracer S/N : 0112-J  
 Tracer Exp Date : 2/17/2010  
 Tracer Volume Added: 0.10

Calibration Date : 7/2/2009  
 Calibration Due Date : 7/31/2010

Sample Characteristics			Tracer Calculations				Tracer Samp.		
Pos.	Sample ID	Sample Aliquot G	Sample Aliquot StDev. G	Tracer Concentration (cpm) (Ba-133 Ref.)	Tracer Ref. Count Uncertainty (cpm)	Tracer Concentration (cpm) (Ba-133 Samp.)	Tracer Count Uncertainty (cpm)	Tracer Aliquot (mL)	Tracer Aliquot StDev. (mL)
1	231217001.1	1.0060	3.3240E-03	240.1	4.02%	208.5	4.36%	0.1	0.000701
2	231217002.1	1.0090	3.3243E-03	240.1	4.02%	200.8	4.46%	0.1	0.000701
3	231217003.1	1.0080	3.3242E-03	204.7	4.41%	167.5	4.96%	0.1	0.000701
4	231217004.1	1.0060	3.3240E-03	240.1	4.02%	202.3	4.44%	0.1	0.000701
5	231217005.1	1.0060	3.3240E-03	204.7	4.41%	158.7	5.12%	0.1	0.000701
6	231217006.1	1.0040	3.3238E-03	204.7	4.41%	155.5	5.19%	0.1	0.000701
7	231217007.1	1.0090	3.3243E-03	240.1	4.02%	192.0	4.58%	0.1	0.000701
8	231217008.1	1.0090	3.3243E-03	240.1	4.02%	196.8	4.51%	0.1	0.000701
9	231217009.1	1.0060	3.3240E-03	240.1	4.02%	210.0	4.34%	0.1	0.000701
10	231217010.1	1.0050	3.3239E-03	204.7	4.41%	179.2	4.76%	0.1	0.000701
11	231217011.1	1.0080	3.3242E-03	204.7	4.41%	172.1	4.88%	0.1	0.000701
12	231217012.1	1.0070	3.3241E-03	240.1	4.02%	198.3	4.49%	0.1	0.000701
13	231217013.1	1.0070	3.3241E-03	240.1	4.02%	203.1	4.43%	0.1	0.000701
14	231217014.1	1.0040	3.3238E-03	204.7	4.41%	174.7	4.84%	0.1	0.000701
15	231217015.1	1.0040	3.3238E-03	204.7	4.41%	173.8	4.85%	0.1	0.000701
16	231217016.1	1.0070	3.3241E-03	240.1	4.02%	201.1	4.45%	0.1	0.000701
17	231217017.1	1.0050	3.3239E-03	240.1	4.02%	191.2	4.59%	0.1	0.000701
18	231217018.1	1.0060	3.3240E-03	240.1	4.02%	182.5	4.71%	0.1	0.000701
19	231217019.1	1.0070	3.3241E-03	240.1	4.02%	190.4	4.60%	0.1	0.000701
20	1201863606.1	1.0090	3.3243E-03	221.3	4.21%	208.1	4.37%	0.1	0.000701
21	1201863607.1	1.0050	3.3239E-03	240.1	4.02%	193.8	4.55%	0.1	0.000701
22	1201863608.1	0.1060	3.2301E-03	240.1	4.02%	183.2	4.70%	0.1	0.000701
23	1201863609.1	1.0090	3.3243E-03	240.1	4.02%	184.6	4.68%	0.1	0.000701

Count raw Data		Counting		Gross Counts		Beta	Detector	Detector	Weekly Bkg	Separation	Count	Ra-228	Ac-228	Ac-228	Calculated	Sample
Pos.	Detector ID	Time (min.)	Alpha	Beta	Beta cpm	Efficiency (cpm/dpm)	Error (cpm/dpm)	cpm	Count Time (min.)	Date/Time	Start Date/Time	Decay	Decay	Correction	Sample Recovery %	Recovery Error %
1	7B	60	4	51	0.850	0.6280	0.00816	0.416	1000	7/8/2009 11:00	7/8/2009 15:17	0.989	0.616	1.058	86.84%	3.13%
2	8A	90	12	163	1.811	0.6247	0.00816	0.675	1000	7/8/2009 11:00	7/8/2009 14:39	0.989	0.661	1.087	83.63%	3.16%
3	1A	390	19	353	0.905	0.6303	0.00600	0.314	1000	7/13/2009 15:10	7/13/2009 16:52	0.987	0.824	1.412	81.83%	3.46%
4	8C	60	13	69	1.150	0.6339	0.00816	0.571	1000	7/8/2009 11:00	7/8/2009 14:39	0.991	0.661	1.058	84.26%	3.15%
5	1B	390	39	387	0.992	0.6282	0.00409	0.364	1000	7/13/2009 15:10	7/13/2009 16:52	0.989	0.824	1.412	77.53%	3.52%
6	1C	390	33	570	1.462	0.6176	0.00344	0.772	1000	7/13/2009 15:10	7/13/2009 16:53	0.989	0.823	1.412	75.96%	3.55%
7	9B	180	7	370	2.056	0.6356	0.00816	1.201	1000	7/8/2009 11:00	7/8/2009 14:40	0.991	0.660	1.179	79.97%	3.20%
8	9C	60	8	90	1.500	0.6273	0.00816	0.381	1000	7/8/2009 11:00	7/8/2009 14:40	0.991	0.660	1.058	81.97%	3.18%
9	10A	60	4	55	0.917	0.6389	0.00816	0.368	1000	7/8/2009 11:00	7/8/2009 14:40	0.991	0.660	1.058	87.46%	3.12%
10	1D	390	57	511	1.310	0.6043	0.00511	0.484	1000	7/13/2009 15:10	7/13/2009 16:53	0.989	0.823	1.412	87.54%	3.39%
11	2A	390	40	462	1.185	0.6172	0.00349	0.556	1000	7/13/2009 15:10	7/13/2009 16:53	0.989	0.823	1.412	84.07%	3.43%
12	11D	60	6	46	0.767	0.6348	0.00816	0.384	1000	7/8/2009 11:00	7/8/2009 14:24	0.991	0.680	1.058	82.59%	3.17%
13	12B	60	3	102	1.700	0.6352	0.00816	0.519	1000	7/8/2009 11:00	7/8/2009 14:24	0.991	0.680	1.058	84.59%	3.15%
14	2B	390	19	746	1.913	0.6167	0.00383	1.378	1000	7/13/2009 15:10	7/13/2009 16:53	0.989	0.822	1.412	85.34%	3.42%
15	2C	390	51	345	0.885	0.5969	0.00575	0.284	1000	7/13/2009 15:10	7/13/2009 16:53	0.991	0.822	1.412	84.90%	3.42%
16	13B	180	18	348	1.933	0.6526	0.00816	1.445	1000	7/8/2009 11:00	7/8/2009 14:24	0.993	0.680	1.179	83.76%	3.16%
17	13C	60	8	34	0.567	0.6538	0.00816	0.287	1000	7/8/2009 11:00	7/8/2009 14:24	0.993	0.680	1.058	79.63%	3.21%
18	13D	150	16	275	1.833	0.6377	0.00816	0.869	1000	7/8/2009 11:00	7/8/2009 14:24	0.993	0.680	1.148	76.01%	3.25%
19	14C	60	14	56	0.933	0.6375	0.00816	0.332	1000	7/8/2009 11:00	7/8/2009 14:24	0.993	0.680	1.058	79.30%	3.21%
20	1A	60	5	35	0.583	0.6303	0.00600	0.380	1000	7/8/2009 11:00	7/8/2009 15:30	0.995	0.601	1.058	94.04%	3.19%
21	1B	60	4	56	0.933	0.6282	0.00409	0.314	1000	7/8/2009 11:00	7/8/2009 15:30	0.993	0.601	1.058	80.72%	3.19%
22	8B	60	8	494	8.233	0.6332	0.00816	1.812	1000	7/8/2009 11:00	7/8/2009 14:43	0.993	0.656	1.058	76.30%	3.25%
23	1D	60	18	328	5.467	0.6043	0.00511	0.484	1000	7/8/2009 11:00	7/8/2009 15:30	0.995	0.601	1.058	76.88%	3.24%

- 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

Pos.	Decision Level pCi/G	Critical Level pCi/G	Required MDA pCi/G	MDA pCi/G	Sample Act. Conc. pCi/G	Sample Act. Error pCi/G	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA		Sample QC	Sample Type	RPD	RER	Nominal pCi/G	Recovery
									Counting Uncertainty pCi/G	Total Prop. Uncertainty pCi/G						
1	0.2849	0.2011	0.5	0.4736	0.6190	0.2801	0.4340	0.1208	0.3376	0.3399		SAMPLE				
2	0.2991	0.2112	0.5	0.4697	1.6131	0.1311	1.1361	0.1442	0.4013	0.4145		SAMPLE				
3	0.1173	0.0828	0.5	0.1771	0.8892	0.0937	0.5911	0.0513	0.1513	0.1634		SAMPLE				
4	0.3167	0.2236	0.5	0.5149	0.7836	0.2448	0.5790	0.1405	0.3727	0.3761		SAMPLE				
5	0.1398	0.0944	0.5	0.2011	1.0014	0.0929	0.6283	0.0539	0.1685	0.1824		SAMPLE				
6	0.2027	0.1431	0.5	0.2990	1.1436	0.1039	0.6895	0.0672	0.2185	0.2328		SAMPLE				
7	0.3272	0.2310	0.5	0.4885	1.3526	0.1356	0.8546	0.1123	0.3485	0.3595		SAMPLE				
8	0.2682	0.1894	0.5	0.4489	1.5702	0.1461	1.1190	0.1593	0.4382	0.4498		SAMPLE				
9	0.2433	0.1718	0.5	0.4083	0.7105	0.2303	0.5487	0.1251	0.3175	0.3207		SAMPLE				
10	0.1422	0.1004	0.5	0.2121	1.2141	0.0826	0.8263	0.0620	0.1785	0.1965		SAMPLE				
11	0.1550	0.1094	0.5	0.2303	0.9392	0.1015	0.6286	0.0599	0.1755	0.1868		SAMPLE				
12	0.2568	0.1813	0.5	0.4296	0.5121	0.3016	0.3827	0.1147	0.3009	0.3028		SAMPLE				
13	0.2914	0.2057	0.5	0.4767	1.5423	0.1475	1.1810	0.1699	0.4348	0.4459		SAMPLE				
14	0.2416	0.1706	0.5	0.3525	0.7914	0.1522	0.5348	0.0793	0.2299	0.2360		SAMPLE				
15	0.1137	0.0803	0.5	0.1724	0.9216	0.0911	0.6006	0.0505	0.1519	0.1645		SAMPLE				
16	0.3243	0.2290	0.5	0.4818	0.6983	0.2284	0.4883	0.1104	0.3094	0.3126		SAMPLE				
17	0.2238	0.1580	0.5	0.3835	0.3773	0.3543	0.2797	0.0986	0.2608	0.2620		SAMPLE				
18	0.2989	0.2110	0.5	0.4534	1.5153	0.1233	0.9643	0.1144	0.3524	0.3663		SAMPLE				
19	0.2474	0.1747	0.5	0.4187	0.8338	0.2122	0.6013	0.1260	0.3426	0.3469		SAMPLE				
20	0.2545	0.1797	0.5	0.4260	0.2710	0.4954	0.2033	0.1005	0.2628	0.2632		MB				
21	0.2719	0.1920	0.5	0.4623	0.9704	0.2060	0.6193	0.1260	0.3869	0.3917	231217015.1	DUP	5.2%	77.8947	116.6%	
22	5.9542	4.2037	0.5	9.1216	91.7144	0.0736	6.4213	0.3729	10.4383	13.2359	231217015.1	MS		8.1680	103.7%	
23	0.3663	0.2586	0.5	0.6022	8.4714	0.0691	4.9827	0.3026	1.0085	1.1475		LCS				

231217001	7B	60	877893m	51	7/8/2009 15:17	7/8/2009 16:17	Protean
231217002	8A	90		163	7/8/2009 14:39	7/8/2009 16:09	Protean
231217003	1A	390		353	7/13/2009 16:52	7/13/2009 23:22	Protean
231217004	8C	60		69	7/8/2009 14:39	7/8/2009 15:39	Protean
231217005	1B	390		387	7/13/2009 16:52	7/13/2009 23:22	Protean
231217006	1C	390		570	7/13/2009 16:53	7/13/2009 23:23	Protean
231217007	9B	180		370	7/8/2009 14:40	7/8/2009 17:40	Protean
231217008	9C	60		90	7/8/2009 14:40	7/8/2009 15:40	Protean
231217009	10A	60		55	7/8/2009 14:40	7/8/2009 15:40	Protean
231217010	1D	390		511	7/13/2009 16:53	7/13/2009 23:23	Protean
231217011	2A	390		462	7/13/2009 16:53	7/13/2009 23:23	Protean
231217012	11D	60		46	7/8/2009 14:24	7/8/2009 15:24	Protean
231217013	12B	60		102	7/8/2009 14:24	7/8/2009 15:24	Protean
231217014	2B	390		746	7/13/2009 16:53	7/13/2009 23:23	Protean
231217015	2C	390		345	7/13/2009 16:53	7/13/2009 23:23	Protean
231217016	13B	180		348	7/8/2009 14:24	7/8/2009 17:24	Protean
231217017	13C	60		34	7/8/2009 14:24	7/8/2009 15:24	Protean
231217018	13D	150		275	7/8/2009 14:24	7/8/2009 16:54	Protean
231217019	14C	60		56	7/8/2009 14:24	7/8/2009 15:24	Protean
1201863606	1A	60		35	7/8/2009 15:30	7/8/2009 16:30	Protean
1201863607	1B	60		56	7/8/2009 15:30	7/8/2009 16:30	Protean
1201863608	8B	60		494	7/8/2009 14:43	7/8/2009 15:43	Protean
1201863609	1D	60		328	7/8/2009 15:30	7/8/2009 16:30	Protean

# RADIUM 226

**Radiochemistry Batch Checklist, Rev 9**

Batch# 877942 Product: Radium 226 Date: 7-14-09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required)			NA
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.			
Instrument bkg check is within limits.	7/14/09 ✓		NCR 71124
Method RDL/ LLD has been met.			See case narrative
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	✓		
Or meets the client's required RER acceptance criteria.			
Tracer yield is 15-125% . Carrier yield 25-125%.	✓		
Or meets the client's contract acceptance criteria.			
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Sample was correctly preserved if required.			NA
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms.			
All line outs initialed and dated.	✓		
No transcription errors are apparent.			
Aux data is correct.			NA
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly stated.	✓		
QC data entered into QC database and batch is in REVW	✓		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	✓		
Batch non-conformances completed, if applicable.	✓		NCR 71124
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCR 71124
Aliquot Correction completed if required.			NA
Review sample historical results if available (If REMF, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC

revised 8/1/08

Primary Review Performed By: [Signature]

KERR 7-15-09

Secondary Review Performed By: [Signature] 7/14/09

# Radium-226 Que Sheet

06/19/2009

General Engineering Laboratories, Radiochemistry Division

Batch #: 877942

Analyst: KSDI

First Client Due Date: 07/15/2009

Internal Due Date: 07/04/2009

Spike Isotope: Radium-226

Spike Code: 00364

Expiration Date: 7/23/09

Nom Conc: 21.1990

LCS Isotope: Radium-226

LCS Code: 00364

Expiration Date: 7/23/09

Nom Conc: 21.1990

Prep Date: 6/21/09

Pipet ID: 429303

Initials: KLD

Witness: [Signature]

Sample Count Time: 30 (Min)

Bkg Count Time: 30 (Min)

Sample I	Client Description	Hazard Type	Code	Matrix	Min CRDL	Client	Vol	End Init	End LN	De-em	Start Count	Date/Time	Cell #	Det #	Bkg counts	Total Counts
231217001-1	RSAL8-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.520	7/11/09 1540	7/11/09	0445	7/19/09 1410	104	1	8	8	600.56
231217002-1	RSAL7-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.510	7/11/09 1540	7/11/09	0445	7/19/09 1410	710	2	8	8	33
231217003-1	RSAL8-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.537	7/11/09 1540	7/11/09	0445	7/19/09 1410	306	3	8	8	39
231217004-1	SA56-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.540	7/11/09 1540	7/11/09	0445	7/19/09 1410	404	4	8	8	28.18
231217005-1	SA35-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.539	7/11/09 1540	7/11/09	0445	7/19/09 1410	501	5	1	1	28.32
231217006-1	SA03-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.514	7/11/09 1540	7/11/09	0445	7/19/09 1410	705	7	4	4	19.15
231217007-1	SA176-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.534	7/11/09 1540	7/11/09	0445	7/19/09 1410	114	1	6	6	19.15
231217008-1	SA55-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.504	7/11/09 1540	7/11/09	0445	7/19/09 1410	211	2	4	4	20.10
231217009-1	SA166-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.502	7/11/09 1540	7/11/09	0445	7/19/09 1410	301	3	2	2	16
231217010-1	SA201-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.510	7/11/09 1540	7/11/09	0445	7/19/09 1410	301	3	6	6	22.10
231217011-1	SA134-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.527	7/11/09 1540	7/11/09	0445	7/19/09 1410	412	4	4	4	19.15
231217012-1	SA182-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.505	7/11/09 1540	7/11/09	0445	7/19/09 1410	501	5	4	4	25.19
231217013-1	RSAL4-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.505	7/11/09 1540	7/11/09	0445	7/19/09 1410	706	7	6	6	34
231217014-1	RSAL4009-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.509	7/11/09 1540	7/11/09	0445	7/19/09 1410	107	1	8	8	20.40
231217015-1	SA85-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.510	7/11/09 1540	7/11/09	0445	7/19/09 1410	204	2	7	7	34
231217016-1	SA71-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.519	7/11/09 1540	7/11/09	0445	7/19/09 1410	301	3	7	7	48.53
231217017-1	SA144-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.526	7/11/09 1540	7/11/09	0445	7/19/09 1410	409	4	8	8	48.44
231217018-1	SA61-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.501	7/11/09 1540	7/11/09	0445	7/19/09 1410	512	5	8	8	42
231217019-1	SA62-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	0.509	7/11/09 1540	7/11/09	0445	7/19/09 1410	707	7	1	1	47
1201863717-1	MB for batch 877942	MB			.5 pCi/g	KERR003	0.501	7/11/09 1540	7/11/09	0445	7/19/09 1410	101	1	7	7	54
1201863718-1	SA85-0.5B(231217015DUP)	DUP			.5 pCi/g	QC ACCOUNT	0.510	7/11/09 1540	7/11/09	0445	7/19/09 1410	201	2	8	8	26
1201863719-1	SA85-0.5B(231217015MS)	MS			.5 pCi/g	QC ACCOUNT	0.518	7/11/09 1540	7/11/09	0445	7/19/09 1410	309	3	9	9	25
1201863720-1	LCS for batch 877942	LCS			.5 pCi/g	QC ACCOUNT	0.502	7/11/09 1540	7/11/09	0445	7/19/09 1410	411	4	8	8	1092
							0.510	7/11/09 1540	7/11/09	0445	7/19/09 1410	504	5	2	2	1304

Data Reviewed By: [Signature] 7-14-09

# Radium-226 Solid

Pipet, 0.1 ml Stdev : +/- 0.000701 ml  
 Pipet, 0.5 ml Stdev : +/- 0.002564 ml  
 Pipet, 1 ml Stdev : +/- 0.005480 ml

Spike S/N : 0638-H  
 Spike Exp Date : 7/23/2009  
 Spike Activity (dpm/ml): 268.25  
 Spike Volume Added: 0.10

Filename : RA226.XLS  
 File type : Excel  
 Version # : 1.2.4

Batch : 877942

Analyst : KSD1  
 Prep Date : 6/29/2009

Ra-226 Abundance : 1

Ra-226 Method Uncertainty : 0.1153

Procedure Code : LUC26RAS

Parname : Radium-226

Required MDA : 0.5 pCi/G

Half-life of Ra-226 : 1600 years

Half-life of Rn-222: 3.823 days

Batch counted on : LUCAS CELL DETECTOR

BKG Count time : 30 min

Pos.	Sample ID	Sample Aliquot G	Sample Aliquot StDev. G	Sample Date/Time	Count Raw Data			Weekly Background			Detector Efficiency (cpm/dpm)	
					Cell Number	Counting Time (min.)	Gross Counts	Gross CPM	Counts	CPM		Count Time (min.)
1	231217001.1	0.5300	3.2744E-03	6/5/2009 12:15	104	30	56	1.867	8	0.267	30	1.9730
2	231217002.1	0.5100	3.2723E-03	6/5/2009 12:55	210	30	33	1.100	8	0.267	30	2.2530
3	231217003.1	0.5370	3.2751E-03	6/5/2009 13:30	306	30	39	1.300	8	0.267	30	1.7470
4	231217004.1	0.5400	3.2754E-03	6/10/2009 10:25	404	30	18	0.600	8	0.267	30	1.9310
5	231217005.1	0.5390	3.2753E-03	6/10/2009 11:15	507	30	32	1.067	1	0.033	30	1.7010
6	231217006.1	0.5140	3.2727E-03	6/10/2009 13:20	705	30	75	2.500	4	0.133	30	2.1600
7	231217007.1	0.5340	3.2748E-03	6/10/2009 12:40	112	30	55	1.833	6	0.200	30	1.6480
8	231217008.1	0.5640	3.2779E-03	6/10/2009 11:50	211	30	41	1.367	4	0.133	30	2.1710
9	231217009.1	0.5620	3.2777E-03	6/11/2009 12:15	301	30	16	0.533	2	0.067	30	2.0210
10	231217010.1	0.5100	3.2723E-03	6/11/2009 8:40	412	30	8	0.267	6	0.200	30	1.9670
11	231217011.1	0.5270	3.2741E-03	6/11/2009 9:25	504	30	25	0.833	4	0.133	30	1.6150
12	231217012.1	0.5050	3.2718E-03	6/11/2009 11:20	706	30	34	1.133	6	0.200	30	2.1180
13	231217013.1	0.5090	3.2722E-03	6/11/2009 10:20	107	30	32	1.067	8	0.267	30	1.7730
14	231217014.1	0.5700	3.2785E-03	6/11/2009 10:20	202	30	34	1.133	7	0.233	30	2.2610
15	231217015.1	0.5290	3.2743E-03	6/16/2009 8:40	307	30	53	1.767	7	0.233	30	1.9310
16	231217016.1	0.5250	3.2738E-03	6/16/2009 10:03	409	30	44	1.467	8	0.267	30	2.0360
17	231217017.1	0.5010	3.2713E-03	6/16/2009 10:55	512	30	42	1.400	8	0.267	30	1.9560
18	231217018.1	0.5190	3.2732E-03	6/16/2009 11:45	707	30	47	1.567	1	0.033	30	2.1190
19	231217019.1	0.5210	3.2734E-03	6/16/2009 13:05	101	30	54	1.800	7	0.233	30	1.7510
20	120186371.1	0.5700	3.2785E-03	6/29/2009 0:00	207	30	26	0.867	8	0.267	30	2.1460
21	1201863718.1	0.5480	3.2762E-03	6/16/2009 8:40	309	30	25	0.833	8	0.267	30	1.8770
22	1201863719.1	0.5620	3.2777E-03	6/16/2009 8:40	411	30	1092	36.400	8	0.267	30	1.8240
23	1201863720.1	0.5700	3.2785E-03	6/29/2009 0:00	502	30	1304	43.467	2	0.067	30	1.8780



Detector Efficiency Error (cpm/dpm)	Cell Calibration Date	Cell Calibration Due Date	De-Gas Date/Time	Rn-222 Ingrow End Date/Time	Count Start Date/Time	De-Gas to Ingrowth	Rn-222 Corrections		Ra-226 Decay
							Ingrowth to Count	During Count	
0.09580	8/29/2008	8/29/2009	7/1/2009 15:40	7/9/2009 9:45	7/9/2009 19:15	0.755	0.931	1.002	1.000
0.07722	12/19/2008	12/19/2009	7/1/2009 15:40	7/9/2009 9:45	7/9/2009 14:10	0.755	0.967	1.002	1.000
0.06082	2/4/2009	2/4/2010	7/1/2009 15:40	7/9/2009 9:45	7/9/2009 14:10	0.755	0.967	1.002	1.000
0.12371	3/2/2009	3/2/2010	7/1/2009 15:40	7/9/2009 9:45	7/9/2009 14:10	0.755	0.967	1.002	1.000
0.14377	3/25/2009	3/25/2010	7/1/2009 15:40	7/9/2009 9:45	7/9/2009 19:15	0.755	0.931	1.002	1.000
0.08547	11/21/2008	11/21/2009	7/1/2009 15:40	7/9/2009 9:45	7/9/2009 19:15	0.755	0.933	1.002	1.000
0.09580	8/29/2008	8/29/2009	7/1/2009 15:40	7/9/2009 10:05	7/9/2009 19:15	0.755	0.933	1.002	1.000
0.07722	12/19/2008	12/19/2009	7/1/2009 15:40	7/9/2009 10:05	7/9/2009 22:10	0.755	0.913	1.002	1.000
0.06082	2/4/2009	2/4/2010	7/1/2009 15:40	7/9/2009 10:05	7/9/2009 15:15	0.755	0.962	1.002	1.000
0.12371	3/2/2009	3/2/2010	7/1/2009 15:40	7/9/2009 10:05	7/9/2009 22:10	0.755	0.913	1.002	1.000
0.14377	3/25/2009	3/25/2010	7/1/2009 15:40	7/9/2009 10:05	7/9/2009 19:45	0.755	0.930	1.002	1.000
0.08547	11/21/2008	11/21/2009	7/1/2009 15:40	7/9/2009 10:05	7/9/2009 15:15	0.755	0.962	1.002	1.000
0.09580	8/29/2008	8/29/2009	7/1/2009 15:40	7/9/2009 10:40	7/9/2009 20:40	0.757	0.927	1.002	1.000
0.07722	12/19/2008	12/19/2009	7/1/2009 15:40	7/9/2009 10:40	7/9/2009 16:20	0.757	0.958	1.002	1.000
0.06082	2/4/2009	2/4/2010	7/1/2009 15:40	7/9/2009 10:40	7/9/2009 19:15	0.757	0.937	1.002	1.000
0.12371	3/2/2009	3/2/2010	7/1/2009 15:40	7/9/2009 10:40	7/9/2009 19:15	0.757	0.937	1.002	1.000
0.14377	3/25/2009	3/25/2010	7/1/2009 15:40	7/9/2009 10:40	7/9/2009 16:20	0.757	0.958	1.002	1.000
0.08547	11/21/2008	11/21/2009	7/1/2009 15:40	7/9/2009 10:40	7/9/2009 16:20	0.757	0.958	1.002	1.000
0.09580	8/29/2008	8/29/2009	7/1/2009 15:40	7/9/2009 11:05	7/9/2009 16:55	0.757	0.957	1.002	1.000
0.07722	12/19/2008	12/19/2009	7/1/2009 15:40	7/9/2009 11:05	7/9/2009 16:55	0.757	0.957	1.002	1.000
0.06082	2/4/2009	2/4/2010	7/1/2009 15:40	7/9/2009 11:05	7/9/2009 16:55	0.757	0.957	1.002	1.000
0.12371	3/2/2009	3/2/2010	7/1/2009 15:40	7/9/2009 11:05	7/9/2009 16:55	0.757	0.957	1.002	1.000
0.14377	3/25/2009	3/25/2010	7/1/2009 15:40	7/9/2009 11:05	7/9/2009 16:55	0.757	0.957	1.002	1.000

- 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

Pos.	Decision Level pCi/G	Critical Level pCi/G	Required MDA pCi/G	MDA pCi/G	Sample Act. Conc. pCi/G	Sample Act. Error pCi/G	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA		Sample QC	Sample Type	RER	Nominal pCi/G	Recovery
									Counting Uncertainty pCi/G	Total Prop. Uncertainty pCi/G					
1	0.1901	0.1342	0.5	0.3297	0.9792	0.1923	1.6000	0.2667	0.3199	0.4304		SAMPLE			
2	0.1665	0.1176	0.5	0.2887	0.4467	0.2676	0.8333	0.2134	0.2242	0.2551		SAMPLE			
3	0.2039	0.1440	0.5	0.3536	0.6784	0.2294	1.0333	0.2285	0.2940	0.3414		SAMPLE			
4	0.1895	0.1295	0.5	0.3181	0.1969	0.5247	0.3333	0.1700	0.1968	0.2073		SAMPLE			
5	0.0767	0.0541	0.5	0.1781	0.7213	0.2346	1.0333	0.1915	0.2620	0.3696		SAMPLE			
6	0.1266	0.0894	0.5	0.2364	1.3642	0.1517	2.3667	0.2963	0.3347	0.5095		SAMPLE			
7	0.1950	0.1377	0.5	0.3478	1.1838	0.1861	1.6333	0.2603	0.3698	0.5079		SAMPLE			
8	0.1170	0.0826	0.5	0.2184	0.6568	0.1971	1.2333	0.2236	0.2334	0.2940		SAMPLE			
9	0.0846	0.0598	0.5	0.1740	0.2543	0.3091	0.4667	0.1414	0.1510	0.1644		SAMPLE			
10	0.1749	0.1235	0.5	0.3119	0.0433	1.8749	0.0667	0.1247	0.1589	0.1595		SAMPLE			
11	0.1653	0.1167	0.5	0.3086	0.5266	0.2941	0.7000	0.1795	0.2647	0.3260		SAMPLE			
12	0.1557	0.1099	0.5	0.2777	0.5400	0.2416	0.9333	0.2108	0.2391	0.2833		SAMPLE			
13	0.2206	0.1558	0.5	0.3826	0.5682	0.2805	0.8000	0.2108	0.2935	0.3377		SAMPLE			
14	0.1399	0.0988	0.5	0.2456	0.4332	0.2495	0.9000	0.2134	0.2014	0.2333		SAMPLE			
15	0.1804	0.1274	0.5	0.3168	0.9519	0.1791	1.5333	0.2582	0.3142	0.3975		SAMPLE			
16	0.1843	0.1301	0.5	0.3196	0.7119	0.2355	1.2000	0.2404	0.2795	0.3659		SAMPLE			
17	0.1967	0.1388	0.5	0.3410	0.7174	0.2529	1.1333	0.2357	0.2924	0.3908		SAMPLE			
18	0.0620	0.0437	0.5	0.1439	0.8649	0.1733	1.5333	0.2309	0.2553	0.3528		SAMPLE			
19	0.1976	0.1395	0.5	0.3471	1.0655	0.1919	1.5667	0.2603	0.3470	0.4676		SAMPLE			
20	0.1576	0.1113	0.5	0.2732	0.3043	0.3331	0.6000	0.1944	0.1932	0.2102		MB			
21	0.1874	0.1323	0.5	0.3249	0.3418	0.3434	0.5667	0.1915	0.2264	0.2427	231217015.1	DUP		21.5011	97.3%
22	0.1880	0.1328	0.5	0.3260	21.8707	0.1276	36.1333	1.1055	1.3116	7.3710	231217015.1	MS		21.1990	118.7%
23	0.0900	0.0636	0.5	0.1851	25.1553	0.1465	43.4000	1.2046	1.3685	9.1932		LCS			

# METHOD CALIBRATION DATA

# **GAS FLOW PROPORTIONAL COUNTERS**


**General Engineering Laboratories**

2040 Savage Road, Charleston, SC 29414  
(843)556-8171

**Gas Flow Proportional Counter Calibration Package**

Method: Ra-228 (AC)

	YES	NO	Comments
1) Is all calibration standard information enclosed for: primary standard certificate? secondard standard(s) documentation? standard preparation information? standard < 1 Year old or verified?	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
2) Are the detector graphs included? beta absorption curves? beta plateau?			Average Efficiency
	<input checked="" type="checkbox"/>		
3) Is the raw count data included for: the plateau generation? the absorption curve generation? the calibration verification? the crosstalk calculations?	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
4) Are the calibration verification calculations included? are verification recoveries 100% +/- 25%	<input checked="" type="checkbox"/>		
5) Is the method Carrier Standardization included?			N/A

Prepared By: 

Date: 7/2/09

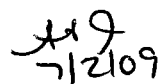
Reviewed By: 

Date: 7/2/09

Effective Date: 7/2/09

## Ra-228 Calibration PROTEAN Detectors

Detector #	Source #	Separation date	Count date	Ac-228 decay (dec)	Spike Vol. Ra-228 (mL)	Std. Act. Ra-228 (dpm/mL)	Standard Nominal (dpm)	raw beta counts	ct. time (min)	Beta cpm	corrected* cpm	Ra-228 eff (cpm/dpm)	
1A	1	7/1/09 10:45	7/1/2009 13:36	0.7249	1.5	6363.2	9544.8	13564	3	4521.3	6237.434348	0.6535	
1A	2	7/1/09 10:45	7/1/2009 13:52	0.7032	1.5	6363.2	9544.8	12775	3	4258.3	6055.521583	0.6344	
1A	3	7/1/09 10:45	7/1/2009 13:48	0.7083	1.5	6363.2	9544.8	12750	3	4250.0	6000.085083	0.6286	
1A	4	7/1/09 10:45	7/1/2009 13:41	0.7170	1.5	6363.2	9544.8	12410	3	4136.7	5769.683602	0.6045	
1B	1	7/1/09 10:45	7/1/2009 13:41	0.7174	1.5	6363.2	9544.8	13292	3	4430.7	6176.07771	0.6471	
1B	2	7/1/09 10:45	7/1/2009 13:36	0.7246	1.5	6363.2	9544.8	13274	3	4424.7	6106.181463	0.6397	
1B	3	7/1/09 10:45	7/1/2009 13:52	0.7031	1.5	6363.2	9544.8	12699	3	4233.0	6020.43969	0.6308	
1B	4	7/1/09 10:45	7/1/2009 13:48	0.7082	1.5	6363.2	9544.8	12072	3	4024.0	5682.267909	0.5953	Average EFF
1C	1	7/1/09 10:45	7/1/2009 13:48	0.7085	1.5	6363.2	9544.8	12813	3	4271.0	6028.410186	0.6316	
1C	2	7/1/09 10:45	7/1/2009 13:41	0.7172	1.5	6363.2	9544.8	12979	3	4326.3	6032.15531	0.6320	
1C	3	7/1/09 10:45	7/1/2009 13:36	0.7245	1.5	6363.2	9544.8	12755	3	4251.7	5888.722998	0.6149	Average EFF
1C	4	7/1/09 10:45	7/1/2009 13:52	0.7030	1.5	6363.2	9544.8	11917	3	3972.3	5650.765354	0.5920	
1D	1	7/1/09 10:45	7/1/2009 13:52	0.7033	1.5	6363.2	9544.8	12473	3	4157.7	5911.258105	0.6193	
1D	2	7/1/09 10:45	7/1/2009 13:48	0.7084	1.5	6363.2	9544.8	12484	3	4161.3	5874.170562	0.6154	
1D	3	7/1/09 10:45	7/1/2009 13:41	0.7171	1.5	6363.2	9544.8	12289	3	4096.3	5712.363902	0.5985	Average EFF
1D	4	7/1/09 10:45	7/1/2009 13:36	0.7243	1.5	6363.2	9544.8	12115	3	4038.3	5575.47435	0.5841	
2A	1	7/1/09 10:45	7/1/2009 13:57	0.6960	1.5	6363.2	9544.8	12499	3	4166.3	5986.085459	0.6272	
2A	2	7/1/09 10:45	7/1/2009 14:15	0.6728	1.5	6363.2	9544.8	12103	3	4034.3	5996.6905	0.6283	
2A	3	7/1/09 10:45	7/1/2009 14:09	0.6815	1.5	6363.2	9544.8	11968	3	3989.3	5854.110901	0.6133	Average EFF
2A	4	7/1/09 10:45	7/1/2009 14:02	0.6899	1.5	6363.2	9544.8	11855	3	3951.7	5728.227222	0.6001	
2B	1	7/1/09 10:45	7/1/2009 14:02	0.6903	1.5	6363.2	9544.8	12471	3	4157.0	6022.266434	0.6309	
2B	2	7/1/09 10:45	7/1/2009 13:57	0.6958	1.5	6363.2	9544.8	12492	3	4164.0	5984.232843	0.6270	
2B	3	7/1/09 10:45	7/1/2009 14:15	0.6727	1.5	6363.2	9544.8	11892	3	3964.0	5892.884561	0.6174	Average EFF
2B	4	7/1/09 10:45	7/1/2009 14:09	0.6814	1.5	6363.2	9544.8	11539	3	3846.3	5644.974311	0.5914	
2C	1	7/1/09 10:45	7/1/2009 14:08	0.6817	1.5	6363.2	9544.8	12050	3	4016.7	5892.005142	0.6173	
2C	2	7/1/09 10:45	7/1/2009 14:02	0.6901	1.5	6363.2	9544.8	11914	3	3971.3	5754.571355	0.6029	
2C	3	7/1/09 10:45	7/1/2009 13:58	0.6957	1.5	6363.2	9544.8	11994	3	3998.0	5748.92868	0.6021	Average EFF
2C	4	7/1/09 10:45	7/1/2009 14:15	0.6726	1.5	6363.2	9544.8	10889	3	3629.7	5396.37168	0.5654	
2D	1	7/1/09 10:45	7/1/2009 14:15	0.6729	1.5	6363.2	9544.8	12010	3	4003.3	5949.493049	0.6233	
2D	2	7/1/09 10:45	7/1/2009 14:08	0.6816	1.5	6363.2	9544.8	12124	3	4041.3	5929.303014	0.6212	
2D	3	7/1/09 10:45	7/1/2009 14:02	0.6900	1.5	6363.2	9544.8	12168	3	4056.0	5878.360714	0.6159	Average EFF
2D	4	7/1/09 10:45	7/1/2009 13:58	0.6954	1.5	6363.2	9544.8	11692	3	3897.3	5604.158523	0.5871	
3A	1	7/1/09 10:45	7/1/2009 14:19	0.6675	1.5	6363.2	9544.8	11194	3	3731.3	5589.748519	0.5856	
3A	2	7/1/09 10:45	7/1/2009 14:30	0.6482	1.5	6363.2	9544.8	14227	4	3556.8	5486.792678	0.5748	
3A	3	7/1/09 10:45	7/1/2009 14:36	0.6548	1.5	6363.2	9544.8	14180	4	3545.0	5414.108112	0.5672	Average EFF
3A	4	7/1/09 10:45	7/1/2009 14:25	0.6608	1.5	6363.2	9544.8	13754	4	3438.5	5203.464549	0.5452	
3B	1	7/1/09 10:45	7/1/2009 14:25	0.6612	1.5	6363.2	9544.8	15370	4	3842.5	5811.010789	0.6088	
3B	2	7/1/09 10:45	7/1/2009 14:20	0.6673	1.5	6363.2	9544.8	11695	3	3898.3	5842.303251	0.6121	
3B	3	7/1/09 10:45	7/1/2009 14:35	0.6481	1.5	6363.2	9544.8	14905	4	3726.3	5749.171166	0.6023	Average EFF
3B	4	7/1/09 10:45	7/1/2009 14:30	0.6547	1.5	6363.2	9544.8	14220	4	3555.0	5430.231301	0.5689	
3C	1	7/1/09 10:45	7/1/2009 14:29	0.6552	1.5	6363.2	9544.8	15644	4	3911.0	5969.527404	0.6254	
3C	2	7/1/09 10:45	7/1/2009 14:25	0.6611	1.5	6363.2	9544.8	15964	4	3991.0	6036.911214	0.6325	
3C	3	7/1/09 10:45	7/1/2009 14:20	0.6672	1.5	6363.2	9544.8	11701	3	3900.3	5846.033242	0.6125	Average EFF
3C	4	7/1/09 10:45	7/1/2009 14:35	0.6480	1.5	6363.2	9544.8	14729	4	3682.3	5682.352456	0.5953	
3D	1	7/1/09 10:45	7/1/2009 14:35	0.6484	1.5	6363.2	9544.8	15152	4	3788.0	5842.430209	0.6121	
3D	2	7/1/09 10:45	7/1/2009 14:30	0.6550	1.5	6363.2	9544.8	15168	4	3792.0	5789.343603	0.6065	
3D	3	7/1/09 10:45	7/1/2009 14:25	0.6610	1.5	6363.2	9544.8	15295	4	3823.8	5785.011122	0.6061	Average EFF
3D	4	7/1/09 10:45	7/1/2009 14:20	0.6670	1.5	6363.2	9544.8	10942	3	3647.3	5468.022172	0.5729	
4A	1	7/1/09 10:45	7/1/2009 14:40	0.6418	1.5	6363.2	9544.8	15298	4	3824.5	5959.288371	0.6243	
4A	2	7/1/09 10:45	7/1/2009 15:00	0.6187	1.5	6363.2	9544.8	14897	4	3724.3	6019.957238	0.6307	
4A	3	7/1/09 10:45	7/1/2009 14:53	0.6266	1.5	6363.2	9544.8	15050	4	3762.5	6005.095127	0.6291	Average EFF
4A	4	7/1/09 10:45	7/1/2009 14:48	0.6325	1.5	6363.2	9544.8	14462	4	3615.5	5715.951787	0.5989	
4B	1	7/1/09 10:45	7/1/2009 14:48	0.6329	1.5	6363.2	9544.8	15335	4	3833.8	6057.766128	0.6347	
4B	2	7/1/09 10:45	7/1/2009 14:41	0.6416	1.5	6363.2	9544.8	15513	4	3878.3	6044.745331	0.6333	
4B	3	7/1/09 10:45	7/1/2009 15:00	0.6186	1.5	6363.2	9544.8	14521	4	3630.3	5888.58525	0.6148	Average EFF
4B	4	7/1/09 10:45	7/1/2009 14:53	0.6265	1.5	6363.2	9544.8	14328	4	3582.0	5717.547589	0.5990	
4C	1	7/1/09 10:45	7/1/2009 14:53	0.6268	1.5	6363.2	9544.8	14733	4	3683.3	5876.583259	0.6157	
4C	2	7/1/09 10:45	7/1/2009 14:48	0.6327	1.5	6363.2	9544.8	14902	4	3725.5	5888.011911	0.6169	
4C	3	7/1/09 10:45	7/1/2009 14:41	0.6414	1.5	6363.2	9544.8	14856	4	3714.0	5790.010642	0.6066	Average EFF
4C	4	7/1/09 10:45	7/1/2009 15:00	0.6185	1.5	6363.2	9544.8	13733	4	3433.3	5550.795964	0.5816	
4D	1	7/1/09 10:45	7/1/2009 15:00	0.6188	1.5	6363.2	9544.8	14167	4	3541.8	5723.884149	0.5997	
4D	2	7/1/09 10:45	7/1/2009 14:53	0.6267	1.5	6363.2	9544.8	14204	4	3551.0	5666.467573	0.5937	
4D	3	7/1/09 10:45	7/1/2009 14:48	0.6326	1.5	6363.2	9544.8	14131	4	3532.8	5584.07765	0.5850	Average EFF
4D	4	7/1/09 10:45	7/1/2009 14:41	0.6413	1.5	6363.2	9544.8	13978	4	3494.5	5449.182717	0.5709	
5A	1	7/1/09 10:45	7/1/2009 15:06	0.6112	1.5	6363.2	9544.8	14870	4	3717.5	6082.165089	0.6372	
5A	2	7/1/09 10:45	7/1/2009 15:21	0.5943	1.5	6363.2	9544.8	14487	4	3621.8	6094.223373	0.6385	
5A	3	7/1/09 10:45	7/1/2009 15:17	0.5996	1.5	6363.2	9544.8	14259	4	3564.8	5945.170793	0.6229	Average EFF
5A	4	7/1/09 10:45	7/1/2009 15:12	0.6047	1.5	6363.2	9544.8	13957	4	3489.3	5770.592799	0.6046	
5B	1	7/1/09 10:45	7/1/2009 15:12	0.6050	1.5	6363.2	9544.8	14869	4	3717.3	6144.005028	0.6437	
5B	2	7/1/09 10:45	7/1/2009 15:06	0.6111	1.5	6363.2	9544.8	14821	4	3705.3	6063.072791	0.6352	
5B	3	7/1/09 10:45	7/1/2009 15:21	0.5942	1.5	6363.2	9544.8	14289	4	3572.3	6011.872812	0.6299	Average EFF
5B	4	7/1/09 10:45	7/1/2009 15:17	0.5995	1.5	6363.2	9544.8	13809	4	3452.3	5758.629577	0.6033	
5C	1	7/1/09 10:45	7/1/2009 15:17	0.5994	1.5	6363.2	9544.8	14676	4	3669.0	6120.953053	0.6413	
5C	2	7/1/09 10:45	7/1/2009 15:12	0.6049	1.5	6363.2	9544.8	15122	4	3780.5	6249.917577	0.6548	
5C	3	7/1/09 10:45	7/1/2009 15:07	0.6108	1.5	6363.2	9544.8	14958	4	3739.5	6121.8025	0.6414	Average EFF


  
 7/21/09

5C	4	7/1/09 10:45	7/1/2009 15:21	0.5941	1.5	6363.2	9544.8	13831	4	3457.8	5819.905873	0.6097	0.6368
5D	1	7/1/09 10:45	7/1/2009 15:21	0.5943	1.5	6363.2	9544.8	14321	4	3580.3	6024.014899	0.6311	
5D	2	7/1/09 10:45	7/1/2009 15:17	0.5993	1.5	6363.2	9544.8	14642	4	3660.5	6107.538025	0.6399	
5D	3	7/1/09 10:45	7/1/2009 15:12	0.6048	1.5	6363.2	9544.8	14443	4	3610.8	5970.409434	0.6255	Average EFF
5D	4	7/1/09 10:45	7/1/2009 15:07	0.6107	1.5	6363.2	9544.8	13954	4	3488.5	5711.973074	0.5984	0.6237
6A	1	7/1/09 10:45	7/1/2009 15:27	0.5885	1.5	6363.2	9544.8	14018	4	3504.5	5955.42076	0.6239	
6A	2	7/1/09 10:45	7/1/2009 15:40	0.5735	1.5	6363.2	9544.8	12283	3.5	3509.4	6118.819734	0.6411	
6A	3	7/1/09 10:45	7/1/2009 15:36	0.5779	1.5	6363.2	9544.8	12111	3.5	3460.3	5987.187856	0.6273	Average EFF
6A	4	7/1/09 10:45	7/1/2009 15:32	0.5826	1.5	6363.2	9544.8	11598	3.5	3313.7	5687.952648	0.5959	0.6221
6B	1	7/1/09 10:45	7/1/2009 15:32	0.5824	1.5	6363.2	9544.8	12151	3.5	3471.7	5961.398905	0.6246	
6B	2	7/1/09 10:45	7/1/2009 15:27	0.5885	1.5	6363.2	9544.8	14371	4	3592.8	6105.389624	0.6397	
6B	3	7/1/09 10:45	7/1/2009 15:40	0.5734	1.5	6363.2	9544.8	11705	3.5	3344.3	5831.983307	0.6110	Average EFF
6B	4	7/1/09 10:45	7/1/2009 15:36	0.5779	1.5	6363.2	9544.8	11388	3.5	3253.7	5630.295163	0.5899	0.6163
6C	1	7/1/09 10:45	7/1/2009 15:36	0.5778	1.5	6363.2	9544.8	12161	3.5	3474.6	6013.224586	0.6300	
6C	2	7/1/09 10:45	7/1/2009 15:32	0.5821	1.5	6363.2	9544.8	12083	3.5	3452.3	5930.638446	0.6213	
6C	3	7/1/09 10:45	7/1/2009 15:27	0.5883	1.5	6363.2	9544.8	13638	4	3409.5	5795.433731	0.6072	Average EFF
6C	4	7/1/09 10:45	7/1/2009 15:40	0.5733	1.5	6363.2	9544.8	11218	3.5	3205.1	5590.212859	0.5857	0.6111
6D	1	7/1/09 10:45	7/1/2009 15:40	0.5732	1.5	6363.2	9544.8	11987	3.5	3424.9	5974.547886	0.6259	
6D	2	7/1/09 10:45	7/1/2009 15:36	0.5777	1.5	6363.2	9544.8	12183	3.5	3480.9	6025.235519	0.6313	
6D	3	7/1/09 10:45	7/1/2009 15:32	0.5819	1.5	6363.2	9544.8	11882	3.5	3394.9	5833.810262	0.6112	Average EFF
6D	4	7/1/09 10:45	7/1/2009 15:27	0.5881	1.5	6363.2	9544.8	13018	4	3254.5	5533.899914	0.5798	0.6120
7A	1	7/1/09 10:45	7/1/2009 15:46	0.5673	1.5	6363.2	9544.8	12007	3.5	3430.6	6047.285806	0.6336	
7A	2	7/1/09 10:45	7/1/2009 16:00	0.5525	1.5	6363.2	9544.8	11655	3.5	3330.0	6027.30696	0.6315	
7A	3	7/1/09 10:45	7/1/2009 15:56	0.5569	1.5	6363.2	9544.8	11445	3.5	3270.0	5871.972756	0.6152	Average EFF
7A	4	7/1/09 10:45	7/1/2009 15:50	0.5627	1.5	6363.2	9544.8	11121	3.5	3177.4	5846.694018	0.5916	0.6180
7B	1	7/1/09 10:45	7/1/2009 15:51	0.5622	1.5	6363.2	9544.8	11988	3.5	3419.4	6082.664171	0.6373	
7B	2	7/1/09 10:45	7/1/2009 15:46	0.5673	1.5	6363.2	9544.8	12050	3.5	3442.9	6069.322745	0.6359	
7B	3	7/1/09 10:45	7/1/2009 16:00	0.5524	1.5	6363.2	9544.8	11675	3.5	3335.7	6038.785014	0.6327	Average EFF
7B	4	7/1/09 10:45	7/1/2009 15:56	0.5567	1.5	6363.2	9544.8	11271	3.5	3220.3	5784.331251	0.6060	0.6280
7C	1	7/1/09 10:45	7/1/2009 15:56	0.5566	1.5	6363.2	9544.8	11781	3.5	3366.0	6047.202464	0.6336	
7C	2	7/1/09 10:45	7/1/2009 15:51	0.5621	1.5	6363.2	9544.8	11760	3.5	3360.0	5978.073192	0.6263	
7C	3	7/1/09 10:45	7/1/2009 15:46	0.5670	1.5	6363.2	9544.8	11766	3.5	3361.7	5928.878357	0.6212	Average EFF
7C	4	7/1/09 10:45	7/1/2009 16:00	0.5523	1.5	6363.2	9544.8	10888	3.5	3110.9	5632.598965	0.5901	0.6178
7D	1	7/1/09 10:45	7/1/2009 16:00	0.5522	1.5	6363.2	9544.8	11805	3.5	3315.7	6004.271132	0.6291	
7D	2	7/1/09 10:45	7/1/2009 15:56	0.5565	1.5	6363.2	9544.8	11920	3.5	3405.7	6119.509991	0.6411	
7D	3	7/1/09 10:45	7/1/2009 15:51	0.5619	1.5	6363.2	9544.8	11933	3.5	3409.4	6067.346561	0.6357	Average EFF
7D	4	7/1/09 10:45	7/1/2009 15:46	0.5668	1.5	6363.2	9544.8	11305	3.5	3230.0	5698.36602	0.5970	0.6257
8A	1	7/1/09 10:45	7/1/2009 16:06	0.5486	1.5	6363.2	9544.8	11673	3.5	3335.1	6101.651756	0.6393	
8A	2	7/1/09 10:45	7/1/2009 16:19	0.5333	1.5	6363.2	9544.8	11172	3.5	3192.0	5985.379105	0.6271	
8A	3	7/1/09 10:45	7/1/2009 16:15	0.5377	1.5	6363.2	9544.8	11258	3.5	3216.6	5982.329368	0.6268	Average EFF
8A	4	7/1/09 10:45	7/1/2009 16:10	0.5424	1.5	6363.2	9544.8	10977	3.5	3136.3	5782.059146	0.6058	0.6247
8B	1	7/1/09 10:45	7/1/2009 16:10	0.5423	1.5	6363.2	9544.8	11583	3.5	3309.4	6102.412618	0.6393	
8B	2	7/1/09 10:45	7/1/2009 16:06	0.5468	1.5	6363.2	9544.8	11758	3.5	3359.4	6146.082528	0.6439	
8B	3	7/1/09 10:45	7/1/2009 16:19	0.5332	1.5	6363.2	9544.8	11499	3.5	3285.4	6161.727069	0.6456	Average EFF
8B	4	7/1/09 10:45	7/1/2009 16:15	0.5376	1.5	6363.2	9544.8	10844	3.5	3098.3	5763.600098	0.6038	0.6332
8C	1	7/1/09 10:45	7/1/2009 16:15	0.5375	1.5	6363.2	9544.8	11539	3.5	3296.9	6133.762218	0.6426	
8C	2	7/1/09 10:45	7/1/2009 16:10	0.5422	1.5	6363.2	9544.8	11774	3.5	3364.0	6204.011354	0.6500	
8C	3	7/1/09 10:45	7/1/2009 16:06	0.5465	1.5	6363.2	9544.8	11611	3.5	3317.4	6070.574762	0.6380	Average EFF
8C	4	7/1/09 10:45	7/1/2009 16:19	0.5331	1.5	6363.2	9544.8	10809	3.5	3088.3	5793.080291	0.6069	0.6339
8D	1	7/1/09 10:45	7/1/2009 16:19	0.5330	1.5	6363.2	9544.8	11301	3.5	3228.9	6057.336905	0.6346	
8D	2	7/1/09 10:45	7/1/2009 16:15	0.5374	1.5	6363.2	9544.8	11412	3.5	3260.6	6067.58377	0.6357	
8D	3	7/1/09 10:45	7/1/2009 16:10	0.5421	1.5	6363.2	9544.8	11660	3.5	3331.4	6145.674775	0.6439	Average EFF
8D	4	7/1/09 10:45	7/1/2009 16:06	0.5464	1.5	6363.2	9544.8	10918	3.5	3119.4	5709.327085	0.5982	0.6281
9A	1	7/1/09 10:45	7/1/2009 16:24	0.5280	1.5	6363.2	9544.8	11805	3.5	3315.7	6280.207813	0.6580	
9A	2	7/1/09 10:45	7/1/2009 16:42	0.5106	1.5	6363.2	9544.8	11281	3.5	3223.1	6313.016372	0.6614	
9A	3	7/1/09 10:45	7/1/2009 16:33	0.5196	1.5	6363.2	9544.8	11301	3.5	3228.9	6214.402502	0.6511	Average EFF
9A	4	7/1/09 10:45	7/1/2009 16:29	0.5236	1.5	6363.2	9544.8	10987	3.5	3139.1	5995.155865	0.6281	0.6496
9B	1	7/1/09 10:45	7/1/2009 16:29	0.5235	1.5	6363.2	9544.8	11151	3.5	3186.0	6085.406803	0.6376	
9B	2	7/1/09 10:45	7/1/2009 16:24	0.5280	1.5	6363.2	9544.8	11462	3.5	3274.9	6202.821366	0.6499	
9B	3	7/1/09 10:45	7/1/2009 16:42	0.5104	1.5	6363.2	9544.8	11004	3.5	3144.0	6180.125852	0.6454	Average EFF
9B	4	7/1/09 10:45	7/1/2009 16:33	0.5195	1.5	6363.2	9544.8	10581	3.5	3023.1	5819.569586	0.6097	0.6356
9C	1	7/1/09 10:45	7/1/2009 16:33	0.5194	1.5	6363.2	9544.8	11026	3.5	3150.3	6064.890483	0.6354	
9C	2	7/1/09 10:45	7/1/2009 16:29	0.5235	1.5	6363.2	9544.8	11281	3.5	3223.1	6157.122814	0.6451	
9C	3	7/1/09 10:45	7/1/2009 16:24	0.5279	1.5	6363.2	9544.8	11016	3.5	3147.4	5962.583098	0.6247	Average EFF
9C	4	7/1/09 10:45	7/1/2009 16:42	0.5103	1.5	6363.2	9544.8	10297	3.5	2942.0	5765.244836	0.6040	0.6273
9D	1	7/1/09 10:45	7/1/2009 16:38	0.5146	1.5	6363.2	9544.8	11135	3.5	3181.4	6182.4976	0.6477	
9D	2	7/1/09 10:45	7/1/2009 16:33	0.5193	1.5	6363.2	9544.8	11412	3.5	3260.6	6278.391381	0.6578	
9D	3	7/1/09 10:45	7/1/2009 16:29	0.5234	1.5	6363.2	9544.8	11340	3.5	3240.0	6190.682442	0.6486	Average EFF
9D	4	7/1/09 10:45	7/1/2009 16:24	0.5278	1.5	6363.2	9544.8	10912	3.5	3117.7	5907.401951	0.6189	0.6433
10A	1	7/1/09 10:45	7/1/2009 16:47	0.5057	1.5	6363.2	9544.8	10991	3.5	3140.3	6209.984837	0.6506	
10A	2	7/1/09 10:45	7/1/2009 17:12	0.4824	1.5	6363.2	9544.8	11959	4	2989.8	6198.188046	0.6494	
10A	3	7/1/09 10:45	7/1/2009 16:58	0.4958	1.5	6363.2	9544.8	10553	3.5	3015.1	6081.381423	0.6371	Average EFF
10A	4	7/1/09 10:45	7/1/2009 16:53	0.5003	1.5	6363.2	9544.8	10338	3.5	2953.7	5903.409852	0.6185	0.6389
10B	1	7/1/09 10:45	7/1/2009 17:03	0.4910	1.5	6363.2	9544.8	11110	4	2777.5	5856.748417	0.5927	
10B	2	7/1/09 10:45	7/1/2009 16:47	0.5057	1.5	6363.2	9544.8	10812	3.5	3089.1	6109.231533	0.6401	
10B	3	7/1/09 10:45	7/1/2009 17:12	0.4822	1.5	6363.2	9544.8	11422	4	2855.5	5921.333197	0.6204	Average EFF
10B	4	7/1/09 10:45	7/1/2009 16:58	0.4957	1.5	6363.2	9544.8	9967	3.5	2847.7	5744.946895	0.6019	0.6137
10C	1	7/1/09 10:45	7/1/2009 16:58	0.4956	1.5	6363.2	9544.8	10482	3.5	2994.9	6042.548531	0.6331	
10C	2	7/1/09 10:45	7/1/20										

10D	3	7/1/09 10:45	7/1/2009 16:53	0.5000	1.5	6363.2	9544.8	10643	3.5	3040.9	6081.577364	0.6372	Average EFF
10D	4	7/1/09 10:45	7/1/2009 16:48	0.5053	1.5	6363.2	9544.8	10064	3.5	2875.4	5690.501596	0.5962	0.6320
11A	1	7/1/09 10:45	7/1/2009 11:56	0.8745	1.5	6363.2	9544.8	14773	3	4924.3	5631.22443	0.5900	
11A	2	7/1/09 10:45	7/1/2009 12:08	0.8547	1.5	6363.2	9544.8	14429	3	4809.7	5627.17636	0.5896	
11A	3	7/1/09 10:45	7/1/2009 12:04	0.8607	1.5	6363.2	9544.8	14454	3	4818.0	5597.851728	0.5865	Average EFF
11A	4	7/1/09 10:45	7/1/2009 12:00	0.8677	1.5	6363.2	9544.8	14013	3	4671.0	5383.193838	0.5640	0.5825
11B	1	7/1/09 10:45	7/1/2009 12:00	0.8681	1.5	6363.2	9544.8	16203	3	5401.0	6221.768068	0.6518	
11B	2	7/1/09 10:45	7/1/2009 11:56	0.8742	1.5	6363.2	9544.8	16106	3	5368.7	6141.073627	0.6434	
11B	3	7/1/09 10:45	7/1/2009 12:08	0.8545	1.5	6363.2	9544.8	15643	3	5214.3	6102.154531	0.6393	Average EFF
11B	4	7/1/09 10:45	7/1/2009 12:04	0.8606	1.5	6363.2	9544.8	15133	3	5044.3	5861.738123	0.6141	0.6372
11C	1	7/1/09 10:45	7/1/2009 12:04	0.8609	1.5	6363.2	9544.8	15637	3	5212.3	6054.305139	0.6343	
11C	2	7/1/09 10:45	7/1/2009 12:00	0.8680	1.5	6363.2	9544.8	15919	3	5308.3	6113.481467	0.6405	
11C	3	7/1/09 10:45	7/1/2009 11:56	0.8740	1.5	6363.2	9544.8	16452	3	5484.0	6274.378359	0.6574	Average EFF
11C	4	7/1/09 10:45	7/1/2009 12:08	0.8544	1.5	6363.2	9544.8	14887	3	4962.3	5808.157492	0.6085	0.6352
11D	1	7/1/09 10:45	7/1/2009 12:08	0.8548	1.5	6363.2	9544.8	15607	3	5202.3	6085.822645	0.6376	
11D	2	7/1/09 10:45	7/1/2009 12:04	0.8608	1.5	6363.2	9544.8	15944	3	5314.7	6174.138045	0.6469	
11D	3	7/1/09 10:45	7/1/2009 12:00	0.8679	1.5	6363.2	9544.8	16098	3	5366.0	6182.989937	0.6478	Average EFF
11D	4	7/1/09 10:45	7/1/2009 11:56	0.8738	1.5	6363.2	9544.8	15191	3	5063.7	5794.733717	0.6071	0.6348
12A	1	7/1/09 10:45	7/1/2009 12:15	0.8437	1.5	6363.2	9544.8	15450	3	5150.0	6104.028984	0.6395	
12A	2	7/1/09 10:45	7/1/2009 12:28	0.8234	1.5	6363.2	9544.8	15016	3	5005.3	6078.958269	0.6369	
12A	3	7/1/09 10:45	7/1/2009 12:24	0.8296	1.5	6363.2	9544.8	14984	3	4994.7	6020.558384	0.6308	Average EFF
12A	4	7/1/09 10:45	7/1/2009 12:20	0.8358	1.5	6363.2	9544.8	14530	3	4843.3	5794.58497	0.6071	0.6286
12B	1	7/1/09 10:45	7/1/2009 12:20	0.8362	1.5	6363.2	9544.8	15404	3	5134.7	6140.835636	0.6433	
12B	2	7/1/09 10:45	7/1/2009 12:15	0.8437	1.5	6363.2	9544.8	15607	3	5202.3	6166.05496	0.6460	
12B	3	7/1/09 10:45	7/1/2009 12:28	0.8232	1.5	6363.2	9544.8	15060	3	5020.0	6097.91718	0.6389	Average EFF
12B	4	7/1/09 10:45	7/1/2009 12:24	0.8295	1.5	6363.2	9544.8	14553	3	4851.0	5848.11587	0.6127	0.6352
12C	1	7/1/09 10:45	7/1/2009 12:24	0.8300	1.5	6363.2	9544.8	15183	3	5061.0	6097.649845	0.6388	
12C	2	7/1/09 10:45	7/1/2009 12:20	0.8361	1.5	6363.2	9544.8	15651	3	5217.0	6239.881493	0.6537	
12C	3	7/1/09 10:45	7/1/2009 12:15	0.8436	1.5	6363.2	9544.8	15216	3	5072.0	6012.519531	0.6299	Average EFF
12C	4	7/1/09 10:45	7/1/2009 12:28	0.8231	1.5	6363.2	9544.8	14117	3	4705.7	5716.805229	0.5989	0.6304
12D	1	7/1/09 10:45	7/1/2009 12:28	0.8235	1.5	6363.2	9544.8	15174	3	5058.0	6141.959419	0.6435	
12D	2	7/1/09 10:45	7/1/2009 12:24	0.8298	1.5	6363.2	9544.8	15137	3	5045.7	6080.699807	0.6371	
12D	3	7/1/09 10:45	7/1/2009 12:20	0.8359	1.5	6363.2	9544.8	15418	3	5139.3	6148.142699	0.6441	Average EFF
12D	4	7/1/09 10:45	7/1/2009 12:15	0.8434	1.5	6363.2	9544.8	14586	3	4855.3	5758.75774	0.6031	0.6320
13A	1	7/1/09 10:45	7/1/2009 12:33	0.8153	1.5	6363.2	9544.8	15230	3	5076.7	6226.552932	0.6524	
13A	2	7/1/09 10:45	7/1/2009 12:50	0.7902	1.5	6363.2	9544.8	14784	3	4928.0	6236.596242	0.6534	
13A	3	7/1/09 10:45	7/1/2009 12:41	0.8031	1.5	6363.2	9544.8	14851	3	4950.3	6164.384216	0.6458	Average EFF
13A	4	7/1/09 10:45	7/1/2009 12:37	0.8090	1.5	6363.2	9544.8	14183	3	4727.7	5843.553624	0.6122	0.6410
13B	1	7/1/09 10:45	7/1/2009 12:37	0.8094	1.5	6363.2	9544.8	15625	3	5208.3	6434.850276	0.6742	
13B	2	7/1/09 10:45	7/1/2009 12:33	0.8153	1.5	6363.2	9544.8	15450	3	5150.0	6316.496573	0.6618	
13B	3	7/1/09 10:45	7/1/2009 12:50	0.7901	1.5	6363.2	9544.8	14689	3	4896.3	6197.297391	0.6493	Average EFF
13B	4	7/1/09 10:45	7/1/2009 12:41	0.8029	1.5	6363.2	9544.8	14377	3	4792.3	5988.757323	0.6253	0.6526
13C	1	7/1/09 10:45	7/1/2009 12:41	0.8033	1.5	6363.2	9544.8	15426	3	5142.0	6401.251014	0.6707	
13C	2	7/1/09 10:45	7/1/2009 12:37	0.8093	1.5	6363.2	9544.8	15315	3	5105.0	6307.973396	0.6609	
13C	3	7/1/09 10:45	7/1/2009 12:33	0.8152	1.5	6363.2	9544.8	15288	3	5096.0	6251.048762	0.6549	Average EFF
13C	4	7/1/09 10:45	7/1/2009 12:50	0.7900	1.5	6363.2	9544.8	14222	3	4740.7	6001.209943	0.6287	0.6538
13D	1	7/1/09 10:45	7/1/2009 12:50	0.7903	1.5	6363.2	9544.8	14492	3	4830.7	6112.65055	0.6404	
13D	2	7/1/09 10:45	7/1/2009 12:46	0.7958	1.5	6363.2	9544.8	14858	3	4952.7	6223.19528	0.6520	
13D	3	7/1/09 10:45	7/1/2009 12:37	0.8082	1.5	6363.2	9544.8	14873	3	4957.7	6126.881339	0.6419	Average EFF
13D	4	7/1/09 10:45	7/1/2009 12:33	0.8151	1.5	6363.2	9544.8	14389	3	4796.3	5884.197712	0.6165	0.6377
14A	1	7/1/09 10:45	7/1/2009 12:54	0.7834	1.5	6363.2	9544.8	14463	3	4821.0	6153.596507	0.6447	
14A	2	7/1/09 10:45	7/1/2009 13:17	0.7507	1.5	6363.2	9544.8	14137	3	4712.3	6277.53373	0.6577	
14A	3	7/1/09 10:45	7/1/2009 13:13	0.7571	1.5	6363.2	9544.8	14022	3	4674.0	6173.627369	0.6468	Average EFF
14A	4	7/1/09 10:45	7/1/2009 13:02	0.7727	1.5	6363.2	9544.8	13451	3	4483.7	5802.830587	0.6080	0.6393
14B	1	7/1/09 10:45	7/1/2009 13:01	0.7730	1.5	6363.2	9544.8	14039	3	4679.7	6054.030301	0.6343	
14B	2	7/1/09 10:45	7/1/2009 12:54	0.7834	1.5	6363.2	9544.8	14398	3	4799.3	6126.324754	0.6418	
14B	3	7/1/09 10:45	7/1/2009 13:17	0.7505	1.5	6363.2	9544.8	13475	3	4491.7	5984.510182	0.6270	Average EFF
14B	4	7/1/09 10:45	7/1/2009 13:13	0.7569	1.5	6363.2	9544.8	13077	3	4359.0	5758.643863	0.6033	0.6266
14C	1	7/1/09 10:45	7/1/2009 13:12	0.7573	1.5	6363.2	9544.8	14116	3	4705.3	6213.281445	0.6510	
14C	2	7/1/09 10:45	7/1/2009 13:02	0.7729	1.5	6363.2	9544.8	14187	3	4729.0	6118.427365	0.6410	
14C	3	7/1/09 10:45	7/1/2009 12:55	0.7832	1.5	6363.2	9544.8	14409	3	4803.0	6132.734423	0.6425	Average EFF
14C	4	7/1/09 10:45	7/1/2009 13:17	0.7505	1.5	6363.2	9544.8	13229	3	4409.7	5875.993199	0.6156	0.6375
14D	1	7/1/09 10:45	7/1/2009 13:17	0.7508	1.5	6363.2	9544.8	13927	3	4642.3	6183.314452	0.6478	
14D	2	7/1/09 10:45	7/1/2009 13:12	0.7572	1.5	6363.2	9544.8	14089	3	4696.3	6202.348821	0.6498	
14D	3	7/1/09 10:45	7/1/2009 13:02	0.7728	1.5	6363.2	9544.8	13912	3	4637.3	6000.768164	0.6287	Average EFF
14D	4	7/1/09 10:45	7/1/2009 12:55	0.7830	1.5	6363.2	9544.8	13545	3	4515.0	5786.084113	0.6041	0.6326

\*Background is considered negligible



SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time
1 1A		3	126	13564	7/1/2009 13:36	7/1/2009 13:39
2 1A		3	136	12775	7/1/2009 13:52	7/1/2009 13:55
3 1A		3	135	12750	7/1/2009 13:48	7/1/2009 13:51
4 1A		3	142	12410	7/1/2009 13:41	7/1/2009 13:44
1 1B		3	115	13292	7/1/2009 13:41	7/1/2009 13:44
2 1B		3	136	13274	7/1/2009 13:36	7/1/2009 13:39
3 1B		3	131	12699	7/1/2009 13:52	7/1/2009 13:55
4 1B		3	129	12072	7/1/2009 13:48	7/1/2009 13:51
1 1C		3	207	12813	7/1/2009 13:48	7/1/2009 13:51
2 1C		3	221	12979	7/1/2009 13:41	7/1/2009 13:44
3 1C		3	189	12755	7/1/2009 13:36	7/1/2009 13:39
4 1C		3	179	11917	7/1/2009 13:52	7/1/2009 13:55
1 1D		3	558	12473	7/1/2009 13:52	7/1/2009 13:55
2 1D		3	582	12484	7/1/2009 13:48	7/1/2009 13:51
3 1D		3	632	12289	7/1/2009 13:41	7/1/2009 13:44
4 1D		3	568	12115	7/1/2009 13:36	7/1/2009 13:39
1 2A		3	424	12499	7/1/2009 13:57	7/1/2009 14:00
2 2A		3	449	12103	7/1/2009 14:15	7/1/2009 14:18
3 2A		3	419	11968	7/1/2009 14:09	7/1/2009 14:12
4 2A		3	417	11855	7/1/2009 14:02	7/1/2009 14:05
1 2B		3	42	12471	7/1/2009 14:02	7/1/2009 14:05
2 2B		3	39	12492	7/1/2009 13:57	7/1/2009 14:00
3 2B		3	54	11892	7/1/2009 14:15	7/1/2009 14:18
4 2B		3	69	11539	7/1/2009 14:09	7/1/2009 14:12
1 2C		3	504	12050	7/1/2009 14:08	7/1/2009 14:11
2 2C		3	527	11914	7/1/2009 14:02	7/1/2009 14:05
3 2C		3	496	11994	7/1/2009 13:58	7/1/2009 14:01
4 2C		3	499	10889	7/1/2009 14:15	7/1/2009 14:18
1 2D		3	543	12010	7/1/2009 14:15	7/1/2009 14:18
2 2D		3	508	12124	7/1/2009 14:08	7/1/2009 14:11
3 2D		3	542	12168	7/1/2009 14:02	7/1/2009 14:05
4 2D		3	544	11692	7/1/2009 13:58	7/1/2009 14:01
1 3A		3	1397	11194	7/1/2009 14:19	7/1/2009 14:22
2 3A		4	1809	14227	7/1/2009 14:35	7/1/2009 14:39
3 3A		4	1757	14180	7/1/2009 14:30	7/1/2009 14:34
4 3A		4	1725	13754	7/1/2009 14:25	7/1/2009 14:29
1 3B		4	914	15370	7/1/2009 14:25	7/1/2009 14:29
2 3B		3	731	11695	7/1/2009 14:20	7/1/2009 14:23
3 3B		4	960	14905	7/1/2009 14:35	7/1/2009 14:39
4 3B		4	922	14220	7/1/2009 14:30	7/1/2009 14:34
1 3C		4	671	15644	7/1/2009 14:29	7/1/2009 14:33
2 3C		4	722	15964	7/1/2009 14:25	7/1/2009 14:29
3 3C		3	558	11701	7/1/2009 14:20	7/1/2009 14:23
4 3C		4	647	14729	7/1/2009 14:35	7/1/2009 14:39
1 3D		4	651	15152	7/1/2009 14:35	7/1/2009 14:39
2 3D		4	722	15168	7/1/2009 14:30	7/1/2009 14:34
3 3D		4	684	15295	7/1/2009 14:25	7/1/2009 14:29
4 3D		3	466	10942	7/1/2009 14:20	7/1/2009 14:23
1 4A		4	412	15298	7/1/2009 14:40	7/1/2009 14:44
2 4A		4	407	14897	7/1/2009 15:00	7/1/2009 15:04
3 4A		4	389	15050	7/1/2009 14:53	7/1/2009 14:57

419  
7/2/09

4 4A	4	417	14462	7/1/2009 14:48	7/1/2009 14:52
1 4B	4	58	15335	7/1/2009 14:48	7/1/2009 14:52
2 4B	4	61	15513	7/1/2009 14:41	7/1/2009 14:45
3 4B	4	53	14521	7/1/2009 15:00	7/1/2009 15:04
4 4B	4	72	14328	7/1/2009 14:53	7/1/2009 14:57
1 4C	4	532	14733	7/1/2009 14:53	7/1/2009 14:57
2 4C	4	545	14902	7/1/2009 14:48	7/1/2009 14:52
3 4C	4	486	14856	7/1/2009 14:41	7/1/2009 14:45
4 4C	4	540	13733	7/1/2009 15:00	7/1/2009 15:04
1 4D	4	1158	14167	7/1/2009 15:00	7/1/2009 15:04
2 4D	4	1192	14204	7/1/2009 14:53	7/1/2009 14:57
3 4D	4	1136	14131	7/1/2009 14:48	7/1/2009 14:52
4 4D	4	1149	13978	7/1/2009 14:41	7/1/2009 14:45
1 5A	4	424	14870	7/1/2009 15:06	7/1/2009 15:10
2 5A	4	395	14487	7/1/2009 15:21	7/1/2009 15:25
3 5A	4	403	14259	7/1/2009 15:17	7/1/2009 15:21
4 5A	4	389	13957	7/1/2009 15:12	7/1/2009 15:16
1 5B	4	428	14869	7/1/2009 15:12	7/1/2009 15:16
2 5B	4	440	14821	7/1/2009 15:06	7/1/2009 15:10
3 5B	4	420	14289	7/1/2009 15:21	7/1/2009 15:25
4 5B	4	414	13809	7/1/2009 15:17	7/1/2009 15:21
1 5C	4	436	14676	7/1/2009 15:17	7/1/2009 15:21
2 5C	4	443	15122	7/1/2009 15:12	7/1/2009 15:16
3 5C	4	433	14958	7/1/2009 15:07	7/1/2009 15:11
4 5C	4	416	13831	7/1/2009 15:21	7/1/2009 15:25
1 5D	4	451	14321	7/1/2009 15:21	7/1/2009 15:25
2 5D	4	452	14642	7/1/2009 15:17	7/1/2009 15:21
3 5D	4	444	14443	7/1/2009 15:12	7/1/2009 15:16
4 5D	4	414	13954	7/1/2009 15:07	7/1/2009 15:11
1 6A	4	272	14018	7/1/2009 15:27	7/1/2009 15:31
2 6A	3.5	246	12283	7/1/2009 15:40	7/1/2009 15:44
3 6A	3.5	231	12111	7/1/2009 15:36	7/1/2009 15:40
4 6A	3.5	229	11598	7/1/2009 15:32	7/1/2009 15:35
1 6B	3.5	540	12151	7/1/2009 15:32	7/1/2009 15:36
2 6B	4	592	14371	7/1/2009 15:27	7/1/2009 15:31
3 6B	3.5	498	11705	7/1/2009 15:40	7/1/2009 15:44
4 6B	3.5	498	11388	7/1/2009 15:36	7/1/2009 15:40
1 6C	3.5	462	12161	7/1/2009 15:36	7/1/2009 15:40
2 6C	3.5	468	12083	7/1/2009 15:32	7/1/2009 15:36
3 6C	4	534	13638	7/1/2009 15:27	7/1/2009 15:31
4 6C	3.5	455	11218	7/1/2009 15:40	7/1/2009 15:44
1 6D	3.5	456	11987	7/1/2009 15:40	7/1/2009 15:44
2 6D	3.5	468	12183	7/1/2009 15:36	7/1/2009 15:40
3 6D	3.5	496	11882	7/1/2009 15:32	7/1/2009 15:36
4 6D	4	525	13018	7/1/2009 15:27	7/1/2009 15:31
1 7A	3.5	466	12007	7/1/2009 15:46	7/1/2009 15:50
2 7A	3.5	491	11655	7/1/2009 16:00	7/1/2009 16:04
3 7A	3.5	444	11445	7/1/2009 15:56	7/1/2009 15:59
4 7A	3.5	477	11121	7/1/2009 15:50	7/1/2009 15:54
1 7B	3.5	418	11968	7/1/2009 15:51	7/1/2009 15:54
2 7B	3.5	448	12050	7/1/2009 15:46	7/1/2009 15:50
3 7B	3.5	460	11675	7/1/2009 16:00	7/1/2009 16:04

4 7B	3.5	413	11271	7/1/2009 15:56	7/1/2009 16:00
1 7C	3.5	471	11781	7/1/2009 15:56	7/1/2009 16:00
2 7C	3.5	457	11760	7/1/2009 15:51	7/1/2009 15:54
3 7C	3.5	454	11766	7/1/2009 15:46	7/1/2009 15:50
4 7C	3.5	406	10888	7/1/2009 16:00	7/1/2009 16:04
1 7D	3.5	359	11605	7/1/2009 16:00	7/1/2009 16:04
2 7D	3.5	391	11920	7/1/2009 15:56	7/1/2009 16:00
3 7D	3.5	386	11933	7/1/2009 15:51	7/1/2009 15:55
4 7D	3.5	400	11305	7/1/2009 15:46	7/1/2009 15:50
1 8A	3.5	348	11673	7/1/2009 16:06	7/1/2009 16:09
2 8A	3.5	340	11172	7/1/2009 16:19	7/1/2009 16:22
3 8A	3.5	298	11258	7/1/2009 16:15	7/1/2009 16:18
4 8A	3.5	327	10977	7/1/2009 16:10	7/1/2009 16:13
1 8B	3.5	124	11583	7/1/2009 16:10	7/1/2009 16:13
2 8B	3.5	112	11758	7/1/2009 16:06	7/1/2009 16:09
3 8B	3.5	110	11499	7/1/2009 16:19	7/1/2009 16:23
4 8B	3.5	102	10844	7/1/2009 16:15	7/1/2009 16:18
1 8C	3.5	202	11539	7/1/2009 16:15	7/1/2009 16:18
2 8C	3.5	196	11774	7/1/2009 16:10	7/1/2009 16:14
3 8C	3.5	203	11611	7/1/2009 16:06	7/1/2009 16:09
4 8C	3.5	207	10809	7/1/2009 16:19	7/1/2009 16:23
1 8D	3.5	240	11301	7/1/2009 16:19	7/1/2009 16:23
2 8D	3.5	248	11412	7/1/2009 16:15	7/1/2009 16:18
3 8D	3.5	233	11660	7/1/2009 16:10	7/1/2009 16:14
4 8D	3.5	235	10918	7/1/2009 16:06	7/1/2009 16:10
1 9A	3.5	39	11605	7/1/2009 16:24	7/1/2009 16:28
2 9A	3.5	49	11281	7/1/2009 16:42	7/1/2009 16:46
3 9A	3.5	47	11301	7/1/2009 16:33	7/1/2009 16:36
4 9A	3.5	64	10987	7/1/2009 16:29	7/1/2009 16:32
1 9B	3.5	53	11151	7/1/2009 16:29	7/1/2009 16:32
2 9B	3.5	39	11462	7/1/2009 16:24	7/1/2009 16:28
3 9B	3.5	45	11004	7/1/2009 16:42	7/1/2009 16:46
4 9B	3.5	51	10581	7/1/2009 16:33	7/1/2009 16:36
1 9C	3.5	49	11026	7/1/2009 16:33	7/1/2009 16:36
2 9C	3.5	49	11281	7/1/2009 16:29	7/1/2009 16:32
3 9C	3.5	40	11016	7/1/2009 16:24	7/1/2009 16:28
4 9C	3.5	60	10297	7/1/2009 16:42	7/1/2009 16:46
1 9D	3.5	65	11135	7/1/2009 16:38	7/1/2009 16:41
2 9D	3.5	53	11412	7/1/2009 16:33	7/1/2009 16:37
3 9D	3.5	54	11340	7/1/2009 16:29	7/1/2009 16:32
4 9D	3.5	77	10912	7/1/2009 16:24	7/1/2009 16:28
1 10A	3.5	71	10991	7/1/2009 16:47	7/1/2009 16:51
2 10A	4	106	11959	7/1/2009 17:12	7/1/2009 17:16
3 10A	3.5	70	10553	7/1/2009 16:58	7/1/2009 17:01
4 10A	3.5	95	10338	7/1/2009 16:53	7/1/2009 16:56
1 10B	4	139	11110	7/1/2009 17:03	7/1/2009 17:07
2 10B	3.5	102	10812	7/1/2009 16:47	7/1/2009 16:51
3 10B	4	103	11422	7/1/2009 17:12	7/1/2009 17:16
4 10B	3.5	110	9967	7/1/2009 16:58	7/1/2009 17:01
1 10C	3.5	74	10482	7/1/2009 16:58	7/1/2009 17:01
2 10C	3.5	79	10535	7/1/2009 16:53	7/1/2009 16:57
3 10C	3.5	87	10723	7/1/2009 16:47	7/1/2009 16:51

4 10C	4	95	11066	7/1/2009 17:13	7/1/2009 17:17
1 10D	4	102	12021	7/1/2009 17:13	7/1/2009 17:17
2 10D	3.5	75	10614	7/1/2009 16:58	7/1/2009 17:01
3 10D	3.5	78	10643	7/1/2009 16:53	7/1/2009 16:57
4 10D	3.5	81	10064	7/1/2009 16:48	7/1/2009 16:51
1 11A	3	31	14773	7/1/2009 11:56	7/1/2009 11:59
2 11A	3	23	14429	7/1/2009 12:08	7/1/2009 12:11
3 11A	3	33	14454	7/1/2009 12:04	7/1/2009 12:07
4 11A	3	49	14013	7/1/2009 12:00	7/1/2009 12:03
1 11B	3	43	16203	7/1/2009 12:00	7/1/2009 12:03
2 11B	3	53	16106	7/1/2009 11:56	7/1/2009 11:59
3 11B	3	46	15643	7/1/2009 12:08	7/1/2009 12:11
4 11B	3	42	15133	7/1/2009 12:04	7/1/2009 12:07
1 11C	3	27	15637	7/1/2009 12:04	7/1/2009 12:07
2 11C	3	38	15919	7/1/2009 12:00	7/1/2009 12:03
3 11C	3	33	16452	7/1/2009 11:56	7/1/2009 11:59
4 11C	3	46	14887	7/1/2009 12:08	7/1/2009 12:11
1 11D	3	43	15607	7/1/2009 12:08	7/1/2009 12:11
2 11D	3	42	15944	7/1/2009 12:04	7/1/2009 12:07
3 11D	3	32	16098	7/1/2009 12:00	7/1/2009 12:03
4 11D	3	39	15191	7/1/2009 11:56	7/1/2009 11:59
1 12A	3	29	15450	7/1/2009 12:15	7/1/2009 12:18
2 12A	3	28	15016	7/1/2009 12:28	7/1/2009 12:31
3 12A	3	31	14984	7/1/2009 12:24	7/1/2009 12:27
4 12A	3	46	14530	7/1/2009 12:20	7/1/2009 12:23
1 12B	3	26	15404	7/1/2009 12:20	7/1/2009 12:23
2 12B	3	31	15607	7/1/2009 12:15	7/1/2009 12:18
3 12B	3	34	15060	7/1/2009 12:28	7/1/2009 12:31
4 12B	3	49	14553	7/1/2009 12:24	7/1/2009 12:27
1 12C	3	24	15183	7/1/2009 12:24	7/1/2009 12:27
2 12C	3	44	15651	7/1/2009 12:20	7/1/2009 12:23
3 12C	3	46	15216	7/1/2009 12:15	7/1/2009 12:18
4 12C	3	60	14117	7/1/2009 12:28	7/1/2009 12:31
1 12D	3	48	15174	7/1/2009 12:28	7/1/2009 12:31
2 12D	3	37	15137	7/1/2009 12:24	7/1/2009 12:27
3 12D	3	25	15418	7/1/2009 12:20	7/1/2009 12:23
4 12D	3	59	14566	7/1/2009 12:15	7/1/2009 12:18
1 13A	3	50	15230	7/1/2009 12:33	7/1/2009 12:36
2 13A	3	36	14784	7/1/2009 12:50	7/1/2009 12:53
3 13A	3	41	14851	7/1/2009 12:41	7/1/2009 12:44
4 13A	3	49	14183	7/1/2009 12:37	7/1/2009 12:40
1 13B	3	39	15625	7/1/2009 12:37	7/1/2009 12:40
2 13B	3	41	15450	7/1/2009 12:33	7/1/2009 12:36
3 13B	3	37	14689	7/1/2009 12:50	7/1/2009 12:53
4 13B	3	47	14377	7/1/2009 12:41	7/1/2009 12:44
1 13C	3	54	15426	7/1/2009 12:41	7/1/2009 12:44
2 13C	3	41	15315	7/1/2009 12:37	7/1/2009 12:40
3 13C	3	36	15288	7/1/2009 12:33	7/1/2009 12:36
4 13C	3	34	14222	7/1/2009 12:50	7/1/2009 12:53
1 13D	3	47	14492	7/1/2009 12:50	7/1/2009 12:53
2 13D	3	50	14858	7/1/2009 12:46	7/1/2009 12:49
3 13D	3	43	14873	7/1/2009 12:37	7/1/2009 12:40

4 13D	3	47	14389	7/1/2009 12:33	7/1/2009 12:36
1 14A	3	44	14463	7/1/2009 12:54	7/1/2009 12:57
2 14A	3	41	14137	7/1/2009 13:17	7/1/2009 13:20
3 14A	3	45	14022	7/1/2009 13:13	7/1/2009 13:16
4 14A	3	51	13451	7/1/2009 13:02	7/1/2009 13:05
1 14B	3	42	14039	7/1/2009 13:01	7/1/2009 13:04
2 14B	3	36	14398	7/1/2009 12:54	7/1/2009 12:57
3 14B	3	47	13475	7/1/2009 13:17	7/1/2009 13:20
4 14B	3	47	13077	7/1/2009 13:13	7/1/2009 13:16
1 14C	3	26	14116	7/1/2009 13:12	7/1/2009 13:15
2 14C	3	35	14187	7/1/2009 13:02	7/1/2009 13:05
3 14C	3	37	14409	7/1/2009 12:55	7/1/2009 12:58
4 14C	3	38	13229	7/1/2009 13:17	7/1/2009 13:20
1 14D	3	16	13927	7/1/2009 13:17	7/1/2009 13:20
2 14D	3	32	14089	7/1/2009 13:12	7/1/2009 13:15
3 14D	3	16	13912	7/1/2009 13:02	7/1/2009 13:05
4 14D	3	47	13545	7/1/2009 12:55	7/1/2009 12:58

**Radium-228 Liquid**

File Name : RA228.LXS

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

LCS S/N : 0503-B  
 LCS Exp Date : 9/13/2009  
 LCS Activity (dpm/ml): 182.42  
 LCS Volume Added: 2.00

Pipet, 0.1 ml Stdev : +/- 0.000701 ml  
 Pipet, 0.5 ml Stdev : +/- 0.002564 ml  
 Pipet, 1 ml Stdev : +/- 0.005480 ml

Procedure Code : GFC090SRL  
 Param Name : Radium-228  
 Required MDA : 1 pCi/L  
 Half-life of Ra-228 : 5.75 years  
 Half-life of Ac-228 : 6.13 hours  
 Batch counted on : PIC  
 BKG Count time : 500 min

Batch : 595514  
 Analyst : AFI  
 Prep Date : 7/12/2009

Tracer S/N : 0112-J  
 Tracer Exp Date : 2/17/2010  
 Tracer Volume Added: 0.10

Re-228 Abundance : 1  
 Re-228 Method Uncertainty : 0.0784  
 Calibration Date : 6/2/2008  
 Calibration Due Date : 6/30/2009

Pos.	Sample ID	Sample Aliquot L	Sample Aliquot L	Sample Aliquot L	Sample Aliquot L	Sample Aliquot L	Sample Date/Time	Pos.	Detector ID	Counting Time (min.)	Alpha	Beta	Gross Counts	Beta cpm	Detector Efficiency Error (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Weekly Bkg Count Time (min.)	Count Rate (cpm)	Separation Date/Time	Count Start Date/Time	Count Rate (cpm)	Ac-228 Count	Ac-228 Decay	Ac-228 Correction	Calculated Sample Recovery %	Sample Recovery Error %	Results Pos.
1	1201245712.1	1.0000	2.0399E-05	7/12/2009 0:00	1A	15	36	1980	132.000	0.6303	0.00600	0.312	500	7/12/2009 5:40	7/12/2009 8:39	1.000	0.713	1.014	100.83%	1.00%	1.014	0.0083%	1.00%	1.014	100.83%	1.00%	1

Page 1

159

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 Normalis are decay corrected to Sample Date/Time

\* indicates results calculated at 100% recovery

Decision Level	Critical Level	Required MDA	Sample Act. Conc.	Sample Act. Error	Net Count Rate		Net Count Rate		Counting Uncertainty		Sample Type	Nominal pCi/L	Recovery
					MDA	pCi/L	CPM	CPM	pCi/L	pCi/L			
0.3471	0.2451	1	0.6937	134.0279	0.0254	131.6880	2.9666	5.9178	21.6466	LCS	164.3409	81.6%	
0.3647	0.2575	1	0.7192	133.0399	0.0251	130.2590	2.9508	5.9071	21.4655	LCS	164.3409	81.0%	
0.5889	0.3790	1	0.9659	145.2921	0.0243	139.8173	3.0611	6.2347	23.3752	LCS	164.3409	88.4%	
0.4695	0.3314	1	0.8755	159.8828	0.0239	150.4760	3.1730	6.6057	25.6756	LCS	164.3409	97.3%	
0.4261	0.3008	1	0.8097	127.0000	0.0257	122.0633	2.8583	5.8279	20.5368	LCS	164.3409	77.3%	
0.7599	0.5395	1	1.2813	141.0616	0.0247	135.4387	3.0211	6.1673	22.7300	LCS	164.3409	85.8%	
0.3798	0.2681	1	0.7515	141.8559	0.0253	131.7993	2.9681	6.2613	22.9053	LCS	164.3409	86.3%	
0.4150	0.2830	1	0.8072	145.8182	0.0251	131.8887	2.9696	6.4352	23.5274	LCS	164.3409	88.7%	
0.6347	0.4481	1	1.1343	129.9854	0.0284	108.9047	2.7042	6.3116	21.1935	LCS	164.3409	78.9%	
0.9035	0.6379	1	1.5022	135.4510	0.0266	119.6900	2.8455	6.3115	21.9803	LCS	164.3409	82.4%	
0.6078	0.4291	1	1.0779	141.2594	0.0255	128.6447	2.9382	6.3235	22.8259	LCS	164.3409	86.0%	
0.5473	0.3864	1	0.9987	155.5960	0.0247	137.7700	3.0378	6.7244	25.0636	LCS	164.3409	94.7%	
0.6283	0.4436	1	1.1054	135.5336	0.0264	124.2433	2.8986	6.1761	21.9739	LCS	164.3409	83.3%	
0.9036	0.6379	1	1.4942	136.9155	0.0254	125.4287	2.9134	6.2333	22.1127	LCS	164.3409	88.8%	
0.7676	0.5419	1	1.3079	145.9826	0.0252	130.3400	2.9624	6.5032	23.5621	LCS	164.3409	90.0%	
0.7520	0.5309	1	1.3000	147.9661	0.0266	124.2633	2.8910	6.7471	24.0105	LCS	164.3409	82.1%	
0.4809	0.3395	1	0.9027	134.9611	0.0269	120.7040	2.8427	6.2312	21.9265	LCS	164.3409	80.0%	
0.8974	0.4924	1	1.2076	131.4742	0.0271	117.9500	2.8170	6.1544	21.3797	LCS	164.3409	89.0%	
0.6530	0.4610	1	1.1419	148.2299	0.0259	132.9873	2.9894	6.4406	23.6659	LCS	164.3409	95.2%	
0.7661	0.5409	1	1.3064	156.3706	0.0255	139.2187	3.0605	6.7377	25.2668	LCS	164.3409	81.7%	
0.6899	0.4871	1	1.1997	134.1863	0.0270	118.9960	2.8288	6.2523	21.8127	LCS	164.3409	83.4%	
0.6079	0.4292	1	1.0862	137.0396	0.0269	120.3027	2.8412	6.3436	22.2643	LCS	164.3409	88.8%	
0.9509	0.6713	1	1.5725	146.0056	0.0264	127.0307	2.9317	6.6044	23.6775	LCS	164.3409	88.0%	
0.4376	0.3090	1	0.8562	144.5849	0.0276	113.7727	2.7577	6.3903	21.8573	LCS	164.3409	89.8%	
0.4227	0.2984	1	0.8330	134.2390	0.0275	118.4887	2.8152	6.4094	22.3723	LCS	164.3409	92.4%	
0.4360	0.3079	1	0.8480	137.6373	0.0270	118.4887	2.8152	6.7858	24.6088	LCS	164.3409	92.6%	
0.3962	0.2797	1	0.7956	151.8935	0.0262	128.6313	2.9319	6.7499	24.6318	LCS	164.3409	77.8%	
0.4480	0.3091	1	0.8657	152.1131	0.0261	130.4707	2.9539	6.2072	20.8618	LCS	164.3409	82.2%	
0.6932	0.4470	1	1.1278	127.8251	0.0279	109.4120	2.7108	6.3699	21.9896	LCS	164.3409	89.2%	
0.8917	0.6931	1	1.6167	135.1471	0.0273	117.2540	2.8124	6.5922	23.7610	LCS	164.3409	86.1%	
0.5779	0.4080	1	1.0463	146.5864	0.0263	127.3240	2.9214	6.4441	23.0149	LCS	164.3409	79.4%	
0.8422	0.5946	1	1.4301	141.4935	0.0272	117.4880	2.8147	6.6441	23.0149	LCS	164.3409	86.1%	
0.4379	0.3091	1	0.8509	130.5505	0.0276	112.2200	2.7400	6.2478	21.2682	LCS	164.3409	81.4%	
0.7972	0.5629	1	1.3635	133.7974	0.0277	112.5273	2.7540	6.4182	21.9026	LCS	164.3409	87.8%	
0.4475	0.3159	1	0.8728	144.2924	0.0269	119.7633	2.8301	6.6832	23.4437	LCS	164.3409	91.8%	
0.8154	0.5757	1	1.3863	150.8313	0.0263	128.3747	2.9406	6.7718	24.4459	LCS	164.3409	81.8%	
0.4063	0.2868	1	0.8104	134.4151	0.0275	113.5507	2.7553	6.3927	21.8871	LCS	164.3409	82.2%	
1.9322	1.3641	1	2.9747	135.0540	0.0285	109.6040	2.7857	6.7277	22.0820	LCS	164.3409	89.4%	
0.4205	0.2969	1	0.8358	146.9063	0.0268	121.4093	2.8489	6.7565	23.8548	LCS	164.3409	86.1%	
0.4437	0.3182	1	0.8728	144.8386	0.0271	117.5853	2.8041	6.7699	23.5500	LCS	164.3409	88.1%	
0.3432	0.2423	1	0.6763	135.4546	0.0253	141.3227	3.0733	5.7736	21.8705	LCS	164.3409	80.1%	
0.3289	0.2322	1	0.6397	131.8931	0.0247	150.2887	3.1684	5.4434	21.2189	LCS	164.3409	80.1%	
0.2949	0.2082	1	0.5922	148.3038	0.0237	169.2980	3.3626	5.7929	23.8966	LCS	164.3409	90.5%	
0.3379	0.2385	1	0.6530	151.8473	0.0235	172.6707	3.3968	5.8549	24.3615	LCS	164.3409	92.4%	
0.4616	0.3400	1	0.8577	131.6889	0.0249	148.2120	3.2186	5.4891	21.2301	LCS	164.3409	80.1%	
0.7498	0.5287	1	1.2332	134.8966	0.0246	153.3873	3.3053	5.5483	21.7215	LCS	164.3409	82.1%	
0.4447	0.3140	1	0.8052	148.8317	0.0238	162.8880	3.3080	5.6232	23.8982	LCS	164.3409	90.8%	
0.6180	0.4363	1	1.0494	143.9479	0.0241	162.8880	3.3080	5.7315	23.1384	LCS	164.3409	87.6%	
0.3427	0.2420	1	0.6680	135.0873	0.0248	148.3533	3.1490	5.6202	21.7752	LCS	164.3409	82.2%	
0.5997	0.4234	1	1.0256	129.5009	0.0251	144.7940	3.1202	5.4697	20.8960	LCS	164.3409	78.9%	
0.6469	0.4602	1	1.0649	146.0021	0.0240	163.4967	3.3053	5.7852	23.4616	LCS	164.3409	88.8%	
0.3316	0.2341	1	0.6469	146.0021	0.0235	174.3747	3.4225	6.1425	25.6134	LCS	164.3409	97.2%	
0.6355	0.4487	1	1.0805	159.6717	0.0251	144.5507	3.1078	5.5650	21.3060	LCS	164.3409	80.4%	
0.3136	0.2214	1	0.6255	132.0625	0.0254	145.4707	3.1861	5.8215	21.9790	LCS	164.3409	82.5%	
1.4618	1.0321	1	2.2506	135.6135	0.0254	154.5427	3.2193	5.7718	22.7000	LCS	164.3409	86.2%	
0.3185	0.2249	1	0.6330	141.6298	0.0245	158.8520	3.2579	5.8988	23.6017	LCS	164.3409	89.3%	
0.3327	0.2349	1	0.6546	146.7439	0.0242	158.8520	3.2579	5.8988	23.6017	LCS	164.3409	89.3%	

Handwritten signature/initials and date: 7/12/09

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine
1	1A	15	36	1980	7/2/2009 8:39	7/2/2009 8:54	Protean
2	1B	15	27	1959	7/2/2009 8:40	7/2/2009 8:55	Protean
3	1C	15	44	2108	7/2/2009 8:40	7/2/2009 8:55	Protean
4	1D	15	108	2265	7/2/2009 8:40	7/2/2009 8:55	Protean
5	2A	15	69	1838	7/2/2009 8:40	7/2/2009 8:55	Protean
6	2B	15	8	2053	7/2/2009 8:40	7/2/2009 8:55	Protean
7	2C	15	96	1982	7/2/2009 8:40	7/2/2009 8:55	Protean
8	2D	15	93	1984	7/2/2009 9:08	7/2/2009 9:23	Protean
1	3A	15	233	1645	7/2/2009 9:08	7/2/2009 9:23	Protean
2	3B	15	99	1821	7/2/2009 9:08	7/2/2009 9:23	Protean
3	3C	15	96	1942	7/2/2009 9:08	7/2/2009 9:23	Protean
4	3D	15	90	2076	7/2/2009 9:08	7/2/2009 9:23	Protean
5	4A	15	79	1877	7/2/2009 9:08	7/2/2009 9:23	Protean
6	4B	15	13	1909	7/2/2009 9:08	7/2/2009 9:23	Protean
7	4C	15	97	1974	7/2/2009 9:09	7/2/2009 9:24	Protean
8	4D	15	181	1880	7/2/2009 9:25	7/2/2009 9:40	Protean
1	5A	15	53	1818	7/2/2009 9:26	7/2/2009 9:41	Protean
2	5B	15	59	1785	7/2/2009 9:26	7/2/2009 9:41	Protean
3	5C	15	43	2009	7/2/2009 9:26	7/2/2009 9:41	Protean
4	5D	15	59	2107	7/2/2009 9:26	7/2/2009 9:41	Protean
5	6A	15	35	1800	7/2/2009 9:27	7/2/2009 9:42	Protean
6	6B	15	71	1816	7/2/2009 9:27	7/2/2009 9:42	Protean
7	6C	15	81	1933	7/2/2009 9:27	7/2/2009 9:42	Protean
8	6D	15	81	1826	7/2/2009 9:47	7/2/2009 10:02	Protean
1	7A	15	75	1711	7/2/2009 9:48	7/2/2009 10:03	Protean
2	7B	15	59	1783	7/2/2009 9:48	7/2/2009 10:03	Protean
3	7C	15	74	1934	7/2/2009 9:48	7/2/2009 10:03	Protean
4	7D	15	83	1963	7/2/2009 9:48	7/2/2009 10:03	Protean
5	8A	15	49	1653	7/2/2009 9:48	7/2/2009 10:03	Protean
6	8B	15	20	1788	7/2/2009 9:48	7/2/2009 10:03	Protean
7	8C	15	34	1920	7/2/2009 9:48	7/2/2009 10:03	Protean
8	8D	15	45	1782	7/2/2009 10:07	7/2/2009 10:22	Protean
1	9A	15	17	1689	7/2/2009 10:06	7/2/2009 10:21	Protean
2	9B	15	13	1706	7/2/2009 10:06	7/2/2009 10:21	Protean
3	9C	15	13	1802	7/2/2009 10:06	7/2/2009 10:21	Protean
4	9D	15	15	1945	7/2/2009 10:06	7/2/2009 10:21	Protean
5	10A	15	10	1708	7/2/2009 10:07	7/2/2009 10:22	Protean
6	10B	15	19	1743	7/2/2009 10:07	7/2/2009 10:22	Protean
7	10C	15	15	1826	7/2/2009 10:07	7/2/2009 10:22	Protean
8	10D	15	14	1769	7/2/2009 10:22	7/2/2009 10:37	Protean
1	11A	15	19	2125	7/2/2009 7:26	7/2/2009 7:41	Protean
2	11B	15	22	2260	7/2/2009 7:26	7/2/2009 7:41	Protean
3	11C	15	13	2544	7/2/2009 7:26	7/2/2009 7:41	Protean
4	11D	15	14	2596	7/2/2009 7:26	7/2/2009 7:41	Protean
5	12A	15	17	2235	7/2/2009 7:26	7/2/2009 7:41	Protean
6	12B	15	10	2330	7/2/2009 7:26	7/2/2009 7:41	Protean
7	12C	15	16	2530	7/2/2009 7:26	7/2/2009 7:41	Protean
8	12D	15	10	2463	7/2/2009 7:26	7/2/2009 7:41	Protean
1	13A	15	11	2231	7/2/2009 7:49	7/2/2009 8:04	Protean
2	13B	15	13	2190	7/2/2009 7:49	7/2/2009 8:04	Protean
3	13C	15	11	2458	7/2/2009 7:49	7/2/2009 8:04	Protean

219  
7/2/09

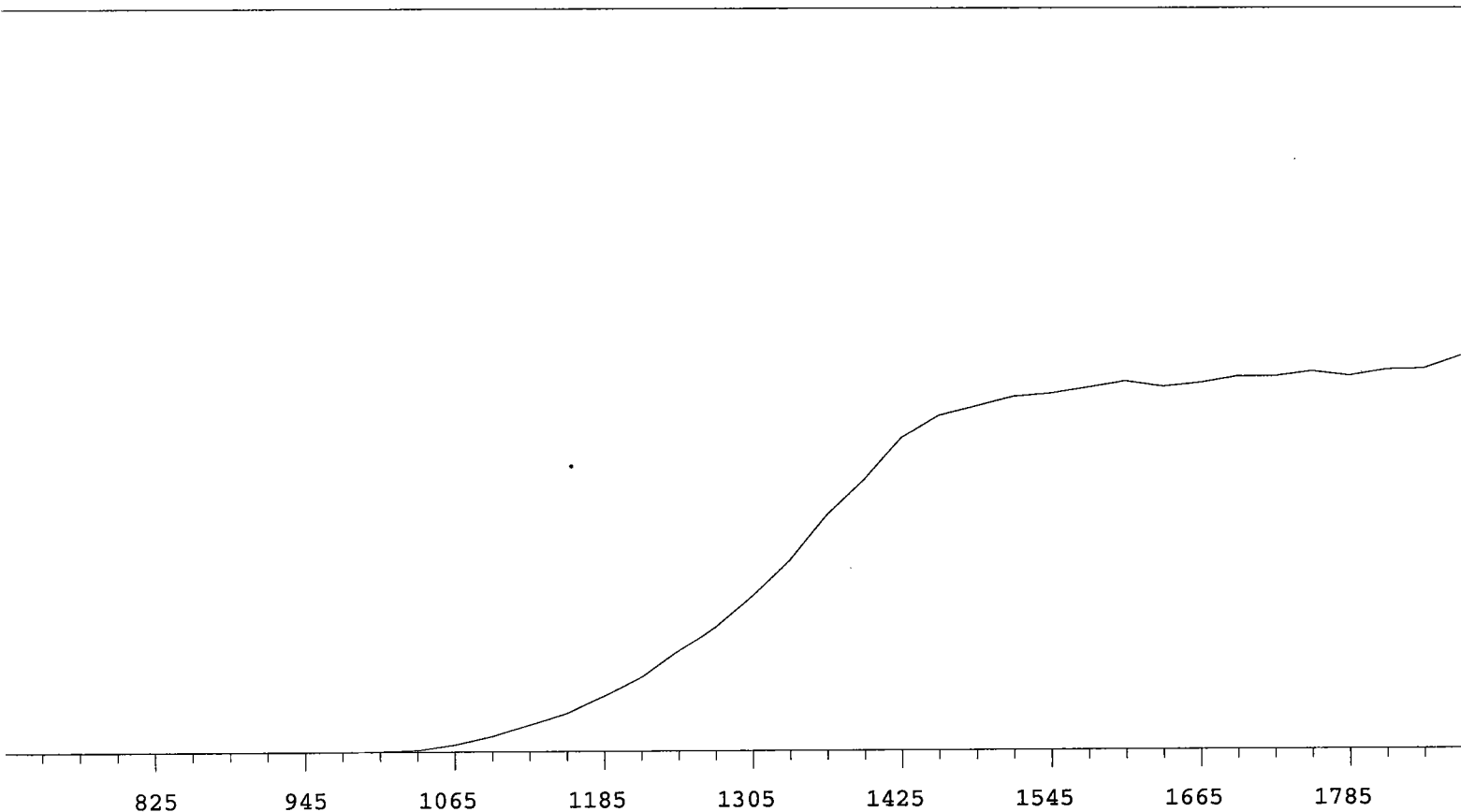


ver\_pic\_09.xls

4	13D	15	12	2635	7/2/2009 7:50	7/2/2009 8:05	Protean
5	14A	15	11	2173	7/2/2009 7:50	7/2/2009 8:05	Protean
6	14B	15	11	2281	7/2/2009 7:50	7/2/2009 8:05	Protean
7	14C	15	14	2323	7/2/2009 7:50	7/2/2009 8:05	Protean
8	14D	15	14	2388	7/2/2009 7:50	7/2/2009 8:05	Protean

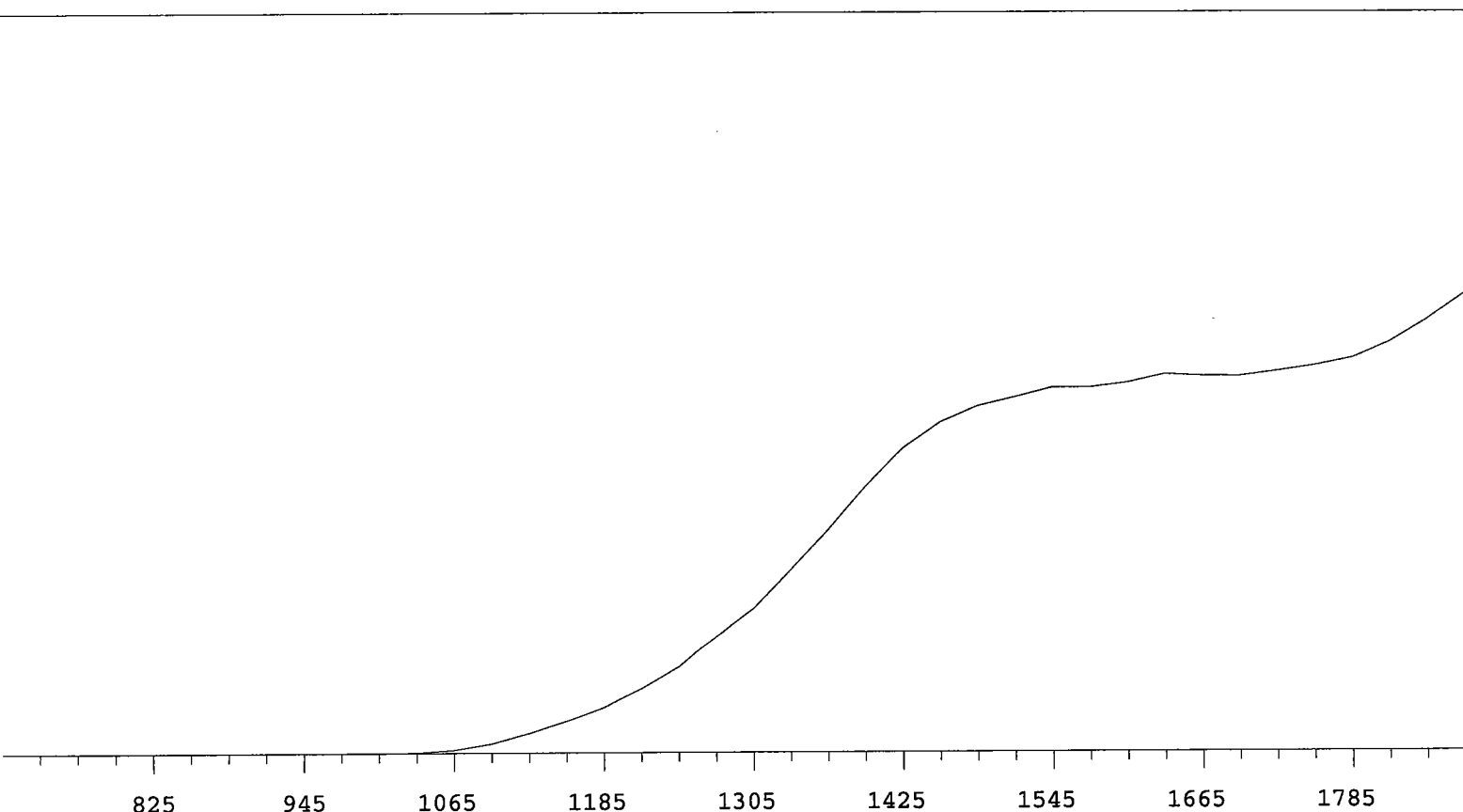
Ra-228 Protean	Cal Date A0	7/2/2009 A1	Exp Date A2	7/31/2009 A3	A4
1A	6.30258E-01				
1B	6.28221E-01				
1C	6.17615E-01				
1D	6.04341E-01				
2A	6.17224E-01				
2B	6.16681E-01				
2C	5.96919E-01				
2D	6.11886E-01				
3A	5.68218E-01				
3B	5.98041E-01				
3C	6.16431E-01				
3D	5.99405E-01				
4A	6.20765E-01				
4B	6.20459E-01				
4C	6.05183E-01				
4D	5.87325E-01				
5A	6.25790E-01				
5B	6.28027E-01				
5C	6.36802E-01				
5D	6.23741E-01				
6A	6.22050E-01				
6B	6.16280E-01				
6C	6.11053E-01				
6D	6.12043E-01				
7A	6.17961E-01				
7B	6.27962E-01				
7C	6.17791E-01				
7D	6.25720E-01				
8A	6.24723E-01				
8B	6.33167E-01				
8C	6.33890E-01				
8D	6.28089E-01				
9A	6.496412E-01				
9B	6.356321E-01				
9C	6.273008E-01				
9D	6.432553E-01				
10A	6.389066E-01				
10B	6.137441E-01				
10C	6.249999E-01				
10D	6.319781E-01				
11A	5.82502E-01				
11B	6.37172E-01				
11C	6.35171E-01				
11D	6.34840E-01				
12A	6.28566E-01				
12B	6.35234E-01				
12C	6.30366E-01				
12D	6.31956E-01				
13A	6.40953E-01				

<b>13B</b>	6.52643E-01
<b>13C</b>	6.53798E-01
<b>13D</b>	6.37701E-01
<b>14A</b>	6.39290E-01
<b>14B</b>	6.26611E-01
<b>14C</b>	6.37531E-01
<b>14D</b>	6.32609E-01



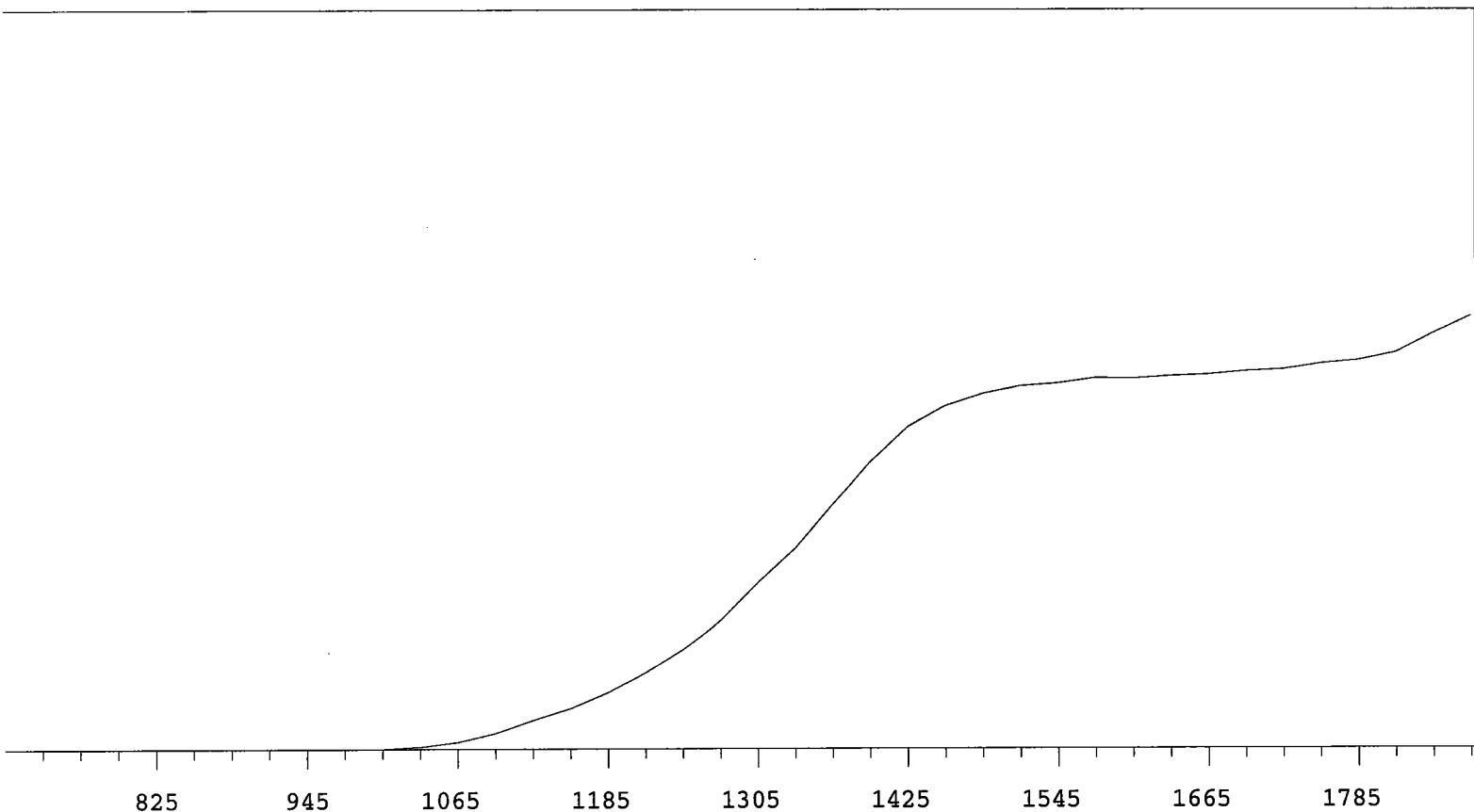
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	11640	+69.78
735	1		1335	14241	+62.88
765	0		1365	17534	+55.91
795	0	+0.00	1395	20127	+45.04
825	0	>100	1425	23254	+31.29
855	1	>100	1455	24902	+20.41
885	0	+55.56	1485	25605	+10.49
915	2	+66.67	1515	26310	+6.44
945	0	>100	1545	26535	+5.31
975	2	>100	1575	26953	+2.79
1005	42	>100	1605	27399	+1.83
1035	145	>100	1635	27000	+1.71
1065	544	>100	1665	27255	+1.62
1095	1136	>100	1695	27723	+3.14
1125	1967	>100	1725	27705	+1.56
1155	2845	>100	1755	28072	+1.15
1185	4078	>100	1785	27729	+1.43
1215	5483	+93.18	1815	28194	+3.24
1245	7400	+83.35	1845	28243	
1275	9328	+75.40	1875	29191	

Alpha Volts: 1575 Beta Volts: 1575

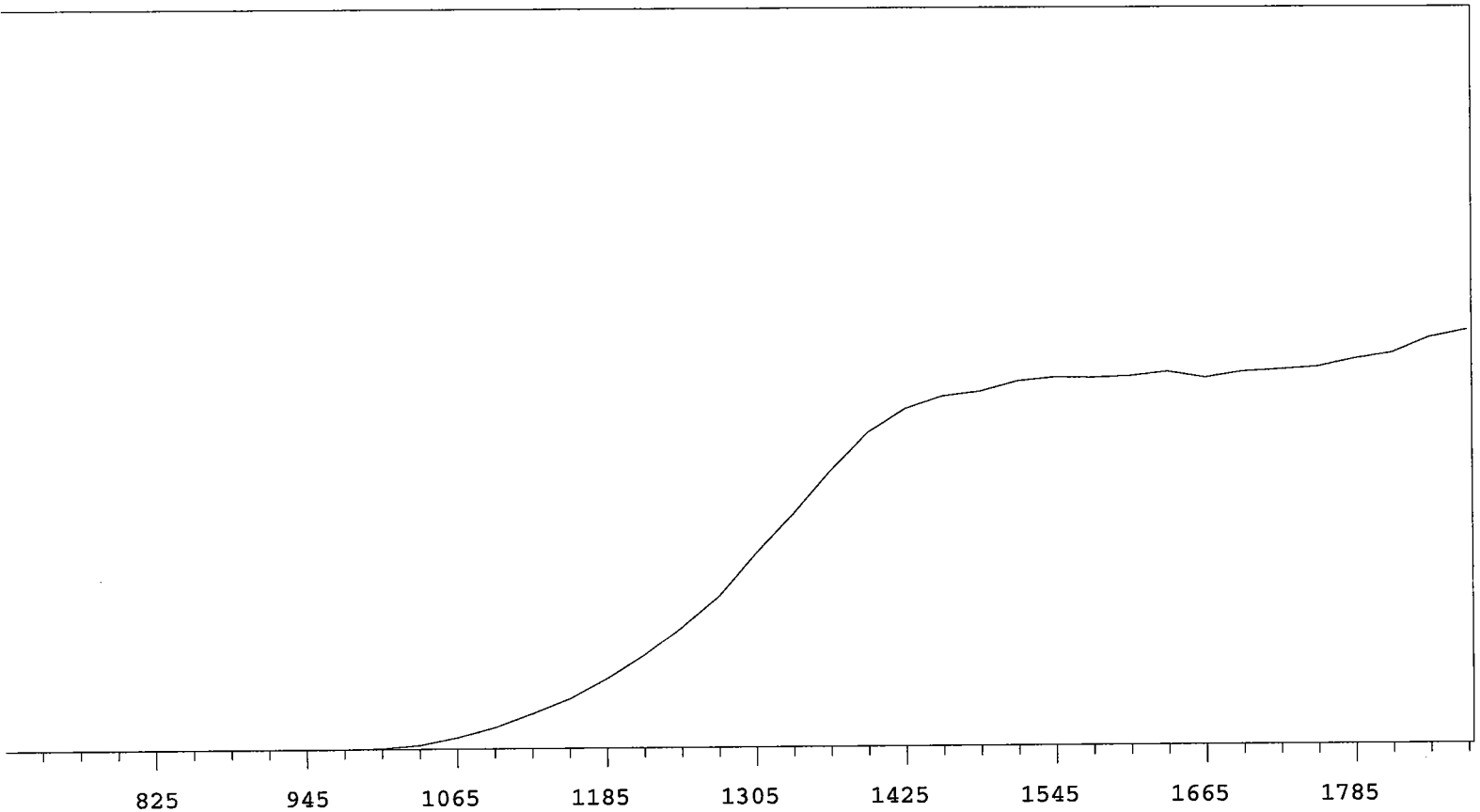


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	13188	+75.92
735	0		1335	16818	+67.60
765	0	+55.56	1365	20420	+59.86
795	1	+83.33	1395	24341	+47.85
825	1	+55.56	1425	27854	+35.51
855	0	>100	1455	30288	+23.26
885	1	+0.00	1485	31798	+14.54
915	0	+0.00	1515	32622	+8.32
945	1	>100	1545	33496	+5.11
975	0	>100	1575	33475	+4.43
1005	4	>100	1605	33903	+3.09
1035	56	>100	1635	34654	+2.46
1065	292	>100	1665	34485	+1.74
1095	890	>100	1695	34445	+1.84
1125	1841	>100	1725	34908	+3.91
1155	2936	>100	1755	35401	+6.80
1185	4179	>100	1785	36062	+10.27
1215	5837	>100	1815	37505	+14.30
1245	7821	+91.28	1845	39508	
1275	10638	+83.88	1875	41843	

Alpha Volts: 1575 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	14817	+71.06
735	0		1335	17823	+63.34
765	1	+0.00	1365	21704	+53.63
795	0	>100	1395	25422	+42.55
825	1	-55.56	1425	28424	+29.21
855	1	+55.56	1455	30244	+18.11
885	0	>100	1485	31305	+10.10
915	1	>100	1515	31989	+6.07
945	0	>100	1545	32223	+3.43
975	4	>100	1575	32671	+2.15
1005	32	>100	1605	32621	+1.68
1035	206	>100	1635	32837	+1.52
1065	639	>100	1665	32961	+2.01
1095	1416	>100	1695	33249	+2.64
1125	2551	>100	1725	33409	+3.21
1155	3619	>100	1755	33931	+4.07
1185	5037	+98.68	1785	34234	+7.20
1215	6875	+91.19	1815	34909	+10.28
1245	8915	+85.53	1845	36660	
1275	11519	+77.28	1875	38205	

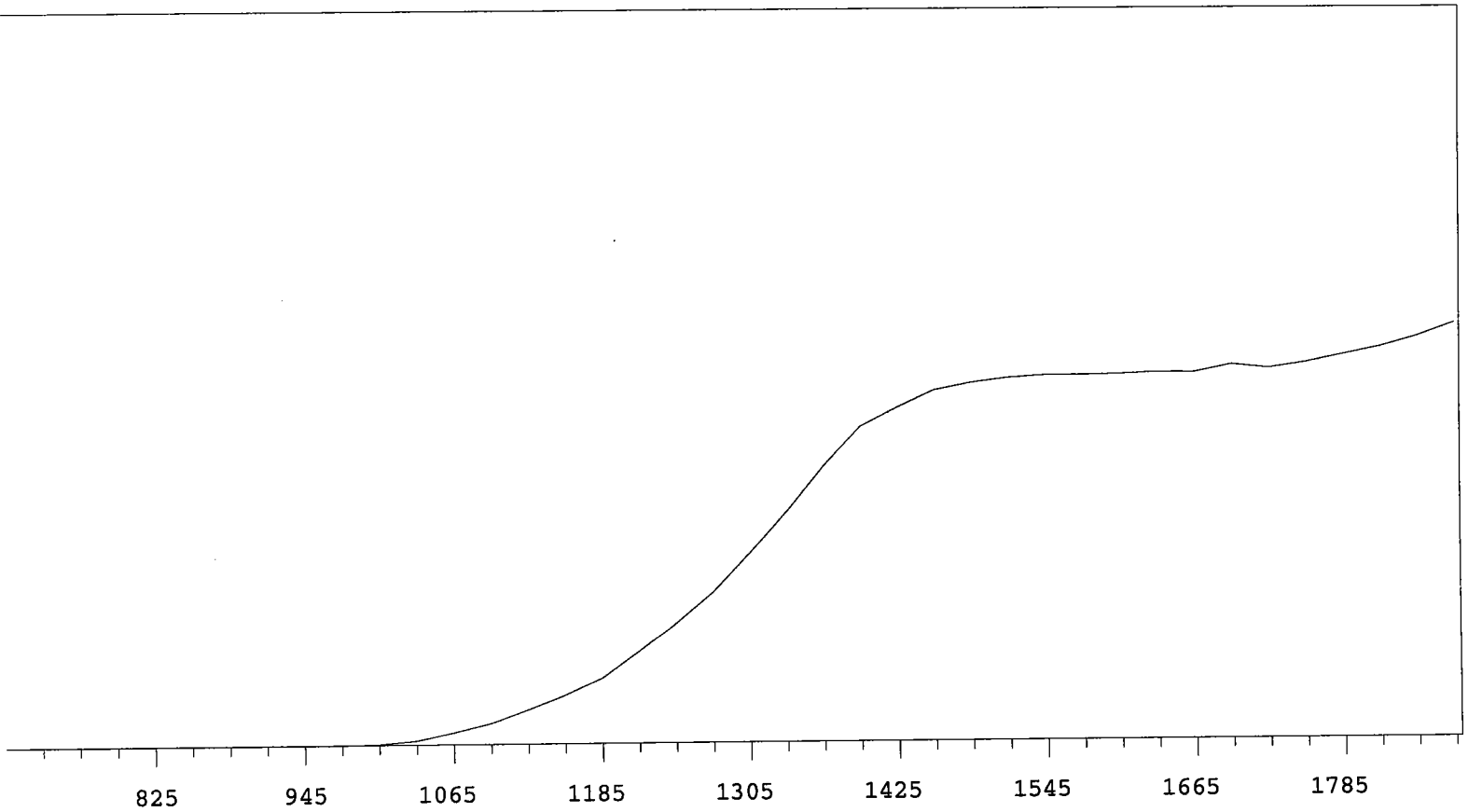


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15202	+66.36
735	1		1335	18216	+57.86
765	0	+0.00	1365	21597	+45.58
795	1	+0.00	1395	24648	+32.96
825	0	+0.00	1425	26505	+19.92
855	1	>100	1455	27475	+11.42
885	0	>100	1485	27836	+7.08
915	0	>100	1515	28609	+4.51
945	0	>100	1545	28896	+2.93
975	8	>100	1575	28862	+1.66
1005	75	>100	1605	28969	+0.36
1035	303	>100	1635	29292	+0.80
1065	872	>100	1665	28836	+1.06
1095	1656	>100	1695	29279	+1.48
1125	2729	>100	1725	29439	+3.59
1155	3862	>100	1755	29642	+4.07
1185	5425	+98.19	1785	30243	+6.51
1215	7256	+88.82	1815	30699	+7.79
1245	9510	+81.89	1845	31876	
1275	11944	+74.07	1875	32444	

MPC 9600 Plateau  
Alpha Volts: 705

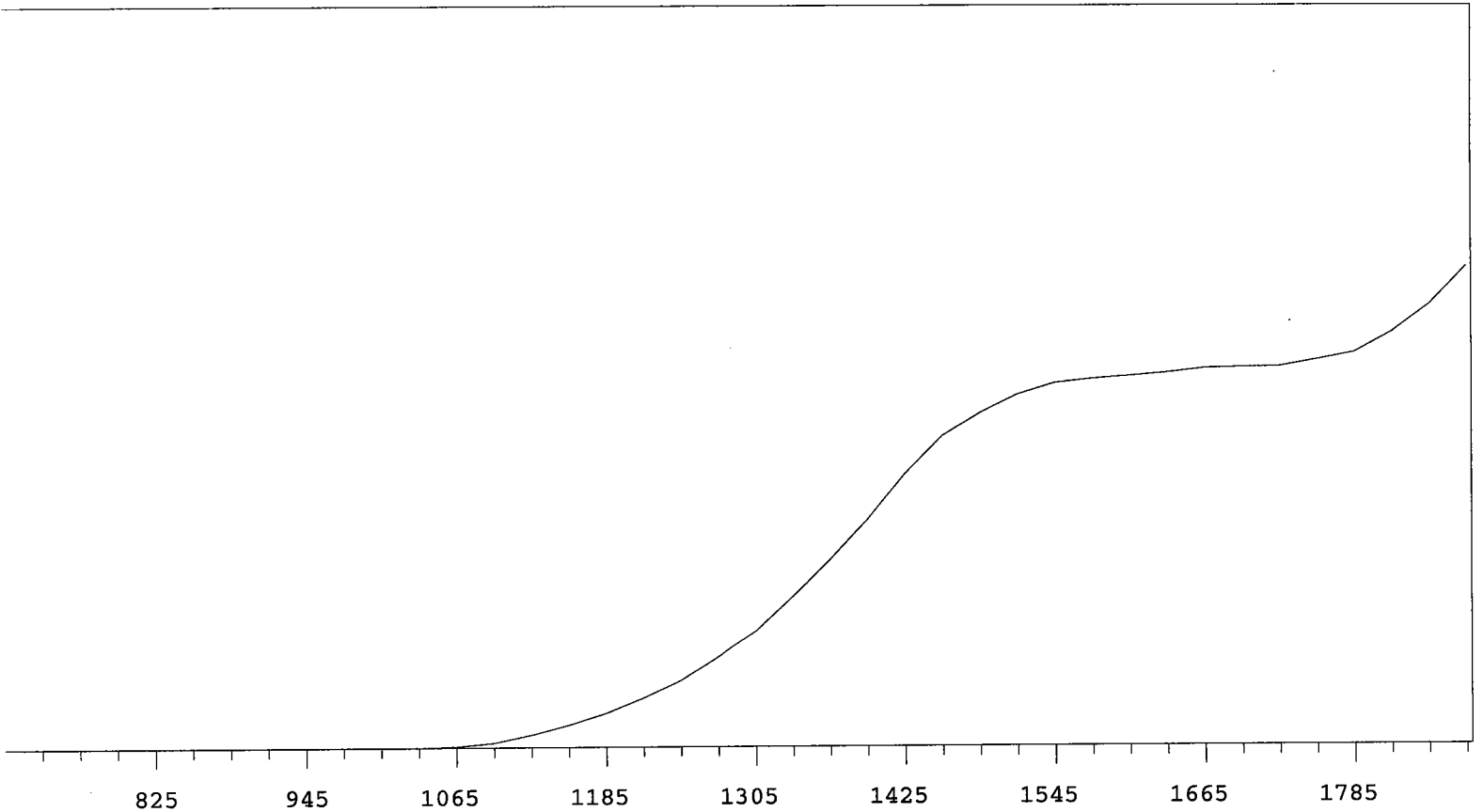
Instrument 2 MPC 9604 Detector A  
Beta Volts: 1575

7/1/2009

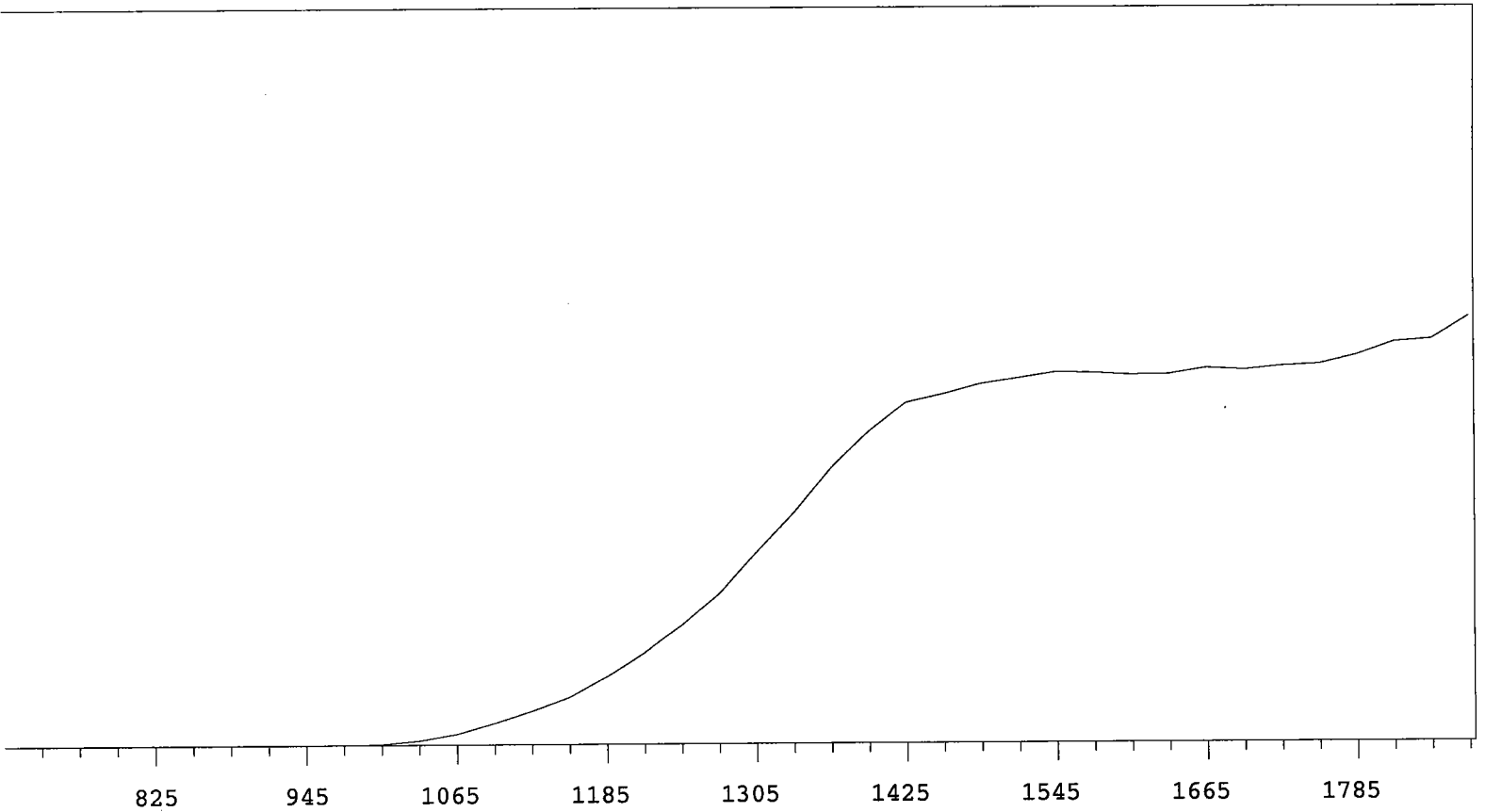


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19017	+67.45
735	1		1335	23157	+59.23
765	0	+83.33	1365	27625	+45.78
795	0	-83.33	1395	31465	+32.72
825	1	>100	1425	33352	+20.41
855	0	>100	1455	35084	+11.74
885	1	+100.00	1485	35819	+7.11
915	1	>100	1515	36292	+3.35
945	2	>100	1545	36527	+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	





VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	12541	+83.18
735	1		1335	16192	+74.48
765	0		1365	20083	+67.17
795	0	>100	1395	24273	+58.43
825	0	>100	1425	29090	+46.86
855	0	>100	1455	33223	+34.56
885	0	>100	1485	35608	+22.67
915	0	>100	1515	37581	+13.63
945	1	>100	1545	38762	+8.18
975	2	>100	1575	39185	+4.42
1005	3	>100	1605	39484	+3.06
1035	14	>100	1635	39806	+2.61
1065	127	>100	1665	40264	+2.03
1095	500	>100	1695	40353	+2.32
1125	1332	>100	1725	40431	+3.28
1155	2373	>100	1755	41127	+7.09
1185	3614	>100	1785	41882	+12.40
1215	5227	>100	1815	44049	+18.52
1245	7060	+97.33	1845	46950	
1275	9574	+90.30	1875	51097	

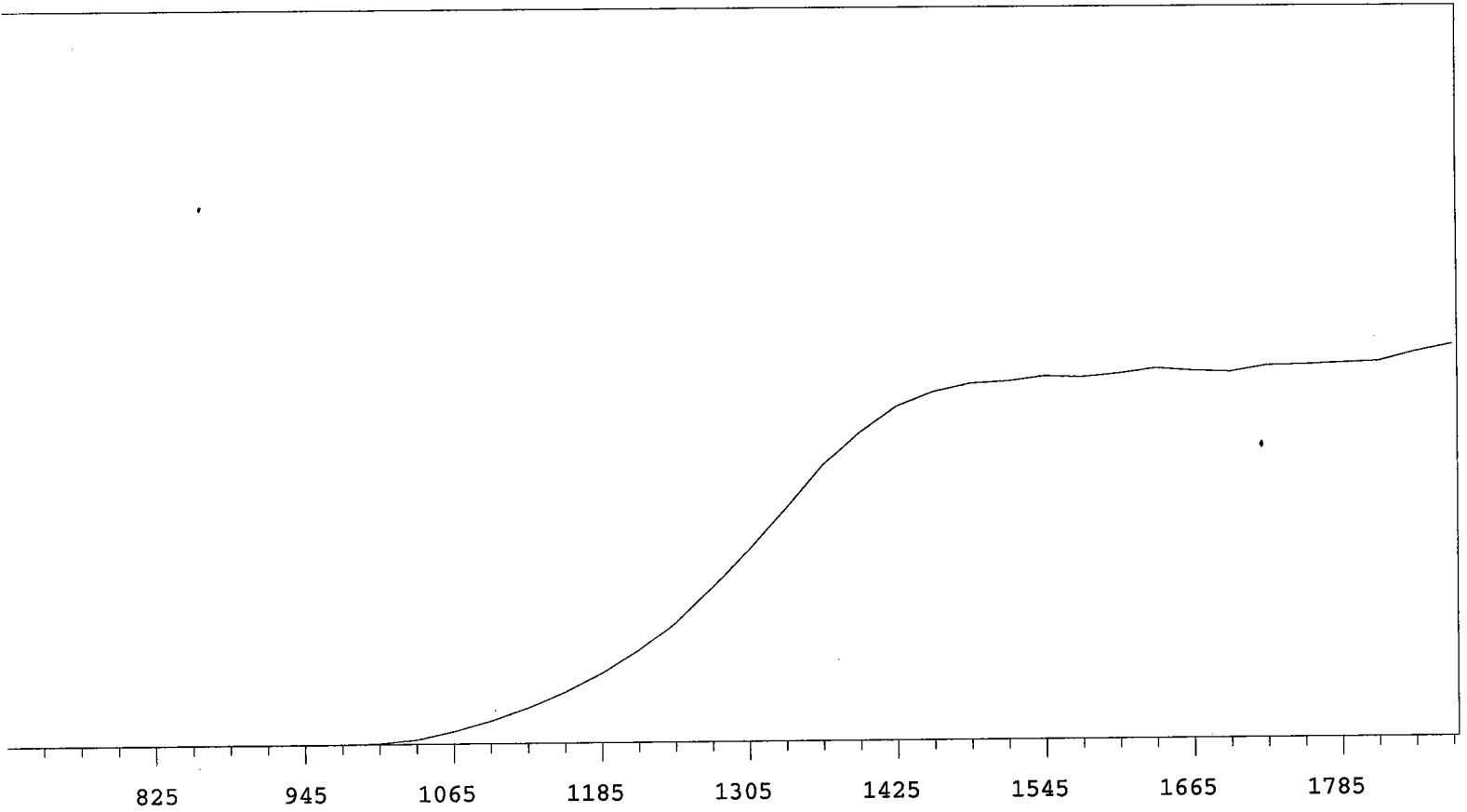


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18216	+67.74
735	0		1335	21995	+58.11
765	0		1365	26173	+46.11
795	0	>100	1395	29479	+32.75
825	0	>100	1425	32186	+20.62
855	0	>100	1455	33022	+12.13
885	0	>100	1485	33981	+7.22
915	1	>100	1515	34520	+4.95
945	0	>100	1545	35095	+2.07
975	17	>100	1575	35014	+0.38
1005	87	>100	1605	34812	+0.55
1035	438	>100	1635	34859	+1.11
1065	1055	>100	1665	35460	+1.94
1095	2114	>100	1695	35273	+1.95
1125	3282	>100	1725	35629	+2.73
1155	4625	>100	1755	35811	+5.77
1185	6554	+97.66	1785	36656	+6.44
1215	8743	+88.09	1815	37896	+9.21
1245	11345	+81.31	1845	38145	
1275	14261	+74.60	1875	40283	

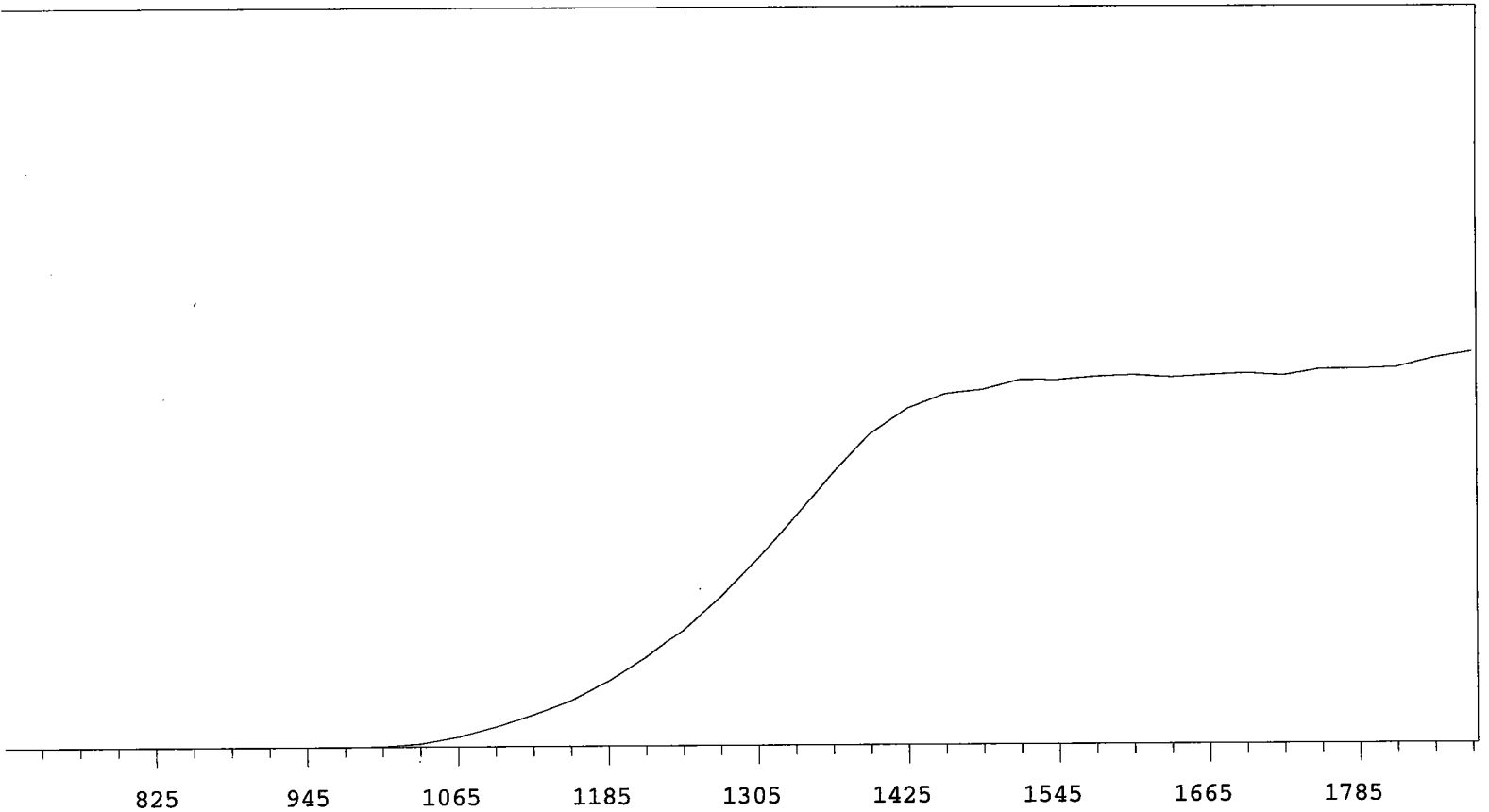
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 2 MPC 9604 Detector D  
Beta Volts: 1575

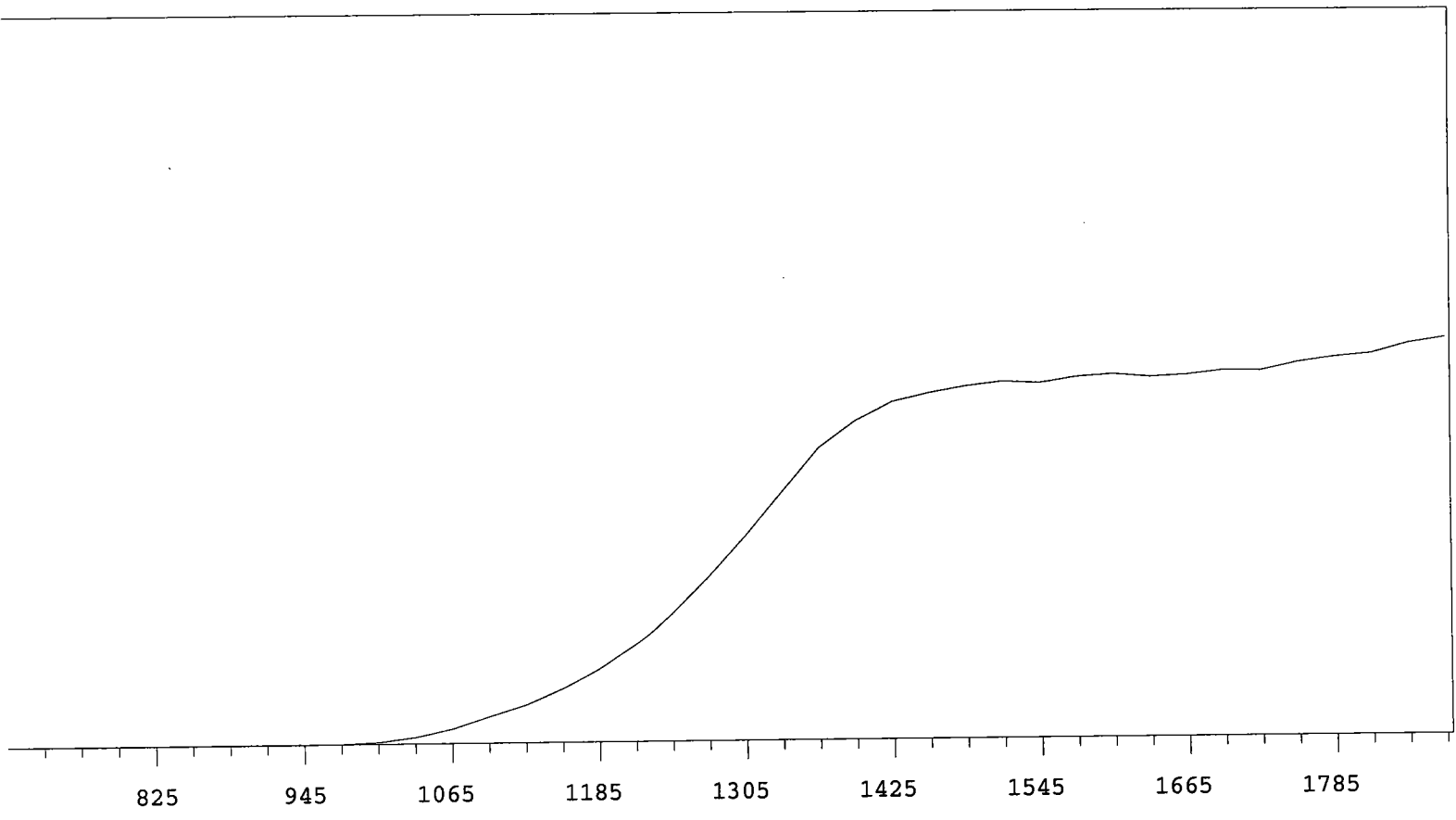
7/1/2009



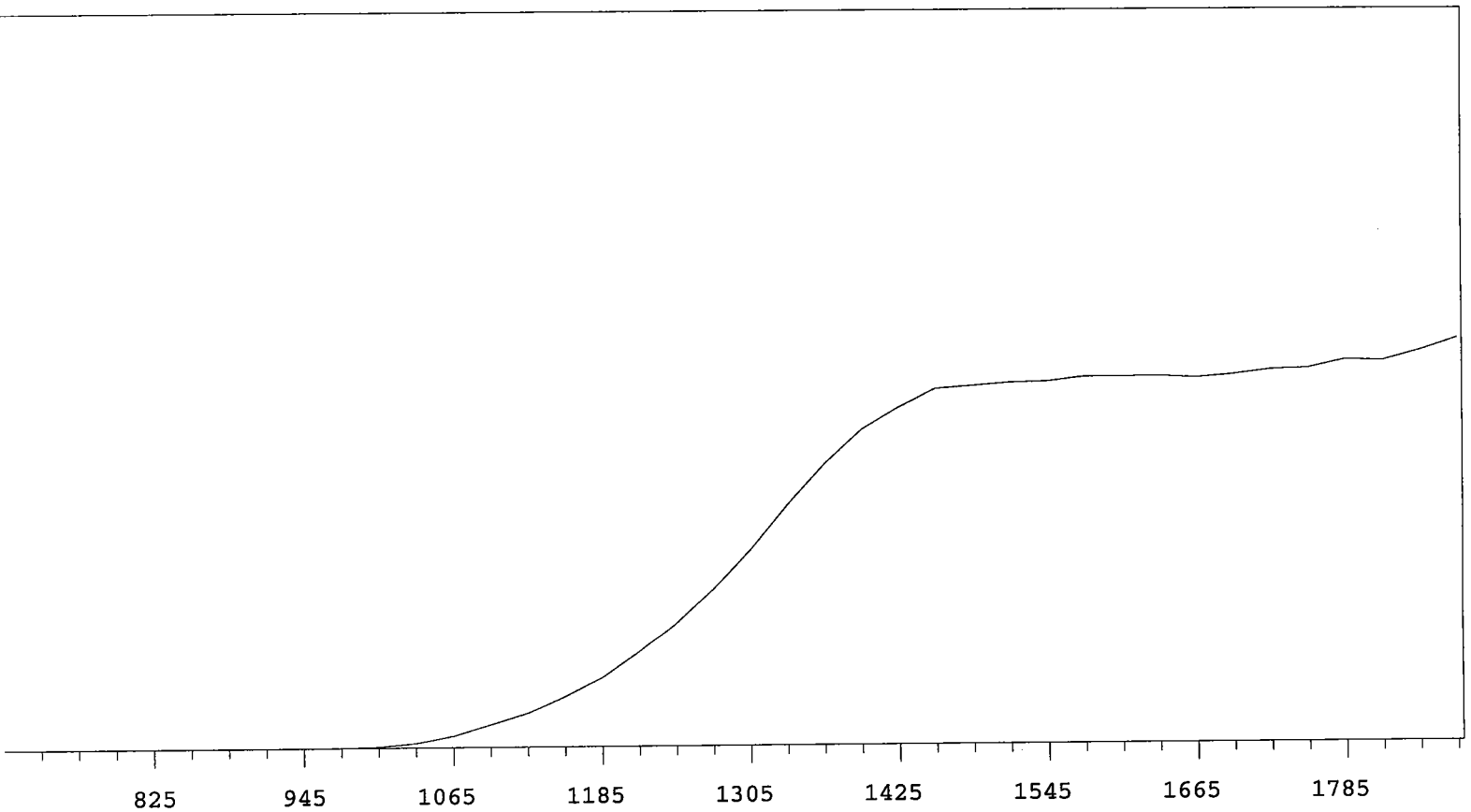
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18675	+65.94
735	0		1335	22620	+55.69
765	0	+83.33	1365	26869	+44.63
795	2	+55.56	1395	29957	+32.08
825	1	>100	1425	32494	+20.49
855	0	>100	1455	33836	+11.98
885	0	>100	1485	34627	+6.45
915	0	>100	1515	34849	+3.22
945	2	>100	1545	35298	+1.98
975	9	>100	1575	35180	+2.37
1005	89	>100	1605	35503	+1.57
1035	439	>100	1635	36006	+0.99
1065	1198	>100	1665	35722	+0.89
1095	2164	>100	1695	35597	+0.93
1125	3436	>100	1725	36188	+1.86
1155	4917	>100	1755	36272	+1.90
1185	6762	+96.59	1785	36389	+2.55
1215	9006	+89.14	1815	36529	+4.39
1245	11800	+81.34	1845	37459	
1275	15132	+73.59	1875	38170	



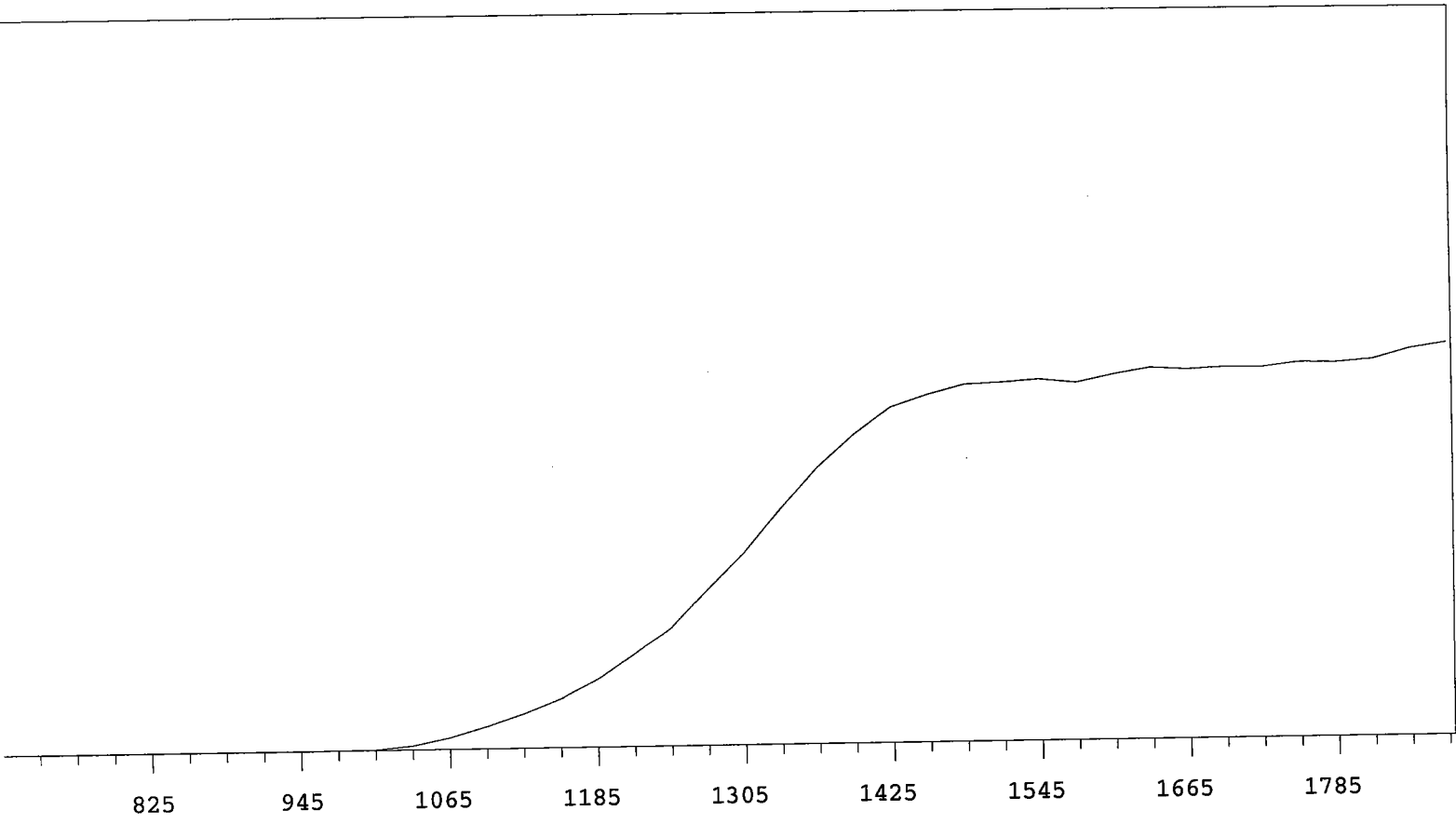
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	16654	+68.57
735	0		1335	20416	+59.26
765	0	+55.56	1365	24191	+47.28
795	1	>100	1395	27643	+34.04
825	1	+0.00	1425	29891	+21.08
855	1	>100	1455	31183	+12.30
885	0	>100	1485	31558	+6.67
915	0	>100	1515	32444	+4.05
945	0	>100	1545	32413	+2.90
975	9	>100	1575	32704	+0.81
1005	53	>100	1605	32837	+0.71
1035	302	>100	1635	32629	+0.49
1065	878	>100	1665	32797	+0.16
1095	1805	>100	1695	32964	+1.32
1125	2887	>100	1725	32746	+1.40
1155	4163	>100	1755	33308	+1.56
1185	5842	+99.81	1785	33318	+3.21
1215	7959	+90.90	1815	33456	+3.92
1245	10323	+83.03	1845	34283	
1275	13250	+75.91	1875	34815	



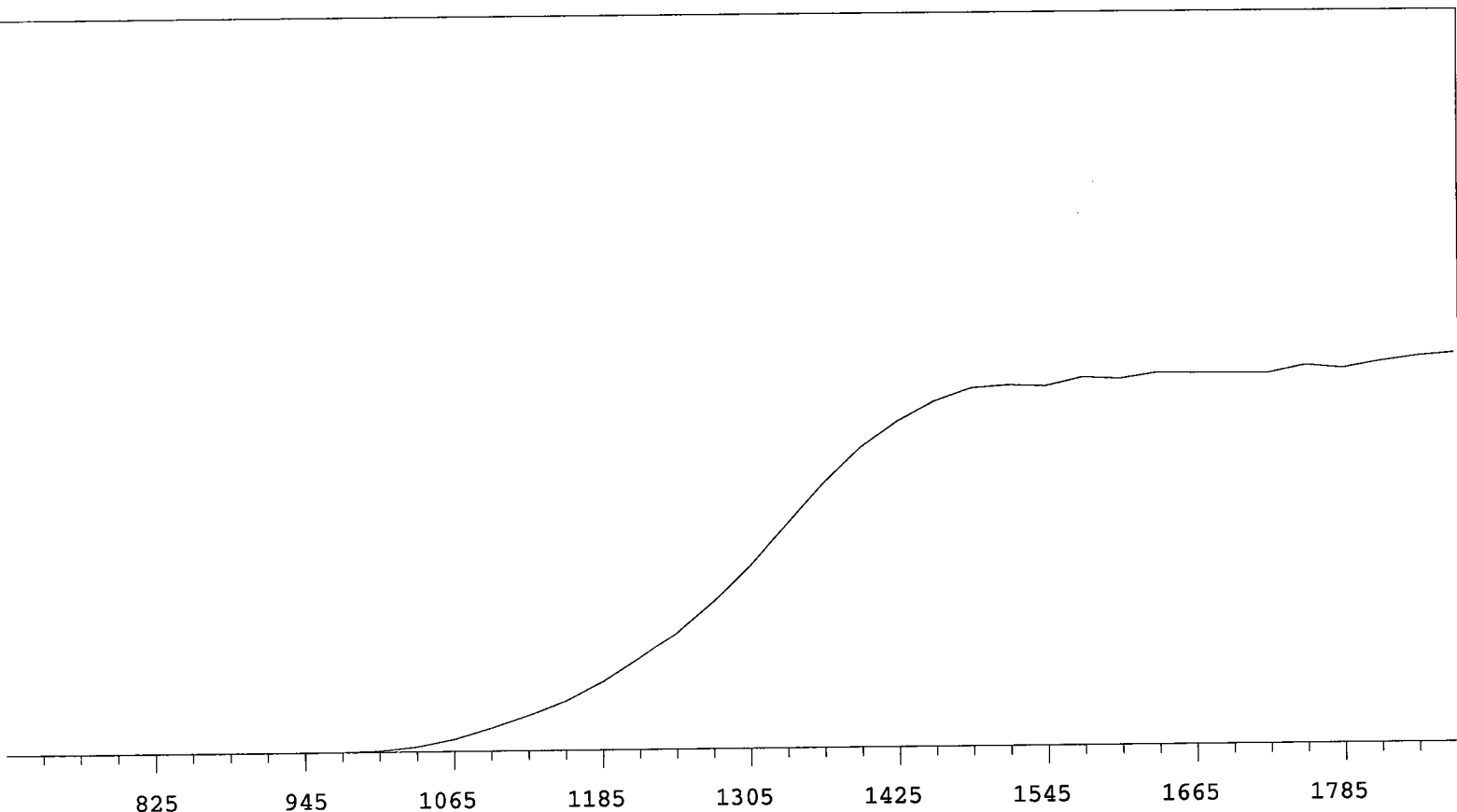
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	19810	+64.73
735	1		1335	23962	+52.62
765	0	-55.56	1365	28091	+39.27
795	0	>100	1395	30594	+25.61
825	1	>100	1425	32381	+14.86
855	3	+33.33	1455	33206	+8.91
885	0	+0.00	1485	33832	+4.41
915	1	>100	1515	34260	+3.01
945	2	>100	1545	34071	+2.33
975	29	>100	1575	34623	+1.34
1005	165	>100	1605	34848	+1.22
1035	613	>100	1635	34564	+0.89
1065	1394	>100	1665	34733	+1.01
1095	2558	>100	1695	35144	+2.76
1125	3702	>100	1725	35084	+3.66
1155	5222	>100	1755	35839	+3.97
1185	7161	+96.06	1785	36332	+5.39
1215	9507	+89.18	1815	36654	+5.35
1245	12552	+81.52	1845	37609	
1275	16030	+73.64	1875	38164	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	21412	+66.80
735	1		1335	26262	+56.32
765	1		1365	30679	+43.71
795	0	>100	1395	34466	+31.61
825	0	+0.00	1425	36949	+20.14
855	0	>100	1455	38998	+11.16
885	1	>100	1485	39313	+5.34
915	1	>100	1515	39625	+2.44
945	1	>100	1545	39751	+2.04
975	17	>100	1575	40227	+1.45
1005	122	>100	1605	40228	+0.56
1035	533	>100	1635	40255	+0.13
1065	1287	>100	1665	40075	+1.22
1095	2493	>100	1695	40384	+1.95
1125	3753	>100	1725	40900	+3.50
1155	5482	>100	1755	41028	+3.05
1185	7538	+99.39	1785	41899	+3.71
1215	10305	+90.31	1815	41767	+5.64
1245	13415	+82.57	1845	42852	
1275	17141	+75.13	1875	44132	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14171	+66.45
735	1		1335	17362	+54.90
765	0	+0.00	1365	20310	+43.83
795	1	>100	1395	22647	+30.82
825	0	+83.33	1425	24551	+20.19
855	0	-83.33	1455	25440	+11.69
885	1	>100	1485	26124	+5.90
915	0	>100	1515	26245	+2.21
945	1	>100	1545	26428	+1.39
975	12	>100	1575	26151	+2.69
1005	51	>100	1605	26721	+2.72
1035	298	>100	1635	27168	+2.80
1065	848	>100	1665	27007	+0.87
1095	1649	>100	1695	27135	+0.70
1125	2535	>100	1725	27089	+1.24
1155	3602	>100	1755	27414	+1.43
1185	5036	+98.31	1785	27373	+3.21
1215	6880	+91.37	1815	27581	+4.34
1245	8822	+82.29	1845	28332	
1275	11546	+74.61	1875	28750	



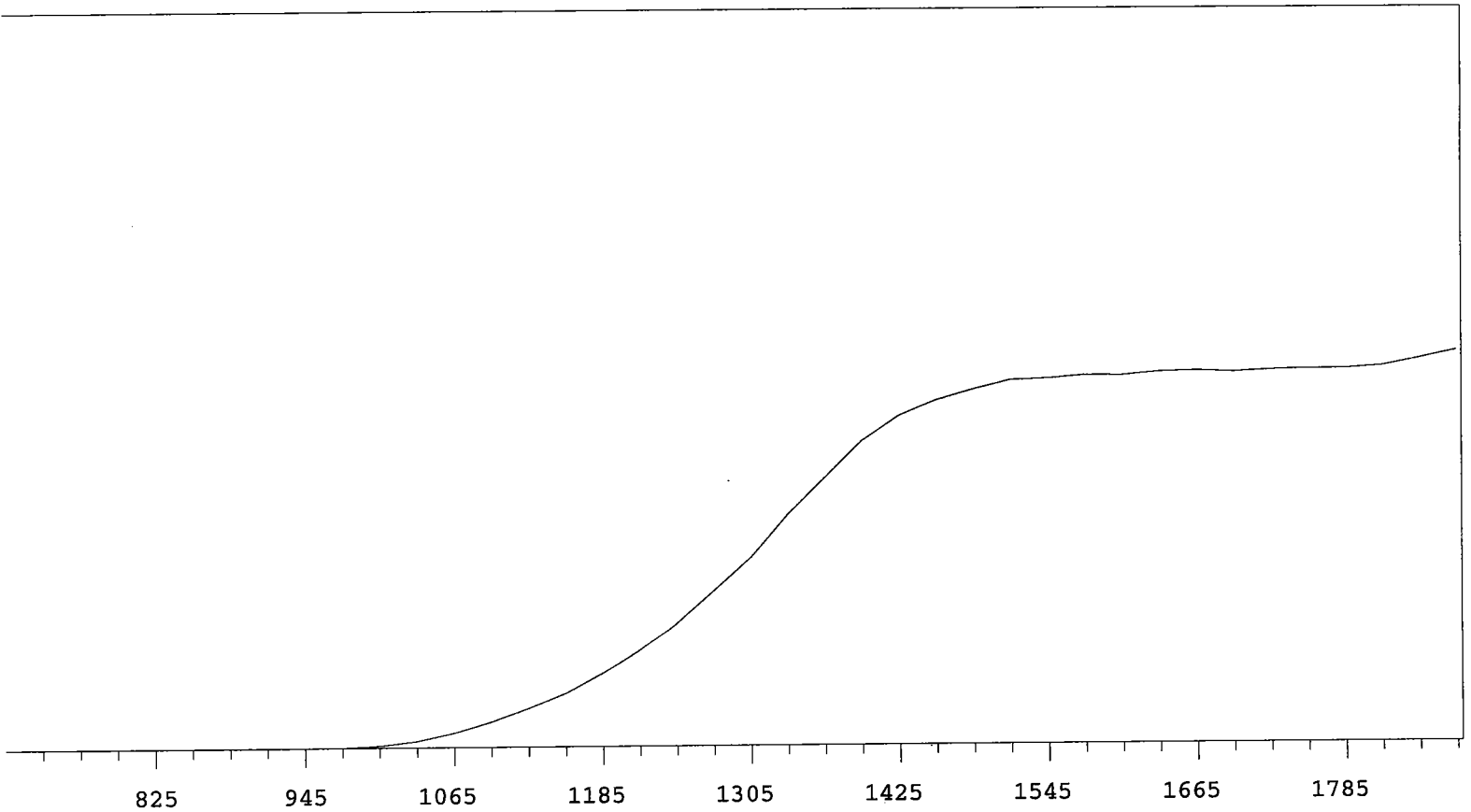
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16442	+66.24
735	0		1335	20146	+57.40
765	0		1365	23769	+46.40
795	0	>100	1395	26926	+34.68
825	2	+55.56	1425	29276	+24.40
855	1	>100	1455	31037	+15.28
885	0	-55.56	1485	32197	+7.91
915	3	>100	1515	32425	+4.33
945	0	>100	1545	32314	+2.14
975	16	>100	1575	33071	+2.66
1005	114	>100	1605	32918	+2.52
1035	451	>100	1635	33435	+1.02
1065	1100	>100	1665	33382	+0.73
1095	2068	>100	1695	33349	+1.07
1125	3189	>100	1725	33324	+1.28
1155	4386	>100	1755	34001	+2.26
1185	6094	+94.81	1785	33701	+3.08
1215	8184	+87.09	1815	34304	+2.97
1245	10489	+78.88	1845	34744	
1275	13273	+72.66	1875	35012	



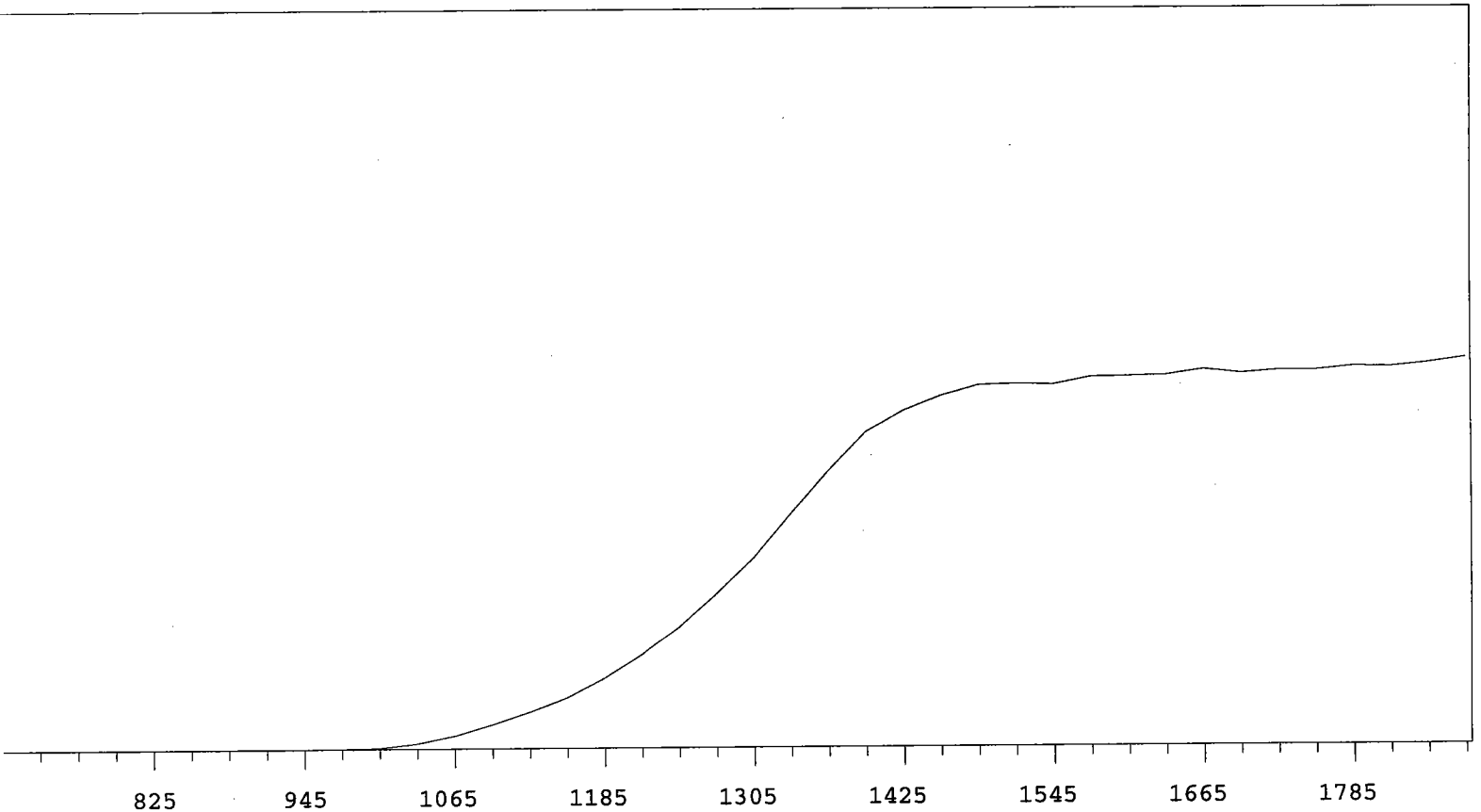
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 4 MPC 9604 Detector B  
Beta Volts: 1575

7/1/2009



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15747	+62.38
735	1		1335	19230	+54.19
765	0	+0.00	1365	22255	+44.46
795	1	>100	1395	25299	+32.45
825	0	>100	1425	27370	+22.24
855	0	>100	1455	28625	+14.10
885	0	>100	1485	29467	+8.56
915	0	>100	1515	30213	+5.29
945	2	>100	1545	30326	+2.77
975	31	>100	1575	30564	+1.57
1005	176	>100	1605	30548	+1.52
1035	550	>100	1635	30820	+0.85
1065	1218	>100	1665	30898	+0.79
1095	2114	>100	1695	30779	+0.44
1125	3212	>100	1725	30934	+0.45
1155	4416	>100	1755	31008	+0.96
1185	6066	+92.28	1785	30991	+2.01
1215	7936	+85.60	1815	31196	+3.80
1245	10288	+76.79	1845	31781	
1275	13020	+70.59	1875	32406	

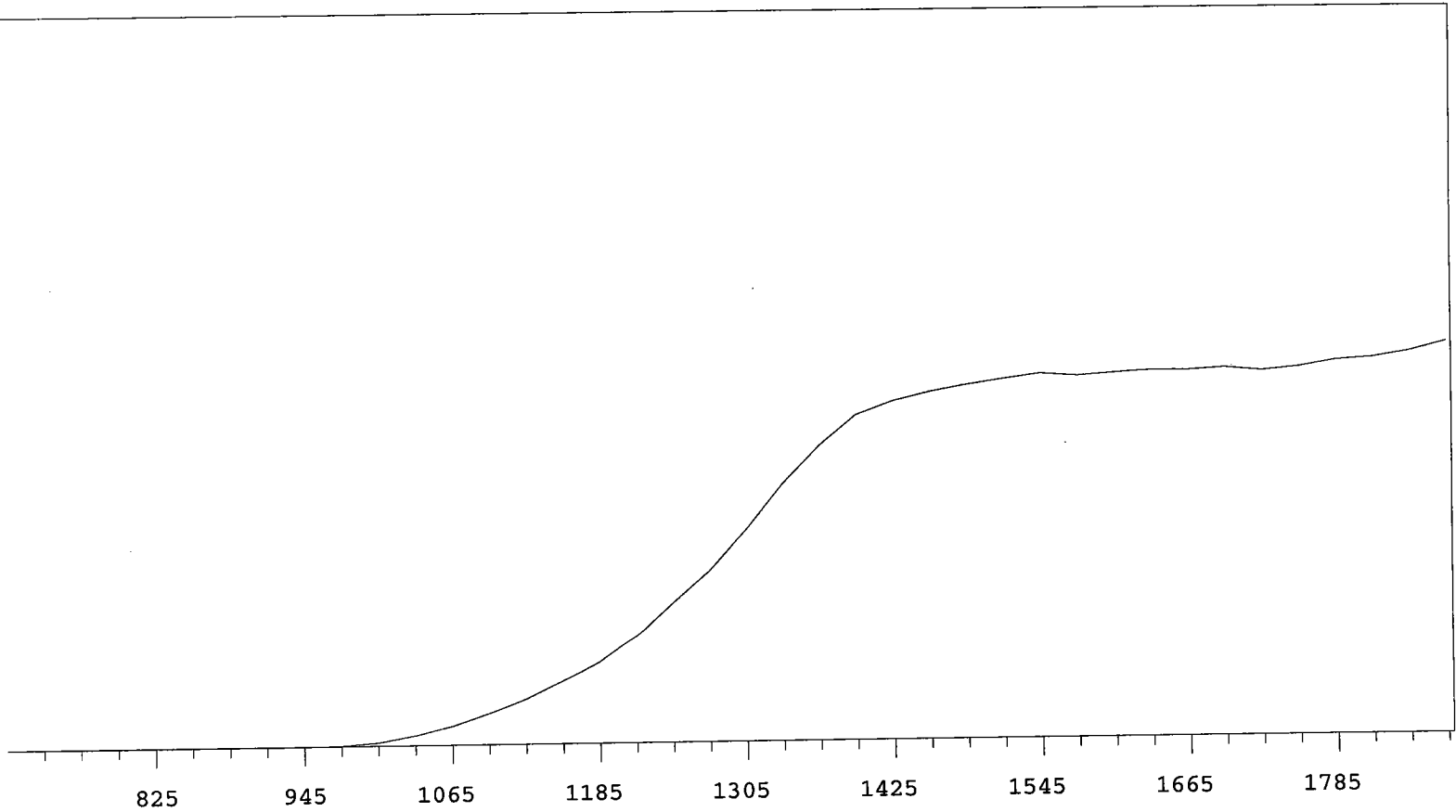


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19796	+65.77
735	1		1335	24338	+57.55
765	0	+55.56	1365	28686	+45.86
795	2	+0.00	1395	32750	+32.27
825	0	-55.56	1425	34919	+20.83
855	1	>100	1455	36434	+11.45
885	0	>100	1485	37487	+5.80
915	0	>100	1515	37623	+3.32
945	2	>100	1545	37528	+2.07
975	24	>100	1575	38277	+2.12
1005	134	>100	1605	38338	+2.70
1035	558	>100	1635	38426	+1.12
1065	1361	>100	1665	39007	+1.06
1095	2511	>100	1695	38592	+0.64
1125	3762	>100	1725	38870	+0.63
1155	5246	>100	1755	38868	+1.30
1185	7268	+96.29	1785	39238	+1.45
1215	9733	+88.98	1815	39169	+2.34
1245	12701	+79.94	1845	39570	
1275	16176	+73.13	1875	40086	

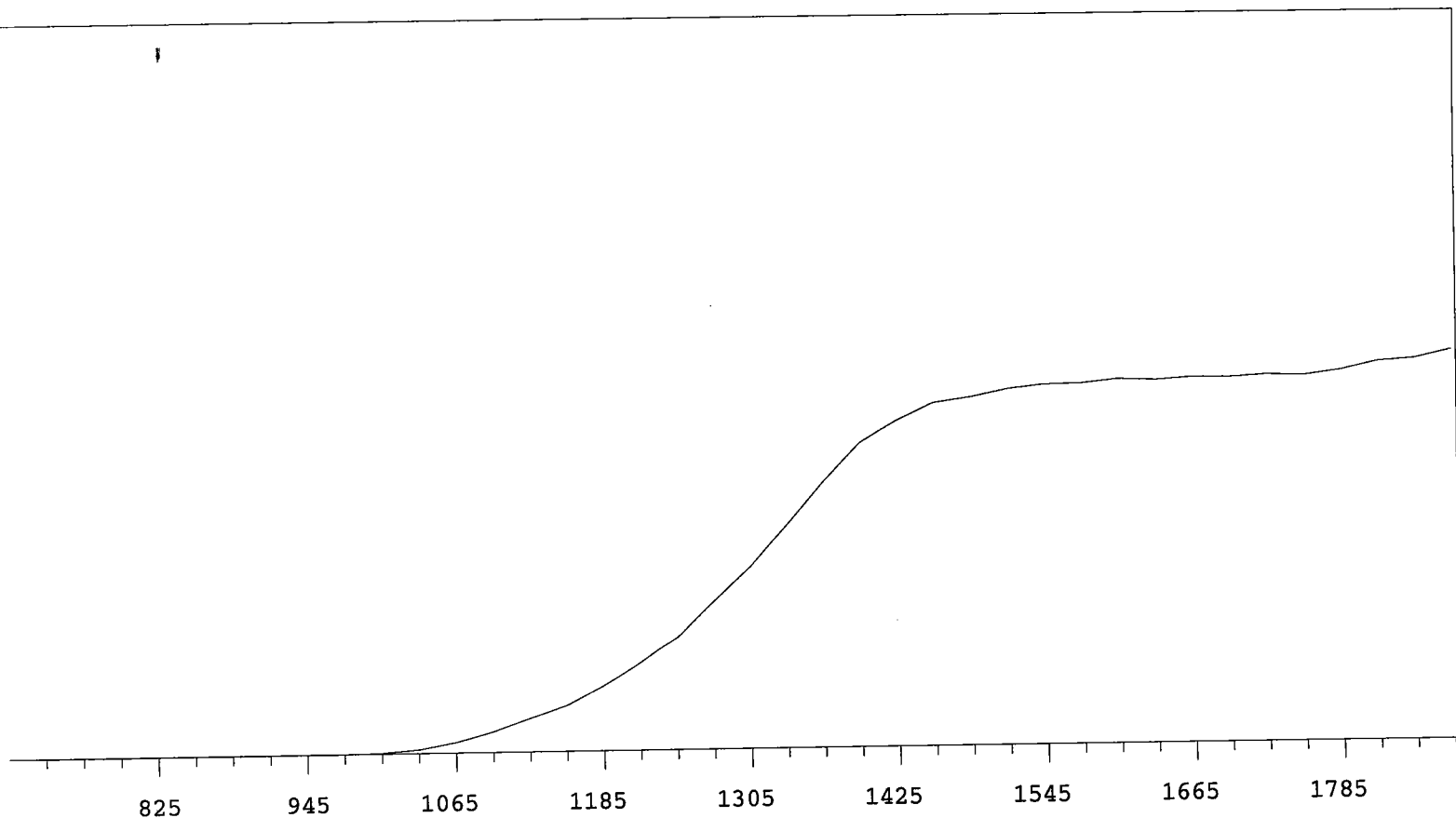
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 4 MPC 9604 Detector D  
Beta Volts: 1575

7/1/2009



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18491	+61.09
735	0		1335	22444	+51.56
765	0	+0.00	1365	25756	+37.44
795	0	>100	1395	28379	+23.82
825	1	+83.33	1425	29517	+14.00
855	1	+55.56	1455	30309	+8.08
885	0	+0.00	1485	30874	+6.03
915	1	>100	1515	31345	+3.66
945	1	>100	1545	31782	+2.17
975	60	>100	1575	31567	+1.31
1005	297	>100	1605	31789	+0.78
1035	855	>100	1635	31963	+1.34
1065	1647	>100	1665	31956	+0.29
1095	2700	>100	1695	32123	+0.20
1125	3921	>100	1725	31850	+1.46
1155	5471	+96.54	1755	32114	+2.39
1185	7042	+90.21	1785	32665	+3.95
1215	9405	+82.23	1815	32876	+4.96
1245	12266	+76.33	1845	33399	
1275	14989	+69.38	1875	34206	

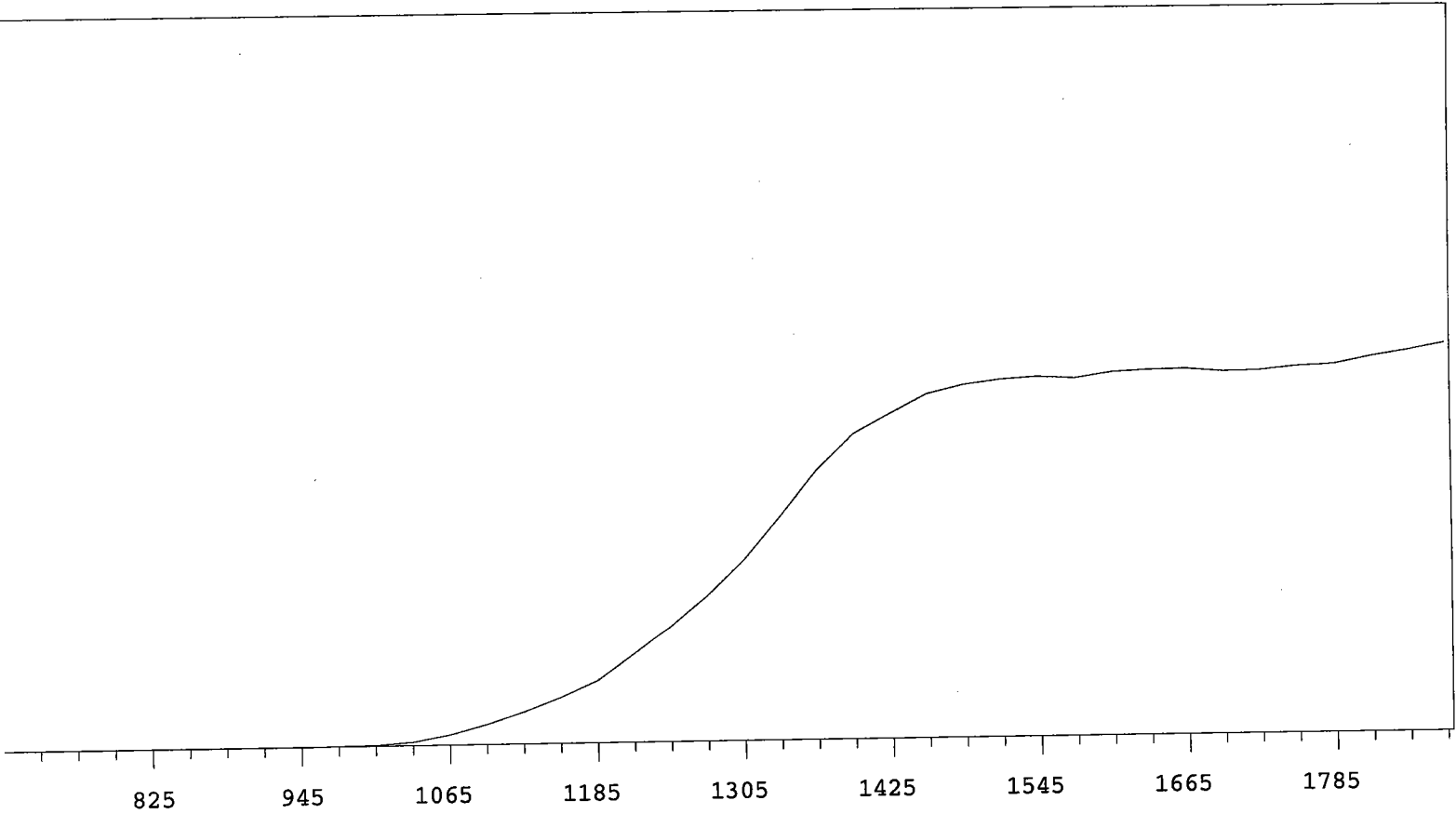


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13974	+68.00
735	0		1335	17170	+58.62
765	1		1365	20456	+47.04
795	1	+83.33	1395	23332	+33.83
825	1	-83.33	1425	24996	+21.10
855	1	>100	1455	26290	+12.40
885	0	-55.56	1485	26683	+7.74
915	0	>100	1515	27270	+4.43
945	1	>100	1545	27590	+3.48
975	9	>100	1575	27635	+1.71
1005	76	>100	1605	27932	+1.20
1035	308	>100	1635	27807	+0.88
1065	814	>100	1665	28006	+0.62
1095	1600	>100	1695	27964	+0.63
1125	2598	>100	1725	28112	+0.98
1155	3596	>100	1755	28020	+2.84
1185	5065	+96.05	1785	28392	+3.76
1215	6773	+90.23	1815	29028	+5.17
1245	8717	+81.43	1845	29220	
1275	11391	+74.83	1875	29849	

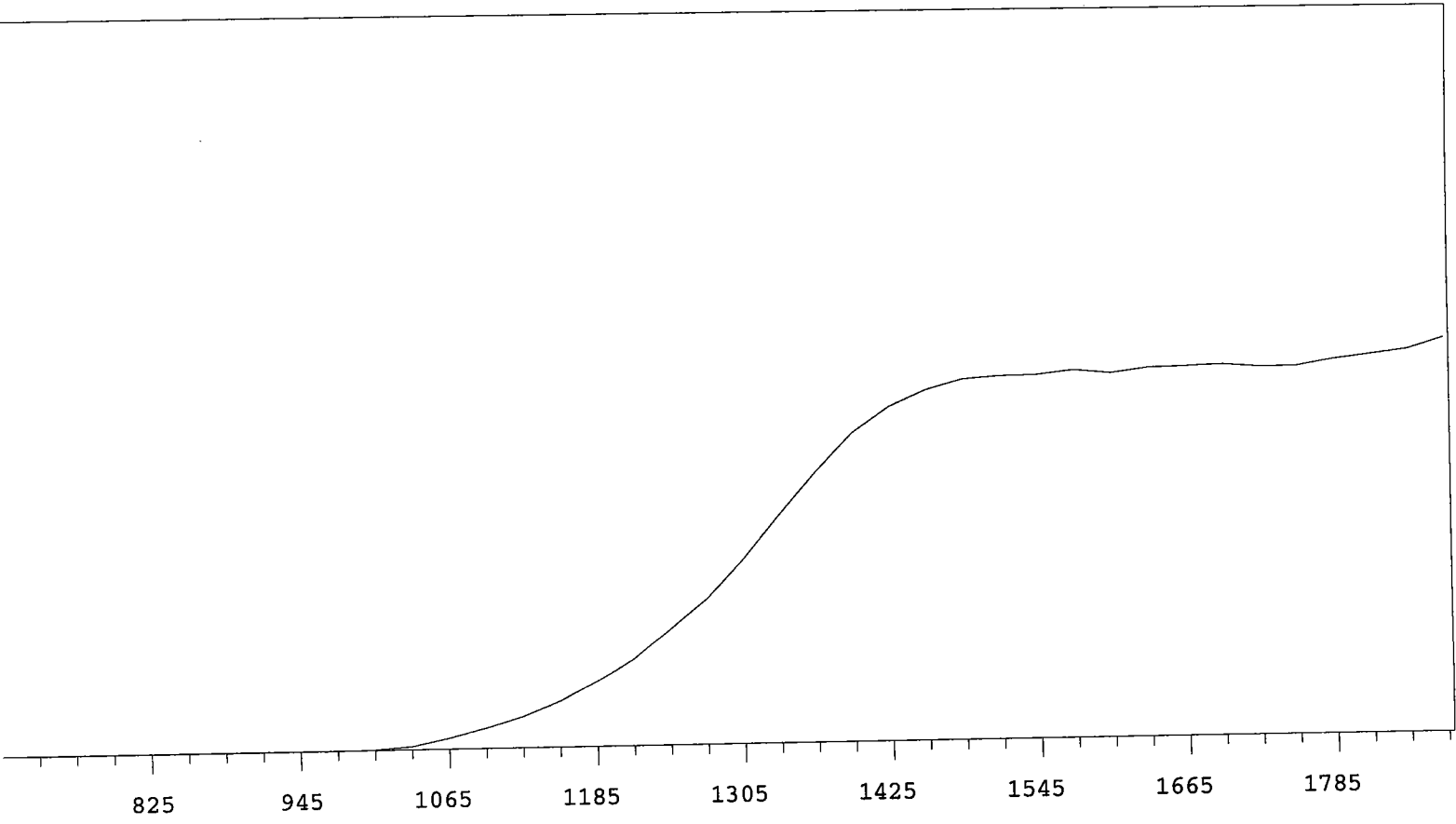
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 5 MPC 9604 Detector B  
Beta Volts: 1575

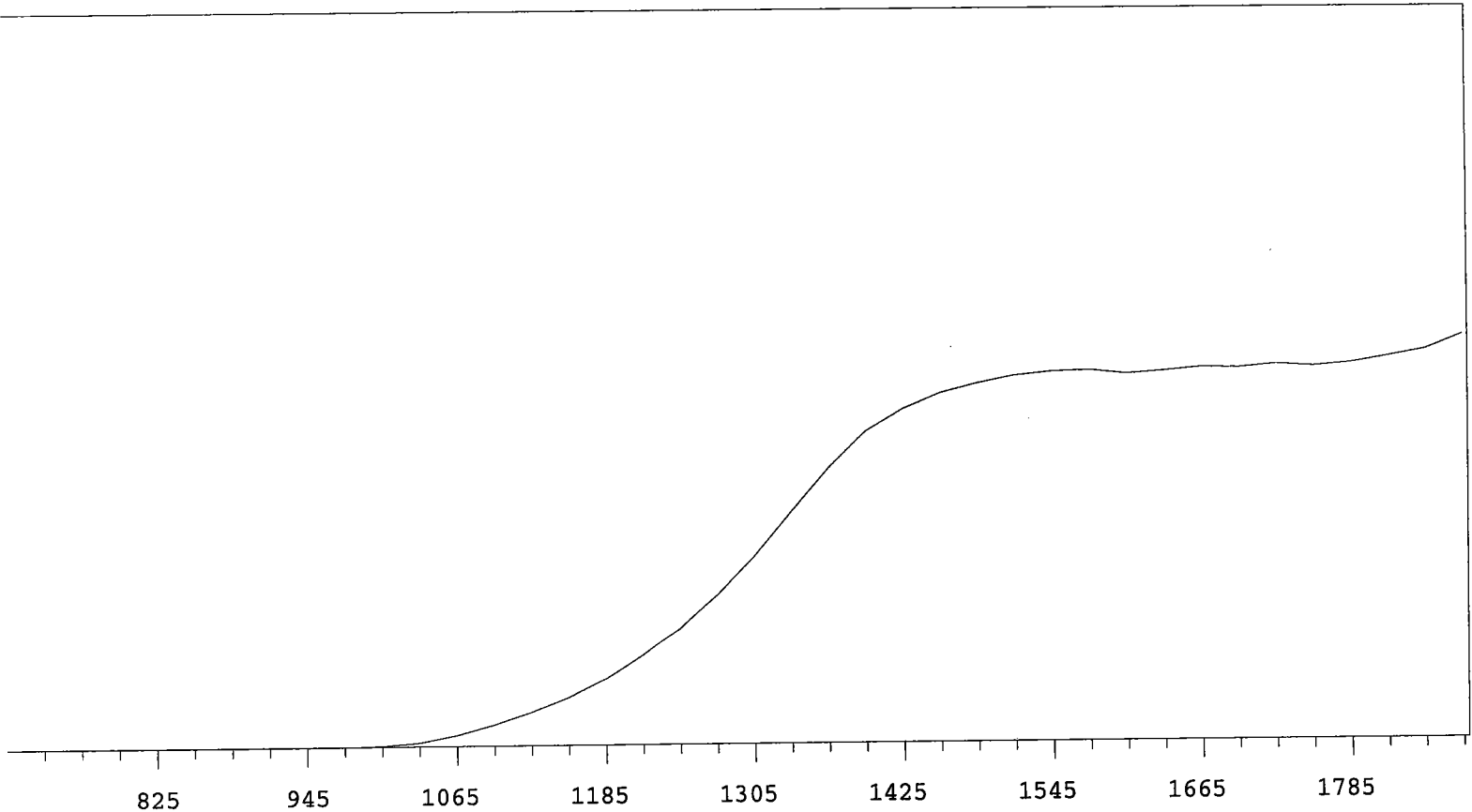
7/1/2009



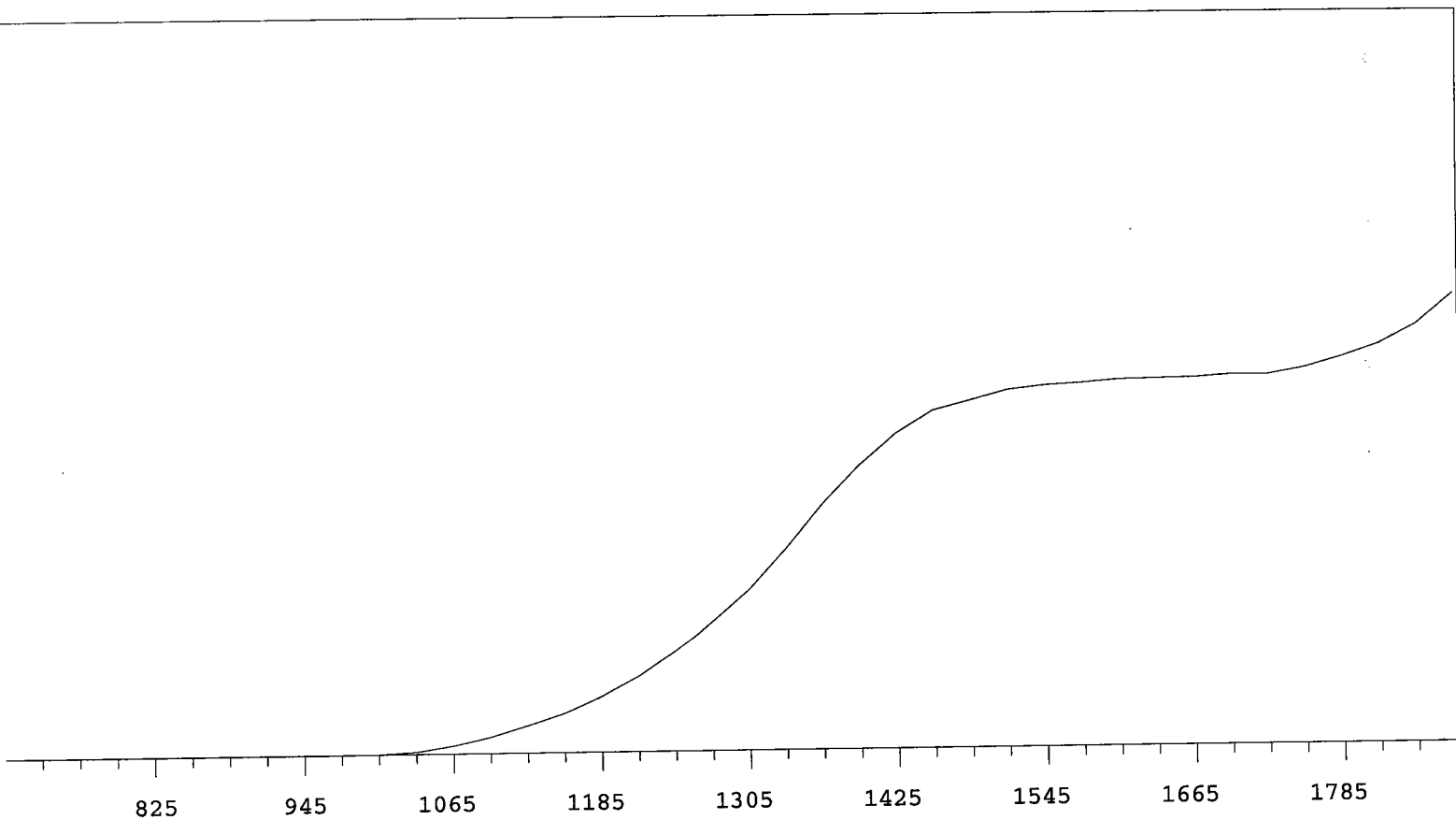
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17414	+68.46
735	0		1335	21540	+59.98
765	0		1365	25854	+46.75
795	0	>100	1395	29222	+33.38
825	1	>100	1425	31128	+21.52
855	1	+41.67	1455	32995	+13.26
885	2	-33.33	1485	33846	+8.09
915	0	>100	1515	34289	+3.25
945	1	>100	1545	34528	+2.00
975	17	>100	1575	34311	+1.78
1005	87	>100	1605	34866	+1.78
1035	336	>100	1635	35046	+1.14
1065	1010	>100	1665	35087	-0.26
1095	1955	>100	1695	34795	+0.11
1125	3124	>100	1725	34857	+0.93
1155	4486	>100	1755	35220	+2.81
1185	6017	>100	1785	35363	+3.98
1215	8507	+91.20	1815	36028	+4.79
1245	11148	+82.59	1845	36577	
1275	14003	+74.21	1875	37207	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17085	+68.24
735	0		1335	21135	+59.99
765	0		1365	25066	+47.39
795	0	>100	1395	28530	+33.93
825	0	>100	1425	30823	+22.30
855	1	>100	1455	32287	+12.93
885	0	>100	1485	33217	+6.71
915	1	>100	1515	33474	+3.57
945	2	>100	1545	33517	+1.17
975	7	>100	1575	33921	+1.13
1005	56	>100	1605	33584	+1.27
1035	305	>100	1635	34014	+1.12
1065	982	>100	1665	34116	+0.98
1095	1874	>100	1695	34225	-0.22
1125	2890	>100	1725	33980	+0.58
1155	4260	>100	1755	33971	+1.96
1185	6001	>100	1785	34541	+3.64
1215	8050	+91.54	1815	34954	+5.38
1245	10895	+82.98	1845	35375	
1275	13556	+76.26	1875	36384	

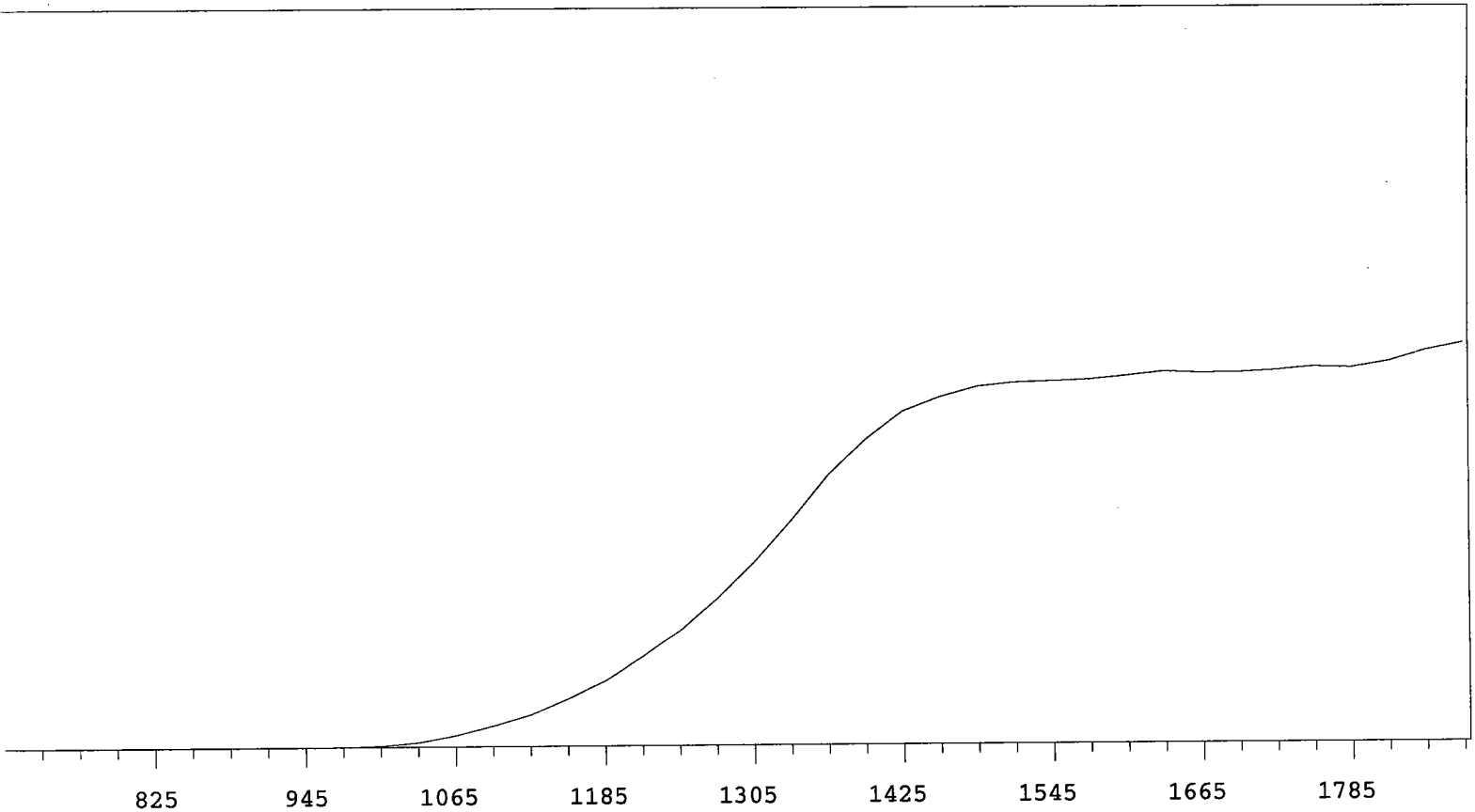


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15025	+68.87
735	0		1335	18640	+58.97
765	0		1365	22048	+45.84
795	0	>100	1395	24877	+32.08
825	0	>100	1425	26653	+20.83
855	0	>100	1455	27899	+13.08
885	0	>100	1485	28670	+8.43
915	0	>100	1515	29257	+5.13
945	0	>100	1545	29568	+2.06
975	6	>100	1575	29683	+0.52
1005	81	>100	1605	29362	+0.57
1035	318	>100	1635	29589	+0.80
1065	897	>100	1665	29870	+1.82
1095	1710	>100	1695	29783	+0.90
1125	2714	>100	1725	30077	+0.75
1155	3925	>100	1755	29889	+2.02
1185	5395	+97.31	1785	30152	+3.33
1215	7282	+88.49	1815	30656	+6.54
1245	9426	+81.36	1845	31211	
1275	12007	+75.65	1875	32389	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16217	+71.57
735	0		1335	20184	+63.76
765	0		1365	24605	+53.98
795	0	>100	1395	28528	+41.40
825	0	>100	1425	31675	+28.02
855	0	>100	1455	33899	+17.93
885	0	>100	1485	34826	+10.65
915	0	>100	1515	35815	+6.13
945	0	>100	1545	36225	+4.15
975	7	>100	1575	36456	+2.28
1005	31	>100	1605	36747	+1.47
1035	238	>100	1635	36801	+1.26
1065	810	>100	1665	36859	+0.85
1095	1637	>100	1695	37095	+1.85
1125	2743	>100	1725	37072	+4.01
1155	3932	>100	1755	37724	+6.65
1185	5579	>100	1785	38802	+10.33
1215	7602	+94.41	1815	40036	+14.71
1245	10078	+84.86	1845	41975	
1275	13091	+77.67	1875	45123	



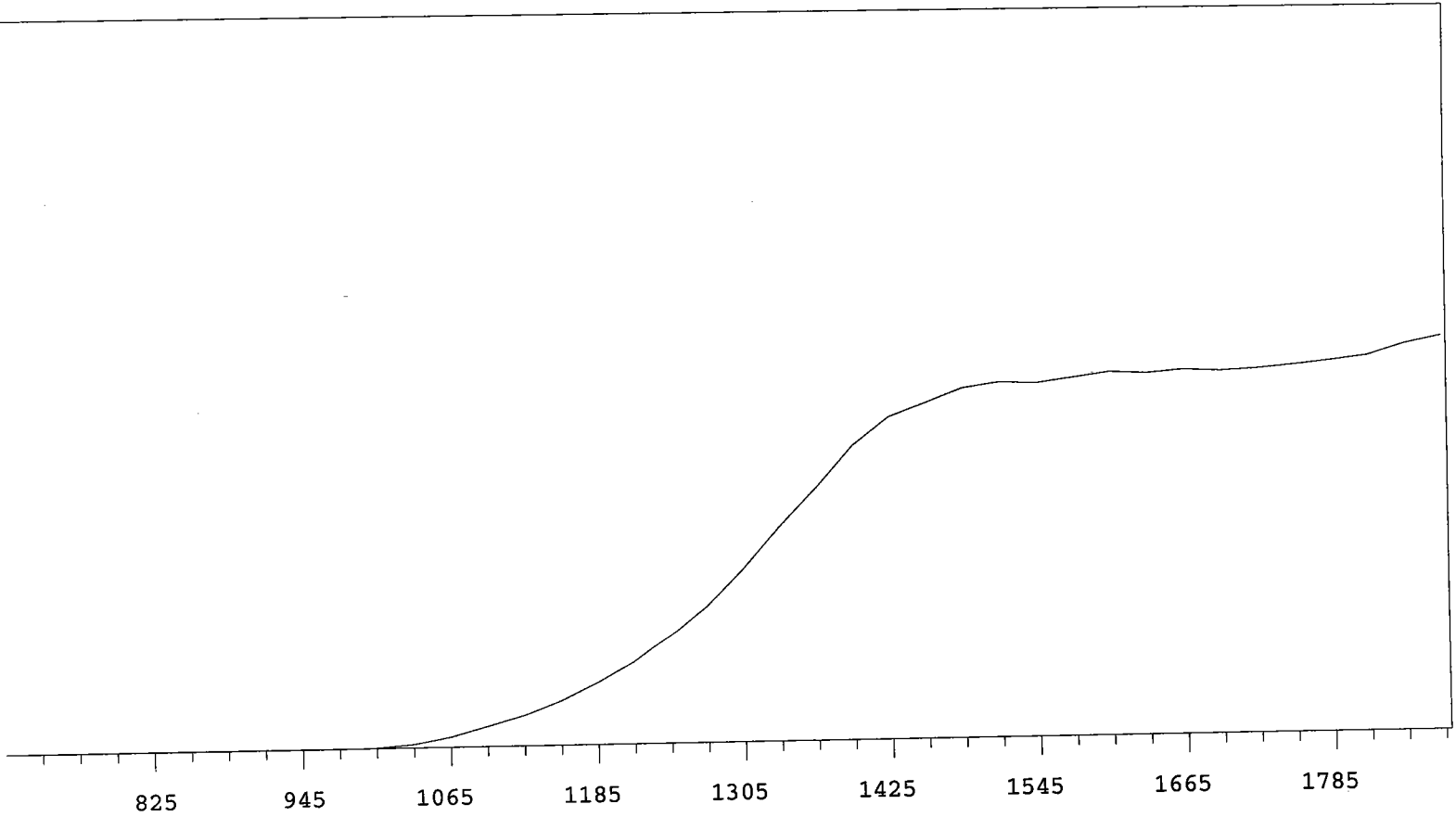


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	20094	+68.67
735	0		1335	24665	+59.40
765	0		1365	29591	+47.86
795	0	>100	1395	33376	+34.51
825	1	+83.33	1425	36440	+22.50
855	1	-83.33	1455	38024	+13.58
885	0	>100	1485	39187	+7.04
915	0	>100	1515	39608	+3.63
945	5	>100	1545	39722	+2.10
975	18	>100	1575	39894	+2.32
1005	125	>100	1605	40298	+2.09
1035	482	>100	1635	40711	+1.41
1065	1255	>100	1665	40574	+0.80
1095	2318	>100	1695	40608	+1.02
1125	3540	>100	1725	40839	+1.28
1155	5288	>100	1755	41201	+1.97
1185	7168	+98.51	1785	41065	+3.74
1215	9760	+88.48	1815	41711	+5.42
1245	12656	+81.52	1845	42917	
1275	16065	+74.58	1875	43699	

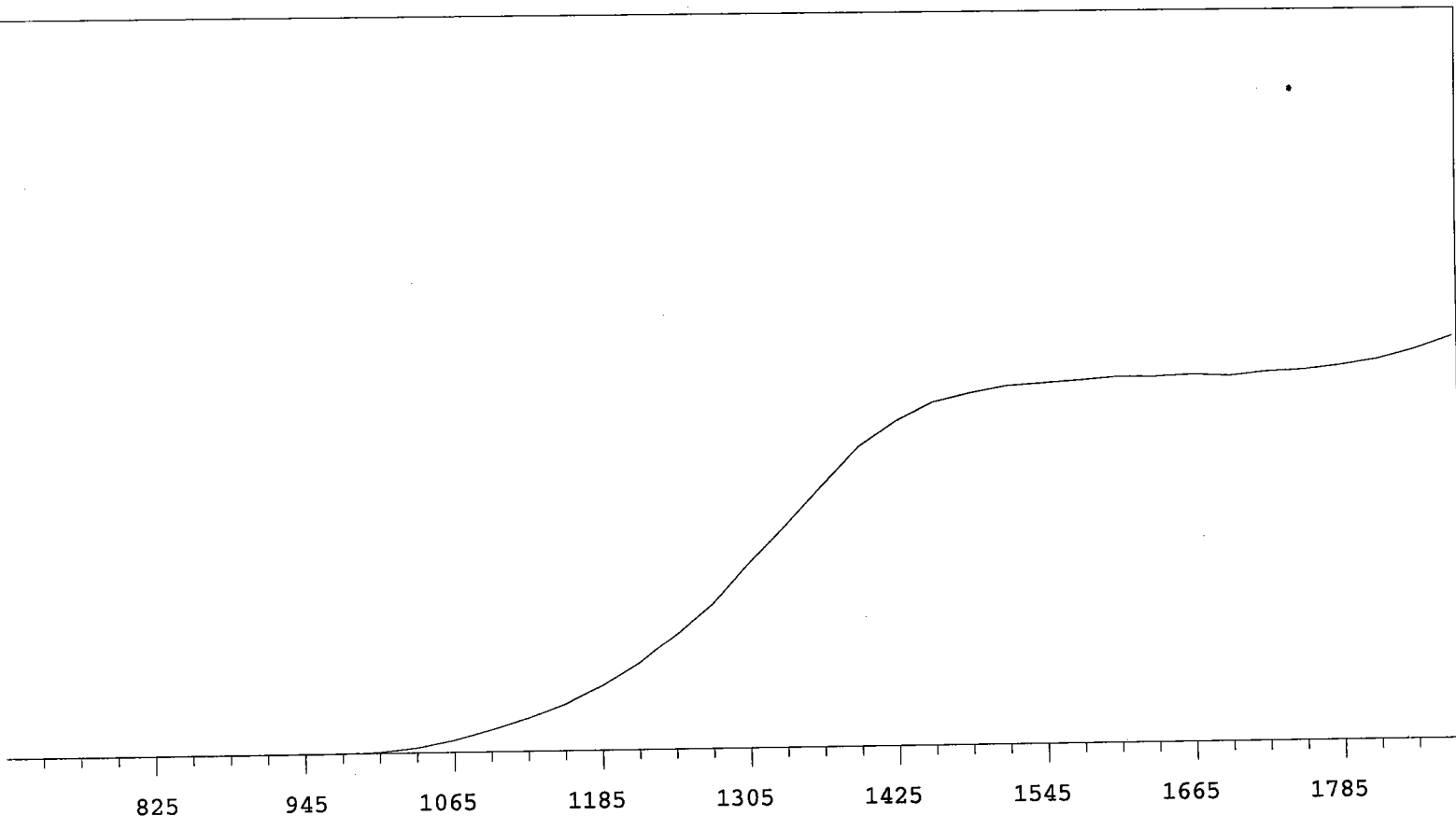
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 6 MPC 9604 Detector C  
Beta Volts: 1575

