



July 30, 2009

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

Re: Tronox Henderson  
Work Order: 232727

Dear Mr. Hagar:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 01, 2009, July 02, 2009 and July 03, 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,

for Edith Kent  
Project Manager

Chain of Custody: 2027.001.00176, 2027.001.00179, 2027.001.00183, 2027.001.00184 and 2027.001.00190  
Enclosures

**Tronox LLC**  
**Tronox Henderson**  
**SDG:232727**

## Table of Contents

<b>Case Narrative</b> .....	<b>1</b>
<b>Chain of Custody and Supporting Documentation</b> .....	<b>4</b>
<b>Laboratory Certifications</b> .....	<b>20</b>
<b>Radiological Analysis</b> .....	<b>22</b>
Sample Data Summary .....	44
Quality Control Data .....	67
Raw Data.....	73
Uranium.....	74
884765.....	75
886957.....	101
Radium 226.....	109
883675.....	110
883008.....	116
Radium 228.....	121
882963.....	122
885330.....	127
Thorium .....	137
888328.....	138
888783.....	146
Method Calibration Data .....	172
Gas Flow Proportional Counters .....	173
Lucas Cell Counters .....	257
<i>Lucas 1</i> .....	258
<i>Lucas 2</i> .....	281
<i>Lucas 3</i> .....	301
<i>Lucas 4</i> .....	321
<i>Lucas 5</i> .....	336
<i>Lucas 7</i> .....	357
Alpha Spectroscopy .....	373
Background and Efficiency Data .....	605
Runlogs .....	805

# **Case Narrative**

**CASE NARRATIVE**  
**for**  
**Tronox LLC**  
**Tronox Henderson**  
**SDG:232727**

**July 30, 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 July 01, 2009, July 02, 2009 and July 03, 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. The client advised the lab as to which equipment and field blanks were associated with specific soil IDs. Sample ID EB070109-SO1 was added to this SDG. Please refer to the attached e-mails for further details. The last sample of this SDG was received on July 3, 2009 at which time the SDG was closed. The client was notified through receipt of login review checklist and in the weekly status report.

**Items of Note**

For Alpha Spec Thorium, the following samples exceeded the Tronox QA program sample result uncertainty limit of 30% with an activity between 2 and 5 times the MDA with samples counting the maximum count time: 232727008 and 232727009. Sample 232727015 did not meet the Tronox QA program sample result for uncertainty limit of <30% with greater than 5 times the MDA for Th232 activity and between 2 and 5 times the MDA for Th228. For Alpha Spec Thorium, the following samples exceeded the Tronox QA program sample result uncertainty limit of 30% with an activity greater than 5 times the MDA with samples counting the maximum count time: 232727010. For Alpha Spec Thorium, the following samples do not meet the Tronox QA program tracer yield requirements of 70-120% due to the sample matrix: 232727001, 232727002, 232727003, 232727004, 232727008, 232727009, 232727010, 232727014, 232727015, 232727017, 232727018, 232727019, 232727020. For Alpha Spec Thorium 232727021 did not meet the Tronox QA program required detection due to aliquot size. For Ra-228, the following samples did not meet the Tronox QA program sample result uncertainty limit of 30%: 232727015. For Alpha Spec Uranium, the following samples exceeded the Tronox QA program sample result uncertainty limit of 30% with an activity between 2 and 5 times the MDA with samples counting the maximum count time: 232727001, 232727002, 232727004, 232727006, 232727007, 232727010, 232727014, 232727017, 232727018. For Alpha Spec Uranium, the following samples exceeded the Tronox QA program sample result uncertainty limit of 30% with an activity greater than 5 times the MDA with samples counting the maximum count time: 232727003, 232727016, 232727020. For Alpha spec Uranium, sample 232727021 did not meet the Tronox QA program required detection limit due to aliquot size. For Alpha spec Uranium, sample 232727008 and 232727009 did not meet the Tronox QA program tracer yield requirement due to the nature of the matrix. Please reference the attached e-mails for further details on all issues.

**Sample Identification**

The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
232727001	SA50-0.5B
232727002	SA54-0.5B
232727003	SA102-0.5B
232727004	SA109-0.5B
232727005	SA82-29B
232727006	RSAL3-10B
232727007	RSAL3-30B
232727008	SA114-0.5B
232727009	SA114009-0.5B
232727010	RSAN6-0.5B
232727011	SA134-20B
232727012	SA134-31B
232727013	SA134009-31B
232727014	SA88-10B
232727015	SA88-20B
232727016	SA88-32B
232727017	RSAK3-0.5B
232727018	RSAK3-10B
232727019	RSAK3-20B
232727020	RSAK3-31B
232727021	EB070109-SO1

### 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.

*DeAtter Shaffer*

for Edith Kent

Project Manager

**Chain of Custody  
and  
Supporting  
Documentation**







### SAMPLE RECEIPT & REVIEW FORM

Client: <u>Kerr/Norlake</u>		SDG/ARCOC/Work Order: <u>2327271-</u>	
Received By: <u>MK</u>		Date Received: <u>7-1-09</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>CP-30</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"/>		ice bags    blue ice    Preservation Method: <u>dry ice</u> <u>none</u> other (describe) <i>ddc</i>
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 7967 3976 8890*

PM (or PMA) review: Initials

*NS*

Date

*7/1/09*

2327271



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. 2027.001.00179  
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 95	City/State:	Henderson, NV 89009	Phone #:	(949)260-9293	GC level Required:	Standard	Special EPA Stage 4	Mark one	
Address:	2040 Savage Road	Project #:	2027-001	Address:	PO Box 95	City/State:	Henderson, NV 89009	Reimbursement project?	X	Non-reimbursement project?		NJ Reduced Deliverable Package?		MA MCP Cert?	CT RCP Cert?	Mark One
Lab PVI:	Edith M. Kent	Site Address:	560 W. Lake Mead Drive	City/State:	Henderson, NV 89009	Phone #:	(949)260-9293	Send EDD to:	Frank Hagar Northgate Environmental Management, Inc frank.hagar@ngem.com	CC Hardcopy report to:	PDF Electronic Version Only	Lab Project ID (lab use)				
Phone/Fax:	(843)556-8171	City:	Henderson	State:	NV	Site PM Name:	Derrick Willis	CC Hardcopy report to:	derrick.willis@ngem.com	See additional comments below						
Lab PM email:	emk@gel.com	Phone/Fax:	949-375-7004	Site PM Email:	derrick.willis@ngem.com											
Applicable Lab Quote #:																
ITEM #	SAMPLE ID	Matrix Codes	Matrix	Sample Type	Sample Date	Sample Time	# of Containers	Field Filtered? (Y/N)	Preservatives	Requested	Comments/Lab Sample I.D.					
1	SA82-0.5B	W, WS	DRINKING WATER	G	7/11/2009	7:00	1	N	Unpreserved	X	250 ml Plastic jar					
2	SA82-0.5BMS	W, WS	DRINKING WATER	G	7/11/2009	7:00	1	N	Unpreserved	X	250 ml Plastic jar					
3	SA82-0.5BMSD	W, WS	DRINKING WATER	G	7/11/2009	7:00	1	N	Unpreserved	X	250 ml Plastic jar					
4	SA82-10B	W, WS	DRINKING WATER	G	7/11/2009	7:56	1	N	Unpreserved	X	250 ml Plastic jar					
5	SA82-29B	W, WS	DRINKING WATER	G	7/11/2009	9:36	1	N	Unpreserved	X	250 ml Plastic jar					
6	RSAL3-10B	W, WS	DRINKING WATER	G	7/11/2009	11:03	1	N	Unpreserved	X	250 ml Plastic jar					
7	RSAL3-30B	W, WS	DRINKING WATER	G	7/11/2009	12:02	1	N	Unpreserved	X	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

RELINQUISHED BY / AFFILIATION  
 DATE: 7-10-2009 TIME: 7:00 AM  
 ACCEPTED BY / AFFILIATION  
 DATE: 7-11-2009 TIME: 14:50  
 SIGNATURE OF SAMPLER: [Signature]  
 DATE SIGNED: 7-10-2009 TIME: 14:50  
 SIGNATURE OF SAMPLER: [Signature]

SHIPPING METHOD: (mark as appropriate)  
 UPS COURIER FEDEX  
 SIGNATURE OF SAMPLER: [Signature]  
 DATE SIGNED: 7-10-2009 TIME: 14:50  
 SIGNATURE OF SAMPLER: [Signature]

Temp in OC  
 Samples On Ice?  
 Sample Intact?  
 Trip Blank?



# SAMPLE RECEIPT & REVIEW FORM

Client: <u>Kerr/Northgate</u>		SDG/ARCOC/Work Order: <u>732727</u>	
Received By: <u>MK</u>		Date Received: <u>7-2-09</u>	
<b>Suspected Hazard Information</b>	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>Gen 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"/>		ice bags    blue ice    Preservation Method: dry ice <u>none</u> other (describe) <u>23°</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 7967 4394 9805

2327271



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. 2027.001.00183  
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 Trenox LLC	If Rush, Date due						
Address:	2040 Savage Road Charleston, SC 29407	Project #:	2027.001	Address:	PO Box 55	QC level Required: Standard		Special EPA Stage 4		Mark one		
Lab P/N:	Edith M. Kent	City:	Henderson	City/State:	Henderson, NV 89009	Reimbursement project?		Non-reimbursement project?		Mark one		
Phone/Fax:	(843)556-8171	State:	NV	Send EDD to:	Frank Hagar, Northgate Environmental Management, Inc frank.hagar@ngem.com	Reimbursement project?		Non-reimbursement project?		Mark one		
Lab PM email:	emk@gel.com	Site PM Name:	Derrick Willis	CC Hardcopy report to:	PDF Electronic Version Only	Reimbursement project?		Non-reimbursement project?		Mark one		
Applicable Lab Quote #:		Phone/Fax:	949-375-7004	CC Hardcopy report to:	see additional comments below	Reimbursement project?		Non-reimbursement project?		Mark one		
		Site PM Email:	derrick.willis@ngem.com			Reimbursement project?		Non-reimbursement project?		Mark one		
ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / -)	MATRIX	ONE CHARACTER PER BOX	SAMPLE TYPE	MATRIX CODE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	FIELD FILTERED? (Y/N)	Preservatives	Requested Analyses	Comments/Lab Sample I.D.
1	SA114-0.5B	WATER	WATER	G-GRAB C-COMP	SO	7/1/2009	8:50	1	N	Unpreserved	EP193, Radium-226 EP194, Radium-228 Radonucleides	250 ml Plastic Jar
2	SA114009-0.5B	WATER	WATER	G-GRAB C-COMP	SO	7/1/2009	8:50	1	N	Unpreserved	EP193, Radium-226 EP194, Radium-228 Radonucleides	250 ml Plastic Jar
3	RSAN6-0.5B	WATER	WATER	G-GRAB C-COMP	SO	7/1/2009	8:20	1	N	Unpreserved	EP193, Radium-226 EP194, Radium-228 Radonucleides	250 ml Plastic Jar
4												
5												
6												
7												
8												
9												
10												
11												
12												

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE RECEIPT CONDITIONS
<i>Phil Birkholtz</i>	7-1	1500	<i>Phil Birkholtz</i>	7-1-09	0850	Y/N Y/N Y/N Y/N Y/N Y/N

SHIPPING METHOD (mark as appropriate)	SIGNATURE OF SAMPLER		DATE SIGNED	
UPS COURIER FEDEX	<i>Phil Birkholtz</i>		7/1/2009	
US MAIL	SIGNATURE OF SAMPLER		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: KERR/NORTHGATE SDG/ARCO/Work Order: 232727

Received By: MK Date Received: 7-2-09

<b>Suspected Hazard Information</b>	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>CPM 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"/>		ice bags    blue ice    dry ice <u>none</u> other (describe) <u>23°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 7977 3088 5575

PM (or PMA) review: Initials DS Date 7/2/09

20090731563

232727%



1100 Quail Street, Suite 102, Newport Beach, CA 92660  
(949) 260-9283

# CHAIN-OF-CUSTODY / Analytical Request Document

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

COC No. 2027.001.00190  
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		IF Rush, Date due																	
Address: 2040 Savage Road		Project #: 2027.001		Address: PO Box 55																			
Charleston, SC 29407		Site Address: 560 W. Lake Mead Drive		City/State: Henderson, NV 89009		Phone #: (949)260-9283		QC level Required: Standard		Special EPA Stage 4 Mark One													
Lab PVI: Edith M. Kent		City: Henderson		State: NV		Reimbursement project? <input checked="" type="checkbox"/>		Non-reimbursement project? <input type="checkbox"/>		Mark one													
Phone/Fax: (843)566-8171		Site PM Name: Derrick Willis		Send EDD to: frank.hagar@ngem.com		Send EDD to: frank.hagar@ngem.com		MA MCP Cert? <input type="checkbox"/>		CT RCP Cert? <input type="checkbox"/>													
Lab PM email: emk@gel.com		Phone/Fax: 949-375-7004		CC Hardcopy report to: PDF Electronic Version Only		CC Hardcopy report to: see additional comments below		Lab Project ID (lab use)		Mark One													
Applicable Lab Quote #:		Site PM Email: derrick.willis@ngem.com																					
#	ITEM	Valid Matrix Codes		Matrix		Sample Date		Sample Time		# of Containers		Field Filtered? (Y/N)		Preservatives		Requested		Analyses		Comments/Lab Sample I.D.			
		W	SW	GW	SW	W	SW	DATE	TIME	CONTAINERS	FIELD FILTERED?	UNPRESERVED	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	EPA903	EPA904	Radionuclides	
1	SA134-10B					7/2/2009	6:29	1	N	X								X	X	X	X	250 ml Plastic jar	
2	SA134-20B					7/2/2009	7:00	1	N	X									X	X	X	X	250 ml Plastic jar
3	SA134-31B					7/2/2009	7:30	1	N	X									X	X	X	X	250 ml Plastic jar
4	SA134009-31B					7/2/2009	7:30	1	N	X									X	X	X	X	250 ml Plastic jar
5	SA88-10B					7/2/2009	8:25	1	N	X									X	X	X	X	250 ml Plastic jar
6	SA88-20B					7/2/2009	8:52	1	N	X									X	X	X	X	250 ml Plastic jar
7	SA88-32B					7/2/2009	9:38	1	N	X									X	X	X	X	250 ml Plastic jar
8	RSAK3-0.5B					7/2/2009	10:56	1	N	X									X	X	X	X	250 ml Plastic jar
9	RSAK3-10B					7/2/2009	11:20	1	N	X									X	X	X	X	250 ml Plastic jar
10	RSAK3-20B					7/2/2009	11:54	1	N	X									X	X	X	X	250 ml Plastic jar
11	RSAK3-31B					7/2/2009	12:20	1	N	X									X	X	X	X	250 ml Plastic jar
12	RSAK3-31BMS					7/2/2009	12:20	1	N	X									X	X	X	X	250 ml Plastic jar
13	RSAK3-31BMSD					7/2/2009	12:20	1	N	X									X	X	X	X	250 ml Plastic jar

**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

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE RECEIPT CONDITIONS
<i>[Signature]</i>	7-2-09	1300	<i>[Signature]</i>	7-2-09	1350	Y/N
<i>[Signature]</i>	7-2-09	1300	<i>[Signature]</i>	7-3-09	845	22

SHIPPING METHOD: (mark as appropriate)	SAMPLER NAME AND SIGNATURE
UPS COURIER FEDEX	<i>[Signature]</i>
US MAIL	PRINT Name of SAMPLER: Doug Davis
	SIGNATURE of SAMPLER: <i>[Signature]</i>
	DATE Signed: 7-1-09
	Time: 1350

\* \* \* \* \*



# SAMPLE RECEIPT & REVIEW FORM

Client: <u>Tronox</u>		SDG/ARCOC/Work Order: <u>2327271</u>	
Received By: <u>C. Duffy</u>		Date Received: <u>7-3-09</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"/>		ice bags    blue ice    dry ice <u>none</u> other (describe) <u>22°</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?				

Comments: 7977 3473 7624

PM (or PMA) review: Initials EM Date 7/3/09

EMT  
7/17/09  
232727%

25690751563

COC No. 2027.001.00184  
Page: 1 of 1  
Cooler # 1 of 1

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

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

**northgate**  
environmental management, inc.  
1100 Quail Street, Suite 102, Newport Beach, CA 92660  
(949) 260-9293

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		<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>										
Address: 2040 Savage Road		Project #: 2027.001		Address: PO Box 55																
Chardleston, SC 29407		Site Address: 560 W. Lake Mead Drive		City/State: Henderson, NV		Phone #: (949)260-9293		QC level Required: Standard		EPA Stage Mark one 4										
Lab PM: Edith M. Kent		City: Henderson State: NV		Reimbursement project? <input checked="" type="checkbox"/>		Non-reimbursement project? <input type="checkbox"/>		NJ Reduced Deliverable Package?												
Phone/Fax: (843)556-8171		Site PM Name: Derrick Willis		Send EDD to: frank.hagar@ngem.com		Frank Hagar Northgate Environmental Management, Inc		MA MCP Cert? <input type="checkbox"/>		CT RCP Cert? <input type="checkbox"/>										
Lab PM email: emk@gel.com		Phone/Fax: 949-375-7004		CC Hardcopy report to: PDF Electronic Version Only				Lab Project ID (lab use)												
Applicable Lab Quote #:		Site PM Email: derrick.willis@ngem.com		CC Hardcopy report to: see additional comments below																
#	ITEM	SAMPLE ID	Character per box. (A-Z, 0-9 / -)	Samples IDs MUST BE UNIQUE	Valid Matrix Codes			FIELD FILTERED? (Y/N)	# OF CONTAINERS	SAMPLE TIME	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE RECEIPT CONDITIONS	Temp in 00	Samples on Ice?	Sample Intact?	Trip Blank?
					MATRIX	W	WS													
1		EB070109-SO1	One		W				11:25	7/1/2009	7-1	1500	Phil Brinkhoff	7-1-09	0840	20	Y/N	Y/N	Y/N	
2		EB070109-SO1	One		W				11:25	7/1/2009	7-1	1500	Phil Brinkhoff	7-1-09	0840	20	Y/N	Y/N	Y/N	
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				

**Additional Comments/Special Instructions:**  
FULL DIGESTION SPECIFICATION  
EMSL HASL 300\* - DOE EMSL HASL 300 modified (alpha spectroscopy) Thorium (isotopic) and Uranium (isotopic)

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

SHIPPING METHOD: (mark as appropriate)  
UPS COURIER FEDEX  
US MAIL

SAMPLER NAME AND SIGNATURE  
Phil Brinkhoff  
SIGNATURE OF SAMPLER:  
DATE SIGNED: 7/1/2009  
Time: 1500





SAMPLE RECEIPT & REVIEW FORM

Client: KERR/northgate SDG/ARCO/Work Order: 232135

Received By: mf Date Received: 7-2-09

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>9hr 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: ice bags    blue ice    dry ice <u>none</u> other (describe) <u>doc</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 7967 4385 4926

PM (or PMA) review: Initials DS Date 7/2

**Subject:** RE: Equipment Blanks and Field Blanks  
**From:** <frank.hagar@ngem.com>  
**Date:** Thu, 16 Jul 2009 09:22:37 -0700  
**To:** "Edie Kent" <emk@gel.com>  
**CC:** "Cindy Arnold" <Cindy.Arnold@ngem.com>

FB060409 is a GW Field blank

EB062609-SO, COC# 2027.001.00150	SA172-0.5B	232135014	232395016
EB070109-SO1, COC# 2027.001.00184	SA114-0.5B	232135020	232727008
EB070809-SO, COC# 2027.001.00216	RSAN3009-20B	232764006	233107004 relogged
EB071009-SO, COC# 2027.001.00232	RSAM2-35B	232764012	233107017 relogged
EB071509-SO, COC# 2027.001.00281	SA74-29B		

-----Original Message-----

From: Edie Kent [mailto:emk@gel.com]  
Sent: Thursday, July 16, 2009 8:47 AM  
To: Frank Hagar  
Cc: Cindy Arnold  
Subject: Equipment Blanks and Field Blanks

Frank:  
Can you tell me whether field blank FB060409 (COC# 2027.001.00042) is a soil or a groundwater field blank? The sample was on a single chain with no other samples listed on that chain. Also, can you tell me what samples the field blank is associated with?

The following soil equipment blank samples were on single chains with no other samples listed on the chain. Can you tell me which samples these equipment blanks are associated with?

EB062609-SO, COC# 2027.001.00150  
EB070109-SO1, COC# 2027.001.00184  
EB070809-SO, COC# 2027.001.00216  
EB071009-SO, COC# 2027.001.00232  
EB071509-SO, COC# 2027.001.00281

For reporting purposes, since we need to make sure that the soil equipment blanks and field blanks are reported in the same SDGs as the samples they are associated with, would it be possible for future samples to put the soil equipment and field blanks on the same chain as the soil samples they are associated with?

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)

CONFIDENTIALITY NOTICE: This e-mail and any files transmitted with it are the property of The GEL Group, Inc. and its affiliates. All rights, including without limitation copyright, are reserved. The proprietary information contained in this e-mail message, and any files transmitted with it, is intended for the use of the recipient(s) named above. If the reader of this e-mail is not the intended recipient, you are hereby notified that you have received this e-mail in error and that any review, distribution or copying of this e-mail or any files transmitted with it is strictly prohibited. If you have received this e-mail in error, please notify the sender immediately and delete the original message and any files transmitted. The unauthorized use of this e-mail or any files transmitted with it is prohibited and disclaimed by The GEL Group, Inc. and its affiliates.

**Subject:** GEL SDG 232727 Closed

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

**Date:** Fri, 03 Jul 2009 10:03:22 -0400

**To:** Cindy Arnold <Cindy.Arnold@ngem.com>

**CC:** Frank Hagar <Frank.Hagar@ngem.com>, Team Kent <Team.Kent@gel.com>

Cindy:

Soil SDG 232727 was closed with Friday's receipts. Attached is a list of the samples in the SDG. As soon as we have completed login review for Friday's logins, you will receive the full receipt package for this SDG (copies of the chains and login review report).

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)

<b>232727.xls</b>	<b>Content-Type:</b> application/vnd.ms-excel <b>Content-Encoding:</b> base64
-------------------	--

**Subject:** SDG 232727 Alpha Spec U issues

**From:** Heather Shaffer <Heather.Shaffer@gel.com>

**Date:** Tue, 28 Jul 2009 09:52:14 -0400

**To:** Cindy Arnold <Cindy.Arnold@ngem.com>, Edie Kent <emk@gel.com>

The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with results between 2 and 5 times the MDA for U-235: SA50-0.5B (232727001), SA54-0.5B (232727002), SA109-0.5B (232727004), RSAL3-10B (232727006), RSAL3-30B (232727007), RSAN6-0.5B(232727010), SA88-10B (232727014), RSAK3-0.5B (232727017), RSAK3-10B (232727018).

The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with results greater than 5 times the MDA for U-235: SA102-0.5B, (232727003), SA88-32B (232727016) and RSAK3-31B (232727020).

Samples SA114-0.5B (232727008) and SA114009-0.5B (232727009) do not meet the client's tracer yield requirement due to the nature of the matrix. The values achieved, 43.7% and 37.6%, do meet GEL standard tracer yield requirements and the method blank and LCS both meet the client's tracer yield requirement with values of 91.5% and 87.1%.

Sample EB070109-SO1 (232727021) did not meet the required detection limit for U233/234, U235 or U238 due to the reduced aliquot size. The lab has noted that an increased aliquot size might be helpful in improving the counting uncertainty. However, to do so would result in U-234 tailing into the U-235 region of interest and possibly lower the tracer recoveries. For these samples, the lab did originally prep with a larger aliquot which did result in lower tracer yields and so the aliquots had to be reduced by half in order to produce acceptable tracer yields. GEL has counted each sample being reported for the maximum possible count time.

This will be noted in the case narrative.

--  
Heather Shaffer  
Project Manager Assistant  
GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC (USA) 29407  
Main: 843.556.8171 x 4505  
Fax: 843.766.1178  
E-mail: [heather.shaffer@gel.com](mailto:heather.shaffer@gel.com)  
Web: [www.gel.com](http://www.gel.com)

**Subject:** SDG 232727 QC issues- Alpha Spec Th and Ra-228  
**From:** Heather Shaffer <Heather.Shaffer@gel.com>  
**Date:** Thu, 30 Jul 2009 16:07:30 -0400  
**To:** Cindy Arnold <Cindy.Arnold@ngem.com>  
**CC:** Edie Kent <emk@gel.com>, Heather Shaffer <hea01394@gel.com>

The following are the QC issues regarding this SDG for Alpha Spec Th and Alpha Spec U:

**Ra 228 Issues:**

The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% for Ra-228 and was counted for the maximum time: SA88-20B (232727015).

**Thorium Issues:**

The following sample did not meet the Tronox QA program required detection limits for Th228 analysis due to reduced aliquot size: EB070109-SO1(232727021).

The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with results between 2 and 5 times the MDA for Th228, Th230, and Th232: SA114-0.5B(232727008) and SA114009-0.5B(232737009).

The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with greater than 5 times the MDA for Th230: RSAN6-0.5B(232727010).

The following sample does not meet the Tronox QA program sample result uncertainty limit of <30% with greater than 5 times the MDA for Th232 and activity between 2 and 5 times the MDA for Th228: SA88-20B(232727015)

The following samples do not meet the Tronox QA program tracer yield requirements of 70-120% due to matrix issues:

SA50-0.5B(232727001), SA54-0.5B (232727002), SA102-0.5B (232727003), SA109-05.B (232727004), SA114-0.5B(232727008), SA114009-0.5B (232727009), RSAN6-0.5B (232727010), SA88-10B (232727014), SA88-20B(232727015), RSAK3-0.5B(232727017), RSAK3-10B(232727018), RSAK3-20B(232727019), RSAK3-31B(232727020).

GEL has counted each sample being reported for the maximum possible count time.

This will be noted in the case narrative.

Thank you,  
Heather

--

Heather Shaffer  
Project Manager Assistant  
GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC (USA) 29407  
Main: 843.556.8171 x 4505  
Fax: 843.766.1178  
E-mail: [heather.shaffer@gel.com](mailto:heather.shaffer@gel.com)  
Web: [www.gel.com](http://www.gel.com)

# **Laboratory Certifications**

**List of current GEL Certifications as of 30 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 232727**

**Method/Analysis Information**

**Product:** Alphaspec Th, Liquid  
Analytical Method: DOE EML HASL-300, Th-01-RC Modified  
Analytical Batch Number: 888328

<b>Sample ID</b>	<b>Client ID</b>
232727021	EB070109-SO1
1201888813	Method Blank (MB)
1201888814	232135004(M-125BDISS) Sample Duplicate (DUP)
1201888818	232135004(M-125BDISS) Matrix Spike (MS)
1201888822	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" 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: 232135004 (M-125BDISS).

**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**

Samples were reprepared due to high blank activity.

**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 716082 was generated due to RDL less than MDA, Failed Recovery for Surrogate or Tracer, Other and Result is more negative than the three sigma TPU. 1. Uncertainty is greater than 30% of the Th232 result and activity is between two times the MDA and five times the MDA for sample 232135015. 2. The following samples do not meet the client tracer yield requirements of 70 to 120% on the KERR Thorium soil analysis for work orders 232135, 232395 and 233587: 232135001, 232135002, 232135004, 232135005, 232135013, 232135017, 232135018, 232135019, 232395021, 233587015 and 1201888814. These yields are not meeting the client requirements due to the matrix of the samples. This is supported by the fact that the Method Blank and LCS on the reanalysis do meet the tracer yield requirements. It should also be noted that the yields which are not meeting the client tracer yield requirements are within the range of 23.4 to 68.3%, which does meet the GEL standard tracer yield requirements. 3. Samples 232135001, 232135002, 232135004, 232135006, 232135007, 232135010, 232135011 and 233587015 do not meet the required detection limit for Th228, Th230 or Th232 due to limited sample volume. Samples 232135005, 232135009, 232135016, 232135019 and 1201888814 do not meet the required detection limit for Th228 or Th230 due to limited sample volume. Samples 232135008 and 232727021 do not meet the required detection limit for Th228 due to limited sample volume. Samples 232135012, 232135013, 232135017 and 232395021 do not meet the required detection limit for Th228 or Th232 due to limited sample volume. The blank, 1201888813, does not meet the required detection limit for Th228 or Th230 due to keeping the blank aliquot size consistent with the sample aliquots. 4. The Th230 result for sample 232395021 is a negative result greater than three times the error, however the result from the original prep confirm that there is no reportable activity for Th230 in this sample. 1. Samples counted for the maximum count time to reduce uncertainty. Project manager notified. Reporting results. 2. Project manager notified. Reporting results. 3. Samples counted for the maximum count time. Project manager notified. Reporting results. 4. Project manager notified. Reporting results.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

The aliquot for the Matrix Spike was reduced due to limited sample volume.

**Qualifier information**

Manual qualifiers were not required.

## 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: 888783  
Prep Batch Number: 882663

<b>Sample ID</b>	<b>Client ID</b>
232727001	SA50-0.5B
232727002	SA54-0.5B
232727003	SA102-0.5B
232727004	SA109-0.5B
232727005	SA82-29B
232727006	RSAL3-10B
232727007	RSAL3-30B
232727008	SA114-0.5B
232727009	SA114009-0.5B
232727010	RSAN6-0.5B
232727011	SA134-20B
232727012	SA134-31B
232727013	SA134009-31B
232727014	SA88-10B
232727015	SA88-20B
232727016	SA88-32B
232727017	RSAK3-0.5B
232727018	RSAK3-10B
232727019	RSAK3-20B
232727020	RSAK3-31B
1201890003	Method Blank (MB)
1201890004	232727020(RSAK3-31B) Sample Duplicate (DUP)
1201890005	232727020(RSAK3-31B) Matrix Spike (MS)
1201890006	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: 232727020 (RSAK3-31B).

#### **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**

Samples were reprepared due to high blank activity.

### **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 716615 was generated due to Failed RPD for DUP and Other. 1. Uncertainty is greater than 30% for the Th228, Th230 and Th232 results and activity is between two times the MDA and five times the MDA for samples 232727008 and 232727009. Uncertainty is greater than 30% of the Th230 result and activity is between two times the MDA and five times the MDA for sample 232727010. For sample 232727015, the uncertainty is greater than 30% of the Th232 result and activity is greater than five times the MDA, and uncertainty is greater than 30% of the Th228 result and activity is between two times the MDA and five times the MDA. 2. The following samples do not meet the client tracer yield requirements of 70 to 120% on the KERR Thorium soil analysis for work order 232727: 232727001, 232727002, 232727003, 232727004, 232727008, 232727009, 232727010, 232727014, 232727015, 232727017, 232727018, 232727019 and 232727020. These yields are not meeting the client requirements due to the matrix of the samples. This is supported by the fact that the Method Blank and LCS on the reanalysis do meet the tracer yield requirements. It should also be noted that the yields which are not meeting the client tracer yield requirements are within the range of 41.9 and 68.9%, which does meet the GEL standard tracer yield requirements. 1. Samples counted for the maximum count time to reduce uncertainty. Project manager notified. Reporting results. 2. Project manager notified. Reporting results.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

The blank, 1201890003 (MB), did not meet the detection limit for Th228 or Th230 due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits. The sample and the duplicate, 1201890004 (RSAK3-31B) and 232727020 (RSAK3-31B), did not meet the relative percent difference requirement for Th232, however they do meet the relative error ratio requirement with a value of 1.69.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>Alphaspec U, Solid</b>
Analytical Method:	DOE EML HASL-300, U-02-RC Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	884765
Prep Batch Number:	882663

<b>Sample ID</b>	<b>Client ID</b>
232727001	SA50-0.5B
232727002	SA54-0.5B
232727003	SA102-0.5B
232727004	SA109-0.5B
232727005	SA82-29B
232727006	RSAL3-10B
232727007	RSAL3-30B
232727008	SA114-0.5B
232727009	SA114009-0.5B
232727010	RSAN6-0.5B
232727011	SA134-20B
232727012	SA134-31B
232727013	SA134009-31B
232727014	SA88-10B
232727015	SA88-20B
232727016	SA88-32B
232727017	RSAK3-0.5B
232727018	RSAK3-10B
232727019	RSAK3-20B
232727020	RSAK3-31B
1201879827	Method Blank (MB)
1201879828	232727020(RSAK3-31B) Sample Duplicate (DUP)
1201879829	232727020(RSAK3-31B) Matrix Spike (MS)
1201879830	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: 232727020 (RSAK3-31B).

**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**

None of the samples in this sample set required reprep or reanalysis.

**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 714512 was generated due to Failed Recovery for Surrogate or Tracer and Other. 1. The uncertainty is greater than 30% of the U235 result and activity is greater than five times the MDA for samples 232727003, 232727016 and 232727020. Uncertainty is greater than 30% of the U235 result and activity is between two times the MDA and five times the MDA for samples 232727001, 232727002, 232727004, 232727006, 232727007, 232727010, 232727014, 232727017 and 232727018. 2. Samples 232727008 and 232727009 do not meet the client's tracer yield requirement due to the nature of the matrix. The values achieved, 43.7% and 37.6%, do not meet GEL standard tracer yield requirements and the method blank and LCS both meet the client's tracer yield requirement with values of 91.5% and 87.1%. 3. The laboratory control sample, 1201879830, does not meet the resolution requirement of having tracer full width half maximum of 100 keV or less. However, the LCS does meet the client's tracer yield requirement and the U238 recovery requirement. 1. Project manager notified. Reporting results. 2. Project manager notified. Reporting results. 3. Reporting results.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

The U238 blank result is greater than the MDC but less than the detection limit.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>Alphaspec U, Liquid</b>
Analytical Method:	DOE EML HASL-300, U-02-RC Modified
Analytical Batch Number:	886957



<b>Sample ID</b>	<b>Client ID</b>
232727021	EB070109-SO1
1201885396	Method Blank (MB)
1201885397	232135004(M-125BDISS) Sample Duplicate (DUP)
1201885400	232135004(M-125BDISS) Matrix Spike (MS)
1201885403	Laboratory Control Sample (LCS)

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

**Designated QC**

The following sample was used for QC: 232135004 (M-125BDISS).

**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 1201885396 (MB) was recounted due to low carrier/tracer yield. Samples were reprep'd due to low carrier/tracer yield.

**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 715635 was generated due to RDL less than MDA, Failed Recovery for Surrogate or Tracer and Other. 1. The uncertainty is greater than 30% of the U235 result and activity is greater than five times the MDA for samples 232135001 and 232135012. Uncertainty is greater than 30% of the U235 result and activity is between two times the MDA and five times the MDA for samples 232135002, 232135004, 232135007, 232135008 and 232135011. 2. The following samples do not meet the client tracer yield requirements of 70 to 120% on the KERR Thorium soil analysis for work order 232135: Samples 232135001, 232135002, 232135006, 232135007, 232135011 and 232135018 . These yields are not meeting the client requirements due to the matrix of the samples. This is supported by the fact that the samples were originally repped due to low tracer yields and because the Method Blank and LCS on the reanalysis do meet the tracer yield requirements. It should also be noted that the yields which are not meeting the client tracer yield requirements are within the range of 36.6 to 67.5%, which does meet the GEL standard tracer yield requirements. 3. Sample 232135016 does not meet the required detection limit for U233/234 and, samples 232395021 and 232727021 do not meet the required detection limit for U233/234, U235 or U238 due to the reduced aliquot size. The blank, 1201885396, does not meet the required detection limit for U233/234, U235 or U238 due to keeping the blank aliquot size consistent with the samples. The aliquot size was reduced for the reprep due to low tracer yields. 1. Samples were counted for the maximum count time to reduce uncertainty. Project manager notified. Reporting results. 2. Project manager notified. Reporting results. 3. Project manager notified. Reporting results.

#### **Manual Integration**

No manual integrations were performed on data in this batch.

#### **Additional Comments**

The sample and the duplicate, 1201885397 (M-125BDISS), did not meet the relative percent difference requirement for U235, however they do meet the relative error ratio requirement with a value of 2.24.

#### **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:	882963
Prep Batch Number:	882663

<b>Sample ID</b>	<b>Client ID</b>
232727001	SA50-0.5B
232727002	SA54-0.5B
232727003	SA102-0.5B
232727004	SA109-0.5B
232727005	SA82-29B
232727006	RSAL3-10B
232727007	RSAL3-30B
232727008	SA114-0.5B
232727009	SA114009-0.5B
232727010	RSAN6-0.5B
232727011	SA134-20B
232727012	SA134-31B
232727013	SA134009-31B
232727014	SA88-10B
232727015	SA88-20B
232727016	SA88-32B
232727017	RSAK3-0.5B
232727018	RSAK3-10B
232727019	RSAK3-20B
232727020	RSAK3-31B
1201875411	Method Blank (MB)
1201875412	232727020(RSAK3-31B) Sample Duplicate (DUP)
1201875413	232727020(RSAK3-31B) Matrix Spike (MS)
1201875414	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: 232727020 (RSAK3-31B).

**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 1201875412 (RSAK3-31B), 232727001 (SA50-0.5B), 232727005 (SA82-29B), 232727013 (SA134009-31B), 232727015 (SA88-20B) and 232727020 (RSAK3-31B) were recounted due to high uncertainty.

**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. The following NCR was generated for this SDG: NCR 712681 was generated due to Other. 1. Sample 232727015 did not meet the client uncertainty requirement. The sample counted for the maximum count time of 400 minutes. 1. Reporting results.

**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>GFPC, Ra228, Liquid</b>
Analytical Method:	EPA 904.0/SW846 9320 Modified
Analytical Batch Number:	885330

<b>Sample ID</b>	<b>Client ID</b>
232727021	EB070109-SO1
1201881212	Method Blank (MB)
1201881213	232135004(M-125BDISS) Sample Duplicate (DUP)
1201881214	232135004(M-125BDISS) Matrix Spike (MS)
1201881215	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" 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: 232135004 (M-125BDISS).

#### **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**

Sample 1201881214 (M-125BDISS) was recounted due to low recovery. Samples were reprecipitated due to low recovery.

#### **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**

Container scanning event for custody for 232395021 and 232727021 is located under 232135014 and

232135020. Samples were originally logged as 232135014 and 232135020 and tracked as such. GEL Sample IDs were updated to report liquids and solids under the same workorder per client request during the middle of the sample analysis.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** Lucas Cell, Ra226, solid  
Analytical Method: EPA 903.1 Modified  
Prep Method: Dry Soil Prep  
Analytical Batch Number: 883008  
Prep Batch Number: 882663

<b>Sample ID</b>	<b>Client ID</b>
232727001	SA50-0.5B
232727002	SA54-0.5B
232727003	SA102-0.5B
232727004	SA109-0.5B
232727005	SA82-29B
232727006	RSAL3-10B
232727007	RSAL3-30B
232727008	SA114-0.5B
232727009	SA114009-0.5B
232727010	RSAN6-0.5B
232727011	SA134-20B
232727012	SA134-31B
232727013	SA134009-31B
232727014	SA88-10B
232727015	SA88-20B
232727016	SA88-32B
232727017	RSAK3-0.5B
232727018	RSAK3-10B
232727019	RSAK3-20B
232727020	RSAK3-31B
1201875553	Method Blank (MB)
1201875554	232727020(RSAK3-31B) Sample Duplicate (DUP)
1201875555	232727020(RSAK3-31B) Matrix Spike (MS)
1201875556	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: 232727020 (RSAK3-31B).

#### **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 recounted due to low recovery.

### **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**

Sample, 232727015 (SA88-20B) and 232727019 (RSAK3-20B), results were verified by Uranium-234 and Thorium-230 results.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** Lucas Cell, Ra226, liquid

Analytical Method: EPA 903.1 Modified

Analytical Batch Number: 883675

<b>Sample ID</b>	<b>Client ID</b>
232727021	EB070109-SO1
1201877244	Method Blank (MB)
1201877245	232135004(M-125BDISS) Sample Duplicate (DUP)
1201877246	232135004(M-125BDISS) Matrix Spike (MS)
1201877247	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" 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: 232135004 (M-125BDISS).

**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**

Sample 1201877246 (M-125BDISS) was recounted due to high recovery.

**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**

Container scanning event for custody for 232395021 and 232727021 is located under 232135014 and 232135020. Samples were originally logged as 232135014 and 232135020 and tracked as such. GEL Sample IDs were updated to report liquids and solids under the same workorder per client request during the middle of the sample analysis.

**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: \_\_\_\_\_  7/30/09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 17-JUL-09	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> GFPC	<b>Test / Method:</b> EPA 904.0/SW846 9320 Modified	<b>Matrix Type:</b> Solid	<b>Client Code:</b> KERR
<b>Batch ID:</b> 882963	<b>Sample Numbers:</b> see below		
<b>Potentially affected work order(s)(SDG): 232727</b>			
<b>Application Issues:</b> Other			
<b>Specification and Requirements Nonconformance Description:</b>		<b>NRG Disposition:</b>	
1. Sample 232727015 did not meet the client uncertainty requirement. The sample counted for the maximum count time of 400 minutes.		1. Reporting results.	

**Originator's Name:**  
Mary Mizzell      17-JUL-09

**Data Validator/Group Leader:**  
Nat Long      20-JUL-09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 23-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> 884765	<b>Sample Numbers:</b> See below		

**Potentially affected work order(s)(SDG): 232727**

**Application Issues:**

Failed Recovery for Surrogate or Tracer

Other

<b>Specification and Requirements Nonconformance Description:</b>	<b>NRG Disposition:</b>
<p>1. The uncertainty is greater than 30% of the U235 result and activity is greater than five times the MDA for samples 232727003, 232727016 and 232727020. Uncertainty is greater than 30% of the U235 result and activity is between two times the MDA and five times the MDA for samples 232727001, 232727002, 232727004, 232727006, 232727007, 232727010, 232727014, 232727017 and 232727018.</p> <p>2. Samples 232727008 and 232727009 do not meet the client's tracer yield requirement due to the nature of the matrix. The values achieved, 43.7% and 37.6%, do meet GEL standard tracer yield requirements and the method blank and LCS both meet the client's tracer yield requirement with values of 91.5% and 87.1%.</p> <p>3. The laboratory control sample, 1201879830, does not meet the resolution requirement of having tracer full width half maximum of 100 keV or less. However, the LCS does meet the client's tracer yield requirement and the U238 recovery requirement.</p>	<p>1. Project manager notified. Reporting results.</p> <p>2. Project manager notified. Reporting results.</p> <p>3. Reporting results.</p>

**Originator's Name:**

Joseph Moulden      23-JUL-09

**Data Validator/Group Leader:**

Eric Brimstin      23-JUL-09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 28-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> Liquid	<b>Client Code:</b> KERR
<b>Batch ID:</b> 886957	<b>Sample Numbers:</b> See Below		

**Potentially affected work order(s)(SDG): 232135,232395,232727**

**Application Issues:**

- RDL less than MDA
- Failed Recovery for Surrogate or Tracer
- Other

**Specification and Requirements  
Nonconformance Description:**

**NRG Disposition:**

1. The uncertainty is greater than 30% of the U235 result and activity is greater than five times the MDA for samples 232135001 and 232135012. Uncertainty is greater than 30% of the U235 result and activity is between two times the MDA and five times the MDA for samples 232135002, 232135004, 232135007, 232135008 and 232135011.
2. The following samples do not meet the client tracer yield requirements of 70 to 120% on the KERR Thorium soil analysis for work order 232135: Samples 232135001, 232135002, 232135006, 232135007, 232135011 and 232135018 . These yields are not meeting the client requirements due to the matrix of the samples. This is supported by the fact that the samples were originally repped due to low tracer yields and because the Method Blank and LCS on the reanalysis do meet the tracer yield requirements. It should also be noted that the yields which are not meeting the client tracer yield requirements are within the range of 36.6 to 67.5%, which does meet the GEL standard tracer yield requirements.
3. Sample 232135016 does not meet the required detection limit for U233/234 and, samples 232395021 and 232727021 do not meet the required detection limit for U233/234, U235 or U238 due to the reduced aliquot size. The blank, 1201885396, does not meet the required detection limit for U233/234, U235 or U238 due to keeping the blank aliquot size consistent with the samples. The aliquot size was reduced for the reprep due to low tracer yields.

1. Samples were counted for the maximum count time to reduce uncertainty. Project manager notified. Reporting results.
2. Project manager notified. Reporting results.
3. Project manager notified. Reporting results.

**Originator's Name:**

Joseph Moulden 28-JUL-09

**Data Validator/Group Leader:**

Eric Brimstin 28-JUL-09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 29-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> Liquid	<b>Client Code:</b> KERR
<b>Batch ID:</b> 888328	<b>Sample Numbers:</b> See Below		

**Potentially affected work order(s)(SDG): 232135,232395,232727,233587**

**Application Issues:**

- RDL less than MDA
- Failed Recovery for Surrogate or Tracer
- Other
- Result is more negative than the three sigma TPU

**Specification and Requirements  
Nonconformance Description:**

**NRG Disposition:**

1. Uncertainty is greater than 30% of the Th232 result and activity is between two times the MDA and five times the MDA for sample 232135015.
2. The following samples do not meet the client tracer yield requirements of 70 to 120% on the KERR Thorium soil analysis for work orders 232135, 232395 and 233587: 232135001, 232135002, 232135004, 232135005, 232135013, 232135017, 232135018, 232135019, 232395021, 233587015 and 1201888814. These yields are not meeting the client requirements due to the matrix of the samples. This is supported by the fact that the Method Blank and LCS on the reanalysis do meet the tracer yield requirements. It should also be noted that the yields which are not meeting the client tracer yield requirements are within the range of 23.4 to 68.3%, which does meet the GEL standard tracer yield requirements.
3. Samples 232135001, 232135002, 232135004, 232135006, 232135007, 232135010, 232135011 and 233587015 do not meet the required detection limit for Th228, Th230 or Th232 due to limited sample volume. Samples 232135005, 232135009, 232135016, 232135019 and 1201888814 do not meet the required detection limit for Th228 or Th230 due to limited sample volume. Samples 232135008 and 232727021 do not meet the required detection limit for Th228 due to limited sample volume. Samples 232135012, 232135013, 232135017 and 232395021 do not meet the required detection limit for Th228 or Th232 due to limited sample volume. The blank, 1201888813, does not meet the required detection limit for Th228 or Th230 due to keeping the blank aliquot size consistent with the sample aliquots.
4. The Th230 result for sample 232395021 is a negative result greater than three times the error, however the result from the original prep confirm that there is no reportable activity for Th230 in this sample.

1. Samples counted for the maximum count time to reduce uncertainty. Project manager notified. Reporting results.
2. Project manager notified. Reporting results.
3. Samples counted for the maximum count time. Project manager notified. Reporting results.
4. Project manager notified. Reporting results.

**Originator's Name:**

Joseph Moulden 29-JUL-09

**Data Validator/Group Leader:**

Scott Moreland 29-JUL-09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 30-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> 888783	<b>Sample Numbers:</b> See Below		

**Potentially affected work order(s)(SDG): 232727**

**Application Issues:**

Failed RPD for DUP

Other

**Specification and Requirements  
Nonconformance Description:**

1. Uncertainty is greater than 30% for the Th228, Th230 and Th232 results and activity is between two times the MDA and five times the MDA for samples 232727008 and 232727009. Uncertainty is greater than 30% of the Th230 result and activity is between two times the MDA and five times the MDA for sample 232727010.

For sample 232727015, the uncertainty is greater than 30% of the Th232 result and activity is greater than five times the MDA, and uncertainty is greater than 30% of the Th228 result and activity is between two times the MDA and five times the MDA.

2. The following samples do not meet the client tracer yield requirements of 70 to 120% on the KERR Thorium soil analysis for work order 232727: 232727001, 232727002, 232727003, 232727004, 232727008, 232727009, 232727010, 232727014, 232727015, 232727017, 232727018, 232727019 and 232727020. These yields are not meeting the client requirements due to the matrix of the samples. This is supported by the fact that the Method Blank and LCS on the reanalysis do meet the tracer yield requirements. It should also be noted that the yields which are not meeting the client tracer yield requirements are within the range of 41.9 and 68.9%, which does meet the GEL standard tracer yield requirements.

**NRG Disposition:**

1. Samples counted for the maximum count time to reduce uncertainty. Project manager notified. Reporting results.

2. Project manager notified. Reporting results.

**Originator's Name:**

Joseph Moulden 30-JUL-09

**Data Validator/Group Leader:**

Eric Brimstin 30-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: 232727 GEL Work Order: 232727

**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 30, 2009

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

Client Sample ID: SA50-0.5B  
Sample ID: 232727001  
Matrix: SO  
Collect Date: 30-JUN-09 12:30  
Receive Date: 01-JUL-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		1.81	+/-0.305	0.188	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		1.36	+/-0.258	0.117	0.050	pCi/g						
Thorium-232		1.45	+/-0.263	0.0938	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.25	+/-0.0797	0.0161	0.040	pCi/g		CXM207/18/09	1821	884765	2	
Uranium-235/236		0.0551	+/-0.0206	0.0199	0.040	pCi/g						
Uranium-238		1.01	+/-0.0714	0.0126	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.33	+/-0.273	0.362	0.500	pCi/g		JXC5	07/16/09	2031	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.610	+/-0.192	0.193	0.500	pCi/g		KSD1	07/27/09	1750	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			68.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			88.9	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			86.1	(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 30, 2009

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

Client Sample ID:	SA54-0.5B	Project:	KERRHenderson
Sample ID:	232727002	Client ID:	KERR003
Matrix:	SO		
Collect Date:	30-JUN-09 13:20		
Receive Date:	01-JUL-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		2.14	+/-0.359	0.267	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		1.05	+/-0.239	0.129	0.050	pCi/g						
Thorium-232		1.88	+/-0.314	0.103	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.706	+/-0.060	0.0161	0.040	pCi/g		CXM207/18/09	1821	884765	2	
Uranium-235/236		0.0501	+/-0.0193	0.0179	0.040	pCi/g						
Uranium-238		0.736	+/-0.0611	0.0144	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.21	+/-0.280	0.285	0.500	pCi/g		JXC5	07/16/09	1639	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.664	+/-0.191	0.182	0.500	pCi/g		KSD1	07/27/09	1750	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			63.2	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			93.8	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			99.1	(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 30, 2009

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

Client Sample ID: SA102-0.5B  
Sample ID: 232727003  
Matrix: SO  
Collect Date: 30-JUN-09 11:05  
Receive Date: 01-JUL-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		1.87	+/-0.314	0.209	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		1.55	+/-0.272	0.094	0.050	pCi/g						
Thorium-232		1.71	+/-0.286	0.094	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.802	+/-0.0661	0.020	0.040	pCi/g		CXM207/18/09	1821	884765	2	
Uranium-235/236		0.0652	+/-0.0207	0.00515	0.040	pCi/g						
Uranium-238		0.823	+/-0.0676	0.0265	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.68	+/-0.332	0.348	0.500	pCi/g		JXC5	07/16/09	1639	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.30	+/-0.249	0.130	0.500	pCi/g		KSD1	07/27/09	1750	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			64.1	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			84.0	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			94.7	(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 30, 2009

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

Client Sample ID:	SA109-0.5B	Project:	KERRHenderson
Sample ID:	232727004	Client ID:	KERR003
Matrix:	SO		
Collect Date:	30-JUN-09 10:40		
Receive Date:	01-JUL-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		1.83	+/-0.325	0.233	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		1.27	+/-0.264	0.162	0.050	pCi/g						
Thorium-232		2.04	+/-0.327	0.145	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.824	+/-0.0641	0.0171	0.040	pCi/g		CXM207/18/09	1821	884765	2	
Uranium-235/236		0.0538	+/-0.0191	0.0151	0.040	pCi/g						
Uranium-238		0.830	+/-0.0641	0.0123	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.34	+/-0.308	0.296	0.500	pCi/g		JXC5	07/16/09	1639	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.676	+/-0.199	0.192	0.500	pCi/g		KSD1	07/27/09	1750	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			64.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			91.5	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			90.0	(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 30, 2009

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

Client Sample ID:	SA82-29B	Project:	KERRHenderson
Sample ID:	232727005	Client ID:	KERR003
Matrix:	SO		
Collect Date:	01-JUL-09 09:36		
Receive Date:	02-JUL-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		1.18	+/-0.246	0.213	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		2.10	+/-0.299	0.119	0.050	pCi/g						
Thorium-232		0.978	+/-0.201	0.0322	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		2.77	+/-0.125	0.0223	0.040	pCi/g		CXM207/20/09	1435	884765	2	
Uranium-235/236		0.124	+/-0.0302	0.0173	0.040	pCi/g						
Uranium-238		2.62	+/-0.121	0.00438	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.41	+/-0.287	0.382	0.500	pCi/g		JXC5	07/16/09	2031	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.33	+/-0.272	0.203	0.500	pCi/g		KSD1	07/27/09	1750	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			75.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			83.2	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			82.5	(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 30, 2009

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

Client Sample ID: RSAL3-10B	Project: KERRHenderson
Sample ID: 232727006	Client ID: KERR003
Matrix: SO	
Collect Date: 01-JUL-09 11:03	
Receive Date: 02-JUL-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		1.38	+/-0.273	0.228	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		1.76	+/-0.281	0.0882	0.050	pCi/g						
Thorium-232		1.45	+/-0.255	0.0882	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.28	+/-0.0829	0.0252	0.040	pCi/g		CXM207/20/09	1435	884765	2	
Uranium-235/236		0.0709	+/-0.0224	0.0162	0.040	pCi/g						
Uranium-238		1.12	+/-0.0767	0.0131	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.02	+/-0.291	0.358	0.500	pCi/g		JXC5	07/16/09	1640	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.332	+/-0.140	0.127	0.500	pCi/g		KSD1	07/27/09	1750	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			73.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			86.3	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			89.4	(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 30, 2009

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

Client Sample ID:	RSAL3-30B	Project:	KERRHenderson
Sample ID:	232727007	Client ID:	KERR003
Matrix:	SO		
Collect Date:	01-JUL-09 12:02		
Receive Date:	02-JUL-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		1.81	+/-0.306	0.217	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		1.81	+/-0.293	0.144	0.050	pCi/g						
Thorium-232		1.54	+/-0.267	0.112	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.41	+/-0.0869	0.0153	0.040	pCi/g		CXM207/20/09	1435	884765	2	
Uranium-235/236		0.0838	+/-0.0248	0.0189	0.040	pCi/g						
Uranium-238		1.33	+/-0.0844	0.0185	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.05	+/-0.282	0.365	0.500	pCi/g		JXC5	07/16/09	1640	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.854	+/-0.234	0.216	0.500	pCi/g		KSD1	07/27/09	1825	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			73.1	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			85.7	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			93.2	(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 30, 2009

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

Client Sample ID:	SA114-0.5B	Project:	KERRHenderson
Sample ID:	232727008	Client ID:	KERR003
Matrix:	SO		
Collect Date:	01-JUL-09 08:50		
Receive Date:	02-JUL-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		0.835	+/-0.317	0.375	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		0.671	+/-0.249	0.225	0.050	pCi/g						
Thorium-232		0.549	+/-0.222	0.195	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.737	+/-0.0888	0.0333	0.040	pCi/g		CXM207/20/09	1435	884765	2	
Uranium-235/236		0.0502	+/-0.027	0.0256	0.040	pCi/g						
Uranium-238		0.796	+/-0.0916	0.0259	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.07	+/-0.284	0.385	0.500	pCi/g		JXC5	07/16/09	1640	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.472	+/-0.160	0.164	0.500	pCi/g		KSD1	07/27/09	1825	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			45.0	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			43.7	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			91.0	(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 30, 2009

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

Client Sample ID:	SA114009-0.5B	Project:	KERRHenderson
Sample ID:	232727009	Client ID:	KERR003
Matrix:	SO		
Collect Date:	01-JUL-09 08:50		
Receive Date:	02-JUL-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		0.876	+/-0.299	0.286	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		0.619	+/-0.240	0.204	0.050	pCi/g						
Thorium-232		0.427	+/-0.205	0.204	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.741	+/-0.0943	0.0338	0.040	pCi/g		CXM207/20/09	1435	884765	2	
Uranium-235/236		0.0189	+/-0.0165	0.0113	0.040	pCi/g						
Uranium-238		0.647	+/-0.0871	0.00916	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.03	+/-0.277	0.376	0.500	pCi/g		JXC5	07/16/09	1640	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.638	+/-0.188	0.154	0.500	pCi/g		KSD1	07/27/09	1825	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			41.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			37.6	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			89.8	(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 30, 2009

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

Client Sample ID:	RSAN6-0.5B	Project:	KERRHenderson
Sample ID:	232727010	Client ID:	KERR003
Matrix:	SO		
Collect Date:	01-JUL-09 08:20		
Receive Date:	02-JUL-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		1.27	+/-0.322	0.305	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		0.611	+/-0.207	0.158	0.050	pCi/g						
Thorium-232		1.14	+/-0.269	0.0495	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.912	+/-0.0677	0.0144	0.040	pCi/g		CXM207/20/09	1435	884765	2	
Uranium-235/236		0.0465	+/-0.0186	0.0177	0.040	pCi/g						
Uranium-238		0.817	+/-0.064	0.0124	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		2.08	+/-0.324	0.358	0.500	pCi/g		JXC5	07/16/09	1640	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.38	+/-0.304	0.221	0.500	pCi/g		KSD1	07/27/09	1825	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			41.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			88.0	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			95.0	(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 30, 2009

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

Client Sample ID:	SA134-20B	Project:	KERRHenderson
Sample ID:	232727011	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-JUL-09 07:00		
Receive Date:	03-JUL-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		2.19	+/-0.327	0.172	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		2.13	+/-0.312	0.0358	0.050	pCi/g						
Thorium-232		1.64	+/-0.274	0.0358	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.55	+/-0.0908	0.023	0.040	pCi/g		CXM207/20/09	1435	884765	2	
Uranium-235/236		0.104	+/-0.0271	0.0186	0.040	pCi/g						
Uranium-238		1.58	+/-0.0909	0.0104	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.15	+/-0.277	0.336	0.500	pCi/g		JXC5	07/16/09	1641	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.970	+/-0.225	0.184	0.500	pCi/g		KSD1	07/27/09	1825	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			71.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			85.0	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			95.8	(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 30, 2009

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

Client Sample ID:	SA134-31B	Project:	KERRHenderson
Sample ID:	232727012	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-JUL-09 07:30		
Receive Date:	03-JUL-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		1.41	+/-0.248	0.171	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		2.75	+/-0.327	0.077	0.050	pCi/g						
Thorium-232		1.57	+/-0.248	0.077	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		2.54	+/-0.115	0.028	0.040	pCi/g		CXM207/20/09	1435	884765	2	
Uranium-235/236		0.170	+/-0.0331	0.0126	0.040	pCi/g						
Uranium-238		2.77	+/-0.120	0.0226	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.32	+/-0.303	0.343	0.500	pCi/g		JXC5	07/16/09	1641	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.29	+/-0.240	0.0872	0.500	pCi/g		KSD1	07/27/09	1825	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			76.5	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			89.3	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			94.4	(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 30, 2009

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

Client Sample ID:	SA134009-31B	Project:	KERRHenderson
Sample ID:	232727013	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-JUL-09 07:30		
Receive Date:	03-JUL-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		1.37	+/-0.273	0.243	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		2.71	+/-0.350	0.161	0.050	pCi/g						
Thorium-232		1.17	+/-0.224	0.0336	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		2.67	+/-0.117	0.0164	0.040	pCi/g		CXM207/20/09	1435	884765	2	
Uranium-235/236		0.171	+/-0.0338	0.0182	0.040	pCi/g						
Uranium-238		2.79	+/-0.119	0.0127	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.13	+/-0.238	0.304	0.500	pCi/g		JXC5	07/16/09	2031	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.57	+/-0.328	0.249	0.500	pCi/g		KSD1	07/27/09	1855	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			80.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			92.0	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			86.9	(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 30, 2009

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

Client Sample ID:	SA88-10B	Project:	KERRHenderson
Sample ID:	232727014	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-JUL-09 08:25		
Receive Date:	03-JUL-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		1.81	+/-0.332	0.227	0.050	pCi/g						
Thorium-230		1.42	+/-0.282	0.135	0.050	pCi/g						
Thorium-232		1.77	+/-0.314	0.135	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.00	+/-0.0734	0.021	0.040	pCi/g						
Uranium-235/236		0.0696	+/-0.0223	0.0163	0.040	pCi/g						
Uranium-238		0.955	+/-0.0727	0.0305	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.23	+/-0.273	0.266	0.500	pCi/g						
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.992	+/-0.213	0.165	0.500	pCi/g						

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			55.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			85.2	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			101	(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 30, 2009

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

Client Sample ID:	SA88-20B	Project:	KERRHenderson
Sample ID:	232727015	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-JUL-09 08:52		
Receive Date:	03-JUL-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		0.618	+/-0.191	0.178	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		10.3	+/-0.700	0.118	0.050	pCi/g						
Thorium-232		0.481	+/-0.155	0.0944	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		10.6	+/-0.238	0.017	0.040	pCi/g		CXM207/20/09	1435	884765	2	
Uranium-235/236		0.793	+/-0.0723	0.0131	0.040	pCi/g						
Uranium-238		9.23	+/-0.221	0.0106	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.663	+/-0.208	0.305	0.500	pCi/g		JXC5	07/16/09	2031	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		10.5	+/-0.697	0.192	0.500	pCi/g		KSD1	07/27/09	1855	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			64.1	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			84.5	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			103	(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 30, 2009

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

Client Sample ID:	SA88-32B	Project:	KERRHenderson
Sample ID:	232727016	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-JUL-09 09:38		
Receive Date:	03-JUL-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		1.50	+/-0.293	0.243	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		1.78	+/-0.307	0.208	0.050	pCi/g						
Thorium-232		1.42	+/-0.259	0.0368	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.91	+/-0.123	0.0226	0.040	pCi/g		CXM207/20/09	1504	884765	2	
Uranium-235/236		0.111	+/-0.0328	0.00757	0.040	pCi/g						
Uranium-238		1.81	+/-0.119	0.00613	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.29	+/-0.308	0.312	0.500	pCi/g		JXC5	07/16/09	1642	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.70	+/-0.299	0.198	0.500	pCi/g		KSD1	07/27/09	1855	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			70.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			89.0	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			87.7	(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 30, 2009

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

Client Sample ID:	RSAK3-0.5B	Project:	KERRHenderson
Sample ID:	232727017	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-JUL-09 10:56		
Receive Date:	03-JUL-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		2.13	+/-0.376	0.229	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		1.47	+/-0.306	0.152	0.050	pCi/g						
Thorium-232		1.52	+/-0.307	0.121	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.22	+/-0.102	0.00659	0.040	pCi/g		CXM207/20/09	1504	884765	2	
Uranium-235/236		0.0679	+/-0.0276	0.0208	0.040	pCi/g						
Uranium-238		1.06	+/-0.0946	0.00659	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.35	+/-0.306	0.311	0.500	pCi/g		JXC5	07/16/09	1642	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.20	+/-0.266	0.140	0.500	pCi/g		KSD1	07/27/09	1855	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			45.0	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			81.9	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			92.3	(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 30, 2009

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

Client Sample ID:	RSAK3-10B	Project:	KERRHenderson
Sample ID:	232727018	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-JUL-09 11:20		
Receive Date:	03-JUL-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		1.87	+/-0.336	0.218	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		1.66	+/-0.309	0.157	0.050	pCi/g						
Thorium-232		1.42	+/-0.279	0.0427	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.17	+/-0.097	0.0254	0.040	pCi/g		CXM207/20/09	1504	884765	2	
Uranium-235/236		0.0434	+/-0.0218	0.0196	0.040	pCi/g						
Uranium-238		0.998	+/-0.0898	0.0254	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.09	+/-0.305	0.361	0.500	pCi/g		JXC5	07/16/09	1639	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.769	+/-0.190	0.110	0.500	pCi/g		KSD1	07/27/09	1855	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			53.4	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			84.7	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			88.9	(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 30, 2009

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

Client Sample ID:	RSAK3-20B	Project:	KERRHenderson
Sample ID:	232727019	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-JUL-09 11:54		
Receive Date:	03-JUL-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		1.32	+/-0.279	0.245	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		10.5	+/-0.707	0.0948	0.050	pCi/g						
Thorium-232		1.13	+/-0.232	0.0372	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		8.15	+/-0.254	0.0444	0.040	pCi/g		CXM207/20/09	1504	884765	2	
Uranium-235/236		0.365	+/-0.0605	0.0243	0.040	pCi/g						
Uranium-238		7.53	+/-0.244	0.0253	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.447	+/-0.218	0.308	0.500	pCi/g		JXC5	07/16/09	1639	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		5.73	+/-0.563	0.224	0.500	pCi/g		KSD1	07/27/09	1930	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			56.2	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			87.9	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			95.3	(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 30, 2009

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

Client Sample ID:	RSAK3-31B	Project:	KERRHenderson
Sample ID:	232727020	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-JUL-09 11:20		
Receive Date:	03-JUL-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		1.94	+/-0.349	0.189	0.050	pCi/g		CXM207/29/09	1712	888783	1	
Thorium-230		2.64	+/-0.394	0.046	0.050	pCi/g						
Thorium-232		1.72	+/-0.318	0.046	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		2.41	+/-0.137	0.0249	0.040	pCi/g		CXM207/20/09	1504	884765	2	
Uranium-235/236		0.132	+/-0.037	0.0239	0.040	pCi/g						
Uranium-238		2.29	+/-0.134	0.0249	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.67	+/-0.338	0.454	0.500	pCi/g		JXC5	07/16/09	2031	882963	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.12	+/-0.231	0.161	0.500	pCi/g		KSD1	07/27/09	1930	883008	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXP2	07/07/09	1437	882663

**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"			57.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			89.8	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			71.2	(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 30, 2009

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

Client Sample ID:	EB070109-SO1	Project:	KERRHenderson
Sample ID:	232727021	Client ID:	KERR003
Matrix:	W		
Collect Date:	01-JUL-09 11:25		
Receive Date:	02-JUL-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, Liquid "As Received"</i>												
Thorium-228	U	0.0196	+/-0.0369	0.0666	0.030	pCi/L		CXM207/28/09	1156	888328	1	
Thorium-230	U	0.00784	+/-0.0154	0.030	0.030	pCi/L						
Thorium-232	U	0.00	+/-0.0109	0.030	0.030	pCi/L						
<i>Alphaspec U, Liquid "As Received"</i>												
Uranium-233/234	U	-0.0118	+/-0.0665	0.134	0.030	pCi/L		CXM207/23/09	2152	886957	2	
Uranium-235/236	U	-0.0153	+/-0.026	0.0733	0.030	pCi/L						
Uranium-238	U	0.0186	+/-0.0402	0.0762	0.030	pCi/L						
<b>Rad Gas Flow Proportional Counting</b>												
<i>GFPC, Ra228, Liquid "As Received"</i>												
Radium-228		1.37	+/-0.781	1.20	3.00	pCi/L		MXS2 07/27/09	0748	885330	3	
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, liquid "As Received"</i>												
Radium-226	U	0.153	+/-0.275	0.494	1.00	pCi/L		KSD1 07/14/09	1505	883675	4	

**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, Liquid "As Received"			75.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			73.6	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			82.3	(15%-125%)

# QUALITY CONTROL DATA

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: July 30, 2009  
Page 1 of 5

Northgate Environmental Management, Inc.  
1100 Quail St., Suite 102  
Newport Beach, California

Contact: Mr. Frank Hagar

Workorder: 232727

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	884765										
QC1201879828	232727020	DUP									
Uranium-233/234		2.41		2.46	pCi/g	2.05		(0% - 20%)	CXM2	07/20/09	15:04
		+/-0.137		+/-0.139							
Uranium-235/236		0.132		0.145	pCi/g	9.39		(0% - 20%)			
		+/-0.037		+/-0.0386							
Uranium-238		2.29		2.26	pCi/g	1.32		(0% - 20%)			
		+/-0.134		+/-0.133							
QC1201879830	LCS										
Uranium-233/234				2.05	pCi/g					07/21/09	12:45
				+/-0.126							
Uranium-235/236				0.195	pCi/g						
				+/-0.0445							
Uranium-238	2.49			2.31	pCi/g		92.8	(75%-125%)			
				+/-0.133							
QC1201879827	MB										
Uranium-233/234			U	0.0066	pCi/g					07/20/09	15:04
				+/-0.0151							
Uranium-235/236			U	0.00969	pCi/g						
				+/-0.0116							
Uranium-238				0.0157	pCi/g						
				+/-0.0122							
QC1201879829	232727020	MS									
Uranium-233/234		2.41		4.81	pCi/g					07/20/09	15:04
		+/-0.137		+/-0.199							
Uranium-235/236		0.132		0.280	pCi/g						
		+/-0.037		+/-0.0559							
Uranium-238	2.52	2.29		4.85	pCi/g		102	(75%-125%)			
		+/-0.134		+/-0.199							
Batch	886957										
QC1201885397	232135004	DUP									
Uranium-233/234		7.81		8.84	pCi/L	12.4		(0% - 20%)	CXM2	07/23/09	21:52
		+/-0.405		+/-0.419							
Uranium-235/236		0.229		0.394	pCi/L	53.0		(0% - 100%)			
		+/-0.0834		+/-0.0996							
Uranium-238		5.26		5.97	pCi/L	12.8		(0% - 20%)			
		+/-0.332		+/-0.344							
QC1201885403	LCS										
Uranium-233/234				5.97	pCi/L					07/23/09	21:52
				+/-0.381							
Uranium-235/236				0.252	pCi/L						
				+/-0.100							
Uranium-238	6.30			6.16	pCi/L		97.9	(75%-125%)			

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 232727

Page 2 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	886957										
QC1201885396	MB			+/-0.384							
Uranium-233/234			U	0.00692	pCi/L				CXM2	07/27/09	12:10
				+/-0.0276							
Uranium-235/236			U	0.00	pCi/L						
				+/-0.0213							
Uranium-238			U	-0.0125	pCi/L						
				+/-0.0423							
QC1201885400	232135004	MS									
Uranium-233/234				7.81	pCi/L					07/23/09	21:52
				+/-0.405							
Uranium-235/236				0.229	pCi/L						
				+/-0.0834							
Uranium-238	6.30			5.26	pCi/L			109	(75%-125%)		
				+/-0.332							
Batch	888328										
QC1201888814	232135004	DUP									
Thorium-228			U	0.0288	pCi/L	32.2			N/A	CXM2	07/28/09 11:57
				+/-0.0404							
Thorium-230			U	0.00	pCi/L	200			N/A		
				+/-0.0114							
Thorium-232			U	-0.00411	pCi/L	200			N/A		
				+/-0.0114							
QC1201888822	LCS										
Thorium-228			U	0.00411	pCi/L					07/28/09	11:57
				+/-0.029							
Thorium-230	3.57			4.25	pCi/L			119	(75%-125%)		
				+/-0.259							
Thorium-232			U	0.0082	pCi/L				(75%-125%)		
				+/-0.0114							
QC1201888813	MB										
Thorium-228			U	-0.00818	pCi/L					07/28/09	11:56
				+/-0.0393							
Thorium-230			U	-0.0368	pCi/L						
				+/-0.0253							
Thorium-232			U	0.00817	pCi/L						
				+/-0.0113							
QC1201888818	232135004	MS									
Thorium-228			U	0.0288	pCi/L					07/28/09	11:57
				+/-0.0404							
Thorium-230	5.35		U	0.00	pCi/L			111	(75%-125%)		
				+/-0.0114							
Thorium-232			U	-0.00411	pCi/L				(75%-125%)		
				+/-0.0114							
Batch	888783										



# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 232727

Page 3 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	888783										
QC1201890004	232727020	DUP									
Thorium-228		1.94		1.67	pCi/g	15.0		(0% - 20%)	CXM2	07/29/09	17:13
		+/-0.349		+/-0.276							
Thorium-230		2.64		2.42	pCi/g	8.70		(0% - 20%)			
		+/-0.394		+/-0.332							
Thorium-232		1.72		1.36	pCi/g	23.4*		(0% - 20%)			
		+/-0.318		+/-0.250							
QC1201890006	LCS										
Thorium-228			U	-0.0161	pCi/g					07/29/09	17:13
				+/-0.0771							
Thorium-230	8.39			9.56	pCi/g		114	(75%-125%)			
				+/-0.544							
Thorium-232			U	-0.016	pCi/g			(75%-125%)			
				+/-0.0385							
QC1201890003	MB										
Thorium-228			U	0.0336	pCi/g					07/29/09	17:12
				+/-0.0466							
Thorium-230			U	0.00839	pCi/g						
				+/-0.0285							
Thorium-232			U	0.00	pCi/g						
				+/-0.0164							
QC1201890005	232727020	MS									
Thorium-228		1.94		1.63	pCi/g					07/29/09	17:13
		+/-0.349		+/-0.267							
Thorium-230	10.5	2.64		15.0	pCi/g		118	(75%-125%)			
		+/-0.394		+/-0.803							
Thorium-232		1.72		1.36	pCi/g			(75%-125%)			
		+/-0.318		+/-0.246							
<b>Rad Gas Flow</b>											
Batch	882963										
QC1201875412	232727020	DUP									
Radium-228		1.67		1.17	pCi/g	35.1		(0% - 100%)	JXC5	07/16/09	20:31
		+/-0.338		+/-0.341							
QC1201875414	LCS										
Radium-228	8.07			6.60	pCi/g		81.8	(75%-125%)		07/16/09	16:40
				+/-0.747							
QC1201875411	MB										
Radium-228			U	0.109	pCi/g					07/16/09	16:40
				+/-0.206							
QC1201875413	232727020	MS									
Radium-228	81.3	1.67		79.4	pCi/g		95.6	(75%-125%)		07/16/09	16:40
		+/-0.338		+/-8.66							
Batch	885330										
QC1201881213	232135004	DUP									
Radium-228			U	0.975	pCi/L	38.5		(0% - 100%)	MXS2	07/27/09	07:44
		+/-0.706		+/-0.644							
QC1201881215	LCS										

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 232727

Page 4 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gas Flow</b>											
Batch	885330										
Radium-228	20.4			19.2	pCi/L		93.8	(75%-125%)		07/27/09	07:45
				+/-2.03							
QC1201881212	MB										
Radium-228			U	0.431	pCi/L				MXS2	07/27/09	07:44
				+/-0.491							
QC1201881214	232135004	MS									
Radium-228	20.6	U	0.975	16.4	pCi/L		79.8	(75%-125%)		07/27/09	16:06
			+/-0.706	+/-4.80							
<b>Rad Ra-226</b>											
Batch	883008										
QC1201875554	232727020	DUP									
Radium-226				1.12	pCi/g	0.769		(0% - 20%)	KSD1	07/27/09	19:30
				+/-0.231							
QC1201875556	LCS										
Radium-226	11.1			8.44	pCi/g		76.3	(75%-125%)		07/27/09	19:30
				+/-0.587							
QC1201875553	MB										
Radium-226		U		0.0514	pCi/g					07/27/09	19:30
				+/-0.113							
QC1201875555	232727020	MS									
Radium-226	12.0			1.12	pCi/g		115	(75%-125%)		07/27/09	19:30
				+/-0.231							
Batch	883675										
QC1201877245	232135004	DUP									
Radium-226			U	0.535	pCi/L	66.0		(0% - 100%)	KSD1	07/14/09	15:05
				+/-0.519							
QC1201877247	LCS										
Radium-226	24.2			22.9	pCi/L		94.9	(75%-125%)		07/14/09	15:05
				+/-1.55							
QC1201877244	MB										
Radium-226		U		0.326	pCi/L					07/14/09	15:05
				+/-0.302							
QC1201877246	232135004	MS									
Radium-226	121			1.06	pCi/L		122	(75%-125%)		07/14/09	16:05
				+/-0.519							

Notes:

The Qualifiers in this report are defined as follows:

- \*\* 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

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 232727

Page 5 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
C											
D											
F											
H											
J											
M											
M											
N/A											
ND											
NJ											
R											
U											
UI											
X											
Y											
^											
h											

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# 884765 Product: U Date: 7/23/09

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.	✓		
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.		✓	NCR 714 512
Method blank is less than the RDL/ LLD. (If rad samples. < 5% of lowest activity)	✓		Case narrative
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 stated.	✓		
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.	✓		NCR 714 512
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCR 714 512
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: JyL MLF - 7/23/09

Secondary Review Performed By: [Signature] 7/23/09

7/20 7/31

KERR

# Uranium Que Sheet

13-JUL-09

Batch #: 884765 Analyst: CXM2 First Client Due Date: 31-JUL-09 Internal Due Date: 20-JUL-09  
 Tracer Isotope: U-232(0-236) Tracer Code: 1283-13 Expiration Date: 12/16/09 Vol: 0.1ml  
 LCS Isotope: U-238 LCS Code: 1163-6 Expiration Date: 4/16/10 Vol: 0.1ml  
 Spike Isotope: U-238 Spike Code: 1163-6 Expiration Date: 4/16/10 Vol: 0.1ml  
 Prep Date: 7/15/09 Initials: CMA Pipet ID: 50410272 Balance ID: 50410272

Witness: Me 7/15/09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g/l/f)	U Det #
232727001-1	SA50-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	30-JUN-09	1	31	1.002	168
232727002-1	SA54-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	30-JUN-09	2	32	1.001	170
232727003-1	SA102-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	30-JUN-09	3	33	1.005	171
232727004-1	SA109-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	30-JUN-09	4	34	1.006	172
232727005-1	SA82-29B	SAMPLE		.04 pCi/g	SOIL	KERR003	01-JUL-09	5	35	1.009	161
232727006-1	RSAL3-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	01-JUL-09	6	36	1.001	163
232727007-1	RSAL3-30B	SAMPLE		.04 pCi/g	SOIL	KERR003	01-JUL-09	7	37	1.004	164
232727008-1	SA114-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	01-JUL-09	8	38	1.003	165
232727009-1	SA114009-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	01-JUL-09	9	39	1.009	166
232727010-1	RSANG-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	01-JUL-09	10	40	1.009	167
232727011-1	SA134-20B	SAMPLE		.04 pCi/g	SOIL	KERR003	01-JUL-09	11	41	1.010	168
232727012-1	SA134-31B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-JUL-09	12	42	1.005	169
232727013-1	SA134009-31B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-JUL-09	13	43	1.003	170
232727014-1	SA88-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-JUL-09	14	44	1.001	171
232727015-1	SA88-20B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-JUL-09	15	45	1.008	172
232727016-1	SA88-32B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-JUL-09	16	46	1.008	149
232727017-1	RSAK3-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-JUL-09	17	47	1.007	150
232727018-1	RSAK3-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-JUL-09	18	48	1.003	155
232727019-1	RSAK3-20B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-JUL-09	19	49	1.010	156
232727020-1	RSAK3-31B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-JUL-09	20	50	1.002	157
1201879827-1	MB for batch 884765	MB		.04 pCi/g	SOIL	QC ACCOUNT	02-JUL-09	21	51	1.01	158
1201879828-1	RSAK3-31B(232727020DUP)	DUP		.04 pCi/g	SOIL	QC ACCOUNT	02-JUL-09	22	52	1.005	159
1201879829-1	RSAK3-31B(232727020MS)	MS		.04 pCi/g	SOIL	QC ACCOUNT	02-JUL-09	23	53	1.001	160
1201879830-1	LCS for batch 884765	LCS		.04 pCi/g	SOIL	QC ACCOUNT		24	54	1.01	131

Data Reviewed By: J. M. L. 7/23/09

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

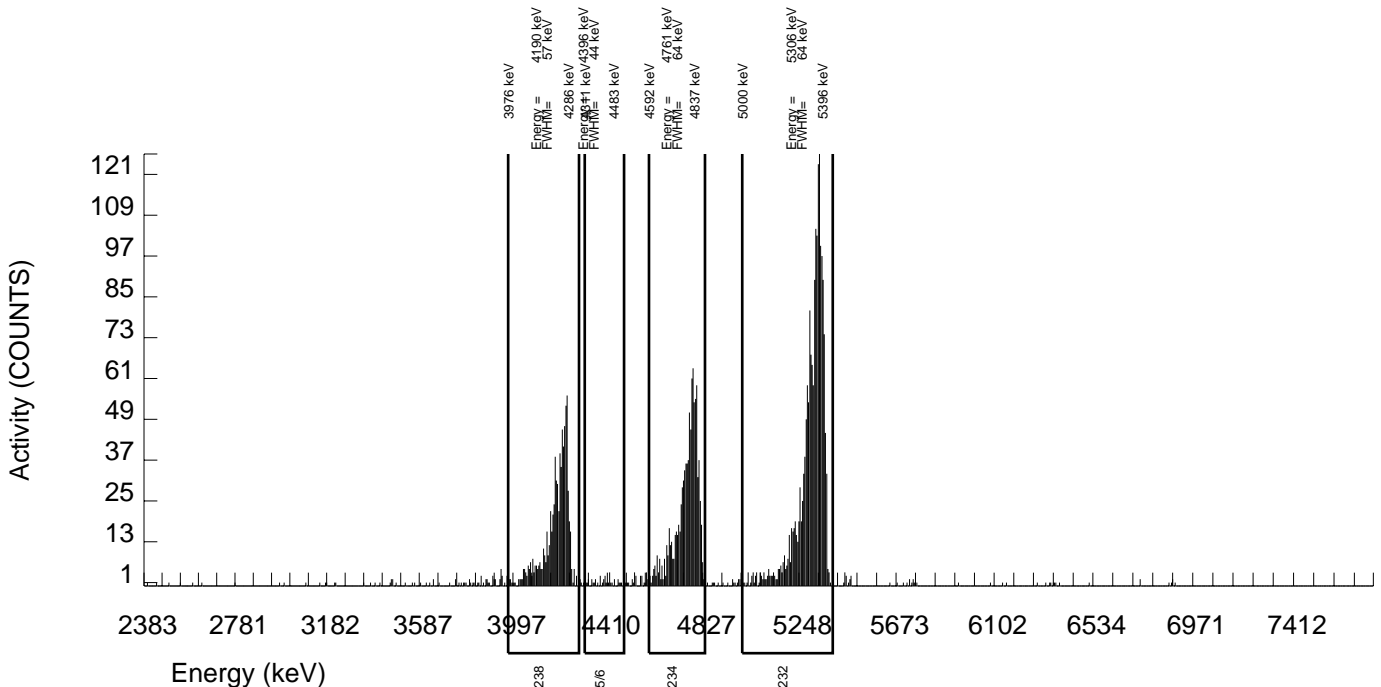
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765 SAMPLE DATE : 30-JUN-2009 00:00:00		SAMPLE ID : S0232727001_UU SAMPLE QTY: 1.002 G	
DETECTOR NUMBER :72547 AVERAGE %EFFICIENCY :38.6120 % YIELD : 88.863		COUNT DATE:18-JUL-2009 18:21:29 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 5.29532 dpm RESULTS : 4.70556 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B168.CNF;106 BKG DATE : 12-JUL-2009 EFF FILE : W168.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
U-3/4	4763.020	964.000	954.520	4.000	2.0000	100.0000	1.25E+00	1.84E-01	1.61E-02	6.10E-03	7.97E-02
U232	5302.100	1840.000	1816.000	24.000	4.8990	100.0000	2.38E+00	3.35E-01	3.38E-02	1.49E-02	1.11E-01
U-235	4391.000	38.000	34.000	4.000	2.0000	80.90000	5.51E-02	2.18E-02	1.99E-02	7.54E-03	2.06E-02
U-238	4184.730	772.000	770.000	2.000	1.4142	100.0000	1.01E+00	1.52E-01	1.26E-02	4.31E-03	7.14E-02

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





GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765  
SAMPLE DATE : 30-JUN-2009 00:00:00

SAMPLE ID : S0232727002\_UU  
SAMPLE QTY: 1.001 G

DETECTOR NUMBER :72549  
AVERAGE %EFFICIENCY :36.7228  
% YIELD : 93.794

COUNT DATE:18-JUL-2009 18:21:35  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

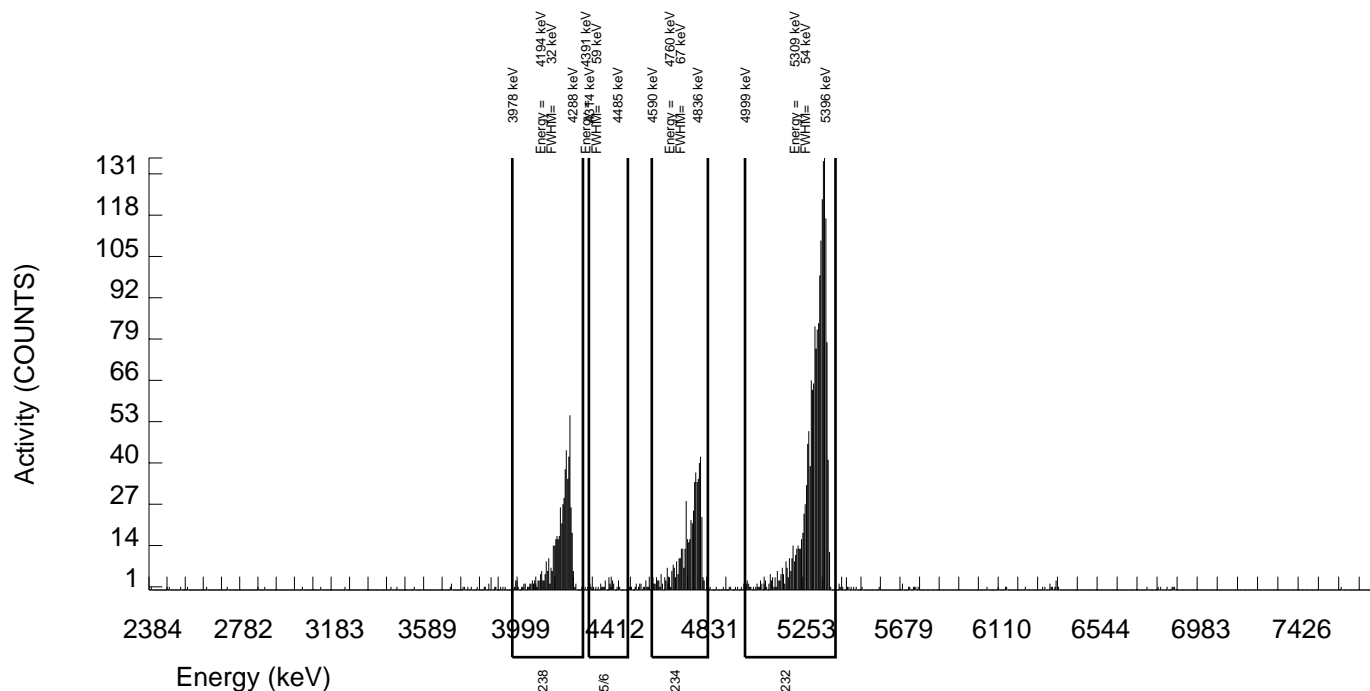
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29532 dpm  
RESULTS : 4.96672 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B170.CNF;106  
BKG DATE : 12-JUL-2009  
EFF FILE : W170.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
U-3/4	4763.020	550.000	540.499	4.000	2.0000	100.0000	7.06E-01	1.11E-01	1.61E-02	6.08E-03	6.00E-02
U232	5302.100	1837.000	1823.000	14.000	3.7417	100.0000	2.38E+00	3.34E-01	2.67E-02	1.14E-02	1.10E-01
U-235	4391.000	34.000	31.000	3.000	1.7321	80.90000	5.01E-02	2.04E-02	1.79E-02	6.51E-03	1.93E-02
U-238	4184.730	566.000	563.000	3.000	1.7321	100.0000	7.36E-01	1.15E-01	1.44E-02	5.26E-03	6.11E-02

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



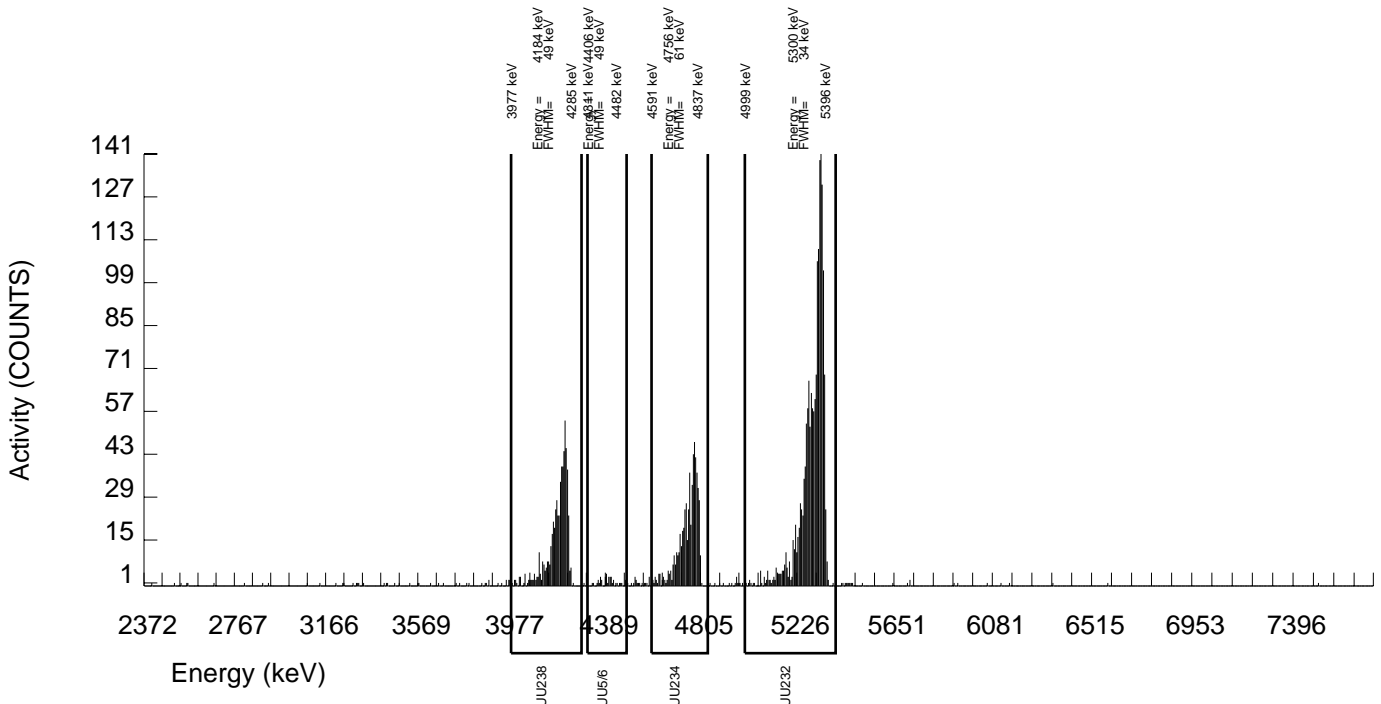
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765 SAMPLE DATE : 30-JUN-2009 00:00:00		SAMPLE ID : S0232727003_UU SAMPLE QTY: 1.005 G	
DETECTOR NUMBER :78260 AVERAGE %EFFICIENCY :38.4334 % YIELD : 84.016		COUNT DATE:18-JUL-2009 18:21:37 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.506E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.506E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29532 dpm RESULTS : 4.44890 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B171.CNF;112 BKG DATE : 12-JUL-2009 EFF FILE : W171.CNF;51 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
U-3/4	4763.020	589.000	577.843	6.000	2.4495	100.0000	8.02E-01	1.26E-01	2.00E-02	7.91E-03	6.61E-02
U232	5302.100	1724.000	1709.000	15.000	3.8730	100.0000	2.37E+00	3.36E-01	2.92E-02	1.25E-02	1.14E-01
U-235	4391.000	38.000	38.000	0.000	0.0000	80.90000	6.52E-02	2.25E-02	5.15E-03	0.00E+00	2.07E-02
U-238	4184.730	605.000	593.000	12.000	3.4641	100.0000	8.23E-01	1.29E-01	2.65E-02	1.12E-02	6.76E-02

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765  
SAMPLE DATE : 30-JUN-2009 00:00:00

SAMPLE ID : S0232727004\_UU  
SAMPLE QTY: 1.006 G

DETECTOR NUMBER :78772  
AVERAGE %EFFICIENCY :38.2609  
% YIELD : 91.505

COUNT DATE:18-JUL-2009 18:21:40  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

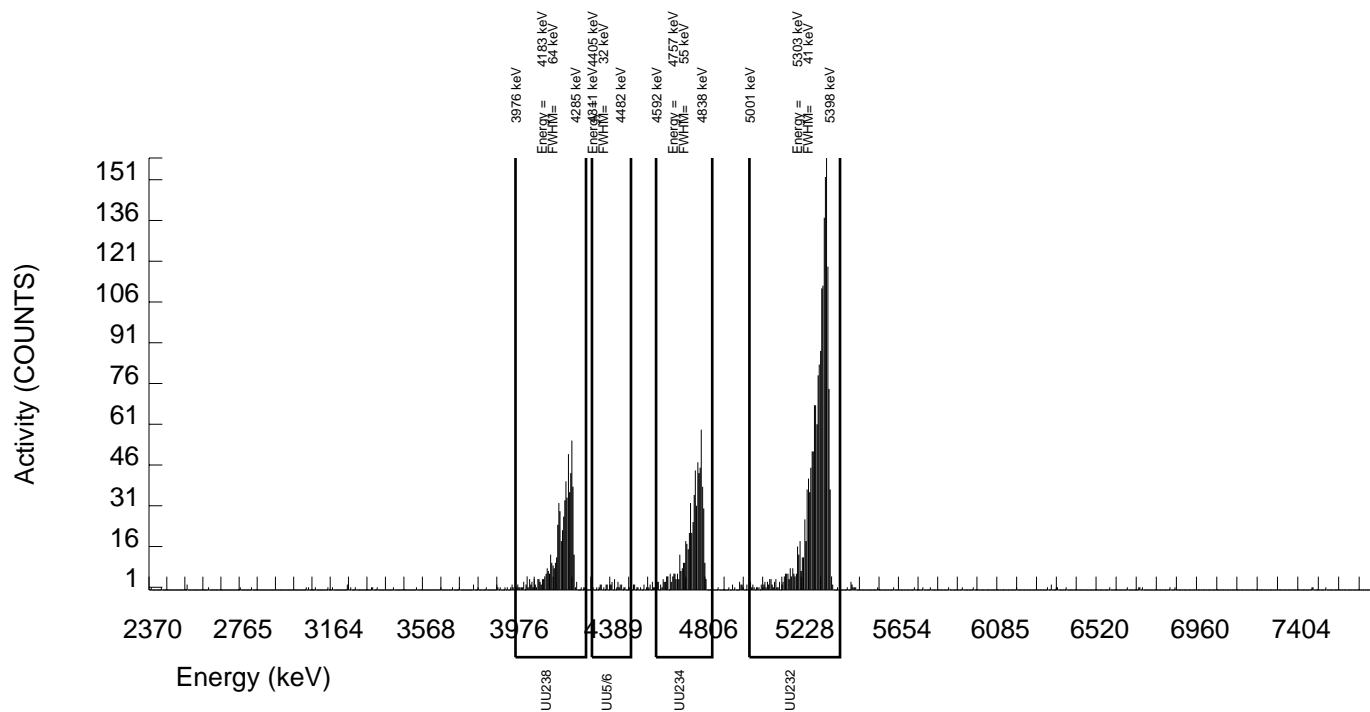
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29532 dpm  
RESULTS : 4.84551 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B172.CNF;110  
BKG DATE : 12-JUL-2009  
EFF FILE : W172.CNF;44  
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
U-3/4	4763.020	655.000	644.408	5.000	2.2361	100.0000	8.24E-01	1.26E-01	1.71E-02	6.65E-03	6.41E-02
U232	5302.100	1858.000	1853.000	5.000	2.2361	100.0000	2.37E+00	3.32E-01	1.72E-02	6.66E-03	1.08E-01
U-235	4391.000	36.000	34.000	2.000	1.4142	80.90000	5.37E-02	2.04E-02	1.51E-02	5.20E-03	1.91E-02
U-238	4184.730	651.000	649.000	2.000	1.4142	100.0000	8.30E-01	1.27E-01	1.23E-02	4.21E-03	6.41E-02

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



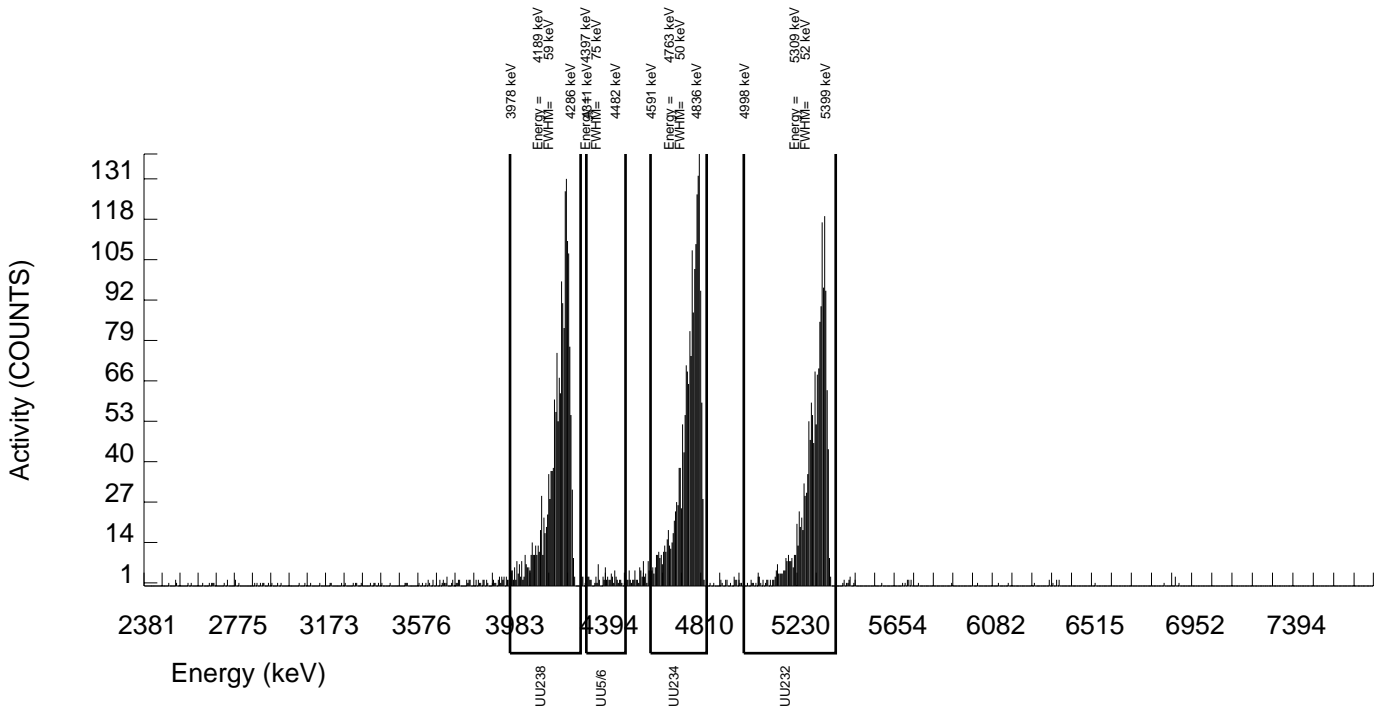
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765 SAMPLE DATE : 1-JUL-2009 00:00:00.		SAMPLE ID : S0232727005_UU SAMPLE QTY: 1.009 G	
DETECTOR NUMBER :70321 AVERAGE %EFFICIENCY :36.8045 % YIELD : 83.169		COUNT DATE:20-JUL-2009 14:35:12 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 5.29517 dpm RESULTS : 4.40396 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B161.CNF;107 BKG DATE : 19-JUL-2009 EFF FILE : W161.CNF;37 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
U-3/4	4763.020	1911.000	1899.111	7.000	2.6458	100.0000	2.77E+00	3.91E-01	2.23E-02	8.98E-03	1.25E-01
U232	5302.100	1629.000	1620.000	9.000	3.0000	100.0000	2.36E+00	3.36E-01	2.47E-02	1.02E-02	1.16E-01
U-235	4391.000	71.000	69.000	2.000	1.4142	80.90000	1.24E-01	3.45E-02	1.73E-02	5.93E-03	3.02E-02
U-238	4184.730	1799.000	1799.000	0.000	0.0000	100.0000	2.62E+00	3.71E-01	4.38E-03	0.00E+00	1.21E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765  
SAMPLE DATE : 1-JUL-2009 00:00:00.

SAMPLE ID : S0232727006\_UU  
SAMPLE QTY: 1.001 G

DETECTOR NUMBER :70324  
AVERAGE %EFFICIENCY :38.2201  
% YIELD : 86.269

COUNT DATE:20-JUL-2009 14:35:16  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

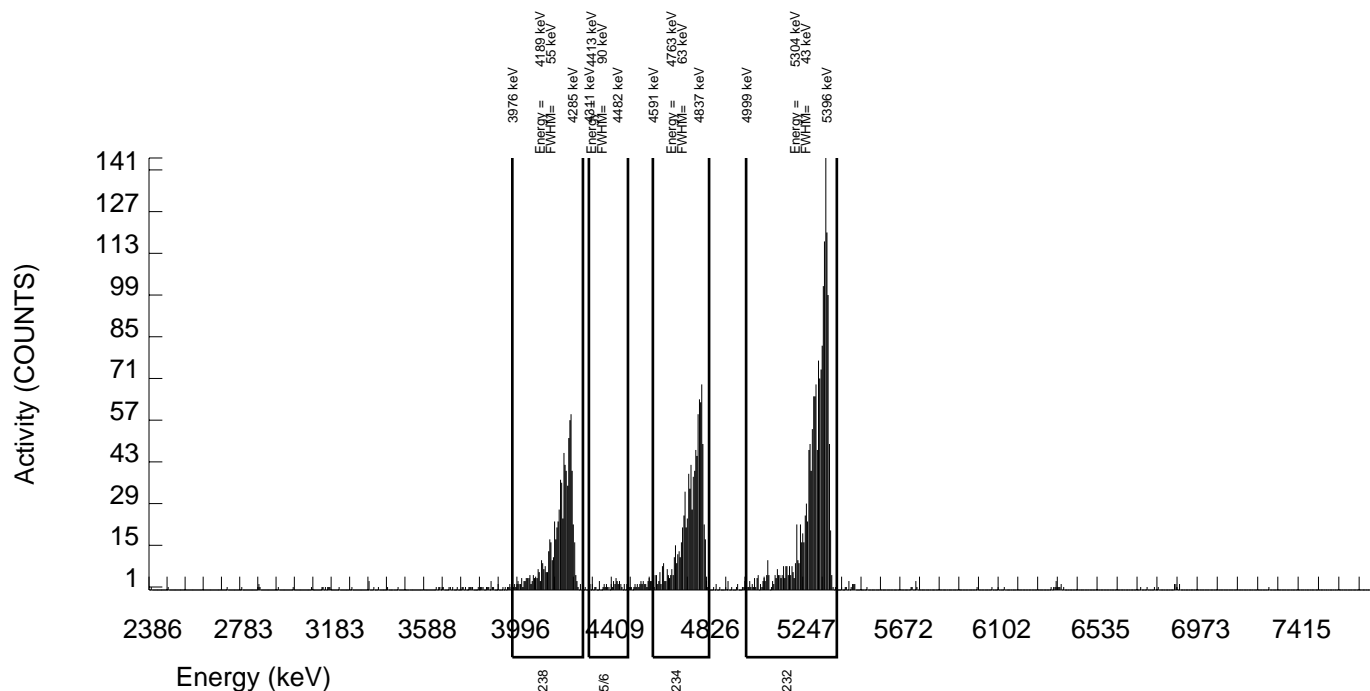
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29517 dpm  
RESULTS : 4.56807 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B163.CNF;107  
BKG DATE : 19-JUL-2009  
EFF FILE : W163.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
U-3/4	4763.020	955.000	938.734	11.000	3.3166	100.0000	1.28E+00	1.89E-01	2.52E-02	1.05E-02	8.29E-02
U232	5302.100	1764.000	1745.000	19.000	4.3589	100.0000	2.38E+00	3.36E-01	3.18E-02	1.38E-02	1.13E-01
U-235	4391.000	44.000	42.000	2.000	1.4142	80.90000	7.09E-02	2.43E-02	1.62E-02	5.55E-03	2.24E-02
U-238	4184.730	821.000	819.000	2.000	1.4142	100.0000	1.12E+00	1.67E-01	1.31E-02	4.49E-03	7.67E-02

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765  
SAMPLE DATE : 1-JUL-2009 00:00:00.

SAMPLE ID : S0232727007\_UU  
SAMPLE QTY: 1.004 G

DETECTOR NUMBER :70325  
AVERAGE %EFFICIENCY :37.8611  
% YIELD : 85.689

COUNT DATE:20-JUL-2009 14:35:19  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

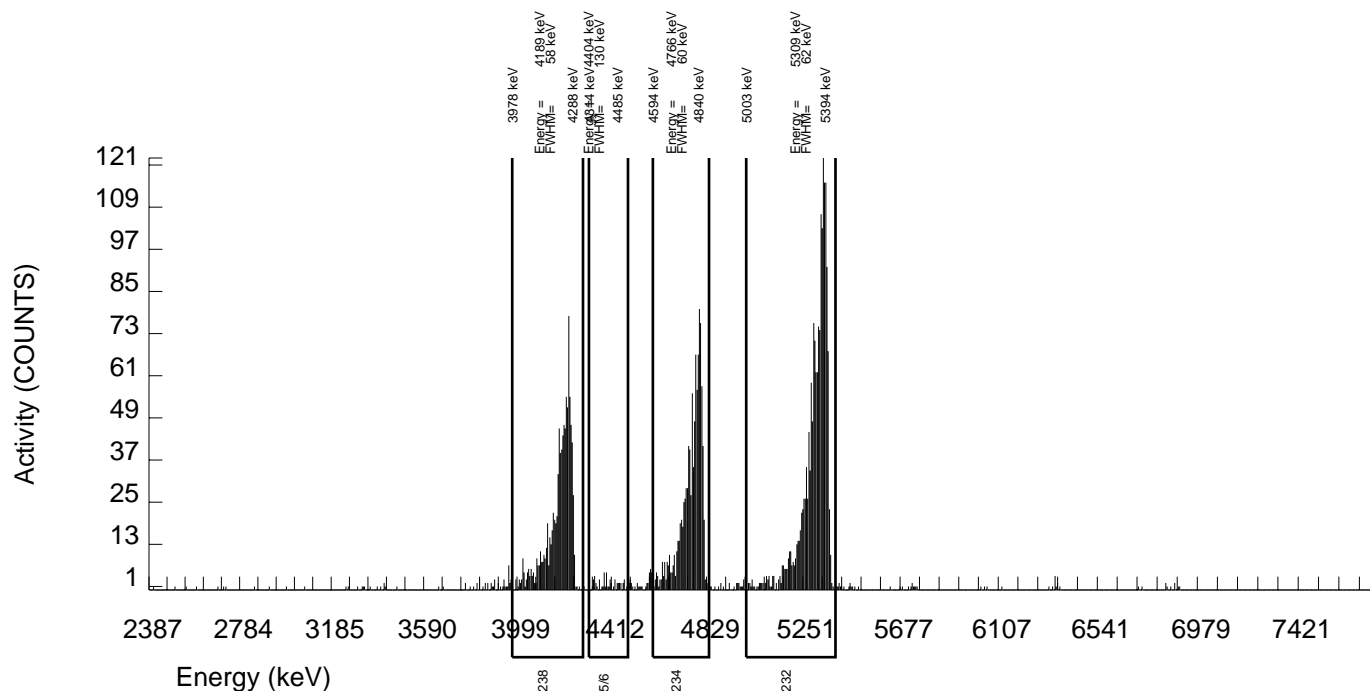
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29517 dpm  
RESULTS : 4.53739 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B164.CNF;107  
BKG DATE : 19-JUL-2009  
EFF FILE : W164.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
U-3/4	4763.020	1030.000	1021.819	3.000	1.7321	100.0000	1.41E+00	2.07E-01	1.53E-02	5.57E-03	8.69E-02
U232	5302.100	1731.000	1717.000	14.000	3.7417	100.0000	2.38E+00	3.36E-01	2.82E-02	1.20E-02	1.13E-01
U-235	4391.000	52.000	49.000	3.000	1.7321	80.90000	8.38E-02	2.72E-02	1.89E-02	6.89E-03	2.48E-02
U-238	4184.730	965.000	960.000	5.000	2.2361	100.0000	1.33E+00	1.96E-01	1.85E-02	7.19E-03	8.44E-02

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765  
SAMPLE DATE : 1-JUL-2009 00:00:00.

SAMPLE ID : S0232727008\_UU  
SAMPLE QTY: 1.003 G

DETECTOR NUMBER :72544  
AVERAGE %EFFICIENCY :37.9362  
% YIELD : 43.731

COUNT DATE:20-JUL-2009 14:35:21  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

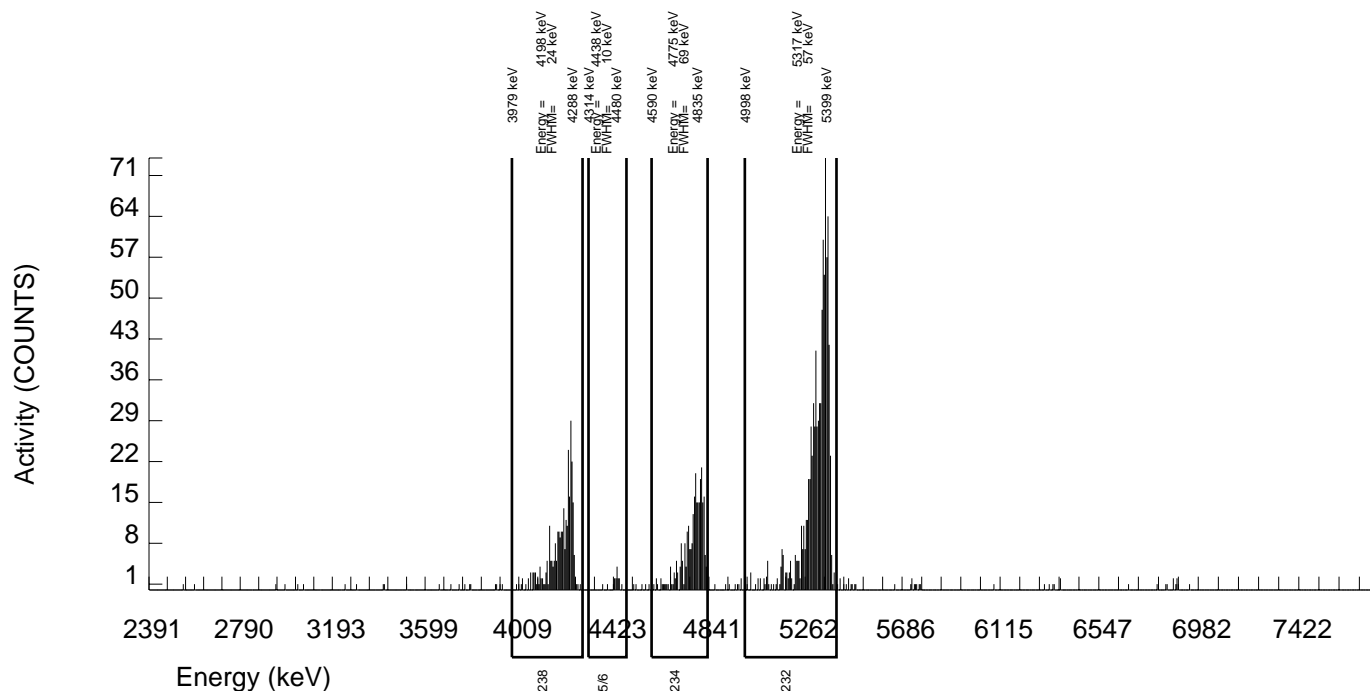
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29517 dpm  
RESULTS : 2.31563 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B165.CNF;107  
BKG DATE : 19-JUL-2009  
EFF FILE : W165.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
U-3/4	4763.020	279.000	272.350	4.000	2.0000	100.0000	7.37E-01	1.37E-01	3.33E-02	1.26E-02	8.88E-02
U232	5302.100	888.000	878.000	10.000	3.1623	100.0000	2.38E+00	3.71E-01	4.80E-02	1.99E-02	1.59E-01
U-235	4391.000	16.000	15.000	1.000	1.0000	80.90000	5.02E-02	2.80E-02	2.56E-02	7.78E-03	2.70E-02
U-238	4184.730	296.000	294.000	2.000	1.4142	100.0000	7.96E-01	1.45E-01	2.59E-02	8.91E-03	9.16E-02

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765  
SAMPLE DATE : 1-JUL-2009 00:00:00.

SAMPLE ID : S0232727009\_UU  
SAMPLE QTY: 1.009 G

DETECTOR NUMBER :74545  
AVERAGE %EFFICIENCY :38.9197  
% YIELD : 37.577

COUNT DATE:20-JUL-2009 14:35:24  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

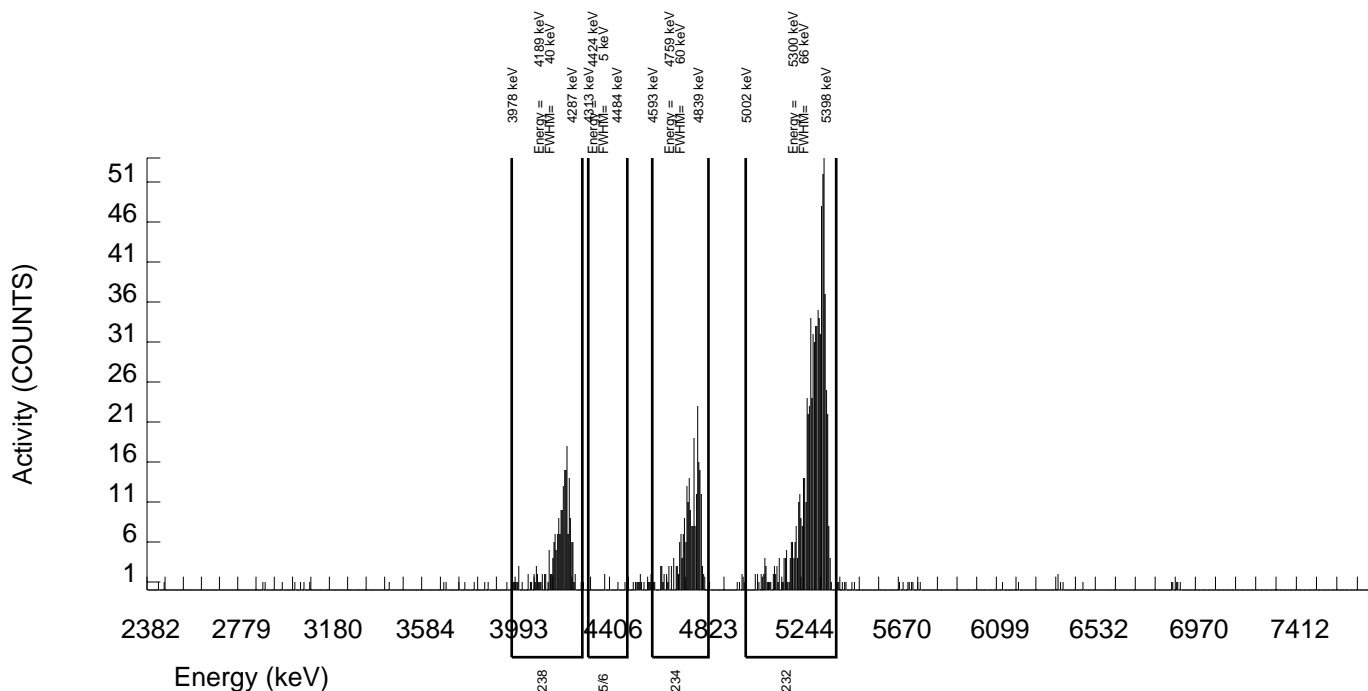
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29517 dpm  
RESULTS : 1.98976 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B166.CNF;108  
BKG DATE : 19-JUL-2009  
EFF FILE : W166.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
U-3/4	4763.020	248.000	242.664	3.000	1.7321	100.0000	7.41E-01	1.42E-01	3.38E-02	1.23E-02	9.43E-02
U232	5302.100	778.000	774.000	4.000	2.0000	100.0000	2.36E+00	3.77E-01	3.76E-02	1.42E-02	1.67E-01
U-235	4391.000	5.000	5.000	0.000	0.0000	80.90000	1.89E-02	1.68E-02	1.13E-02	0.00E+00	1.65E-02
U-238	4184.730	212.000	212.000	0.000	0.0000	100.0000	6.47E-01	1.27E-01	9.16E-03	0.00E+00	8.71E-02

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





GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765  
SAMPLE DATE : 1-JUL-2009 00:00:00.

SAMPLE ID : S0232727010\_UU  
SAMPLE QTY: 1.009 G

DETECTOR NUMBER :72546  
AVERAGE %EFFICIENCY :39.0763  
% YIELD : 88.005

COUNT DATE:20-JUL-2009 14:35:26  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

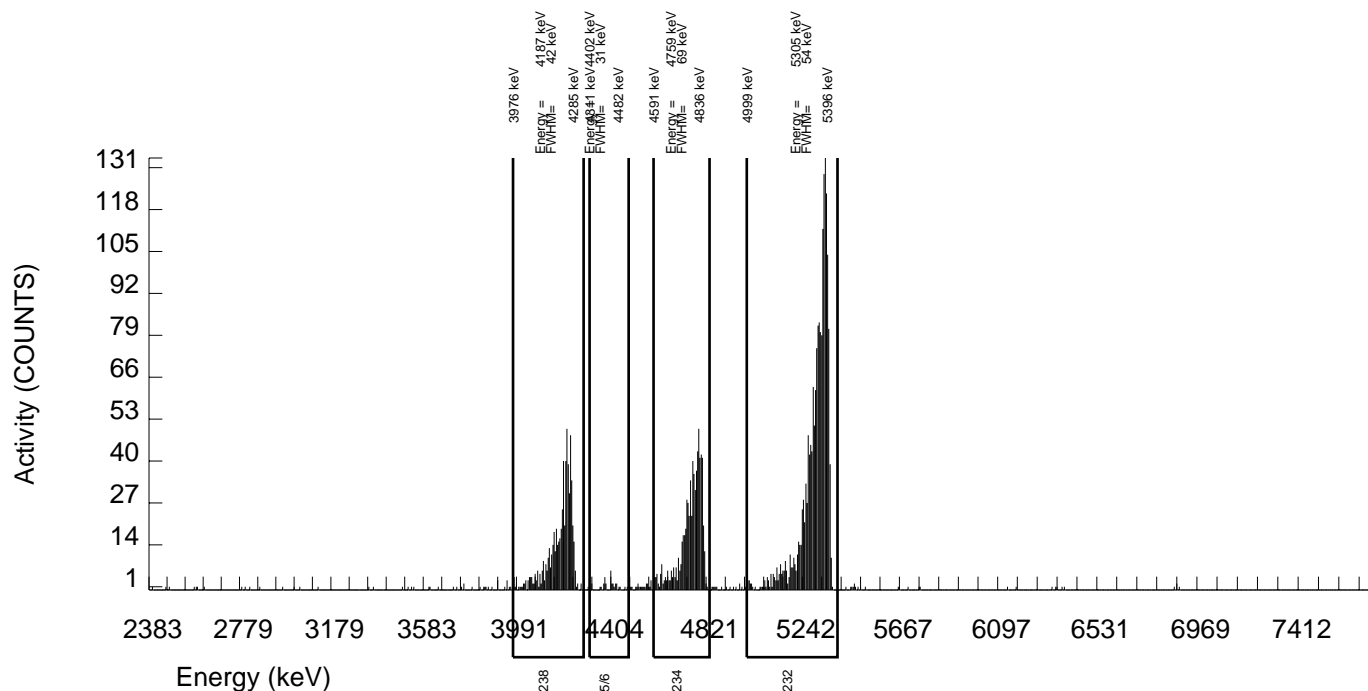
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29517 dpm  
RESULTS : 4.66001 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B167.CNF;108  
BKG DATE : 19-JUL-2009  
EFF FILE : W167.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
U-3/4	4763.020	711.000	702.508	3.000	1.7321	100.0000	9.12E-01	1.39E-01	1.44E-02	5.23E-03	6.77E-02
U232	5302.100	1831.000	1820.000	11.000	3.3166	100.0000	2.36E+00	3.32E-01	2.39E-02	1.00E-02	1.09E-01
U-235	4391.000	32.000	29.000	3.000	1.7321	80.90000	4.65E-02	1.96E-02	1.77E-02	6.47E-03	1.86E-02
U-238	4184.730	631.000	629.000	2.000	1.4142	100.0000	8.17E-01	1.26E-01	1.24E-02	4.27E-03	6.40E-02

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



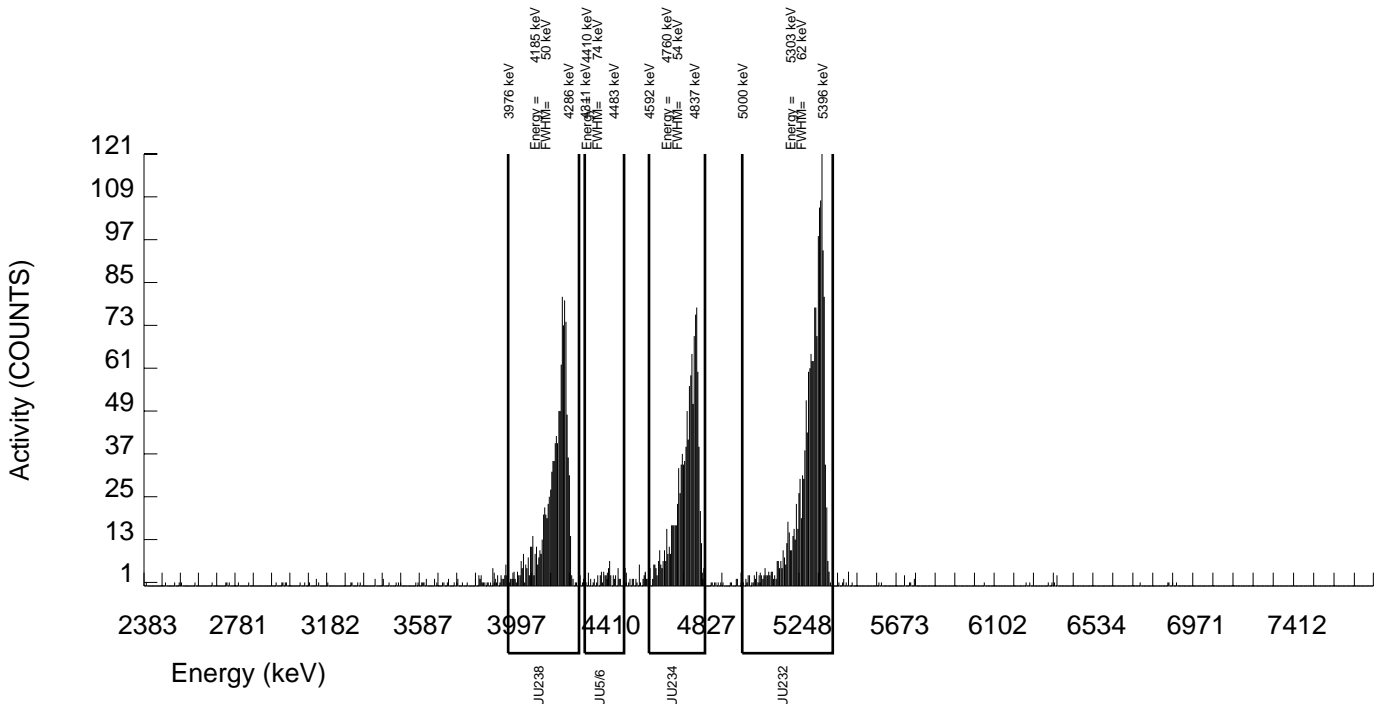
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765 SAMPLE DATE : 2-JUL-2009 00:00:00.		SAMPLE ID : S0232727011_UU SAMPLE QTY: 1.010 G	
DETECTOR NUMBER :72547 AVERAGE %EFFICIENCY :38.6120 % YIELD : 85.001		COUNT DATE:20-JUL-2009 14:35:29 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 5.29504 dpm RESULTS : 4.50085 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B168.CNF;108 BKG DATE : 19-JUL-2009 EFF FILE : W168.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
U-3/4	4763.020	1158.000	1143.758	9.000	3.0000	100.0000	1.55E+00	2.26E-01	2.30E-02	9.48E-03	9.08E-02
U232	5302.100	1754.000	1737.000	17.000	4.1231	100.0000	2.36E+00	3.33E-01	3.02E-02	1.30E-02	1.12E-01
U-235	4391.000	65.000	62.000	3.000	1.7321	80.90000	1.04E-01	3.05E-02	1.86E-02	6.77E-03	2.71E-02
U-238	4184.730	1164.000	1163.000	1.000	1.0000	100.0000	1.58E+00	2.29E-01	1.04E-02	3.16E-03	9.09E-02

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765  
SAMPLE DATE : 2-JUL-2009 00:00:00.

SAMPLE ID : S0232727012\_UU  
SAMPLE QTY: 1.005 G

DETECTOR NUMBER :72548  
AVERAGE %EFFICIENCY :37.6788  
% YIELD : 89.313

COUNT DATE:20-JUL-2009 14:35:32  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/G : 2.506E+00

LCS/LCSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/G : 2.506E+00

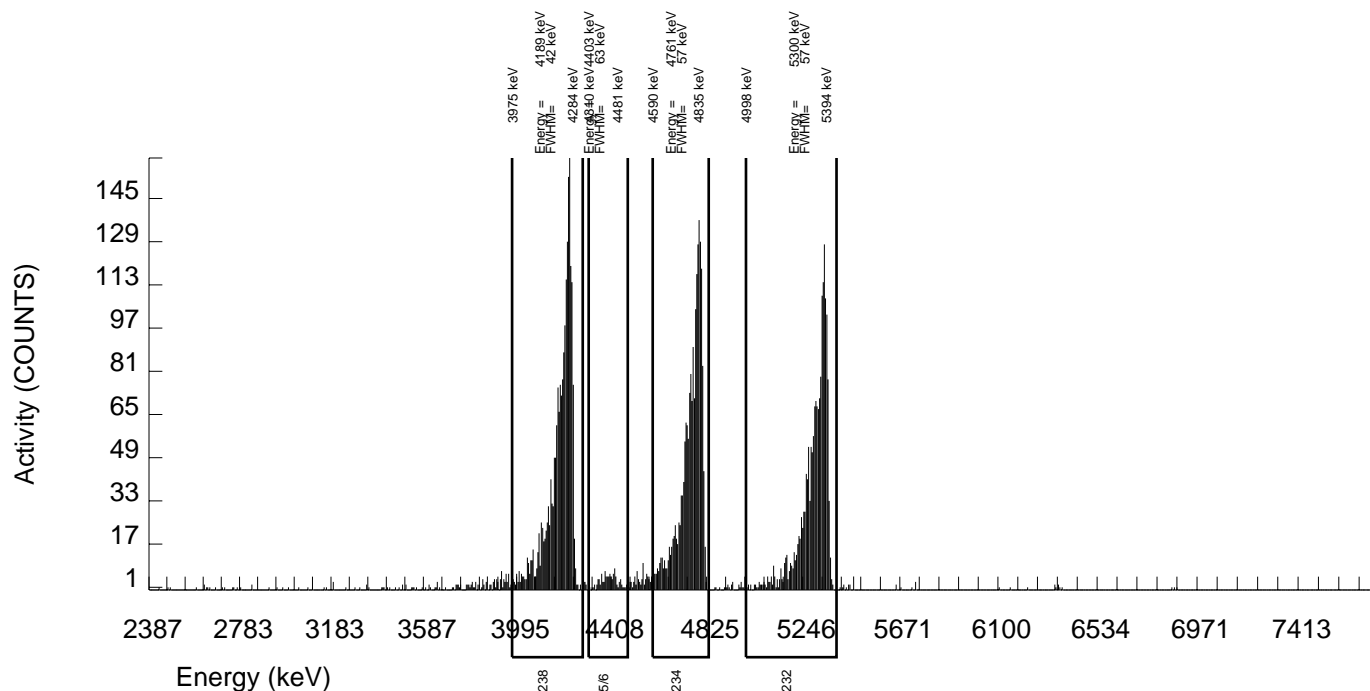
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29504 dpm  
RESULTS : 4.72916 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B169.CNF;108  
BKG DATE : 19-JUL-2009  
EFF FILE : W169.CNF;35  
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
U-3/4	4763.020	1925.000	1904.625	15.000	3.8730	100.0000	2.54E+00	3.56E-01	2.80E-02	1.20E-02	1.15E-01
U232	5302.100	1803.000	1781.000	22.000	4.6904	100.0000	2.37E+00	3.34E-01	3.31E-02	1.45E-02	1.12E-01
U-235	4391.000	104.000	103.000	1.000	1.0000	80.90000	1.70E-01	4.00E-02	1.26E-02	3.83E-03	3.31E-02
U-238	4184.730	2089.000	2080.000	9.000	3.0000	100.0000	2.77E+00	3.87E-01	2.26E-02	9.30E-03	1.20E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765  
SAMPLE DATE : 2-JUL-2009 00:00:00.

SAMPLE ID : S0232727013\_UU  
SAMPLE QTY: 1.003 G

DETECTOR NUMBER :72549  
AVERAGE %EFFICIENCY :36.7228  
% YIELD : 91.998

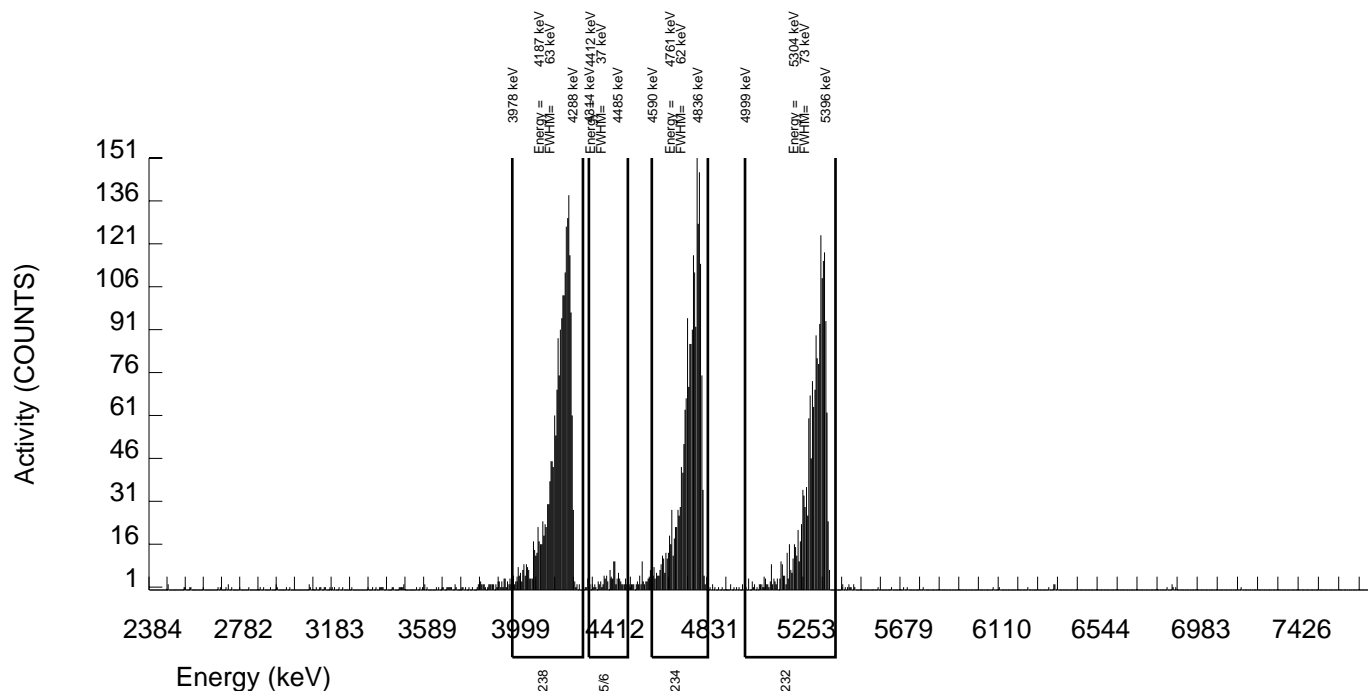
COUNT DATE:20-JUL-2009 14:35:34  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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 : 5.29504 dpm RESULTS : 4.87134 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B170.CNF;108 BKG DATE : 19-JUL-2009 EFF FILE : W170.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
U-3/4	4763.020	2020.000	2010.604	4.000	2.0000	100.0000	2.67E+00	3.73E-01	1.64E-02	6.19E-03	1.17E-01
U232	5302.100	1797.000	1788.000	9.000	3.0000	100.0000	2.38E+00	3.34E-01	2.26E-02	9.28E-03	1.11E-01
U-235	4391.000	107.000	104.000	3.000	1.7321	80.90000	1.71E-01	4.07E-02	1.82E-02	6.62E-03	3.38E-02
U-238	4184.730	2098.000	2096.000	2.000	1.4142	100.0000	2.79E+00	3.88E-01	1.27E-02	4.37E-03	1.19E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765  
SAMPLE DATE : 2-JUL-2009 00:00:00.

SAMPLE ID : S0232727014\_UU  
SAMPLE QTY: 1.001 G

DETECTOR NUMBER :78260  
AVERAGE %EFFICIENCY :38.4334  
% YIELD : 85.200

COUNT DATE:20-JUL-2009 14:35:36  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

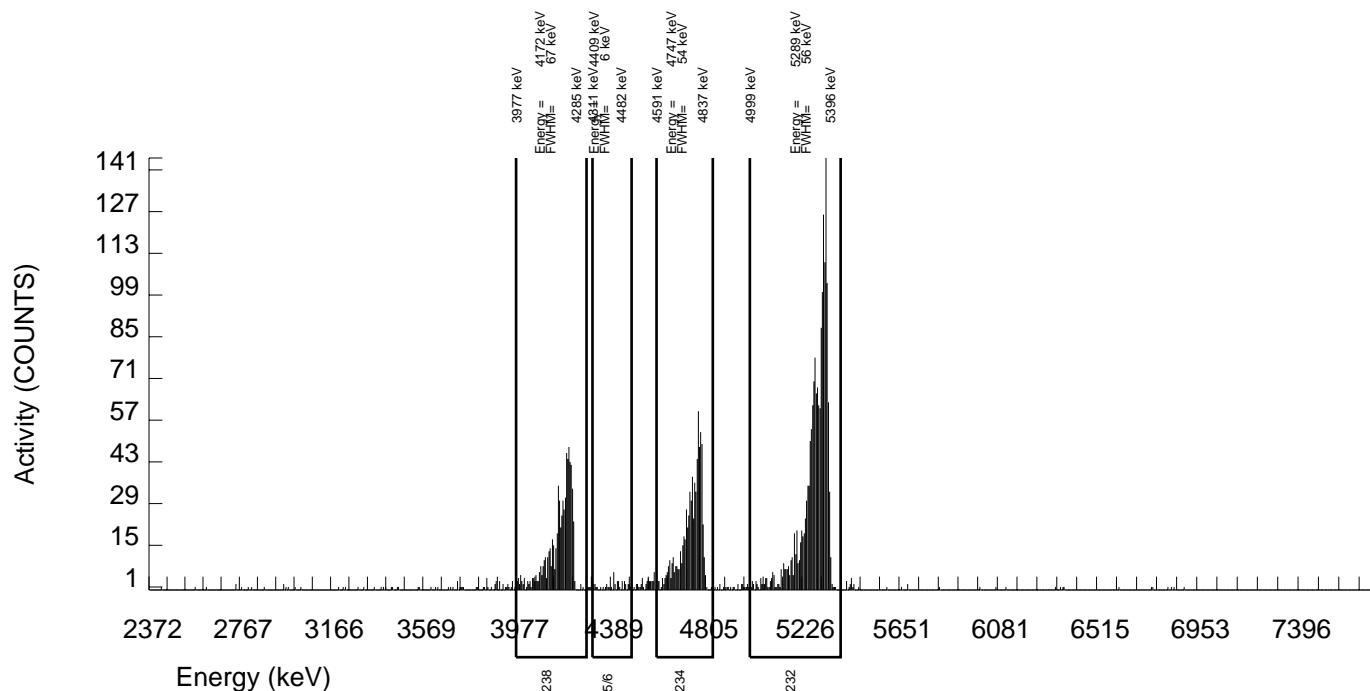
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29503 dpm  
RESULTS : 4.51135 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B171.CNF;114  
BKG DATE : 19-JUL-2009  
EFF FILE : W171.CNF;51  
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
U-3/4	4763.020	741.000	728.770	7.000	2.6458	100.0000	1.00E+00	1.52E-01	2.10E-02	8.46E-03	7.34E-02
U232	5302.100	1759.000	1733.000	26.000	5.0990	100.0000	2.38E+00	3.37E-01	3.67E-02	1.63E-02	1.14E-01
U-235	4391.000	43.000	41.000	2.000	1.4142	80.90000	6.96E-02	2.42E-02	1.63E-02	5.59E-03	2.23E-02
U-238	4184.730	712.000	695.000	17.000	4.1231	100.0000	9.55E-01	1.46E-01	3.05E-02	1.32E-02	7.27E-02

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



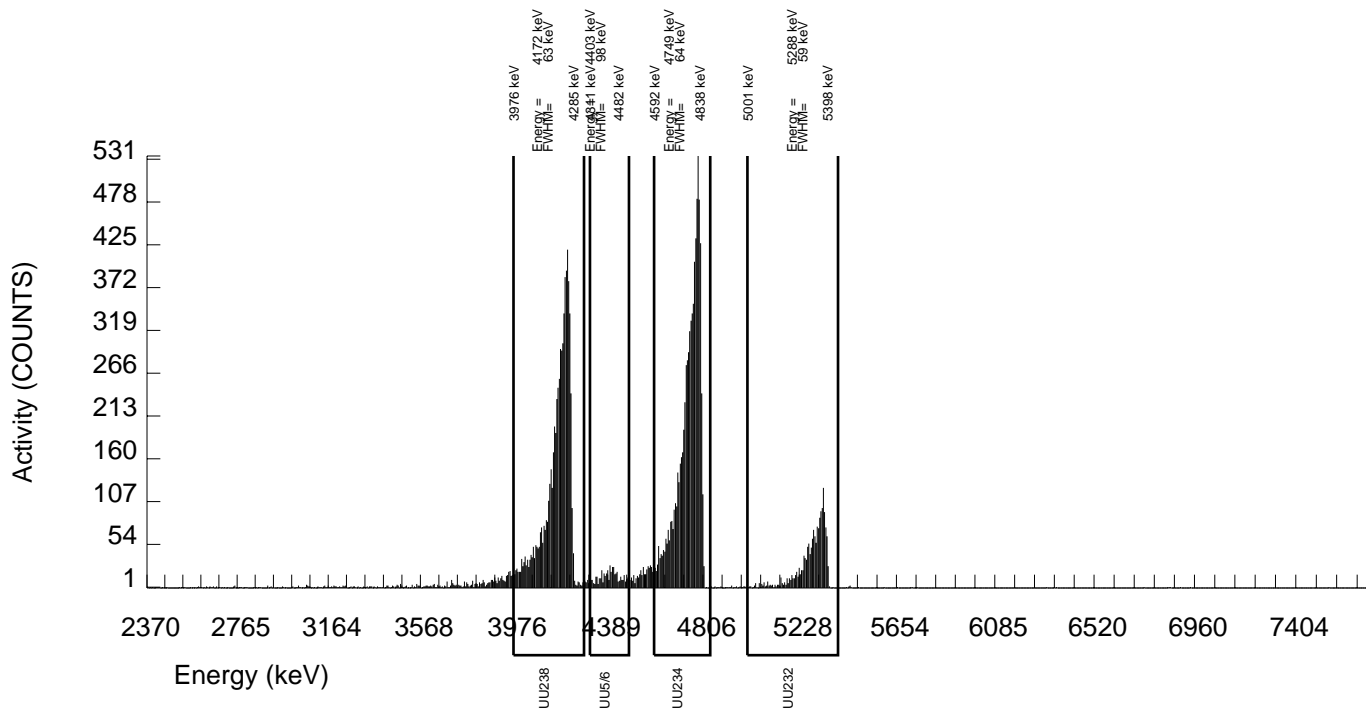
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765 SAMPLE DATE : 2-JUL-2009 00:00:00.		SAMPLE ID : S0232727015_UU SAMPLE QTY: 1.008 G	
DETECTOR NUMBER :78772 AVERAGE %EFFICIENCY :38.2609 % YIELD : 84.497		COUNT DATE:20-JUL-2009 14:35:38 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 5.29504 dpm RESULTS : 4.47416 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B172.CNF;112 BKG DATE : 19-JUL-2009 EFF FILE : W172.CNF;44 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
U-3/4	4763.020	7702.000	7692.836	4.000	2.0000	100.0000	1.06E+01	1.43E+00	1.70E-02	6.43E-03	2.38E-01
U232	5302.100	1717.000	1711.000	6.000	2.4495	100.0000	2.37E+00	3.34E-01	1.99E-02	7.88E-03	1.13E-01
U-235	4391.000	465.000	464.000	1.000	1.0000	80.90000	7.93E-01	1.28E-01	1.31E-02	3.97E-03	7.23E-02
U-238	4184.730	6680.000	6679.000	1.000	1.0000	100.0000	9.23E+00	1.25E+00	1.06E-02	3.22E-03	2.21E-01

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



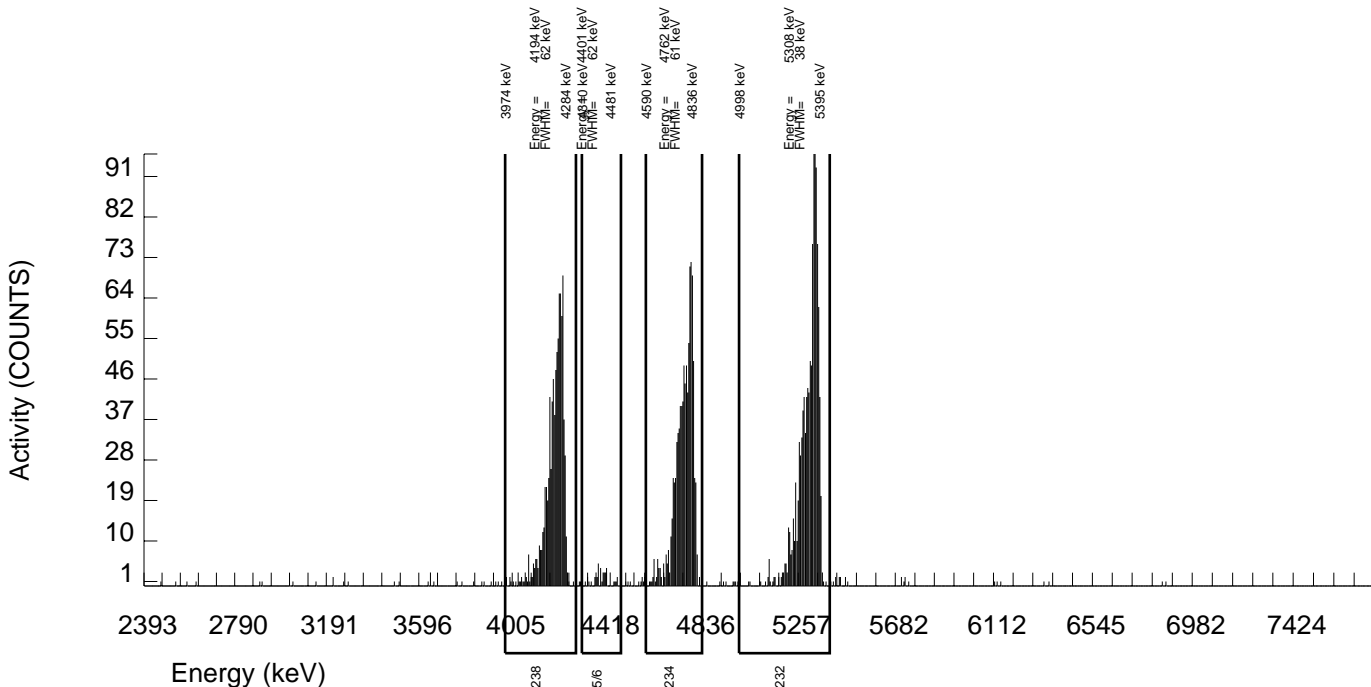
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765 SAMPLE DATE : 2-JUL-2009 00:00:00.		SAMPLE ID : S0232727016_UU SAMPLE QTY: 1.008 G	
DETECTOR NUMBER :33449 AVERAGE %EFFICIENCY :24.5768 % YIELD : 89.029		COUNT DATE:20-JUL-2009 15:04:05 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 5.29504 dpm RESULTS : 4.71412 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B149.CNF;337 BKG DATE : 19-JUL-2009 EFF FILE : W149.CNF;100 CAL DATE : 17-JUL-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	940.000	933.505	3.000	1.7321	100.0000	1.91E+00	2.89E-01	2.26E-02	8.23E-03	1.23E-01
U232	5302.100	1163.000	1158.000	5.000	2.2361	100.0000	2.37E+00	3.53E-01	2.74E-02	1.06E-02	1.37E-01
U-235	4391.000	44.000	44.000	0.000	0.0000	80.90000	1.11E-01	3.62E-02	7.57E-03	0.00E+00	3.28E-02
U-238	4184.730	886.000	886.000	0.000	0.0000	100.0000	1.81E+00	2.76E-01	6.13E-03	0.00E+00	1.19E-01

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



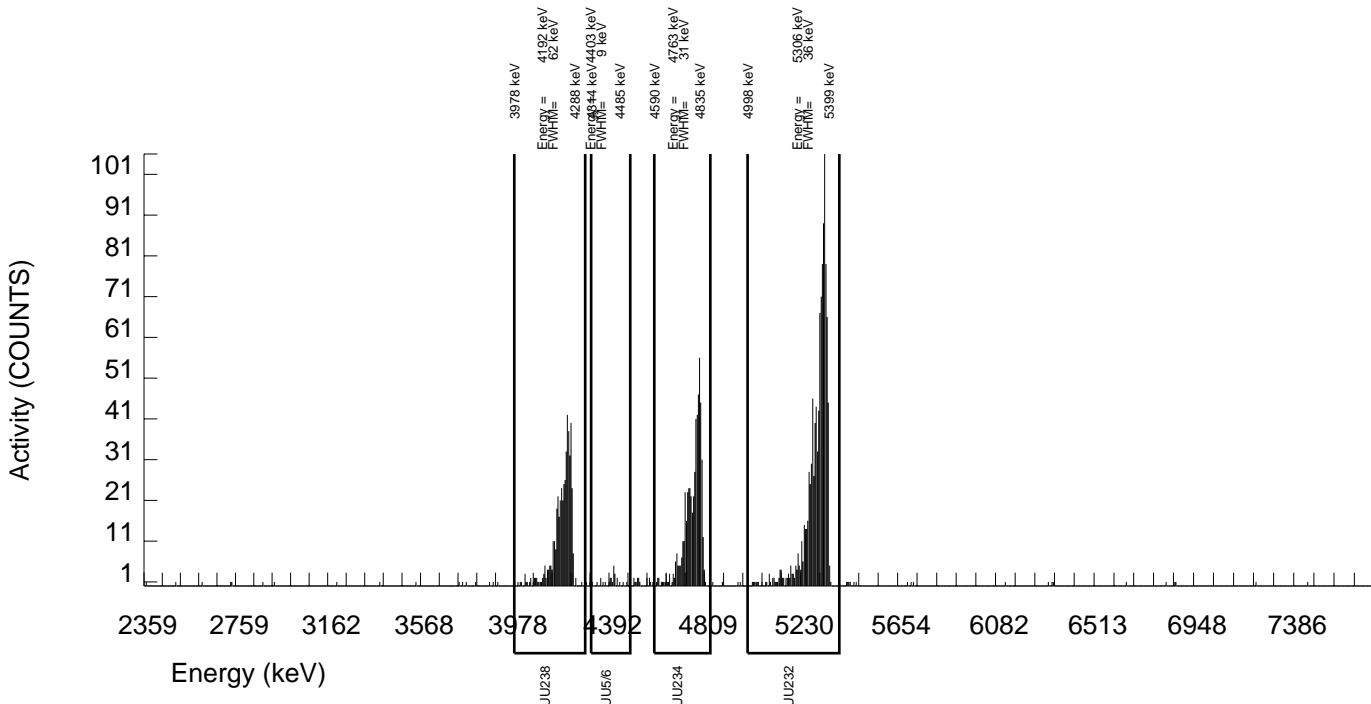
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765 SAMPLE DATE : 2-JUL-2009 00:00:00.		SAMPLE ID : S0232727017_UU SAMPLE QTY: 1.007 G	
DETECTOR NUMBER :75552 AVERAGE %EFFICIENCY :24.8730 % YIELD : 81.892		COUNT DATE:20-JUL-2009 15:04:07 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 5.29503 dpm RESULTS : 4.33619 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B150.CNF;338 BKG DATE : 19-JUL-2009 EFF FILE : W150.CNF;108 CAL DATE : 17-JUL-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	561.000	557.747	0.000	0.0000	100.0000	1.22E+00	1.97E-01	6.59E-03	0.00E+00	1.02E-01
U232	5302.100	1084.000	1078.000	6.000	2.4495	100.0000	2.37E+00	3.57E-01	3.16E-02	1.25E-02	1.42E-01
U-235	4391.000	26.000	25.000	1.000	1.0000	80.90000	6.79E-02	2.92E-02	2.08E-02	6.32E-03	2.76E-02
U-238	4184.730	483.000	483.000	0.000	0.0000	100.0000	1.06E+00	1.74E-01	6.59E-03	0.00E+00	9.46E-02

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





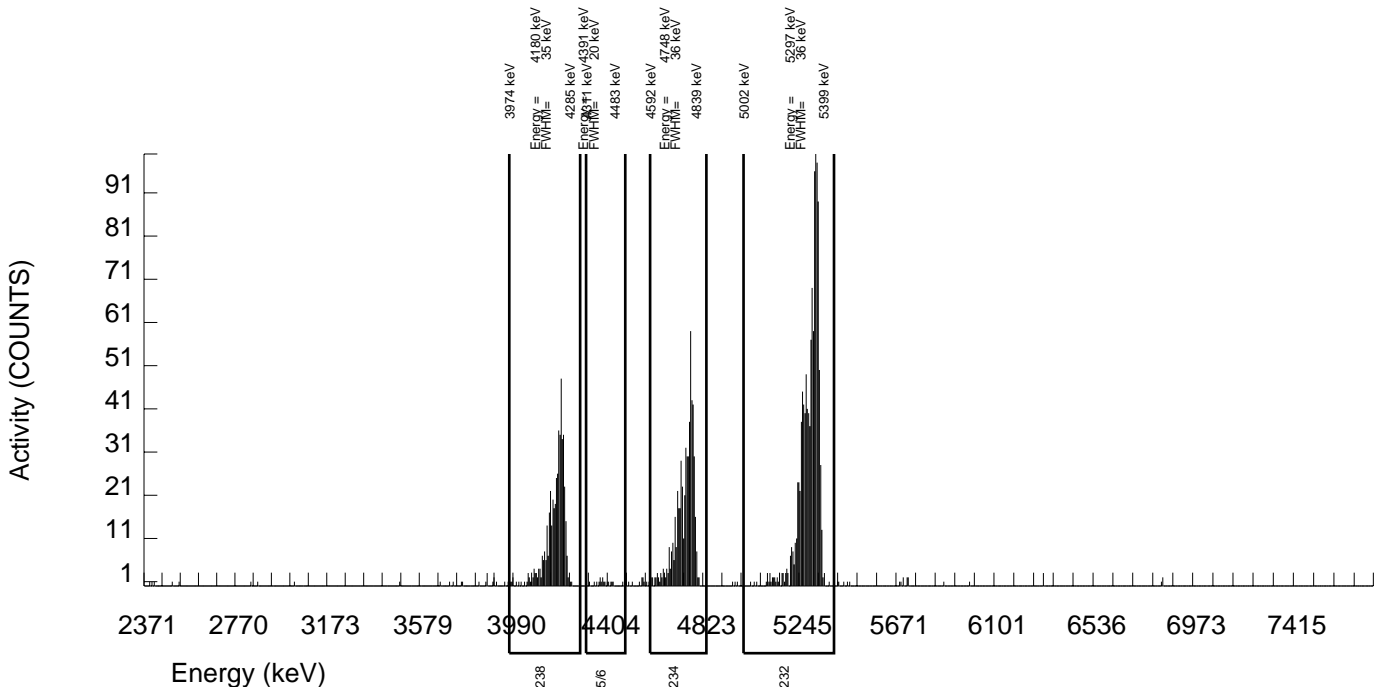
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765 SAMPLE DATE : 2-JUL-2009 00:00:00.		SAMPLE ID : S0232727018_UU SAMPLE QTY: 1.003 G	
DETECTOR NUMBER :75553 AVERAGE %EFFICIENCY :25.6615 % YIELD : 84.677		COUNT DATE:20-JUL-2009 15:04:10 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 5.29504 dpm RESULTS : 4.48367 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B155.CNF;334 BKG DATE : 19-JUL-2009 EFF FILE : W155.CNF;103 CAL DATE : 17-JUL-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	573.000	565.530	4.000	2.0000	100.0000	1.17E+00	1.88E-01	2.54E-02	9.62E-03	9.70E-02
U232	5302.100	1159.000	1150.000	9.000	3.0000	100.0000	2.38E+00	3.55E-01	3.51E-02	1.44E-02	1.39E-01
U-235	4391.000	18.000	17.000	1.000	1.0000	80.90000	4.34E-02	2.26E-02	1.96E-02	5.94E-03	2.18E-02
U-238	4184.730	487.000	483.000	4.000	2.0000	100.0000	9.98E-01	1.64E-01	2.54E-02	9.62E-03	8.98E-02

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



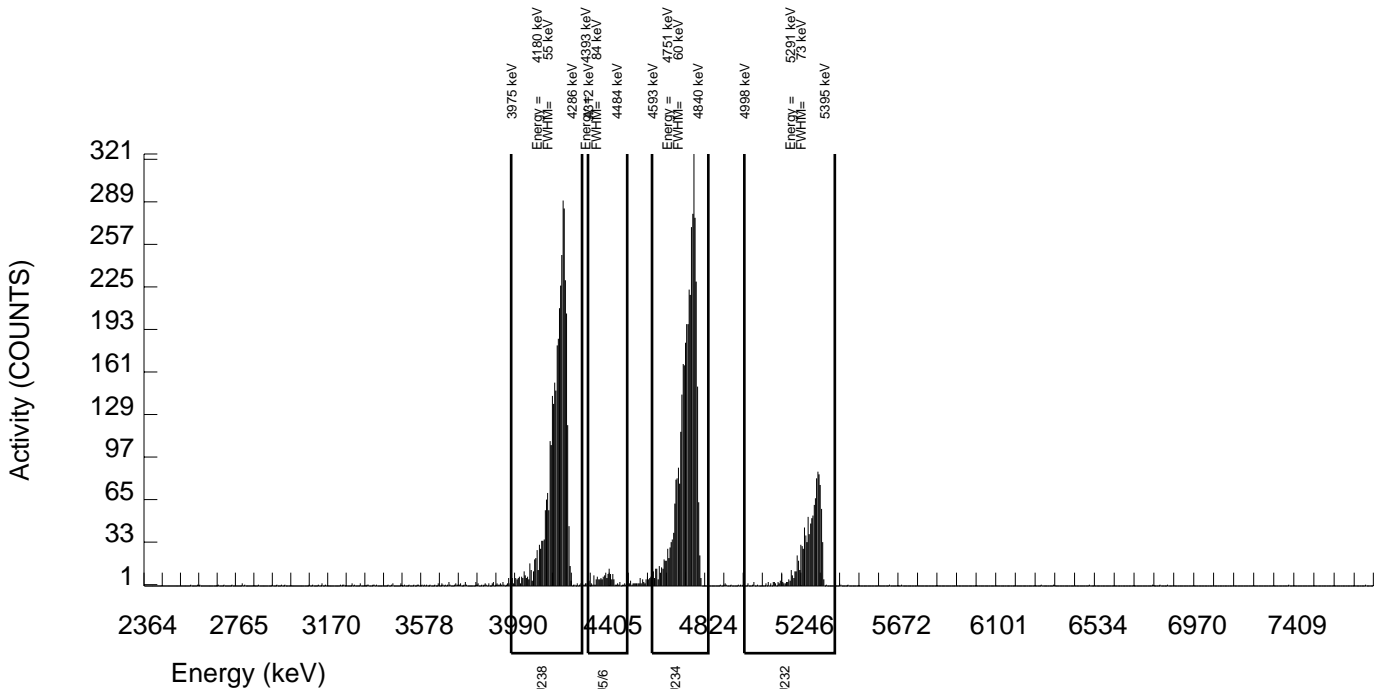
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765 SAMPLE DATE : 2-JUL-2009 00:00:00.		SAMPLE ID : S0232727019_UU SAMPLE QTY: 1.010 G	
DETECTOR NUMBER :75554 AVERAGE %EFFICIENCY :24.7315 % YIELD : 87.861		COUNT DATE:20-JUL-2009 15:04:12 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 5.29504 dpm RESULTS : 4.65226 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B156.CNF;335 BKG DATE : 19-JUL-2009 EFF FILE : W156.CNF;107 CAL DATE : 17-JUL-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	3988.000	3968.530	16.000	4.0000	100.0000	8.15E+00	1.15E+00	4.44E-02	1.91E-02	2.54E-01
U232	5302.100	1162.000	1150.000	12.000	3.4641	100.0000	2.36E+00	3.53E-01	3.93E-02	1.65E-02	1.38E-01
U-235	4391.000	146.000	144.000	2.000	1.4142	80.90000	3.65E-01	7.86E-02	2.43E-02	8.35E-03	6.05E-02
U-238	4184.730	3673.000	3669.000	4.000	2.0000	100.0000	7.53E+00	1.06E+00	2.53E-02	9.55E-03	2.44E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765  
SAMPLE DATE : 2-JUL-2009 00:00:00.

SAMPLE ID : S0232727020\_UU  
SAMPLE QTY: 1.002 G

DETECTOR NUMBER :75555  
AVERAGE %EFFICIENCY :24.7679  
% YIELD : 89.792

COUNT DATE:20-JUL-2009 15:04:15  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

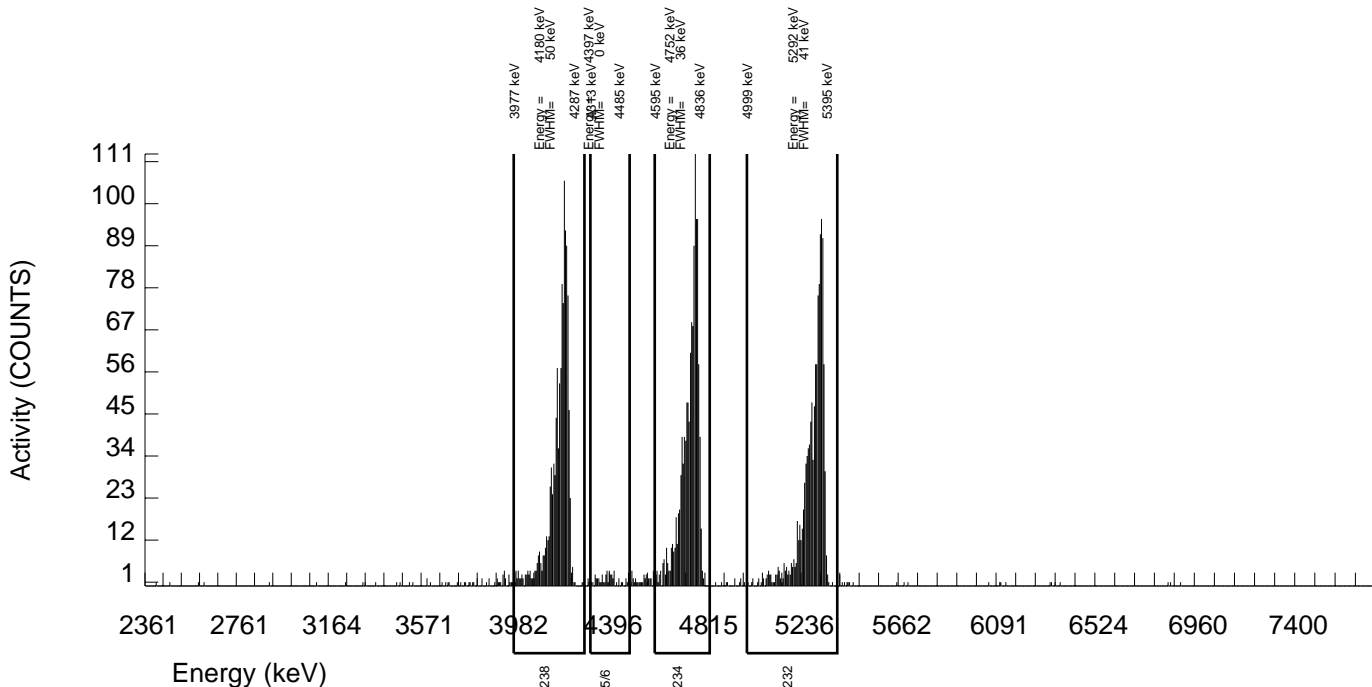
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29504 dpm  
RESULTS : 4.75450 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B157.CNF;335  
BKG DATE : 19-JUL-2009  
EFF FILE : W157.CNF;97  
CAL DATE : 17-JUL-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	1198.000	1190.448	4.000	2.0000	100.0000	2.41E+00	3.57E-01	2.49E-02	9.41E-03	1.37E-01
U232	5302.100	1182.000	1177.000	5.000	2.2361	100.0000	2.38E+00	3.54E-01	2.71E-02	1.05E-02	1.37E-01
U-235	4391.000	55.000	53.000	2.000	1.4142	80.90000	1.32E-01	4.12E-02	2.39E-02	8.22E-03	3.70E-02
U-238	4184.730	1136.000	1132.000	4.000	2.0000	100.0000	2.29E+00	3.41E-01	2.49E-02	9.41E-03	1.34E-01

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



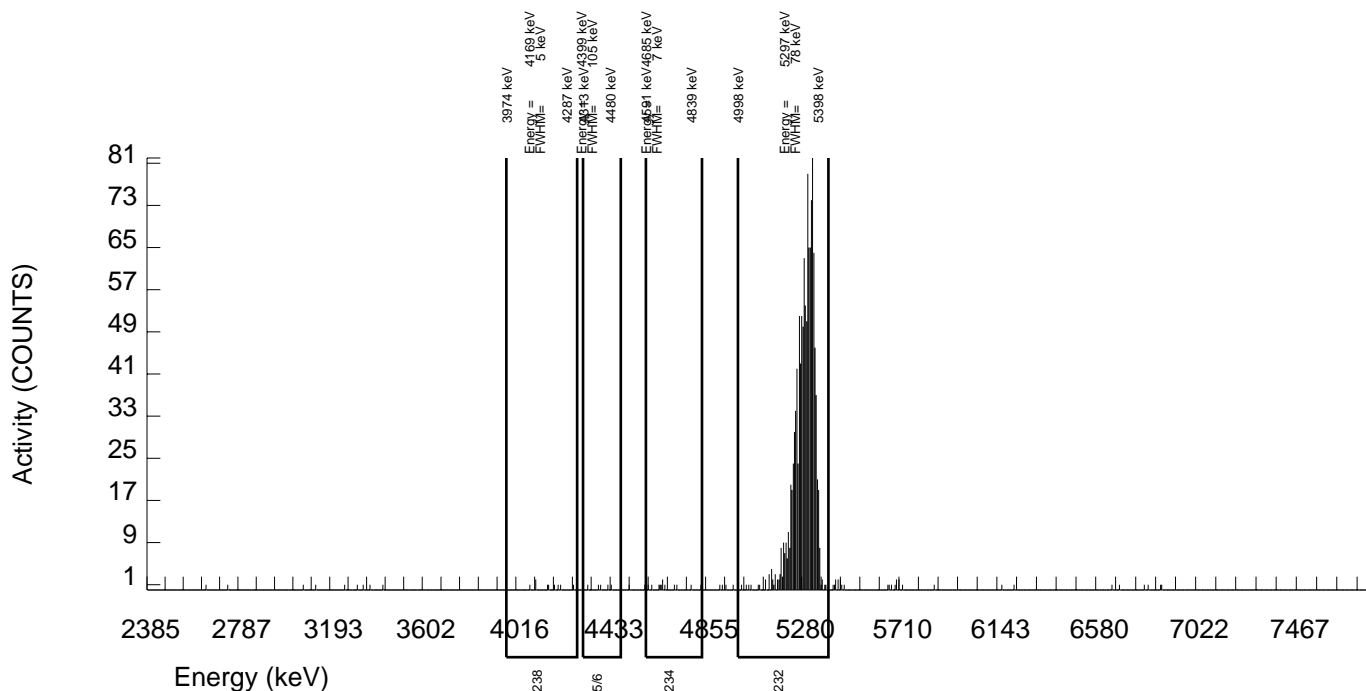
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765 SAMPLE DATE : 15-JUL-2009 00:00:00		SAMPLE ID : S1201879827_UU SAMPLE QTY: 1.010 G	
DETECTOR NUMBER :33451 AVERAGE %EFFICIENCY :24.8572 % YIELD : 91.521		COUNT DATE:20-JUL-2009 15:04:18 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 5.29322 dpm RESULTS : 4.84443 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B158.CNF;336 BKG DATE : 19-JUL-2009 EFF FILE : W158.CNF;100 CAL DATE : 17-JUL-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	13.000	3.367	6.000	2.4495	100.0000	6.60E-03	1.51E-02	2.82E-02	1.12E-02	1.51E-02
U232	5302.100	1211.000	1204.000	7.000	2.6458	100.0000	2.36E+00	3.50E-01	3.00E-02	1.21E-02	1.34E-01
U-235	4391.000	5.000	4.000	1.000	1.0000	80.90000	9.69E-03	1.17E-02	1.85E-02	5.64E-03	1.16E-02
U-238	4184.730	9.000	8.000	1.000	1.0000	100.0000	1.57E-02	1.23E-02	1.50E-02	4.56E-03	1.22E-02

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



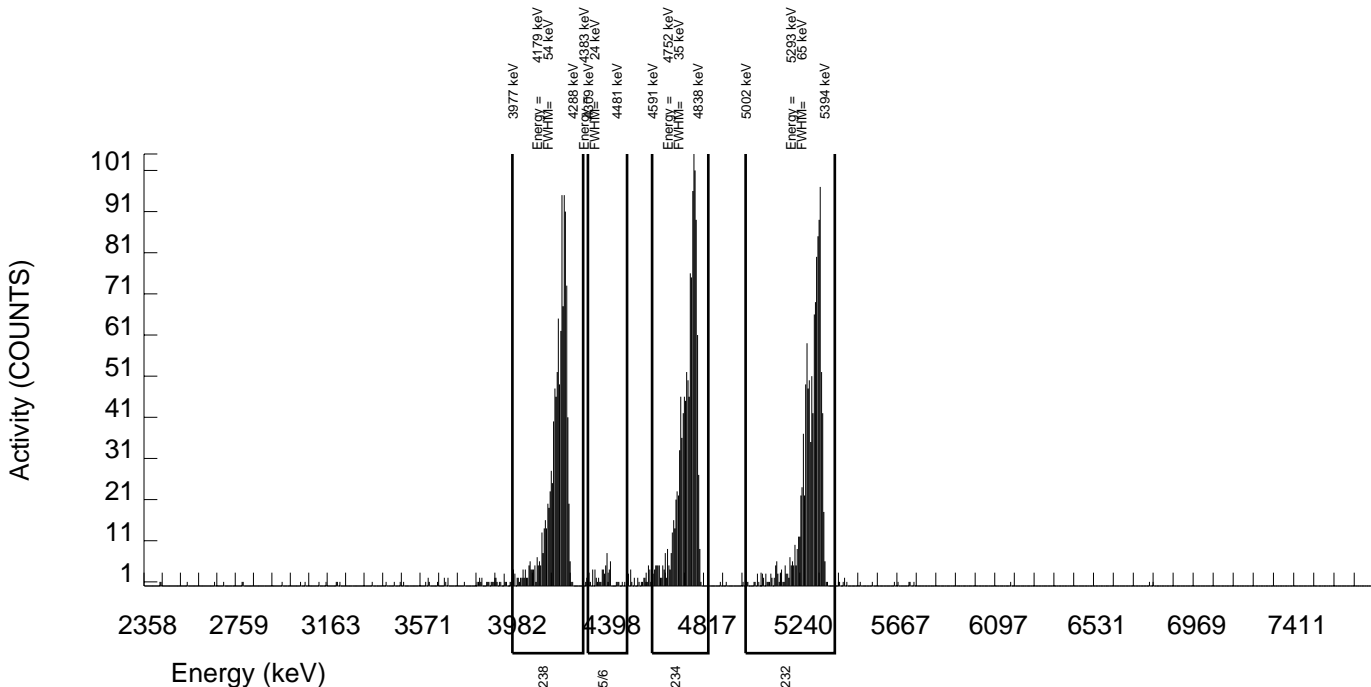
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765 SAMPLE DATE : 2-JUL-2009 00:00:00.		SAMPLE ID : S1201879828_UU SAMPLE QTY: 1.005 G	
DETECTOR NUMBER :76225 AVERAGE %EFFICIENCY :25.3232 % YIELD : 87.524		COUNT DATE:20-JUL-2009 15:04:20 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.506E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 2.506E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29504 dpm RESULTS : 4.63443 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B159.CNF;309 BKG DATE : 19-JUL-2009 EFF FILE : W159.CNF;92 CAL DATE : 17-JUL-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	1224.000	1215.460	5.000	2.2361	100.0000	2.46E+00	3.65E-01	2.71E-02	1.05E-02	1.39E-01
U232	5302.100	1180.000	1173.000	7.000	2.6458	100.0000	2.37E+00	3.53E-01	3.10E-02	1.25E-02	1.37E-01
U-235	4391.000	60.000	58.000	2.000	1.4142	80.90000	1.45E-01	4.34E-02	2.39E-02	8.22E-03	3.86E-02
U-238	4184.730	1118.000	1117.000	1.000	1.0000	100.0000	2.26E+00	3.37E-01	1.55E-02	4.70E-03	1.33E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765  
SAMPLE DATE : 2-JUL-2009 00:00:00.

SAMPLE ID : S1201879829\_UU  
SAMPLE QTY: 1.001 G

DETECTOR NUMBER :76226  
AVERAGE %EFFICIENCY :24.6915  
% YIELD : 86.090

COUNT DATE:20-JUL-2009 15:04:22  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

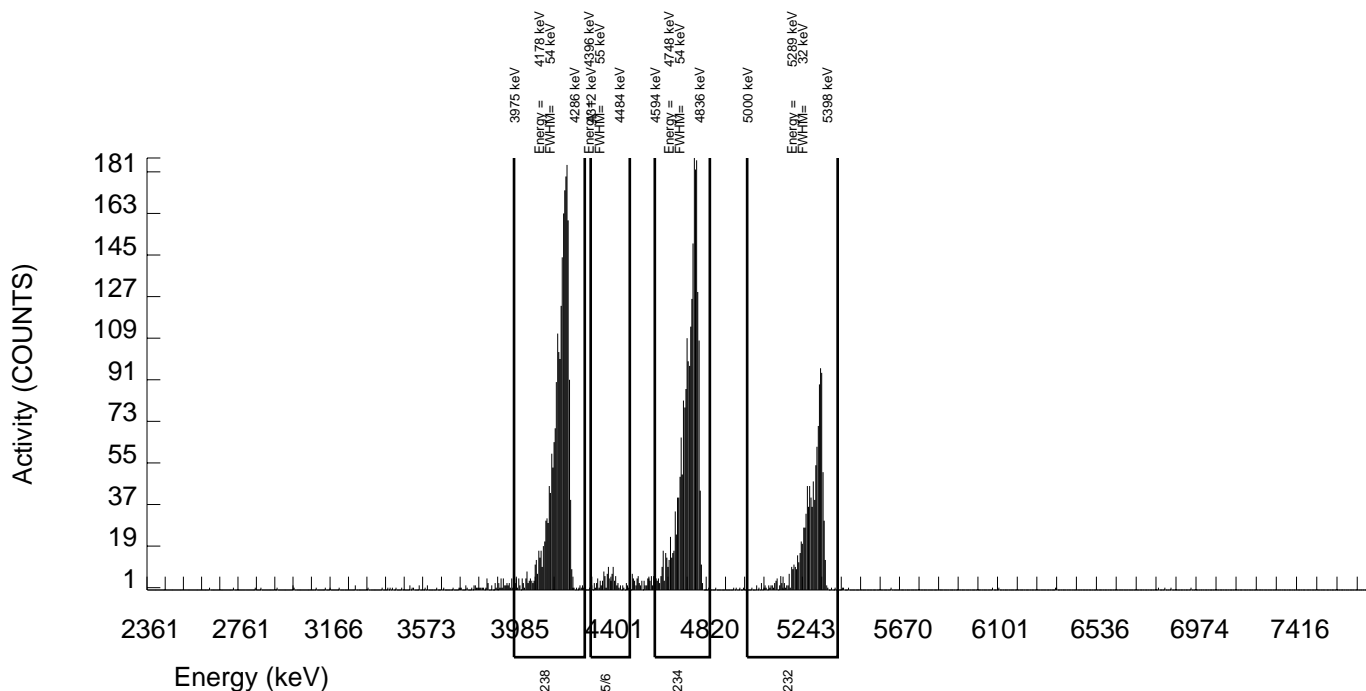
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29504 dpm  
RESULTS : 4.55850 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B160.CNF;311  
BKG DATE : 19-JUL-2009  
EFF FILE : W160.CNF;100  
CAL DATE : 17-JUL-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	2290.000	2273.605	13.000	3.6056	100.0000	4.81E+00	6.92E-01	4.19E-02	1.78E-02	1.99E-01
U232	5302.100	1132.000	1125.000	7.000	2.6458	100.0000	2.38E+00	3.57E-01	3.24E-02	1.30E-02	1.40E-01
U-235	4391.000	113.000	107.000	6.000	2.4495	80.90000	2.80E-01	6.80E-02	3.77E-02	1.49E-02	5.59E-02
U-238	4184.730	2296.000	2293.000	3.000	1.7321	100.0000	4.85E+00	6.98E-01	2.34E-02	8.53E-03	1.99E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 884765  
SAMPLE DATE : 15-JUL-2009 00:00:00

SAMPLE ID : S1201879830\_UU  
SAMPLE QTY: 1.010 G

DETECTOR NUMBER :33448  
AVERAGE %EFFICIENCY :25.7020  
% YIELD : 87.119

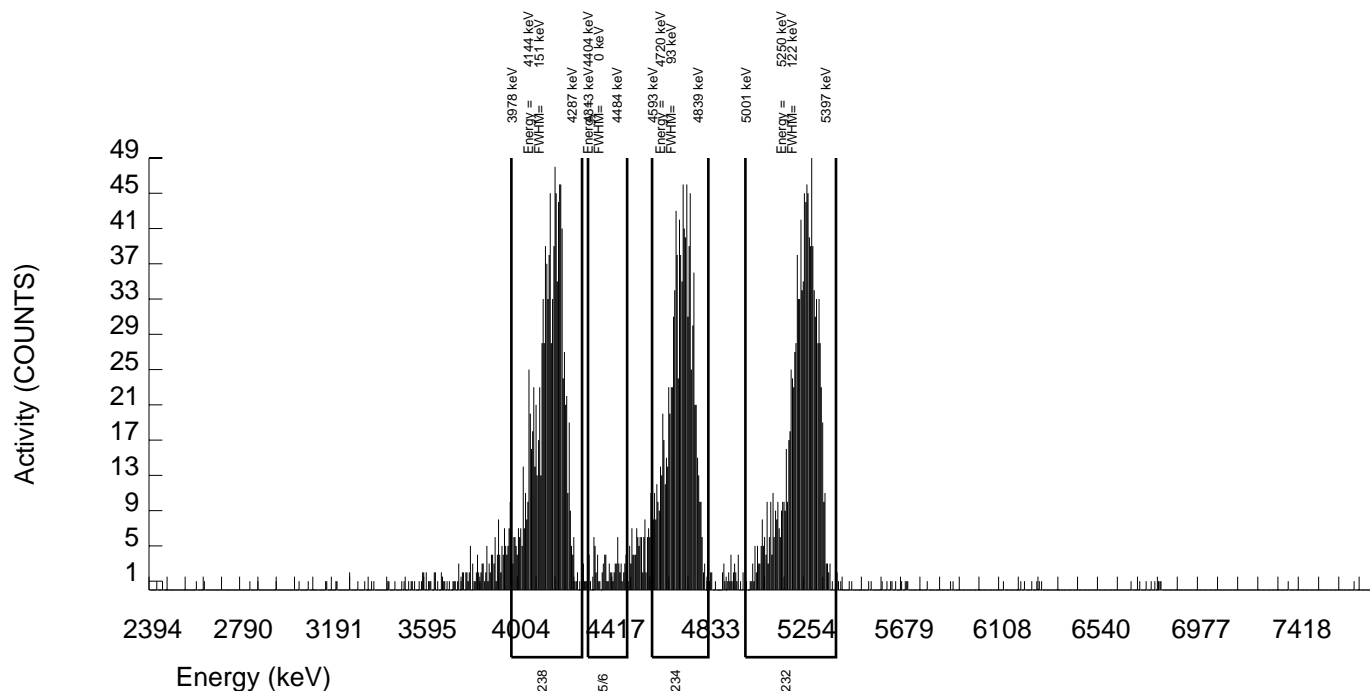
COUNT DATE:21-JUL-2009 12:45:28  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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 : 5.29322 dpm RESULTS : 4.61138 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B131.CNF;377 BKG DATE : 19-JUL-2009 EFF FILE : W131.CNF;114 CAL DATE : 17-JUL-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	1039.000	1031.424	4.000	2.0000	100.0000	2.05E+00	3.08E-01	2.45E-02	9.27E-03	1.26E-01
U232	5302.100	1193.000	1185.000	8.000	2.8284	100.0000	2.36E+00	3.51E-01	3.22E-02	1.31E-02	1.35E-01
U-235	4391.000	82.000	79.000	3.000	1.7321	80.90000	1.95E-01	5.19E-02	2.72E-02	9.92E-03	4.45E-02
U-238	4184.730	1159.000	1158.000	1.000	1.0000	100.0000	2.31E+00	3.43E-01	1.52E-02	4.63E-03	1.33E-01

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



### Radiochemistry Batch Checklist, Rev 9

Batch# 886957 Product: U Date: 7/28/09

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.		✓	NCR 715635
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.	✓		Case narrative
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.		✓	NCR 715635
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.	✓		
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 stated.	✓		
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.	✓		NCR 715635
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCR 715635
Aliquot Correction completed if required.			N/A
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: Japl ML 7/28/09

Secondary Review Performed By: [Signature] 7/28/09

7/29  
KERR



# Uranium Que Sheet

21-JUL-09

Batch #: 886957

Analyst: CXM2

First Client Due Date: 29-JUL-09

Internal Due Date: 23-JUL-09

Tracer Isotope: U-232

Tracer Code: 1283-B

Expiration Date: 12/16/09

Vol: 0.1ml

LCS Isotope: U-238

LCS Code: 1163-G

Expiration Date: 4/16/10

Vol: 0.1ml

Spike Isotope: U-238

Spike Code: 1163-G

Expiration Date: 4/16/10

Vol: 0.1ml

Prep Date: 7/21/09

Initials: CMM

Pipet ID: 241-1058

Balance ID: 16750207

Witness: ME 7/21/09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g/l)	U Det #
232135001-2	M-19B	SAMPLE		.03 pCi/L	WATER	KERR003	19-JUN-09	1	1	0.400	137
232135002-2	M-34B	SAMPLE		.03 pCi/L	WATER	KERR003	19-JUN-09	2	2	0.400	138
232135004-2	M-125BDISS	SAMPLE		.03 pCi/L	WATER	KERR003	23-JUN-09	3	3	0.400	139
232135005-2	M-22AB	SAMPLE		.03 pCi/L	WATER	KERR003	24-JUN-09	4	4	0.400	140
232135006-2	M-17AB	SAMPLE		.03 pCi/L	WATER	KERR003	24-JUN-09	5	5	0.400	141
232135007-2	M-17ABDISS	SAMPLE		.03 pCi/L	WATER	KERR003	24-JUN-09	6	6	0.400	142
232135008-2	M-75B	SAMPLE		.03 pCi/L	WATER	KERR003	25-JUN-09	7	7	0.400	144
232135009-2	M-13AB	SAMPLE		.03 pCi/L	WATER	KERR003	25-JUN-09	8	8	0.400	145
232135010-2	M-13ABDISS	SAMPLE		.03 pCi/L	WATER	KERR003	25-JUN-09	9	9	0.400	146
232135011-2	M-13009AB	SAMPLE		.03 pCi/L	WATER	KERR003	25-JUN-09	10	10	0.400	147
232135012-2	M-13009ABDISS	SAMPLE		.03 pCi/L	WATER	KERR003	25-JUN-09	11	11	0.400	148
232135013-2	M-64B	SAMPLE		.03 pCi/L	WATER	KERR003	26-JUN-09	12	12	0.400	149
232135015-2	M-111AB	SAMPLE		.03 pCi/L	WATER	KERR003	29-JUN-09	13	13	0.400	150
232135016-2	EB062909-GW	SAMPLE		.03 pCi/L	WATER	KERR003	29-JUN-09	14	14	0.400	151
232135017-2	M-25B	SAMPLE		.03 pCi/L	WATER	KERR003	30-JUN-09	15	15	0.400	152
232135018-2	M-12AB	SAMPLE		.03 pCi/L	WATER	KERR003	30-JUN-09	16	16	0.400	153
232135019-2	M-12ABDISS	SAMPLE		.03 pCi/L	WATER	KERR003	30-JUN-09	17	17	0.400	154
232395021-2	EB062609-SO	SAMPLE		.03 pCi/L	WATER	KERR003	26-JUN-09	18	18	0.400	155
232727021-2	EB070109-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	01-JUL-09	19	19	0.400	156
1201885396-1	MB for batch 886957	MB		UCF pCi/L to pCi	WATER	QC ACCOUNT	23-JUN-09	20	20	0.400	157
1201885397-2	M-125BDISS(232135004DUP)	DUP		.03 pCi/L	WATER	QC ACCOUNT	23-JUN-09	21	21	0.400	158
1201885400-2	M-125BDISS(232135004MS)	MS		.03 pCi/L	WATER	QC ACCOUNT	23-JUN-09	22	22	0.400	159
1201885403-1	LCS for batch 886957	LCS		UCF pCi/L to pCi	WATER	QC ACCOUNT		23	23	0.400	160

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

Solid Sample Dissolution by: LEACH OF DIGESTION  
 Circle One 258 7/21/09

Data Reviewed By: J. L. M. S. - 7/28/09

GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886957  
SAMPLE DATE : 23-JUN-2009 00:00:00

SAMPLE ID : S0232135004\_UU  
SAMPLE QTY: 0.400 L

DETECTOR NUMBER :76231  
AVERAGE %EFFICIENCY :25.0427  
% YIELD : 82.626

COUNT DATE:23-JUL-2009 21:51:55  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/L : 6.297E+00

LCS/LCSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/L : 6.297E+00

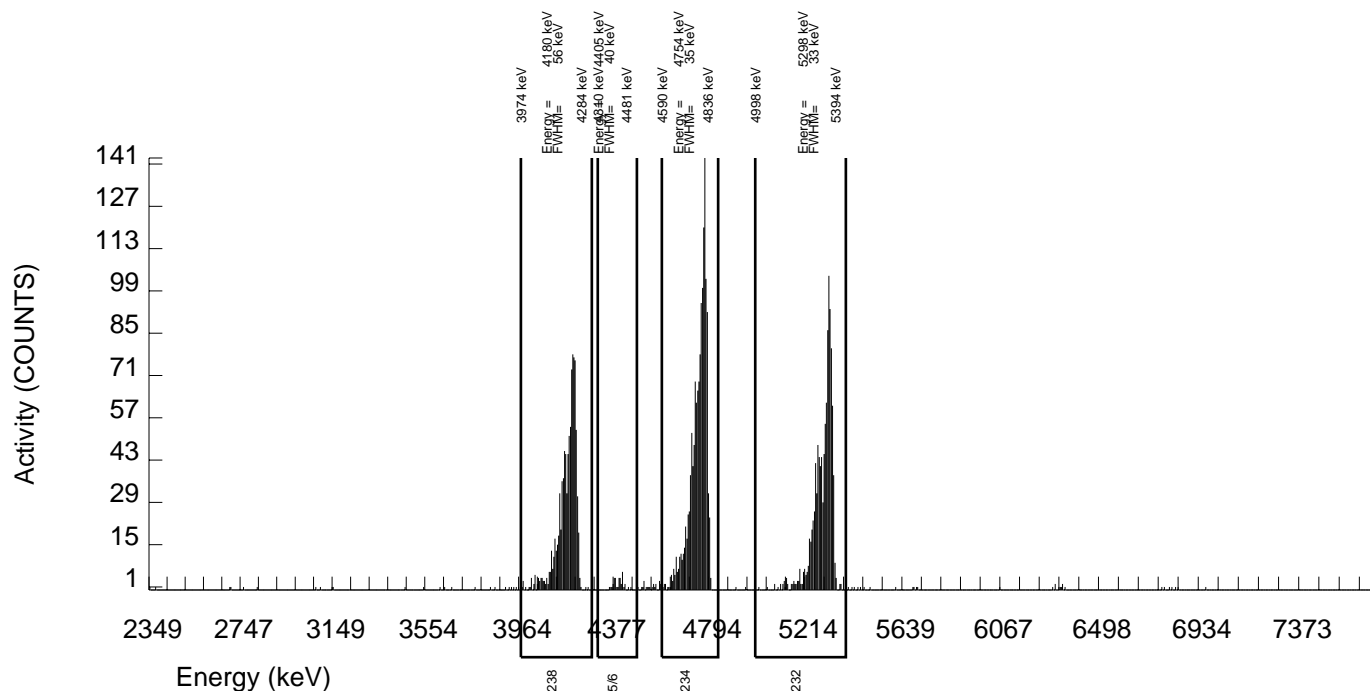
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29630 dpm  
RESULTS : 4.37613 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B139.CNF;332  
BKG DATE : 19-JUL-2009  
EFF FILE : W139.CNF;90  
CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
U-3/4	4763.020	1443.000	1434.695	5.000	2.2361	100.0000	7.81E+00	1.17E+00	7.29E-02	2.83E-02	4.05E-01
U232	5302.100	1102.000	1095.000	7.000	2.6458	100.0000	5.96E+00	9.11E-01	8.34E-02	3.35E-02	3.56E-01
U-235	4391.000	37.000	34.000	3.000	1.7321	80.90000	2.29E-01	8.94E-02	7.44E-02	2.71E-02	8.34E-02
U-238	4184.730	968.000	966.000	2.000	1.4142	100.0000	5.26E+00	8.11E-01	5.21E-02	1.79E-02	3.32E-01

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



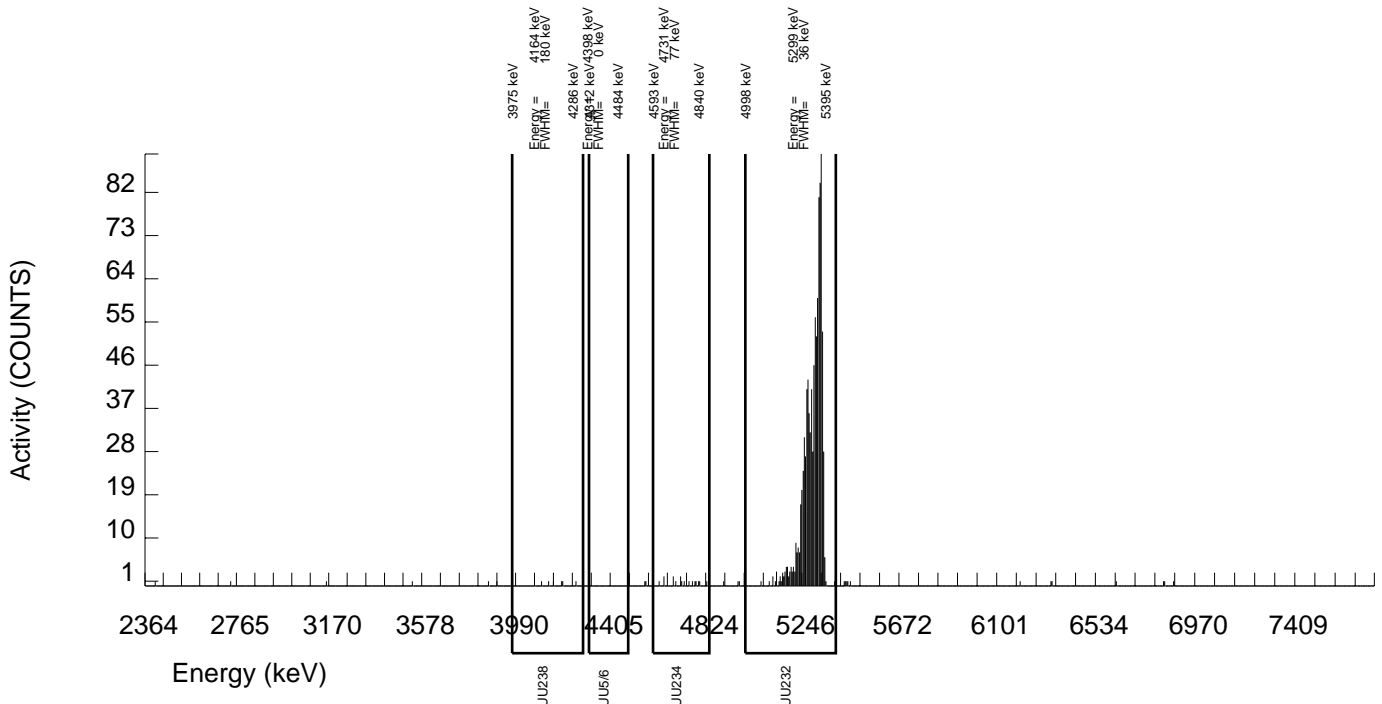
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886957 SAMPLE DATE : 1-JUL-2009 00:00:00.		SAMPLE ID : S0232727021_UU SAMPLE QTY: 0.400 L	
DETECTOR NUMBER :75554 AVERAGE %EFFICIENCY :24.7315 % YIELD : 73.580		COUNT DATE:23-JUL-2009 21:52:39 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 6.297E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 6.297E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29518 dpm RESULTS : 3.89620 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B156.CNF;335 BKG DATE : 19-JUL-2009 EFF FILE : W156.CNF;107 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
U-3/4	4763.020	17.000	-1.906	16.000	4.0000	100.0000	-1.18E-02	6.65E-02	1.34E-01	5.76E-02	6.65E-02
U232	5302.100	975.000	963.000	12.000	3.4641	100.0000	5.96E+00	9.17E-01	1.18E-01	4.99E-02	3.81E-01
U-235	4391.000	0.000	-2.000	2.000	1.4142	80.90000	-1.53E-02	2.60E-02	7.33E-02	2.52E-02	2.60E-02
U-238	4184.730	7.000	3.000	4.000	2.0000	100.0000	1.86E-02	4.03E-02	7.62E-02	2.88E-02	4.02E-02

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



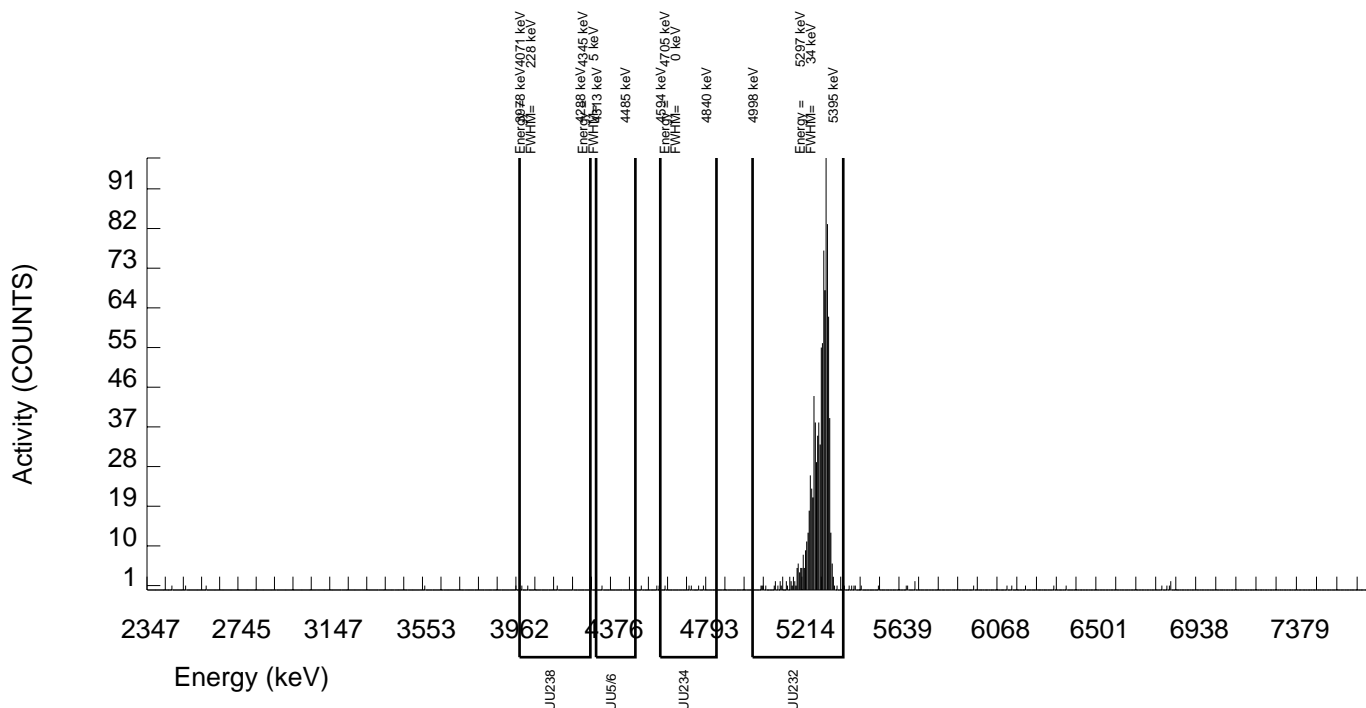
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886957 SAMPLE DATE : 21-JUL-2009 00:00:00		SAMPLE ID : S1201885396_UU SAMPLE QTY: 0.400 L	
DETECTOR NUMBER :78771 AVERAGE %EFFICIENCY :25.5149 % YIELD : 70.884		COUNT DATE:27-JUL-2009 12:10:23 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 6.297E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 6.297E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29238 dpm RESULTS : 3.75143 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B140.CNF;334 BKG DATE : 26-JUL-2009 EFF FILE : W140.CNF;95 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
U-3/4	4763.020	6.000	1.111	2.000	1.4142	100.0000	6.92E-03	2.76E-02	5.97E-02	2.05E-02	2.76E-02
U232	5302.100	964.000	957.000	7.000	2.6458	100.0000	5.96E+00	9.16E-01	9.53E-02	3.83E-02	3.80E-01
U-235	4391.000	1.000	0.000	1.000	1.0000	80.90000	0.00E+00	2.14E-02	5.89E-02	1.79E-02	2.13E-02
U-238	4184.730	5.000	-2.000	7.000	2.6458	100.0000	-1.25E-02	4.23E-02	9.53E-02	3.83E-02	4.23E-02

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886957  
SAMPLE DATE : 23-JUN-2009 00:00:00

SAMPLE ID : S1201885397\_UU  
SAMPLE QTY: 0.400 L

DETECTOR NUMBER :33451  
AVERAGE %EFFICIENCY :24.8572  
% YIELD : 88.184

COUNT DATE:23-JUL-2009 21:52:45  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/L : 6.297E+00

LCS/LCSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/L : 6.297E+00

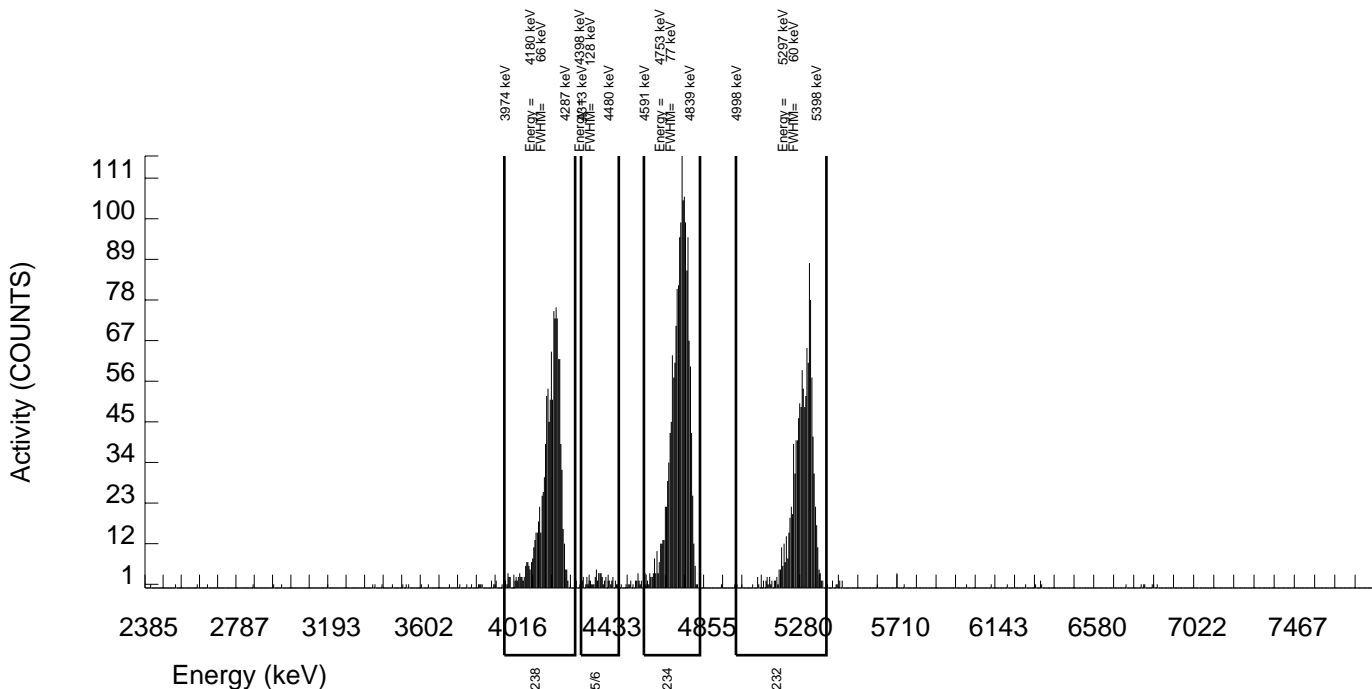
TRACER  
ID : 1283-B  
ISOTOPE : U232  
NOMINAL : 5.29630 dpm  
RESULTS : 4.67051 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B158.CNF;336  
BKG DATE : 19-JUL-2009  
EFF FILE : W158.CNF;100  
CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
U-3/4	4763.020	1730.000	1720.499	6.000	2.4495	100.0000	8.84E+00	1.28E+00	7.40E-02	2.93E-02	4.19E-01
U232	5302.100	1167.000	1160.000	7.000	2.6458	100.0000	5.96E+00	8.88E-01	7.87E-02	3.16E-02	3.45E-01
U-235	4391.000	63.000	62.000	1.000	1.0000	80.90000	3.94E-01	1.13E-01	4.86E-02	1.48E-02	9.96E-02
U-238	4184.730	1164.000	1163.000	1.000	1.0000	100.0000	5.97E+00	8.89E-01	3.93E-02	1.20E-02	3.44E-01

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



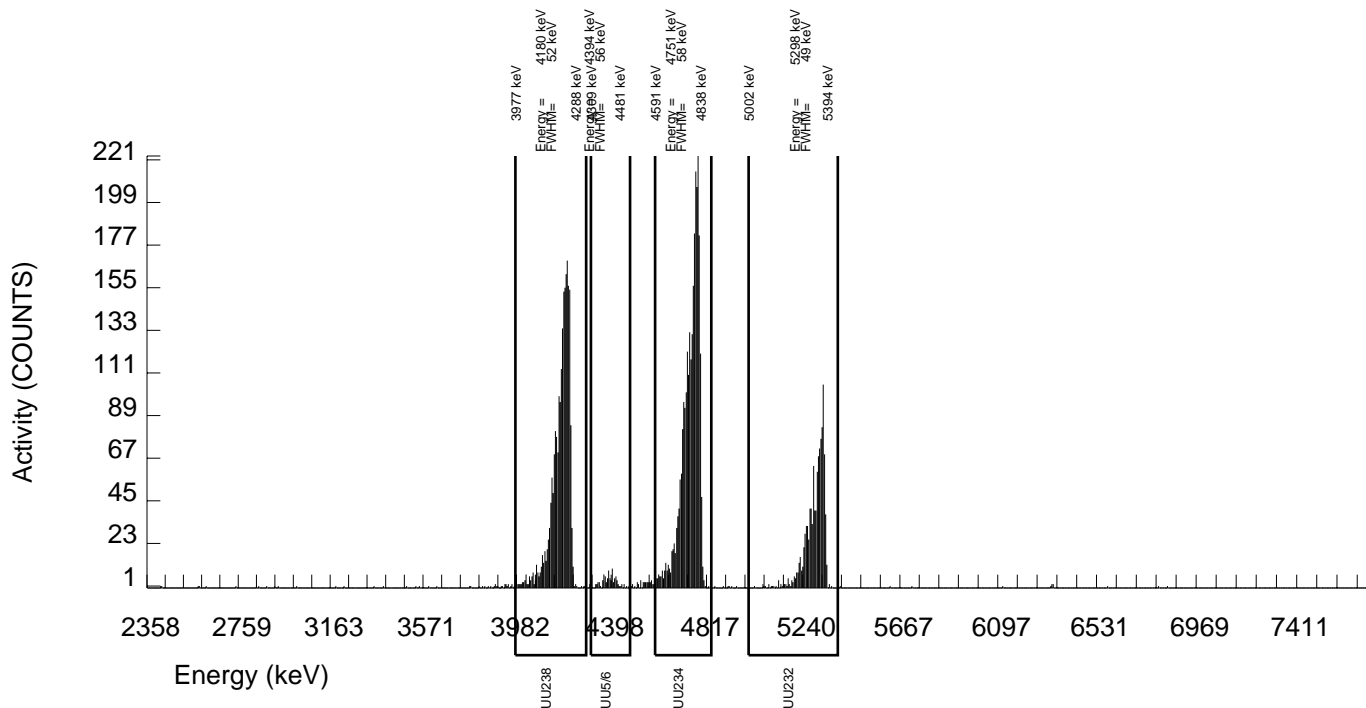
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886957 SAMPLE DATE : 23-JUN-2009 00:00:00		SAMPLE ID : S1201885400_UU SAMPLE QTY: 0.400 L	
DETECTOR NUMBER :76225 AVERAGE %EFFICIENCY :25.3232 % YIELD : 81.487		COUNT DATE:23-JUL-2009 21:52:48 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 6.297E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 6.297E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29629 dpm RESULTS : 4.31580 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B159.CNF;309 BKG DATE : 19-JUL-2009 EFF FILE : W159.CNF;92 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
U-3/4	4763.020	2749.000	2740.704	5.000	2.2361	100.0000	1.50E+01	2.14E+00	7.31E-02	2.84E-02	5.61E-01
U232	5302.100	1099.000	1092.000	7.000	2.6458	100.0000	5.96E+00	8.97E-01	8.36E-02	3.36E-02	3.56E-01
U-235	4391.000	95.000	93.000	2.000	1.4142	80.90000	6.27E-01	1.56E-01	6.46E-02	2.22E-02	1.30E-01
U-238	4184.730	2219.000	2218.000	1.000	1.0000	100.0000	1.21E+01	1.74E+00	4.18E-02	1.27E-02	5.04E-01

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



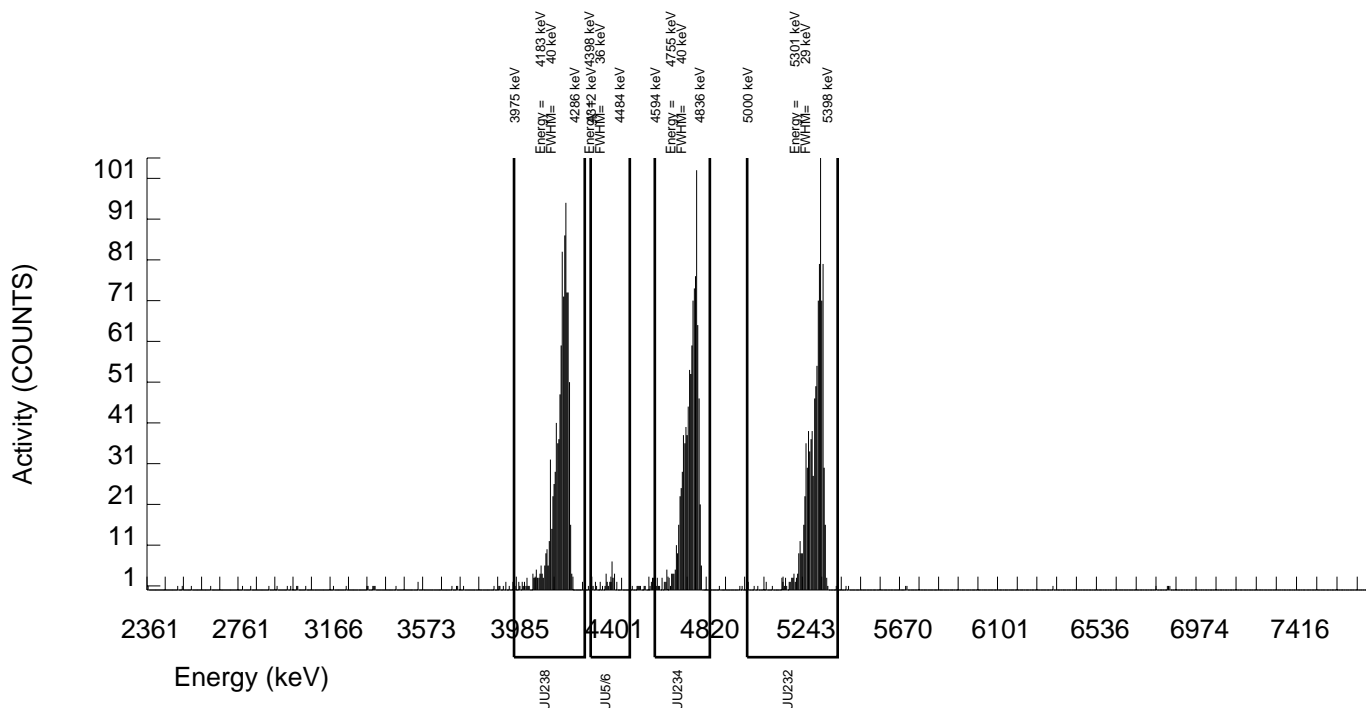
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886957 SAMPLE DATE : 21-JUL-2009 00:00:00		SAMPLE ID : S1201885403_UU SAMPLE QTY: 0.400 L	
DETECTOR NUMBER :76226 AVERAGE %EFFICIENCY :24.6915 % YIELD : 73.852		COUNT DATE:23-JUL-2009 21:52:52 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 6.297E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 6.297E+00	TRACER ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29239 dpm RESULTS : 3.90856 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B160.CNF;311 BKG DATE : 19-JUL-2009 EFF FILE : W160.CNF;100 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
U-3/4	4763.020	983.000	967.088	13.000	3.6056	100.0000	5.97E+00	9.17E-01	1.22E-01	5.18E-02	3.81E-01
U232	5302.100	972.000	965.000	7.000	2.6458	100.0000	5.96E+00	9.15E-01	9.46E-02	3.80E-02	3.79E-01
U-235	4391.000	39.000	33.000	6.000	2.4495	80.90000	2.52E-01	1.06E-01	1.10E-01	4.35E-02	1.00E-01
U-238	4184.730	1001.000	998.000	3.000	1.7321	100.0000	6.16E+00	9.42E-01	6.83E-02	2.49E-02	3.84E-01

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



# RADIUM 226



### Radiochemistry Batch Checklist, Rev 9

Batch# 883675 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.	✓		
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.	NA		
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 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.			NCR 711444
Batch non-conformances second reviewed and disposition verified to be completed.	✓		GEL 711444
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 7-30-09

Secondary Review Performed By: [Signature] 7/15/09

# Radium-226 Que Sheet

07/09/2009

General Engineering Laboratories, Radiochemistry Division

Batch #: 883675 Analyst: KSD1

First Client Due Date: 07/30/2009

Internal Due Date: 07/19/2009

Spike Code: U18/H

Expiration Date: 11/2/06

Nom Conc: 100.8553

LCS Code: 0078/1

Expiration Date: 7/2/09

Nom Conc: 24.1666

Prep Date: 11/06

Pipet ID: 1413/3

Sample Count Time: 30 (Min)

Bkg Count Time: 30 (Min)

Witness: KL 7-10-09

Sample I	Client Description	Type	Hazard Code Matrix	Min CRDL	Client	Vol (mL)	End Init Degas Date/Tin	End LN De-em Date/Time	Start Count Date/Time	Cell #	Det #	Bkg counts	Total Counts
232135001-1	M-19B	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1540	7/14/09 1000	7/14/09 1310	104	2	8	39
232135002-1	M-34B	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1540	7/14/09 1000	7/14/09 1310	306	3	8	28
232135004-1	M-125BDISS	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1546	7/14/09 1000	7/14/09 1310	403	4	7	32
232135005-1	M-22AB	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1540	7/14/09 1000	7/14/09 1310	507	5	2	37
232135006-1	M-17AB	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1540	7/14/09 1000	7/14/09 1310	507	7	4	17
232135007-1	M-17ABDISS	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1546	7/14/09 1115	7/14/09 1355	104	1	6	38
232135008-1	M-75B	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1546	7/14/09 1115	7/14/09 1355	241	2	4	12
232135009-1	M-13AB	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1540	7/14/09 1115	7/14/09 1355	303	3	8	39
232135010-1	M-13ABDISS	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1546	7/14/09 1115	7/14/09 1355	410	4	7	36
232135011-1	M-13009AB	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1540	7/14/09 1115	7/14/09 1355	505	5	7	16
232135012-1	M-13009ABDISS	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1546	7/14/09 1115	7/14/09 1355	701	7	3	19
232135013-1	M-64B	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1546	7/14/09 1140	7/14/09 1430	101	1	7	34
232135014-1	EB062609-SO	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1540	7/14/09 1140	7/14/09 1430	100	2	8	18
232135015-1	M-111AB	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1546	7/14/09 1140	7/14/09 1430	311	3	4	35
232135016-1	EB062909-GW	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1546	7/14/09 1140	7/14/09 1430	402	4	8	25
232135017-1	M-25B	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1546	7/14/09 1140	7/14/09 1430	510	5	2	59
232135018-1	M-12AB	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1546	7/14/09 1140	7/14/09 1430	107	7	3	53
232135019-1	M-12ABDISS	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1546	7/14/09 1140	7/14/09 1505	100	1	4	51
232135020-1	EB070109-SO1	SAMPLE	WATER	1 pC/L	KERR003	500	7/10/09 1546	7/14/09 1140	7/14/09 1505	101	2	8	13
1201877244-1	MB for batch 883675	MB	WATER	1 pC/L	QC ACCOUNT	500	7/10/09 1546	7/14/09 1140	7/14/09 1505	305	3	8	19
1201877245-1	M-125BDISS(232135004DUP)	DUP	WATER	1 pC/L	QC ACCOUNT	500	7/10/09 1546	7/14/09 1140	7/14/09 1505	411	4	8	34
1201877246-1	M-125BDISS(232135004MS)	MS	WATER	1 pC/L	QC ACCOUNT	100	7/10/09 1546	7/14/09 1140	7/14/09 1505	503	5	5	84
1201877247-1	LCS for batch 883675	LCS	WATER	1 pC/L	QC ACCOUNT	500	7/10/09 1546	7/14/09 1140	7/14/09 1600	704	7	4	850

16:05 7-14-09

dailes

*[Handwritten Signature]*

Data Reviewed By: 7-14-09

# Radium-226 Liquid

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

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

Spike SN : 0638-H  
 Spike Exp Date : 7/23/2009  
 Spike Activity (dpm/ml) : 266.25  
 Spike Volume Added : 0.10

Batch : 883675  
 Analyst : KSD1  
 Prep Date : 7/10/2009  
 Ra-226 Abundance : 1  
 Ra-226 Method Uncertainty : 0.0918

Procedure Code : LUC26RAL  
 Parmname : Radium-226  
 Required MDA : 1 pCi/L  
 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

LCS SN : 0638-H  
 LCS Exp Date : 7/23/2009  
 LCS Activity (dpm/ml) : 266.25  
 LCS Volume Added : 0.10

Sample Characteristics			Count Raw Data			Weekly Background			Detector Efficiency			
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Sample Date/Time	Cell Number	Counting Time (min.)	Gross Counts	Gross CPM	Counts	CPM	Count Time (min.)	Efficiency (cpm/dpm)
1	232135001.1	0.5000	2.0256E-05	6/19/2009 9:10	204	30	39	1.300	8	0.267	30	2.1930
2	232135002.1	0.5000	2.0256E-05	6/19/2009 11:40	306	30	28	0.933	8	0.267	30	1.7470
3	232135004.1	0.5000	2.0256E-05	6/23/2009 10:14	403	30	32	1.067	7	0.233	30	1.4630
4	232135005.1	0.5000	2.0256E-05	6/24/2009 9:06	507	30	37	1.233	2	0.067	30	1.7010
5	232135006.1	0.5000	2.0256E-05	6/24/2009 12:35	705	30	17	0.567	4	0.133	30	2.1600
6	232135007.1	0.5000	2.0256E-05	6/24/2009 12:35	112	30	38	1.267	6	0.200	30	1.6480
7	232135008.1	0.5000	2.0256E-05	6/25/2009 8:47	211	30	12	0.400	4	0.133	30	2.1710
8	232135009.1	0.5000	2.0256E-05	6/25/2009 12:15	303	30	39	1.300	8	0.267	30	2.1360
9	232135010.1	0.5000	2.0256E-05	6/25/2009 12:15	410	30	36	1.200	8	0.267	30	1.8860
10	232135011.1	0.5000	2.0256E-05	6/25/2009 12:15	505	30	16	0.533	7	0.233	30	2.3310
11	232135012.1	0.5000	2.0256E-05	6/25/2009 12:15	701	30	19	0.633	3	0.100	30	1.8150
12	232135013.1	0.5000	2.0256E-05	6/26/2009 12:35	101	30	34	1.133	7	0.233	30	1.7510
13	232395021.1	0.5000	2.0256E-05	6/26/2009 13:30	206	30	18	0.600	8	0.267	30	2.2590
14	232135015.1	0.5000	2.0256E-05	6/29/2009 9:55	311	30	35	1.167	4	0.133	30	2.1140
15	232135016.1	0.5000	2.0256E-05	6/29/2009 11:25	402	30	25	0.833	8	0.267	30	2.1180
16	232135017.1	0.5000	2.0256E-05	6/30/2009 7:45	510	30	59	1.967	2	0.067	30	1.4580
17	232135018.1	0.5000	2.0256E-05	6/30/2009 10:10	707	30	53	1.767	3	0.100	30	2.1190
18	232135019.1	0.5000	2.0256E-05	6/30/2009 10:10	106	30	51	1.700	4	0.133	30	1.4860
19	232727021.1	0.5000	2.0256E-05	7/1/2009 11:25	201	30	13	0.433	8	0.267	30	1.9930
20	1201877244.1	0.5000	2.0256E-05	7/10/2009 0:00	305	30	19	0.633	8	0.267	30	2.0570
21	1201877245.1	0.5000	2.0256E-05	6/23/2009 10:14	411	30	24	0.800	8	0.267	30	1.8240
22	1201877246.1	0.1000	1.1370E-05	6/23/2009 10:14	503	30	782	26.067	5	0.167	30	1.6010
23	1201877247.1	0.5000	2.0256E-05	7/10/2009 0:00	704	30	850	28.333	4	0.133	30	2.2480

Detector Efficiency Error (cpm/dpm)	Cell Calibration Date	Cell Calibration Due Date	De-Gas Date/Time	Rn-222 Ingrow		Count Start Date/Time	De-Gas to Ingrowth	Rn-222 Corrections		Ra-226 Decay
				End Date/Time	Count Start Date/Time			Ingrowth to Count	During Count	
0.07722	12/19/2008	12/19/2009	7/10/2009 15:40	7/14/2009 10:00	7/14/2009 13:10	0.495	0.976	1.002	1.000	
0.06082	2/4/2009	2/4/2010	7/10/2009 15:40	7/14/2009 10:00	7/14/2009 13:10	0.495	0.976	1.002	1.000	
0.12371	3/2/2009	3/2/2010	7/10/2009 15:40	7/14/2009 10:00	7/14/2009 13:10	0.495	0.976	1.002	1.000	
0.14377	3/25/2009	3/25/2010	7/10/2009 15:40	7/14/2009 10:00	7/14/2009 13:10	0.495	0.976	1.002	1.000	
0.08547	11/21/2008	11/21/2009	7/10/2009 15:40	7/14/2009 10:00	7/14/2009 13:10	0.499	0.980	1.002	1.000	
0.09580	8/29/2008	8/29/2009	7/10/2009 15:40	7/14/2009 11:15	7/14/2009 13:55	0.499	0.980	1.002	1.000	
0.07722	12/19/2008	12/19/2009	7/10/2009 15:40	7/14/2009 11:15	7/14/2009 13:55	0.499	0.980	1.002	1.000	
0.06082	2/4/2009	2/4/2010	7/10/2009 15:40	7/14/2009 11:15	7/14/2009 13:55	0.499	0.980	1.002	1.000	
0.12371	3/2/2009	3/2/2010	7/10/2009 15:40	7/14/2009 11:15	7/14/2009 13:55	0.499	0.980	1.002	1.000	
0.14377	3/25/2009	3/25/2010	7/10/2009 15:40	7/14/2009 11:15	7/14/2009 13:55	0.499	0.980	1.002	1.000	
0.08547	11/21/2008	11/21/2009	7/10/2009 15:40	7/14/2009 11:15	7/14/2009 13:55	0.499	0.980	1.002	1.000	
0.09580	8/29/2008	8/29/2009	7/10/2009 15:40	7/14/2009 11:40	7/14/2009 14:30	0.501	0.979	1.002	1.000	
0.07722	12/19/2008	12/19/2009	7/10/2009 15:40	7/14/2009 11:40	7/14/2009 14:30	0.501	0.979	1.002	1.000	
0.06082	2/4/2009	2/4/2010	7/10/2009 15:40	7/14/2009 11:40	7/14/2009 14:30	0.501	0.979	1.002	1.000	
0.12371	3/2/2009	3/2/2010	7/10/2009 15:40	7/14/2009 11:40	7/14/2009 14:30	0.501	0.979	1.002	1.000	
0.14377	3/25/2009	3/25/2010	7/10/2009 15:40	7/14/2009 11:40	7/14/2009 14:30	0.501	0.979	1.002	1.000	
0.08547	11/21/2008	11/21/2009	7/10/2009 15:40	7/14/2009 12:10	7/14/2009 15:05	0.503	0.978	1.002	1.000	
0.09580	8/29/2008	8/29/2009	7/10/2009 15:40	7/14/2009 12:10	7/14/2009 15:05	0.503	0.978	1.002	1.000	
0.07722	12/19/2008	12/19/2009	7/10/2009 15:40	7/14/2009 12:10	7/14/2009 15:05	0.503	0.978	1.002	1.000	
0.06082	2/4/2009	2/4/2010	7/10/2009 15:40	7/14/2009 12:10	7/14/2009 15:05	0.503	0.978	1.002	1.000	
0.12371	3/2/2009	3/2/2010	7/10/2009 15:40	7/14/2009 12:10	7/14/2009 15:05	0.503	0.978	1.002	1.000	
0.14377	3/25/2009	3/25/2010	7/10/2009 15:40	7/14/2009 12:10	7/14/2009 16:05	0.503	0.971	1.002	1.000	
0.08547	11/21/2008	11/21/2009	7/10/2009 15:40	7/14/2009 12:10	7/14/2009 15:05	0.503	0.978	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/L	Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error pCi/L	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA		Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
									Counting Uncertainty pCi/L	Total Prop. Uncertainty pCi/L						
1	0.2638	0.1862	1	0.4574	0.8774	0.2342	1.0333	0.2285	0.3803	0.4327		SAMPLE				
2	0.3311	0.2338	1	0.5741	0.7106	0.3061	0.6667	0.2000	0.4178	0.4451		SAMPLE				
3	0.3699	0.2611	1	0.6495	1.0606	0.2788	0.8333	0.2082	0.5193	0.6101		SAMPLE				
4	0.1700	0.1200	1	0.3496	1.2771	0.2291	1.1667	0.2082	0.4466	0.6179		SAMPLE				
5	0.1894	0.1337	1	0.3536	0.3736	0.3627	0.4333	0.1528	0.2581	0.2739		SAMPLE				
6	0.3000	0.2118	1	0.5350	1.1892	0.2284	1.0667	0.2211	0.4832	0.5737		SAMPLE				
7	0.1859	0.1313	1	0.3472	0.2257	0.5059	0.2667	0.1333	0.2212	0.2275		SAMPLE				
8	0.2672	0.1887	1	0.4634	0.8889	0.2294	1.0333	0.2285	0.3853	0.4304		SAMPLE				
9	0.3027	0.2137	1	0.5248	0.9093	0.2673	0.9333	0.2211	0.4222	0.5036		SAMPLE				
10	0.2291	0.1617	1	0.4023	0.2365	0.5519	0.3000	0.1599	0.2470	0.2593		SAMPLE				
11	0.1926	0.1360	1	0.3732	0.5399	0.3054	0.5333	0.1563	0.3102	0.3374		SAMPLE				
12	0.3044	0.2149	1	0.5345	0.9426	0.2558	0.9000	0.2134	0.4981	0.5021		SAMPLE				
13	0.2522	0.1781	1	0.4373	0.2706	0.5157	0.3333	0.1700	0.2704	0.2778		SAMPLE				
14	0.1906	0.1345	1	0.3558	0.8964	0.2104	1.0333	0.2082	0.3539	0.4034		SAMPLE				
15	0.2690	0.1899	1	0.4664	0.4907	0.3598	0.5667	0.1915	0.3250	0.3571		SAMPLE				
16	0.1954	0.1379	1	0.4017	2.3899	0.1986	1.9000	0.2603	0.6418	1.0249		SAMPLE				
17	0.1646	0.1162	1	0.3190	1.4424	0.1724	1.6667	0.2494	0.4231	0.5521		SAMPLE				
18	0.2703	0.1908	1	0.5046	1.9274	0.1846	1.5667	0.2472	0.5961	0.7788		SAMPLE				
19	0.2850	0.2012	1	0.4941	0.1529	0.9198	0.1667	0.1528	0.2746	0.2770		SAMPLE				
20	0.2761	0.1949	1	0.4787	0.3259	0.4763	0.3667	0.1732	0.3017	0.3098		SAMPLE				
21	0.3114	0.2198	1	0.5399	0.5346	0.3746	0.5333	0.1886	0.3704	0.4041		MB				
22	1.4129	0.9975	1	2.5704	148.9993	0.1482	25.9000	0.9351	10.5440	50.9187	232135004.1	DUP	66.0%		120.8353	122.4%
23	0.1786	0.1261	1	0.3336	22.9334	0.0922	28.2000	0.9741	1.5527	5.8479	232135004.1	MS			24.1666	94.9%
											LCS					

**Subject:** Change in KERR Henderson Samples  
**From:** Edie Kent <emk@gel.com>  
**Date:** Fri, 17 Jul 2009 15:06:12 -0400  
**To:** Theresa Austin <theresa.austin@gel.com>  
**CC:** "team.kent" <team.kent@gel.com>

Theresa:

I have relogged the two water samples that we are moving and deleted the tests from the original sample numbers so they are ready to be rebatched. Sample 232135014 is now 232395021. Sample 232135020 is now 232727021. As soon as I can track down Mike, I'm getting the bottles relabeled.