7/1/2009



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17350	+67.80
735	0		1335	21371	+60.27
765	1	+0.00	1365	25084	+49.32
795	0	>100	1395	29177	+36.15
825	0	+0.00	1425	31927	+24.86
855	0	>100	1455	33217	+14.70
885	1	>100	1485	34545	+7.74
915	1	>100	1515	35097	+4.64
945	2	>100	1545	34927	+2.96
975	8	>100	1575	35439	+2.21
1005	70	>100	1605	35939	+2.41
1035	353	>100	1635	35763	+0.94
1065	990	>100	1665	36053	+0.35
1095	1956	>100	1695	35886	+1.15
1125	3024	>100	1725	36066	+1.77
1155	4400	>100	1755	36379	+3.03
1185	6173	+99.75	1785	36768	+4.80
1215	8230	+89.85	1815	37193	+6.14
1245	10904	+82.36	1845	38320	
1275	13747	+76.18	1875	39061	

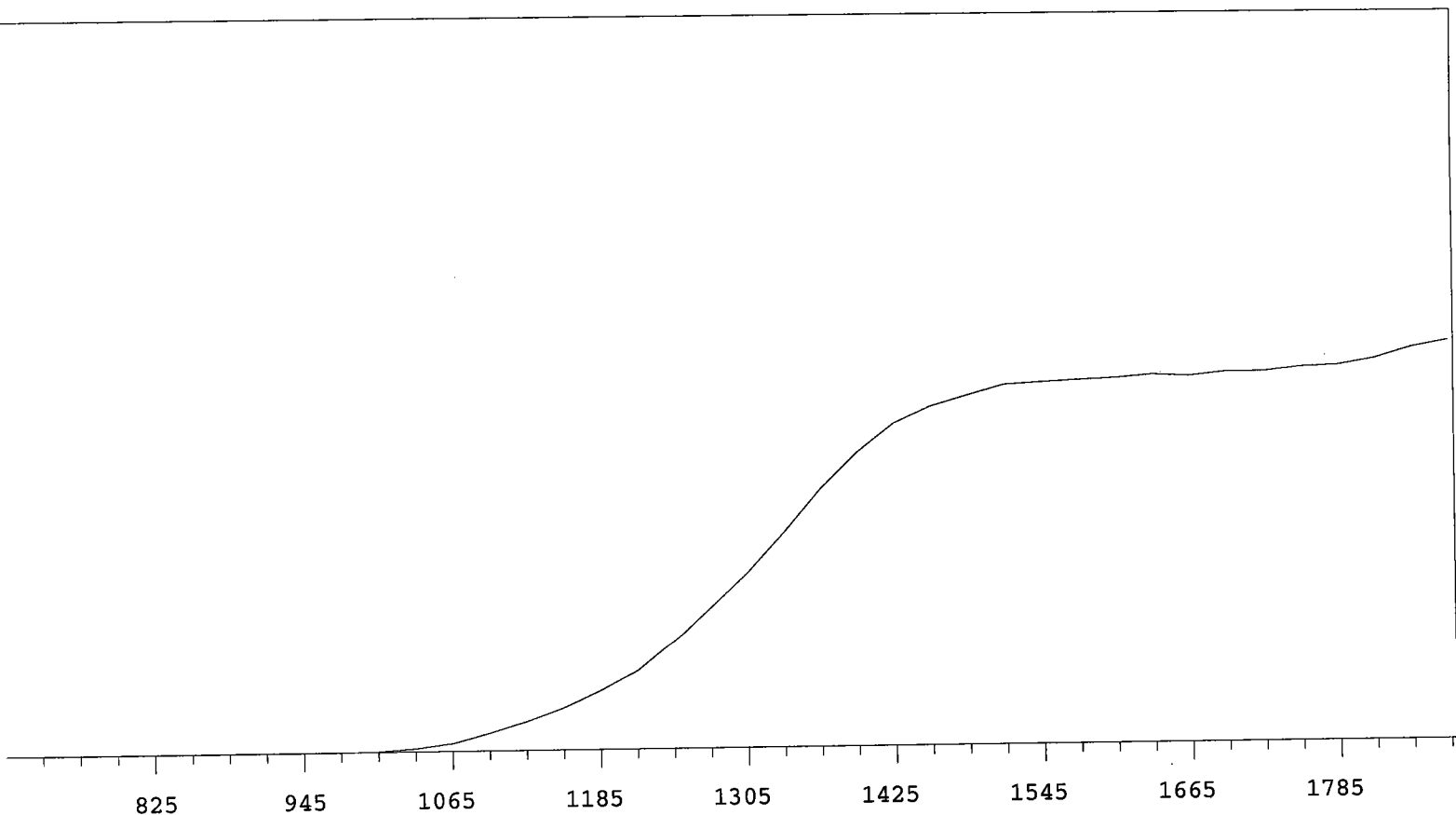


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17954	+65.82
735	0		1335	21482	+57.64
765	0		1365	25373	+45.78
795	1	+0.00	1395	29042	+34.80
825	0	>100	1425	31373	+23.29
855	0	+0.00	1455	33143	+14.25
885	0	>100	1485	34006	+8.49
915	1	>100	1515	34662	+4.71
945	0	>100	1545	34892	+3.14
975	14	>100	1575	35129	+1.86
1005	109	>100	1605	35411	+1.49
1035	481	>100	1635	35380	+0.62
1065	1177	>100	1665	35554	+0.65
1095	2133	>100	1695	35385	+1.18
1125	3243	>100	1725	35755	+1.89
1155	4554	>100	1755	35907	+3.26
1185	6285	+98.38	1785	36305	+4.62
1215	8468	+89.75	1815	36870	+6.98
1245	11266	+83.13	1845	37807	
1275	14088	+74.43	1875	39047	

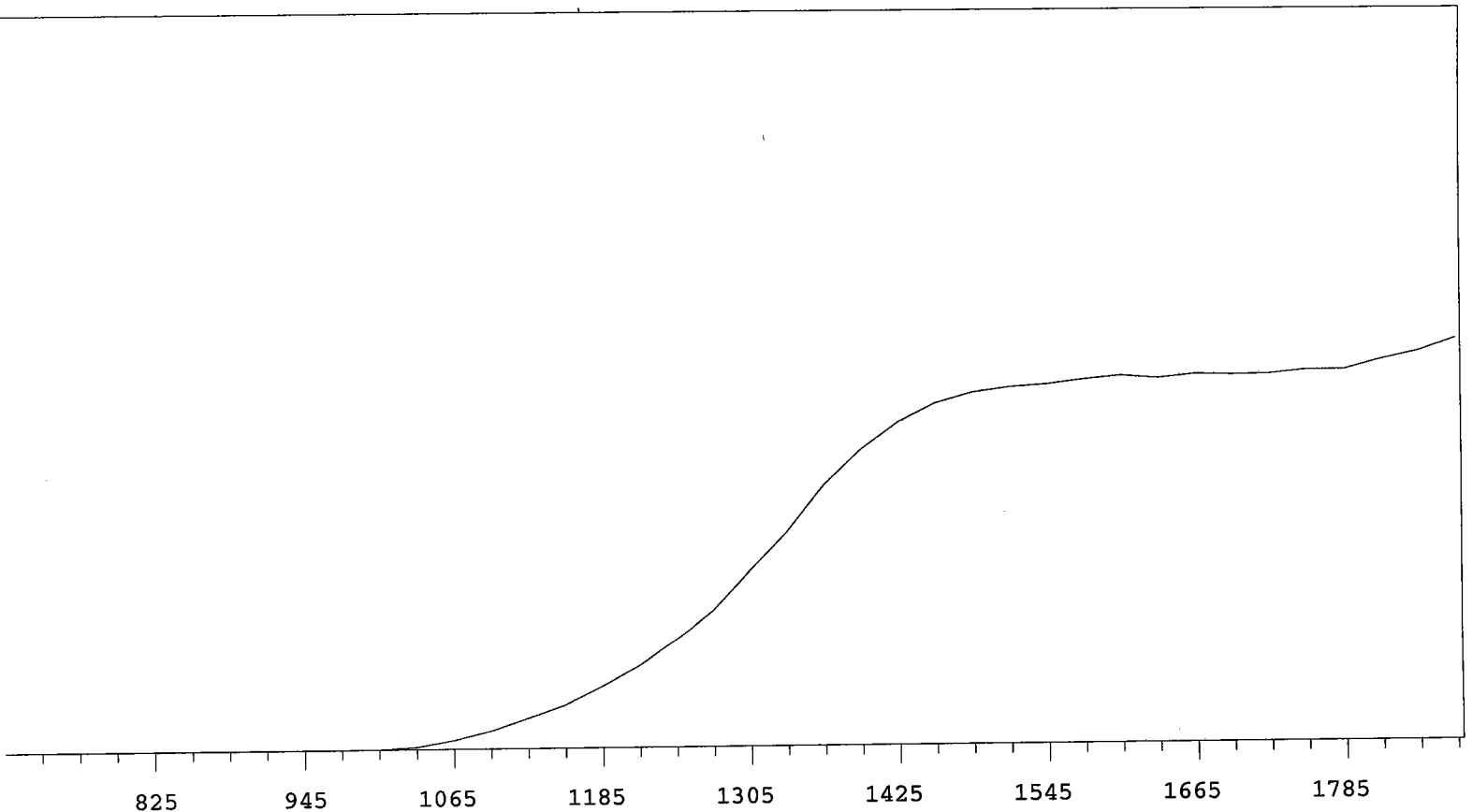
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 7 MPC 9604 Detector A  
Beta Volts: 1575

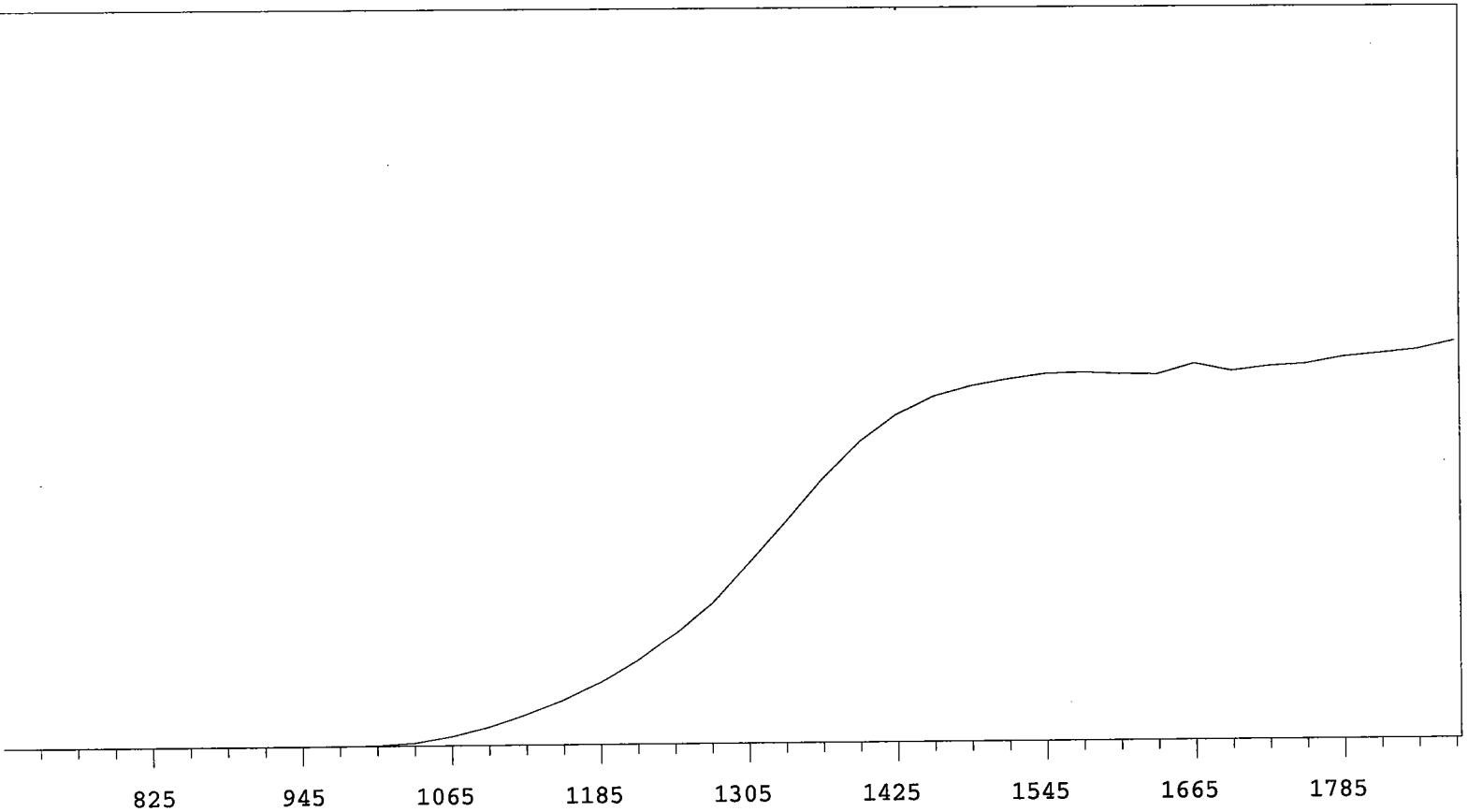
7/1/2009



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13228	+70.36
735	0		1335	16271	+60.12
765	0		1365	19506	+49.19
795	0	>100	1395	22188	+36.46
825	1	+83.33	1425	24373	+24.43
855	1	-83.33	1455	25649	+15.99
885	0	-55.56	1485	26433	+9.58
915	0	>100	1515	27195	+5.74
945	1	>100	1545	27367	+3.24
975	3	>100	1575	27490	+1.86
1005	42	>100	1605	27608	+1.22
1035	242	>100	1635	27841	+1.33
1065	613	>100	1665	27695	+1.11
1095	1353	>100	1695	27999	+1.42
1125	2213	>100	1725	27992	+2.04
1155	3256	>100	1755	28289	+2.52
1185	4474	>100	1785	28408	+4.56
1215	5932	+94.10	1815	28863	+5.70
1245	8072	+87.32	1845	29664	
1275	10579	+79.61	1875	30148	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16978	+70.97
735	0		1335	20569	+61.39
765	0		1365	24989	+48.97
795	0	>100	1395	28389	+36.69
825	0	>100	1425	30977	+24.05
855	0	>100	1455	32727	+14.93
885	0	>100	1485	33697	+8.42
915	1	>100	1515	34195	+4.89
945	1	>100	1545	34437	+3.49
975	3	>100	1575	34850	+2.11
1005	34	>100	1605	35174	+1.62
1035	221	>100	1635	34923	+0.68
1065	825	>100	1665	35250	+0.35
1095	1709	>100	1695	35171	+1.24
1125	2873	>100	1725	35237	+1.02
1155	4078	>100	1755	35584	+2.79
1185	5858	>100	1785	35587	+4.59
1215	7809	+91.82	1815	36485	+6.74
1245	10336	+85.02	1845	37270	
1275	13215	+77.79	1875	38453	

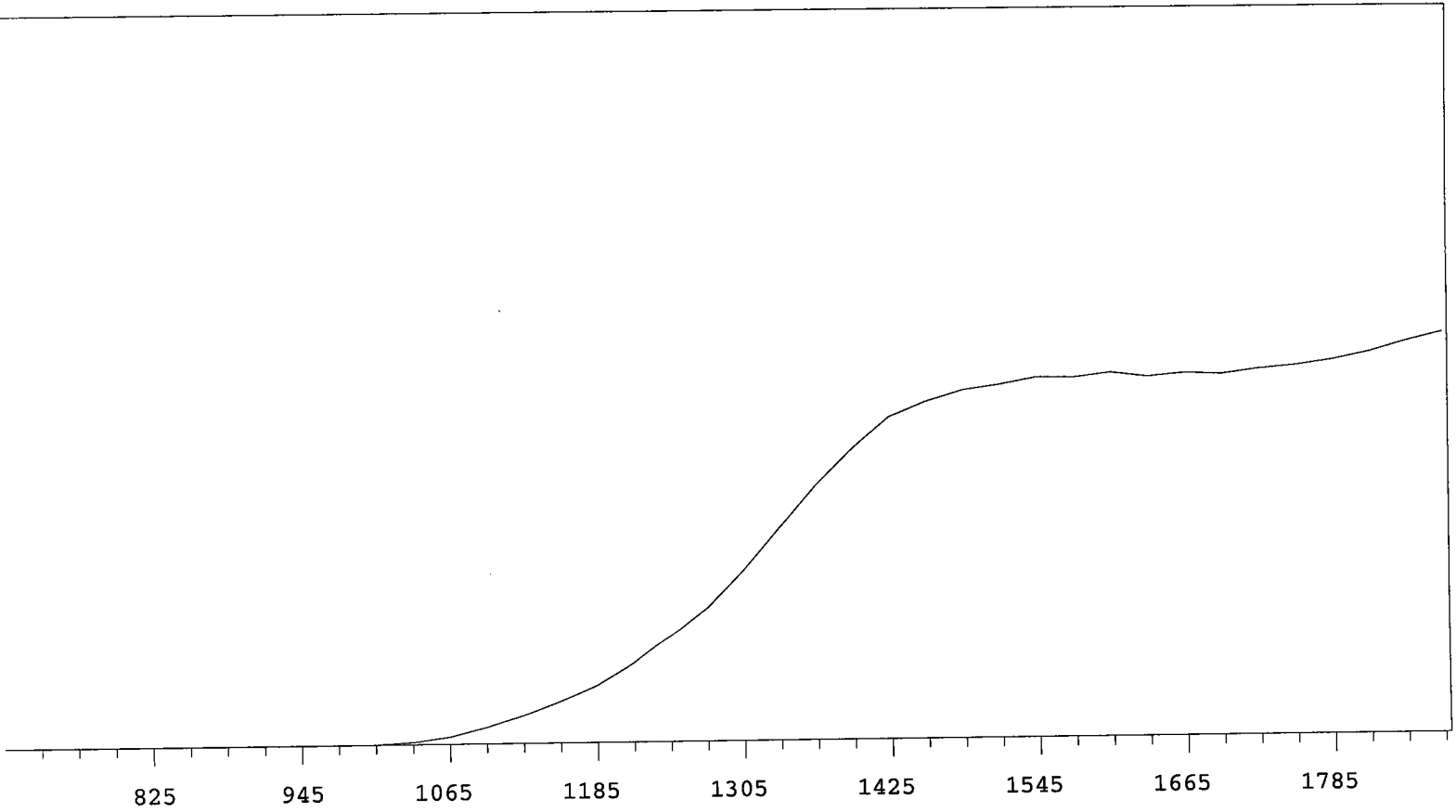


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16543	+70.03
735	0		1335	20257	+60.71
765	0		1365	24245	+48.17
795	0	>100	1395	27602	+35.50
825	0	>100	1425	30019	+23.48
855	0	>100	1455	31614	+14.53
885	0	>100	1485	32522	+8.91
915	0	>100	1515	33103	+5.28
945	0	>100	1545	33572	+2.60
975	4	>100	1575	33695	+0.70
1005	57	>100	1605	33525	+1.48
1035	277	>100	1635	33477	+0.99
1065	817	>100	1665	34432	+1.49
1095	1666	>100	1695	33745	+1.43
1125	2766	>100	1725	34149	+1.60
1155	4077	>100	1755	34350	+3.69
1185	5667	>100	1785	34955	+3.62
1215	7694	+91.50	1815	35251	+4.44
1245	10209	+84.83	1845	35592	
1275	12950	+77.50	1875	36382	

MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 7 MPC 9604 Detector D  
 Beta Volts: 1575

7/1/2009

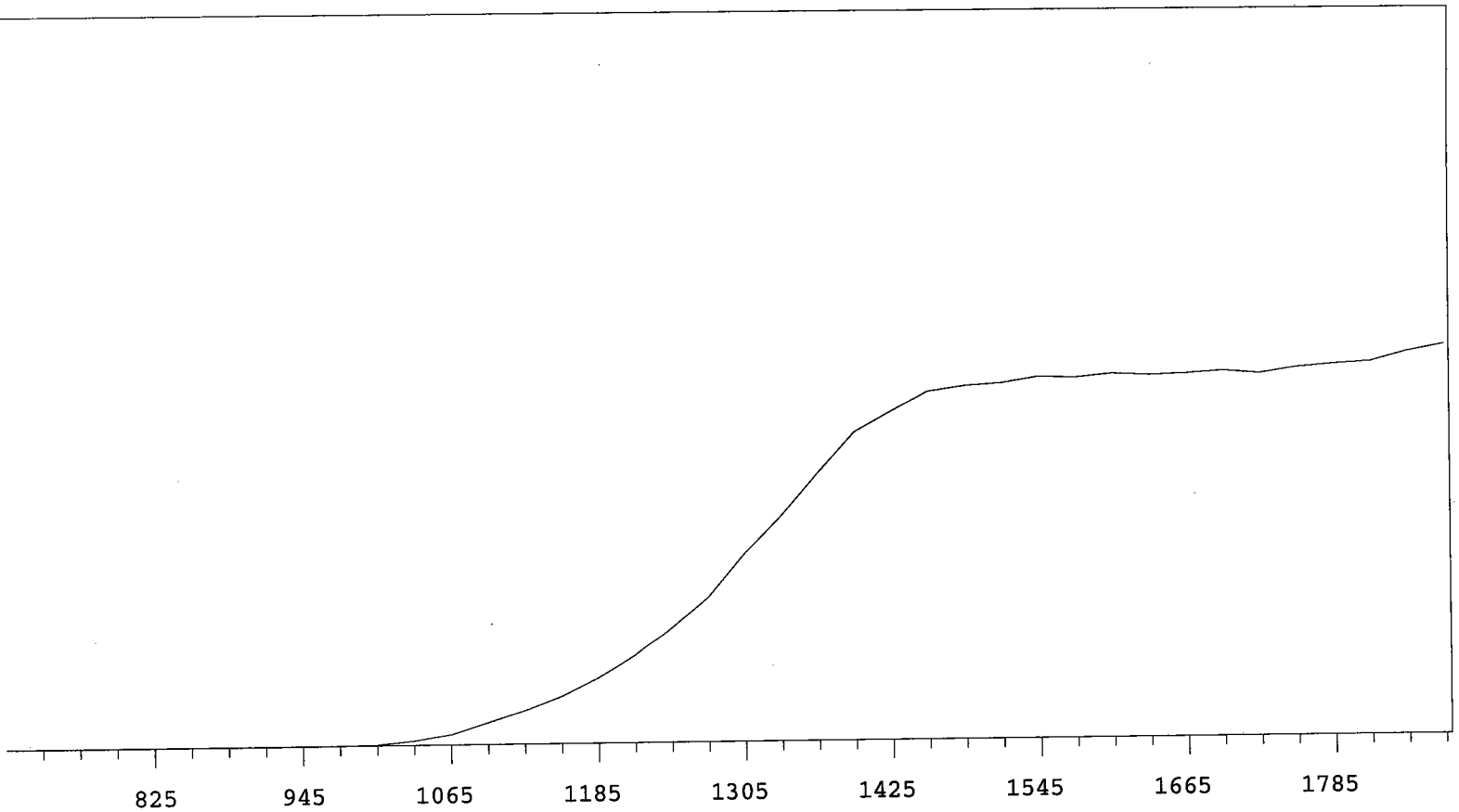


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14016	+71.42
735	0		1335	17436	+62.21
765	0		1365	20814	+50.32
795	0	>100	1395	23760	+36.91
825	0	>100	1425	26302	+24.91
855	0	>100	1455	27519	+15.17
885	0	>100	1485	28410	+8.91
915	0	>100	1515	28843	+5.41
945	0	>100	1545	29396	+3.58
975	5	>100	1575	29357	+1.54
1005	29	>100	1605	29719	+0.51
1035	204	>100	1635	29358	+0.23
1065	609	>100	1665	29623	+0.57
1095	1354	>100	1695	29509	+2.12
1125	2316	>100	1725	29896	+2.84
1155	3418	>100	1755	30165	+4.42
1185	4654	>100	1785	30570	+5.65
1215	6455	+92.99	1815	31180	+6.95
1245	8669	+86.45	1845	31995	
1275	10931	+79.15	1875	32717	

MPC 9600 Plateau  
Alpha Volts: 705

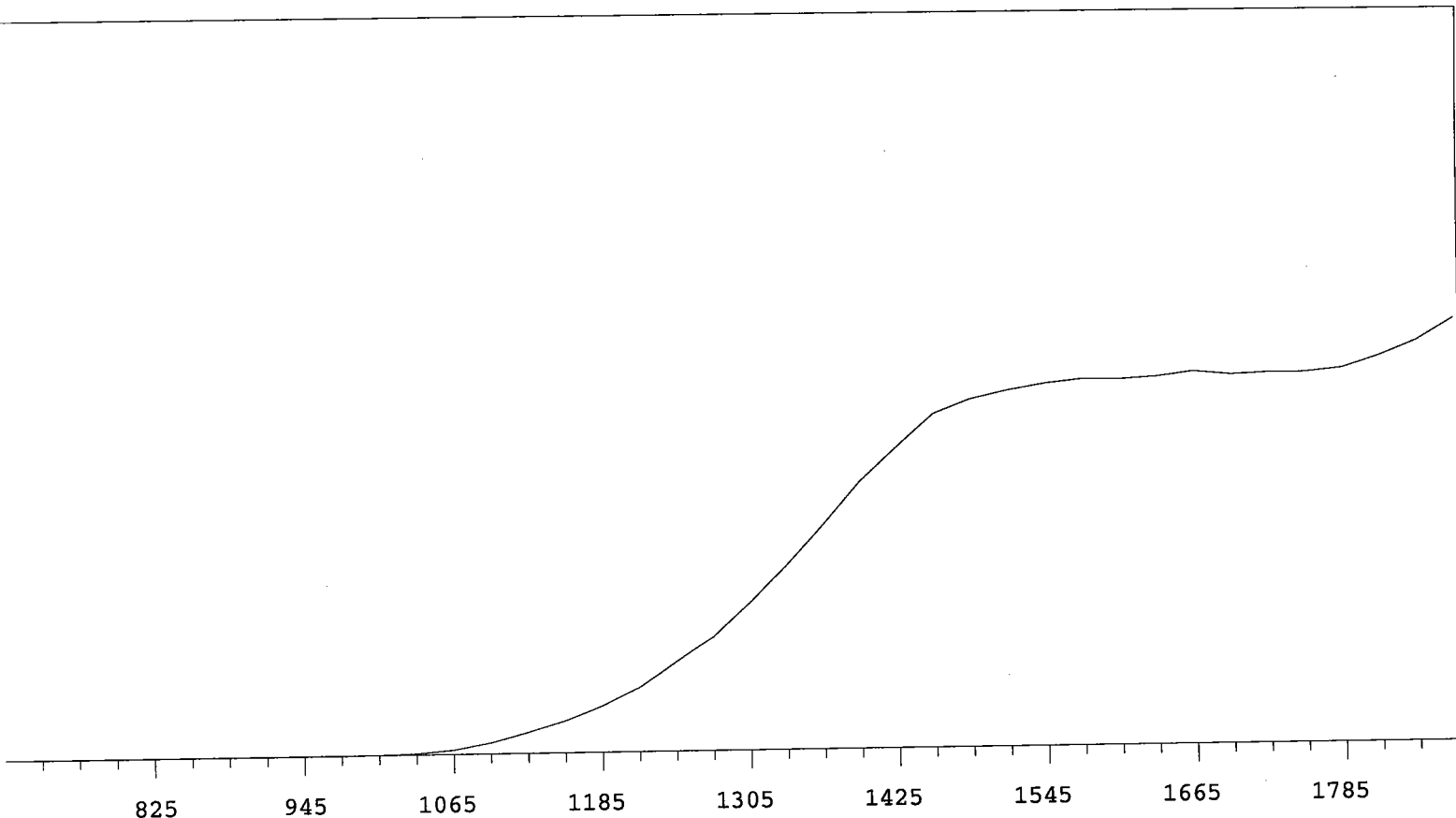
Instrument 8 MPC 9604 Detector A  
Beta Volts: 1575

7/1/2009

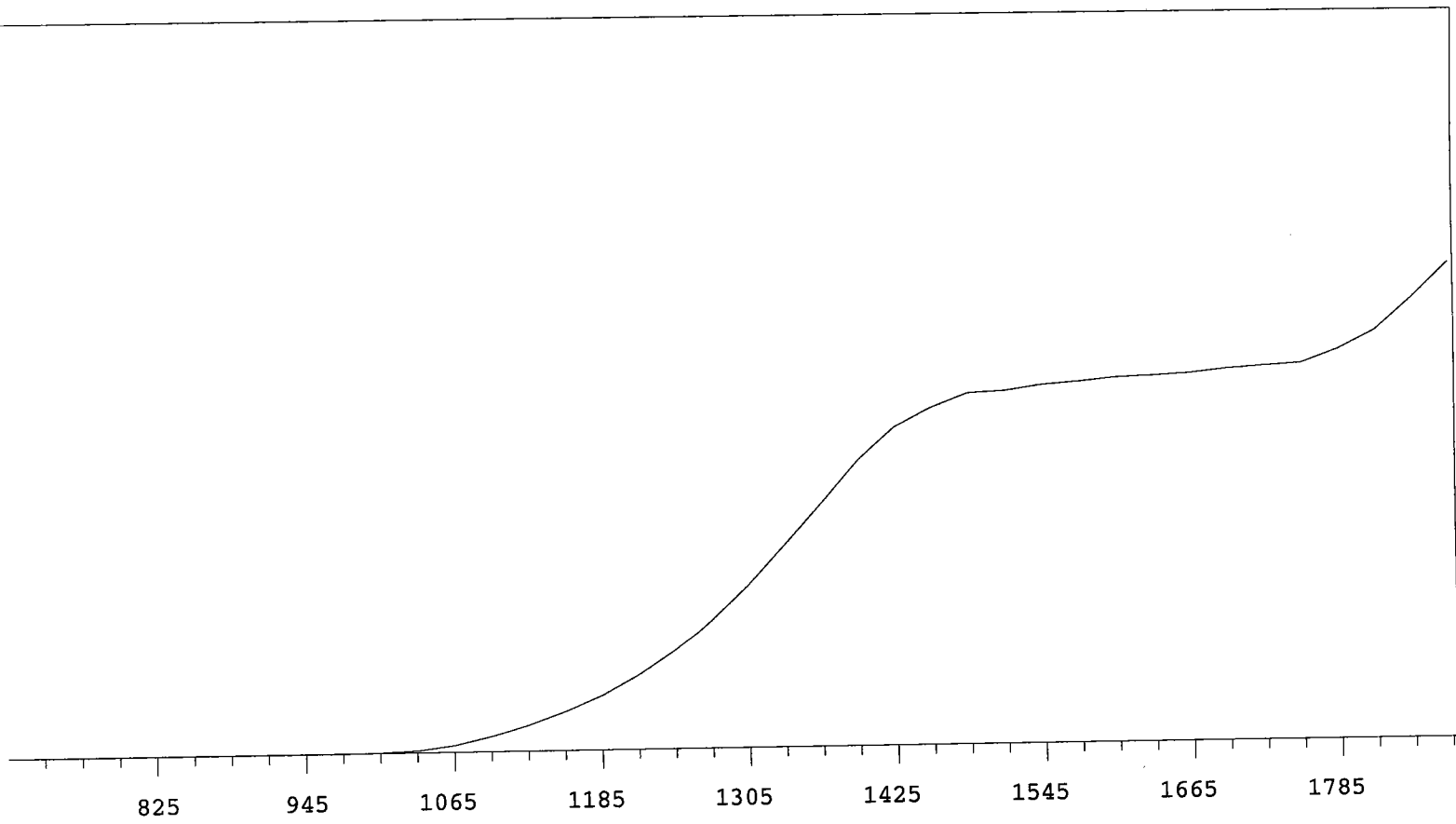


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19482	+67.45
735	0		1335	23344	+59.35
765	0		1365	27793	+45.86
795	0	>100	1395	31916	+34.29
825	0	>100	1425	33979	+21.61
855	0	>100	1455	35993	+11.71
885	0	>100	1485	36530	+7.04
915	0	>100	1515	36796	+3.11
945	1	>100	1545	37393	+2.44
975	9	>100	1575	37279	+1.41
1005	96	>100	1605	37650	+0.49
1035	468	>100	1635	37458	+0.91
1065	1084	>100	1665	37579	+0.12
1095	2286	>100	1695	37828	+1.10
1125	3479	>100	1725	37535	+1.72
1155	4912	>100	1755	38104	+2.18
1185	6819	+98.23	1785	38416	+4.12
1215	9153	+89.05	1815	38633	+4.92
1245	12105	+83.21	1845	39649	
1275	15122	+75.24	1875	40366	

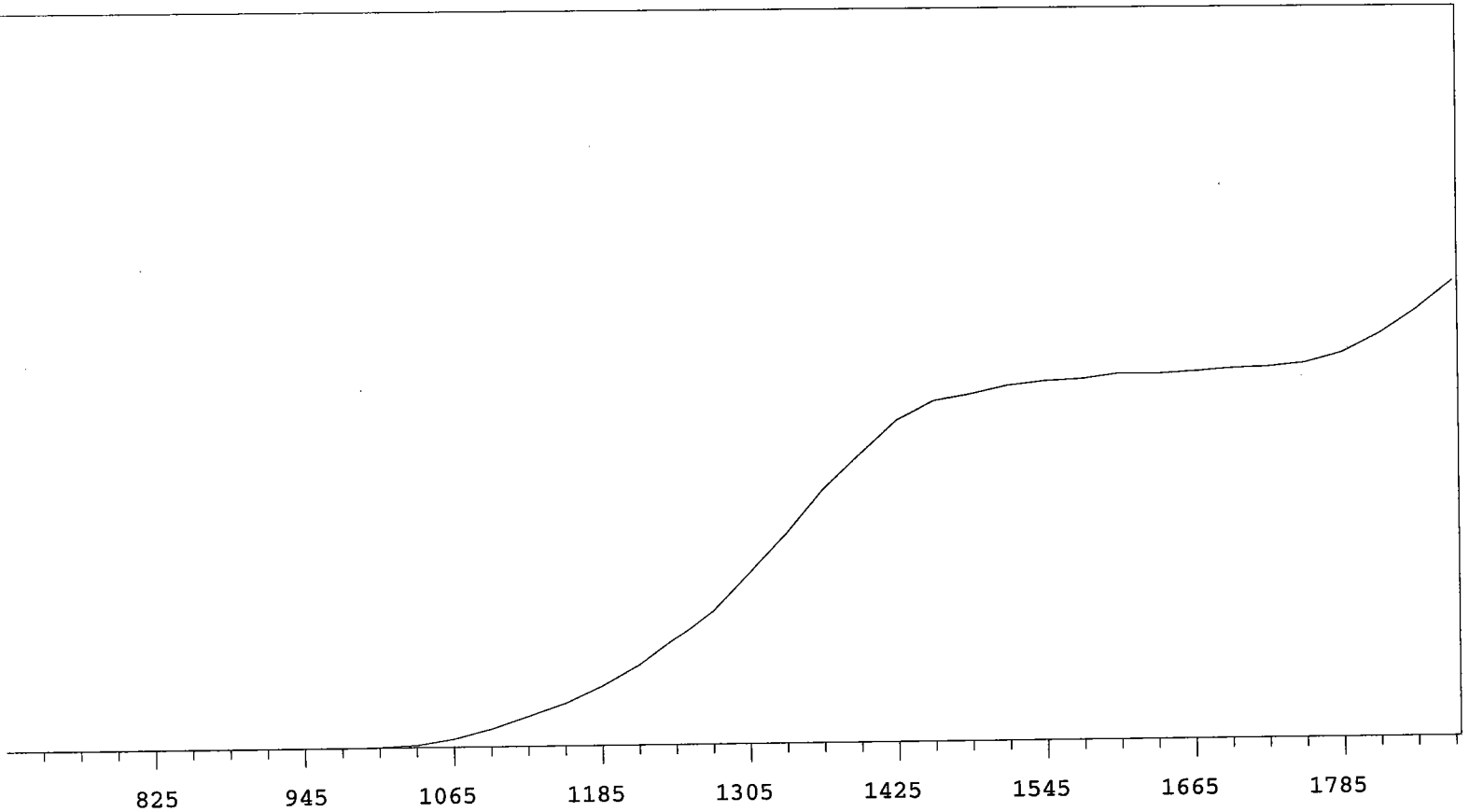




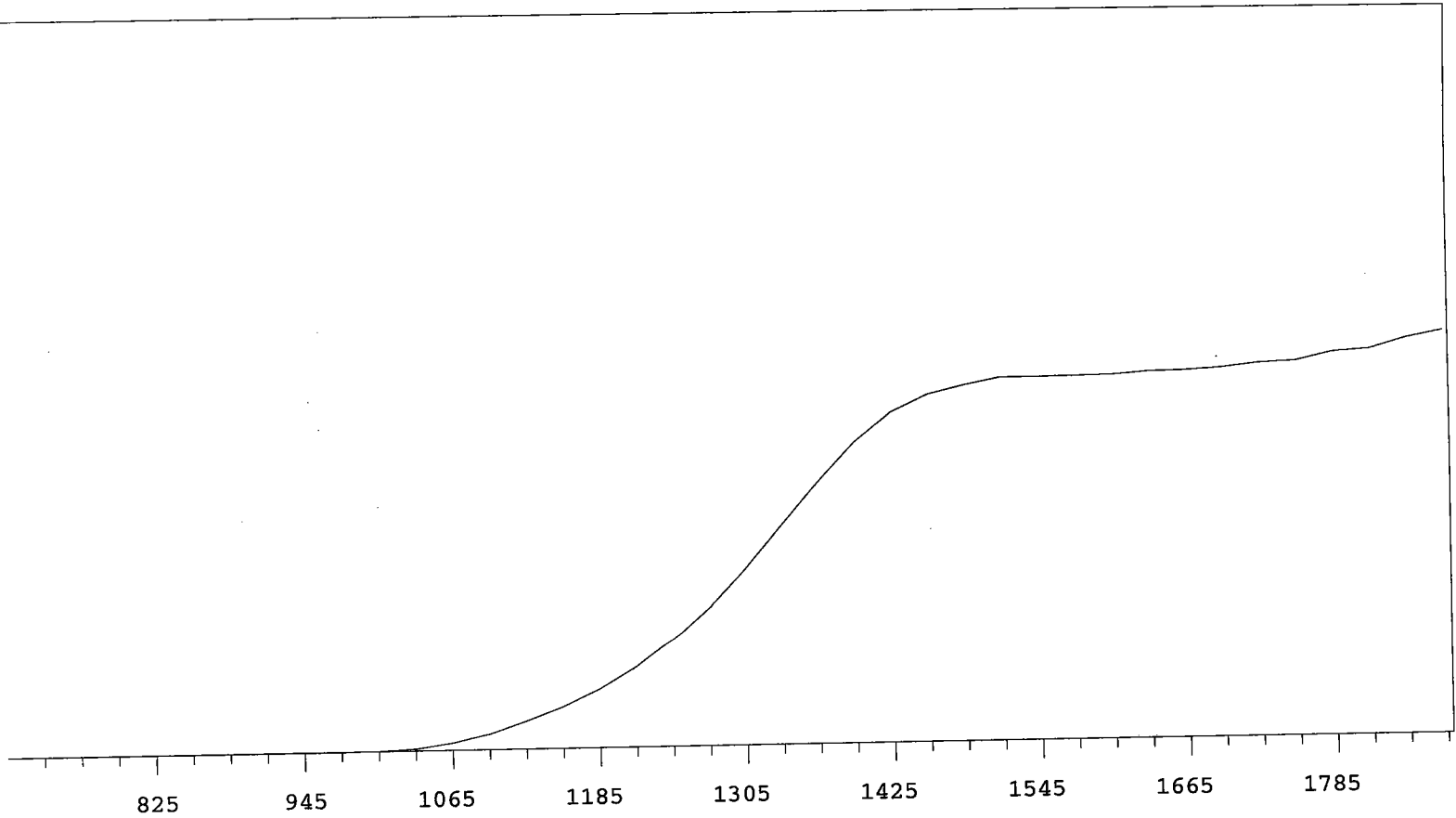
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16337	+74.91
735	0		1335	20471	+68.07
765	0		1365	25012	+57.86
795	0	>100	1395	29694	+47.48
825	0	>100	1425	33409	+35.17
855	0	>100	1455	37013	+23.27
885	0	>100	1485	38629	+14.35
915	0	>100	1515	39529	+7.69
945	0	>100	1545	40284	+4.34
975	0	>100	1575	40711	+2.52
1005	20	>100	1605	40642	+1.97
1035	122	>100	1635	40879	+1.11
1065	511	>100	1665	41405	+0.98
1095	1263	>100	1695	41011	+0.30
1125	2390	>100	1725	41182	+0.41
1155	3641	>100	1755	41178	+3.28
1185	5246	>100	1785	41573	+6.47
1215	7212	+98.32	1815	42858	+10.82
1245	9897	+89.80	1845	44440	
1275	12742	+82.40	1875	46780	



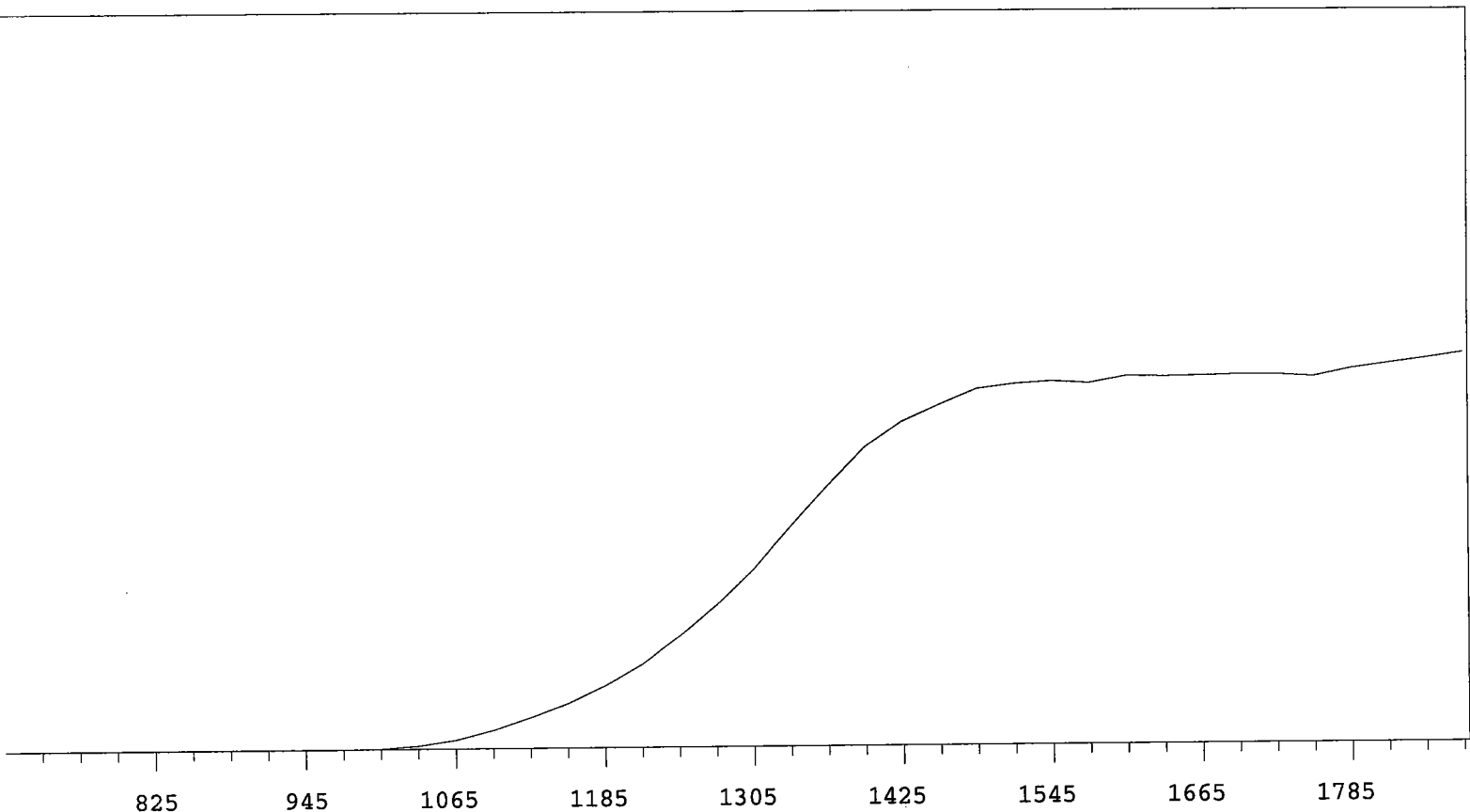
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16303	+72.82
735	0		1335	20309	+64.32
765	0		1365	24364	+53.82
795	0	>100	1395	28527	+40.95
825	0	>100	1425	31774	+28.74
855	0	>100	1455	33631	+16.87
885	0	>100	1485	35030	+9.25
915	0	>100	1515	35208	+5.21
945	0	>100	1545	35741	+3.27
975	4	>100	1575	36019	+2.95
1005	46	>100	1605	36373	+2.21
1035	202	>100	1635	36484	+2.27
1065	697	>100	1665	36713	+2.28
1095	1532	>100	1695	37093	+2.46
1125	2614	>100	1725	37325	+4.17
1155	3953	>100	1755	37543	+7.52
1185	5474	>100	1785	38833	+13.43
1215	7466	+93.09	1815	40656	+19.49
1245	9842	+86.73	1845	43753	
1275	12814	+80.29	1875	47246	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16889	+70.18
735	0		1335	20600	+61.29
765	1	+0.00	1365	24824	+50.40
795	0	>100	1395	28208	+38.85
825	0	>100	1425	31539	+25.79
855	0	>100	1455	33391	+16.06
885	0	>100	1485	33991	+8.60
915	0	>100	1515	34782	+5.01
945	0	>100	1545	35201	+4.10
975	5	>100	1575	35380	+2.50
1005	47	>100	1605	35849	+1.87
1035	243	>100	1635	35784	+1.79
1065	792	>100	1665	36000	+1.43
1095	1744	>100	1695	36269	+2.10
1125	2933	>100	1725	36381	+3.46
1155	4123	>100	1755	36733	+6.86
1185	5780	>100	1785	37669	+11.78
1215	7791	+91.58	1815	39465	+16.64
1245	10478	+84.93	1845	41803	
1275	13118	+77.50	1875	44665	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16226	+71.71
735	0		1335	20083	+61.95
765	1	+0.00	1365	23913	+49.99
795	0	>100	1395	27526	+36.97
825	0	>100	1425	30193	+24.54
855	0	>100	1455	31747	+14.71
885	0	>100	1485	32544	+7.71
915	0	>100	1515	33198	+3.66
945	0	>100	1545	33188	+1.51
975	2	>100	1575	33227	+0.73
1005	33	>100	1605	33278	+1.04
1035	203	>100	1635	33518	+1.38
1065	668	>100	1665	33565	+1.95
1095	1403	>100	1695	33774	+1.99
1125	2545	>100	1725	34135	+3.30
1155	3800	>100	1755	34244	+3.67
1185	5363	>100	1785	35022	+4.84
1215	7355	+95.00	1815	35229	+5.93
1245	9807	+87.69	1845	36179	
1275	12700	+80.28	1875	36821	



VOLTS    COUNTS    %/100 Volts

VOLTS    COUNTS    %/100 Volts

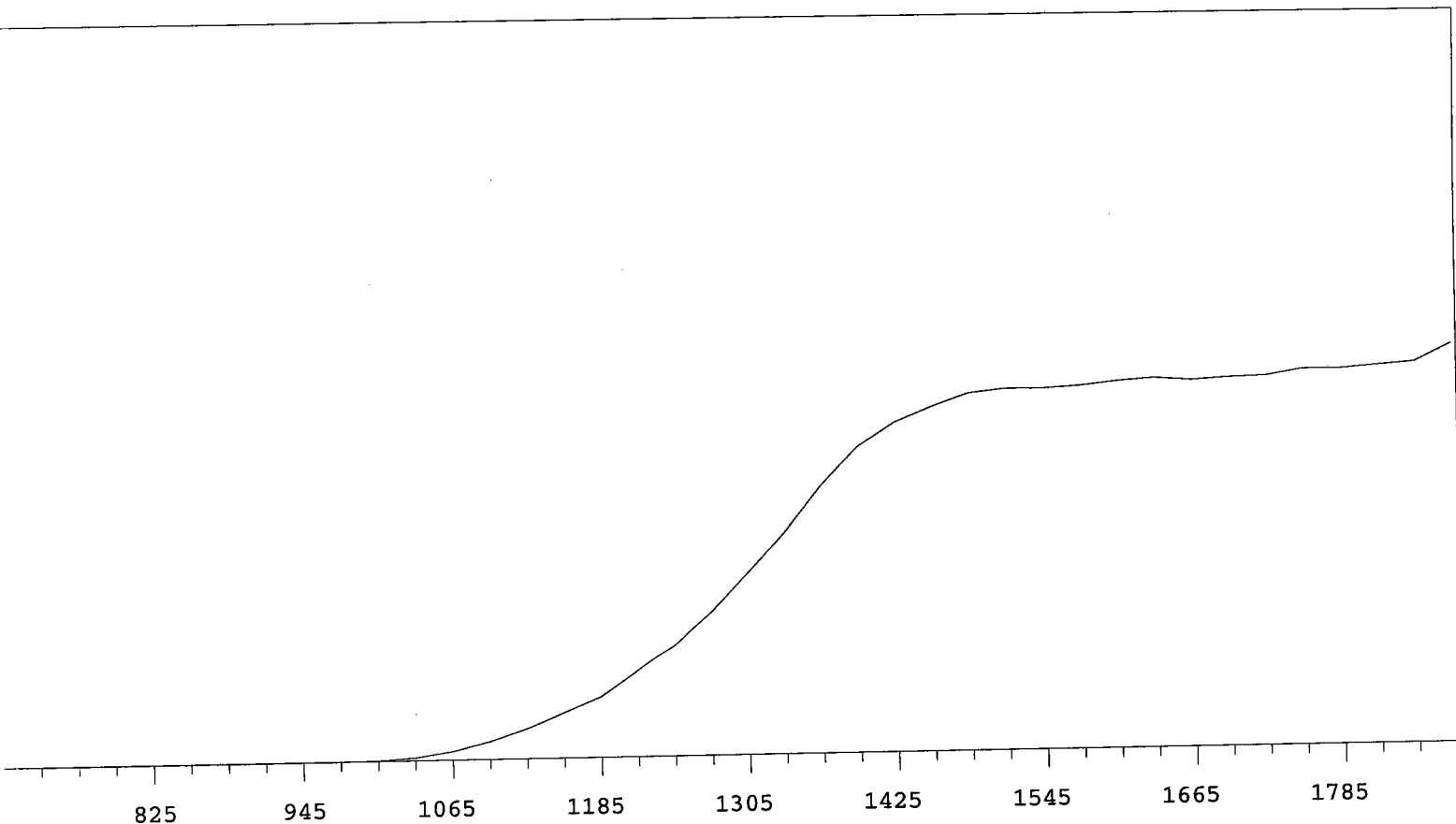
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	4	>100
1005	45	>100
1035	300	>100
1065	836	>100
1095	1742	>100
1125	2896	>100
1155	4198	>100
1185	5849	>100
1215	7887	+92.20
1245	10561	+83.55
1275	13442	+76.62

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	

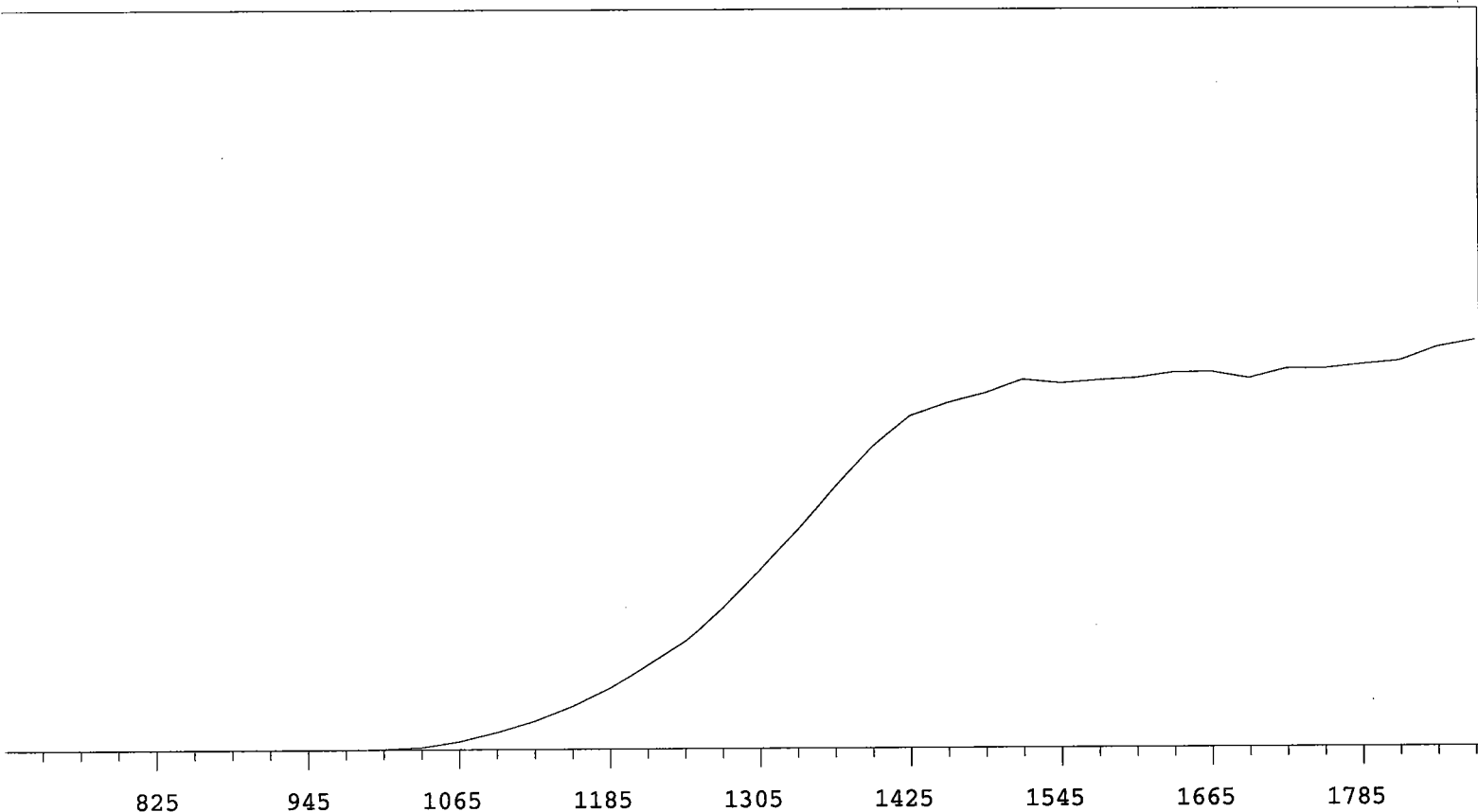
MPC 9600 Plateau  
 Alpha Volts: 870

Instrument 9 MPC 9604 Detector C  
 Beta Volts: 1530

7/1/2009



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	20192	+70.39
735	0		1335	24524	+60.97
765	0		1365	29650	+48.44
795	0	>100	1395	33904	+35.09
825	0	>100	1425	36549	+22.73
855	0	>100	1455	38217	+13.58
885	1	>100	1485	39628	+7.51
915	1	>100	1515	40035	+3.73
945	2	>100	1545	40020	+1.92
975	3	>100	1575	40236	+2.06
1005	64	>100	1605	40680	+1.62
1035	349	>100	1635	40953	+1.03
1065	970	>100	1665	40643	+0.43
1095	1982	>100	1695	40882	+1.41
1125	3328	>100	1725	40979	+2.18
1155	5012	>100	1755	41654	+2.20
1185	6669	>100	1785	41602	+2.27
1215	9448	+92.67	1815	41935	+4.50
1245	12293	+86.58	1845	42259	
1275	15917	+76.99	1875	44183	



VOLTS    COUNTS    %/100 Volts

VOLTS    COUNTS    %/100 Volts

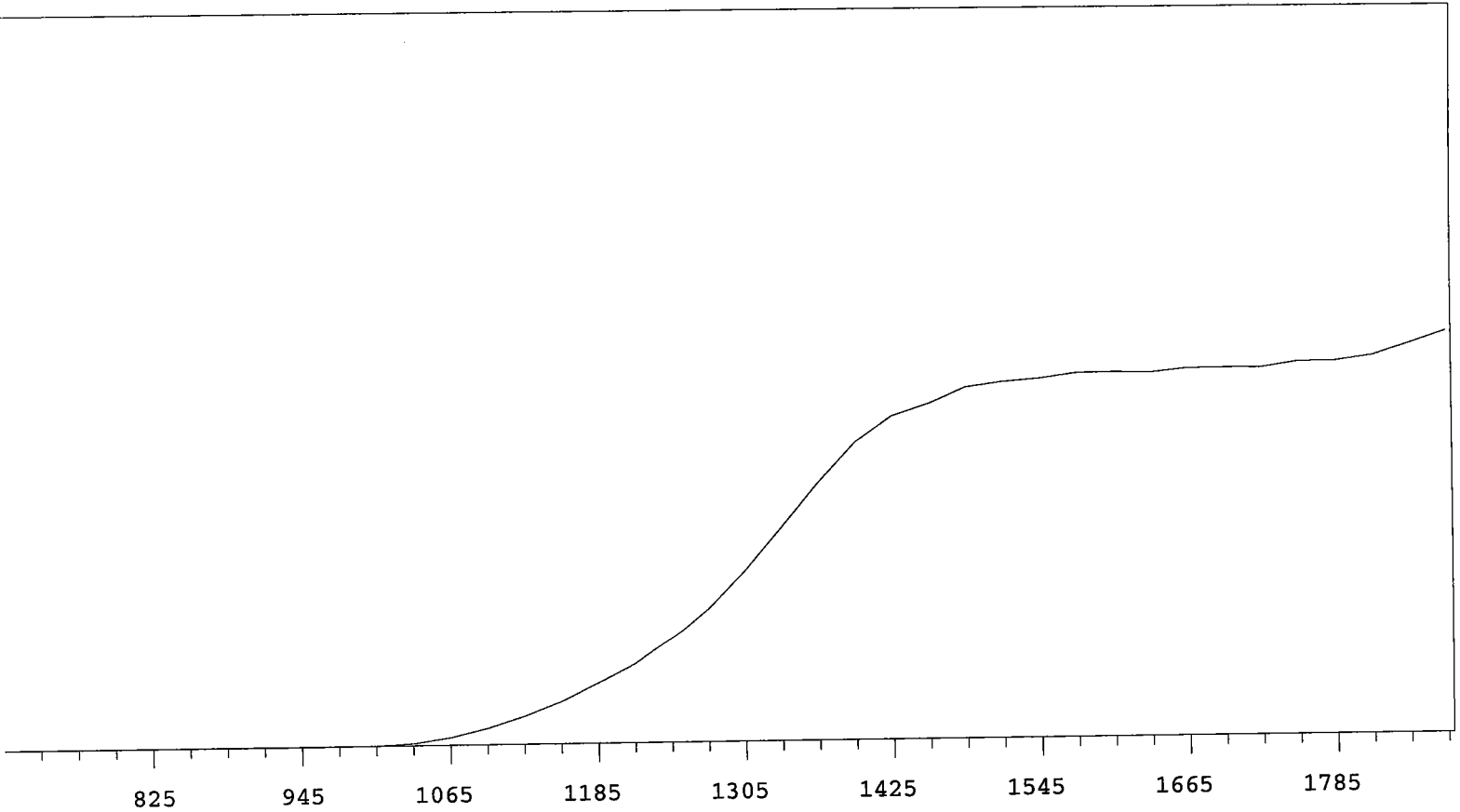
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	5	>100
1005	35	>100
1035	186	>100
1065	618	>100
1095	1280	>100
1125	2141	>100
1155	3268	>100
1185	4659	>100
1215	6343	+90.68
1245	8064	+83.46
1275	10497	+77.03

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  
Alpha Volts: 870

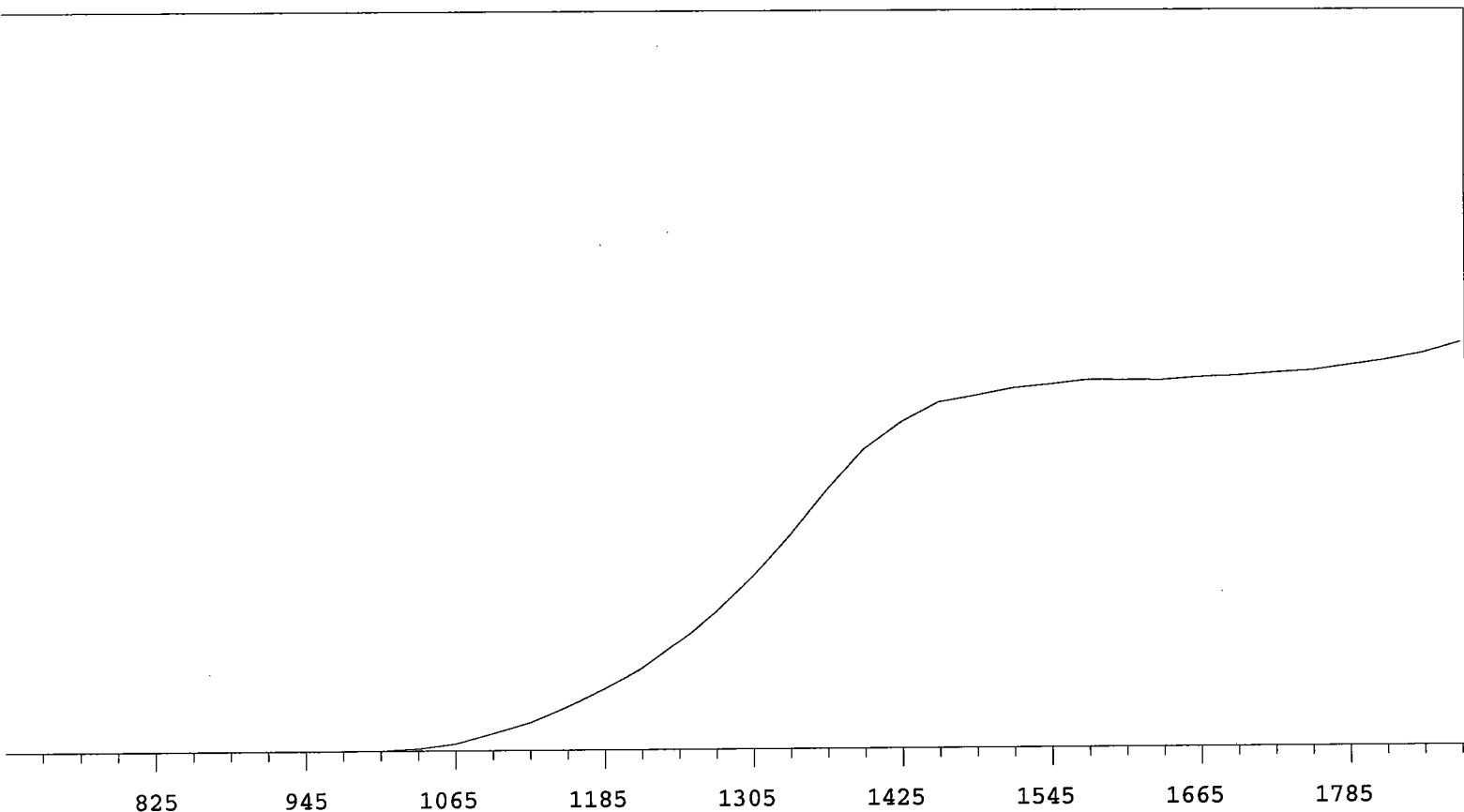
Instrument 10 MPC 9604 Detector A  
Beta Volts: 1552

7/1/2009

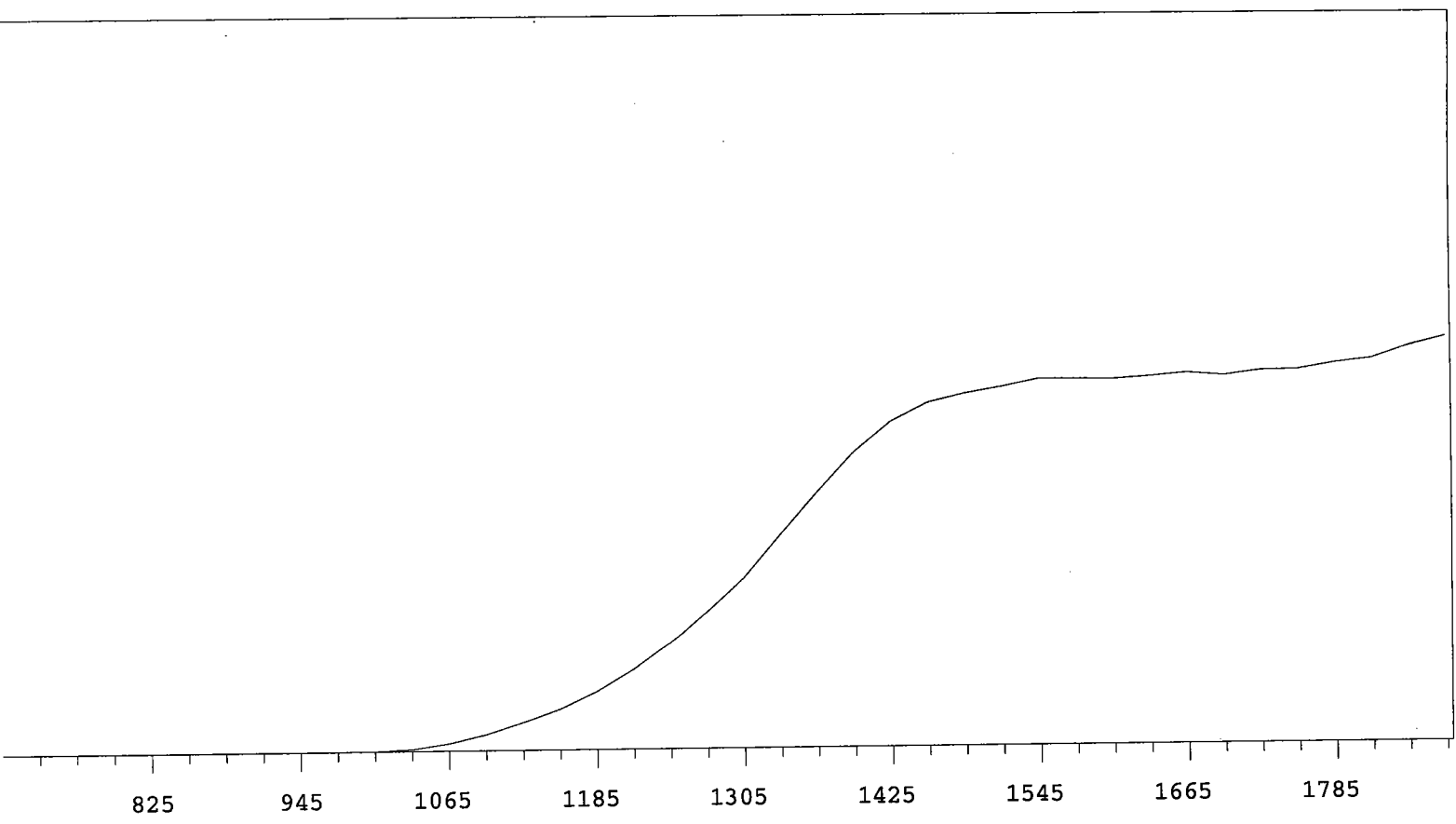


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16076	+72.76
735	1		1335	19985	+63.85
765	0		1365	24102	+50.95
795	0	>100	1395	27819	+36.01
825	0	>100	1425	30228	+23.86
855	0	>100	1455	31343	+14.40
885	0	>100	1485	32811	+8.77
915	0	>100	1515	33243	+6.10
945	0	>100	1545	33518	+3.25
975	1	>100	1575	34010	+1.98
1005	37	>100	1605	34061	+1.59
1035	198	>100	1635	33973	+0.97
1065	687	>100	1665	34346	+0.93
1095	1491	>100	1695	34366	+1.72
1125	2580	>100	1725	34341	+1.54
1155	3920	>100	1755	34860	+2.47
1185	5588	>100	1785	34897	+4.50
1215	7384	+91.32	1815	35377	+6.60
1245	9794	+84.81	1845	36458	
1275	12572	+79.73	1875	37630	

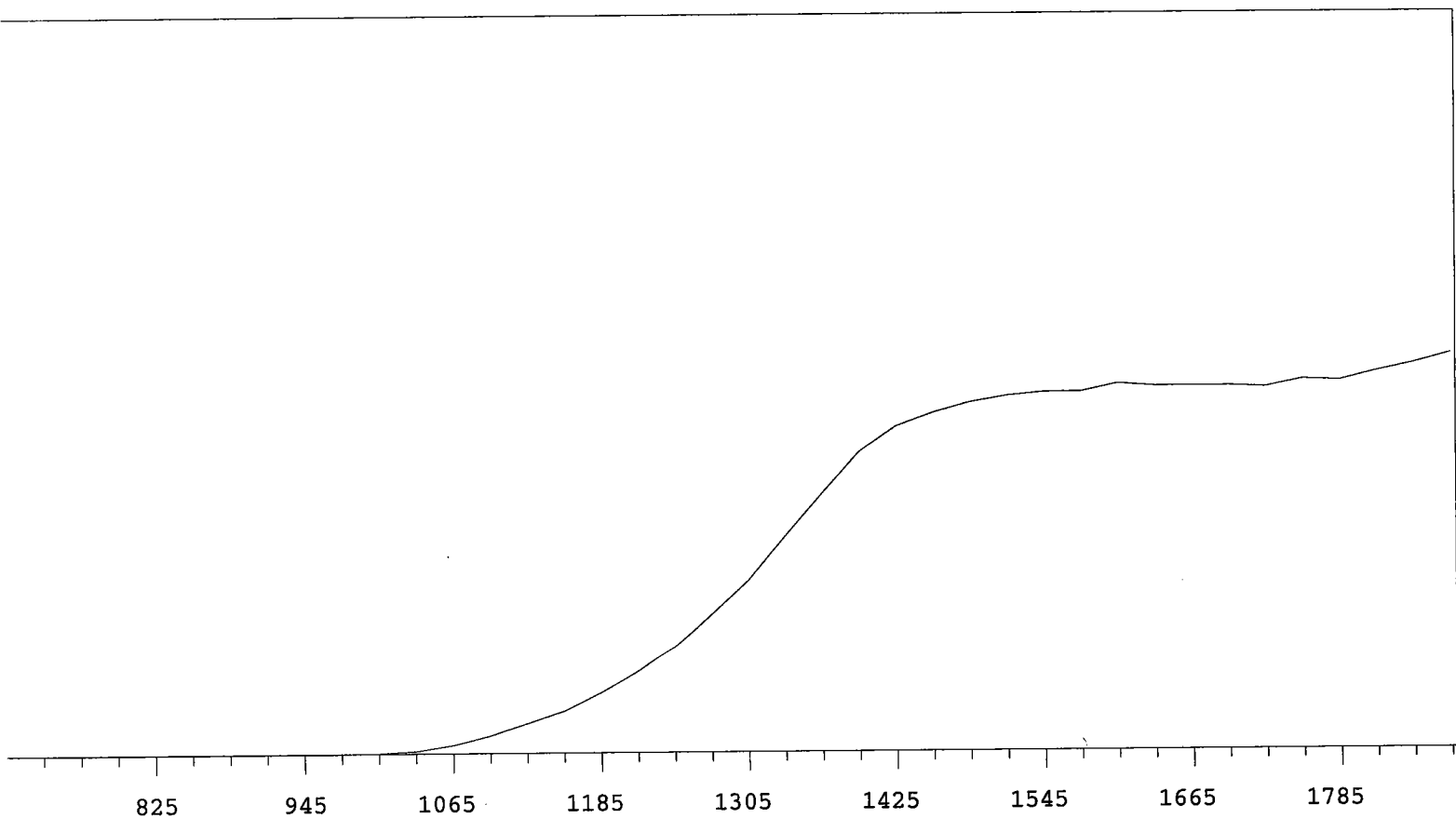




VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14469	+71.08
735	0		1335	17904	+63.07
765	0		1365	21677	+51.20
795	0	>100	1395	25027	+38.06
825	0	>100	1425	27237	+24.55
855	0	>100	1455	28914	+14.61
885	0	>100	1485	29480	+8.48
915	0	>100	1515	30075	+5.06
945	1	>100	1545	30374	+3.42
975	7	>100	1575	30738	+1.68
1005	28	>100	1605	30703	+1.08
1035	190	>100	1635	30679	+0.77
1065	597	>100	1665	30902	+1.46
1095	1474	>100	1695	30992	+1.89
1125	2383	>100	1725	31224	+2.40
1155	3680	>100	1755	31397	+3.27
1185	5131	>100	1785	31826	+4.13
1215	6808	+89.95	1815	32236	+5.59
1245	8990	+83.03	1845	32782	
1275	11493	+77.30	1875	33632	

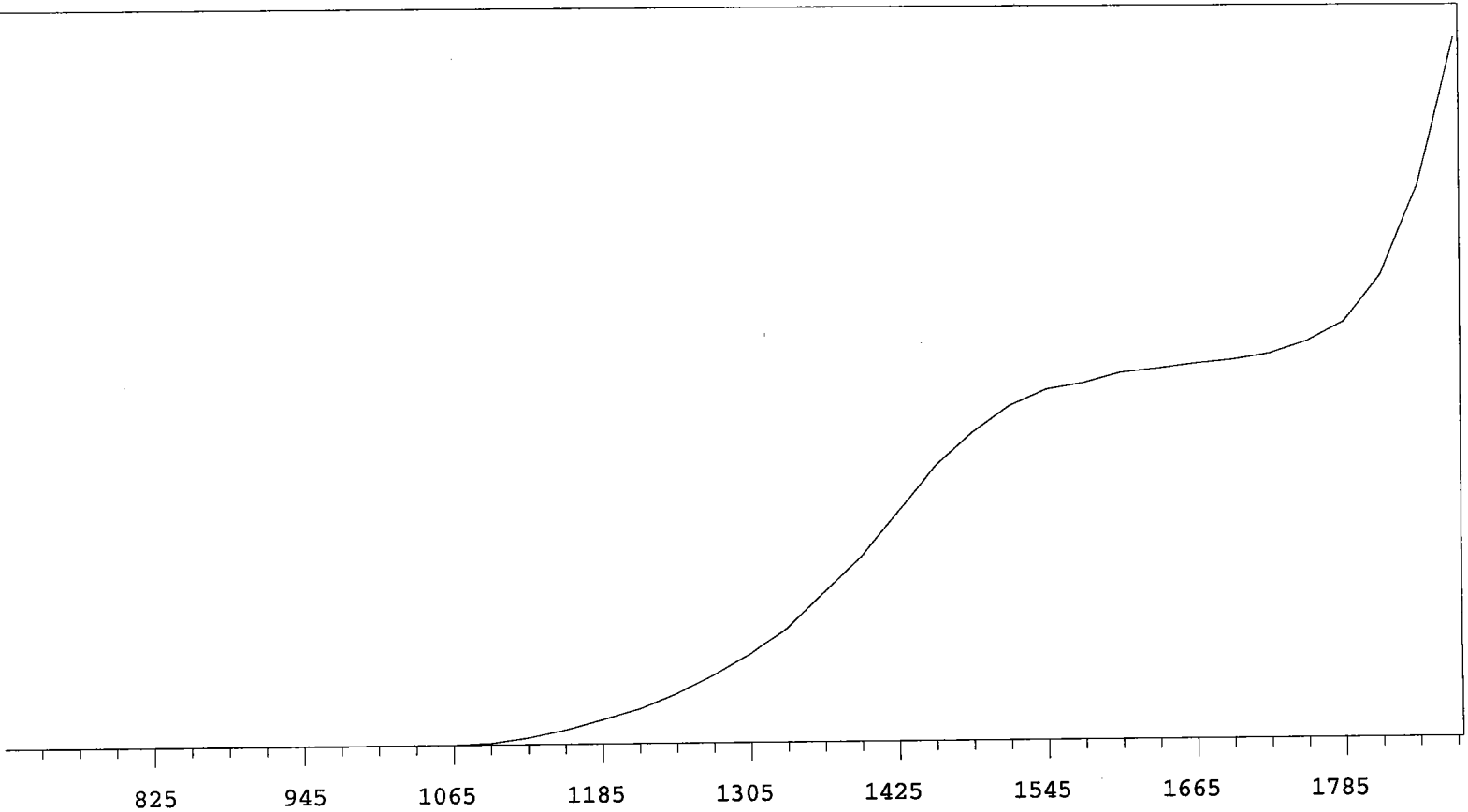


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18051	+71.16
735	0		1335	22586	+62.34
765	0		1365	26973	+51.47
795	0	>100	1395	31137	+38.24
825	0	>100	1425	34321	+25.70
855	0	>100	1455	36267	+15.37
885	1	>100	1485	37197	+9.21
915	0	>100	1515	37851	+5.38
945	2	>100	1545	38622	+3.00
975	2	>100	1575	38600	+1.55
1005	36	>100	1605	38538	+1.03
1035	220	>100	1635	38786	+0.91
1065	780	>100	1665	39129	+1.38
1095	1712	>100	1695	38832	+1.20
1125	2926	>100	1725	39323	+2.00
1155	4297	>100	1755	39390	+3.35
1185	6097	>100	1785	40031	+4.86
1215	8397	+95.11	1815	40466	+6.64
1245	11155	+85.84	1845	41713	
1275	14430	+78.79	1875	42620	

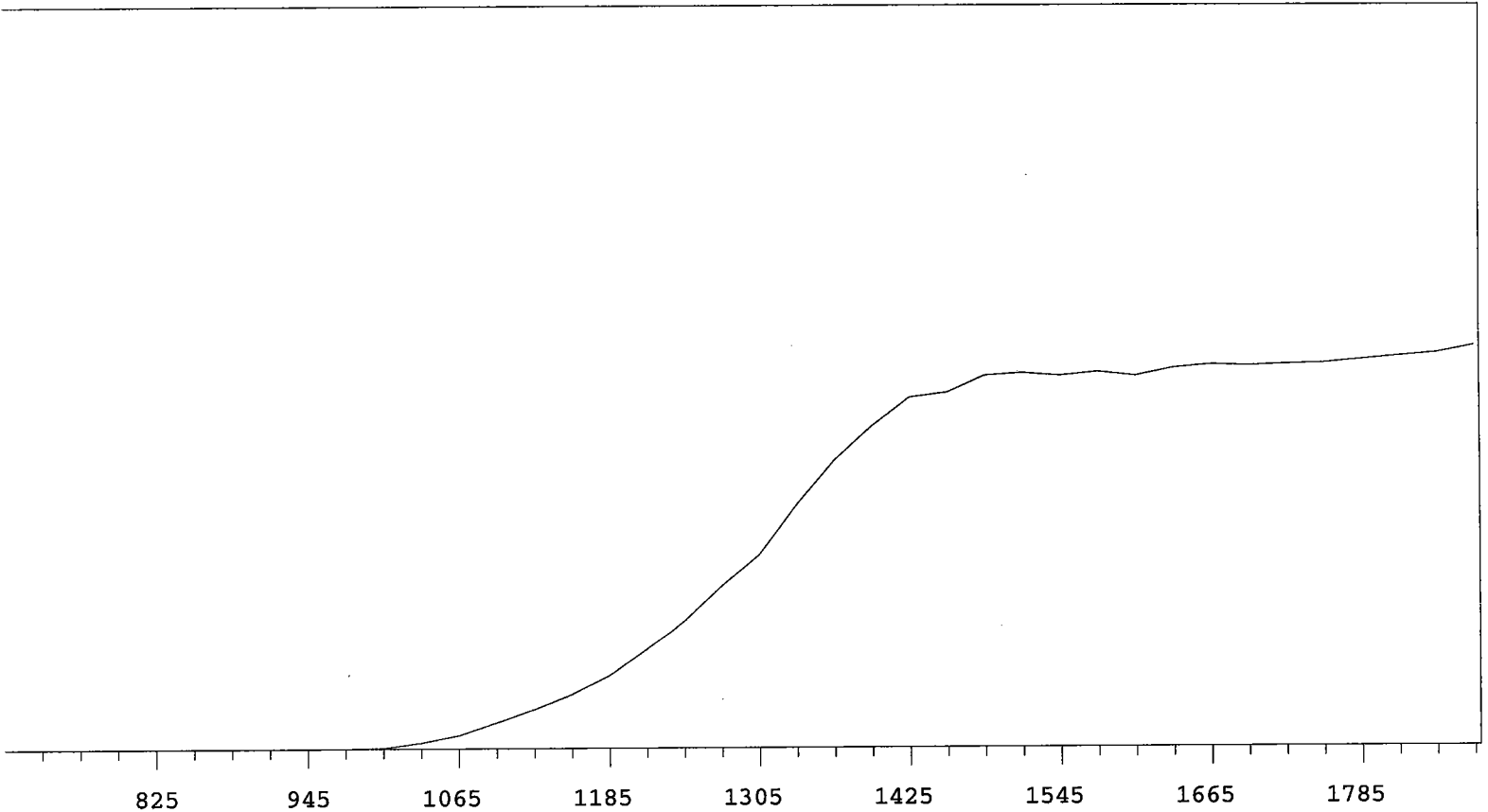


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15430	+69.87
735	0		1335	19258	+61.49
765	0		1365	23018	+50.06
795	0	>100	1395	26562	+35.34
825	0	>100	1425	28750	+22.67
855	0	>100	1455	29911	+13.20
885	0	>100	1485	30798	+8.01
915	0	>100	1515	31375	+4.83
945	0	>100	1545	31684	+3.74
975	3	>100	1575	31721	+2.38
1005	49	>100	1605	32398	+1.44
1035	244	>100	1635	32154	+0.64
1065	764	>100	1665	32157	-0.77
1095	1584	>100	1695	32152	+0.99
1125	2677	>100	1725	32029	+1.41
1155	3763	>100	1755	32699	+3.00
1185	5395	>100	1785	32566	+4.71
1215	7350	+93.71	1815	33351	+5.92
1245	9655	+83.52	1845	34031	
1275	12504	+76.82	1875	34941	

Alpha Volts: 1515 Beta Volts: 1515

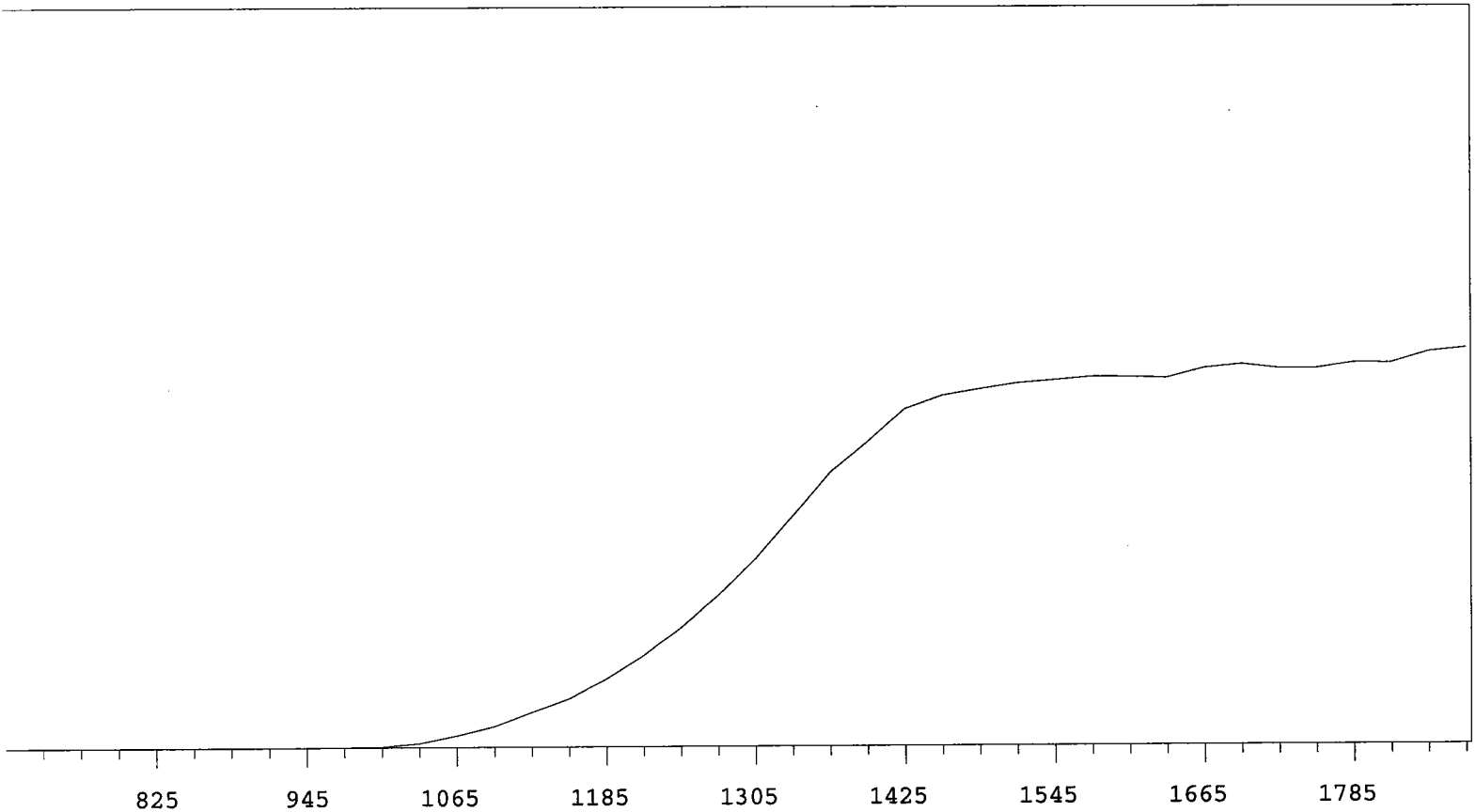


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	3225	+87.64
735	1		1335	4189	+80.15
765	0		1365	5428	+75.12
795	0	>100	1395	6662	+68.60
825	0	>100	1425	8241	+58.14
855	0	>100	1455	9857	+46.65
885	0	>100	1485	11018	+33.24
915	0	>100	1515	11953	+21.01
945	1	+0.00	1545	12538	+13.57
975	0	>100	1575	12760	+8.35
1005	0	>100	1605	13114	+5.84
1035	2	>100	1635	13258	+4.78
1065	9	>100	1665	13430	+3.99
1095	61	>100	1695	13551	+5.46
1125	248	>100	1725	13771	+8.65
1155	528	>100	1755	14204	+16.44
1185	882	>100	1785	14916	+30.03
1215	1270	>100	1815	16579	+48.74
1245	1786	>100	1845	19717	
1275	2478	+93.67	1875	25029	

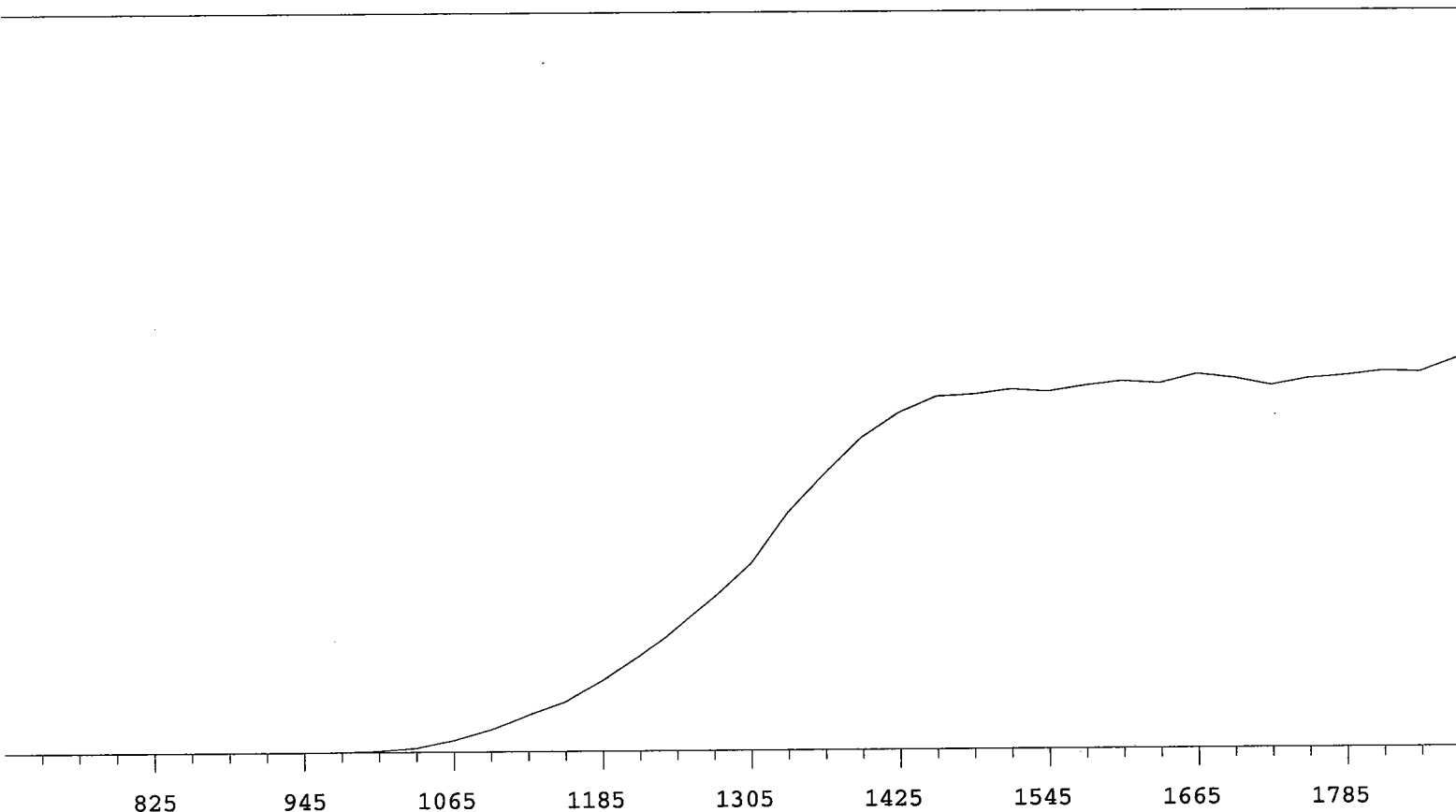


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8947	+65.63
735	0		1335	11238	+56.58
765	0		1365	13246	+46.66
795	0	>100	1395	14838	+30.69
825	0	>100	1425	16166	+20.11
855	0	>100	1455	16396	+11.95
885	0	>100	1485	17161	+5.61
915	1	>100	1515	17274	+3.59
945	0	>100	1545	17144	-0.00
975	11	>100	1575	17323	+0.80
1005	47	>100	1605	17136	+2.21
1035	280	>100	1635	17484	+1.94
1065	610	>100	1665	17638	+2.16
1095	1192	>100	1695	17580	+0.85
1125	1789	>100	1725	17655	+1.05
1155	2466	>100	1755	17700	+1.98
1185	3337	+94.91	1785	17857	+2.38
1215	4526	+88.85	1815	18006	+3.36
1245	5885	+78.40	1845	18140	
1275	7518	+72.09	1875	18468	

Alpha Volts: 1515 Beta Volts: 1515



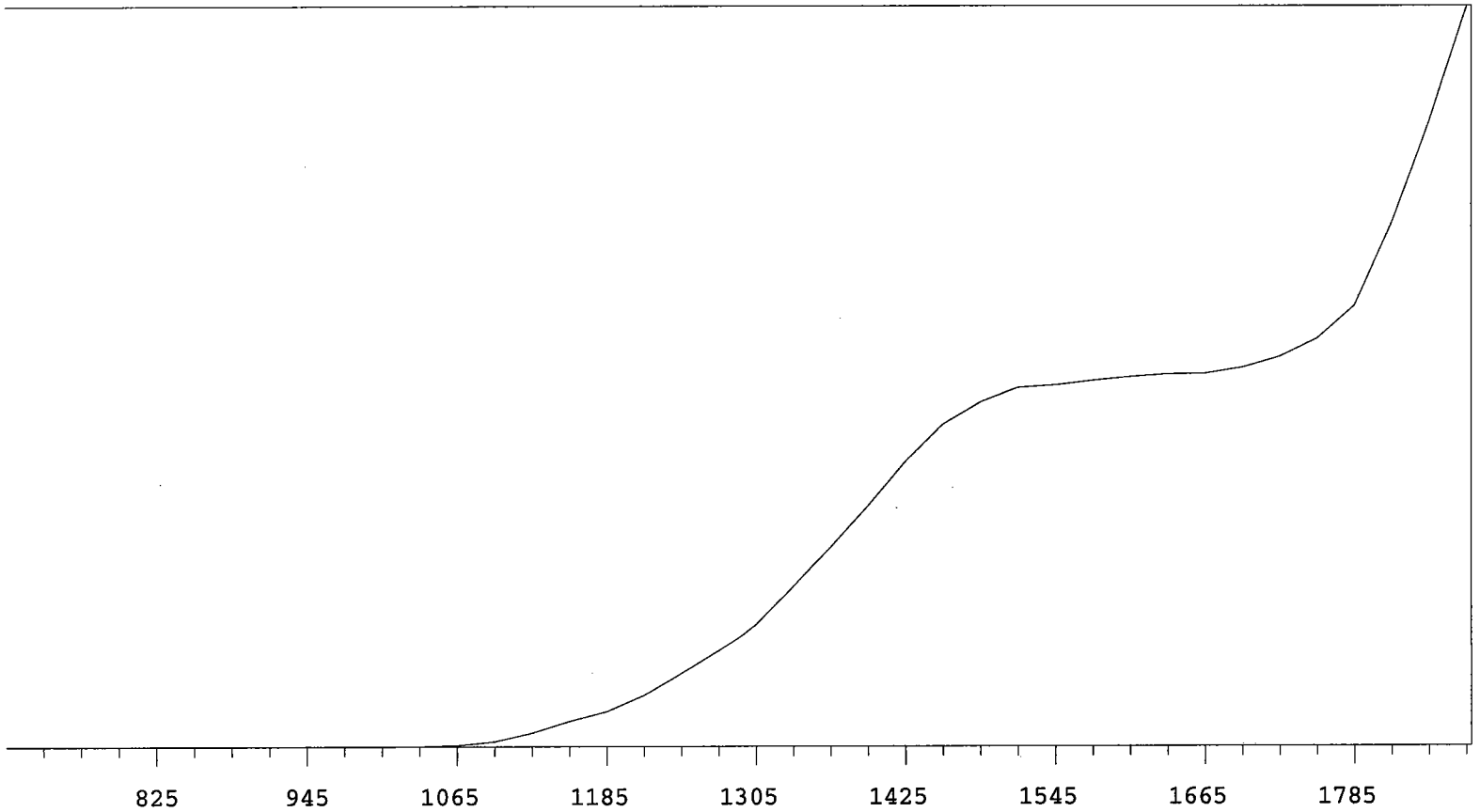
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	8636	+66.44
735	0		1335	10593	+56.56
765	0	+0.00	1365	12582	+46.23
795	0	>100	1395	13957	+33.45
825	1	+0.00	1425	15443	+21.49
855	0	>100	1455	16048	+13.14
885	0	+0.00	1485	16331	+6.45
915	0	>100	1515	16603	+4.19
945	1	>100	1545	16736	+2.73
975	7	>100	1575	16884	+1.11
1005	46	>100	1605	16875	+1.91
1035	191	>100	1635	16813	+2.86
1065	540	>100	1665	17257	+2.60
1095	957	>100	1695	17425	+1.58
1125	1597	>100	1725	17238	+0.49
1155	2217	>100	1755	17230	+0.63
1185	3154	+98.74	1785	17482	+3.27
1215	4239	+89.75	1815	17468	+4.46
1245	5550	+79.98	1845	17977	
1275	6980	+73.12	1875	18163	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	7679	+65.97
735	0		1335	9737	+57.57
765	0		1365	11301	+45.87
795	0	>100	1395	12767	+31.71
825	0	>100	1425	13767	+19.90
855	1	+83.33	1455	14399	+10.72
885	1	+55.56	1485	14467	+4.38
915	0	>100	1515	14671	+2.12
945	1	>100	1545	14576	+2.61
975	9	>100	1575	14808	+1.80
1005	60	>100	1605	14974	+3.15
1035	173	>100	1635	14872	+1.76
1065	480	>100	1665	15248	-0.41
1095	911	>100	1695	15067	-0.27
1125	1508	>100	1725	14784	-0.43
1155	2024	>100	1755	15044	+2.01
1185	2872	+97.38	1785	15163	+2.82
1215	3858	+89.30	1815	15333	+3.61
1245	5070	+78.02	1845	15278	
1275	6322	+73.30	1875	15817	

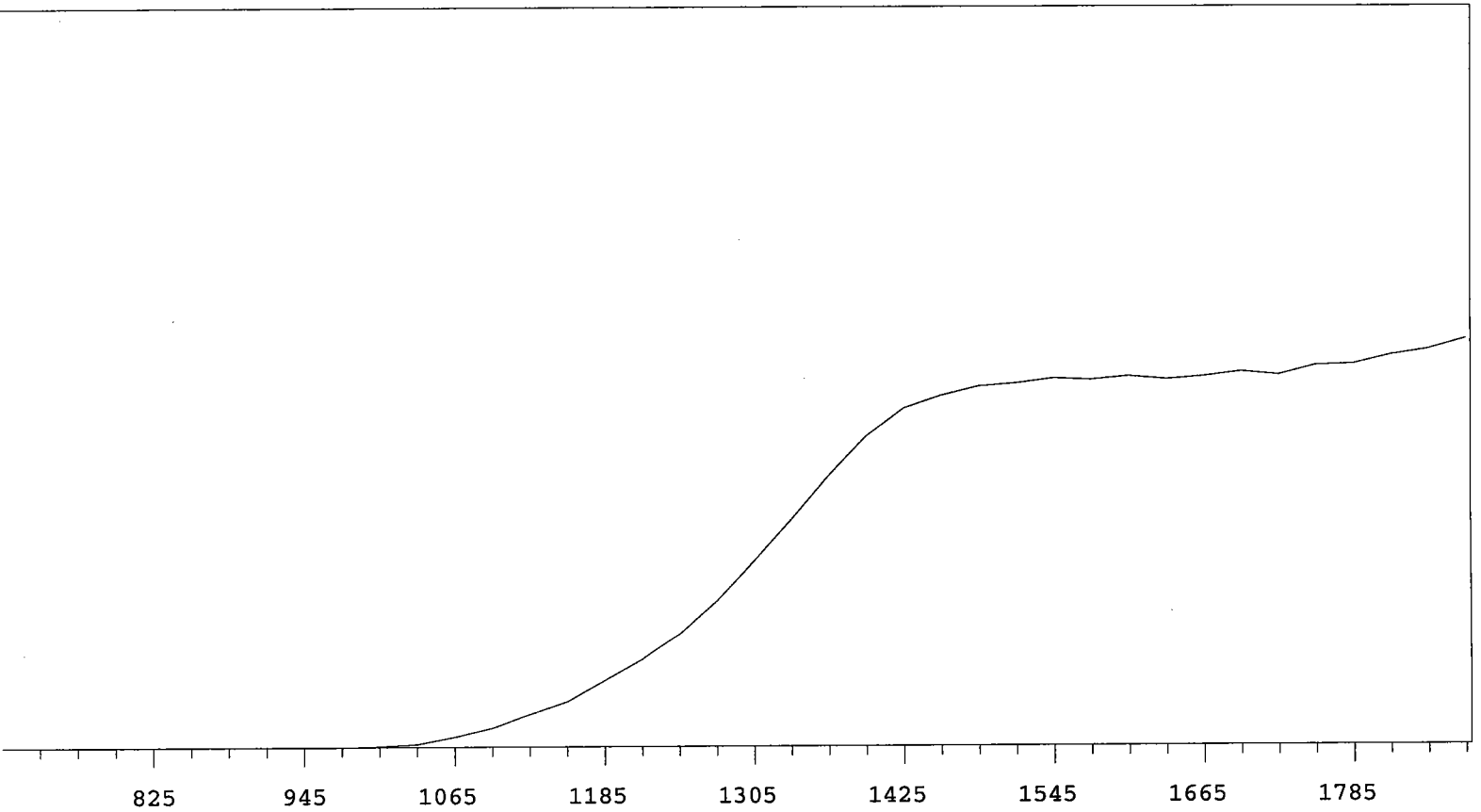
Alpha Volts: 705

Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	6302	+80.03
735	1		1335	8191	+73.78
765	0		1365	10140	+66.18
795	0	>100	1395	12247	+55.83
825	0	>100	1425	14468	+43.92
855	0	>100	1455	16303	+31.28
885	0	>100	1485	17411	+18.64
915	0	>100	1515	18150	+9.87
945	0	>100	1545	18275	+5.30
975	1	>100	1575	18496	+3.16
1005	3	>100	1605	18685	+2.66
1035	17	>100	1635	18820	+2.63
1065	84	>100	1665	18855	+4.16
1095	267	>100	1695	19152	+7.70
1125	709	>100	1725	19706	+13.90
1155	1299	>100	1755	20640	+26.51
1185	1813	>100	1785	22308	+40.92
1215	2638	>100	1815	26460	+51.46
1245	3777	+96.47	1845	31616	
1275	4915	+87.98	1875	37348	

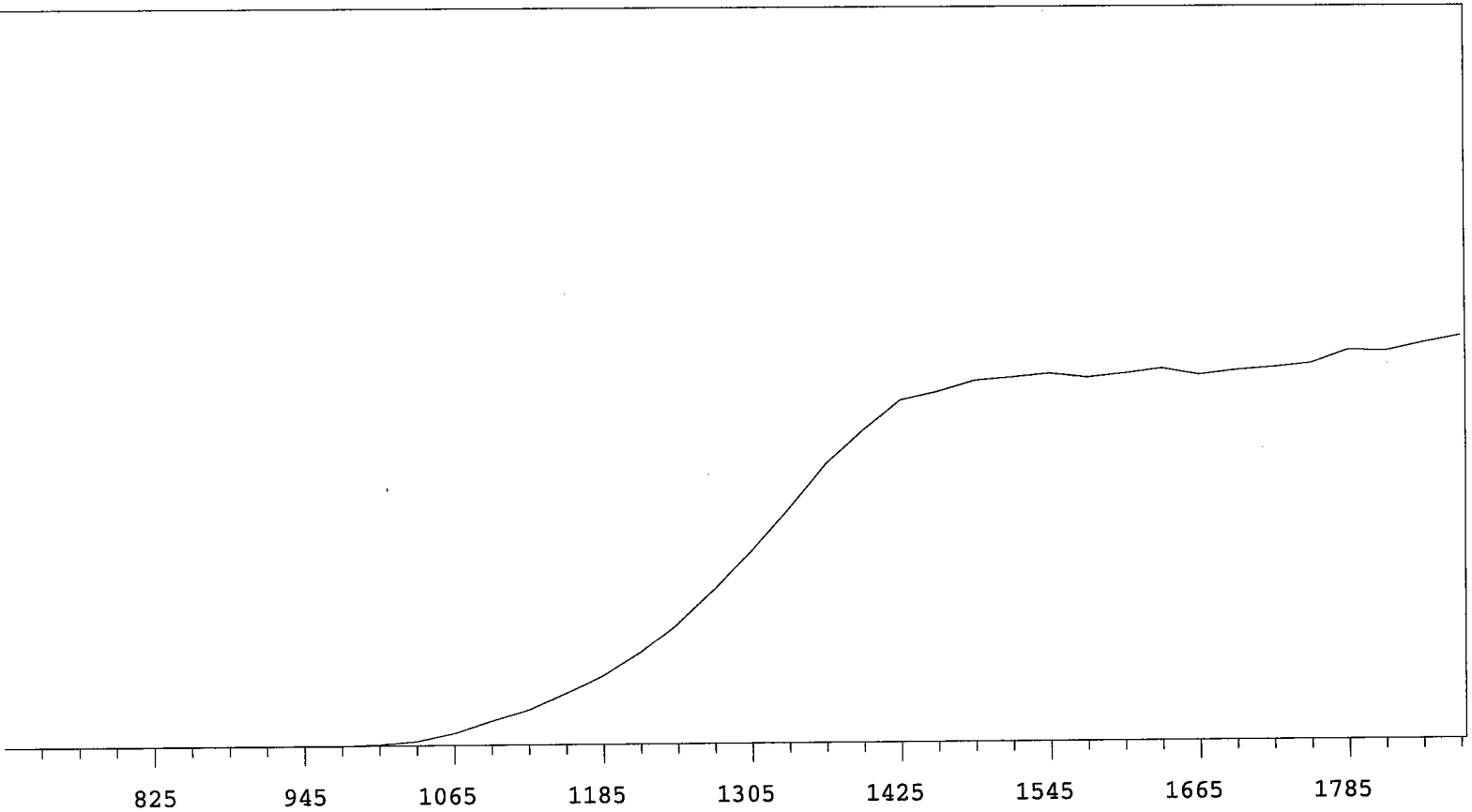




VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	10207	+70.42
735	0		1335	12473	+60.75
765	0		1365	14900	+48.87
795	0	>100	1395	17101	+35.36
825	0	>100	1425	18643	+22.53
855	1	+83.33	1455	19350	+12.34
885	1	-83.33	1485	19848	+6.68
915	0	-55.56	1515	20014	+3.51
945	0	>100	1545	20278	+2.03
975	1	>100	1575	20186	+0.80
1005	43	>100	1605	20375	+0.32
1035	165	>100	1635	20209	+1.36
1065	557	>100	1665	20364	+0.83
1095	1055	>100	1695	20607	+2.43
1125	1775	>100	1725	20429	+2.51
1155	2470	>100	1755	20924	+3.64
1185	3617	+98.46	1785	20984	+5.11
1215	4757	+90.95	1815	21470	+5.63
1245	6186	+83.59	1845	21773	
1275	8021	+77.85	1875	22346	

Alpha Volts: 705

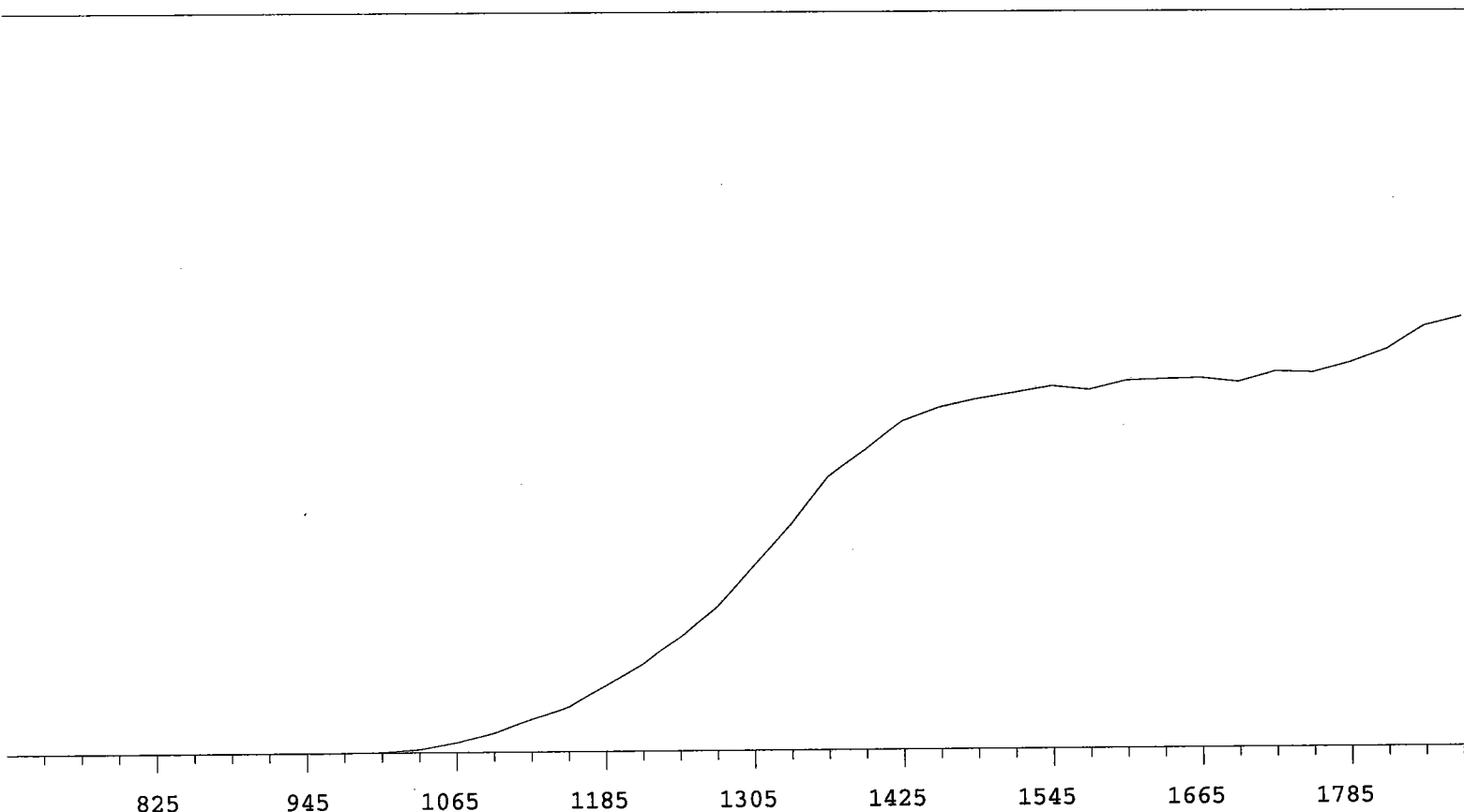
Beta Volts: 1515



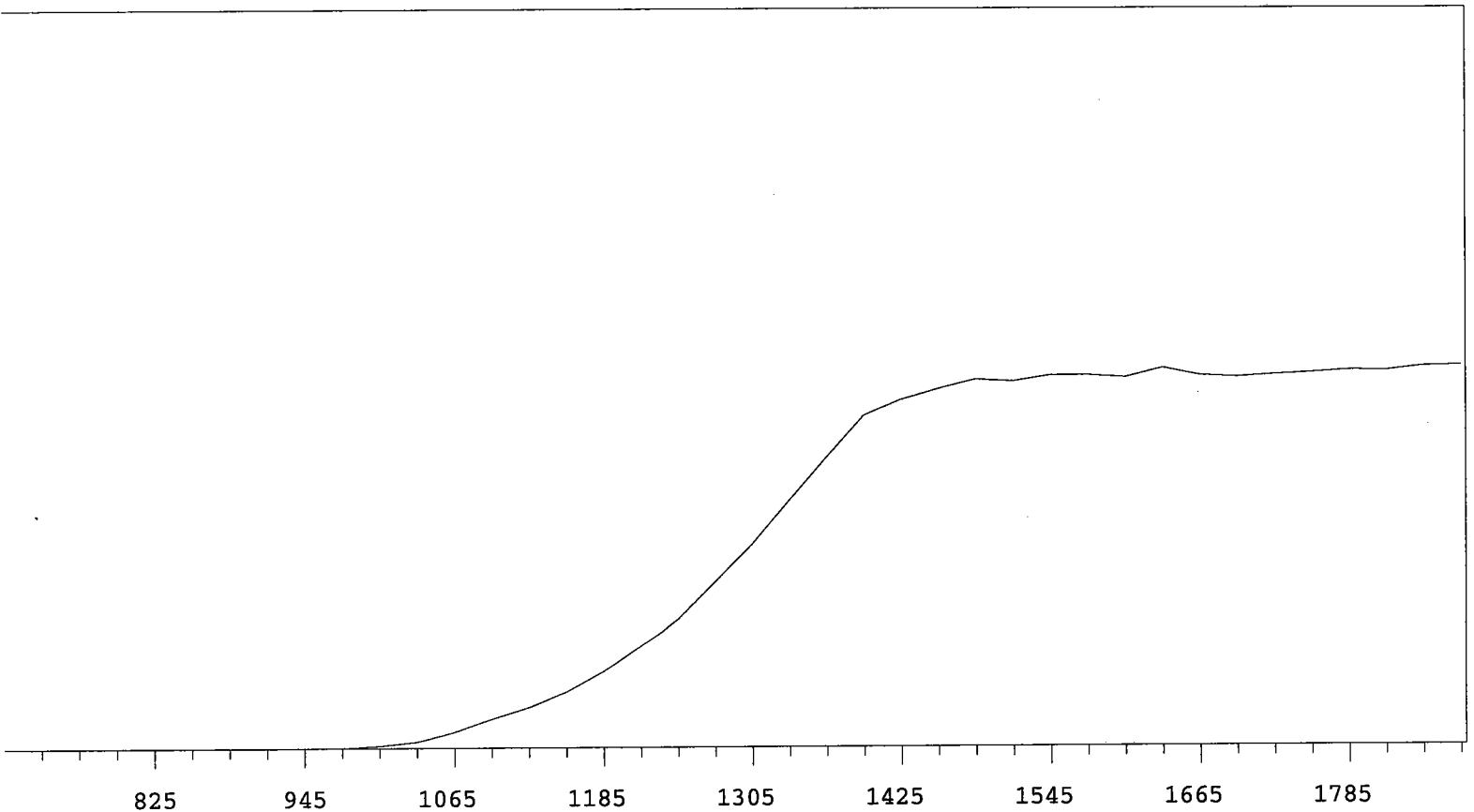
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	9543	+67.01
735	0		1335	11617	+56.47
765	0		1365	13791	+45.47
795	0	>100	1395	15387	+31.66
825	0	>100	1425	16819	+20.02
855	0	>100	1455	17210	+11.63
885	1	+0.00	1485	17742	+6.05
915	0	>100	1515	17892	+3.04
945	0	>100	1545	18070	+1.09
975	7	>100	1575	17856	+1.43
1005	52	>100	1605	18054	+0.42
1035	214	>100	1635	18287	+1.06
1065	590	>100	1665	17969	+0.78
1095	1201	>100	1695	18187	+1.48
1125	1759	>100	1725	18317	+4.89
1155	2569	>100	1755	18518	+4.76
1185	3440	+95.13	1785	19156	+5.18
1215	4583	+87.74	1815	19100	+5.18
1245	5985	+81.67	1845	19496	
1275	7682	+74.54	1875	19842	

Alpha Volts: 705

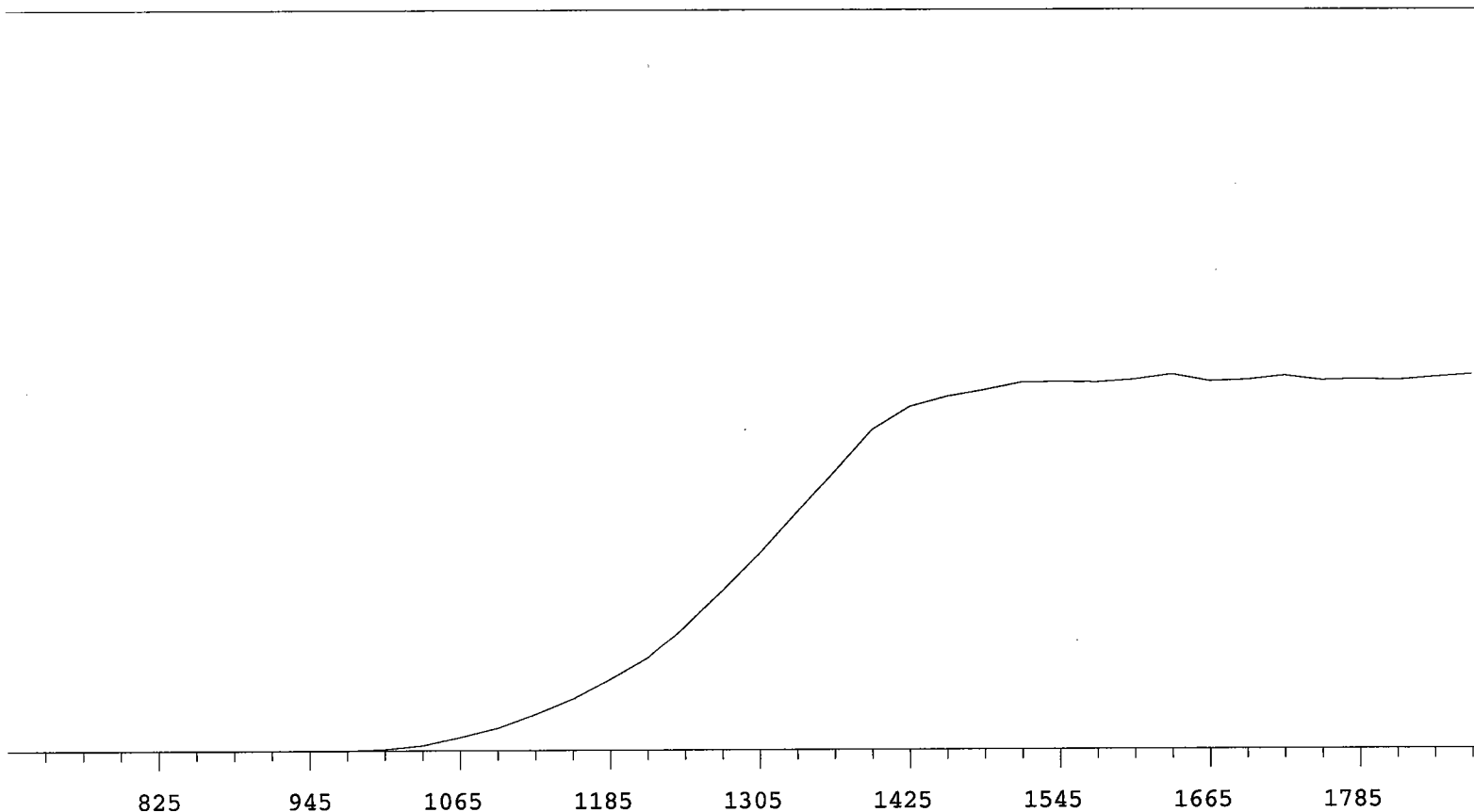
Beta Volts: 1515



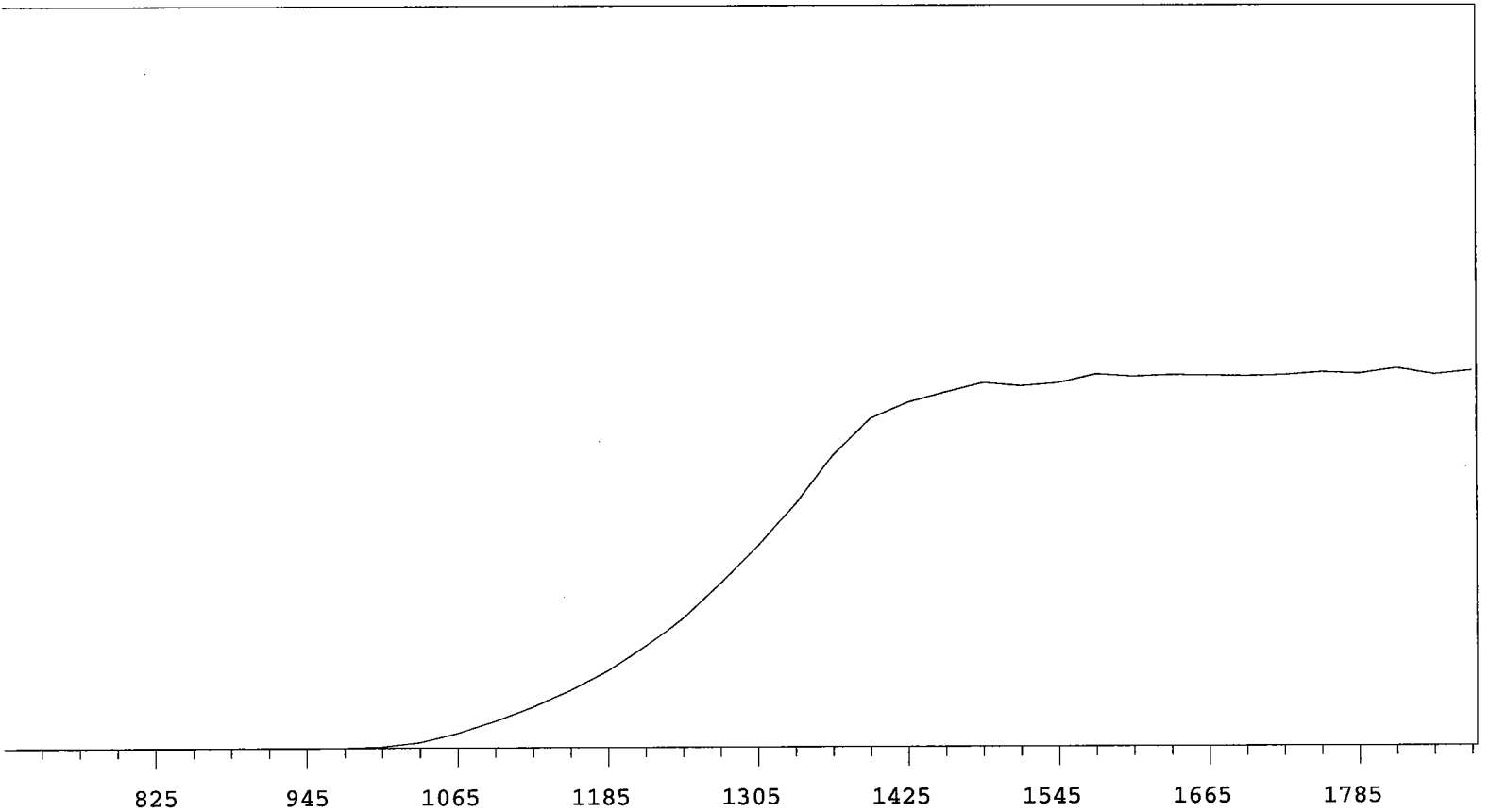
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9144	+69.92
735	0		1335	11120	+58.43
765	0		1365	13399	+45.40
795	0	>100	1395	14711	+32.57
825	0	>100	1425	16134	+20.69
855	0	>100	1455	16805	+13.46
885	0	>100	1485	17209	+7.90
915	0	>100	1515	17500	+4.31
945	0	>100	1545	17812	+3.48
975	4	>100	1575	17629	+2.80
1005	26	>100	1605	18066	+2.23
1035	169	>100	1635	18122	+1.44
1065	483	>100	1665	18166	+1.20
1095	955	>100	1695	17967	+1.60
1125	1639	>100	1725	18469	+3.41
1155	2233	>100	1755	18409	+6.35
1185	3262	+98.61	1785	18884	+9.47
1215	4306	+89.77	1815	19535	+11.98
1245	5662	+82.36	1845	20630	
1275	7113	+76.36	1875	21076	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9209	+64.55
735	1		1335	11200	+55.94
765	0	+55.56	1365	13123	+43.27
795	2	>100	1395	14957	+29.04
825	0	+0.00	1425	15658	+17.41
855	0	>100	1455	16123	+8.01
885	1	>100	1485	16530	+4.92
915	0	>100	1515	16437	+2.71
945	1	>100	1545	16704	+0.83
975	14	>100	1575	16707	+2.14
1005	104	>100	1605	16602	+0.55
1035	281	>100	1635	17024	-0.28
1065	720	>100	1665	16684	-0.42
1095	1302	>100	1695	16597	-0.85
1125	1834	>100	1725	16711	+1.27
1155	2544	>100	1755	16796	+1.51
1185	3485	+92.28	1785	16903	+1.57
1215	4624	+85.50	1815	16880	+1.46
1245	5878	+77.82	1845	17066	
1275	7515	+71.49	1875	17085	



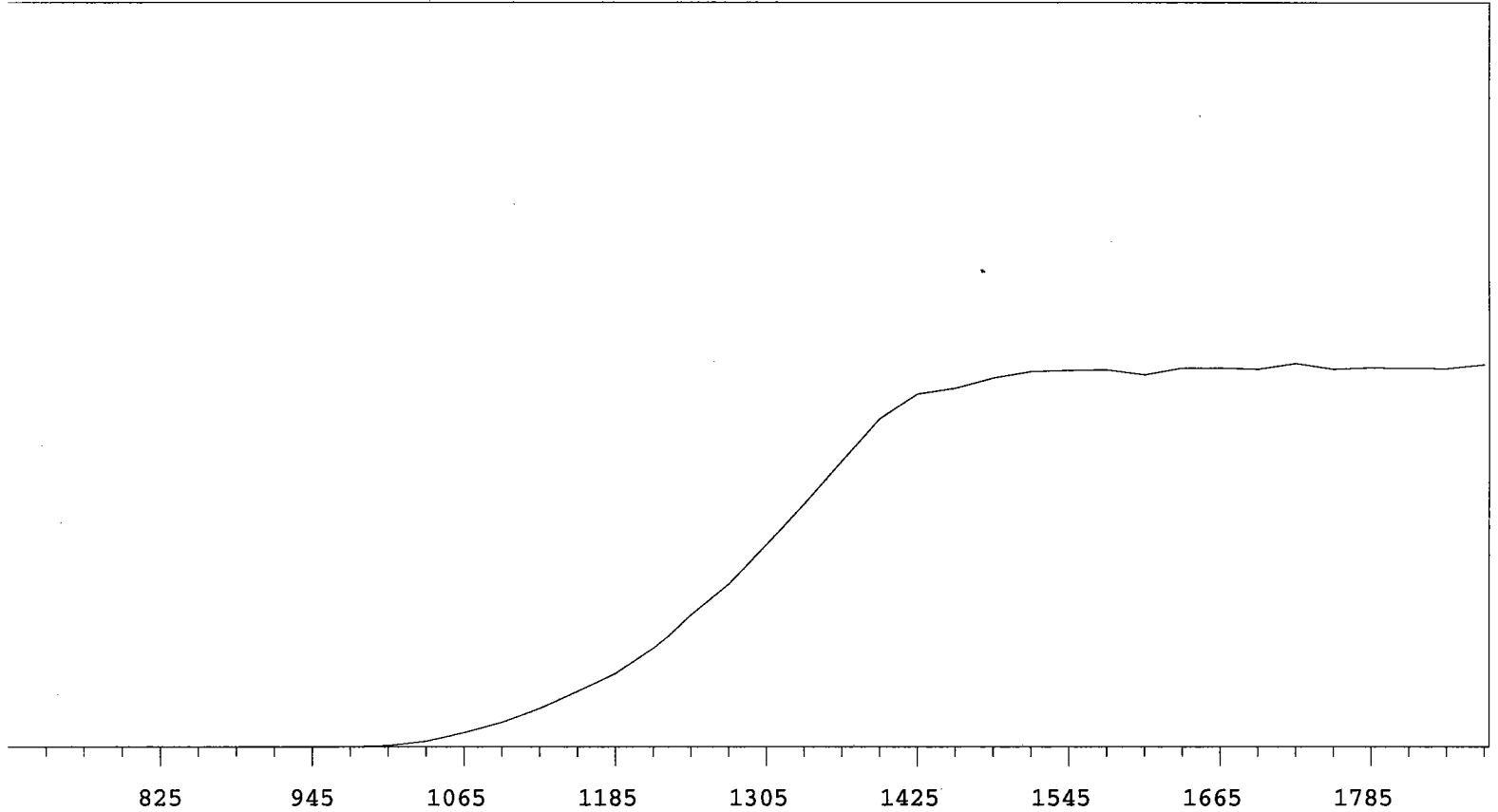
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9666	+64.39
735	0		1335	11722	+55.91
765	0		1365	13680	+44.91
795	0	>100	1395	15677	+31.56
825	0	>100	1425	16786	+19.46
855	0	>100	1455	17283	+10.57
885	0	>100	1485	17608	+5.95
915	1	>100	1515	17972	+3.32
945	0	>100	1545	18006	+1.84
975	4	>100	1575	17970	+1.58
1005	70	>100	1605	18104	+0.74
1035	257	>100	1635	18351	+0.24
1065	648	>100	1665	18016	+0.16
1095	1116	>100	1695	18080	-0.63
1125	1784	>100	1725	18283	+0.29
1155	2560	>100	1755	18047	-0.47
1185	3531	+96.11	1785	18110	-0.32
1215	4568	+89.22	1815	18040	+1.17
1245	6137	+81.65	1845	18200	
1275	7855	+74.42	1875	18320	



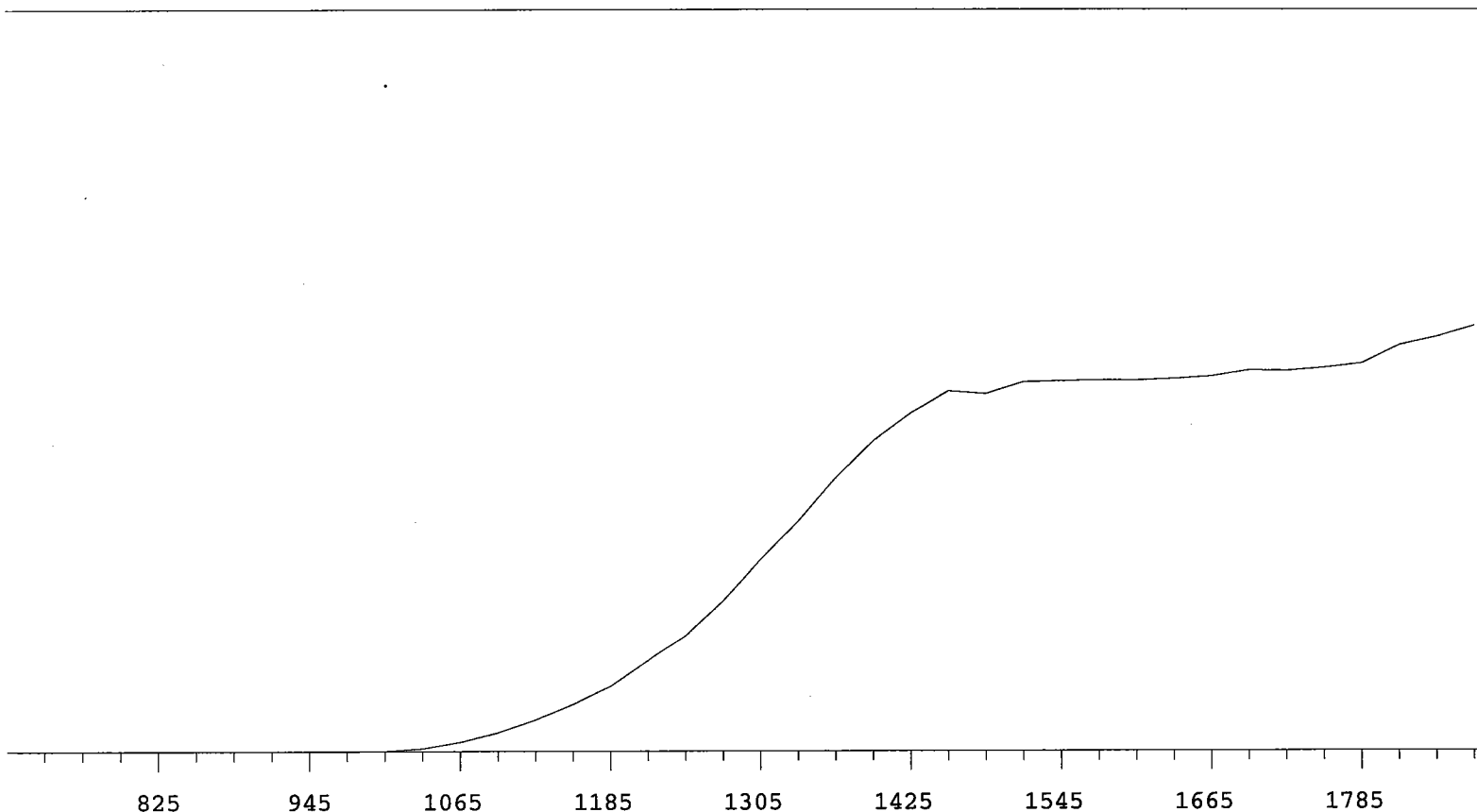
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	11573	+64.95
735	0		1335	13929	+56.47
765	0		1365	16726	+43.82
795	0	>100	1395	18834	+29.38
825	0	>100	1425	19743	+16.84
855	0	>100	1455	20314	+7.95
885	0	>100	1485	20860	+4.16
915	0	>100	1515	20670	+3.23
945	0	>100	1545	20844	+2.09
975	9	>100	1575	21330	+2.48
1005	93	>100	1605	21188	+1.16
1035	325	>100	1635	21280	-0.32
1065	834	>100	1665	21237	+0.08
1095	1525	>100	1695	21202	+0.42
1125	2318	>100	1725	21254	+0.60
1155	3233	>100	1755	21406	+1.41
1185	4357	+92.07	1785	21326	+0.42
1215	5755	+85.64	1815	21619	+0.16
1245	7438	+78.35	1845	21282	
1275	9463	+70.89	1875	21478	

Alpha Volts: 705

Beta Volts: 1515

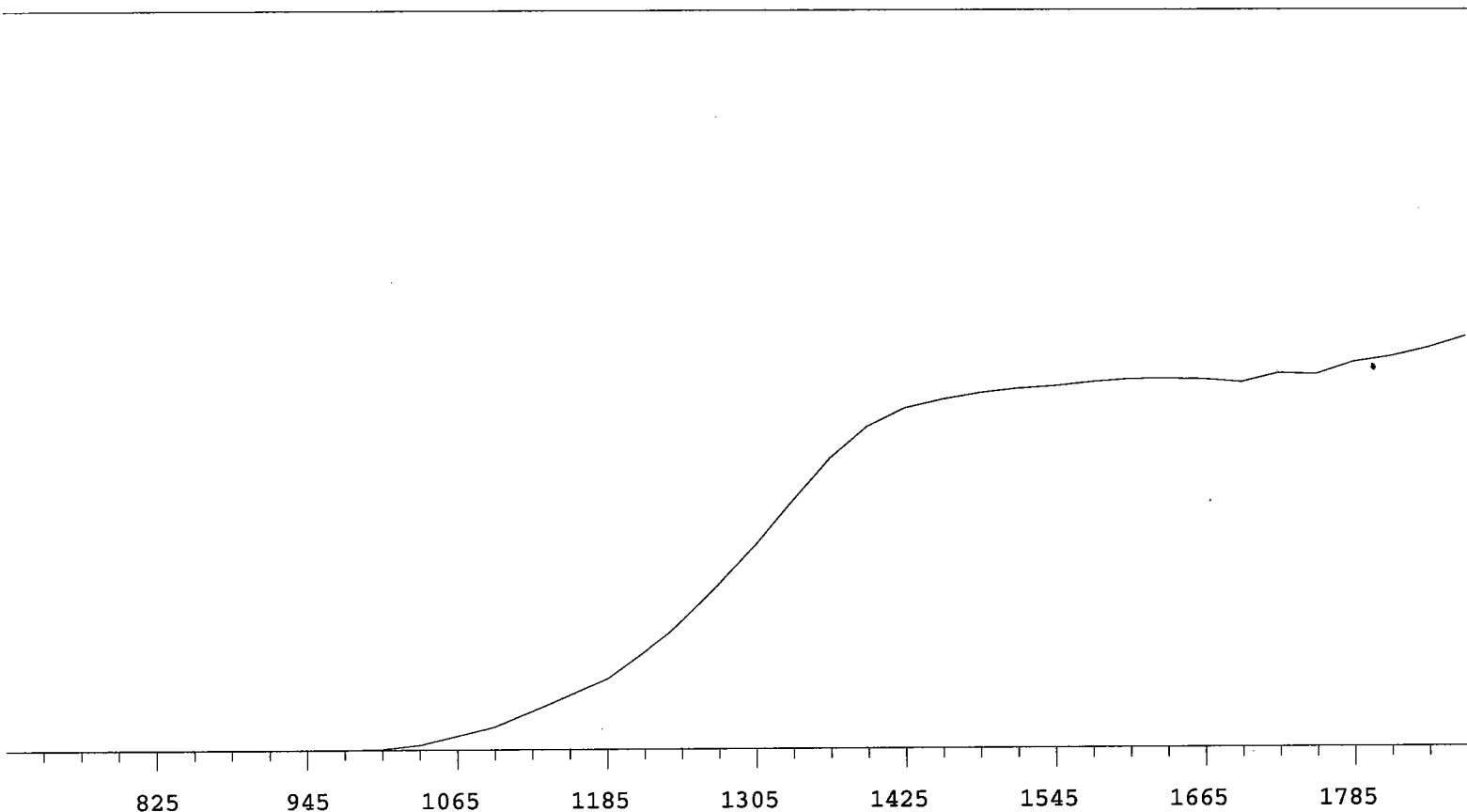


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	7524	+61.93
735	0		1335	9002	+55.36
765	0		1365	10542	+44.70
795	0	>100	1395	12064	+31.21
825	0	>100	1425	12981	+19.20
855	0	>100	1455	13192	+10.41
885	0	>100	1485	13570	+5.93
915	0	>100	1515	13820	+4.08
945	0	>100	1545	13866	+0.75
975	9	>100	1575	13880	+0.21
1005	58	>100	1605	13695	+0.59
1035	228	>100	1635	13950	+0.77
1065	544	>100	1665	13954	+1.92
1095	936	>100	1695	13911	+0.19
1125	1468	>100	1725	14116	+0.02
1155	2110	>100	1755	13908	-0.24
1185	2770	+94.71	1785	13960	-0.81
1215	3670	+85.91	1815	13939	+0.71
1245	4937	+79.46	1845	13931	
1275	6066	+70.79	1875	14071	

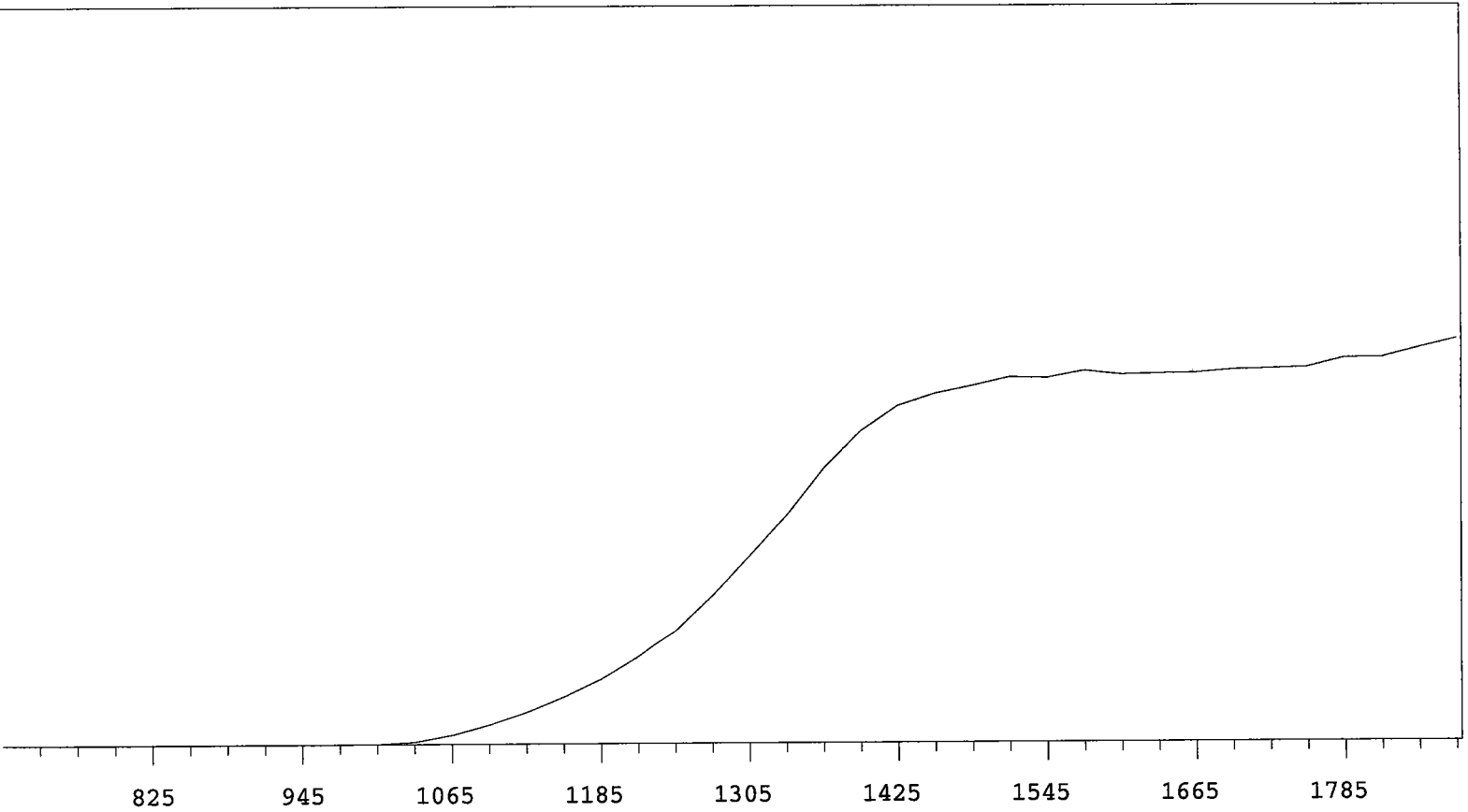


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8778	+67.49
735	0		1335	10502	+57.68
765	0		1365	12516	+46.36
795	0	>100	1395	14215	+35.88
825	0	>100	1425	15472	+22.01
855	0	>100	1455	16469	+12.99
885	1	+0.00	1485	16342	+6.70
915	0	>100	1515	16874	+3.07
945	0	>100	1545	16918	+2.53
975	0	>100	1575	16950	+0.58
1005	18	>100	1605	16943	+0.95
1035	137	>100	1635	17008	+2.13
1065	430	>100	1665	17130	+2.45
1095	865	>100	1695	17403	+2.43
1125	1444	>100	1725	17377	+2.43
1155	2151	>100	1755	17515	+4.88
1185	2981	>100	1785	17710	+7.54
1215	4168	+92.14	1815	18533	+9.04
1245	5377	+84.73	1845	18905	
1275	6924	+74.92	1875	19415	





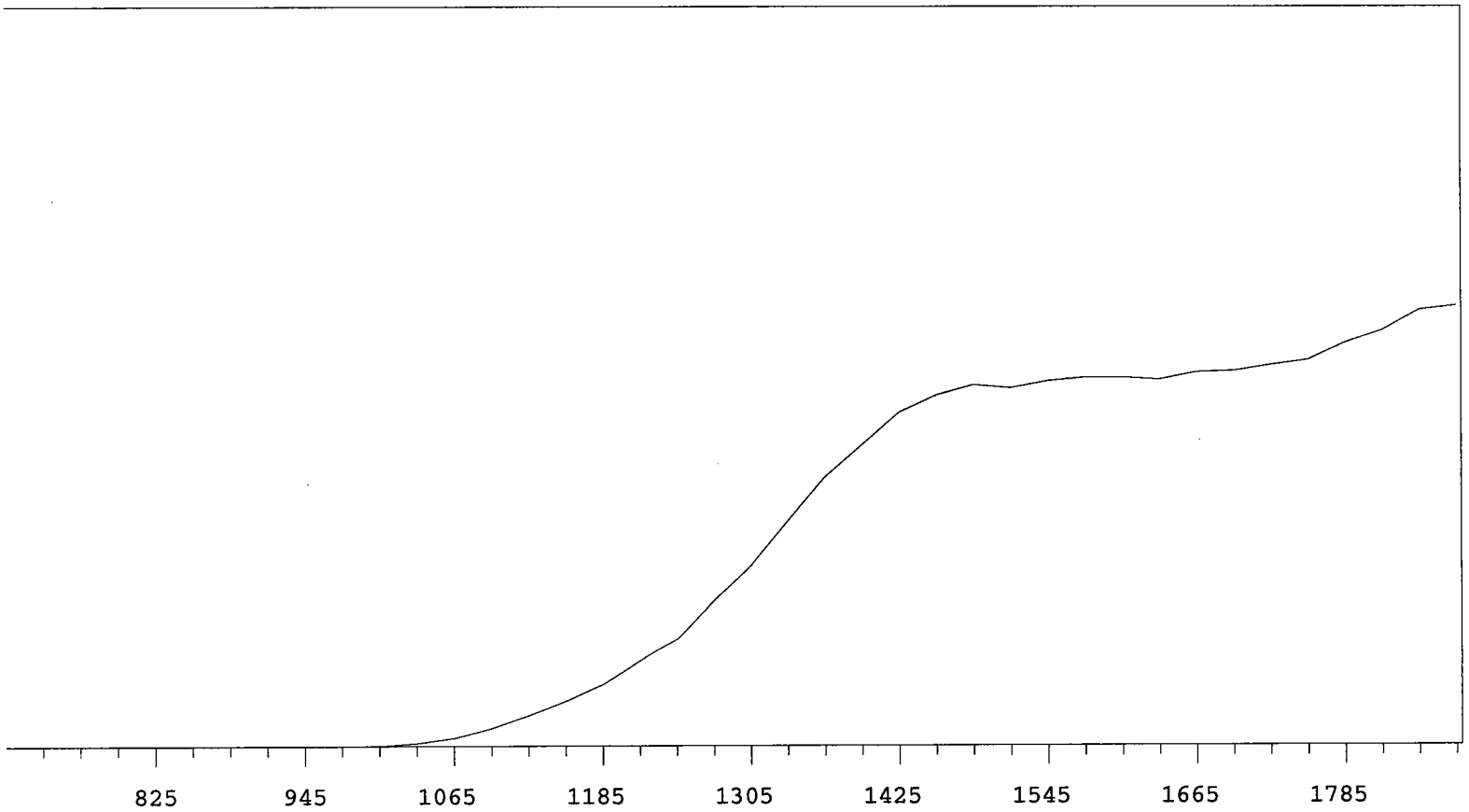
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8797	+65.44
735	0		1335	10726	+54.47
765	0		1365	12570	+41.11
795	0	>100	1395	13917	+26.79
825	0	>100	1425	14687	+15.44
855	1	+0.00	1455	15048	+8.47
885	0	>100	1485	15318	+5.00
915	0	>100	1515	15494	+3.76
945	0	>100	1545	15606	+3.04
975	3	>100	1575	15776	+2.35
1005	40	>100	1605	15889	+1.44
1035	210	>100	1635	15907	-0.16
1065	590	>100	1665	15881	+0.64
1095	983	>100	1695	15741	+1.21
1125	1645	>100	1725	16124	+3.63
1155	2342	>100	1755	16076	+5.41
1185	3045	+96.43	1785	16588	+5.79
1215	4201	+90.42	1815	16830	+7.53
1245	5579	+83.64	1845	17185	
1275	7121	+74.44	1875	17682	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	10118	+69.76
735	0		1335	12269	+59.65
765	0		1365	14810	+47.35
795	0	>100	1395	16773	+33.46
825	0	>100	1425	18104	+20.13
855	0	>100	1455	18720	+11.98
885	1	+0.00	1485	19122	+6.50
915	0	>100	1515	19580	+4.77
945	0	>100	1545	19527	+2.48
975	2	>100	1575	19902	+0.81
1005	21	>100	1605	19690	+0.53
1035	132	>100	1635	19739	+0.23
1065	491	>100	1665	19765	+1.29
1095	1036	>100	1695	19932	+1.40
1125	1698	>100	1725	19976	+2.72
1155	2517	>100	1755	20051	+2.92
1185	3468	>100	1785	20523	+4.26
1215	4721	+91.83	1815	20542	+5.57
1245	6175	+85.13	1845	21035	
1275	8025	+76.82	1875	21528	

Alpha Volts: 705

Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8095	+71.16
735	0		1335	10052	+58.38
765	0		1365	11990	+47.92
795	0	>100	1395	13400	+35.01
825	0	>100	1425	14808	+23.58
855	0	>100	1455	15554	+13.45
885	0	>100	1485	15987	+6.39
915	0	>100	1515	15861	+3.45
945	0	>100	1545	16156	+2.18
975	1	>100	1575	16297	+1.72
1005	14	>100	1605	16297	+1.33
1035	130	>100	1635	16208	+1.62
1065	363	>100	1665	16526	+2.92
1095	785	>100	1695	16581	+3.94
1125	1357	>100	1725	16832	+5.91
1155	1996	>100	1755	17039	+8.68
1185	2735	+99.45	1785	17800	+11.53
1215	3785	+94.20	1815	18351	+11.46
1245	4857	+86.43	1845	19265	
1275	6571	+78.80	1875	19468	

# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

66002-278

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

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

ISOTOPE:	Ra-228
ACTIVITY (dps):	2.367 E4
HALF-LIFE:	5.75 years
CALIBRATION DATE:	April 23, 2003 12:00 EST
TOTAL UNCERTAINTY*:	2.4%

\*95% Confidence Level

Impurities:  $\gamma$ -impurities (other than decay products) <0.1%,  
Ra-226 <0.1%

5.31628 grams 4M HCl solution with 100  $\mu$ g/g Ba carrier.

P O NUMBER 3219 RD, Item 1

SOURCE PREPARED BY:

M. Taskaeva  
M. Taskaeva, Radiochemist

Q A APPROVED:

J.M. Muth 4-23-03



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0553-A	Isotope:	Radium-228 SPIKE
Prepared By:	Lonnie Morris	Prepared By:	Lonnie Morris
Carrier Conc:	0.5M HCl	Prep Date:	04/25/2003
Reference Date:	04/23/2003	Verification Date:	04/27/2005
Ampoule Mass (g):	5.0235 g	Expiration Date:	04/27/2006
Uncertainty:	+/-	Primary Code:	0553-B
LogBook No:	RC-S-035-068	Dilution(mL):	1000 mL
		Mass of Parent(g):	30.535 g
		Density(g/mL):	
		Balance ID:	

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

$(\text{Mass of parent(g)}) * (\text{Parent Activity (dpm/mL)}) * (\text{conversion dpm to dpm}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parent Activity (dpm/mL)}) * (\text{conversion dpm to dpm}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(30.535 \text{ g}) * (13419.8626 \text{ dpm/mL}) * (1 \text{ dpm/dpm}) / (1000 \text{ mL}) = 409.7755 \text{ dpm/mL}$
$(30.535 \text{ g}) * (13419.8626 \text{ dpm/mL}) * (1 \text{ dpm/dpm}) / (\text{g/mL}) / (1000 \text{ mL}) = \text{dpm/g}$

### 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

# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

64673-278

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

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

ISOTOPE:	Ra-228
ACTIVITY (dps):	1.939 E4
HALF-LIFE:	5.75 years
CALIBRATION DATE:	October 1, 2002 12:00 EST
TOTAL UNCERTAINTY*:	3.6%
SYSTEMATIC:	3.4%
RANDOM:	1.1%

\*99% Confidence Level

Impurities:  $\gamma$ -impurities <0.1%

5.02617 grams 0.1M HCl solution with 110  $\mu\text{g/g}$  Ba carrier.

P O NUMBER 3208RD, Item 2

SOURCE PREPARED BY:

M. Taskaeva  
M. Taskaeva, Radiochemist

Q A APPROVED:

M. Mty 10202



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0503	Isotope:	Radium-228
Prepared By:	Angela Johnson	Prepared By:	Angela Johnson
Carrier Conc:	0.1 M HCL	Prep Date:	02/20/2003
Reference Date:	10/01/2002	Verification Date:	04/09/2004
Ampoule Mass (g):	5.02617 g	Expiration Date:	04/09/2005
Uncertainty:	+/- 3.6 %	Primary Code:	0503-A
LogBook No:	RC S 035 018	Dilution(mL):	100 mL
		Mass of Parent(g):	4.4737 g
		Density(g/mL):	0.9992
		Balance ID:	

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

$(\text{Mass of parent(g)}) * (\text{Parent Activity (dps)}) * (\text{conversion dpm to dps}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parent Activity (dps)}) * (\text{conversion dpm to dps}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.4737 \text{ g}) * (19390 \text{ dps}) * (60 \text{ dpm/dps}) / (5.02617 \text{ g} * 100 \text{ mL}) = 10355.2060 \text{ dpm/mL}$
$(4.4737 \text{ g}) * (19390 \text{ dps}) * (60 \text{ dpm/dps}) / (0.9992 \text{ g/mL}) / (5.02617 \text{ g} * 100 \text{ mL}) = 10363.0820 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
04/02/2003	Lonnie Morris	39.71	1000	0503-B	411.518 dpm/mL	09/13/2008	09/13/2009

GEL Laboratories LLC  
Version 1.0 9/18/2000

## Verification for Ra-228 Standard 0503-B

D. Roy 9/13/2008	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff. Mass. Used (mL)	Standard Source DPM/mL
	0503-B	1962.0000	45.6000	1916.4000	9.263763	206.8705773
	0503-B	1983.2000	45.6000	1937.6000	9.263763	209.1590642
	0503-B	1927.0000	45.6000	1881.4000	9.263763	203.092415

Mean Value (Counting) = 206.3740189 dpm/mL  
 Stdev = 3.063655617 dpm/mL

102.890426 Pass  
 0.01484516 Rule 3 (Pass/Fail)

Certificate Value = 200.596 dpm/mL  
 Lower Limit = 200.2467076 dpm/mL  
 Upper Limit = 212.5013301 dpm/mL  
 Rule 1 Pass/Fail Pass  
 Two sigma = 6.127311233  
 10 % of Mean = 20.63740189  
 Rule 2 (Pass/Fail) Pass

### Verification Rules

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 = The determined mean value shall be within 10% of the certificate value.

The analyst prepared three standard verification sources for Ra-228 source 0503-B by transferring portions of the standard into glass liquid scintillation vials. Ten mL of Ready Gel 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 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Gold for Ra-228 source standard verification. The Ra-228 efficiency calibration which was used for verification calculations was performed on 9/13/08 using source 0683-A (Ra-228). Calibration data is recorded in this logbook under Ra-228 0683-A. Each verification source calculation was performed as follows:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

where:

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

Reference RAD SOP M-001

*David S. J. J. 9/16/08*

*Angela Johnson 9/17/08*



5/19/16  
28

16 SEP 2008 16:24

**ID: TOTAL ACTIVITY**

USER:11 COMMENT:GOLD

```

PRESET TIME :      5.00
DATA CALC   :      CPM  H#   :YES  SAMPLE REPEATS:  1  PRINTER      : STD
COUNT BLANK :      NO  IC#  : NO   REPLICATES   :  1  RS232       : EDIT
TWO PHASE   :      NO  AQC  : NO   CYCLE REPEATS :  1  DISK        : OFF
SCINTILLATOR: LIQUID LUMEX: YES  LOW SAMPLE REJ:  0
LOW LEVEL   :      NO  HALF LIFE CORRECTION DATE: none

```

```

CHAN:  0.0 - 990.0 %ERROR: 2.00 FACTOR:  1.000000  BKG. SUB:  0
CHAN:  0.0 - 1000.0 %ERROR: 2.00 FACTOR:  1.000000  BKG. SUB:  0

```

SAM NO	POS	TIME MIN	H#	WIND1		WIND2		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
1	11-1	5.00	98.2	50.40	12.60	54.00	12.17	0.41	5.55
2	11-2	1.30	99.3	7802.31	1.99	7803.08	1.99	0.00	7.81
3	11-3	1.30	100.4	7782.31	1.99	7786.15	1.99	0.00	10.14
4	11-4	1.35	99.2	7581.48	1.98	7585.19	1.98	0.01	12.51
5	11-5	5.00	97.9	45.60	13.25	47.20	13.02	0.43	18.61
6	11-6	5.00	110.7	1962.00	2.02	1964.80	2.02	0.01	24.65
7	11-7	5.00	110.8	1983.20	2.01	1984.80	2.01	0.01	30.75
8	11-8	5.00	110.7	1927.00	2.04	1927.80	2.04	0.02	36.85

8/16/08  
228

Sample Count Start Time:

16 Sep 2008 16:46:59

Data Capture Date:

9/16/2008 16:52:01

User Filename:

S11091611-5A.WK1

U11091611-1A.WK1

Spectrum Type

Log Counts

User Number:

11

User Id:

TOTAL ACTIVITY

User Comment:

GOLD

Isotope Name:

14C

Scintillator:

LIQUID

Sample, Rack-Pos, Time:

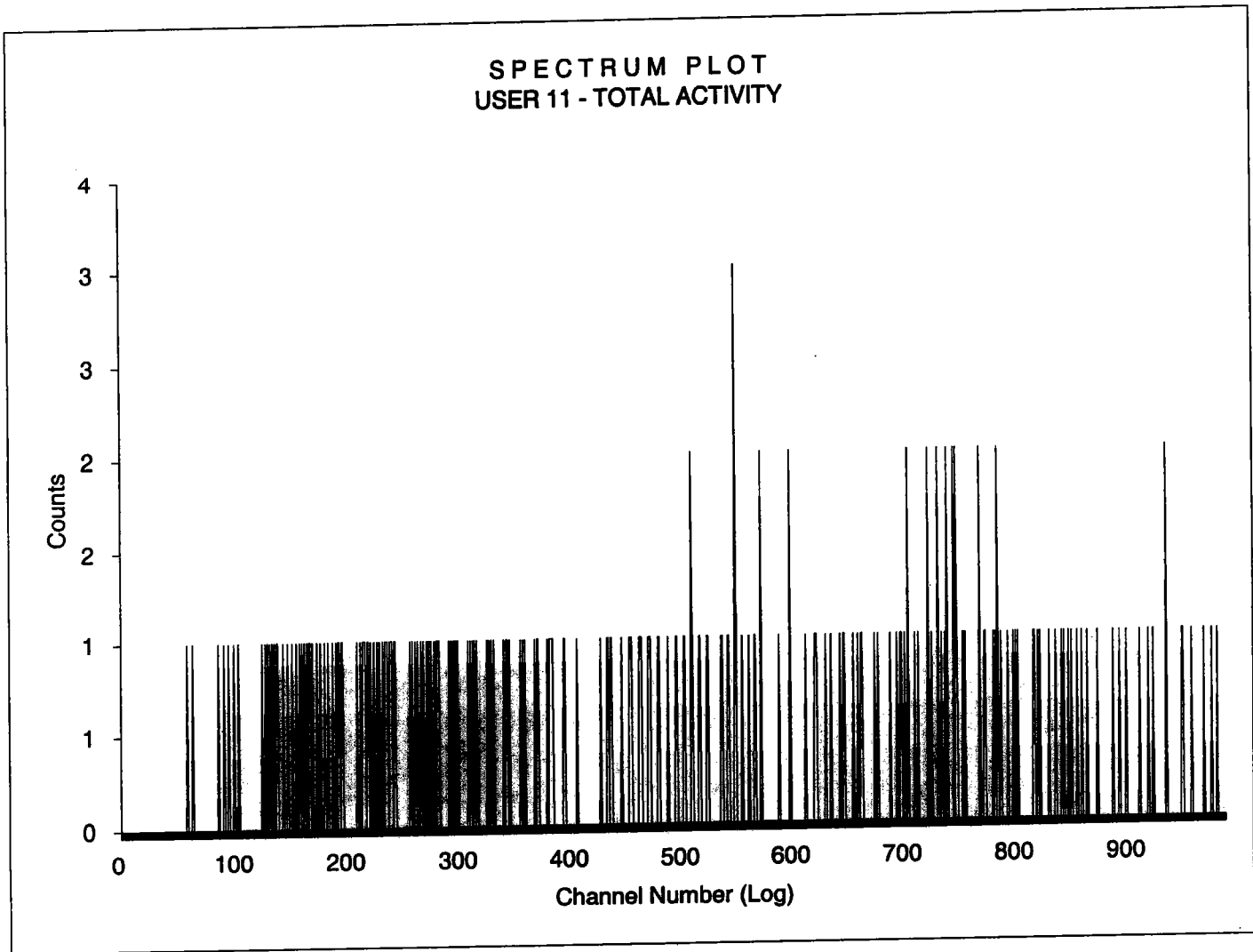
5 11-5 5.00

H#, Total Counts:

97.9 69

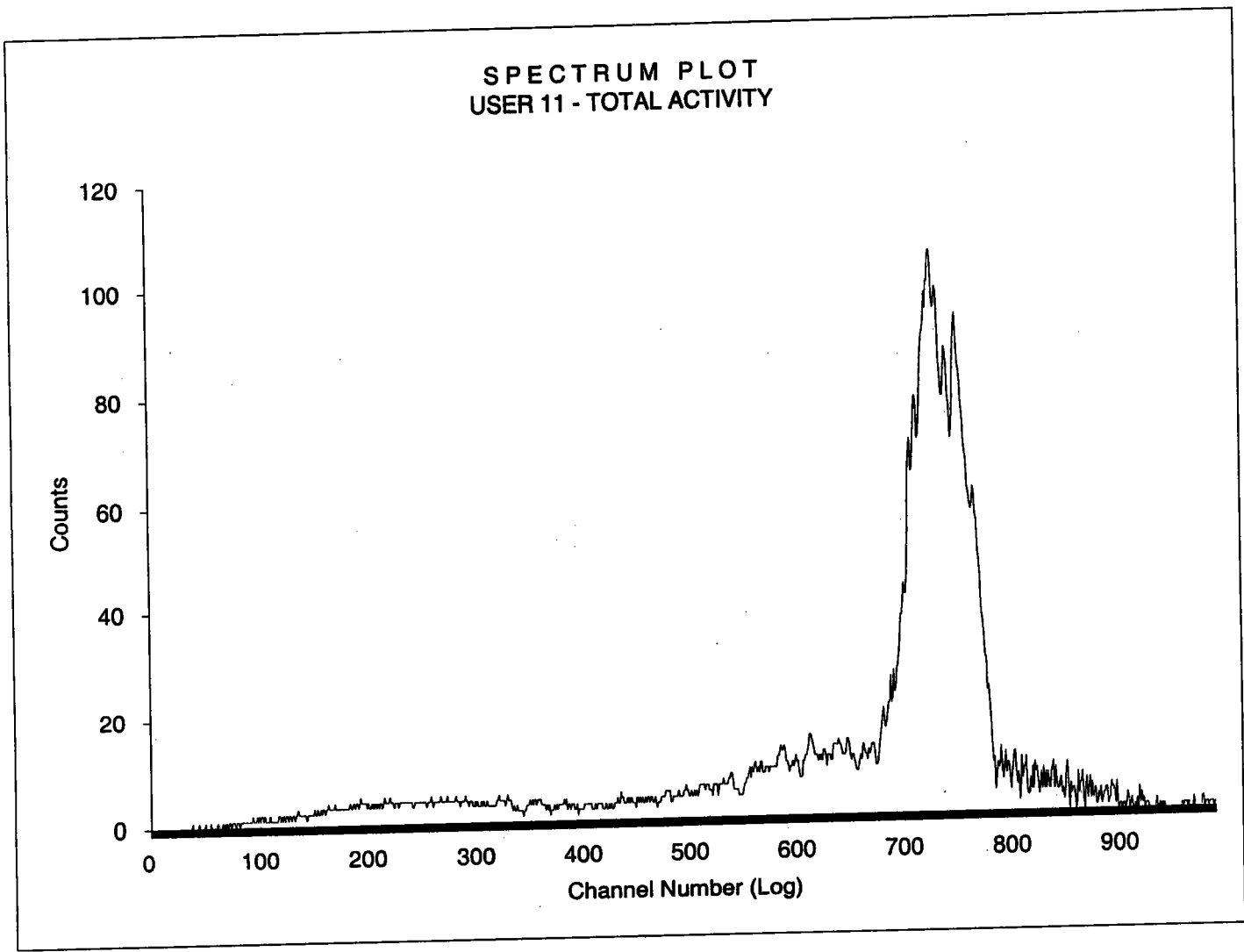
Start, End, X-Axis:

0 990 Channel Number



50/9/16  
25

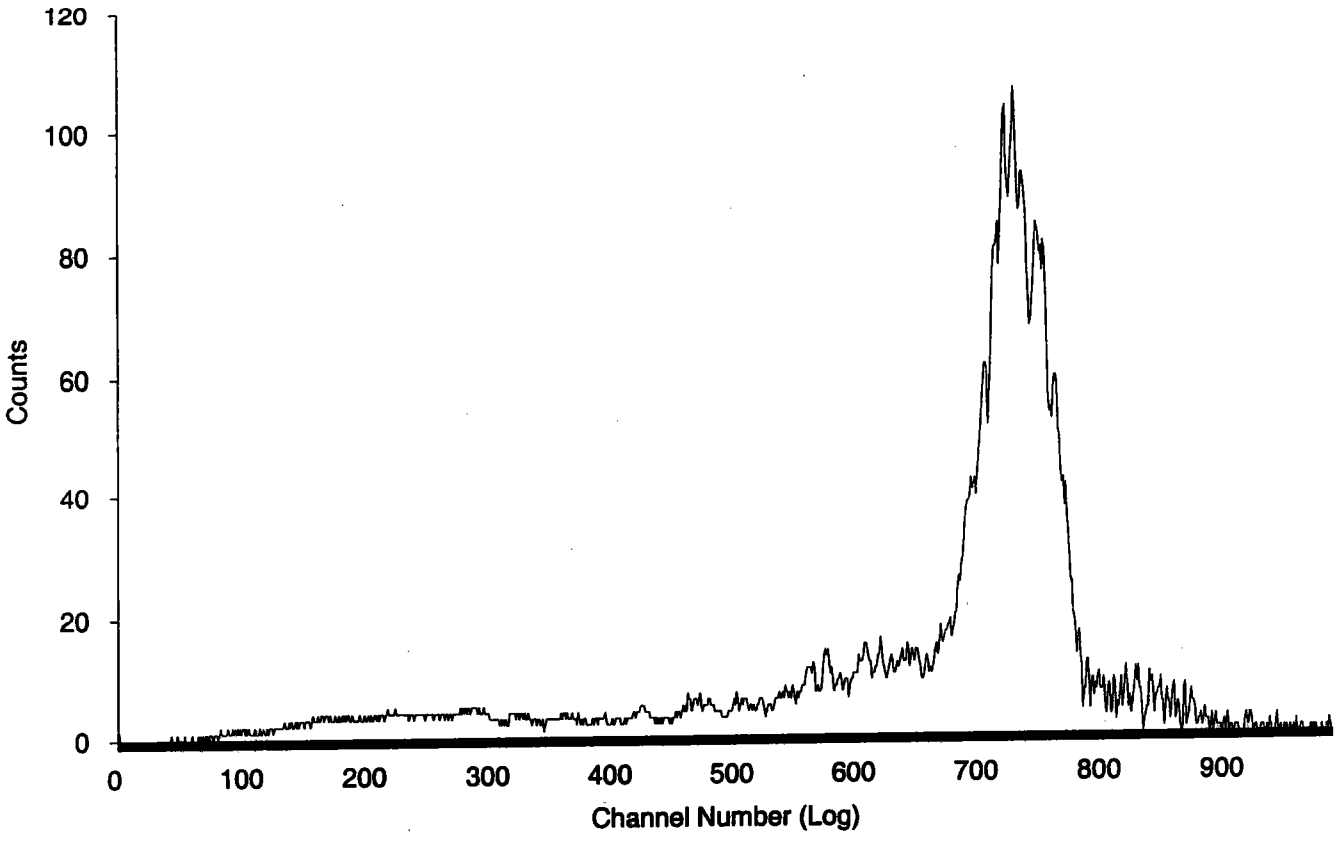
Sample Count Start Time: 16 Sep 2008 16:53:01  
Data Capture Date: 9/16/2008 16:58:06  
User Filename: S11091611-6A.WK1  
U11091611-1A.WK1  
Spectrum Type: Log Counts  
User Number: 11  
User Id: TOTAL ACTIVITY  
User Comment: GOLD  
Isotope Name: 14C  
Scintillator: LIQUID  
Sample, Rack-Pos, Time: 6 11-6 5.00  
H#, Total Counts: 110.7 7666  
Start, End, X-Axis: 0 990 Channel Number



8/16/08  
SLS

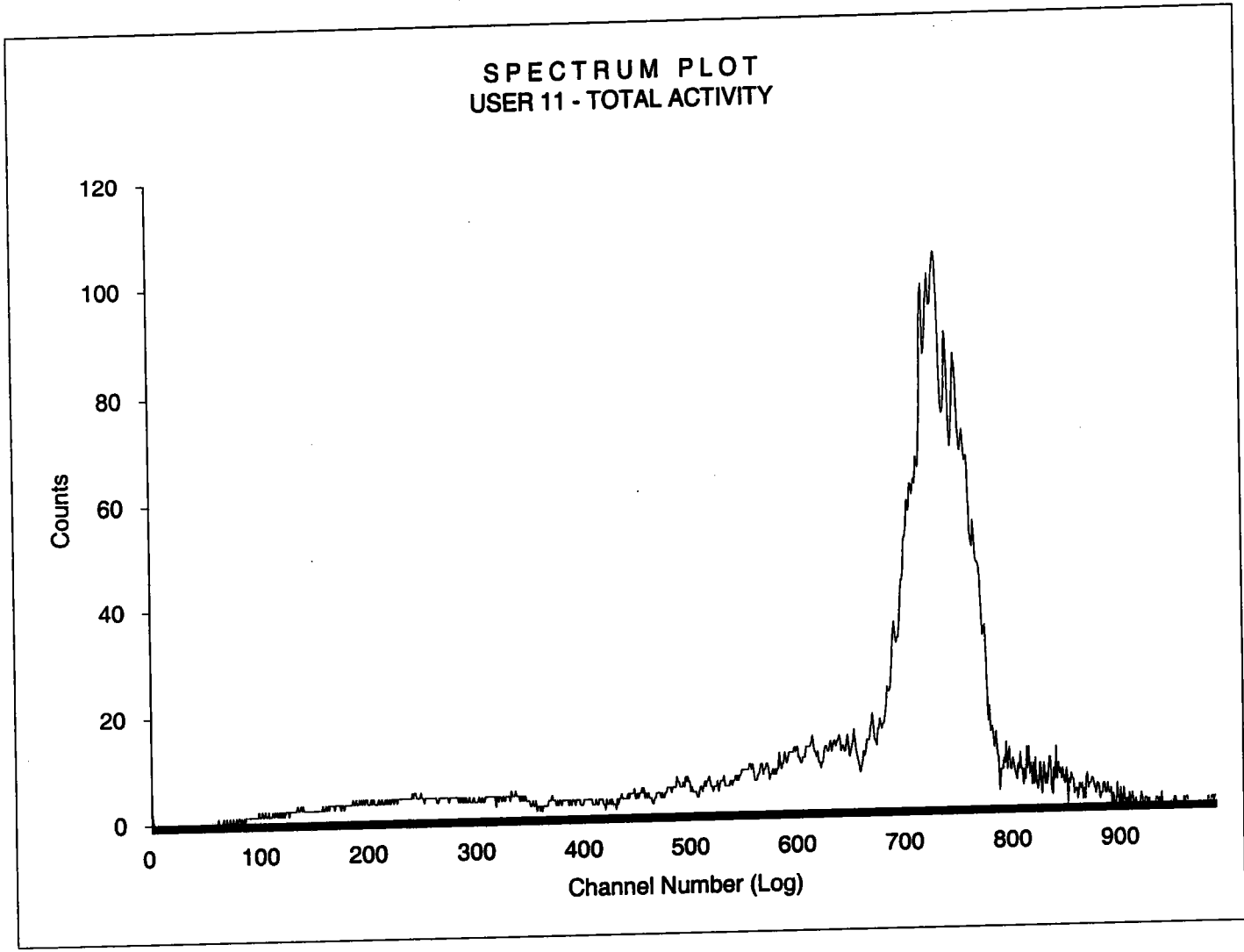
Sample Count Start Time: 16 Sep 2008 16:59:07  
Data Capture Date: 9/16/2008 17:04:12  
User Filename: S11091611-7A.WK1  
U11091611-1A.WK1  
Spectrum Type: Log Counts  
User Number: 11  
User Id: TOTAL ACTIVITY  
User Comment: GOLD  
Isotope Name: 14C  
Scintillator: LIQUID  
Sample, Rack-Pos, Time: 7 11-7 5.00  
H#, Total Counts: 110.8 7726  
Start, End, X-Axis: 0 990 Channel Number

SPECTRUM PLOT  
USER 11 - TOTAL ACTIVITY



9/16/08  
11-8

Sample Count Start Time: 16 Sep 2008 17:05:13  
Data Capture Date: 9/16/2008 17:10:18  
User Filename: S11091611-8A.WK1  
U11091611-1A.WK1  
Spectrum Type: Log Counts  
User Number: 11  
User Id: TOTAL ACTIVITY  
User Comment: GOLD  
Isotope Name: 14C  
Scintillator: LIQUID  
Sample, Rack-Pos, Time: 8 11-8 5.00  
H#, Total Counts: 110.7 7557  
Start, End, X-Axis: 0 990 Channel Number



# Radium-228 Que Sheet

SR 6/30/09

Batch #: 881540  
 Spike Isotope: Radium-228  
 LCS Isotope: Radium-228  
 Tracer Isotope: Barium-133  
 Prep Date: 6/30/09  
 Analyst: DXM2  
 Spike Code: NA  
 LCS Code: 0503-B  
 Tracer Code: 0112-2  
 Initials: JRS  
 First Client Due Date: NA  
 Expiration Date: 9/13/09  
 Expiration Date: 2/17/10  
 Pipet ID: 1734212  
 Internal Due Date: 07/03/2009  
 Ac-228 Ingrow: 2025 6/30/09  
 Ac-228 Separation Date/Time: 7-2-09 0540  
 Witness: JRS 6/30/09  
 Balance ID: NA

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Pos. #	Vol (mL)	Det #	Ba Yield (%)	Gamma Det. #
1201872112-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	1	20		100.83	↑
1201872113-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	2	20		108.20	
1201872114-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	3	20		114.22	
1201872115-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	4	20		120.58	WZAL
1201872116-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	5	20		105.84	
1201872117-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	6	20		102.70	
1201872118-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	7	20		112.82	
1201872119-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	8	20		111.91	↓

JRS 7/2/09

JRS 7/2/09

Data Reviewed By:

Comments:

ASSAY 30-Jun-09 19:32:06

Protocol id 8 228\_REC  
Time limit 180  
Count limit 50000  
Isotope Ba-133  
Protocol date 9-Apr-07 10:03:07  
Run id. 54

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT	TIME
1	97	1	180	779	229.3	4.13			19:32:13
2	97	2	180	785	231.2	4.11	100.83		19:35:24
3	97	3	180	835	248.1	3.95	108.20		19:38:35
4	97	4	180	877	261.9	3.83	114.22		19:41:47
5	97	5	180	921	276.5	3.71	120.58		19:44:58
6	72	6	180	819	242.7	4	105.84		19:48:17
7	72	7	180	798	235.5	4.07	102.70		19:51:28
8	72	8	180	867	258.7	3.85	112.82		19:54:40
9	72	9	180	861	256.6	3.87	111.91		19:57:51

END OF ASSAY

*[Handwritten signature]*  
7/2/09

# ALPHA SPECTROSCOPY



## Alpha Spectroscopy Calibration Sources

The following is a summary of the procedure performed for preparing mixed alpha calibration standards:

A calibration stock solution was prepared by combining the following in a volumetric flask and diluting to 50 ml (51.4561 grams). These individual standards were first verified by direct precipitation of small aliquots of each standard (as described in Attachment I).

Isotope	Serial #	amount used (g)	dpm (note 1)
Gd-148	64445-278	0.2471	212.159287
Np-237	4341	1.8075	204.438594
Cm-244	4320A	7.2704	240.144737

Note 1: Dpm values are decay corrected to 2/7/2003.

Forty one weighted aliquots were then directly precipitated using Neodymium Flouride /HF system. The sources were then mounted on 0.1Poly-propylene filters and taped securely to 1 inch stainless steel planchettes for counting in an Alpha Spectroscopy system. The liquid fraction that passes through the filter is collected, traced with Am-241 and prepared for counting using the identical procedure. These samples are counted to ensure there is no more than 1% loss in the filtering processes. All sources pass this requirement. The DPM information for each source is listed in attachment II.

Certificate files were then created on the Alpha system used for acquisition and processing of data. Each source is assigned a name (AESS-001 through AESS-041). The information for the source activities is entered into the certificate files appropriate for the detector being used.

For example: If source AESS-001 is used for calibrating detector 25, the source data is entered into the certificate file name [env\_alpha.cer]U025.cer.

The computer software uses these certificate files to calculate an energy calibration and determine the efficiency of the detector after counting the source.

*Ante Hill*  
4/1/03

2002 Alpha Eff Source Stock Verification

Curium-244

Isotope	Value pCi/g
SSTOCK2002A2_AM	106.000
SSTOCK2002B2_AM	106.000
SSTOCK2002C2_AM	106.000

Mean Value (Counting) = 106.000  
Stdev = 0

Target = 108.1230 pCi/g  
Lower Limit = 106  
Upper Limit = 106  
Rule 1 Pass/Fail Pass  
Two sigma = 0  
10 % of Mean = 10.6  
Rule 2 (Pass/Fail) Pass

98.04%

Target = 108.1230 pCi/g  
Lower Limit = 106  
Upper Limit = 106  
Rule 1 Pass/Fail Pass  
Two sigma = 0  
10 % of Mean = 10.6  
Rule 2 (Pass/Fail) Pass

Neptunium-237

Isotope	Value pCi/g
SSTOCK2002A2_AM	90.100
SSTOCK2002B2_AM	87.200
SSTOCK2002C2_AM	93.500

Mean Value (Counting) = 90.267  
Stdev = 3.153305144

Target = 92.0900 pCi/g  
Lower Limit = 83.96005638  
Upper Limit = 96.57327696  
Rule 1 Pass/Fail Pass  
Two sigma = 6.306610289  
10 % of Mean = 9.026666667  
Rule 2 (Pass/Fail) Pass

98.02%

Target = 92.0900 pCi/g  
Lower Limit = 83.96005638  
Upper Limit = 96.57327696  
Rule 1 Pass/Fail Pass  
Two sigma = 6.306610289  
10 % of Mean = 9.026666667  
Rule 2 (Pass/Fail) Pass

Gadolinium-148

Isotope	Value pCi/g
SSTOCK2002A2_AM	95.080
SSTOCK2002B2_AM	93.750
SSTOCK2002C2_AM	96.560

Mean Value (Counting) = 95.463  
Stdev = 1.503074627

Target = 95.6460 pCi/g  
Lower Limit = 92.45718408  
Upper Limit = 98.46848259  
Rule 1 Pass/Fail Pass  
Two sigma = 3.006148253  
10 % of Mean = 9.546333333  
Rule 2 (Pass/Fail) Pass

The analyst prepared three standard verification sources for the mixed alpha stock standard using 0.1030 g for source #1, 0.1035 g for source #2 and 0.1028 g for source #3. Each standard was combined with 1.0 mL of Am-243 standard 0454-A and 0.1 mL of Nd carrier in a disposable centrifuge tube. Four mL of 2 M HCl was added to each standard and then diluted with 4 mL of DI water. 5 mL of ascorbic acid was added to each sample then one mL of 48% HF was added to precipitate Nd (and Curium) fluoride. After 30 minutes, each sample was filtered following routine procedures for alpha spectroscopy source preparation. Each source was counted using routine alpha spec procedures. pCi/L values for the Mixed Alpha Stock were calculated and compared to Am-243 certified values.

① The rule failed because the 3 results from 3 sources were the same. Therefore, the stdev was zero. The intent of this rule is to ensure an appropriate amount of counts are achieved for proper determinations. ~~Since~~ For each standard the # of counts achieved was just under 10000 which has a counting error of nearly 1%. Because the standard's bias is < 2% from the known value the standard is acceptable.

Robertson 02/20/03

Attachment II

Mixed alpha Reference date = 2/7/2003		Stock Dpm/g	Reference date	Half-life (years)	amount used for mixed	Dpm/g mixed	Decay corr dpm/g
Isotope	Source						
Gd-148	64445-278 (0502)	44354.59289	9/5/2002	74.60	0.2471	212.9974853	212.159287
Np-237	Srm 4341 (0493)	5820	3/1/1992	2.14E+06	1.8075	204.4393182	204.438594
Cm-244	SRM 4320a (0490)	2223.6	2/1/1996	18.1	7.2704	314.1796879	240.144737
Source	Amount of standard used	dpm Gd-148	dpm Np-237	dpm Cm-244	dps Gd-148	dps Np-237	dps Cm-244
AESS-001	1.0362	219.839	211.839	248.838	3.664	3.531	4.147
AESS-002	1.0344	219.458	211.471	248.406	3.658	3.525	4.140
AESS-003	1.034	219.373	211.390	248.310	3.656	3.523	4.138
AESS-004	1.0331	219.182	211.206	248.094	3.653	3.520	4.135
AESS-005	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-006	1.0331	219.182	211.206	248.094	3.653	3.520	4.135
AESS-007	1.0348	219.542	211.553	248.502	3.659	3.526	4.142
AESS-008	1.0363	219.861	211.860	248.862	3.664	3.531	4.148
AESS-009	1.0352	219.627	211.635	248.598	3.660	3.527	4.143
AESS-010	1.0346	219.500	211.512	248.454	3.658	3.525	4.141
AESS-011	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-012	1.0367	219.946	211.941	248.958	3.666	3.532	4.149
AESS-013	1.0396	220.561	212.534	249.654	3.676	3.542	4.161
AESS-014	1.0368	219.967	211.962	248.982	3.666	3.533	4.150
AESS-015	1.0363	219.861	211.860	248.862	3.664	3.531	4.148
AESS-016	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-017	1.0356	219.712	211.717	248.694	3.662	3.529	4.145
AESS-018	1.0359	219.776	211.778	248.766	3.663	3.530	4.146
AESS-019	1.0349	219.564	211.574	248.526	3.659	3.526	4.142
AESS-020	1.0361	219.818	211.819	248.814	3.664	3.530	4.147
AESS-021	1.0348	219.542	211.553	248.502	3.659	3.526	4.142
AESS-022	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-023	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-024	1.0343	219.436	211.451	248.382	3.657	3.524	4.140
AESS-025	1.0364	219.882	211.880	248.886	3.665	3.531	4.148
AESS-026	1.0336	219.288	211.308	248.214	3.655	3.522	4.137
AESS-027	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-028	1.0366	219.924	211.921	248.934	3.665	3.532	4.149

Attachment II

AESS-029	1.0355	219.691	211.696	248.670	3.662	3.528	4.144
AESS-030	1.0349	219.564	211.574	248.526	3.659	3.526	4.142
AESS-031	1.0343	219.436	211.451	248.382	3.657	3.524	4.140
AESS-032	1.0326	219.076	211.103	247.973	3.651	3.518	4.133
AESS-033	1.0308	218.694	210.735	247.541	3.645	3.512	4.126
AESS-034	1.0314	218.821	210.858	247.685	3.647	3.514	4.128
AESS-035	1.0303	218.588	210.633	247.421	3.643	3.511	4.124
AESS-036	1.0343	219.436	211.451	248.382	3.657	3.524	4.140
AESS-037	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-038	1.0373	220.073	212.064	249.102	3.668	3.534	4.152
AESS-039	1.0334	219.245	211.267	248.166	3.654	3.521	4.136
AESS-040	1.0346	219.500	211.512	248.454	3.658	3.525	4.141
AESS-041	1.0352	219.627	211.635	248.598	3.660	3.527	4.143



0490  
0491

# National Institute of Standards & Technology

## Certificate

### Standard Reference Material 4320A Curium-244 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive curium-244 nitrate and nitric 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 alpha-particle counting instruments and for the monitoring of radiochemical procedures.

#### Radiological Hazard

The SRM ampoule contains curium-244 with a total activity of approximately 200 Bq. Curium-244 decays by alpha-particle emission to plutonium-240, which also decays by alpha-particle emission. None of the alpha particles escape from the SRM ampoule. During the decay process X-rays and gamma rays with energies from 40 keV to 1100 keV are also emitted. Most of these photons escape from the SRM ampoule but their intensities are so small that they do not represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]\*. The SRM should be used only by persons qualified to handle radioactive material.

#### Chemical Hazard

The SRM ampoule contains nitric acid ( $\text{HNO}_3$ ) 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 February 2006.

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.

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  
February 1996 (Text only revised November 1997)

Thomas E. Gills, Chief  
Standard Reference Materials Program

### Recommended Procedure for Opening the SRM Ampoule

- 1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition 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]\*.

PROPERTIES OF SRM 4320A  
(Certified values are shown in bold type)

Source identification number	NIST SRM 4320A		
Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule		
Ampoule specifications	Body outside diameter	(16.5 ± 0.5) mm	
	Wall Thickness	(0.60 ± 0.04) mm	
	Barium content	Less than 2.5%	
	Lead-oxide content	Less than 0.02%	
	Other heavy elements	Trace quantities	
Solution density	(1.030 ± 0.002) g·mL <sup>-1</sup> at 22.8 °C [b]*		
Solution mass	Approximately 5.15 g		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration (mol·L <sup>-1</sup> )	Mass Fraction (g·g <sup>-1</sup> )
	H <sub>2</sub> O	54	0.94
	HNO <sub>3</sub>	1.0	0.06
	HCl	<0.001	<4 × 10 <sup>-5</sup>
	<sup>244</sup> Cm +3	5 × 10 <sup>-11</sup>	1 × 10 <sup>-11</sup>
Radiological Properties:			
Radionuclide	Curium-244		
Reference time	1230 EST, 1 February 1996 [c]		
Massic activity of the solution [d]	37.06 Bq·g <sup>-1</sup> 24.12 Bq·g <sup>-1</sup>		
Relative expanded uncertainty (k=2)	0.68% [e] [f]		
Alpha-particle-emitting daughters	Plutonium-240: (0.22 ± 0.11) Bq·g <sup>-1</sup> [b] [c]		
Alpha-particle-emitting impurities	Curium-243: (0.005 ± 0.004) Bq·g <sup>-1</sup> [b] [g]		
Photon-emitting impurities	None detected [h]		
Half lives used in the decay corrections	Curium-244: (18.10 ± 0.02) a [i] Plutonium-240: (6563 ± 7) a [i]		
Calibration method	Two 4π liquid-scintillation counting systems		

37.06 x 2      2004  
6

- [i] The stated uncertainty is the standard uncertainty. See reference [5].
- [j] Relative standard uncertainty of the input quantity  $x_i$ .
- [k] 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  $y$ .
- [m] Relative component of combined standard uncertainty of output quantity  $y$ , rounded to two significant figures or less. The relative component of combined standard uncertainty of  $y$  is given by  $u_i(y)/y = |\partial y/\partial x_i| \cdot u(x_i)/y = |\partial y/\partial x_i| \cdot (x_i/y) \cdot u(x_i)/x_i$ . 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.
- [n] The relative standard uncertainty of  $\lambda \cdot t$  is determined by the relative standard uncertainty of  $\lambda$  (i.e., of the half life). The relative standard uncertainty of  $t$  is negligible.
- [p]  $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$
- [q] The live time is determined by counting the pulses from a gated oscillator.
- [r] The standard uncertainty given is for the detected Cm-243 impurity.  $|\partial y/\partial x_i| \cdot (x_i/y) = \{(\text{response per Bq of impurity})/(\text{response per Bq of Cm-244})\} \cdot \{(\text{Bq of impurity})/(\text{Bq of Cm-244})\}$ .
- [s] 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.  $u(x_i)/x_i = 100\%$ .  $|\partial y/\partial x_i| \cdot (x_i/y) = \{(\text{response per Bq of impurity})/(\text{response per Bq of Cm-244})\} \cdot \{(\text{Bq of impurity})/(\text{Bq of Cm-244})\}$ . 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), February 1996.





# CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

64445-278

Gd-148 5 mL Liquid in Flame Sealed Vial

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

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

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ISOTOPE:	Gd-148
ACTIVITY (dps):	<u>3.759 E3</u>
HALF-LIFE:	<u>74.6 years</u>
CALIBRATION DATE:	September 5, 2002 12:00 EST
TOTAL UNCERTAINTY*:	2.7%
SYSTEMATIC:	1.9%
RANDOM:	0.8%

99% confidence level.

5.08493 grams 0.1M HCl solution.

P O NUMBER 3207RD, Item 1

SOURCE PREPARED BY:

M.D. Currie  
M.D. Currie, Radiochemist

Q A APPROVED:

100. [Signature] 9-6-02

25  
31  
30  
31  
31  
7

0493



# National Institute of Standards & Technology

## Certificate

### Standard Reference Material 4341 Radioactivity Standard

Radionuclide	Neptunium-237
Source identification	SRM 4341
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule <sup>(1)*</sup>
Solution mass	Approximately 5 grams
Solution composition	Neptunium-237 in 2 mol·L <sup>-1</sup> nitric acid
Reference time	March 1992
Radioactivity concentration	97.0 Bq·g <sup>-1</sup>
Overall uncertainty	1.28 percent <sup>(2)</sup>
Photon-emitting impurities	None detected <sup>(3)</sup>
Alpha-particle-emitting impurities	None detected <sup>(4)</sup>
Half life	(2.14 ± 0.11) × 10 <sup>6</sup> years <sup>(5)</sup>
Measuring instrument	NIST "0.8π" α defined-solid-angle counter with scintillation detector

This standard reference material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M. Robin Hutchinson, Acting Group Leader.

Gaithersburg, MD  
January 1993

William P. Reed, Chief  
Standard Reference Materials Program

\*Notes on back

## NOTES

(1) Approximately five milliliters of solution. Ampoule specifications:

body diameter	$16.5 \pm 0.5$ mm
wall thickness	$0.60 \pm 0.04$ mm
barium content	less than 2.5 percent
lead oxide content	less than 0.02 percent
other heavy elements	trace quantities

(2) The overall uncertainty was formed by taking three times the quadratic combination of the standard deviations of the mean, or approximations thereof, for the following:

a) alpha-particle-emission-rate measurements	0.34 percent
b) background	0.01 percent
c) livetime	0.10 percent
d) detection efficiency	0.16 percent
e) count-rate-vs-energy extrapolation to zero energy	0.10 percent
f) half life	0.00 percent
g) gravimetric measurements	0.10 percent
h) alpha-emitting impurities	0.10 percent

(3) The protactinium-233 daughter of neptunium-237 is approximately in equilibrium.  
The limit of detection for photon-emitting impurities is

$0.19 \text{ } \gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$  for energies between 30 and 307 keV and  
 $0.01 \text{ } \gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$  for energies between 317 and 1750 keV,

provided that the impurity photons are separated in energy by 5 keV or more from photons emitted in the decay of neptunium-237 and progeny.

(4) The limit of detection for alpha-particle-emitting impurities is

$0.10 \text{ } \alpha \cdot \text{s}^{-1} \cdot \text{g}^{-1}$  for energies between 1.0 and 4.3 MeV and  
 $0.05 \text{ } \alpha \cdot \text{s}^{-1} \cdot \text{g}^{-1}$  for energies between 4.9 and 10 MeV.

(5) Evaluated Nuclear Structure Data File (ENSDF), February 1990.

For further information please contact Dr. J.M. Robin Hutchinson at NIST.  
Telephone: (301) 975-5532  
FAX: (301) 926-7416

## Subsection 1: Energy Calibration

The Energy Calibration energy=Cal\_Zero+(e1\*C)+(e2\*C^2)

where : Cal\_Zero = Energy Calibration Zero  
 e1 = Energy Calibration Slope  
 e2 = Energy Calibration Quadratic  
 C = Channel

Instrument : CHAMBER 001  
 Detector : 78788  
 Calibration Date/Time : 6-JUL-2009 14:30:47  
 Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.307
NP-237	4341	2/28/10	4768.800	4769.611
CM-244	4320A	2/28/10	5795.020	5795.576

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2636.547  
 Energy Calibration Slope : 5.562682  
 Energy Calibration Quadratic : 4.2404264E-04  
 Energy Calibration Range : 8777.000

Instrument : CHAMBER 002  
 Detector : 78266  
 Calibration Date/Time : 6-JUL-2009 14:31:01  
 Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.381
NP-237	4341	2/28/10	4768.800	4769.059
CM-244	4320A	2/28/10	5795.020	5795.281

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2457.268  
 Energy Calibration Slope : 5.068144  
 Energy Calibration Quadratic : 3.1073095E-04  
 Energy Calibration Range : 7973.000

Instrument : CHAMBER 003  
 Detector : 67617  
 Calibration Date/Time : 1-JUL-2009 14:34:18  
 Calibration Source Id : AESS-003

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3256.624
NP-237	4341	2/28/10	4768.800	4498.057
CM-244	4320A	2/28/10	5795.020	5643.440

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2303.136  
 Energy Calibration Slope : 5.574179  
 Energy Calibration Quadratic : -3.1479710E-04  
 Energy Calibration Range : 7681.000

Instrument : CHAMBER 004  
 Detector : 64279  
 Calibration Date/Time : 6-JUL-2009 14:31:14  
 Calibration Source Id : AESS-004  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.700  
 NP-237 4341 2/28/10 4768.800 4768.502  
 CM-244 4320A 2/28/10 5795.020 5794.708  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2548.030  
 Energy Calibration Slope : 5.181645  
 Energy Calibration Quadratic : 3.6983294E-04  
 Energy Calibration Range : 8242.000

Instrument : CHAMBER 005  
 Detector : 67612  
 Calibration Date/Time : 6-JUL-2009 14:31:33  
 Calibration Source Id : AESS-005  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3239.511  
 NP-237 4341 2/28/10 4768.800 4822.857  
 CM-244 4320A 2/28/10 5795.020 5760.225  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2540.769  
 Energy Calibration Slope : 4.586285  
 Energy Calibration Quadratic : 1.2606301E-03  
 Energy Calibration Range : 8559.000

Instrument : CHAMBER 006  
 Detector : 67613  
 Calibration Date/Time : 6-JUL-2009 14:31:42  
 Calibration Source Id : AESS-006  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.980  
 NP-237 4341 2/28/10 4768.800 4771.889  
 CM-244 4320A 2/28/10 5795.020 5798.332  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.189  
 Energy Calibration Slope : 4.968290  
 Energy Calibration Quadratic : 2.9507218E-04  
 Energy Calibration Range : 7759.000

Instrument : CHAMBER 007  
 Detector : 67607  
 Calibration Date/Time : 6-JUL-2009 14:31:52  
 Calibration Source Id : AESS-007  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.695  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2433.790  
 Energy Calibration Slope : 5.142394  
 Energy Calibration Quadratic : 3.0138035E-04  
 Energy Calibration Range : 8016.000

Instrument : CHAMBER 008  
 Detector : 78788  
 Calibration Date/Time : 6-JUL-2009 14:32:01  
 Calibration Source Id : AESS-008  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.588  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2373.661  
 Energy Calibration Slope : 4.981515  
 Energy Calibration Quadratic : 2.9968601E-04  
 Energy Calibration Range : 7789.000

Instrument : CHAMBER 009  
 Detector : 72528  
 Calibration Date/Time : 6-JUL-2009 14:32:10  
 Calibration Source Id : AESS-009  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.963  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.116  
 Energy Calibration Slope : 4.955449  
 Energy Calibration Quadratic : 3.2997411E-04  
 Energy Calibration Range : 7796.000

Instrument : CHAMBER 010  
 Detector : 72529  
 Calibration Date/Time : 6-JUL-2009 14:32:19  
 Calibration Source Id : AESS-010

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.261
NP-237	4341	2/28/10	4768.800	4769.006
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2373.375  
 Energy Calibration Slope : 4.948005  
 Energy Calibration Quadratic : 2.8748735E-04  
 Energy Calibration Range : 7742.000

Instrument : CHAMBER 011  
 Detector : 72531  
 Calibration Date/Time : 6-JUL-2009 14:32:29  
 Calibration Source Id : AESS-011

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.184
NP-237	4341	2/28/10	4768.800	4768.906
CM-244	4320A	2/28/10	5795.020	5795.321

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.106  
 Energy Calibration Slope : 4.984596  
 Energy Calibration Quadratic : 3.1995389E-04  
 Energy Calibration Range : 7793.000

Instrument : CHAMBER 012  
 Detector : 67594  
 Calibration Date/Time : 6-JUL-2009 14:32:37  
 Calibration Source Id : AESS-012

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.008
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2380.096  
 Energy Calibration Slope : 4.961268  
 Energy Calibration Quadratic : 2.7943935E-04  
 Energy Calibration Range : 7753.000

Instrument : CHAMBER 013  
 Detector : 78790  
 Calibration Date/Time : 6-JUL-2009 14:32:45  
 Calibration Source Id : AESS-013

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.992
NP-237	4341	2/28/10	4768.800	4768.663
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2357.626  
 Energy Calibration Slope : 4.921106  
 Energy Calibration Quadratic : 2.8607668E-04  
 Energy Calibration Range : 7697.000

Instrument : CHAMBER 014  
 Detector : 67616  
 Calibration Date/Time : 6-JUL-2009 14:32:56  
 Calibration Source Id : AESS-014

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5794.876

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2354.365  
 Energy Calibration Slope : 4.948353  
 Energy Calibration Quadratic : 3.2476214E-04  
 Energy Calibration Range : 7762.000

Instrument : CHAMBER 015  
 Detector : 61581  
 Calibration Date/Time : 6-JUL-2009 14:33:12  
 Calibration Source Id : AESS-015

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.620
NP-237	4341	2/28/10	4768.800	4768.609
CM-244	4320A	2/28/10	5795.020	5794.858

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2344.469  
 Energy Calibration Slope : 4.895294  
 Energy Calibration Quadratic : 3.0532407E-04  
 Energy Calibration Range : 7677.000



Instrument : CHAMBER 016  
 Detector : 78774  
 Calibration Date/Time : 6-JUL-2009 14:33:38  
 Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.282
NP-237	4341	2/28/10	4768.800	4769.068
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2356.850  
 Energy Calibration Slope : 4.876907  
 Energy Calibration Quadratic : 3.2479633E-04  
 Energy Calibration Range : 7691.000

Instrument : CHAMBER 017  
 Detector : 78791  
 Calibration Date/Time : 6-JUL-2009 14:33:47  
 Calibration Source Id : AESS-017

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.882
CM-244	4320A	2/28/10	5795.020	5795.156

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2369.181  
 Energy Calibration Slope : 4.952589  
 Energy Calibration Quadratic : 3.2460166E-04  
 Energy Calibration Range : 7781.000

Instrument : CHAMBER 018  
 Detector : 21063  
 Calibration Date/Time : 6-JUL-2009 14:33:55  
 Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.324
CM-244	4320A	2/28/10	5795.020	5792.230

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2398.371  
 Energy Calibration Slope : 4.991943  
 Energy Calibration Quadratic : 2.9626046E-04  
 Energy Calibration Range : 7821.000

Instrument : CHAMBER 019  
 Detector : 78786  
 Calibration Date/Time : 6-JUL-2009 14:34:03  
 Calibration Source Id : AESS-019

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.635
NP-237	4341	2/28/10	4768.800	4769.628
CM-244	4320A	2/28/10	5795.020	5795.798

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2346.014  
 Energy Calibration Slope : 5.054453  
 Energy Calibration Quadratic : 2.2688090E-04  
 Energy Calibration Range : 7760.000

Instrument : CHAMBER 020  
 Detector : 78787  
 Calibration Date/Time : 6-JUL-2009 14:34:12  
 Calibration Source Id : AESS-020

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2339.467  
 Energy Calibration Slope : 4.972310  
 Energy Calibration Quadratic : 3.0532698E-04  
 Energy Calibration Range : 7751.000

Instrument : CHAMBER 021  
 Detector : 67047  
 Calibration Date/Time : 6-JUL-2009 14:34:21  
 Calibration Source Id : AESS-021

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2271.765  
 Energy Calibration Slope : 4.961651  
 Energy Calibration Quadratic : 2.7429842E-04  
 Energy Calibration Range : 7640.000

Instrument : CHAMBER 022  
 Detector : 72530  
 Calibration Date/Time : 6-JUL-2009 14:34:44  
 Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.024
NP-237	4341	2/28/10	4768.800	4769.027
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2380.245  
 Energy Calibration Slope : 4.952941  
 Energy Calibration Quadratic : 3.0796995E-04  
 Energy Calibration Range : 7775.000

Instrument : CHAMBER 023  
 Detector : 78264  
 Calibration Date/Time : 6-JUL-2009 14:34:52  
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.366
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2380.600  
 Energy Calibration Slope : 5.002743  
 Energy Calibration Quadratic : 2.8062947E-04  
 Energy Calibration Range : 7798.000

Instrument : CHAMBER 024  
 Detector : 76542  
 Calibration Date/Time : 6-JUL-2009 14:35:01  
 Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2346.716  
 Energy Calibration Slope : 4.980215  
 Energy Calibration Quadratic : 2.5087653E-04  
 Energy Calibration Range : 7710.000

Instrument : CHAMBER 025  
 Detector : 45-149AA5  
 Calibration Date/Time : 6-JUL-2009 14:35:10  
 Calibration Source Id : AESS-025  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.237  
 NP-237 4341 2/28/10 4768.800 4769.932  
 CM-244 4320A 2/28/10 5795.020 5795.518  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2322.042  
 Energy Calibration Slope : 4.860308  
 Energy Calibration Quadratic : 3.0488655E-04  
 Energy Calibration Range : 7619.000

Instrument : CHAMBER 026  
 Detector : 78204  
 Calibration Date/Time : 6-JUL-2009 14:35:19  
 Calibration Source Id : AESS-026  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.984  
 NP-237 4341 2/28/10 4768.800 4768.684  
 CM-244 4320A 2/28/10 5795.020 5794.748  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.724  
 Energy Calibration Slope : 4.928299  
 Energy Calibration Quadratic : 3.4985787E-04  
 Energy Calibration Range : 7774.000

Instrument : CHAMBER 027  
 Detector : 42484  
 Calibration Date/Time : 6-JUL-2009 14:35:28  
 Calibration Source Id : AESS-027  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.621  
 NP-237 4341 2/28/10 4768.800 4767.888  
 CM-244 4320A 2/28/10 5795.020 5793.806  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2398.616  
 Energy Calibration Slope : 5.038840  
 Energy Calibration Quadratic : 3.1374834E-04  
 Energy Calibration Range : 7887.000

Instrument : CHAMBER 028  
 Detector : 78792  
 Calibration Date/Time : 6-JUL-2009 14:35:37  
 Calibration Source Id : AESS-028

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2321.462  
 Energy Calibration Slope : 4.941727  
 Energy Calibration Quadratic : 3.3650306E-04  
 Energy Calibration Range : 7735.000

Instrument : CHAMBER 029  
 Detector : 33454  
 Calibration Date/Time : 6-JUL-2009 14:35:45  
 Calibration Source Id : AESS-029

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.895
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2356.431  
 Energy Calibration Slope : 4.907866  
 Energy Calibration Quadratic : 3.0104505E-04  
 Energy Calibration Range : 7698.000

Instrument : CHAMBER 030  
 Detector : 33447  
 Calibration Date/Time : 6-JUL-2009 14:35:54  
 Calibration Source Id : AESS-030

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.338
CM-244	4320A	2/28/10	5795.020	5794.792

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2374.233  
 Energy Calibration Slope : 4.948391  
 Energy Calibration Quadratic : 3.0175908E-04  
 Energy Calibration Range : 7758.000

Instrument : CHAMBER 031  
 Detector : 67042  
 Calibration Date/Time : 6-JUL-2009 14:36:03  
 Calibration Source Id : AESS-031

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3181.244
NP-237	4341	2/28/10	4768.800	4766.175
CM-244	4320A	2/28/10	5795.020	5790.666

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2422.576  
 Energy Calibration Slope : 5.069265  
 Energy Calibration Quadratic : 3.3458683E-04  
 Energy Calibration Range : 7964.000

Instrument : CHAMBER 032  
 Detector : 67041  
 Calibration Date/Time : 6-JUL-2009 14:36:11  
 Calibration Source Id : AESS-032

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3144.592
NP-237	4341	2/28/10	4768.800	4712.482
CM-244	4320A	2/28/10	5795.020	5648.188

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2317.734  
 Energy Calibration Slope : 5.974524  
 Energy Calibration Quadratic : -1.0960279E-03  
 Energy Calibration Range : 7286.000

Instrument : CHAMBER 033  
 Detector : 78785  
 Calibration Date/Time : 6-JUL-2009 14:36:20  
 Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.822
CM-244	4320A	2/28/10	5795.020	5795.221

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2378.215  
 Energy Calibration Slope : 4.936105  
 Energy Calibration Quadratic : 3.4599172E-04  
 Energy Calibration Range : 7796.000

Instrument : CHAMBER 034  
 Detector : 61586  
 Calibration Date/Time : 6-JUL-2009 14:36:28  
 Calibration Source Id : AESS-034

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3179.509
NP-237	4341	2/28/10	4768.800	4753.572
CM-244	4320A	2/28/10	5795.020	5756.329

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2516.425  
 Energy Calibration Slope : 5.392761  
 Energy Calibration Quadratic : 4.9317838E-04  
 Energy Calibration Range : 8556.000

Instrument : CHAMBER 035  
 Detector : 78202  
 Calibration Date/Time : 6-JUL-2009 14:36:36  
 Calibration Source Id : AESS-035

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.571
CM-244	4320A	2/28/10	5795.020	5794.874

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2334.698  
 Energy Calibration Slope : 4.957491  
 Energy Calibration Quadratic : 3.3283085E-04  
 Energy Calibration Range : 7760.000

Instrument : CHAMBER 036  
 Detector : 78203  
 Calibration Date/Time : 6-JUL-2009 14:36:45  
 Calibration Source Id : AESS-036

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.768
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2354.938  
 Energy Calibration Slope : 4.922945  
 Energy Calibration Quadratic : 3.4444858E-04  
 Energy Calibration Range : 7757.000

Instrument : CHAMBER 037  
 Detector : 45-149BB5  
 Calibration Date/Time : 6-JUL-2009 14:36:53  
 Calibration Source Id : AESS-037

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.484
NP-237	4341	2/28/10	4768.800	4769.580
CM-244	4320A	2/28/10	5795.020	5795.541

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.709  
 Energy Calibration Slope : 4.946308  
 Energy Calibration Quadratic : 2.5989802E-04  
 Energy Calibration Range : 7722.000

Instrument : CHAMBER 038  
 Detector : 72532  
 Calibration Date/Time : 8-JUL-2009 07:31:06  
 Calibration Source Id : AESS-038

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.361
NP-237	4341	2/28/10	4768.800	4769.277
CM-244	4320A	2/28/10	5795.020	5795.217

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2373.087  
 Energy Calibration Slope : 4.930811  
 Energy Calibration Quadratic : 3.3542284E-04  
 Energy Calibration Range : 7774.000

Instrument : CHAMBER 039  
 Detector : 45-149BB2  
 Calibration Date/Time : 6-JUL-2009 14:37:12  
 Calibration Source Id : AESS-039

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.536
NP-237	4341	2/28/10	4768.800	4768.350
CM-244	4320A	2/28/10	5795.020	5794.833

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.948  
 Energy Calibration Slope : 4.914604  
 Energy Calibration Quadratic : 3.1003577E-04  
 Energy Calibration Range : 7742.000



Instrument : CHAMBER 040  
 Detector : 78773  
 Calibration Date/Time : 6-JUL-2009 14:37:21  
 Calibration Source Id : AESS-040

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.545  
 Energy Calibration Slope : 4.888068  
 Energy Calibration Quadratic : 3.4239746E-04  
 Energy Calibration Range : 7718.000

Instrument : CHAMBER 041  
 Detector : 78205  
 Calibration Date/Time : 6-JUL-2009 14:37:34  
 Calibration Source Id : AESS-041

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.714
NP-237	4341	2/28/10	4768.800	4768.652
CM-244	4320A	2/28/10	5795.020	5794.887

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.504  
 Energy Calibration Slope : 4.933050  
 Energy Calibration Quadratic : 3.6094084E-04  
 Energy Calibration Range : 7791.000

Instrument : CHAMBER 042  
 Detector : 78793  
 Calibration Date/Time : 6-JUL-2009 14:37:44  
 Calibration Source Id : AESS-042

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.865  
 Energy Calibration Slope : 4.914897  
 Energy Calibration Quadratic : 3.2152777E-04  
 Energy Calibration Range : 7747.000

Instrument : CHAMBER 043  
 Detector : 76543  
 Calibration Date/Time : 6-JUL-2009 14:37:56  
 Calibration Source Id : AESS-043

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2368.689  
 Energy Calibration Slope : 4.938226  
 Energy Calibration Quadratic : 3.2137471E-04  
 Energy Calibration Range : 7762.000

Instrument : CHAMBER 044  
 Detector : 79459  
 Calibration Date/Time : 7-JUL-2009 13:33:56  
 Calibration Source Id : AESS-044

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.945
CM-244	4320A	2/28/10	5795.020	5795.104

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.983  
 Energy Calibration Slope : 4.923144  
 Energy Calibration Quadratic : 3.4992688E-04  
 Energy Calibration Range : 7771.000

Instrument : CHAMBER 045  
 Detector : 67601  
 Calibration Date/Time : 6-JUL-2009 14:38:13  
 Calibration Source Id : AESS-045

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.713
NP-237	4341	2/28/10	4768.800	4769.999
CM-244	4320A	2/28/10	5795.020	5795.503

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2455.739  
 Energy Calibration Slope : 5.118891  
 Energy Calibration Quadratic : 3.3903588E-04  
 Energy Calibration Range : 8053.000

Instrument : CHAMBER 046  
 Detector : 76544  
 Calibration Date/Time : 6-JUL-2009 14:38:21  
 Calibration Source Id : AESS-046

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.832
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.131  
 Energy Calibration Slope : 4.885582  
 Energy Calibration Quadratic : 3.3954665E-04  
 Energy Calibration Range : 7722.000

Instrument : CHAMBER 047  
 Detector : 46-089B1  
 Calibration Date/Time : 6-JUL-2009 14:38:30  
 Calibration Source Id : AESS-047

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.917
CM-244	4320A	2/28/10	5795.020	5795.028

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.735  
 Energy Calibration Slope : 4.953376  
 Energy Calibration Quadratic : 3.2229861E-04  
 Energy Calibration Range : 7769.000

Instrument : CHAMBER 048  
 Detector : 42483  
 Calibration Date/Time : 6-JUL-2009 14:38:39  
 Calibration Source Id : AESS-048

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.757
NP-237	4341	2/28/10	4768.800	4768.527
CM-244	4320A	2/28/10	5795.020	5794.876

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2379.156  
 Energy Calibration Slope : 4.959531  
 Energy Calibration Quadratic : 2.8168198E-04  
 Energy Calibration Range : 7753.000

Instrument : CHAMBER 065  
 Detector : 68551  
 Calibration Date/Time : 9-JUL-2009 13:06:51  
 Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3181.934
NP-237	4341	2/28/10	4768.800	4768.222
CM-244	4320A	2/28/10	5795.020	5794.627

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.031  
 Energy Calibration Slope : 4.912300  
 Energy Calibration Quadratic : 3.2574762E-04  
 Energy Calibration Range : 7755.000

Instrument : CHAMBER 066  
 Detector : 46-089C1  
 Calibration Date/Time : 9-JUL-2009 13:07:05  
 Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.612
NP-237	4341	2/28/10	4768.800	4768.619
CM-244	4320A	2/28/10	5795.020	5794.832

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2375.985  
 Energy Calibration Slope : 4.975531  
 Energy Calibration Quadratic : 2.7539468E-04  
 Energy Calibration Range : 7760.000

Instrument : CHAMBER 067  
 Detector : 46-089B4  
 Calibration Date/Time : 9-JUL-2009 13:07:16  
 Calibration Source Id : AESS-003

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.025
NP-237	4341	2/28/10	4768.800	4768.287
CM-244	4320A	2/28/10	5795.020	5794.643

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2392.470  
 Energy Calibration Slope : 4.972788  
 Energy Calibration Quadratic : 2.7622253E-04  
 Energy Calibration Range : 7774.000

Instrument : CHAMBER 068  
 Detector : 78794  
 Calibration Date/Time : 9-JUL-2009 13:07:28  
 Calibration Source Id : AESS-004

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.711
NP-237	4341	2/28/10	4768.800	4768.483
CM-244	4320A	2/28/10	5795.020	5794.734

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.543  
 Energy Calibration Slope : 4.977541  
 Energy Calibration Quadratic : 3.1141064E-04  
 Energy Calibration Range : 7787.000

Instrument : CHAMBER 069  
 Detector : 78795  
 Calibration Date/Time : 9-JUL-2009 13:07:42  
 Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.689
NP-237	4341	2/28/10	4768.800	4768.583
CM-244	4320A	2/28/10	5795.020	5794.896

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.120  
 Energy Calibration Slope : 4.922992  
 Energy Calibration Quadratic : 3.4665639E-04  
 Energy Calibration Range : 7781.000

Instrument : CHAMBER 070  
 Detector : 46-089B2  
 Calibration Date/Time : 9-JUL-2009 13:07:53  
 Calibration Source Id : AESS-006

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.107
NP-237	4341	2/28/10	4768.800	4768.384
CM-244	4320A	2/28/10	5795.020	5794.512

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2386.604  
 Energy Calibration Slope : 4.939598  
 Energy Calibration Quadratic : 2.9686227E-04  
 Energy Calibration Range : 7756.000

Instrument : CHAMBER 071  
 Detector : 64259  
 Calibration Date/Time : 9-JUL-2009 13:08:07  
 Calibration Source Id : AESS-007

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.519
NP-237	4341	2/28/10	4768.800	4768.421
CM-244	4320A	2/28/10	5795.020	5794.714

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2381.008  
 Energy Calibration Slope : 4.974834  
 Energy Calibration Quadratic : 3.0491504E-04  
 Energy Calibration Range : 7795.000

Instrument : CHAMBER 072  
 Detector : 45-149AA3  
 Calibration Date/Time : 9-JUL-2009 13:08:19  
 Calibration Source Id : AESS-008

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.621
NP-237	4341	2/28/10	4768.800	4768.489
CM-244	4320A	2/28/10	5795.020	5794.766

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.531  
 Energy Calibration Slope : 4.947875  
 Energy Calibration Quadratic : 2.9255319E-04  
 Energy Calibration Range : 7739.000

Instrument : CHAMBER 073  
 Detector : 78775  
 Calibration Date/Time : 9-JUL-2009 13:08:30  
 Calibration Source Id : AESS-009

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.442
NP-237	4341	2/28/10	4768.800	4768.180
CM-244	4320A	2/28/10	5795.020	5794.629

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2339.856  
 Energy Calibration Slope : 4.937759  
 Energy Calibration Quadratic : 3.0114278E-04  
 Energy Calibration Range : 7712.000

Instrument : CHAMBER 074  
 Detector : 78266  
 Calibration Date/Time : 9-JUL-2009 13:08:42  
 Calibration Source Id : AESS-010

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.764
NP-237	4341	2/28/10	4768.800	4768.637
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.120  
 Energy Calibration Slope : 4.981784  
 Energy Calibration Quadratic : 2.9874133E-04  
 Energy Calibration Range : 7768.000

Instrument : CHAMBER 075  
 Detector : 68550  
 Calibration Date/Time : 9-JUL-2009 13:08:53  
 Calibration Source Id : AESS-011

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.163
NP-237	4341	2/28/10	4768.800	4768.299
CM-244	4320A	2/28/10	5795.020	5794.726

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.223  
 Energy Calibration Slope : 4.955623  
 Energy Calibration Quadratic : 3.1275101E-04  
 Energy Calibration Range : 7767.000

Instrument : CHAMBER 076  
 Detector : 78779  
 Calibration Date/Time : 9-JUL-2009 13:09:04  
 Calibration Source Id : AESS-012

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.983
NP-237	4341	2/28/10	4768.800	4768.736
CM-244	4320A	2/28/10	5795.020	5794.908

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.316  
 Energy Calibration Slope : 4.951778  
 Energy Calibration Quadratic : 3.2127454E-04  
 Energy Calibration Range : 7761.000

Instrument : CHAMBER 077  
 Detector : 67576  
 Calibration Date/Time : 9-JUL-2009 13:09:15  
 Calibration Source Id : AESS-013  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.001  
 NP-237 4341 2/28/10 4768.800 4768.613  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.225  
 Energy Calibration Slope : 4.943738  
 Energy Calibration Quadratic : 2.9529908E-04  
 Energy Calibration Range : 7733.000

Instrument : CHAMBER 078  
 Detector : 67577  
 Calibration Date/Time : 9-JUL-2009 13:09:25  
 Calibration Source Id : AESS-014  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.605  
 NP-237 4341 2/28/10 4768.800 4768.392  
 CM-244 4320A 2/28/10 5795.020 5794.652  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2395.349  
 Energy Calibration Slope : 4.935272  
 Energy Calibration Quadratic : 3.3427982E-04  
 Energy Calibration Range : 7800.000

Instrument : CHAMBER 079  
 Detector : 67598  
 Calibration Date/Time : 9-JUL-2009 13:09:33  
 Calibration Source Id : AESS-015  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.660  
 NP-237 4341 2/28/10 4768.800 4768.547  
 CM-244 4320A 2/28/10 5795.020 5794.894  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2369.373  
 Energy Calibration Slope : 4.904424  
 Energy Calibration Quadratic : 3.2698381E-04  
 Energy Calibration Range : 7734.000



Instrument : CHAMBER 080  
 Detector : 78197  
 Calibration Date/Time : 9-JUL-2009 13:09:43  
 Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3184.302
NP-237	4341	2/28/10	4768.800	4771.069
CM-244	4320A	2/28/10	5795.020	5795.787

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2345.798  
 Energy Calibration Slope : 5.019492  
 Energy Calibration Quadratic : 2.4690092E-04  
 Energy Calibration Range : 7745.000

Instrument : CHAMBER 081  
 Detector : 72533  
 Calibration Date/Time : 9-JUL-2009 13:09:58  
 Calibration Source Id : AESS-017

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3128.274
NP-237	4341	2/28/10	4768.800	4679.048
CM-244	4320A	2/28/10	5795.020	5545.961

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2299.761  
 Energy Calibration Slope : 8.847325  
 Energy Calibration Quadratic : -4.6356809E-03  
 Energy Calibration Range : 6499.000

Instrument : CHAMBER 082  
 Detector : 64263  
 Calibration Date/Time : 9-JUL-2009 13:10:11  
 Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.523
NP-237	4341	2/28/10	4768.800	4768.330
CM-244	4320A	2/28/10	5795.020	5794.746

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2391.756  
 Energy Calibration Slope : 4.946808  
 Energy Calibration Quadratic : 3.5040258E-04  
 Energy Calibration Range : 7825.000

Instrument : CHAMBER 083  
 Detector : 64278  
 Calibration Date/Time : 9-JUL-2009 13:10:22  
 Calibration Source Id : AESS-019

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4769.394
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2373.863  
 Energy Calibration Slope : 5.042446  
 Energy Calibration Quadratic : 2.3603256E-04  
 Energy Calibration Range : 7785.000

Instrument : CHAMBER 084  
 Detector : 78265  
 Calibration Date/Time : 9-JUL-2009 13:10:32  
 Calibration Source Id : AESS-020

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.274

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.172  
 Energy Calibration Slope : 5.013323  
 Energy Calibration Quadratic : 2.8020472E-04  
 Energy Calibration Range : 7790.000

Instrument : CHAMBER 085  
 Detector : 78776  
 Calibration Date/Time : 9-JUL-2009 13:10:43  
 Calibration Source Id : AESS-021

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.102  
 Energy Calibration Slope : 4.983326  
 Energy Calibration Quadratic : 2.9771921E-04  
 Energy Calibration Range : 7782.000

Instrument : CHAMBER 086  
 Detector : 78198  
 Calibration Date/Time : 9-JUL-2009 13:10:52  
 Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.643
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2354.748  
 Energy Calibration Slope : 5.010773  
 Energy Calibration Quadratic : 2.3814633E-04  
 Energy Calibration Range : 7735.000

Instrument : CHAMBER 087  
 Detector : 78199  
 Calibration Date/Time : 9-JUL-2009 13:11:02  
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2338.424  
 Energy Calibration Slope : 4.984921  
 Energy Calibration Quadratic : 2.3201770E-04  
 Energy Calibration Range : 7686.000

Instrument : CHAMBER 088  
 Detector : 33452  
 Calibration Date/Time : 9-JUL-2009 13:11:13  
 Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
NP-237	4341	2/28/10	4768.800	4768.468
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2351.689  
 Energy Calibration Slope : 4.964746  
 Energy Calibration Quadratic : 2.3151403E-04  
 Energy Calibration Range : 7678.000

Instrument : CHAMBER 089  
 Detector : 78262  
 Calibration Date/Time : 9-JUL-2009 13:11:23  
 Calibration Source Id : AESS-025

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.808
NP-237	4341	2/28/10	4768.800	4768.497
CM-244	4320A	2/28/10	5795.020	5794.868

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2357.358  
 Energy Calibration Slope : 4.998539  
 Energy Calibration Quadratic : 3.0872814E-04  
 Energy Calibration Range : 7800.000

Instrument : CHAMBER 090  
 Detector : 78263  
 Calibration Date/Time : 9-JUL-2009 13:11:39  
 Calibration Source Id : AESS-026

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.574
NP-237	4341	2/28/10	4768.800	4768.547
CM-244	4320A	2/28/10	5795.020	5794.930

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.561  
 Energy Calibration Slope : 4.900284  
 Energy Calibration Quadratic : 3.4428819E-04  
 Energy Calibration Range : 7746.000

Instrument : CHAMBER 091  
 Detector : 78259  
 Calibration Date/Time : 9-JUL-2009 13:11:52  
 Calibration Source Id : AESS-027

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.675
NP-237	4341	2/28/10	4768.800	4768.729
CM-244	4320A	2/28/10	5795.020	5794.997

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2370.658  
 Energy Calibration Slope : 4.954311  
 Energy Calibration Quadratic : 3.4313111E-04  
 Energy Calibration Range : 7804.000

Instrument : CHAMBER 092  
 Detector : 79457  
 Calibration Date/Time : 9-JUL-2009 13:12:01  
 Calibration Source Id : AESS-028

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.641
NP-237	4341	2/28/10	4768.800	4767.945
CM-244	4320A	2/28/10	5795.020	5794.641

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2351.606  
 Energy Calibration Slope : 4.967536  
 Energy Calibration Quadratic : 2.7795028E-04  
 Energy Calibration Range : 7730.000

Instrument : CHAMBER 093  
 Detector : 33206  
 Calibration Date/Time : 9-JUL-2009 13:12:10  
 Calibration Source Id : AESS-029

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.697
NP-237	4341	2/28/10	4768.800	4768.674
CM-244	4320A	2/28/10	5795.020	5794.907

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2369.563  
 Energy Calibration Slope : 4.914497  
 Energy Calibration Quadratic : 3.2562285E-04  
 Energy Calibration Range : 7743.000

Instrument : CHAMBER 094  
 Detector : 78267  
 Calibration Date/Time : 9-JUL-2009 13:12:19  
 Calibration Source Id : AESS-030

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.761
NP-237	4341	2/28/10	4768.800	4768.682
CM-244	4320A	2/28/10	5795.020	5794.852

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.085  
 Energy Calibration Slope : 4.944716  
 Energy Calibration Quadratic : 3.0186711E-04  
 Energy Calibration Range : 7743.000

Instrument : CHAMBER 095  
 Detector : 64279  
 Calibration Date/Time : 9-JUL-2009 13:12:27  
 Calibration Source Id : AESS-031

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.666
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2355.533  
 Energy Calibration Slope : 4.950543  
 Energy Calibration Quadratic : 2.9788527E-04  
 Energy Calibration Range : 7737.000

Instrument : CHAMBER 096  
 Detector : 67605  
 Calibration Date/Time : 9-JUL-2009 13:12:36  
 Calibration Source Id : AESS-032

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.747
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2347.386  
 Energy Calibration Slope : 4.941090  
 Energy Calibration Quadratic : 3.3197468E-04  
 Energy Calibration Range : 7755.000

Instrument : CHAMBER 097  
 Detector : 67599  
 Calibration Date/Time : 9-JUL-2009 13:12:44  
 Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4769.290
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.267  
 Energy Calibration Slope : 4.928224  
 Energy Calibration Quadratic : 3.4786455E-04  
 Energy Calibration Range : 7775.000

Instrument : CHAMBER 098  
 Detector : 68644  
 Calibration Date/Time : 9-JUL-2009 13:12:53  
 Calibration Source Id : AESS-034

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.282
NP-237	4341	2/28/10	4768.800	4768.479
CM-244	4320A	2/28/10	5795.020	5794.637

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2385.389  
 Energy Calibration Slope : 4.950438  
 Energy Calibration Quadratic : 3.5501088E-04  
 Energy Calibration Range : 7827.000

Instrument : CHAMBER 099  
 Detector : 70317  
 Calibration Date/Time : 9-JUL-2009 13:13:03  
 Calibration Source Id : AESS-035

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.752
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2368.685  
 Energy Calibration Slope : 4.893388  
 Energy Calibration Quadratic : 3.5426160E-04  
 Energy Calibration Range : 7751.000

Instrument : CHAMBER 100  
 Detector : 79456  
 Calibration Date/Time : 9-JUL-2009 13:13:12  
 Calibration Source Id : AESS-046

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.705
CM-244	4320A	2/28/10	5795.020	5794.913

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2354.623  
 Energy Calibration Slope : 4.898829  
 Energy Calibration Quadratic : 3.4345602E-04  
 Energy Calibration Range : 7731.000

Instrument : CHAMBER 101  
 Detector : 64253  
 Calibration Date/Time : 9-JUL-2009 13:13:22  
 Calibration Source Id : AESS-037  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.469  
 NP-237 4341 2/28/10 4768.800 4767.637  
 CM-244 4320A 2/28/10 5795.020 5794.300  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2410.698  
 Energy Calibration Slope : 4.933665  
 Energy Calibration Quadratic : 3.2843428E-04  
 Energy Calibration Range : 7807.000

Instrument : CHAMBER 102  
 Detector : 72525  
 Calibration Date/Time : 9-JUL-2009 13:13:31  
 Calibration Source Id : AESS-038  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.443  
 CM-244 4320A 2/28/10 5795.020 5794.909  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.658  
 Energy Calibration Slope : 4.864605  
 Energy Calibration Quadratic : 3.5245687E-04  
 Energy Calibration Range : 7715.000

Instrument : CHAMBER 103  
 Detector : 79461  
 Calibration Date/Time : 9-JUL-2009 13:13:40  
 Calibration Source Id : AESS-039  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.789  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2389.068  
 Energy Calibration Slope : 4.916300  
 Energy Calibration Quadratic : 3.4528042E-04  
 Energy Calibration Range : 7785.000



Instrument : CHAMBER 104  
 Detector : 72524  
 Calibration Date/Time : 9-JUL-2009 13:13:48  
 Calibration Source Id : AESS-040

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5794.853

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.445  
 Energy Calibration Slope : 4.898041  
 Energy Calibration Quadratic : 3.2613348E-04  
 Energy Calibration Range : 7711.000

Instrument : CHAMBER 105  
 Detector : 78777  
 Calibration Date/Time : 9-JUL-2009 13:13:56  
 Calibration Source Id : AESS-041

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.693
NP-237	4341	2/28/10	4768.800	4768.750
CM-244	4320A	2/28/10	5795.020	5794.773

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.710  
 Energy Calibration Slope : 4.874049  
 Energy Calibration Quadratic : 3.5893198E-04  
 Energy Calibration Range : 7744.000

Instrument : CHAMBER 106  
 Detector : 64274  
 Calibration Date/Time : 9-JUL-2009 13:14:04  
 Calibration Source Id : AESS-042

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2388.689  
 Energy Calibration Slope : 4.927028  
 Energy Calibration Quadratic : 3.4706845E-04  
 Energy Calibration Range : 7798.000

Instrument : CHAMBER 107  
 Detector : 67578  
 Calibration Date/Time : 9-JUL-2009 13:14:15  
 Calibration Source Id : AESS-043

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.693
NP-237	4341	2/28/10	4768.800	4768.881
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.860  
 Energy Calibration Slope : 4.955241  
 Energy Calibration Quadratic : 3.3647806E-04  
 Energy Calibration Range : 7790.000

Instrument : CHAMBER 108  
 Detector : 78778  
 Calibration Date/Time : 9-JUL-2009 13:14:24  
 Calibration Source Id : AESS-044

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.974
CM-244	4320A	2/28/10	5795.020	5795.155

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.359  
 Energy Calibration Slope : 4.898832  
 Energy Calibration Quadratic : 3.3370056E-04  
 Energy Calibration Range : 7727.000

Instrument : CHAMBER 109  
 Detector : 79463  
 Calibration Date/Time : 9-JUL-2009 13:14:36  
 Calibration Source Id : AESS-045

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.218  
 Energy Calibration Slope : 4.898855  
 Energy Calibration Quadratic : 3.6102085E-04  
 Energy Calibration Range : 7756.000

Instrument : CHAMBER 110  
 Detector : 67602  
 Calibration Date/Time : 9-JUL-2009 13:15:06  
 Calibration Source Id : AESS-046

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3151.318
NP-237	4341	2/28/10	4768.800	4743.843
CM-244	4320A	2/28/10	5795.020	5748.494

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2393.627  
 Energy Calibration Slope : 5.263870  
 Energy Calibration Quadratic : 7.2507857E-05  
 Energy Calibration Range : 7860.000

Instrument : CHAMBER 111  
 Detector : 79462  
 Calibration Date/Time : 9-JUL-2009 13:15:22  
 Calibration Source Id : AESS-047

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2359.279  
 Energy Calibration Slope : 4.970932  
 Energy Calibration Quadratic : 3.2777866E-04  
 Energy Calibration Range : 7793.000

Instrument : CHAMBER 112  
 Detector : 78261  
 Calibration Date/Time : 9-JUL-2009 13:15:42  
 Calibration Source Id : AESS-048

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4769.029
CM-244	4320A	2/28/10	5795.020	5795.070

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2372.776  
 Energy Calibration Slope : 4.930915  
 Energy Calibration Quadratic : 3.0952421E-04  
 Energy Calibration Range : 7747.000

Instrument : CHAMBER 113  
 Detector : 45-111B4  
 Calibration Date/Time : 16-JUN-2009 07:07:19  
 Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.504
CM-244	4320A	2/28/10	5795.020	5794.837

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2390.082  
 Energy Calibration Slope : 5.008648  
 Energy Calibration Quadratic : 2.7258813E-04  
 Energy Calibration Range : 7805.000

Instrument : CHAMBER 114  
 Detector : 78258  
 Calibration Date/Time : 16-JUN-2009 07:07:32  
 Calibration Source Id : AESS-007

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.993
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2338.882  
 Energy Calibration Slope : 4.971025  
 Energy Calibration Quadratic : 2.6137536E-04  
 Energy Calibration Range : 7703.000

Instrument : CHAMBER 115  
 Detector : 45-132FF4  
 Calibration Date/Time : 16-JUN-2009 07:07:47  
 Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.317  
 Energy Calibration Slope : 5.006582  
 Energy Calibration Quadratic : 2.5661435E-04  
 Energy Calibration Range : 7759.000

Instrument : CHAMBER 116  
 Detector : 45-132FF2  
 Calibration Date/Time : 16-JUN-2009 07:08:01  
 Calibration Source Id : AESS-008

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4769.073
CM-244	4320A	2/28/10	5795.020	5795.198

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.127  
 Energy Calibration Slope : 4.971977  
 Energy Calibration Quadratic : 2.8097059E-04  
 Energy Calibration Range : 7750.000

Instrument : CHAMBER 117  
 Detector : 33450  
 Calibration Date/Time : 16-JUN-2009 07:08:13  
 Calibration Source Id : AESS-003

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.382
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2373.417  
 Energy Calibration Slope : 4.981668  
 Energy Calibration Quadratic : 2.6134594E-04  
 Energy Calibration Range : 7749.000

Instrument : CHAMBER 118  
 Detector : 75544  
 Calibration Date/Time : 16-JUN-2009 07:08:26  
 Calibration Source Id : AESS-009

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2337.457  
 Energy Calibration Slope : 4.972951  
 Energy Calibration Quadratic : 2.7644937E-04  
 Energy Calibration Range : 7720.000

Instrument : CHAMBER 119  
 Detector : 74429  
 Calibration Date/Time : 2-FEB-2009 15:15:38  
 Calibration Source Id : AESS-004

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3031.796
NP-237	4341	2/28/10	4768.800	4669.281
CM-244	4320A	2/28/10	5795.020	5706.875

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2437.949  
 Energy Calibration Slope : 5.036866  
 Energy Calibration Quadratic :  
 Energy Calibration Range : 7596.000

Instrument : CHAMBER 120  
 Detector : 74430  
 Calibration Date/Time : 16-JUN-2009 07:08:40  
 Calibration Source Id : AESS-010

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.975
CM-244	4320A	2/28/10	5795.020	5795.168

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2312.230  
 Energy Calibration Slope : 4.968864  
 Energy Calibration Quadratic : 2.5235498E-04  
 Energy Calibration Range : 7665.000

Instrument : CHAMBER 121  
 Detector : 75545  
 Calibration Date/Time : 16-JUN-2009 07:09:11  
 Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2334.649  
 Energy Calibration Slope : 4.966432  
 Energy Calibration Quadratic : 2.6362672E-04  
 Energy Calibration Range : 7697.000

Instrument : CHAMBER 122  
 Detector : 75546  
 Calibration Date/Time : 16-JUN-2009 07:09:33  
 Calibration Source Id : AESS-011

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.286

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2334.092  
 Energy Calibration Slope : 4.954957  
 Energy Calibration Quadratic : 2.8123663E-04  
 Energy Calibration Range : 7703.000

Instrument : CHAMBER 123  
 Detector : 45-142V3  
 Calibration Date/Time : 16-JUN-2009 07:09:44  
 Calibration Source Id : AESS-006

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.185

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2380.172  
 Energy Calibration Slope : 4.969619  
 Energy Calibration Quadratic : 2.5775100E-04  
 Energy Calibration Range : 7739.000

Instrument : CHAMBER 124  
 Detector : 45-142V2  
 Calibration Date/Time : 16-JUN-2009 07:09:56  
 Calibration Source Id : AESS-012

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.325
NP-237	4341	2/28/10	4768.800	4769.563
CM-244	4320A	2/28/10	5795.020	5795.377

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2379.600  
 Energy Calibration Slope : 5.017830  
 Energy Calibration Quadratic : 2.2996348E-04  
 Energy Calibration Range : 7759.000

Instrument : CHAMBER 125  
 Detector : 75547  
 Calibration Date/Time : 16-JUN-2009 07:10:06  
 Calibration Source Id : AESS-013  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.008  
 NP-237 4341 2/28/10 4768.800 4768.897  
 CM-244 4320A 2/28/10 5795.020 5795.021  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2339.246  
 Energy Calibration Slope : 4.955701  
 Energy Calibration Quadratic : 2.6825210E-04  
 Energy Calibration Range : 7695.000

Instrument : CHAMBER 126  
 Detector : 75548  
 Calibration Date/Time : 16-JUN-2009 07:10:15  
 Calibration Source Id : AESS-019  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.405  
 NP-237 4341 2/28/10 4768.800 4769.253  
 CM-244 4320A 2/28/10 5795.020 5795.275  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2347.868  
 Energy Calibration Slope : 5.030078  
 Energy Calibration Quadratic : 2.0419329E-04  
 Energy Calibration Range : 7713.000

Instrument : CHAMBER 127  
 Detector : 78770  
 Calibration Date/Time : 16-JUN-2009 07:10:25  
 Calibration Source Id : AESS-014  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.511  
 NP-237 4341 2/28/10 4768.800 4768.543  
 CM-244 4320A 2/28/10 5795.020 5794.896  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2340.790  
 Energy Calibration Slope : 4.962737  
 Energy Calibration Quadratic : 2.6109588E-04  
 Energy Calibration Range : 7696.000



Instrument : CHAMBER 128  
 Detector : 75549  
 Calibration Date/Time : 16-JUN-2009 07:10:34  
 Calibration Source Id : AESS-020  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.201  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2328.569  
 Energy Calibration Slope : 5.008022  
 Energy Calibration Quadratic : 2.2430606E-04  
 Energy Calibration Range : 7692.000

Instrument : CHAMBER 129  
 Detector : 76227  
 Calibration Date/Time : 16-JUN-2009 07:10:45  
 Calibration Source Id : AESS-015  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.015  
 NP-237 4341 2/28/10 4768.800 4769.082  
 CM-244 4320A 2/28/10 5795.020 5795.180  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2346.687  
 Energy Calibration Slope : 4.941697  
 Energy Calibration Quadratic : 2.8269604E-04  
 Energy Calibration Range : 7703.000

Instrument : CHAMBER 130  
 Detector : 76228  
 Calibration Date/Time : 16-JUN-2009 07:10:54  
 Calibration Source Id : AESS-021  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.292  
 NP-237 4341 2/28/10 4768.800 4769.256  
 CM-244 4320A 2/28/10 5795.020 5795.226  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2333.425  
 Energy Calibration Slope : 4.971998  
 Energy Calibration Quadratic : 2.4682598E-04  
 Energy Calibration Range : 7684.000

Instrument : CHAMBER 131  
 Detector : 33448  
 Calibration Date/Time : 16-JUN-2009 07:11:04  
 Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3184.006
NP-237	4341	2/28/10	4768.800	4769.139
CM-244	4320A	2/28/10	5795.020	5795.161

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2386.053  
 Energy Calibration Slope : 4.928617  
 Energy Calibration Quadratic : 3.1576524E-04  
 Energy Calibration Range : 7764.000

Instrument : CHAMBER 132  
 Detector : 67579  
 Calibration Date/Time : 16-JUN-2009 07:11:14  
 Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3184.217
NP-237	4341	2/28/10	4768.800	4770.152
CM-244	4320A	2/28/10	5795.020	5796.396

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2356.848  
 Energy Calibration Slope : 5.034854  
 Energy Calibration Quadratic : 2.6319851E-04  
 Energy Calibration Range : 7789.000

Instrument : CHAMBER 133  
 Detector : 76229  
 Calibration Date/Time : 16-JUN-2009 07:11:23  
 Calibration Source Id : AESS-017

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.904
CM-244	4320A	2/28/10	5795.020	5795.095

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2306.766  
 Energy Calibration Slope : 4.913421  
 Energy Calibration Quadratic : 2.5427641E-04  
 Energy Calibration Range : 7605.000

Instrument : CHAMBER 134  
 Detector : 76230  
 Calibration Date/Time : 16-JUN-2009 07:11:32  
 Calibration Source Id : AESS-023  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2326.431  
 Energy Calibration Slope : 4.986051  
 Energy Calibration Quadratic : 2.2440210E-04  
 Energy Calibration Range : 7667.000

Instrument : CHAMBER 135  
 Detector : 64270  
 Calibration Date/Time : 16-JUN-2009 07:15:31  
 Calibration Source Id : AESS-018  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.149  
 NP-237 4341 2/28/10 4768.800 4768.942  
 CM-244 4320A 2/28/10 5795.020 5795.113  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2334.536  
 Energy Calibration Slope : 4.929379  
 Energy Calibration Quadratic : 2.8629895E-04  
 Energy Calibration Range : 7682.000

Instrument : CHAMBER 136  
 Detector : 68549  
 Calibration Date/Time : 16-JUN-2009 07:16:13  
 Calibration Source Id : AESS-024  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.932  
 NP-237 4341 2/28/10 4768.800 4768.802  
 CM-244 4320A 2/28/10 5795.020 5795.548  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2342.226  
 Energy Calibration Slope : 5.015644  
 Energy Calibration Quadratic : 2.0903966E-04  
 Energy Calibration Range : 7697.000

Instrument : CHAMBER 137  
 Detector : 64288  
 Calibration Date/Time : 16-JUN-2009 07:16:28  
 Calibration Source Id : AESS-025  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.574  
 NP-237 4341 2/28/10 4768.800 4769.629  
 CM-244 4320A 2/28/10 5795.020 5796.515  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2377.649  
 Energy Calibration Slope : 5.028330  
 Energy Calibration Quadratic : 2.9354112E-04  
 Energy Calibration Range : 7834.000

Instrument : CHAMBER 138  
 Detector : 65877  
 Calibration Date/Time : 16-JUN-2009 07:16:37  
 Calibration Source Id : AESS-031  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.211  
 NP-237 4341 2/28/10 4768.800 4769.381  
 CM-244 4320A 2/28/10 5795.020 5795.108  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2375.414  
 Energy Calibration Slope : 4.991161  
 Energy Calibration Quadratic : 2.8877539E-04  
 Energy Calibration Range : 7789.000

Instrument : CHAMBER 139  
 Detector : 76231  
 Calibration Date/Time : 16-JUN-2009 07:16:46  
 Calibration Source Id : AESS-026  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.119  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2348.629  
 Energy Calibration Slope : 4.949206  
 Energy Calibration Quadratic : 2.9484290E-04  
 Energy Calibration Range : 7726.000

Instrument : CHAMBER 140  
 Detector : 78771  
 Calibration Date/Time : 16-JUN-2009 07:16:54  
 Calibration Source Id : AESS-032

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.262
NP-237	4341	2/28/10	4768.800	4768.958
CM-244	4320A	2/28/10	5795.020	5795.093

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2341.468  
 Energy Calibration Slope : 4.965883  
 Energy Calibration Quadratic : 2.8860217E-04  
 Energy Calibration Range : 7729.000

Instrument : CHAMBER 141  
 Detector : 76232  
 Calibration Date/Time : 16-JUN-2009 07:17:04  
 Calibration Source Id : AESS-027

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.910
CM-244	4320A	2/28/10	5795.020	5795.188

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2356.602  
 Energy Calibration Slope : 4.960644  
 Energy Calibration Quadratic : 2.8023543E-04  
 Energy Calibration Range : 7730.000

Instrument : CHAMBER 142  
 Detector : 64261  
 Calibration Date/Time : 16-JUN-2009 07:17:13  
 Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.429
NP-237	4341	2/28/10	4768.800	4768.932
CM-244	4320A	2/28/10	5795.020	5795.116

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.285  
 Energy Calibration Slope : 4.960367  
 Energy Calibration Quadratic : 2.9466228E-04  
 Energy Calibration Range : 7765.000

Instrument : CHAMBER 143  
 Detector : 65882  
 Calibration Date/Time : 16-JUN-2009 07:17:25  
 Calibration Source Id : AESS-028

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3250.229
NP-237	4341	2/28/10	4768.800	4837.343
CM-244	4320A	2/28/10	5795.020	5849.067

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2455.688  
 Energy Calibration Slope : 5.031915  
 Energy Calibration Quadratic : 3.0768578E-04  
 Energy Calibration Range : 7931.000

Instrument : CHAMBER 144  
 Detector : 75551  
 Calibration Date/Time : 16-JUN-2009 07:17:35  
 Calibration Source Id : AESS-034

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.150
NP-237	4341	2/28/10	4768.800	4768.904
CM-244	4320A	2/28/10	5795.020	5795.093

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2344.634  
 Energy Calibration Slope : 4.953329  
 Energy Calibration Quadratic : 2.8785199E-04  
 Energy Calibration Range : 7719.000

Instrument : CHAMBER 145  
 Detector : 72526  
 Calibration Date/Time : 16-JUN-2009 07:17:46  
 Calibration Source Id : AESS-029

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
NP-237	4341	2/28/10	4768.800	4768.852
CM-244	4320A	2/28/10	5795.020	5795.094

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2357.925  
 Energy Calibration Slope : 4.974996  
 Energy Calibration Quadratic : 2.7891100E-04  
 Energy Calibration Range : 7745.000

Instrument : CHAMBER 146  
 Detector : 72527  
 Calibration Date/Time : 16-JUN-2009 07:17:55  
 Calibration Source Id : AESS-035

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.816
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2351.927  
 Energy Calibration Slope : 4.941407  
 Energy Calibration Quadratic : 2.7957113E-04  
 Energy Calibration Range : 7705.000

Instrument : CHAMBER 147  
 Detector : 75550  
 Calibration Date/Time : 16-JUN-2009 07:18:04  
 Calibration Source Id : AESS-030

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.166

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2347.077  
 Energy Calibration Slope : 4.972399  
 Energy Calibration Quadratic : 2.5946190E-04  
 Energy Calibration Range : 7711.000

Instrument : CHAMBER 148  
 Detector : 74429  
 Calibration Date/Time : 16-JUN-2009 07:18:16  
 Calibration Source Id : AESS-036

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2346.171  
 Energy Calibration Slope : 4.955534  
 Energy Calibration Quadratic : 2.8144897E-04  
 Energy Calibration Range : 7716.000

Instrument : CHAMBER 149  
 Detector : 33449  
 Calibration Date/Time : 16-JUN-2009 07:18:25  
 Calibration Source Id : AESS-037

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.608
NP-237	4341	2/28/10	4768.800	4768.669
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2382.624  
 Energy Calibration Slope : 4.971137  
 Energy Calibration Quadratic : 2.7805354E-04  
 Energy Calibration Range : 7765.000

Instrument : CHAMBER 150  
 Detector : 75552  
 Calibration Date/Time : 16-JUN-2009 07:18:38  
 Calibration Source Id : AESS-043

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.826
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5794.950

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.074  
 Energy Calibration Slope : 4.944486  
 Energy Calibration Quadratic : 3.0842941E-04  
 Energy Calibration Range : 7745.000

Instrument : CHAMBER 151  
 Detector : 75556  
 Calibration Date/Time : 16-JUN-2009 07:18:48  
 Calibration Source Id : AESS-038

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.728
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2343.808  
 Energy Calibration Slope : 4.940684  
 Energy Calibration Quadratic : 2.6592601E-04  
 Energy Calibration Range : 7682.000



Instrument : CHAMBER 152  
 Detector : 76222  
 Calibration Date/Time : 16-JUN-2009 07:18:58  
 Calibration Source Id : AESS-044  
 Cal. Isotopes    Source Id    Expiration Date    Standard Energy    Actual Energy  
   GD-148        6445-278      2/28/10            3183.000        3182.991  
   NP-237        4341          2/28/10            4768.800        4768.745  
   CM-244        4320A        2/28/10            5795.020        5794.972

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2344.574  
 Energy Calibration Slope : 4.943527  
 Energy Calibration Quadratic : 2.7533009E-04  
 Energy Calibration Range : 7695.000

Instrument : CHAMBER 153  
 Detector : 76223  
 Calibration Date/Time : 16-JUN-2009 07:19:07  
 Calibration Source Id : AESS-039  
 Cal. Isotopes    Source Id    Expiration Date    Standard Energy    Actual Energy  
   GD-148        6445-278      2/28/10            3183.000        3183.000  
   NP-237        4341          2/28/10            4768.800        4768.802  
   CM-244        4320A        2/28/10            5795.020        5795.019

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2332.105  
 Energy Calibration Slope : 4.960024  
 Energy Calibration Quadratic : 2.7056716E-04  
 Energy Calibration Range : 7695.000

Instrument : CHAMBER 154  
 Detector : 76224  
 Calibration Date/Time : 16-JUN-2009 07:19:27  
 Calibration Source Id : AESS-045  
 Cal. Isotopes    Source Id    Expiration Date    Standard Energy    Actual Energy  
   GD-148        6445-278      2/28/10            3183.000        3182.918  
   NP-237        4341          2/28/10            4768.800        4768.801  
   CM-244        4320A        2/28/10            5795.020        5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2340.580  
 Energy Calibration Slope : 4.942686  
 Energy Calibration Quadratic : 2.9231849E-04  
 Energy Calibration Range : 7708.000

Instrument : CHAMBER 155  
 Detector : 75553  
 Calibration Date/Time : 16-JUN-2009 07:19:38  
 Calibration Source Id : AESS-040  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.830  
 NP-237 4341 2/28/10 4768.800 4768.685  
 CM-244 4320A 2/28/10 5795.020 5794.995  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.782  
 Energy Calibration Slope : 4.981919  
 Energy Calibration Quadratic : 2.8656950E-04  
 Energy Calibration Range : 7768.000

Instrument : CHAMBER 156  
 Detector : 75554  
 Calibration Date/Time : 16-JUN-2009 07:19:50  
 Calibration Source Id : AESS-046  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.382  
 Energy Calibration Slope : 4.974847  
 Energy Calibration Quadratic : 2.9205118E-04  
 Energy Calibration Range : 7766.000

Instrument : CHAMBER 157  
 Detector : 75555  
 Calibration Date/Time : 16-JUN-2009 07:20:18  
 Calibration Source Id : AESS-041  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.152  
 Energy Calibration Slope : 4.962382  
 Energy Calibration Quadratic : 2.9934224E-04  
 Energy Calibration Range : 7756.000

Instrument : CHAMBER 158  
 Detector : 33451  
 Calibration Date/Time : 16-JUN-2009 07:20:28  
 Calibration Source Id : AESS-047  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.785  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.662  
 Energy Calibration Slope : 4.991979  
 Energy Calibration Quadratic : 3.1088511E-04  
 Energy Calibration Range : 7822.000

Instrument : CHAMBER 159  
 Detector : 76225  
 Calibration Date/Time : 16-JUN-2009 07:20:41  
 Calibration Source Id : AESS-042  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2357.102  
 Energy Calibration Slope : 4.990944  
 Energy Calibration Quadratic : 2.8481637E-04  
 Energy Calibration Range : 7766.000

Instrument : CHAMBER 160  
 Detector : 76226  
 Calibration Date/Time : 16-JUN-2009 07:20:51  
 Calibration Source Id : AESS-048  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.387  
 Energy Calibration Slope : 4.978779  
 Energy Calibration Quadratic : 3.0207759E-04  
 Energy Calibration Range : 7775.000

Instrument : CHAMBER 161  
 Detector : 70321  
 Calibration Date/Time : 22-JUN-2009 14:58:45  
 Calibration Source Id : AESS-001  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.262  
 Energy Calibration Slope : 4.896393  
 Energy Calibration Quadratic : 3.3797286E-04  
 Energy Calibration Range : 7745.000

Instrument : CHAMBER 162  
 Detector : 70323  
 Calibration Date/Time : 22-JUN-2009 14:59:02  
 Calibration Source Id : AESS-007  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.662  
 NP-237 4341 2/28/10 4768.800 4769.615  
 CM-244 4320A 2/28/10 5795.020 5795.417  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2370.305  
 Energy Calibration Slope : 4.919915  
 Energy Calibration Quadratic : 3.0847988E-04  
 Energy Calibration Range : 7732.000

Instrument : CHAMBER 163  
 Detector : 70324  
 Calibration Date/Time : 22-JUN-2009 14:59:20  
 Calibration Source Id : AESS-002  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.798  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2381.293  
 Energy Calibration Slope : 4.927099  
 Energy Calibration Quadratic : 3.2329891E-04  
 Energy Calibration Range : 7766.000

Instrument : CHAMBER 164  
 Detector : 70325  
 Calibration Date/Time : 22-JUN-2009 14:59:35  
 Calibration Source Id : AESS-008  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.405  
 NP-237 4341 2/28/10 4768.800 4768.212  
 CM-244 4320A 2/28/10 5795.020 5795.019  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2382.304  
 Energy Calibration Slope : 4.931757  
 Energy Calibration Quadratic : 3.2424228E-04  
 Energy Calibration Range : 7772.000

Instrument : CHAMBER 165  
 Detector : 72544  
 Calibration Date/Time : 22-JUN-2009 15:00:00  
 Calibration Source Id : AESS-003  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5794.717  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2386.365  
 Energy Calibration Slope : 4.964369  
 Energy Calibration Quadratic : 2.8651269E-04  
 Energy Calibration Range : 7770.000

Instrument : CHAMBER 166  
 Detector : 74545  
 Calibration Date/Time : 22-JUN-2009 15:00:15  
 Calibration Source Id : AESS-009  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.357  
 NP-237 4341 2/28/10 4768.800 4768.476  
 CM-244 4320A 2/28/10 5795.020 5794.620  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2377.530  
 Energy Calibration Slope : 4.930614  
 Energy Calibration Quadratic : 3.2020407E-04  
 Energy Calibration Range : 7762.000

Instrument : CHAMBER 167  
 Detector : 72546  
 Calibration Date/Time : 22-JUN-2009 15:00:26  
 Calibration Source Id : AESS-004

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2378.454  
 Energy Calibration Slope : 4.916844  
 Energy Calibration Quadratic : 3.3378412E-04  
 Energy Calibration Range : 7763.000

Instrument : CHAMBER 168  
 Detector : 72547  
 Calibration Date/Time : 22-JUN-2009 15:00:38  
 Calibration Source Id : AESS-010

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.481
NP-237	4341	2/28/10	4768.800	4769.733
CM-244	4320A	2/28/10	5795.020	5795.360

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2378.216  
 Energy Calibration Slope : 4.943952  
 Energy Calibration Quadratic : 3.0569665E-04  
 Energy Calibration Range : 7761.000

Instrument : CHAMBER 169  
 Detector : 72548  
 Calibration Date/Time : 22-JUN-2009 15:00:51  
 Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.437
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2381.692  
 Energy Calibration Slope : 4.923065  
 Energy Calibration Quadratic : 3.2510224E-04  
 Energy Calibration Range : 7764.000

Instrument : CHAMBER 170  
 Detector : 72549  
 Calibration Date/Time : 22-JUN-2009 15:01:02  
 Calibration Source Id : AESS-011  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.574  
 NP-237 4341 2/28/10 4768.800 4769.165  
 CM-244 4320A 2/28/10 5795.020 5795.548  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2379.378  
 Energy Calibration Slope : 4.940187  
 Energy Calibration Quadratic : 3.2377098E-04  
 Energy Calibration Range : 7778.000

Instrument : CHAMBER 171  
 Detector : 78260  
 Calibration Date/Time : 22-JUN-2009 15:01:15  
 Calibration Source Id : AESS-006  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.011  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.025  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.143  
 Energy Calibration Slope : 4.905009  
 Energy Calibration Quadratic : 3.4086173E-04  
 Energy Calibration Range : 7747.000

Instrument : CHAMBER 172  
 Detector : 78772  
 Calibration Date/Time : 22-JUN-2009 15:01:28  
 Calibration Source Id : AESS-012  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.889  
 Energy Calibration Slope : 4.905996  
 Energy Calibration Quadratic : 3.5168754E-04  
 Energy Calibration Range : 7757.000

Instrument : CHAMBER 173  
 Detector : 74431  
 Calibration Date/Time : 22-JUN-2009 15:01:41  
 Calibration Source Id : AESS-013

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.716
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.857  
 Energy Calibration Slope : 4.989556  
 Energy Calibration Quadratic : 2.6047556E-04  
 Energy Calibration Range : 7745.000

Instrument : CHAMBER 174  
 Detector : 74432  
 Calibration Date/Time : 22-JUN-2009 15:01:51  
 Calibration Source Id : AESS-019

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.008
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.090  
 Energy Calibration Slope : 5.020361  
 Energy Calibration Quadratic : 2.1951902E-04  
 Energy Calibration Range : 7732.000

Instrument : CHAMBER 175  
 Detector : 74433  
 Calibration Date/Time : 22-JUN-2009 15:02:01  
 Calibration Source Id : AESS-014

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2356.841  
 Energy Calibration Slope : 4.985576  
 Energy Calibration Quadratic : 2.6544777E-04  
 Energy Calibration Range : 7740.000



Instrument : CHAMBER 176  
 Detector : 74434  
 Calibration Date/Time : 22-JUN-2009 15:02:12  
 Calibration Source Id : AESS-020

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.343
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2354.481  
 Energy Calibration Slope : 5.029559  
 Energy Calibration Quadratic : 2.1999818E-04  
 Energy Calibration Range : 7735.000

Instrument : CHAMBER 177  
 Detector : 74435  
 Calibration Date/Time : 22-JUN-2009 15:02:24  
 Calibration Source Id : AESS-015

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.728  
 Energy Calibration Slope : 4.966811  
 Energy Calibration Quadratic : 2.8411727E-04  
 Energy Calibration Range : 7745.000

Instrument : CHAMBER 178  
 Detector : 74436  
 Calibration Date/Time : 22-JUN-2009 15:02:37  
 Calibration Source Id : AESS-021

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.016
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2350.840  
 Energy Calibration Slope : 5.018156  
 Energy Calibration Quadratic : 2.2526548E-04  
 Energy Calibration Range : 7726.000

Instrument : CHAMBER 179  
 Detector : 74437  
 Calibration Date/Time : 22-JUN-2009 15:02:54  
 Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.008
NP-237	4341	2/28/10	4768.800	4768.694
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.137  
 Energy Calibration Slope : 4.971311  
 Energy Calibration Quadratic : 2.7695790E-04  
 Energy Calibration Range : 7739.000

Instrument : CHAMBER 180  
 Detector : 74438  
 Calibration Date/Time : 22-JUN-2009 15:03:14  
 Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.026

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2352.778  
 Energy Calibration Slope : 5.029830  
 Energy Calibration Quadratic : 2.1214969E-04  
 Energy Calibration Range : 7726.000

Instrument : CHAMBER 181  
 Detector : 74439  
 Calibration Date/Time : 22-JUN-2009 15:03:27  
 Calibration Source Id : AESS-017

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.903
CM-244	4320A	2/28/10	5795.020	5795.074

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2356.310  
 Energy Calibration Slope : 4.974973  
 Energy Calibration Quadratic : 2.7404417E-04  
 Energy Calibration Range : 7738.000

Instrument : CHAMBER 182  
 Detector : 74440  
 Calibration Date/Time : 22-JUN-2009 15:03:39  
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.403
NP-237	4341	2/28/10	4768.800	4768.970
CM-244	4320A	2/28/10	5795.020	5795.165

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2349.923  
 Energy Calibration Slope : 4.986344  
 Energy Calibration Quadratic : 2.5572060E-04  
 Energy Calibration Range : 7724.000

Instrument : CHAMBER 183  
 Detector : 74441  
 Calibration Date/Time : 22-JUN-2009 15:03:53  
 Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2359.238  
 Energy Calibration Slope : 4.971895  
 Energy Calibration Quadratic : 2.8019695E-04  
 Energy Calibration Range : 7744.000

Instrument : CHAMBER 184  
 Detector : 74442  
 Calibration Date/Time : 22-JUN-2009 15:04:06  
 Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.759  
 Energy Calibration Slope : 5.027183  
 Energy Calibration Quadratic : 2.1329588E-04  
 Energy Calibration Range : 7725.000

Instrument : CHAMBER 185  
 Detector : 68615  
 Calibration Date/Time : 22-JUN-2009 15:04:16  
 Calibration Source Id : AESS-025  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.019  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2356.756  
 Energy Calibration Slope : 4.942091  
 Energy Calibration Quadratic : 2.7517328E-04  
 Energy Calibration Range : 7706.000

Instrument : CHAMBER 186  
 Detector : 68616  
 Calibration Date/Time : 22-JUN-2009 15:04:28  
 Calibration Source Id : AESS-031  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.797  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.497  
 Energy Calibration Slope : 4.943951  
 Energy Calibration Quadratic : 2.8680658E-04  
 Energy Calibration Range : 7724.000

Instrument : CHAMBER 187  
 Detector : 68620  
 Calibration Date/Time : 22-JUN-2009 15:04:38  
 Calibration Source Id : AESS-026  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.853  
 CM-244 4320A 2/28/10 5795.020 5795.115  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2371.605  
 Energy Calibration Slope : 4.963061  
 Energy Calibration Quadratic : 3.0924208E-04  
 Energy Calibration Range : 7778.000

Instrument : CHAMBER 188  
 Detector : 68621  
 Calibration Date/Time : 22-JUN-2009 15:04:49  
 Calibration Source Id : AESS-032

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.832
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.401  
 Energy Calibration Slope : 4.951802  
 Energy Calibration Quadratic : 3.1090144E-04  
 Energy Calibration Range : 7764.000

Instrument : CHAMBER 189  
 Detector : 68622  
 Calibration Date/Time : 22-JUN-2009 15:05:00  
 Calibration Source Id : AESS-027

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.746
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2356.776  
 Energy Calibration Slope : 4.949914  
 Energy Calibration Quadratic : 2.7563065E-04  
 Energy Calibration Range : 7715.000

Instrument : CHAMBER 190  
 Detector : 68623  
 Calibration Date/Time : 22-JUN-2009 15:05:13  
 Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.750
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2355.469  
 Energy Calibration Slope : 4.940720  
 Energy Calibration Quadratic : 2.9352074E-04  
 Energy Calibration Range : 7723.000

Instrument : CHAMBER 191  
 Detector : 68624  
 Calibration Date/Time : 22-JUN-2009 15:05:24  
 Calibration Source Id : AESS-028  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.750  
 CM-244 4320A 2/28/10 5795.020 5794.952  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2370.162  
 Energy Calibration Slope : 4.969944  
 Energy Calibration Quadratic : 3.0237788E-04  
 Energy Calibration Range : 7776.000

Instrument : CHAMBER 192  
 Detector : 74430  
 Calibration Date/Time : 22-JUN-2009 15:05:39  
 Calibration Source Id : AESS-034  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.866  
 Energy Calibration Slope : 4.974655  
 Energy Calibration Quadratic : 2.9466255E-04  
 Energy Calibration Range : 7768.000

Instrument : CHAMBER 193  
 Detector : 68627  
 Calibration Date/Time : 22-JUN-2009 15:05:50  
 Calibration Source Id : AESS-029  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.252  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.004  
 Energy Calibration Slope : 4.933344  
 Energy Calibration Quadratic : 3.0485235E-04  
 Energy Calibration Range : 7732.000

Instrument : CHAMBER 194  
 Detector : 68635  
 Calibration Date/Time : 22-JUN-2009 15:06:02  
 Calibration Source Id : AESS-035  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.956  
 CM-244 4320A 2/28/10 5795.020 5795.088  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2356.275  
 Energy Calibration Slope : 4.943244  
 Energy Calibration Quadratic : 2.9090239E-04  
 Energy Calibration Range : 7723.000

Instrument : CHAMBER 195  
 Detector : 68636  
 Calibration Date/Time : 22-JUN-2009 15:06:11  
 Calibration Source Id : AESS-030  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.227  
 NP-237 4341 2/28/10 4768.800 4769.136  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.543  
 Energy Calibration Slope : 4.955566  
 Energy Calibration Quadratic : 2.8235061E-04  
 Energy Calibration Range : 7732.000

Instrument : CHAMBER 196  
 Detector : 68637  
 Calibration Date/Time : 22-JUN-2009 15:06:21  
 Calibration Source Id : AESS-036  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.134  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.497  
 Energy Calibration Slope : 4.932623  
 Energy Calibration Quadratic : 2.9964585E-04  
 Energy Calibration Range : 7727.000

Instrument : CHAMBER 197  
 Detector : 78894  
 Calibration Date/Time : 23-JUN-2009 13:40:27  
 Calibration Source Id : AESS-037

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.236
NP-237	4341	2/28/10	4768.800	4768.958
CM-244	4320A	2/28/10	5795.020	5795.067

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.861  
 Energy Calibration Slope : 4.977748  
 Energy Calibration Quadratic : 2.8034966E-04  
 Energy Calibration Range : 7757.000

Instrument : CHAMBER 198  
 Detector : 78895  
 Calibration Date/Time : 22-JUN-2009 15:06:54  
 Calibration Source Id : AESS-043

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.894  
 Energy Calibration Slope : 4.963814  
 Energy Calibration Quadratic : 2.8298626E-04  
 Energy Calibration Range : 7746.000

Instrument : CHAMBER 199  
 Detector : 78896  
 Calibration Date/Time : 22-JUN-2009 15:07:05  
 Calibration Source Id : AESS-038

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.091
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.930  
 Energy Calibration Slope : 4.986914  
 Energy Calibration Quadratic : 2.6706583E-04  
 Energy Calibration Range : 7752.000



Instrument : CHAMBER 200  
 Detector : 78900  
 Calibration Date/Time : 22-JUN-2009 15:07:19  
 Calibration Source Id : AESS-044

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2368.921  
 Energy Calibration Slope : 4.942559  
 Energy Calibration Quadratic : 3.1796028E-04  
 Energy Calibration Range : 7764.000

Instrument : CHAMBER 201  
 Detector : 78902  
 Calibration Date/Time : 22-JUN-2009 15:07:30  
 Calibration Source Id : AESS-039

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.093

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.354  
 Energy Calibration Slope : 4.963643  
 Energy Calibration Quadratic : 3.0018482E-04  
 Energy Calibration Range : 7761.000

Instrument : CHAMBER 202  
 Detector : 78903  
 Calibration Date/Time : 22-JUN-2009 15:07:41  
 Calibration Source Id : AESS-045

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.121
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2352.562  
 Energy Calibration Slope : 4.948048  
 Energy Calibration Quadratic : 3.0442388E-04  
 Energy Calibration Range : 7739.000

Instrument : CHAMBER 203  
 Detector : 78905  
 Calibration Date/Time : 22-JUN-2009 15:07:50  
 Calibration Source Id : AESS-040  
 Cal. Isotopes    Source Id    Expiration Date    Standard Energy    Actual Energy  
   GD-148        6445-278      2/28/10            3183.000        3183.175  
   NP-237        4341          2/28/10            4768.800        4768.800  
   CM-244        4320A        2/28/10            5795.020        5795.021  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2359.840  
 Energy Calibration Slope : 4.964388  
 Energy Calibration Quadratic : 2.9003547E-04  
 Energy Calibration Range : 7747.000

Instrument : CHAMBER 204  
 Detector : 78907  
 Calibration Date/Time : 22-JUN-2009 15:08:00  
 Calibration Source Id : AESS-046  
 Cal. Isotopes    Source Id    Expiration Date    Standard Energy    Actual Energy  
   GD-148        6445-278      2/28/10            3183.000        3183.082  
   NP-237        4341          2/28/10            4768.800        4768.826  
   CM-244        4320A        2/28/10            5795.020        5795.021  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.510  
 Energy Calibration Slope : 4.952772  
 Energy Calibration Quadratic : 3.0013063E-04  
 Energy Calibration Range : 7748.000

Instrument : CHAMBER 205  
 Detector : 78908  
 Calibration Date/Time : 22-JUN-2009 15:08:10  
 Calibration Source Id : AESS-041  
 Cal. Isotopes    Source Id    Expiration Date    Standard Energy    Actual Energy  
   GD-148        6445-278      2/28/10            3183.000        3183.169  
   NP-237        4341          2/28/10            4768.800        4768.800  
   CM-244        4320A        2/28/10            5795.020        5795.027  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.907  
 Energy Calibration Slope : 4.968532  
 Energy Calibration Quadratic : 2.9018772E-04  
 Energy Calibration Range : 7755.000

Instrument : CHAMBER 206  
 Detector : 78909  
 Calibration Date/Time : 22-JUN-2009 15:08:23  
 Calibration Source Id : AESS-047  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.146  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.042  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2357.156  
 Energy Calibration Slope : 4.978078  
 Energy Calibration Quadratic : 2.6590825E-04  
 Energy Calibration Range : 7734.000

Instrument : CHAMBER 207  
 Detector : 78910  
 Calibration Date/Time : 22-JUN-2009 15:08:36  
 Calibration Source Id : AESS-042  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.255  
 Energy Calibration Slope : 4.968539  
 Energy Calibration Quadratic : 2.9294274E-04  
 Energy Calibration Range : 7762.000

Instrument : CHAMBER 208  
 Detector : 78911  
 Calibration Date/Time : 22-JUN-2009 15:08:47  
 Calibration Source Id : AESS-048  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.810  
 Energy Calibration Slope : 4.972878  
 Energy Calibration Quadratic : 2.8153346E-04  
 Energy Calibration Range : 7752.000

Instrument : CHAMBER 209  
 Detector : 79188  
 Calibration Date/Time : 30-JUN-2009 13:25:14  
 Calibration Source Id : AESS-001  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2387.726  
 Energy Calibration Slope : 4.931397  
 Energy Calibration Quadratic : 3.2478853E-04  
 Energy Calibration Range : 7778.000

Instrument : CHAMBER 210  
 Detector : 79189  
 Calibration Date/Time : 30-JUN-2009 13:25:32  
 Calibration Source Id : AESS-002  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.637  
 Energy Calibration Slope : 4.939270  
 Energy Calibration Quadratic : 3.1113683E-04  
 Energy Calibration Range : 7768.000

Instrument : CHAMBER 211  
 Detector : 79190  
 Calibration Date/Time : 30-JUN-2009 13:25:46  
 Calibration Source Id : AESS-003  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2389.518  
 Energy Calibration Slope : 4.955431  
 Energy Calibration Quadratic : 3.0932875E-04  
 Energy Calibration Range : 7788.000

Instrument : CHAMBER 212  
 Detector : 79191  
 Calibration Date/Time : 30-JUN-2009 13:25:56  
 Calibration Source Id : AESS-004  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2387.357  
 Energy Calibration Slope : 4.935492  
 Energy Calibration Quadratic : 3.2339373E-04  
 Energy Calibration Range : 7780.000

Instrument : CHAMBER 213  
 Detector : 79192  
 Calibration Date/Time : 30-JUN-2009 13:26:06  
 Calibration Source Id : AESS-005  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2392.713  
 Energy Calibration Slope : 4.948073  
 Energy Calibration Quadratic : 3.1151611E-04  
 Energy Calibration Range : 7786.000

Instrument : CHAMBER 214  
 Detector : 79193  
 Calibration Date/Time : 30-JUN-2009 13:26:15  
 Calibration Source Id : AESS-006  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2381.982  
 Energy Calibration Slope : 4.949060  
 Energy Calibration Quadratic : 3.1146532E-04  
 Energy Calibration Range : 7776.000

Instrument : CHAMBER 215  
 Detector : 79194  
 Calibration Date/Time : 30-JUN-2009 13:26:24  
 Calibration Source Id : AESS-007  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2392.654  
 Energy Calibration Slope : 4.938601  
 Energy Calibration Quadratic : 3.3165864E-04  
 Energy Calibration Range : 7798.000

Instrument : CHAMBER 216  
 Detector : 79195  
 Calibration Date/Time : 30-JUN-2009 13:26:33  
 Calibration Source Id : AESS-008  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.258  
 Energy Calibration Slope : 4.954875  
 Energy Calibration Quadratic : 3.0062834E-04  
 Energy Calibration Range : 7772.000

Instrument : CHAMBER 217  
 Detector : 79410  
 Calibration Date/Time : 30-JUN-2009 13:26:43  
 Calibration Source Id : AESS-009  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2389.657  
 Energy Calibration Slope : 4.940731  
 Energy Calibration Quadratic : 3.2290843E-04  
 Energy Calibration Range : 7788.000

Instrument : CHAMBER 218  
 Detector : 79411  
 Calibration Date/Time : 30-JUN-2009 13:26:51  
 Calibration Source Id : AESS-010  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.019  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2387.484  
 Energy Calibration Slope : 4.945539  
 Energy Calibration Quadratic : 3.2147722E-04  
 Energy Calibration Range : 7789.000

Instrument : CHAMBER 219  
 Detector : 79412  
 Calibration Date/Time : 30-JUN-2009 13:27:01  
 Calibration Source Id : AESS-011  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.001  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2385.324  
 Energy Calibration Slope : 4.953215  
 Energy Calibration Quadratic : 3.0849627E-04  
 Energy Calibration Range : 7781.000

Instrument : CHAMBER 220  
 Detector : 79413  
 Calibration Date/Time : 30-JUN-2009 13:27:10  
 Calibration Source Id : AESS-012  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.523  
 Energy Calibration Slope : 4.935628  
 Energy Calibration Quadratic : 3.2036271E-04  
 Energy Calibration Range : 7774.000

Instrument : CHAMBER 221  
 Detector : 79414  
 Calibration Date/Time : 30-JUN-2009 13:27:19  
 Calibration Source Id : AESS-013  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2386.554  
 Energy Calibration Slope : 4.965968  
 Energy Calibration Quadratic : 3.1077291E-04  
 Energy Calibration Range : 7798.000

Instrument : CHAMBER 222  
 Detector : 79415  
 Calibration Date/Time : 30-JUN-2009 13:27:29  
 Calibration Source Id : AESS-014  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5794.573  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2380.427  
 Energy Calibration Slope : 5.024710  
 Energy Calibration Quadratic : 2.4253939E-04  
 Energy Calibration Range : 7780.000

Instrument : CHAMBER 223  
 Detector : 79416  
 Calibration Date/Time : 30-JUN-2009 13:27:39  
 Calibration Source Id : AESS-015  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2391.487  
 Energy Calibration Slope : 4.944519  
 Energy Calibration Quadratic : 3.4526619E-04  
 Energy Calibration Range : 7817.000



Instrument : CHAMBER 224  
 Detector : 79417  
 Calibration Date/Time : 30-JUN-2009 13:27:48  
 Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2389.036  
 Energy Calibration Slope : 4.998024  
 Energy Calibration Quadratic : 2.7591022E-04  
 Energy Calibration Range : 7796.000

Instrument : CHAMBER 225  
 Detector : 79418  
 Calibration Date/Time : 30-JUN-2009 13:28:00  
 Calibration Source Id : AESS-017

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2391.820  
 Energy Calibration Slope : 4.947299  
 Energy Calibration Quadratic : 3.2222894E-04  
 Energy Calibration Range : 7796.000

Instrument : CHAMBER 226  
 Detector : 79419  
 Calibration Date/Time : 30-JUN-2009 13:28:10  
 Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.017  
 Energy Calibration Slope : 4.975819  
 Energy Calibration Quadratic : 2.9400751E-04  
 Energy Calibration Range : 7788.000

Instrument : CHAMBER 227  
 Detector : 79420  
 Calibration Date/Time : 30-JUN-2009 13:28:21  
 Calibration Source Id : AESS-019  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2390.902  
 Energy Calibration Slope : 4.944205  
 Energy Calibration Quadratic : 3.2253028E-04  
 Energy Calibration Range : 7792.000

Instrument : CHAMBER 228  
 Detector : 79421  
 Calibration Date/Time : 30-JUN-2009 13:28:30  
 Calibration Source Id : AESS-020  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2382.530  
 Energy Calibration Slope : 4.981592  
 Energy Calibration Quadratic : 2.8075394E-04  
 Energy Calibration Range : 7778.000

Instrument : CHAMBER 229  
 Detector : 79422  
 Calibration Date/Time : 30-JUN-2009 13:28:39  
 Calibration Source Id : AESS-021  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2388.282  
 Energy Calibration Slope : 4.954379  
 Energy Calibration Quadratic : 3.1871718E-04  
 Energy Calibration Range : 7796.000

Instrument : CHAMBER 230  
 Detector : 79423  
 Calibration Date/Time : 30-JUN-2009 13:28:51  
 Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.651  
 Energy Calibration Slope : 4.970551  
 Energy Calibration Quadratic : 2.9692691E-04  
 Energy Calibration Range : 7786.000

Instrument : CHAMBER 231  
 Detector : 79424  
 Calibration Date/Time : 30-JUN-2009 13:29:03  
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2387.183  
 Energy Calibration Slope : 4.959881  
 Energy Calibration Quadratic : 3.0125881E-04  
 Energy Calibration Range : 7782.000

Instrument : CHAMBER 232  
 Detector : 79425  
 Calibration Date/Time : 30-JUN-2009 13:29:13  
 Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.233  
 Energy Calibration Slope : 5.017519  
 Energy Calibration Quadratic : 2.4404455E-04  
 Energy Calibration Range : 7778.000

Instrument : CHAMBER 233  
 Detector : 79426  
 Calibration Date/Time : 30-JUN-2009 13:29:22  
 Calibration Source Id : AESS-025  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.019  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.418  
 Energy Calibration Slope : 4.917979  
 Energy Calibration Quadratic : 3.4538476E-04  
 Energy Calibration Range : 7782.000

Instrument : CHAMBER 234  
 Detector : 79427  
 Calibration Date/Time : 30-JUN-2009 13:29:34  
 Calibration Source Id : AESS-026  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2382.356  
 Energy Calibration Slope : 4.914772  
 Energy Calibration Quadratic : 3.4141311E-04  
 Energy Calibration Range : 7773.000

Instrument : CHAMBER 235  
 Detector : 79428  
 Calibration Date/Time : 30-JUN-2009 13:29:43  
 Calibration Source Id : AESS-027  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2387.058  
 Energy Calibration Slope : 4.936741  
 Energy Calibration Quadratic : 3.3184959E-04  
 Energy Calibration Range : 7790.000

Instrument : CHAMBER 236  
 Detector : 79429  
 Calibration Date/Time : 30-JUN-2009 13:29:51  
 Calibration Source Id : AESS-028  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2387.647  
 Energy Calibration Slope : 4.918993  
 Energy Calibration Quadratic : 3.4496849E-04  
 Energy Calibration Range : 7786.000

Instrument : CHAMBER 237  
 Detector : 79430  
 Calibration Date/Time : 30-JUN-2009 13:30:00  
 Calibration Source Id : AESS-029  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2389.033  
 Energy Calibration Slope : 4.937141  
 Energy Calibration Quadratic : 3.3584173E-04  
 Energy Calibration Range : 7797.000

Instrument : CHAMBER 238  
 Detector : 79431  
 Calibration Date/Time : 30-JUN-2009 13:30:09  
 Calibration Source Id : AESS-030  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.856  
 Energy Calibration Slope : 4.918208  
 Energy Calibration Quadratic : 3.4156963E-04  
 Energy Calibration Range : 7778.000

Instrument : CHAMBER 239  
 Detector : 79432  
 Calibration Date/Time : 30-JUN-2009 13:30:18  
 Calibration Source Id : AESS-031

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2389.888  
 Energy Calibration Slope : 4.920895  
 Energy Calibration Quadratic : 3.5708703E-04  
 Energy Calibration Range : 7803.000

Instrument : CHAMBER 240  
 Detector : 79433  
 Calibration Date/Time : 30-JUN-2009 13:30:27  
 Calibration Source Id : AESS-032

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2386.559  
 Energy Calibration Slope : 4.907694  
 Energy Calibration Quadratic : 3.6268227E-04  
 Energy Calibration Range : 7792.000

Instrument : CHAMBER 241  
 Detector : 79434  
 Calibration Date/Time : 30-JUN-2009 13:30:36  
 Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.510  
 Energy Calibration Slope : 4.923378  
 Energy Calibration Quadratic : 3.4127611E-04  
 Energy Calibration Range : 7784.000

Instrument : CHAMBER 242  
 Detector : 79435  
 Calibration Date/Time : 30-JUN-2009 13:30:45  
 Calibration Source Id : AESS-034  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.798  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2390.047  
 Energy Calibration Slope : 4.916013  
 Energy Calibration Quadratic : 3.5139045E-04  
 Energy Calibration Range : 7793.000

Instrument : CHAMBER 243  
 Detector : 79436  
 Calibration Date/Time : 30-JUN-2009 13:30:54  
 Calibration Source Id : AESS-035  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2388.583  
 Energy Calibration Slope : 4.932609  
 Energy Calibration Quadratic : 3.3716374E-04  
 Energy Calibration Range : 7793.000

Instrument : CHAMBER 244  
 Detector : 79437  
 Calibration Date/Time : 30-JUN-2009 13:31:04  
 Calibration Source Id : AESS-036  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2389.087  
 Energy Calibration Slope : 4.916673  
 Energy Calibration Quadratic : 3.5015366E-04  
 Energy Calibration Range : 7791.000

Instrument : CHAMBER 245  
 Detector : 79438  
 Calibration Date/Time : 30-JUN-2009 13:31:18  
 Calibration Source Id : AESS-037  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4769.036  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2390.120  
 Energy Calibration Slope : 4.932529  
 Energy Calibration Quadratic : 3.4877865E-04  
 Energy Calibration Range : 7807.000

Instrument : CHAMBER 246  
 Detector : 78912  
 Calibration Date/Time : 30-JUN-2009 13:31:31  
 Calibration Source Id : AESS-038  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4769.115  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2391.179  
 Energy Calibration Slope : 4.943339  
 Energy Calibration Quadratic : 3.2214838E-04  
 Energy Calibration Range : 7791.000

Instrument : CHAMBER 247  
 Detector : 79440  
 Calibration Date/Time : 30-JUN-2009 13:31:41  
 Calibration Source Id : AESS-039  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2391.692  
 Energy Calibration Slope : 4.933953  
 Energy Calibration Quadratic : 3.4777186E-04  
 Energy Calibration Range : 7809.000



Instrument : CHAMBER 248  
 Detector : 79441  
 Calibration Date/Time : 30-JUN-2009 13:31:51  
 Calibration Source Id : AESS-040  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2387.938  
 Energy Calibration Slope : 4.919151  
 Energy Calibration Quadratic : 3.5771105E-04  
 Energy Calibration Range : 7800.000

Instrument : CHAMBER 249  
 Detector : 79442  
 Calibration Date/Time : 30-JUN-2009 13:32:04  
 Calibration Source Id : AESS-041  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2387.381  
 Energy Calibration Slope : 4.922509  
 Energy Calibration Quadratic : 3.6959481E-04  
 Energy Calibration Range : 7816.000

Instrument : CHAMBER 250  
 Detector : 79443  
 Calibration Date/Time : 30-JUN-2009 13:32:16  
 Calibration Source Id : AESS-042  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2381.157  
 Energy Calibration Slope : 4.929844  
 Energy Calibration Quadratic : 3.4039136E-04  
 Energy Calibration Range : 7786.000

Instrument : CHAMBER 251  
 Detector : 79444  
 Calibration Date/Time : 30-JUN-2009 13:32:48  
 Calibration Source Id : AESS-043

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2387.225  
 Energy Calibration Slope : 4.925405  
 Energy Calibration Quadratic : 3.6185942E-04  
 Energy Calibration Range : 7810.000

Instrument : CHAMBER 252  
 Detector : 79445  
 Calibration Date/Time : 30-JUN-2009 13:33:09  
 Calibration Source Id : AESS-044

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2382.012  
 Energy Calibration Slope : 4.929501  
 Energy Calibration Quadratic : 3.4806953E-04  
 Energy Calibration Range : 7795.000

Instrument : CHAMBER 253  
 Detector : 79446  
 Calibration Date/Time : 30-JUN-2009 13:33:20  
 Calibration Source Id : AESS-045

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2394.239  
 Energy Calibration Slope : 4.943881  
 Energy Calibration Quadratic : 3.5968810E-04  
 Energy Calibration Range : 7834.000

Instrument : CHAMBER 254  
 Detector : 79447  
 Calibration Date/Time : 30-JUN-2009 13:33:32  
 Calibration Source Id : AESS-046

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2390.188  
 Energy Calibration Slope : 4.926832  
 Energy Calibration Quadratic : 3.5614919E-04  
 Energy Calibration Range : 7809.000

Instrument : CHAMBER 255  
 Detector : 79448  
 Calibration Date/Time : 30-JUN-2009 13:33:42  
 Calibration Source Id : AESS-047

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2390.725  
 Energy Calibration Slope : 4.926145  
 Energy Calibration Quadratic : 3.6522237E-04  
 Energy Calibration Range : 7818.000

Instrument : CHAMBER 256  
 Detector : 79449  
 Calibration Date/Time : 30-JUN-2009 13:33:53  
 Calibration Source Id : AESS-048

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2387.915  
 Energy Calibration Slope : 4.925013  
 Energy Calibration Quadratic : 3.5367915E-04  
 Energy Calibration Range : 7802.000

## Subsection 2: Background Calibration

Instrument : CHAMBER 001  
 Detector : 78788  
 Background Analysis Date/Time : 5-JUL-2009 15:11:54  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.679	3298.848	2.000000	0.4799997	70.71068	95.00000
NP-237	4436.698	4905.866	9.000000	2.159999	33.33334	95.00000
CM-244	5535.874	5884.629	8.000000	1.919999	35.35534	95.00000

Instrument : CHAMBER 002  
 Detector : 78266  
 Background Analysis Date/Time : 5-JUL-2009 15:11:54  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.715	3301.971	9.000000	2.159999	33.33334	95.00000
NP-237	4433.336	4902.576	8.000000	1.919999	35.35534	95.00000
CM-244	5533.904	5882.845	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 003  
 Detector : 67617  
 Background Analysis Date/Time : 5-JUL-2009 15:11:54  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.494	3301.750	234063.0	56175.08	0.2066967	95.00000
NP-237	4434.514	4906.213	77237.00	18536.87	0.3598217	95.00000
CM-244	5534.317	5886.218	1459.000	350.1598	2.618016	95.00000

Instrument : CHAMBER 004  
 Detector : 64279  
 Background Analysis Date/Time : 5-JUL-2009 15:11:54  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.142	3301.855	1.000000	0.2399998	100.0000	95.00000
NP-237	4434.122	4905.061	9.000000	2.159999	33.33334	95.00000
CM-244	5532.169	5885.896	4.000000	0.9599994	50.00000	95.00000

Instrument : CHAMBER 005  
 Detector : 67612  
 Background Analysis Date/Time : 5-JUL-2009 15:11:54  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.844	3301.859	6.000000	1.439999	40.82483	95.00000
NP-237	4432.372	4905.723	7.000000	1.679999	37.79645	95.00000
CM-244	5534.445	5887.312	11.000000	2.639998	30.15113	95.00000

Instrument : CHAMBER 006  
 Detector : 67613  
 Background Analysis Date/Time : 5-JUL-2009 15:11:54  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.836	3301.578	1.000000	0.2399998	100.0000	95.00000
NP-237	4433.162	4904.315	5.000000	1.199999	44.72136	95.00000
CM-244	5534.623	5882.438	4.000000	0.9599994	50.00000	95.00000

Instrument : CHAMBER 007  
 Detector : 67607  
 Background Analysis Date/Time : 5-JUL-2009 15:11:55  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.476	3300.975	5.000000	1.199999	44.72136	95.00000
NP-237	4436.790	4906.439	13.000000	3.119998	27.73501	95.00000
CM-244	5534.241	5887.079	16.000000	3.839998	25.00000	95.00000

Instrument : CHAMBER 008  
 Detector : 78788  
 Background Analysis Date/Time : 5-JUL-2009 15:11:55  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.921	3300.406	4.000000	0.9599994	50.00000	95.00000
NP-237	4435.107	4902.387	10.000000	2.399998	31.62278	95.00000
CM-244	5534.594	5883.502	2.000000	0.4799997	70.71068	95.00000

Instrument : CHAMBER 009  
 Detector : 72528  
 Background Analysis Date/Time : 5-JUL-2009 15:11:55  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.628	3299.090	3.000000	0.7199996	57.73503	95.00000
NP-237	4437.197	4904.633	13.000000	3.119998	27.73501	95.00000
CM-244	5532.440	5887.594	10.000000	2.399998	31.62278	95.00000

Instrument : CHAMBER 010  
 Detector : 72529  
 Background Analysis Date/Time : 5-JUL-2009 15:11:55  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.348	3298.595	1.000000	0.2399998	100.0000	95.00000
NP-237	4434.835	4903.545	8.000000	1.919999	35.35534	95.00000
CM-244	5530.435	5886.972	9.000000	2.159999	33.33334	95.00000

Instrument : CHAMBER 011  
 Detector : 72531  
 Background Analysis Date/Time : 5-JUL-2009 15:11:55  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.311	3301.519	2.000000	0.4799997	70.71068	95.00000
NP-237	4434.837	4904.180	7.000000	1.679999	37.79645	95.00000
CM-244	5534.270	5885.159	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 012  
 Detector : 67594  
 Background Analysis Date/Time : 5-JUL-2009 15:11:55  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.530	3302.430	7.000000	1.679999	37.79645	95.00000
NP-237	4435.245	4904.394	9.000000	2.159999	33.33334	95.00000
CM-244	5531.663	5882.971	9.000000	2.159999	33.33334	95.00000

Instrument : CHAMBER 013  
 Detector : 78790  
 Background Analysis Date/Time : 5-JUL-2009 15:11:56  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.215	3297.934	1.000000	0.2400001	100.0000	95.00000
NP-237	4433.681	4905.322	9.000000	2.160001	33.33334	95.00000
CM-244	5534.510	5884.075	1.000000	0.2400001	100.0000	95.00000

Instrument : CHAMBER 014  
 Detector : 67616  
 Background Analysis Date/Time : 5-JUL-2009 15:11:56  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.044	3301.205	4.000000	0.9600002	50.00000	95.00000
NP-237	4432.568	4904.459	8.000000	1.920000	35.35534	95.00000
CM-244	5531.132	5885.588	19.00000	4.560001	22.94157	95.00000

Instrument : CHAMBER 015  
 Detector : 61581  
 Background Analysis Date/Time : 5-JUL-2009 15:11:56  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.992	3300.634	1.000000	0.2400001	100.0000	95.00000
NP-237	4433.750	4904.866	3.000000	0.7200001	57.73503	95.00000
CM-244	5533.850	5883.539	18.00000	4.320001	23.57022	95.00000

Instrument : CHAMBER 016  
 Detector : 78774  
 Background Analysis Date/Time : 5-JUL-2009 15:11:56  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.376	3300.188	2.000000	0.4800001	70.71068	95.00000
NP-237	4436.705	4902.519	8.000000	1.920000	35.35534	95.00000
CM-244	5531.791	5887.203	1.000000	0.2400001	100.0000	95.00000

Instrument : CHAMBER 017  
 Detector : 78791  
 Background Analysis Date/Time : 5-JUL-2009 15:11:56  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.293	3301.593	4.000000	0.9600002	50.00000	95.00000
NP-237	4433.438	4905.522	3.000000	0.7200001	57.73503	95.00000
CM-244	5532.444	5887.037	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 018  
 Detector : 21063  
 Background Analysis Date/Time : 5-JUL-2009 15:11:56  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.545	3301.421	3.000000	0.7200001	57.73503	95.00000
NP-237	4437.321	4904.992	5.000000	1.200000	44.72136	95.00000
CM-244	5532.286	5886.743	17.00000	4.080001	24.25356	95.00000

Instrument : CHAMBER 019  
 Detector : 78786  
 Background Analysis Date/Time : 5-JUL-2009 15:11:57  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.589	3299.131	2.000000	0.4800001	70.71068	95.00000
NP-237	4435.520	4903.560	5.000000	1.200000	44.72136	95.00000
CM-244	5534.981	5882.589	1.000000	0.2400001	100.0000	95.00000

Instrument : CHAMBER 020  
 Detector : 78787  
 Background Analysis Date/Time : 5-JUL-2009 15:11:57  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.028	3300.317	3.000000	0.7200001	57.73503	95.00000
NP-237	4434.663	4901.954	7.000000	1.680000	37.79645	95.00000
CM-244	5534.316	5883.376	3.000000	0.7200001	57.73503	95.00000



Instrument : CHAMBER 021  
 Detector : 67047  
 Background Analysis Date/Time : 5-JUL-2009 15:11:57  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.930	3300.431	3.000000	0.7200001	57.73503	95.00000
NP-237	4435.207	4905.011	8.000000	1.920000	35.35534	95.00000
CM-244	5533.018	5884.673	17.00000	4.080001	24.25356	95.00000

Instrument : CHAMBER 022  
 Detector : 72530  
 Background Analysis Date/Time : 5-JUL-2009 15:11:57  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.087	3302.012	33.00000	7.920002	17.40777	95.00000
NP-237	4436.701	4902.154	23.00000	5.520001	20.85144	95.00000
CM-244	5532.124	5885.279	12.00000	2.880001	28.86751	95.00000

Instrument : CHAMBER 023  
 Detector : 78264  
 Background Analysis Date/Time : 5-JUL-2009 15:11:57  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.041	3300.395	2.000000	0.4800001	70.71068	95.00000
NP-237	4437.054	4904.602	10.00000	2.400001	31.62278	95.00000
CM-244	5531.351	5885.314	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 024  
 Detector : 76542  
 Background Analysis Date/Time : 5-JUL-2009 15:11:57  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.294	3302.013	10.00000	2.400001	31.62278	95.00000
NP-237	4435.963	4904.774	26.00000	6.240001	19.61161	95.00000
CM-244	5530.886	5886.529	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 025  
 Detector : 45-149AA5  
 Background Analysis Date/Time : 5-JUL-2009 15:11:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.683	3301.317	3.000000	0.7200001	57.73503	95.00000
NP-237	4432.505	4905.964	7.000000	1.680000	37.79645	95.00000
CM-244	5531.275	5884.228	21.00000	5.040001	21.82179	95.00000

Instrument : CHAMBER 026  
 Detector : 78204  
 Background Analysis Date/Time : 5-JUL-2009 15:11:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.261	3299.610	2.000000	0.4800001	70.71068	95.00000
NP-237	4434.923	4901.784	5.000000	1.200000	44.72136	95.00000
CM-244	5534.672	5884.552	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 027  
 Detector : 42484  
 Background Analysis Date/Time : 5-JUL-2009 15:11:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.456	3300.321	2.000000	0.4800001	70.71068	95.00000
NP-237	4432.625	4905.570	12.00000	2.880001	28.86751	95.00000
CM-244	5534.870	5882.737	23.00000	5.520001	20.85144	95.00000

Instrument : CHAMBER 028  
 Detector : 78792  
 Background Analysis Date/Time : 5-JUL-2009 15:11:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.695	3297.894	3.000000	0.7200001	57.73503	95.00000
NP-237	4435.454	4902.851	4.000000	0.9600002	50.00000	95.00000
CM-244	5530.764	5886.057	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 029  
 Detector : 33454  
 Background Analysis Date/Time : 5-JUL-2009 15:11:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.570	3299.793	4.000000	0.9600002	50.00000	95.00000
NP-237	4434.729	4906.466	6.000000	1.440000	40.82483	95.00000
CM-244	5530.876	5886.187	7.000000	1.680000	37.79645	95.00000

Instrument : CHAMBER 030  
 Detector : 33447  
 Background Analysis Date/Time : 5-JUL-2009 15:11:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.473	3300.013	5.000000	1.200000	44.72136	95.00000
NP-237	4433.021	4902.873	11.00000	2.640000	30.15113	95.00000
CM-244	5531.626	5884.032	17.00000	4.080001	24.25356	95.00000

Instrument : CHAMBER 031  
 Detector : 67042  
 Background Analysis Date/Time : 5-JUL-2009 15:11:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.387	3299.204	8.000000	1.920000	35.35534	95.00000
NP-237	4434.493	4905.969	19.00000	4.560001	22.94157	95.00000
CM-244	5535.377	5886.491	16.00000	3.840001	25.00000	95.00000

Instrument : CHAMBER 032  
 Detector : 67041  
 Background Analysis Date/Time : 5-JUL-2009 15:11:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.309	3301.728	6.000000	1.440000	40.82483	95.00000
NP-237	4434.927	4903.407	7.000000	1.680000	37.79645	95.00000
CM-244	5531.147	5887.049	14.00000	3.360001	26.72612	95.00000

Instrument : CHAMBER 033  
 Detector : 78785  
 Background Analysis Date/Time : 5-JUL-2009 15:11:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.591	3298.173	1.000000	0.2400000	100.0000	95.00000
NP-237	4434.089	4906.364	9.000000	2.160000	33.33334	95.00000
CM-244	5534.061	5883.941	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 034  
 Detector : 61586  
 Background Analysis Date/Time : 5-JUL-2009 15:11:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.328	3297.675	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.628	4903.241	6.000000	1.440000	40.82483	95.00000
CM-244	5530.873	5887.758	52.00000	12.48000	13.86751	95.00000

Instrument : CHAMBER 035  
 Detector : 78202  
 Background Analysis Date/Time : 5-JUL-2009 15:11:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.841	3298.805	1.000000	0.2400000	100.0000	95.00000
NP-237	4433.680	4901.942	20.00000	4.800001	22.36068	95.00000
CM-244	5530.913	5886.751	8.000000	1.920000	35.35534	95.00000

Instrument : CHAMBER 036  
 Detector : 78203  
 Background Analysis Date/Time : 5-JUL-2009 15:11:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.719	3297.679	1.000000	0.2400000	100.0000	95.00000
NP-237	4436.454	4902.523	2.000000	0.4800001	70.71068	95.00000
CM-244	5534.221	5883.385	6.000000	1.440000	40.82483	95.00000

Instrument : CHAMBER 037  
 Detector : 45-149BB5  
 Background Analysis Date/Time : 5-JUL-2009 15:12:00  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.027	3298.587	4.000000	0.9600002	50.00000	95.00000
NP-237	4435.750	4902.017	14.00000	3.360001	26.72612	95.00000
CM-244	5535.521	5884.277	18.00000	4.320001	23.57022	95.00000

Instrument : CHAMBER 038  
 Detector : 72532  
 Background Analysis Date/Time : 5-JUL-2009 15:12:00  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.665	3301.822	6.000000	1.440000	40.82483	95.00000
NP-237	4435.489	4906.553	18.00000	4.320001	23.57022	95.00000
CM-244	5532.401	5886.525	16.00000	3.840001	25.00000	95.00000

Instrument : CHAMBER 039  
 Detector : 45-149BB2  
 Background Analysis Date/Time : 5-JUL-2009 15:12:00  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.145	3298.732	3.000000	0.7200001	57.73503	95.00000
NP-237	4435.549	4903.088	5.000000	1.200000	44.72136	95.00000
CM-244	5534.287	5885.251	15.00000	3.600001	25.81989	95.00000

Instrument : CHAMBER 040  
 Detector : 78773  
 Background Analysis Date/Time : 5-JUL-2009 15:12:00  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.803	3299.657	3.000000	0.7200001	57.73503	95.00000
NP-237	4435.891	4904.106	7.000000	1.680000	37.79645	95.00000
CM-244	5531.706	5883.967	1.000000	0.2400001	100.0000	95.00000

Instrument : CHAMBER 041  
 Detector : 78205  
 Background Analysis Date/Time : 5-JUL-2009 15:12:00  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.799	3301.675	4.000000	0.9600002	50.00000	95.00000
NP-237	4434.272	4902.386	12.00000	2.880001	28.86751	95.00000
CM-244	5531.847	5882.877	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 042  
 Detector : 78793  
 Background Analysis Date/Time : 5-JUL-2009 15:12:00  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.257	3302.160	1.000000	0.2400001	100.0000	95.00000
NP-237	4435.667	4904.225	11.00000	2.640001	30.15113	95.00000
CM-244	5531.759	5883.730	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 043  
 Detector : 76543  
 Background Analysis Date/Time : 5-JUL-2009 15:12:00  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.989	3298.318	1.000000	0.2399998	100.0000	95.00000
NP-237	4436.983	4902.370	4.000000	0.9599994	50.00000	95.00000
CM-244	5532.584	5886.039	3.000000	0.7199996	57.73503	95.00000

Instrument : CHAMBER 044  
 Detector : 79459  
 Background Analysis Date/Time : 5-JUL-2009 15:12:00  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.854	3300.902	4.000000	0.9600002	50.00000	95.00000
NP-237	4435.084	4901.492	10.00000	2.400001	31.62278	95.00000
CM-244	5533.776	5883.326	6.000000	1.440000	40.82483	95.00000

Instrument : CHAMBER 045  
 Detector : 67601  
 Background Analysis Date/Time : 5-JUL-2009 15:12:00  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.770	3299.125	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4433.748	4903.897	5.000000	1.199999	44.72136	95.00000
CM-244	5533.235	5887.359	9.000000	2.159999	33.33334	95.00000

Instrument : CHAMBER 046  
 Detector : 76544  
 Background Analysis Date/Time : 5-JUL-2009 15:12:00  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.077	3298.635	2.000000	0.4799997	70.71068	95.00000
NP-237	4433.627	4906.487	10.00000	2.399998	31.62278	95.00000
CM-244	5533.329	5885.134	8.000000	1.919999	35.35534	95.00000

Instrument : CHAMBER 047  
 Detector : 46-089B1  
 Background Analysis Date/Time : 5-JUL-2009 15:12:00  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.977	3301.361	2.000000	0.4799997	70.71068	95.00000
NP-237	4433.363	4905.447	8.000000	1.919999	35.35534	95.00000
CM-244	5532.313	5886.846	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 048  
 Detector : 42483  
 Background Analysis Date/Time : 5-JUL-2009 15:12:00  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.411	3301.246	4.000000	0.9599994	50.00000	95.00000
NP-237	4433.969	4903.143	13.00000	3.119998	27.73501	95.00000
CM-244	5530.501	5887.230	14.00000	3.359998	26.72612	95.00000

Instrument : CHAMBER 065  
 Detector : 68551  
 Background Analysis Date/Time : 5-JUL-2009 15:12:01  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.172	3297.923	12.00000	2.879998	28.86751	95.00000
NP-237	4436.297	4904.907	11.00000	2.639998	30.15113	95.00000
CM-244	5532.615	5884.733	17.00000	4.079998	24.25356	95.00000

Instrument : CHAMBER 066  
 Detector : 46-089C1  
 Background Analysis Date/Time : 5-JUL-2009 15:12:01  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.142	3300.807	4.000000	0.9599994	50.00000	95.00000
NP-237	4436.247	4906.352	9.000000	2.159999	33.33334	95.00000
CM-244	5534.784	5886.688	18.00000	4.319997	23.57022	95.00000

Instrument : CHAMBER 067  
 Detector : 46-089B4  
 Background Analysis Date/Time : 5-JUL-2009 15:12:01  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.144	3301.594	1.000000	0.2399998	100.0000	95.00000
NP-237	4436.169	4905.946	11.00000	2.639998	30.15113	95.00000
CM-244	5533.963	5885.648	7.000000	1.679999	37.79645	95.00000

Instrument : CHAMBER 068  
 Detector : 78794  
 Background Analysis Date/Time : 5-JUL-2009 15:12:01  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.601	3300.139	1.000000	0.2399998	100.0000	95.00000
NP-237	4435.756	4903.729	4.000000	0.9599994	50.00000	95.00000
CM-244	5531.794	5886.867	4.000000	0.9599994	50.00000	95.00000



Instrument : CHAMBER 069  
 Detector : 78795  
 Background Analysis Date/Time : 5-JUL-2009 15:12:01  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.901	3298.738	4.000000	0.9599994	50.00000	95.00000
NP-237	4437.201	4903.207	6.000000	1.439999	40.82483	95.00000
CM-244	5534.874	5884.048	9.000000	2.159999	33.33334	95.00000

Instrument : CHAMBER 070  
 Detector : 46-089B2  
 Background Analysis Date/Time : 5-JUL-2009 15:12:01  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.641	3300.492	4.000000	0.9599994	50.00000	95.00000
NP-237	4435.833	4904.443	11.00000	2.639998	30.15113	95.00000
CM-244	5531.433	5882.799	7.000000	1.679999	37.79645	95.00000

Instrument : CHAMBER 071  
 Detector : 64259  
 Background Analysis Date/Time : 5-JUL-2009 15:12:02  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.476	3301.614	1.000000	0.2399998	100.0000	95.00000
NP-237	4435.387	4902.436	6.000000	1.439999	40.82483	95.00000
CM-244	5534.462	5883.334	12.00000	2.879998	28.86751	95.00000

Instrument : CHAMBER 072  
 Detector : 45-149AA3  
 Background Analysis Date/Time : 5-JUL-2009 15:12:02  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.586	3301.014	2.000000	0.4799997	70.71068	95.00000
NP-237	4432.963	4902.126	5.000000	1.199999	44.72136	95.00000
CM-244	5535.050	5886.750	14.00000	3.359998	26.72612	95.00000

Instrument : CHAMBER 073  
 Detector : 78775  
 Background Analysis Date/Time : 5-JUL-2009 15:12:02  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.870	3299.007	2.000000	0.4799997	70.71068	95.00000
NP-237	4435.703	4904.982	6.000000	1.439999	40.82483	95.00000
CM-244	5532.962	5884.931	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 074  
 Detector : 78266  
 Background Analysis Date/Time : 5-JUL-2009 15:12:02  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.625	3300.254	2.000000	0.4799997	70.71068	95.00000
NP-237	4435.417	4902.858	9.000000	2.159999	33.33334	95.00000
CM-244	5535.258	5884.259	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 075  
 Detector : 68550  
 Background Analysis Date/Time : 5-JUL-2009 15:12:02  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.563	3301.861	2.000000	0.4799997	70.71068	95.00000
NP-237	4432.969	4904.420	19.00000	4.559997	22.94157	95.00000
CM-244	5535.562	5884.044	7.000000	1.679999	37.79645	95.00000

Instrument : CHAMBER 076  
 Detector : 78779  
 Background Analysis Date/Time : 5-JUL-2009 15:12:02  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.408	3300.679	2.000000	0.4799997	70.71068	95.00000
NP-237	4437.552	4904.251	7.000000	1.679999	37.79645	95.00000
CM-244	5530.870	5885.252	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 077  
 Detector : 67576  
 Background Analysis Date/Time : 5-JUL-2009 15:12:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.825	3301.085	2.000000	0.4800001	70.71068	95.00000
NP-237	4432.612	4901.681	5.000000	1.200000	44.72136	95.00000
CM-244	5534.546	5886.248	8.000000	1.920000	35.35534	95.00000

Instrument : CHAMBER 078  
 Detector : 67577  
 Background Analysis Date/Time : 5-JUL-2009 15:12:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.395	3299.584	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.349	4904.419	5.000000	1.200000	44.72136	95.00000
CM-244	5535.593	5884.350	7.000000	1.680000	37.79645	95.00000

Instrument : CHAMBER 079  
 Detector : 67598  
 Background Analysis Date/Time : 5-JUL-2009 15:12:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.535	3297.935	1.000000	0.2400000	100.0000	95.00000
NP-237	4435.153	4903.332	3.000000	0.7200001	57.73503	95.00000
CM-244	5530.500	5882.333	4.000000	0.9600002	50.00000	95.00000

Instrument : CHAMBER 080  
 Detector : 78197  
 Background Analysis Date/Time : 5-JUL-2009 15:12:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.338	3298.189	3.000000	0.7200001	57.73503	95.00000
NP-237	4434.851	4901.472	10.00000	2.400000	31.62278	95.00000
CM-244	5531.493	5883.930	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 081  
 Detector : 72533  
 Background Analysis Date/Time : 5-JUL-2009 15:12:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2985.980	3302.417	1.000000	0.2400000	100.0000	95.00000
NP-237	4432.287	4905.979	5.000000	1.200000	44.72136	95.00000
CM-244	5534.795	5885.572	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 082  
 Detector : 64263  
 Background Analysis Date/Time : 5-JUL-2009 15:12:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.419	3298.608	1.000000	0.2400000	100.0000	95.00000
NP-237	4437.000	4905.115	7.000000	1.680000	37.79645	95.00000
CM-244	5534.320	5885.085	9.000000	2.160000	33.33334	95.00000

Instrument : CHAMBER 083  
 Detector : 64278  
 Background Analysis Date/Time : 5-JUL-2009 15:12:04  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.455	3299.407	2.000000	0.4800001	70.71068	95.00000
NP-237	4433.838	4906.607	13.00000	3.120001	27.73501	95.00000
CM-244	5532.253	5885.057	13.00000	3.120001	27.73501	95.00000

Instrument : CHAMBER 084  
 Detector : 78265  
 Background Analysis Date/Time : 5-JUL-2009 15:12:04  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.133	3299.227	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.289	4901.844	8.000000	1.920000	35.35534	95.00000
CM-244	5535.275	5884.618	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 085  
 Detector : 78776  
 Background Analysis Date/Time : 5-JUL-2009 15:12:04  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.612	3299.207	2.000000	0.4800001	70.71068	95.00000
NP-237	4434.183	4901.520	9.000000	2.160001	33.33334	95.00000
CM-244	5533.754	5882.654	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 086  
 Detector : 78198  
 Background Analysis Date/Time : 5-JUL-2009 15:12:04  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.886	3300.091	3.000000	0.7200001	57.73503	95.00000
NP-237	4433.582	4903.927	6.000000	1.440000	40.82483	95.00000
CM-244	5531.751	5882.863	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 087  
 Detector : 78199  
 Background Analysis Date/Time : 5-JUL-2009 15:12:04  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.385	3299.009	4.000000	0.9600002	50.00000	95.00000
NP-237	4436.772	4904.542	10.00000	2.400001	31.62278	95.00000
CM-244	5534.083	5883.178	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 088  
 Detector : 33452  
 Background Analysis Date/Time : 5-JUL-2009 15:12:04  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.970	3298.296	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.463	4902.334	8.000000	1.920000	35.35534	95.00000
CM-244	5534.583	5887.587	9.000000	2.160001	33.33334	95.00000

Instrument : CHAMBER 089  
 Detector : 78262  
 Background Analysis Date/Time : 5-JUL-2009 15:12:04  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.075	3297.767	4.000000	0.9599994	50.00000	95.00000
NP-237	4432.406	4901.978	7.000000	1.679999	37.79645	95.00000
CM-244	5532.097	5882.869	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 090  
 Detector : 78263  
 Background Analysis Date/Time : 5-JUL-2009 15:12:04  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.462	3300.982	1.000000	0.2399998	100.0000	95.00000
NP-237	4434.552	4903.775	8.000000	1.919999	35.35534	95.00000
CM-244	5532.754	5885.804	3.000000	0.7199996	57.73503	95.00000

Instrument : CHAMBER 091  
 Detector : 78259  
 Background Analysis Date/Time : 5-JUL-2009 15:12:04  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.268	3298.949	1.000000	0.2399998	100.0000	95.00000
NP-237	4433.436	4901.824	7.000000	1.679999	37.79645	95.00000
CM-244	5531.214	5887.413	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 092  
 Detector : 79457  
 Background Analysis Date/Time : 5-JUL-2009 15:12:04  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.004	3300.399	49.00000	11.75999	14.28572	95.00000
NP-237	4435.019	4904.862	19.00000	4.559997	22.94157	95.00000
CM-244	5533.010	5884.790	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 093  
 Detector : 33206  
 Background Analysis Date/Time : 5-JUL-2009 15:12:04  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.963	3299.960	1.000000	0.2399998	100.0000	95.00000
NP-237	4434.063	4902.978	9.000000	2.159999	33.33334	95.00000
CM-244	5531.085	5883.424	2.000000	0.4799997	70.71068	95.00000

Instrument : CHAMBER 094  
 Detector : 78267  
 Background Analysis Date/Time : 5-JUL-2009 15:12:04  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.912	3298.303	4.000000	0.9599994	50.00000	95.00000
NP-237	4435.971	4905.664	4.000000	0.9599994	50.00000	95.00000
CM-244	5534.211	5886.502	4.000000	0.9599994	50.00000	95.00000

Instrument : CHAMBER 095  
 Detector : 64279  
 Background Analysis Date/Time : 5-JUL-2009 15:12:05  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.056	3301.826	3.000000	0.7199996	57.73503	95.00000
NP-237	4435.330	4905.275	10.00000	2.399998	31.62278	95.00000
CM-244	5534.057	5886.430	24.00000	5.759996	20.41241	95.00000

Instrument : CHAMBER 096  
 Detector : 67605  
 Background Analysis Date/Time : 8-JUL-2009 15:03:56  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.311	3298.177	2.000000	0.4799997	70.71068	95.00000
NP-237	4434.251	4906.198	29.00000	6.959996	18.56953	95.00000
CM-244	5533.120	5882.408	2.000000	0.4799997	70.71068	95.00000

Instrument : CHAMBER 097  
 Detector : 67599  
 Background Analysis Date/Time : 5-JUL-2009 15:12:05  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.746	3302.068	2.000000	0.4799997	70.71068	95.00000
NP-237	4437.101	4903.794	1.000000	0.2399998	100.0000	95.00000
CM-244	5531.052	5886.116	14.00000	3.359998	26.72612	95.00000

Instrument : CHAMBER 098  
 Detector : 68644  
 Background Analysis Date/Time : 5-JUL-2009 15:12:05  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.589	3298.128	1.000000	0.2399998	100.0000	95.00000
NP-237	4432.836	4901.640	13.00000	3.119998	27.73501	95.00000
CM-244	5531.873	5883.257	2.000000	0.4799997	70.71068	95.00000

Instrument : CHAMBER 099  
 Detector : 70317  
 Background Analysis Date/Time : 5-JUL-2009 15:12:05  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.876	3301.163	3.000000	0.7199996	57.73503	95.00000
NP-237	4434.526	4903.945	4.000000	0.9599994	50.00000	95.00000
CM-244	5533.432	5886.885	7.000000	1.679999	37.79645	95.00000

Instrument : CHAMBER 100  
 Detector : 79456  
 Background Analysis Date/Time : 5-JUL-2009 15:12:05  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.287	3297.799	2.000000	0.4799997	70.71068	95.00000
NP-237	4436.422	4905.631	13.00000	3.119998	27.73501	95.00000
CM-244	5534.572	5887.590	7.000000	1.679999	37.79645	95.00000



Instrument : CHAMBER 101  
 Detector : 64253  
 Background Analysis Date/Time : 5-JUL-2009 15:12:06  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.433	3299.297	2.000000	0.4800001	70.71068	95.00000
NP-237	4436.714	4901.796	4.000000	0.9600002	50.00000	95.00000
CM-244	5531.777	5885.188	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 102  
 Detector : 72525  
 Background Analysis Date/Time : 5-JUL-2009 15:12:06  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.102	3300.657	3.000000	0.7200001	57.73503	95.00000
NP-237	4432.858	4904.949	7.000000	1.680000	37.79645	95.00000
CM-244	5531.106	5882.690	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 103  
 Detector : 79461  
 Background Analysis Date/Time : 5-JUL-2009 15:12:06  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.996	3300.314	1.000000	0.2400000	100.0000	95.00000
NP-237	4436.805	4901.981	2.000000	0.4800001	70.71068	95.00000
CM-244	5532.506	5886.425	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 104  
 Detector : 72524  
 Background Analysis Date/Time : 5-JUL-2009 15:12:06  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.719	3300.868	1.000000	0.2400000	100.0000	95.00000
NP-237	4437.132	4904.901	12.00000	2.880001	28.86751	95.00000
CM-244	5531.506	5883.017	4.000000	0.9600002	50.00000	95.00000

Instrument : CHAMBER 105  
 Detector : 78777  
 Background Analysis Date/Time : 5-JUL-2009 15:12:06  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.574	3300.708	1.000000	0.2400000	100.0000	95.00000
NP-237	4435.406	4903.467	4.000000	0.9600002	50.00000	95.00000
CM-244	5531.275	5883.854	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 106  
 Detector : 64274  
 Background Analysis Date/Time : 5-JUL-2009 15:12:06  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.941	3301.958	4.000000	0.9600002	50.00000	95.00000
NP-237	4435.855	4902.069	6.000000	1.440000	40.82483	95.00000
CM-244	5534.023	5883.359	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 107  
 Detector : 67578  
 Background Analysis Date/Time : 5-JUL-2009 15:12:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.523	3301.257	5.000000	1.199999	44.72136	95.00000
NP-237	4435.381	4903.438	5.000000	1.199999	44.72136	95.00000
CM-244	5532.229	5882.600	2.000000	0.4799997	70.71068	95.00000

Instrument : CHAMBER 108  
 Detector : 78778  
 Background Analysis Date/Time : 5-JUL-2009 15:12:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.893	3298.158	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.321	4903.667	6.000000	1.439999	40.82483	95.00000
CM-244	5531.222	5883.353	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 109  
 Detector : 79463  
 Background Analysis Date/Time : 5-JUL-2009 15:12:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.195	3299.997	2.000000	0.4799997	70.71068	95.00000
NP-237	4435.631	4906.161	7.000000	1.679999	37.79645	95.00000
CM-244	5531.938	5886.333	2.000000	0.4799997	70.71068	95.00000

Instrument : CHAMBER 110  
 Detector : 67602  
 Background Analysis Date/Time : 5-JUL-2009 15:12:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.370	3301.157	2.000000	0.4799997	70.71068	95.00000
NP-237	4436.284	4904.992	4.000000	0.9599993	50.00000	95.00000
CM-244	5535.250	5883.287	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 111  
 Detector : 79462  
 Background Analysis Date/Time : 5-JUL-2009 15:12:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.820	3300.305	5.000000	1.199999	44.72136	95.00000
NP-237	4436.744	4905.500	6.000000	1.439999	40.82483	95.00000
CM-244	5535.002	5885.661	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 112  
 Detector : 78261  
 Background Analysis Date/Time : 5-JUL-2009 15:12:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.969	3300.635	3.000000	0.7199995	57.73503	95.00000
NP-237	4436.114	4905.135	7.000000	1.679999	37.79645	95.00000
CM-244	5532.983	5884.981	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 113  
 Detector : 45-111B4  
 Background Analysis Date/Time : 14-JUN-2009 16:49:30  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.972	3300.471	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.156	4904.493	5.000000	1.500000	44.72136	95.00000
CM-244	5530.767	5884.366	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 114  
 Detector : 78258  
 Background Analysis Date/Time : 14-JUN-2009 16:49:34  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.532	3297.883	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.498	4905.438	4.000000	1.200000	50.00000	95.00000
CM-244	5531.981	5882.667	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 115  
 Detector : 45-132FF4  
 Background Analysis Date/Time : 14-JUN-2009 16:49:39  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.079	3298.318	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.074	4904.453	4.000000	1.200000	50.00000	95.00000
CM-244	5534.102	5886.452	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 116  
 Detector : 45-132FF2  
 Background Analysis Date/Time : 14-JUN-2009 16:49:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.014	3298.635	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.264	4904.602	9.000000	2.700000	33.33334	95.00000
CM-244	5533.481	5885.701	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 117  
 Detector : 33450  
 Background Analysis Date/Time : 14-JUN-2009 16:49:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.116	3298.892	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4433.860	4903.379	7.000000	2.100000	37.79645	95.00000
CM-244	5530.688	5887.135	13.00000	3.900000	27.73501	95.00000

Instrument : CHAMBER 118  
 Detector : 75544  
 Background Analysis Date/Time : 14-JUN-2009 16:49:53  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.613	3302.455	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4433.239	4903.545	2.000000	0.6000000	70.71068	95.00000
CM-244	5532.271	5884.351	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 119  
 Detector : 74429  
 Background Analysis Date/Time : 7-JUN-2009 17:09:05  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.004	3299.253	7.000000	2.100000	37.79645	95.00000
NP-237	4432.548	4906.013	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5530.584	5883.165	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 120  
 Detector : 74430  
 Background Analysis Date/Time : 17-MAY-2009 15:24:48  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.625	3300.890	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.308	4901.537	7.000000	2.100000	37.79645	95.00000
CM-244	5532.202	5887.484	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 121  
 Detector : 75545  
 Background Analysis Date/Time : 14-JUN-2009 16:50:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.776	3297.922	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.937	4904.696	2.000000	0.6000000	70.71068	95.00000
CM-244	5531.058	5887.000	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 122  
 Detector : 75546  
 Background Analysis Date/Time : 14-JUN-2009 16:50:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.018	3300.875	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.647	4902.829	8.000000	2.400000	35.35534	95.00000
CM-244	5535.492	5886.909	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 123  
 Detector : 45-142V3  
 Background Analysis Date/Time : 14-JUN-2009 16:50:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.302	3298.244	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.146	4903.289	6.000000	1.800000	40.82483	95.00000
CM-244	5533.976	5884.017	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 124  
 Detector : 45-142V2  
 Background Analysis Date/Time : 14-JUN-2009 16:50:20  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.125	3300.463	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.931	4904.039	4.000000	1.200000	50.00000	95.00000
CM-244	5531.345	5887.400	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 125  
 Detector : 75547  
 Background Analysis Date/Time : 14-JUN-2009 16:50:25  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.021	3300.630	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.884	4905.060	1.000000	0.3000000	100.0000	95.00000
CM-244	5530.764	5886.395	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 126  
 Detector : 75548  
 Background Analysis Date/Time : 14-JUN-2009 16:50:29  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.981	3300.740	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.131	4903.488	15.00000	4.500000	25.81989	95.00000
CM-244	5534.443	5883.975	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 127  
 Detector : 78770  
 Background Analysis Date/Time : 14-JUN-2009 16:50:33  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.359	3298.198	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.936	4903.107	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.915	5884.064	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 128  
 Detector : 75549  
 Background Analysis Date/Time : 14-JUN-2009 16:50:38  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.469	3298.378	55.00000	16.50000	13.48400	95.00000
NP-237	4435.142	4904.355	40.00000	12.00000	15.81139	95.00000
CM-244	5535.626	5885.579	18.00000	5.400000	23.57022	95.00000

Instrument : CHAMBER 129  
 Detector : 76227  
 Background Analysis Date/Time : 14-JUN-2009 16:50:42  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.870	3300.864	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.827	4903.885	2.000000	0.6000000	70.71068	95.00000
CM-244	5535.087	5885.718	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 130  
 Detector : 76228  
 Background Analysis Date/Time : 14-JUN-2009 16:50:47  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.993	3302.215	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.138	4902.010	5.000000	1.500000	44.72136	95.00000
CM-244	5532.060	5886.931	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 131  
 Detector : 33448  
 Background Analysis Date/Time : 14-JUN-2009 16:50:52  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.044	3298.565	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.937	4903.089	3.000000	0.9000000	57.73503	95.00000
CM-244	5531.267	5883.522	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 132  
 Detector : 67579  
 Background Analysis Date/Time : 14-JUN-2009 16:50:57  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.317	3302.437	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.887	4903.001	9.000000	2.700000	33.33334	95.00000
CM-244	5531.401	5886.076	7.000000	2.100000	37.79645	95.00000



Instrument : CHAMBER 133  
 Detector : 76229  
 Background Analysis Date/Time : 14-JUN-2009 16:51:01  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.661	3299.622	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4435.770	4904.619	6.000000	1.800000	40.82483	95.00000
CM-244	5534.556	5886.567	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 134  
 Detector : 76230  
 Background Analysis Date/Time : 14-JUN-2009 16:51:06  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.500	3302.170	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.290	4901.615	13.00000	3.900000	27.73501	95.00000
CM-244	5530.370	5884.236	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 135  
 Detector : 64270  
 Background Analysis Date/Time : 14-JUN-2009 16:51:10  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.202	3301.610	4.000000	1.200000	50.00000	95.00000
NP-237	4434.703	4902.104	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.521	5882.764	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 136  
 Detector : 68549  
 Background Analysis Date/Time : 14-JUN-2009 16:51:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.653	3297.650	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.780	4902.308	8.000000	2.400000	35.35534	95.00000
CM-244	5532.280	5886.634	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 137  
 Detector : 64288  
 Background Analysis Date/Time : 14-JUN-2009 16:51:19  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.375	3302.529	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.948	4901.380	6.000000	1.800000	40.82483	95.00000
CM-244	5532.616	5883.823	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 138  
 Detector : 65877  
 Background Analysis Date/Time : 14-JUN-2009 16:51:24  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.633	3298.467	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.751	4906.243	14.00000	4.200000	26.72612	95.00000
CM-244	5532.819	5886.784	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 139  
 Detector : 76231  
 Background Analysis Date/Time : 14-JUN-2009 16:51:28  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.983	3299.622	6.000000	1.800000	40.82483	95.00000
NP-237	4432.558	4902.187	12.00000	3.600000	28.86751	95.00000
CM-244	5530.474	5882.536	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 140  
 Detector : 78771  
 Background Analysis Date/Time : 14-JUN-2009 16:51:33  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.911	3300.480	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.400	4901.815	11.00000	3.300000	30.15113	95.00000
CM-244	5531.254	5883.879	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 141  
 Detector : 76232  
 Background Analysis Date/Time : 14-JUN-2009 16:51:37  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.123	3299.107	3.000000	0.9000000	57.73503	95.00000
NP-237	4437.573	4901.742	6.000000	1.800000	40.82483	95.00000
CM-244	5534.616	5886.136	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 142  
 Detector : 64261  
 Background Analysis Date/Time : 14-JUN-2009 16:51:41  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.868	3298.969	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.566	4903.867	14.00000	4.200000	26.72612	95.00000
CM-244	5533.037	5885.587	12.00000	3.600000	28.86751	95.00000

Instrument : CHAMBER 143  
 Detector : 65882  
 Background Analysis Date/Time : 14-JUN-2009 16:51:46  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.528	3299.464	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.313	4904.622	7.000000	2.100000	37.79645	95.00000
CM-244	5531.624	5883.597	16.00000	4.800000	25.00000	95.00000

Instrument : CHAMBER 144  
 Detector : 75551  
 Background Analysis Date/Time : 14-JUN-2009 16:51:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.404	3301.221	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.267	4903.746	8.000000	2.400000	35.35534	95.00000
CM-244	5531.659	5883.429	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 145  
 Detector : 72526  
 Background Analysis Date/Time : 14-JUN-2009 16:51:55  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.202	3298.002	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.152	4904.644	6.000000	1.800000	40.82483	95.00000
CM-244	5533.675	5885.956	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 146  
 Detector : 72527  
 Background Analysis Date/Time : 14-JUN-2009 16:52:00  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.008	3300.887	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.242	4902.966	8.000000	2.400000	35.35534	95.00000
CM-244	5533.644	5883.949	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 147  
 Detector : 75550  
 Background Analysis Date/Time : 14-JUN-2009 16:52:05  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.795	3301.200	7.000000	2.100000	37.79645	95.00000
NP-237	4434.562	4903.375	7.000000	2.100000	37.79645	95.00000
CM-244	5534.997	5885.574	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 148  
 Detector : 74429  
 Background Analysis Date/Time : 14-JUN-2009 16:52:09  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.118	3297.883	6.000000	1.800000	40.82483	95.00000
NP-237	4435.625	4904.775	11.00000	3.300000	30.15113	95.00000
CM-244	5532.095	5883.458	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 149  
 Detector : 33449  
 Background Analysis Date/Time : 14-JUN-2009 16:52:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.202	3301.653	5.000000	1.500000	44.72136	95.00000
NP-237	4436.346	4906.220	12.000000	3.600000	28.86751	95.00000
CM-244	5534.414	5886.219	10.000000	3.000000	31.62278	95.00000

Instrument : CHAMBER 150  
 Detector : 75552  
 Background Analysis Date/Time : 14-JUN-2009 16:52:17  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.998	3298.539	2.000000	0.6000000	70.71068	95.00000
NP-237	4437.161	4902.172	4.000000	1.200000	50.00000	95.00000
CM-244	5531.563	5884.403	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 151  
 Detector : 75556  
 Background Analysis Date/Time : 14-JUN-2009 16:52:22  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.591	3302.222	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.830	4901.462	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5535.613	5884.795	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 152  
 Detector : 76222  
 Background Analysis Date/Time : 14-JUN-2009 16:52:26  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.886	3298.833	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.214	4906.051	6.000000	1.800000	40.82483	95.00000
CM-244	5531.255	5886.692	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 153  
 Detector : 76223  
 Background Analysis Date/Time : 14-JUN-2009 16:52:30  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.542	3299.468	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.114	4905.919	3.000000	0.9000000	57.73503	95.00000
CM-244	5532.513	5883.339	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 154  
 Detector : 76224  
 Background Analysis Date/Time : 14-JUN-2009 16:52:34  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.069	3300.352	3.000000	0.9000000	57.73503	95.00000
NP-237	4436.954	4905.947	8.000000	2.400000	35.35534	95.00000
CM-244	5533.331	5884.860	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 155  
 Detector : 75553  
 Background Analysis Date/Time : 14-JUN-2009 16:52:37  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.947	3302.333	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.678	4902.049	7.000000	2.100000	37.79645	95.00000
CM-244	5532.716	5885.997	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 156  
 Detector : 75554  
 Background Analysis Date/Time : 14-JUN-2009 16:52:41  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.802	3300.808	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.311	4904.756	16.00000	4.800000	25.00000	95.00000
CM-244	5535.375	5883.323	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 157  
 Detector : 75555  
 Background Analysis Date/Time : 14-JUN-2009 16:52:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.165	3298.585	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.634	4905.657	2.000000	0.6000000	70.71068	95.00000
CM-244	5530.567	5883.729	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 158  
 Detector : 33451  
 Background Analysis Date/Time : 14-JUN-2009 16:52:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.176	3298.395	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.437	4905.375	9.000000	2.700000	33.33334	95.00000
CM-244	5534.708	5885.073	12.00000	3.600000	28.86751	95.00000

Instrument : CHAMBER 159  
 Detector : 76225  
 Background Analysis Date/Time : 14-JUN-2009 16:52:53  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.482	3300.368	4.000000	1.200000	50.00000	95.00000
NP-237	4435.596	4902.679	7.000000	2.100000	37.79645	95.00000
CM-244	5534.257	5882.643	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 160  
 Detector : 76226  
 Background Analysis Date/Time : 14-JUN-2009 16:52:57  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.509	3301.982	6.000000	1.800000	40.82483	95.00000
NP-237	4436.790	4904.178	9.000000	2.700000	33.33334	95.00000
CM-244	5531.239	5885.638	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 161  
 Detector : 70321  
 Background Analysis Date/Time : 21-JUN-2009 15:55:13  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.612	3298.684	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.424	4903.719	10.00000	3.000000	31.62278	95.00000
CM-244	5531.313	5883.518	18.00000	5.400000	23.57022	95.00000

Instrument : CHAMBER 162  
 Detector : 70323  
 Background Analysis Date/Time : 21-JUN-2009 15:55:18  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.114	3301.116	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.153	4902.154	3.000000	0.9000000	57.73503	95.00000
CM-244	5533.930	5885.193	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 163  
 Detector : 70324  
 Background Analysis Date/Time : 21-JUN-2009 15:55:23  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.217	3298.824	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.987	4904.671	13.00000	3.900000	27.73501	95.00000
CM-244	5533.739	5886.581	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 164  
 Detector : 70325  
 Background Analysis Date/Time : 21-JUN-2009 15:55:27  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.804	3300.725	3.000000	0.9000000	57.73503	95.00000
NP-237	4432.850	4902.971	5.000000	1.500000	44.72136	95.00000
CM-244	5532.641	5885.829	4.000000	1.200000	50.00000	95.00000



Instrument : CHAMBER 165  
 Detector : 72544  
 Background Analysis Date/Time : 21-JUN-2009 15:55:31  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.249	3299.371	4.000000	1.200000	50.00000	95.00000
NP-237	4433.539	4903.436	6.000000	1.800000	40.82483	95.00000
CM-244	5531.871	5883.913	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 166  
 Detector : 74545  
 Background Analysis Date/Time : 21-JUN-2009 15:55:36  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.840	3300.652	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.331	4901.890	3.000000	0.9000000	57.73503	95.00000
CM-244	5530.967	5883.776	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 167  
 Detector : 72546  
 Background Analysis Date/Time : 21-JUN-2009 15:55:40  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.275	3299.494	3.000000	0.9000000	57.73503	95.00000
NP-237	4434.900	4904.573	2.000000	0.6000000	70.71068	95.00000
CM-244	5533.886	5886.993	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 168  
 Detector : 72547  
 Background Analysis Date/Time : 21-JUN-2009 15:55:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.947	3298.253	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.851	4905.623	7.000000	2.100000	37.79645	95.00000
CM-244	5534.369	5886.817	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 169  
 Detector : 72548  
 Background Analysis Date/Time : 21-JUN-2009 15:55:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.147	3298.542	3.000000	0.9000000	57.73503	95.00000
NP-237	4434.044	4903.513	27.00000	8.100000	19.24501	95.00000
CM-244	5532.339	5885.069	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 170  
 Detector : 72549  
 Background Analysis Date/Time : 21-JUN-2009 15:55:53  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.920	3299.334	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.260	4904.103	11.00000	3.300000	30.15113	95.00000
CM-244	5534.714	5883.037	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 171  
 Detector : 78260  
 Background Analysis Date/Time : 21-JUN-2009 15:55:59  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.586	3301.332	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.496	4904.863	5.000000	1.500000	44.72136	95.00000
CM-244	5533.949	5887.016	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 172  
 Detector : 78772  
 Background Analysis Date/Time : 21-JUN-2009 15:56:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.628	3299.646	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.466	4905.809	6.000000	1.800000	40.82483	95.00000
CM-244	5531.112	5885.129	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 173  
 Detector : 74431  
 Background Analysis Date/Time : 21-JUN-2009 15:56:08  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.621	3299.926	3.000000	0.9000000	57.73503	95.00000
NP-237	4436.753	4901.757	3.000000	0.9000000	57.73503	95.00000
CM-244	5535.262	5886.887	17.00000	5.100000	24.25356	95.00000

Instrument : CHAMBER 174  
 Detector : 74432  
 Background Analysis Date/Time : 21-JUN-2009 15:56:12  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.065	3302.471	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.541	4905.194	4.000000	1.200000	50.00000	95.00000
CM-244	5531.639	5887.080	14.00000	4.200000	26.72612	95.00000

Instrument : CHAMBER 175  
 Detector : 74433  
 Background Analysis Date/Time : 21-JUN-2009 15:56:17  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.238	3298.426	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4435.144	4905.490	4.000000	1.200000	50.00000	95.00000
CM-244	5533.995	5885.818	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 176  
 Detector : 74434  
 Background Analysis Date/Time : 21-JUN-2009 15:56:21  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.698	3297.590	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.745	4903.265	5.000000	1.500000	44.72136	95.00000
CM-244	5530.868	5886.966	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 177  
 Detector : 74435  
 Background Analysis Date/Time : 21-JUN-2009 15:56:26  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.057	3299.457	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.482	4904.663	3.000000	0.9000000	57.73503	95.00000
CM-244	5533.411	5885.598	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 178  
 Detector : 74436  
 Background Analysis Date/Time : 21-JUN-2009 15:56:30  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.779	3302.215	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.746	4905.748	7.000000	2.100000	37.79645	95.00000
CM-244	5532.798	5883.324	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 179  
 Detector : 74437  
 Background Analysis Date/Time : 21-JUN-2009 15:56:35  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.919	3302.532	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.536	4902.537	2.000000	0.6000000	70.71068	95.00000
CM-244	5530.871	5882.740	14.00000	4.200000	26.72612	95.00000

Instrument : CHAMBER 180  
 Detector : 74438  
 Background Analysis Date/Time : 21-JUN-2009 15:56:39  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.905	3300.775	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.062	4905.007	6.000000	1.800000	40.82483	95.00000
CM-244	5531.655	5887.118	16.00000	4.800000	25.00000	95.00000

Instrument : CHAMBER 181  
 Detector : 74439  
 Background Analysis Date/Time : 21-JUN-2009 15:56:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.507	3301.291	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.916	4901.810	8.000000	2.400000	35.35534	95.00000
CM-244	5535.507	5887.405	26.00000	7.800000	19.61161	95.00000

Instrument : CHAMBER 182  
 Detector : 74440  
 Background Analysis Date/Time : 21-JUN-2009 15:56:48  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.364	3301.476	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.311	4901.783	4.000000	1.200000	50.00000	95.00000
CM-244	5534.452	5885.559	16.00000	4.800000	25.00000	95.00000

Instrument : CHAMBER 183  
 Detector : 74441  
 Background Analysis Date/Time : 21-JUN-2009 15:56:53  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.145	3298.781	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.414	4904.732	8.000000	2.400000	35.35534	95.00000
CM-244	5533.565	5885.751	14.00000	4.200000	26.72612	95.00000

Instrument : CHAMBER 184  
 Detector : 74442  
 Background Analysis Date/Time : 21-JUN-2009 15:56:57  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.570	3301.301	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.154	4904.955	5.000000	1.500000	44.72136	95.00000
CM-244	5531.440	5886.825	18.00000	5.400000	23.57022	95.00000

Instrument : CHAMBER 185  
 Detector : 68615  
 Background Analysis Date/Time : 21-JUN-2009 15:57:01  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.840	3300.640	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.438	4901.812	3.000000	0.9000000	57.73503	95.00000
CM-244	5531.912	5887.166	16.00000	4.800000	25.00000	95.00000

Instrument : CHAMBER 186  
 Detector : 68616  
 Background Analysis Date/Time : 21-JUN-2009 15:57:05  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.988	3300.097	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.729	4904.174	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5530.696	5887.018	17.00000	5.100000	24.25356	95.00000

Instrument : CHAMBER 187  
 Detector : 68620  
 Background Analysis Date/Time : 21-JUN-2009 15:57:10  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.780	3300.355	3.000000	0.9000000	57.73503	95.00000
NP-237	4437.583	4904.093	7.000000	2.100000	37.79645	95.00000
CM-244	5535.508	5884.097	16.00000	4.800000	25.00000	95.00000

Instrument : CHAMBER 188  
 Detector : 68621  
 Background Analysis Date/Time : 21-JUN-2009 15:57:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.235	3299.192	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.285	4905.242	2.000000	0.6000000	70.71068	95.00000
CM-244	5530.351	5883.763	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 189  
 Detector : 68622  
 Background Analysis Date/Time : 21-JUN-2009 15:57:17  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.861	3302.155	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.574	4905.866	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.675	5887.456	13.00000	3.900000	27.73501	95.00000

Instrument : CHAMBER 190  
 Detector : 68623  
 Background Analysis Date/Time : 21-JUN-2009 15:57:21  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.675	3299.750	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.687	4904.443	33.00000	9.900001	17.40777	95.00000
CM-244	5531.545	5882.933	33.00000	9.900001	17.40777	95.00000

Instrument : CHAMBER 191  
 Detector : 68624  
 Background Analysis Date/Time : 21-JUN-2009 15:57:25  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.084	3299.950	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.587	4904.375	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5530.362	5884.163	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 192  
 Detector : 74430  
 Background Analysis Date/Time : 21-JUN-2009 15:57:29  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.302	3300.346	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.147	4904.787	1.000000	0.3000000	100.0000	95.00000
CM-244	5530.391	5883.883	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 193  
 Detector : 68627  
 Background Analysis Date/Time : 21-JUN-2009 15:57:33  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.456	3299.248	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.921	4903.889	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.552	5883.390	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 194  
 Detector : 68635  
 Background Analysis Date/Time : 21-JUN-2009 15:57:37  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.759	3300.939	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.087	4905.856	9.000000	2.700000	33.33334	95.00000
CM-244	5532.909	5884.238	18.00000	5.400000	23.57022	95.00000

Instrument : CHAMBER 195  
 Detector : 68636  
 Background Analysis Date/Time : 21-JUN-2009 15:57:41  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.427	3298.108	5.000000	1.500000	44.72136	95.00000
NP-237	4435.602	4904.677	9.000000	2.700000	33.33334	95.00000
CM-244	5531.920	5883.250	12.00000	3.600000	28.86751	95.00000

Instrument : CHAMBER 196  
 Detector : 68637  
 Background Analysis Date/Time : 21-JUN-2009 15:57:46  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.764	3299.421	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.243	4902.720	4.000000	1.200000	50.00000	95.00000
CM-244	5534.908	5886.289	16.00000	4.800000	25.00000	95.00000



Instrument : CHAMBER 197  
 Detector : 78894  
 Background Analysis Date/Time : 21-JUN-2009 15:57:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.459	3301.421	4.000000	1.200000	50.00000	95.00000
NP-237	4433.039	4903.794	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5533.211	5885.723	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 198  
 Detector : 78895  
 Background Analysis Date/Time : 21-JUN-2009 15:57:54  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.792	3298.953	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.042	4902.810	1.000000	0.3000000	100.0000	95.00000
CM-244	5530.984	5882.838	25.00000	7.500000	20.00000	95.00000

Instrument : CHAMBER 199  
 Detector : 78896  
 Background Analysis Date/Time : 21-JUN-2009 15:57:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.467	3301.736	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.639	4904.142	6.000000	1.800000	40.82483	95.00000
CM-244	5532.893	5884.873	13.00000	3.900000	27.73501	95.00000

Instrument : CHAMBER 200  
 Detector : 78900  
 Background Analysis Date/Time : 21-JUN-2009 15:58:02  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.709	3299.237	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.212	4903.912	12.00000	3.600000	28.86751	95.00000
CM-244	5534.189	5887.638	19.00000	5.700000	22.94157	95.00000

Instrument : CHAMBER 201  
 Detector : 78902  
 Background Analysis Date/Time : 21-JUN-2009 15:58:05  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.500	3302.053	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.282	4904.434	4.000000	1.200000	50.00000	95.00000
CM-244	5534.865	5882.809	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 202  
 Detector : 78903  
 Background Analysis Date/Time : 21-JUN-2009 15:58:09  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.900	3298.618	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.436	4902.692	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.047	5884.818	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 203  
 Detector : 78905  
 Background Analysis Date/Time : 21-JUN-2009 15:58:13  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.958	3298.323	6.000000	1.800000	40.82483	95.00000
NP-237	4433.591	4904.036	9.000000	2.700000	33.33334	95.00000
CM-244	5533.281	5885.816	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 204  
 Detector : 78907  
 Background Analysis Date/Time : 21-JUN-2009 15:58:17  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.324	3298.173	16.00000	4.800000	25.00000	95.00000
NP-237	4437.399	4902.424	14.00000	4.200000	26.72612	95.00000
CM-244	5531.626	5884.261	27.00000	8.100000	19.24501	95.00000

Instrument : CHAMBER 205  
 Detector : 78908  
 Background Analysis Date/Time : 21-JUN-2009 15:58:22  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.508	3302.170	4.000000	1.200000	50.00000	95.00000
NP-237	4433.168	4903.946	2.000000	0.6000000	70.71068	95.00000
CM-244	5533.636	5886.419	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 206  
 Detector : 78909  
 Background Analysis Date/Time : 21-JUN-2009 15:58:26  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.616	3302.433	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.477	4902.186	2.000000	0.6000000	70.71068	95.00000
CM-244	5535.166	5886.569	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 207  
 Detector : 78910  
 Background Analysis Date/Time : 21-JUN-2009 15:58:30  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.858	3301.538	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.769	4903.719	4.000000	1.200000	50.00000	95.00000
CM-244	5533.705	5886.686	13.00000	3.900000	27.73501	95.00000

Instrument : CHAMBER 208  
 Detector : 78911  
 Background Analysis Date/Time : 21-JUN-2009 15:58:34  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.819	3299.505	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.407	4905.872	8.000000	2.400000	35.35534	95.00000
CM-244	5534.932	5887.260	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 209  
 Detector : 79188  
 Background Analysis Date/Time : 28-JUN-2009 17:00:00  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.181	3301.049	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4433.021	4903.097	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5532.718	5885.886	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 210  
 Detector : 79189  
 Background Analysis Date/Time : 28-JUN-2009 17:00:05  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.859	3297.943	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.076	4904.812	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5533.646	5886.210	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 211  
 Detector : 79190  
 Background Analysis Date/Time : 28-JUN-2009 17:00:09  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.624	3301.653	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4436.794	4902.468	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.766	5886.120	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 212  
 Detector : 79191  
 Background Analysis Date/Time : 28-JUN-2009 17:00:13  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.287	3301.382	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.079	4904.410	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.335	5887.654	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 213  
 Detector : 79192  
 Background Analysis Date/Time : 28-JUN-2009 17:00:17  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.968	3298.520	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.380	4902.572	2.000000	0.6000000	70.71068	95.00000
CM-244	5532.282	5885.336	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 214  
 Detector : 79193  
 Background Analysis Date/Time : 28-JUN-2009 17:00:21  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.403	3298.091	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.439	4902.827	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5532.795	5885.993	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 215  
 Detector : 79194  
 Background Analysis Date/Time : 28-JUN-2009 17:00:25  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.062	3302.465	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4436.774	4902.728	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.954	5882.708	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 216  
 Detector : 79195  
 Background Analysis Date/Time : 28-JUN-2009 17:00:29  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.227	3300.068	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.095	4904.331	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5533.563	5886.220	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 217  
 Detector : 79410  
 Background Analysis Date/Time : 28-JUN-2009 17:00:33  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.213	3299.566	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.215	4903.920	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.328	5882.531	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 218  
 Detector : 79411  
 Background Analysis Date/Time : 28-JUN-2009 17:00:38  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.601	3298.221	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.747	4903.769	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5534.561	5882.956	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 219  
 Detector : 79412  
 Background Analysis Date/Time : 28-JUN-2009 17:00:42  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.180	3302.094	4.000000	1.200000	50.00000	95.00000
NP-237	4436.774	4902.239	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5532.237	5885.415	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 220  
 Detector : 79413  
 Background Analysis Date/Time : 28-JUN-2009 17:00:46  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.438	3302.525	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.000	4905.156	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5534.774	5882.515	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 221  
 Detector : 79414  
 Background Analysis Date/Time : 28-JUN-2009 17:00:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.987	3300.655	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.096	4905.038	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.434	5885.564	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 222  
 Detector : 79415  
 Background Analysis Date/Time : 28-JUN-2009 17:00:54  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.968	3297.845	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.336	4906.032	2.000000	0.6000000	70.71068	95.00000
CM-244	5530.429	5882.613	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 223  
 Detector : 79416  
 Background Analysis Date/Time : 28-JUN-2009 17:00:59  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.801	3297.756	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.980	4902.483	1.000000	0.3000000	100.0000	95.00000
CM-244	5530.752	5886.350	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 224  
 Detector : 79417  
 Background Analysis Date/Time : 28-JUN-2009 17:01:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.708	3297.620	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.391	4904.314	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5535.163	5883.043	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 225  
 Detector : 79418  
 Background Analysis Date/Time : 28-JUN-2009 17:01:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.136	3297.838	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.708	4903.892	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.915	5883.445	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 226  
 Detector : 79419  
 Background Analysis Date/Time : 28-JUN-2009 17:01:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.396	3299.355	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4437.021	4903.289	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.002	5887.398	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 227  
 Detector : 79420  
 Background Analysis Date/Time : 28-JUN-2009 17:01:15  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.851	3301.430	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.798	4901.523	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5532.218	5885.954	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 228  
 Detector : 79421  
 Background Analysis Date/Time : 28-JUN-2009 17:01:19  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.413	3298.479	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.708	4901.434	2.000000	0.6000000	70.71068	95.00000
CM-244	5531.094	5883.745	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000



Instrument : CHAMBER 229  
 Detector : 79422  
 Background Analysis Date/Time : 28-JUN-2009 17:01:24  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.428	3300.536	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4436.659	4902.986	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.392	5883.088	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 230  
 Detector : 79423  
 Background Analysis Date/Time : 28-JUN-2009 17:01:28  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.435	3299.126	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.006	4902.037	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5532.506	5885.804	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 231  
 Detector : 79424  
 Background Analysis Date/Time : 28-JUN-2009 17:01:32  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.739	3299.860	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.942	4905.625	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5535.464	5883.098	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 232  
 Detector : 79425  
 Background Analysis Date/Time : 28-JUN-2009 17:01:36  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.849	3300.399	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4435.500	4901.412	1.000000	0.3000000	100.0000	95.00000
CM-244	5530.414	5887.598	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 233  
 Detector : 79426  
 Background Analysis Date/Time : 28-JUN-2009 17:01:40  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.552	3300.019	3.000000	0.9000000	57.73503	95.00000
NP-237	4437.049	4902.445	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5533.265	5887.350	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 234  
 Detector : 79427  
 Background Analysis Date/Time : 28-JUN-2009 17:01:43  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.038	3298.233	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.030	4904.076	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.071	5887.649	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 235  
 Detector : 79428  
 Background Analysis Date/Time : 28-JUN-2009 17:01:48  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.263	3301.595	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.665	4901.527	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.636	5886.715	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 236  
 Detector : 79429  
 Background Analysis Date/Time : 28-JUN-2009 17:01:52  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.896	3299.376	3.000000	0.9000000	57.73503	95.00000
NP-237	4436.423	4901.814	3.000000	0.9000000	57.73503	95.00000
CM-244	5532.618	5886.688	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 237  
 Detector : 79430  
 Background Analysis Date/Time : 28-JUN-2009 17:01:56  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.344	3298.717	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.245	4904.669	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5531.003	5885.403	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 238  
 Detector : 79431  
 Background Analysis Date/Time : 28-JUN-2009 17:02:00  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.961	3300.370	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.951	4902.062	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5532.406	5886.179	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 239  
 Detector : 79432  
 Background Analysis Date/Time : 28-JUN-2009 17:02:04  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.544	3302.370	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.212	4902.679	6.000000	1.800000	40.82483	95.00000
CM-244	5535.220	5884.998	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 240  
 Detector : 79433  
 Background Analysis Date/Time : 28-JUN-2009 17:02:08  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.696	3301.853	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.664	4904.733	3.000000	0.9000000	57.73503	95.00000
CM-244	5531.260	5886.094	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 241  
 Detector : 79434  
 Background Analysis Date/Time : 28-JUN-2009 17:02:12  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.242	3301.966	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.457	4905.204	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5530.782	5884.826	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 242  
 Detector : 79435  
 Background Analysis Date/Time : 28-JUN-2009 17:02:17  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.030	3301.446	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.469	4904.310	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5535.605	5884.633	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 243  
 Detector : 79436  
 Background Analysis Date/Time : 28-JUN-2009 17:02:21  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.365	3297.486	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.388	4902.306	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.622	5882.491	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 244  
 Detector : 79437  
 Background Analysis Date/Time : 28-JUN-2009 17:02:26  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.131	3300.564	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.574	4903.374	3.000000	0.9000000	57.73503	95.00000
CM-244	5534.584	5883.551	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 245  
 Detector : 79438  
 Background Analysis Date/Time : 28-JUN-2009 17:02:30  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.063	3299.394	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.575	4906.628	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5534.102	5883.894	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 246  
 Detector : 78912  
 Background Analysis Date/Time : 28-JUN-2009 17:02:34  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.019	3301.538	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.665	4906.544	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.825	5885.470	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 247  
 Detector : 79440  
 Background Analysis Date/Time : 28-JUN-2009 17:02:38  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.774	3301.191	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.556	4903.380	3.000000	0.9000000	57.73503	95.00000
CM-244	5530.809	5885.967	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 248  
 Detector : 79441  
 Background Analysis Date/Time : 28-JUN-2009 17:02:43  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.392	3300.122	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.659	4905.293	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5532.437	5887.556	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 249  
 Detector : 79442  
 Background Analysis Date/Time : 28-JUN-2009 17:02:46  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.416	3300.577	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.398	4904.007	2.000000	0.6000000	70.71068	95.00000
CM-244	5533.011	5883.893	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 250  
 Detector : 79443  
 Background Analysis Date/Time : 28-JUN-2009 17:02:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.664	3299.772	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.576	4904.834	2.000000	0.6000000	70.71068	95.00000
CM-244	5531.060	5885.456	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 251  
 Detector : 79444  
 Background Analysis Date/Time : 28-JUN-2009 17:02:54  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.497	3300.693	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.150	4903.399	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5531.737	5887.575	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 252  
 Detector : 79445  
 Background Analysis Date/Time : 28-JUN-2009 17:02:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.592	3300.825	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.553	4902.127	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5534.590	5884.216	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 253  
 Detector : 79446  
 Background Analysis Date/Time : 28-JUN-2009 17:03:02  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.654	3300.865	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.573	4903.102	2.000000	0.6000000	70.71068	95.00000
CM-244	5533.082	5884.383	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 254  
 Detector : 79447  
 Background Analysis Date/Time : 28-JUN-2009 17:03:06  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.549	3298.669	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.543	4905.678	6.000000	1.800000	40.82483	95.00000
CM-244	5533.440	5883.478	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 255  
 Detector : 79448  
 Background Analysis Date/Time : 28-JUN-2009 17:03:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.136	3299.381	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.277	4902.796	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.573	5887.697	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 256  
 Detector : 79449  
 Background Analysis Date/Time : 28-JUN-2009 17:03:15  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.020	3301.037	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.346	4901.908	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.491	5884.250	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

### Subsection 3: Efficiency Calibration

Instrument : CHAMBER 001  
 Detector : 78788  
 Standard ID : AESS-001  
 Standard Reference Date : 20-FEB-2008 09:54:53  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:09  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:30:47  
 Average Efficiency : 0.2968604  
 Average Efficiency Error : 8.1920959E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.6698	28-FEB-2010	2988.679	3298.848	14368.00	0.2905553	1.2499626E-02	54.37264
NP-237	171.0024	28-FEB-2010	4436.698	4905.866	12378.00	0.3015518	1.5319364E-02	65.40276
CM-244	158.1060	28-FEB-2010	5535.874	5884.629	10862.00	0.3016641	1.5358537E-02	54.23344

Instrument : CHAMBER 002  
 Detector : 78266  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:09  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:31:01  
 Average Efficiency : 0.3091908  
 Average Efficiency Error : 8.5140709E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1144	28-FEB-2010	2987.715	3301.971	14528.00	0.3063232	1.3175298E-02	49.84956
NP-237	200.4990	28-FEB-2010	4433.336	4902.576	15147.00	0.3147377	1.5943376E-02	61.42959
CM-244	196.5558	28-FEB-2010	5533.904	5882.845	13779.00	0.3078977	1.5616762E-02	53.40513

Instrument : CHAMBER 003  
 Detector : 67617  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:09  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 1-JUL-2009 14:34:18  
 Average Efficiency : 0.3600250  
 Average Efficiency Error : 1.0207428E-02  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2989.494	3301.750	51088.00	0.5304641	2.2688475E-02	17.25958
NP-237	203.2080	28-FEB-2010	4434.514	4906.213	23507.00	0.2944960	1.5031389E-02	23.33439
CM-244	197.2236	28-FEB-2010	5534.317	5886.218	303.0000	0.3473051	1.7597629E-02	23.27553



Instrument : CHAMBER 004  
 Detector : 64279  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:09  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:31:14  
 Average Efficiency : 0.3320934  
 Average Efficiency Error : 9.1318591E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.1222	28-FEB-2010	2991.142	3301.855	16052.00	0.3286779	1.4111746E-02	51.04387
NP-237	204.2586	28-FEB-2010	4434.122	4905.061	16497.00	0.3364784	1.7026719E-02	57.46174
CM-244	198.8100	28-FEB-2010	5532.169	5885.896	15051.00	0.3326688	1.6853061E-02	54.96896

Instrument : CHAMBER 005  
 Detector : 67612  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:09  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:31:33  
 Average Efficiency : 6.5707625E-03  
 Average Efficiency Error : 3.8320033E-04  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.7452	28-FEB-2010	2987.844	3301.859	3508.000	7.0225731E-02	1.923207E-03	0.0000000E+00
NP-237	209.5938	28-FEB-2010	4432.372	4905.723	2125.000	4.2211074E-02	3.009577E-03	0.0000000E+00
CM-244	202.7478	28-FEB-2010	5534.445	5887.312	214.0000	4.5812004E-03	9.153980E-04	0.0000000E+00

Instrument : CHAMBER 006  
 Detector : 67613  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:09  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:31:42  
 Average Efficiency : 0.3023717  
 Average Efficiency Error : 8.3279395E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2987.836	3301.578	14382.00	0.2979915	1.2819309E-02	52.92189
NP-237	204.7038	28-FEB-2010	4433.162	4904.315	14912.00	0.3035040	1.5377419E-02	64.79807
CM-244	195.0060	28-FEB-2010	5534.623	5882.438	13655.00	0.3076988	1.5608697E-02	55.89266

Instrument : CHAMBER 007  
 Detector : 67607  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:31:52  
 Average Efficiency : 0.2957362  
 Average Efficiency Error : 8.1475200E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2987.476	3300.975	14142.00	0.2886904	1.2423181E-02	50.35310
NP-237	205.0260	28-FEB-2010	4436.790	4906.439	14907.00	0.3028864	1.5346253E-02	60.44886
CM-244	199.6806	28-FEB-2010	5534.241	5887.079	13602.00	0.2992603	1.5181582E-02	51.78771

Instrument : CHAMBER 008  
 Detector : 78788  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:32:01  
 Average Efficiency : 0.3188090  
 Average Efficiency Error : 8.7708440E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.0418	28-FEB-2010	2990.921	3300.406	15479.00	0.3170527	1.3621154E-02	48.62412
NP-237	209.2716	28-FEB-2010	4435.107	4902.387	15876.00	0.3160491	1.6000355E-02	65.04717
CM-244	199.6488	28-FEB-2010	5534.594	5883.502	14733.00	0.3242763	1.6432470E-02	50.70723

Instrument : CHAMBER 009  
 Detector : 72528  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:32:10  
 Average Efficiency : 0.3375995  
 Average Efficiency Error : 9.2831012E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.3736	28-FEB-2010	2990.628	3299.090	15971.00	0.3313866	1.4229259E-02	50.85649
NP-237	204.0192	28-FEB-2010	4437.197	4904.633	16709.00	0.3411832	1.7262230E-02	60.63605
CM-244	197.2128	28-FEB-2010	5532.440	5887.594	15414.00	0.3432376	1.7383220E-02	53.31252

Instrument : CHAMBER 010  
 Detector : 72529  
 Standard ID : AESS-010  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:32:19  
 Average Efficiency : 0.3172926  
 Average Efficiency Error : 8.7324297E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.0008	28-FEB-2010	2991.348	3298.595	15125.00	0.3160139	1.3582063E-02	48.55328
NP-237	202.9926	28-FEB-2010	4434.835	4903.545	15667.00	0.3215450	1.6281251E-02	62.71636
CM-244	196.2330	28-FEB-2010	5530.435	5886.972	14067.00	0.3149689	1.5970867E-02	52.28595

Instrument : CHAMBER 011  
 Detector : 72531  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:32:29  
 Average Efficiency : 0.2985433  
 Average Efficiency Error : 8.2169101E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	212.8284	28-FEB-2010	2991.311	3301.519	14980.00	0.2970565	1.2769507E-02	51.39855
NP-237	214.4868	28-FEB-2010	4434.837	4904.180	15445.00	0.3000057	1.5193330E-02	59.19451
CM-244	208.4184	28-FEB-2010	5534.270	5885.159	14191.00	0.2991836	1.5168598E-02	51.74621

Instrument : CHAMBER 012  
 Detector : 67594  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:32:37  
 Average Efficiency : 0.2994599  
 Average Efficiency Error : 8.2469108E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.2200	28-FEB-2010	2989.530	3302.430	14453.00	0.2957655	1.2722428E-02	49.93941
NP-237	205.8930	28-FEB-2010	4435.245	4904.394	15165.00	0.3068516	1.5543667E-02	68.21289
CM-244	203.1954	28-FEB-2010	5531.663	5882.971	13767.00	0.2976886	1.5099200E-02	52.18476

Instrument : CHAMBER 013  
 Detector : 78790  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:32:45  
 Average Efficiency : 0.3386290  
 Average Efficiency Error : 9.3077216E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2992.215	3297.934	16446.00	0.3408228	1.4627260E-02	48.82562
NP-237	210.2526	28-FEB-2010	4433.681	4905.322	17035.00	0.3375474	1.7074423E-02	66.72312
CM-244	201.9108	28-FEB-2010	5534.510	5884.075	15472.00	0.3367262	1.7052578E-02	51.74340

Instrument : CHAMBER 014  
 Detector : 67616  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:32:56  
 Average Efficiency : 0.3118280  
 Average Efficiency Error : 8.5774874E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2988.044	3301.205	15708.00	0.3087174	1.3259654E-02	54.69494
NP-237	211.7160	28-FEB-2010	4432.568	4904.459	16091.00	0.3166406	1.6027654E-02	64.49153
CM-244	207.3882	28-FEB-2010	5531.132	5885.588	14716.00	0.3115681	1.5788864E-02	58.20748

Instrument : CHAMBER 015  
 Detector : 61581  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:33:12  
 Average Efficiency : 0.3223390  
 Average Efficiency Error : 8.8713039E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0270	28-FEB-2010	2990.992	3300.634	15182.00	0.3140531	1.3496879E-02	59.83858
NP-237	200.6460	28-FEB-2010	4433.750	4904.866	15926.00	0.3307087	1.6741820E-02	75.43053
CM-244	195.9270	28-FEB-2010	5533.850	5883.539	14567.00	0.3266208	1.6553897E-02	63.39113

Instrument : CHAMBER 016  
 Detector : 78774  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:33:38  
 Average Efficiency : 0.3364573  
 Average Efficiency Error : 9.2521459E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2991.376	3300.188	16062.00	0.3322090	1.4263208E-02	47.94983
NP-237	199.3962	28-FEB-2010	4436.705	4902.519	16457.00	0.3438525	1.7400362E-02	59.25246
CM-244	198.6402	28-FEB-2010	5531.791	5887.203	15163.00	0.3354346	1.6991531E-02	53.20901

Instrument : CHAMBER 017  
 Detector : 78791  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:33:47  
 Average Efficiency : 0.2933579  
 Average Efficiency Error : 8.0790650E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.0798	28-FEB-2010	2988.293	3301.593	14424.00	0.2897618	1.2464617E-02	48.04712
NP-237	208.5846	28-FEB-2010	4433.438	4905.522	14920.00	0.2980264	1.5099768E-02	63.18722
CM-244	205.5828	28-FEB-2010	5532.444	5887.037	13752.00	0.2939516	1.4909811E-02	52.23705

Instrument : CHAMBER 018  
 Detector : 21063  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:33:55  
 Average Efficiency : 0.2661345  
 Average Efficiency Error : 7.3447963E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.1856	28-FEB-2010	2991.545	3301.421	12680.00	0.2646750	1.1414763E-02	95.60474
NP-237	208.8990	28-FEB-2010	4437.321	4904.992	13620.00	0.2716386	1.3779967E-02	117.2805
CM-244	198.1458	28-FEB-2010	5532.286	5886.743	11861.00	0.2629564	1.3367859E-02	114.9829

Instrument : CHAMBER 019  
 Detector : 78786  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:13  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:34:03  
 Average Efficiency : 0.2886755  
 Average Efficiency Error : 7.9575144E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.6468	28-FEB-2010	2991.589	3299.131	13636.00	0.2811793	1.2108484E-02	45.78609
NP-237	202.9140	28-FEB-2010	4435.520	4903.560	14455.00	0.2967967	1.5043795E-02	63.86615
CM-244	199.3140	28-FEB-2010	5534.981	5882.589	13252.00	0.2920234	1.4819912E-02	48.96563

Instrument : CHAMBER 020  
 Detector : 78787  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:13  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:34:12  
 Average Efficiency : 0.3430721  
 Average Efficiency Error : 9.4324267E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	205.5870	28-FEB-2010	2991.028	3300.317	16260.00	0.3337892	1.4328116E-02	49.41795
NP-237	203.4984	28-FEB-2010	4434.663	4901.954	17092.00	0.3499276	1.7699974E-02	68.09825
CM-244	197.1096	28-FEB-2010	5534.316	5883.376	15719.00	0.3504178	1.7742448E-02	47.75075

Instrument : CHAMBER 021  
 Detector : 67047  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:13  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:34:21  
 Average Efficiency : 0.3007418  
 Average Efficiency Error : 8.2816491E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2991.930	3300.431	14520.00	0.2940652	1.2648145E-02	54.30077
NP-237	210.1548	28-FEB-2010	4435.207	4905.011	15253.00	0.3023781	1.5315918E-02	63.06406
CM-244	200.7390	28-FEB-2010	5533.018	5884.673	14140.00	0.3092899	1.5681855E-02	54.78833

Instrument : CHAMBER 022  
 Detector : 72530  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:13  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:34:44  
 Average Efficiency : 0.3177471  
 Average Efficiency Error : 8.7433932E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2989.087	3302.012	15372.00	0.3092707	1.3288673E-02	50.08852
NP-237	206.8830	28-FEB-2010	4436.701	4902.154	16304.00	0.3282550	1.6613014E-02	63.36660
CM-244	203.0208	28-FEB-2010	5532.124	5885.279	14804.00	0.3203634	1.6233236E-02	52.02282

Instrument : CHAMBER 023  
 Detector : 78264  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:13  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:34:52  
 Average Efficiency : 0.3327100  
 Average Efficiency Error : 9.1472948E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	207.4764	28-FEB-2010	2990.041	3300.395	16228.00	0.3301035	1.4170360E-02	46.67713
NP-237	207.4998	28-FEB-2010	4437.054	4904.602	16550.00	0.3322816	1.6813723E-02	63.18299
CM-244	199.8804	28-FEB-2010	5531.351	5885.314	15327.00	0.3369316	1.7065044E-02	50.76911

Instrument : CHAMBER 024  
 Detector : 76542  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:13  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:35:01  
 Average Efficiency : 0.3278600  
 Average Efficiency Error : 9.0207923E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.5218	28-FEB-2010	2988.294	3302.013	15351.00	0.3182911	1.3676404E-02	53.01509
NP-237	205.6662	28-FEB-2010	4435.963	4904.774	16397.00	0.3320666	1.6804798E-02	66.65491
CM-244	198.3060	28-FEB-2010	5530.886	5886.529	15278.00	0.3385208	1.7146233E-02	56.84327

Instrument : CHAMBER 025  
 Detector : 45-149AA5  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:14  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:35:10  
 Average Efficiency : 0.3244141  
 Average Efficiency Error : 8.9428928E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2988.683	3301.317	15182.00	0.3276230	1.4080081E-02	58.08860
NP-237	167.9916	28-FEB-2010	4432.505	4905.964	12934.00	0.3207583	1.6284095E-02	71.50992
CM-244	157.2432	28-FEB-2010	5531.275	5884.228	11591.00	0.3237635	1.6465405E-02	65.55542

Instrument : CHAMBER 026  
 Detector : 78204  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:14  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:35:19  
 Average Efficiency : 0.3149063  
 Average Efficiency Error : 9.2313625E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2992.261	3299.610	15024.00	0.3178152	1.6101750E-02	48.28163
NP-237	168.0294	28-FEB-2010	4434.923	4901.784	12780.00	0.3168793	1.6090054E-02	60.42010
CM-244	160.5822	28-FEB-2010	5534.672	5884.552	11338.00	0.3102135	1.5781984E-02	48.50001

Instrument : CHAMBER 027  
 Detector : 42484  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:14  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:35:28  
 Average Efficiency : 0.3410775  
 Average Efficiency Error : 9.9962037E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2992.456	3300.321	15132.00	0.3301674	1.6726010E-02	62.71494
NP-237	161.6154	28-FEB-2010	4432.625	4905.570	13412.00	0.3457057	1.7541273E-02	89.17722
CM-244	148.1754	28-FEB-2010	5534.870	5882.737	11761.00	0.3486037	1.7724430E-02	78.01683



Instrument : CHAMBER 028  
 Detector : 78792  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:14  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:35:37  
 Average Efficiency : 0.3059801  
 Average Efficiency Error : 8.9743091E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2989.695	3297.894	14335.00	0.3030114	1.5361304E-02	46.74673
NP-237	168.1992	28-FEB-2010	4435.454	4902.851	12365.00	0.3062848	1.5560016E-02	61.29473
CM-244	156.7614	28-FEB-2010	5530.764	5886.057	11017.00	0.3087767	1.5716689E-02	48.99289

Instrument : CHAMBER 029  
 Detector : 33454  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:14  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:35:45  
 Average Efficiency : 0.3133109  
 Average Efficiency Error : 9.1862464E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.5742	28-FEB-2010	2989.570	3299.793	14696.00	0.3076786	1.5592718E-02	62.98538
NP-237	169.7700	28-FEB-2010	4434.729	4906.466	12891.00	0.3163488	1.6061027E-02	66.74791
CM-244	154.8234	28-FEB-2010	5530.876	5886.187	11145.00	0.3162610	1.6094424E-02	59.70258

Instrument : CHAMBER 030  
 Detector : 33447  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:14  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:35:54  
 Average Efficiency : 0.3190225  
 Average Efficiency Error : 9.3542365E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.9792	28-FEB-2010	2992.473	3300.013	14522.00	0.3079955	1.5611262E-02	56.22778
NP-237	166.3758	28-FEB-2010	4433.021	4902.873	13108.00	0.3282070	1.6658967E-02	66.10047
CM-244	157.1856	28-FEB-2010	5531.626	5884.032	11533.00	0.3222875	1.6391672E-02	59.45288

Instrument : CHAMBER 031  
 Detector : 67042  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:36:03  
 Average Efficiency : 0.3300655  
 Average Efficiency Error : 9.0998914E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2989.387	3299.204	14976.00	0.3262995	1.4026678E-02	78.27441
NP-237	162.9186	28-FEB-2010	4434.493	4905.969	13197.00	0.3373988	1.7123887E-02	109.2424
CM-244	153.1968	28-FEB-2010	5535.377	5886.491	11458.00	0.3284280	1.6705802E-02	103.1350

Instrument : CHAMBER 032  
 Detector : 67041  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:36:11  
 Average Efficiency : 0.2759571  
 Average Efficiency Error : 7.6319943E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2990.309	3301.728	12645.00	0.2732977	1.1787349E-02	83.74034
NP-237	165.9822	28-FEB-2010	4434.927	4903.407	10833.00	0.2718998	1.3843792E-02	100.6996
CM-244	153.7938	28-FEB-2010	5531.147	5887.049	9962.000	0.2844382	1.4504842E-02	75.36310

Instrument : CHAMBER 033  
 Detector : 78785  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:36:20  
 Average Efficiency : 0.3132727  
 Average Efficiency Error : 8.6470284E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.4158	28-FEB-2010	2990.591	3298.173	14059.00	0.3083428	1.3270319E-02	45.02124
NP-237	161.7816	28-FEB-2010	4434.089	4906.364	12264.00	0.3158025	1.6045660E-02	60.74144
CM-244	147.2670	28-FEB-2010	5534.061	5883.941	10663.00	0.3180395	1.6197534E-02	44.95700

Instrument : CHAMBER 034  
 Detector : 61586  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:36:28  
 Average Efficiency : 0.2656702  
 Average Efficiency Error : 7.4172420E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2989.328	3297.675	14505.00	0.3052286	1.3128525E-02	140.9261
NP-237	167.2962	28-FEB-2010	4435.628	4903.241	11467.00	0.2855605	1.4524990E-02	0.0000000E+00
CM-244	154.4388	28-FEB-2010	5530.873	5887.758	7862.000	0.2232612	1.1444509E-02	77.94916

Instrument : CHAMBER 035  
 Detector : 78202  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:36:36  
 Average Efficiency : 0.3039385  
 Average Efficiency Error : 8.3862301E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2989.841	3298.805	14385.00	0.3055661	1.3145097E-02	44.60017
NP-237	168.2934	28-FEB-2010	4433.680	4901.942	12309.00	0.3046319	1.5477315E-02	57.84991
CM-244	158.8128	28-FEB-2010	5530.913	5886.751	10886.00	0.3010460	1.5326467E-02	49.59610

Instrument : CHAMBER 036  
 Detector : 78203  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:36:45  
 Average Efficiency : 0.3217056  
 Average Efficiency Error : 8.8684531E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.3204	28-FEB-2010	2990.719	3297.679	15140.00	0.3173648	1.3639865E-02	54.98193
NP-237	167.4312	28-FEB-2010	4436.454	4902.523	13140.00	0.3269882	1.6596414E-02	66.33447
CM-244	156.4188	28-FEB-2010	5534.221	5883.385	11497.00	0.3228255	1.6419753E-02	57.03784

Instrument : CHAMBER 037  
 Detector : 45-149BB5  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:16  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:36:53  
 Average Efficiency : 0.3609357  
 Average Efficiency Error : 9.9339429E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7372	28-FEB-2010	2992.027	3298.587	16638.00	0.3550694	1.5235793E-02	70.66451
NP-237	167.1294	28-FEB-2010	4435.750	4902.017	14747.00	0.3675707	1.8626243E-02	87.35378
CM-244	154.7664	28-FEB-2010	5535.521	5884.277	12795.00	0.3630245	1.8432988E-02	72.91970

Instrument : CHAMBER 038  
 Detector : 72532  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 7-JUL-2009 20:14:26  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 8-JUL-2009 07:31:06  
 Average Efficiency : 0.3440174  
 Average Efficiency Error : 9.4721830E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1408	28-FEB-2010	2989.665	3301.822	16315.00	0.3439969	1.4765469E-02	56.35861
NP-237	170.0886	28-FEB-2010	4435.489	4906.553	14189.00	0.3474887	1.7617788E-02	67.43947
CM-244	157.7460	28-FEB-2010	5532.401	5886.525	12237.00	0.3406941	1.7311083E-02	58.94252

Instrument : CHAMBER 039  
 Detector : 45-149BB2  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:16  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:37:12  
 Average Efficiency : 0.3633558  
 Average Efficiency Error : 1.0003410E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2988.145	3298.732	16409.00	0.3601976	1.5459352E-02	56.41948
NP-237	159.1506	28-FEB-2010	4435.549	4903.088	13988.00	0.3661838	1.8569179E-02	74.12836
CM-244	151.7142	28-FEB-2010	5534.287	5885.251	12613.00	0.3650793	1.8541345E-02	65.99350

Instrument : CHAMBER 040  
 Detector : 78773  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:16  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:37:21  
 Average Efficiency : 0.3236358  
 Average Efficiency Error : 8.9229112E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4828	28-FEB-2010	2989.803	3299.657	15035.00	0.3262324	1.4022750E-02	46.94137
NP-237	166.8174	28-FEB-2010	4435.891	4904.106	12881.00	0.3216923	1.6332518E-02	63.17031
CM-244	155.0100	28-FEB-2010	5531.706	5883.967	11365.00	0.3220472	1.6383301E-02	50.43327

Instrument : CHAMBER 041  
 Detector : 78205  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:16  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:37:34  
 Average Efficiency : 0.3271760  
 Average Efficiency Error : 9.0137199E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.9034	28-FEB-2010	2988.799	3301.675	15672.00	0.3243389	1.3931162E-02	49.27284
NP-237	171.2268	28-FEB-2010	4434.272	4902.386	13569.00	0.3301208	1.6747680E-02	61.97926
CM-244	159.5796	28-FEB-2010	5531.847	5882.877	11929.00	0.3283235	1.6689207E-02	48.64401

Instrument : CHAMBER 042  
 Detector : 78793  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:16  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:37:44  
 Average Efficiency : 0.3312008  
 Average Efficiency Error : 9.1335429E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	188.7090	28-FEB-2010	2991.257	3302.160	14934.00	0.3339659	1.4356897E-02	46.01327
NP-237	159.6558	28-FEB-2010	4435.667	4904.225	12775.00	0.3333308	1.6925573E-02	66.93758
CM-244	150.5208	28-FEB-2010	5531.759	5883.730	11154.00	0.3254806	1.6563315E-02	47.72076

Instrument : CHAMBER 043  
 Detector : 76543  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:17  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:37:56  
 Average Efficiency : 0.3406220  
 Average Efficiency Error : 9.3815317E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7708	28-FEB-2010	2990.989	3298.318	15838.00	0.3379508	1.4513168E-02	53.32027
NP-237	168.7422	28-FEB-2010	4436.983	4902.370	13848.00	0.3419185	1.7341113E-02	70.53008
CM-244	156.3252	28-FEB-2010	5532.584	5886.039	12214.00	0.3431670	1.7437097E-02	50.59512

Instrument : CHAMBER 044  
 Detector : 79459  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 7-JUL-2009 08:06:38  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 7-JUL-2009 13:33:56  
 Average Efficiency : 0.3539364  
 Average Efficiency Error : 9.7440388E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2988.854	3300.902	16237.00	0.3523722	1.5126155E-02	49.91737
NP-237	166.6248	28-FEB-2010	4435.084	4901.492	14193.00	0.3548543	1.7991094E-02	62.49409
CM-244	155.8290	28-FEB-2010	5533.776	5883.326	12603.00	0.3552387	1.8041683E-02	52.59266

Instrument : CHAMBER 045  
 Detector : 67601  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:17  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:38:13  
 Average Efficiency : 0.3405751  
 Average Efficiency Error : 9.3894145E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	186.9936	28-FEB-2010	2991.770	3299.125	14966.00	0.3377543	1.4519182E-02	57.98501
NP-237	160.8066	28-FEB-2010	4433.748	4903.897	13081.00	0.3389117	1.7202776E-02	67.02407
CM-244	145.8384	28-FEB-2010	5533.235	5887.359	11506.00	0.3464760	1.7622491E-02	62.48396

Instrument : CHAMBER 046  
 Detector : 76544  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:17  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:38:21  
 Average Efficiency : 0.3406382  
 Average Efficiency Error : 9.3857087E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2989.077	3298.635	15535.00	0.3366195	1.4460829E-02	49.62128
NP-237	164.6658	28-FEB-2010	4433.627	4906.487	13519.00	0.3420215	1.7352322E-02	69.09070
CM-244	151.3824	28-FEB-2010	5533.329	5885.134	11898.00	0.3451394	1.7544771E-02	55.17302

Instrument : CHAMBER 047  
 Detector : 46-089B1  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:17  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:38:30  
 Average Efficiency : 0.3442340  
 Average Efficiency Error : 9.4810873E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2987.977	3301.361	15865.00	0.3390196	1.4558652E-02	55.57606
NP-237	168.3948	28-FEB-2010	4433.363	4905.447	13899.00	0.3438680	1.7439116E-02	74.62081
CM-244	154.6032	28-FEB-2010	5532.313	5886.846	12409.00	0.3525089	1.7907353E-02	58.04284

Instrument : CHAMBER 048  
 Detector : 42483  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 6-JUL-2009 09:46:17  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 6-JUL-2009 14:38:39  
 Average Efficiency : 0.3178092  
 Average Efficiency Error : 8.7683024E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2988.411	3301.246	14378.00	0.3162740	1.3605888E-02	55.68159
NP-237	161.5530	28-FEB-2010	4433.969	4903.143	12372.00	0.3190103	1.6206456E-02	67.40500
CM-244	151.1856	28-FEB-2010	5530.501	5887.230	10976.00	0.3187887	1.6227484E-02	60.96161

Instrument : CHAMBER 065  
 Detector : 68551  
 Standard ID : AESS-001  
 Standard Reference Date : 20-FEB-2008 09:54:53  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:10  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:06:51  
 Average Efficiency : 0.3167298  
 Average Efficiency Error : 8.7357797E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.6698	28-FEB-2010	2992.172	3297.923	15001.00	0.3033305	1.3038947E-02	62.70693
NP-237	171.0024	28-FEB-2010	4436.297	4904.907	13337.00	0.3249072	1.6487280E-02	73.64597
CM-244	158.1060	28-FEB-2010	5532.615	5884.733	11898.00	0.3304830	1.6799837E-02	62.05407

Instrument : CHAMBER 066  
 Detector : 46-089C1  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:10  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:07:05  
 Average Efficiency : 0.3104099  
 Average Efficiency Error : 8.5468190E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1144	28-FEB-2010	2992.142	3300.807	14611.00	0.3081217	1.3251217E-02	57.90394
NP-237	200.4990	28-FEB-2010	4436.247	4906.352	15119.00	0.3141508	1.5914036E-02	71.36474
CM-244	196.5558	28-FEB-2010	5534.784	5886.688	13872.00	0.3099799	1.5721031E-02	60.13244

Instrument : CHAMBER 067  
 Detector : 46-089B4  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:10  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:07:16  
 Average Efficiency : 0.3225107  
 Average Efficiency Error : 8.8746333E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2988.144	3301.594	15198.00	0.3160322	1.3581690E-02	73.87538
NP-237	203.2080	28-FEB-2010	4436.169	4905.946	16027.00	0.3285710	1.6632373E-02	84.27850
CM-244	197.2236	28-FEB-2010	5533.963	5885.648	14635.00	0.3261202	1.6527411E-02	74.53841



Instrument : CHAMBER 068  
 Detector : 78794  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:10  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:07:28  
 Average Efficiency : 0.3018608  
 Average Efficiency Error : 8.3120642E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.1222	28-FEB-2010	2990.601	3300.139	14643.00	0.2998493	1.2894920E-02	46.91775
NP-237	204.2586	28-FEB-2010	4435.756	4903.729	14909.00	0.3041092	1.5408116E-02	62.03638
CM-244	198.8100	28-FEB-2010	5531.794	5886.867	13681.00	0.3024790	1.5343496E-02	51.78417

Instrument : CHAMBER 069  
 Detector : 78795  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:10  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:07:42  
 Average Efficiency : 0.3159011  
 Average Efficiency Error : 8.6903321E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.7452	28-FEB-2010	2991.901	3298.738	15562.00	0.3116586	1.3388185E-02	51.55959
NP-237	209.5938	28-FEB-2010	4437.201	4903.207	15965.00	0.3173516	1.6065169E-02	63.95503
CM-244	202.7478	28-FEB-2010	5534.874	5884.048	14792.00	0.3206663	1.6248737E-02	52.59375

Instrument : CHAMBER 070  
 Detector : 46-089B2  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:10  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:07:53  
 Average Efficiency : 0.3520789  
 Average Efficiency Error : 9.6757710E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2988.641	3300.492	16713.00	0.3463008	1.4858479E-02	61.95700
NP-237	204.7038	28-FEB-2010	4435.833	4904.443	17344.00	0.3529772	1.7851282E-02	74.78303
CM-244	195.0060	28-FEB-2010	5531.433	5882.799	15964.00	0.3598273	1.8215435E-02	68.73500

Instrument : CHAMBER 071  
 Detector : 64259  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:08:07  
 Average Efficiency : 0.3163752  
 Average Efficiency Error : 8.7076994E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2992.476	3301.614	15079.00	0.3078622	1.3232440E-02	56.06450
NP-237	205.0260	28-FEB-2010	4435.387	4902.436	15763.00	0.3203167	1.6217813E-02	68.61439
CM-244	199.6806	28-FEB-2010	5534.462	5883.334	14790.00	0.3255263	1.6495051E-02	58.90277

Instrument : CHAMBER 072  
 Detector : 45-149AA3  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:08:19  
 Average Efficiency : 0.3234064  
 Average Efficiency Error : 8.8950237E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.0418	28-FEB-2010	2988.586	3301.014	15743.00	0.3224942	1.3850860E-02	54.24233
NP-237	209.2716	28-FEB-2010	4432.963	4902.126	16207.00	0.3226633	1.6331071E-02	69.06731
CM-244	199.6488	28-FEB-2010	5535.050	5886.750	14785.00	0.3254575	1.6491652E-02	56.72540

Instrument : CHAMBER 073  
 Detector : 78775  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:08:30  
 Average Efficiency : 0.3320738  
 Average Efficiency Error : 9.1329338E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.3736	28-FEB-2010	2991.870	3299.007	15813.00	0.3281374	1.4092137E-02	50.25317
NP-237	204.0192	28-FEB-2010	4435.703	4904.982	16193.00	0.3306793	1.6736971E-02	68.87427
CM-244	197.2128	28-FEB-2010	5532.962	5884.931	15235.00	0.3394034	1.7191524E-02	49.27633

Instrument : CHAMBER 074  
 Detector : 78266  
 Standard ID : AESS-010  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:08:42  
 Average Efficiency : 0.3124804  
 Average Efficiency Error : 8.6027775E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.0008	28-FEB-2010	2990.625	3300.254	14705.00	0.3072563	1.3212435E-02	51.15489
NP-237	202.9926	28-FEB-2010	4435.417	4902.858	15345.00	0.3149306	1.5950510E-02	57.41002
CM-244	196.2330	28-FEB-2010	5535.258	5884.259	14186.00	0.3177475	1.6109865E-02	49.01177

Instrument : CHAMBER 075  
 Detector : 68550  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:08:53  
 Average Efficiency : 0.2973897  
 Average Efficiency Error : 8.1859389E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	212.8284	28-FEB-2010	2988.563	3301.861	14863.00	0.2947582	1.2672522E-02	56.94482
NP-237	214.4868	28-FEB-2010	4432.969	4904.420	15483.00	0.3006926	1.5227719E-02	69.06491
CM-244	208.4184	28-FEB-2010	5535.562	5884.044	14125.00	0.2978785	1.5103404E-02	58.86678

Instrument : CHAMBER 076  
 Detector : 78779  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:09:04  
 Average Efficiency : 0.3059446  
 Average Efficiency Error : 8.4217470E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.2200	28-FEB-2010	2992.408	3300.679	14839.00	0.3037126	1.3057882E-02	46.65081
NP-237	205.8930	28-FEB-2010	4437.552	4904.251	15221.00	0.3079897	1.5600574E-02	59.39308
CM-244	203.1954	28-FEB-2010	5530.870	5885.252	14195.00	0.3070807	1.5568880E-02	50.95067

Instrument : CHAMBER 077  
 Detector : 67576  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:11  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:09:15  
 Average Efficiency : 0.3220192  
 Average Efficiency Error : 8.8578872E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2988.825	3301.085	15444.00	0.3200761	1.3751586E-02	52.27526
NP-237	210.2526	28-FEB-2010	4432.612	4901.681	16184.00	0.3207017	1.6232070E-02	64.77522
CM-244	201.9108	28-FEB-2010	5534.546	5886.248	14985.00	0.3261909	1.6525861E-02	54.87537

Instrument : CHAMBER 078  
 Detector : 67577  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:11  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:09:25  
 Average Efficiency : 0.3269402  
 Average Efficiency Error : 8.9888843E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2992.395	3299.584	16294.00	0.3202777	1.3747618E-02	52.02948
NP-237	211.7160	28-FEB-2010	4433.349	4904.419	17152.00	0.3375357	1.7072473E-02	63.87207
CM-244	207.3882	28-FEB-2010	5535.593	5884.350	15420.00	0.3266392	1.6542494E-02	56.64688

Instrument : CHAMBER 079  
 Detector : 67598  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:11  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:09:33  
 Average Efficiency : 0.3269641  
 Average Efficiency Error : 8.9949844E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0270	28-FEB-2010	2987.535	3297.935	15565.00	0.3219998	1.3832338E-02	51.91238
NP-237	200.6460	28-FEB-2010	4435.153	4903.332	15964.00	0.3314978	1.6781278E-02	65.57870
CM-244	195.9270	28-FEB-2010	5530.500	5882.333	14697.00	0.3297131	1.6708534E-02	52.00982

Instrument : CHAMBER 080  
 Detector : 78197  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:11  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:09:43  
 Average Efficiency : 0.3342651  
 Average Efficiency Error : 9.1930544E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2992.338	3298.189	15890.00	0.3286708	1.4113899E-02	49.39791
NP-237	199.3962	28-FEB-2010	4434.851	4901.472	16357.00	0.3417528	1.7295377E-02	67.37957
CM-244	198.6402	28-FEB-2010	5531.493	5883.930	15145.00	0.3351447	1.6977096E-02	53.36457

Instrument : CHAMBER 081  
 Detector : 72533  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:11  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:09:58  
 Average Efficiency : 1.0059110E-03  
 Average Efficiency Error : 1.4002950E-04  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.0798	28-FEB-2010	2985.980	3302.417	45.00000	8.9930405E-04	4.4010404E-04	0.0000000E+00
NP-237	208.5846	28-FEB-2010	4432.287	4905.979	16296.00	0.3255036	1.6473748E-02	140.8390
CM-244	205.5828	28-FEB-2010	5534.795	5885.572	3965.000	8.4768414E-02	4.4471347E-03	0.0000000E+00

Instrument : CHAMBER 082  
 Detector : 64263  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:11  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:10:11  
 Average Efficiency : 0.3262649  
 Average Efficiency Error : 8.9742821E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.1856	28-FEB-2010	2990.419	3298.608	15507.00	0.3237216	1.3907208E-02	58.84102
NP-237	208.8990	28-FEB-2010	4437.000	4905.115	16371.00	0.3264953	1.6523048E-02	77.98001
CM-244	198.1458	28-FEB-2010	5534.320	5885.085	14864.00	0.3296992	1.6705383E-02	70.67408

Instrument : CHAMBER 083  
 Detector : 64278  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:10:22  
 Average Efficiency : 0.3331127  
 Average Efficiency Error : 9.1688316E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.6468	28-FEB-2010	2987.455	3299.407	15432.00	0.3182384	1.3672802E-02	55.81121
NP-237	202.9140	28-FEB-2010	4433.838	4906.607	17206.00	0.3532467	1.7866544E-02	69.77620
CM-244	199.3140	28-FEB-2010	5532.253	5885.057	15334.00	0.3379439	1.7116275E-02	60.81681

Instrument : CHAMBER 084  
 Detector : 78265  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:10:32  
 Average Efficiency : 0.3434564  
 Average Efficiency Error : 9.4431741E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	205.5870	28-FEB-2010	2988.133	3299.227	16254.00	0.3337056	1.4324601E-02	49.70576
NP-237	203.4984	28-FEB-2010	4433.289	4901.844	17176.00	0.3516426	1.7785732E-02	63.55498
CM-244	197.1096	28-FEB-2010	5535.275	5884.618	15707.00	0.3502632	1.7734783E-02	51.80883

Instrument : CHAMBER 085  
 Detector : 78776  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:10:43  
 Average Efficiency : 0.3254945  
 Average Efficiency Error : 8.9515289E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2989.612	3299.207	15817.00	0.3203625	1.3758179E-02	45.89981
NP-237	210.1548	28-FEB-2010	4434.183	4901.520	16560.00	0.3282868	1.6611453E-02	60.08111
CM-244	200.7390	28-FEB-2010	5533.754	5882.654	15090.00	0.3302506	1.6729988E-02	50.06017

Instrument : CHAMBER 086  
 Detector : 78198  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:10:52  
 Average Efficiency : 0.2987570  
 Average Efficiency Error : 8.2268827E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2989.886	3300.091	14561.00	0.2931078	1.2606329E-02	46.08396
NP-237	206.8830	28-FEB-2010	4433.582	4903.927	15096.00	0.3040077	1.5400495E-02	61.33533
CM-244	203.0208	28-FEB-2010	5531.751	5882.863	13945.00	0.3018999	1.5310007E-02	49.24375

Instrument : CHAMBER 087  
 Detector : 78199  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:11:02  
 Average Efficiency : 0.3162691  
 Average Efficiency Error : 8.7025622E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	207.4764	28-FEB-2010	2990.385	3299.009	15285.00	0.3109341	1.3361266E-02	44.58315
NP-237	207.4998	28-FEB-2010	4436.772	4904.542	15818.00	0.3175828	1.6078727E-02	57.63754
CM-244	199.8804	28-FEB-2010	5534.083	5883.178	14684.00	0.3229105	1.6363984E-02	49.88237

Instrument : CHAMBER 088  
 Detector : 33452  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:11:13  
 Average Efficiency : 0.2998269  
 Average Efficiency Error : 8.2606915E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.5218	28-FEB-2010	2990.970	3298.296	14025.00	0.2908646	1.2518696E-02	52.96125
NP-237	205.6662	28-FEB-2010	4436.463	4902.334	15055.00	0.3049660	1.5449598E-02	63.94186
CM-244	198.3060	28-FEB-2010	5534.583	5887.587	13923.00	0.3085581	1.5648056E-02	61.30964

Instrument : CHAMBER 089  
 Detector : 78262  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:13  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:11:23  
 Average Efficiency : 0.2963288  
 Average Efficiency Error : 8.1822695E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2992.075	3297.767	13916.00	0.3003191	1.2927603E-02	50.98783
NP-237	167.9916	28-FEB-2010	4432.406	4901.978	12013.00	0.2979151	1.5141796E-02	61.57396
CM-244	157.2432	28-FEB-2010	5532.097	5882.869	10361.00	0.2896218	1.4757983E-02	57.67693

Instrument : CHAMBER 090  
 Detector : 78263  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:13  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:11:39  
 Average Efficiency : 0.3241549  
 Average Efficiency Error : 9.4982684E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2990.462	3300.982	15417.00	0.3261584	1.6518990E-02	52.53284
NP-237	168.0294	28-FEB-2010	4434.552	4903.775	13172.00	0.3265822	1.6575273E-02	66.40552
CM-244	160.5822	28-FEB-2010	5532.754	5885.804	11687.00	0.3198750	1.6265199E-02	57.74523

Instrument : CHAMBER 091  
 Detector : 78259  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:13  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:11:52  
 Average Efficiency : 0.3403451  
 Average Efficiency Error : 9.9735688E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2990.268	3298.949	15270.00	0.3332087	1.6878121E-02	49.79137
NP-237	161.6154	28-FEB-2010	4433.436	4901.824	13289.00	0.3425658	1.7384235E-02	66.53712
CM-244	148.1754	28-FEB-2010	5531.214	5887.413	11658.00	0.3458194	1.7585119E-02	55.76472



Instrument : CHAMBER 092  
 Detector : 79457  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:13  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:12:01  
 Average Efficiency : 0.3244753  
 Average Efficiency Error : 9.5090605E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2992.004	3300.399	15511.00	0.3276620	1.6594216E-02	50.06383
NP-237	168.1992	28-FEB-2010	4435.019	4904.862	13201.00	0.3269055	1.6591255E-02	61.45340
CM-244	156.7614	28-FEB-2010	5533.010	5884.790	11382.00	0.3190994	1.6232992E-02	50.60435

Instrument : CHAMBER 093  
 Detector : 33206  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:13  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:12:10  
 Average Efficiency : 0.3253579  
 Average Efficiency Error : 9.5347259E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.5742	28-FEB-2010	2988.963	3299.960	15194.00	0.3181445	1.6116098E-02	50.56812
NP-237	169.7700	28-FEB-2010	4434.063	4902.978	13286.00	0.3260259	1.6544953E-02	75.56580
CM-244	154.8234	28-FEB-2010	5531.085	5883.424	11716.00	0.3326032	1.6911702E-02	57.95201

Instrument : CHAMBER 094  
 Detector : 78267  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:13  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:12:19  
 Average Efficiency : 0.3085452  
 Average Efficiency Error : 9.0499781E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.9792	28-FEB-2010	2990.912	3298.303	14487.00	0.3072813	1.5575566E-02	44.68866
NP-237	166.3758	28-FEB-2010	4435.971	4905.664	12598.00	0.3154770	1.6022354E-02	64.16422
CM-244	157.1856	28-FEB-2010	5534.211	5886.502	10849.00	0.3033472	1.5444501E-02	48.21400

Instrument : CHAMBER 095  
 Detector : 64279  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:14  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:12:27  
 Average Efficiency : 0.3068112  
 Average Efficiency Error : 8.4704254E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2989.056	3301.826	13965.00	0.3043179	1.3098821E-02	55.82520
NP-237	162.9186	28-FEB-2010	4435.330	4905.275	12386.00	0.3167128	1.6089419E-02	68.30973
CM-244	153.1968	28-FEB-2010	5534.057	5886.430	10508.00	0.3012262	1.5345651E-02	56.59253

Instrument : CHAMBER 096  
 Detector : 67605  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:14  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:12:36  
 Average Efficiency : 0.3103104  
 Average Efficiency Error : 8.5620275E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2990.311	3298.177	14291.00	0.3089209	1.3291076E-02	50.28194
NP-237	165.9822	28-FEB-2010	4434.251	4906.198	12426.00	0.3117568	1.5837051E-02	61.11779
CM-244	153.7938	28-FEB-2010	5533.120	5882.408	10880.00	0.3108360	1.5824955E-02	51.23636

Instrument : CHAMBER 097  
 Detector : 67599  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:14  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:12:44  
 Average Efficiency : 0.3440487  
 Average Efficiency Error : 9.4836140E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.4158	28-FEB-2010	2989.746	3302.068	15243.00	0.3343306	1.4367314E-02	49.90135
NP-237	161.7816	28-FEB-2010	4437.101	4903.794	13519.00	0.3481746	1.7664408E-02	69.66666
CM-244	147.2670	28-FEB-2010	5531.052	5886.116	11904.00	0.3550793	1.8049983E-02	57.03643

Instrument : CHAMBER 098  
 Detector : 68644  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:14  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:12:53  
 Average Efficiency : 0.3341772  
 Average Efficiency Error : 9.2099942E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2989.589	3298.128	15405.00	0.3241865	1.3928778E-02	51.17890
NP-237	167.2962	28-FEB-2010	4432.836	4901.640	13623.00	0.3392162	1.7208137E-02	68.23425
CM-244	154.4388	28-FEB-2010	5531.873	5883.257	12118.00	0.3447607	1.7520264E-02	52.08022

Instrument : CHAMBER 099  
 Detector : 70317  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:14  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:13:03  
 Average Efficiency : 0.3431231  
 Average Efficiency Error : 9.4483467E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2990.876	3301.163	16106.00	0.3421397	1.4688905E-02	50.68632
NP-237	168.2934	28-FEB-2010	4434.526	4903.945	13954.00	0.3454547	1.7518591E-02	61.64373
CM-244	158.8128	28-FEB-2010	5533.432	5886.885	12370.00	0.3422045	1.7384758E-02	52.31840

Instrument : CHAMBER 100  
 Detector : 79456  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:14  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:13:12  
 Average Efficiency : 0.3427027  
 Average Efficiency Error : 9.4427206E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2992.287	3297.799	15520.00	0.3363194	1.4448194E-02	50.00877
NP-237	164.6658	28-FEB-2010	4436.422	4905.631	13582.00	0.3435974	1.7431144E-02	61.98585
CM-244	151.3824	28-FEB-2010	5534.572	5887.590	12114.00	0.3515212	1.7863980E-02	52.94975

Instrument : CHAMBER 101  
 Detector : 64253  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:13:22  
 Average Efficiency : 0.3390052  
 Average Efficiency Error : 9.3409885E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7372	28-FEB-2010	2992.433	3299.297	15460.00	0.3299631	1.4176095E-02	61.39046
NP-237	167.1294	28-FEB-2010	4436.714	4901.796	13907.00	0.3466887	1.7581994E-02	74.45712
CM-244	154.7664	28-FEB-2010	5531.777	5885.188	12159.00	0.3452022	1.7541731E-02	61.78313

Instrument : CHAMBER 102  
 Detector : 72525  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:13:31  
 Average Efficiency : 0.3328035  
 Average Efficiency Error : 9.1680549E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1408	28-FEB-2010	2992.102	3300.657	15781.00	0.3327644	1.4291358E-02	57.28693
NP-237	170.0886	28-FEB-2010	4432.858	4904.949	13683.00	0.3351520	1.7000843E-02	70.05949
CM-244	157.7460	28-FEB-2010	5531.106	5882.690	11868.00	0.3305628	1.6804401E-02	60.52639

Instrument : CHAMBER 103  
 Detector : 79461  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:13:40  
 Average Efficiency : 0.3354990  
 Average Efficiency Error : 9.2500327E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2988.996	3300.314	15148.00	0.3325511	1.4292428E-02	46.53494
NP-237	159.1506	28-FEB-2010	4436.805	4901.981	13231.00	0.3463839	1.7579062E-02	65.39693
CM-244	151.7142	28-FEB-2010	5532.506	5886.425	11383.00	0.3296518	1.6769741E-02	53.08098

Instrument : CHAMBER 104  
 Detector : 72524  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:13:48  
 Average Efficiency : 0.3172685  
 Average Efficiency Error : 8.7505886E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4828	28-FEB-2010	2990.719	3300.868	14808.00	0.3213409	1.3816299E-02	52.43279
NP-237	166.8174	28-FEB-2010	4437.132	4904.901	12602.00	0.3146936	1.5982572E-02	60.08082
CM-244	155.0100	28-FEB-2010	5531.506	5883.017	11092.00	0.3143873	1.6000355E-02	48.93826

Instrument : CHAMBER 105  
 Detector : 78777  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:13:56  
 Average Efficiency : 0.3238136  
 Average Efficiency Error : 8.9225518E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.9034	28-FEB-2010	2991.574	3300.708	15632.00	0.3235499	1.3897874E-02	47.98710
NP-237	171.2268	28-FEB-2010	4435.406	4903.467	13447.00	0.3271988	1.6601518E-02	65.57580
CM-244	159.5796	28-FEB-2010	5531.275	5883.854	11655.00	0.3209064	1.6318357E-02	49.59695

Instrument : CHAMBER 106  
 Detector : 64274  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:14:04  
 Average Efficiency : 0.3300298  
 Average Efficiency Error : 9.1015678E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	188.7090	28-FEB-2010	2989.941	3301.958	14641.00	0.3274217	1.4080711E-02	51.04536
NP-237	159.6558	28-FEB-2010	4435.855	4902.069	12766.00	0.3331273	1.6915364E-02	68.33770
CM-244	150.5208	28-FEB-2010	5534.023	5883.359	11329.00	0.3306891	1.6823869E-02	57.44720

Instrument : CHAMBER 107  
 Detector : 67578  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:16  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:14:15  
 Average Efficiency : 0.3045647  
 Average Efficiency Error : 8.4048761E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7708	28-FEB-2010	2987.523	3301.257	14050.00	0.2997997	1.2902850E-02	50.05696
NP-237	168.7422	28-FEB-2010	4435.381	4903.438	12388.00	0.3058615	1.5538067E-02	64.39712
CM-244	156.3252	28-FEB-2010	5532.229	5882.600	11043.00	0.3103665	1.5796915E-02	54.52126

Instrument : CHAMBER 108  
 Detector : 78778  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:16  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:14:24  
 Average Efficiency : 0.3360237  
 Average Efficiency Error : 9.2592761E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2987.893	3298.158	15260.00	0.3312062	1.4232747E-02	47.93427
NP-237	166.6248	28-FEB-2010	4435.321	4903.667	13641.00	0.3410752	1.7302046E-02	70.21724
CM-244	155.8290	28-FEB-2010	5531.222	5883.353	11990.00	0.3380632	1.7182823E-02	49.12675

Instrument : CHAMBER 109  
 Detector : 79463  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:16  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:14:36  
 Average Efficiency : 0.3557599  
 Average Efficiency Error : 9.8008178E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	186.9936	28-FEB-2010	2989.195	3299.997	15695.00	0.3542219	1.5214318E-02	44.90919
NP-237	160.8066	28-FEB-2010	4435.631	4906.161	13634.00	0.3532281	1.7918682E-02	60.71558
CM-244	145.8384	28-FEB-2010	5531.938	5886.333	11971.00	0.3606424	1.8330947E-02	47.40115

Instrument : CHAMBER 110  
 Detector : 67602  
 Standard ID : AESS-046  
 Standard Reference Date : 8-JAN-2007 09:29:00  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:16  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:15:06  
 Average Efficiency : 0.3174780  
 Average Efficiency Error : 8.7590944E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.6531	28-FEB-2010	2989.370	3301.157	14395.00	0.3105389	1.3360999E-02	53.22070
NP-237	164.3834	28-FEB-2010	4436.284	4904.992	12802.00	0.3244717	1.6475134E-02	64.57879
CM-244	159.4253	28-FEB-2010	5535.250	5883.287	11162.00	0.3209743	1.6333863E-02	56.77616

Instrument : CHAMBER 111  
 Detector : 79462  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:16  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:15:22  
 Average Efficiency : 0.3410317  
 Average Efficiency Error : 9.3937013E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2990.820	3300.305	15891.00	0.3395850	1.4582562E-02	46.16263
NP-237	168.3948	28-FEB-2010	4436.744	4905.500	13621.00	0.3369952	1.7095437E-02	61.95173
CM-244	154.6032	28-FEB-2010	5535.002	5885.661	12226.00	0.3474574	1.7654790E-02	55.37262

Instrument : CHAMBER 112  
 Detector : 78261  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 9-JUL-2009 08:08:16  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 9-JUL-2009 13:15:42  
 Average Efficiency : 0.3101838  
 Average Efficiency Error : 8.5619837E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2988.969	3300.635	14006.00	0.3081187	1.3261668E-02	44.59222
NP-237	161.5530	28-FEB-2010	4436.114	4905.135	12212.00	0.3149208	1.6001921E-02	60.98758
CM-244	151.1856	28-FEB-2010	5532.983	5884.981	10616.00	0.3085150	1.5713703E-02	48.71024

Instrument : CHAMBER 113  
 Detector : 45-111B4  
 Standard ID : AESS-001  
 Standard Reference Date : 20-FEB-2008 09:54:53  
 Calibration Analysis Date/Time : 15-JUN-2009 10:34:17  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:07:19  
 Average Efficiency : 0.2512662  
 Average Efficiency Error : 6.9272262E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.6698	28-FEB-2010	2989.972	3300.471	15191.00	0.2456316	1.0556183E-02	72.56663
NP-237	171.0024	28-FEB-2010	4437.156	4904.493	13091.00	0.2551526	1.2951119E-02	73.75543
CM-244	158.1060	28-FEB-2010	5530.767	5884.366	11544.00	0.2559068	1.3015254E-02	68.82397

Instrument : CHAMBER 114  
 Detector : 78258  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 15-JUN-2009 10:34:22  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:07:32  
 Average Efficiency : 0.2564797  
 Average Efficiency Error : 7.0553892E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2989.532	3297.883	15685.00	0.2560320	1.0996984E-02	48.44337
NP-237	205.0260	28-FEB-2010	4436.498	4905.438	15877.00	0.2581105	1.3067111E-02	55.54007
CM-244	199.6806	28-FEB-2010	5531.981	5882.667	14544.00	0.2554991	1.2949442E-02	50.71301

Instrument : CHAMBER 115  
 Detector : 45-132FF4  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 15-JUN-2009 10:34:29  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:07:47  
 Average Efficiency : 0.2643126  
 Average Efficiency Error : 7.2705052E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1144	28-FEB-2010	2988.079	3298.318	15573.00	0.2625803	1.1279631E-02	58.83834
NP-237	200.4990	28-FEB-2010	4433.074	4904.453	15892.00	0.2641877	1.3374619E-02	66.18045
CM-244	196.5558	28-FEB-2010	5534.102	5886.452	14967.00	0.2669303	1.3523758E-02	61.46997



Instrument : CHAMBER 116  
 Detector : 45-132FF2  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 15-JUN-2009 10:34:34  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:08:01  
 Average Efficiency : 0.2631126  
 Average Efficiency Error : 7.2348751E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.0418	28-FEB-2010	2990.014	3298.635	16042.00	0.2627395	1.1280742E-02	61.24348
NP-237	209.2716	28-FEB-2010	4434.264	4904.602	16410.00	0.2613400	1.3225358E-02	66.02269
CM-244	199.6488	28-FEB-2010	5533.481	5885.701	15114.00	0.2654757	1.3448412E-02	61.02598

Instrument : CHAMBER 117  
 Detector : 33450  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 15-JUN-2009 10:34:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:08:13  
 Average Efficiency : 0.2535215  
 Average Efficiency Error : 6.9773588E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2990.116	3298.892	15044.00	0.2501165	1.0750802E-02	64.95226
NP-237	203.2080	28-FEB-2010	4433.860	4903.379	15484.00	0.2539584	1.2860937E-02	65.91832
CM-244	197.2236	28-FEB-2010	5530.688	5887.135	14517.00	0.2581113	1.3082263E-02	64.26273

Instrument : CHAMBER 118  
 Detector : 75544  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 15-JUN-2009 10:34:45  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:08:26  
 Average Efficiency : 0.2556936  
 Average Efficiency Error : 7.0353490E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.3736	28-FEB-2010	2988.613	3302.455	15383.00	0.2552249	1.0966013E-02	45.61243
NP-237	204.0192	28-FEB-2010	4433.239	4903.545	15743.00	0.2572047	1.3022603E-02	54.38210
CM-244	197.2128	28-FEB-2010	5532.271	5884.351	14337.00	0.2548569	1.2919434E-02	43.95222

Instrument : CHAMBER 119  
 Detector : 74429  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 18-MAY-2009 09:45:14  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 2-FEB-2009 15:15:38  
 Average Efficiency : 0.2936279  
 Average Efficiency Error : 1.2630888E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.1222	28-FEB-2010	2992.004	3299.253	8361.000	0.2936279	1.2630888E-02	64.24287
NP-237	204.2586	28-FEB-2010	4432.548	4906.013	0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
CM-244	198.8100	28-FEB-2010	5530.584	5883.165	0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Instrument : CHAMBER 120  
 Detector : 74430  
 Standard ID : AESS-010  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 18-MAY-2009 09:45:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:08:40  
 Average Efficiency : 0.2593915  
 Average Efficiency Error : 7.1360366E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.0008	28-FEB-2010	2987.625	3300.890	15609.00	0.2605769	1.1193055E-02	46.01385
NP-237	202.9926	28-FEB-2010	4433.308	4901.537	15660.00	0.2571375	1.3020062E-02	59.70750
CM-244	196.2330	28-FEB-2010	5532.202	5887.484	14591.00	0.2600576	1.3179922E-02	50.41711

Instrument : CHAMBER 121  
 Detector : 75545  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 15-JUN-2009 10:34:51  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:09:11  
 Average Efficiency : 0.2472194  
 Average Efficiency Error : 6.8029435E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.7452	28-FEB-2010	2989.776	3297.922	15239.00	0.2440135	1.0486079E-02	48.93954
NP-237	209.5938	28-FEB-2010	4435.937	4904.696	15716.00	0.2499344	1.2654767E-02	57.25295
CM-244	202.7478	28-FEB-2010	5531.058	5887.000	14402.00	0.2491659	1.2630149E-02	55.83962

Instrument : CHAMBER 122  
 Detector : 75546  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 15-JUN-2009 10:34:57  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:09:33  
 Average Efficiency : 0.2532469  
 Average Efficiency Error : 6.9644302E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	212.8284	28-FEB-2010	2988.018	3300.875	15833.00	0.2510521	1.0781343E-02	48.34190
NP-237	214.4868	28-FEB-2010	4433.647	4902.829	16551.00	0.2571815	1.3013585E-02	59.44254
CM-244	208.4184	28-FEB-2010	5535.492	5886.909	15007.00	0.2525347	1.2793982E-02	56.97988

Instrument : CHAMBER 123  
 Detector : 45-142V3  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 15-JUN-2009 10:35:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:09:44  
 Average Efficiency : 0.2590818  
 Average Efficiency Error : 7.1274652E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2990.302	3298.244	15603.00	0.2584944	1.1103758E-02	65.04736
NP-237	204.7038	28-FEB-2010	4435.146	4903.289	15797.00	0.2572043	1.3022059E-02	64.99042
CM-244	195.0060	28-FEB-2010	5533.976	5884.017	14559.00	0.2618713	1.3272266E-02	65.77435

Instrument : CHAMBER 124  
 Detector : 45-142V2  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 15-JUN-2009 10:35:08  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:09:56  
 Average Efficiency : 0.2605025  
 Average Efficiency Error : 7.1640639E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.2200	28-FEB-2010	2990.125	3300.463	15901.00	0.2602051	1.1173601E-02	62.60045
NP-237	205.8930	28-FEB-2010	4433.931	4904.039	16246.00	0.2629976	1.3310809E-02	74.65723
CM-244	203.1954	28-FEB-2010	5531.345	5887.400	14976.00	0.2584959	1.3096336E-02	67.19219

Instrument : CHAMBER 125  
 Detector : 75547  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 15-JUN-2009 10:35:14  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:10:06  
 Average Efficiency : 0.2576497  
 Average Efficiency Error : 7.0874048E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2988.021	3300.630	15724.00	0.2605440	1.1190312E-02	46.52571
NP-237	210.2526	28-FEB-2010	4436.884	4905.060	15887.00	0.2518669	1.2750901E-02	53.98732
CM-244	201.9108	28-FEB-2010	5530.764	5886.395	14955.00	0.2598075	1.3162972E-02	48.51832

Instrument : CHAMBER 126  
 Detector : 75548  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 15-JUN-2009 10:35:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:10:15  
 Average Efficiency : 0.2546385  
 Average Efficiency Error : 7.0086187E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.6468	28-FEB-2010	2989.981	3300.740	15028.00	0.2477837	1.0650723E-02	48.55910
NP-237	202.9140	28-FEB-2010	4434.131	4903.488	15965.00	0.2621883	1.3272729E-02	56.40110
CM-244	199.3140	28-FEB-2010	5534.443	5883.975	14647.00	0.2576338	1.3056433E-02	51.64242

Instrument : CHAMBER 127  
 Detector : 78770  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 15-JUN-2009 10:35:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:10:25  
 Average Efficiency : 0.2475945  
 Average Efficiency Error : 6.8113576E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2990.359	3298.198	15570.00	0.2446848	1.0510931E-02	48.76539
NP-237	211.7160	28-FEB-2010	4434.936	4903.107	15990.00	0.2517476	1.2743857E-02	52.97125
CM-244	207.3882	28-FEB-2010	5533.915	5884.064	14653.00	0.2477150	1.2553682E-02	53.44726

Instrument : CHAMBER 128  
 Detector : 75549  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 15-JUN-2009 10:35:31  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:10:34  
 Average Efficiency : 0.2583520  
 Average Efficiency Error : 7.1076816E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	205.5870	28-FEB-2010	2988.469	3298.378	15538.00	0.2547795	1.0945436E-02	51.03008
NP-237	203.4984	28-FEB-2010	4435.142	4904.355	15865.00	0.2596745	1.3146663E-02	55.87120
CM-244	197.1096	28-FEB-2010	5535.626	5885.579	14743.00	0.2622676	1.3290238E-02	52.27489

Instrument : CHAMBER 129  
 Detector : 76227  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 15-JUN-2009 10:35:37  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:10:45  
 Average Efficiency : 0.2638222  
 Average Efficiency Error : 7.2564404E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0270	28-FEB-2010	2988.870	3300.864	15814.00	0.2615568	1.1232710E-02	46.07543
NP-237	200.6460	28-FEB-2010	4435.827	4903.885	15878.00	0.2637715	1.3353678E-02	55.23547
CM-244	195.9270	28-FEB-2010	5535.087	5885.718	14923.00	0.2671641	1.3536071E-02	53.28099

Instrument : CHAMBER 130  
 Detector : 76228  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 15-JUN-2009 10:35:42  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:10:54  
 Average Efficiency : 0.2467641  
 Average Efficiency Error : 6.7914533E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2988.993	3302.215	15084.00	0.2442679	1.0498905E-02	47.40536
NP-237	210.1548	28-FEB-2010	4434.138	4902.010	15469.00	0.2453350	1.2424372E-02	56.08064
CM-244	200.7390	28-FEB-2010	5532.060	5886.931	14427.00	0.2519681	1.2771877E-02	50.88863

Instrument : CHAMBER 131  
 Detector : 33448  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 15-JUN-2009 10:35:48  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:11:04  
 Average Efficiency : 0.2543488  
 Average Efficiency Error : 7.0006228E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2992.044	3298.565	15040.00	0.2487275	1.0691158E-02	62.43827
NP-237	199.3962	28-FEB-2010	4433.937	4903.089	15511.00	0.2592844	1.3130342E-02	71.65115
CM-244	198.6402	28-FEB-2010	5531.267	5883.522	14603.00	0.2578587	1.3068354E-02	66.01441

Instrument : CHAMBER 132  
 Detector : 67579  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 15-JUN-2009 10:35:54  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:11:14  
 Average Efficiency : 0.2486215  
 Average Efficiency Error : 6.8415161E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2990.317	3302.437	15261.00	0.2456177	1.0554738E-02	58.82565
NP-237	206.8830	28-FEB-2010	4433.887	4903.001	15457.00	0.2490022	1.2610241E-02	74.55650
CM-244	203.0208	28-FEB-2010	5531.401	5886.076	14625.00	0.2526496	1.2804133E-02	67.58425

Instrument : CHAMBER 133  
 Detector : 76229  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 15-JUN-2009 10:35:59  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:11:23  
 Average Efficiency : 0.2452400  
 Average Efficiency Error : 6.7492719E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.0798	28-FEB-2010	2989.661	3299.622	15177.00	0.2437980	1.0477561E-02	52.23539
NP-237	208.5846	28-FEB-2010	4435.770	4904.619	15660.00	0.2502294	1.2670294E-02	59.51420
CM-244	205.5828	28-FEB-2010	5534.556	5886.567	14216.00	0.2425270	1.2295833E-02	52.80878

Instrument : CHAMBER 134  
 Detector : 76230  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 15-JUN-2009 10:36:05  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:11:32  
 Average Efficiency : 0.2444110  
 Average Efficiency Error : 6.7283073E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	207.4764	28-FEB-2010	2988.500	3302.170	14897.00	0.2422969	1.0416550E-02	46.32745
NP-237	207.4998	28-FEB-2010	4434.290	4901.615	15103.00	0.2425561	1.2287448E-02	54.14053
CM-244	199.8804	28-FEB-2010	5530.370	5884.236	14219.00	0.2494942	1.2649023E-02	48.64564

Instrument : CHAMBER 135  
 Detector : 64270  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 15-JUN-2009 10:36:11  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:15:31  
 Average Efficiency : 0.2537577  
 Average Efficiency Error : 6.9827521E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.1856	28-FEB-2010	2990.202	3301.610	15370.00	0.2565182	1.1021796E-02	46.74546
NP-237	208.8990	28-FEB-2010	4434.703	4902.104	15603.00	0.2489672	1.2606921E-02	58.19459
CM-244	198.1458	28-FEB-2010	5532.521	5882.764	14405.00	0.2549969	1.2925685E-02	54.61489

Instrument : CHAMBER 136  
 Detector : 68549  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 15-JUN-2009 10:36:16  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:16:13  
 Average Efficiency : 0.2513555  
 Average Efficiency Error : 6.9189258E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.5218	28-FEB-2010	2987.653	3297.650	14822.00	0.2457564	1.0566254E-02	59.85030
NP-237	205.6662	28-FEB-2010	4433.780	4902.308	15677.00	0.2540460	1.2863384E-02	81.43013
CM-244	198.3060	28-FEB-2010	5532.280	5886.634	14537.00	0.2571105	1.3031241E-02	71.53568

Instrument : CHAMBER 137  
 Detector : 64288  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 15-JUN-2009 10:36:21  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:16:28  
 Average Efficiency : 0.2557148  
 Average Efficiency Error : 7.0506227E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2990.375	3302.529	14927.00	0.2575615	1.1072390E-02	65.14900
NP-237	167.9916	28-FEB-2010	4435.948	4901.380	12792.00	0.2537867	1.2886268E-02	76.44326
CM-244	157.2432	28-FEB-2010	5532.616	5883.823	11440.00	0.2551335	1.2977892E-02	65.84521

Instrument : CHAMBER 138  
 Detector : 65877  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 15-JUN-2009 10:36:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:16:37  
 Average Efficiency : 0.2574858  
 Average Efficiency Error : 7.1013318E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2988.633	3298.467	14755.00	0.2570738	1.1053749E-02	55.55835
NP-237	162.9186	28-FEB-2010	4433.751	4906.243	12763.00	0.2610467	1.3255445E-02	65.48614
CM-244	153.1968	28-FEB-2010	5532.819	5886.784	11129.00	0.2546485	1.2959382E-02	57.19302

Instrument : CHAMBER 139  
 Detector : 76231  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 15-JUN-2009 10:36:30  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:16:46  
 Average Efficiency : 0.2488251  
 Average Efficiency Error : 7.2955429E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2991.983	3299.622	14912.00	0.2522007	1.2778690E-02	54.04042
NP-237	168.0294	28-FEB-2010	4432.558	4902.187	12560.00	0.2490915	1.2651469E-02	58.86668
CM-244	160.5822	28-FEB-2010	5530.474	5882.536	11235.00	0.2453442	1.2483801E-02	49.38453



Instrument : CHAMBER 140  
 Detector : 78771  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 15-JUN-2009 10:36:37  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:16:54  
 Average Efficiency : 0.2564780  
 Average Efficiency Error : 7.0724888E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2991.911	3300.480	14911.00	0.2577060	1.1078800E-02	44.28521
NP-237	165.9822	28-FEB-2010	4436.400	4901.815	12719.00	0.2553630	1.2967485E-02	52.18042
CM-244	153.7938	28-FEB-2010	5531.254	5883.879	11226.00	0.2559058	1.3021342E-02	49.44242

Instrument : CHAMBER 141  
 Detector : 76232  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 15-JUN-2009 10:36:41  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:17:04  
 Average Efficiency : 0.2566228  
 Average Efficiency Error : 7.5264731E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2991.123	3299.107	14521.00	0.2533267	1.2840237E-02	52.25722
NP-237	161.6154	28-FEB-2010	4437.573	4901.742	12392.00	0.2555492	1.2982112E-02	60.55564
CM-244	148.1754	28-FEB-2010	5534.616	5886.136	11040.00	0.2612852	1.3298938E-02	55.64223

Instrument : CHAMBER 142  
 Detector : 64261  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 15-JUN-2009 10:36:46  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:17:13  
 Average Efficiency : 0.2612252  
 Average Efficiency Error : 7.2049387E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.4158	28-FEB-2010	2990.868	3298.969	14685.00	0.2575099	1.1073480E-02	52.27830
NP-237	161.7816	28-FEB-2010	4433.566	4903.867	12769.00	0.2630049	1.3354780E-02	61.68942
CM-244	147.2670	28-FEB-2010	5533.037	5885.587	11130.00	0.2649188	1.3482044E-02	52.55888

Instrument : CHAMBER 143  
 Detector : 65882  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 15-JUN-2009 10:36:52  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:17:25  
 Average Efficiency : 0.1352163  
 Average Efficiency Error : 4.2609810E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2992.528	3299.464	12609.00	0.2131045	1.0823449E-02	0.0000000E+00
NP-237	168.1992	28-FEB-2010	4433.313	4904.622	9847.000	0.1951042	9.9514676E-03	0.0000000E+00
CM-244	156.7614	28-FEB-2010	5531.624	5883.597	4491.000	0.1003793	5.2382387E-03	0.0000000E+00

Instrument : CHAMBER 144  
 Detector : 75551  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 15-JUN-2009 10:36:58  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:17:35  
 Average Efficiency : 0.2477770  
 Average Efficiency Error : 6.8350467E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2988.404	3301.221	14642.00	0.2463485	1.0594078E-02	45.61309
NP-237	167.2962	28-FEB-2010	4434.267	4903.746	12377.00	0.2465608	1.2525752E-02	53.68409
CM-244	154.4388	28-FEB-2010	5531.659	5883.429	11063.00	0.2511226	1.2781225E-02	49.97287

Instrument : CHAMBER 145  
 Detector : 72526  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 15-JUN-2009 10:37:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:17:46  
 Average Efficiency : 0.2484448  
 Average Efficiency Error : 7.2849421E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.5742	28-FEB-2010	2989.202	3298.002	14675.00	0.2456670	1.2450230E-02	49.28074
NP-237	169.7700	28-FEB-2010	4434.152	4904.644	12673.00	0.2487916	1.2634436E-02	57.44262
CM-244	154.8234	28-FEB-2010	5533.675	5885.956	11081.00	0.2510151	1.2775337E-02	50.17173

Instrument : CHAMBER 146  
 Detector : 72527  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 15-JUN-2009 10:37:08  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:17:55  
 Average Efficiency : 0.2498991  
 Average Efficiency Error : 6.8927244E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2989.008	3300.887	14801.00	0.2513779	1.0808230E-02	52.33326
NP-237	168.2934	28-FEB-2010	4435.242	4902.966	12855.00	0.2545674	1.2924969E-02	57.92883
CM-244	158.8128	28-FEB-2010	5533.644	5883.949	11038.00	0.2436542	1.2401605E-02	49.48374

Instrument : CHAMBER 147  
 Detector : 75550  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 15-JUN-2009 10:37:13  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:18:04  
 Average Efficiency : 0.2466264  
 Average Efficiency Error : 7.2331135E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.9792	28-FEB-2010	2987.795	3301.200	14480.00	0.2455383	1.2445973E-02	46.45729
NP-237	166.3758	28-FEB-2010	4434.562	4903.375	12468.00	0.2497540	1.2686511E-02	58.97713
CM-244	157.1856	28-FEB-2010	5534.997	5885.574	10968.00	0.2447012	1.2456270E-02	50.77650

Instrument : CHAMBER 148  
 Detector : 74429  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 15-JUN-2009 10:37:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:18:16  
 Average Efficiency : 0.2487163  
 Average Efficiency Error : 6.8600415E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.3204	28-FEB-2010	2990.118	3297.883	14743.00	0.2470770	1.0624102E-02	52.04195
NP-237	167.4312	28-FEB-2010	4435.625	4904.775	12702.00	0.2528144	1.2838330E-02	56.58137
CM-244	156.4188	28-FEB-2010	5532.095	5883.458	11023.00	0.2470807	1.2576239E-02	53.15009

Instrument : CHAMBER 149  
 Detector : 33449  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 15-JUN-2009 10:37:24  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:18:25  
 Average Efficiency : 0.2490303  
 Average Efficiency Error : 6.8702092E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7372	28-FEB-2010	2988.202	3301.653	14441.00	0.2464049	1.0599255E-02	64.73112
NP-237	167.1294	28-FEB-2010	4436.346	4906.220	12755.00	0.2543278	1.2914364E-02	67.04056
CM-244	154.7664	28-FEB-2010	5534.414	5886.219	10936.00	0.2476957	1.2609394E-02	59.12540

Instrument : CHAMBER 150  
 Detector : 75552  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 15-JUN-2009 10:37:29  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:18:38  
 Average Efficiency : 0.2470877  
 Average Efficiency Error : 6.8164105E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7708	28-FEB-2010	2990.998	3298.539	14398.00	0.2456424	1.0567016E-02	51.05392
NP-237	168.7422	28-FEB-2010	4437.161	4902.172	12441.00	0.2457357	1.2482788E-02	55.78210
CM-244	156.3252	28-FEB-2010	5531.563	5884.403	11175.00	0.2506036	1.2752553E-02	52.28529

Instrument : CHAMBER 151  
 Detector : 75556  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 15-JUN-2009 10:37:34  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:18:48  
 Average Efficiency : 0.2438540  
 Average Efficiency Error : 6.7277611E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1408	28-FEB-2010	2990.591	3302.222	14620.00	0.2464838	1.0600180E-02	55.27609
NP-237	170.0886	28-FEB-2010	4434.830	4901.462	12486.00	0.2446960	1.2429229E-02	62.47716
CM-244	157.7460	28-FEB-2010	5535.613	5884.795	10779.00	0.2395607	1.2198334E-02	57.73852

Instrument : CHAMBER 152  
 Detector : 76222  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 15-JUN-2009 10:37:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:18:58  
 Average Efficiency : 0.2467627  
 Average Efficiency Error : 6.8090535E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2991.886	3298.833	14412.00	0.2500895	1.0758107E-02	48.91403
NP-237	166.6248	28-FEB-2010	4433.214	4906.051	12231.00	0.2446454	1.2430749E-02	57.74051
CM-244	155.8290	28-FEB-2010	5531.255	5886.692	10865.00	0.2444332	1.2444678E-02	53.38279

Instrument : CHAMBER 153  
 Detector : 76223  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 15-JUN-2009 10:37:45  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:19:07  
 Average Efficiency : 0.2508456  
 Average Efficiency Error : 6.9236015E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2991.542	3299.468	14264.00	0.2503628	1.0771971E-02	46.24896
NP-237	159.1506	28-FEB-2010	4437.114	4905.919	12282.00	0.2572217	1.3068873E-02	56.14782
CM-244	151.7142	28-FEB-2010	5532.513	5883.339	10632.00	0.2456530	1.2511721E-02	50.18634

Instrument : CHAMBER 154  
 Detector : 76224  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 15-JUN-2009 10:37:51  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:19:27  
 Average Efficiency : 0.2593558  
 Average Efficiency Error : 7.1560498E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	186.9936	28-FEB-2010	2988.069	3300.352	14368.00	0.2592530	1.1152963E-02	45.36002
NP-237	160.8066	28-FEB-2010	4436.954	4905.947	12360.00	0.2561586	1.3013619E-02	51.54403
CM-244	145.8384	28-FEB-2010	5533.331	5884.860	10936.00	0.2628850	1.3382559E-02	48.22709

Instrument : CHAMBER 155  
 Detector : 75553  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 15-JUN-2009 10:37:56  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:19:38  
 Average Efficiency : 0.2562746  
 Average Efficiency Error : 7.0671267E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4828	28-FEB-2010	2987.947	3302.333	14992.00	0.2601089	1.1181003E-02	50.79648
NP-237	166.8174	28-FEB-2010	4435.678	4902.049	12695.00	0.2536287	1.2879748E-02	59.88642
CM-244	155.0100	28-FEB-2010	5532.716	5885.997	11223.00	0.2538188	1.2915225E-02	50.91598

Instrument : CHAMBER 156  
 Detector : 75554  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 15-JUN-2009 10:38:01  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:19:50  
 Average Efficiency : 0.2490924  
 Average Efficiency Error : 6.8736156E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2991.802	3300.808	14237.00	0.2466562	1.0612887E-02	50.15816
NP-237	164.6658	28-FEB-2010	4433.311	4904.756	12295.00	0.2487909	1.2640454E-02	59.32560
CM-244	151.3824	28-FEB-2010	5535.375	5883.323	10927.00	0.2529932	1.2879262E-02	51.23388