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)

### Radiochemistry Batch Checklist, Rev 9

Batch# 883008 Product: RA226 Date: 7/29/09

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.	✓		
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.			N/A
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.	✓		
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 stated.	✓		
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 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]* 7/29/09

Secondary Review Performed By:

*[Signature]* 7/29/09

KERR

7/20 - 7/31


# Radium-226 Que Sheet

07/29/2009 General Engineering Laboratories, Radiochemistry Division

Batch #: 883008  
 Analyst: ~~GF~~ KSD  
 First Client Due Date: 07/31/2009 Internal Due Date: 07/20/2009  
 Spike Isotope: Radium-226 Spike Code: D638-14 Vol: 0.1 Nom Conc: 11.9875 (Min)  
 LCS Isotope: Radium-226 LCS Code: D638-14 Vol: 0.1 Nom Conc: 11.6652 (Min)  
 Prep Date: 7/16/09 Pipet ID: 1429303 Initials: KD Sample Count Time: 30 (Min)  
 Witness: MSP 7/20/09 Bkg Count Time: 30 (Min)

Recopied due to recount by 7/29/09

Sample I	Client Description	Type	Hazard Code	Matrix	Min CRDL	Client	Vol (mL)	End Init	End LN	De-em	Start Count	Cell #	Det #	Bkg counts	Total Counts
232727001-1	SA50-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.043	7-21-09 1600	7-27-09 0950		7-27-09 1750	104	1	8	59
232727002-1	SA54-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.019	7-21-09 1600	7-27-09 0950		7-27-09 1750	207	2	8	67
232727003-1	SA102-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.037	7-21-09 1600	7-27-09 0950		7-27-09 1750	301	3	3	114
232727004-1	SA109-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.055	7-21-09 1600	7-27-09 0950		7-27-09 1750	412	4	8	65
232727005-1	SA82-29B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.001	7-21-09 1600	7-27-09 0950		7-27-09 1750	511	5	8	114
232727006-1	RSAL3-10B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.020	7-21-09 1600	7-27-09 0950		7-27-09 1750	701	7	2	27
232727007-1	RSAL3-30B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.000	7-21-09 1600	7-27-09 0950		7-27-09 1825	108	1	8	72
232727008-1	SA114-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.043	7-21-09 1600	7-27-09 1025		7-27-09 1825	204	2	7	51
232727009-1	SA114009-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.009	7-21-09 1600	7-27-09 1025		7-27-09 1825	312	3	4	55
232727010-1	RSANG-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.092	7-21-09 1600	7-27-09 1025		7-27-09 1825	403	4	6	94
232727011-1	SA134-20B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.051	7-21-09 1600	7-27-09 1025		7-27-09 1825	501	5	8	93
232727012-1	SA134-31B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.034	7-21-09 1600	7-27-09 1025		7-27-09 1825	703	7	1	114
232727013-1	SA134009-31B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.012	7-21-09 1600	7-27-09 1025		7-27-09 1825	111	1	8	110
232727014-1	SA88-10B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.061	7-21-09 1600	7-27-09 1050		7-27-09 1855	206	2	8	105
232727015-1	SA88-20B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.005	7-21-09 1600	7-27-09 1050		7-27-09 1855	305	3	8	896
232727016-1	SA88-32B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.062	7-21-09 1600	7-27-09 1050		7-27-09 1855	410	4	8	147
232727017-1	RSAK3-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.046	7-21-09 1600	7-27-09 1050		7-27-09 1855	503	5	2	84
232727018-1	RSAK3-10B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.009	7-21-09 1600	7-27-09 1050		7-27-09 1855	706	7	2	69
232727019-1	RSAK3-20B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.009	7-21-09 1600	7-27-09 1115		7-27-09 1930	101	1	8	421
232727020-1	RSAK3-31B	SAMPLE		SOIL	.5 pCi/g	KERR003	1.012	7-21-09 1600	7-27-09 1115		7-27-09 1930	211	2	6	104
1201875553-1	MB for batch 883008	MB		QC ACCOUNT	.5 pCi/g	QC ACCOUNT	1.092	7-21-09 1600	7-27-09 1115		7-27-09 1930	306	3	8	12
1201875554-1	RSAK3-31B(232727020DUP)	DUP		QC ACCOUNT	.5 pCi/g	QC ACCOUNT	1.028	7-21-09 1600	7-27-09 1115		7-27-09 1930	409	4	8	104
1201875555-1	RSAK3-31B(232727020MS)	MS		QC ACCOUNT	.5 pCi/g	QC ACCOUNT	1.008	7-21-09 1600	7-27-09 1115		7-27-09 1930	510	5	2	892
1201875556-1	LCS for batch 883008	LCS		QC ACCOUNT	.5 pCi/g	QC ACCOUNT	1.092	7-21-09 1600	7-27-09 1115		7-27-09 1930	707	7	1	798

Comments: \_\_\_\_\_  
 Instrument ID's: LUCAS1:90988, LUCAS2:136917, LUCAS3:90989, LUCAS4:102753, LUC5:132286, LUC6:170055  
 Data Reviewed By: 



# Radium-226 Solid

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

Spike S/N : 0638-H  
 Spike Exp Date : 7/23/2009  
 Spike Activity (dpm/ml): 268.25  
 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 : 883008

Analyst : KSD1  
 Prep Date : 7/16/2009

Ra-226 Abundance : 1  
 Ra-226 Method Uncertainty : 0.1153

Procedure Code : LUC26RRAS

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

Sample Characteristics			Count Raw Data				Weekly Background					
Pos.	Sample ID	Sample Aliquot G	Sample Aliquot StDev. G	Sample Date/Time	Cell Number	Counting Time (min.)	Gross Counts	Gross CPM	Counts	CPM	Count Time (min.)	Detector Efficiency (cpm/dpm)
1	232727001.1	1.0430	3.3278E-03	6/30/2009 12:30	104	30	59	1.967	8	0.267	30	1.9730
2	232727002.1	1.0190	3.3253E-03	6/30/2009 13:20	207	30	67	2.233	8	0.267	30	2.1460
3	232727003.1	1.0370	3.3272E-03	6/30/2009 11:05	301	30	114	3.800	3	0.100	30	2.0210
4	232727004.1	1.0550	3.3291E-03	6/30/2009 10:40	412	30	65	2.167	8	0.267	30	1.9670
5	232727005.1	1.0010	3.3234E-03	7/1/2009 9:36	511	30	114	3.800	8	0.267	30	1.9590
6	232727006.1	1.0200	3.3254E-03	7/1/2009 11:03	701	30	27	0.900	2	0.067	30	1.8150
7	232727007.1	1.0000	3.3233E-03	7/1/2009 12:02	108	30	72	2.400	8	0.267	30	1.8400
8	232727008.1	1.0430	3.3278E-03	7/1/2009 8:50	204	30	51	1.700	7	0.233	30	2.1930
9	232727009.1	1.0090	3.3243E-03	7/1/2009 8:50	312	30	55	1.833	4	0.133	30	1.9440
10	232727010.1	1.0920	3.3329E-03	7/1/2009 8:20	403	30	96	3.200	6	0.200	30	1.4630
11	232727011.1	1.0310	3.3266E-03	7/2/2009 7:00	501	30	93	3.100	8	0.267	30	2.0870
12	232727012.1	1.0340	3.3269E-03	7/2/2009 7:30	703	30	114	3.800	1	0.033	30	2.0830
13	232727013.1	1.0120	3.3246E-03	7/2/2009 7:30	111	30	110	3.667	8	0.267	30	1.5750
14	232727014.1	1.0610	3.3297E-03	7/2/2009 8:25	206	30	105	3.500	8	0.267	30	2.2590
15	232727015.1	1.0050	3.3239E-03	7/2/2009 8:52	305	30	890	29.667	8	0.267	30	2.0570
16	232727016.1	1.0620	3.3298E-03	7/2/2009 9:38	410	30	147	4.900	8	0.267	30	1.8860
17	232727017.1	1.0460	3.3281E-03	7/2/2009 10:56	503	30	84	2.800	2	0.067	30	1.6010
18	232727018.1	1.0090	3.3243E-03	7/2/2009 11:20	706	30	69	2.300	2	0.067	30	2.1180
19	232727019.1	1.0120	3.3246E-03	7/2/2009 11:54	101	30	421	14.033	8	0.267	30	1.7510
20	232727020.1	1.0120	3.3246E-03	7/2/2009 11:20	211	30	106	3.533	6	0.200	30	2.1710
21	1201875553.1	1.0920	3.3329E-03	7/16/2009 0:00	306	30	12	0.400	8	0.267	30	1.7470
22	1201875554.1	1.0280	3.3263E-03	7/2/2009 11:20	409	30	104	3.467	8	0.267	30	2.0360
23	1201875555.1	1.0080	3.3242E-03	7/2/2009 11:20	510	30	892	29.733	2	0.067	30	1.4580
24	1201875556.1	1.0920	3.3329E-03	7/16/2009 0:00	707	30	798	26.600	1	0.033	30	2.1190

Detector Efficiency Error (cpm/dpm)	Cell Calibration Date	Cell Calibration Due Date	De-Gas Date/Time	Rn-222 Ingrowth		Count Start Date/Time	De-Gas to Ingrowth	Rn-222 Corrections		Ra-226 Decay
				End Date/Time	Count Date/Time			Ingrowth to Count	During Count	
0.09580	8/29/2008	8/29/2009	7/21/2009 16:00	7/27/2009 9:50	7/27/2009 17:50	0.647	0.941	1.002	1.000	
0.07722	12/19/2008	12/19/2009	7/21/2009 16:00	7/27/2009 9:50	7/27/2009 17:50	0.647	0.941	1.002	1.000	
0.06082	2/4/2009	2/4/2010	7/21/2009 16:00	7/27/2009 9:50	7/27/2009 17:50	0.647	0.941	1.002	1.000	
0.12371	3/2/2009	3/2/2010	7/21/2009 16:00	7/27/2009 9:50	7/27/2009 17:50	0.647	0.941	1.002	1.000	
0.14377	3/25/2009	3/25/2010	7/21/2009 16:00	7/27/2009 9:50	7/27/2009 17:50	0.647	0.941	1.002	1.000	
0.08547	11/21/2008	11/21/2009	7/21/2009 16:00	7/27/2009 9:50	7/27/2009 17:50	0.647	0.941	1.002	1.000	
0.09580	8/29/2008	8/29/2009	7/21/2009 16:00	7/27/2009 10:25	7/27/2009 18:25	0.649	0.941	1.002	1.000	
0.07722	12/19/2008	12/19/2009	7/21/2009 16:00	7/27/2009 10:25	7/27/2009 18:25	0.649	0.941	1.002	1.000	
0.06082	2/4/2009	2/4/2010	7/21/2009 16:00	7/27/2009 10:25	7/27/2009 18:25	0.649	0.941	1.002	1.000	
0.12371	3/2/2009	3/2/2010	7/21/2009 16:00	7/27/2009 10:25	7/27/2009 18:25	0.649	0.941	1.002	1.000	
0.14377	3/25/2009	3/25/2010	7/21/2009 16:00	7/27/2009 10:25	7/27/2009 18:25	0.649	0.941	1.002	1.000	
0.08547	11/21/2008	11/21/2009	7/21/2009 16:00	7/27/2009 10:25	7/27/2009 18:25	0.649	0.941	1.002	1.000	
0.09580	8/29/2008	8/29/2009	7/21/2009 16:00	7/27/2009 10:50	7/27/2009 18:55	0.650	0.941	1.002	1.000	
0.07722	12/19/2008	12/19/2009	7/21/2009 16:00	7/27/2009 10:50	7/27/2009 18:55	0.650	0.941	1.002	1.000	
0.06082	2/4/2009	2/4/2010	7/21/2009 16:00	7/27/2009 10:50	7/27/2009 18:55	0.650	0.941	1.002	1.000	
0.12371	3/2/2009	3/2/2010	7/21/2009 16:00	7/27/2009 10:50	7/27/2009 18:55	0.650	0.941	1.002	1.000	
0.14377	3/25/2009	3/25/2010	7/21/2009 16:00	7/27/2009 10:50	7/27/2009 18:55	0.650	0.941	1.002	1.000	
0.08547	11/21/2008	11/21/2009	7/21/2009 16:00	7/27/2009 10:50	7/27/2009 18:55	0.650	0.941	1.002	1.000	
0.09580	8/29/2008	8/29/2009	7/21/2009 16:00	7/27/2009 11:15	7/27/2009 19:30	0.651	0.940	1.002	1.000	
0.07722	12/19/2008	12/19/2009	7/21/2009 16:00	7/27/2009 11:15	7/27/2009 19:30	0.651	0.940	1.002	1.000	
0.06082	2/4/2009	2/4/2010	7/21/2009 16:00	7/27/2009 11:15	7/27/2009 19:30	0.651	0.940	1.002	1.000	
0.12371	3/2/2009	3/2/2010	7/21/2009 16:00	7/27/2009 11:15	7/27/2009 19:30	0.651	0.940	1.002	1.000	
0.14377	3/25/2009	3/25/2010	7/21/2009 16:00	7/27/2009 11:15	7/27/2009 19:30	0.651	0.940	1.002	1.000	
0.08547	11/21/2008	11/21/2009	7/21/2009 16:00	7/27/2009 11:15	7/27/2009 19:30	0.651	0.940	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

Results 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 Counting Uncertainty pCi/G	2 SIGMA Total Prop. Uncertainty pCi/G	Sample QC	Sample Type	RPD	RER	Nominal pCi/G	Recovery
1	0.1114	0.0787	0.5	0.1932	0.6098	0.1869	1.7000	0.2728	0.1918	0.2625		SAMPLE				
2	0.1049	0.0740	0.5	0.1818	0.6639	0.1659	1.9667	0.2887	0.1910	0.2629		SAMPLE				
3	0.0670	0.0473	0.5	0.1298	1.3033	0.1149	3.7000	0.3606	0.2489	0.4158		SAMPLE				
4	0.1105	0.0780	0.5	0.1916	0.6759	0.1944	1.9000	0.2848	0.1986	0.2994		SAMPLE				
5	0.1170	0.0826	0.5	0.2028	1.3301	0.1776	3.5333	0.3682	0.2717	0.5520		SAMPLE				
6	0.0619	0.0437	0.5	0.1273	0.3323	0.2318	0.8333	0.1795	0.1403	0.1686		SAMPLE				
7	0.1243	0.0878	0.5	0.2156	0.8539	0.1695	2.1333	0.2981	0.2339	0.3430		SAMPLE				
8	0.0936	0.0661	0.5	0.1643	0.4722	0.1896	1.4667	0.2539	0.1602	0.2054		SAMPLE				
9	0.0825	0.0582	0.5	0.1540	0.6383	0.1625	1.7000	0.2560	0.1884	0.2492		SAMPLE				
10	0.1240	0.0876	0.5	0.2212	1.3829	0.1670	3.0000	0.3367	0.3042	0.5502		SAMPLE				
11	0.1063	0.0751	0.5	0.1844	0.9697	0.1862	2.8333	0.3350	0.2247	0.4162		SAMPLE				
12	0.0376	0.0265	0.5	0.0872	1.2879	0.1278	3.7667	0.3575	0.2396	0.4344		SAMPLE				
13	0.1434	0.1012	0.5	0.2486	1.5693	0.1433	3.4000	0.3621	0.3276	0.5657		SAMPLE				
14	0.0954	0.0673	0.5	0.1653	0.9924	0.1341	3.2333	0.3543	0.2132	0.3440		SAMPLE				
15	0.1106	0.0781	0.5	0.1917	10.4622	0.0697	29.4000	0.9989	0.6967	2.7632		SAMPLE				
16	0.1141	0.0806	0.5	0.1978	1.7018	0.1528	4.6333	0.4150	0.2988	0.6384		SAMPLE				
17	0.0682	0.0482	0.5	0.1403	1.2007	0.1829	2.7333	0.3091	0.2662	0.5089		SAMPLE				
18	0.0535	0.0378	0.5	0.1099	0.7688	0.1521	2.2333	0.2809	0.1895	0.2876		SAMPLE				
19	0.1293	0.0913	0.5	0.2242	5.7298	0.1082	13.7667	0.6904	0.5632	1.7756		SAMPLE				
20	0.0900	0.0636	0.5	0.1606	1.1156	0.1311	3.3333	0.3528	0.2314	0.3817		SAMPLE				
21	0.1197	0.0845	0.5	0.2076	0.0514	1.1197	0.1333	0.1491	0.1126	0.1134		SAMPLE				
22	0.1091	0.0771	0.5	0.1893	1.1243	0.1657	3.2000	0.3528	0.2429	0.4449		MB	0.8%			
23	0.0777	0.0549	0.5	0.1598	14.8436	0.1477	29.6667	0.9967	0.9774	5.4509	232727020.1	DUP			11.9875	114.5%
24	0.0349	0.0246	0.5	0.0811	8.4424	0.0926	26.5667	0.9422	0.5869	2.4469	232727020.1	MS			11.0652	76.3%
												LCS				

# RADIUM 228

### Radiochemistry Batch Checklist, Rev 9

Batch# 882963

Product: Ra 228

Date: 7/17/09

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.	✓		
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 712681
Batch non-conformances second reviewed and disposition verified to be completed.			NCR 712681
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: Marymuzzie

KERR  
7/31

Secondary Review Performed By: [Signature]

# Radium-228 Que Sheet

Batch #: 882963    Analyst: JXC5    First Client Due Date: 07/31/2009    Internal Due Date: 07/20/2009  
 Spike Isotope: Radium-228    Spike Code: 0503-B    Expiration Date: 9-13-09    Vol: 0.1 mL  
 LCS Isotope: Radium-228    LCS Code: 0503-B    Expiration Date: 9-13-09    Vol: 0.1 mL  
 Tracer Isotope: Barium-133    Tracer Code: 0112d    Expiration Date: 2-12-10    Vol: 0.1 mL  
 Prep Date: 7-8-09    Initials:    Pipet ID: 2766953    Balance ID: 1795160    Witness: H5 7-8-09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Pos. #	Vol (mL)	Det #	Ba Yield (%)	Gamma Det. #
232727001-1	SA50-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	30-JUN-09 12:30 PM	1	1.008	1A2B	86.10	
232727002-1	SA54-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	30-JUN-09 01:20 PM	2	1.003	1B	99.10	
232727003-1	SA102-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	30-JUN-09 11:05 AM	3	1.013	2A	94.74	
232727004-1	SA109-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	30-JUN-09 10:40 AM	4	1.008	2C	90.01	
232727005-1	SA82-29B	SAMPLE		.5 pCi/g	SOIL	KERR003	01-JUL-09 09:36 AM	5	1.013	2D7B	82.50	
232727006-1	RSAL3-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	01-JUL-09 11:03 AM	6	1.006	SA	89.36	
232727007-1	RSAL3-30B	SAMPLE		.5 pCi/g	SOIL	KERR003	01-JUL-09 12:02 PM	7	1.004	7A	93.16	
232727008-1	SA114-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	01-JUL-09 08:50 AM	8	1.002	7B	91.05	
232727009-1	SA114009-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	01-JUL-09 08:50 AM	9	1.016	7C	9.83	
232727010-1	RSAN6-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	01-JUL-09 08:20 AM	10	1.005	7D	94.94	
232727011-1	SA134-20B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-JUL-09 07:00 AM	11	1.005	8A	95.82	
232727012-1	SA134-31B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-JUL-09 07:30 AM	12	1.016	8C	94.42	
232727013-1	SA134009-31B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-JUL-09 07:30 AM	13	1.009	8D	86.86	
232727014-1	SA88-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-JUL-09 08:25 AM	14	1.010	9C	101.48	
232727015-1	SA88-20B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-JUL-09 08:52 AM	15	1.015	10A	102.88	
232727016-1	SA88-32B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-JUL-09 09:38 AM	16	1.004	10C	87.72	
232727017-1	RSAK3-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-JUL-09 10:56 AM	17	1.010	10D	92.31	
232727018-1	RSAK3-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-JUL-09 11:20 AM	18	1.002	11C	88.89	
232727019-1	RSAK3-20B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-JUL-09 11:54 AM	19	1.001	11D	95.28	
232727020-1	RSAK3-31B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-JUL-09 11:20 AM	20	1.007	12B	71.20	
1201875411-1	MB for batch 882963	MB		.5 pCi/g	SOIL	QC ACCOUNT		21	1.016	13A	84.26	
1201875412-1	RSAK3-31B(232727020DUP)	DUP		.5 pCi/g	SOIL	QC ACCOUNT	02-JUL-09 11:20 AM	22	1.008	14A	102.83	
1201875413-1	RSAK3-31B(232727020MS)	MS		.5 pCi/g	SOIL	QC ACCOUNT	02-JUL-09 11:20 AM	23	1.01	14B	76.20	
1201875414-1	LCS for batch 882963	LCS		.5 pCi/g	SOIL	QC ACCOUNT		24	1.016	14D	84.62	

\* 11/109 12/20/09

Data Reviewed By: Mary Maggall 7/17/09

Comments:

Instrument Used: (Circle One) PIC S/N: 10751-4

# 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) : 182.00  
 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 : 882963  
 Analyst : JXC5  
 Prep Date : 7/8/2009

LCS S/N : 0503-B  
 LCS Exp Date : 9/13/2009  
 LCS Activity (dpm/ml) : 182.00  
 LCS Volume Added : 0.10

Procedure Code : GFC28RAS  
 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 : 500 min

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

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

Pos.	Sample Characteristics			Sample Date/Time	Tracer Calculations			Tracer Samp.		
	Sample ID	Sample Aliquot G	Sample Aliquot StDev. G		Tracer Concentration (cpm) (Ba-133 Ref.)	Tracer Count Uncertainty (cpm)	Tracer Concentration (cpm) (Ba-133 Samp.)	Tracer Count Uncertainty (cpm)	Tracer Aliquot (mL)	Tracer Aliquot StDev. (mL)
1	232727001.1	1.0080	3.3242E-03	6/30/2009 12:30	222.3	4.20%	191.4	4.58%	0.1	0.000701
2	232727002.1	1.0030	3.3237E-03	6/30/2009 13:20	222.3	4.20%	220.3	4.22%	0.1	0.000701
3	232727003.1	1.0130	3.3247E-03	6/30/2009 11:05	222.3	4.20%	210.6	4.34%	0.1	0.000701
4	232727004.1	1.0080	3.3242E-03	6/30/2009 10:40	222.3	4.20%	200.1	4.47%	0.1	0.000701
5	232727005.1	1.0130	3.3247E-03	7/1/2009 9:36	222.3	4.20%	183.4	4.70%	0.1	0.000701
6	232727006.1	1.0060	3.3240E-03	7/1/2009 11:03	222.3	4.20%	198.7	4.49%	0.1	0.000701
7	232727007.1	1.0040	3.3238E-03	7/1/2009 12:02	222.3	4.20%	207.1	4.38%	0.1	0.000701
8	232727008.1	1.0020	3.3235E-03	7/1/2009 8:50	222.3	4.20%	202.4	4.44%	0.1	0.000701
9	232727009.1	1.0160	3.3250E-03	7/1/2009 8:50	222.3	4.20%	199.7	4.47%	0.1	0.000701
10	232727010.1	1.0050	3.3239E-03	7/1/2009 8:20	222.3	4.20%	211.1	4.33%	0.1	0.000701
11	232727011.1	1.0050	3.3239E-03	7/2/2009 7:00	222.3	4.20%	213.0	4.31%	0.1	0.000701
12	232727012.1	1.0160	3.3250E-03	7/2/2009 7:30	222.3	4.20%	209.9	4.34%	0.1	0.000701
13	232727013.1	1.0090	3.3243E-03	7/2/2009 7:30	222.3	4.20%	193.1	4.56%	0.1	0.000701
14	232727014.1	1.0100	3.3244E-03	7/2/2009 8:25	222.3	4.20%	225.6	4.17%	0.1	0.000701
15	232727015.1	1.0150	3.3249E-03	7/2/2009 8:52	222.3	4.20%	228.7	4.13%	0.1	0.000701
16	232727016.1	1.0040	3.3238E-03	7/2/2009 9:38	222.3	4.20%	195.0	4.53%	0.1	0.000701
17	232727017.1	1.0100	3.3244E-03	7/2/2009 10:56	222.3	4.20%	205.2	4.40%	0.1	0.000701
18	232727018.1	1.0020	3.3235E-03	7/2/2009 11:20	222.3	4.20%	197.6	4.50%	0.1	0.000701
19	232727019.1	1.0010	3.3234E-03	7/2/2009 11:54	222.3	4.20%	211.8	4.32%	0.1	0.000701
20	232727020.1	1.0020	3.3235E-03	7/2/2009 11:20	223.6	4.19%	159.2	5.11%	0.1	0.000701
21	1201875411.1	1.0160	3.3250E-03	7/8/2009 0:00	222.3	4.20%	187.3	4.64%	0.1	0.000701
22	1201875412.1	1.0080	3.3242E-03	7/2/2009 11:20	222.3	4.20%	228.6	4.14%	0.1	0.000701
23	1201875413.1	1.0100	3.3296E-03	7/2/2009 11:20	222.3	4.20%	169.4	4.93%	0.1	0.000701
24	1201875414.1	1.0160	3.3250E-03	7/8/2009 0:00	222.3	4.20%	188.1	4.63%	0.1	0.000701

Count raw Data		Counting		Gross Counts		Beta	Detector	Detector	Detector	Weekly Bkg		Separation		Count	Ra-228	Ac-228	Ac-228	Calculated	Sample
Pos.	Detector ID	Time (min.)	Alpha	Beta	Counts	cpm	Efficiency (cpm/dpm)	Efficiency Error (cpm/dpm)	cpm	Count Time (min.)	Date/Time	Date/Time	Date/Time	Start Date/Time	Decay	Decay	Correction	Sample Recovery %	Recovery Error %
1	7A	400	67	350	0.875	0.6180	0.00816	0.360	500	7/16/2009 13:45	7/16/2009 20:31	0.995	0.465	1.424	86.10%	3.26%			
2	1B	90	8	132	1.467	0.6282	0.00409	0.364	500	7/16/2009 13:45	7/16/2009 16:39	0.995	0.720	1.087	99.10%	3.14%			
3	2A	100	11	200	2.000	0.6172	0.00349	0.556	500	7/16/2009 13:45	7/16/2009 16:39	0.995	0.720	1.097	94.74%	3.18%			
4	2C	90	8	121	1.344	0.5969	0.00575	0.284	500	7/16/2009 13:45	7/16/2009 16:39	0.995	0.720	1.087	90.01%	3.22%			
5	7B	400	44	368	0.920	0.6280	0.00816	0.386	500	7/16/2009 13:45	7/16/2009 20:31	0.995	0.465	1.424	82.50%	3.30%			
6	5A	100	15	136	1.360	0.6258	0.00816	0.528	500	7/16/2009 13:45	7/16/2009 16:40	0.995	0.719	1.097	89.38%	3.23%			
7	3D	130	34	195	1.500	0.5994	0.00464	0.670	500	7/16/2009 13:45	7/16/2009 16:40	0.995	0.719	1.127	93.16%	3.19%			
8	4A	150	26	252	1.680	0.6208	0.00744	0.844	500	7/16/2009 13:45	7/16/2009 16:40	0.995	0.718	1.148	91.05%	3.21%			
9	5C	150	24	251	1.673	0.6368	0.00816	0.846	500	7/16/2009 13:45	7/16/2009 16:40	0.995	0.718	1.148	89.83%	3.22%			
10	6B	150	57	371	2.473	0.6163	0.00816	0.782	500	7/16/2009 13:45	7/16/2009 16:40	0.995	0.718	1.148	94.96%	3.17%			
11	8A	120	28	191	1.592	0.6247	0.00816	0.614	500	7/16/2009 13:45	7/16/2009 16:41	0.995	0.717	1.117	95.82%	3.17%			
12	8C	100	19	173	1.730	0.6339	0.00816	0.568	500	7/16/2009 13:45	7/16/2009 16:41	0.995	0.717	1.097	94.42%	3.18%			
13	7C	400	166	278	0.695	0.6178	0.00816	0.254	500	7/16/2009 13:45	7/16/2009 20:31	0.995	0.465	1.424	86.86%	3.25%			
14	9C	400	14	133	1.478	0.6273	0.00816	0.328	500	7/16/2009 13:45	7/16/2009 16:41	0.995	0.717	1.087	101.48%	3.12%			
15	7D	400	201	277	0.693	0.6257	0.00816	0.380	500	7/16/2009 13:45	7/16/2009 20:31	0.995	0.465	1.424	102.88%	3.11%			
16	10C	90	4	123	1.367	0.6250	0.00816	0.330	500	7/16/2009 13:45	7/16/2009 16:42	0.995	0.716	1.087	87.72%	3.24%			
17	10D	90	11	139	1.544	0.6320	0.00816	0.384	500	7/16/2009 13:45	7/16/2009 16:42	0.995	0.716	1.087	92.31%	3.20%			
18	11C	90	23	126	1.400	0.6352	0.00816	0.496	500	7/16/2009 13:45	7/16/2009 16:39	0.995	0.720	1.087	88.89%	3.23%			
19	11D	90	6	72	0.800	0.6348	0.00816	0.404	500	7/16/2009 13:45	7/16/2009 16:39	0.995	0.719	1.087	95.28%	3.17%			
20	9A	400	53	395	0.988	0.6496	0.00816	0.428	500	7/16/2009 13:45	7/16/2009 20:31	0.995	0.465	1.424	71.20%	3.45%			
21	13A	90	5	50	0.556	0.6410	0.00816	0.468	500	7/16/2009 13:45	7/16/2009 16:40	0.997	0.719	1.087	84.26%	3.28%			
22	9B	400	32	709	1.773	0.6356	0.00816	1.214	500	7/16/2009 13:45	7/16/2009 20:31	0.995	0.465	1.424	102.89%	3.11%			
23	14B	60	6	366	6.100	0.6266	0.00816	0.350	500	7/16/2009 13:45	7/16/2009 16:40	0.995	0.718	1.058	76.20%	3.39%			
24	14D	60	7	347	5.783	0.6326	0.00816	0.386	500	7/16/2009 13:45	7/16/2009 16:40	0.997	0.718	1.058	84.62%	3.28%			



- 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		Critical Level	Required MDA	MDA	Sample Act. Conc.	Sample Act. Error	Net Count		Net Count Rate Error	2 SIGMA Counting Uncertainty		Total Prop. Uncertainty	Sample QC	Sample Type	RPD	RER	Nominal pCi/G	Recovery
	pCi/G	pCi/G						Rate CPM	Rate CPM		pCi/G	pCi/G							
1	0.2424	0.1712	0.5	0.3617	1.3314	0.1100	0.5150	0.0539	0.2732	0.2871	0.2871	SAMPLE							
2	0.1763	0.1244	0.5	0.2854	1.2075	0.1225	1.1027	0.1305	0.2800	0.2900	0.2900	SAMPLE							
3	0.2218	0.1566	0.5	0.3482	1.6830	0.1056	1.4440	0.1453	0.3319	0.3485	0.3485	SAMPLE							
4	0.1796	0.1268	0.5	0.2957	1.3397	0.1219	1.0604	0.1245	0.3083	0.3202	0.3202	SAMPLE							
5	0.2565	0.1811	0.5	0.3820	1.4106	0.1093	0.5340	0.0554	0.2870	0.3021	0.3021	SAMPLE							
6	0.2277	0.1607	0.5	0.3583	1.0214	0.1493	0.8320	0.1211	0.2913	0.2989	0.2989	SAMPLE							
7	0.2379	0.1679	0.5	0.3651	1.0515	0.1405	0.8300	0.1135	0.2818	0.2896	0.2896	SAMPLE							
8	0.2546	0.1797	0.5	0.3850	1.0680	0.1398	0.8360	0.1135	0.2843	0.2926	0.2926	SAMPLE							
9	0.2485	0.1754	0.5	0.3758	1.0304	0.1410	0.8273	0.1133	0.2767	0.2848	0.2848	SAMPLE							
10	0.2361	0.1667	0.5	0.3581	2.0821	0.0860	1.6913	0.1344	0.3242	0.3510	0.3510	SAMPLE							
11	0.2175	0.1536	0.5	0.3364	1.1458	0.1274	0.9777	0.1204	0.2765	0.2862	0.2862	SAMPLE							
12	0.2191	0.1547	0.5	0.3435	1.3233	0.1214	1.1620	0.1358	0.3031	0.3149	0.3149	SAMPLE							
13	0.2016	0.1424	0.5	0.3039	1.1289	0.1126	0.4410	0.0474	0.2378	0.2492	0.2492	SAMPLE							
14	0.1631	0.1152	0.5	0.2660	1.2276	0.1182	1.1498	0.1307	0.2735	0.2844	0.2844	SAMPLE							
15	0.2044	0.1443	0.5	0.3046	0.6631	0.1630	0.3125	0.0499	0.2076	0.2118	0.2118	SAMPLE							
16	0.1913	0.1351	0.5	0.3117	1.2939	0.1260	1.0367	0.1259	0.3079	0.3195	0.3195	SAMPLE							
17	0.1928	0.1361	0.5	0.3111	1.3534	0.1201	1.1604	0.1339	0.3061	0.3185	0.3185	SAMPLE							
18	0.2271	0.1603	0.5	0.3610	1.0927	0.1462	0.9040	0.1286	0.3048	0.3131	0.3131	SAMPLE							
19	0.1916	0.1353	0.5	0.3082	0.4474	0.2508	0.3960	0.0985	0.2181	0.2200	0.2200	SAMPLE							
20	0.3059	0.2160	0.5	0.4544	1.6738	0.1090	0.5595	0.0577	0.3381	0.3577	0.3577	SAMPLE							
21	0.2274	0.1605	0.5	0.3626	0.1091	0.9636	0.0876	0.0843	0.2059	0.2060	0.2060	MB							
22	0.3621	0.2556	0.5	0.5270	1.1743	0.1518	0.5585	0.0828	0.3413	0.3493	0.3493	DUP	232727020.1	35.1%	1.9583		81.3173	95.6%	
23	2.6022	1.8372	0.5	4.3652	79.4475	0.0730	5.7500	0.3199	8.6646	11.3706	11.3706	MS	232727020.1				8.0690	81.8%	
24	0.2419	0.1708	0.5	0.4028	6.6021	0.0670	5.3973	0.3117	0.7473	0.8669	0.8669	LCS							

### Radiochemistry Batch Checklist, Rev 9

Batch# 885330 Product: Radium 228 Date: 7/28/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required)			NP
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.	✓		
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 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]*

7130  
KERR

Secondary Review Performed By:

*[Signature]* 7/29/09

# Radium-228 Que Sheet

Batch #: 885330  
 Spike Isotope: Radium-228  
 LCS Isotope: Radium-228  
 Tracer Isotope: Barium-133  
 Prep Date: 7-15-09  
 Analyst: MXS2  
 Spike Code: 0503-B  
 LCS Code: 0503-B  
 Tracer Code: 012-J  
 Initials: JVC  
 Pipet ID: 2766953  
 First Client Due Date: 07/30/2009  
 Expiration Date: 9-13-09  
 Expiration Date: 9-13-09  
 Expiration Date: 2-17-10  
 Internal Due Date: 07/24/2009  
 Ac-228 Ingrow: 7-16-09 | 1000  
 Ac-228 Separation Date/Time: 7-20-09 | 0445  
 Witness: MS 7-15-09  
 Balance ID: 17955100

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Pos. #	Vol (mL)	Det #	Ba Yield (%)	Gamma Det. #
232135001-2	M-19B	SAMPLE		3 pCi/L	WATER	KERR003	19-JUN-09 09:10 AM	1	400	1A	82.53	
232135002-2	M-34B	SAMPLE		3 pCi/L	WATER	KERR003	19-JUN-09 11:40 AM	2	400	1B	71.54	
232135004-2	M-125BDISS	SAMPLE		3 pCi/L	WATER	KERR003	23-JUN-09 10:14 AM	3	400	1D	74.54	
232135005-2	M-22AB	SAMPLE		3 pCi/L	WATER	KERR003	24-JUN-09 09:06 AM	4	400	2A	73.46	
232135006-2	M-17AB	SAMPLE		3 pCi/L	WATER	KERR003	24-JUN-09 12:35 PM	5	400	2B	80.34	
232135007-2	M-17ABDISS	SAMPLE		3 pCi/L	WATER	KERR003	24-JUN-09 12:35 PM	6	400	2C	74.50	
232135008-2	M-75B	SAMPLE		3 pCi/L	WATER	KERR003	25-JUN-09 08:47 AM	7	400	2D	74.70	
232135009-2	M-13AB	SAMPLE		3 pCi/L	WATER	KERR003	25-JUN-09 12:15 PM	8	400	3A	70.29	
232135010-2	M-13ABDISS	SAMPLE		3 pCi/L	WATER	KERR003	25-JUN-09 12:15 PM	9	400	3C	72.60	
232135011-2	M-13009AB	SAMPLE		3 pCi/L	WATER	KERR003	25-JUN-09 12:15 PM	10	400	3B	74.54	
232135012-2	M-13009ABDISS	SAMPLE		3 pCi/L	WATER	KERR003	25-JUN-09 12:15 PM	11	400	4A	73.22	
232135013-2	M-64B	SAMPLE		3 pCi/L	WATER	KERR003	26-JUN-09 12:35 PM	12	400	4C	76.14	
232135015-2	EB062609-SO 2-2395021	SAMPLE		3 pCi/L	WATER	KERR003	26-JUN-09 01:30 PM	13	400	4D	79.86	
232135015-2	M-111AB	SAMPLE		3 pCi/L	WATER	KERR003	29-JUN-09 09:55 AM	14	400	5A	73.12	
232135016-2	EB062909-GW	SAMPLE		3 pCi/L	WATER	KERR003	29-JUN-09 11:25 AM	15	400	5B	73.58	
232135017-2	M-25B	SAMPLE		3 pCi/L	WATER	KERR003	30-JUN-09 07:45 AM	16	400	5C	70.92	
232135018-2	M-12AB	SAMPLE		3 pCi/L	WATER	KERR003	30-JUN-09 10:10 AM	17	400	5D	79.98	
232135019-2	M-12ABDISS	SAMPLE		3 pCi/L	WATER	KERR003	30-JUN-09 10:10 AM	18	400	6B	75.86	
232135020-2	ER070109-SO1	SAMPLE		3 pCi/L	WATER	KERR003	01-JUL-09 11:25 AM	19	400	7A	96.11	
1201881212-1	MB for batch 885330	MB		UCF pCi/L to pCi/WATER	QC ACCOUNT			20	400	7B	78.06	
1201881213-2	M-125BDISS(232135004DUP)	DUP		3 pCi/L	WATER	QC ACCOUNT	23-JUN-09 10:14 AM	21	400	7C	82.95	
1201881214-2	M-125BDISS(232135004MS)	MS		3 pCi/L	WATER	QC ACCOUNT	23-JUN-09 10:14 AM	22	400	7D	71.78	
1201881215-1	LCS for batch 885330	LCS		UCF pCi/L to pCi/WATER	QC ACCOUNT			23	400	8B	72.18	

Comments: *daily*  
 Data Reviewed By: *[Signature]*  
 Instrument Used: (Circle One) PIC S/N: 10751-4  
 Page 1 of 1

# Radium 228 Re-Elute / Reprecipitate

Batch # 885330  
 Ra 228 Spike Code 0503-B  
 LCS Code 0503-B  
 Ba-133 Tracer Code 0112-J

Prep Date 7-15-09 Initials MS  
 Spike Vol (mls) 0.1 mL  
 LCS Vol (mls) 0.1 mL Ingrow Start Time: 1710 / 7-23-09  
 Tracer Vol (mls) 0.1 mL Separation Time: 0515 / 7-27-09

Sample ID	Bkr #	Vol. (mls)	Det #	% Yield	Gamma Det #
232135001	1	400	1A	81.66	90-2
232135002	2	400	1C	76.97	90-3
232135004	3	400	1D	75.33	90-4
232135005	4	400	2A	80.54	90-5
232135006	5	400	<del>2A</del> 7D	74.21	73-6
232135007	6	400	<del>2B</del> 12B	72.47	72-2
232135008	7	400	3A	80.76	73-8
232135009	8	400	3B	80.59	73-9
232135010	9	400	3C	84.67	73-10
232135011	10	400	3D	91.26	70-11
232135012	11	400	4A	82.48	70-12
232135013	12	400	4C	87.60	70-13
232395021- <del>232135014</del>	13	400	4D	79.60	70-14
232135015	14	400	5A	76.32	70-15
232135016	15	400	5B	87.47	92-16
232135017	16	400	5C	75.25	92-17
232135018	17	400	5D	80.89	72-3
232135019	18	400	<del>6A</del> 8A	78.39	92-19
232721021	19	400	6B	82.26	92-20
120881212	20	400	6D	93.37	66-21
120881213	21	400	7A	77.62	66-22
120881214	22	400	<del>7B</del> 8A <sup>MS</sup> <sub>7-23-09</sub>	<del>77.62</del> <sup>78.38</sup>	72-4
120881215	23	400	7C	80.41	66-24
		400	<del>7D</del>		

\* NL 7/28/09

# Radium-228 Liquid

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): 181.58  
 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 : 885330  
 Analyst : MXS2  
 Prep Date : 7/15/2009

Procedure Code : GFC28RAL  
 Parname : Radium-228  
 Required MDA : 3 pCi/L  
 Halfife of Ra-228 : 5.75 years  
 Halfife of Ac-228 : 6.13 hours  
 Batch counted on : PIC  
 BKG Count time : 500 min

LCS S/N : 0503-B  
 LCS Exp Date : 9/13/2009  
 LCS Activity (dpm/ml): 181.58  
 LCS Volume Added: 0.10

Ra-228 Abundance : 1  
 Ra-228 Method Uncertainty : 0.1268

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

Pos.	Sample Characteristics			Sample Date/Time	Tracer Calculations			Tracer Samp.		
	Sample ID	Sample Aliquot L	Sample Aliquot L StDev.		Tracer Concentration (Ba-133 Ref.) (cpm)	Tracer Count Uncertainty (cpm)	Tracer Concentration (Ba-133 Samp.) (cpm)	Tracer Count Uncertainty (cpm)	Tracer Aliquot (mL)	Tracer Aliquot StDev. (mL)
1	232135001.2	0.4000	1.9669E-05	6/19/2009 9:10	232.3	4.10%	189.7	4.61%	0.1	0.000701
2	232135002.2	0.4000	1.9669E-05	6/19/2009 11:40	232.3	4.10%	178.8	4.77%	0.1	0.000701
3	232135004.2	0.4000	1.9669E-05	6/23/2009 10:14	232.3	4.10%	175.0	4.83%	0.1	0.000701
4	232135005.2	0.4000	1.9669E-05	6/24/2009 9:06	232.3	4.10%	187.1	4.65%	0.1	0.000701
5	232135006.2	0.4000	1.9669E-05	6/24/2009 12:35	232.3	4.10%	172.4	4.87%	0.1	0.000701
6	232135007.2	0.4000	1.9669E-05	6/24/2009 12:35	235.0	4.07%	170.3	4.91%	0.1	0.000701
7	232135008.2	0.4000	1.9669E-05	6/25/2009 8:47	232.3	4.10%	187.6	4.64%	0.1	0.000701
8	232135009.2	0.4000	1.9669E-05	6/25/2009 12:15	232.3	4.10%	187.2	4.64%	0.1	0.000701
9	232135010.2	0.4000	1.9669E-05	6/25/2009 12:15	232.3	4.10%	196.7	4.51%	0.1	0.000701
10	232135011.2	0.4000	1.9669E-05	6/25/2009 12:15	232.3	4.10%	212.0	4.32%	0.1	0.000701
11	232135012.2	0.4000	1.9669E-05	6/25/2009 12:15	232.3	4.10%	191.6	4.58%	0.1	0.000701
12	232135013.2	0.4000	1.9669E-05	6/26/2009 12:35	232.3	4.10%	203.5	4.42%	0.1	0.000701
13	232135015.2	0.4000	1.9669E-05	6/29/2009 9:55	232.3	4.10%	177.3	4.80%	0.1	0.000701
14	232135016.2	0.4000	1.9669E-05	6/29/2009 11:25	232.3	4.10%	203.2	4.43%	0.1	0.000701
15	232135017.2	0.4000	1.9669E-05	6/30/2009 7:45	232.3	4.10%	174.8	4.84%	0.1	0.000701
16	232135018.2	0.4000	1.9669E-05	6/30/2009 10:10	235.0	4.07%	190.1	4.60%	0.1	0.000701
17	232135019.2	0.4000	1.9669E-05	6/30/2009 10:10	232.3	4.10%	182.1	4.72%	0.1	0.000701
18	232395021.1	0.4000	1.9669E-05	6/26/2009 13:30	232.3	4.10%	184.9	4.68%	0.1	0.000701
19	232727021.1	0.4000	1.9669E-05	7/1/2009 11:25	232.3	4.10%	191.1	4.59%	0.1	0.000701
20	1201881212.1	0.4000	1.9669E-05	7/15/2009 0:00	232.3	4.10%	216.9	4.26%	0.1	0.000701
21	1201881213.2	0.4000	1.9669E-05	6/23/2009 10:14	232.3	4.10%	180.3	4.75%	0.1	0.000701
22	1201881214.2	0.4000	1.9669E-05	6/23/2009 10:14	235.0	4.07%	184.2	4.69%	0.1	0.000701
23	1201881215.1	0.4000	1.9669E-05	7/15/2009 0:00	232.3	4.10%	186.8	4.65%	0.1	0.000701

Pos.	Counting				Beta		Detector Efficiency		Weekly Bkg		Separation		Count		Ra-228		Ac-228		Ac-228		Calculated	
	Detector ID	Time (min.)	Gross Alpha	Gross Beta	Beta cpm	Detector Efficiency (cpm/dpm)	Detector Error (cpm/dpm)	Count Time (min.)	cpm	Count (min.)	Date/Time	Date/Time	Start Date/Time	Decay	Count Correction	Recovery %	Sample Recovery Error %					
1	1A	90	8	75	0.833	0.6303	0.00600	500	0.336	7/27/2009 5:15	7/27/2009 7:44	0.988	0.754	1.087	81.66%	3.24%						
2	1C	90	12	116	1.289	0.6176	0.00344	500	0.798	7/27/2009 5:15	7/27/2009 7:45	0.988	0.753	1.087	76.97%	3.30%						
3	1D	90	14	72	0.800	0.6043	0.00511	500	0.530	7/27/2009 5:15	7/27/2009 7:45	0.989	0.753	1.087	75.33%	3.32%						
4	2A	90	6	83	0.922	0.6172	0.00349	500	0.608	7/27/2009 5:15	7/27/2009 7:45	0.989	0.752	1.087	80.54%	3.25%						
5	7D	90	17	51	0.567	0.6257	0.00816	500	0.376	7/27/2009 5:15	7/27/2009 7:46	0.989	0.751	1.087	74.21%	3.33%						
6	12B	90	11	61	0.678	0.6352	0.00816	500	0.652	7/27/2009 5:15	7/27/2009 11:12	0.989	0.510	1.087	72.47%	3.34%						
7	3A	90	20	103	1.144	0.5682	0.00943	500	1.094	7/27/2009 5:15	7/27/2009 7:46	0.989	0.752	1.087	80.76%	3.25%						
8	3B	90	18	177	1.967	0.5980	0.00655	500	1.764	7/27/2009 5:15	7/27/2009 7:46	0.990	0.752	1.087	80.59%	3.25%						
9	3C	90	3	119	1.322	0.6164	0.00535	500	0.970	7/27/2009 5:15	7/27/2009 7:46	0.990	0.751	1.087	84.67%	3.20%						
10	3D	90	16	142	1.578	0.5994	0.00464	500	1.082	7/27/2009 5:15	7/27/2009 7:46	0.990	0.751	1.087	91.26%	3.14%						
11	4A	90	19	111	1.233	0.6208	0.00744	500	0.844	7/27/2009 5:15	7/27/2009 7:46	0.990	0.751	1.087	82.48%	3.23%						
12	4C	90	11	154	1.711	0.6052	0.00426	500	1.502	7/27/2009 5:15	7/27/2009 7:46	0.990	0.751	1.087	87.60%	3.17%						
13	5A	90	9	59	0.656	0.6258	0.00816	500	0.480	7/27/2009 5:15	7/27/2009 7:47	0.991	0.751	1.087	76.32%	3.31%						
14	5B	90	18	147	1.633	0.6280	0.00816	500	1.108	7/27/2009 5:15	7/27/2009 7:47	0.991	0.751	1.087	87.47%	3.18%						
15	5C	90	21	127	1.411	0.6368	0.00816	500	0.858	7/27/2009 5:15	7/27/2009 7:47	0.991	0.750	1.087	75.25%	3.32%						
16	5D	90	14	179	1.989	0.6237	0.00816	500	1.256	7/27/2009 5:15	7/27/2009 7:47	0.991	0.750	1.087	80.89%	3.23%						
17	8A	90	13	79	0.878	0.6247	0.00816	500	0.652	7/27/2009 5:15	7/27/2009 7:48	0.991	0.749	1.087	78.39%	3.28%						
18	4D	90	22	160	1.778	0.5873	0.00816	500	1.190	7/27/2009 5:15	7/27/2009 7:48	0.990	0.751	1.087	79.60%	3.27%						
19	6B	90	34	109	1.211	0.6163	0.00816	500	0.790	7/27/2009 5:15	7/27/2009 7:48	0.991	0.749	1.087	82.26%	3.23%						
20	6D	90	14	55	0.611	0.6120	0.00816	500	0.460	7/27/2009 5:15	7/27/2009 7:44	0.996	0.754	1.087	93.37%	3.12%						
21	7A	90	13	69	0.767	0.6180	0.00816	500	0.346	7/27/2009 5:15	7/27/2009 7:44	0.989	0.754	1.087	77.62%	3.29%						
22	8A	30	4	80	2.667	0.6247	0.00816	500	0.652	7/27/2009 5:15	7/27/2009 16:06	0.989	0.293	1.029	78.38%	3.26%						
23	7C	60	15	377	6.283	0.6178	0.00816	500	0.280	7/27/2009 5:15	7/27/2009 7:45	0.996	0.753	1.058	80.41%	3.25%						

- 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		Critical Level	Required MDA	MDA	Sample Act. Conc.	Sample Act. Error	Net Count		Net Count Rate Error	2 SIGMA Counting Uncertainty		Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
	pCi/L	pCi/L						Rate CPM	Rate CPM		pCi/L	pCi/L						
1	0.4938	0.3486		3	0.8037	1.5881	0.2031	0.4973	0.0997	0.1262	0.6237	0.7452		SAMPLE				
2	0.8253	0.5827		3	1.2808	1.7000	0.2591	0.4909	0.1262	0.8563	0.8563	0.9612		SAMPLE				
3	0.7016	0.4954		3	1.1112	0.9754	0.3709	0.2700	0.0997	0.7062	0.7062	0.7494		SAMPLE				
4	0.6883	0.4859		3	1.0821	1.0396	0.3423	0.3142	0.1071	0.6943	0.6943	0.7438		SAMPLE				
5	0.5796	0.4092		3	0.9366	0.6756	0.4417	0.1907	0.0840	0.5830	0.5830	0.6084		SAMPLE				
6	1.1367	0.8025		3	1.7809	0.1360	3.6465	0.0258	0.0940	0.9721	0.9721	0.9727		SAMPLE				
7	1.0010	0.7067		3	1.5331	0.1810	2.4204	0.0504	0.1221	0.8584	0.8584	0.8596		SAMPLE				
8	1.2104	0.8546		3	1.8230	0.6923	0.7868	0.2027	0.1593	1.0666	1.0666	1.0814		SAMPLE				
9	0.8289	0.5852		3	1.2756	1.1111	0.3676	0.3522	0.1290	0.7974	0.7974	0.8468		SAMPLE				
10	0.8356	0.5899		3	1.2802	1.4927	0.2848	0.4958	0.1403	0.8282	0.8282	0.9122		SAMPLE				
11	0.7886	0.5568		3	1.2208	1.2527	0.3204	0.3893	0.1241	0.7824	0.7824	0.8460		SAMPLE				
12	1.0158	0.7171		3	1.5378	0.6496	0.7103	0.2091	0.1484	0.9035	0.9035	0.9187		SAMPLE				
13	0.6370	0.4497		3	1.0144	0.6050	0.5183	0.1756	0.0908	0.6133	0.6133	0.6328		SAMPLE				
14	0.8416	0.5941		3	1.2882	1.5742	0.2736	0.5253	0.1427	0.8382	0.8382	0.9305		SAMPLE				
15	0.8490	0.5994		3	1.3133	1.9002	0.2409	0.5531	0.1319	0.8881	0.8881	1.0139		SAMPLE				
16	0.9756	0.6888		3	1.4863	2.3913	0.2166	0.7329	0.1569	1.0033	1.0033	1.1765		SAMPLE				
17	0.7250	0.5119		3	1.1360	0.7599	0.4670	0.2258	0.1052	0.6936	0.6936	0.7207		SAMPLE				
18	1.0255	0.7240		3	1.5655	2.0712	0.2553	0.5878	0.1488	1.0275	1.0275	1.1573		SAMPLE				
19	0.7710	0.5443		3	1.1970	1.3692	0.2981	0.4211	0.1226	0.7814	0.7814	0.8570		SAMPLE				
20	0.5162	0.3645		3	0.8240	0.4311	0.5820	0.1511	0.0878	0.4910	0.4910	0.5033		SAMPLE				
21	0.5374	0.3794		3	0.8729	1.4405	0.2306	0.4207	0.0960	0.6441	0.6441	0.7431	232135004.2	MB	38.5%		20.5940	79.8%
22	2.8863	2.0377		3	4.8916	16.4425	0.1528	2.0147	0.3003	4.8040	4.8040	6.3992	232135004.2	DUP			20.4479	93.8%
23	0.5383	0.3800		3	0.9198	19.1836	0.0636	6.0033	0.3245	2.0322	2.0322	5.3340		LCS				

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine
232135001	1A	90	8	75	7/27/2009 7:44	7/27/2009 9:14	Protean
232135002	1C	90	12	116	7/27/2009 7:45	7/27/2009 9:15	Protean
232135004	1D	90	14	72	7/27/2009 7:45	7/27/2009 9:15	Protean
232135005	2A	90	6	83	7/27/2009 7:45	7/27/2009 9:15	Protean
232135006	7D	90	17	51	7/27/2009 7:46	7/27/2009 9:16	Protean
232135007	12B	90	11	61	7/27/2009 11:12	7/27/2009 12:42	Protean
232135008	3A	90	20	103	7/27/2009 7:46	7/27/2009 9:16	Protean
232135009	3B	90	18	177	7/27/2009 7:46	7/27/2009 9:16	Protean
232135010	3C	90	3	119	7/27/2009 7:46	7/27/2009 9:16	Protean
232135011	3D	90	16	142	7/27/2009 7:46	7/27/2009 9:16	Protean
232135012	4A	90	19	111	7/27/2009 7:46	7/27/2009 9:16	Protean
232135013	4C	90	11	154	7/27/2009 7:46	7/27/2009 9:16	Protean
232395021	4D	90	22	160	7/27/2009 7:47	7/27/2009 9:17	Protean
232135015	5A	90	9	59	7/27/2009 7:47	7/27/2009 9:17	Protean
232135016	5B	90	18	147	7/27/2009 7:47	7/27/2009 9:17	Protean
232135017	5C	90	21	127	7/27/2009 7:47	7/27/2009 9:17	Protean
232135018	5D	90	14	179	7/27/2009 7:47	7/27/2009 9:17	Protean
232135019	8A	90	13	79	7/27/2009 7:48	7/27/2009 9:18	Protean
232727021	6B	90	34	109	7/27/2009 7:48	7/27/2009 9:18	Protean
1201881212	6D	90	14	55	7/27/2009 7:44	7/27/2009 9:14	Protean
1201881213	7A	90	13	69	7/27/2009 7:44	7/27/2009 9:14	Protean
1201881214	8A	30	4	80	7/27/2009 16:06	7/27/2009 16:36	Protean
1201881215	7C	60	15	377	7/27/2009 7:45	7/27/2009 8:45	Protean



ASSAY 23-Jul-09 16:44:16

Protocol id 9 228\_REC2  
Time limit 180  
Count limit 50000  
Isotope Ba-133  
Protocol date 9-Apr-07 10:02:22  
Run id. 98

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	90	1	180	788	232.3	4.1		16:44:23
2	90	2	180	660	189.7	4.61	81.66	16:47:35
3	90	3	180	628	178.8	4.77	76.97	16:50:46
4	90	4	180	616	175	4.83	75.33	16:53:57
5	90	5	180	653	187.1	4.65	80.54	16:57:09
6	73	6	180	609	172.4	4.87	74.21	17:00:28
<del>7</del>	<del>73</del>	<del>7</del>	<del>180</del>	<del>561</del>	<del>156.4</del>	<del>5.17</del>	<del>67.33</del>	<del>17:03:39</del> *
8	73	8	180	654	187.6	4.64	80.76	17:06:50
9	73	9	180	653	187.2	4.64	80.59	17:10:02
10	73	10	180	681	196.7	4.51	84.67	17:13:13
11	70	11	180	727	212	4.32	91.26	17:16:37
12	70	12	180	666	191.6	4.58	82.48	17:19:49
13	70	13	180	702	203.5	4.42	87.60	17:23:00
14	70	14	180	646	184.9	4.68	79.60	17:26:11 •
15	70	15	180	623	177.3	4.8	76.32	17:29:23
16	92	16	180	701	203.2	4.43	87.47	17:32:47
17	92	17	180	616	174.8	4.84	75.25	17:35:59
<del>18</del>	<del>92</del>	<del>18</del>	<del>180</del>	<del>564</del>	<del>157.5</del>	<del>5.15</del>	<del>67.80</del>	<del>17:39:10</del> *
19	92	19	180	637	182.1	4.72	78.39	17:42:21
20	92	20	180	664	191.1	4.59	82.26	17:45:33
21	66	21	180	742	216.9	4.26	93.37	17:48:58
22	66	22	180	632	180.3	4.75	77.62	17:52:09
<del>23</del>	<del>66</del>	<del>23</del>	<del>180</del>	<del>598</del>	<del>168.8</del>	<del>4.94</del>	<del>72.66</del>	<del>17:55:20</del> *
24	66	24	180	652	186.8	4.65	80.41	17:58:32

END OF ASSAY

\* NL 7/25/09

ASSAY 23-Jul-09 19:03:31

Protocol id 9 228\_REC2  
Time limit 180  
Count limit 50000  
Isotope Ba-133  
Protocol date 9-Apr-07 10:02:22  
Run id. 1

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	72	1	180	796	235	4.07		19:03:38
2	72	2	180	602	170.3	4.91	72.47	19:06:49
3	72	3	180	662	190.1	4.6	80.89	19:10:00
4	72	4	180	644	184.2	4.69	78.38	19:13:12

END OF ASSAY

**Subject:** Change in KERR Henderson Samples  
**From:** Edie Kent <emk@gel.com>  
**Date:** Fri, 17 Jul 2009 15:06:12 -0400  
**To:** Theresa Austin <theresa.austin@gel.com>  
**CC:** "team.kent" <team.kent@gel.com>

Theresa:

I have relogged the two water samples that we are moving and deleted the tests from the original sample numbers so they are ready to be rebatched. Sample 232135014 is now 232395021. Sample 232135020 is now 232727021. As soon as I can track down Mike, I'm getting the bottles relabeled.

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)

# THORIUM

### Radiochemistry Batch Checklist, Rev 9

Batch# 888 328      Product: Th      Date: 7/29/07

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.		✓	NCR 716 082
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.		✓	NCR 716082
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.	✓		
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 stated.	✓		
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.	✓		NCR 716082
Batch non-conformances second reviewed and disposition verified to be completed.			NCR 716082
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: Jocelyn - 7/29/07

Secondary Review Performed By: Att Caldwell 7/29/07

7/29  
NCR

# Thorium (Ac-227 Tracer) Que Sheet

27-JUL-09

Batch #: 888328 Analyst: CXM2 First Client Due Date: 29-JUL-09 Internal Due Date: 23-JUL-09  
 Tracer Code: 0387-β-(0.2) Expiration Date: 02/31/09 Vol: 0.1 ml Ac-227 Separation Date/Time: 24 7/27/09  
 LCS Isotope: Th-230 Expiration Date: 04/13/10 Vol: 0.1 ml  
 Spike Isotope: Th-230 Expiration Date: 04/13/10 Vol: 0.1 ml  
 Prep Date: 02/27/09 Initials: JAO Pipet ID: 297057 Balance ID: 16750207

Witness: De 1/21/09

Wet/Dry

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Aliquot (g/μl)	Th Det #
232135001-3	M-19B	SAMPLE		.03 pCi/L	WATER	KERR003	19-JUN-09	1	1	0.600	173
232135002-3	M-34B	SAMPLE		.03 pCi/L	WATER	KERR003	19-JUN-09	2	2	0.600	175
232135004-3	M-125BDISS	SAMPLE		.03 pCi/L	WATER	KERR003	23-JUN-09	3	3	0.600	177
232135005-3	M-22AB	SAMPLE		.03 pCi/L	WATER	KERR003	24-JUN-09	4	4	0.600	179
232135006-3	M-17AB	SAMPLE		.03 pCi/L	WATER	KERR003	24-JUN-09	5	5	0.600	181
232135007-3	M-17ABDISS	SAMPLE		.03 pCi/L	WATER	KERR003	24-JUN-09	6	6	0.600	183
232135008-3	M-75B	SAMPLE		.03 pCi/L	WATER	KERR003	25-JUN-09	7	7	0.600	174
232135009-3	M-13AB	SAMPLE		.03 pCi/L	WATER	KERR003	25-JUN-09	8	8	0.600	176
232135010-3	M-13ABDISS	SAMPLE		.03 pCi/L	WATER	KERR003	25-JUN-09	9	9	0.600	178
232135011-3	M-13009AB	SAMPLE		.03 pCi/L	WATER	KERR003	25-JUN-09	10	10	0.600	180
232135012-3	M-13009ABDISS	SAMPLE		.03 pCi/L	WATER	KERR003	25-JUN-09	11	11	0.600	182
232135013-3	M-64B	SAMPLE		.03 pCi/L	WATER	KERR003	26-JUN-09	12	12	0.600	184
232135015-3	M-111AB	SAMPLE		.03 pCi/L	WATER	KERR003	29-JUN-09	13	13	0.600	185
232135016-3	EB062909-GW	SAMPLE		.03 pCi/L	WATER	KERR003	29-JUN-09	14	14	0.600	187
232135017-3	M-25B	SAMPLE		.03 pCi/L	WATER	KERR003	30-JUN-09	15	15	0.600	189
232135018-3	M-12AB	SAMPLE		.03 pCi/L	WATER	KERR003	30-JUN-09	16	16	0.600	191
232135019-3	M-12ABDISS	SAMPLE		.03 pCi/L	WATER	KERR003	30-JUN-09	17	17	0.600	193
232395021-3	EB062609-SO	SAMPLE		.03 pCi/L	WATER	KERR003	26-JUN-09	18	18	0.600	195
232727021-3	EB070109-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	01-JUL-09	19	19	0.600	186
233587015-1	EB071609-SO	SAMPLE		.03 pCi/L	WATER	KERR003	16-JUL-09	20	20	0.600	188
1201888813-1	MB for batch 888328	MB		UCF pCi/L to	WATER	QC ACCOUNT		21	21	0.600	190
1201888814-3	M-125BDISS(232135004DUP)	DUP		.03 pCi/L	WATER	QC ACCOUNT	23-JUN-09	22	22	0.400	192
1201888818-3	M-125BDISS(232135004MS)	MS		.03 pCi/L	WATER	QC ACCOUNT	23-JUN-09	23	23	0.400	194
1201888822-1	LCS for batch 888328	LCS		UCF pCi/L to	WATER	QC ACCOUNT		24	24	0.600	196

Solid Sample Dissolution by: LEACH or DIGESTION

Data Reviewed By: Jacques M. S. - 7/29/09

Choose SOP Used: GL-RAD-A-038

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

GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888328  
SAMPLE DATE : 27-JUL-2009 21:30:00

SAMPLE ID : S0232135004\_TH  
SAMPLE QTY: 0.600 L

DETECTOR NUMBER :74435  
AVERAGE %EFFICIENCY :26.8586  
% YIELD : 67.990

COUNT DATE:28-JUL-2009 11:56:16  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 3.567E+00

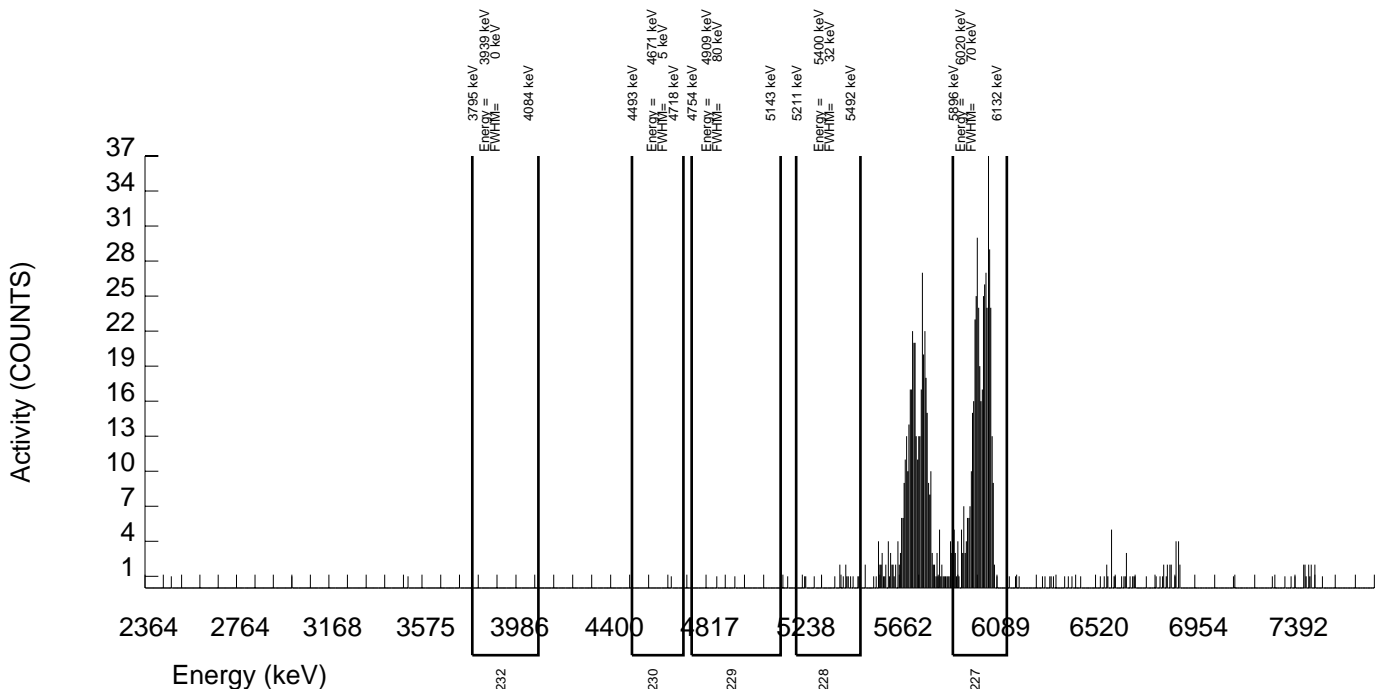
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 3.567E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92277 dpm  
RESULTS : 2.66708 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B177.CNF;111  
BKG DATE : 26-JUL-2009  
EFF FILE : W177.CNF;35  
CAL DATE : 22-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
AC-227	6038.010	475.000	471.000	4.000	2.0000	68.10000	2.95E+00	3.12E-01	7.69E-02	2.91E-02	2.68E-01
TH-228	5363.000	16.000	7.000	9.000	3.0000	99.94000	2.88E-02	4.04E-02	6.98E-02	2.87E-02	4.04E-02
TH229	4900.000	2.000	0.000	2.000	1.4142	99.52000	0.00E+00	1.62E-02	3.96E-02	1.36E-02	1.62E-02
TH-230	4625.000	1.000	0.000	1.000	1.0000	100.0000	0.00E+00	1.14E-02	3.15E-02	9.56E-03	1.14E-02
TH-232	3972.000	0.000	-1.000	1.000	1.0000	100.0000	-4.11E-03	1.14E-02	3.15E-02	9.56E-03	1.14E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888328  
SAMPLE DATE : 27-JUL-2009 21:30:00

SAMPLE ID : S0232727021\_TH  
SAMPLE QTY: 0.600 L

DETECTOR NUMBER :68616  
AVERAGE %EFFICIENCY :25.3097  
% YIELD : 75.675

COUNT DATE:28-JUL-2009 11:56:48  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 3.567E+00

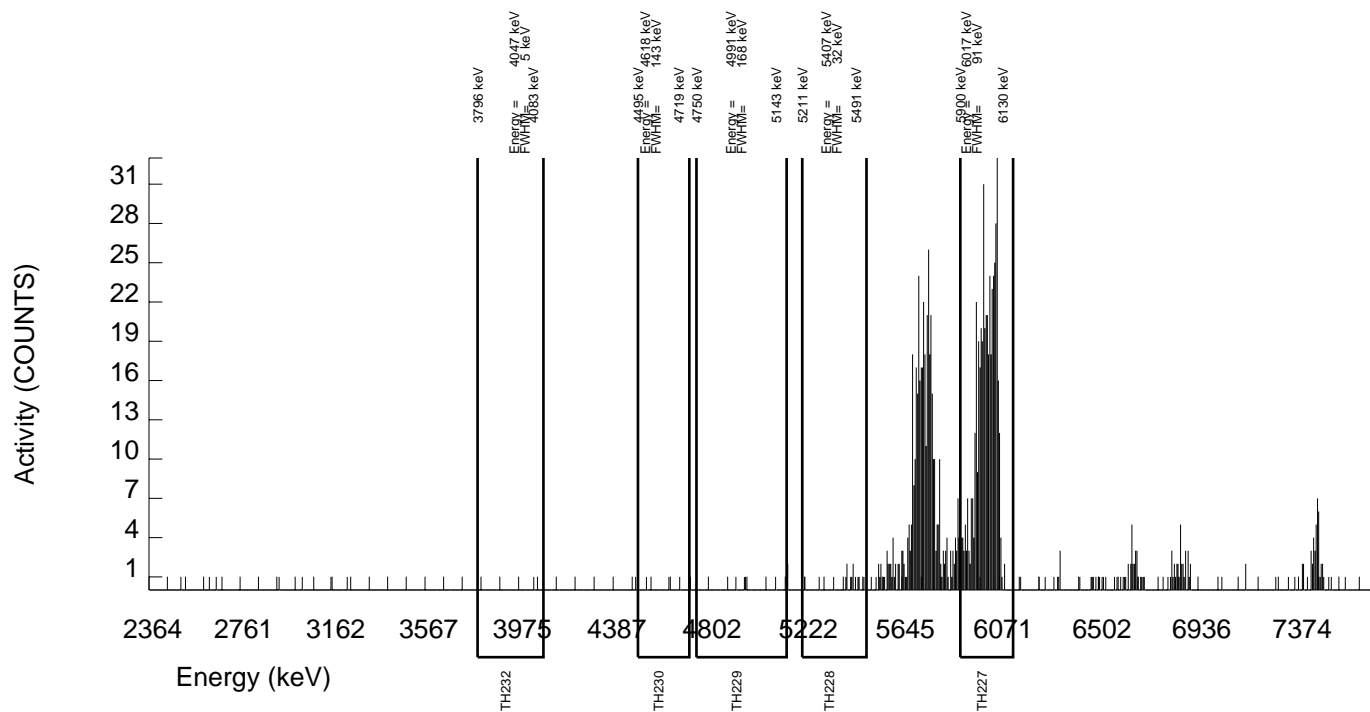
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 3.567E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92277 dpm  
RESULTS : 2.96855 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B186.CNF;93  
BKG DATE : 26-JUL-2009  
EFF FILE : W186.CNF;36  
CAL DATE : 22-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
AC-227	6038.010	495.000	494.000	1.000	1.0000	68.10000	2.95E+00	3.05E-01	4.56E-02	1.39E-02	2.60E-01
TH-228	5363.000	14.000	5.000	9.000	3.0000	99.94000	1.96E-02	3.69E-02	6.66E-02	2.74E-02	3.69E-02
TH229	4900.000	4.000	4.000	0.000	0.0000	99.52000	1.58E-02	1.55E-02	1.18E-02	0.00E+00	1.54E-02
TH-230	4625.000	3.000	2.000	1.000	1.0000	100.0000	7.84E-03	1.54E-02	3.00E-02	9.12E-03	1.54E-02
TH-232	3972.000	1.000	0.000	1.000	1.0000	100.0000	0.00E+00	1.09E-02	3.00E-02	9.12E-03	1.09E-02





GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888328  
SAMPLE DATE : 27-JUL-2009 21:30:00

SAMPLE ID : S1201888813\_TH  
SAMPLE QTY: 0.600 L

DETECTOR NUMBER :68623  
AVERAGE %EFFICIENCY :26.0642  
% YIELD : 70.510

COUNT DATE:28-JUL-2009 11:56:58  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 3.567E+00

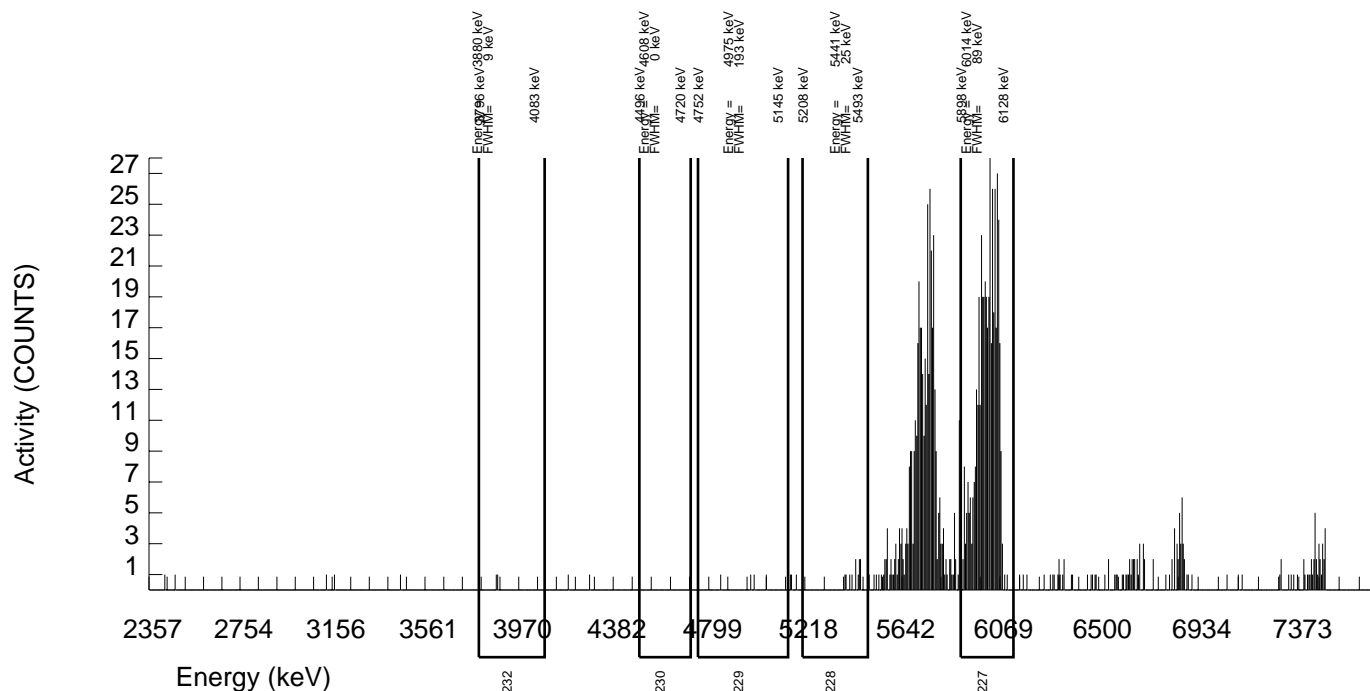
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 3.567E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92277 dpm  
RESULTS : 2.76593 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B190.CNF;93  
BKG DATE : 26-JUL-2009  
EFF FILE : W190.CNF;36  
CAL DATE : 22-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
AC-227	6038.010	480.000	474.000	6.000	2.4495	68.10000	2.95E+00	3.12E-01	8.94E-02	3.54E-02	2.68E-01
TH-228	5363.000	11.000	-2.000	13.000	3.6056	99.94000	-8.18E-03	3.93E-02	8.09E-02	3.43E-02	3.93E-02
TH229	4900.000	4.000	-21.000	25.000	5.0000	99.52000	-8.62E-02	4.33E-02	1.08E-01	4.77E-02	4.33E-02
TH-230	4625.000	0.000	-9.000	9.000	3.0000	100.0000	-3.68E-02	2.53E-02	6.93E-02	2.85E-02	2.53E-02
TH-232	3972.000	2.000	2.000	0.000	0.0000	100.0000	8.17E-03	1.13E-02	1.23E-02	0.00E+00	1.13E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888328  
SAMPLE DATE : 27-JUL-2009 21:30:00

SAMPLE ID : S1201888814\_TH  
SAMPLE QTY: 0.400 L

DETECTOR NUMBER :74430  
AVERAGE %EFFICIENCY :26.1047  
% YIELD : 62.231

COUNT DATE:28-JUL-2009 11:57:03  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 5.351E+00

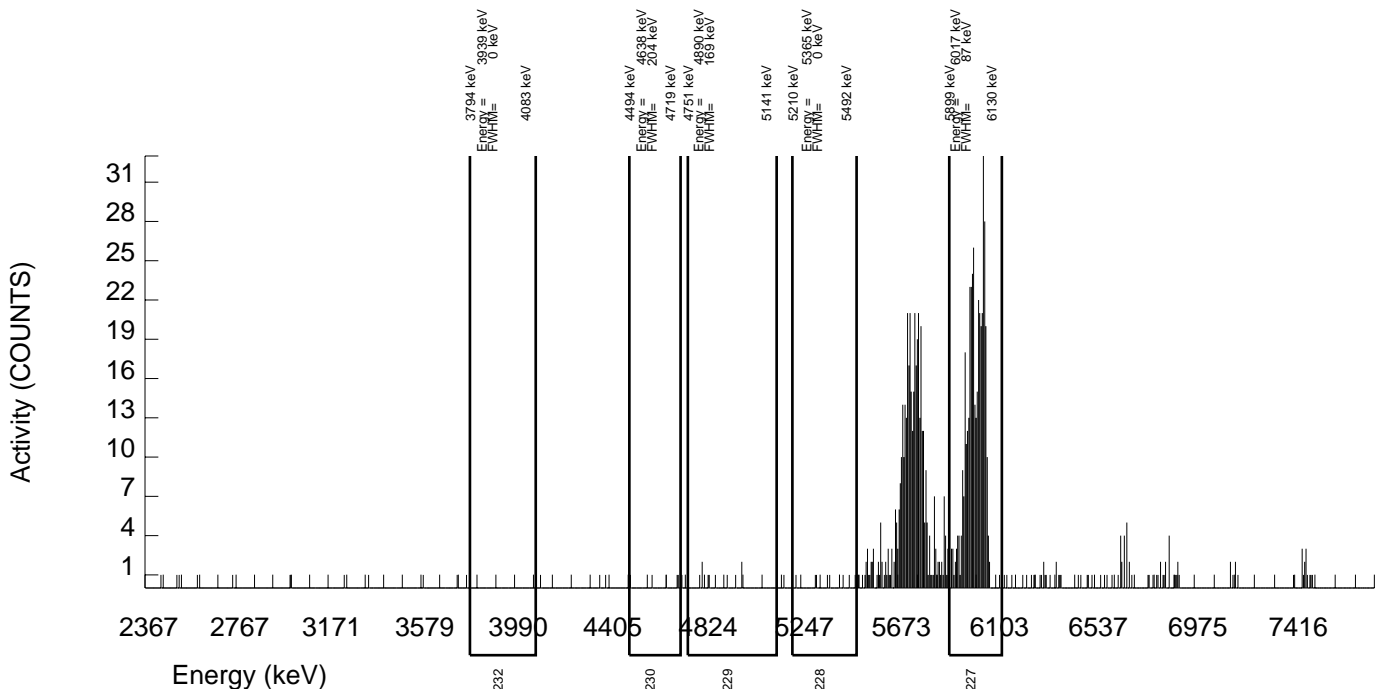
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 5.351E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92277 dpm  
RESULTS : 2.44119 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B192.CNF;93  
BKG DATE : 26-JUL-2009  
EFF FILE : W192.CNF;42  
CAL DATE : 22-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
AC-227	6038.010	421.000	419.000	2.000	1.4142	68.10000	4.42E+00	4.87E-01	1.01E-01	3.47E-02	4.25E-01
TH-228	5363.000	10.000	3.000	7.000	2.6458	99.94000	2.08E-02	5.61E-02	1.06E-01	4.27E-02	5.61E-02
TH229	4900.000	10.000	6.000	4.000	2.0000	99.52000	4.18E-02	5.11E-02	8.57E-02	3.24E-02	5.11E-02
TH-230	4625.000	5.000	2.000	3.000	1.7321	100.0000	1.39E-02	3.84E-02	7.67E-02	2.79E-02	3.84E-02
TH-232	3972.000	0.000	0.000	0.000	0.0000	100.0000	0.00E+00	1.36E-02	2.08E-02	0.00E+00	1.36E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888328  
SAMPLE DATE : 27-JUL-2009 21:30:00

SAMPLE ID : S1201888818\_TH  
SAMPLE QTY: 0.400 L

DETECTOR NUMBER :68635  
AVERAGE %EFFICIENCY :25.4957  
% YIELD : 76.188

COUNT DATE:28-JUL-2009 11:57:08  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 5.351E+00

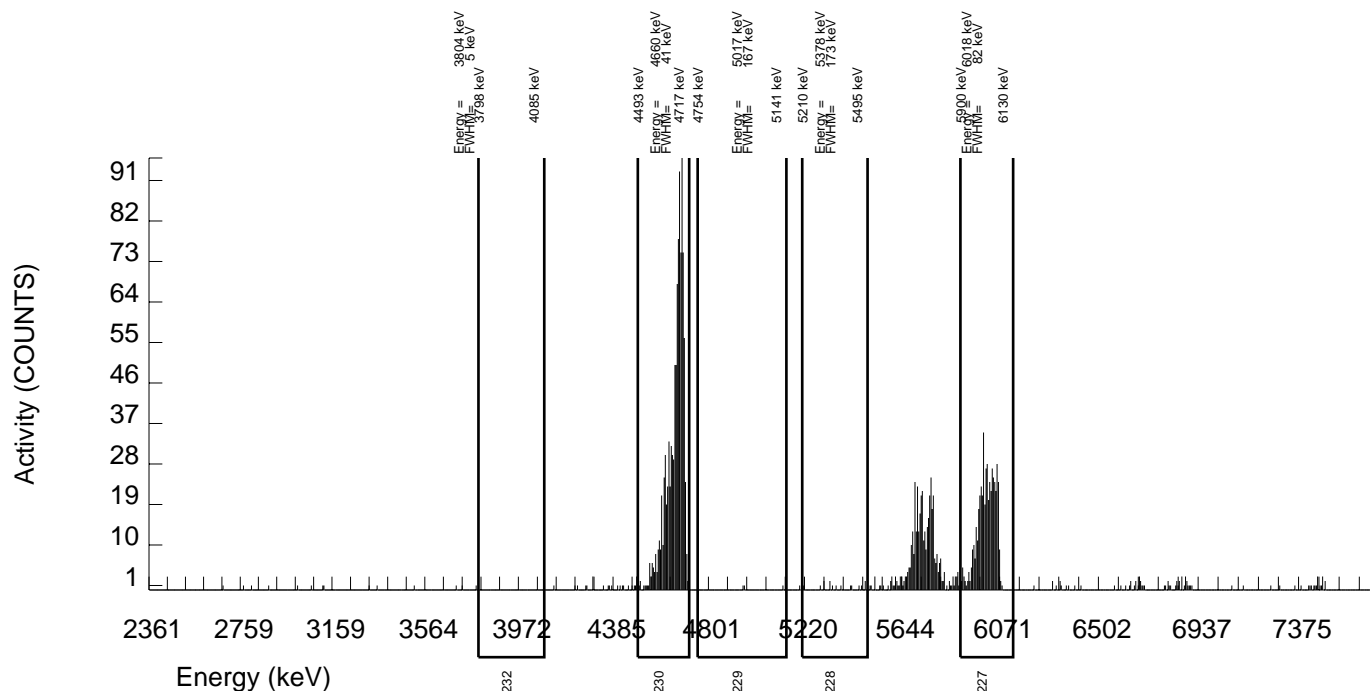
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 5.351E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92277 dpm  
RESULTS : 2.98868 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B194.CNF;93  
BKG DATE : 26-JUL-2009  
EFF FILE : W194.CNF;35  
CAL DATE : 22-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
AC-227	6038.010	503.000	501.000	2.000	1.4142	68.10000	4.42E+00	4.56E-01	8.45E-02	2.90E-02	3.88E-01
TH-228	5363.000	15.000	11.000	4.000	2.0000	99.94000	6.39E-02	4.97E-02	7.15E-02	2.70E-02	4.96E-02
TH229	4900.000	3.000	-1.000	4.000	2.0000	99.52000	-5.83E-03	3.02E-02	7.17E-02	2.71E-02	3.02E-02
TH-230	4625.000	1028.000	1028.000	0.000	0.0000	100.0000	5.96E+00	4.86E-01	1.74E-02	0.00E+00	3.64E-01
TH-232	3972.000	2.000	2.000	0.000	0.0000	100.0000	1.16E-02	1.61E-02	1.74E-02	0.00E+00	1.61E-02

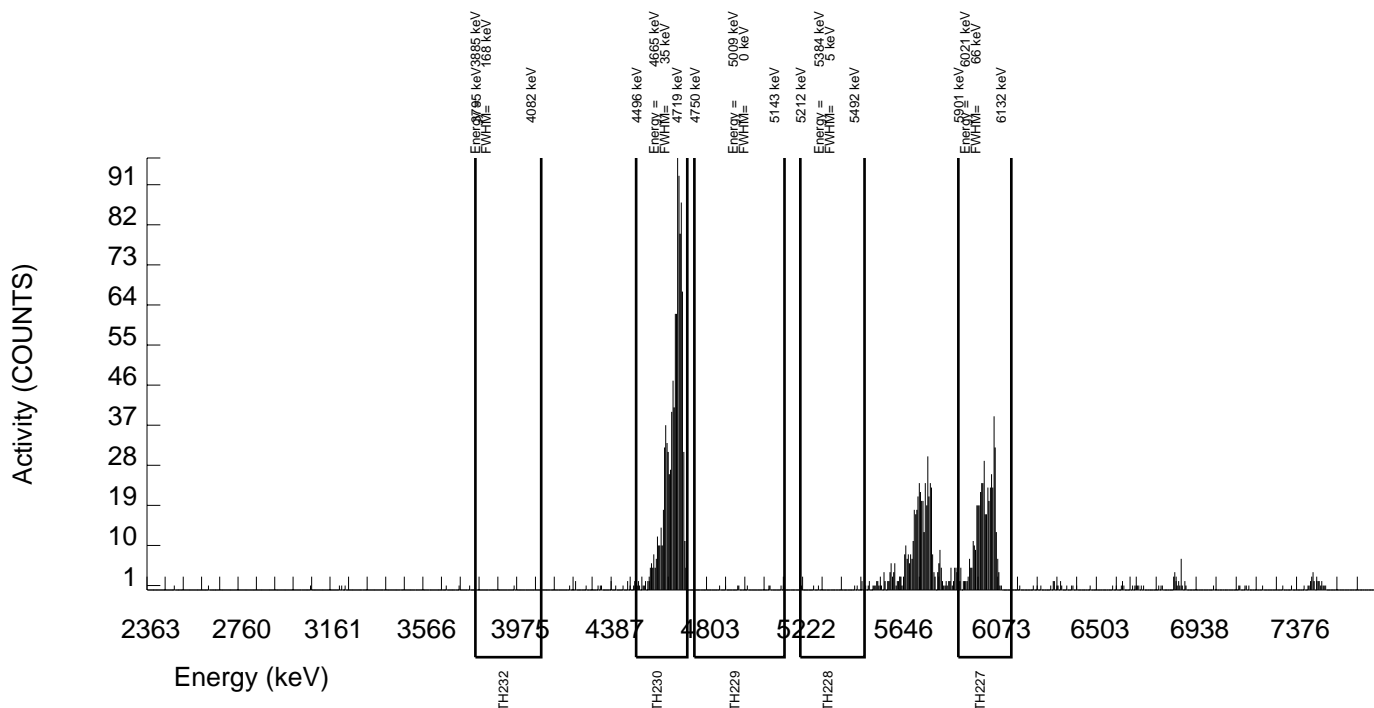


GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888328 SAMPLE DATE : 27-JUL-2009 21:30:00		SAMPLE ID : S1201888822_TH SAMPLE QTY: 0.600 L	
DETECTOR NUMBER :68637 AVERAGE %EFFICIENCY :25.6679 % YIELD : 71.297		COUNT DATE:28-JUL-2009 11:57:14 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 3.567E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 3.567E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92277 dpm RESULTS : 2.79680 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B196.CNF;94 BKG DATE : 26-JUL-2009 EFF FILE : W196.CNF;35 CAL DATE : 22-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
AC-227	6038.010	474.000	472.000	2.000	1.4142	68.10000	2.95E+00	3.11E-01	5.98E-02	2.05E-02	2.67E-01
TH-228	5363.000	7.000	1.000	6.000	2.4495	99.94000	4.11E-03	2.90E-02	5.92E-02	2.34E-02	2.90E-02
TH229	4900.000	9.000	5.000	4.000	2.0000	99.52000	2.06E-02	2.92E-02	5.07E-02	1.92E-02	2.91E-02
TH-230	4625.000	1037.000	1036.000	1.000	1.0000	100.0000	4.25E+00	3.46E-01	3.14E-02	9.54E-03	2.59E-01
TH-232	3972.000	2.000	2.000	0.000	0.0000	100.0000	8.20E-03	1.14E-02	1.23E-02	0.00E+00	1.14E-02



**Radiochemistry Batch Checklist, Rev 9**

Batch# 888783 Product: Th Date: 7/30/09

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 REF acceptance criteria.	✓		case narrative
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.		✓	NCR 716615
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.	✓		NCR 716615
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCR 716615
Aliquot Correction completed if required.			N/A
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: Jap LM - 7/30/09

Secondary Review Performed By: [Signature] 7/30/09

7/25 7/31  
KERR

# Thorium (Ac-227 Tracer) Que Sheet

28-JUL-09

Batch #: 888783

Analyst: CXM2 First Client Due Date: 31-JUL-09 Internal Due Date: 25-JUL-09

Tracer Isotope: Ac-227

Tracer Code: 227-8-102 Expiration Date: 3/3/10

LCS Isotope: Th-230

LCS Code: A2276-57 Expiration Date: 4/13/10

Spike Isotope: Th-230

Spike Code: A2276-57 Expiration Date: 4/13/10

Prep Date: 7/28/09

Initials: LLA Pipet ID: 2971052 Balance ID: 50-110272

Vol: 0.1 Ac-227 Separation Date/Time: 22:00 7/28/09

Vol: 0.1

Vol: 0.1

Witness: MP 7/28/09

Wet/Dry Aliquot (g/l/l)

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g/l/l)	Th Det #
232727001-2	SA50-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	30-JUN-09	1	1	0.210	175
232727002-2	SA54-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	30-JUN-09	2	2	0.204	176
232727003-2	SA102-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	30-JUN-09	3	3	0.213	177
232727004-2	SA109-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	30-JUN-09	4	4	0.207	178
232727005-2	SA82-29B	SAMPLE		.05 pCi/g	SOIL	KERR003	01-JUL-09	5	5	0.202	179
232727006-2	RSAL3-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	01-JUL-09	6	6	0.213	180
232727007-2	RSAL3-30B	SAMPLE		.05 pCi/g	SOIL	KERR003	01-JUL-09	7	7	0.206	181
232727008-2	SA114-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	01-JUL-09	8	8	0.191	182
232727009-2	SA114009-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	01-JUL-09	9	9	0.191	183
232727010-2	RSAN6-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	01-JUL-09	10	10	0.255	184
232727011-2	SA134-20B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-JUL-09	11	11	0.205	185
232727012-2	SA134-31B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-JUL-09	12	12	0.231	186
232727013-2	SA134009-31B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-JUL-09	13	13	0.199	187
232727014-2	SA88-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-JUL-09	14	14	0.222	188
232727015-2	SA88-20B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-JUL-09	15	15	0.220	189
232727016-2	SA88-32B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-JUL-09	16	16	0.199	190
232727017-2	RSAK3-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-JUL-09	17	17	0.241	191
232727018-2	RSAK3-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-JUL-09	18	18	0.227	192
232727019-2	RSAK3-20B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-JUL-09	19	19	0.245	193
232727020-2	RSAK3-31B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-JUL-09	20	20	0.200	194
1201890003-1	MB for batch 888783	MB		UCF pCi/g to 1	SOIL	QC ACCOUNT		21	21	0.255	197
1201890004-2	RSAK3-31B(232727020DUP)	DUP		.05 pCi/g	SOIL	QC ACCOUNT	02-JUL-09	22	22	0.211	198
1201890005-2	RSAK3-31B(232727020MS)	MS		.05 pCi/g	SOIL	QC ACCOUNT	02-JUL-09	23	23	0.203	199
1201890006-1	LCS for batch 888783	LCS		UCF pCi/g to 1	SOIL	QC ACCOUNT		24	24	0.255	200

Solid Sample Dissolution by: LEACH or DIGESTION

Data Reviewed By: Darrell-7/30/09

Choose SOP Used: GL-RAD-A-038

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

GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727001\_TH  
SAMPLE QTY: 0.210 G

DETECTOR NUMBER :74433  
AVERAGE %EFFICIENCY :25.3924  
% YIELD : 68.915

COUNT DATE:29-JUL-2009 17:12:02  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.019E+01

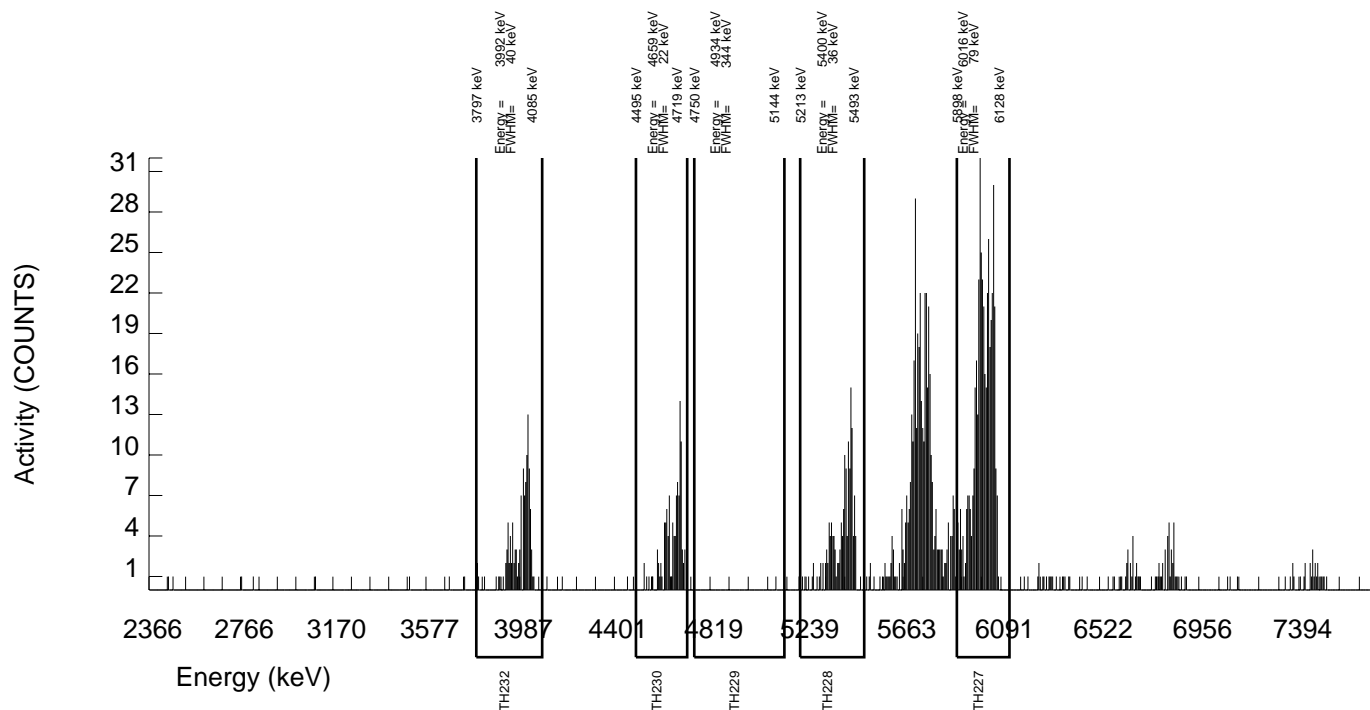
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.019E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 2.70312 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B175.CNF;111  
BKG DATE : 26-JUL-2009  
EFF FILE : W175.CNF;35  
CAL DATE : 22-JUL-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	451.000	448.000	3.000	1.7321	68.10000	8.41E+00	9.41E-01	2.08E-01	7.57E-02	7.84E-01
TH-228	5363.000	154.000	147.000	7.000	2.6458	99.94000	1.81E+00	3.25E-01	1.88E-01	7.56E-02	3.05E-01
TH229	4900.000	2.000	-4.000	6.000	2.4495	99.52000	-4.93E-02	6.83E-02	1.77E-01	7.02E-02	6.83E-02
TH-230	4625.000	113.000	111.000	2.000	1.4142	100.0000	1.36E+00	2.71E-01	1.17E-01	4.03E-02	2.58E-01
TH-232	3972.000	119.000	118.000	1.000	1.0000	100.0000	1.45E+00	2.78E-01	9.38E-02	2.85E-02	2.63E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727002\_TH  
SAMPLE QTY: 0.204 G

DETECTOR NUMBER :74434  
AVERAGE %EFFICIENCY :25.9651  
% YIELD : 63.182

COUNT DATE:29-JUL-2009 17:12:04  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.049E+01

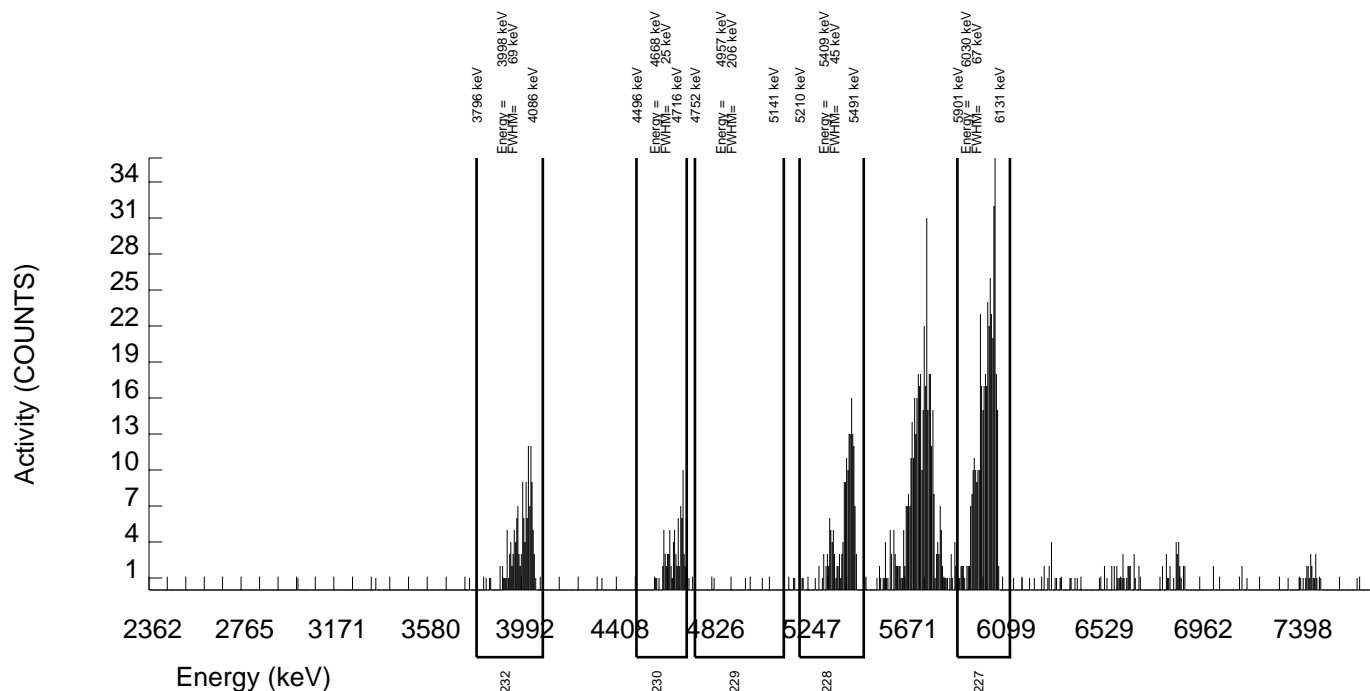
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.049E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92241 dpm  
RESULTS : 2.47827 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B176.CNF;111  
BKG DATE : 26-JUL-2009  
EFF FILE : W176.CNF;35  
CAL DATE : 22-JUL-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	422.000	420.000	2.000	1.4142	68.10000	8.66E+00	9.92E-01	1.98E-01	6.78E-02	8.32E-01
TH-228	5363.000	172.000	159.000	13.000	3.6056	99.94000	2.14E+00	3.83E-01	2.67E-01	1.13E-01	3.59E-01
TH229	4900.000	3.000	3.000	0.000	0.0000	99.52000	4.06E-02	4.60E-02	4.06E-02	0.00E+00	4.59E-02
TH-230	4625.000	80.000	78.000	2.000	1.4142	100.0000	1.05E+00	2.48E-01	1.29E-01	4.43E-02	2.39E-01
TH-232	3972.000	141.000	140.000	1.000	1.0000	100.0000	1.88E+00	3.36E-01	1.03E-01	3.13E-02	3.14E-01





GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727003\_TH  
SAMPLE QTY: 0.213 G

DETECTOR NUMBER :74435  
AVERAGE %EFFICIENCY :26.8586  
% YIELD : 64.134

COUNT DATE:29-JUL-2009 17:12:06  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

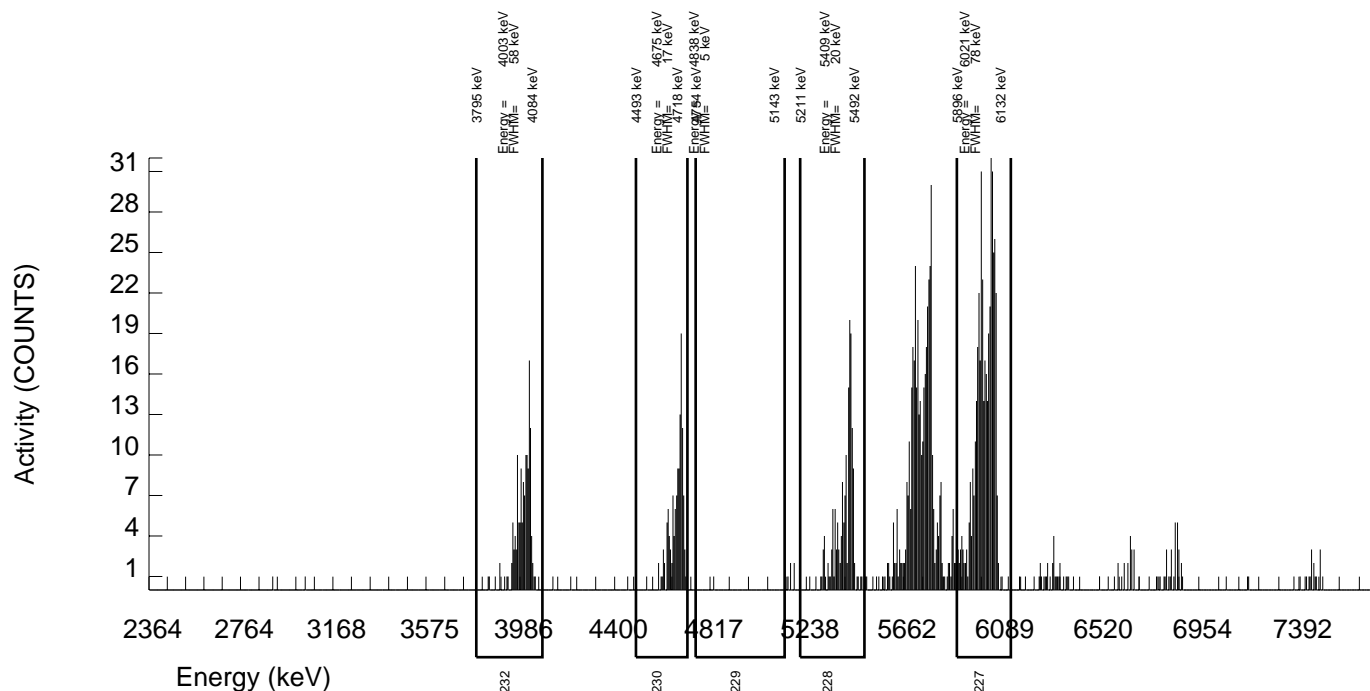
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.005E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92241 dpm  
RESULTS : 2.51562 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B177.CNF;111  
BKG DATE : 26-JUL-2009  
EFF FILE : W177.CNF;35  
CAL DATE : 22-JUL-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	445.000	441.000	4.000	2.0000	68.10000	8.30E+00	9.33E-01	2.31E-01	8.75E-02	7.81E-01
TH-228	5363.000	161.000	152.000	9.000	3.0000	99.94000	1.87E+00	3.35E-01	2.09E-01	8.58E-02	3.14E-01
TH229	4900.000	1.000	-1.000	2.000	1.4142	99.52000	-1.23E-02	4.19E-02	1.18E-01	4.06E-02	4.19E-02
TH-230	4625.000	127.000	126.000	1.000	1.0000	100.0000	1.55E+00	2.88E-01	9.40E-02	2.86E-02	2.72E-01
TH-232	3972.000	140.000	139.000	1.000	1.0000	100.0000	1.71E+00	3.04E-01	9.40E-02	2.86E-02	2.86E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727004\_TH  
SAMPLE QTY: 0.207 G

DETECTOR NUMBER :74436  
AVERAGE %EFFICIENCY :25.6373  
% YIELD : 64.600

COUNT DATE:29-JUL-2009 17:12:09  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

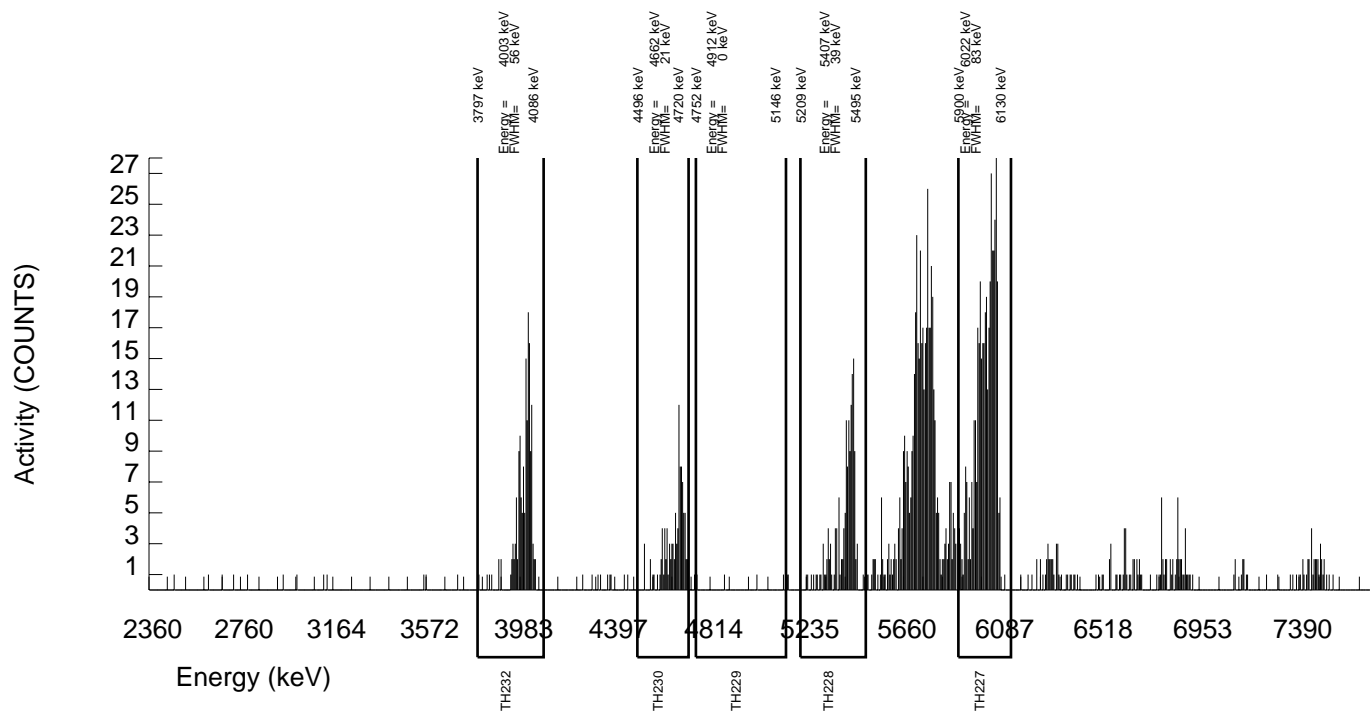
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.034E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 2.53386 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B178.CNF;111  
BKG DATE : 26-JUL-2009  
EFF FILE : W178.CNF;35  
CAL DATE : 22-JUL-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	426.000	424.000	2.000	1.4142	68.10000	8.54E+00	9.73E-01	1.93E-01	6.62E-02	8.16E-01
TH-228	5363.000	149.000	139.000	10.000	3.1623	99.94000	1.83E+00	3.45E-01	2.33E-01	9.68E-02	3.25E-01
TH229	4900.000	5.000	-3.000	8.000	2.8284	99.52000	-3.96E-02	9.33E-02	2.13E-01	8.69E-02	9.33E-02
TH-230	4625.000	101.000	97.000	4.000	2.0000	100.0000	1.27E+00	2.75E-01	1.62E-01	6.11E-02	2.64E-01
TH-232	3972.000	158.000	155.000	3.000	1.7321	100.0000	2.04E+00	3.50E-01	1.45E-01	5.29E-02	3.27E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727005\_TH  
SAMPLE QTY: 0.208 G

DETECTOR NUMBER :74437  
AVERAGE %EFFICIENCY :26.5432  
% YIELD : 75.934

COUNT DATE:29-JUL-2009 17:12:11  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.029E+01

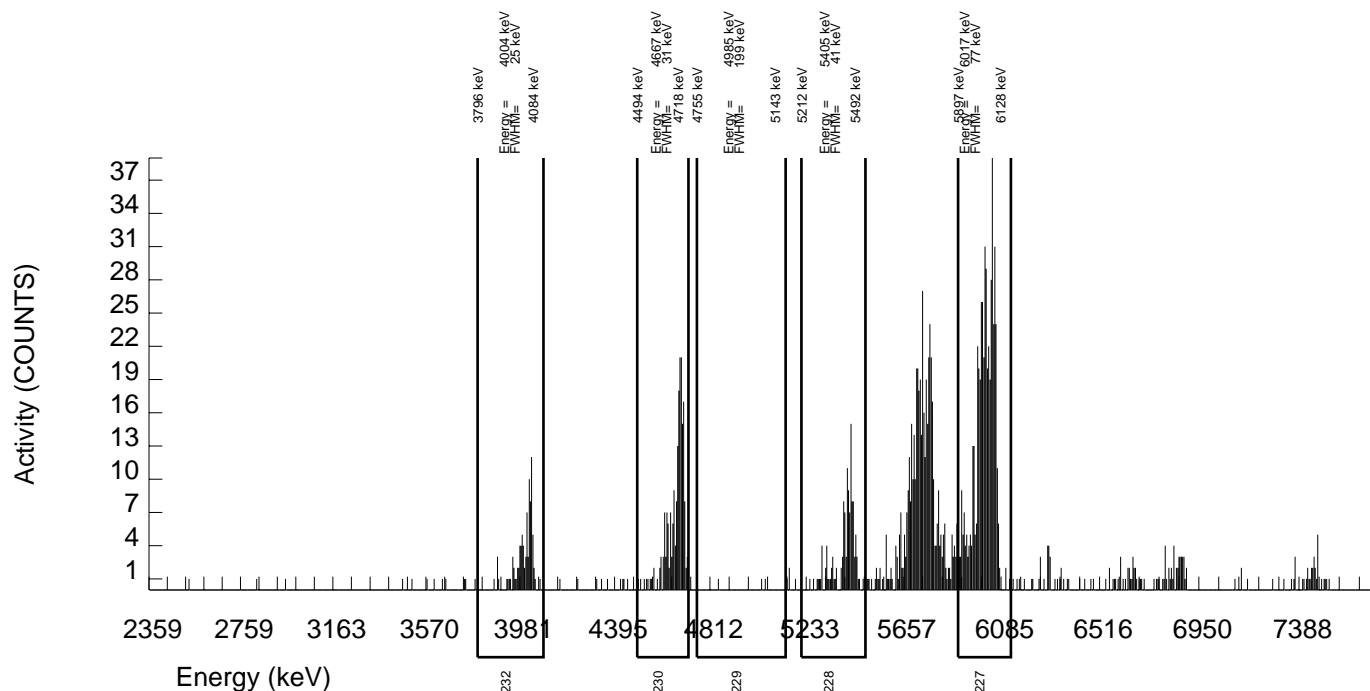
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.029E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92241 dpm  
RESULTS : 2.97843 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B179.CNF;111  
BKG DATE : 26-JUL-2009  
EFF FILE : W179.CNF;35  
CAL DATE : 22-JUL-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	520.000	516.000	4.000	2.0000	68.10000	8.49E+00	9.07E-01	2.03E-01	7.66E-02	7.39E-01
TH-228	5363.000	123.000	110.000	13.000	3.6056	99.94000	1.18E+00	2.57E-01	2.13E-01	9.03E-02	2.46E-01
TH229	4900.000	3.000	-5.000	8.000	2.8284	99.52000	-5.40E-02	7.02E-02	1.74E-01	7.10E-02	7.02E-02
TH-230	4625.000	198.000	195.000	3.000	1.7321	100.0000	2.10E+00	3.26E-01	1.19E-01	4.33E-02	2.99E-01
TH-232	3972.000	91.000	91.000	0.000	0.0000	100.0000	9.78E-01	2.10E-01	3.22E-02	0.00E+00	2.01E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727006\_TH  
SAMPLE QTY: 0.213 G

DETECTOR NUMBER :74438  
AVERAGE %EFFICIENCY :25.0525  
% YIELD : 73.280

COUNT DATE:29-JUL-2009 17:12:14  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

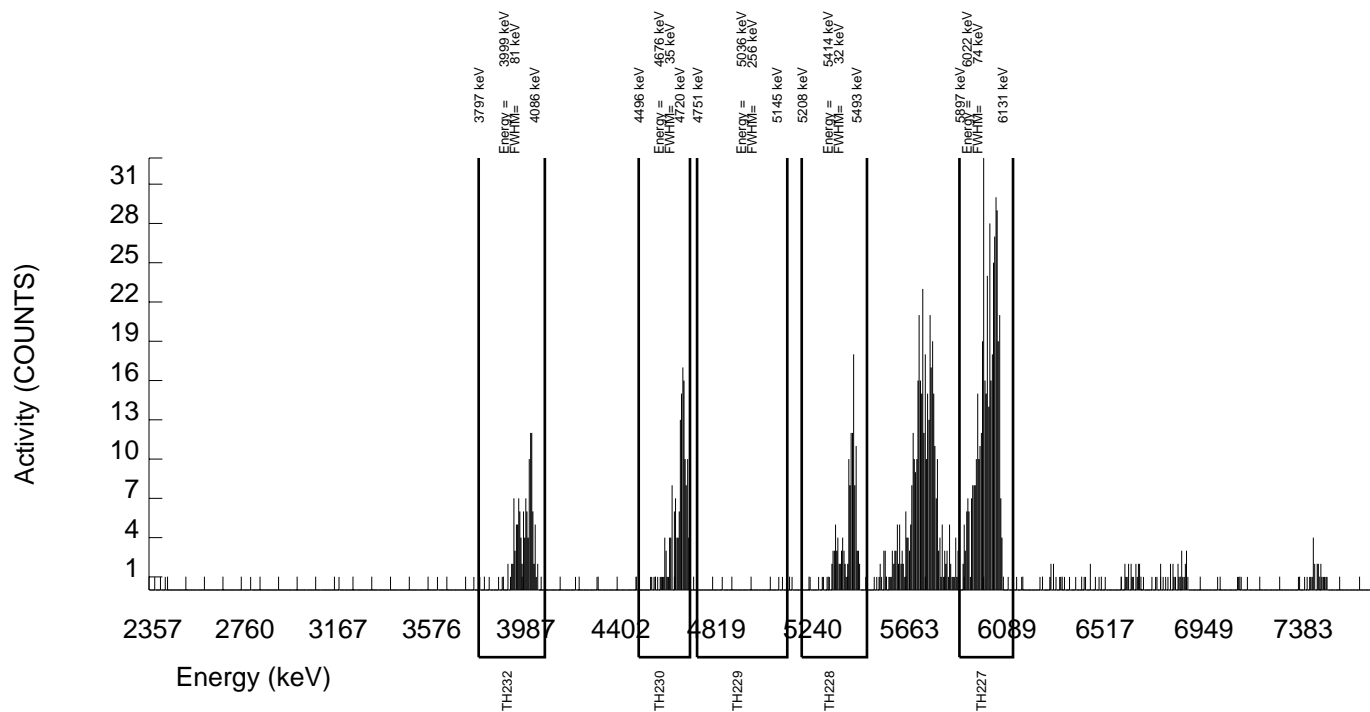
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.005E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92241 dpm  
RESULTS : 2.87434 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B180.CNF;113  
BKG DATE : 26-JUL-2009  
EFF FILE : W180.CNF;35  
CAL DATE : 22-JUL-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	472.000	470.000	2.000	1.4142	68.10000	8.30E+00	9.10E-01	1.69E-01	5.81E-02	7.53E-01
TH-228	5363.000	133.000	120.000	13.000	3.6056	99.94000	1.38E+00	2.86E-01	2.28E-01	9.68E-02	2.73E-01
TH229	4900.000	3.000	-4.000	7.000	2.6458	99.52000	-4.63E-02	7.17E-02	1.77E-01	7.12E-02	7.17E-02
TH-230	4625.000	154.000	153.000	1.000	1.0000	100.0000	1.76E+00	3.01E-01	8.82E-02	2.68E-02	2.81E-01
TH-232	3972.000	127.000	126.000	1.000	1.0000	100.0000	1.45E+00	2.71E-01	8.82E-02	2.68E-02	2.55E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727007\_TH  
SAMPLE QTY: 0.206 G

DETECTOR NUMBER :74439  
AVERAGE %EFFICIENCY :25.4854  
% YIELD : 73.108

COUNT DATE:29-JUL-2009 17:12:16  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

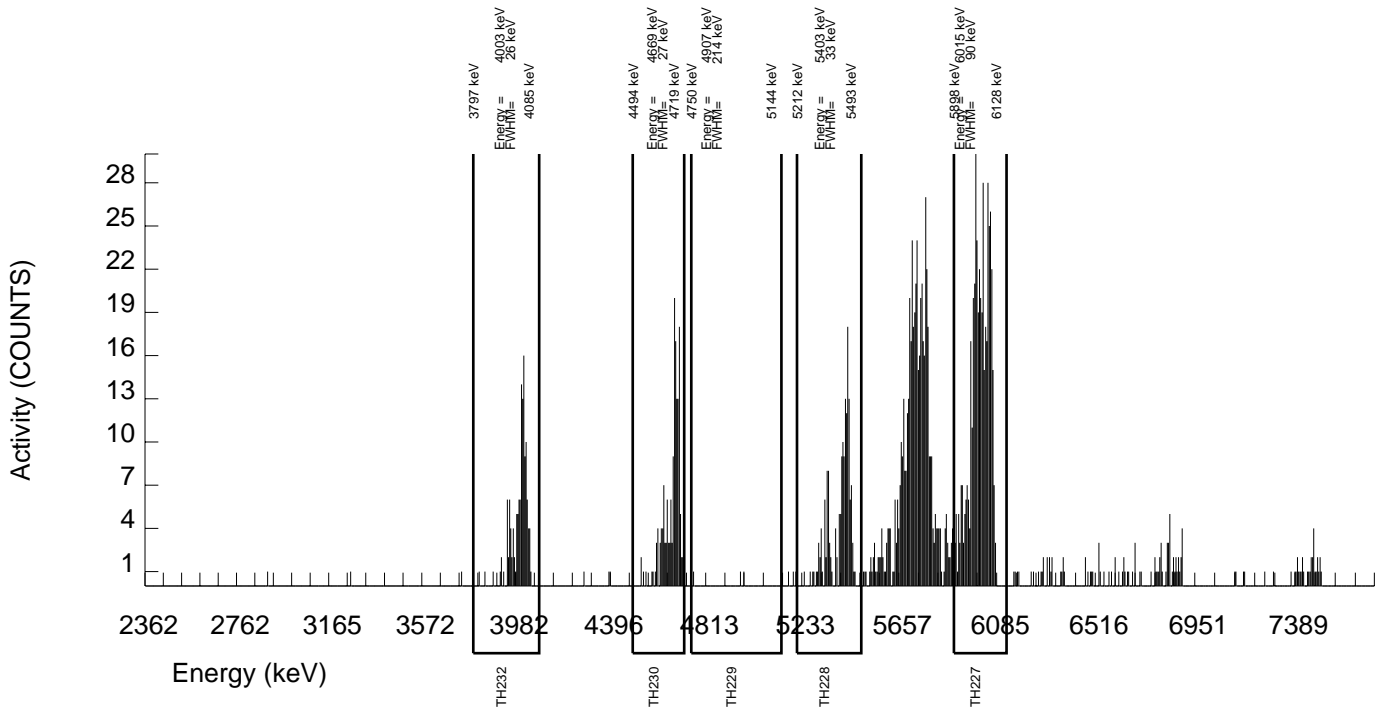
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.039E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 2.86760 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B181.CNF;111  
BKG DATE : 26-JUL-2009  
EFF FILE : W181.CNF;35  
CAL DATE : 22-JUL-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	478.000	477.000	1.000	1.0000	68.10000	8.58E+00	9.37E-01	1.38E-01	4.18E-02	7.71E-01
TH-228	5363.000	165.000	154.000	11.000	3.3166	99.94000	1.81E+00	3.26E-01	2.17E-01	9.07E-02	3.06E-01
TH229	4900.000	3.000	-2.000	5.000	2.2361	99.52000	-2.36E-02	6.54E-02	1.58E-01	6.13E-02	6.54E-02
TH-230	4625.000	158.000	154.000	4.000	2.0000	100.0000	1.81E+00	3.14E-01	1.44E-01	5.46E-02	2.93E-01
TH-232	3972.000	133.000	131.000	2.000	1.4142	100.0000	1.54E+00	2.84E-01	1.12E-01	3.86E-02	2.67E-01

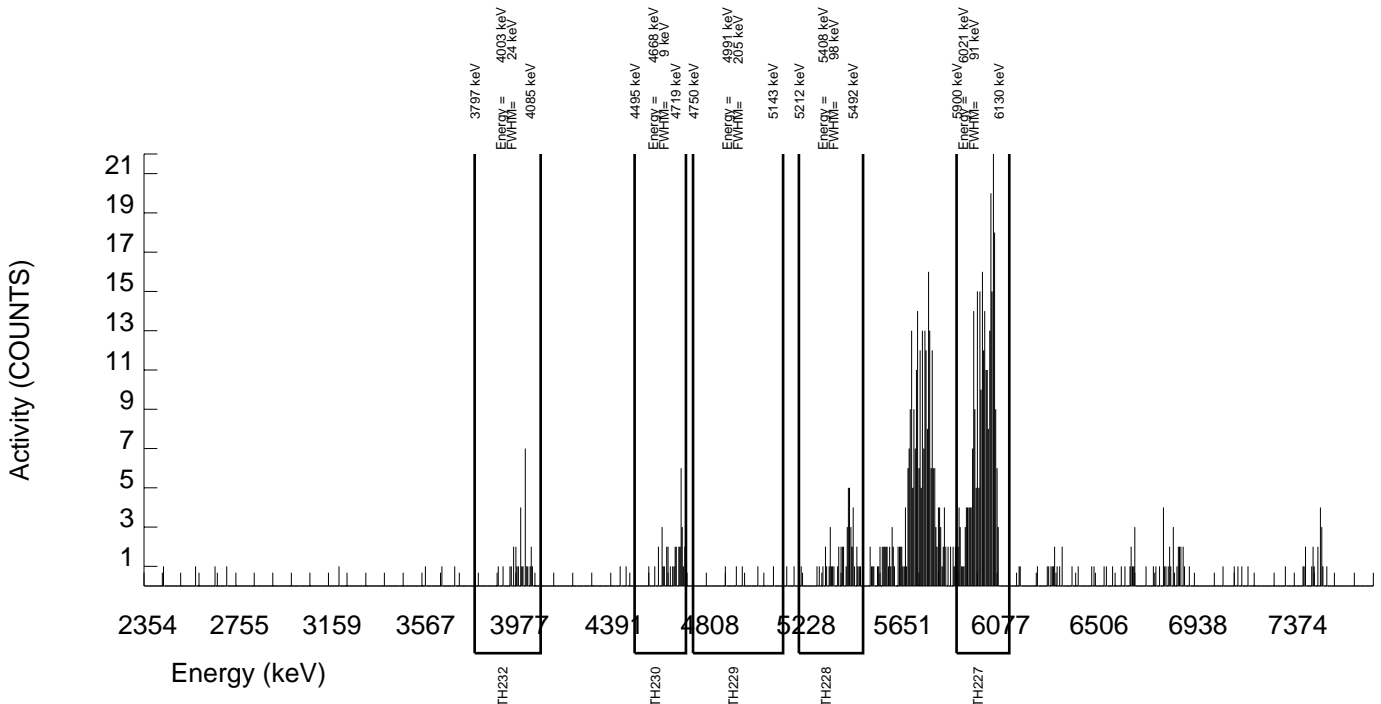


GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783 SAMPLE DATE : 28-JUL-2009 22:00:00		SAMPLE ID : S0232727008_TH SAMPLE QTY: 0.191 G	
DETECTOR NUMBER :74440 AVERAGE %EFFICIENCY :25.7871 % YIELD : 44.988		COUNT DATE:29-JUL-2009 17:12:19 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.121E+01	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.121E+01	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92242 dpm RESULTS : 1.76460 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B182.CNF;111 BKG DATE : 26-JUL-2009 EFF FILE : W182.CNF;35 CAL DATE : 22-JUL-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	298.000	297.000	1.000	1.0000	68.10000	9.25E+00	1.21E+00	2.38E-01	7.25E-02	1.06E+00
TH-228	5363.000	52.000	41.000	11.000	3.3166	99.94000	8.35E-01	3.21E-01	3.75E-01	1.57E-01	3.17E-01
TH229	4900.000	5.000	1.000	4.000	2.0000	99.52000	2.04E-02	1.20E-01	2.51E-01	9.50E-02	1.20E-01
TH-230	4625.000	36.000	33.000	3.000	1.7321	100.0000	6.71E-01	2.52E-01	2.25E-01	8.19E-02	2.49E-01
TH-232	3972.000	29.000	27.000	2.000	1.4142	100.0000	5.49E-01	2.25E-01	1.95E-01	6.69E-02	2.22E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727009\_TH  
SAMPLE QTY: 0.191 G

DETECTOR NUMBER :74441  
AVERAGE %EFFICIENCY :26.3659  
% YIELD : 41.926

COUNT DATE:29-JUL-2009 17:12:23  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.121E+01

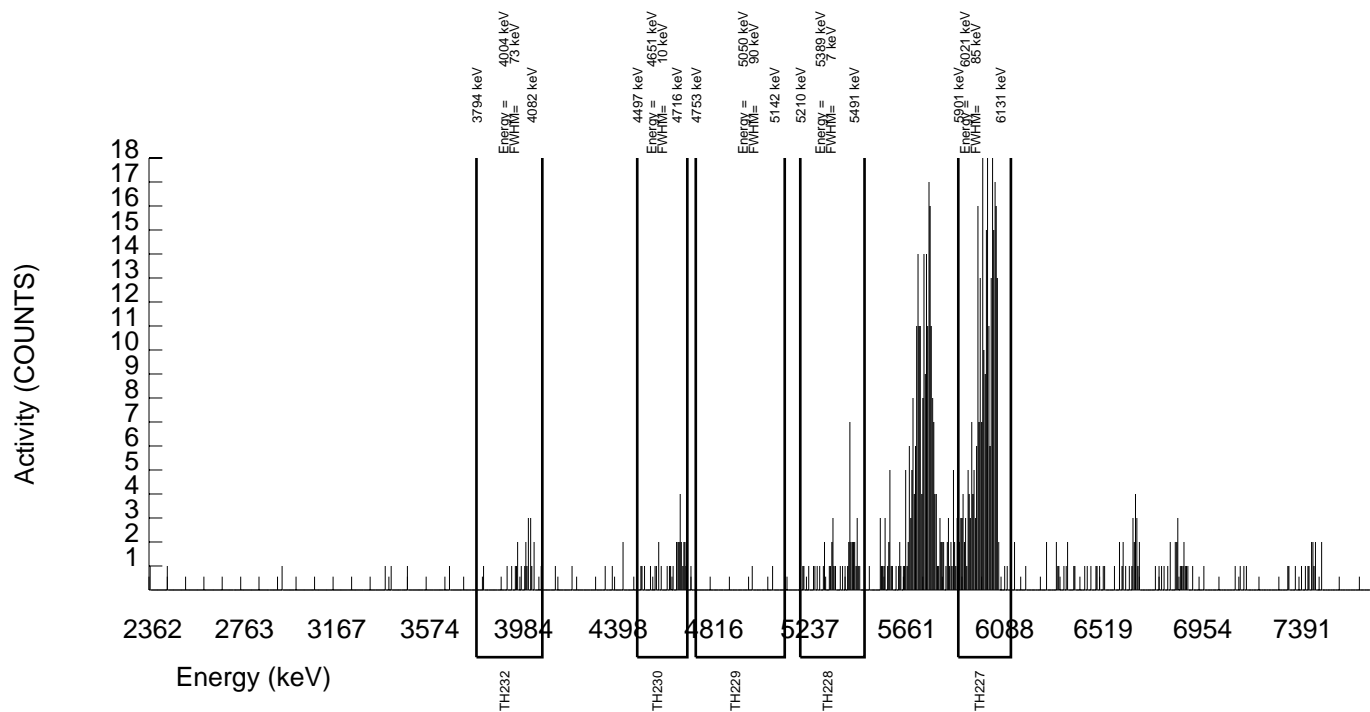
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.121E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 1.64451 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B183.CNF;111  
BKG DATE : 26-JUL-2009  
EFF FILE : W183.CNF;35  
CAL DATE : 22-JUL-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	284.000	283.000	1.000	1.0000	68.10000	9.25E+00	1.23E+00	2.50E-01	7.60E-02	1.08E+00
TH-228	5363.000	46.000	41.000	5.000	2.2361	99.94000	8.76E-01	3.04E-01	2.86E-01	1.11E-01	2.99E-01
TH229	4900.000	2.000	-1.000	3.000	1.7321	99.52000	-2.14E-02	9.40E-02	2.37E-01	8.64E-02	9.40E-02
TH-230	4625.000	31.000	29.000	2.000	1.4142	100.0000	6.19E-01	2.43E-01	2.04E-01	7.02E-02	2.40E-01
TH-232	3972.000	22.000	20.000	2.000	1.4142	100.0000	4.27E-01	2.07E-01	2.04E-01	7.02E-02	2.05E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727010\_TH  
SAMPLE QTY: 0.255 G

DETECTOR NUMBER :74442  
AVERAGE %EFFICIENCY :25.8992  
% YIELD : 41.324

COUNT DATE:29-JUL-2009 17:12:25  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.393E+00

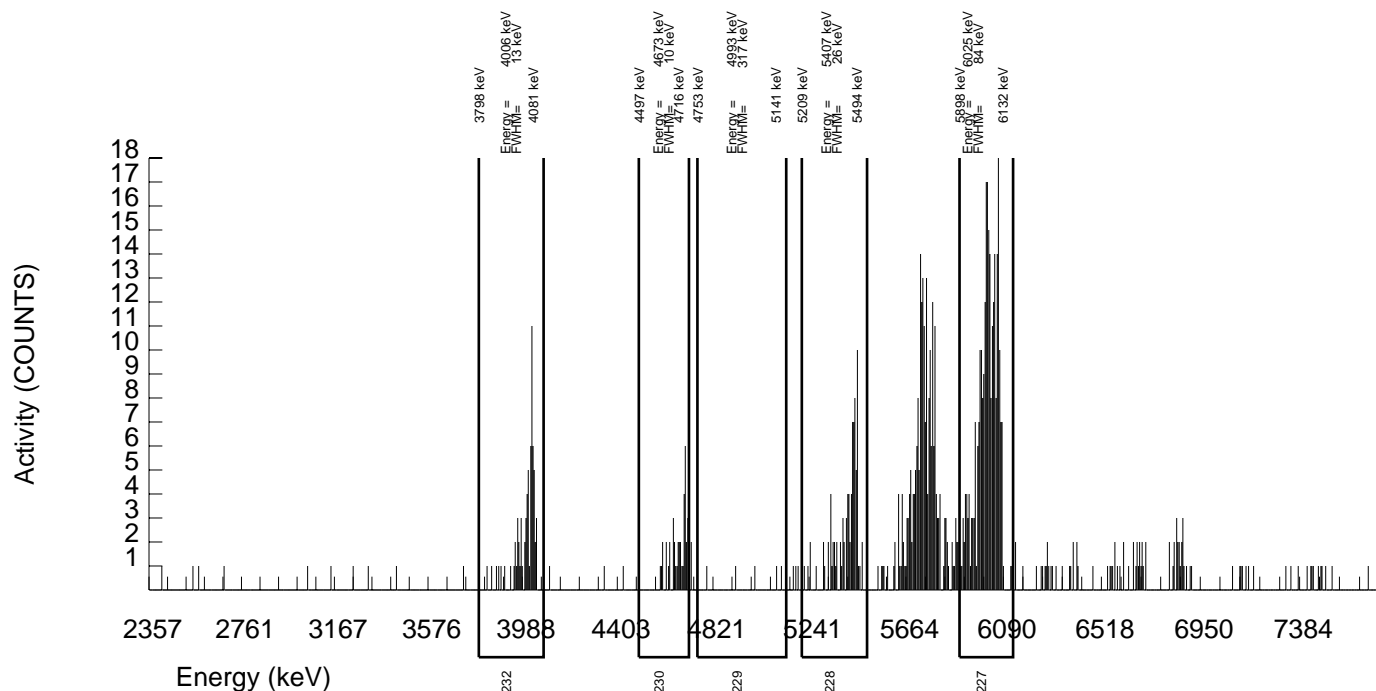
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.393E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 1.62091 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B184.CNF;113  
BKG DATE : 26-JUL-2009  
EFF FILE : W184.CNF;35  
CAL DATE : 22-JUL-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	279.000	274.000	5.000	2.2361	68.10000	6.93E+00	9.31E-01	3.39E-01	1.32E-01	8.35E-01
TH-228	5363.000	88.000	77.000	11.000	3.3166	99.94000	1.27E+00	3.31E-01	3.05E-01	1.28E-01	3.22E-01
TH229	4900.000	5.000	1.000	4.000	2.0000	99.52000	1.66E-02	9.75E-02	2.04E-01	7.72E-02	9.75E-02
TH-230	4625.000	39.000	37.000	2.000	1.4142	100.0000	6.11E-01	2.10E-01	1.58E-01	5.43E-02	2.07E-01
TH-232	3972.000	69.000	69.000	0.000	0.0000	100.0000	1.14E+00	2.77E-01	4.95E-02	0.00E+00	2.69E-01





GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727011\_TH  
SAMPLE QTY: 0.205 G

DETECTOR NUMBER :68615  
AVERAGE %EFFICIENCY :25.6564  
% YIELD : 71.708

COUNT DATE:29-JUL-2009 17:12:27  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

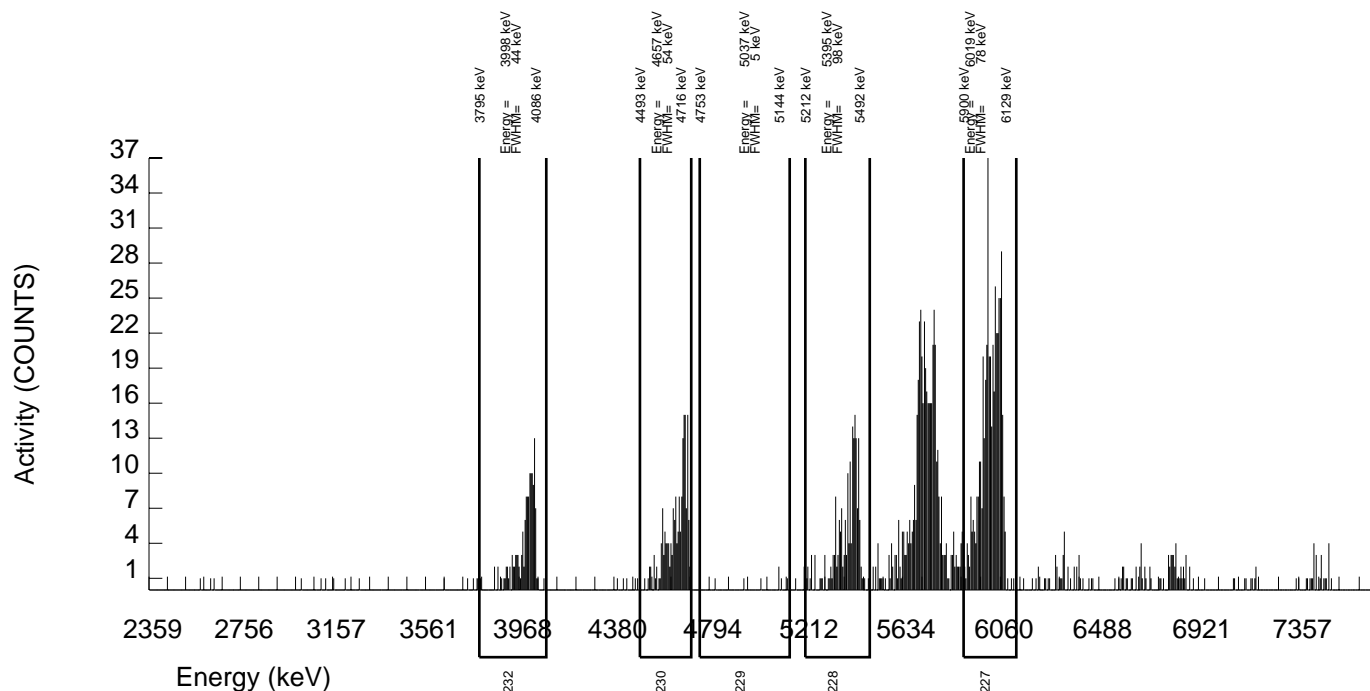
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.044E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 2.81267 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B185.CNF;93  
BKG DATE : 26-JUL-2009  
EFF FILE : W185.CNF;35  
CAL DATE : 22-JUL-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	477.000	471.000	6.000	2.4495	68.10000	8.62E+00	9.54E-01	2.63E-01	1.04E-01	7.88E-01
TH-228	5363.000	189.000	183.000	6.000	2.4495	99.94000	2.19E+00	3.55E-01	1.72E-01	6.82E-02	3.27E-01
TH229	4900.000	7.000	3.000	4.000	2.0000	99.52000	3.60E-02	7.80E-02	1.48E-01	5.58E-02	7.80E-02
TH-230	4625.000	178.000	178.000	0.000	0.0000	100.0000	2.13E+00	3.39E-01	3.58E-02	0.00E+00	3.12E-01
TH-232	3972.000	137.000	137.000	0.000	0.0000	100.0000	1.64E+00	2.92E-01	3.58E-02	0.00E+00	2.74E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727012\_TH  
SAMPLE QTY: 0.231 G

DETECTOR NUMBER :68616  
AVERAGE %EFFICIENCY :25.3097  
% YIELD : 76.548

COUNT DATE:29-JUL-2009 17:12:29  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.265E+00

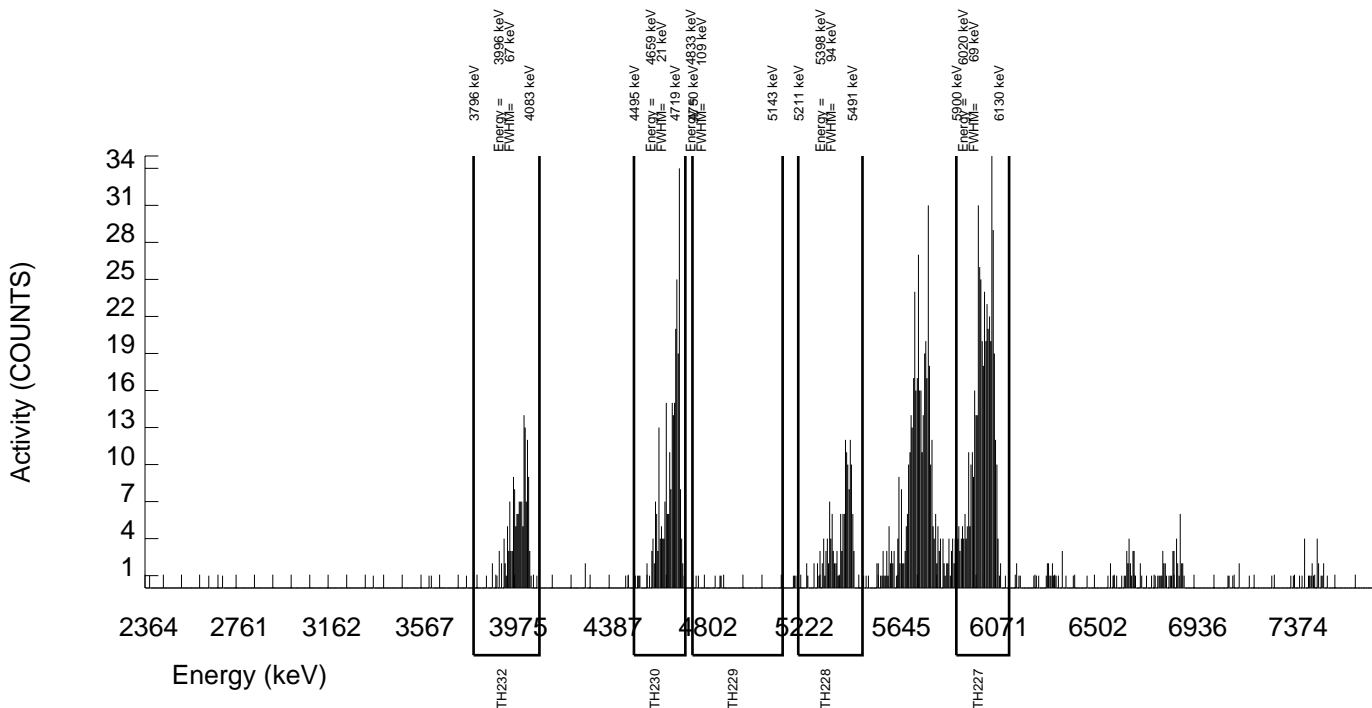
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.265E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 3.00254 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B186.CNF;93  
BKG DATE : 26-JUL-2009  
EFF FILE : W186.CNF;36  
CAL DATE : 22-JUL-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	497.000	496.000	1.000	1.0000	68.10000	7.65E+00	8.19E-01	1.18E-01	3.59E-02	6.74E-01
TH-228	5363.000	149.000	140.000	9.000	3.0000	99.94000	1.41E+00	2.63E-01	1.71E-01	7.04E-02	2.48E-01
TH229	4900.000	5.000	5.000	0.000	0.0000	99.52000	5.06E-02	4.44E-02	3.03E-02	0.00E+00	4.43E-02
TH-230	4625.000	274.000	273.000	1.000	1.0000	100.0000	2.75E+00	3.67E-01	7.70E-02	2.34E-02	3.27E-01
TH-232	3972.000	157.000	156.000	1.000	1.0000	100.0000	1.57E+00	2.66E-01	7.70E-02	2.34E-02	2.48E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727013\_TH  
SAMPLE QTY: 0.199 G

DETECTOR NUMBER :68620  
AVERAGE %EFFICIENCY :25.0189  
% YIELD : 80.717

COUNT DATE:29-JUL-2009 17:12:33  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.075E+01

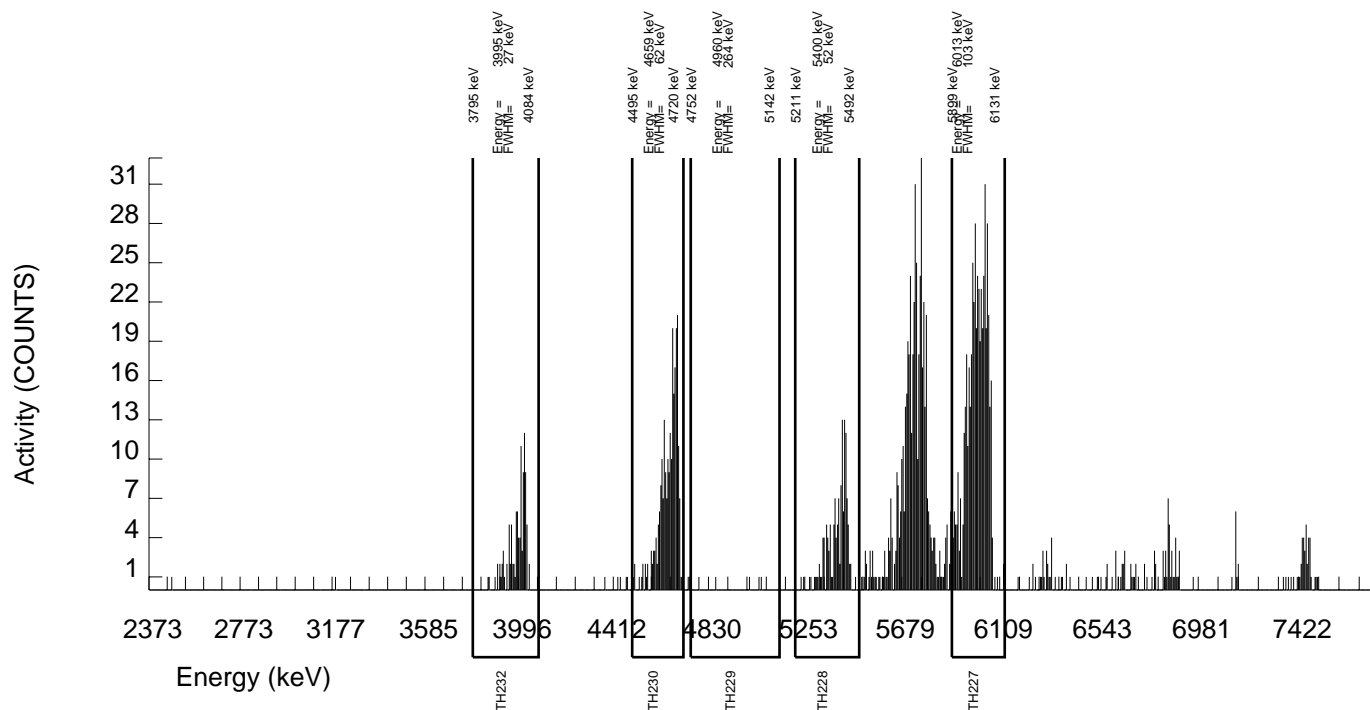
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.075E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 3.16605 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B187.CNF;93  
BKG DATE : 26-JUL-2009  
EFF FILE : W187.CNF;35  
CAL DATE : 22-JUL-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	524.000	517.000	7.000	2.6458	68.10000	8.88E+00	9.71E-01	2.63E-01	1.06E-01	7.76E-01
TH-228	5363.000	138.000	122.000	16.000	4.0000	99.94000	1.37E+00	2.88E-01	2.43E-01	1.04E-01	2.73E-01
TH229	4900.000	5.000	-1.000	6.000	2.4495	99.52000	-1.13E-02	7.32E-02	1.62E-01	6.42E-02	7.32E-02
TH-230	4625.000	248.000	242.000	6.000	2.4495	100.0000	2.71E+00	3.93E-01	1.61E-01	6.39E-02	3.50E-01
TH-232	3972.000	104.000	104.000	0.000	0.0000	100.0000	1.17E+00	2.37E-01	3.36E-02	0.00E+00	2.24E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727014\_TH  
SAMPLE QTY: 0.222 G

DETECTOR NUMBER :68621  
AVERAGE %EFFICIENCY :26.0109  
% YIELD : 55.563

COUNT DATE:29-JUL-2009 17:12:35  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

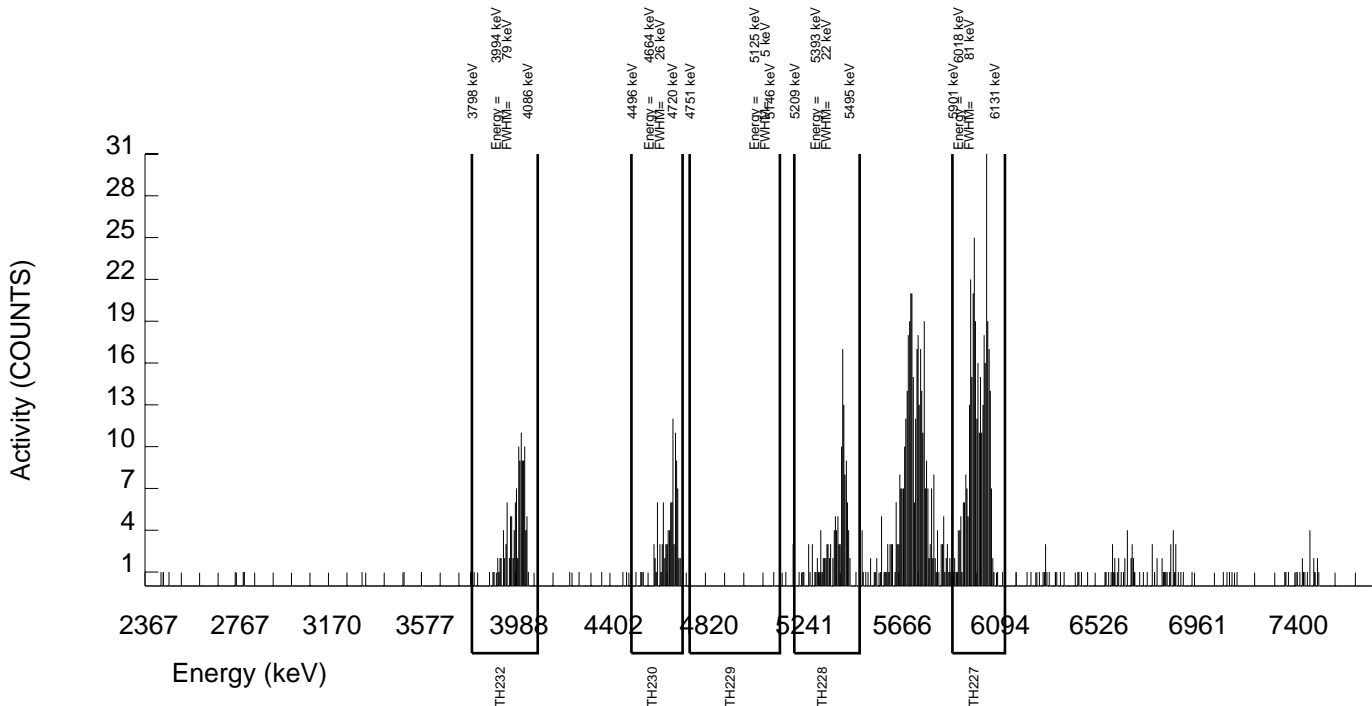
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.641E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 2.17942 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B188.CNF;93  
BKG DATE : 26-JUL-2009  
EFF FILE : W188.CNF;36  
CAL DATE : 22-JUL-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	374.000	370.000	4.000	2.0000	68.10000	7.96E+00	9.53E-01	2.65E-01	1.00E-01	8.20E-01
TH-228	5363.000	137.000	129.000	8.000	2.8284	99.94000	1.81E+00	3.50E-01	2.27E-01	9.25E-02	3.32E-01
TH229	4900.000	1.000	-5.000	6.000	2.4495	99.52000	-7.05E-02	7.32E-02	2.03E-01	8.04E-02	7.32E-02
TH-230	4625.000	103.000	101.000	2.000	1.4142	100.0000	1.42E+00	2.95E-01	1.34E-01	4.62E-02	2.82E-01
TH-232	3972.000	128.000	126.000	2.000	1.4142	100.0000	1.77E+00	3.32E-01	1.34E-01	4.62E-02	3.14E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727015\_TH  
SAMPLE QTY: 0.220 G

DETECTOR NUMBER :68622  
AVERAGE %EFFICIENCY :25.9042  
% YIELD : 64.086

COUNT DATE:29-JUL-2009 17:12:38  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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

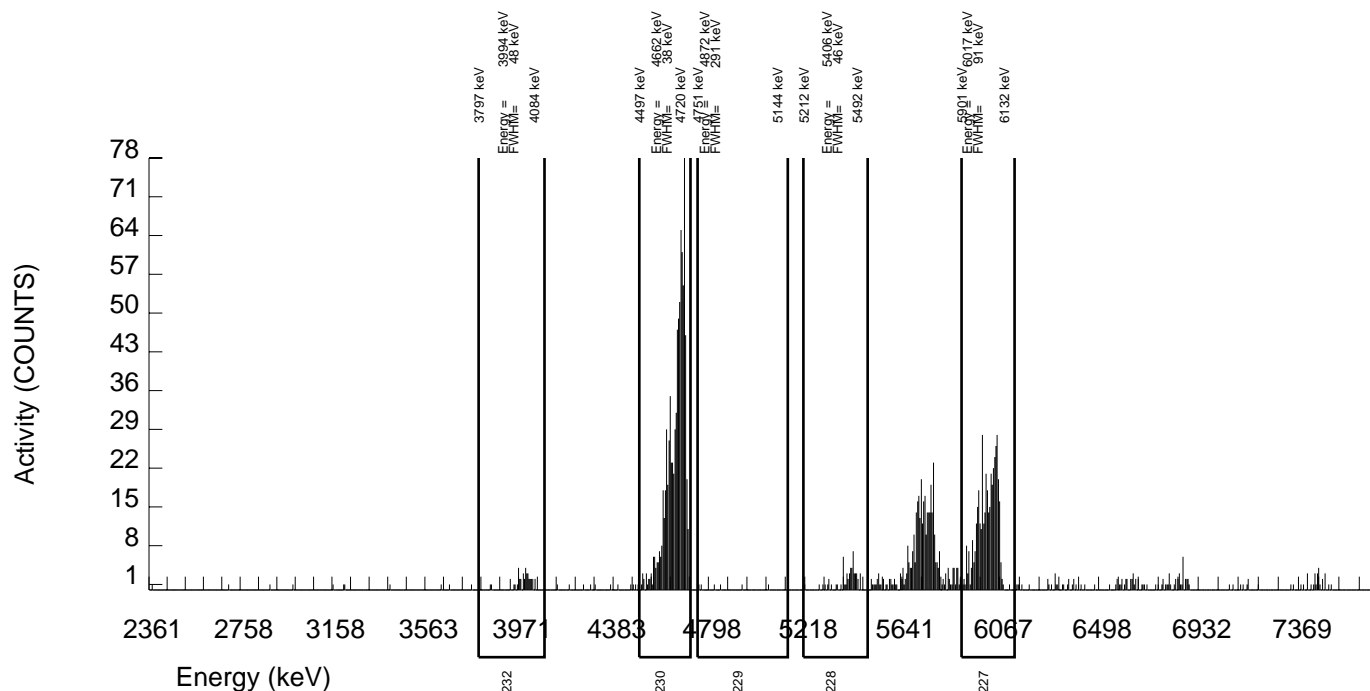
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.728E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 2.51371 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B189.CNF;93  
BKG DATE : 26-JUL-2009  
EFF FILE : W189.CNF;35  
CAL DATE : 22-JUL-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	427.000	425.000	2.000	1.4142	68.10000	8.03E+00	9.25E-01	1.81E-01	6.22E-02	7.67E-01
TH-228	5363.000	56.000	50.000	6.000	2.4495	99.94000	6.18E-01	1.95E-01	1.78E-01	7.04E-02	1.91E-01
TH229	4900.000	6.000	4.000	2.000	1.4142	99.52000	4.96E-02	6.88E-02	1.19E-01	4.08E-02	6.87E-02
TH-230	4625.000	837.000	835.000	2.000	1.4142	100.0000	1.03E+01	9.64E-01	1.18E-01	4.06E-02	7.00E-01
TH-232	3972.000	40.000	39.000	1.000	1.0000	100.0000	4.81E-01	1.58E-01	9.44E-02	2.87E-02	1.55E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727016\_TH  
SAMPLE QTY: 0.199 G

DETECTOR NUMBER :68623  
AVERAGE %EFFICIENCY :26.0642  
% YIELD : 70.886

COUNT DATE:29-JUL-2009 17:12:40  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.075E+01

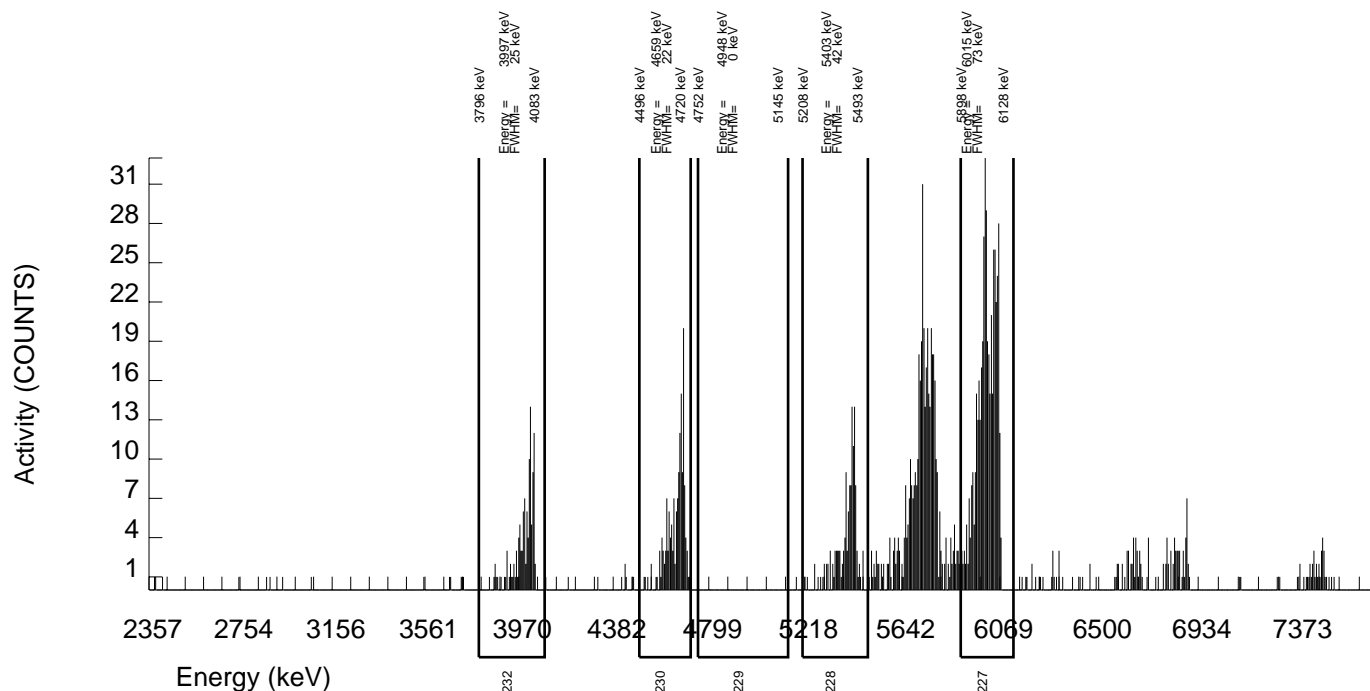
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.075E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 2.78044 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B190.CNF;93  
BKG DATE : 26-JUL-2009  
EFF FILE : W190.CNF;36  
CAL DATE : 22-JUL-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	479.000	473.000	6.000	2.4495	68.10000	8.88E+00	9.83E-01	2.70E-01	1.07E-01	8.10E-01
TH-228	5363.000	135.000	122.000	13.000	3.6056	99.94000	1.50E+00	3.07E-01	2.43E-01	1.03E-01	2.93E-01
TH229	4900.000	0.000	-25.000	25.000	5.0000	99.52000	-3.08E-01	1.23E-01	3.23E-01	1.43E-01	1.23E-01
TH-230	4625.000	154.000	145.000	9.000	3.0000	100.0000	1.78E+00	3.26E-01	2.08E-01	8.55E-02	3.07E-01
TH-232	3972.000	116.000	116.000	0.000	0.0000	100.0000	1.42E+00	2.74E-01	3.68E-02	0.00E+00	2.59E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727017\_TH  
SAMPLE QTY: 0.241 G

DETECTOR NUMBER :68624  
AVERAGE %EFFICIENCY :26.2116  
% YIELD : 45.005

COUNT DATE:29-JUL-2009 17:12:43  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.881E+00

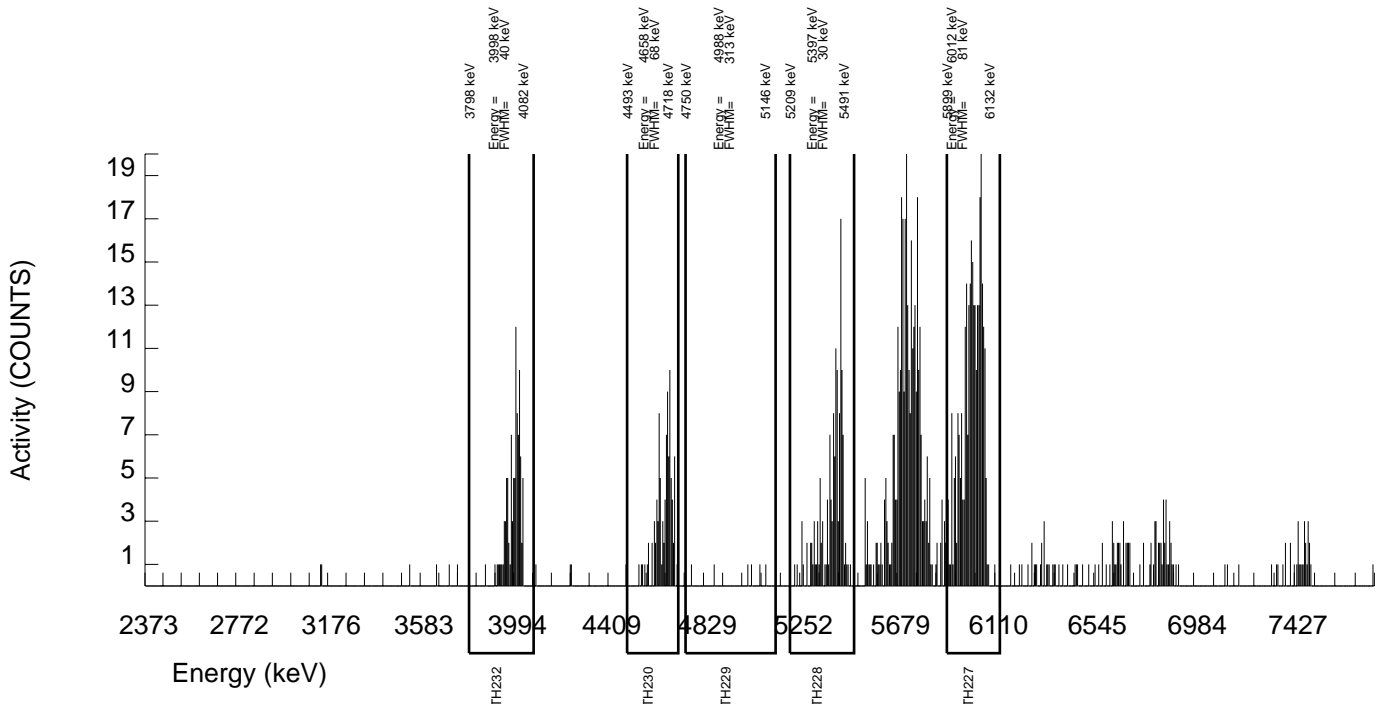
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.881E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 1.76527 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B191.CNF;95  
BKG DATE : 26-JUL-2009  
EFF FILE : W191.CNF;35  
CAL DATE : 22-JUL-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	307.000	302.000	5.000	2.2361	68.10000	7.33E+00	9.60E-01	3.25E-01	1.26E-01	8.40E-01
TH-228	5363.000	140.000	134.000	6.000	2.4495	99.94000	2.13E+00	3.99E-01	2.29E-01	9.04E-02	3.76E-01
TH229	4900.000	6.000	5.000	1.000	1.0000	99.52000	7.96E-02	8.27E-02	1.22E-01	3.70E-02	8.26E-02
TH-230	4625.000	95.000	93.000	2.000	1.4142	100.0000	1.47E+00	3.20E-01	1.52E-01	5.21E-02	3.06E-01
TH-232	3972.000	97.000	96.000	1.000	1.0000	100.0000	1.52E+00	3.22E-01	1.21E-01	3.69E-02	3.07E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727018\_TH  
SAMPLE QTY: 0.227 G

DETECTOR NUMBER :74430  
AVERAGE %EFFICIENCY :26.1047  
% YIELD : 53.419

COUNT DATE:29-JUL-2009 17:12:45  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.428E+00

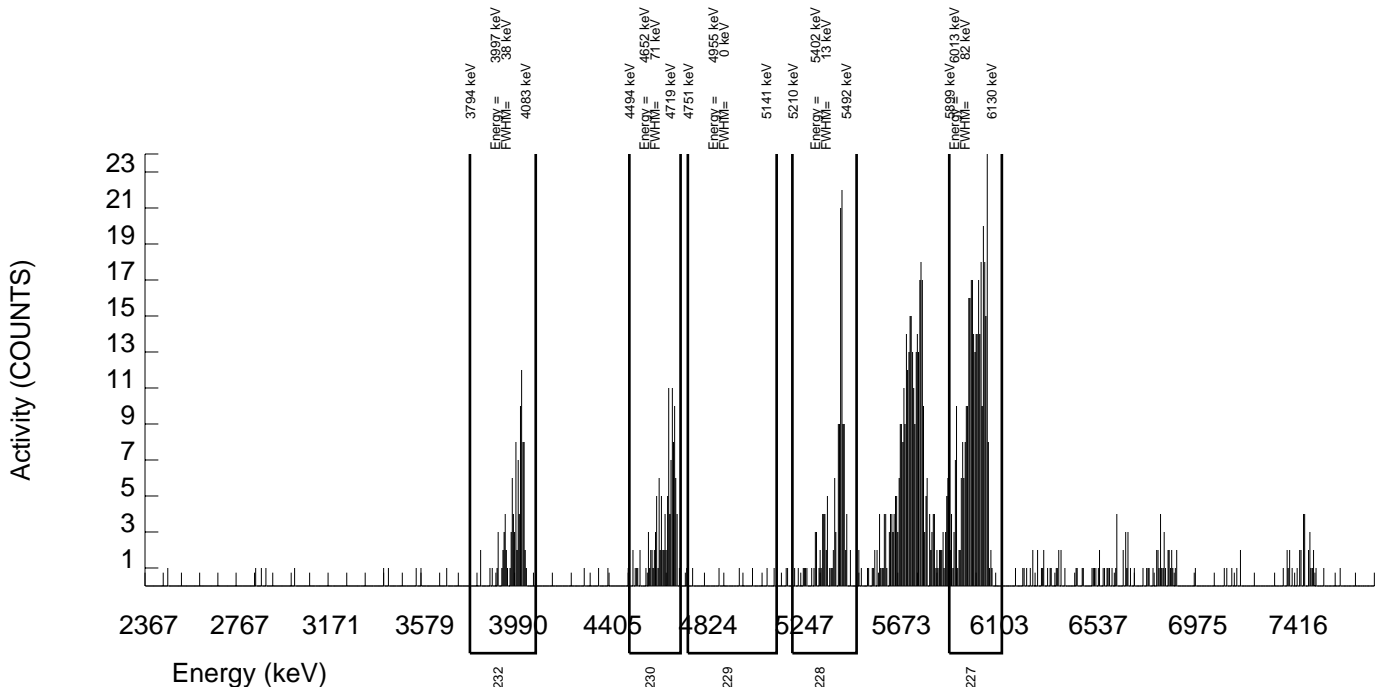
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 9.428E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 2.09530 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B192.CNF;93  
BKG DATE : 26-JUL-2009  
EFF FILE : W192.CNF;42  
CAL DATE : 22-JUL-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	359.000	357.000	2.000	1.4142	68.10000	7.78E+00	9.40E-01	2.09E-01	7.17E-02	8.12E-01
TH-228	5363.000	138.000	131.000	7.000	2.6458	99.94000	1.87E+00	3.55E-01	2.18E-01	8.77E-02	3.36E-01
TH229	4900.000	7.000	3.000	4.000	2.0000	99.52000	4.29E-02	9.30E-02	1.76E-01	6.65E-02	9.30E-02
TH-230	4625.000	120.000	117.000	3.000	1.7321	100.0000	1.66E+00	3.25E-01	1.57E-01	5.73E-02	3.09E-01
TH-232	3972.000	100.000	100.000	0.000	0.0000	100.0000	1.42E+00	2.92E-01	4.27E-02	0.00E+00	2.79E-01





GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727019\_TH  
SAMPLE QTY: 0.245 G

DETECTOR NUMBER :68627  
AVERAGE %EFFICIENCY :26.4072  
% YIELD : 56.209

COUNT DATE:29-JUL-2009 17:12:48  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.736E+00

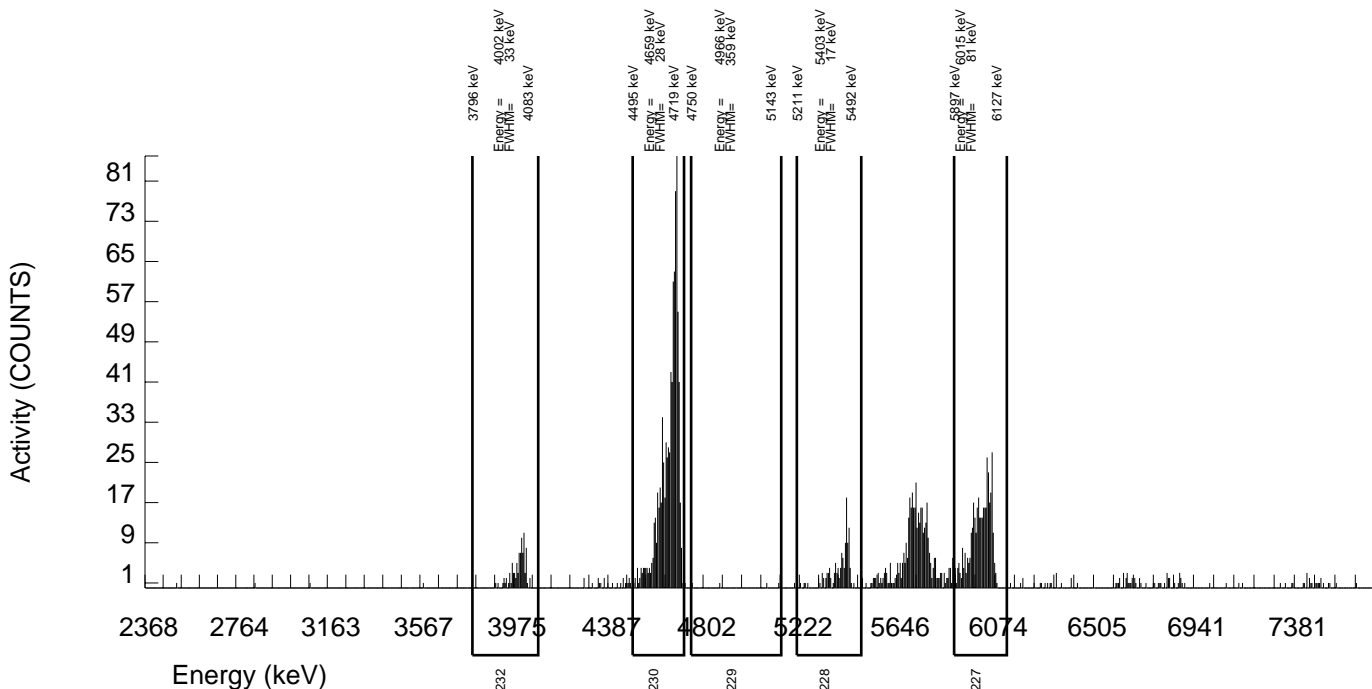
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.736E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 2.20475 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B193.CNF;95  
BKG DATE : 26-JUL-2009  
EFF FILE : W193.CNF;34  
CAL DATE : 22-JUL-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	389.000	380.000	9.000	3.0000	68.10000	7.21E+00	8.70E-01	3.22E-01	1.32E-01	7.42E-01
TH-228	5363.000	119.000	106.000	13.000	3.6056	99.94000	1.32E+00	2.91E-01	2.45E-01	1.04E-01	2.79E-01
TH229	4900.000	4.000	1.000	3.000	1.7321	99.52000	1.24E-02	6.45E-02	1.38E-01	5.02E-02	6.45E-02
TH-230	4625.000	846.000	845.000	1.000	1.0000	100.0000	1.05E+01	9.67E-01	9.48E-02	2.88E-02	7.07E-01
TH-232	3972.000	91.000	91.000	0.000	0.0000	100.0000	1.13E+00	2.42E-01	3.72E-02	0.00E+00	2.32E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S0232727020\_TH  
SAMPLE QTY: 0.200 G

DETECTOR NUMBER :68635  
AVERAGE %EFFICIENCY :25.4957  
% YIELD : 57.606

COUNT DATE:29-JUL-2009 17:12:50  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.070E+01

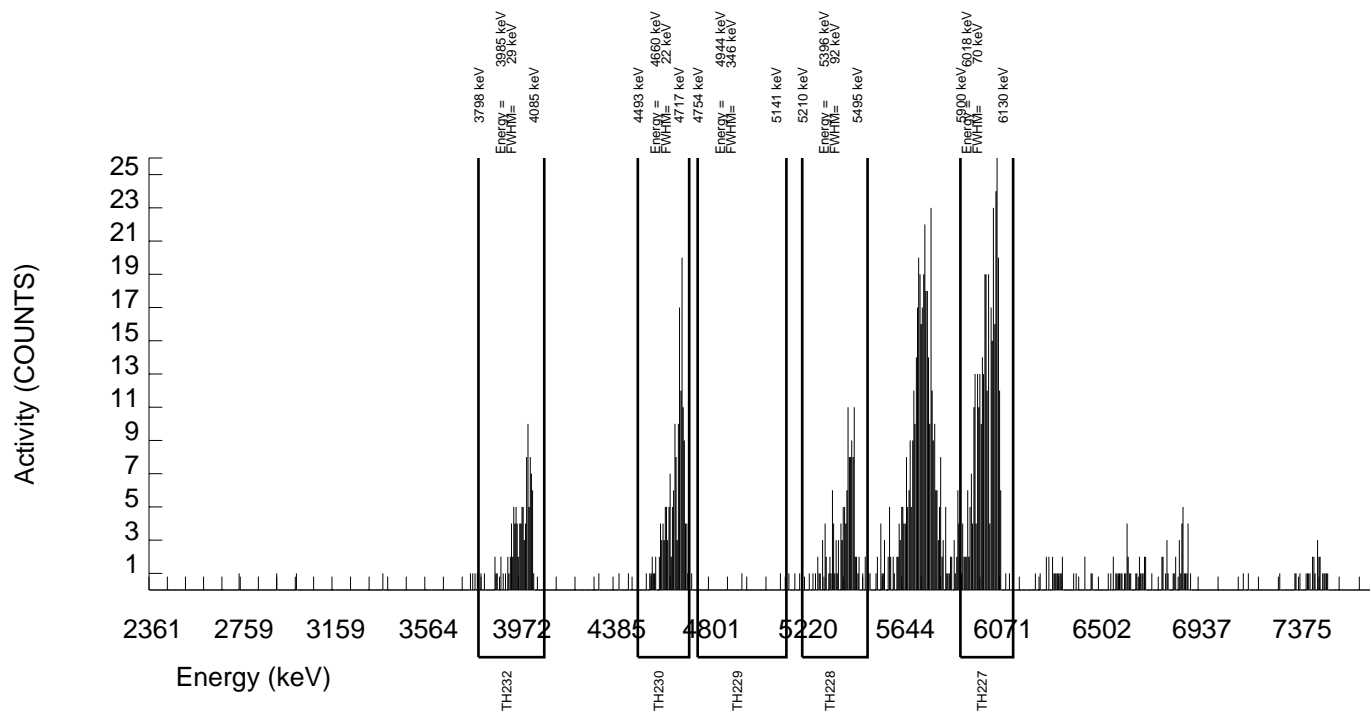
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.070E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 2.25954 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B194.CNF;93  
BKG DATE : 26-JUL-2009  
EFF FILE : W194.CNF;35  
CAL DATE : 22-JUL-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	378.000	376.000	2.000	1.4142	68.10000	8.83E+00	1.05E+00	2.25E-01	7.73E-02	8.98E-01
TH-228	5363.000	130.000	126.000	4.000	2.0000	99.94000	1.94E+00	3.69E-01	1.89E-01	7.15E-02	3.49E-01
TH229	4900.000	3.000	-1.000	4.000	2.0000	99.52000	-1.54E-02	7.99E-02	1.90E-01	7.17E-02	7.99E-02
TH-230	4625.000	172.000	172.000	0.000	0.0000	100.0000	2.64E+00	4.27E-01	4.60E-02	0.00E+00	3.94E-01
TH-232	3972.000	112.000	112.000	0.000	0.0000	100.0000	1.72E+00	3.36E-01	4.60E-02	0.00E+00	3.18E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S1201890003\_TH  
SAMPLE QTY: 0.255 G