Instrument : CHAMBER 157  
 Detector : 75555  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 15-JUN-2009 10:38:06  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:20:18  
 Average Efficiency : 0.2467633  
 Average Efficiency Error : 6.8049603E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.9034	28-FEB-2010	2990.165	3298.585	14752.00	0.2441149	1.0496578E-02	50.43448
NP-237	171.2268	28-FEB-2010	4434.634	4905.657	12726.00	0.2477299	1.2579673E-02	57.20475
CM-244	159.5796	28-FEB-2010	5530.567	5883.729	11364.00	0.2496554	1.2700644E-02	49.12801

Instrument : CHAMBER 158  
 Detector : 33451  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 15-JUN-2009 10:38:11  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:20:28  
 Average Efficiency : 0.2484803  
 Average Efficiency Error : 6.8544419E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2988.176	3298.395	14533.00	0.2483205	1.0680343E-02	60.95971
NP-237	168.3948	28-FEB-2010	4436.437	4905.375	12551.00	0.2483904	1.2615971E-02	64.17879
CM-244	154.6032	28-FEB-2010	5534.708	5885.073	10974.00	0.2487956	1.2664642E-02	64.19312

Instrument : CHAMBER 159  
 Detector : 76225  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 15-JUN-2009 10:38:17  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:20:41  
 Average Efficiency : 0.2521274  
 Average Efficiency Error : 6.9584623E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	188.7090	28-FEB-2010	2990.482	3300.368	14187.00	0.2536569	1.0914853E-02	47.89695
NP-237	159.6558	28-FEB-2010	4435.596	4902.679	11990.00	0.2502863	1.2721431E-02	57.91509
CM-244	150.5208	28-FEB-2010	5534.257	5882.643	10816.00	0.2518869	1.2825266E-02	48.16030

Instrument : CHAMBER 160  
 Detector : 76226  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 15-JUN-2009 10:38:22  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUN-2009 07:20:51  
 Average Efficiency : 0.2438486  
 Average Efficiency Error : 6.7329453E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2992.509	3301.982	13811.00	0.2428969	1.0457288E-02	46.63693
NP-237	161.5530	28-FEB-2010	4436.790	4904.178	12001.00	0.2475616	1.2582781E-02	57.85719
CM-244	151.1856	28-FEB-2010	5531.239	5885.638	10420.00	0.2416134	1.2310460E-02	49.42951

Instrument : CHAMBER 161  
 Detector : 70321  
 Standard ID : AESS-001  
 Standard Reference Date : 20-FEB-2008 09:54:53  
 Calibration Analysis Date/Time : 22-JUN-2009 09:48:54  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 14:58:45  
 Average Efficiency : 0.3680447  
 Average Efficiency Error : 1.0097147E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.6698	28-FEB-2010	2988.612	3298.684	21898.00	0.3541356	1.5135950E-02	64.95872
NP-237	171.0024	28-FEB-2010	4435.424	4903.719	19609.00	0.3821778	1.9302875E-02	80.01273
CM-244	158.1060	28-FEB-2010	5531.313	5883.518	16964.00	0.3762999	1.9035701E-02	66.25313

Instrument : CHAMBER 162  
 Detector : 70323  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 22-JUN-2009 09:49:01  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 14:59:02  
 Average Efficiency : 0.3669952  
 Average Efficiency Error : 1.0053982E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2990.114	3301.116	21863.00	0.3569376	1.5256034E-02	61.57318
NP-237	205.0260	28-FEB-2010	4434.153	4902.154	23087.00	0.3753361	1.8928697E-02	74.80619
CM-244	199.6806	28-FEB-2010	5533.930	5885.193	21283.00	0.3741003	1.8880047E-02	63.50636

Instrument : CHAMBER 163  
 Detector : 70324  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 22-JUN-2009 09:49:05  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 14:59:20  
 Average Efficiency : 0.3822009  
 Average Efficiency Error : 1.0467267E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1144	28-FEB-2010	2992.217	3298.824	22246.00	0.3751688	1.6031768E-02	61.52280
NP-237	200.4990	28-FEB-2010	4434.987	4904.671	23472.00	0.3901615	1.9673660E-02	79.06695
CM-244	196.5558	28-FEB-2010	5533.739	5886.581	21558.00	0.3847618	1.9415820E-02	63.58135



Instrument : CHAMBER 164  
 Detector : 70325  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 22-JUN-2009 09:49:10  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 14:59:35  
 Average Efficiency : 0.3786111  
 Average Efficiency Error : 1.0367543E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.0418	28-FEB-2010	2988.804	3300.725	22607.00	0.3703200	1.5821498E-02	54.52739
NP-237	209.2716	28-FEB-2010	4432.850	4902.971	23978.00	0.3819043	1.9253852E-02	71.96546
CM-244	199.6488	28-FEB-2010	5532.641	5885.829	22062.00	0.3878940	1.9569764E-02	60.11813

Instrument : CHAMBER 165  
 Detector : 72544  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 22-JUN-2009 09:49:16  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:00:00  
 Average Efficiency : 0.3793618  
 Average Efficiency Error : 1.0392112E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2991.249	3299.371	22074.00	0.3670397	1.5685942E-02	75.43552
NP-237	203.2080	28-FEB-2010	4433.539	4903.436	23735.00	0.3893091	1.9628821E-02	89.50409
CM-244	197.2236	28-FEB-2010	5531.871	5883.913	21843.00	0.3886937	1.9611897E-02	67.83678

Instrument : CHAMBER 166  
 Detector : 74545  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 22-JUN-2009 09:49:22  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:00:15  
 Average Efficiency : 0.3891973  
 Average Efficiency Error : 1.0658387E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.3736	28-FEB-2010	2988.840	3300.652	22711.00	0.3768678	1.6100317E-02	54.68238
NP-237	204.0192	28-FEB-2010	4437.331	4901.890	24296.00	0.3969417	2.0009808E-02	77.78448
CM-244	197.2128	28-FEB-2010	5530.967	5883.776	22526.00	0.4007283	2.0213576E-02	56.93469

Instrument : CHAMBER 167  
 Detector : 72546  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 22-JUN-2009 09:49:28  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:00:26  
 Average Efficiency : 0.3907633  
 Average Efficiency Error : 1.0697938E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.1222	28-FEB-2010	2988.275	3299.494	23296.00	0.3814596	1.6291581E-02	55.56178
NP-237	204.2586	28-FEB-2010	4434.900	4904.573	24286.00	0.3963182	1.9978439E-02	75.18340
CM-244	198.8100	28-FEB-2010	5533.886	5886.993	22618.00	0.3993391	2.0142792E-02	60.08310

Instrument : CHAMBER 168  
 Detector : 72547  
 Standard ID : AESS-010  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 22-JUN-2009 09:49:33  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:00:38  
 Average Efficiency : 0.3861204  
 Average Efficiency Error : 1.0573328E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.0008	28-FEB-2010	2990.947	3298.253	22591.00	0.3774759	1.6127346E-02	61.24447
NP-237	202.9926	28-FEB-2010	4435.851	4905.623	23946.00	0.3931818	1.9822638E-02	73.08669
CM-244	196.2330	28-FEB-2010	5534.369	5886.817	21920.00	0.3920950	1.9782864E-02	60.02387

Instrument : CHAMBER 169  
 Detector : 72548  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 22-JUN-2009 09:49:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:00:51  
 Average Efficiency : 0.3767878  
 Average Efficiency Error : 1.0317106E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.7452	28-FEB-2010	2992.147	3298.542	22931.00	0.3672459	1.5687475E-02	58.28659
NP-237	209.5938	28-FEB-2010	4434.044	4903.513	24256.00	0.3856335	1.9440131E-02	72.53197
CM-244	202.7478	28-FEB-2010	5532.339	5885.069	22094.00	0.3825103	1.9297916E-02	57.36194

Instrument : CHAMBER 170  
 Detector : 72549  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 22-JUN-2009 09:49:44  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:01:02  
 Average Efficiency : 0.3672283  
 Average Efficiency Error : 1.0055818E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	212.8284	28-FEB-2010	2991.920	3299.334	22602.00	0.3584369	1.5313840E-02	55.24641
NP-237	214.4868	28-FEB-2010	4433.260	4904.103	24108.00	0.3746104	1.8885318E-02	73.41397
CM-244	208.4184	28-FEB-2010	5534.714	5883.037	22158.00	0.3731794	1.8826678E-02	58.17384

Instrument : CHAMBER 171  
 Detector : 78260  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 22-JUN-2009 09:49:50  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:01:15  
 Average Efficiency : 0.3843338  
 Average Efficiency Error : 1.0524615E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2990.586	3301.332	22712.00	0.3763276	1.6077265E-02	51.07104
NP-237	204.7038	28-FEB-2010	4435.496	4904.863	23664.00	0.3853128	1.9427808E-02	72.98476
CM-244	195.0060	28-FEB-2010	5533.949	5887.016	21979.00	0.3956421	1.9961338E-02	55.64689

Instrument : CHAMBER 172  
 Detector : 78772  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 22-JUN-2009 09:49:55  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:01:28  
 Average Efficiency : 0.3826092  
 Average Efficiency Error : 1.0474577E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.2200	28-FEB-2010	2988.628	3299.646	23148.00	0.3788596	1.6181752E-02	48.41407
NP-237	205.8930	28-FEB-2010	4435.466	4905.809	24139.00	0.3907726	1.9699879E-02	75.41741
CM-244	203.1954	28-FEB-2010	5531.112	5885.129	22005.00	0.3801389	1.9178953E-02	52.17172

Instrument : CHAMBER 173  
 Detector : 74431  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 22-JUN-2009 09:50:01  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:01:41  
 Average Efficiency : 0.2593230  
 Average Efficiency Error : 7.1322038E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2990.621	3299.926	15676.00	0.2597894	1.1158522E-02	50.69847
NP-237	210.2526	28-FEB-2010	4436.753	4901.757	16312.00	0.2585954	1.3087362E-02	58.81396
CM-244	201.9108	28-FEB-2010	5535.262	5886.887	14926.00	0.2594097	1.3143276E-02	55.15737

Instrument : CHAMBER 174  
 Detector : 74432  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 22-JUN-2009 09:50:07  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:01:51  
 Average Efficiency : 0.2561836  
 Average Efficiency Error : 7.0509571E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.6468	28-FEB-2010	2992.065	3302.471	15121.00	0.2493561	1.0717154E-02	52.25386
NP-237	202.9140	28-FEB-2010	4435.541	4905.194	16194.00	0.2660043	1.3463500E-02	57.47507
CM-244	199.3140	28-FEB-2010	5531.639	5887.080	14608.00	0.2570774	1.3028788E-02	54.29767

Instrument : CHAMBER 175  
 Detector : 74433  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 22-JUN-2009 09:50:12  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:02:01  
 Average Efficiency : 0.2515986  
 Average Efficiency Error : 6.9203642E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2989.238	3298.426	15722.00	0.2471218	1.0613844E-02	45.29536
NP-237	211.7160	28-FEB-2010	4435.144	4905.490	16108.00	0.2535914	1.2836066E-02	57.72879
CM-244	207.3882	28-FEB-2010	5533.995	5885.818	15149.00	0.2562569	1.2980960E-02	47.84649

Instrument : CHAMBER 176  
 Detector : 74434  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 22-JUN-2009 09:50:17  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:02:12  
 Average Efficiency : 0.2579391  
 Average Efficiency Error : 7.0963693E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	205.5870	28-FEB-2010	2991.698	3297.590	15497.00	0.2544173	1.0929942E-02	49.36812
NP-237	203.4984	28-FEB-2010	4432.745	4903.265	15910.00	0.2605837	1.3191990E-02	55.23719
CM-244	197.1096	28-FEB-2010	5530.868	5886.966	14625.00	0.2604272	1.3198279E-02	48.45524

Instrument : CHAMBER 177  
 Detector : 74435  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 22-JUN-2009 09:50:23  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:02:24  
 Average Efficiency : 0.2681777  
 Average Efficiency Error : 7.3747509E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0270	28-FEB-2010	2991.057	3299.457	16007.00	0.2647958	1.1369478E-02	47.28368
NP-237	200.6460	28-FEB-2010	4434.482	4904.663	16304.00	0.2708437	1.3707319E-02	53.90463
CM-244	195.9270	28-FEB-2010	5533.411	5885.598	15098.00	0.2704247	1.3699308E-02	53.91009

Instrument : CHAMBER 178  
 Detector : 74436  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 22-JUN-2009 09:50:28  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:02:37  
 Average Efficiency : 0.2556835  
 Average Efficiency Error : 7.0334878E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2991.779	3302.215	15571.00	0.2521989	1.0833724E-02	47.95219
NP-237	210.1548	28-FEB-2010	4435.746	4905.748	16086.00	0.2551121	1.2913272E-02	51.54728
CM-244	200.7390	28-FEB-2010	5532.798	5883.324	14964.00	0.2614959	1.3248475E-02	50.56778

Instrument : CHAMBER 179  
 Detector : 74437  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 22-JUN-2009 09:50:33  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:02:54  
 Average Efficiency : 0.2622361  
 Average Efficiency Error : 7.2137858E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2988.919	3302.532	15791.00	0.2611886	1.1217199E-02	49.05256
NP-237	199.3962	28-FEB-2010	4432.536	4902.537	16046.00	0.2682333	1.3577815E-02	59.11048
CM-244	198.6402	28-FEB-2010	5530.871	5882.740	14609.00	0.2580948	1.3080338E-02	50.98325

Instrument : CHAMBER 180  
 Detector : 74438  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 22-JUN-2009 09:50:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:03:14  
 Average Efficiency : 0.2506651  
 Average Efficiency Error : 6.8974807E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2989.905	3300.775	15284.00	0.2460265	1.0572049E-02	47.55061
NP-237	206.8830	28-FEB-2010	4435.062	4905.007	15694.00	0.2528355	1.2801906E-02	57.86346
CM-244	203.0208	28-FEB-2010	5531.655	5887.118	14776.00	0.2553983	1.2941745E-02	52.08472

Instrument : CHAMBER 181  
 Detector : 74439  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 22-JUN-2009 09:50:44  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:03:27  
 Average Efficiency : 0.2556638  
 Average Efficiency Error : 7.0319269E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.0798	28-FEB-2010	2987.507	3301.291	15701.00	0.2522502	1.0834388E-02	45.61578
NP-237	208.5846	28-FEB-2010	4436.916	4901.810	16267.00	0.2599201	1.3154872E-02	58.60517
CM-244	205.5828	28-FEB-2010	5535.507	5887.405	15025.00	0.2564206	1.2990783E-02	53.43116

Instrument : CHAMBER 182  
 Detector : 74440  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 22-JUN-2009 09:50:49  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:03:39  
 Average Efficiency : 0.2558407  
 Average Efficiency Error : 7.0378492E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	207.4764	28-FEB-2010	2992.364	3301.476	15578.00	0.2534181	1.0886028E-02	44.54460
NP-237	207.4998	28-FEB-2010	4437.311	4901.783	16019.00	0.2573143	1.3025383E-02	55.86248
CM-244	199.8804	28-FEB-2010	5534.452	5885.559	14687.00	0.2578480	1.3066921E-02	50.87081

Instrument : CHAMBER 183  
 Detector : 74441  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 22-JUN-2009 09:50:53  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:03:53  
 Average Efficiency : 0.2616060  
 Average Efficiency Error : 7.1956841E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.1856	28-FEB-2010	2990.145	3298.781	15838.00	0.2643961	1.1354355E-02	49.09375
NP-237	208.8990	28-FEB-2010	4434.414	4904.732	16046.00	0.2560026	1.2958746E-02	55.38850
CM-244	198.1458	28-FEB-2010	5533.565	5885.751	14889.00	0.2636993	1.3361022E-02	51.92845

Instrument : CHAMBER 184  
 Detector : 74442  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 22-JUN-2009 09:50:58  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:04:06  
 Average Efficiency : 0.2583629  
 Average Efficiency Error : 7.1082856E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.5218	28-FEB-2010	2990.570	3301.301	15320.00	0.2540686	1.0917156E-02	45.64460
NP-237	205.6662	28-FEB-2010	4435.154	4904.955	16035.00	0.2598630	1.3154246E-02	56.52773
CM-244	198.3060	28-FEB-2010	5531.440	5886.825	14876.00	0.2632301	1.3337432E-02	51.73911

Instrument : CHAMBER 185  
 Detector : 68615  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 22-JUN-2009 09:51:04  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:04:16  
 Average Efficiency : 0.2577632  
 Average Efficiency Error : 7.1065617E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2988.840	3300.640	15138.00	0.2612484	1.1228072E-02	58.07288
NP-237	167.9916	28-FEB-2010	4434.438	4901.812	12961.00	0.2571577	1.3054820E-02	59.76388
CM-244	157.2432	28-FEB-2010	5531.912	5887.166	11372.00	0.2537484	1.2908846E-02	57.77697

Instrument : CHAMBER 186  
 Detector : 68616  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 22-JUN-2009 09:51:09  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:04:28  
 Average Efficiency : 0.2545925  
 Average Efficiency Error : 7.0233443E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2987.988	3300.097	14397.00	0.2508908	1.0792810E-02	50.66381
NP-237	162.9186	28-FEB-2010	4435.729	4904.174	12681.00	0.2594548	1.3175752E-02	61.08182
CM-244	153.1968	28-FEB-2010	5530.696	5887.018	11148.00	0.2552285	1.2988597E-02	55.37442

Instrument : CHAMBER 187  
 Detector : 68620  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 22-JUN-2009 09:51:15  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:04:38  
 Average Efficiency : 0.2487007  
 Average Efficiency Error : 7.2918888E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2991.780	3300.355	14881.00	0.2517360	1.2755483E-02	50.86592
NP-237	168.0294	28-FEB-2010	4437.583	4904.093	12548.00	0.2488833	1.2641029E-02	60.88034
CM-244	160.5822	28-FEB-2010	5535.508	5884.097	11241.00	0.2456087	1.2497237E-02	52.60560



Instrument : CHAMBER 188  
 Detector : 68621  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 22-JUN-2009 09:51:20  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:04:49  
 Average Efficiency : 0.2586242  
 Average Efficiency Error : 7.1308562E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2991.235	3299.192	14866.00	0.2569736	1.1047941E-02	51.13421
NP-237	165.9822	28-FEB-2010	4434.285	4905.242	12979.00	0.2606384	1.3231235E-02	56.78614
CM-244	153.7938	28-FEB-2010	5530.351	5883.763	11355.00	0.2589744	1.3175028E-02	50.04874

Instrument : CHAMBER 189  
 Detector : 68622  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 22-JUN-2009 09:51:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:05:00  
 Average Efficiency : 0.2605101  
 Average Efficiency Error : 7.6384274E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2989.861	3302.155	14783.00	0.2579485	1.3071399E-02	55.19755
NP-237	161.6154	28-FEB-2010	4432.574	4905.866	12646.00	0.2608190	1.3245604E-02	56.80165
CM-244	148.1754	28-FEB-2010	5531.675	5887.456	11101.00	0.2628785	1.3378831E-02	53.23755

Instrument : CHAMBER 190  
 Detector : 68623  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 22-JUN-2009 09:51:31  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:05:13  
 Average Efficiency : 0.2627474  
 Average Efficiency Error : 7.2460058E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.4158	28-FEB-2010	2987.675	3299.750	14852.00	0.2604897	1.1199310E-02	47.17914
NP-237	161.7816	28-FEB-2010	4435.687	4904.443	12741.00	0.2623105	1.3320174E-02	60.95700
CM-244	147.2670	28-FEB-2010	5531.545	5882.933	11195.00	0.2665110	1.3562006E-02	48.64064

Instrument : CHAMBER 191  
 Detector : 68624  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 22-JUN-2009 09:51:36  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:05:24  
 Average Efficiency : 0.2624353  
 Average Efficiency Error : 7.6893568E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2991.084	3299.950	15363.00	0.2597040	1.3153810E-02	50.65557
NP-237	168.1992	28-FEB-2010	4432.587	4904.375	13466.00	0.2668662	1.3540036E-02	59.46810
CM-244	156.7614	28-FEB-2010	5530.362	5884.163	11655.00	0.2609591	1.3270005E-02	54.62358

Instrument : CHAMBER 192  
 Detector : 74430  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 22-JUN-2009 09:51:41  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:05:39  
 Average Efficiency : 0.2528592  
 Average Efficiency Error : 6.9742138E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2991.302	3300.346	14675.00	0.2469523	1.0619615E-02	46.13663
NP-237	167.2962	28-FEB-2010	4433.147	4904.787	12994.00	0.2588962	1.3142551E-02	54.53447
CM-244	154.4388	28-FEB-2010	5530.391	5883.883	11261.00	0.2558116	1.3015866E-02	47.75322

Instrument : CHAMBER 193  
 Detector : 68627  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 22-JUN-2009 09:51:47  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:05:50  
 Average Efficiency : 0.2616625  
 Average Efficiency Error : 7.6664970E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.5742	28-FEB-2010	2992.456	3299.248	15599.00	0.2611919	1.3226620E-02	70.75836
NP-237	169.7700	28-FEB-2010	4434.921	4903.889	13250.00	0.2601501	1.3202393E-02	85.04011
CM-244	154.8234	28-FEB-2010	5531.552	5883.390	11633.00	0.2637065	1.3410171E-02	75.12811

Instrument : CHAMBER 194  
 Detector : 68635  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 22-JUN-2009 09:51:52  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:06:02  
 Average Efficiency : 0.2568864  
 Average Efficiency Error : 7.0813606E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2988.759	3300.939	14987.00	0.2545973	1.0944160E-02	50.81337
NP-237	168.2934	28-FEB-2010	4437.087	4905.856	13065.00	0.2587210	1.3132677E-02	56.26561
CM-244	158.8128	28-FEB-2010	5532.909	5884.238	11698.00	0.2583487	1.3136664E-02	49.04685

Instrument : CHAMBER 195  
 Detector : 68636  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 22-JUN-2009 09:51:58  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:06:11  
 Average Efficiency : 0.2565587  
 Average Efficiency Error : 7.5203422E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.9792	28-FEB-2010	2990.427	3298.108	14898.00	0.2526821	1.2803250E-02	52.36766
NP-237	166.3758	28-FEB-2010	4435.602	4904.677	13066.00	0.2617230	1.3285043E-02	56.16147
CM-244	157.1856	28-FEB-2010	5531.920	5883.250	11450.00	0.2556100	1.3001991E-02	53.60020

Instrument : CHAMBER 196  
 Detector : 68637  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 22-JUN-2009 09:52:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:06:21  
 Average Efficiency : 0.2579557  
 Average Efficiency Error : 7.1107536E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.3204	28-FEB-2010	2987.764	3299.421	15154.00	0.2540307	1.0917650E-02	54.18713
NP-237	167.4312	28-FEB-2010	4434.243	4902.720	13085.00	0.2604812	1.3221670E-02	59.74107
CM-244	156.4188	28-FEB-2010	5534.908	5886.289	11649.00	0.2612170	1.3283413E-02	54.65987

Instrument : CHAMBER 197  
 Detector : 78894  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 23-JUN-2009 08:30:18  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUN-2009 13:40:27  
 Average Efficiency : 0.2567551  
 Average Efficiency Error : 7.0790784E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7372	28-FEB-2010	2992.459	3301.421	14935.00	0.2548909	1.0957510E-02	53.54255
NP-237	167.1294	28-FEB-2010	4433.039	4903.794	12934.00	0.2579639	1.3096124E-02	56.62766
CM-244	154.7664	28-FEB-2010	5533.211	5885.723	11391.00	0.2582181	1.3135778E-02	57.79705

Instrument : CHAMBER 198  
 Detector : 78895  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 22-JUN-2009 09:52:14  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:06:54  
 Average Efficiency : 0.2558283  
 Average Efficiency Error : 7.0531382E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7708	28-FEB-2010	2990.792	3298.953	15029.00	0.2564534	1.1023409E-02	56.63857
NP-237	168.7422	28-FEB-2010	4433.042	4902.810	12945.00	0.2557096	1.2981524E-02	58.76215
CM-244	156.3252	28-FEB-2010	5530.984	5882.838	11372.00	0.2550805	1.2976733E-02	53.96784

Instrument : CHAMBER 199  
 Detector : 78896  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 22-JUN-2009 09:52:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:07:05  
 Average Efficiency : 0.2503328  
 Average Efficiency Error : 6.9033257E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1408	28-FEB-2010	2992.467	3301.736	15050.00	0.2537782	1.0908134E-02	52.31808
NP-237	170.0886	28-FEB-2010	4433.639	4904.142	12664.00	0.2481491	1.2601945E-02	58.89103
CM-244	157.7460	28-FEB-2010	5532.893	5884.873	11149.00	0.2479126	1.2616216E-02	52.99783

Instrument : CHAMBER 200  
 Detector : 78900  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 22-JUN-2009 09:52:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:07:19  
 Average Efficiency : 0.2686577  
 Average Efficiency Error : 7.4024275E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2991.709	3299.237	15525.00	0.2694455	1.1575188E-02	52.63724
NP-237	166.6248	28-FEB-2010	4433.212	4903.912	13505.00	0.2700959	1.3703452E-02	61.10624
CM-244	155.8290	28-FEB-2010	5534.189	5887.638	11827.00	0.2661784	1.3532363E-02	53.69180

Instrument : CHAMBER 201  
 Detector : 78902  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 22-JUN-2009 09:52:31  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:07:30  
 Average Efficiency : 0.2608171  
 Average Efficiency Error : 7.1935584E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2988.500	3302.053	14805.00	0.2599045	1.1174787E-02	49.08611
NP-237	159.1506	28-FEB-2010	4433.282	4904.434	12713.00	0.2662428	1.3519990E-02	52.63206
CM-244	151.7142	28-FEB-2010	5534.865	5882.809	11118.00	0.2569896	1.3078903E-02	48.72089

Instrument : CHAMBER 202  
 Detector : 78903  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 22-JUN-2009 09:52:37  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:07:41  
 Average Efficiency : 0.2643825  
 Average Efficiency Error : 7.2935103E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	186.9936	28-FEB-2010	2990.900	3298.618	14652.00	0.2644352	1.1371753E-02	43.60920
NP-237	160.8066	28-FEB-2010	4432.436	4902.692	12420.00	0.2574461	1.3077959E-02	54.52970
CM-244	145.8384	28-FEB-2010	5532.047	5884.818	11313.00	0.2720752	1.3842396E-02	44.04590

Instrument : CHAMBER 203  
 Detector : 78905  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 22-JUN-2009 09:52:43  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:07:50  
 Average Efficiency : 0.2542375  
 Average Efficiency Error : 7.0116646E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4828	28-FEB-2010	2989.958	3298.323	14729.00	0.2555648	1.0989280E-02	48.90236
NP-237	166.8174	28-FEB-2010	4433.591	4904.036	12594.00	0.2515985	1.2778236E-02	52.39742
CM-244	155.0100	28-FEB-2010	5533.281	5885.816	11276.00	0.2551089	1.2980009E-02	47.65225

Instrument : CHAMBER 204  
 Detector : 78907  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 22-JUN-2009 09:52:49  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:08:00  
 Average Efficiency : 0.2538103  
 Average Efficiency Error : 7.0014698E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2990.324	3298.173	14541.00	0.2519002	1.0834365E-02	51.17892
NP-237	164.6658	28-FEB-2010	4437.399	4902.424	12509.00	0.2531350	1.2857672E-02	56.33944
CM-244	151.3824	28-FEB-2010	5531.626	5884.261	11110.00	0.2573011	1.3094992E-02	51.37049

Instrument : CHAMBER 205  
 Detector : 78908  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 22-JUN-2009 09:52:54  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:08:10  
 Average Efficiency : 0.2561495  
 Average Efficiency Error : 7.0592412E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.9034	28-FEB-2010	2988.508	3302.170	15373.00	0.2544265	1.0931892E-02	47.59354
NP-237	171.2268	28-FEB-2010	4433.168	4903.946	13244.00	0.2578140	1.3083938E-02	59.69577
CM-244	159.5796	28-FEB-2010	5533.636	5886.419	11689.00	0.2569510	1.3065674E-02	49.40511

Instrument : CHAMBER 206  
 Detector : 78909  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 22-JUN-2009 09:53:00  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:08:23  
 Average Efficiency : 0.2574005  
 Average Efficiency Error : 7.0962599E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2988.616	3302.433	15062.00	0.2573945	1.1063425E-02	48.19839
NP-237	168.3948	28-FEB-2010	4432.477	4902.186	13001.00	0.2573397	1.3063446E-02	52.88721
CM-244	154.6032	28-FEB-2010	5535.166	5886.569	11347.00	0.2574700	1.3098557E-02	52.05136

Instrument : CHAMBER 207  
 Detector : 78910  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 22-JUN-2009 09:53:05  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:08:36  
 Average Efficiency : 0.2561320  
 Average Efficiency Error : 7.0672869E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	188.7090	28-FEB-2010	2987.858	3301.538	14376.00	0.2570925	1.1059917E-02	51.83183
NP-237	159.6558	28-FEB-2010	4432.769	4903.719	12374.00	0.2583224	1.3123268E-02	56.06316
CM-244	150.5208	28-FEB-2010	5533.705	5886.686	10845.00	0.2527259	1.2867418E-02	54.23968

Instrument : CHAMBER 208  
 Detector : 78911  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 22-JUN-2009 09:53:10  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUN-2009 15:08:47  
 Average Efficiency : 0.2524280  
 Average Efficiency Error : 6.9653862E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2990.819	3299.505	14260.00	0.2508653	1.0793664E-02	50.33332
NP-237	161.5530	28-FEB-2010	4435.407	4905.872	12192.00	0.2515088	1.2780157E-02	58.56274
CM-244	151.1856	28-FEB-2010	5534.932	5887.260	11020.00	0.2556523	1.3012759E-02	49.93821

Instrument : CHAMBER 209  
 Detector : 79188  
 Standard ID : AESS-001  
 Standard Reference Date : 20-FEB-2008 09:54:53  
 Calibration Analysis Date/Time : 29-JUN-2009 11:06:21  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:25:14  
 Average Efficiency : 0.3677108  
 Average Efficiency Error : 1.0086662E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.6698	28-FEB-2010	2989.181	3301.049	21968.00	0.3553457	1.5187075E-02	65.89574
NP-237	171.0024	28-FEB-2010	4433.021	4903.097	19297.00	0.3761547	1.9001663E-02	90.73633
CM-244	158.1060	28-FEB-2010	5532.718	5885.886	17059.00	0.3788077	1.9161167E-02	62.71068

Instrument : CHAMBER 210  
 Detector : 79189  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 29-JUN-2009 11:06:26  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:25:32  
 Average Efficiency : 0.3938951  
 Average Efficiency Error : 1.0783576E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1144	28-FEB-2010	2990.859	3297.943	23047.00	0.3887416	1.6604694E-02	57.83068
NP-237	200.4990	28-FEB-2010	4435.076	4904.812	24104.00	0.4007338	2.0202259E-02	76.70370
CM-244	196.5558	28-FEB-2010	5533.646	5886.210	22093.00	0.3946623	1.9910963E-02	61.67818

Instrument : CHAMBER 211  
 Detector : 79190  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 29-JUN-2009 11:06:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:25:46  
 Average Efficiency : 0.3797782  
 Average Efficiency Error : 1.0400439E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2988.624	3301.653	22395.00	0.3724639	1.5914930E-02	64.54439
NP-237	203.2080	28-FEB-2010	4436.794	4902.468	23454.00	0.3847243	1.9399559E-02	74.42917
CM-244	197.2236	28-FEB-2010	5532.766	5886.120	21658.00	0.3857397	1.9464286E-02	63.38742



Instrument : CHAMBER 212  
 Detector : 79191  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 29-JUN-2009 11:06:38  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:25:56  
 Average Efficiency : 0.3834927  
 Average Efficiency Error : 1.0500317E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.1222	28-FEB-2010	2989.287	3301.382	22921.00	0.3754007	1.6035914E-02	59.43782
NP-237	204.2586	28-FEB-2010	4434.079	4904.410	23916.00	0.3902802	1.9676529E-02	70.71378
CM-244	198.8100	28-FEB-2010	5534.335	5887.654	22006.00	0.3888572	1.9618779E-02	58.13512

Instrument : CHAMBER 213  
 Detector : 79192  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 29-JUN-2009 11:06:43  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:26:06  
 Average Efficiency : 0.3631246  
 Average Efficiency Error : 9.9473838E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.7452	28-FEB-2010	2990.968	3298.520	22030.00	0.3528930	1.5081747E-02	65.96364
NP-237	209.5938	28-FEB-2010	4437.380	4902.572	23193.00	0.3688471	1.8600717E-02	79.66854
CM-244	202.7478	28-FEB-2010	5532.282	5885.336	21539.00	0.3732129	1.8833132E-02	63.84235

Instrument : CHAMBER 214  
 Detector : 79193  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 29-JUN-2009 11:06:48  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:26:15  
 Average Efficiency : 0.3842220  
 Average Efficiency Error : 1.0522687E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2990.403	3298.091	22543.00	0.3736039	1.5962366E-02	54.14455
NP-237	204.7038	28-FEB-2010	4437.439	4902.827	23935.00	0.3897505	1.9649688E-02	76.09060
CM-244	195.0060	28-FEB-2010	5532.795	5885.993	21931.00	0.3950915	1.9933926E-02	57.07459

Instrument : CHAMBER 215  
 Detector : 79194  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 29-JUN-2009 11:06:53  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:26:24  
 Average Efficiency : 0.3850240  
 Average Efficiency Error : 1.0540539E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2990.062	3302.465	23238.00	0.3794642	1.6206851E-02	59.62454
NP-237	205.0260	28-FEB-2010	4436.774	4902.728	24080.00	0.3914905	1.9736437E-02	77.73202
CM-244	199.6806	28-FEB-2010	5533.954	5882.708	21984.00	0.3867625	1.9513281E-02	61.70960

Instrument : CHAMBER 216  
 Detector : 79195  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 29-JUN-2009 11:06:59  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:26:33  
 Average Efficiency : 0.3755702  
 Average Efficiency Error : 1.0284359E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.0418	28-FEB-2010	2992.227	3300.068	22506.00	0.3687362	1.5754715E-02	57.73516
NP-237	209.2716	28-FEB-2010	4434.095	4904.331	23839.00	0.3797142	1.9144330E-02	77.62376
CM-244	199.6488	28-FEB-2010	5533.563	5886.220	21686.00	0.3815858	1.9254461E-02	58.78411

Instrument : CHAMBER 217  
 Detector : 79410  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 29-JUN-2009 11:07:05  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:26:43  
 Average Efficiency : 0.3781467  
 Average Efficiency Error : 1.0355381E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.3736	28-FEB-2010	2992.213	3299.566	22448.00	0.3725700	1.5918989E-02	57.23290
NP-237	204.0192	28-FEB-2010	4433.215	4903.920	23291.00	0.3805314	1.9189263E-02	75.68012
CM-244	197.2128	28-FEB-2010	5534.328	5882.531	21567.00	0.3839772	1.9376099E-02	61.18950

Instrument : CHAMBER 218  
 Detector : 79411  
 Standard ID : AESS-010  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 29-JUN-2009 11:07:11  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:26:51  
 Average Efficiency : 0.3930978  
 Average Efficiency Error : 1.0763295E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.0008	28-FEB-2010	2990.601	3298.221	22913.00	0.3829195	1.6357172E-02	60.17708
NP-237	202.9926	28-FEB-2010	4432.747	4903.769	24319.00	0.3993416	2.0130621E-02	79.18008
CM-244	196.2330	28-FEB-2010	5534.561	5882.956	22479.00	0.4024245	2.0299474E-02	60.89557

Instrument : CHAMBER 219  
 Detector : 79412  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 29-JUN-2009 11:07:16  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:27:01  
 Average Efficiency : 0.3689672  
 Average Efficiency Error : 1.0101880E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	212.8284	28-FEB-2010	2989.180	3302.094	22853.00	0.3624727	1.5484245E-02	56.52708
NP-237	214.4868	28-FEB-2010	4436.774	4902.239	24088.00	0.3743512	1.8872330E-02	86.37078
CM-244	208.4184	28-FEB-2010	5532.237	5885.415	22142.00	0.3732110	1.8828364E-02	61.88073

Instrument : CHAMBER 220  
 Detector : 79413  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 29-JUN-2009 11:07:21  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:27:10  
 Average Efficiency : 0.3750438  
 Average Efficiency Error : 1.0269084E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.2200	28-FEB-2010	2990.438	3302.525	22663.00	0.3709926	1.5849777E-02	57.01278
NP-237	205.8930	28-FEB-2010	4435.000	4905.156	23426.00	0.3792588	1.9124148E-02	81.06312
CM-244	203.1954	28-FEB-2010	5534.774	5882.515	21789.00	0.3767064	1.9007433E-02	61.18806

Instrument : CHAMBER 221  
 Detector : 79414  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 29-JUN-2009 11:07:27  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:27:19  
 Average Efficiency : 0.3793155  
 Average Efficiency Error : 1.0384974E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2991.987	3300.655	22692.00	0.3761454	1.6069671E-02	54.91935
NP-237	210.2526	28-FEB-2010	4433.096	4905.038	23943.00	0.3795863	1.9137202E-02	74.16172
CM-244	201.9108	28-FEB-2010	5531.434	5885.564	22050.00	0.3836373	1.9355079E-02	57.98247

Instrument : CHAMBER 222  
 Detector : 79415  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 29-JUN-2009 11:07:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:27:29  
 Average Efficiency : 0.3503861  
 Average Efficiency Error : 9.6052606E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2991.968	3297.845	21293.00	0.3347430	1.4312199E-02	57.14749
NP-237	211.7160	28-FEB-2010	4434.336	4906.032	23208.00	0.3653858	1.8426064E-02	76.21756
CM-244	207.3882	28-FEB-2010	5530.429	5882.613	21327.00	0.3610742	1.8222243E-02	61.58858

Instrument : CHAMBER 223  
 Detector : 79416  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 29-JUN-2009 11:07:37  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:27:39  
 Average Efficiency : 0.3893896  
 Average Efficiency Error : 1.0661449E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0270	28-FEB-2010	2989.801	3297.756	23051.00	0.3813936	1.6290823E-02	56.25597
NP-237	200.6460	28-FEB-2010	4434.980	4902.483	23824.00	0.3957835	1.9954618E-02	75.62739
CM-244	195.9270	28-FEB-2010	5530.752	5886.350	22029.00	0.3949774	1.9927377E-02	58.25835

Instrument : CHAMBER 224  
 Detector : 79417  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 29-JUN-2009 11:07:43  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:27:48  
 Average Efficiency : 0.3855355  
 Average Efficiency Error : 1.0559128E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2987.708	3297.620	22614.00	0.3741145	1.5983578E-02	56.47799
NP-237	199.3962	28-FEB-2010	4432.391	4904.314	23852.00	0.3987372	2.0103335E-02	75.47507
CM-244	198.6402	28-FEB-2010	5535.163	5883.043	22064.00	0.3902014	1.9686140E-02	61.20261

Instrument : CHAMBER 225  
 Detector : 79418  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 29-JUN-2009 11:07:48  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:28:00  
 Average Efficiency : 0.3784462  
 Average Efficiency Error : 1.0361466E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.0798	28-FEB-2010	2990.136	3297.838	23025.00	0.3699967	1.5804220E-02	54.96978
NP-237	208.5846	28-FEB-2010	4432.708	4903.892	24244.00	0.3874272	1.9530520E-02	72.92027
CM-244	205.5828	28-FEB-2010	5534.915	5883.445	22371.00	0.3822702	1.9283641E-02	60.31302

Instrument : CHAMBER 226  
 Detector : 79419  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 29-JUN-2009 11:07:53  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:28:10  
 Average Efficiency : 0.3837910  
 Average Efficiency Error : 1.0508147E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.1856	28-FEB-2010	2990.396	3299.355	22716.00	0.3792837	1.6203530E-02	50.45033
NP-237	208.8990	28-FEB-2010	4437.021	4903.289	23922.00	0.3817108	1.9244449E-02	73.07991
CM-244	198.1458	28-FEB-2010	5534.002	5887.398	22152.00	0.3927352	1.9813271E-02	59.33780

Instrument : CHAMBER 227  
 Detector : 79420  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 29-JUN-2009 11:07:59  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:28:21  
 Average Efficiency : 0.3834471  
 Average Efficiency Error : 1.0500080E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.6468	28-FEB-2010	2988.851	3301.430	22706.00	0.3745125	1.5999762E-02	61.38483
NP-237	202.9140	28-FEB-2010	4435.798	4901.523	23913.00	0.3928266	1.9804921E-02	69.44127
CM-244	199.3140	28-FEB-2010	5532.218	5885.954	22005.00	0.3876506	1.9557914E-02	59.98711

Instrument : CHAMBER 228  
 Detector : 79421  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 29-JUN-2009 11:08:06  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:28:30  
 Average Efficiency : 0.3812083  
 Average Efficiency Error : 1.0441090E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	205.5870	28-FEB-2010	2989.413	3298.479	22499.00	0.3694338	1.5784577E-02	57.02933
NP-237	203.4984	28-FEB-2010	4435.708	4901.434	23757.00	0.3891334	1.9619791E-02	78.34894
CM-244	197.1096	28-FEB-2010	5531.094	5883.745	21974.00	0.3916203	1.9758444E-02	59.88309

Instrument : CHAMBER 229  
 Detector : 79422  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 29-JUN-2009 11:08:14  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:28:39  
 Average Efficiency : 0.3777187  
 Average Efficiency Error : 1.0341295E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2992.428	3300.536	22973.00	0.3721605	1.5897052E-02	58.77625
NP-237	210.1548	28-FEB-2010	4436.659	4902.986	23961.00	0.3800487	1.9160392E-02	70.52748
CM-244	200.7390	28-FEB-2010	5534.392	5883.088	21930.00	0.3835794	1.9353105E-02	57.32039

Instrument : CHAMBER 230  
 Detector : 79423  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 29-JUN-2009 11:08:21  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:28:51  
 Average Efficiency : 0.3723746  
 Average Efficiency Error : 1.0199217E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2990.435	3299.126	22423.00	0.3610166	1.5425573E-02	51.30120
NP-237	206.8830	28-FEB-2010	4436.006	4902.037	23676.00	0.3814719	1.9234043E-02	72.62286
CM-244	203.0208	28-FEB-2010	5532.506	5885.804	22015.00	0.3809220	1.9218368E-02	59.56349

Instrument : CHAMBER 231  
 Detector : 79424  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 29-JUN-2009 11:08:27  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:29:03  
 Average Efficiency : 0.3858555  
 Average Efficiency Error : 1.0562916E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	207.4764	28-FEB-2010	2991.739	3299.860	23293.00	0.3789935	1.6186299E-02	57.20384
NP-237	207.4998	28-FEB-2010	4434.942	4905.625	24373.00	0.3915348	1.9736728E-02	74.61633
CM-244	199.8804	28-FEB-2010	5535.464	5883.098	22212.00	0.3903586	1.9692916E-02	65.42931

Instrument : CHAMBER 232  
 Detector : 79425  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 29-JUN-2009 11:08:33  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:29:13  
 Average Efficiency : 0.3708555  
 Average Efficiency Error : 1.0160839E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.5218	28-FEB-2010	2989.849	3300.399	21668.00	0.3594086	1.5363393E-02	54.49700
NP-237	205.6662	28-FEB-2010	4435.500	4901.412	23160.00	0.3753609	1.8929429E-02	74.14132
CM-244	198.3060	28-FEB-2010	5530.414	5887.598	21698.00	0.3843684	1.9394770E-02	61.92214

Instrument : CHAMBER 233  
 Detector : 79426  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 29-JUN-2009 11:08:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:29:22  
 Average Efficiency : 0.3807971  
 Average Efficiency Error : 1.0442032E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2988.552	3300.019	21743.00	0.3753024	1.6042113E-02	57.53493
NP-237	167.9916	28-FEB-2010	4437.049	4902.445	19555.00	0.3880157	1.9598201E-02	65.87717
CM-244	157.2432	28-FEB-2010	5533.265	5887.350	17089.00	0.3817507	1.9309653E-02	57.89972

Instrument : CHAMBER 234  
 Detector : 79427  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 29-JUN-2009 11:08:46  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:29:34  
 Average Efficiency : 0.3715710  
 Average Efficiency Error : 1.0840051E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2992.038	3298.233	21630.00	0.3659885	1.8468786E-02	59.50484
NP-237	168.0294	28-FEB-2010	4434.030	4904.076	19159.00	0.3800664	1.9200675E-02	73.78577
CM-244	160.5822	28-FEB-2010	5534.071	5887.649	16880.00	0.3692411	1.8679539E-02	60.73690

Instrument : CHAMBER 235  
 Detector : 79428  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 29-JUN-2009 11:08:52  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:29:43  
 Average Efficiency : 0.3940442  
 Average Efficiency Error : 1.1499584E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2989.263	3301.595	21602.00	0.3770158	1.9025473E-02	58.14516
NP-237	161.6154	28-FEB-2010	4435.665	4901.527	19364.00	0.3993784	2.0174121E-02	80.43070
CM-244	148.1754	28-FEB-2010	5532.636	5886.715	17233.00	0.4085333	2.0662384E-02	62.76055



Instrument : CHAMBER 236  
 Detector : 79429  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 29-JUN-2009 11:08:58  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:29:51  
 Average Efficiency : 0.3835090  
 Average Efficiency Error : 1.1186651E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2987.896	3299.376	22084.00	0.3733852	1.8838538E-02	56.68213
NP-237	168.1992	28-FEB-2010	4436.423	4901.814	19840.00	0.3931670	1.9855550E-02	67.99222
CM-244	156.7614	28-FEB-2010	5532.618	5886.688	17183.00	0.3850371	1.9474657E-02	58.26772

Instrument : CHAMBER 237  
 Detector : 79430  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 29-JUN-2009 11:09:04  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:30:00  
 Average Efficiency : 0.3829979  
 Average Efficiency Error : 1.1177646E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.5742	28-FEB-2010	2991.344	3298.717	21746.00	0.3641782	1.8376544E-02	56.31577
NP-237	169.7700	28-FEB-2010	4433.245	4904.669	19754.00	0.3878583	1.9588275E-02	82.97163
CM-244	154.8234	28-FEB-2010	5531.003	5885.403	17660.00	0.4006723	2.0259250E-02	60.27898

Instrument : CHAMBER 238  
 Detector : 79431  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 29-JUN-2009 11:09:12  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:30:09  
 Average Efficiency : 0.3807547  
 Average Efficiency Error : 1.1108285E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.9792	28-FEB-2010	2988.961	3300.370	21726.00	0.3685883	1.8599236E-02	56.98843
NP-237	166.3758	28-FEB-2010	4436.951	4902.062	19490.00	0.3904817	1.9723417E-02	79.47810
CM-244	157.1856	28-FEB-2010	5532.406	5886.179	17210.00	0.3846013	1.9452270E-02	57.54609

Instrument : CHAMBER 239  
 Detector : 79432  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 29-JUN-2009 11:09:18  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:30:18  
 Average Efficiency : 0.3896177  
 Average Efficiency Error : 1.0683284E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2990.544	3302.370	22065.00	0.3845867	1.6435910E-02	56.06851
NP-237	162.9186	28-FEB-2010	4436.212	4902.679	19357.00	0.3960098	2.0004071E-02	74.77979
CM-244	153.1968	28-FEB-2010	5535.220	5884.998	17043.00	0.3906523	1.9760521E-02	60.01815

Instrument : CHAMBER 240  
 Detector : 79433  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 29-JUN-2009 11:09:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:30:27  
 Average Efficiency : 0.3777754  
 Average Efficiency Error : 1.0360904E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2990.696	3301.853	21594.00	0.3733324	1.5959276E-02	54.88348
NP-237	165.9822	28-FEB-2010	4433.664	4904.733	18875.00	0.3790388	1.9151727E-02	72.74045
CM-244	153.7938	28-FEB-2010	5531.260	5886.094	16776.00	0.3830326	1.9378640E-02	59.08883

Instrument : CHAMBER 241  
 Detector : 79434  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 29-JUN-2009 11:09:31  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:30:36  
 Average Efficiency : 0.3931700  
 Average Efficiency Error : 1.0783223E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.4158	28-FEB-2010	2990.242	3301.966	21884.00	0.3839029	1.6408380E-02	53.49284
NP-237	161.7816	28-FEB-2010	4434.457	4905.204	19269.00	0.3970166	2.0055814E-02	84.30279
CM-244	147.2670	28-FEB-2010	5530.782	5884.826	16923.00	0.4035279	2.0413468E-02	60.66447

Instrument : CHAMBER 242  
 Detector : 79435  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 29-JUN-2009 11:09:38  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:30:45  
 Average Efficiency : 0.3846521  
 Average Efficiency Error : 1.0549294E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2990.030	3301.446	22109.00	0.3721264	1.5903009E-02	60.76245
NP-237	167.2962	28-FEB-2010	4433.469	4904.310	19754.00	0.3935935	1.9877926E-02	76.54881
CM-244	154.4388	28-FEB-2010	5535.605	5884.633	17390.00	0.3954074	1.9996468E-02	61.98755

Instrument : CHAMBER 243  
 Detector : 79436  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 29-JUN-2009 11:09:44  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:30:54  
 Average Efficiency : 0.3685505  
 Average Efficiency Error : 1.0109218E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2990.365	3297.486	21347.00	0.3626947	1.5506803E-02	57.87182
NP-237	168.2934	28-FEB-2010	4436.388	4902.306	19057.00	0.3774501	1.9069549E-02	79.79286
CM-244	158.8128	28-FEB-2010	5533.622	5882.491	16666.00	0.3685086	1.8645244E-02	59.82504

Instrument : CHAMBER 244  
 Detector : 79437  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 29-JUN-2009 11:09:51  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:31:04  
 Average Efficiency : 0.3725442  
 Average Efficiency Error : 1.0218798E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.3204	28-FEB-2010	2989.131	3300.564	21635.00	0.3627526	1.5506621E-02	61.82745
NP-237	167.4312	28-FEB-2010	4432.574	4903.374	19014.00	0.3785259	1.9124355E-02	78.29796
CM-244	156.4188	28-FEB-2010	5534.584	5883.551	16999.00	0.3816244	1.9304425E-02	60.38109

Instrument : CHAMBER 245  
 Detector : 79438  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 29-JUN-2009 11:09:58  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:31:18  
 Average Efficiency : 0.3871339  
 Average Efficiency Error : 1.0614644E-02  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7372	28-FEB-2010	2992.063	3299.394	22212.00	0.3791691	1.6203059E-02	61.13074
NP-237	167.1294	28-FEB-2010	4434.575	4906.628	19802.00	0.3949435	1.9945625E-02	77.95452
CM-244	154.7664	28-FEB-2010	5534.102	5883.894	17248.00	0.3913280	1.9792015E-02	61.02800

Instrument : CHAMBER 246  
 Detector : 78912  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 29-JUN-2009 11:10:04  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:31:31  
 Average Efficiency : 0.3734691  
 Average Efficiency Error : 1.0242580E-02  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1408	28-FEB-2010	2989.019	3301.538	21682.00	0.3656716	1.5630983E-02	62.50508
NP-237	170.0886	28-FEB-2010	4435.665	4906.544	19170.00	0.3756807	1.8979004E-02	73.78893
CM-244	157.7460	28-FEB-2010	5531.825	5885.470	17212.00	0.3831484	1.9378757E-02	60.45332

Instrument : CHAMBER 247  
 Detector : 79440  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 29-JUN-2009 11:10:09  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:31:41  
 Average Efficiency : 0.3946936  
 Average Efficiency Error : 1.0825262E-02  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2988.774	3301.191	21982.00	0.3859695	1.6495787E-02	57.12532
NP-237	159.1506	28-FEB-2010	4436.556	4903.380	19616.00	0.4108289	2.0749848E-02	76.11504
CM-244	151.7142	28-FEB-2010	5530.809	5885.967	16961.00	0.3925581	1.9858034E-02	61.99513

Instrument : CHAMBER 248  
 Detector : 79441  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 29-JUN-2009 11:10:15  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:31:51  
 Average Efficiency : 0.3902423  
 Average Efficiency Error : 1.0700536E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4828	28-FEB-2010	2988.392	3300.122	21933.00	0.3806768	1.6270030E-02	55.85408
NP-237	166.8174	28-FEB-2010	4433.659	4905.293	19807.00	0.3957821	1.9987926E-02	82.39788
CM-244	155.0100	28-FEB-2010	5532.437	5887.556	17631.00	0.3993214	2.0191407E-02	58.45845

Instrument : CHAMBER 249  
 Detector : 79442  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 29-JUN-2009 11:10:21  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:32:04  
 Average Efficiency : 0.3691239  
 Average Efficiency Error : 1.0123477E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.9034	28-FEB-2010	2988.416	3300.577	21774.00	0.3604519	1.5407033E-02	52.81279
NP-237	171.2268	28-FEB-2010	4436.398	4904.007	19367.00	0.3770129	1.9044334E-02	66.80524
CM-244	159.5796	28-FEB-2010	5533.011	5883.893	17016.00	0.3744264	1.8940104E-02	54.54869

Instrument : CHAMBER 250  
 Detector : 79443  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 29-JUN-2009 11:10:26  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:32:16  
 Average Efficiency : 0.4029809  
 Average Efficiency Error : 1.1048914E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	188.7090	28-FEB-2010	2987.664	3299.772	22102.00	0.3953417	1.6895199E-02	54.69497
NP-237	159.6558	28-FEB-2010	4433.576	4904.834	19622.00	0.4096608	2.0690778E-02	72.59711
CM-244	150.5208	28-FEB-2010	5531.060	5885.456	17478.00	0.4077245	2.0618226E-02	53.57324

Instrument : CHAMBER 251  
 Detector : 79444  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 29-JUN-2009 11:10:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:32:48  
 Average Efficiency : 0.3859750  
 Average Efficiency Error : 1.0582183E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7708	28-FEB-2010	2988.497	3300.693	22197.00	0.3788451	1.6189344E-02	55.12341
NP-237	168.7422	28-FEB-2010	4436.150	4903.399	19871.00	0.3925318	1.9823143E-02	75.41560
CM-244	156.3252	28-FEB-2010	5531.737	5887.575	17366.00	0.3900679	1.9726753E-02	56.80479

Instrument : CHAMBER 252  
 Detector : 79445  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 29-JUN-2009 11:10:38  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:33:09  
 Average Efficiency : 0.3764580  
 Average Efficiency Error : 1.0325164E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2988.592	3300.825	21491.00	0.3730471	1.5948050E-02	52.77084
NP-237	166.6248	28-FEB-2010	4435.553	4902.127	19212.00	0.3843369	1.9415863E-02	79.06938
CM-244	155.8290	28-FEB-2010	5534.590	5884.216	16588.00	0.3737789	1.8912956E-02	58.86968

Instrument : CHAMBER 253  
 Detector : 79446  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 29-JUN-2009 11:10:44  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:33:20  
 Average Efficiency : 0.4178050  
 Average Efficiency Error : 1.1451593E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	186.9936	28-FEB-2010	2987.654	3300.865	23009.00	0.4153371	1.7741047E-02	58.55786
NP-237	160.8066	28-FEB-2010	4434.573	4903.102	19908.00	0.4126572	2.0839127E-02	76.00024
CM-244	145.8384	28-FEB-2010	5533.082	5884.383	17734.00	0.4269842	2.1588651E-02	59.04111

Instrument : CHAMBER 254  
 Detector : 79447  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 29-JUN-2009 11:10:49  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:33:32  
 Average Efficiency : 0.3998787  
 Average Efficiency Error : 1.0964696E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2991.549	3298.669	22357.00	0.3874868	1.6557176E-02	61.70351
NP-237	164.6658	28-FEB-2010	4433.543	4905.678	20062.00	0.4060794	2.0505425E-02	75.89950
CM-244	151.3824	28-FEB-2010	5533.440	5883.478	17814.00	0.4131682	2.0889070E-02	60.11974

Instrument : CHAMBER 255  
 Detector : 79448  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 29-JUN-2009 11:10:56  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:33:42  
 Average Efficiency : 0.3661844  
 Average Efficiency Error : 1.0047055E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2992.136	3299.381	20925.00	0.3576654	1.5295714E-02	54.59342
NP-237	168.3948	28-FEB-2010	4435.277	4902.796	18729.00	0.3707303	1.8733418E-02	71.29922
CM-244	154.6032	28-FEB-2010	5531.573	5887.697	16494.00	0.3746144	1.8956492E-02	56.20598

Instrument : CHAMBER 256  
 Detector : 79449  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 29-JUN-2009 11:11:01  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 30-JUN-2009 13:33:53  
 Average Efficiency : 0.3793263  
 Average Efficiency Error : 1.0406218E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2989.020	3301.037	21283.00	0.3744797	1.6011277E-02	53.36488
NP-237	161.5530	28-FEB-2010	4435.346	4901.908	18858.00	0.3890801	1.9659264E-02	69.14060
CM-244	151.1856	28-FEB-2010	5534.491	5884.250	16233.00	0.3770208	1.9081894E-02	56.15398

# LUCAS CELL COUNTERS



# General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414  
(843)556-8171

## Lucas Cell Calibration Package

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the second standard(s) documentation? standard preparation information? standard < 1 Year old or verified?	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
2) Is the efficiency calibration report included ?	<input checked="" type="checkbox"/>		
3) Is the raw count data included for: Cell constant determination? Plateau generation?	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
4) Are the calibration verifications included?	<input checked="" type="checkbox"/>		
5) Are the instrument settings included: HVPS settings?	<input checked="" type="checkbox"/>		
6) Has the CELLEFF.xls file been updated ?	<input checked="" type="checkbox"/>		
7) Have the calibration dates been updated in ALPHALIMS ?	<input checked="" type="checkbox"/>		

Prepared By: Kelli S. Demee

Date: 8/29/08

Reviewed By: Mark J. Idem

Date: 9/12/08

Effective Date: 9/24/08

# Ra-226 Cell Constants

standard ID: 0299-G  
 Volume added (mL): 0.1  
 Standard Reference Activity (DPM/mL): 2446.35

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/time flushed to cell	Date/time end of degas	Bkg Counts	Bkg cpm	total counts	time min	count	Known activity dpm	11 (days) end-degas to flush	12 (days) end-flush to count	13 (days) Std Ref Date to count	Decay from Std Ref Date to count
101	1.796	Average 1.751	6/11/2008 22:40	6/11/2008 14:55	6/5/2008 14:10	8	0.287	8239	30	274.63	244.63	6.03125	0.32292	3102	0.9963
101	1.729	Stdev 0.039	8/15/2008 12:50	8/15/2008 9:25	8/12/2008 16:10	8	0.287	4800	30	160.00	244.63	2.71875	0.14236	3167	0.9962
101	1.728		7/31/2008 15:35	7/31/2008 8:55	7/28/2008 10:55	8	0.287	4938	30	164.60	244.63	2.91667	0.27778	3152	0.9963
102	1.877	Average 1.847	6/11/2008 23:15	6/11/2008 15:20	6/5/2008 14:10	8	0.287	7998	30	256.60	244.63	6.04861	0.32986	3102	0.9963
102	1.832	Stdev 0.026	8/4/2008 16:35	8/4/2008 9:45	8/1/2008 13:30	8	0.287	4570	30	152.33	244.63	2.84375	0.28472	3156	0.9963
102	1.832		7/31/2008 16:10	7/31/2008 9:20	7/28/2008 10:55	8	0.287	4680	30	156.00	244.63	2.93403	0.28472	3152	0.9963
103	1.864	Average 1.752	6/11/2008 13:40	6/11/2008 9:40	6/5/2008 14:10	8	0.287	8620	30	287.33	244.63	5.81250	0.16667	3102	0.9963
103	1.867	Stdev 0.098	7/31/2008 16:40	7/31/2008 9:50	7/28/2008 10:55	7	0.233	4862	30	162.07	244.63	2.95486	0.28472	3152	0.9963
103	1.704		8/4/2008 17:10	8/4/2008 10:15	8/1/2008 13:30	7	0.233	4796	30	159.87	244.63	2.86458	0.28819	3156	0.9963
104	1.937	Average 1.973	6/11/2008 14:10	6/11/2008 10:00	6/5/2008 14:10	6	0.200	8955	30	298.50	244.63	5.82639	0.17361	3102	0.9963
104	1.917	Stdev 0.080	6/24/2008 17:20	6/24/2008 14:10	6/20/2008 9:50	8	0.287	7275	30	242.50	244.63	4.18056	0.13194	3115	0.9963
104	2.064		7/31/2008 17:20	7/31/2008 10:15	7/28/2008 10:55	8	0.287	5964	30	198.80	244.63	2.97222	0.29514	3152	0.9963
105	1.916	Average 1.749	8/15/2008 13:55	8/15/2008 9:55	8/12/2008 16:10	8	0.287	5327	30	177.57	244.63	2.73958	0.16667	3167	0.9962
105	1.700	Stdev 0.149	7/31/2008 17:55	7/31/2008 10:45	7/28/2008 10:55	4	0.133	4933	30	164.43	244.63	2.99306	0.29861	3152	0.9963
105	1.831		8/4/2008 18:35	8/4/2008 11:05	8/1/2008 13:30	1	0.033	4805	30	153.50	244.63	2.89931	0.31250	3156	0.9963
106	1.594	Average 1.486	8/15/2008 14:30	8/15/2008 10:15	8/12/2008 16:10	8	0.287	4441	30	148.03	244.63	2.75347	0.17708	3167	0.9962
106	1.441	Stdev 0.094	7/31/2008 18:25	7/31/2008 11:15	7/28/2008 10:55	8	0.287	4208	30	140.27	244.63	3.01389	0.29861	3152	0.9963
106	1.422		8/19/2008 8:00	8/18/2008 16:00	8/15/2008 9:25	8	0.287	4132	30	137.73	244.63	3.27431	0.68667	3170	0.9962
107	1.779	Average 1.773	6/11/2008 15:50	6/11/2008 11:10	6/5/2008 14:10	8	0.287	8232	30	274.40	244.63	5.87500	0.19444	3102	0.9963
107	1.751	Stdev 0.020	7/31/2008 19:05	7/31/2008 11:40	7/28/2008 10:55	7	0.233	5121	30	170.70	244.63	3.03125	0.30903	3152	0.9963
107	1.790		8/4/2008 19:40	8/4/2008 12:00	8/1/2008 13:30	8	0.287	5105	30	170.17	244.63	2.93750	0.31944	3156	0.9963
108	1.755	Average 1.840	6/11/2008 17:00	6/11/2008 11:30	6/5/2008 14:10	7	0.233	8081	30	268.37	244.63	5.88889	0.22917	3102	0.9963
108	1.937	Stdev 0.092	6/25/2008 20:00	6/25/2008 15:40	6/20/2008 9:50	8	0.287	8413	30	280.43	244.63	5.24306	0.18056	3116	0.9963
108	1.827		8/15/2008 15:09	8/15/2008 10:15	8/12/2008 16:10	8	0.287	5071	30	169.03	244.63	2.75347	0.19792	3167	0.9962
109	1.846	Average 1.512	6/11/2008 17:35	6/11/2008 11:45	6/5/2008 14:10	8	0.287	7570	30	252.33	244.63	5.89931	0.24306	3102	0.9963
109	1.441	Stdev 0.117	8/1/2008 8:55	7/31/2008 13:05	7/28/2008 10:55	6	0.200	3694	30	129.80	244.63	3.09028	0.82639	3152	0.9963
109	1.448		8/4/2008 20:40	8/4/2008 13:40	8/1/2008 13:30	8	0.287	4226	30	140.87	244.63	3.00694	0.29167	3156	0.9963
110	1.864	Average 1.544	6/24/2008 21:15	6/24/2008 15:05	6/20/2008 9:50	8	0.287	6214	30	207.13	244.63	4.21875	0.26894	3115	0.9963
110	1.566	Stdev 0.133	8/15/2008 15:35	8/15/2008 10:50	8/12/2008 16:10	8	0.287	4377	30	145.90	244.63	2.77778	0.19792	3167	0.9962
110	1.401		8/4/2008 21:10	8/4/2008 14:05	8/1/2008 13:30	8	0.287	4103	30	136.77	244.63	3.02431	0.29514	3156	0.9963
111	1.832	Average 1.575	6/24/2008 22:30	6/24/2008 15:30	6/20/2008 9:50	7	0.233	6071	30	202.37	244.63	4.23611	0.29167	3115	0.9963
111	1.517	Stdev 0.057	8/1/2008 10:30	7/31/2008 14:00	7/28/2008 10:55	8	0.287	4120	30	137.33	244.63	3.12847	0.85417	3152	0.9963
111	1.576		8/4/2008 21:35	8/4/2008 14:30	8/1/2008 13:30	7	0.233	4636	30	154.53	244.63	3.04167	0.29514	3156	0.9963
112	1.797	Average 1.648	6/11/2008 22:10	6/11/2008 14:30	6/5/2008 14:10	8	0.287	8239	30	274.63	244.63	6.01389	0.31944	3102	0.9963
112	1.588	Stdev 0.130	8/1/2008 11:00	7/31/2008 14:00	7/28/2008 10:55	8	0.287	4294	30	143.13	244.63	3.12847	0.87500	3152	0.9963
112	1.559		8/4/2008 22:00	8/4/2008 14:50	8/1/2008 13:30	8	0.287	4599	30	153.30	244.63	3.05556	0.29861	3156	0.9963

10/8/2010

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 19	500	<del>6/15/08 1410</del>						
Cal 13	500	<del>6/15/08 1410</del>						
Cal 10	500	<del>6/15/08 1410</del>						
Cal 14	500	<del>6/15/08 1410</del>						
Cal 34	500	<del>6/15/08 1410</del>						
Cal 21	500	6/24/08 0950	6/24/08 1410	6/24/08 1720	104	1	8	7275
<del>Cal 20</del>	500	<del>6/24/08 0950</del>	<del>6/24/08 1430</del>	<del>6/24/08 1820</del>	<del>107</del>	<del>1</del>	<del>8</del>	<del>18</del>
<del>Cal 25</del>	500	<del>6/24/08 0950</del>	<del>6/24/08 1450</del>	<del>6/24/08 1921</del>	<del>108</del>	<del>1</del>	<del>8</del>	<del>7547</del>
Cal 36	500	6/24/08 0950	6/24/08 1505	6/24/08 2115	110	1	8	6214
Cal 37	500	6/24/08 0950	6/24/08 1530	6/24/08 2230	111	1	7	6071
<del>Cal 37</del>	500	<del>6/24/08 0950</del>	<del>6/24/08 1545</del>	<del>6/24/08 2305</del>	<del>112</del>	<del>1</del>	<del>8</del>	<del>5592</del>
<del>Cal 3</del>	500	<del>6/25/08 0950</del>	<del>6/25/08 1405</del>	<del>6/25/08 1705</del>	<del>109</del>	<del>1</del>	<del>8</del>	<del>8275</del>
<del>Cal 32</del>	500	<del>6/25/08 0950</del>	<del>6/25/08 1420</del>	<del>6/25/08 1740</del>	<del>101</del>	<del>1</del>	<del>8</del>	<del>3362</del>
<del>Cal 41</del>	500	<del>6/25/08 0950</del>	<del>6/25/08 1445</del>	<del>6/25/08 1820</del>	<del>103</del>	<del>1</del>	<del>8</del>	<del>8905</del>
<del>Cal 39</del>	500	<del>6/25/08 0950</del>	<del>6/25/08 1510</del>	<del>6/25/08 1851</del>	<del>105</del>	<del>1</del>	<del>8</del>	<del>9300</del>
<del>Cal 43</del>	500	<del>6/25/08 0950</del>	<del>6/25/08 1525</del>	<del>6/25/08 1930</del>	<del>109</del>	<del>1</del>	<del>8</del>	<del>8121</del>
<del>Cal 47</del>	500	<del>6/25/08 0950</del>	<del>6/25/08 1540</del>	<del>6/25/08 2000</del>	<del>100</del>	<del>1</del>	<del>8</del>	<del>8413</del>

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Ca147	500	6/5/08 1410	6/11/08 0940	6/11/08 1340	103	1	8	8220
Ca13	500	6/5/08 1410	6/11/08 1000	6/11/08 1410	104	1	6	8955
<del>Ca127</del>	<del>500</del>	<del>6/5/08 1410</del>	<del>6/11/08 1015</del>	<del>6/11/08 1440</del>	<del>105</del>	<del>1</del>	<del>4</del>	<del>9424</del>
<del>Ca140</del>	<del>500</del>	<del>6/5/08 1410</del>	<del>6/11/08 1045</del>	<del>6/11/08 1510</del>	<del>106</del>	<del>1</del>	<del>8</del>	<del>3534</del>
Ca125	500	6/5/08 1410	6/11/08 1110	6/11/08 1550	107	1	8	8232
Ca136	500	6/5/08 1410	6/11/08 1130	6/11/08 1700	108	1	7	8081
Ca121	500	6/5/08 1410	6/11/08 1145	6/11/08 1735	109	1	8	7570
<del>Ca132</del>	<del>500</del>	<del>6/5/08 1410</del>	<del>6/11/08 1350</del>	<del>6/11/08 2040</del>	<del>110</del>	<del>1</del>	<del>8</del>	<del>4366</del>
<del>Ca134</del>	<del>500</del>	<del>6/5/08 1410</del>	<del>6/11/08 1415</del>	<del>6/11/08 2115</del>	<del>111</del>	<del>1</del>	<del>6</del>	<del>6792</del>
Ca143	500	6/5/08 1410	6/11/08 1430	6/11/08 2210	110	1	8	5867
Ca117	500	6/5/08 1410	6/11/08 1455	6/11/08 2240	101	1	8	8239
Ca141	500	6/5/08 1410	6/11/08 1520	6/11/08 2315	102	1	8	7690
Ca111	500	6/5/08 1410						
Ca120	500	6/5/08 1410						
Ca17	500	6/5/08 1410						
Ca19	500	6/5/08 1410						
Ca16	500	6/5/08 1410						
Ca18	500	6/5/08 1410						
Ca135	500	6/5/08 1410						

160  
8/29/08

Ra-226 Verification Sheet

1197

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 14	500	7/28/08 1055	7/31/08 0855	7/31/08 1535	101	1	8	4938
Cal 144	500	7/28/08 1055	7/31/08 0920	7/31/08 1610	102	1	8	4680
Cal 140	500	7/28/08 1055	7/31/08 0950	7/31/08 1640	103	1	7	4862
Cal 119	500	7/28/08 1055	7/31/08 1015	7/31/08 1720	104	1	8	5964
Cal 130	500	7/28/08 1055	7/31/08 1045	7/31/08 1755	105	1	4	4933
Cal 146	500	7/28/08 1055	7/31/08 1115	7/31/08 1825	106	1	8	4209
Cal 113	500	7/28/08 1055	7/31/08 1140	7/31/08 1905	107	1	7	5721
<del>Cal 113</del>	<del>500</del>	<del>7/28/08 1055</del>	<del>7/31/08 1205</del>	<del>8/1/08 0815</del>	<del>108</del>	<del>1</del>	<del>8</del>	<del>3759</del>
Cal 142	500	7/28/08 1055	7/31/08 1305	8/1/08 0855	109	1	6	3894
<del>Cal 113</del>	<del>500</del>	<del>7/28/08 1055</del>	<del>7/31/08 1330</del>	<del>8/1/08 0930</del>	<del>110</del>	<del>1</del>	<del>6</del>	<del>3185</del>
Cal 143	500	7/28/08 1055	7/31/08 1400	8/1/08 1030	111	1	8	4120
Cal 137	500	7/28/08 1055	7/31/08 1415	8/1/08 1100	112	1	8	4294

100  
8/2/08

Ra-226 Verification Sheet

Run 1

VP  
8/29/08

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
<del>41</del>	500	<del>8/11/08 1330</del>	<del>8/4/08 0615</del>	<del>8/4/08 1550</del>	101	1	8	3638
44	500	8/11/08 1330	8/4/08 0645	8.4.08 1635	102	1	8	4570
30	500	8/11/08 1330	8/4/08 1015	8.4.08 1710	103	1	7	4796
<del>19</del>	500	<del>8/11/08 1330</del>	<del>8/4/08 1035</del>	<del>8.4.08 1745</del>	104	1	6	4733
35	500	8/11/08 1330	8/4/08 1105	8.4.08 1835	105	1	1	4605
<del>46</del>	500	<del>8/11/08 1330</del>	<del>8/4/08 1130</del>	<del>8.4.08 1910</del>	106	1	6	3725
13	500	8/11/08 1330	8/4/08 1200	8.4.08 1940	107	1	8	5105
<del>25</del>	500	<del>8/11/08 1330</del>	<del>8/4/08 1310</del>	<del>8.4.08 2010</del>	108	1	8	4575
42	500	8/11/08 1330	8/4/08 1340	8.4.08 2040	109	1	8	4226
15	500	8/11/08 1330	8/4/08 1405	8.4.08 2110	110	1	8	4103
43	500	8/11/08 1330	8/4/08 1430	8.4.08 2135	111	1	7	4636
37	500	8/11/08 1330	8/4/08 1450	8.4.08 2200	112	1	8	4599

VP 8/29/08

Ra-226 Verification Sheet

Fix 1

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
		<del>8/11/08 1305</del>						
Cal 15		8/12/08 1610	8/15/08 0925	8/15/08 1250	101	1	8	4900
Cal 37		8/12/08 1610	8/15/08 0955	8/15/08 1355	105	1	8	5327
Cal 43		8/12/08 1610	8/15/08 1015	8/15/08 1430	106	1	8	4441
Cal 44		8/12/08 1610	8/15/08 1030	8/15/08 1500	109	1	8	5071
Cal 13		8/12/08 1610	8/15/08 1050	8/15/08 1535	110	1	8	4377
<del>Cal 15</del>	<del>500</del>	<del>8/15/08 0925</del>	<del>8/18/08 1000</del>	<del>8-18-08 1700</del>	<del>104</del>	<del>1</del>	<del>4132</del>	<del>462</del>
CAL-15	500	8/15/08 0925	8/18/08 1600	8/19/08 0800	106	1	8	4132

8/15/08

8/15/08

# Verification for Ra-226 Standard 0299-G

4/2/2008	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard Mass. Used (G)	Source DPM/G
D. Roy	0299-G N1	2536.9600	52.4000	2484.5600	1.917186	0.5057	2562.667649
	0299-G N2	2520.2500	52.4000	2467.8500	1.917186	0.5056	2545.935781
	0299-G N3	2532.5000	52.4000	2480.1000	1.917186	0.5042	2565.677715
						Average =	2558.093715

Mean Value (Counting) = 2558.093715  
 Stdev = 10.63610098

Certificate Value = 2437.6 dpm/mL  
 Lower Limit = 2536.821513 dpm/mL  
 Upper Limit = 2579.365917 dpm/mL

Rule 1 Pass/Fail  
 Two sigma = 21.27220197 dpm/mL  
 10 % of Mean = 255.8093715 dpm/mL  
 Rule 2 (Pass/Fail) Pass

\*exception taken due to full recovery of standard  
 Rule 3 (Pass/Fail) Pass

### Verification Rules

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 = The determined mean value shall be within 10% of the certificate value.

The analyst prepared three standard verification sources for Ra-226 source 0299-G by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel 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 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Gold for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 4/02/08 using source 0024-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0024. Each verification source calculation was performed as follows:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

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

RAD.SOP.M-001

W 8/17/08  
 Nancy E. Jackson 4/9/08  
 David Roy 4/10/08





# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0299	Isotope:	Radium-226
Prepared By:	Angela Johnson	Prepared By:	Angela Johnson
Carrier Conc:	0.5 M HCL	Prep Date:	09/15/2000
Reference Date:	12/15/1999	Verification Date:	01/23/2008
Ampoule Mass (g):	5.0368 g	Expiration Date:	01/23/2009
Uncertainty:	+/- 2.5 %	Primary Code:	0299-A
LogBook No:	RC S 027 128	Dilution(mL):	100 mL
		Mass of Parent(g):	4.6634 g
		Density(g/mL):	1.0012
		Balance ID:	

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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 122414.2500 \text{ dpm/mL}$
$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0012 \text{ g/mL}) / (100 \text{ mL}) = 122273.3377 \text{ dpm/g}$

### 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	04/02/2008	04/02/2009

GEL Laboratories LLC  
Version 1.0 9/18/2000

*140  
8/28/08*

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-KAD-A-008 Isotope Ka-226  
 Date Standards Prepared 4/5/05 Cocktail Type Used N/A  
 Standard ID 0299-6 Matrix of Vial/Planchett N/A  
 Amount Used (g or ml) 0.1 N/A  
 Standard Activity (DPM/g or ml) 2446.347 Type of Scintillation Vial N/A  
 Reference Date 12/15/99 Pipette ID Used 1429303  
 Expiration Date 4/12/09 Balance ID Used 36040216  
 Residue/Carrier Agent 0.5M HCl Quenching Agent N/A

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	CAL 1				
2	CAL 2				
3	CAL 3				
4	CAL 4				
5	CAL 5				
6	CAL 6				
7	CAL 7				
8	CAL 8				
9	CAL 9				
10	CAL 10				
11	CAL 11				
12	CAL 12				
13	CAL 13				
14	CAL 14				
15	CAL 15				

No. of Standards

Prepared By: Kyle B. Dancer Date: 8/23/05  
 Reviewed By: John G. Adams Date: 8/28/08

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-KAD-A-008 Isotope La-226  
 Date Standards Prepared 4/5/05 Cocktail Type Used N/A  
 Standard ID 02991-6 Matrix of Vial/Planchett N/A  
 Amount Used (g or ml) 0.1 N/A  
 Standard Activity (DPM/g or ml) 2446.347 Type of Scintillation Vial N/A  
 Reference Date 12/15/99 Pipette ID Used 1429303  
 Expiration Date 4/12/09 Balance ID Used 36040216  
 Residue/Carrier Agent 0.5M HCl Quenching Agent N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
16	CAL 16				
17	CAL 17				
18	CAL 18				
19	CAL 19				
20	CAL 20				
21	CAL 21				
22	CAL 22				
23	CAL 23				
24	CAL 24				
25	CAL 25				
26	CAL 26				
27	CAL 27				
28	CAL 28				
29	CAL 29				
30	CAL 30				

8/22/08  
 8/22/08

Prepared By: Kelli Powell Date: 8/22/08  
 Reviewed By: John J. Identi Date: 8/22/08

Rev 1 RLM.9/10/97

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-KAD-A-008 Isotope Ka-226  
 Date Standards Prepared 4/15/05 Cocktail Type Used N/A  
 Standard ID 0299-6 Matrix of Vial/Planchet N/A  
 Amount Used (g or ml) 0.1 N/A  
 Standard Activity (DPM/g or ml) 2446.347 Type of Scintillation Vial N/A  
 Reference Date 12/15/99 Pipette ID Used 1429303  
 Expiration Date 4/12/09 Balance ID Used 36040216  
 Residue/Carrier Agent 0.5M HCl Quenching Agent N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
31	CAL 31				
32	CAL 32				
33	CAL 33				
34	CAL 34				
35	CAL 35				
36	CAL 36				
37	CAL 37				
38	CAL 38				
39	CAL 39				
40	CAL 40				
41	CAL 41				
42	CAL 42				
43	CAL 43				
44	CAL 44				
45	CAL 45				

N/A  
 8/25/08

Prepared By: Kelli Brownlee Date 8/25/08  
 Reviewed By: Henry G. Jones Date 8/29/08

Rev 1 RLM 9/10/97

## General Engineering Laboratories Verification Source Preparation Sheet

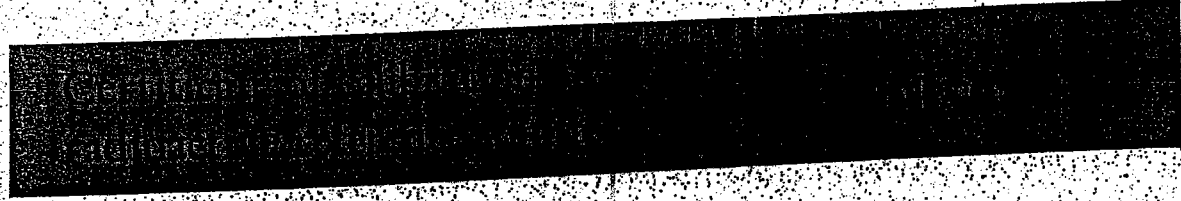
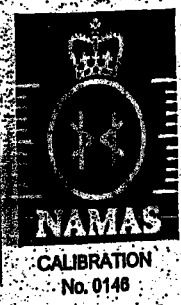
Applicable SOP Number GL-KAD-A-003 Isotope Po-226  
 Date Standards Prepared 4/15/05 Cocktail Type Used N/A  
 Standard ID 0299-G Matrix of Vial/Planchett N/A  
 Amount Used (g or ml) 0.1 Type of Scintillation Vial N/A  
 Standard Activity (DPM/g or mL) 2446.347 Pipette ID Used 1429303  
 Reference Date 12/15/09 Balance ID Used 36040216  
 Expiration Date 4/12/09 Quenching Agent N/A  
 Residue/Carrier Agent 0.5M HCl

	Standard Number	Quenching Vol (uL)/ Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
46	CAL 46				<del>1.0000</del>
47	CAL 47				<del>1.0000</del>
48	CAL 48				<del>1.0000</del>

Prepared By: Vello's Dione Date: 8/1/05  
 Reviewed By: John J. Adams Date: 3/28/08

Rev 1 RLM 9/10/97

0299



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

ion Principal radionuclide: Radium-226

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

ment Reference time: 1200 GMT on 15 December 1999

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

ion of The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$ , which  
inties 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

ved  
ory

Date of  
issue

17<sup>th</sup> December 1999

KAP 8/11/99

# Ra-226 WATER

Batch : LCSVER  
 Date : 8/20/2008  
 Analyst : KSD1

Procedure Code : LUC26RAL  
 Parmname : Radium-226

MDA : 1 pCi/L  
 Instrument Used : LUCAS CELL DETECTOR

Bkg Count Time: 30 min

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME
Ver 1	0.500	30	738	101	1.751	0.267	0.4737	21.7600	1.5957	8/26/2008 16:10
Ver 2	0.500	30	770	102	1.647	0.267	0.5038	24.1604	1.7334	8/26/2008 17:05
Ver 3	0.500	30	716	103	1.752	0.267	0.4735	21.0967	1.5715	8/26/2008 17:45
Ver 4	0.500	30	820	104	1.973	0.200	0.3728	21.4823	1.4866	8/26/2008 18:15
Ver 5	0.500	30	656	106	1.486	0.267	0.5576	22.7382	1.7722	8/26/2008 19:00
Ver 6	0.500	30	860	107	1.773	0.267	0.4674	25.0613	1.6986	8/26/2008 19:35
Ver 7	0.500	30	867	108	1.940	0.267	0.4505	24.3515	1.6436	8/26/2008 20:10
Ver 8	0.500	30	756	110	1.544	0.267	0.5372	25.2853	1.8313	8/26/2008 20:40
Ver 9	0.500	30	827	111	1.575	0.133	0.3989	27.2897	1.8735	8/26/2008 21:10
VER 10	0.500	30	851	112	1.648	0.267	0.5042	26.7480	1.8227	8/26/2008 21:45

WJ  
8/25/08

Sample ID	Sample Dup	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
Ver 1		1	8/26/2008 13:00	LCS	0638-F	24.10	pCi/L	90%
Ver 2		1	8/26/2008 13:30	LCS	0638-F	24.10	pCi/L	100%
Ver 3		1	8/26/2008 13:55	LCS	0638-F	24.10	pCi/L	88%
Ver 4		1	8/26/2008 14:25	LCS	0638-F	24.10	pCi/L	89%
Ver 5		1	8/26/2008 14:45	LCS	0638-F	24.10	pCi/L	94%
Ver 6		1	8/26/2008 15:05	LCS	0638-F	24.10	pCi/L	104%
Ver 7		1	8/26/2008 15:25	LCS	0638-F	24.10	pCi/L	101%
Ver 8		1	8/26/2008 15:40	LCS	0638-F	24.10	pCi/L	105%
Ver 9		1	8/26/2008 15:55	LCS	0638-F	24.10	pCi/L	113%
Ver 10		1	8/26/2008 16:10	LCS	0638-F	24.10	pCi/L	111%

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM	Ingrowth constant
8/21/2008 15:30	8/26/2008 13:00	117.50	3.17	0.5882	0.9764	1.0019	24.3333	0.5754
8/21/2008 15:30	8/26/2008 13:30	118.00	3.58	0.5897	0.9733	1.0019	25.4000	0.5751
8/21/2008 15:30	8/26/2008 13:55	118.42	3.83	0.5910	0.9715	1.0019	23.6000	0.5752
8/21/2008 15:30	8/26/2008 14:25	118.92	3.83	0.5925	0.9715	1.0019	27.1333	0.5767
8/21/2008 15:30	8/26/2008 14:45	119.25	4.25	0.5936	0.9684	1.0019	21.6000	0.5759
8/21/2008 15:30	8/26/2008 15:05	119.58	4.50	0.5946	0.9666	1.0019	28.4000	0.5758
8/21/2008 15:30	8/26/2008 15:25	119.92	4.75	0.5956	0.9648	1.0019	28.6333	0.5757
8/21/2008 15:30	8/26/2008 15:40	120.17	5.00	0.5964	0.9630	1.0019	24.9333	0.5754
8/21/2008 15:30	8/26/2008 15:55	120.42	5.25	0.5971	0.9611	1.0019	27.4333	0.5750
8/21/2008 15:30	8/26/2008 16:10	120.67	5.58	0.5979	0.9587	1.0019	28.1000	0.5743

*Handwritten signature*



Ra-226 Verification Sheet

Via 1

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VEN 1	500	8/21/08 1530	8/21/08 1300	8/21/08 1610	101	1	8	138
VEN 2	500	8/21/08 1530	8/21/08 1330	8/21/08 1765	102	1	8	770
VEN 3	500	8/21/08 1530	8/21/08 1355	8/22/08 1748	103	1	8	716
VEN 4	500	8/21/08 1530	8/21/08 1425	8/22/08 1815	104	1	8	820
VEN 5	500	8/21/08 1530	8/21/08 1445	8/22/08 1900	106	1	8	656
VEN 6	500	8/21/08 1530	8/21/08 1505	8/22/08 1935	107	1	8	800
VEN 7	500	8/21/08 1530	8/21/08 1525	8/22/08 2010	108	1	8	867
VEN 8	500	8/21/08 1530	8/21/08 1540	8/22/08 2040	110	1	8	756
VEN 9	500	8/21/08 1530	8/21/08 1555	8/22/08 2110	111	1	4	827
VEN 10	500	8/21/08 1530	8/21/08 1610	8/22/08 2145	112	1	8	851
VEN 11	500	8/21/08 1530						
VEN 12	500	8/21/08 1530						

VP 8/22/08

# Verification for Ra-226 Standard 0638-F

D Roy  
12/27/2007

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass. Used (mL)	Source DPM/mL
0638-F N1	1239.9000	31.5000	1208.4000	1.0000	261.3311626
0638-F N2	1222.8000	31.5000	1191.3000	1.0000	257.6330801
0638-F N3	1219.4000	31.5000	1187.9000	1.0000	256.8977889
				Average =	258.6206772

Mean Value (Counting) = 258.6206772  
 Stdev = 2.375965421

Certificate Value = 267.1  
 Lower Limit = 253.8687464  
 Upper Limit = 263.3726081  
 Rule 1 Pass/Fail **Fail**  
 Two sigma = 4.751930843  
 10 % of Mean = 25.86206772  
 Rule 2 (Pass/Fail) **Pass**

\*exception taken due to full recovery of standard

## Verification Rules

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 = The determined mean value shall be within 5% of the certificate value.

The analyst prepared three standard verification sources for Ra-226 source 0638-F by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and 10 mL Ready Gel 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 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC YELLOW using source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 12/27/07 using source 0024-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 (0024-A). Each verification source calculation was performed as follows:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

where:

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

Reference RAD SOP M-001

VAD  
 8/20/08  
 Amanda L. Fehr 1/4/07  
 Amanda L. Fehr 1/4/07

**General Engineering Laboratories  
Verification Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-008

Isotope Ra-226

Date Standards Prepared 12/18/07

Cocktail Type Used N/A

Standard ID 0638-F

Matrix of Vial/Planchett N/A

Amount Used (g or ml) 0.1

N/A  
N/A

Standard Activity (DPM/g or ml) 267.519

Type of Scintillation Vial N/A

Reference Date 1/23/04

Pipette ID Used 1429303

Expiration Date 12/20/08

Balance ID Used 3604046

Residue/Carrier Agent 0.1M HCl

Quenching Agent N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	ver 1				
2	ver 2				
3	ver 3				
4	ver 4				
5	ver 5				
6	ver 6				
7	ver 7				
8	ver 8				
9	ver 9				
10	ver 10				
11	ver 11				
12	ver 12				
13	ver 13				
14	ver 14				
15	ver 15				

Prepared By: Kelli Percece Date 8/29/08

Reviewed By: Mary G. Jones Date 8/29/08

Rev 1 RLM 9/10/97

**General Engineering Laboratories  
Verification Source Preparation Sheet**

Applicable SOP Number GL-STD. A-008

Isotope Ka-226

Date Standards Prepared 12/18/07

Cocktail Type Used N/A

Standard ID 0638-P

Matrix of Vial/Planchett N/A

Amount Used (g or ml) 12.1

N/A

N/A

Standard Activity (DPM/g or mL) 267-519

Type of Scintillation Vial N/A

Reference Date 1/23/04

Pipette ID Used 1429303

Expiration Date 12/20/08

Balance ID Used 3604046

Residue/Carrier Agent 0.1u HCl

Quenching Agent N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
16	VER 16				
17	VER 17				
18	VER 18				
19	VER 19				
20	VER 20				
21	VER 21				
22	VER 22				
23	VER 23				
24	VER 24				

N/A 2/28/08

Prepared By: Kelly Daniel Date 8/29/08

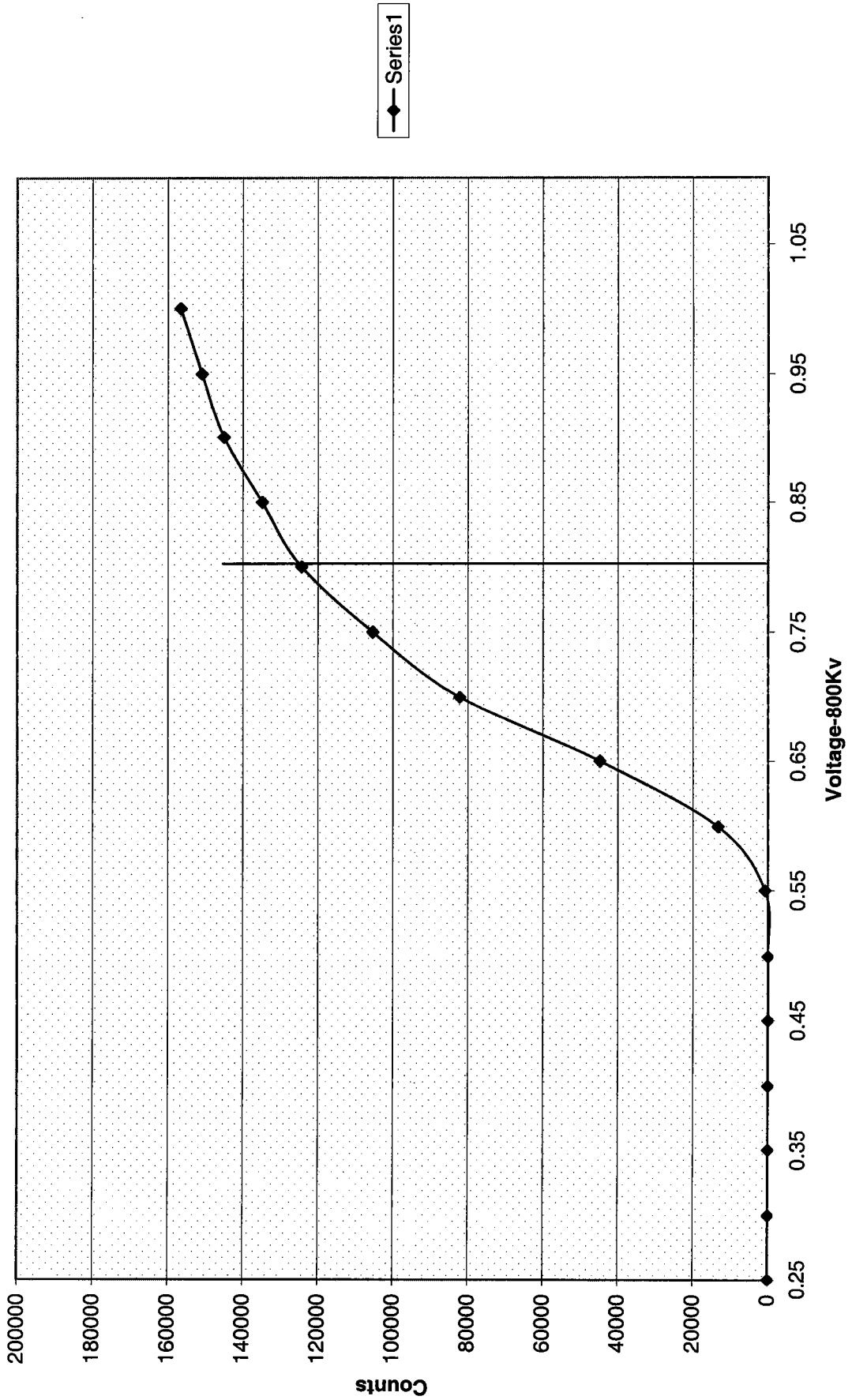
Reviewed By: [Signature] Date 3/28/08

VOLTAGE CURVE 08

Voltage Curve Ludlum # 1				
Volts	Counts	Date	Time	Detector
0.00	0	8/19/2008	11:00	1
0.05	0	8/19/2008	11:00	1
0.10	0	8/19/2008	11:00	1
0.15	0	8/19/2008	11:00	1
0.20	0	8/19/2008	11:00	1
0.25	0	8/19/2008	11:00	1
0.30	0	8/19/2008	11:00	1
0.35	0	8/19/2008	11:00	1
0.40	0	8/19/2008	11:00	1
0.45	0	8/19/2008	11:00	1
0.50	0	8/19/2008	11:00	1
0.55	813	8/19/2008	11:00	1
0.60	13369	8/19/2008	11:00	1
0.65	44807	8/19/2008	11:00	1
0.70	82131	8/19/2008	11:00	1
0.75	105365	8/19/2008	11:00	1
0.80	124405	8/19/2008	11:00	1
0.85	134938	8/19/2008	11:00	1
0.90	145048	8/19/2008	11:00	1
0.95	150949	8/19/2008	11:00	1
1.00	156594	8/19/2008	11:00	1

*MD  
Shaner*

Ludlum 1 Voltage Curve



10 8/29/08

101	1.751	8/29/2008
102	1.647	8/29/2008
103	1.752	8/29/2008
104	1.973	8/29/2008
105	1.749	8/29/2008
106	1.486	8/29/2008
107	1.773	8/29/2008
108	1.840	8/29/2008
109	1.512	8/29/2008
110	1.544	8/29/2008
111	1.575	8/29/2008
112	1.648	8/29/2008

# General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414  
(843)556-8171

## Lucas Cell Calibration Package

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate?	✓	✓	
the secondary standard(s) documentation?	✓	✓	
standard preparation information?	✓	✓	
standard < 1 Year old or verified?	✓	✓	
2) Is the efficiency calibration report included?	✓	✓	
3) Is the raw count data included for: Cell constant determination?	✓	✓	
Plateau generation?	✓	✓	
4) Are the calibration verifications included?	✓	✓	
5) Are the instrument settings included: HVPS settings?	✓	✓	
6) Has the CELLEFF.xls file been updated?	✓	✓	
7) Have the calibration dates been updated in ALPHALIMS?	✓	✓	

Prepared By: Kelli Donnell

Date: 12/19/08

Reviewed By: Mark G. Adams

Date: 12/19/08

Effective Date: 12/19/08



NU 12/19/08

### Ra-226 Cell Constants

Standard Reference date: 12/15/1999  
 standard ID: 0299-G  
 Volume added (mL): 0.1  
 Standard Reference Activity (DPM/mL): 2446.35

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	bkg cpm	total counts	count time min	cpm	Known activity dpm	11 (days) end-degas to flush	12 (days) end-flush to count	13 (days) Std Ref Date to count	Decay from Std Ref Date to count
201	2.021	Average	9/15/2008 15:45	9/15/2008 9:05	9/12/2008 13:20	0.267	5596	30	186.53	243.02	2.82292	0.27778	3198	0.9962
201	2.043	Stdv	9/18/2008 13:00	9/18/2008 8:10	9/15/2008 9:05	0.267	5949	30	198.30	243.02	2.96181	0.20139	3201	0.9962
201	1.915		9/25/2008 19:35	9/25/2008 9:15	9/22/2008 10:00	0.267	5361	30	178.70	243.02	2.96875	0.49056	3208	0.9962
202	2.436	Average	9/15/2008 16:20	9/15/2008 9:35	9/12/2008 13:20	0.267	6779	30	225.97	243.02	2.84375	0.28125	3198	0.9962
202	2.209	Stdv	9/18/2008 13:50	9/18/2008 8:45	9/15/2008 9:35	0.267	6425	30	214.17	243.02	2.96528	0.21181	3201	0.9962
202	2.137		10/21/2008 13:50	10/20/2008 13:45	10/13/2008 16:00	0.267	9248	30	308.27	243.02	6.90625	1.00347	3234	0.9962
203	2.255	Average	9/15/2008 16:50	9/15/2008 10:00	9/12/2008 13:20	0.267	6300	30	210.00	243.02	2.86111	0.28472	3198	0.9962
203	2.273	Stdv	9/18/2008 14:25	9/18/2008 9:15	9/15/2008 10:00	0.267	6613	30	220.43	243.02	2.96875	0.21528	3201	0.9962
203	2.234		9/25/2008 21:00	9/25/2008 10:15	9/22/2008 10:00	0.267	6298	30	209.93	243.02	3.01042	0.44782	3208	0.9962
204	2.184	Average	9/15/2008 17:25	9/15/2008 10:30	9/12/2008 13:20	0.267	6132	30	204.40	243.02	2.88194	0.28819	3198	0.9962
204	2.300	Stdv	9/18/2008 14:55	9/18/2008 9:35	9/15/2008 10:30	0.267	6671	30	222.37	243.02	2.96181	0.22222	3201	0.9962
204	2.096		9/30/2008 14:05	9/30/2008 9:10	9/28/2008 9:45	0.133	7535	30	251.17	243.02	3.97569	0.20486	3213	0.9962
205	1.677	Average	10/21/2008 8:30	10/20/2008 14:05	10/13/2008 16:00	0.267	7584	30	252.80	243.02	6.32014	0.76736	3233	0.9962
205	1.730	Stdv	9/18/2008 16:00	9/18/2008 10:05	9/15/2008 10:55	0.167	4989	30	166.63	243.02	2.96528	0.24653	3201	0.9962
205	1.990		9/30/2008 14:45	9/30/2008 9:40	9/28/2008 9:45	0.187	7170	30	239.00	243.02	3.89653	0.21181	3213	0.9962
206	2.240	Average	9/15/2008 21:10	9/15/2008 11:25	9/12/2008 13:20	0.233	6216	30	207.20	243.02	2.32014	0.40825	3198	0.9962
206	2.293	Stdv	9/18/2008 16:35	9/18/2008 10:25	9/15/2008 11:25	0.267	6604	30	220.13	243.02	2.95833	0.25694	3201	0.9962
206	2.245		9/30/2008 15:20	9/30/2008 10:15	9/28/2008 9:45	0.267	8125	30	270.83	243.02	4.02083	0.21181	3213	0.9962
207	2.187	Average	9/15/2008 21:40	9/15/2008 11:50	9/12/2008 13:20	0.267	6084	30	203.13	243.02	2.33750	0.40972	3198	0.9962
207	2.141	Stdv	9/18/2008 17:55	9/18/2008 10:40	9/15/2008 11:50	0.267	6105	30	203.50	243.02	2.95139	0.30208	3201	0.9962
207	2.110		9/30/2008 16:00	9/30/2008 10:45	9/28/2008 9:45	0.233	7856	30	255.20	243.02	4.04167	0.21875	3213	0.9962
208	2.239	Average	9/15/2008 22:15	9/15/2008 12:15	9/12/2008 13:20	0.267	6288	30	208.60	243.02	2.85486	0.41667	3198	0.9962
208	2.243	Stdv	9/18/2008 19:30	9/18/2008 11:00	9/15/2008 12:15	0.133	6374	30	212.47	243.02	2.94786	0.41290	3201	0.9962
208	2.148		9/30/2008 16:55	9/30/2008 11:10	9/28/2008 9:45	0.695	7691	30	236.03	243.02	4.96989	0.89569	3213	0.9962
209	2.471	Average	9/15/2008 22:45	9/15/2008 13:50	9/12/2008 13:20	0.033	7073	30	235.77	243.02	3.02083	0.37153	3198	0.9962
209	2.212	Stdv	9/18/2008 19:15	9/18/2008 11:15	9/15/2008 13:50	0.067	6170	30	205.67	243.02	2.89236	0.33333	3201	0.9962
209	2.420		9/30/2008 17:25	9/30/2008 11:40	9/28/2008 9:45	0.100	8795	30	293.17	243.02	4.07986	0.23958	3213	0.9962
210	2.320	Average	9/15/2008 23:15	9/15/2008 14:15	9/12/2008 13:20	0.033	6665	30	222.17	243.02	3.03819	0.37500	3198	0.9962
210	2.210	Stdv	9/18/2008 19:45	9/18/2008 11:30	9/15/2008 14:15	0.100	6142	30	204.73	243.02	2.88542	0.34375	3201	0.9962
210	2.230		9/30/2008 18:00	9/30/2008 12:05	9/28/2008 9:45	0.033	8116	30	270.53	243.02	4.09722	0.24653	3213	0.9962
211	2.140	Average	9/15/2008 23:50	9/15/2008 14:30	9/12/2008 13:20	0.033	6150	30	205.00	243.02	3.04661	0.36889	3198	0.9962
211	2.238	Stdv	9/18/2008 22:20	9/18/2008 12:35	9/15/2008 14:30	0.133	6207	30	206.90	243.02	2.92014	0.40625	3201	0.9962
211	2.136		9/30/2008 18:30	9/30/2008 13:35	9/28/2008 9:45	0.100	7917	30	263.90	243.02	4.15972	0.20486	3213	0.9962
212	2.405	Average	9/16/2008 0:20	9/15/2008 14:50	9/12/2008 13:20	0.033	6926	30	230.87	243.02	3.06250	0.39583	3198	0.9962
212	2.315	Stdv	9/18/2008 22:55	9/18/2008 12:50	9/15/2008 14:50	0.267	6405	30	213.50	243.02	2.91667	0.42014	3201	0.9962
212	2.244		9/30/2008 19:50	9/30/2008 14:00	9/28/2008 9:45	0.267	8287	30	276.23	243.02	4.17708	0.24306	3213	0.9962

NU 12/19/08

NU 12/19/08

NU 12/19/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Ca114	500	9/25/08 1000	9/25/08 0015	9/25/08 1935	201	2	0	5361
<del>Ca113</del>	<del>500</del>	<del>9/25/08 1000</del>	<del>9/25/08 0015</del>	<del>9/25/08 2010</del>	<del>202</del>	<del>2</del>	<del>0</del>	<del>5845</del>
Ca143	500	9/22/08 1000	9/25/08 1015	9/25/08 2100	203	2	0	6298
Ca115	500	9/22/08 1000						
Ca144	500	9/22/08 1000						
Ca146	500	9/22/08 1000						
Ca136	500	9/22/08 1000						
Ca130	500	9/22/08 1000						
Ca119	500	9/22/08 1000						
Ca147	500	9/22/08 1000						
Ca137	500	9/22/08 1000						
Ca142	500	9/22/08 1000						

140  
121868

9/21/08  
121868

121868

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 14	500	9/12/08 1320	9/15/08 0905	9/15/08 1545	201	2	8	5596
Cal 13	500	9/12/08 1320	9/15/08 0935	9/15/08 1620	202	2	8	6779
Cal 43	500	9/12/08 1320	9/15/08 1000	9/15/08 1650	203	2	8	6300
Cal 15	500	9/12/08 1320	9/15/08 1030	9/15/08 1725	204	2	8	6132
<del>Cal 44</del>	<del>500</del>	<del>9/12/08 1320</del>	<del>9/15/08 1055</del>	<del>9/15/08 1805</del>	<del>205</del>	<del>2</del>	<del>5</del>	<del>6132</del>
Cal 46	500	9/12/08 1320	9/15/08 1115	9/15/08 2110	206	2	7	6216
Cal 36	500	9/12/08 1320	9/15/08 1150	9/15/08 2140	207	2	8	6094
<del>Cal 38</del>	<del>500</del>	<del>9/12/08 1320</del>	<del>9/15/08 1215</del>	<del>9/15/08 2215</del>	<del>208</del>	<del>2</del>	<del>8</del>	<del>6258</del>
Cal 19	500	9/12/08 1320	9/15/08 1350	9/15/08 2245	209	2	1	7073
Cal 47	500	9/12/08 1320	9/15/08 1415	9/15/08 2315	210	2	1	6665
Cal 37	500	9/12/08 1320	9/15/08 1430	9/15/08 2350	211	2	1	6150
Cal 42	500	9/12/08 1320	9/15/08 1450	9/16/08 0020	212	2	1	6426

140  
12/18/08

140  
12/19/08

140  
12/19/08  
140  
12/19/08  
140  
12/19/08

140  
12/18/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
15	500	9/20/08 0945	9/20/08 0910	9/20/08 1405	204	2	4	7535
44	500	9/20/08 0945	9/20/08 0940	9/30/08 1445	205	2	5	7170
46	500	9/20/08 0945	9/30/08 1015	9/30/08 1520	206	2	8	8125
36	500	9/20/08 0945	9/30/08 1015	9/30/08 1410	207	2	7	7456
<del>30</del>	<del>500</del>	<del>9/20/08 0945</del>	<del>9/30/08 1110</del>	<del>9/30/08 1635</del>	<del>208</del>	<del>2</del>	<del>1</del>	<del>7681</del>
19	500	9/20/08 0945	9/30/08 1140	9.30.08 1725	209	2	3	8795
47	500	9/20/08 0945	9/30/08 1205	9.30.08 1800	210	2	1	8116
37	500	9/20/08 0945	9/30/08 1335	9.30.08 1830	211	2	3	7917
42	500	9/20/08 0945	9/30/08 1400	9.30.08 1950	212	2	8	8287

100 12/19/08

100 12/19/08  
1469 CPM

12/18/08  
400



Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 14	500	10/19/08 1600	10/20/08 1345	10/21/08 1350 <del>10/20/08</del> <del>1350</del>	202	2	8	9748
13	500	10/19/08 1600	10/20/08 1405	10/21/08 1430	205	2	8	7584
43								
44								
15								
36								
46								
30								
19								
47								
37								
42								

Lab  
12/18/08

Lab  
12/19/08

# Verification for Ra-226 Standard 0299-G

4/2/2008	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Mass. Used (G)	Source DPM/G
D. Roy	0299-G N1	2536.9600	52.4000	2484.5600	1.917186	0.5057	2562.667649
	0299-G N2	2520.2500	52.4000	2467.8500	1.917186	0.5056	2545.935781
	0299-G N3	2532.5000	52.4000	2480.1000	1.917186	0.5042	2565.677715
						Average =	2558.093715

Mean Value (Counting) = 2558.093715  
 Stdev = 10.63610098

Certificate Value = 2437.6 dpm/mL  
 Lower Limit = 2536.821513 dpm/mL  
 Upper Limit = 2579.365917 dpm/mL  
 Rule 1 Pass/Fail = Fail \*exception taken due to full recovery of standard  
 Two sigma = 21.27220197 dpm/mL  
 10 % of Mean = 255.8093715 dpm/mL  
 Rule 2 (Pass/Fail) = Pass

## Verification Rules

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 = The determined mean value shall be within 10% of the certificate value.

The analyst prepared three standard verification sources for Ra-226 source 0299-G by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel 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 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Gold for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 4/02/08 using source 0024-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0024. Each verification source calculation was performed as follows:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

where:

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

BAD.SOP.M-001

Net 121.9 (28)  
 4/17/10/08  
 Nancy E. Johnson 4/19/08  
 Daniel Dwyer 4/10/08



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0299	Isotope:	Radium-226
Prepared By:	Angela Johnson	Prepared By:	Angela Johnson
Carrier Conc:	0.5 M HCL	Prep Date:	09/15/2000
Reference Date:	12/15/1999	Verification Date:	01/23/2008
Ampoule Mass (g):	5.0368 g	Expiration Date:	01/23/2009
Uncertainty:	+/- 2.5 %	Primary Code:	0299-A
LogBook No:	RC S 027 128	Dilution(mL):	100 mL
		Mass of Parent(g):	4.6634 g
		Density(g/mL):	1.0012
		Balance ID:	

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

$$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$$

$$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$$

$$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 122414.2500 \text{ dpm/mL}$$

$$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0012 \text{ g/mL}) / (100 \text{ mL}) = 122273.3377 \text{ dpm/g}$$

### 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	04/02/2008	04/02/2009

GEL Laboratories LLC  
Version 1.0 9/18/2000

*all the 12/19/08*  
*len 12/19/08*



## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number <u>GLRAD A-008</u>	Isotope <u>Ra-226</u>
Date Standards Prepared <u>4/5/08</u>	Cocktail Type Used <u>NA</u>
Standard ID <u>0299-G</u>	Matrix of Vial/Planchett <u>NA</u> <u>NA</u> <u>NA</u>
Amount Used (g or ml) <u>0.1</u>	Type of Scintillation Vial <u>NA</u>
Standard Activity (DPM/g or ml) <u>2446.347</u>	Pipette ID Used <u>1429303</u>
Reference Date <u>12/15/99</u>	Balance ID Used <u>36040216</u>
Expiration Date <u>4/2/09</u>	Quenching Agent <u>NA</u>
Residue/Carrier Agent <u>0.5 M HCl</u>	

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
14	Cal 14				
13	Cal 13				
43	Cal 43				
15	Cal 15				
44	Cal 44				
46	Cal 46				
36	Cal 36				
19	Cal 19				
47	Cal 47				
37	Cal 37				
42	Cal 42				

*See table*

Prepared By: Kelli S. Deroso Date: 12/19/08  
 Reviewed By: M. G. Johnson Date: 12/19/08

0299

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

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.

Expanded uncertainty in the radioactive concentration quoted above:  $\pm 2.5\%$   
Combined Type A uncertainty:  $\pm 0.2\%$   
Combined Type B uncertainty:  $\pm 1.3\%$

Radiochemical 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.

Carrier free in 0.5M HCl

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.

*Handwritten:* 12/19/99  
12/19/98

# Ra-226 WATER

Batch : LCSVER  
 Date : 10/31/2008  
 Analyst : KSD1

Procedure Code : LUC26RAL

Parname : Radium-226

MDA : 1 pCi/L

Instrument Used : LUCAS CELL DETECTOR

Bkg Count Time: 30 min

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME
VER 1	0.500	30	1014	201	1.993	0.267	0.3504	22.1841	1.3817	11/17/2008 15:10
VER 2	0.500	30	1056	202	2.261	0.267	0.3089	20.3702	1.2427	11/17/2008 15:45
VER 3	0.500	30	726	203	2.254	0.267	0.5419	24.4866	1.8110	10/30/2008 16:05
VER 4	0.500	30	737	204	2.193	0.267	0.5519	25.3188	1.8580	10/30/2008 18:20
VER 5	0.500	30	937	205	1.799	0.267	0.3882	22.6936	1.4718	11/17/2008 16:20
VER 6	0.500	30	780	206	2.259	0.267	0.5373	26.1045	1.8604	10/30/2008 20:20
VER 7	0.500	30	711	207	2.146	0.267	0.5705	25.2245	1.8858	10/30/2008 22:00
VER 3	<del>0.500</del>	<del>30</del>	<del>593</del>	<del>208</del>	<del>2.283</del>	<del>0.267</del>	<del>0.5132</del>	<del>16.9552</del>	<del>1.4723</del>	<del>11/20/2008 16:40</del>
VER 9	0.500	30	630	209	2.291	0.133	0.4042	21.0513	1.6596	10/30/2008 23:40
VER 10	0.500	30	691	210	2.253	0.033	0.2527	23.7356	1.7736	10/31/2008 1:15
VER 11	0.500	30	1067	211	2.171	0.267	0.3314	22.0840	1.3401	11/17/2008 21:55
VER 12	0.500	30	648	212	2.322	0.133	0.4223	22.6294	1.7586	10/31/2008 9:15

12/19/08  
 12/19/08

Sample ID	Sample Dup	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
201		2	11/17/2008 10:20	LCS	0638-F	24.10	pCi/L	92%
202		2	11/17/2008 10:45	LCS	0638-F	24.10	pCi/L	85%
203		2	10/30/2008 11:05	LCS	0638-F	24.10	pCi/L	102%
204		2	10/30/2008 12:30	LCS	0638-F	24.10	pCi/L	105%
205		2	11/17/2008 11:10	LCS	0638-F	24.10	pCi/L	94%
206		2	10/30/2008 13:10	LCS	0638-F	24.10	pCi/L	108%
207		2	10/30/2008 13:25	LCS	0638-F	24.10	pCi/L	105%
208		2	11/20/2008 11:45	LCS	0638-F	24.10	pCi/L	70% <i>W</i>
209		2	10/30/2008 14:05	LCS	0638-F	24.10	pCi/L	87% <i>W</i>
210		2	10/30/2008 14:25	LCS	0638-F	24.10	pCi/L	98% <i>W</i>
211		2	11/17/2008 12:20	LCS	0638-F	24.10	pCi/L	92%
212		2	10/30/2008 14:55	LCS	0638-F	24.10	pCi/L	94%

*W*  
*12/18/08*

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM	Ingrowth constant
11/10/2008 15:35	11/17/2008 10:20	162.75	4.83	0.7073	0.9642	1.0019	33.5333	0.6833
11/10/2008 15:35	11/17/2008 10:45	163.17	5.00	0.7083	0.9630	1.0019	34.9333	0.6833
10/27/2008 14:20	10/30/2008 11:05	68.75	5.00	0.4049	0.9630	1.0019	23.9333	0.3907
10/27/2008 14:20	10/30/2008 12:30	70.17	5.83	0.4113	0.9569	1.0019	24.3000	0.3943
11/10/2008 15:35	11/17/2008 11:10	163.58	5.17	0.7092	0.9617	1.0019	30.9667	0.6833
10/27/2008 14:20	10/30/2008 13:10	70.83	7.17	0.4142	0.9473	1.0019	25.7333	0.3931
10/27/2008 14:20	10/30/2008 13:25	71.08	8.58	0.4153	0.9373	1.0019	23.4330	0.3900
11/17/2008 11:10	11/20/2008 11:45	72.58	4.92	0.4219	0.9696	1.0019	17.5900	0.4073
10/27/2008 14:20	10/30/2008 14:05	71.75	9.58	0.4182	0.9302	1.0019	20.8670	0.3898
10/27/2008 14:20	10/30/2008 14:25	72.08	10.83	0.4197	0.9215	1.0019	23.0003	0.3875
11/10/2008 15:35	11/17/2008 12:20	164.75	9.58	0.7117	0.9302	1.0019	35.3000	0.6633
10/27/2008 14:20	10/30/2008 14:55	72.58	18.33	0.4219	0.8707	1.0019	21.4670	0.3681

*W*  
*12/18/08*

*W*  
*12/19/08*  
*W*  
*12/18/08*

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
<del>VCV 1</del>	<del>500</del>	<del>1110108 1535</del>	<del>1111108 1020</del>	<del>1111108 1510</del>	<del>201</del>	<del>2</del>	<del>8</del>	<del>1014</del>
<del>2</del>	<del>500</del>	<del>11110108 1535</del>	<del>1111108 1045</del>	<del>1111108 1545</del>	<del>202</del>	<del>2</del>	<del>8</del>	<del>1054</del>
<del>3</del>	<del>500</del>	<del>11110108 1535</del>	<del>1111108 1110</del>	<del>1111108 1020</del>	<del>205</del>	<del>2</del>	<del>8</del>	<del>937</del>
<del>4</del>	<del>500</del>	<del>11110108 1535</del>	<del>1111108 1145</del>	<del>1111108 2050</del>	<del>208</del>	<del>2</del>	<del>8</del>	<del>786</del>
<del>5</del>	<del>500</del>	<del>11110108 1535</del>	<del>1111108 1150</del>	<del>1111108 2120</del>	<del>209</del>	<del>2</del>	<del>8</del>	<del>1200</del>
<del>6</del>	<del>500</del>	<del>11110108 1535</del>	<del>1111108 1200</del>	<del>1111108 2155</del>	<del>211</del>	<del>2</del>	<del>8</del>	<del>1067</del>
<del>7</del>	<del>500</del>	<del>11110108 1535</del>	<del>1111108 1845</del>	<del>1111108 1330</del>	<del>701</del>	<del>1</del>	<del>8</del>	<del>982</del>
<del>8</del>	<del>500</del>	<del>11110108 1535</del>	<del>1111108 0900</del>	<del>1111108 1405</del>	<del>708</del>	<del>1</del>	<del>8</del>	<del>1191</del>
<del>9</del>	<del>500</del>	<del>11110108 1535</del>	<del>1111108 0920</del>	<del>1111108 1435</del>	<del>705</del>	<del>1</del>	<del>8</del>	<del>1110</del>
<del>10</del>								
<del>11</del>								
<del>12</del>								
<del>VCV 3</del>	<del>500</del>	<del>1111108 1110</del>	<del>11110108 1145</del>	<del>11110108 1040</del>	<del>208</del>	<del>2</del>	<del>8</del>	<del>533</del>

12/18/08

502

12/18/08

12/18/08

12/19/08

12/19/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
<del>VEN 1</del>	<del>500</del>	<del>10/27/08 1420</del>	<del>10/30/08 1045</del>	<del>10/30/08 1500</del>	<del>201</del>	<del>2</del>	<del>4</del>	<del>152</del>
<del>VEN 2</del>	<del>500</del>	<del>10/27/08 1420</del>	<del>10/30/08 1005</del>	<del>10/30/08 1535</del>	<del>202</del>	<del>2</del>	<del>4</del>	<del>189</del>
VEN 3	500	10/27/08 1420	10/30/08 1105	10/30/08 1605	203	2	8	726
VEN 4	500	10/27/08 1420	10/30/08 1230	10/30/08 1820	204	2	8	737
<del>VEN 5</del>	<del>500</del>	<del>10/27/08 1420</del>	<del>10/30/08 1050</del>	<del>10/30/08 1900</del>	<del>205</del>	<del>2</del>	<del>6</del>	<del>663</del>
VEN 6	500	10/27/08 1420	10/30/08 1310	10/30/08 2020	206	2	8	780
VEN 7	500	10/27/08 1420	10/30/08 1425	10/30/08 2200	207	2	8	711
<del>VEN 8</del>	<del>500</del>	<del>10/27/08 1420</del>	<del>10/30/08 1345</del>	<del>10/30/08 2300</del>	<del>208</del>	<del>2</del>	<del>4</del>	<del>497</del>
VEN 9	500	10/27/08 1420	10/30/08 1405	10/30/08 2340	209	2	4	630
VEN 10	500	10/27/08 1420	10/30/08 1425	10/31/08 0115	210	2	1	691
<del>VEN 11</del>	<del>500</del>	<del>10/27/08 1420</del>	<del>10/30/08 1440</del>	<del>10/31/08 0835</del>	<del>211</del>	<del>2</del>	<del>3</del>	<del>423</del>
VEN 12	500	10/27/08 1420	10/30/08 1455	10/31/08 0915	212	2	4	648

VP  
12/18/08

12/18/08

12/18/08

12/18/08

12/18/08

12/18/08

# Verification for Ra-226 Standard 0638-F

D Roy  
12/27/2007

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass. Used (mL)	Source DPM/mL
0638-F N1	1239.9000	31.5000	1208.4000	4.624018	261.3311626
0638-F N2	1222.8000	31.5000	1191.3000	4.624018	257.6330801
0638-F N3	1219.4000	31.5000	1187.9000	4.624018	256.8977889
					Average =

Mean Value (Counting) = 258.6206772  
 Stdev = 2.375965421

96.8384646  
 0.00918707 Rule 3 (Pass/Fail) Pass

Certificate Value = 267.1  
 Lower Limit = 253.8687464  
 Upper Limit = 263.3726081  
 Rule 1 Pass/Fail Fail  
 Two sigma = 4.751930843  
 10 % of Mean = 25.86206772  
 Rule 2 (Pass/Fail) Pass

\*exception taken due to full recovery of standard

## Verification Rules

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 = The determined mean value shall be within 5% of the certificate value.

The analyst prepared three standard verification sources for Ra-226 source 0638-F by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and 10 mL Ready Gel 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 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC YELLOW using source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 12/27/07 using source 0024-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 (0024-A). Each verification source calculation was performed as follows:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

where:

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

Reference RAD SOP M-001

12/19/08

*Handwritten signature and date:*  
 1/4/07  
 Amanda L. Feher 1/4/07

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GE-RAD-A-008 Isotope RA-226  
 Date Standards Prepared 12/18/07 Cocktail Type Used NA  
 Standard ID 0638-F Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or mL) 117.519 Type of Scintillation Vial NA  
 Reference Date 1/23/04 Pipette ID Used 1429303  
 Expiration Date 12/20/08 Balance ID Used 3604046  
 Residue/Carrier Agent 0.1M HCl Quenching Agent NA

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	Ver 1				
2	Ver 2				
3	Ver 3				
4	Ver 4				
5	Ver 5				
6	Ver 6				
7	Ver 7				
8	Ver 8				
9	Ver 9				
10	Ver 10				
11	Ver 11				
12	Ver 12				

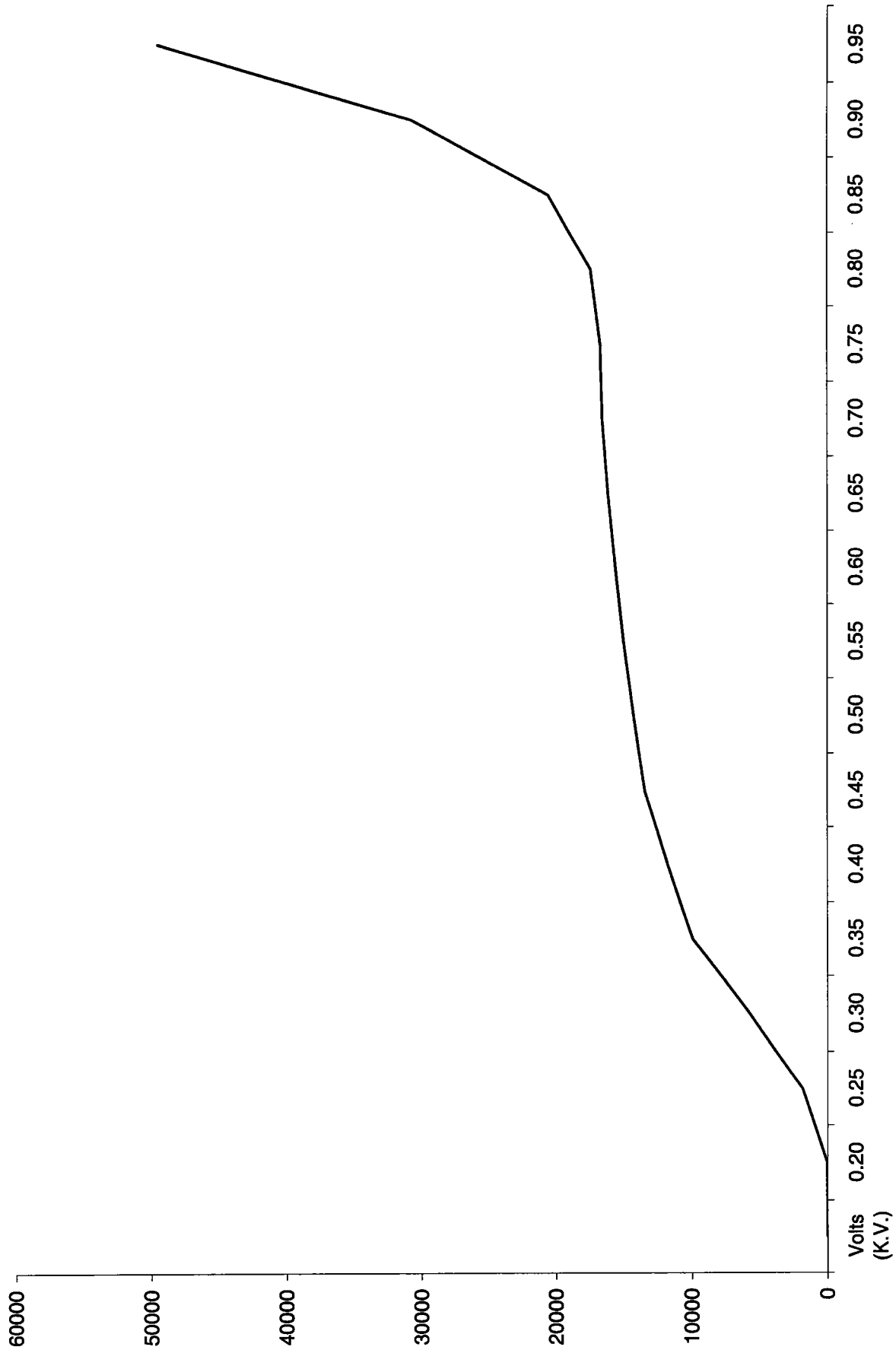
12/19/08

Prepared By: Kelli Dieriel Date: 12/19/08  
 Reviewed By: Mary Jo Adams Date: 12/19/08



Voltage Curve Ludlum # 2				
Volts (K.V.)	Counts	Date	Time	Detector
0.20	0	9/19/2008	10:00	2
0.25	0	9/19/2008	10:00	2
0.30	0	9/19/2008	10:00	2
0.35	0	9/19/2008	10:00	2
0.40	0	9/19/2008	10:00	2
0.45	36	9/19/2008	10:00	2
0.50	1860	9/19/2008	10:00	2
0.55	5751	9/19/2008	10:00	2
0.60	9916	9/19/2008	10:00	2
0.65	11761	9/19/2008	10:00	2
0.70	13431	9/19/2008	10:00	2
0.75	14254	9/19/2008	10:00	2
0.80	14984	9/19/2008	10:00	2
0.85	15598	9/19/2008	10:00	2
0.90	16129	9/19/2008	10:00	2
0.95	16562	9/19/2008	10:00	2
1.00	16711	9/19/2008	10:00	2
1.05	17428	9/19/2008	10:00	2
1.10	20558	9/19/2008	10:00	2
1.15	30722	9/19/2008	10:00	2
1.20	49527	9/19/2008	10:00	2
1.25	71509	9/19/2008	10:00	2
1.30	115018	9/19/2008	10:00	2

*W 12/19/08  
U 12/19/08*



mut 12/19/08  
VW 12/19/08

201	1.993	12/19/2008
202	2.261	12/19/2008
203	2.254	12/19/2008
204	2.193	12/19/2008
205	1.799	12/19/2008
206	2.259	12/19/2008
207	2.146	12/19/2008
209	2.291	12/19/2008
210	2.253	12/19/2008
211	2.171	12/19/2008
212	2.322	12/19/2008

Next  
12/19/08

# General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414

(843)556-8171

## Lucas Cell Calibration Package

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the secondary standard(s) documentation? standard preparation information? standard < 1 Year old or verified?	✓		
	✓		
	✓		
	✓		
2) Is the efficiency calibration report included ?	✓		
3) Is the raw count data included for: Cell constant determination? Plateau generation?	✓		
	✓		
4) Are the calibration verifications included?	✓		
5) Are the instrument settings included: HVPS settings?	✓		
6) Has the CELLEFF.xls file been updated ?	✓		
7) Have the calibration dates been updated in ALPHALIMS ?	✓		

Prepared By: Kellipanel

Date: 2/3/09

Reviewed By: M. G. Hens

Date: 2/4/09

Effective Date: 2/4/09

# Ra-226 Cell Constants

Standard Reference date: 12/15/1999  
 standard ID: 0299-G  
 Volume added (mL): 0.1  
 Standard Reference Activity (DPM/mL): 2446.35

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/time end of degas	bkg cpm	total counts	count time min	cpm	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count
301	1.867	Average 2.021	1/20/2009 11:05	1/19/2009 10:10	1/19/2009 15:45	0.267	9355	30	311.83	243.67	9.76736	1.03819	3324	0.9961
301	2.184	Stdev 0.159	1/29/2009 11:50	1/29/2009 8:50	1/28/2009 13:00	0.267	6239	30	207.97	243.67	2.82639	0.12500	3333	0.9961
301	2.011		1/26/2009 14:35	1/26/2009 9:25	1/22/2009 9:10	0.267	7282	30	242.73	243.67	4.01042	0.21528	3331	0.9961
302	2.082	Average 2.131	1/30/2009 11:30	1/30/2009 8:30	1/28/2009 13:00	0.267	7401	30	246.70	243.67	3.81250	0.12500	3334	0.9961
302	2.225	Stdev 0.082	1/29/2009 13:30	1/29/2009 9:20	1/28/2009 13:00	0.233	6335	30	211.17	243.67	2.84722	0.17361	3334	0.9961
302	2.086		1/26/2009 15:30	1/26/2009 9:55	1/22/2009 9:10	0.267	7555	30	251.83	243.67	4.03125	0.23264	3331	0.9961
303	1.958	Average 2.136	1/20/2009 13:40	1/19/2009 11:00	1/19/2009 15:45	0.267	9695	30	323.17	243.67	9.80208	1.11111	3325	0.9961
303	2.218	Stdev 0.154	1/22/2009 20:35	1/22/2009 10:05	1/19/2009 15:00	0.267	5938	30	197.93	243.67	2.79514	0.43750	3327	0.9961
303	2.231		1/26/2009 17:20	1/26/2009 10:25	1/22/2009 9:10	0.267	8028	30	267.60	243.67	4.05208	0.28819	3331	0.9961

305	1.897	Average 2.057	1/20/2009 14:50	1/19/2009 11:35	1/19/2009 15:45	0.200	9357	30	311.90	243.67	9.82639	1.13542	3325	0.9961
305	2.191	Stdev 0.149	1/22/2009 21:50	1/22/2009 11:05	1/19/2009 15:00	0.267	5921	30	197.37	243.67	2.83681	0.44792	3327	0.9961
305	2.083		1/26/2009 23:00	1/26/2009 11:20	1/22/2009 9:10	0.267	7280	30	242.67	243.67	4.09028	0.48611	3331	0.9961
306	1.730	Average 1.747	1/20/2009 15:20	1/19/2009 11:50	1/19/2009 15:45	0.167	8521	30	284.03	243.67	9.83681	1.14593	3325	0.9961
306	1.891	Stdev 0.067	1/29/2009 14:30	1/29/2009 10:20	1/28/2009 13:00	0.233	4869	30	162.30	243.67	2.88889	0.17361	3334	0.9961
306	1.821		1/26/2009 23:30	1/26/2009 11:50	1/22/2009 9:10	0.267	6387	30	212.90	243.67	4.11111	0.48611	3331	0.9961
307	1.818	Average 1.931	1/20/2009 15:50	1/19/2009 12:05	1/19/2009 15:45	0.267	8944	30	298.13	243.67	9.84722	1.15625	3325	0.9961
307	2.095	Stdev 0.145	1/30/2009 12:55	1/30/2009 9:10	1/28/2009 13:00	0.267	7442	30	248.07	243.67	3.84028	0.15625	3335	0.9961
307	1.881		1/27/2009 0:05	1/26/2009 12:10	1/22/2009 9:10	0.267	6598	30	219.93	243.67	4.12500	0.49653	3331	0.9961
308	2.129	Average 1.950	1/29/2009 15:50	1/29/2009 11:05	1/28/2009 13:00	0.133	6149	30	204.97	243.67	2.92014	0.19792	3334	0.9961
308	1.858	Stdev 0.155	1/23/2009 9:35	1/22/2009 13:45	1/19/2009 15:00	0.267	4829	30	160.97	243.67	2.94792	0.82639	3327	0.9961
308	1.862		1/27/2009 8:30	1/26/2009 13:15	1/22/2009 9:10	0.267	6226	30	207.53	243.67	4.17014	0.80208	3331	0.9961
309	1.857	Average 1.877	1/20/2009 17:20	1/19/2009 13:35	1/19/2009 15:45	0.033	9149	30	304.97	243.67	9.90972	1.15625	3325	0.9961
309	1.964	Stdev 0.079	1/23/2009 10:30	1/22/2009 14:05	1/19/2009 15:00	0.267	5100	30	170.00	243.67	2.96181	0.85069	3327	0.9961
309	1.810		1/27/2009 9:05	1/26/2009 13:30	1/22/2009 9:10	0.267	6046	30	201.53	243.67	4.18056	0.81597	3331	0.9961

311	2.140	Average 2.114	1/29/2009 16:40	1/29/2009 11:20	1/28/2009 13:00	0.267	6176	30	205.87	243.67	2.93056	0.22222	3334	0.9961
311	2.212	Stdev 0.114	1/23/2009 12:20	1/22/2009 14:25	1/19/2009 15:00	0.267	5698	30	189.93	243.67	2.97569	0.91319	3328	0.9961
311	1.988		1/27/2009 10:15	1/26/2009 13:45	1/22/2009 9:10	0.267	6607	30	220.23	243.67	4.19097	0.85417	3331	0.9961
312	1.871	Average 1.944	1/20/2009 19:16	1/19/2009 14:10	1/19/2009 15:45	0.100	9135	30	304.50	243.67	9.93403	1.21250	3325	0.9961
312	2.014	Stdev 0.071	1/29/2009 17:10	1/29/2009 11:35	1/28/2009 13:00	0.167	5814	30	193.80	243.67	2.94097	0.23264	3334	0.9961
312	1.946		1/27/2009 11:10	1/26/2009 14:00	1/22/2009 9:10	0.267	6446	30	214.87	243.67	4.20139	0.88194	3331	0.9961

K0 213109



Ra-226 Verification Sheet

#3

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 13	500	11/26/09 1300	11/26/09 0850	11/26/09 1150	301	3	8	6239
Cal 17	500	11/26/09 1300	11/26/09 0920	11/26/09 1330	302	3	7	6335
<del>Cal 19</del>	<del>500</del>	<del>11/26/09 1300</del>	<del>11/26/09 0450</del>	<del>11/26/09 1400</del>	<del>304</del>	<del>3</del>	<del>2</del>	<del>6472</del>
Cal 30	500	11/26/09 1300	11/26/09 1020	11/26/09 1430	306	3	7	4809
<del>Cal 42</del>	<del>500</del>	<del>11/26/09 1300</del>	<del>11/26/09 1045</del>	<del>11/26/09 1515</del>	<del>307</del>	<del>3</del>	<del>3</del>	<del>6668</del>
Cal 44	500	11/26/09 1300	11/26/09 1105	11/26/09 1550	308	3	4	6149
Cal 15	500	11/26/09 1300	11/26/09 1120	1/29/09 1640	311	3	8	6176
Cal 14	500	11/26/09 1300	11/26/09 1135	1/29/09 1710	312	3	5	5814
<del>Cal 13</del>	<del>500</del>	<del>11/26/09 1300</del>						
<del>Cal 28</del>	<del>500</del>	<del>11/26/09 1300</del>						
<del>Cal 36</del>	<del>500</del>	<del>11/26/09 1300</del>						
<del>Cal 37</del>	<del>500</del>	<del>11/26/09 1300</del>						

100  
2/3/09  
140 2/3/09

KD  
2/3/09  
M.A.  
2/4/09

W 2/3/09

512

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 43	500	11/9/09 1545	11/9/09 1010	11/20/09 1105	301	3	8	9355
<del>Cal 44</del>	<del>500</del>	<del>11/9/09 1545</del>	<del>11/9/09 1040</del>	<del>11/20/09 1150</del>	<del>302</del>	<del>3</del>	<del>8</del>	<del>8433</del>
Cal 49	500	11/9/09 1545	11/9/09 1100	11/20/09 1340	303	3	8	9095
<del>Cal 50</del>	<del>500</del>	<del>11/9/09 1545</del>	<del>11/9/09 1140</del>	<del>11/20/09 1470</del>	<del>304</del>	<del>3</del>	<del>8</del>	<del>1050</del>
Cal 42	500	11/9/09 1545	11/9/09 1135	11/20/09 1450	305	3	5	9357
Cal 44	500	11/9/09 1545	11/9/09 1150	11/20/09 1520 <del>1470</del>	306	3	7	8521
Cal 15	500	11/9/09 1545	11/9/09 1205	11/20/09 1550	307	3	8	8944
<del>Cal 14</del>	<del>500</del>	<del>11/9/09 1545</del>	<del>11/9/09 1315</del>	<del>11/20/09 1645</del>	<del>308</del>	<del>3</del>	<del>3</del>	<del>6938</del>
Cal 13	500	11/9/09 1545	11/9/09 1325	11/20/09 1720	309	3	1	9149
<del>Cal 28</del>	<del>500</del>	<del>11/9/09 1545</del>	<del>11/9/09 1355</del>	<del>11/20/09 1840</del>	<del>311</del>	<del>3</del>	<del>8</del>	<del>8648</del>
Cal 36	500	11/9/09 1545	11/9/09 1410	11/20/09 1916	312	3	1	9135
<del>Cal 37</del>	<del>500</del>	<del>11/9/09 1545</del>						

K20  
11/31/09

K20  
2/13/09

K20 2/13/09

K20 2/13/09

K20  
2/13/09  
K20  
2/13/09

K20  
2/13/09



Ra-226 Verification Sheet

Cal for #3

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
<del>Cal 43</del>	<del>500</del>	<del>11/11/09 1500</del>	<del>11/21/09 0410</del>	<del>11/21/09 1525</del>	<del>301</del>	<del>3</del>	<del>8</del>	<del>6110</del>
<del>Cal 44</del>	<del>500</del>	<del>11/11/09 1500</del>	<del>11/21/09 0435</del>	<del>11/21/09 1605</del>	<del>302</del>	<del>3</del>	<del>8</del>	<del>6498</del>
Cal 19	500	11/11/09 1500	11/21/09 1005	11/21/09 2035	303	3	8	5938
Cal 30	500	11/11/09 1500	11/21/09 1035	11/21/09 2120	304	3	8	5240
Cal 42	500	11/11/09 1500	11/21/09 1105	11/21/09 2150	305	3	8	5921
<del>Cal 44</del>	<del>500</del>	<del>11/11/09 1500</del>	<del>11/21/09 1135</del>	<del>11/21/09 1840</del>	<del>306</del>	<del>3</del>	<del>8</del>	<del>5393</del>
<del>Cal 15</del>	<del>500</del>	<del>11/11/09 1500</del>	<del>11/21/09 1320</del>	<del>11/21/09 0960</del>	<del>307</del>	<del>3</del>	<del>8</del>	<del>5870</del>
Cal 14	500	11/11/09 1500	11/21/09 1345	11/21/09 0935	308	3	8	4824
Cal 13	500	11/11/09 1500	11/21/09 1405	11/21/09 1000	309	3	8	5100
Cal 20	500	11/11/09 1500	11/21/09 1425	11/21/09 1220	311	3	8	5098
<del>Cal 36</del>	<del>500</del>	<del>11/11/09 1500</del>	<del>11/21/09 1440</del>	<del>11/21/09 1335</del>	<del>312</del>	<del>3</del>	<del>8</del>	<del>5881</del>
<del>Cal 27</del>	<del>500</del>	<del>11/11/09 1500</del>	<del>11/21/09</del>	<del></del>	<del></del>	<del></del>	<del></del>	<del></del>

514

Cal for #3

Cal 43: K0 213109  
 Cal 44: K0 213109  
 Cal 19: K0 213109  
 Cal 30: K0 213109  
 Cal 42: K0 213109  
 Cal 44: K0 213109  
 Cal 15: K0 213109  
 Cal 14: K0 213109  
 Cal 13: K0 213109  
 Cal 20: K0 213109  
 Cal 36: K0 213109  
 Cal 27: K0 213109  
 K0 213109  
 K0 213109

Ra-226 Verification Sheet

Call for #3

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Ca143	500	1122109 0910	1126109 0955	1126109 1455	301	3	8	7282
Ca147	500	1122109 0910	1126109 0955	1126109 1530	302	3	8	1555
Ca119	500	1122109 0910	1126109 1025	1126109 1600	303	3	8	8028
<del>Ca130</del>	<del>500</del>	<del>1122109 0910</del>	<del>1126109 1050</del>	<del>1126109 1645</del>	<del>304</del>	<del>3</del>		<del>5162</del>
Ca142	500	1122109 0910	1126109 1100	1126109 2300	305	3	8	7280
Ca141	500	1122109 0910	1126109 1150	1126109 2330	306	3	8	6387
Ca115	500	1122109 0910	1126109 1210	1127109 0005	307	3	8	6598
Ca114	500	1122109 0910	1126109 1315	1127109 0830	308	3	8	6226
Ca113	500	1122109 0910	1126109 1330	1127109 0905	309	3	8	6046
Ca128	500	1122109 0910	1126109 1345	1127109 1015	311	3	8	6607
Ca136	500	1122109 1510	1126109 1400	1127109 1110	312	3	8	6446
<del>Ca137</del>								

Ko 213109

Ko 213109

Ko 213109  
Kc 214109

# Verification for Ra-226 Standard 0299-G

4/2/2008	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard Mass. Used (G)	Source DPM/G
D. Roy	0299-G N1	2536.9600	52.4000	2484.5600	1.917186	0.5057	2562.667649
	0299-G N2	2520.2500	52.4000	2467.8500	1.917186	0.5056	2545.935781
	0299-G N3	2532.5000	52.4000	2480.1000	1.917186	0.5042	2565.677715
						Average =	2558.093715

Mean Value (Counting) = 2558.093715  
 Stdev = 10.63610098

Certificate Value = 2437.6 dpm/mL  
 Lower Limit = 2536.821513 dpm/mL  
 Upper Limit = 2579.365917 dpm/mL

Rule 1 Pass/Fail **Fail**  
 Two sigma = 21.27220197 dpm/mL  
 10 % of Mean = 255.8093715 dpm/mL

Rule 2 (Pass/Fail) **Pass**

104.944421 **Pass**  
 0.00415782 **Rule 3 (Pass/Fail)**

\*exception taken due to full recovery of standard

**Verification Rules**

**Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements**

**Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule 3 = The determined mean value shall be within 10% of the certificate value.**

The analyst prepared three standard verification sources for Ra-226 source 0299-G by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel 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 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Gold for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 4/02/08 using source 0024-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0024. Each verification source calculation was performed as follows:

Source dpm/g = (A - B)/(C)(D)  
 where:  
 A = Ver. source cpm,  
 B = BKG cpm,  
 C = System efficiency, (cpm/dpm), and  
 D = mass used for standard verification.

IRAD-SOP M-001

*Handwritten notes:*  
 5/16/08  
 1.5 ml water  
 10 ml Ready Gel



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0299	Isotope:	Radium-226
Prepared By:	Angela Johnson	Prepared By:	Angela Johnson
Carrier Conc:	0.5 M HCL	Prep Date:	09/15/2000
Reference Date:	12/15/1999	Verification Date:	01/23/2008
Ampoule Mass (g):	5.0368 g	Expiration Date:	01/23/2009
Uncertainty:	+/- 2.5 %	Primary Code:	0299-A
LogBook No:	RC S 027 128	Dilution(mL):	100 mL
		Mass of Parent(g):	4.6634 g
		Density(g/mL):	1.0012
		Balance ID:	

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

$$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$$

$$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$$

$$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 122414.2500 \text{ dpm/mL}$$

$$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0012 \text{ g/mL}) / (100 \text{ mL}) = 122273.3377 \text{ dpm/g}$$

### 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	04/02/2008	04/02/2009

GEL Laboratories LLC  
Version 1.0 9/18/2000

LD 2/3/09  
ALLA 2/4/09

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-RAD-A-008 Isotope RA-226  
 Date Standards Prepared 4/5/09 Cocktail Type Used NA  
 Standard ID 02896 Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or mL) 2446.347 Type of Scintillation Vial NA  
 Reference Date 12/15/99 Pipette ID Used 1429303  
 Expiration Date 4/2/09 Balance ID Used 30040216  
 Residue/Carrier Agent 0.5 M HCl Quenching Agent NA

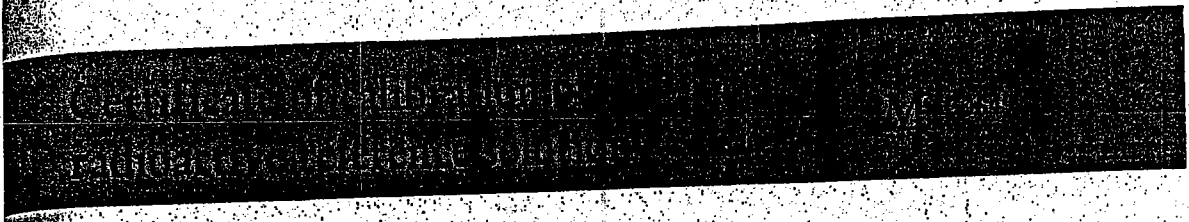
	Standard Number	Quenching Vol (uL)/ Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
43	Cal 43				
47	Cal 47				
19	Cal 19				
30	Cal 30				
42	Cal 42				
44	Cal 44				
15	Cal 15				
14	Cal 14				
13	Cal 13				
28	Cal 28				
36	Cal 36				

160  
2/3/09

Prepared By: Kelli Brown Date: 2/3/09  
 Reviewed By: Raymond Jones Date: 2/4/09

Rev 1 RLM 9/10/97

0299



UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

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.

Expanded uncertainty in the radioactive concentration quoted above:  $\pm 2.5\%$

Combined Type A uncertainty:  $\pm 0.2\%$

Combined Type B uncertainty:  $\pm 1.3\%$

Radiochemical 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 form: Carrier free in 0.5M HCL

Conformance: 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.

KB 21/3/09  
WMA 21/11/09

# Ra-226 WATER

Batch : LCSVER  
 Date : 1/2/2009  
 Analyst : KSD1

Procedure Code : LUC26RAL  
 Parmname : Radium-226  
 MDA : 1 pCi/L

Instrument Used : LUCAS CELL DETECTOR

Bkg Count Time: 30 min

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME
1	0.500	30	656	301	2.021	0.267	0.4919	20.0589	1.5634	1/30/2009 15:05
1	0.500	30	655	302	2.131	0.267	0.5554	22.6149	1.7640	2/2/2009 13:40
2	0.500	30	914	303	2.136	0.267	0.4647	26.4838	1.7397	1/30/2009 15:40
3	0.500	30	791	305	2.057	0.267	0.4845	23.8718	1.6891	1/30/2009 17:05
4	0.500	30	768	306	1.747	0.267	0.5709	27.2885	1.9605	1/30/2009 17:37
2	0.500	30	720	307	1.931	0.267	0.6113	27.3779	2.0335	2/2/2009 14:15
5	0.500	30	730	308	1.950	0.267	0.5149	23.3957	1.7254	1/30/2009 19:05
6	0.500	30	764	309	1.877	0.267	0.5908	28.0944	2.0238	1/31/2009 10:20
7	0.500	30	594	311	2.114	0.267	0.5510	20.3087	1.6667	1/31/2009 17:20
8	0.500	30	542	312	1.944	0.267	0.8009	26.8983	2.3154	2/2/2009 8:25

601112  
 CW

*Handwritten signature*

Sample ID	Cell #	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
1	301	3	1/30/2009 10:40	LCS	0638-F	24.10	pCi/L	83%
2	302	3	2/2/2009 9:15	LCS	0638-F	24.10	pCi/L	94%
2	303	3	1/30/2009 11:05	LCS	0638-F	24.10	pCi/L	110%
3	305	3	1/30/2009 11:30	LCS	0638-F	24.10	pCi/L	99%
4	306	3	1/30/2009 11:45	LCS	0638-F	24.10	pCi/L	113%
2	307	3	2/2/2009 9:40	LCS	0638-F	24.10	pCi/L	114%
5	308	3	1/30/2009 12:00	LCS	0638-F	24.10	pCi/L	97%
3	309	3	1/30/2009 13:05	LCS	0638-F	24.10	pCi/L	117%
7	311	3	1/30/2009 13:20	LCS	0638-F	24.10	pCi/L	84%
8	312	3	1/30/2009 13:40	LCS	0638-F	24.10	pCi/L	112%

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	Net CPM	Ingrowth constant
1/26/2009 16:05	1/30/2009 10:40	90.58	4.42	0.9672	1.0019	21.6000	0.4800
1/30/2009 10:00	2/2/2009 9:15	71.25	4.42	0.9672	1.0019	21.5667	0.4032
1/26/2009 16:05	1/30/2009 11:05	91.00	4.58	0.9660	1.0019	30.1997	0.4809
1/26/2009 16:05	1/30/2009 11:30	91.42	5.58	0.9587	1.0019	26.1000	0.4788
1/26/2009 16:05	1/30/2009 11:45	91.67	5.87	0.9567	1.0019	25.3330	0.4787
1/30/2009 10:00	2/2/2009 9:40	71.67	4.58	0.9660	1.0019	23.7330	0.4044
1/26/2009 16:05	1/30/2009 12:00	91.92	7.08	0.9479	1.0019	24.0667	0.4753
1/26/2009 16:05	1/30/2009 13:05	93.00	21.25	0.8518	1.0019	25.1997	0.4305
1/26/2009 16:05	1/30/2009 13:20	93.25	28.00	0.8095	1.0019	19.5330	0.4099
1/26/2009 16:05	1/30/2009 13:40	93.58	66.75	0.6041	1.0019	17.7997	0.3067

5/11/12  
 071  
 LEWA 2141.04



Ra-226 Verification Sheet

#3

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VER 1	500	1126109 1605	1126109 1040	1126109 1505	301	3	8	656
VER 2	500	1126109 1605	1126109 1105	1126109 1540	303	3	8	914
VER 3	500	1126109 1605	1126109 1130	1130109 1705	305	3	8	791
VER 4	500	1126109 1605	1126109 1145	<del>1130109 1737</del> 1.31.09 1020	306	3	8	768
VER 5	500	1126109 1605	1126109 1200	<del>1130109 1905</del> 1.31.09 1020	308	3	8	730
VER 6	500	1126109 1605	1126109 1305	1.31.09 1020	309	3	8	764
VER 7	500	1126109 1605	1126109 1320	131.09 1720	311	3	8	594
VER 8	500	1126109 1605	1126109 1340	1126109 0845	312	3	8	542
<del>VER 9</del>	500	1126109 1605						
VER 10	500	1126109 1605						
VER 11	500	1126109 1605						
VER 12	500	1126109 1605						

VER 2/3/09

1126109



## Verification for Ra-226 Standard 0638-F

D. Roy 2/2/2009	Isotope	Value	Uncertainty
	0638-F #1	24.629	1.7426
	0638-F #2	24.438	1.7557
	0638-F #3	22.791	1.6808
<b>Mean Value (Counting) =</b>	23.953	99.60	<b>Pass</b>
<b>Stdev =</b>	1.010781096		<b>Rule 3 (Pass/Fail)</b>
<b>Target =</b>	24.05		
<b>Lower Limit =</b>	21.93100448		
<b>Upper Limit =</b>	25.97412886		
<b>Rule 1 Pass/Fail</b>	<b>Pass</b>		
<b>Two sigma =</b>	2.021562191		
<b>10 % of Mean =</b>	2.395256667		
<b>Rule 2 (Pass/Fail)</b>	<b>Pass</b>		

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements**
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**
- Rule 3 = The determined mean value shall be within 5% of the certificate value.**

The analyst prepared three standard verification sources for standard 0638-F using 0.1 mL for each source. Each source was counted using routine Lucas cell procedures. Calibration for 0299-G was used in this verification.

140 214109  
*[Signature]* 2/2/09  
 Amanda L. Lehn  
 2/2/09

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-RAD-008 Isotope Po-226  
 Date Standards Prepared <sup>2/11/09</sup> 2/13/2007 Cocktail Type Used N/A  
 Standard ID 0630-F Matrix of Vial/Planchett N/A  
 Amount Used (g or ml) 0.1 ml Type of Scintillation Vial N/A  
 Standard Activity (DPM/g or mL) 267.519 dpm/ml Pipette ID Used 1429303  
 Reference Date 1/23/2004 Balance ID Used N/A  
 Expiration Date <sup>2/14/09</sup> 2/1/09 Quenching Agent N/A  
 Residue/Carrier Agent 0.1 ml H<sub>2</sub>O

	Standard Number	Quenching Vol (uL)/ Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	Ver 1				
2	Ver 2				
3	Ver 3				
4	Ver 4				
5	Ver 5				
6	Ver 6				
7	Ver 7				
8	Ver 8				
9	Ver 9				
10	Ver 10				
11	Ver 11				
12	Ver 12				

LO 2/13/09

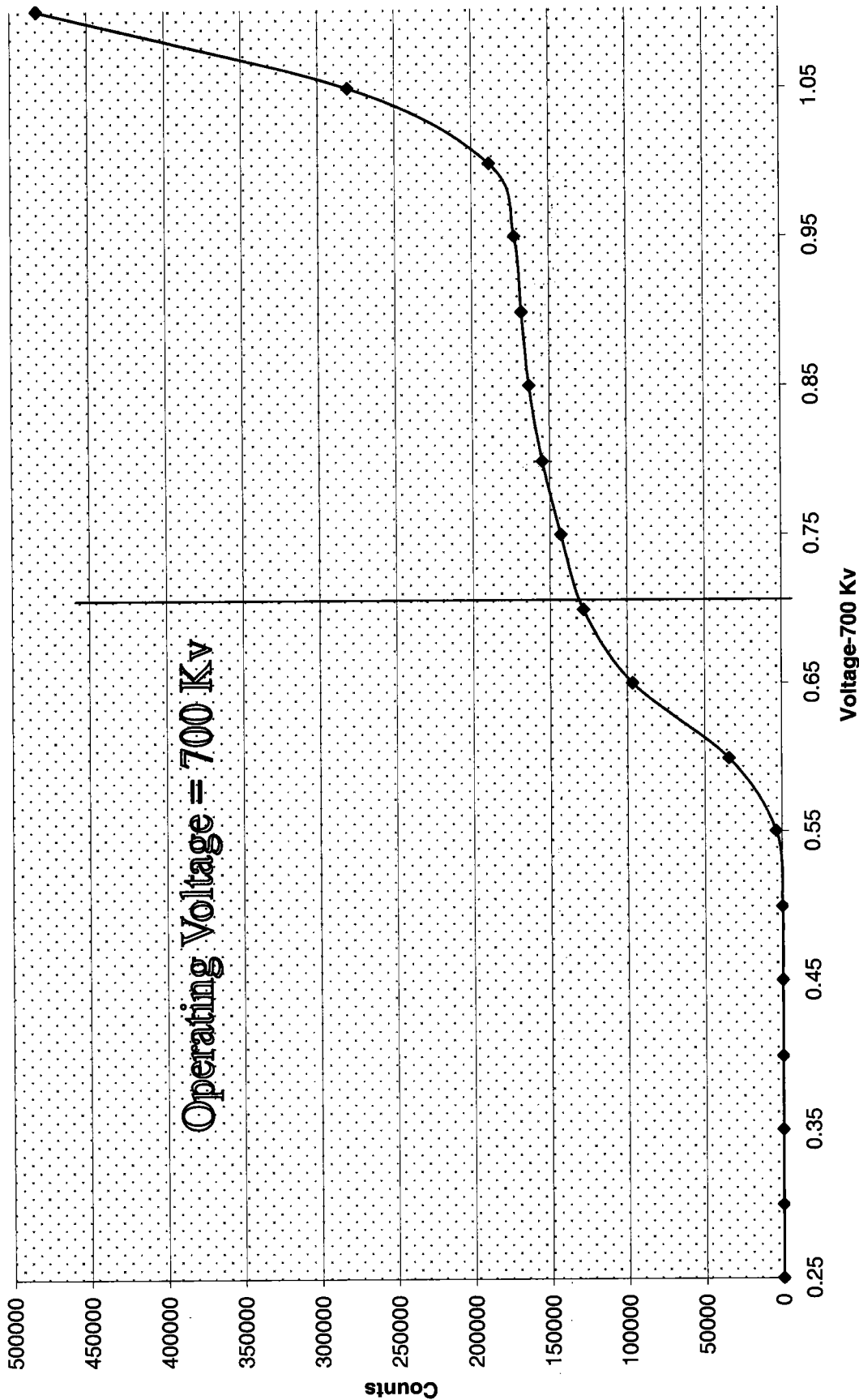
Prepared By: Kelli S. Nevel Date 2/13/09  
 Reviewed By: [Signature] Date 2/14/09

## Voltage Curve 1-09

Voltage Curve Ludlum # 3				
Volts	Counts	Date	Time	Detector
0.00	0	1/20/2009	13:45	3
0.05	0	1/20/2009	13:46	3
0.10	0	1/20/2009	13:47	3
0.15	0	1/20/2009	13:48	3
0.20	0	1/20/2009	13:49	3
0.25	0	1/20/2009	14:00	3
0.30	0	1/20/2009	14:01	3
0.35	0	1/20/2009	14:02	3
0.40	0	1/20/2009	14:03	3
0.45	0	1/20/2009	14:04	3
0.50	0	1/20/2009	14:05	3
0.55	3914	1/20/2009	14:06	3
0.60	34392	1/20/2009	14:07	3
0.65	96643	1/20/2009	14:08	3
0.70	128361	1/20/2009	14:09	3
0.75	142888	1/20/2009	14:10	3
0.80	154583	1/20/2009	14:11	3
0.85	163087	1/20/2009	14:12	3
0.90	167801	1/20/2009	14:13	3
0.95	172317	1/20/2009	14:14	3
1.00	188508	1/20/2009	14:15	3

KLA 2/4/09  
 LW  
 2/3/09

Ludlum 3 Voltage Curve



2/11/59  
MCA

KO 213109

301	2.021	2/4/2009
302	2.131	2/4/2009
303	2.136	2/4/2009
305	2.057	2/4/2009
306	1.747	2/4/2009
307	1.931	2/4/2009
308	1.950	2/4/2009
309	1.877	2/4/2009
311	2.114	2/4/2009
312	1.944	2/4/2009

RE UT  
2/4/09

~~RE UT~~  
2/4/09  
RE UT  
2/4/09

# General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414

(843)556-8171

## Lucas Cell Calibration Package

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the secondary standard(s) documentation? standard preparation information? standard < 1 Year old or verified?	✓		
	✓		
	✓		
	✓		
2) Is the efficiency calibration report included?	✓		
3) Is the raw count data included for: Cell constant determination? Plateau generation?	✓		
	✓		
4) Are the calibration verifications included?	✓		
5) Are the instrument settings included: HVPS settings?	✓		
6) Has the CELLEFF.xls file been updated?	✓		
7) Have the calibration dates been updated in ALPHALIMS?	✓		

Prepared By: Kelli Dorrel

Date: 2/28/09

Reviewed By: Angela Johnson

Date: 3/2/09

Effective Date: 3/2/09



# Ra-226 Cell Constants

Standard Reference date : 12/15/1999  
 standard ID : 0.299-G  
 Volume added (mL) : 0.1  
 Standard Reference Activity (DPM/mL) : 2446.35

Lucas cell #	Call constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	bkg cpm	total counts	count time min	cpm	Known activity dpm	11 (days) end-degas to flush	12 (days) end-flush to count	13 (days) Std Ref Date to count	Decay from Std Ref Date to count
401	1.689	Average	2/23/2009 16:15	2/23/2009 10:30	2/20/2009 17:25	0.267	4580	30	152.67	243.66	2.71181	0.23958	3359	0.9960
401	1.585	Stdev	2/27/2009 13:15	2/27/2009 9:00	2/23/2009 16:05	0.267	5474	30	182.47	243.66	3.70486	0.17708	3363	0.9960
401	1.448		2/25/2009 14:40	2/25/2009 7:55	2/20/2009 17:25	0.267	5677	30	189.23	243.66	4.60417	0.28125	3361	0.9960
402	2.133	Average	2/23/2009 16:55	2/23/2009 11:05	2/20/2009 17:25	0.267	5817	30	193.90	243.66	2.73611	0.24306	3359	0.9960
402	2.173	Stdev	2/27/2009 14:10	2/27/2009 9:30	2/23/2009 16:05	0.267	7507	30	250.23	243.66	3.72569	0.19444	3363	0.9960
402	2.048		2/25/2009 15:25	2/25/2009 8:15	2/20/2009 17:25	0.267	8017	30	267.23	243.66	4.61806	0.29861	3361	0.9960
403	1.475	Average	2/23/2009 18:30	2/23/2009 11:30	2/20/2009 17:25	0.267	4011	30	133.70	243.66	2.75347	0.29167	3359	0.9960
403	1.495	Stdev	2/27/2009 14:50	2/27/2009 10:00	2/23/2009 16:05	0.267	5182	30	172.73	243.66	3.74853	0.20139	3363	0.9960
403	1.419		2/25/2009 15:55	2/25/2009 8:35	2/20/2009 17:25	0.267	5582	30	185.40	243.66	4.63194	0.30556	3361	0.9960
404	1.792	Average	2/23/2009 19:05	2/23/2009 13:10	2/20/2009 17:25	0.267	5005	30	166.83	243.66	2.82292	0.24653	3359	0.9960
404	2.142	Stdev	2/27/2009 15:25	2/27/2009 10:30	2/23/2009 16:05	0.267	7443	30	248.10	243.66	3.76736	0.20486	3363	0.9960
404	1.859		2/25/2009 20:20	2/25/2009 8:55	2/20/2009 17:25	0.267	7075	30	235.83	243.66	4.64583	0.47569	3361	0.9960
405	2.066	Average	3/2/2009 13:40	3/2/2009 10:30	2/25/2009 14:00	0.267	8602	30	286.73	243.66	4.85417	0.13194	3366	0.9960
405	1.899	Stdev	2/27/2009 16:00	2/27/2009 10:55	2/23/2009 16:05	0.267	6612	30	220.40	243.66	3.78472	0.21181	3363	0.9960
405	1.745		2/25/2009 20:55	2/25/2009 10:10	2/20/2009 17:25	0.267	6721	30	224.03	243.66	4.69792	0.44792	3361	0.9960
409	1.805	Average	2/24/2009 0:30	2/23/2009 15:20	2/20/2009 17:25	0.267	5039	30	167.97	243.66	2.91319	0.38194	3359	0.9960
409	2.153	Stdev	2/3/2009 21:10	2/3/2009 15:00	1/30/2009 10:50	0.267	7949	30	264.97	243.67	4.17361	0.25694	3339	0.9960
409	2.149		2/27/2009 16:35	2/27/2009 11:30	2/23/2009 16:05	0.267	7516	30	250.53	243.66	3.80903	0.21181	3363	0.9960
410	1.869	Average	2/26/2009 8:50	2/25/2009 13:05	2/20/2009 17:25	0.267	6838	30	227.93	243.66	4.31944	0.82292	3361	0.9960
410	1.965	Stdev	2/4/2009 8:30	2/3/2009 15:30	1/30/2009 10:50	0.267	6708	30	223.60	243.67	4.19444	0.70853	3339	0.9960
410	1.824		2/24/2009 8:00	2/23/2009 15:40	2/20/2009 17:25	0.267	4840	30	161.33	243.66	2.92708	0.68056	3359	0.9960
411	1.824	Average	2/24/2009 8:40	2/23/2009 15:55	2/20/2009 17:25	0.267	4839	30	161.30	243.66	2.93750	0.69792	3359	0.9960
411	1.911	Stdev	2/27/2009 17:45	2/27/2009 12:20	2/23/2009 16:05	0.267	6357	30	211.90	243.66	3.84375	0.22569	3363	0.9960
411	1.836		2/26/2009 9:30	2/25/2009 13:40	2/20/2009 17:25	0.267	6734	30	224.47	243.66	4.84375	0.82639	3361	0.9960
412	1.947	Average	2/26/2009 10:15	2/25/2009 14:05	2/20/2009 17:25	0.267	7137	30	237.90	243.66	4.86111	0.84028	3361	0.9960
412	2.131	Stdev	2/27/2009 18:20	2/27/2009 12:45	2/23/2009 16:05	0.267	7495	30	249.83	243.66	3.86111	0.23264	3363	0.9960
412	1.822		2/24/2009 9:40	2/23/2009 16:10	2/20/2009 17:25	0.267	4818	30	160.60	243.66	2.94792	0.72917	3359	0.9960

EffErr 0.123705 <- Put in Machines.xls (Lucas Cell Tab)

Angela J. Johnson 3/2/09  
 Mike Dorell 3/2/09

---

401	1.574	3/2/2009
402	2.118	3/2/2009
403	1.463	3/2/2009
404	1.931	3/2/2009
405	1.903	3/2/2009
409	2.036	3/2/2009
410	1.886	3/2/2009
411	1.824	3/2/2009
412	1.967	3/2/2009

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GLRAD-A-008 Isotope Pu-239  
 Date Standards Prepared 4/15/09 Cocktail Type Used NA  
 Standard ID 02996 Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or mL) 2446.347 Type of Scintillation Vial NA  
 Reference Date 4/15/09 Pipette ID Used 1429303  
 Expiration Date 4/15/09 Balance ID Used 3604026  
 Residue/Carrier Agent 0.5M HCl Quenching Agent NA

	Standard Number	Quenching Vol (uL) Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
3	CA13				
43	CA143				
7	CA17				
42	CA142				
13	CA143				
44	CA144				
30	CA130				
48	CA148				
36	CA136				
35	CA135				
38	CA138				
15	CA115				
14	CA114				
46	CA146				
47	CA147				

*W 3/2/09*

Prepared By: Kell Deneo Date: 3/2/09  
 Reviewed By: Angie J. Ghera Date: 3/2/09

Rev 1 RLM 9/10/97


## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-PAD-008 Isotope RA-226  
 Date Standards Prepared 4/5/09 Cocktail Type Used NA  
 Standard ID 0299G Matrix of Vial/Planchet NA  
 Amount Used (g or ml) 0.103109 Matrix of Vial/Planchet NA  
 Standard Activity (DPM/g or ml) 2.446347 Type of Scintillation Vial NA  
 Reference Date 12/5/99 Pipette ID Used 1429305  
 Expiration Date 4/1/09 Balance ID Used 3604026  
 Residue/Carrier Agent 0.5M HCl Quenching Agent NA

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
16	CA116				
25	CA125				
23	CA123				
28	CA128				
9	CA19				
34	CA134				

Prepared By: Valeri Dorella Date: 3/2/09  
 Reviewed By: Aylee A. G... Date: 3/2/09

Rev 1 RLM 9/10/97



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0299	Isotope:	Radium-226
Prepared By:	Angela Johnson	Prepared By:	Angela Johnson
Carrier Conc:	0.5 M HCL	Prep Date:	09/15/2000
Reference Date:	12/15/1999	Verification Date:	01/23/2008
Ampoule Mass (g):	5.0368 g	Expiration Date:	01/23/2009
Uncertainty:	+/- 2.5 %	Primary Code:	0299-A
LogBook No:	RC S 027 128	Dilution(mL):	100 mL
		Mass of Parent(g):	4.6634 g
		Density(g/mL):	1.0012
		Balance ID:	

534

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

$(\text{Mass of parent(g)}) * (\text{Parent Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parent Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 122414.2500 \text{ dpm/mL}$
$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0012 \text{ g/mL}) / (100 \text{ mL}) = 122273.3377 \text{ dpm/g}$

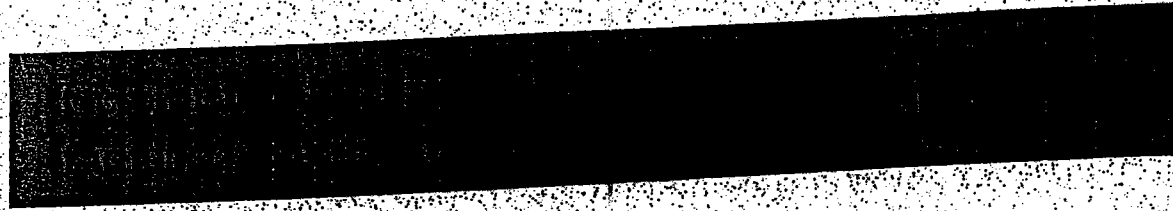
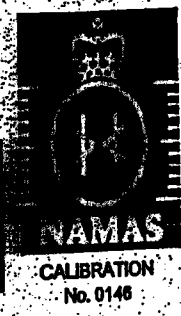
### Secondary Standards

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	04/02/2008	04/02/2009

CEL Laboratories LLC  
Version 1.0 9/18/2000

8-21-00  
Nycomed Amersham plc  
Amersham Laboratories

0299



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

ion Principal radionuclide: Radium-226

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

ment Reference time: 1200 GMT on 15 December 1999

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

ion of The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$ , which  
inties 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

ved  
ory

Date of  
issue 35  
17<sup>th</sup> December 1999

Nycomed  
Amersham  
Via 31/05

# Verification for Ra-226 Standard 0299-G

4/2/2008	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard Mass. Used (G)	Source DPM/G
D. Roy	0299-G N1	2536.9600	52.4000	2484.5600	1.917186	0.5057	2562.667649
	0299-G N2	2520.2500	52.4000	2467.8500	1.917186	0.5056	2545.935781
	0299-G N3	2532.5000	52.4000	2480.1000	1.917186	0.5042	2565.677715
						Average =	2558.093715

Mean Value (Counting) = 2558.093715      **Pass**  
 Stdev = 10.63610098      0.00415782      **Rule 3 (Pass/Fail)**

Certificate Value = 2437.6      dpm/mL  
 Lower Limit = 2536.821513      dpm/mL  
 Upper Limit = 2579.365917      dpm/mL  
**Rule 1 Pass/Fail**      \*exception taken due to full recovery of standard  
 Two sigma = 21.27220197      dpm/mL  
 10 % of Mean = 255.8093715      dpm/mL  
**Rule 2 (Pass/Fail)**      **Pass**

### Verification Rules

- Rule 1 =** The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 =** The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 =** The determined mean value shall be within 10% of the certificate value.

The analyst prepared three standard verification sources for Ra-226 source 0299-G by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel 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 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Gold for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 4/02/08 using source 0024-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0024. Each verification source calculation was performed as follows:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

where:

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

RAD.SOP.M-001

*Henry St. Johnson 4/19/08*  
*David Dwyer 4/10/08*  
*WJN*





Ra-226 Verification Sheet

Cal #4

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 3	500	2/20/09 1725	2/23/09 1030	2/23/09 1615	401	4	0	4580
43	500	2/20/09 1725	2/23/09 1105	2/23/09 1655	402	4	0	5877 4877
7	500	2/20/09 1725	2/23/09 1130	2.22.09 1930	403	4	0	4011
42	500	2/20/09 1725	2/23/09 1310	2.23.09 1908	404	4	0	5005
<del>13</del>	<del>500</del>	<del>2/20/09 1725</del>	<del>2/23/09 1340</del>	<del>2.23.09 1955</del>	<del>405</del>	<del>4</del>	<del>0</del>	<del>4224</del>
3A	500	2/20/09 1725	2/23/09 1405	2.23.09 2250	406	4		2355
44	500	2/20/09 1725	2/23/09 1435	2.23.09 2330	407	4		2359
<del>4A</del>	<del>500</del>	<del>2/20/09 1725</del>	<del>2/23/09 1455</del>	<del>2.24.09 00:00</del>	<del>408</del>	<del>4</del>	<del>0</del>	<del>2598</del>
30	500	2/20/09 1725	2/23/09 1540	2.24.09 00:30	409	4	8	5827 5887
48	500	2/20/09 1725	2/23/09 1540	2/24/09 0800	410	4	8	4840
30	500	2/20/09 1725	2/23/09 1555	2/24/09 0840	411	4	8	4829
35	500	2/20/09 1725	2/23/09 1610	2/24/09 0900	412	4	8	4878

K40 2/23/09

K40 2/18/09  
K40 2/22/09

2/28/09-140  
K40 2/28/09

K40 2/24/09

K40 2/21/09

K40 3/12/09

Re-226 Verification Sheet

#4

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 28	500	2/26/09 1725	2/25/09 0755	2/25/09 1440	401	4	8	5677
15	500	2/26/09 1725	2/25/09 0815	2/25/09 1525	402	4	8	8017
14	500	2/26/09 1725	2/25/09 0835	2/25/09 1555	403	4	8	5562
40	500	2/26/09 1725	2/25/09 0855	2.25.09 20:20	404	4	8	7075
47	500	2/26/09 1725	2/25/09 1010	2.25.09 20:55	405	4	8	6721
10	500	2/26/09 1725	2/25/09 1040	2.26.09 20:22 2.25.09 20:55 2.26.09 20:22	406	4	8	7091
25	500	2/26/09 1725	2/25/09 1110	2.25.09 22:05	407	4	8	2827
22	500	2/26/09 1725	2/25/09 1145	2.25.09 22:45 2.26.09 22:55	408	4	8	5137
29	500	2/26/09 1725	2/25/09 1210	2/26/09 0810	409	4	8	5169
28	500	2/26/09 1725	2/25/09 1305	2/26/09 0850	410	4	8	6838
9	500	2/26/09 1725	2/25/09 1310	2/26/09 0930	411	4	8	6734
34	500	2/26/09 1725	2/25/09 1405	2/26/09 1015	412	4	8	7137

HQ 3/2/09  
 HQ 3/2/09  
 HQ 3/2/09  
 HQ 3/2/09  
 HQ 3/2/09  
 HQ 3/2/09  
 HQ 3/2/09

100 3/2/09

100 3/2/09

100 3/2/09

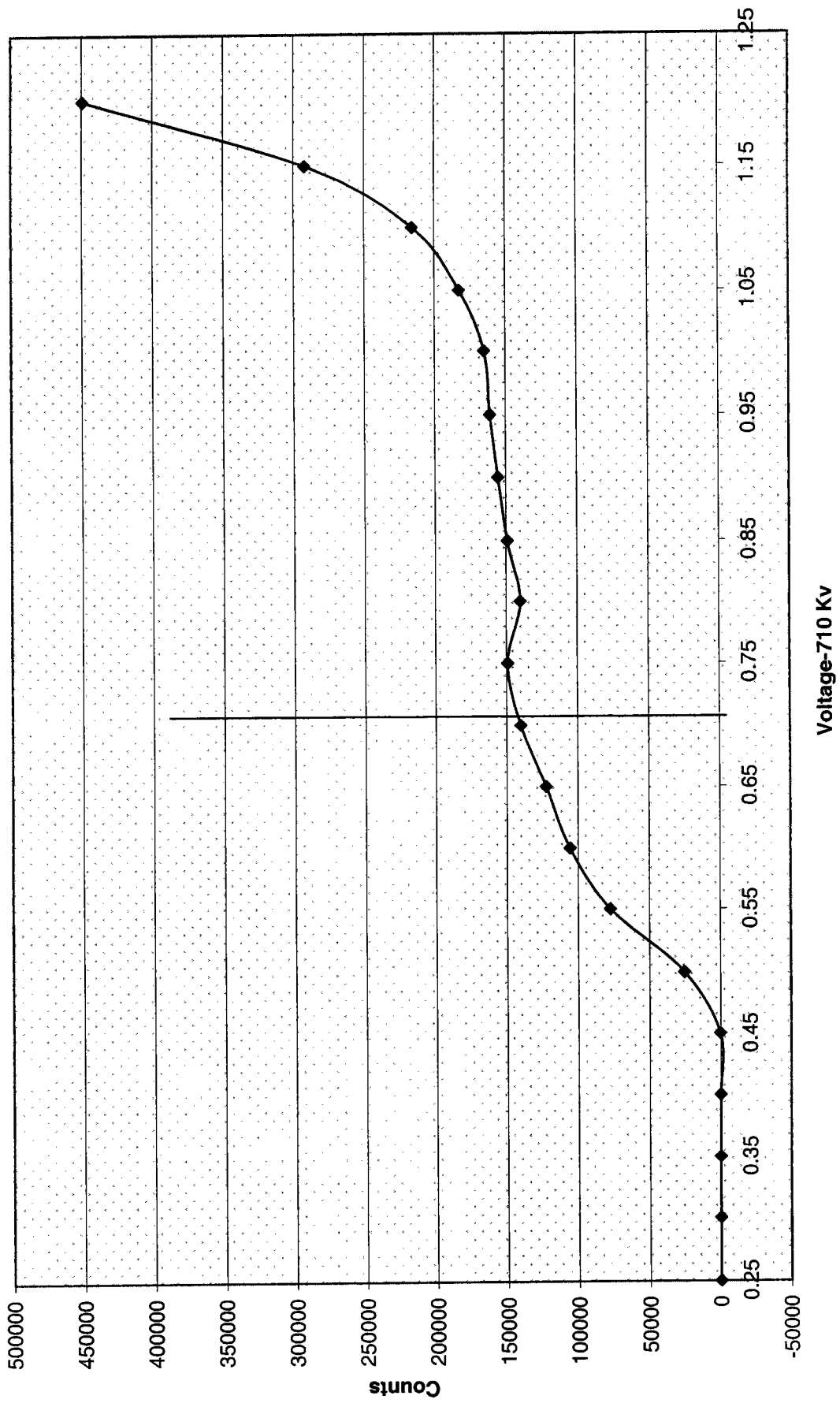
NO RECORDS







Ludlum 4 Voltage Curve



10/3/04

# General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414  
 (843)556-8171

## Lucas Cell Calibration Package (501-512)

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the second standard standard(s) documentation? standard preparation information? standard < 1 Year old or verified?	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
2) Is the efficiency calibration report included?	<input checked="" type="checkbox"/>		
3) Is the raw count data included for: Cell constant determination? Plateau generation?	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
4) Are the calibration verifications included?	<input checked="" type="checkbox"/>		
5) Are the instrument settings included: HVPS settings?	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
6) Has the CELLEFF.xls file been updated?	<input checked="" type="checkbox"/>		
7) Have the calibration dates been updated in ALPHALIMS?	<input checked="" type="checkbox"/>		

Prepared By: Kelli S. Dancer

Date: 3/24/09

Reviewed By: Angela J. Johnson

Date: 3/25/09

Effective Date: 3/25/09

# Ra-226 Cell Constants

standard ID: 0299-E  
 Volume added (mL): 0.1  
 Standard Reference Activity (DPM/mL): 2434.34

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/time flushed to cell	Date/time end of degas	total counts	count time min	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count	
501	1.927	15	3/6/2009 7:50	3/3/2009 8:15	2/25/2009 14:00	5281	30	176.03	243.03	5.76042	2.98264	3369	0.9960
501	2.086	9	3/11/2009 10:40	3/10/2009 12:50	3/5/2009 14:00	7611	30	253.70	243.03	4.95139	0.90972	3374	0.9960
501	2.247	42	3/12/2009 13:30	3/12/2009 9:10	3/6/2009 15:25	10210	30	340.33	243.03	5.73958	0.18056	3376	0.9960
502	1.772	16	3/18/2009 8:25	3/17/2009 12:50	3/10/2009 14:00	7951	30	265.03	243.03	6.95739	0.81597	3381	0.9960
502	2.045	14	3/11/2009 11:15	3/10/2009 13:20	3/5/2009 14:00	7474	30	249.13	243.03	4.97222	0.91319	3374	0.9960
502	1.816	19	3/12/2009 14:20	3/12/2009 9:35	3/6/2009 15:25	8243	30	274.77	243.03	5.75694	0.19792	3376	0.9960
503	1.581	46	3/6/2009 9:20	3/5/2009 9:20	2/25/2009 14:00	7250	30	241.67	243.03	7.80556	1.00000	3369	0.9960
503	1.633	42	3/19/2009 20:15	3/19/2009 15:15	3/12/2009 12:10	8282	30	276.07	243.03	7.12847	0.20833	3383	0.9960
503	1.588	44	3/12/2009 14:50	3/12/2009 10:00	3/6/2009 15:25	7214	30	240.47	243.03	5.77431	0.20139	3376	0.9960
504	1.592	47	3/6/2009 10:30	3/5/2009 9:40	2/25/2009 14:00	7262	30	242.07	243.03	7.81944	1.03472	3369	0.9960
504	1.611	34	3/11/2009 12:30	3/10/2009 14:05	3/5/2009 14:00	5889	30	196.30	243.03	5.00347	0.93403	3375	0.9960
504	1.641	19	3/19/2009 20:50	3/19/2009 15:30	3/12/2009 12:10	8310	30	277.00	243.03	7.13889	0.22222	3383	0.9960
505	2.364	16	3/6/2009 12:40	3/5/2009 10:05	2/25/2009 14:00	10654	30	355.13	243.03	7.83681	1.10764	3370	0.9960
505	2.438	23	3/11/2009 13:00	3/10/2009 14:30	3/5/2009 14:00	8924	30	297.47	243.03	5.02083	0.93750	3375	0.9960
505	2.190	7	3/12/2009 17:01	3/12/2009 10:50	3/6/2009 15:25	9884	30	329.47	243.03	5.80903	0.25764	3376	0.9960
506	1.902	25	3/6/2009 13:10	3/5/2009 10:30	2/25/2009 14:00	8576	30	285.87	243.03	7.85417	1.11111	3370	0.9960
506	2.124	47	3/11/2009 13:30	3/10/2009 15:05	3/5/2009 14:00	7804	30	260.13	243.03	5.04514	0.93403	3375	0.9960
506	1.965	13	3/12/2009 17:40	3/12/2009 11:15	3/6/2009 15:25	8954	30	298.47	243.03	5.82639	0.26736	3376	0.9960
507	1.708	23	3/6/2009 13:45	3/5/2009 10:55	2/25/2009 14:00	7695	30	256.50	243.03	7.87153	1.11806	3370	0.9960
507	1.722	25	3/11/2009 14:20	3/10/2009 15:27	3/5/2009 14:00	6315	30	210.50	243.03	5.06042	0.95347	3375	0.9960
507	1.674	43	3/12/2009 18:30	3/12/2009 11:35	3/6/2009 15:25	7535	30	251.17	243.03	5.84028	0.28819	3376	0.9960
508	1.605	39	3/6/2009 14:20	3/5/2009 11:25	2/25/2009 14:00	7236	30	241.20	243.03	7.89236	1.12153	3370	0.9960
508	1.497	44	3/19/2009 21:30	3/19/2009 15:45	3/12/2009 12:10	7581	30	252.03	243.03	7.14931	0.23958	3383	0.9960
508	1.499	3	3/12/2009 20:45	3/12/2009 12:10	3/6/2009 15:25	6680	30	222.67	243.03	5.86458	0.35764	3376	0.9960
509	1.730	28	3/6/2009 14:50	3/5/2009 11:45	2/25/2009 14:00	7795	30	259.83	243.03	7.90625	1.12847	3370	0.9960
509	1.857	39	3/11/2009 15:25	3/10/2009 16:05	3/5/2009 14:00	6810	30	227.00	243.03	5.08681	0.97222	3375	0.9960
509	1.806	36	3/12/2009 21:20	3/12/2009 12:35	3/6/2009 15:25	8049	30	268.30	243.03	5.88194	0.36458	3376	0.9960
510	1.460	9	3/6/2009 15:25	3/5/2009 12:10	2/25/2009 14:00	6578	30	219.27	243.03	7.92361	1.13542	3370	0.9960
510	1.433	28	3/11/2009 16:05	3/10/2009 16:20	3/5/2009 14:00	5246	30	174.87	243.03	5.09722	0.98958	3375	0.9960
510	1.481	35	3/12/2009 21:55	3/12/2009 12:50	3/6/2009 15:25	6589	30	219.63	243.03	5.89236	0.37847	3376	0.9960
511	1.839	34	3/6/2009 16:30	3/5/2009 13:20	2/25/2009 14:00	8316	30	277.20	243.03	7.97222	1.13194	3370	0.9960
511	1.995	46	3/12/2009 16:50	3/10/2009 16:35	3/5/2009 14:00	7283	30	242.77	243.03	5.10764	1.01042	3375	0.9960
511	2.041	37	3/12/2009 22:40	3/12/2009 13:10	3/6/2009 15:25	9088	30	302.27	243.03	5.90625	0.39583	3376	0.9960
512	1.796	48	3/11/2009 17:35	3/10/2009 16:50	3/5/2009 14:00	6542	30	218.07	243.03	5.11806	1.03125	3375	0.9960
512	2.100	38	3/12/2009 23:15	3/12/2009 13:30	3/6/2009 15:25	9322	30	310.73	243.03	5.92014	0.40625	3376	0.9960
512	1.972	48	3/18/2009 13:00	3/17/2009 14:00	3/6/2009 14:00	8653	30	288.43	243.03	7.00000	0.95833	3382	0.9960

ERR 0.143768 <- Put in Machines.xls (Lucas Cell Tab) \*Backgrounds are not significant enough to be considered in calculations. ANSI N42.25-1997 (B.2).



Calibration  
Ra-226 Verification-Sheet  
3/19/09

Cal # 5

3/24/09  
3/19/09

3/19/09

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 15	500	2/25/09 1400	3/2/09 0815	3/6/09 0750	501	5	8	5281
<del>Cal 14</del>	<del>500</del>	<del>2/25/09 1400</del>	<del>2/27/09 0845</del>	<del>3/6/09 0840</del>	<del>502</del>	<del>5</del>	<del>1</del>	<del>4208</del>
		2/25/09 1400	3/3/09		503	5	100 3/3/09	6800
Cal 46	500	2/25/09 1400	3/5/09 0920	3/6/09 0900	503	5	3	7250
Cal 47	500	2/25/09 1400	3/5/09 0940	3/6/09 1030	504	5	1	7262
Cal 48	500	2/25/09 1400	3/5/09 1005	3/6/09 1040	505	5	3	10654
Cal 45	500	2/25/09 1400	3/5/09 1030	3/6/09 1016	506	5	8	8576
Cal 23	500	2/25/09 1400	3/5/09 1055	3/6/09 1345	507	5	4	7695
Cal 39	500	2/25/09 1400	3/5/09 1125	3/6/09 1420	508	5	1	7236
Cal 28	500	2/25/09 1400	3/5/09 1145	3/6/09 1450	509	5	8	7795
Cal 9	500	2/25/09 1400	3/5/09 1210	3/6/09 1525	510	5	2	6578
Cal 34	500	2/25/09 1400	3/5/09 1220	3/6/09 1630	511	5	6	8316

Calibration

Ra-226 Verification Sheet

219 3116109

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 9	500	3/5/09 1400	3/10/09 1250	3/11/09 1040	501	5	8	7611
Cal 14	500	3/5/09 1400	3/10/09 1370	3/11/09 1115	502	5	5	7474
<del>Cal 15</del>	<del>500</del>	<del>3/5/09 1400</del>	<del>3/10/09 1345</del>	<del>3/11/09 1155</del>	<del>503</del>	<del>5</del>	<del>8</del>	<del>7352</del>
Cal 16	500	3/5/09 1400	3/10/09 1405	3/11/09 1230	504	5	4	5889
Cal 17	500	3/5/09 1400	3/10/09 1430	3/11/09 1280	505	5	2	8924
Cal 17	500	3/5/09 1400	3/10/09 1505	3/11/09 1530	506	5	8	7804
<del>Cal 18</del>	<del>500</del>	<del>3/5/09 1400</del>	<del>3/10/09 1527</del>	<del>3/11/09 1410</del>	<del>507</del>	<del>5</del>	<del>4</del>	<del>6315</del>
<del>Cal 19</del>	<del>500</del>	<del>3/5/09 1400</del>	<del>3/10/09 1550</del>	<del>3/11/09 1455</del>	<del>508</del>	<del>5</del>	<del>4</del>	<del>6423</del>
Cal 29	500	3/5/09 1400	3/10/09 1605	3/11/09 1525	509	5	8	6810
Cal 28	500	3/5/09 1400	3/10/09 1620	3/11/09 1610	510	5	3	5246
Cal 44	500	3/5/09 1400	3/10/09 1635	3/11/09 1650	511	5	8	7283
Cal 48	500	3/5/09 1400	3/10/09 1650	3/11/09 1735	512	5	8	6542

219 3124109

219 3124109

219 3124109

219 3116109



Calibration  
Ra-226 Verification Sheet  
3/25/09

Cal #5's

120  
3122109  
120  
3122109

3125109  
3125109

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 114	500	3/10/09 1400	3/17/09 1250	3/18/09 0825	502	5	5	7451
<del>Cal 119</del>	<del>500</del>	<del>3/10/09 1400</del>	<del>3/17/09 1325</del>	<del>3/18/09 0855</del>	<del>503</del>	<del>5</del>		<del>6855</del>
<del>Cal 128</del>	<del>500</del>	<del>3/10/09 1400</del>	<del>3/17/09 1345</del>	<del>3/18/09 1005</del>	<del>504</del>	<del>5</del>		<del>6804</del>
Cal 140	500	3/10/09 1400	3/17/09 1400	3/18/09 1300	512	5	8	8453
Cal 125	500	3/5/09 1400	3/10/09 1527	3/11/09 1420	507	5	4	6315

3/25/09

# Ra-226 Calibration Sheet

Standard ID: 0124109  
 Volume Added (mL): 0.1  
 Expiration Date: 4/12/09

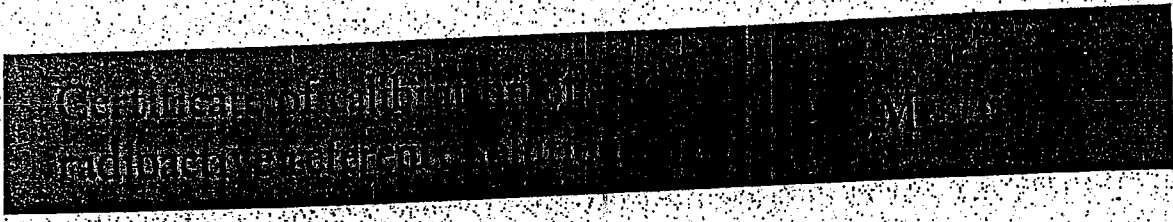
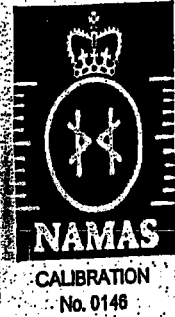
Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 42	500	3/12/09 1210	3/12/09 1515	3/19/09 2015	503	85	8282
Cal 19	500	3/12/09 1210	3/12/09 1530	3/19/09 2030	504	5	8310
Cal 44	500	3/12/09 1210	3/12/09 1545	3/19/09 2130	508	5	7561
<del>Cal 30</del>	<del>500</del>	<del>3/12/09 1210</del>	<del>3/12/09 1600</del>	<del>3/19/09 2200</del>	<del>509</del>	<del>5</del>	<del>9942</del>

3/25/09  
 3/25/09

8-21-00

Nycomed Amersham plc  
Amersham Laboratories

0299



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

ion Principal radionuclide: Radium-226

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

ment Reference time: 1200 GMT on 15 December 1999

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

ion of The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$ , which  
inties for a  $t$ -distribution with  $v_{eff} = \infty$  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

ved

Date of 551 17<sup>th</sup> December 1999



# 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:	01/23/2008
Expiration Date:	01/23/2009
Primary Code:	0299-A
Dilution(mL):	100 mL
Mass of Parent(g):	4.6634 g
Density(g/mL):	1.0012
Balance ID:	

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

$$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$$

$$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$$

$$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 122414.2500 \text{ dpm/mL}$$

$$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0012 \text{ g/mL}) / (100 \text{ mL}) = 122273.3377 \text{ dpm/g}$$

### 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	04/02/2008	04/02/2009

GEL Laboratories LLC  
Version 1.0 9/18/2000

*Kelli Dorell*

# Verification for Ra-226 Standard 0299-G

4/2/2008	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard Mass. Used (G)	Source DPM/G
D. Roy	0299-G N1	2536.9600	52.4000	2484.5600	1.917186	0.5057	2562.667649
	0299-G N2	2520.2500	52.4000	2467.8500	1.917186	0.5056	2545.935781
	0299-G N3	2532.5000	52.4000	2480.1000	1.917186	0.5042	2565.677715
						Average =	2558.093715

Mean Value (Counting) = 2558.093715  
 Stdev = 10.63610098

Certificate Value = 2437.6 dpm/mL  
 Lower Limit = 2536.821513 dpm/mL  
 Upper Limit = 2579.365917 dpm/mL  
 Rule 1 Pass/Fail = **Fail** \*exception taken due to full recovery of standard  
 Two sigma = 21.27220197 dpm/mL  
 10 % of Mean = 255.8093715 dpm/mL  
 Rule 2 (Pass/Fail) = **Pass**

### Verification Rules

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 = The determined mean value shall be within 10% of the certificate value.

The analyst prepared three standard verification sources for Ra-226 source 0299-G by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel 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 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Gold for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 4/02/08 using source 0024-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0024. Each verification source calculation was performed as follows:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

where:

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

BAD.SOP.M-001

*Handwritten notes:*  
 New Source 3/24/09  
 4/19/08  
 David Dwyer 4/10/08



**General Engineering Laboratories**  
**Verification Source Preparation Sheet**  
*Calibration*

Applicable SOP Number GL RAD-A-008 Isotope RA-226  
 Date Standards Prepared 4/15/09 Cocktail Type Used NA  
 Standard ID 0249-G Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or ml) 2446.347 Type of Scintillation Vial NA  
 Reference Date 12/15/99 Pipette ID Used 1429303  
 Expiration Date 4/2/09 Balance ID Used 36240216  
 Residue/Carrier Agent D.5M HCl Quenching Agent NA

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
15	Ca115				
46	Ca146				
47	Ca147				
16	Ca116				
25	Ca125				
23	Ca123				
39	Ca139				
28	Ca128				
9	Ca19				
34	Ca134				
42	Ca142				
19	Ca119				
44	Ca144				
7	Ca17				
13	Ca113				

Prepared By: Kelli D'Amore Date 3/24/09  
 Reviewed By: \_\_\_\_\_ Date \_\_\_\_\_

Rev 1 RLM 9/10/97

**General Engineering Laboratories**  
**Verification Source Preparation Sheet**  
*Calibration*

*3/25/09*

Applicable SOP Number GLDMP-A-008 Isotope DIA 226

Date Standards Prepared 4/5/09 Cocktail Type Used NA

Standard ID 02996 Matrix of Vial/Planchett NA  
NA  
NA

Amount Used (g or ml) 0.1 Type of Scintillation Vial NA

Standard Activity (DPM/g or mL) 2146.347 Pipette ID Used 1429303

Reference Date 12/15/99 Balance ID Used 3604026

Expiration Date 4/2/09 Quenching Agent NA

Residue/Carrier Agent 0.5M HCl

	Standard Number	Quenching Vol (uL)/ Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
<i>43</i>	<i>Cal 43</i>				
<i>3</i>	<i>Cal 3</i>				
<i>36</i>	<i>Cal 36</i>				
<i>35</i>	<i>Cal 35</i>				
<i>37</i>	<i>Cal 37</i>				
<i>38</i>	<i>Cal 38</i>				

*160 3/24/09*

Prepared By: Kelli Dence Date 3/24/09

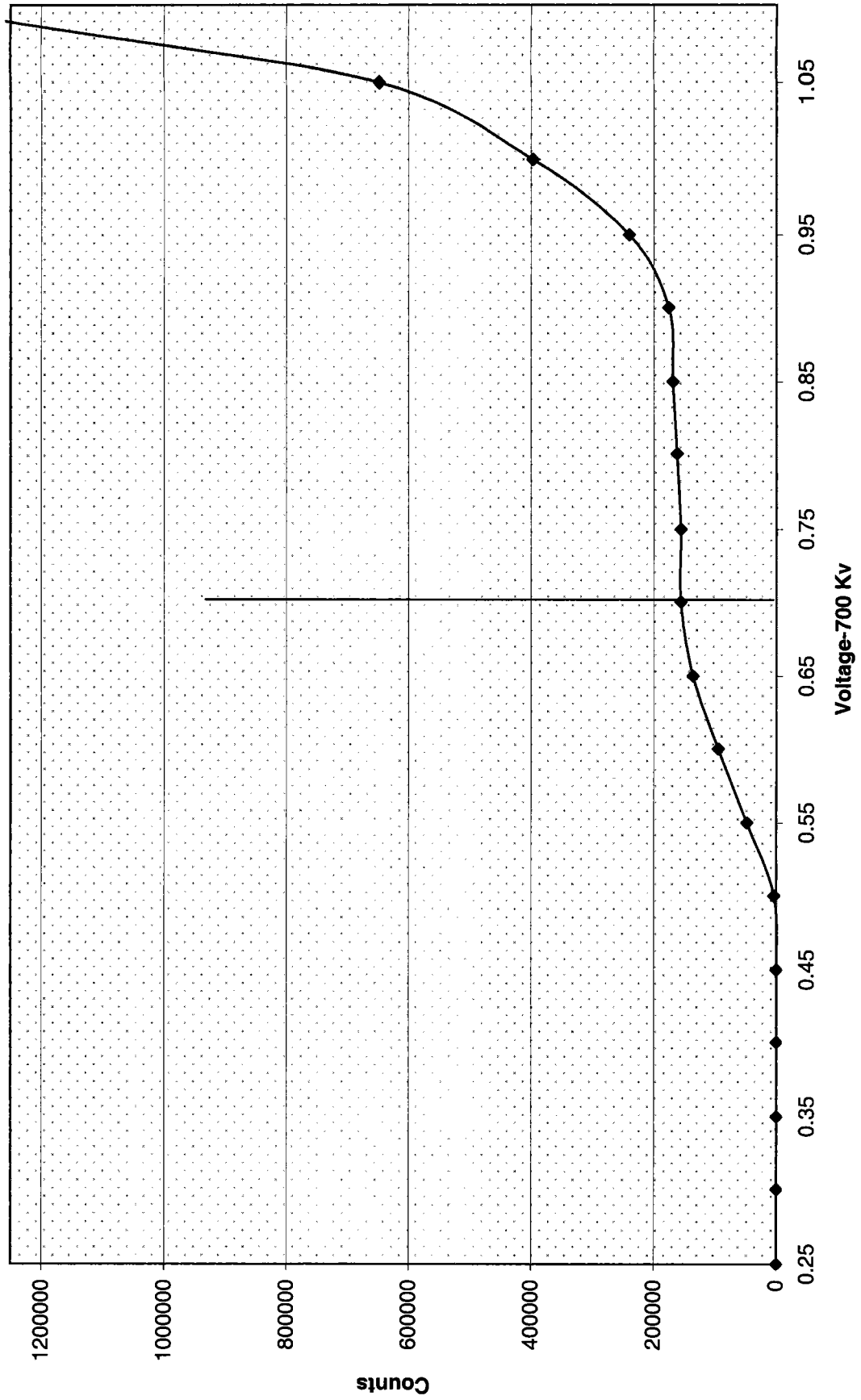
Reviewed By: \_\_\_\_\_ Date \_\_\_\_\_

Voltage

Voltage Curve Ludlum # 5				
Volts	Counts	Date	Time	Detector
0.00	0	2/25/2009	9:20	5
0.05	0	2/25/2009	9:20	5
0.10	0	2/25/2009	9:20	5
0.15	0	2/25/2009	9:20	5
0.20	0	2/25/2009	9:20	5
0.25	0	2/25/2009	9:20	5
0.30	0	2/25/2009	9:20	5
0.35	0	2/25/2009	9:20	5
0.40	0	2/25/2009	9:20	5
0.45	0	2/25/2009	9:20	5
0.50	3611	2/25/2009	9:20	5
0.55	47984	2/25/2009	9:20	5
0.60	94752	2/25/2009	9:20	5
0.65	135854	2/25/2009	9:20	5
0.70	155952	2/25/2009	9:20	5
0.75	155696	2/25/2009	9:20	5
0.80	161972	2/25/2009	9:20	5
0.85	168840	2/25/2009	9:20	5
0.90	175598	2/25/2009	9:20	5
0.95	239969	2/25/2009	9:20	5
1.00	397249	2/25/2009	9:20	5

UD 3/25/09

# Ludlum 5 Voltage Curve



KAP 3/24/09

# Ra-226 WATER

Batch : LCSVER  
 Date : 2/20/2008  
 Analyst : DXM2

Procedure Code : LUC26RAL  
 Parmname : Radium-226  
 MDA : 1 pCi/L

Bkg Count Time: 30 min Instrument Used : LUCAS CELL DETECTOR

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME
Ver 1	0.500	30	766	501	2.087	0.267	0.6041	28.8142	2.0728	3/16/2009 15:10
Ver 2	0.500	30	537	502	1.878	0.167	0.5682	23.0223	1.9747	3/16/2009 19:25
Ver 3	0.500	30	518	503	1.601	0.267	0.8071	25.9035	2.2832	3/16/2009 20:20
Ver 4	0.500	30	701	504	1.615	0.267	0.6021	26.2570	1.9774	3/20/2009 19:00
Ver 5	0.500	30	680	505	2.331	0.033	0.2559	23.5744	1.7758	3/16/2009 22:00
Ver 6	0.500	30	893	506	2.004	0.267	0.4859	27.0593	1.7988	3/20/2009 19:40
Ver 7	0.500	30	488	507	1.701	0.267	0.7287	22.0004	2.0008	3/16/2009 23:00
Ver 8	0.500	30	544	508	1.534	0.033	0.3760	27.7023	2.3344	3/16/2009 23:30
Ver 9	0.500	30	768	509	1.798	0.267	0.5430	25.9694	1.8657	3/20/2009 20:50
Ver 10	0.500	30	432	510	1.458	0.033	0.3700	21.6379	2.0476	3/17/2009 5:00
Ver 11	0.500	30	577	511	1.959	0.267	0.5934	21.2369	1.7694	3/17/2009 5:35
Ver 12	0.500	30	723	512	1.956	0.267	0.5945	26.7349	1.9815	3/17/2009 6:10

Sample ID	Sample Dup	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
501		5	3/16/2009 15:10	LCS	0638-F	24.05	pCi/L	120%
502		5	3/16/2009 19:25	LCS	0638-F	24.05	pCi/L	96%
503		5	3/16/2009 20:20	LCS	0638-F	24.05	pCi/L	108%
504		5	3/20/2009 19:00	LCS	0638-F	24.05	pCi/L	109%
505		5	3/16/2009 22:00	LCS	0638-F	24.05	pCi/L	98%
506		5	3/20/2009 19:40	LCS	0638-F	24.05	pCi/L	113%
507		5	3/16/2009 23:00	LCS	0638-F	24.05	pCi/L	91%
508		5	3/16/2009 23:30	LCS	0638-F	24.05	pCi/L	115%
509		5	3/20/2009 20:50	LCS	0638-F	24.05	pCi/L	108%
510		5	3/17/2009 5:00	LCS	0638-F	24.05	pCi/L	90%
511		5	3/17/2009 5:35	LCS	0638-F	24.05	pCi/L	88%
512		5	3/17/2009 6:10	LCS	0638-F	24.05	pCi/L	111%

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM	Ingrowth constant
3/13/2009 15:30	3/16/2009 9:45	66.25	5.42	0.3936	0.9599	1.0019	25.2667	0.3785
3/13/2009 15:30	3/16/2009 10:10	66.67	9.25	0.3955	0.9325	1.0019	17.7333	0.3695
3/13/2009 15:30	3/16/2009 10:30	67.00	9.83	0.3970	0.9284	1.0019	17.0000	0.3693
3/16/2009 14:00	3/20/2009 13:05	95.08	5.92	0.5122	0.9563	1.0019	23.1000	0.4908
3/13/2009 15:30	3/16/2009 11:25	67.92	10.58	0.4012	0.9232	1.0019	22.6333	0.3711
3/16/2009 14:00	3/20/2009 13:20	95.33	6.33	0.5131	0.9533	1.0019	29.5000	0.4901
3/13/2009 15:30	3/16/2009 13:50	70.33	9.17	0.4120	0.9331	1.0019	15.9997	0.3852
3/13/2009 15:30	3/16/2009 13:50	70.33	9.67	0.4120	0.9296	1.0019	18.1000	0.3837
3/16/2009 14:00	3/20/2009 13:45	95.75	7.08	0.5147	0.9479	1.0019	25.3333	0.4888
3/13/2009 5:30	3/16/2009 14:25	80.92	14.58	0.4571	0.8957	1.0019	14.3667	0.4103
3/13/2009 5:30	3/16/2009 14:45	81.25	14.83	0.4585	0.8941	1.0019	18.9663	0.4107
3/13/2009 5:30	3/16/2009 15:00	81.50	15.17	0.4595	0.8918	1.0019	23.8330	0.4106

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
NUN 1	500	3/16/09 1530	3/16/09 0945	3/16/09 1510 <del>3/16/09 1510</del> SEE 3/16/09	501	5	8	766
NUN 2	500	3/13/09 1530	3/16/09 1010	3/16/09 1925	502	5	85 <del>140 3/12/09</del>	537
NUN 3	500	3/13/09 1530	3/16/09 1030	3/16/09 2020	503	5	8	518
<del>NUN 4</del>	<del>500</del>	<del>3/13/09 1530</del>	<del>3/16/09 1100</del>	<del>3/16/09 2115</del>	<del>504</del>	<del>5</del>	<del>8</del>	<del>577</del>
NUN 5	500	3/13/09 1530	3/16/09 1125	3/16/09 2200	505	5	8 <del>140 3/12/09</del>	680
<del>NUN 6</del>	<del>500</del>	<del>3/13/09 1530</del>	<del>3/16/09 1155</del>	<del>3/16/09 2230</del>	<del>506</del>	<del>5</del>	<del>8</del>	<del>707</del>
NUN 7	500	3/13/09 1530	3/16/09 1320	3/16/09 2300	507	5	8	488
NUN 8	500	3/13/09 1530	3/16/09 1350	3/16/09 2330	508	5	8 <del>140 3/12/09</del>	544
<del>NUN 9</del>	<del>500</del>	<del>3/13/09 1530</del>	<del>3/16/09 1410</del>	<del>3/17/09 0445</del> <del>0345</del> <del>0345</del> <del>0345</del>	<del>509</del>	<del>5</del>	<del>8</del>	<del>640</del>
NUN 10	500	3/13/09 1530	3/16/09 1415	3/17/09 0500 <del>0345</del> <del>0345</del>	510	5	8 <del>140 3/12/09</del>	432
NUN 11	500	3/13/09 1530	3/16/09 1445	3/17/09 0535	511	5	8	577
NUN 12	500	3/13/09 1530	3/16/09 1500	3/17/09 0610	512	5	8	723

140  
3/24/09

140  
3/24/09

140  
3/24/09

3/25/09  
3/25/09

3/17/09  
140

# Ra-226 Verification Sheet

Standard ID: 0638F

Volume Added (mL): 0.1

Expiration Date: 12/10

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background Counts	Total Counts
<del>VEN 1</del>	<del>500</del>	<del>3/16/09 1400</del>	<del>3/20/09 1245</del>	<del>3/20/09 1820</del>	<del>501</del>	<del>5</del>	<del>8</del>	<del>70</del>
VEN 2	500	3/16/09 1400	3/20/09 1305	3/20/09 1900	504	5	8	701
VEN 3	500	3/16/09 1400	3/20/09 1320	3/30/09 1940 <small>10/10/09 1940</small>	506	5	8	893
VEN 4	500	3/16/09 1400	3/20/09 1345	3/30/09 2050 <small>10/10/09 2050</small>	509	5	8	768

VEN 3/24/09

VEN 3/24/09

VEN 3/24/09



## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number <u>GL-APP-D-008</u>	Isotope <u>RA 226</u>
Date Standards Prepared <u>11/6/09</u>	Cocktail Type Used <u>NA</u>
Standard ID <u>0638-F</u>	Matrix of Vial/Planchett <u>NA</u>
Amount Used (g or ml) <u>0.1</u>	<u>NA</u>
Standard Activity (DPM/g or ml) <u>267.519</u>	Type of Scintillation Vial <u>NA</u>
Reference Date <u>11/23/04</u>	Pipette ID Used <u>1429303</u>
Expiration Date <u>2/2/10</u>	Balance ID Used <u>3808 0204</u>
Residue/Carrier Agent <u>NA</u>	Quenching Agent <u>NA</u>

	Standard Number	Quenching Vol (uL) Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	Ver 1				
2	Ver 2				
3	Ver 3				
4	Ver 4				
5	Ver 5				
6	Ver 6				
7	Ver 7				
8	Ver 8				
9	Ver 9				
10	Ver 10				
11	Ver 11				
12	Ver 12				

11/6/09  
 3/25/09

Prepared By: Kelli Daniels Date: 3/24/09  
 Reviewed By: Angela A. G... Date: 3/25/09

# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0638	Isotope:	Radium-226
Prepared By:	Amanda Fehr	Prepared By:	Amanda Fehr
Carrier Conc:	0.1M HCl	Prep Date:	01/16/2006
Reference Date:	01/23/2004	Verification Date:	03/04/2007
Ampoule Mass (g):	5.01065 g	Expiration Date:	03/04/2008
Uncertainty:	+/- 3.3 %	Primary Code:	0638-A
LogBook No:	RC-S-037-037	Dilution(mL):	100 mL
		Mass of Parent(g):	4.8398 g
		Density(g/mL):	1.0266
		Balance ID:	38080204

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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.8398 \text{ g}) * (23530 \text{ dps}) * (60 \text{ dpm/dps}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13636.6133 \text{ dpm/mL}$
$(4.8398 \text{ g}) * (23530 \text{ dps}) * (60 \text{ dpm/dps}) / (1.0266 \text{ g/mL}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13282.9676 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
01/17/2006	Amanda Fehr	2.1041	100	0638-B	279.0211 dpm/mL	01/17/2007	01/17/2008
07/17/2006	Mary Aders	2.1313	100	0638-C	282.6281 dpm/mL	07/26/2006	07/26/2007
03/28/2007	Daniel Roy	2.1025	100	0638-D	279.2744 dpm/ml	04/08/2007	04/08/2008
03/28/2007	Daniel Roy	45.468	250	0638-E	2415.7999 dpm/ml	04/09/2008	04/08/2009
12/18/2007	Daniel Roy	2.014	100	0638-F	267.519 dpm/ml	02/02/2009	02/02/2010
02/12/2008	Daniel Roy	.5004	100	0638-G	66.468 dpm/ml	03/04/2008	03/04/2009
07/23/2008	Daniel Roy	5.0607	250	0638-H	268.8845 dpm/ml	07/23/2008	07/23/2009

## Verification for Ra-226 Standard 0638-F

D. Roy 2/2/2009	<b>Isotope</b>	<b>Value</b>	<b>Uncertainty</b>
	0638-F #1	24.629	1.7426
	0638-F #2	24.438	1.7557
	0638-F #3	22.791	1.6808
<b>Mean Value (Counting) =</b>	23.953	99.60	<b>Pass</b>
<b>Stdev =</b>	1.010781096		<b>Rule 3 (Pass/Fail)</b>
<b>Target =</b>	24.05		
<b>Lower Limit =</b>	21.93100448		
<b>Upper Limit =</b>	25.97412886		
<b>Rule 1 Pass/Fail</b>	<b>Pass</b>		
<b>Two sigma =</b>	2.021562191		
<b>10 % of Mean =</b>	2.395256667		
<b>Rule 2 (Pass/Fail)</b>	<b>Pass</b>		

**Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements**

**Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule 3 = The determined mean value shall be within 5% of the certificate value.**

The analyst prepared three standard verification sources for standard 0638-F using 0.1 mL for each source. Each source was counted using routine Lucas cell procedures. Calibration for 0299-G was used in this verification.