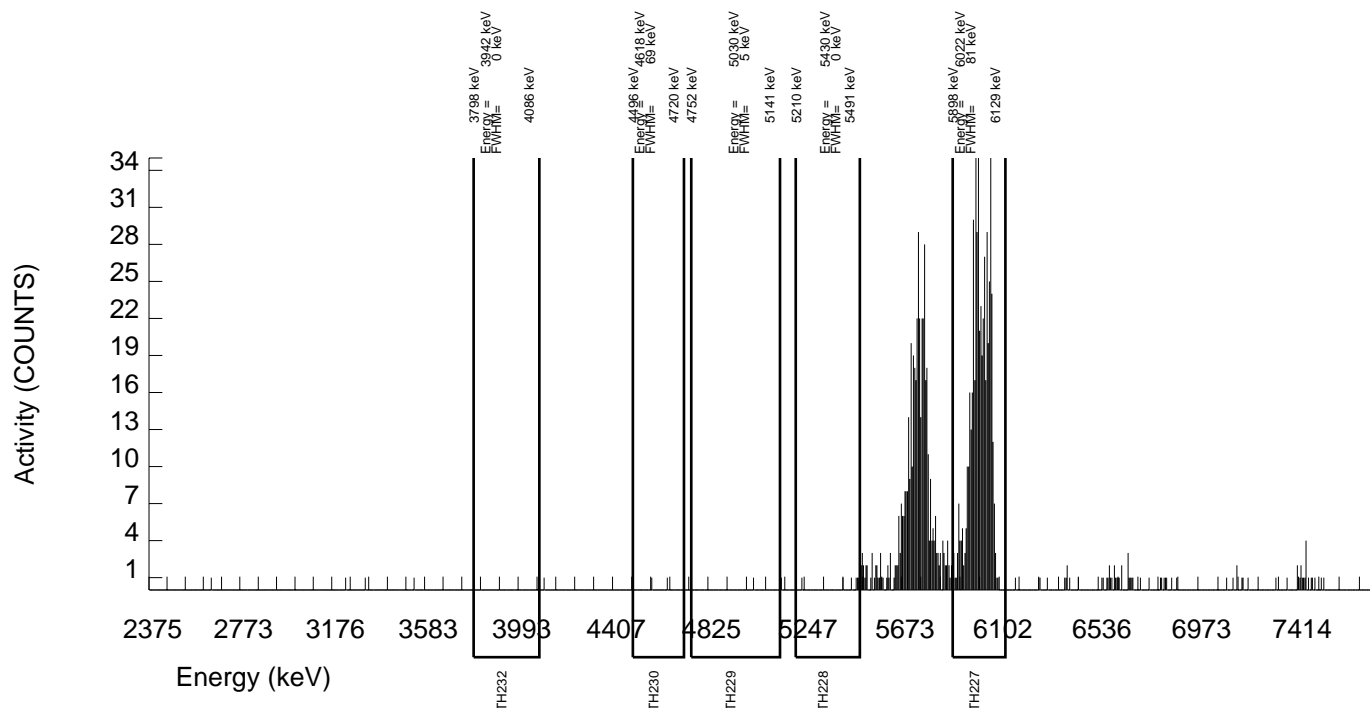
DETECTOR NUMBER :78894  
AVERAGE %EFFICIENCY :25.6823  
% YIELD : 81.979

COUNT DATE:29-JUL-2009 17:12:58  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.393E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.393E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92242 dpm RESULTS : 3.21555 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B197.CNF;39 BKG DATE : 26-JUL-2009 EFF FILE : W197.CNF;34 CAL DATE : 23-JUL-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	539.000	539.000	0.000	0.0000	68.10000	6.93E+00	7.16E-01	3.86E-02	0.00E+00	5.85E-01
TH-228	5363.000	6.000	4.000	2.000	1.4142	99.94000	3.36E-02	4.66E-02	8.05E-02	2.77E-02	4.66E-02
TH229	4900.000	1.000	1.000	0.000	0.0000	99.52000	8.43E-03	1.65E-02	2.53E-02	0.00E+00	1.65E-02
TH-230	4625.000	2.000	1.000	1.000	1.0000	100.0000	8.39E-03	2.85E-02	6.42E-02	1.95E-02	2.85E-02
TH-232	3972.000	0.000	0.000	0.000	0.0000	100.0000	0.00E+00	1.65E-02	2.52E-02	0.00E+00	1.64E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S1201890004\_TH  
SAMPLE QTY: 0.211 G

DETECTOR NUMBER :78895  
AVERAGE %EFFICIENCY :25.5422  
% YIELD : 71.265

COUNT DATE:29-JUL-2009 17:13:01  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.014E+01

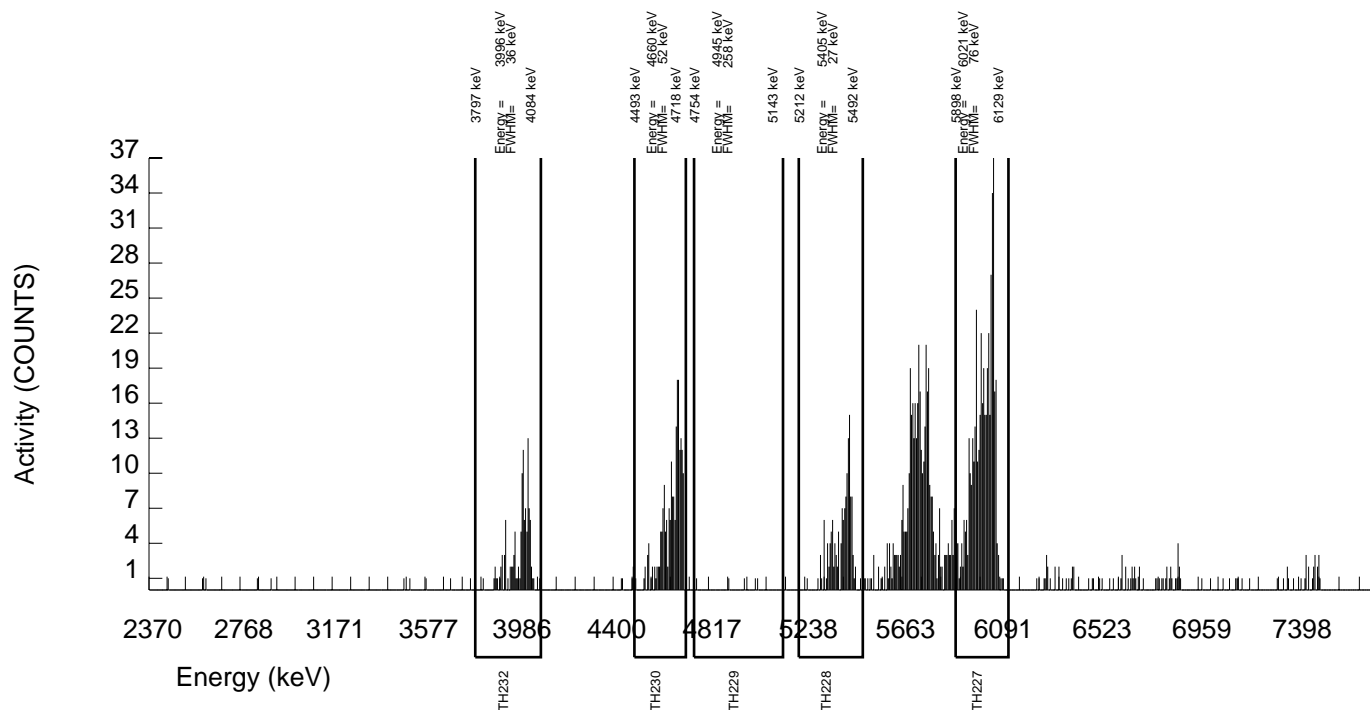
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.014E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 2.79530 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B198.CNF;39  
BKG DATE : 26-JUL-2009  
EFF FILE : W198.CNF;32  
CAL DATE : 23-JUL-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	8.37E+00	9.21E-01	1.38E-01	4.18E-02	7.62E-01
TH-228	5363.000	143.000	142.000	1.000	1.0000	99.94000	1.67E+00	2.95E-01	8.99E-02	2.73E-02	2.76E-01
TH229	4900.000	5.000	2.000	3.000	1.7321	99.52000	2.36E-02	6.53E-02	1.30E-01	4.75E-02	6.53E-02
TH-230	4625.000	207.000	206.000	1.000	1.0000	100.0000	2.42E+00	3.64E-01	8.98E-02	2.73E-02	3.32E-01
TH-232	3972.000	117.000	116.000	1.000	1.0000	100.0000	1.36E+00	2.64E-01	8.98E-02	2.73E-02	2.50E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S1201890005\_TH  
SAMPLE QTY: 0.203 G

DETECTOR NUMBER :78896  
AVERAGE %EFFICIENCY :25.1297  
% YIELD : 79.118

COUNT DATE:29-JUL-2009 17:13:04  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.054E+01

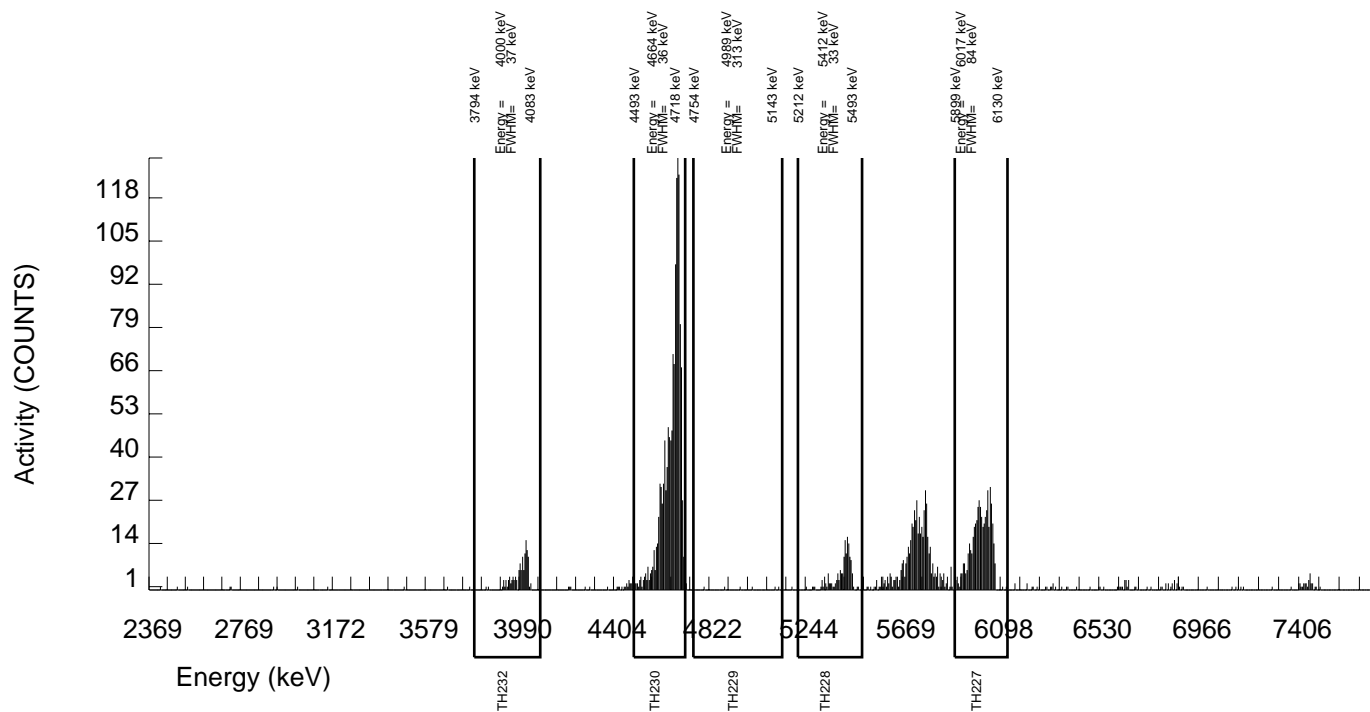
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 1.054E+01

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 3.10335 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B199.CNF;39  
BKG DATE : 26-JUL-2009  
EFF FILE : W199.CNF;32  
CAL DATE : 23-JUL-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	509.000	509.000	0.000	0.0000	68.10000	8.70E+00	9.31E-01	5.13E-02	0.00E+00	7.56E-01
TH-228	5363.000	147.000	146.000	1.000	1.0000	99.94000	1.63E+00	2.85E-01	8.56E-02	2.60E-02	2.67E-01
TH229	4900.000	6.000	4.000	2.000	1.4142	99.52000	4.49E-02	6.22E-02	1.07E-01	3.69E-02	6.22E-02
TH-230	4625.000	1347.000	1347.000	0.000	0.0000	100.0000	1.50E+01	1.24E+00	3.35E-02	0.00E+00	8.03E-01
TH-232	3972.000	124.000	122.000	2.000	1.4142	100.0000	1.36E+00	2.60E-01	1.07E-01	3.67E-02	2.46E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 888783  
SAMPLE DATE : 28-JUL-2009 22:00:00

SAMPLE ID : S1201890006\_TH  
SAMPLE QTY: 0.255 G

DETECTOR NUMBER :78900  
AVERAGE %EFFICIENCY :26.7253  
% YIELD : 82.434

COUNT DATE:29-JUL-2009 17:13:06  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.393E+00

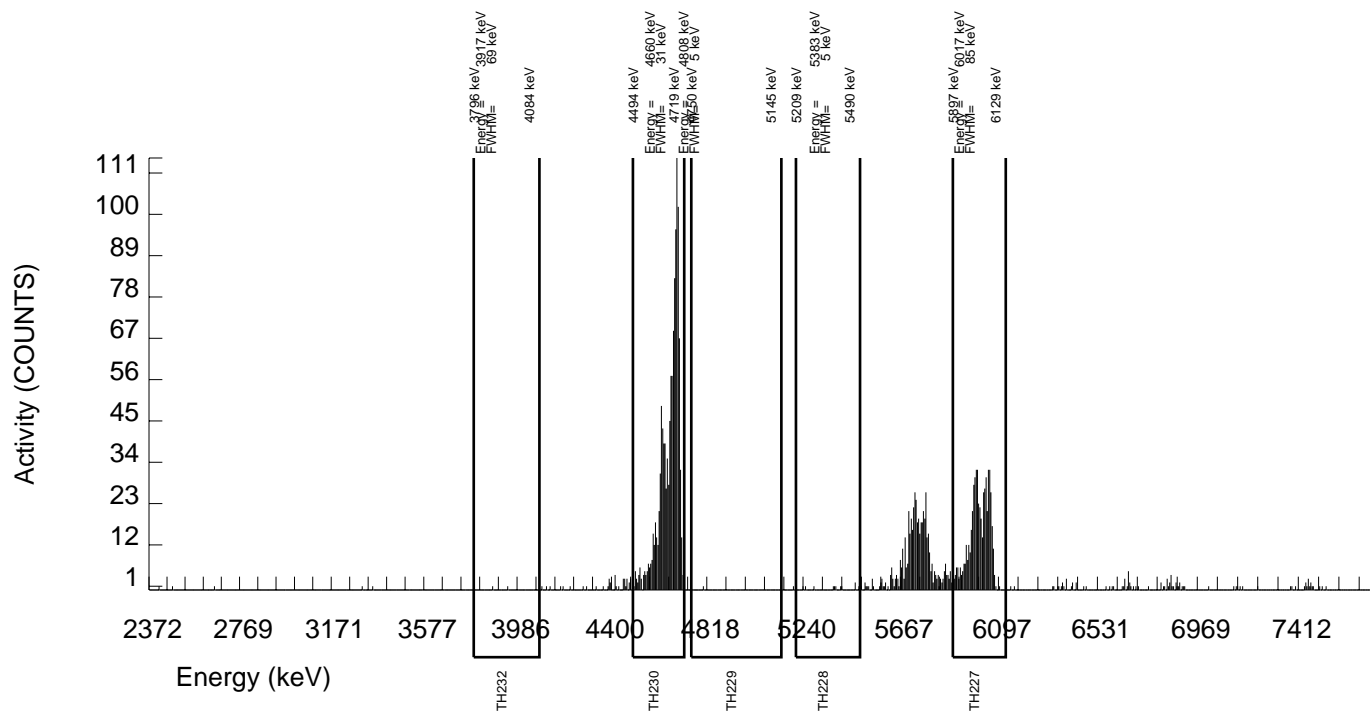
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/G : 8.393E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.92242 dpm  
RESULTS : 3.23339 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B200.CNF;39  
BKG DATE : 26-JUL-2009  
EFF FILE : W200.CNF;32  
CAL DATE : 23-JUL-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	566.000	564.000	2.000	1.4142	68.10000	6.93E+00	7.07E-01	1.18E-01	4.04E-02	5.74E-01
TH-228	5363.000	11.000	-2.000	13.000	3.6056	99.94000	-1.61E-02	7.71E-02	1.59E-01	6.74E-02	7.71E-02
TH229	4900.000	1.000	-5.000	6.000	2.4495	99.52000	-4.03E-02	4.18E-02	1.16E-01	4.59E-02	4.18E-02
TH-230	4625.000	1194.000	1192.000	2.000	1.4142	100.0000	9.56E+00	7.87E-01	7.68E-02	2.64E-02	5.44E-01
TH-232	3972.000	2.000	-2.000	4.000	2.0000	100.0000	-1.60E-02	3.85E-02	9.87E-02	3.73E-02	3.85E-02



# 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? secondary 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 #	Seperation date	Count date	Ac-228 decay (dec)	Spike Vol. Ra-228 (mL)	Seperation time		raw beta counts	ct. time (min)	Beta cpm	corrected* cpm	Ra-228 eff (cpm/dpm)	
						Decay Corrected	Volume corrected						
						Std. Act. Ra-228 dpm/mL	Standard Nominal						
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	Average EFF
1A	4	7/1/09 10:45	7/1/2009 13:41	0.7170	1.5	6363.2	9544.8	12410	3	4136.7	5769.693602	0.6045	0.6303
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	Average EFF
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	0.6282
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	5868.722998	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	0.6176
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	0.6043
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	0.6172
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	0.6167
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	5746.92868	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	0.5969
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	0.6119
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	0.5682
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	0.5980
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	0.6164
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	0.5994
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	0.6208
4B	1	7/1/09 10:45	7/1/2009 14:48	0.6329	1.5	6363.2	9544.8	15335	4	3833.8	6057.768128	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	5868.58525	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	0.6205
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	5790.010842	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	0.6052
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	5866.467573	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	0.5873
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	0.6258
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	0.6280
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	3680.5	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	0.5466	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	0.5466	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	6133.782218	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	6145.874775	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	6198.168046	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										

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	6274.376359	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	6104.026984	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	14566	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	5968.757323	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



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	MDA	Sample Act. Conc.		Sample Error	Net Count Rate	Net Count Rate	Net Count Rate	2 SIGMA Counting		Total Prop. Uncertainty	Sample Type	Nominal pCi/L	Recovery
				pCi/L	Conc.					CPM	CPM				
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	130.2580	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	122.0833	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	1.1943	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	0.9887	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	0.0269	124.2633	2.8910	6.7471	24.0105	LCS	164.3409	82.1%			
0.4809	0.3395	1	0.9027	134.9611	0.0268	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	2.9884	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	6.3803	21.8573	LCS	164.3409	88.0%			
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	6.4094	22.3723	LCS	164.3409	92.4%			
0.3962	0.2797	1	0.7956	151.8935	0.0262	128.6313	2.9319	6.6518	23.4785	LCS	164.3409	88.0%			
0.4480	0.3091	1	0.8657	152.1131	0.0261	130.4707	2.9539	6.7499	24.6318	LCS	164.3409	92.6%			
0.8917	0.6931	1	1.1278	127.8251	0.0279	109.4120	2.7108	6.2072	20.8618	LCS	164.3409	77.8%			
0.5779	0.4080	1	1.0463	146.5864	0.0263	127.3240	2.9214	6.5922	23.7610	LCS	164.3409	82.2%			
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	79.4%			
0.7972	0.5629	1	1.3635	133.7974	0.0277	112.5273	2.7540	6.4182	21.9026	LCS	164.3409	81.4%			
0.4475	0.3159	1	0.8728	144.2924	0.0269	119.7633	2.8301	6.6832	23.4437	LCS	164.3409	87.8%			
0.8154	0.5757	1	1.3863	150.8313	0.0263	128.3747	2.9406	6.7718	24.4459	LCS	164.3409	91.8%			
0.4063	0.2868	1	0.8104	134.4151	0.0285	118.5507	2.7553	6.3927	21.8871	LCS	164.3409	81.8%			
0.4205	0.2969	1	0.8358	146.9063	0.0268	121.4093	2.8489	6.7565	23.8548	LCS	164.3409	82.2%			
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	3.0730	5.7736	21.8705	LCS	164.3409	82.4%			
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	134.8566	0.0246	153.3873	3.3053	5.6282	23.8982	LCS	164.3409	90.6%			
0.4447	0.3140	1	0.8052	148.8317	0.0238	162.8880	3.3080	5.7315	23.1384	LCS	164.3409	87.8%			
0.6180	0.4363	1	1.0494	143.9479	0.0241	162.8880	3.3080	5.7315	23.1384	LCS	164.3409	82.2%			
0.3427	0.2420	1	0.6680	135.0873	0.0248	148.3533	3.1490	5.6202	21.7752	LCS	164.3409	78.9%			
0.5997	0.4234	1	1.0256	129.5009	0.0251	144.7940	3.1202	5.4687	20.8960	LCS	164.3409	88.8%			
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	22.7970	LCS	164.3409	82.5%			
1.4618	1.0321	1	2.2506	135.6135	0.0254	154.5427	3.2193	5.7718	21.9090	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

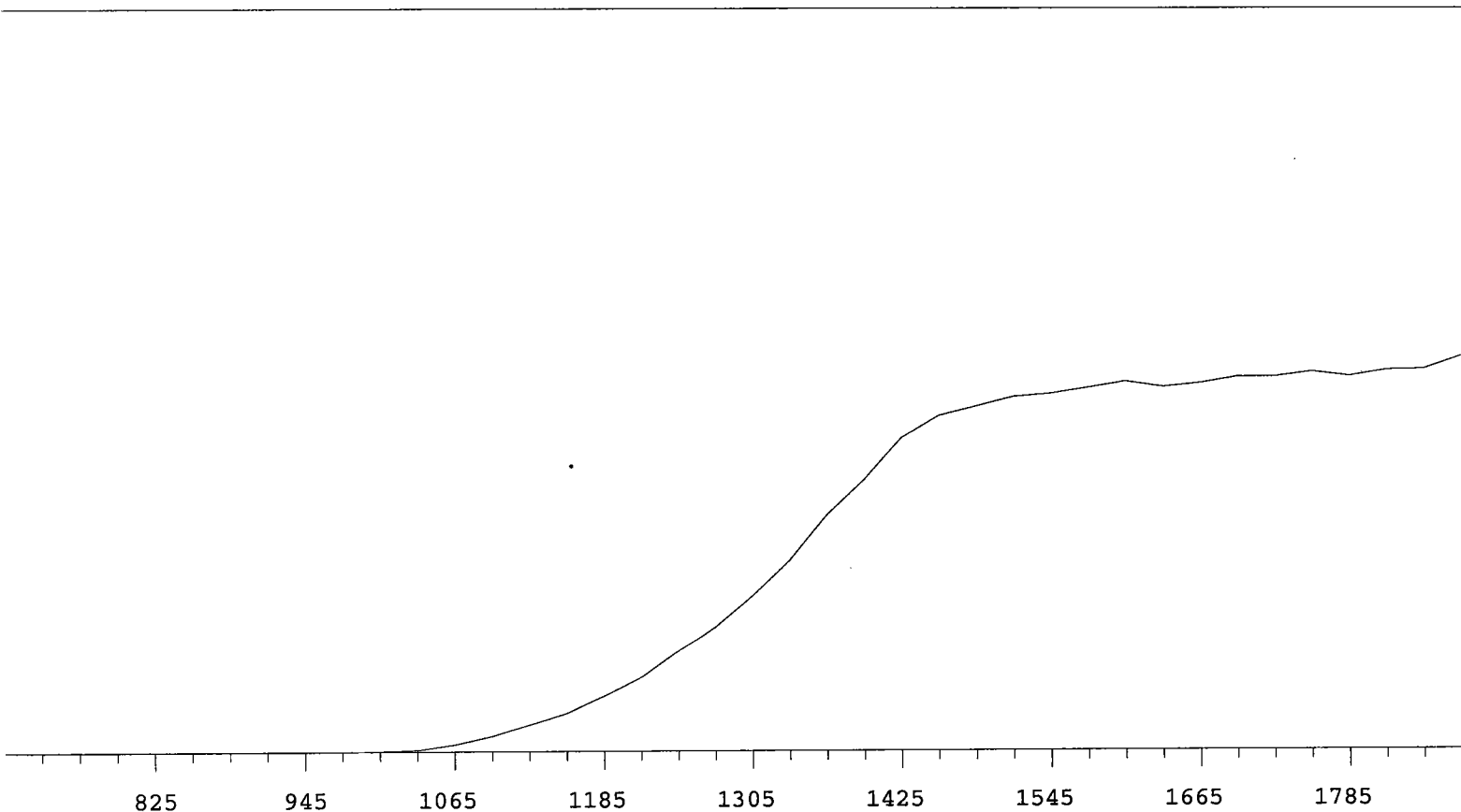
219  
7/2/09

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				

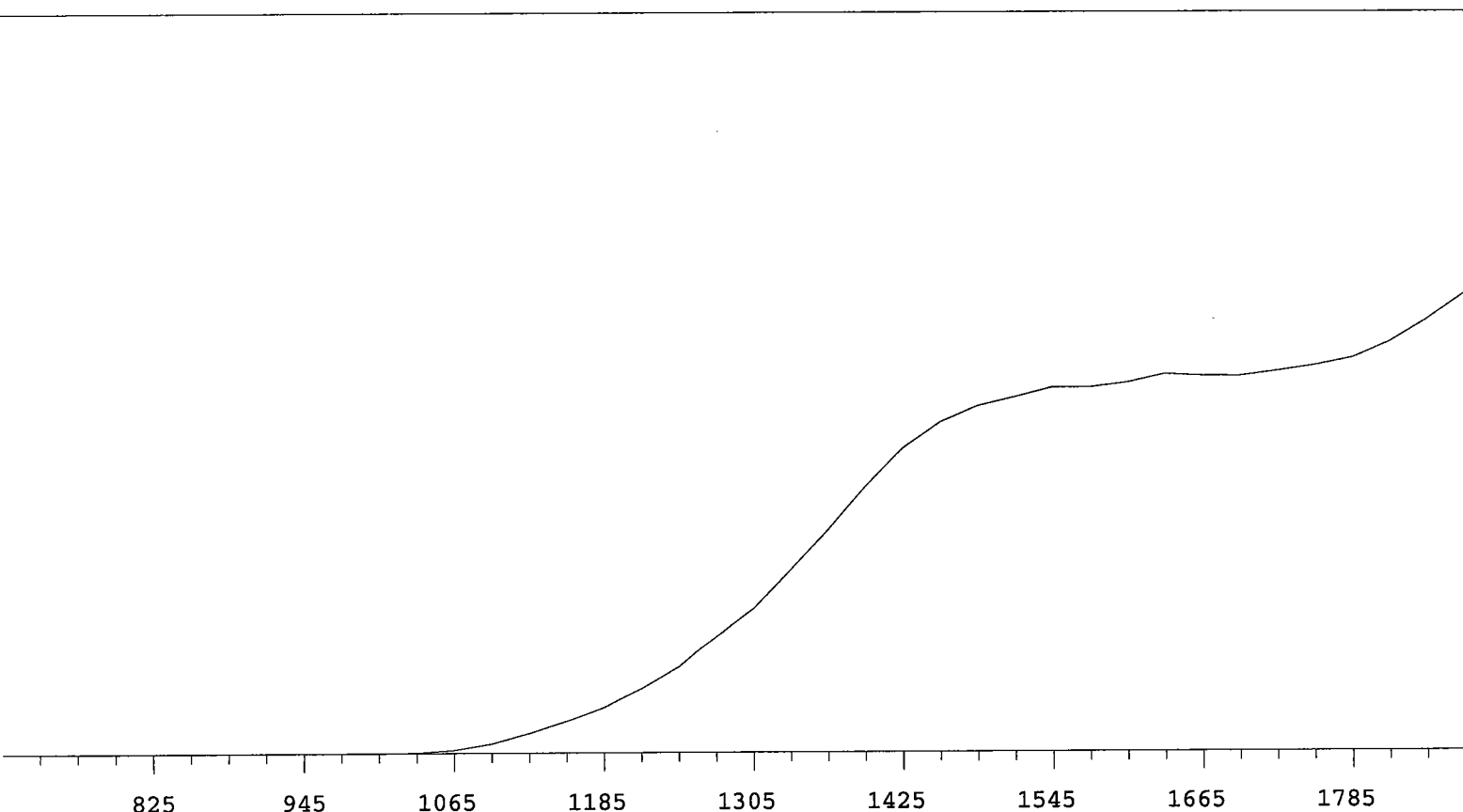
<b>13B</b>	6.52643E-01
<b>13C</b>	6.53798E-01
<b>13D</b>	6.37701E-01
<b>14A</b>	6.39290E-01
<b>14B</b>	6.26611E-01
<b>14C</b>	6.37531E-01
<b>14D</b>	6.32609E-01



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	

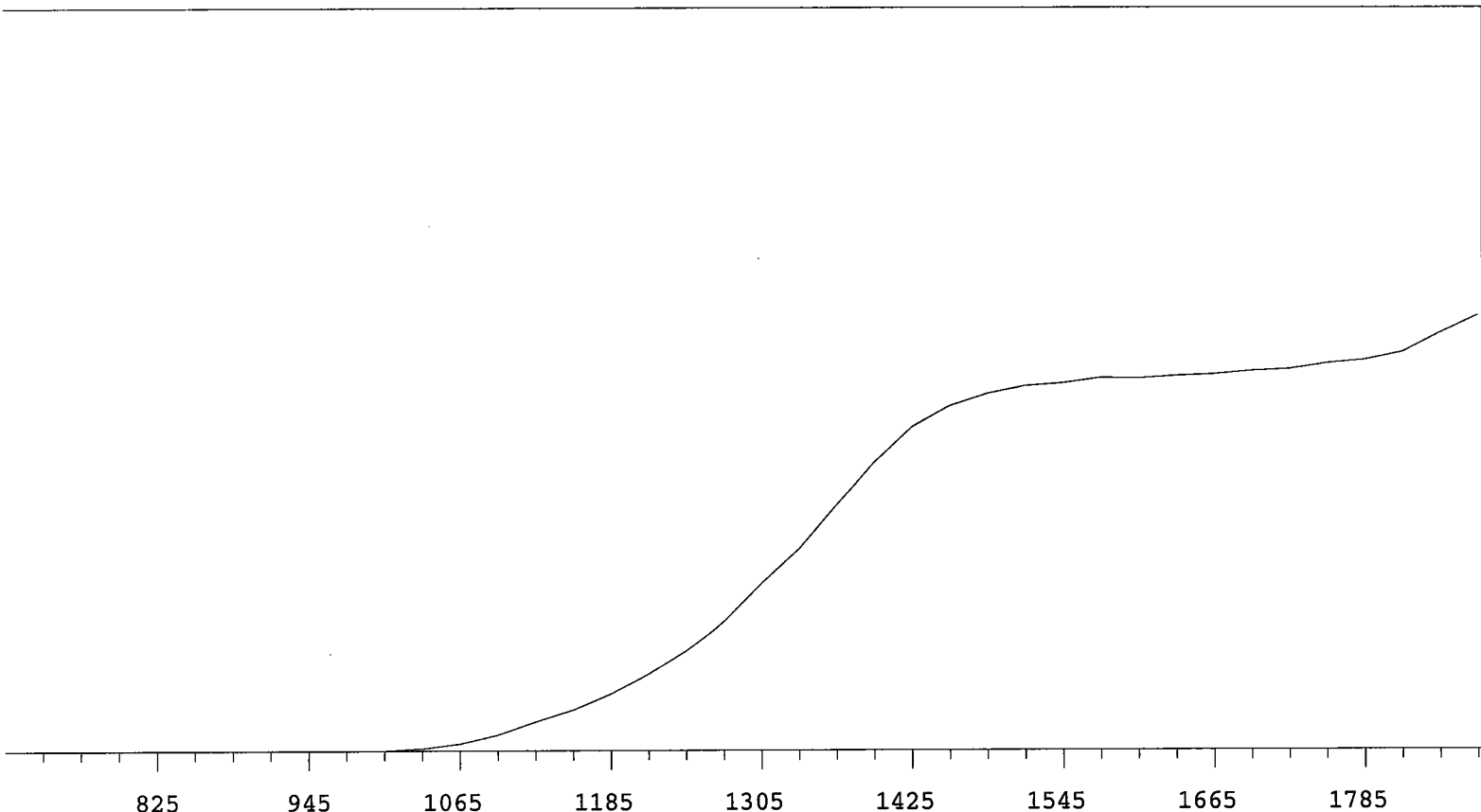


Alpha Volts: 1575 Beta Volts: 1575

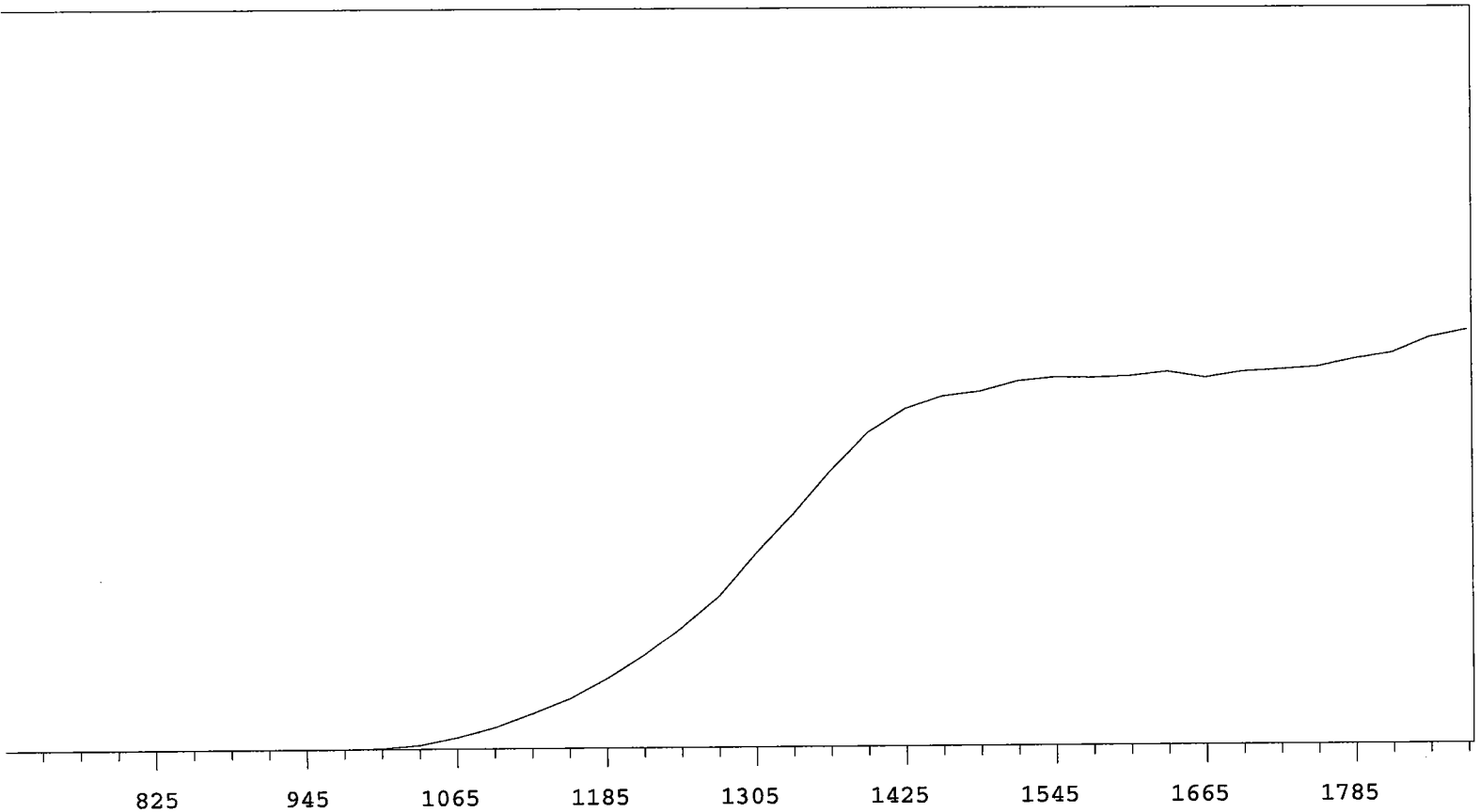


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	13188	+75.92
735	0		1335	16818	+67.60
765	0	+55.56	1365	20420	+59.86
795	1	+83.33	1395	24341	+47.85
825	1	+55.56	1425	27854	+35.51
855	0	>100	1455	30288	+23.26
885	1	+0.00	1485	31798	+14.54
915	0	+0.00	1515	32622	+8.32
945	1	>100	1545	33496	+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	

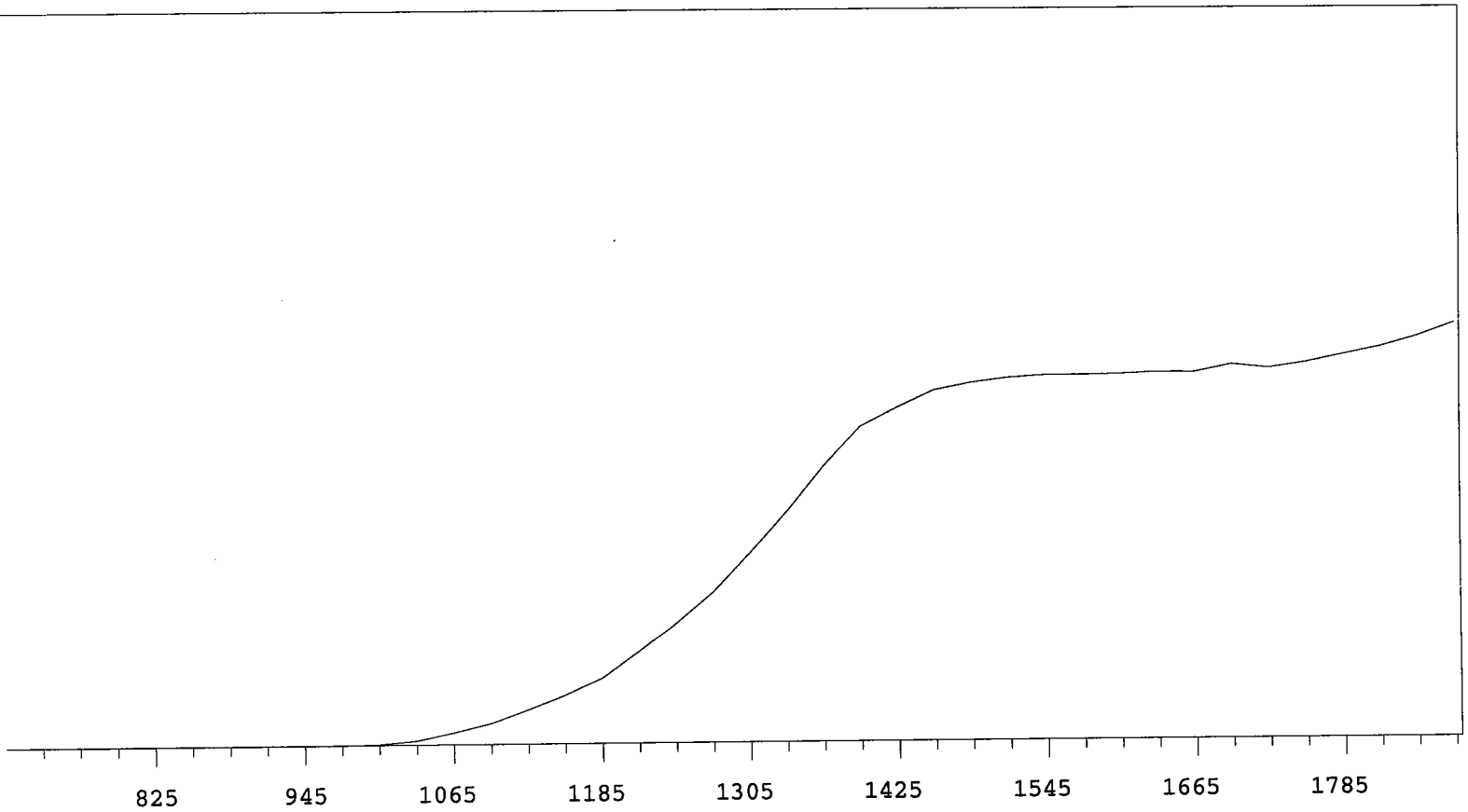


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15202	+66.36
735	1		1335	18216	+57.86
765	0	+0.00	1365	21597	+45.58
795	1	+0.00	1395	24648	+32.96
825	0	+0.00	1425	26505	+19.92
855	1	>100	1455	27475	+11.42
885	0	>100	1485	27836	+7.08
915	0	>100	1515	28609	+4.51
945	0	>100	1545	28896	+2.93
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	

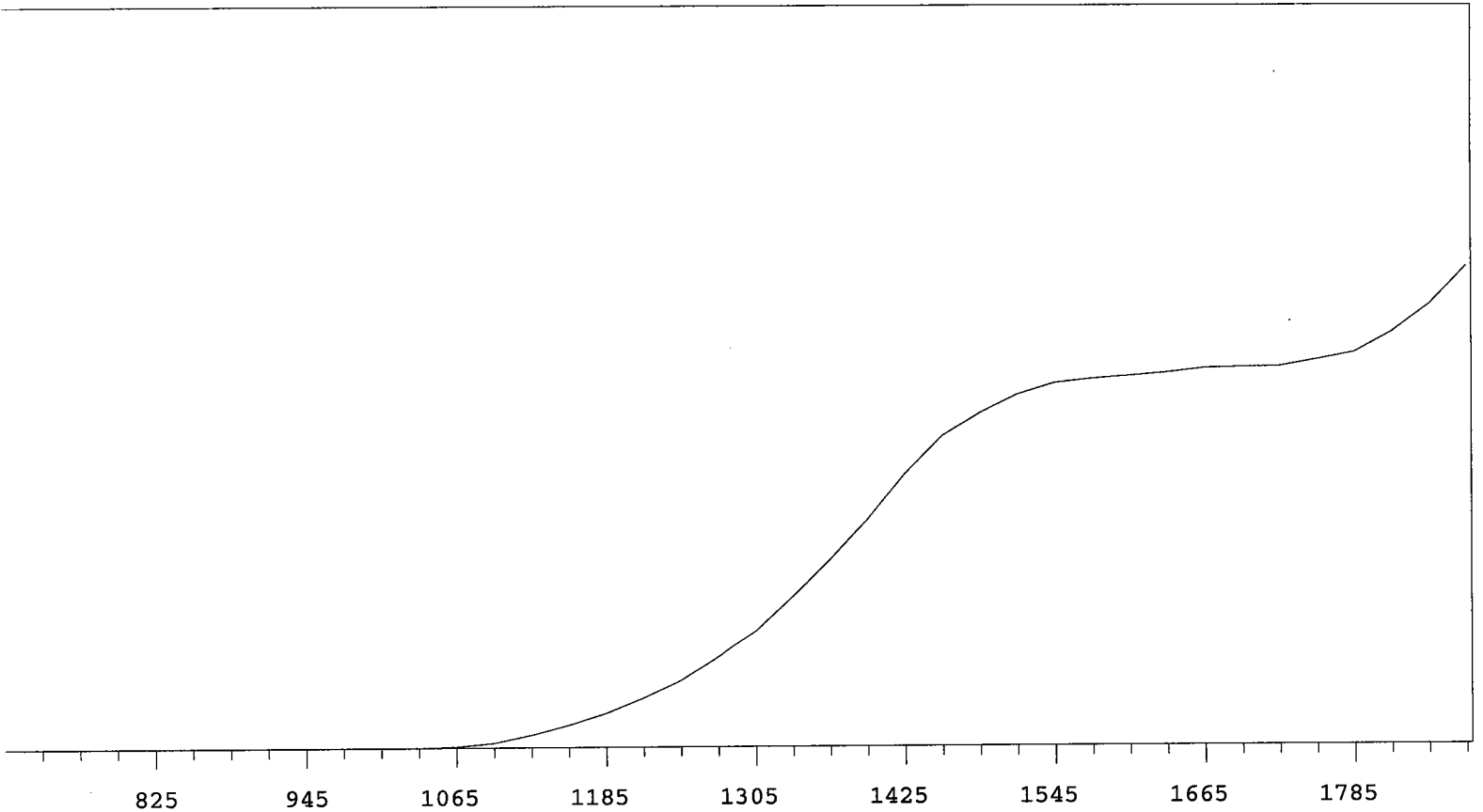
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 2 MPC 9604 Detector A  
Beta Volts: 1575

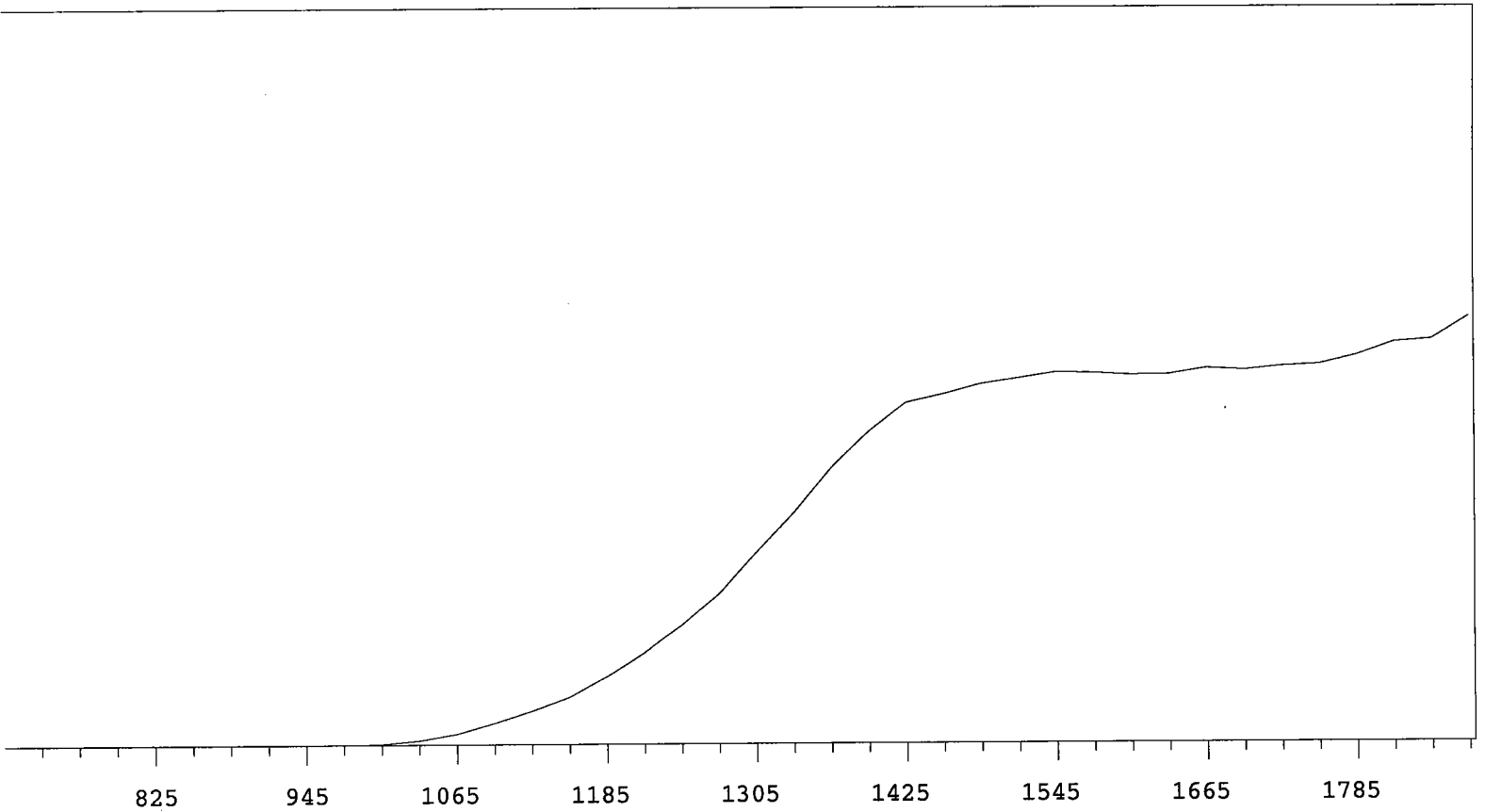
7/1/2009



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	

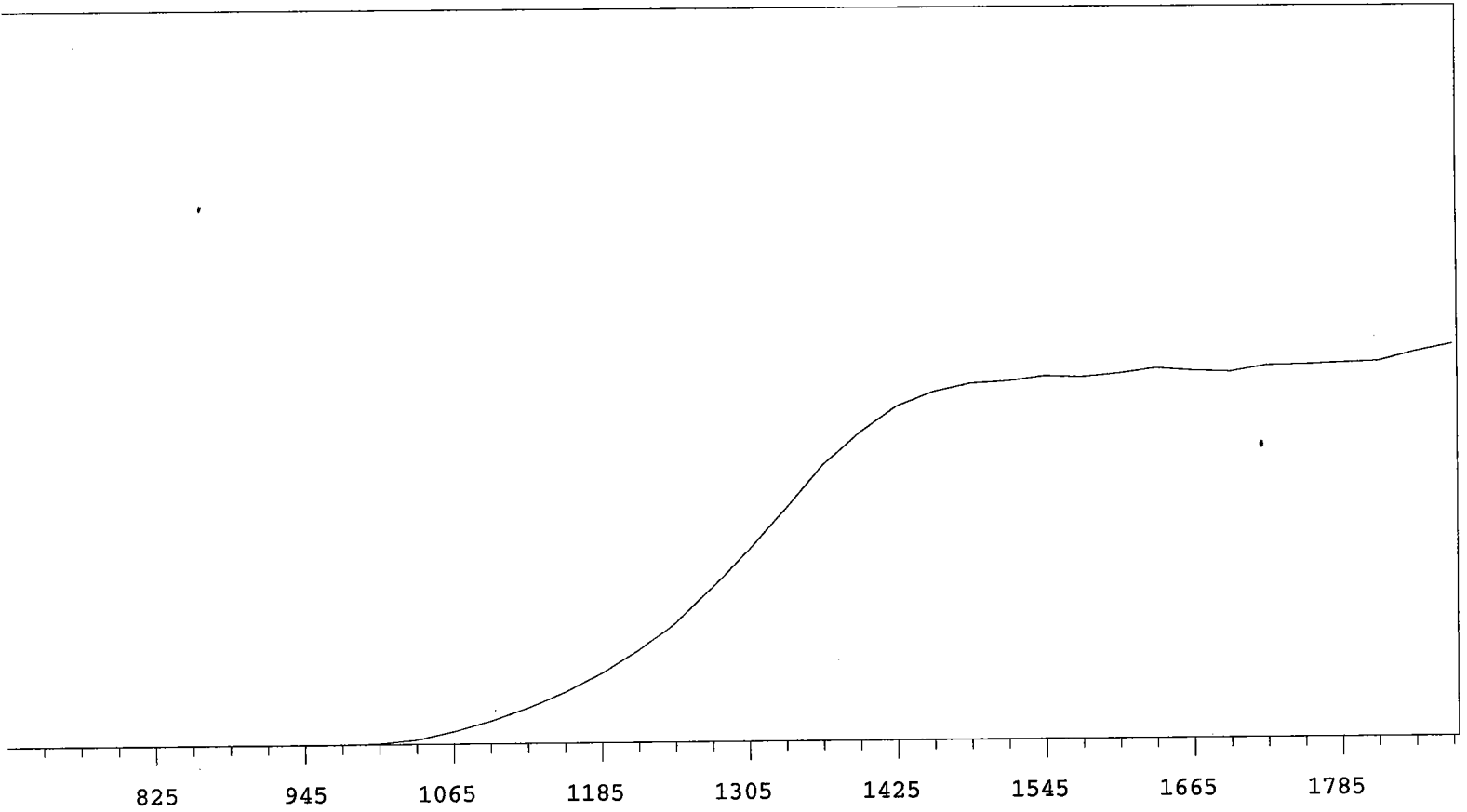


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18216	+67.74
735	0		1335	21995	+58.11
765	0		1365	26173	+46.11
795	0	>100	1395	29479	+32.75
825	0	>100	1425	32186	+20.62
855	0	>100	1455	33022	+12.13
885	0	>100	1485	33981	+7.22
915	1	>100	1515	34520	+4.95
945	0	>100	1545	35095	+2.07
975	17	>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	

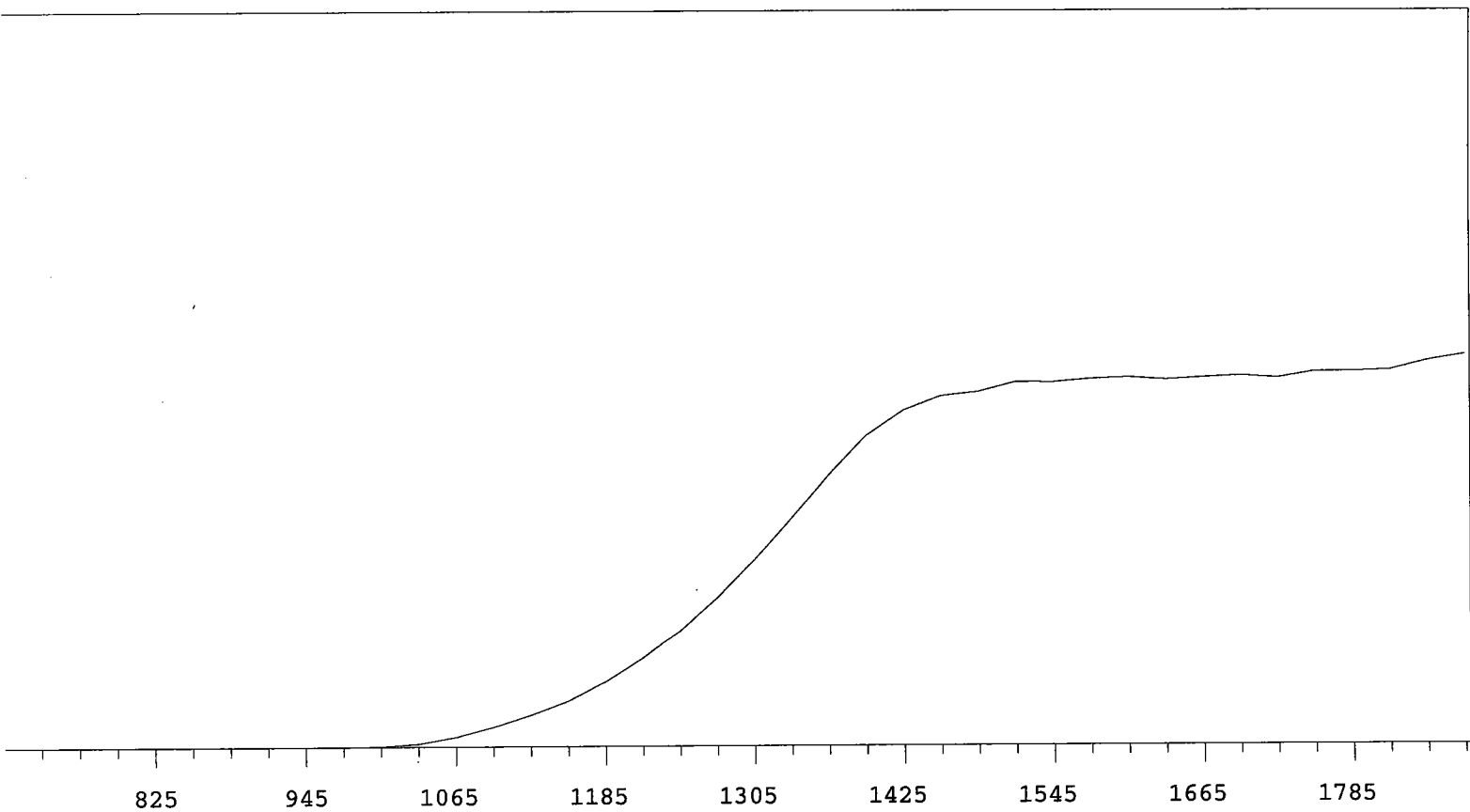
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 2 MPC 9604 Detector D  
Beta Volts: 1575

7/1/2009

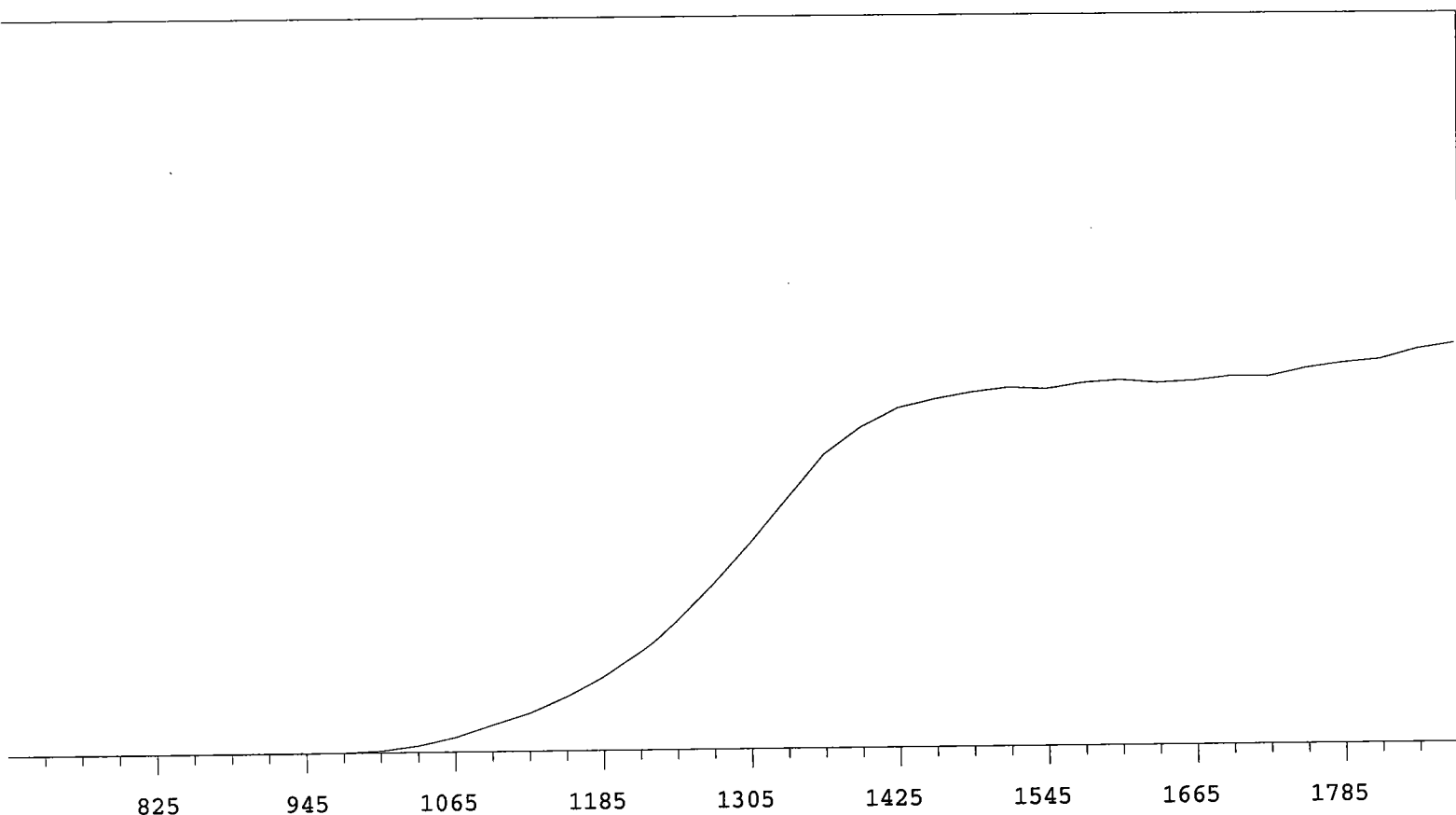


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18675	+65.94
735	0		1335	22620	+55.69
765	0	+83.33	1365	26869	+44.63
795	2	+55.56	1395	29957	+32.08
825	1	>100	1425	32494	+20.49
855	0	>100	1455	33836	+11.98
885	0	>100	1485	34627	+6.45
915	0	>100	1515	34849	+3.22
945	2	>100	1545	35298	+1.98
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	

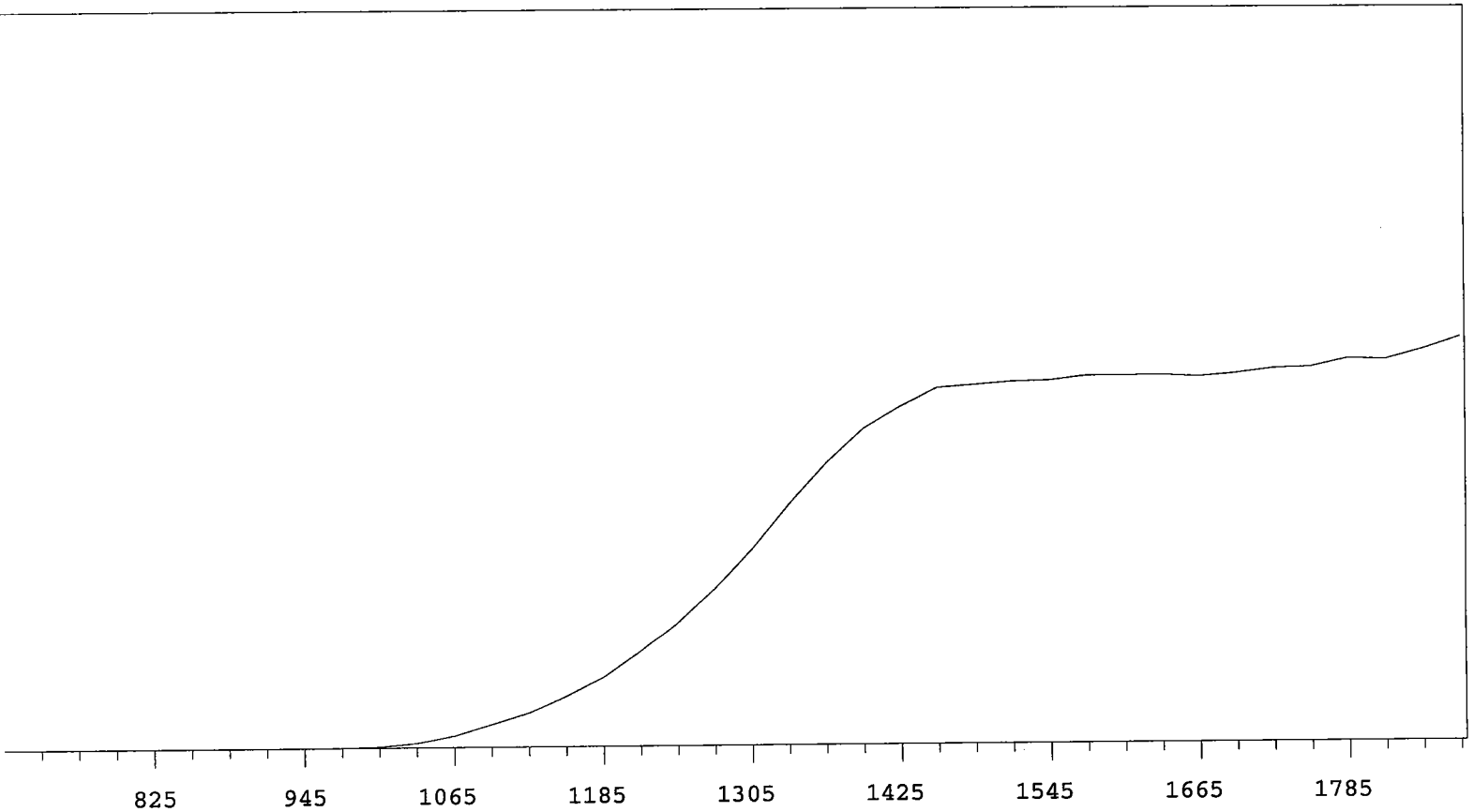


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	16654	+68.57
735	0		1335	20416	+59.26
765	0	+55.56	1365	24191	+47.28
795	1	>100	1395	27643	+34.04
825	1	+0.00	1425	29891	+21.08
855	1	>100	1455	31183	+12.30
885	0	>100	1485	31558	+6.67
915	0	>100	1515	32444	+4.05
945	0	>100	1545	32413	+2.90
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	

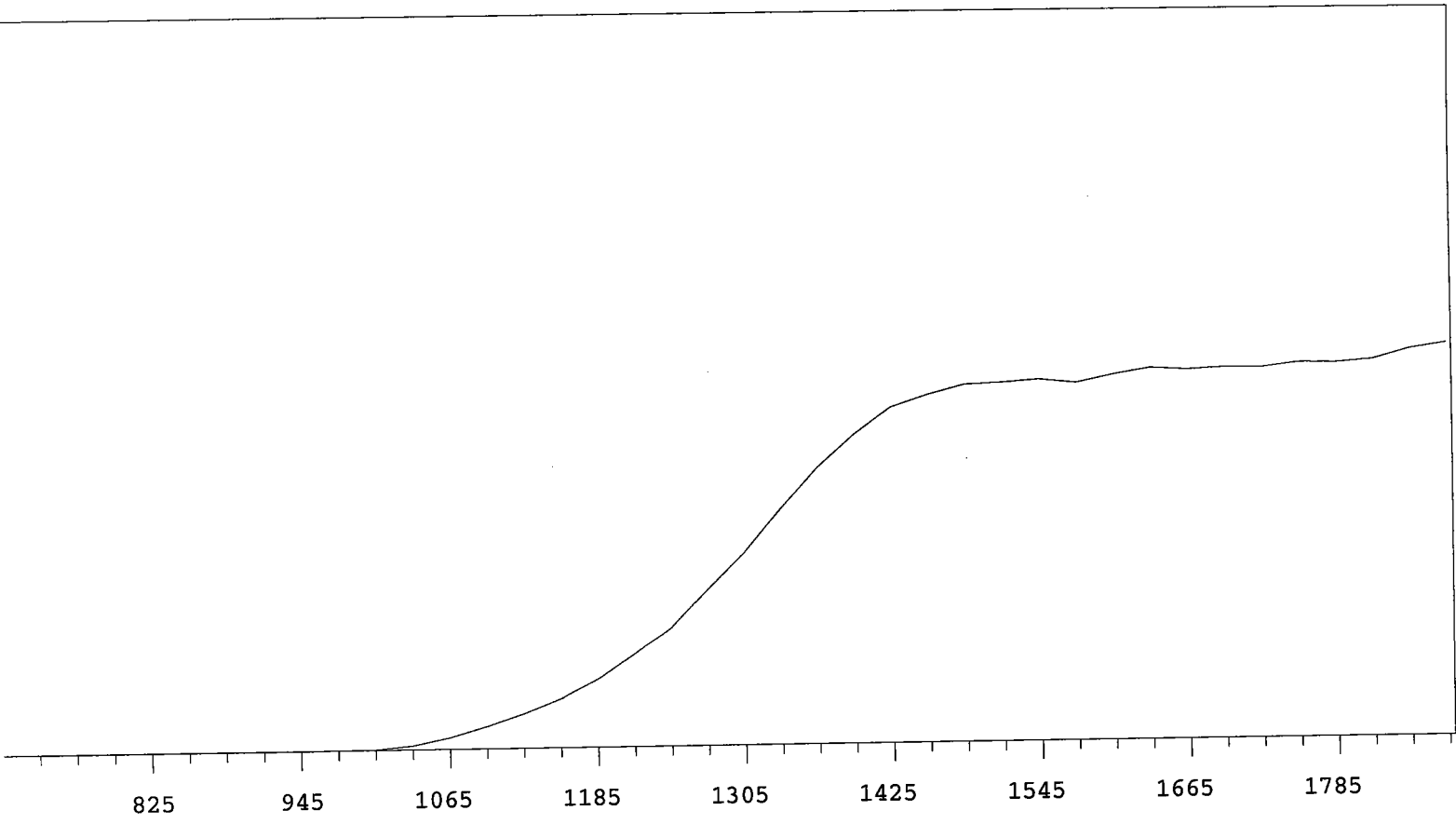




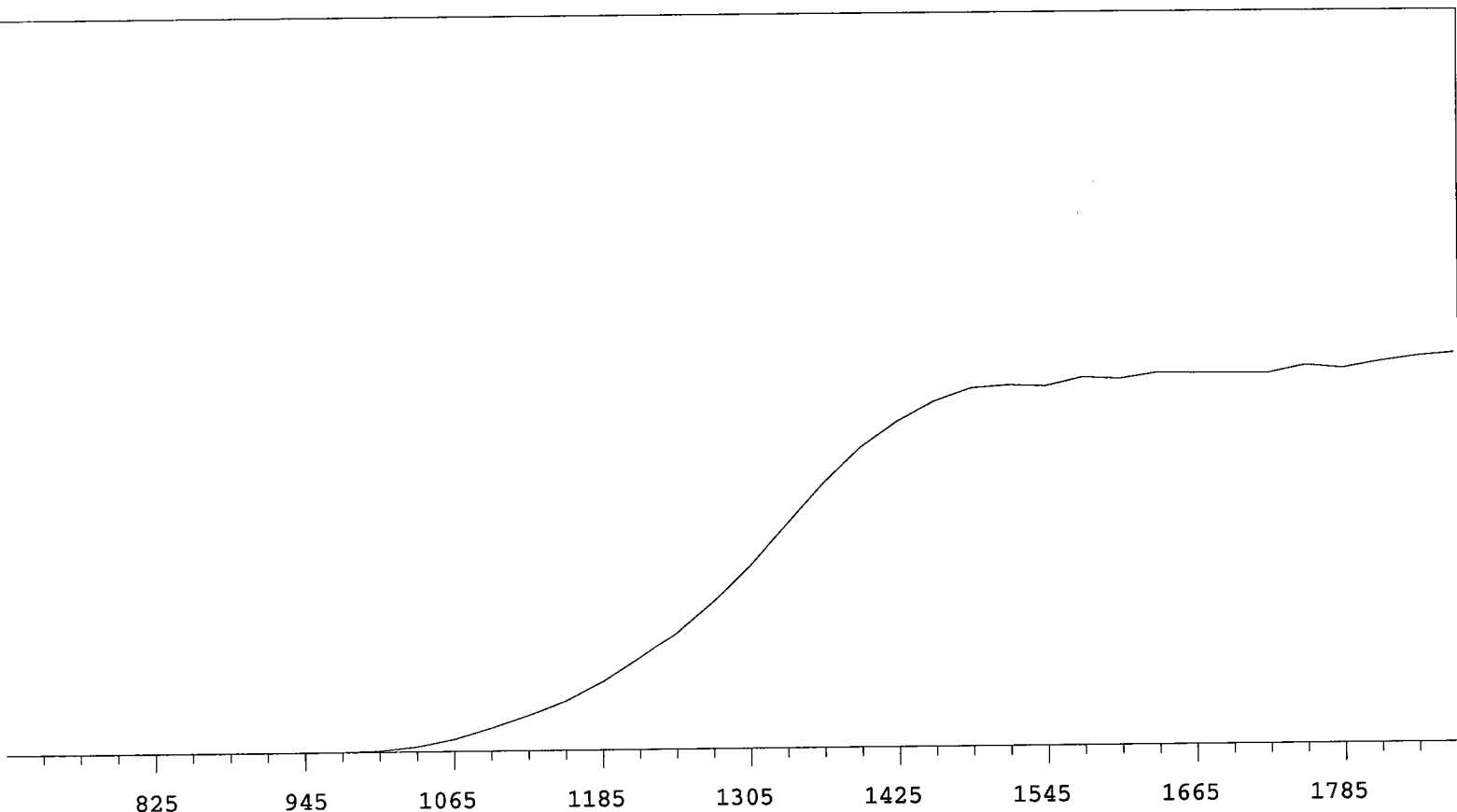
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	19810	+64.73
735	1		1335	23962	+52.62
765	0	-55.56	1365	28091	+39.27
795	0	>100	1395	30594	+25.61
825	1	>100	1425	32381	+14.86
855	3	+33.33	1455	33206	+8.91
885	0	+0.00	1485	33832	+4.41
915	1	>100	1515	34260	+3.01
945	2	>100	1545	34071	+2.33
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	



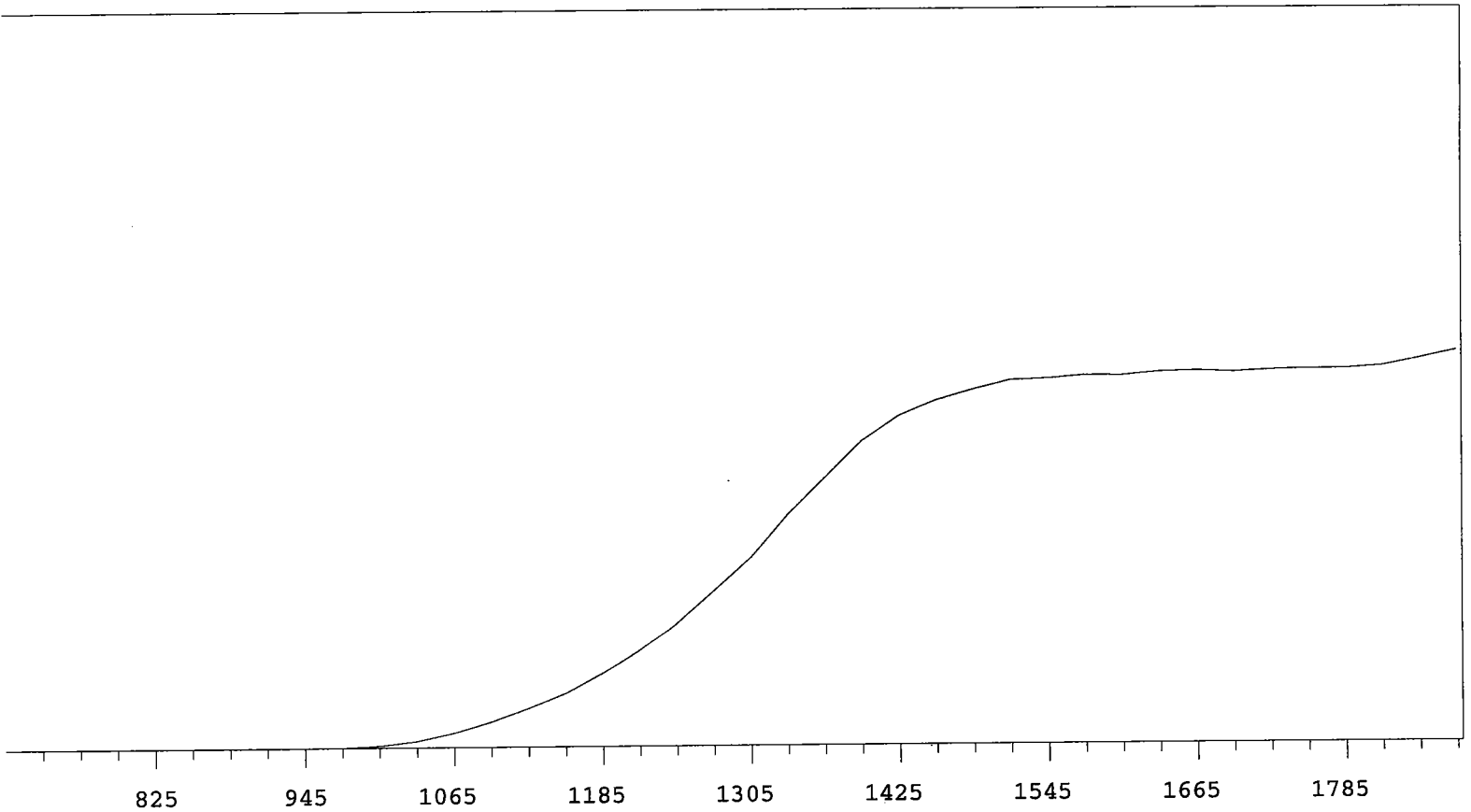
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14171	+66.45
735	1		1335	17362	+54.90
765	0	+0.00	1365	20310	+43.83
795	1	>100	1395	22647	+30.82
825	0	+83.33	1425	24551	+20.19
855	0	-83.33	1455	25440	+11.69
885	1	>100	1485	26124	+5.90
915	0	>100	1515	26245	+2.21
945	1	>100	1545	26428	+1.39
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	



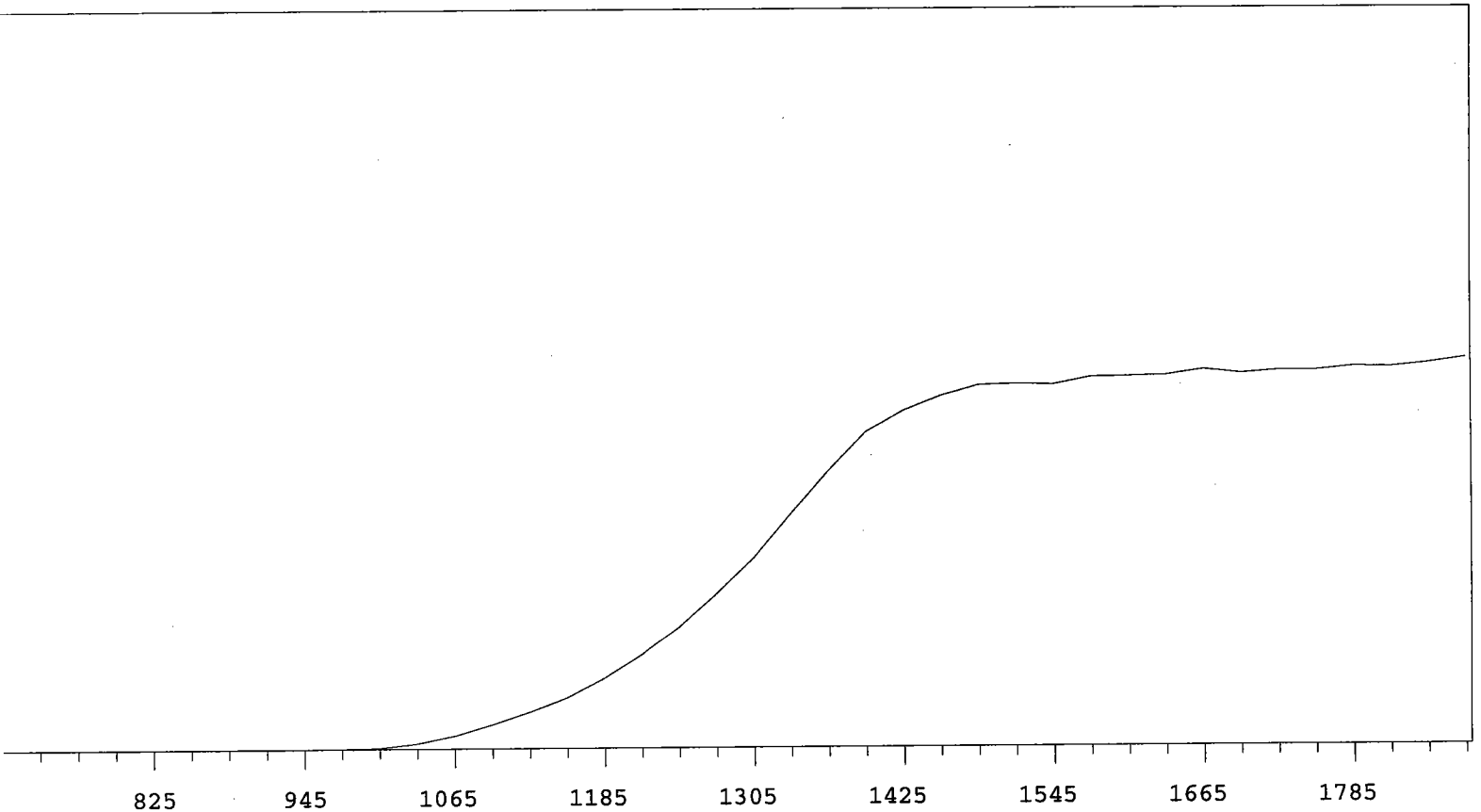
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16442	+66.24
735	0		1335	20146	+57.40
765	0		1365	23769	+46.40
795	0	>100	1395	26926	+34.68
825	2	+55.56	1425	29276	+24.40
855	1	>100	1455	31037	+15.28
885	0	-55.56	1485	32197	+7.91
915	3	>100	1515	32425	+4.33
945	0	>100	1545	32314	+2.14
975	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 7/1/2009  
Beta Volts: 1575



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	

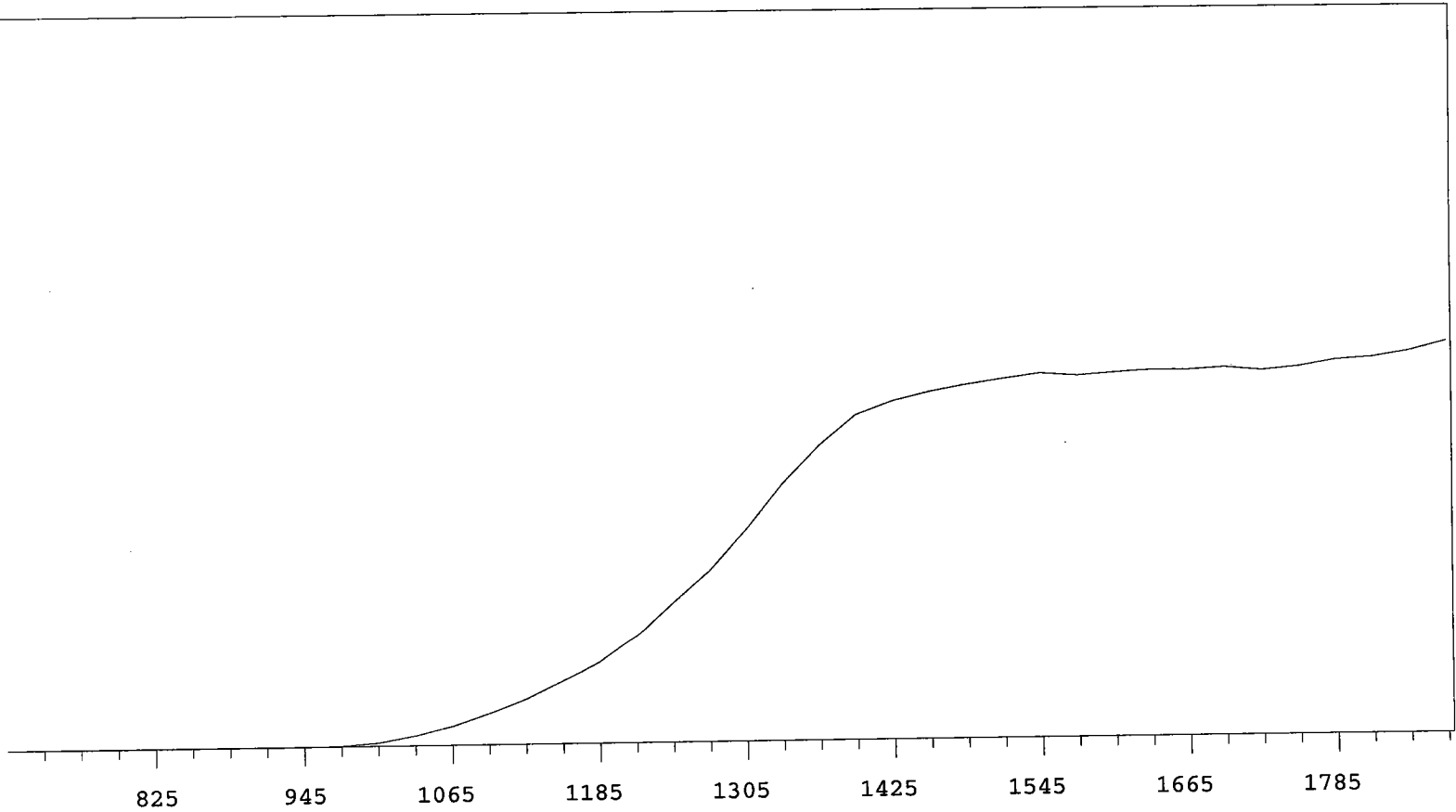


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19796	+65.77
735	1		1335	24338	+57.55
765	0	+55.56	1365	28686	+45.86
795	2	+0.00	1395	32750	+32.27
825	0	-55.56	1425	34919	+20.83
855	1	>100	1455	36434	+11.45
885	0	>100	1485	37487	+5.80
915	0	>100	1515	37623	+3.32
945	2	>100	1545	37528	+2.07
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	

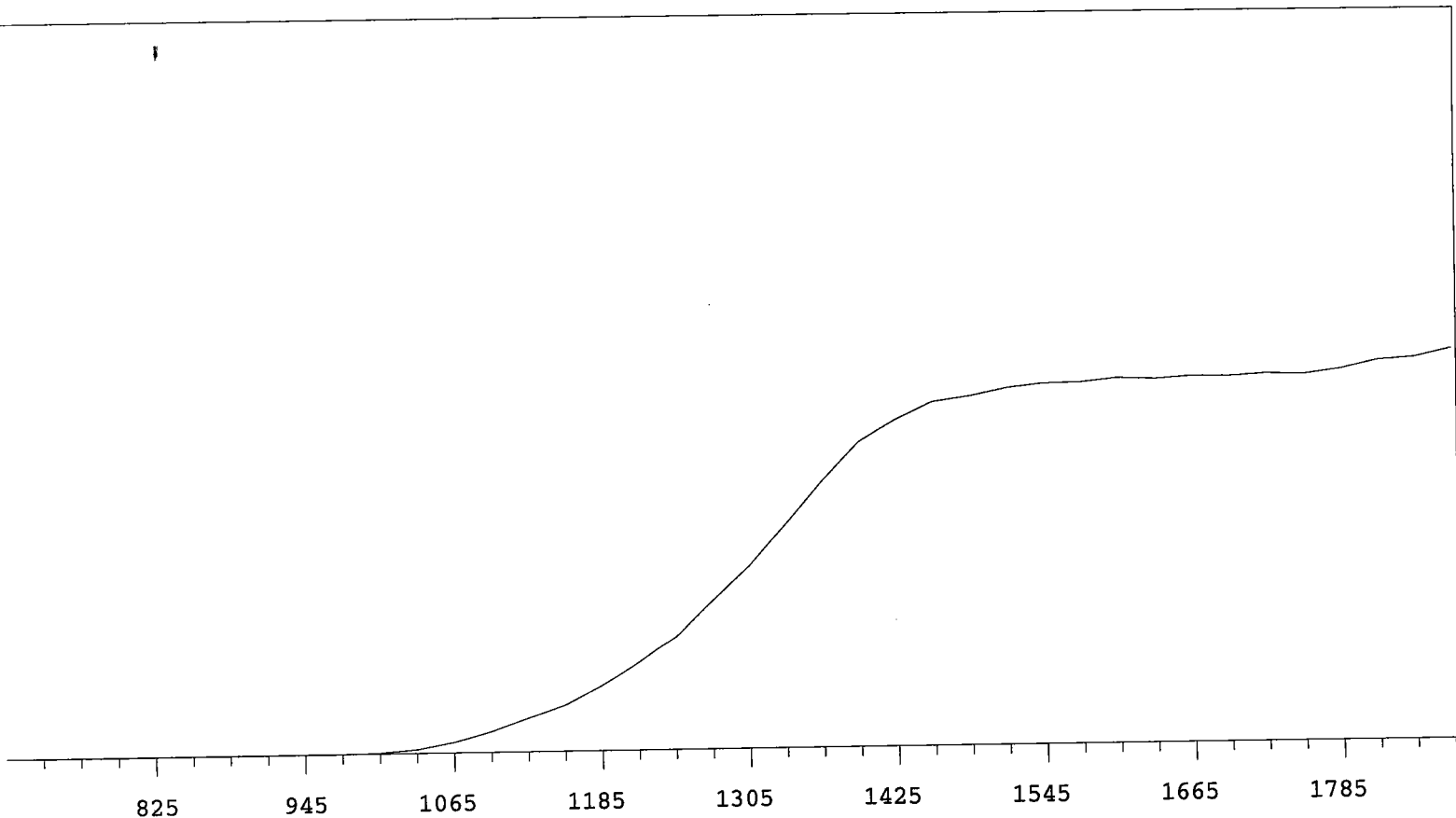
MPC 9600 Plateau  
Alpha Volts: 705

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	



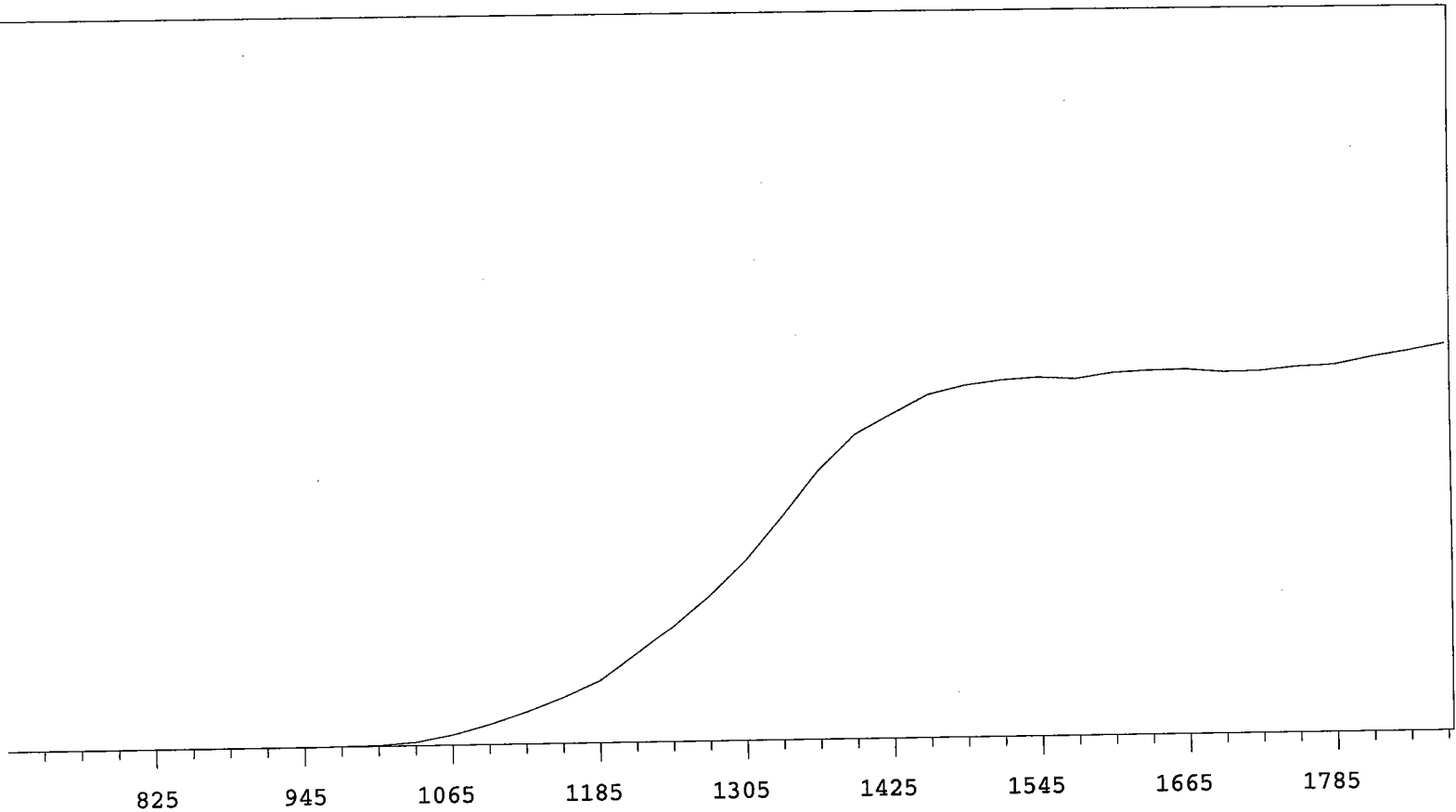
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13974	+68.00
735	0		1335	17170	+58.62
765	1		1365	20456	+47.04
795	1	+83.33	1395	23332	+33.83
825	1	-83.33	1425	24996	+21.10
855	1	>100	1455	26290	+12.40
885	0	-55.56	1485	26683	+7.74
915	0	>100	1515	27270	+4.43
945	1	>100	1545	27590	+3.48
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	



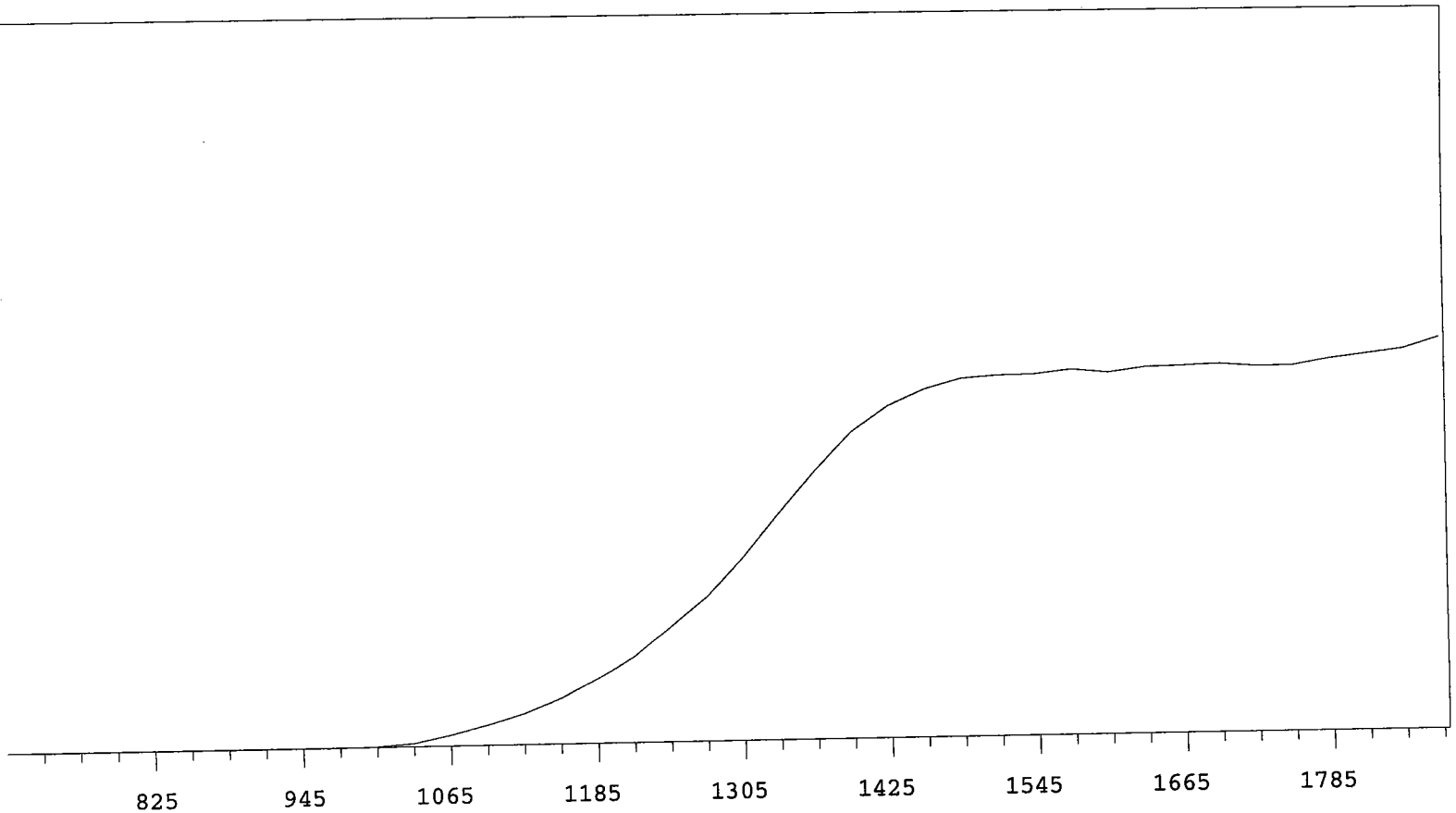
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 5 MPC 9604 Detector B  
Beta Volts: 1575

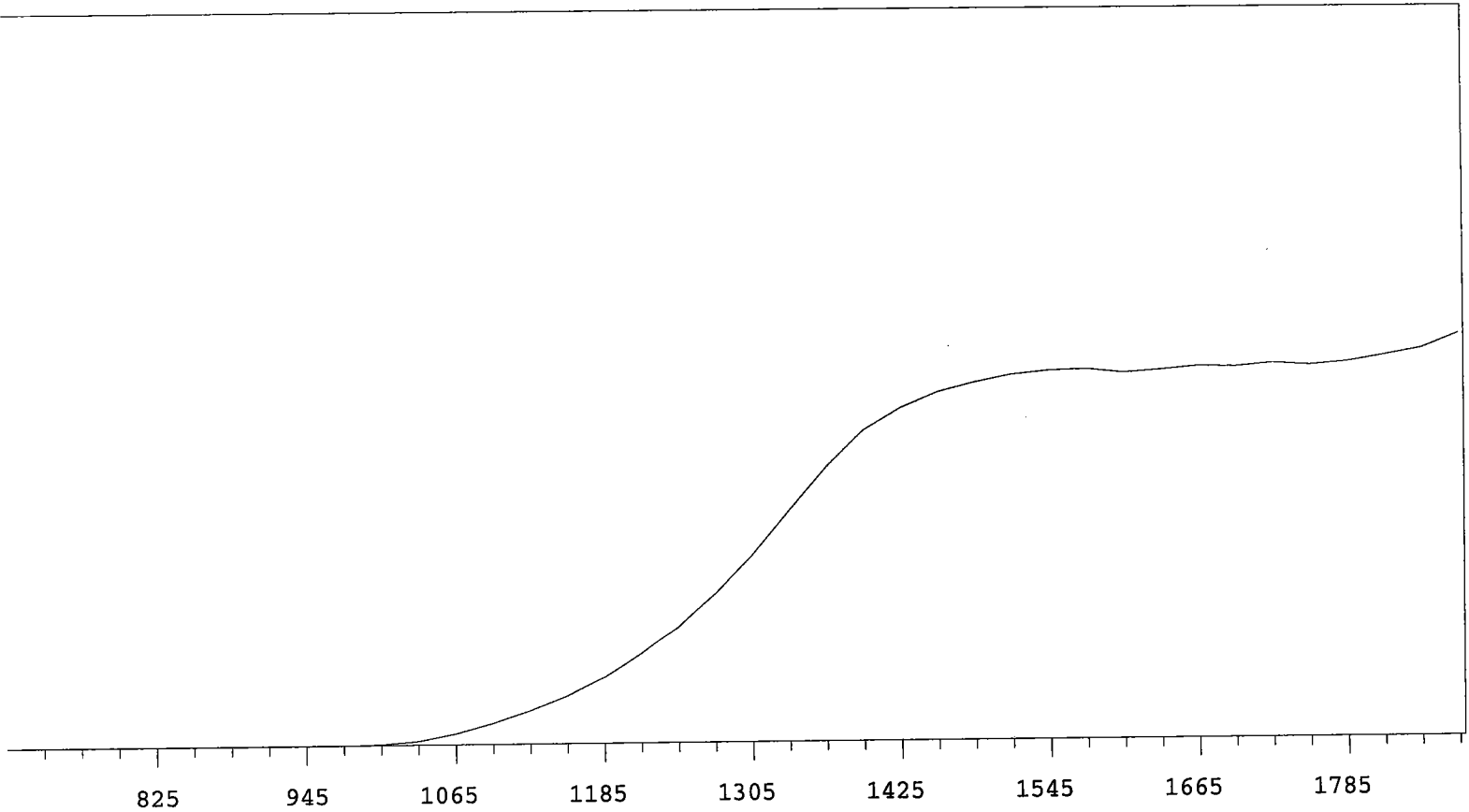
7/1/2009



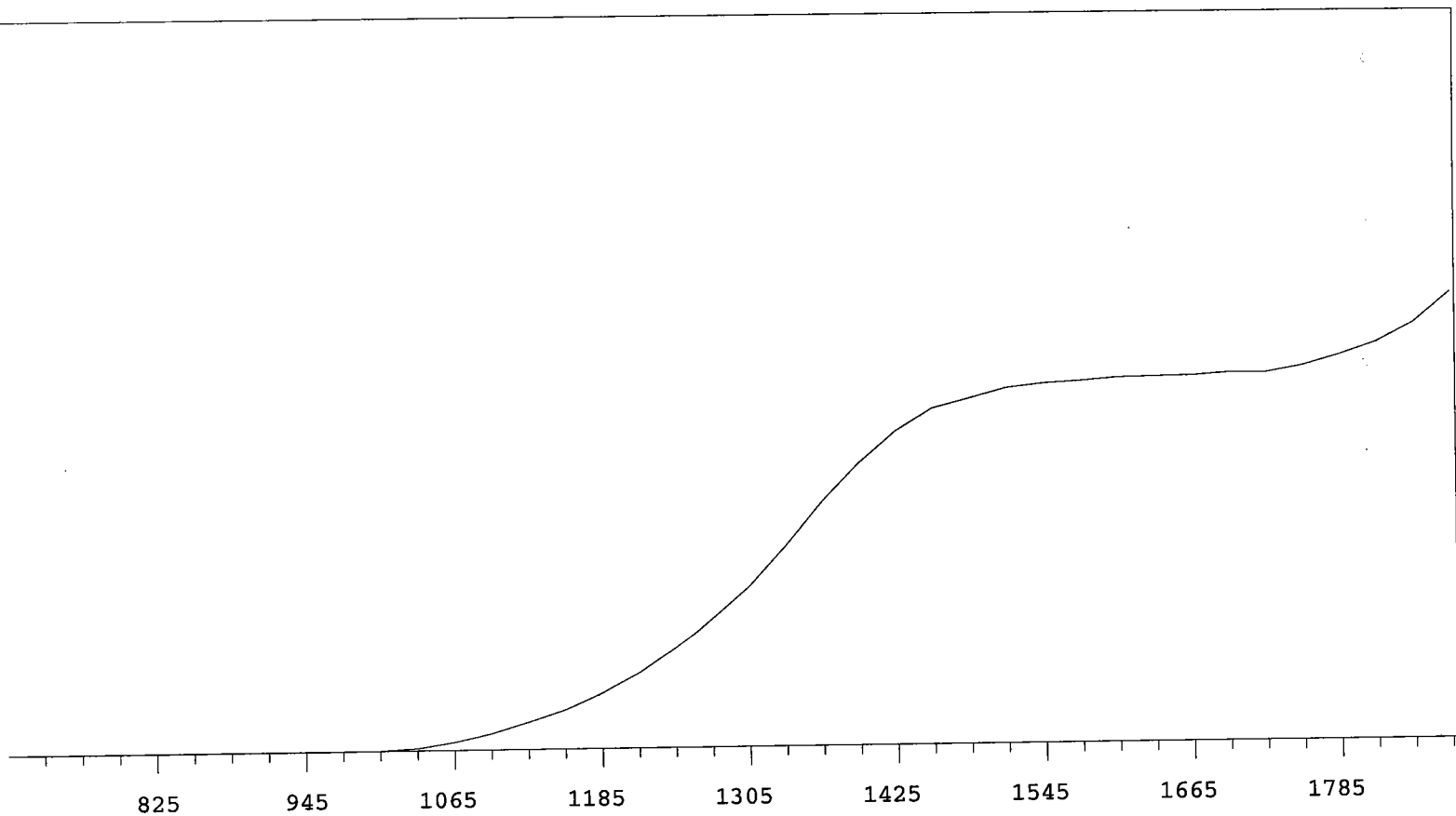
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17414	+68.46
735	0		1335	21540	+59.98
765	0		1365	25854	+46.75
795	0	>100	1395	29222	+33.38
825	1	>100	1425	31128	+21.52
855	1	+41.67	1455	32995	+13.26
885	2	-33.33	1485	33846	+8.09
915	0	>100	1515	34289	+3.25
945	1	>100	1545	34528	+2.00
975	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	



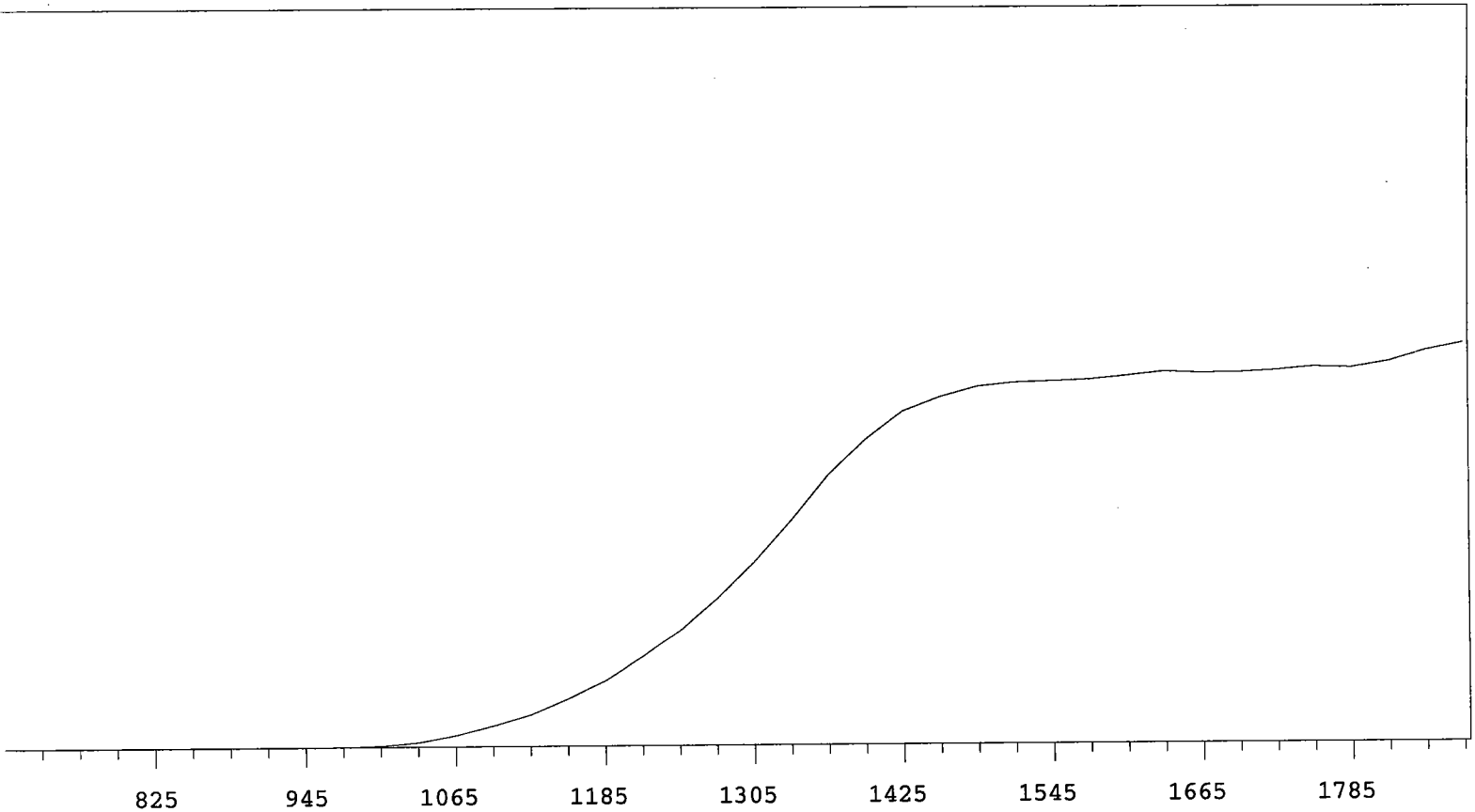
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17085	+68.24
735	0		1335	21135	+59.99
765	0		1365	25066	+47.39
795	0	>100	1395	28530	+33.93
825	0	>100	1425	30823	+22.30
855	1	>100	1455	32287	+12.93
885	0	>100	1485	33217	+6.71
915	1	>100	1515	33474	+3.57
945	2	>100	1545	33517	+1.17
975	7	>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	

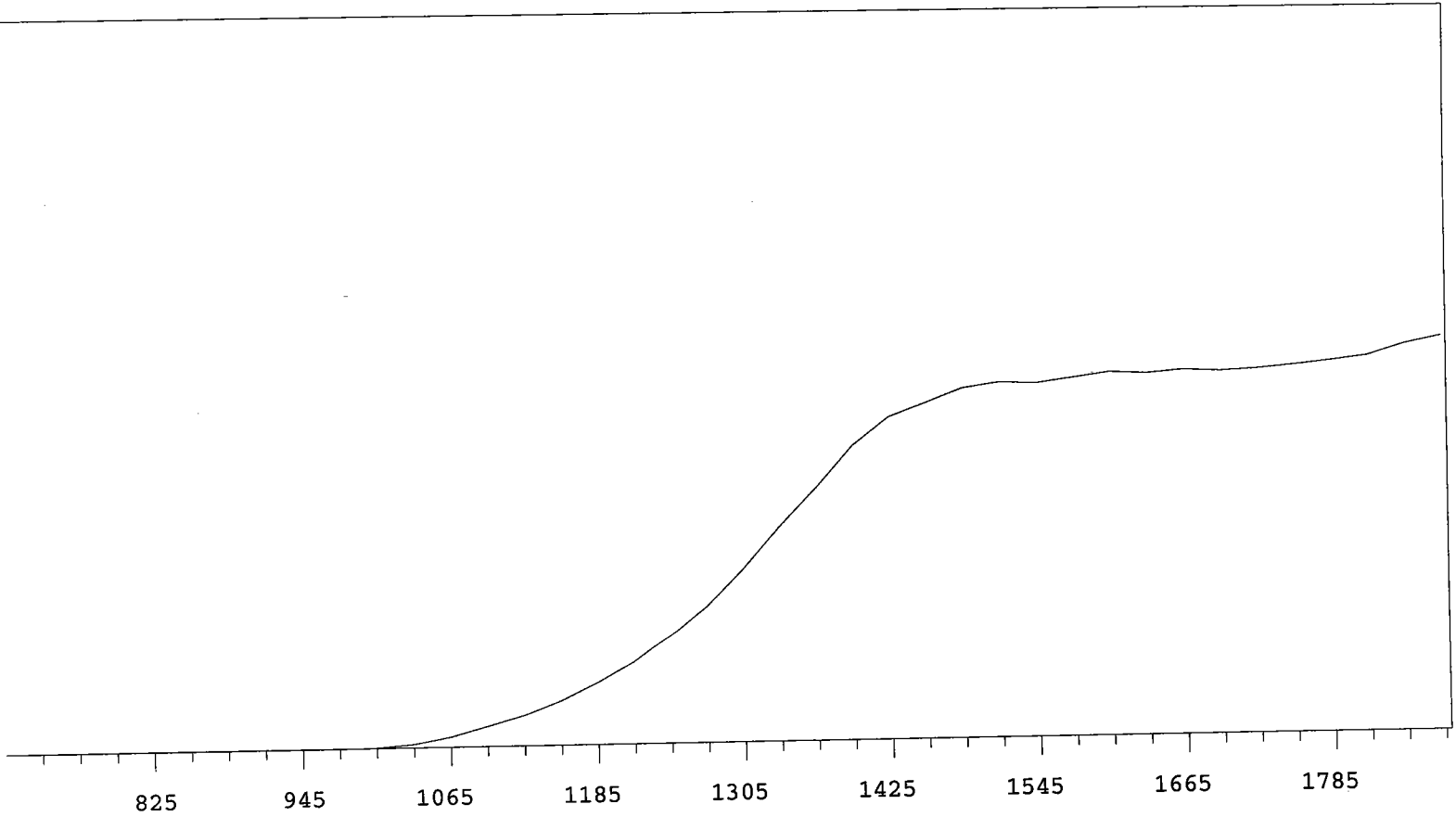


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	20094	+68.67
735	0		1335	24665	+59.40
765	0		1365	29591	+47.86
795	0	>100	1395	33376	+34.51
825	1	+83.33	1425	36440	+22.50
855	1	-83.33	1455	38024	+13.58
885	0	>100	1485	39187	+7.04
915	0	>100	1515	39608	+3.63
945	5	>100	1545	39722	+2.10
975	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	

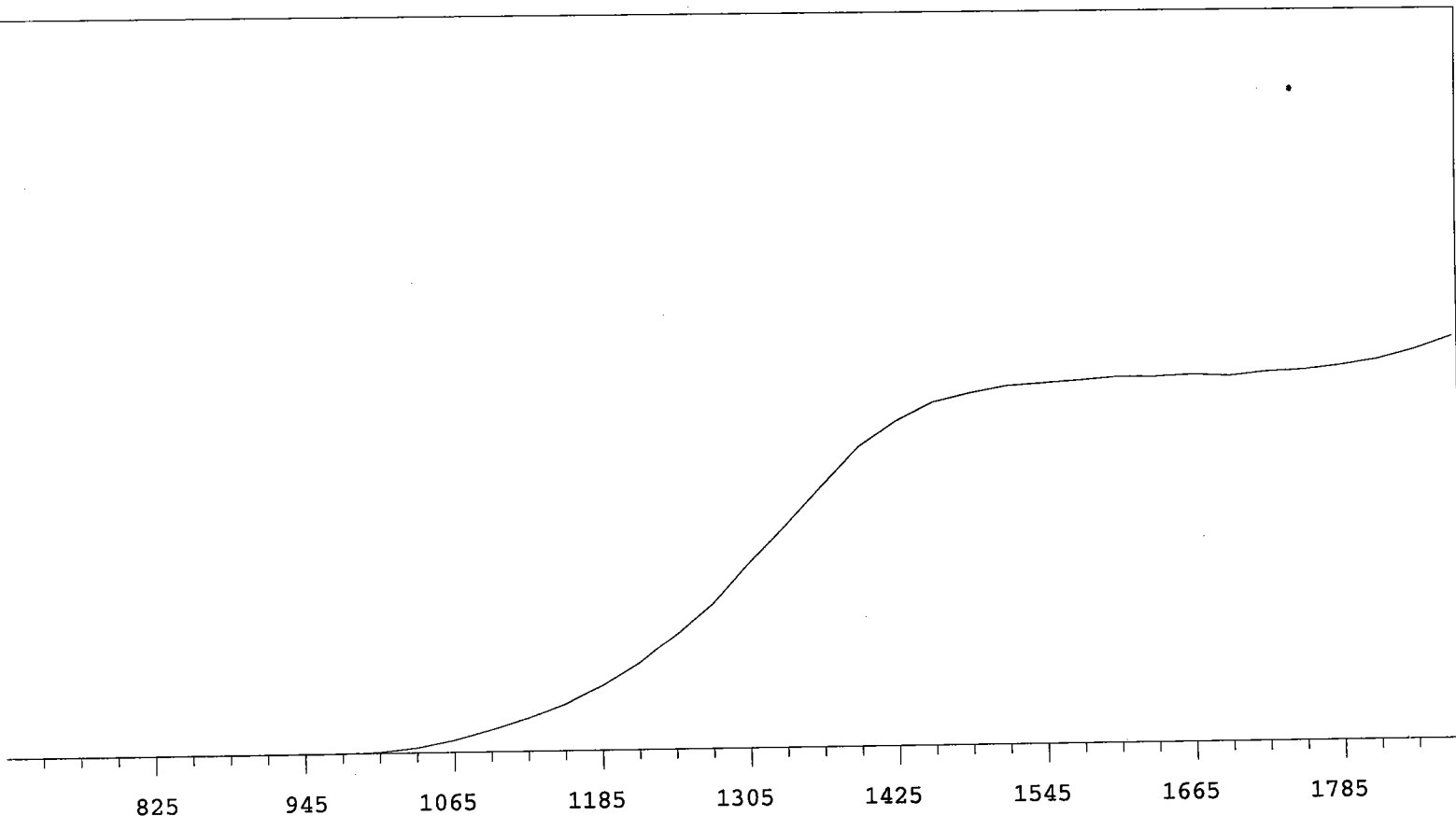
MPC 9600 Plateau  
Alpha Volts: 705

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	

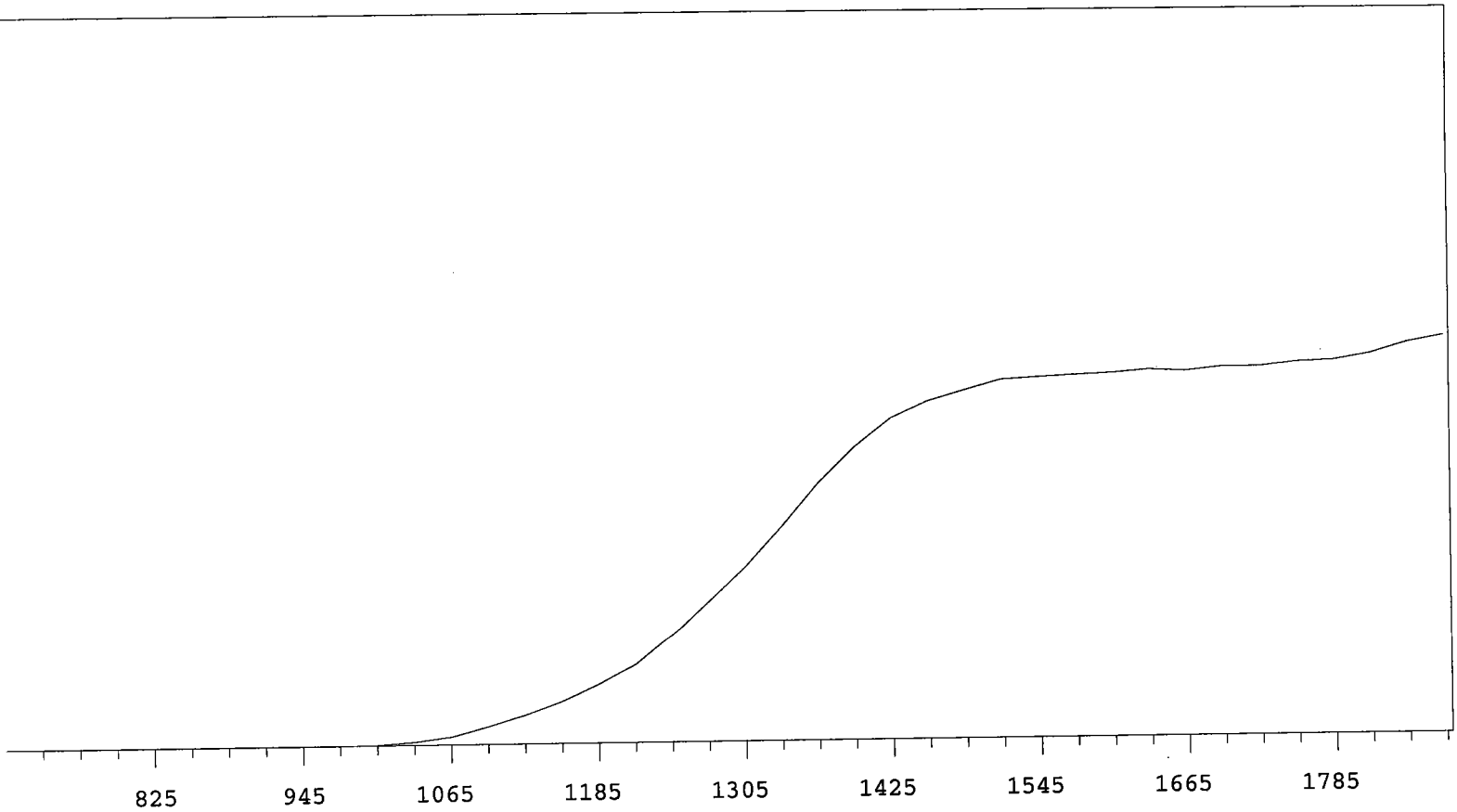


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17954	+65.82
735	0		1335	21482	+57.64
765	0		1365	25373	+45.78
795	1	+0.00	1395	29042	+34.80
825	0	>100	1425	31373	+23.29
855	0	+0.00	1455	33143	+14.25
885	0	>100	1485	34006	+8.49
915	1	>100	1515	34662	+4.71
945	0	>100	1545	34892	+3.14
975	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

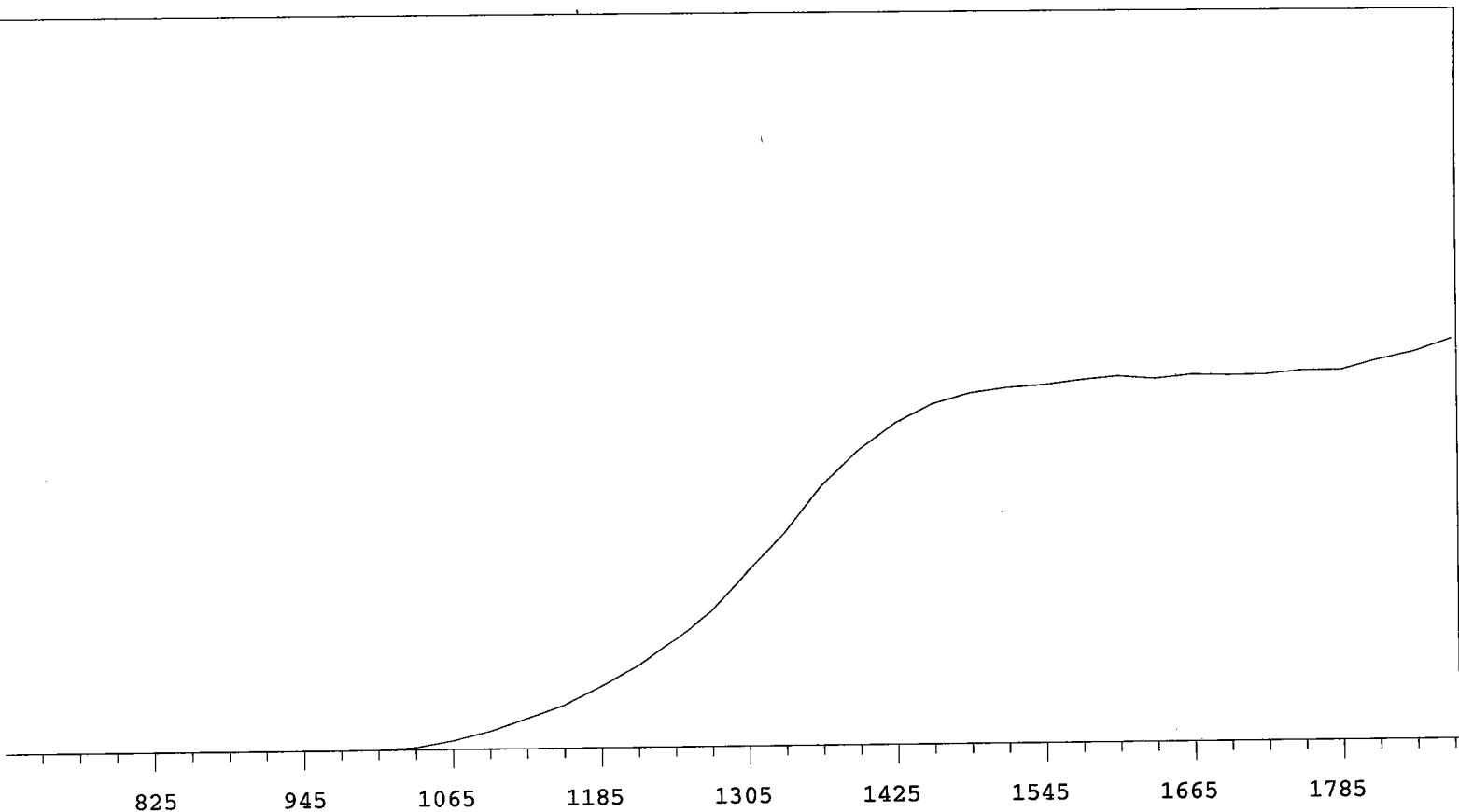
Instrument 7 MPC 9604 Detector A  
Beta Volts: 1575

7/1/2009

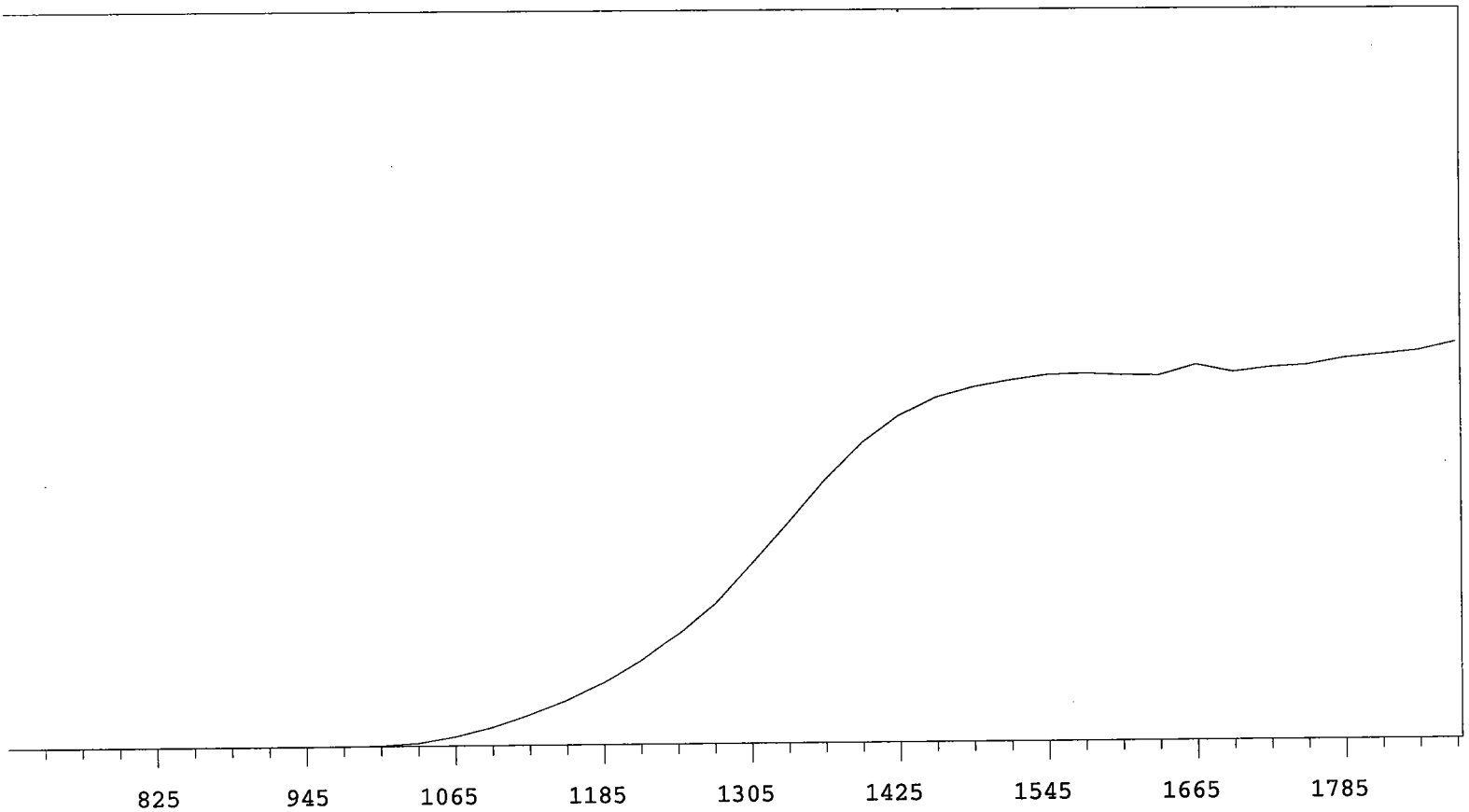


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13228	+70.36
735	0		1335	16271	+60.12
765	0		1365	19506	+49.19
795	0	>100	1395	22188	+36.46
825	1	+83.33	1425	24373	+24.43
855	1	-83.33	1455	25649	+15.99
885	0	-55.56	1485	26433	+9.58
915	0	>100	1515	27195	+5.74
945	1	>100	1545	27367	+3.24
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	

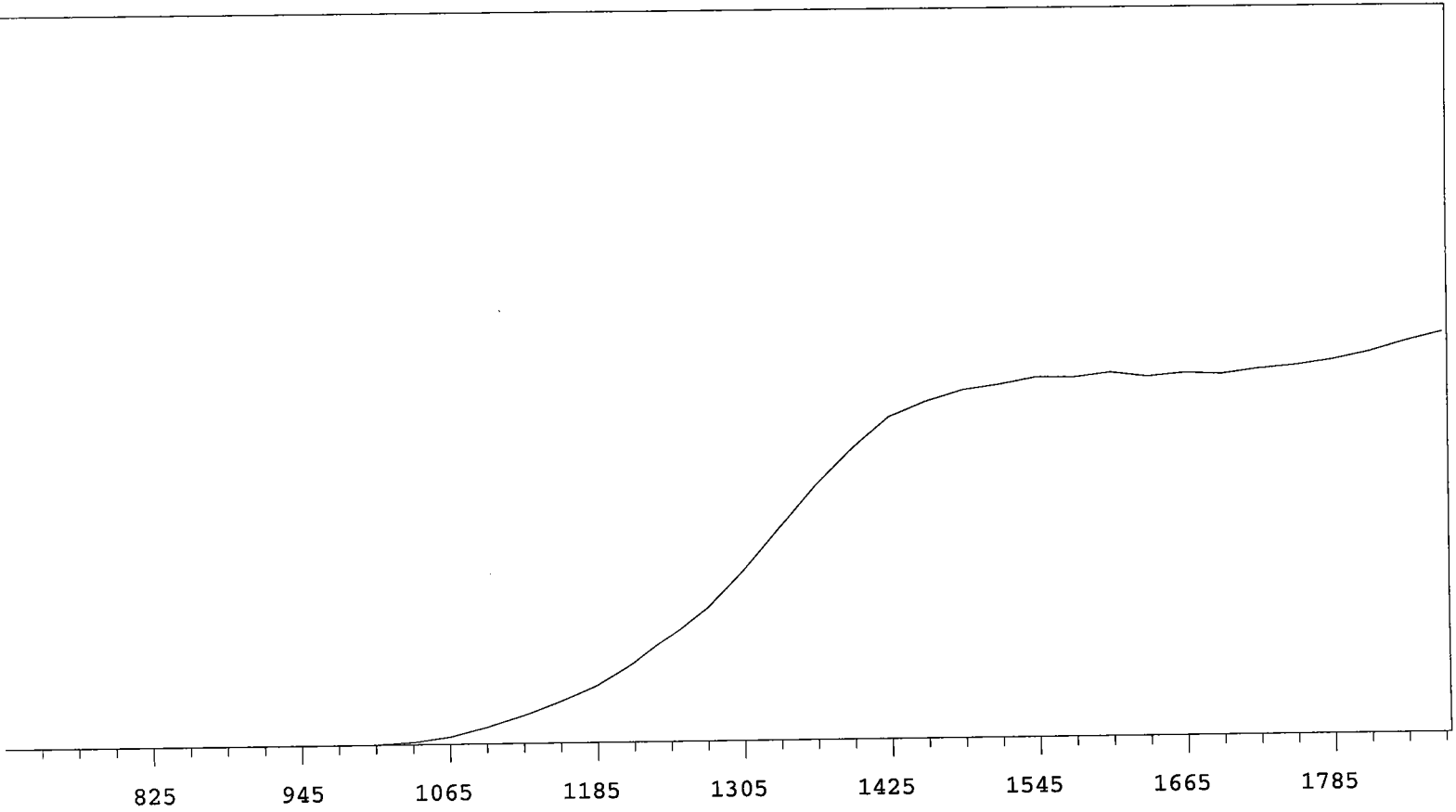


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16543	+70.03
735	0		1335	20257	+60.71
765	0		1365	24245	+48.17
795	0	>100	1395	27602	+35.50
825	0	>100	1425	30019	+23.48
855	0	>100	1455	31614	+14.53
885	0	>100	1485	32522	+8.91
915	0	>100	1515	33103	+5.28
945	0	>100	1545	33572	+2.60
975	4	>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	

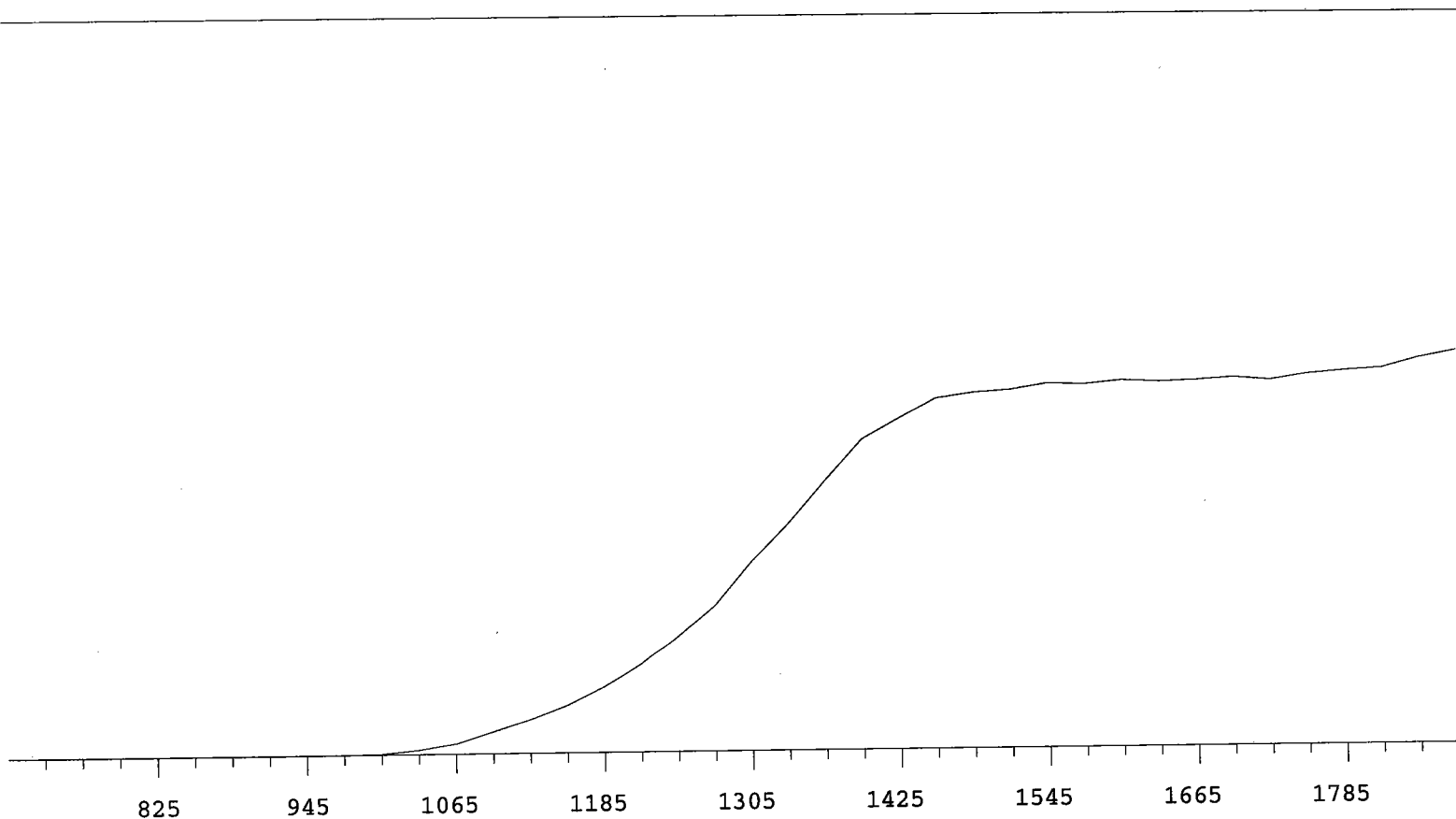
MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 7 MPC 9604 Detector D  
 Beta Volts: 1575

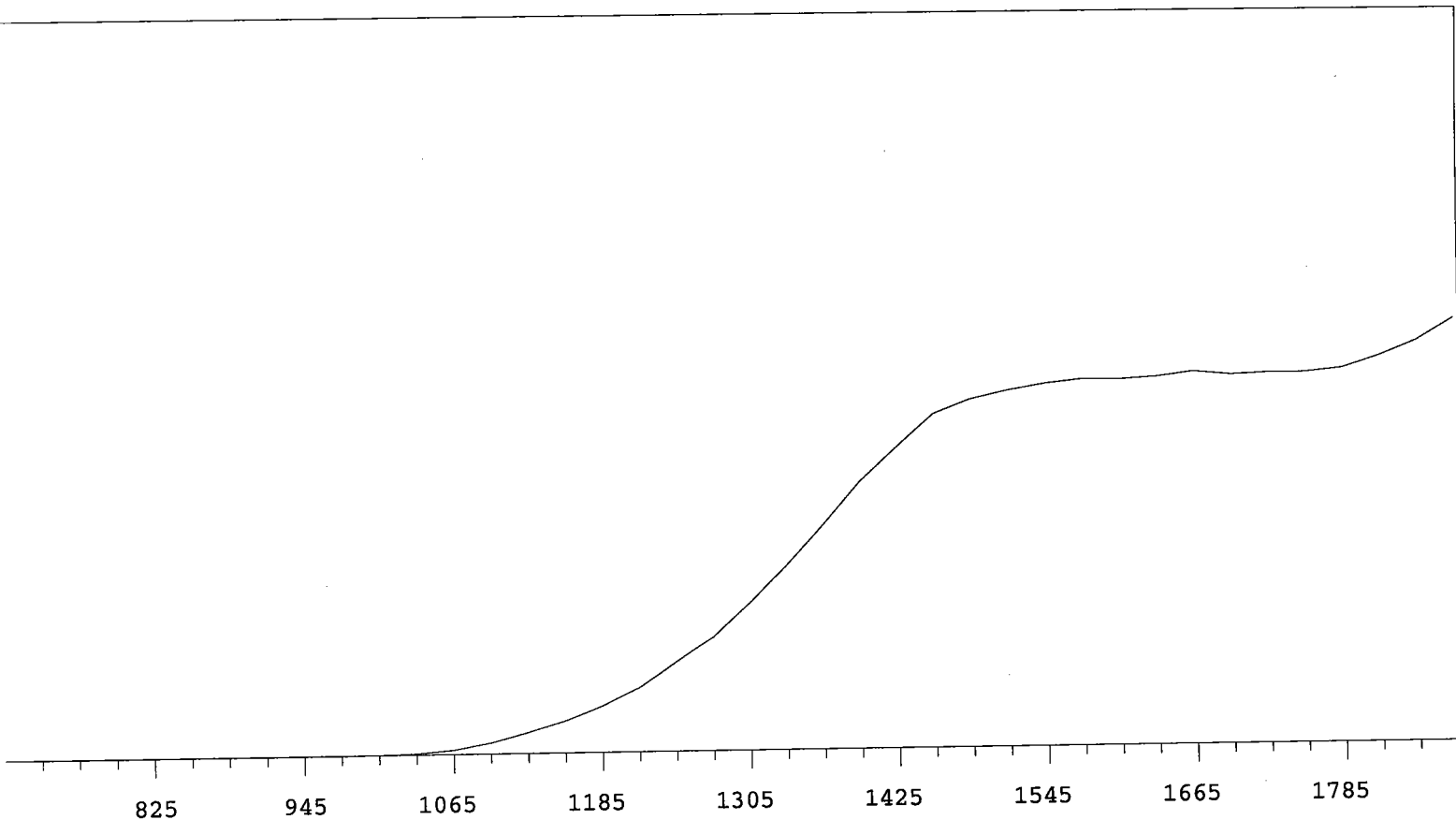
7/1/2009



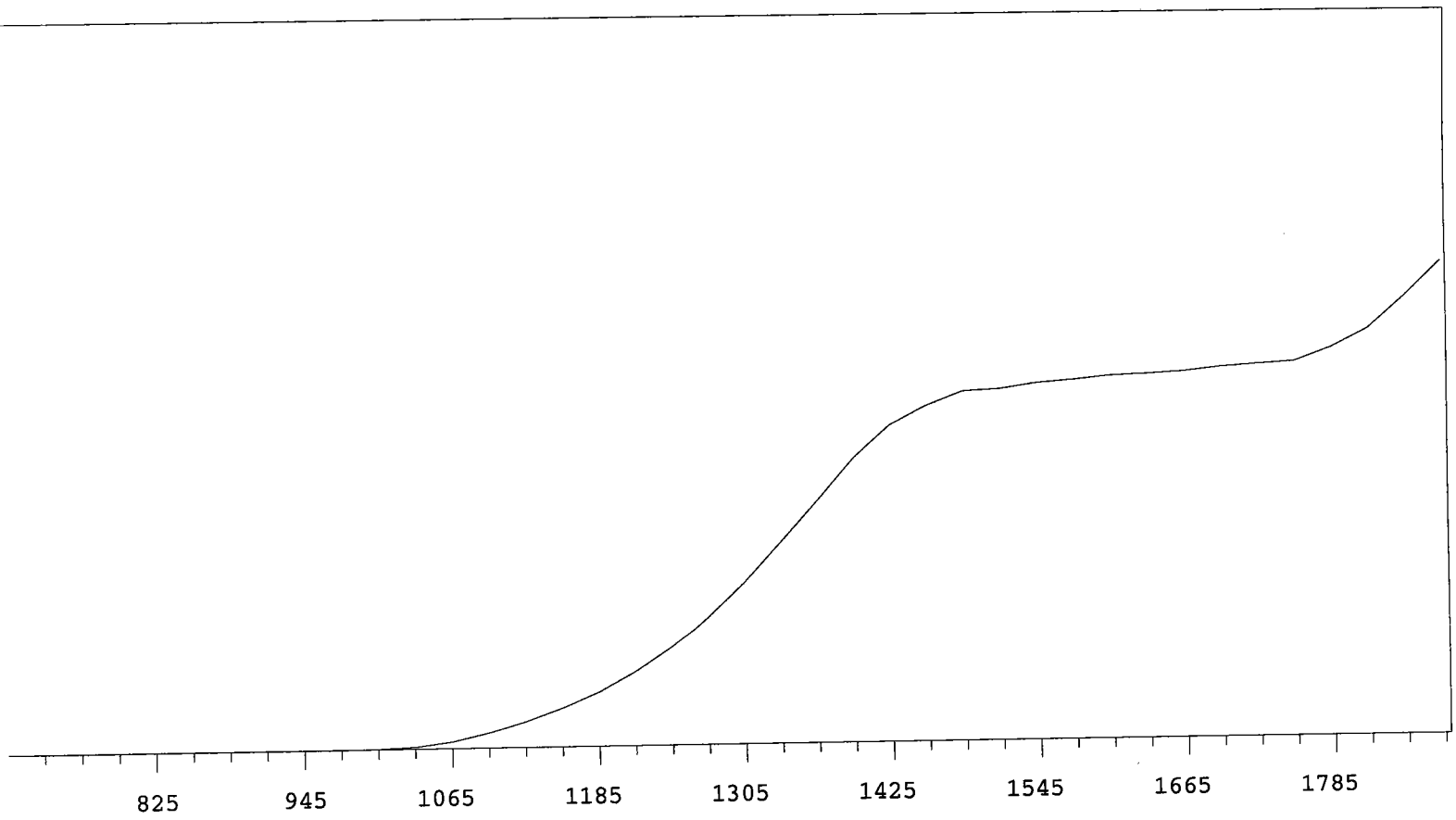
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14016	+71.42
735	0		1335	17436	+62.21
765	0		1365	20814	+50.32
795	0	>100	1395	23760	+36.91
825	0	>100	1425	26302	+24.91
855	0	>100	1455	27519	+15.17
885	0	>100	1485	28410	+8.91
915	0	>100	1515	28843	+5.41
945	0	>100	1545	29396	+3.58
975	5	>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	



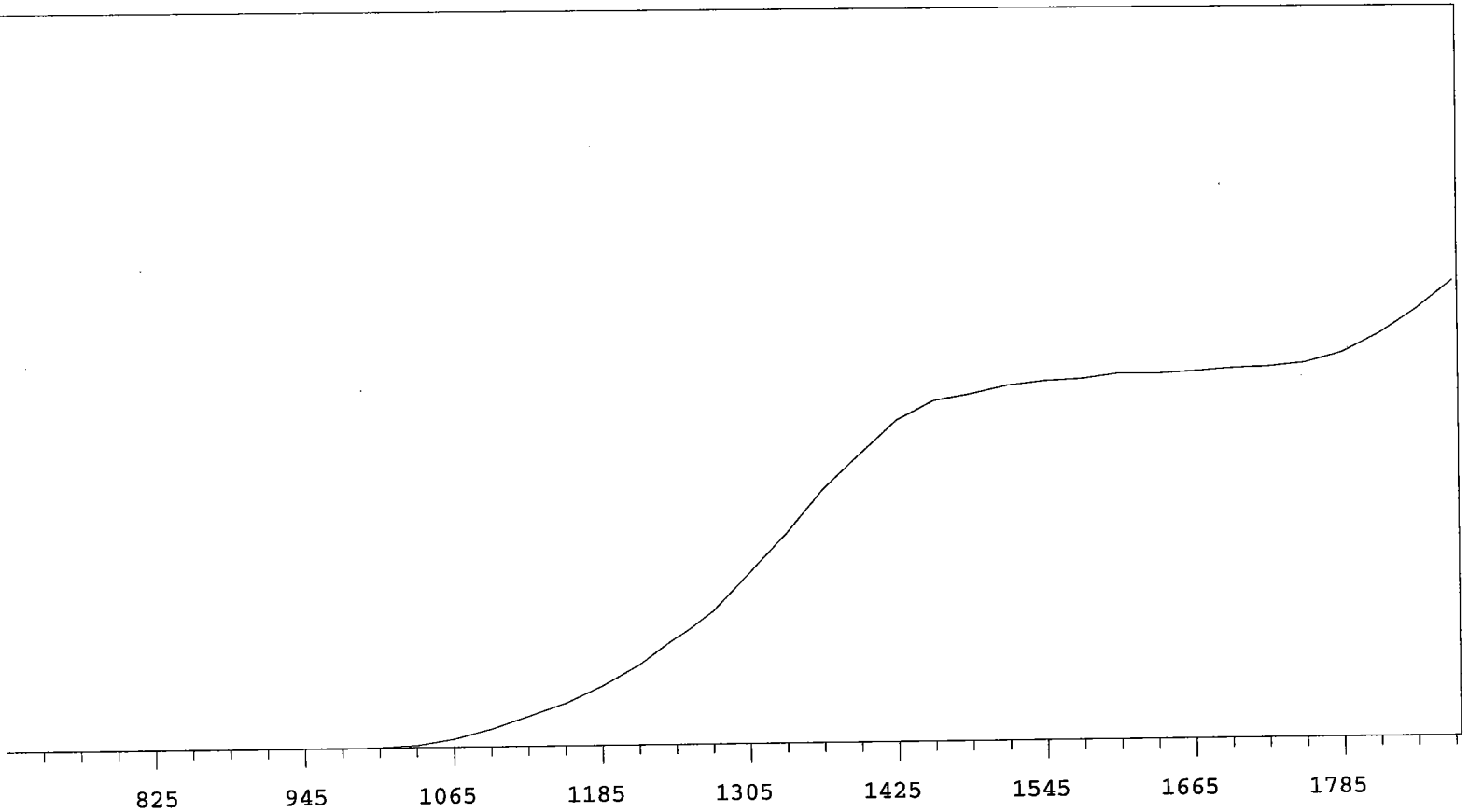
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19482	+67.45
735	0		1335	23344	+59.35
765	0		1365	27793	+45.86
795	0	>100	1395	31916	+34.29
825	0	>100	1425	33979	+21.61
855	0	>100	1455	35993	+11.71
885	0	>100	1485	36530	+7.04
915	0	>100	1515	36796	+3.11
945	1	>100	1545	37393	+2.44
975	9	>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	



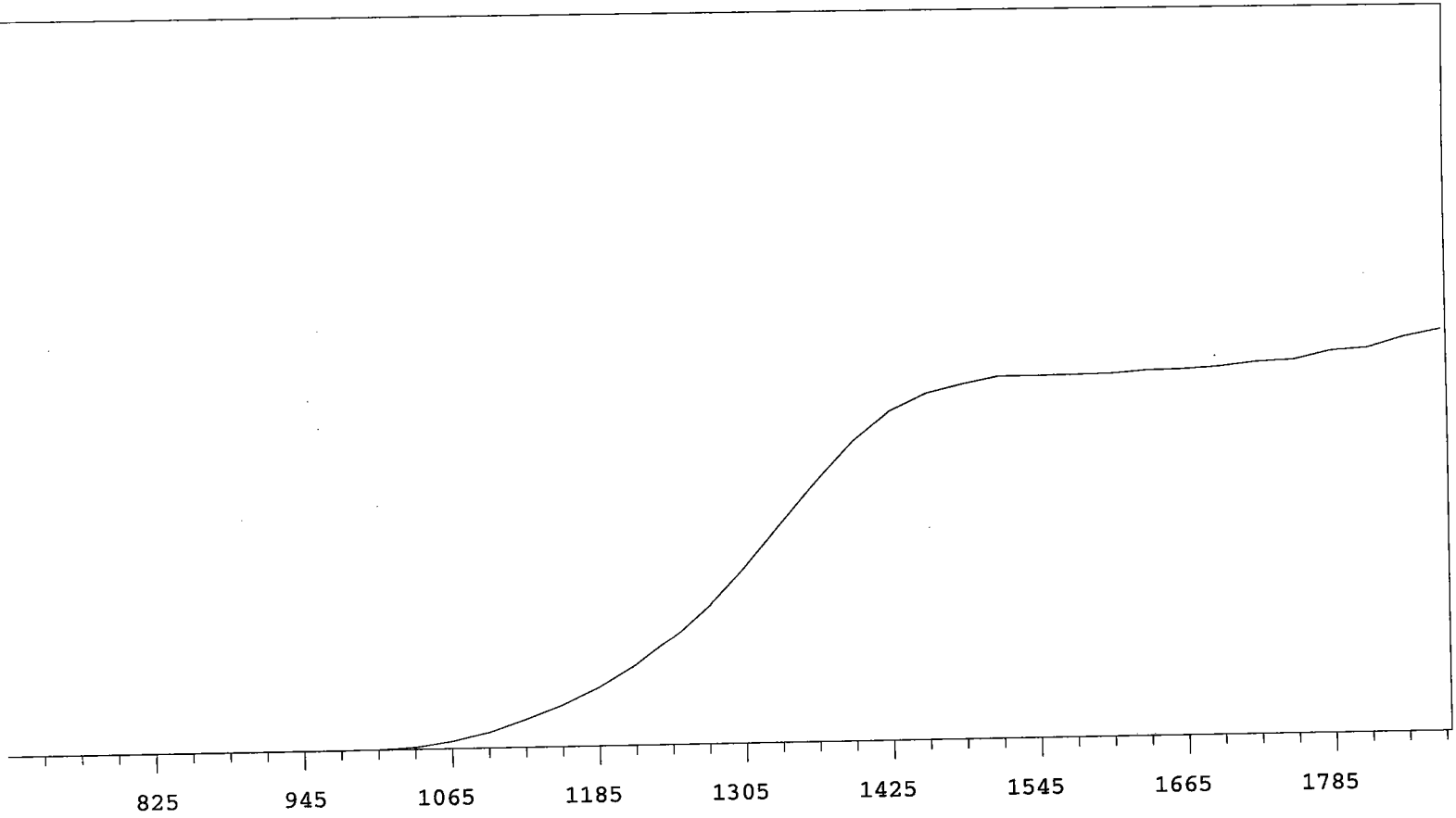
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16337	+74.91
735	0		1335	20471	+68.07
765	0		1365	25012	+57.86
795	0	>100	1395	29694	+47.48
825	0	>100	1425	33409	+35.17
855	0	>100	1455	37013	+23.27
885	0	>100	1485	38629	+14.35
915	0	>100	1515	39529	+7.69
945	0	>100	1545	40284	+4.34
975	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	

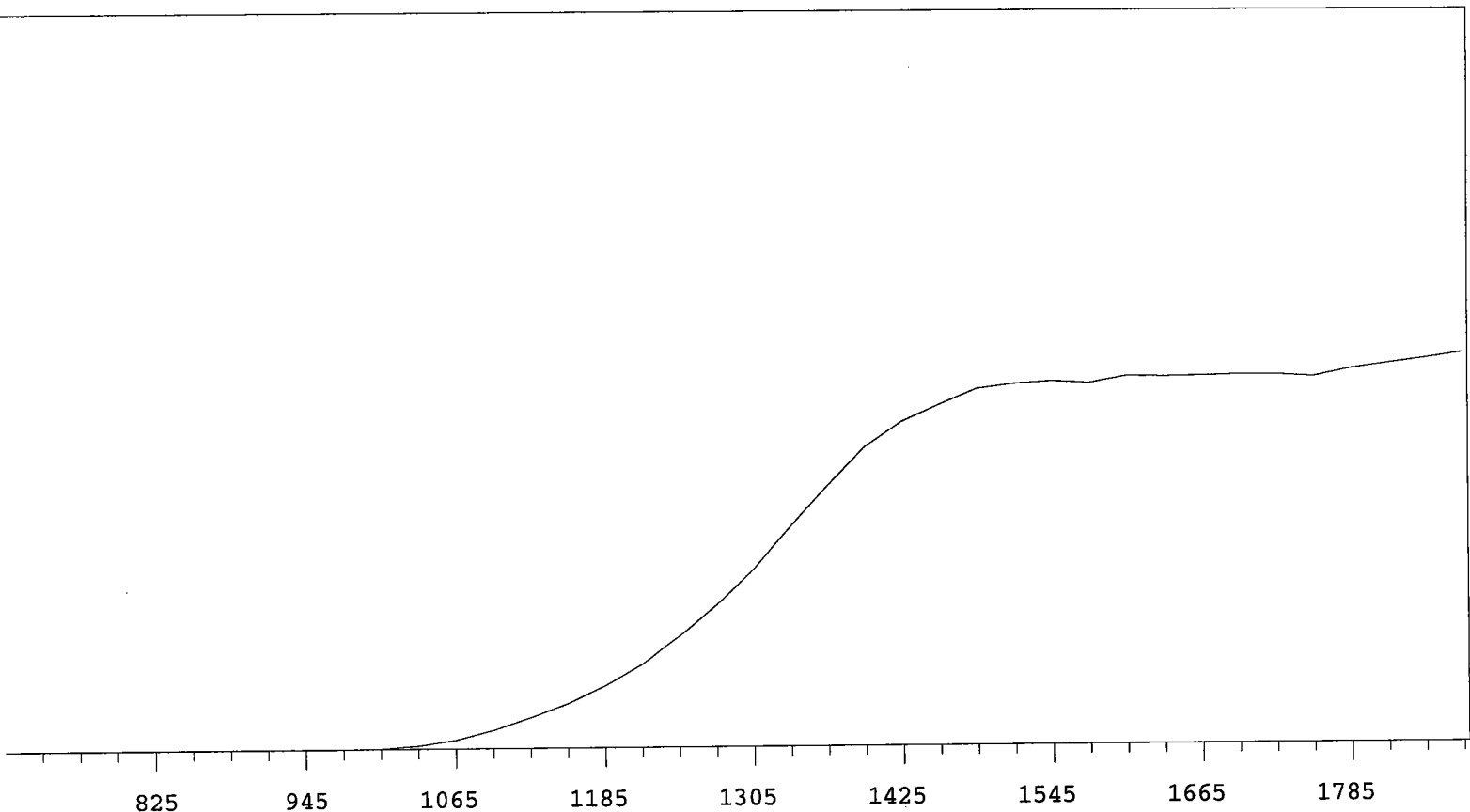


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16889	+70.18
735	0		1335	20600	+61.29
765	1	+0.00	1365	24824	+50.40
795	0	>100	1395	28208	+38.85
825	0	>100	1425	31539	+25.79
855	0	>100	1455	33391	+16.06
885	0	>100	1485	33991	+8.60
915	0	>100	1515	34782	+5.01
945	0	>100	1545	35201	+4.10
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

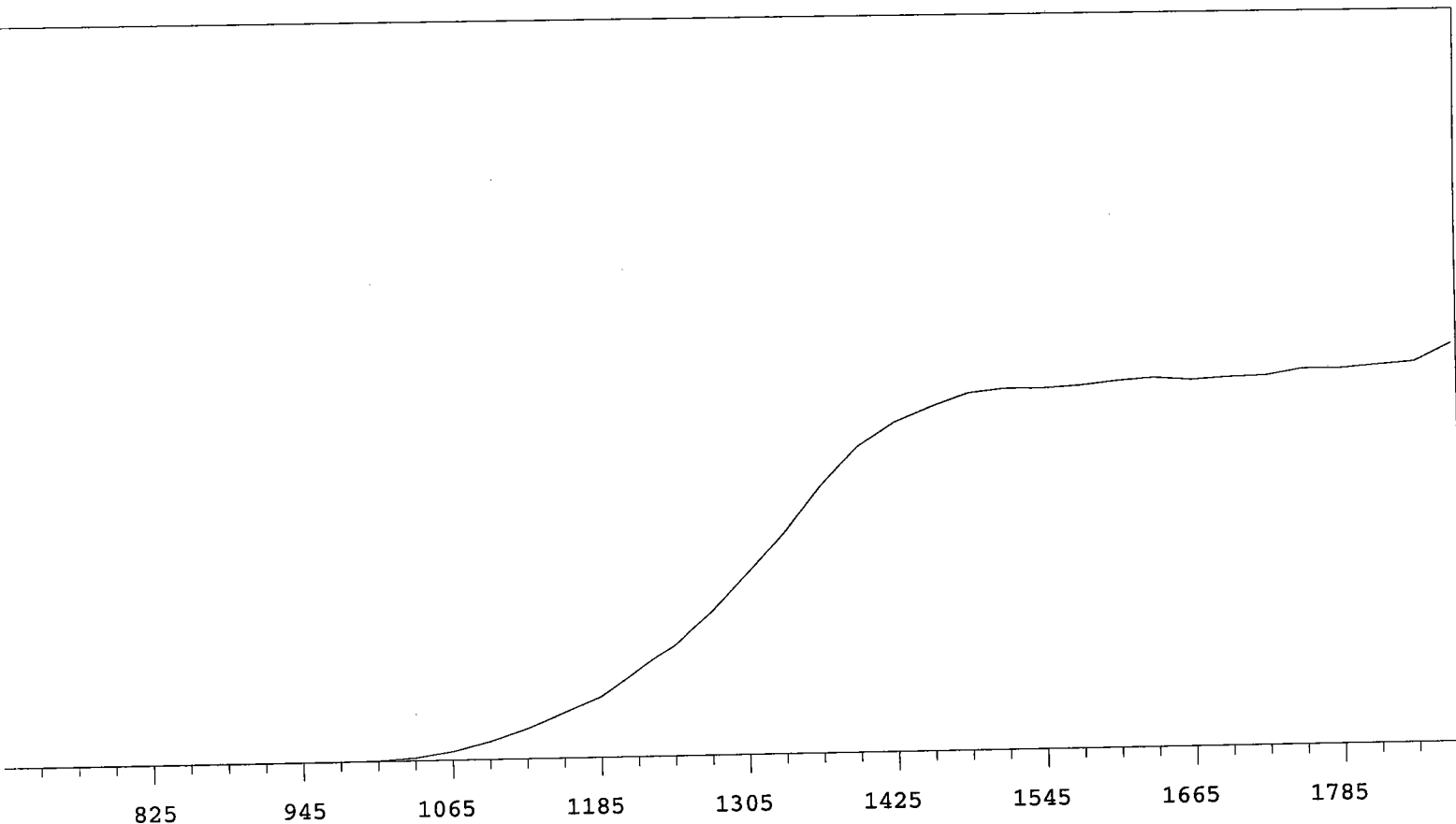
705        0  
 735        0  
 765        0  
 795        0 >100  
 825        0 >100  
 855        0 >100  
 885        0 >100  
 915        0 >100  
 945        0 >100  
 975        4 >100  
 1005       45 >100  
 1035       300 >100  
 1065       836 >100  
 1095       1742 >100  
 1125       2896 >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

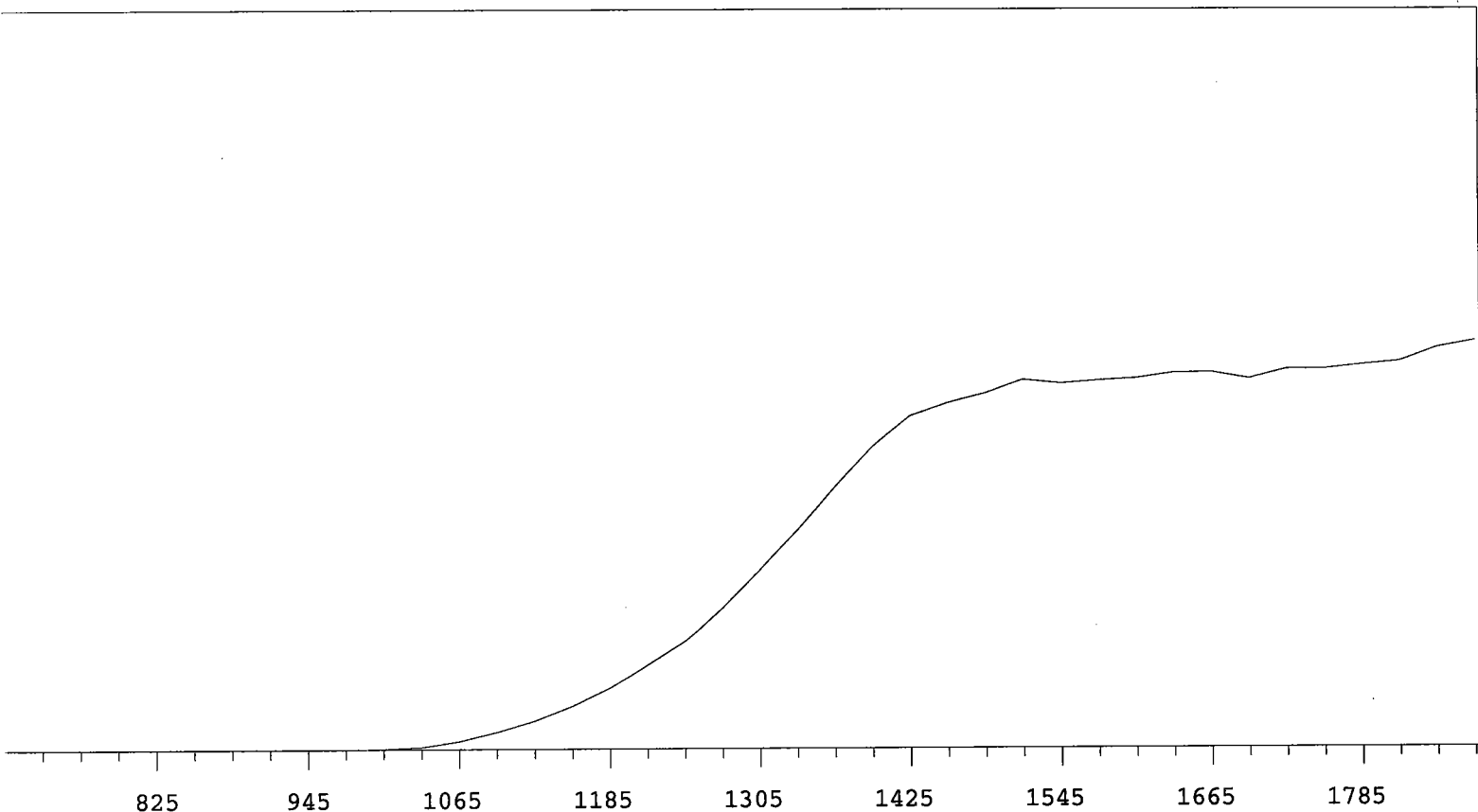
MPC 9600 Plateau  
Alpha Volts: 870

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	



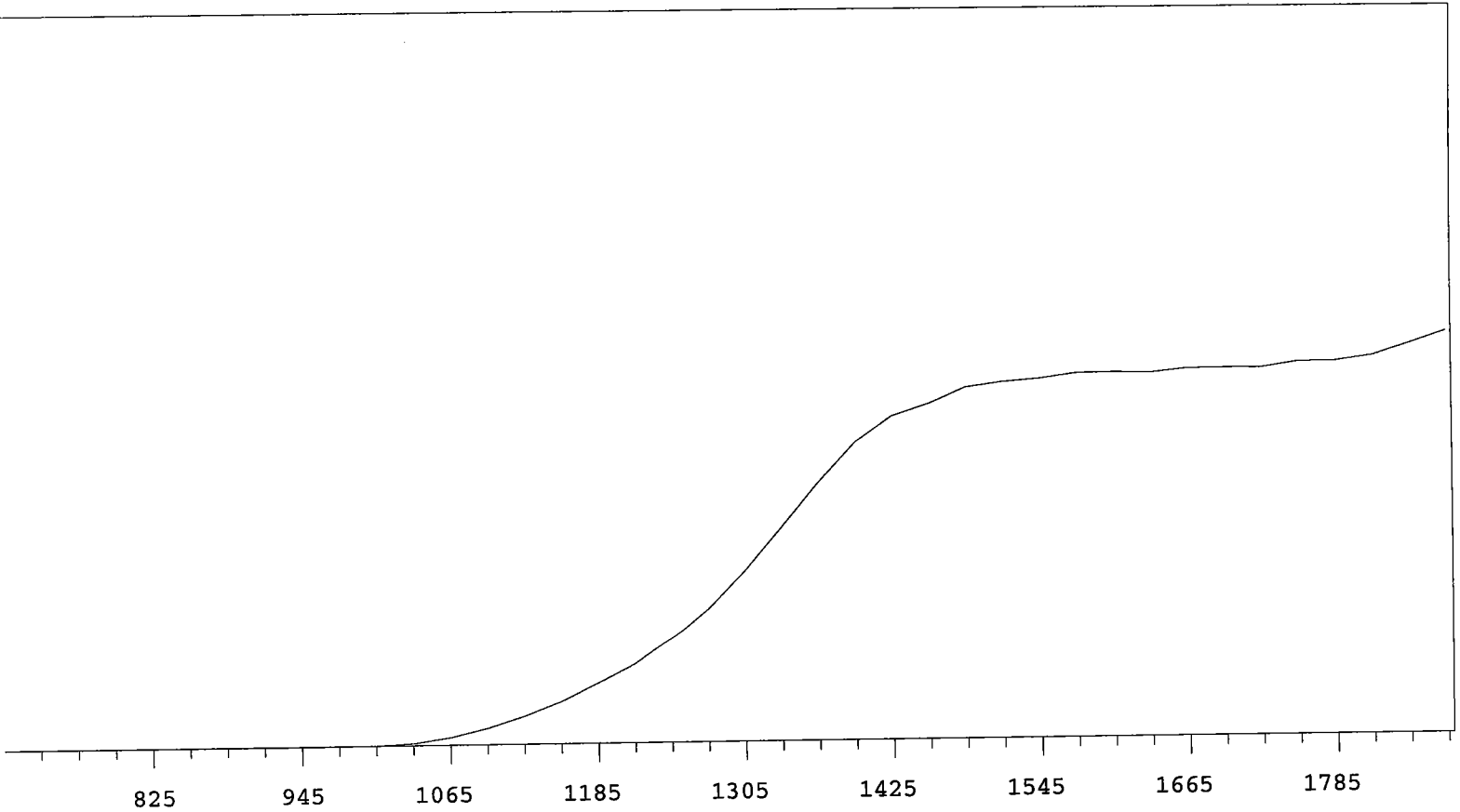
VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	5	>100
1005	35	>100
1035	186	>100
1065	618	>100
1095	1280	>100
1125	2141	>100
1155	3268	>100
1185	4659	>100
1215	6343	+90.68
1245	8064	+83.46
1275	10497	+77.03

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

MPC 9600 Plateau  
Alpha Volts: 870

Instrument 10 MPC 9604 Detector A  
Beta Volts: 1552

7/1/2009

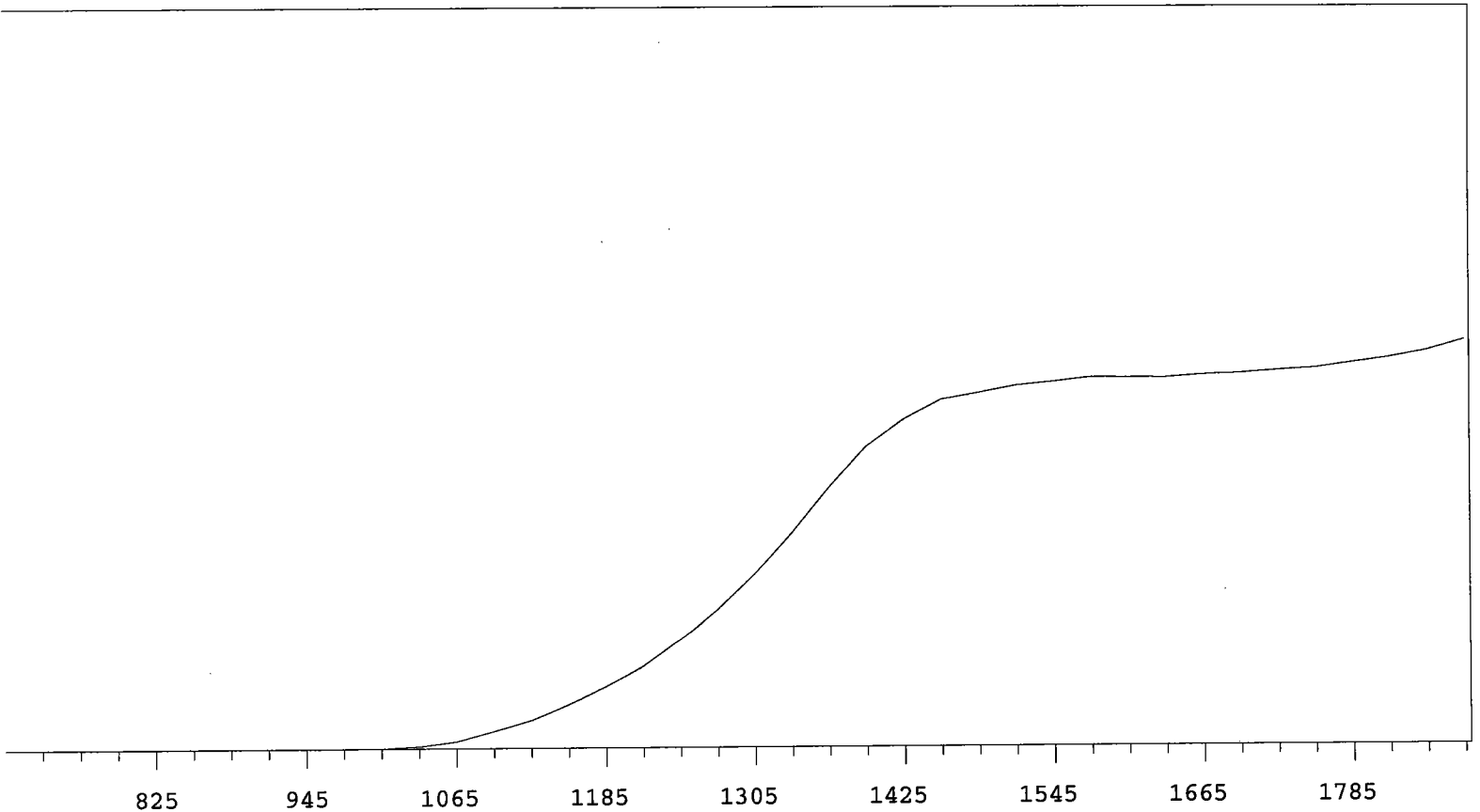


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16076	+72.76
735	1		1335	19985	+63.85
765	0		1365	24102	+50.95
795	0	>100	1395	27819	+36.01
825	0	>100	1425	30228	+23.86
855	0	>100	1455	31343	+14.40
885	0	>100	1485	32811	+8.77
915	0	>100	1515	33243	+6.10
945	0	>100	1545	33518	+3.25
975	1	>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	

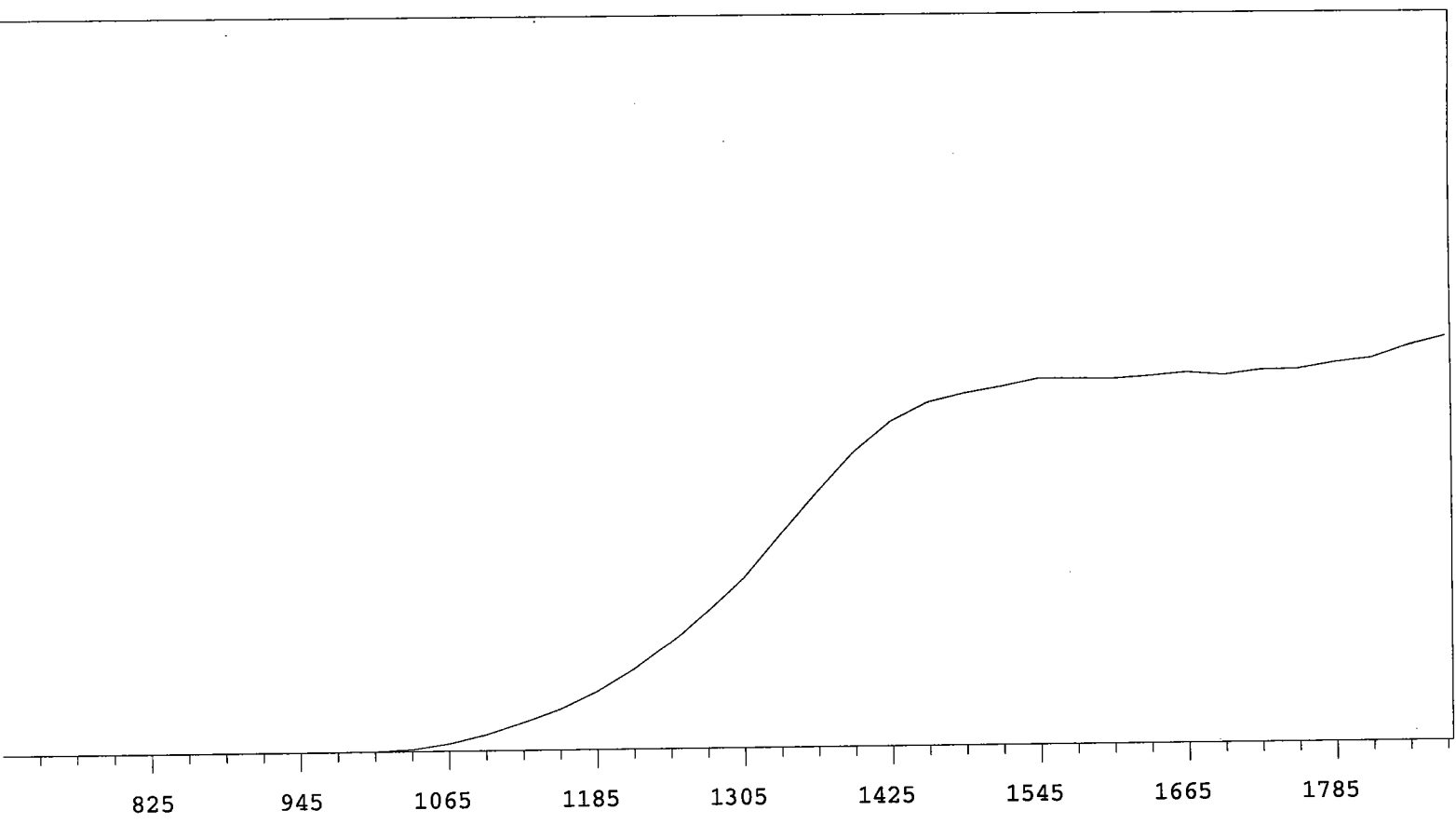
MPC 9600 Plateau  
Alpha Volts: 870

Instrument 10 MPC 9604 Detector B  
Beta Volts: 1552

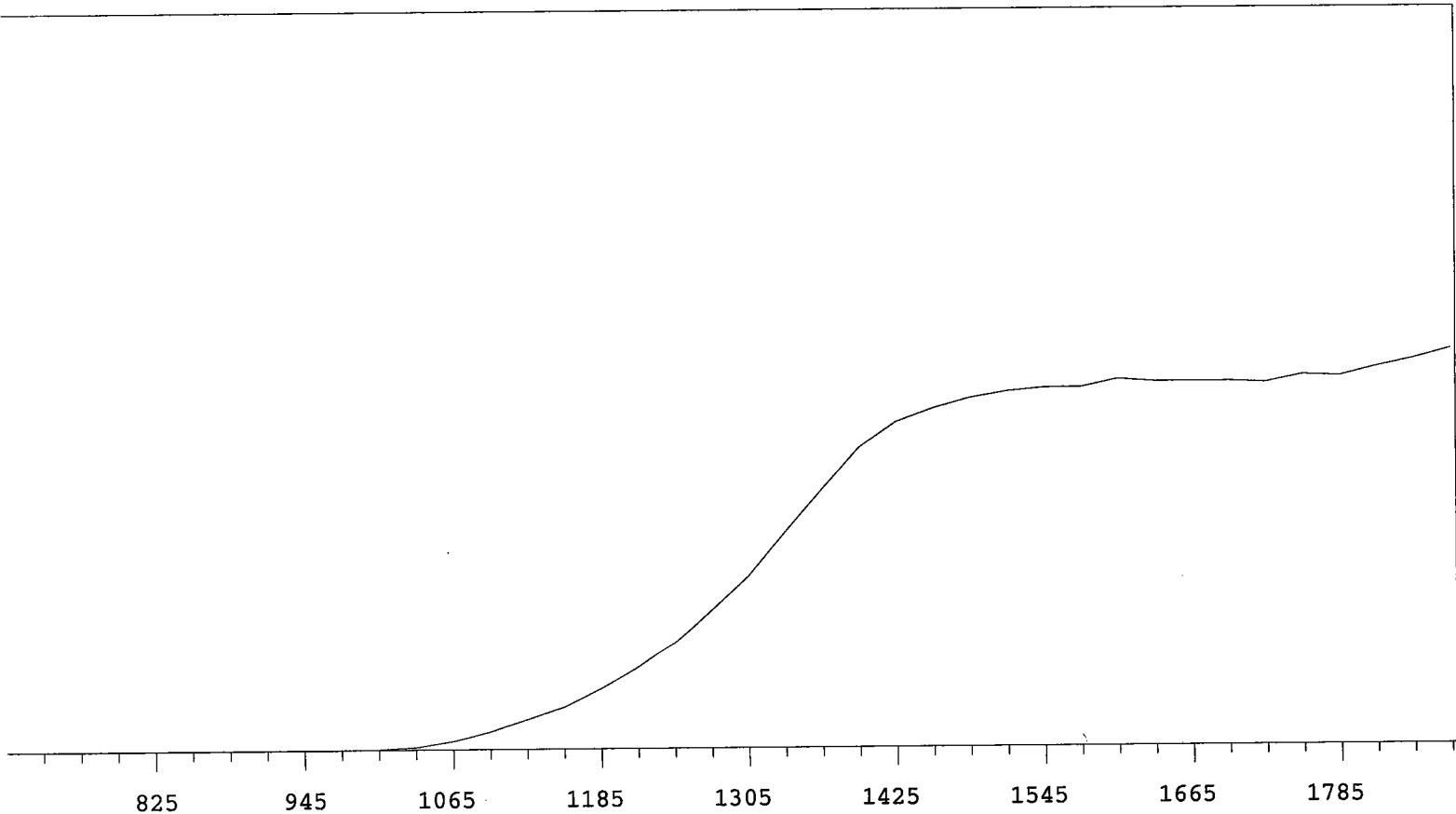
7/1/2009



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	

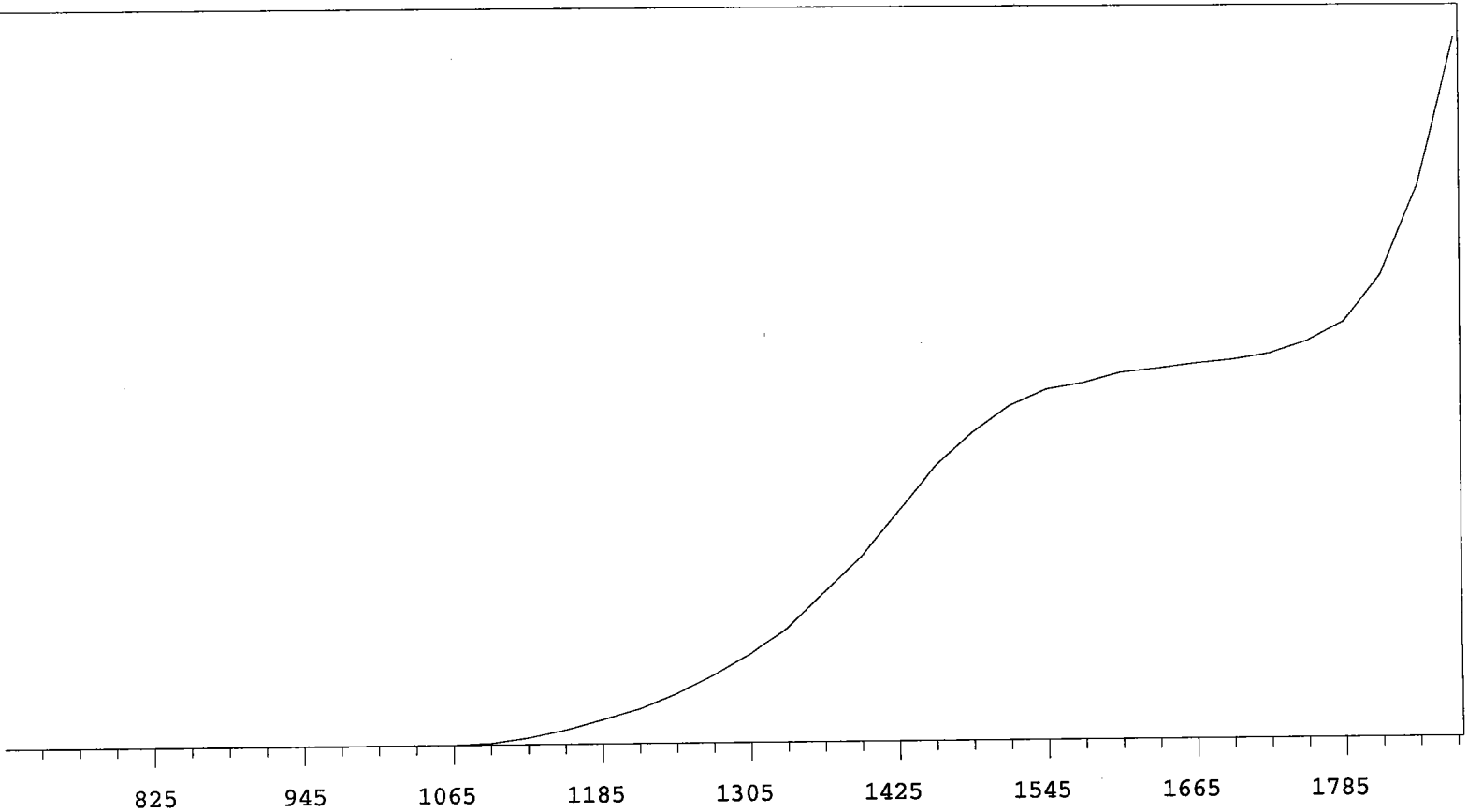


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18051	+71.16
735	0		1335	22586	+62.34
765	0		1365	26973	+51.47
795	0	>100	1395	31137	+38.24
825	0	>100	1425	34321	+25.70
855	0	>100	1455	36267	+15.37
885	1	>100	1485	37197	+9.21
915	0	>100	1515	37851	+5.38
945	2	>100	1545	38622	+3.00
975	2	>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	



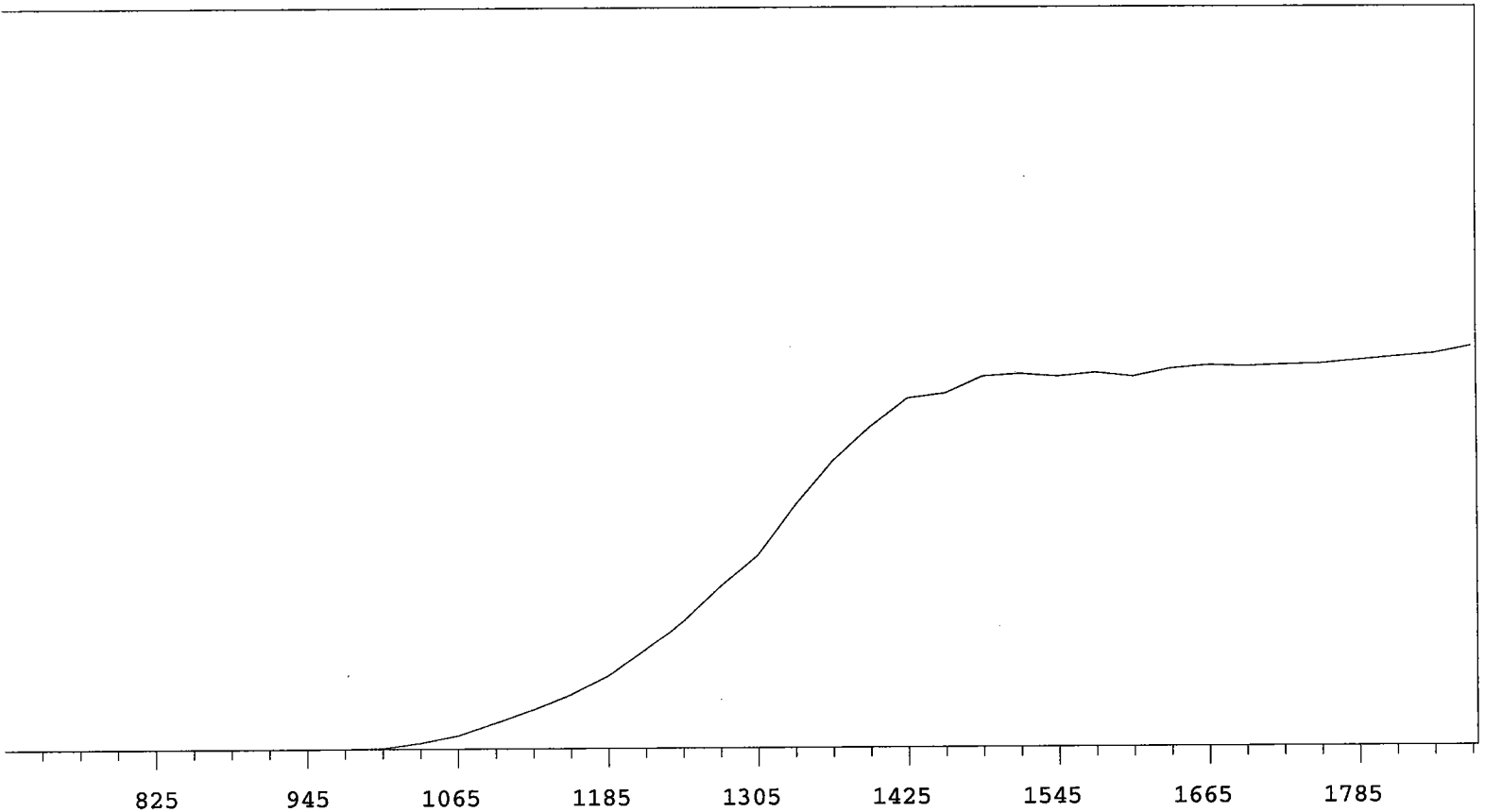
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15430	+69.87
735	0		1335	19258	+61.49
765	0		1365	23018	+50.06
795	0	>100	1395	26562	+35.34
825	0	>100	1425	28750	+22.67
855	0	>100	1455	29911	+13.20
885	0	>100	1485	30798	+8.01
915	0	>100	1515	31375	+4.83
945	0	>100	1545	31684	+3.74
975	3	>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

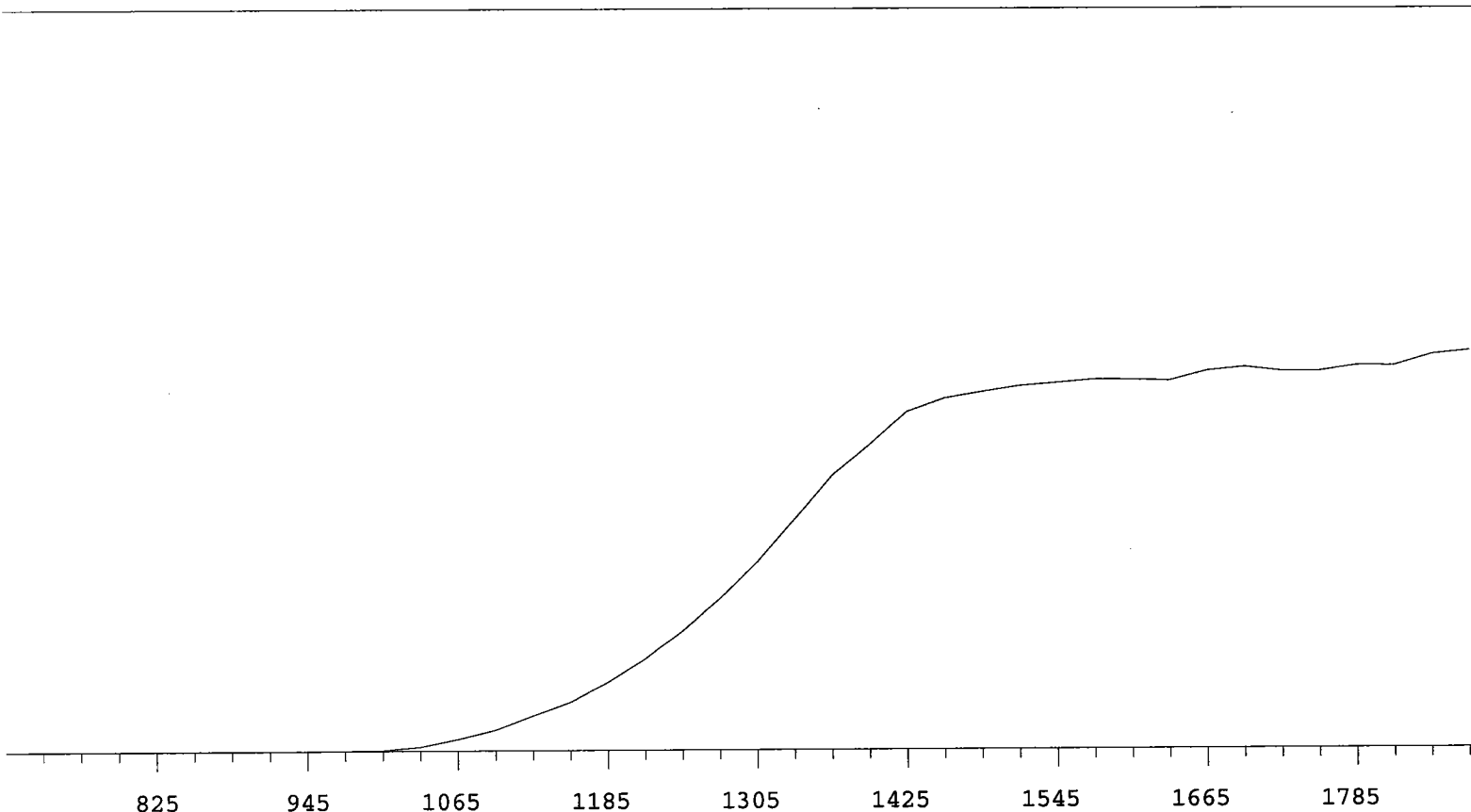


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	3225	+87.64
735	1		1335	4189	+80.15
765	0		1365	5428	+75.12
795	0	>100	1395	6662	+68.60
825	0	>100	1425	8241	+58.14
855	0	>100	1455	9857	+46.65
885	0	>100	1485	11018	+33.24
915	0	>100	1515	11953	+21.01
945	1	+0.00	1545	12538	+13.57
975	0	>100	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	





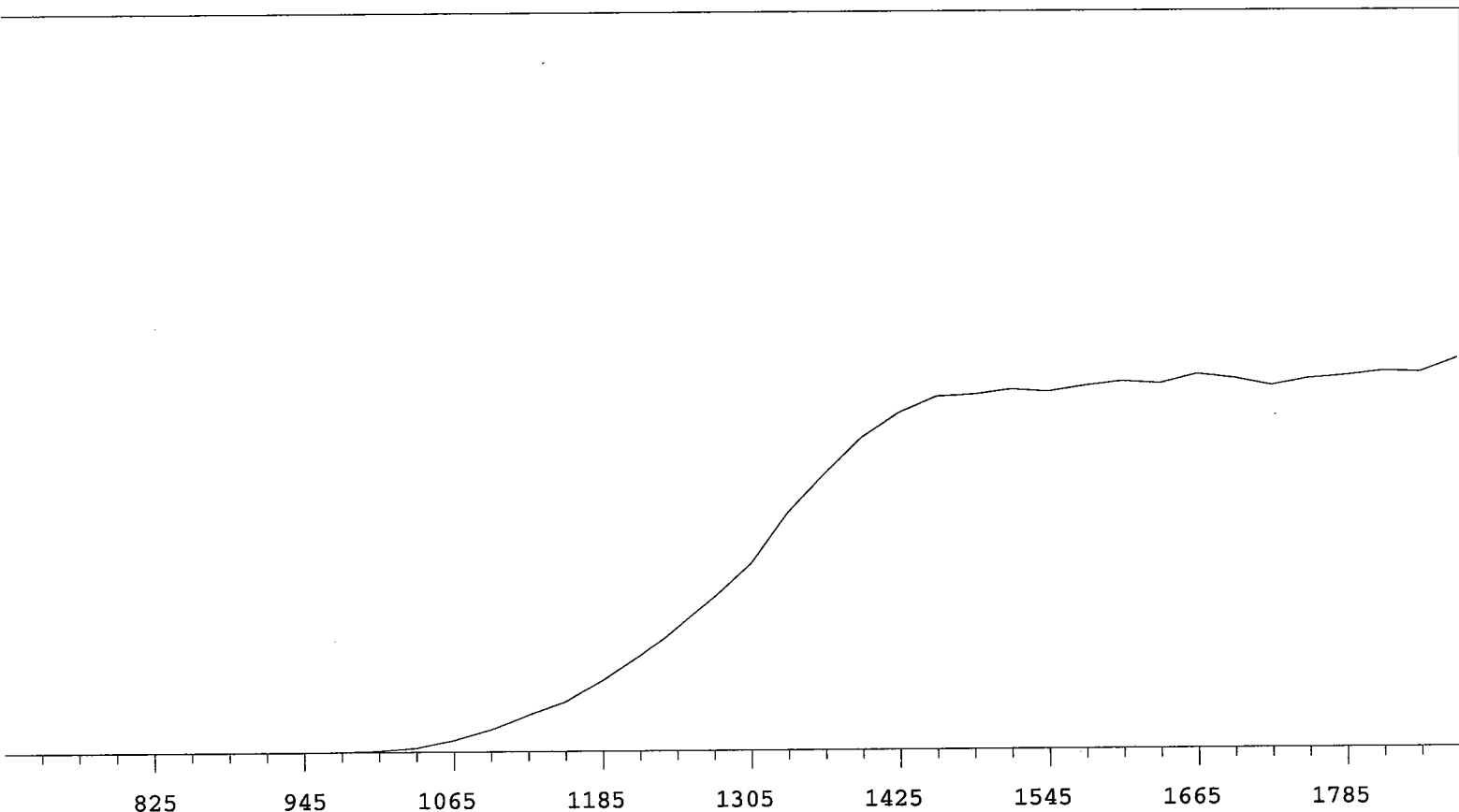
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8947	+65.63
735	0		1335	11238	+56.58
765	0		1365	13246	+46.66
795	0	>100	1395	14838	+30.69
825	0	>100	1425	16166	+20.11
855	0	>100	1455	16396	+11.95
885	0	>100	1485	17161	+5.61
915	1	>100	1515	17274	+3.59
945	0	>100	1545	17144	-0.00
975	11	>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	