140 3124109

# General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414

(843)556-8171

## Lucas Cell Calibration Package

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the secondary standard(s) documentation? standard preparation information? standard < 1 Year old or verified?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2) Is the efficiency calibration report included ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3) Is the raw count data included for: Cell constant determination? Plateau generation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4) Are the calibration verifications included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5) Are the instrument settings included: HVPS settings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6) Has the CELLEFF.xls file been updated ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7) Have the calibration dates been updated in ALPHALIMS ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Prepared By: Kelli Derell

Date: 11/21/08

Reviewed By: Angela Johnson

Date: 11/21/08

Effective Date: 11/21/08

**Ra-226 Cell Constants**

Standard Reference date: 12/15/1999  
 standard ID: 0299-G  
 Volume added (mL): 0.1  
 Standard Reference Activity (DPM/mL): 2446.35

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	bkg cpm	total counts	count time min	cpm	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count
701	1.996	Average	11/20/2008 16:40	11/20/2008 12:00	11/13/2008 12:20	0.267	10056	30	335.20	243.02	6.98611	0.19444	3264	0.9961
701	1.720	Sidev	10/15/2008 14:35	10/15/2008 10:40	10/10/2008 14:20	0.267	7095	30	236.50	243.02	4.84722	0.16319	3228	0.9962
701	1.728		10/13/2008 16:15	10/13/2008 9:35	10/10/2008 14:20	0.267	4760	30	158.67	243.02	2.80208	0.27778	3226	0.9962
702	1.820	Average	10/20/2008 15:45	10/20/2008 9:40	10/15/2008 14:10	0.233	7352	30	245.07	243.02	4.81250	0.25347	3233	0.9962
702	2.014	Sidev	10/15/2008 15:20	10/15/2008 10:55	10/10/2008 14:20	0.100	8282	30	276.07	243.02	4.85764	0.18403	3228	0.9962
702	1.963		10/13/2008 20:25	10/13/2008 10:10	10/10/2008 14:20	0.267	5296	30	176.53	243.02	2.82639	0.42708	3226	0.9962
703	1.899	Average	11/13/2008 15:20	11/13/2008 12:20	11/10/2008 16:15	0.267	5428	30	180.99	243.02	2.83681	0.12500	3257	0.9961
703	2.126	Sidev	10/15/2008 15:55	10/15/2008 11:10	10/10/2008 14:20	0.267	8738	30	291.27	243.02	4.86806	0.19792	3228	0.9962
703	2.222		10/13/2008 20:55	10/13/2008 10:35	10/10/2008 14:20	0.267	6019	30	200.63	243.02	2.84375	0.43056	3226	0.9962
704	2.116	Average	10/20/2008 17:00	10/20/2008 10:30	10/15/2008 14:10	0.233	8560	30	285.33	243.02	4.84722	0.27083	3233	0.9962
704	2.390	Sidev	10/15/2008 17:30	10/15/2008 12:30	10/10/2008 14:20	0.267	9909	30	330.30	243.02	4.92361	0.18750	3228	0.9962
704	2.239		10/13/2008 21:30	10/13/2008 11:00	10/10/2008 14:20	0.267	6084	30	202.80	243.02	2.86111	0.43750	3226	0.9962
705	2.199	Average	10/20/2008 17:35	10/20/2008 10:55	10/15/2008 14:10	0.233	8905	30	296.83	243.02	4.86458	0.27778	3233	0.9962
705	2.050	Sidev	10/15/2008 17:30	10/15/2008 12:45	10/10/2008 14:20	0.267	8495	30	283.17	243.02	4.93403	0.19792	3228	0.9962
705	2.232		10/13/2008 22:00	10/13/2008 11:20	10/10/2008 14:20	0.267	6081	30	202.70	243.02	2.87500	0.44444	3226	0.9962
706	2.099	Average	10/20/2008 18:05	10/20/2008 11:15	10/15/2008 14:10	0.233	8504	30	283.47	243.02	4.87847	0.28472	3233	0.9962
706	2.040	Sidev	10/15/2008 18:00	10/15/2008 13:00	10/10/2008 14:20	0.267	8452	30	281.73	243.02	4.94444	0.20883	3228	0.9962
706	2.213		10/13/2008 22:30	10/13/2008 11:40	10/10/2008 14:20	0.267	6044	30	201.47	243.02	2.88889	0.45139	3226	0.9962
707	2.069	Average	10/20/2008 18:35	10/20/2008 11:30	10/15/2008 14:10	0.233	8378	30	279.27	243.02	4.88889	0.29514	3233	0.9962
707	2.057	Sidev	10/15/2008 18:35	10/15/2008 13:25	10/10/2008 14:20	0.267	8527	30	284.23	243.02	4.96181	0.21528	3228	0.9962
707	2.230		10/13/2008 23:00	10/13/2008 13:20	10/10/2008 14:20	0.267	6255	30	208.50	243.02	2.95833	0.40278	3226	0.9962
708	1.652	Average	10/20/2008 22:00	10/20/2008 12:50	10/15/2008 14:10	0.233	6632	30	221.07	243.02	4.94444	0.38194	3233	0.9962
708	1.772	Sidev	10/15/2008 19:20	10/15/2008 13:40	10/10/2008 14:20	0.267	7329	30	244.30	243.02	4.97222	0.23611	3228	0.9962
708	1.954		11/13/2008 15:50	11/13/2008 12:50	11/10/2008 16:15	0.267	5614	30	187.13	243.02	2.85764	0.12500	3257	0.9961
709	1.890	Average	10/20/2008 22:35	10/20/2008 13:05	10/15/2008 14:10	0.233	7578	30	252.60	243.02	4.95486	0.39583	3233	0.9962
709	1.817	Sidev	10/15/2008 20:35	10/15/2008 13:55	10/10/2008 14:20	0.267	7469	30	248.97	243.02	4.98264	0.27778	3228	0.9962
709	2.127		10/14/2008 9:00	10/13/2008 14:05	10/10/2008 14:20	0.267	5608	30	186.93	243.02	2.96958	0.78819	3226	0.9962
710	1.965	Average	10/20/2008 23:05	10/20/2008 13:25	10/15/2008 14:10	0.233	7882	30	262.73	243.02	4.96875	0.40278	3233	0.9962
710	2.009	Sidev	10/15/2008 21:40	10/15/2008 14:15	10/10/2008 14:20	0.267	8224	30	274.13	243.02	4.99653	0.30903	3228	0.9962
710	2.152		10/14/2008 10:00	10/13/2008 14:25	10/10/2008 14:20	0.267	5666	30	188.87	243.02	3.00347	0.81597	3226	0.9962
711	2.283	Average	10/20/2008 23:55	10/20/2008 13:45	10/15/2008 14:10	0.233	9136	30	304.53	243.02	4.98264	0.42361	3233	0.9962
711	2.208	Sidev	10/16/2008 8:30	10/15/2008 14:30	10/10/2008 14:20	0.267	8357	30	278.57	243.02	5.00694	0.75000	3228	0.9962
711	2.122		10/14/2008 10:55	10/13/2008 14:45	10/10/2008 14:20	0.267	5581	30	186.03	243.02	3.01736	0.84028	3226	0.9962
712	2.049	Average	10/21/2008 1:00	10/20/2008 14:05	10/15/2008 14:10	0.233	8170	30	272.33	243.02	4.99653	0.45486	3233	0.9962
712	2.174	Sidev	10/16/2008 19:15	10/15/2008 14:50	10/10/2008 14:20	0.267	7618	30	253.93	243.02	5.02083	1.18403	3229	0.9962
712	2.174		10/14/2008 11:25	10/13/2008 16:15	10/10/2008 14:20	0.267	5852	30	195.07	243.02	3.07986	0.79861	3226	0.9962

*On the Johnson 11/21/08*

*Kelli Powell 11/21/08*

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number <u>GLRPD-12008</u>	Isotope <u>Ka-226</u>
Date Standards Prepared <u>4/15/08</u>	Cocktail Type Used <u>NA</u>
Standard ID <u>6+ 0299-G</u> <u>ED 7112108</u>	Matrix of Vial/Planchett <u>NA</u> <u>NA</u> <u>NA</u>
Amount Used (g or ml) <u>0.1</u>	Type of Scintillation Vial <u>NA</u>
Standard Activity (DPM/g or mL) <u>2446.347</u>	Pipette ID Used <u>1429303</u>
Reference Date <u>12/15/09</u>	Balance ID Used <u>36040216</u>
Expiration Date <u>4/12/09</u>	Quenching Agent <u>NA</u>
Residue/Carrier Agent <u>0.5 M HCl</u>	

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
<del>Ca148</del>	<del>Ca148</del>				
<del>Ca135</del>	<del>Ca135</del>				
<del>Ca134</del>	<del>Ca134</del>				
<del>Ca138</del>	<del>Ca138</del>				
<del>Ca125</del>	<del>Ca125</del>				
<del>Ca13</del>	<del>Ca13</del>				
<del>Ca116</del>	<del>Ca116</del>				
<del>Ca139</del>	<del>Ca139</del>				

120  
11/21/08

Prepared By: Kelli Doree Date: 11/21/08  
 Reviewed By: Angela Johnson Date: 11/21/08

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-RAD-A-008 Isotope Ra 226  
 Date Standards Prepared 4/15/05 Cocktail Type Used NA  
 Standard ID 0799-0 Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or ml) 2446.347 Type of Scintillation Vial NA  
 Reference Date 1-21-1999 Pipette ID Used 1429303  
 Expiration Date 4/12/09 Balance ID Used 36040216  
 Residue/Carrier Agent 0.5 M HCL Quenching Agent N/A

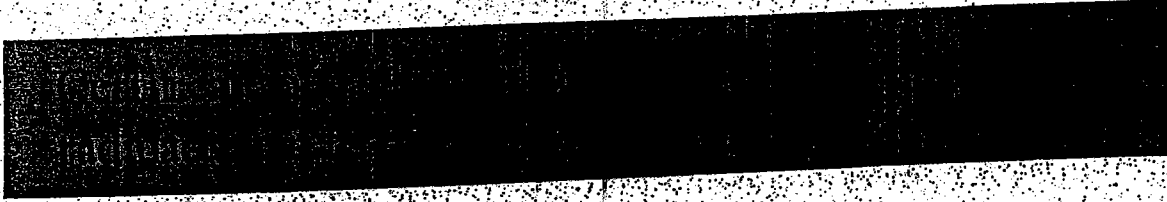
	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
Cal 14	Cal 14				
Cal 13	Cal 13				
Cal 43	Cal 43				
Cal 44	Cal 44				
Cal 15	Cal 15				
Cal 36	Cal 36				
Cal 46	Cal 46				
Cal 47	Cal 47				
Cal 19	Cal 19				
Cal 37	Cal 37				
Cal 42	Cal 42				
Cal 28	Cal 28				
Cal 19	Cal 19				
Cal 17	Cal 17				
Cal 23	Cal 23				

(20)  
11/21/05

Prepared By: Kelli Dwyer Date: 11/21/08  
 Reviewed By: Angie Johnson Date: 11/21/08

Rev 1 RLM 9/10/97

0299



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

ion Principal radionuclide: Radium-226

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

ment Reference time: 1200 GMT on 15 December 1999

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

ion of The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$ , which  
inties 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

17<sup>th</sup> December 1999



0299



UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

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.

Expanded uncertainty in the radioactive concentration quoted above:  $\pm 2.5\%$

Combined Type A uncertainty:  $\pm 0.2\%$

Combined Type B uncertainty:  $\pm 1.3\%$

Radiochemical 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.

Carrier free in 0.5M HCL

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.



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0299	Isotope:	Radium-226
Prepared By:	Angela Johnson	Prepared By:	Angela Johnson
Carrier Conc:	0.5 M HCL	Prep Date:	09/15/2000
Reference Date:	12/15/1999	Verification Date:	01/23/2008
Ampoule Mass (g):	5.0368 g	Expiration Date:	01/23/2009
Uncertainty:	+/- 2.5 %	Primary Code:	0299-A
LogBook No:	RC S 027 128	Dilution(mL):	100 mL
		Mass of Parent(g):	4.6634 g
		Density(g/mL):	1.0012
		Balance ID:	

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

$$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$$

$$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$$

$$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 122414.2500 \text{ dpm/mL}$$

$$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0012 \text{ g/mL}) / (100 \text{ mL}) = 122273.3377 \text{ dpm/g}$$

### 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	04/02/2008	04/02/2009

GEL Laboratories LLC  
Version 1.0 9/18/2000

W 11/21/08

# Verification for Ra-226 Standard 0299-G

4/2/2008  
D. Roy

Isotope  
0299-G N1  
0299-G N2  
0299-G N3

Detector CPM  
2536.9600  
2520.2500  
2532.5000

BKG CPM  
52.4000  
52.4000  
52.4000

NET CPM  
2484.5600  
2467.8500  
2480.1000

Detector Eff  
1.917186  
1.917186  
1.917186

Standard Mass. Used (G)  
0.5057  
0.5056  
0.5042

Source DPM/G  
2562.667649  
2545.935781  
2565.677715  
Average =  
2558.093715

Mean Value (Counting) = 2558.093715  
Stdev = 10.63610098

104.944421  
0.00415782

Rule 3 (Pass/Fail)  
Pass

Certificate Value = 2437.6 dpm/mL  
Lower Limit = 2536.821513 dpm/mL  
Upper Limit = 2579.365917 dpm/mL  
Rule 1 Pass/Fail = Fail \*exception taken due to full recovery of standard  
Two sigma = 21.27220197 dpm/mL  
10 % of Mean = 255.8093715 dpm/mL  
Rule 2 (Pass/Fail) = Pass

### Verification Rules

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 = The determined mean value shall be within 10% of the certificate value.

The analyst prepared three standard verification sources for Ra-226 source 0299-G by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel 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 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Gold for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 4/02/08 using source 0024-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0024. Each verification source calculation was performed as follows:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

where:

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

BAD.SOP.M-001

*Mary E. Johnson 4/9/08*  
*Daniel Dwyer 4/10/08*







Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
<del>Cal 13</del>	<del>500</del>	<del>11/10/08 1615</del>	<del>11/13/08 1655</del>	<del>11/13/08 1435</del>	<del>701</del>	<del>7</del>	<del>8</del>	<del>7318</del>
Cal 43	500	11/10/08 1615	11/13/08 1220	11/13/08 1520	703	7	8	6428
Cal 14	500	11/10/08 1615	11/13/08 1250	11/13/08 1650	708	7	8	5614
<del>Cal 15</del>	<del>500</del>	<del>11/10/08 1615</del>	<del>11/13/08 1220</del>	<del>11/13/08 1520</del>	<del>705</del>	<del>7</del>	<del>8</del>	<del>7013</del>
<del>Cal 44</del>	<del>500</del>	<del>11/10/08 1615</del>	<del>11/13/08 1220</del>	<del>11/13/08 1520</del>	<del>705</del>	<del>7</del>	<del>8</del>	<del>7013</del>
<del>Cal 43</del>	<del>500</del>	<del>11/13/08 1220</del>	<del>11/13/08 1220</del>	<del>11/13/08 1440</del>	<del>701</del>	<del>7</del>	<del>8</del>	<del>16056</del>

11/14/08

11/13/08

11/21/08  
GAM

160 11/21/08

## Voltage Curve Ludlum #7

Voltage (kV)	Count Time (min)	Counts	Date/Time
0.20	1.00	0	11/21/08 11:20
0.25	1.00	0	11/21/08 11:22
0.30	1.00	0	11/21/08 11:24
0.35	1.00	0	11/21/08 11:26
0.40	1.00	0	11/21/08 11:29
0.45	1.00	0	11/21/08 11:31
0.50	1.00	1	11/21/08 11:33
0.55	1.00	781	11/21/08 11:36
0.60	1.00	10872	11/21/08 11:38
0.65	1.00	34947	11/21/08 11:40
0.70	1.00	67984	11/21/08 11:43
0.75	1.00	95541	11/21/08 11:45
0.80	1.00	114849	11/21/08 11:47
0.85	1.00	128116	11/21/08 11:49
0.90	1.00	136852	11/21/08 11:52
0.95	1.00	143914	11/21/08 11:54
1.00	1.00	149894	11/21/08 11:56
1.05	1.00	154762	11/21/08 11:59
1.10	1.00	158921	11/21/08 12:01
1.15	1.00	161613	11/21/08 12:03
1.20	1.00	167982	11/21/08 12:06
1.25	1.00	190502	11/21/08 12:08
1.30	1.00	311908	11/21/08 12:10
1.35	1.00	627837	11/21/08 12:13
1.40	1.00	1075213	11/21/08 12:15
1.45	1.00	1601419	11/21/08 12:17

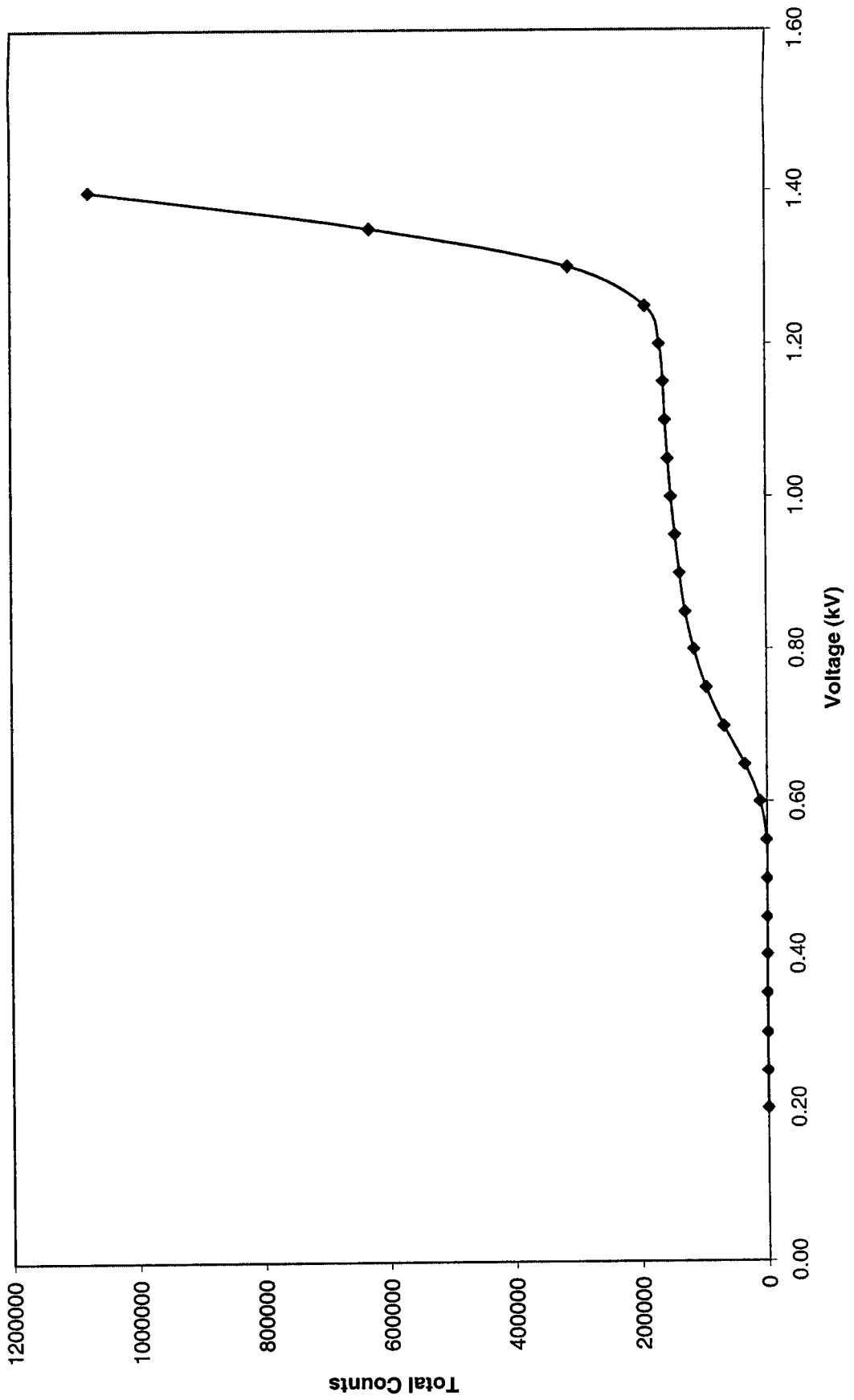
\*Highlighted areas indicate points with percent slope below 5%. No slope will appear at points where no counts detected.

Detector set to operate at 0.85 kV (850 volts)



# Ludlum Detector Voltage Curve

—◆— Voltage Curve Ludlum #7



### DAILY CALIBRATION RANGE

Trial	Counts	Date	Time	Detector
1	138657	10/13/2008	16:00	7
2	139338	10/16/2008	14:20	7
3	137849	10/20/2008	9:50	7
4	138518	10/29/2008	15:35	7
5	139828	11/12/2008	13:40	7
6	138146	11/21/2008	14:10	7
7	138219	11/21/2008	12:15	7
8	138822	11/21/2008	12:16	7
9	137486	11/21/2008	12:20	7
10	137365	11/21/2008	12:30	7
11	135262	11/21/2008	13:00	7
12	133624	11/21/2008	13:02	7
13	132633	11/21/2008	13:04	7
14	133126	11/21/2008	13:06	7
15	133343	11/21/2008	13:09	7
16	132096	11/21/2008	13:11	7
17	133801	11/21/2008	13:13	7
18	133895	11/21/2008	13:16	7
19	138993	11/21/2008	13:18	7
20	139729	11/21/2008	13:20	7

STATISTICS	
Average	136536.50
St. Dev.	2701.27
+ 3 S.D.	144640.30
+ 2 S.D.	141939.03
Average	136536.50
- 2 S.D.	131133.97
- 3 S.D.	128432.70
<b>UPPER</b>	<b>144640</b>
<b>LOWER</b>	<b>128433</b>

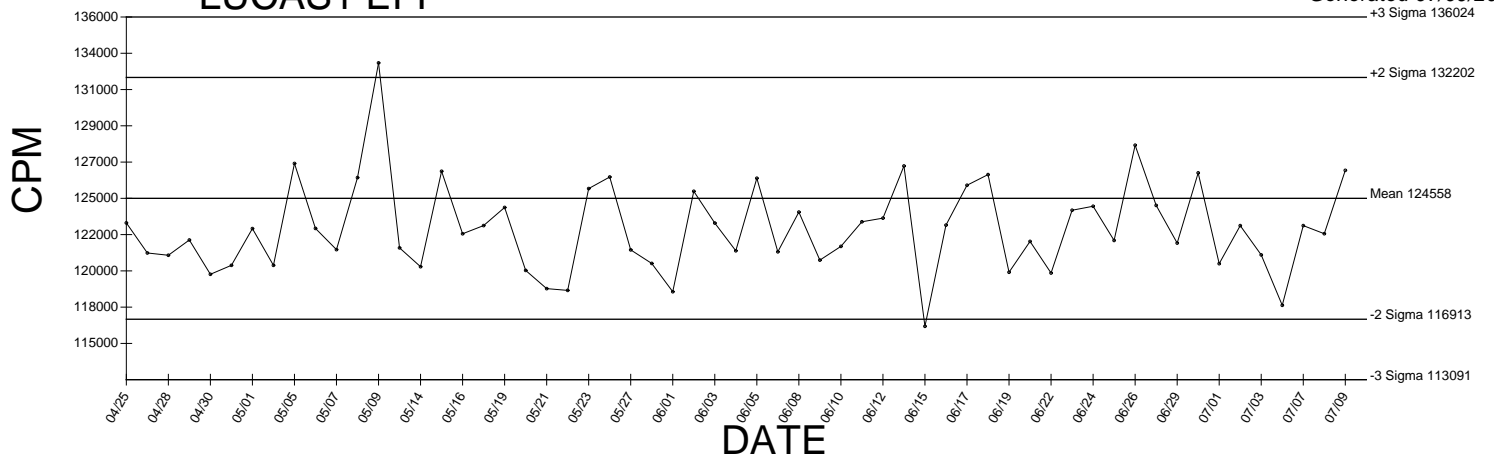
701	1.815	11/21/2008
702	1.932	11/21/2008
703	2.083	11/21/2008
704	2.248	11/21/2008
705	2.16	11/21/2008
706	2.118	11/21/2008
707	2.119	11/21/2008
708	1.869	11/21/2008
709	1.96	11/21/2008
710	2.042	11/21/2008
711	2.204	11/21/2008
712	2.132	11/21/2008

*Handwritten signature*  
11/21/08

# BACKGROUND AND EFFICIENCY DATA

# LUCAS1 EFF

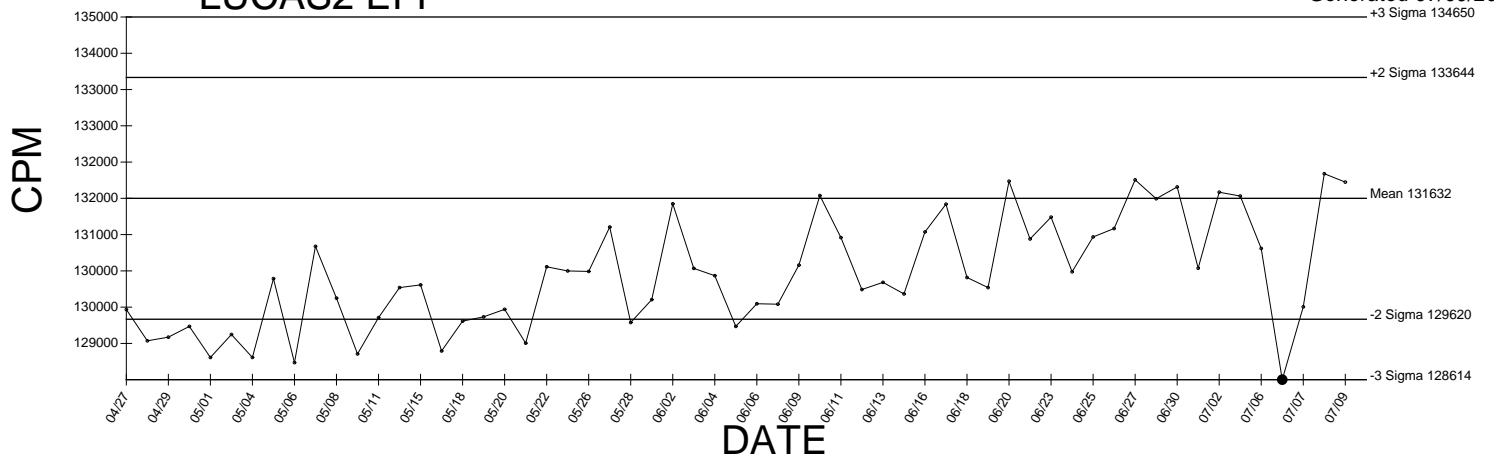
Generated 07/09/2009



● Denotes Outlier

# LUCAS2 EFF

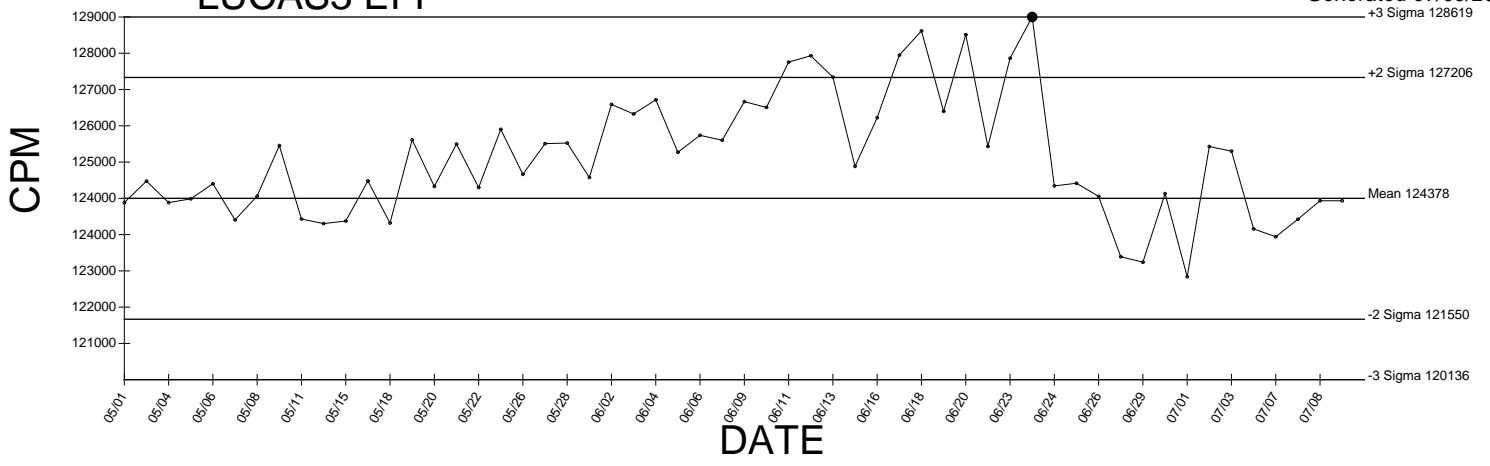
Generated 07/09/2009



● Denotes Outlier

# LUCAS3 EFF

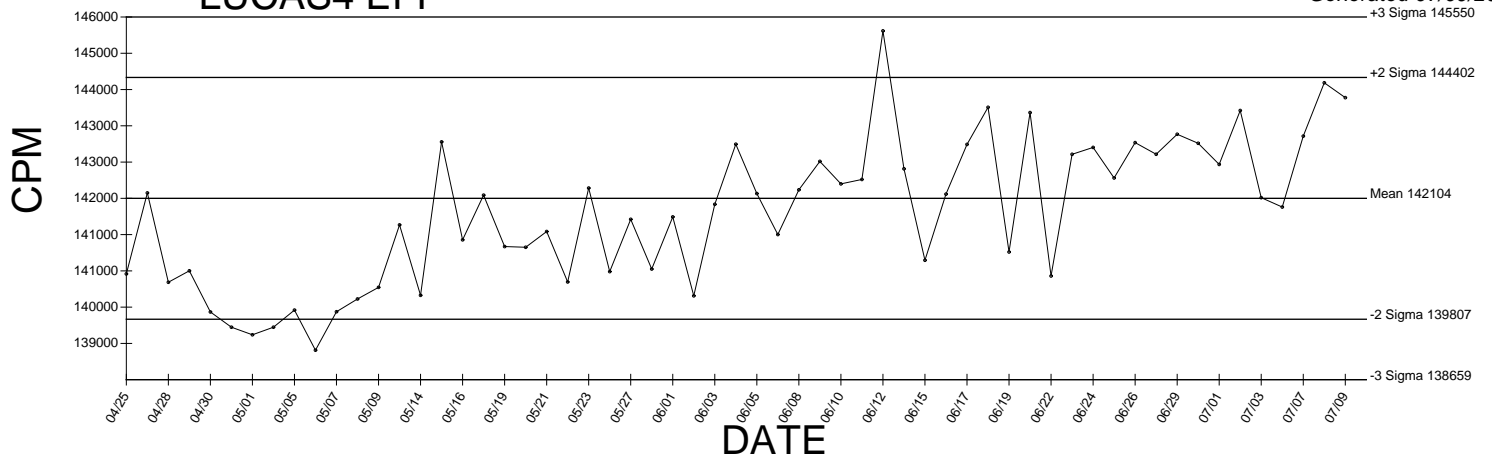
Generated 07/09/2009



● Denotes Outlier

# LUCAS4 EFF

Generated 07/09/2009

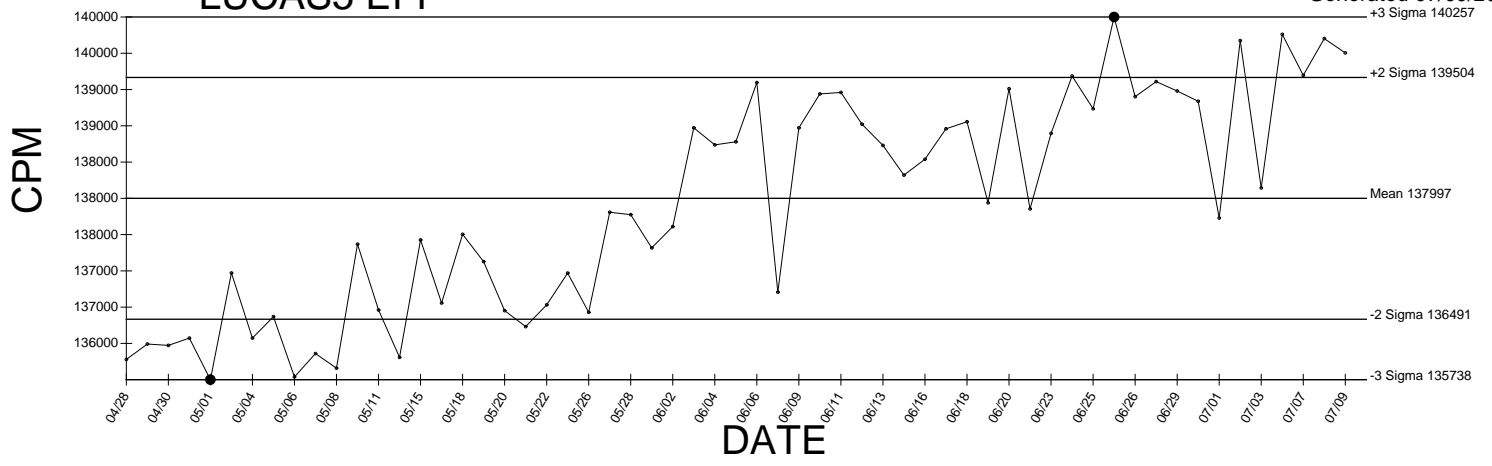


● Denotes Outlier



# LUCAS5 EFF

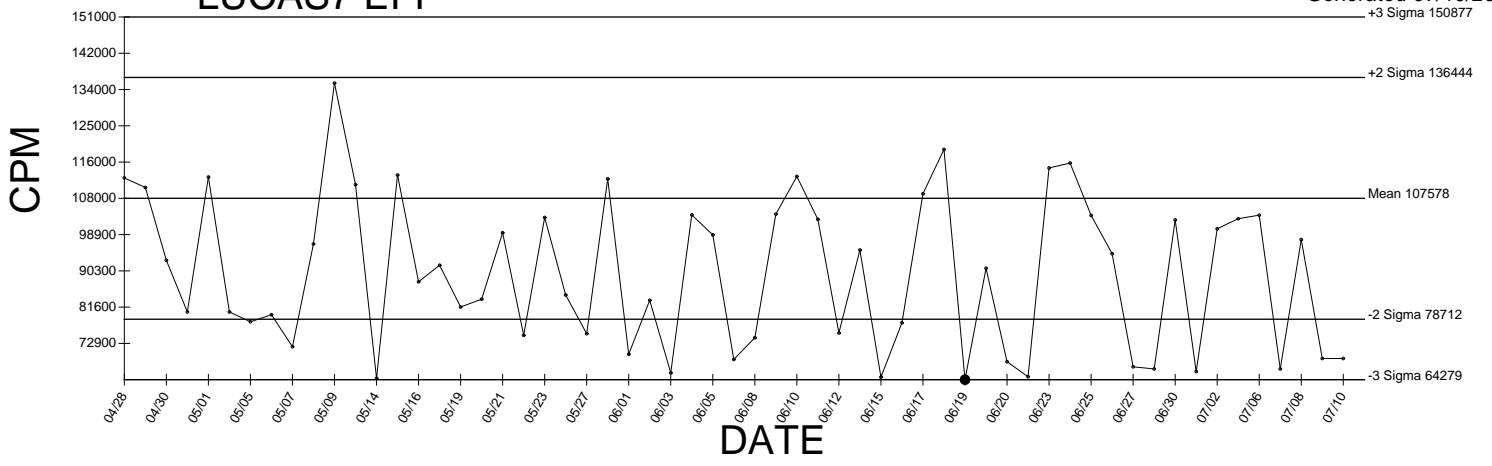
Generated 07/09/2009



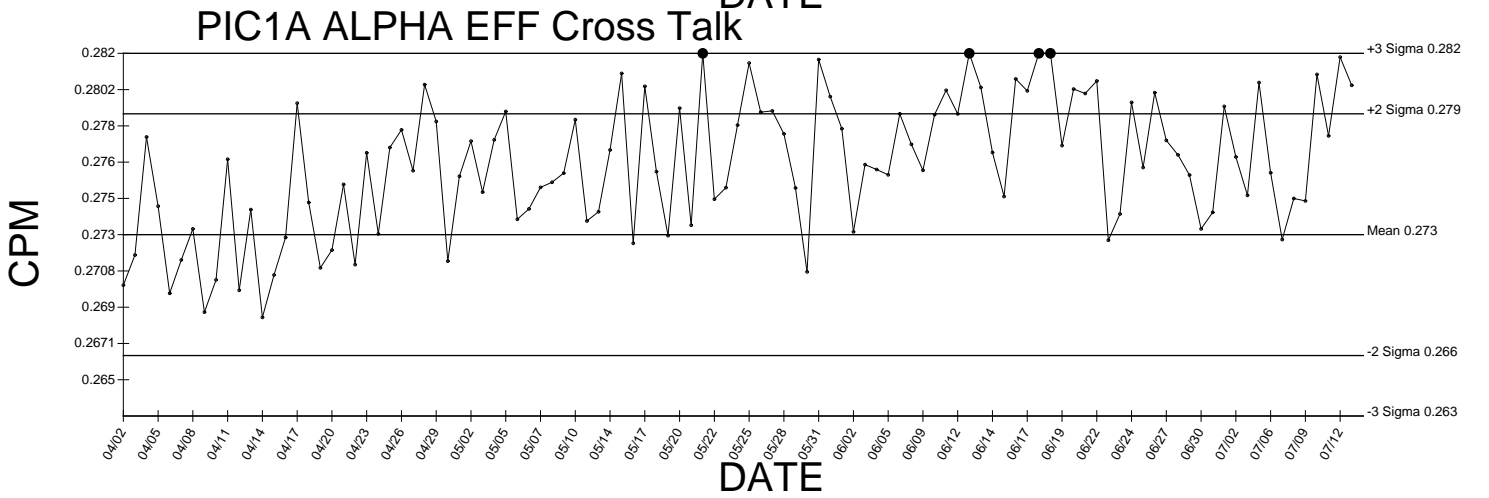
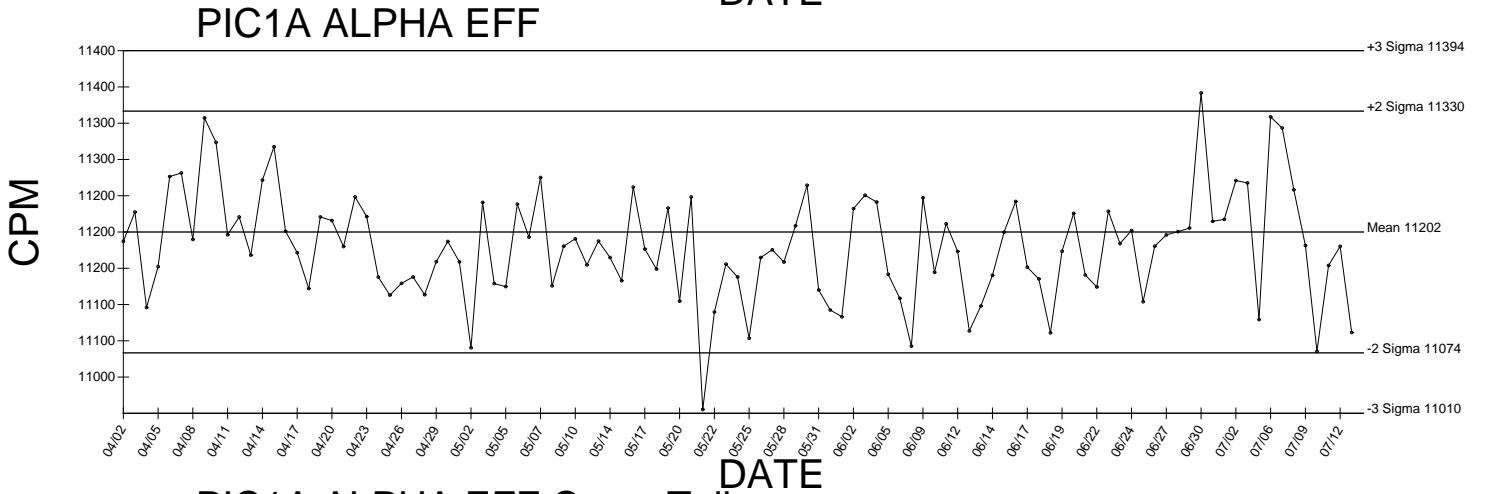
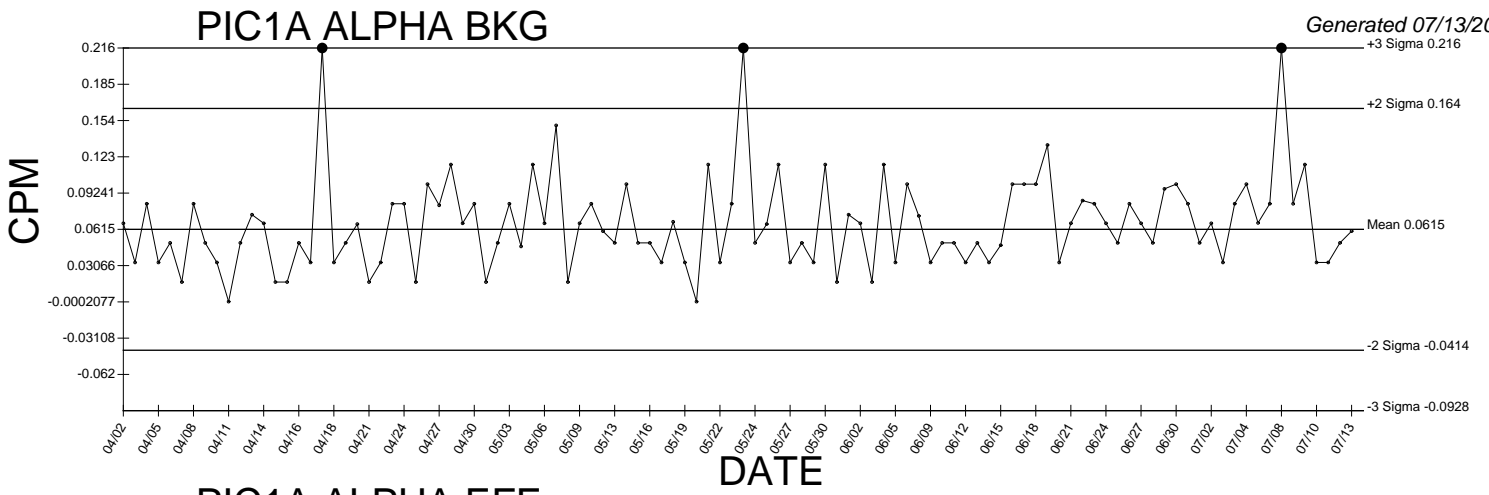
● Denotes Outlier

# LUCAS7 EFF

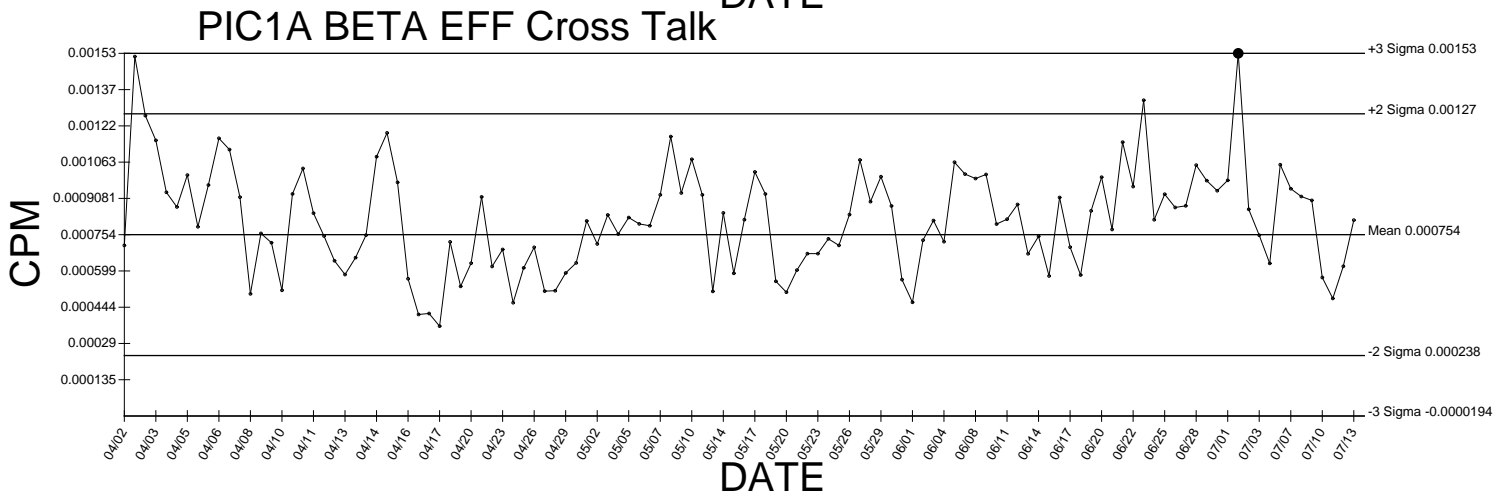
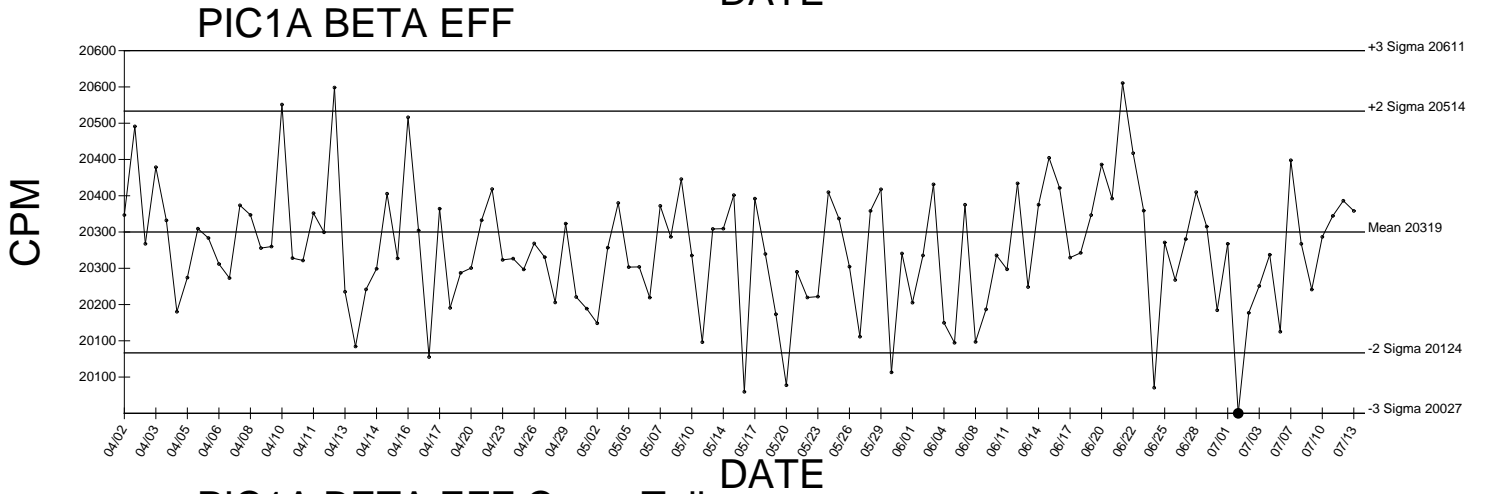
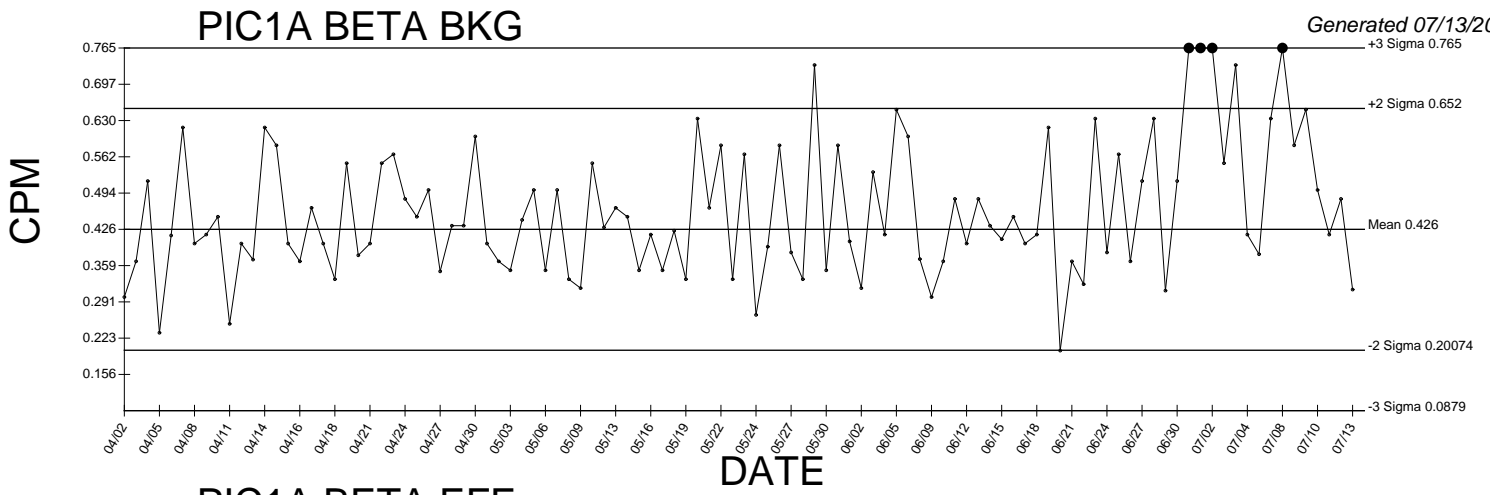
Generated 07/10/2009



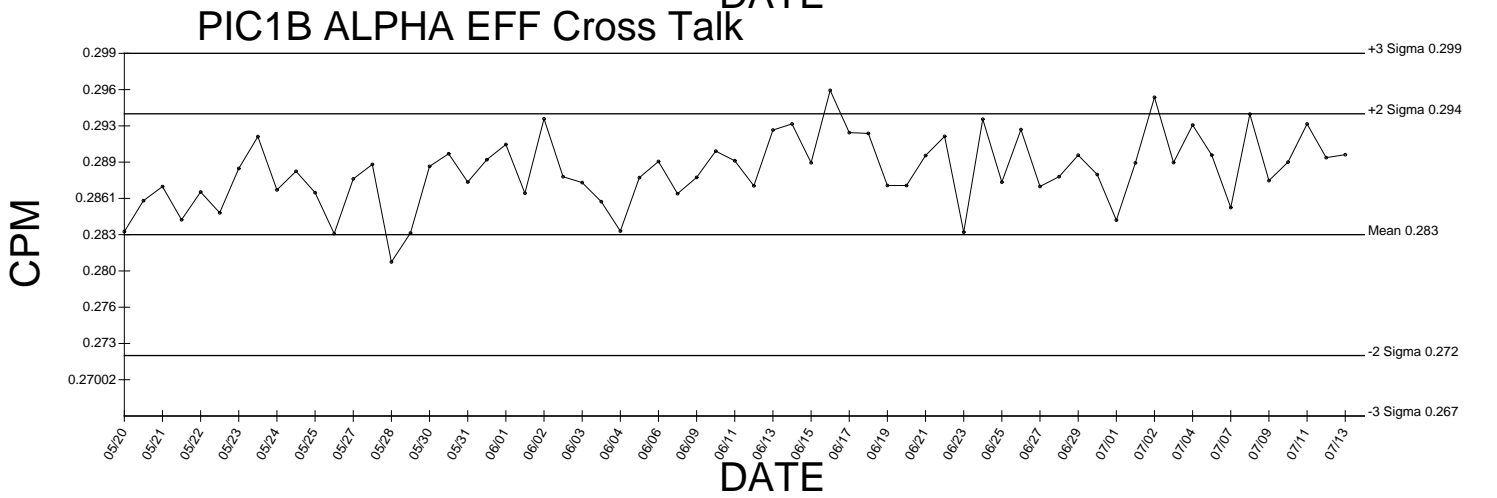
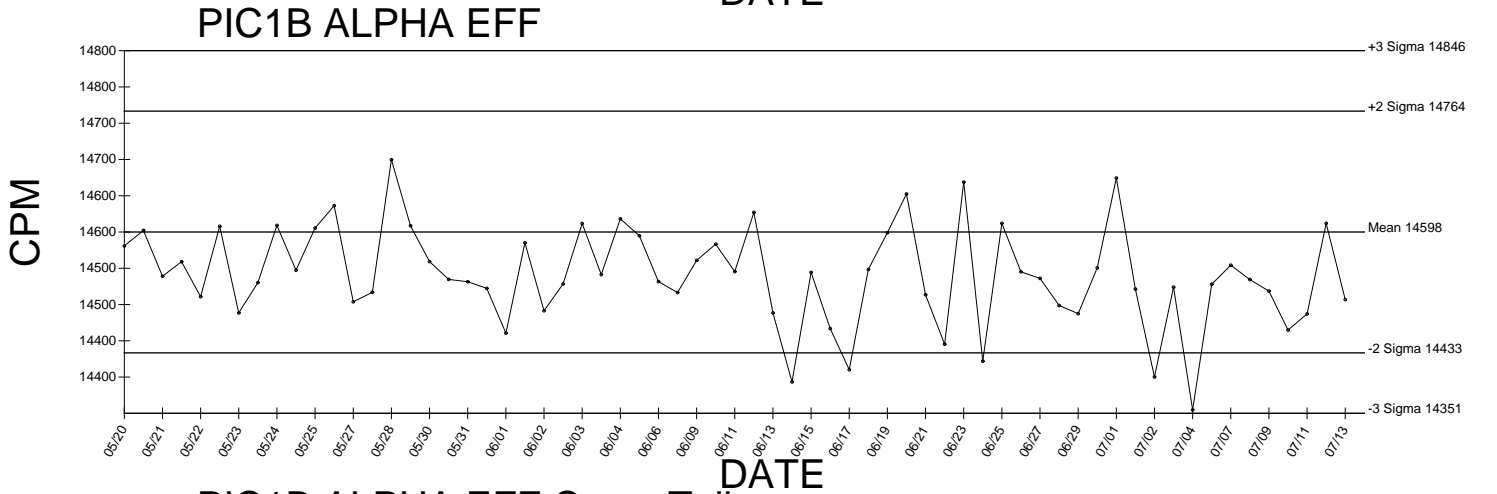
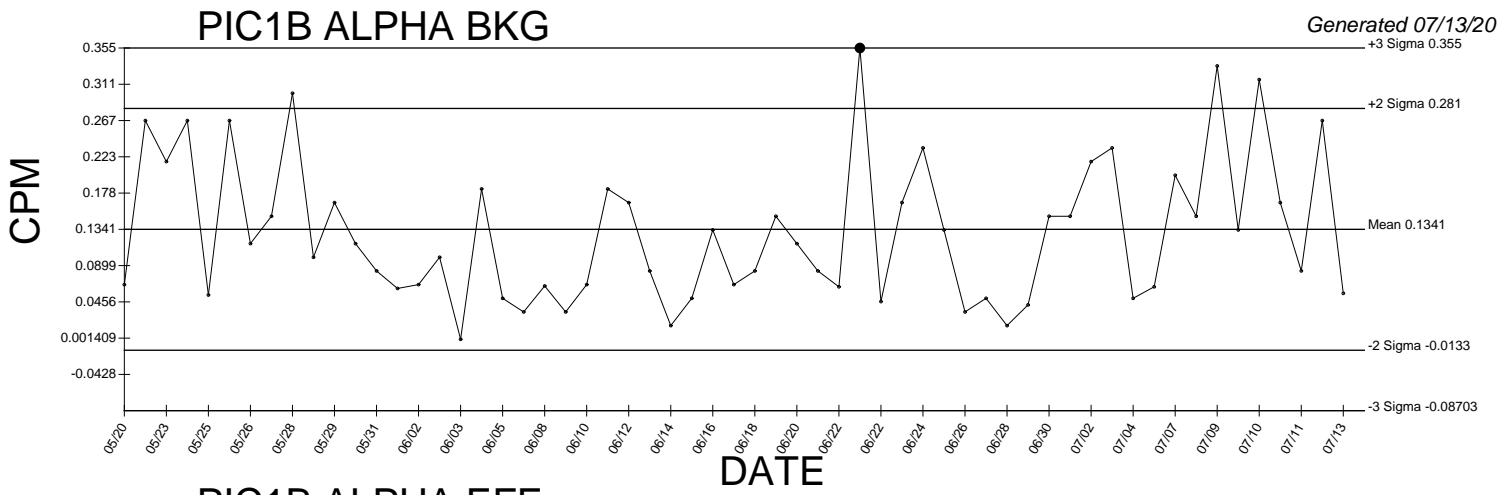
● Denotes Outlier



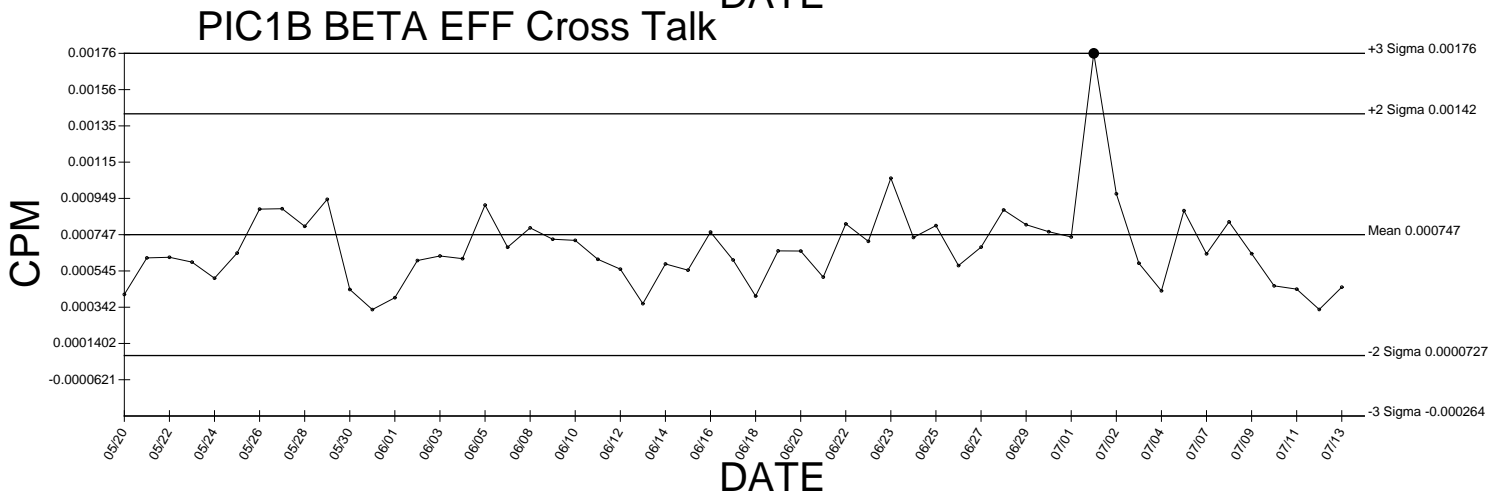
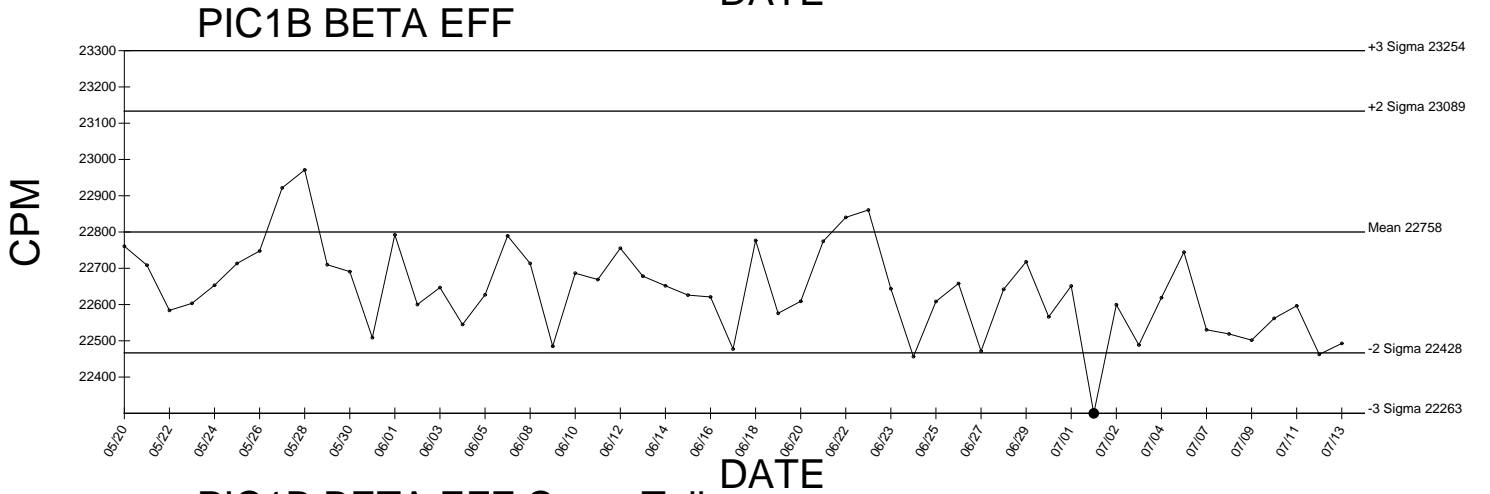
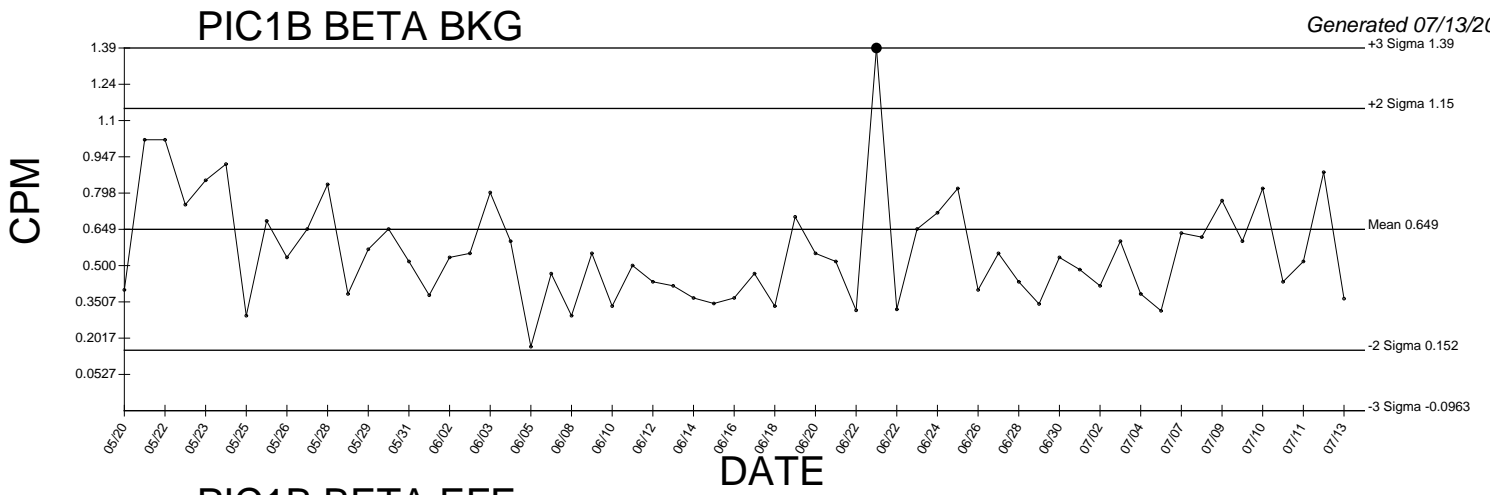
● Denotes Outlier



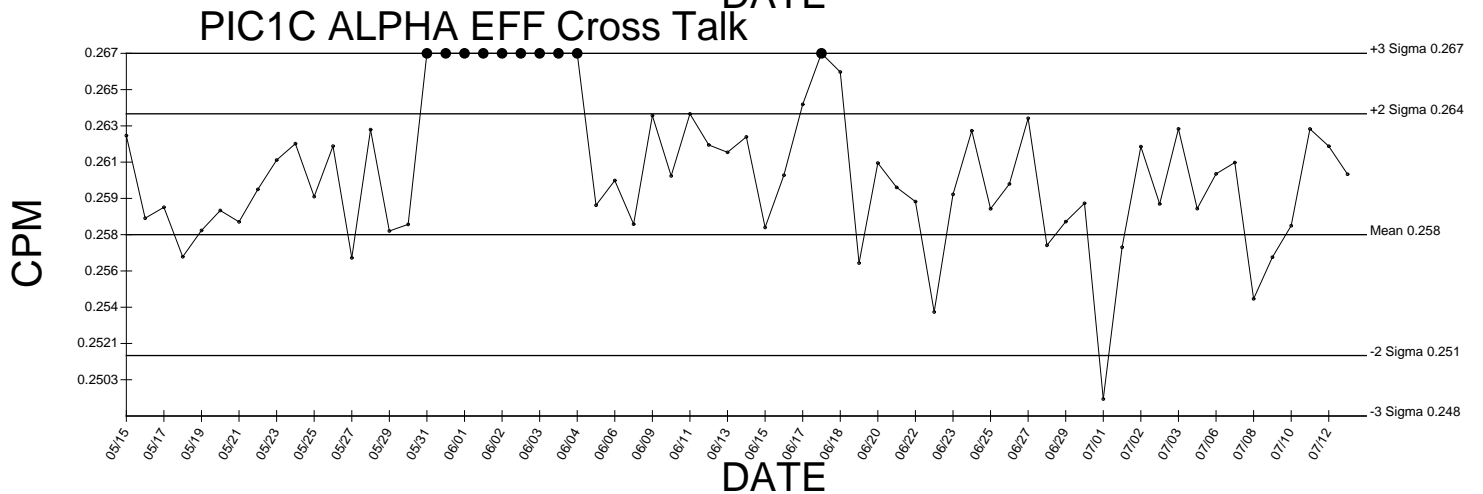
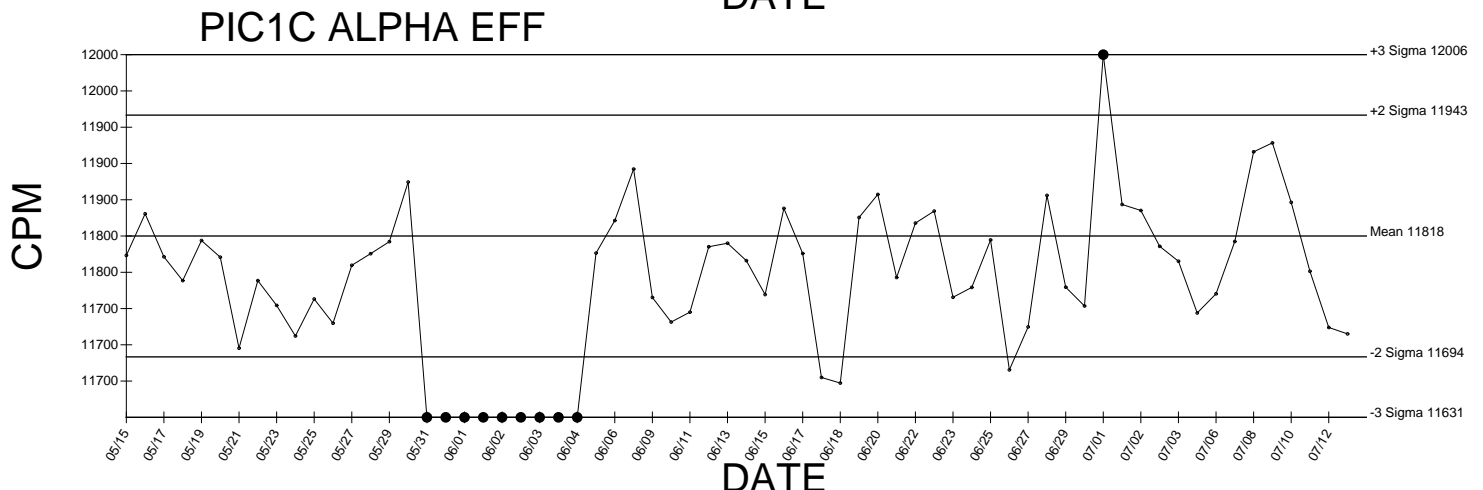
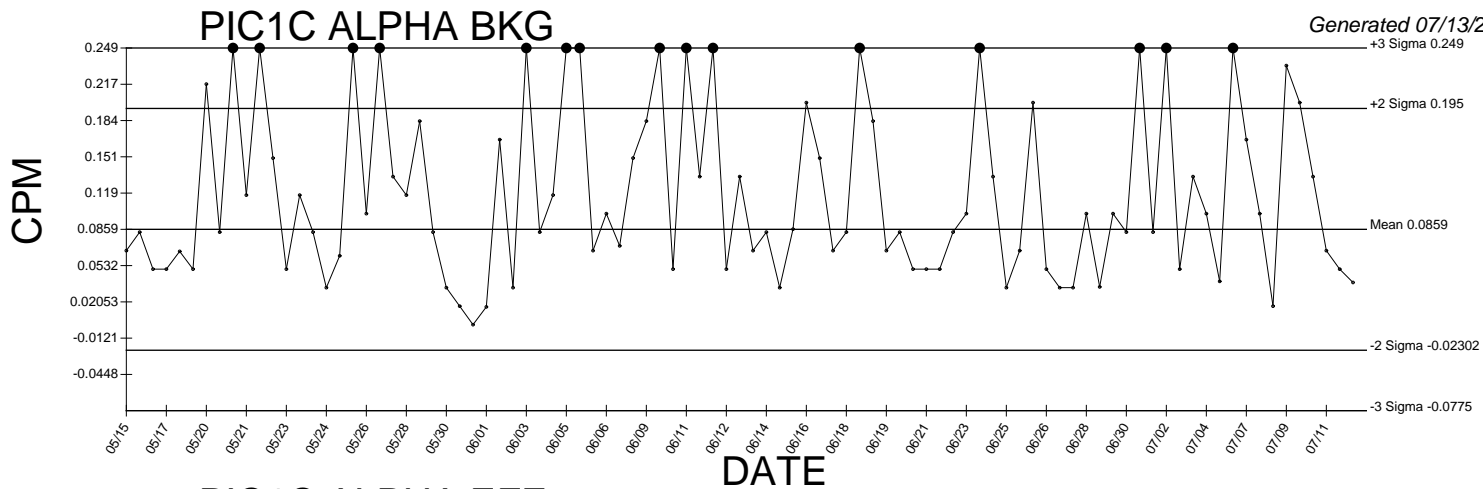
● Denotes Outlier



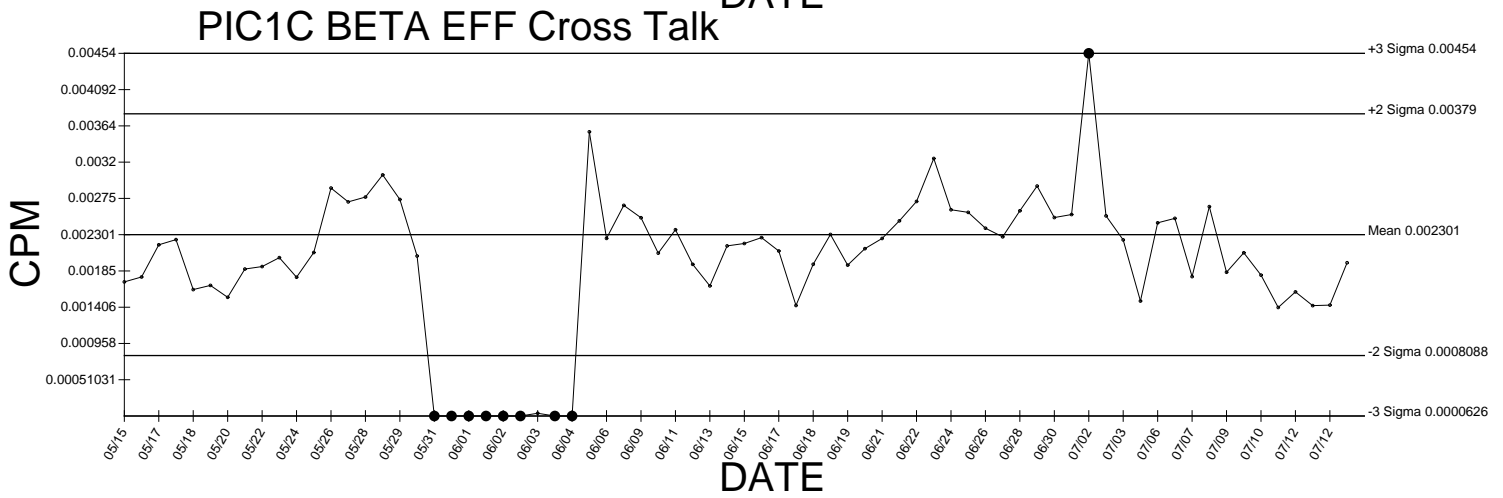
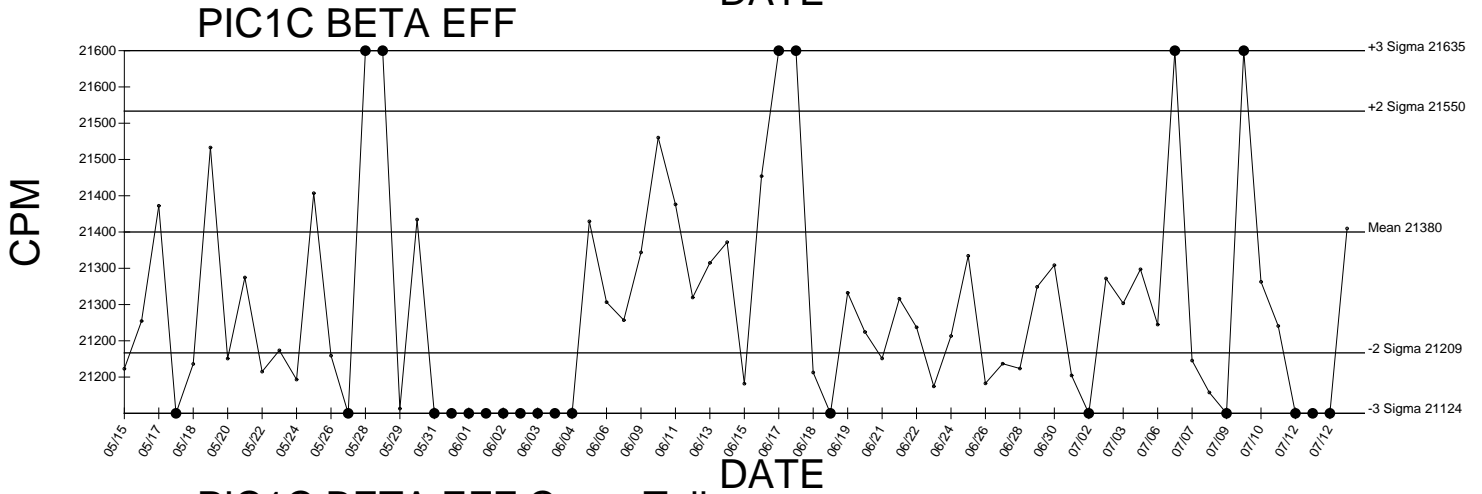
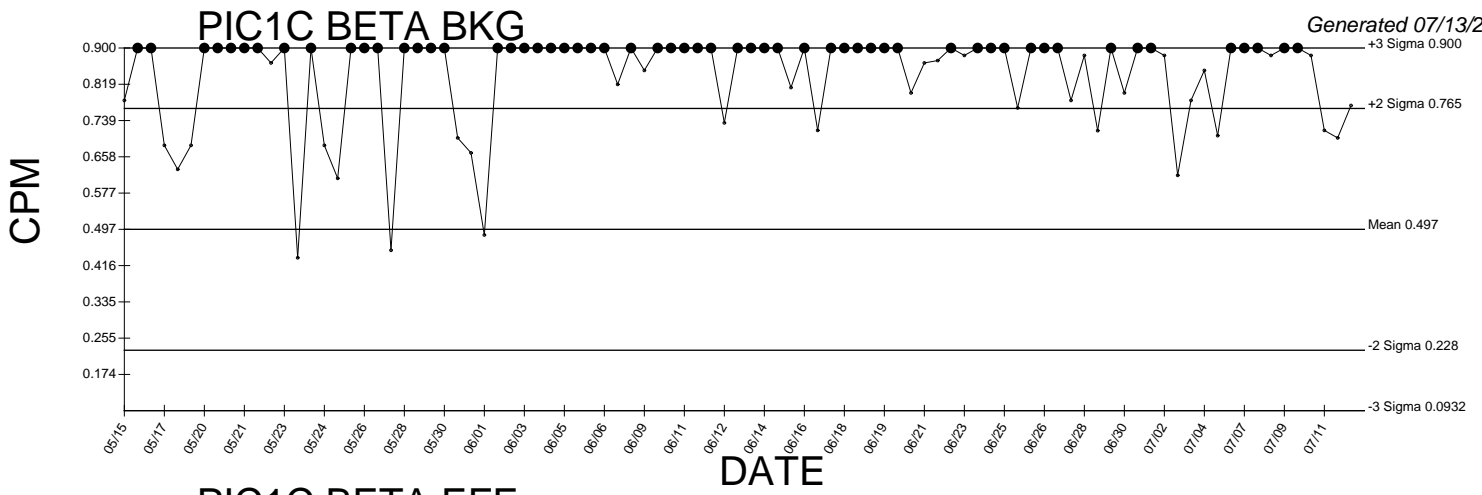
● Denotes Outlier



● Denotes Outlier

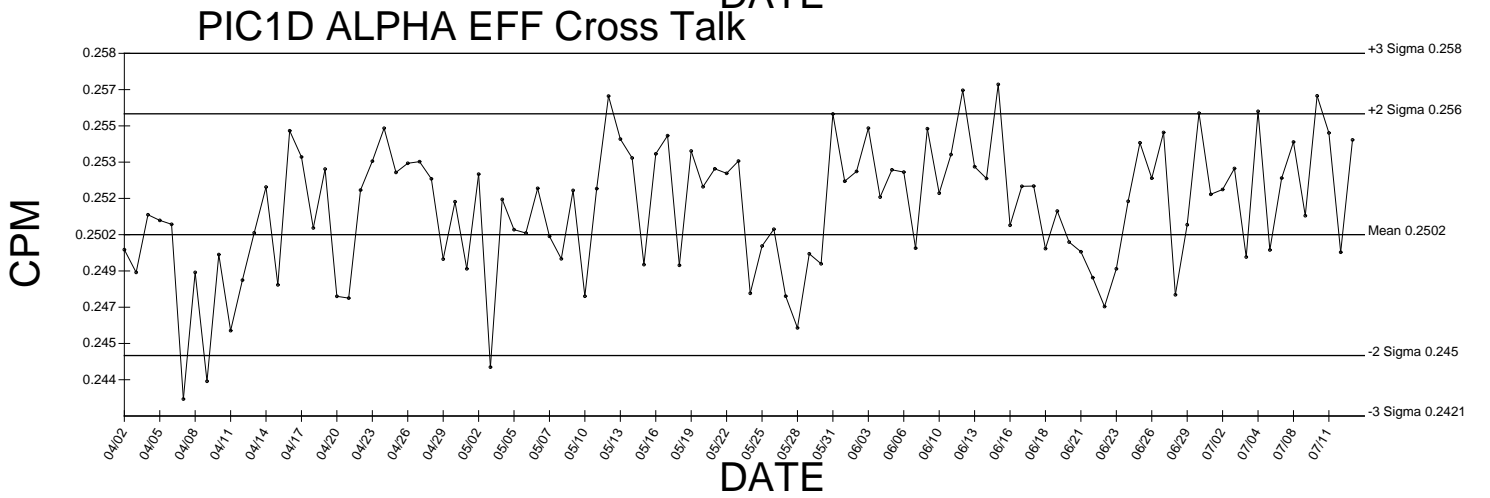
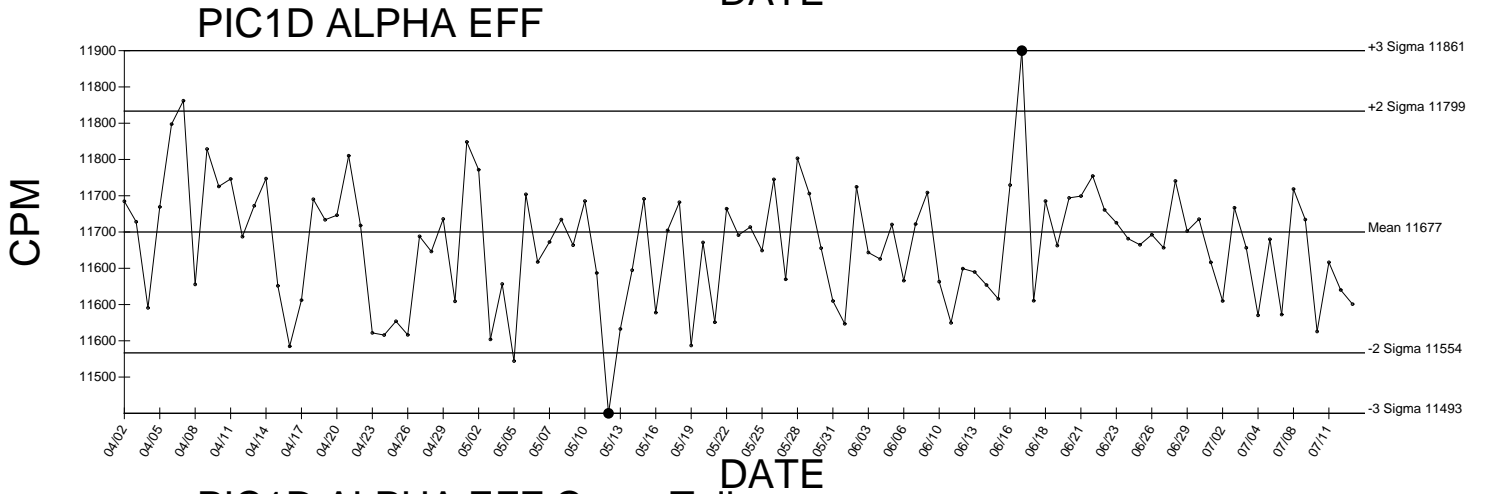
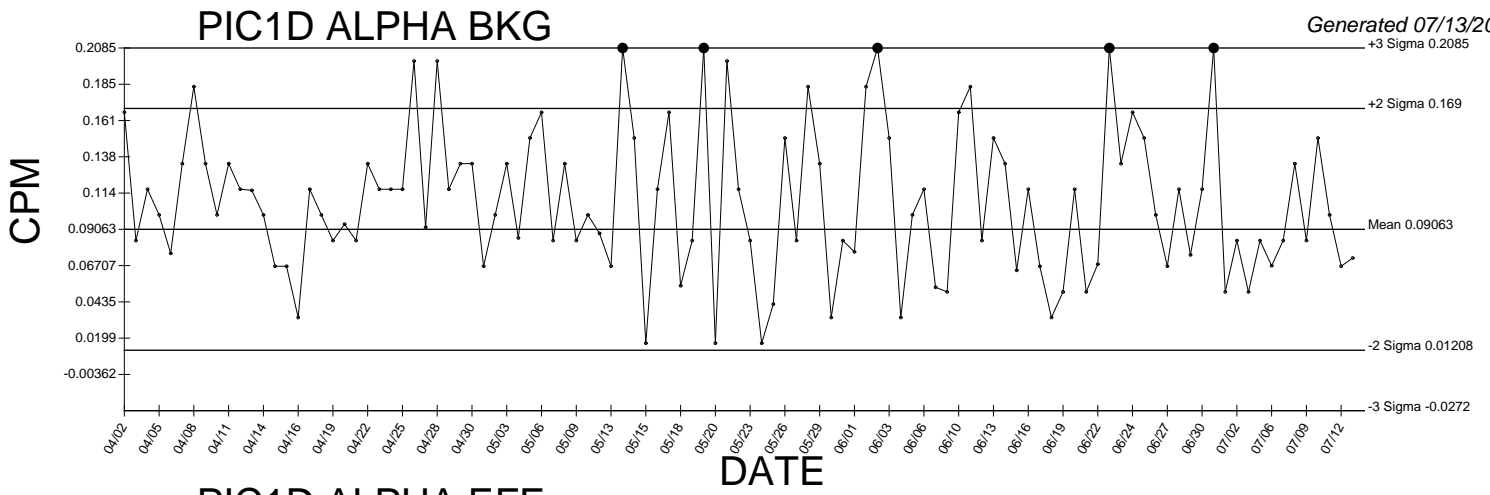


● Denotes Outlier

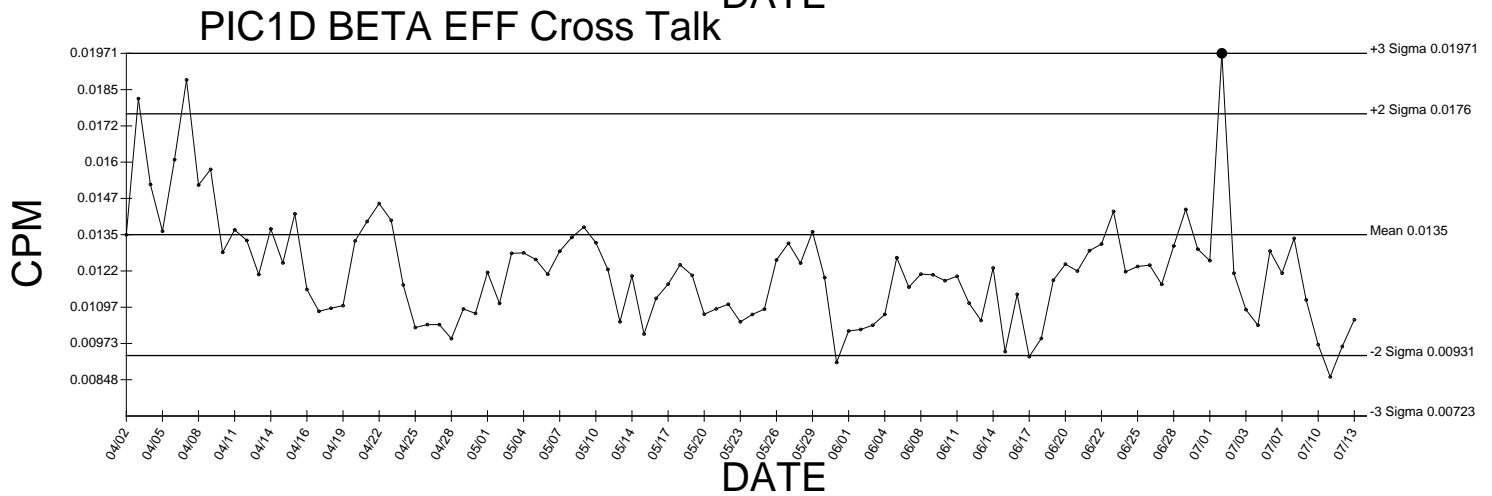
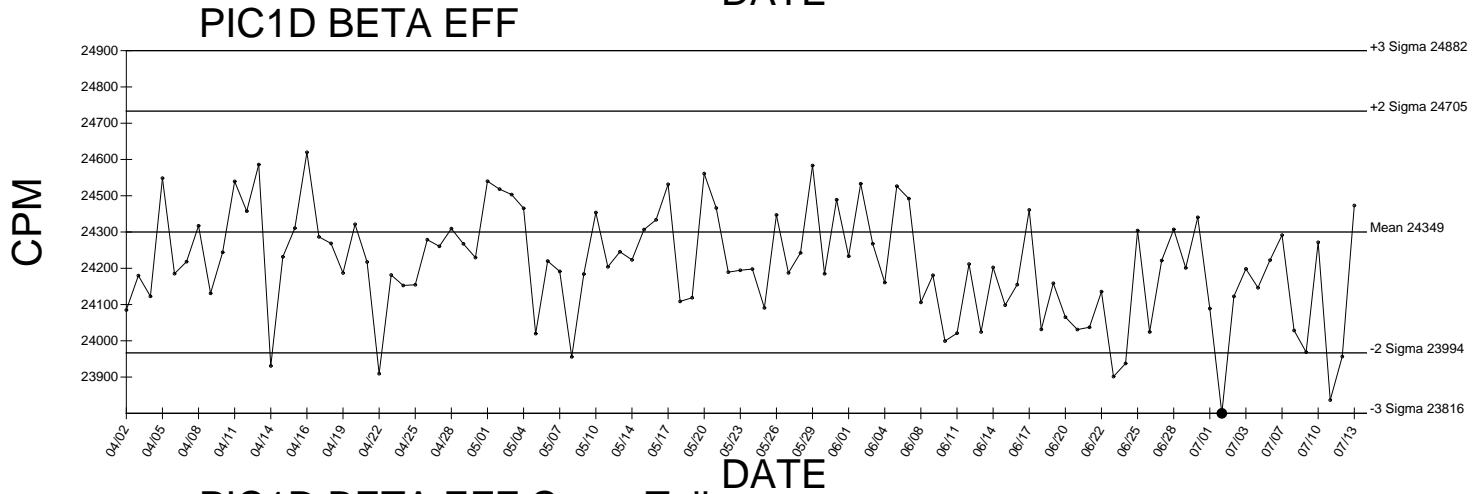
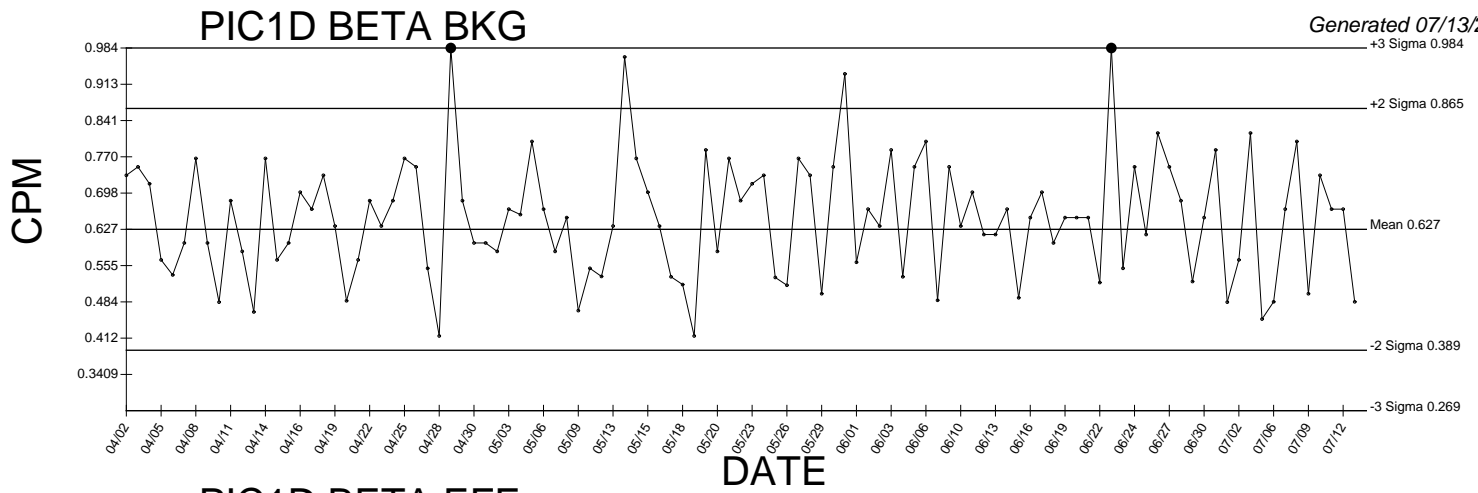


● Denotes Outlier

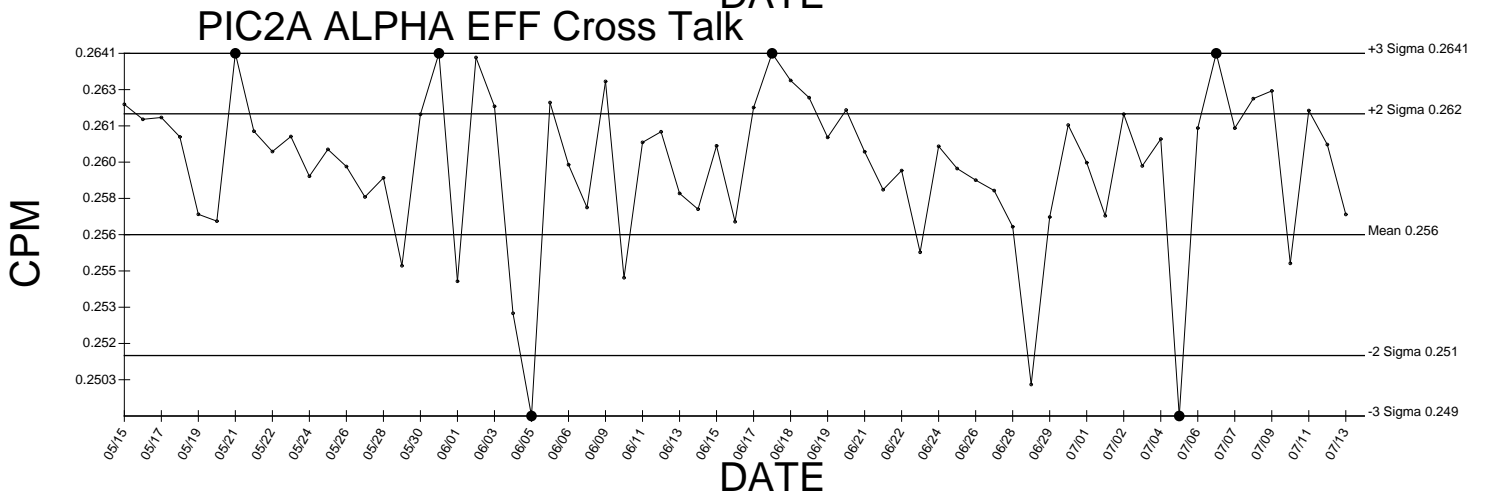
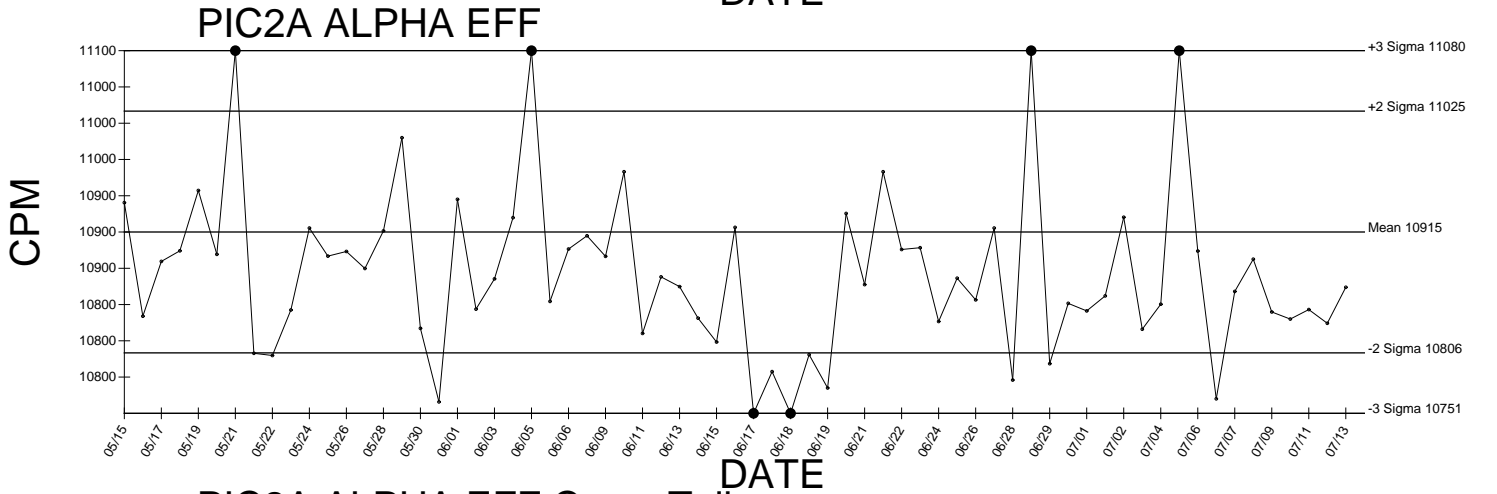
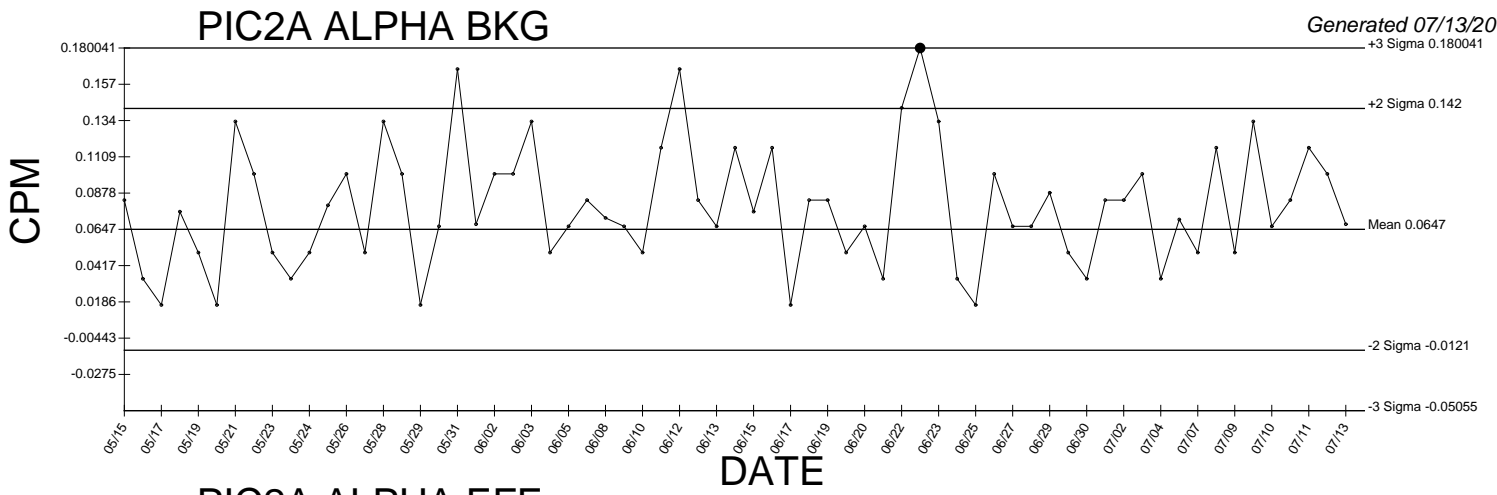




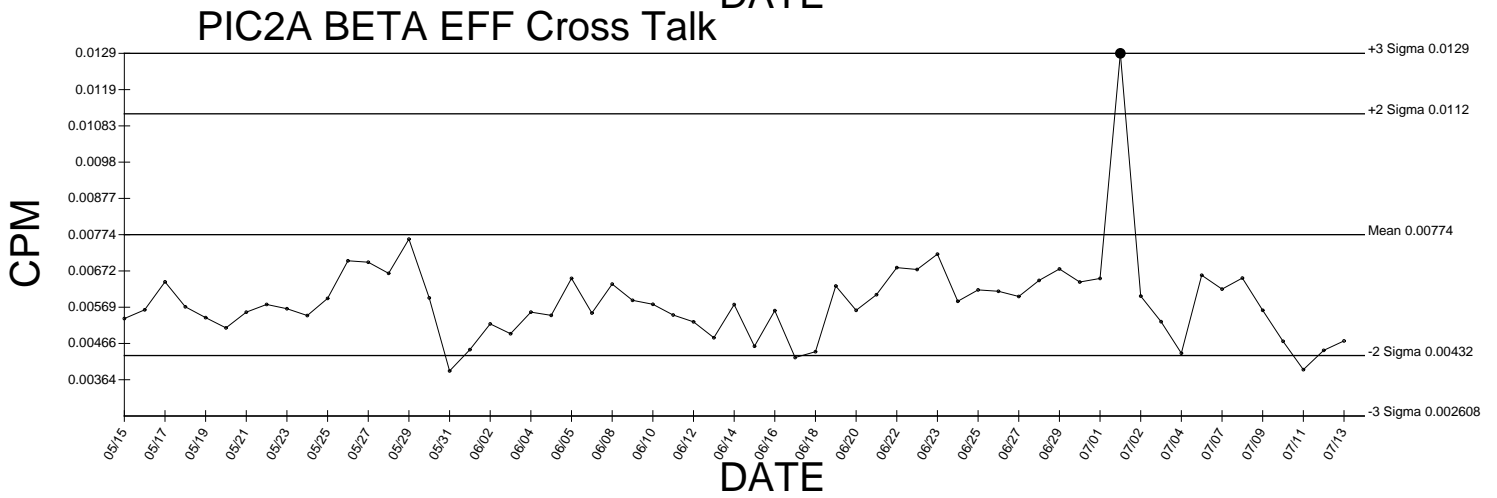
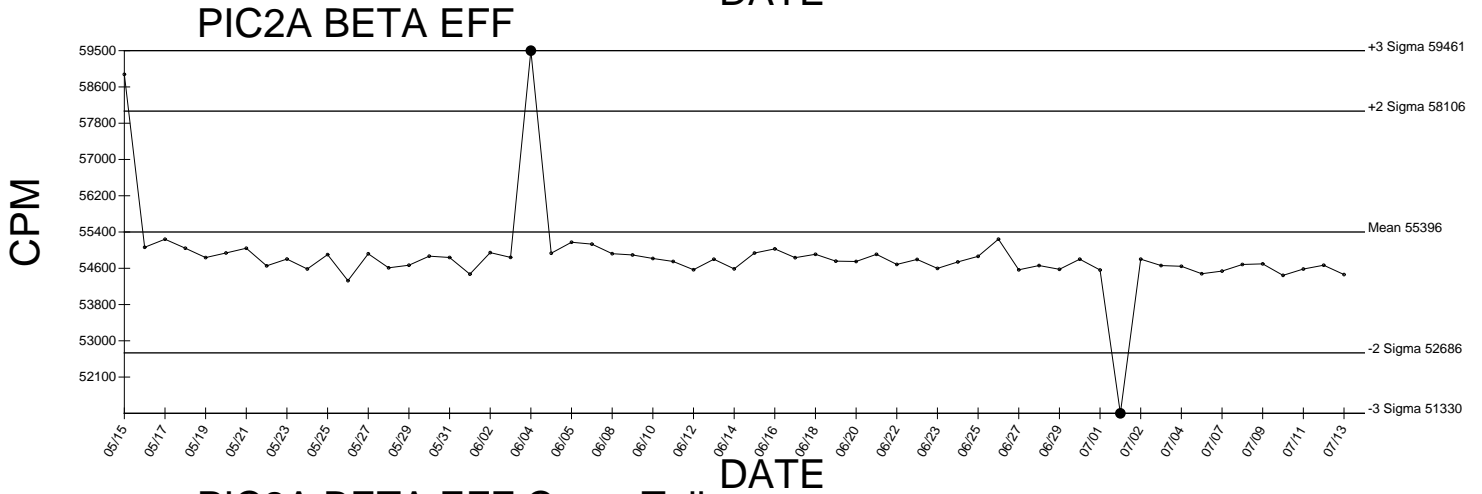
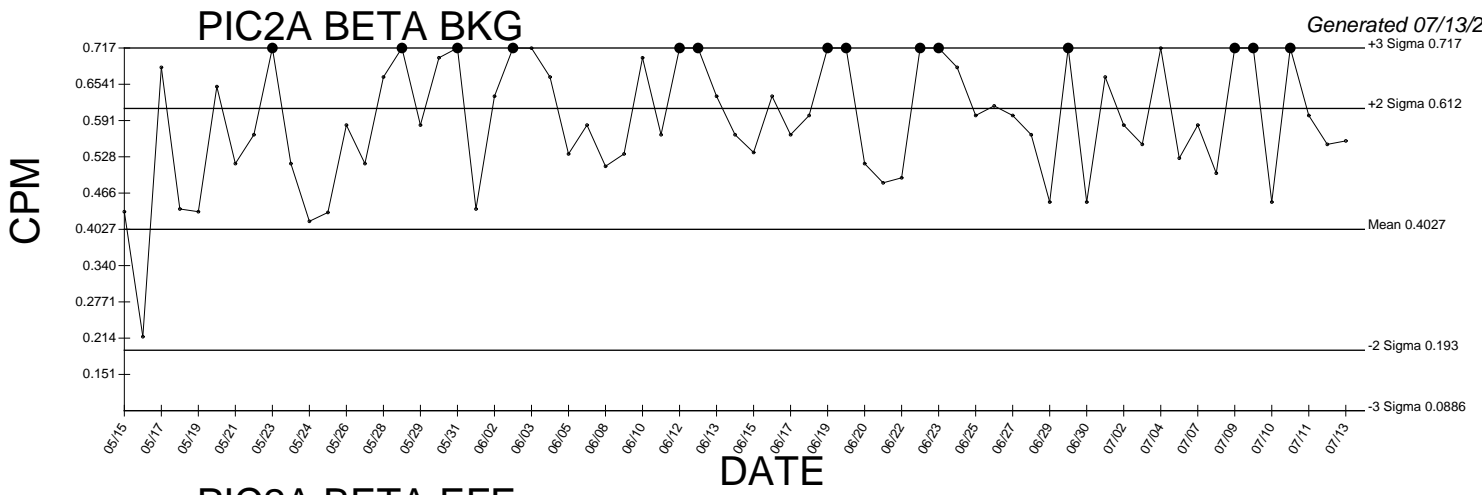
● Denotes Outlier



● Denotes Outlier



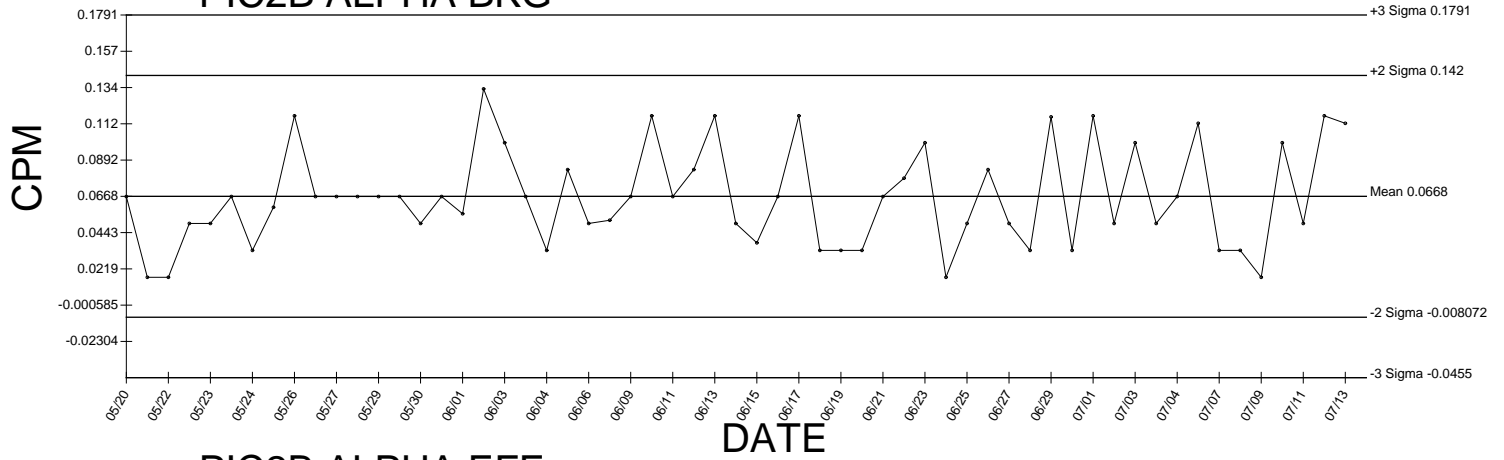
● Denotes Outlier



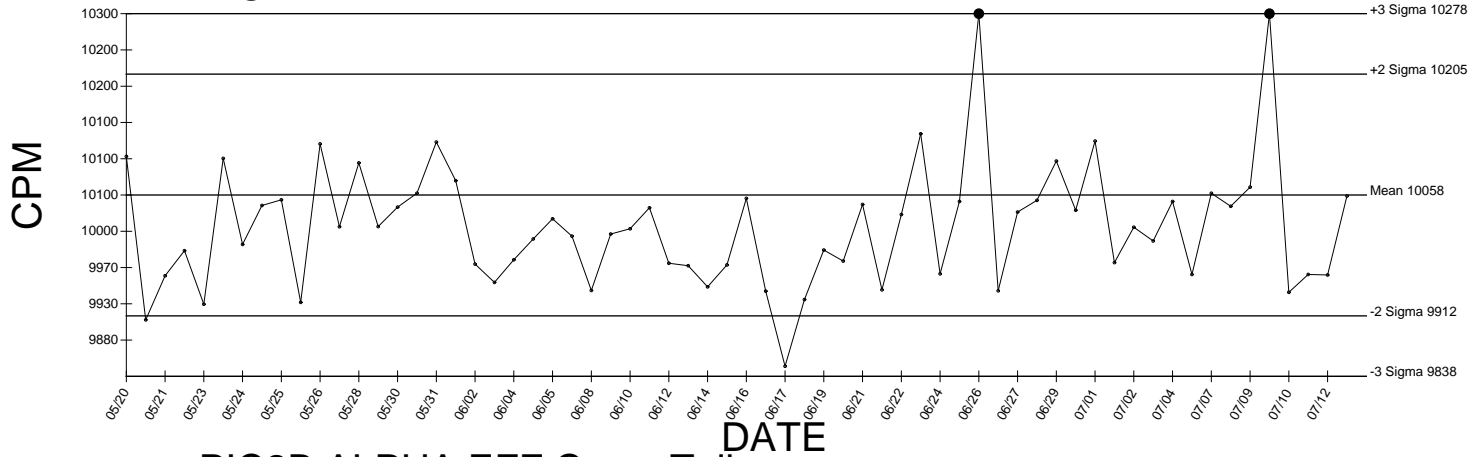
● Denotes Outlier

# PIC2B ALPHA BKG

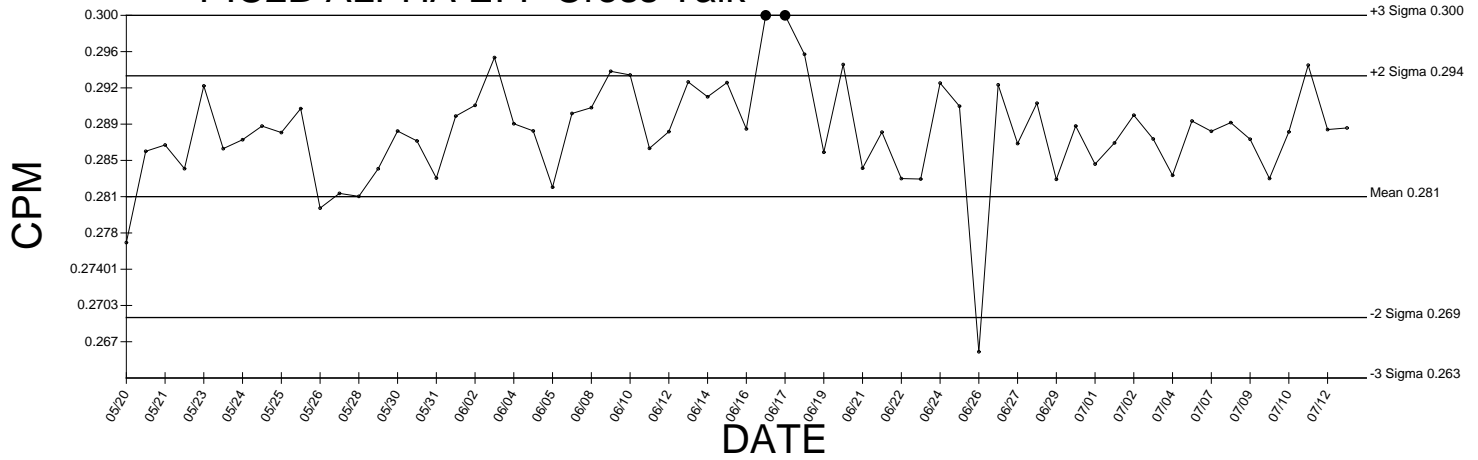
Generated 07/13/2009



# PIC2B ALPHA EFF



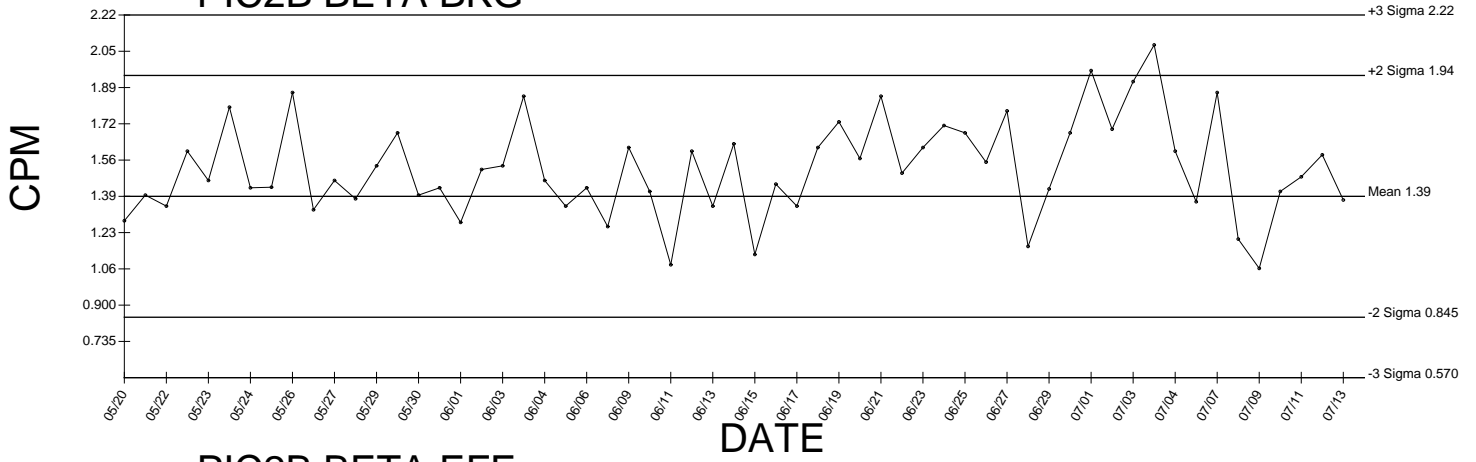
# PIC2B ALPHA EFF Cross Talk



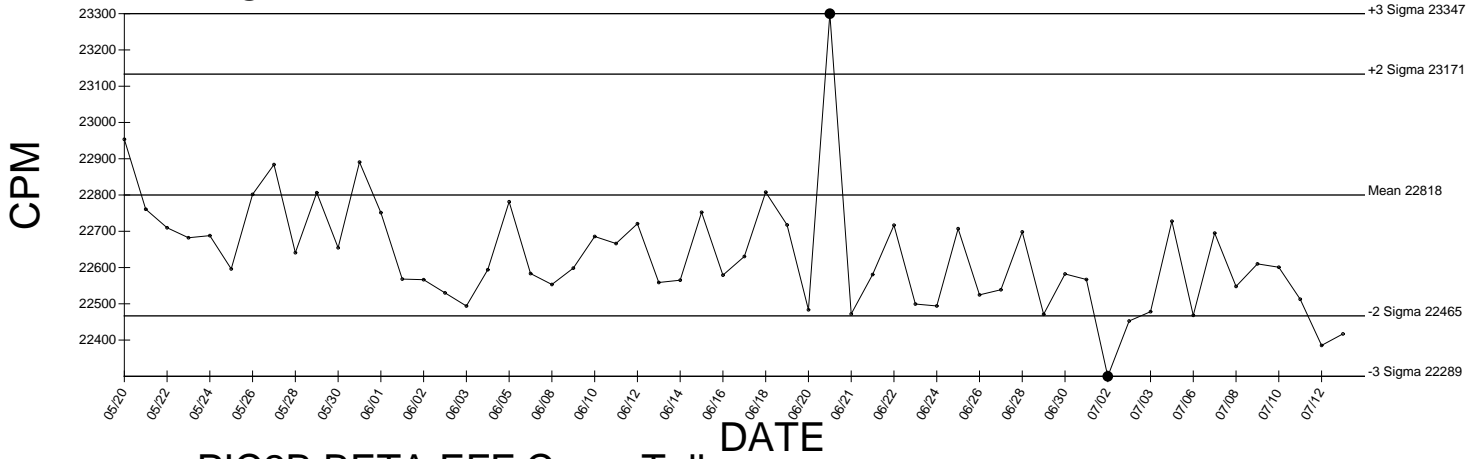
● Denotes Outlier

# PIC2B BETA BKG

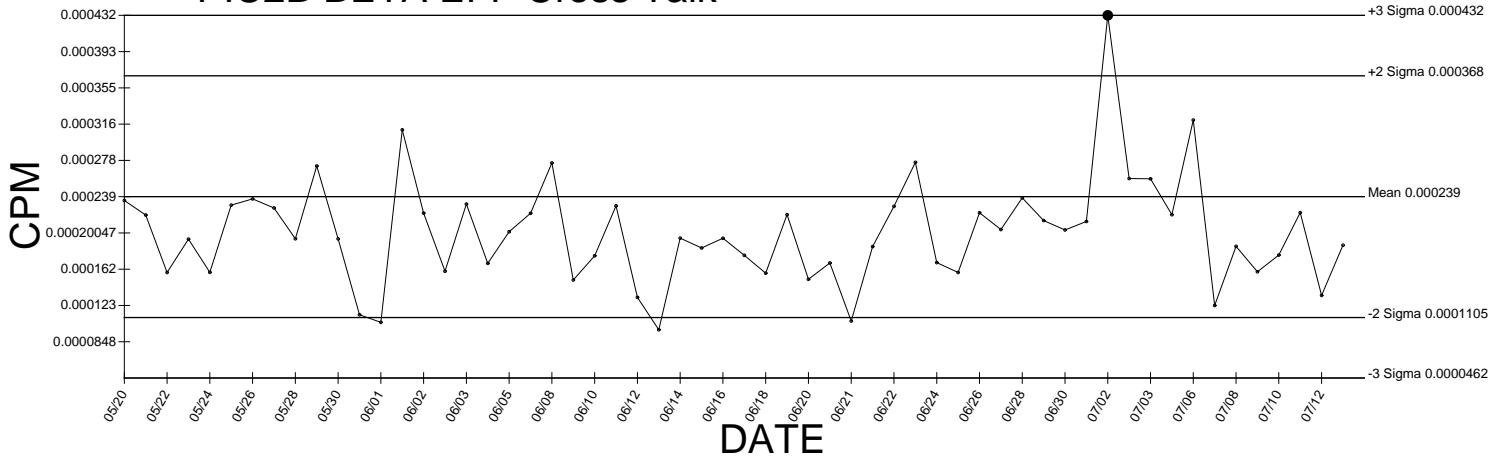
Generated 07/13/2009



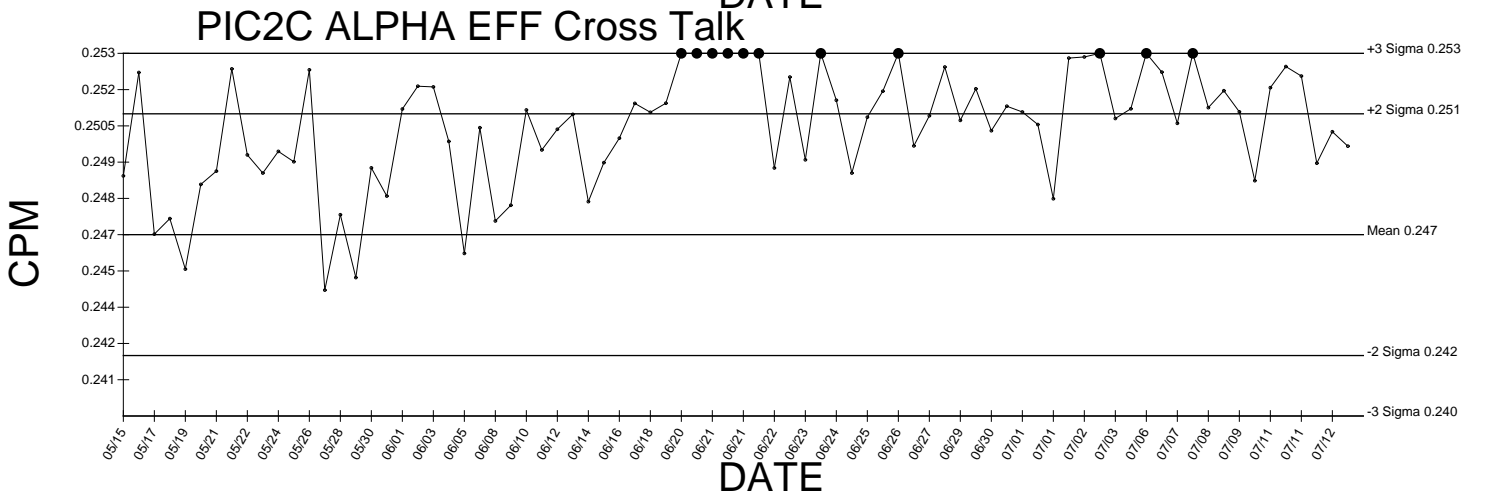
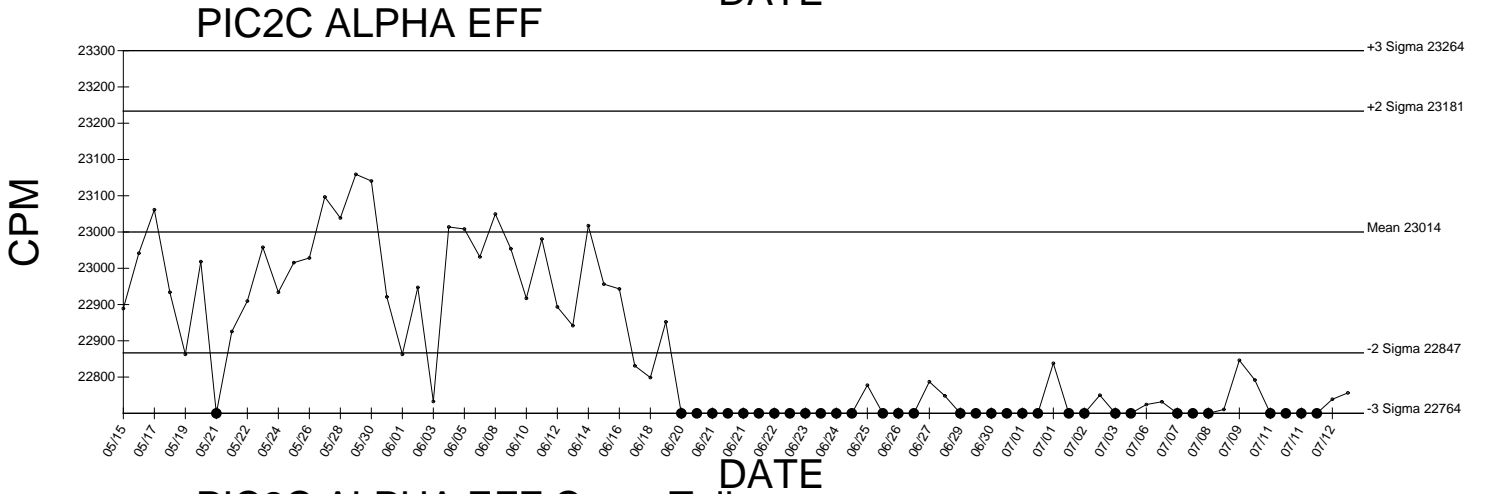
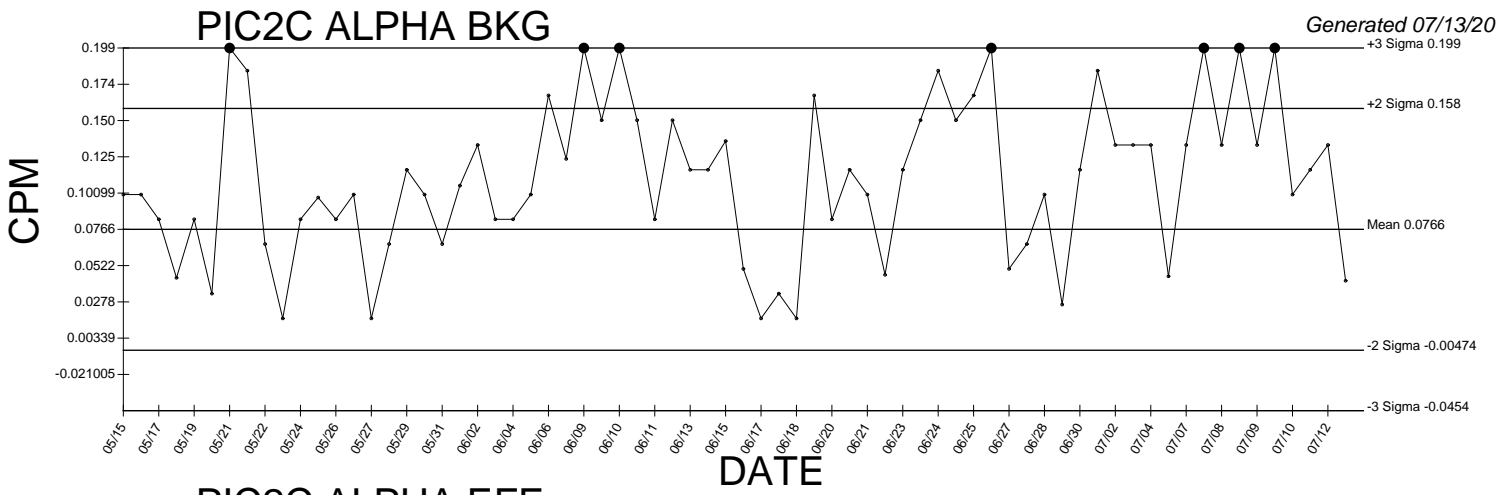
# PIC2B BETA EFF



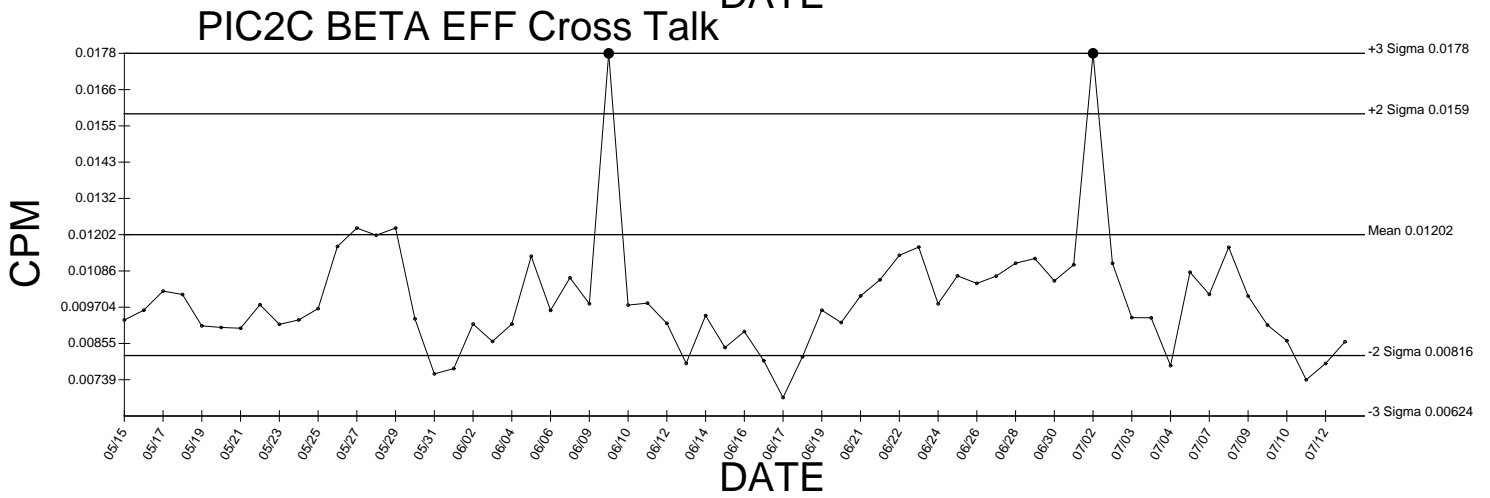
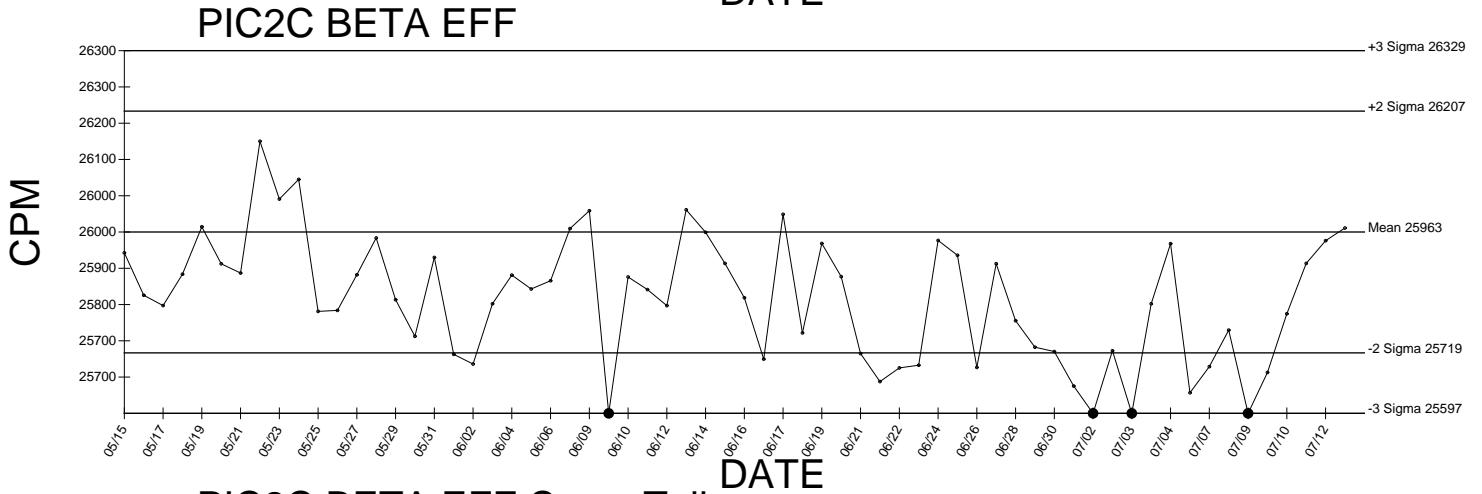
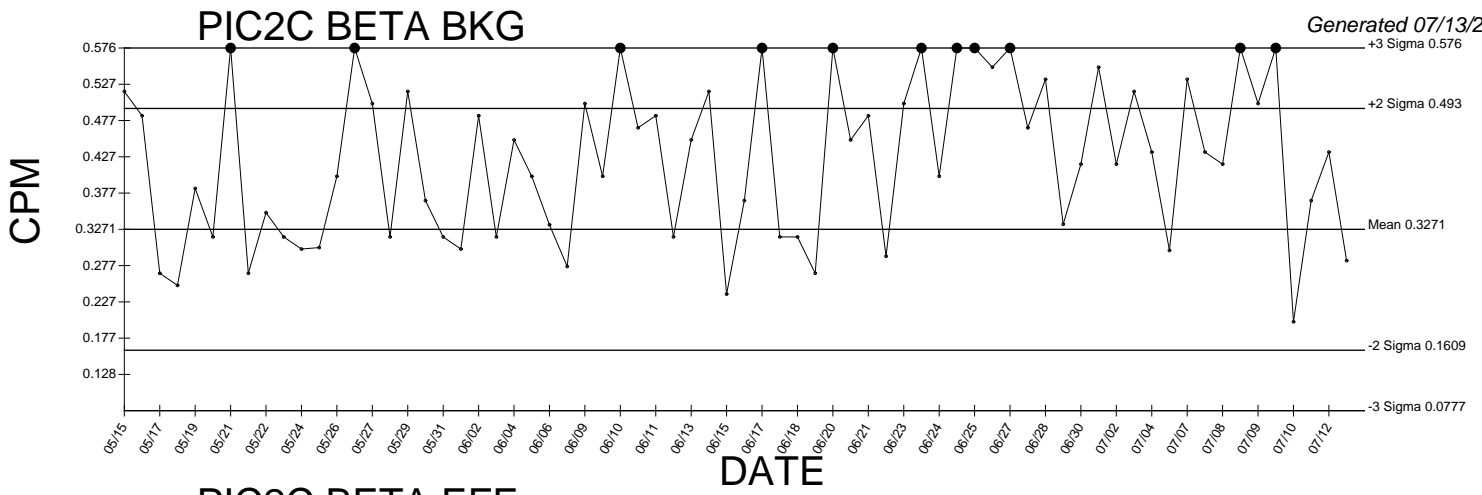
# PIC2B BETA EFF Cross Talk



● Denotes Outlier

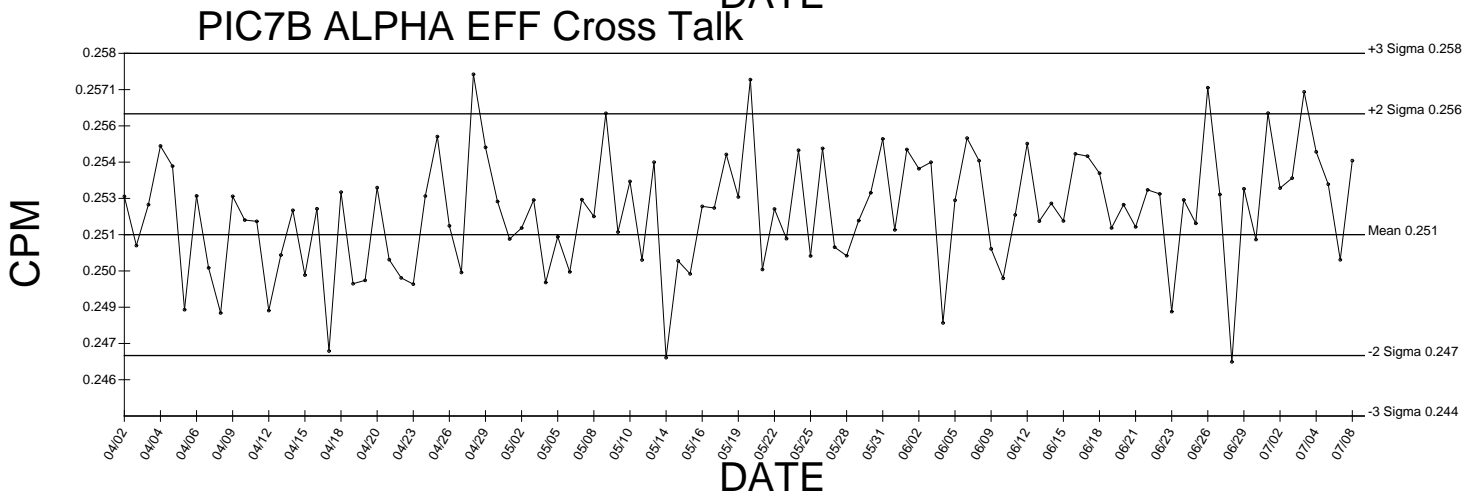
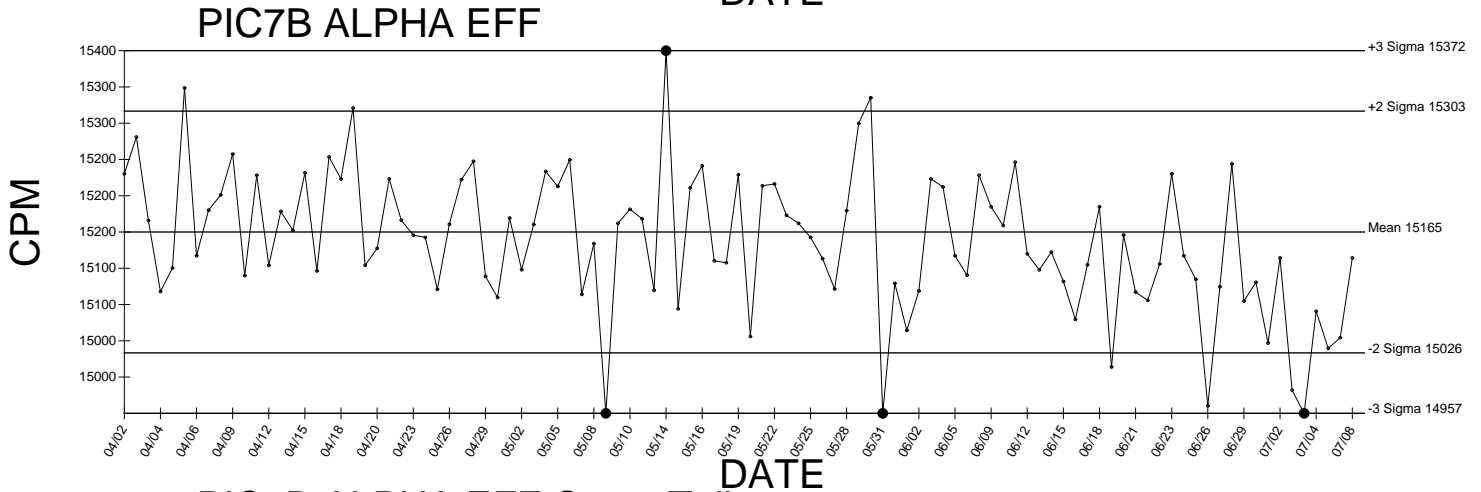
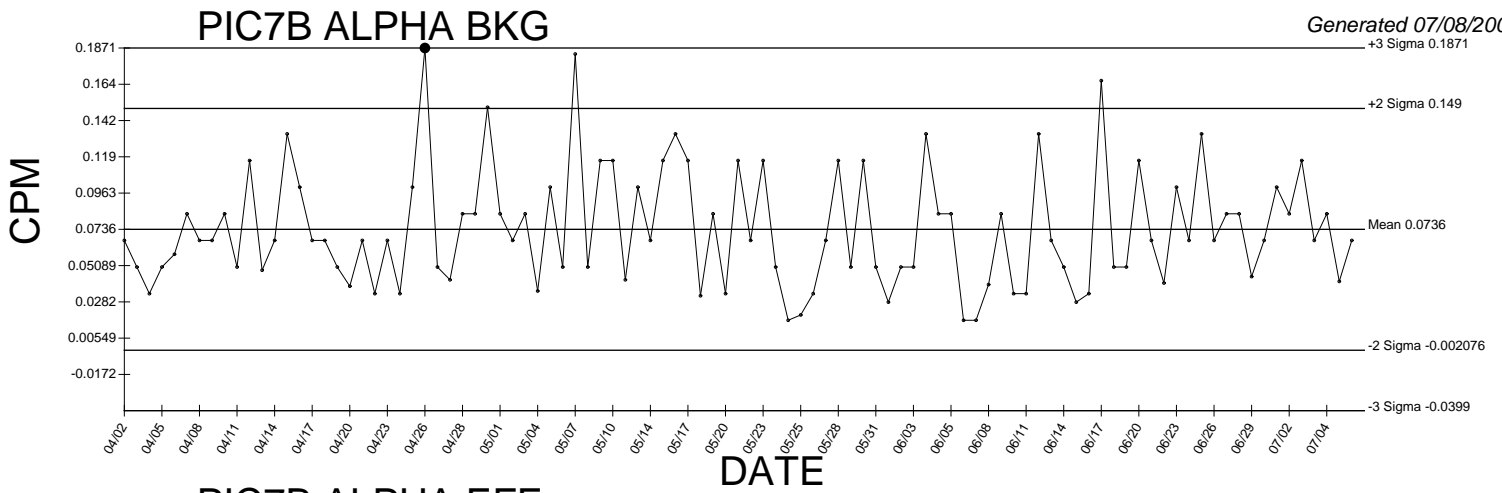


● Denotes Outlier

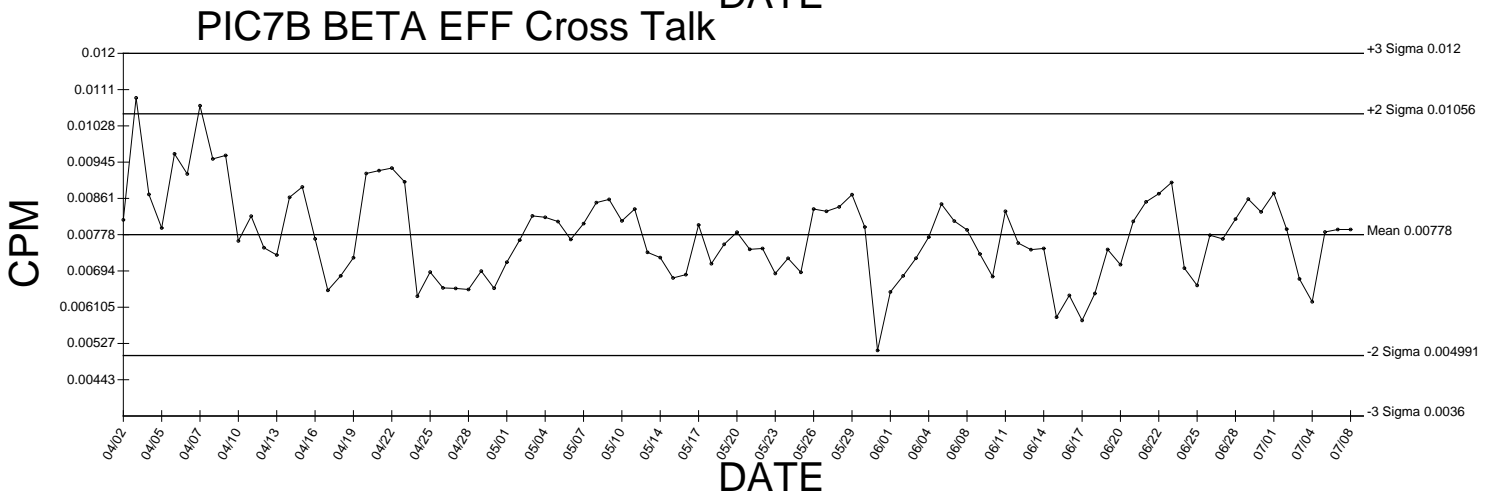
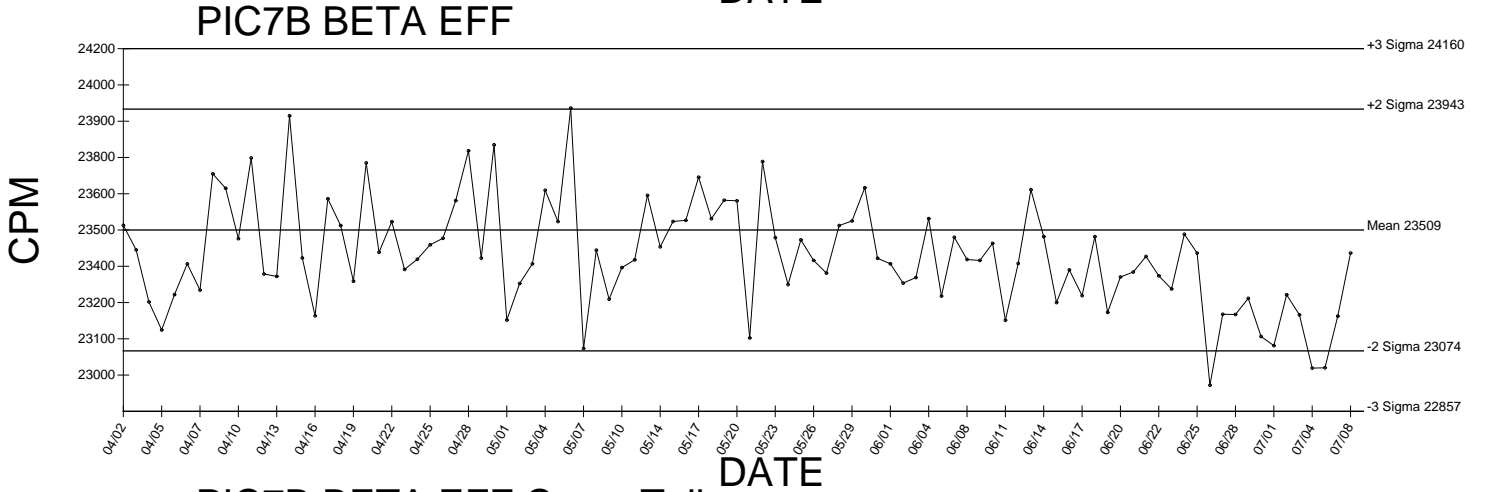
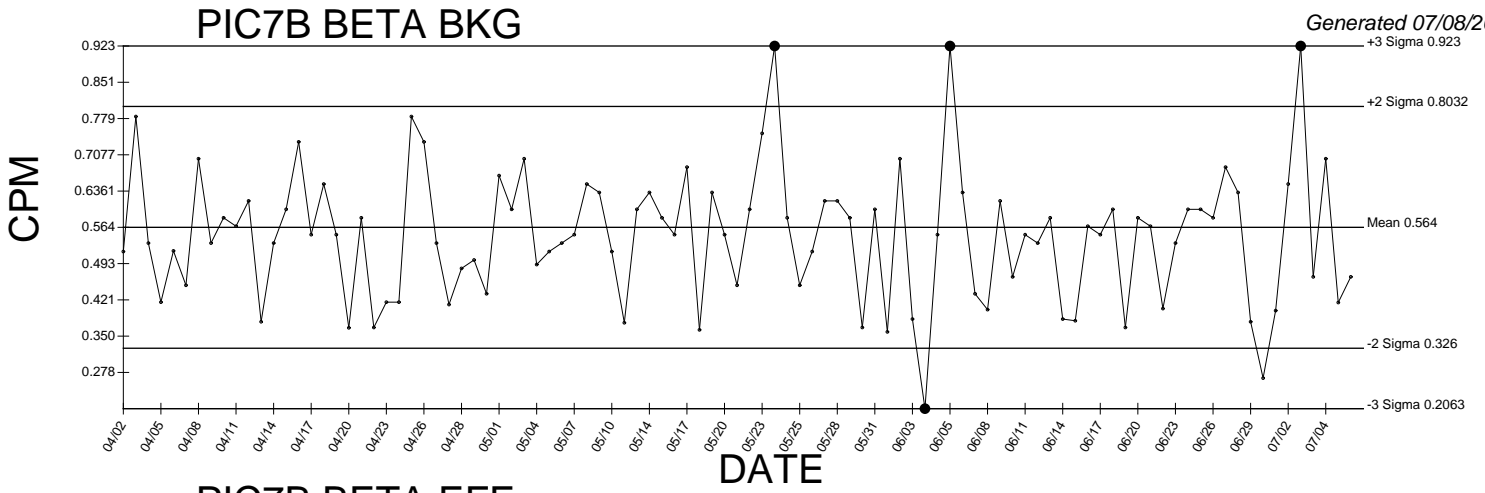


● Denotes Outlier





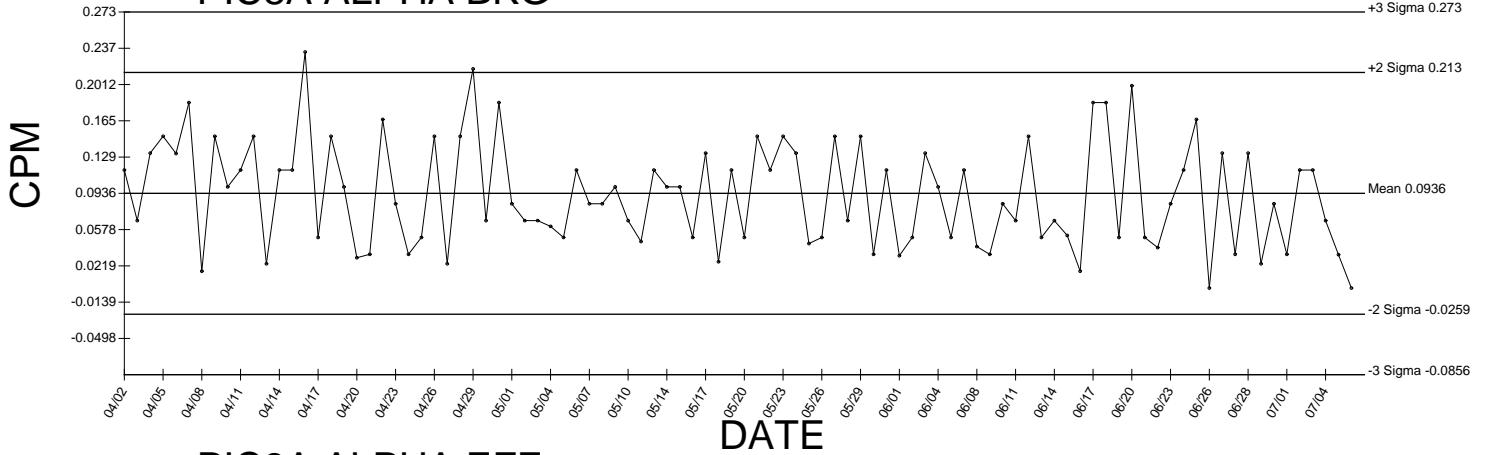
● Denotes Outlier



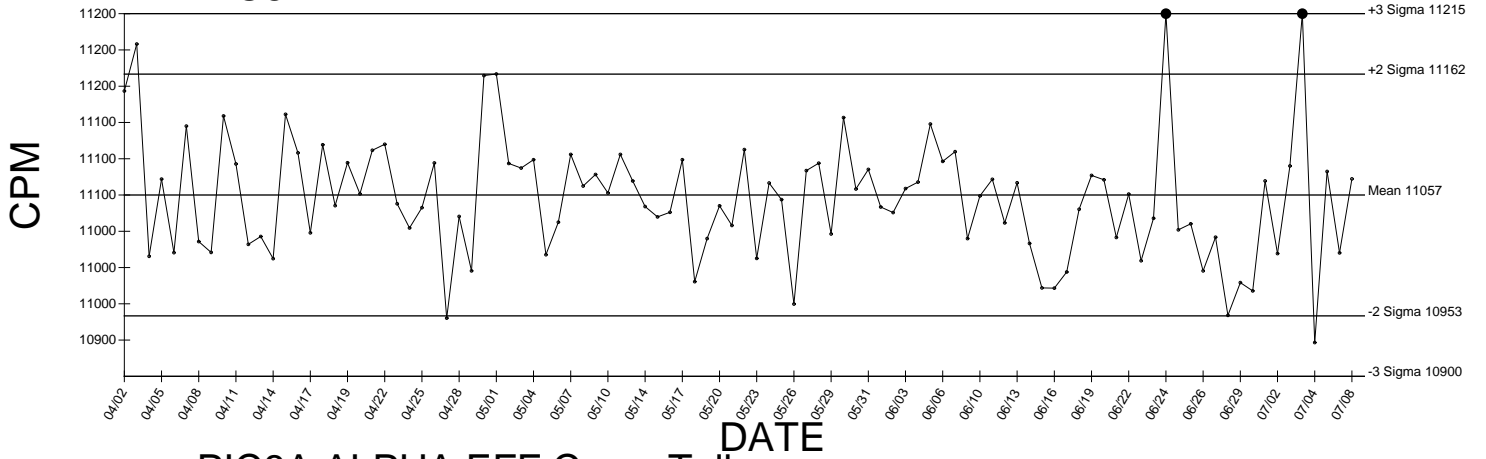
● Denotes Outlier

# PIC8A ALPHA BKG

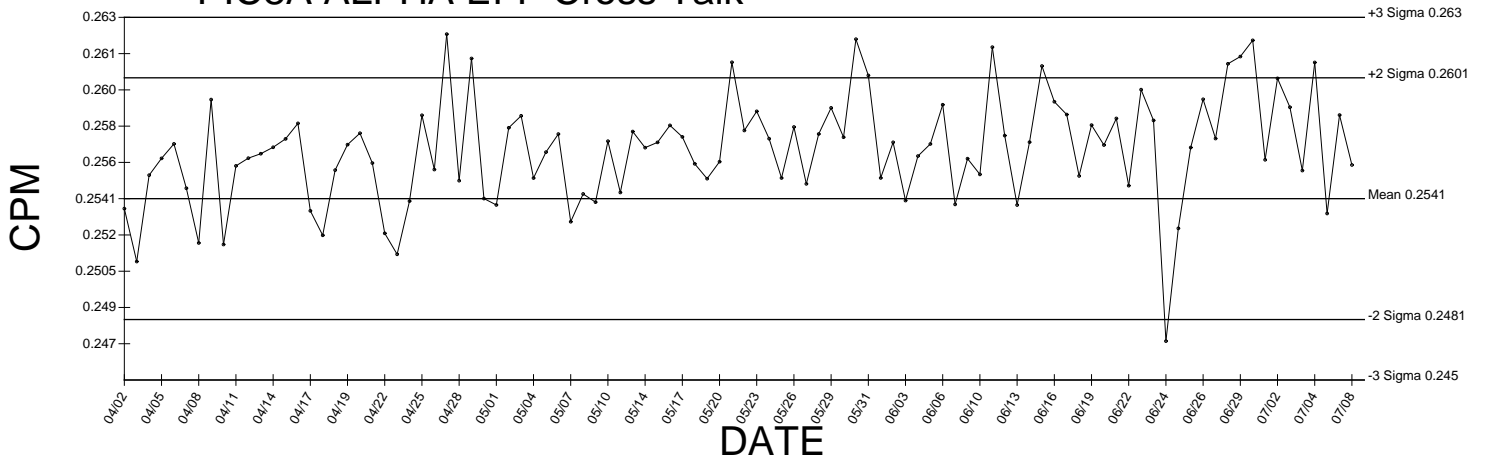
Generated 07/08/2009



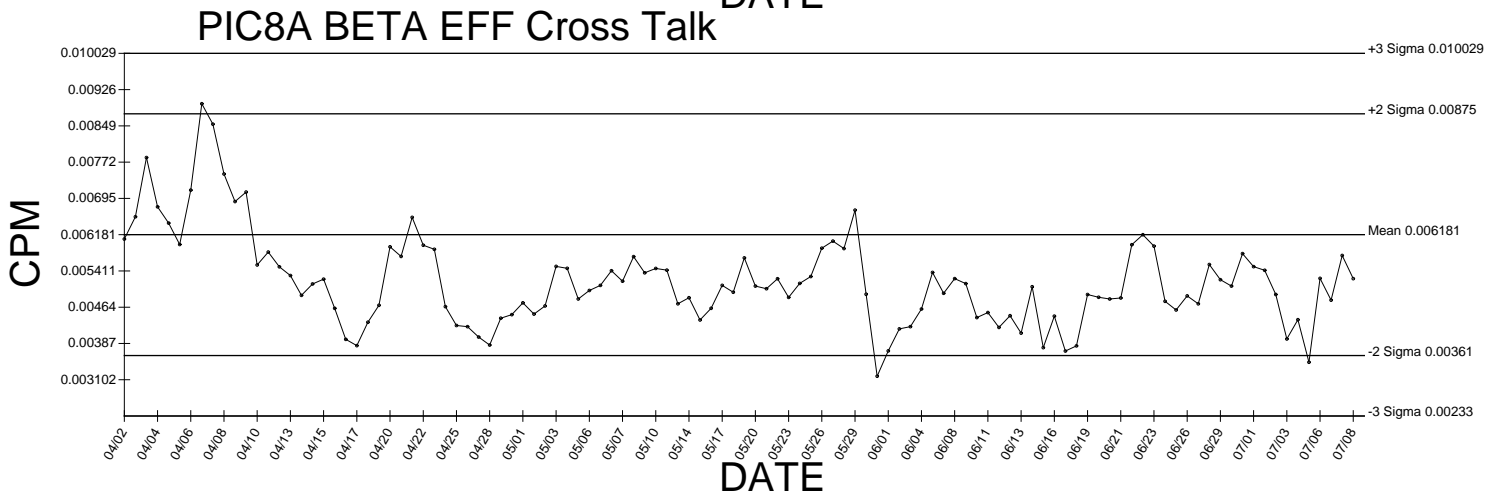
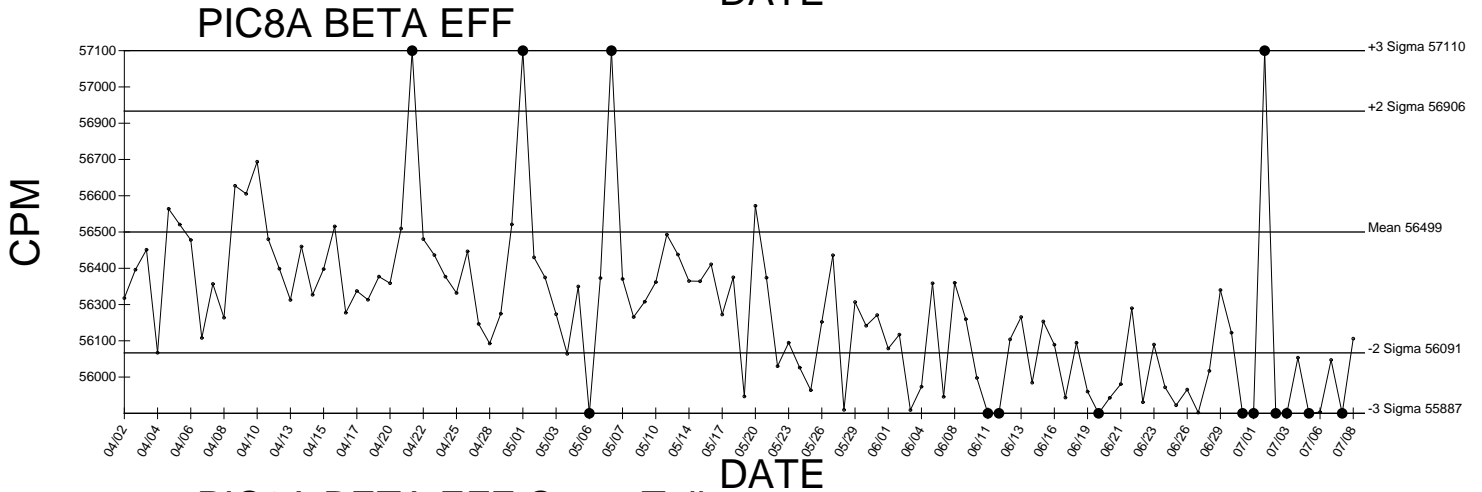
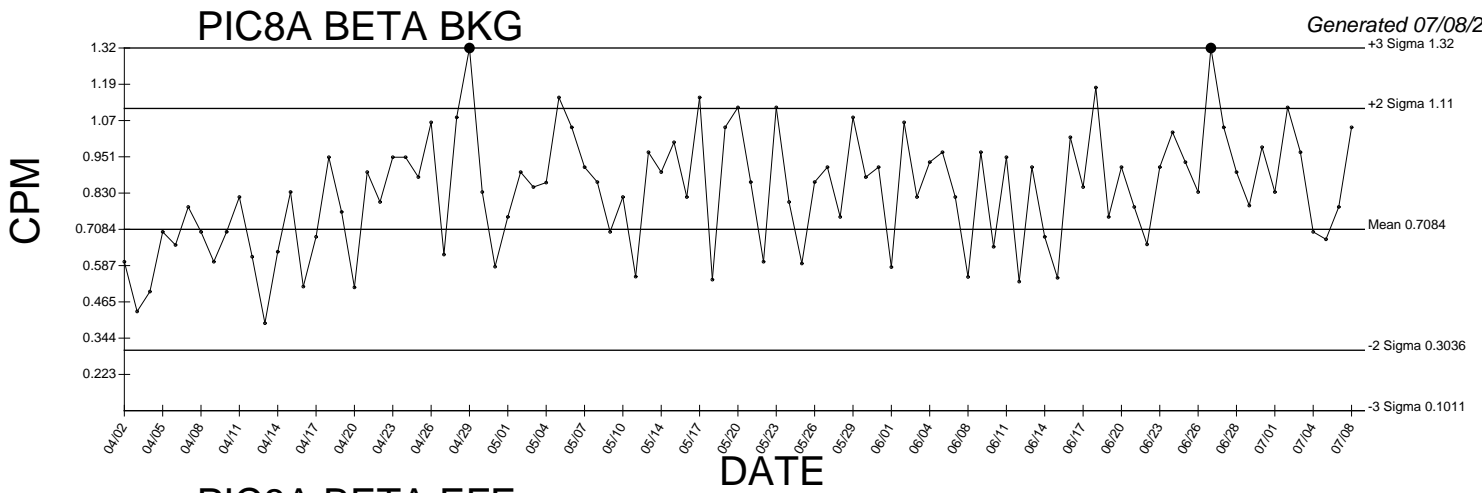
# PIC8A ALPHA EFF



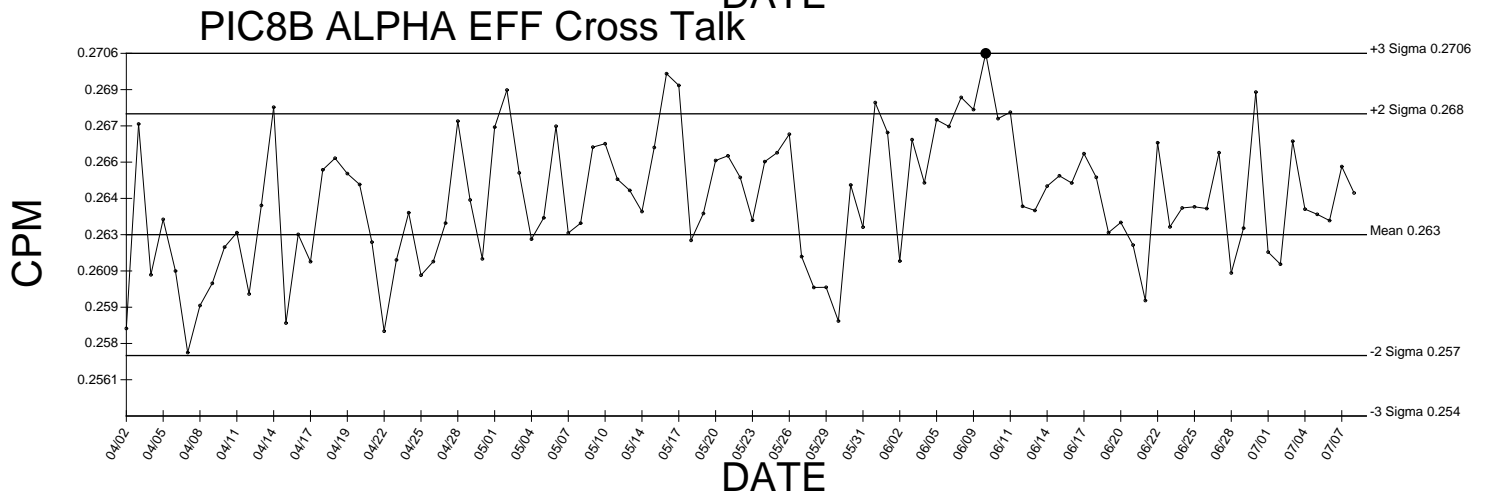
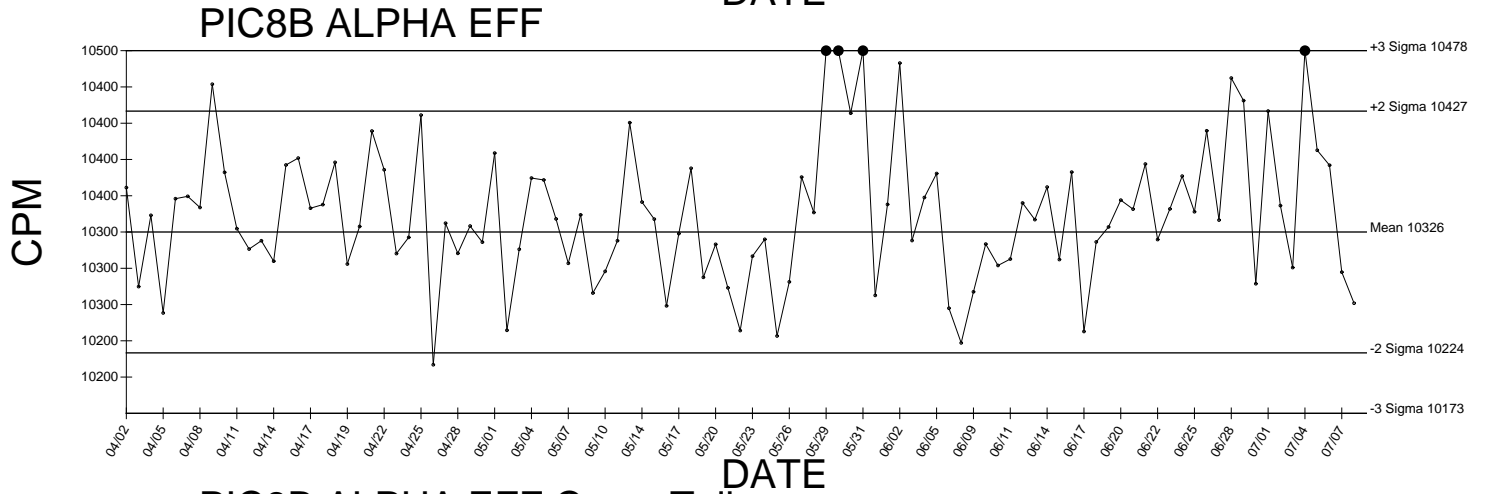
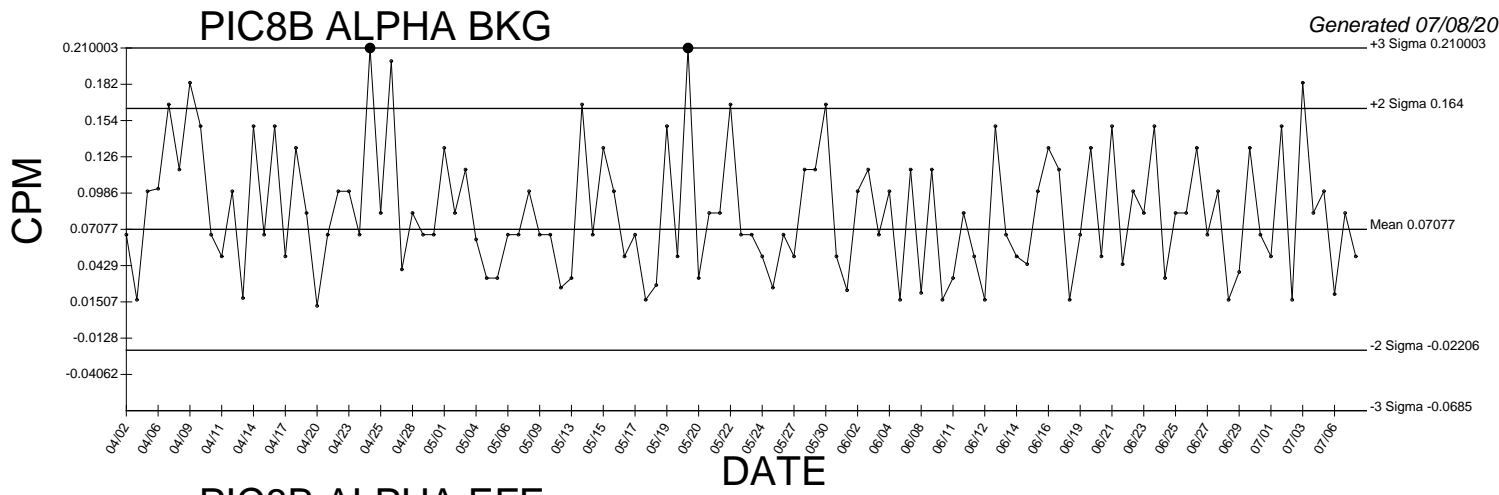
# PIC8A ALPHA EFF Cross Talk



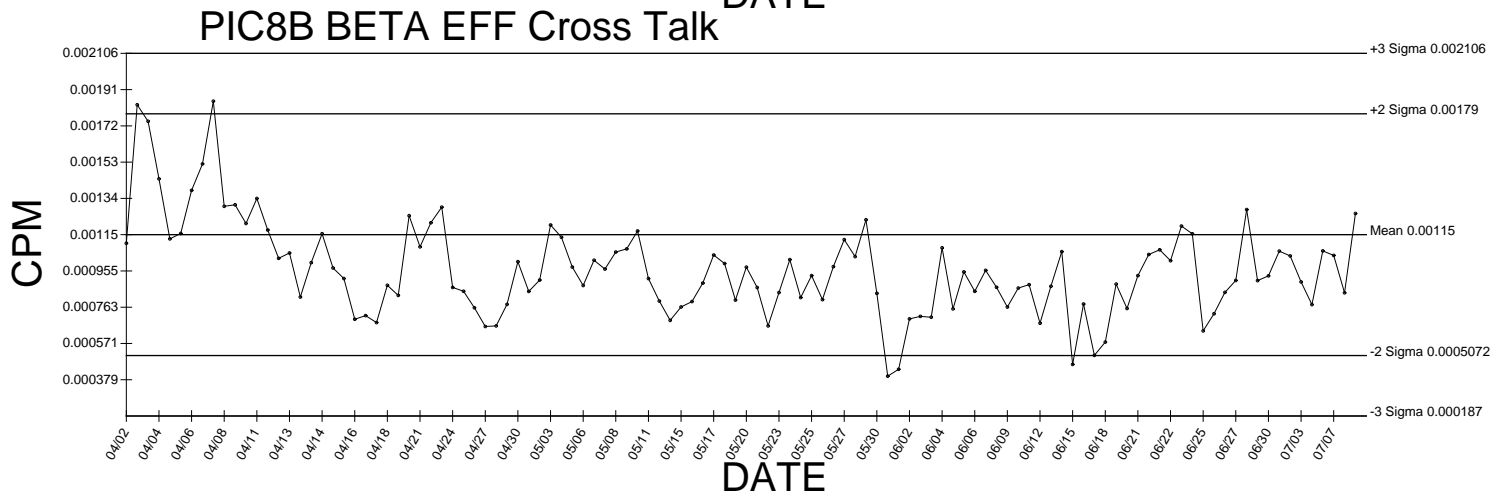
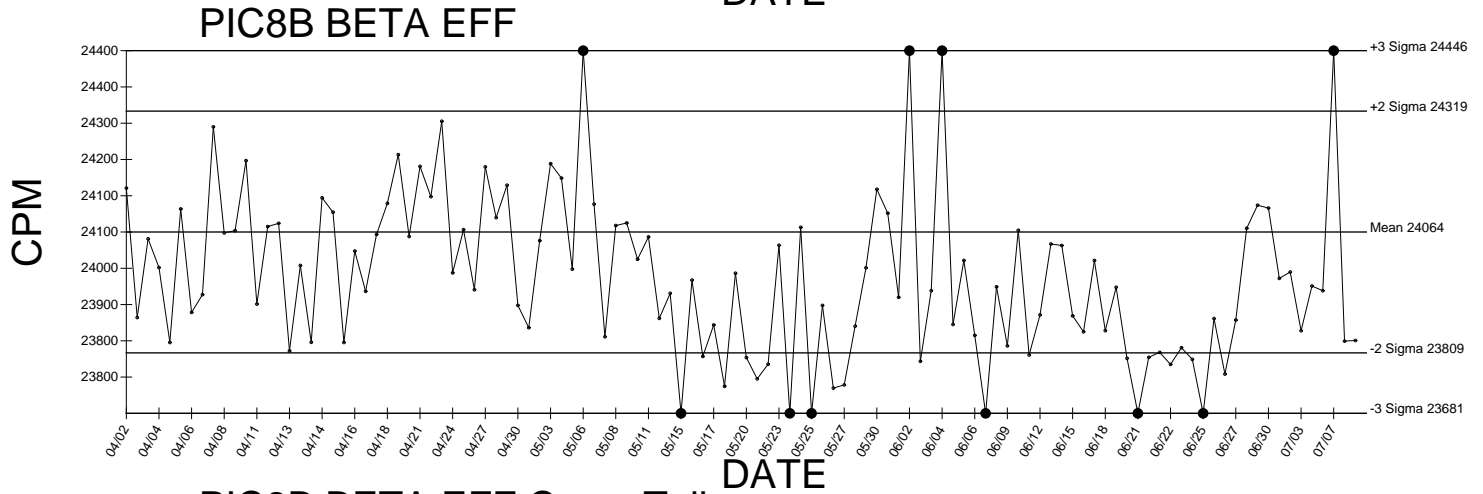
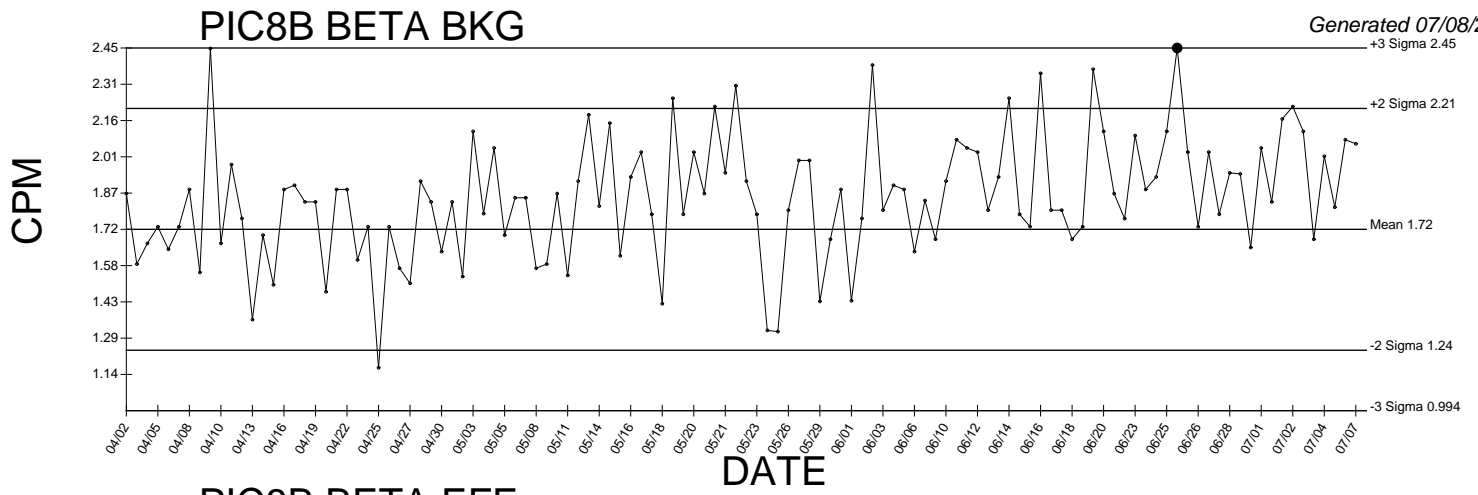
● Denotes Outlier



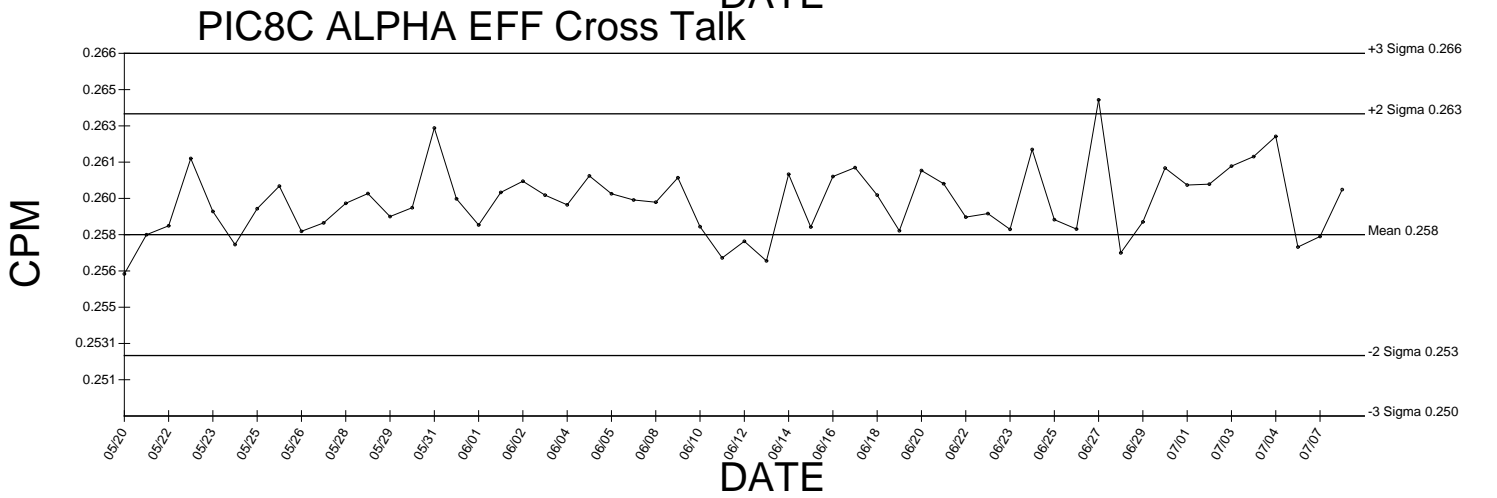
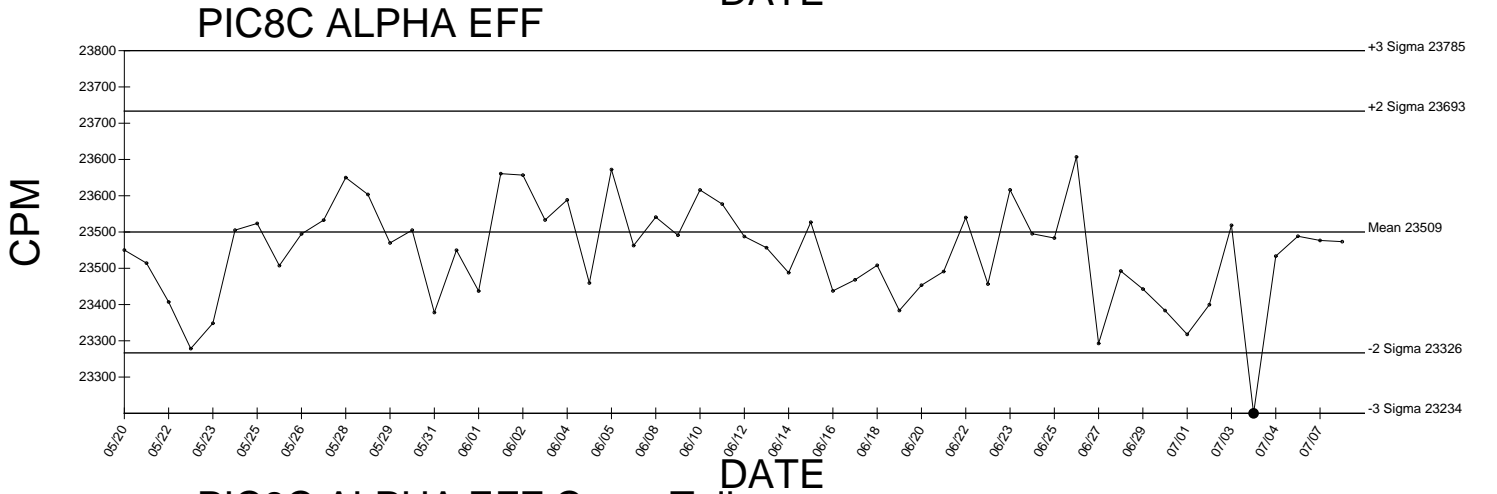
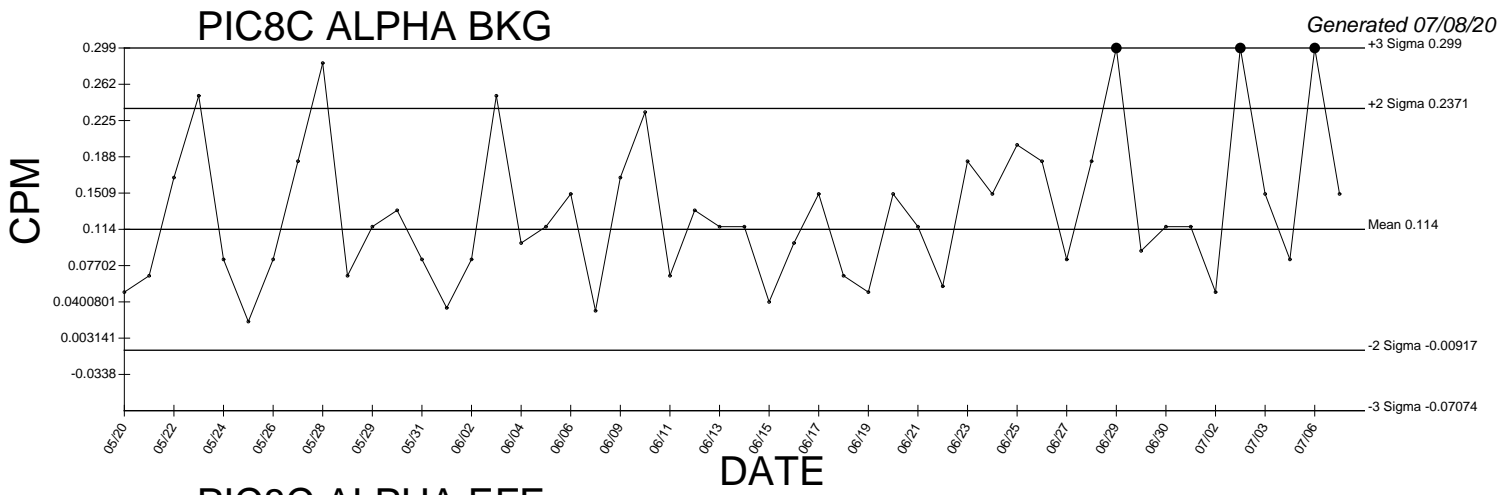
● Denotes Outlier



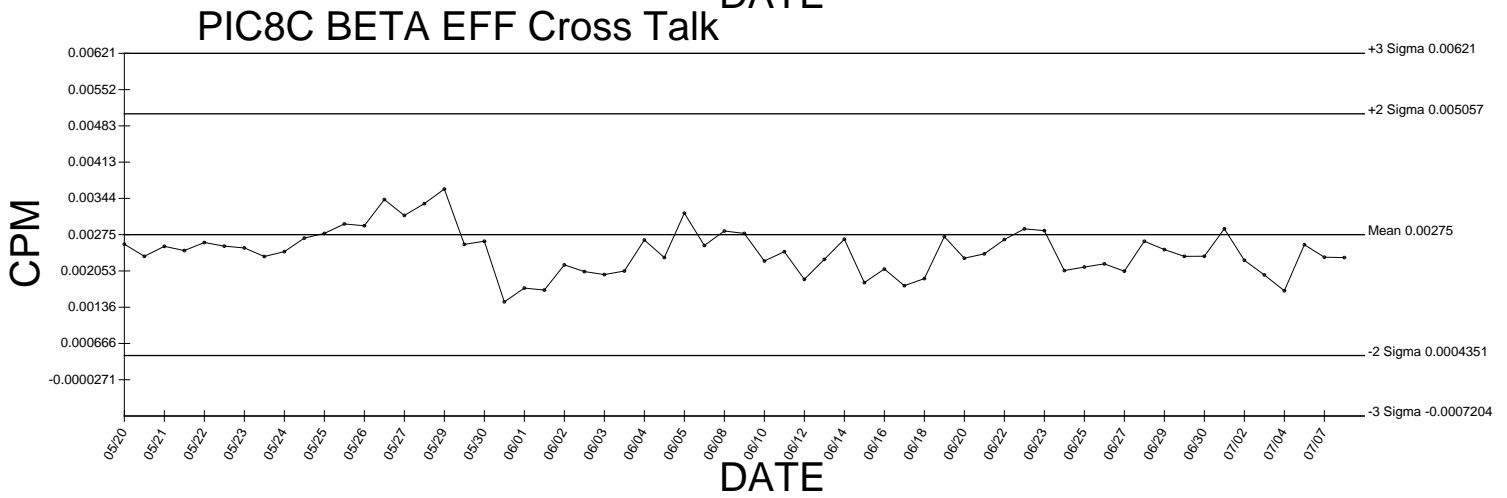
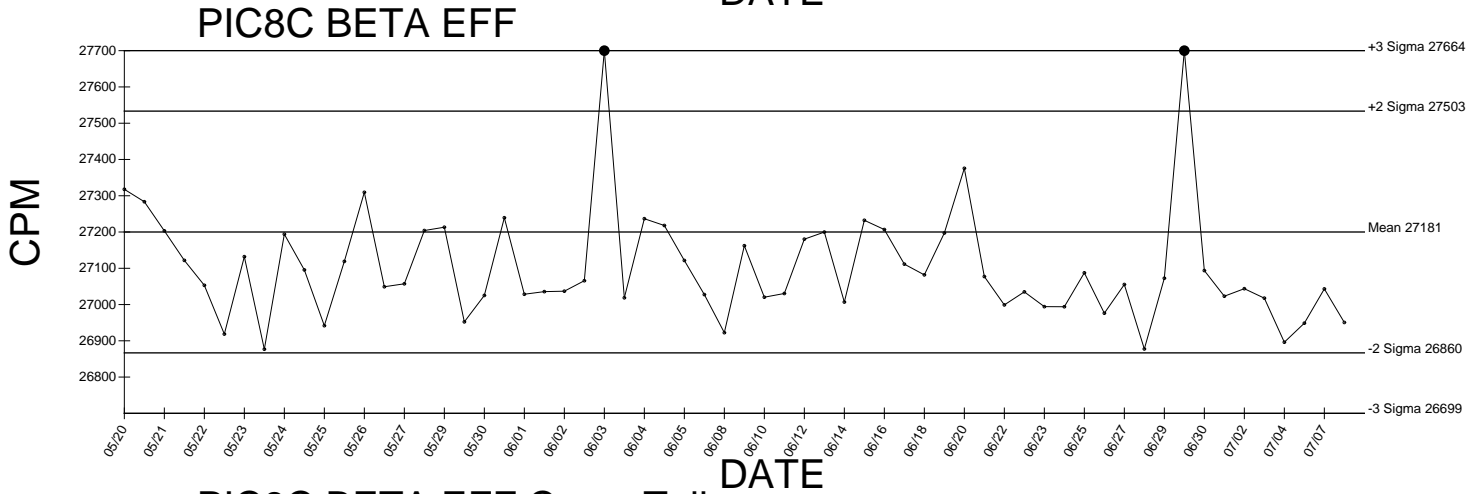
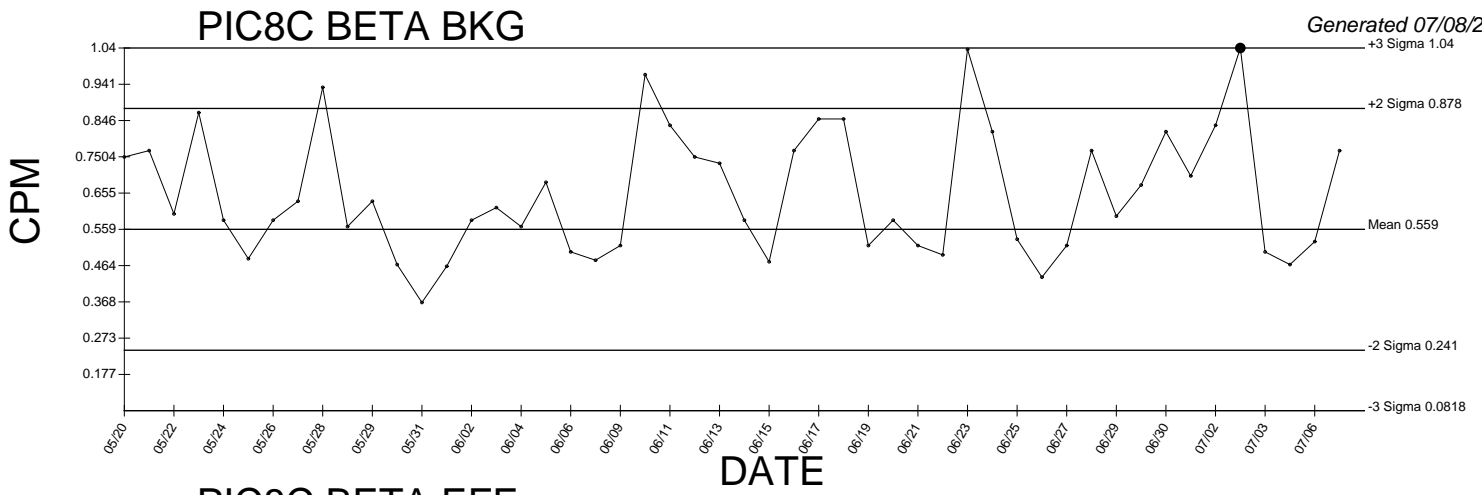
● Denotes Outlier



● Denotes Outlier

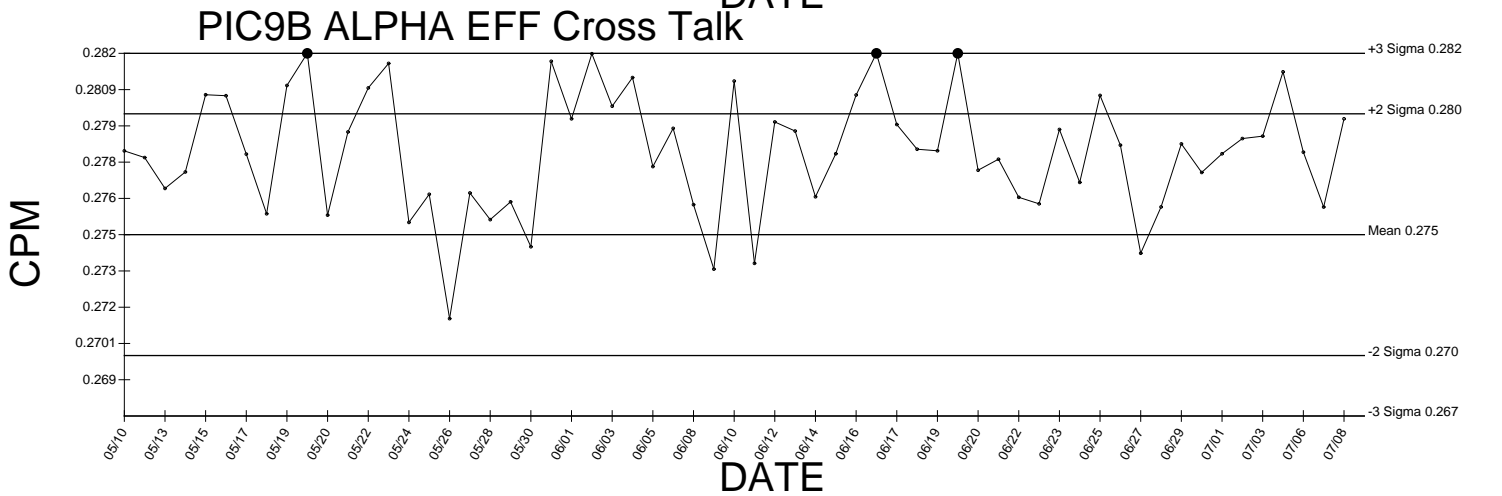
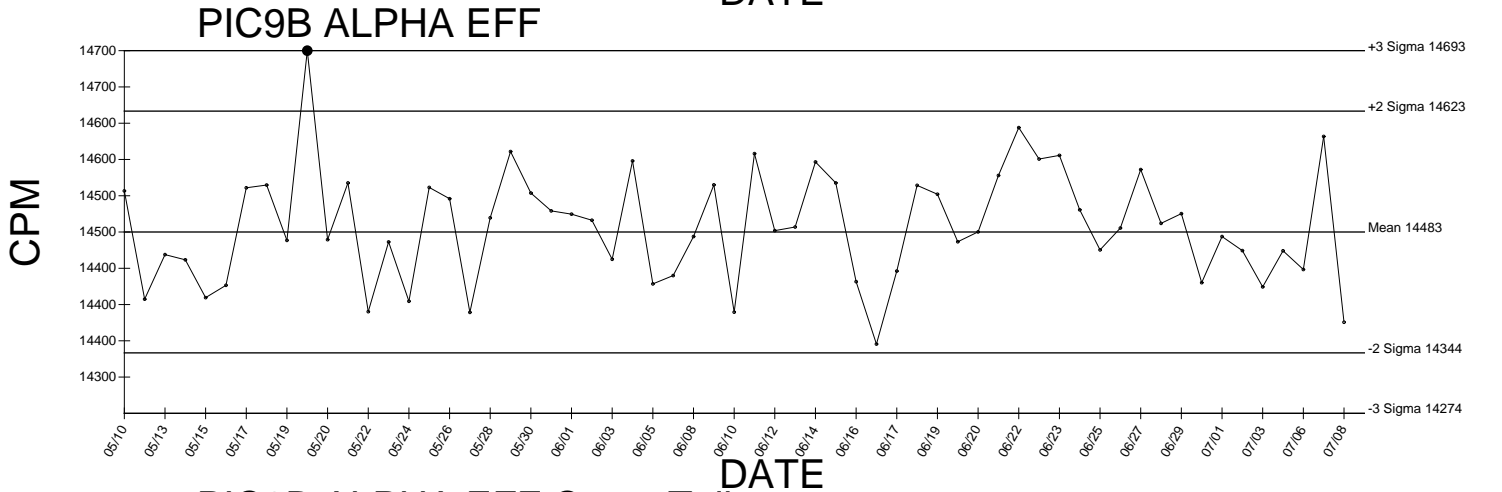
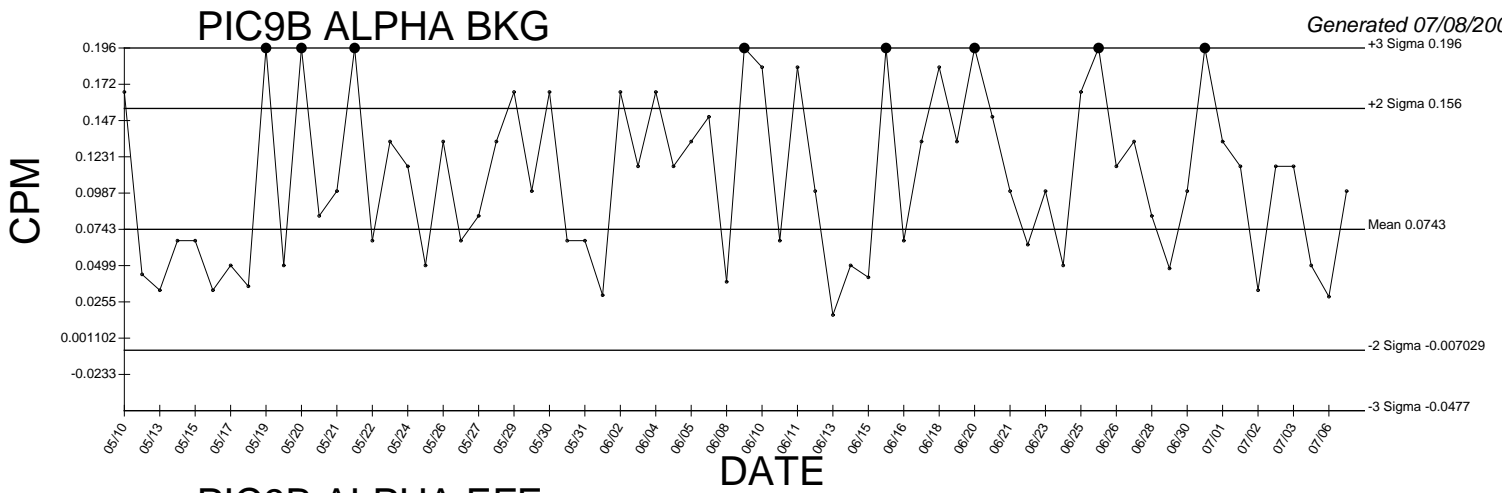


● Denotes Outlier

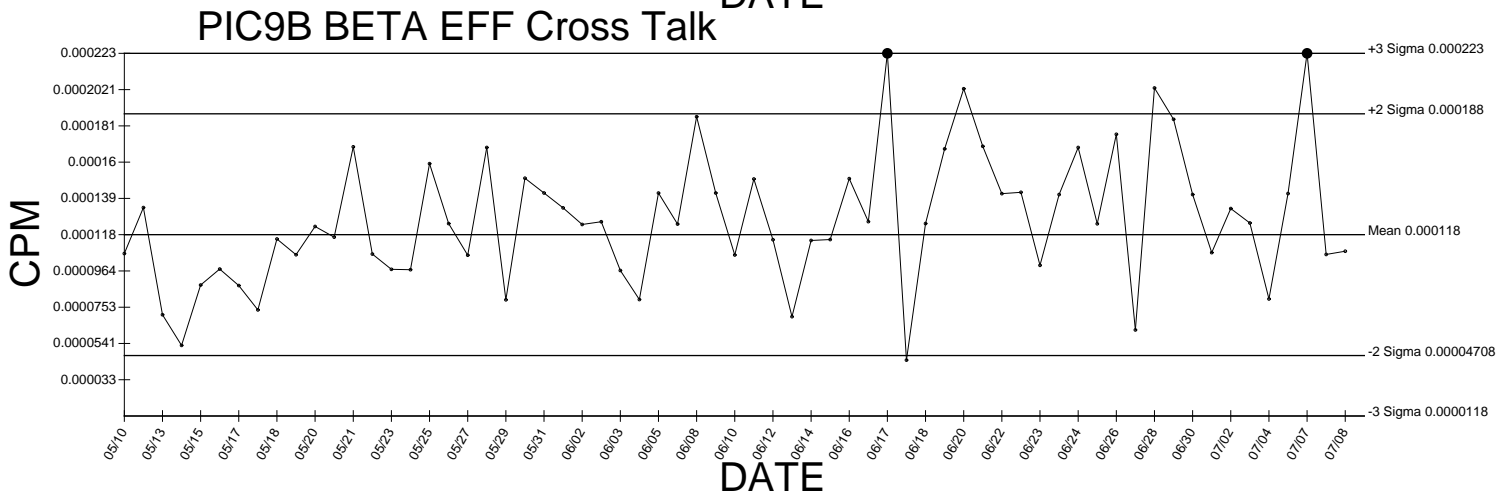
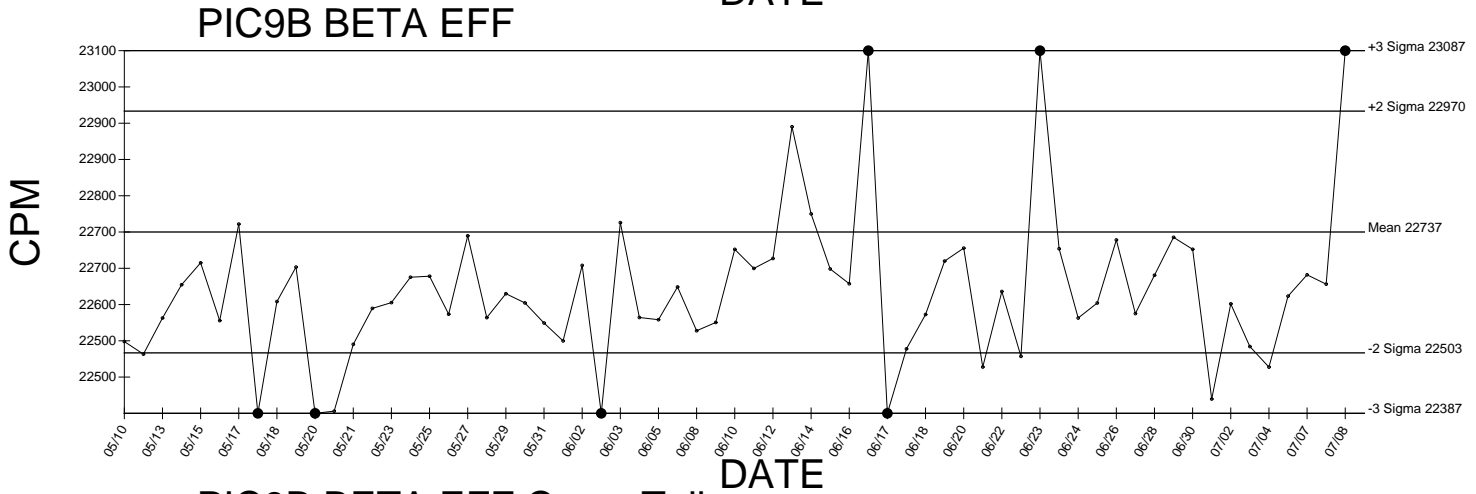
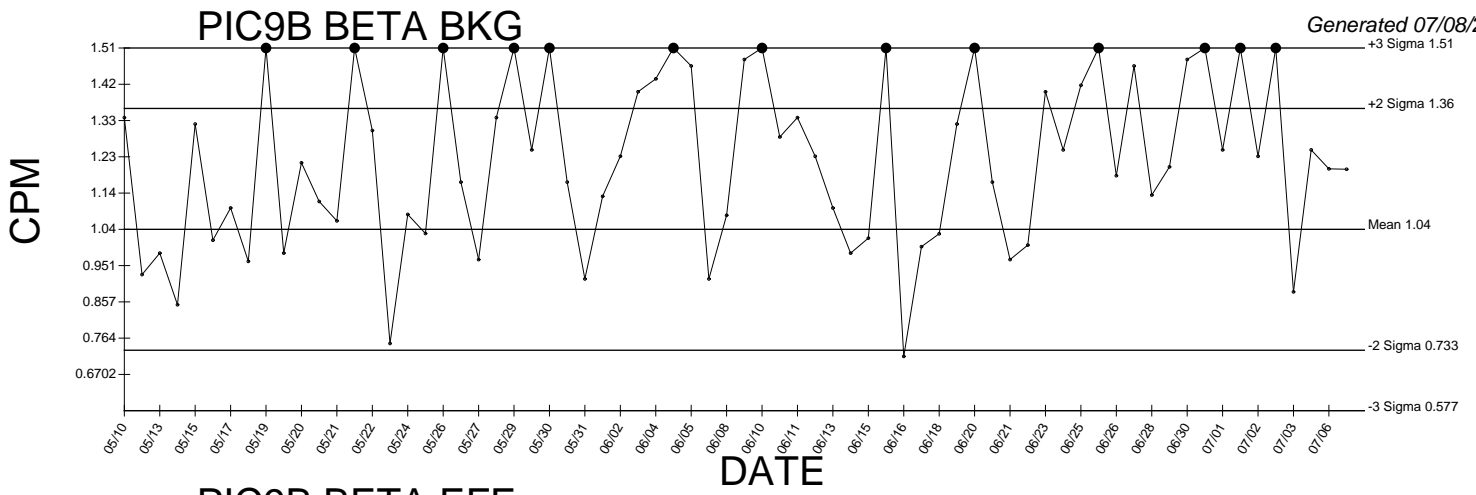


● Denotes Outlier

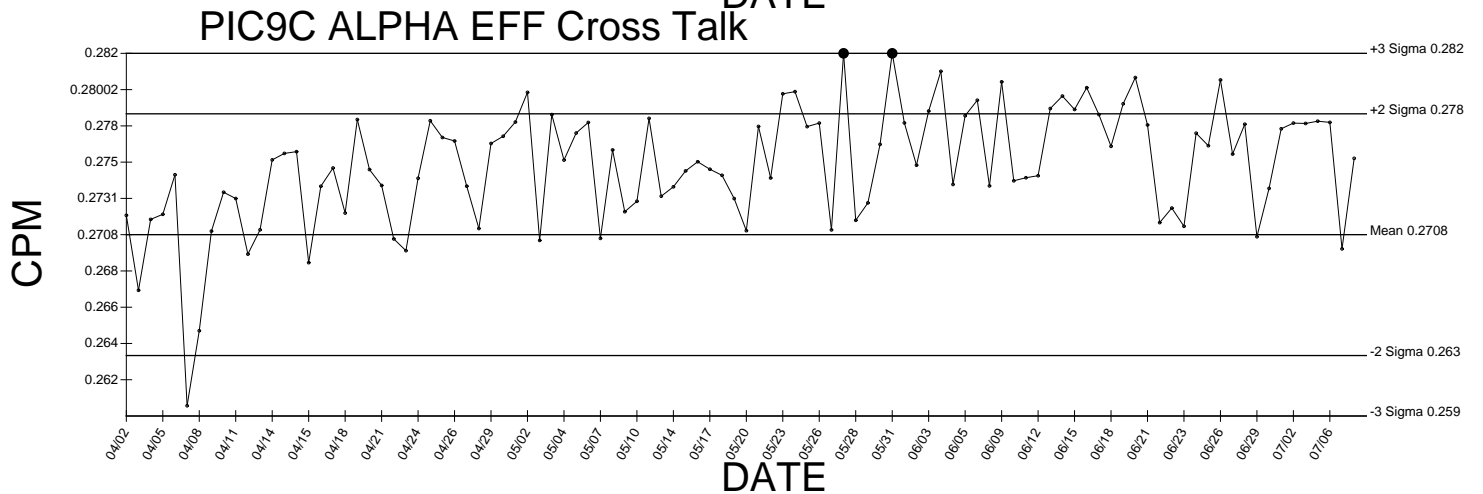
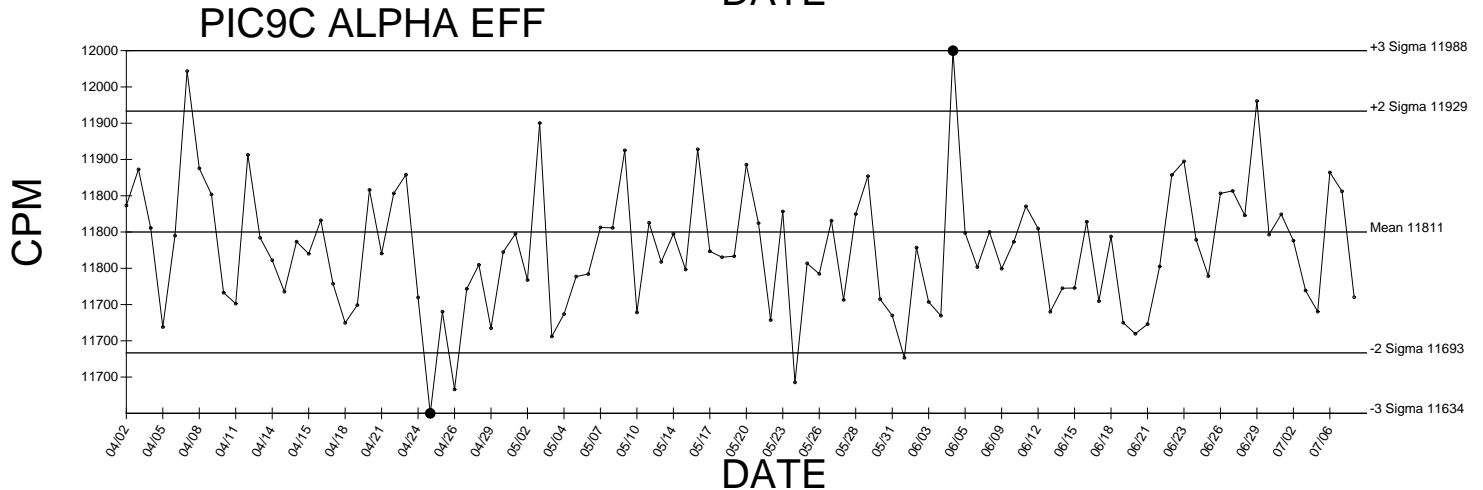
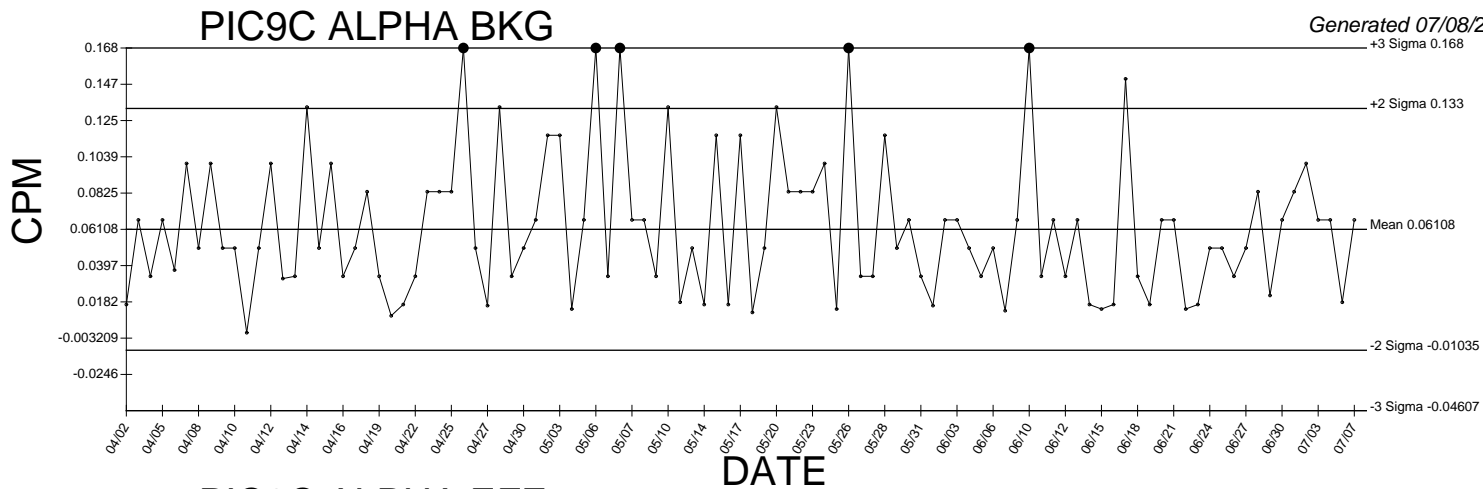




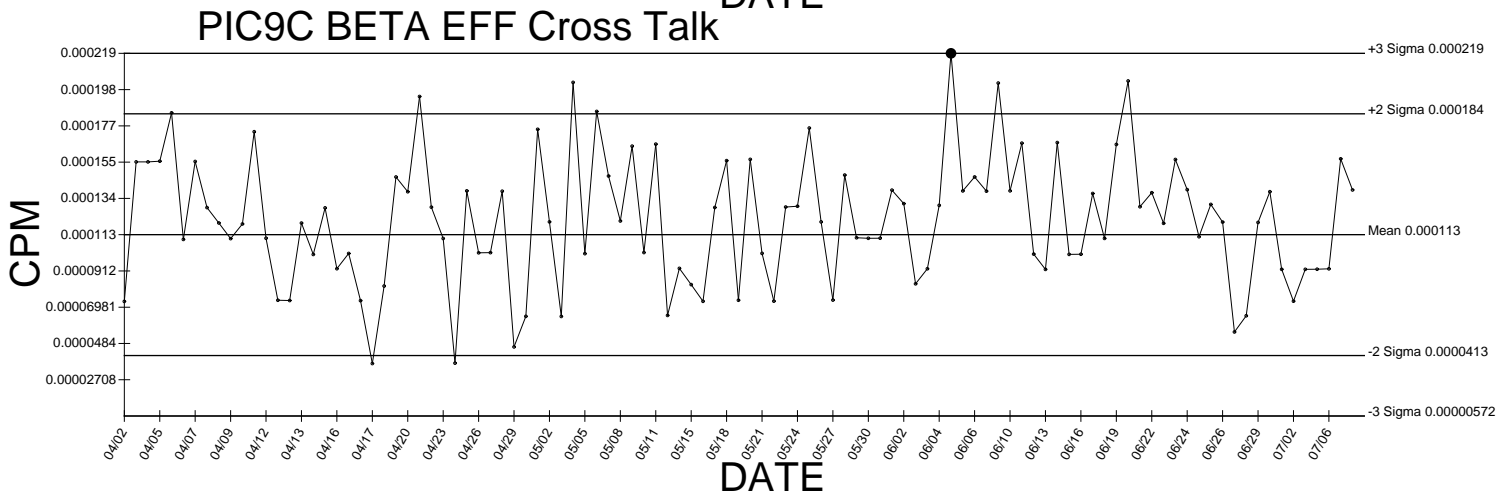
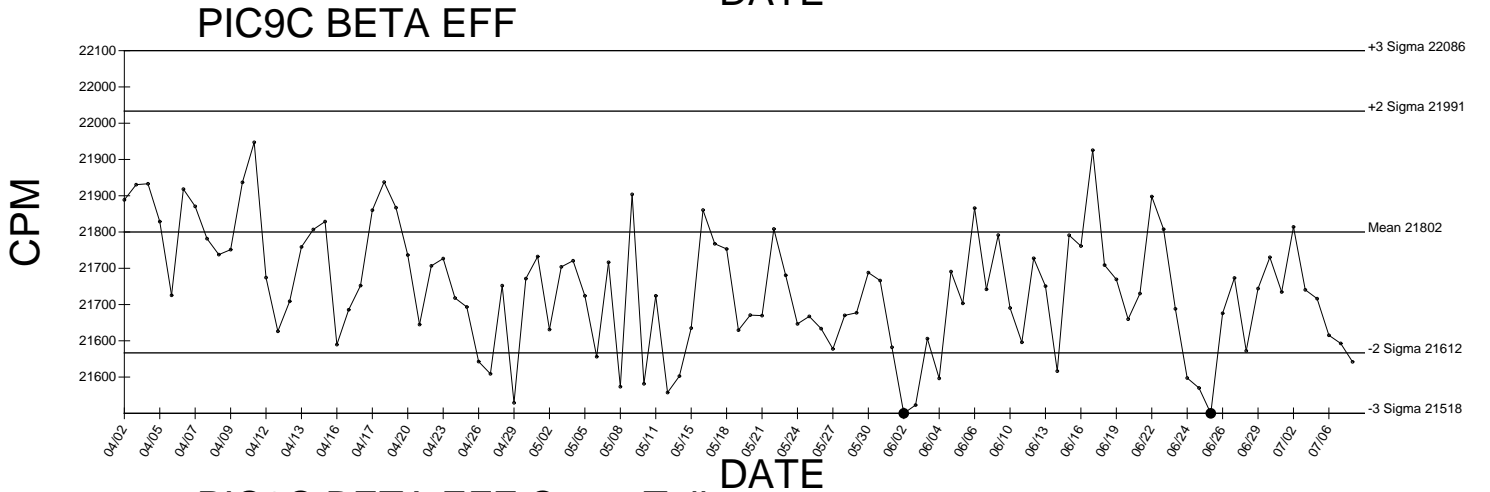
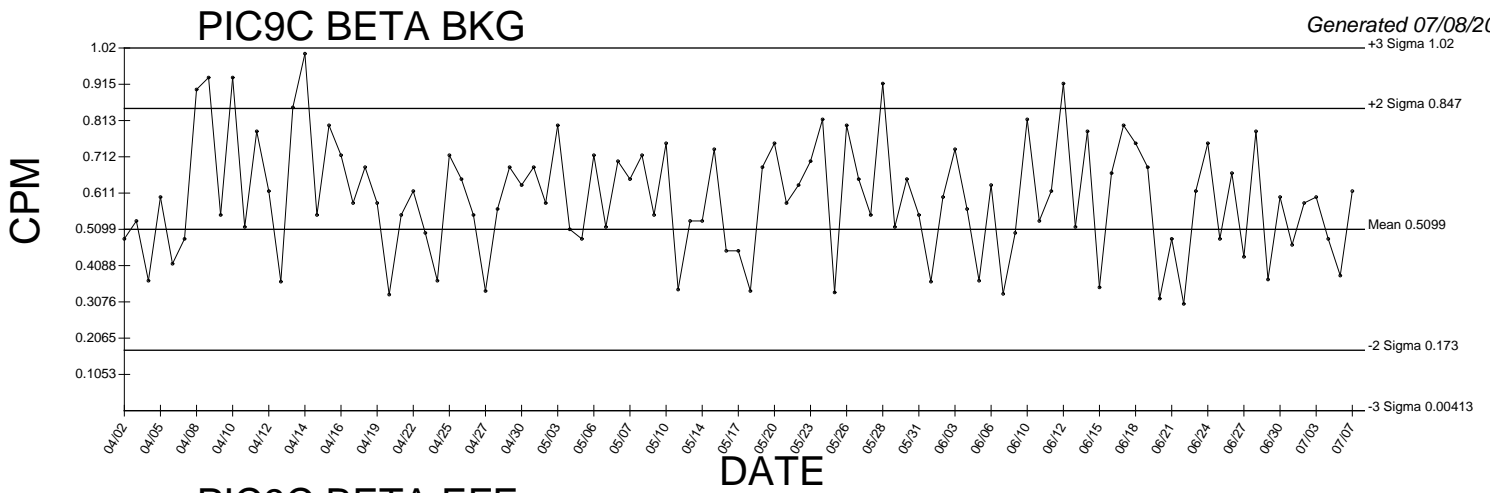
● Denotes Outlier