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	

Alpha Volts: 1515

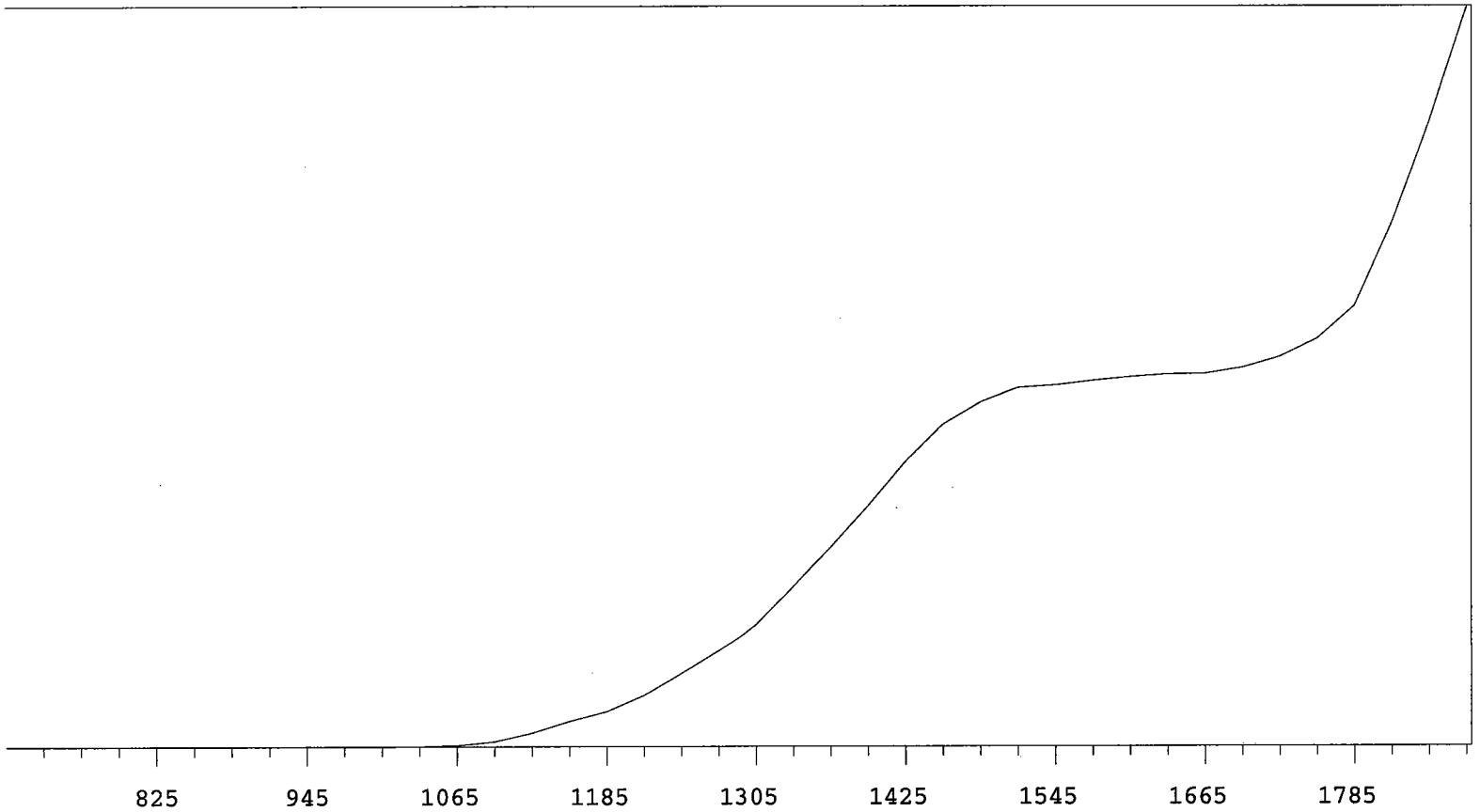
Beta Volts: 1515



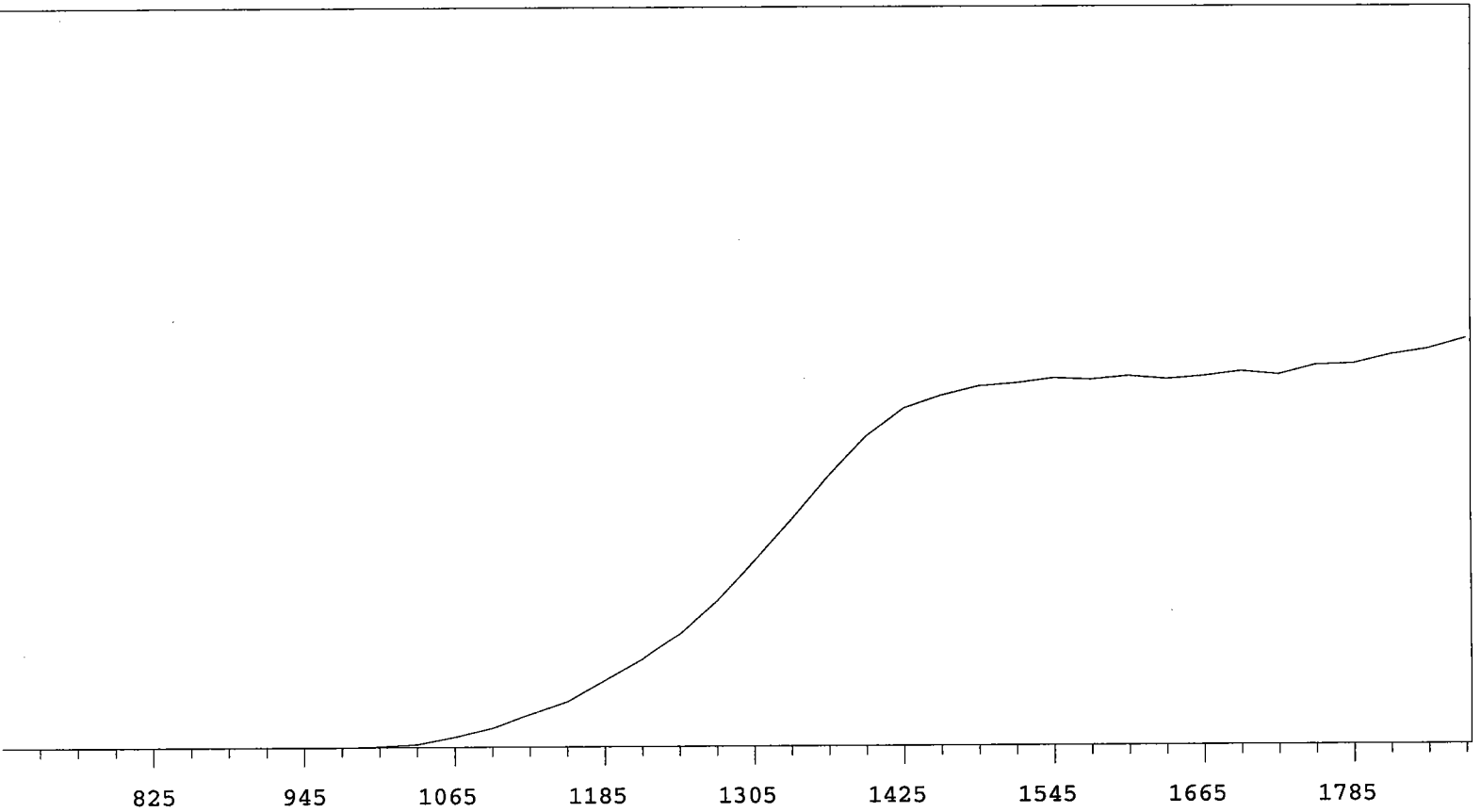
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	7679	+65.97
735	0		1335	9737	+57.57
765	0		1365	11301	+45.87
795	0	>100	1395	12767	+31.71
825	0	>100	1425	13767	+19.90
855	1	+83.33	1455	14399	+10.72
885	1	+55.56	1485	14467	+4.38
915	0	>100	1515	14671	+2.12
945	1	>100	1545	14576	+2.61
975	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



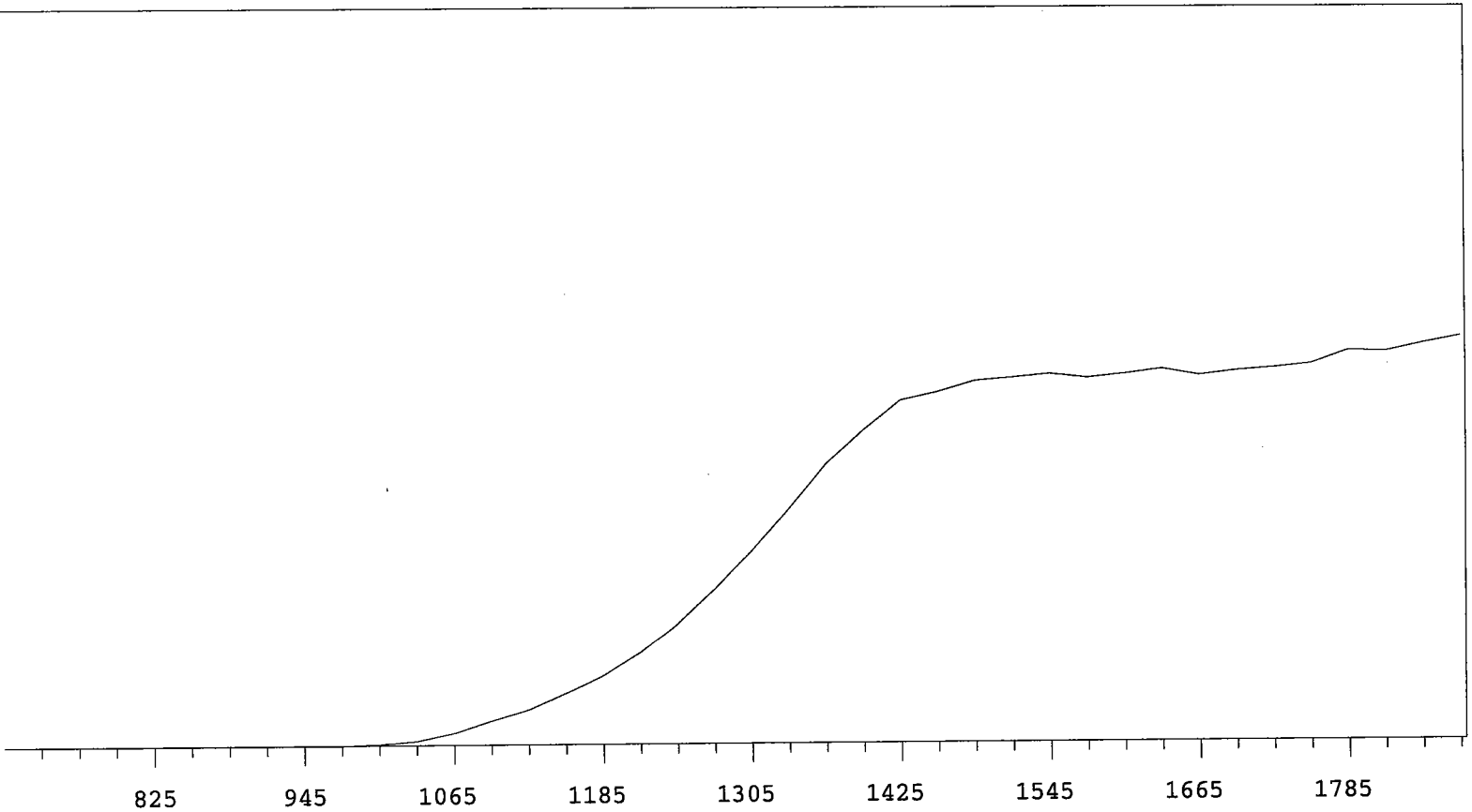
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	6302	+80.03
735	1		1335	8191	+73.78
765	0		1365	10140	+66.18
795	0	>100	1395	12247	+55.83
825	0	>100	1425	14468	+43.92
855	0	>100	1455	16303	+31.28
885	0	>100	1485	17411	+18.64
915	0	>100	1515	18150	+9.87
945	0	>100	1545	18275	+5.30
975	1	>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

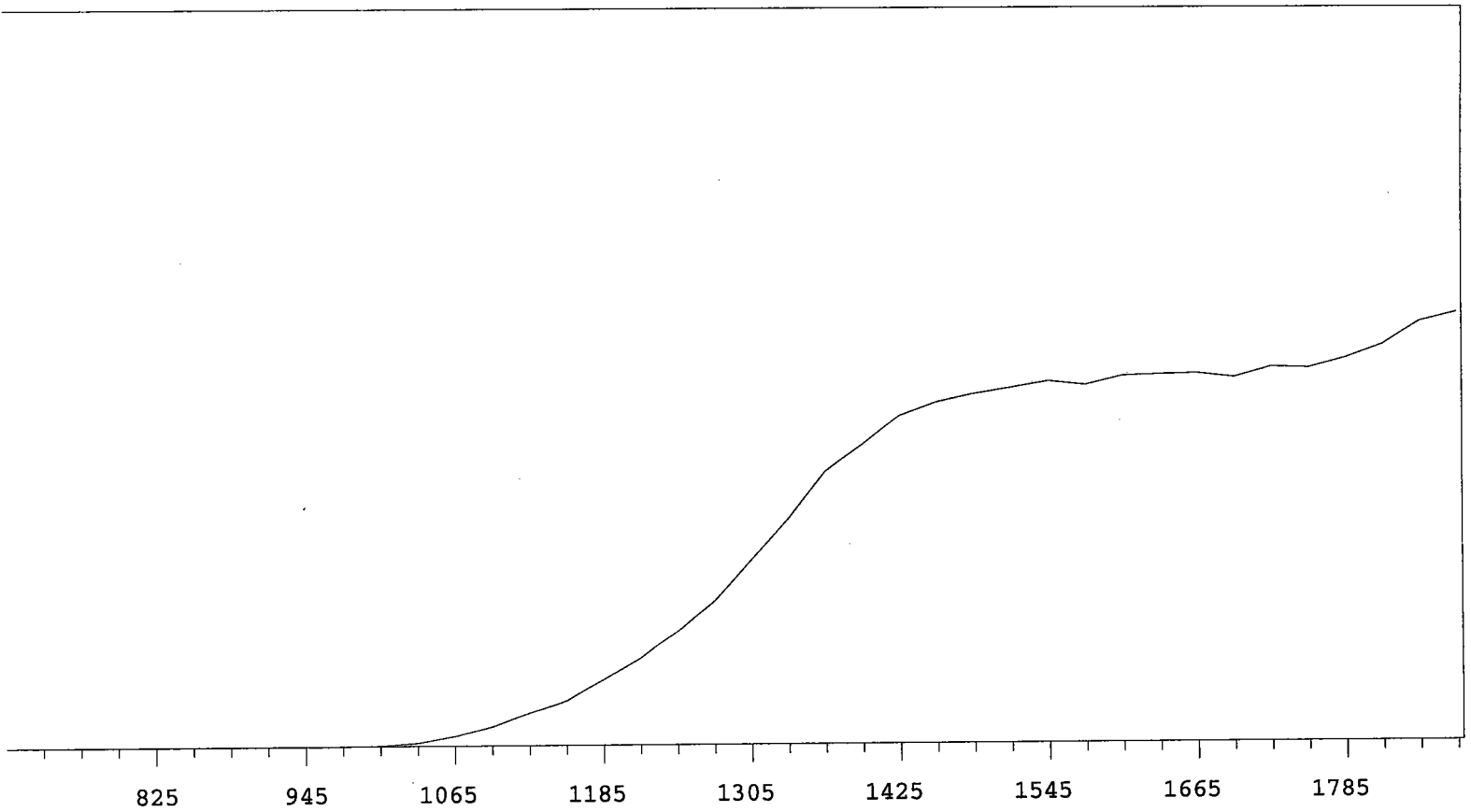
Beta Volts: 1515



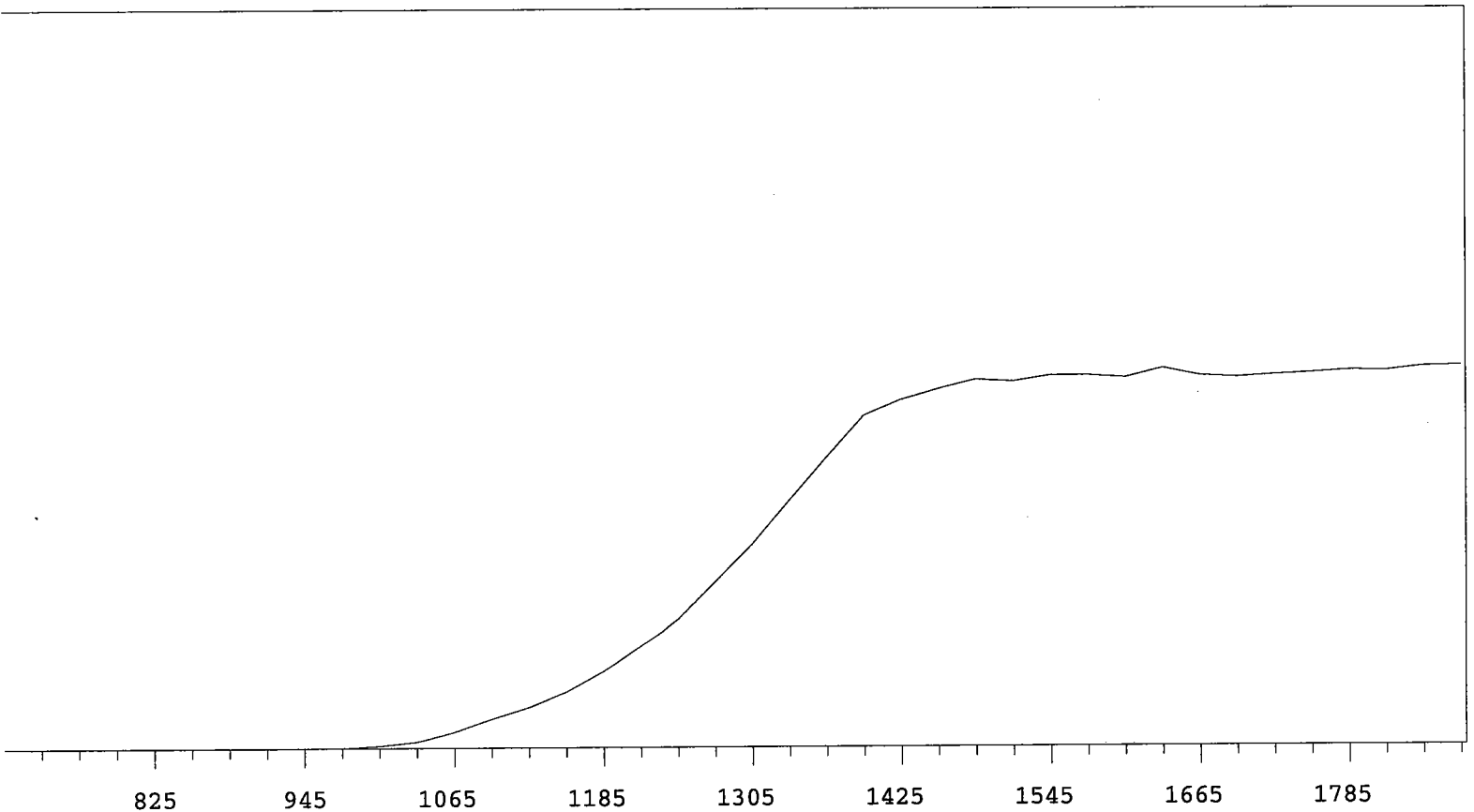
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	9543	+67.01
735	0		1335	11617	+56.47
765	0		1365	13791	+45.47
795	0	>100	1395	15387	+31.66
825	0	>100	1425	16819	+20.02
855	0	>100	1455	17210	+11.63
885	1	+0.00	1485	17742	+6.05
915	0	>100	1515	17892	+3.04
945	0	>100	1545	18070	+1.09
975	7	>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	

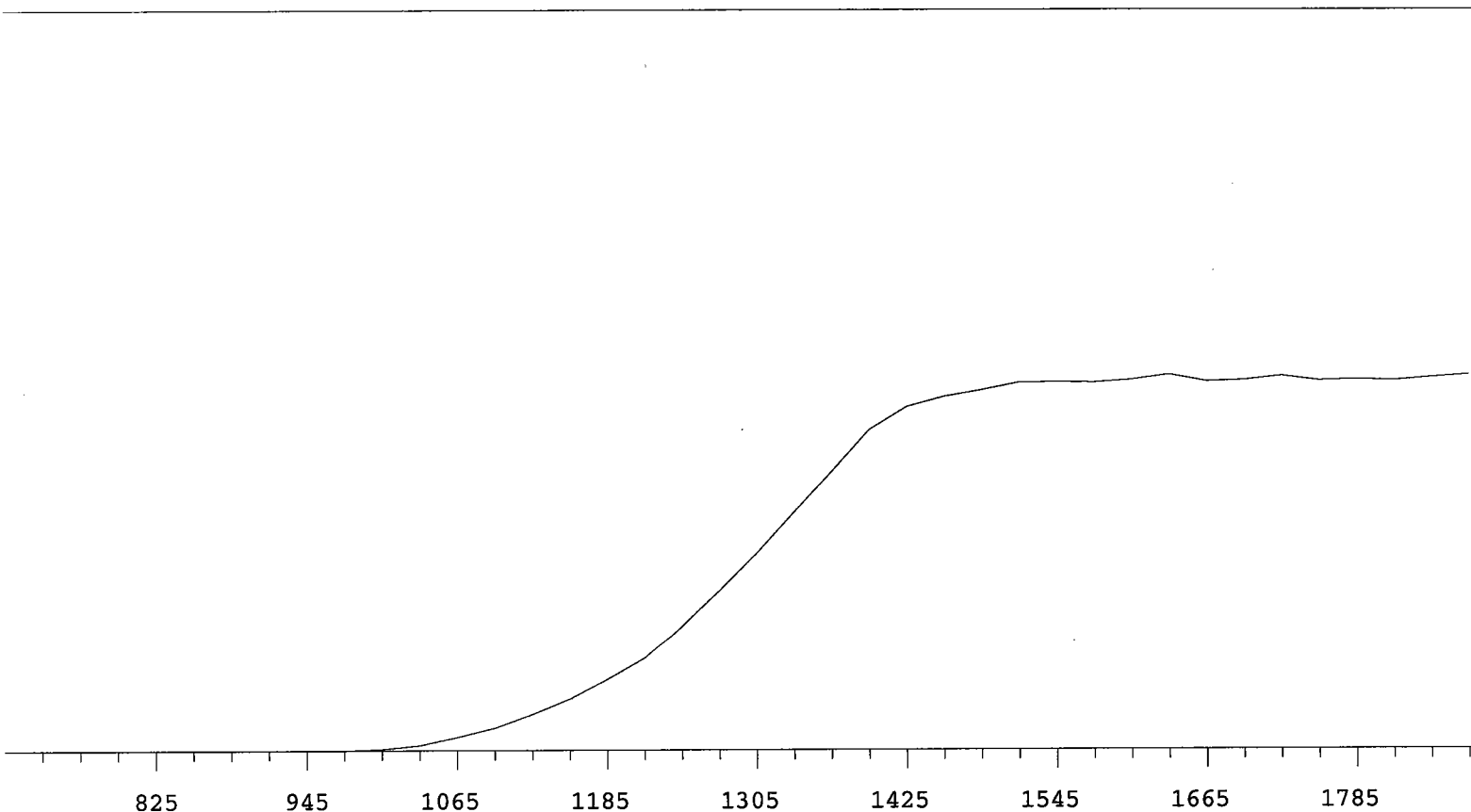


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9209	+64.55
735	1		1335	11200	+55.94
765	0	+55.56	1365	13123	+43.27
795	2	>100	1395	14957	+29.04
825	0	+0.00	1425	15658	+17.41
855	0	>100	1455	16123	+8.01
885	1	>100	1485	16530	+4.92
915	0	>100	1515	16437	+2.71
945	1	>100	1545	16704	+0.83
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	

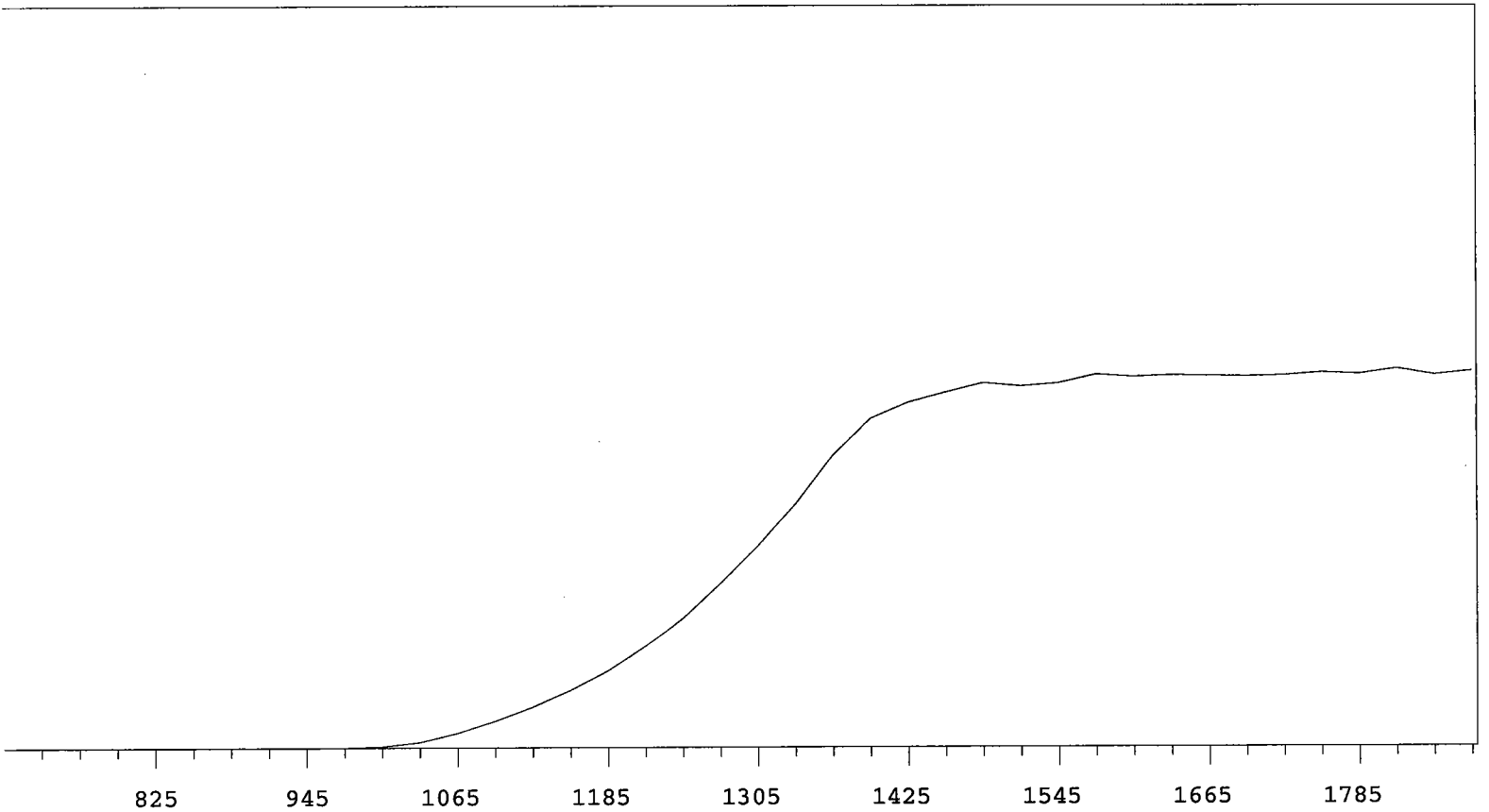


Alpha Volts: 705

Beta Volts: 1515



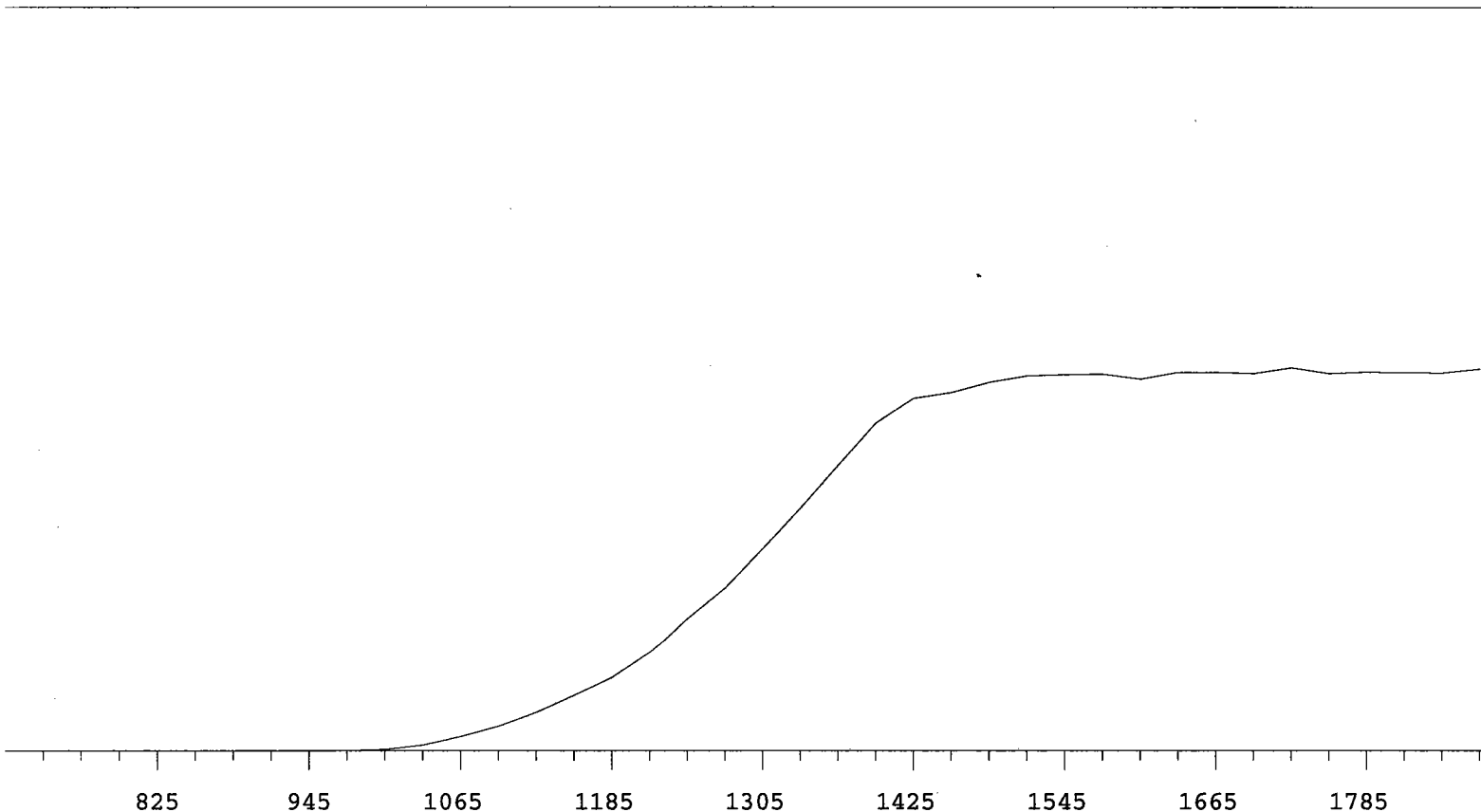
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9666	+64.39
735	0		1335	11722	+55.91
765	0		1365	13680	+44.91
795	0	>100	1395	15677	+31.56
825	0	>100	1425	16786	+19.46
855	0	>100	1455	17283	+10.57
885	0	>100	1485	17608	+5.95
915	1	>100	1515	17972	+3.32
945	0	>100	1545	18006	+1.84
975	4	>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	



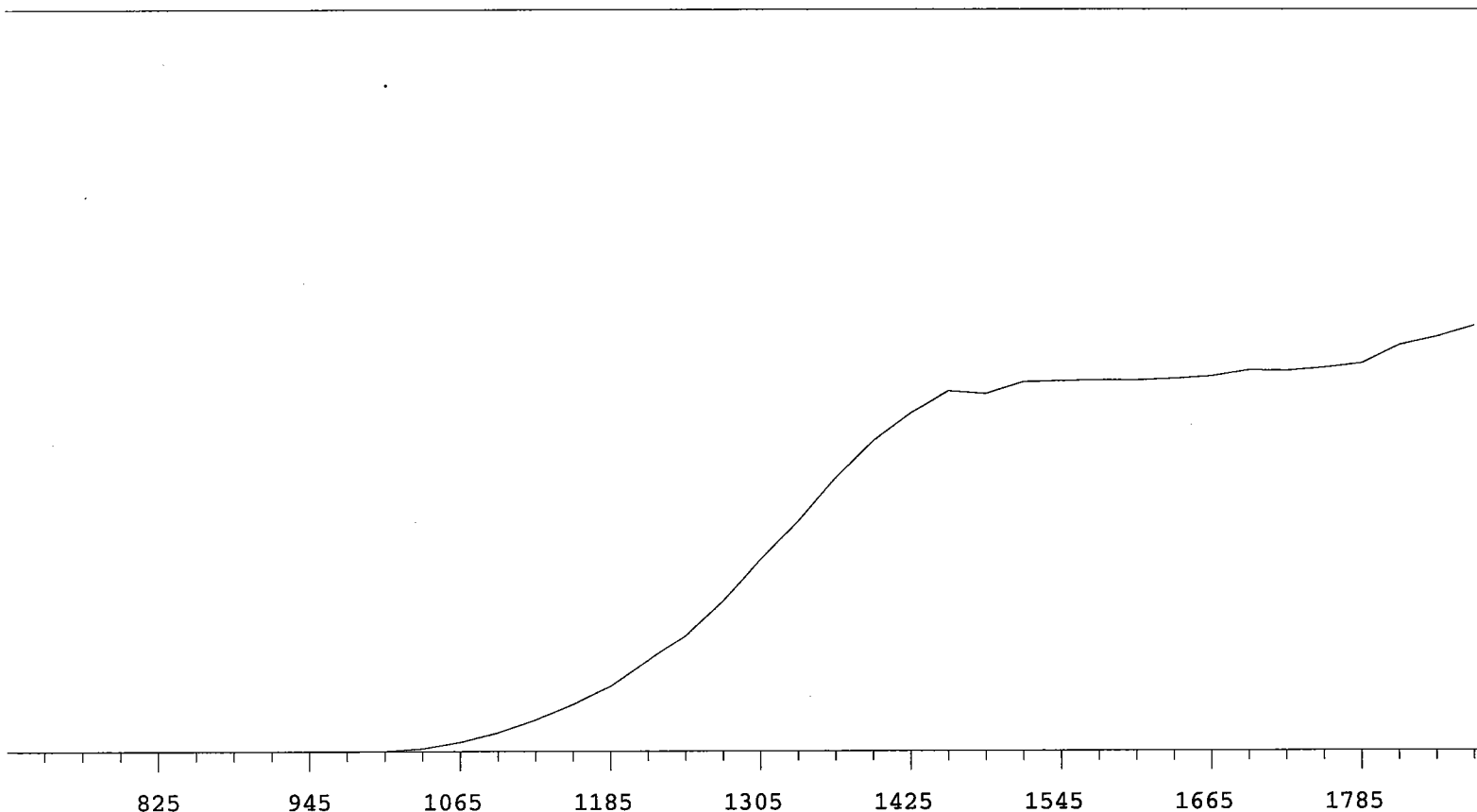
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	11573	+64.95
735	0		1335	13929	+56.47
765	0		1365	16726	+43.82
795	0	>100	1395	18834	+29.38
825	0	>100	1425	19743	+16.84
855	0	>100	1455	20314	+7.95
885	0	>100	1485	20860	+4.16
915	0	>100	1515	20670	+3.23
945	0	>100	1545	20844	+2.09
975	9	>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

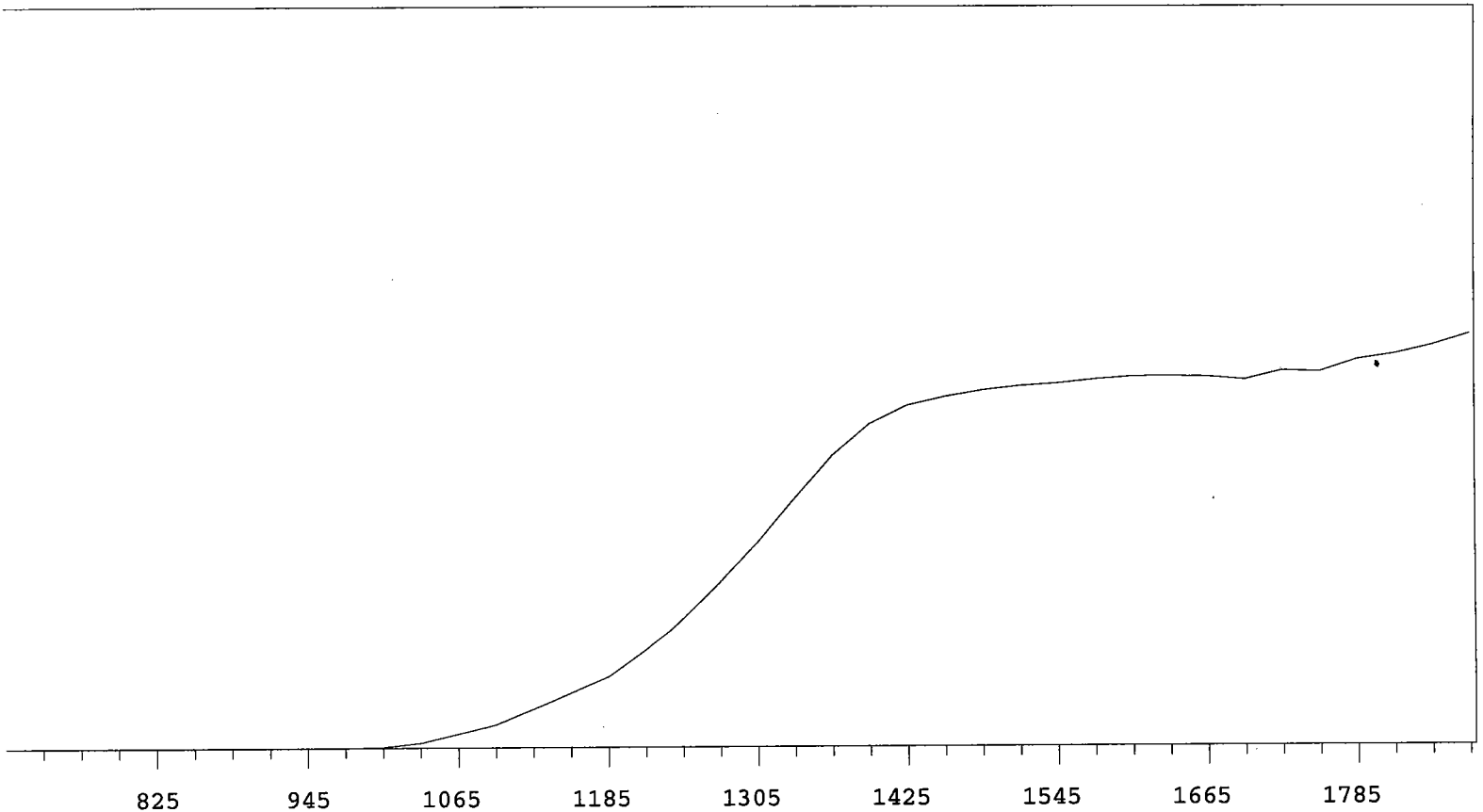
Beta Volts: 1515



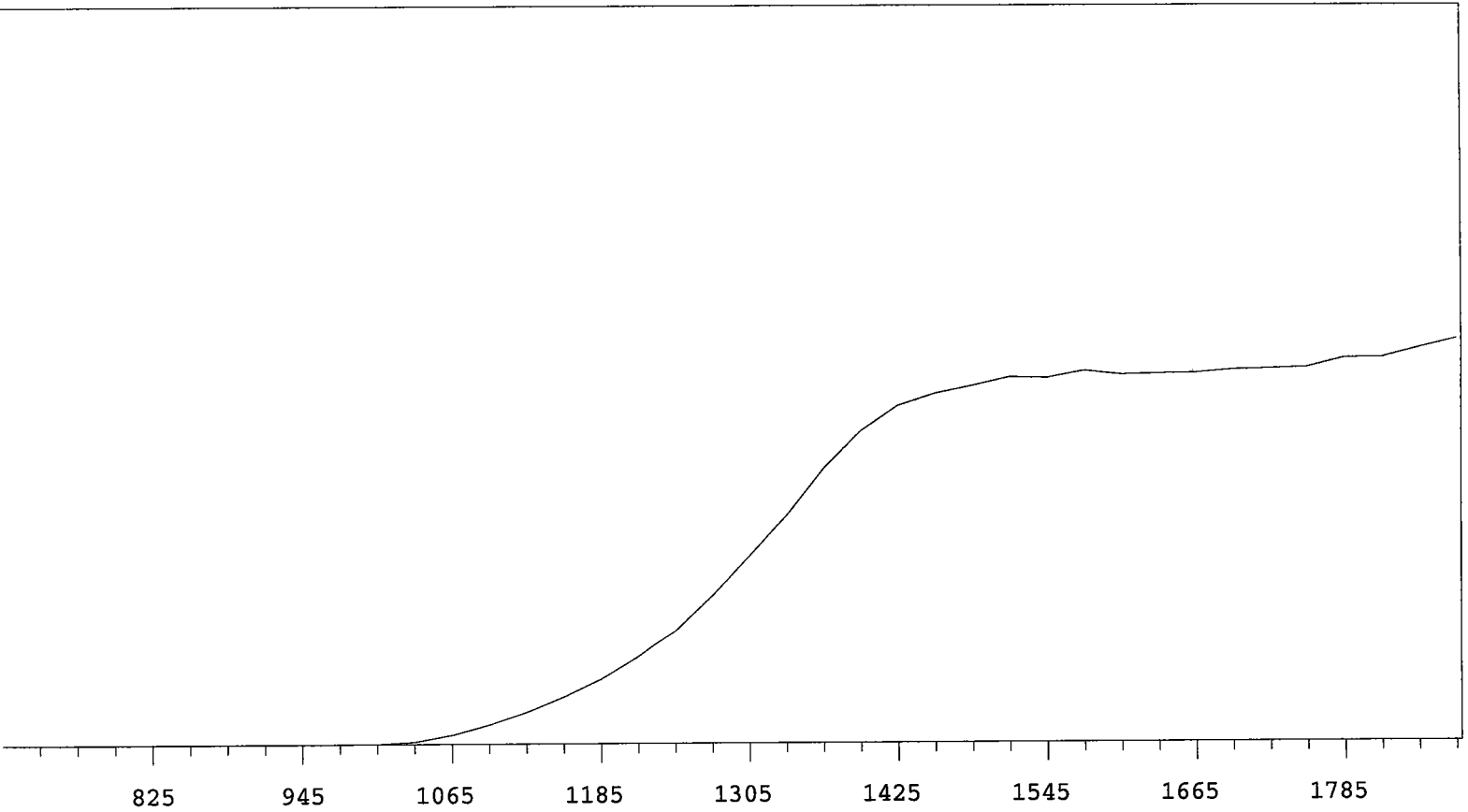
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	7524	+61.93
735	0		1335	9002	+55.36
765	0		1365	10542	+44.70
795	0	>100	1395	12064	+31.21
825	0	>100	1425	12981	+19.20
855	0	>100	1455	13192	+10.41
885	0	>100	1485	13570	+5.93
915	0	>100	1515	13820	+4.08
945	0	>100	1545	13866	+0.75
975	9	>100	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	



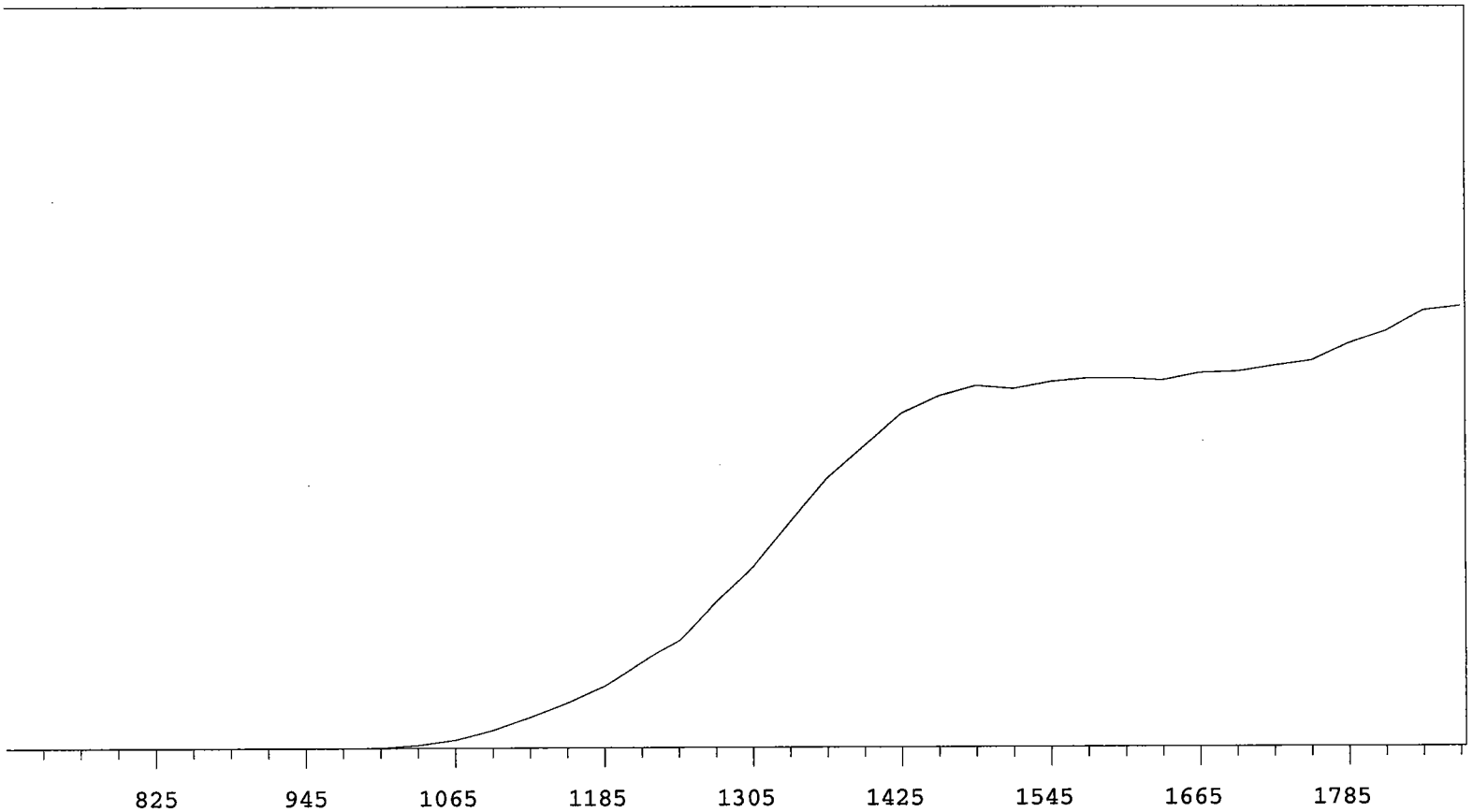
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8778	+67.49
735	0		1335	10502	+57.68
765	0		1365	12516	+46.36
795	0	>100	1395	14215	+35.88
825	0	>100	1425	15472	+22.01
855	0	>100	1455	16469	+12.99
885	1	+0.00	1485	16342	+6.70
915	0	>100	1515	16874	+3.07
945	0	>100	1545	16918	+2.53
975	0	>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	



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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (dpm/mL)}) * (\text{conversion dpm to dpm}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (dpm/mL)}) * (\text{conversion dpm to dpm}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(30.535 \text{ g}) * (13419.8626 \text{ dpm/mL}) * (1 \text{ dpm/dpm}) / (1000 \text{ mL}) = 409.7755 \text{ dpm/mL}$
$(30.535 \text{ g}) * (13419.8626 \text{ dpm/mL}) * (1 \text{ dpm/dpm}) / (\text{g/mL}) / (1000 \text{ mL}) = \text{dpm/g}$

### 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. M. Ty 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      **Pass**  
 Stdev = 3.063655617 dpm/mL      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 D. Perry* 9/16/08  
*Angela Johnson* 9/17/08

5/19/16  
26

16 SEP 2008 16:24

**ID: TOTAL ACTIVITY**

USER:11 COMMENT:GOLD

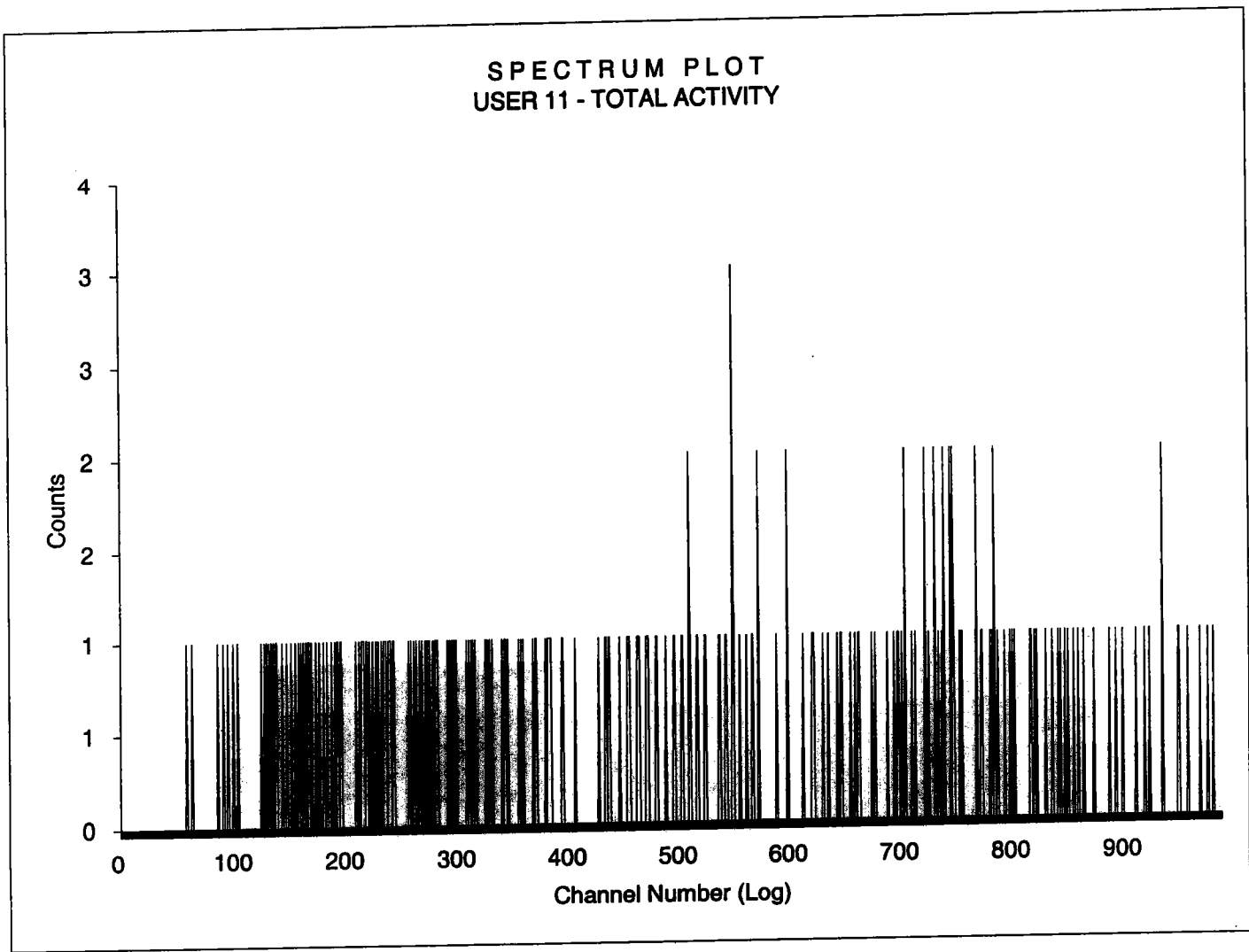
PRESET TIME : 5.00  
 DATA CALC : CPM H# :YES SAMPLE REPEATS: 1 PRINTER : STD  
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 :EDIT  
 TWO PHASE : NO AQC : NO CYCLE REPEATS : 1 DISK : OFF  
 SCINTILLATOR: LIQUID LUMEX:YES LOW SAMPLE REJ: 0  
 LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

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

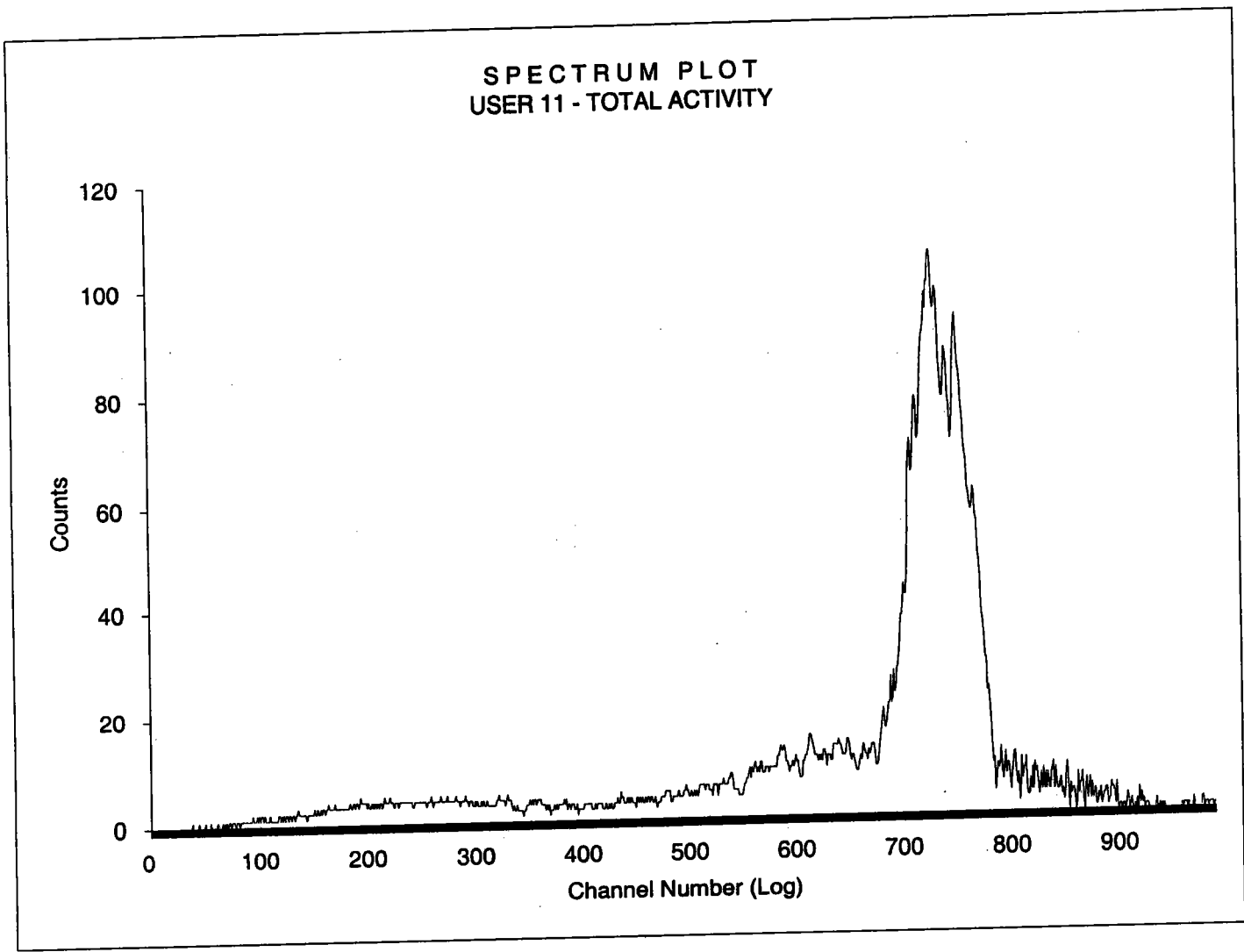
8/16/08  
228

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

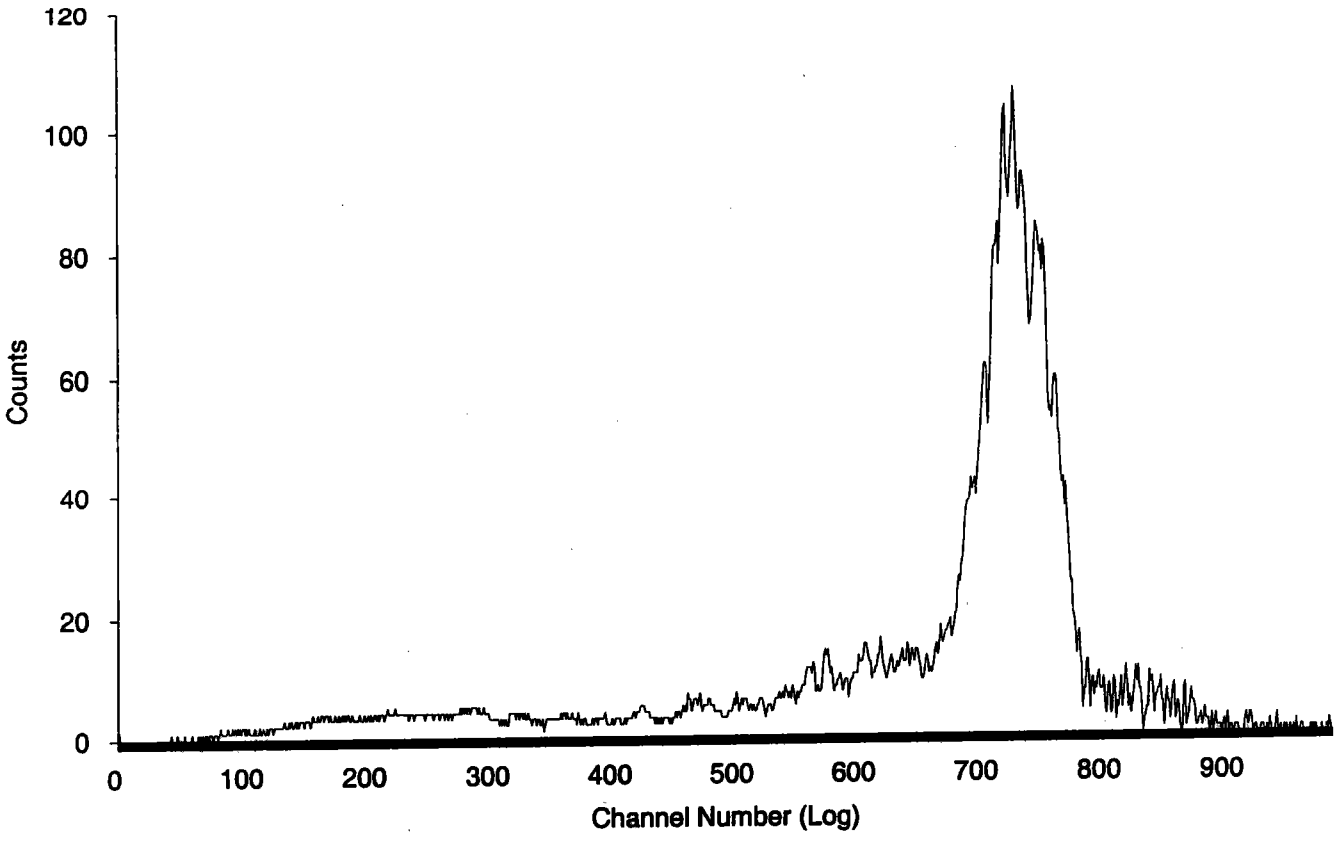
Sample Count Start Time: 16 Sep 2008 16:53:01  
Data Capture Date: 9/16/2008 16:58:06  
User Filename: S11091611-6A.WK1  
U11091611-1A.WK1  
Spectrum Type: Log Counts  
User Number: 11  
User Id: TOTAL ACTIVITY  
User Comment: GOLD  
Isotope Name: 14C  
Scintillator: LIQUID  
Sample, Rack-Pos, Time: 6 11-6 5.00  
H#, Total Counts: 110.7 7666  
Start, End, X-Axis: 0 990 Channel Number



8/16/08  
SJS

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

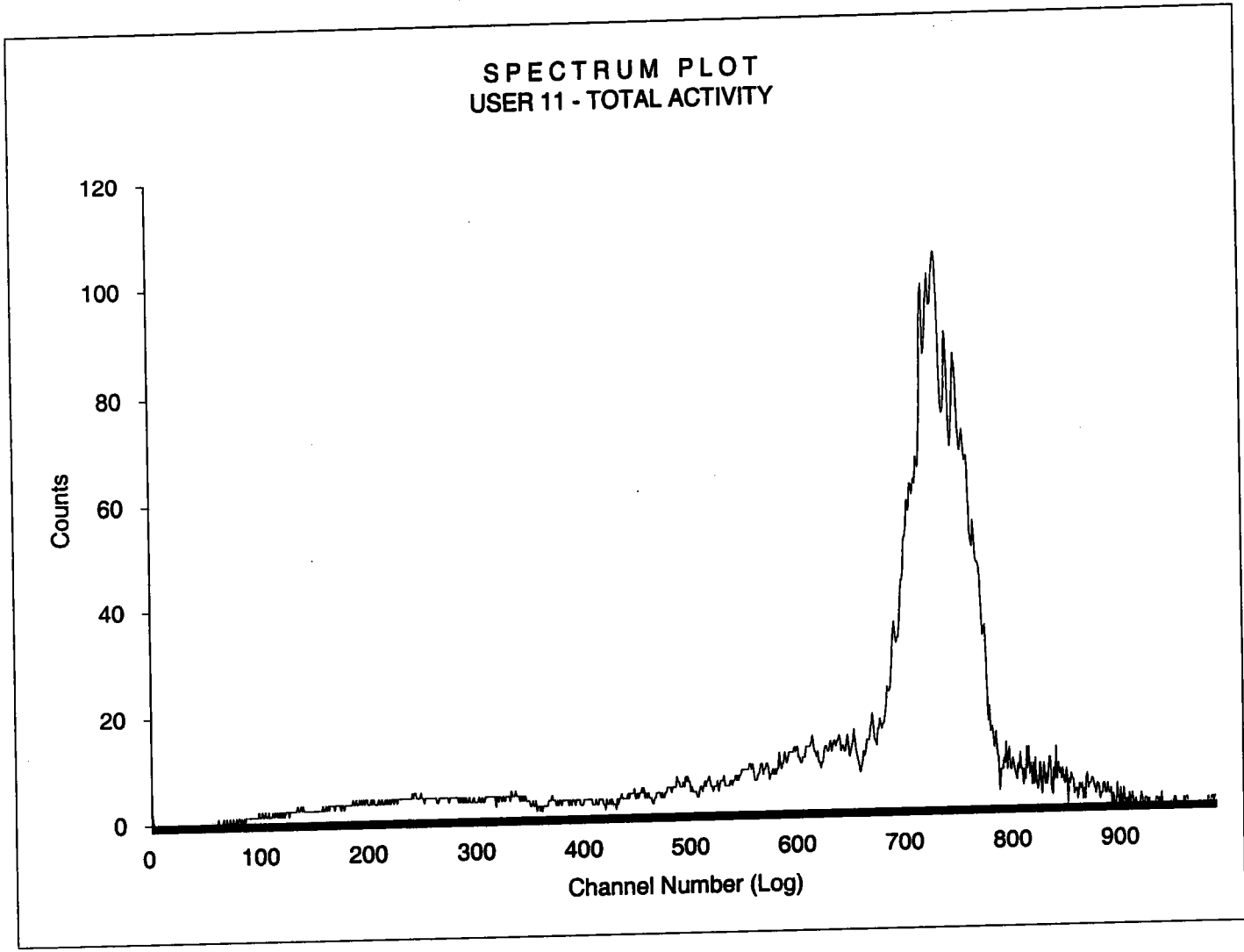
SPECTRUM PLOT  
USER 11 - TOTAL ACTIVITY





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: 7/03/2009  
 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

SLC 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

# 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?	<input checked="" type="checkbox"/>		
the second standard(s) documentation?	<input checked="" type="checkbox"/>		
standard preparation information?	<input checked="" type="checkbox"/>		
standard < 1 Year old or verified?	<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?	<input checked="" type="checkbox"/>		
Plateau generation?	<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	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
101	1.796	Average 1.751	6/11/2008 22:40	6/11/2008 14:55	6/5/2008 14:10	8	0.267	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	0.267	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	0.267	4938	30	164.60	244.63	2.91667	0.27778	3152	0.9963
102	1.677	Average 1.647	6/11/2008 23:15	6/11/2008 15:20	6/5/2008 14:10	8	0.267	7998	30	256.60	244.63	6.04861	0.32986	3102	0.9963
102	1.632	Stdev 0.026	8/4/2008 16:35	8/4/2008 9:45	8/1/2008 13:30	8	0.267	4570	30	152.33	244.63	2.84375	0.28472	3156	0.9963
102	1.632		7/31/2008 16:10	7/31/2008 9:20	7/28/2008 10:55	8	0.267	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	0.267	8620	30	287.33	244.63	5.81250	0.16667	3102	0.9963
103	1.667	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	0.267	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	0.267	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	0.267	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	1.631		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	0.267	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	0.267	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	0.267	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	0.267	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	0.267	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	0.267	8413	30	280.43	244.63	5.24306	0.18056	3116	0.9963
108	1.827		8/15/2008 16:09	8/15/2008 10:15	8/12/2008 16:10	8	0.267	5071	30	169.03	244.63	2.75347	0.19792	3167	0.9962
109	1.646	Average 1.512	6/11/2008 17:35	6/11/2008 11:45	6/5/2008 14:10	8	0.267	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	0.267	4226	30	140.87	244.63	3.00694	0.29167	3156	0.9963
110	1.664	Average 1.544	6/24/2008 21:15	6/24/2008 15:05	6/20/2008 9:50	8	0.267	6214	30	207.13	244.63	4.21875	0.26684	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	0.267	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	0.267	4103	30	136.77	244.63	3.02431	0.29514	3156	0.9963
111	1.632	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	0.267	4120	30	137.33	244.63	3.12847	0.65417	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	0.267	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	0.267	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	0.267	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	6/15/08 1410						
Cal 13	500	6/15/08 1410						
Cal 10	500	6/15/08 1410						
Cal 14	500	6/15/08 1410						
Cal 24	500	6/15/08 1410						
Cal 21	500	6/12/08 0950	6/12/08 1410	6/12/08 1720	104	1	8	7275
Cal 20	500	6/12/08 0950	6/12/08 1430	6/24/08 1820	107	1	8	18
Cal 25	500	6/12/08 0950	6/12/08 1450	6/24/08 1921	108	1	8	7547
Cal 36	500	6/12/08 0950	6/12/08 1505	6/24/08 2115	110	1	8	6214
Cal 37	500	6/12/08 0950	6/12/08 1530	6/24/08 2230	111	1	7	6071
Cal 17	500	6/12/08 0950	6/12/08 1545	6/24/08 2305	112	1	8	5592
Cal 3	500	6/12/08 0950	6/12/08 1405	6/25/08 1708	109	1	8	8275
Cal 32	500	6/12/08 0950	6/12/08 1420	6/25/08 1740	101	1	8	3362
Cal 41	500	6/12/08 0950	6/12/08 1445	6/25/08 1820	103	1	8	8905
Cal 39	500	6/12/08 0950	6/12/08 1510	6/25/08 1851	105	1	8	9300
Cal 43	500	6/12/08 0950	6/12/08 1525	6/25/08 1930	109	1	8	8121
Cal 47	500	6/12/08 0950	6/12/08 1540	6/25/08 2000	100	1	8	8413

408h/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
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
Ca127	500	6/5/08 1410	6/11/08 1015	6/11/08 1440	105	1	4	9429
Ca140	500	6/5/08 1410	6/11/08 1045	6/11/08 1510	106	1	8	3534
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
Ca132	500	6/5/08 1410	6/11/08 1350	6/11/08 2040	110	1	8	4366
Ca134	500	6/5/08 1410	6/11/08 1415	6/11/08 2115	111	1	6	6792
Ca143	500	6/5/08 1410	6/11/08 1430	6/11/08 2210	112	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						
Ca130	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						

109

100  
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	5121
<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>3159</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

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

VO 8/29/08

VO 8/29/08

Ra-226 Verification Sheet

Ring 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 1510	109	1	8	5071
Cal 13		8/12/08 1610	8/15/08 1050	8/15/08 1535	110	1	8	4377
Cal 15	500	8/15/08 0925	8/18/08 1000	8-18-08 1700	104	1	4132	462
CAL-15	500	8/15/08 0925	8/18/08 1600	8/19/08 0800	106	1	8	4132

20

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 = **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:

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

10/8/10/08  
 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. Pearce Date: 8/23/05  
 Reviewed By: John G. Adams Date: 8/28/08

Rev 1 RLM 9/10/97

## 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 D2991-6 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				

*WJ  
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-KAP-A-008 Isotope Ka-226  
 Date Standards Prepared 4/15/05 Cocktail Type Used NIA  
 Standard ID 0299-6 Matrix of Vial/Planchett NIA  
 Amount Used (g or ml) 0.1 Type of Scintillation Vial NIA  
 Standard Activity (DPM/g or ml) 2446.347 Pipette ID Used 1429303  
 Reference Date 12/15/99 Balance ID Used 36040216  
 Expiration Date 4/12/09 Quenching Agent NIA  
 Residue/Carrier Agent 0.5M HCl

	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				

NIA  
 8/25/08

Prepared By: Kelli Brown Date: 8/25/08  
 Reviewed By: James 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 12/15/99 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>10.120</del>
47	CAL 47				<del>10.120</del>
48	CAL 48				<del>10.120</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  $\nu_{\text{eff}} = \infty$  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

271

17<sup>th</sup> December 1999

1008/89/100

Nycomed  
Amersham

# 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*



# 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  
 8/27/07  
 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

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 Perce 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 12/20/08

Prepared By: Kelly Daniel Date 8/29/08

Reviewed By: John J. Adams Date 8/28/08

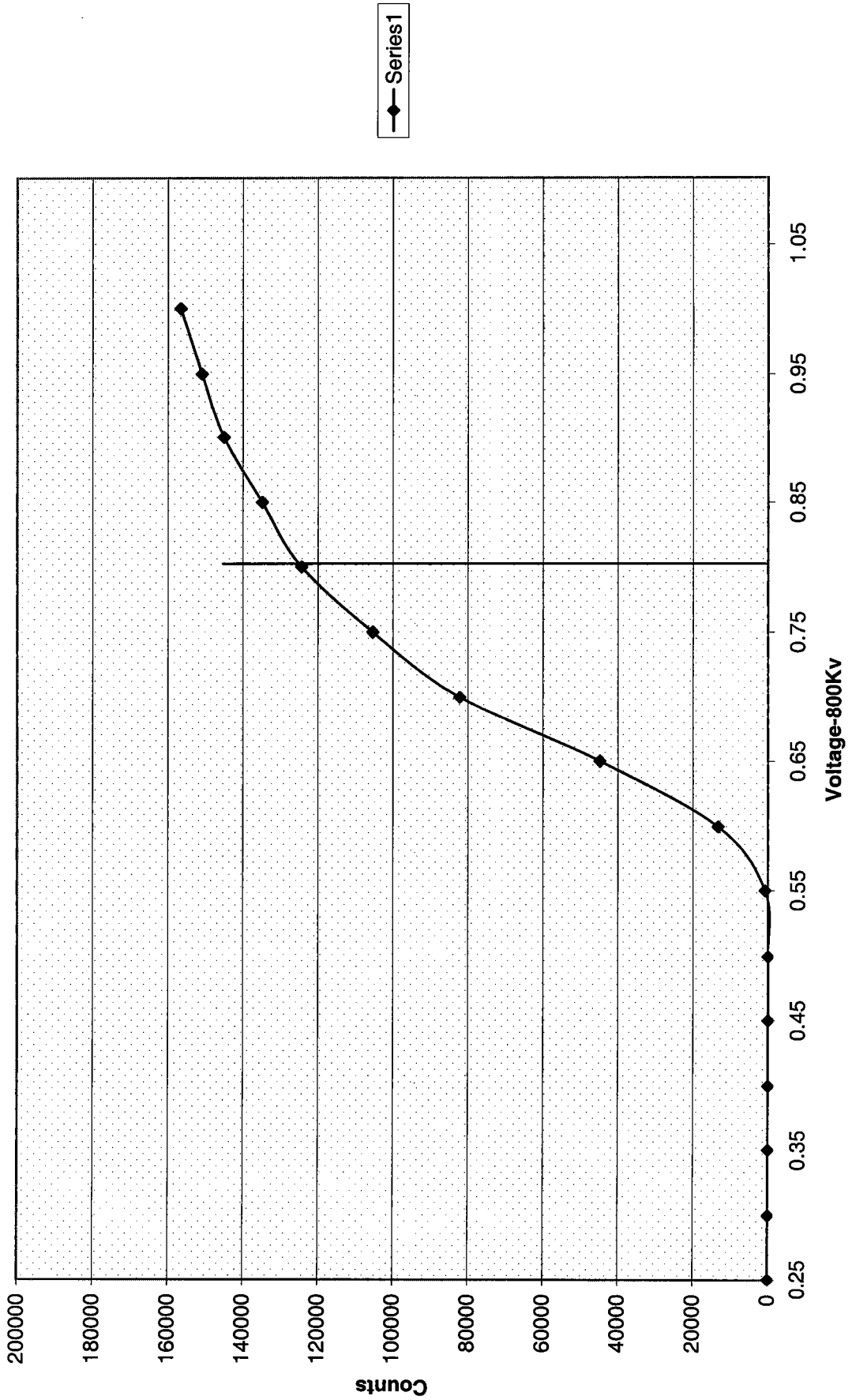


VOLTAGE CURVE 08

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

*10 8/29/08*

# 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: 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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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













# 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

Net 12/19/08  
 11/11/08  
 Mary E. Johnson 4/9/08  
 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				

Prepared By: Kelli S. Deroso Date: 12/19/08  
 Reviewed By: Mary 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  
KSD

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*







# 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. Fehr 1/4/07

## General Engineering Laboratories Verification Source Preparation Sheet

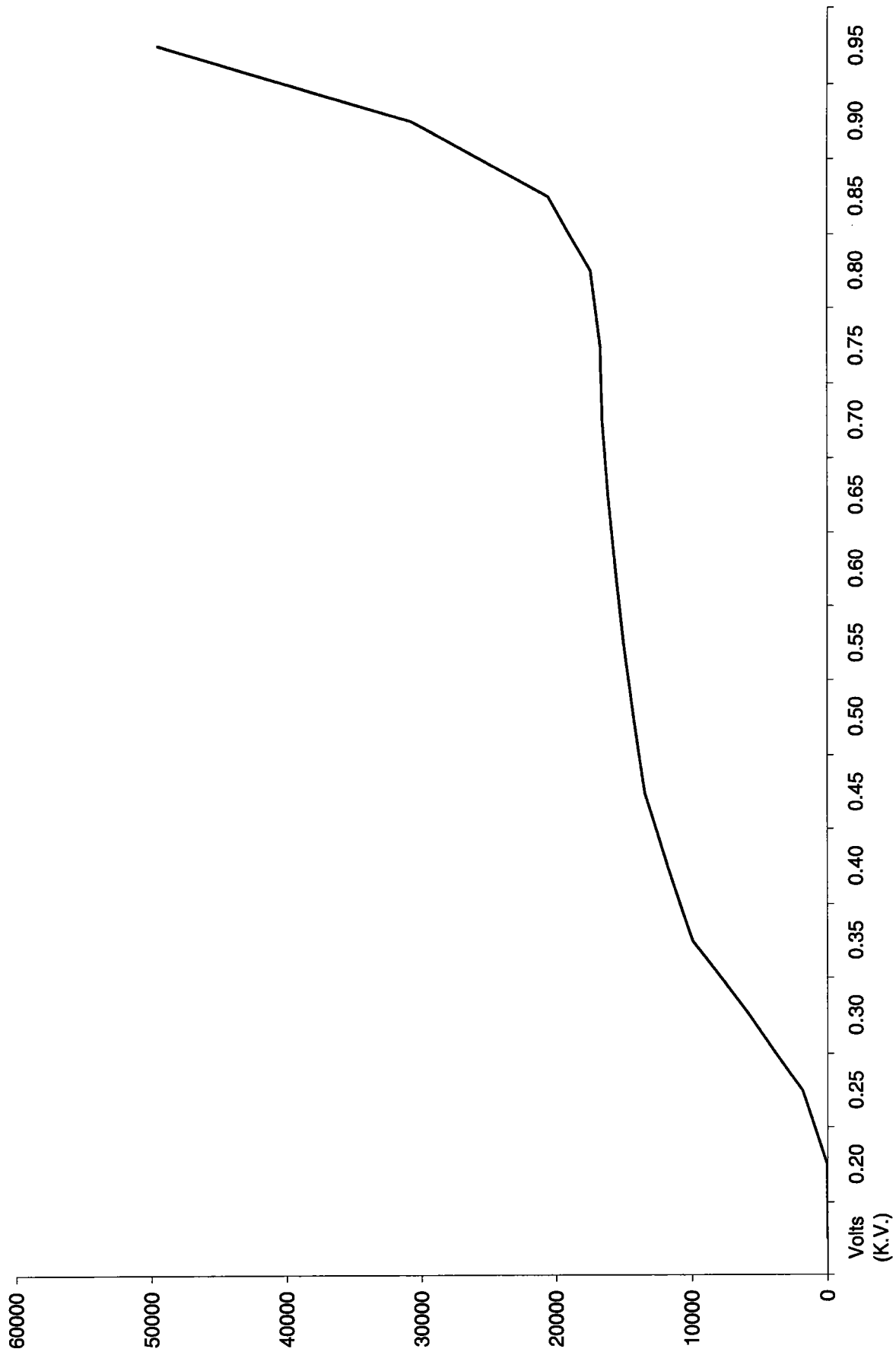
Applicable SOP Number GE-RAD-A-008 Isotope RA-226  
 Date Standards Prepared 12/18/07 Cocktail Type Used NA  
 Standard ID 0638-F Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or mL) 1127.519 Type of Scintillation Vial NA  
 Reference Date 1/23/04 Pipette ID 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





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*

12/19/2008 10:48 AM

# 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: W. 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	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	1/20/2009 11:05	1/19/2009 10:10	1/9/2009 15:45	0.267	9355	30	311.83	9.76736	1.03819	3324	0.9961
301	2.184	Stdev	1/29/2009 11:50	1/29/2009 8:50	1/26/2009 13:00	0.267	6239	30	207.97	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	4.01042	0.21528	3331	0.9961
302	2.082	Average	1/30/2009 11:30	1/30/2009 8:30	1/26/2009 13:00	0.267	7401	30	246.70	3.81250	0.12500	3334	0.9961
302	2.225	Stdev	1/29/2009 13:30	1/29/2009 9:20	1/26/2009 13:00	0.233	6335	30	211.17	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	4.03125	0.23264	3331	0.9961
303	1.958	Average	1/20/2009 13:40	1/19/2009 11:00	1/9/2009 15:45	0.267	9695	30	323.17	9.80208	1.11111	3325	0.9961
303	2.218	Stdev	1/22/2009 20:35	1/22/2009 10:05	1/19/2009 15:00	0.267	5938	30	197.93	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	4.05208	0.28819	3331	0.9961

305	1.897	Average	1/20/2009 14:50	1/19/2009 11:35	1/9/2009 15:45	0.200	9357	30	311.90	9.82639	1.13542	3325	0.9961
305	2.191	Stdev	1/22/2009 21:50	1/22/2009 11:05	1/19/2009 15:00	0.267	5921	30	197.37	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	4.09028	0.48611	3331	0.9961
306	1.730	Average	1/20/2009 15:20	1/19/2009 11:50	1/9/2009 15:45	0.167	8521	30	284.03	9.83681	1.14593	3325	0.9961
306	1.891	Stdev	1/29/2009 14:30	1/29/2009 10:20	1/26/2009 13:00	0.233	4869	30	162.30	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	4.11111	0.48611	3331	0.9961
307	1.818	Average	1/20/2009 15:50	1/19/2009 12:05	1/9/2009 15:45	0.267	8944	30	298.13	9.84722	1.15625	3325	0.9961
307	2.095	Stdev	1/30/2009 12:55	1/30/2009 9:10	1/26/2009 13:00	0.267	7442	30	248.07	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	4.12500	0.49653	3331	0.9961
308	2.129	Average	1/29/2009 15:50	1/29/2009 11:05	1/26/2009 13:00	0.133	6149	30	204.97	2.92014	0.19792	3334	0.9961
308	1.858	Stdev	1/23/2009 9:35	1/22/2009 13:45	1/19/2009 15:00	0.267	4829	30	160.97	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	4.17014	0.80208	3331	0.9961
309	1.857	Average	1/20/2009 17:20	1/19/2009 13:35	1/9/2009 15:45	0.033	9149	30	304.97	9.90972	1.15625	3325	0.9961
309	1.964	Stdev	1/23/2009 10:30	1/22/2009 14:05	1/19/2009 15:00	0.267	5100	30	170.00	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	4.18056	0.81597	3331	0.9961

311	2.140	Average	1/29/2009 16:40	1/29/2009 11:20	1/26/2009 13:00	0.267	6176	30	205.87	2.93056	0.22222	3334	0.9961
311	2.212	Stdev	1/23/2009 12:20	1/22/2009 14:25	1/19/2009 15:00	0.267	5698	30	189.93	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	4.19097	0.85417	3331	0.9961
312	1.871	Average	1/20/2009 19:16	1/19/2009 14:10	1/9/2009 15:45	0.100	9135	30	304.50	9.93403	1.21250	3325	0.9961
312	2.014	Stdev	1/29/2009 17:10	1/29/2009 11:35	1/26/2009 13:00	0.167	5814	30	193.80	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	4.20139	0.86194	3331	0.9961

K0 2/3/09



#3

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 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 144	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
Cal 13	500	11/26/09 1300						
Cal 28	500	11/26/09 1300						
Cal 36	500	11/26/09 1300						
Cal 37	500	11/26/09 1300						

100 2/3/09  
 140 2/5/09

KD  
 2/3/09  
 MUA  
 2/4/09

304

W 2/5/09

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
Cal 44	500	11/9/09 1545	11/9/09 1040	11/20/09 1150	302	3	8	8433
Cal 49	500	11/9/09 1545	11/9/09 1100	11/20/09 1340	303	3	8	9095
Cal 50	500	11/9/09 1545	11/9/09 1140	11/20/09 1470	304	3	8	1050
Cal 42	500	11/9/09 1545	11/9/09 1135	11/20/09 1450	305	3	5	9557
Cal 44	500	11/9/09 1545	11/9/09 1150	11/20/09 1520	306	3	7	8521
Cal 15	500	11/9/09 1545	11/9/09 1205	11/20/09 1550	307	3	8	8944
Cal 14	500	11/9/09 1545	11/9/09 1315	11/20/09 1645	308	3	3	6938
Cal 13	500	11/9/09 1545	11/9/09 1325	11/20/09 1720	309	3	1	9149
Cal 28	500	11/9/09 1545	11/9/09 1355	11/20/09 1840	311	3	8	8648
Cal 36	500	11/9/09 1545	11/9/09 1410	11/20/09 1916	312	3	1	9135
Cal 37	500	11/9/09 1545						

K20  
213109

K20  
213109

K20 213109

K20 213109

K20  
213109  
K20  
213109

K20  
213109

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>11/1/09 1500</del>	<del>11/2/09 0410</del>	<del>11/1/09 1525</del>	<del>301</del>	<del>3</del>	<del>8</del>	<del>6110</del>
<del>Cal 44</del>	<del>500</del>	<del>11/1/09 1500</del>	<del>11/2/09 0855</del>	<del>11/1/09 1605</del>	<del>302</del>	<del>3</del>	<del>8</del>	<del>6498</del>
Cal 119	500	11/1/09 1500	11/2/09 1005	1/22/09 2035	303	3	8	5938
<del>Cal 30</del>	<del>500</del>	<del>11/1/09 1500</del>	<del>11/2/09 1035</del>	<del>1/22/09 2120</del>	<del>304</del>	<del>3</del>	<del>8</del>	<del>5240</del>
Cal 42	500	11/1/09 1500	11/2/09 1105	1/22/09 2150	305	3	8	5921
<del>Cal 44</del>	<del>500</del>	<del>11/1/09 1500</del>	<del>11/2/09 1135</del>	<del>1/22/09 1840</del>	<del>306</del>	<del>3</del>	<del>8</del>	<del>5393</del>
<del>Cal 15</del>	<del>500</del>	<del>11/1/09 1500</del>	<del>11/2/09 1320</del>	<del>1/23/09 0950</del>	<del>307</del>	<del>3</del>	<del>8</del>	<del>5870</del>
<del>306</del>	<del>500</del>	<del>11/1/09 1500</del>	<del>11/2/09 1345</del>	<del>1/23/09 0935</del>	<del>308</del>	<del>3</del>	<del>8</del>	<del>4824</del>
Cal 13	500	11/1/09 1500	11/2/09 1405	1/23/09 1000	309	3	8	5100
Cal 28	500	11/1/09 1500	11/2/09 1425	1/23/09 1020	311	3	8	5698
<del>Cal 36</del>	<del>500</del>	<del>11/1/09 1500</del>	<del>11/2/09 1440</del>	<del>1/23/09 1035</del>	<del>312</del>	<del>3</del>	<del>8</del>	<del>5881</del>
<del>Cal 27</del>	<del>500</del>	<del>11/1/09 1500</del>	<del>11/2/09</del>	<del></del>	<del></del>	<del></del>	<del></del>	<del></del>

KO 213109

KO 213109

KO 213109

KO 213109

KO 213109

KO 213109

KO 213109  
Kut 214159

KO 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>1.26.09 1645</del>	<del>304</del>	<del>3</del>		<del>5162</del>
Ca142	500	1122109 0910	1126109 1100	1.26.09 2300	305	3	8	7280
Ca141	500	1122109 0910	1126109 1150	1.26.09 2330	306	3	8	6387
Ca115	500	1122109 0910	1126109 1210	1.27.09 0005	307	3	8	6598
Ca114	500	1122109 0910	1126109 1315	1127109 0859	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>								

LD 213109

LD 213109

LD 213109  
LD 214159

# 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      **104.944421**      **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**      **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:

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

*Handwritten notes:*  
 5/10/08  
 M. N. Roy  
 Ra-226



# 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

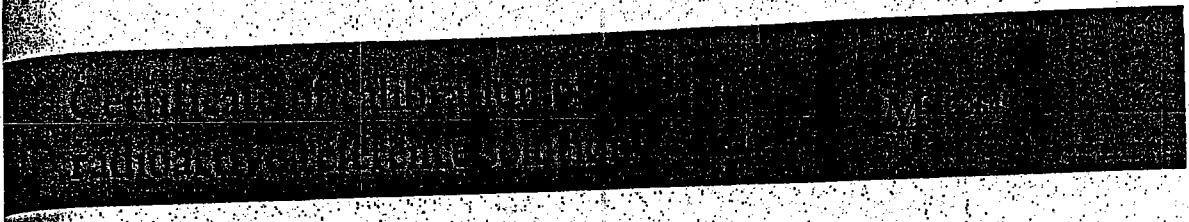
Applicable SOP Number GL RAD A 008 Isotope RA 226  
 Date Standards Prepared 4/15/09 Cocktail Type Used NA  
 Standard ID 02896 Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or ml) 2446.347 Type of Scintillation Vial NA  
 Reference Date 12/15/99 Pipette ID Used 1429303  
 Expiration Date 4/21/09 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

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.

Chemical Carrier free in 0.5M HCL

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

1 year = 365.25 days

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

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
Vex 1	500	1126109 1605	1126109 1040	1126109 1505	301	3	8	656
Vex 2	500	1126109 1605	1126109 1105	1126109 1540	303	3	8	914
Vex 3	500	1126109 1605	1126109 1130	1130109 1705	305	3	8	791
Vex 4	500	1126109 1605	1126109 1145	<del>1130109 1737</del> 1.31.09 1020	306	3	8	768
Vex 5	500	1126109 1605	1126109 1200	<del>1130109 1905</del> 1.31.09 1020	308	3	8	730
Vex 6	500	1126109 1605	1126109 1305	1.31.09 1020	309	3	8	764
Vex 7	500	1126109 1605	1126109 1320	131.09 1720	311	3	8	594
Vex 8	500	1126109 1605	1126109 1340	1126109 0845	312	3	8	542
<del>Vex 9</del>	500	1126109 1605						
Vex 10	500	1126109 1605						
Vex 11	500	1126109 1605						
Vex 12	500	1126109 1605						

11/30/09  
12/3/09

11/26/09

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
VUN 1	500	11/20/09 10:00	2/2/09 09:15	2/2/09 13:40	504	3	8	655
VUN 2	500	11/20/09 10:00	2/2/09 09:40	2/2/09 14:15	507	3	8	120
<del>VUN 3</del>	<del>500</del>	<del>11/20/09 10:00</del>	<del>2/2/09 11:15</del>	<del>2/2/09 14:50</del>	<del>509</del>	<del>3</del>	<del>8</del>	<del>754</del>

LO 213109

LO 213109

LO 213109

## Verification for Ra-226 Standard 0638-F

	Isotope	Value	Uncertainty
D. Roy 2/2/2009	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 2/4/09  
*[Signature]*  
 Amanda L. Lehn  
 2/4/09

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-RAD-008 Isotope Pb-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 2/14/09 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 Brunell Date 2/13/09  
 Reviewed By: [Signature] Date 2/14/09

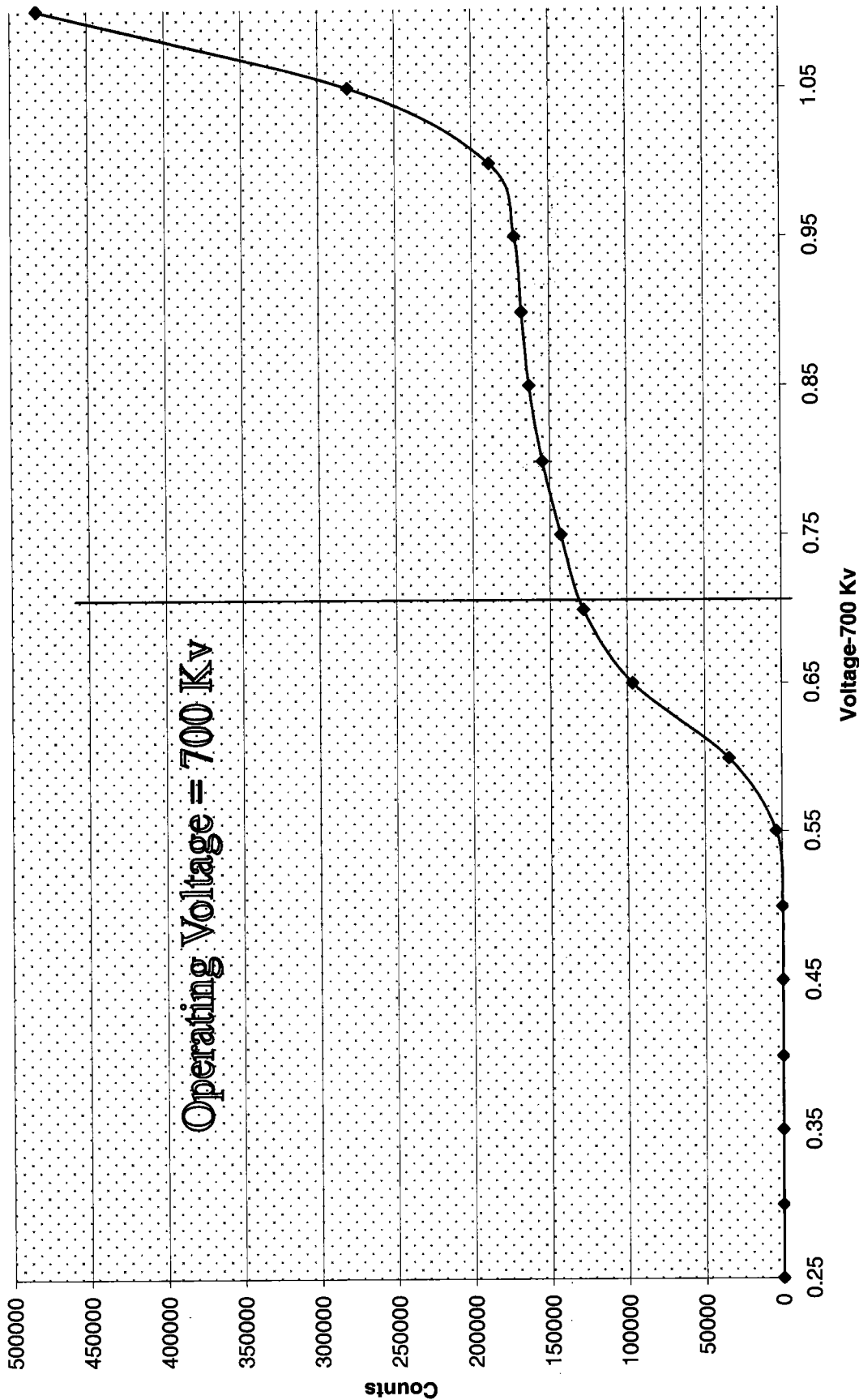


## Voltage Curve 1-09

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



2/12/72  
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. ... 3/2/09*  
*Miki Davel 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 Type of Scintillation Vial NA  
 Standard Activity (DPM/g or mL) 2446.347 Pipette ID Used 1429303  
 Reference Date 4/15/09 Balance ID Used 3604026  
 Expiration Date 4/15/09 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)
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 0.1 Matrix of Vial/Planchet NA  
 Standard Activity (DPM/g or mL) 2.446.347 Type of Scintillation Vial NA  
 Reference Date 12/5/99 Pipette ID Used 1429305  
 Expiration Date 4/2/09 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: Valli Perera Date 3/2/09  
 Reviewed By: Aylee A. G... Date 3/2/09

Rev 1 RLM 9/10/97





# Standard Traceability Log Rad

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:	

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

326

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

$(\text{Mass of parent(g)}) * (\text{Parent Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parent Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 122414.2500 \text{ dpm/mL}$
$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0012 \text{ g/mL}) / (100 \text{ mL}) = 122273.3377 \text{ dpm/g}$

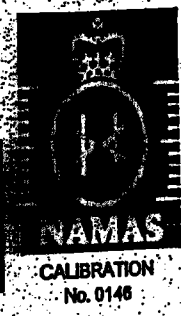
### Secondary Standards

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  $\nu_{\text{eff}} = \infty$  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

Nycomed  
Amersham

# 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*  
*WMS*

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
<del>41</del>	<del>1050</del>	<del>11/30/09 1050</del>	<del>2/3/09 1435</del>	<del>2.3.09 1710</del>	<del>401</del>	<del>4</del>	<del>8</del>	<del>6763</del>
<del>47</del>	<del>1050</del>	<del>11/30/09 1050</del>	<del>2/3/09 1510</del>	<del>2.3.09 1800</del>	<del>402</del>	<del>4</del>	<del>8</del>	<del>9067</del>
<del>49</del>	<del>1050</del>	<del>11/30/09 1050</del>	<del>2/3/09 1535</del>	<del>2.3.09 1840</del>	<del>403</del>	<del>4</del>	<del>8</del>	<del>7092</del>
<del>50</del>	<del>1050</del>	<del>11/30/09 1050</del>	<del>2/3/09 1400</del>	<del>2.3.09 1915</del>	<del>404</del>	<del>4</del>	<del>8</del>	<del>7877</del>
<del>42</del>	<del>1050</del>	<del>11/30/09 1050</del>	<del>2/3/09 1435</del>	<del>2.3.09 2035</del>	<del>405</del>	<del>4</del>	<del>8</del>	<del>8700</del>
<del>44</del>	<del>1050</del>	<del>11/30/09 1050</del>	<del>2/3/09 1500</del>	<del>2.3.09 2110</del>	<del>409</del>	<del>4</del>	<del>8</del>	<del>7949</del>
<del>15</del>	<del>1050</del>	<del>11/30/09 1050</del>	<del>2/3/09 1530</del>	<del>2.4.09 0830</del>	<del>410</del>	<del>4</del>	<del>8</del>	<del>4108</del>
<del>44</del>	<del>1050</del>	<del>11/30/09 1050</del>	<del>2/3/09 1545</del>	<del>2.4.09 1015</del>	<del>411</del>	<del>4</del>	<del>8</del>	<del>7582</del>
<del>42</del>	<del>1050</del>	<del>11/30/09 1050</del>	<del>2/3/09 1600</del>	<del>2.4.09 1100</del>	<del>412</del>	<del>4</del>	<del>8</del>	<del>9523</del>
<del>48</del>								
<del>36</del>								

160  
3/2/09

160  
3/2/09  
160 3/2/09

160  
3/2/09

160 3/2/09  
160  
3/2/09

160  
3/2/09

160  
3/2/09

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	2.23.09 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	5887 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 0940	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 3/12/09

K40 3/12/09

K40 2/25/09

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	2/20/09 1725	2/25/09 0755	2/25/09 1440	401	4	8	5677
15	500	2/20/09 1725	2/25/09 0815	2/25/09 1525	402	4	8	8017
14	500	2/20/09 1725	2/25/09 0835	2/25/09 1555	403	4	8	5562
40	500	2/20/09 1725	2/25/09 0855	2.25.09 20:20	404	4	8	7075
47	500	2/20/09 1725	2/25/09 1010	2.25.09 20:55	405	4	8	6721
10	500	2/20/09 1725	2/25/09 1040	<del>2.26.09 20:22</del> <del>2.25.09 20:55</del> <del>2.26.09 20:22</del>	406	4	8	7091
25	500	2/20/09 1725	2/25/09 1110	2.25.09 22:05	407	4	8	2827
22	500	2/20/09 1725	2/25/09 1145	<del>2.25.09 22:45</del> <del>2.25.09 22:55</del>	408	4	8	5137
29	500	2/20/09 1725	2/25/09 1210	2/26/09 0810	409	4	8	5169
28	500	2/20/09 1725	2/25/09 1305	2/26/09 0850	410	4	8	6838
9	500	2/20/09 1725	2/25/09 1310	2/26/09 0930	411	4	8	6734
34	500	2/20/09 1725	2/25/09 1405	2/26/09 1015	412	4	8	7137

HP 3/2/09  
HP 3/2/09  
HP 3/2/09  
HP 3/2/09

HP 3/2/09

HP 3/2/09

HP 3/2/09

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 43	500	2/23/09 16:05	2/27/09 09:30	2/27/09 12:15	401	4	8	5474
Cal 43	500	2/23/09 16:05	2/27/09 09:30	2/27/09 14:16	402	4	8	7507
Cal 4	500	2/23/09 16:05	2/27/09 10:50	2/28/09 14:50	403	4	8	5182
Cal 42	500	2/23/09 16:05	2/27/09 10:30	2/27/09 15:25	404	4	8	7443
Cal 13	500	2/23/09 16:05	2/27/09 10:55	2/28/09 16:00	405	4	8	6612
Cal 44	500	2/23/09 16:05	2/27/09 11:30	2/27/09 16:35	409	4	8	7516
Cal 9	500	<del>2/23/09 16:05</del>	<del>2/27/09 11:50</del>	<del>2/27/09 17:15</del>	<del>410</del>	<del>4</del>	<del>8</del>	<del>7850</del>
Cal 40	500	2/23/09 16:05	2/27/09 12:20	2/27/09 17:15	411	4	8	2357
Cal 46	500	2/23/09 16:05	2/27/09 12:45	2/27/09 18:20	412	4	8	7495

160312109  
6357  
1640  
2/28/09

1640  
312109

~~NO WORK~~



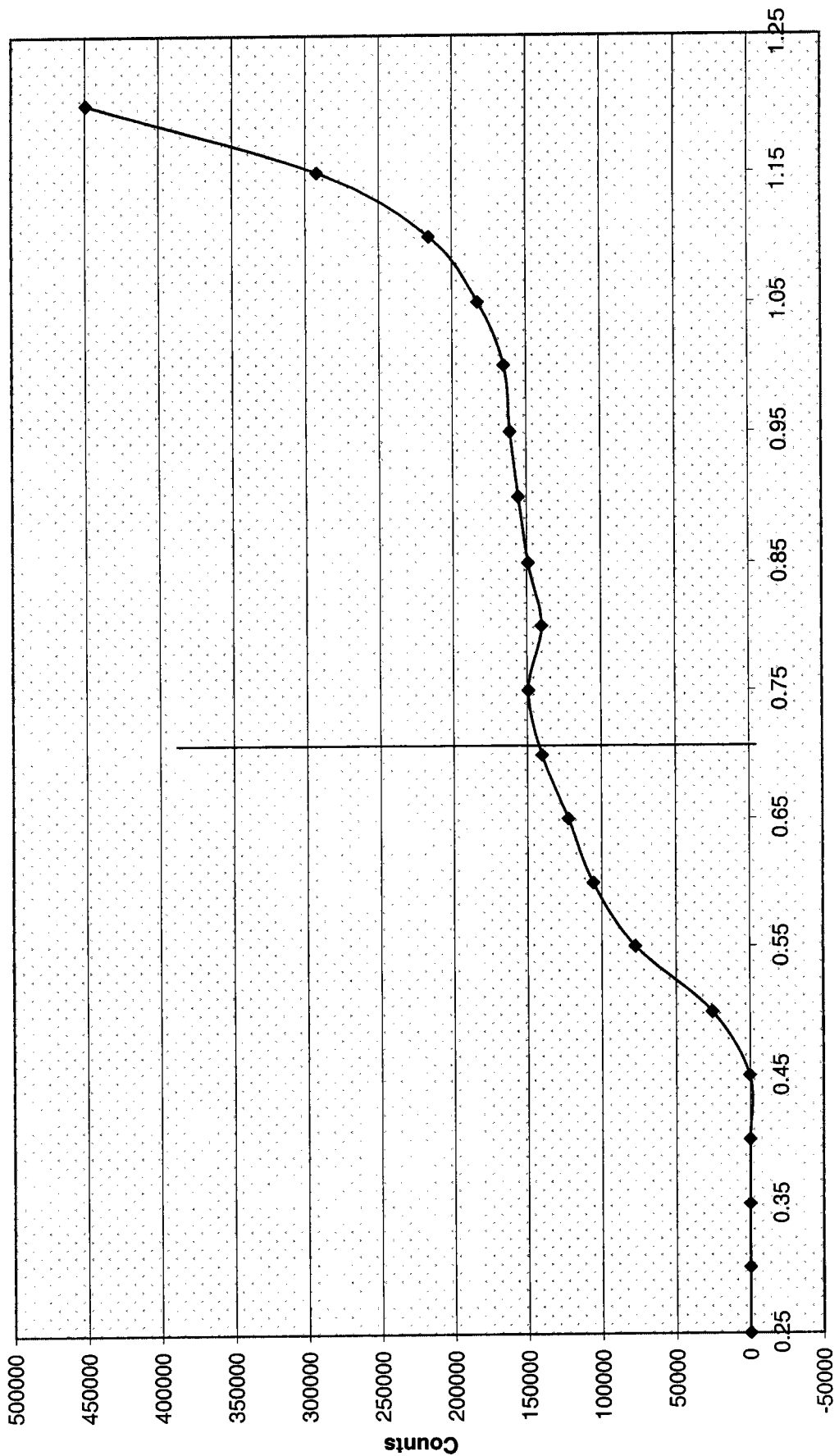


Voltage Curve Ludlum # 4				
Volts (K.V.)	Counts	Date	Time	Detector
0.20	0	2/2/2009	9:00	4
0.25	0	2/2/2009	9:00	4
0.30	0	2/2/2009	9:00	4
0.35	0	2/2/2009	9:00	4
0.40	0	2/2/2009	9:00	4
0.45	473	2/2/2009	9:00	4
0.50	25577	2/2/2009	9:00	4
0.55	77365	2/2/2009	9:00	4
0.60	105618	2/2/2009	9:00	4
0.65	122379	2/2/2009	9:00	4
0.70	140073	2/2/2009	9:00	4
0.75	149183	2/2/2009	9:00	4
0.80	140046	2/2/2009	9:00	4
0.85	149183	2/2/2009	9:00	4
0.90	155553	2/2/2009	9:00	4
0.95	161020	2/2/2009	9:00	4
1.00	165182	2/2/2009	9:00	4
1.05	182720	2/2/2009	9:00	4
1.10	215932	2/2/2009	9:00	4
1.15	292211	2/2/2009	9:00	4
1.20	449383	2/2/2009	9:00	4

*JAG  
3/2/09*

*1/m 3/2/09*

Ludlum 4 Voltage Curve



Voltage-710 Kv

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 secondary 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 Brancee

Date: 3/24/09

Reviewed By: Angela 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	3378	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	3/10/2009 14:00	8653	30	288.43	243.03	7.00000	0.95833	3382	0.9960

\*Backgrounds are not significant enough to be considered in calculations. ANSI N42.25-1997 (B.2).

ERR 0.143768 <- Put in Machines.xls (Lucas Cell Tab)

Calibration  
Ra-226 Verification-Sheet  
3/14/09

Cal # 5

no 3124109  
3119109

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	3/3/09 0815	3/6/09 0750	501	5	8	5781
<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>4700</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







# Ra-226 Calibration Sheet

Standard ID: 0124109

Volume Added (mL): 1.1

Expiration Date: 4/12/09

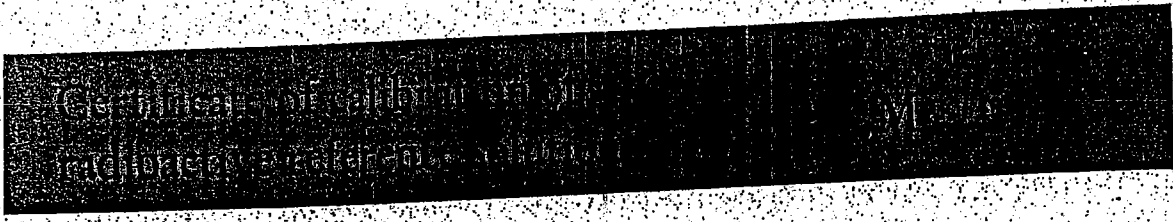
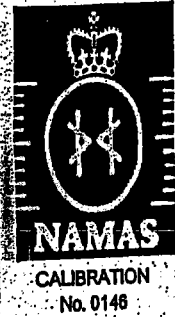
Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 42	500	3/12/09 1210	3/12/09 1515	3/19/09 2015	503	85	8282
Cal 19	500	3/12/09 1210	3/12/09 1530	3/19/09 2030	504	5	8310
Cal 44	500	3/12/09 1210	3/12/09 1545	3/19/09 2130	508	5	7561
<del>Cal 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>7942</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 343

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 Sporell*

# 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**

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.

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				

VLD 3/24/09

Prepared By: Kelli D'Amico 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  
 Date Standards Prepared 4/5/09  
 Standard ID 02996  
 Amount Used (g or ml) 0.1  
 Standard Activity (DPM/g or mL) 2146.347  
 Reference Date 12/15/99  
 Expiration Date 4/2/09  
 Residue/Carrier Agent 0.5M HCl

Isotope DIA 226  
 Cocktail Type Used NA  
 Matrix of Vial/Planchett NA  
NA  
NA  
 Type of Scintillation Vial NA  
 Pipette ID Used 1429303  
 Balance ID Used 3604026  
 Quenching Agent NA

	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>46</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*

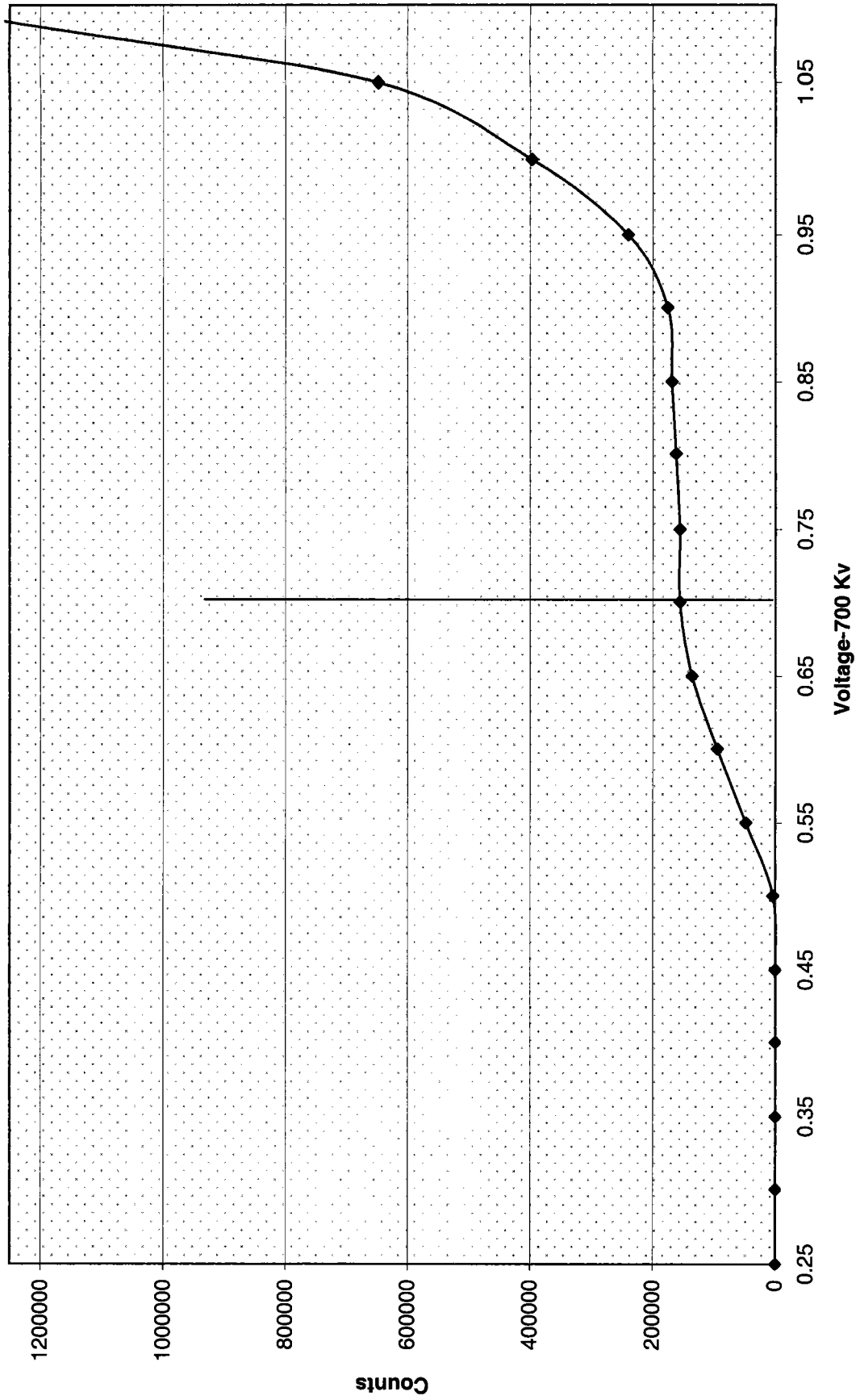
Prepared By: Kelli Duce Date 3/24/09  
 Reviewed By: \_\_\_\_\_ Date \_\_\_\_\_

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> <del>3/16/09 1510</del>	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>3/17/09 0515</del> <del>3/17/09</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	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	3/20/09 1940	506	5	8	893
VEN 4	500	3/16/09 1400	3/20/09 1345	3/20/09 2050	509	5	8	768

VEN 3/24/09

VEN 3/24/09

VEN 3/24/09



# GEL 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	<b>Isotope</b>	<b>Value</b>	<b>Uncertainty</b>
2/2/2009	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?	✓		
	✓		
	✓		
	✓		
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 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: 0289-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	bkgr cpm	total counts	count time min	cpm	Known activity dpm	11 (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	1.815	11/20/2008 16:40	11/20/2008 12:00	11/13/2008 12:20	0.267	10056	30	335.20	243.02	0.19444	3264	0.9961
701	1.720	Sidev	0.157	10/15/2008 14:35	10/15/2008 10:40	10/10/2008 14:20	0.267	7095	30	236.50	243.02	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	0.27778	3226	0.9962
702	1.820	Average	1.932	10/20/2008 15:45	10/20/2008 9:40	10/15/2008 14:10	0.233	7352	30	245.07	243.02	0.25347	3233	0.9962
702	2.014	Sidev	0.101	10/15/2008 15:20	10/15/2008 10:55	10/10/2008 14:20	0.100	8282	30	276.07	243.02	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	0.42708	3226	0.9962
703	1.899	Average	2.083	11/13/2008 15:20	11/13/2008 12:20	11/10/2008 16:15	0.267	5428	30	180.99	243.02	0.12500	3257	0.9961
703	2.126	Sidev	0.166	10/15/2008 15:55	10/15/2008 11:10	10/10/2008 14:20	0.267	8738	30	291.27	243.02	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	0.43056	3226	0.9962
704	2.116	Average	2.248	10/20/2008 17:00	10/20/2008 10:30	10/15/2008 14:10	0.233	8560	30	285.33	243.02	0.27083	3233	0.9962
704	2.390	Sidev	0.137	10/15/2008 17:00	10/15/2008 12:30	10/10/2008 14:20	0.267	9909	30	330.30	243.02	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	0.43750	3226	0.9962
705	2.199	Average	2.160	10/20/2008 17:35	10/20/2008 10:55	10/15/2008 14:10	0.233	8905	30	296.83	243.02	0.27778	3233	0.9962
705	2.050	Sidev	0.097	10/15/2008 17:30	10/15/2008 12:45	10/10/2008 14:20	0.267	8495	30	283.17	243.02	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	0.44444	3226	0.9962
706	2.099	Average	2.118	10/20/2008 18:05	10/20/2008 11:15	10/15/2008 14:10	0.233	8504	30	283.47	243.02	0.28472	3233	0.9962
706	2.040	Sidev	0.088	10/15/2008 18:00	10/15/2008 13:00	10/10/2008 14:20	0.267	8452	30	281.73	243.02	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	0.45139	3226	0.9962
707	2.069	Average	2.119	10/20/2008 18:35	10/20/2008 11:30	10/15/2008 14:10	0.233	8378	30	279.27	243.02	0.29514	3233	0.9962
707	2.057	Sidev	0.097	10/15/2008 18:35	10/15/2008 13:25	10/10/2008 14:20	0.267	8527	30	284.23	243.02	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	0.40278	3226	0.9962
708	1.652	Average	1.869	10/20/2008 22:00	10/20/2008 12:50	10/15/2008 14:10	0.233	6632	30	221.07	243.02	0.38194	3233	0.9962
708	1.772	Sidev	0.163	10/15/2008 19:20	10/15/2008 13:40	10/10/2008 14:20	0.267	7329	30	244.30	243.02	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	0.12500	3257	0.9961
709	1.890	Average	1.960	10/20/2008 22:35	10/20/2008 13:05	10/15/2008 14:10	0.233	7578	30	252.60	243.02	0.39583	3233	0.9962
709	1.817	Sidev	0.162	10/15/2008 20:35	10/15/2008 13:55	10/10/2008 14:20	0.267	7469	30	248.97	243.02	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	0.78819	3226	0.9962
710	1.965	Average	2.042	10/20/2008 23:05	10/20/2008 13:25	10/15/2008 14:10	0.233	7882	30	262.73	243.02	0.40675	3233	0.9962
710	2.009	Sidev	0.098	10/15/2008 21:40	10/15/2008 14:15	10/10/2008 14:20	0.267	8224	30	274.13	243.02	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	0.81597	3226	0.9962
711	2.283	Average	2.204	10/20/2008 23:55	10/20/2008 13:45	10/15/2008 14:10	0.233	9136	30	304.53	243.02	0.42361	3233	0.9962
711	2.208	Sidev	0.081	10/16/2008 8:30	10/15/2008 14:30	10/10/2008 14:20	0.267	8357	30	278.57	243.02	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	0.84028	3226	0.9962
712	2.049	Average	2.132	10/21/2008 1:00	10/20/2008 14:05	10/15/2008 14:10	0.233	8170	30	272.33	243.02	0.45486	3233	0.9962
712	2.174	Sidev	0.072	10/16/2008 19:15	10/15/2008 14:50	10/10/2008 14:20	0.267	7618	30	253.93	243.02	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	0.79861	3226	0.9962

*Kelli Powell 11/21/08*  
 Page 1  
*On the Johnson 11/21/08*

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GLRPD-12008 Isotope Ka-226  
 Date Standards Prepared 4/15/08 Cocktail Type Used NA  
 Standard ID 6+ 0299-G Matrix of Vial/Planchett NA  
ED 7112108 NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or mL) 2446.347 Type of Scintillation Vial NA  
 Reference Date 12/15/09 Pipette ID Used 1429303  
 Expiration Date 4/12/09 Balance ID Used 36040216  
 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)
<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				

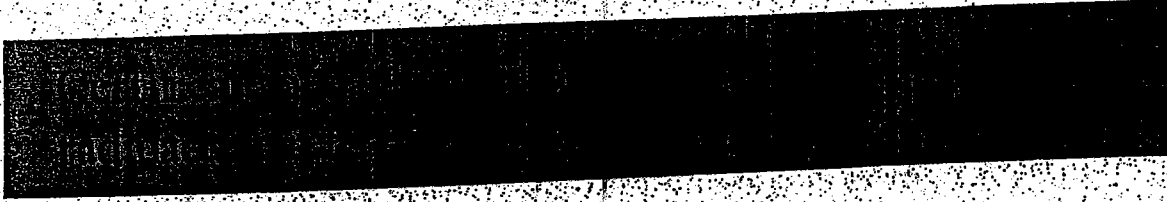
(2)  
11/21/05

Prepared By: Kelli Dwyer Date: 11/21/08  
 Reviewed By: Angela Johnson Date: 11/21/08

Rev 1 RLM.9/10/97

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 361

17<sup>th</sup> December 1999

Nycomed  
Amersham

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

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:

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  
Danil D. Roy 4/10/08











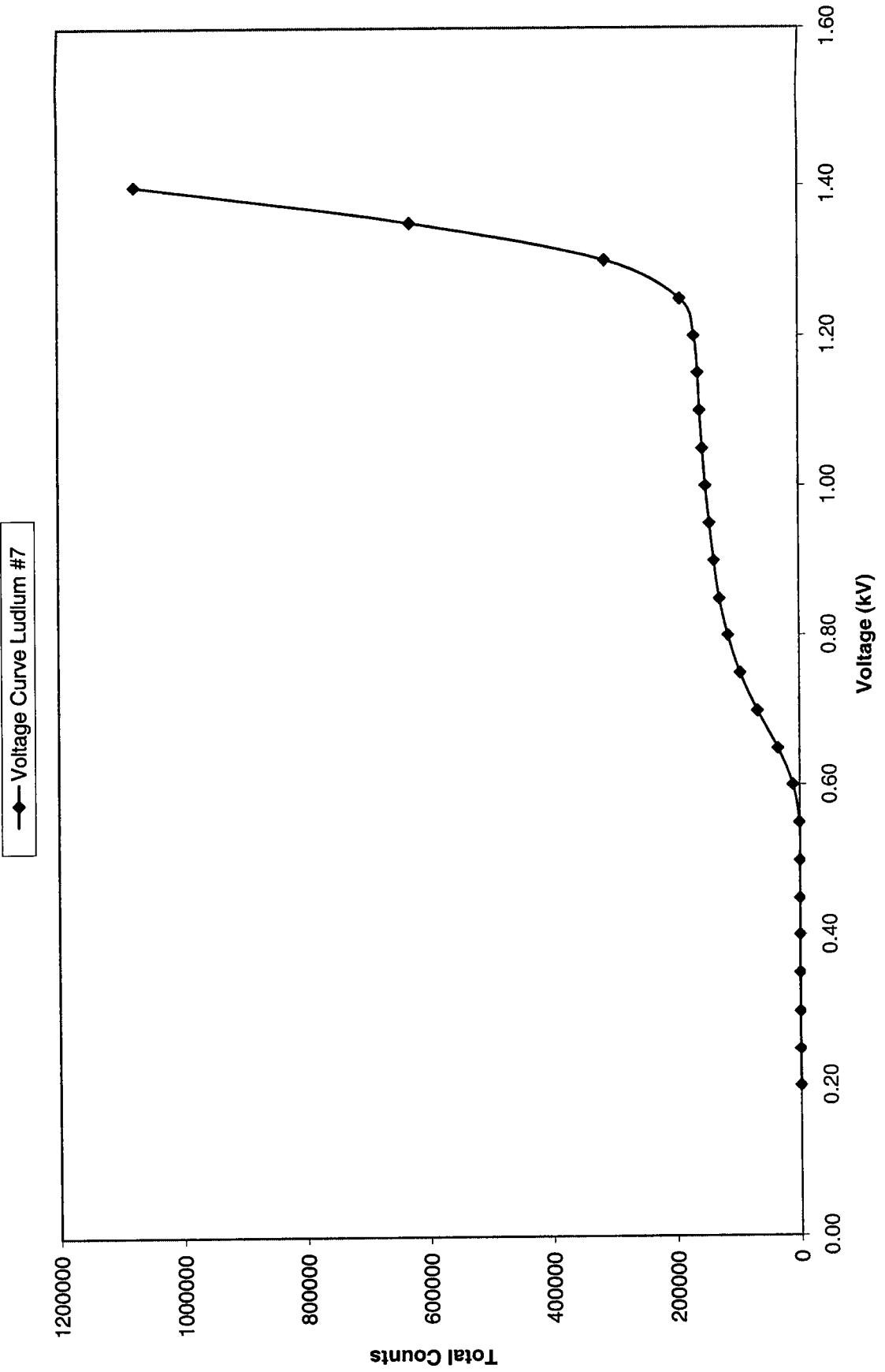
## Voltage Curve Ludlum #7

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



### 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

# 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 98.04%  
 Stdev = 0 pCi/g

Target = 108.1230  
 Lower Limit = 106  
 Upper Limit = 106  
 Rule 1 Pass/Fail Pass  
 Two sigma = 0  
 10 % of Mean = 10.6  
 Rule 2 (Pass/Fail) Pass

PASS  
 Fair 3/2/0

Neptunium-237

Isotope	Value pCi/g
SSTOCK2002A2_AM	90.100
SSTOCK2002B2_AM	87.200
SSTOCK2002C2_AM	93.500

Mean Value (Counting) = 90.267 98.02%  
 Stdev = 3.153305144 pCi/g

Target = 92.0900  
 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 99.81%  
 Stdev = 1.503074627 pCi/g

Target = 95.6460  
 Lower Limit = 92.45718408  
 Upper Limit = 98.46948259  
 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		

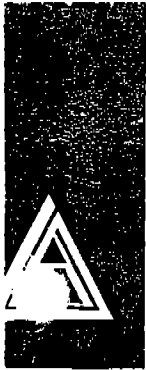
37.06 x 2      2004  
6

- [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 : 28-JUL-2009 13:16:04  
 Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3180.599
NP-237	4341	2/28/10	4768.800	4768.443
CM-244	4320A	2/28/10	5795.020	5794.593

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2375.714  
 Energy Calibration Slope : 5.026415  
 Energy Calibration Quadratic : 2.7678933E-04  
 Energy Calibration Range : 7813.000

Instrument : CHAMBER 006  
 Detector : 67613  
 Calibration Date/Time : 28-JUL-2009 13:16:33  
 Calibration Source Id : AESS-006

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3180.664
NP-237	4341	2/28/10	4768.800	4768.146
CM-244	4320A	2/28/10	5795.020	5794.381

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.959  
 Energy Calibration Slope : 4.993081  
 Energy Calibration Quadratic : 2.7519590E-04  
 Energy Calibration Range : 7762.000

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 : 15-JUL-2009 07:50:05  
 Calibration Source Id : AESS-018  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.276  
 NP-237 4341 2/28/10 4768.800 4768.965  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2350.011  
 Energy Calibration Slope : 4.971119  
 Energy Calibration Quadratic : 3.1396872E-04  
 Energy Calibration Range : 7770.000

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 : 24-JUL-2009 13:43:22  
 Calibration Source Id : AESS-027

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.220
NP-237	4341	2/28/10	4768.800	4768.918
CM-244	4320A	2/28/10	5795.020	5795.135

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.849  
 Energy Calibration Slope : 4.954154  
 Energy Calibration Quadratic : 3.4097850E-04  
 Energy Calibration Range : 7795.000

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 : 15-JUL-2009 07:50:24  
 Calibration Source Id : AESS-031

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.352
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 : 2369.164  
 Energy Calibration Slope : 4.941464  
 Energy Calibration Quadratic : 3.3644502E-04  
 Energy Calibration Range : 7782.000

Instrument : CHAMBER 032  
 Detector : 67041  
 Calibration Date/Time : 15-JUL-2009 07:50:35  
 Calibration Source Id : AESS-032

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	4768.915
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2370.431  
 Energy Calibration Slope : 4.915299  
 Energy Calibration Quadratic : 3.7063286E-04  
 Energy Calibration Range : 7792.000

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 : 15-JUL-2009 07:50:46  
 Calibration Source Id : AESS-034  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.661  
 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 : 2338.228  
 Energy Calibration Slope : 4.969683  
 Energy Calibration Quadratic : 3.5388564E-04  
 Energy Calibration Range : 7798.000

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 : 15-JUL-2009 07:50:59  
 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 : 2360.907  
 Energy Calibration Slope : 4.934806  
 Energy Calibration Quadratic : 3.2861135E-04  
 Energy Calibration Range : 7759.000

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 : 10-JUL-2009 08:15:23  
 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 : 2351.067  
 Energy Calibration Slope : 4.974295  
 Energy Calibration Quadratic : 2.6989207E-04  
 Energy Calibration Range : 7728.000

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 : 10-JUL-2009 08:15:33  
 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	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.573  
 Energy Calibration Slope : 4.897293  
 Energy Calibration Quadratic : 3.3521929E-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 : 15-JUL-2009 13:43:32  
 Calibration Source Id : AESS-001  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.143  
 NP-237 4341 2/28/10 4768.800 4769.352  
 CM-244 4320A 2/28/10 5795.020 5795.169  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.808  
 Energy Calibration Slope : 5.000635  
 Energy Calibration Quadratic : 2.7049560E-04  
 Energy Calibration Range : 7789.000

Instrument : CHAMBER 114  
 Detector : 78258  
 Calibration Date/Time : 15-JUL-2009 13:43:44  
 Calibration Source Id : AESS-007  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.317  
 NP-237 4341 2/28/10 4768.800 4768.936  
 CM-244 4320A 2/28/10 5795.020 5795.187  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2334.310  
 Energy Calibration Slope : 4.976188  
 Energy Calibration Quadratic : 2.4765823E-04  
 Energy Calibration Range : 7690.000

Instrument : CHAMBER 115  
 Detector : 45-132FF4  
 Calibration Date/Time : 15-JUL-2009 13:43:54  
 Calibration Source Id : AESS-002  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.299  
 NP-237 4341 2/28/10 4768.800 4768.906  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.743  
 Energy Calibration Slope : 4.999947  
 Energy Calibration Quadratic : 2.6256693E-04  
 Energy Calibration Range : 7758.000

Instrument : CHAMBER 116  
 Detector : 45-132FF2  
 Calibration Date/Time : 15-JUL-2009 13:44:05  
 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 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.201  
 Energy Calibration Slope : 4.980864  
 Energy Calibration Quadratic : 2.6853522E-04  
 Energy Calibration Range : 7743.000

Instrument : CHAMBER 117  
 Detector : 33450  
 Calibration Date/Time : 15-JUL-2009 13:44:15  
 Calibration Source Id : AESS-003  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.341  
 NP-237 4341 2/28/10 4768.800 4769.249  
 CM-244 4320A 2/28/10 5795.020 5795.149  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2372.642  
 Energy Calibration Slope : 4.960156  
 Energy Calibration Quadratic : 2.9082331E-04  
 Energy Calibration Range : 7757.000

Instrument : CHAMBER 118  
 Detector : 75544  
 Calibration Date/Time : 15-JUL-2009 13:44:26  
 Calibration Source Id : AESS-009  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.240  
 NP-237 4341 2/28/10 4768.800 4768.906  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2335.434  
 Energy Calibration Slope : 4.978148  
 Energy Calibration Quadratic : 2.6964993E-04  
 Energy Calibration Range : 7716.000

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	3069.001
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-JUL-2009 09:29:36  
 Calibration Source Id : AESS-010

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.243
NP-237	4341	2/28/10	4768.800	4768.978
CM-244	4320A	2/28/10	5795.020	5795.142

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2311.106  
 Energy Calibration Slope : 4.960131  
 Energy Calibration Quadratic : 2.6160042E-04  
 Energy Calibration Range : 7665.000

Instrument : CHAMBER 121  
 Detector : 75545  
 Calibration Date/Time : 15-JUL-2009 13:44:36  
 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	5795.188

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2334.679  
 Energy Calibration Slope : 4.950221  
 Energy Calibration Quadratic : 2.8347687E-04  
 Energy Calibration Range : 7701.000

Instrument : CHAMBER 122  
 Detector : 75546  
 Calibration Date/Time : 15-JUL-2009 13:44:46  
 Calibration Source Id : AESS-011

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.172
NP-237	4341	2/28/10	4768.800	4769.003
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2330.980  
 Energy Calibration Slope : 4.960747  
 Energy Calibration Quadratic : 2.7343398E-04  
 Energy Calibration Range : 7698.000

Instrument : CHAMBER 123  
 Detector : 45-142V3  
 Calibration Date/Time : 15-JUL-2009 13:44:55  
 Calibration Source Id : AESS-006

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.316
NP-237	4341	2/28/10	4768.800	4769.249
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2374.720  
 Energy Calibration Slope : 4.978360  
 Energy Calibration Quadratic : 2.5058995E-04  
 Energy Calibration Range : 7735.000

Instrument : CHAMBER 124  
 Detector : 45-142V2  
 Calibration Date/Time : 15-JUL-2009 13:45:05  
 Calibration Source Id : AESS-012

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.701
NP-237	4341	2/28/10	4768.800	4768.518
CM-244	4320A	2/28/10	5795.020	5794.902

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2382.371  
 Energy Calibration Slope : 5.018754  
 Energy Calibration Quadratic : 2.4640319E-04  
 Energy Calibration Range : 7780.000

Instrument : CHAMBER 125  
 Detector : 75547  
 Calibration Date/Time : 17-JUL-2009 14:23:54  
 Calibration Source Id : AESS-013  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.386  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.165  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2338.781  
 Energy Calibration Slope : 4.955306  
 Energy Calibration Quadratic : 2.6291917E-04  
 Energy Calibration Range : 7689.000

Instrument : CHAMBER 126  
 Detector : 75548  
 Calibration Date/Time : 17-JUL-2009 14:24:06  
 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 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.019  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2345.216  
 Energy Calibration Slope : 5.042264  
 Energy Calibration Quadratic : 1.8960494E-04  
 Energy Calibration Range : 7707.000

Instrument : CHAMBER 127  
 Detector : 78770  
 Calibration Date/Time : 17-JUL-2009 14:24:19  
 Calibration Source Id : AESS-014  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.168  
 NP-237 4341 2/28/10 4768.800 4769.036  
 CM-244 4320A 2/28/10 5795.020 5795.095  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2333.395  
 Energy Calibration Slope : 4.961254  
 Energy Calibration Quadratic : 2.6867207E-04  
 Energy Calibration Range : 7695.000



Instrument : CHAMBER 128  
 Detector : 75549  
 Calibration Date/Time : 17-JUL-2009 14:24:31  
 Calibration Source Id : AESS-020  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.449  
 NP-237 4341 2/28/10 4768.800 4769.095  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2323.424  
 Energy Calibration Slope : 5.017115  
 Energy Calibration Quadratic : 2.1570176E-04  
 Energy Calibration Range : 7687.000

Instrument : CHAMBER 129  
 Detector : 76227  
 Calibration Date/Time : 17-JUL-2009 14:24:41  
 Calibration Source Id : AESS-015  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.112  
 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 : 2343.567  
 Energy Calibration Slope : 4.949915  
 Energy Calibration Quadratic : 2.7041257E-04  
 Energy Calibration Range : 7696.000

Instrument : CHAMBER 130  
 Detector : 76228  
 Calibration Date/Time : 17-JUL-2009 14:24:51  
 Calibration Source Id : AESS-021  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.758  
 NP-237 4341 2/28/10 4768.800 4768.607  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2336.361  
 Energy Calibration Slope : 4.980415  
 Energy Calibration Quadratic : 2.3134552E-04  
 Energy Calibration Range : 7679.000

Instrument : CHAMBER 131  
 Detector : 33448  
 Calibration Date/Time : 17-JUL-2009 14:25:01  
 Calibration Source Id : AESS-016  
 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 4768.573  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2388.756  
 Energy Calibration Slope : 4.931267  
 Energy Calibration Quadratic : 3.1428930E-04  
 Energy Calibration Range : 7768.000

Instrument : CHAMBER 132  
 Detector : 67579  
 Calibration Date/Time : 17-JUL-2009 14:25:11  
 Calibration Source Id : AESS-022  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3181.074  
 NP-237 4341 2/28/10 4768.800 4765.688  
 CM-244 4320A 2/28/10 5795.020 5788.063  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2375.917  
 Energy Calibration Slope : 5.056964  
 Energy Calibration Quadratic : 2.6723032E-04  
 Energy Calibration Range : 7834.000

Instrument : CHAMBER 133  
 Detector : 76229  
 Calibration Date/Time : 17-JUL-2009 14:25:22  
 Calibration Source Id : AESS-017  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.235  
 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 : 2304.280  
 Energy Calibration Slope : 4.909981  
 Energy Calibration Quadratic : 2.5969208E-04  
 Energy Calibration Range : 7604.000

Instrument : CHAMBER 134  
 Detector : 76230  
 Calibration Date/Time : 17-JUL-2009 14:25:32  
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.428
NP-237	4341	2/28/10	4768.800	4769.138
CM-244	4320A	2/28/10	5795.020	5795.114

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2323.771  
 Energy Calibration Slope : 4.983015  
 Energy Calibration Quadratic : 2.2696581E-04  
 Energy Calibration Range : 7664.000

Instrument : CHAMBER 135  
 Detector : 64270  
 Calibration Date/Time : 17-JUL-2009 14:25:42  
 Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.580
NP-237	4341	2/28/10	4768.800	4768.589
CM-244	4320A	2/28/10	5795.020	5794.911

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2342.408  
 Energy Calibration Slope : 4.931945  
 Energy Calibration Quadratic : 2.7902660E-04  
 Energy Calibration Range : 7685.000

Instrument : CHAMBER 136  
 Detector : 68549  
 Calibration Date/Time : 17-JUL-2009 14:25:52  
 Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3181.940
NP-237	4341	2/28/10	4768.800	4766.491
CM-244	4320A	2/28/10	5795.020	5789.976

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.642  
 Energy Calibration Slope : 5.024161  
 Energy Calibration Quadratic : 2.3099547E-04  
 Energy Calibration Range : 7741.000

Instrument : CHAMBER 137  
 Detector : 64288  
 Calibration Date/Time : 17-JUL-2009 14:26:02  
 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 4769.015  
 CM-244 4320A 2/28/10 5795.020 5795.229  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2378.044  
 Energy Calibration Slope : 5.009023  
 Energy Calibration Quadratic : 3.1443321E-04  
 Energy Calibration Range : 7837.000

Instrument : CHAMBER 138  
 Detector : 65877  
 Calibration Date/Time : 17-JUL-2009 14:26:11  
 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 4768.798  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2377.362  
 Energy Calibration Slope : 4.981610  
 Energy Calibration Quadratic : 2.9931843E-04  
 Energy Calibration Range : 7792.000

Instrument : CHAMBER 139  
 Detector : 76231  
 Calibration Date/Time : 17-JUL-2009 14:26:21  
 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 4768.896  
 CM-244 4320A 2/28/10 5795.020 5795.211  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2343.572  
 Energy Calibration Slope : 4.954267  
 Energy Calibration Quadratic : 2.9043874E-04  
 Energy Calibration Range : 7721.000

Instrument : CHAMBER 140  
 Detector : 78771  
 Calibration Date/Time : 17-JUL-2009 14:26:31  
 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	4768.831
CM-244	4320A	2/28/10	5795.020	5795.069

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2342.367  
 Energy Calibration Slope : 4.948852  
 Energy Calibration Quadratic : 3.0391497E-04  
 Energy Calibration Range : 7729.000

Instrument : CHAMBER 141  
 Detector : 76232  
 Calibration Date/Time : 17-JUL-2009 14:26:40  
 Calibration Source Id : AESS-027

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.179
NP-237	4341	2/28/10	4768.800	4768.885
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2351.966  
 Energy Calibration Slope : 4.956621  
 Energy Calibration Quadratic : 2.8871323E-04  
 Energy Calibration Range : 7730.000

Instrument : CHAMBER 142  
 Detector : 64261  
 Calibration Date/Time : 17-JUL-2009 14:26:50  
 Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.815
NP-237	4341	2/28/10	4768.800	4768.706
CM-244	4320A	2/28/10	5795.020	5794.924

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2381.651  
 Energy Calibration Slope : 4.957265  
 Energy Calibration Quadratic : 2.9752569E-04  
 Energy Calibration Range : 7770.000

Instrument : CHAMBER 143  
 Detector : 65882  
 Calibration Date/Time : 17-JUL-2009 14:27:11  
 Calibration Source Id : AESS-028  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3198.011  
 NP-237 4341 2/28/10 4768.800 4793.655  
 CM-244 4320A 2/28/10 5795.020 5843.728  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2400.594  
 Energy Calibration Slope : 4.866200  
 Energy Calibration Quadratic : 5.6703738E-04  
 Energy Calibration Range : 7978.000

Instrument : CHAMBER 144  
 Detector : 75551  
 Calibration Date/Time : 17-JUL-2009 14:27:26  
 Calibration Source Id : AESS-034  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.828  
 NP-237 4341 2/28/10 4768.800 4768.697  
 CM-244 4320A 2/28/10 5795.020 5795.020  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2348.318  
 Energy Calibration Slope : 4.957791  
 Energy Calibration Quadratic : 2.7922410E-04  
 Energy Calibration Range : 7718.000

Instrument : CHAMBER 145  
 Detector : 72526  
 Calibration Date/Time : 17-JUL-2009 14:27:37  
 Calibration Source Id : AESS-029  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.094  
 NP-237 4341 2/28/10 4768.800 4768.886  
 CM-244 4320A 2/28/10 5795.020 5795.045  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.360  
 Energy Calibration Slope : 4.971958  
 Energy Calibration Quadratic : 2.8320373E-04  
 Energy Calibration Range : 7742.000

Instrument : CHAMBER 146  
 Detector : 72527  
 Calibration Date/Time : 17-JUL-2009 14:27:48  
 Calibration Source Id : AESS-035  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.175  
 NP-237 4341 2/28/10 4768.800 4768.922  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2350.571  
 Energy Calibration Slope : 4.930733  
 Energy Calibration Quadratic : 2.9194859E-04  
 Energy Calibration Range : 7706.000

Instrument : CHAMBER 147  
 Detector : 75550  
 Calibration Date/Time : 17-JUL-2009 14:27:59  
 Calibration Source Id : AESS-030  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.209  
 NP-237 4341 2/28/10 4768.800 4769.018  
 CM-244 4320A 2/28/10 5795.020 5795.333  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2343.476  
 Energy Calibration Slope : 4.959011  
 Energy Calibration Quadratic : 2.7492910E-04  
 Energy Calibration Range : 7710.000

Instrument : CHAMBER 148  
 Detector : 74429  
 Calibration Date/Time : 17-JUL-2009 14:28:08  
 Calibration Source Id : AESS-036  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.165  
 NP-237 4341 2/28/10 4768.800 4768.865  
 CM-244 4320A 2/28/10 5795.020 5795.167  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2342.407  
 Energy Calibration Slope : 4.941724  
 Energy Calibration Quadratic : 3.0098064E-04  
 Energy Calibration Range : 7718.000

Instrument : CHAMBER 149  
 Detector : 33449  
 Calibration Date/Time : 17-JUL-2009 14:28:21  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2388.292  
 Energy Calibration Slope : 4.935481  
 Energy Calibration Quadratic : 3.1694383E-04  
 Energy Calibration Range : 7775.000

Instrument : CHAMBER 150  
 Detector : 75552  
 Calibration Date/Time : 17-JUL-2009 14:28:35  
 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	4768.748
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2354.055  
 Energy Calibration Slope : 4.971218  
 Energy Calibration Quadratic : 2.7575236E-04  
 Energy Calibration Range : 7734.000

Instrument : CHAMBER 151  
 Detector : 75556  
 Calibration Date/Time : 17-JUL-2009 14:28:46  
 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	4768.936
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2341.373  
 Energy Calibration Slope : 4.941175  
 Energy Calibration Quadratic : 2.6452926E-04  
 Energy Calibration Range : 7679.000



Instrument : CHAMBER 152  
 Detector : 76222  
 Calibration Date/Time : 17-JUL-2009 14:28:57  
 Calibration Source Id : AESS-044

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.140
NP-237	4341	2/28/10	4768.800	4768.855
CM-244	4320A	2/28/10	5795.020	5795.046

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2338.705  
 Energy Calibration Slope : 4.955201  
 Energy Calibration Quadratic : 2.6211896E-04  
 Energy Calibration Range : 7688.000

Instrument : CHAMBER 153  
 Detector : 76223  
 Calibration Date/Time : 17-JUL-2009 14:29:06  
 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	5795.045

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2333.099  
 Energy Calibration Slope : 4.935291  
 Energy Calibration Quadratic : 2.9876101E-04  
 Energy Calibration Range : 7700.000

Instrument : CHAMBER 154  
 Detector : 76224  
 Calibration Date/Time : 17-JUL-2009 14:29:15  
 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	4768.651
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2341.465  
 Energy Calibration Slope : 4.948726  
 Energy Calibration Quadratic : 2.8072123E-04  
 Energy Calibration Range : 7703.000

Instrument : CHAMBER 155  
 Detector : 75553  
 Calibration Date/Time : 17-JUL-2009 14:29:25  
 Calibration Source Id : AESS-040

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.160
NP-237	4341	2/28/10	4768.800	4768.857
CM-244	4320A	2/28/10	5795.020	5795.116

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.986  
 Energy Calibration Slope : 4.960846  
 Energy Calibration Quadratic : 3.0533157E-04  
 Energy Calibration Range : 7766.000

Instrument : CHAMBER 156  
 Detector : 75554  
 Calibration Date/Time : 17-JUL-2009 14:29:35  
 Calibration Source Id : AESS-046

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.180
NP-237	4341	2/28/10	4768.800	4768.829
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.748  
 Energy Calibration Slope : 4.995668  
 Energy Calibration Quadratic : 2.7021556E-04  
 Energy Calibration Range : 7758.000

Instrument : CHAMBER 157  
 Detector : 75555  
 Calibration Date/Time : 17-JUL-2009 14:29:49  
 Calibration Source Id : AESS-041

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.132
NP-237	4341	2/28/10	4768.800	4768.802
CM-244	4320A	2/28/10	5795.020	5795.161

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2355.714  
 Energy Calibration Slope : 4.974587  
 Energy Calibration Quadratic : 2.8556405E-04  
 Energy Calibration Range : 7749.000

Instrument : CHAMBER 158  
 Detector : 33451  
 Calibration Date/Time : 17-JUL-2009 14:30:01  
 Calibration Source Id : AESS-047

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.110
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 : 2380.269  
 Energy Calibration Slope : 4.995139  
 Energy Calibration Quadratic : 3.1028705E-04  
 Energy Calibration Range : 7821.000

Instrument : CHAMBER 159  
 Detector : 76225  
 Calibration Date/Time : 17-JUL-2009 14:30:14  
 Calibration Source Id : AESS-042

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.190
NP-237	4341	2/28/10	4768.800	4768.913
CM-244	4320A	2/28/10	5795.020	5795.044

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.142  
 Energy Calibration Slope : 4.981561  
 Energy Calibration Quadratic : 2.9250194E-04  
 Energy Calibration Range : 7761.000

Instrument : CHAMBER 160  
 Detector : 76226  
 Calibration Date/Time : 17-JUL-2009 14:30:32  
 Calibration Source Id : AESS-048

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.999
NP-237	4341	2/28/10	4768.800	4768.958
CM-244	4320A	2/28/10	5795.020	5795.070

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2355.931  
 Energy Calibration Slope : 4.980661  
 Energy Calibration Quadratic : 2.9644801E-04  
 Energy Calibration Range : 7767.000

Instrument : CHAMBER 161  
 Detector : 70321  
 Calibration Date/Time : 23-JUL-2009 13:58:35  
 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	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2371.155  
 Energy Calibration Slope : 4.901179  
 Energy Calibration Quadratic : 3.3258999E-04  
 Energy Calibration Range : 7739.000

Instrument : CHAMBER 162  
 Detector : 70323  
 Calibration Date/Time : 23-JUL-2009 13:58:45  
 Calibration Source Id : AESS-007

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.999
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 : 2365.388  
 Energy Calibration Slope : 4.934335  
 Energy Calibration Quadratic : 2.9240557E-04  
 Energy Calibration Range : 7725.000

Instrument : CHAMBER 163  
 Detector : 70324  
 Calibration Date/Time : 23-JUL-2009 13:58:54  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2378.440  
 Energy Calibration Slope : 4.923447  
 Energy Calibration Quadratic : 3.2373652E-04  
 Energy Calibration Range : 7760.000

Instrument : CHAMBER 164  
 Detector : 70325  
 Calibration Date/Time : 23-JUL-2009 13:59:02  
 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 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2380.008  
 Energy Calibration Slope : 4.927452  
 Energy Calibration Quadratic : 3.2609751E-04  
 Energy Calibration Range : 7768.000

Instrument : CHAMBER 165  
 Detector : 72544  
 Calibration Date/Time : 23-JUL-2009 13:59:11  
 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 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2387.218  
 Energy Calibration Slope : 4.942940  
 Energy Calibration Quadratic : 3.0943105E-04  
 Energy Calibration Range : 7773.000

Instrument : CHAMBER 166  
 Detector : 74545  
 Calibration Date/Time : 23-JUL-2009 13:59:23  
 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 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2373.718  
 Energy Calibration Slope : 4.929422  
 Energy Calibration Quadratic : 3.2212323E-04  
 Energy Calibration Range : 7759.000

Instrument : CHAMBER 167  
 Detector : 72546  
 Calibration Date/Time : 23-JUL-2009 13:59:32  
 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 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2375.899  
 Energy Calibration Slope : 4.924172  
 Energy Calibration Quadratic : 3.2251154E-04  
 Energy Calibration Range : 7756.000

Instrument : CHAMBER 168  
 Detector : 72547  
 Calibration Date/Time : 23-JUL-2009 13:59:40  
 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 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2378.301  
 Energy Calibration Slope : 4.935927  
 Energy Calibration Quadratic : 3.1537362E-04  
 Energy Calibration Range : 7763.000

Instrument : CHAMBER 169  
 Detector : 72548  
 Calibration Date/Time : 23-JUL-2009 13:59:49  
 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 4768.798  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2382.046  
 Energy Calibration Slope : 4.917411  
 Energy Calibration Quadratic : 3.3011474E-04  
 Energy Calibration Range : 7764.000

Instrument : CHAMBER 170  
 Detector : 72549  
 Calibration Date/Time : 23-JUL-2009 13:59:58  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2381.389  
 Energy Calibration Slope : 4.912318  
 Energy Calibration Quadratic : 3.5837301E-04  
 Energy Calibration Range : 7787.000

Instrument : CHAMBER 171  
 Detector : 78260  
 Calibration Date/Time : 23-JUL-2009 14:00:07  
 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	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2368.307  
 Energy Calibration Slope : 4.932293  
 Energy Calibration Quadratic : 3.2247280E-04  
 Energy Calibration Range : 7757.000

Instrument : CHAMBER 172  
 Detector : 78772  
 Calibration Date/Time : 23-JUL-2009 14:00:15  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.785  
 Energy Calibration Slope : 4.920015  
 Energy Calibration Quadratic : 3.3008555E-04  
 Energy Calibration Range : 7750.000

Instrument : CHAMBER 173  
 Detector : 74431  
 Calibration Date/Time : 22-JUL-2009 14:12:56  
 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	4768.926
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.405  
 Energy Calibration Slope : 4.981549  
 Energy Calibration Quadratic : 2.6860670E-04  
 Energy Calibration Range : 7747.000

Instrument : CHAMBER 174  
 Detector : 74432  
 Calibration Date/Time : 22-JUL-2009 14:13:10  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.379  
 Energy Calibration Slope : 5.035265  
 Energy Calibration Quadratic : 2.0271989E-04  
 Energy Calibration Range : 7727.000

Instrument : CHAMBER 175  
 Detector : 74433  
 Calibration Date/Time : 22-JUL-2009 14:13:33  
 Calibration Source Id : AESS-014

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.817
NP-237	4341	2/28/10	4768.800	4768.732
CM-244	4320A	2/28/10	5795.020	5794.897

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.060  
 Energy Calibration Slope : 4.980610  
 Energy Calibration Quadratic : 2.6701824E-04  
 Energy Calibration Range : 7741.000



Instrument : CHAMBER 176  
 Detector : 74434  
 Calibration Date/Time : 22-JUL-2009 14:13:51  
 Calibration Source Id : AESS-020

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.546
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 : 2357.097  
 Energy Calibration Slope : 5.018647  
 Energy Calibration Quadratic : 2.3654266E-04  
 Energy Calibration Range : 7744.000

Instrument : CHAMBER 177  
 Detector : 74435  
 Calibration Date/Time : 22-JUL-2009 14:14:02  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.948  
 Energy Calibration Slope : 4.983318  
 Energy Calibration Quadratic : 2.6383059E-04  
 Energy Calibration Range : 7739.000

Instrument : CHAMBER 178  
 Detector : 74436  
 Calibration Date/Time : 22-JUL-2009 14:14:14  
 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 : 2354.644  
 Energy Calibration Slope : 4.987851  
 Energy Calibration Quadratic : 2.6228666E-04  
 Energy Calibration Range : 7737.000

Instrument : CHAMBER 179  
 Detector : 74437  
 Calibration Date/Time : 22-JUL-2009 14:14:24  
 Calibration Source Id : AESS-016  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.260  
 NP-237 4341 2/28/10 4768.800 4768.966  
 CM-244 4320A 2/28/10 5795.020 5795.056  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.987  
 Energy Calibration Slope : 4.982908  
 Energy Calibration Quadratic : 2.6569929E-04  
 Energy Calibration Range : 7735.000

Instrument : CHAMBER 180  
 Detector : 74438  
 Calibration Date/Time : 22-JUL-2009 14:14:36  
 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 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.167  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2352.144  
 Energy Calibration Slope : 5.023554  
 Energy Calibration Quadratic : 2.2043443E-04  
 Energy Calibration Range : 7727.000

Instrument : CHAMBER 181  
 Detector : 74439  
 Calibration Date/Time : 22-JUL-2009 14:14:47  
 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 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2357.233  
 Energy Calibration Slope : 4.973598  
 Energy Calibration Quadratic : 2.7286567E-04  
 Energy Calibration Range : 7736.000

Instrument : CHAMBER 182  
 Detector : 74440  
 Calibration Date/Time : 22-JUL-2009 14:14:57  
 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	4768.653
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2348.571  
 Energy Calibration Slope : 4.995710  
 Energy Calibration Quadratic : 2.4269641E-04  
 Energy Calibration Range : 7719.000

Instrument : CHAMBER 183  
 Detector : 74441  
 Calibration Date/Time : 22-JUL-2009 14:15:07  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2357.181  
 Energy Calibration Slope : 4.984746  
 Energy Calibration Quadratic : 2.6386807E-04  
 Energy Calibration Range : 7738.000

Instrument : CHAMBER 184  
 Detector : 74442  
 Calibration Date/Time : 22-JUL-2009 14:15:18  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2352.411  
 Energy Calibration Slope : 5.026765  
 Energy Calibration Quadratic : 2.1738216E-04  
 Energy Calibration Range : 7728.000

Instrument : CHAMBER 185  
 Detector : 68615  
 Calibration Date/Time : 22-JUL-2009 14:15:30  
 Calibration Source Id : AESS-025

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.262
NP-237	4341	2/28/10	4768.800	4769.011
CM-244	4320A	2/28/10	5795.020	5795.113

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2354.510  
 Energy Calibration Slope : 4.938845  
 Energy Calibration Quadratic : 2.7730624E-04  
 Energy Calibration Range : 7703.000

Instrument : CHAMBER 186  
 Detector : 68616  
 Calibration Date/Time : 22-JUL-2009 14:15:43  
 Calibration Source Id : AESS-031

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.191
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.143

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2359.547  
 Energy Calibration Slope : 4.938616  
 Energy Calibration Quadratic : 2.9074642E-04  
 Energy Calibration Range : 7722.000

Instrument : CHAMBER 187  
 Detector : 68620  
 Calibration Date/Time : 22-JUL-2009 14:15:58  
 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	4768.775
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.921  
 Energy Calibration Slope : 4.980083  
 Energy Calibration Quadratic : 2.9012386E-04  
 Energy Calibration Range : 7772.000

Instrument : CHAMBER 188  
 Detector : 68621  
 Calibration Date/Time : 22-JUL-2009 14:16:10  
 Calibration Source Id : AESS-032  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.008  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.044  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.934  
 Energy Calibration Slope : 4.976158  
 Energy Calibration Quadratic : 2.7708741E-04  
 Energy Calibration Range : 7748.000

Instrument : CHAMBER 189  
 Detector : 68622  
 Calibration Date/Time : 22-JUL-2009 14:16:25  
 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 5795.093  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2355.697  
 Energy Calibration Slope : 4.939315  
 Energy Calibration Quadratic : 2.8903113E-04  
 Energy Calibration Range : 7717.000

Instrument : CHAMBER 190  
 Detector : 68623  
 Calibration Date/Time : 22-JUL-2009 14:16:38  
 Calibration Source Id : AESS-033  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.298  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.045  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2351.739  
 Energy Calibration Slope : 4.948914  
 Energy Calibration Quadratic : 2.8685224E-04  
 Energy Calibration Range : 7720.000

Instrument : CHAMBER 191  
 Detector : 68624  
 Calibration Date/Time : 22-JUL-2009 14:17:15  
 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 4768.925  
 CM-244 4320A 2/28/10 5795.020 5795.090  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.921  
 Energy Calibration Slope : 4.966295  
 Energy Calibration Quadratic : 3.1035815E-04  
 Energy Calibration Range : 7779.000

Instrument : CHAMBER 192  
 Detector : 74430  
 Calibration Date/Time : 22-JUL-2009 14:17:47  
 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 4768.903  
 CM-244 4320A 2/28/10 5795.020 5795.089  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.162  
 Energy Calibration Slope : 4.978550  
 Energy Calibration Quadratic : 2.9185213E-04  
 Energy Calibration Range : 7766.000

Instrument : CHAMBER 193  
 Detector : 68627  
 Calibration Date/Time : 22-JUL-2009 14:18:09  
 Calibration Source Id : AESS-029  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.786  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.042  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.145  
 Energy Calibration Slope : 4.920224  
 Energy Calibration Quadratic : 3.1340783E-04  
 Energy Calibration Range : 7730.000

Instrument : CHAMBER 194  
 Detector : 68635  
 Calibration Date/Time : 22-JUL-2009 14:18:45  
 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 : 2356.478  
 Energy Calibration Slope : 4.939730  
 Energy Calibration Quadratic : 2.9438961E-04  
 Energy Calibration Range : 7723.000

Instrument : CHAMBER 195  
 Detector : 68636  
 Calibration Date/Time : 22-JUL-2009 14:19:31  
 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	5795.181

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2359.634  
 Energy Calibration Slope : 4.956642  
 Energy Calibration Quadratic : 2.8082752E-04  
 Energy Calibration Range : 7730.000

Instrument : CHAMBER 196  
 Detector : 68637  
 Calibration Date/Time : 22-JUL-2009 14:19:51  
 Calibration Source Id : AESS-036

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.156
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 : 2357.884  
 Energy Calibration Slope : 4.943155  
 Energy Calibration Quadratic : 2.9007217E-04  
 Energy Calibration Range : 7724.000

Instrument : CHAMBER 197  
 Detector : 78894  
 Calibration Date/Time : 23-JUL-2009 14:00:24  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2369.600  
 Energy Calibration Slope : 4.961125  
 Energy Calibration Quadratic : 2.9980636E-04  
 Energy Calibration Range : 7764.000

Instrument : CHAMBER 198  
 Detector : 78895  
 Calibration Date/Time : 23-JUL-2009 14:00:36  
 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 : 2364.985  
 Energy Calibration Slope : 4.958083  
 Energy Calibration Quadratic : 2.9077829E-04  
 Energy Calibration Range : 7747.000

Instrument : CHAMBER 199  
 Detector : 78896  
 Calibration Date/Time : 23-JUL-2009 14:00:47  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.893  
 Energy Calibration Slope : 4.975142  
 Energy Calibration Quadratic : 2.8265564E-04  
 Energy Calibration Range : 7755.000



Instrument : CHAMBER 200  
 Detector : 78900  
 Calibration Date/Time : 23-JUL-2009 14:00:57  
 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	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2366.560  
 Energy Calibration Slope : 4.944607  
 Energy Calibration Quadratic : 3.1754555E-04  
 Energy Calibration Range : 7763.000

Instrument : CHAMBER 201  
 Detector : 78902  
 Calibration Date/Time : 23-JUL-2009 14:01:05  
 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	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.274  
 Energy Calibration Slope : 4.952928  
 Energy Calibration Quadratic : 3.1035283E-04  
 Energy Calibration Range : 7763.000

Instrument : CHAMBER 202  
 Detector : 78903  
 Calibration Date/Time : 23-JUL-2009 14:01:14  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2355.391  
 Energy Calibration Slope : 4.951035  
 Energy Calibration Quadratic : 2.9712555E-04  
 Energy Calibration Range : 7737.000

Instrument : CHAMBER 203  
 Detector : 78905  
 Calibration Date/Time : 23-JUL-2009 14:01:22  
 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 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2359.621  
 Energy Calibration Slope : 4.976038  
 Energy Calibration Quadratic : 2.7450506E-04  
 Energy Calibration Range : 7743.000

Instrument : CHAMBER 204  
 Detector : 78907  
 Calibration Date/Time : 23-JUL-2009 14:01:31  
 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 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.966  
 Energy Calibration Slope : 4.954226  
 Energy Calibration Quadratic : 2.9946532E-04  
 Energy Calibration Range : 7748.000

Instrument : CHAMBER 205  
 Detector : 78908  
 Calibration Date/Time : 23-JUL-2009 14:01:40  
 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 : 2367.589  
 Energy Calibration Slope : 4.954722  
 Energy Calibration Quadratic : 3.0296977E-04  
 Energy Calibration Range : 7759.000

Instrument : CHAMBER 206  
 Detector : 78909  
 Calibration Date/Time : 23-JUL-2009 14:01:49  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.905  
 Energy Calibration Slope : 4.955875  
 Energy Calibration Quadratic : 2.9360279E-04  
 Energy Calibration Range : 7745.000

Instrument : CHAMBER 207  
 Detector : 78910  
 Calibration Date/Time : 23-JUL-2009 14:01:57  
 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	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2368.030  
 Energy Calibration Slope : 4.964427  
 Energy Calibration Quadratic : 2.9426123E-04  
 Energy Calibration Range : 7760.000

Instrument : CHAMBER 208  
 Detector : 78911  
 Calibration Date/Time : 23-JUL-2009 14:02:06  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.066  
 Energy Calibration Slope : 4.968146  
 Energy Calibration Quadratic : 2.8974371E-04  
 Energy Calibration Range : 7755.000

Instrument : CHAMBER 209  
 Detector : 79188  
 Calibration Date/Time : 28-JUL-2009 13:59:46  
 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 : 2390.309  
 Energy Calibration Slope : 4.907889  
 Energy Calibration Quadratic : 3.5155186E-04  
 Energy Calibration Range : 7785.000

Instrument : CHAMBER 210  
 Detector : 79189  
 Calibration Date/Time : 28-JUL-2009 13:59:55  
 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	5795.019

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2382.719  
 Energy Calibration Slope : 4.945560  
 Energy Calibration Quadratic : 3.0519743E-04  
 Energy Calibration Range : 7767.000

Instrument : CHAMBER 211  
 Detector : 79190  
 Calibration Date/Time : 28-JUL-2009 14:00:03  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2388.786  
 Energy Calibration Slope : 4.957439  
 Energy Calibration Quadratic : 3.0850343E-04  
 Energy Calibration Range : 7789.000

Instrument : CHAMBER 212  
 Detector : 79191  
 Calibration Date/Time : 28-JUL-2009 14:00:11  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2386.612  
 Energy Calibration Slope : 4.941330  
 Energy Calibration Quadratic : 3.1567214E-04  
 Energy Calibration Range : 7778.000

Instrument : CHAMBER 213  
 Detector : 79192  
 Calibration Date/Time : 28-JUL-2009 14:00:20  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2392.102  
 Energy Calibration Slope : 4.949504  
 Energy Calibration Quadratic : 3.0747624E-04  
 Energy Calibration Range : 7783.000

Instrument : CHAMBER 214  
 Detector : 79193  
 Calibration Date/Time : 28-JUL-2009 14:00:29  
 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	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.299  
 Energy Calibration Slope : 4.938057  
 Energy Calibration Quadratic : 3.2320846E-04  
 Energy Calibration Range : 7779.000

Instrument : CHAMBER 215  
 Detector : 79194  
 Calibration Date/Time : 28-JUL-2009 14:00:38  
 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	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2391.097  
 Energy Calibration Slope : 4.946728  
 Energy Calibration Quadratic : 3.2361320E-04  
 Energy Calibration Range : 7796.000

Instrument : CHAMBER 216  
 Detector : 79195  
 Calibration Date/Time : 28-JUL-2009 14:00:46  
 Calibration Source Id : AESS-008

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
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 : 2389.871  
 Energy Calibration Slope : 4.924810  
 Energy Calibration Quadratic : 3.3861332E-04  
 Energy Calibration Range : 7788.000

Instrument : CHAMBER 217  
 Detector : 79410  
 Calibration Date/Time : 28-JUL-2009 14:00:55  
 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 : 2391.358  
 Energy Calibration Slope : 4.934552  
 Energy Calibration Quadratic : 3.3054961E-04  
 Energy Calibration Range : 7791.000

Instrument : CHAMBER 218  
 Detector : 79411  
 Calibration Date/Time : 28-JUL-2009 14:01:03  
 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 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2388.335  
 Energy Calibration Slope : 4.946022  
 Energy Calibration Quadratic : 3.1945287E-04  
 Energy Calibration Range : 7788.000

Instrument : CHAMBER 219  
 Detector : 79412  
 Calibration Date/Time : 28-JUL-2009 14:01:48  
 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 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2390.188  
 Energy Calibration Slope : 4.929147  
 Energy Calibration Quadratic : 3.3767600E-04  
 Energy Calibration Range : 7792.000

Instrument : CHAMBER 220  
 Detector : 79413  
 Calibration Date/Time : 28-JUL-2009 14:02:00  
 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 : 2382.449  
 Energy Calibration Slope : 4.943600  
 Energy Calibration Quadratic : 3.1373679E-04  
 Energy Calibration Range : 7774.000

Instrument : CHAMBER 221  
 Detector : 79414  
 Calibration Date/Time : 28-JUL-2009 14:02:09  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2387.174  
 Energy Calibration Slope : 4.970656  
 Energy Calibration Quadratic : 3.0409341E-04  
 Energy Calibration Range : 7796.000

Instrument : CHAMBER 222  
 Detector : 79415  
 Calibration Date/Time : 28-JUL-2009 14:02:19  
 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	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2382.306  
 Energy Calibration Slope : 5.025091  
 Energy Calibration Quadratic : 2.4377843E-04  
 Energy Calibration Range : 7784.000

Instrument : CHAMBER 223  
 Detector : 79416  
 Calibration Date/Time : 28-JUL-2009 14:02:29  
 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	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2389.067  
 Energy Calibration Slope : 4.958123  
 Energy Calibration Quadratic : 3.2477293E-04  
 Energy Calibration Range : 7807.000



Instrument : CHAMBER 224  
 Detector : 79417  
 Calibration Date/Time : 28-JUL-2009 14:02:37  
 Calibration Source Id : AESS-016  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.027  
 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 : 2386.695  
 Energy Calibration Slope : 5.011842  
 Energy Calibration Quadratic : 2.6290418E-04  
 Energy Calibration Range : 7794.000

Instrument : CHAMBER 225  
 Detector : 79418  
 Calibration Date/Time : 28-JUL-2009 14:02:46  
 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 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.019  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2392.776  
 Energy Calibration Slope : 4.933724  
 Energy Calibration Quadratic : 3.3852886E-04  
 Energy Calibration Range : 7800.000

Instrument : CHAMBER 226  
 Detector : 79419  
 Calibration Date/Time : 28-JUL-2009 14:02:55  
 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 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.150  
 Energy Calibration Slope : 4.973210  
 Energy Calibration Quadratic : 2.9508519E-04  
 Energy Calibration Range : 7786.000

Instrument : CHAMBER 227  
 Detector : 79420  
 Calibration Date/Time : 28-JUL-2009 14:03:04  
 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 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2391.061  
 Energy Calibration Slope : 4.938961  
 Energy Calibration Quadratic : 3.3045741E-04  
 Energy Calibration Range : 7795.000

Instrument : CHAMBER 228  
 Detector : 79421  
 Calibration Date/Time : 28-JUL-2009 14:03:13  
 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 : 2386.005  
 Energy Calibration Slope : 4.959556  
 Energy Calibration Quadratic : 3.0744984E-04  
 Energy Calibration Range : 7787.000

Instrument : CHAMBER 229  
 Detector : 79422  
 Calibration Date/Time : 28-JUL-2009 14:03:22  
 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 : 2387.995  
 Energy Calibration Slope : 4.940877  
 Energy Calibration Quadratic : 3.3899915E-04  
 Energy Calibration Range : 7803.000

Instrument : CHAMBER 230  
 Detector : 79423  
 Calibration Date/Time : 28-JUL-2009 14:03:31  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.573  
 Energy Calibration Slope : 4.960246  
 Energy Calibration Quadratic : 3.1046796E-04  
 Energy Calibration Range : 7789.000

Instrument : CHAMBER 231  
 Detector : 79424  
 Calibration Date/Time : 28-JUL-2009 14:03:40  
 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 : 2387.425  
 Energy Calibration Slope : 4.946337  
 Energy Calibration Quadratic : 3.1792521E-04  
 Energy Calibration Range : 7786.000

Instrument : CHAMBER 232  
 Detector : 79425  
 Calibration Date/Time : 28-JUL-2009 14:03:48  
 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 : 2384.962  
 Energy Calibration Slope : 5.004478  
 Energy Calibration Quadratic : 2.5898189E-04  
 Energy Calibration Range : 7781.000

Instrument : CHAMBER 233  
 Detector : 79426  
 Calibration Date/Time : 28-JUL-2009 14:03:57  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.858  
 Energy Calibration Slope : 4.908395  
 Energy Calibration Quadratic : 3.6085595E-04  
 Energy Calibration Range : 7789.000

Instrument : CHAMBER 234  
 Detector : 79427  
 Calibration Date/Time : 28-JUL-2009 14:04:08  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2378.557  
 Energy Calibration Slope : 4.936086  
 Energy Calibration Quadratic : 3.1737317E-04  
 Energy Calibration Range : 7766.000

Instrument : CHAMBER 235  
 Detector : 79428  
 Calibration Date/Time : 28-JUL-2009 14:04:17  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2386.048  
 Energy Calibration Slope : 4.937345  
 Energy Calibration Quadratic : 3.3249237E-04  
 Energy Calibration Range : 7791.000

Instrument : CHAMBER 236  
 Detector : 79429  
 Calibration Date/Time : 28-JUL-2009 14:04:27  
 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 : 2388.810  
 Energy Calibration Slope : 4.906125  
 Energy Calibration Quadratic : 3.6270331E-04  
 Energy Calibration Range : 7793.000

Instrument : CHAMBER 237  
 Detector : 79430  
 Calibration Date/Time : 28-JUL-2009 14:04:36  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2387.128  
 Energy Calibration Slope : 4.944391  
 Energy Calibration Quadratic : 3.2767057E-04  
 Energy Calibration Range : 7794.000

Instrument : CHAMBER 238  
 Detector : 79431  
 Calibration Date/Time : 28-JUL-2009 14:04:46  
 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 : 2381.338  
 Energy Calibration Slope : 4.929770  
 Energy Calibration Quadratic : 3.3144769E-04  
 Energy Calibration Range : 7777.000

Instrument : CHAMBER 239  
 Detector : 79432  
 Calibration Date/Time : 28-JUL-2009 14:04:55  
 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	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2390.132  
 Energy Calibration Slope : 4.920120  
 Energy Calibration Quadratic : 3.5708508E-04  
 Energy Calibration Range : 7803.000

Instrument : CHAMBER 240  
 Detector : 79433  
 Calibration Date/Time : 28-JUL-2009 14:05:04  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2385.205  
 Energy Calibration Slope : 4.918474  
 Energy Calibration Quadratic : 3.4866974E-04  
 Energy Calibration Range : 7787.000

Instrument : CHAMBER 241  
 Detector : 79434  
 Calibration Date/Time : 28-JUL-2009 14:05:13  
 Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	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 : 2385.825  
 Energy Calibration Slope : 4.908836  
 Energy Calibration Quadratic : 3.6050563E-04  
 Energy Calibration Range : 7790.000

Instrument : CHAMBER 242  
 Detector : 79435  
 Calibration Date/Time : 28-JUL-2009 14:05:21  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2385.009  
 Energy Calibration Slope : 4.945025  
 Energy Calibration Quadratic : 3.1615721E-04  
 Energy Calibration Range : 7780.000

Instrument : CHAMBER 243  
 Detector : 79436  
 Calibration Date/Time : 28-JUL-2009 14:05:30  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2386.770  
 Energy Calibration Slope : 4.934989  
 Energy Calibration Quadratic : 3.3655608E-04  
 Energy Calibration Range : 7793.000

Instrument : CHAMBER 244  
 Detector : 79437  
 Calibration Date/Time : 28-JUL-2009 14:05:39  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2391.069  
 Energy Calibration Slope : 4.911016  
 Energy Calibration Quadratic : 3.5919523E-04  
 Energy Calibration Range : 7797.000

Instrument : CHAMBER 245  
 Detector : 79438  
 Calibration Date/Time : 28-JUL-2009 14:05:48  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2392.602  
 Energy Calibration Slope : 4.941990  
 Energy Calibration Quadratic : 3.3874813E-04  
 Energy Calibration Range : 7808.000

Instrument : CHAMBER 246  
 Detector : 78912  
 Calibration Date/Time : 28-JUL-2009 14:05:57  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2392.768  
 Energy Calibration Slope : 4.935872  
 Energy Calibration Quadratic : 3.3401168E-04  
 Energy Calibration Range : 7797.000

Instrument : CHAMBER 247  
 Detector : 79440  
 Calibration Date/Time : 28-JUL-2009 14:06:06  
 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	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2393.687  
 Energy Calibration Slope : 4.919972  
 Energy Calibration Quadratic : 3.6322643E-04  
 Energy Calibration Range : 7813.000



Instrument : CHAMBER 248  
 Detector : 79441  
 Calibration Date/Time : 28-JUL-2009 14:06:15  
 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	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2386.829  
 Energy Calibration Slope : 4.935865  
 Energy Calibration Quadratic : 3.3986062E-04  
 Energy Calibration Range : 7798.000

Instrument : CHAMBER 249  
 Detector : 79442  
 Calibration Date/Time : 28-JUL-2009 14:10:21  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2391.737  
 Energy Calibration Slope : 4.913334  
 Energy Calibration Quadratic : 3.7958668E-04  
 Energy Calibration Range : 7821.000

Instrument : CHAMBER 250  
 Detector : 79443  
 Calibration Date/Time : 28-JUL-2009 14:07:02  
 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	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.582  
 Energy Calibration Slope : 4.915850  
 Energy Calibration Quadratic : 3.5610356E-04  
 Energy Calibration Range : 7791.000

Instrument : CHAMBER 251  
 Detector : 79444  
 Calibration Date/Time : 28-JUL-2009 14:07:11  
 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	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2390.072  
 Energy Calibration Slope : 4.920268  
 Energy Calibration Quadratic : 3.7023224E-04  
 Energy Calibration Range : 7817.000

Instrument : CHAMBER 252  
 Detector : 79445  
 Calibration Date/Time : 28-JUL-2009 14:07:24  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2391.797  
 Energy Calibration Slope : 4.906192  
 Energy Calibration Quadratic : 3.7361679E-04  
 Energy Calibration Range : 7808.000

Instrument : CHAMBER 253  
 Detector : 79446  
 Calibration Date/Time : 28-JUL-2009 14:07:35  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2393.983  
 Energy Calibration Slope : 4.947714  
 Energy Calibration Quadratic : 3.5550338E-04  
 Energy Calibration Range : 7833.000

Instrument : CHAMBER 254  
 Detector : 79447  
 Calibration Date/Time : 28-JUL-2009 14:07:52  
 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 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2389.038  
 Energy Calibration Slope : 4.937405  
 Energy Calibration Quadratic : 3.4224574E-04  
 Energy Calibration Range : 7804.000

Instrument : CHAMBER 255  
 Detector : 79448  
 Calibration Date/Time : 28-JUL-2009 14:08:10  
 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 : 2391.216  
 Energy Calibration Slope : 4.920984  
 Energy Calibration Quadratic : 3.7234218E-04  
 Energy Calibration Range : 7821.000

Instrument : CHAMBER 256  
 Detector : 79449  
 Calibration Date/Time : 28-JUL-2009 14:08:26  
 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 : 2387.279  
 Energy Calibration Slope : 4.932406  
 Energy Calibration Quadratic : 3.4164111E-04  
 Energy Calibration Range : 7796.000

## 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 : 26-JUL-2009 16:47:47  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.963	3299.690	5.000000	1.200000	44.72136	95.00000
NP-237	4435.814	4905.115	6.000000	1.440000	40.82483	95.00000
CM-244	5534.094	5883.857	9.000000	2.160001	33.33334	95.00000

Instrument : CHAMBER 006  
 Detector : 67613  
 Background Analysis Date/Time : 26-JUL-2009 16:47:47  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.395	3299.193	3.000000	0.7200001	57.73503	95.00000
NP-237	4433.513	4905.230	7.000000	1.680000	37.79645	95.00000
CM-244	5530.459	5883.505	5.000000	1.200000	44.72136	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	13.00000	3.119998	27.73501	95.00000
CM-244	5534.241	5887.079	16.00000	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	10.00000	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 : 13-JUL-2009 21:54:51  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.459	3300.768	2.000000	0.4800001	70.71068	95.00000
NP-237	4435.720	4903.495	7.000000	1.680000	37.79645	95.00000
CM-244	5531.358	5886.349	4.000000	0.9600002	50.00000	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 : 22-JUL-2009 21:43:06  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.447	3298.118	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.441	4905.996	3.000000	0.7199996	57.73503	95.00000
CM-244	5535.248	5885.925	3.000000	0.7199996	57.73503	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 : 13-JUL-2009 21:54:52  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.104	3299.916	5.000000	1.200000	44.72136	95.00000
NP-237	4436.072	4902.901	16.00000	3.840001	25.00000	95.00000
CM-244	5535.417	5884.932	11.00000	2.640001	30.15113	95.00000

Instrument : CHAMBER 032  
 Detector : 67041  
 Background Analysis Date/Time : 13-JUL-2009 21:54:52  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.634	3297.499	1.000000	0.2400001	100.0000	95.00000
NP-237	4437.570	4904.884	14.00000	3.360001	26.72612	95.00000
CM-244	5533.522	5884.215	16.00000	3.840001	25.00000	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 : 13-JUL-2009 21:54:52  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.268	3300.348	1.000000	0.2400001	100.0000	95.00000
NP-237	4435.287	4906.218	9.000000	2.160001	33.33334	95.00000
CM-244	5533.837	5886.701	12.00000	2.880001	28.86751	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 : 13-JUL-2009 21:54:53  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.909	3300.265	1.000000	0.2400000	100.0000	95.00000
NP-237	4434.212	4905.200	7.000000	1.680000	37.79645	95.00000
CM-244	5530.781	5884.673	1.000000	0.2400000	100.0000	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	12.00000	2.879998	28.86751	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	10.00000	2.399998	31.62278	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	5.000000	1.199999	44.72136	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	2992.198	3300.849	49.00000	11.75999	14.28572	95.00000
NP-237	4435.896	4905.687	19.00000	4.559997	22.94157	95.00000
CM-244	5533.567	5885.099	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	12.00000	2.879998	28.86751	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	2987.937	3298.136	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.160	4903.491	6.000000	1.439999	40.82483	95.00000
CM-244	5531.067	5883.227	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	0.000000E+00	0.000000E+00	0.000000E+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 : 12-JUL-2009 18:14:41  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.779	3298.785	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.559	4905.331	6.000000	1.800000	40.82483	95.00000
CM-244	5530.517	5883.481	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 114  
 Detector : 78258  
 Background Analysis Date/Time : 12-JUL-2009 18:14:46  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.441	3298.868	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.900	4905.218	5.000000	1.500000	44.72136	95.00000
CM-244	5530.599	5885.790	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 115  
 Detector : 45-132FF4  
 Background Analysis Date/Time : 12-JUL-2009 18:14:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.839	3301.816	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.001	4902.052	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.697	5884.118	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 116  
 Detector : 45-132FF2  
 Background Analysis Date/Time : 12-JUL-2009 18:14:55  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.005	3302.013	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.895	4903.021	6.000000	1.800000	40.82483	95.00000
CM-244	5531.311	5883.052	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 117  
 Detector : 33450  
 Background Analysis Date/Time : 12-JUL-2009 18:15:00  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.173	3300.224	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.403	4904.427	5.000000	1.500000	44.72136	95.00000
CM-244	5533.135	5885.381	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 118  
 Detector : 75544  
 Background Analysis Date/Time : 12-JUL-2009 18:15:04  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.199	3301.179	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4437.404	4902.417	2.000000	0.6000000	70.71068	95.00000
CM-244	5530.853	5882.689	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 119  
 Detector : 74429  
 Background Analysis Date/Time : 12-JUL-2009 18:15:09  
 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	3.000000	0.9000000	57.73503	95.00000
NP-237	4432.548	4906.013	1.000000	0.3000000	100.0000	95.00000
CM-244	5530.584	5883.165	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 120  
 Detector : 74430  
 Background Analysis Date/Time : 12-JUL-2009 18:15:13  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.522	3298.404	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.328	4903.588	4.000000	1.200000	50.00000	95.00000
CM-244	5534.528	5884.756	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 121  
 Detector : 75545  
 Background Analysis Date/Time : 12-JUL-2009 18:15:18  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.023	3300.631	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4432.658	4901.599	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.997	5885.295	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 122  
 Detector : 75546  
 Background Analysis Date/Time : 12-JUL-2009 18:15:22  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.563	3298.589	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.782	4905.890	5.000000	1.500000	44.72136	95.00000
CM-244	5532.955	5884.078	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 123  
 Detector : 45-142V3  
 Background Analysis Date/Time : 12-JUL-2009 18:15:27  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.850	3299.223	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.241	4905.636	4.000000	1.200000	50.00000	95.00000
CM-244	5531.191	5886.517	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 124  
 Detector : 45-142V2  
 Background Analysis Date/Time : 12-JUL-2009 18:15:31  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.169	3298.838	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.514	4905.983	2.000000	0.6000000	70.71068	95.00000
CM-244	5535.498	5887.649	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 125  
 Detector : 75547  
 Background Analysis Date/Time : 12-JUL-2009 18:15:35  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.438	3299.892	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.342	4903.042	3.000000	0.9000000	57.73503	95.00000
CM-244	5533.267	5883.118	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 126  
 Detector : 75548  
 Background Analysis Date/Time : 12-JUL-2009 18:15:39  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.642	3299.863	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.022	4903.287	10.00000	3.000000	31.62278	95.00000
CM-244	5533.750	5882.833	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 127  
 Detector : 78770  
 Background Analysis Date/Time : 12-JUL-2009 18:15:43  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.930	3300.925	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4433.404	4902.114	4.000000	1.200000	50.00000	95.00000
CM-244	5533.832	5884.575	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 128  
 Detector : 75549  
 Background Analysis Date/Time : 12-JUL-2009 18:15:48  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.441	3299.762	3.000000	0.9000000	57.73503	95.00000
NP-237	4437.479	4901.607	5.000000	1.500000	44.72136	95.00000
CM-244	5532.807	5882.614	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 129  
 Detector : 76227  
 Background Analysis Date/Time : 12-JUL-2009 18:15:53  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.626	3298.866	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.006	4901.792	4.000000	1.200000	50.00000	95.00000
CM-244	5532.320	5882.430	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 130  
 Detector : 76228  
 Background Analysis Date/Time : 12-JUL-2009 18:15:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.724	3301.129	4.000000	1.200000	50.00000	95.00000
NP-237	4432.733	4905.256	8.000000	2.400000	35.35534	95.00000
CM-244	5534.221	5882.991	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 131  
 Detector : 33448  
 Background Analysis Date/Time : 12-JUL-2009 18:16:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.041	3301.703	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.470	4901.500	6.000000	1.800000	40.82483	95.00000
CM-244	5535.040	5887.344	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 132  
 Detector : 67579  
 Background Analysis Date/Time : 12-JUL-2009 18:16:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.722	3299.982	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.189	4902.037	8.000000	2.400000	35.35534	95.00000
CM-244	5533.193	5884.042	5.000000	1.500000	44.72136	95.00000



Instrument : CHAMBER 133  
 Detector : 76229  
 Background Analysis Date/Time : 12-JUL-2009 18:16:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.784	3301.677	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.798	4901.797	5.000000	1.500000	44.72136	95.00000
CM-244	5532.072	5884.338	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 134  
 Detector : 76230  
 Background Analysis Date/Time : 12-JUL-2009 18:16:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.526	3299.017	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.982	4903.287	19.00000	5.700000	22.94157	95.00000
CM-244	5532.080	5886.000	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 135  
 Detector : 64270  
 Background Analysis Date/Time : 12-JUL-2009 18:16:20  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.277	3299.628	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.221	4904.200	5.000000	1.500000	44.72136	95.00000
CM-244	5533.869	5883.613	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 136  
 Detector : 68549  
 Background Analysis Date/Time : 12-JUL-2009 18:16:24  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.353	3301.238	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.739	4902.455	15.00000	4.500000	25.81989	95.00000
CM-244	5530.869	5887.561	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 137  
 Detector : 64288  
 Background Analysis Date/Time : 12-JUL-2009 18:16:27  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.740	3300.102	3.000000	0.9000000	57.73503	95.00000
NP-237	4437.224	4902.644	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.374	5886.101	13.00000	3.900000	27.73501	95.00000

Instrument : CHAMBER 138  
 Detector : 65877  
 Background Analysis Date/Time : 12-JUL-2009 18:16:31  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.573	3299.020	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.563	4906.044	32.00000	9.600000	17.67767	95.00000
CM-244	5532.867	5887.098	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 139  
 Detector : 76231  
 Background Analysis Date/Time : 12-JUL-2009 18:16:35  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.505	3300.432	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.030	4903.806	6.000000	1.800000	40.82483	95.00000
CM-244	5532.176	5884.231	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 140  
 Detector : 78771  
 Background Analysis Date/Time : 12-JUL-2009 18:16:39  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.854	3298.685	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.882	4903.279	10.00000	3.000000	31.62278	95.00000
CM-244	5532.806	5885.667	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 141  
 Detector : 76232  
 Background Analysis Date/Time : 12-JUL-2009 18:16:43  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.144	3299.081	4.000000	1.200000	50.00000	95.00000
NP-237	4432.714	4902.455	11.00000	3.300000	30.15113	95.00000
CM-244	5530.738	5882.724	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 142  
 Detector : 64261  
 Background Analysis Date/Time : 12-JUL-2009 18:16:47  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.865	3298.794	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.947	4903.147	17.00000	5.100000	24.25356	95.00000
CM-244	5532.255	5884.805	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 143  
 Detector : 65882  
 Background Analysis Date/Time : 12-JUL-2009 18:16:51  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.701	3299.952	4.000000	1.200000	50.00000	95.00000
NP-237	4432.480	4904.917	14.00000	4.200000	26.72612	95.00000
CM-244	5535.542	5887.375	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 144  
 Detector : 75551  
 Background Analysis Date/Time : 12-JUL-2009 18:16:55  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.490	3300.379	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.137	4902.257	6.000000	1.800000	40.82483	95.00000
CM-244	5534.787	5886.106	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 145  
 Detector : 72526  
 Background Analysis Date/Time : 12-JUL-2009 18:16:59  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.366	3298.098	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.265	4904.885	7.000000	2.100000	37.79645	95.00000
CM-244	5534.192	5886.678	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 146  
 Detector : 72527  
 Background Analysis Date/Time : 12-JUL-2009 18:17:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.494	3297.950	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.761	4904.596	6.000000	1.800000	40.82483	95.00000
CM-244	5530.438	5886.440	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 147  
 Detector : 75550  
 Background Analysis Date/Time : 12-JUL-2009 18:17:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.763	3300.677	8.000000	2.400000	35.35534	95.00000
NP-237	4433.256	4902.183	15.00000	4.500000	25.81989	95.00000
CM-244	5534.346	5885.412	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 148  
 Detector : 74429  
 Background Analysis Date/Time : 12-JUL-2009 18:17:10  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.918	3302.313	6.000000	1.800000	40.82483	95.00000
NP-237	4434.677	4904.245	11.00000	3.300000	30.15113	95.00000
CM-244	5532.604	5884.780	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 149  
 Detector : 33449  
 Background Analysis Date/Time : 12-JUL-2009 18:17:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.126	3302.099	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.957	4903.766	6.000000	1.800000	40.82483	95.00000
CM-244	5532.840	5885.608	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 150  
 Detector : 75552  
 Background Analysis Date/Time : 12-JUL-2009 18:17:18  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.847	3298.390	5.000000	1.500000	44.72136	95.00000
NP-237	4433.411	4903.355	5.000000	1.500000	44.72136	95.00000
CM-244	5531.584	5883.380	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 151  
 Detector : 75556  
 Background Analysis Date/Time : 12-JUL-2009 18:17:22  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.196	3299.830	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.520	4904.128	2.000000	0.6000000	70.71068	95.00000
CM-244	5532.939	5887.339	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 152  
 Detector : 76222  
 Background Analysis Date/Time : 12-JUL-2009 18:17:26  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.335	3299.767	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.085	4902.709	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.813	5882.589	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 153  
 Detector : 76223  
 Background Analysis Date/Time : 12-JUL-2009 18:17:30  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.763	3301.789	7.000000	2.100000	37.79645	95.00000
NP-237	4432.699	4901.612	7.000000	2.100000	37.79645	95.00000
CM-244	5534.359	5886.038	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 154  
 Detector : 76224  
 Background Analysis Date/Time : 12-JUL-2009 18:17:34  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.543	3301.969	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.171	4901.699	2.000000	0.6000000	70.71068	95.00000
CM-244	5533.478	5884.401	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 155  
 Detector : 75553  
 Background Analysis Date/Time : 12-JUL-2009 18:17:38  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.863	3299.267	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.628	4901.683	4.000000	1.200000	50.00000	95.00000
CM-244	5532.390	5885.923	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 156  
 Detector : 75554  
 Background Analysis Date/Time : 12-JUL-2009 18:17:42  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.492	3302.387	4.000000	1.200000	50.00000	95.00000
NP-237	4436.746	4903.077	15.00000	4.500000	25.81989	95.00000
CM-244	5533.286	5886.114	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 157  
 Detector : 75555  
 Background Analysis Date/Time : 12-JUL-2009 18:17:46  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.092	3301.029	5.000000	1.500000	44.72136	95.00000
NP-237	4432.881	4903.879	12.000000	3.600000	28.86751	95.00000
CM-244	5533.745	5886.569	13.000000	3.900000	27.73501	95.00000

Instrument : CHAMBER 158  
 Detector : 33451  
 Background Analysis Date/Time : 12-JUL-2009 18:17:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.224	3299.662	4.000000	1.200000	50.00000	95.00000
NP-237	4433.214	4902.387	14.000000	4.200000	26.72612	95.00000
CM-244	5532.016	5882.536	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 159  
 Detector : 76225  
 Background Analysis Date/Time : 12-JUL-2009 18:17:54  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.518	3300.013	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.310	4906.501	6.000000	1.800000	40.82483	95.00000
CM-244	5532.775	5886.617	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 160  
 Detector : 76226  
 Background Analysis Date/Time : 12-JUL-2009 18:17:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.201	3297.681	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.389	4904.545	8.000000	2.400000	35.35534	95.00000
CM-244	5531.162	5885.243	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 161  
 Detector : 70321  
 Background Analysis Date/Time : 19-JUL-2009 13:08:31  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.000	3299.306	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.547	4904.892	11.00000	3.300000	30.15113	95.00000
CM-244	5532.420	5884.522	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 162  
 Detector : 70323  
 Background Analysis Date/Time : 19-JUL-2009 13:08:36  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.757	3298.334	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.446	4905.658	4.000000	1.200000	50.00000	95.00000
CM-244	5531.781	5882.612	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 163  
 Detector : 70324  
 Background Analysis Date/Time : 19-JUL-2009 13:08:40  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.922	3300.358	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.910	4905.359	19.00000	5.700000	22.94157	95.00000
CM-244	5534.127	5886.809	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 164  
 Detector : 70325  
 Background Analysis Date/Time : 19-JUL-2009 13:08:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.018	3297.699	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.306	4904.250	9.000000	2.700000	33.33334	95.00000
CM-244	5533.729	5886.834	9.000000	2.700000	33.33334	95.00000



Instrument : CHAMBER 165  
 Detector : 72544  
 Background Analysis Date/Time : 19-JUL-2009 13:08:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.844	3302.139	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.670	4904.543	11.00000	3.300000	30.15113	95.00000
CM-244	5533.515	5886.135	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 166  
 Detector : 74545  
 Background Analysis Date/Time : 19-JUL-2009 13:08:54  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.919	3301.734	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4433.352	4903.208	6.000000	1.800000	40.82483	95.00000
CM-244	5532.473	5885.411	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 167  
 Detector : 72546  
 Background Analysis Date/Time : 19-JUL-2009 13:08:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.456	3297.909	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.461	4902.876	7.000000	2.100000	37.79645	95.00000
CM-244	5531.568	5884.192	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 168  
 Detector : 72547  
 Background Analysis Date/Time : 19-JUL-2009 13:09:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.191	3302.241	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.272	4904.107	10.00000	3.000000	31.62278	95.00000
CM-244	5533.178	5885.925	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 169  
 Detector : 72548  
 Background Analysis Date/Time : 19-JUL-2009 13:09:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.882	3298.026	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.930	4902.295	20.00000	6.000000	22.36068	95.00000
CM-244	5531.111	5883.897	12.00000	3.600000	28.86751	95.00000

Instrument : CHAMBER 170  
 Detector : 72549  
 Background Analysis Date/Time : 19-JUL-2009 13:09:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.026	3302.433	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.863	4906.064	7.000000	2.100000	37.79645	95.00000
CM-244	5532.657	5887.477	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 171  
 Detector : 78260  
 Background Analysis Date/Time : 19-JUL-2009 13:09:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.883	3301.923	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.363	4904.564	11.00000	3.300000	30.15113	95.00000
CM-244	5534.294	5887.494	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 172  
 Detector : 78772  
 Background Analysis Date/Time : 19-JUL-2009 13:09:20  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.947	3302.414	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.288	4903.064	6.000000	1.800000	40.82483	95.00000
CM-244	5532.422	5885.508	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 173  
 Detector : 74431  
 Background Analysis Date/Time : 19-JUL-2009 13:09:25  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.296	3300.266	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.390	4906.583	5.000000	1.500000	44.72136	95.00000
CM-244	5534.964	5886.757	17.00000	5.100000	24.25356	95.00000

Instrument : CHAMBER 174  
 Detector : 74432  
 Background Analysis Date/Time : 19-JUL-2009 13:09:29  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.955	3301.951	3.000000	0.9000000	57.73503	95.00000
NP-237	4436.112	4905.743	7.000000	2.100000	37.79645	95.00000
CM-244	5531.741	5886.720	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 175  
 Detector : 74433  
 Background Analysis Date/Time : 19-JUL-2009 13:09:34  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.808	3301.771	2.000000	0.6000000	70.71068	95.00000
NP-237	4437.598	4902.379	3.000000	0.9000000	57.73503	95.00000
CM-244	5530.438	5887.378	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 176  
 Detector : 74434  
 Background Analysis Date/Time : 19-JUL-2009 13:09:39  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.124	3298.749	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.658	4904.539	5.000000	1.500000	44.72136	95.00000
CM-244	5533.031	5884.495	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 177  
 Detector : 74435  
 Background Analysis Date/Time : 19-JUL-2009 13:09:43  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.035	3300.055	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.061	4906.072	4.000000	1.200000	50.00000	95.00000
CM-244	5534.094	5885.629	20.00000	6.000000	22.36068	95.00000

Instrument : CHAMBER 178  
 Detector : 74436  
 Background Analysis Date/Time : 19-JUL-2009 13:09:47  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.331	3301.630	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.348	4903.642	11.00000	3.300000	30.15113	95.00000
CM-244	5531.998	5883.700	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 179  
 Detector : 74437  
 Background Analysis Date/Time : 19-JUL-2009 13:09:52  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.102	3300.165	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.443	4906.617	6.000000	1.800000	40.82483	95.00000
CM-244	5534.901	5886.605	25.00000	7.500000	20.00000	95.00000

Instrument : CHAMBER 180  
 Detector : 74438  
 Background Analysis Date/Time : 19-JUL-2009 13:09:56  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.611	3299.257	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.245	4903.299	9.000000	2.700000	33.33334	95.00000
CM-244	5535.594	5886.061	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 181  
 Detector : 74439  
 Background Analysis Date/Time : 19-JUL-2009 13:10:01  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.239	3301.914	2.000000	0.6000000	70.71068	95.00000
NP-237	4437.080	4901.757	3.000000	0.9000000	57.73503	95.00000
CM-244	5535.131	5886.836	26.00000	7.800000	19.61161	95.00000

Instrument : CHAMBER 182  
 Detector : 74440  
 Background Analysis Date/Time : 19-JUL-2009 13:10:05  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.998	3301.429	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.415	4901.861	6.000000	1.800000	40.82483	95.00000
CM-244	5533.907	5884.511	30.00000	9.000000	18.25742	95.00000

Instrument : CHAMBER 183  
 Detector : 74441  
 Background Analysis Date/Time : 19-JUL-2009 13:10:09  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.448	3298.556	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.882	4905.025	5.000000	1.500000	44.72136	95.00000
CM-244	5533.221	5884.854	26.00000	7.800000	19.61161	95.00000

Instrument : CHAMBER 184  
 Detector : 74442  
 Background Analysis Date/Time : 19-JUL-2009 13:10:15  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.235	3300.018	3.000000	0.9000000	57.73503	95.00000
NP-237	4434.314	4904.409	4.000000	1.200000	50.00000	95.00000
CM-244	5531.386	5887.098	30.00000	9.000000	18.25742	95.00000

Instrument : CHAMBER 185  
 Detector : 68615  
 Background Analysis Date/Time : 19-JUL-2009 13:10:19  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.225	3297.857	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.385	4903.692	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.756	5883.696	28.00000	8.400001	18.89822	95.00000

Instrument : CHAMBER 186  
 Detector : 68616  
 Background Analysis Date/Time : 19-JUL-2009 13:10:23  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.440	3298.282	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.254	4901.541	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.251	5884.261	30.00000	9.000000	18.25742	95.00000

Instrument : CHAMBER 187  
 Detector : 68620  
 Background Analysis Date/Time : 19-JUL-2009 13:10:27  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.912	3299.166	3.000000	0.9000000	57.73503	95.00000
NP-237	4432.442	4904.149	11.00000	3.300000	30.15113	95.00000
CM-244	5535.067	5883.156	22.00000	6.600000	21.32007	95.00000

Instrument : CHAMBER 188  
 Detector : 68621  
 Background Analysis Date/Time : 19-JUL-2009 13:10:31  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.283	3302.165	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.129	4903.527	2.000000	0.6000000	70.71068	95.00000
CM-244	5532.390	5884.553	29.00000	8.700001	18.56953	95.00000

Instrument : CHAMBER 189  
 Detector : 68622  
 Background Analysis Date/Time : 19-JUL-2009 13:10:35  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.652	3299.552	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.579	4902.841	6.000000	1.800000	40.82483	95.00000
CM-244	5534.475	5885.420	43.00000	12.90000	15.24986	95.00000

Instrument : CHAMBER 190  
 Detector : 68623  
 Background Analysis Date/Time : 19-JUL-2009 13:10:39  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.900	3302.388	5.000000	1.500000	44.72136	95.00000
NP-237	4434.198	4903.145	22.00000	6.600000	21.32007	95.00000
CM-244	5535.637	5887.028	30.00000	9.000000	18.25742	95.00000

Instrument : CHAMBER 191  
 Detector : 68624  
 Background Analysis Date/Time : 19-JUL-2009 13:10:43  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.514	3302.389	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.396	4902.283	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.230	5883.124	16.00000	4.800000	25.00000	95.00000

Instrument : CHAMBER 192  
 Detector : 74430  
 Background Analysis Date/Time : 19-JUL-2009 13:10:47  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.042	3298.270	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.778	4903.324	5.000000	1.500000	44.72136	95.00000
CM-244	5534.357	5882.529	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 193  
 Detector : 68627  
 Background Analysis Date/Time : 19-JUL-2009 13:10:51  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.069	3299.225	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.121	4901.609	5.000000	1.500000	44.72136	95.00000
CM-244	5534.158	5885.907	25.00000	7.500000	20.00000	95.00000

Instrument : CHAMBER 194  
 Detector : 68635  
 Background Analysis Date/Time : 19-JUL-2009 13:10:55  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.572	3300.603	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.435	4905.175	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.274	5883.671	22.00000	6.600000	21.32007	95.00000

Instrument : CHAMBER 195  
 Detector : 68636  
 Background Analysis Date/Time : 19-JUL-2009 13:10:59  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.629	3301.408	5.000000	1.500000	44.72136	95.00000
NP-237	4433.877	4902.925	52.00000	15.60000	13.86751	95.00000
CM-244	5535.397	5886.705	43.00000	12.90000	15.24986	95.00000

Instrument : CHAMBER 196  
 Detector : 68637  
 Background Analysis Date/Time : 19-JUL-2009 13:11:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.343	3302.501	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.338	4901.979	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.144	5885.395	20.00000	6.000000	22.36068	95.00000



Instrument : CHAMBER 197  
 Detector : 78894  
 Background Analysis Date/Time : 19-JUL-2009 13:11:08  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.389	3297.669	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.236	4904.076	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.086	5887.165	19.00000	5.700000	22.94157	95.00000

Instrument : CHAMBER 198  
 Detector : 78895  
 Background Analysis Date/Time : 19-JUL-2009 13:11:12  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.288	3302.314	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.287	4906.224	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.818	5887.000	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 199  
 Detector : 78896  
 Background Analysis Date/Time : 19-JUL-2009 13:11:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.202	3299.048	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.598	4906.357	2.000000	0.6000000	70.71068	95.00000
CM-244	5530.513	5883.049	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 200  
 Detector : 78900  
 Background Analysis Date/Time : 19-JUL-2009 13:11:20  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.598	3302.306	3.000000	0.9000000	57.73503	95.00000
NP-237	4436.820	4902.466	15.00000	4.500000	25.81989	95.00000
CM-244	5532.933	5886.480	31.00000	9.300000	17.96053	95.00000

Instrument : CHAMBER 201  
 Detector : 78902  
 Background Analysis Date/Time : 19-JUL-2009 13:11:24  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.239	3302.324	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.525	4903.539	4.000000	1.200000	50.00000	95.00000
CM-244	5534.042	5887.523	22.00000	6.600000	21.32007	95.00000

Instrument : CHAMBER 202  
 Detector : 78903  
 Background Analysis Date/Time : 19-JUL-2009 13:11:29  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.965	3301.750	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.262	4905.190	0.000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5533.929	5886.269	31.00000	9.300000	17.96053	95.00000

Instrument : CHAMBER 203  
 Detector : 78905  
 Background Analysis Date/Time : 19-JUL-2009 13:11:32  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.960	3299.739	5.000000	1.500000	44.72136	95.00000
NP-237	4435.540	4905.766	9.000000	2.700000	33.33334	95.00000
CM-244	5534.337	5886.308	25.00000	7.500000	20.00000	95.00000

Instrument : CHAMBER 204  
 Detector : 78907  
 Background Analysis Date/Time : 19-JUL-2009 13:11:37  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.953	3297.878	13.00000	3.900000	27.73501	95.00000
NP-237	4437.339	4902.439	14.00000	4.200000	26.72612	95.00000
CM-244	5531.727	5884.400	31.00000	9.300000	17.96053	95.00000

Instrument : CHAMBER 205  
 Detector : 78908  
 Background Analysis Date/Time : 19-JUL-2009 13:11:41  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.664	3299.649	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.348	4904.923	3.000000	0.9000000	57.73503	95.00000
CM-244	5534.662	5887.628	18.00000	5.400000	23.57022	95.00000

Instrument : CHAMBER 206  
 Detector : 78909  
 Background Analysis Date/Time : 19-JUL-2009 13:11:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.007	3298.921	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.777	4902.746	2.000000	0.6000000	70.71068	95.00000
CM-244	5531.452	5883.730	22.00000	6.600000	21.32007	95.00000

Instrument : CHAMBER 207  
 Detector : 78910  
 Background Analysis Date/Time : 19-JUL-2009 13:11:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.143	3301.594	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.296	4902.779	2.000000	0.6000000	70.71068	95.00000
CM-244	5532.449	5885.271	25.00000	7.500000	20.00000	95.00000

Instrument : CHAMBER 208  
 Detector : 78911  
 Background Analysis Date/Time : 19-JUL-2009 13:11:53  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.612	3298.165	3.000000	0.9000000	57.73503	95.00000
NP-237	4434.097	4904.804	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.389	5887.108	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 209  
 Detector : 79188  
 Background Analysis Date/Time : 26-JUL-2009 17:06:41  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.310	3300.226	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.667	4905.853	1.000000	0.3000000	100.0000	95.00000
CM-244	5530.947	5884.845	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 210  
 Detector : 79189  
 Background Analysis Date/Time : 26-JUL-2009 17:06:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.620	3297.977	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.731	4905.552	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5534.352	5886.824	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 211  
 Detector : 79190  
 Background Analysis Date/Time : 26-JUL-2009 17:06:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.121	3301.259	3.000000	0.9000000	57.73503	95.00000
NP-237	4436.737	4902.524	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.952	5886.368	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 212  
 Detector : 79191  
 Background Analysis Date/Time : 26-JUL-2009 17:06:54  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.135	3301.447	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.433	4904.665	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5534.267	5887.313	12.00000	3.600000	28.86751	95.00000

Instrument : CHAMBER 213  
 Detector : 79192  
 Background Analysis Date/Time : 26-JUL-2009 17:06:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.470	3298.036	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4436.689	4901.687	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.037	5883.842	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 214  
 Detector : 79193  
 Background Analysis Date/Time : 26-JUL-2009 17:07:02  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.553	3297.788	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.227	4901.574	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.780	5885.252	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 215  
 Detector : 79194  
 Background Analysis Date/Time : 26-JUL-2009 17:07:06  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.364	3302.121	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.186	4903.222	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.359	5882.968	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 216  
 Detector : 79195  
 Background Analysis Date/Time : 26-JUL-2009 17:07:10  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.730	3302.451	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.761	4905.361	2.000000	0.6000000	70.71068	95.00000
CM-244	5530.680	5884.547	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 217  
 Detector : 79410  
 Background Analysis Date/Time : 26-JUL-2009 17:07:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.264	3300.395	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.666	4904.432	1.000000	0.3000000	100.0000	95.00000
CM-244	5535.108	5883.550	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 218  
 Detector : 79411  
 Background Analysis Date/Time : 26-JUL-2009 17:07:19  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.480	3299.092	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.463	4904.366	6.000000	1.800000	40.82483	95.00000
CM-244	5534.949	5883.207	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 219  
 Detector : 79412  
 Background Analysis Date/Time : 26-JUL-2009 17:07:23  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.558	3298.478	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.677	4902.329	2.000000	0.6000000	70.71068	95.00000
CM-244	5533.300	5887.374	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 220  
 Detector : 79413  
 Background Analysis Date/Time : 26-JUL-2009 17:07:26  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.238	3297.635	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.067	4906.404	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5530.768	5883.799	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 221  
 Detector : 79414  
 Background Analysis Date/Time : 26-JUL-2009 17:07:30  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.031	3301.906	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.520	4906.347	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.427	5886.301	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 222  
 Detector : 79415  
 Background Analysis Date/Time : 26-JUL-2009 17:07:34  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.828	3299.834	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4436.567	4903.132	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5532.999	5885.314	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 223  
 Detector : 79416  
 Background Analysis Date/Time : 26-JUL-2009 17:07:38  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.719	3302.203	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.717	4901.802	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.370	5883.775	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 224  
 Detector : 79417  
 Background Analysis Date/Time : 26-JUL-2009 17:07:43  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.902	3302.451	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.496	4905.621	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.081	5884.107	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 225  
 Detector : 79418  
 Background Analysis Date/Time : 26-JUL-2009 17:07:47  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.698	3301.928	3.000000	0.9000000	57.73503	95.00000
NP-237	4436.047	4902.115	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.662	5882.674	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 226  
 Detector : 79419  
 Background Analysis Date/Time : 26-JUL-2009 17:07:51  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.229	3299.048	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.278	4902.399	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.943	5886.259	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 227  
 Detector : 79420  
 Background Analysis Date/Time : 26-JUL-2009 17:07:55  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.495	3300.898	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.132	4906.286	3.000000	0.9000000	57.73503	95.00000
CM-244	5532.133	5886.196	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 228  
 Detector : 79421  
 Background Analysis Date/Time : 26-JUL-2009 17:07:59  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.613	3298.829	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.639	4905.792	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5531.072	5884.538	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000



Instrument : CHAMBER 229  
 Detector : 79422  
 Background Analysis Date/Time : 26-JUL-2009 17:08:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.805	3298.464	3.000000	0.9000000	57.73503	95.00000
NP-237	4434.226	4906.242	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5533.427	5882.943	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 230  
 Detector : 79423  
 Background Analysis Date/Time : 26-JUL-2009 17:08:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.308	3297.622	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.975	4905.433	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5531.188	5884.956	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 231  
 Detector : 79424  
 Background Analysis Date/Time : 26-JUL-2009 17:08:12  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.586	3298.189	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.432	4903.240	4.000000	1.200000	50.00000	95.00000
CM-244	5533.660	5887.186	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 232  
 Detector : 79425  
 Background Analysis Date/Time : 26-JUL-2009 17:08:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.229	3299.258	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.403	4904.597	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.062	5886.338	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 233  
 Detector : 79426  
 Background Analysis Date/Time : 26-JUL-2009 17:08:20  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.053	3300.219	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.148	4902.933	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.654	5884.028	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 234  
 Detector : 79427  
 Background Analysis Date/Time : 26-JUL-2009 17:08:25  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.497	3297.542	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.922	4904.935	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.289	5887.217	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 235  
 Detector : 79428  
 Background Analysis Date/Time : 26-JUL-2009 17:08:29  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.334	3300.717	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.003	4906.236	2.000000	0.6000000	70.71068	95.00000
CM-244	5532.236	5886.409	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 236  
 Detector : 79429  
 Background Analysis Date/Time : 26-JUL-2009 17:08:33  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.761	3298.777	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.283	4906.214	9.000000	2.700000	33.33334	95.00000
CM-244	5532.557	5887.291	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 237  
 Detector : 79430  
 Background Analysis Date/Time : 26-JUL-2009 17:08:37  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.197	3297.861	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.935	4904.354	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5530.478	5884.662	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 238  
 Detector : 79431  
 Background Analysis Date/Time : 26-JUL-2009 17:08:41  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.703	3299.637	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4437.459	4902.787	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5533.171	5886.843	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 239  
 Detector : 79432  
 Background Analysis Date/Time : 26-JUL-2009 17:08:46  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.694	3302.472	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.142	4902.540	8.000000	2.400000	35.35534	95.00000
CM-244	5534.989	5884.715	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 240  
 Detector : 79433  
 Background Analysis Date/Time : 26-JUL-2009 17:08:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.448	3302.009	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.377	4905.282	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.249	5885.600	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 241  
 Detector : 79434  
 Background Analysis Date/Time : 26-JUL-2009 17:08:54  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.069	3301.257	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.036	4904.033	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5530.409	5885.133	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 242  
 Detector : 79435  
 Background Analysis Date/Time : 26-JUL-2009 17:08:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.986	3300.537	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.402	4905.006	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5535.112	5883.069	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 243  
 Detector : 79436  
 Background Analysis Date/Time : 26-JUL-2009 17:09:02  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.831	3301.144	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.437	4901.520	3.000000	0.9000000	57.73503	95.00000
CM-244	5533.039	5887.402	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 244  
 Detector : 79437  
 Background Analysis Date/Time : 26-JUL-2009 17:09:06  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.561	3301.814	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.746	4904.768	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.146	5885.854	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 245  
 Detector : 79438  
 Background Analysis Date/Time : 26-JUL-2009 17:09:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.519	3298.200	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.025	4906.060	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.264	5882.788	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 246  
 Detector : 78912  
 Background Analysis Date/Time : 26-JUL-2009 17:09:15  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.883	3302.161	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.171	4902.069	2.000000	0.6000000	70.71068	95.00000
CM-244	5533.279	5887.441	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 247  
 Detector : 79440  
 Background Analysis Date/Time : 26-JUL-2009 17:09:20  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.314	3301.154	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.427	4902.237	2.000000	0.6000000	70.71068	95.00000
CM-244	5535.390	5885.574	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 248  
 Detector : 79441  
 Background Analysis Date/Time : 26-JUL-2009 17:09:23  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.045	3301.474	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.389	4902.813	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.872	5884.178	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 249  
 Detector : 79442  
 Background Analysis Date/Time : 26-JUL-2009 17:09:28  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.808	3298.538	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.459	4906.270	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5535.492	5886.613	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 250  
 Detector : 79443  
 Background Analysis Date/Time : 26-JUL-2009 17:09:32  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.616	3300.155	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.911	4904.182	6.000000	1.800000	40.82483	95.00000
CM-244	5530.811	5885.622	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 251  
 Detector : 79444  
 Background Analysis Date/Time : 26-JUL-2009 17:09:36  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.845	3297.824	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.069	4905.749	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.571	5885.360	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 252  
 Detector : 79445  
 Background Analysis Date/Time : 26-JUL-2009 17:09:40  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.916	3302.142	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.879	4906.631	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.322	5884.528	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 253  
 Detector : 79446  
 Background Analysis Date/Time : 26-JUL-2009 17:09:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.796	3301.166	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.182	4903.720	9.000000	2.700000	33.33334	95.00000
CM-244	5533.610	5884.813	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 254  
 Detector : 79447  
 Background Analysis Date/Time : 26-JUL-2009 17:09:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.474	3298.982	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.396	4906.361	4.000000	1.200000	50.00000	95.00000
CM-244	5533.560	5883.122	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 255  
 Detector : 79448  
 Background Analysis Date/Time : 26-JUL-2009 17:09:53  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.107	3299.169	3.000000	0.9000000	57.73503	95.00000
NP-237	4434.844	4902.471	4.000000	1.200000	50.00000	95.00000
CM-244	5531.565	5882.529	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 256  
 Detector : 79449  
 Background Analysis Date/Time : 26-JUL-2009 17:09:57  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.102	3301.350	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.732	4901.991	8.000000	2.400000	35.35534	95.00000
CM-244	5533.871	5883.102	3.000000	0.9000000	57.73503	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 : 28-JUL-2009 08:29:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 13:16:04  
 Average Efficiency : 0.2949482  
 Average Efficiency Error : 8.1221173E-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	2987.963	3299.690	14593.00	0.2923914	1.2575096E-02	47.61151
NP-237	209.5938	28-FEB-2010	4435.814	4905.115	15008.00	0.2983264	1.5113835E-02	68.97178
CM-244	202.7478	28-FEB-2010	5534.094	5883.857	13593.00	0.2952577	1.4978610E-02	53.44432

Instrument : CHAMBER 006  
 Detector : 67613  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 28-JUL-2009 08:29:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 13:16:33  
 Average Efficiency : 0.3152152  
 Average Efficiency Error : 8.6775627E-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	2989.395	3299.193	14889.00	0.3086578	1.3269765E-02	52.22050
NP-237	204.7038	28-FEB-2010	4433.513	4905.230	15484.00	0.3151368	1.5959116E-02	67.53505
CM-244	195.0060	28-FEB-2010	5530.459	5883.505	14409.00	0.3254324	1.6495980E-02	57.06753

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 : 14-JUL-2009 15:04:40  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 07:50:05  
 Average Efficiency : 0.3223269  
 Average Efficiency Error : 8.8674370E-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	2991.459	3300.768	15427.00	0.3220896	1.3838380E-02	41.77474
NP-237	208.8990	28-FEB-2010	4435.720	4903.495	16011.00	0.3193196	1.6164232E-02	59.35002
CM-244	198.1458	28-FEB-2010	5531.358	5886.349	14679.00	0.3258023	1.6510617E-02	49.83286

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 : 24-JUL-2009 08:07:28  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 24-JUL-2009 13:43:22  
 Average Efficiency : 0.3412640  
 Average Efficiency Error : 1.0000055E-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	2989.447	3298.118	15426.00	0.3367459	1.7055135E-02	44.71416
NP-237	161.6154	28-FEB-2010	4432.441	4905.996	13155.00	0.3391359	1.7212695E-02	71.77612
CM-244	148.1754	28-FEB-2010	5535.248	5885.925	11727.00	0.3483921	1.7714251E-02	48.91441



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 : 14-JUL-2009 15:04:42  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 07:50:24  
 Average Efficiency : 0.3338314  
 Average Efficiency Error : 9.2027988E-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	2992.104	3299.916	15053.00	0.3280614	1.4101115E-02	64.46095
NP-237	162.9186	28-FEB-2010	4436.072	4902.901	13435.00	0.3435040	1.7429167E-02	93.20530
CM-244	153.1968	28-FEB-2010	5535.417	5884.932	11607.00	0.3330215	1.6935715E-02	63.05283

Instrument : CHAMBER 032  
 Detector : 67041  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 14-JUL-2009 15:04:42  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 07:50:35  
 Average Efficiency : 0.3120490  
 Average Efficiency Error : 8.6091449E-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	2990.634	3297.499	14436.00	0.3121021	1.3425405E-02	53.99254
NP-237	165.9822	28-FEB-2010	4437.570	4904.884	12360.00	0.3101901	1.5758617E-02	64.26519
CM-244	153.7938	28-FEB-2010	5533.522	5884.215	10984.00	0.3138851	1.5977694E-02	52.03965

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 : 14-JUL-2009 15:04:42  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 07:50:46  
 Average Efficiency : 0.3171561  
 Average Efficiency Error : 8.7465709E-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	2990.268	3300.348	14798.00	0.3114539	1.3391386E-02	50.21013
NP-237	167.2962	28-FEB-2010	4435.287	4906.218	12784.00	0.3183437	1.6164379E-02	67.44197
CM-244	154.4388	28-FEB-2010	5533.837	5886.701	11405.00	0.3245862	1.6511625E-02	55.32959

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 : 14-JUL-2009 15:04:44  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 07:50:59  
 Average Efficiency : 0.3430506  
 Average Efficiency Error : 9.4568562E-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	2987.909	3300.265	15299.00	0.3453356	1.4839282E-02	39.68650
NP-237	160.8066	28-FEB-2010	4434.212	4905.200	12955.00	0.3356342	1.7038893E-02	56.79002
CM-244	145.8384	28-FEB-2010	5530.781	5884.673	11538.00	0.3477968	1.7688734E-02	40.32752

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. Isteps	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. Isteps	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. Isteps	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. Istps	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. Istps	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. Istps	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 : 10-JUL-2009 08:15:23  
 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	2992.198	3300.849	15511.00	0.3276620	1.6594216E-02	50.13194
NP-237	168.1992	28-FEB-2010	4435.896	4905.687	13201.00	0.3269055	1.6591255E-02	61.53701
CM-244	156.7614	28-FEB-2010	5533.567	5885.099	11382.00	0.3190994	1.6232992E-02	50.67320

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 : 10-JUL-2009 08:15:33  
 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	2987.937	3298.136	15260.00	0.3312062	1.4232747E-02	47.91920
NP-237	166.6248	28-FEB-2010	4435.160	4903.491	13641.00	0.3410752	1.7302046E-02	70.19518
CM-244	155.8290	28-FEB-2010	5531.067	5883.227	11990.00	0.3380632	1.7182823E-02	49.11132

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-JUL-2009 08:37:50  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 13:43:32  
 Average Efficiency : 0.2519916  
 Average Efficiency Error : 6.9467155E-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	2988.779	3298.785	15298.00	0.2475491	1.0637350E-02	69.86681
NP-237	171.0024	28-FEB-2010	4433.559	4905.331	12963.00	0.2526515	1.2826058E-02	72.30716
CM-244	158.1060	28-FEB-2010	5530.517	5883.481	11603.00	0.2580627	1.3123710E-02	68.28992

Instrument : CHAMBER 114  
 Detector : 78258  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 15-JUL-2009 08:37:55  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 13:43:44  
 Average Efficiency : 0.2556549  
 Average Efficiency Error : 7.0340075E-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	2990.441	3298.868	15389.00	0.2513953	1.0801502E-02	44.39313
NP-237	205.0260	28-FEB-2010	4436.900	4905.218	15927.00	0.2589234	1.3107756E-02	58.50210
CM-244	199.6806	28-FEB-2010	5530.599	5885.790	14679.00	0.2586593	1.3108032E-02	49.91982

Instrument : CHAMBER 115  
 Detector : 45-132FF4  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 15-JUL-2009 08:37:59  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 13:43:54  
 Average Efficiency : 0.2654886  
 Average Efficiency Error : 7.3024337E-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	2991.839	3301.816	15791.00	0.2664527	1.1443332E-02	55.36104
NP-237	200.4990	28-FEB-2010	4436.001	4902.052	15786.00	0.2624403	1.3287230E-02	64.95200
CM-244	196.5558	28-FEB-2010	5531.697	5884.118	14942.00	0.2673051	1.3543067E-02	65.53946



Instrument : CHAMBER 116  
 Detector : 45-132FF2  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 15-JUL-2009 08:38:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 13:44:05  
 Average Efficiency : 0.2629267  
 Average Efficiency Error : 7.2302124E-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	2988.005	3302.013	16058.00	0.2632007	1.1300448E-02	59.26229
NP-237	209.2716	28-FEB-2010	4432.895	4903.021	16270.00	0.2591243	1.3114552E-02	68.78876
CM-244	199.6488	28-FEB-2010	5531.311	5883.052	15125.00	0.2665666	1.3503457E-02	63.98270

Instrument : CHAMBER 117  
 Detector : 33450  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 15-JUL-2009 08:38:07  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 13:44:15  
 Average Efficiency : 0.2535850  
 Average Efficiency Error : 6.9797374E-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	2992.173	3300.224	14948.00	0.2486987	1.0691201E-02	65.60831
NP-237	203.2080	28-FEB-2010	4434.403	4904.427	15595.00	0.2557888	1.2952457E-02	67.83129
CM-244	197.2236	28-FEB-2010	5533.135	5885.381	14502.00	0.2586756	1.3111014E-02	62.53085

Instrument : CHAMBER 118  
 Detector : 75544  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 15-JUL-2009 08:38:11  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 13:44:26  
 Average Efficiency : 0.2598683  
 Average Efficiency Error : 7.1489667E-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	2992.199	3301.179	15535.00	0.2579420	1.1080938E-02	44.86411
NP-237	204.0192	28-FEB-2010	4437.404	4902.417	15842.00	0.2588220	1.3103474E-02	58.11101
CM-244	197.2128	28-FEB-2010	5530.853	5882.689	14791.00	0.2637591	1.3365132E-02	41.32130

Instrument : CHAMBER 119  
 Detector : 74429  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 15-JUL-2009 08:38:16  
 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	9998.000	0.2936279	1.2630888E-02	0.0000000E+00
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 : 15-JUL-2009 08:38:20  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-JUL-2009 09:29:36  
 Average Efficiency : 0.2329810  
 Average Efficiency Error : 6.4206291E-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	2990.522	3298.404	13848.00	0.2315074	9.9664843E-03	47.05631
NP-237	202.9926	28-FEB-2010	4435.328	4903.588	14182.00	0.2328624	1.1806204E-02	59.86080
CM-244	196.2330	28-FEB-2010	5534.528	5884.756	13118.00	0.2352170	1.1938849E-02	50.37906

Instrument : CHAMBER 121  
 Detector : 75545  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 15-JUL-2009 08:38:24  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 13:44:36  
 Average Efficiency : 0.2481502  
 Average Efficiency Error : 6.8278033E-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	2988.023	3300.631	15450.00	0.2475892	1.0637230E-02	49.92188
NP-237	209.5938	28-FEB-2010	4432.658	4901.599	15670.00	0.2492075	1.2618415E-02	57.40462
CM-244	202.7478	28-FEB-2010	5533.997	5885.295	14284.00	0.2478847	1.2566634E-02	53.21548

Instrument : CHAMBER 122  
 Detector : 75546  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 15-JUL-2009 08:38:29  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 13:44:46  
 Average Efficiency : 0.2535488  
 Average Efficiency Error : 6.9723255E-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	2990.563	3298.589	16028.00	0.2543318	1.0920011E-02	51.38880
NP-237	214.4868	28-FEB-2010	4436.782	4905.890	16182.00	0.2514608	1.2727518E-02	56.55112
CM-244	208.4184	28-FEB-2010	5532.955	5884.078	15083.00	0.2546007	1.2897825E-02	50.53276

Instrument : CHAMBER 123  
 Detector : 45-142V3  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 15-JUL-2009 08:38:33  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 13:44:55  
 Average Efficiency : 0.2599957  
 Average Efficiency Error : 7.1522635E-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	2990.850	3299.223	15663.00	0.2596899	1.1154454E-02	71.05709
NP-237	204.7038	28-FEB-2010	4437.241	4905.636	15899.00	0.2588749	1.3105587E-02	67.04378
CM-244	195.0060	28-FEB-2010	5531.191	5886.517	14497.00	0.2615748	1.3257999E-02	62.26140

Instrument : CHAMBER 124  
 Detector : 45-142V2  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 15-JUL-2009 08:38:38  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-JUL-2009 13:45:05  
 Average Efficiency : 0.2587920  
 Average Efficiency Error : 7.1179173E-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	2988.169	3298.838	15692.00	0.2569794	1.1037684E-02	70.68444
NP-237	205.8930	28-FEB-2010	4434.514	4905.983	16135.00	0.2612102	1.3221423E-02	71.87656
CM-244	203.1954	28-FEB-2010	5535.498	5887.649	14956.00	0.2589717	1.3120654E-02	72.67943

Instrument : CHAMBER 125  
 Detector : 75547  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-JUL-2009 09:11:36  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:23:54  
 Average Efficiency : 0.2576947  
 Average Efficiency Error : 7.0884591E-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	2992.438	3299.892	15734.00	0.2609255	1.1206666E-02	46.30545
NP-237	210.2526	28-FEB-2010	4435.342	4903.042	16013.00	0.2538552	1.2850333E-02	59.85715
CM-244	201.9108	28-FEB-2010	5533.267	5883.118	14760.00	0.2572743	1.3036882E-02	47.93466

Instrument : CHAMBER 126  
 Detector : 75548  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 17-JUL-2009 09:11:44  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:24:06  
 Average Efficiency : 0.2541045  
 Average Efficiency Error : 6.9944067E-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	2988.642	3299.863	14987.00	0.2472976	1.0630463E-02	48.38591
NP-237	202.9140	28-FEB-2010	4434.022	4903.287	15977.00	0.2624101	1.3283804E-02	54.76476
CM-244	199.3140	28-FEB-2010	5533.750	5882.833	14524.00	0.2563267	1.2991657E-02	55.65510

Instrument : CHAMBER 127  
 Detector : 78770  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 17-JUL-2009 09:11:52  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:24:19  
 Average Efficiency : 0.2465067  
 Average Efficiency Error : 6.7814202E-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	2987.930	3300.925	15708.00	0.2470578	1.0611333E-02	45.78584
NP-237	211.7160	28-FEB-2010	4433.404	4902.114	15685.00	0.2469317	1.2503051E-02	55.80547
CM-244	207.3882	28-FEB-2010	5533.832	5884.575	14464.00	0.2453295	1.2434963E-02	52.15766

Instrument : CHAMBER 128  
 Detector : 75549  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 17-JUL-2009 09:11:58  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:24:31  
 Average Efficiency : 0.2568552  
 Average Efficiency Error : 7.0680329E-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	2989.441	3299.762	15295.00	0.2512498	1.0796450E-02	45.99468
NP-237	203.4984	28-FEB-2010	4437.479	4901.607	16011.00	0.2622381	1.3274715E-02	55.45222
CM-244	197.1096	28-FEB-2010	5532.807	5882.614	14556.00	0.2598990	1.3172311E-02	50.77409

Instrument : CHAMBER 129  
 Detector : 76227  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-JUL-2009 09:12:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:24:41  
 Average Efficiency : 0.2644528  
 Average Efficiency Error : 7.2740684E-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	2991.626	3298.866	15762.00	0.2609125	1.1205764E-02	46.80607
NP-237	200.6460	28-FEB-2010	4434.006	4901.792	16185.00	0.2688618	1.3608224E-02	54.56116
CM-244	195.9270	28-FEB-2010	5532.320	5882.430	14766.00	0.2652449	1.3440695E-02	49.47559

Instrument : CHAMBER 130  
 Detector : 76228  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 17-JUL-2009 09:12:07  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:24:51  
 Average Efficiency : 0.2468057  
 Average Efficiency Error : 6.7924876E-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	2987.724	3301.129	15063.00	0.2441104	1.0492519E-02	52.03590
NP-237	210.1548	28-FEB-2010	4432.733	4905.256	15645.00	0.2481126	1.2563273E-02	57.61189
CM-244	200.7390	28-FEB-2010	5534.221	5882.991	14232.00	0.2493957	1.2643824E-02	52.52812

Instrument : CHAMBER 131  
 Detector : 33448  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-JUL-2009 09:12:11  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:25:01  
 Average Efficiency : 0.2570197  
 Average Efficiency Error : 7.0734182E-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	2990.041	3301.703	15183.00	0.2512954	1.0799803E-02	73.19037
NP-237	199.3962	28-FEB-2010	4437.470	4901.500	15793.00	0.2639839	1.3365344E-02	77.05526
CM-244	198.6402	28-FEB-2010	5535.040	5887.344	14606.00	0.2587552	1.3113786E-02	69.05248

Instrument : CHAMBER 132  
 Detector : 67579  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 17-JUL-2009 09:12:16  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:25:11  
 Average Efficiency : 0.2430298  
 Average Efficiency Error : 6.6918936E-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	2991.722	3299.982	14858.00	0.2393249	1.0289361E-02	82.35345
NP-237	206.8830	28-FEB-2010	4436.189	4902.037	15718.00	0.2532126	1.2820771E-02	110.8838
CM-244	203.0208	28-FEB-2010	5533.193	5884.042	13792.00	0.2390666	1.2125478E-02	95.32550

Instrument : CHAMBER 133  
 Detector : 76229  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-JUL-2009 09:12:20  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:25:22  
 Average Efficiency : 0.2443746  
 Average Efficiency Error : 6.7256871E-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	2991.784	3301.677	15064.00	0.2421688	1.0409047E-02	50.61230
NP-237	208.5846	28-FEB-2010	4432.798	4901.797	15477.00	0.2473098	1.2524300E-02	59.86257
CM-244	205.5828	28-FEB-2010	5532.072	5884.338	14290.00	0.2446276	1.2401419E-02	51.55180

Instrument : CHAMBER 134  
 Detector : 76230  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 17-JUL-2009 09:12:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:25:32  
 Average Efficiency : 0.2446093  
 Average Efficiency Error : 6.7343172E-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	2990.526	3299.017	14780.00	0.2405785	1.0344269E-02	47.58438
NP-237	207.4998	28-FEB-2010	4435.982	4903.287	15238.00	0.2446961	1.2394482E-02	57.76377
CM-244	199.8804	28-FEB-2010	5532.080	5886.000	14233.00	0.2505983	1.2704798E-02	45.62634

Instrument : CHAMBER 135  
 Detector : 64270  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-JUL-2009 09:12:30  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:25:42  
 Average Efficiency : 0.2559817  
 Average Efficiency Error : 7.0438967E-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	2988.277	3299.628	15593.00	0.2604657	1.1188660E-02	51.52015
NP-237	208.8990	28-FEB-2010	4437.221	4904.200	15580.00	0.2485812	1.2587634E-02	59.07031
CM-244	198.1458	28-FEB-2010	5533.869	5883.613	14517.00	0.2578413	1.3068504E-02	58.17161

Instrument : CHAMBER 136  
 Detector : 68549  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 17-JUL-2009 09:12:34  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:25:52  
 Average Efficiency : 0.2467655  
 Average Efficiency Error : 6.7935060E-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	2990.353	3301.238	14853.00	0.2464695	1.0596607E-02	65.72455
NP-237	205.6662	28-FEB-2010	4436.739	4902.455	15465.00	0.2505761	1.2689904E-02	90.78280
CM-244	198.3060	28-FEB-2010	5530.869	5887.561	13725.00	0.2435561	1.2354044E-02	84.13201

Instrument : CHAMBER 137  
 Detector : 64288  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 17-JUL-2009 09:12:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:26:02  
 Average Efficiency : 0.2552701  
 Average Efficiency Error : 7.0390012E-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	2988.740	3300.102	14923.00	0.2576955	1.1078311E-02	64.99760
NP-237	167.9916	28-FEB-2010	4437.224	4902.644	12892.00	0.2557947	1.2986653E-02	75.28851
CM-244	157.2432	28-FEB-2010	5534.374	5886.101	11242.00	0.2515239	1.2798158E-02	68.25955

Instrument : CHAMBER 138  
 Detector : 65877  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 17-JUL-2009 09:12:44  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:26:11  
 Average Efficiency : 0.2546351  
 Average Efficiency Error : 7.0242025E-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	2989.573	3299.020	14588.00	0.2543695	1.0939864E-02	53.70593
NP-237	162.9186	28-FEB-2010	4433.563	4906.044	12608.00	0.2577648	1.3091444E-02	63.94941
CM-244	153.1968	28-FEB-2010	5532.867	5887.098	10976.00	0.2519955	1.2827461E-02	58.23169

Instrument : CHAMBER 139  
 Detector : 76231  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 17-JUL-2009 09:12:48  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:26:21  
 Average Efficiency : 0.2504273  
 Average Efficiency Error : 7.3419176E-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	2987.505	3300.432	14828.00	0.2510030	1.2718994E-02	48.79321
NP-237	168.0294	28-FEB-2010	4434.030	4903.806	12788.00	0.2536503	1.2879401E-02	56.03834
CM-244	160.5822	28-FEB-2010	5532.176	5884.231	11264.00	0.2468024	1.2557442E-02	47.42265



Instrument : CHAMBER 140  
 Detector : 78771  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 17-JUL-2009 09:12:53  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:26:31  
 Average Efficiency : 0.2551487  
 Average Efficiency Error : 7.0366412E-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	2990.854	3298.685	14731.00	0.2547957	1.0956220E-02	48.77175
NP-237	165.9822	28-FEB-2010	4432.882	4903.279	12676.00	0.2545053	1.2924591E-02	56.74310
CM-244	153.7938	28-FEB-2010	5532.806	5885.667	11205.00	0.2563040	1.3041983E-02	50.50342

Instrument : CHAMBER 141  
 Detector : 76232  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 17-JUL-2009 09:12:58  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:26:40  
 Average Efficiency : 0.2558747  
 Average Efficiency Error : 7.5053386E-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	2991.144	3299.081	14344.00	0.2504358	1.2695894E-02	52.97828
NP-237	161.6154	28-FEB-2010	4432.714	4902.455	12501.00	0.2577664	1.3093018E-02	59.69727
CM-244	148.1754	28-FEB-2010	5530.738	5882.724	10942.00	0.2598479	1.3227826E-02	52.14254

Instrument : CHAMBER 142  
 Detector : 64261  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 17-JUL-2009 09:13:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:26:50  
 Average Efficiency : 0.2578609  
 Average Efficiency Error : 7.1141319E-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	2990.865	3298.794	14538.00	0.2551434	1.0973847E-02	59.26533
NP-237	161.7816	28-FEB-2010	4432.947	4903.147	12416.00	0.2557132	1.2990172E-02	60.24754
CM-244	147.2670	28-FEB-2010	5532.255	5884.805	11064.00	0.2642446	1.3449099E-02	59.08084

Instrument : CHAMBER 143  
 Detector : 65882  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 17-JUL-2009 09:13:09  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:27:11  
 Average Efficiency : 0.2247539  
 Average Efficiency Error : 6.6391113E-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	2987.701	3299.952	14717.00	0.2489303	1.2615234E-02	59.75106
NP-237	168.1992	28-FEB-2010	4432.480	4904.917	12257.00	0.2428234	1.2337844E-02	78.49762
CM-244	156.7614	28-FEB-2010	5535.542	5887.375	8790.000	0.1972357	1.0083942E-02	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 : 17-JUL-2009 09:13:14  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:27:26  
 Average Efficiency : 0.2489190  
 Average Efficiency Error : 6.8659927E-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	2987.490	3300.379	14854.00	0.2501176	1.0753425E-02	46.53134
NP-237	167.2962	28-FEB-2010	4433.137	4902.257	12414.00	0.2473100	1.2563203E-02	59.28743
CM-244	154.4388	28-FEB-2010	5534.787	5886.106	10929.00	0.2488915	1.2670427E-02	55.09279

Instrument : CHAMBER 145  
 Detector : 72526  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 17-JUL-2009 09:13:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:27:37  
 Average Efficiency : 0.2495571  
 Average Efficiency Error : 7.3171528E-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	2989.366	3298.098	14915.00	0.2498968	1.2661957E-02	51.73314
NP-237	169.7700	28-FEB-2010	4434.265	4904.885	12751.00	0.2503173	1.2710736E-02	57.53227
CM-244	154.8234	28-FEB-2010	5534.192	5886.678	10933.00	0.2484652	1.2648602E-02	48.31667

Instrument : CHAMBER 146  
 Detector : 72527  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 17-JUL-2009 09:13:24  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:27:48  
 Average Efficiency : 0.2495693  
 Average Efficiency Error : 6.8829530E-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	2991.494	3297.950	14697.00	0.2498184	1.0742654E-02	54.01461
NP-237	168.2934	28-FEB-2010	4436.761	4904.596	12650.00	0.2505190	1.2722510E-02	56.99129
CM-244	158.8128	28-FEB-2010	5530.438	5886.440	11210.00	0.2482881	1.2634057E-02	52.12059

Instrument : CHAMBER 147  
 Detector : 75550  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 17-JUL-2009 09:13:29  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:27:59  
 Average Efficiency : 0.2449156  
 Average Efficiency Error : 7.1838433E-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	2987.763	3300.677	14416.00	0.2446455	1.2401544E-02	44.93960
NP-237	166.3758	28-FEB-2010	4433.256	4902.183	12106.00	0.2424534	1.2321484E-02	55.16415
CM-244	157.1856	28-FEB-2010	5534.346	5885.412	11068.00	0.2477740	1.2610656E-02	48.98204

Instrument : CHAMBER 148  
 Detector : 74429  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 17-JUL-2009 09:13:34  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:28:08  
 Average Efficiency : 0.2454490  
 Average Efficiency Error : 6.7716590E-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	2989.918	3302.313	14456.00	0.2424625	1.0429571E-02	47.34021
NP-237	167.4312	28-FEB-2010	4434.677	4904.245	12395.00	0.2467024	1.2532696E-02	55.78803
CM-244	156.4188	28-FEB-2010	5532.604	5884.780	11054.00	0.2485659	1.2651297E-02	54.50585

Instrument : CHAMBER 149  
 Detector : 33449  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 17-JUL-2009 09:13:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:28:21  
 Average Efficiency : 0.2457679  
 Average Efficiency Error : 6.7815189E-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	2990.126	3302.099	14274.00	0.2437622	1.0487950E-02	64.38747
NP-237	167.1294	28-FEB-2010	4433.957	4903.766	12301.00	0.2453031	1.2463043E-02	67.00629
CM-244	154.7664	28-FEB-2010	5532.840	5885.608	10964.00	0.2491831	1.2684503E-02	59.86861

Instrument : CHAMBER 150  
 Detector : 75552  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 17-JUL-2009 09:13:44  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:28:35  
 Average Efficiency : 0.2487296  
 Average Efficiency Error : 6.8612574E-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	2989.847	3298.390	14400.00	0.2458598	1.0576462E-02	51.08628
NP-237	168.7422	28-FEB-2010	4433.411	4903.355	12733.00	0.2514980	1.2770942E-02	58.74739
CM-244	156.3252	28-FEB-2010	5531.584	5883.380	11116.00	0.2501363	1.2729902E-02	54.38089

Instrument : CHAMBER 151  
 Detector : 75556  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 17-JUL-2009 09:13:48  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:28:46  
 Average Efficiency : 0.2462034  
 Average Efficiency Error : 6.7912084E-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	2988.196	3299.830	14661.00	0.2473749	1.0638047E-02	50.47650
NP-237	170.0886	28-FEB-2010	4437.520	4904.128	12488.00	0.2447234	1.2430614E-02	54.82476
CM-244	157.7460	28-FEB-2010	5532.939	5887.339	11036.00	0.2460822	1.2525211E-02	55.11473

Instrument : CHAMBER 152  
 Detector : 76222  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 17-JUL-2009 09:13:54  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:28:57  
 Average Efficiency : 0.2424625  
 Average Efficiency Error : 6.6924468E-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	2992.335	3299.767	14031.00	0.2436645	1.0487170E-02	49.42483
NP-237	166.6248	28-FEB-2010	4435.085	4902.709	12138.00	0.2428150	1.2339183E-02	57.89848
CM-244	155.8290	28-FEB-2010	5532.813	5882.589	10654.00	0.2404757	1.2247530E-02	56.10107

Instrument : CHAMBER 153  
 Detector : 76223  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 17-JUL-2009 09:13:59  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:29:06  
 Average Efficiency : 0.2537628  
 Average Efficiency Error : 7.0021353E-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	2989.763	3301.789	14281.00	0.2508323	1.0792080E-02	43.74009
NP-237	159.1506	28-FEB-2010	4432.699	4901.612	12218.00	0.2558562	1.3000614E-02	52.94971
CM-244	151.7142	28-FEB-2010	5534.359	5886.038	11040.00	0.2559308	1.3026465E-02	50.96056

Instrument : CHAMBER 154  
 Detector : 76224  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 17-JUL-2009 09:14:04  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:29:15  
 Average Efficiency : 0.2562141  
 Average Efficiency Error : 7.0709228E-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	2989.543	3301.969	14237.00	0.2571022	1.1062440E-02	44.63987
NP-237	160.8066	28-FEB-2010	4433.171	4901.699	12222.00	0.2533354	1.2872400E-02	53.13824
CM-244	145.8384	28-FEB-2010	5533.478	5884.401	10695.00	0.2579601	1.3137060E-02	43.14489

Instrument : CHAMBER 155  
 Detector : 75553  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 17-JUL-2009 09:14:09  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:29:25  
 Average Efficiency : 0.2566149  
 Average Efficiency Error : 7.0761675E-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	2990.863	3299.267	14869.00	0.2581782	1.1099775E-02	49.42255
NP-237	166.8174	28-FEB-2010	4435.628	4901.683	12765.00	0.2550453	1.2950568E-02	57.37749
CM-244	155.0100	28-FEB-2010	5532.390	5885.923	11282.00	0.2560498	1.3027489E-02	54.62441

Instrument : CHAMBER 156  
 Detector : 75554  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 17-JUL-2009 09:14:14  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:29:35  
 Average Efficiency : 0.2473153  
 Average Efficiency Error : 6.8258164E-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	2992.492	3302.387	14104.00	0.2445442	1.0524000E-02	51.31209
NP-237	164.6658	28-FEB-2010	4436.746	4903.077	12183.00	0.2465298	1.2527379E-02	60.35096
CM-244	151.3824	28-FEB-2010	5533.286	5886.114	10859.00	0.2522683	1.2843768E-02	55.38654

Instrument : CHAMBER 157  
 Detector : 75555  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 17-JUL-2009 09:14:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:29:49  
 Average Efficiency : 0.2476787  
 Average Efficiency Error : 6.8296832E-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	2992.092	3301.029	14898.00	0.2467154	1.0606610E-02	50.26978
NP-237	171.2268	28-FEB-2010	4432.881	4903.879	12754.00	0.2482167	1.2604078E-02	60.14729
CM-244	159.5796	28-FEB-2010	5533.745	5886.569	11276.00	0.2485061	1.2643948E-02	50.54896

Instrument : CHAMBER 158  
 Detector : 33451  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 17-JUL-2009 09:14:24  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:30:01  
 Average Efficiency : 0.2485719  
 Average Efficiency Error : 6.8571796E-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	2989.224	3299.662	14546.00	0.2487231	1.0697613E-02	60.48595
NP-237	168.3948	28-FEB-2010	4433.214	4902.387	12467.00	0.2466980	1.2531369E-02	67.30831
CM-244	154.6032	28-FEB-2010	5532.016	5882.536	11002.00	0.2502942	1.2740301E-02	63.12125

Instrument : CHAMBER 159  
 Detector : 76225  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 17-JUL-2009 09:14:28  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:30:14  
 Average Efficiency : 0.2532322  
 Average Efficiency Error : 6.9885729E-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	2990.518	3300.013	14150.00	0.2532160	1.0896488E-02	50.25048
NP-237	159.6558	28-FEB-2010	4434.310	4906.501	12068.00	0.2519211	1.2803175E-02	54.85251
CM-244	150.5208	28-FEB-2010	5532.775	5886.617	10895.00	0.2545989	1.2961634E-02	49.59791

Instrument : CHAMBER 160  
 Detector : 76226  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 17-JUL-2009 09:14:34  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-JUL-2009 14:30:32  
 Average Efficiency : 0.2469152  
 Average Efficiency Error : 6.8162913E-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	2988.201	3297.681	13856.00	0.2439119	1.0500359E-02	46.45536
NP-237	161.5530	28-FEB-2010	4437.389	4904.545	12040.00	0.2483725	1.2623324E-02	55.48813
CM-244	151.1856	28-FEB-2010	5531.162	5885.243	10738.00	0.2498441	1.2722801E-02	48.70280

Instrument : CHAMBER 161  
 Detector : 70321  
 Standard ID : AESS-001  
 Standard Reference Date : 20-FEB-2008 09:54:53  
 Calibration Analysis Date/Time : 23-JUL-2009 08:06:57  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 13:58:35  
 Average Efficiency : 0.3724494  
 Average Efficiency Error : 1.0217360E-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	2989.000	3299.306	22090.00	0.3575253	1.5279296E-02	62.61223
NP-237	171.0024	28-FEB-2010	4436.547	4904.892	19670.00	0.3833612	1.9362049E-02	79.92251
CM-244	158.1060	28-FEB-2010	5532.420	5884.522	17328.00	0.3856982	1.9506300E-02	61.01914

Instrument : CHAMBER 162  
 Detector : 70323  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 23-JUL-2009 08:07:02  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 13:58:45  
 Average Efficiency : 0.3625240  
 Average Efficiency Error : 9.9324752E-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	2991.757	3298.334	21624.00	0.3533120	1.5103292E-02	69.51453
NP-237	205.0260	28-FEB-2010	4432.446	4905.658	22738.00	0.3696573	1.8644748E-02	85.73167
CM-244	199.6806	28-FEB-2010	5531.781	5882.612	20947.00	0.3694310	1.8647112E-02	72.91757

Instrument : CHAMBER 163  
 Detector : 70324  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 23-JUL-2009 08:07:06  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 13:58:54  
 Average Efficiency : 0.3824499  
 Average Efficiency Error : 1.0474509E-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	2988.922	3300.358	22181.00	0.3743604	1.5997946E-02	60.90985
NP-237	200.4990	28-FEB-2010	4435.910	4905.359	23404.00	0.3890015	1.9615676E-02	79.84089
CM-244	196.5558	28-FEB-2010	5534.127	5886.809	21671.00	0.3880399	1.9580306E-02	54.00466



Instrument : CHAMBER 164  
 Detector : 70325  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 23-JUL-2009 08:07:11  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 13:59:02  
 Average Efficiency : 0.3871453  
 Average Efficiency Error : 1.0598736E-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	2991.018	3297.699	23119.00	0.3790087	1.6188504E-02	60.82843
NP-237	209.2716	28-FEB-2010	4434.306	4904.250	24656.00	0.3926844	1.9792885E-02	74.00230
CM-244	199.6488	28-FEB-2010	5533.729	5886.834	22328.00	0.3938190	1.9866610E-02	56.32586

Instrument : CHAMBER 165  
 Detector : 72544  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 23-JUL-2009 08:07:15  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 13:59:11  
 Average Efficiency : 0.3820039  
 Average Efficiency Error : 1.0462373E-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	2989.844	3302.139	22390.00	0.3726058	1.5921146E-02	65.20252
NP-237	203.2080	28-FEB-2010	4434.670	4904.543	24014.00	0.3938612	1.9856445E-02	91.19821
CM-244	197.2236	28-FEB-2010	5533.515	5886.135	21543.00	0.3846419	1.9409848E-02	65.46077

Instrument : CHAMBER 166  
 Detector : 74545  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 23-JUL-2009 08:07:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 13:59:23  
 Average Efficiency : 0.3925092  
 Average Efficiency Error : 1.0746423E-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	2989.919	3301.734	23062.00	0.3829970	1.6359299E-02	52.59587
NP-237	204.0192	28-FEB-2010	4433.352	4903.208	24416.00	0.3988877	2.0107118E-02	75.96468
CM-244	197.2128	28-FEB-2010	5532.473	5885.411	22446.00	0.4005800	2.0206742E-02	58.40631

Instrument : CHAMBER 167  
 Detector : 72546  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 23-JUL-2009 08:07:23  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 13:59:32  
 Average Efficiency : 0.3888160  
 Average Efficiency Error : 1.0646137E-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	2991.456	3297.909	23075.00	0.3781414	1.6151825E-02	58.07474
NP-237	204.2586	28-FEB-2010	4433.461	4902.876	24396.00	0.3980886	2.0066978E-02	77.66827
CM-244	198.8100	28-FEB-2010	5531.568	5884.192	22354.00	0.3959535	1.9974077E-02	59.99561

Instrument : CHAMBER 168  
 Detector : 72547  
 Standard ID : AESS-010  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 23-JUL-2009 08:07:28  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 13:59:40  
 Average Efficiency : 0.3899174  
 Average Efficiency Error : 1.0677175E-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	2990.191	3302.241	22715.00	0.3798450	1.6227633E-02	58.81176
NP-237	202.9926	28-FEB-2010	4434.272	4904.107	24151.00	0.3965338	1.9990249E-02	77.71660
CM-244	196.2330	28-FEB-2010	5533.178	5885.925	22217.00	0.3986928	2.0113347E-02	60.84048

Instrument : CHAMBER 169  
 Detector : 72548  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 23-JUL-2009 08:07:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 13:59:49  
 Average Efficiency : 0.3738278  
 Average Efficiency Error : 1.0237770E-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	2991.882	3298.026	22677.00	0.3634718	1.5528463E-02	58.22092
NP-237	209.5938	28-FEB-2010	4432.930	4902.295	23781.00	0.3781127	1.9064061E-02	78.18230
CM-244	202.7478	28-FEB-2010	5531.111	5883.897	22203.00	0.3856194	1.9453954E-02	60.54502

Instrument : CHAMBER 170  
 Detector : 72549  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 23-JUL-2009 08:07:36  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 13:59:58  
 Average Efficiency : 0.3678014  
 Average Efficiency Error : 1.0071305E-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	2991.026	3302.433	22648.00	0.3594523	1.5356976E-02	58.76050
NP-237	214.4868	28-FEB-2010	4434.863	4906.064	24165.00	0.3755153	1.8930556E-02	77.34428
CM-244	208.4184	28-FEB-2010	5532.657	5887.477	22059.00	0.3727079	1.8803651E-02	57.81808

Instrument : CHAMBER 171  
 Detector : 78260  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 23-JUL-2009 08:07:41  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:00:07  
 Average Efficiency : 0.3837917  
 Average Efficiency Error : 1.0510301E-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	2989.883	3301.923	22631.00	0.3752889	1.6033715E-02	57.49370
NP-237	204.7038	28-FEB-2010	4434.363	4904.564	23668.00	0.3853487	1.9429620E-02	72.93391
CM-244	195.0060	28-FEB-2010	5534.294	5887.494	21890.00	0.3953083	1.9945232E-02	55.35253

Instrument : CHAMBER 172  
 Detector : 78772  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 23-JUL-2009 08:07:46  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:00:15  
 Average Efficiency : 0.3822835  
 Average Efficiency Error : 1.0466998E-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	2990.947	3302.414	22849.00	0.3742635	1.5988056E-02	52.36660
NP-237	205.8930	28-FEB-2010	4433.288	4903.064	24169.00	0.3912586	1.9724179E-02	72.41768
CM-244	203.1954	28-FEB-2010	5532.422	5885.508	22239.00	0.3854235	1.9443754E-02	56.46907

Instrument : CHAMBER 173  
 Detector : 74431  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 22-JUL-2009 08:09:49  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:12:56  
 Average Efficiency : 0.2623188  
 Average Efficiency Error : 7.2139227E-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	2991.296	3300.266	16061.00	0.2663769	1.1436811E-02	50.38961
NP-237	210.2526	28-FEB-2010	4436.390	4906.583	16403.00	0.2600285	1.3159030E-02	60.88579
CM-244	201.9108	28-FEB-2010	5534.964	5886.757	14870.00	0.2592480	1.3135729E-02	54.15428

Instrument : CHAMBER 174  
 Detector : 74432  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 22-JUL-2009 08:09:54  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:13:10  
 Average Efficiency : 0.2553943  
 Average Efficiency Error : 7.0305546E-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	2990.955	3301.951	14943.00	0.2465975	1.0600956E-02	50.10695
NP-237	202.9140	28-FEB-2010	4436.112	4905.743	16012.00	0.2629998	1.3313278E-02	60.55487
CM-244	199.3140	28-FEB-2010	5531.741	5886.720	14821.00	0.2616092	1.3255978E-02	55.35811

Instrument : CHAMBER 175  
 Detector : 74433  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 22-JUL-2009 08:09:59  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:13:33  
 Average Efficiency : 0.2539235  
 Average Efficiency Error : 6.9827326E-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	2987.808	3301.771	16022.00	0.2520186	1.0820774E-02	50.17014
NP-237	211.7160	28-FEB-2010	4437.598	4902.379	16148.00	0.2542258	1.2867783E-02	58.39753
CM-244	207.3882	28-FEB-2010	5530.438	5887.378	15110.00	0.2563593	1.2986641E-02	52.37697

Instrument : CHAMBER 176  
 Detector : 74434  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 22-JUL-2009 08:10:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:13:51  
 Average Efficiency : 0.2596514  
 Average Efficiency Error : 7.1437038E-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	2988.124	3298.749	15474.00	0.2542223	1.0921958E-02	48.05445
NP-237	203.4984	28-FEB-2010	4433.658	4904.539	16076.00	0.2633027	1.3327949E-02	56.64418
CM-244	197.1096	28-FEB-2010	5533.031	5884.495	14789.00	0.2641215	1.3383611E-02	51.45706

Instrument : CHAMBER 177  
 Detector : 74435  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 22-JUL-2009 08:10:07  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:14:02  
 Average Efficiency : 0.2685861  
 Average Efficiency Error : 7.3855612E-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	2991.035	3300.055	16129.00	0.2670162	1.1463443E-02	46.17820
NP-237	200.6460	28-FEB-2010	4436.061	4906.072	16230.00	0.2696093	1.3645601E-02	58.26474
CM-244	195.9270	28-FEB-2010	5534.094	5885.629	15017.00	0.2697915	1.3668223E-02	52.64664

Instrument : CHAMBER 178  
 Detector : 74436  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 22-JUL-2009 08:10:12  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:14:14  
 Average Efficiency : 0.2563734  
 Average Efficiency Error : 7.0544411E-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	2992.331	3301.630	15324.00	0.2483911	1.0673227E-02	46.26046
NP-237	210.1548	28-FEB-2010	4433.348	4903.642	16496.00	0.2615961	1.3237508E-02	57.60064
CM-244	200.7390	28-FEB-2010	5531.998	5883.700	15038.00	0.2635517	1.3351870E-02	53.76401

Instrument : CHAMBER 179  
 Detector : 74437  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 22-JUL-2009 08:10:16  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:14:24  
 Average Efficiency : 0.2654315  
 Average Efficiency Error : 7.3000593E-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	2991.102	3300.165	15895.00	0.2631131	1.1298665E-02	48.51485
NP-237	199.3962	28-FEB-2010	4436.443	4906.617	16075.00	0.2687030	1.3601316E-02	57.52364
CM-244	198.6402	28-FEB-2010	5534.901	5886.605	14985.00	0.2655179	1.3452120E-02	51.10583

Instrument : CHAMBER 180  
 Detector : 74438  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 22-JUL-2009 08:10:21  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:14:36  
 Average Efficiency : 0.2505249  
 Average Efficiency Error : 6.8937857E-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	2988.611	3299.257	15266.00	0.2459229	1.0567908E-02	47.44321
NP-237	206.8830	28-FEB-2010	4433.245	4903.299	15791.00	0.2543839	1.2879343E-02	51.57590
CM-244	203.0208	28-FEB-2010	5535.594	5886.061	14621.00	0.2534862	1.2846692E-02	51.76523

Instrument : CHAMBER 181  
 Detector : 74439  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 22-JUL-2009 08:10:26  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:14:47  
 Average Efficiency : 0.2548543  
 Average Efficiency Error : 7.0099598E-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	2988.239	3301.914	15878.00	0.2552872	1.0962813E-02	48.35796
NP-237	208.5846	28-FEB-2010	4437.080	4901.757	16198.00	0.2588415	1.3100917E-02	57.35833
CM-244	205.5828	28-FEB-2010	5535.131	5886.836	14634.00	0.2505288	1.2696699E-02	51.18034

Instrument : CHAMBER 182  
 Detector : 74440  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 22-JUL-2009 08:10:30  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:14:57  
 Average Efficiency : 0.2578707  
 Average Efficiency Error : 7.0930445E-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	2991.998	3301.429	15699.00	0.2555752	1.0977317E-02	46.97070
NP-237	207.4998	28-FEB-2010	4432.415	4901.861	16221.00	0.2605498	1.3187178E-02	56.46945
CM-244	199.8804	28-FEB-2010	5533.907	5884.511	14682.00	0.2584959	1.3099929E-02	47.10158

Instrument : CHAMBER 183  
 Detector : 74441  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 22-JUL-2009 08:10:35  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:15:07  
 Average Efficiency : 0.2636590  
 Average Efficiency Error : 7.2516296E-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	2989.448	3298.556	16019.00	0.2676203	1.1490691E-02	47.36681
NP-237	208.8990	28-FEB-2010	4434.882	4905.025	16143.00	0.2575647	1.3036844E-02	61.28753
CM-244	198.1458	28-FEB-2010	5533.221	5884.854	14903.00	0.2647125	1.3412292E-02	54.17869

Instrument : CHAMBER 184  
 Detector : 74442  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 22-JUL-2009 08:10:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:15:18  
 Average Efficiency : 0.2589915  
 Average Efficiency Error : 7.1259094E-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	2989.235	3300.018	15286.00	0.2536818	1.0901084E-02	45.69374
NP-237	205.6662	28-FEB-2010	4434.314	4904.409	16135.00	0.2614885	1.3235523E-02	58.78146
CM-244	198.3060	28-FEB-2010	5531.386	5887.098	14902.00	0.2644547	1.3399277E-02	53.47013

Instrument : CHAMBER 185  
 Detector : 68615  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 22-JUL-2009 08:10:43  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:15:30  
 Average Efficiency : 0.2565642  
 Average Efficiency Error : 7.0740697E-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	2991.225	3297.857	15033.00	0.2596380	1.1160337E-02	55.72531
NP-237	167.9916	28-FEB-2010	4436.385	4903.692	12852.00	0.2550071	1.2947261E-02	59.11316
CM-244	157.2432	28-FEB-2010	5533.756	5883.696	11351.00	0.2539946	1.2921941E-02	56.16187

Instrument : CHAMBER 186  
 Detector : 68616  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 22-JUL-2009 08:10:48  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:15:43  
 Average Efficiency : 0.2530972  
 Average Efficiency Error : 6.9825449E-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	2991.440	3298.282	14435.00	0.2517332	1.0828621E-02	55.45393
NP-237	162.9186	28-FEB-2010	4433.254	4901.541	12537.00	0.2565026	1.3028130E-02	59.45676
CM-244	153.1968	28-FEB-2010	5533.251	5884.261	10964.00	0.2517129	1.2813604E-02	55.46026

Instrument : CHAMBER 187  
 Detector : 68620  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 22-JUL-2009 08:10:52  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:15:58  
 Average Efficiency : 0.2501889  
 Average Efficiency Error : 7.3357723E-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	2989.912	3299.166	15000.00	0.2539414	1.2865975E-02	52.23053
NP-237	168.0294	28-FEB-2010	4432.442	4904.149	12738.00	0.2526287	1.2828344E-02	58.21870
CM-244	160.5822	28-FEB-2010	5535.067	5883.156	11152.00	0.2443892	1.2436978E-02	54.57392



Instrument : CHAMBER 188  
 Detector : 68621  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 22-JUL-2009 08:10:57  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:16:10  
 Average Efficiency : 0.2601093  
 Average Efficiency Error : 7.1711414E-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	2988.283	3302.165	15025.00	0.2599137	1.1172294E-02	51.37601
NP-237	165.9822	28-FEB-2010	4433.129	4903.527	12962.00	0.2602972	1.3214173E-02	62.37115
CM-244	153.7938	28-FEB-2010	5532.390	5884.553	11377.00	0.2601953	1.3236898E-02	52.05467

Instrument : CHAMBER 189  
 Detector : 68622  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 22-JUL-2009 08:11:01  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:16:25  
 Average Efficiency : 0.2590416  
 Average Efficiency Error : 7.5966278E-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	2987.652	3299.552	14591.00	0.2547911	1.2913714E-02	51.68600
NP-237	161.6154	28-FEB-2010	4434.579	4902.841	12573.00	0.2592825	1.3168799E-02	58.17202
CM-244	148.1754	28-FEB-2010	5534.475	5885.420	11096.00	0.2633716	1.3404469E-02	50.36570

Instrument : CHAMBER 190  
 Detector : 68623  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 22-JUL-2009 08:11:06  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:16:38  
 Average Efficiency : 0.2606415  
 Average Efficiency Error : 7.1893386E-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	2989.900	3302.388	14653.00	0.2571782	1.1059794E-02	51.45757
NP-237	161.7816	28-FEB-2010	4434.198	4903.145	12826.00	0.2641300	1.3411093E-02	58.05247
CM-244	147.2670	28-FEB-2010	5535.637	5887.028	10980.00	0.2622307	1.3348678E-02	51.95362

Instrument : CHAMBER 191  
 Detector : 68624  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 22-JUL-2009 08:11:10  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:17:15  
 Average Efficiency : 0.2621158  
 Average Efficiency Error : 7.6803956E-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	2988.514	3302.389	15421.00	0.2608921	1.3213424E-02	48.76201
NP-237	168.1992	28-FEB-2010	4435.396	4902.283	13449.00	0.2665235	1.3522904E-02	61.15327
CM-244	156.7614	28-FEB-2010	5534.230	5883.124	11542.00	0.2591464	1.3180151E-02	50.76146

Instrument : CHAMBER 192  
 Detector : 74430  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 22-JUL-2009 08:11:15  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:17:47  
 Average Efficiency : 0.2610474  
 Average Efficiency Error : 7.1950918E-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	2989.042	3298.270	15338.00	0.2583001	1.1098851E-02	47.63512
NP-237	167.2962	28-FEB-2010	4436.778	4903.324	13156.00	0.2621002	1.3302793E-02	56.66595
CM-244	154.4388	28-FEB-2010	5534.357	5882.529	11589.00	0.2639953	1.3425920E-02	46.57637

Instrument : CHAMBER 193  
 Detector : 68627  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 22-JUL-2009 08:11:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:18:09  
 Average Efficiency : 0.2640715  
 Average Efficiency Error : 7.7369036E-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	2988.069	3299.225	15508.00	0.2598549	1.3159974E-02	52.58962
NP-237	169.7700	28-FEB-2010	4433.121	4901.609	13394.00	0.2629541	1.3342631E-02	58.77226
CM-244	154.8234	28-FEB-2010	5534.158	5885.907	11872.00	0.2698340	1.3717437E-02	53.66179

Instrument : CHAMBER 194  
 Detector : 68635  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 22-JUL-2009 08:11:24  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:18:45  
 Average Efficiency : 0.2549567  
 Average Efficiency Error : 7.0293345E-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	2988.572	3300.603	15135.00	0.2573063	1.1058749E-02	49.25695
NP-237	168.2934	28-FEB-2010	4436.435	4905.175	12918.00	0.2558570	1.2989412E-02	62.01285
CM-244	158.8128	28-FEB-2010	5532.274	5883.671	11329.00	0.2509550	1.2767645E-02	52.44061

Instrument : CHAMBER 195  
 Detector : 68636  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 22-JUL-2009 08:11:29  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:19:31  
 Average Efficiency : 0.2573034  
 Average Efficiency Error : 7.5419121E-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	2988.629	3301.408	14891.00	0.2527547	1.2807086E-02	48.20201
NP-237	166.3758	28-FEB-2010	4433.877	4902.925	13025.00	0.2606431	1.3231294E-02	57.67042
CM-244	157.1856	28-FEB-2010	5535.397	5886.705	11566.00	0.2588032	1.3162592E-02	51.27964

Instrument : CHAMBER 196  
 Detector : 68637  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 22-JUL-2009 08:11:34  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 22-JUL-2009 14:19:51  
 Average Efficiency : 0.2566788  
 Average Efficiency Error : 7.0757568E-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	2990.343	3302.501	15220.00	0.2553304	1.0972751E-02	52.52193
NP-237	167.4312	28-FEB-2010	4433.338	4901.979	12956.00	0.2579251	1.3093841E-02	56.52662
CM-244	156.4188	28-FEB-2010	5534.144	5885.395	11442.00	0.2573523	1.3090876E-02	54.16713

Instrument : CHAMBER 197  
 Detector : 78894  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 23-JUL-2009 07:57:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:00:24  
 Average Efficiency : 0.2568228  
 Average Efficiency Error : 7.0815496E-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	2989.389	3297.669	14834.00	0.2533745	1.0893730E-02	54.12946
NP-237	167.1294	28-FEB-2010	4433.236	4904.076	13081.00	0.2608898	1.3242440E-02	59.82949
CM-244	154.7664	28-FEB-2010	5534.086	5887.165	11341.00	0.2578318	1.3117233E-02	57.39178

Instrument : CHAMBER 198  
 Detector : 78895  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 23-JUL-2009 07:57:47  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:00:36  
 Average Efficiency : 0.2554221  
 Average Efficiency Error : 7.0427968E-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	2989.288	3302.314	14813.00	0.2529756	1.0876846E-02	54.48853
NP-237	168.7422	28-FEB-2010	4436.287	4906.224	13147.00	0.2597000	1.3181067E-02	56.83169
CM-244	156.3252	28-FEB-2010	5534.818	5887.000	11318.00	0.2547599	1.2961345E-02	56.23568

Instrument : CHAMBER 199  
 Detector : 78896  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 23-JUL-2009 07:57:56  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:00:47  
 Average Efficiency : 0.2512973  
 Average Efficiency Error : 6.9297734E-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	2990.202	3299.048	14855.00	0.2506810	1.0777651E-02	51.46595
NP-237	170.0886	28-FEB-2010	4435.598	4906.357	12647.00	0.2478395	1.2586436E-02	58.09747
CM-244	157.7460	28-FEB-2010	5530.513	5883.049	11473.00	0.2558941	1.3016121E-02	53.79463

Instrument : CHAMBER 200  
 Detector : 78900  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 23-JUL-2009 07:58:04  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:00:57  
 Average Efficiency : 0.2672527  
 Average Efficiency Error : 7.3646023E-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	2989.598	3302.306	15546.00	0.2700108	1.1599314E-02	51.74545
NP-237	166.6248	28-FEB-2010	4436.820	4902.466	13287.00	0.2657169	1.3484498E-02	57.34525
CM-244	155.8290	28-FEB-2010	5532.933	5886.480	11743.00	0.2650634	1.3477416E-02	51.61598

Instrument : CHAMBER 201  
 Detector : 78902  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 23-JUL-2009 07:58:10  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:01:05  
 Average Efficiency : 0.2606938  
 Average Efficiency Error : 7.1896687E-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	2989.239	3302.324	14811.00	0.2602134	1.1188080E-02	47.14003
NP-237	159.1506	28-FEB-2010	4432.525	4903.539	12448.00	0.2606924	1.3242436E-02	55.19216
CM-244	151.7142	28-FEB-2010	5534.042	5887.523	11271.00	0.2613738	1.3298883E-02	50.86152

Instrument : CHAMBER 202  
 Detector : 78903  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 23-JUL-2009 07:58:17  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:01:14  
 Average Efficiency : 0.2637661  
 Average Efficiency Error : 7.2755860E-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	2988.965	3301.750	14586.00	0.2634446	1.1330210E-02	45.61659
NP-237	160.8066	28-FEB-2010	4435.262	4905.190	12706.00	0.2633806	1.3374711E-02	55.61831
CM-244	145.8384	28-FEB-2010	5533.929	5886.269	10972.00	0.2646115	1.3470060E-02	49.12627

Instrument : CHAMBER 203  
 Detector : 78905  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 23-JUL-2009 07:58:24  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:01:22  
 Average Efficiency : 0.2569410  
 Average Efficiency Error : 7.0852954E-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	2990.960	3299.739	14972.00	0.2599902	1.1176325E-02	44.74440
NP-237	166.8174	28-FEB-2010	4435.540	4905.766	12710.00	0.2539164	1.2894144E-02	57.74120
CM-244	155.0100	28-FEB-2010	5534.337	5886.308	11275.00	0.2558869	1.3019669E-02	47.66172

Instrument : CHAMBER 204  
 Detector : 78907  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 23-JUL-2009 07:58:28  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:01:31  
 Average Efficiency : 0.2506487  
 Average Efficiency Error : 6.9159763E-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	2989.953	3297.878	14336.00	0.2485577	1.0693511E-02	50.84674
NP-237	164.6658	28-FEB-2010	4437.339	4902.439	12528.00	0.2535195	1.2876903E-02	55.89592
CM-244	151.3824	28-FEB-2010	5531.727	5884.400	10796.00	0.2508073	1.2771029E-02	51.62991

Instrument : CHAMBER 205  
 Detector : 78908  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 23-JUL-2009 07:58:33  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:01:40  
 Average Efficiency : 0.2503343  
 Average Efficiency Error : 6.9021145E-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	2991.664	3299.649	14924.00	0.2472031	1.0627222E-02	48.93098
NP-237	171.2268	28-FEB-2010	4434.348	4904.923	13015.00	0.2533501	1.2860725E-02	61.87793
CM-244	159.5796	28-FEB-2010	5534.662	5887.628	11424.00	0.2518927	1.2813480E-02	52.59251

Instrument : CHAMBER 206  
 Detector : 78909  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 23-JUL-2009 07:58:38  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:01:49  
 Average Efficiency : 0.2562930  
 Average Efficiency Error : 7.0664333E-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	2991.007	3298.921	15006.00	0.2566382	1.1031752E-02	49.35140
NP-237	168.3948	28-FEB-2010	4432.777	4902.746	12926.00	0.2558552	1.2989211E-02	55.62066
CM-244	154.6032	28-FEB-2010	5531.452	5883.730	11261.00	0.2562518	1.3038474E-02	55.87610

Instrument : CHAMBER 207  
 Detector : 78910  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 23-JUL-2009 07:58:42  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:01:57  
 Average Efficiency : 0.2558556  
 Average Efficiency Error : 7.0599136E-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	2988.143	3301.594	14367.00	0.2571380	1.1062090E-02	47.38946
NP-237	159.6558	28-FEB-2010	4437.296	4902.779	12320.00	0.2572077	1.3067513E-02	57.42012
CM-244	150.5208	28-FEB-2010	5532.449	5885.271	10817.00	0.2528071	1.2872322E-02	52.11042

Instrument : CHAMBER 208  
 Detector : 78911  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 23-JUL-2009 07:58:46  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 23-JUL-2009 14:02:06  
 Average Efficiency : 0.2527668  
 Average Efficiency Error : 6.9748992E-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	2989.612	3298.165	14243.00	0.2507517	1.0789137E-02	50.79447
NP-237	161.5530	28-FEB-2010	4434.097	4904.804	12430.00	0.2564567	1.3027546E-02	58.53157
CM-244	151.1856	28-FEB-2010	5534.389	5887.108	10827.00	0.2520371	1.2832657E-02	54.35335

Instrument : CHAMBER 209  
 Detector : 79188  
 Standard ID : AESS-001  
 Standard Reference Date : 20-FEB-2008 09:54:53  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:13  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 13:59:46  
 Average Efficiency : 0.3720503  
 Average Efficiency Error : 1.0203380E-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	2989.310	3300.226	22310.00	0.3611241	1.5431225E-02	61.07782
NP-237	171.0024	28-FEB-2010	4435.667	4905.853	19559.00	0.3812561	1.9256754E-02	78.47396
CM-244	158.1060	28-FEB-2010	5530.947	5884.845	17057.00	0.3798239	1.9212671E-02	62.16251

Instrument : CHAMBER 210  
 Detector : 79189  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 13:59:55  
 Average Efficiency : 0.3939427  
 Average Efficiency Error : 1.0785731E-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	2990.620	3297.977	22918.00	0.3868399	1.6524704E-02	56.73992
NP-237	200.4990	28-FEB-2010	4435.731	4905.552	24207.00	0.4024462	2.0287881E-02	74.58759
CM-244	196.5558	28-FEB-2010	5534.352	5886.824	22110.00	0.3960794	1.9982373E-02	58.11366

Instrument : CHAMBER 211  
 Detector : 79190  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:03  
 Average Efficiency : 0.3799735  
 Average Efficiency Error : 1.0408110E-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	2988.121	3301.259	22155.00	0.3687188	1.5757136E-02	56.93997
NP-237	203.2080	28-FEB-2010	4436.737	4902.524	23738.00	0.3893826	1.9632483E-02	71.62598
CM-244	197.2236	28-FEB-2010	5532.952	5886.368	21725.00	0.3879907	1.9577414E-02	62.12684



Instrument : CHAMBER 212  
 Detector : 79191  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:11  
 Average Efficiency : 0.3809828  
 Average Efficiency Error : 1.0432592E-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	2989.135	3301.447	22739.00	0.3726791	1.5921319E-02	60.42460
NP-237	204.2586	28-FEB-2010	4434.433	4904.665	23808.00	0.3885271	1.9588865E-02	78.17927
CM-244	198.8100	28-FEB-2010	5534.267	5887.313	21781.00	0.3859496	1.9473951E-02	58.94521

Instrument : CHAMBER 213  
 Detector : 79192  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:20  
 Average Efficiency : 0.3632684  
 Average Efficiency Error : 9.9503463E-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	2990.470	3298.036	22131.00	0.3547624	1.5160903E-02	63.50857
NP-237	209.5938	28-FEB-2010	4436.689	4901.687	23169.00	0.3684698	1.8581852E-02	80.13203
CM-244	202.7478	28-FEB-2010	5531.037	5883.842	21347.00	0.3709584	1.8720919E-02	62.77599

Instrument : CHAMBER 214  
 Detector : 79193  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:45  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:29  
 Average Efficiency : 0.3836091  
 Average Efficiency Error : 1.0504629E-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	2990.553	3297.788	22693.00	0.3763517	1.6078612E-02	56.27348
NP-237	204.7038	28-FEB-2010	4436.227	4901.574	23647.00	0.3850555	1.9414932E-02	74.54285
CM-244	195.0060	28-FEB-2010	5531.780	5885.252	21759.00	0.3931459	1.9837169E-02	56.86452

Instrument : CHAMBER 215  
 Detector : 79194  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:51  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:38  
 Average Efficiency : 0.3803512  
 Average Efficiency Error : 1.0415906E-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	2989.364	3302.121	22674.00	0.3705170	1.5829490E-02	58.59007
NP-237	205.0260	28-FEB-2010	4437.186	4903.222	23893.00	0.3884499	1.9584402E-02	72.67680
CM-244	199.6806	28-FEB-2010	5534.359	5882.968	21950.00	0.3872738	1.9539375E-02	61.41080

Instrument : CHAMBER 216  
 Detector : 79195  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:57  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:46  
 Average Efficiency : 0.3731616  
 Average Efficiency Error : 1.0220583E-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	2990.730	3302.451	22182.00	0.3636904	1.5542008E-02	60.14384
NP-237	209.2716	28-FEB-2010	4434.761	4905.361	23781.00	0.3787806	1.9097654E-02	75.39853
CM-244	199.6488	28-FEB-2010	5530.680	5884.547	21648.00	0.3820059	1.9275997E-02	60.78160

Instrument : CHAMBER 217  
 Detector : 79410  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:04  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:55  
 Average Efficiency : 0.3778184  
 Average Efficiency Error : 1.0346431E-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	2988.264	3300.395	22447.00	0.3728177	1.5929710E-02	59.20551
NP-237	204.0192	28-FEB-2010	4433.666	4904.432	23270.00	0.3801880	1.9172091E-02	76.02460
CM-244	197.2128	28-FEB-2010	5535.108	5883.550	21438.00	0.3827657	1.9316062E-02	61.20031

Instrument : CHAMBER 218  
 Detector : 79411  
 Standard ID : AESS-010  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:10  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:01:03  
 Average Efficiency : 0.3940997  
 Average Efficiency Error : 1.0791861E-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	2991.480	3299.092	22843.00	0.3820206	1.6319500E-02	60.57081
NP-237	202.9926	28-FEB-2010	4433.463	4904.366	24456.00	0.4015617	2.0241646E-02	78.79704
CM-244	196.2330	28-FEB-2010	5534.949	5883.207	22582.00	0.4054522	2.0451389E-02	60.53443

Instrument : CHAMBER 219  
 Detector : 79412  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:16  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:01:48  
 Average Efficiency : 0.3662424  
 Average Efficiency Error : 1.0028155E-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	2991.558	3298.478	22686.00	0.3600933	1.5384067E-02	58.88719
NP-237	214.4868	28-FEB-2010	4436.677	4902.329	24003.00	0.3730206	1.8805804E-02	79.43044
CM-244	208.4184	28-FEB-2010	5533.300	5887.374	21804.00	0.3685999	1.8598294E-02	60.23553

Instrument : CHAMBER 220  
 Detector : 79413  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:23  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:00  
 Average Efficiency : 0.3800345  
 Average Efficiency Error : 1.0404716E-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	2990.238	3297.635	22946.00	0.3758968	1.6057028E-02	61.95944
NP-237	205.8930	28-FEB-2010	4436.067	4906.404	23867.00	0.3863981	1.9481128E-02	76.81815
CM-244	203.1954	28-FEB-2010	5530.768	5883.799	21903.00	0.3797704	1.9161157E-02	61.74461

Instrument : CHAMBER 221  
 Detector : 79414  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:29  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:09  
 Average Efficiency : 0.3757081  
 Average Efficiency Error : 1.0287202E-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	2988.031	3301.906	22489.00	0.3730499	1.5939282E-02	52.97857
NP-237	210.2526	28-FEB-2010	4434.520	4906.347	23758.00	0.3766535	1.8990556E-02	73.94412
CM-244	201.9108	28-FEB-2010	5532.427	5886.301	21697.00	0.3785694	1.9102205E-02	60.49401

Instrument : CHAMBER 222  
 Detector : 79415  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:37  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:19  
 Average Efficiency : 0.3486046  
 Average Efficiency Error : 9.5541952E-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	2988.828	3299.834	21348.00	0.3358505	1.4359185E-02	53.28439
NP-237	211.7160	28-FEB-2010	4436.567	4903.132	22784.00	0.3587198	1.8092748E-02	75.86924
CM-244	207.3882	28-FEB-2010	5532.999	5885.314	21129.00	0.3587538	1.8106727E-02	62.25880

Instrument : CHAMBER 223  
 Detector : 79416  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:43  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:29  
 Average Efficiency : 0.3842350  
 Average Efficiency Error : 1.0522764E-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	2988.719	3302.203	22642.00	0.3749019	1.6017098E-02	52.37010
NP-237	200.6460	28-FEB-2010	4434.717	4901.802	23720.00	0.3940558	1.9868227E-02	70.08206
CM-244	195.9270	28-FEB-2010	5534.370	5883.775	21616.00	0.3886585	1.9611971E-02	55.34917

Instrument : CHAMBER 224  
 Detector : 79417  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:51  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:37  
 Average Efficiency : 0.3844876  
 Average Efficiency Error : 1.0532029E-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	2991.902	3302.451	22483.00	0.3722161	1.5903715E-02	55.77303
NP-237	199.3962	28-FEB-2010	4433.496	4905.621	23986.00	0.4009725	2.0215105E-02	74.29817
CM-244	198.6402	28-FEB-2010	5531.081	5884.107	21855.00	0.3876156	1.9557375E-02	62.08027

Instrument : CHAMBER 225  
 Detector : 79418  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:57  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:46  
 Average Efficiency : 0.3784786  
 Average Efficiency Error : 1.0361850E-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	2989.698	3301.928	23097.00	0.3714026	1.5863828E-02	56.57831
NP-237	208.5846	28-FEB-2010	4436.047	4902.115	24170.00	0.3862496	1.9471634E-02	72.01178
CM-244	205.5828	28-FEB-2010	5533.662	5882.674	22249.00	0.3812986	1.9235564E-02	61.39241

Instrument : CHAMBER 226  
 Detector : 79419  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:04  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:55  
 Average Efficiency : 0.3808596  
 Average Efficiency Error : 1.0428368E-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	2990.229	3299.048	22549.00	0.3767624	1.6097387E-02	54.38462
NP-237	208.8990	28-FEB-2010	4436.278	4902.399	23852.00	0.3805940	1.9188609E-02	81.14477
CM-244	198.1458	28-FEB-2010	5532.943	5886.259	21774.00	0.3871692	1.9535474E-02	57.36676

Instrument : CHAMBER 227  
 Detector : 79420  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:10  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:04  
 Average Efficiency : 0.3843335  
 Average Efficiency Error : 1.0524626E-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	2988.495	3300.898	22690.00	0.3745091	1.5999891E-02	56.91222
NP-237	202.9140	28-FEB-2010	4435.132	4906.286	23781.00	0.3906433	1.9695761E-02	72.78109
CM-244	199.3140	28-FEB-2010	5532.133	5886.196	22245.00	0.3930259	1.9827209E-02	61.27127

Instrument : CHAMBER 228  
 Detector : 79421  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:16  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:13  
 Average Efficiency : 0.3819269  
 Average Efficiency Error : 1.0460673E-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	2990.613	3298.829	22551.00	0.3705553	1.5832171E-02	51.70354
NP-237	203.4984	28-FEB-2010	4434.639	4905.792	23625.00	0.3869812	1.9512173E-02	70.48917
CM-244	197.1096	28-FEB-2010	5531.072	5884.538	22079.00	0.3946491	1.9910410E-02	54.39862

Instrument : CHAMBER 229  
 Detector : 79422  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:22  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:22  
 Average Efficiency : 0.3798401  
 Average Efficiency Error : 1.0399979E-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	2990.805	3298.464	23010.00	0.3730097	1.5933167E-02	54.32673
NP-237	210.1548	28-FEB-2010	4434.226	4906.242	23918.00	0.3793714	1.9126525E-02	69.91097
CM-244	200.7390	28-FEB-2010	5533.427	5882.943	22277.00	0.3907950	1.9714409E-02	60.50524

Instrument : CHAMBER 230  
 Detector : 79423  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:29  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:31  
 Average Efficiency : 0.3762562  
 Average Efficiency Error : 1.0304146E-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	2989.308	3297.622	22698.00	0.3656987	1.5623449E-02	50.65837
NP-237	206.8830	28-FEB-2010	4433.975	4905.433	24027.00	0.3871273	1.9516820E-02	69.68443
CM-244	203.0208	28-FEB-2010	5531.188	5884.956	21996.00	0.3817128	1.9258413E-02	56.82364

Instrument : CHAMBER 231  
 Detector : 79424  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:35  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:40  
 Average Efficiency : 0.3847702  
 Average Efficiency Error : 1.0534914E-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	2990.586	3298.189	23057.00	0.3754197	1.6035730E-02	56.58625
NP-237	207.4998	28-FEB-2010	4432.432	4903.240	24264.00	0.3897645	1.9648222E-02	77.05042
CM-244	199.8804	28-FEB-2010	5533.660	5887.186	22354.00	0.3940257	1.9876782E-02	61.75343

Instrument : CHAMBER 232  
 Detector : 79425  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:42  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:48  
 Average Efficiency : 0.3748871  
 Average Efficiency Error : 1.0271599E-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	2989.229	3299.258	21761.00	0.3612023	1.5439365E-02	56.38522
NP-237	205.6662	28-FEB-2010	4433.403	4904.597	23806.00	0.3858308	1.9452941E-02	74.06577
CM-244	198.3060	28-FEB-2010	5534.062	5886.338	21708.00	0.3856767	1.9460704E-02	58.09093

Instrument : CHAMBER 233  
 Detector : 79426  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:48  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:57  
 Average Efficiency : 0.3793921  
 Average Efficiency Error : 1.0403312E-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	2989.053	3300.219	21850.00	0.3774274	1.6132066E-02	56.42078
NP-237	167.9916	28-FEB-2010	4437.148	4902.933	19321.00	0.3833666	1.9365741E-02	74.45728
CM-244	157.2432	28-FEB-2010	5534.654	5884.028	16885.00	0.3782761	1.9136583E-02	61.18657

Instrument : CHAMBER 234  
 Detector : 79427  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:54  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:04:08  
 Average Efficiency : 0.3700874  
 Average Efficiency Error : 1.0797138E-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	2990.497	3297.542	21594.00	0.3656335	1.8451264E-02	61.40455
NP-237	168.0294	28-FEB-2010	4434.922	4904.935	19043.00	0.3777652	1.9085610E-02	76.29016
CM-244	160.5822	28-FEB-2010	5534.289	5887.217	16745.00	0.3673259	1.8584441E-02	59.63282

Instrument : CHAMBER 235  
 Detector : 79428  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:01  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:04:17  
 Average Efficiency : 0.3932829  
 Average Efficiency Error : 1.1475780E-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	2988.334	3300.717	21681.00	0.3786630	1.9108076E-02	53.32552
NP-237	161.6154	28-FEB-2010	4435.003	4906.236	19404.00	0.4001970	2.0215055E-02	77.72460
CM-244	148.1754	28-FEB-2010	5532.236	5886.409	16945.00	0.4028875	2.0380763E-02	59.12006



Instrument : CHAMBER 236  
 Detector : 79429  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:07  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:04:27  
 Average Efficiency : 0.3837650  
 Average Efficiency Error : 1.1193846E-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	2987.761	3298.777	22073.00	0.3734792	1.8843459E-02	56.09225
NP-237	168.1992	28-FEB-2010	4435.283	4906.214	19676.00	0.3898810	1.9691262E-02	74.38795
CM-244	156.7614	28-FEB-2010	5532.557	5887.291	17304.00	0.3888687	1.9666921E-02	61.23972

Instrument : CHAMBER 237  
 Detector : 79430  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:14  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:04:36  
 Average Efficiency : 0.3796787  
 Average Efficiency Error : 1.1077547E-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	2990.197	3297.861	21831.00	0.3658611	1.8460920E-02	57.27552
NP-237	169.7700	28-FEB-2010	4432.935	4904.354	19680.00	0.3864051	1.9515611E-02	75.85569
CM-244	154.8234	28-FEB-2010	5530.478	5884.662	17077.00	0.3885164	1.9652124E-02	63.51448

Instrument : CHAMBER 238  
 Detector : 79431  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:20  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:04:46  
 Average Efficiency : 0.3810317  
 Average Efficiency Error : 1.1114767E-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	2987.703	3299.637	22045.00	0.3742708	1.8883610E-02	56.22876
NP-237	166.3758	28-FEB-2010	4437.459	4902.787	19439.00	0.3894599	1.9672327E-02	69.82738
CM-244	157.1856	28-FEB-2010	5533.171	5886.843	16955.00	0.3799904	1.9222379E-02	58.92646

Instrument : CHAMBER 239  
 Detector : 79432  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:26  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:04:55  
 Average Efficiency : 0.3927835  
 Average Efficiency Error : 1.0770131E-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	2990.694	3302.472	22065.00	0.3848595	1.6447702E-02	55.29106
NP-237	162.9186	28-FEB-2010	4436.142	4902.540	19439.00	0.3976750	2.0087343E-02	70.90855
CM-244	153.1968	28-FEB-2010	5534.989	5884.715	17391.00	0.3998017	2.0218691E-02	58.92552

Instrument : CHAMBER 240  
 Detector : 79433  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:04  
 Average Efficiency : 0.3772089  
 Average Efficiency Error : 1.0348574E-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	2990.448	3302.009	21172.00	0.3663063	1.5662992E-02	53.41883
NP-237	165.9822	28-FEB-2010	4434.377	4905.282	19119.00	0.3839507	1.9397326E-02	73.43593
CM-244	153.7938	28-FEB-2010	5531.249	5885.600	16917.00	0.3873951	1.9597435E-02	58.29160

Instrument : CHAMBER 241  
 Detector : 79434  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:38  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:13  
 Average Efficiency : 0.3940109  
 Average Efficiency Error : 1.0806140E-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	2990.069	3301.257	21921.00	0.3848144	1.6447132E-02	59.39081
NP-237	161.7816	28-FEB-2010	4433.036	4904.033	19316.00	0.3979853	2.0104248E-02	71.72956
CM-244	147.2670	28-FEB-2010	5530.409	5885.133	16898.00	0.4041099	2.0443266E-02	59.86270

Instrument : CHAMBER 242  
 Detector : 79435  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:45  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:21  
 Average Efficiency : 0.3872019  
 Average Efficiency Error : 1.0618003E-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	2987.986	3300.537	22304.00	0.3756698	1.6052835E-02	60.14239
NP-237	167.2962	28-FEB-2010	4434.402	4905.006	19728.00	0.3930755	1.9852022E-02	81.49045
CM-244	154.4388	28-FEB-2010	5535.112	5883.069	17513.00	0.3993755	2.0195547E-02	60.38340

Instrument : CHAMBER 243  
 Detector : 79436  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:51  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:30  
 Average Efficiency : 0.3689618  
 Average Efficiency Error : 1.0121634E-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	2988.831	3301.144	21270.00	0.3616530	1.5463094E-02	51.17657
NP-237	168.2934	28-FEB-2010	4435.437	4901.520	19256.00	0.3813798	1.9266052E-02	75.58389
CM-244	158.8128	28-FEB-2010	5533.039	5887.402	16593.00	0.3679604	1.8618485E-02	58.44908

Instrument : CHAMBER 244  
 Detector : 79437  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:57  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:39  
 Average Efficiency : 0.3687662  
 Average Efficiency Error : 1.0117218E-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	2990.561	3301.814	21334.00	0.3579595	1.5304583E-02	62.36397
NP-237	167.4312	28-FEB-2010	4433.746	4904.768	18977.00	0.3778012	1.9088112E-02	75.63606
CM-244	156.4188	28-FEB-2010	5531.146	5885.854	16722.00	0.3765100	1.9049343E-02	61.05648

Instrument : CHAMBER 245  
 Detector : 79438  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:02  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:48  
 Average Efficiency : 0.3877061  
 Average Efficiency Error : 1.0631136E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7372	28-FEB-2010	2990.519	3298.200	22136.00	0.3781450	1.6160103E-02	62.31918
NP-237	167.1294	28-FEB-2010	4434.025	4906.060	19910.00	0.3970917	2.0053044E-02	78.86944
CM-244	154.7664	28-FEB-2010	5533.264	5882.788	17268.00	0.3929479	1.9873664E-02	61.71907

Instrument : CHAMBER 246  
 Detector : 78912  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:08  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:57  
 Average Efficiency : 0.3708842  
 Average Efficiency Error : 1.0172031E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1408	28-FEB-2010	2989.883	3302.161	21584.00	0.3642771	1.5572389E-02	64.71516
NP-237	170.0886	28-FEB-2010	4436.171	4902.069	19259.00	0.3774192	1.9065937E-02	76.67652
CM-244	157.7460	28-FEB-2010	5533.279	5887.441	16761.00	0.3742064	1.8932275E-02	58.21912

Instrument : CHAMBER 247  
 Detector : 79440  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:13  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:06:06  
 Average Efficiency : 0.3957888  
 Average Efficiency Error : 1.0855773E-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	2989.314	3301.154	21842.00	0.3837782	1.6403578E-02	54.27637
NP-237	159.1506	28-FEB-2010	4435.427	4902.237	19566.00	0.4097880	2.0697797E-02	74.12901
CM-244	151.7142	28-FEB-2010	5535.390	5885.574	17262.00	0.4007001	2.0265834E-02	60.50509

Instrument : CHAMBER 248  
 Detector : 79441  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:06:15  
 Average Efficiency : 0.3937030  
 Average Efficiency Error : 1.0792862E-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	2989.045	3301.474	22331.00	0.3878492	1.6573036E-02	60.09726
NP-237	166.8174	28-FEB-2010	4436.389	4902.813	19896.00	0.3975548	2.0076567E-02	79.69174
CM-244	155.0100	28-FEB-2010	5534.872	5884.178	17540.00	0.3984762	2.0149769E-02	58.60526

Instrument : CHAMBER 249  
 Detector : 79442  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:24  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:10:21  
 Average Efficiency : 0.3675877  
 Average Efficiency Error : 1.0082438E-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	2991.808	3298.538	21645.00	0.3585607	1.5327478E-02	53.17529
NP-237	171.2268	28-FEB-2010	4433.459	4906.270	19414.00	0.3779393	1.9090647E-02	76.86456
CM-244	159.5796	28-FEB-2010	5535.492	5886.613	16816.00	0.3711205	1.8775435E-02	56.57472

Instrument : CHAMBER 250  
 Detector : 79443  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:30  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:07:02  
 Average Efficiency : 0.3960947  
 Average Efficiency Error : 1.0862177E-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	2988.616	3300.155	21788.00	0.3900070	1.6670316E-02	52.60693
NP-237	159.6558	28-FEB-2010	4432.911	4904.182	19368.00	0.4043324	2.0424359E-02	73.85986
CM-244	150.5208	28-FEB-2010	5530.811	5885.622	16966.00	0.3969653	2.0080892E-02	59.65899

Instrument : CHAMBER 251  
 Detector : 79444  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:36  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:07:11  
 Average Efficiency : 0.3862193  
 Average Efficiency Error : 1.0589682E-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	2990.845	3297.824	22101.00	0.3774794	1.6131971E-02	54.21589
NP-237	168.7422	28-FEB-2010	4433.069	4905.749	19931.00	0.3937052	1.9881824E-02	74.21349
CM-244	156.3252	28-FEB-2010	5534.571	5885.360	17400.00	0.3919745	1.9822748E-02	57.06868

Instrument : CHAMBER 252  
 Detector : 79445  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:43  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:07:24  
 Average Efficiency : 0.3698718  
 Average Efficiency Error : 1.0146284E-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	2990.916	3302.142	21075.00	0.3660958	1.5654918E-02	61.30944
NP-237	166.6248	28-FEB-2010	4434.879	4906.631	18642.00	0.3729277	1.8845377E-02	80.38726
CM-244	155.8290	28-FEB-2010	5534.322	5884.528	16473.00	0.3722862	1.8838966E-02	60.16105

Instrument : CHAMBER 253  
 Detector : 79446  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:49  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:07:35  
 Average Efficiency : 0.4175173  
 Average Efficiency Error : 1.1444525E-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	2987.796	3301.166	22755.00	0.4110381	1.7559895E-02	55.81194
NP-237	160.8066	28-FEB-2010	4435.182	4903.720	20118.00	0.4169668	2.1054644E-02	75.83978
CM-244	145.8384	28-FEB-2010	5533.610	5884.813	17722.00	0.4279359	2.1636952E-02	56.91713

Instrument : CHAMBER 254  
 Detector : 79447  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:54  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:07:52  
 Average Efficiency : 0.4058467  
 Average Efficiency Error : 1.1127573E-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	2991.474	3298.982	22591.00	0.3918256	1.6740572E-02	58.61956
NP-237	164.6658	28-FEB-2010	4434.396	4906.361	20593.00	0.4168403	2.1043487E-02	82.24182
CM-244	151.3824	28-FEB-2010	5533.560	5883.122	17929.00	0.4170516	2.1083934E-02	61.14439

Instrument : CHAMBER 255  
 Detector : 79448  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 27-JUL-2009 11:52:00  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:08:10  
 Average Efficiency : 0.3643631  
 Average Efficiency Error : 9.9972216E-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	2992.107	3299.169	20953.00	0.3583827	1.5326263E-02	55.06876
NP-237	168.3948	28-FEB-2010	4434.844	4902.471	18382.00	0.3638436	1.8389078E-02	74.38364
CM-244	154.6032	28-FEB-2010	5531.565	5882.529	16422.00	0.3740352	1.8928226E-02	58.14114

Instrument : CHAMBER 256  
 Detector : 79449  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 27-JUL-2009 11:52:06  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:08:26  
 Average Efficiency : 0.3831320  
 Average Efficiency Error : 1.0509511E-02  
 Confidence : 95.00000

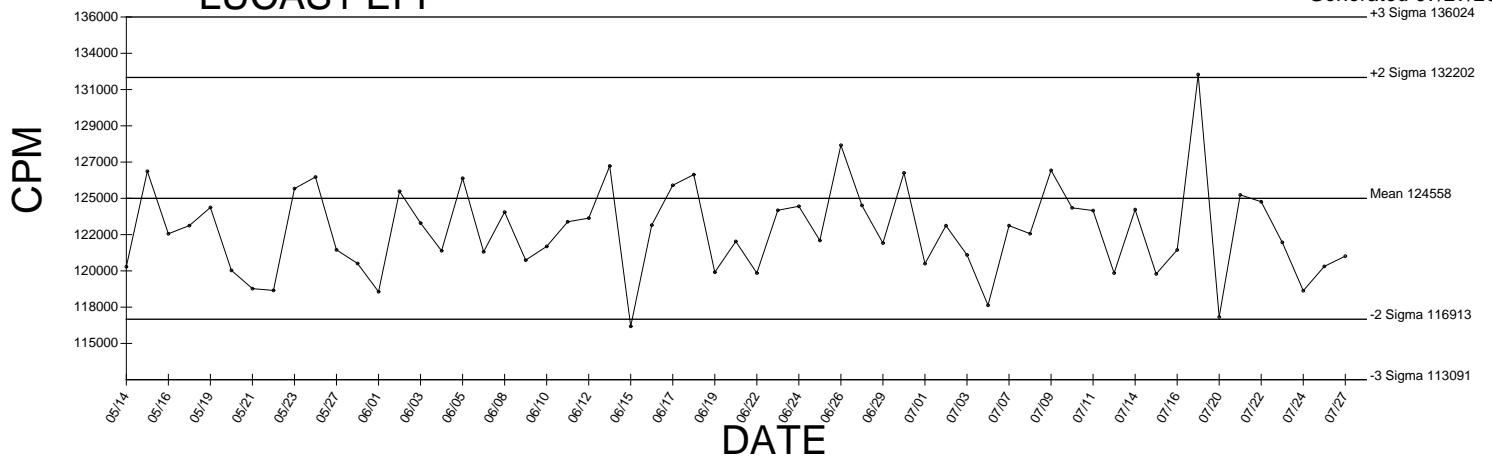
Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2989.102	3301.350	21361.00	0.3761188	1.6080733E-02	55.66320
NP-237	161.5530	28-FEB-2010	4435.732	4901.991	18891.00	0.3897299	1.9691780E-02	78.88689
CM-244	151.1856	28-FEB-2010	5533.871	5883.102	16615.00	0.3870071	1.9581940E-02	56.91294

# **BACKGROUND AND EFFICIENCY DATA**



# LUCAS1 EFF

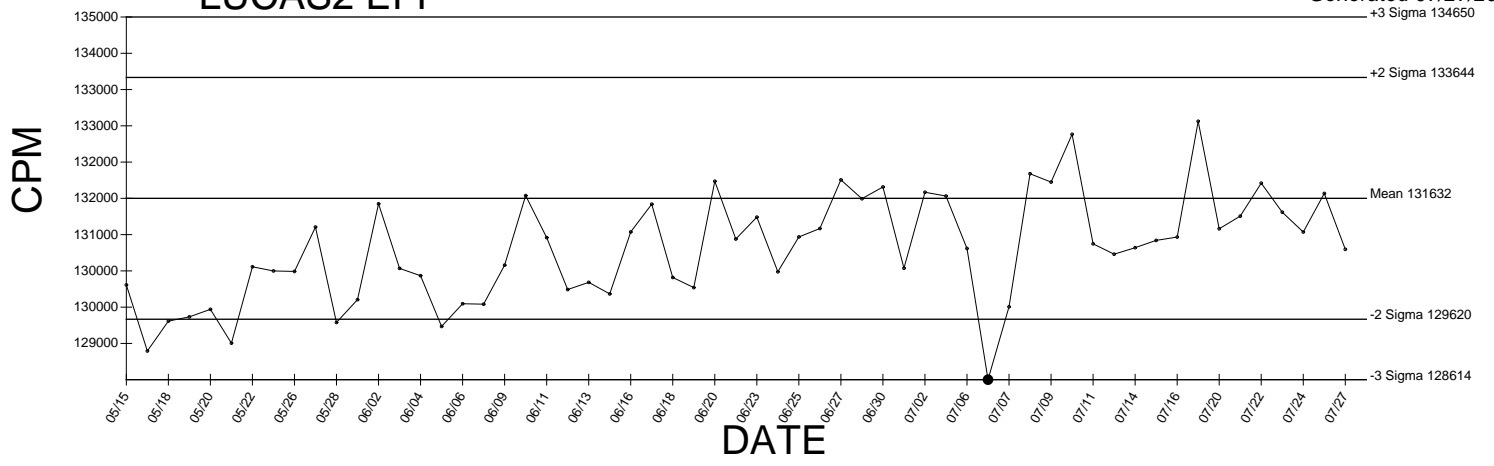
Generated 07/27/2009



● Denotes Outlier

# LUCAS2 EFF

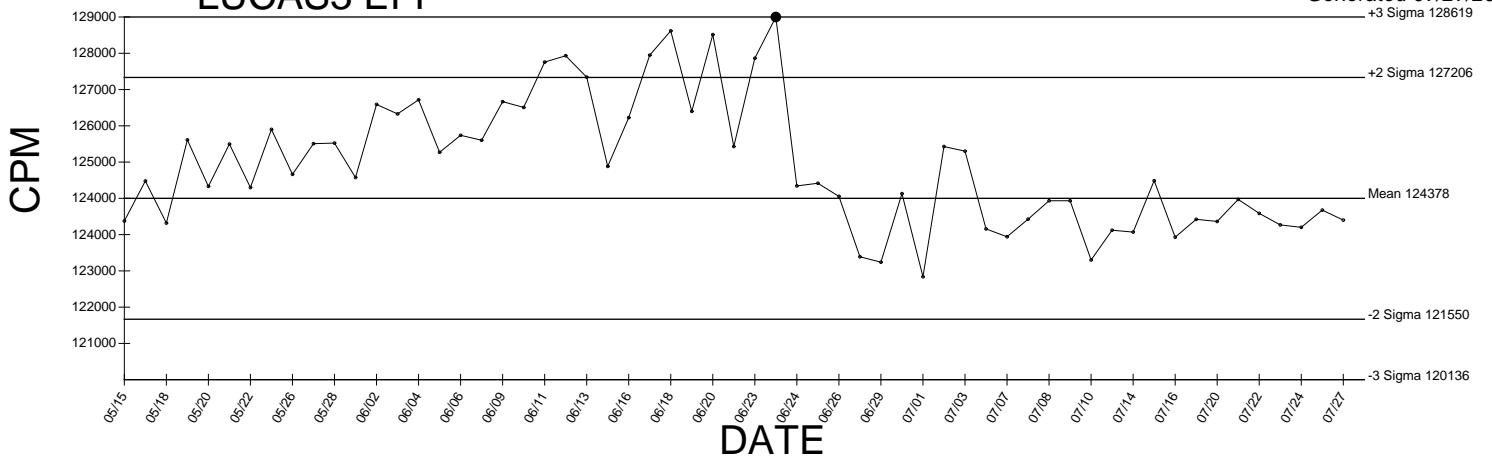
Generated 07/27/2009



● Denotes Outlier

# LUCAS3 EFF

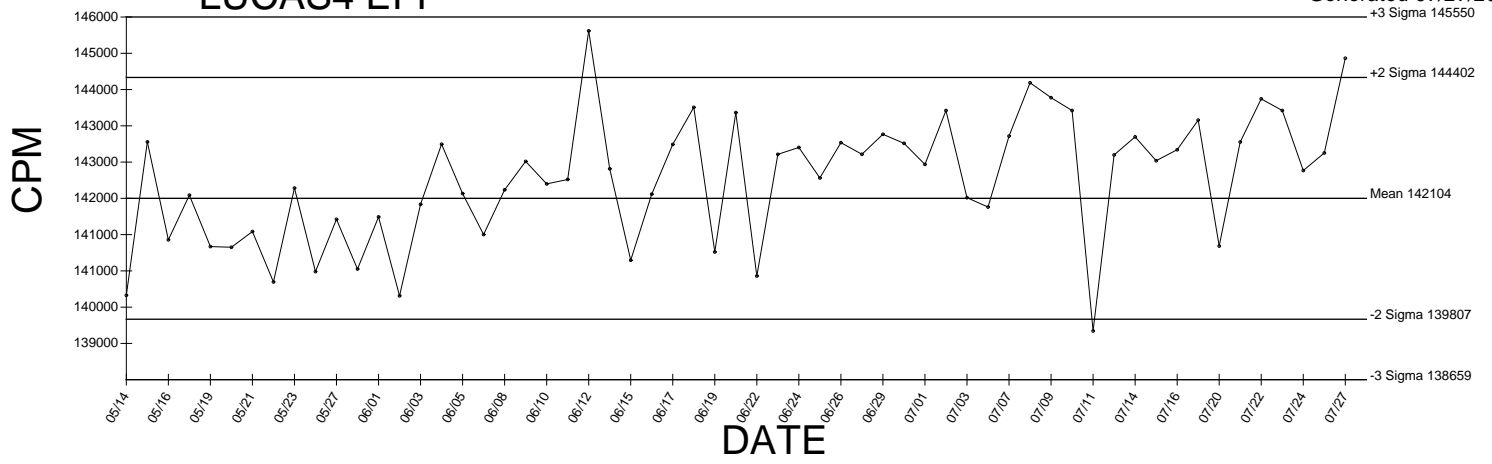
Generated 07/27/2009



● Denotes Outlier

# LUCAS4 EFF

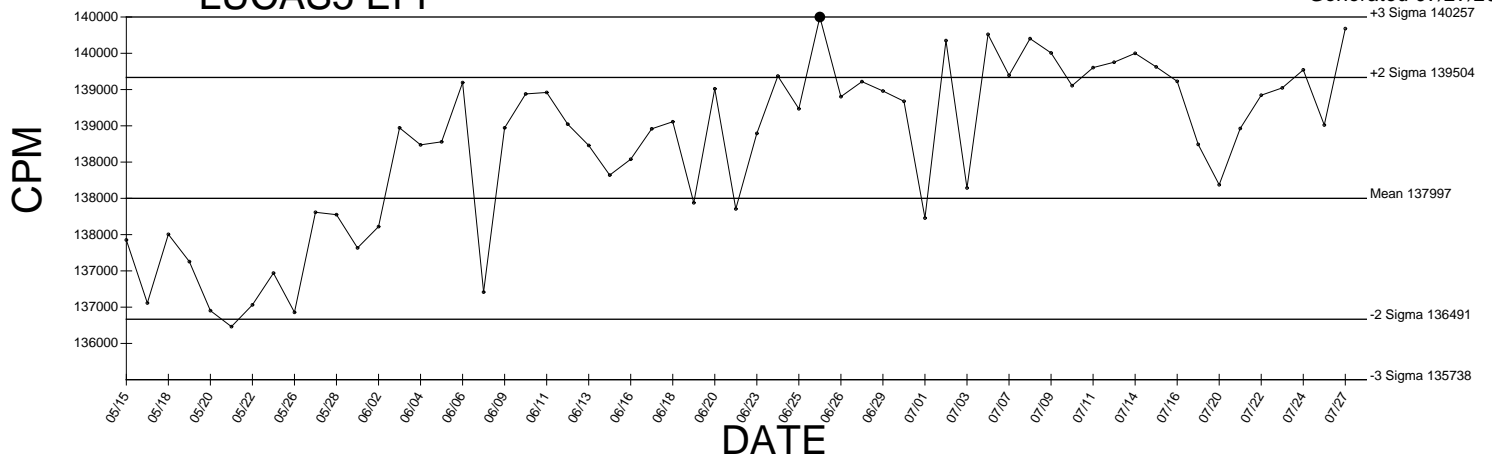
Generated 07/27/2009



● Denotes Outlier

# LUCAS5 EFF

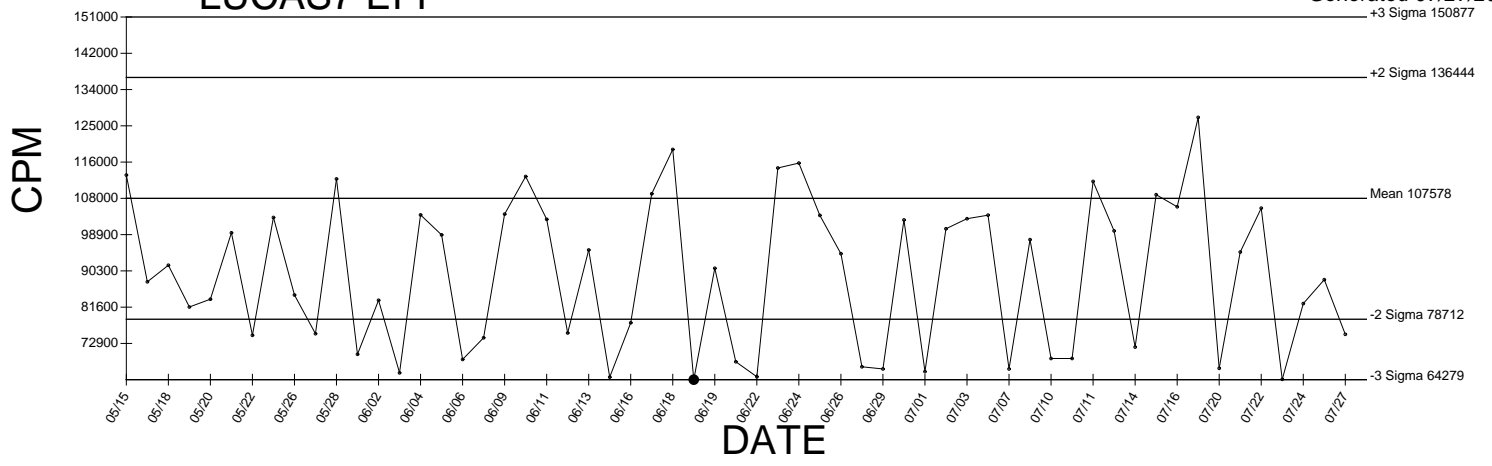
Generated 07/27/2009



● Denotes Outlier

# LUCAS7 EFF

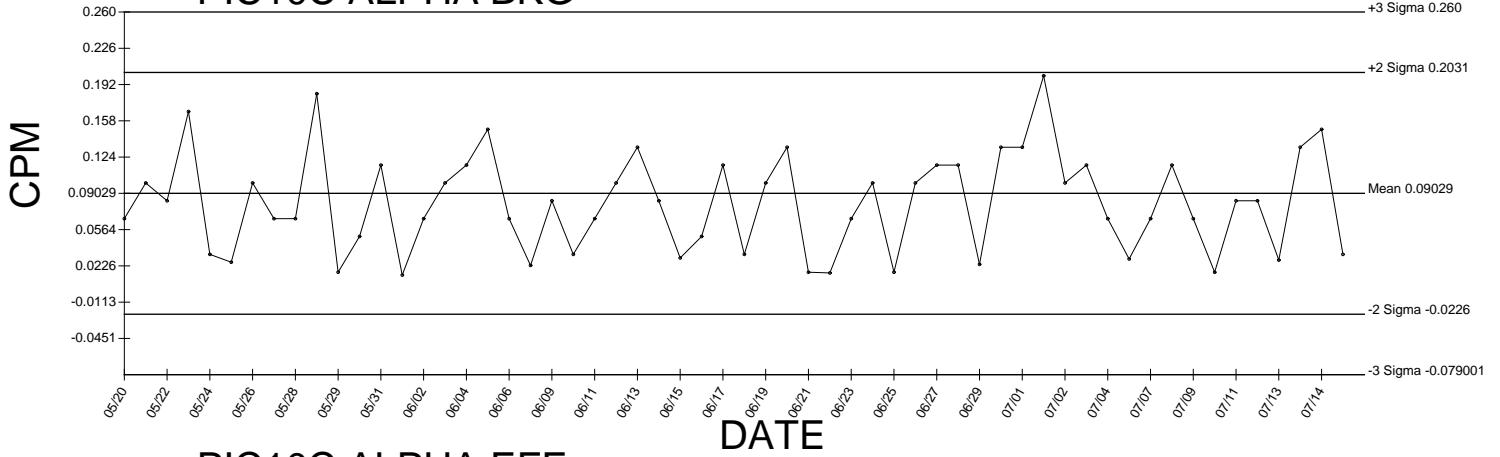
Generated 07/27/2009



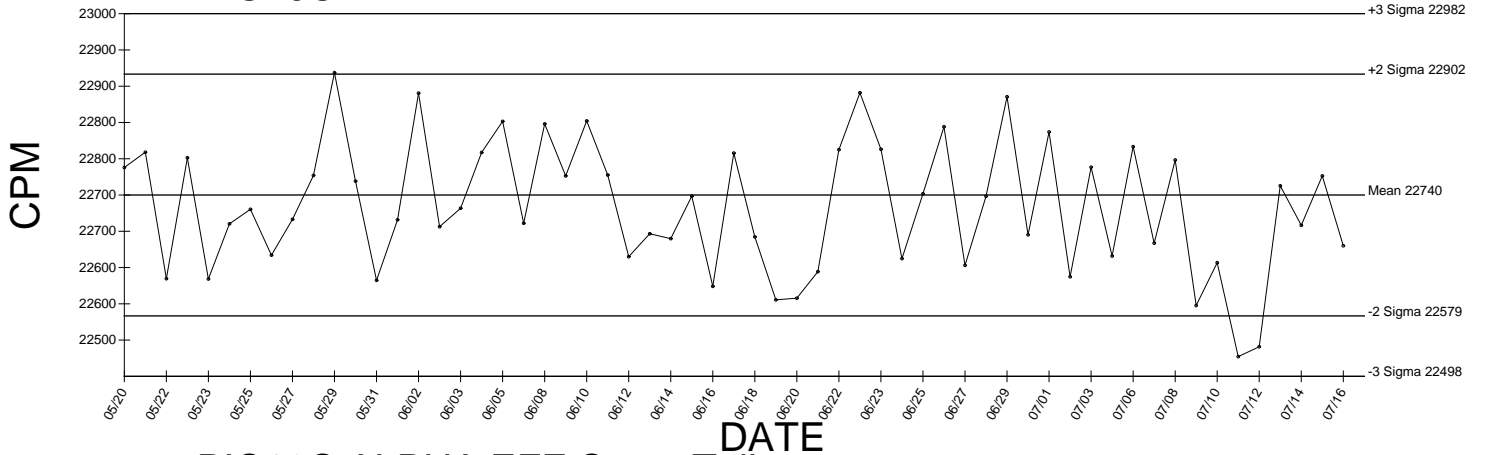
● Denotes Outlier

# PIC10C ALPHA BKG

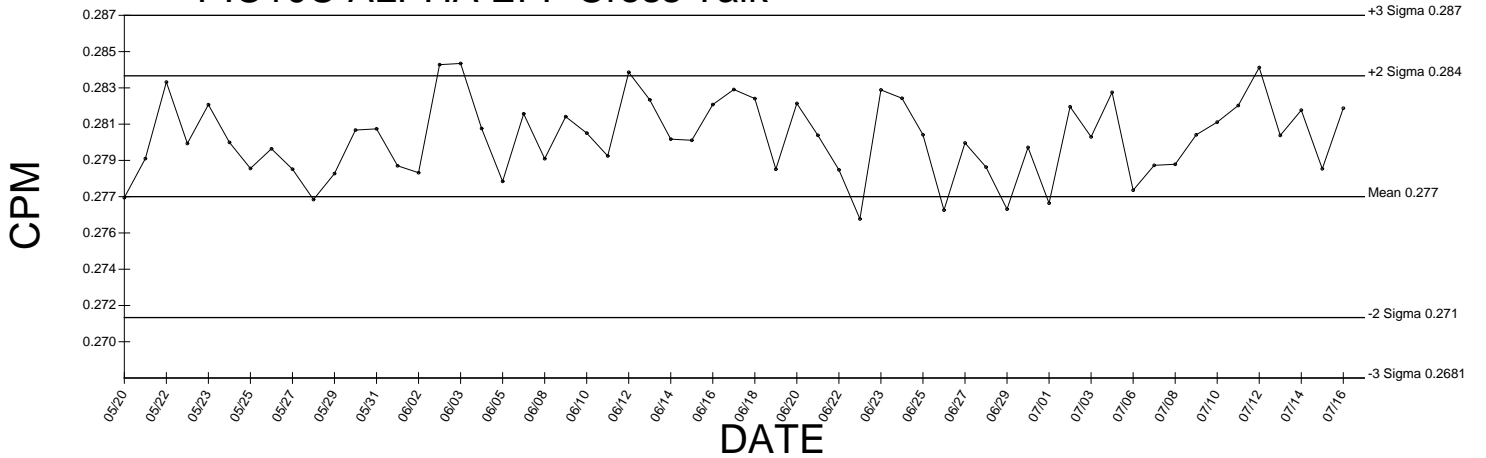
Generated 07/16/2009



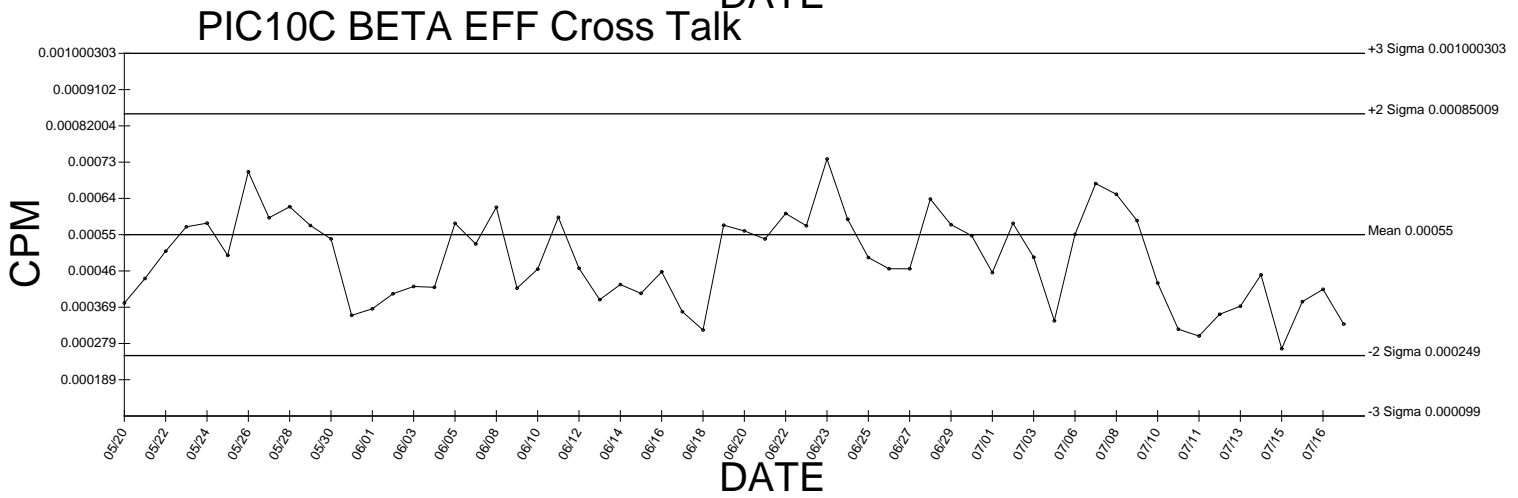
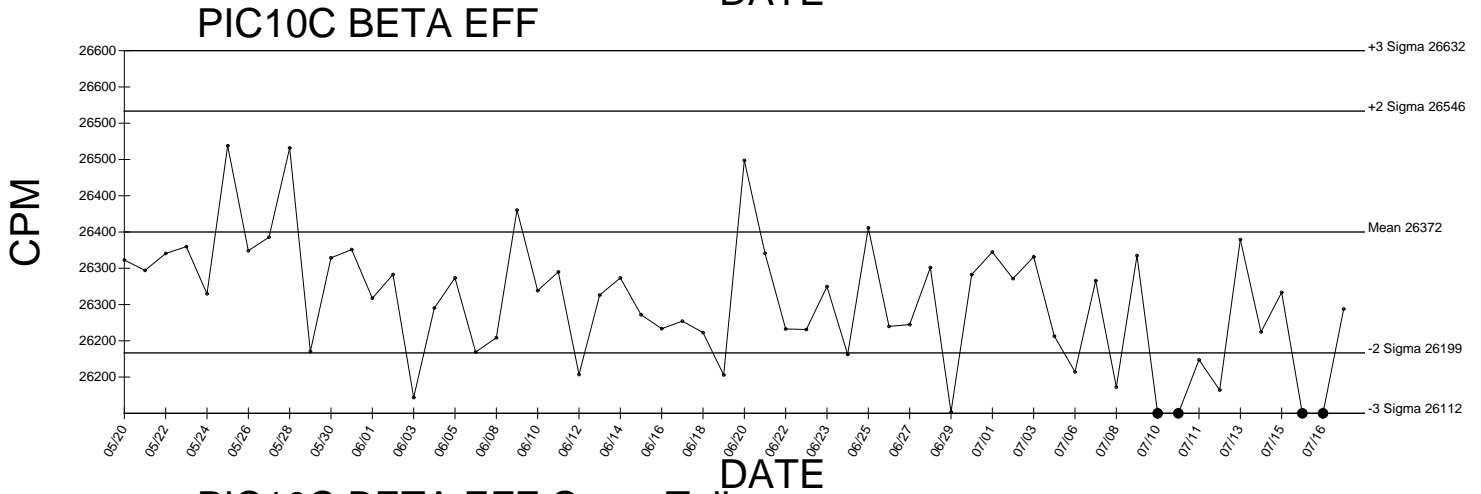
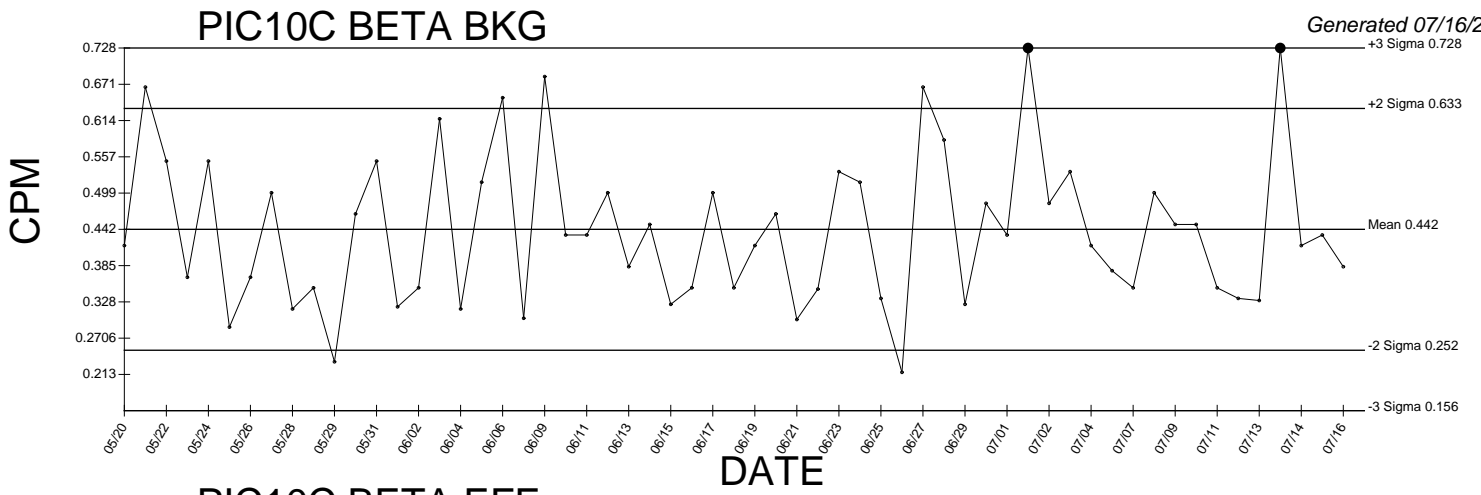
# PIC10C ALPHA EFF



# PIC10C ALPHA EFF Cross Talk



● Denotes Outlier

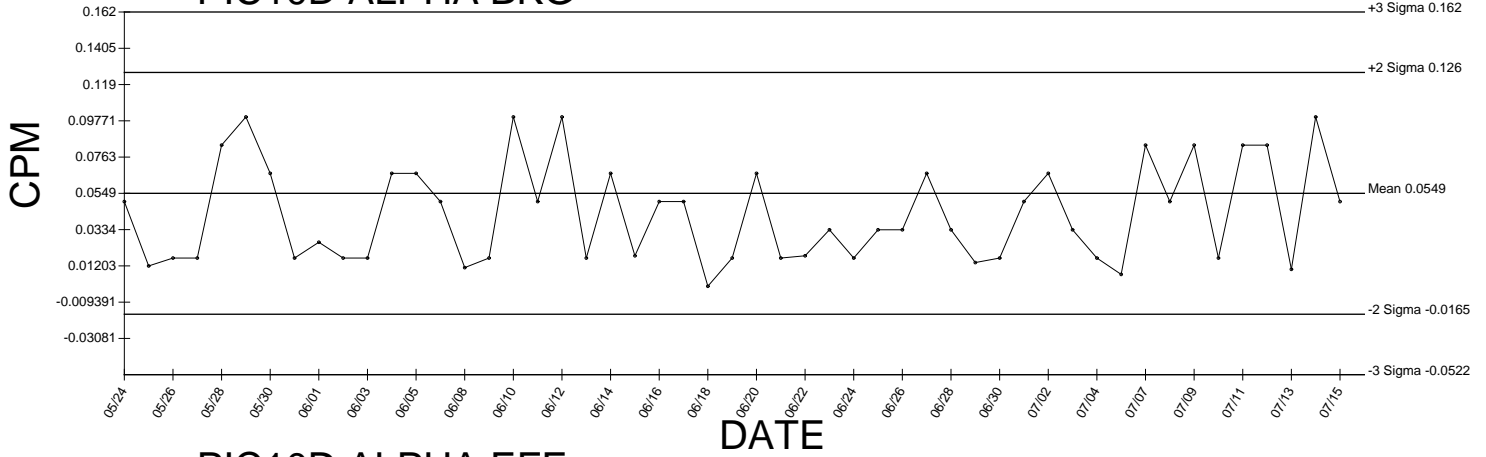


● Denotes Outlier

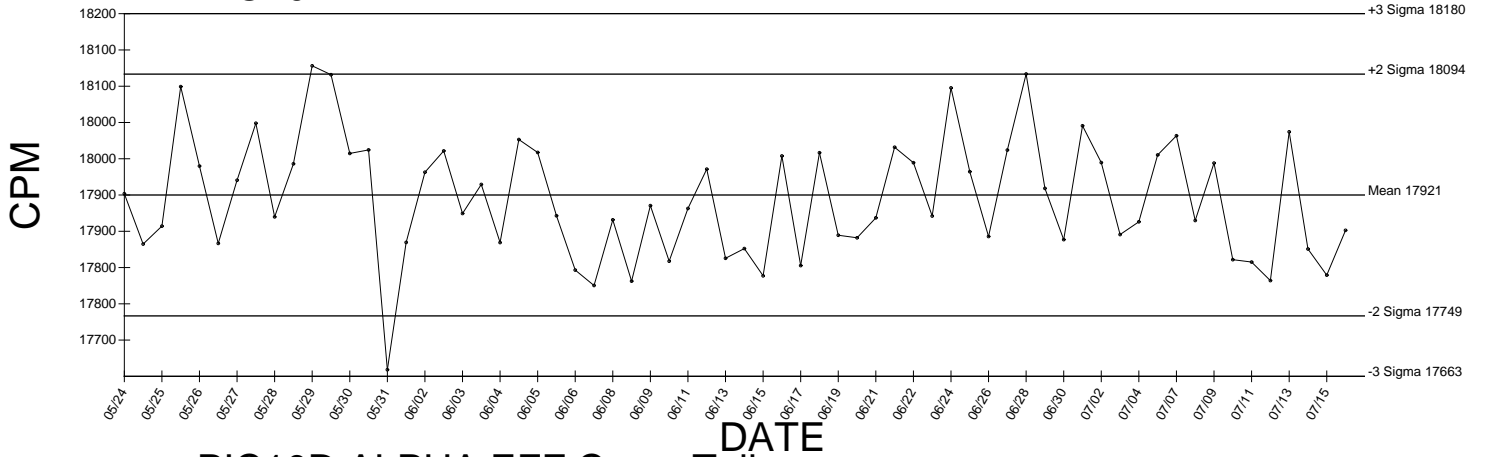


# PIC10D ALPHA BKG

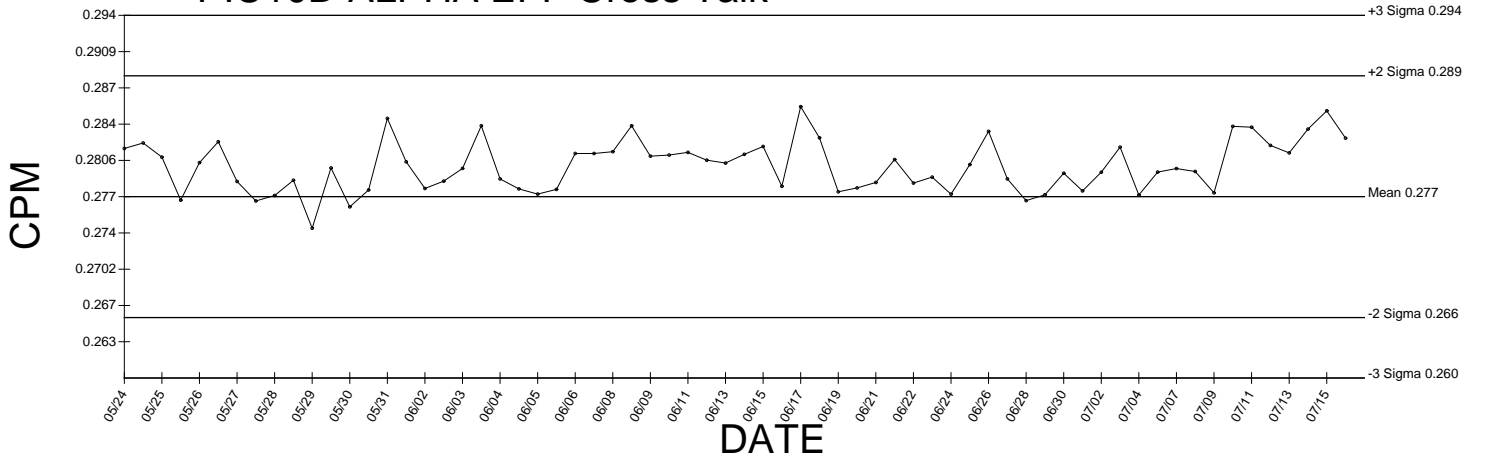
Generated 07/16/2009



# PIC10D ALPHA EFF



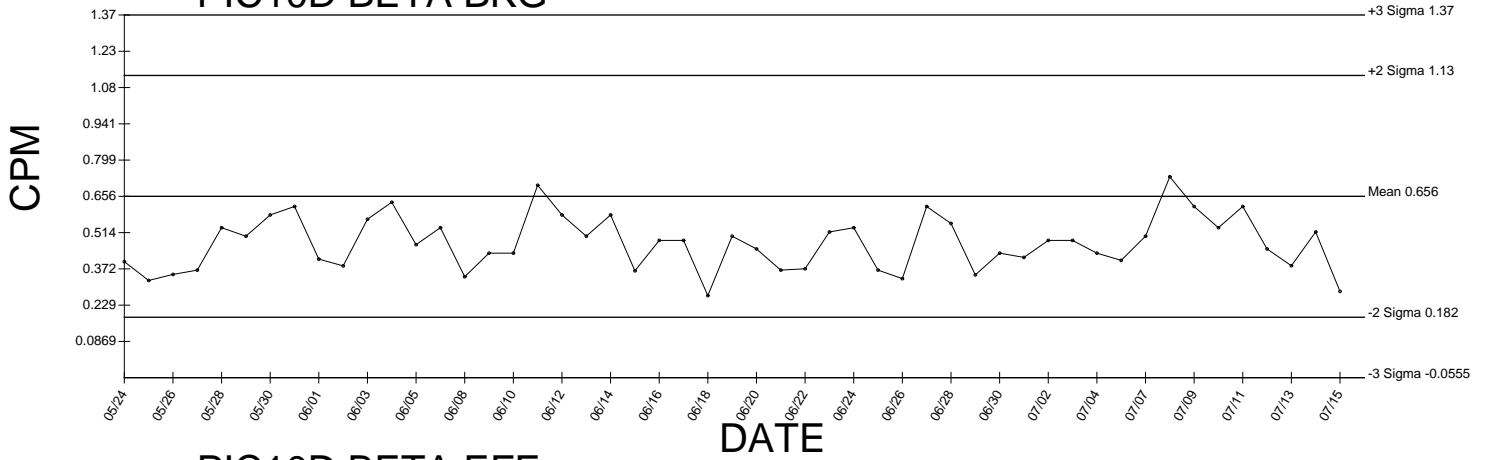
# PIC10D ALPHA EFF Cross Talk



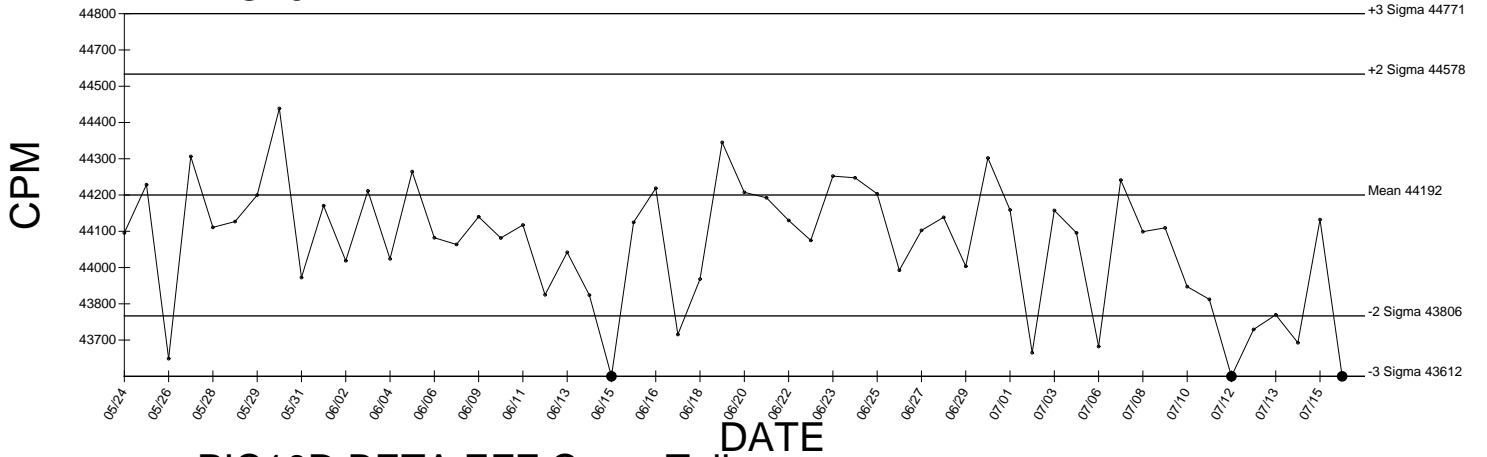
● Denotes Outlier

# PIC10D BETA BKG

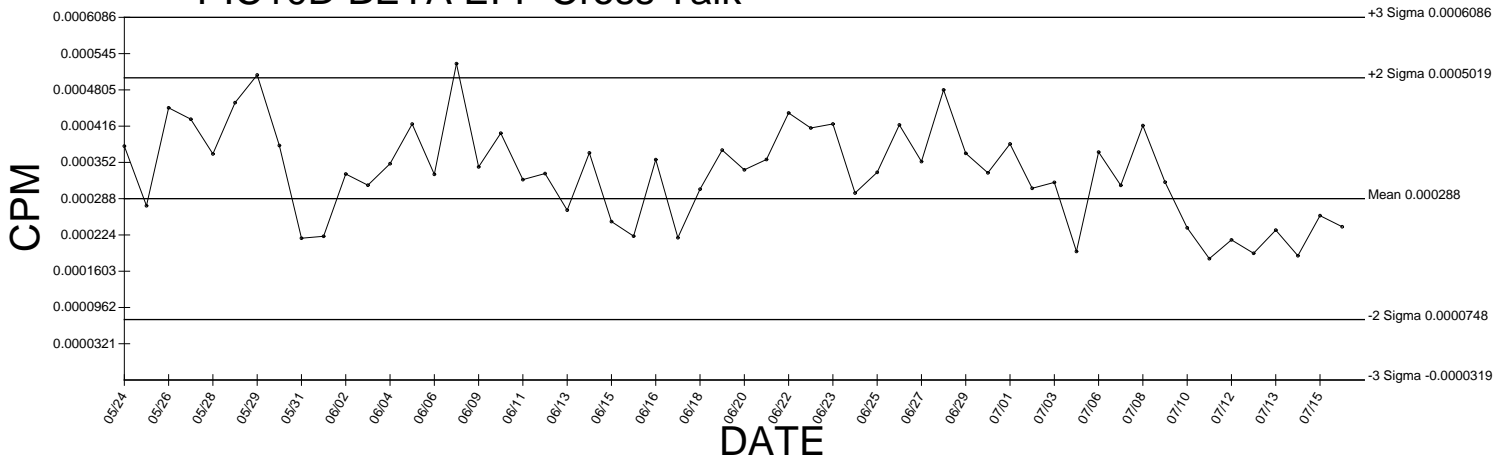
Generated 07/16/2009



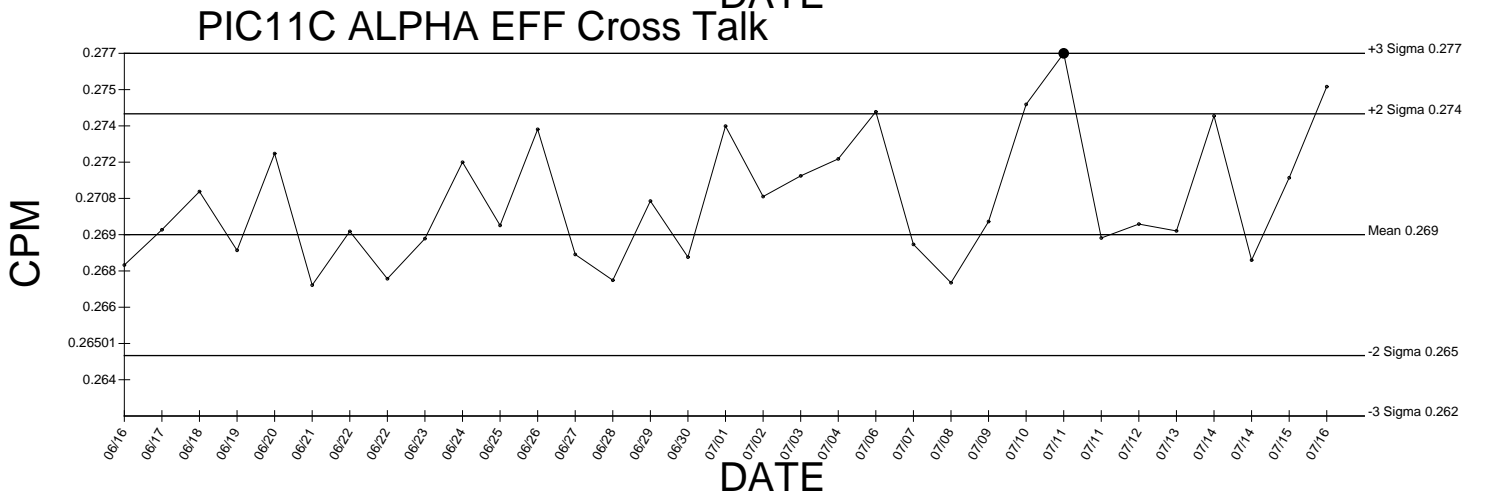
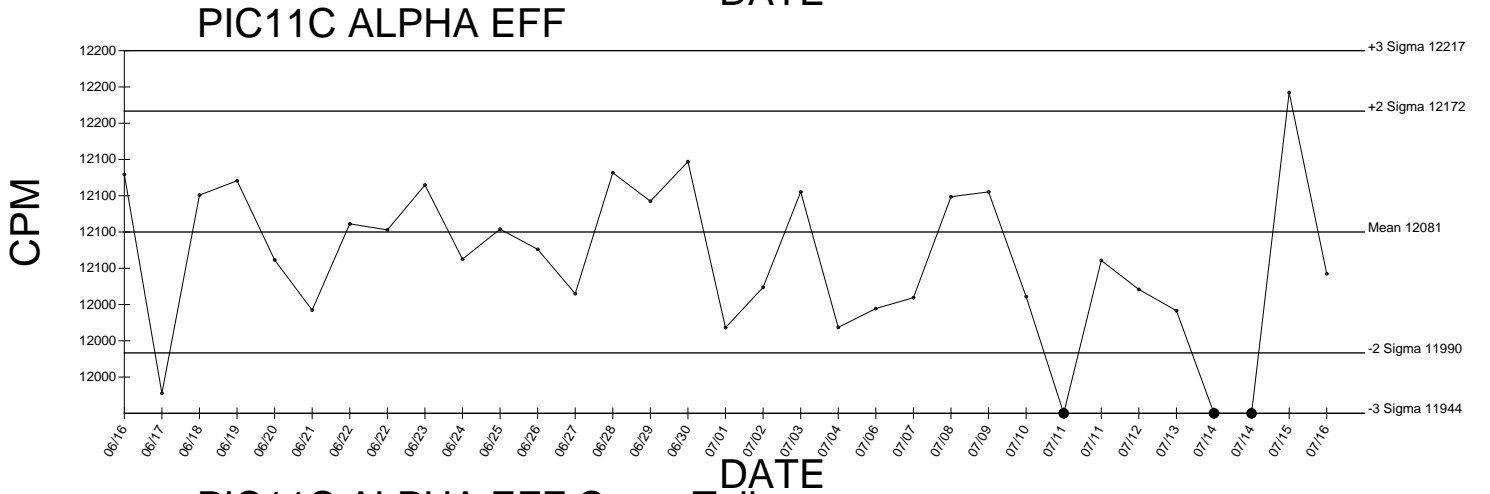
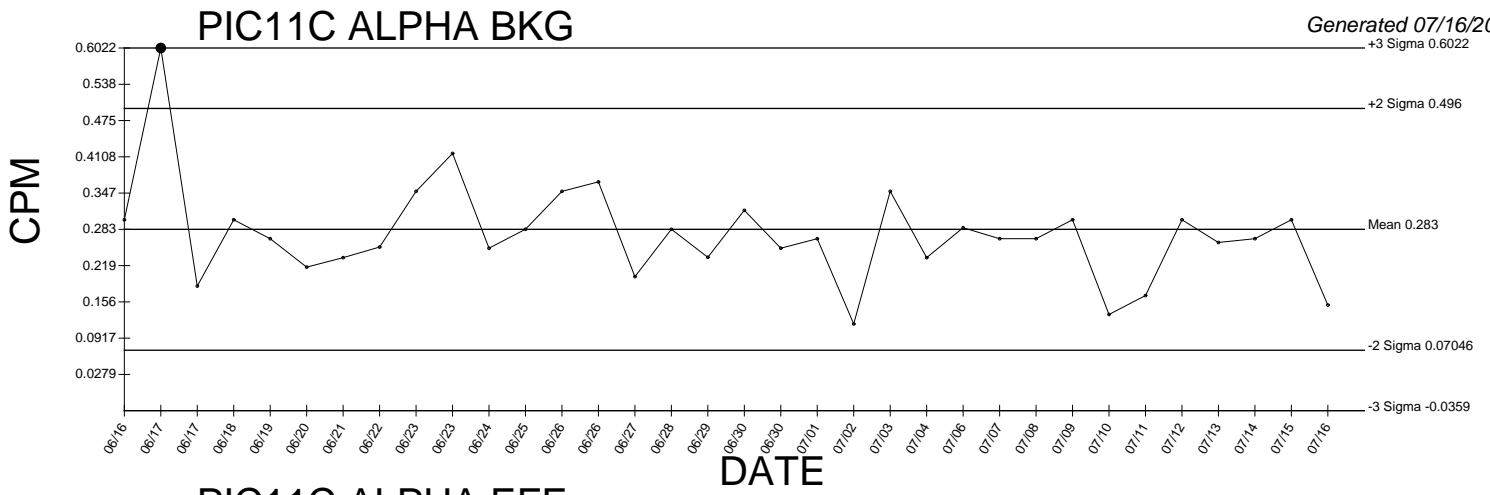
# PIC10D BETA EFF



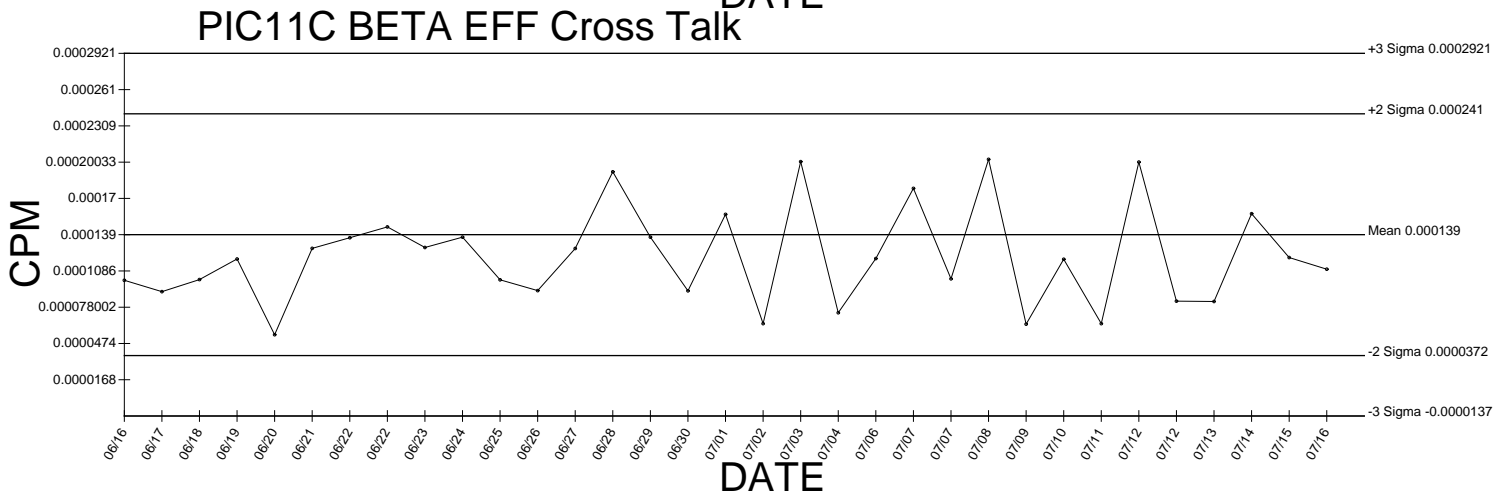
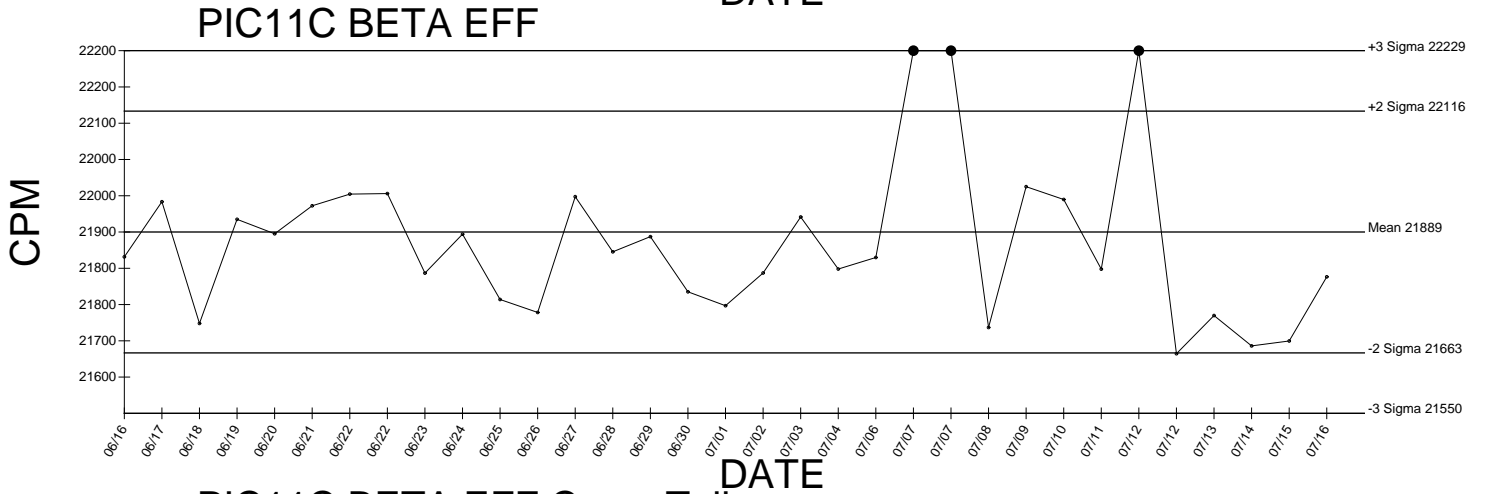
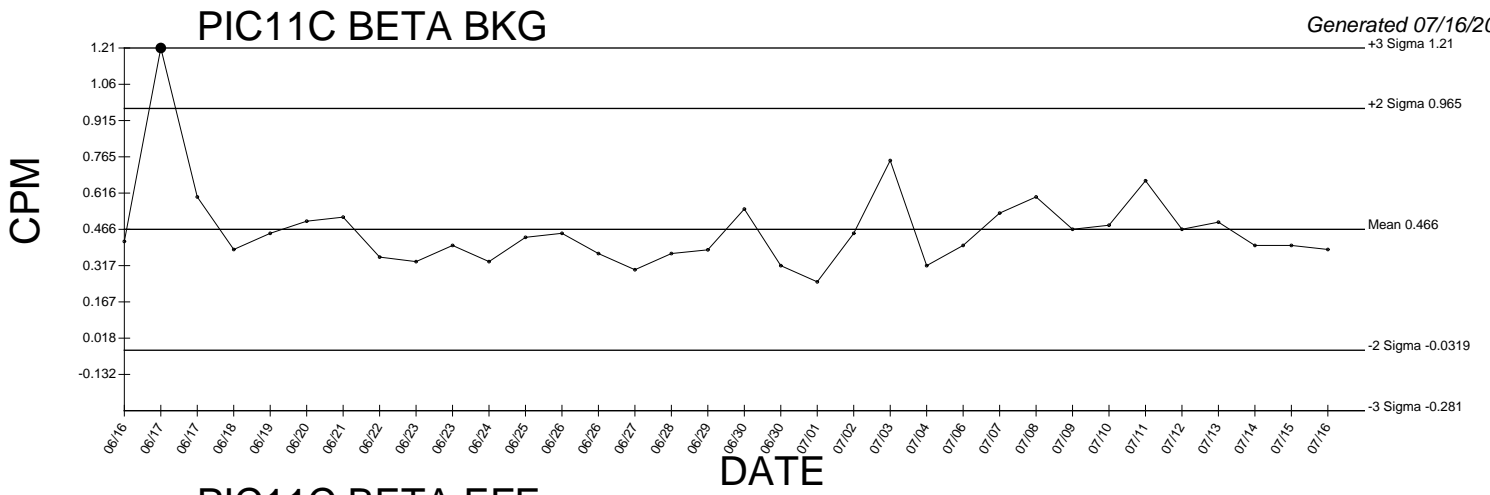
# PIC10D BETA EFF Cross Talk



● Denotes Outlier



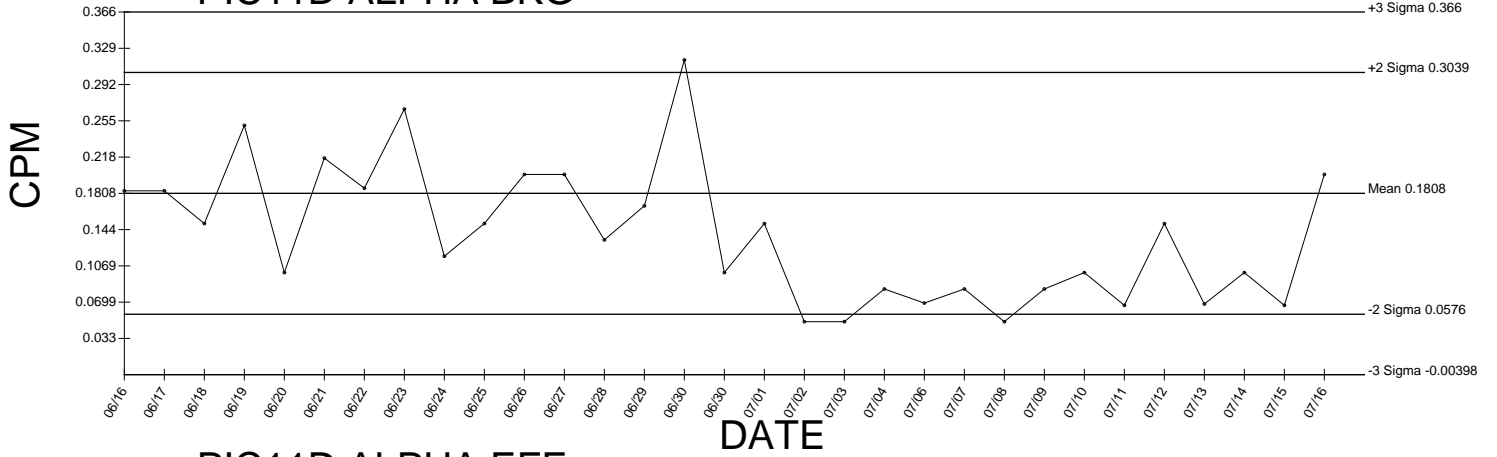
● Denotes Outlier



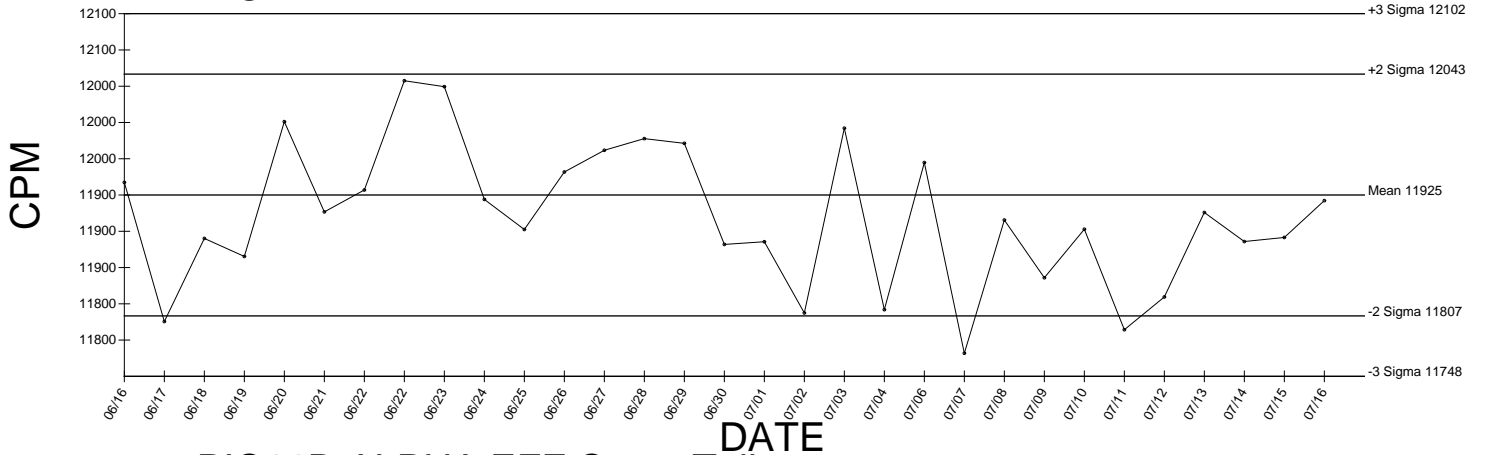
● Denotes Outlier

# PIC11D ALPHA BKG

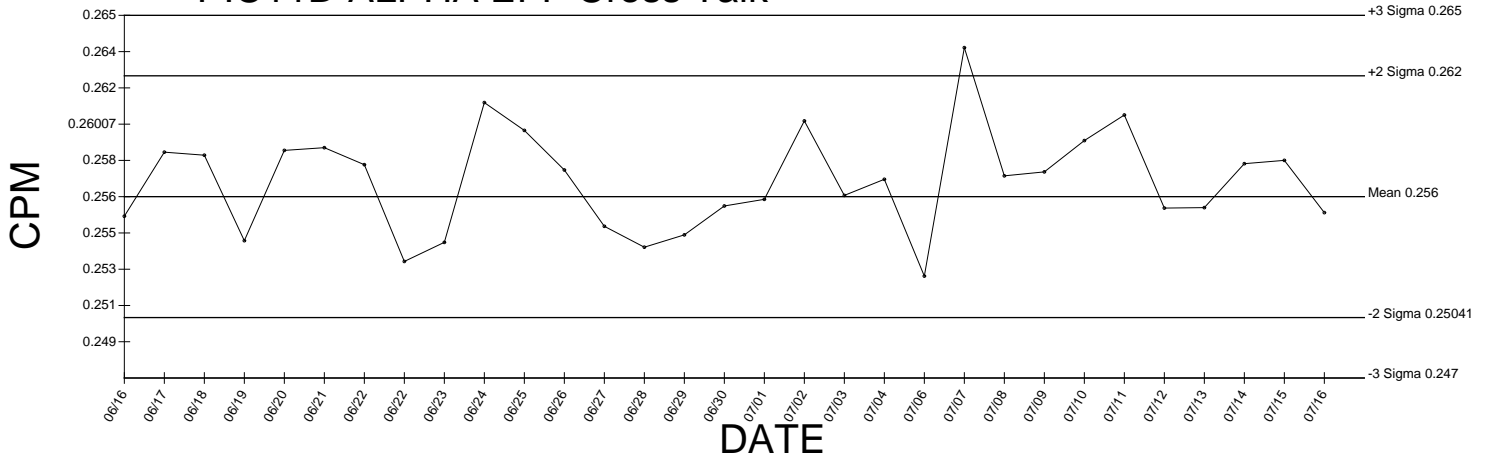
Generated 07/16/2009



# PIC11D ALPHA EFF



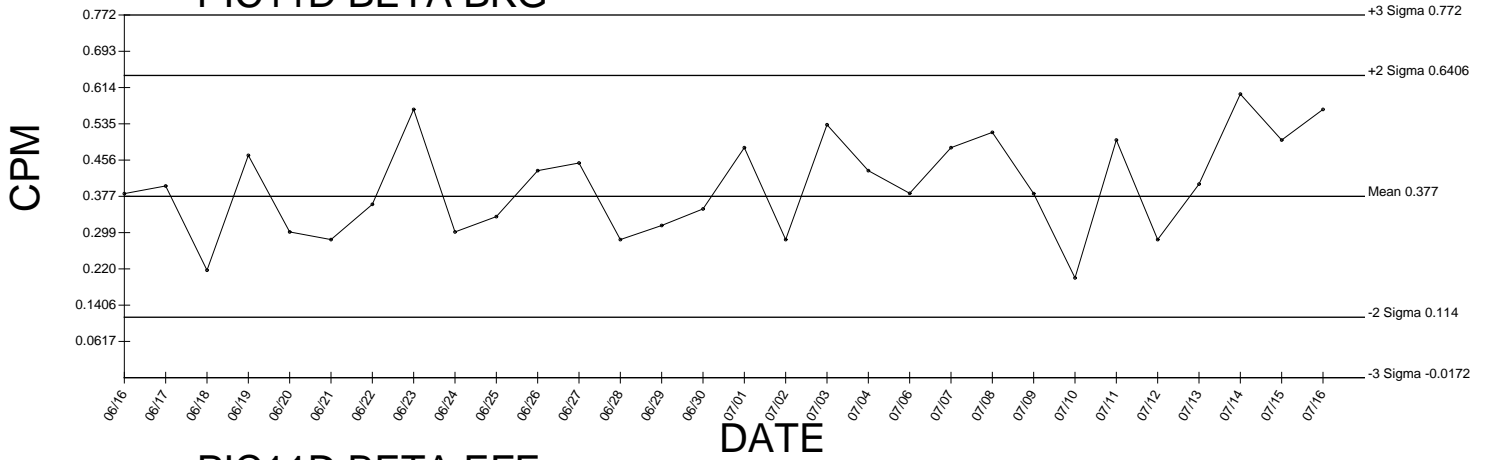
# PIC11D ALPHA EFF Cross Talk



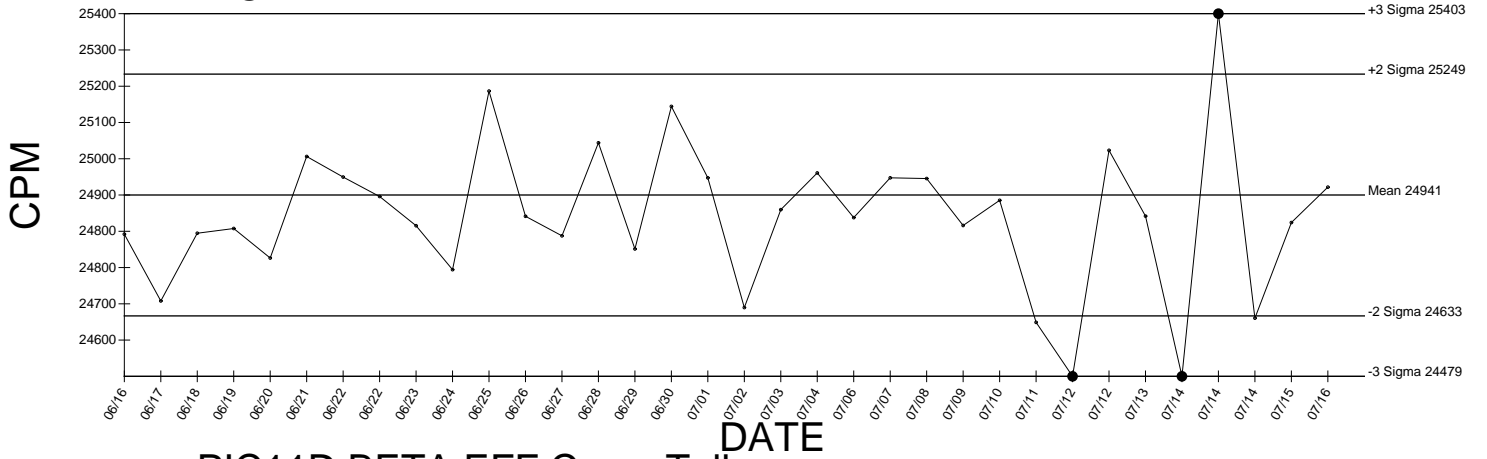
● Denotes Outlier

# PIC11D BETA BKG

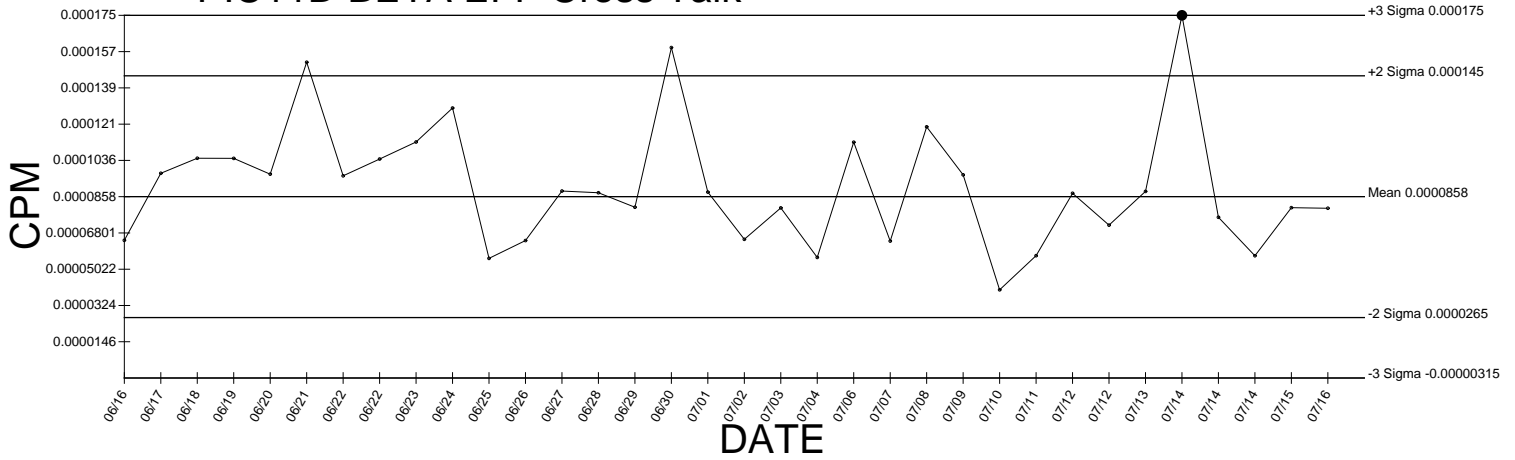
Generated 07/16/2009



# PIC11D BETA EFF



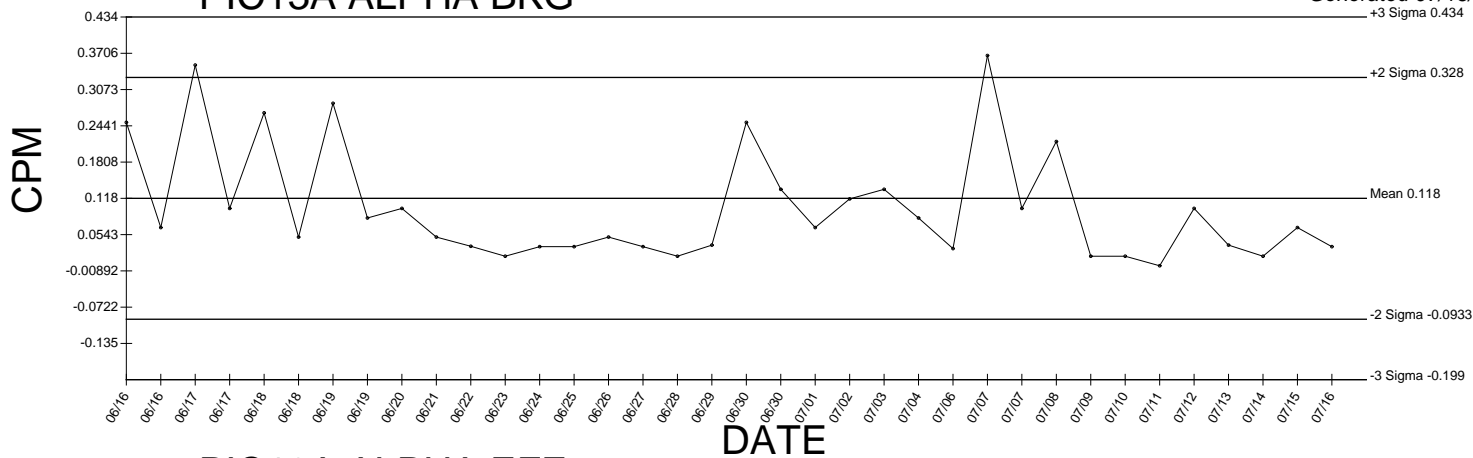
# PIC11D BETA EFF Cross Talk



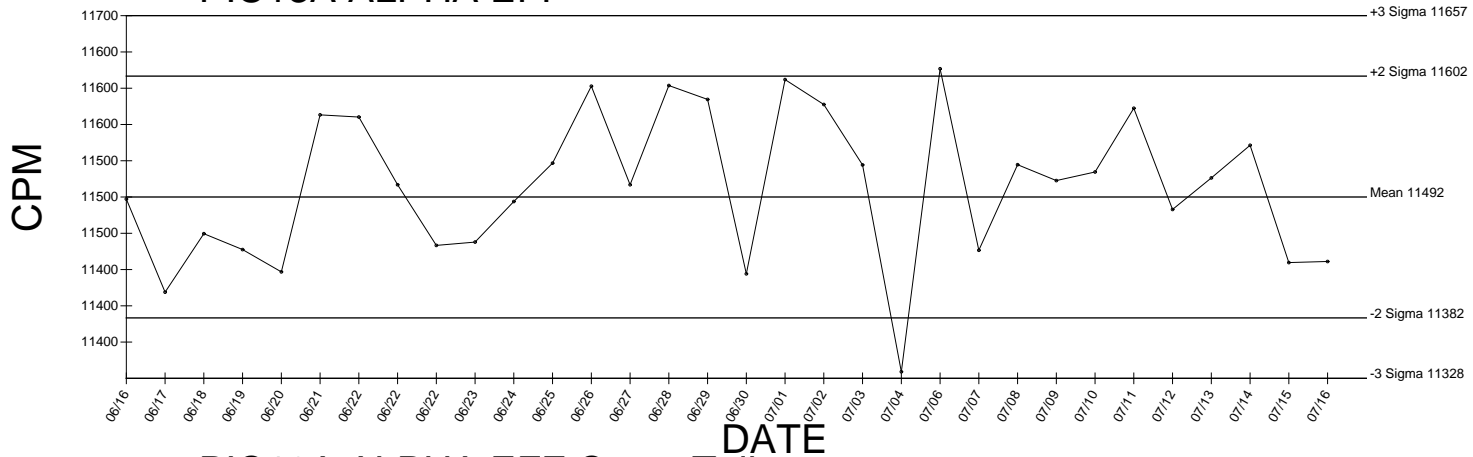
● Denotes Outlier

# PIC13A ALPHA BKG

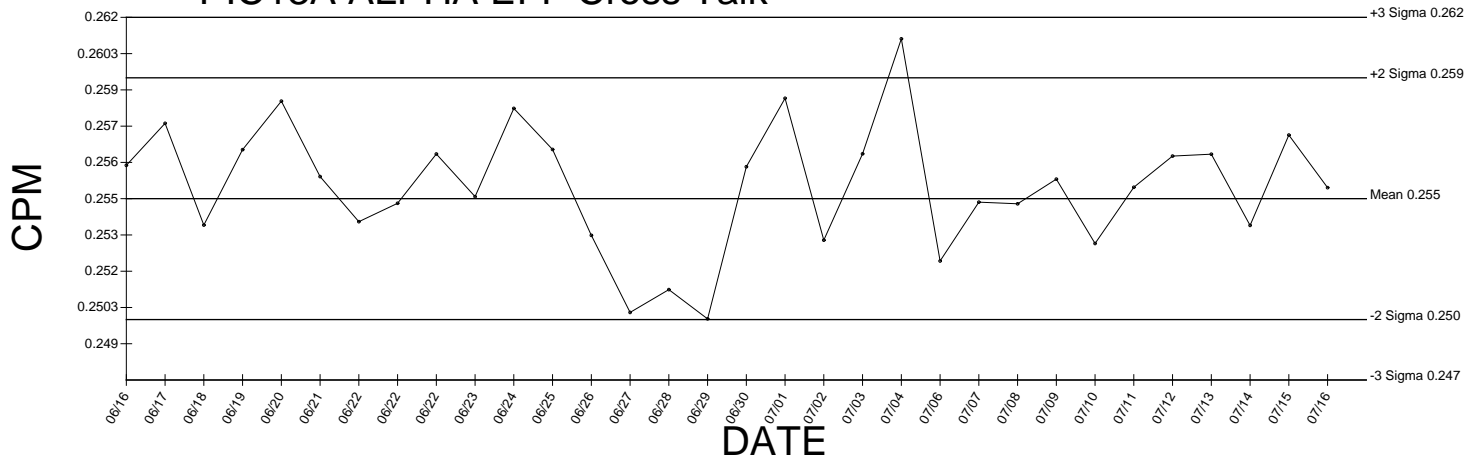
Generated 07/16/2009



# PIC13A ALPHA EFF



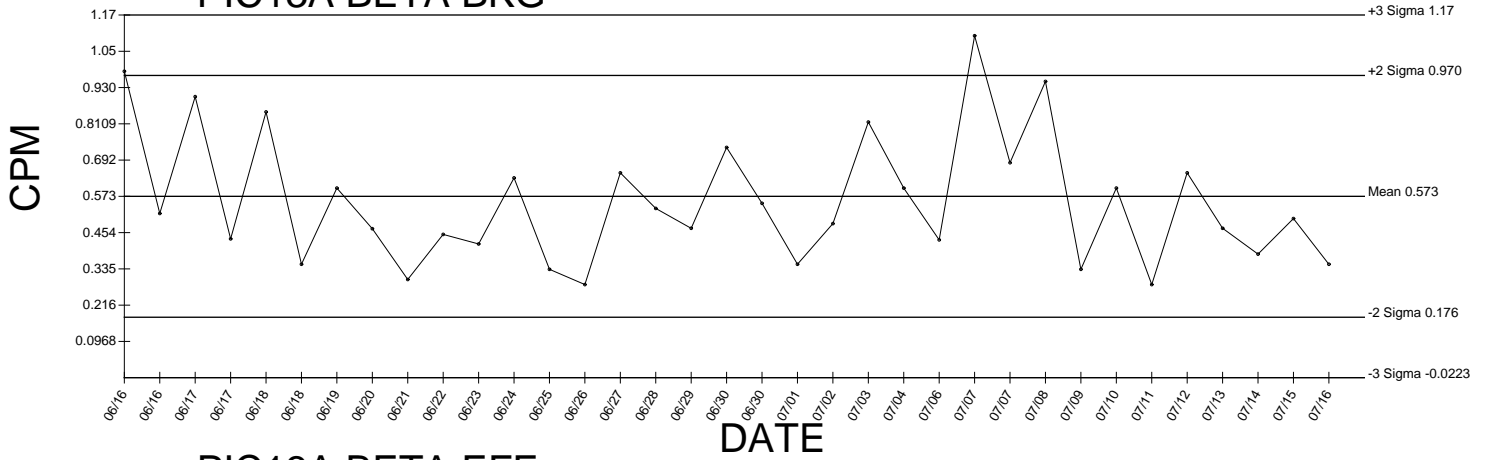
# PIC13A ALPHA EFF Cross Talk



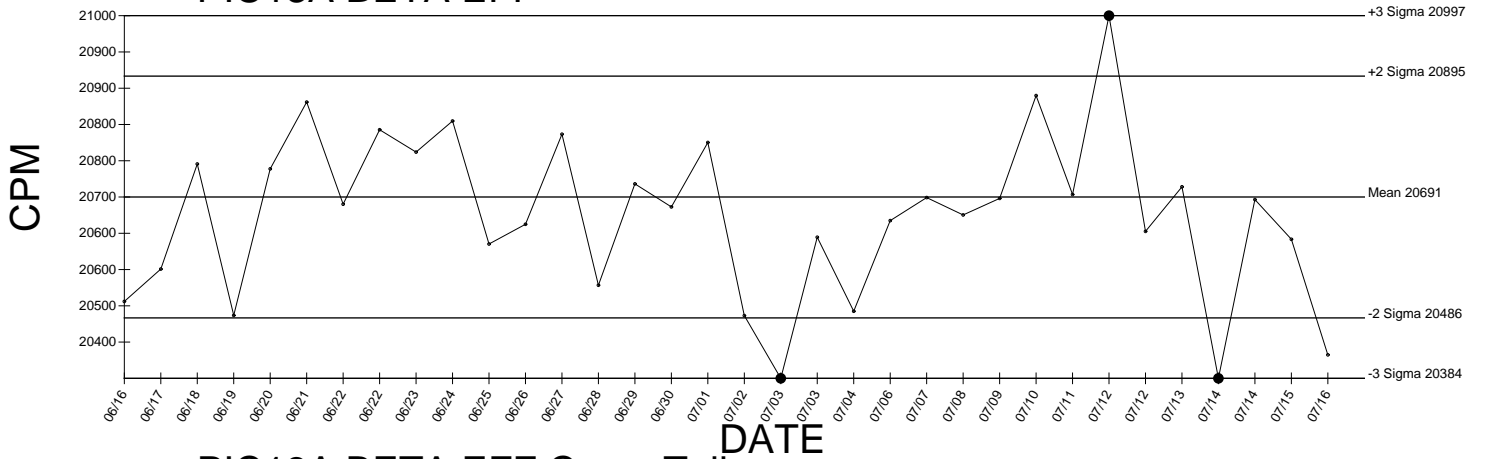
● Denotes Outlier

# PIC13A BETA BKG

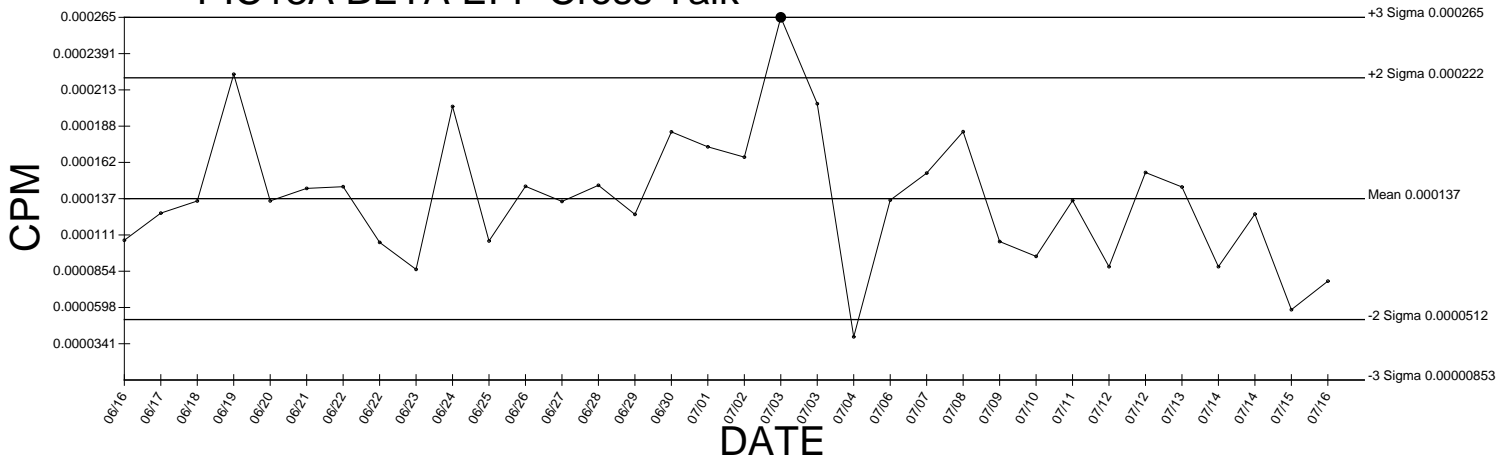
Generated 07/16/2009



# PIC13A BETA EFF

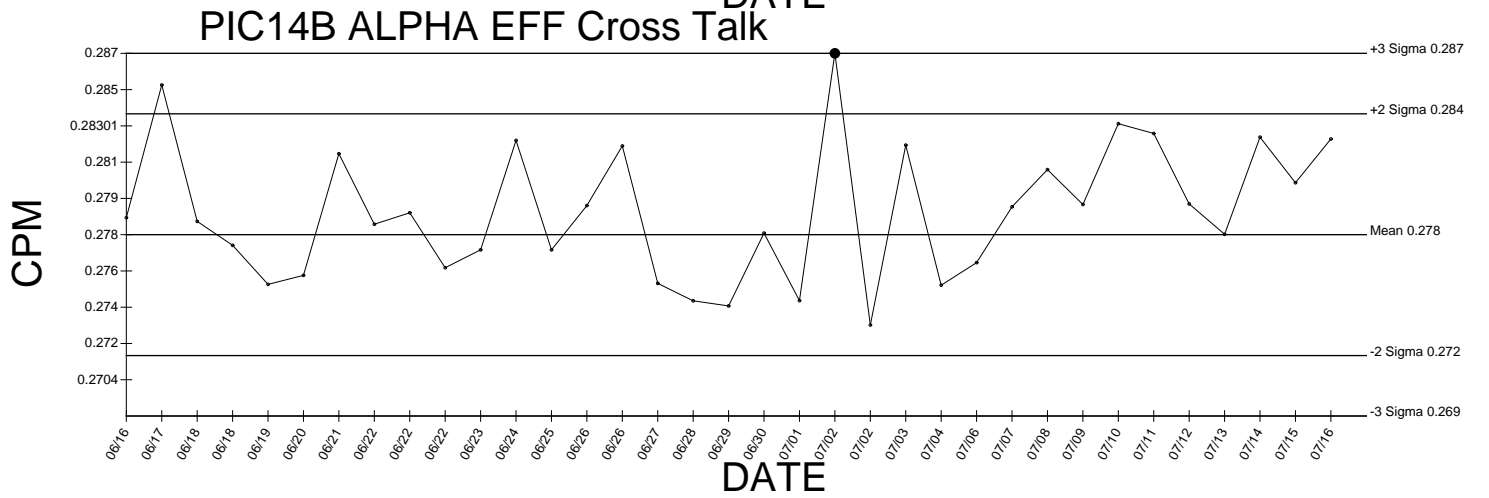
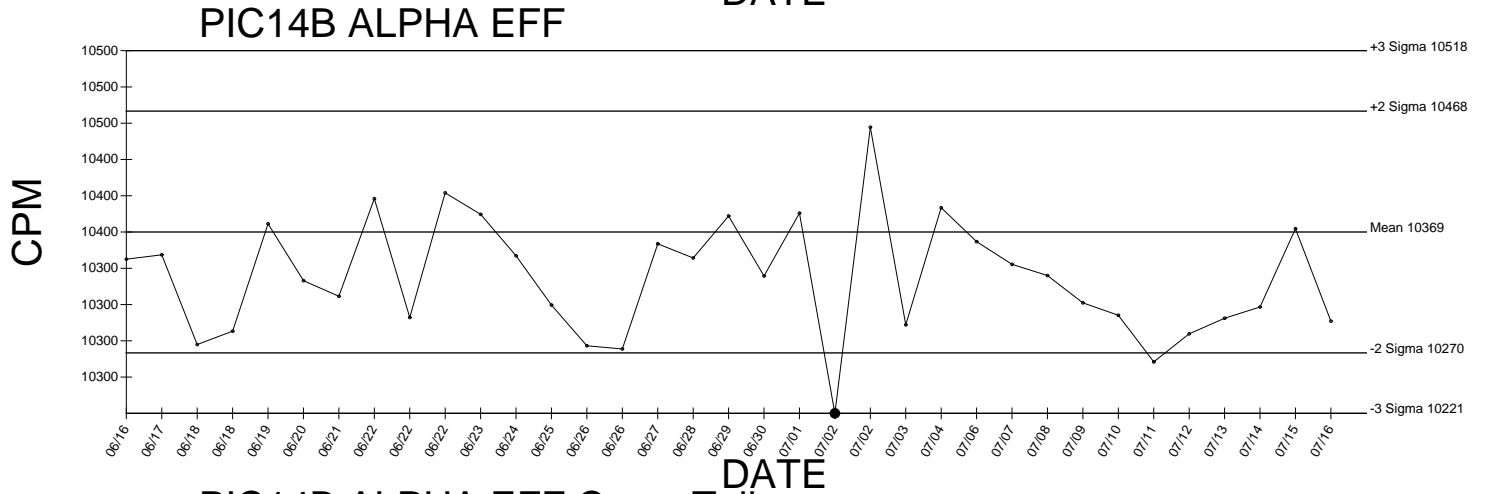
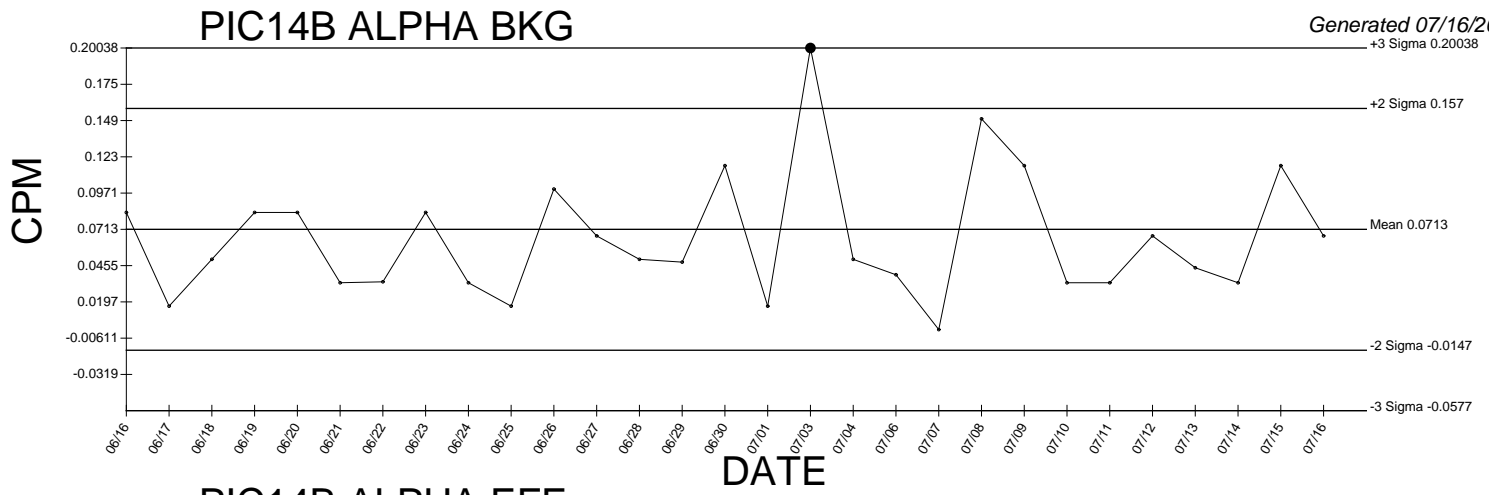


# PIC13A BETA EFF Cross Talk



● Denotes Outlier

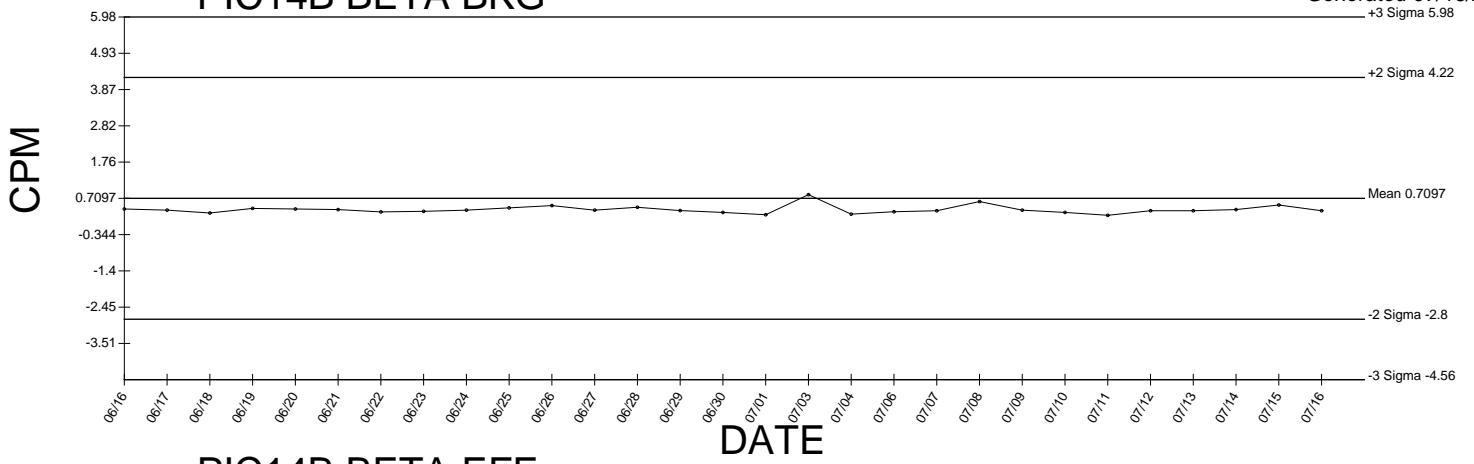




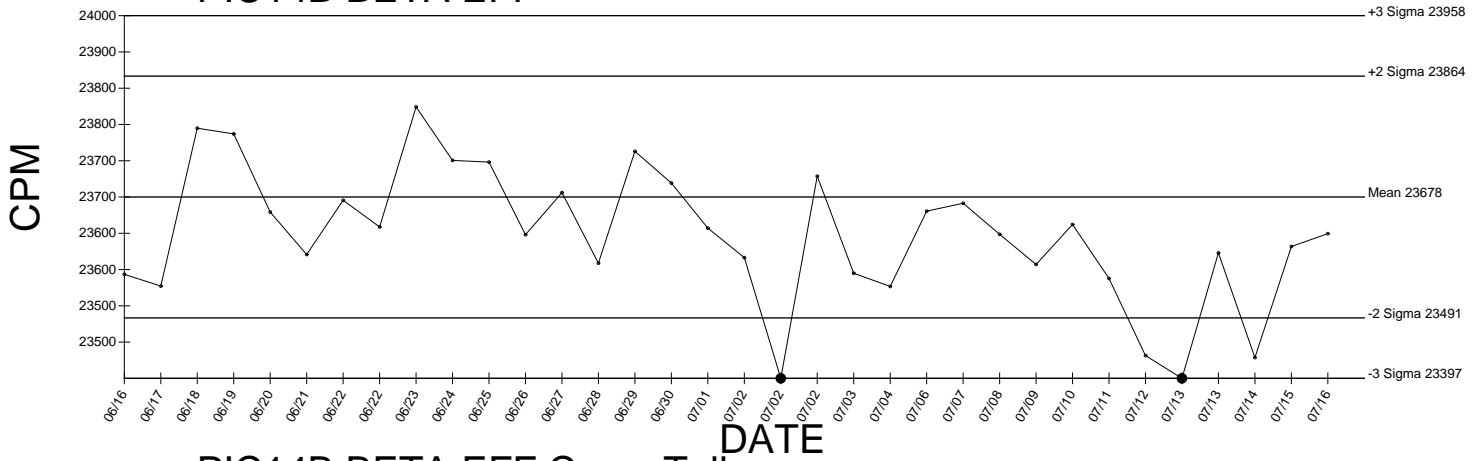
● Denotes Outlier

# PIC14B BETA BKG

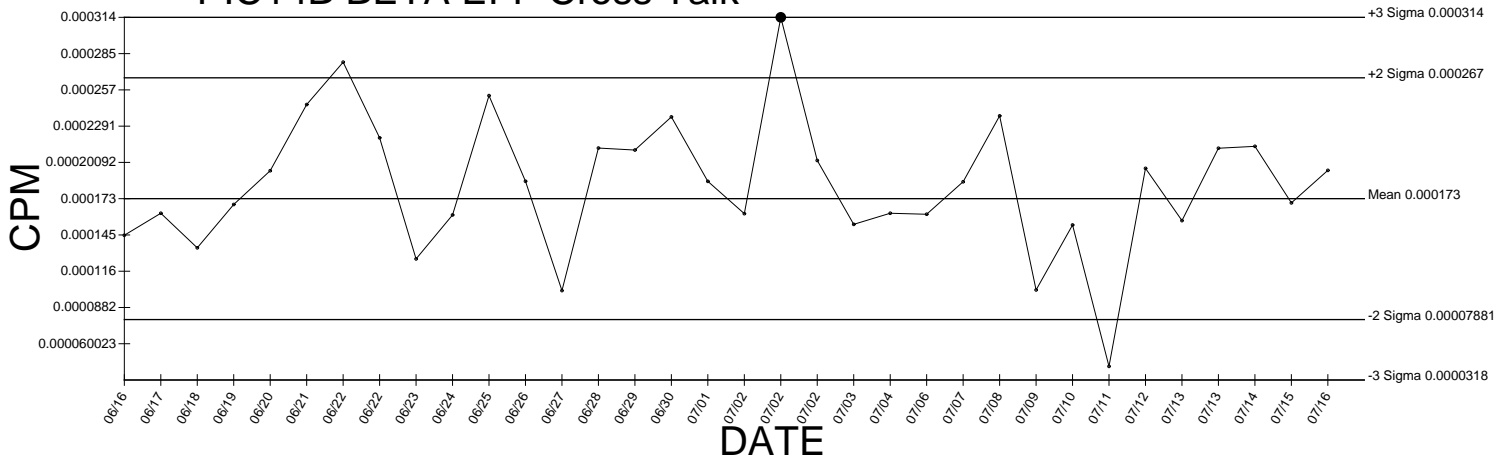
Generated 07/16/2009



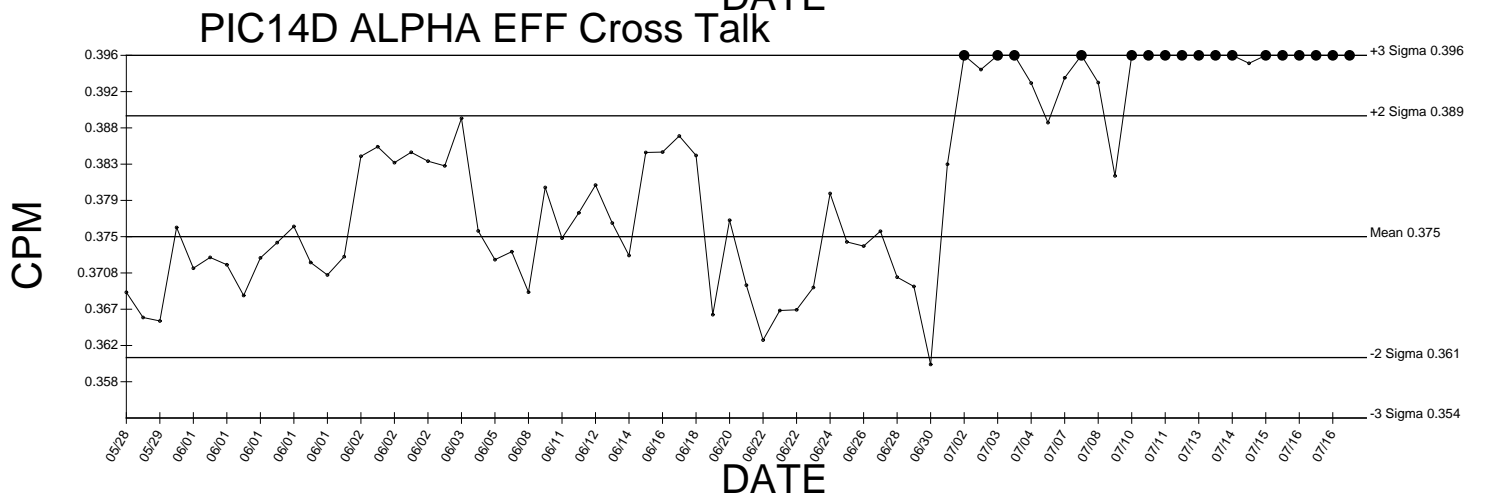
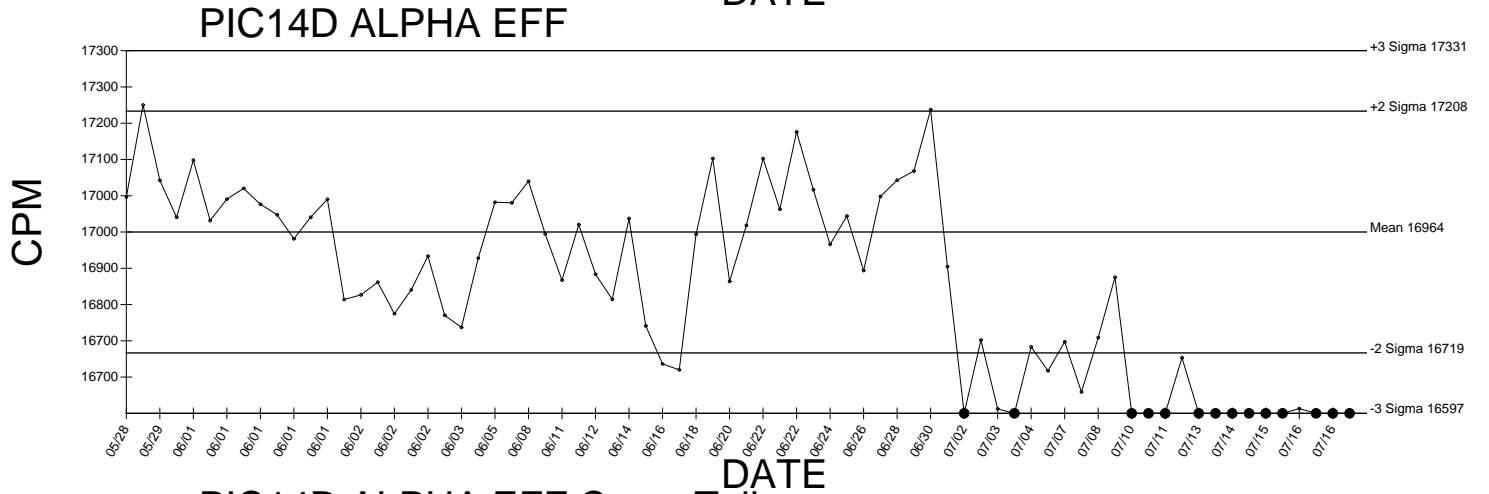
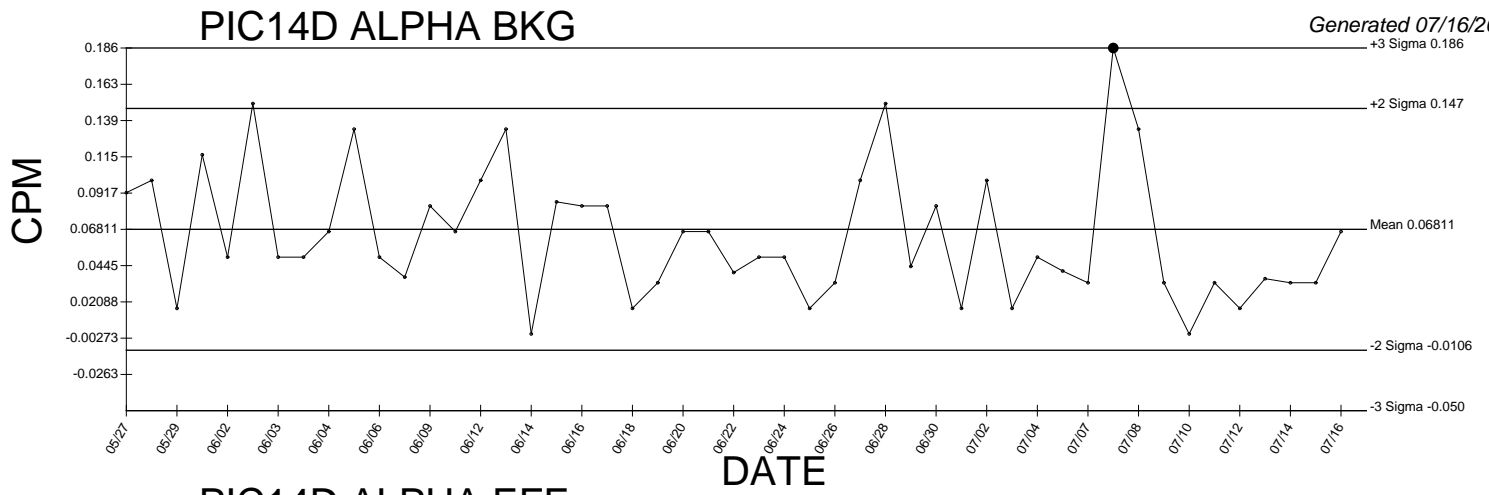
# PIC14B BETA EFF



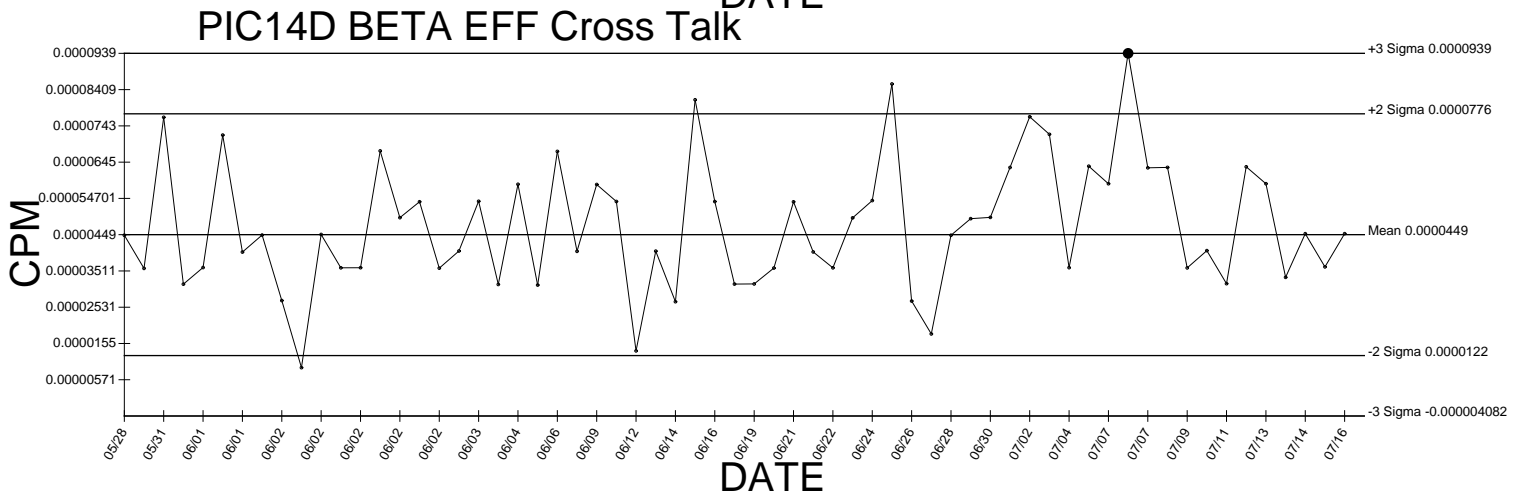
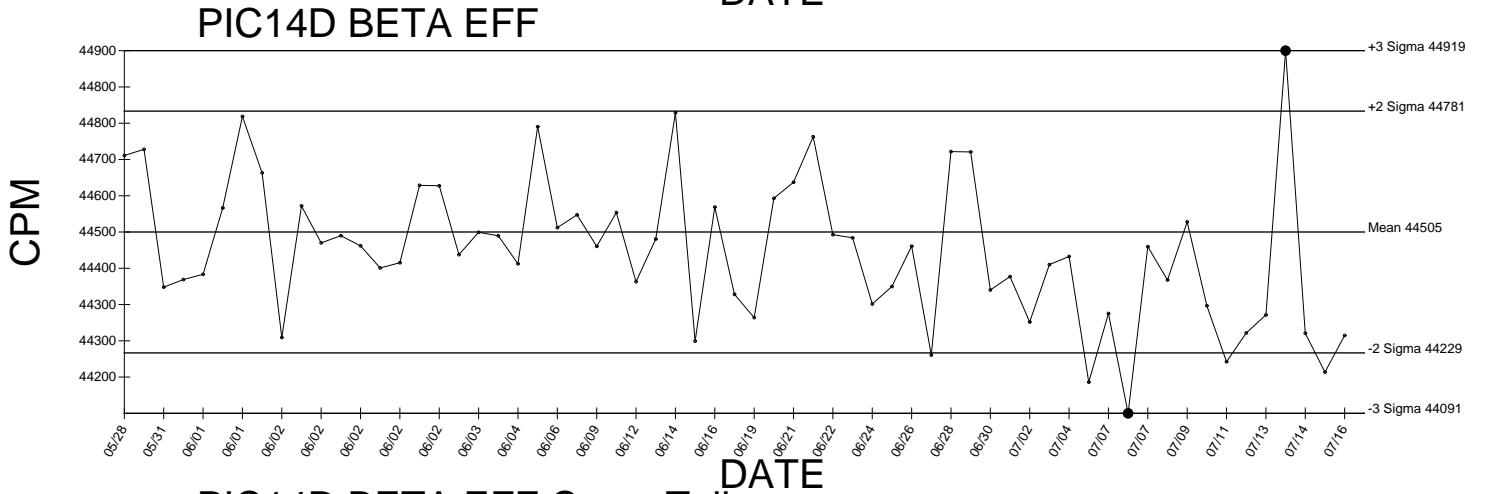
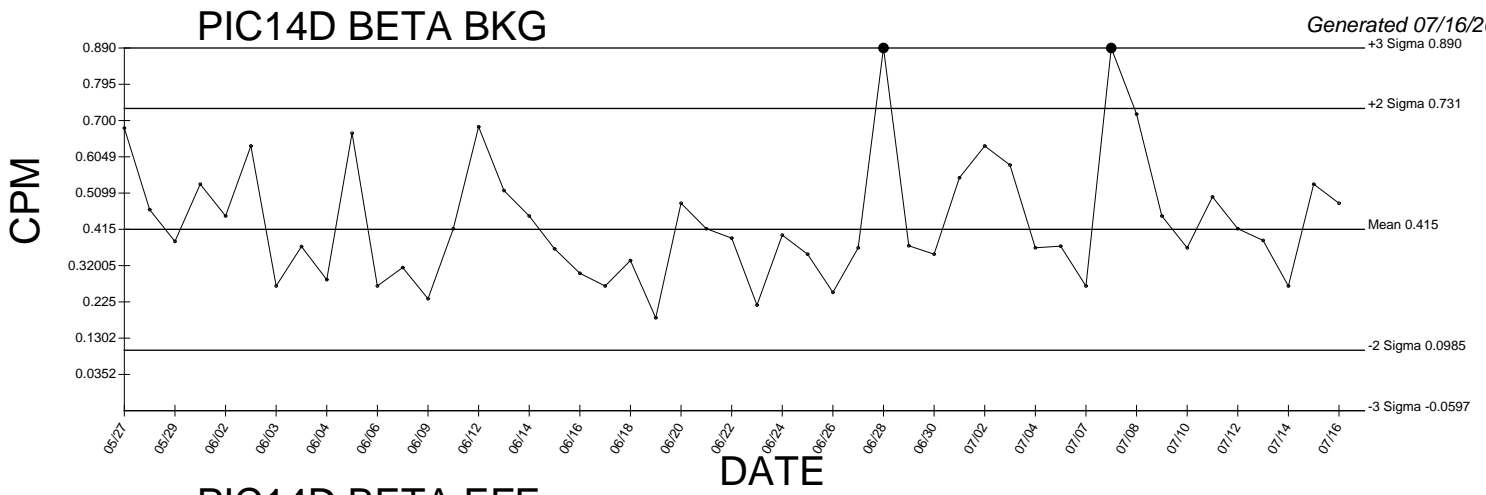
# PIC14B BETA EFF Cross Talk