● Denotes Outlier

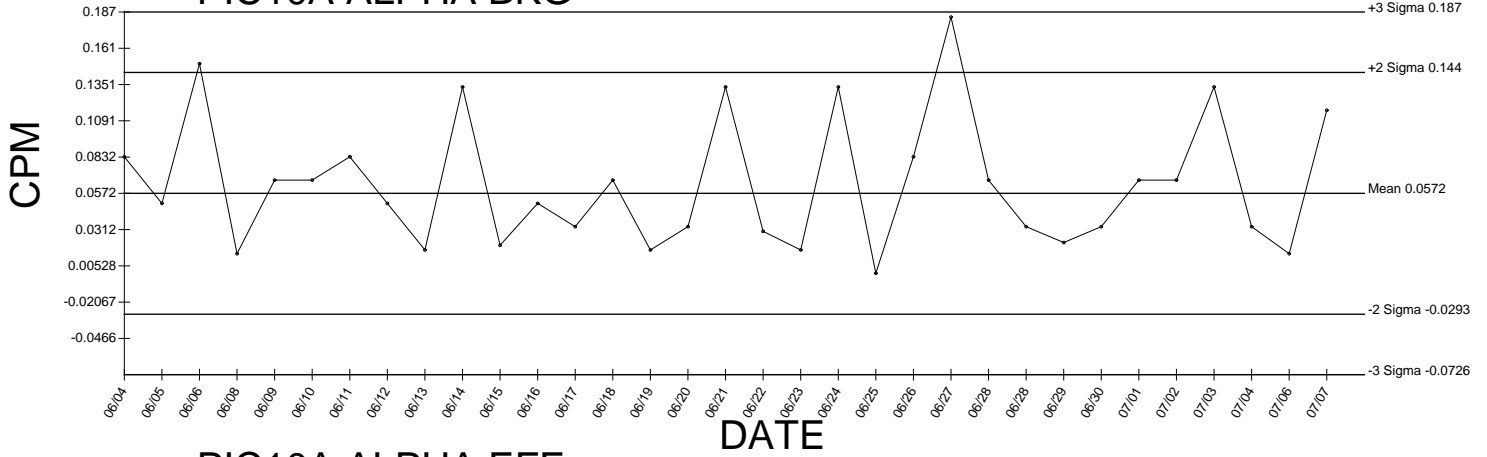


● Denotes Outlier

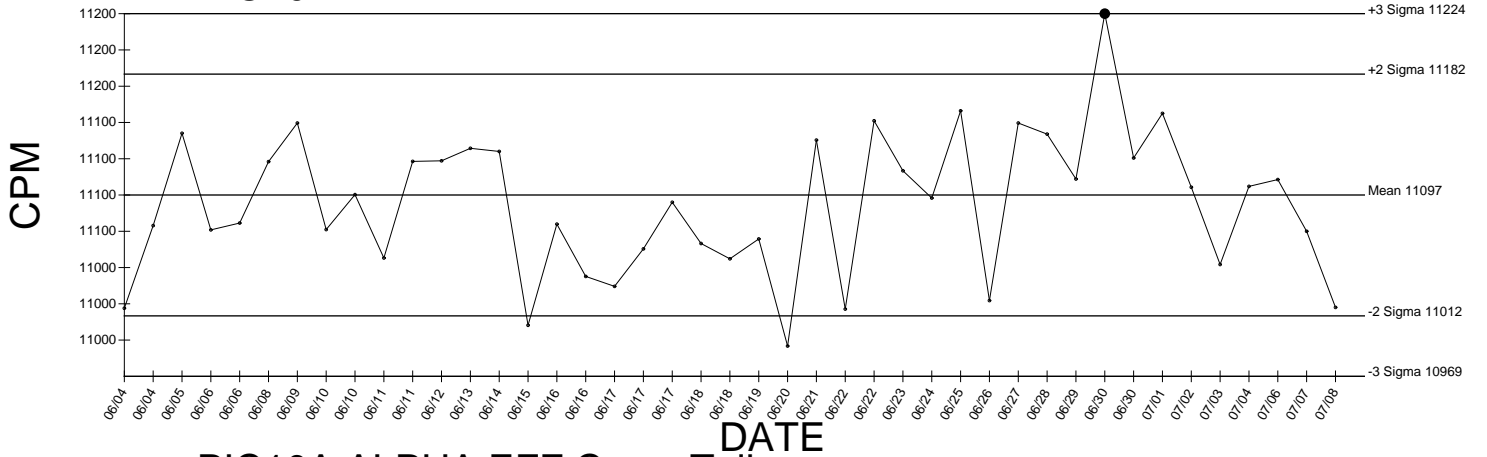


● Denotes Outlier

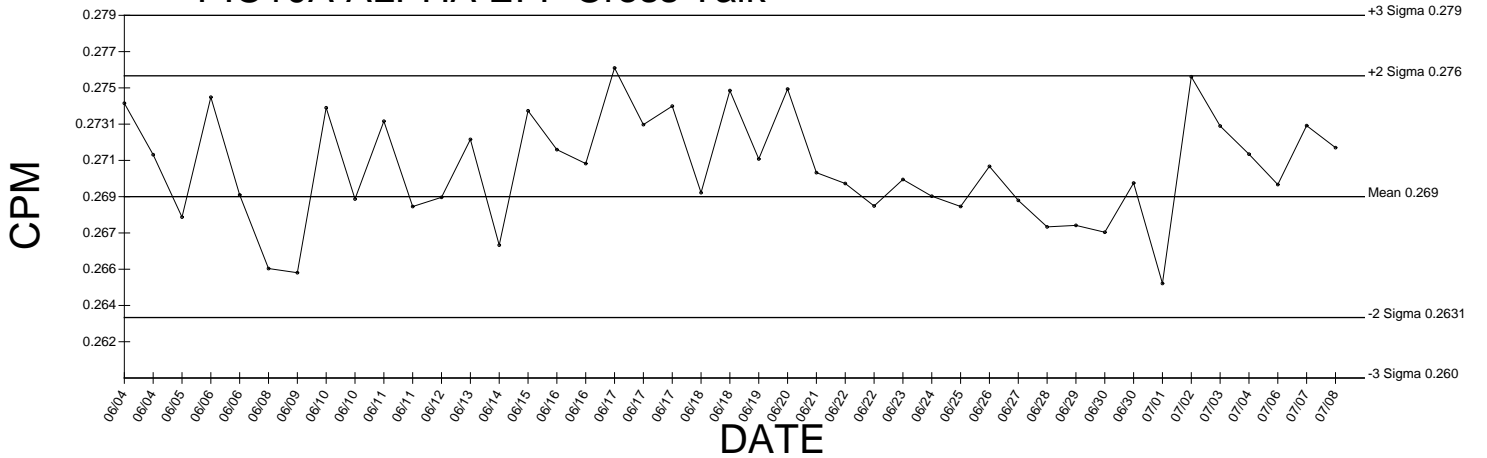
### PIC10A ALPHA BKG



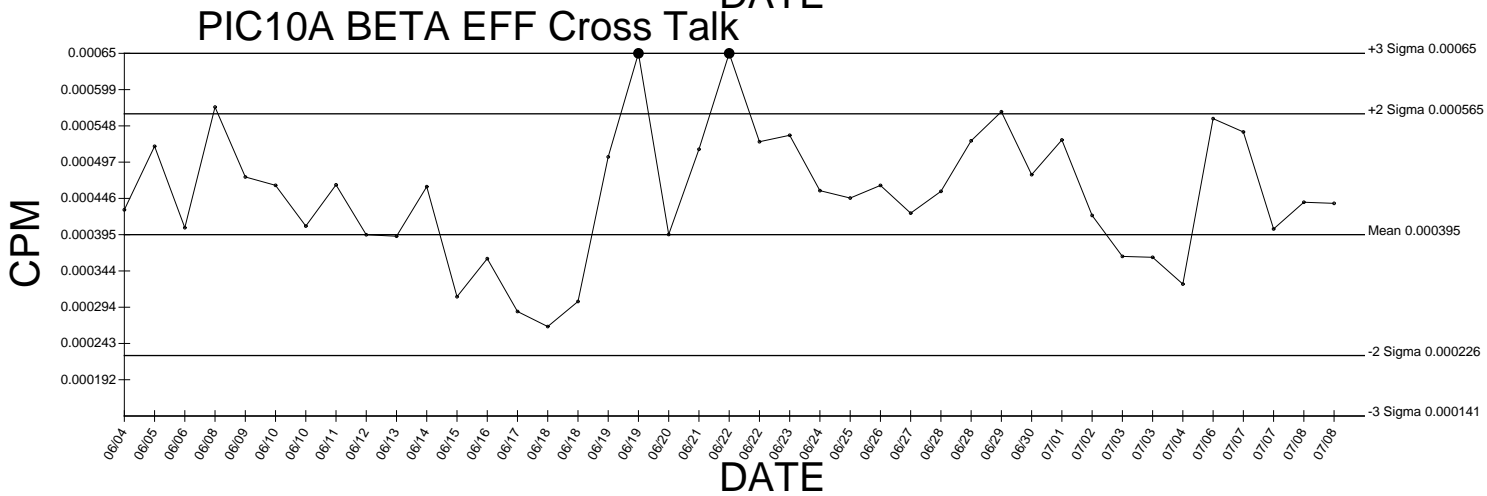
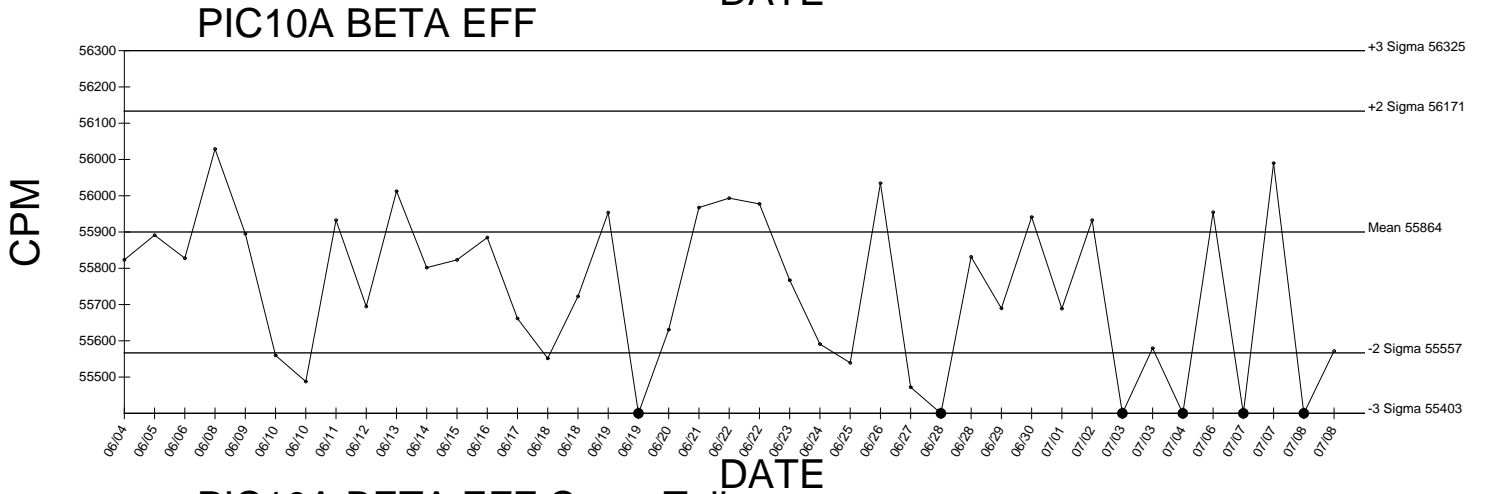
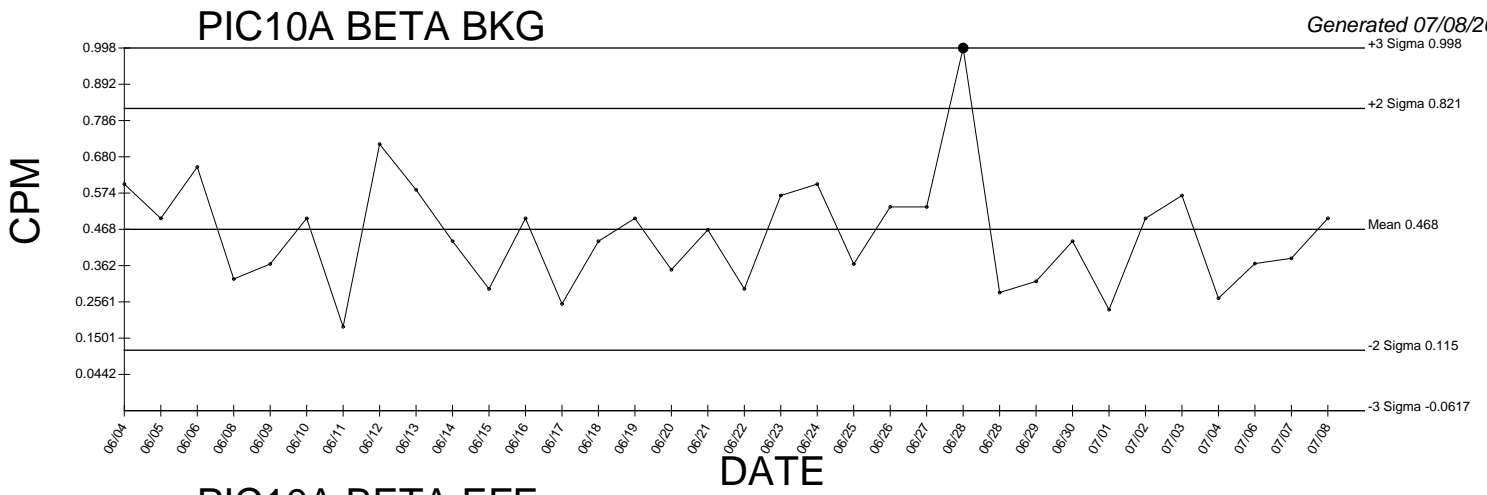
### PIC10A ALPHA EFF



### PIC10A ALPHA EFF Cross Talk

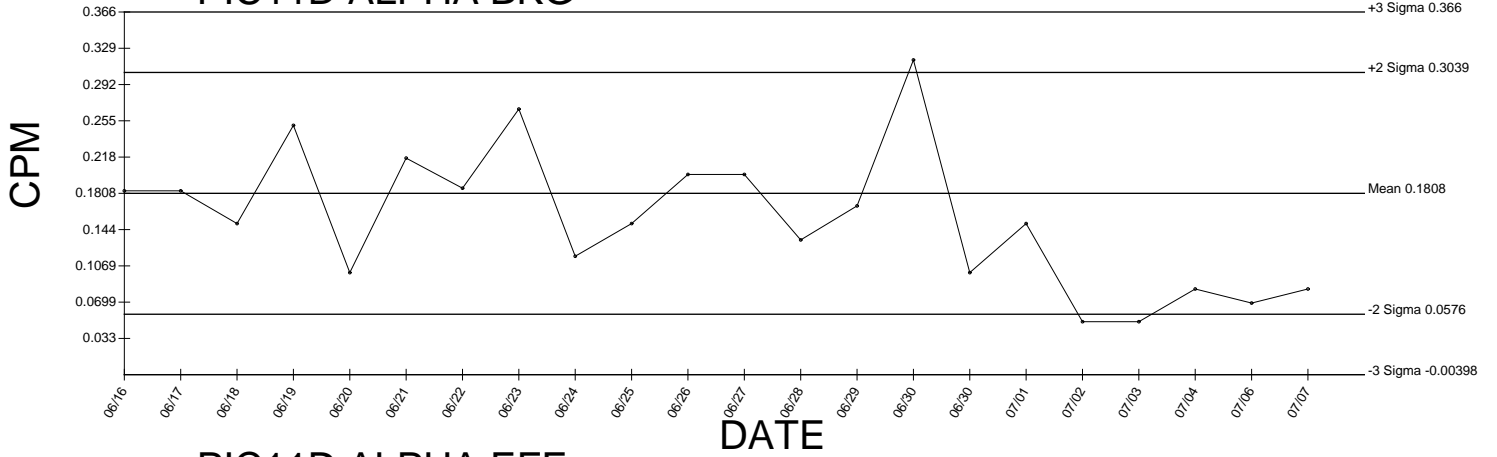


● Denotes Outlier

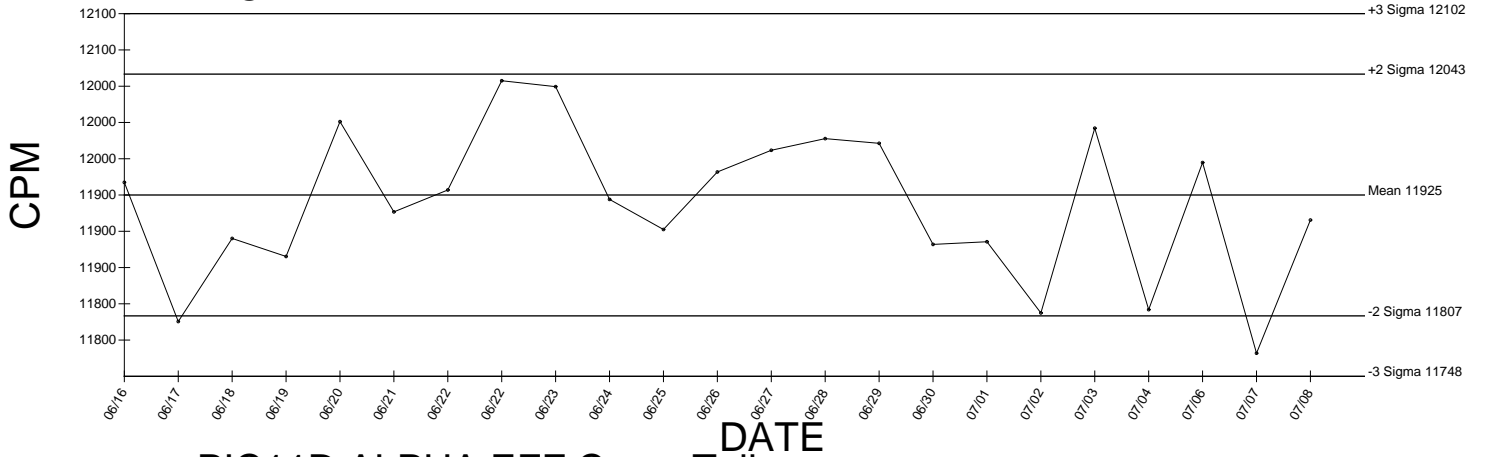


● Denotes Outlier

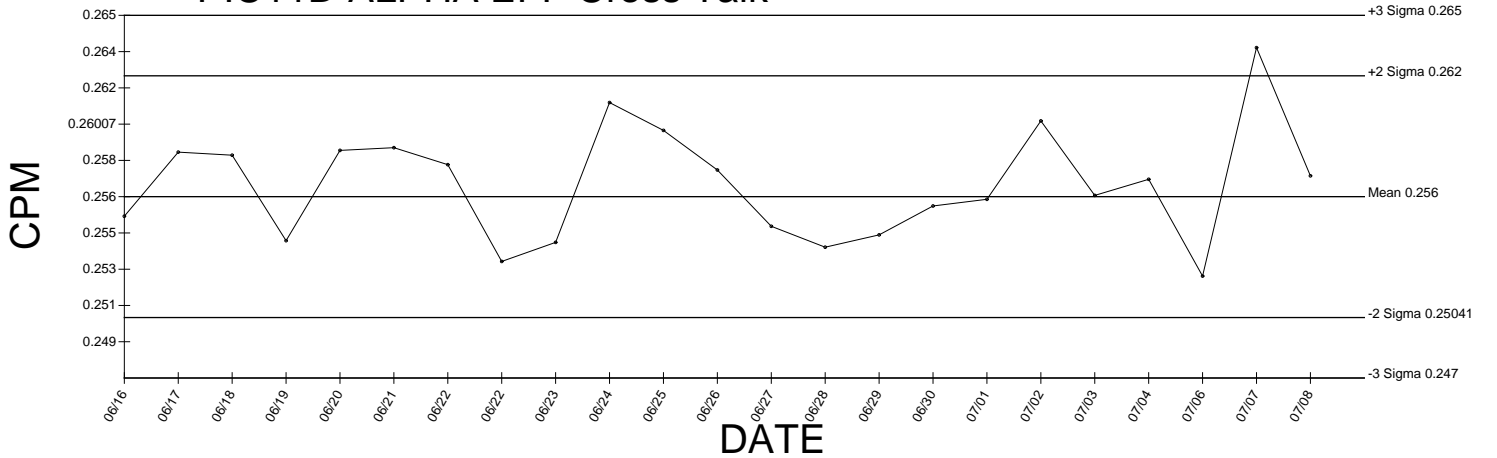
### PIC11D ALPHA BKG



### PIC11D ALPHA EFF



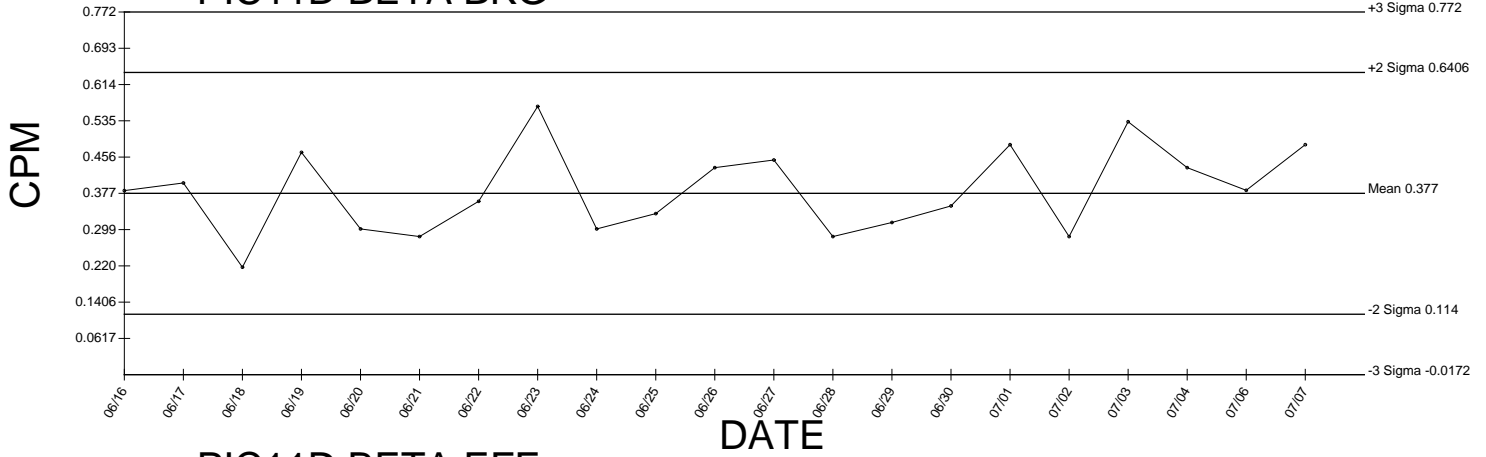
### PIC11D ALPHA EFF Cross Talk



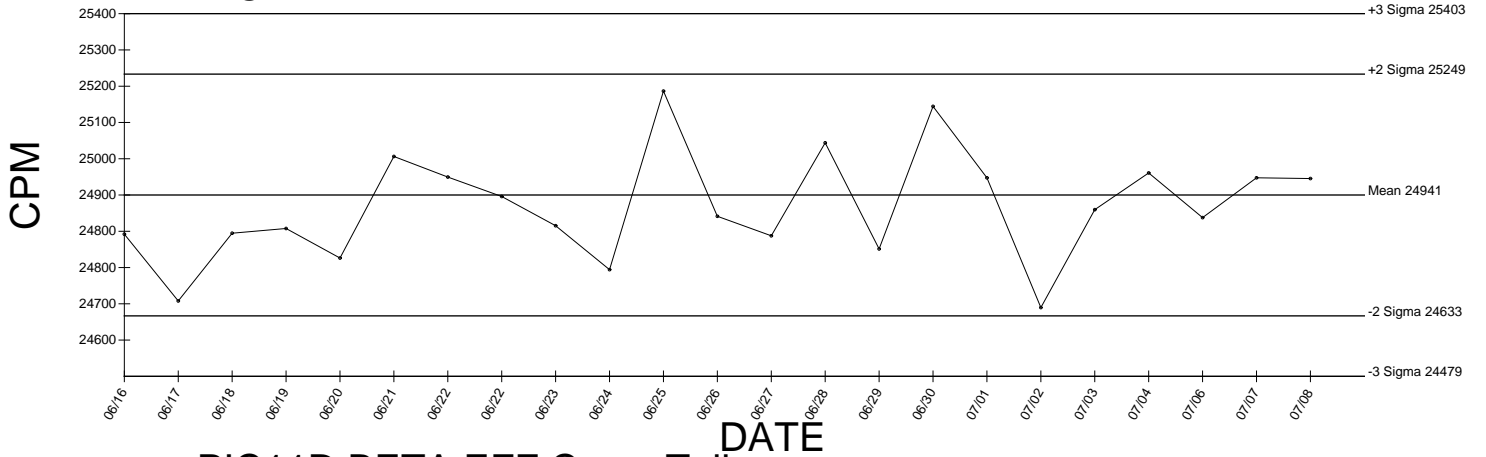
● Denotes Outlier

# PIC11D BETA BKG

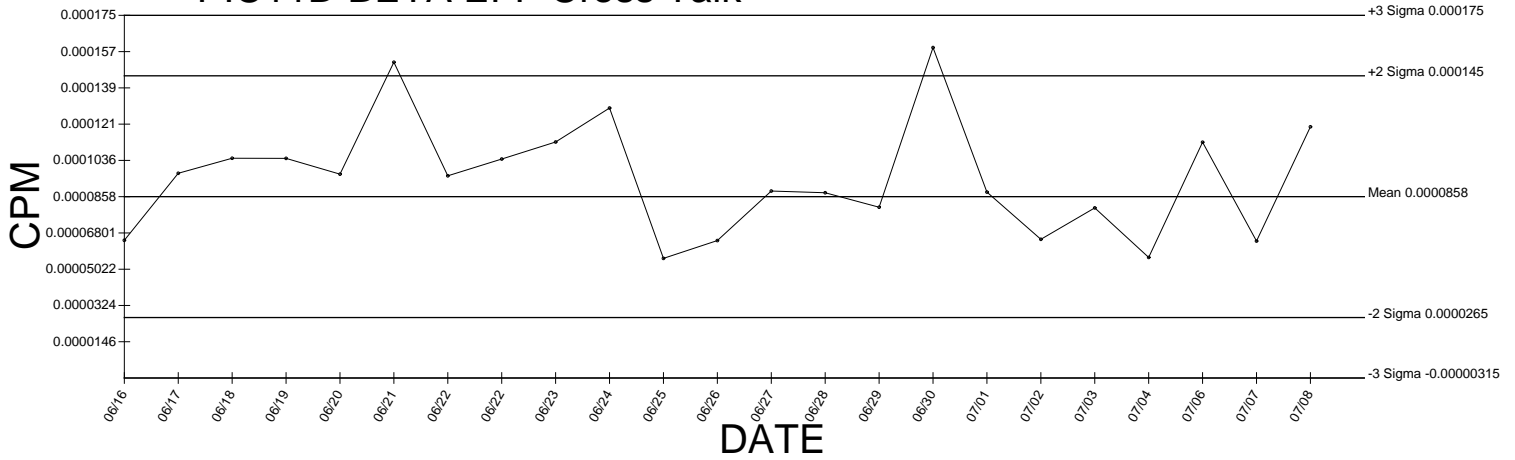
Generated 07/08/2009



# PIC11D BETA EFF



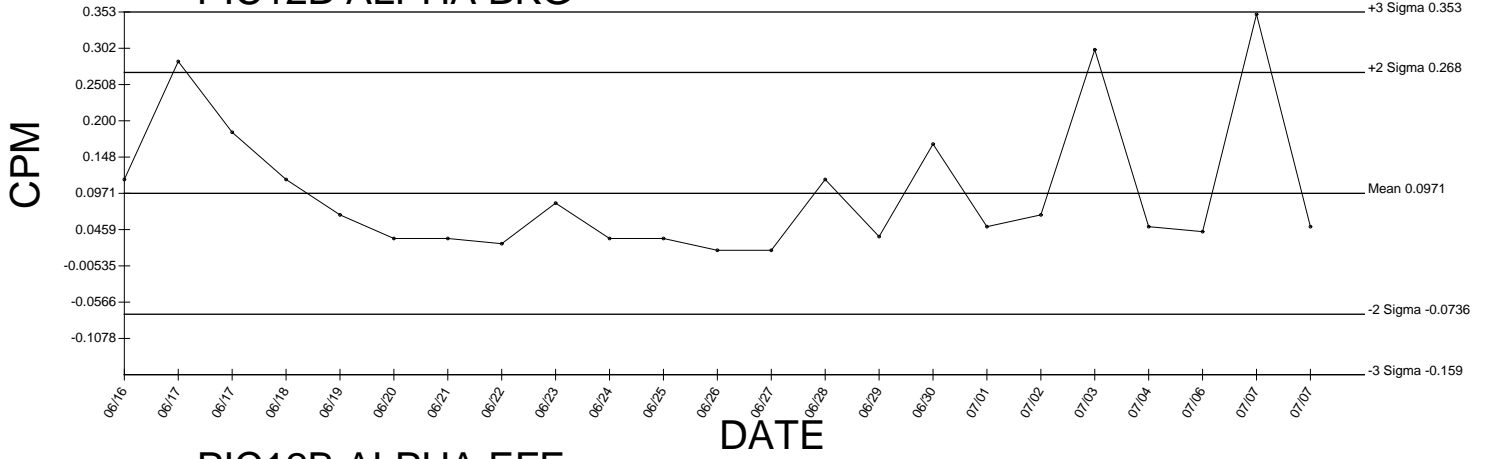
# PIC11D BETA EFF Cross Talk



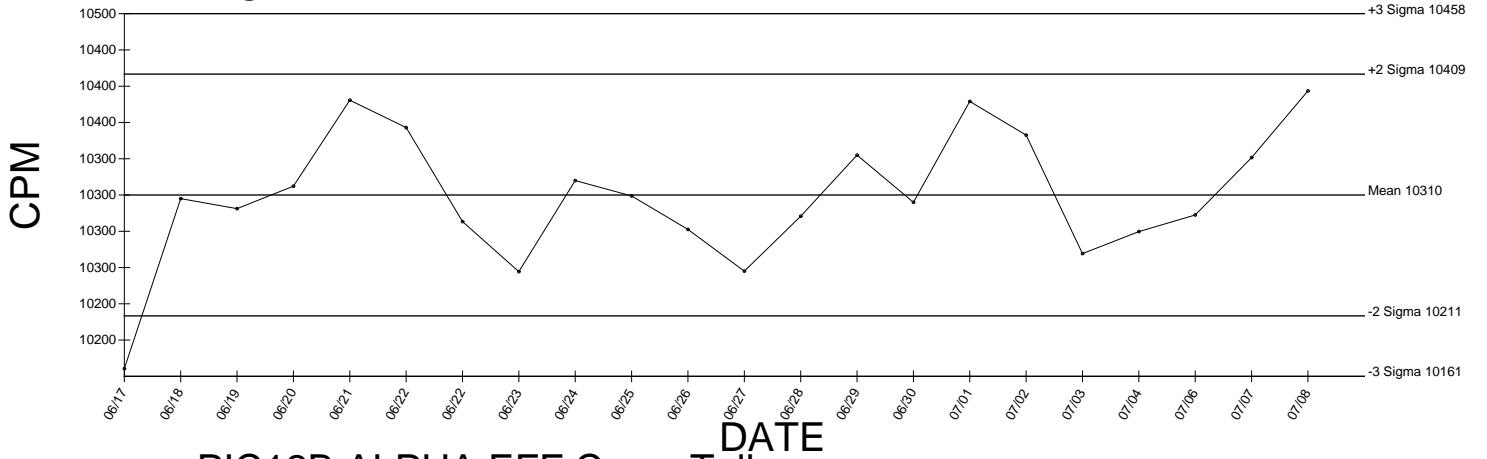
● Denotes Outlier



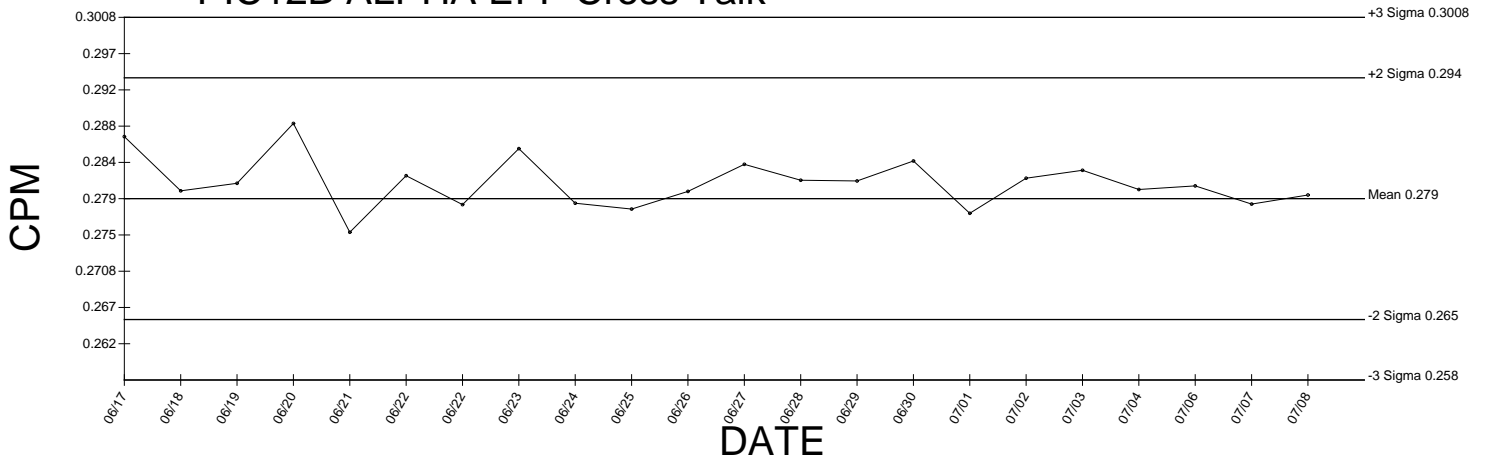
### PIC12B ALPHA BKG



### PIC12B ALPHA EFF

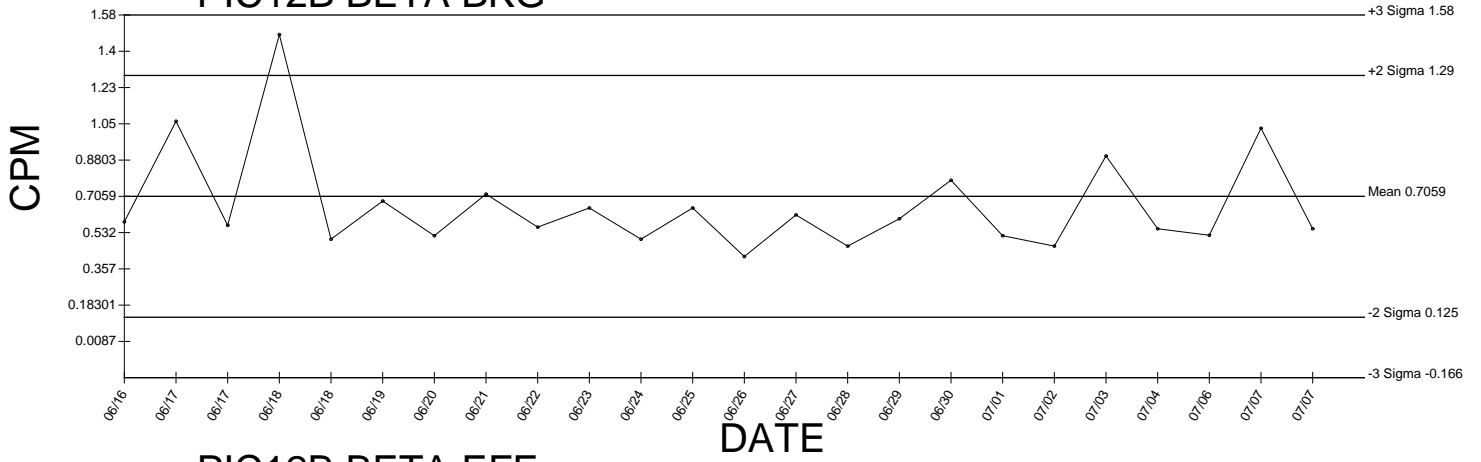


### PIC12B ALPHA EFF Cross Talk

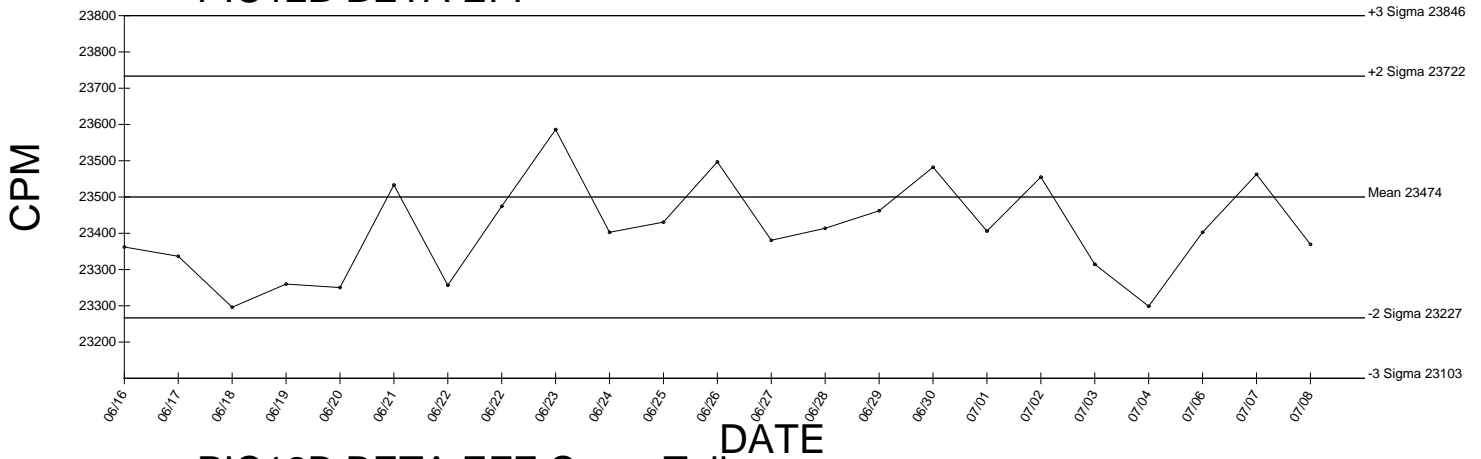


● Denotes Outlier

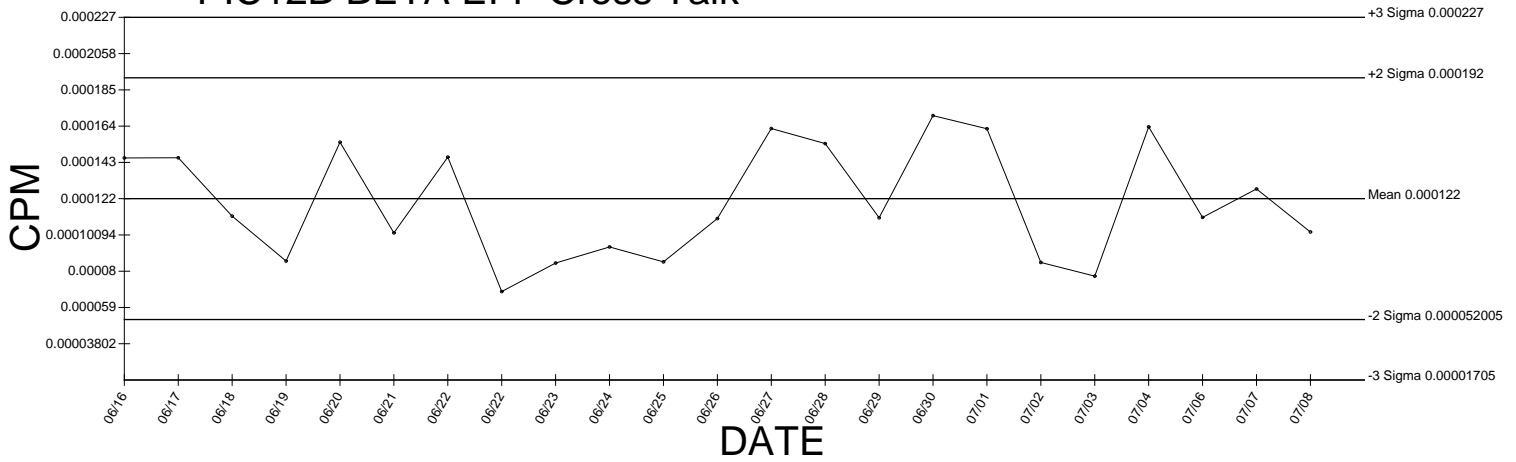
### PIC12B BETA BKG



### PIC12B BETA EFF



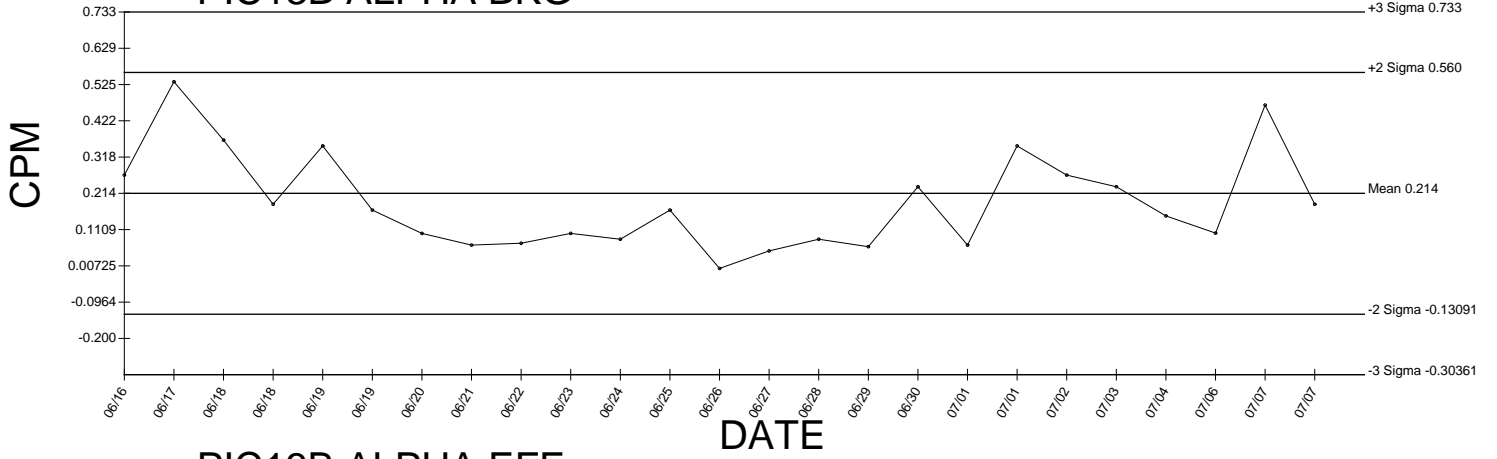
### PIC12B BETA EFF Cross Talk



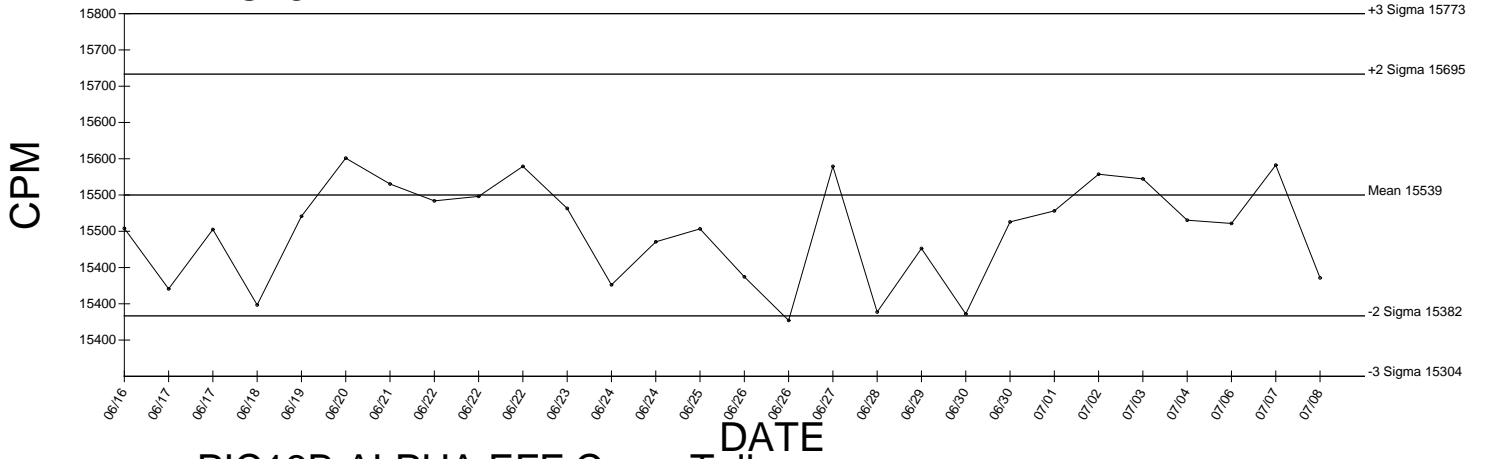
● Denotes Outlier

# PIC13B ALPHA BKG

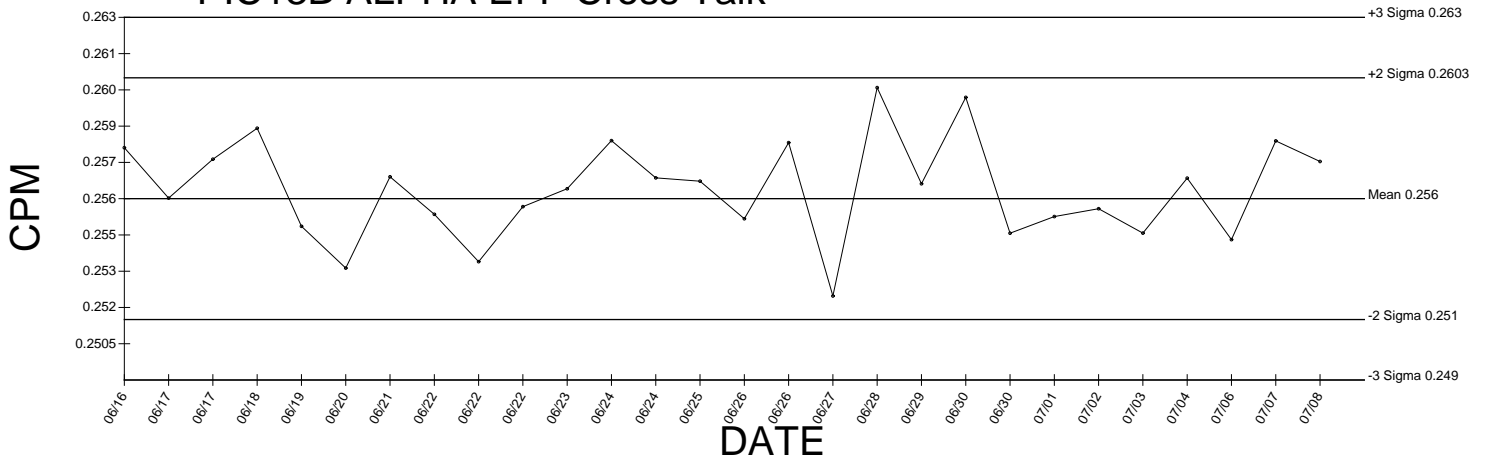
Generated 07/08/2009



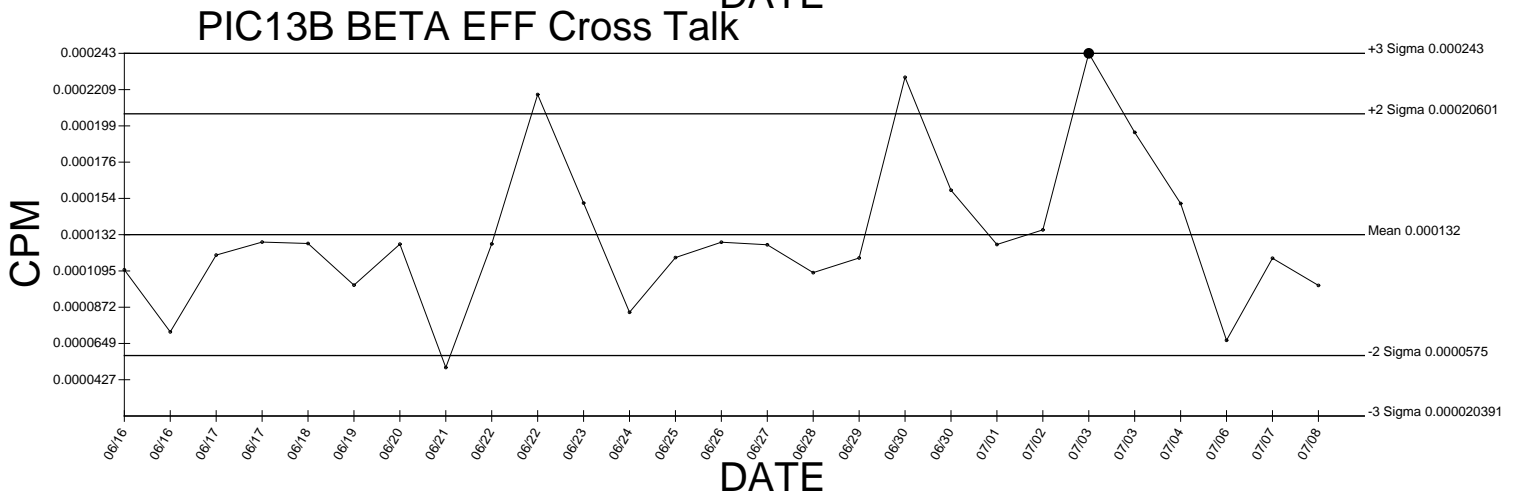
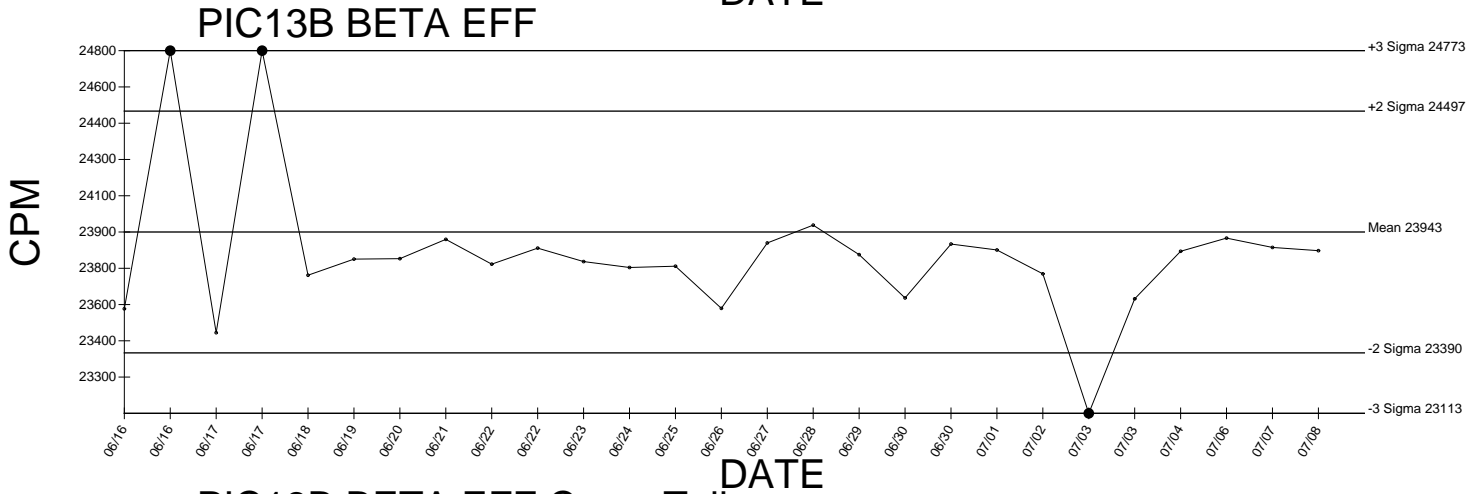
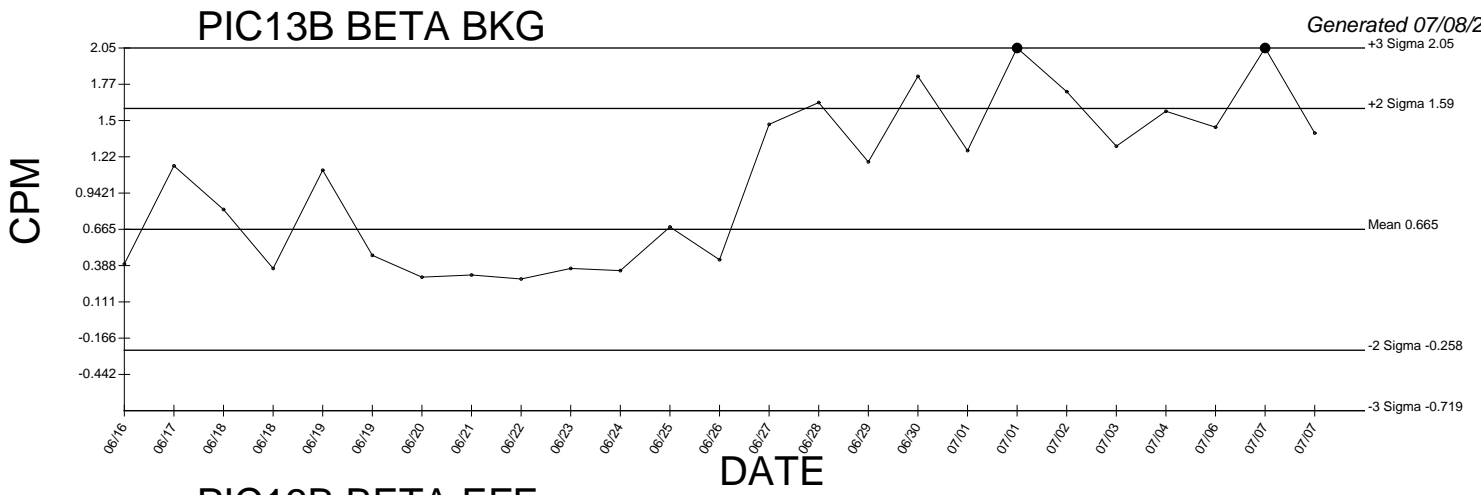
# PIC13B ALPHA EFF



# PIC13B ALPHA EFF Cross Talk

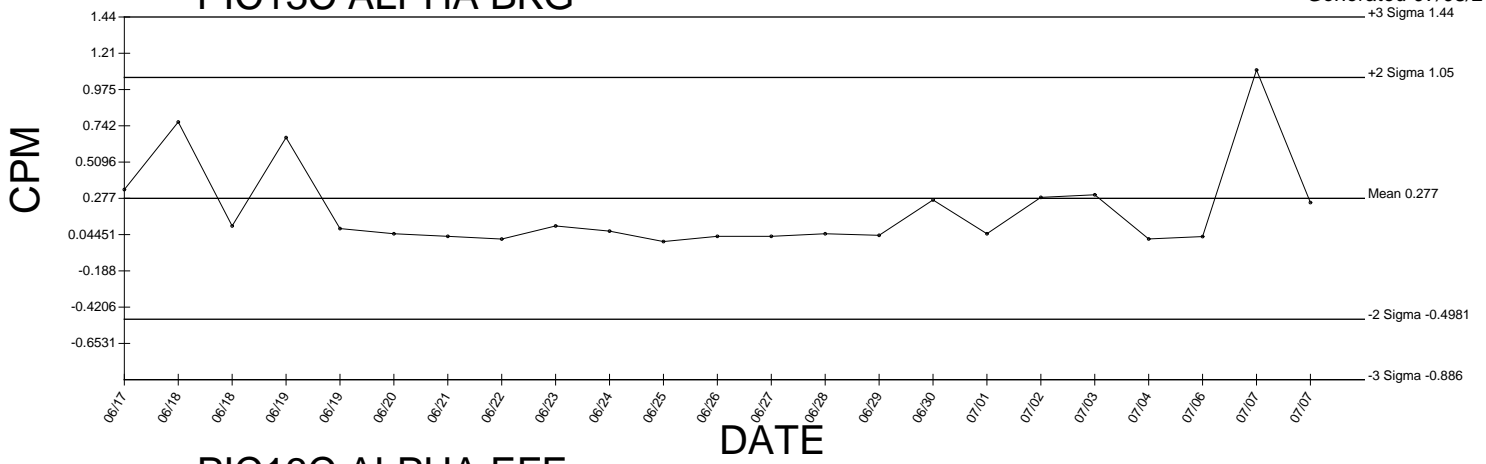


● Denotes Outlier

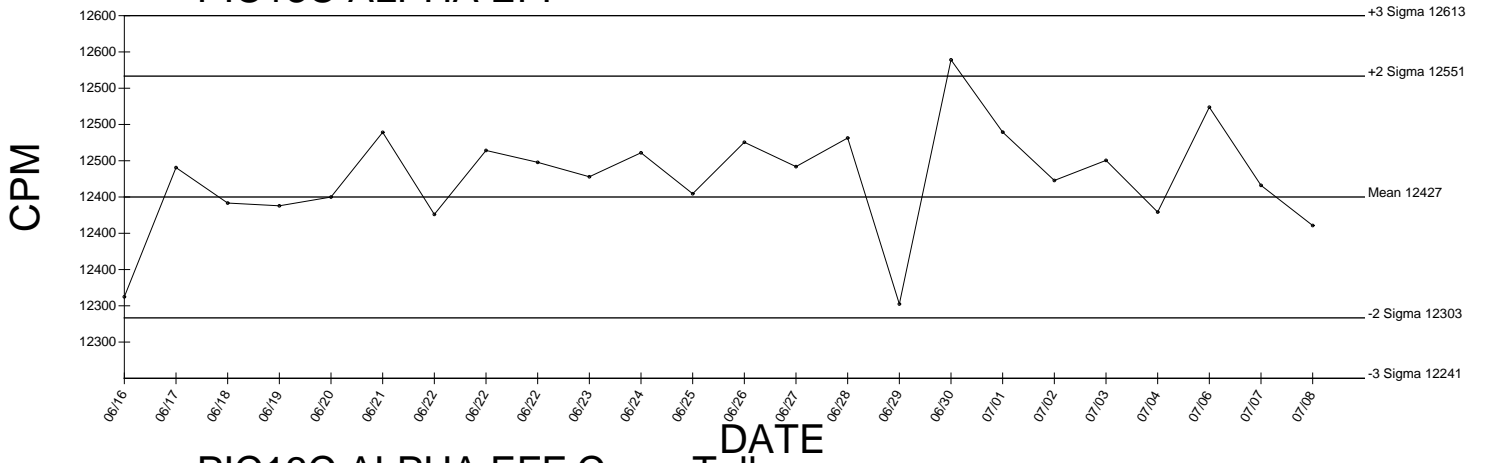


● Denotes Outlier

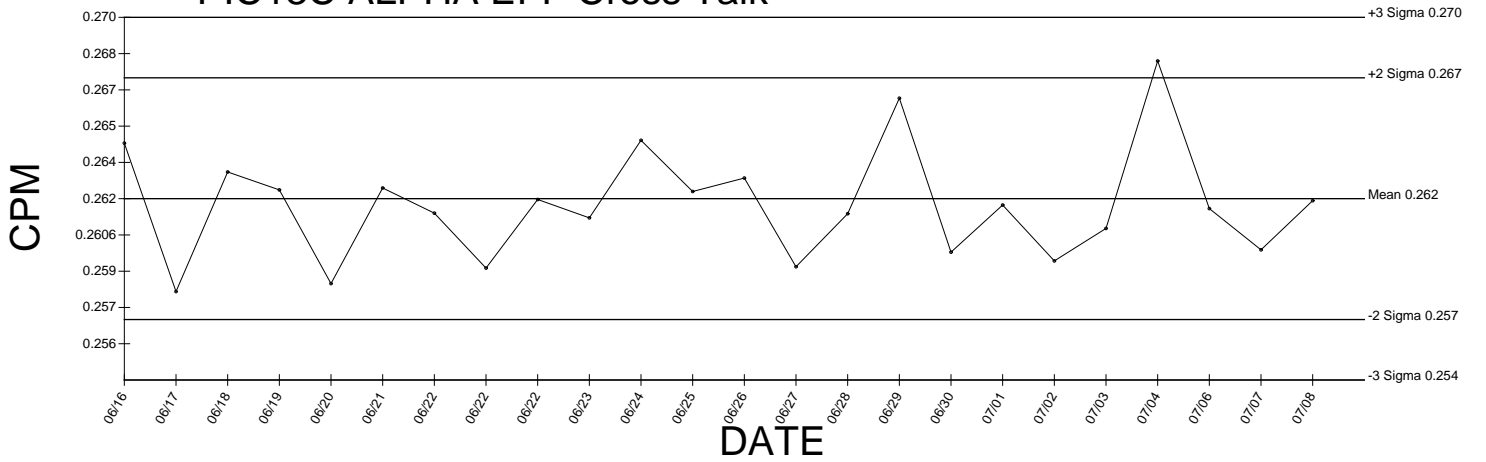
### PIC13C ALPHA BKG



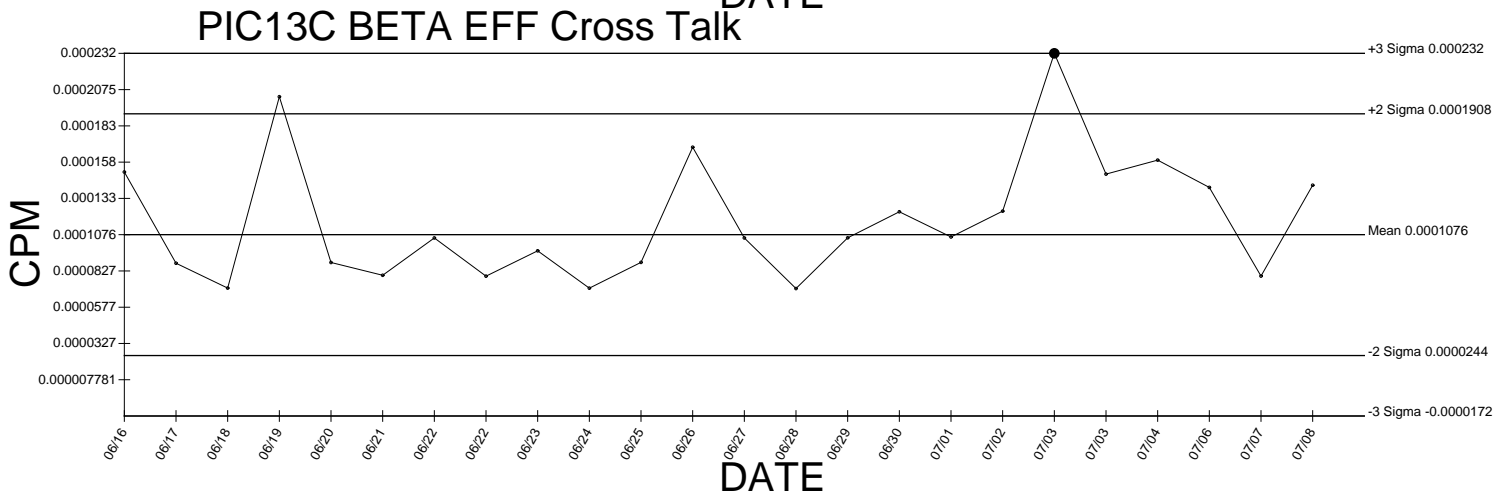
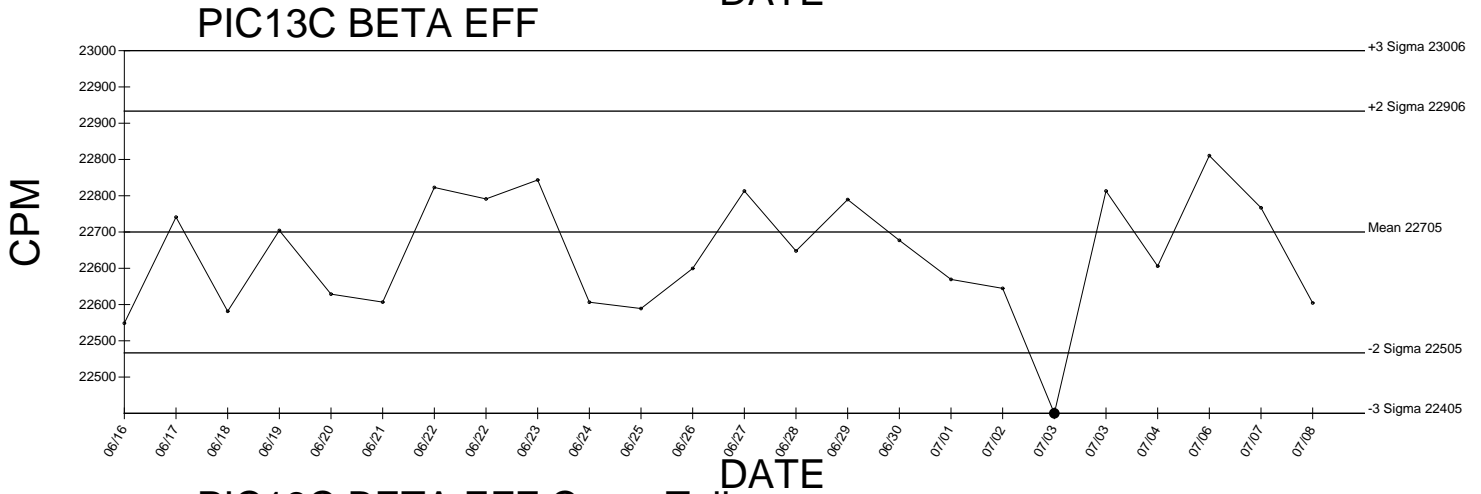
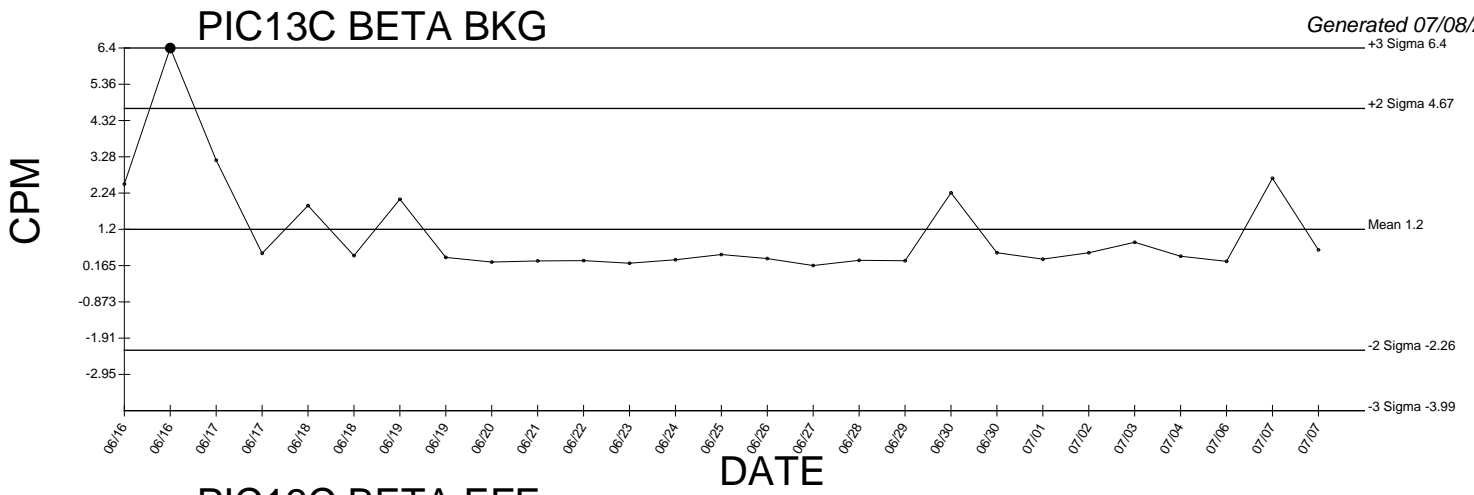
### PIC13C ALPHA EFF



### PIC13C ALPHA EFF Cross Talk

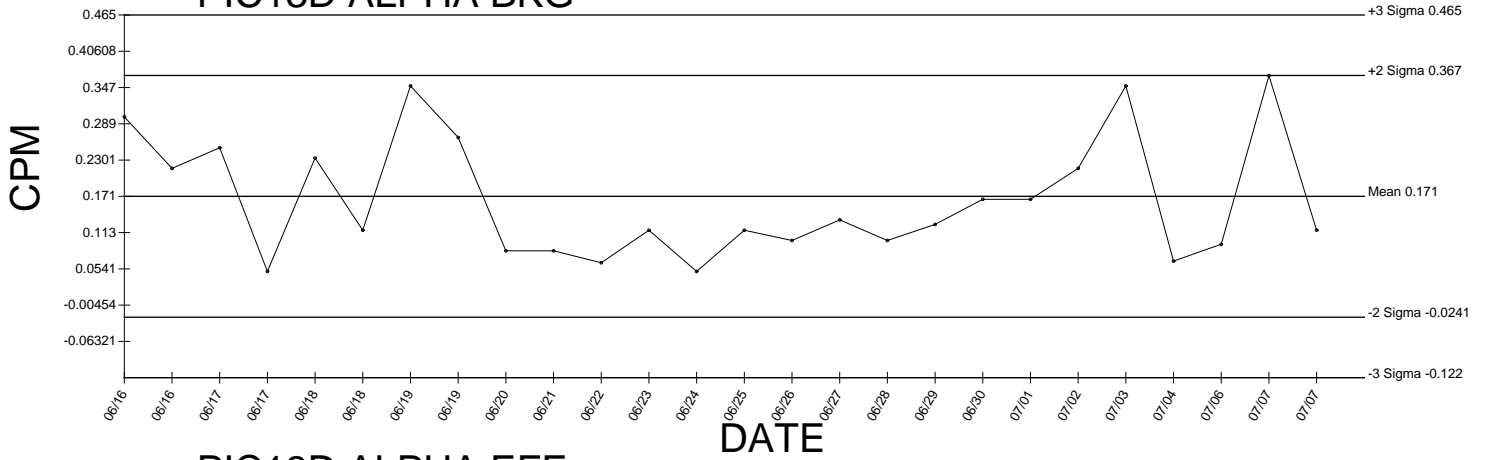


● Denotes Outlier

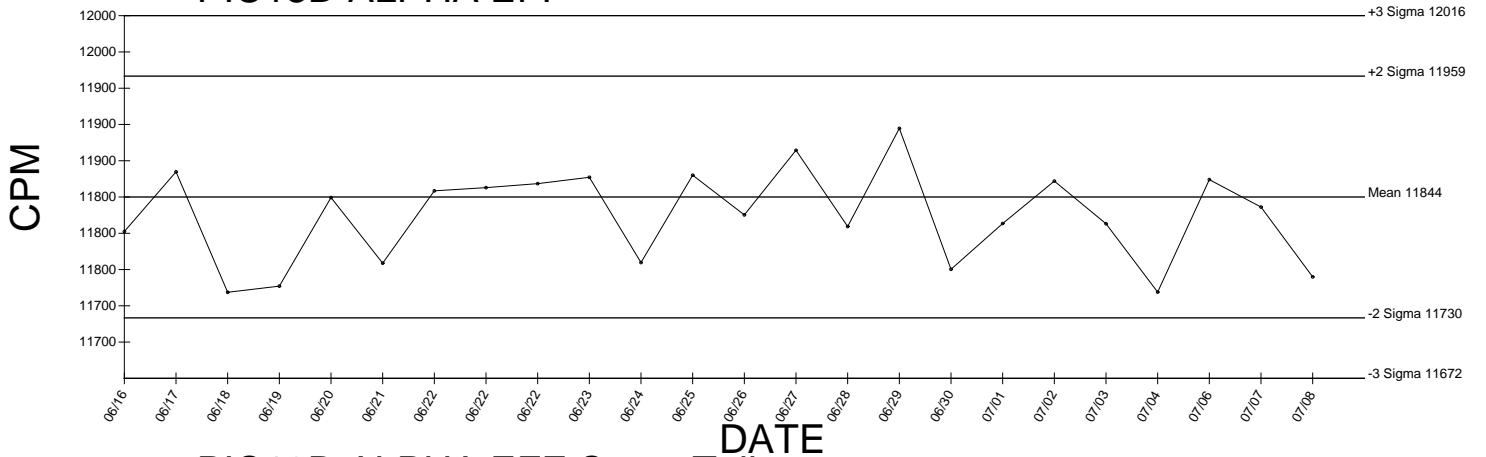


● Denotes Outlier

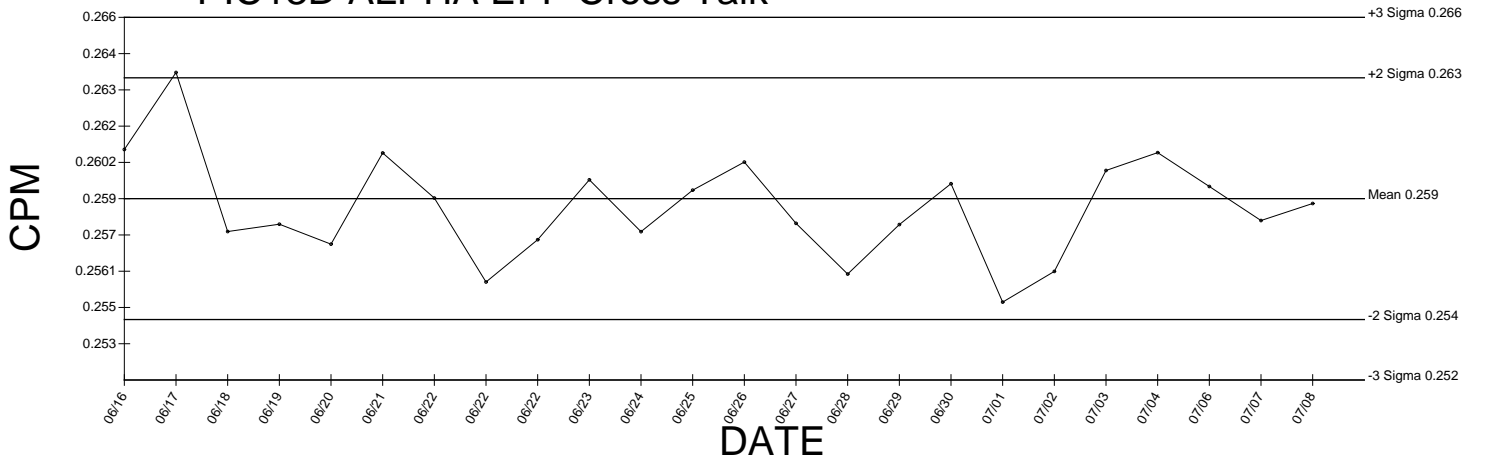
### PIC13D ALPHA BKG



### PIC13D ALPHA EFF



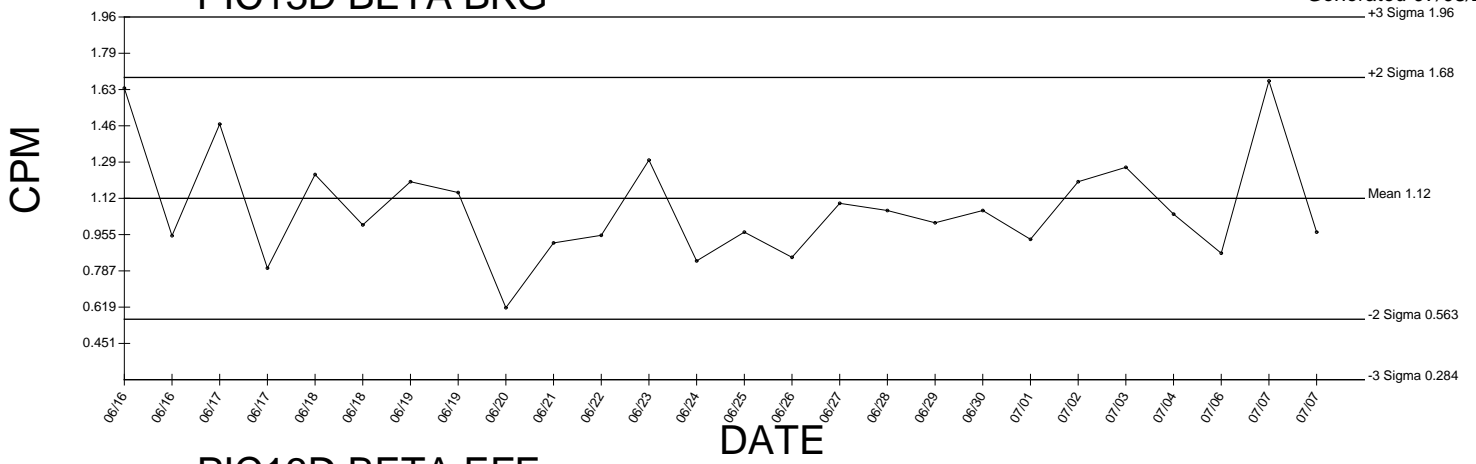
### PIC13D ALPHA EFF Cross Talk



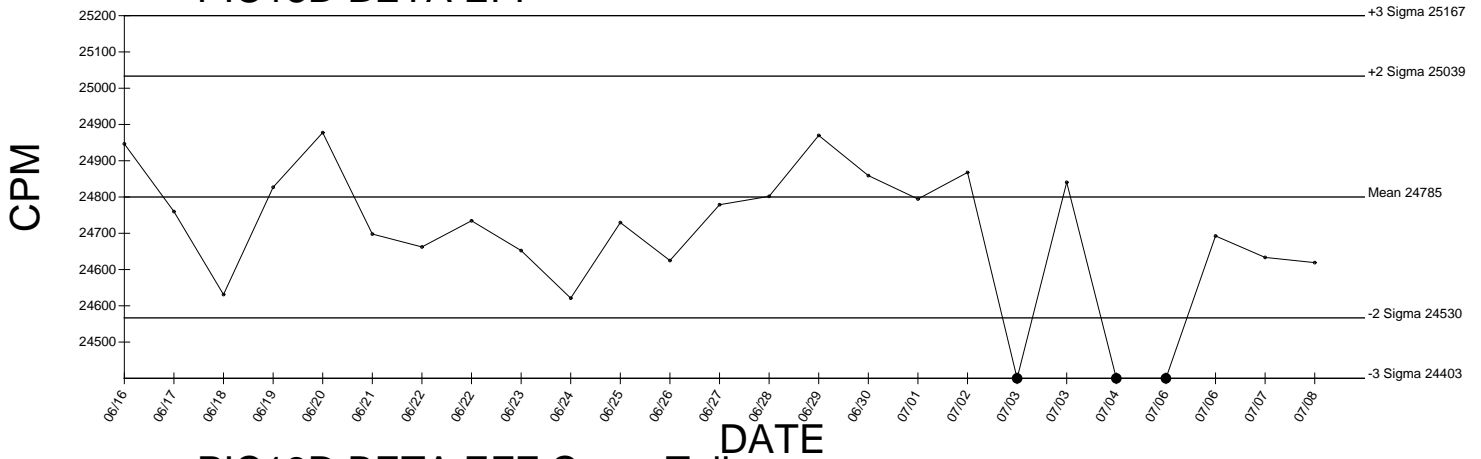
● Denotes Outlier

# PIC13D BETA BKG

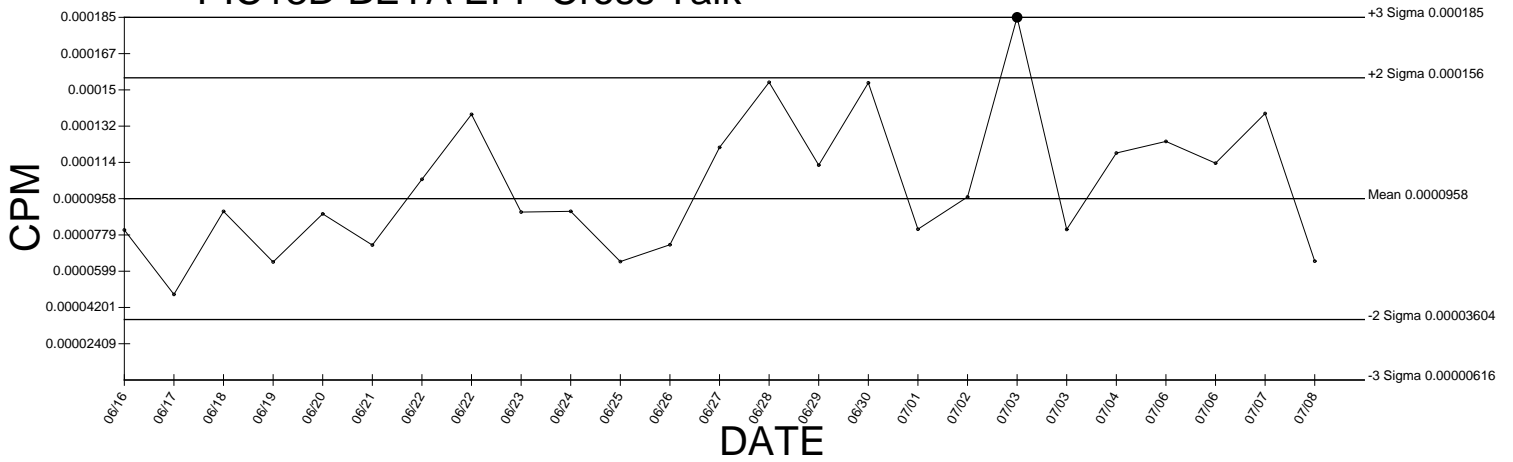
Generated 07/08/2009



# PIC13D BETA EFF



# PIC13D BETA EFF Cross Talk

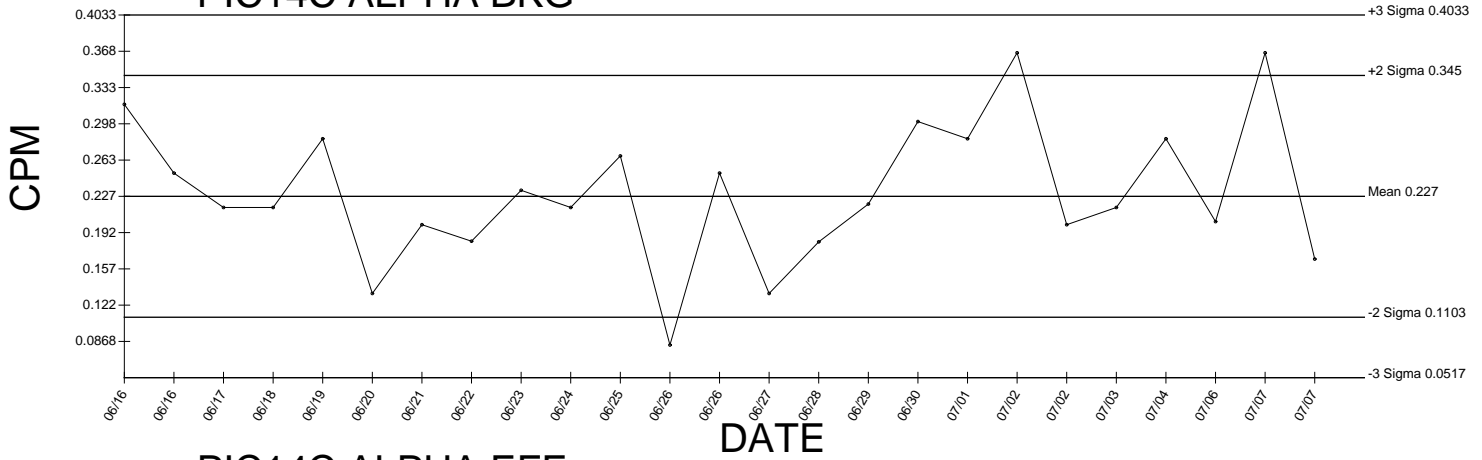


● Denotes Outlier

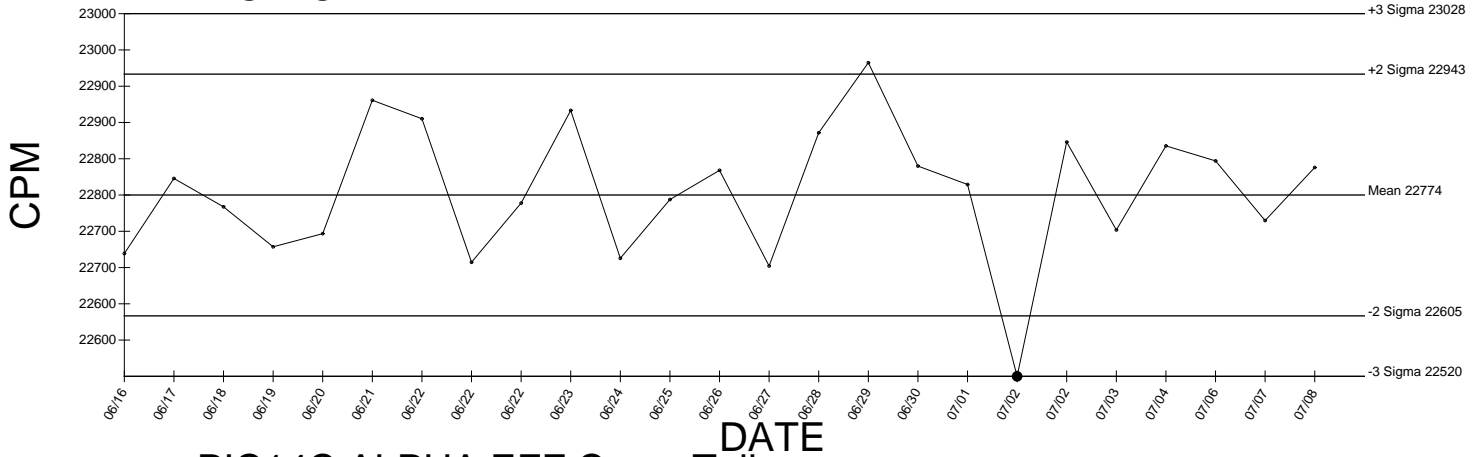


# PIC14C ALPHA BKG

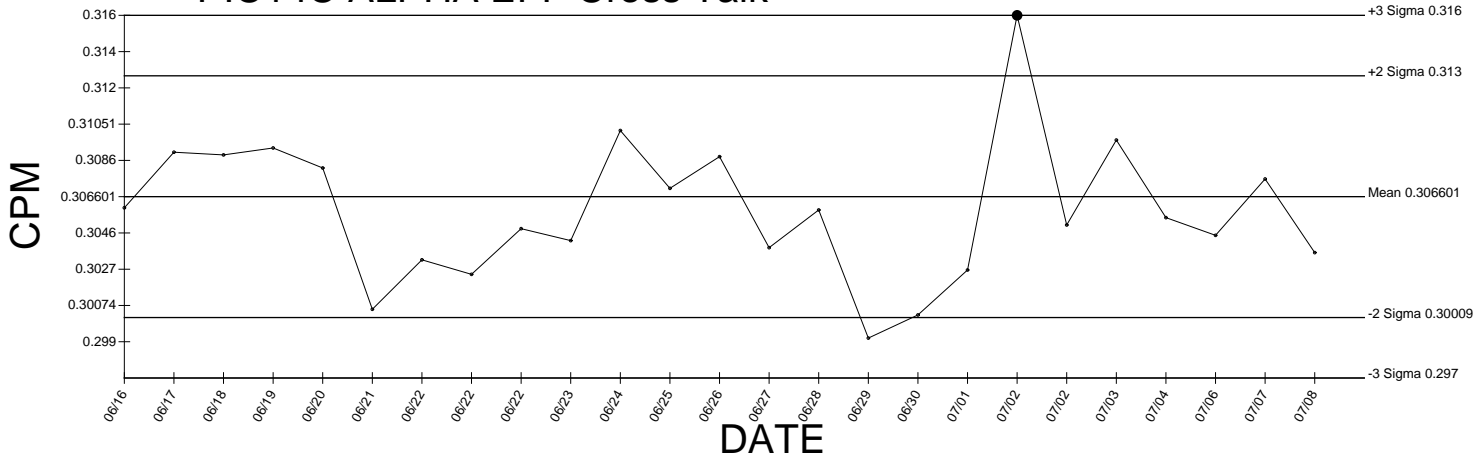
Generated 07/08/2009



# PIC14C ALPHA EFF



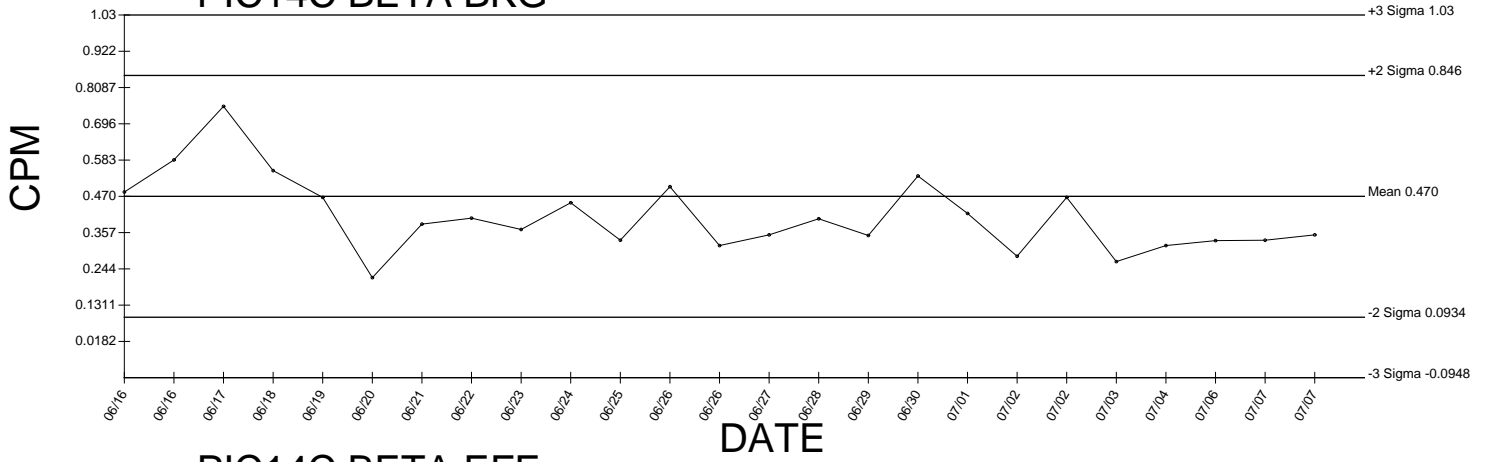
# PIC14C ALPHA EFF Cross Talk



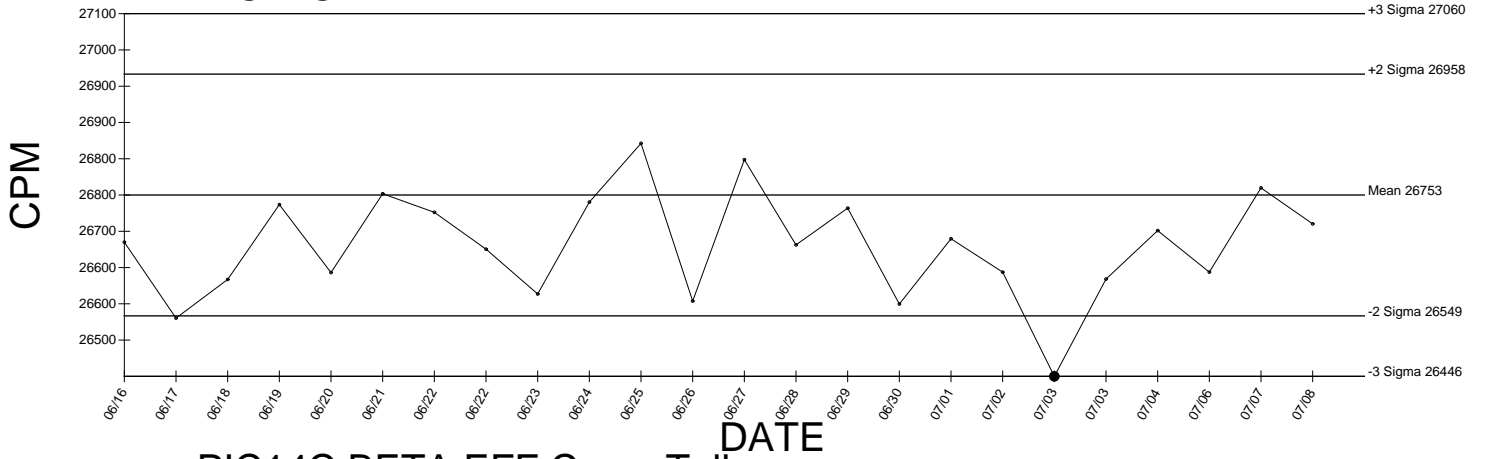
● Denotes Outlier

# PIC14C BETA BKG

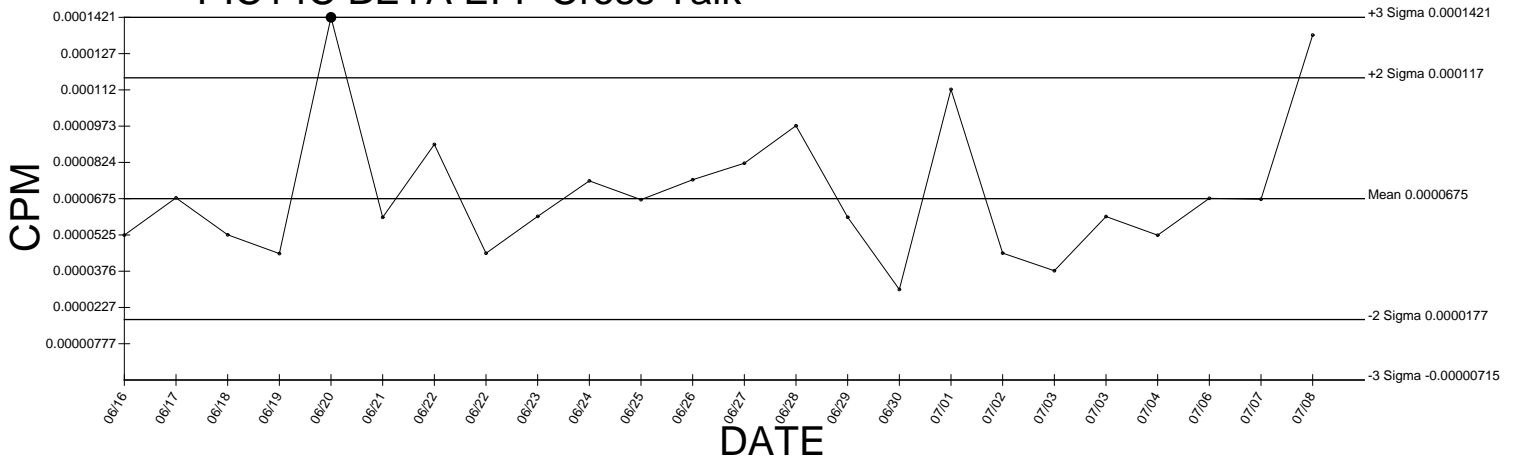
Generated 07/08/2009



# PIC14C BETA EFF

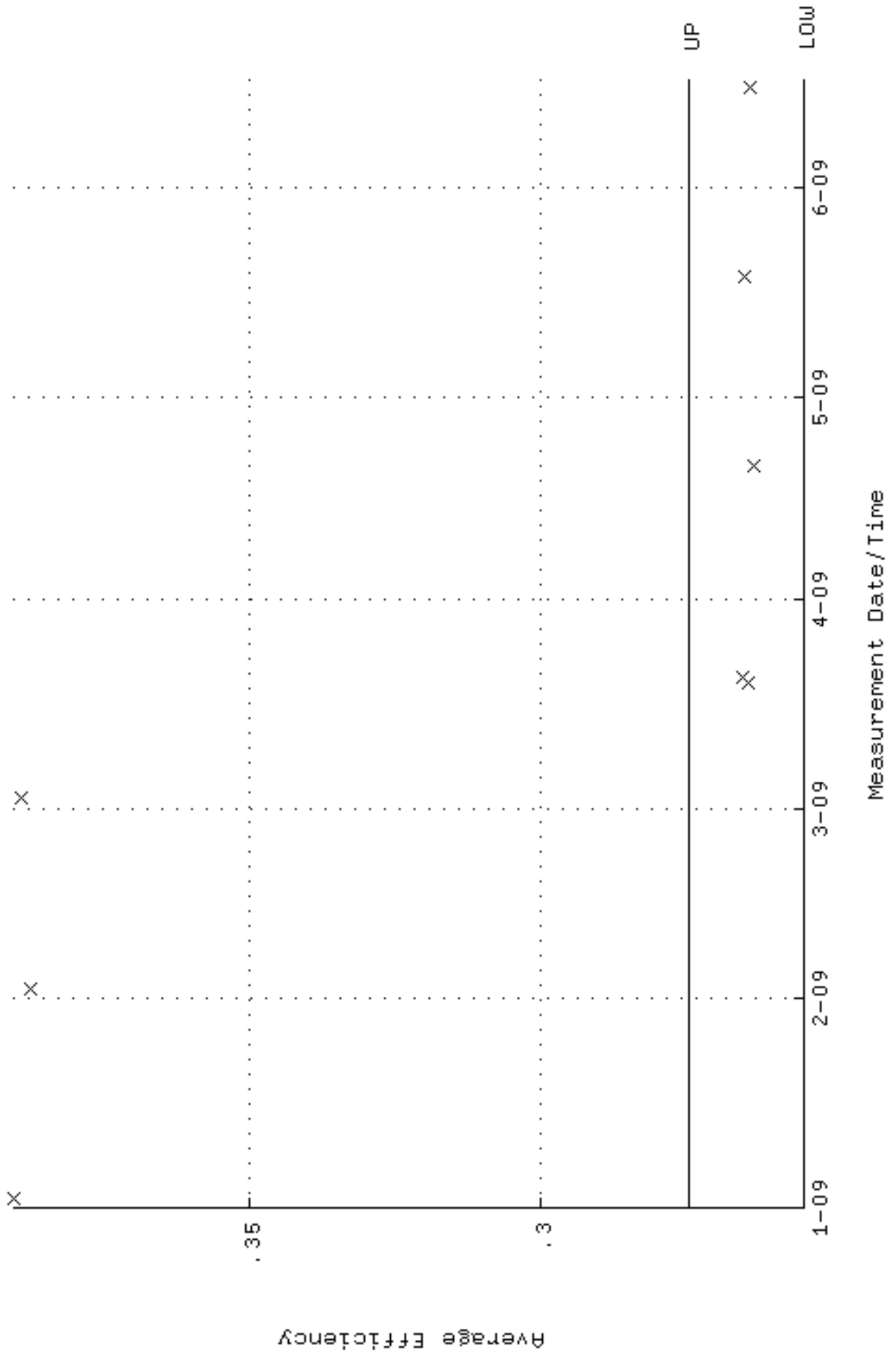


# PIC14C BETA EFF Cross Talk

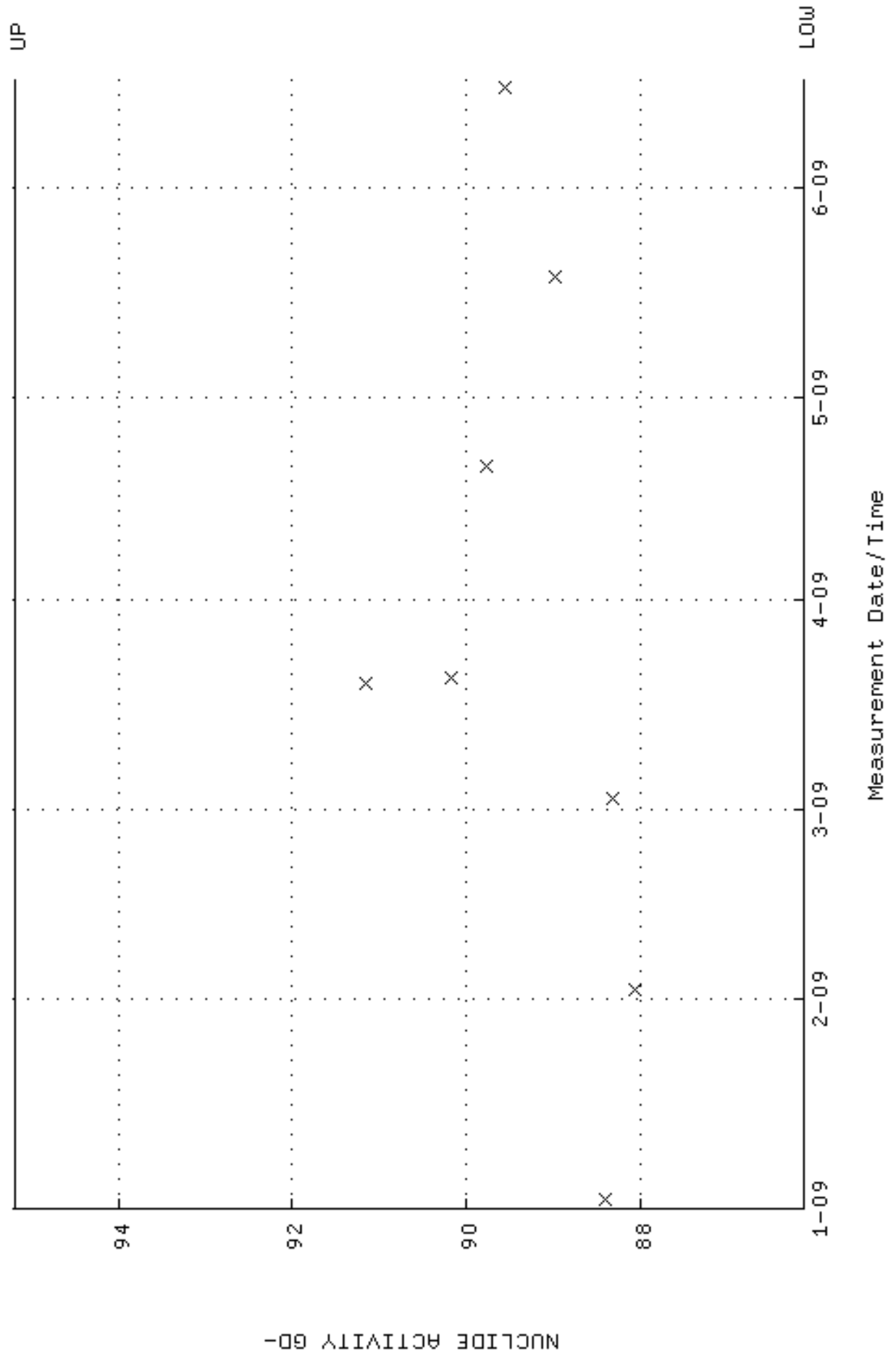


● Denotes Outlier

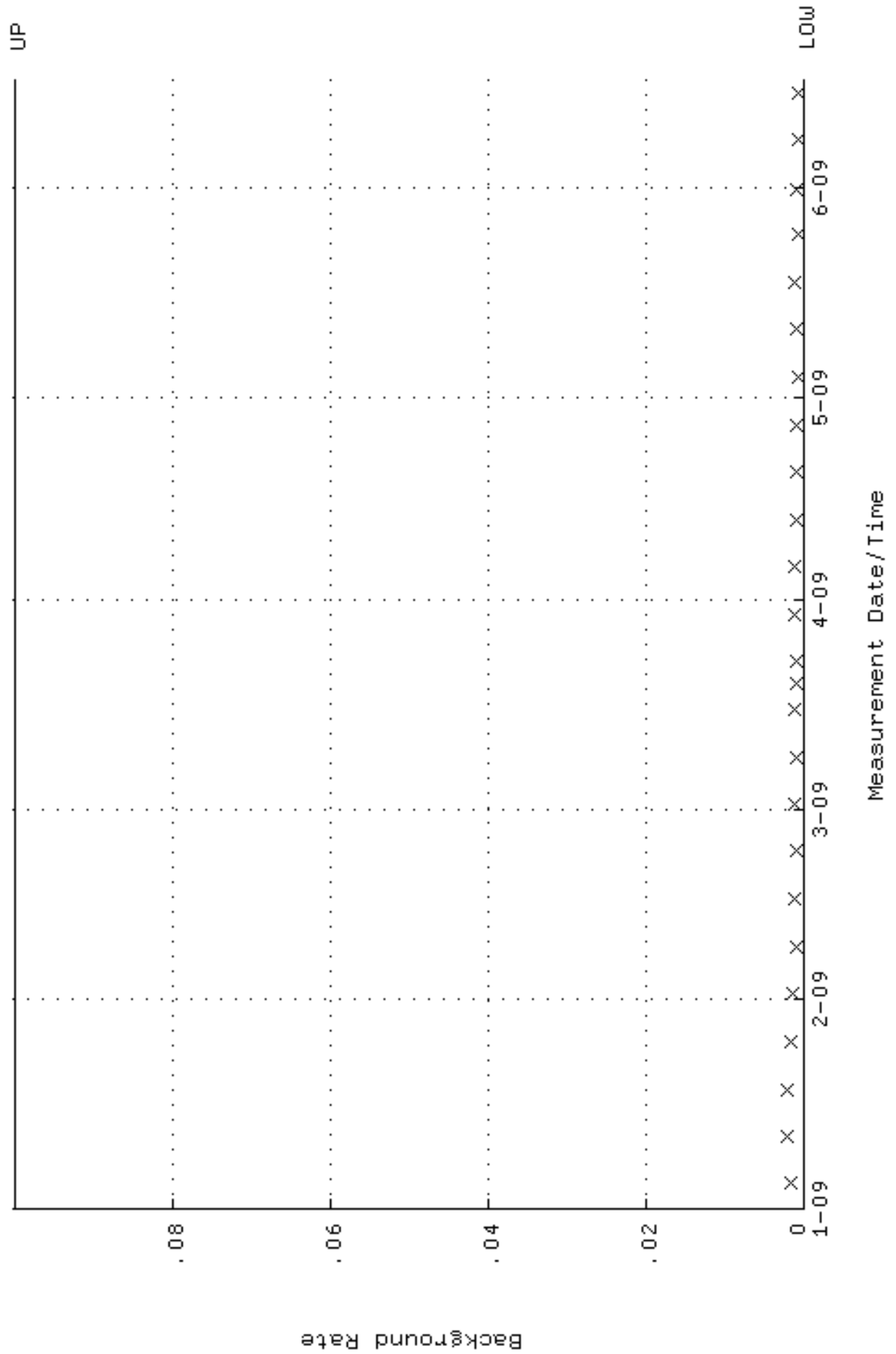
QA filename : DKA100:[ENV\_ALPHA.QA.W]W115.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:22:48 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.255018 through 0.275018



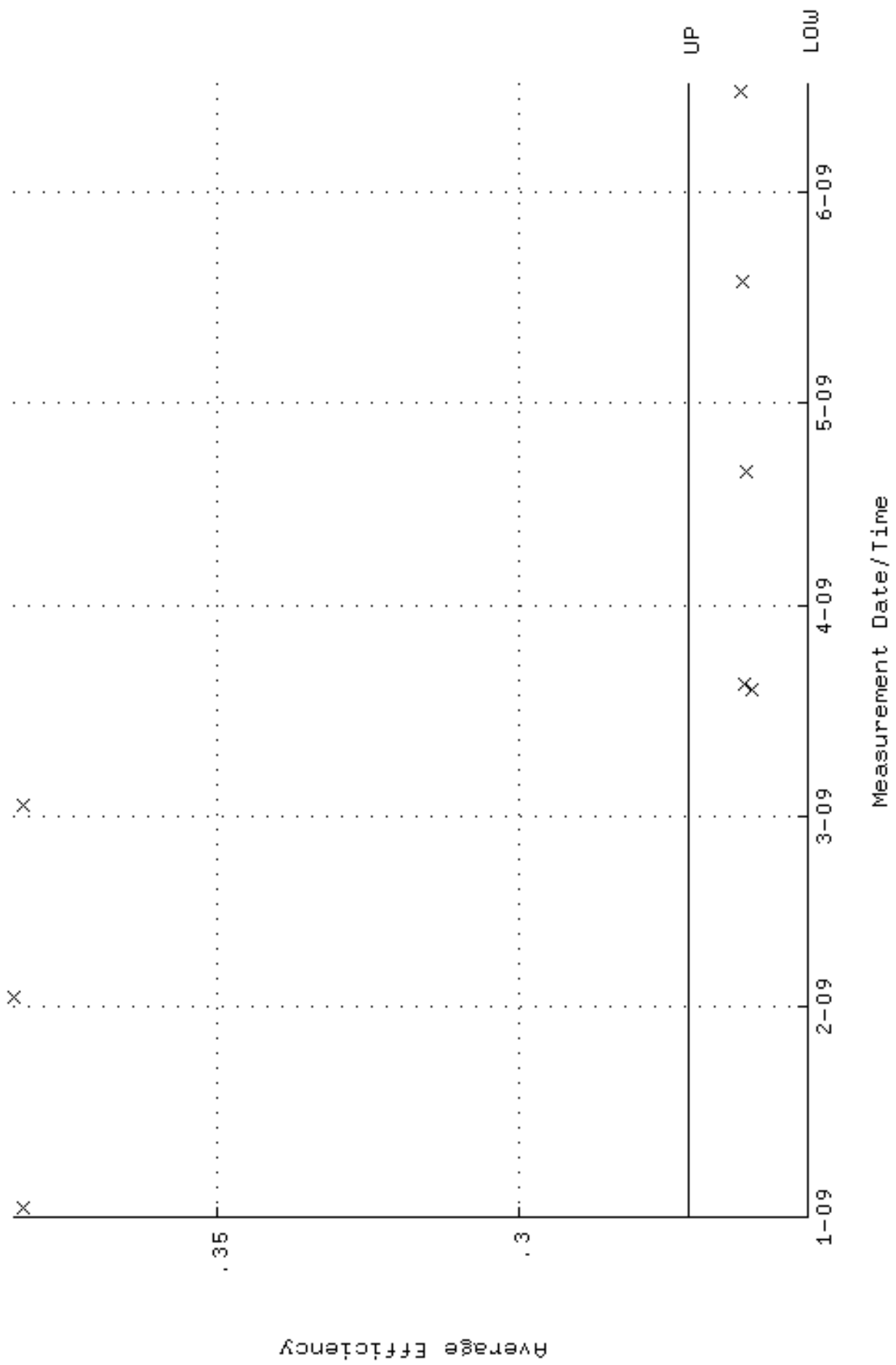
QA filename : DKA100:[ENV\_ALPHA.QA.W]W115.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:22:48 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 86.1212 through 95.1866



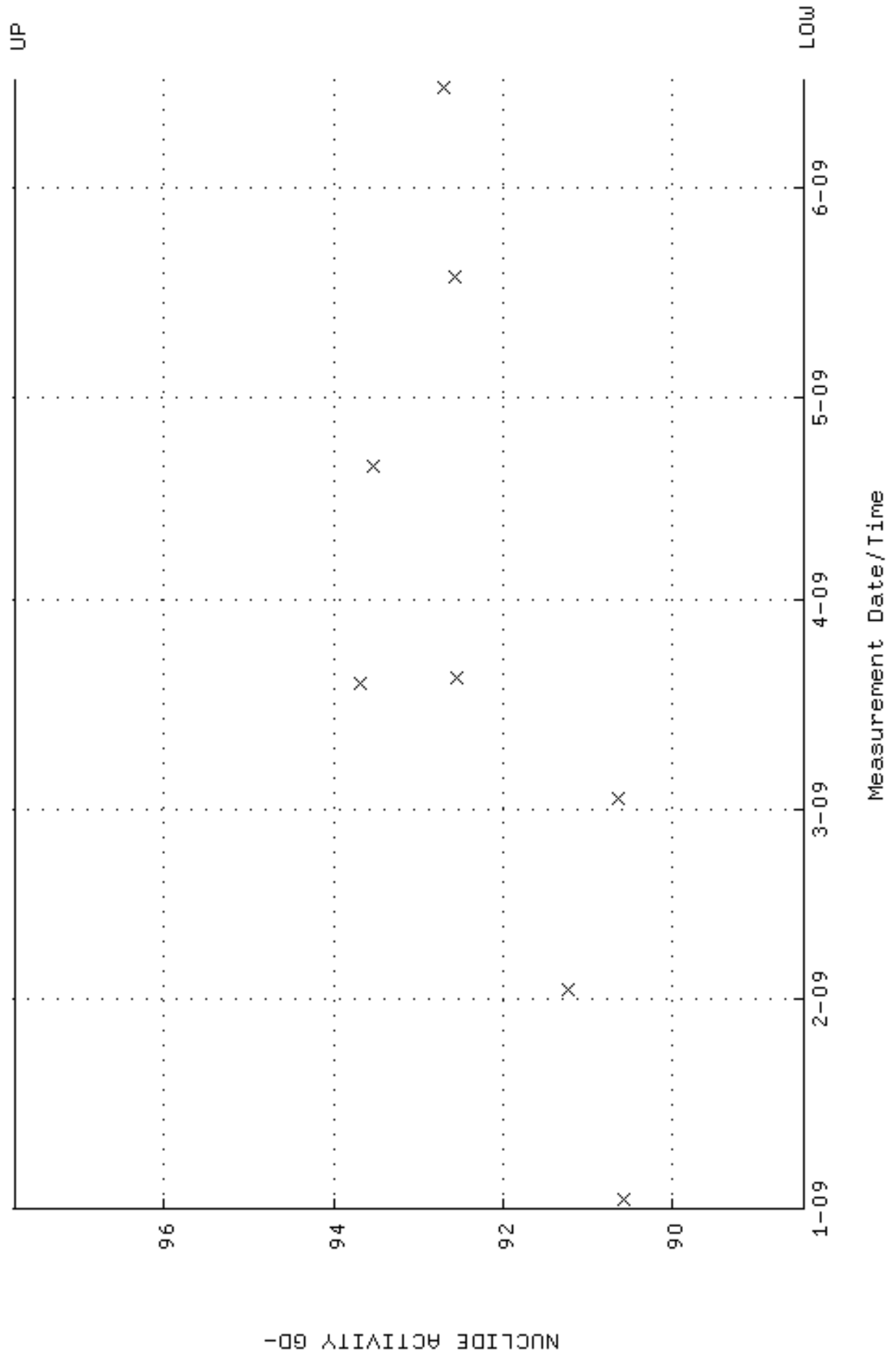
QA filename : DKA100:[ENV\_ALPHA.QA.B]B115.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:21:56 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



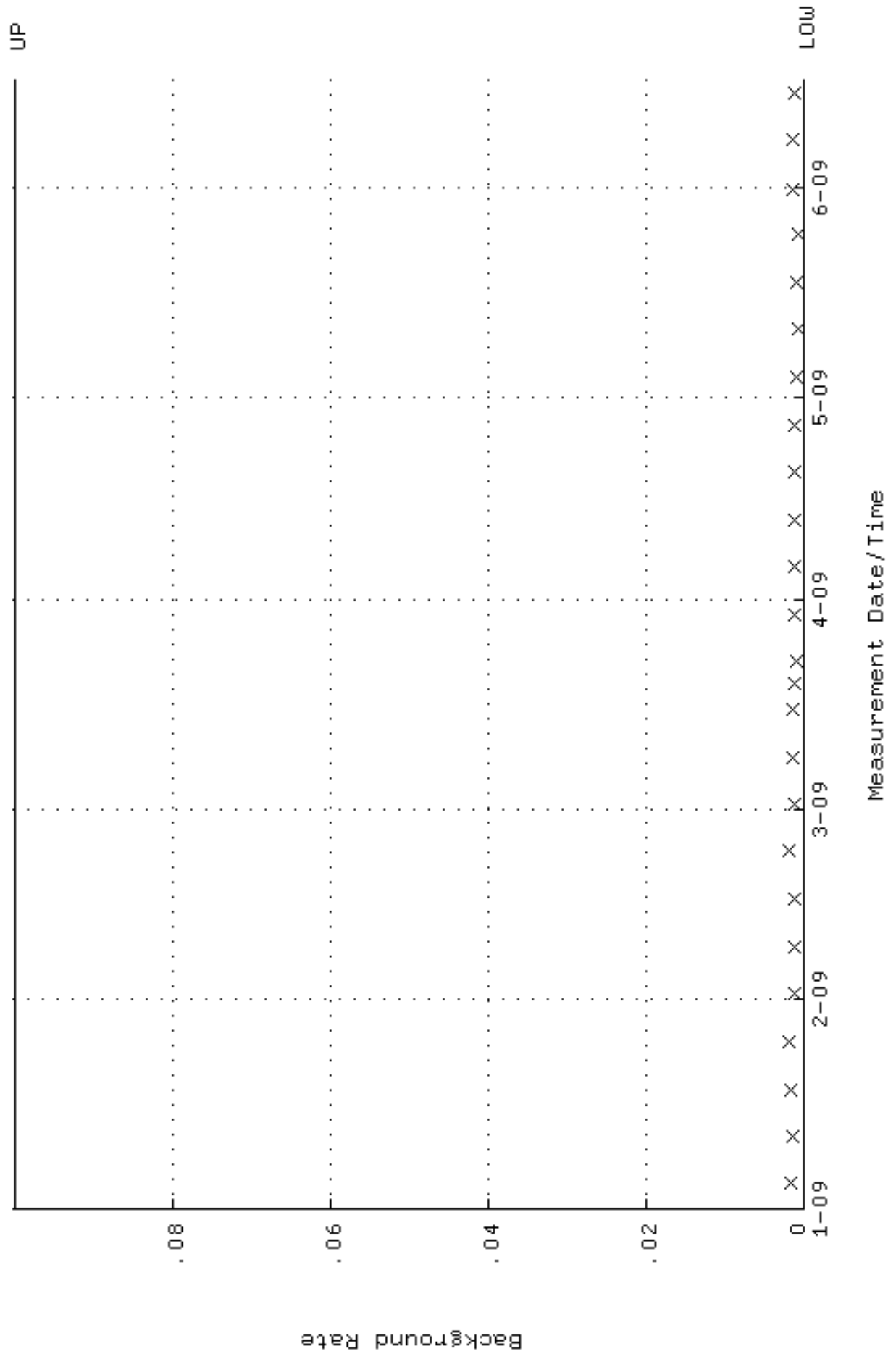
QA filename : DKA100:[ENV\_ALPHA.QA.W]W116.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:22:53 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.251950 through 0.271950



QA filename : DKA100:[ENV\_ALPHA.QA.W]W116.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:22:53 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 88.4515 through 97.7621

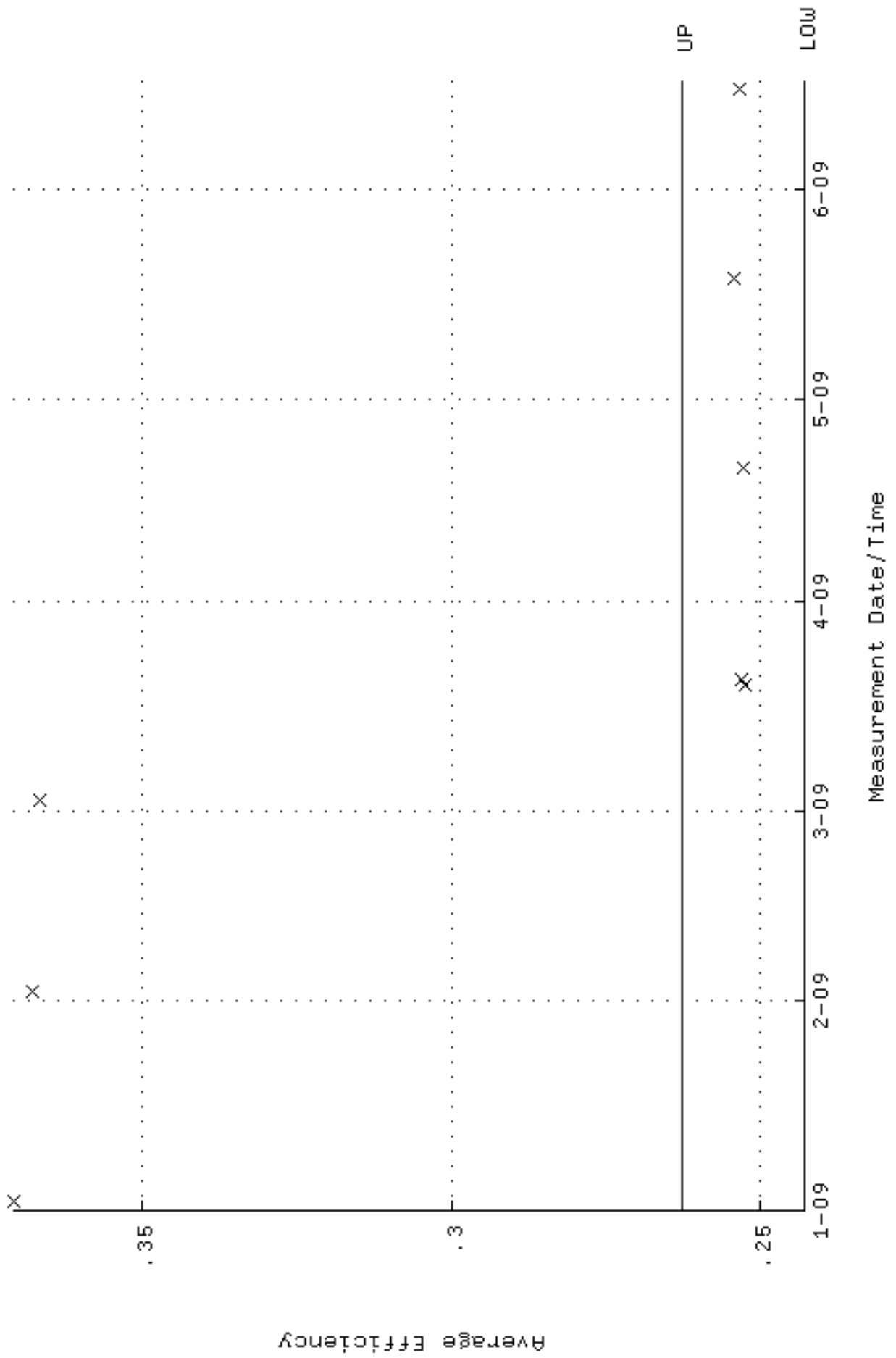


QA filename : DKA100:[ENV\_ALPHA.QA.B]B116.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:22:01 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

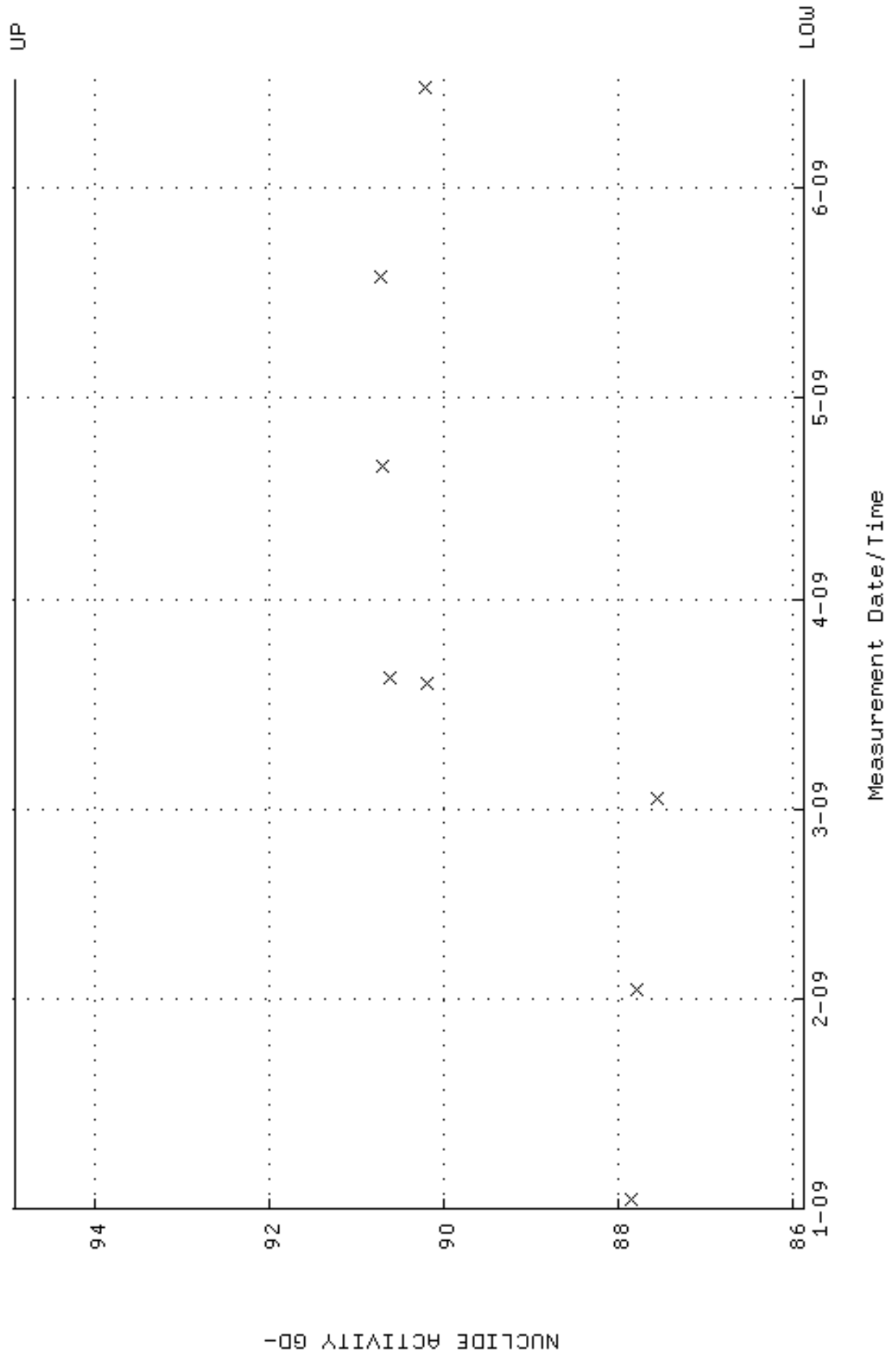




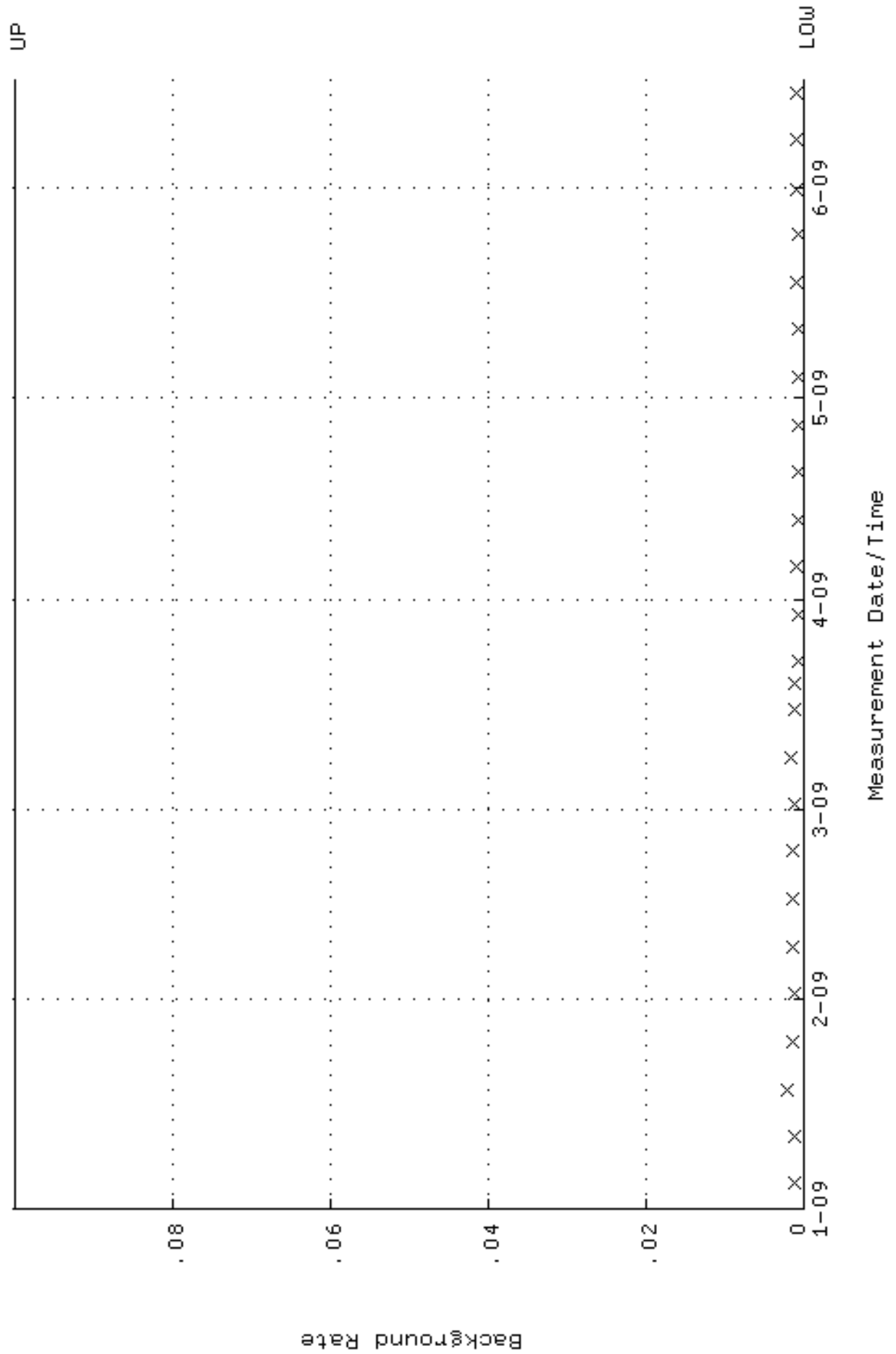
QA filename : DKA100:[ENV\_ALPHA.QA.W]W117.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:22:59 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.242940 through 0.262940



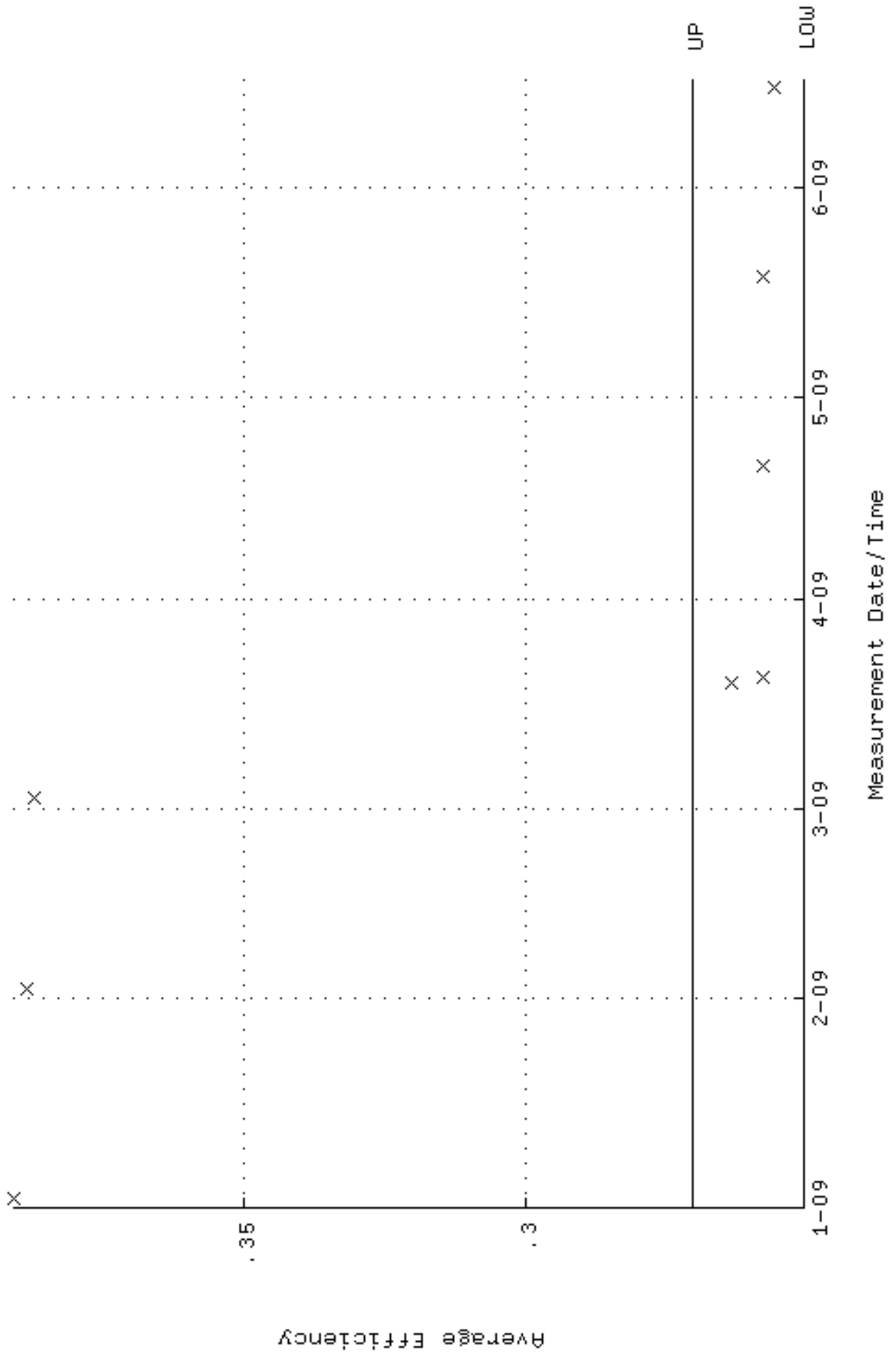
QA filename : DKA100:[ENV\_ALPHA.QA.W]W117.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:22:59 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 85.8693 through 94.9081



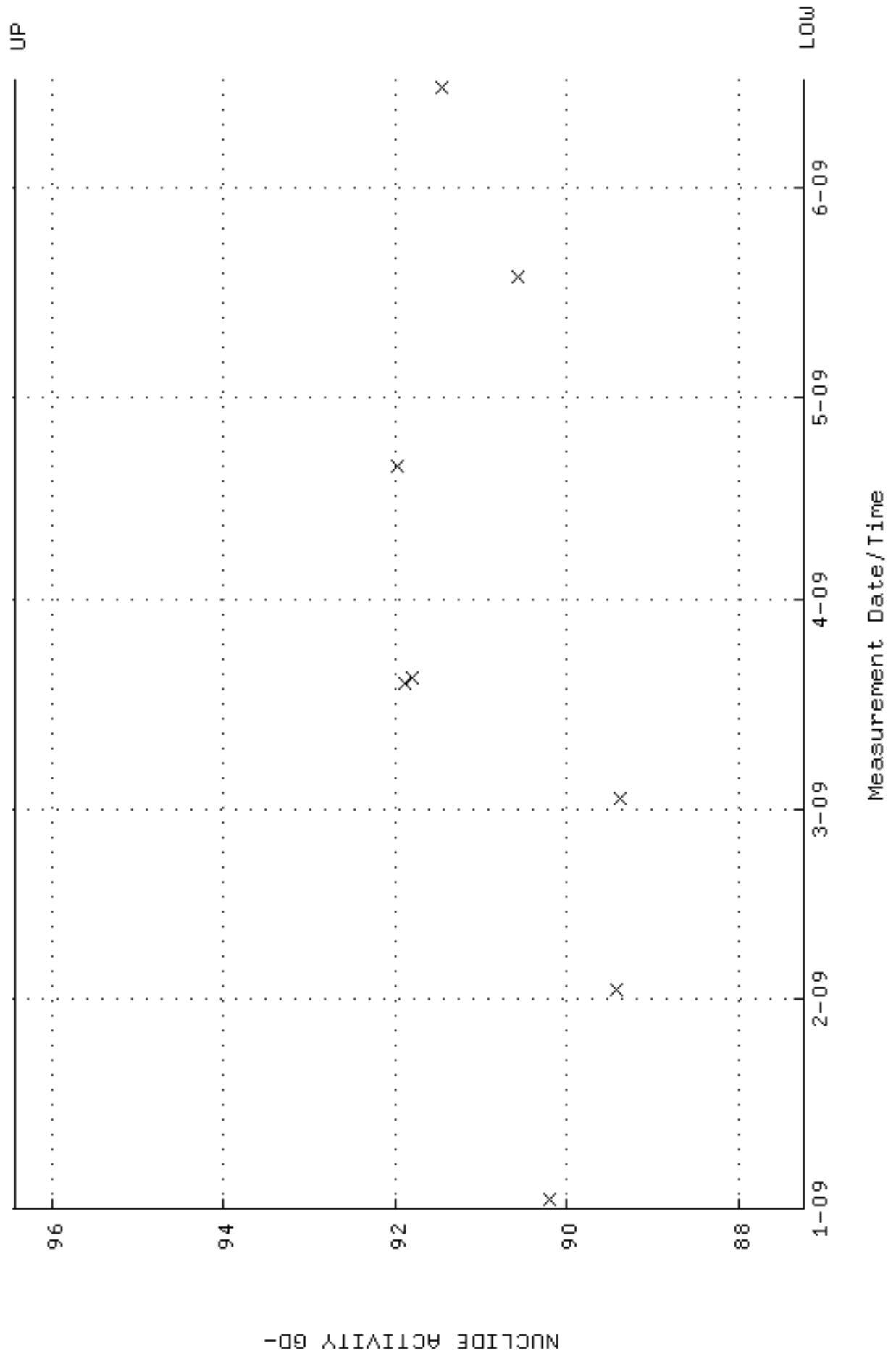
QA filename : DKA100:[ENV\_ALPHA.QA.B]B117.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:22:06 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



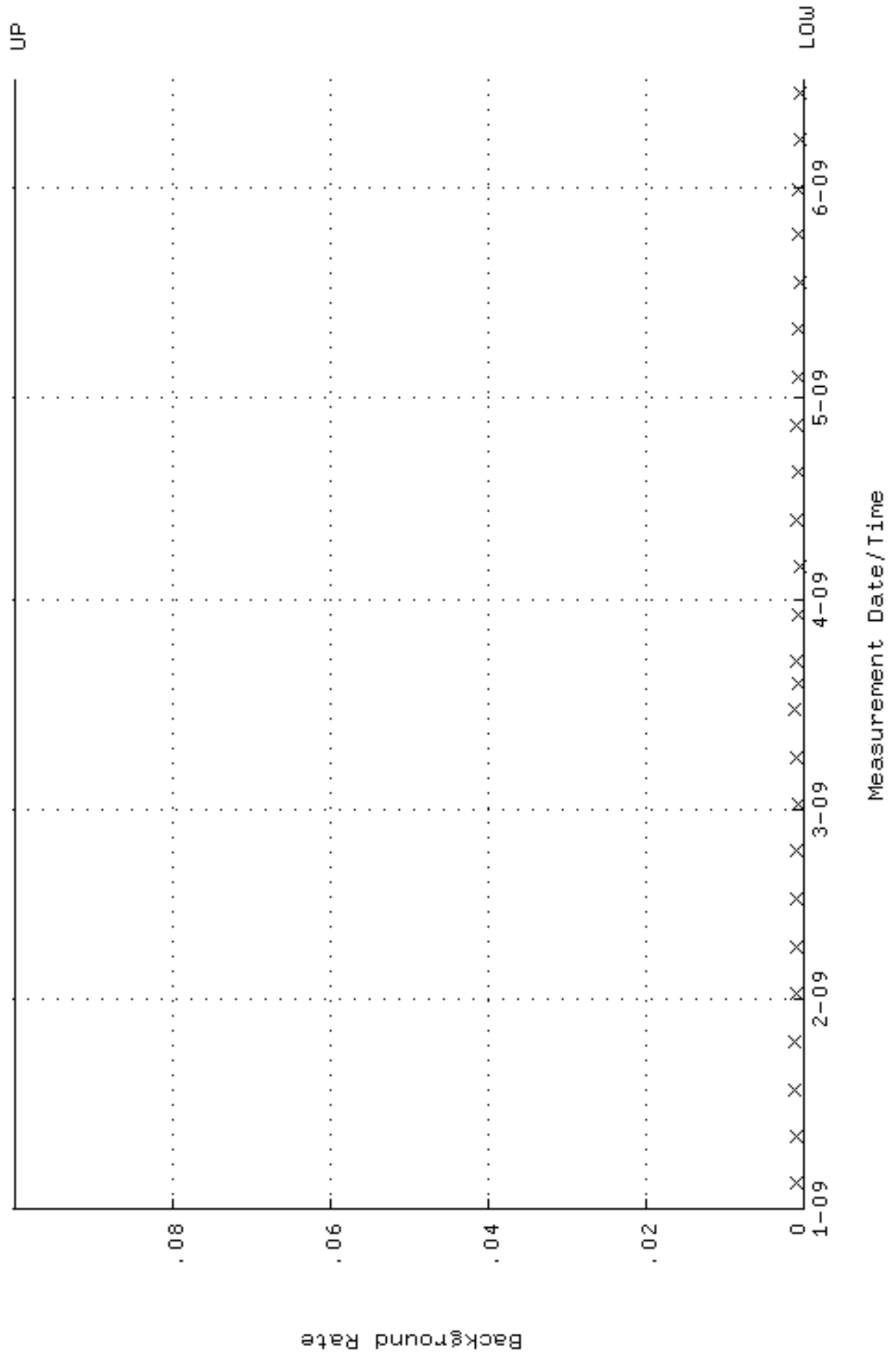
QA filename : DKA100:[ENV\_ALPHA.QA.W]W118.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:23:04 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.250490 through 0.270490



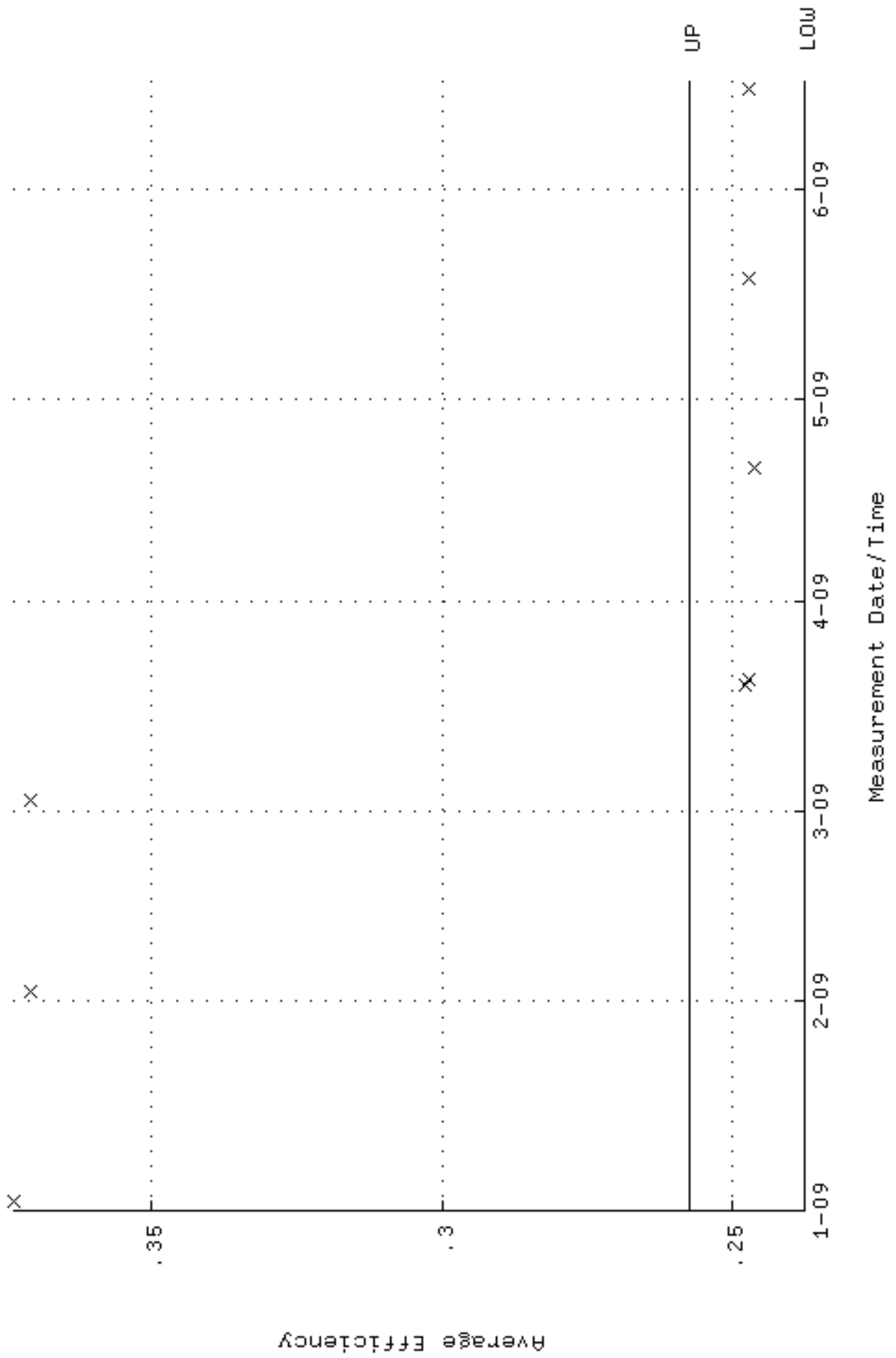
QA filename : DKA100:[ENV\_ALPHA.QA.W]w118.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:23:04 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 87.2440 through 96.4276



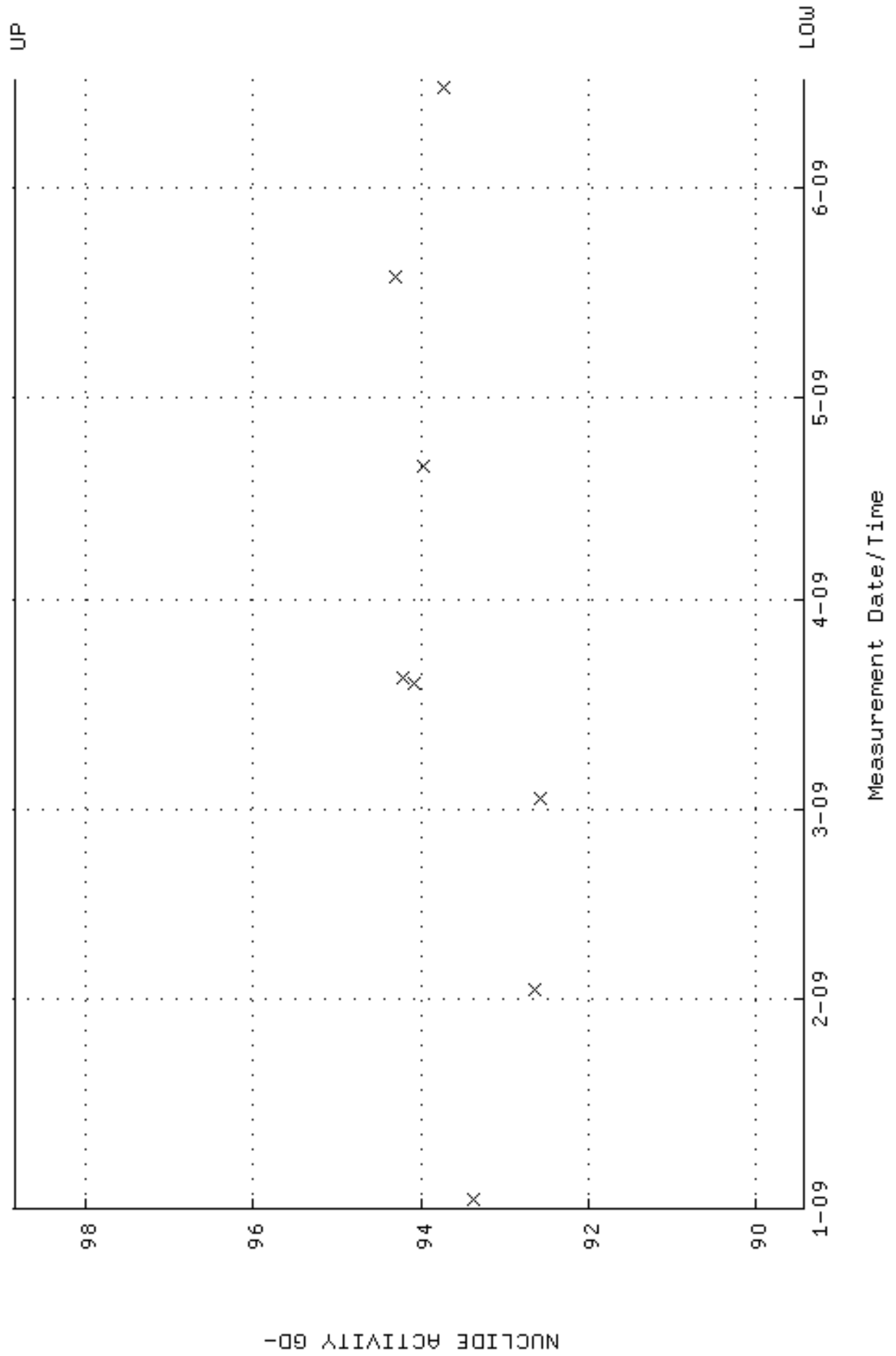
QA filename : DKA100:[ENV\_ALPHA.QA.B]B118.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:22:10 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W121.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:23:19 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.237686 through 0.257686

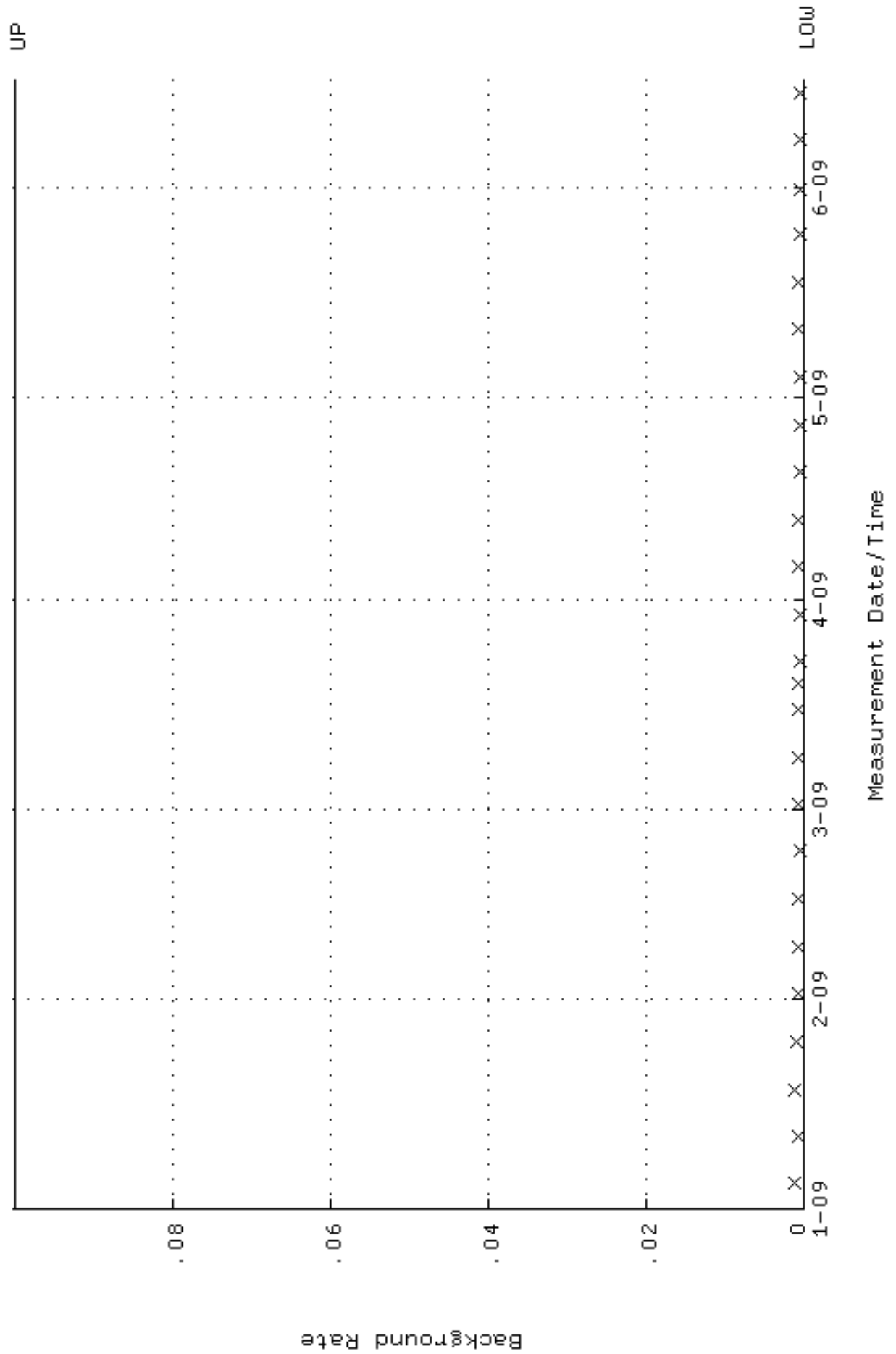


QA filename : DKA100:[ENV\_ALPHA.QA.W]W121.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 2-JAN-2009 07:23:19 through 16-JUN-2009 12:00:00  
Lower/Upper Lmts: 89.4263 through 98.8395

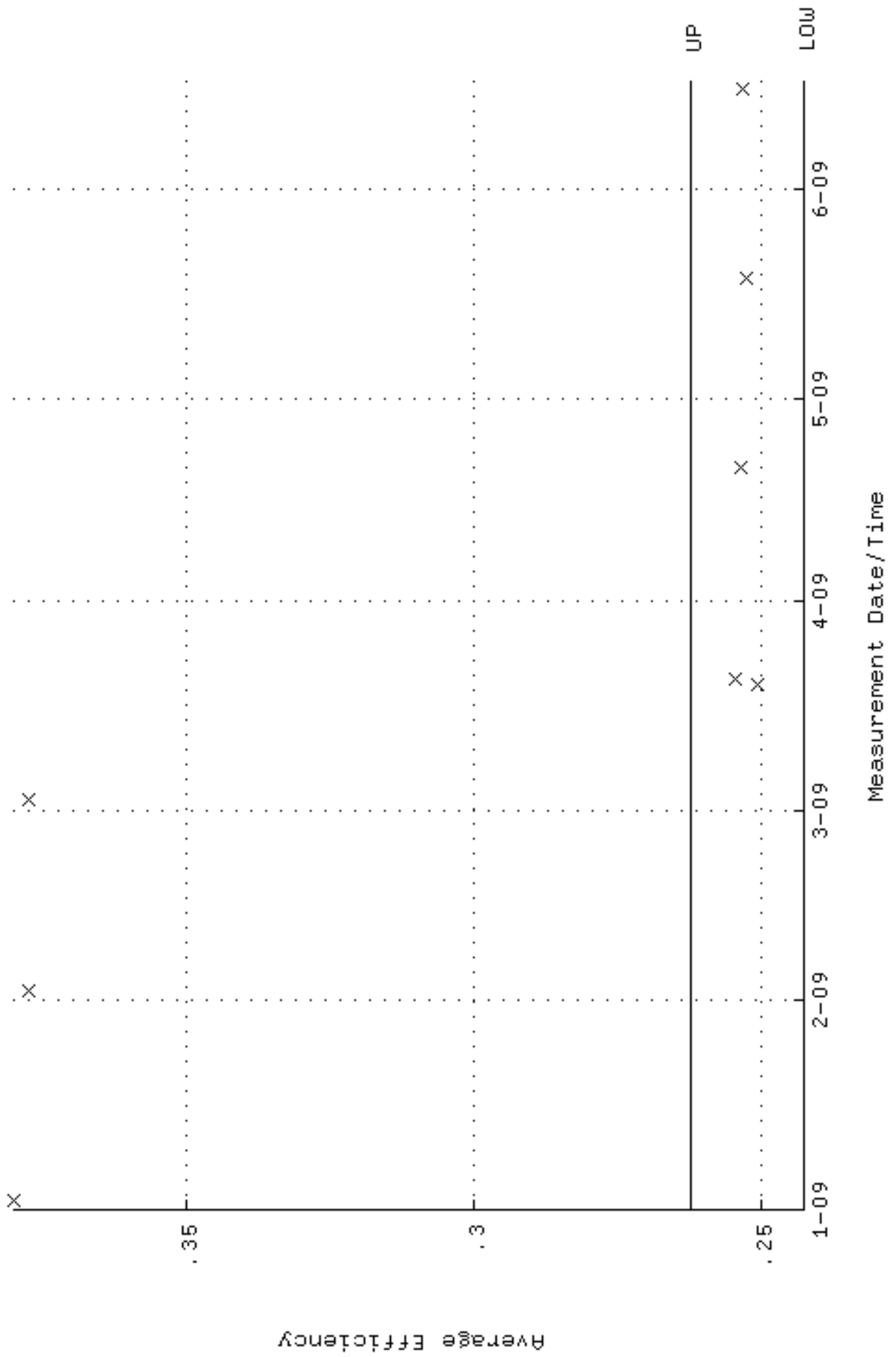




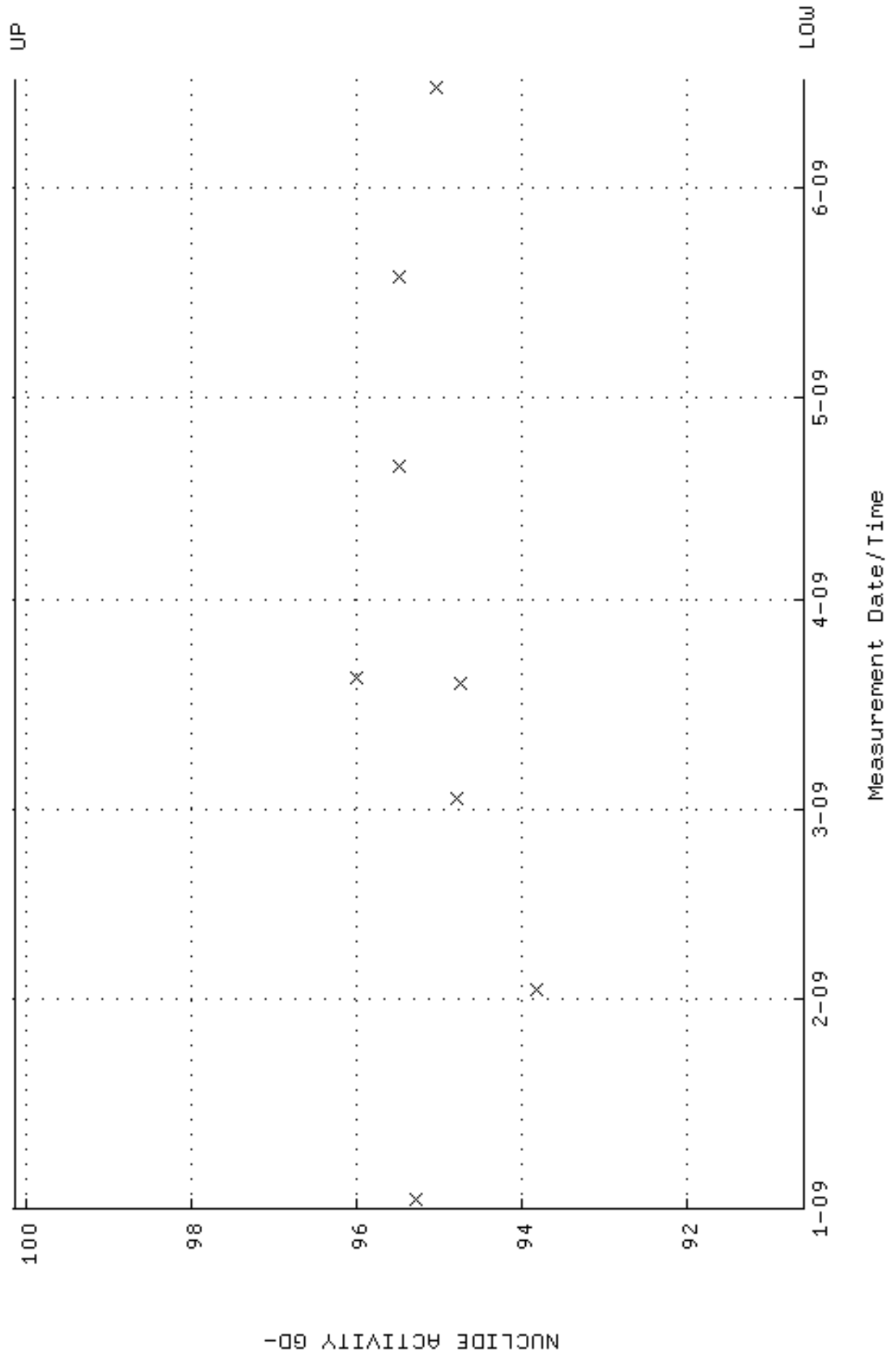
QA filename : DKA100:[ENV\_ALPHA.QA.B]B121.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:22:23 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



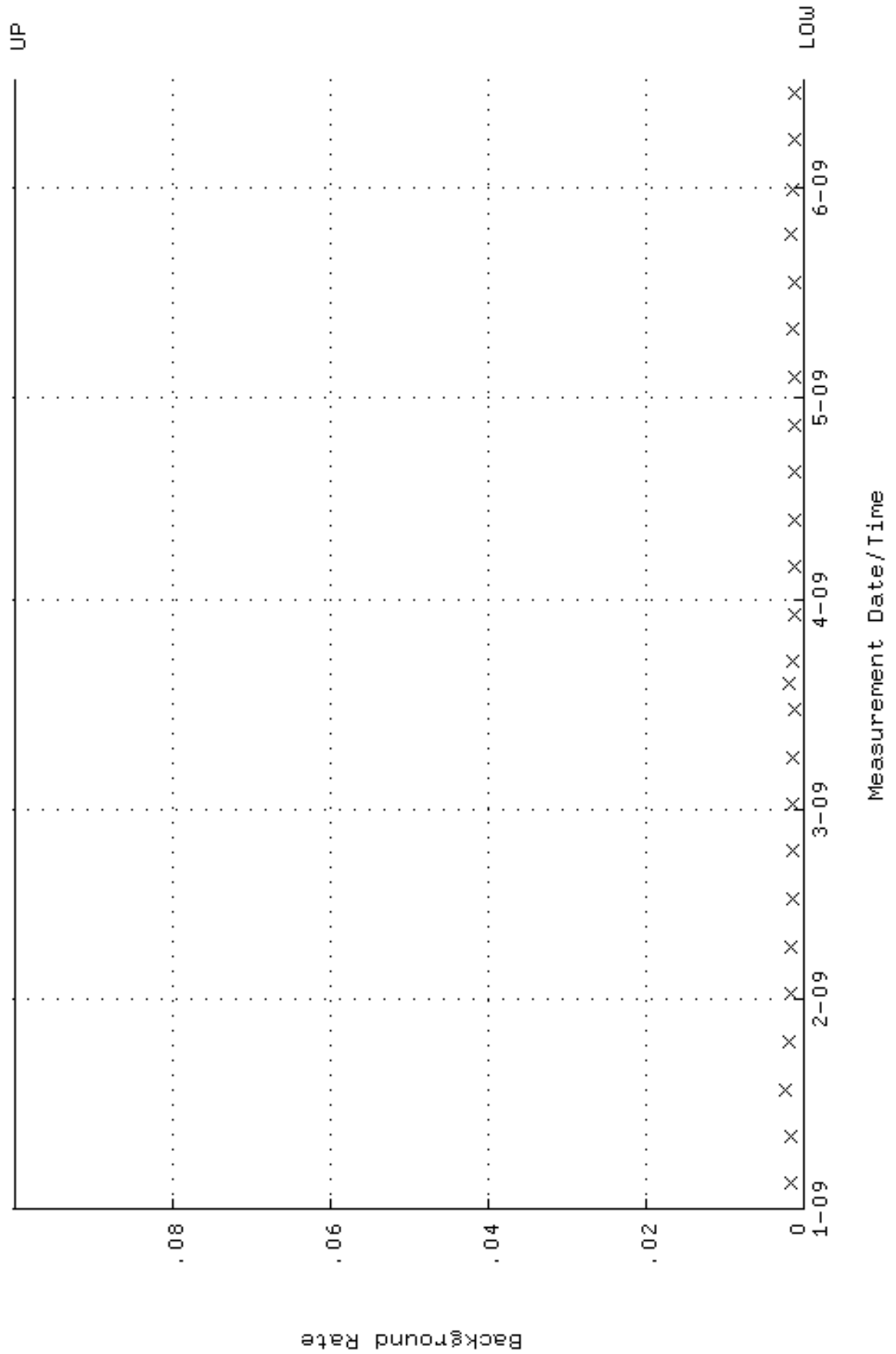
QA filename : DKA100:[ENV\_ALPHA.QA.W]W122.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:23:23 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.242659 through 0.262659



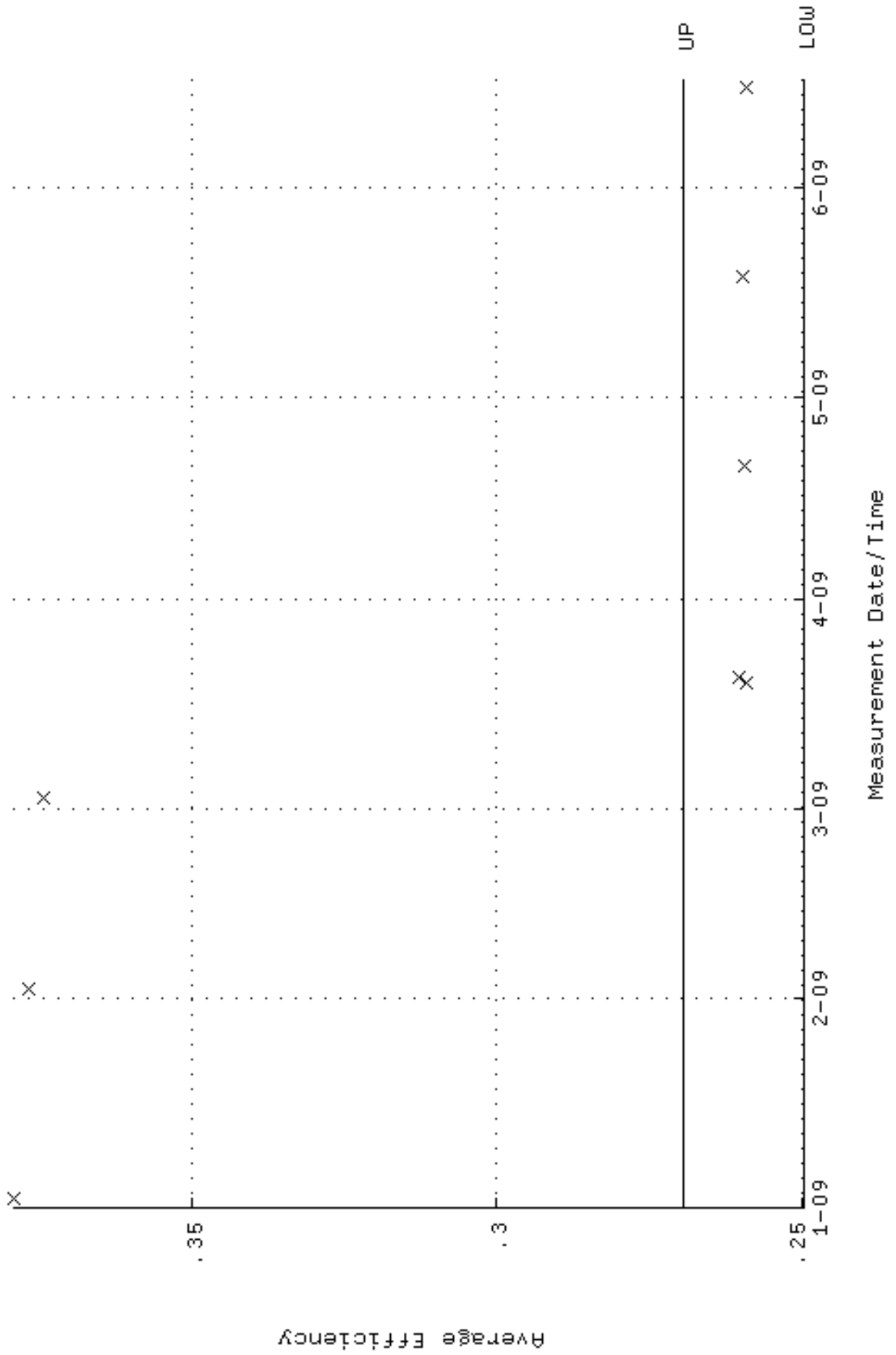
QA filename : DKA100:[ENV\_ALPHA.QA.W]W122.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:23:23 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 90.5949 through 100.131



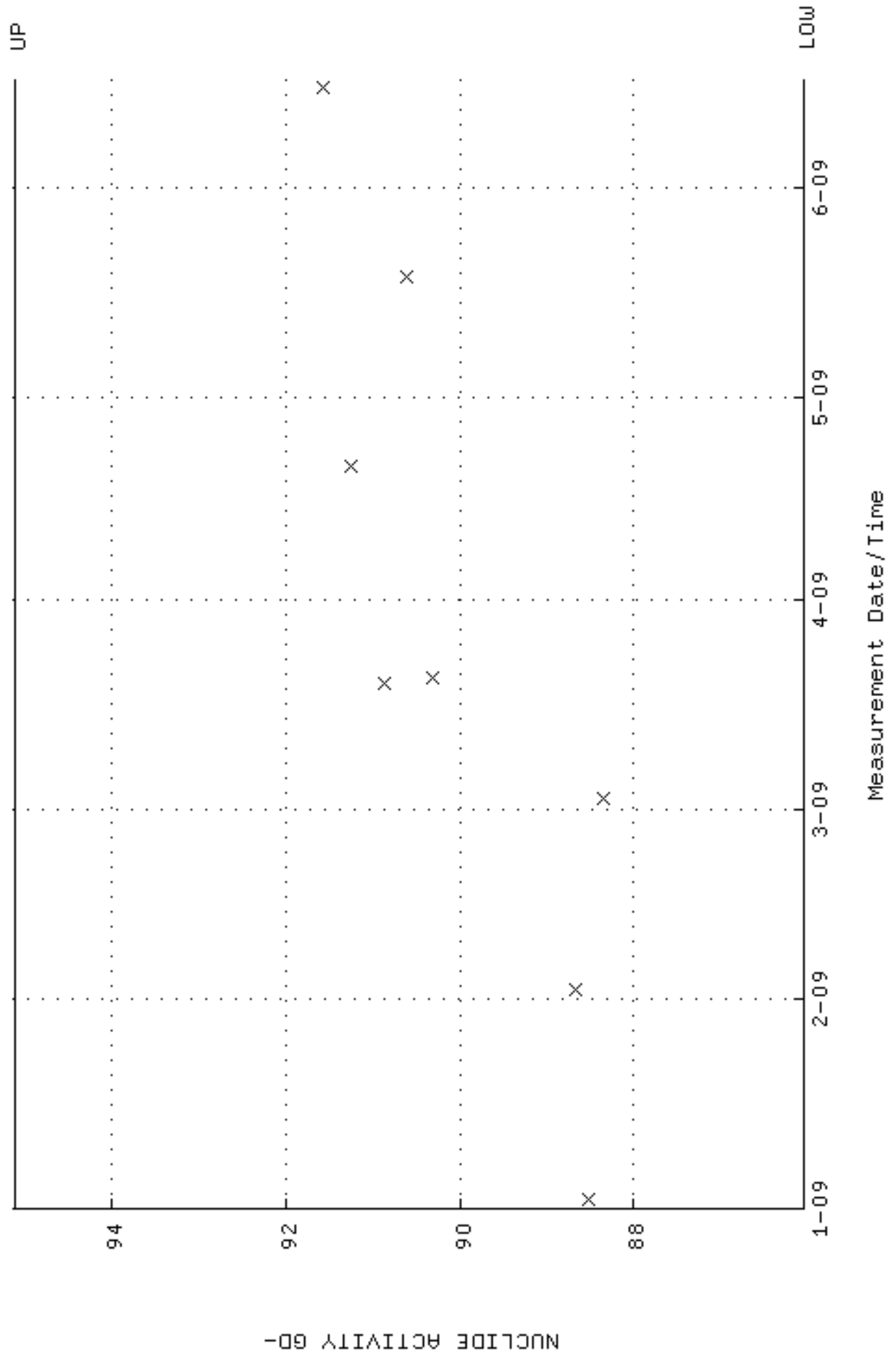
QA filename : DKA100:[ENV\_ALPHA.QA.B]B122.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:22:26 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



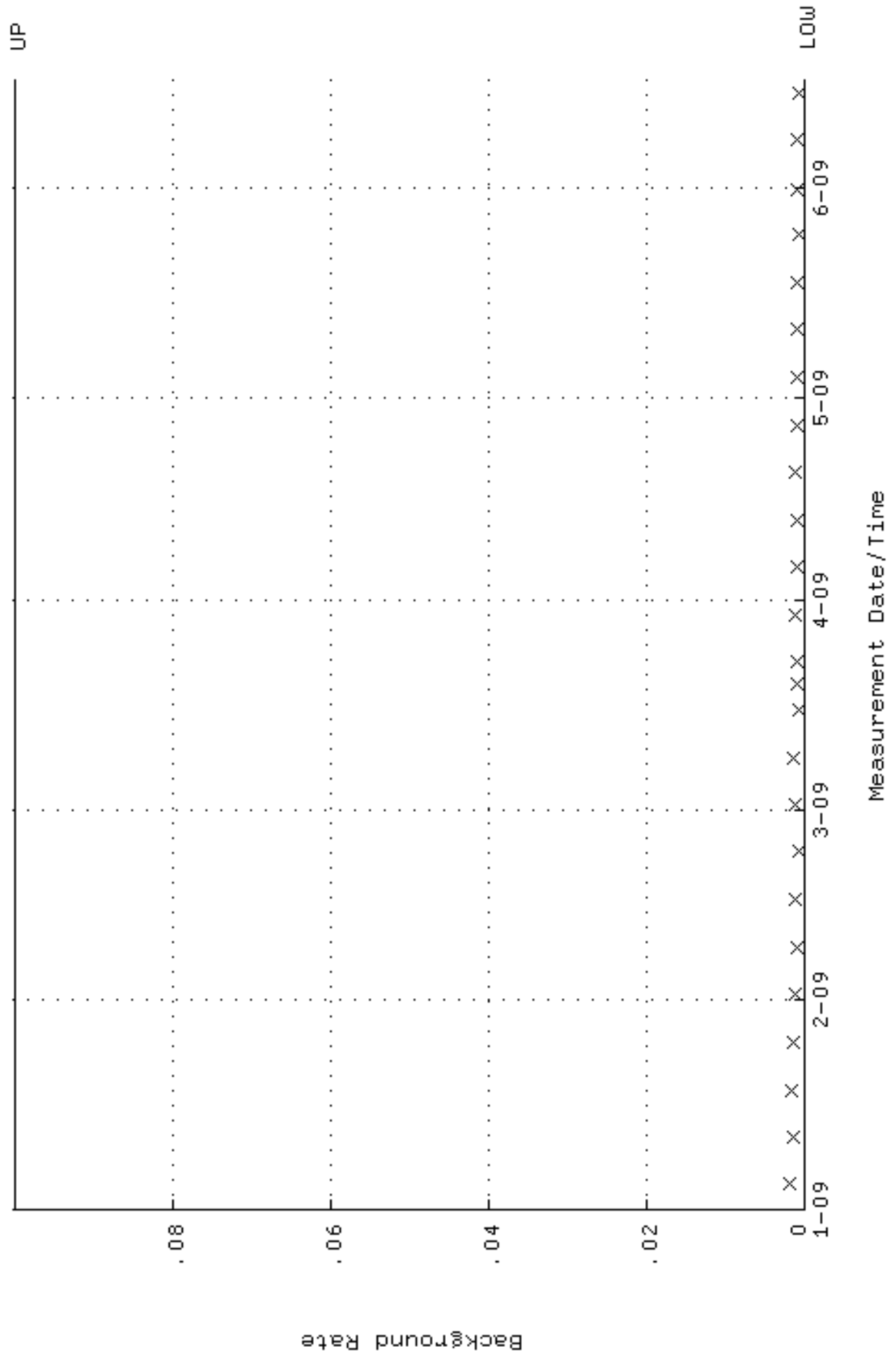
QA filename : DKA100:[ENV\_ALPHA.QA.W]W123.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:23:29 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.249752 through 0.269752



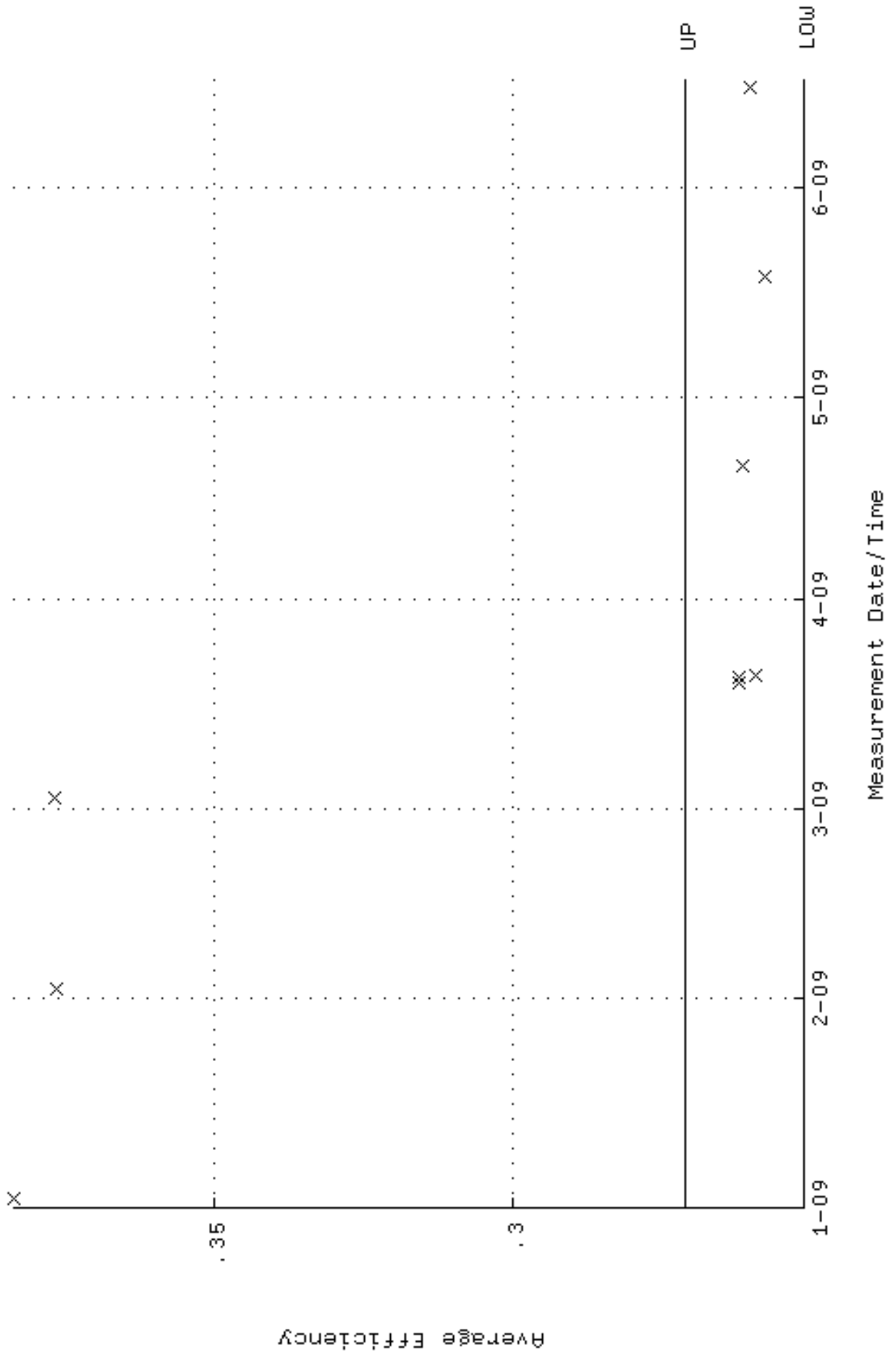
QA filename : DKA100:[ENV\_ALPHA.QA.W]W123.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 2-JAN-2009 07:23:29 through 16-JUN-2009 12:00:00  
Lower/Upper Lmts: 86.0496 through 95.1074



QA filename : DKA100:[ENV\_ALPHA.QA.B]B123.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:22:30 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

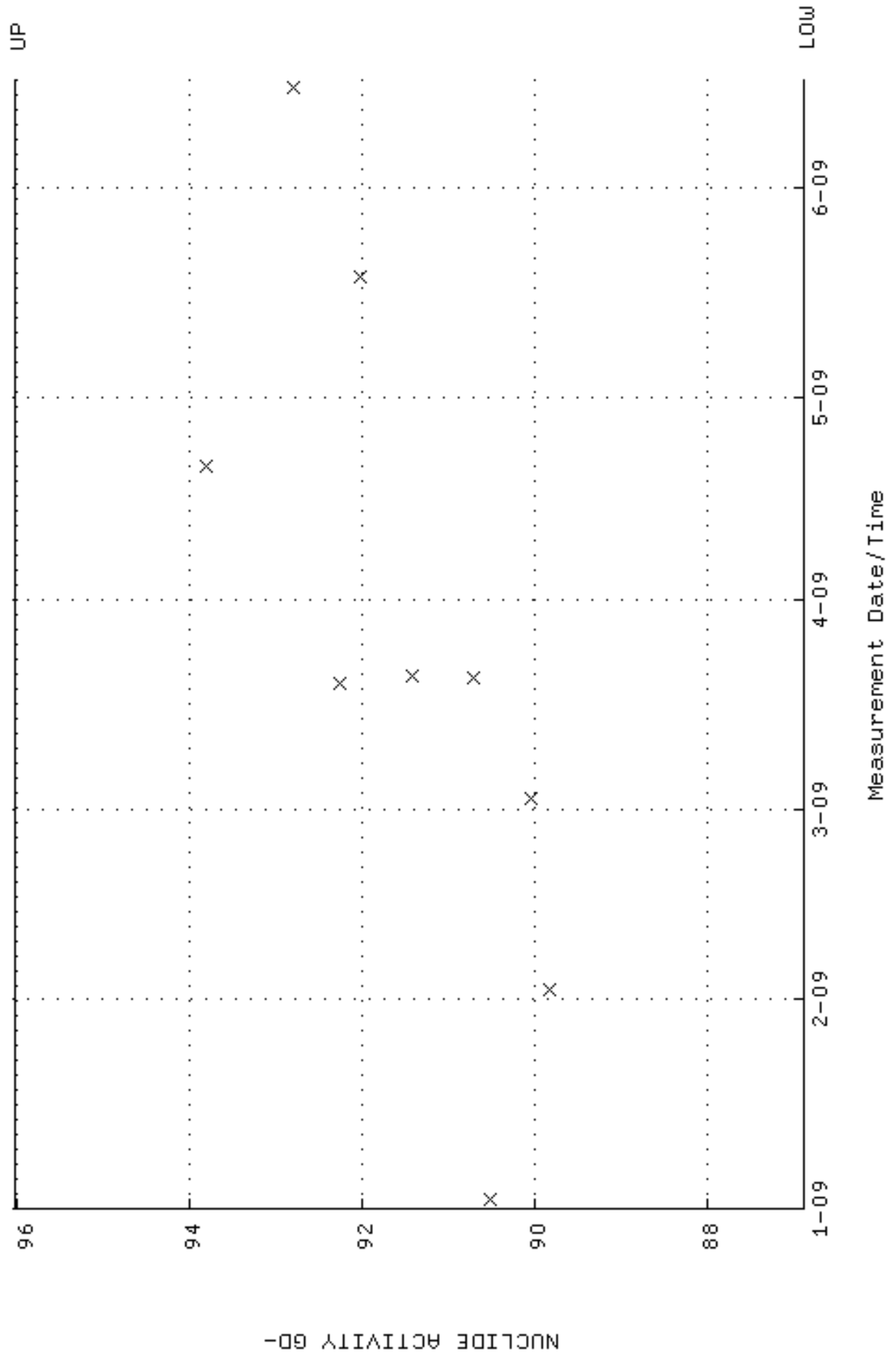


QA filename : DKA100:[ENV\_ALPHA.QA.W]W124.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:23:33 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.251398 through 0.271398

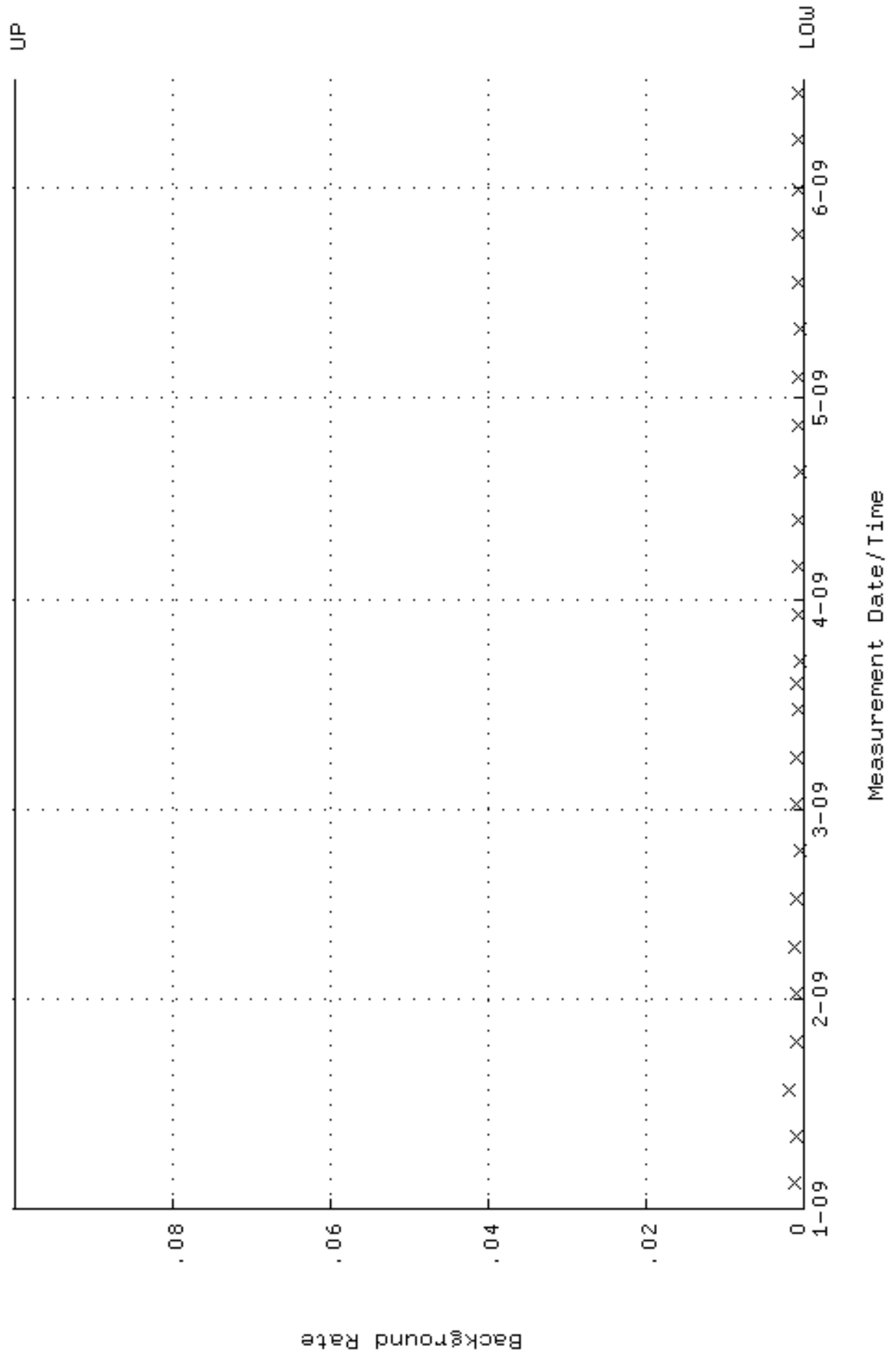




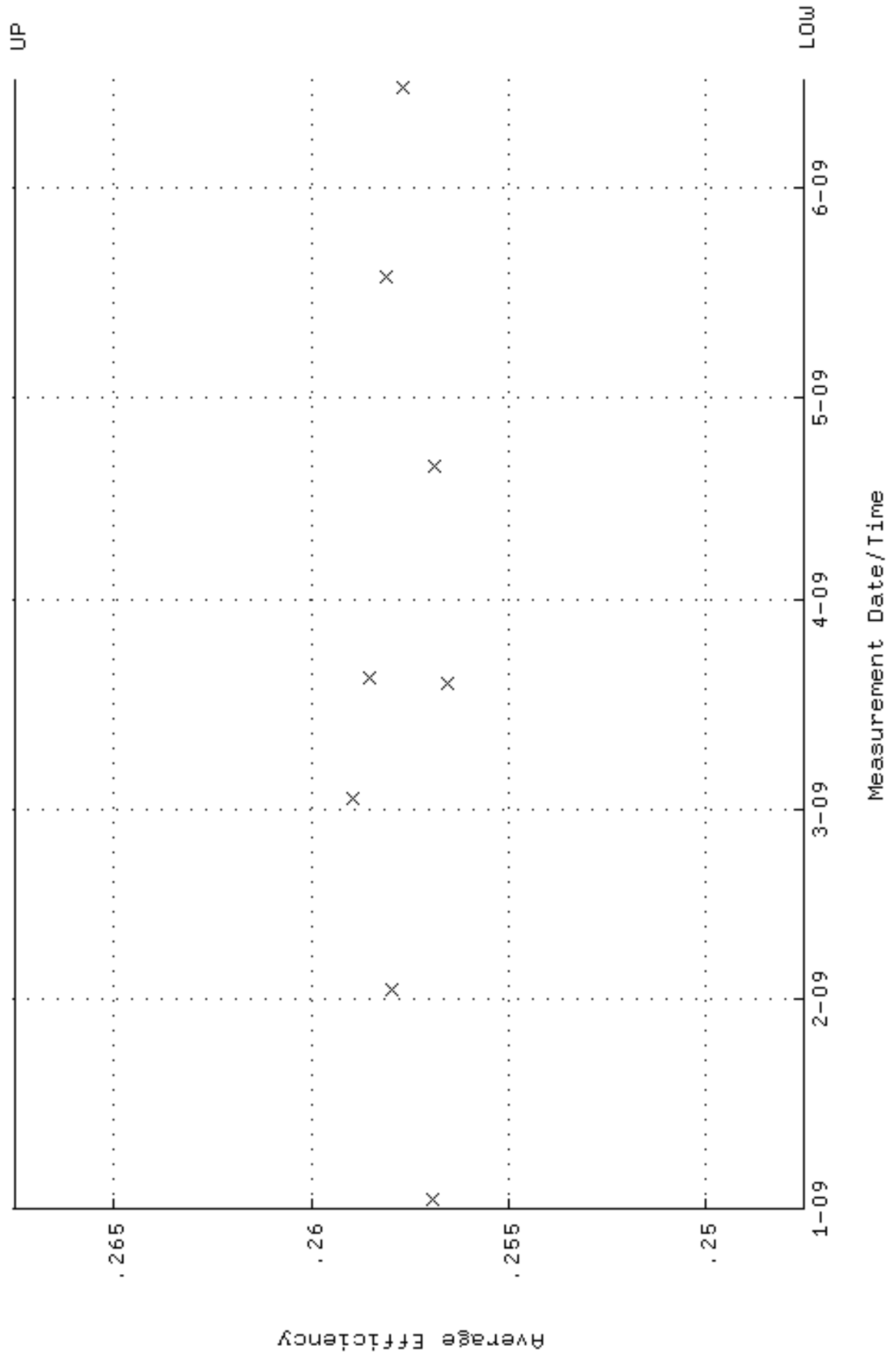
QA filename : DKA100:[ENV\_ALPHA.QA.W]W124.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:23:33 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 86.8862 through 96.0322



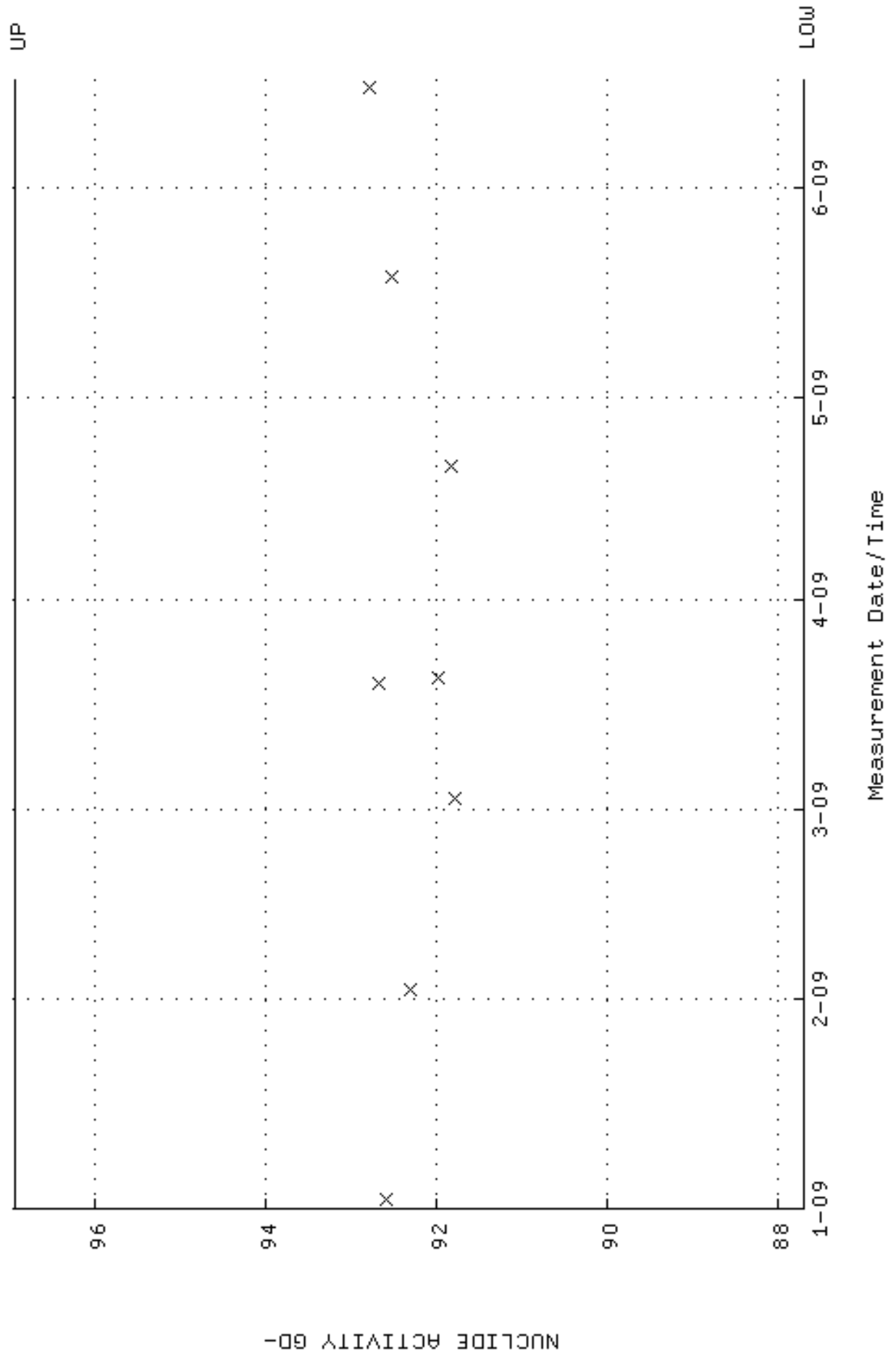
QA filename : DKA100:[ENV\_ALPHA.QA.B]B124.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:22:35 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



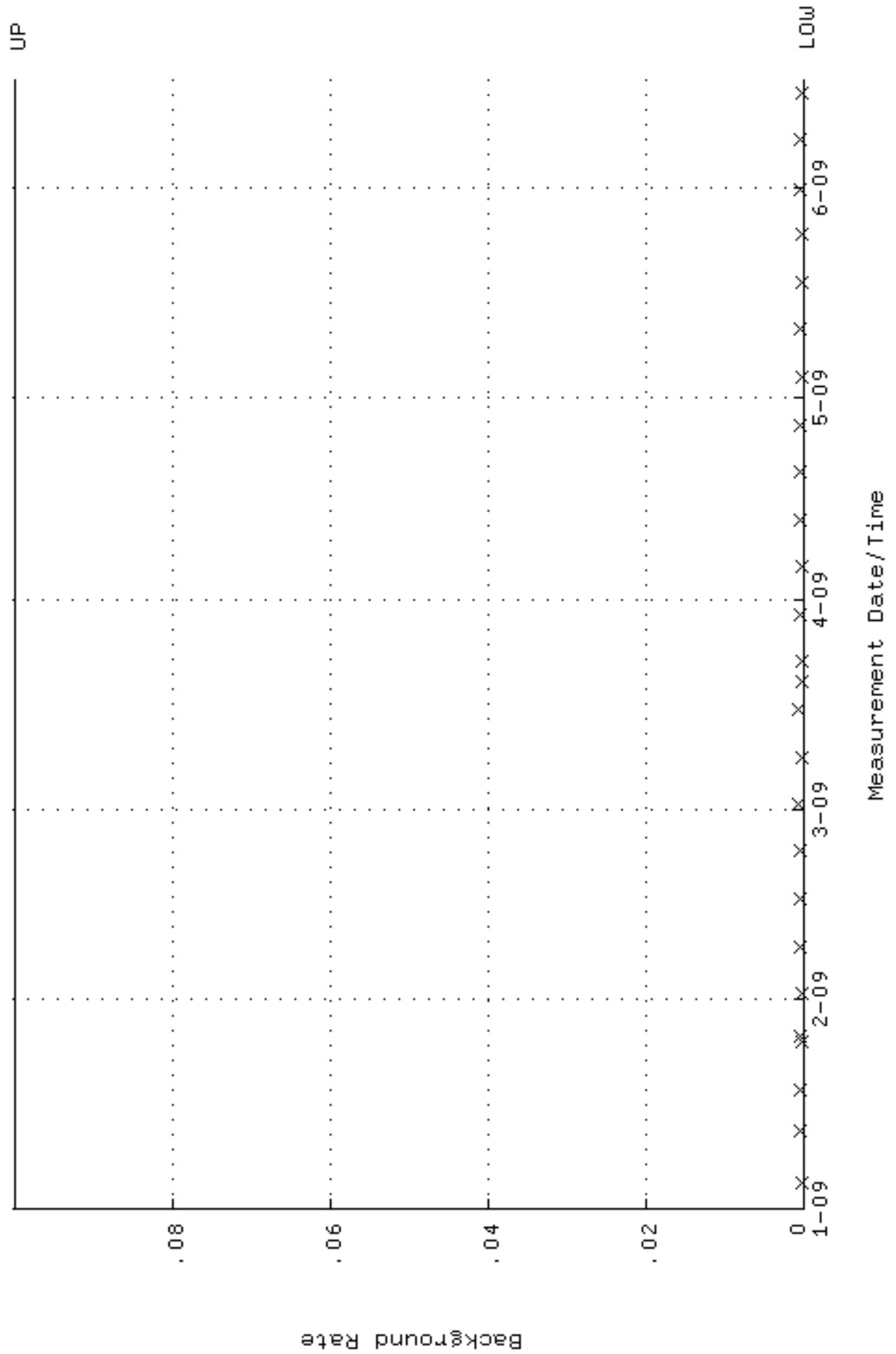
QA filename : DKA100:[ENV\_ALPHA.QA.W]W125.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:23:39 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.247512 through 0.267512



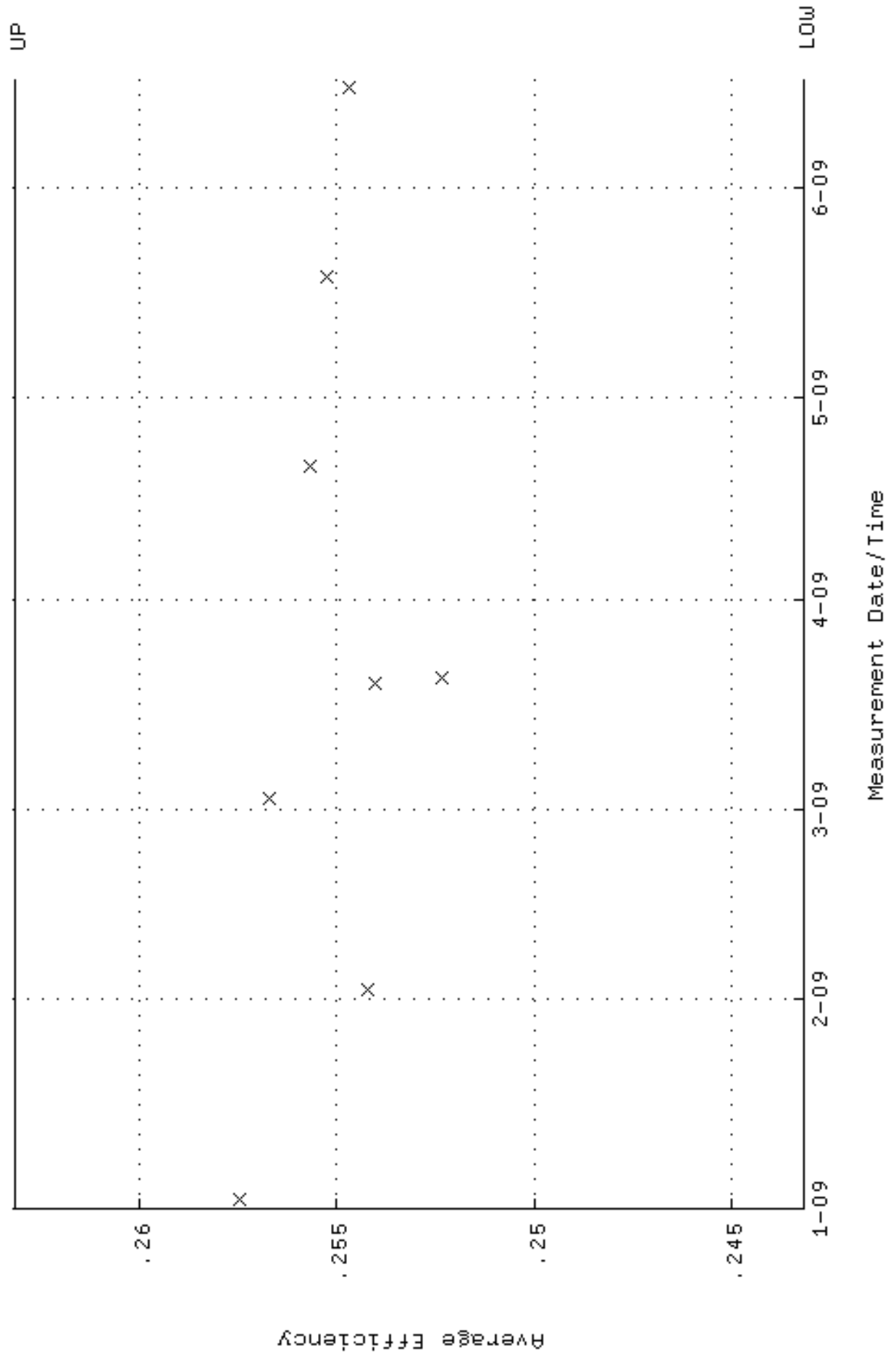
QA filename : DKA100:[ENV\_ALPHA.QA.W]W125.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 2-JAN-2009 07:23:39 through 16-JUN-2009 12:00:00  
Lower/Upper Lmts: 87.6956 through 96.9268



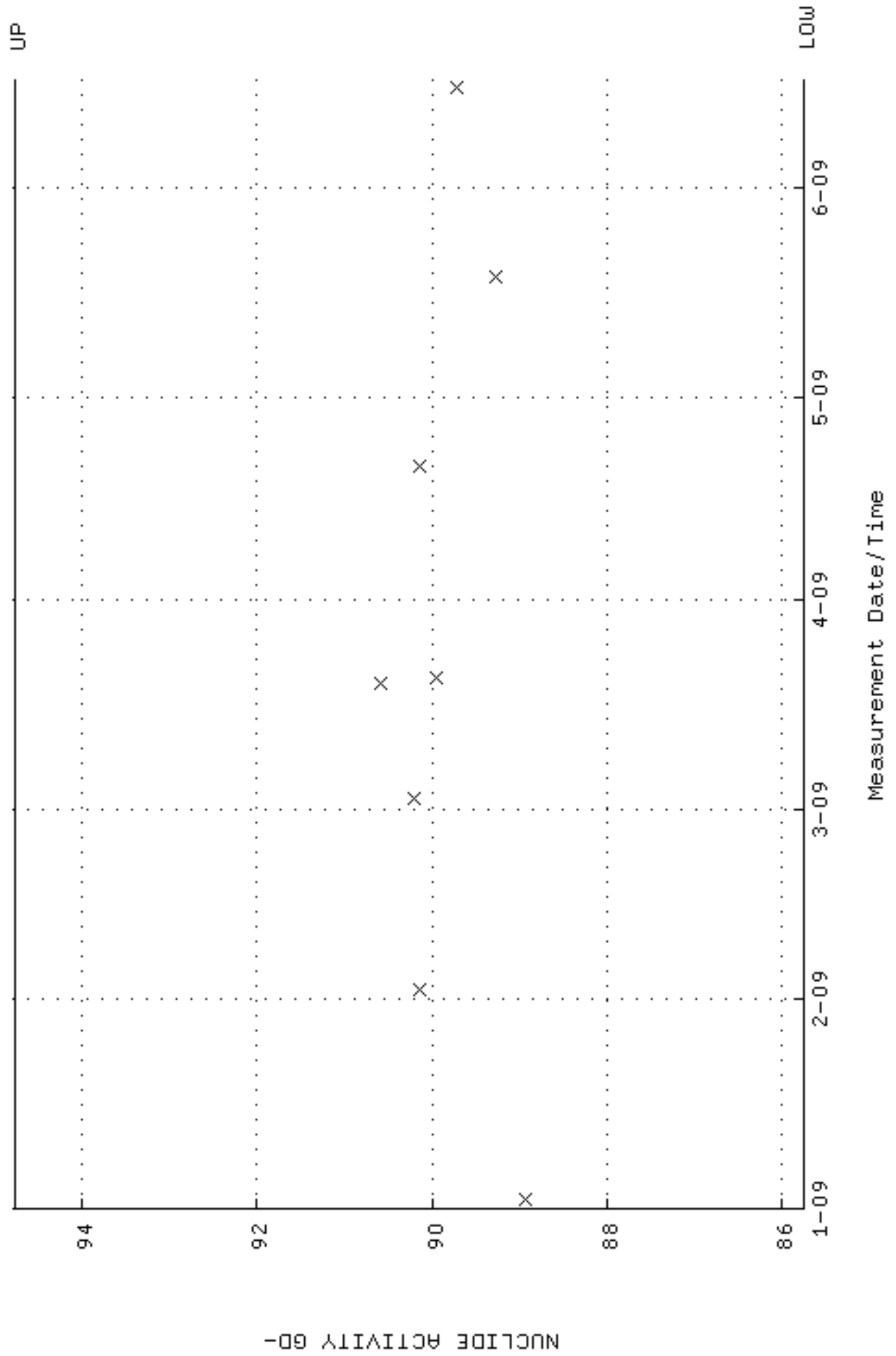
QA filename : DKA100:[ENV\_ALPHA.QA.B]B125.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:22:39 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



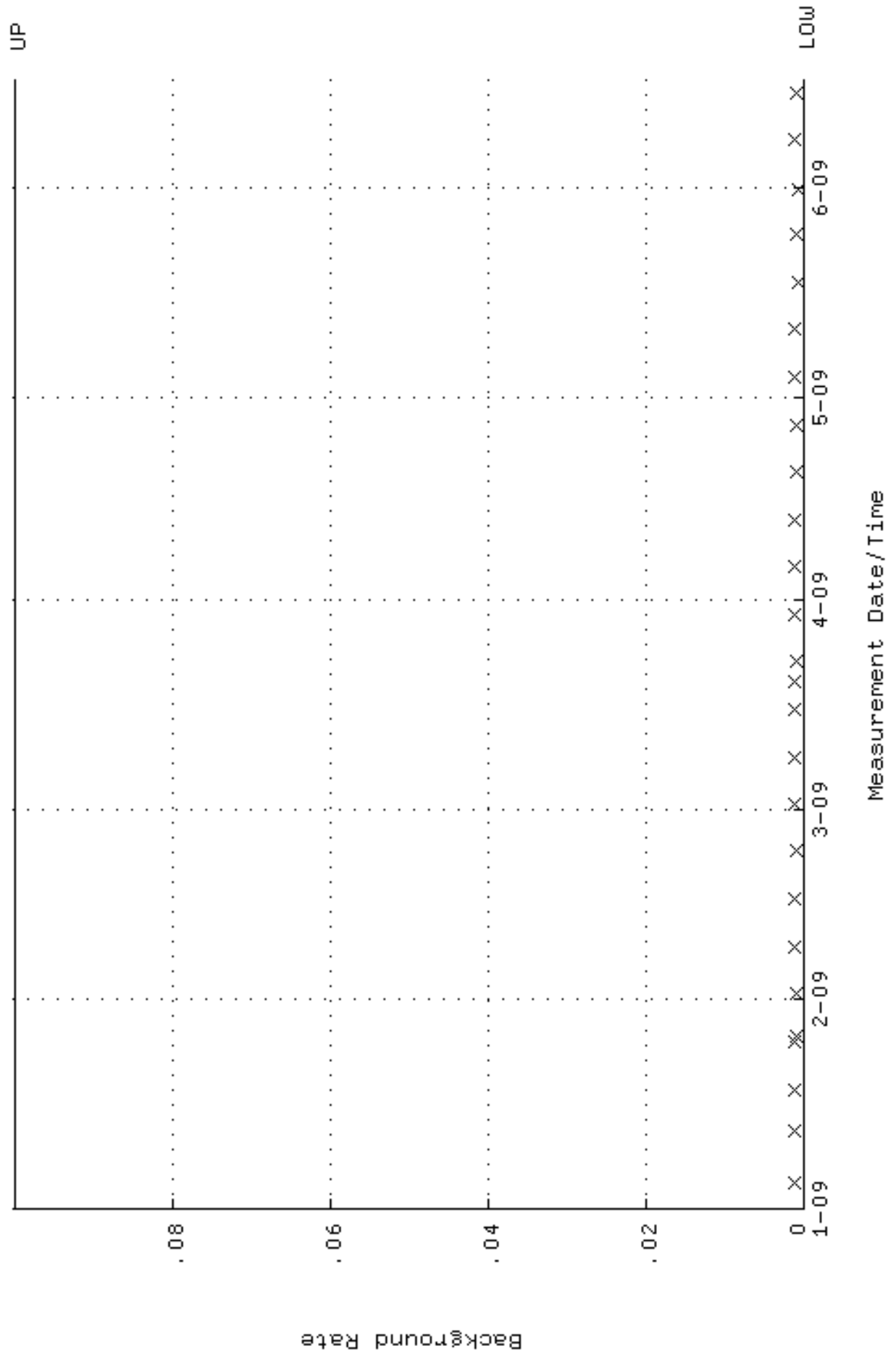
QA filename : DKA100:[ENV\_ALPHA.QA.W]W126.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:23:44 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.243156 through 0.263156



QA filename : DKA100:[ENV\_ALPHA.QA.W]W126.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 2-JAN-2009 07:23:44 through 16-JUN-2009 12:00:00  
Lower/Upper Lmts: 85.7449 through 94.7707