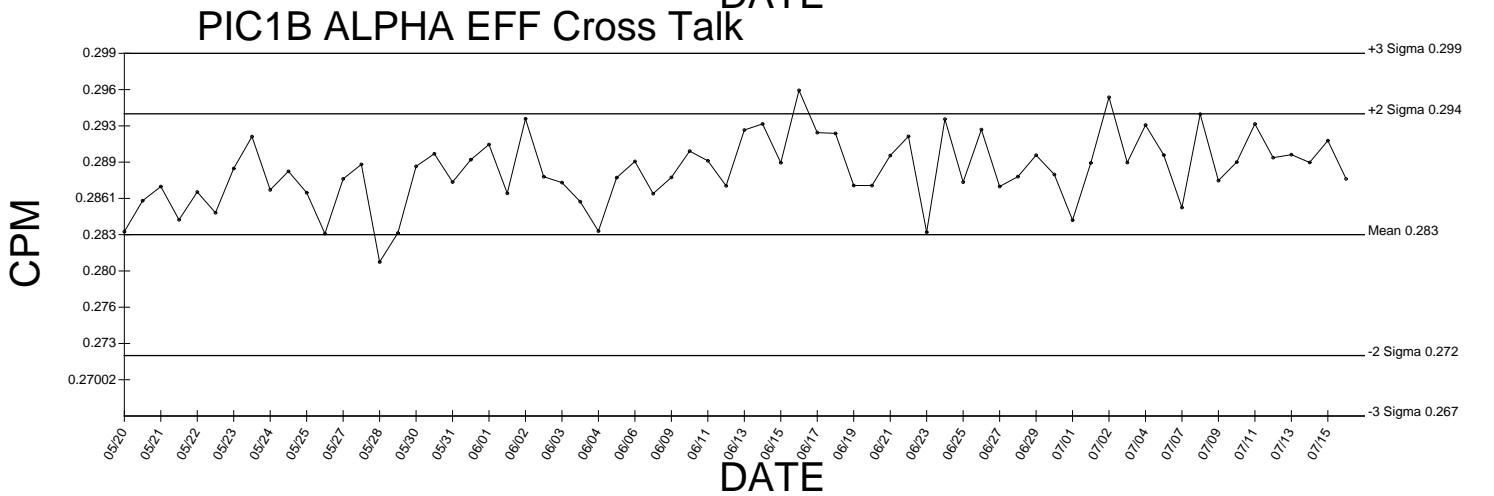
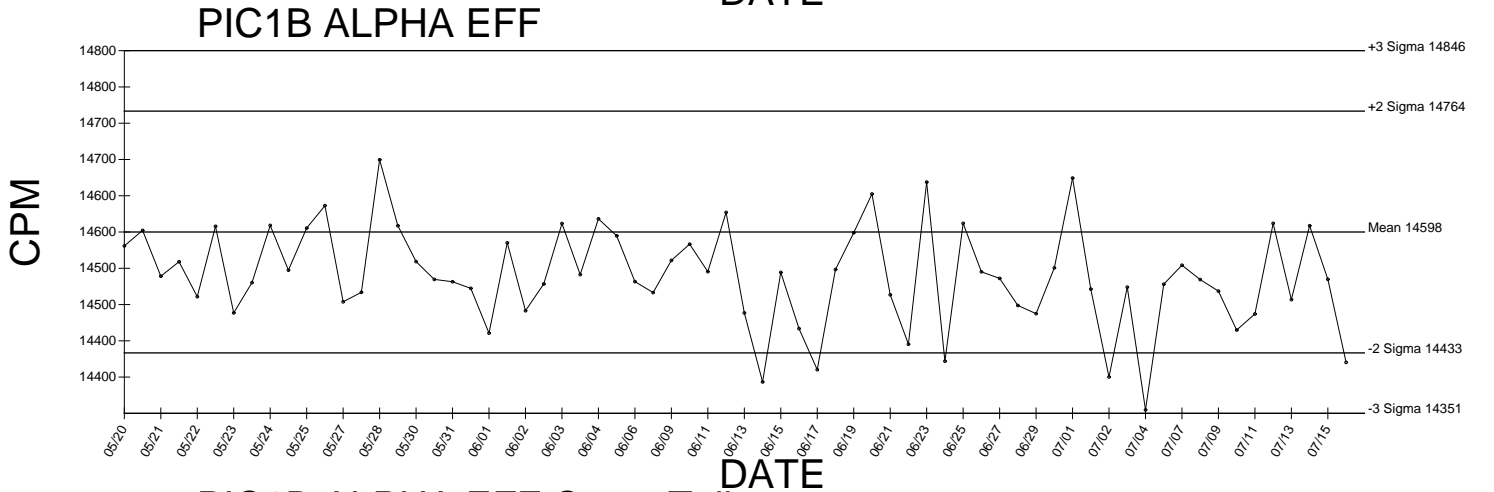
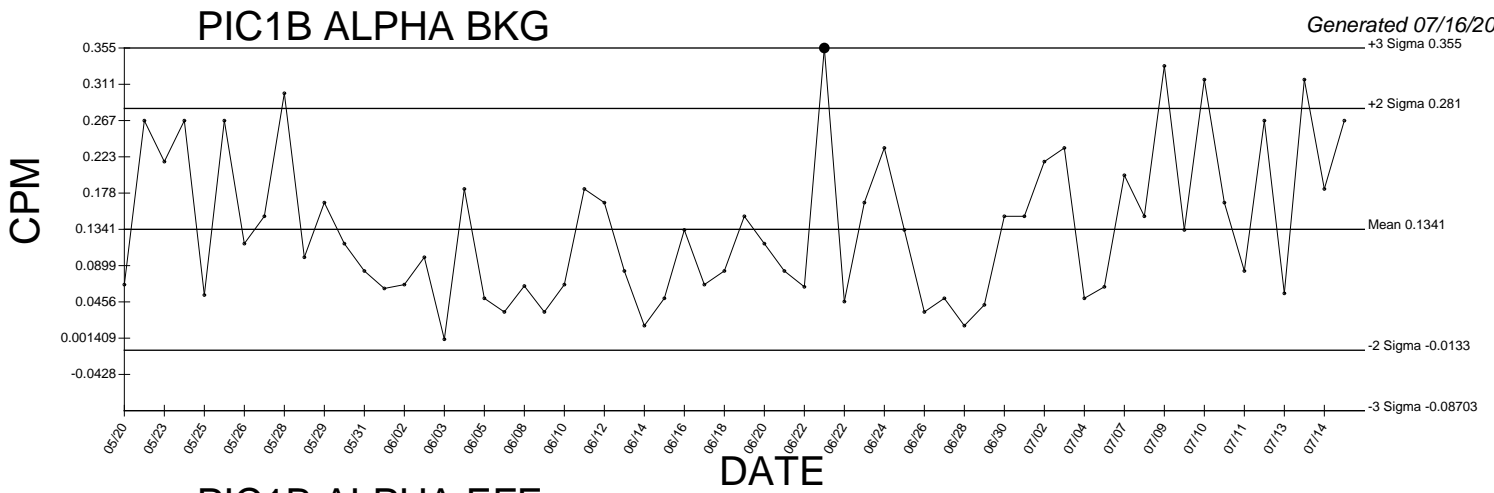
● Denotes Outlier



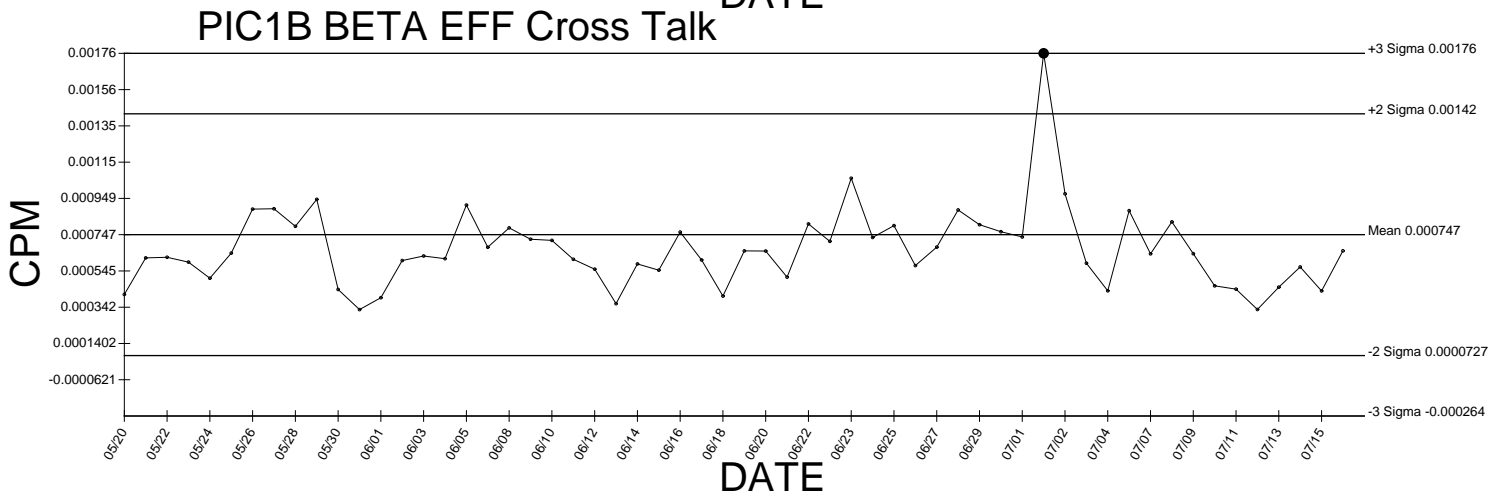
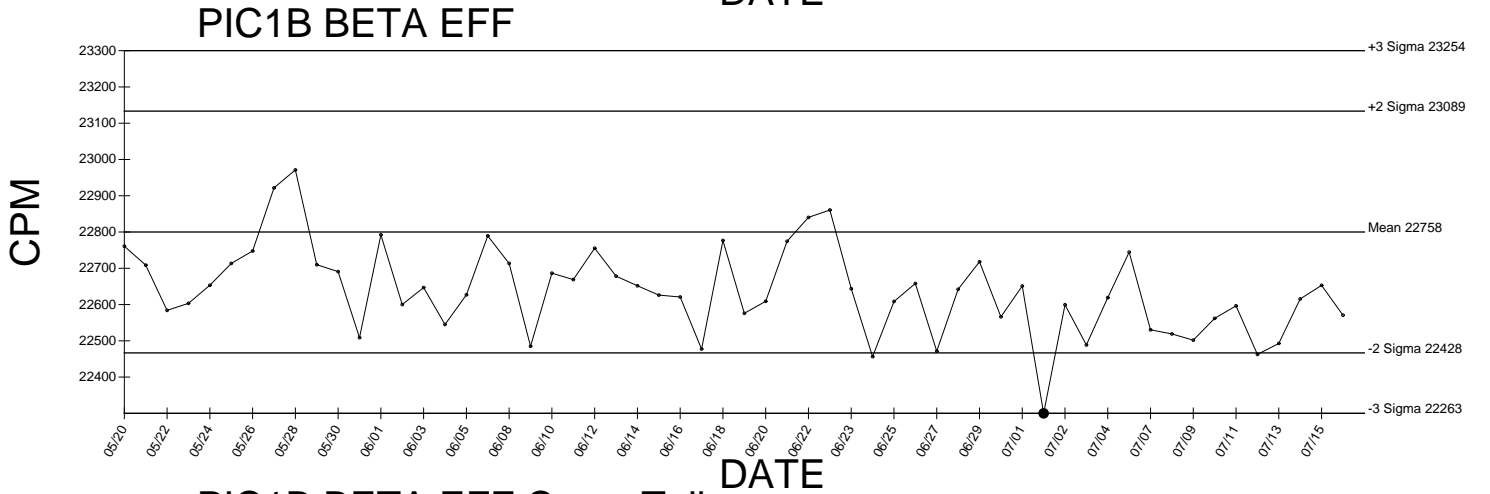
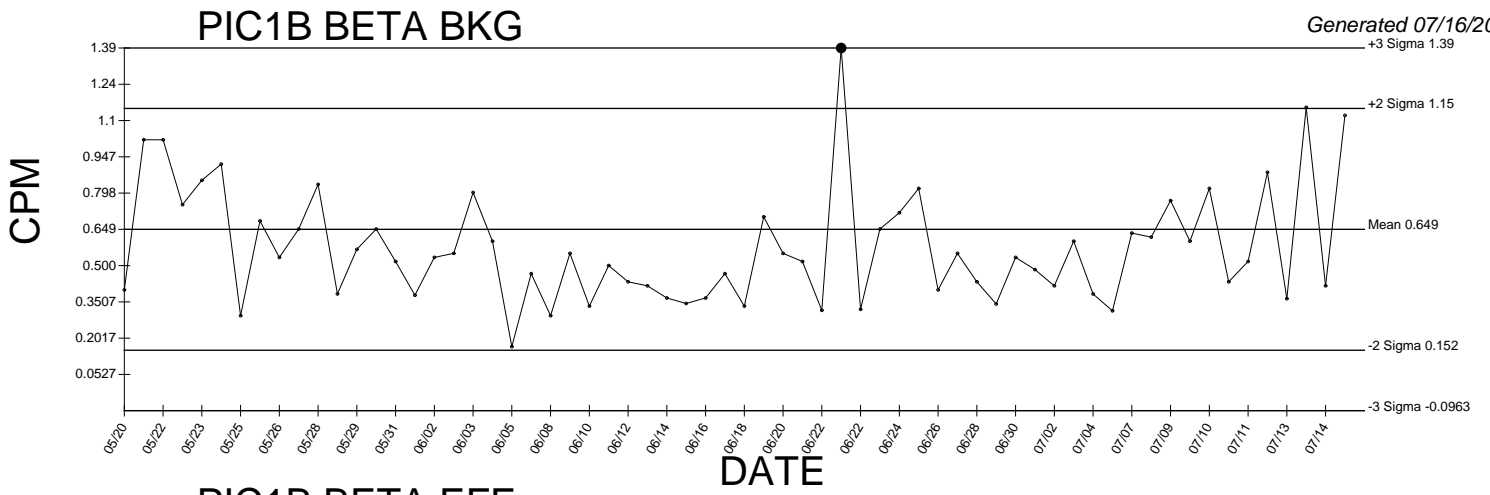
● Denotes Outlier



● Denotes Outlier



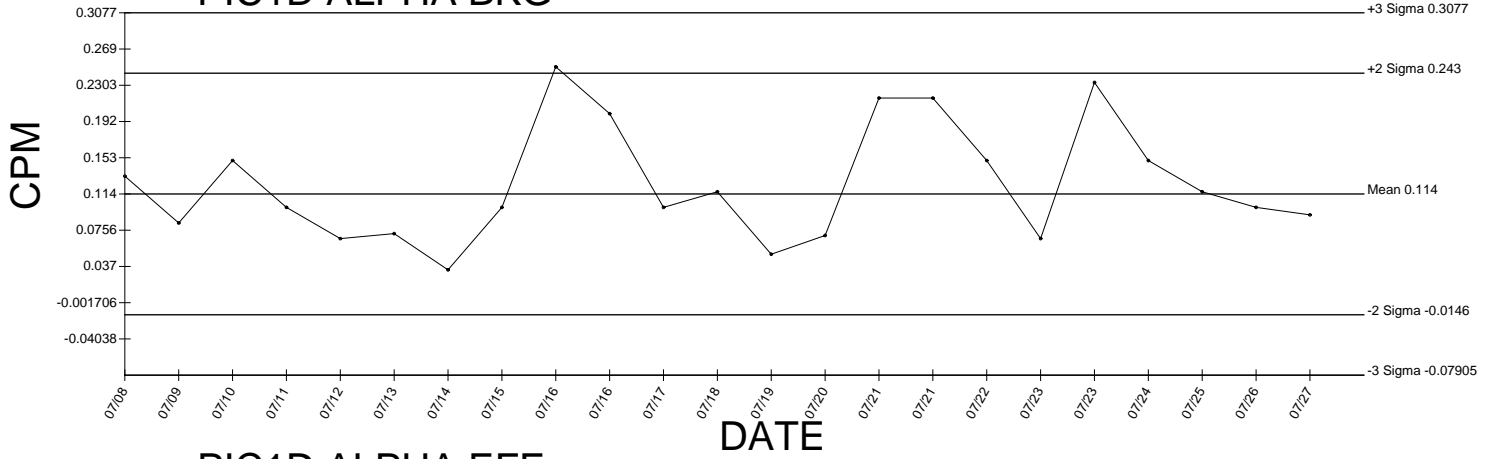
● Denotes Outlier



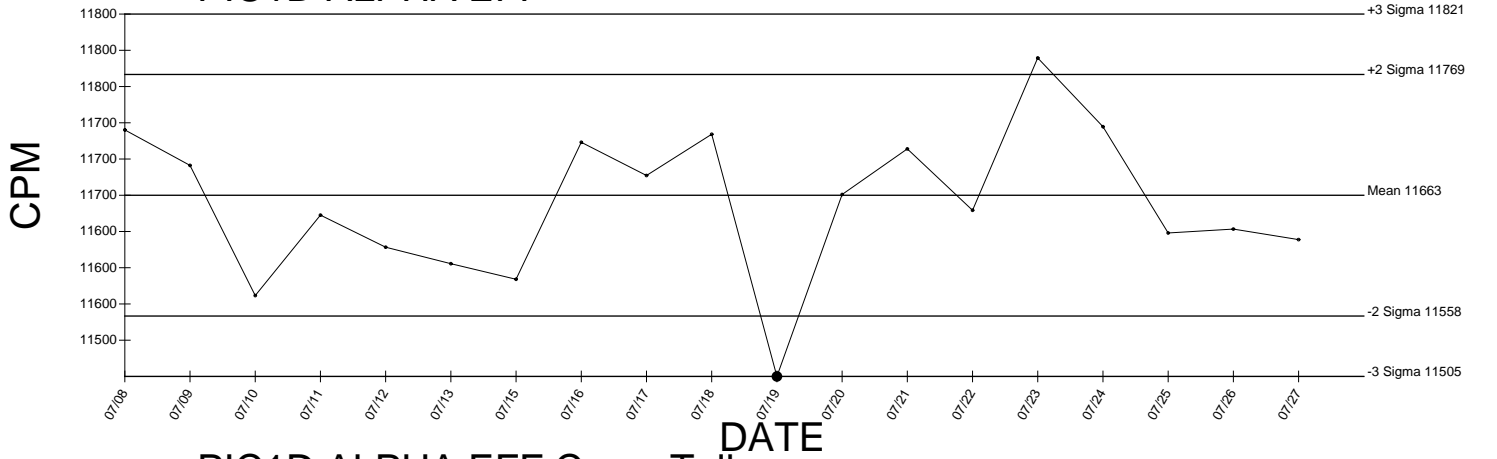
● Denotes Outlier

# PIC1D ALPHA BKG

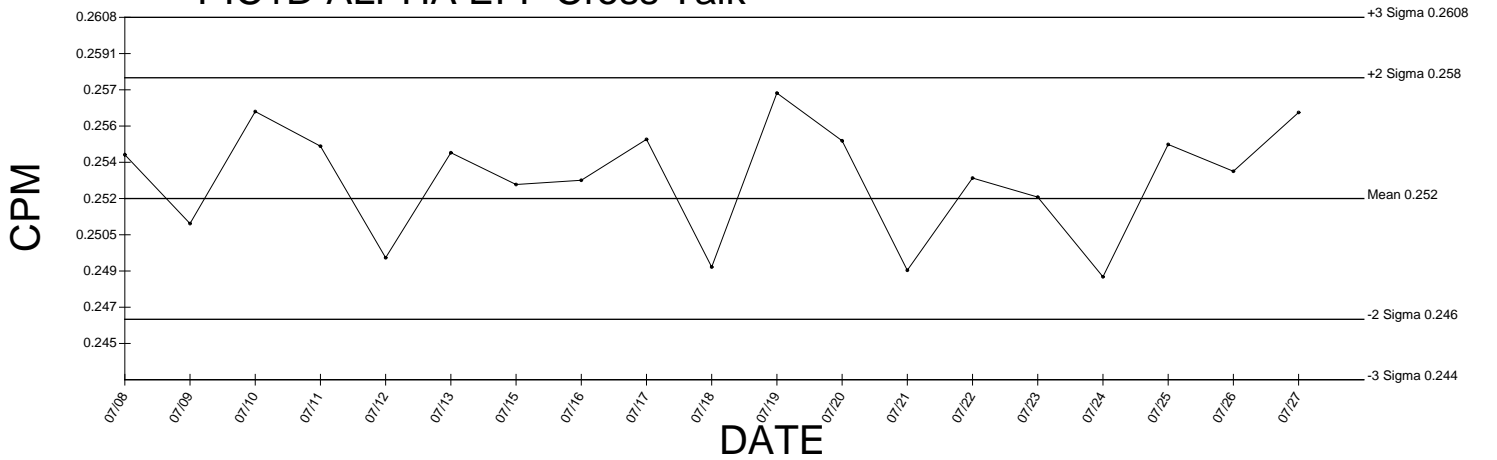
Generated 07/27/2009



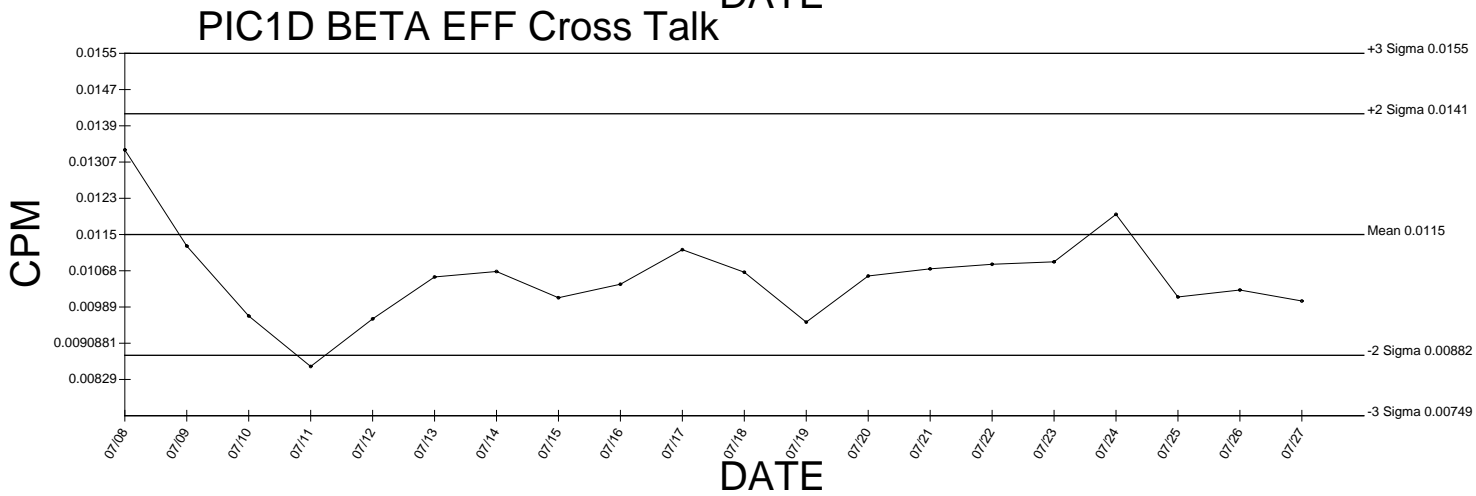
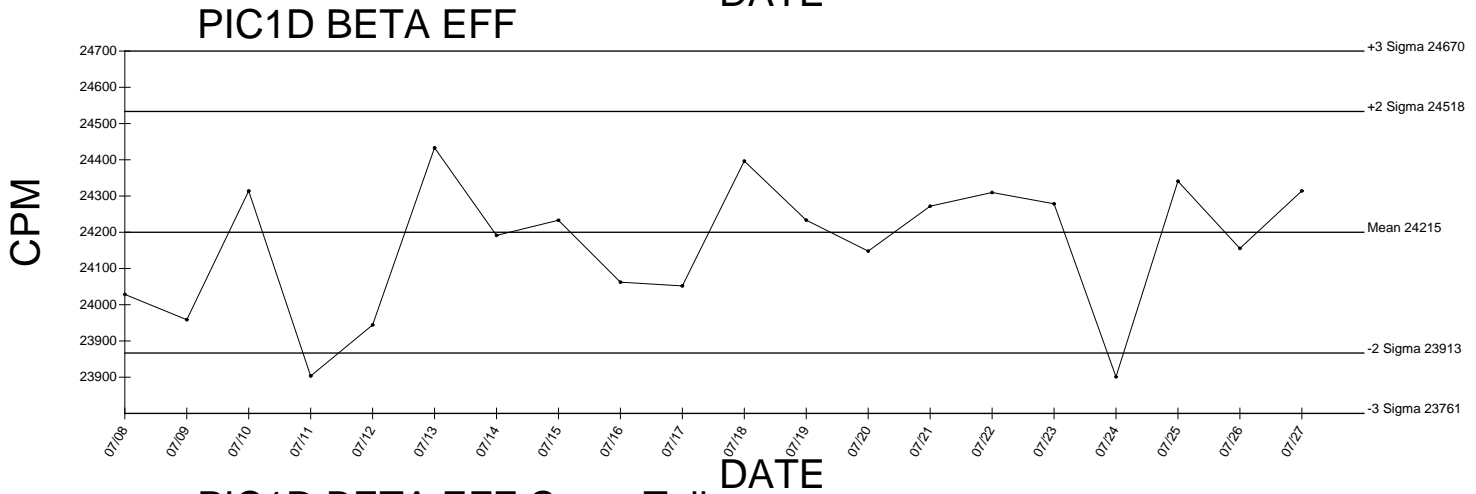
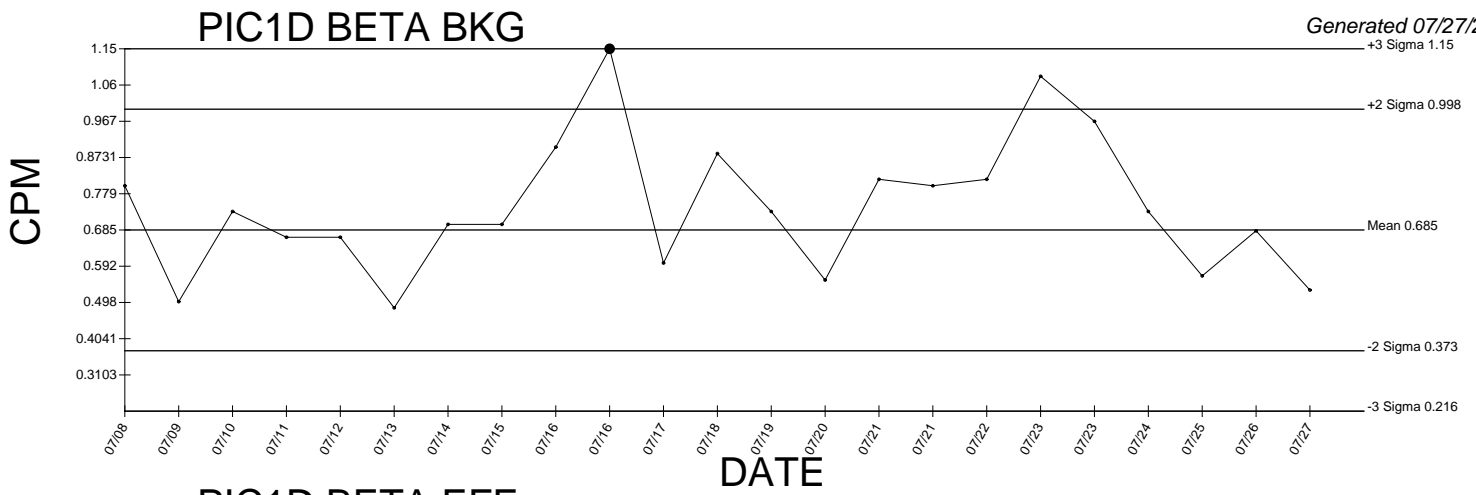
# PIC1D ALPHA EFF



# PIC1D ALPHA EFF Cross Talk

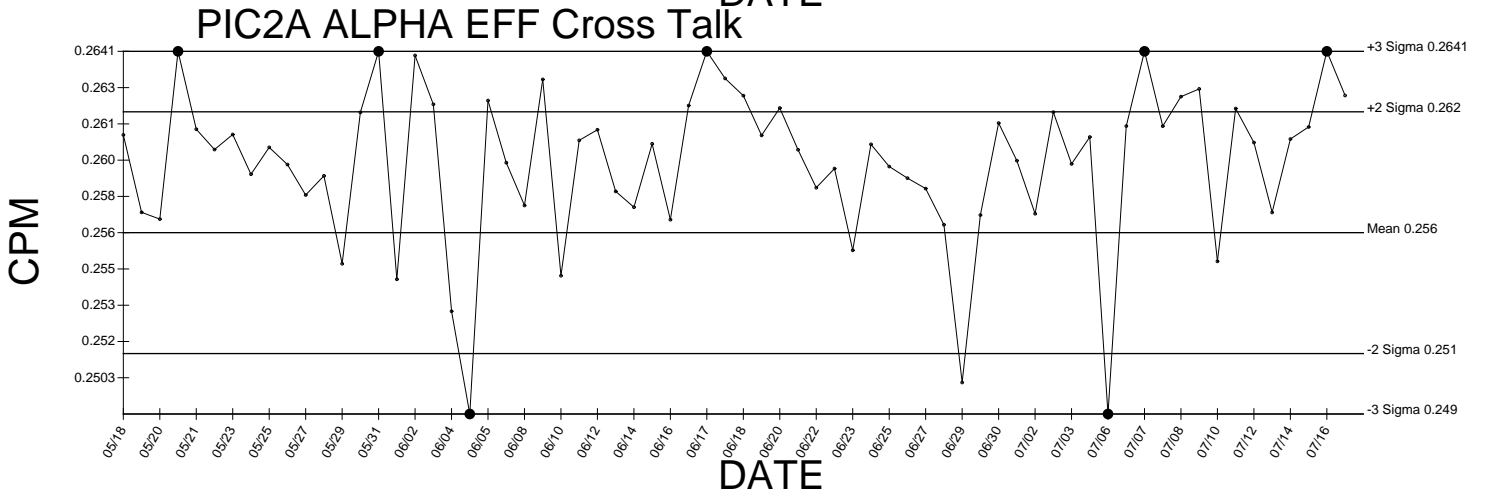
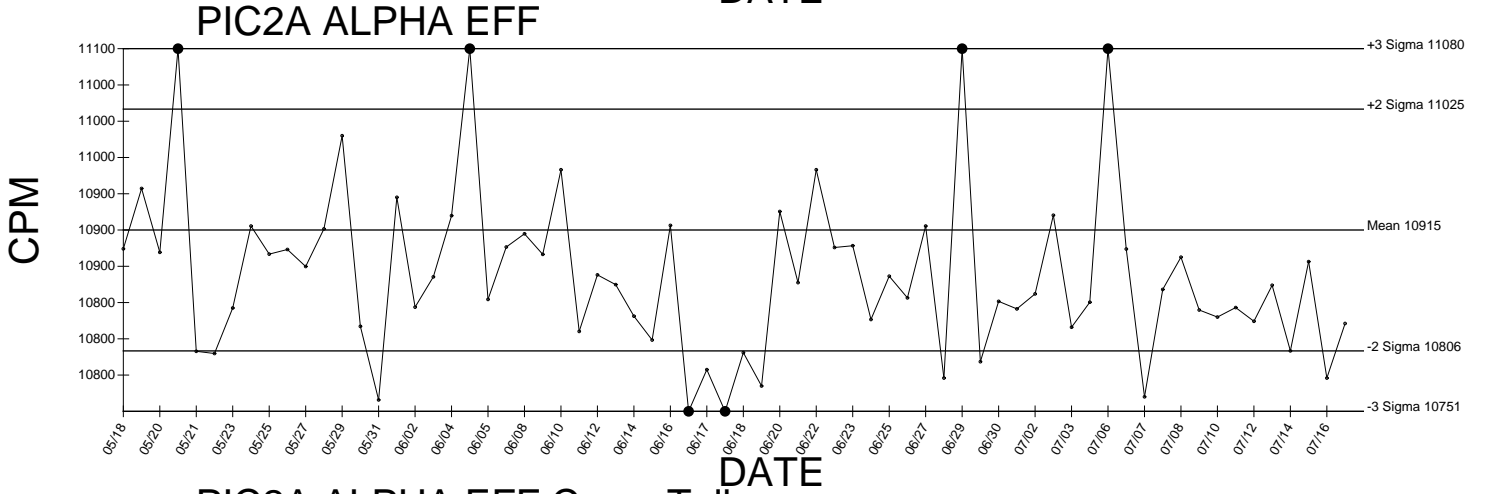
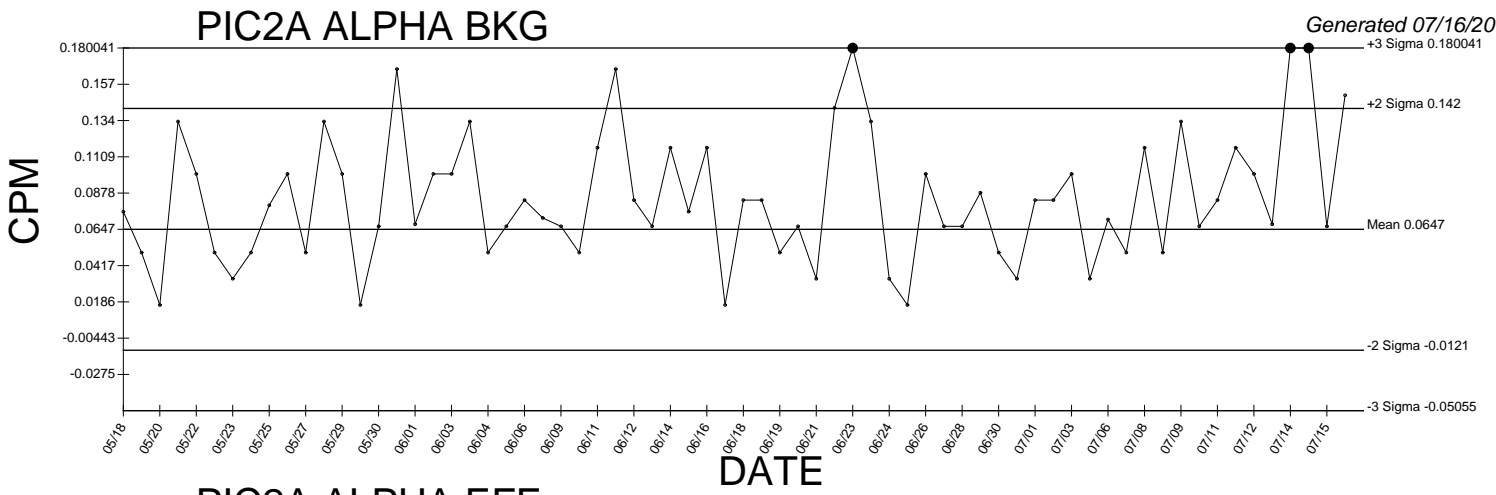


● Denotes Outlier

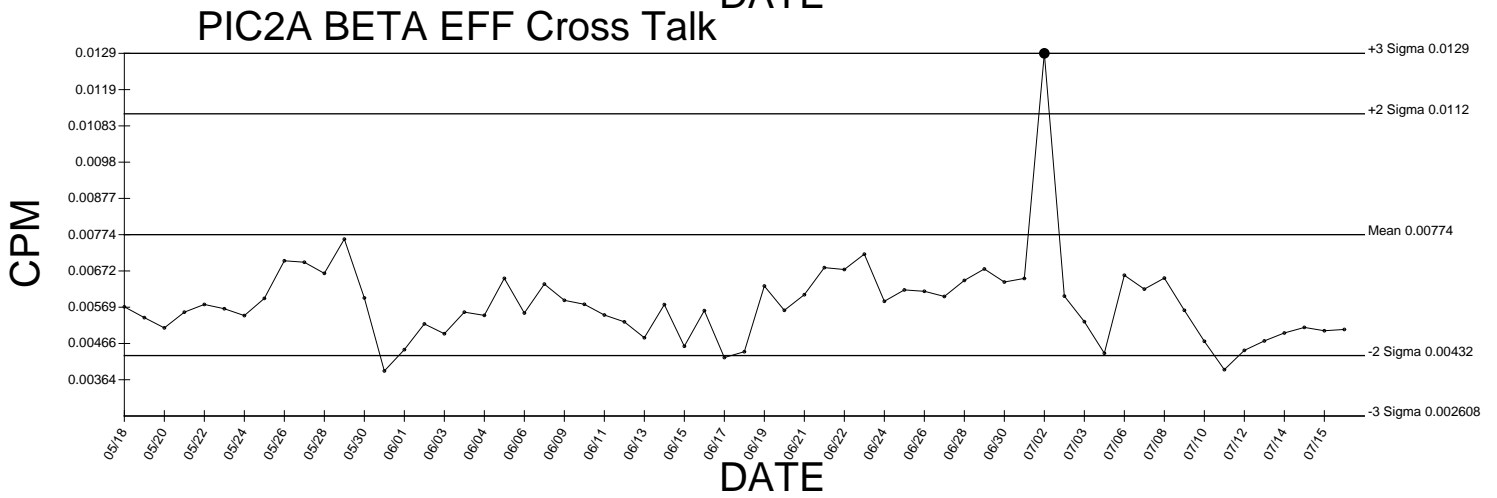
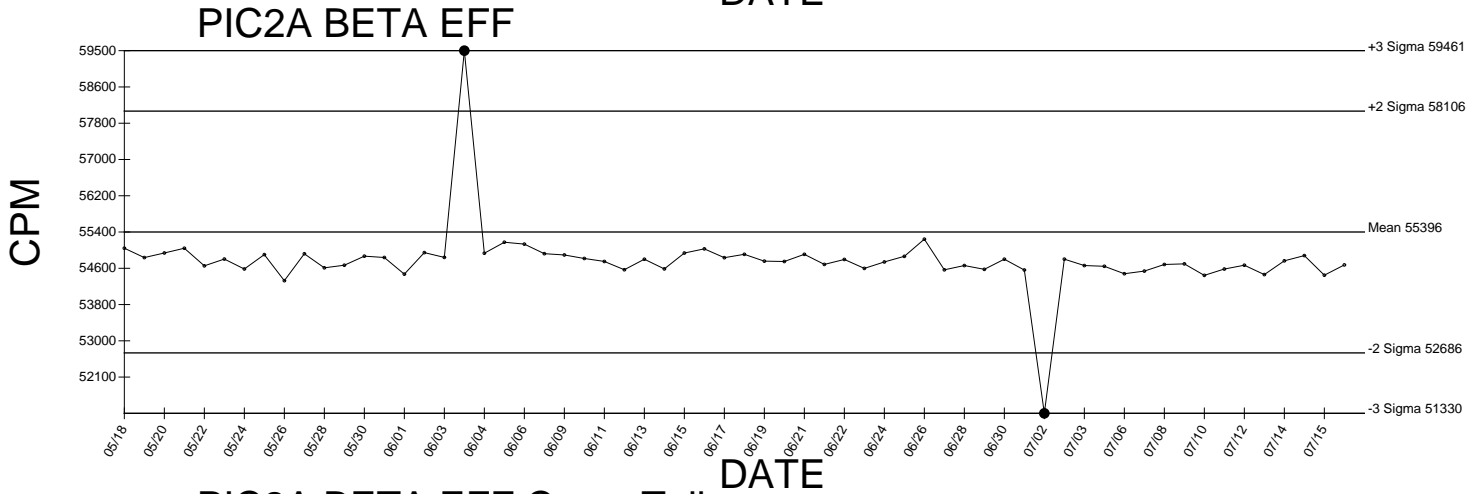
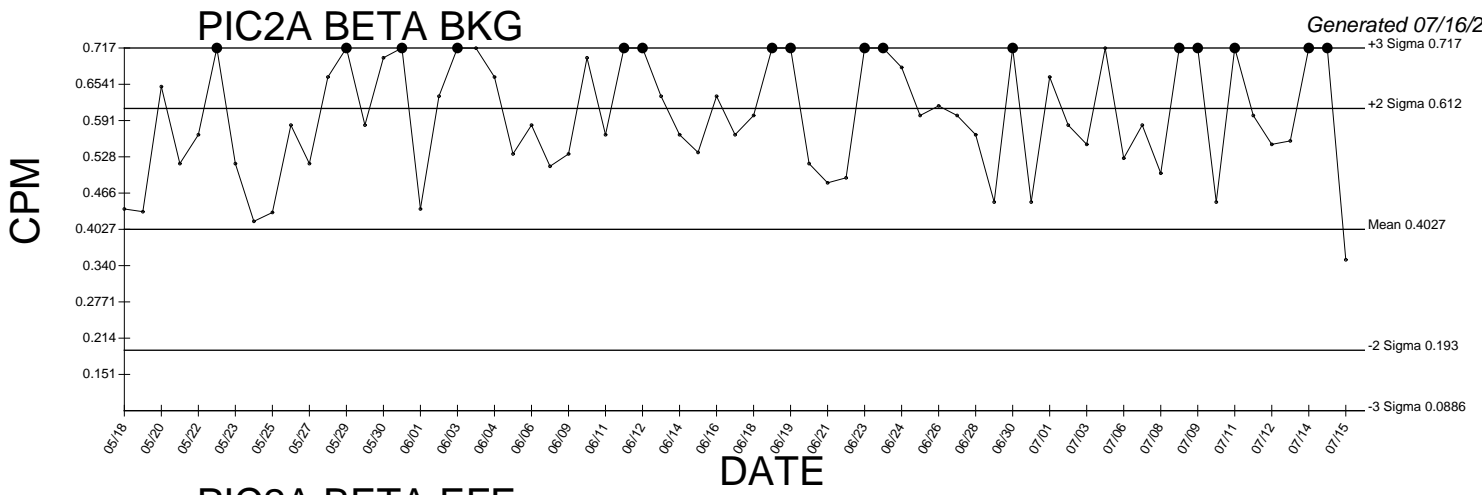


● Denotes Outlier

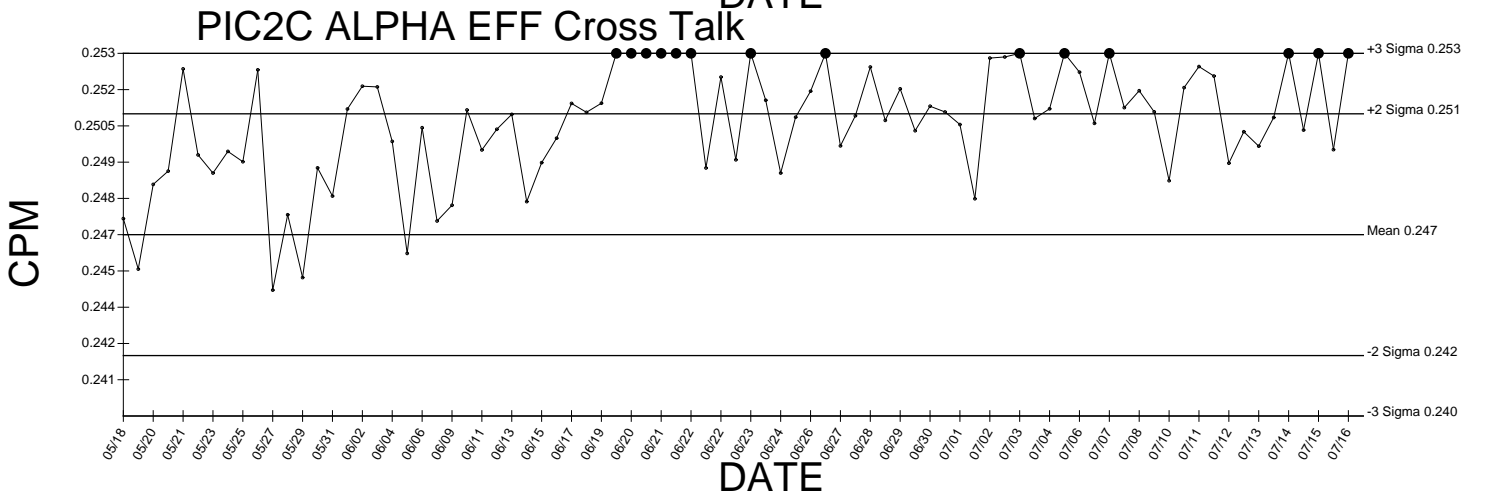
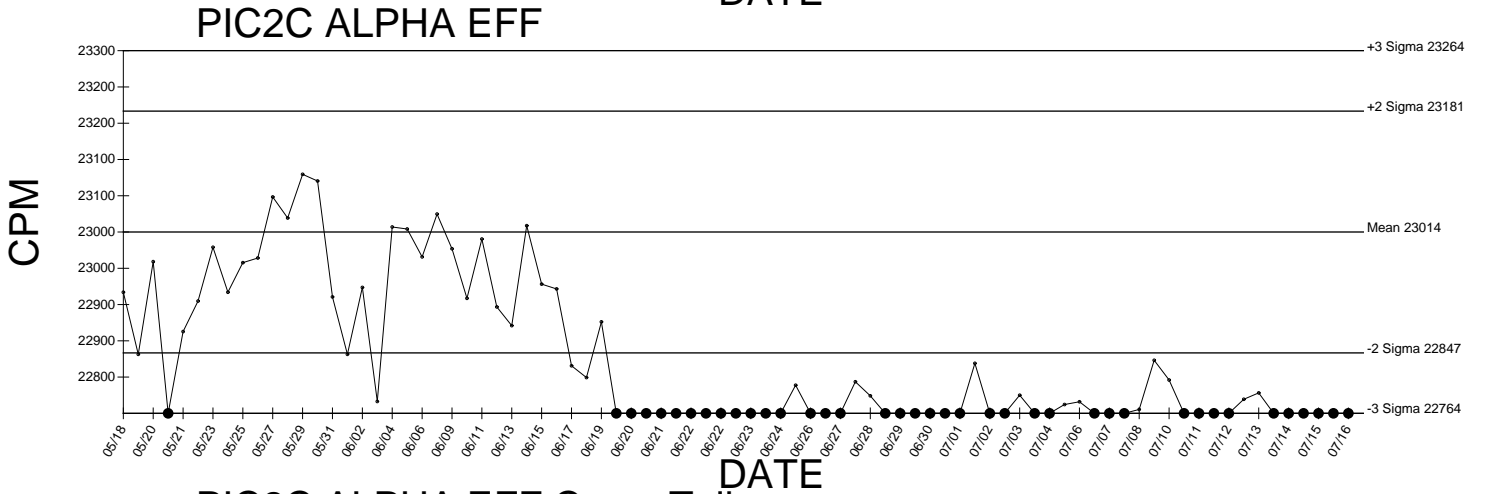
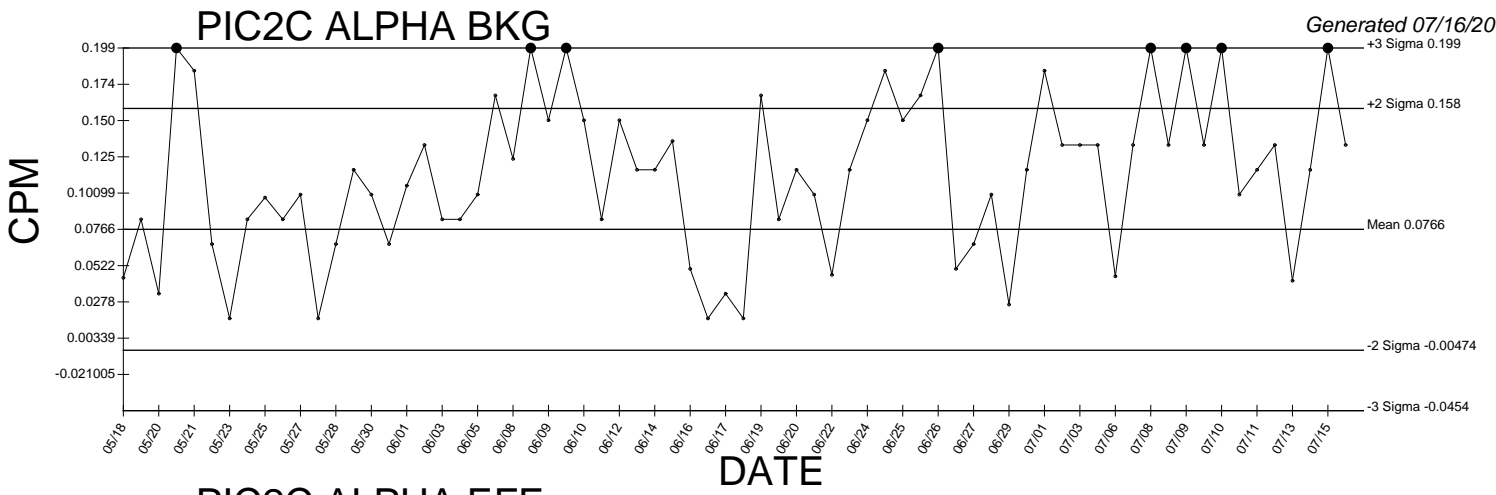




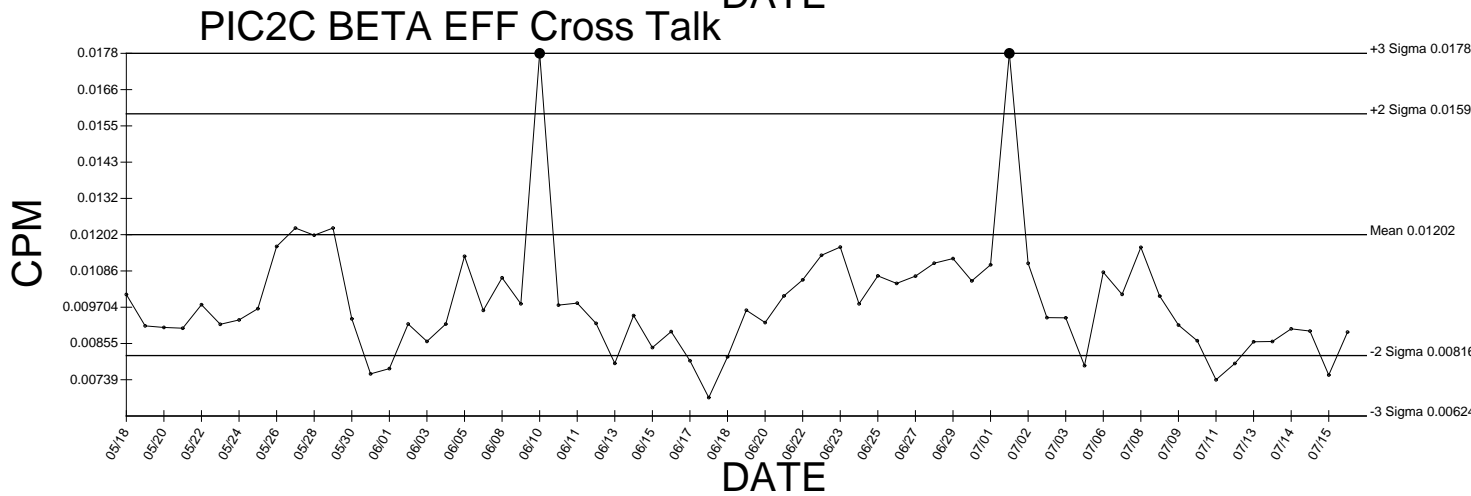
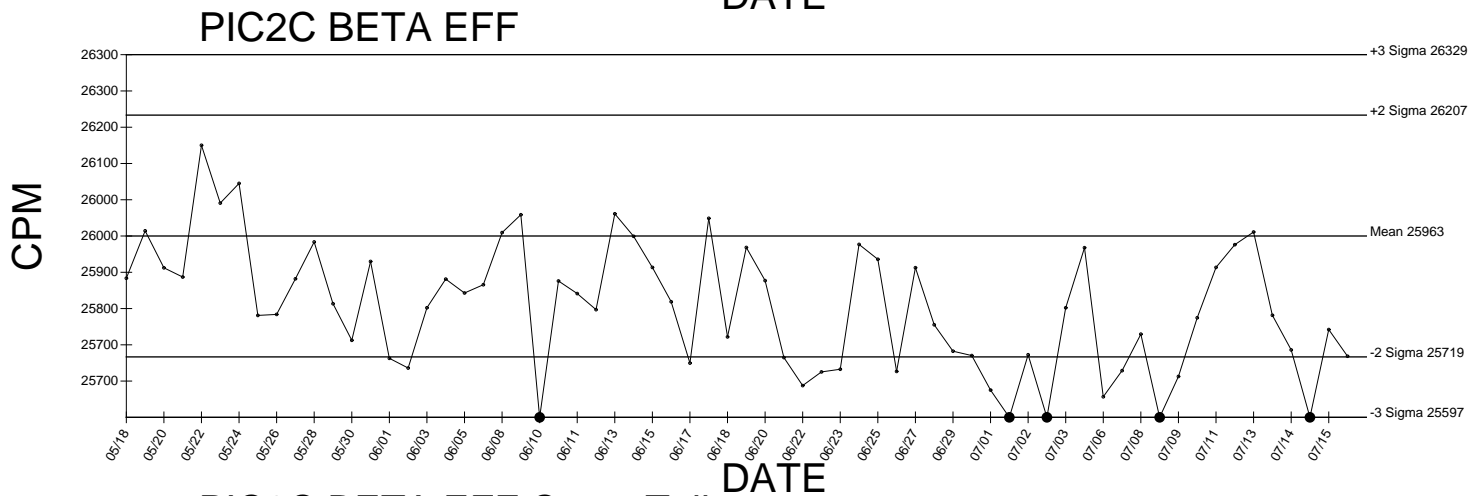
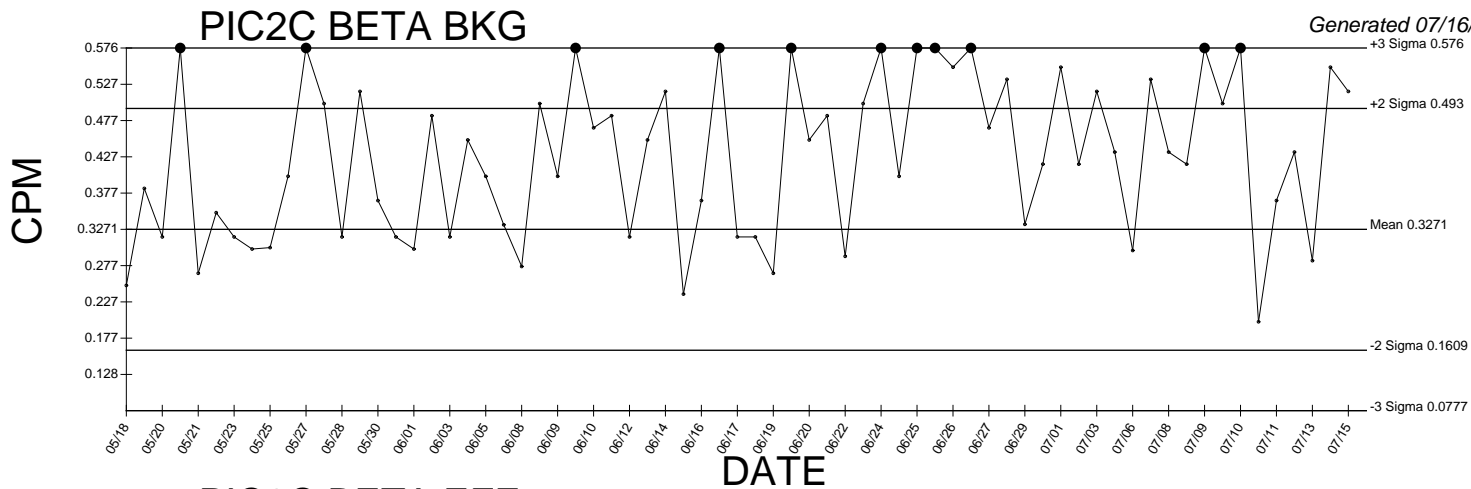
● Denotes Outlier



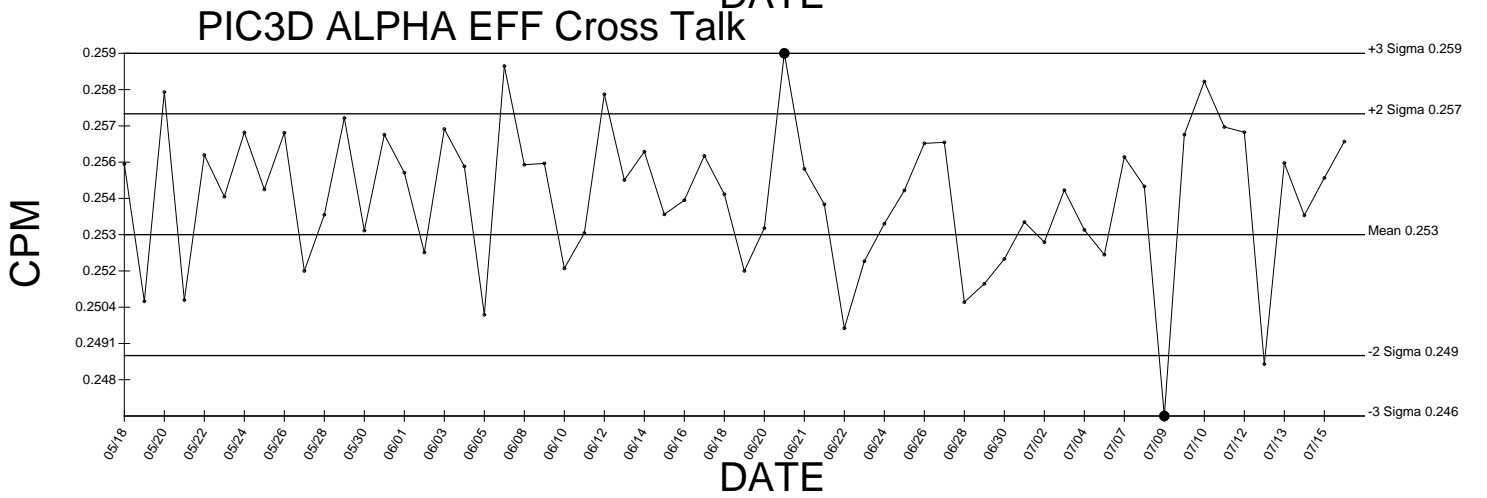
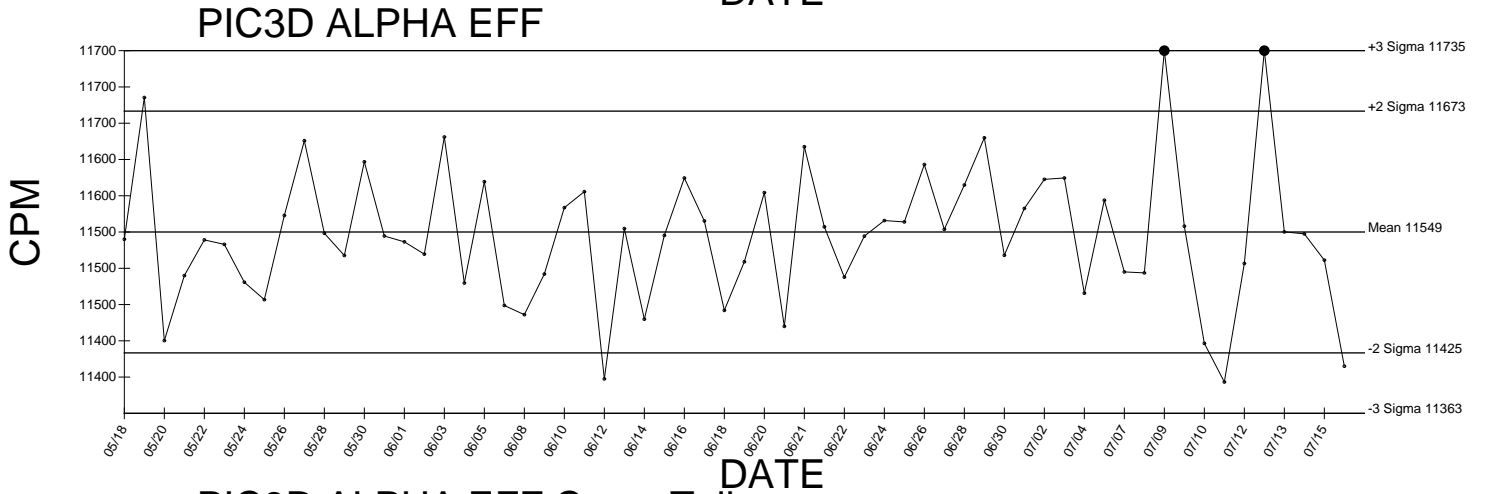
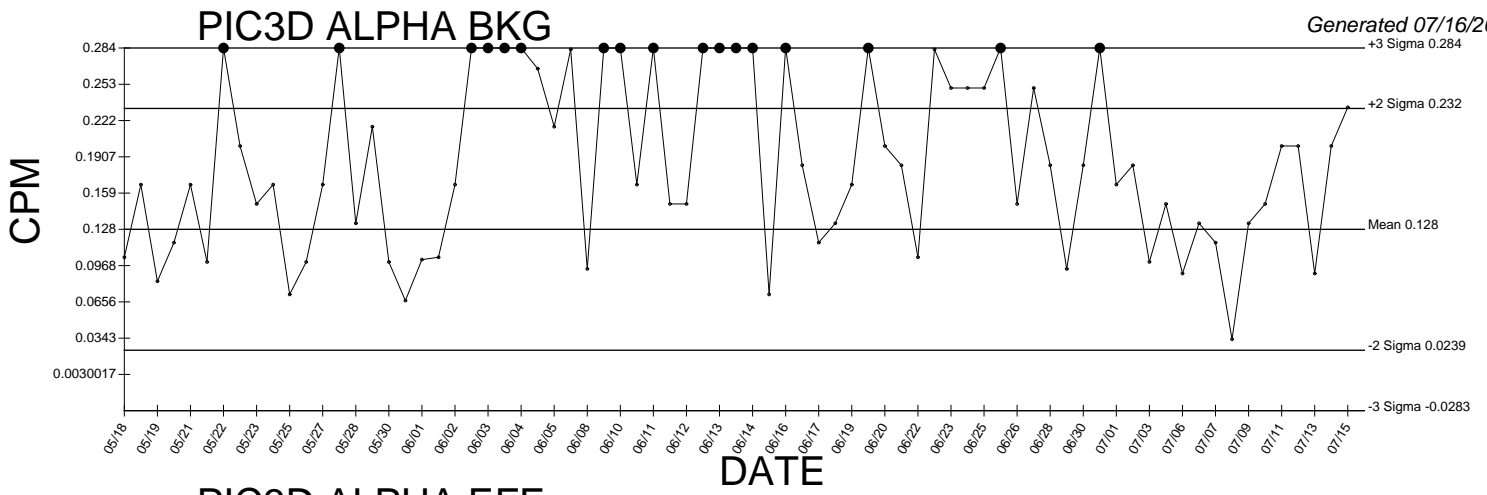
● Denotes Outlier



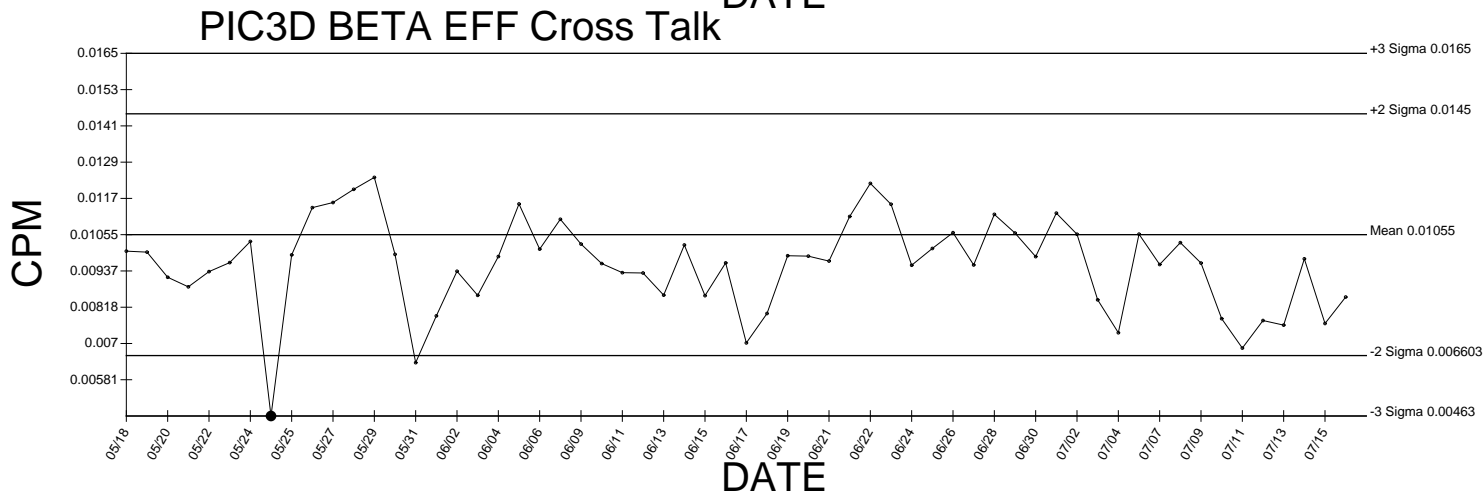
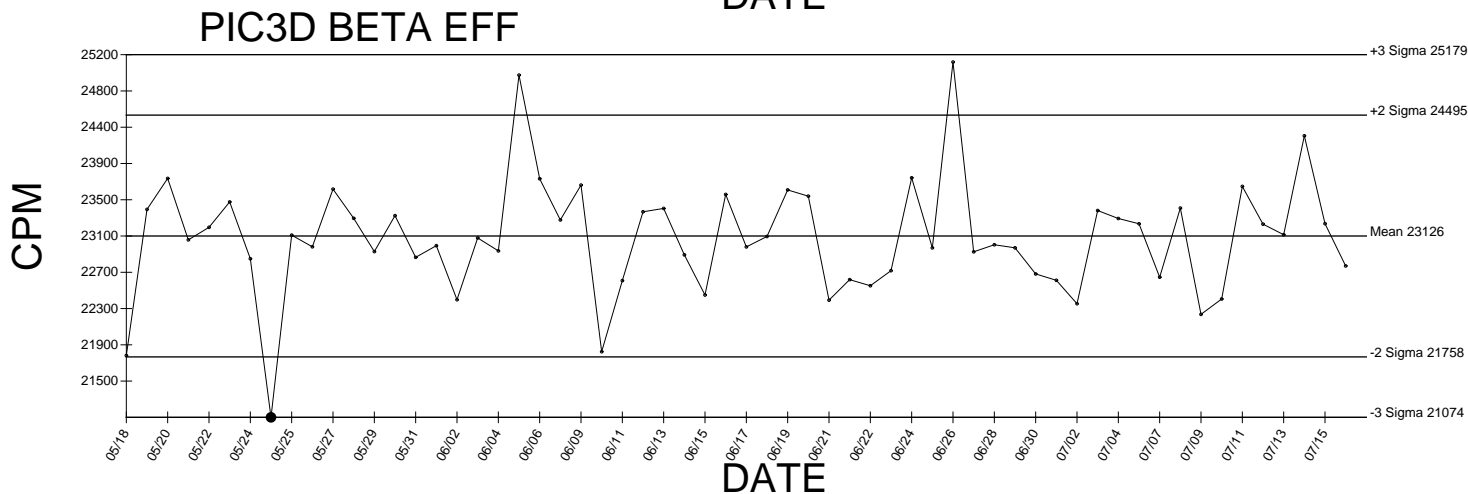
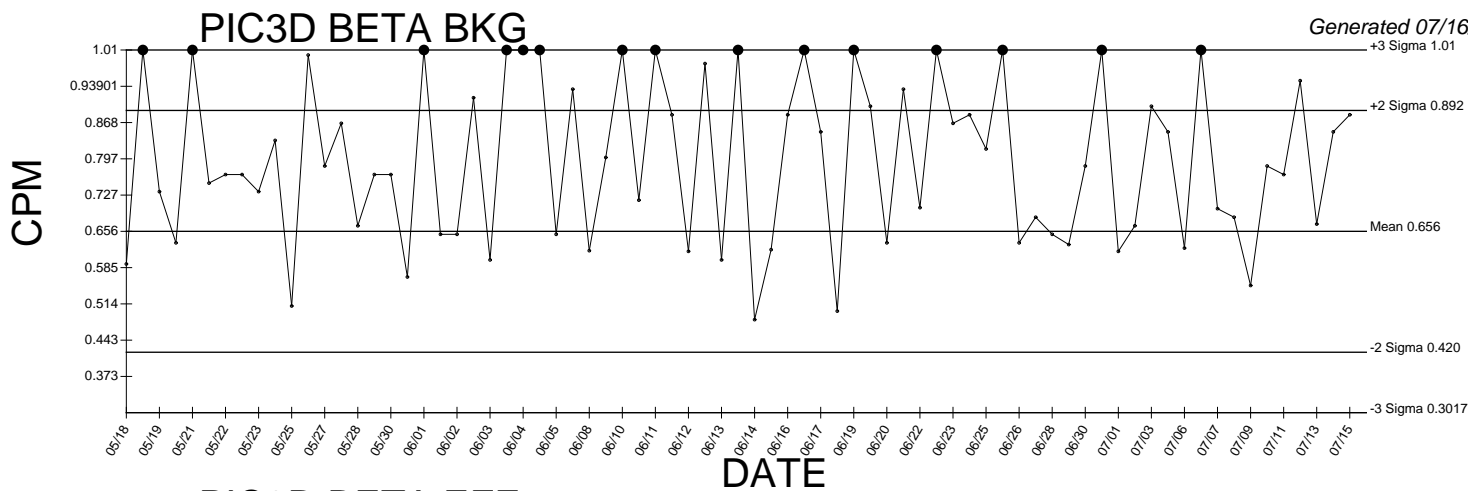
● Denotes Outlier



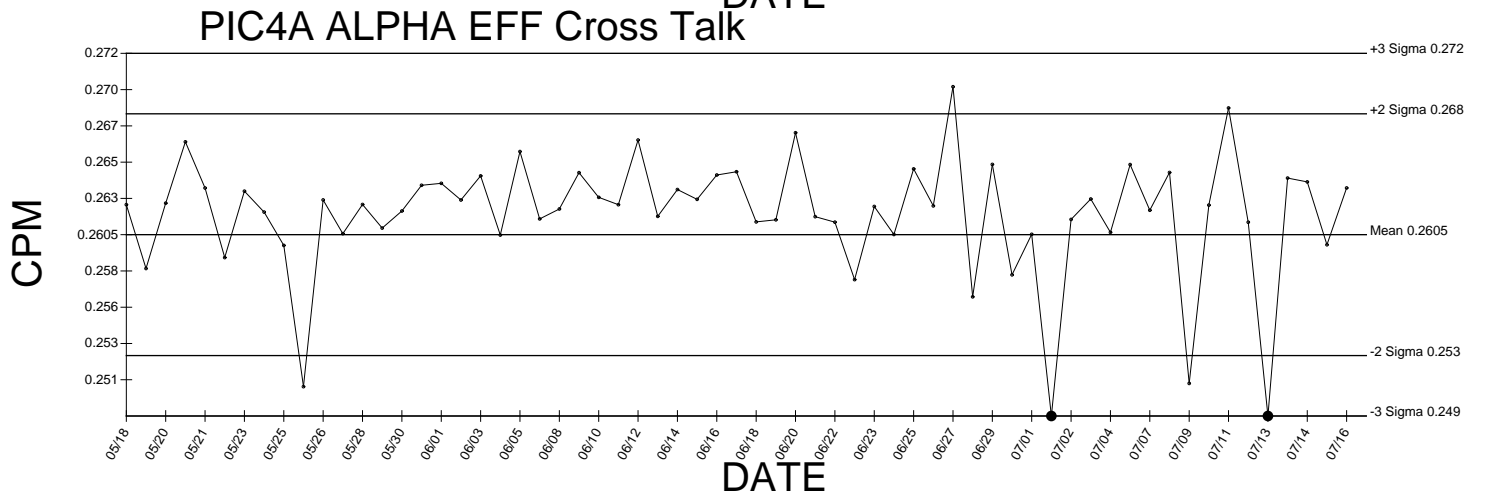
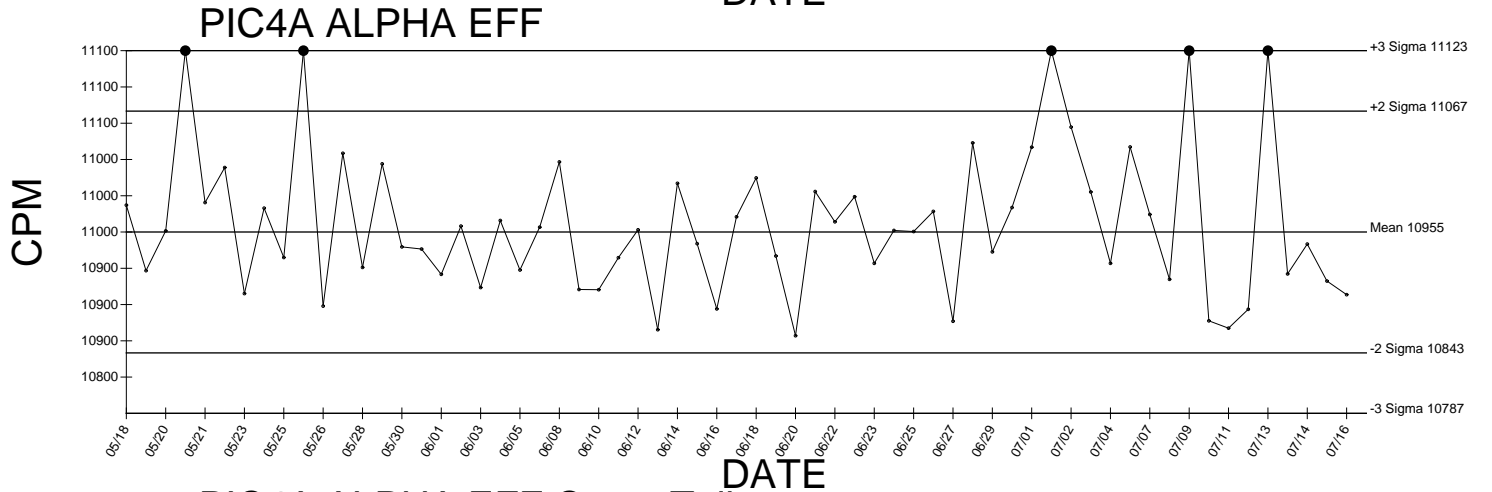
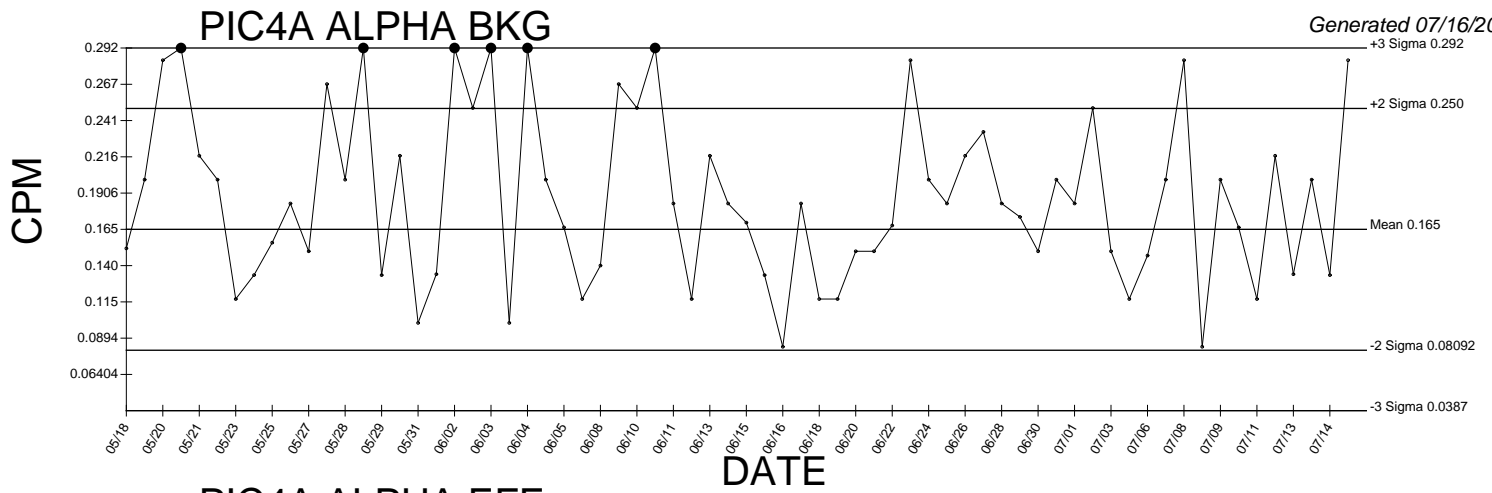
● Denotes Outlier



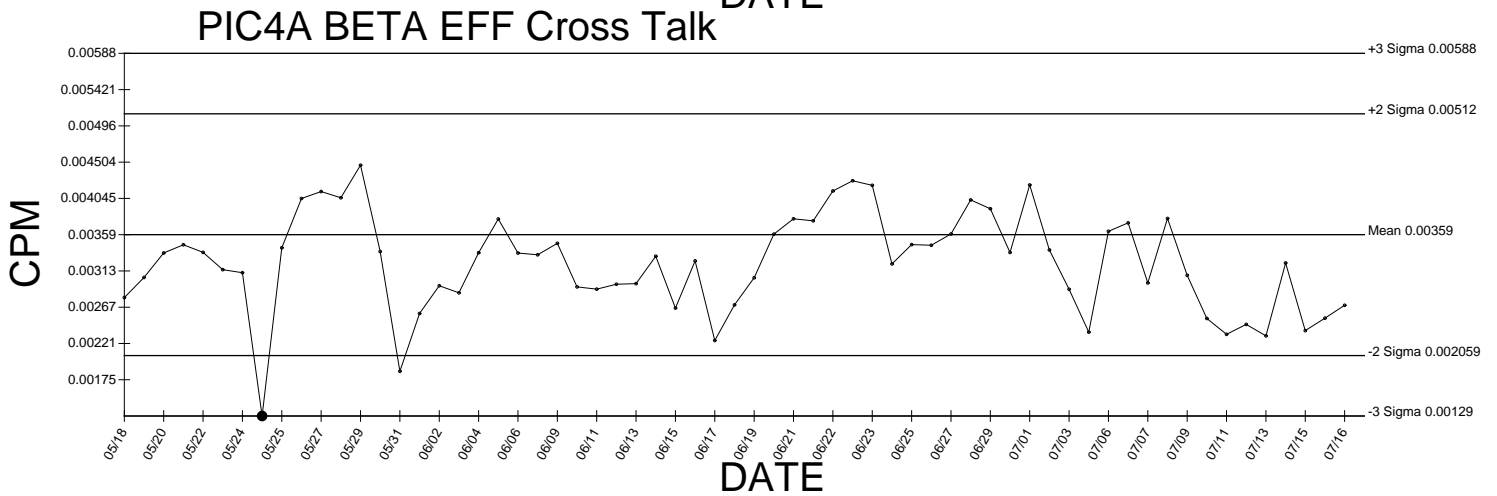
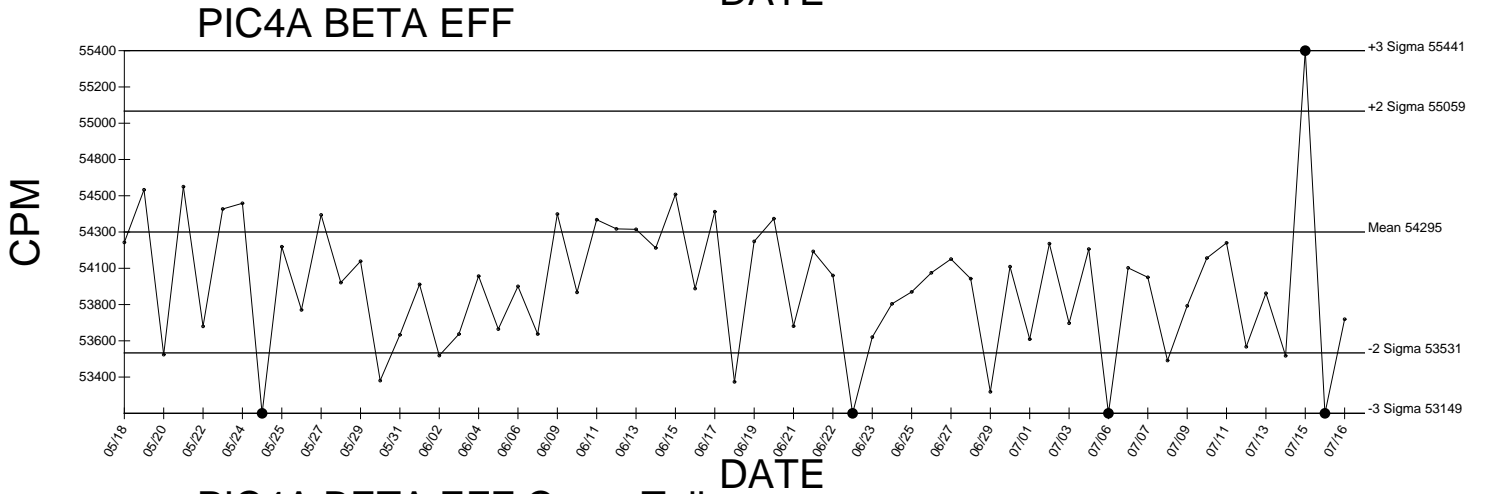
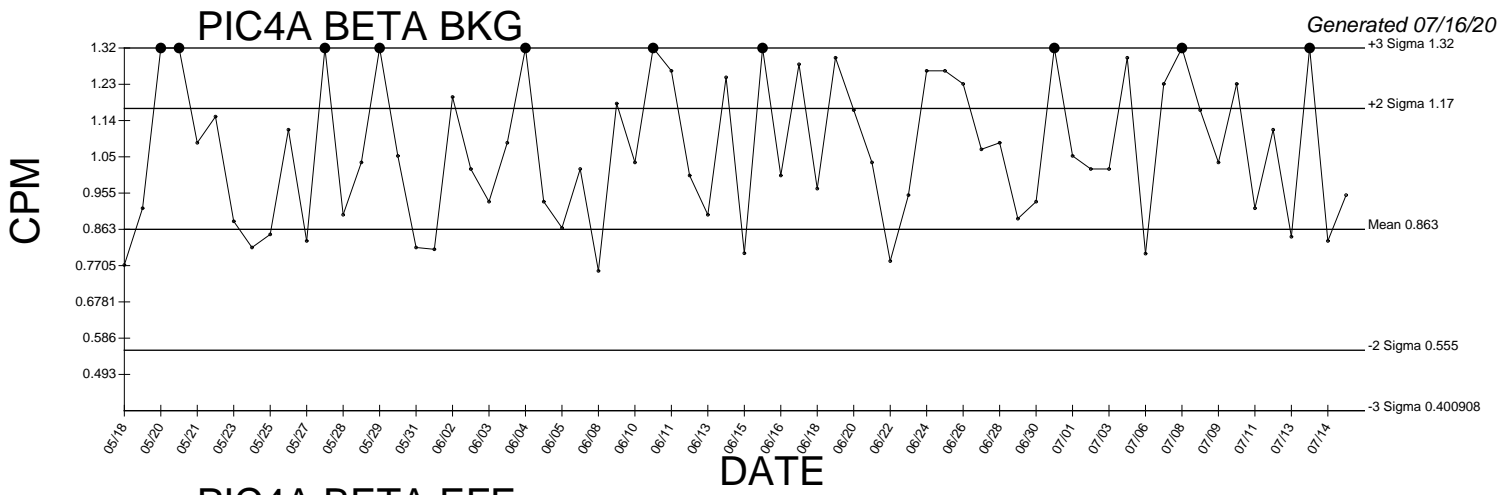
● Denotes Outlier



● Denotes Outlier

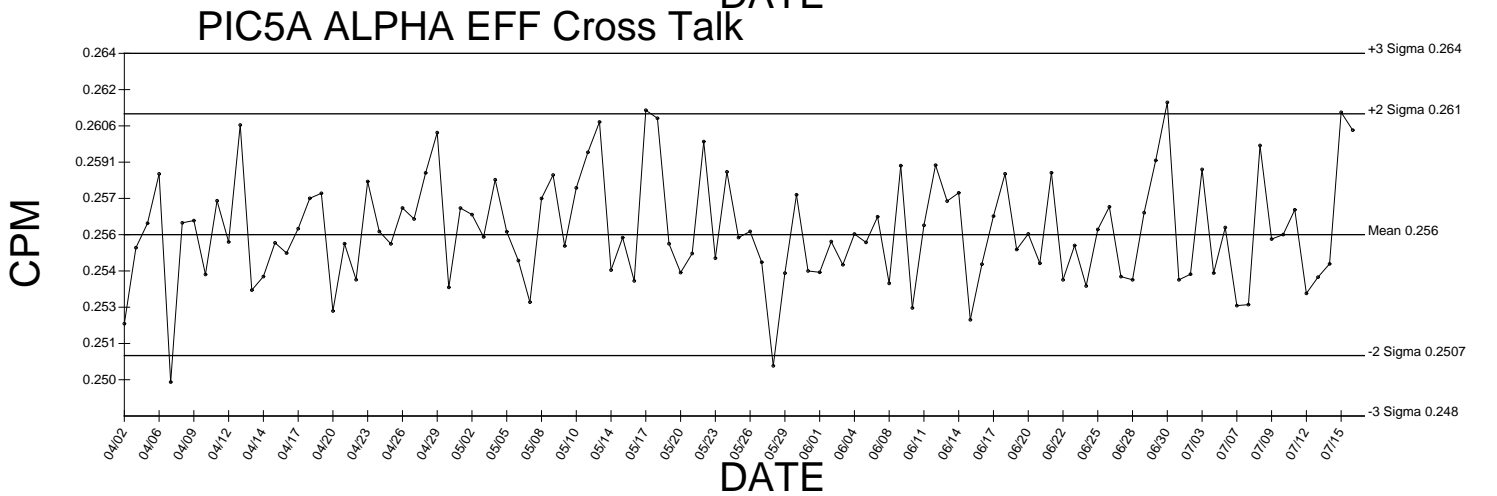
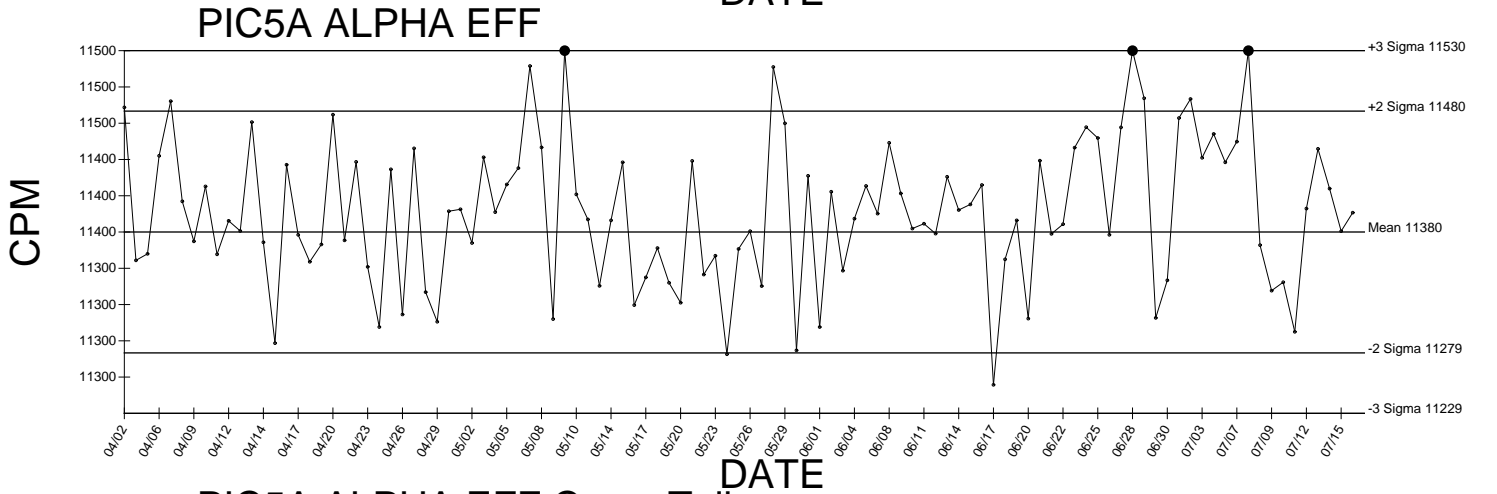
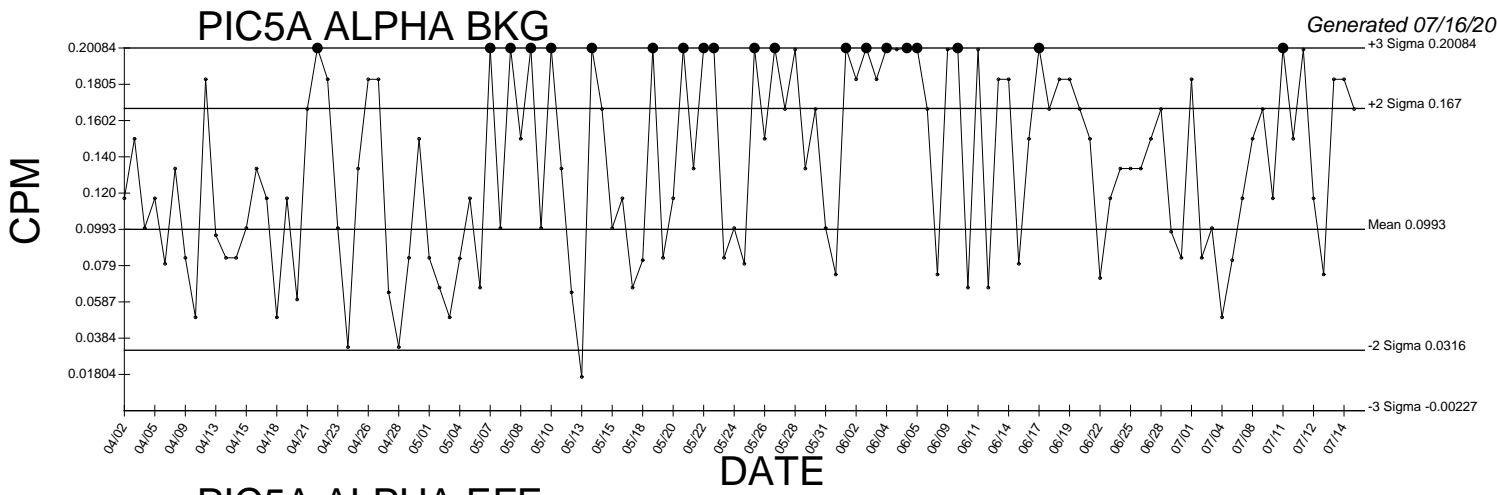


● Denotes Outlier

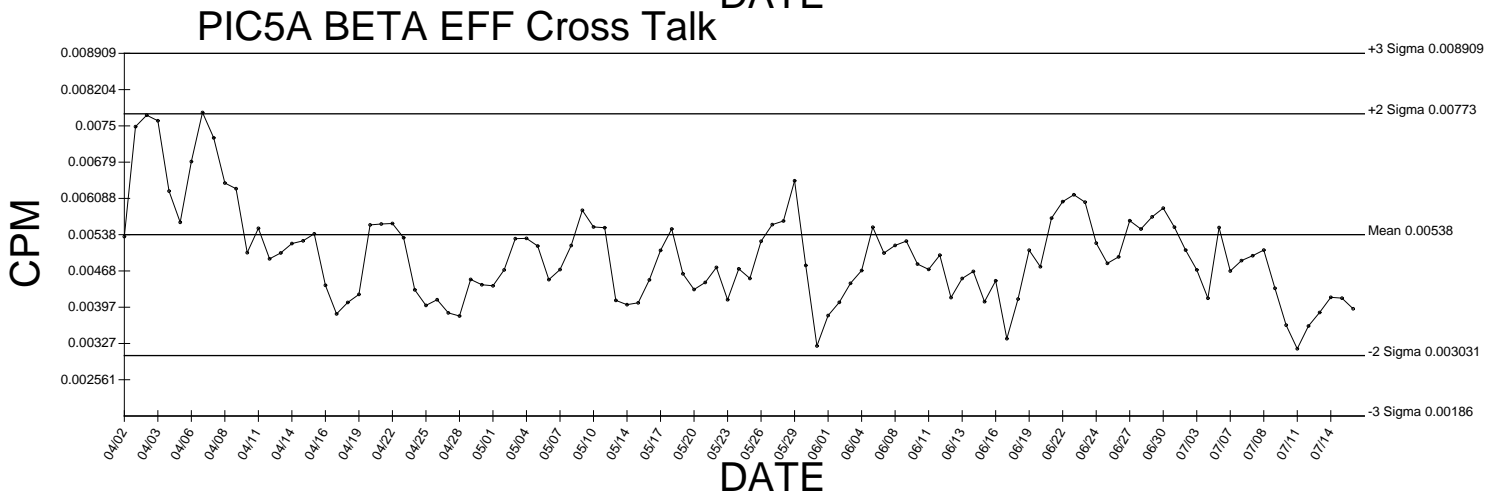
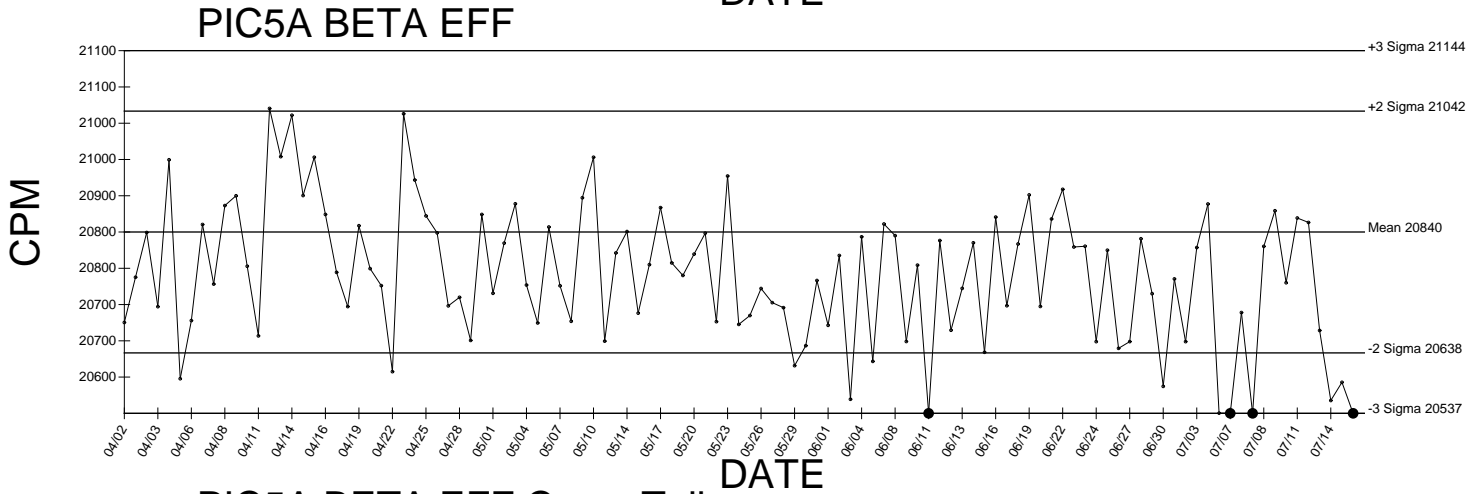
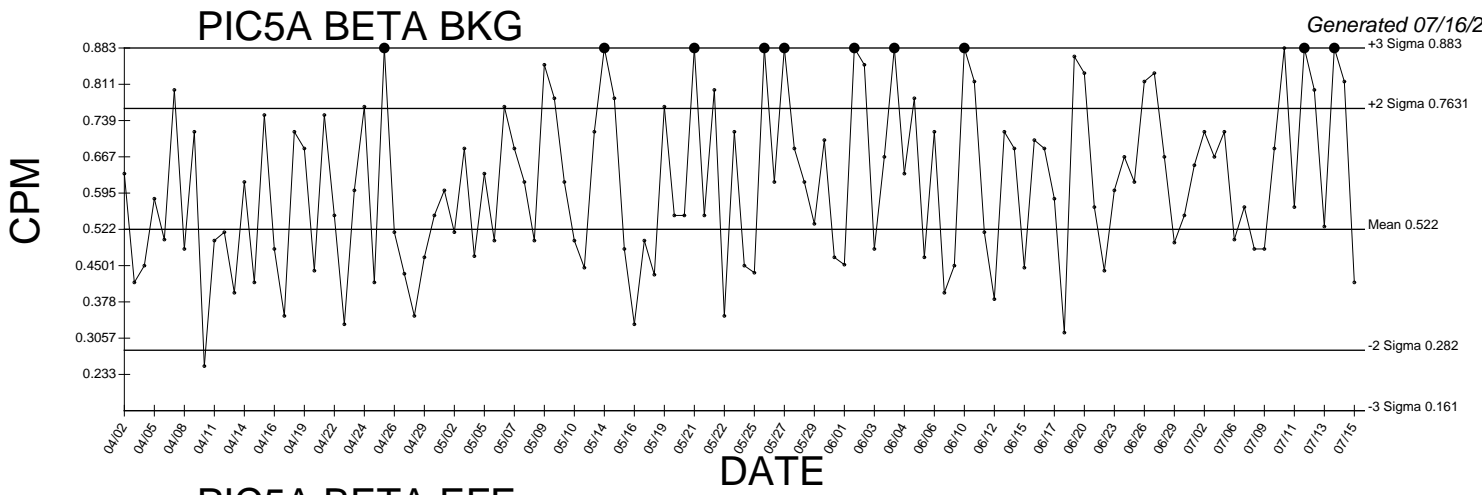


● Denotes Outlier

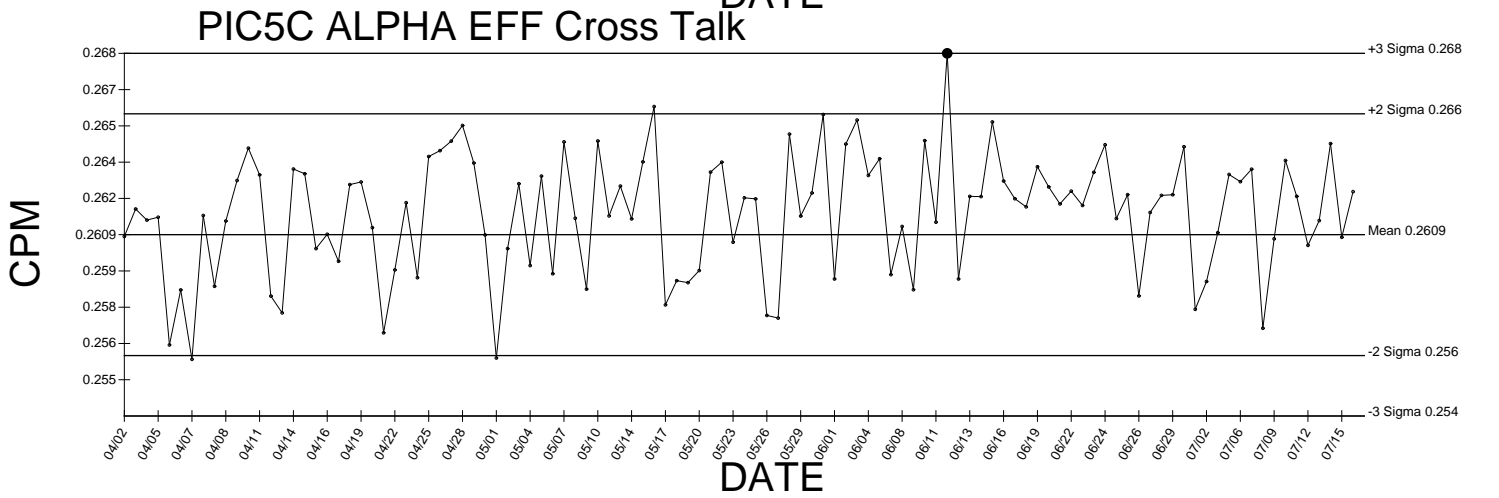
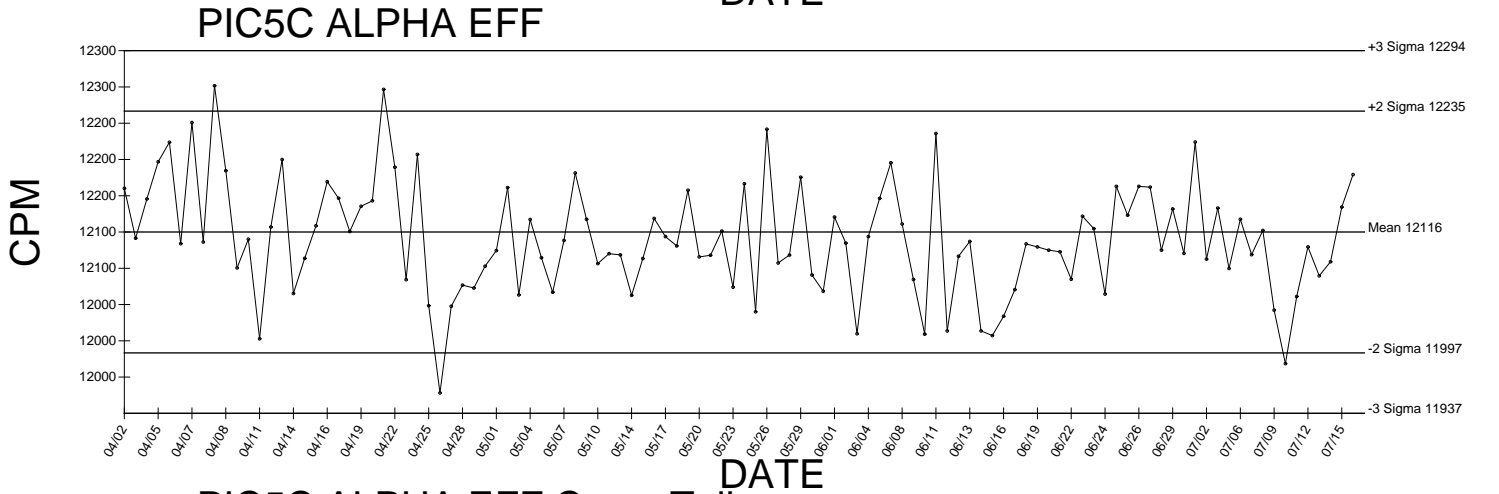
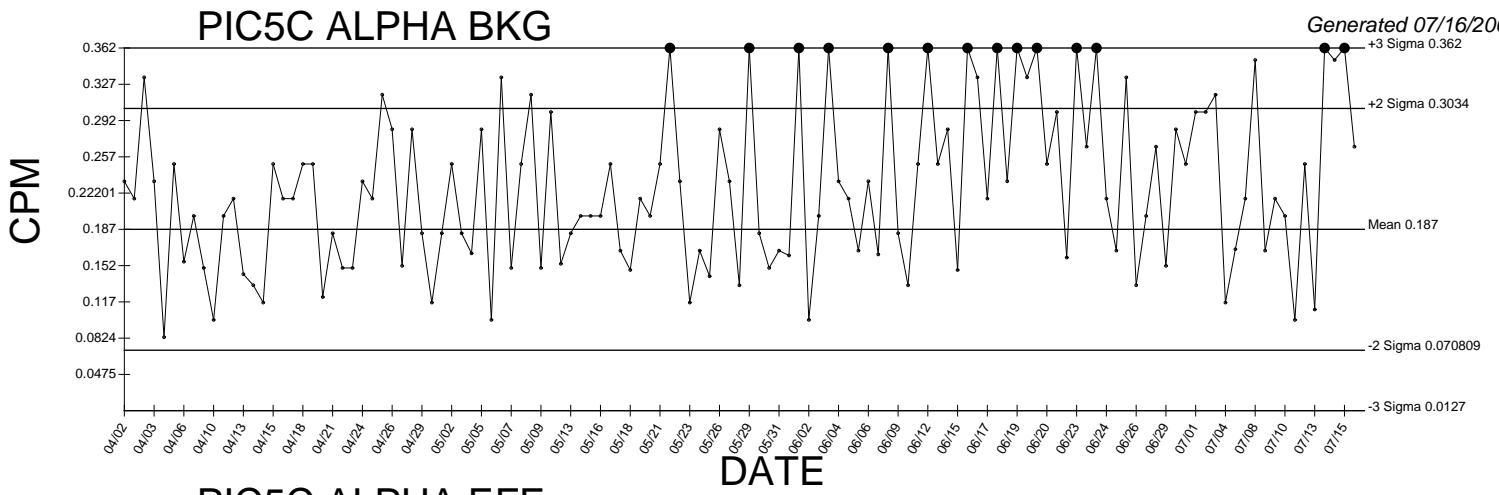




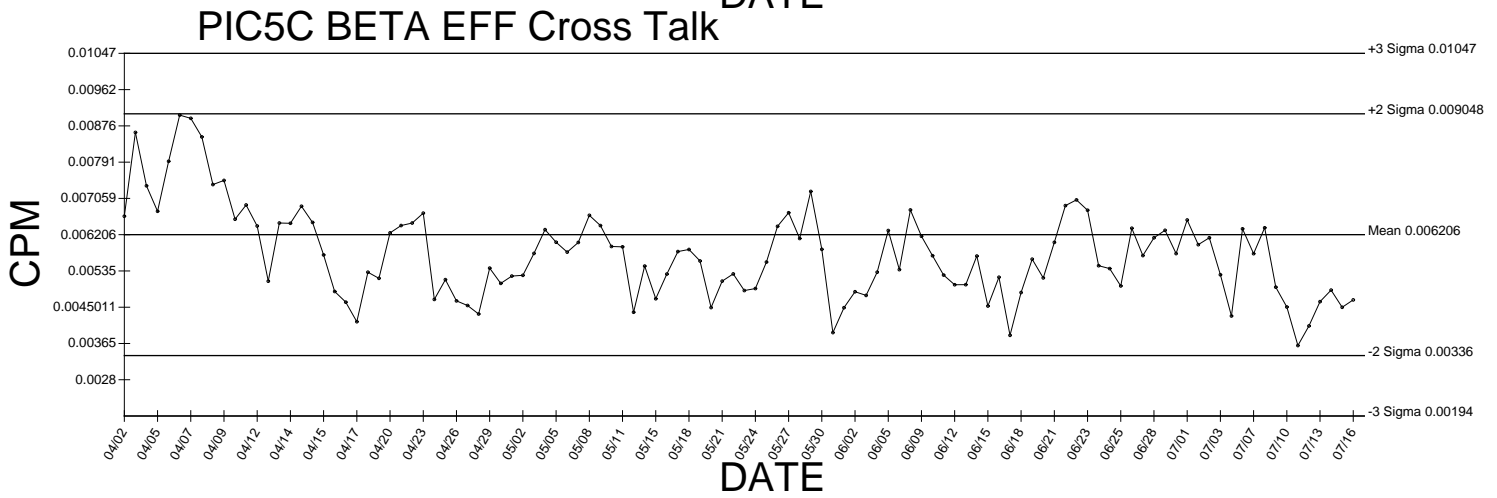
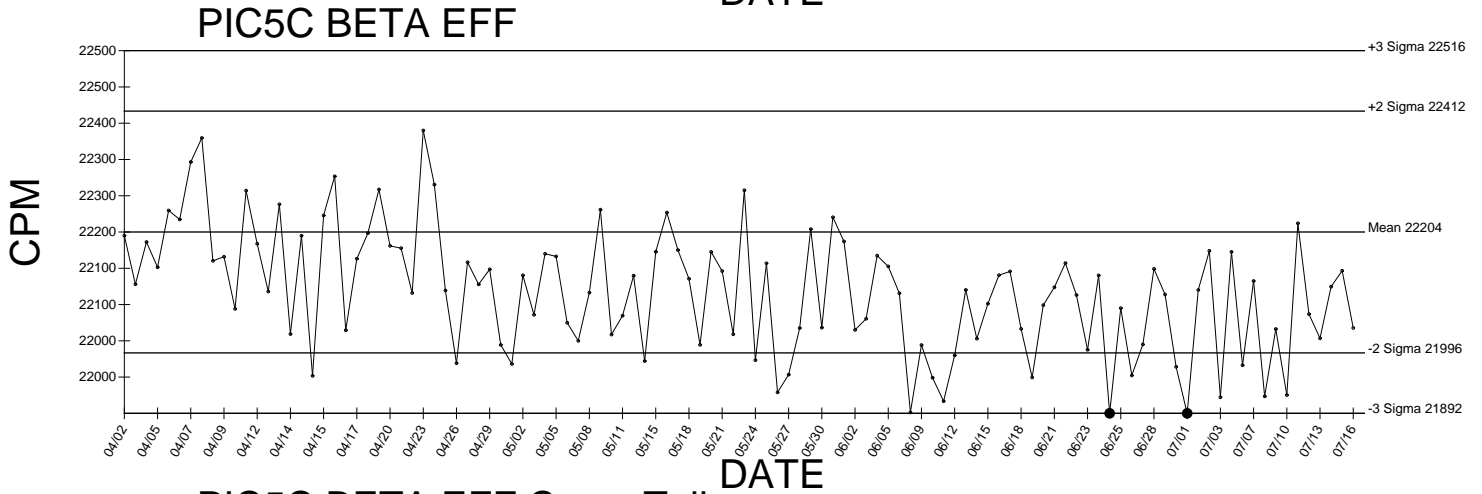
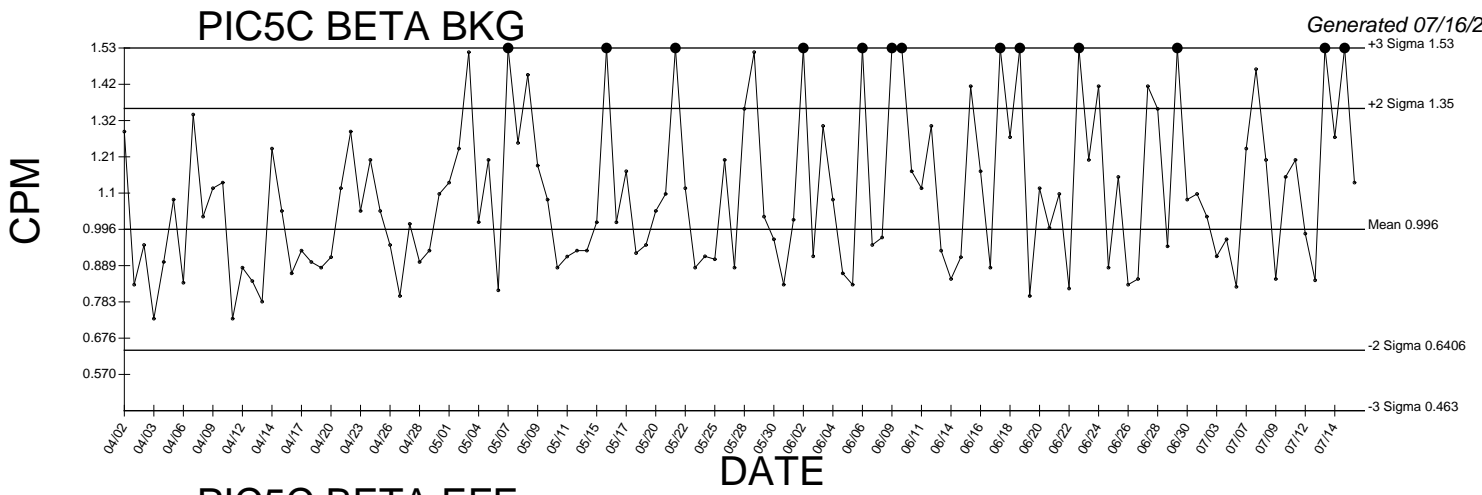
● Denotes Outlier



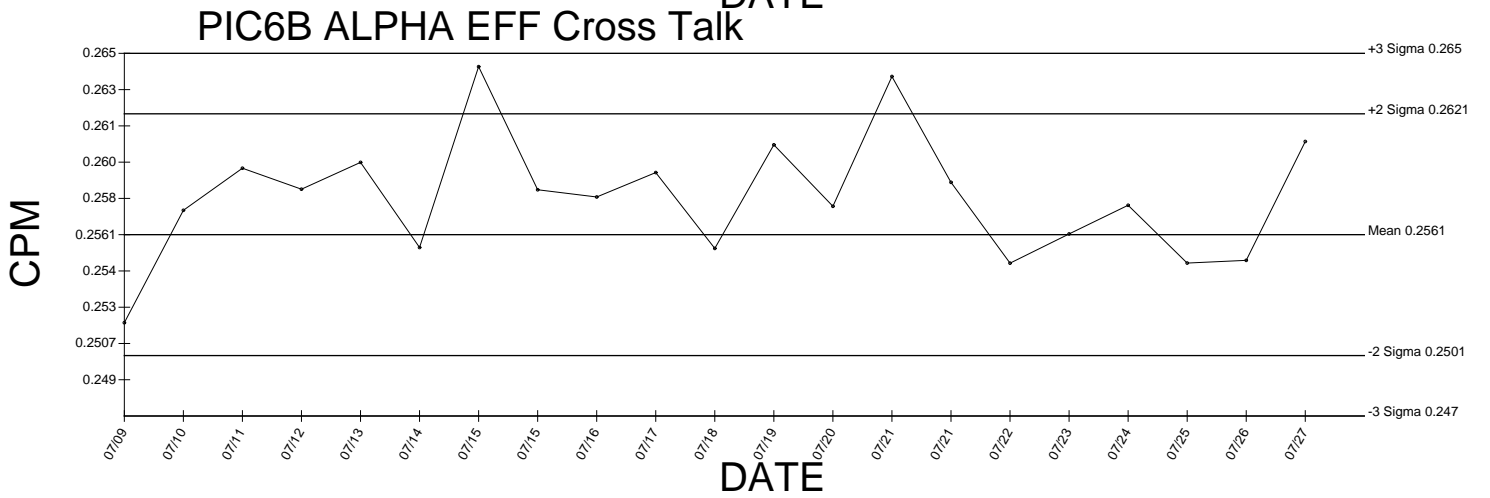
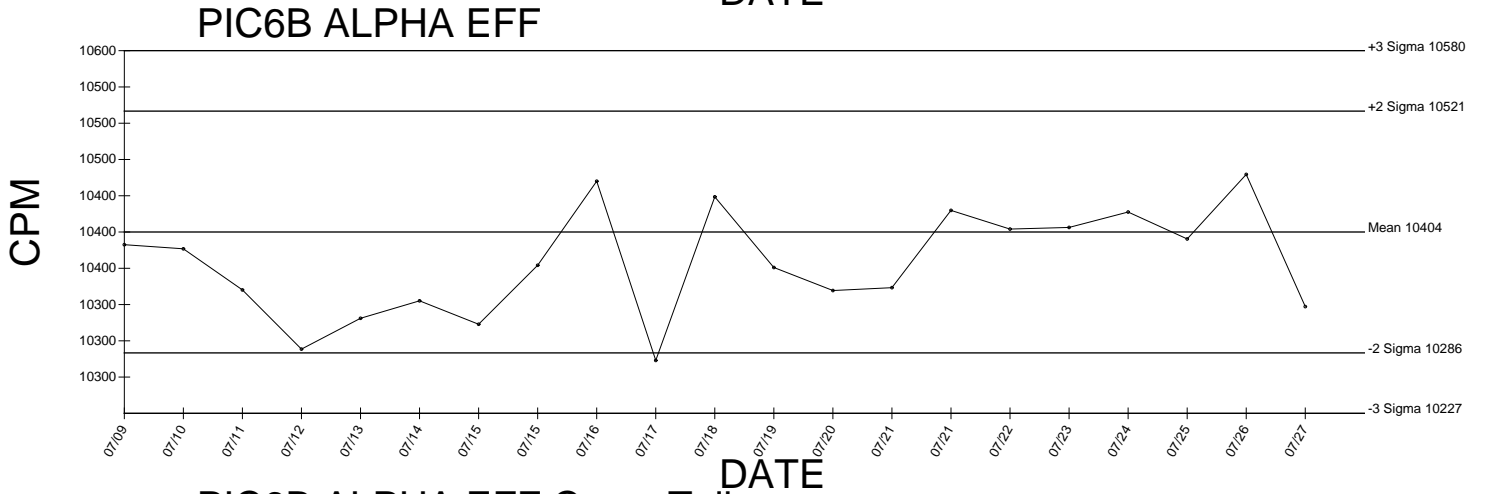
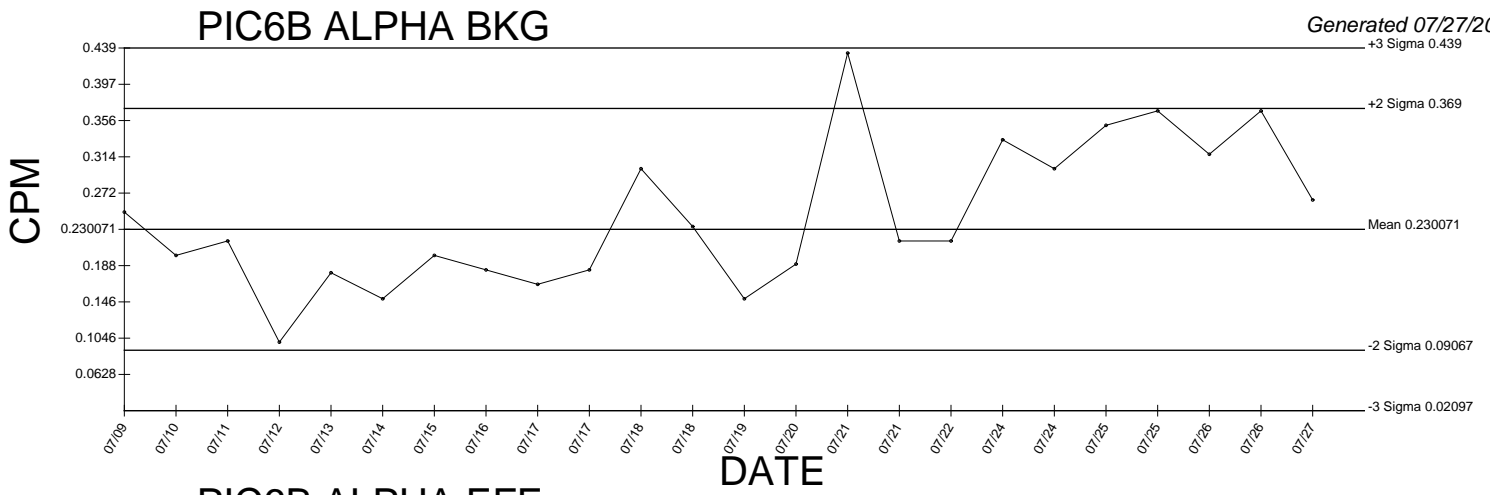
● Denotes Outlier



● Denotes Outlier

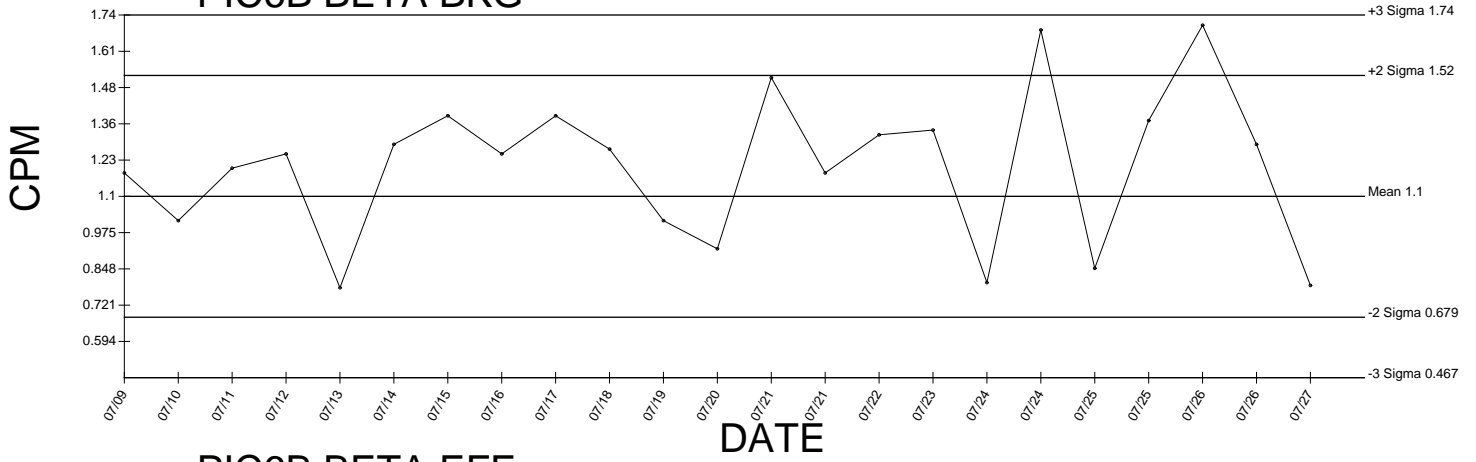


● Denotes Outlier

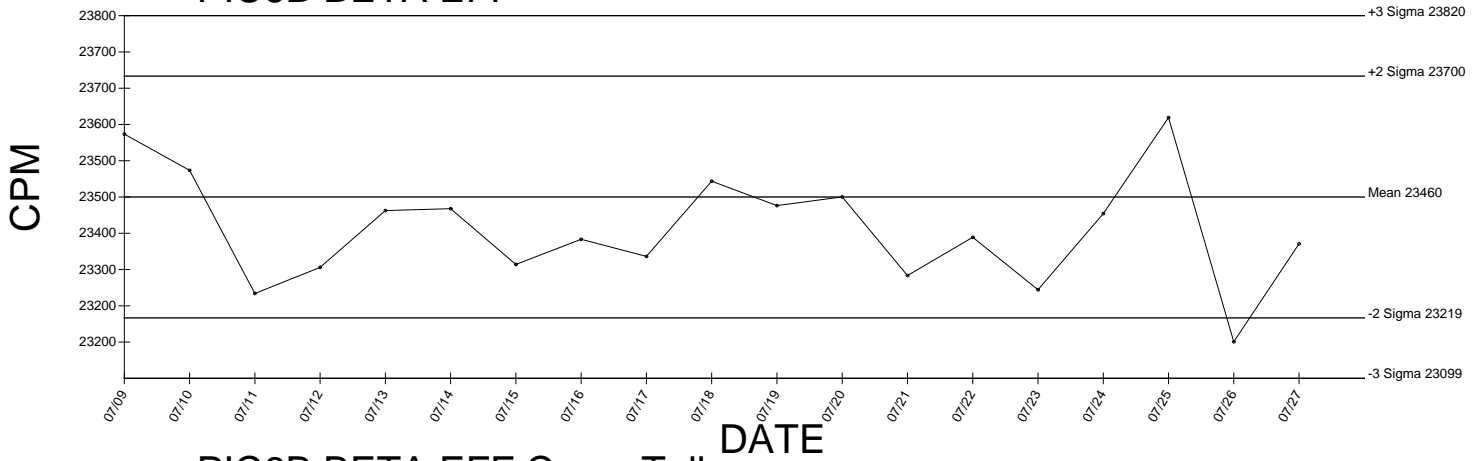


● Denotes Outlier

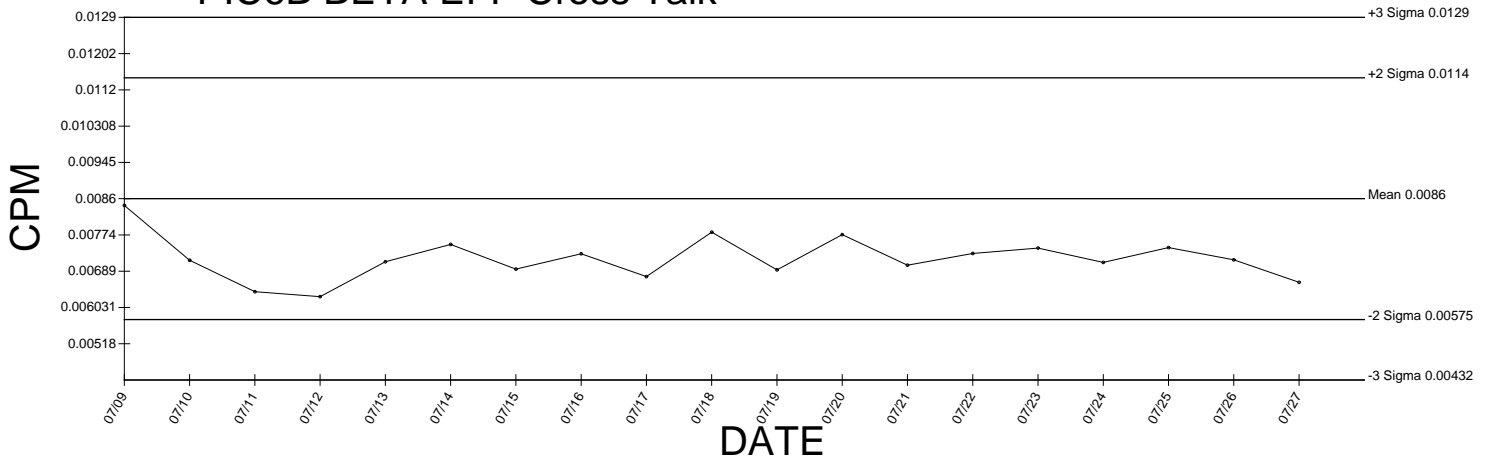
### PIC6B BETA BKG



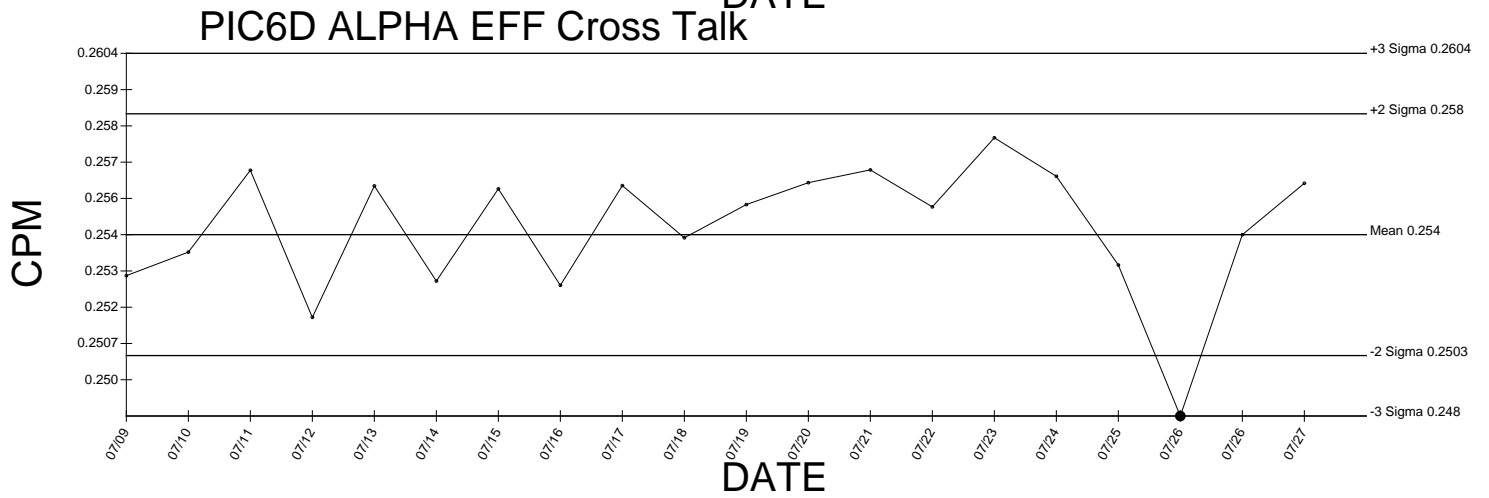
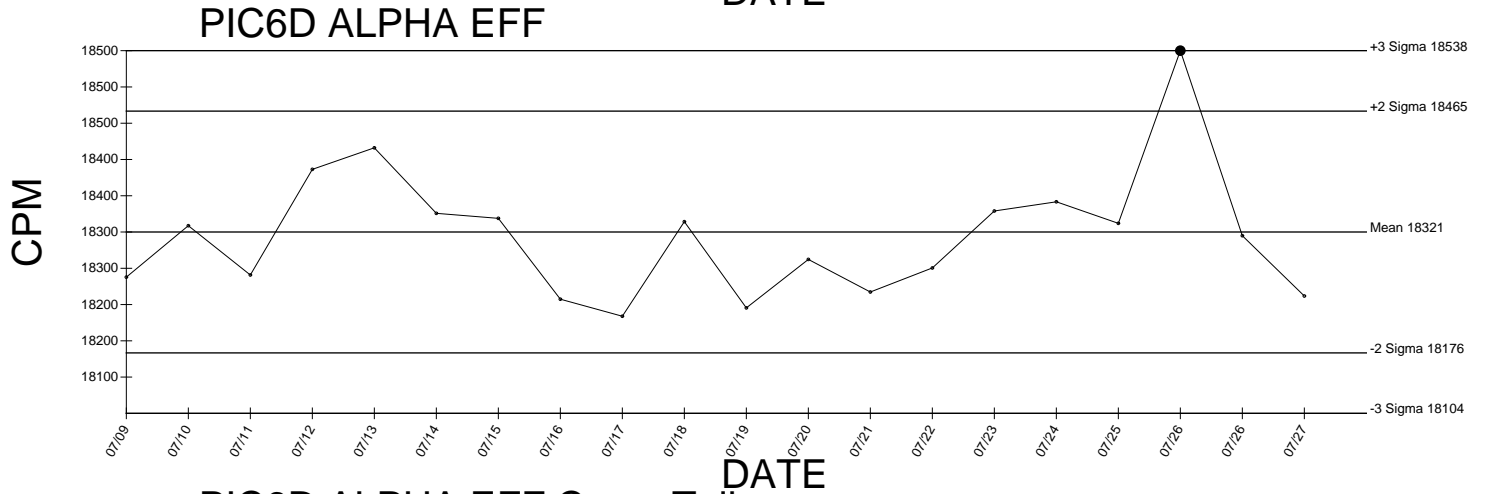
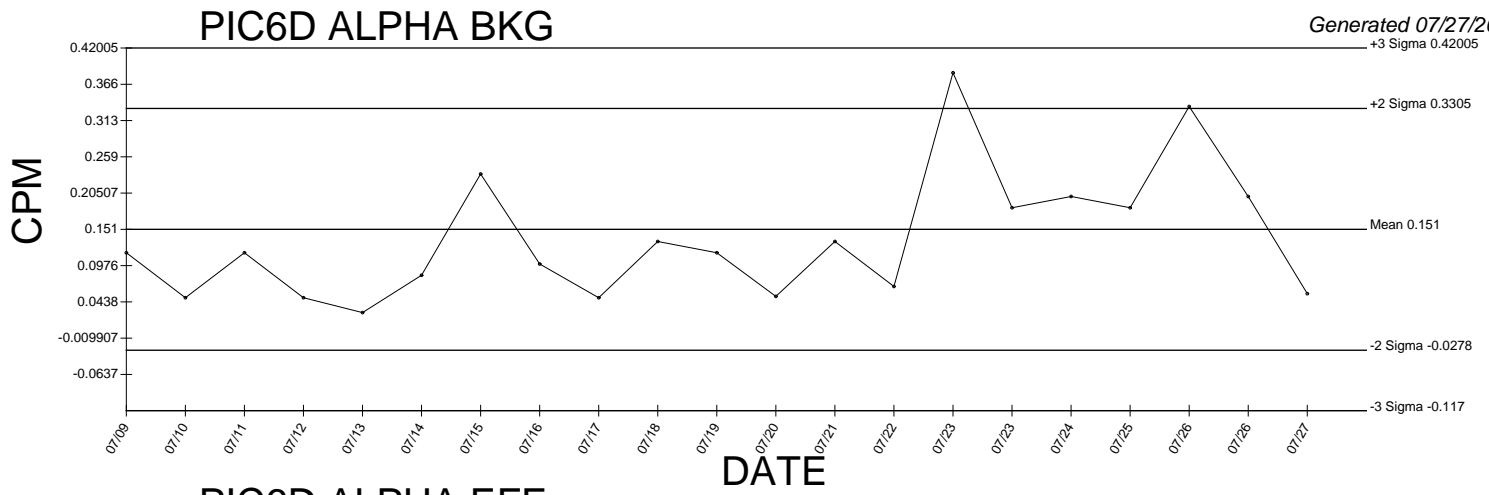
### PIC6B BETA EFF



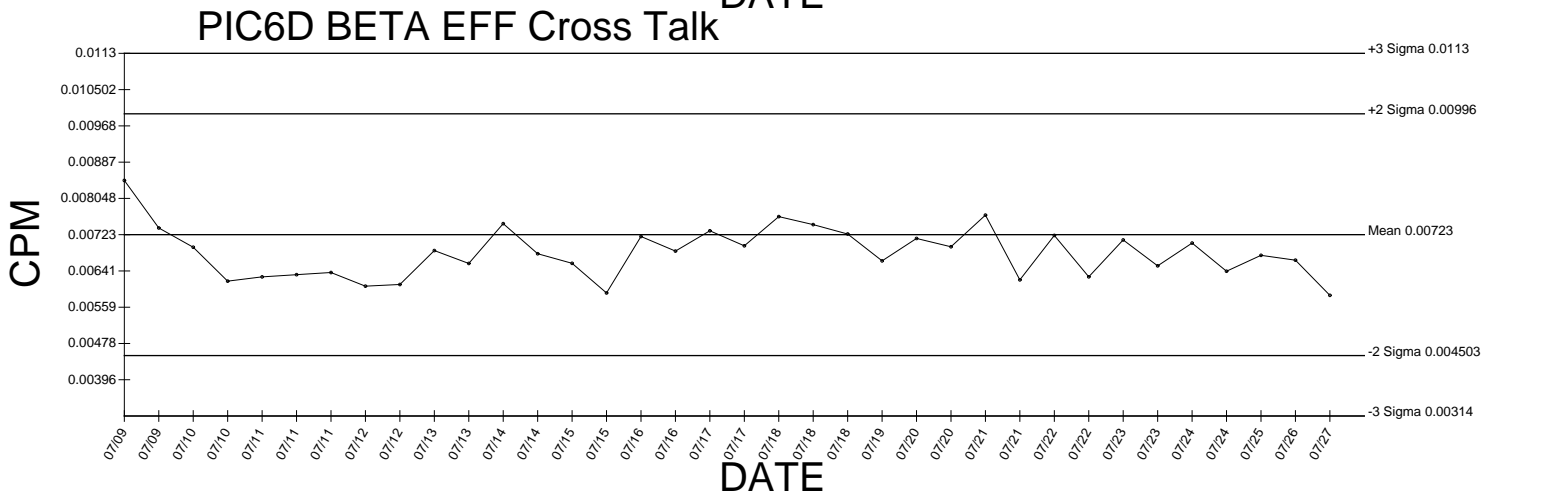
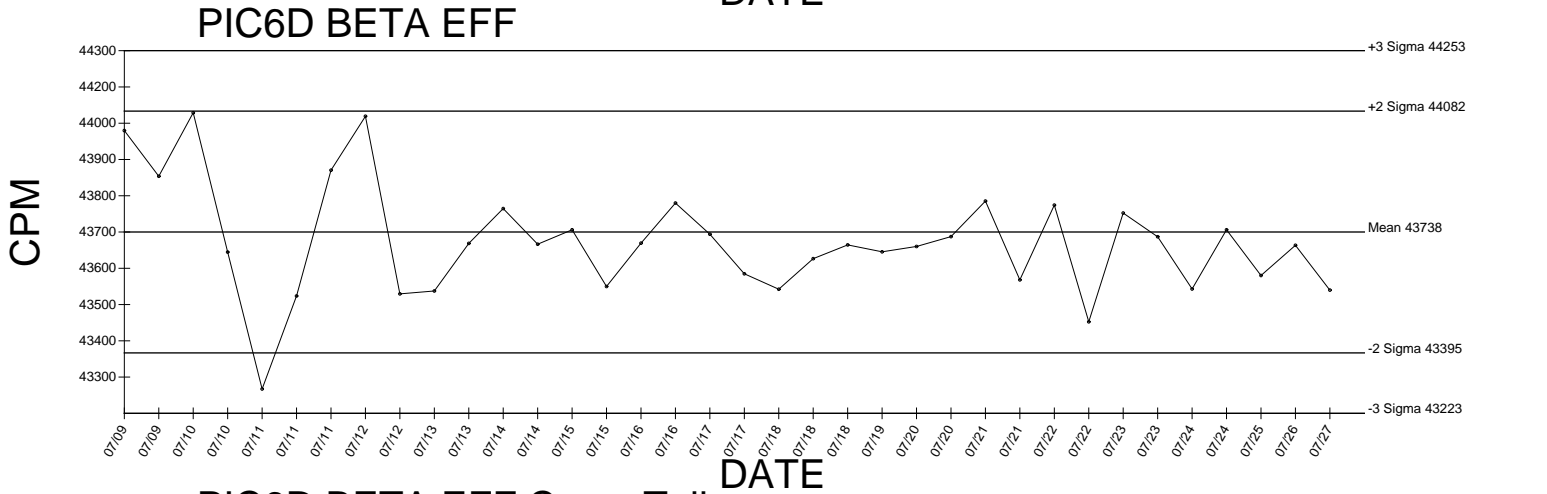
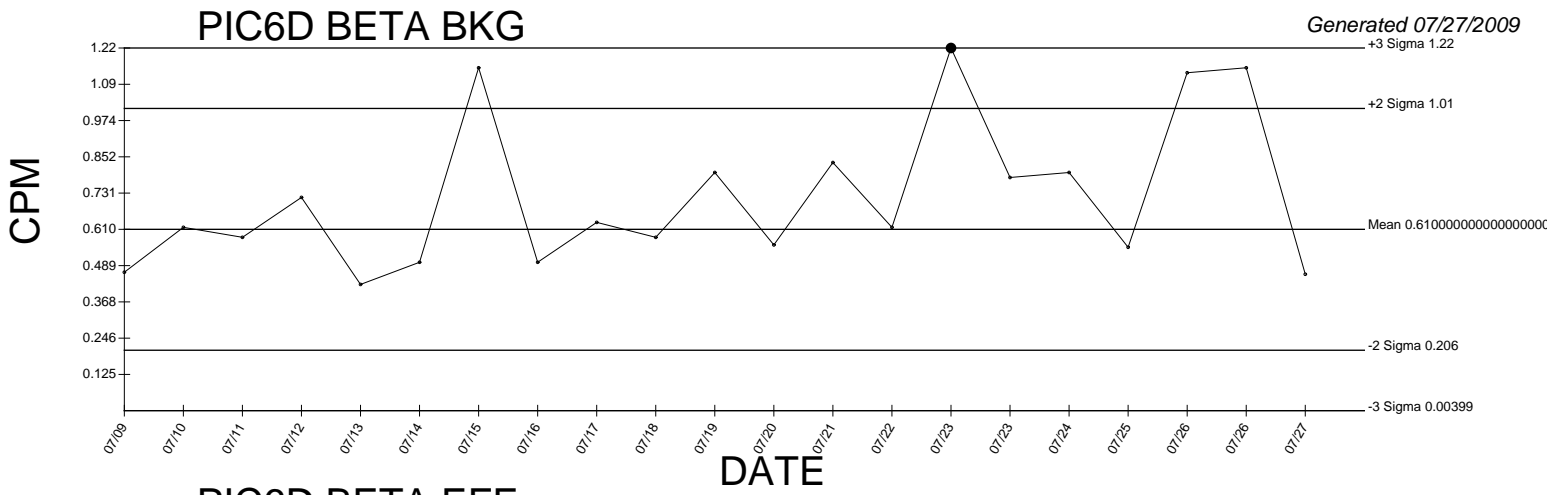
### PIC6B BETA EFF Cross Talk



● Denotes Outlier



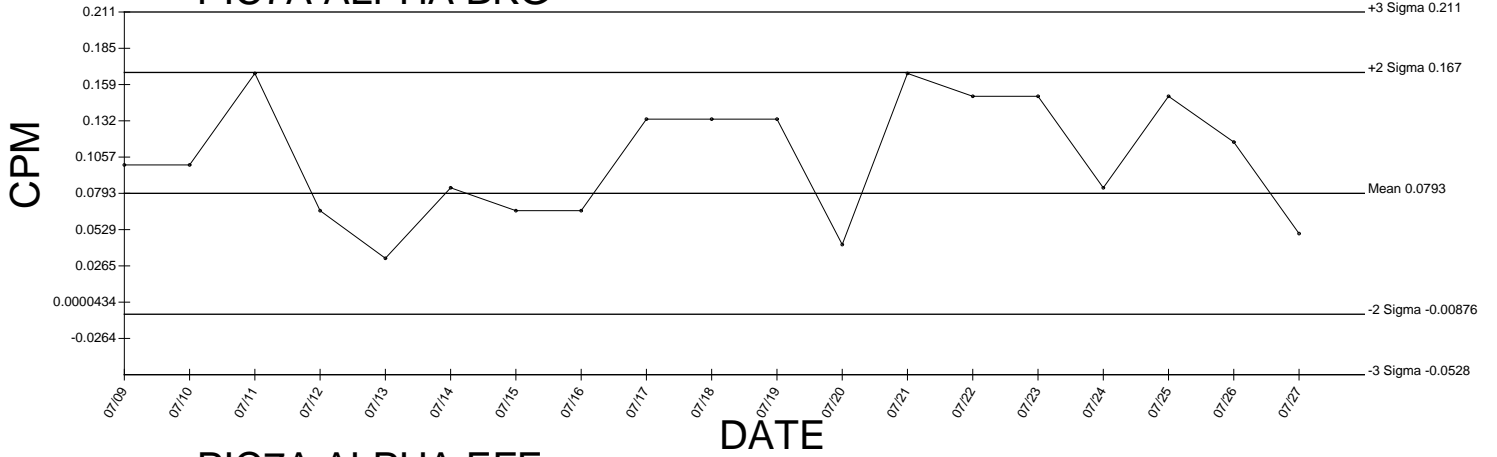
● Denotes Outlier



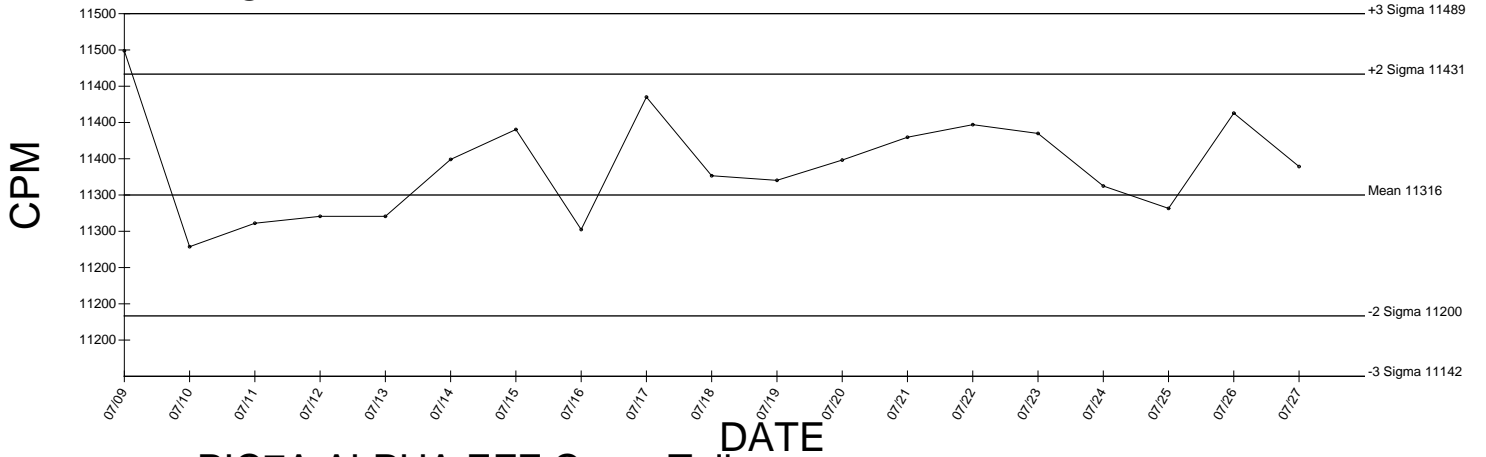
● Denotes Outlier



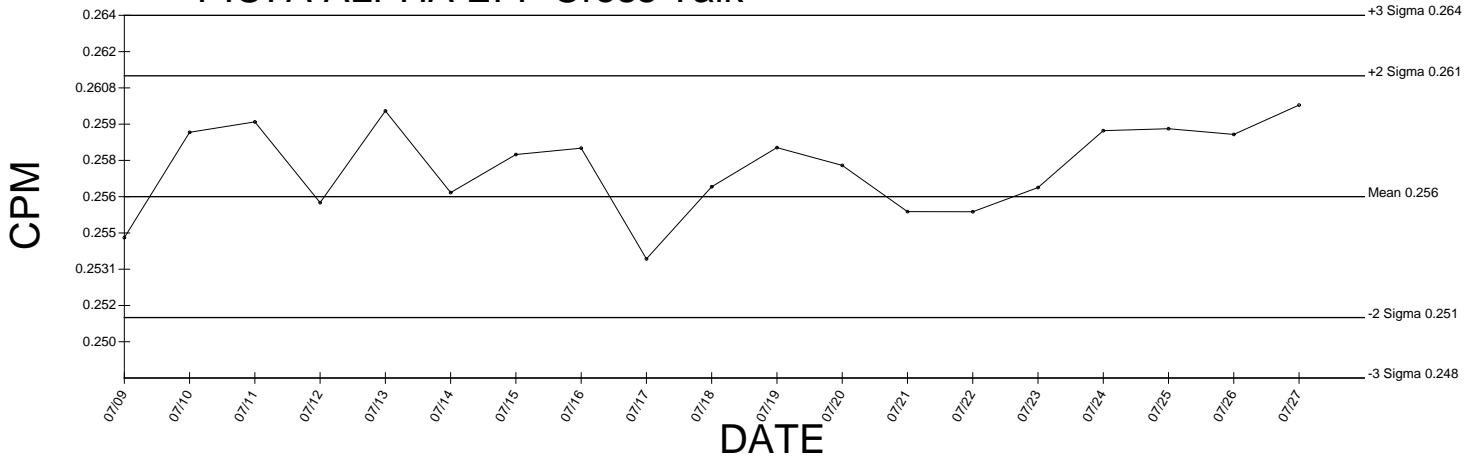
### PIC7A ALPHA BKG



### PIC7A ALPHA EFF

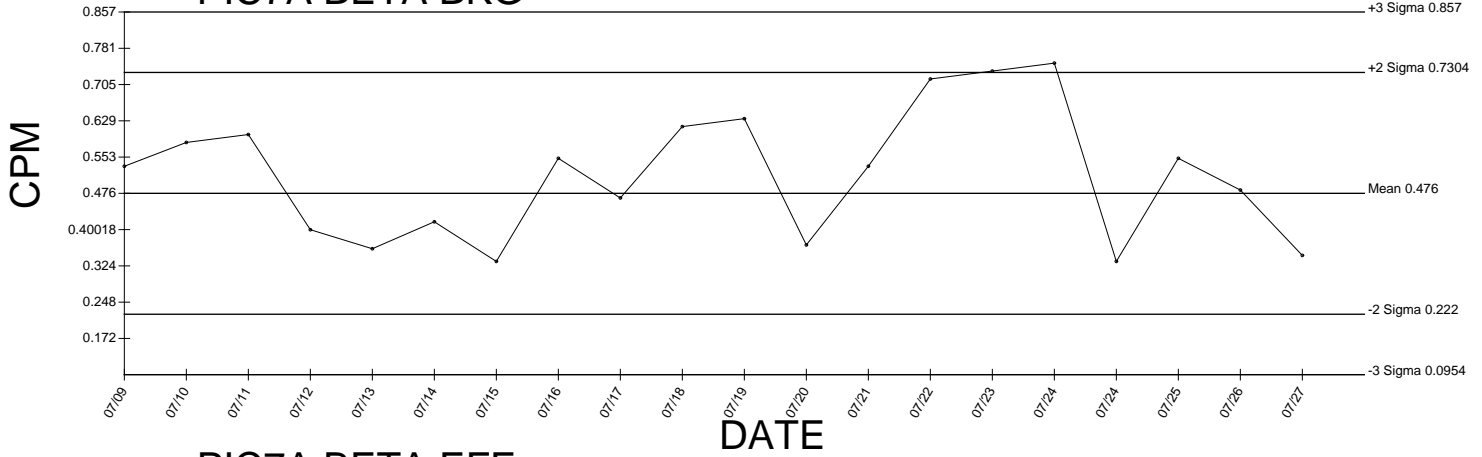


### PIC7A ALPHA EFF Cross Talk

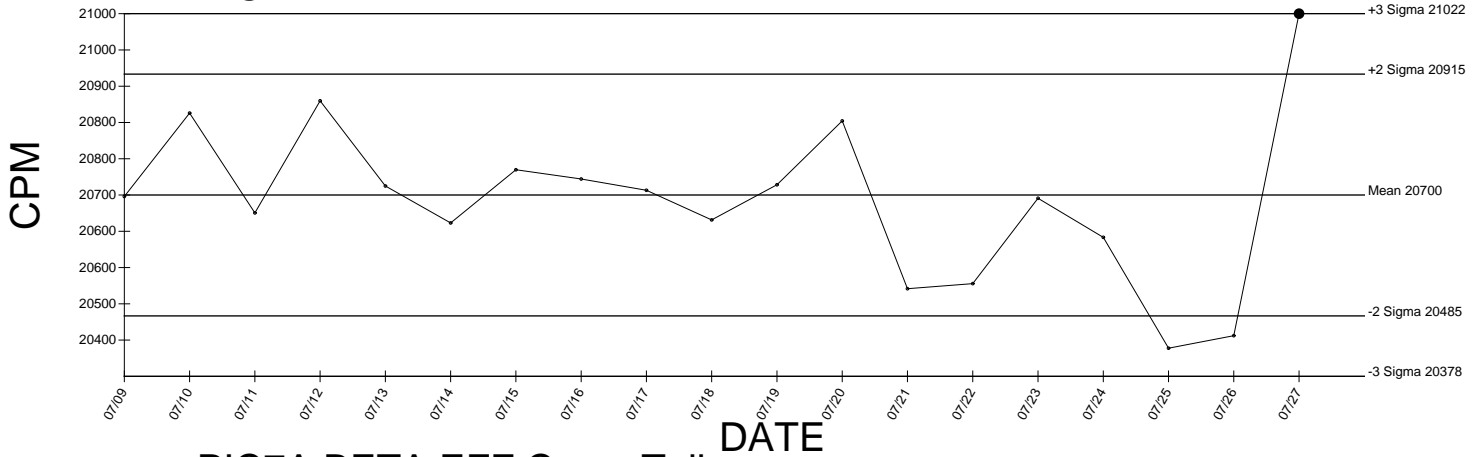


● Denotes Outlier

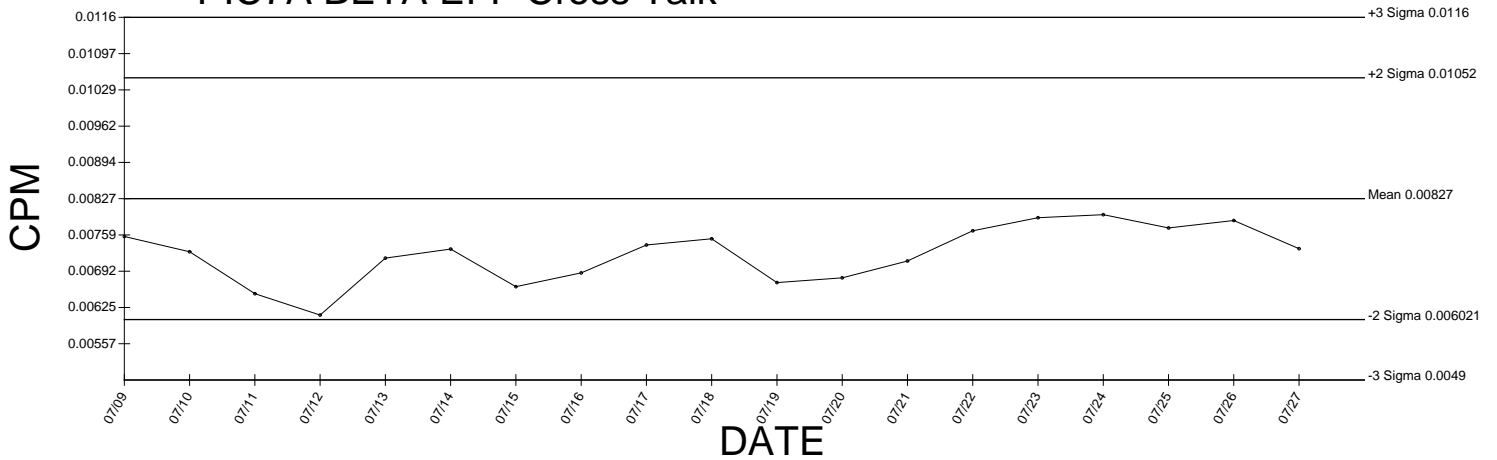
### PIC7A BETA BKG



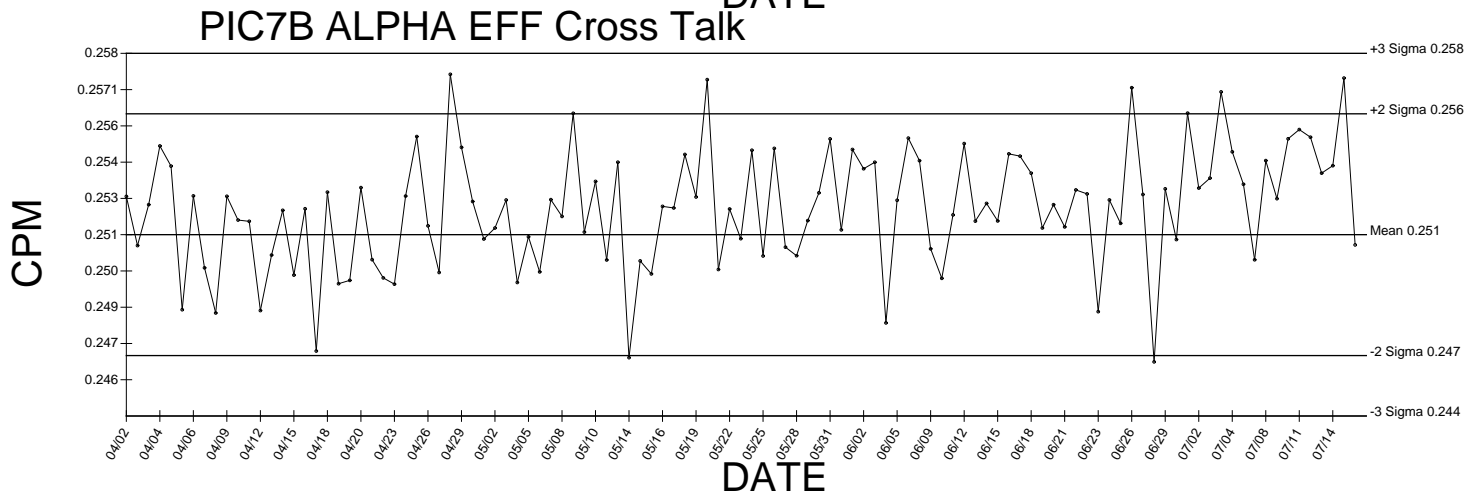
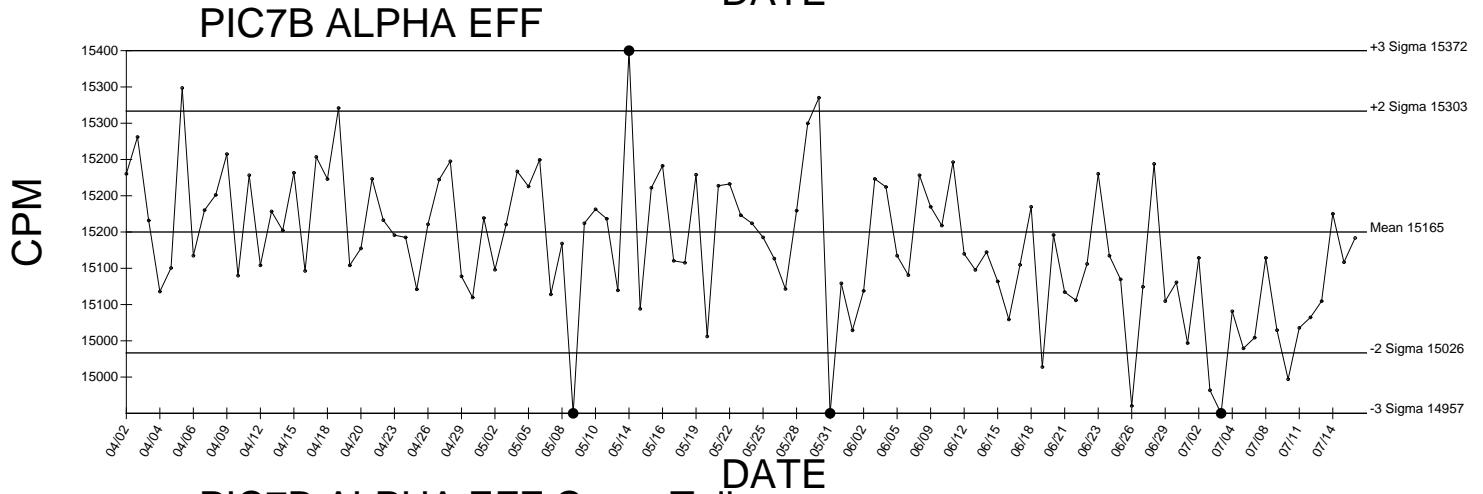
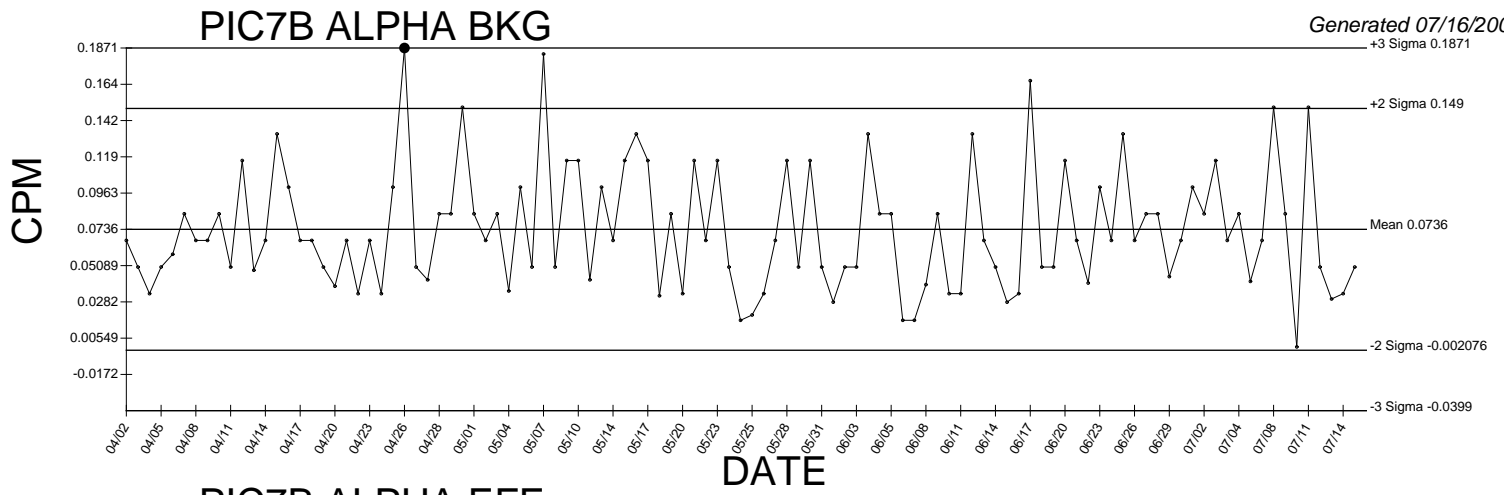
### PIC7A BETA EFF



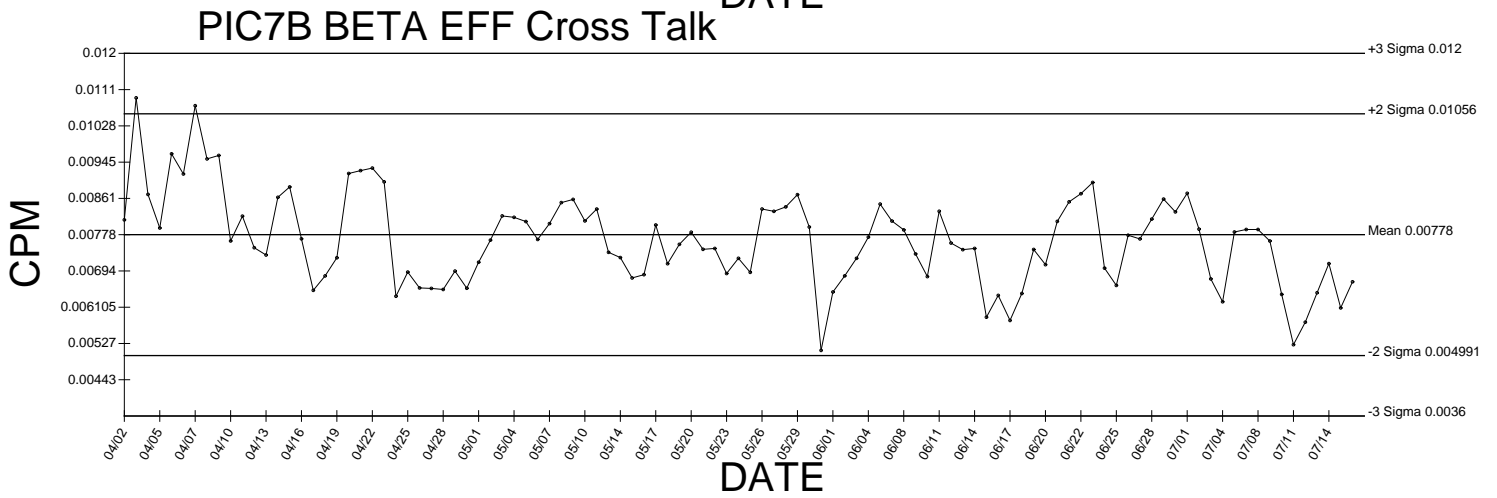
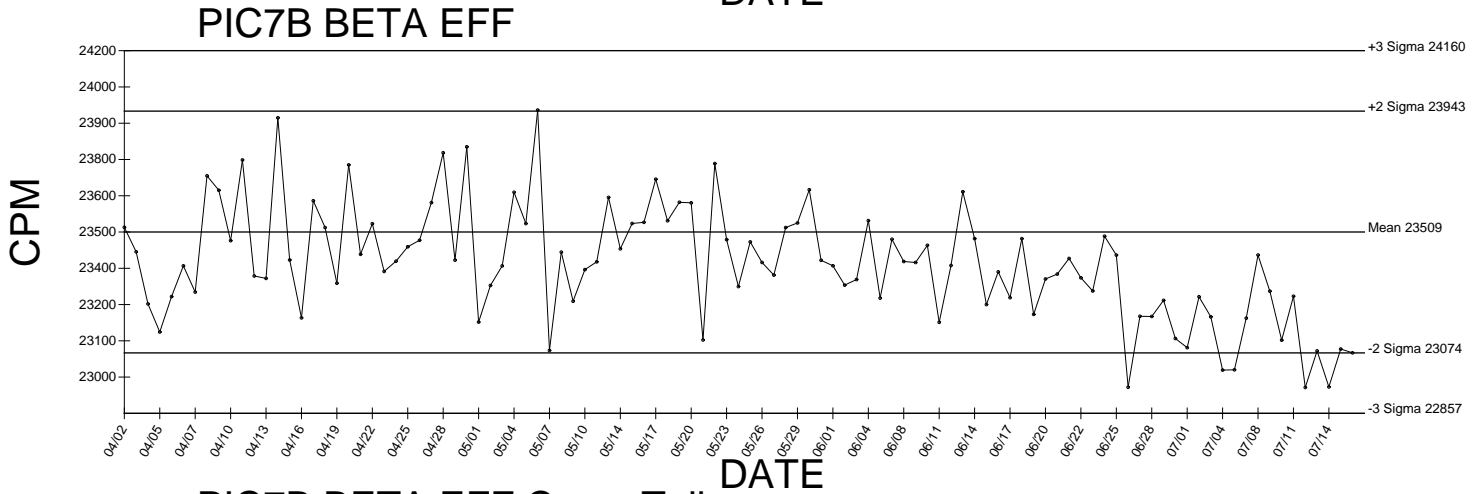
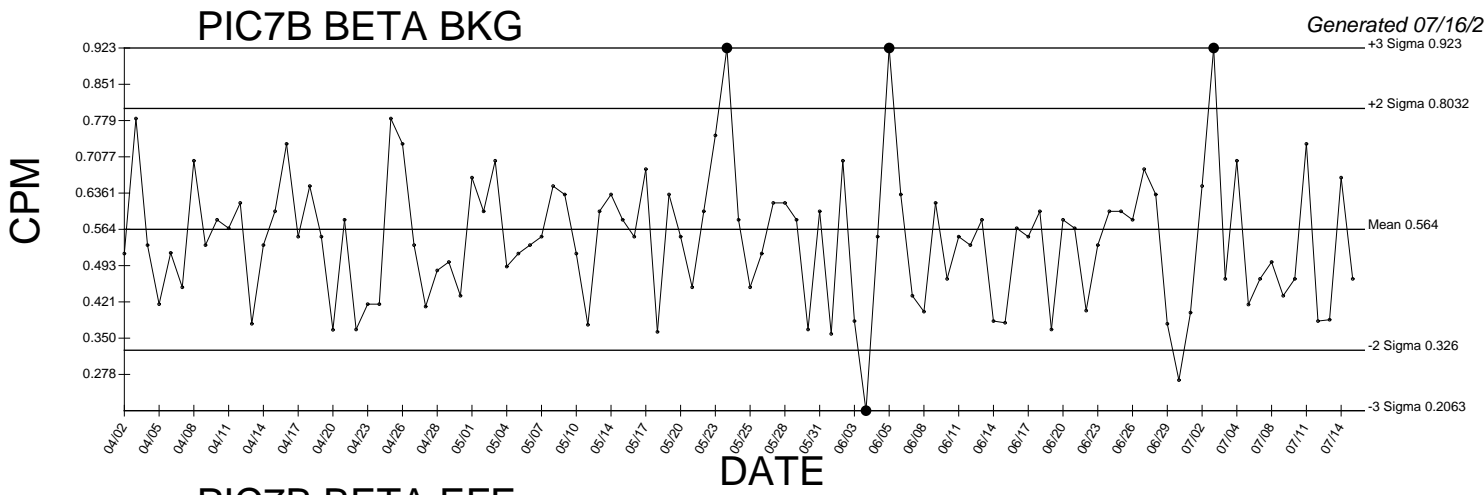
### PIC7A BETA EFF Cross Talk



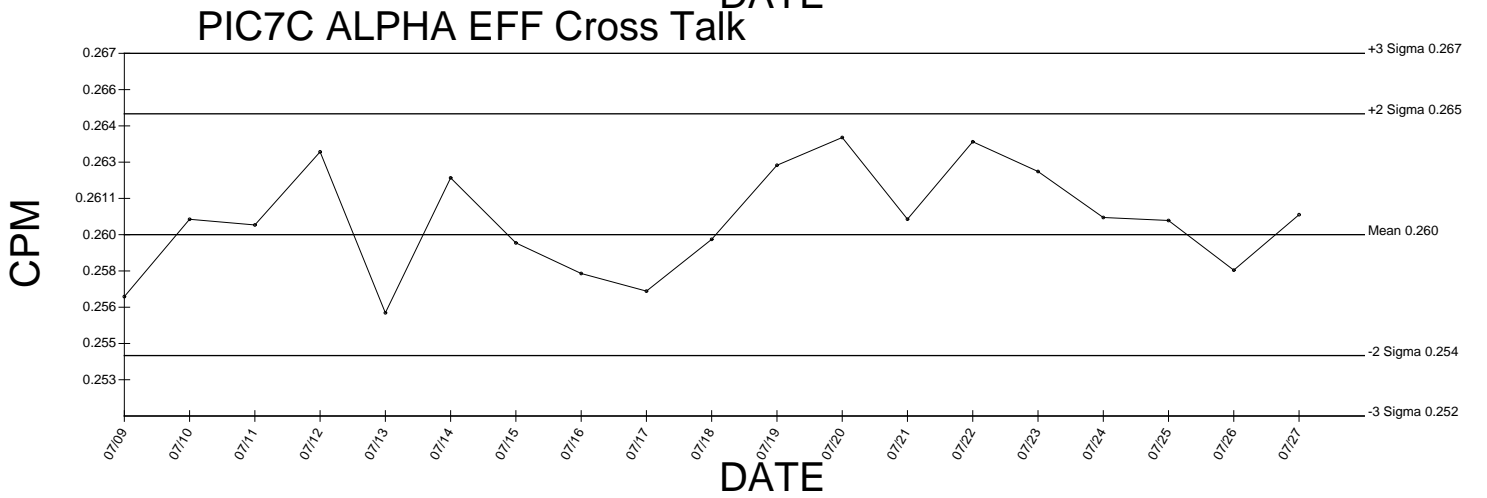
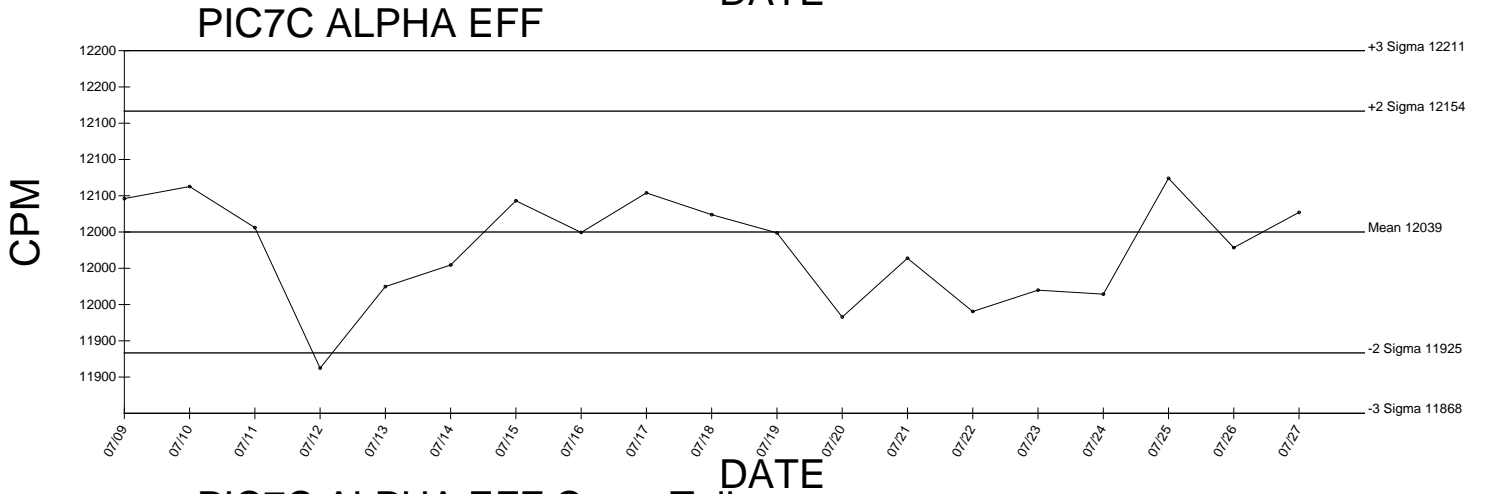
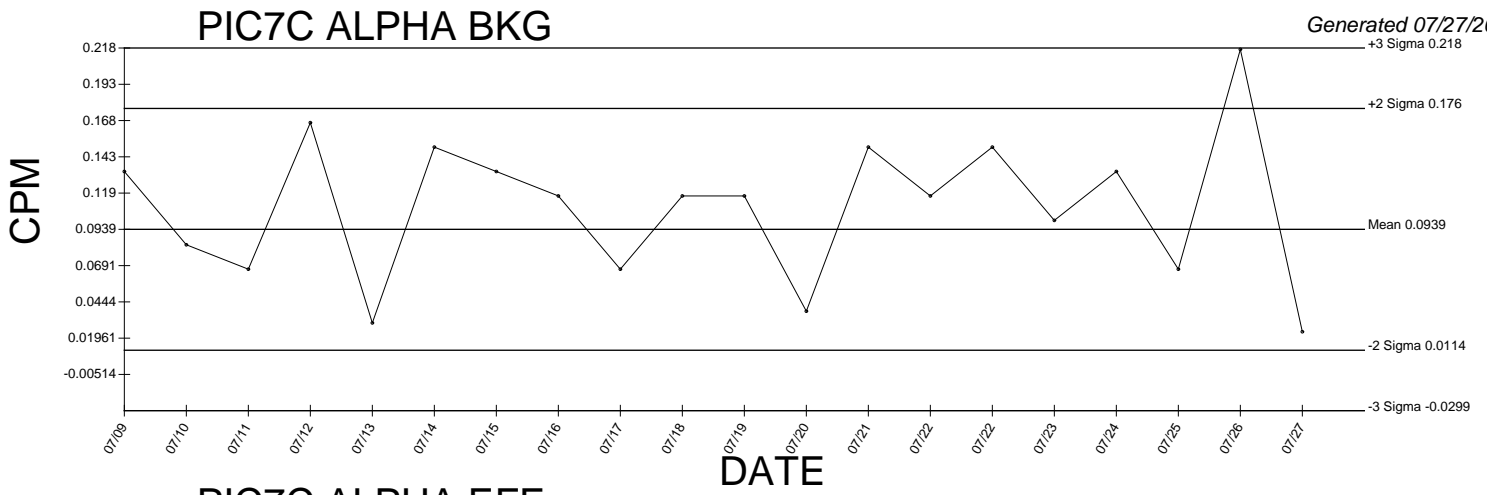
● Denotes Outlier



● Denotes Outlier

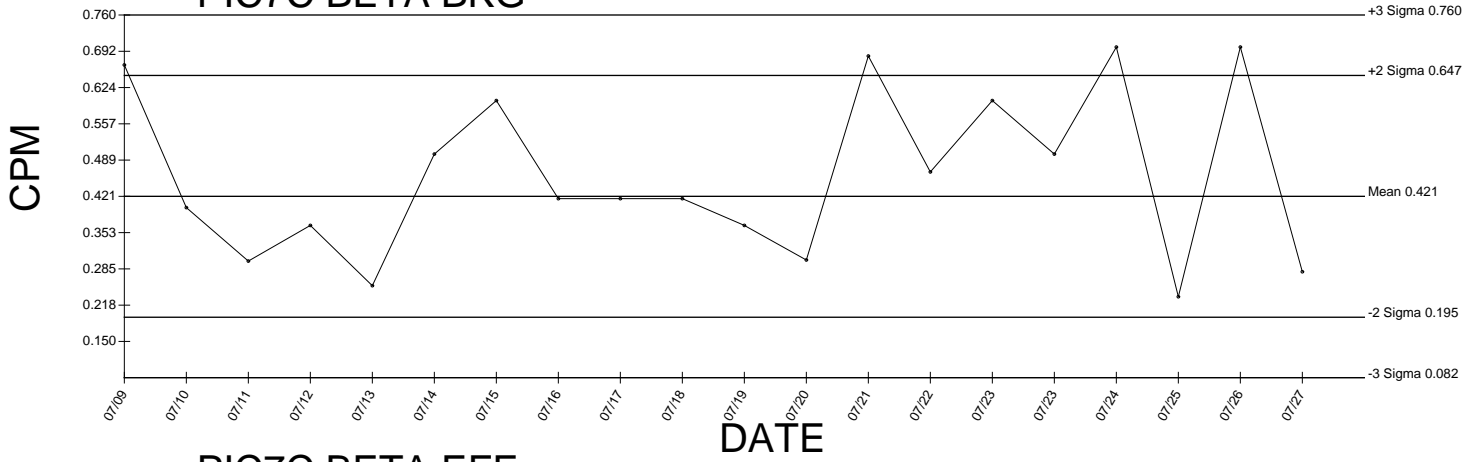


● Denotes Outlier

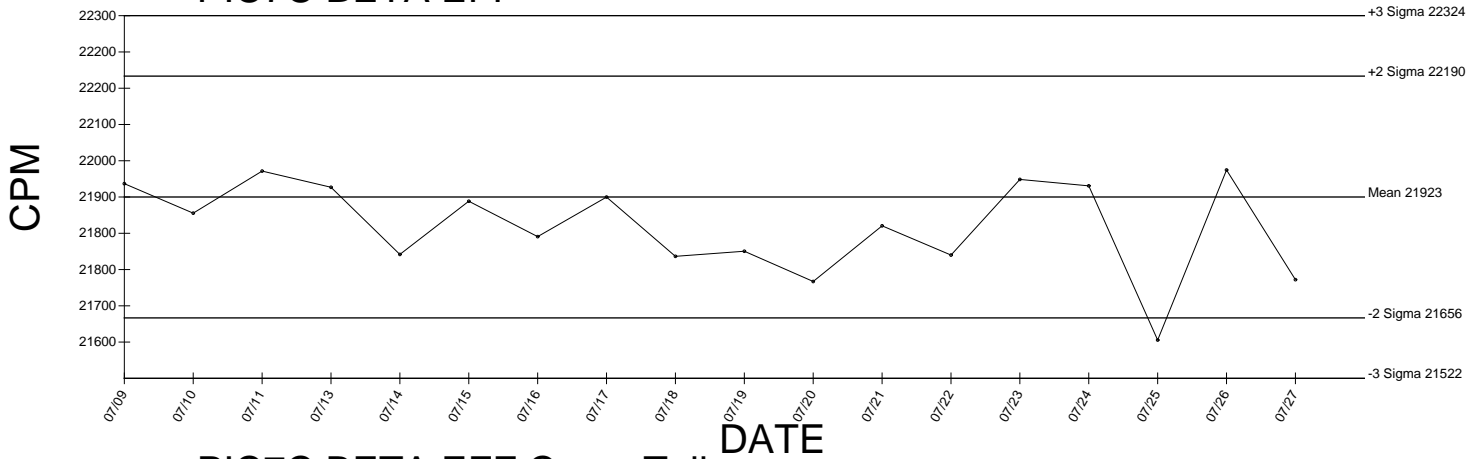


● Denotes Outlier

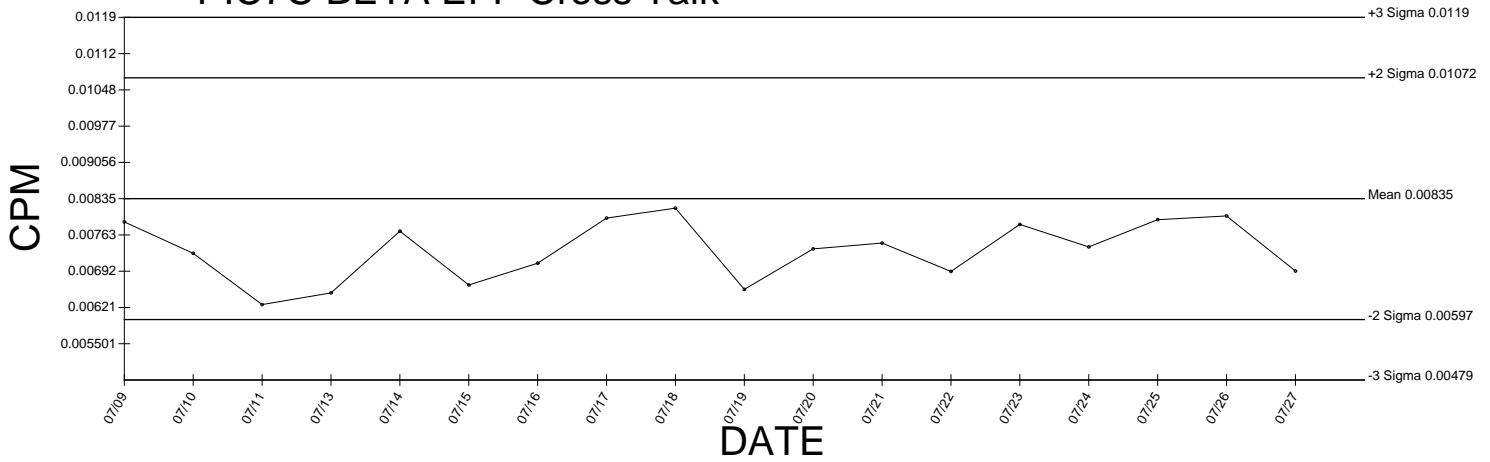
### PIC7C BETA BKG



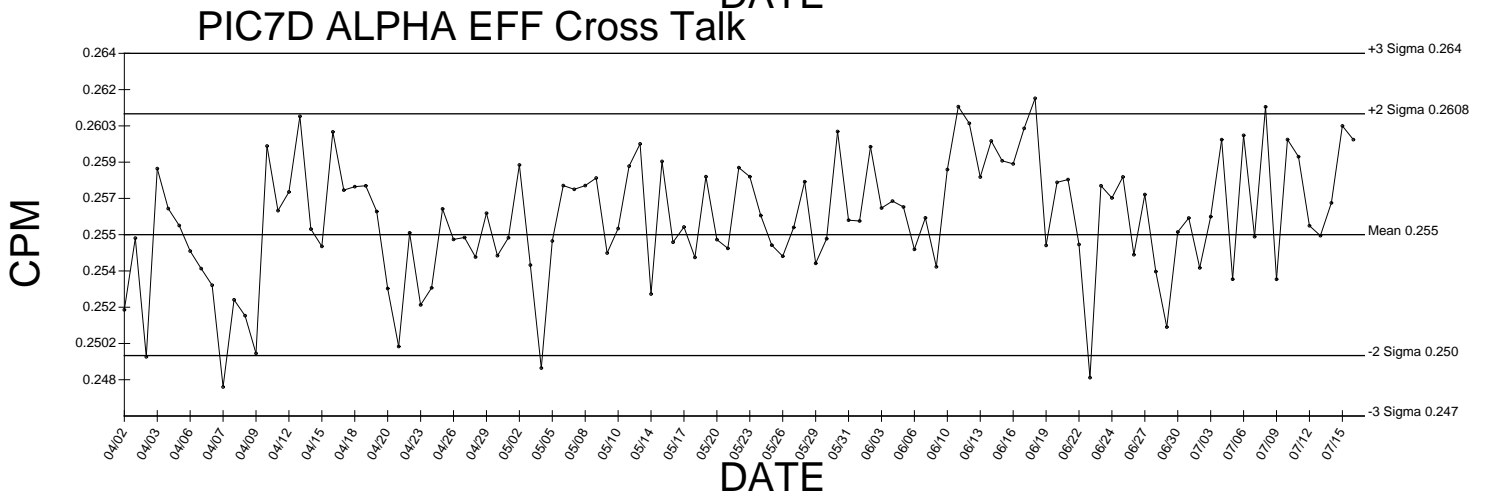
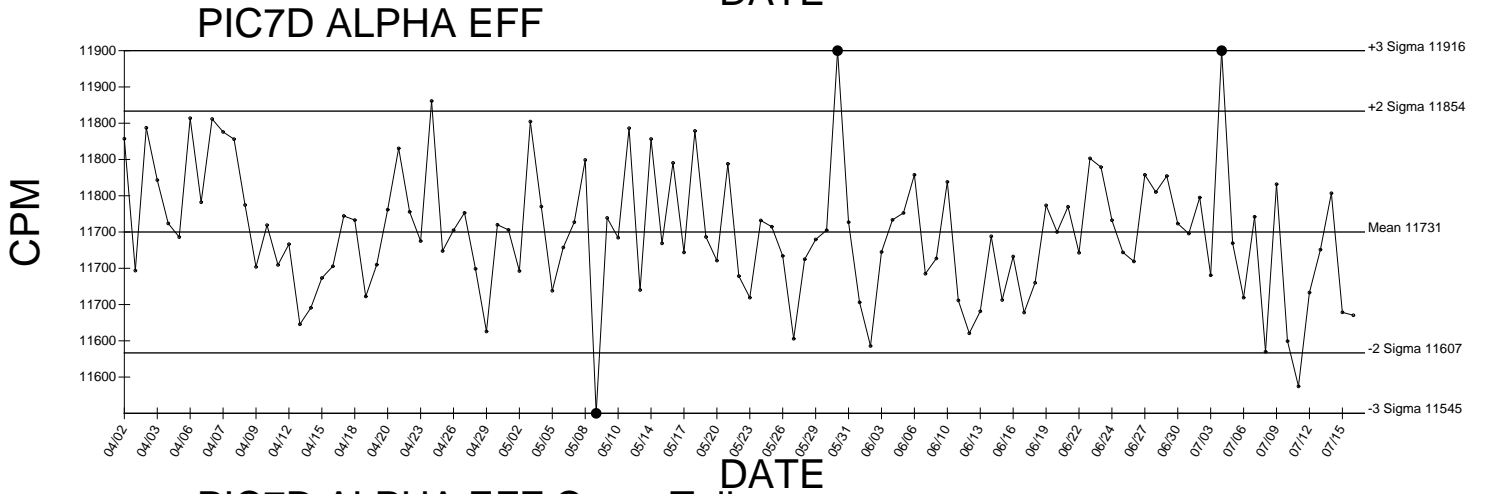
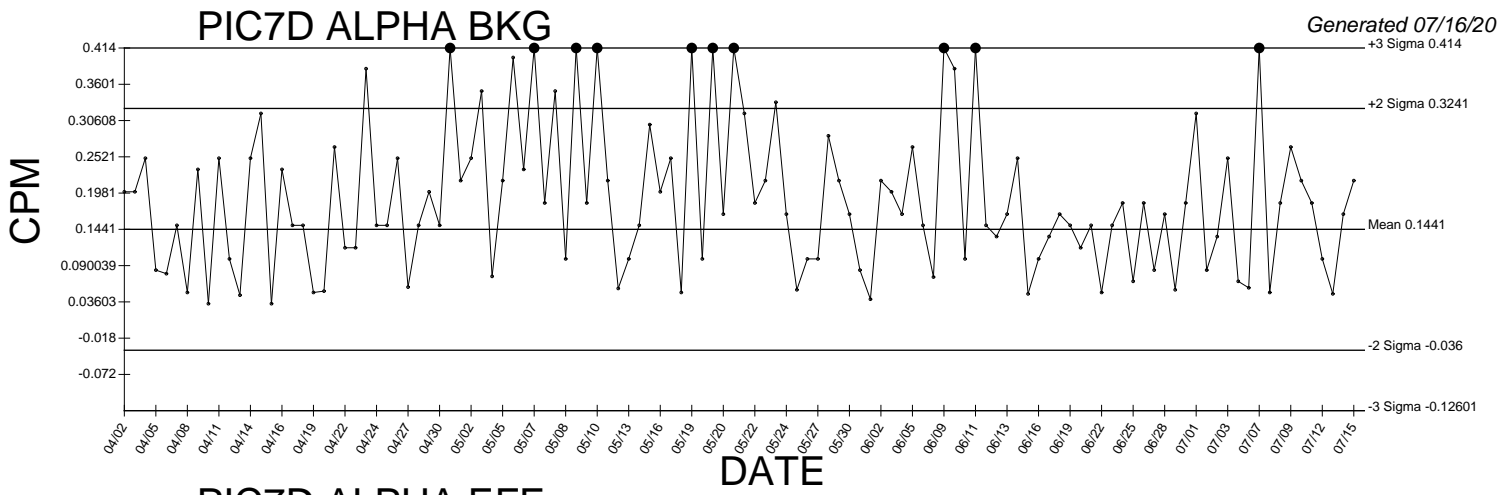
### PIC7C BETA EFF



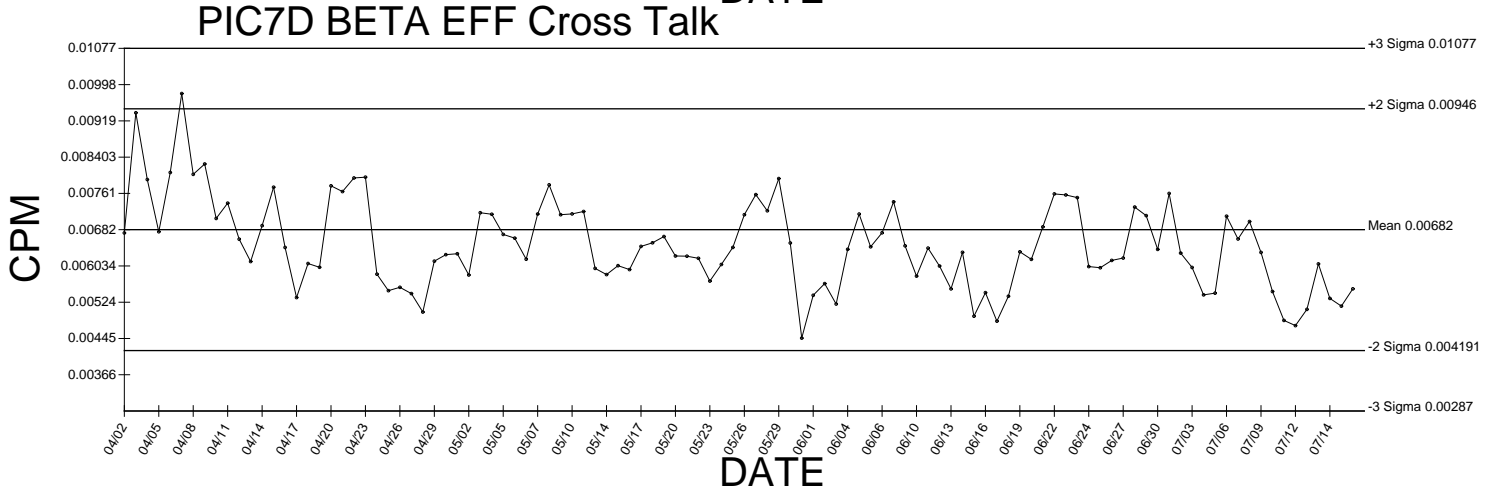
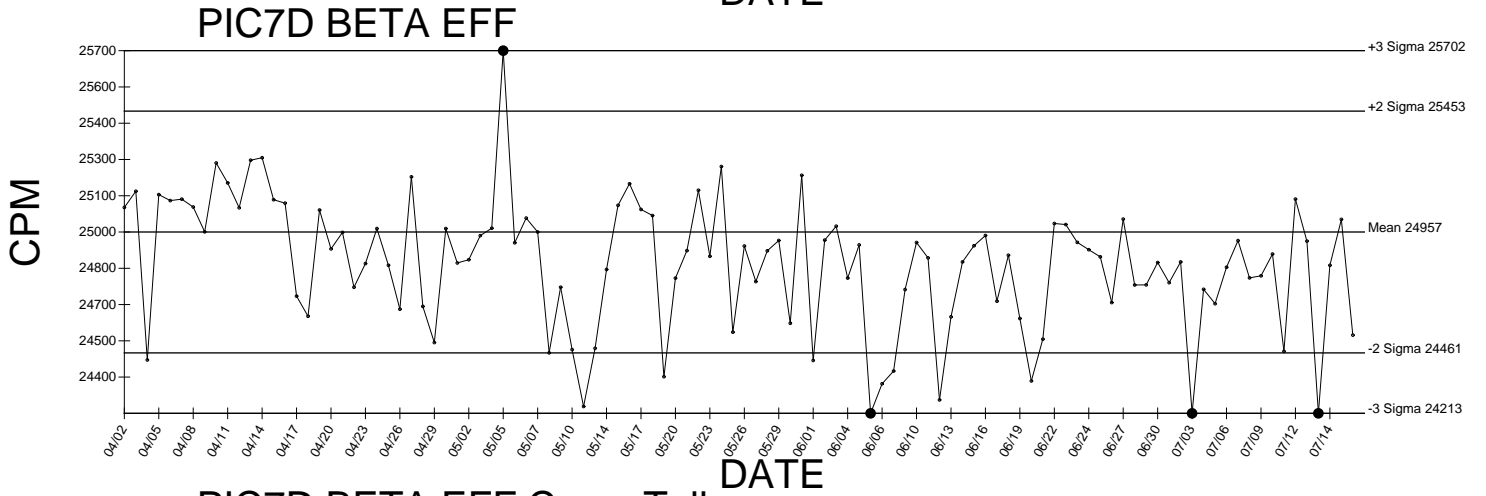
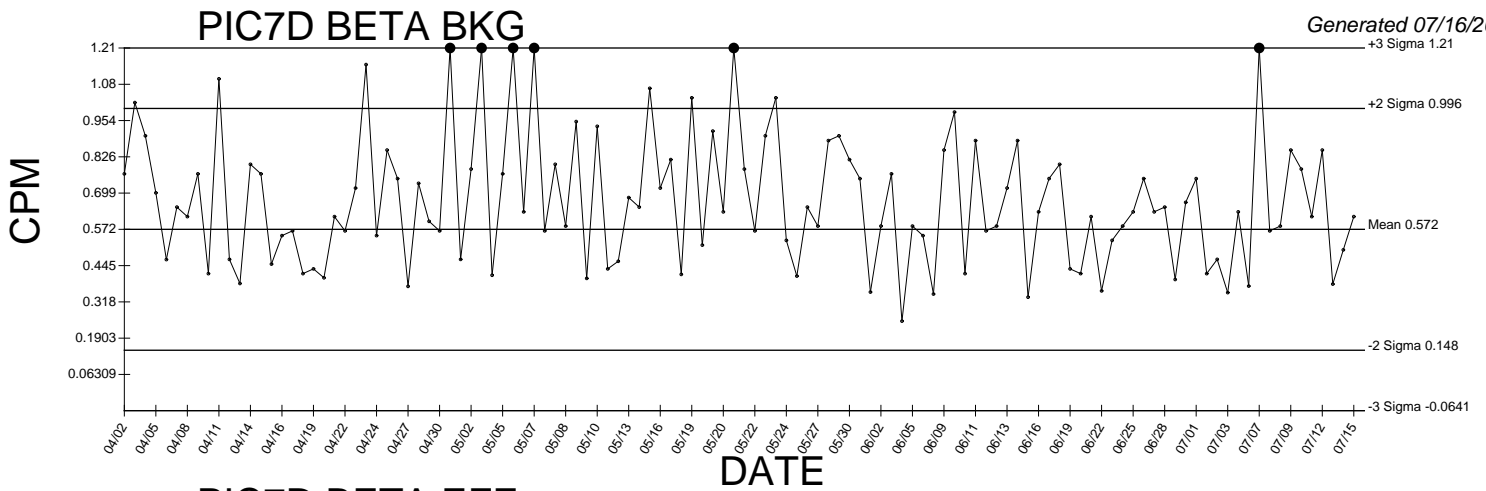
### PIC7C BETA EFF Cross Talk



● Denotes Outlier



● Denotes Outlier

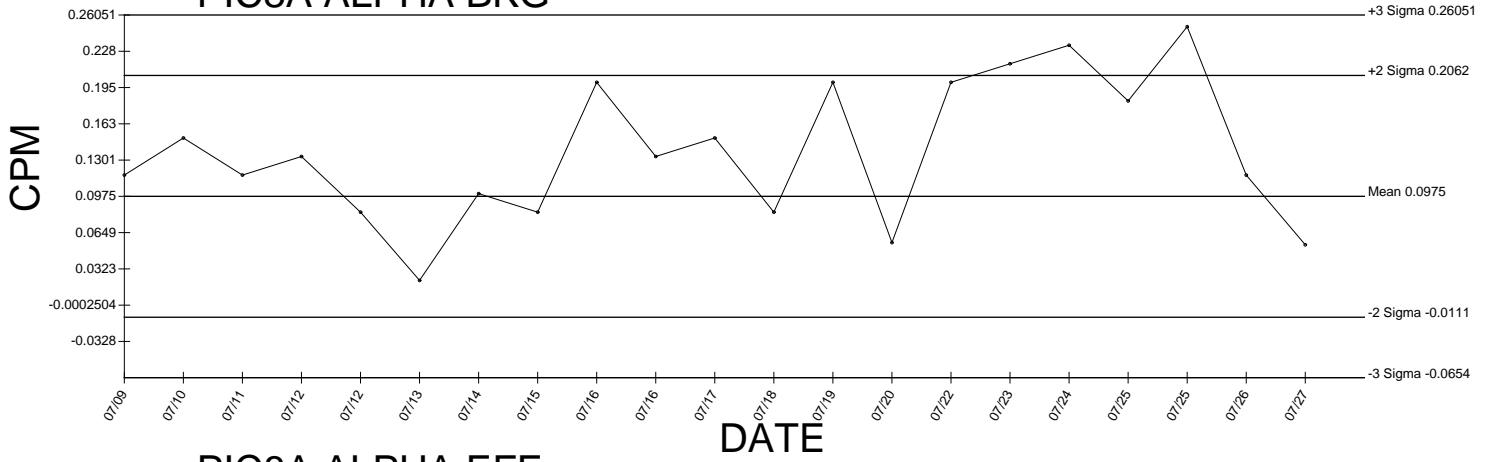


● Denotes Outlier

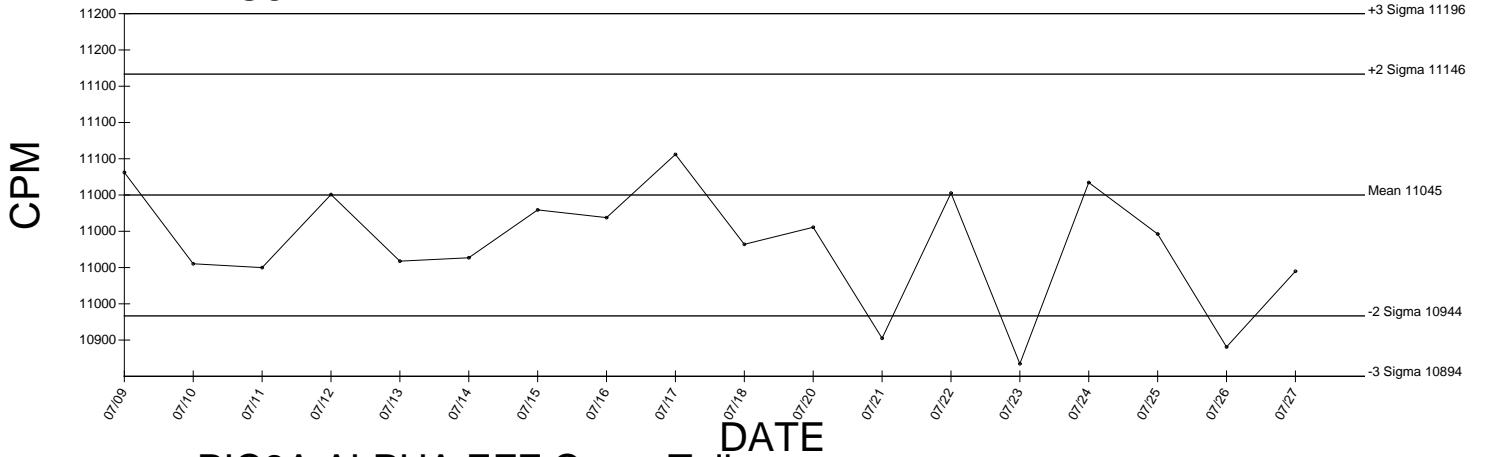


# PIC8A ALPHA BKG

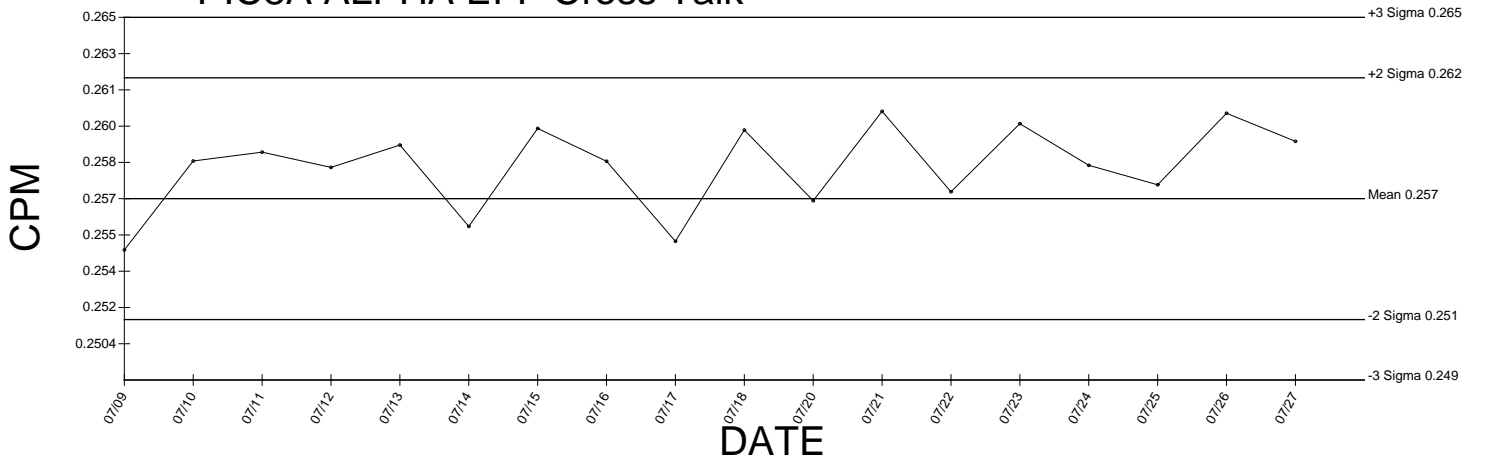
Generated 07/27/2009



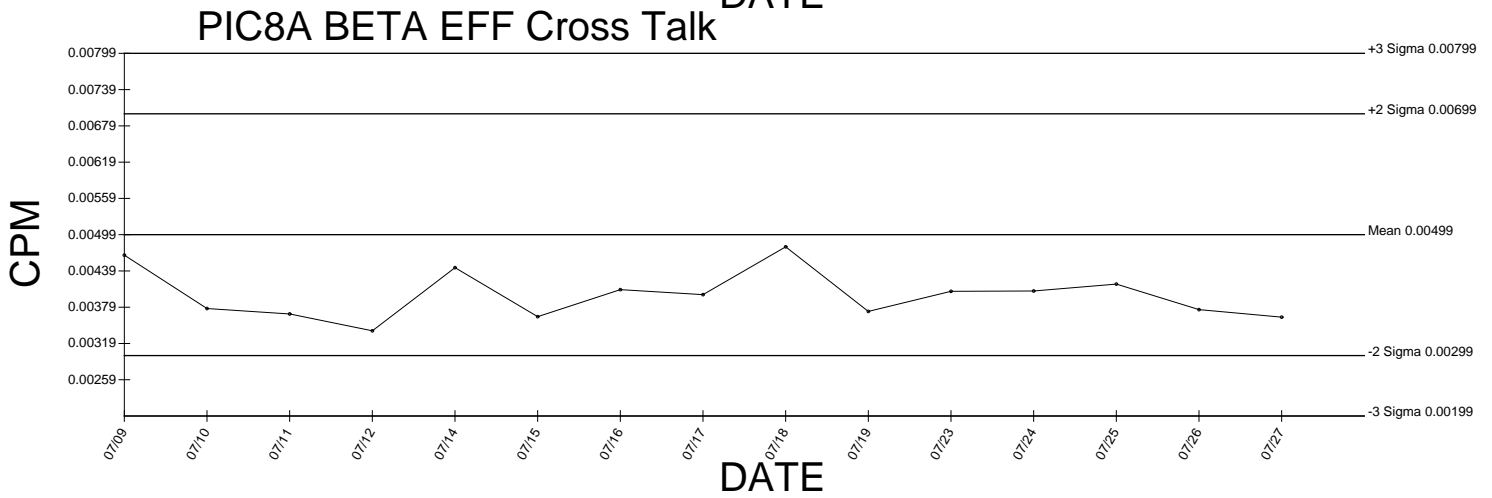
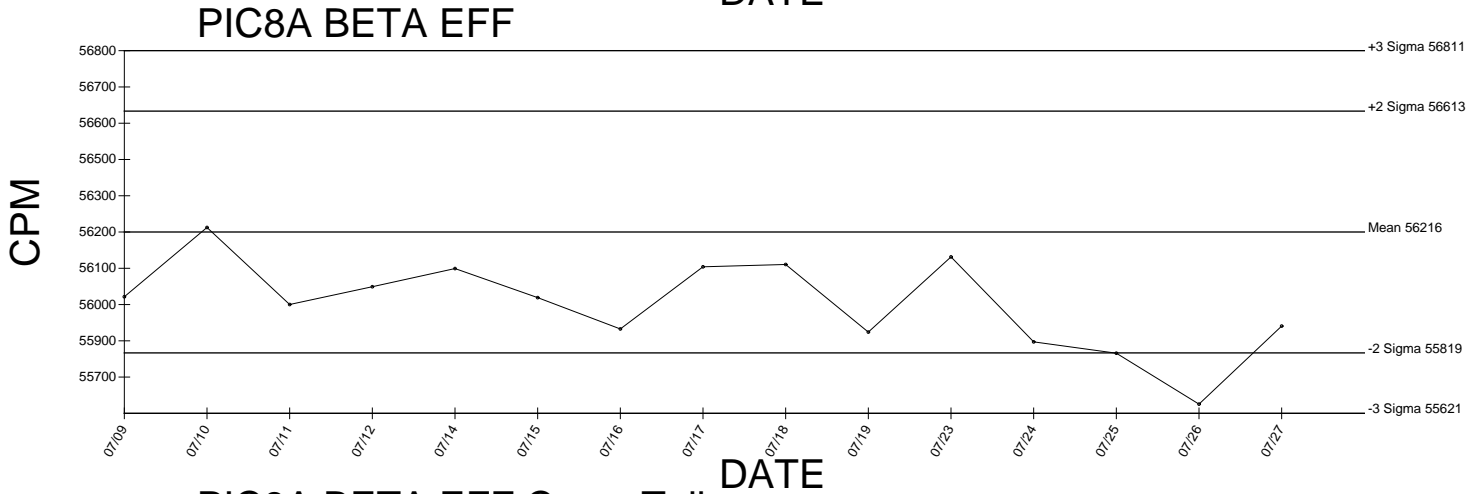
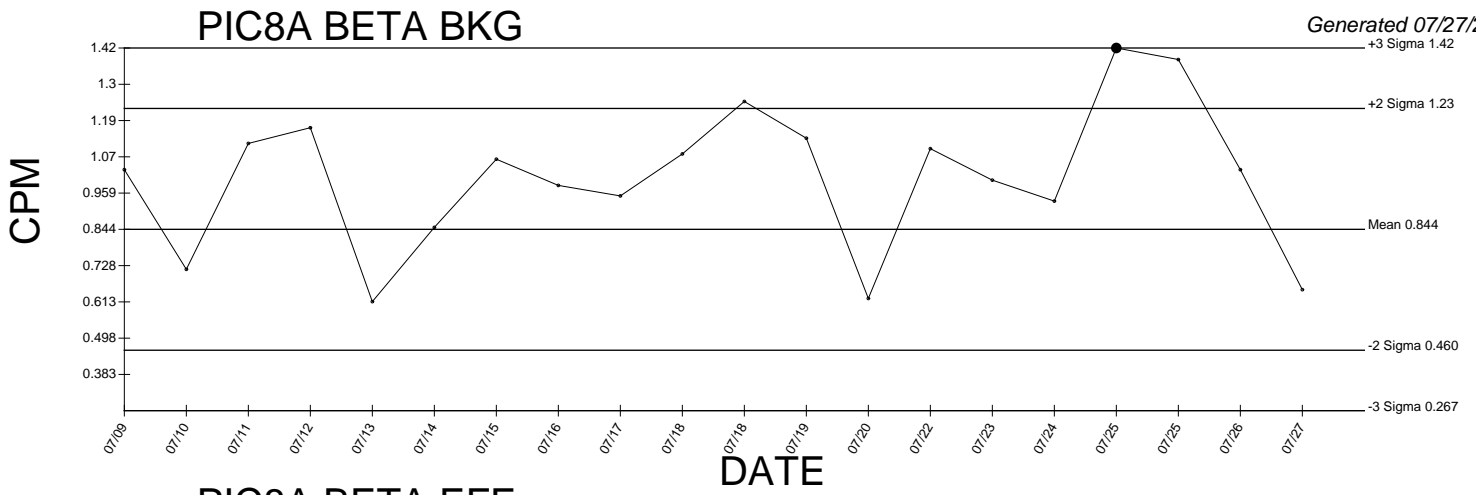
# PIC8A ALPHA EFF



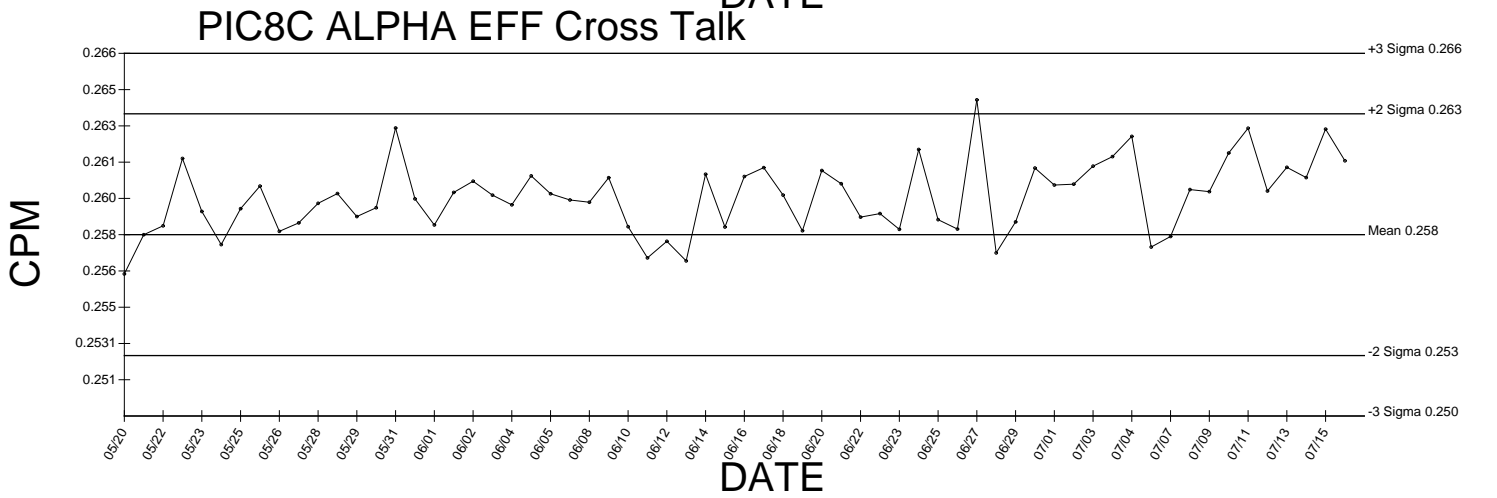
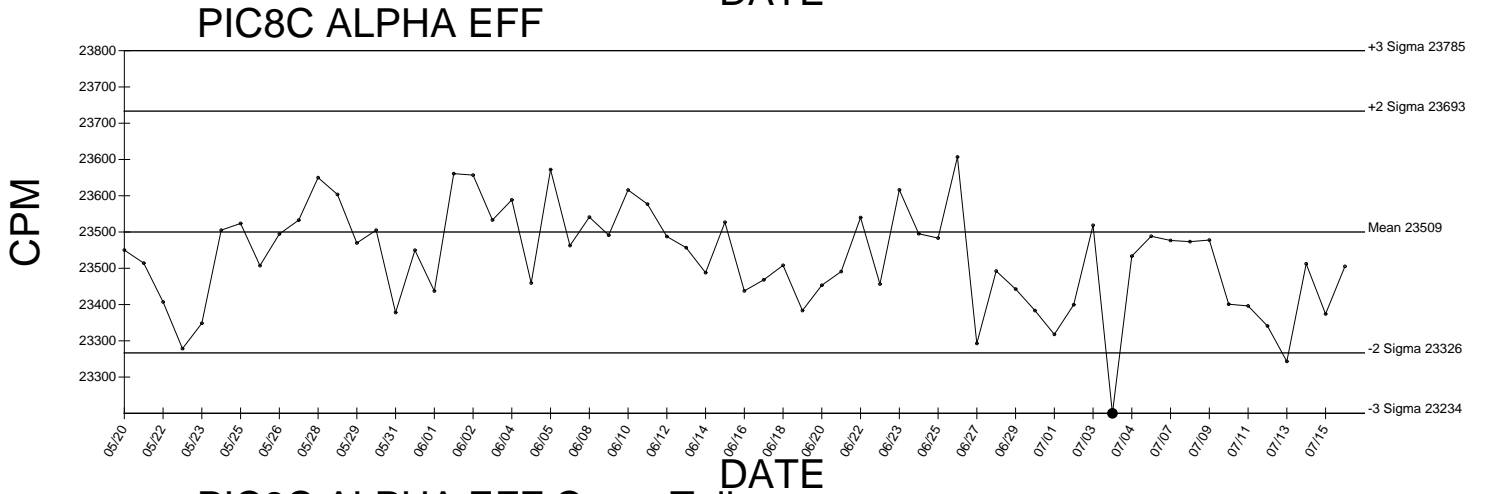
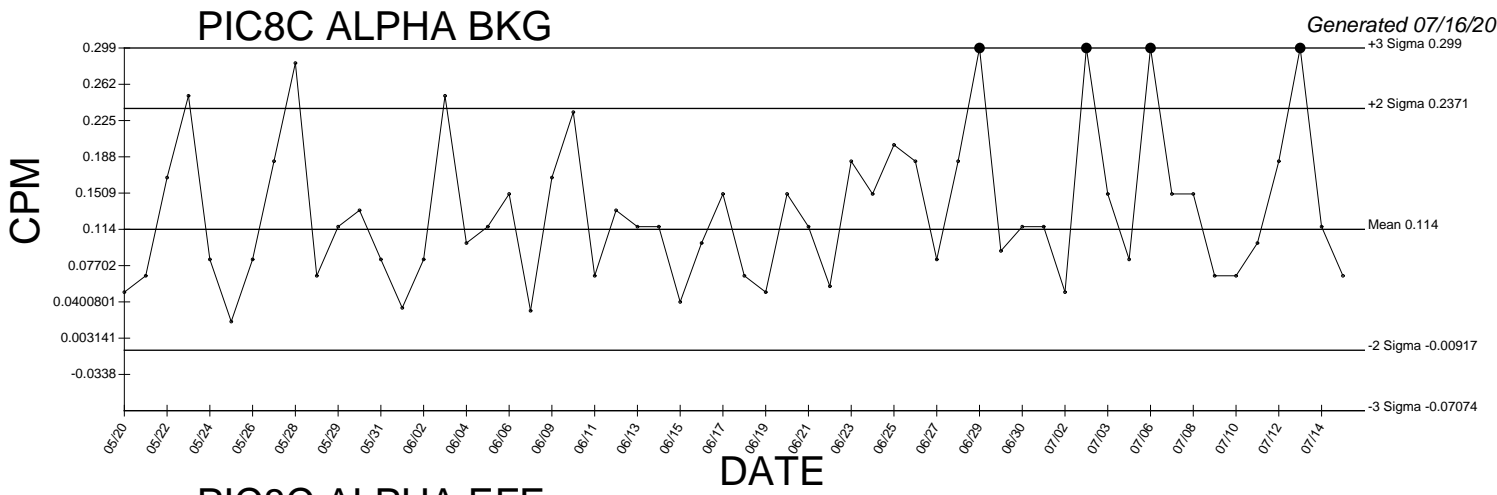
# PIC8A ALPHA EFF Cross Talk



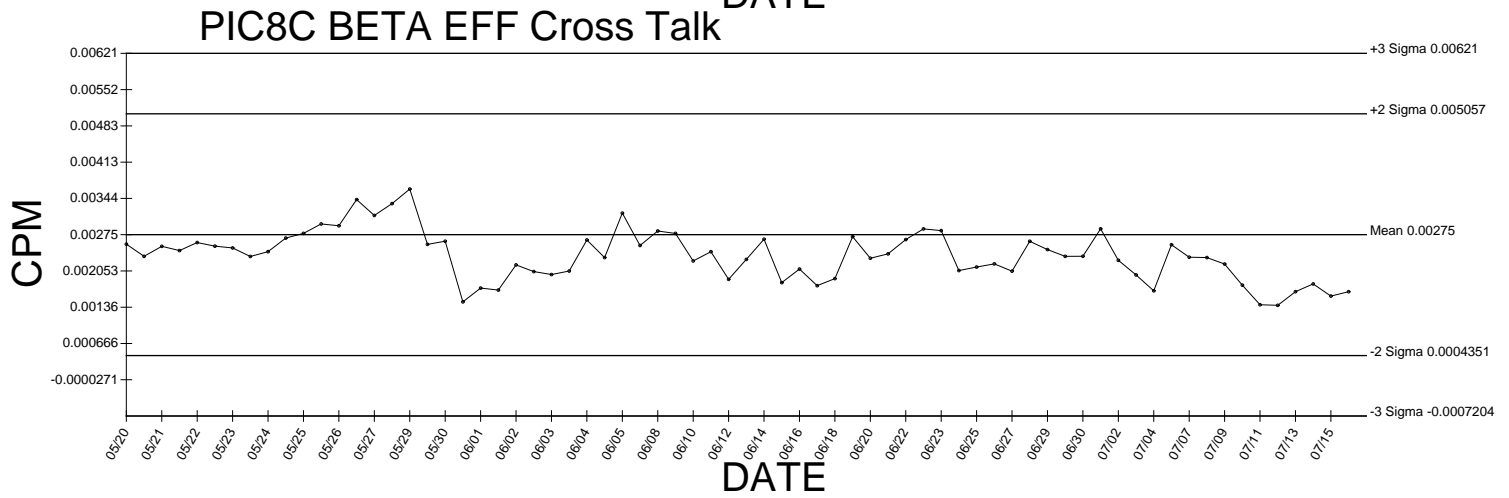
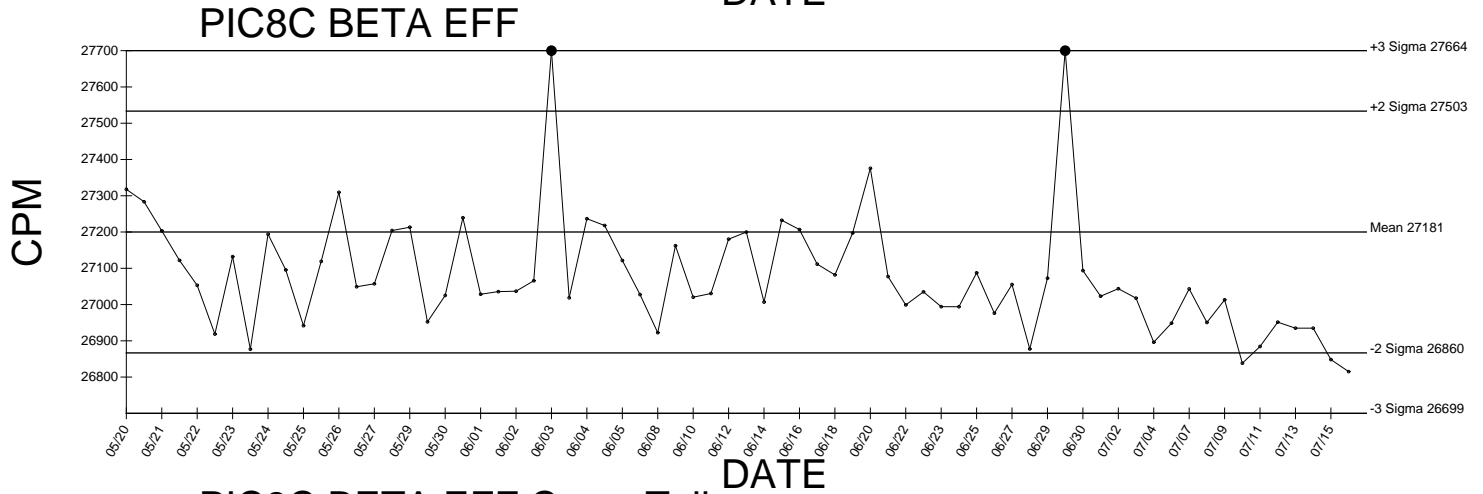
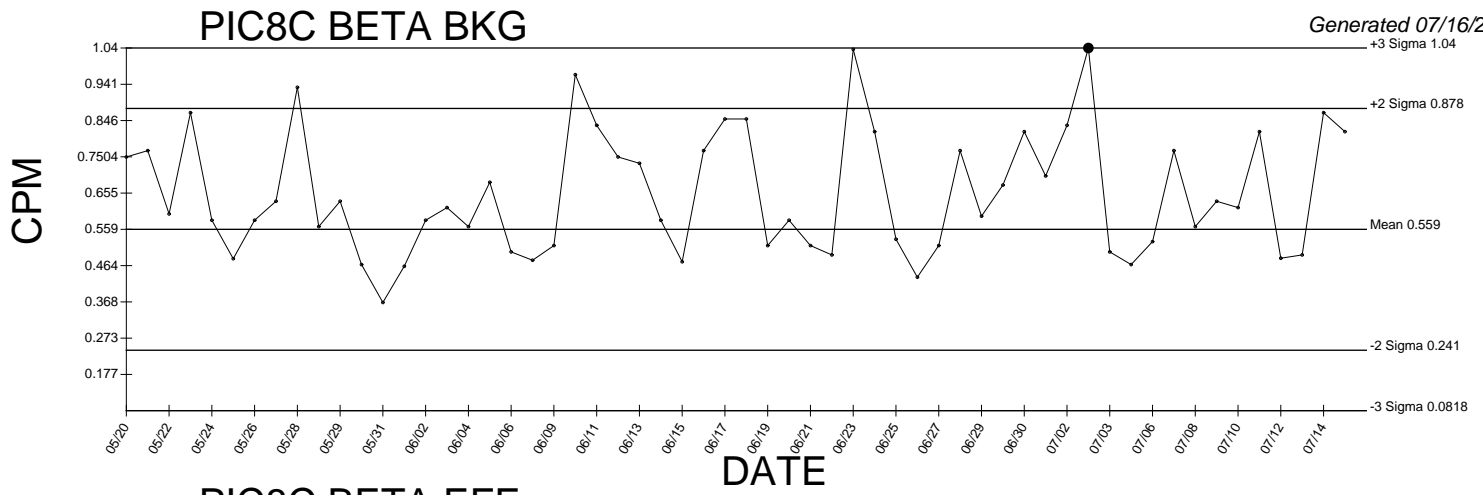
● Denotes Outlier



● Denotes Outlier

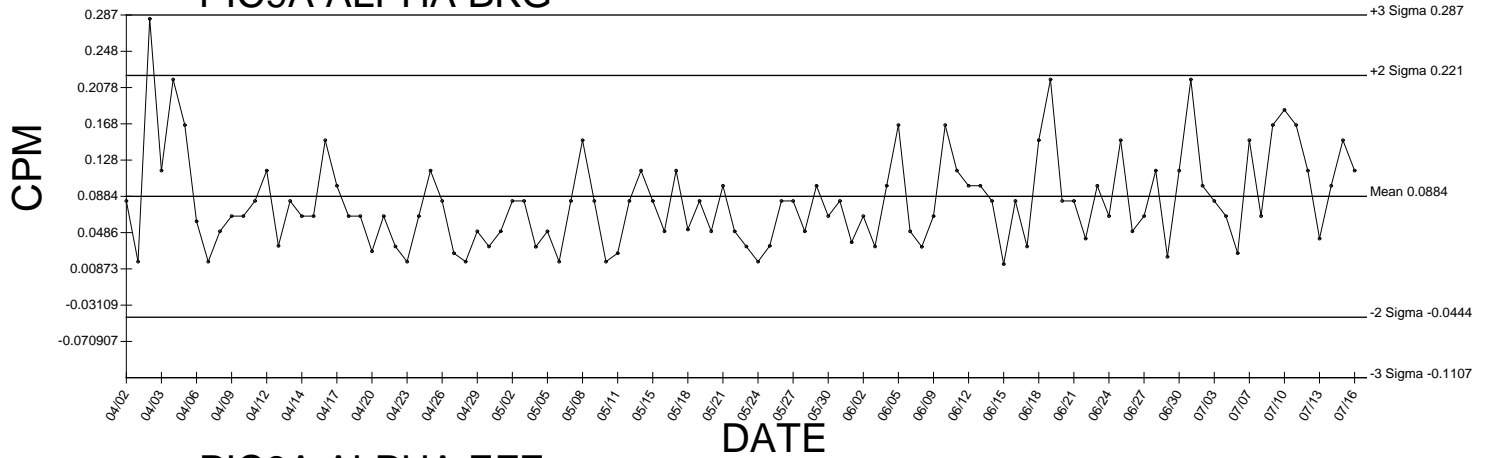


● Denotes Outlier

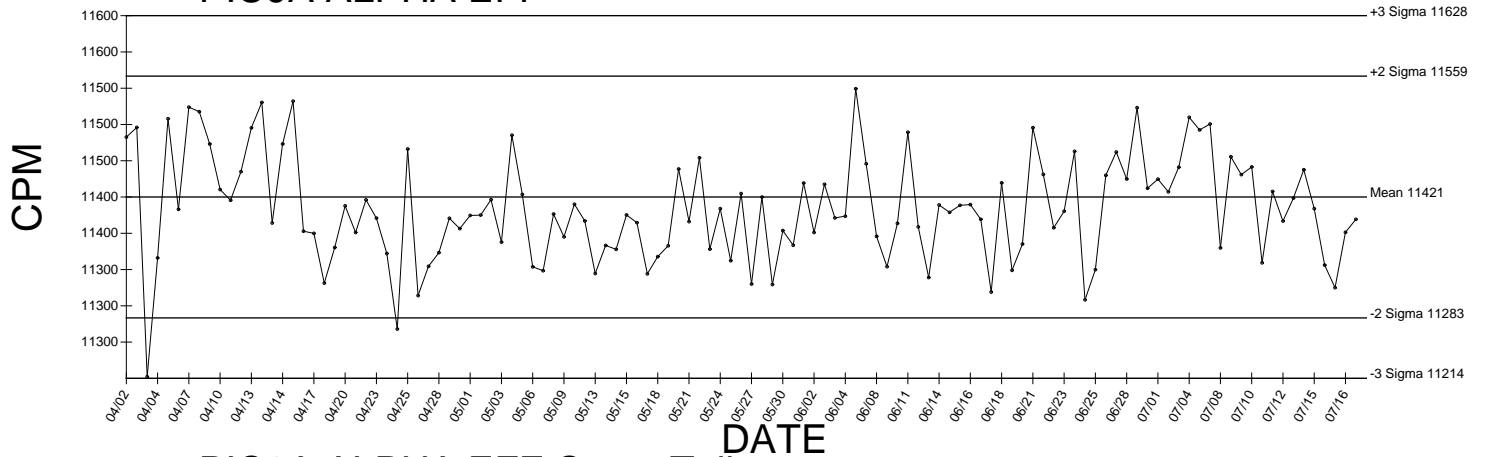


● Denotes Outlier

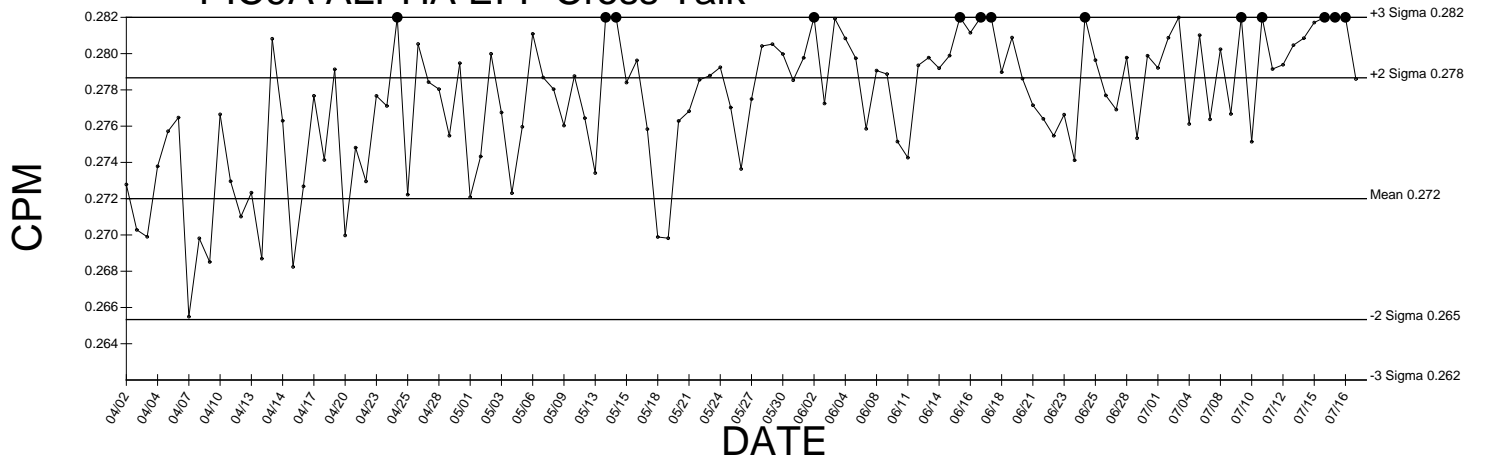
### PIC9A ALPHA BKG



### PIC9A ALPHA EFF



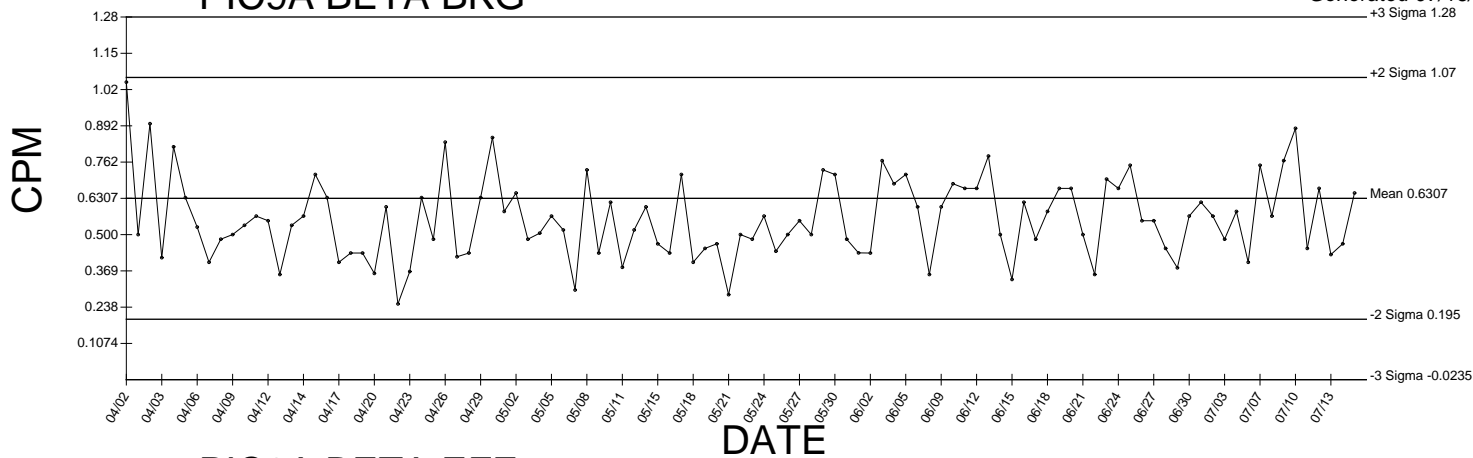
### PIC9A ALPHA EFF Cross Talk



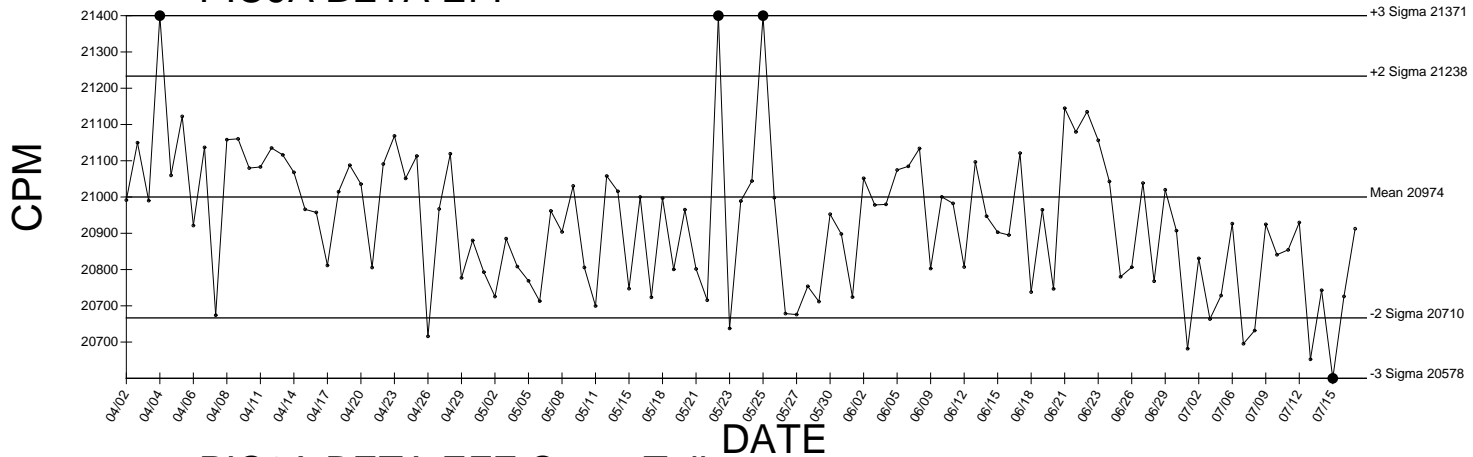
● Denotes Outlier

# PIC9A BETA BKG

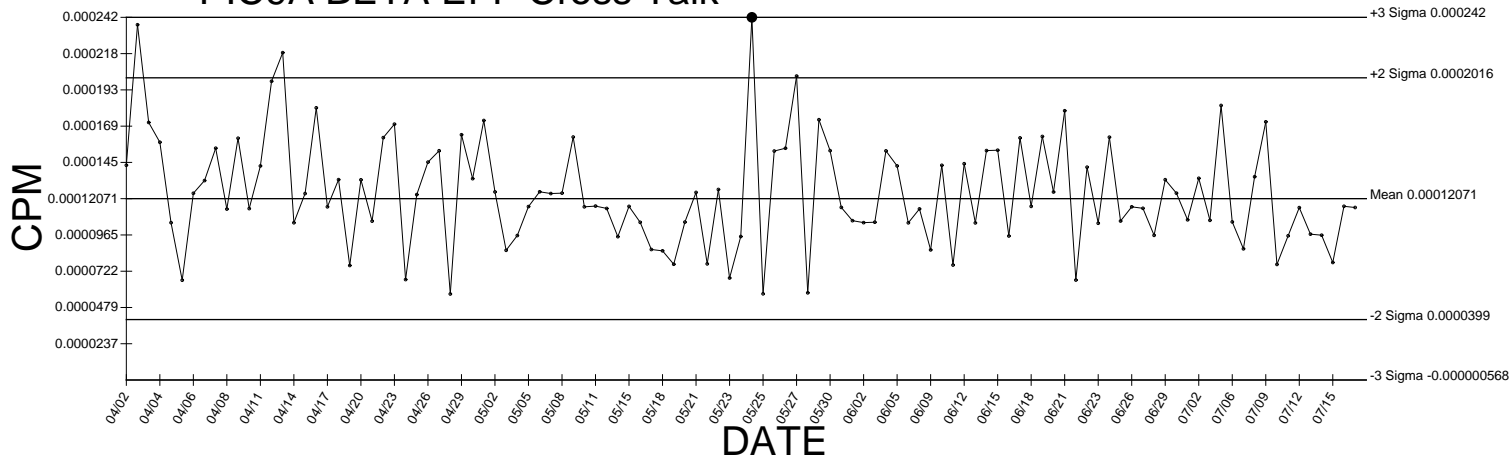
Generated 07/16/2009



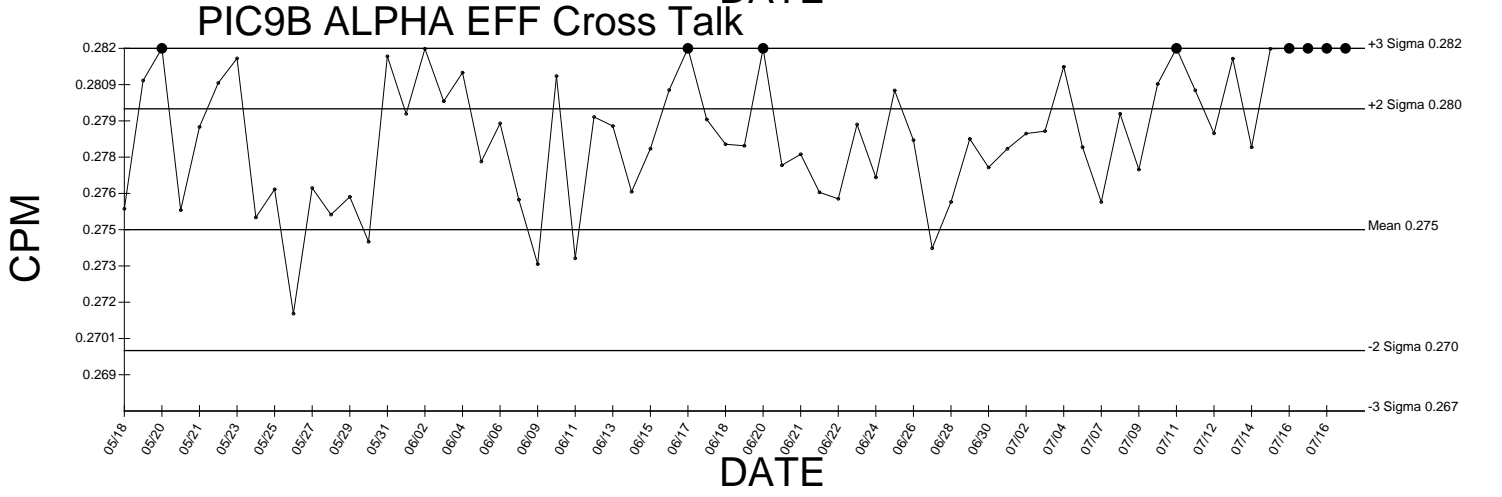
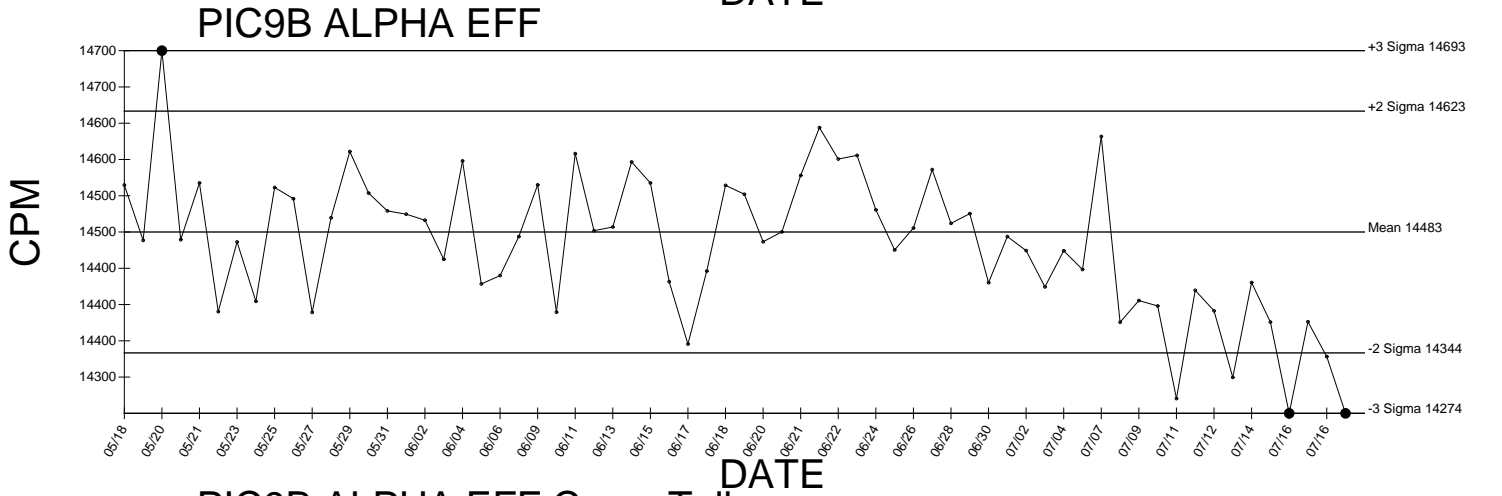
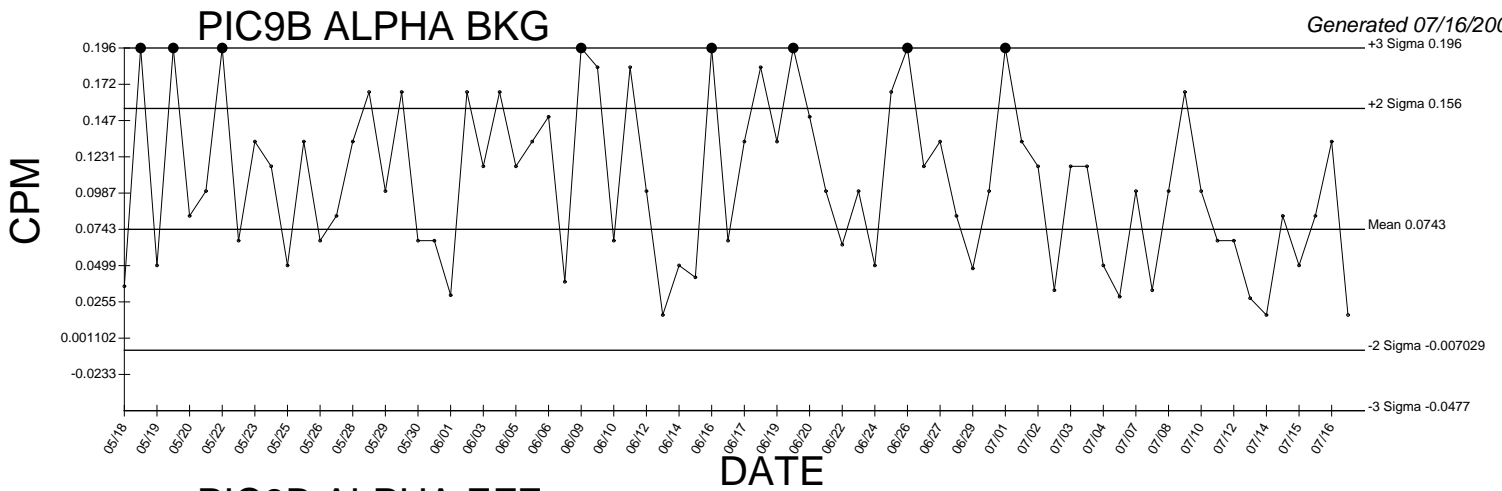
# PIC9A BETA EFF



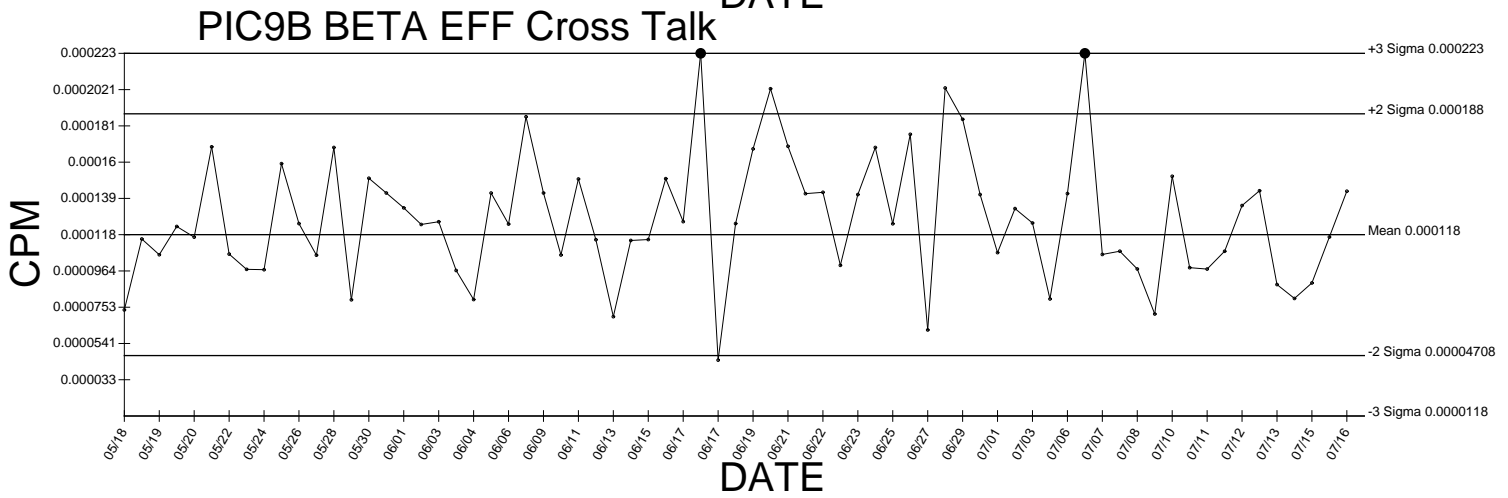
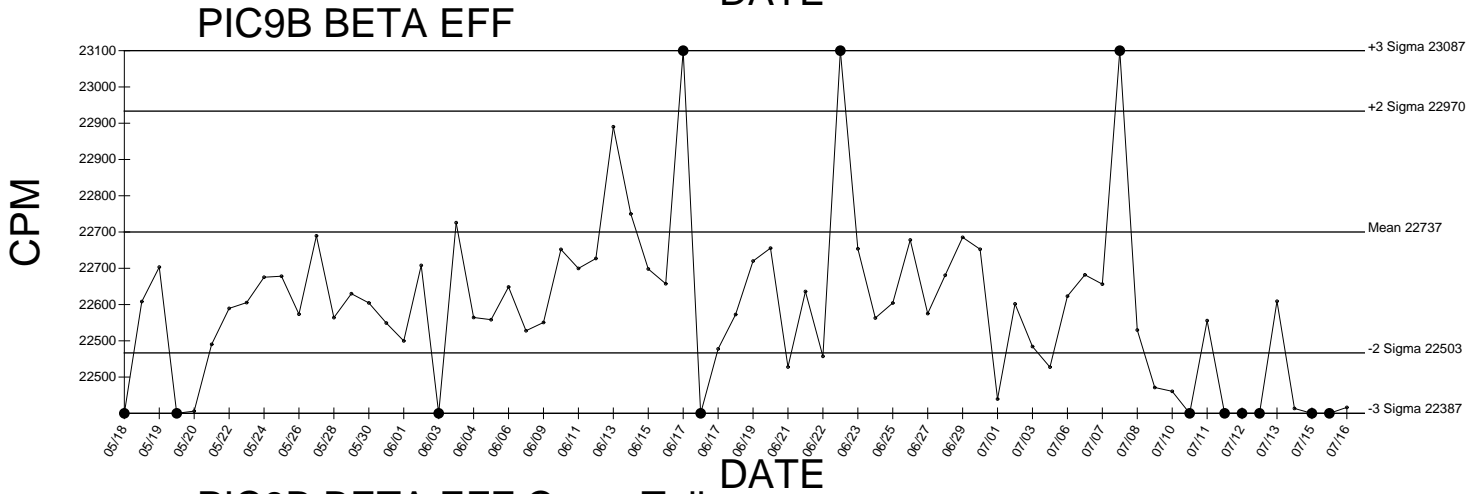
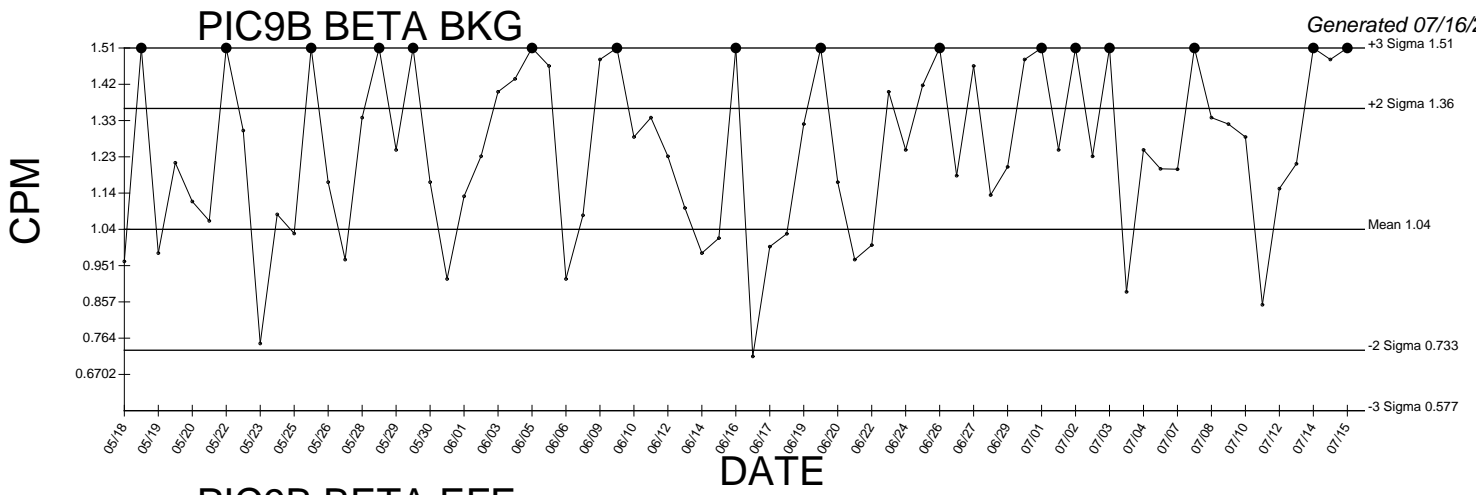
# PIC9A BETA EFF Cross Talk



● Denotes Outlier

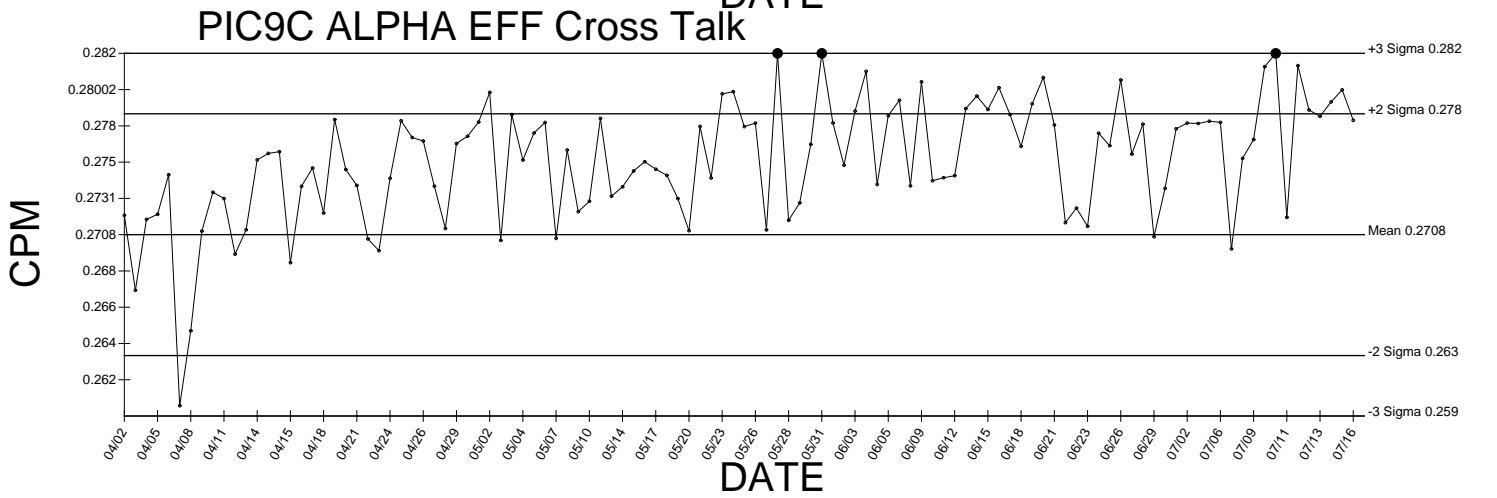
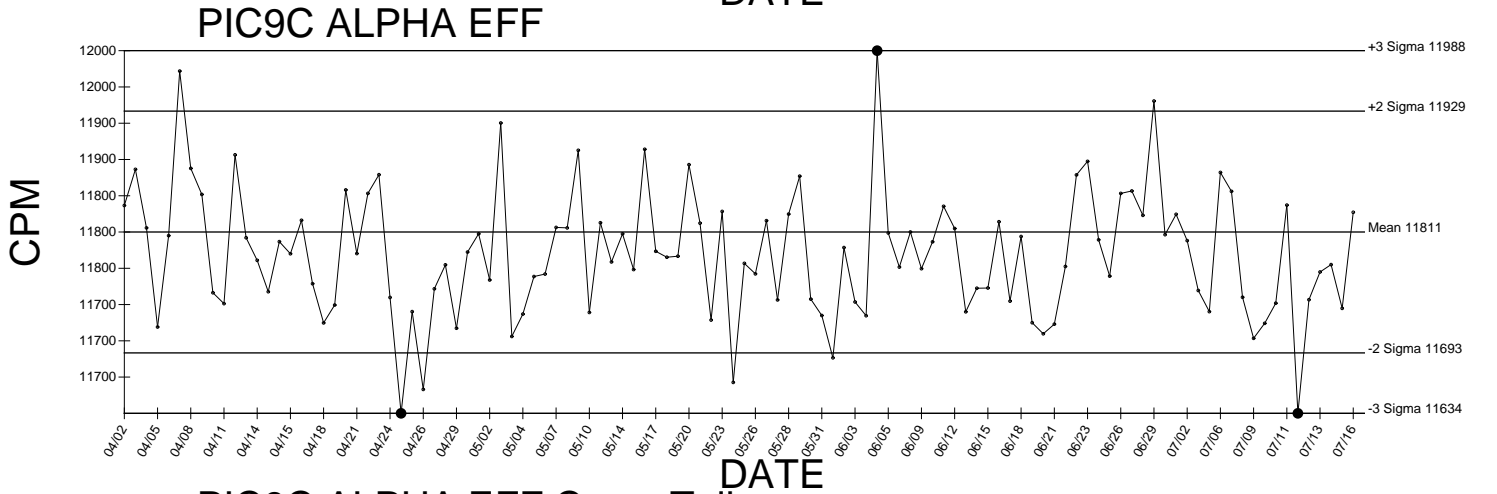
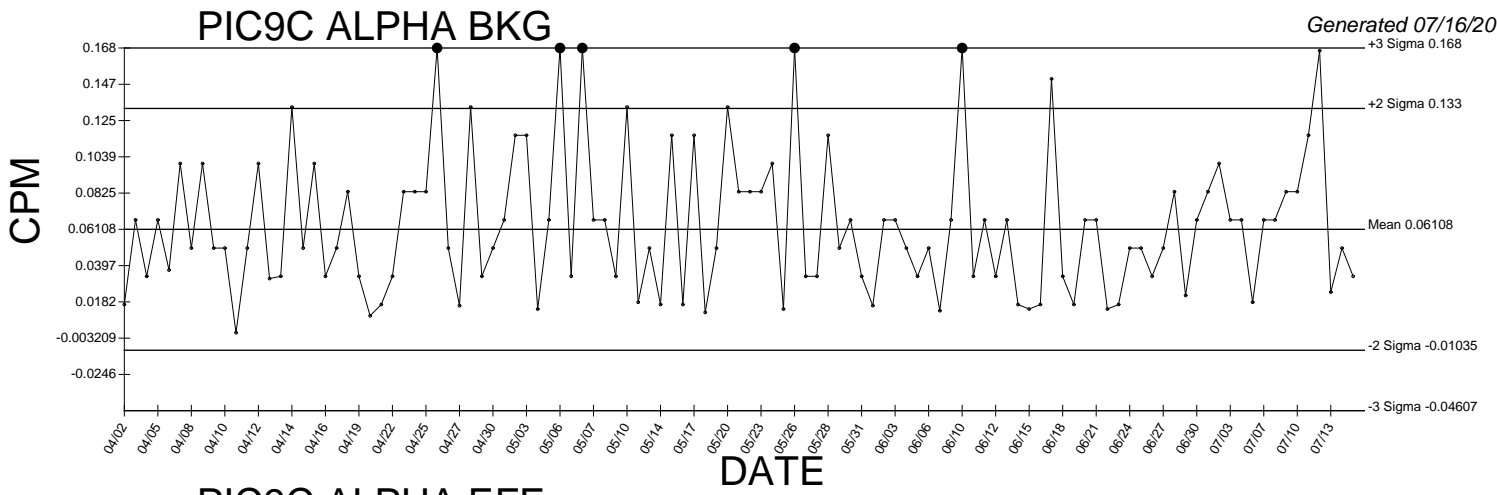


● Denotes Outlier

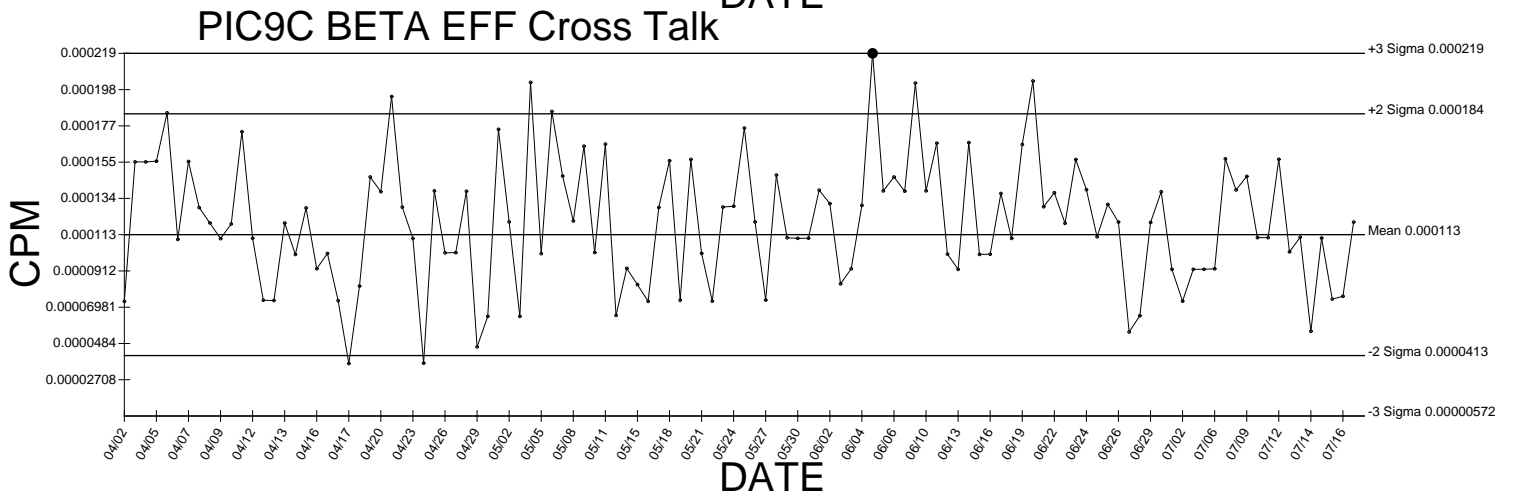
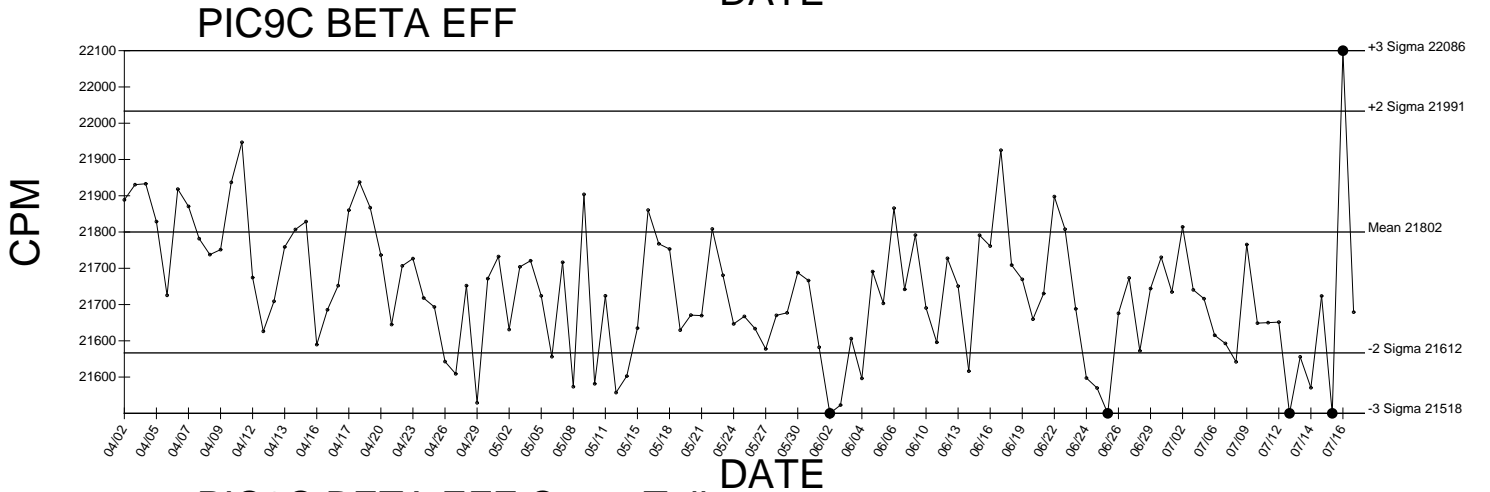
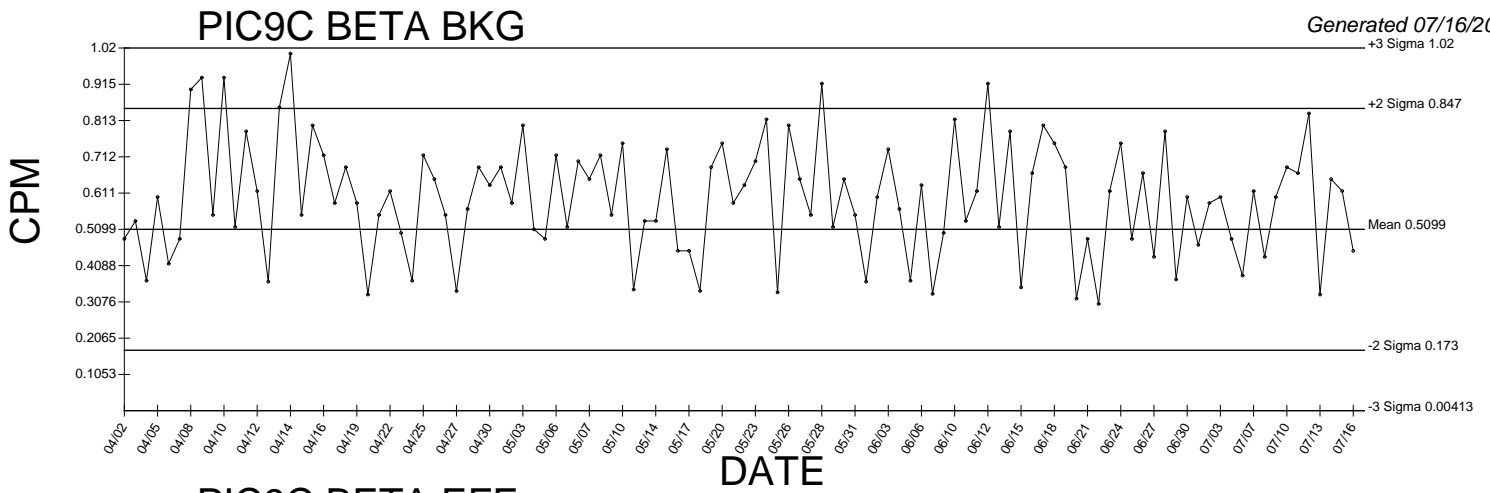


● Denotes Outlier



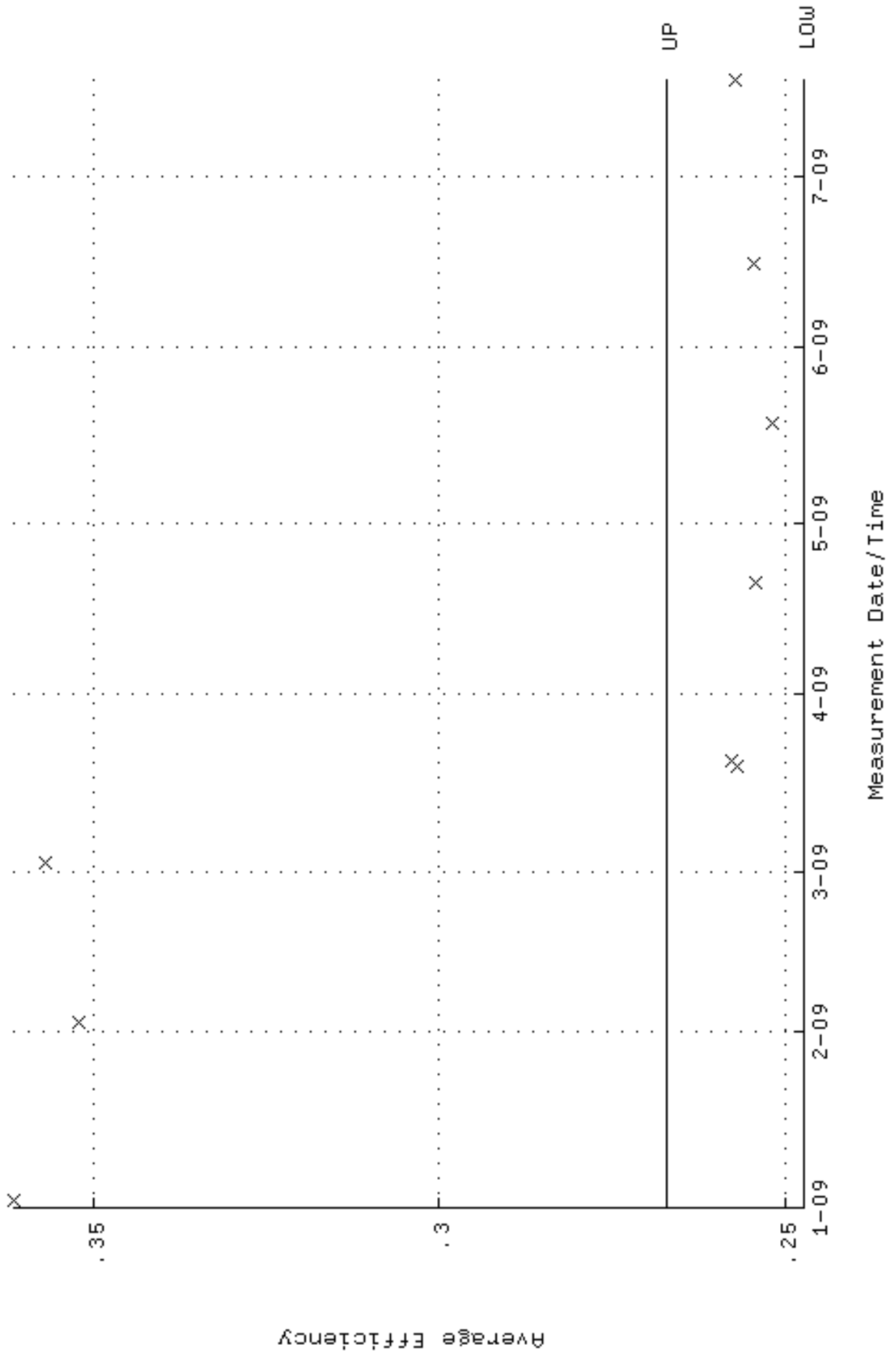


● Denotes Outlier

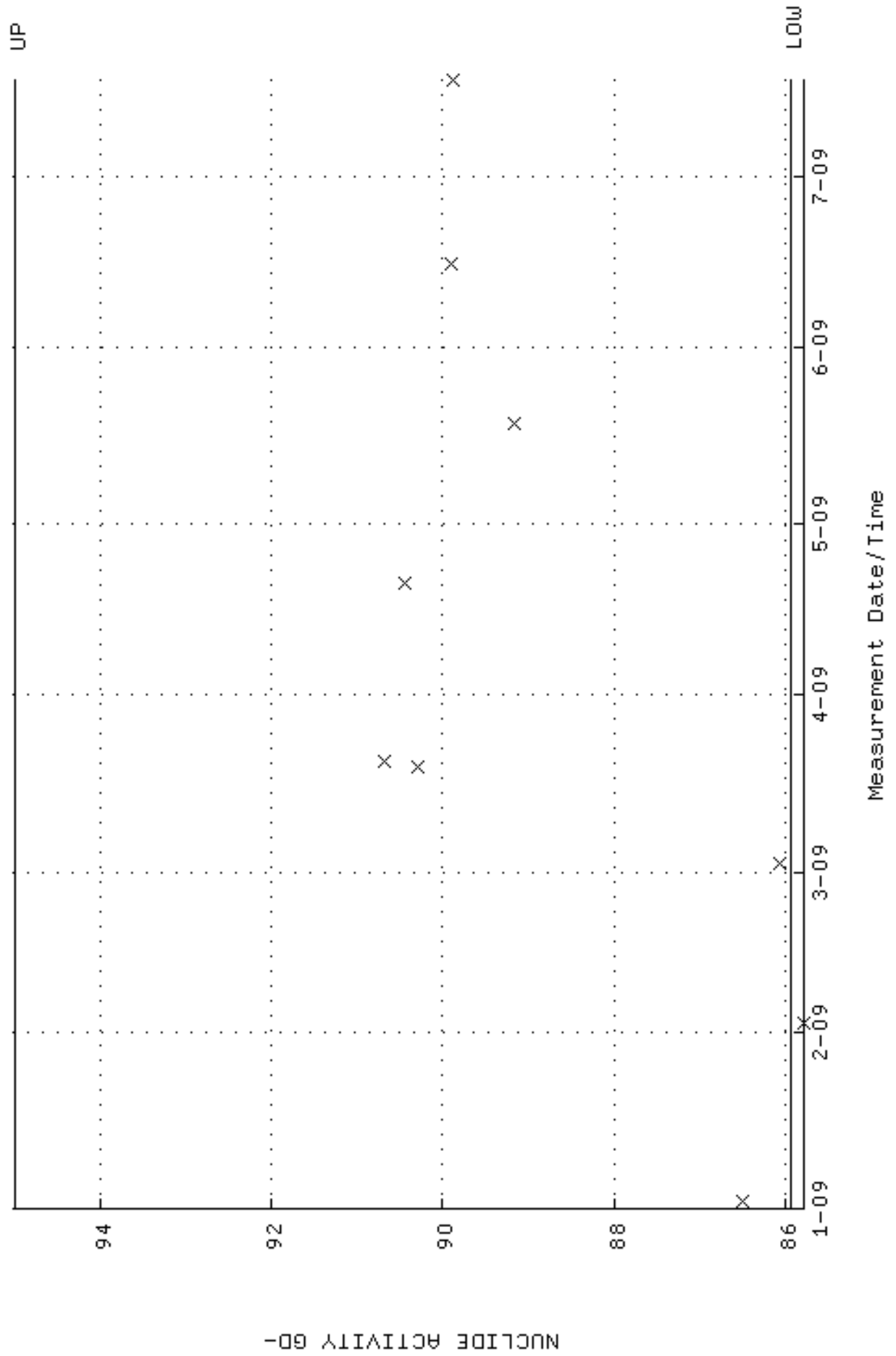


● Denotes Outlier

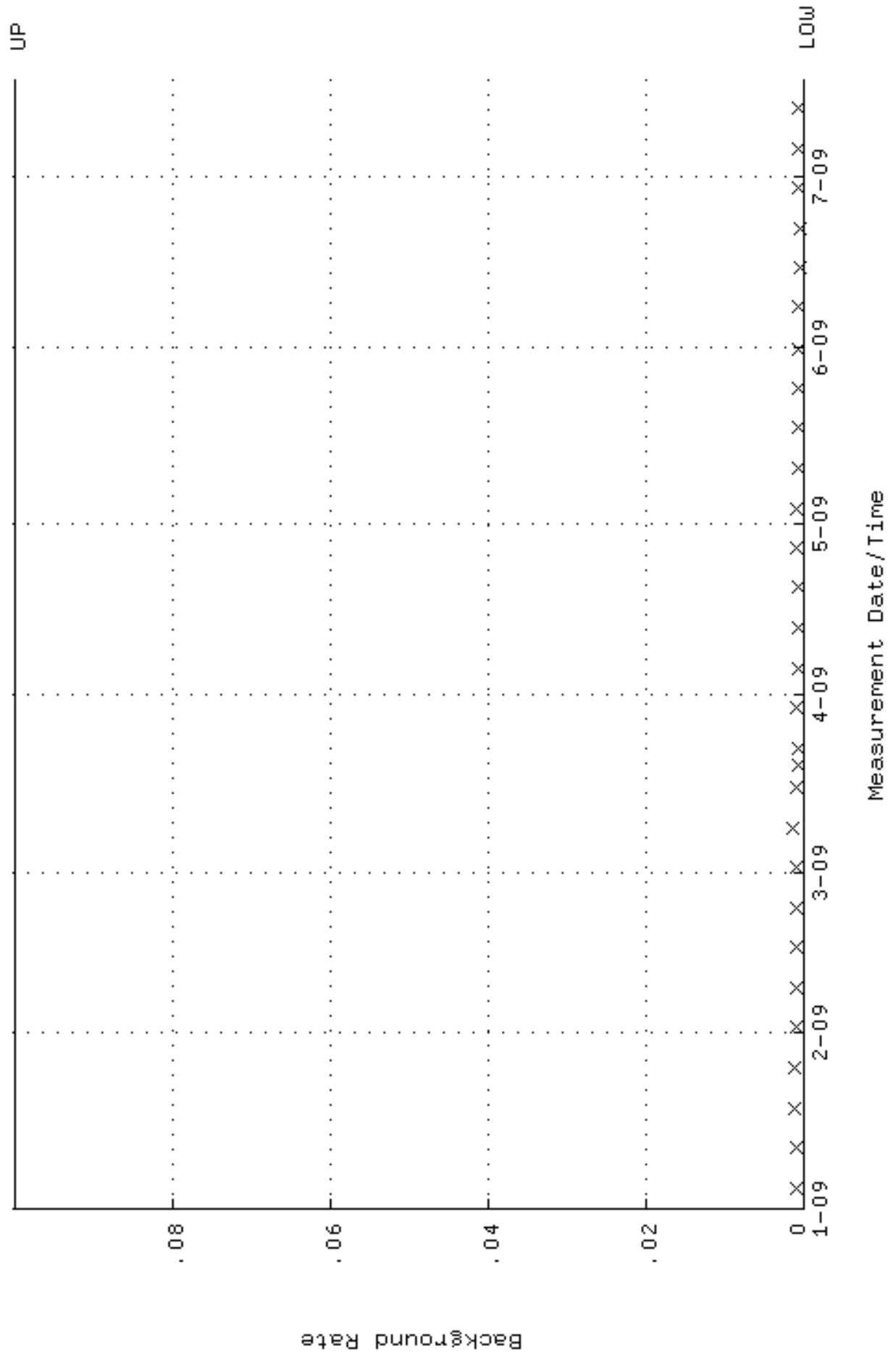
QA filename : DKA100:[ENV\_ALPHA.QA.W]W131.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:10 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.247185 through 0.267185



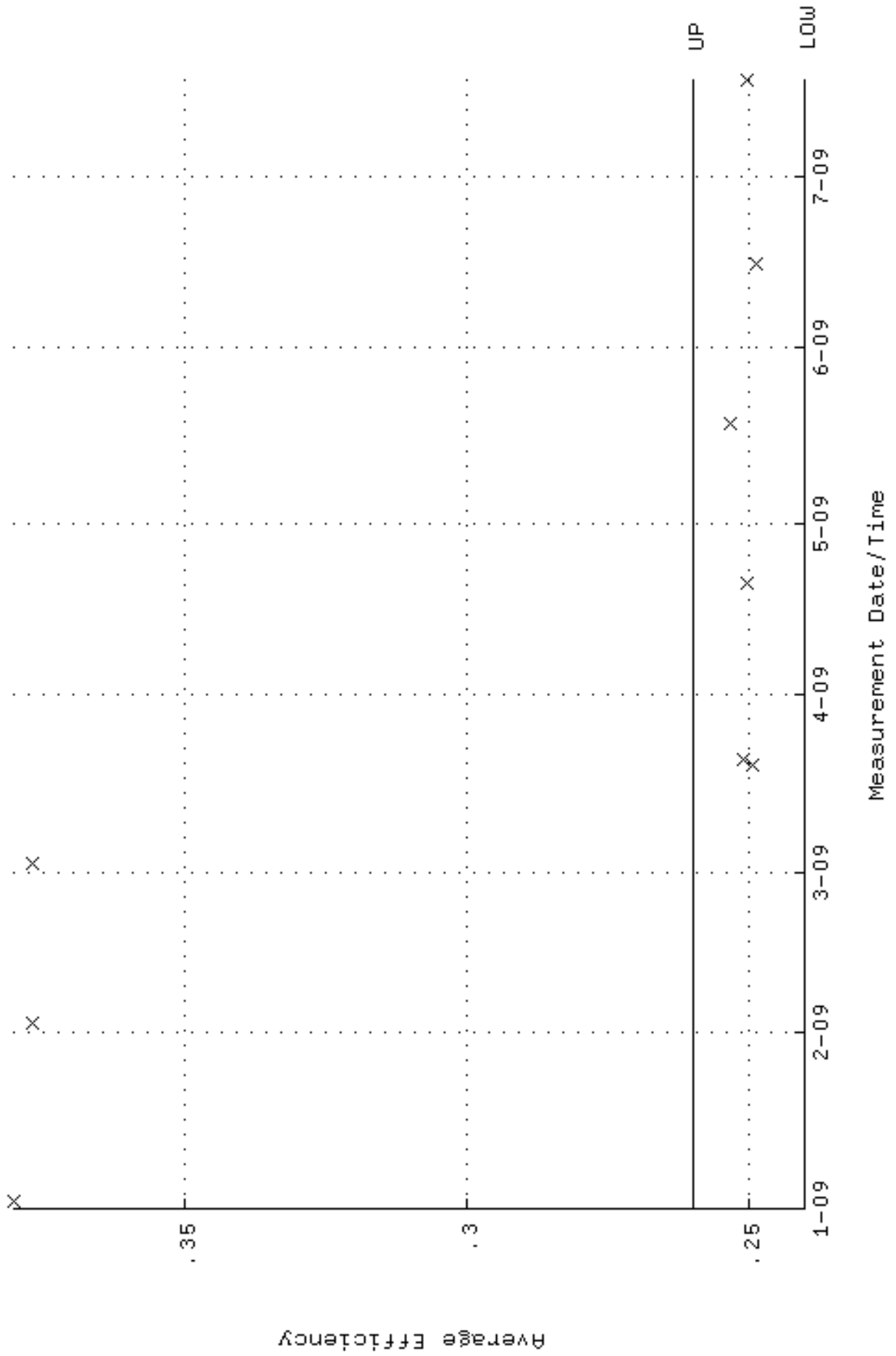
QA filename : DKA100:[ENV\_ALPHA.QA.W]w131.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:24:10 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.9407 through 94.9871



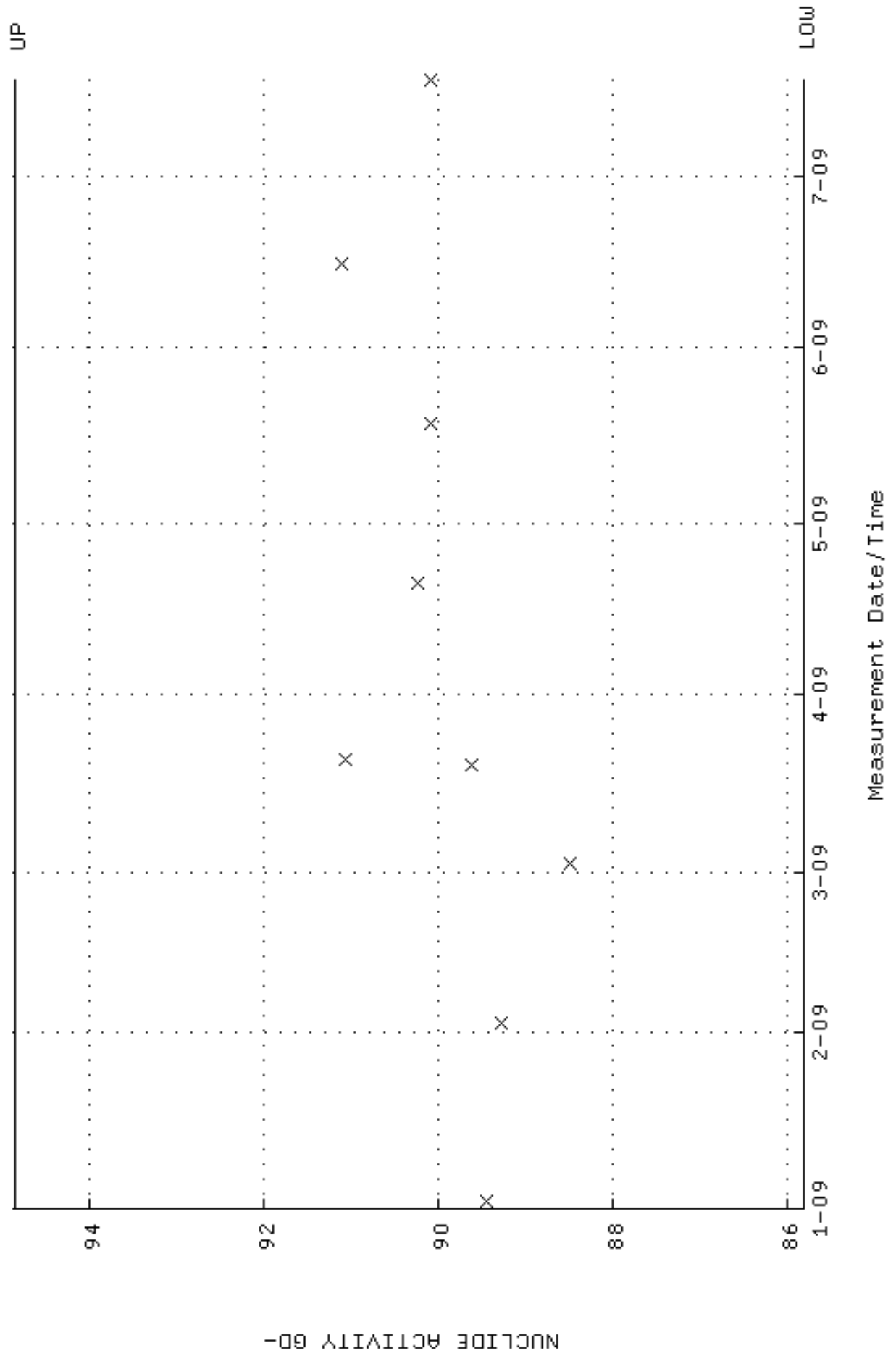
QA filename : DKA100:[ENV\_ALPHA.QA.B]B131.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:06 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



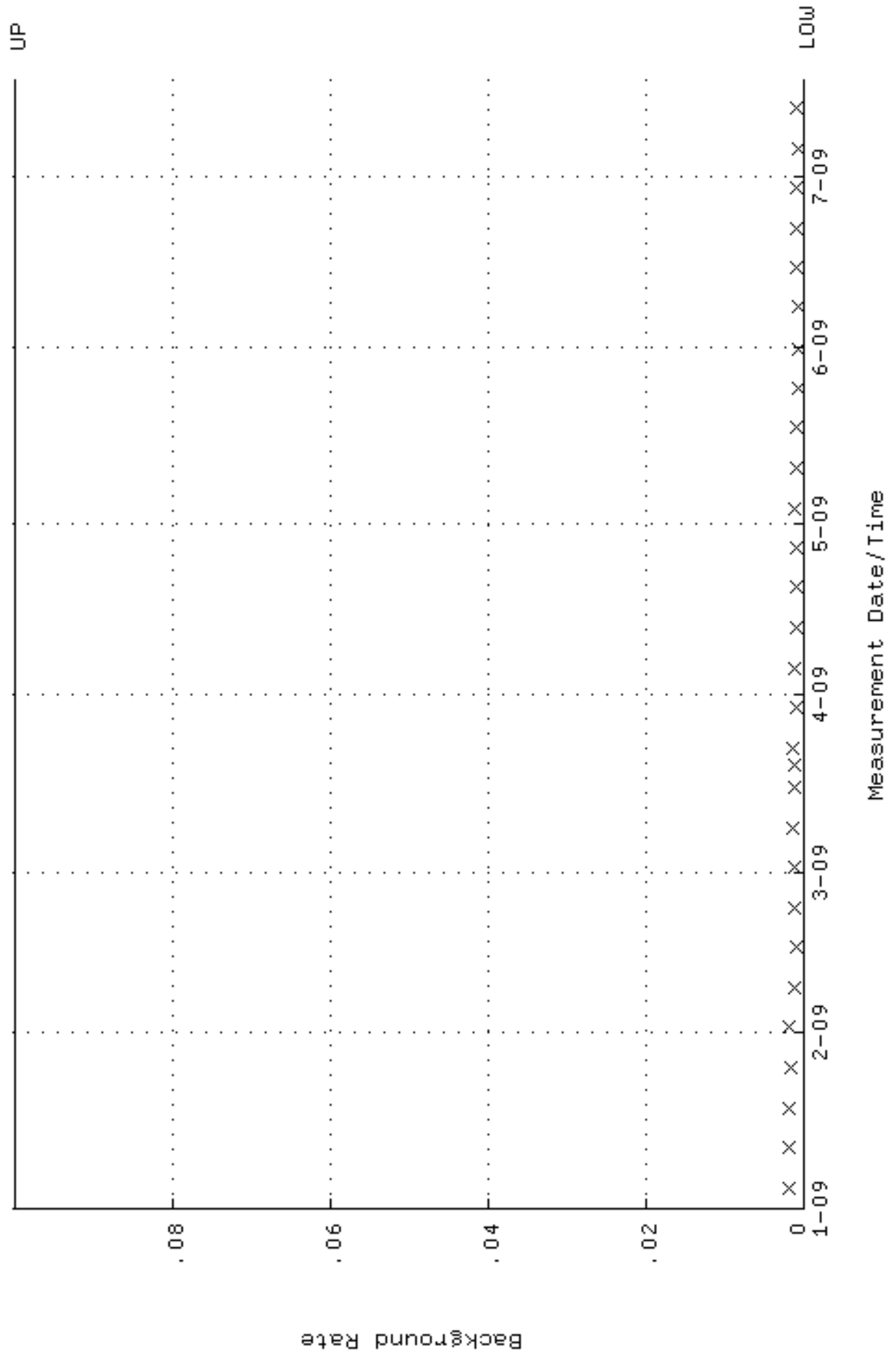
QA filename : DKA100:[ENV\_ALPHA.QA.W]W139.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:47 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.240299 through 0.260299



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 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.8145 through 94.8477

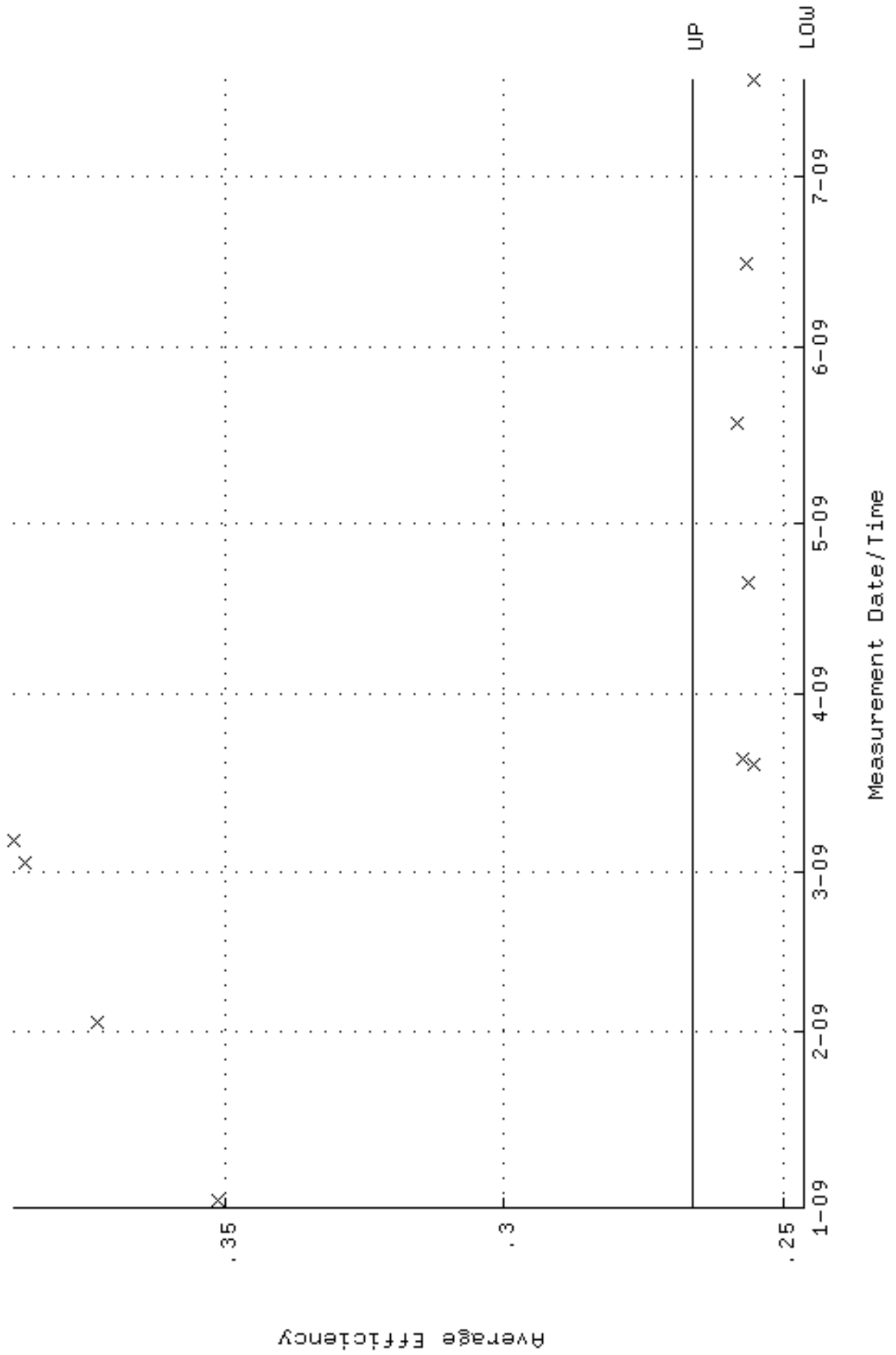


QA filename : DKA100:[ENV\_ALPHA.QA.B]B139.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:39 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

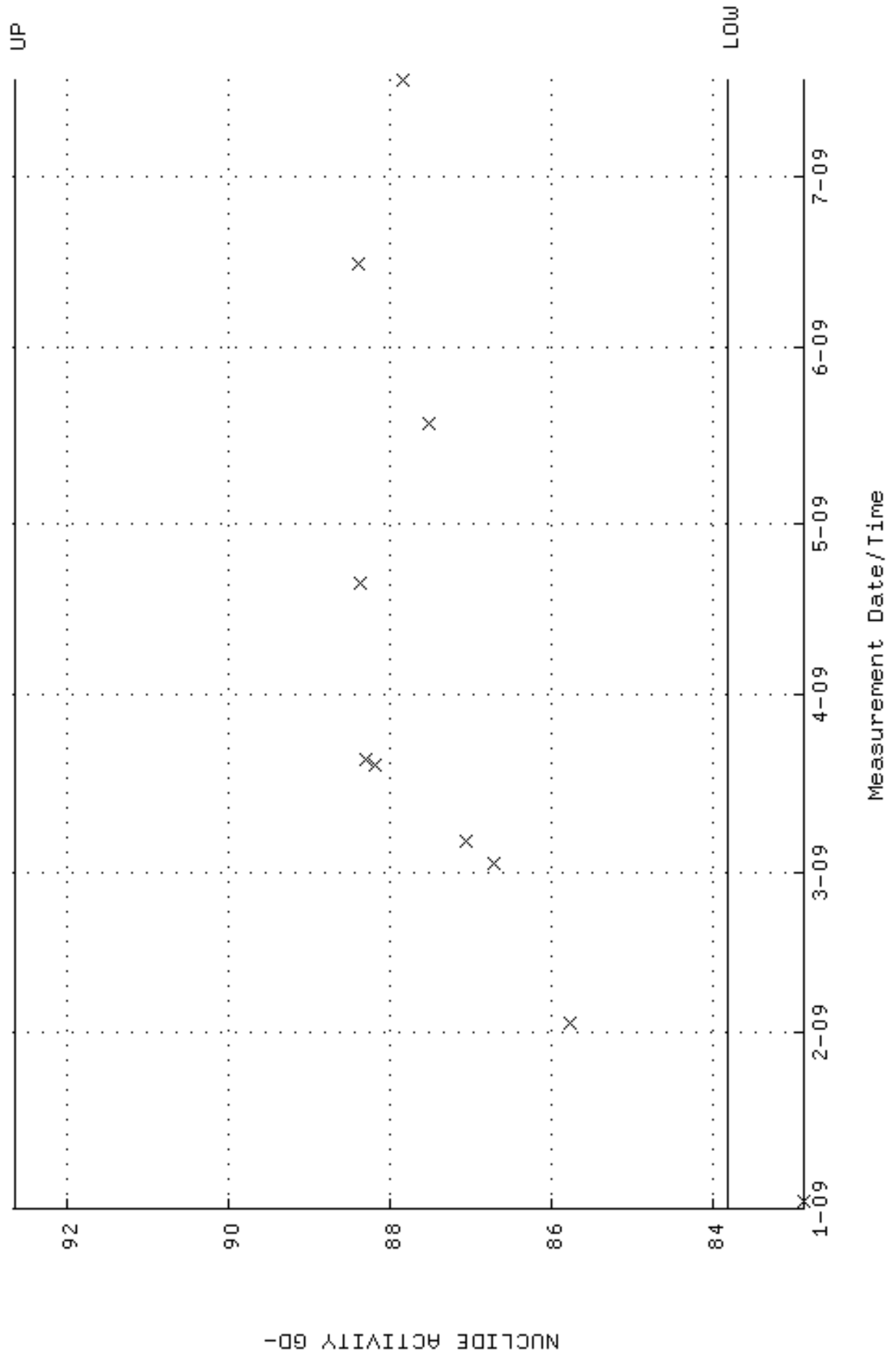




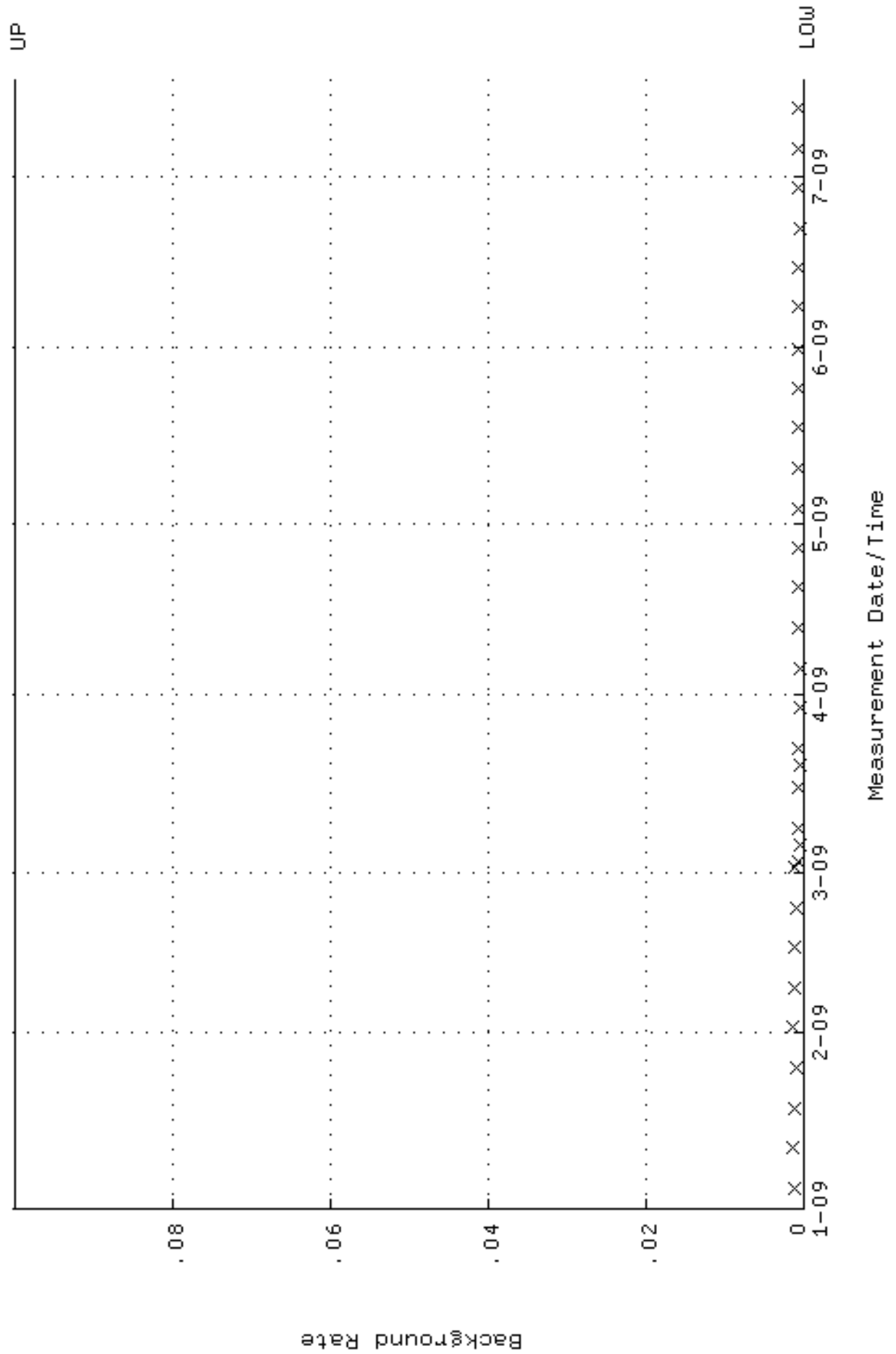
QA filename : DKA100:[ENV\_ALPHA.QA.W]W140.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:52 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.246178 through 0.266178



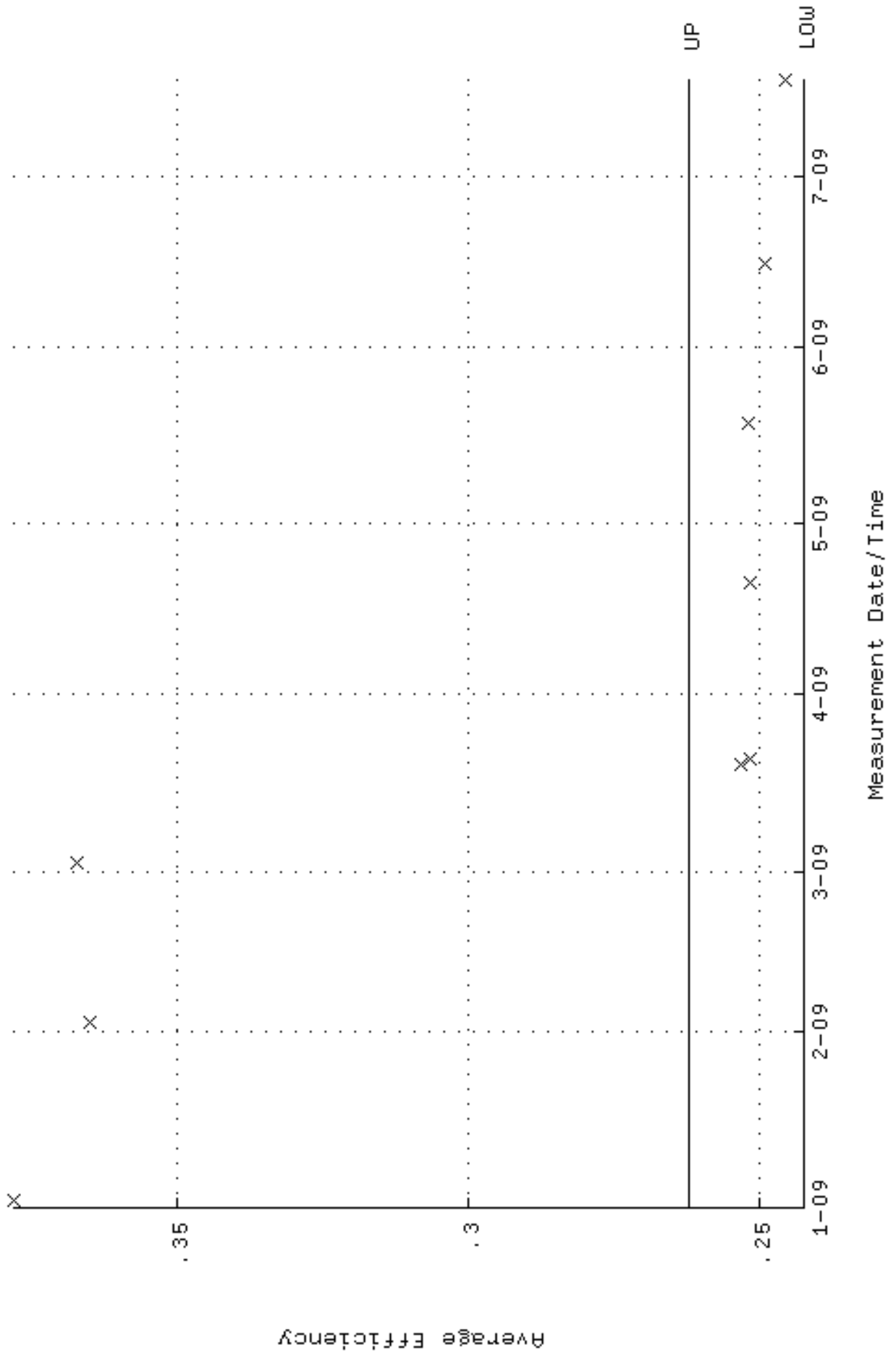
QA filename : DKA100:[ENV\_ALPHA.QA.W]w140.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:24:52 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 83.8171 through 92.6399



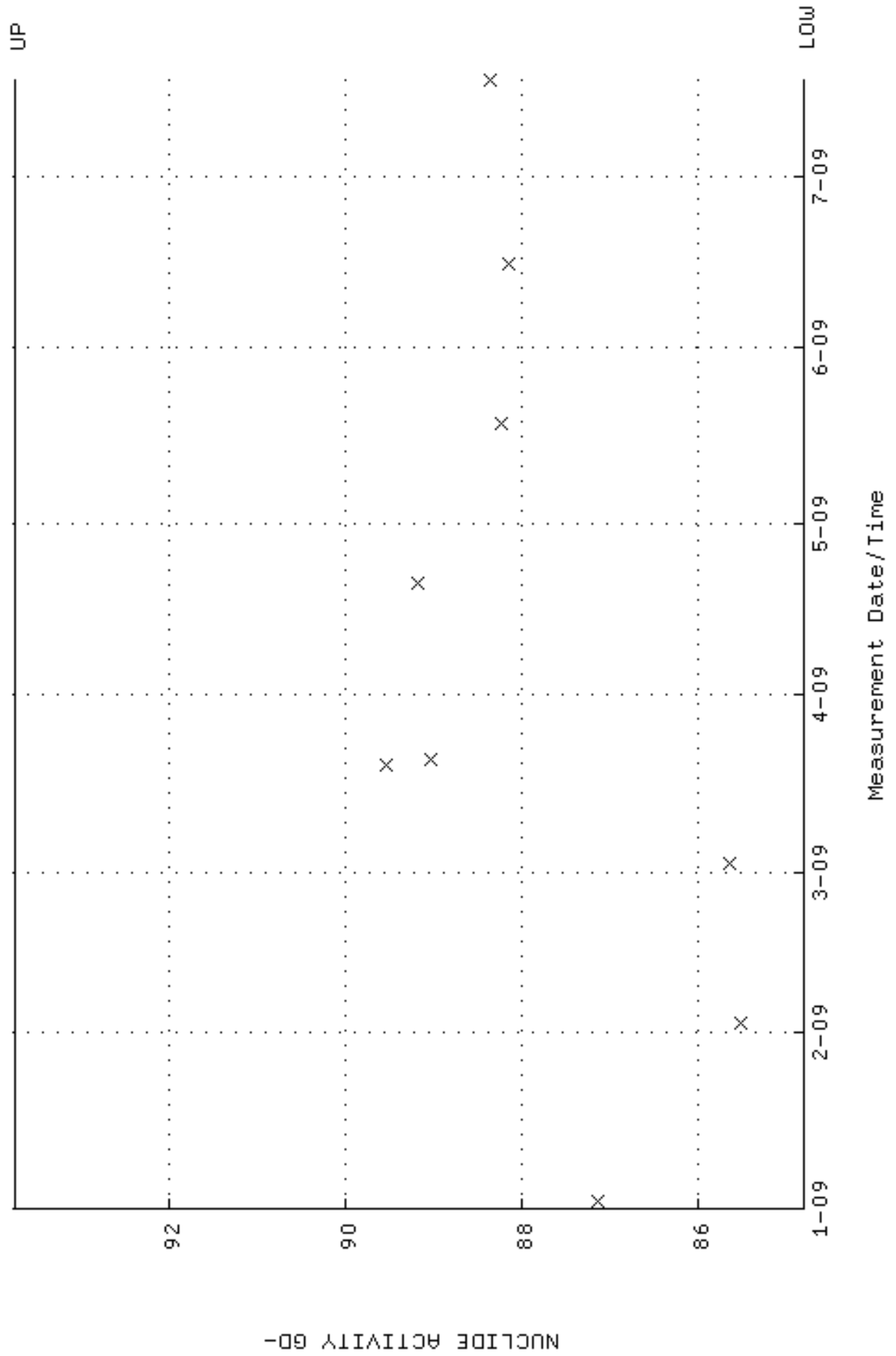
QA filename : DKA100:[ENV\_ALPHA.QA.B]B140.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:43 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



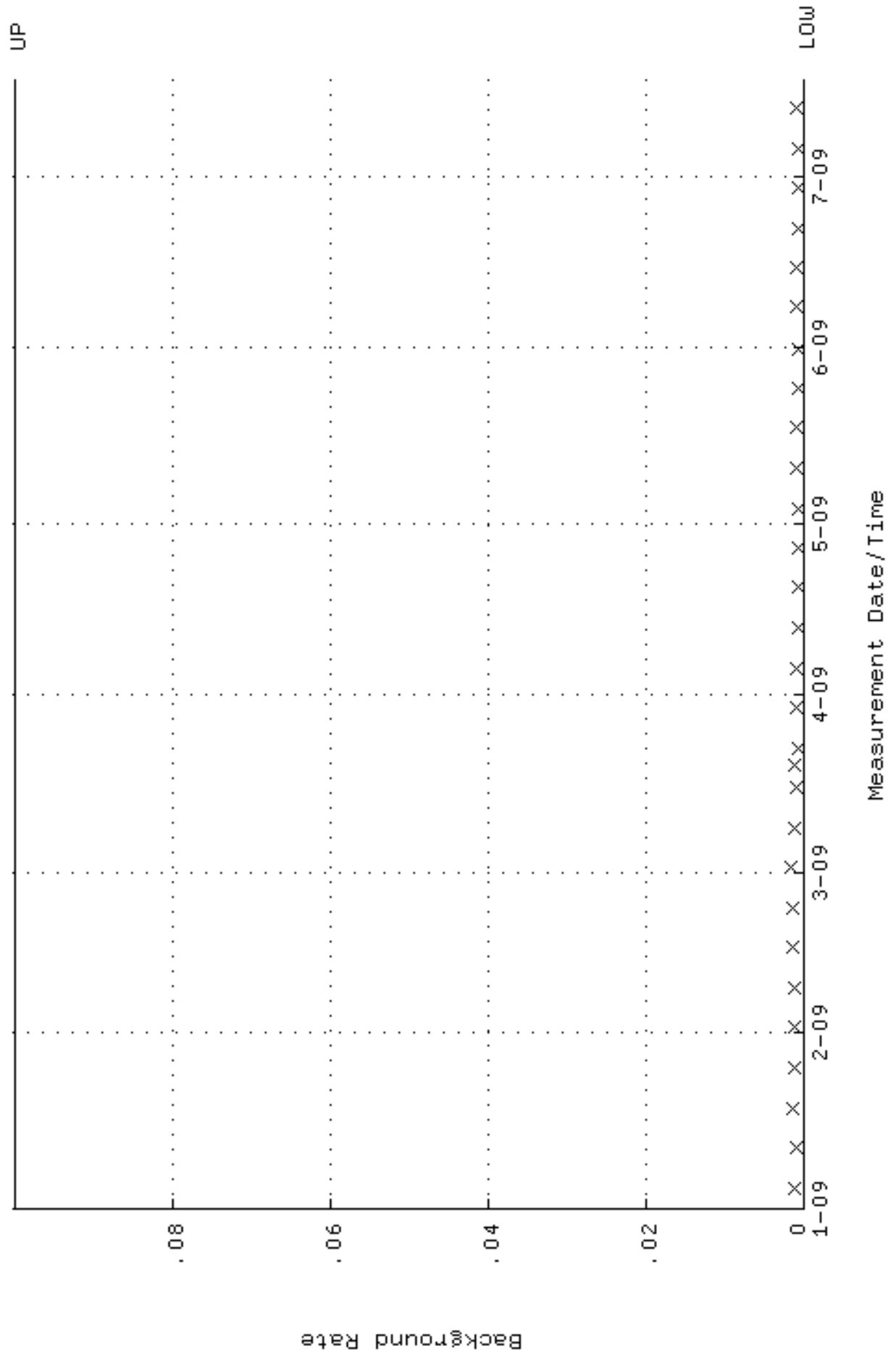
QA filename : DKA100:[ENV\_ALPHA.QA.W]W149.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:32 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.242495 through 0.262495



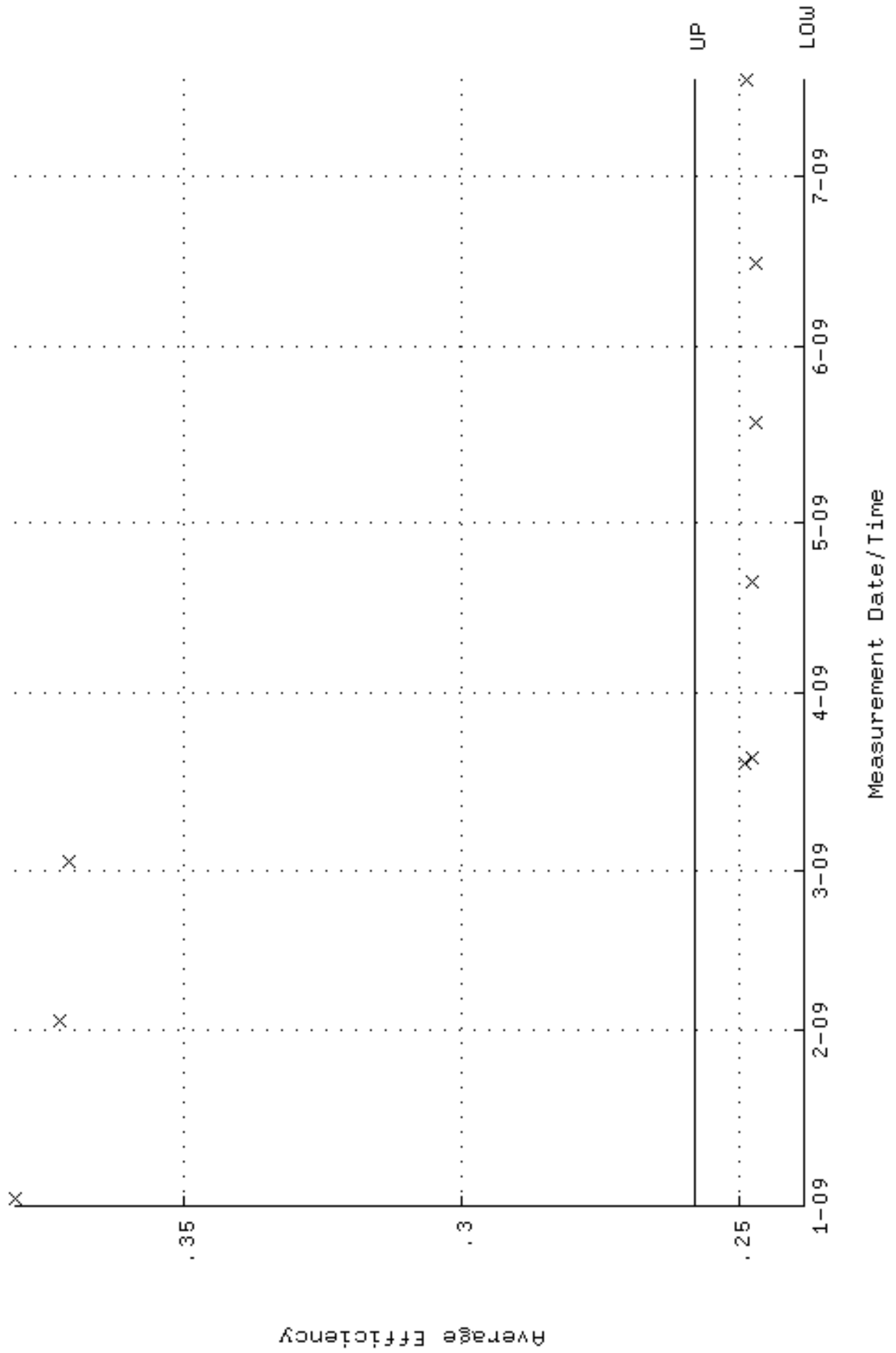
QA filename : DKA100:[ENV\_ALPHA.QA.W]w149.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:25:32 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.8126 through 93.7402



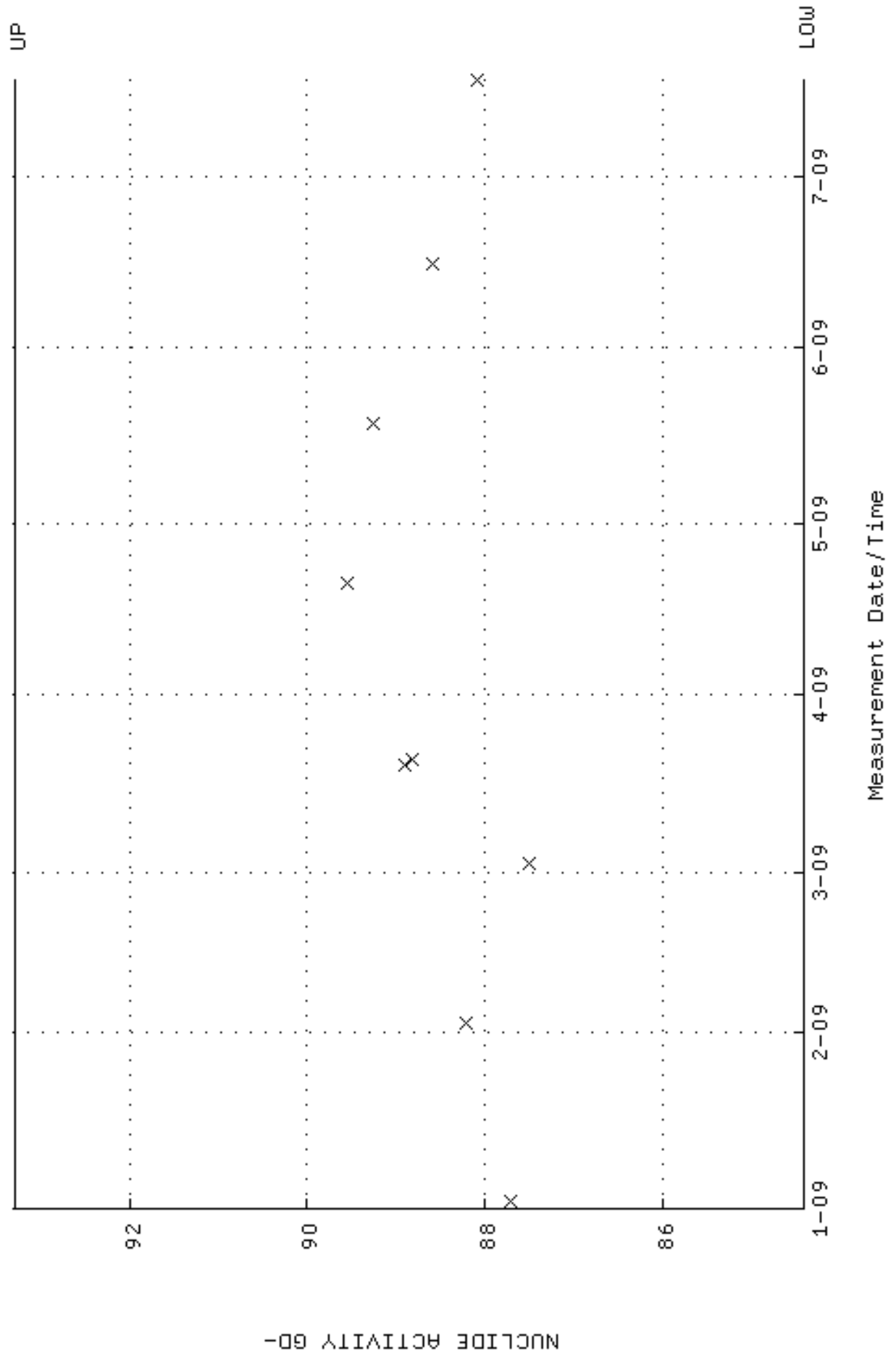
QA filename : DKA100:[ENV\_ALPHA.QA.B]B149.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:21 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W150.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:37 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.238314 through 0.258314

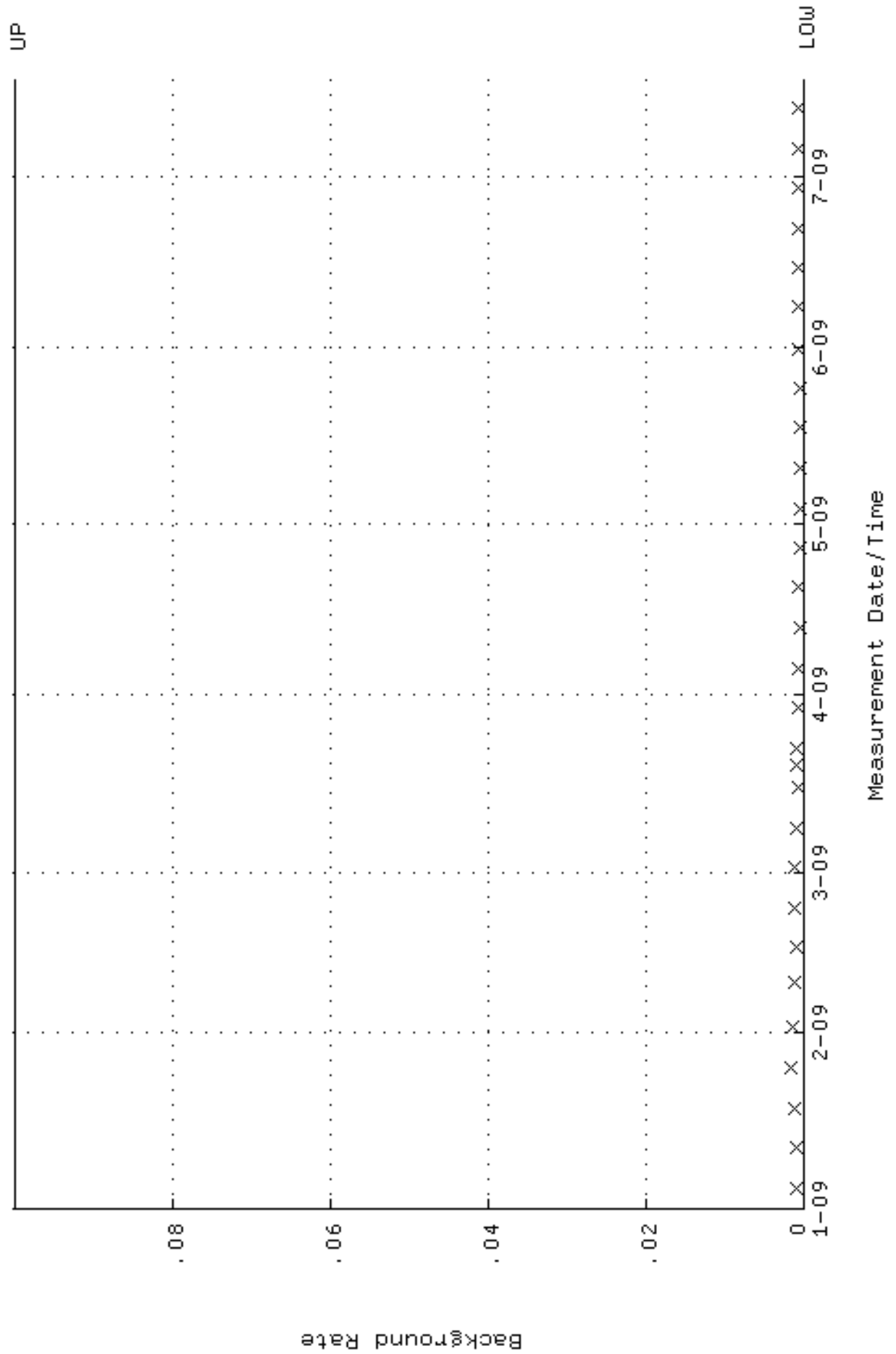


QA filename : DKA100:[ENV\_ALPHA.QA.W]w150.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 2-JAN-2009 07:25:37 through 17-JUL-2009 12:00:00  
Lower/Upper Lmts: 84.4039 through 93.2885

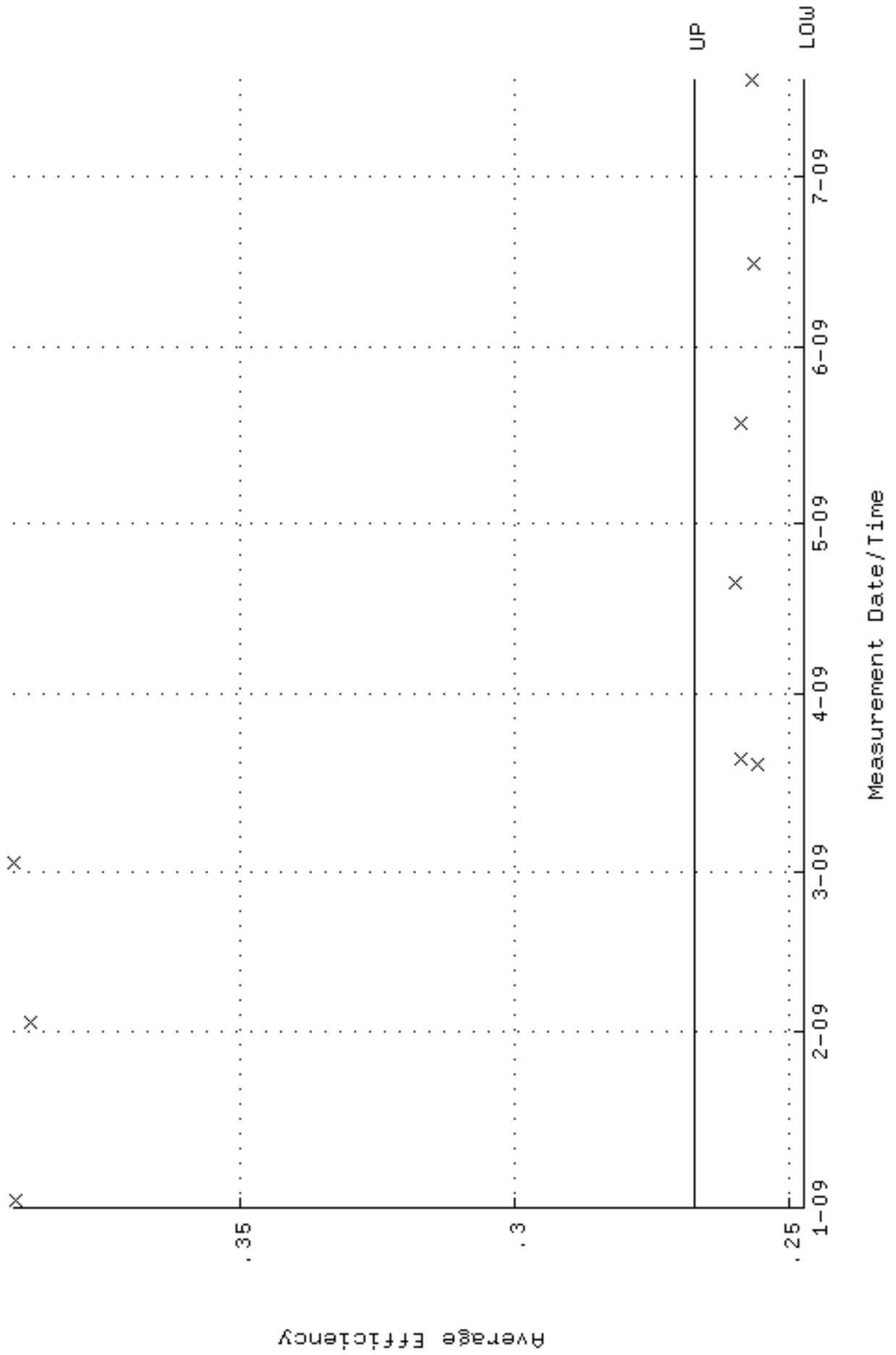




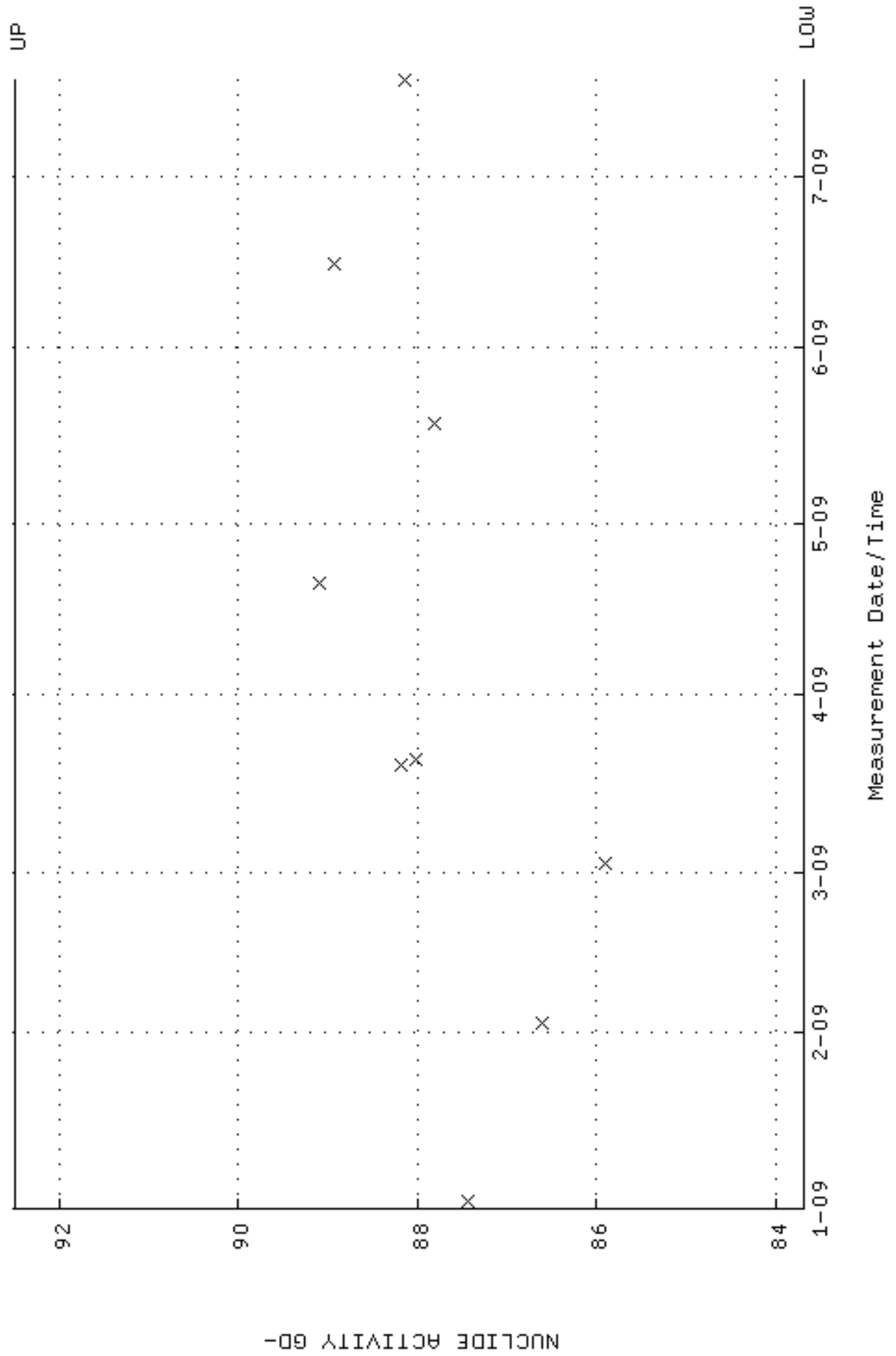
QA filename : DKA100:[ENV\_ALPHA.QA.B]B150.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:24 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



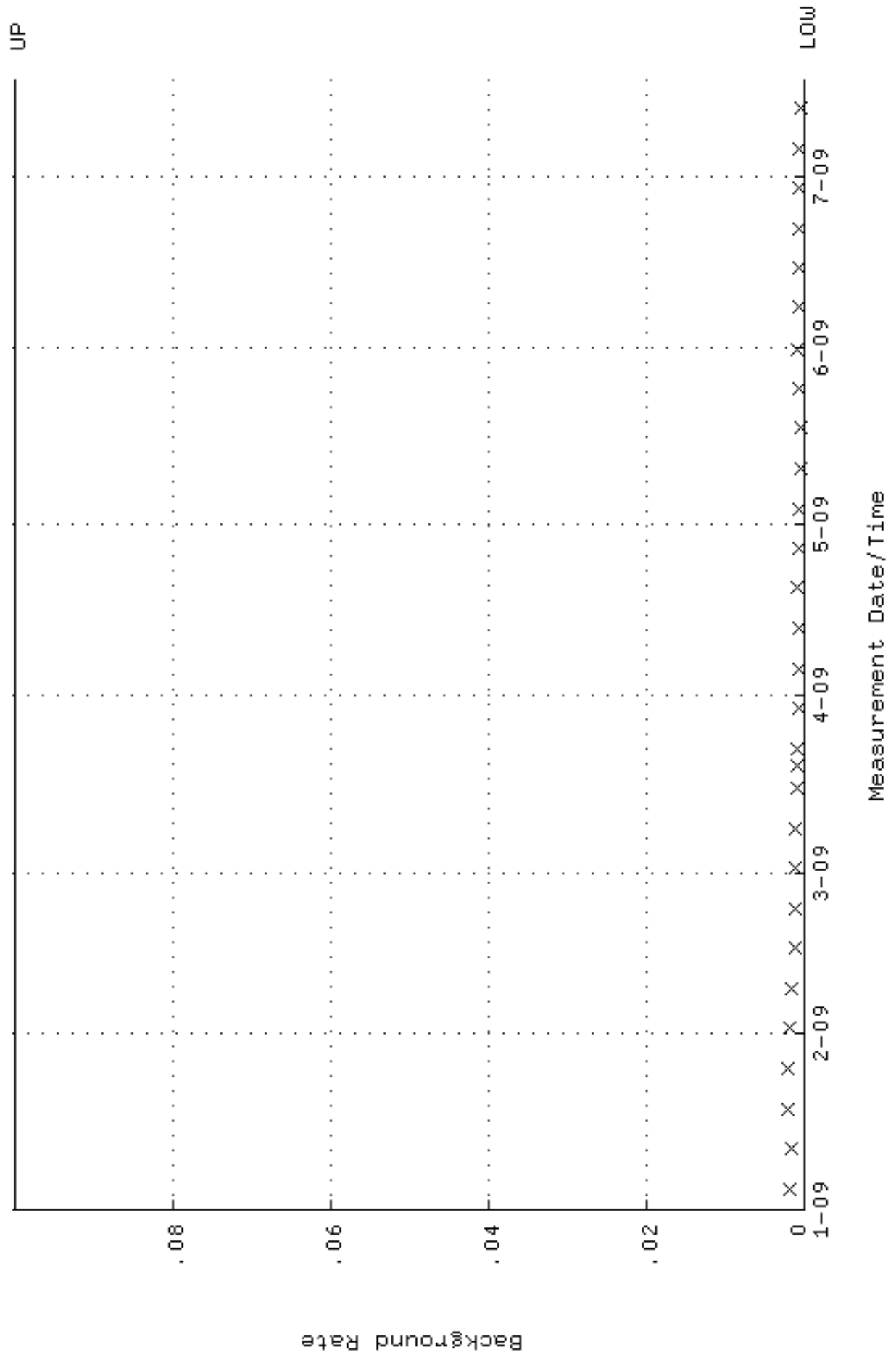
QA filename : DKA100:[ENV\_ALPHA.QA.W]W155.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:26:01 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.247241 through 0.267241



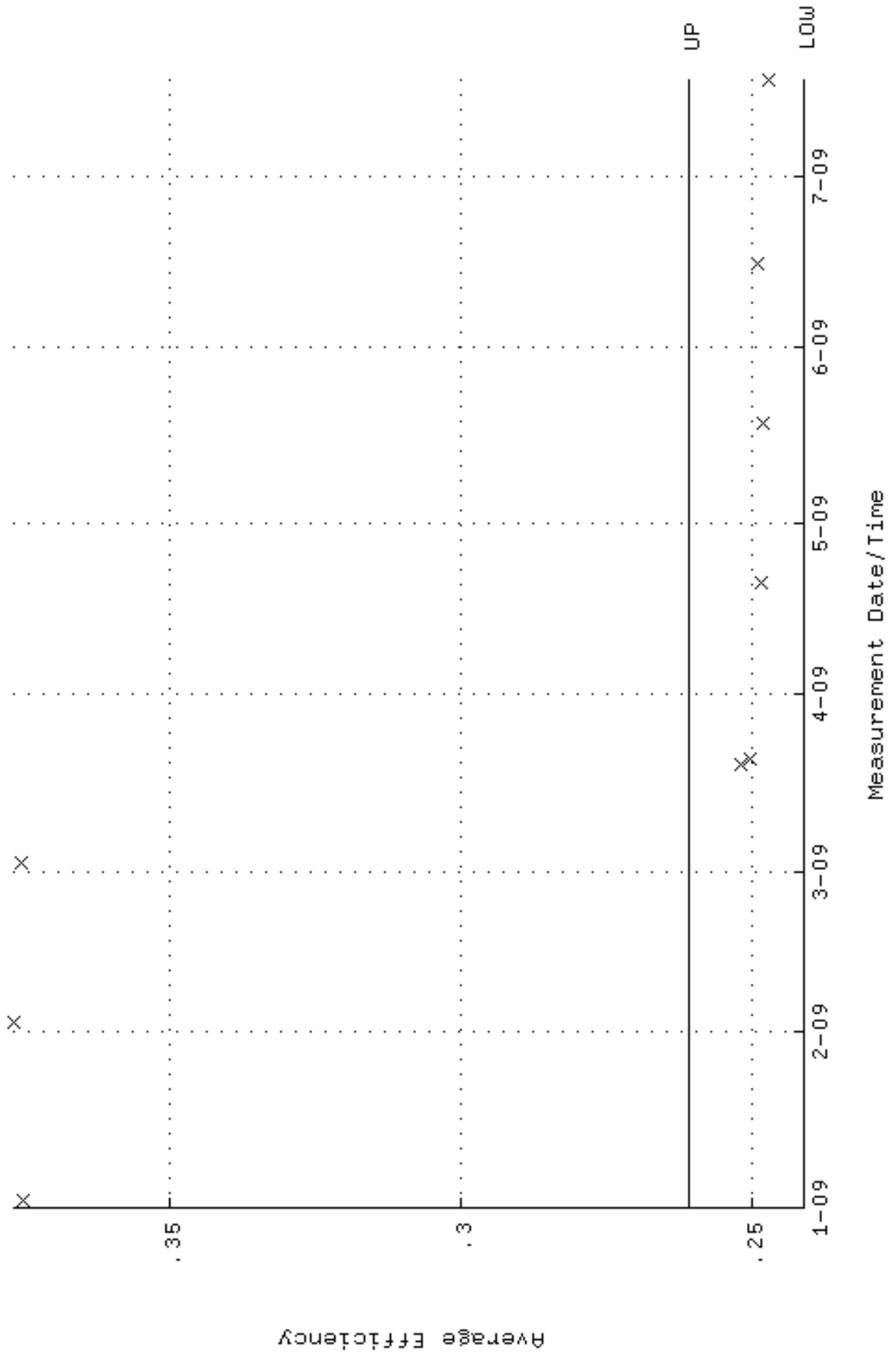
QA filename : DKA100:[ENV\_ALPHA.QA.W]W155.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:26:01 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 83.6873 through 92.4965



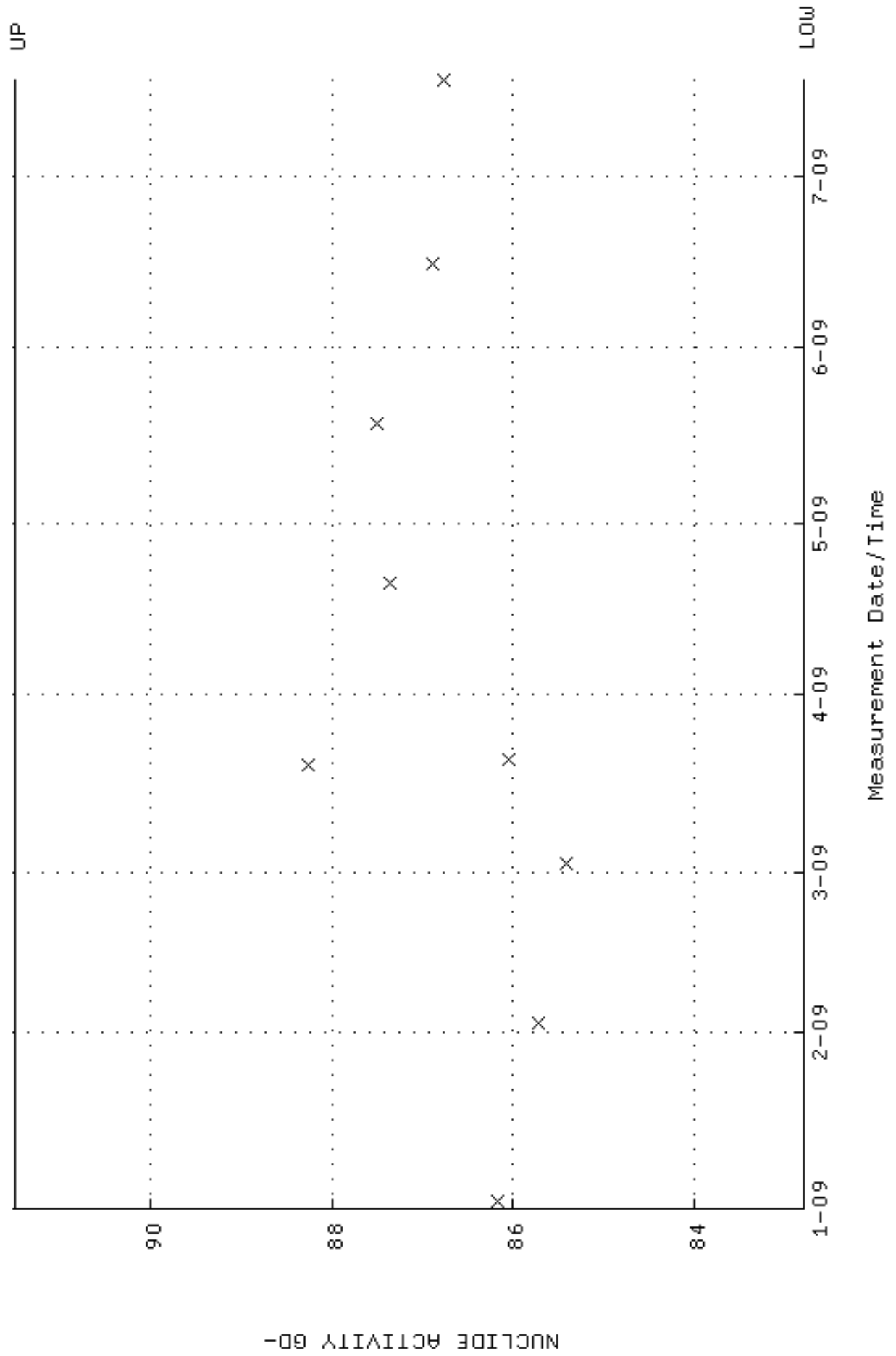
QA filename : DKA100:[ENV\_ALPHA.QA.B]B155.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:44 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



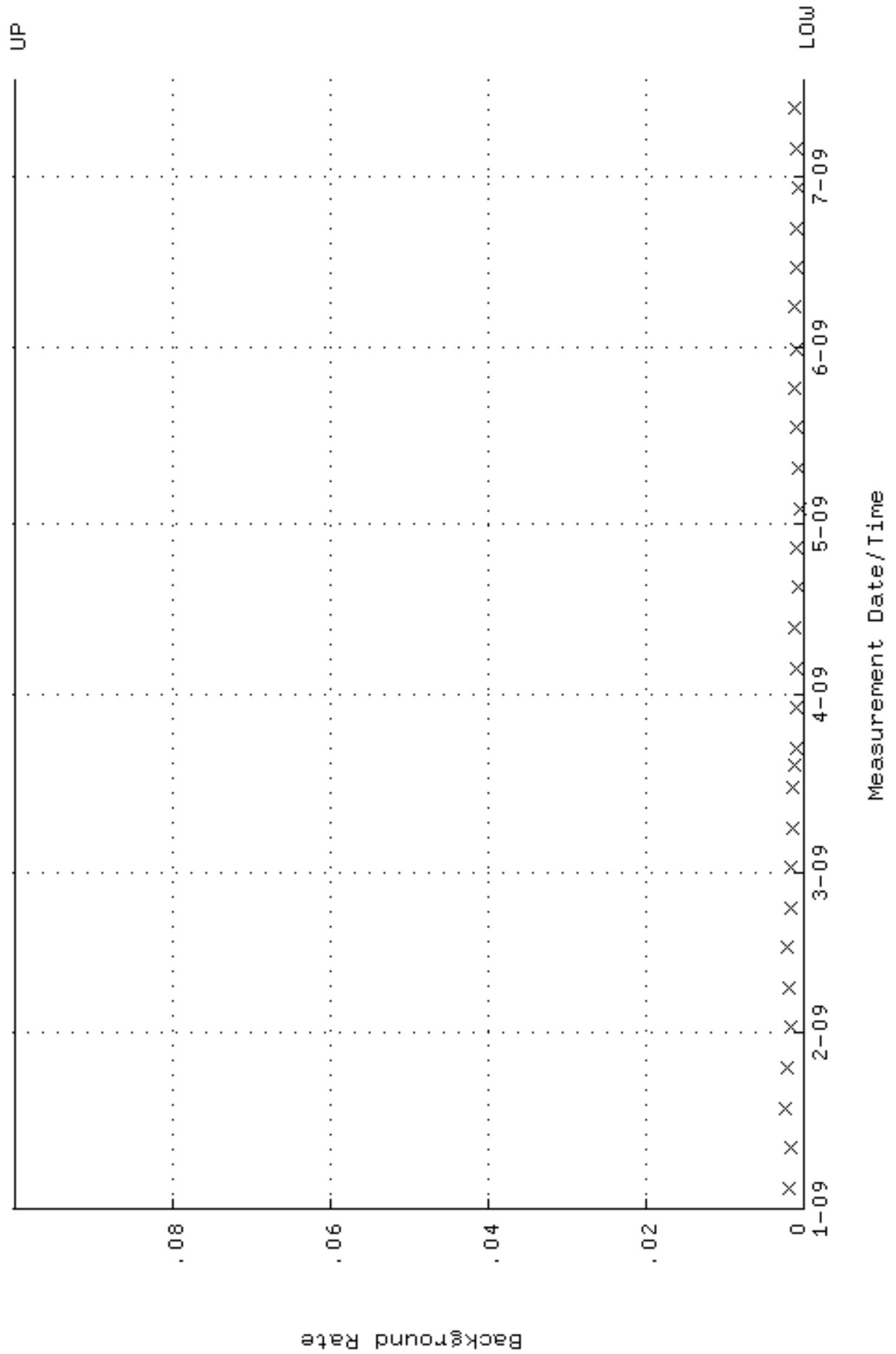
QA filename : DKA100:[ENV\_ALPHA.QA.W]W156.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:26:06 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.241250 through 0.261250



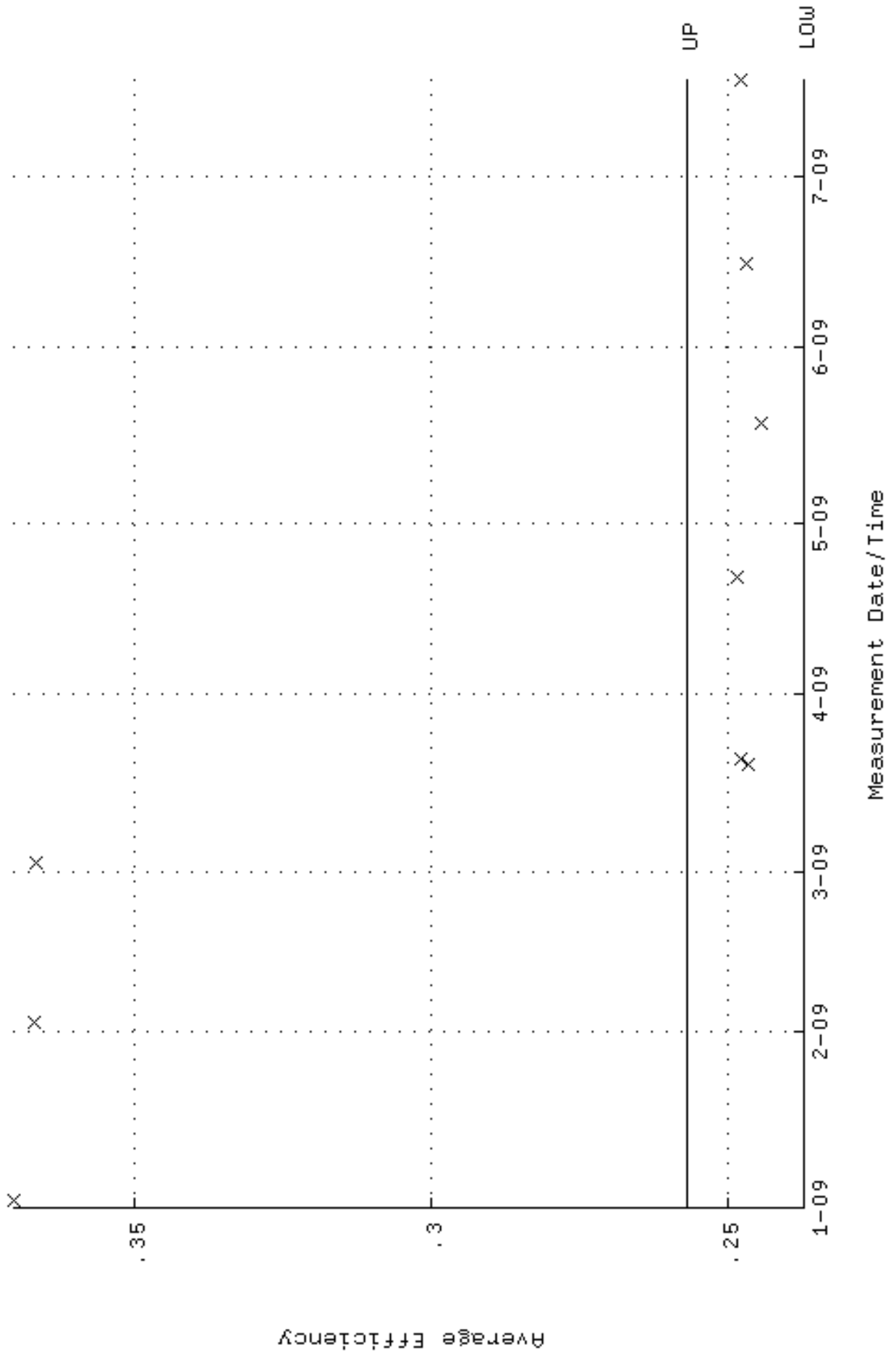
QA filename : DKA100:[ENV\_ALPHA.QA.W]w156.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:26:06 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 82.7847 through 91.4989



QA filename : DKA100:[ENV\_ALPHA.QA.B]B156.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:47 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

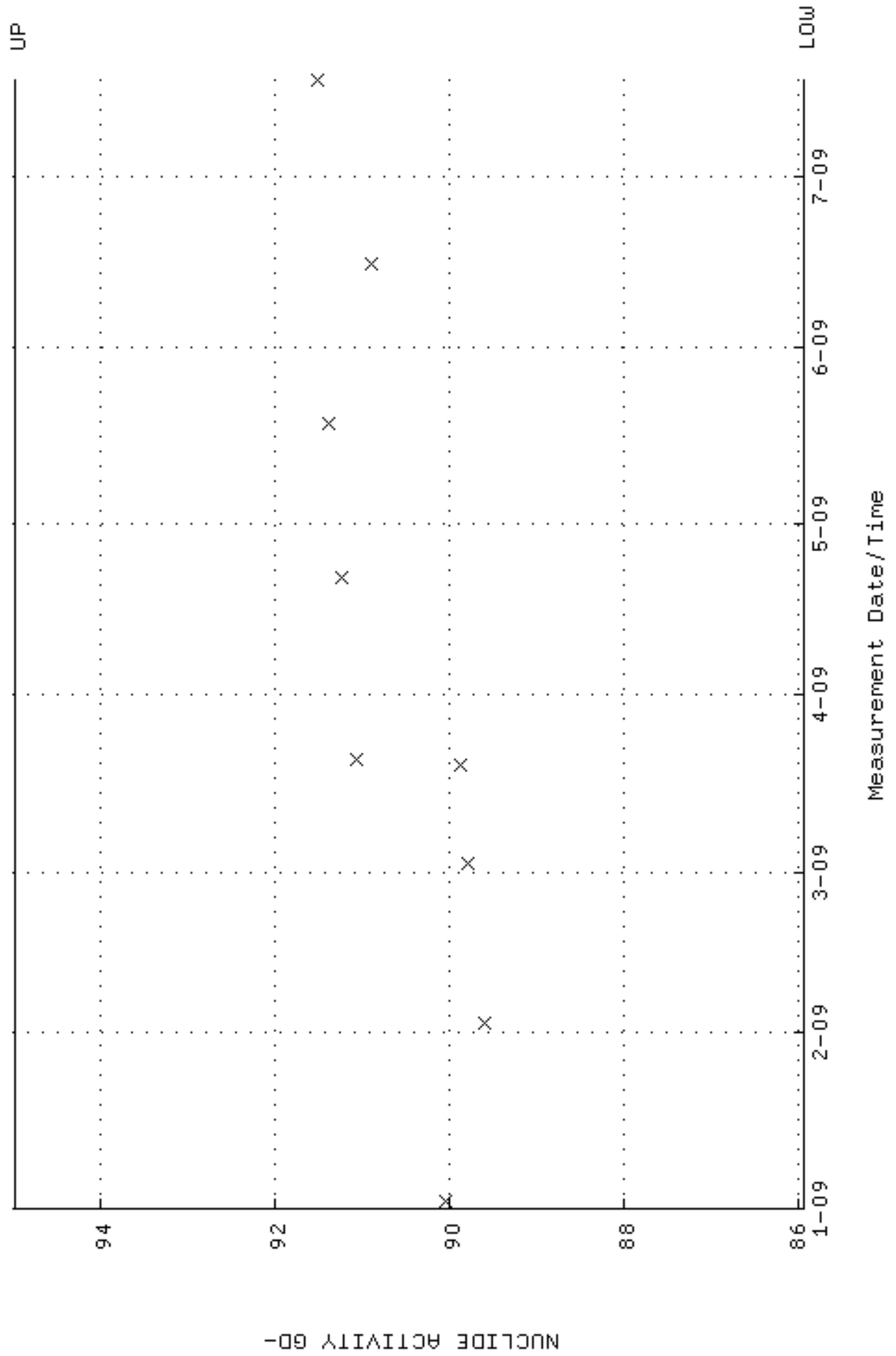


QA filename : DKA100:[ENV\_ALPHA.QA.W]w157.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:26:10 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.237137 through 0.257137

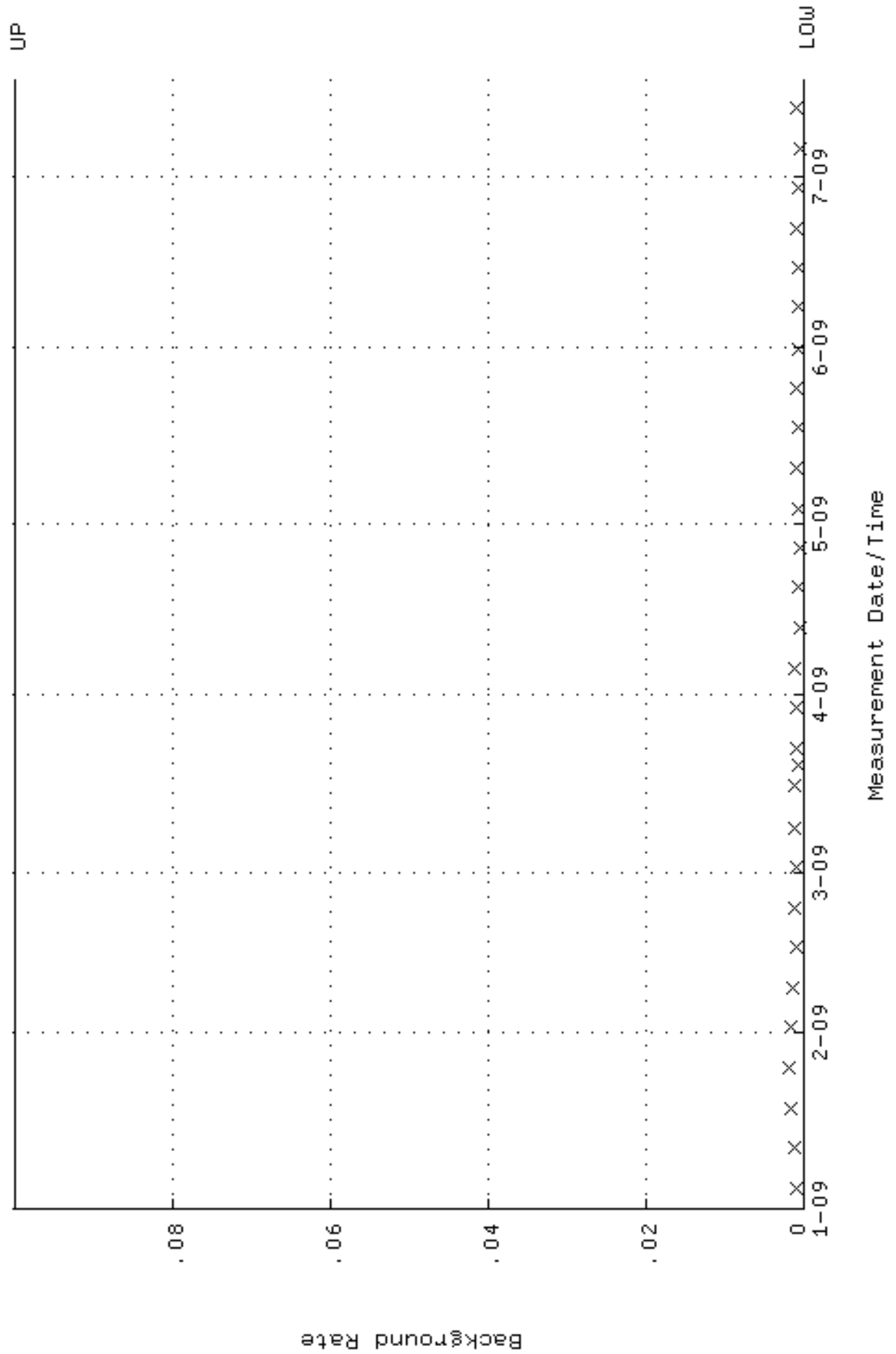




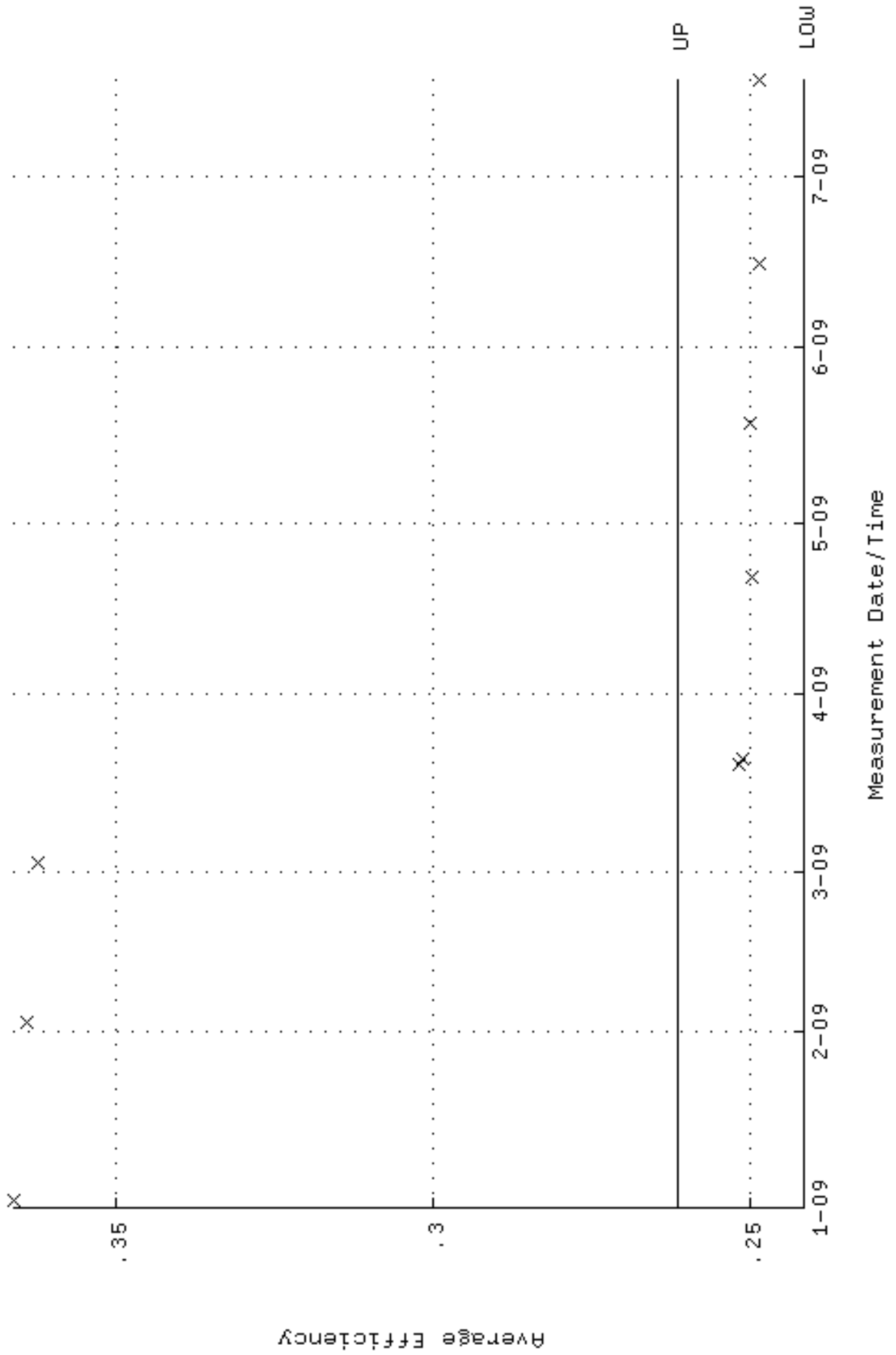
QA filename : DKA100:[ENV\_ALPHA.QA.W]w157.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:26:10 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.9292 through 94.9744



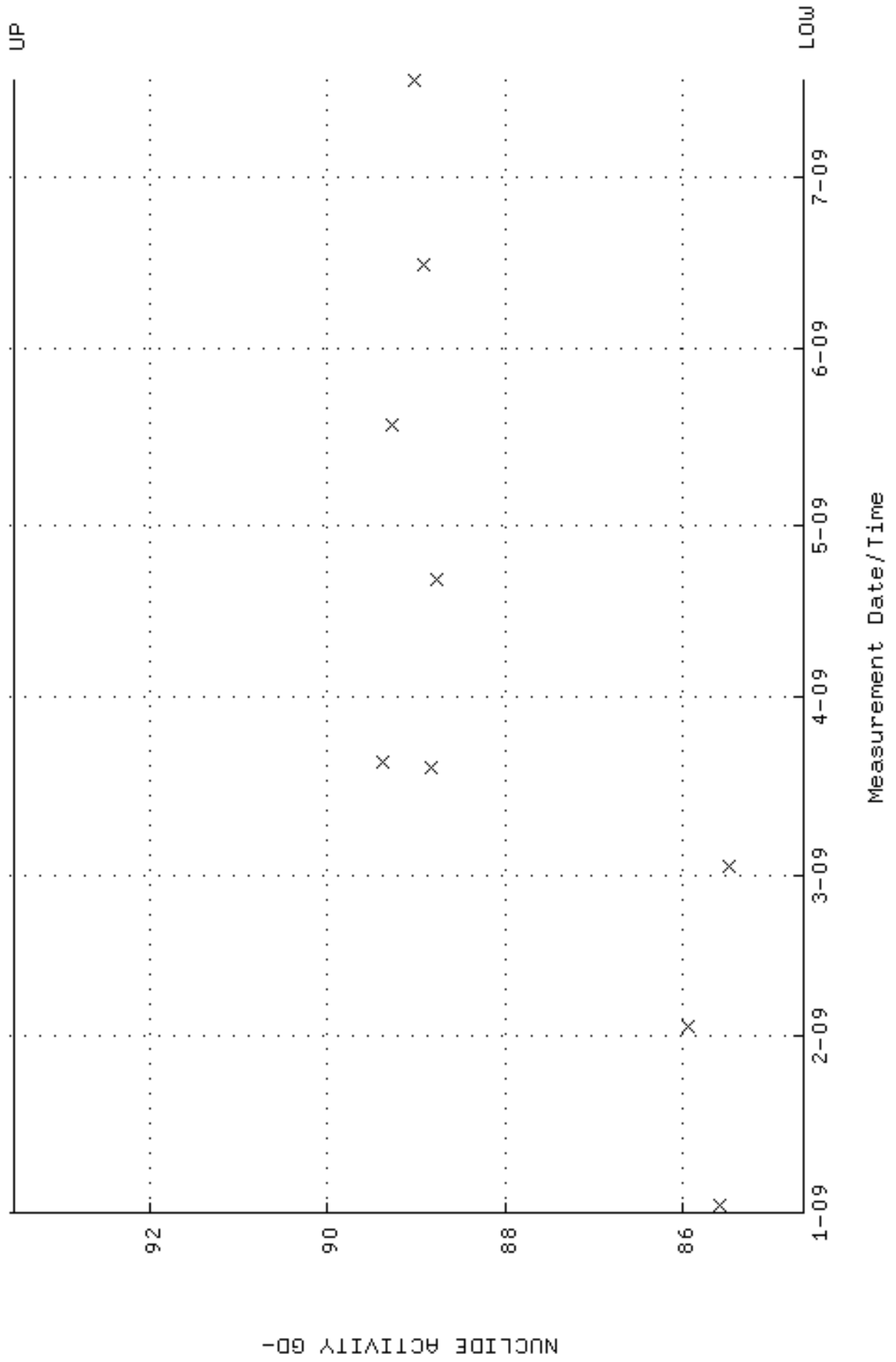
QA filename : DKA100:[ENV\_ALPHA.QA.B]B157.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:51 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



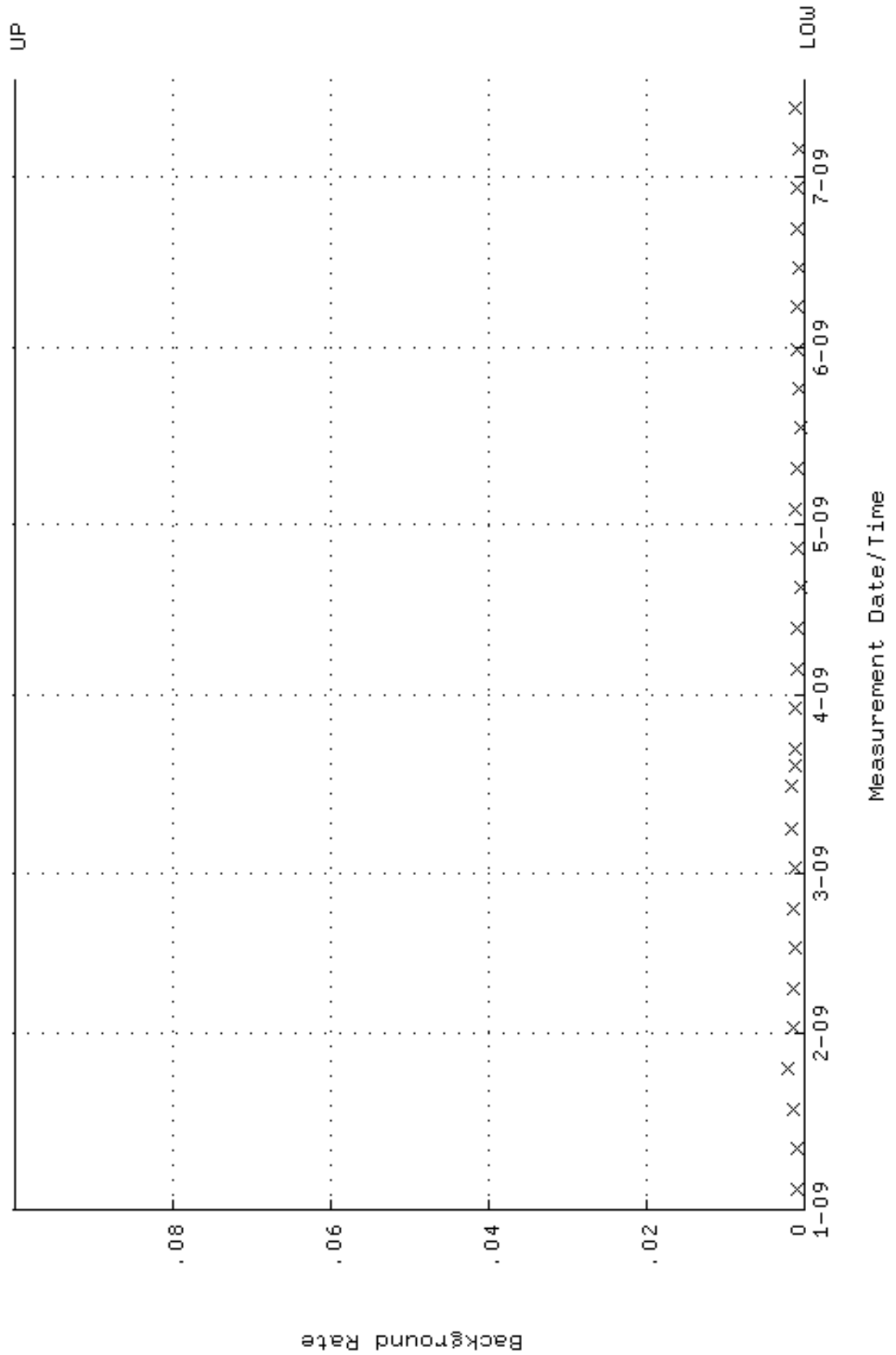
QA filename : DKA100:[ENV\_ALPHA.QA.W]W158.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:26:14 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.241466 through 0.261466



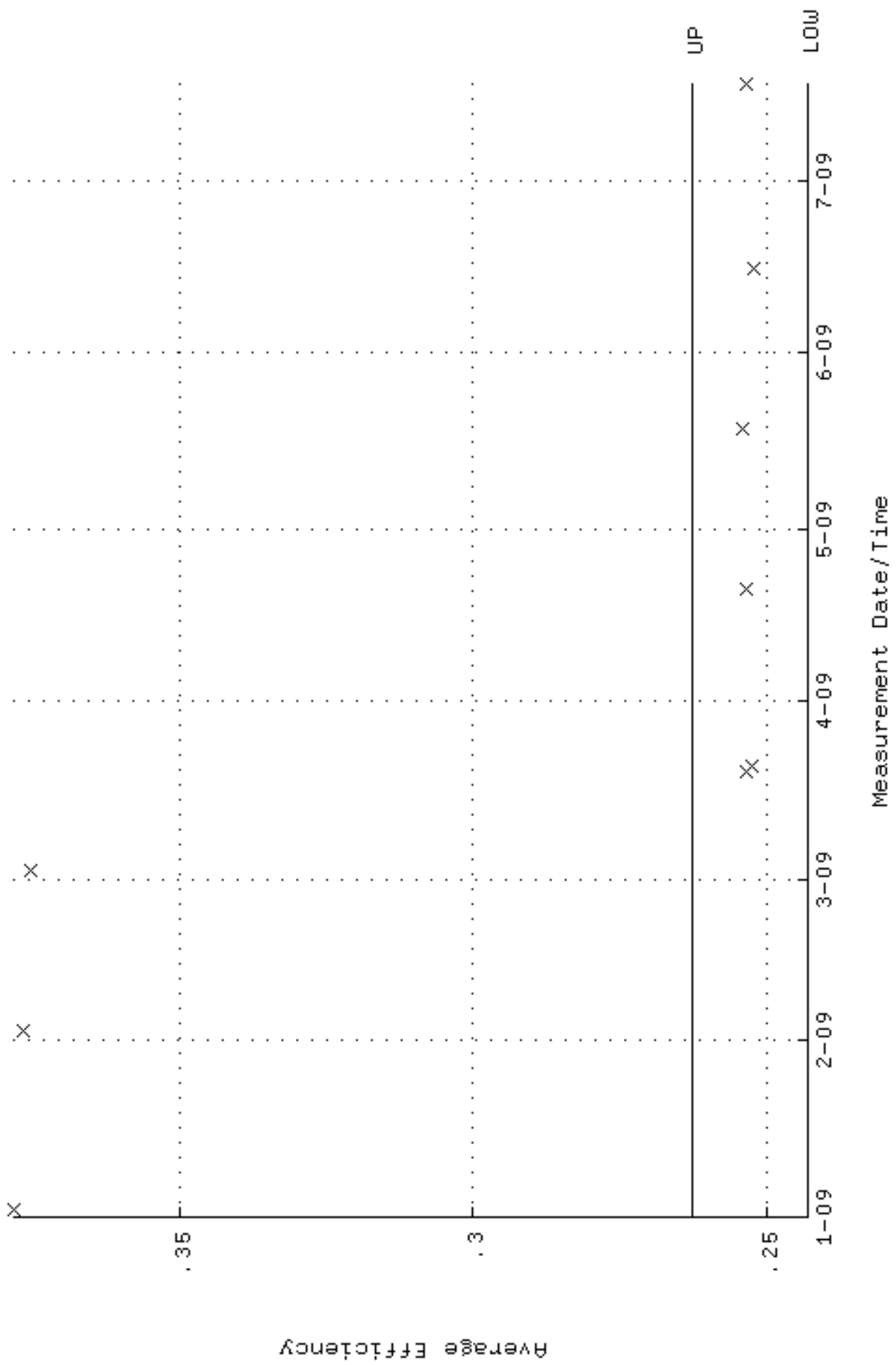
QA filename : DKA100:[ENV\_ALPHA.QA.W]w158.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:26:14 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.6414 through 93.5510



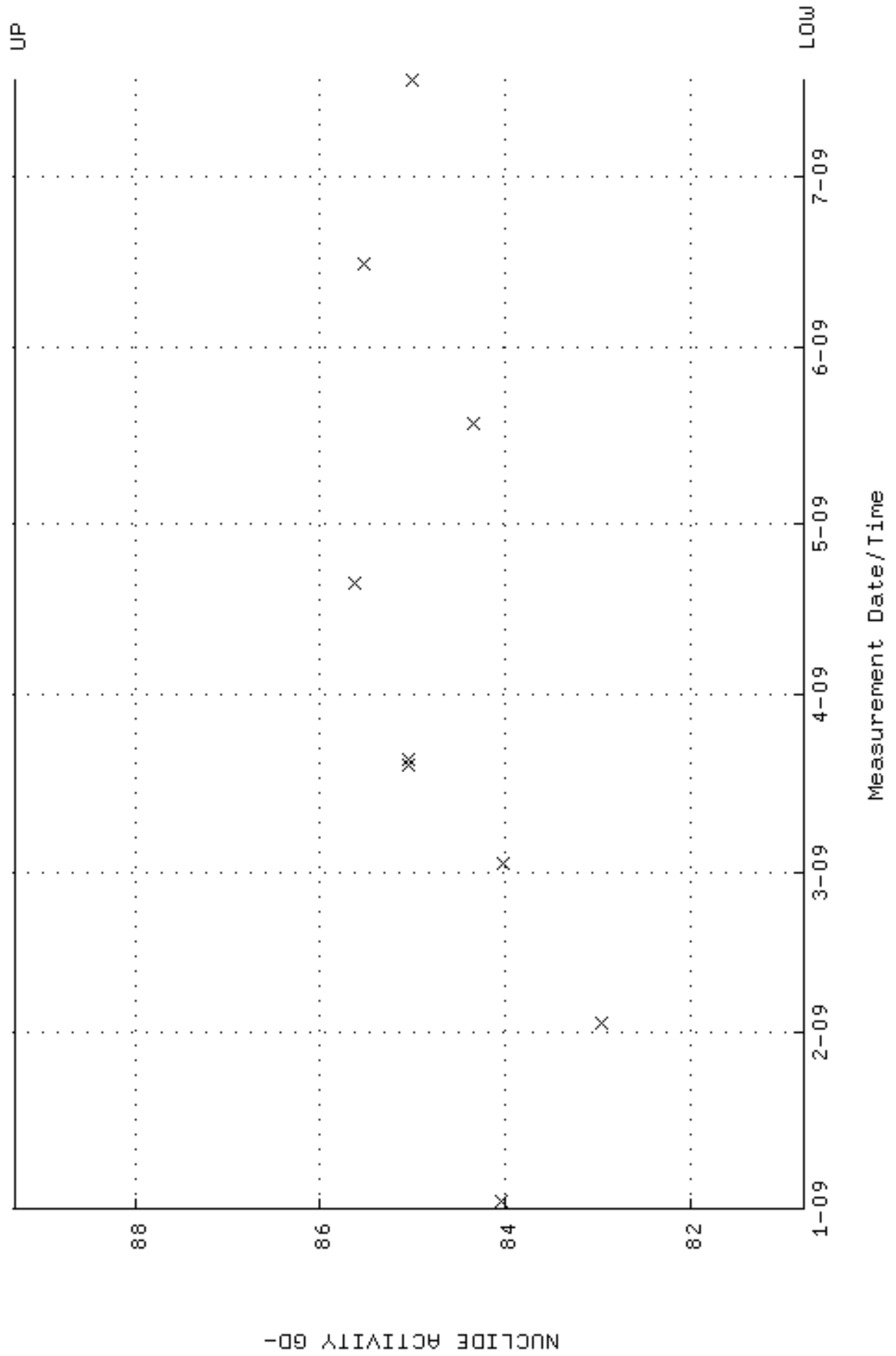
QA filename : DKA100:[ENV\_ALPHA.QA.B]B158.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:55 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



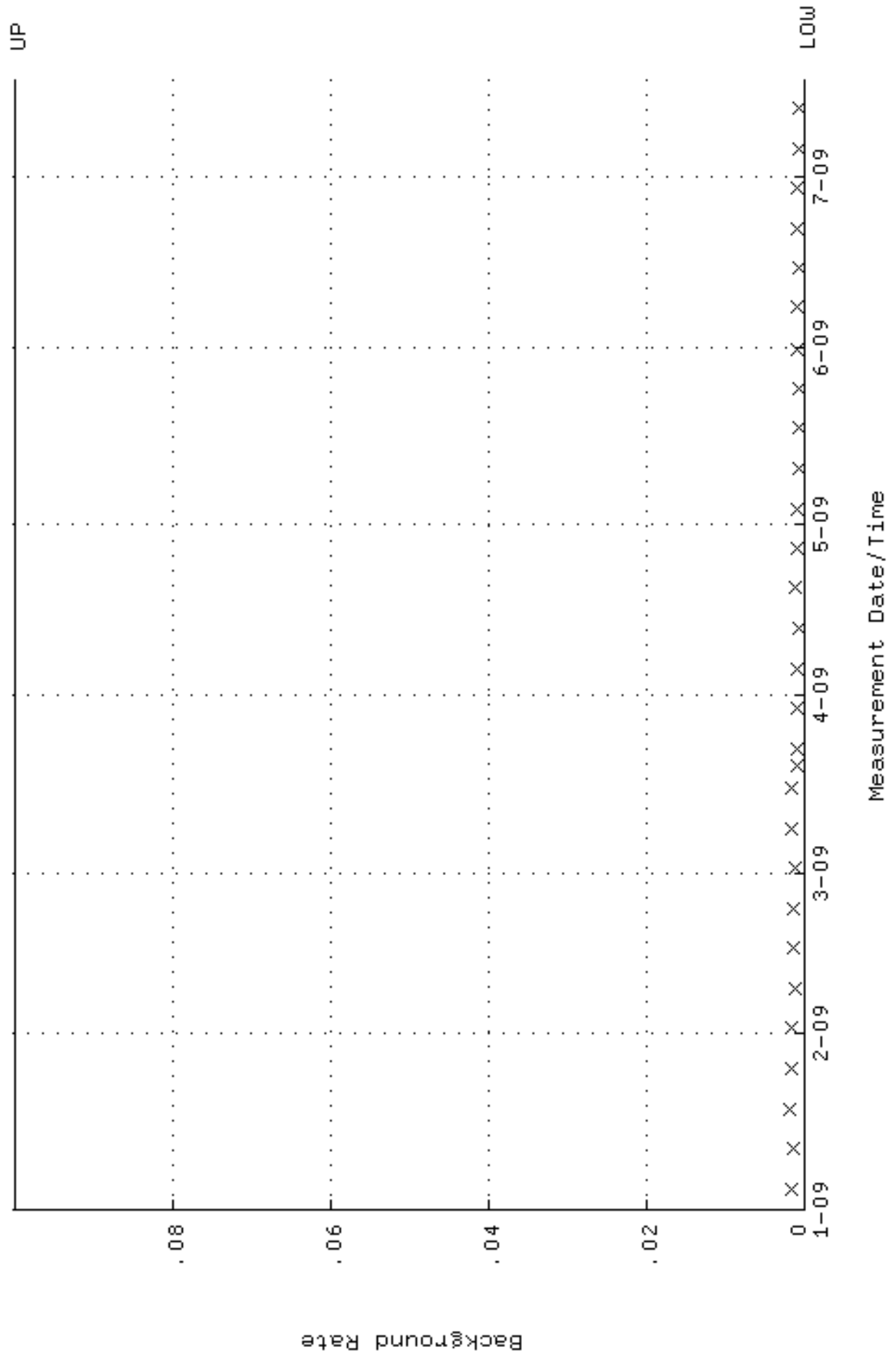
QA filename : DKA100:[ENV\_ALPHA.QA.W]W159.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:26:19 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.242851 through 0.262851



QA filename : DKA100:[ENV\_ALPHA.QA.W]w159.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:26:19 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 80.7870 through 89.2909

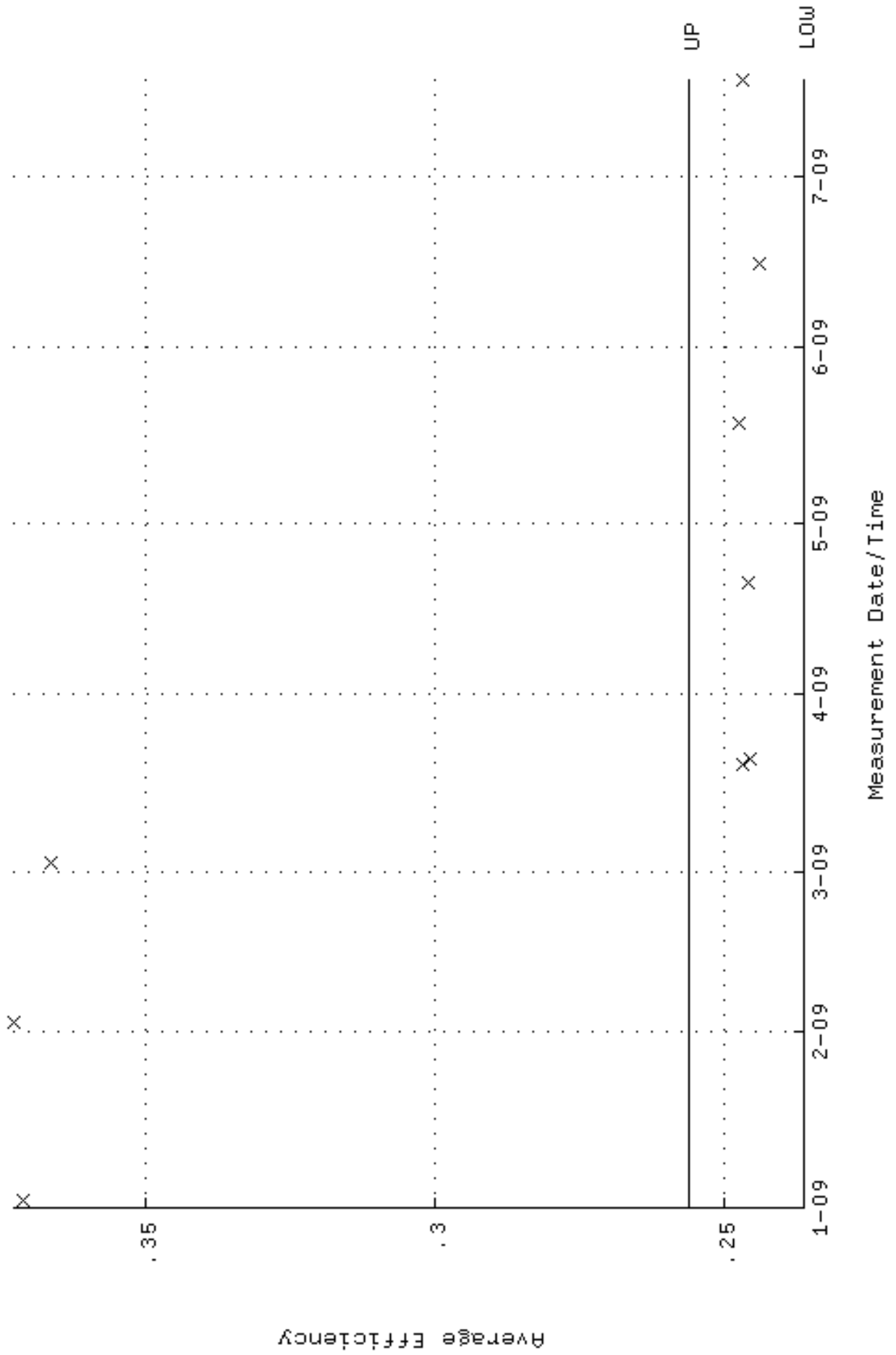


QA filename : DKA100:[ENV\_ALPHA.QA.B]B159.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:59 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

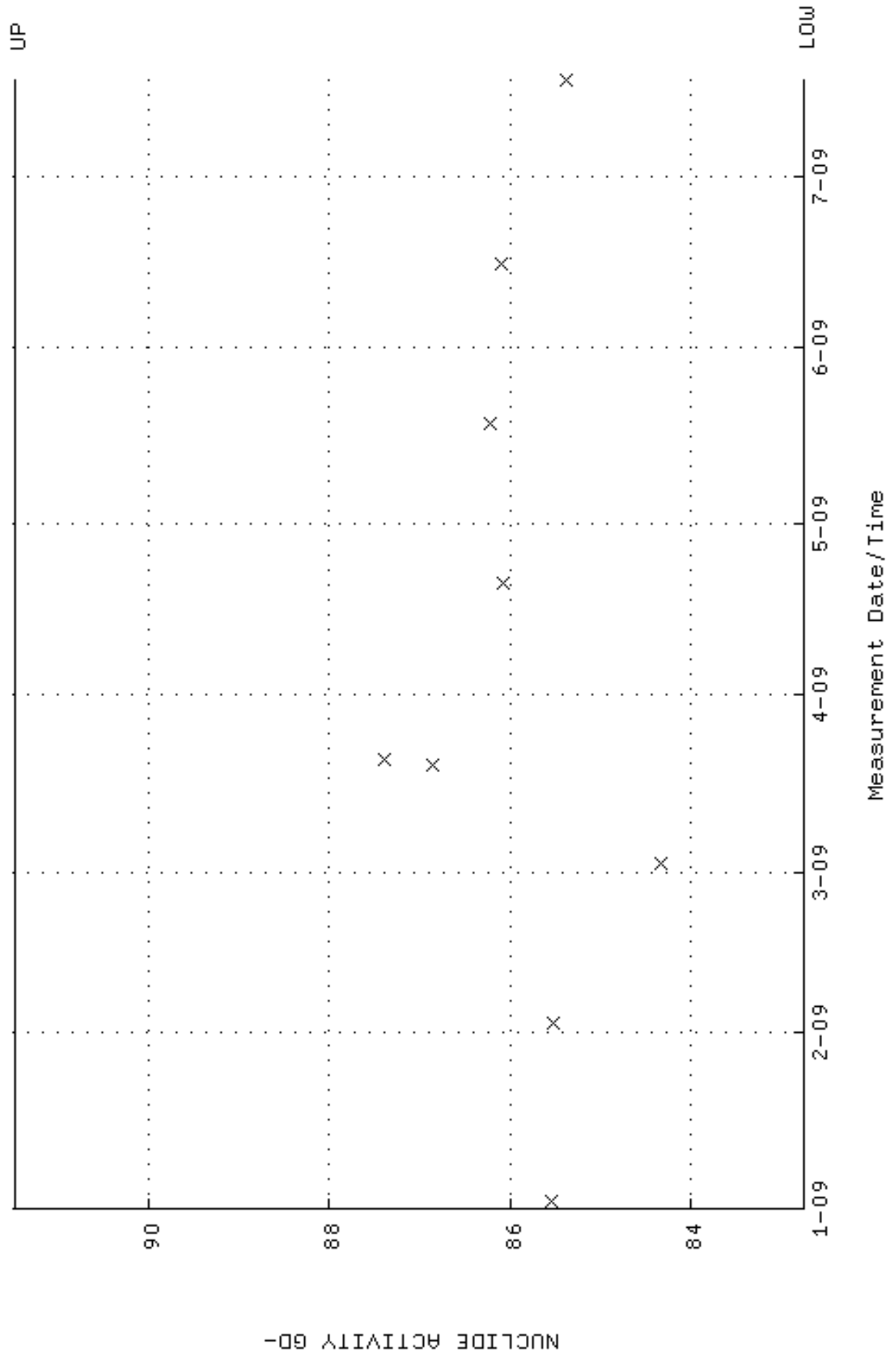




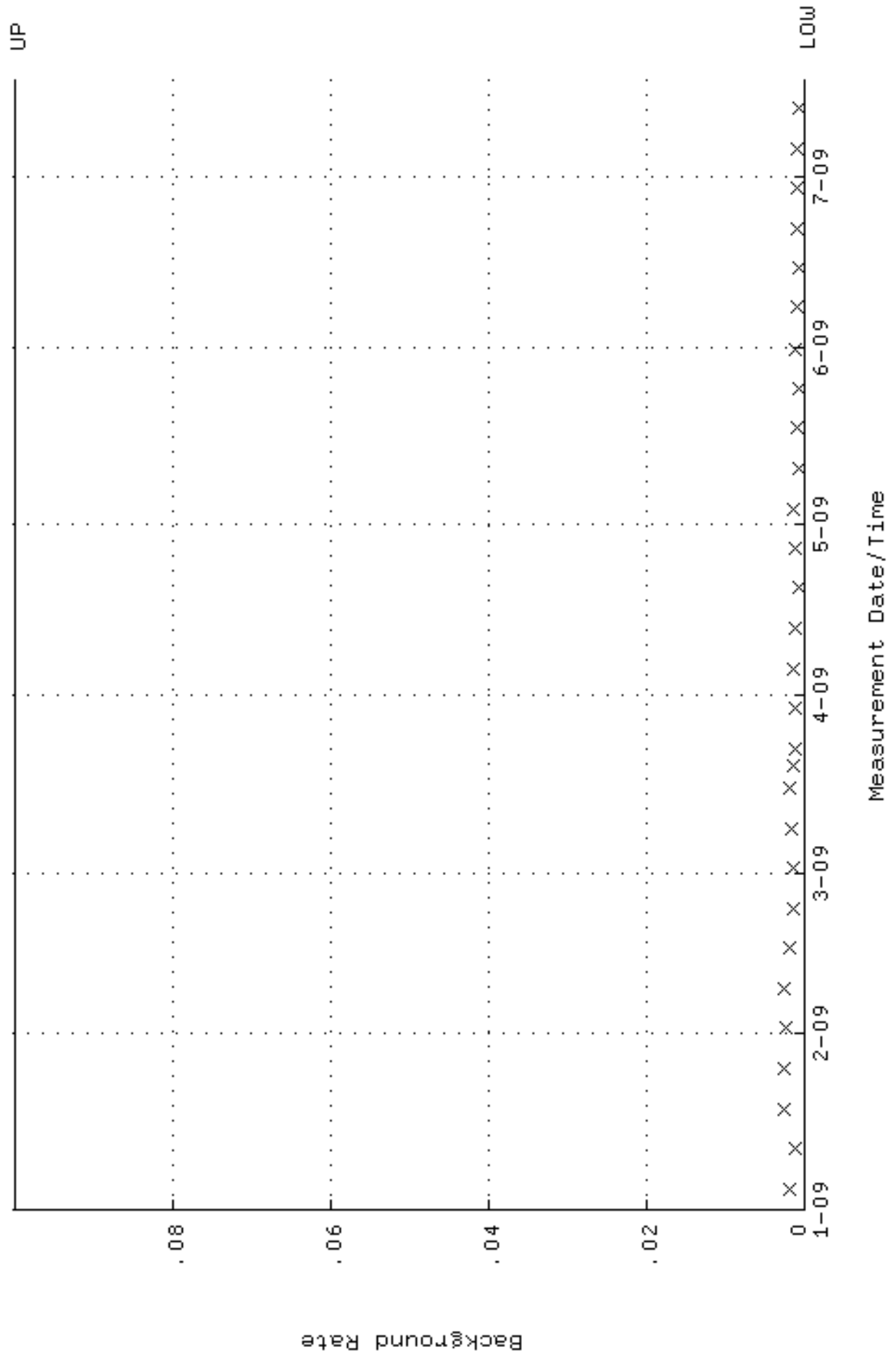
QA filename : DKA100:[ENV\_ALPHA.QA.W]W160.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:26:23 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.236284 through 0.256284



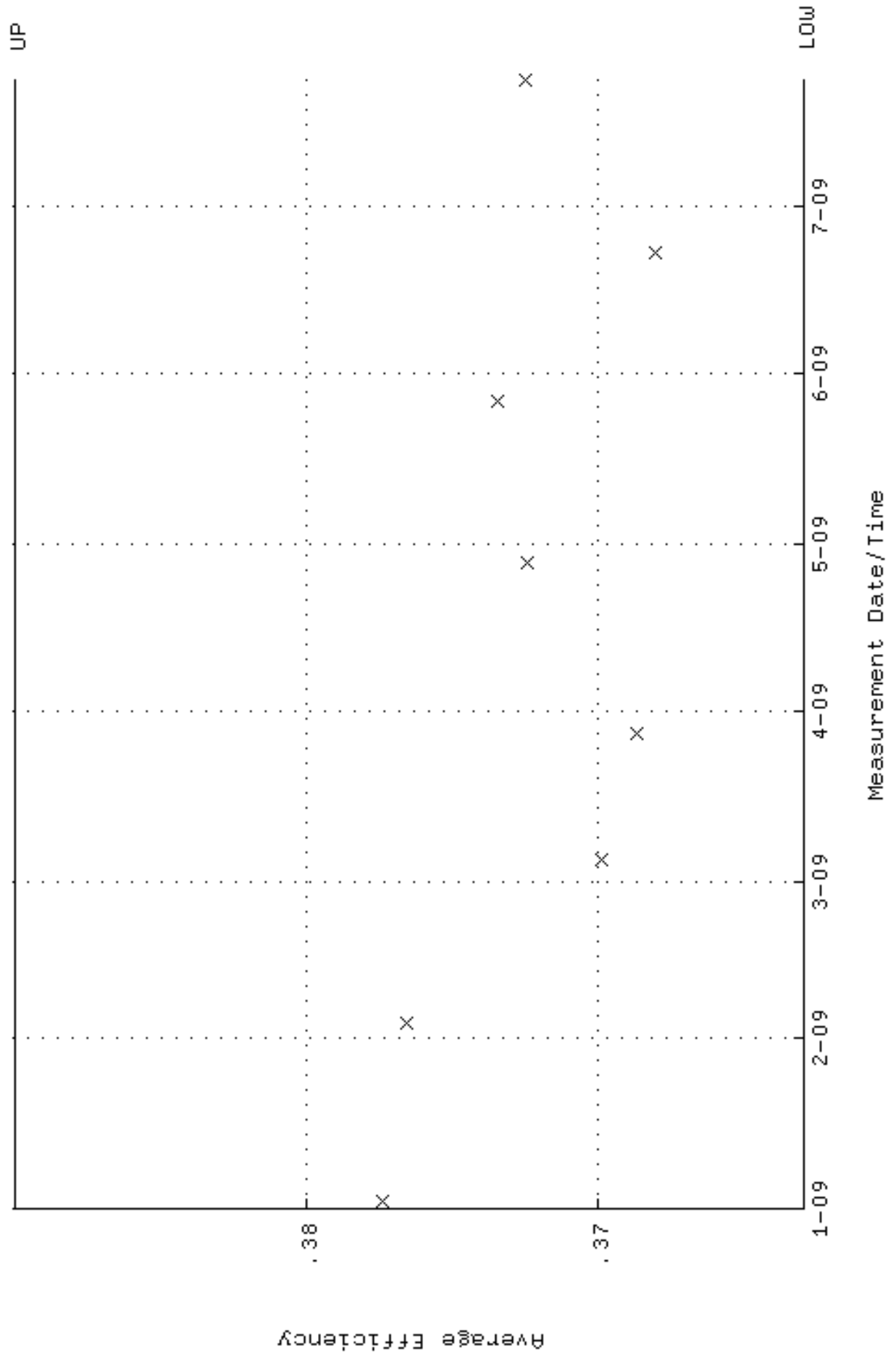
QA filename : DKA100:[ENV\_ALPHA.QA.W]w160.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:26:23 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 82.7554 through 91.4664



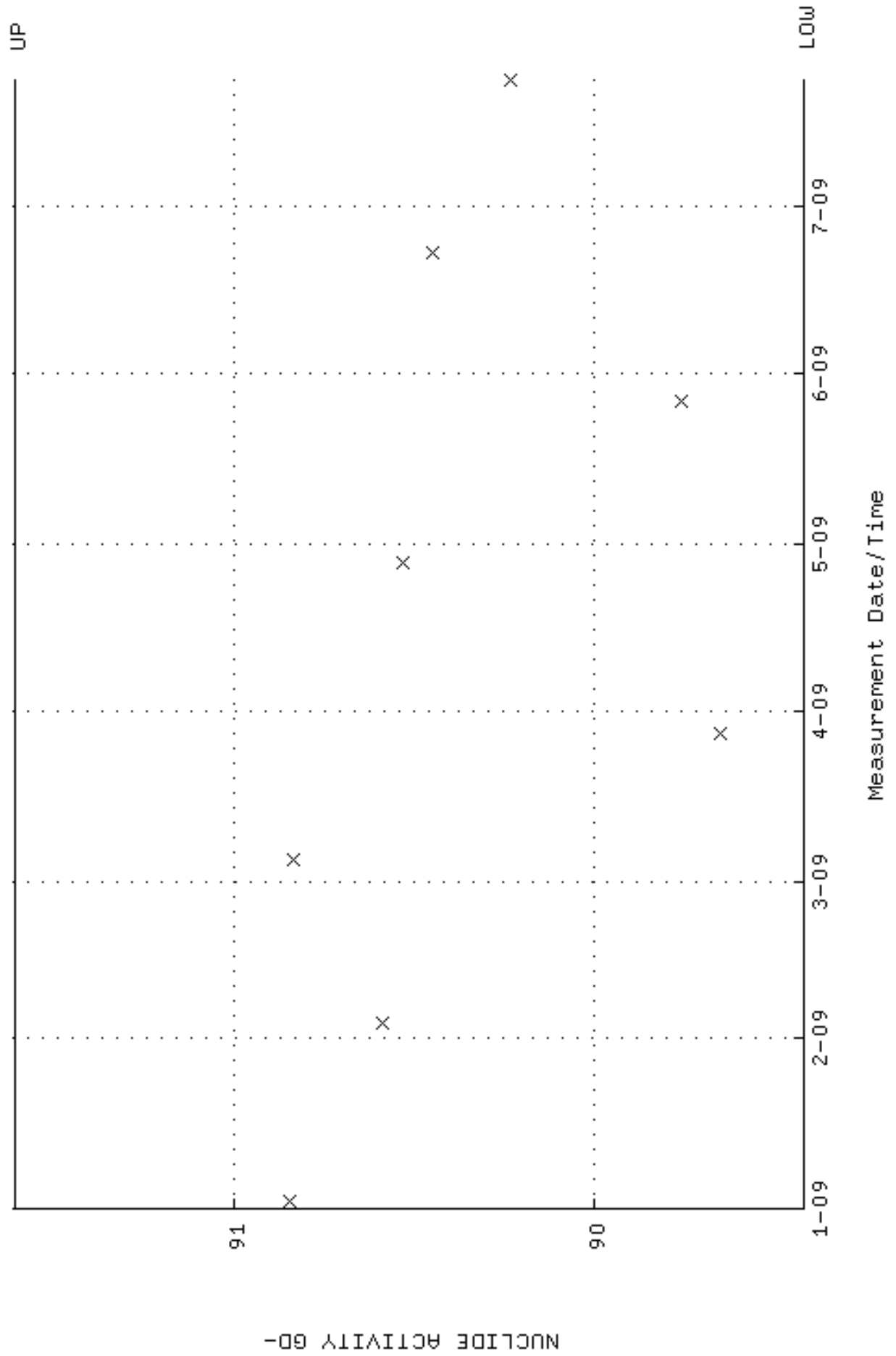
QA filename : DKA100:[ENV\_ALPHA.QA.B]B160.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:02 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