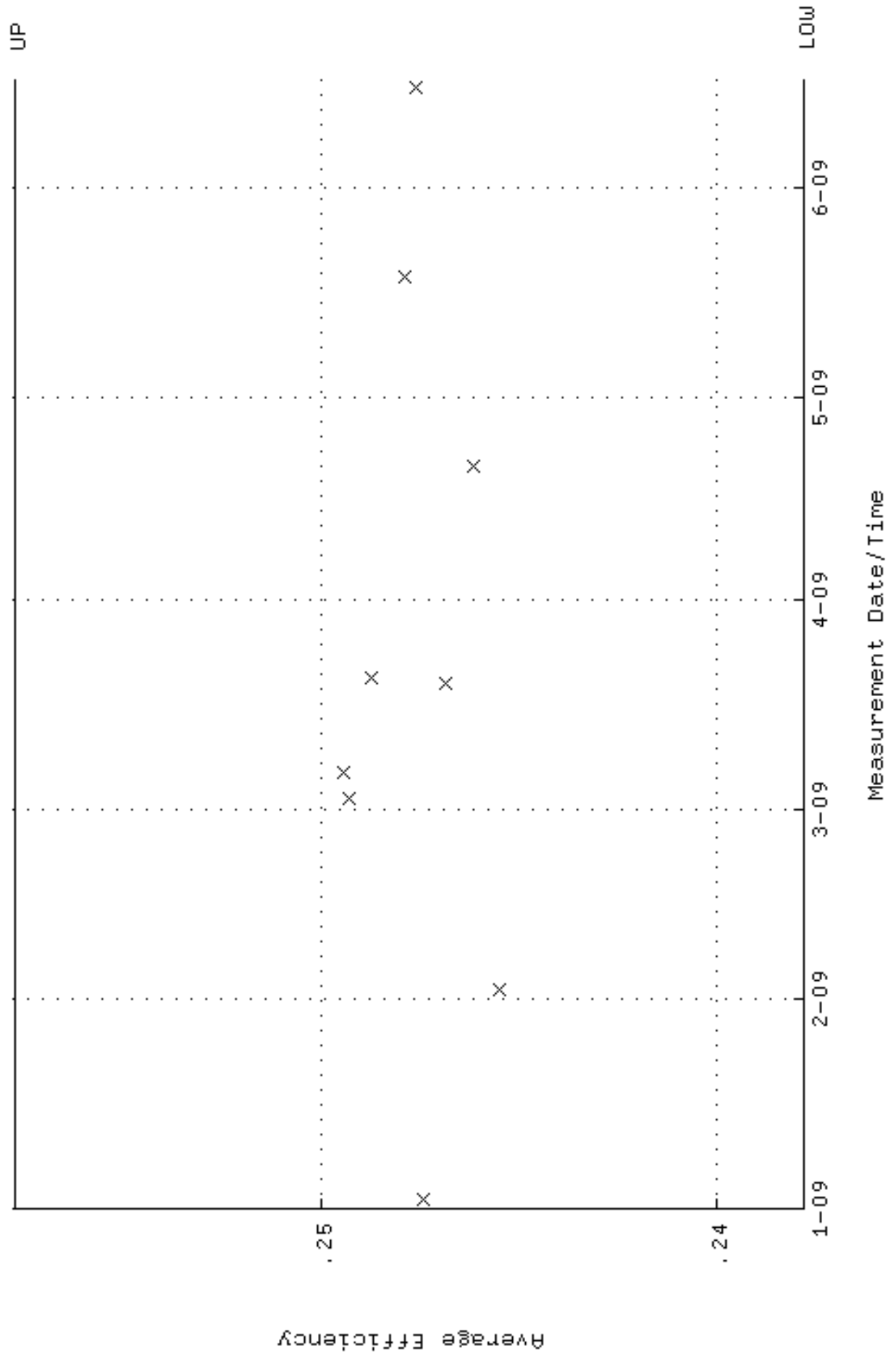


QA filename : DKA100:[ENV\_ALPHA.QA.B]B126.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:22:43 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

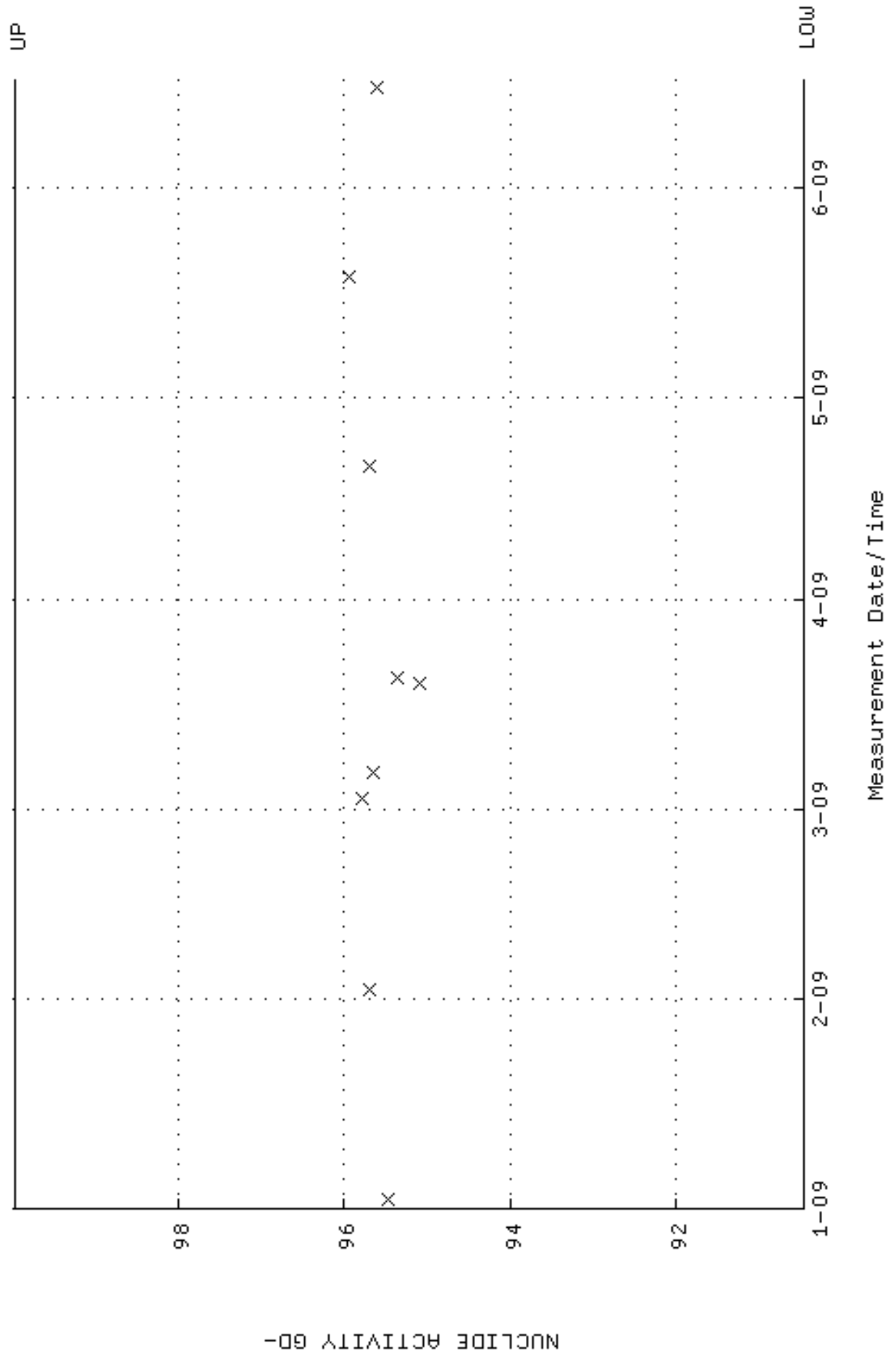




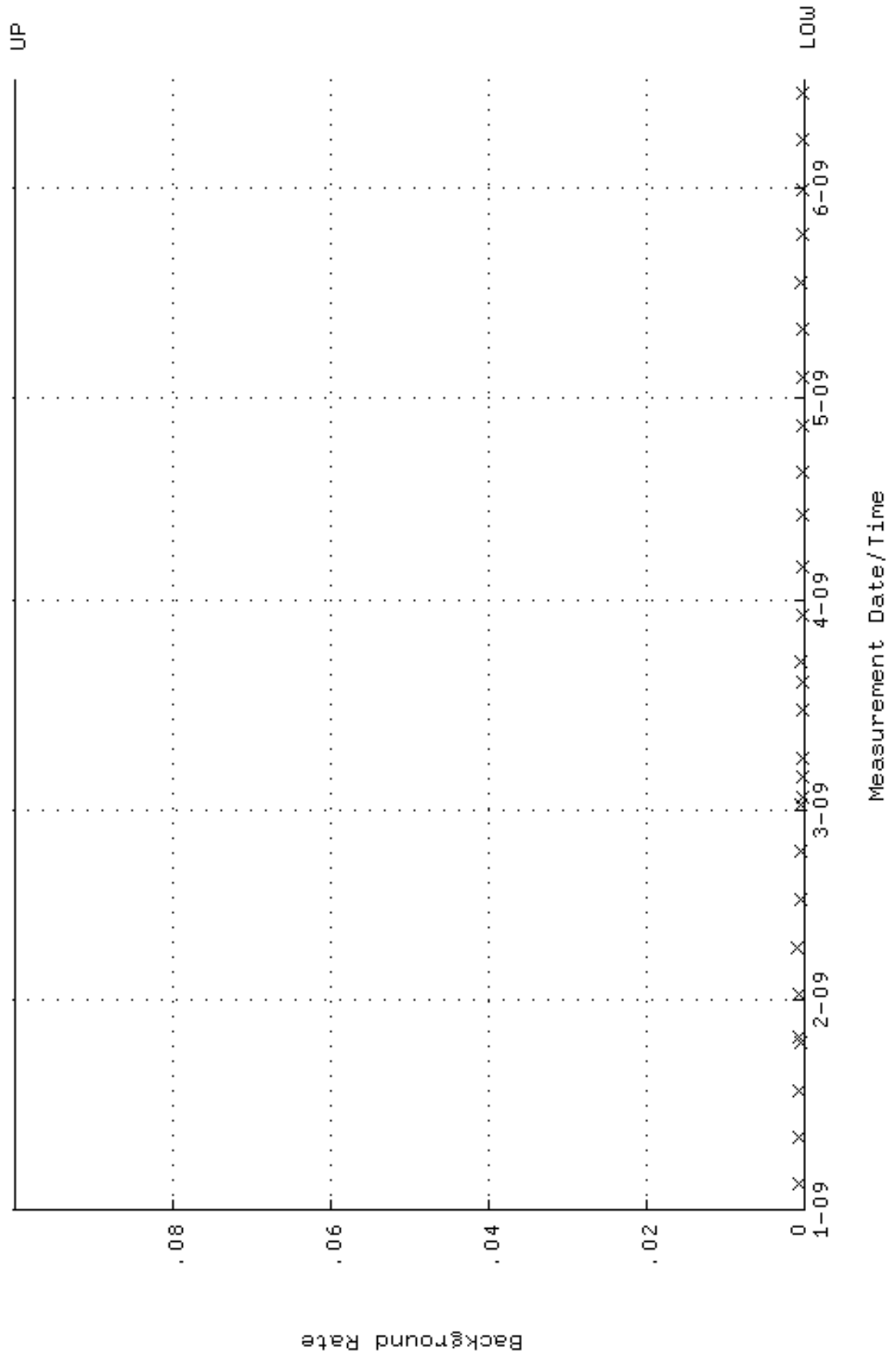
QA filename : DKA100:[ENV\_ALPHA.QA.W]W127.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:23:48 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.237773 through 0.257773



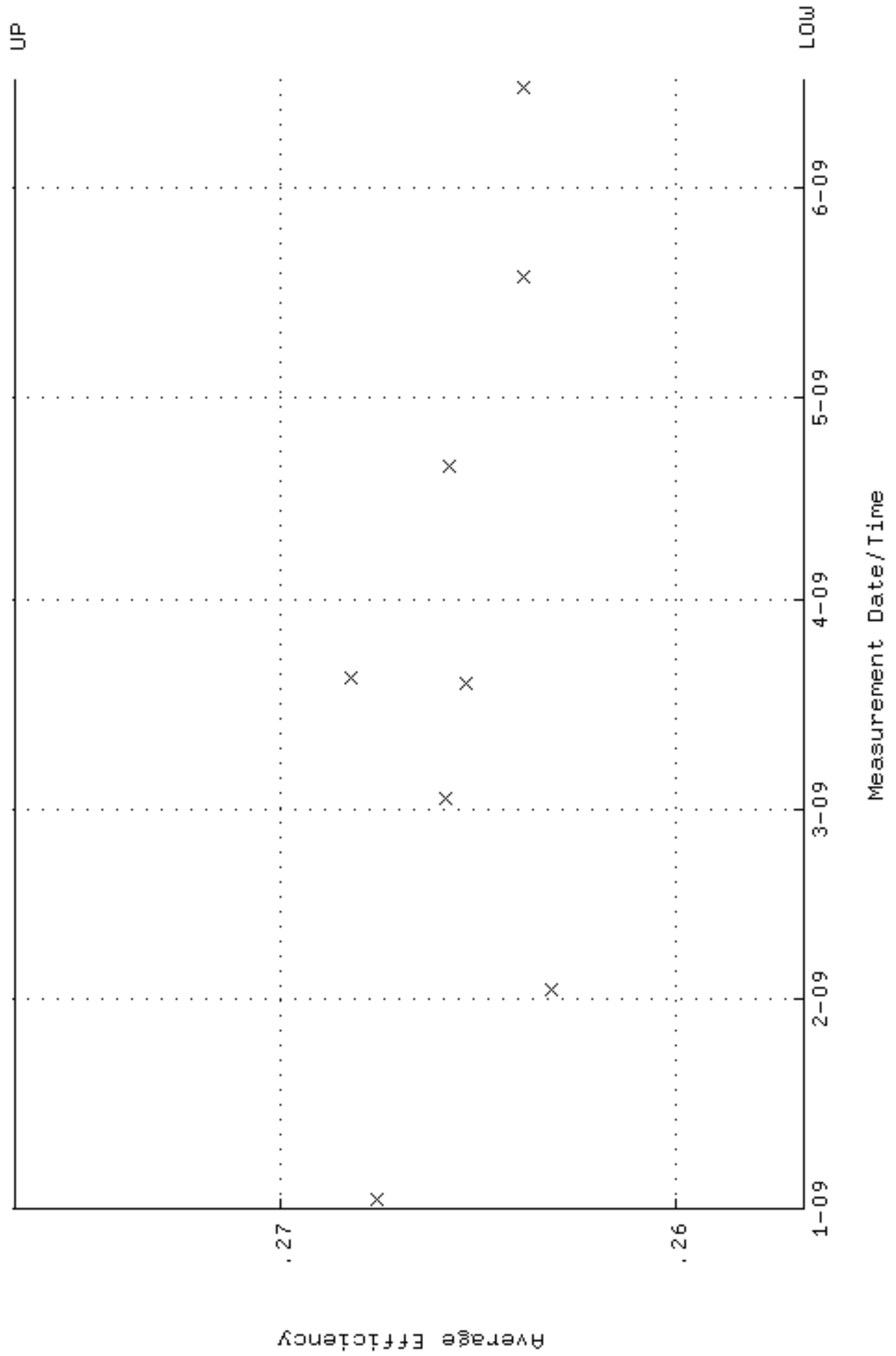
QA filename : DKA100:[ENV\_ALPHA.QA.W]W127.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:23:48 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 90.4503 through 99.9713



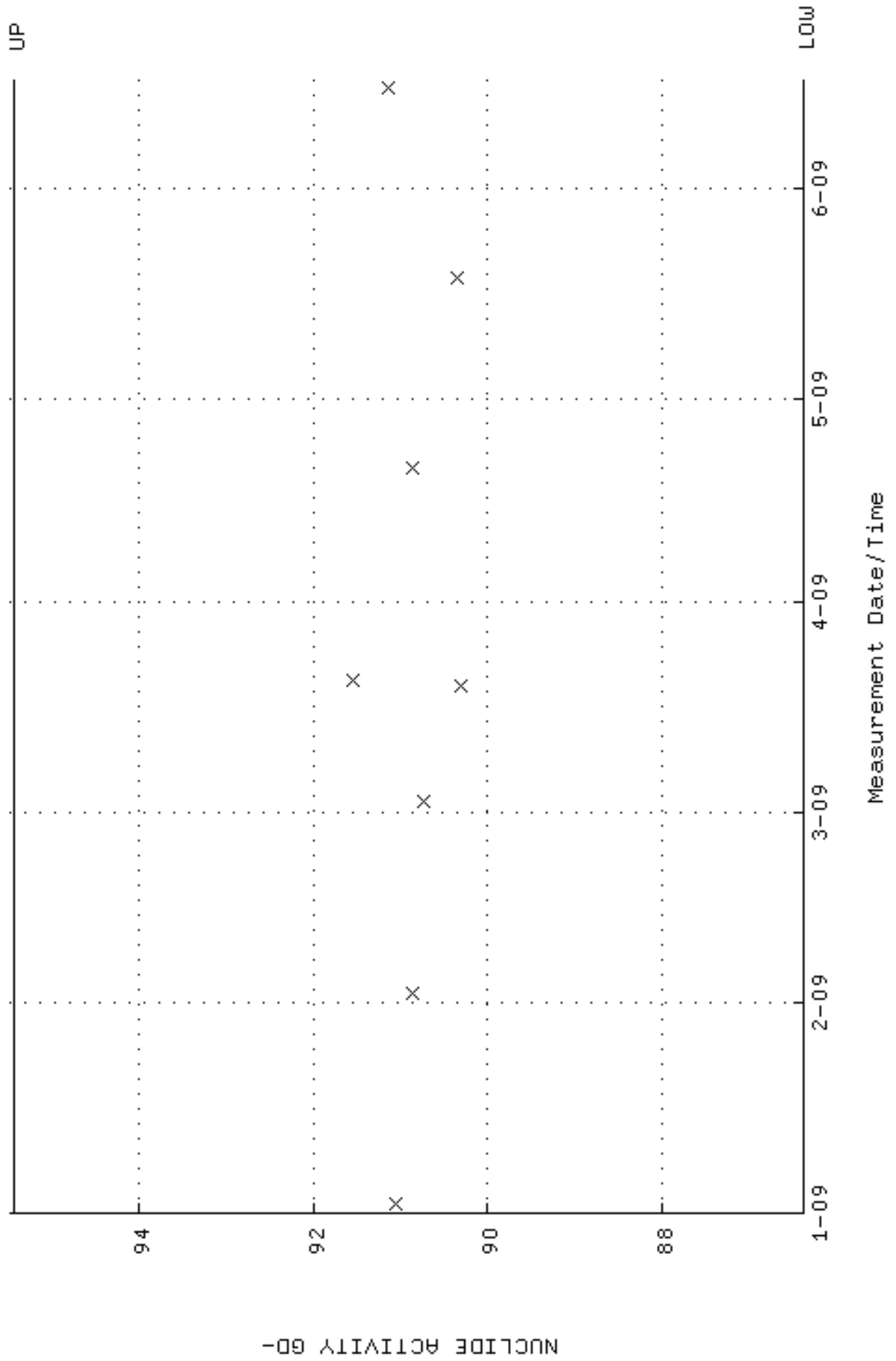
QA filename : DKA100:[ENV\_ALPHA.QA.B]B127.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:22:48 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



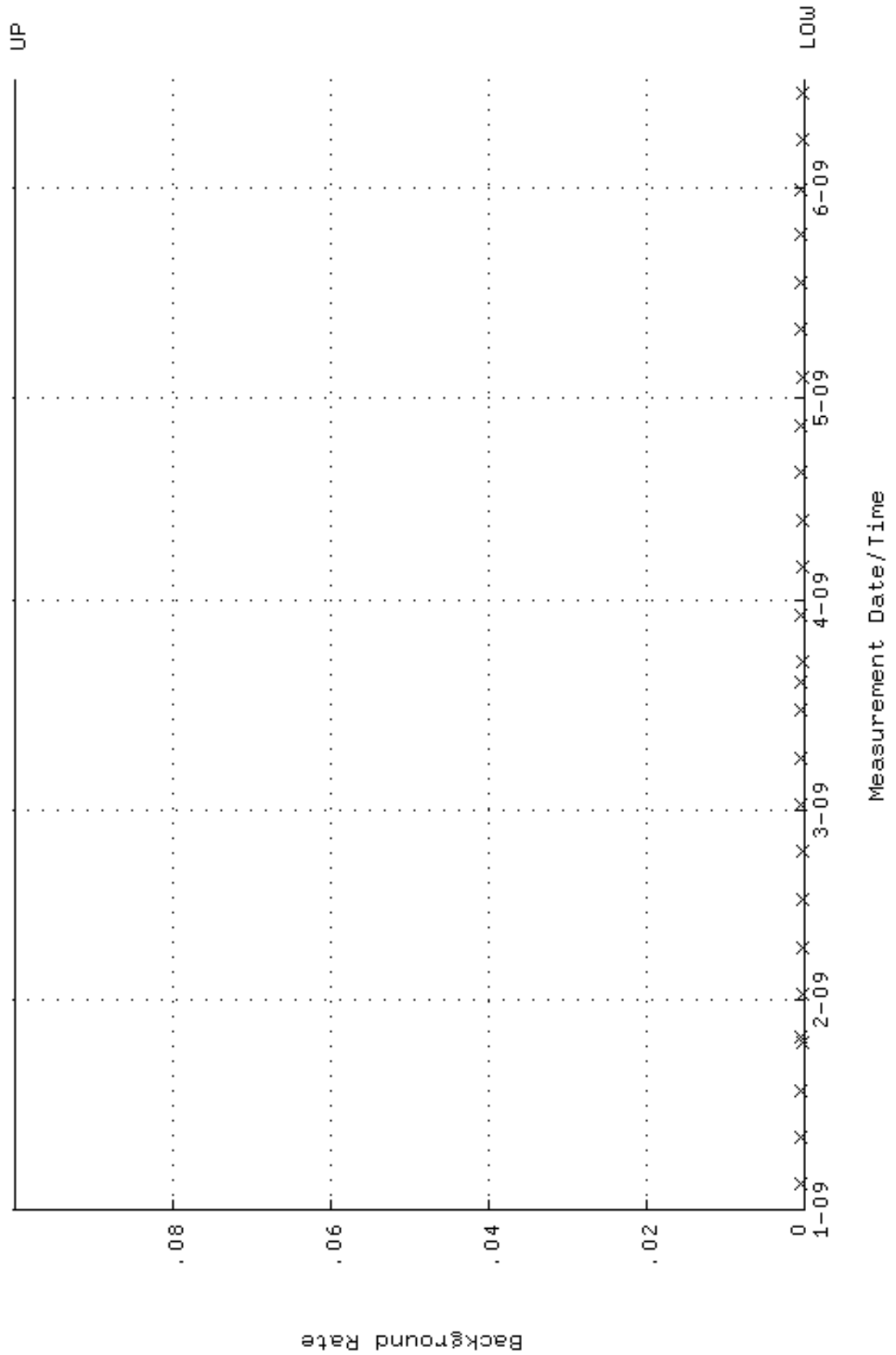
QA filename : DKA100:[ENV\_ALPHA.QA.W]W129.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:23:59 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.256741 through 0.276741



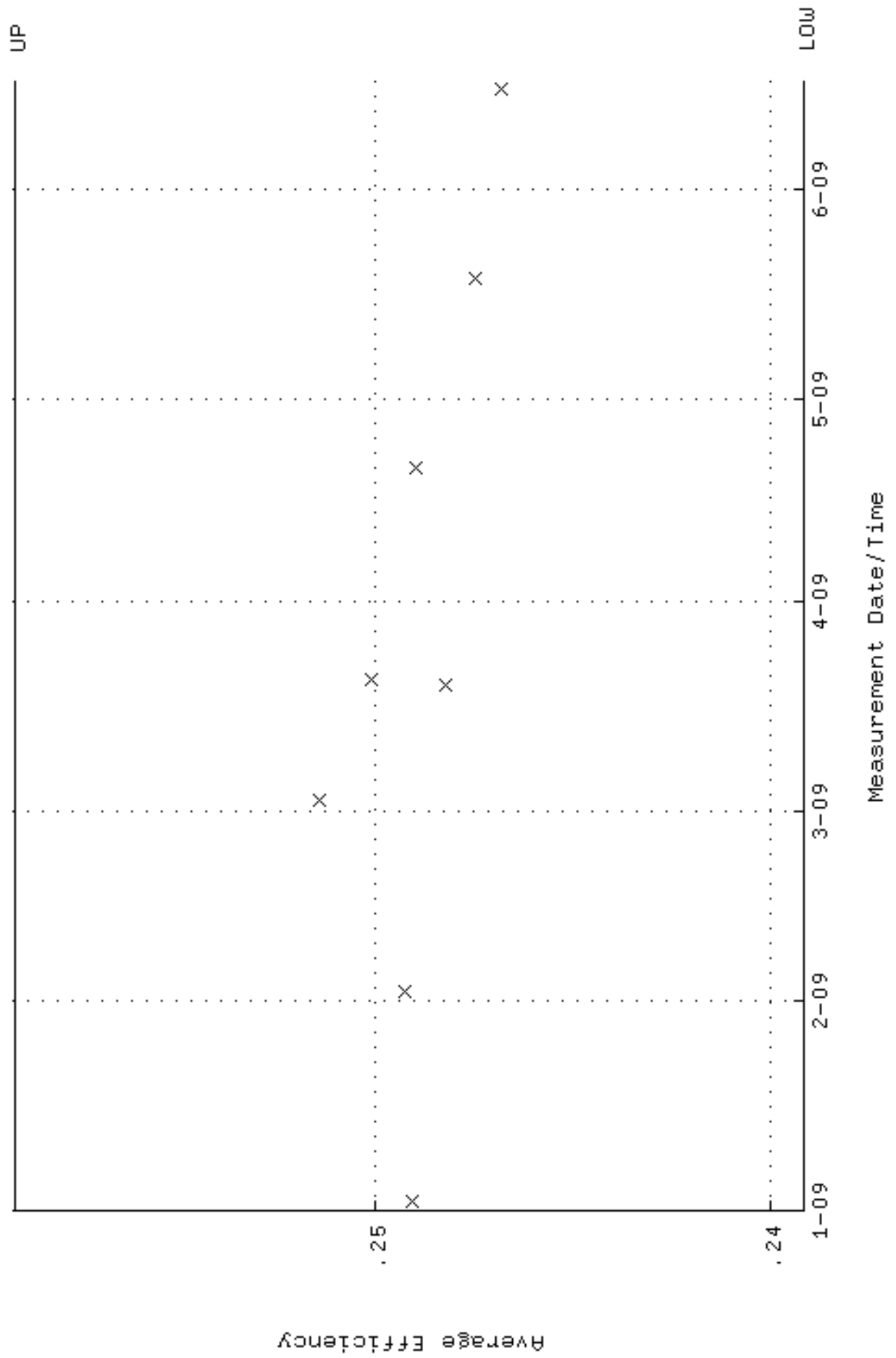
QA filename : DKA100:[ENV\_ALPHA.QA.W]W129.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:23:59 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 86.3646 through 95.4556



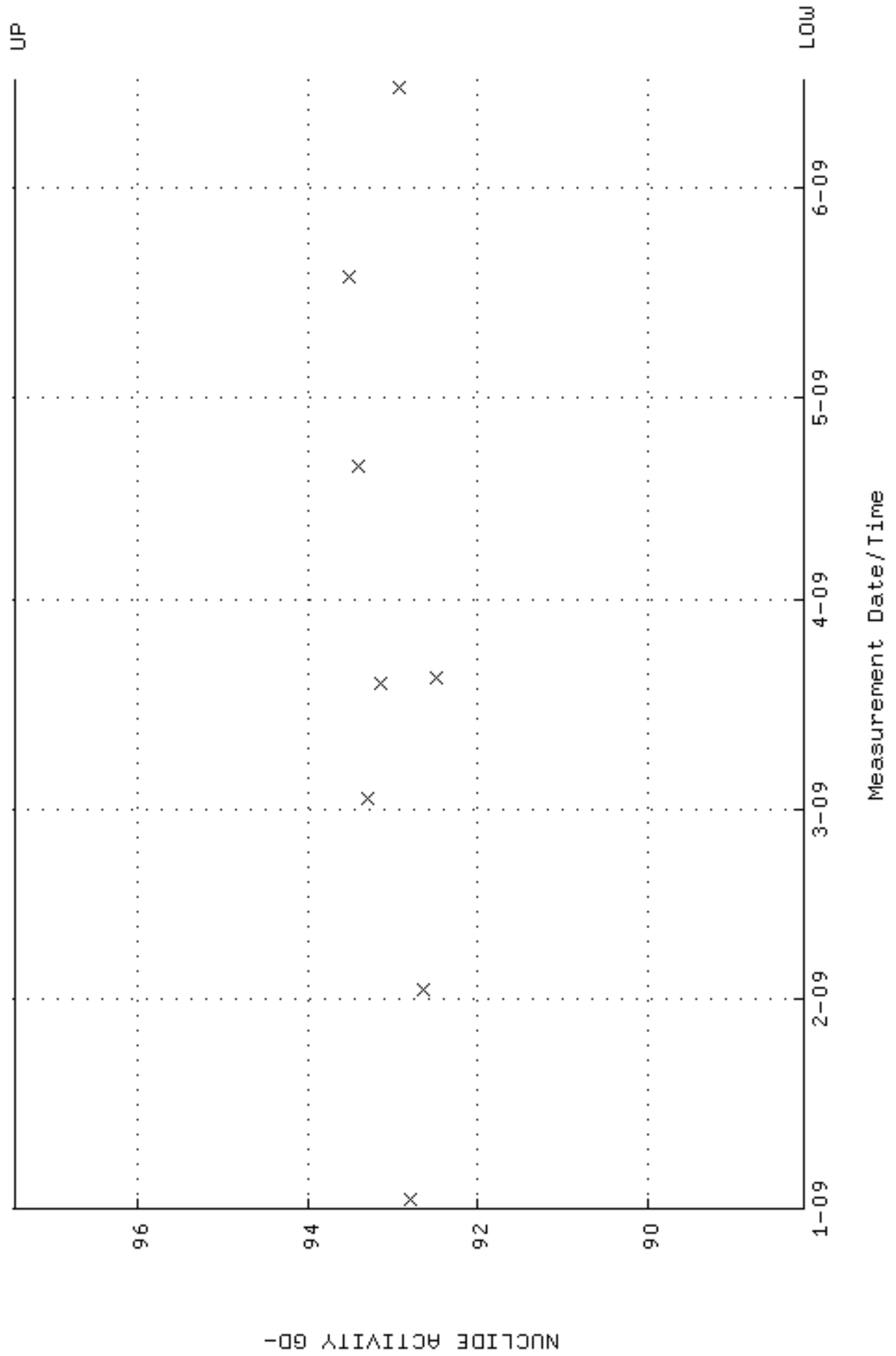
QA filename : DKA100:[ENV\_ALPHA.QA.B]B129.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:22:57 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W130.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:04 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.239131 through 0.259131

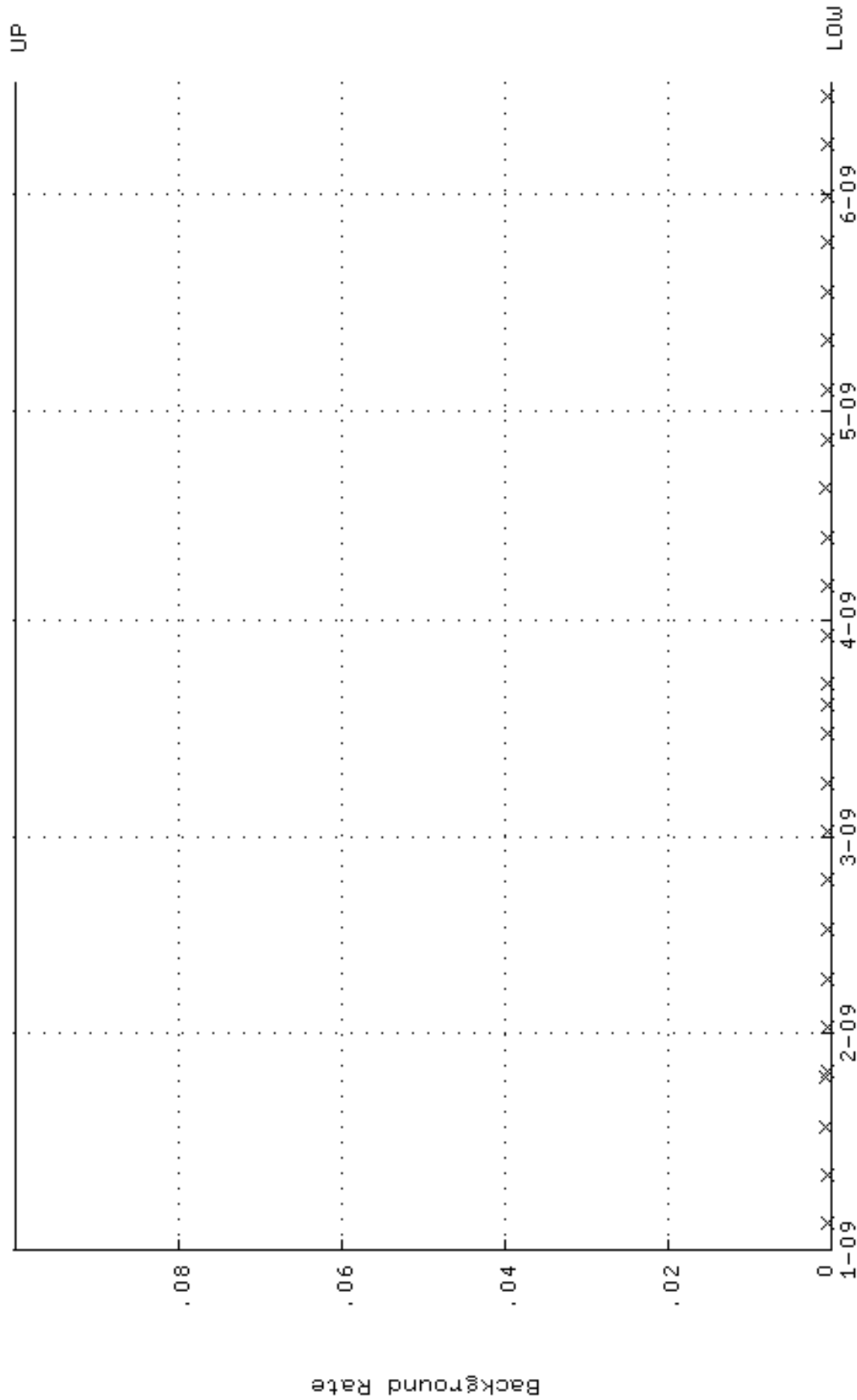


QA filename : DKA100:[ENV\_ALPHA.QA.W]W130.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 2-JAN-2009 07:24:04 through 16-JUN-2009 12:00:00  
Lower/Upper Lmts: 88.1614 through 97.4416

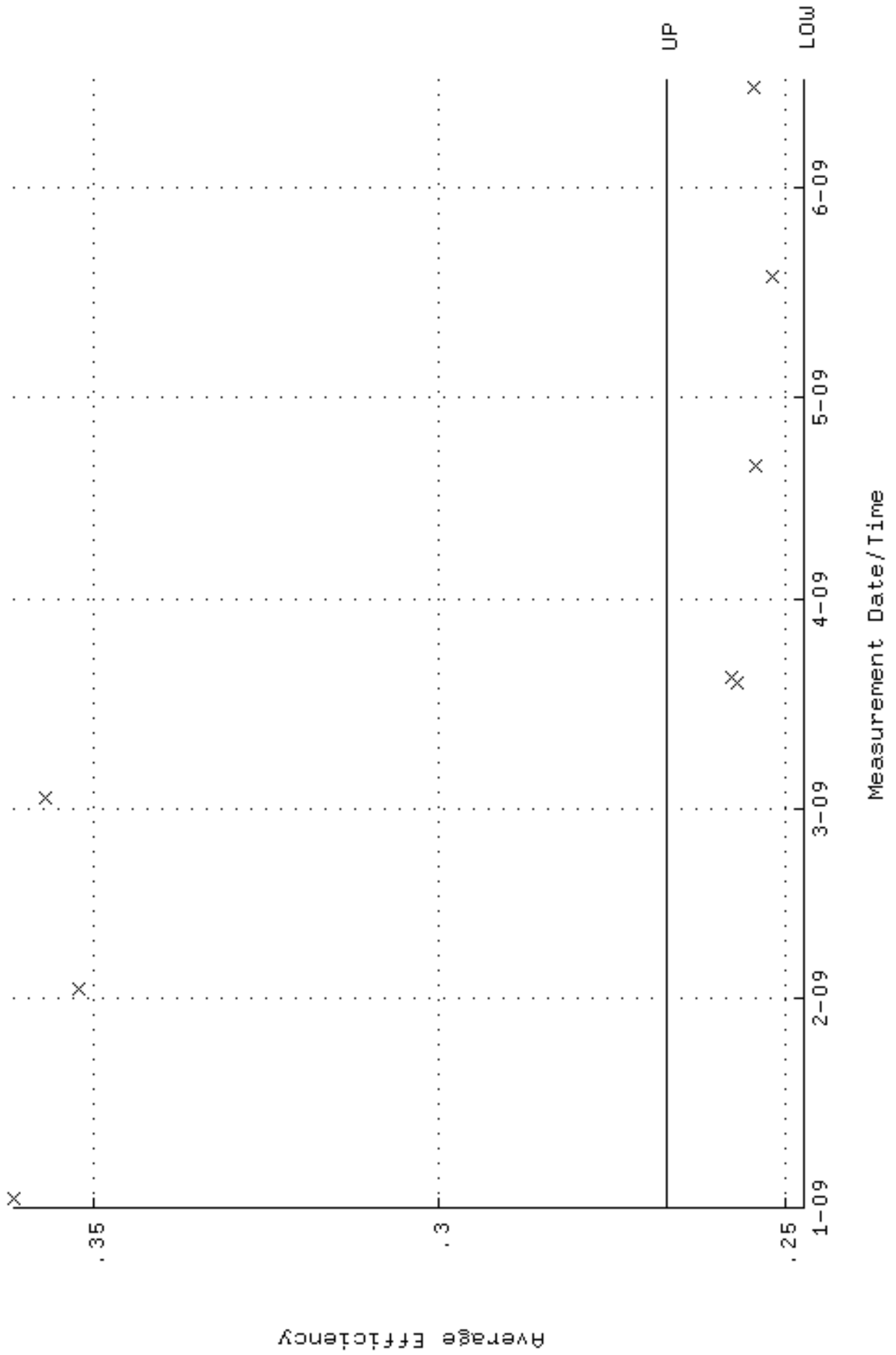




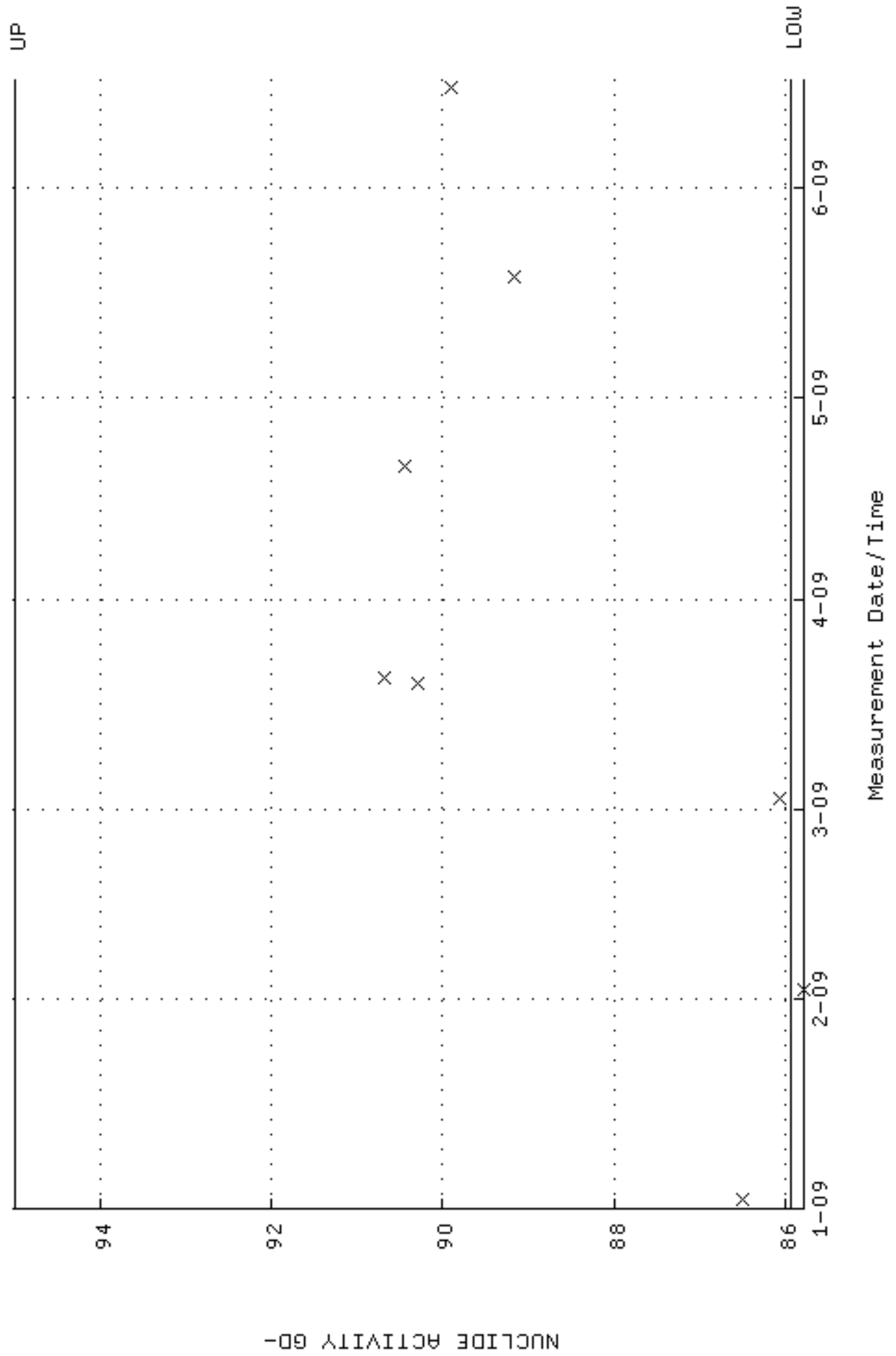
QA filename : DKA100:[ENV\_ALPHA.QA.B]B130.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:01 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



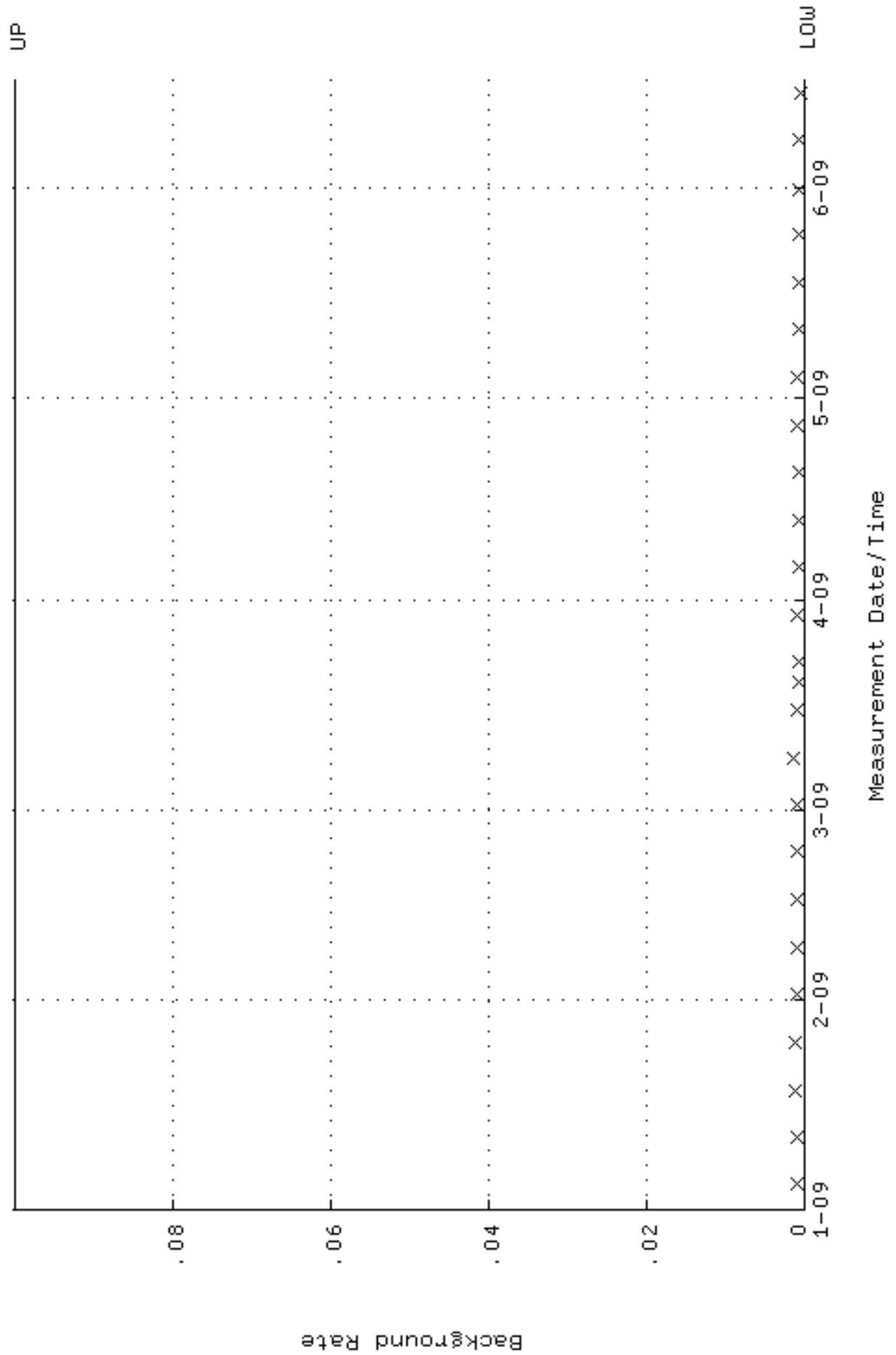
QA filename : DKA100:[ENV\_ALPHA.QA.W]W131.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:10 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.247185 through 0.267185



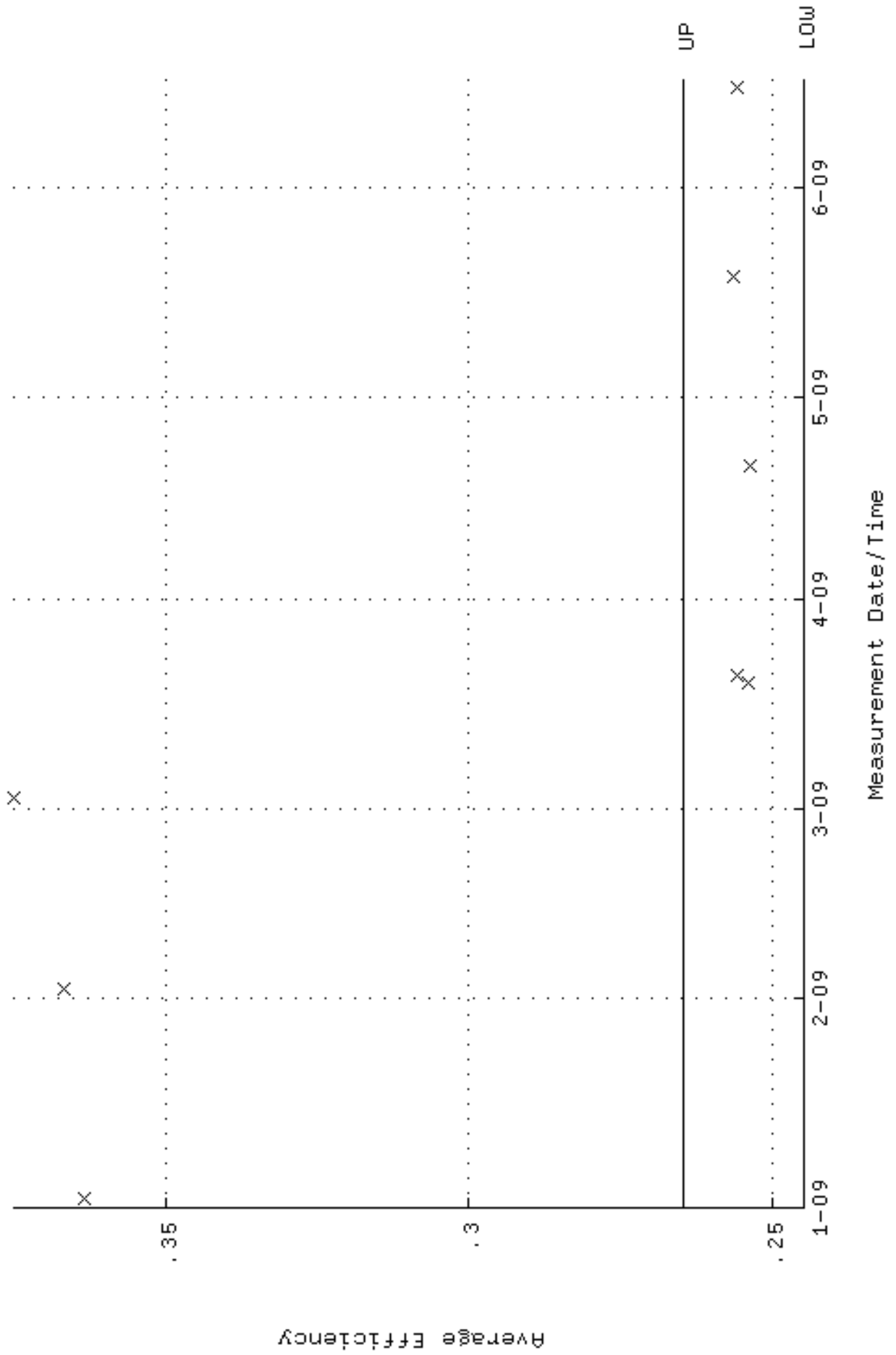
QA filename : DKA100:[ENV\_ALPHA.QA.W]W131.QAF;1  
 Parameter Name : NACTIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:24:10 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 85.9407 through 94.9871



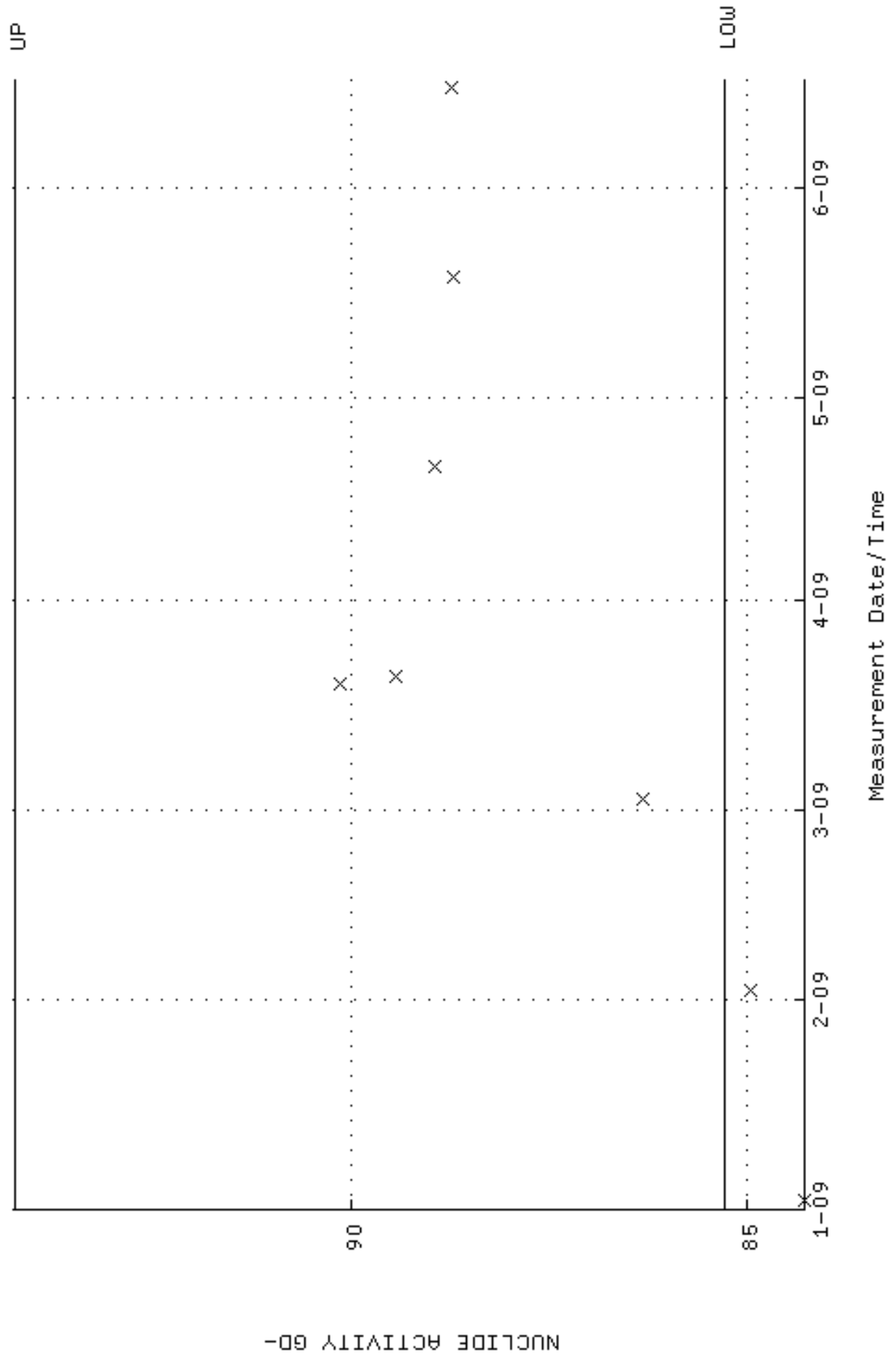
QA filename : DKA100:[ENV\_ALPHA.QA.B]B131.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:06 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



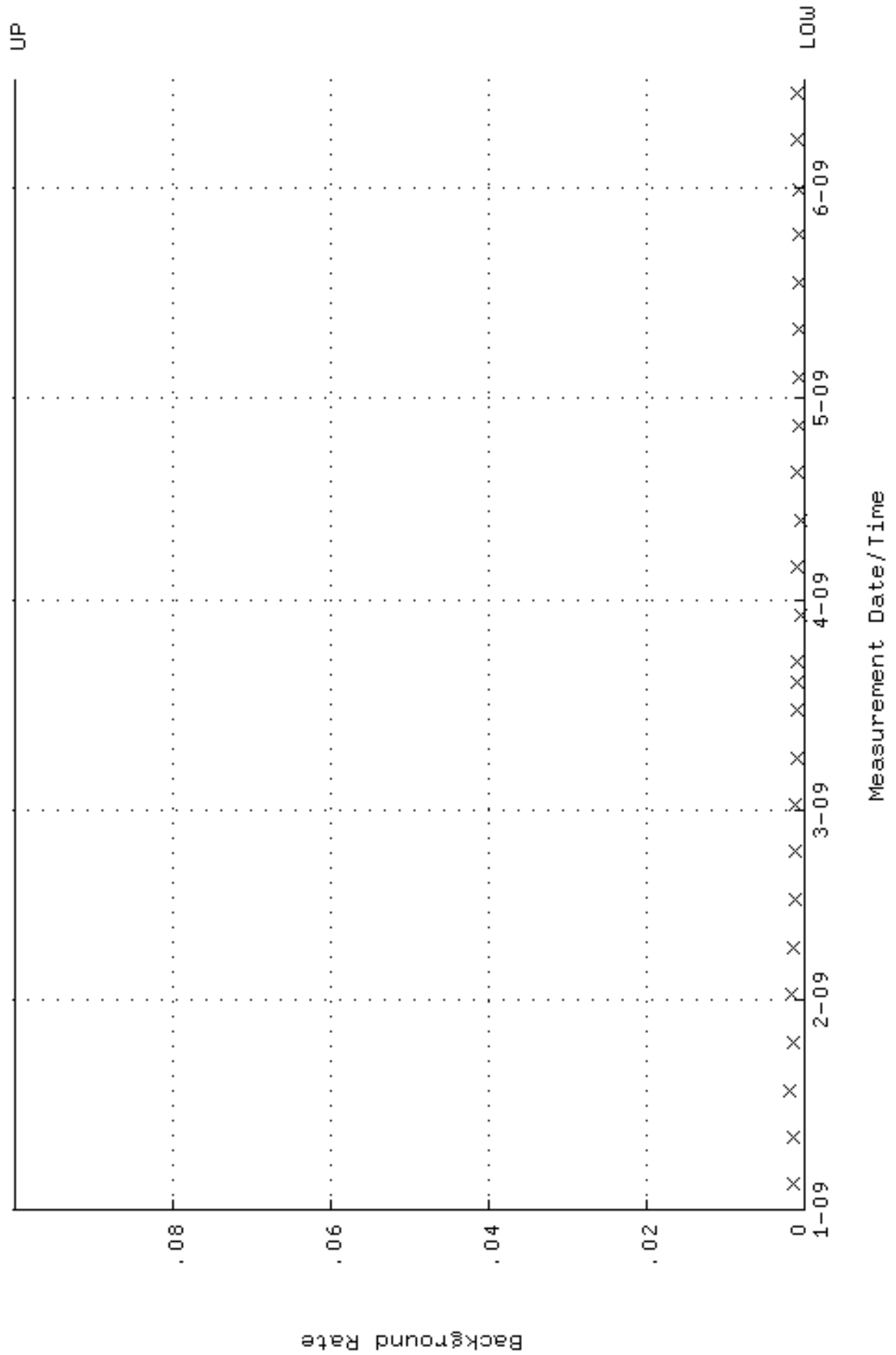
QA filename : DKA100:[ENV\_ALPHA.QA.W]W137.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:36 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.244801 through 0.264801



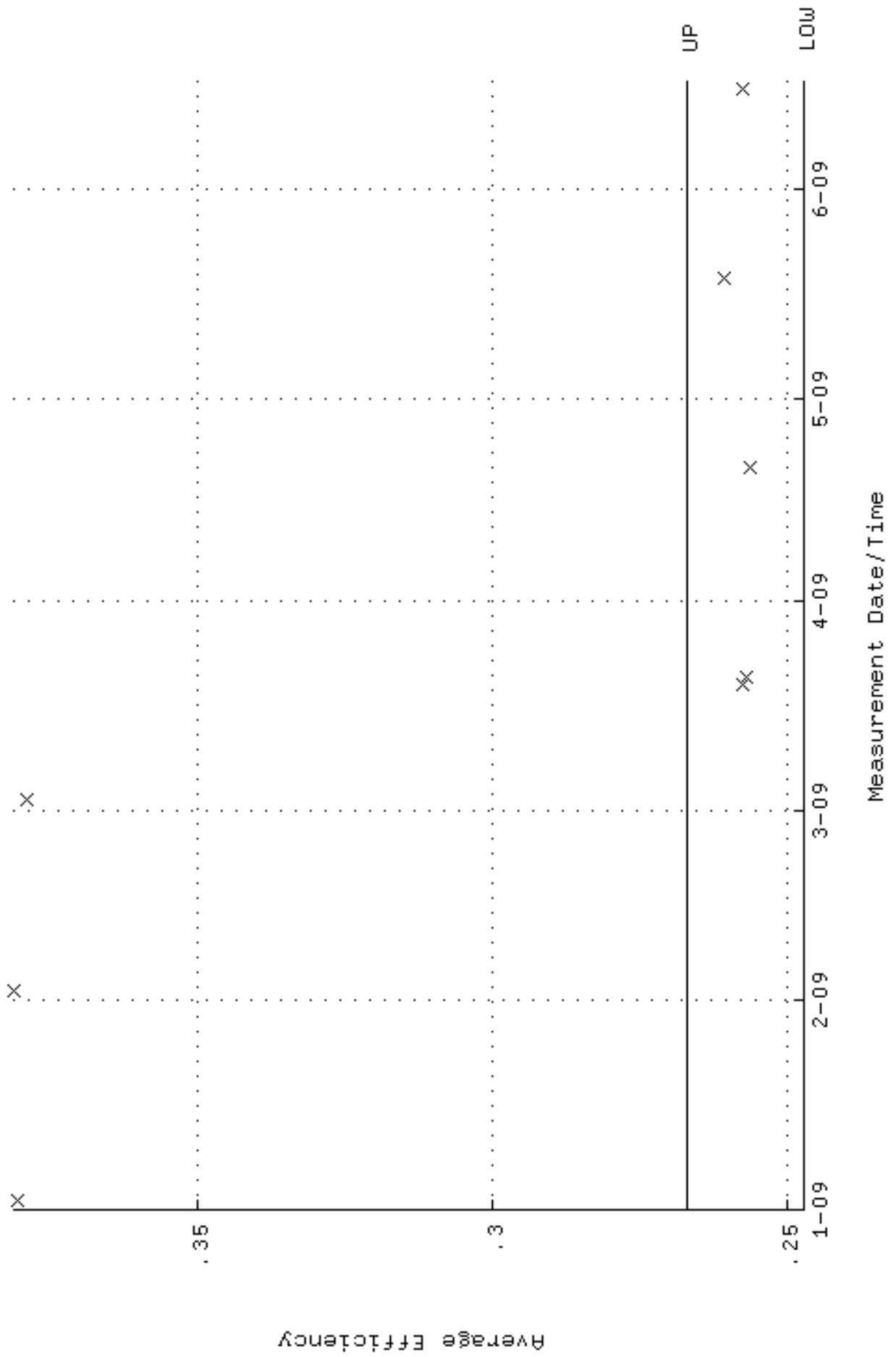
QA filename : DKA100:[ENV\_ALPHA.QA.W]W137.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:24:36 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 85.2880 through 94.2656



QA filename : DKA100:[ENV\_ALPHA.QA.B]B137.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:31 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

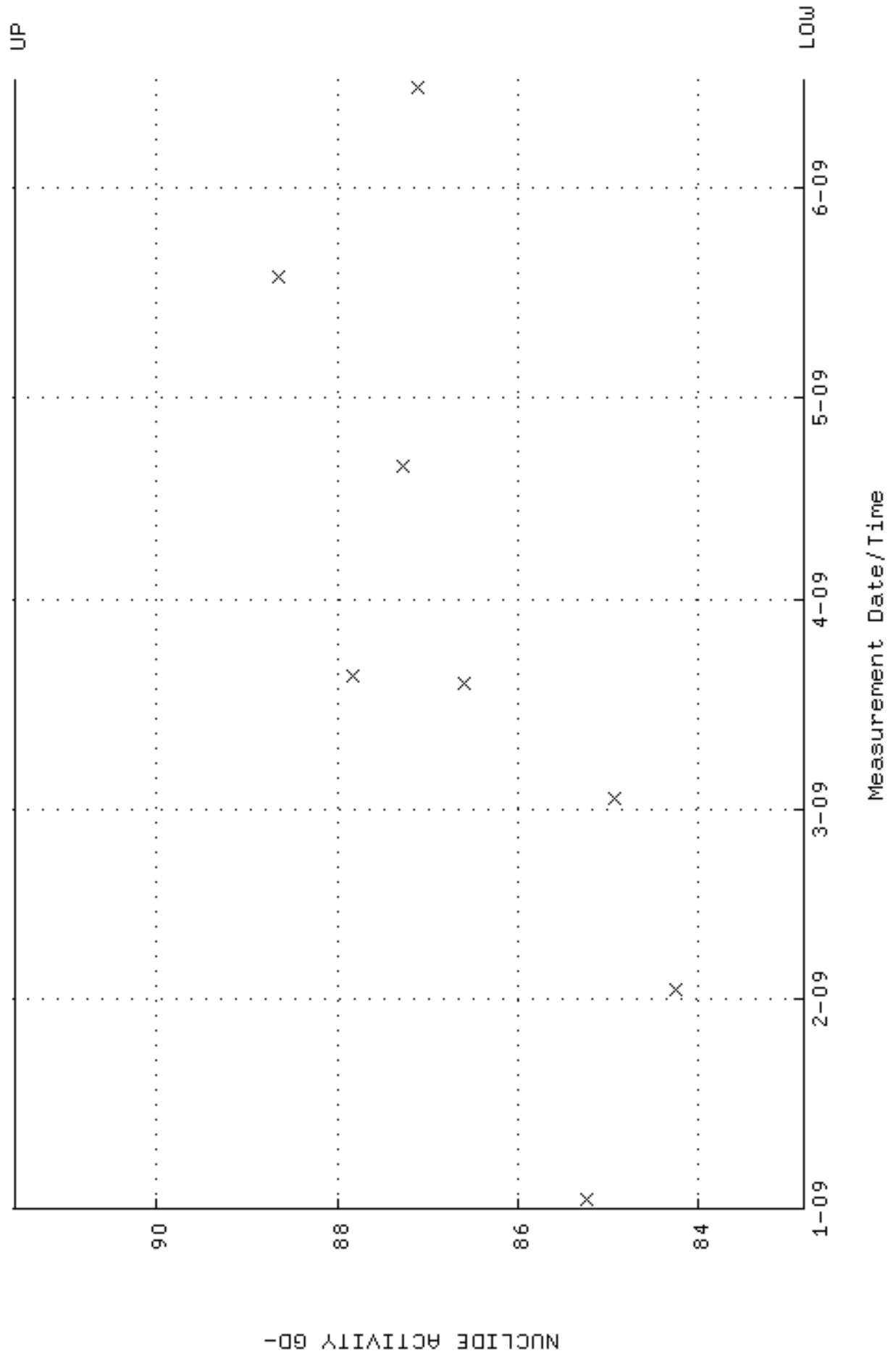


QA filename : DKA100:[ENV\_ALPHA.QA.W]W138.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:41 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.247085 through 0.267085

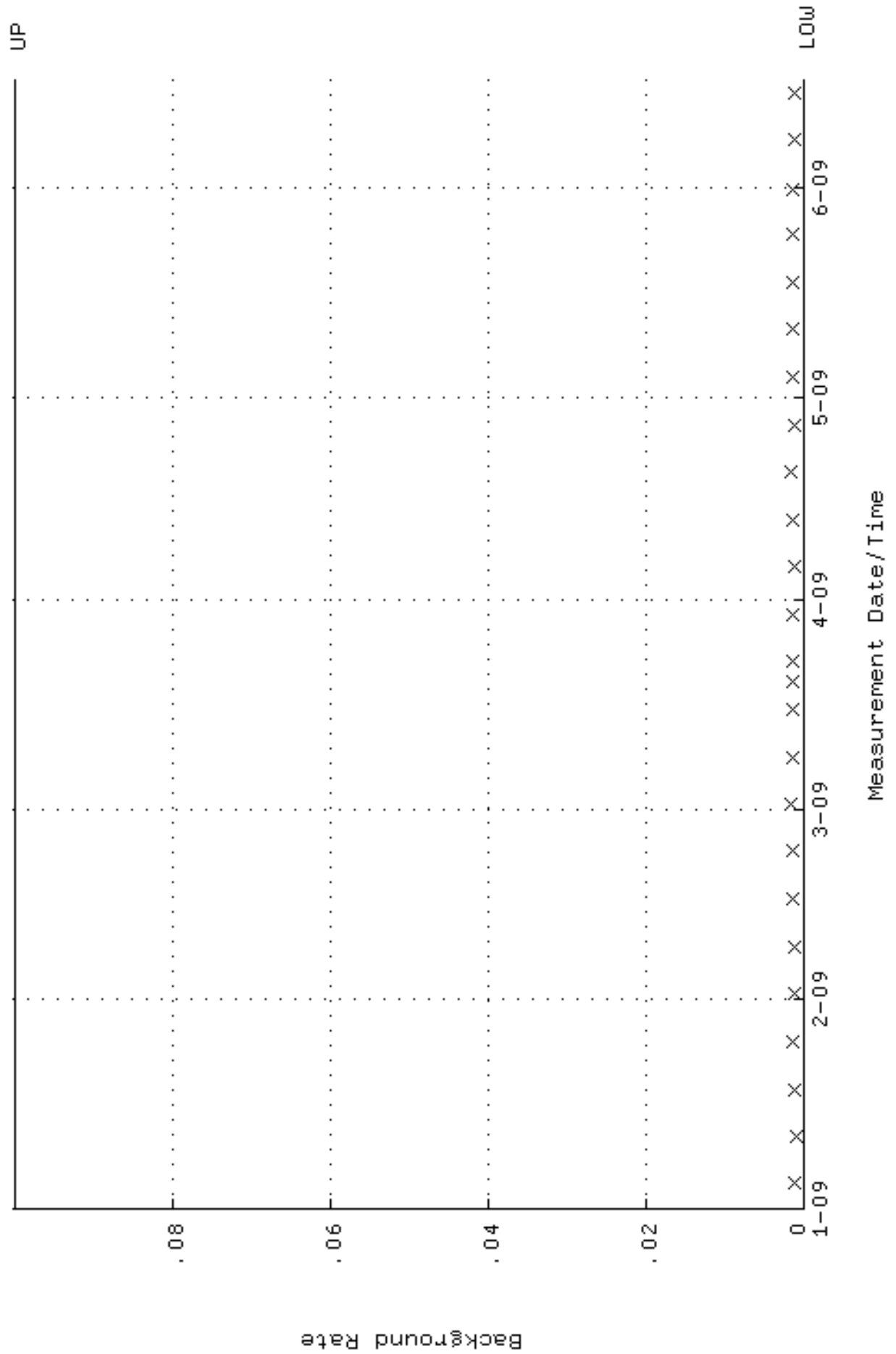




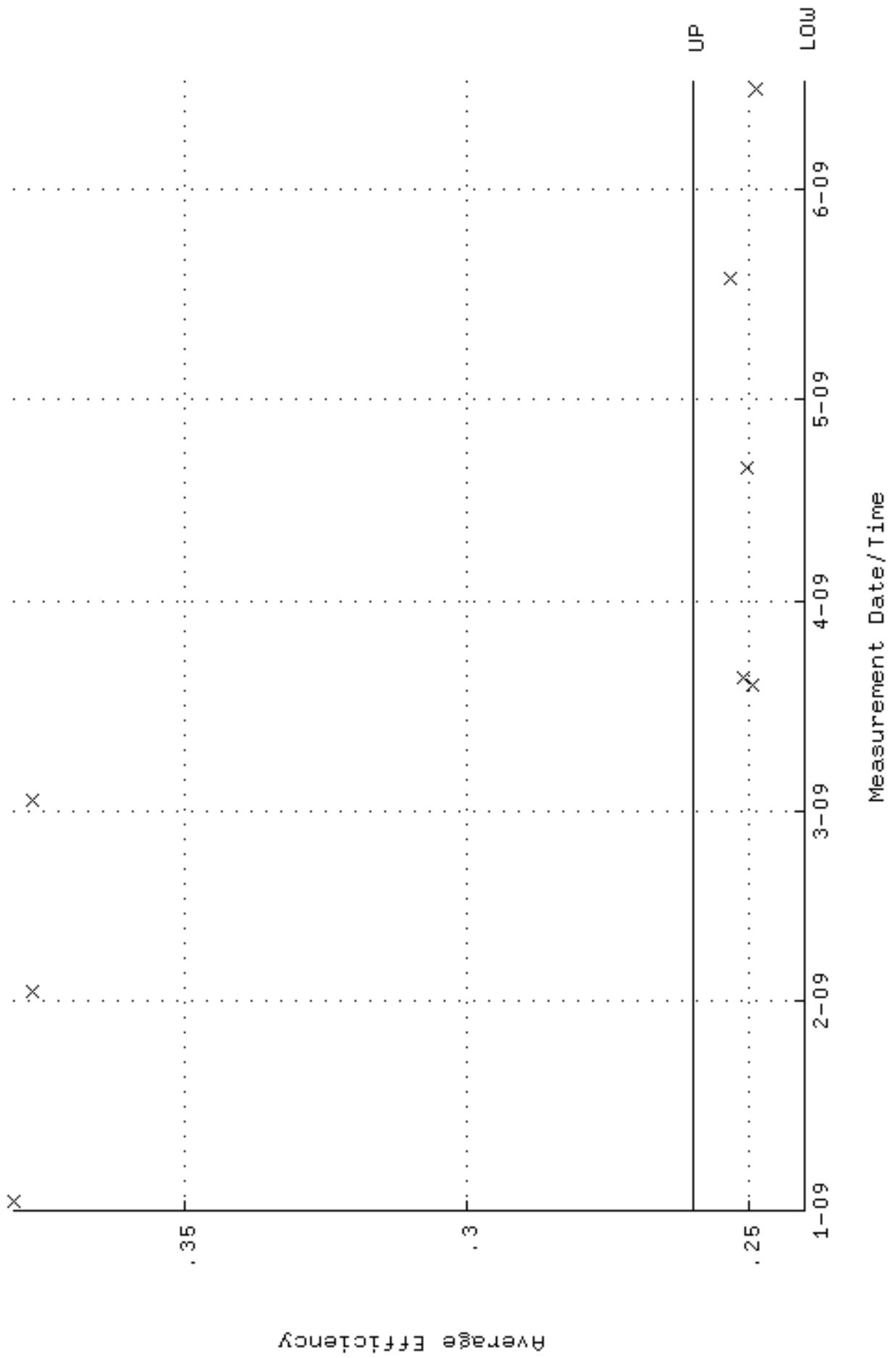
QA filename : DKA100:[ENV\_ALPHA.QA.W]W138.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:24:41 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 82.8399 through 91.5599



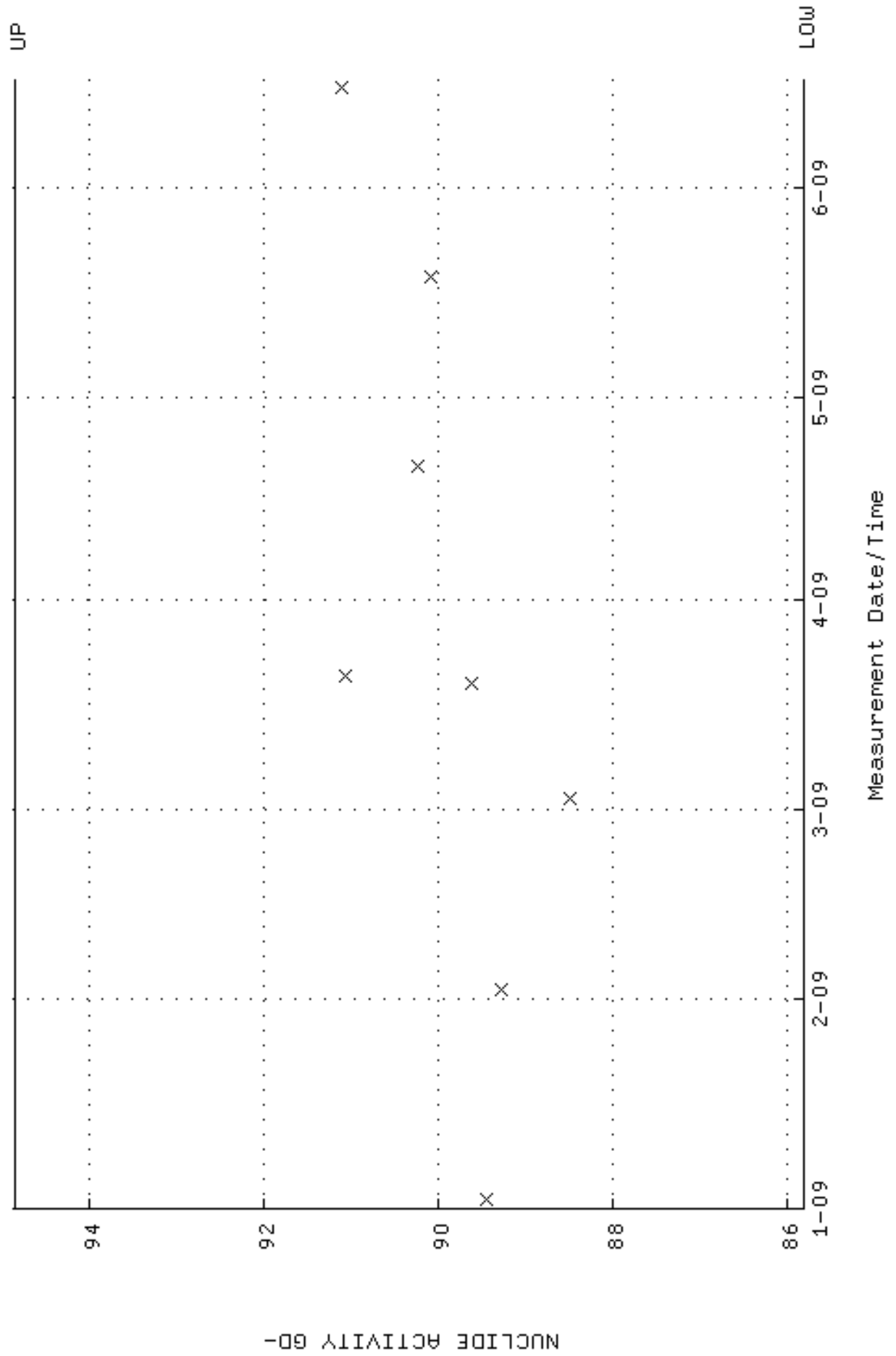
QA filename : DKA100:[ENV\_ALPHA.QA.B]B138.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:35 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



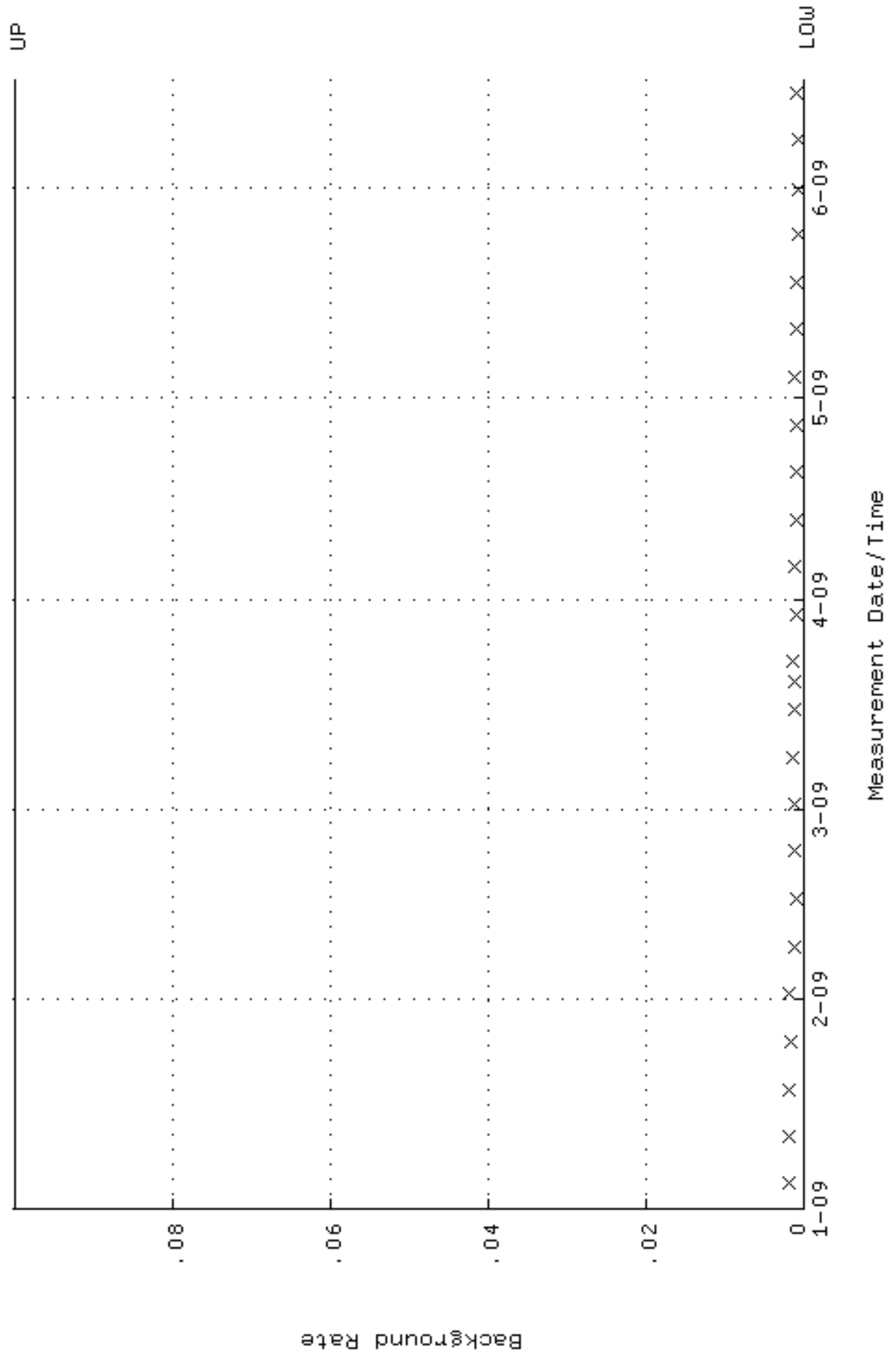
QA filename : DKA100:[ENV\_ALPHA.QA.W]W139.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:47 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.240299 through 0.260299



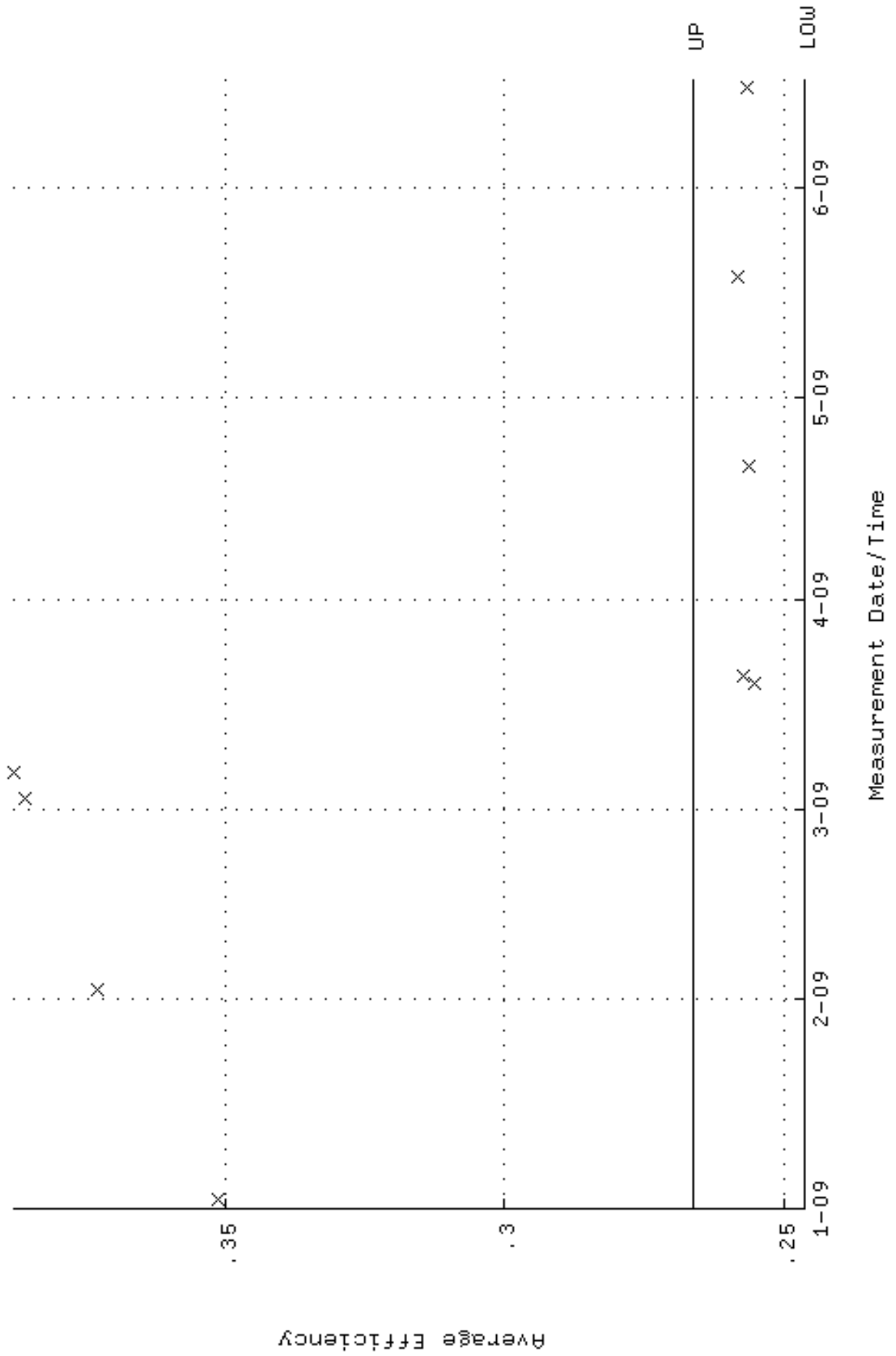
QA filename : DKA100:[ENV\_ALPHA.QA.W]W139.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 2-JAN-2009 07:24:47 through 16-JUN-2009 12:00:00  
Lower/Upper Lmts: 85.8145 through 94.8477



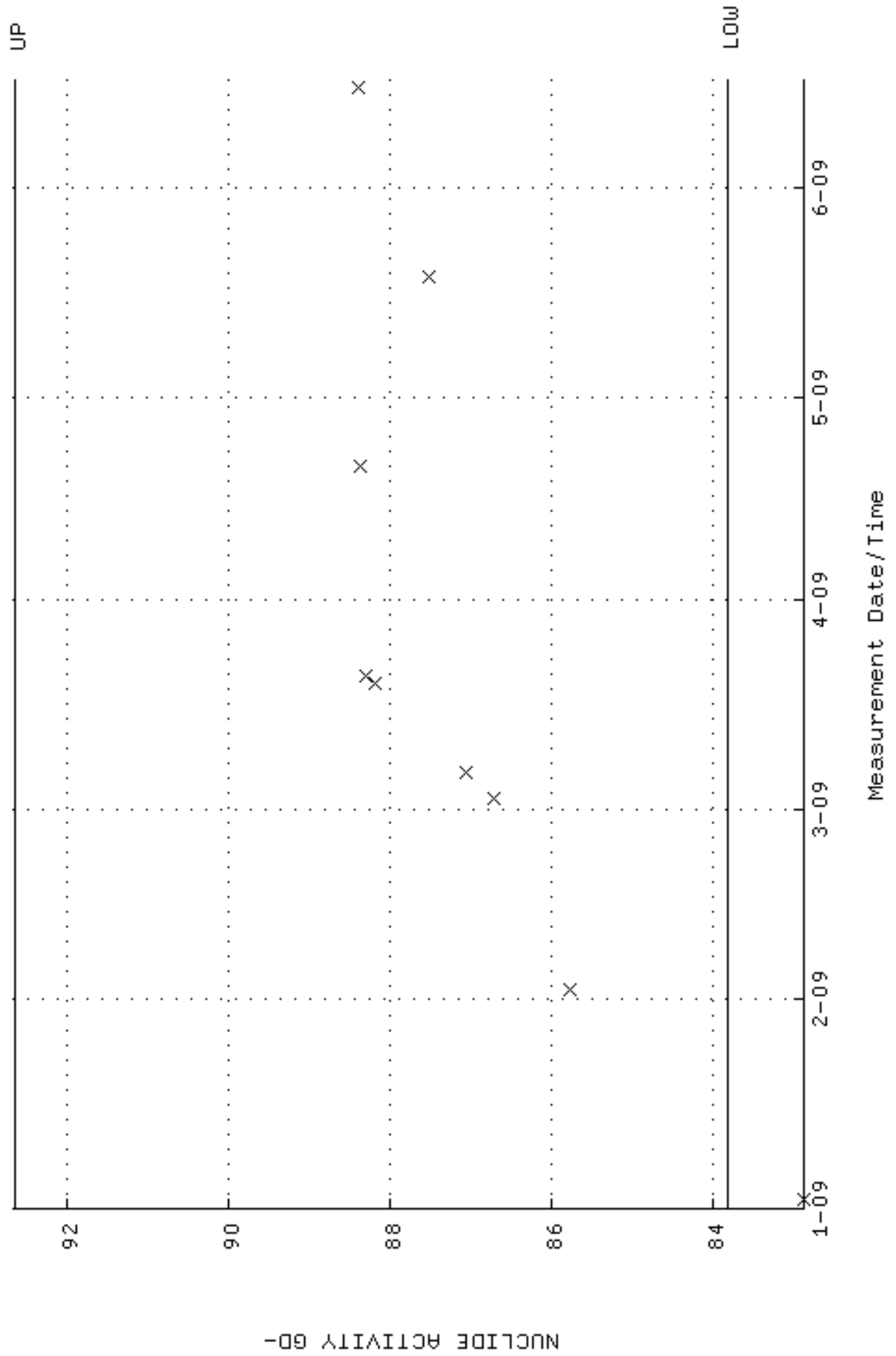
QA filename : DKA100:[ENV\_ALPHA.QA.B]B139.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:39 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



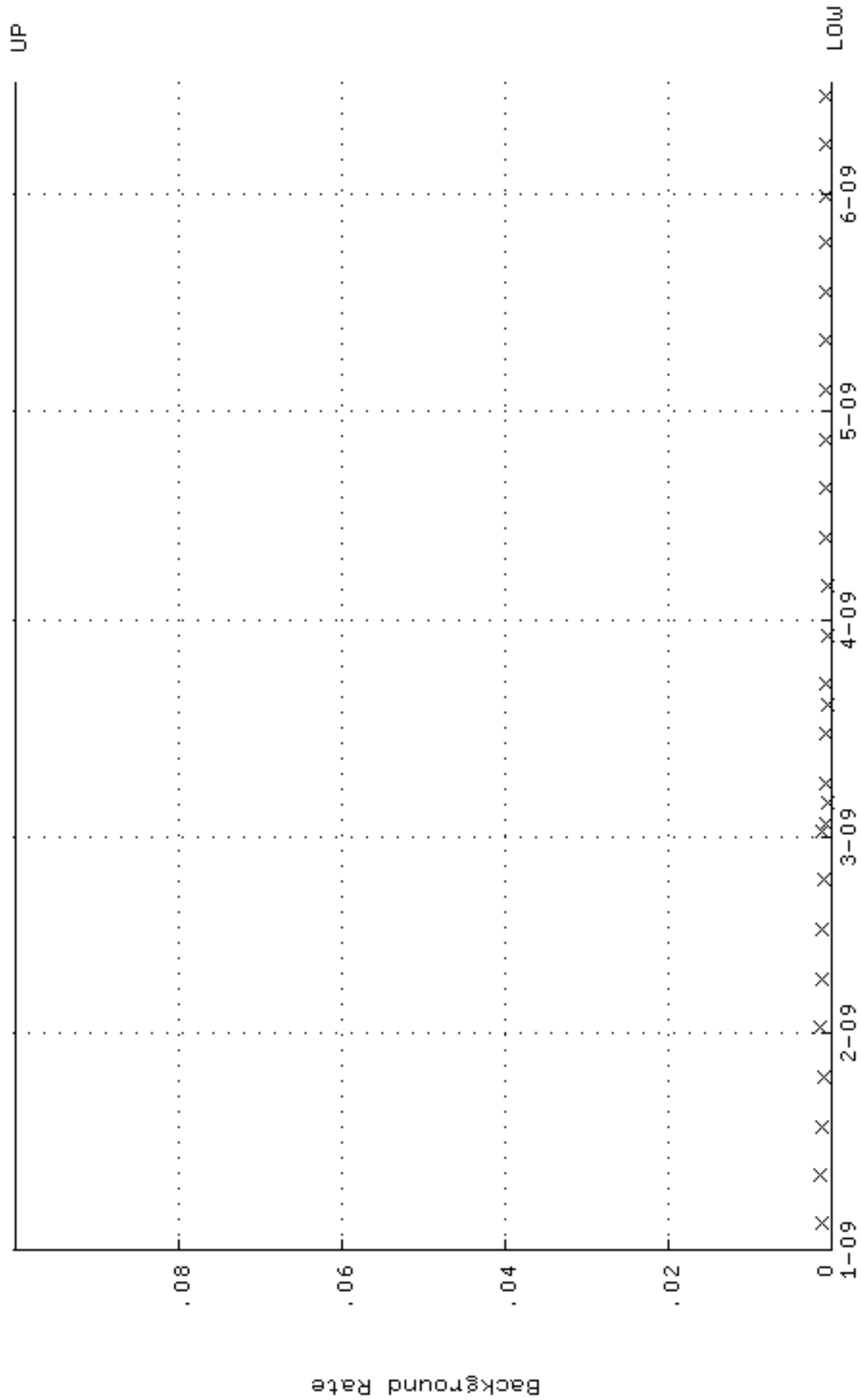
QA filename : DKA100:[ENV\_ALPHA.QA.W]W140.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:52 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.246178 through 0.266178



QA filename : DKA100:[ENV\_ALPHA.QA.W]W140.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:24:52 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 83.8171 through 92.6399

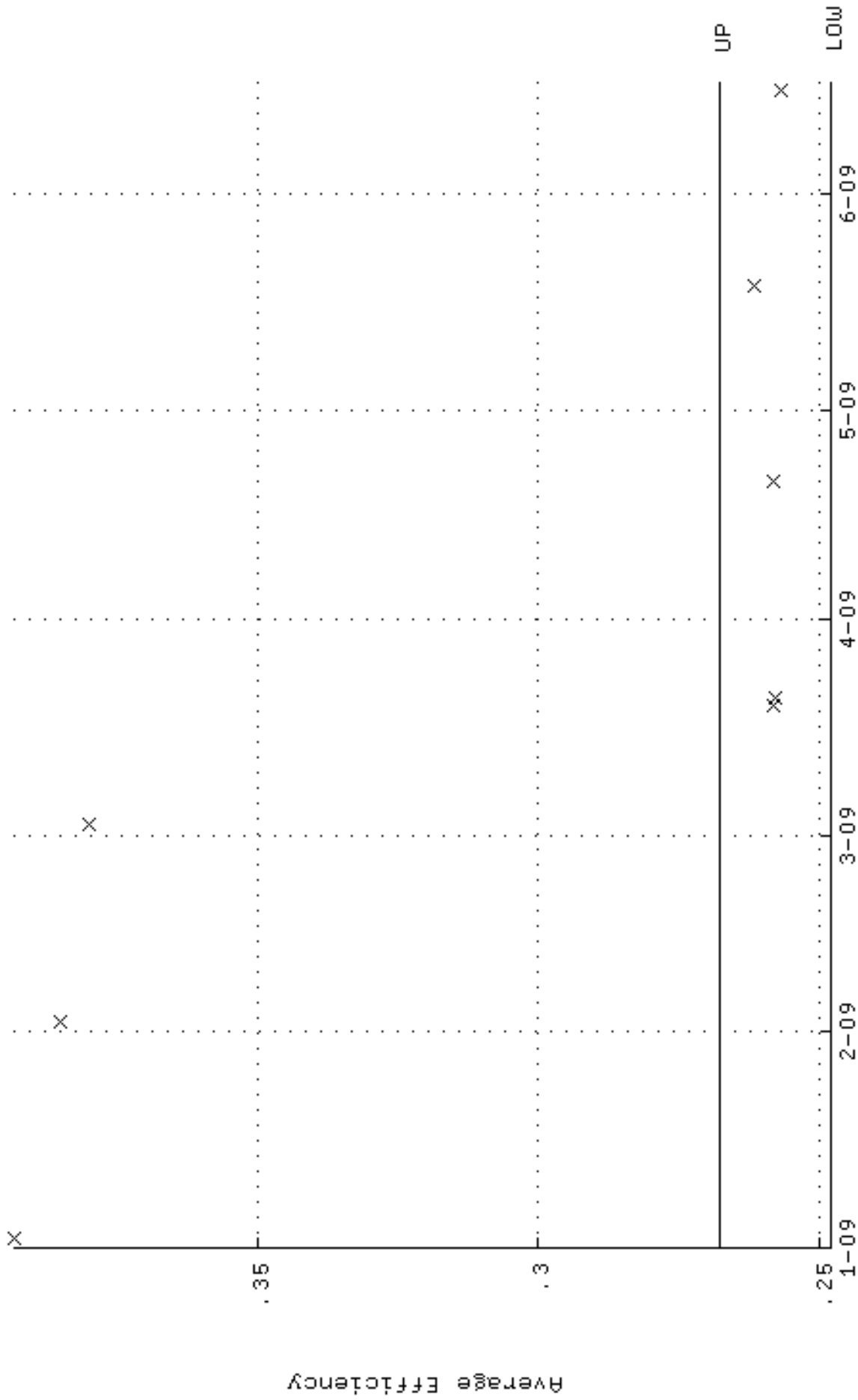


QA filename : DKA100:[ENV\_ALPHA.QA.B]B140.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:43 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

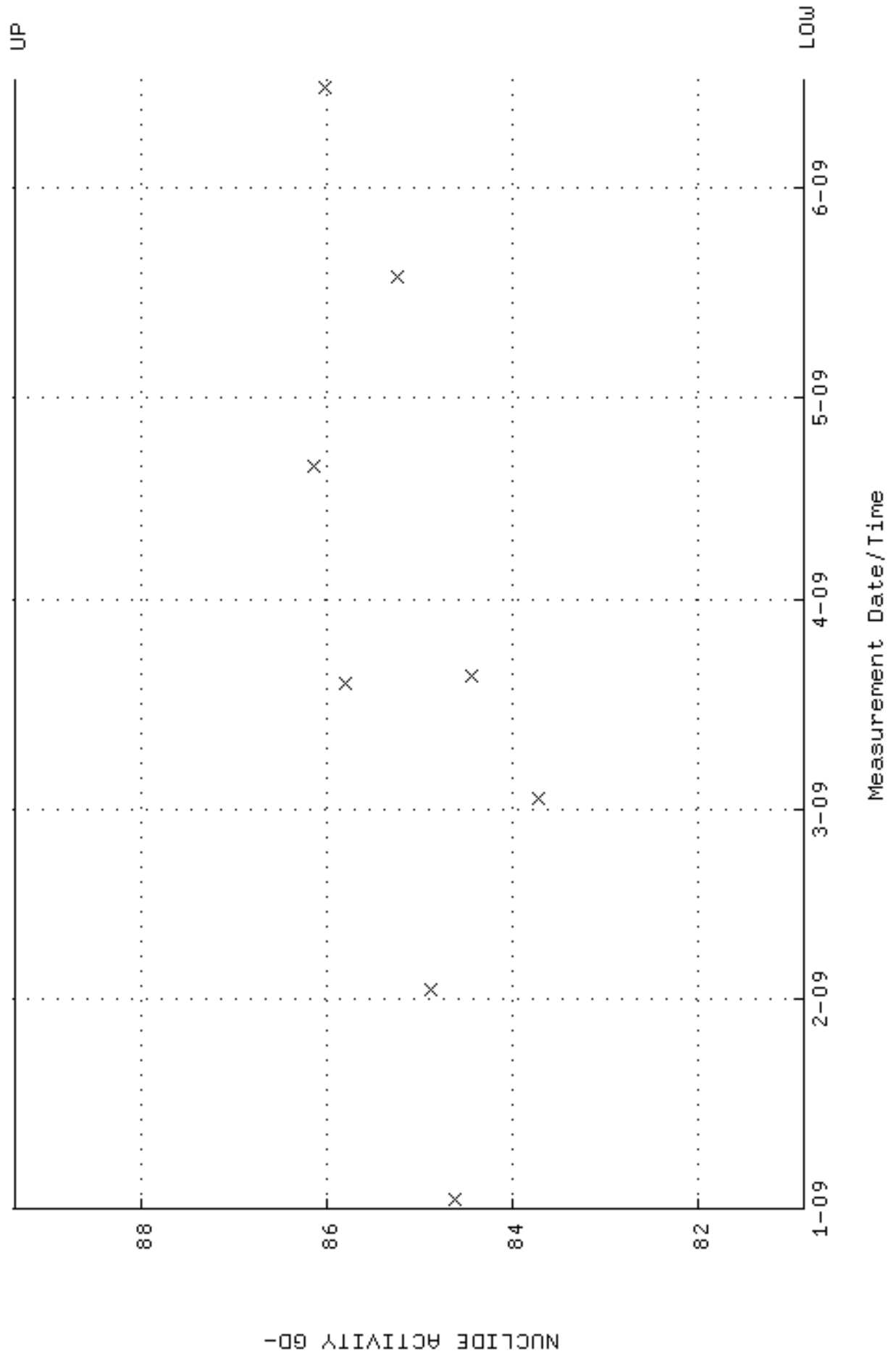




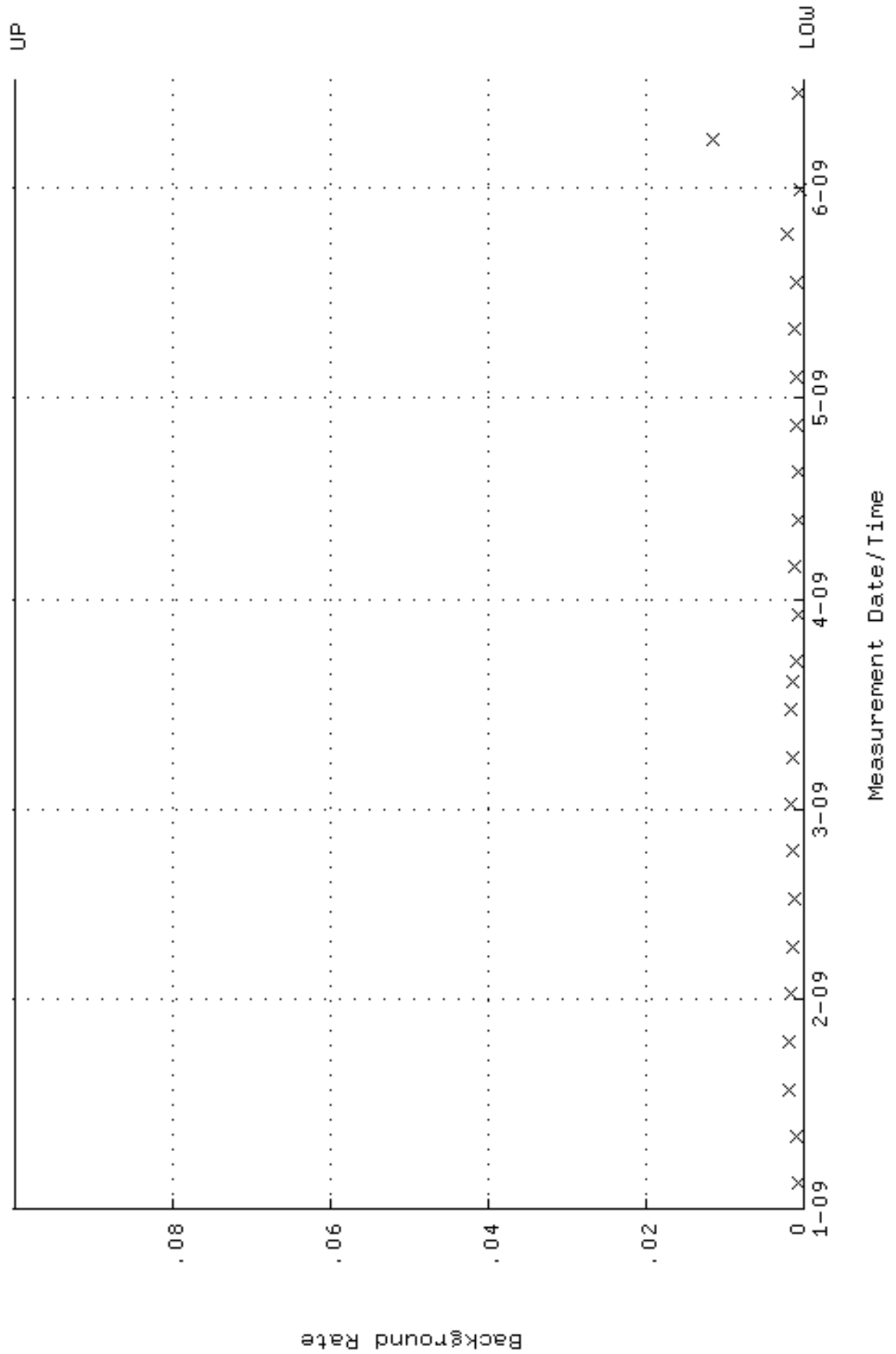
QA filename : DKA100:[ENV\_ALPHA.QA.W]W141.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:56 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.247845 through 0.267845



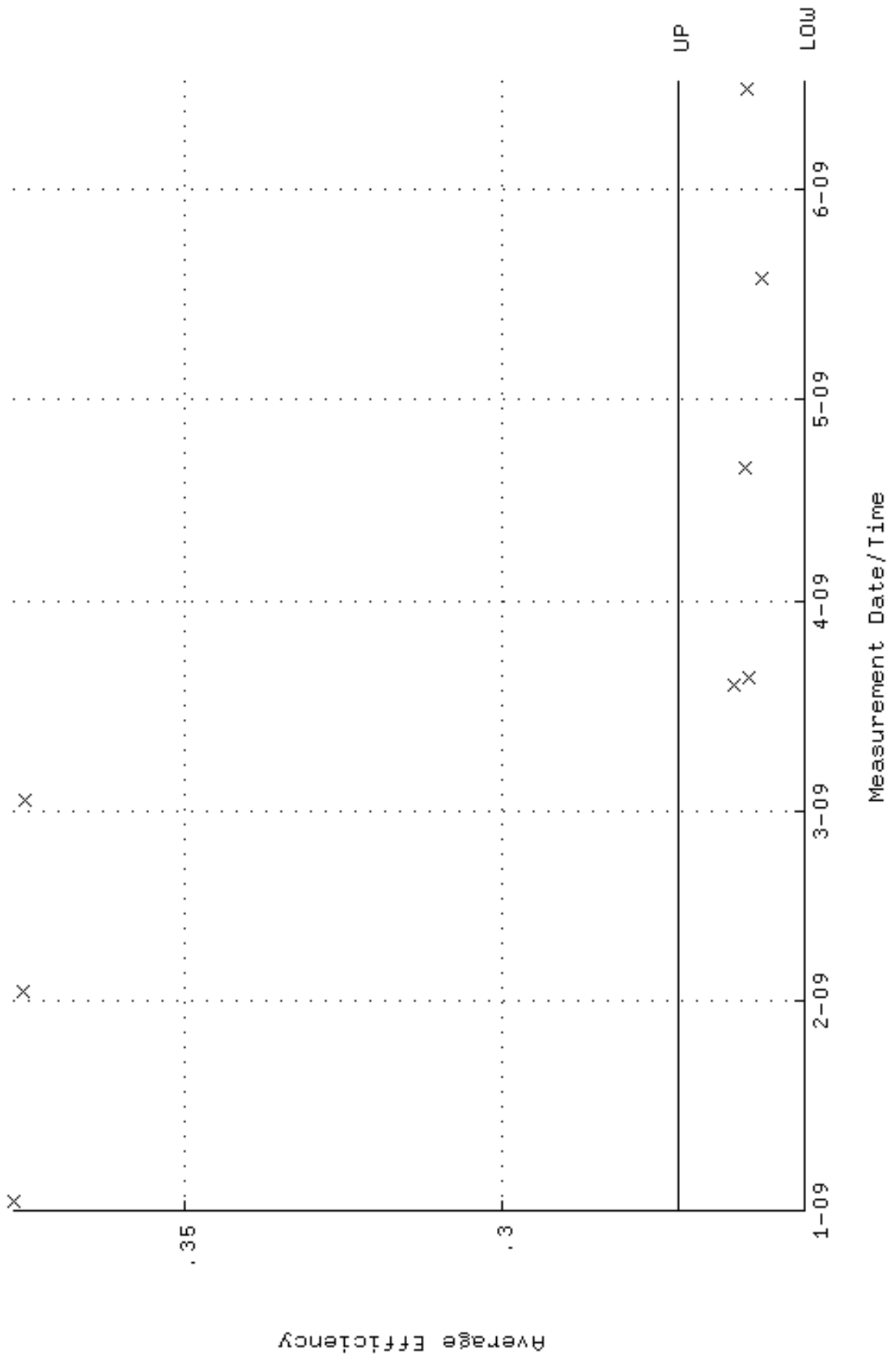
QA filename : DKA100:[ENV\_ALPHA.QA.W]W141.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:24:56 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 80.8595 through 89.3711



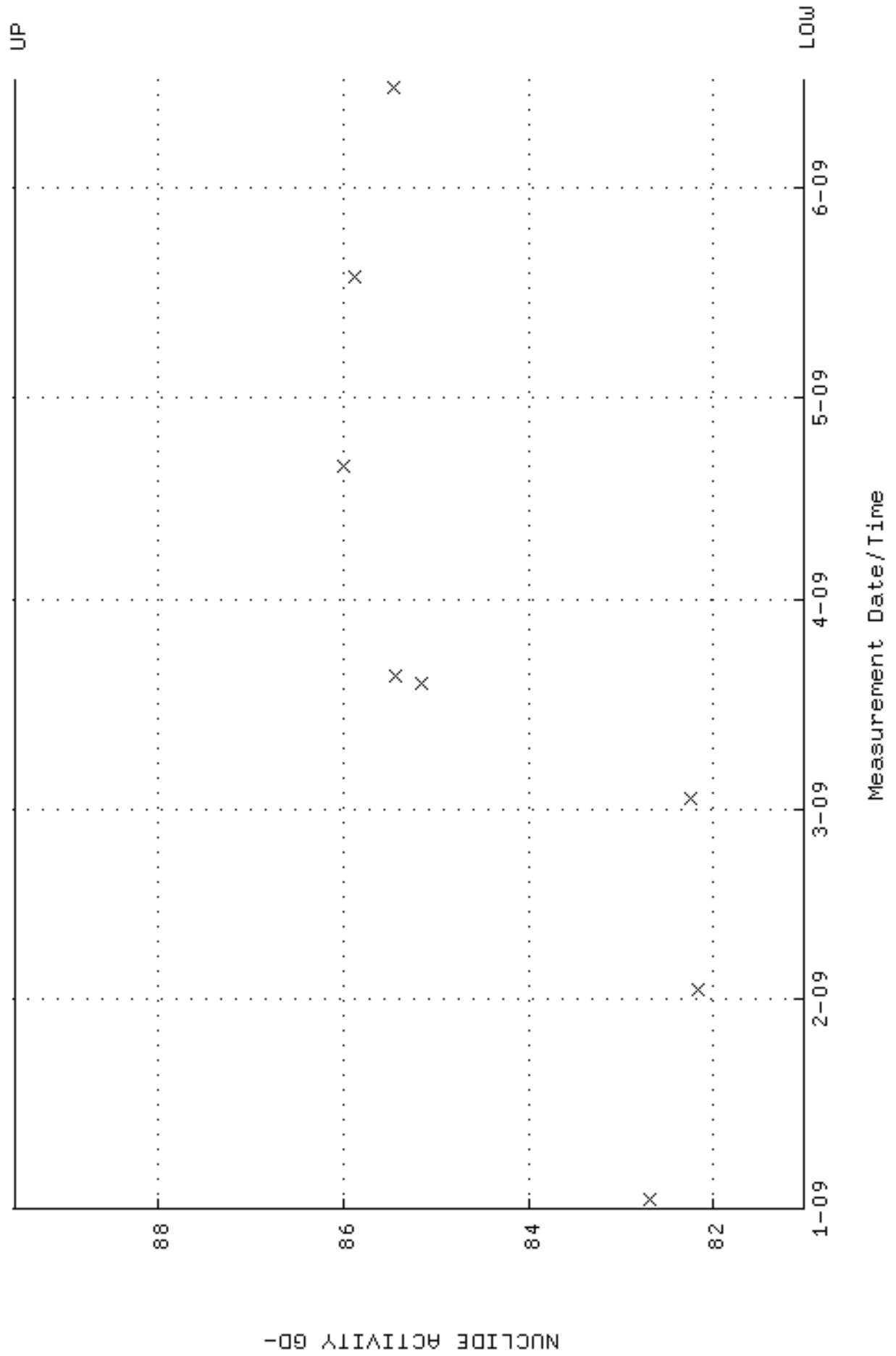
QA filename : DKA100:[ENV\_ALPHA.QA.B]B141.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:47 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



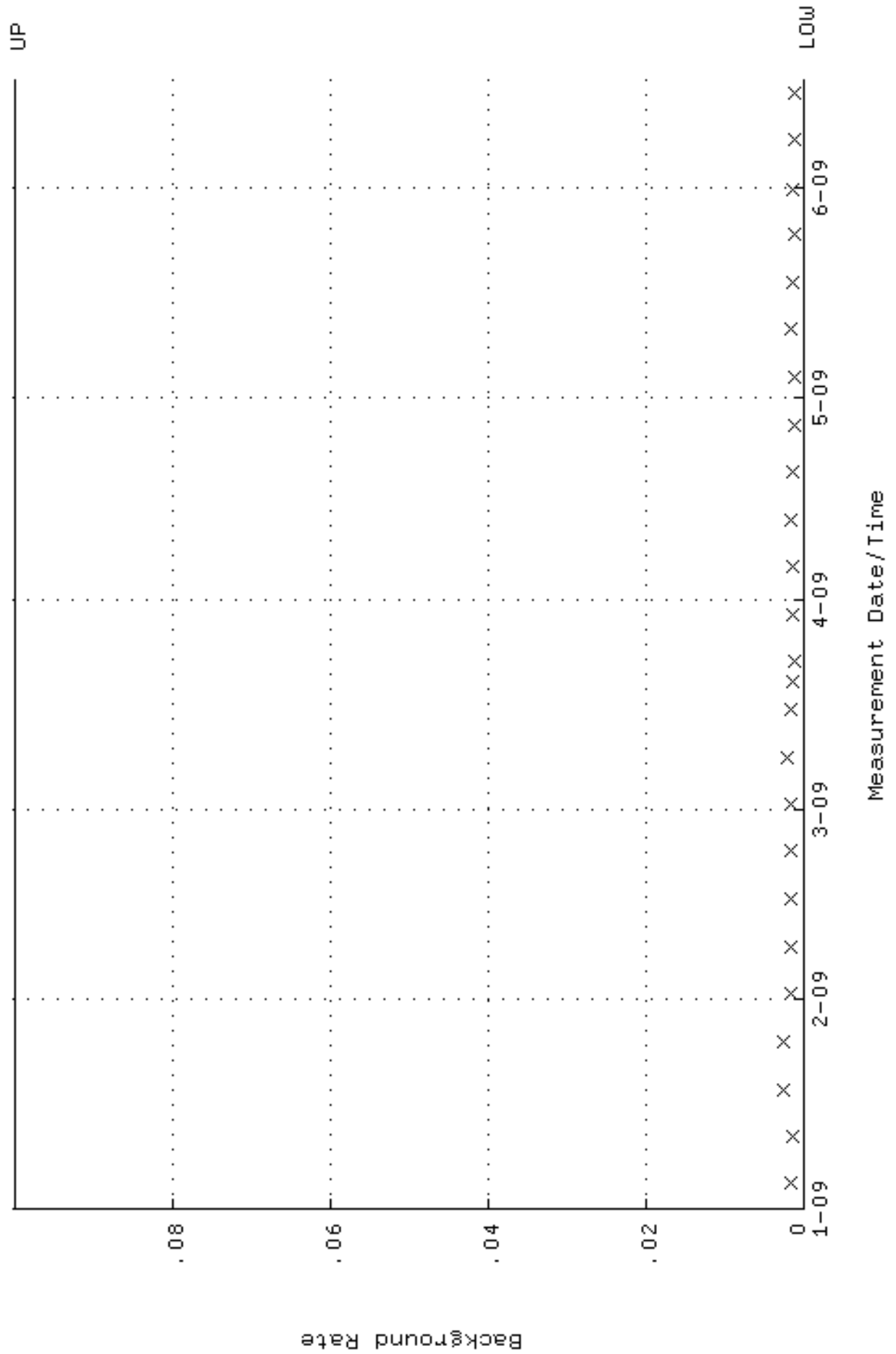
QA filename : DKA100:[ENV\_ALPHA.QA.W]W142.QAF;2  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:02 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.252182 through 0.272182



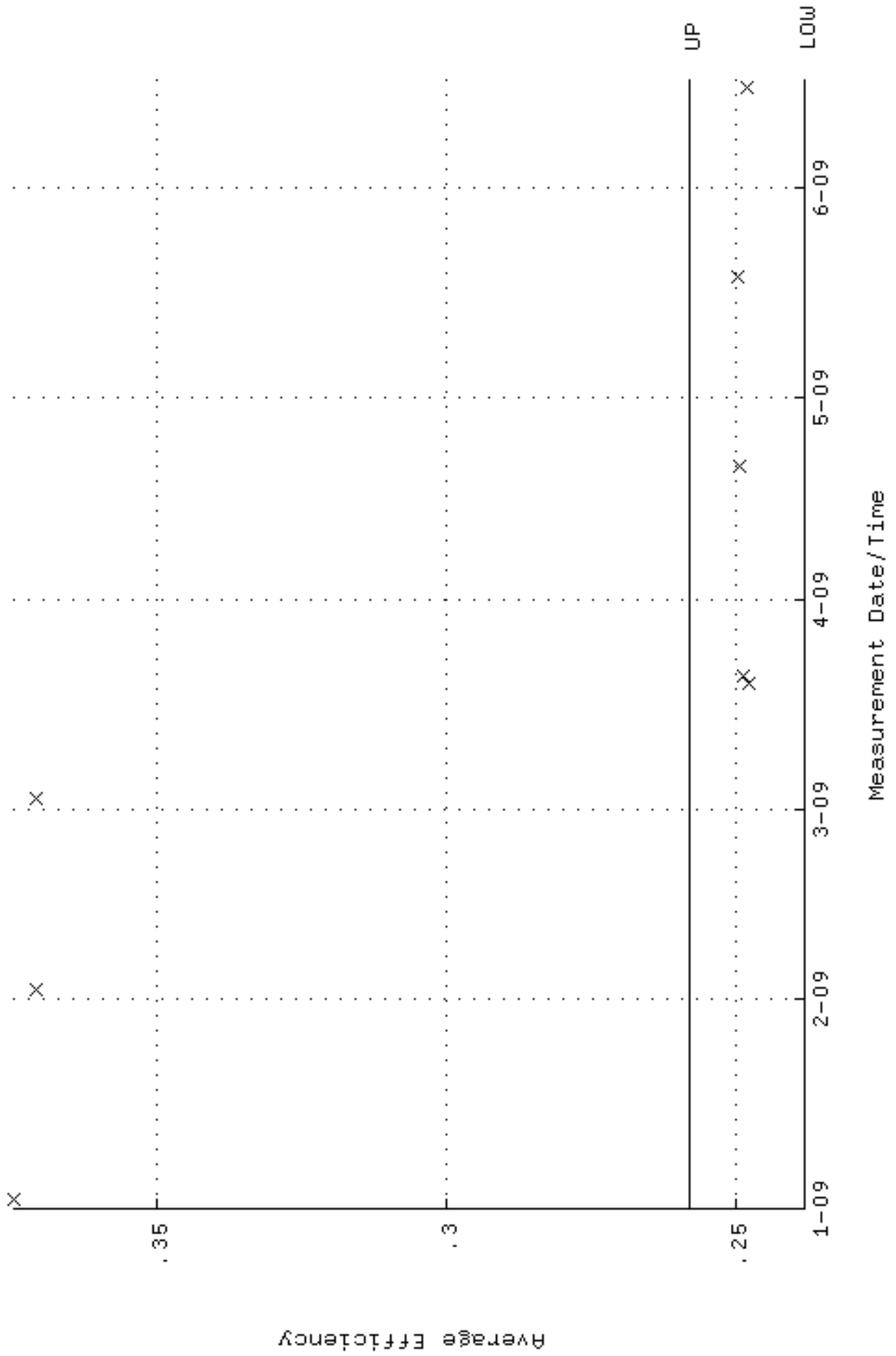
QA filename : DKA100:[ENV\_ALPHA.QA.W]W142.QAF;2  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:25:02 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 81.0245 through 89.5533



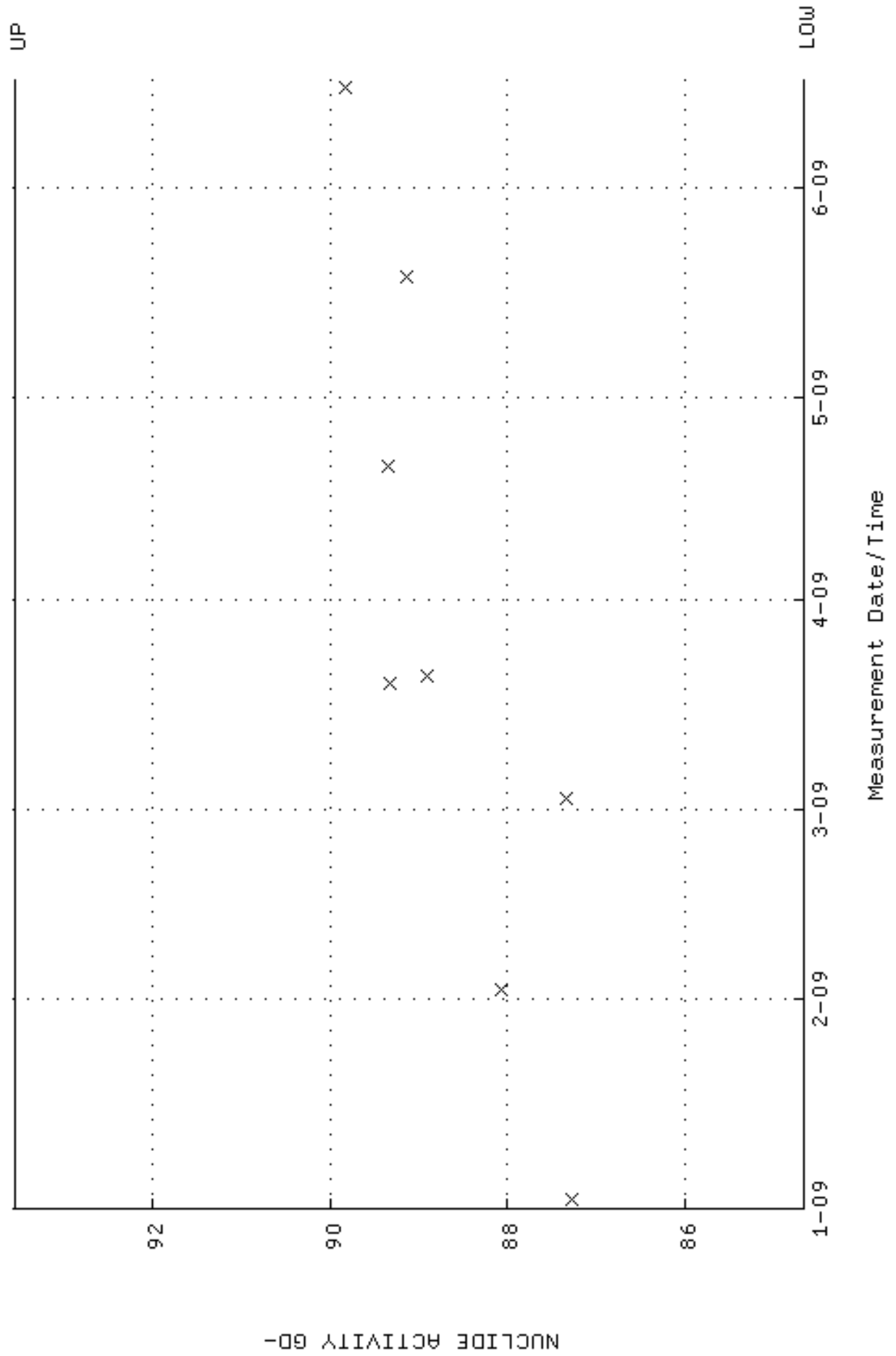
QA filename : DKA100:[ENV\_ALPHA.QA.B]B142.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:51 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W144.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:11 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.237963 through 0.257963

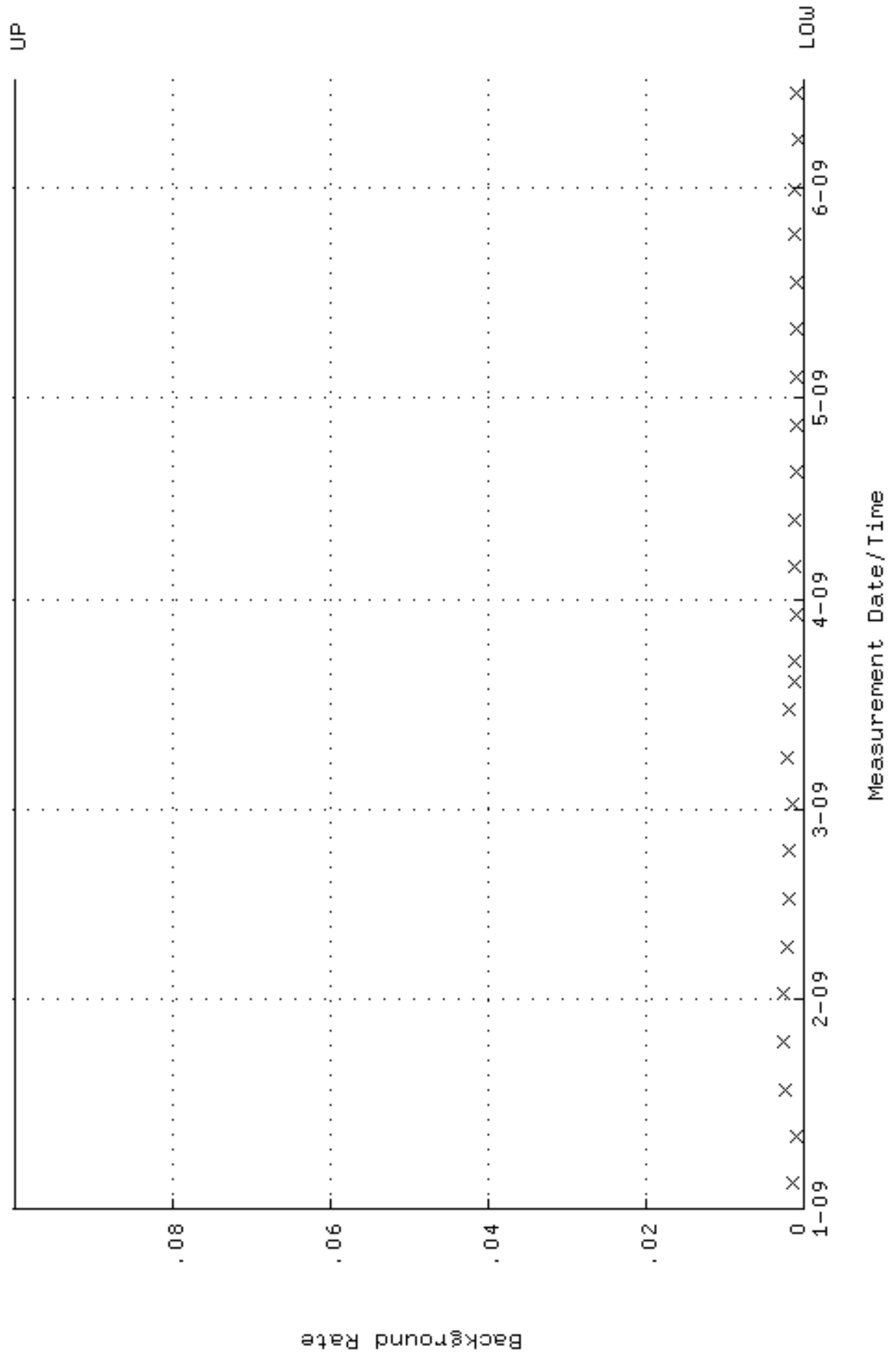


QA filename : DKA100:[ENV\_ALPHA.QA.W]W144.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:25:11 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 84.6507 through 93.5613

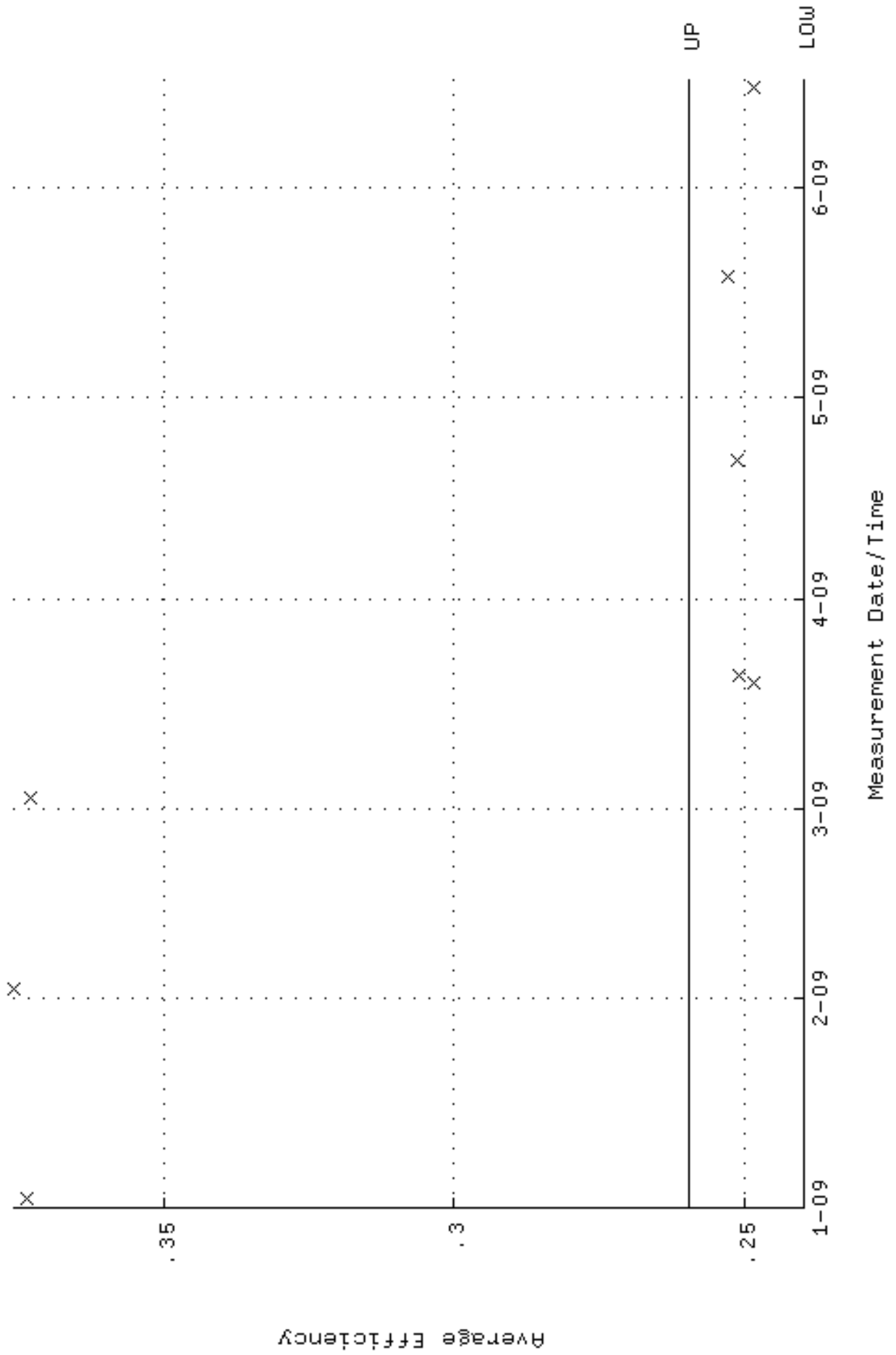




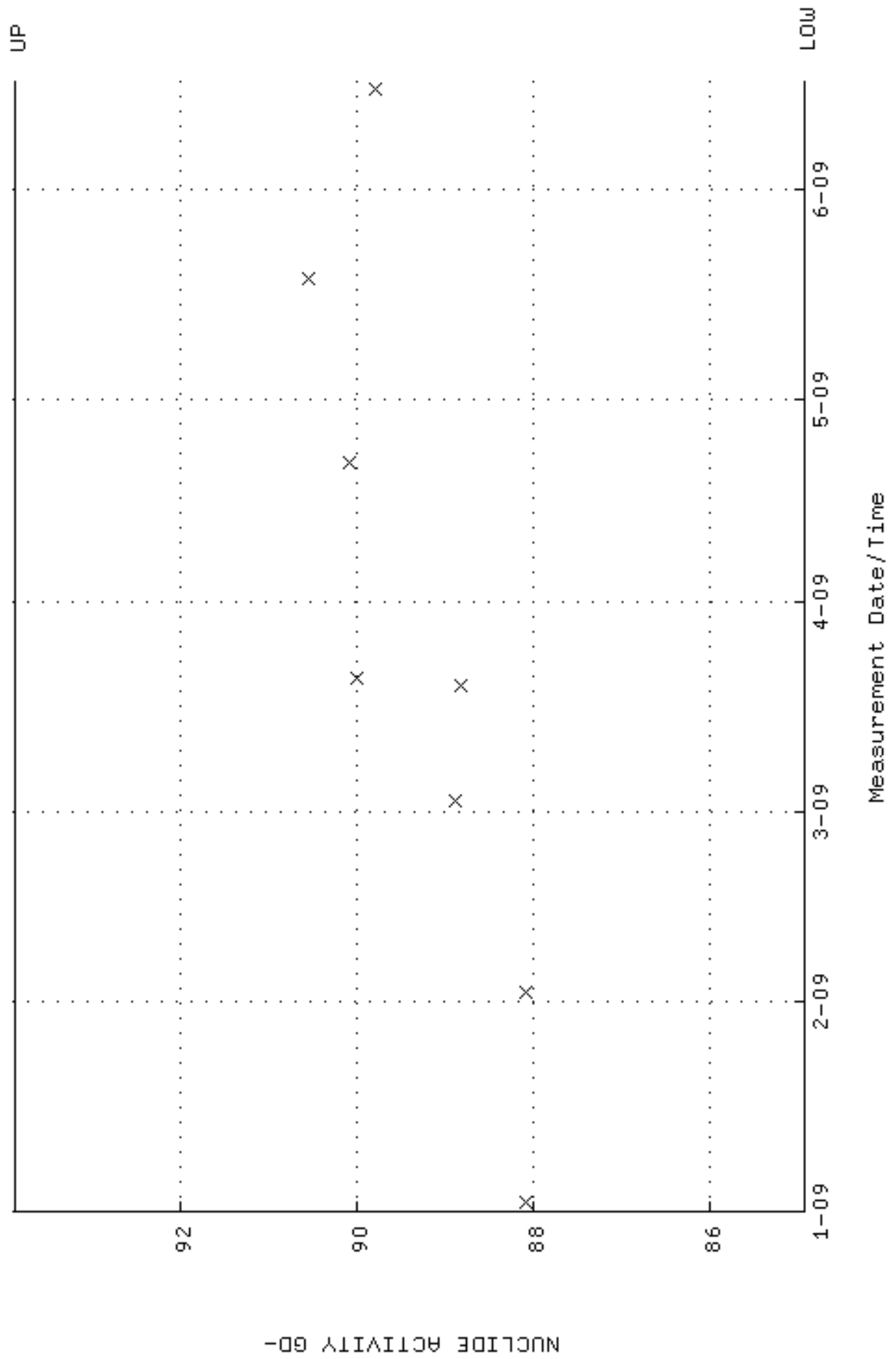
QA filename : DKA100:[ENV\_ALPHA.QA.B]B144.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:00 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



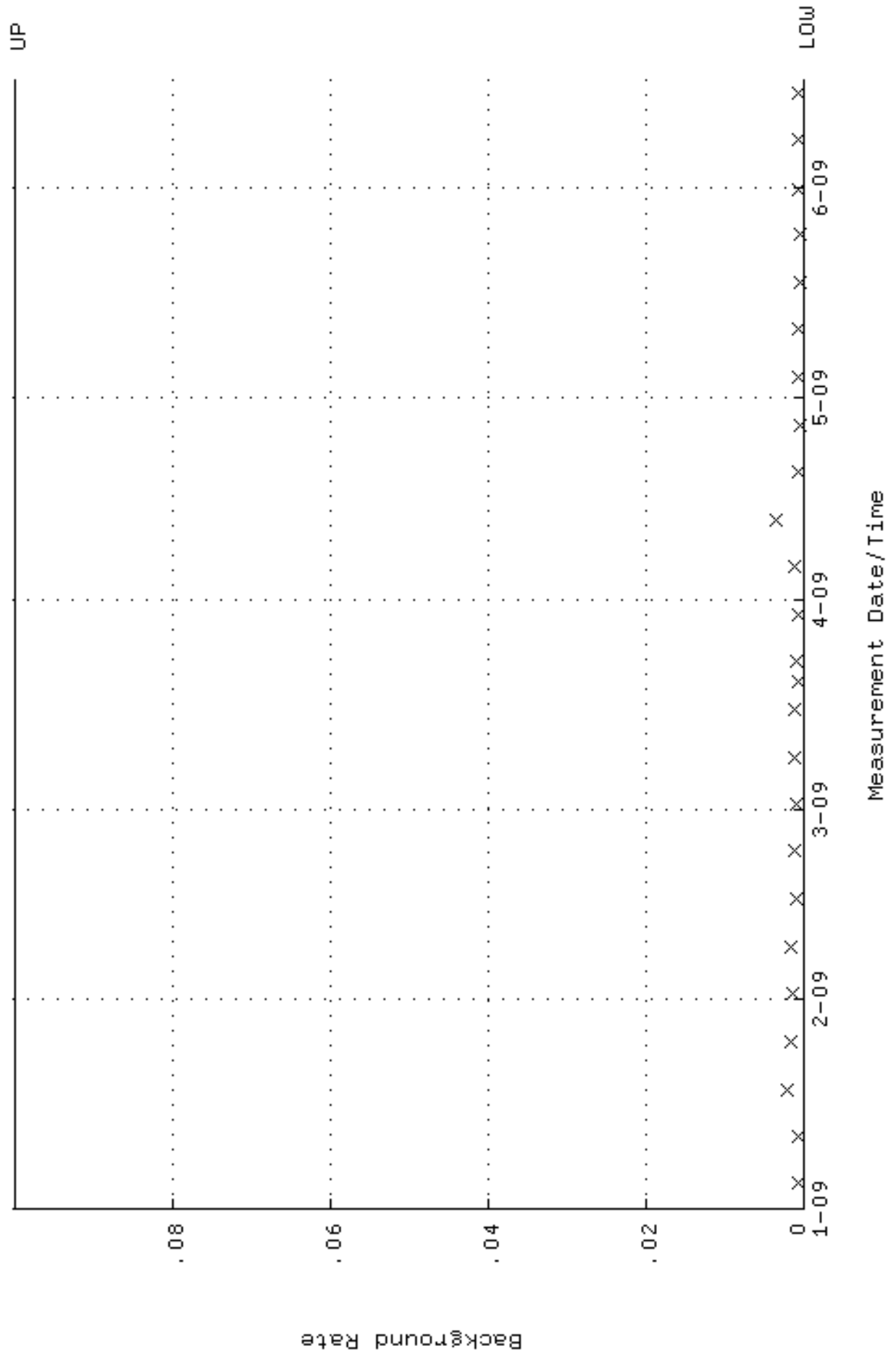
QA filename : DKA100:[ENV\_ALPHA.QA.W]W145.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:15 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.239850 through 0.259850



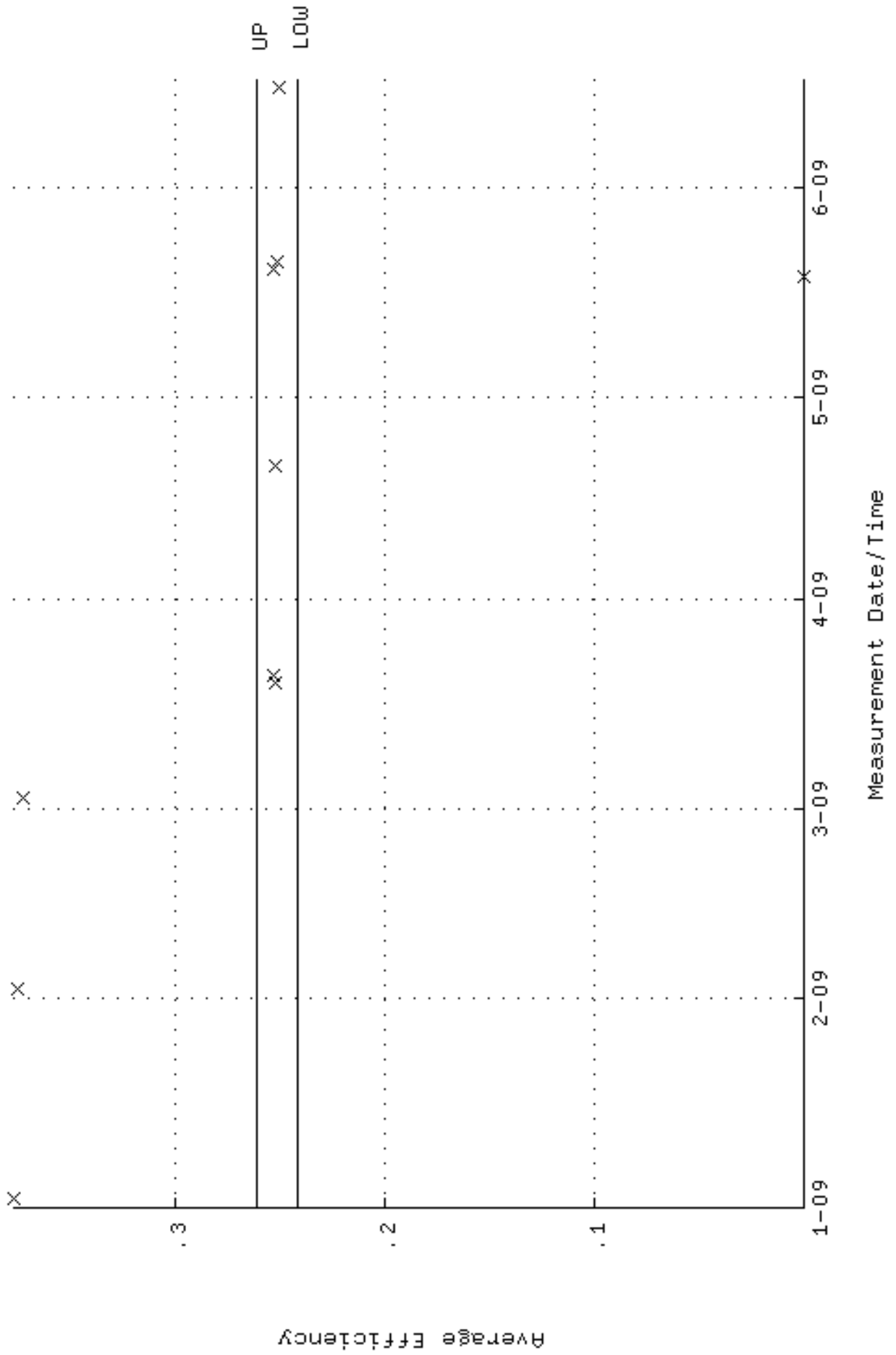
QA filename : DKA100:[ENV\_ALPHA.QA.W]W145.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:25:15 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 84.9354 through 93.8760



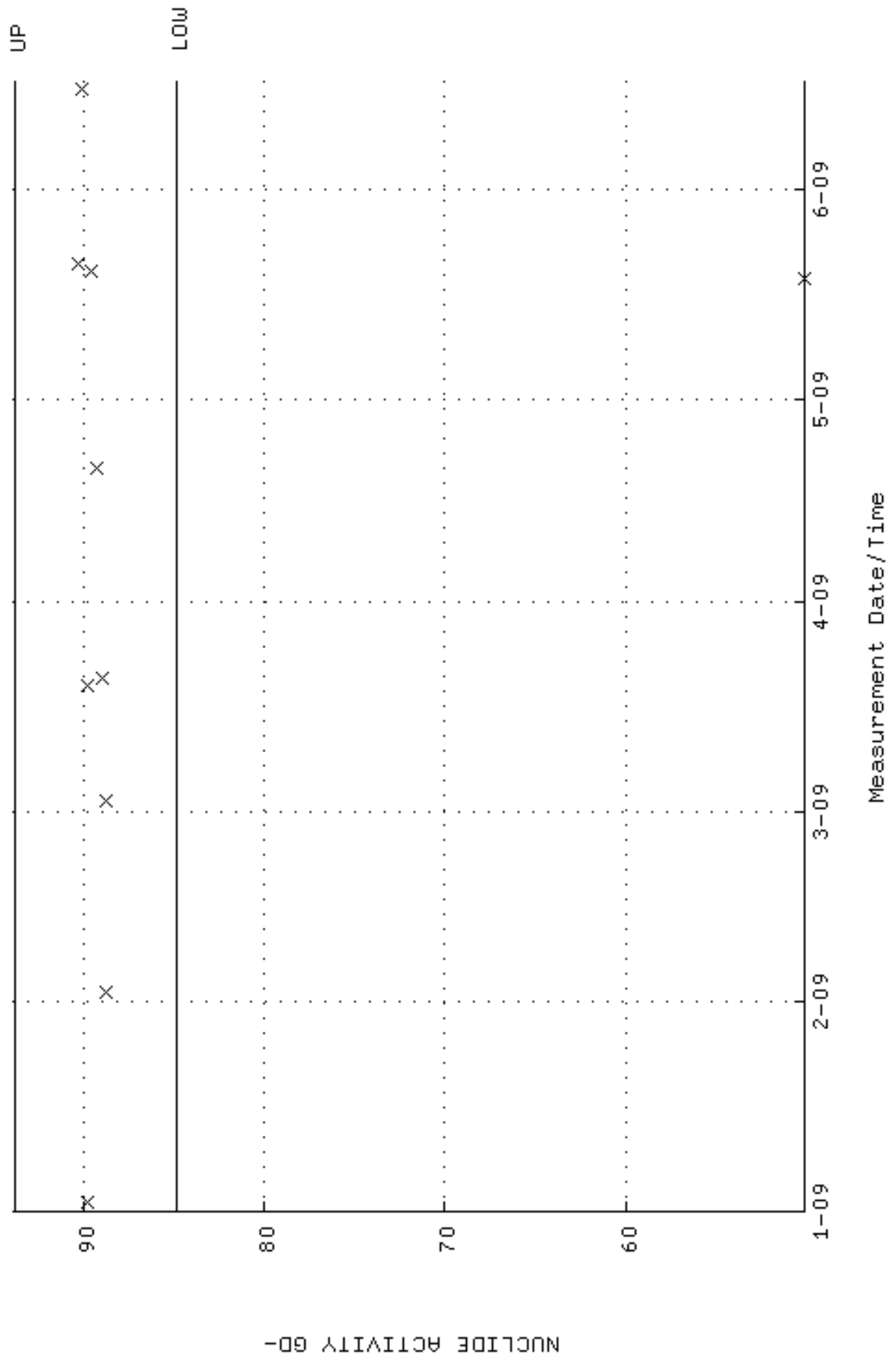
QA filename : DKA100:[ENV\_ALPHA.QA.B]B145.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:04 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



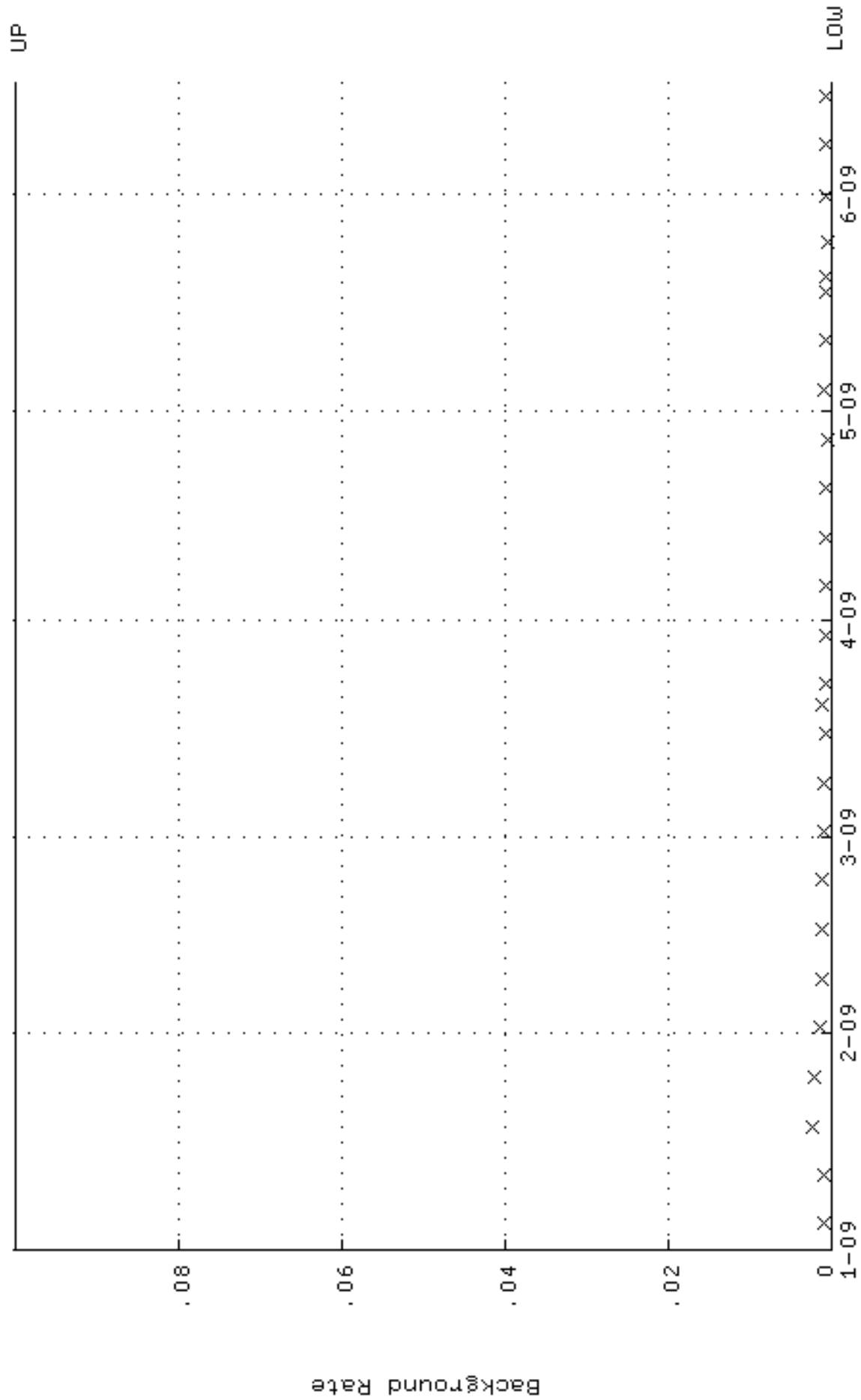
QA filename : DKA100:[ENV\_ALPHA.QA.W]W146.QAF;2  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:19 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.241831 through 0.261831



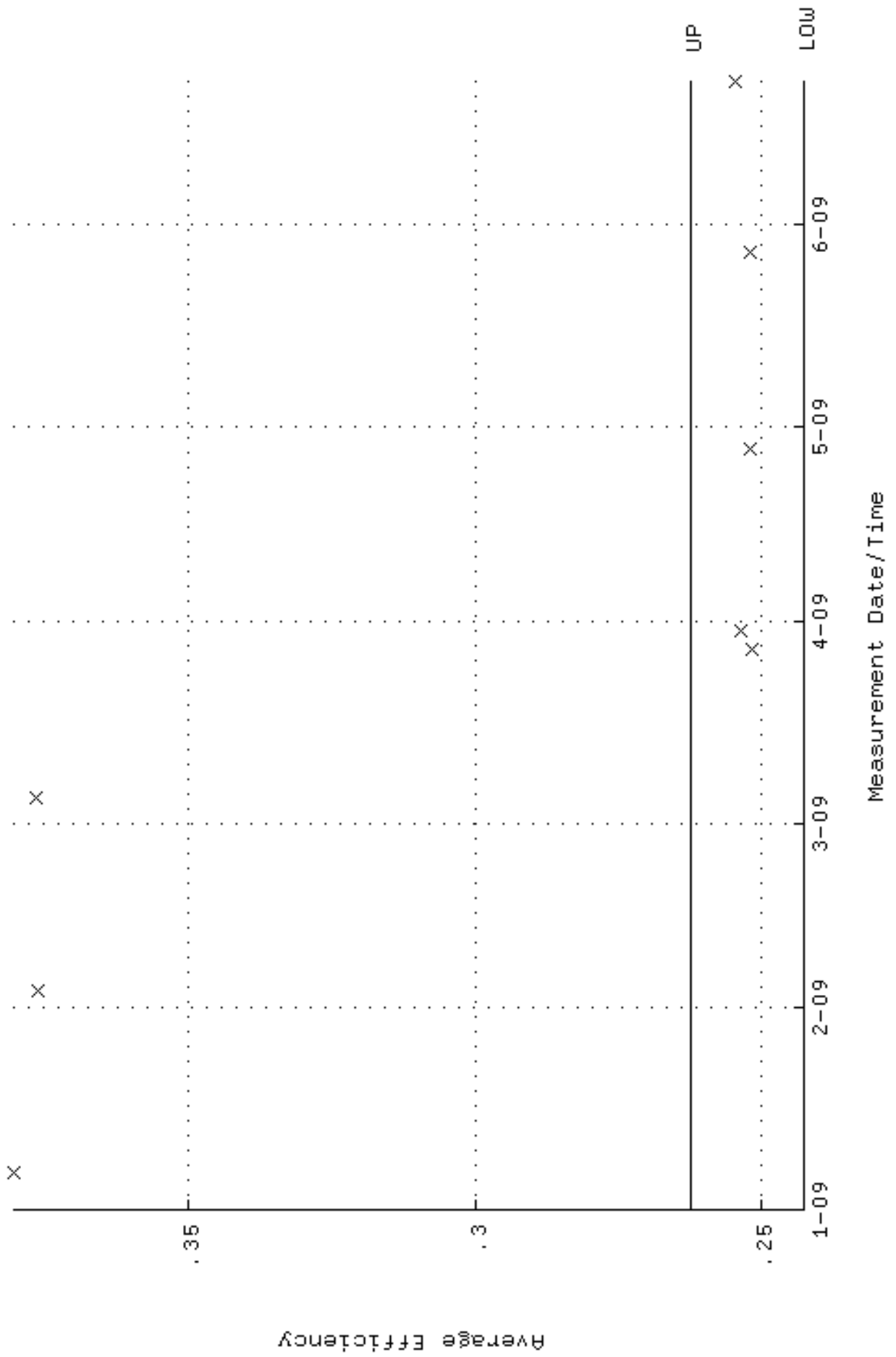
QA filename : DKA100:[ENV\_ALPHA.QA.W]W146.QAF;2  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:25:19 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 84.8578 through 93.7902



QA filename : DKA100:[ENV\_ALPHA.QA.B]B146.QAF;2  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:09 through 16-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

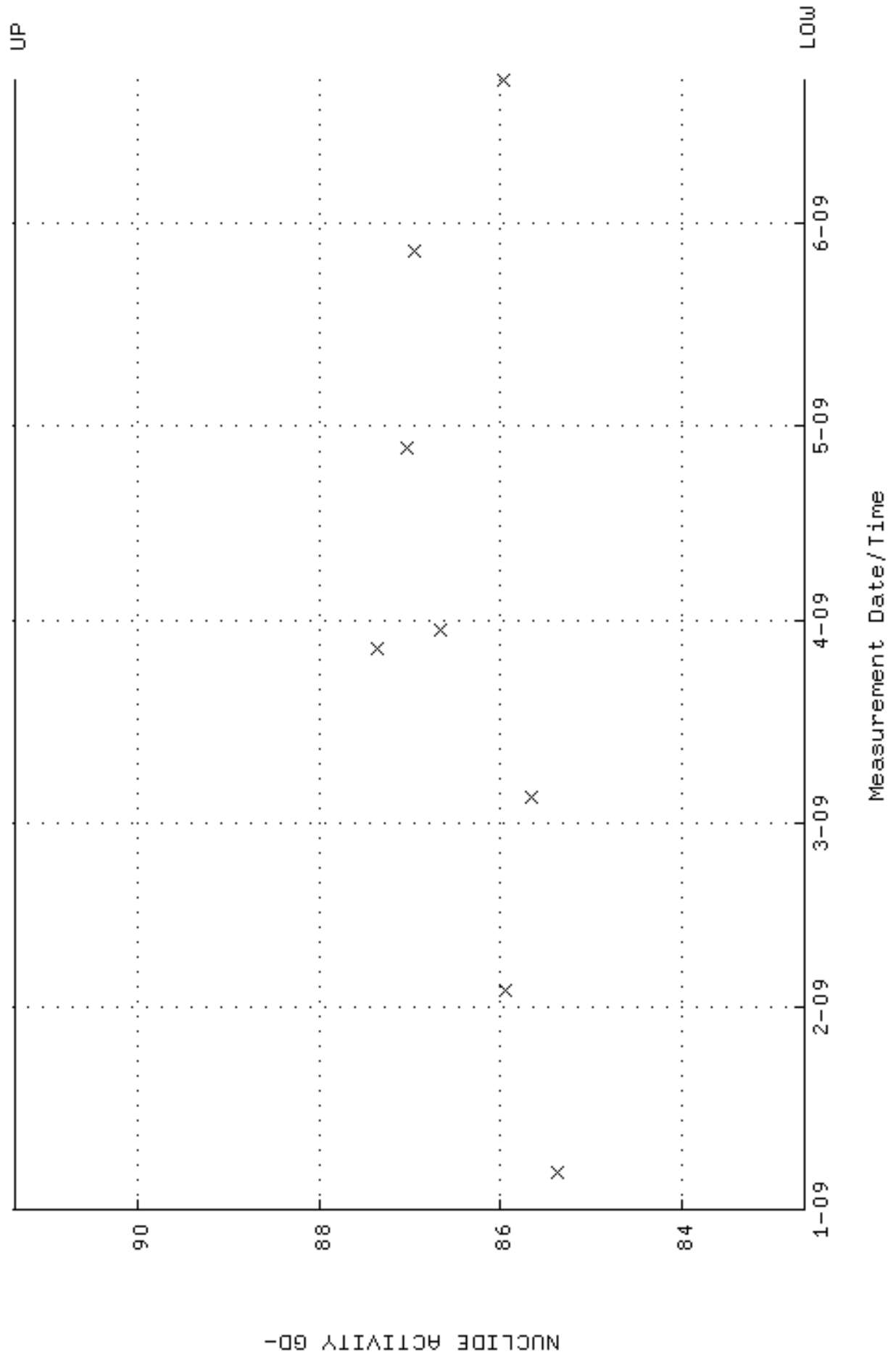


QA filename : DKA100:[ENV\_ALPHA.QA.W]W186.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:33 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.242649 through 0.262649

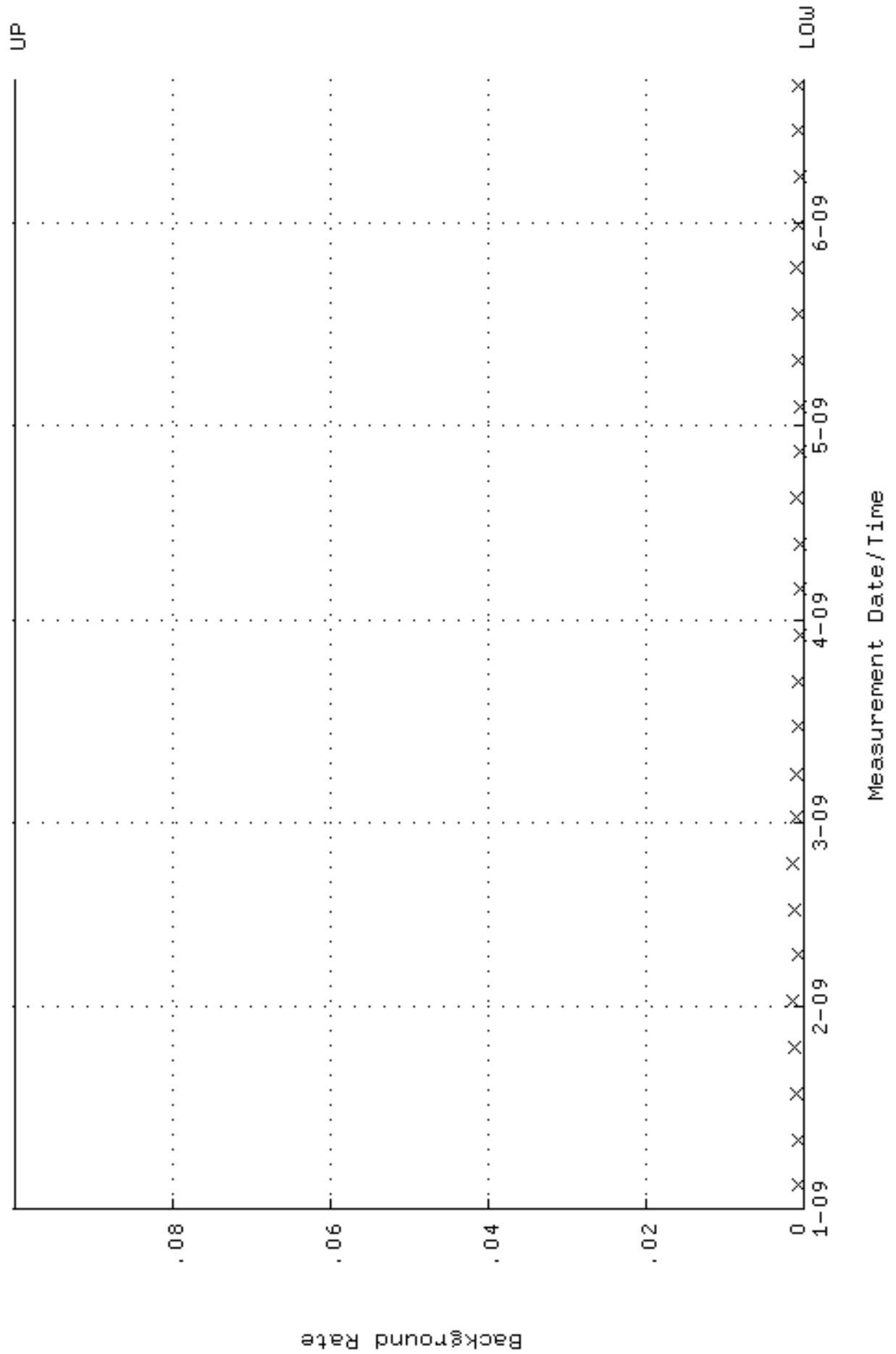




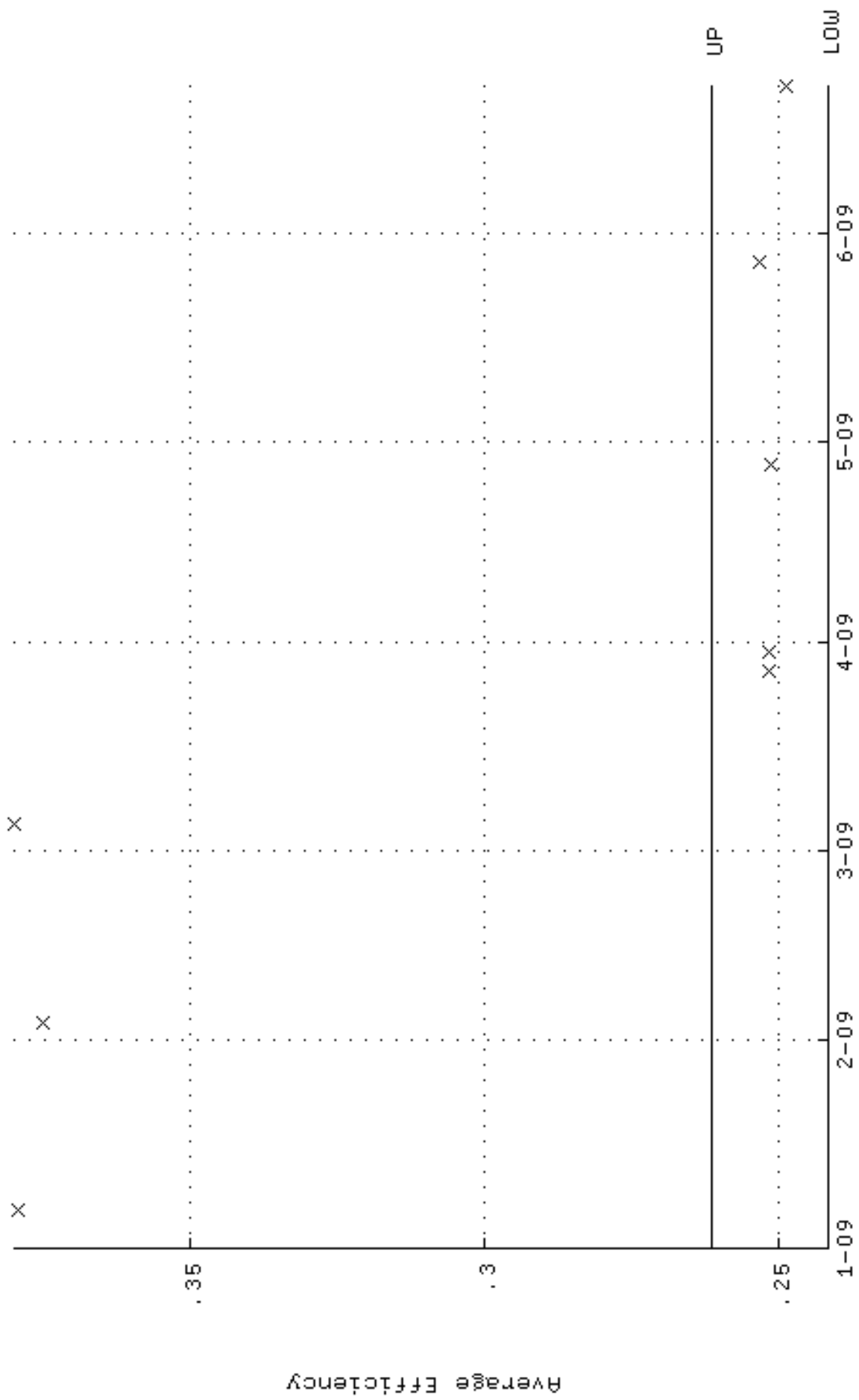
QA filename : DKA100:[ENV\_ALPHA.QA.W]W186.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:33 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 82.6495 through 91.3495



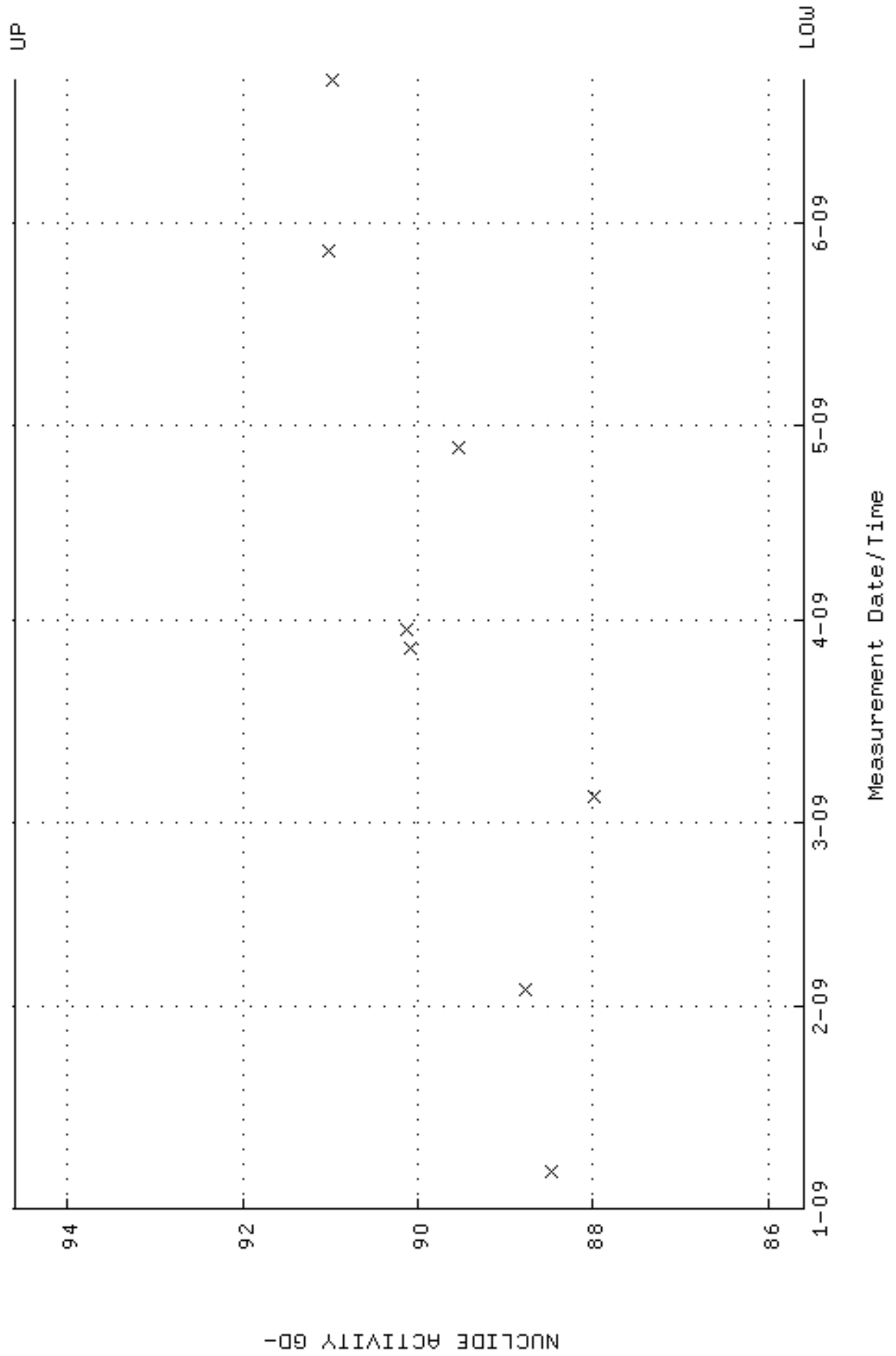
QA filename : DKA100:[ENV\_ALPHA.QA.B]B186.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:40 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



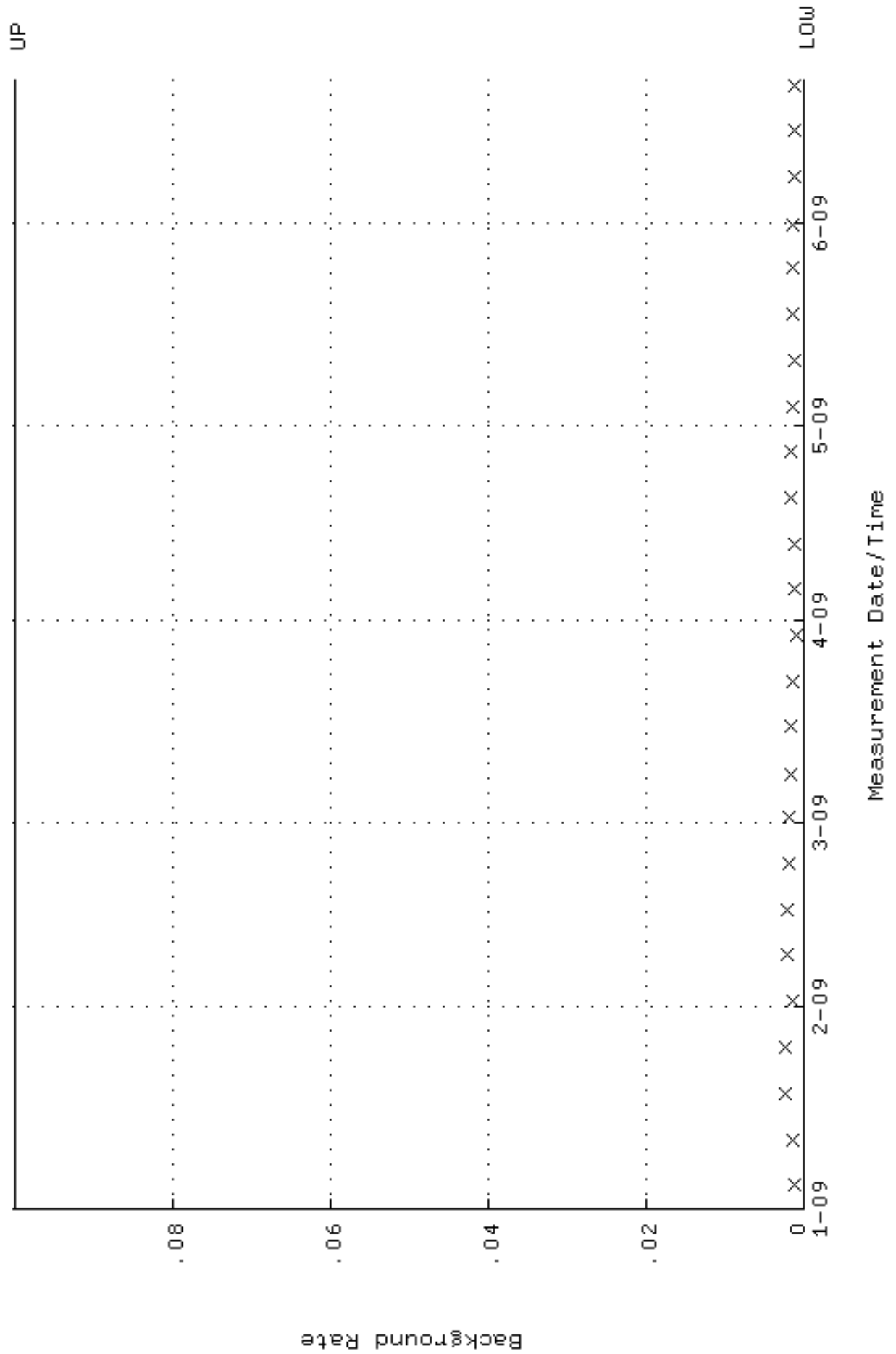
QA filename : DKA100:[ENV\_ALPHA.QA.W]W187.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:37 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.241464 through 0.261464



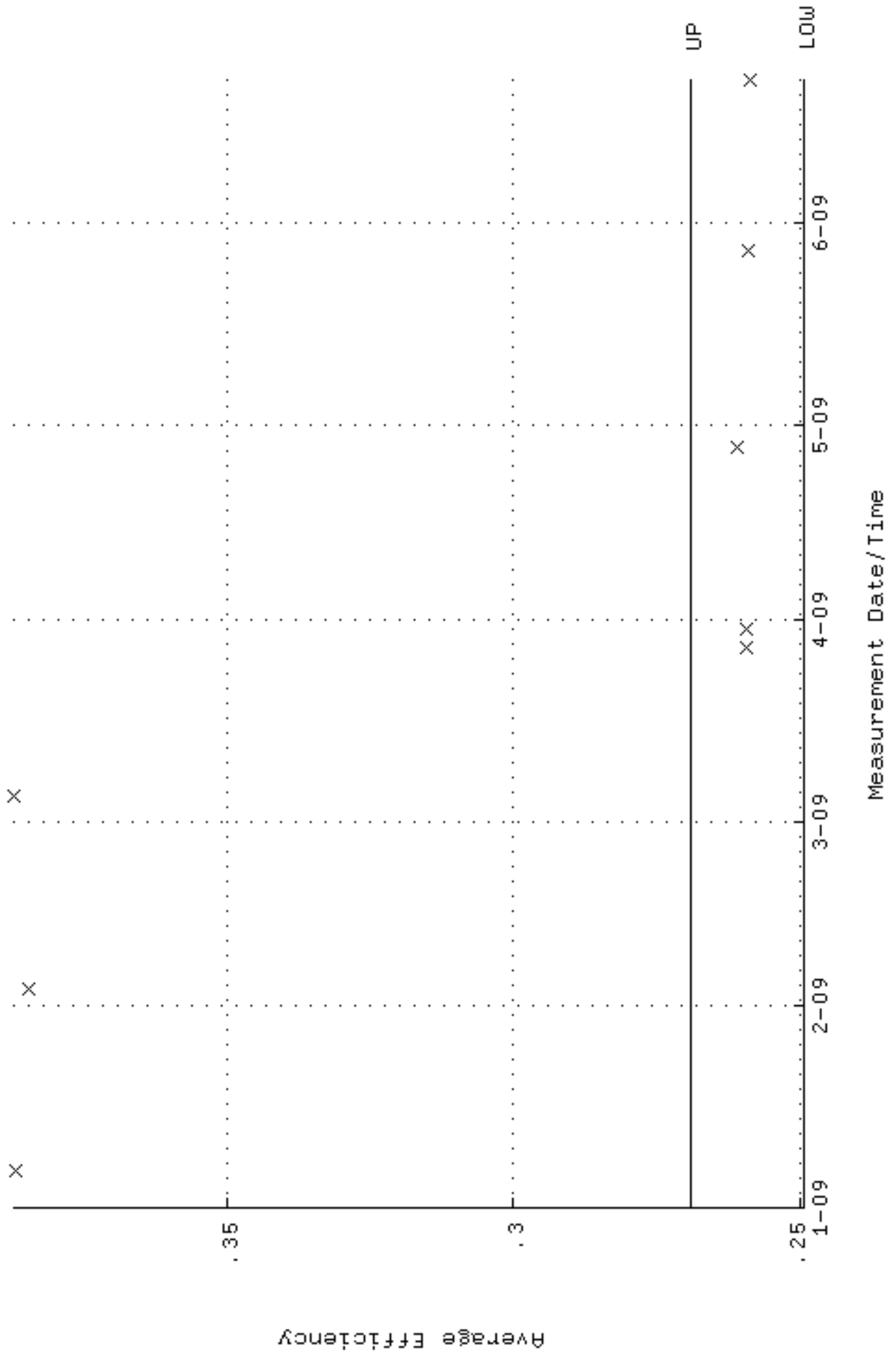
QA filename : DKA100:[ENV\_ALPHA.QA.W]W187.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:37 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 85.5888 through 94.5982



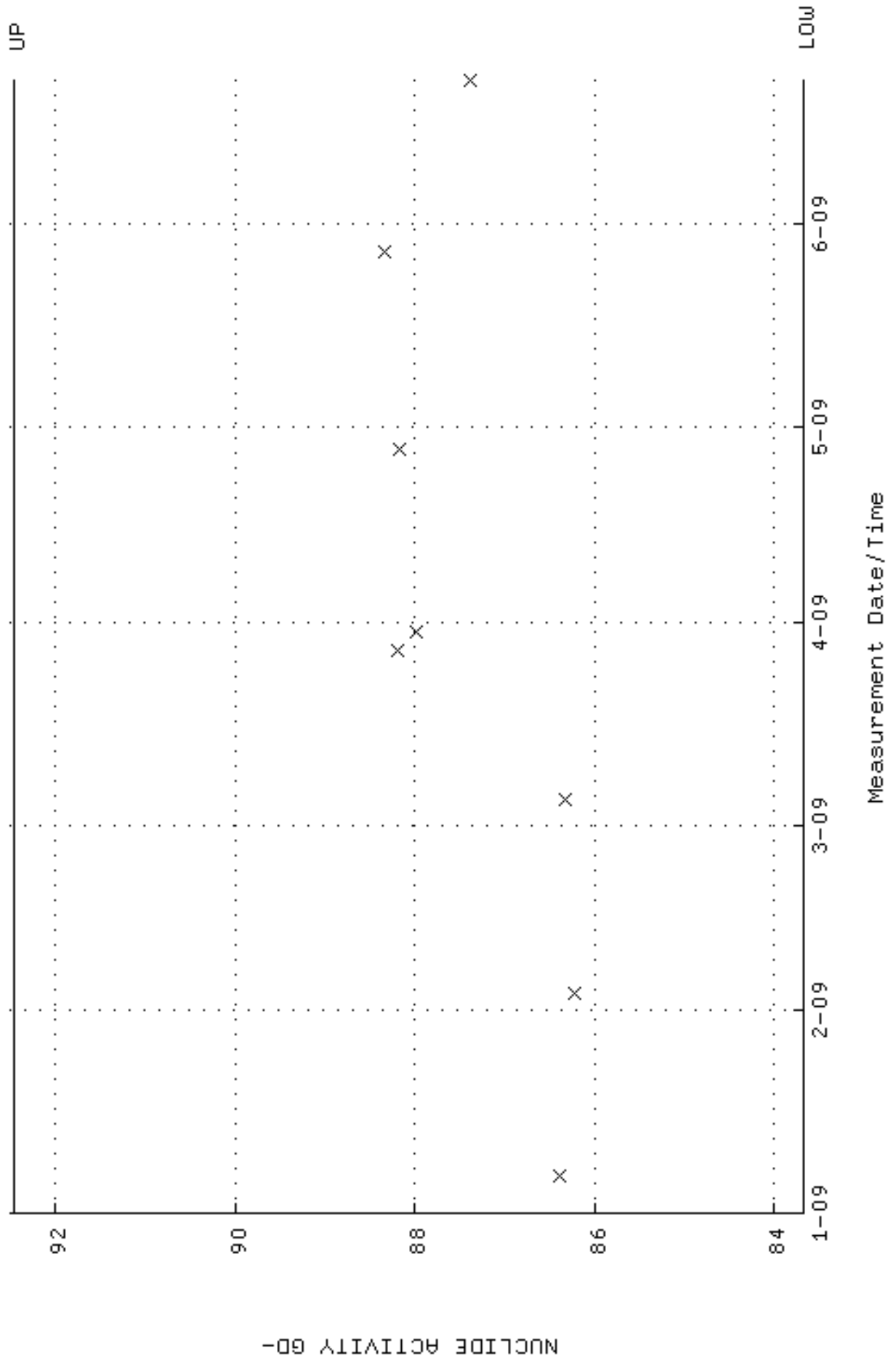
QA filename : DKA100:[ENV\_ALPHA.QA.B]B187.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:44 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



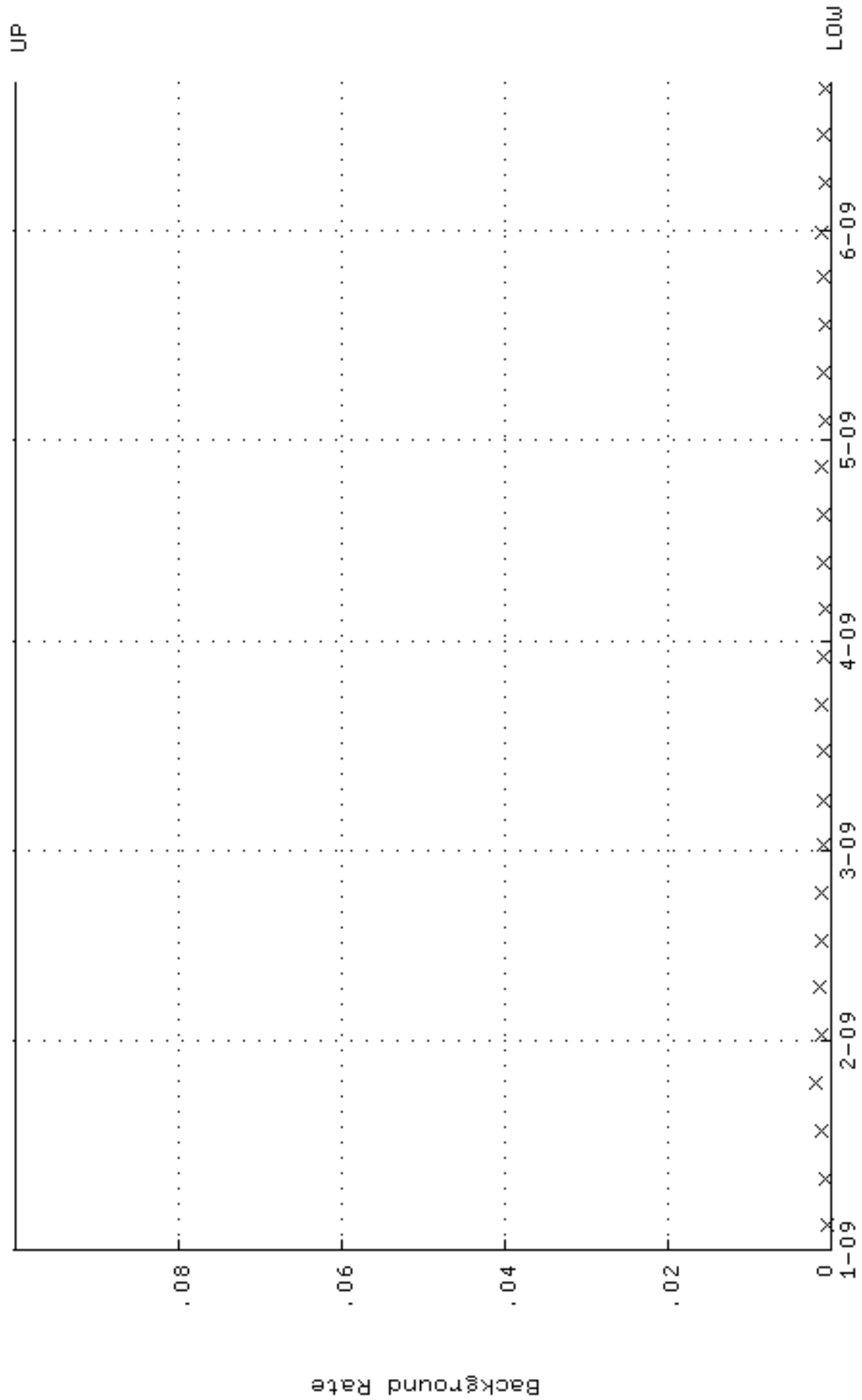
QA filename : DKA100:[ENV\_ALPHA.QA.W]W188.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:41 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.249341 through 0.269341



QA filename : DKA100:[ENV\_ALPHA.QA.W]W188.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:41 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 83.6747 through 92.4825

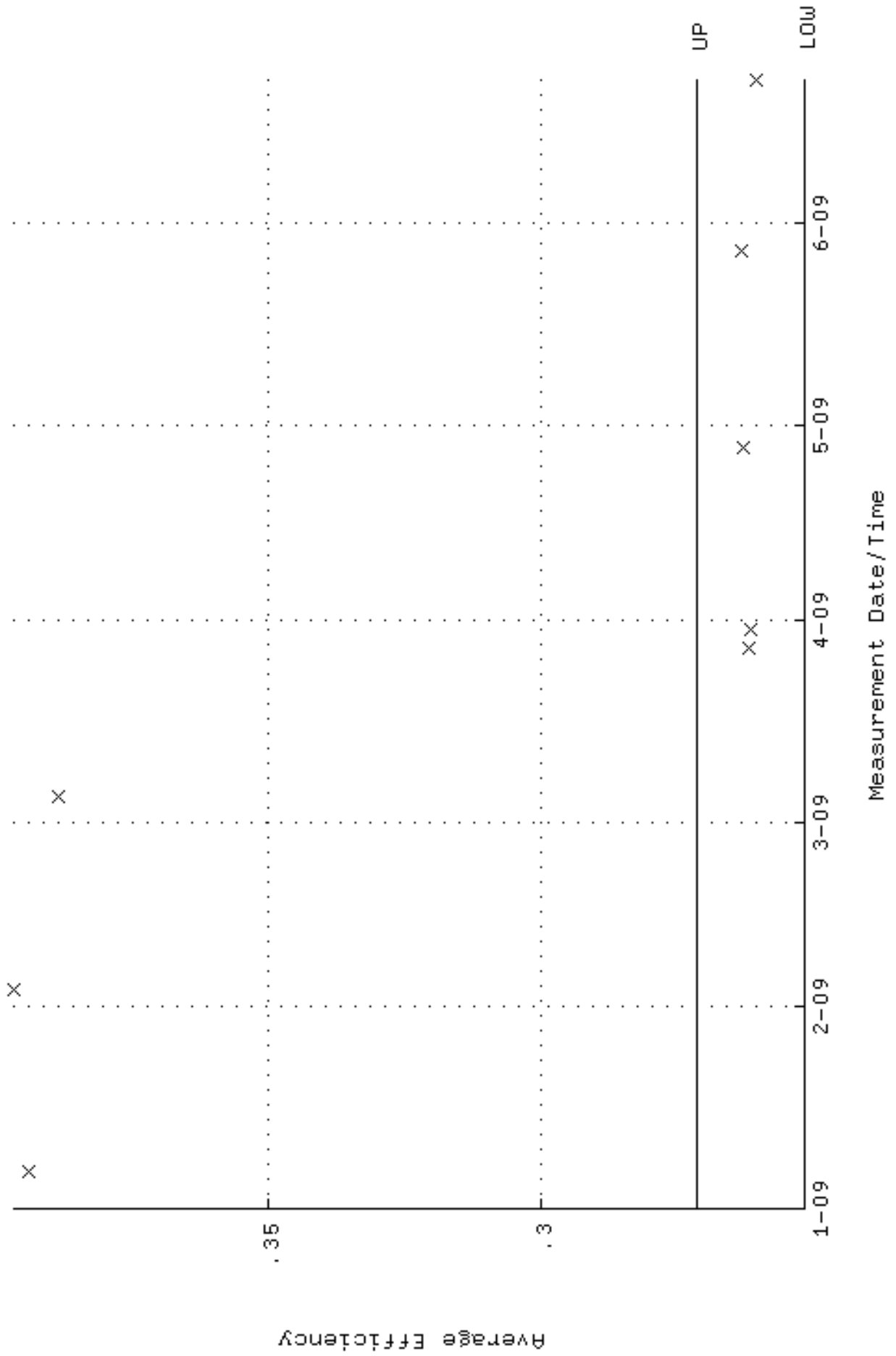


QA filename : DKA100:[ENV\_ALPHA.QA.B]B188.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:47 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

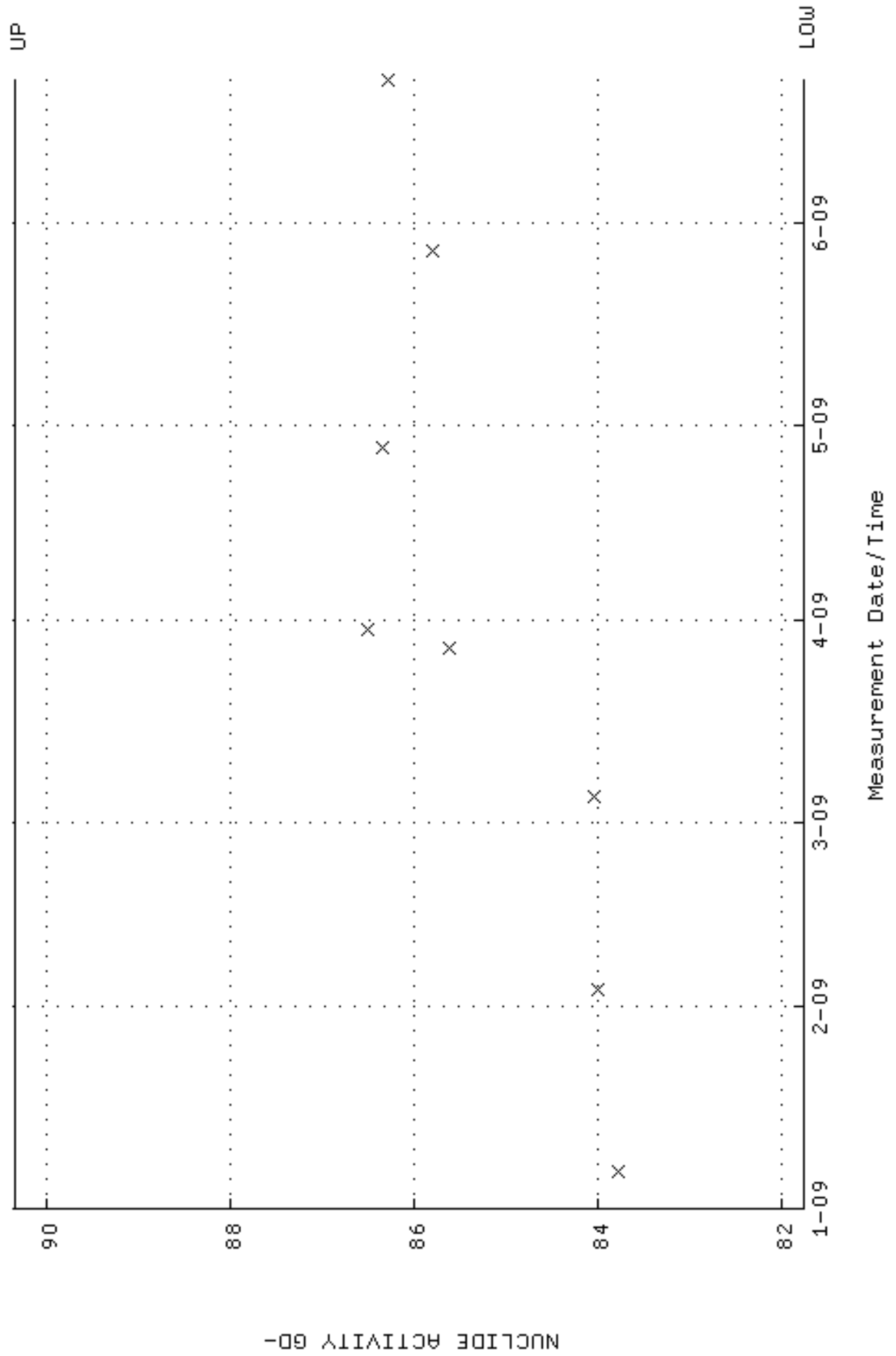




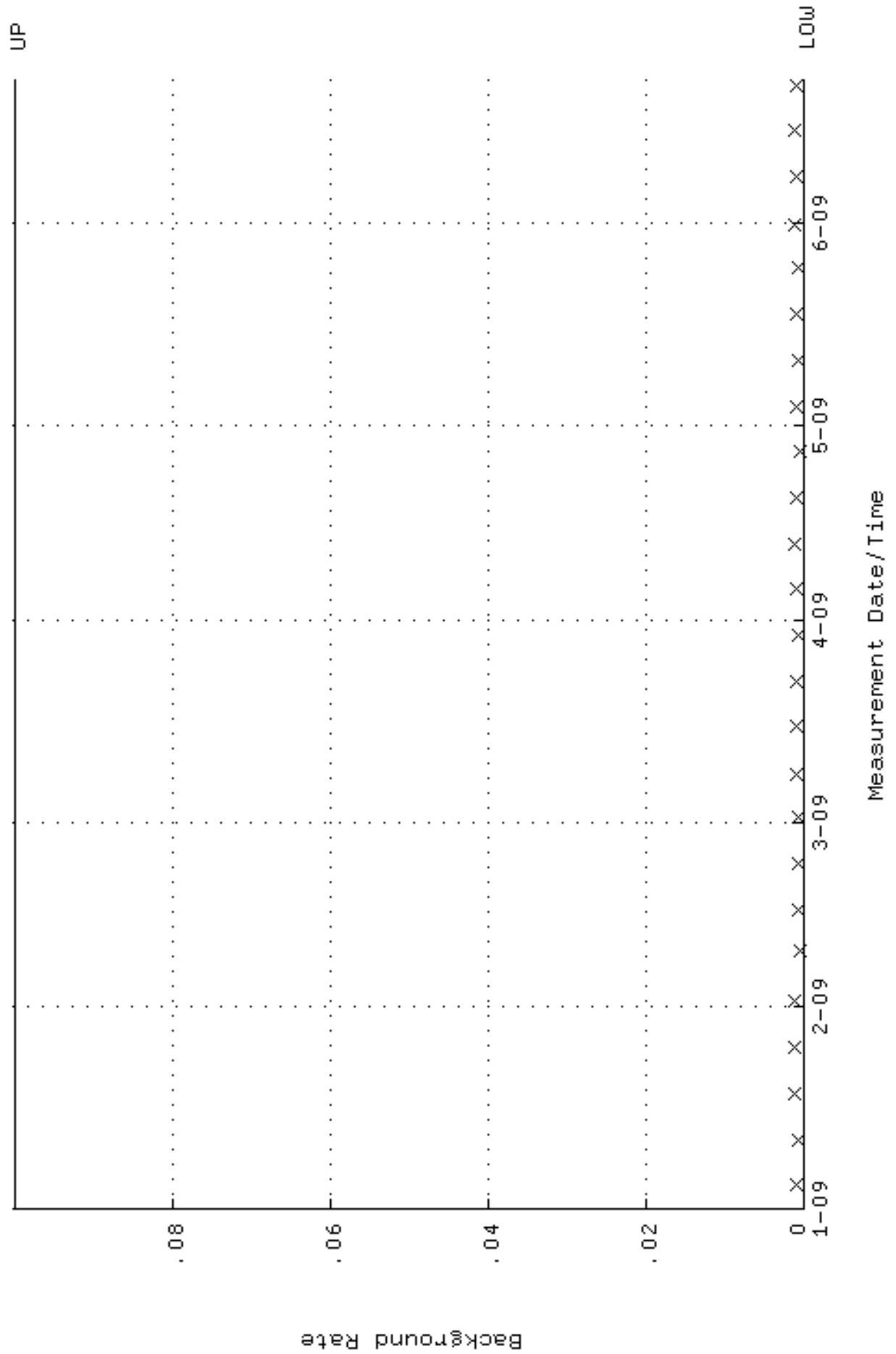
QA filename : DKA100:[ENV\_ALPHA.QA.W]W189.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:46 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.251590 through 0.271590



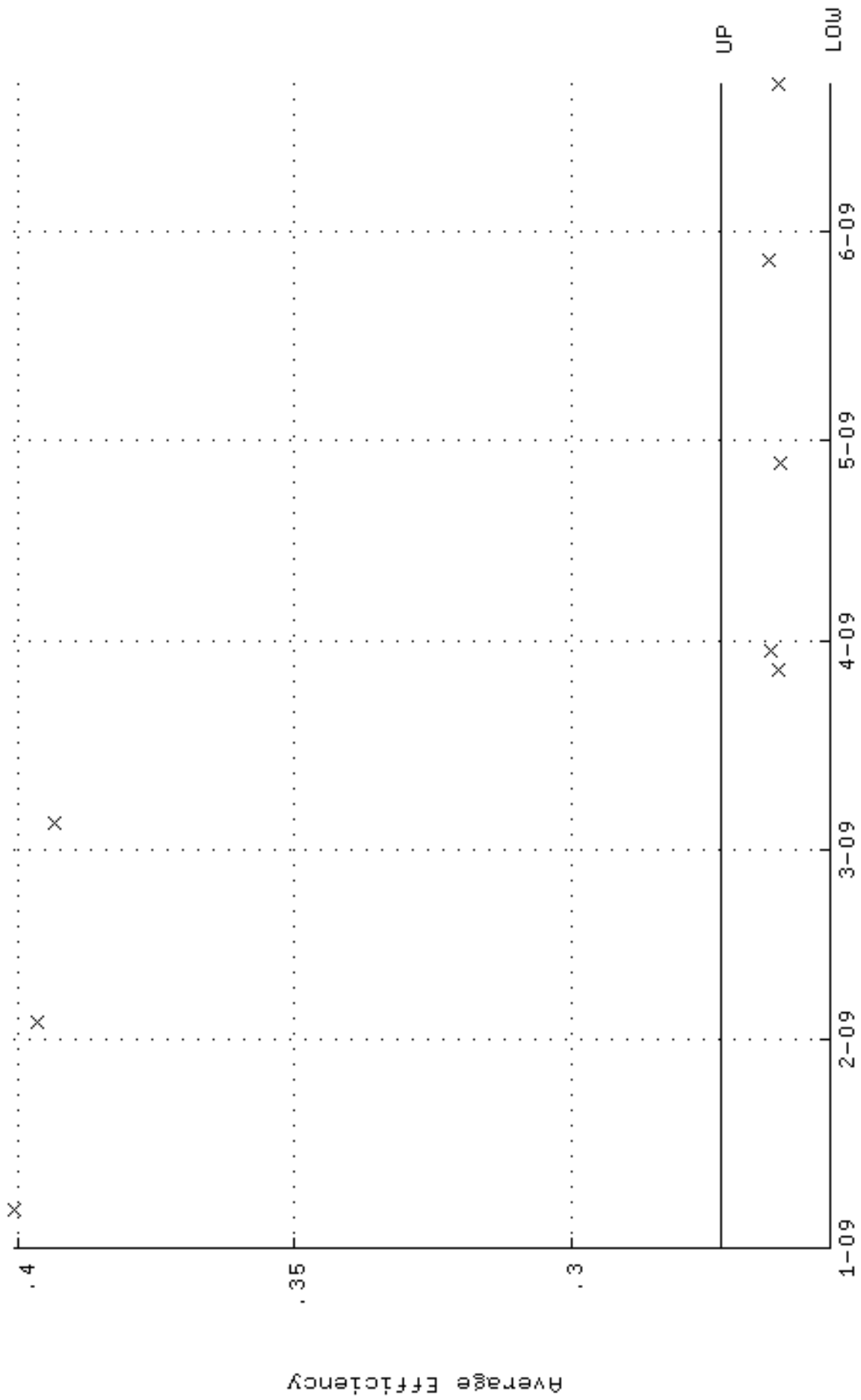
QA filename : DKA100:[ENV\_ALPHA.QA.W]W189.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:46 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 81.7473 through 90.3523



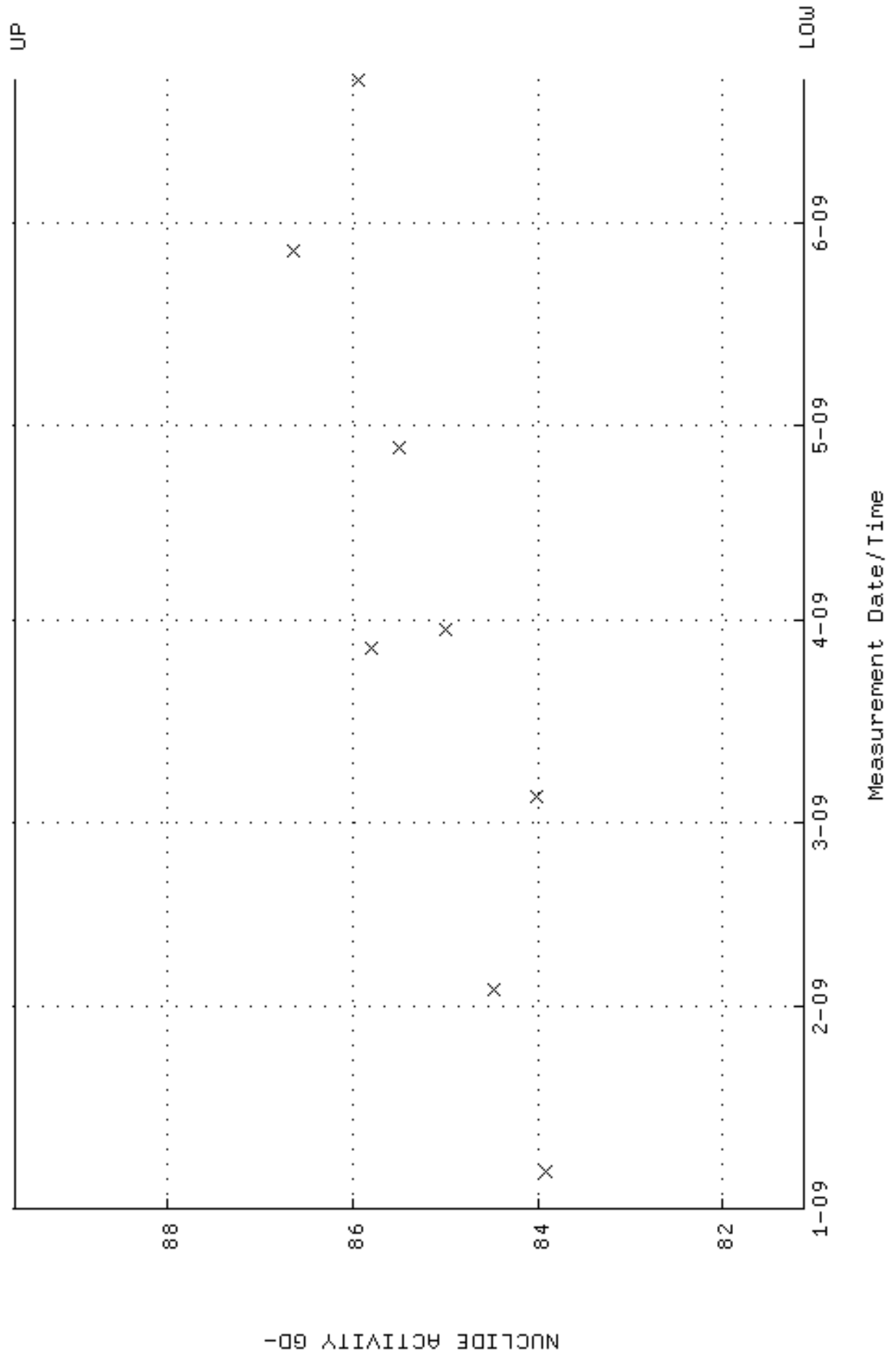
QA filename : DKA100:[ENV\_ALPHA.QA.B]B189.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:51 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



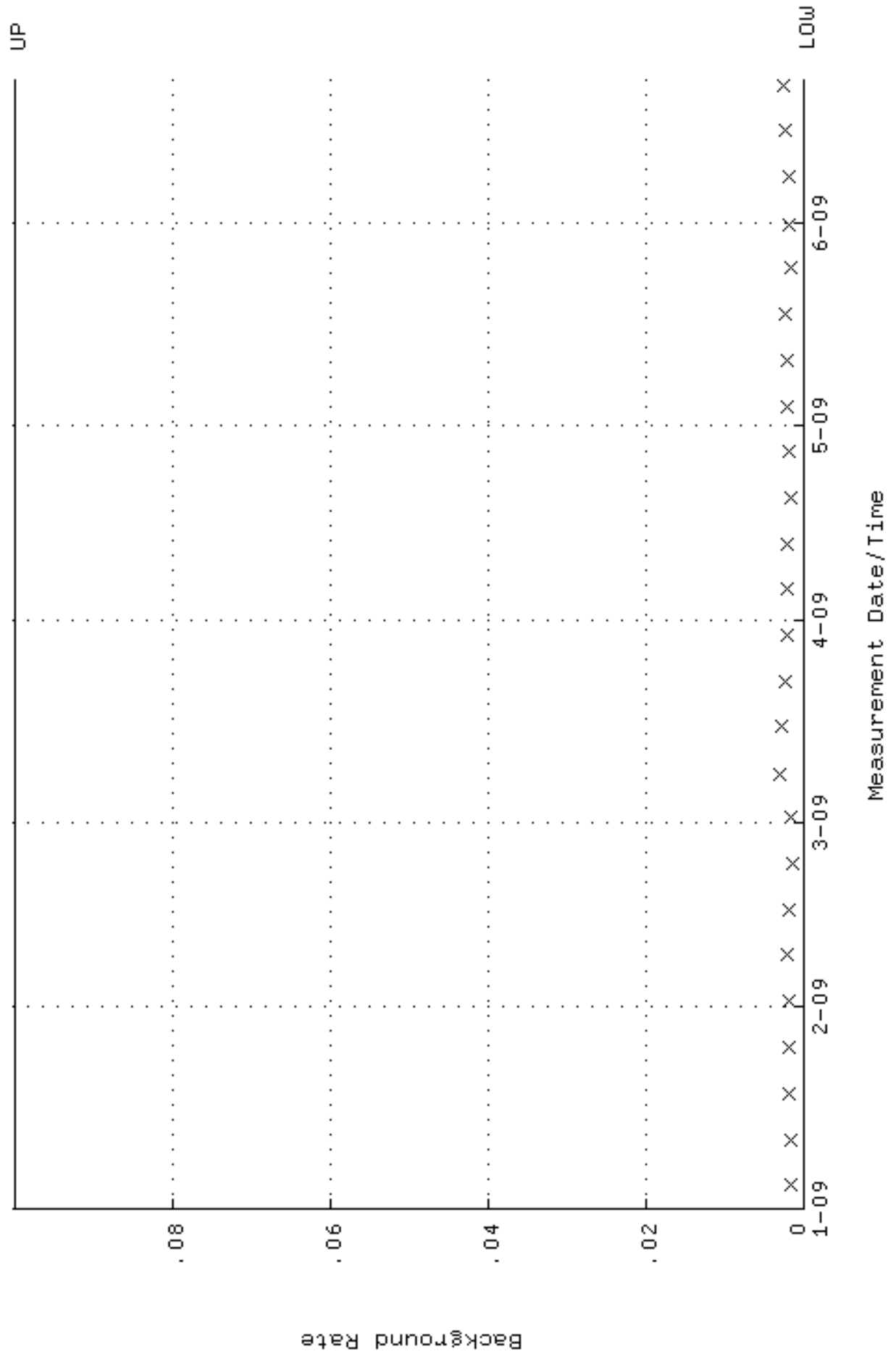
QA filename : DKA100:[ENV\_ALPHA.QA.W]W190.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:49 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.253504 through 0.273504



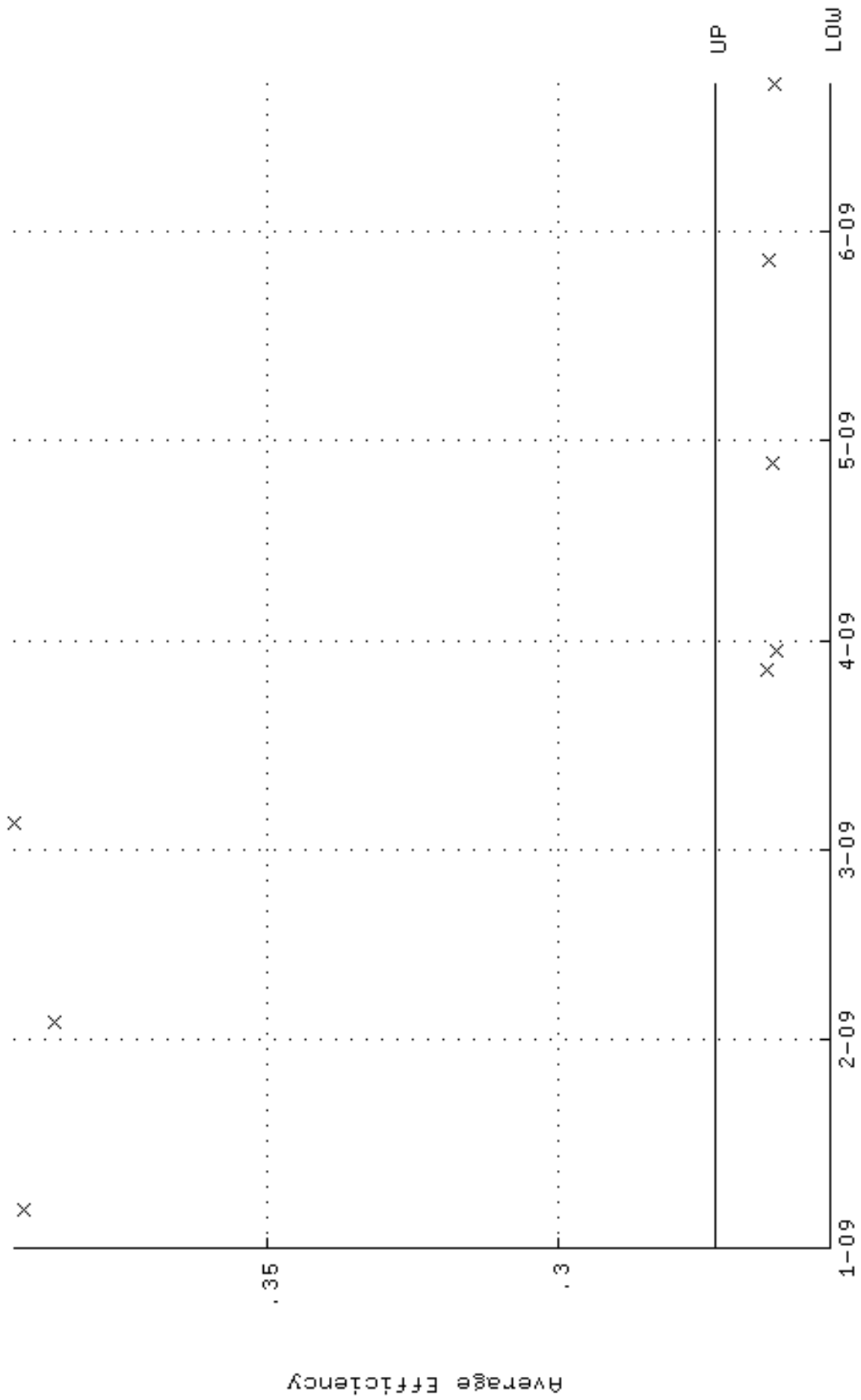
QA filename : DKA100:[ENV\_ALPHA.QA.W]W190.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:49 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 81.1176 through 89.6562



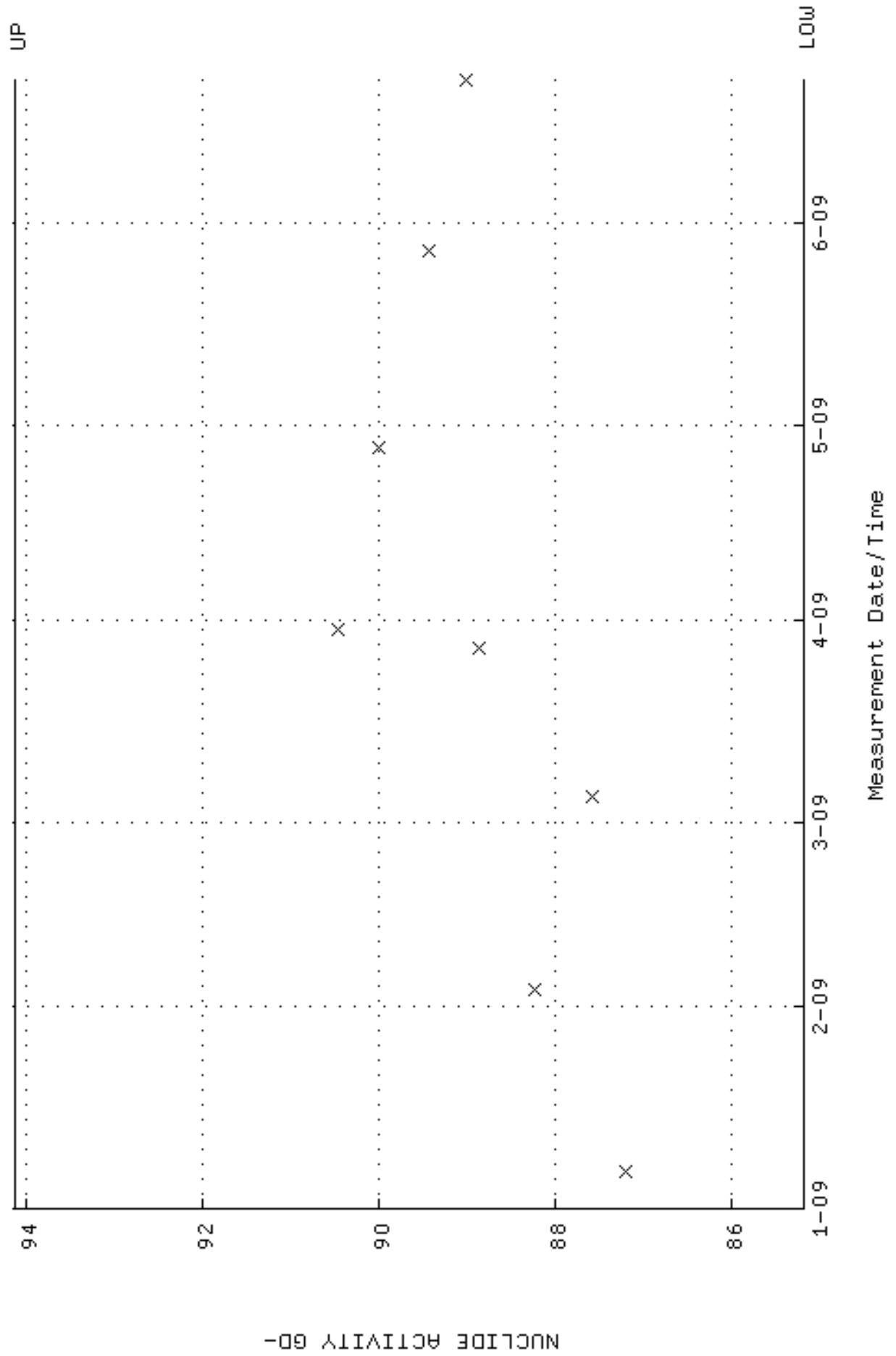
QA filename : DKA100:[ENV\_ALPHA.QA.B]B190.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:55 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W191.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:54 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.252993 through 0.272993

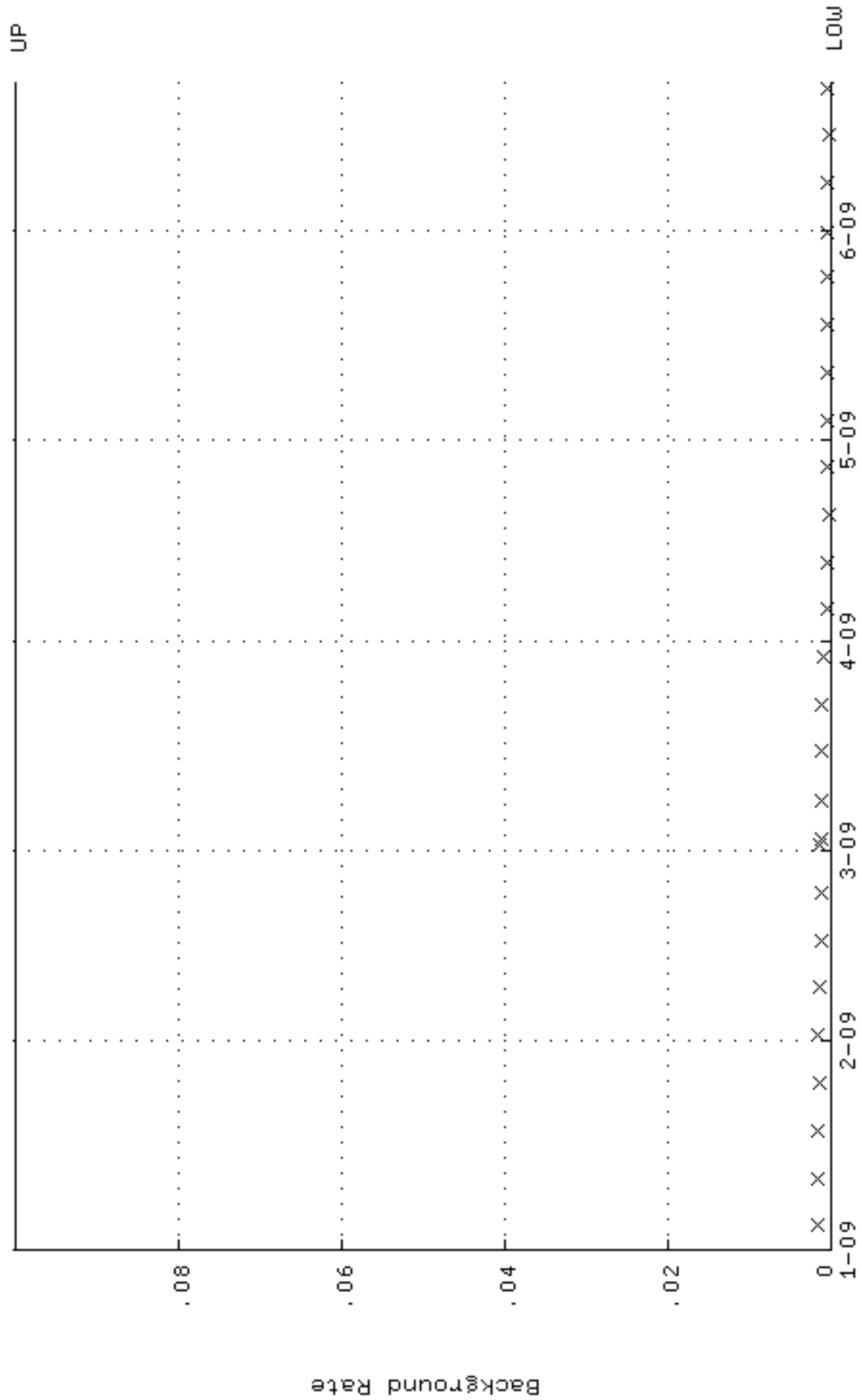


QA filename : DKA100:[ENV\_ALPHA.QA.W]W191.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:54 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 85.1712 through 94.1366

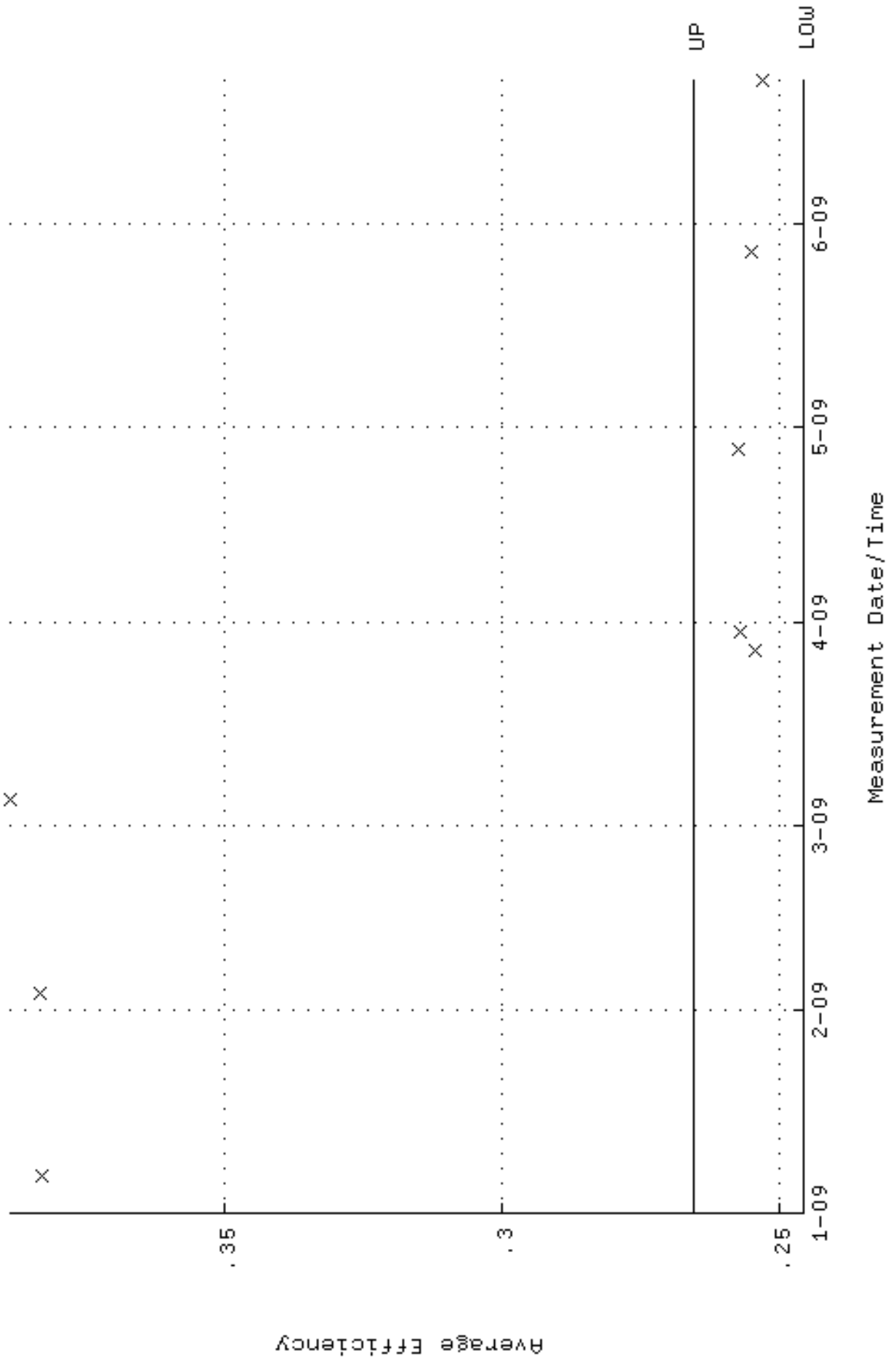




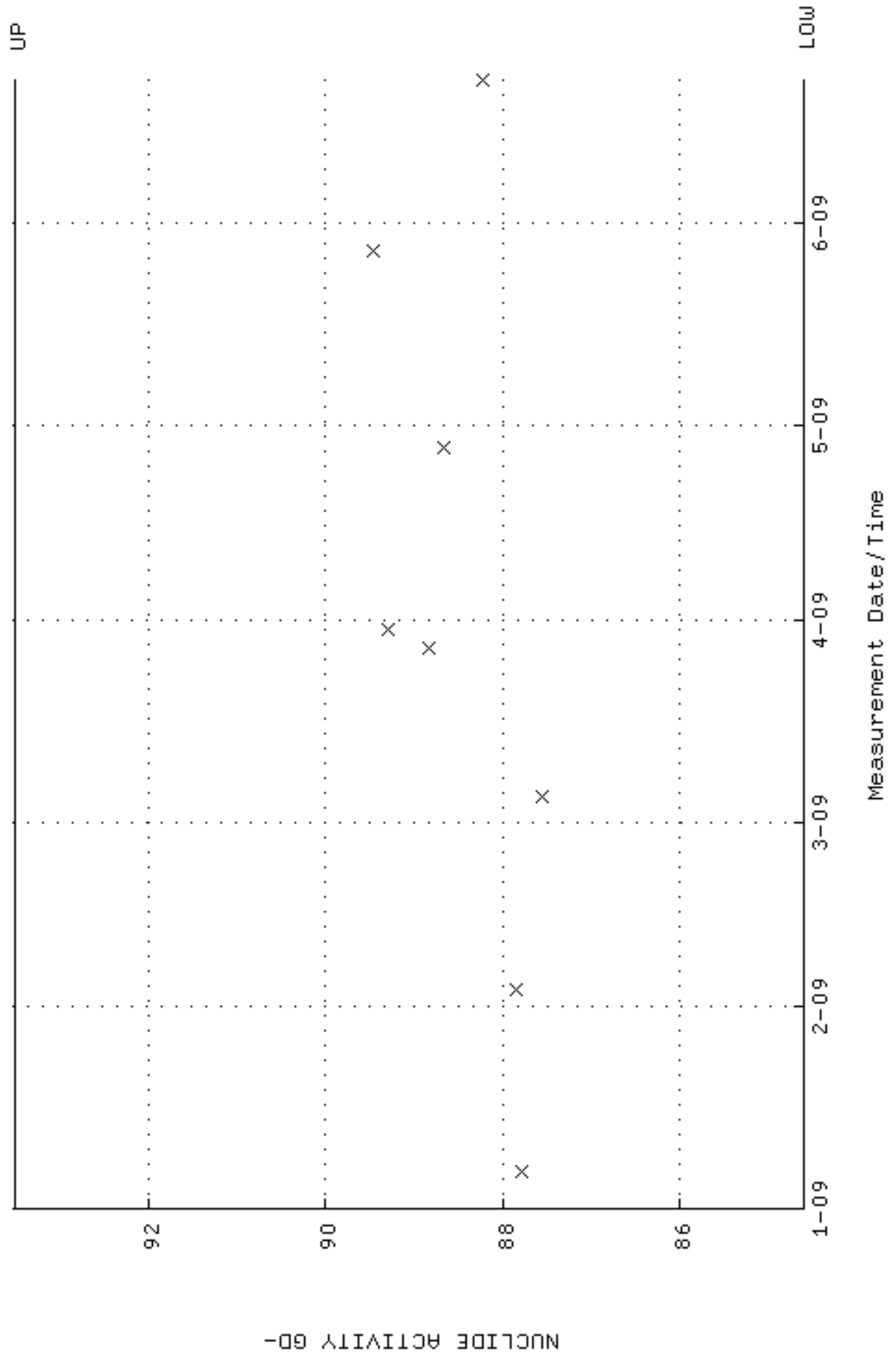
QA filename : DKA100:[ENV\_ALPHA.QA.B]B191.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:58 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



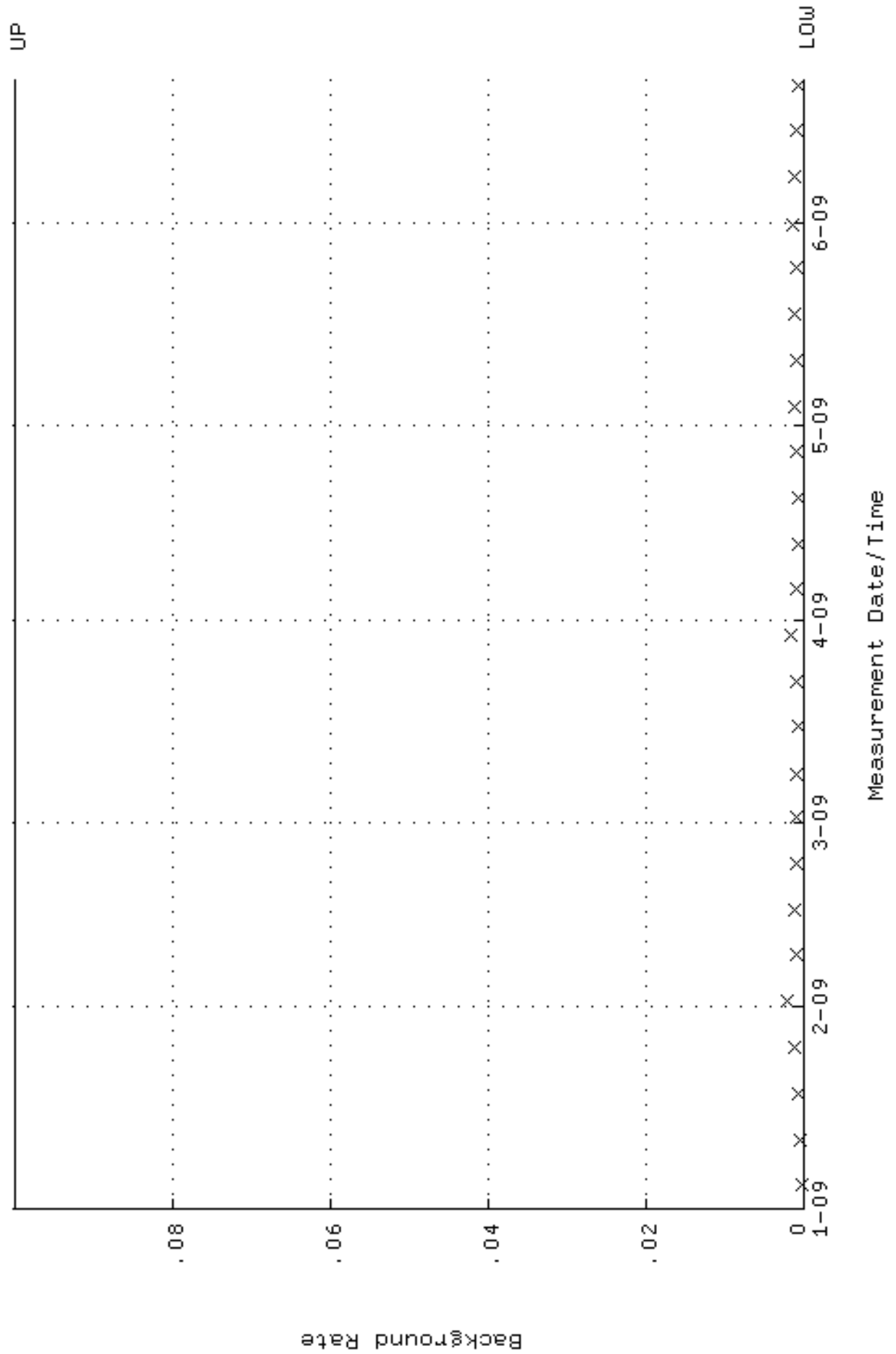
QA filename : DKA100:[ENV\_ALPHA.QA.W]W192.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:58 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.245663 through 0.265663



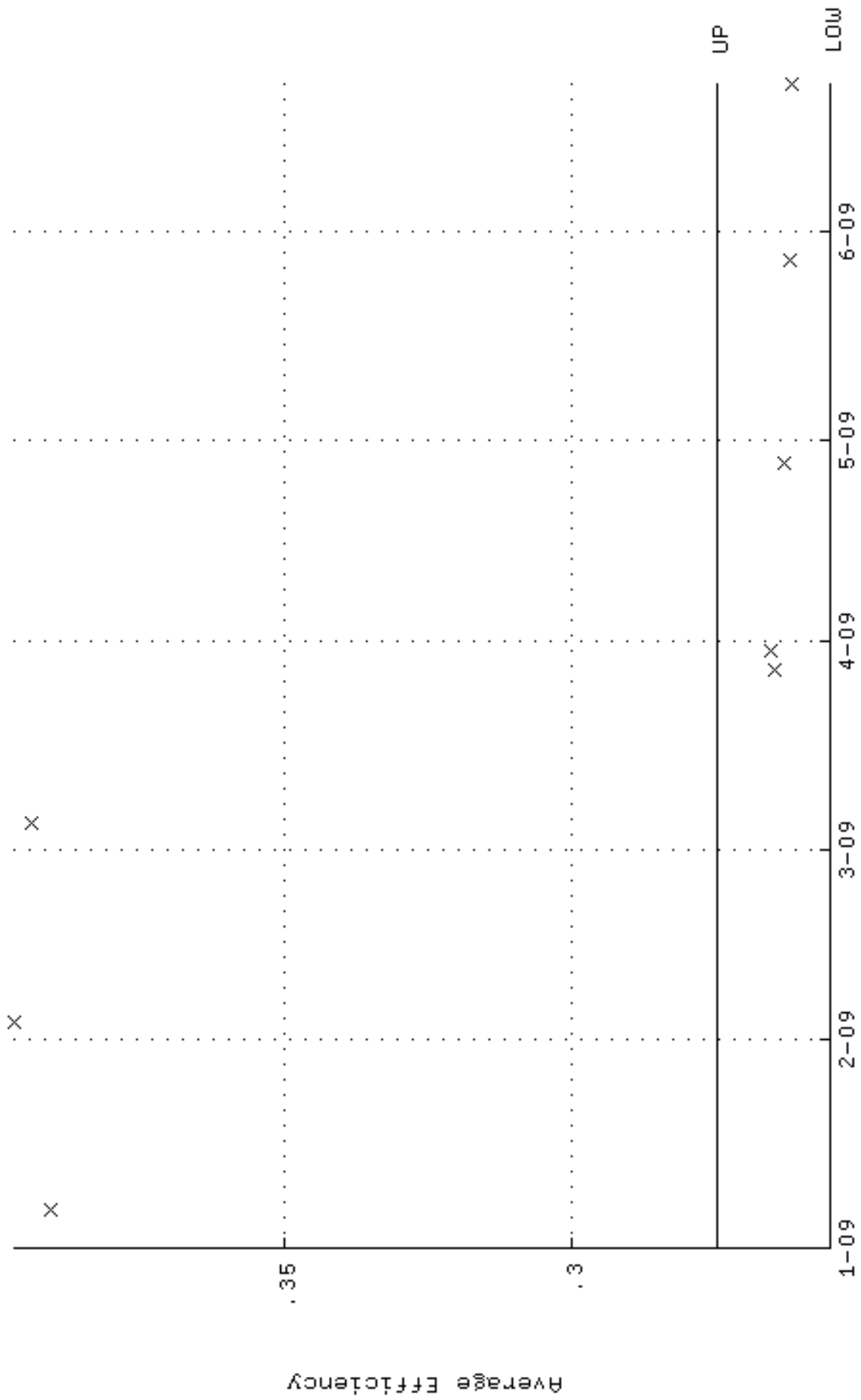
QA filename : DKA100:[ENV\_ALPHA.QA.W]W192.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 6-JAN-2009 19:31:58 through 22-JUN-2009 12:00:00  
Lower/Upper Lmts: 84.6037 through 93.5093



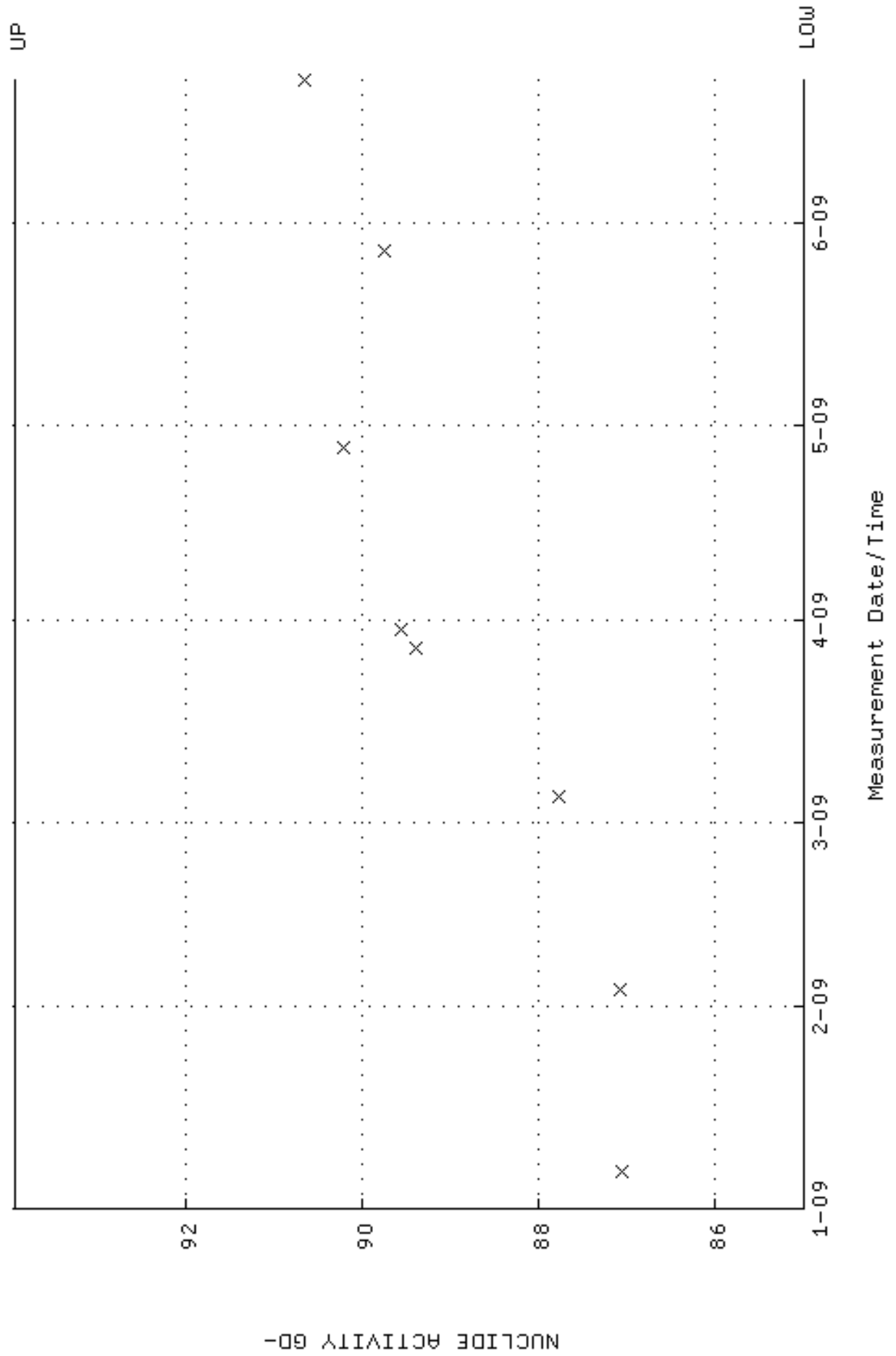
QA filename : DKA100:[ENV\_ALPHA.QA.B]B192.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:27:03 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



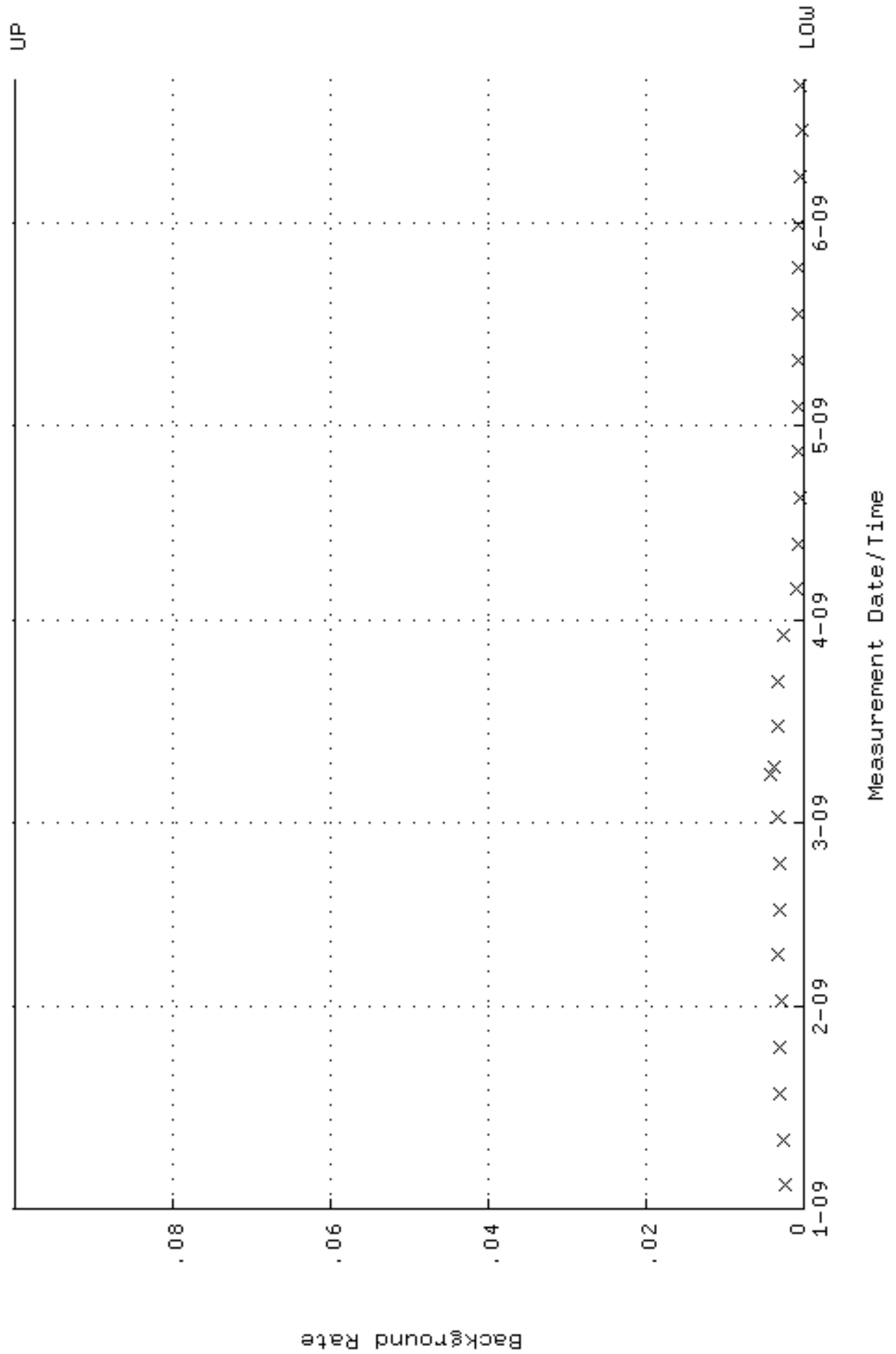
QA filename : DKA100:[ENV\_ALPHA.QA.W]W193.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:32:01 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.254861 through 0.274861



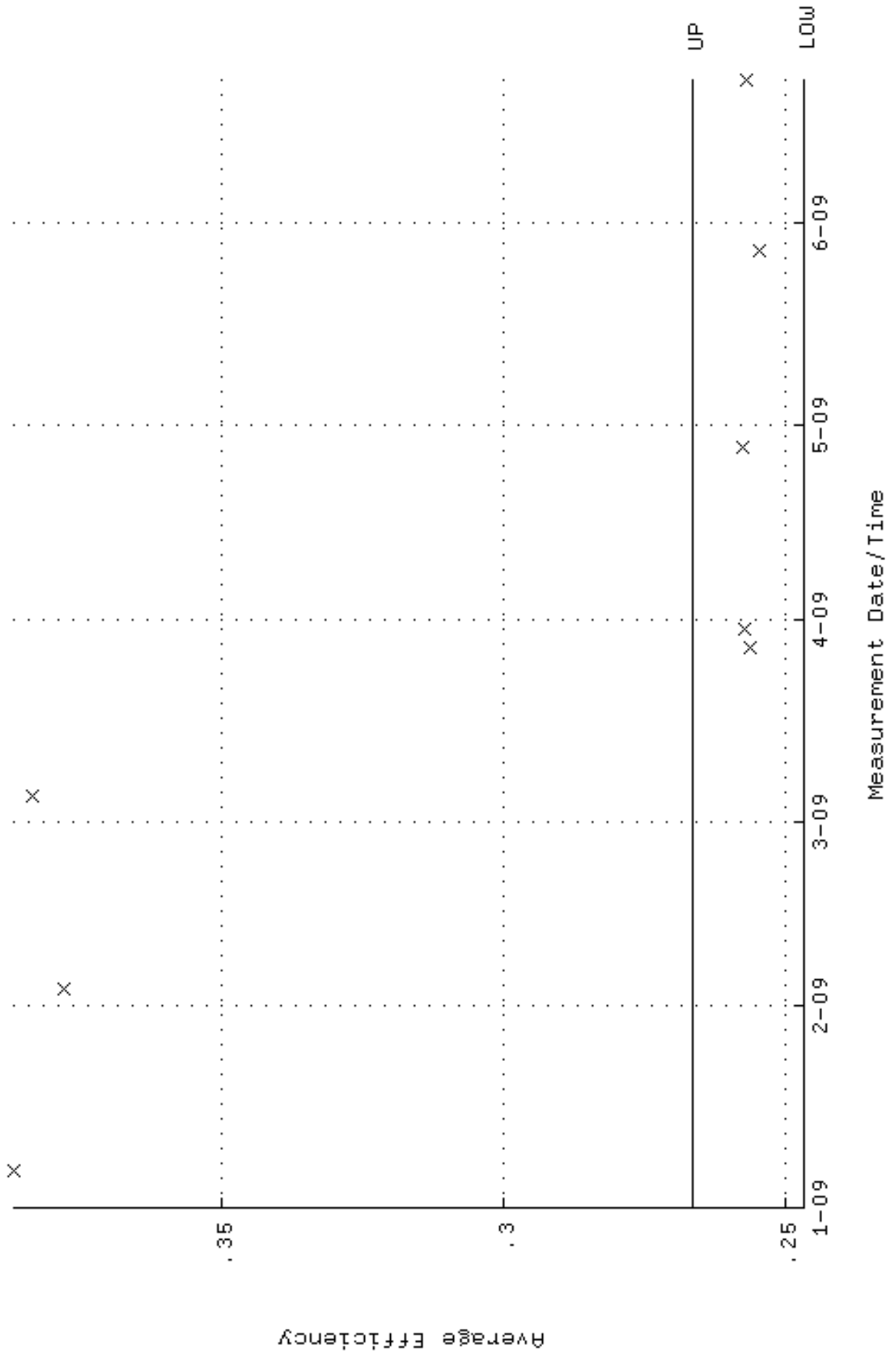
QA filename : DKA100:[ENV\_ALPHA.QA.W]W193.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:32:01 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 84.9815 through 93.9269



QA filename : DKA100:[ENV\_ALPHA.QA.B]B193.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:27:07 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

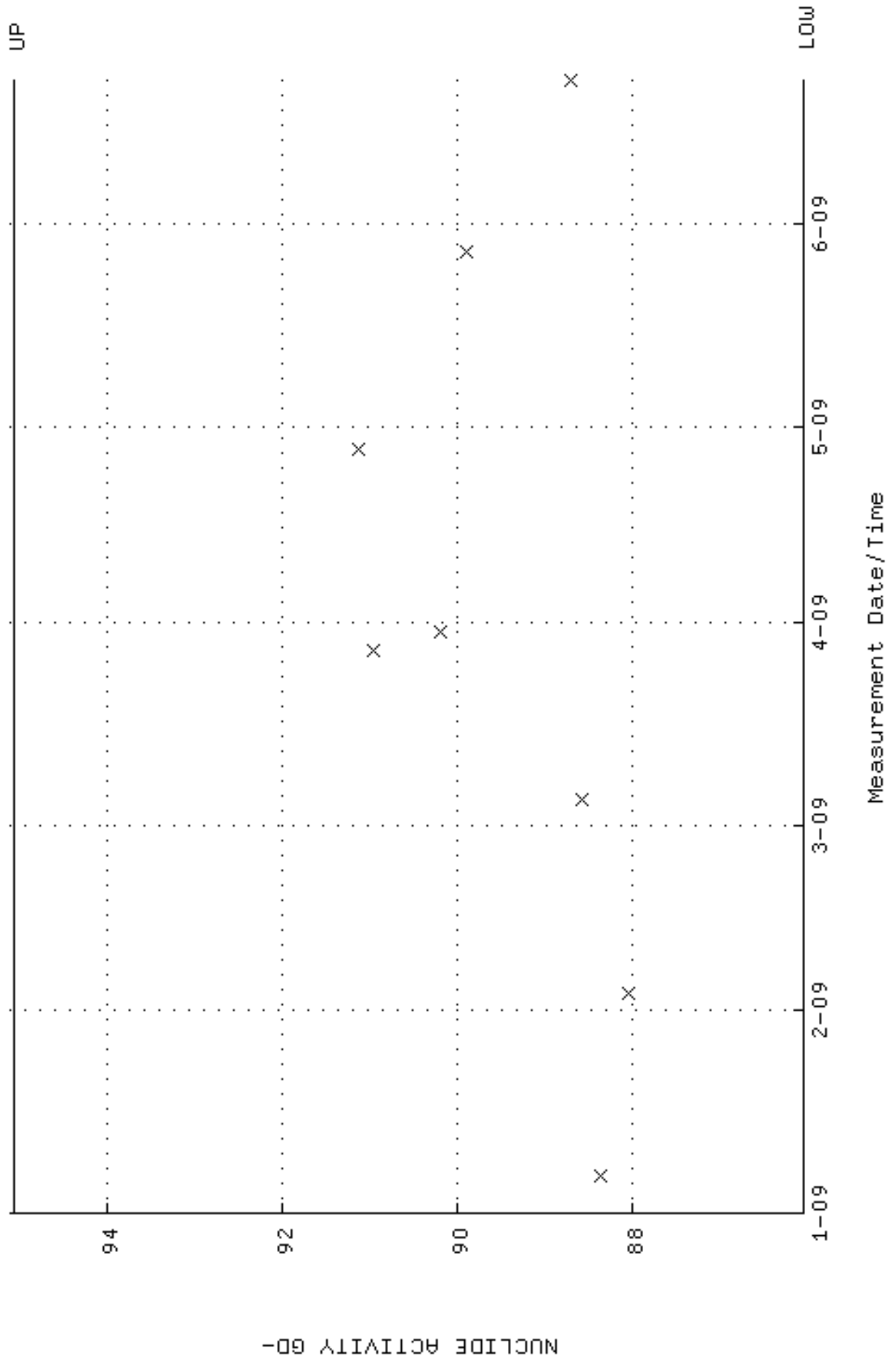


QA filename : DKA100:[ENV\_ALPHA.QA.W]W194.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:32:05 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.246760 through 0.266760

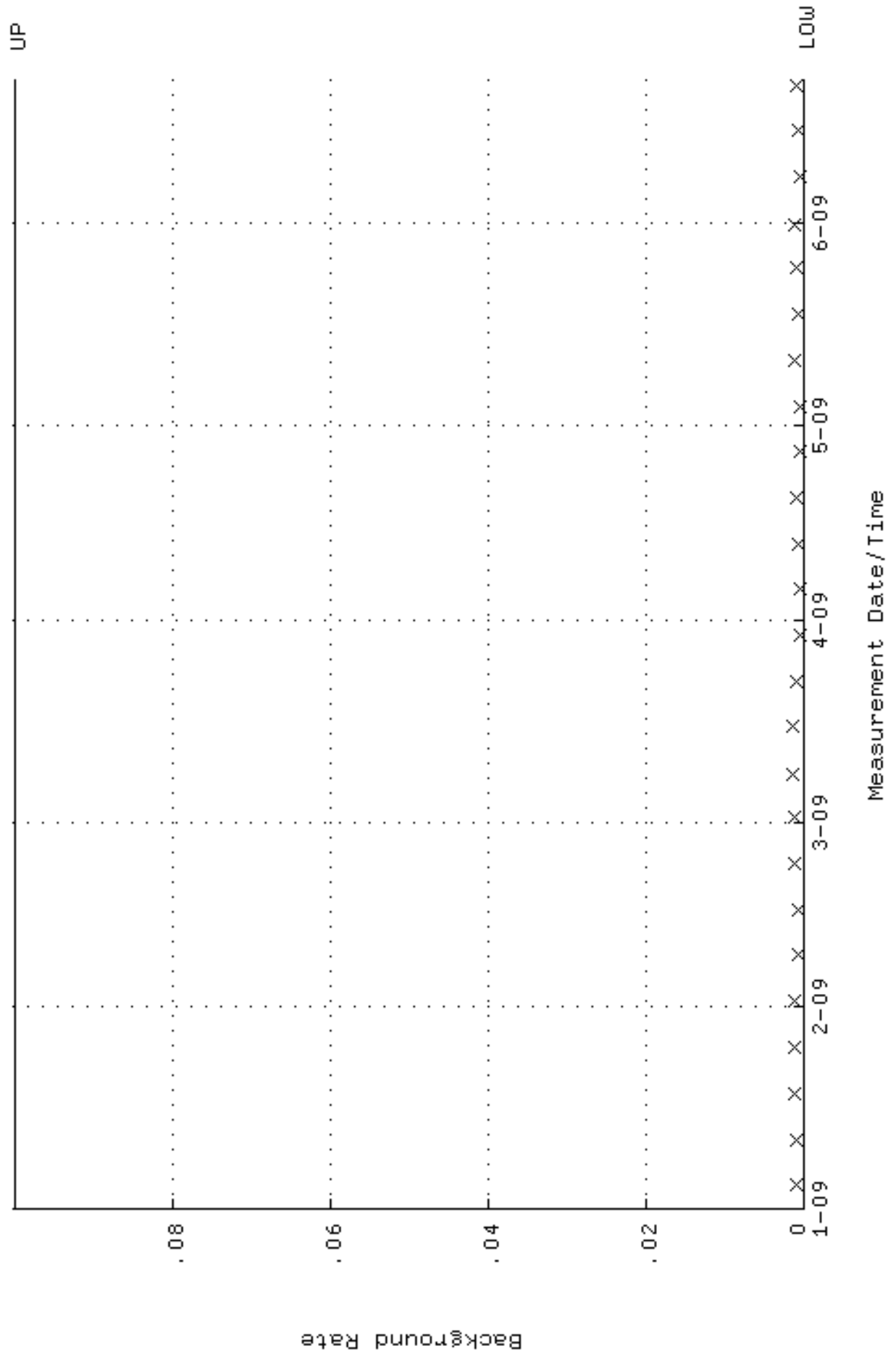




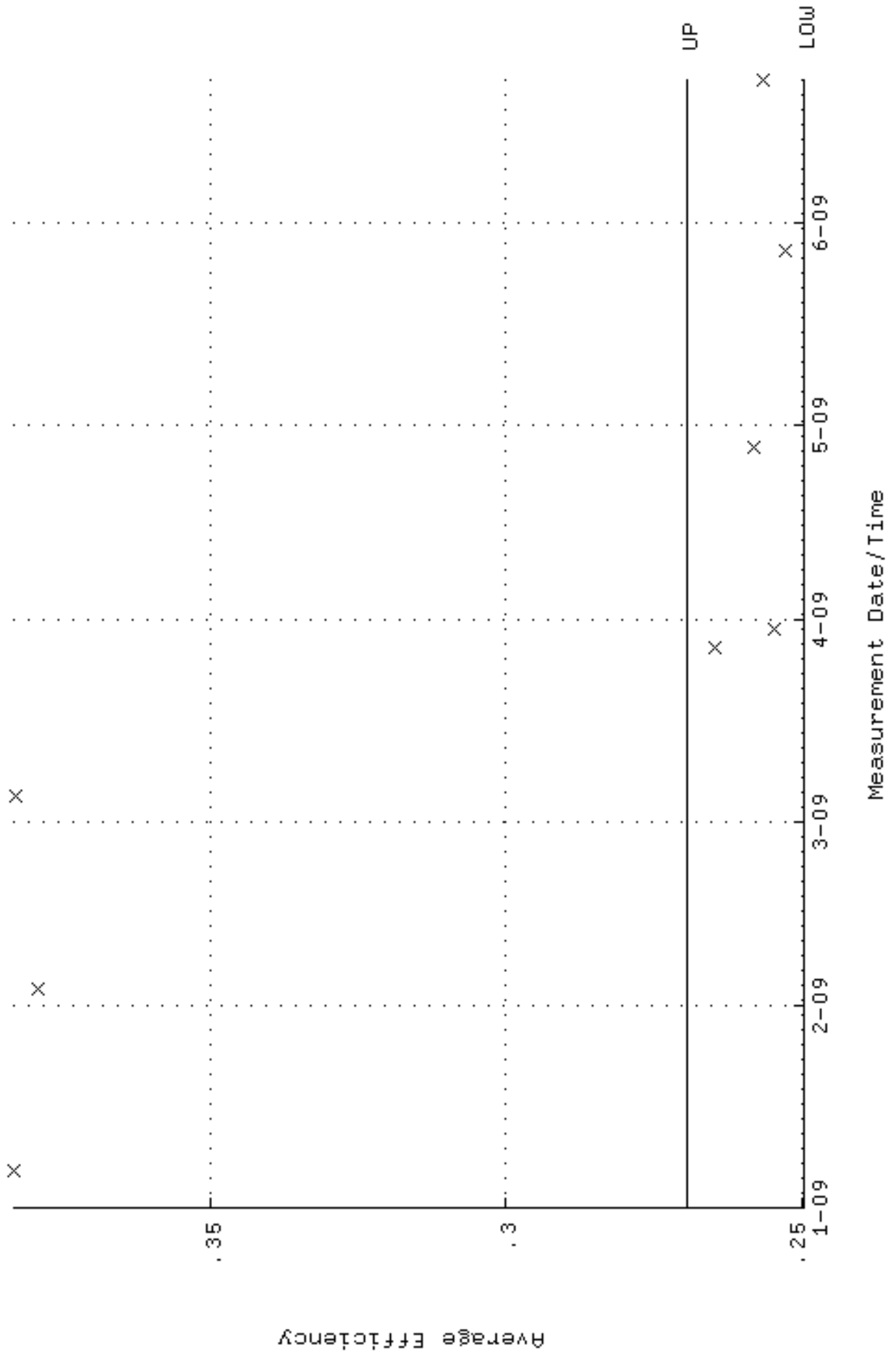
QA filename : DKA100:[ENV\_ALPHA.QA.W]W194.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:32:05 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 86.0376 through 95.0942



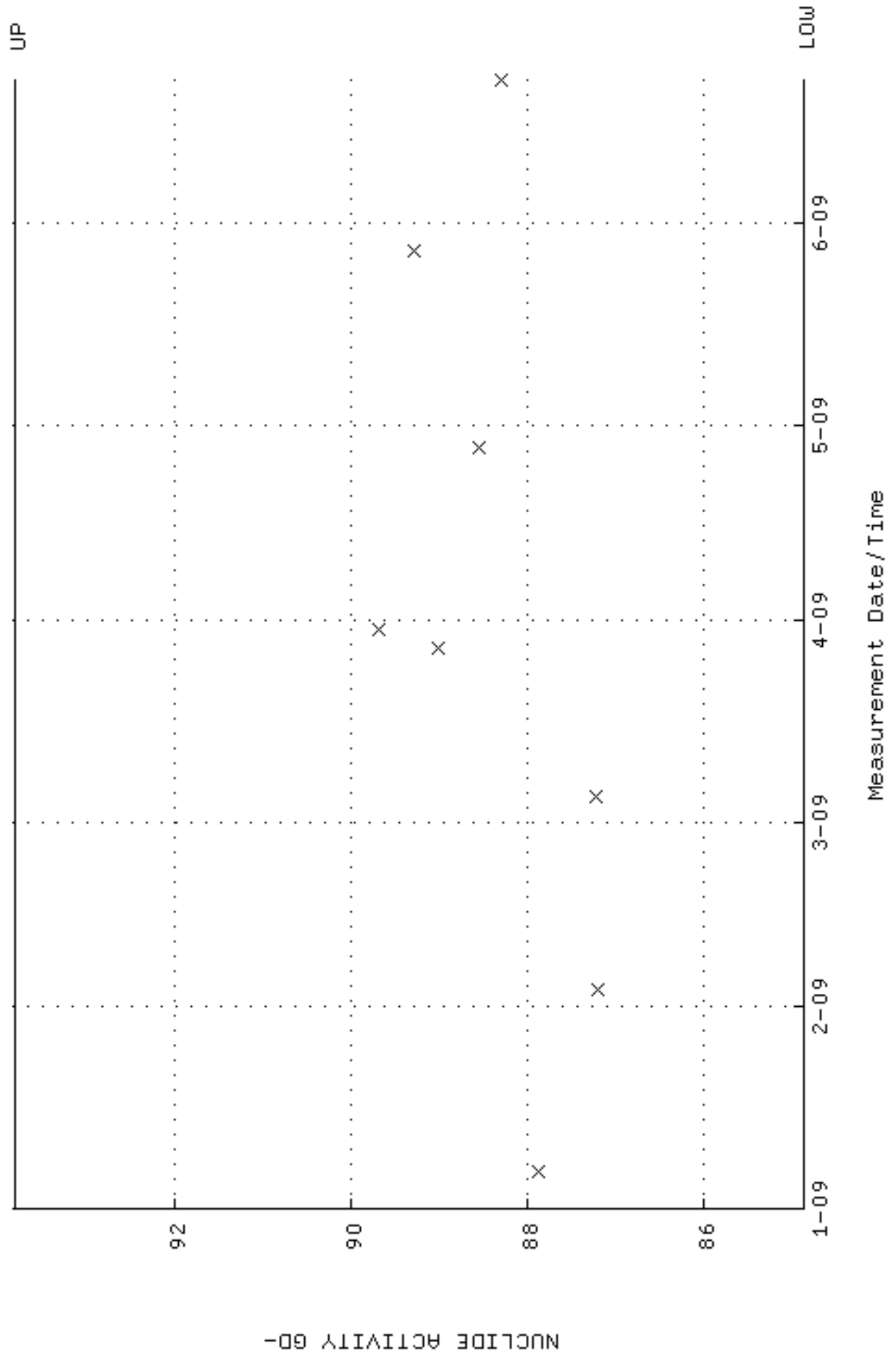
QA filename : DKA100:[ENV\_ALPHA.QA.B]B194.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:27:10 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



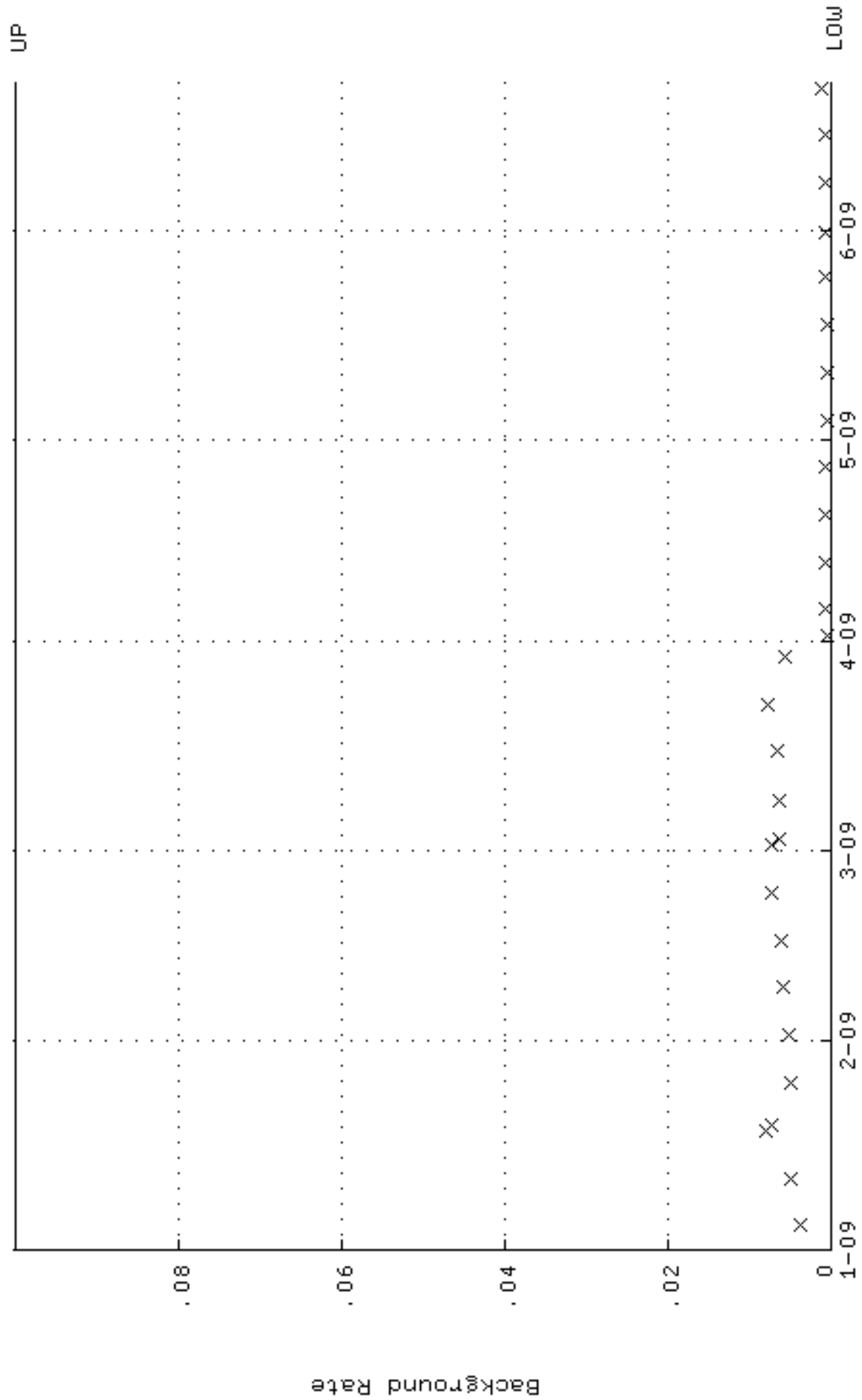
QA filename : DKA100:[ENV\_ALPHA.QA.W]W195.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:32:09 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.249622 through 0.269622



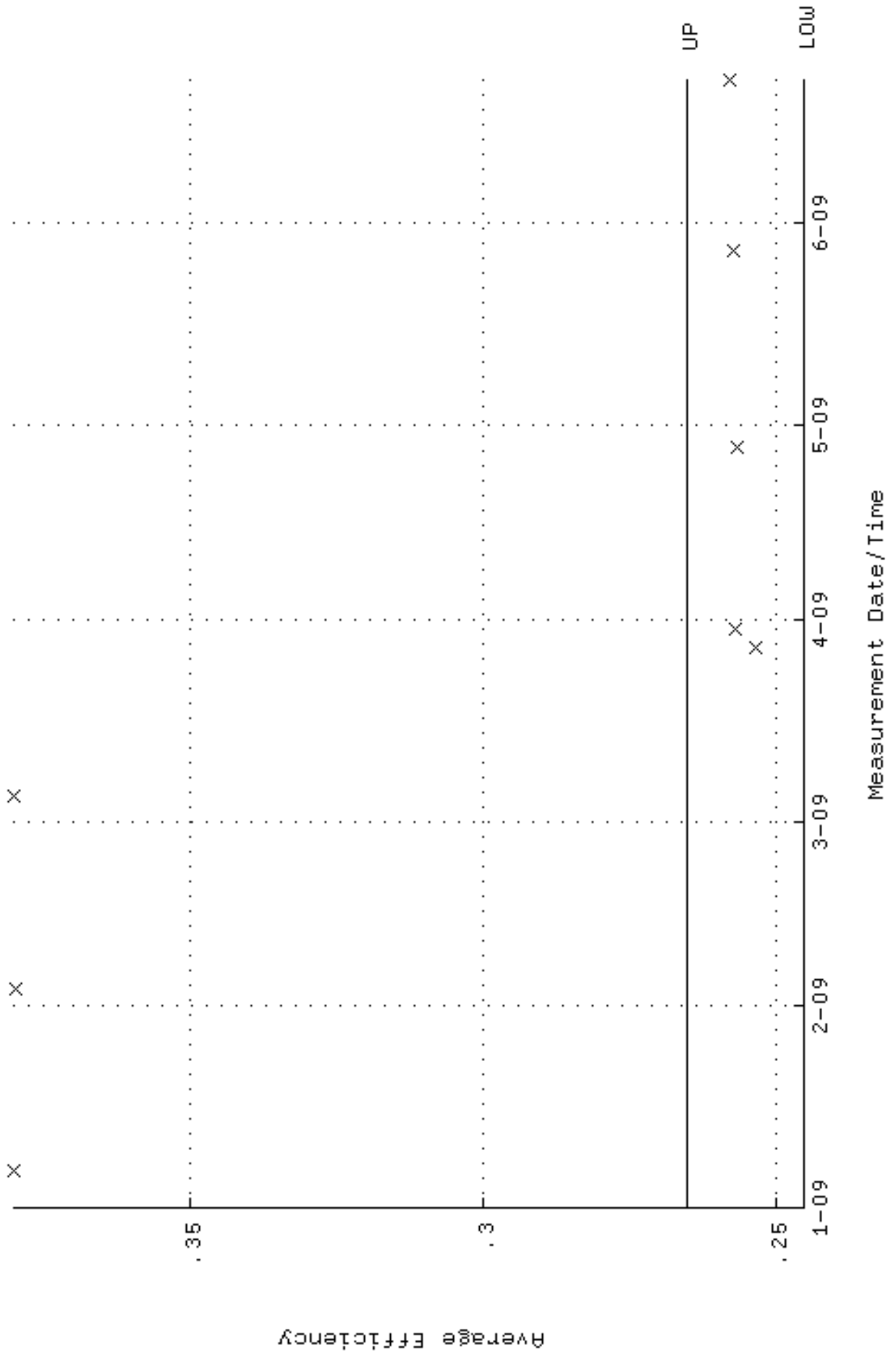
QA filename : DKA100:[ENV\_ALPHA.QA.W]W195.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:32:09 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 84.8653 through 93.7985



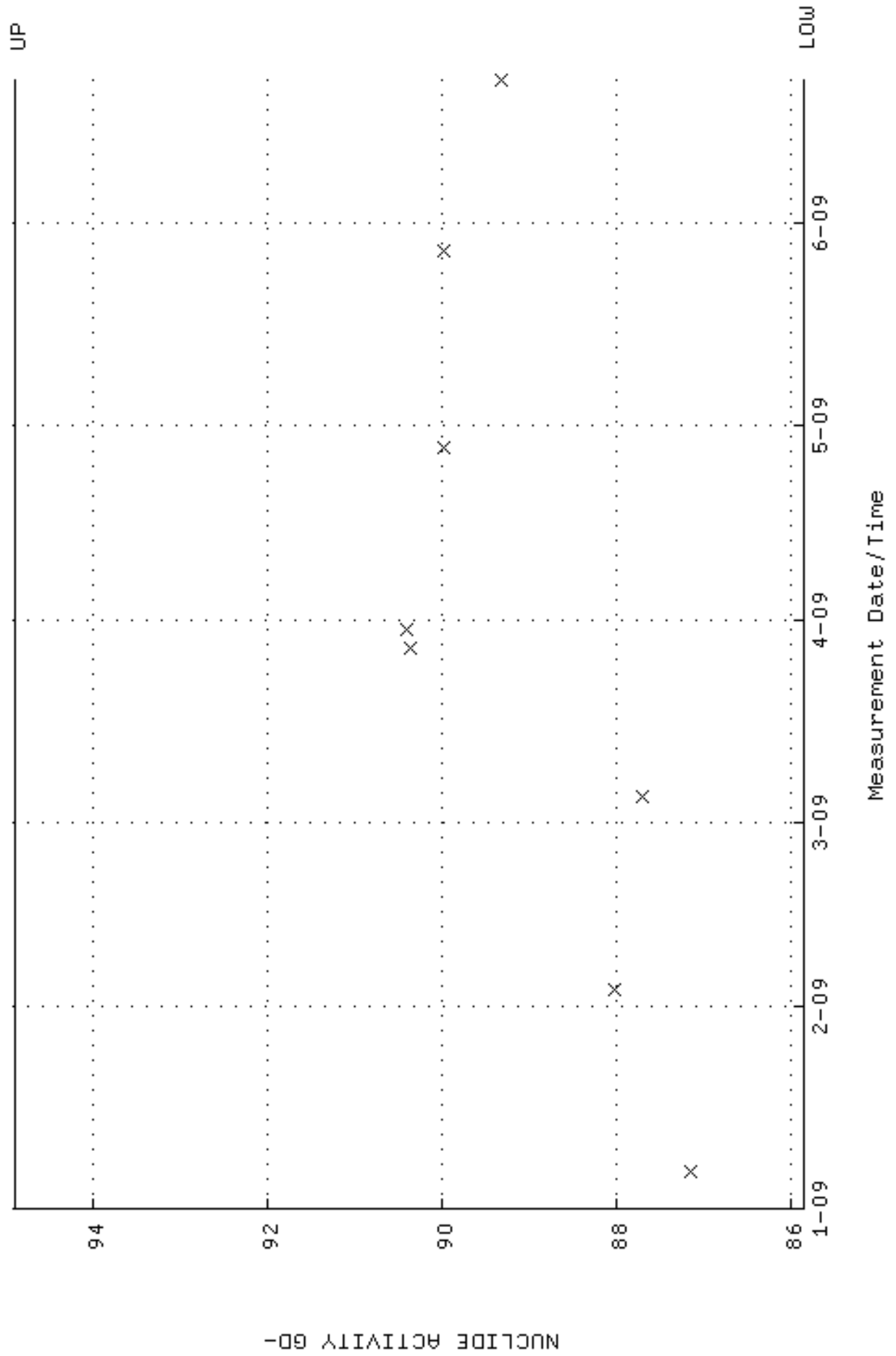
QA filename : DKA100:[ENV\_ALPHA.QA.B]B195.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:27:14 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



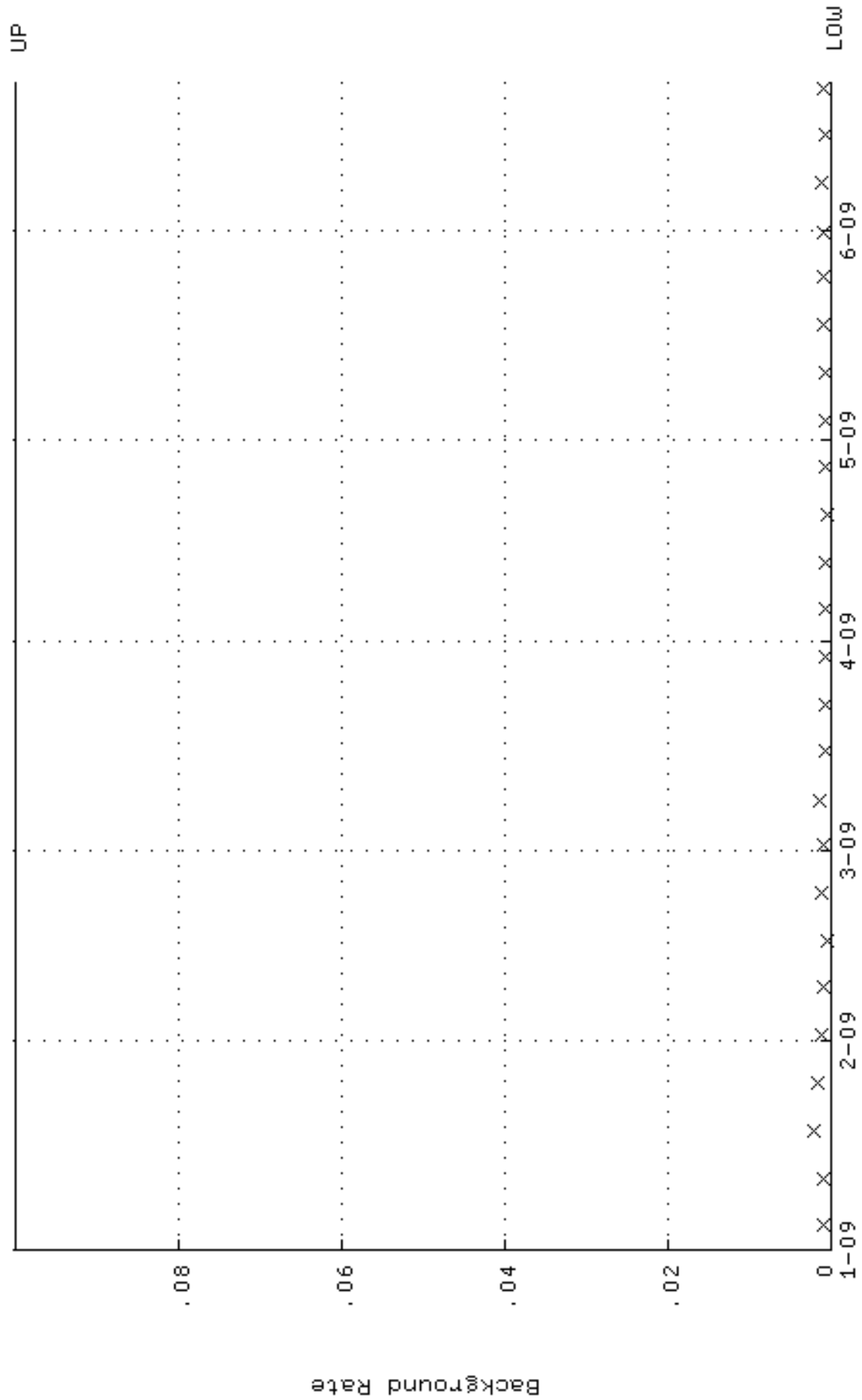
QA filename : DKA100:[ENV\_ALPHA.QA.W]W196.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:32:14 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.245168 through 0.265168



QA filename : DKA100:[ENV\_ALPHA.QA.W]w196.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:32:14 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 85.8592 through 94.8970

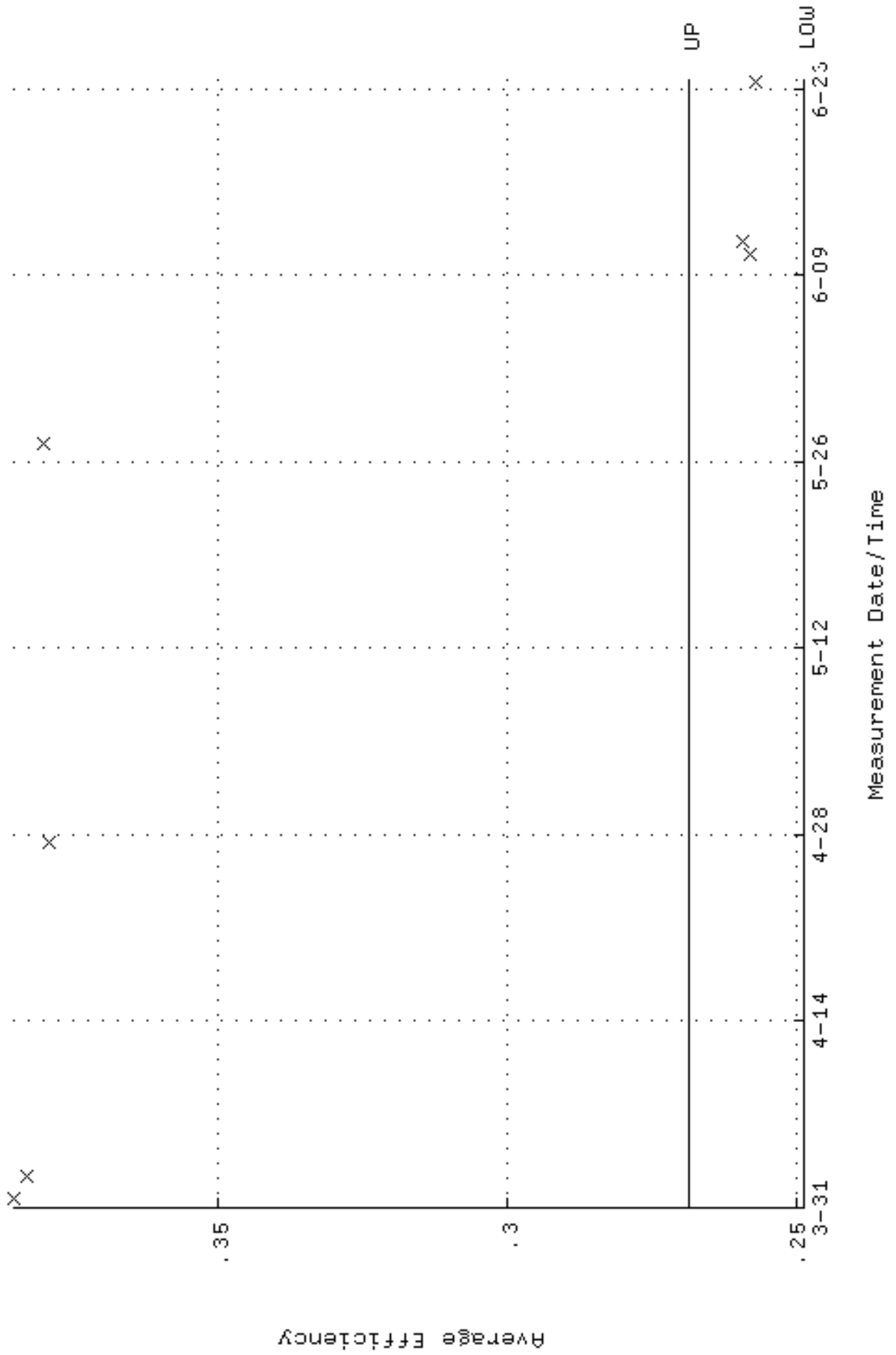


QA filename : DKA100:[ENV\_ALPHA.QA.B]B196.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:27:18 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

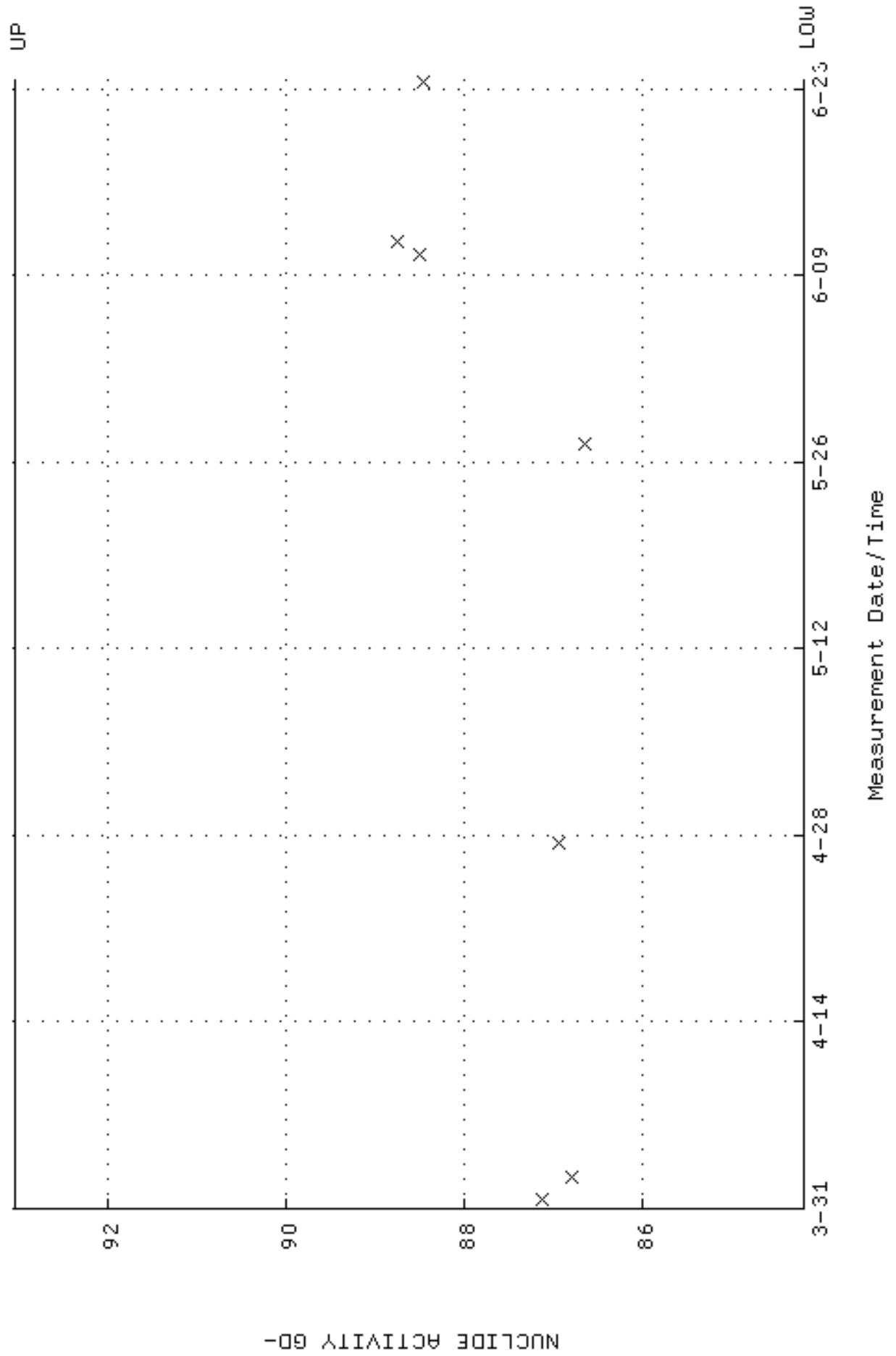




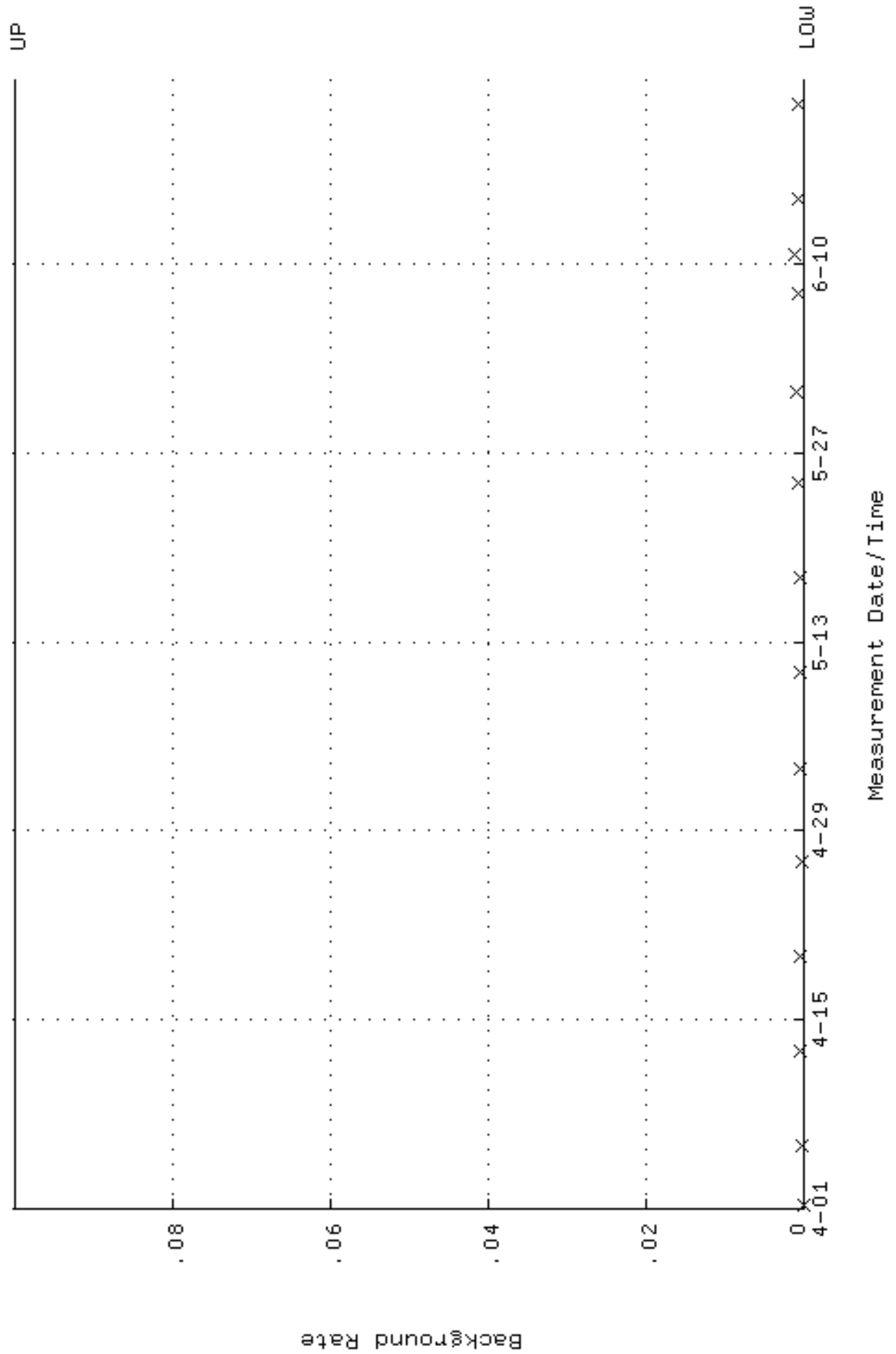
QA filename : DKA100:[ENV\_ALPHA.QA.W]W197.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:03:56 through 23-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.248572 through 0.268572



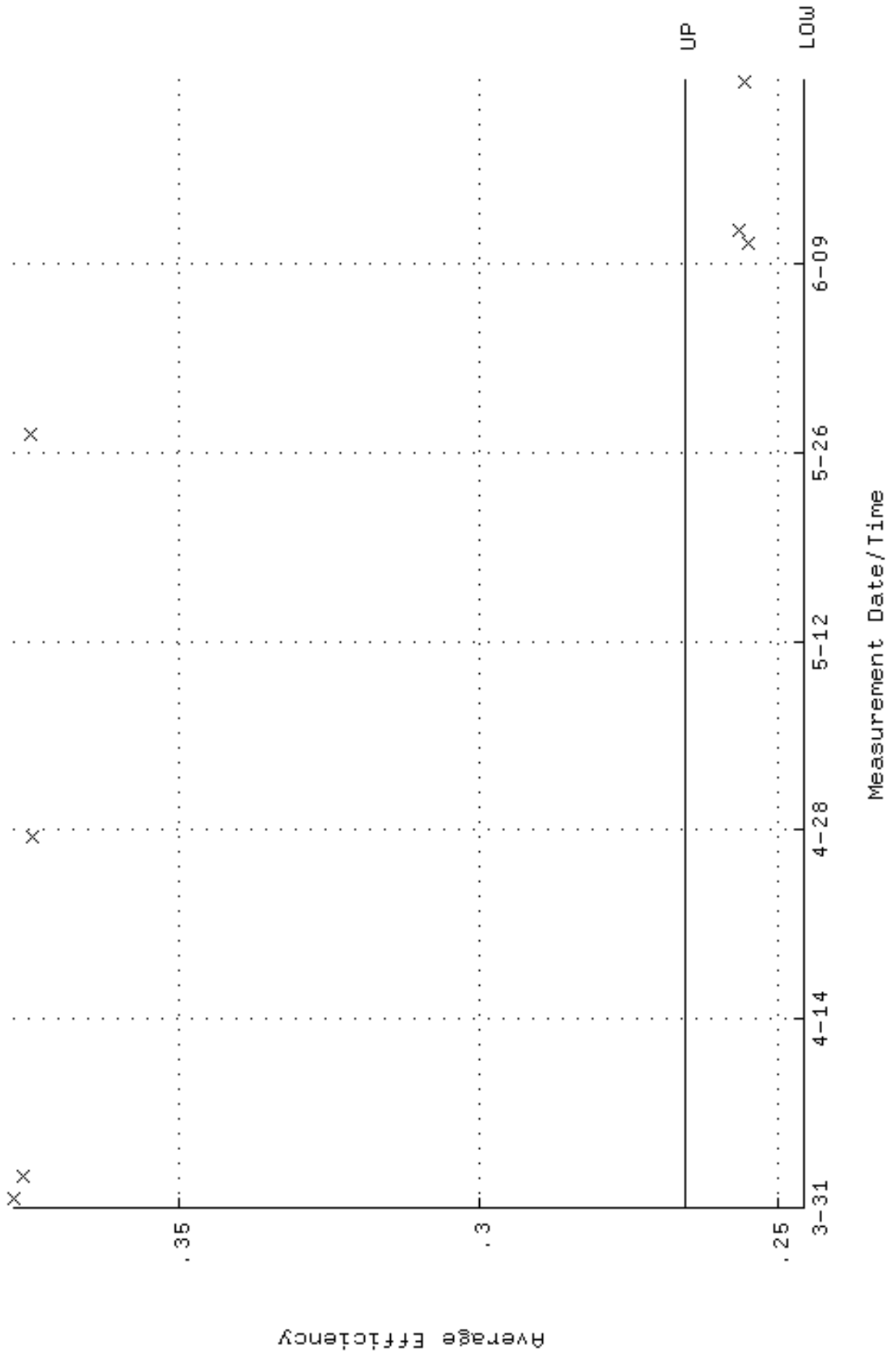
QA filename : DKA100:[ENV\_ALPHA.QA.W]w197.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:03:56 through 23-JUN-2009 12:00:00  
 Lower/Upper Lmts: 84.1772 through 93.0380



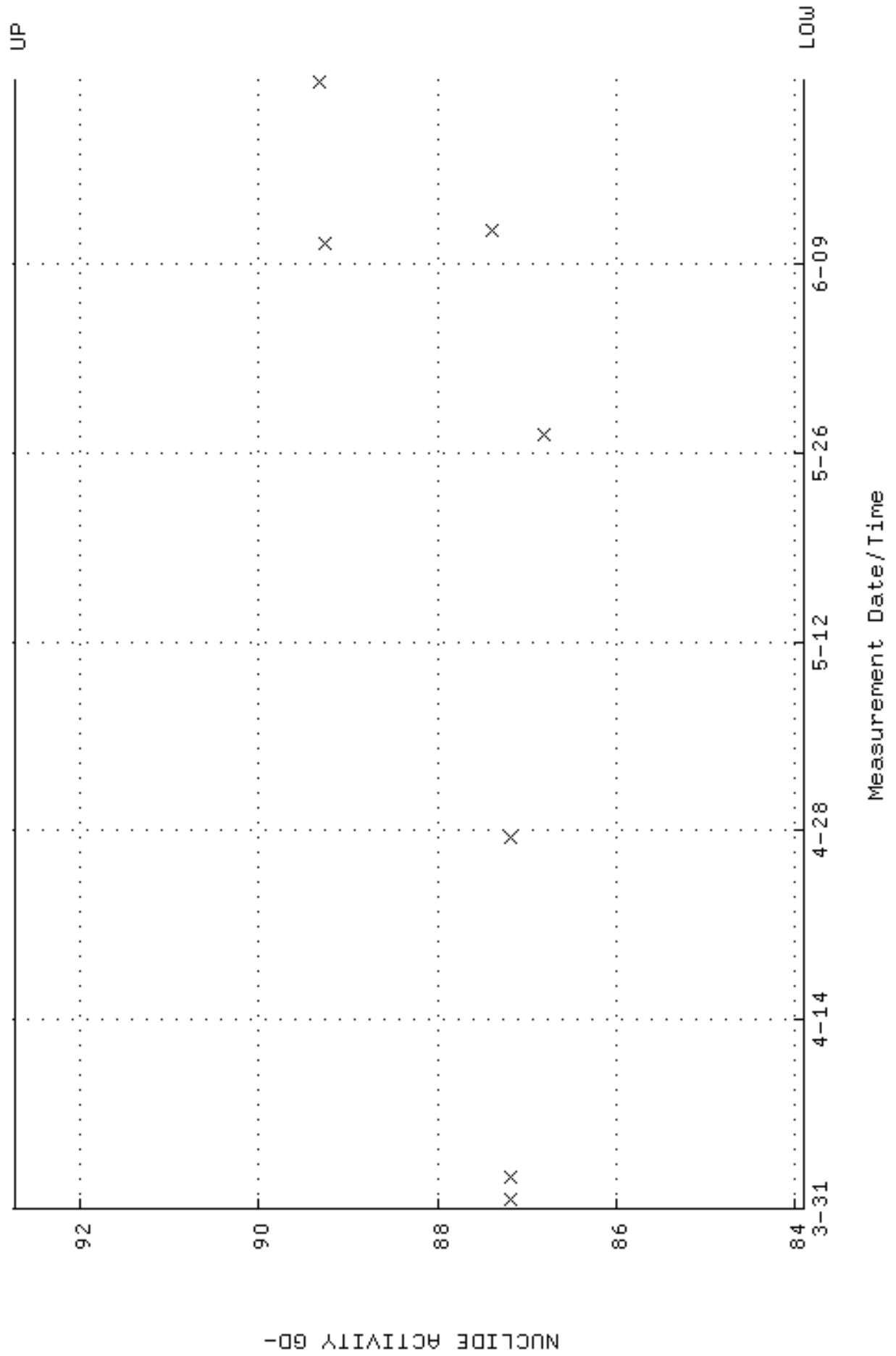
QA filename : DKA100:[ENV\_ALPHA.QA.B]B197.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:18 through 23-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



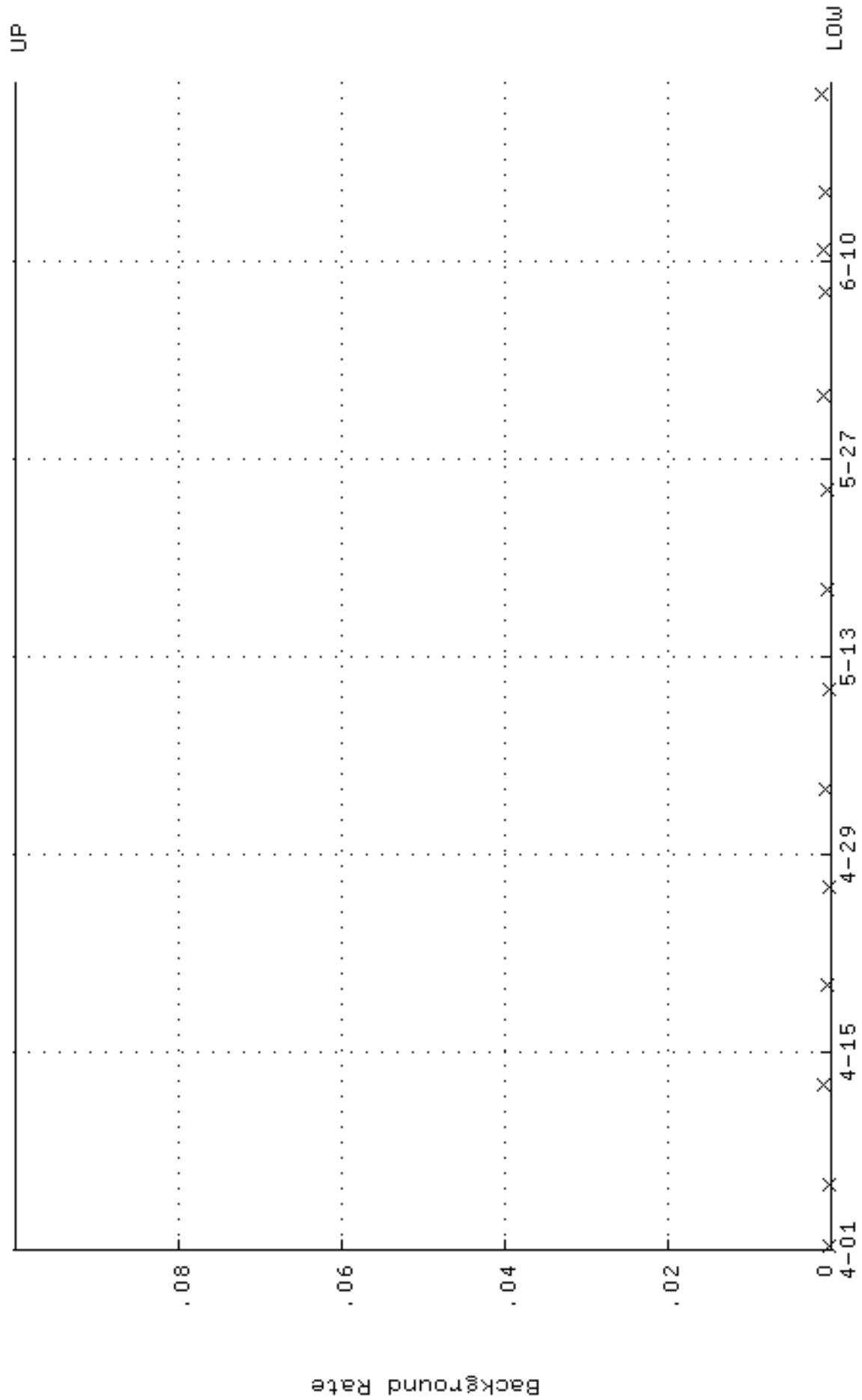
QA filename : DKA100:[ENV\_ALPHA.QA.W]W198.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:06:01 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.245817 through 0.265817



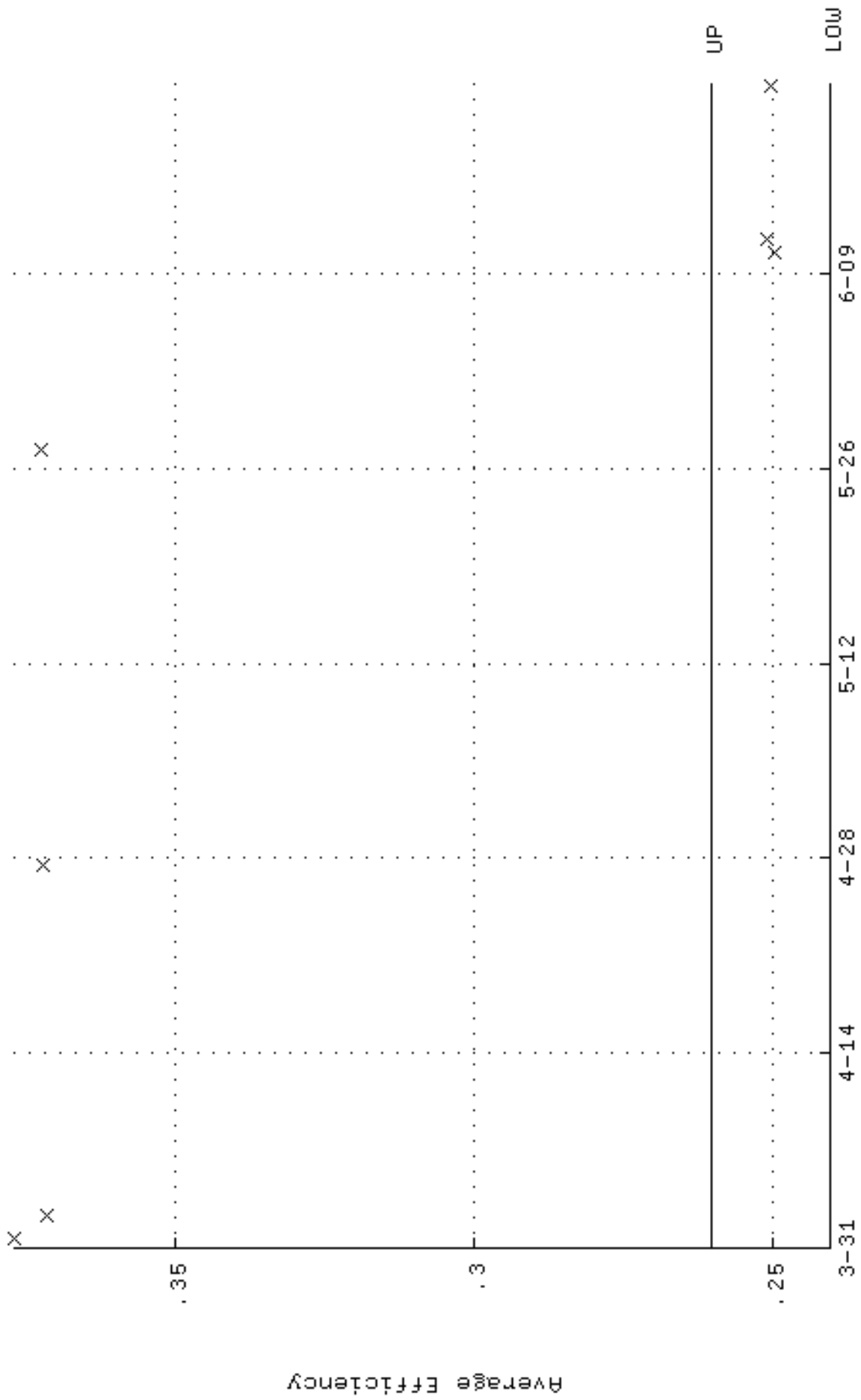
QA filename : DKA100:[ENV\_ALPHA.QA.W]W198.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:06:01 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 83.8978 through 92.7292



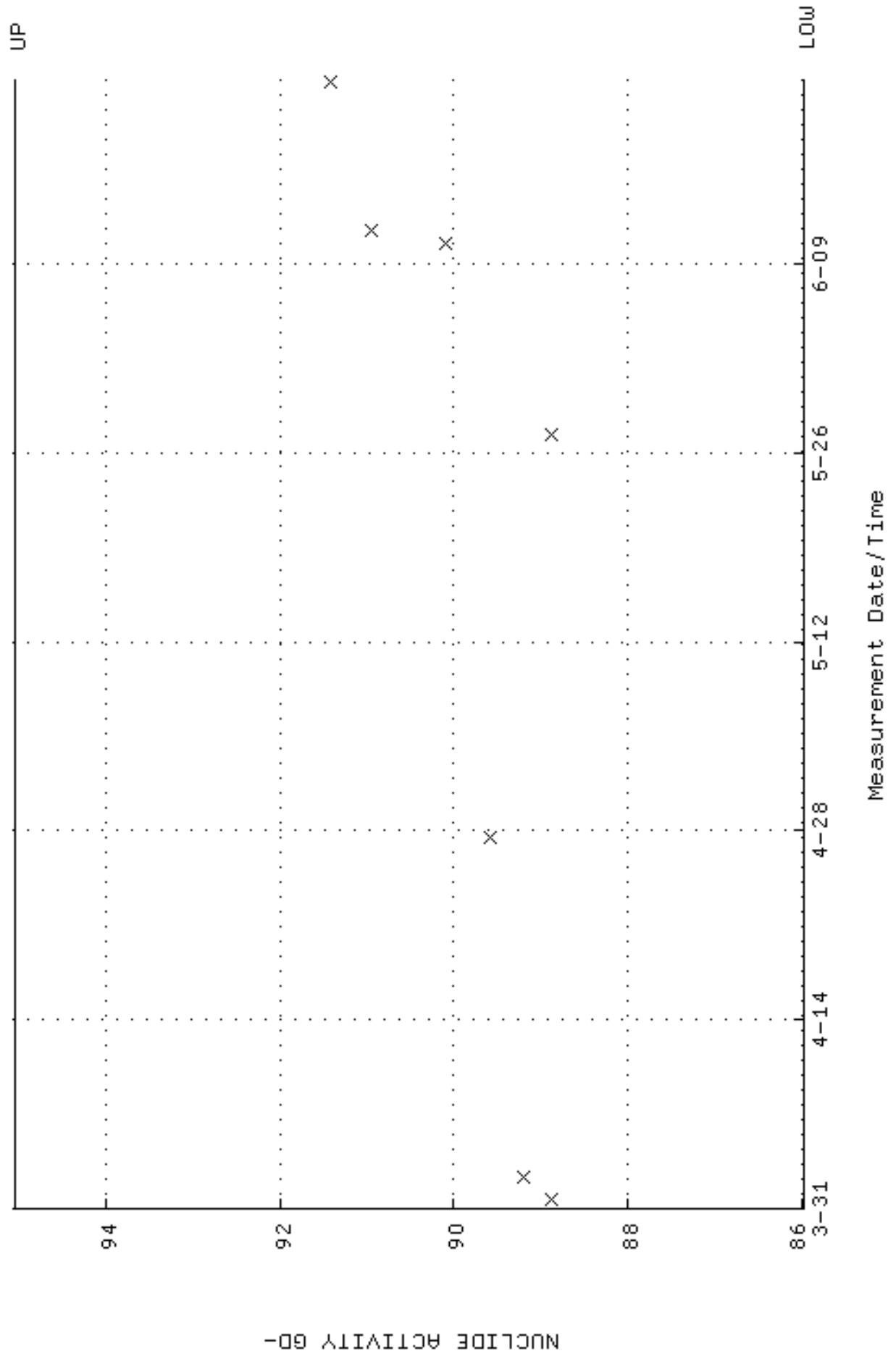
QA filename : DKA100:[ENV\_ALPHA.QA.B]B198.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:23 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W199.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:22 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.240278 through 0.260278

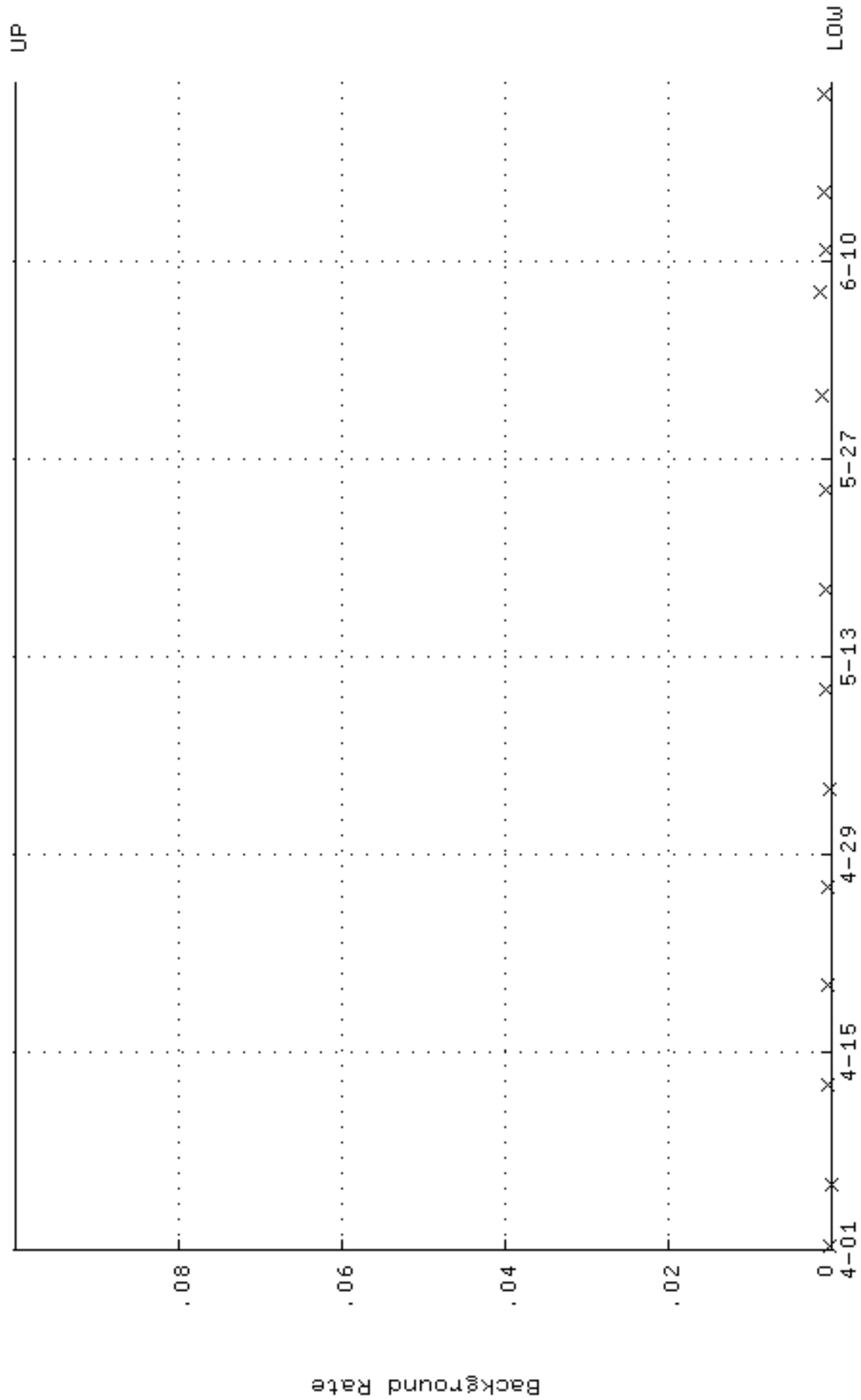


QA filename : DKA100:[ENV\_ALPHA.QA.W]w199.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 31-MAR-2009 15:10:22 through 22-JUN-2009 12:00:00  
Lower/Upper Lmts: 85.9853 through 95.0363

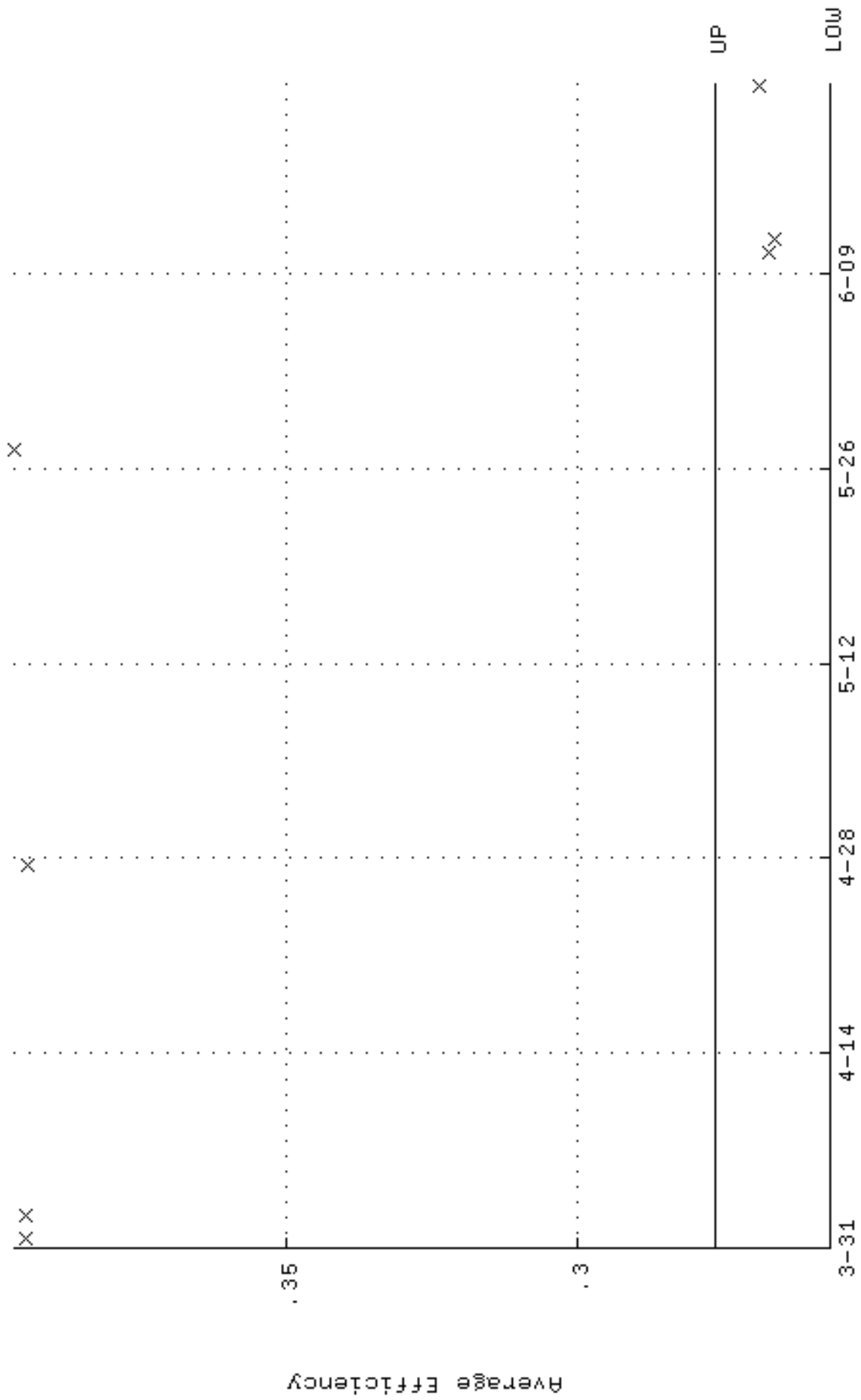




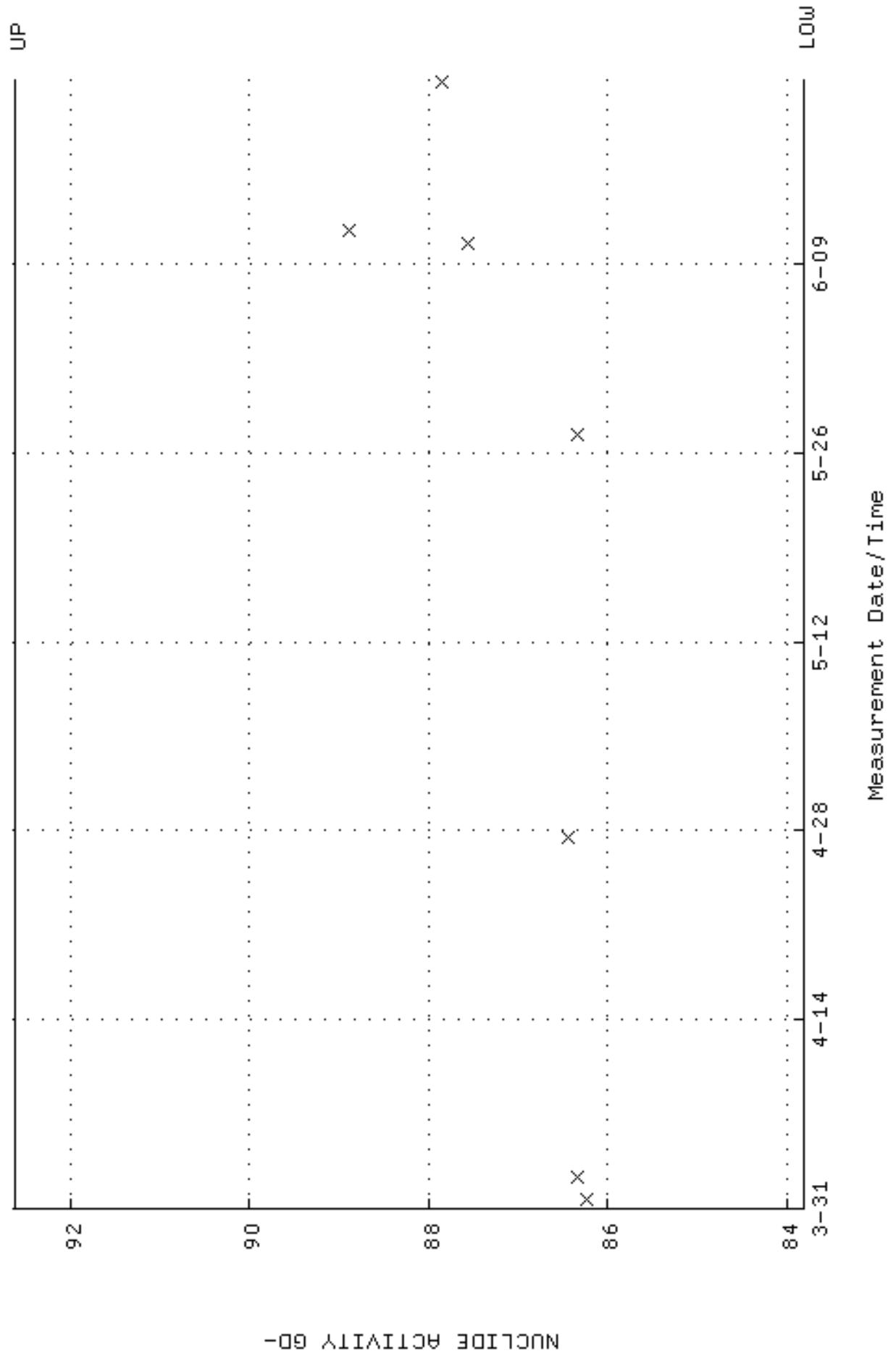
QA filename : DKA100:[ENV\_ALPHA.QA.B]B199.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:28 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



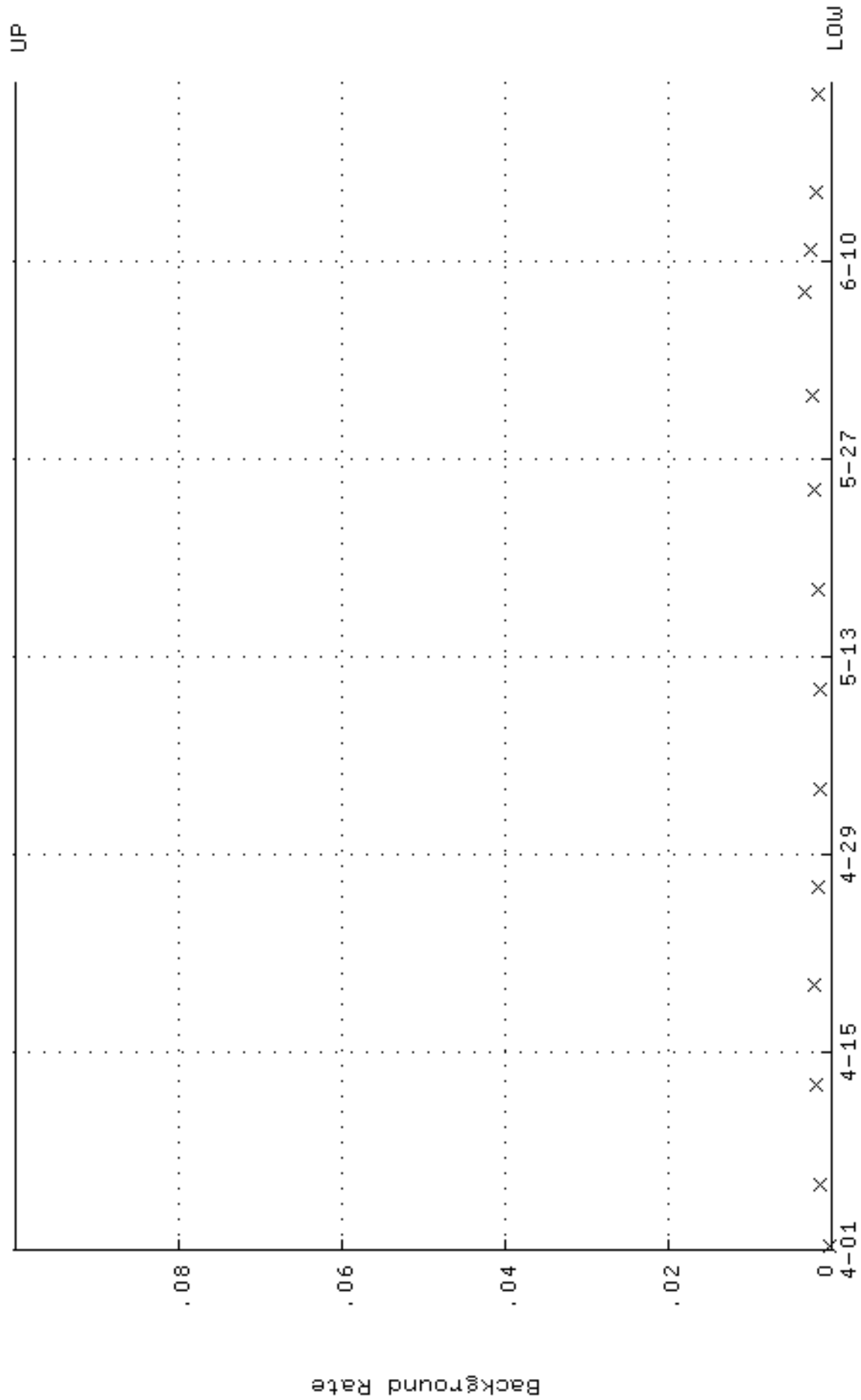
QA filename : DKA100:[ENV\_ALPHA.QA.W]W200.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:24 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.256586 through 0.276586



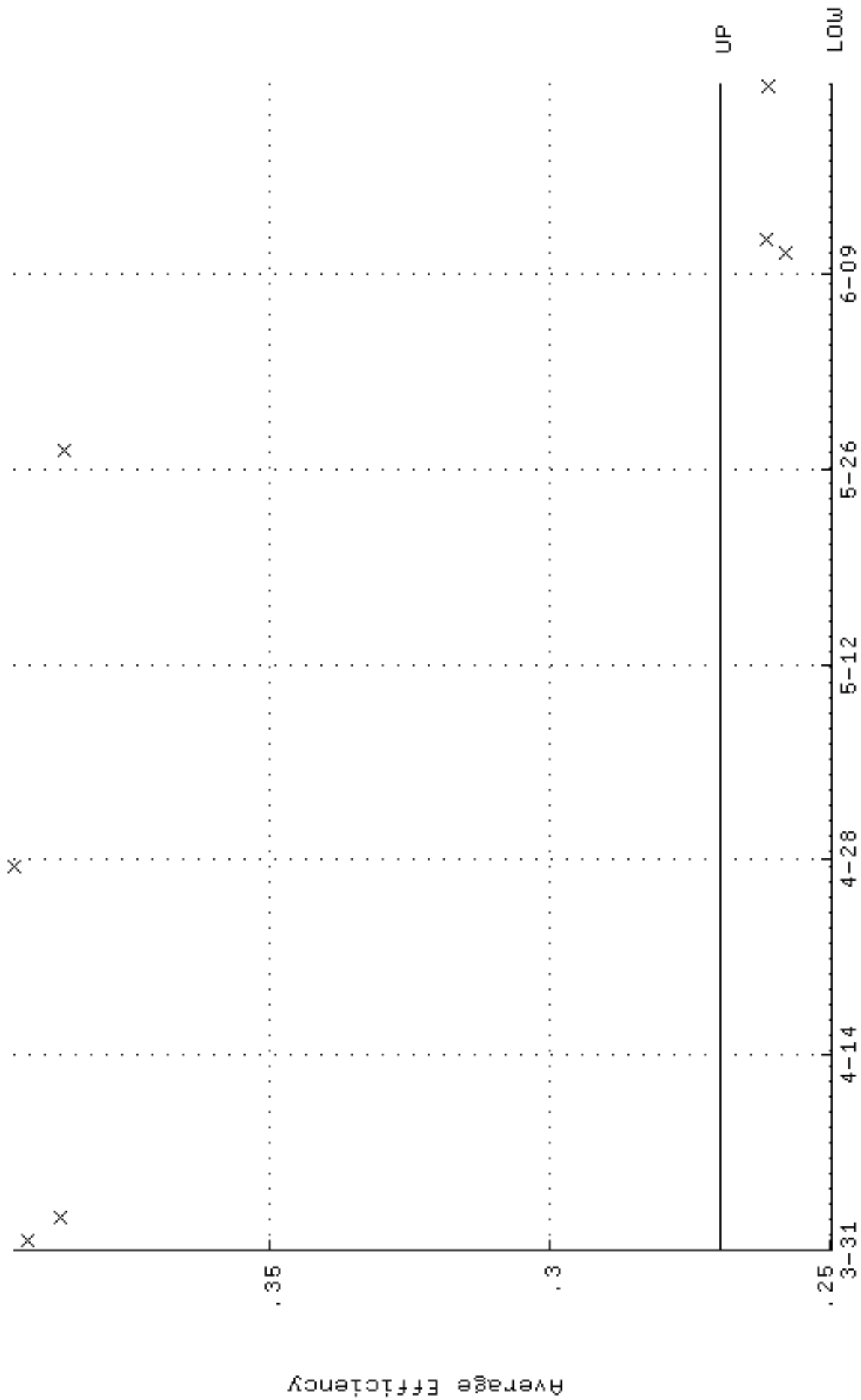
QA filename : DKA100:[ENV\_ALPHA.QA.W]w200.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:24 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 83.8028 through 92.6242



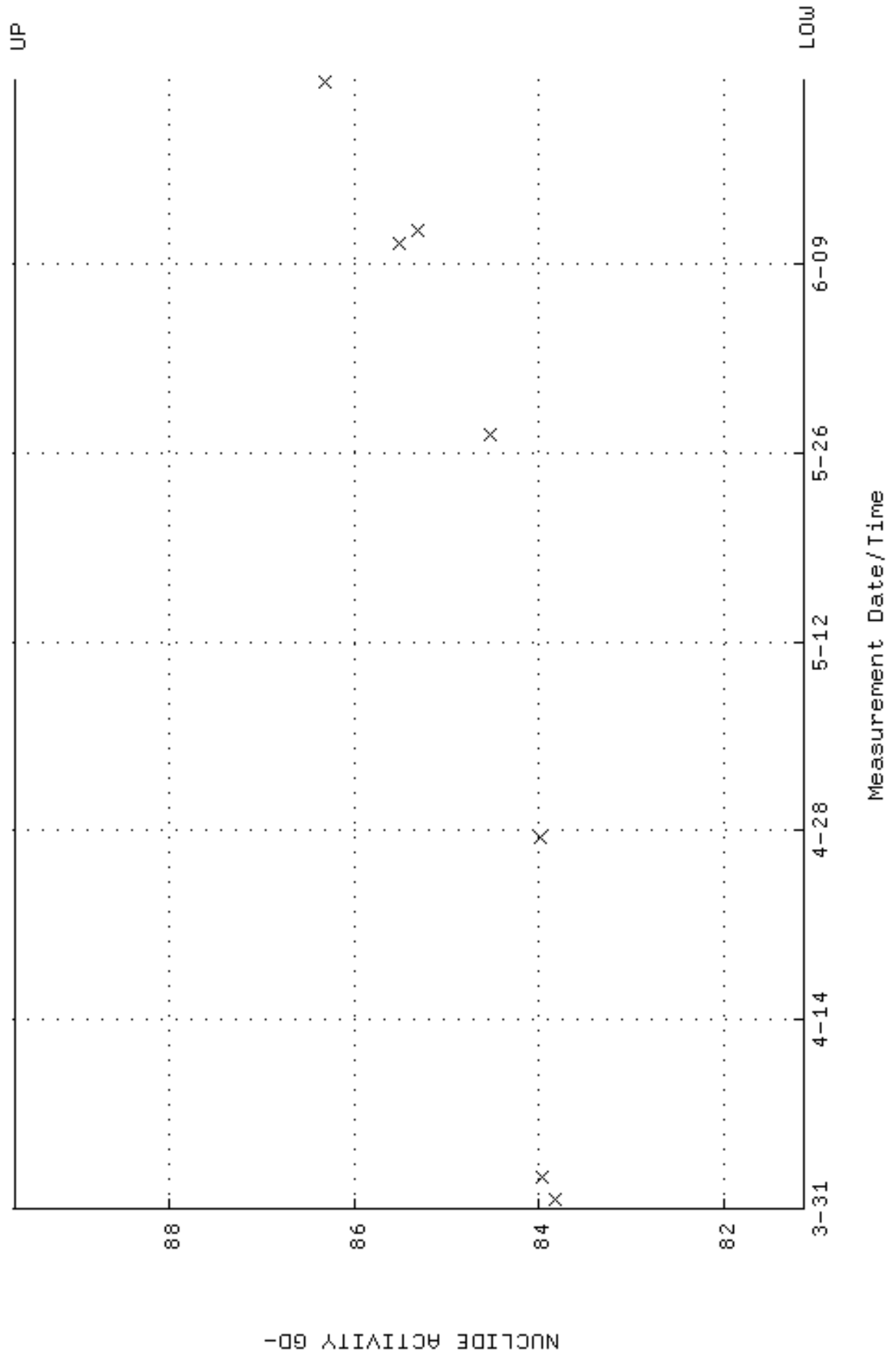
QA filename : DKA100:[ENV\_ALPHA.QA.B]B200.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:33 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



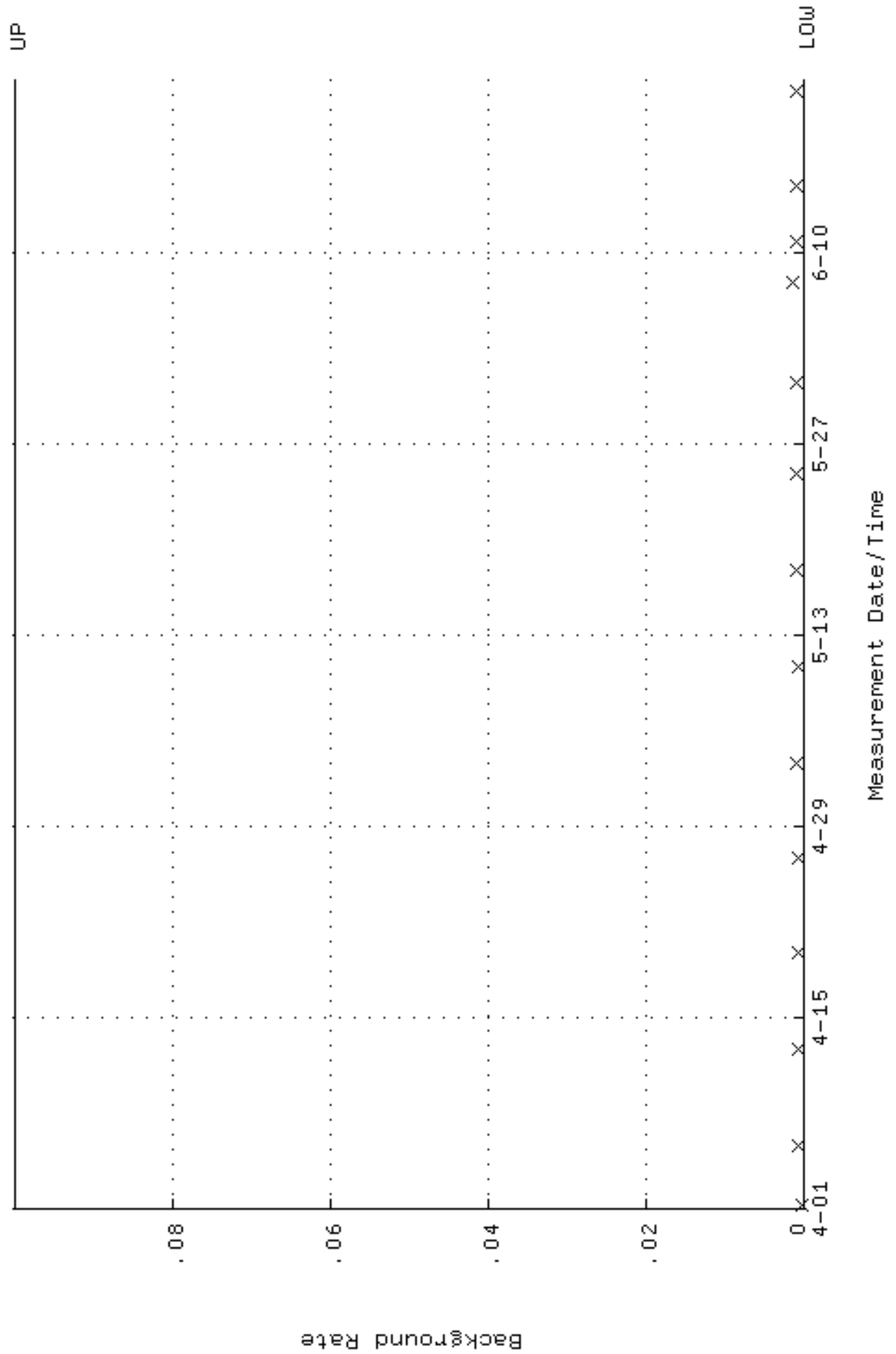
QA filename : DKA100:[ENV\_ALPHA.QA.W]W201.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:26 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.249568 through 0.269568



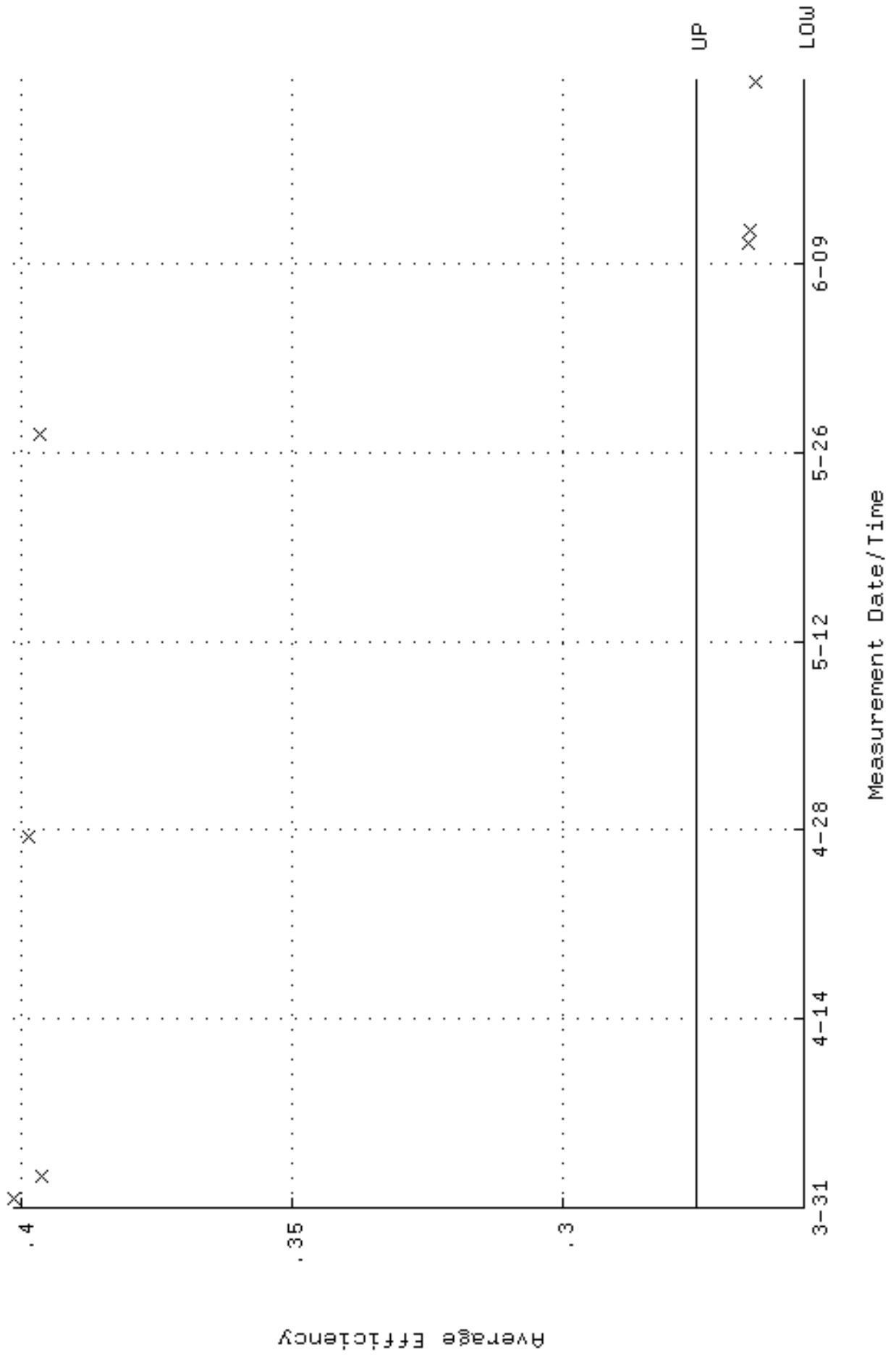
QA filename : DKA100:[ENV\_ALPHA.QA.W]w201.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:26 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 81.1299 through 89.6699



QA filename : DKA100:[ENV\_ALPHA.QA.B]B201.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:39 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

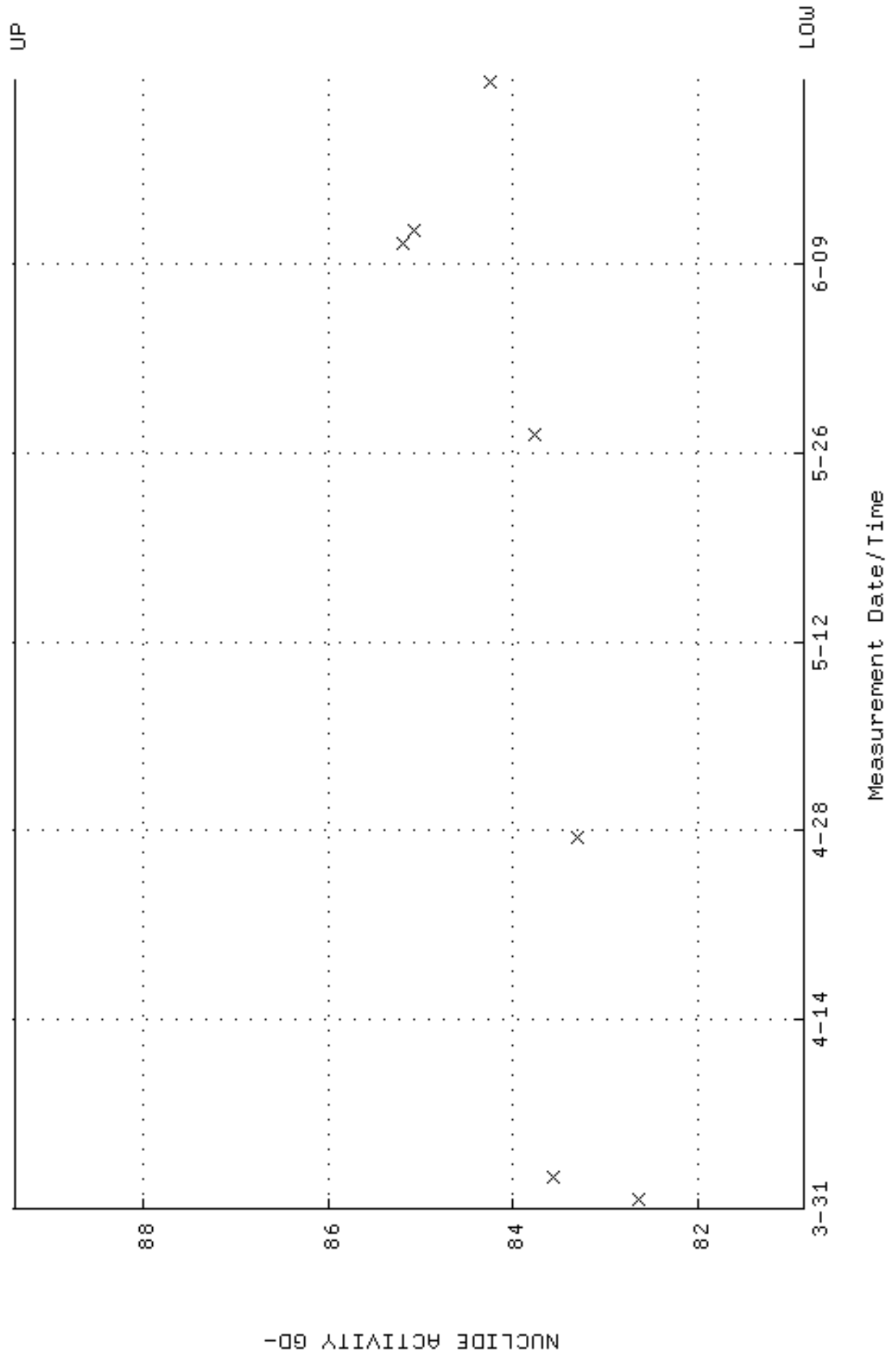


QA filename : DKA100:[ENV\_ALPHA.QA.W]W202.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:28 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.255511 through 0.275511

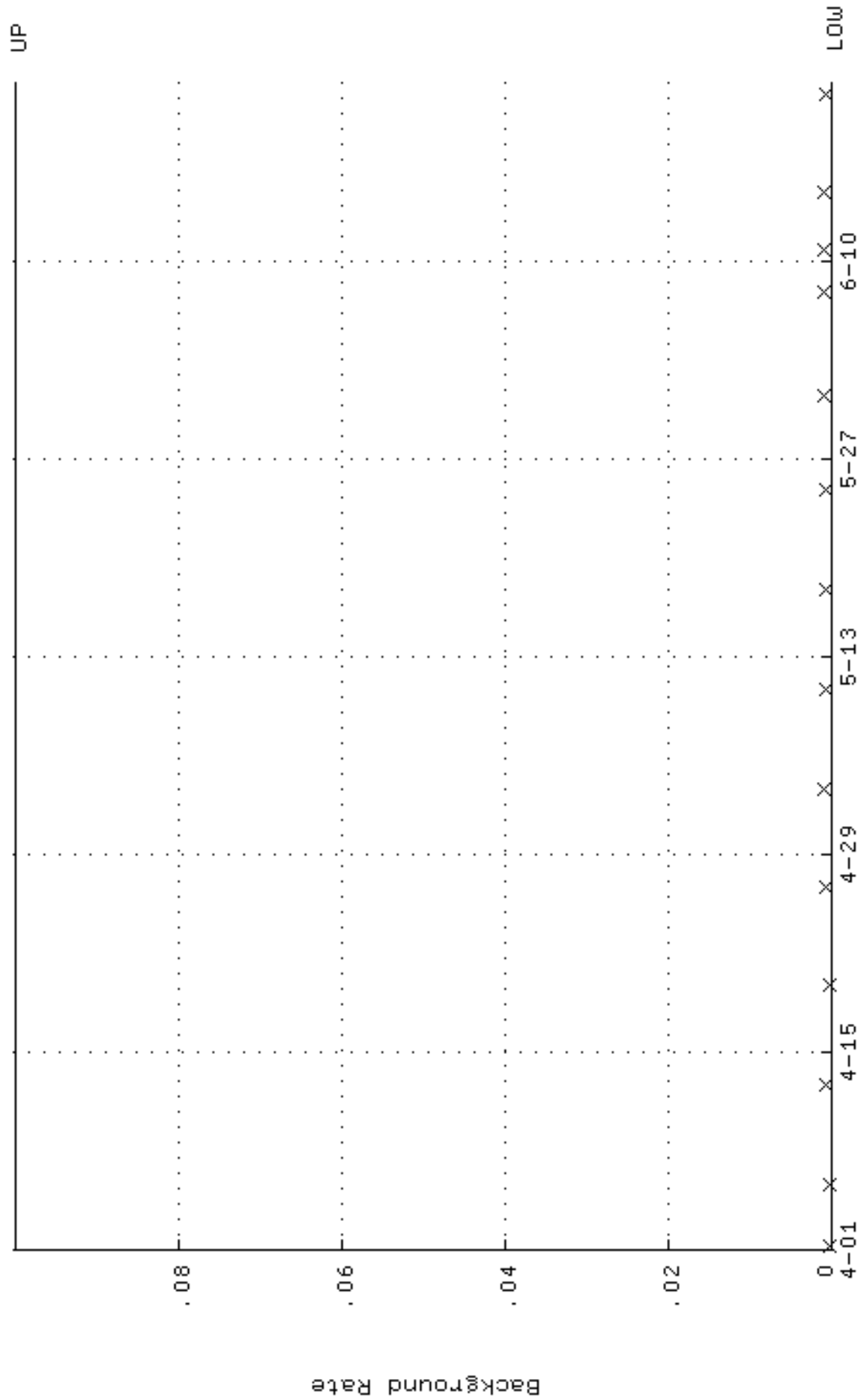




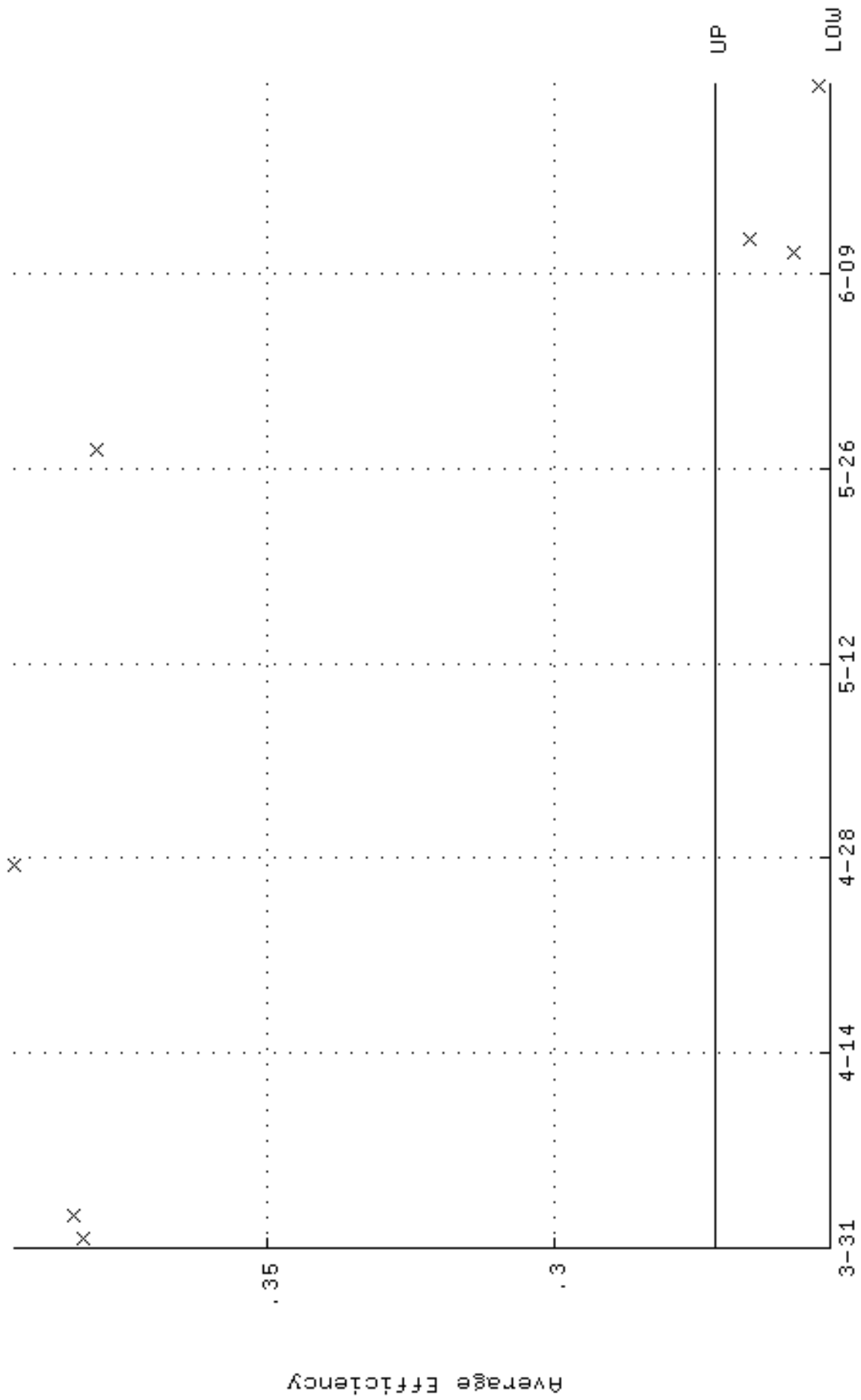
QA filename : DKA100:[ENV\_ALPHA.QA.W]w202.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:28 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 80.8649 through 89.3769



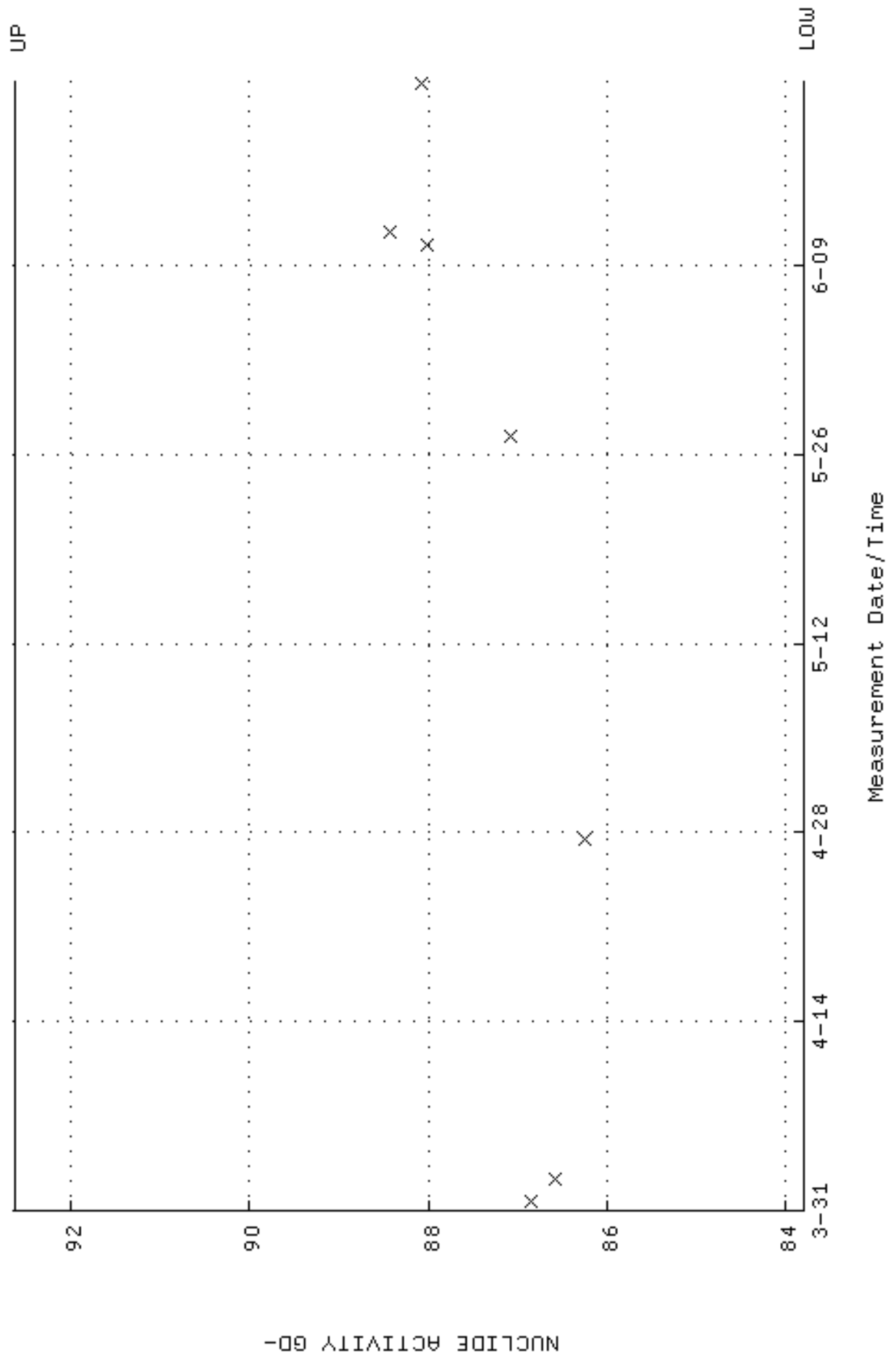
QA filename : DKA100:[ENV\_ALPHA.QA.B]B202.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:44 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



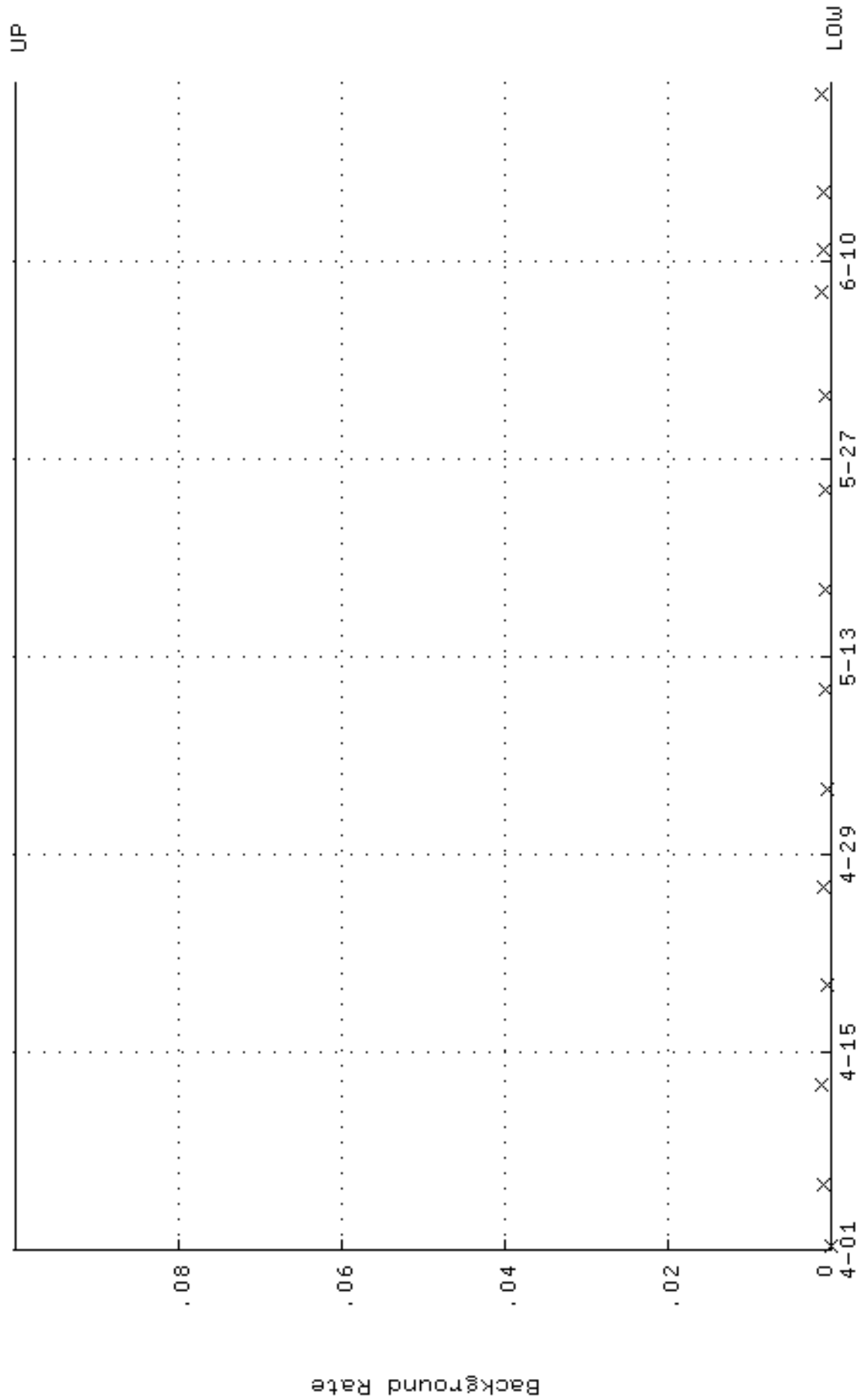
QA filename : DKA100:[ENV\_ALPHA.QA.W]W203.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:29 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.252203 through 0.272203



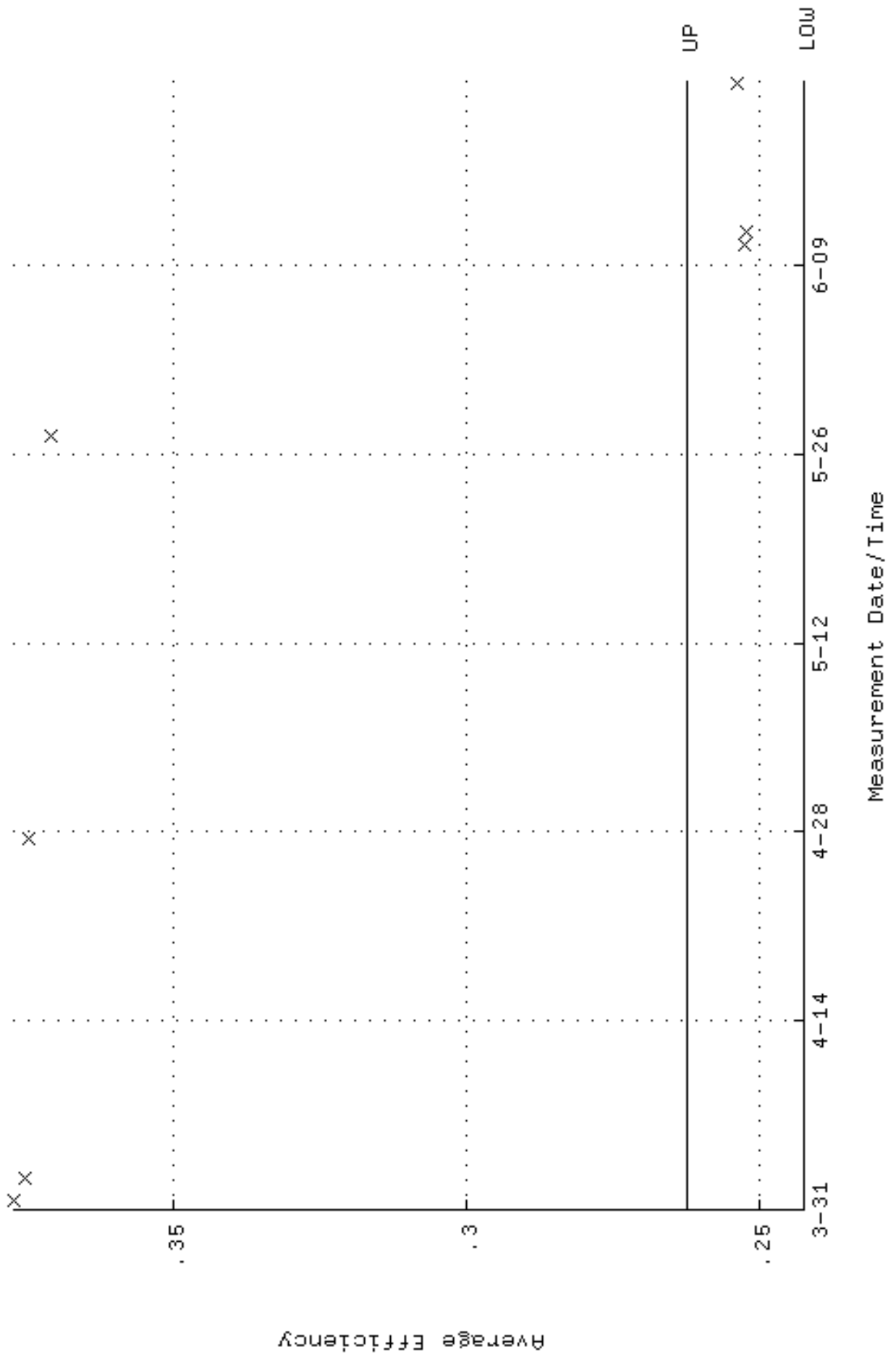
QA filename : DKA100:[ENV\_ALPHA.QA.W]w203.QAF;1  
 Parameter Name : NACTIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:29 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 83.7993 through 92.6203



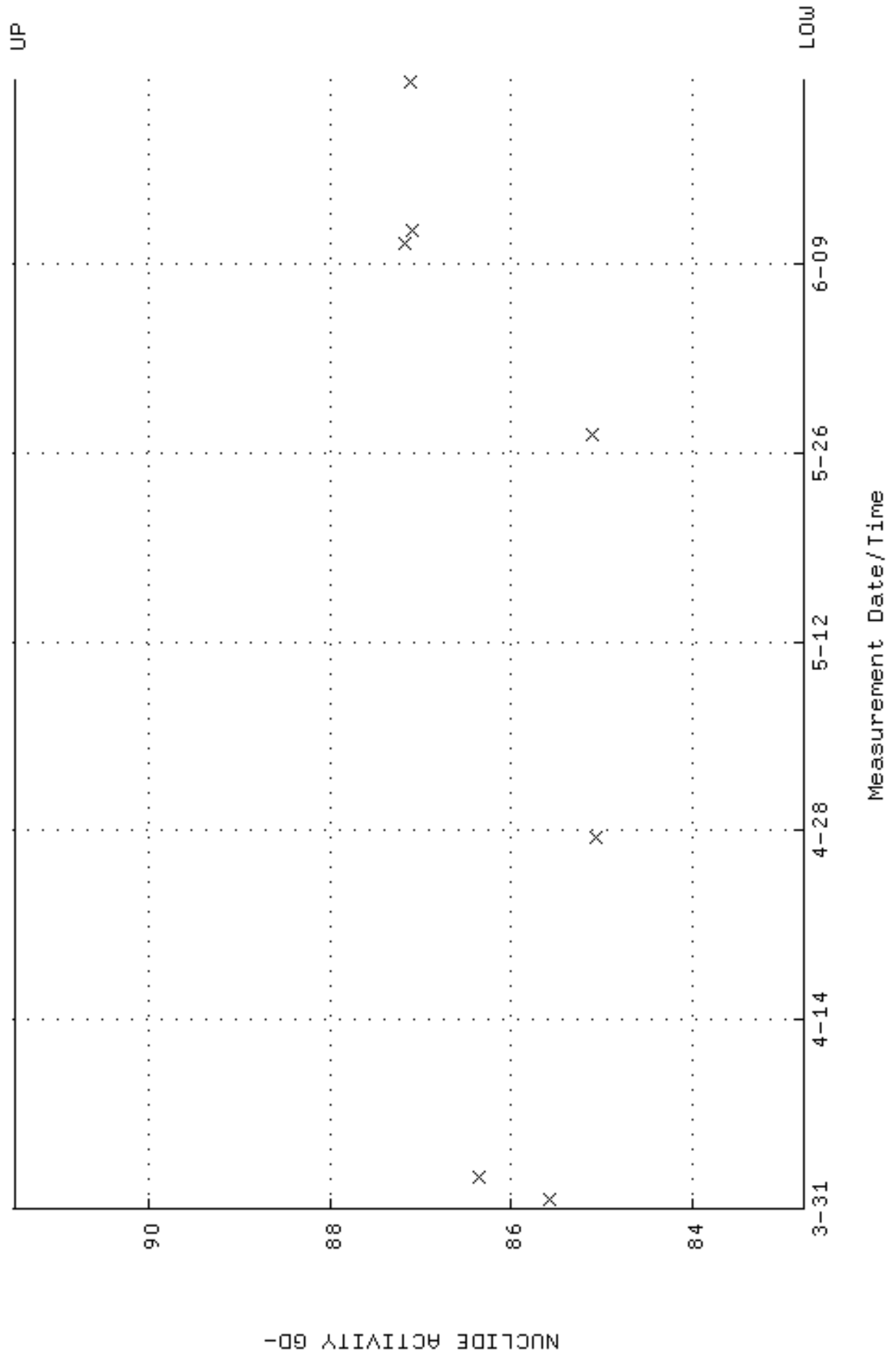
QA filename : DKA100:[ENV\_ALPHA.QA.B]B203.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:49 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



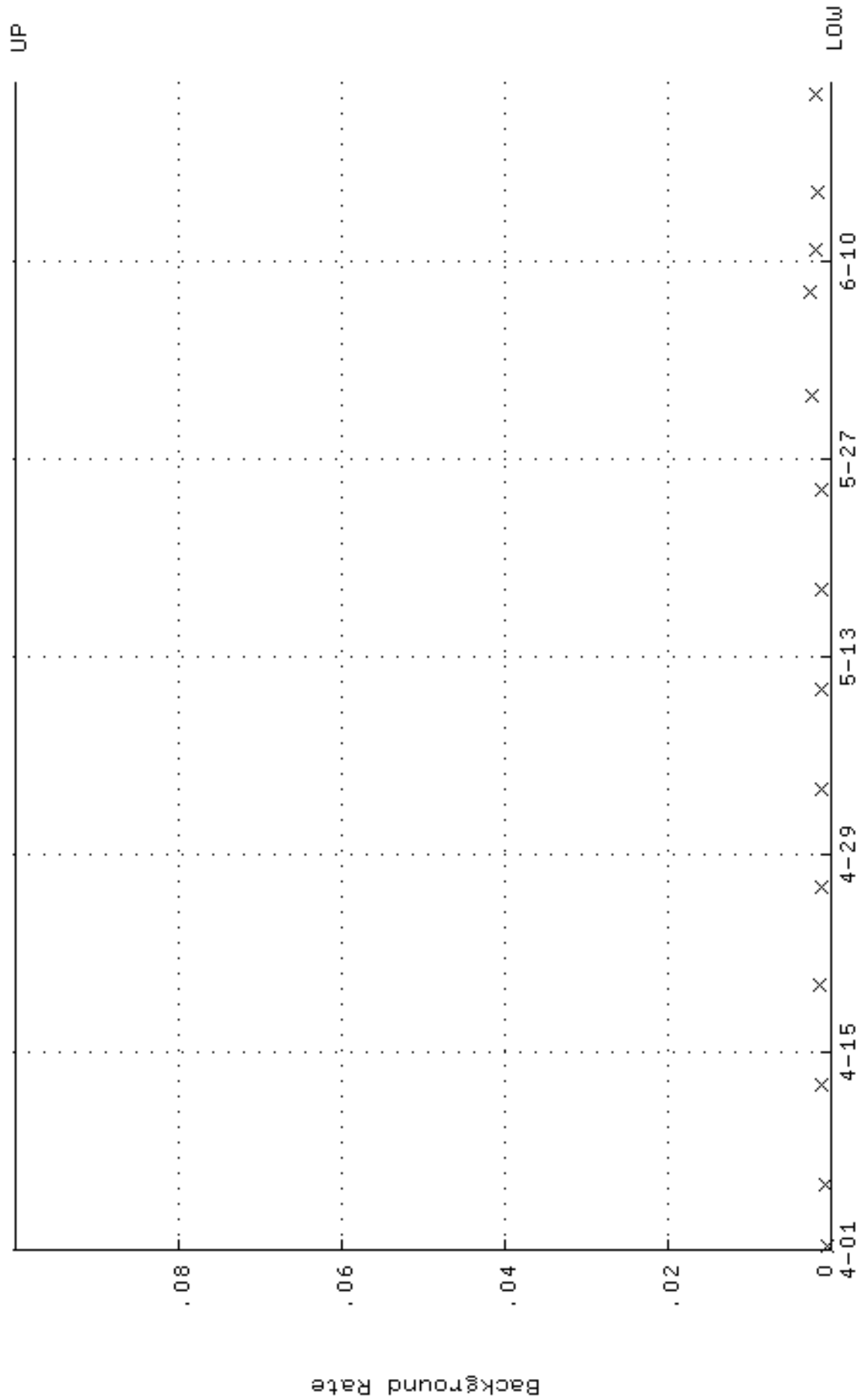
QA filename : DKA100:[ENV\_ALPHA.QA.W]W204.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:31 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.242368 through 0.262368



QA filename : DKA100:[ENV\_ALPHA.QA.W]w204.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:31 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 82.7661 through 91.4783

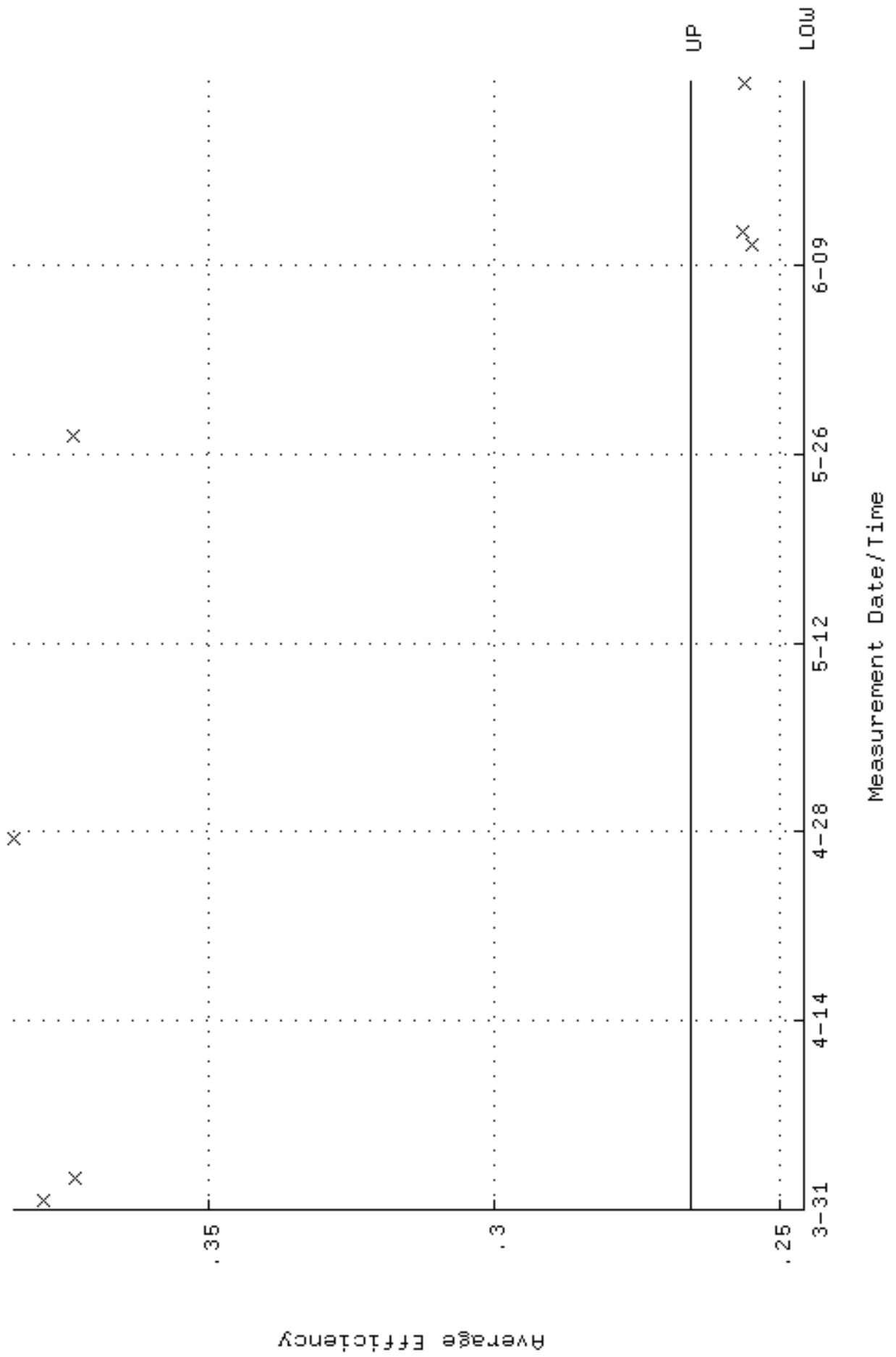


QA filename : DKA100:[ENV\_ALPHA.QA.B]B204.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:55 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

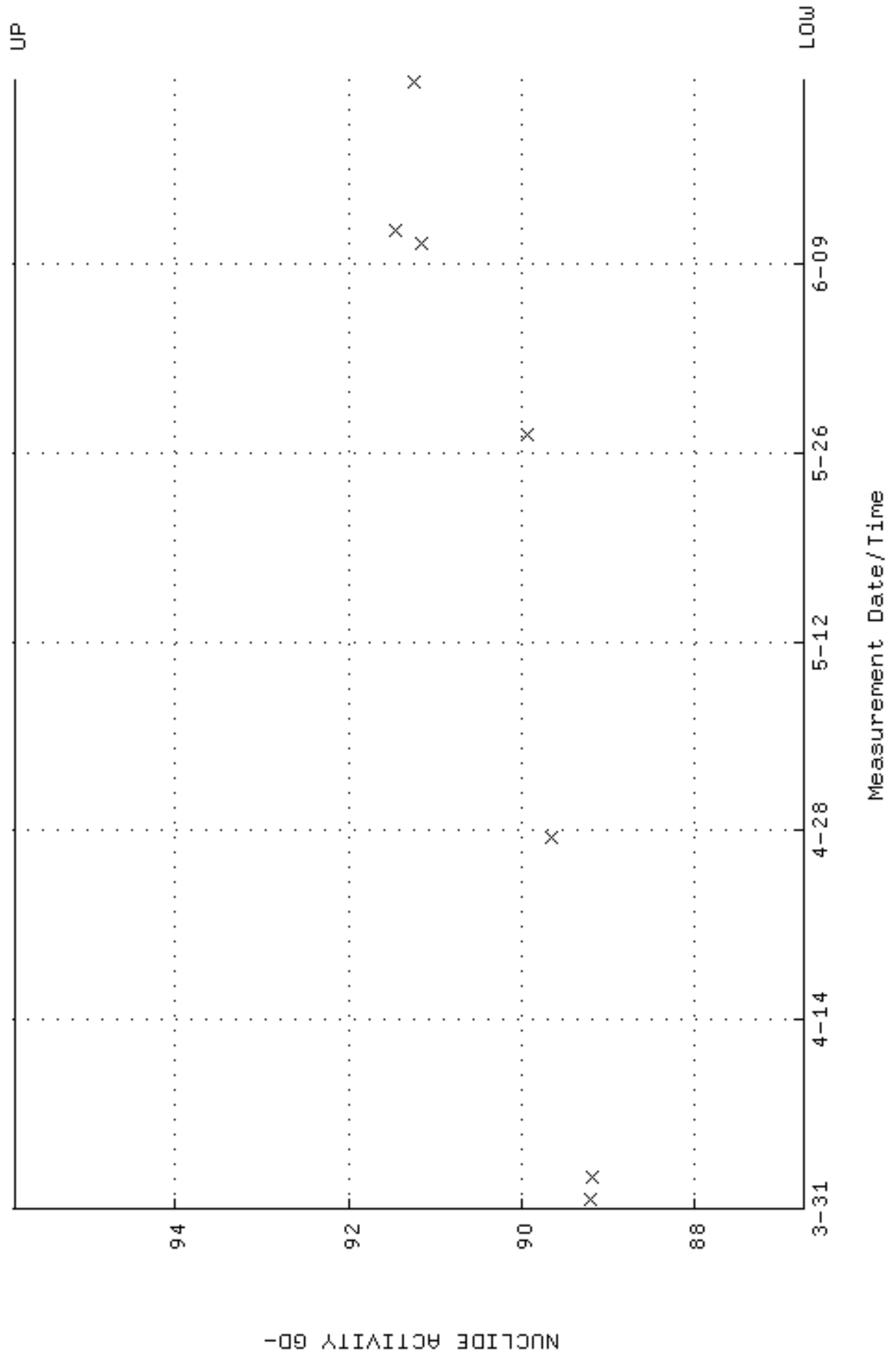




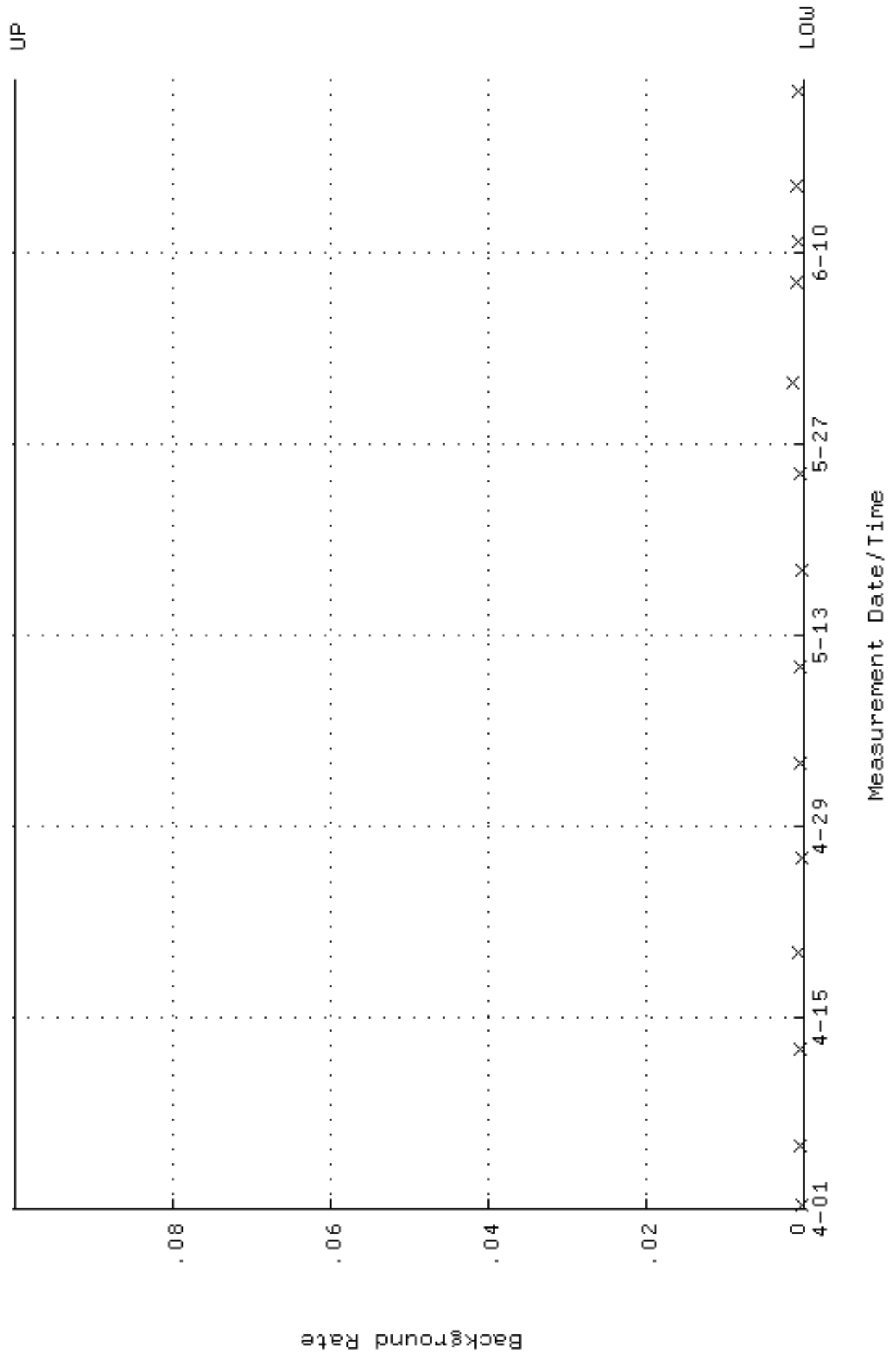
QA filename : DKA100:[ENV\_ALPHA.QA.W]W205.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:33 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.245702 through 0.265702



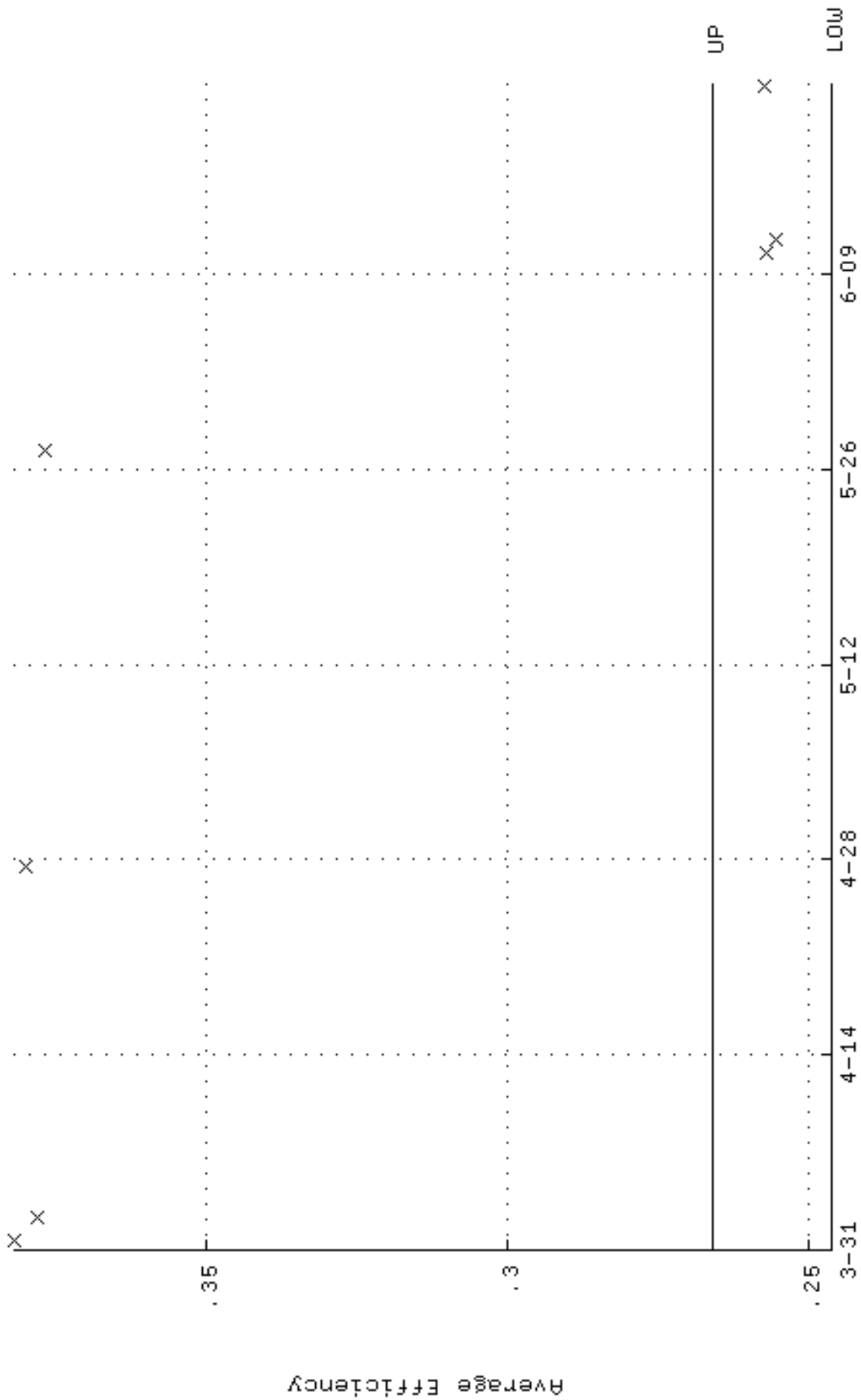
QA filename : DKA100:[ENV\_ALPHA.QA.W]W205.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:33 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 86.7285 through 95.8579



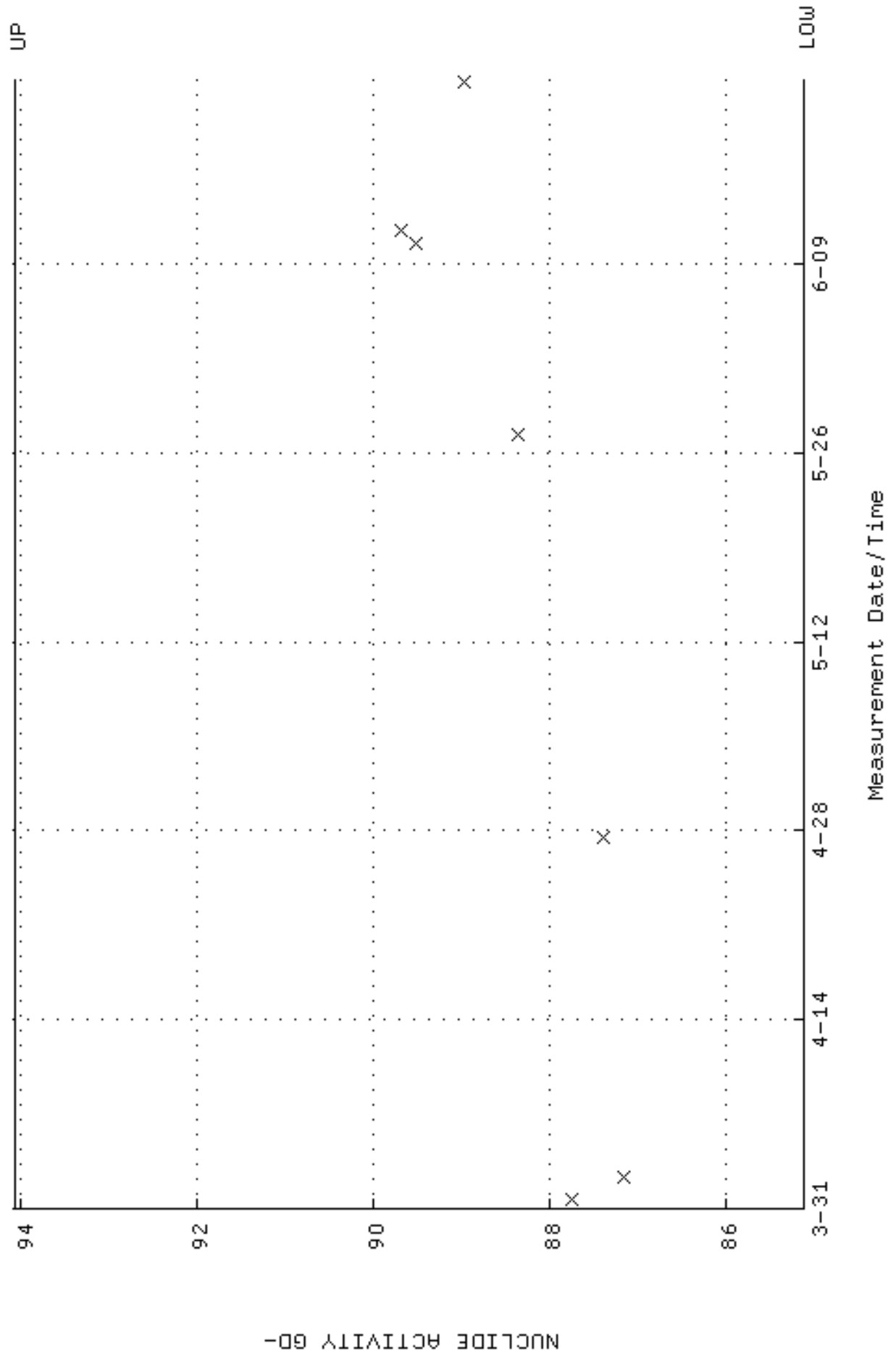
QA filename : DKA100:[ENV\_ALPHA.QA.B]B205.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:03:01 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



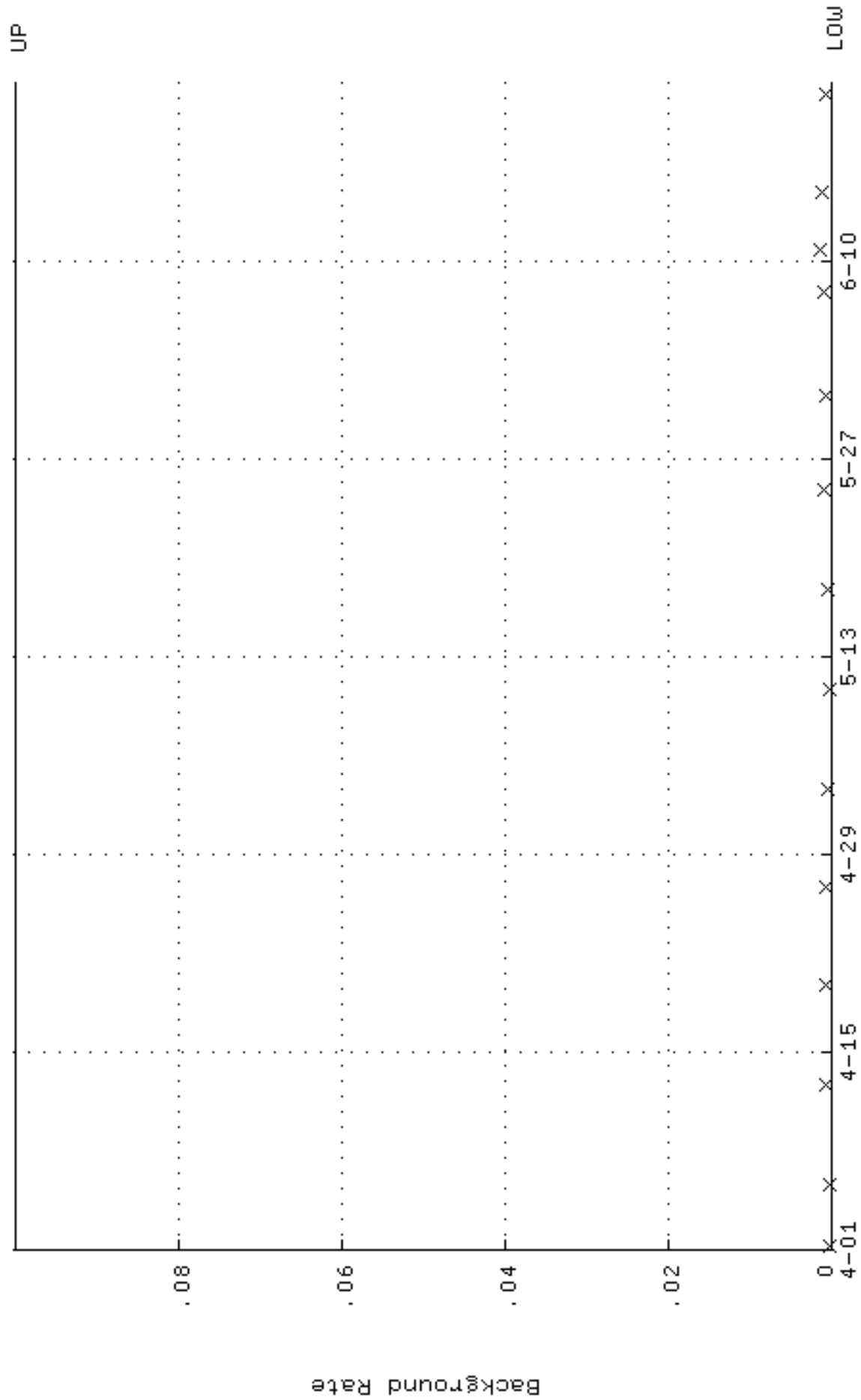
QA filename : DKA100:[ENV\_ALPHA.QA.W]W206.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:35 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.246228 through 0.266228



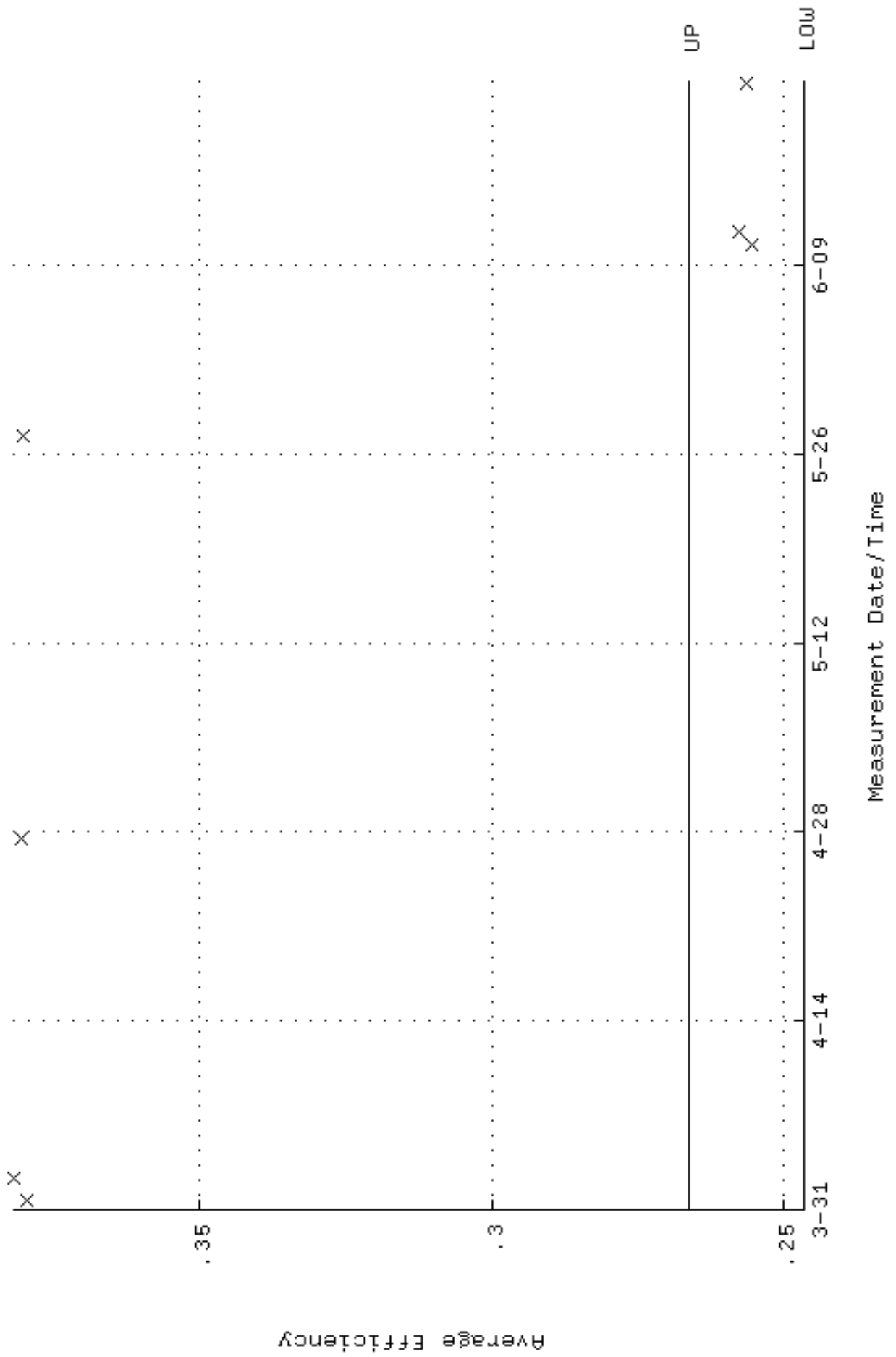
QA filename : DKA100:[ENV\_ALPHA.QA.W]w206.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:35 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 85.1104 through 94.0694



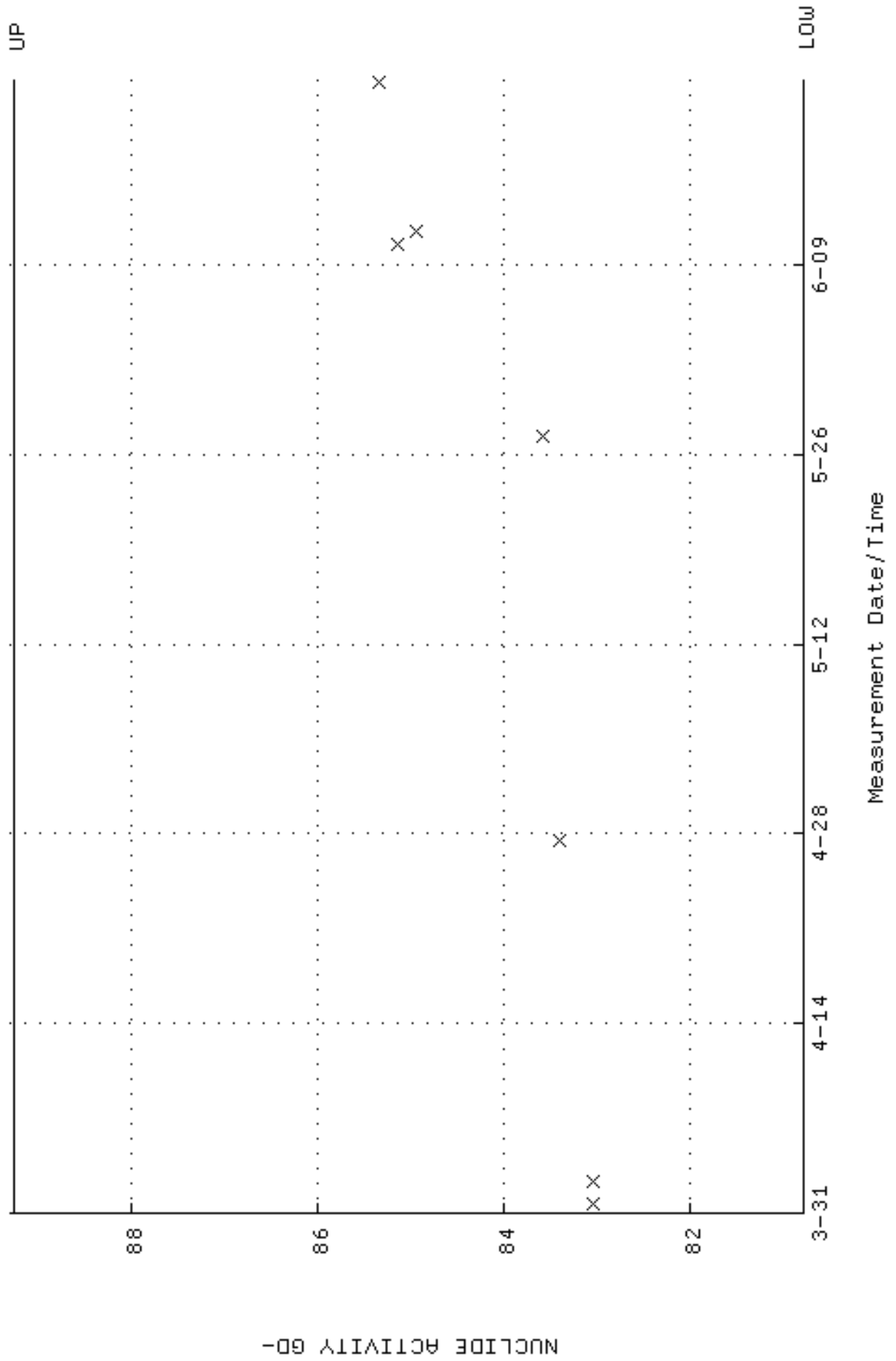
QA filename : DKA100:[ENV\_ALPHA.QA.B]B206.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:03:06 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W207.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:38 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.246432 through 0.266432

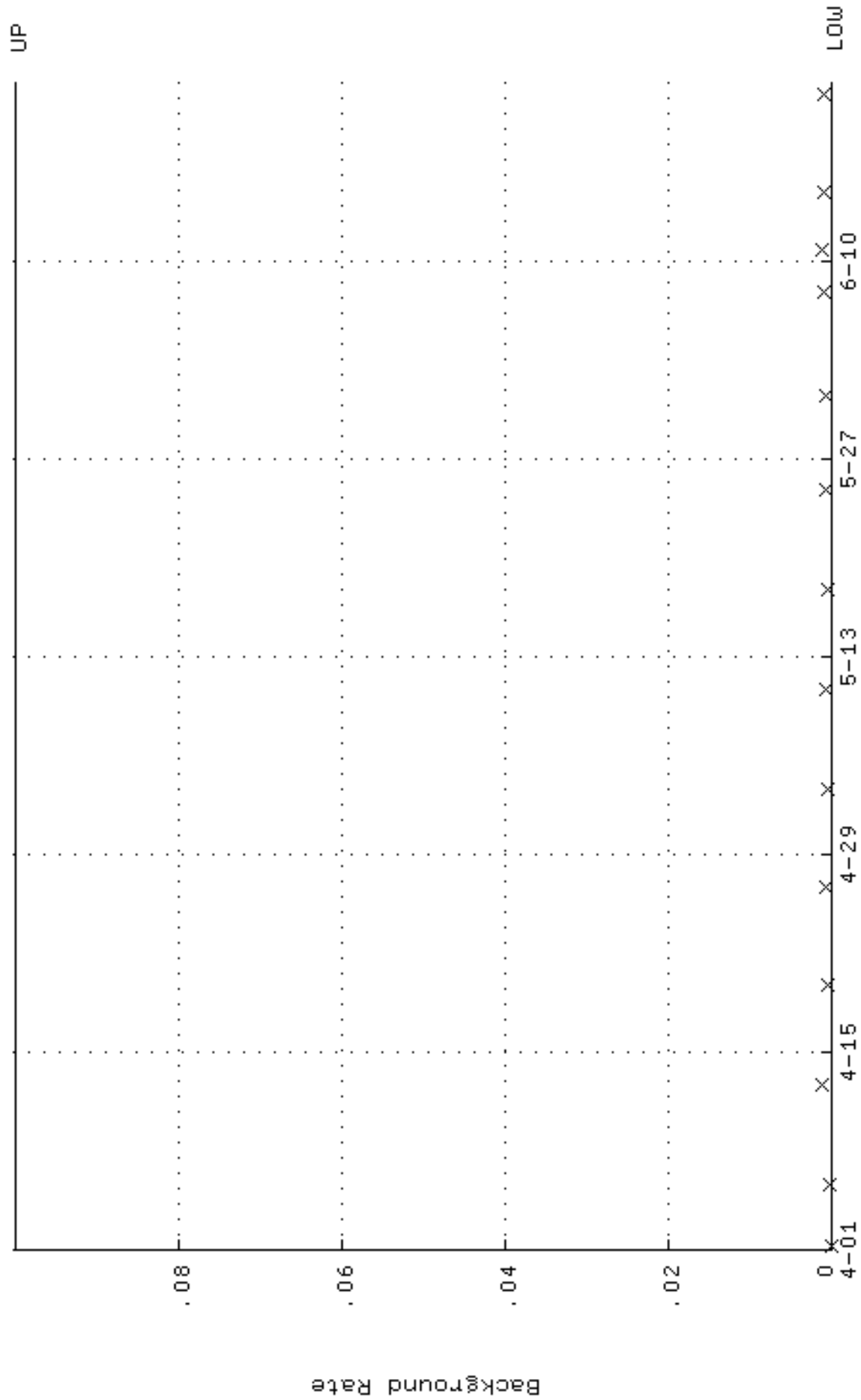


QA filename : DKA100:[ENV\_ALPHA.QA.W]w207.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:38 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 80.7759 through 89.2787

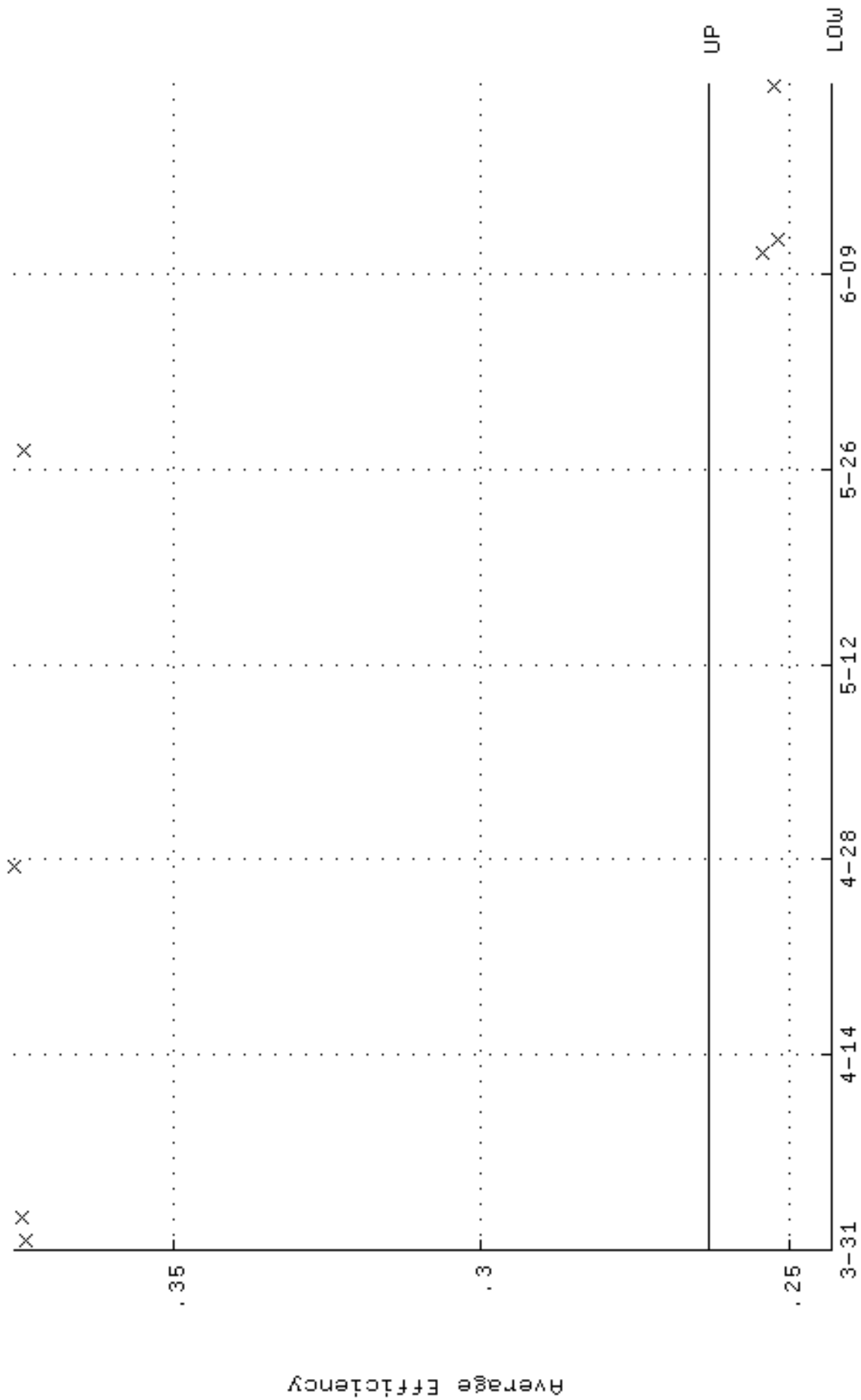




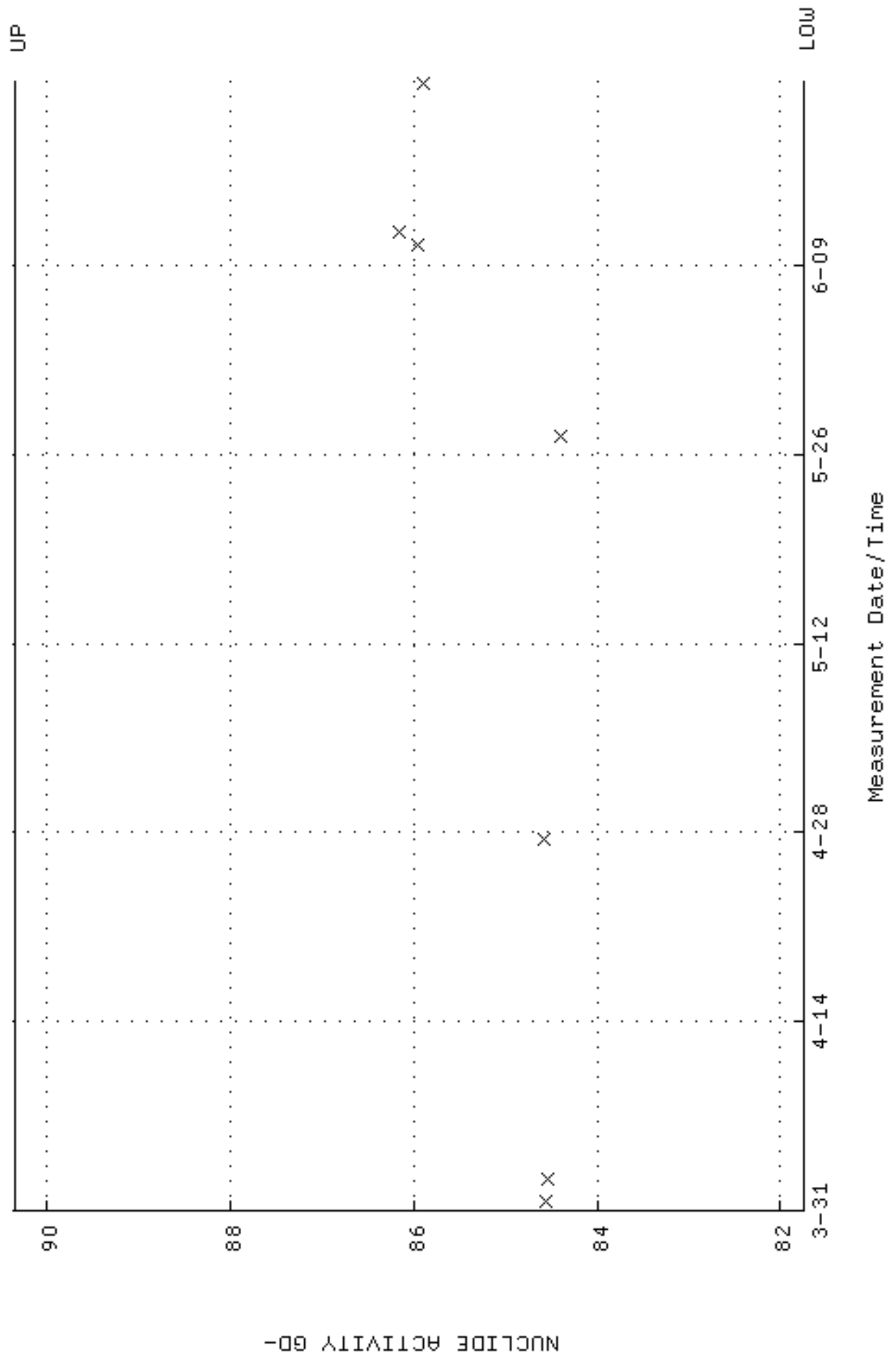
QA filename : DKA100:[ENV\_ALPHA.QA.B]B207.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:03:11 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



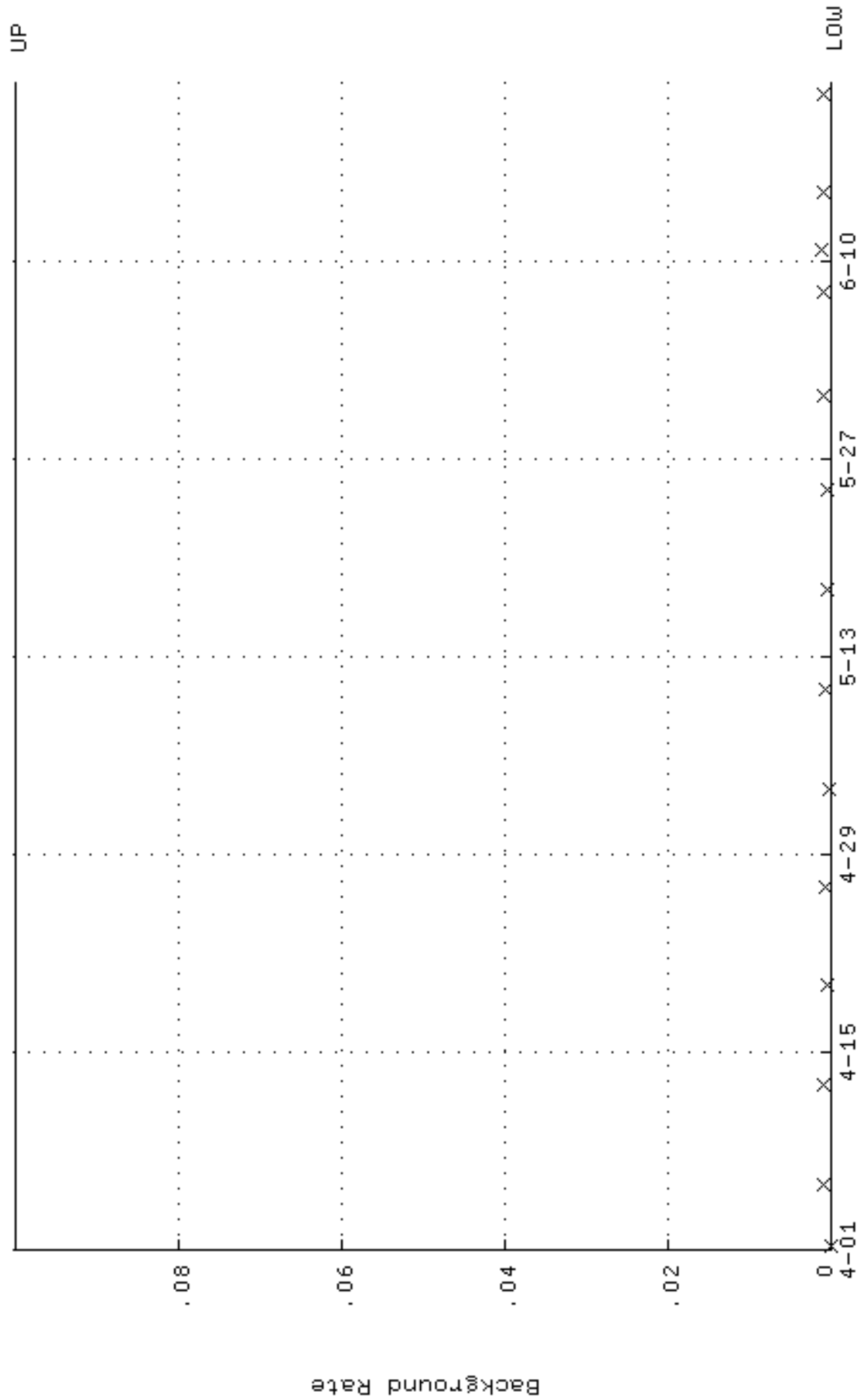
QA filename : DKA100:[ENV\_ALPHA.QA.W]W208.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:40 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.243128 through 0.263128



QA filename : DKA100:[ENV\_ALPHA.QA.W]w208.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:40 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 81.7467 through 90.3517



QA filename : DKA100:[ENV\_ALPHA.QA.B]B208.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:03:15 through 22-JUN-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



# RUNLOGS

# Instrument Run Log

Instrument Type: GFPC

Batch ID: 877893

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
231217013	SAMPLE	DXM2	PIC12B	08-JUL-09 14:24	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217012	SAMPLE	DXM2	PIC11D	08-JUL-09 14:24	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217017	SAMPLE	DXM2	PIC13C	08-JUL-09 14:24	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217018	SAMPLE	DXM2	PIC13D	08-JUL-09 14:24	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217019	SAMPLE	DXM2	PIC14C	08-JUL-09 14:24	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217016	SAMPLE	DXM2	PIC13B	08-JUL-09 14:24	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217002	SAMPLE	DXM2	PIC8A	08-JUL-09 14:39	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217004	SAMPLE	DXM2	PIC8C	08-JUL-09 14:39	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217008	SAMPLE	DXM2	PIC9C	08-JUL-09 14:40	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217007	SAMPLE	DXM2	PIC9B	08-JUL-09 14:40	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217009	SAMPLE	DXM2	PIC10A	08-JUL-09 14:40	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201863608	MS	DXM2	PIC8B	08-JUL-09 14:43	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217001	SAMPLE	DXM2	PIC7B	08-JUL-09 15:17	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201863607	DUP	DXM2	PIC1B	08-JUL-09 15:30	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201863606	MB	DXM2	PIC1A	08-JUL-09 15:30	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201863609	LCS	DXM2	PIC1D	08-JUL-09 15:30	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217003	SAMPLE	DXM2	PIC1A	13-JUL-09 16:52	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217005	SAMPLE	DXM2	PIC1B	13-JUL-09 16:52	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217006	SAMPLE	DXM2	PIC1C	13-JUL-09 16:53	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217010	SAMPLE	DXM2	PIC1D	13-JUL-09 16:53	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217011	SAMPLE	DXM2	PIC2A	13-JUL-09 16:53	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217014	SAMPLE	DXM2	PIC2B	13-JUL-09 16:53	DONE	CeF on 25mm Filter	02-JUL-09 00:00
231217015	SAMPLE	DXM2	PIC2C	13-JUL-09 16:53	DONE	CeF on 25mm Filter	02-JUL-09 00:00

# Instrument Run Log

Instrument Type: LUCAS CELL DETECTOR

Batch ID: 877942

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
231217002	SAMPLE	KSD1	LUCAS2	09-JUL-09 14:10	DONE	Lucas Cell	19-DEC-08 00:00
231217003	SAMPLE	KSD1	LUCAS3	09-JUL-09 14:10	DONE	Lucas Cell	04-FEB-09 00:00
231217004	SAMPLE	KSD1	LUCAS4	09-JUL-09 14:10	DONE	Lucas Cell	02-MAR-09 00:00
231217009	SAMPLE	KSD1	LUCAS3	09-JUL-09 15:15	DONE	Lucas Cell	04-FEB-09 00:00
231217012	SAMPLE	KSD1	LUCAS7	09-JUL-09 15:15	DONE	Lucas Cell	21-NOV-08 00:00
231217014	SAMPLE	KSD1	LUCAS2	09-JUL-09 16:20	DONE	Lucas Cell	19-DEC-08 00:00
231217017	SAMPLE	KSD1	LUCAS5	09-JUL-09 16:20	DONE	Lucas Cell	25-MAR-09 00:00
231217018	SAMPLE	KSD1	LUCAS7	09-JUL-09 16:20	DONE	Lucas Cell	21-NOV-08 00:00
231217019	SAMPLE	KSD1	LUCAS1	09-JUL-09 16:55	DONE	Lucas Cell	29-AUG-08 00:00
1201863717	MB	KSD1	LUCAS2	09-JUL-09 16:55	DONE	Lucas Cell	19-DEC-08 00:00
1201863718	DUP	KSD1	LUCAS3	09-JUL-09 16:55	DONE	Lucas Cell	04-FEB-09 00:00
1201863719	MS	KSD1	LUCAS4	09-JUL-09 16:55	DONE	Lucas Cell	02-MAR-09 00:00
1201863720	LCS	KSD1	LUCAS5	09-JUL-09 16:55	DONE	Lucas Cell	25-MAR-09 00:00
231217001	SAMPLE	KSD1	LUCAS1	09-JUL-09 19:15	DONE	Lucas Cell	29-AUG-08 00:00
231217007	SAMPLE	KSD1	LUCAS1	09-JUL-09 19:15	DONE	Lucas Cell	29-AUG-08 00:00
231217015	SAMPLE	KSD1	LUCAS3	09-JUL-09 19:15	DONE	Lucas Cell	04-FEB-09 00:00
231217016	SAMPLE	KSD1	LUCAS4	09-JUL-09 19:15	DONE	Lucas Cell	02-MAR-09 00:00
231217005	SAMPLE	KSD1	LUCAS5	09-JUL-09 19:15	DONE	Lucas Cell	25-MAR-09 00:00
231217006	SAMPLE	KSD1	LUCAS7	09-JUL-09 19:15	DONE	Lucas Cell	21-NOV-08 00:00
231217011	SAMPLE	KSD1	LUCAS5	09-JUL-09 19:45	DONE	Lucas Cell	25-MAR-09 00:00
231217013	SAMPLE	KSD1	LUCAS1	09-JUL-09 20:40	DONE	Lucas Cell	29-AUG-08 00:00
231217008	SAMPLE	KSD1	LUCAS2	09-JUL-09 22:10	DONE	Lucas Cell	19-DEC-08 00:00
231217010	SAMPLE	KSD1	LUCAS4	09-JUL-09 22:10	DONE	Lucas Cell	02-MAR-09 00:00

# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 881150

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
231217001	SAMPLE	KXM4	1137	08-JUL-09 17:17	DONE		
231217002	SAMPLE	KXM4	1138	08-JUL-09 17:17	DONE		
231217003	SAMPLE	KXM4	1139	08-JUL-09 17:17	DONE		
231217004	SAMPLE	KXM4	1140	08-JUL-09 17:17	DONE		
231217005	SAMPLE	KXM4	1141	08-JUL-09 17:17	DONE		
231217006	SAMPLE	KXM4	1142	08-JUL-09 17:17	DONE		
231217008	SAMPLE	KXM4	1145	08-JUL-09 17:18	DONE		
231217009	SAMPLE	KXM4	1146	08-JUL-09 17:18	DONE		
231217007	SAMPLE	KXM4	1144	08-JUL-09 17:24	DONE		
231217010	SAMPLE	KXM4	1115	10-JUL-09 21:20	DONE		
231217011	SAMPLE	KXM4	1116	10-JUL-09 21:20	DONE		
231217012	SAMPLE	KXM4	1117	10-JUL-09 21:20	DONE		
231217013	SAMPLE	KXM4	1118	10-JUL-09 21:20	DONE		
231217014	SAMPLE	KXM4	1121	10-JUL-09 21:20	DONE		
231217015	SAMPLE	KXM4	1122	10-JUL-09 21:20	DONE		
231217016	SAMPLE	KXM4	1123	10-JUL-09 21:20	DONE		
231217017	SAMPLE	KXM4	1124	10-JUL-09 21:20	DONE		
231217018	SAMPLE	KXM4	1125	10-JUL-09 21:20	DONE		
231217019	SAMPLE	KXM4	1126	10-JUL-09 21:20	DONE		
1201871202	MB	KXM4	1129	10-JUL-09 21:20	DONE		
1201871203	DUP	KXM4	1130	10-JUL-09 21:20	DONE		
1201871204	MS	KXM4	1131	10-JUL-09 21:20	DONE		
1201871205	LCS	KXM4	1132	10-JUL-09 21:20	DUSE		
1201871205	LCS	KXM4	1127	13-JUL-09 13:34	DONE		



# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 883985

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
231217001	SAMPLE	KXM4	1186	13-JUL-09 13:04	DONE		
231217002	SAMPLE	KXM4	1187	13-JUL-09 13:04	DONE		
231217003	SAMPLE	KXM4	1188	13-JUL-09 13:04	DONE		
231217004	SAMPLE	KXM4	1189	13-JUL-09 13:04	DONE		
231217005	SAMPLE	KXM4	1190	13-JUL-09 13:04	DONE		
231217006	SAMPLE	KXM4	1191	13-JUL-09 13:04	DONE		
231217007	SAMPLE	KXM4	1192	13-JUL-09 13:04	DONE		
231217008	SAMPLE	KXM4	1193	13-JUL-09 13:04	DONE		
231217009	SAMPLE	KXM4	1194	13-JUL-09 13:04	DONE		
231217010	SAMPLE	KXM4	1195	13-JUL-09 13:04	DONE		
231217011	SAMPLE	KXM4	1196	13-JUL-09 13:04	DONE		
231217012	SAMPLE	KXM4	1197	13-JUL-09 13:04	DONE		
231217013	SAMPLE	KXM4	1198	13-JUL-09 13:05	DONE		
231217014	SAMPLE	KXM4	1199	13-JUL-09 13:05	DONE		
231217015	SAMPLE	KXM4	1200	13-JUL-09 13:05	DONE		
231217016	SAMPLE	KXM4	1201	13-JUL-09 13:05	DONE		
231217017	SAMPLE	KXM4	1202	13-JUL-09 13:05	DONE		
231217018	SAMPLE	KXM4	1203	13-JUL-09 13:05	DONE		
231217019	SAMPLE	KXM4	1204	13-JUL-09 13:05	DONE		
1201877937	MB	KXM4	1205	13-JUL-09 13:05	DONE		
1201877938	DUP	KXM4	1206	13-JUL-09 13:05	DONE		
1201877939	MS	KXM4	1207	13-JUL-09 13:05	DONE		
1201877940	LCS	KXM4	1208	13-JUL-09 13:05	DONE		