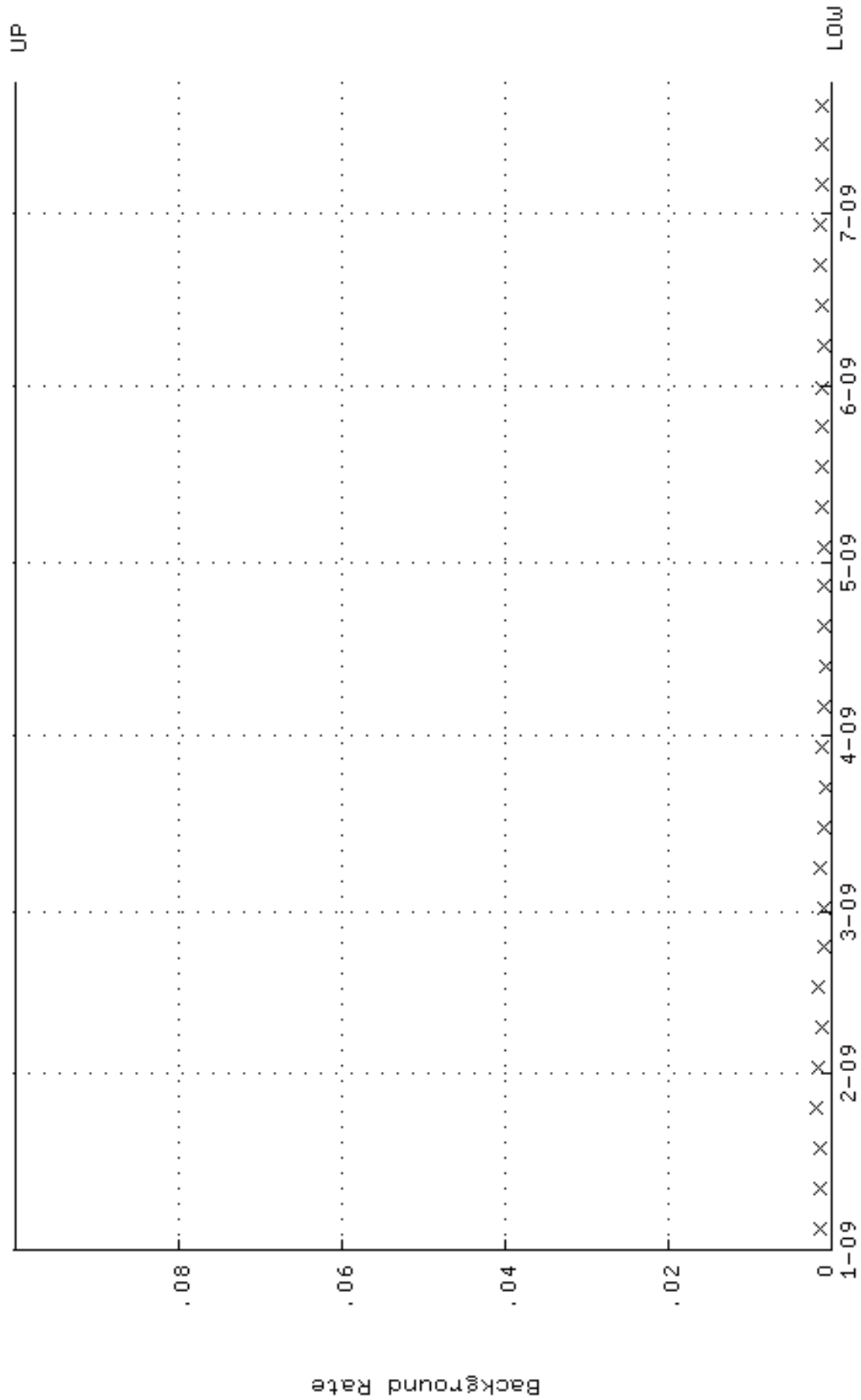
QA filename : DKA100:[ENV\_ALPHA.QA.W]W161.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 12:08:44 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.362982 through 0.389932



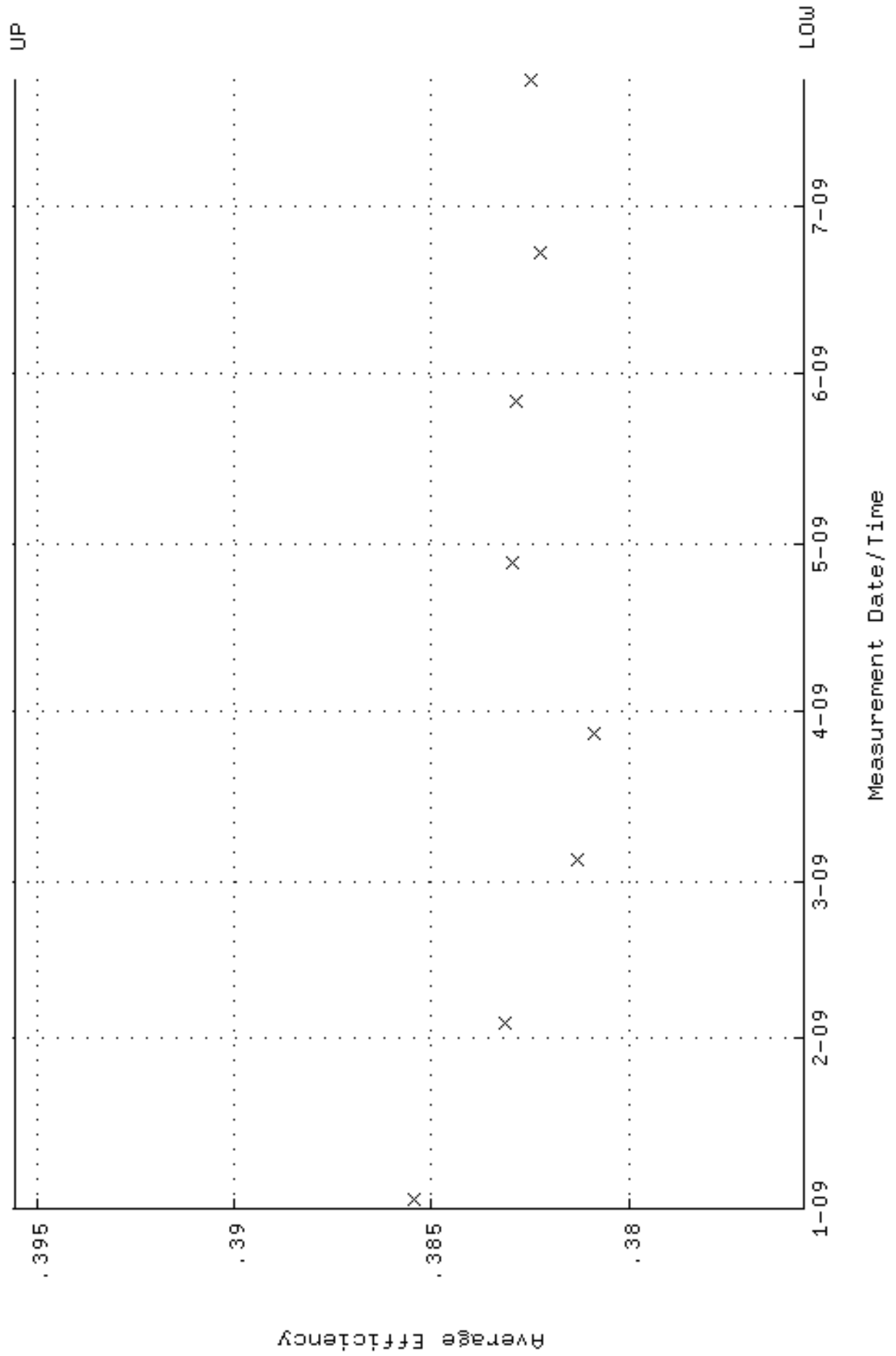
QA filename : DKA100:[ENV\_ALPHA.QA.W]w161.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 12:08:44 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 89.4216 through 91.6054



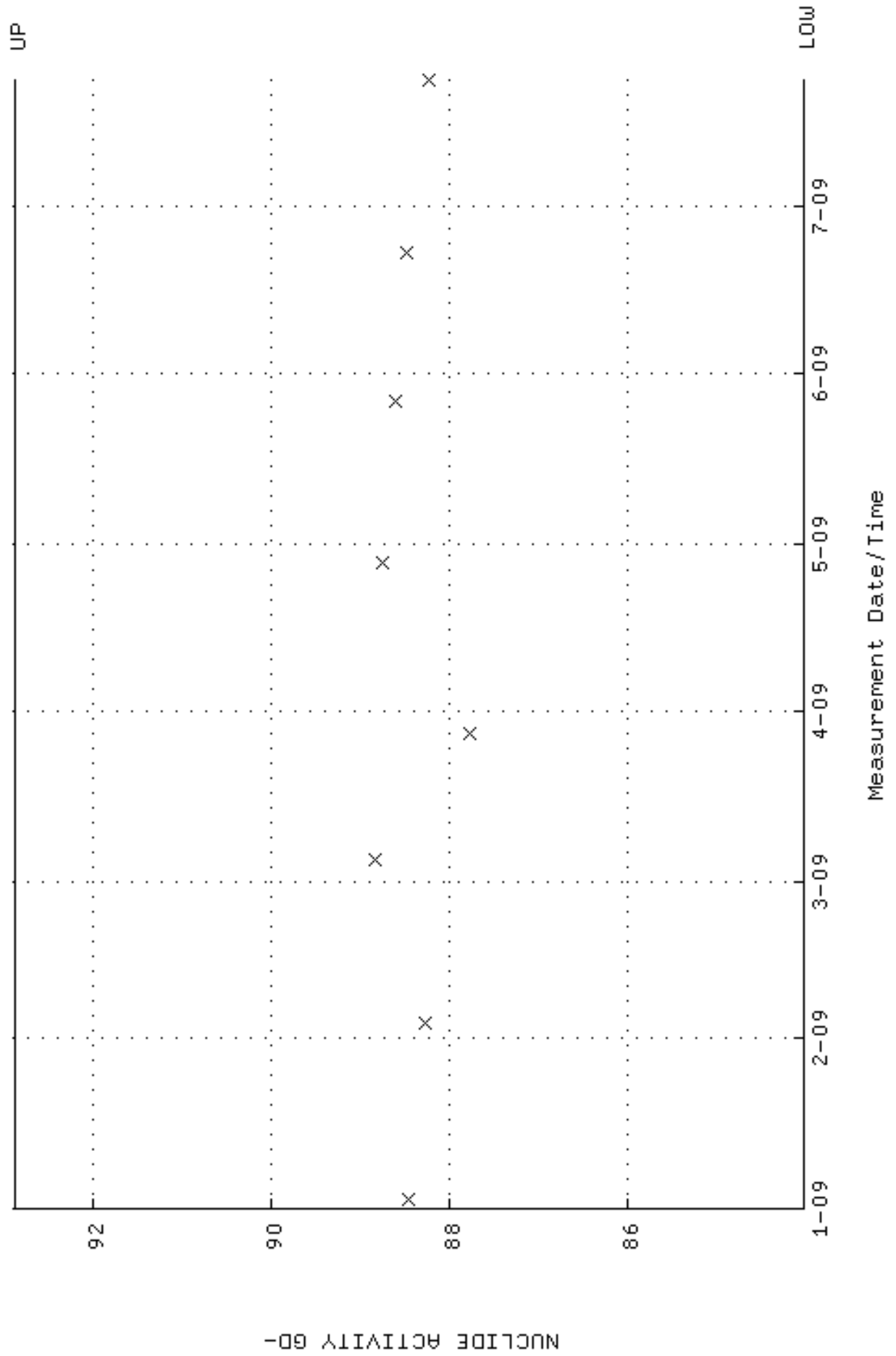
QA filename : DKA100:[ENV\_ALPHA.QA.B]B161.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:06 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W163.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 12:08:55 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.375557 through 0.395557

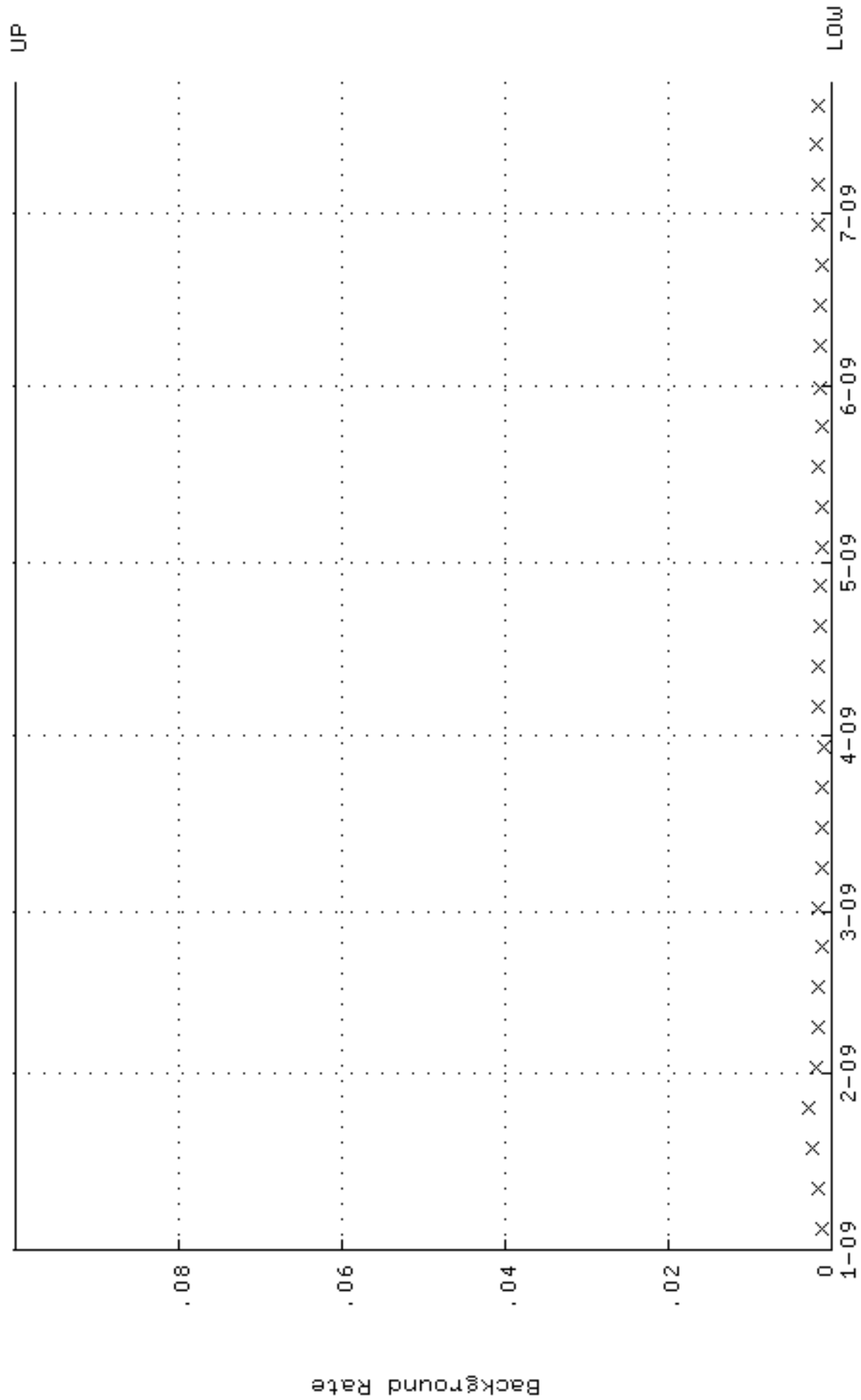


QA filename : DKA100:[ENV\_ALPHA.QA.W]w163.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 12:08:55 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.0322 through 92.8777

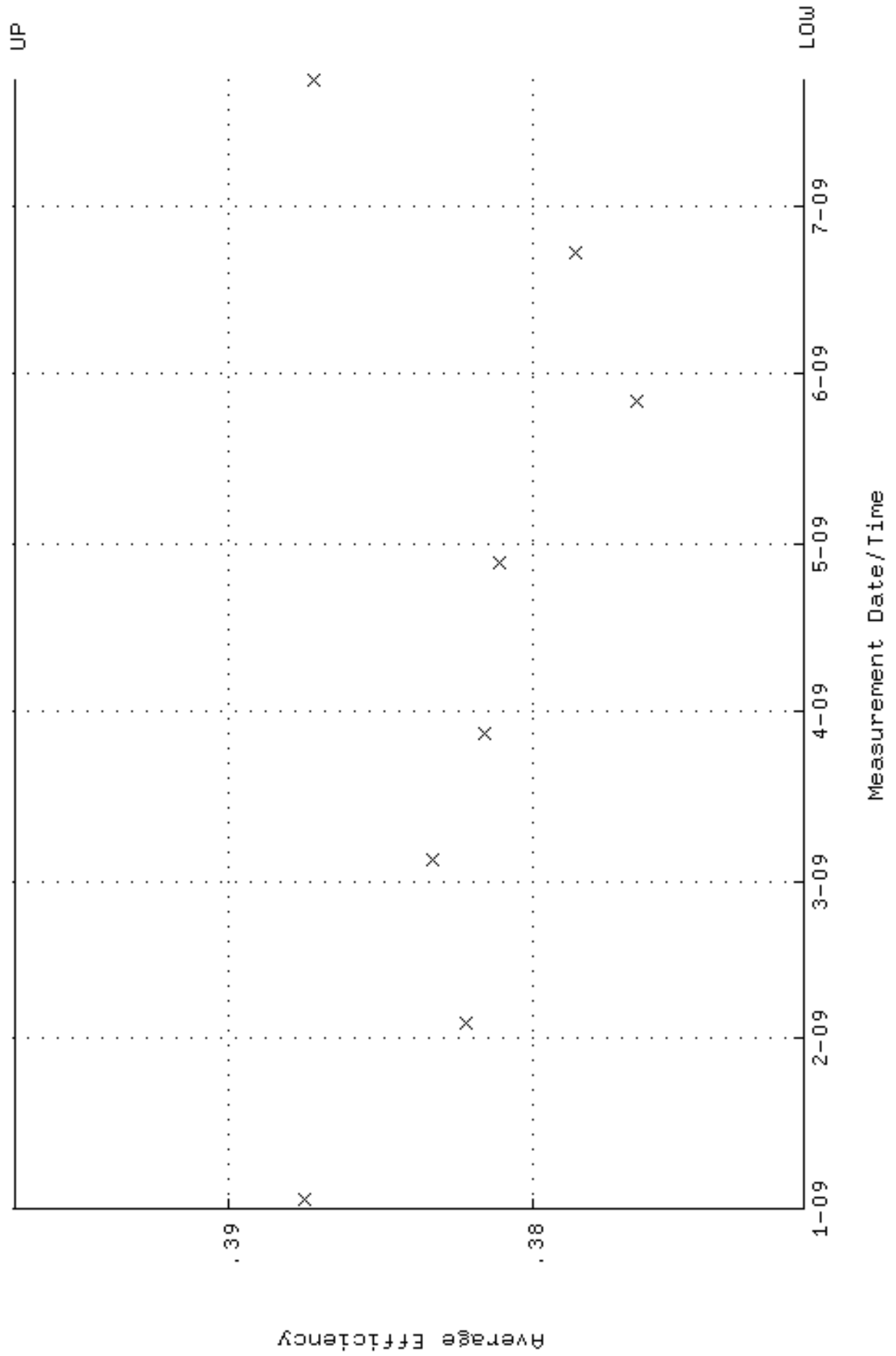




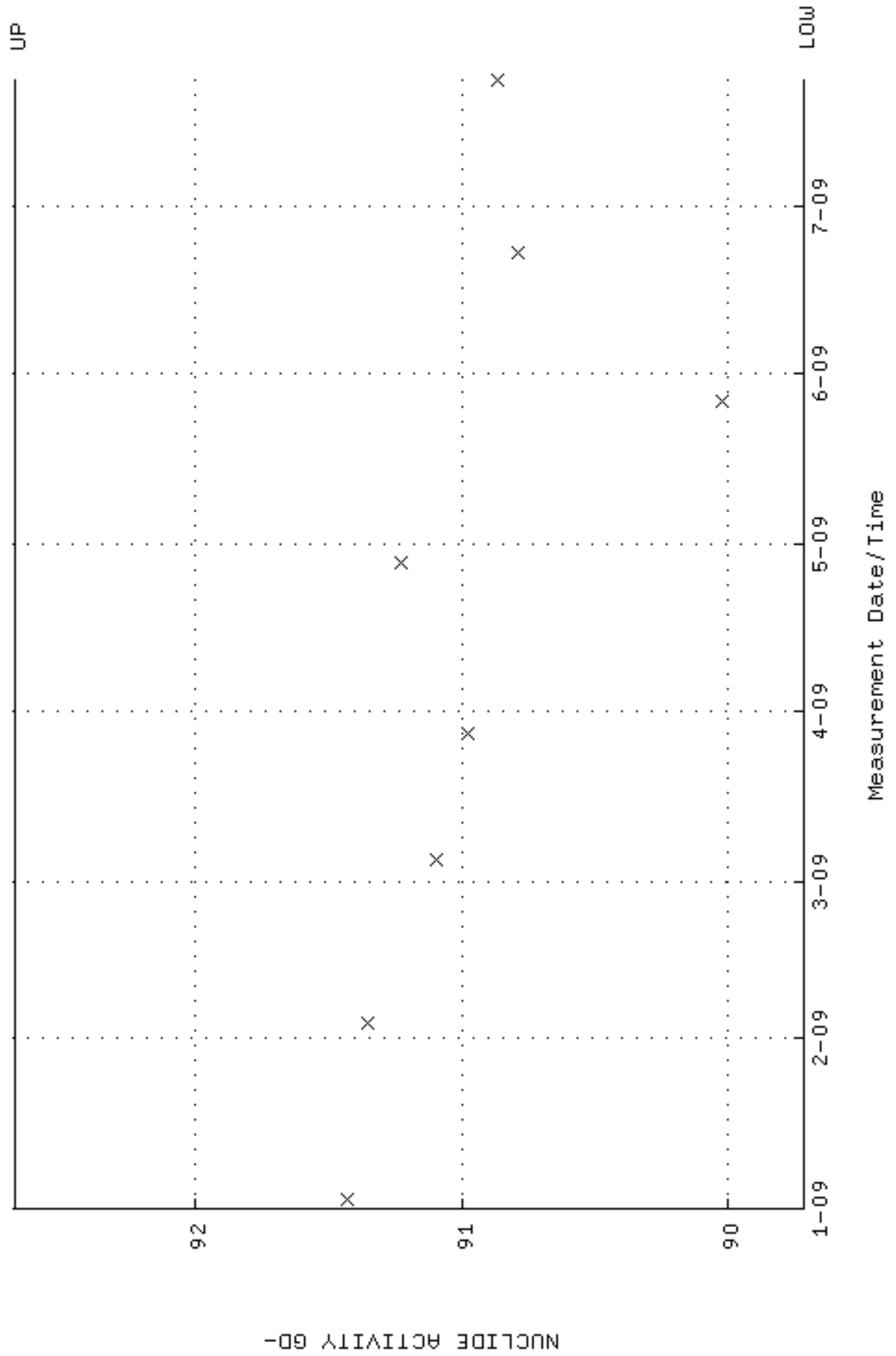
QA filename : DKA100:[ENV\_ALPHA.QA.B]B163.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:13 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



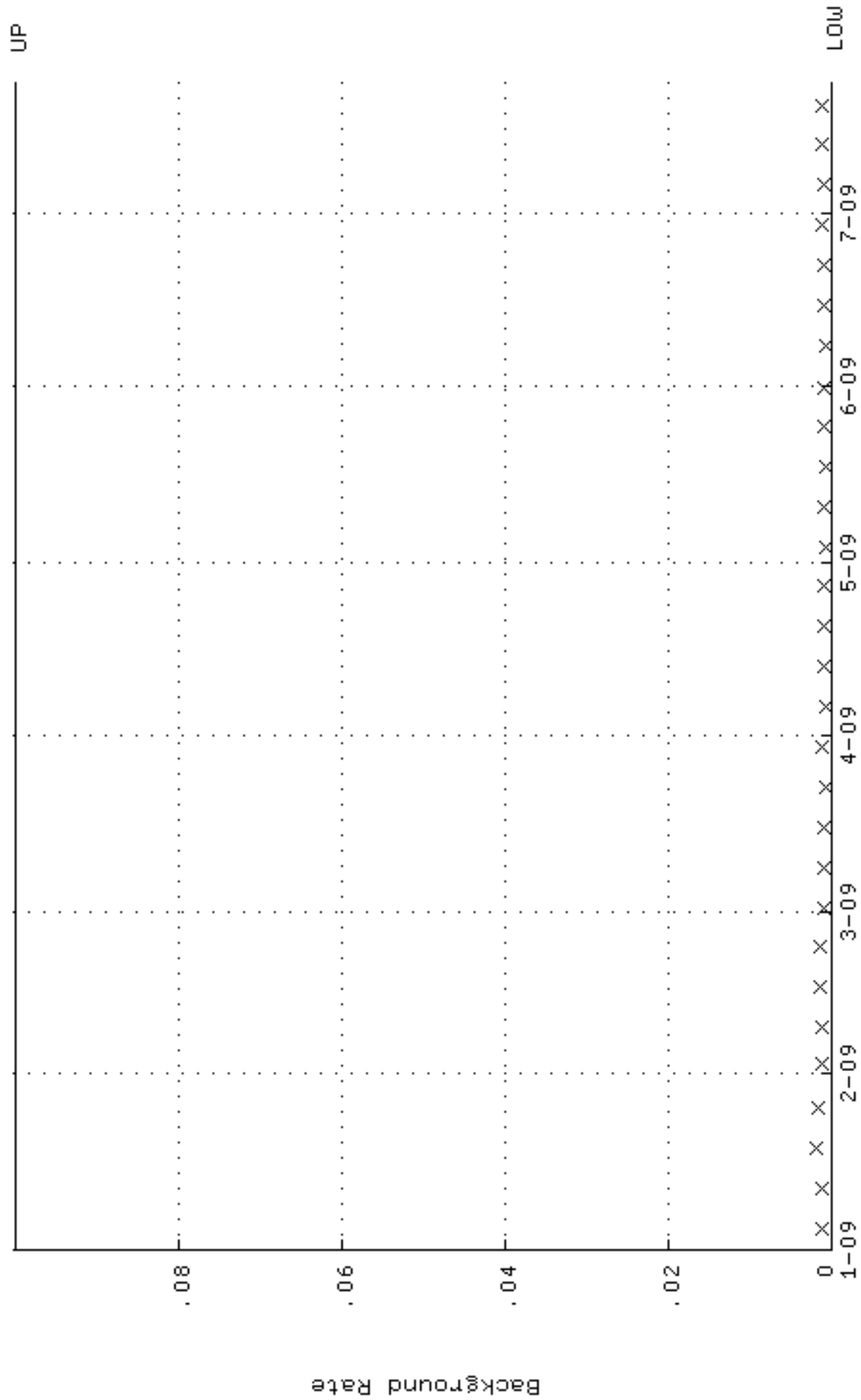
QA filename : DKA100:[ENV\_ALPHA.QA.W]W164.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 12:09:00 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.371107 through 0.397001



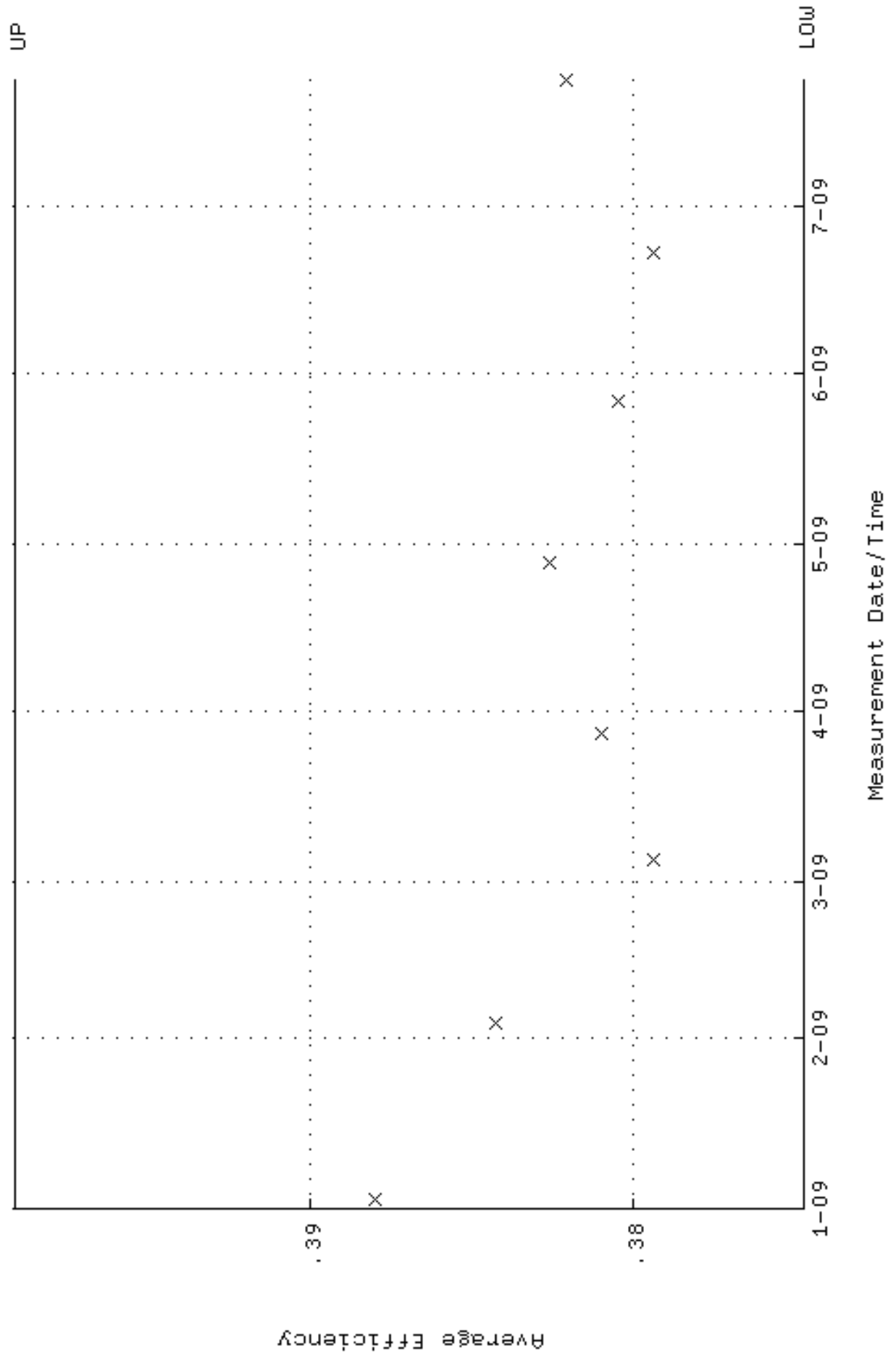
QA filename : DKA100:[ENV\_ALPHA.QA.W]W164.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 12:09:00 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 89.7107 through 92.6809



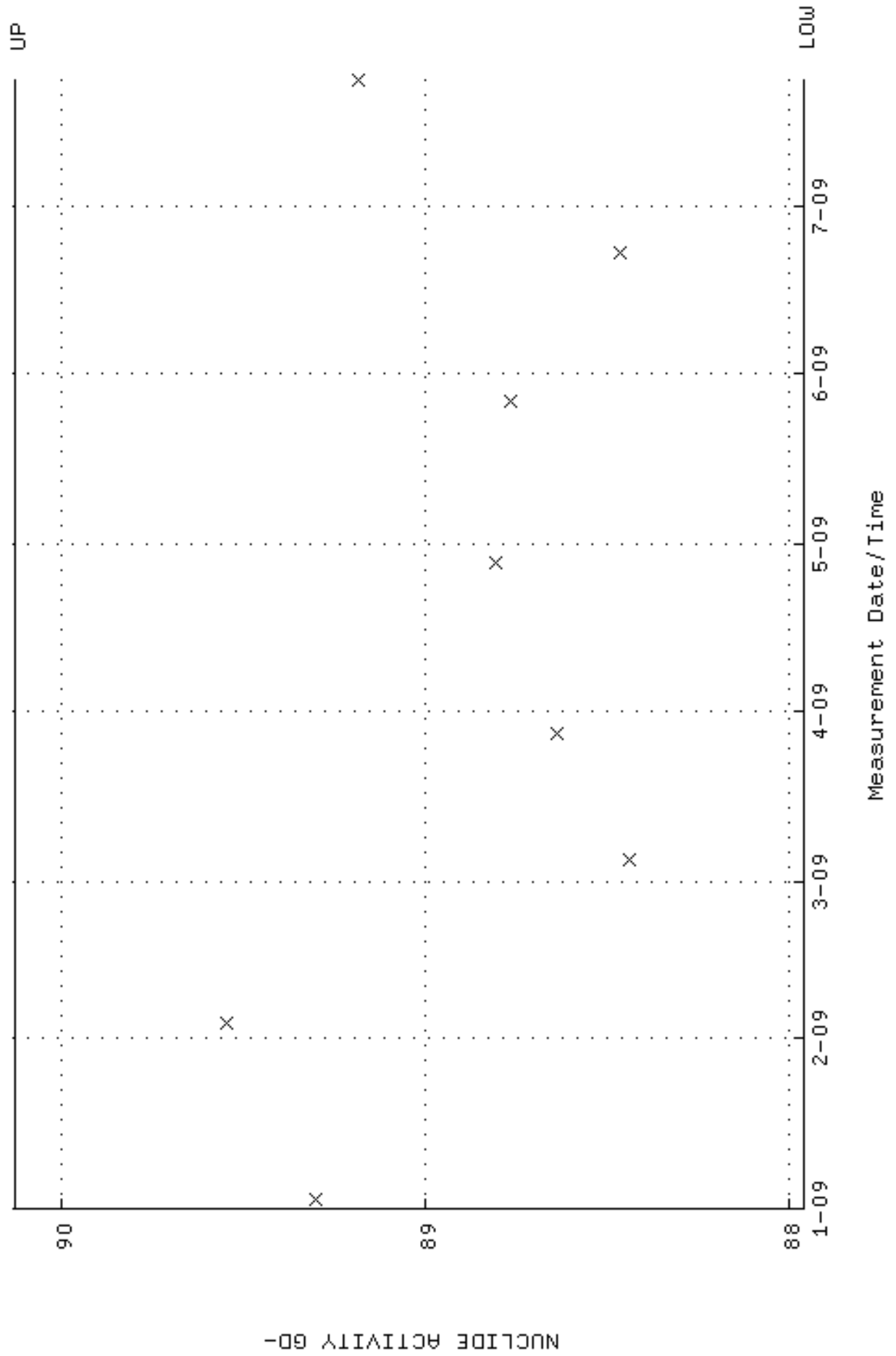
QA filename : DKA100:[ENV\_ALPHA.QA.B]B164.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:17 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



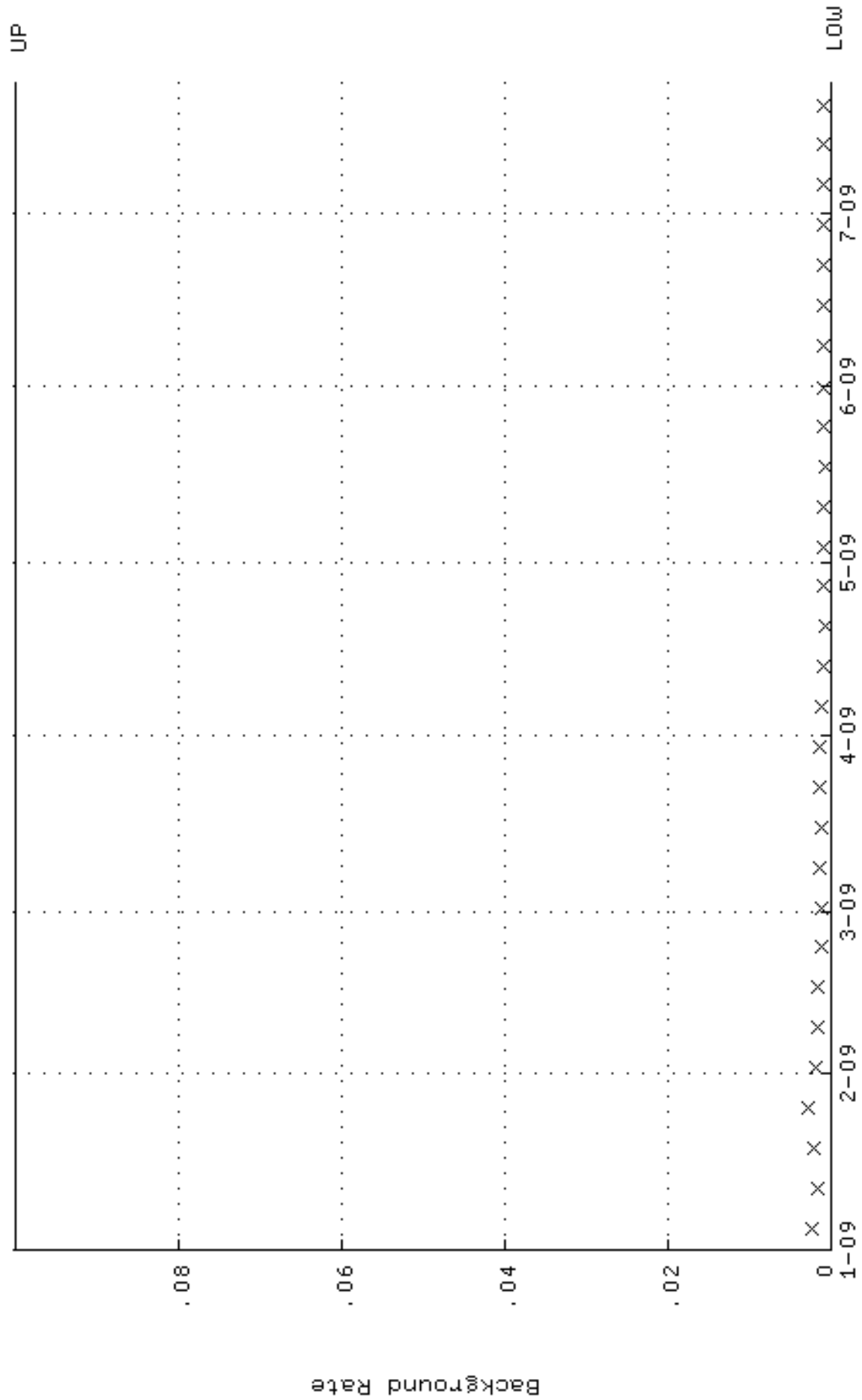
QA filename : DKA100:[ENV\_ALPHA.QA.W]W165.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 12:09:06 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.374689 through 0.399127



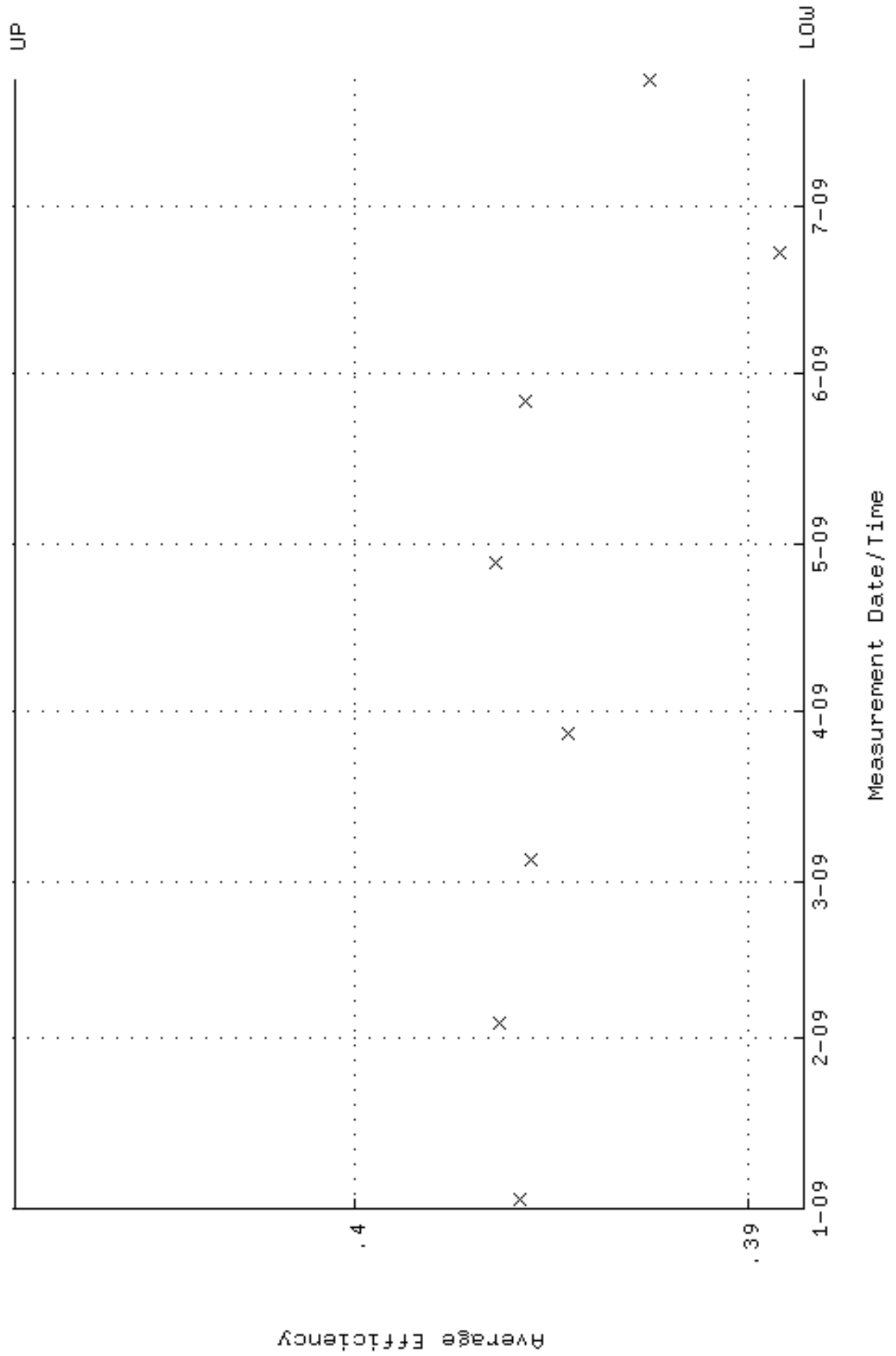
QA filename : DKA100:[ENV\_ALPHA.QA.W]W165.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 12:09:06 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 87.9613 through 90.1269



QA filename : DKA100:[ENV\_ALPHA.QA.B]B165.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:20 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

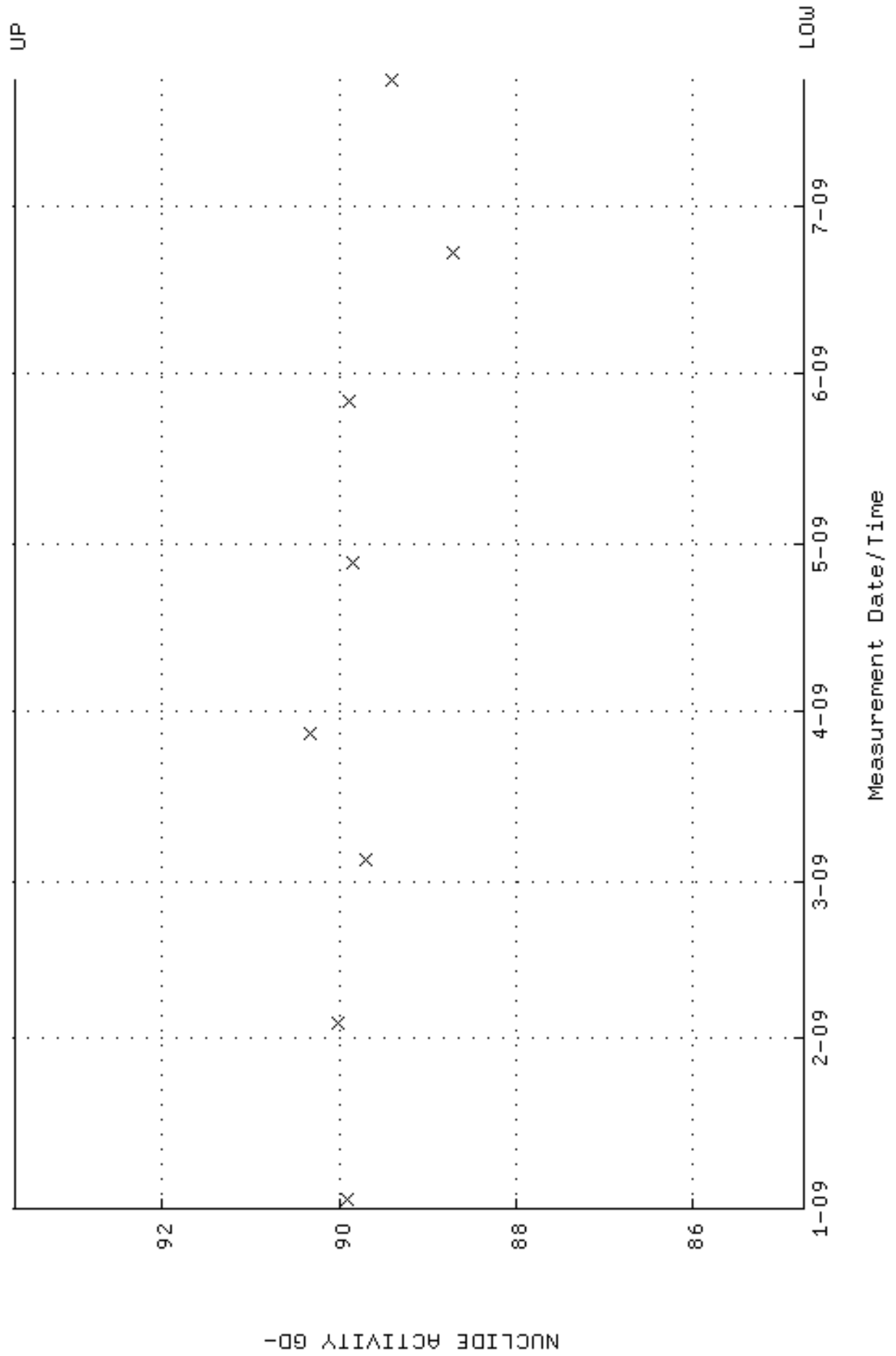


QA filename : DKA100:[ENV\_ALPHA.QA.W]W166.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 12:09:12 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.388604 through 0.408604

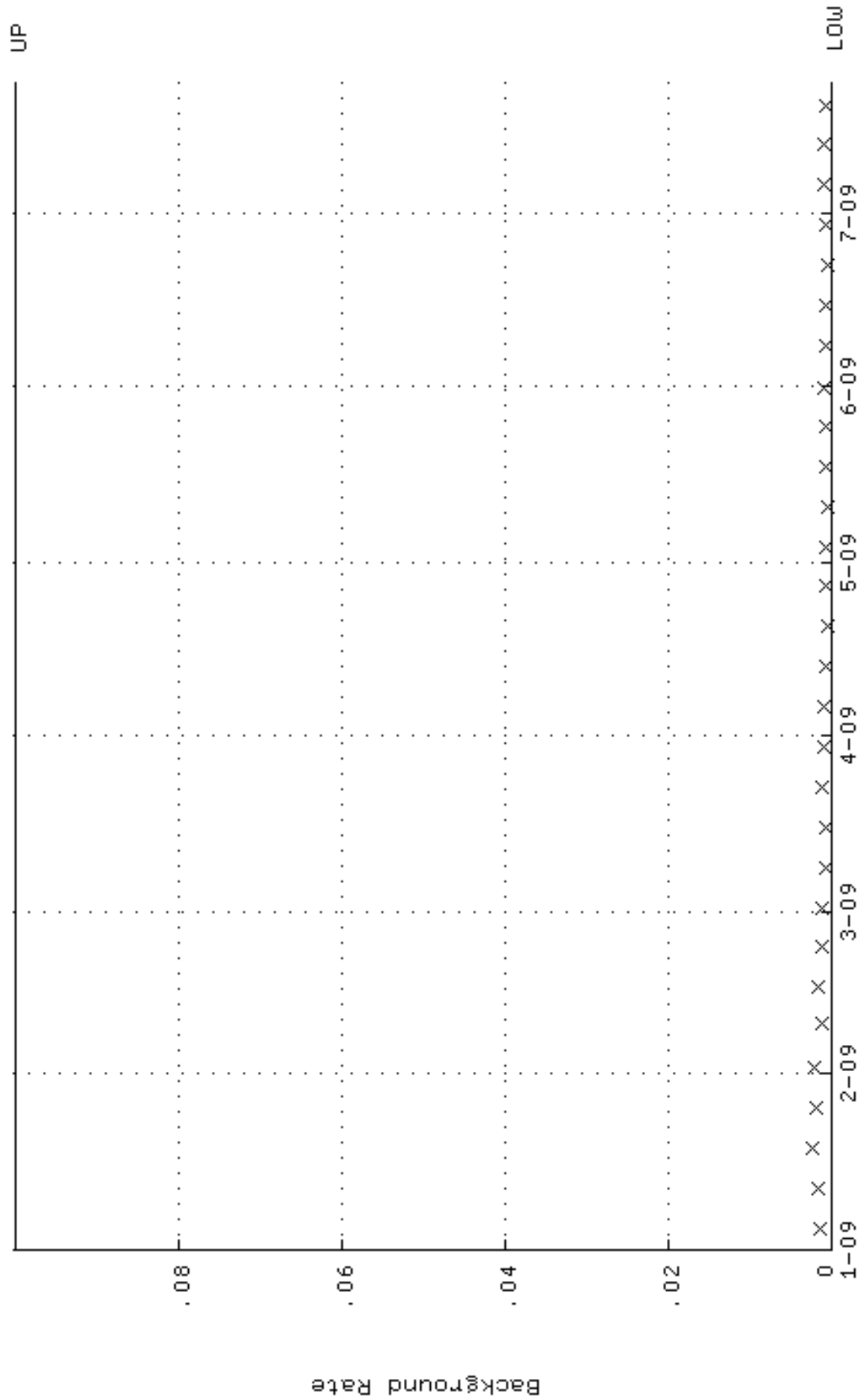




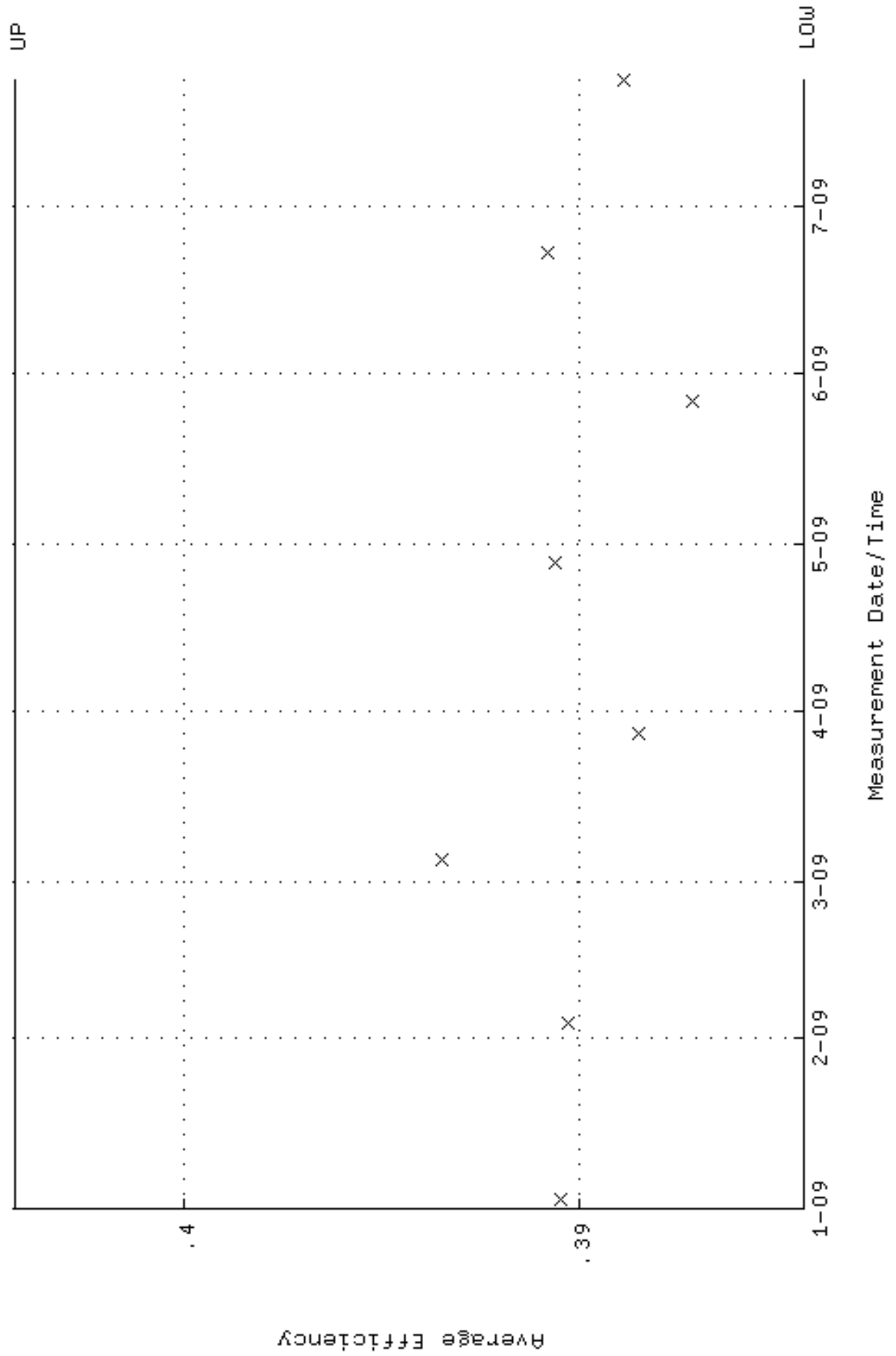
QA filename : DKA100:[ENV\_ALPHA.QA.W]W166.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 12:09:12 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.7448 through 93.6654



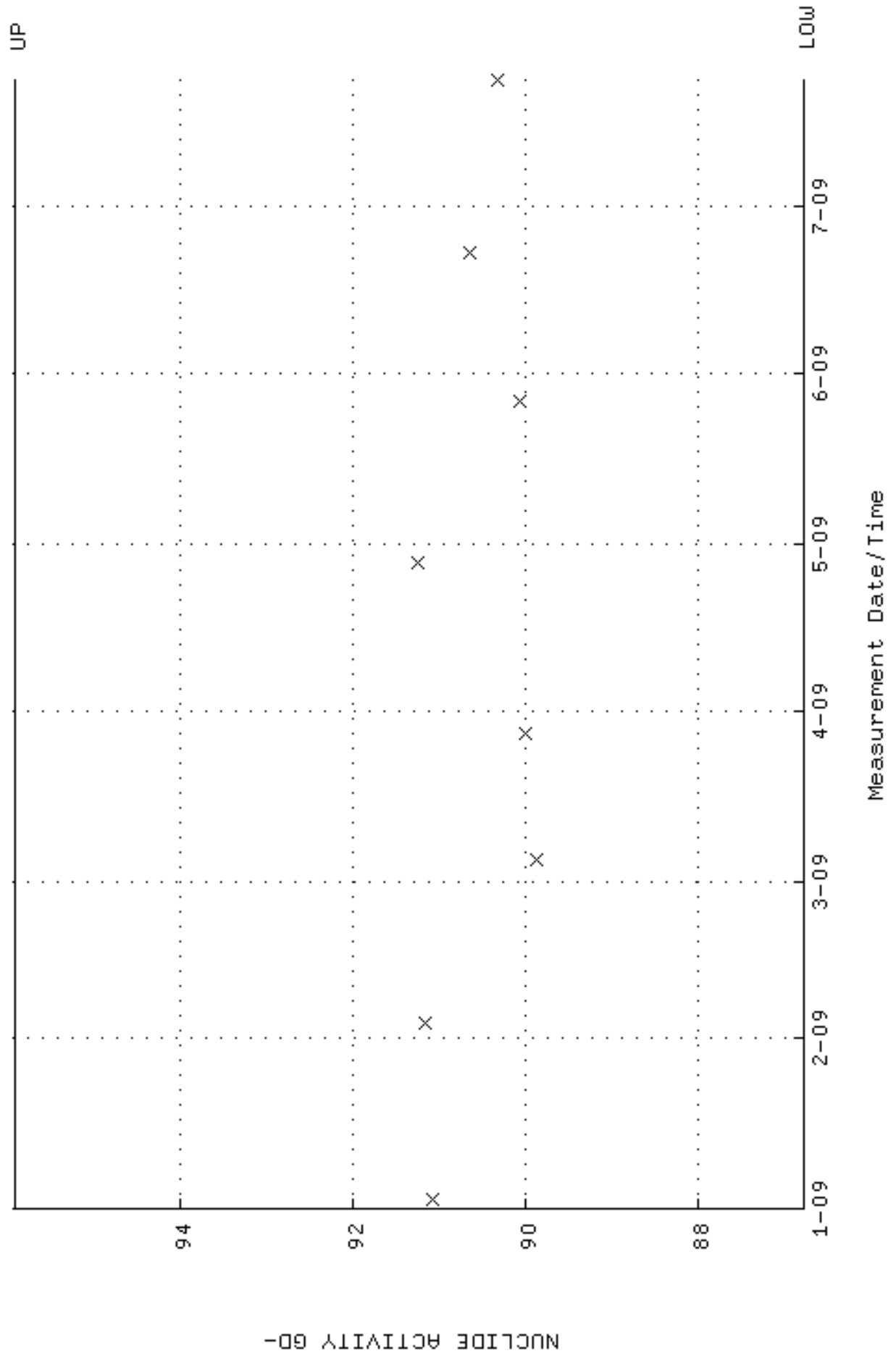
QA filename : DKA100:[ENV\_ALPHA.QA.B]B166.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:24 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



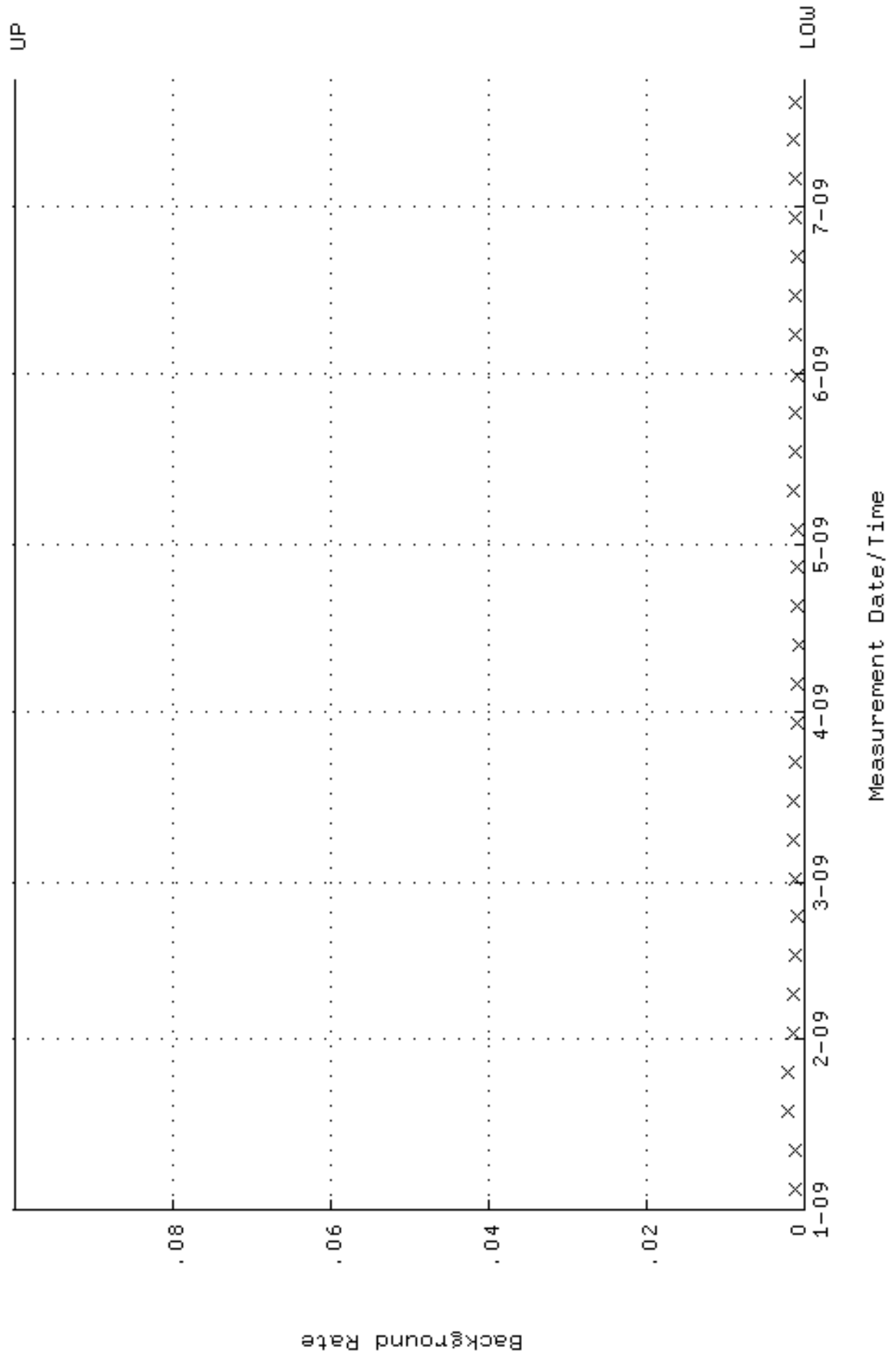
QA filename : DKA100:[ENV\_ALPHA.QA.W]W167.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 12:09:17 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.384285 through 0.404285



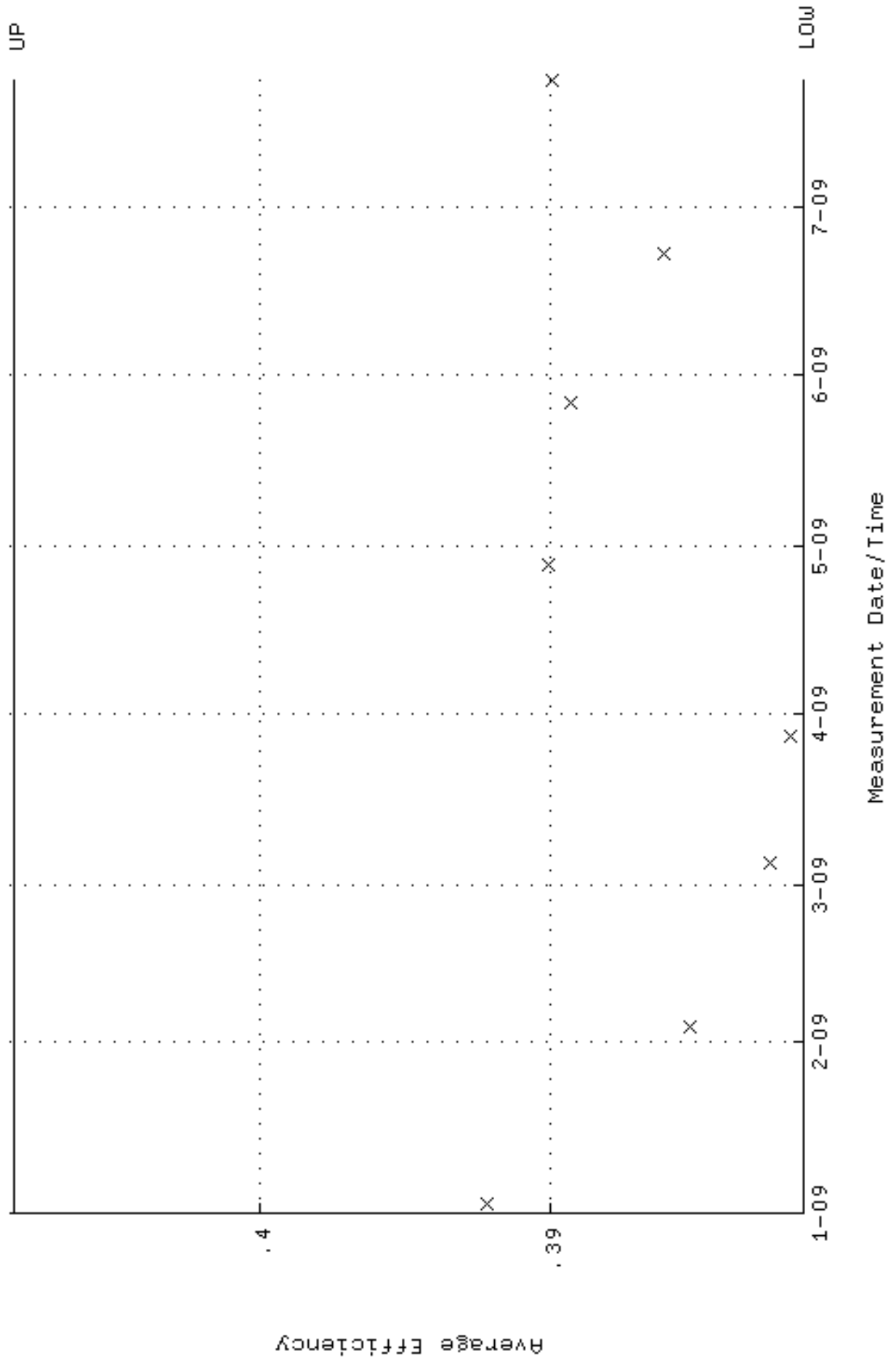
QA filename : DKA100:[ENV\_ALPHA.QA.W]w167.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 12:09:17 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 86.7740 through 95.9082



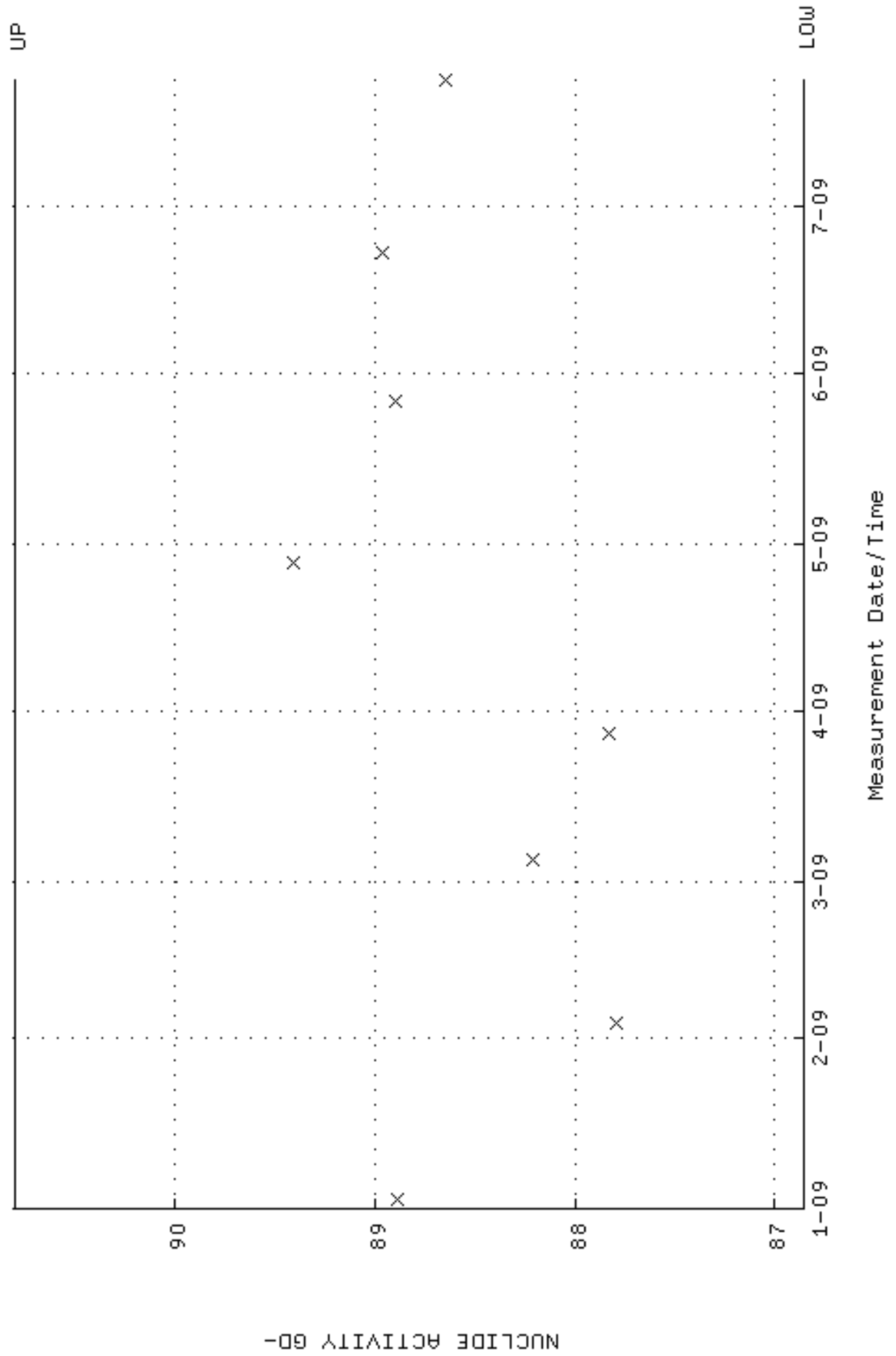
QA filename : DKA100:[ENV\_ALPHA.QA.B]B167.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:28 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



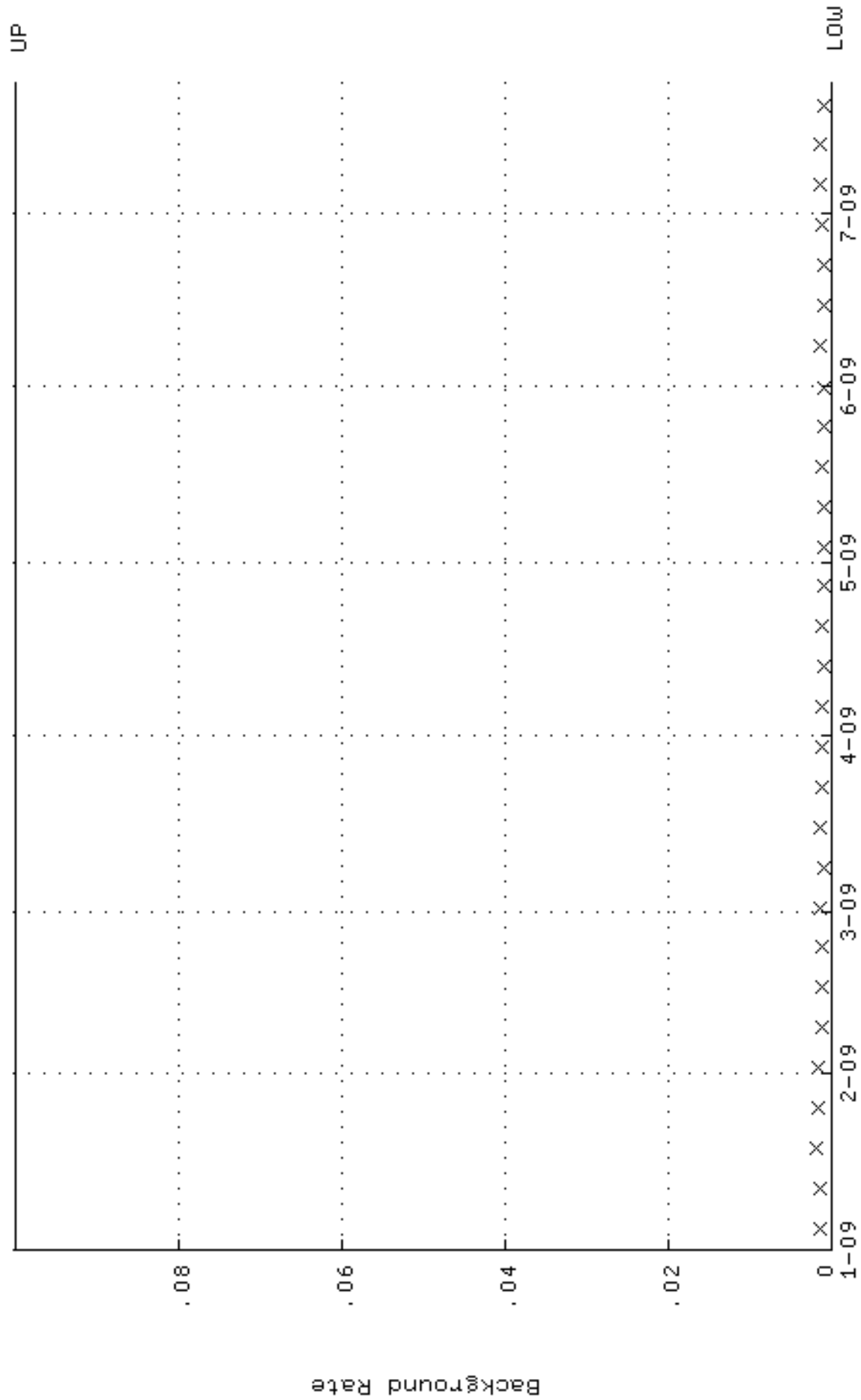
QA filename : DKA100:[ENV\_ALPHA.QA.W]W168.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 12:09:22 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.381339 through 0.408495



QA filename : DKA100:[ENV\_ALPHA.QA.W]W168.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 12:09:22 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 86.8544 through 90.7976

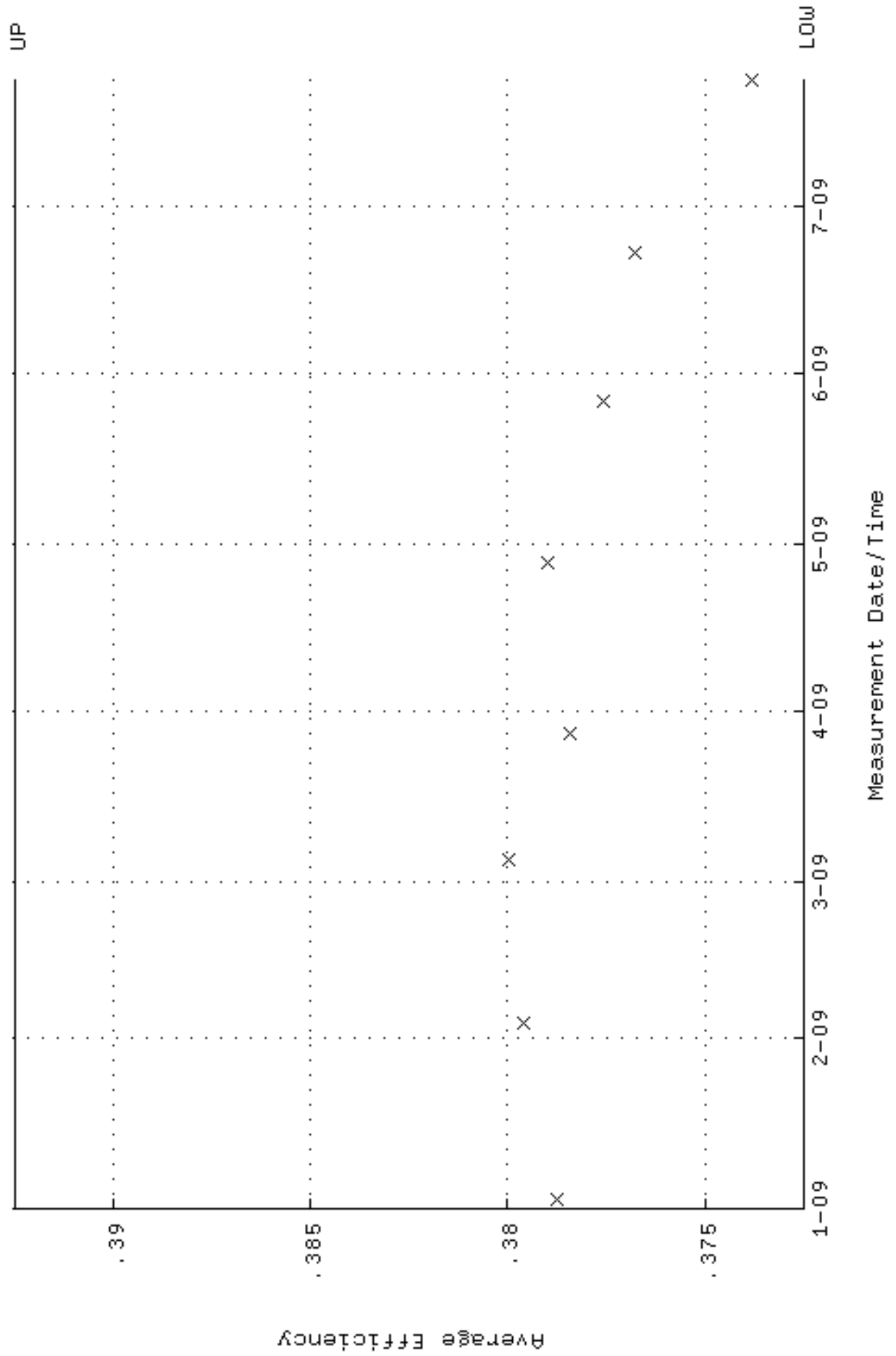


QA filename : DKA100:[ENV\_ALPHA.QA.B]B168.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:31 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

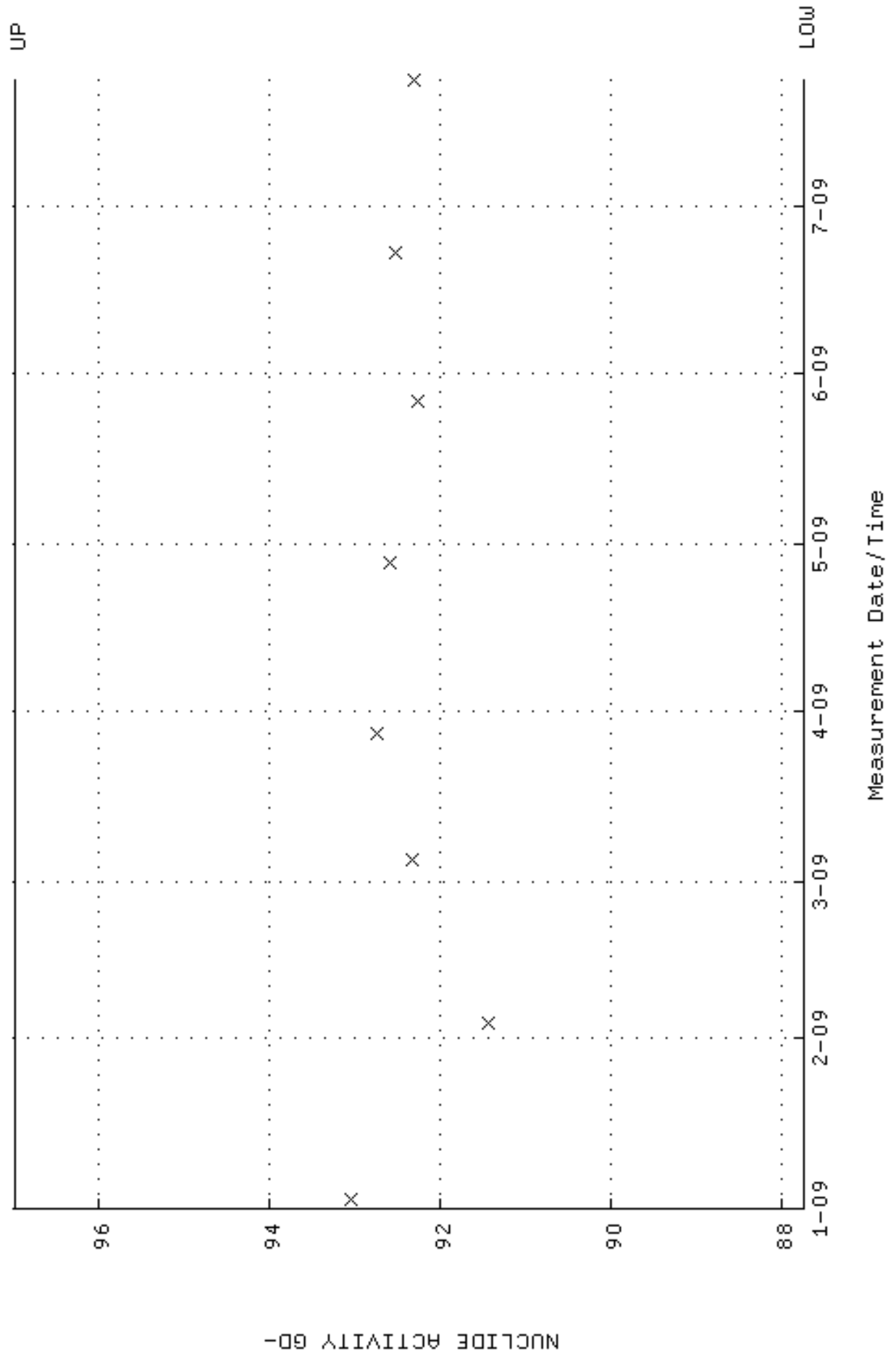




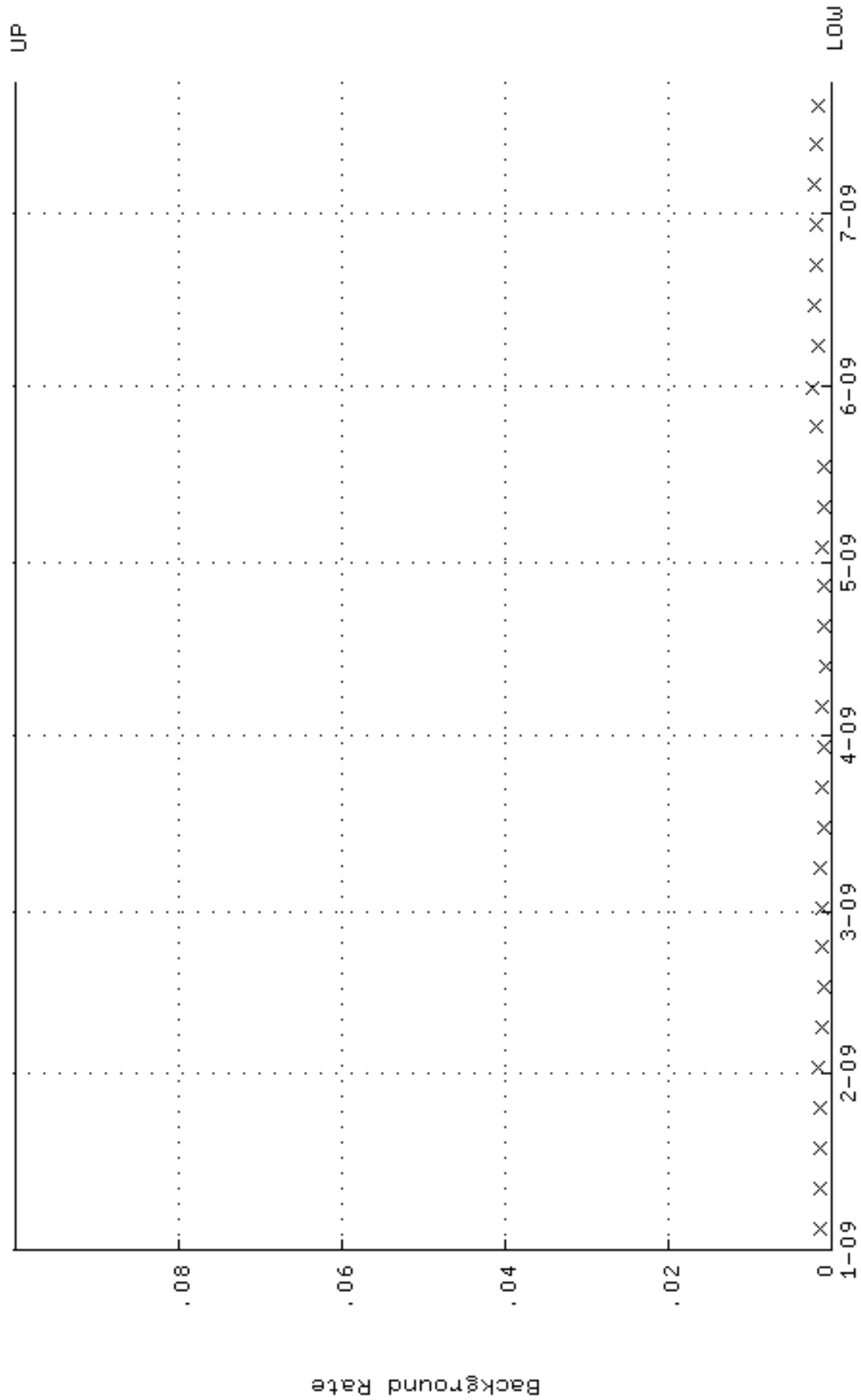
QA filename : DKA100:[ENV\_ALPHA.QA.W]W169.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 12:09:28 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.372494 through 0.392494



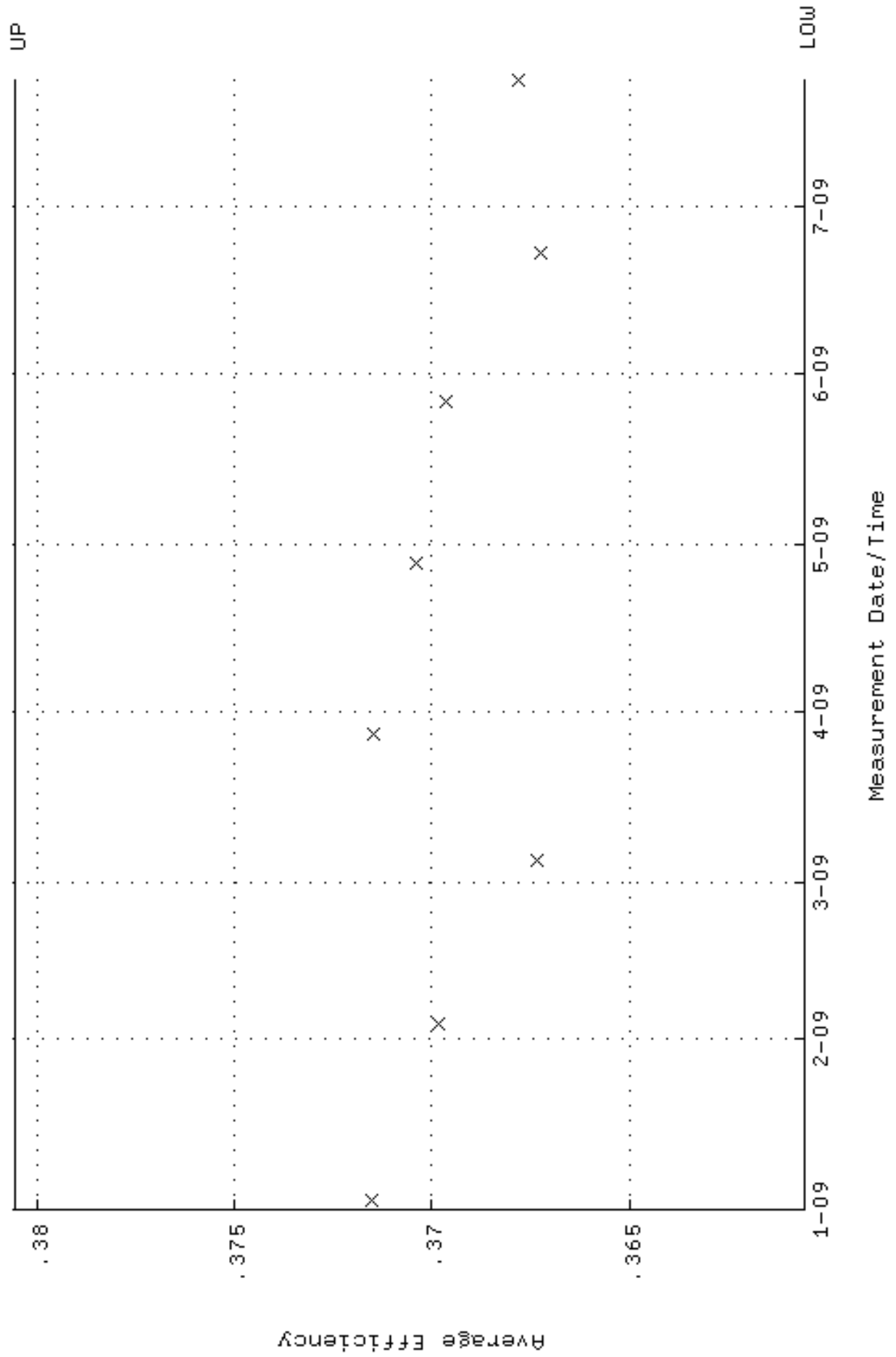
QA filename : DKA100:[ENV\_ALPHA.QA.W]w169.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 2-JAN-2009 12:09:28 through 23-JUL-2009 12:00:00  
Lower/Upper Lmts: 87.7496 through 96.9864



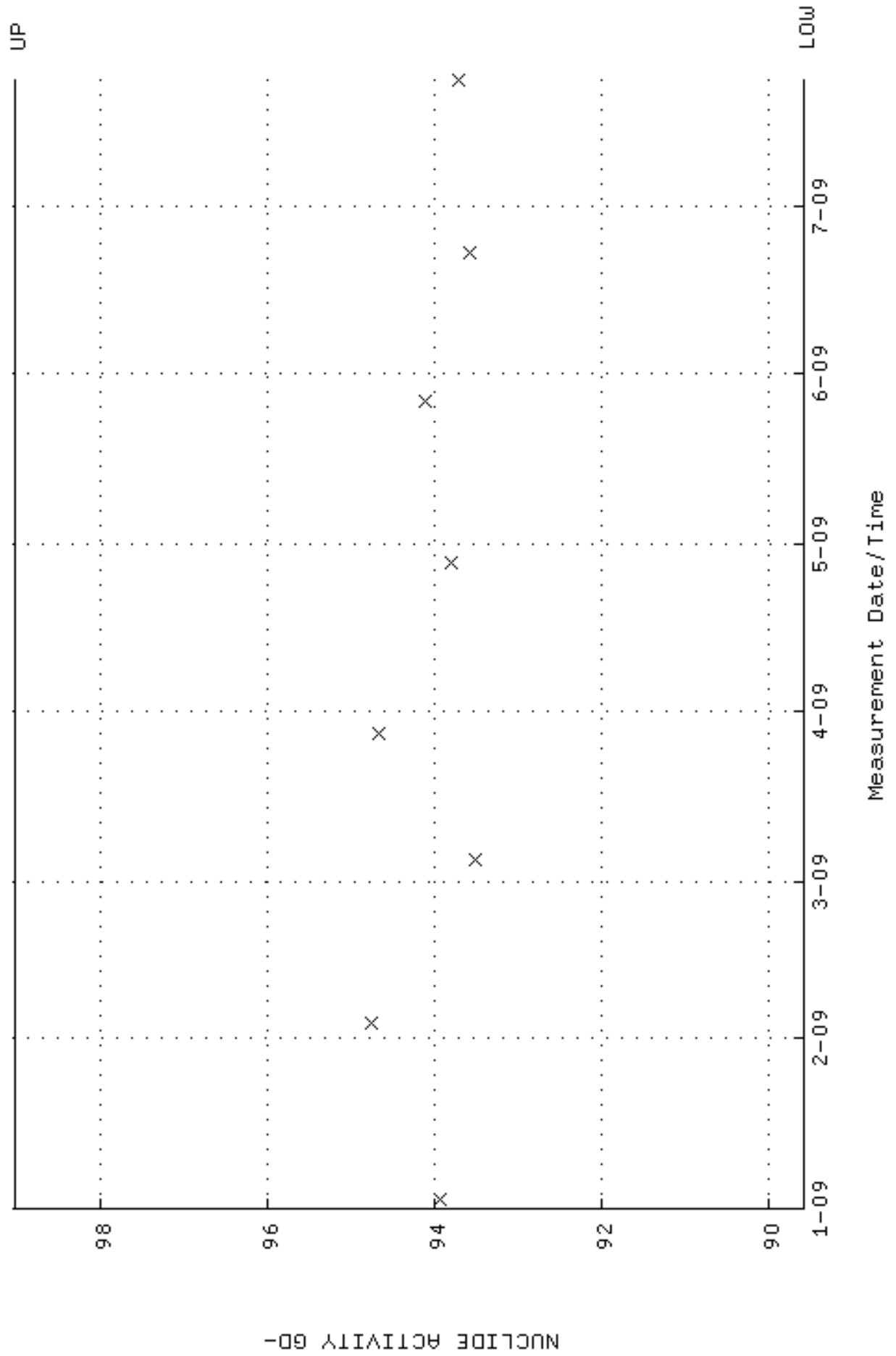
QA filename : DKA100:[ENV\_ALPHA.QA.B]B169.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:35 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



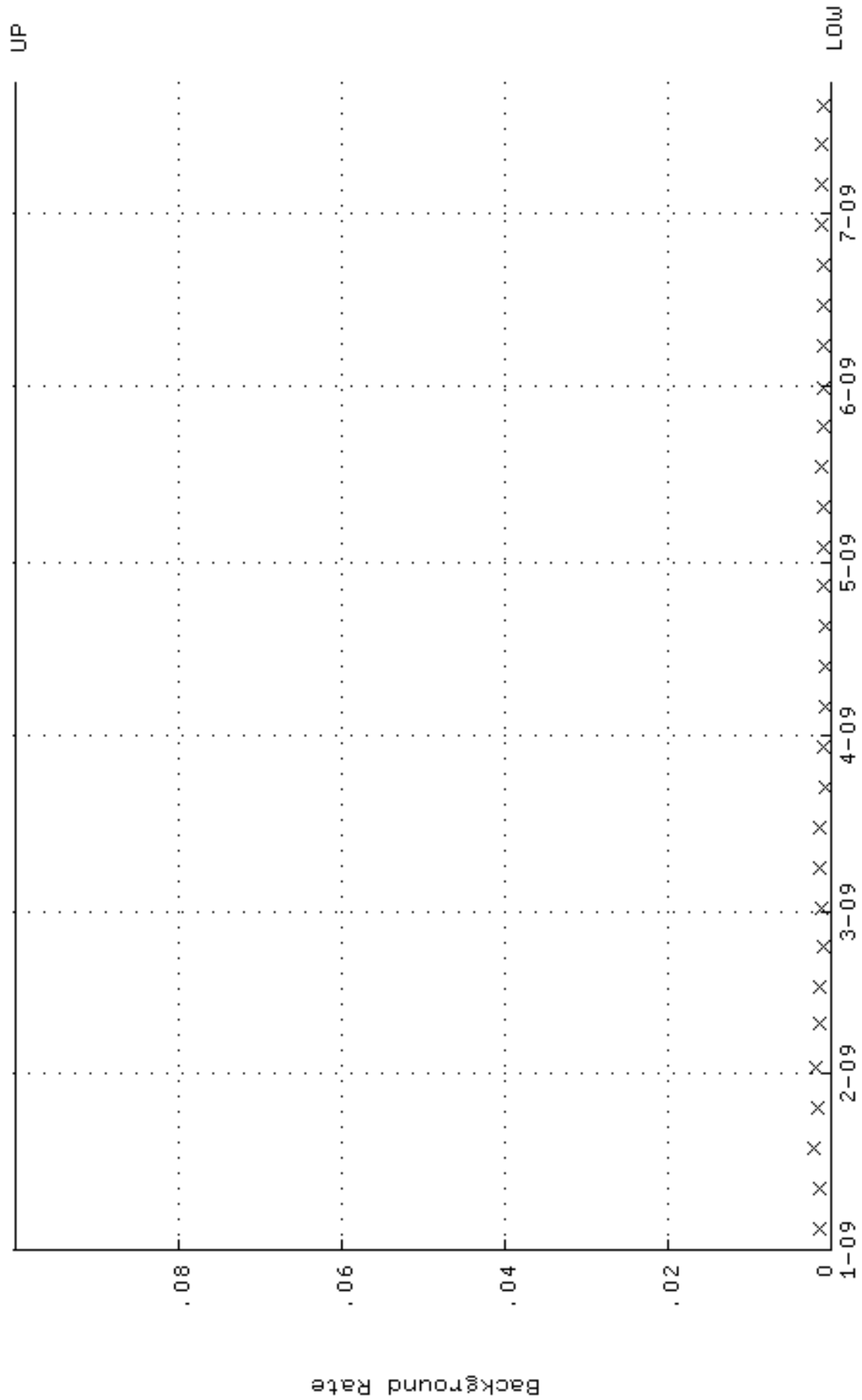
QA filename : DKA100:[ENV\_ALPHA.QA.W]W170.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 12:09:33 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.360563 through 0.380563



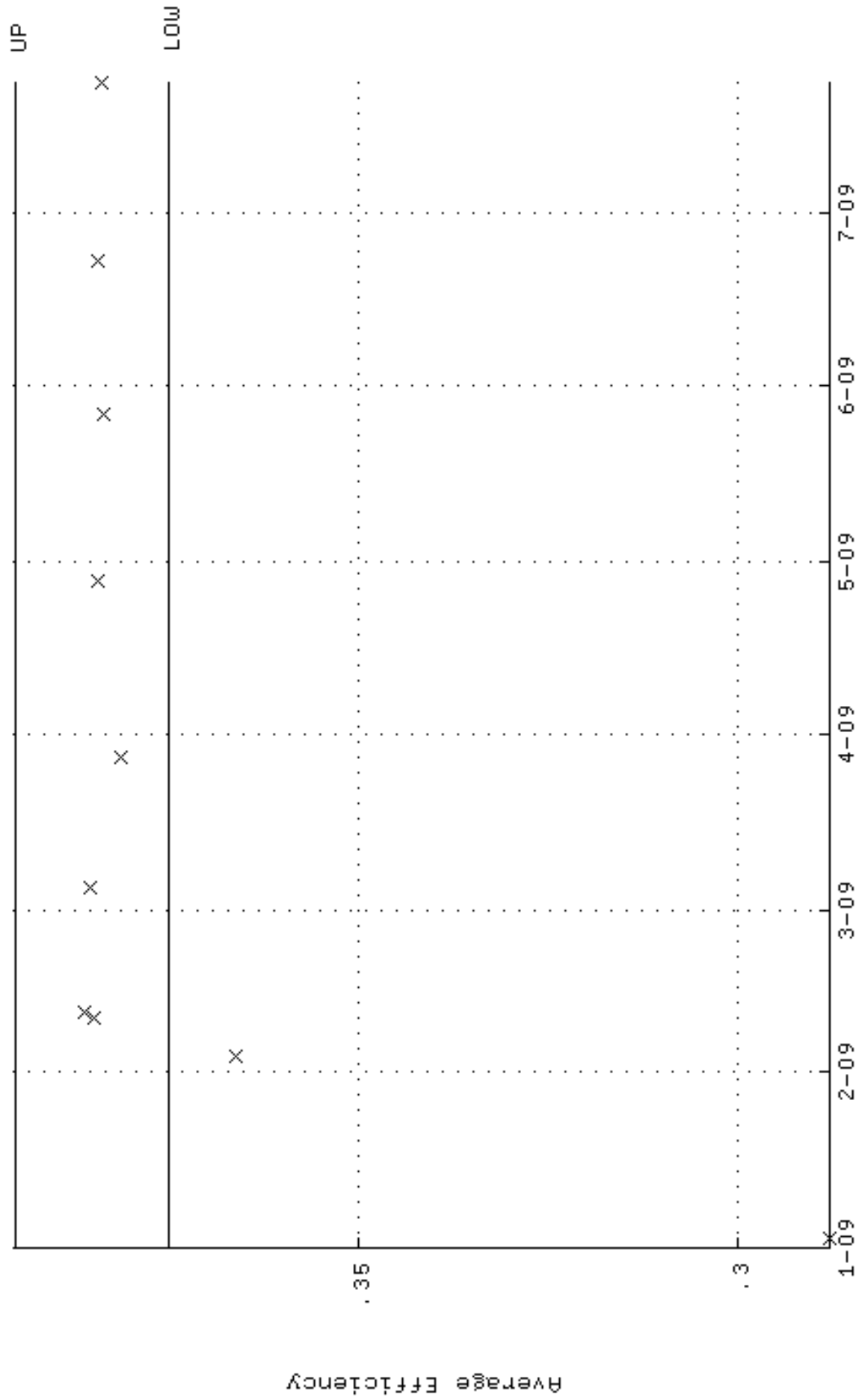
QA filename : DKA100:[ENV\_ALPHA.QA.W]w170.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 12:09:33 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 89.5841 through 99.0139



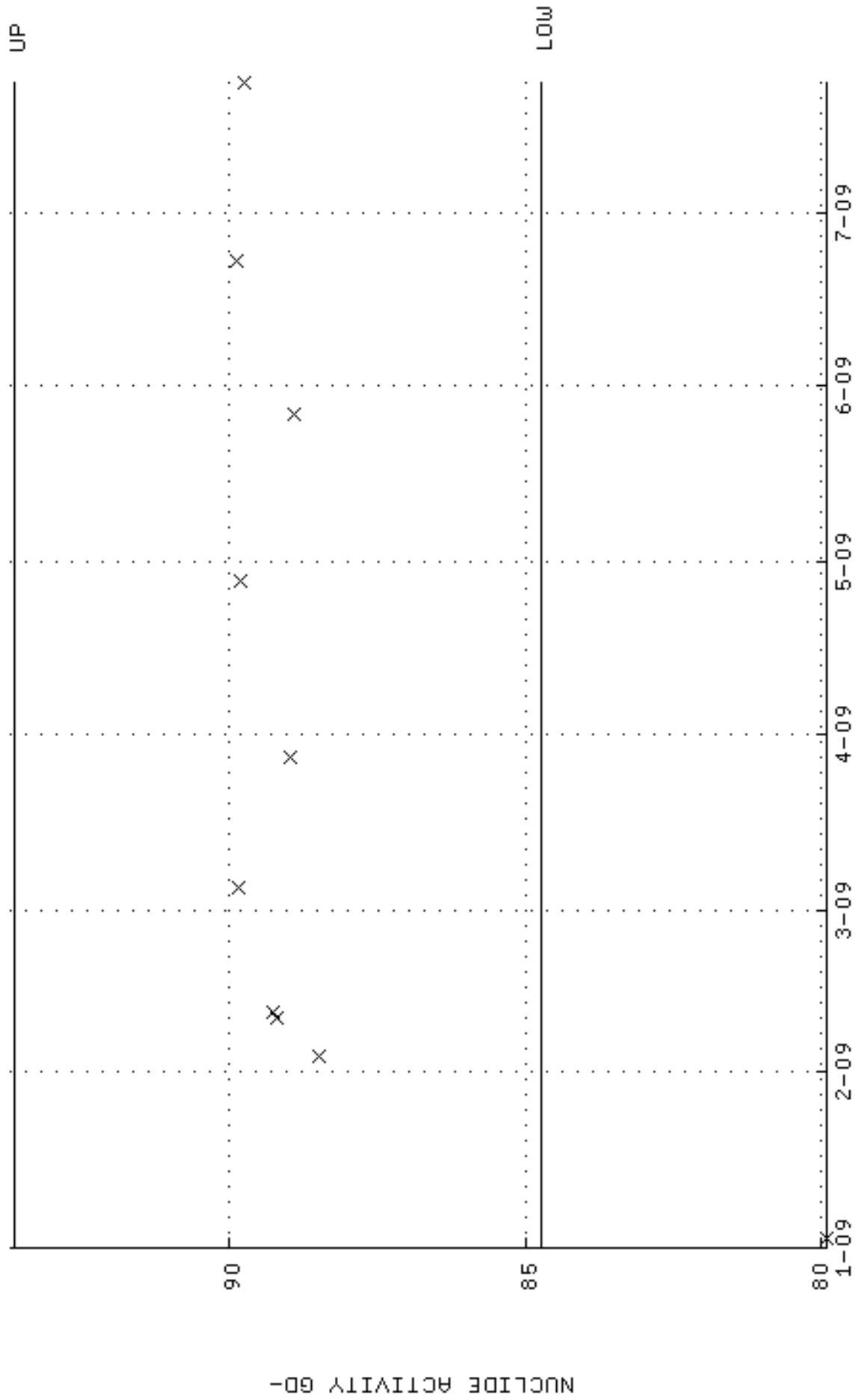
QA filename : DKA100:[ENV\_ALPHA.QA.B]B170.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:39 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W171.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 12:09:38 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.375364 through 0.395364

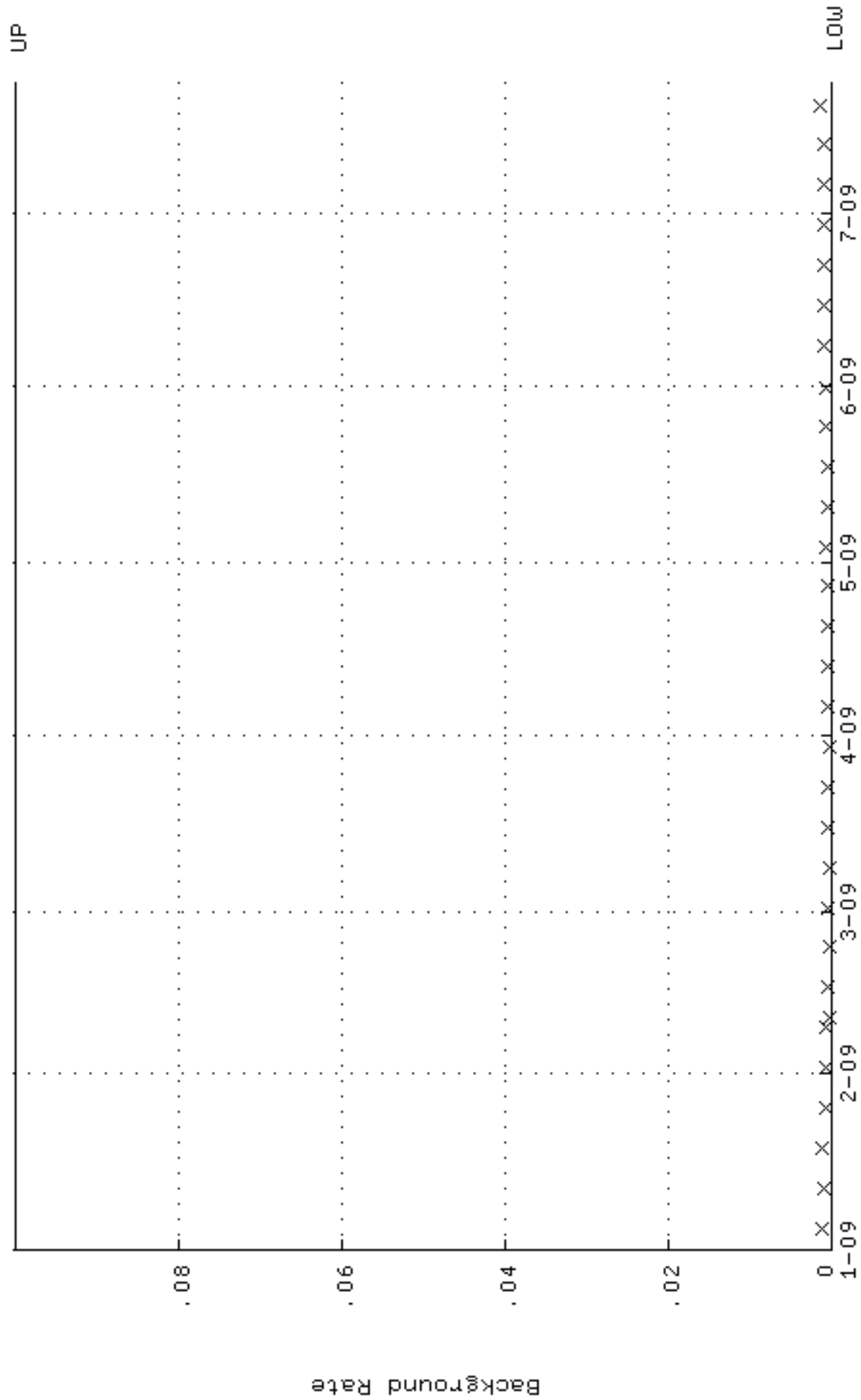


QA filename : DKA100:[ENV\_ALPHA.QA.W]w171.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 12:09:38 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.7539 through 93.6753

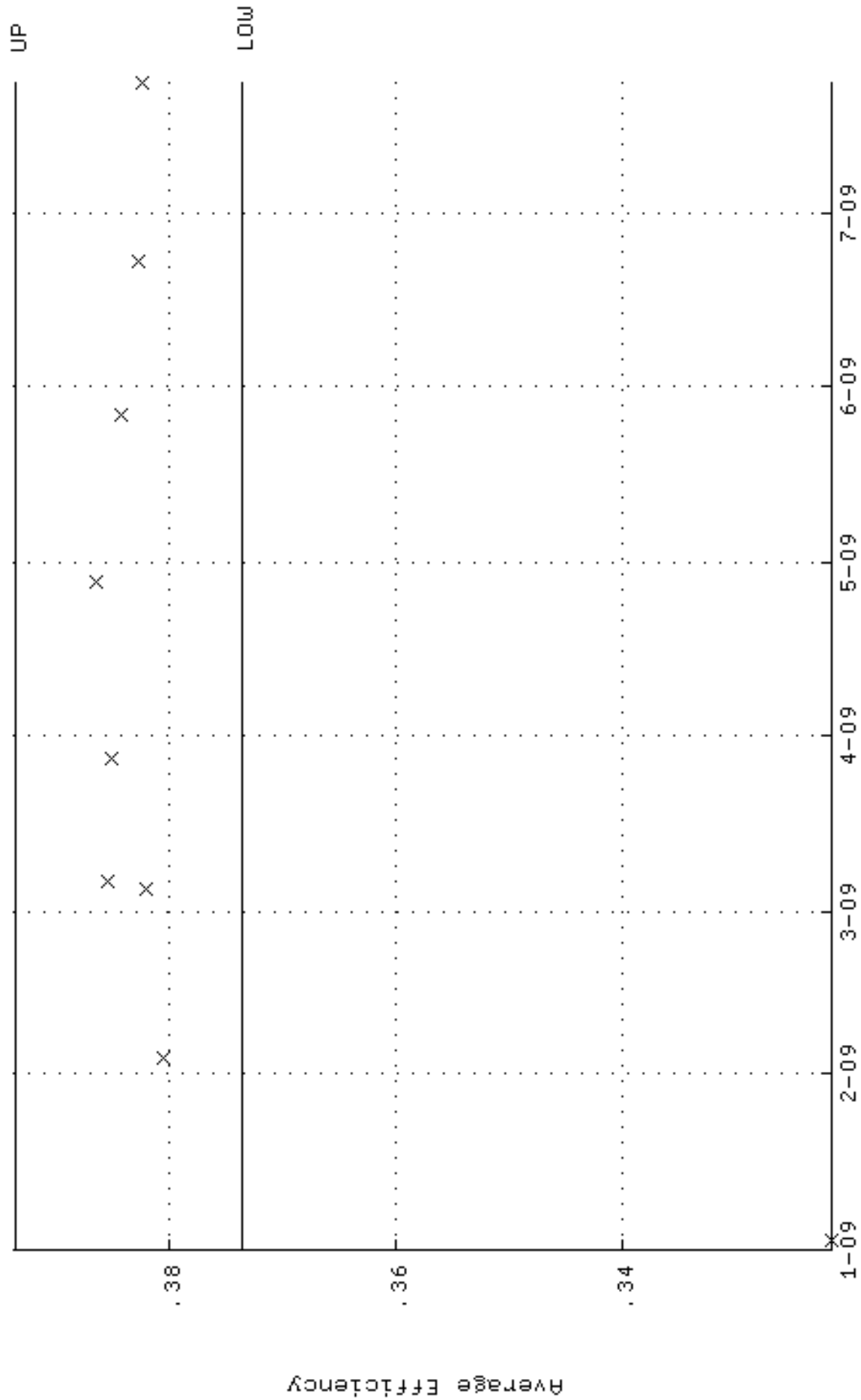




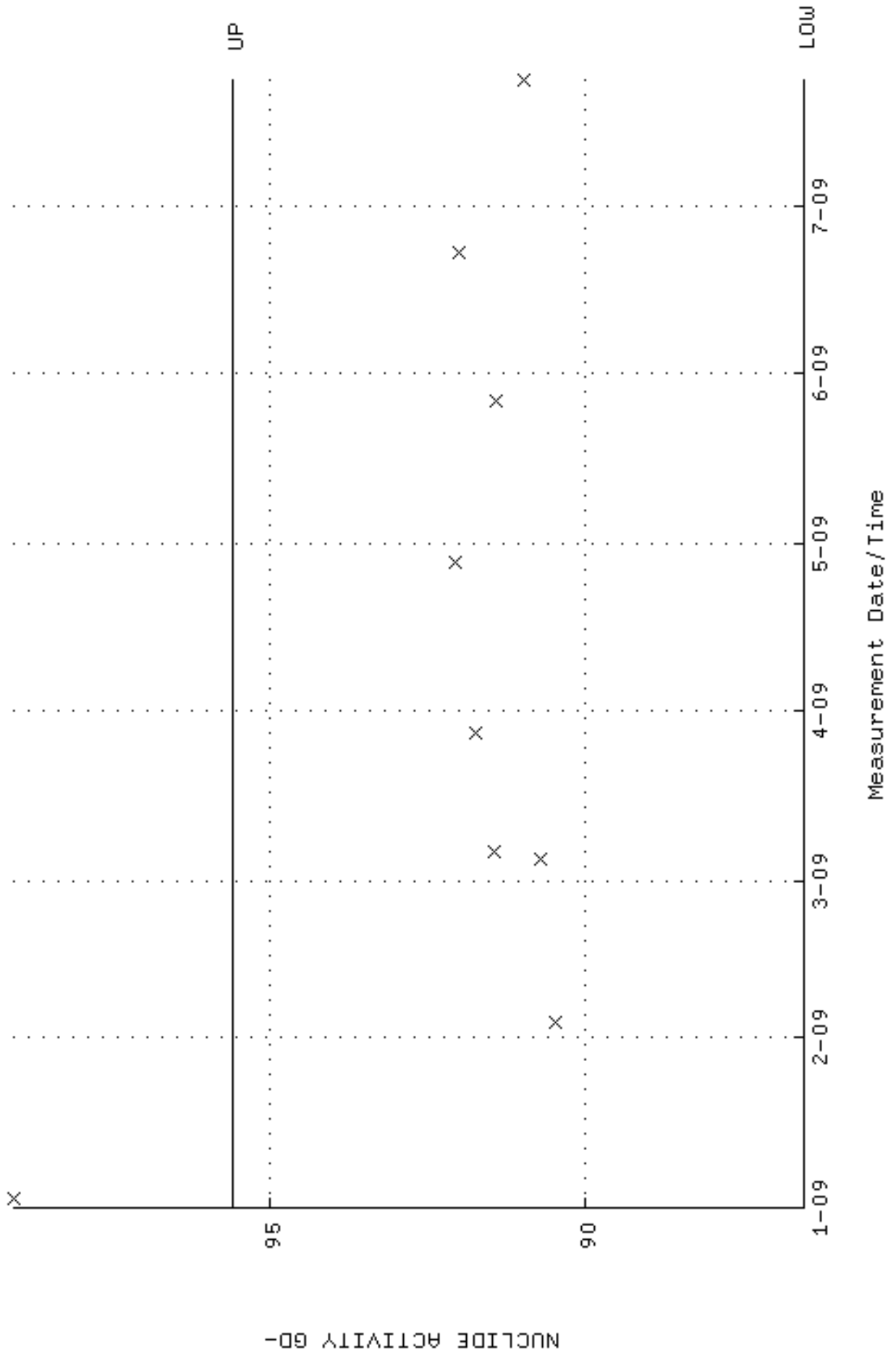
QA filename : DKA100:[ENV\_ALPHA.QA.B]B171.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:42 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



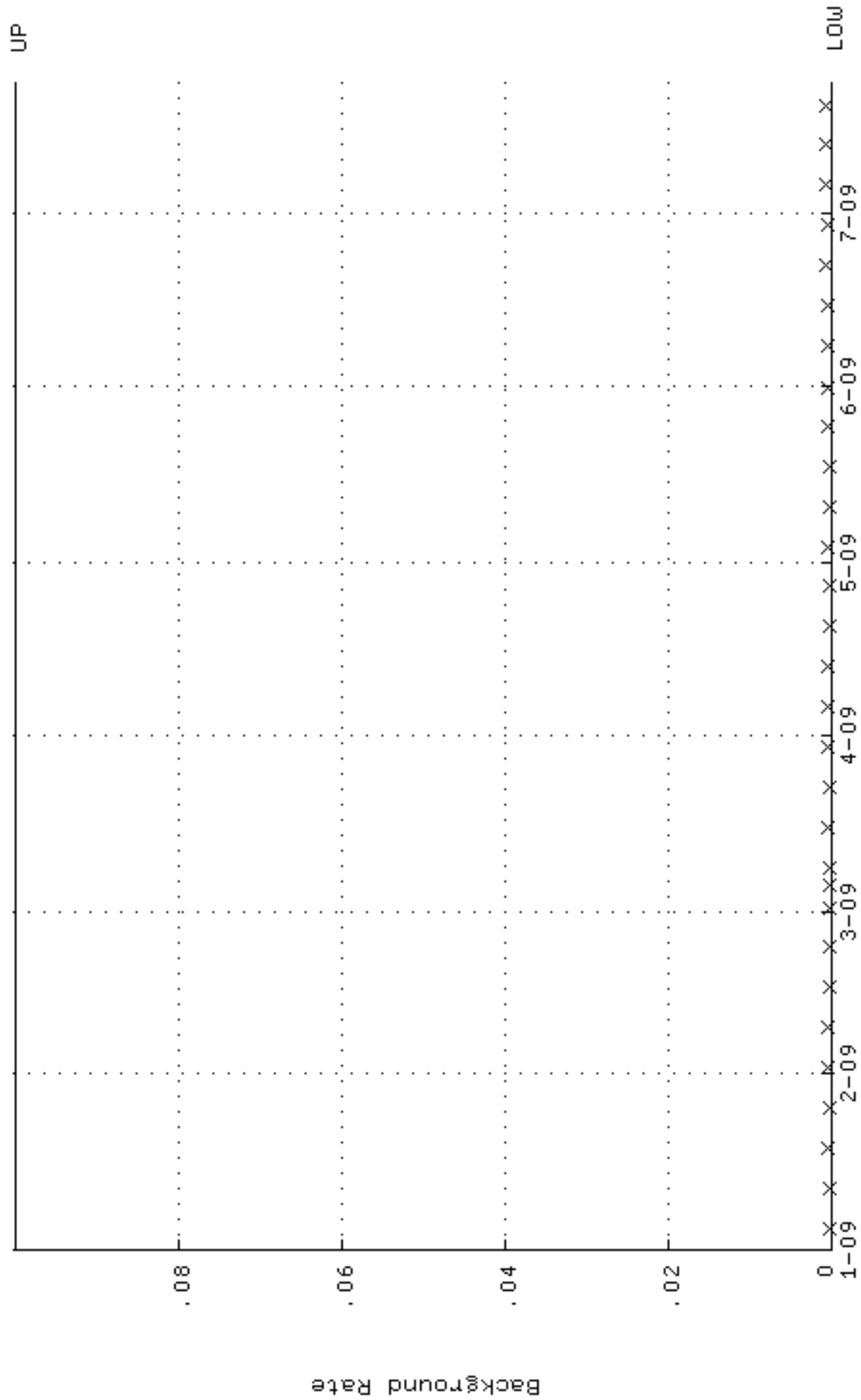
QA filename : DKA100:[ENV\_ALPHA.QA.W]W172.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 12:09:49 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.373575 through 0.393575



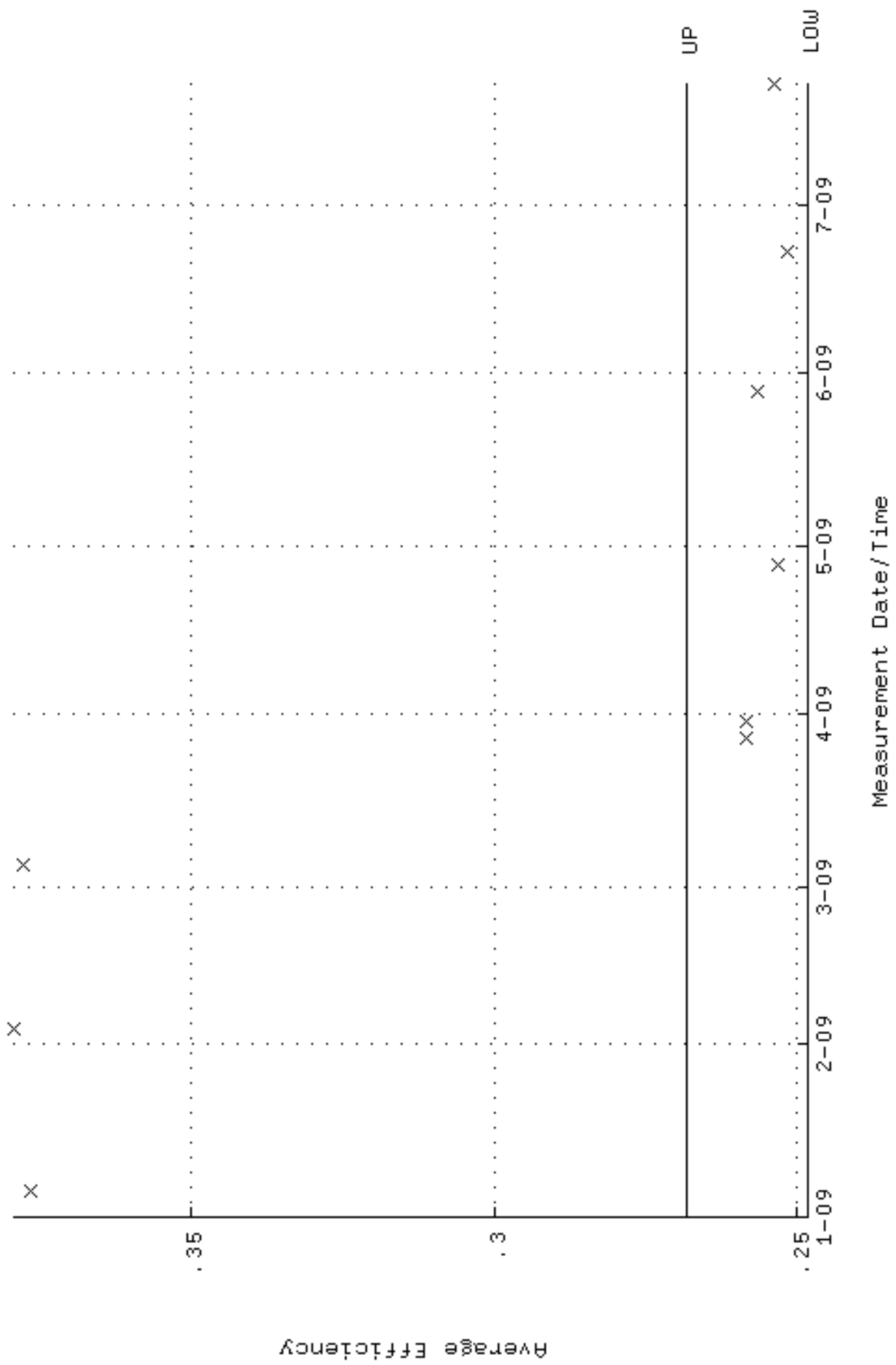
QA filename : DKA100:[ENV\_ALPHA.QA.W]w172.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 12:09:49 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 86.5089 through 95.6151



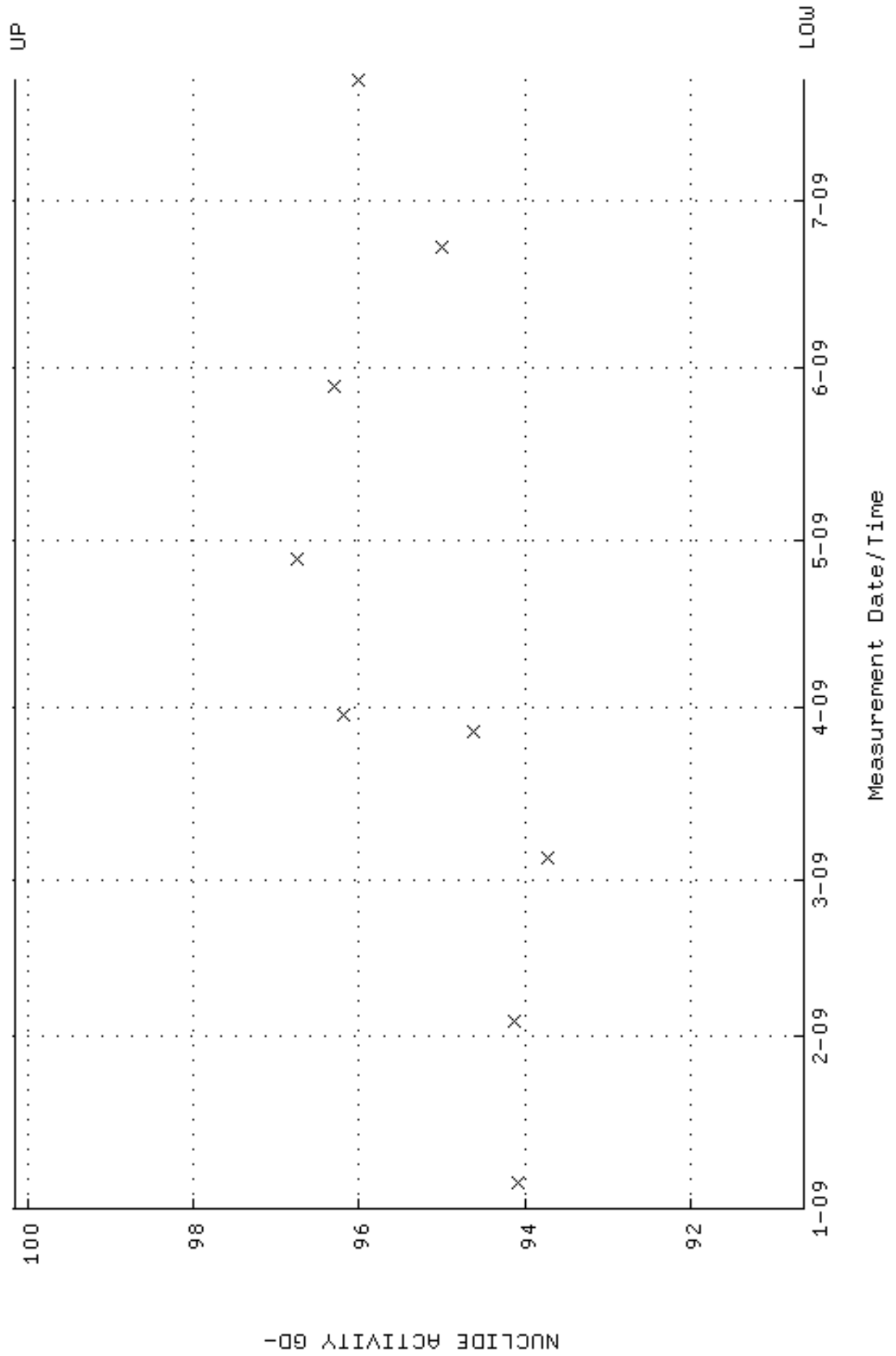
QA filename : DKA100:[ENV\_ALPHA.QA.B]B172.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:46 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



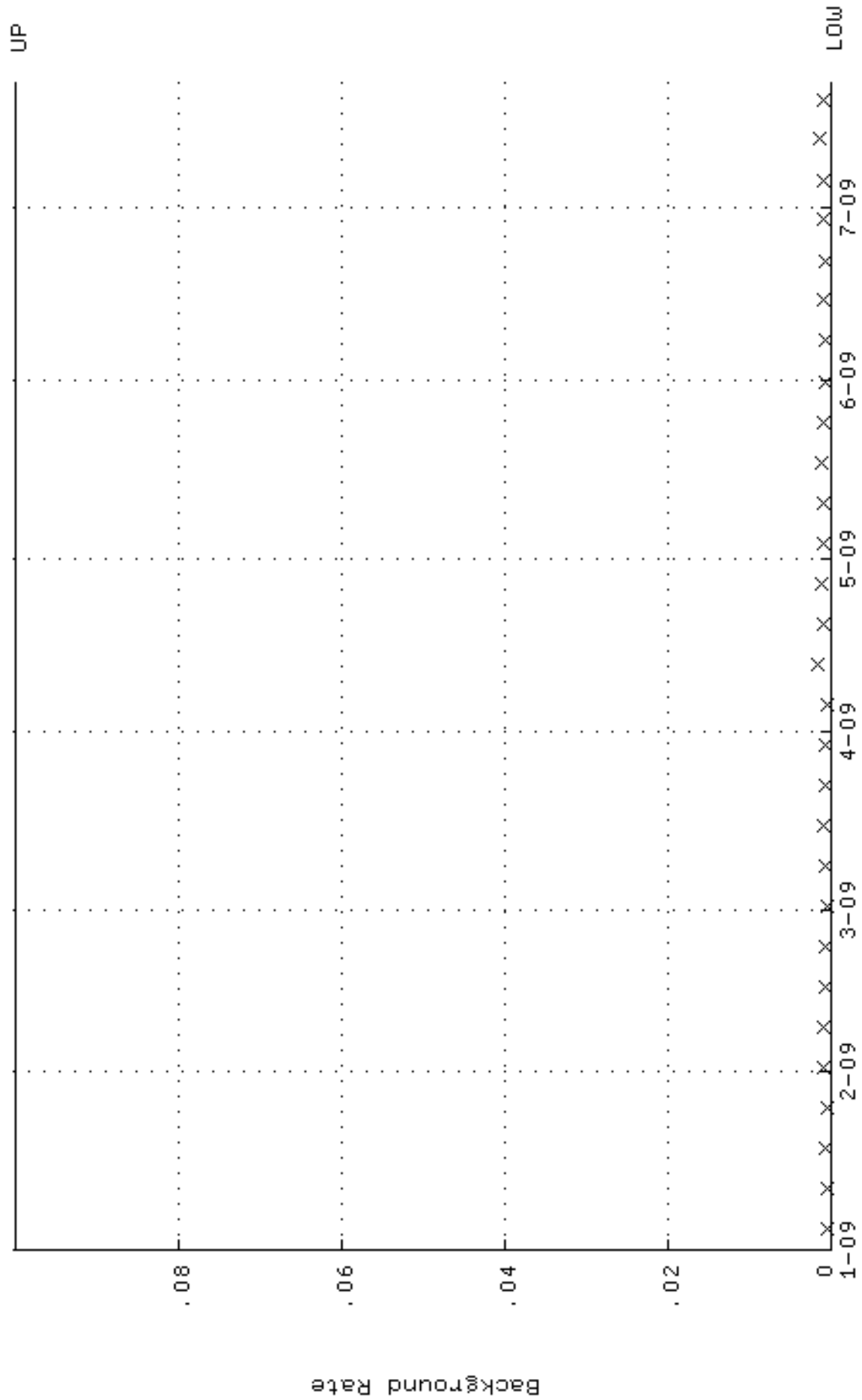
QA filename : DKA100:[ENV\_ALPHA.QA.W]W175.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 5-JAN-2009 12:57:05 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.248296 through 0.268296



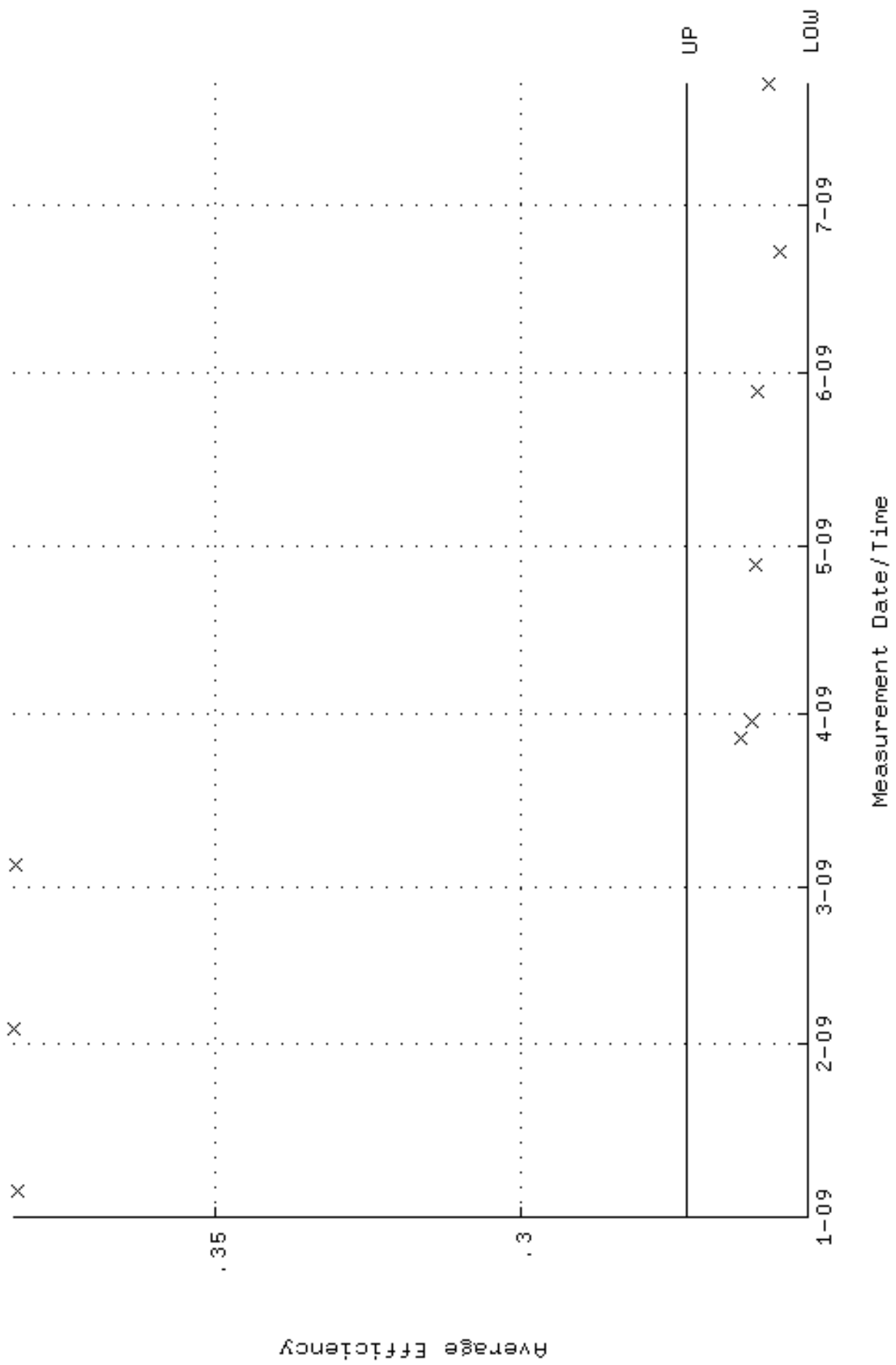
QA filename : DKA100:[ENV\_ALPHA.QA.W]w175.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 5-JAN-2009 12:57:05 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 90.6224 through 100.162



QA filename : DKA100:[ENV\_ALPHA.QA.B]B175.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:58 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

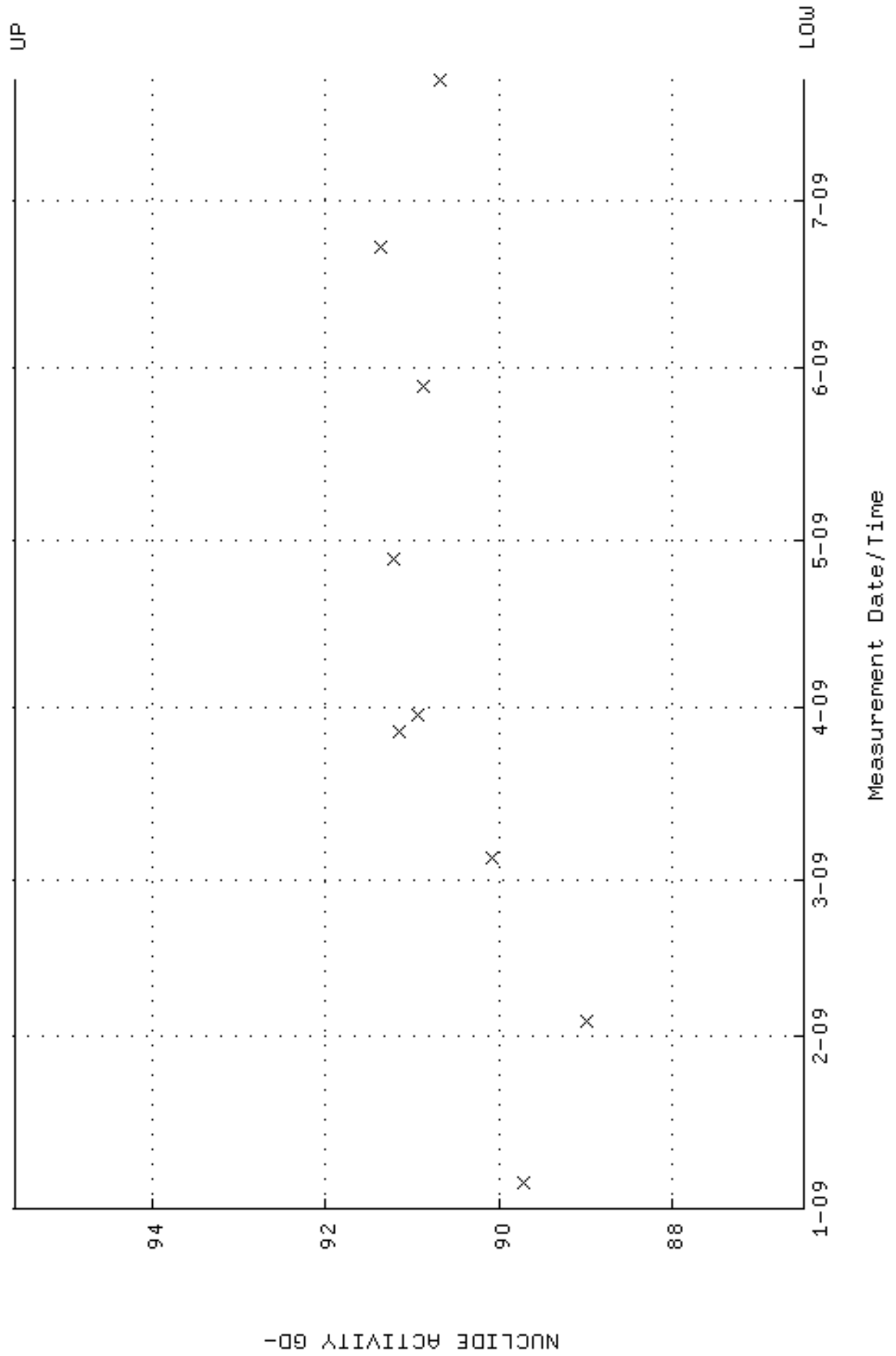


QA filename : DKA100:[ENV\_ALPHA.QA.W]W176.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 5-JAN-2009 12:57:11 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.253285 through 0.273285

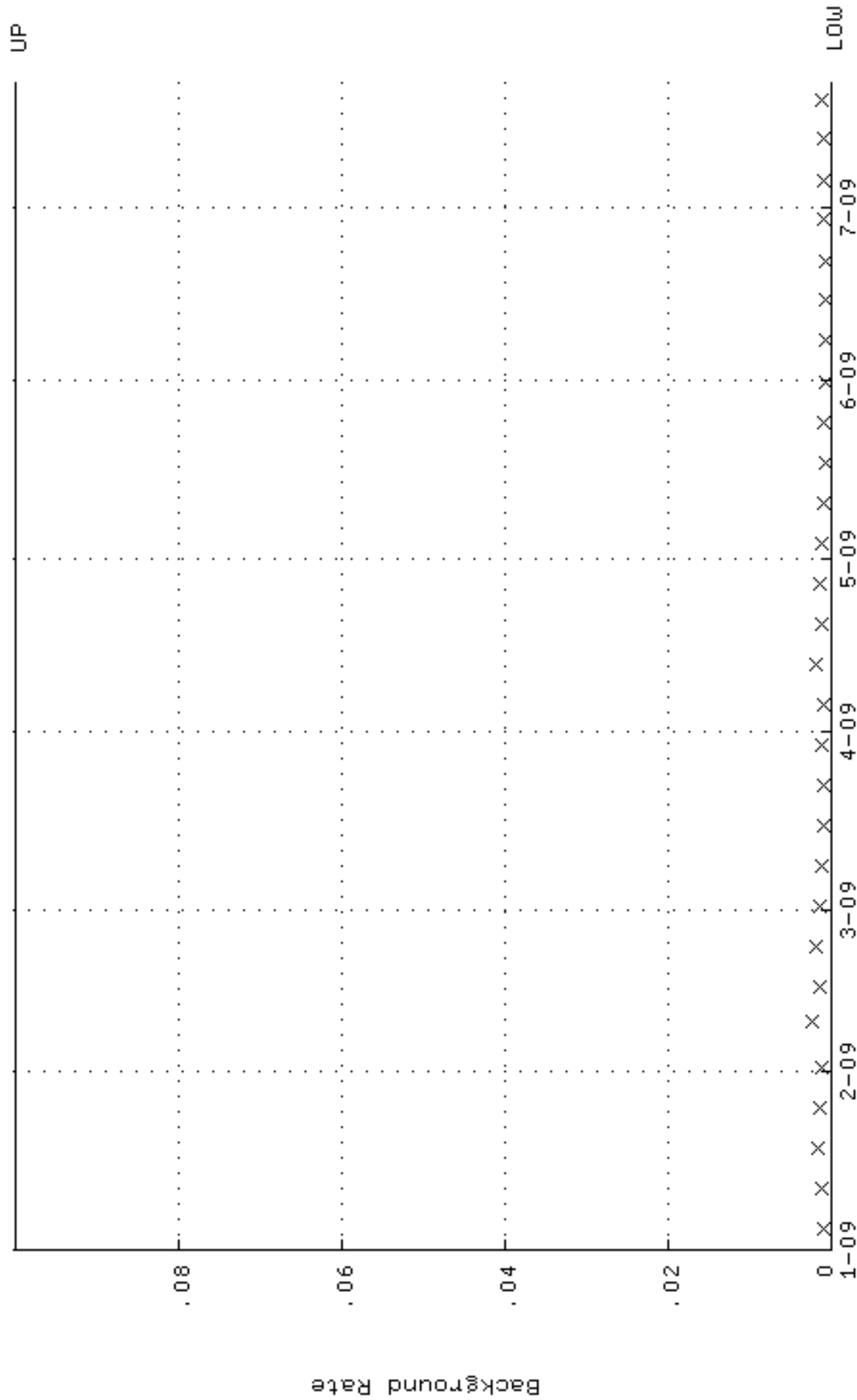




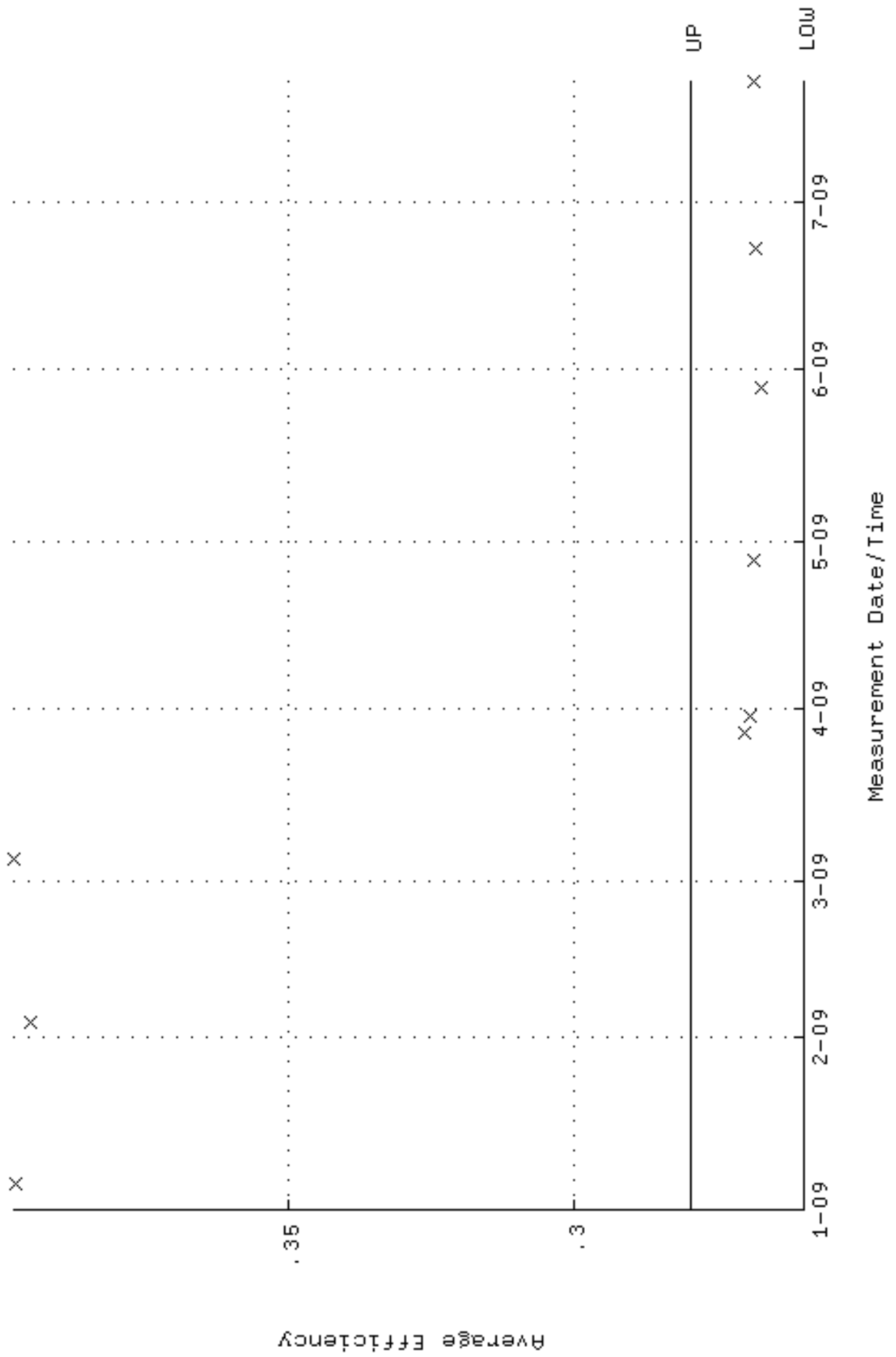
QA filename : DKA100:[ENV\_ALPHA.QA.W]w176.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 5-JAN-2009 12:57:11 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 86.4817 through 95.5851



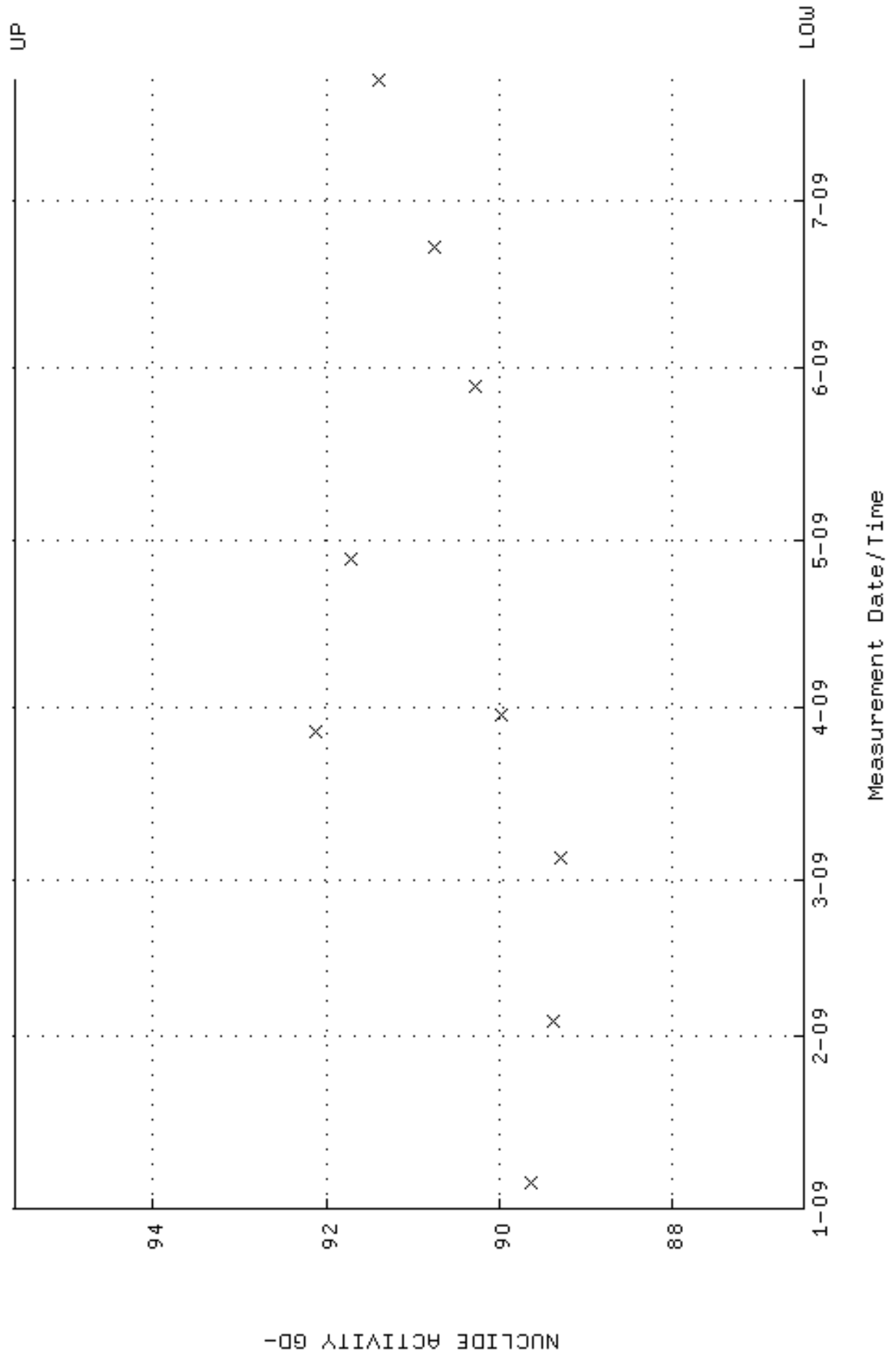
QA filename : DKA100:[ENV\_ALPHA.QA.B]B176.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:01 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



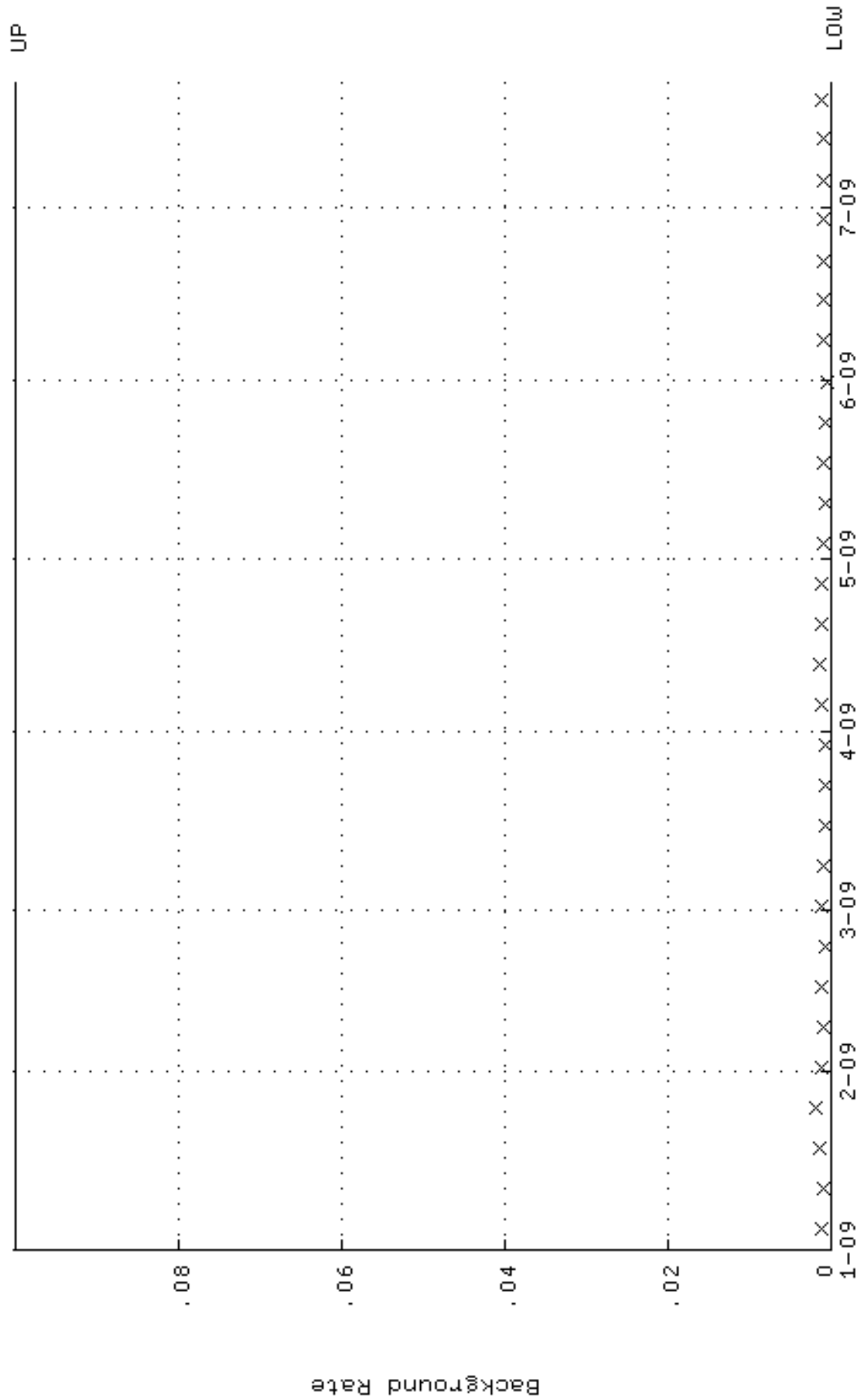
QA filename : DKA100:[ENV\_ALPHA.QA.W]W177.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 5-JAN-2009 12:57:19 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.259935 through 0.279935



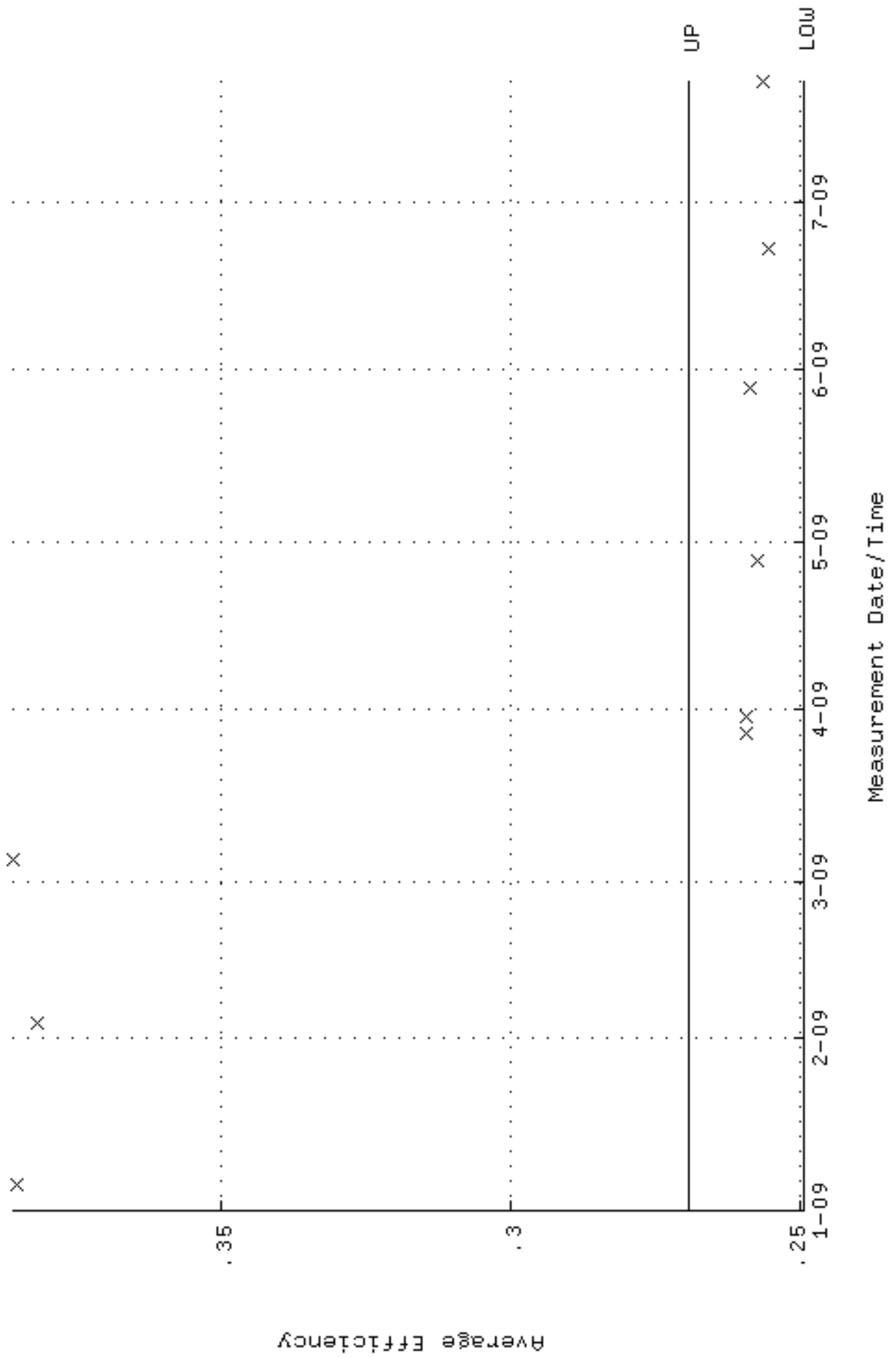
QA filename : DKA100:[ENV\_ALPHA.QA.W]w177.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 5-JAN-2009 12:57:19 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 86.4857 through 95.5895



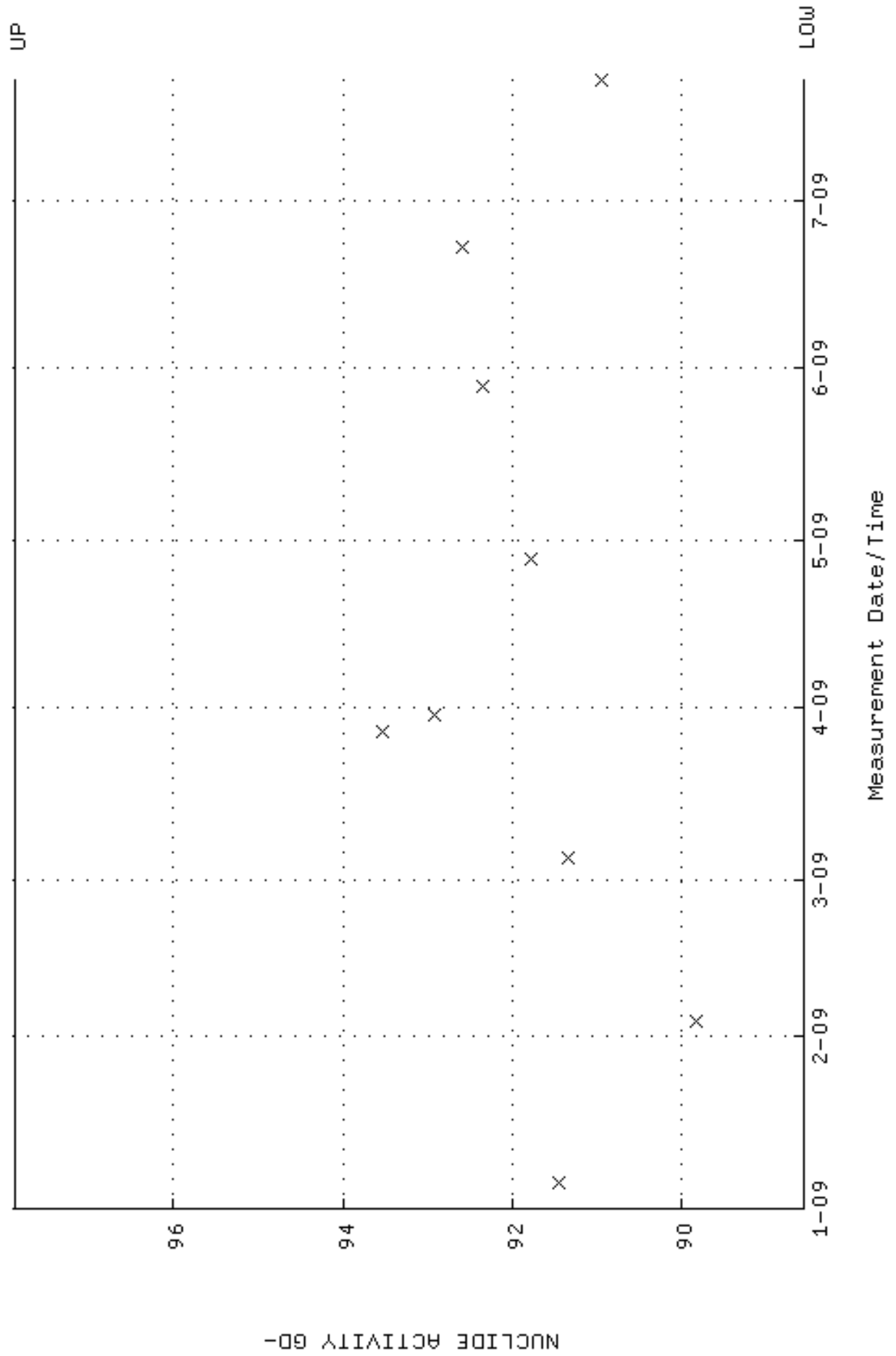
QA filename : DKA100:[ENV\_ALPHA.QA.B]B177.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:05 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



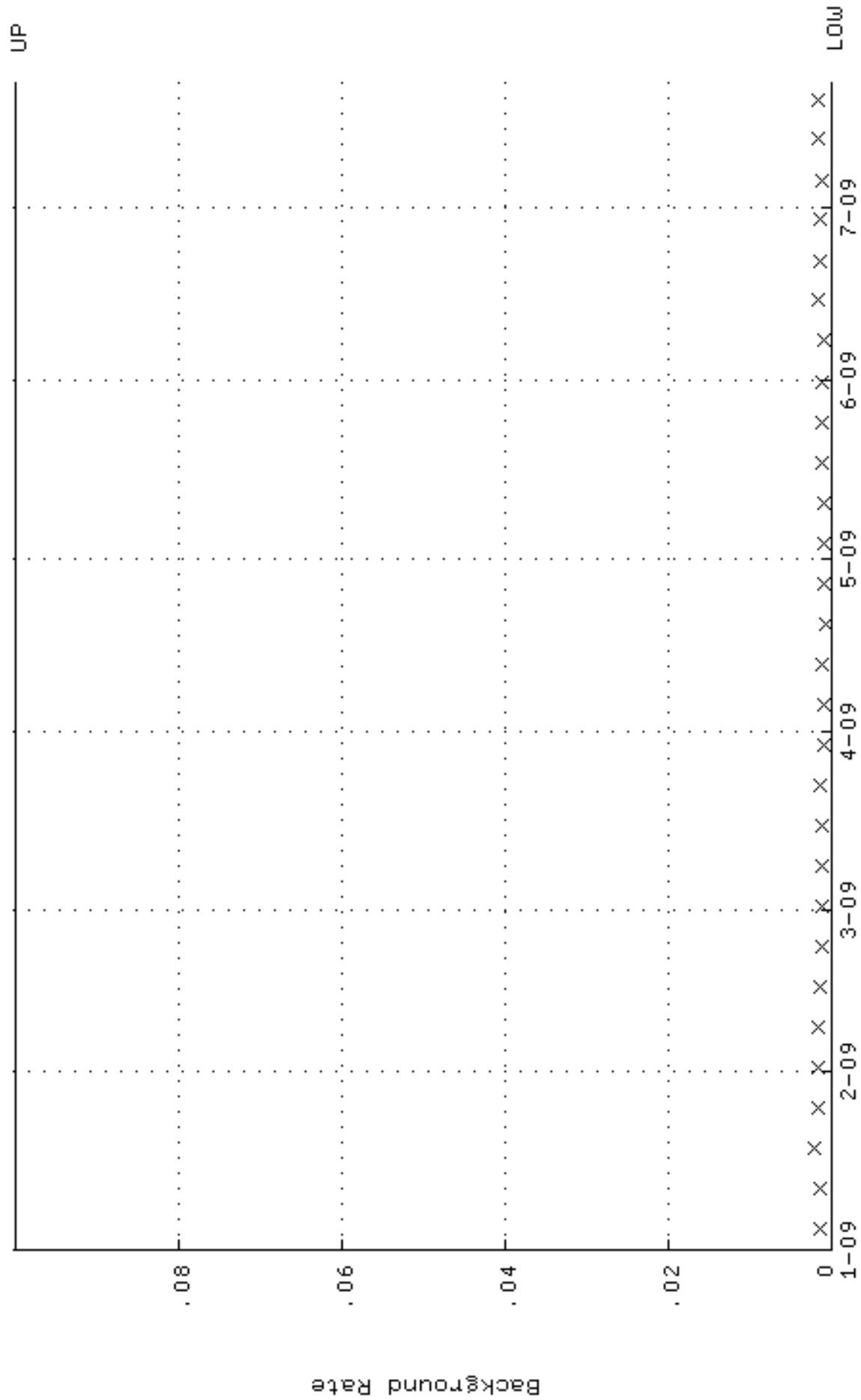
QA filename : DKA100:[ENV\_ALPHA.QA.W]W178.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 5-JAN-2009 12:57:25 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.249490 through 0.269490



QA filename : DKA100:[ENV\_ALPHA.QA.W]w178.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 5-JAN-2009 12:57:25 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 88.5525 through 97.8739

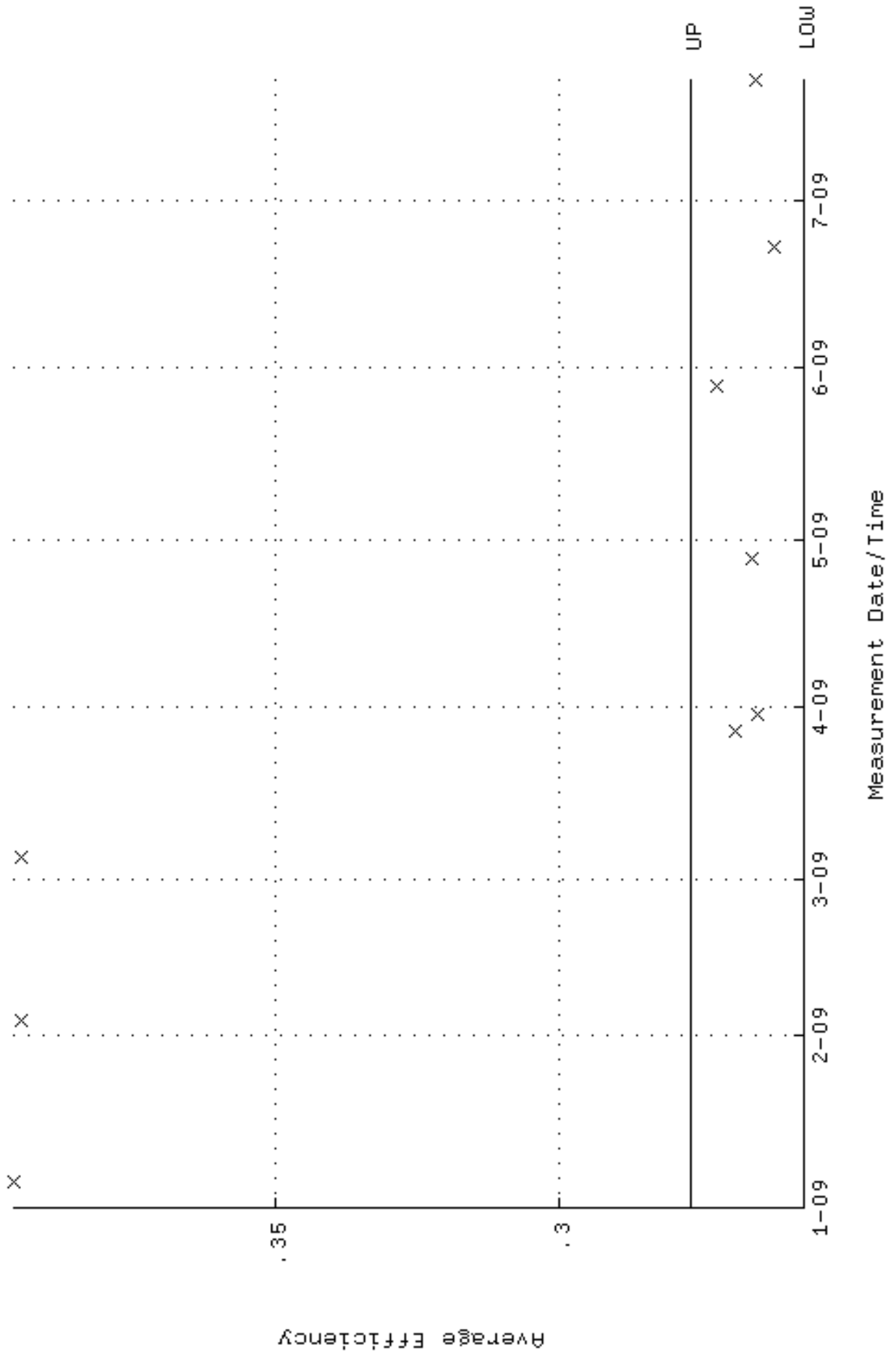


QA filename : DKA100:[ENV\_ALPHA.QA.B]B178.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:09 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

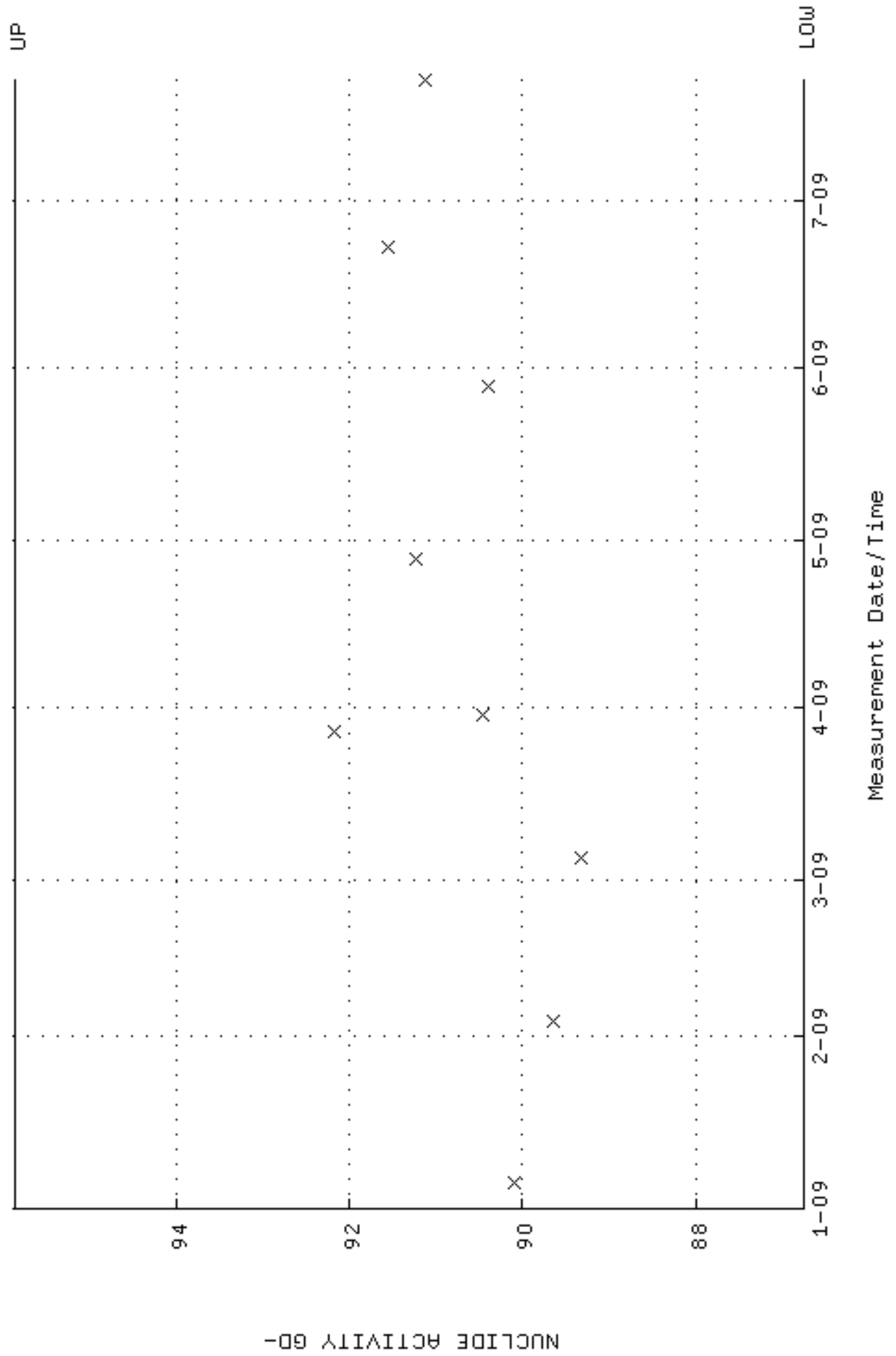




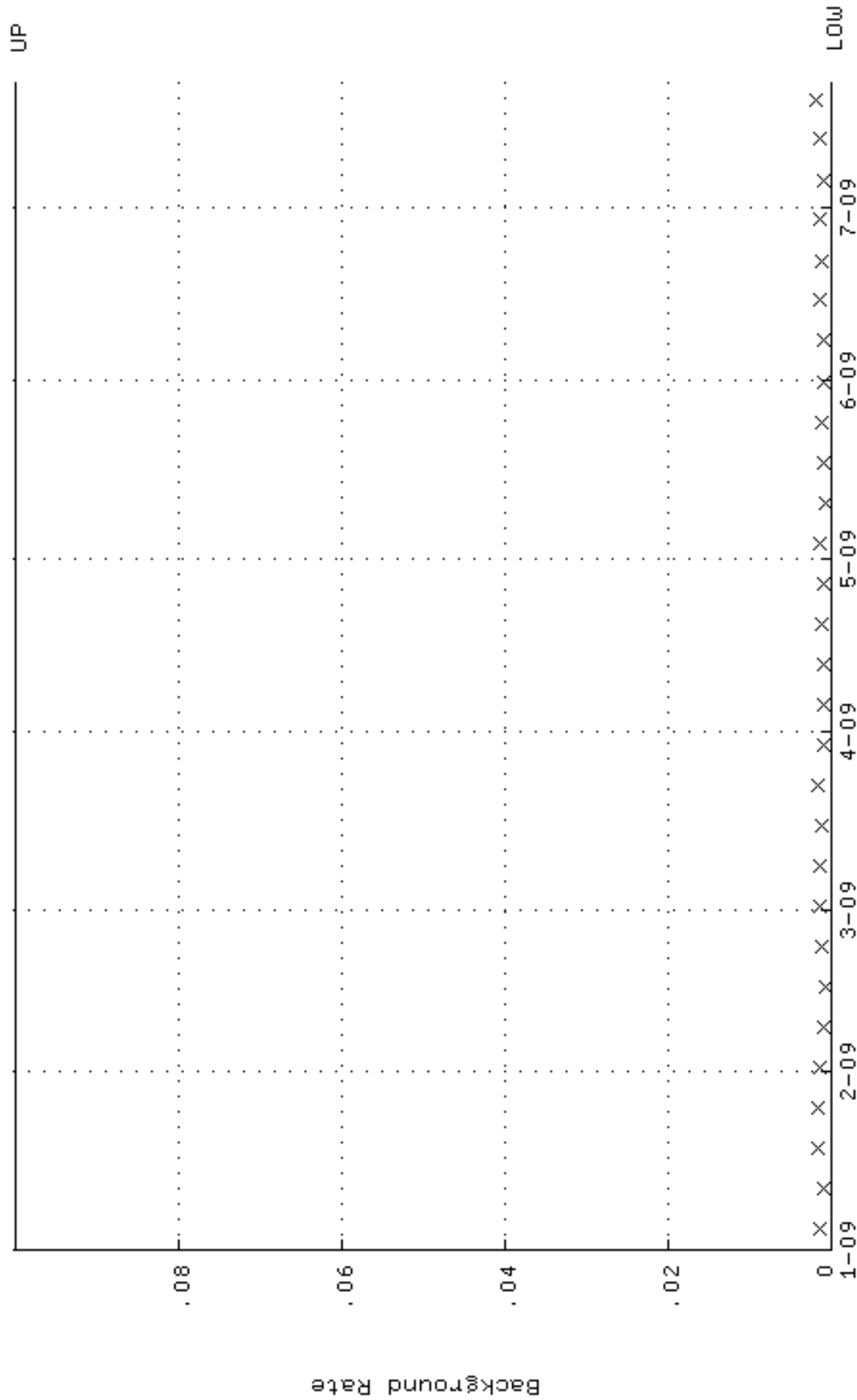
QA filename : DKA100:[ENV\_ALPHA.QA.W]W179.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 5-JAN-2009 12:57:29 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.256911 through 0.276911



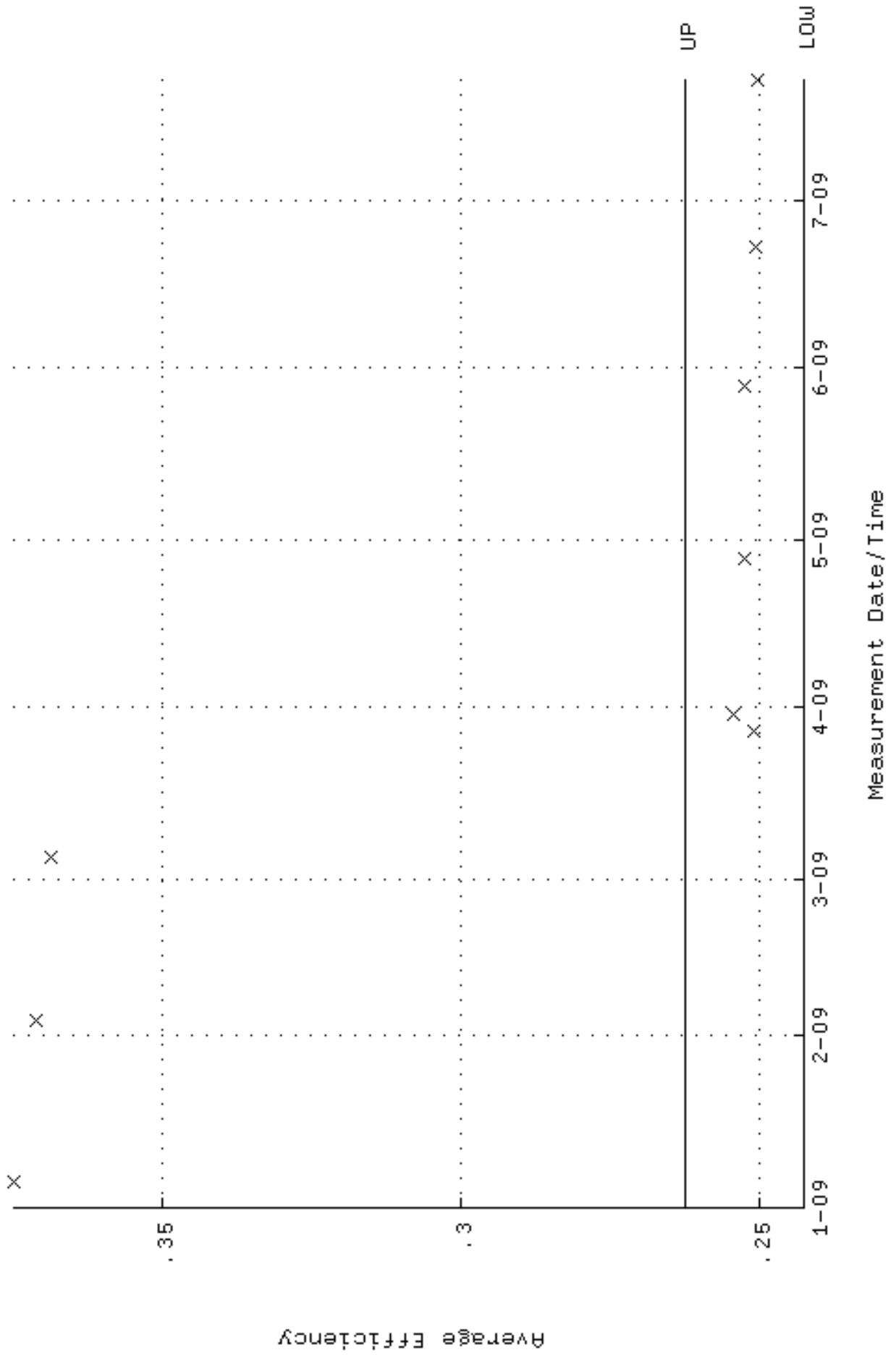
QA filename : DKA100:[ENV\_ALPHA.QA.W]w179.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 5-JAN-2009 12:57:29 through 22-JUL-2009 12:00:00  
Lower/Upper Lmts: 86.7434 through 95.8742



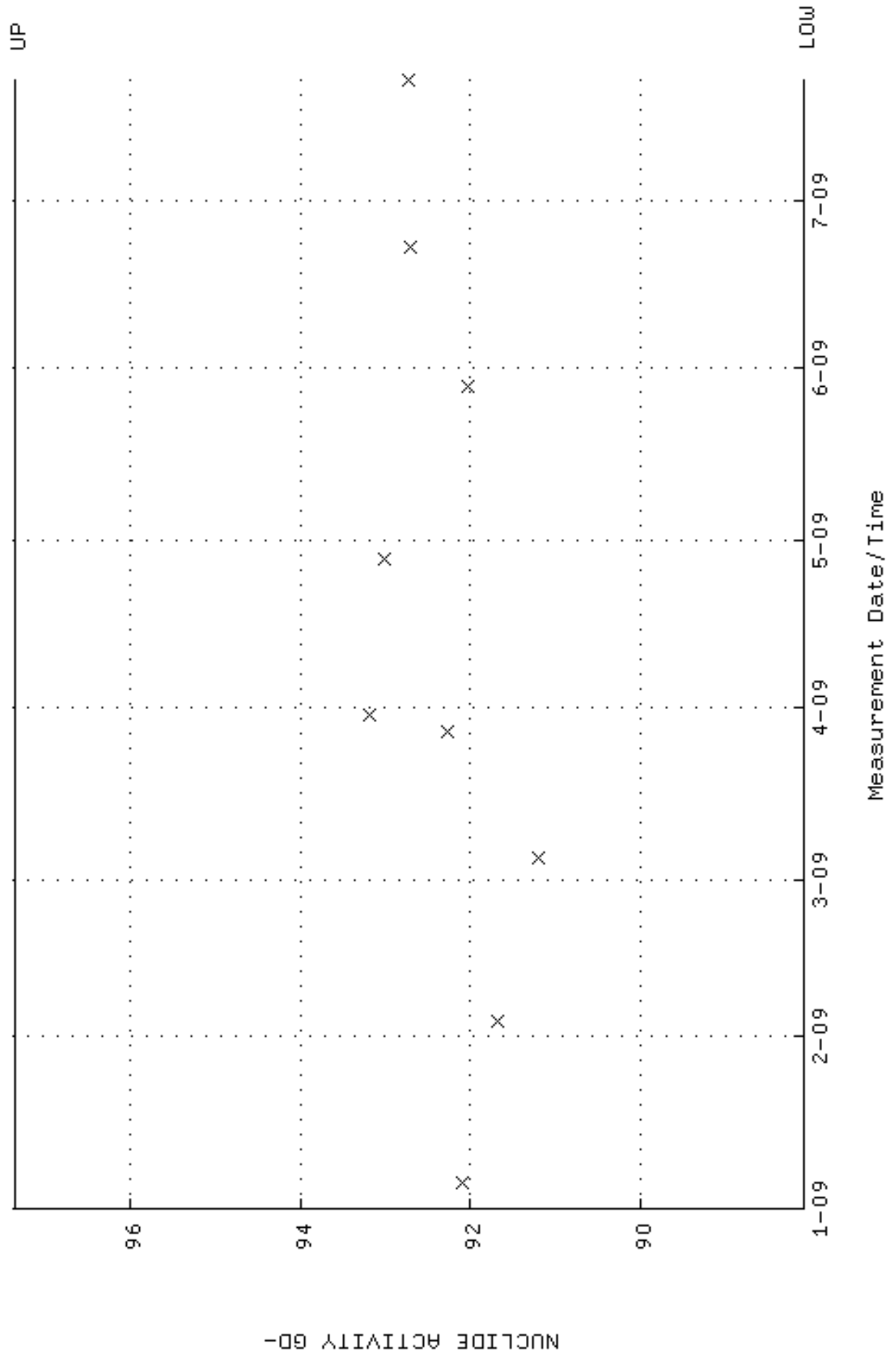
QA filename : DKA100:[ENV\_ALPHA.QA.B]B179.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:13 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



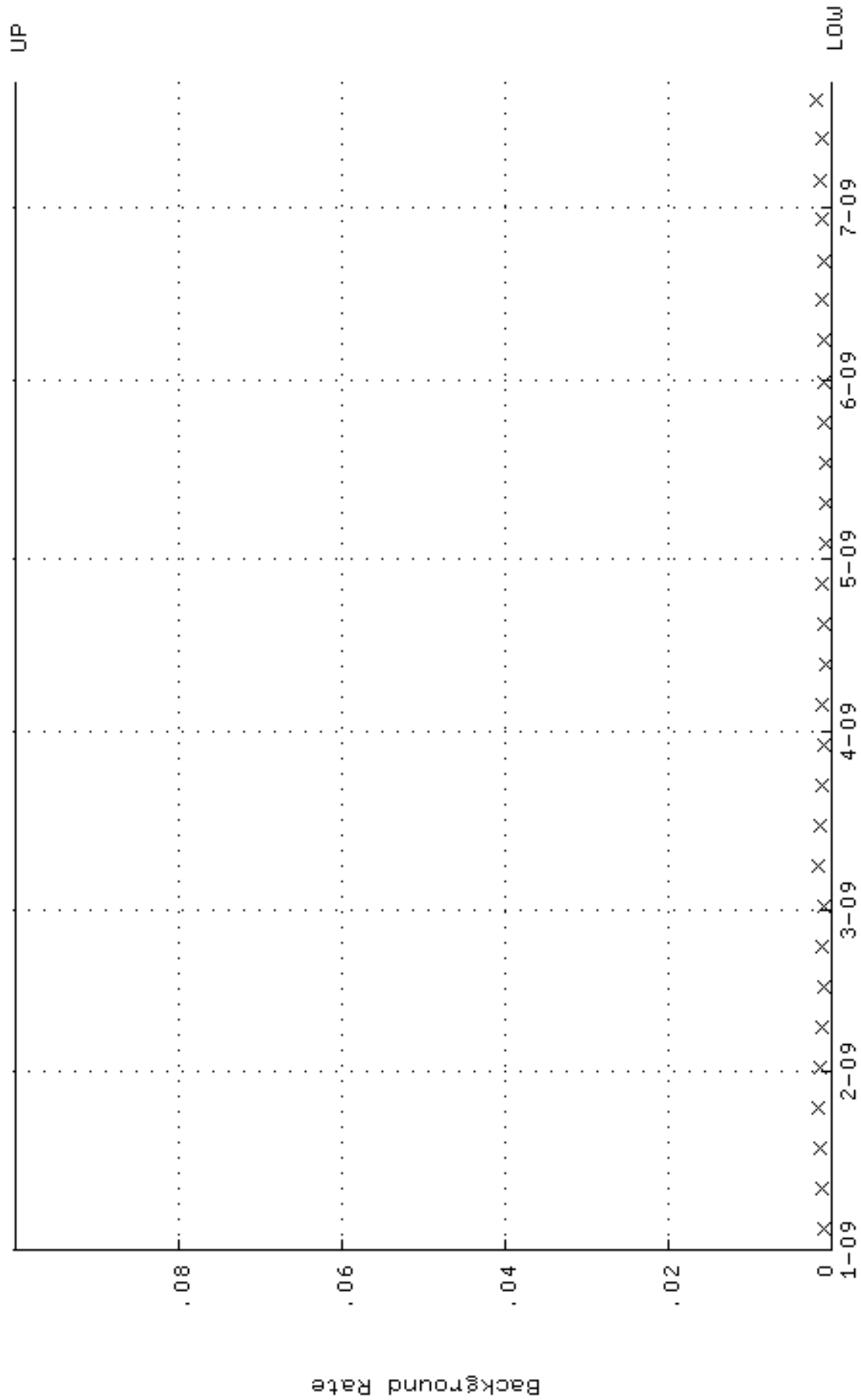
QA filename : DKA100:[ENV\_ALPHA.QA.W]W180.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 5-JAN-2009 12:57:34 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.242633 through 0.262633



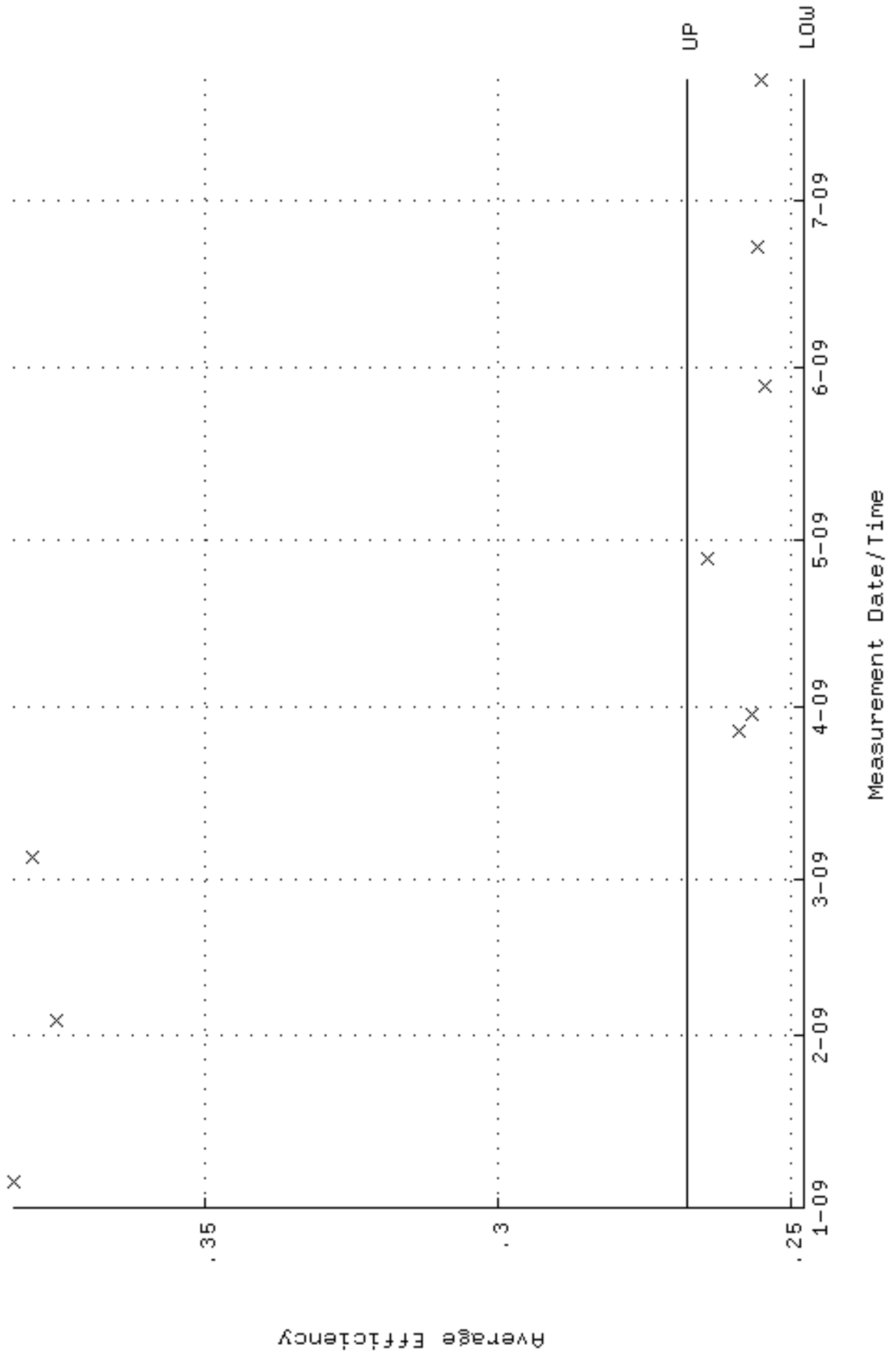
QA filename : DKA100:[ENV\_ALPHA.QA.W]w180.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 5-JAN-2009 12:57:34 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 88.0803 through 97.3519



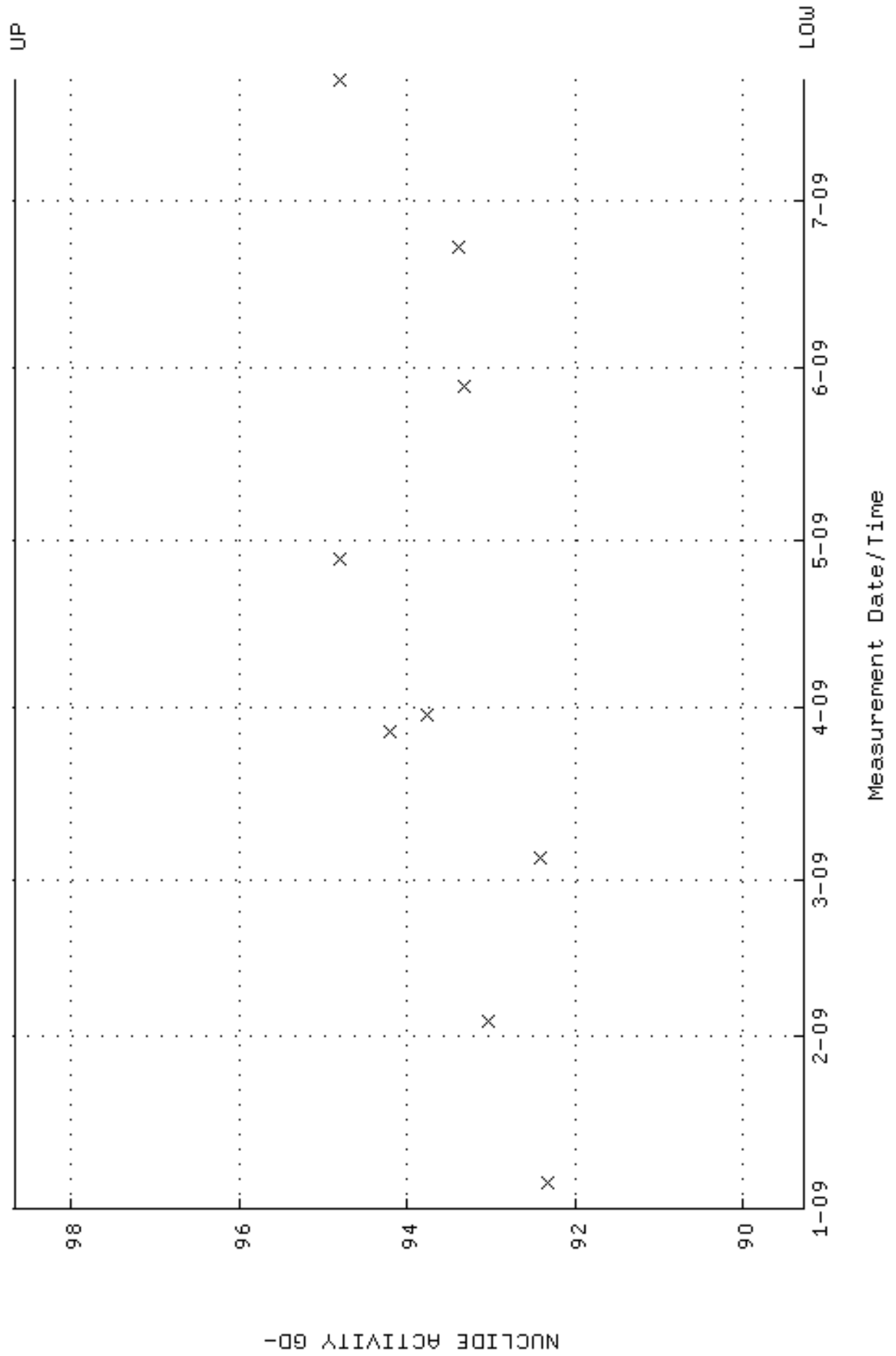
QA filename : DKA100:[ENV\_ALPHA.QA.B]B180.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:17 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W181.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 5-JAN-2009 12:57:38 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.247722 through 0.267722

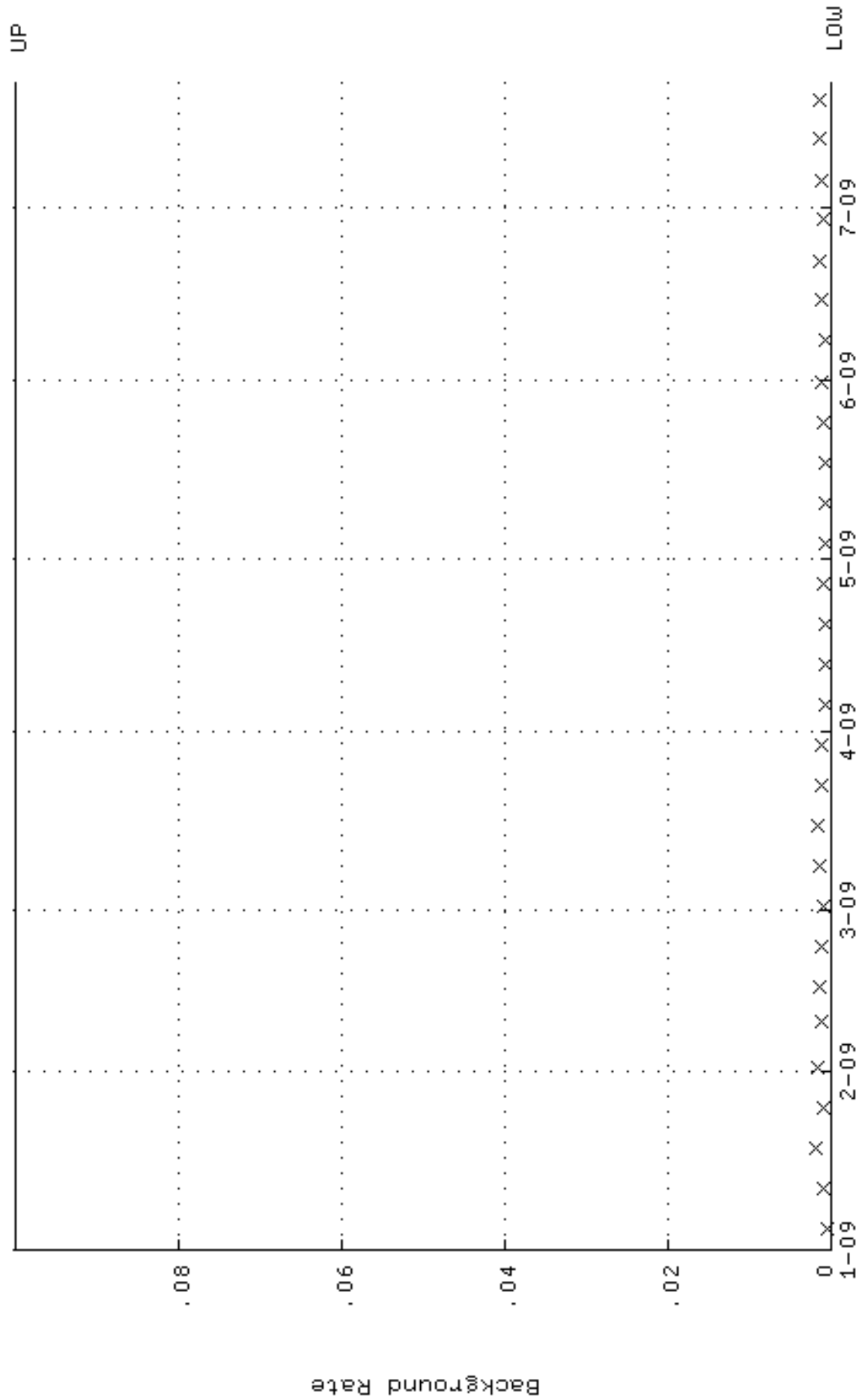


QA filename : DKA100:[ENV\_ALPHA.QA.W]w181.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 5-JAN-2009 12:57:38 through 22-JUL-2009 12:00:00  
Lower/Upper Lmts: 89.2737 through 98.6709

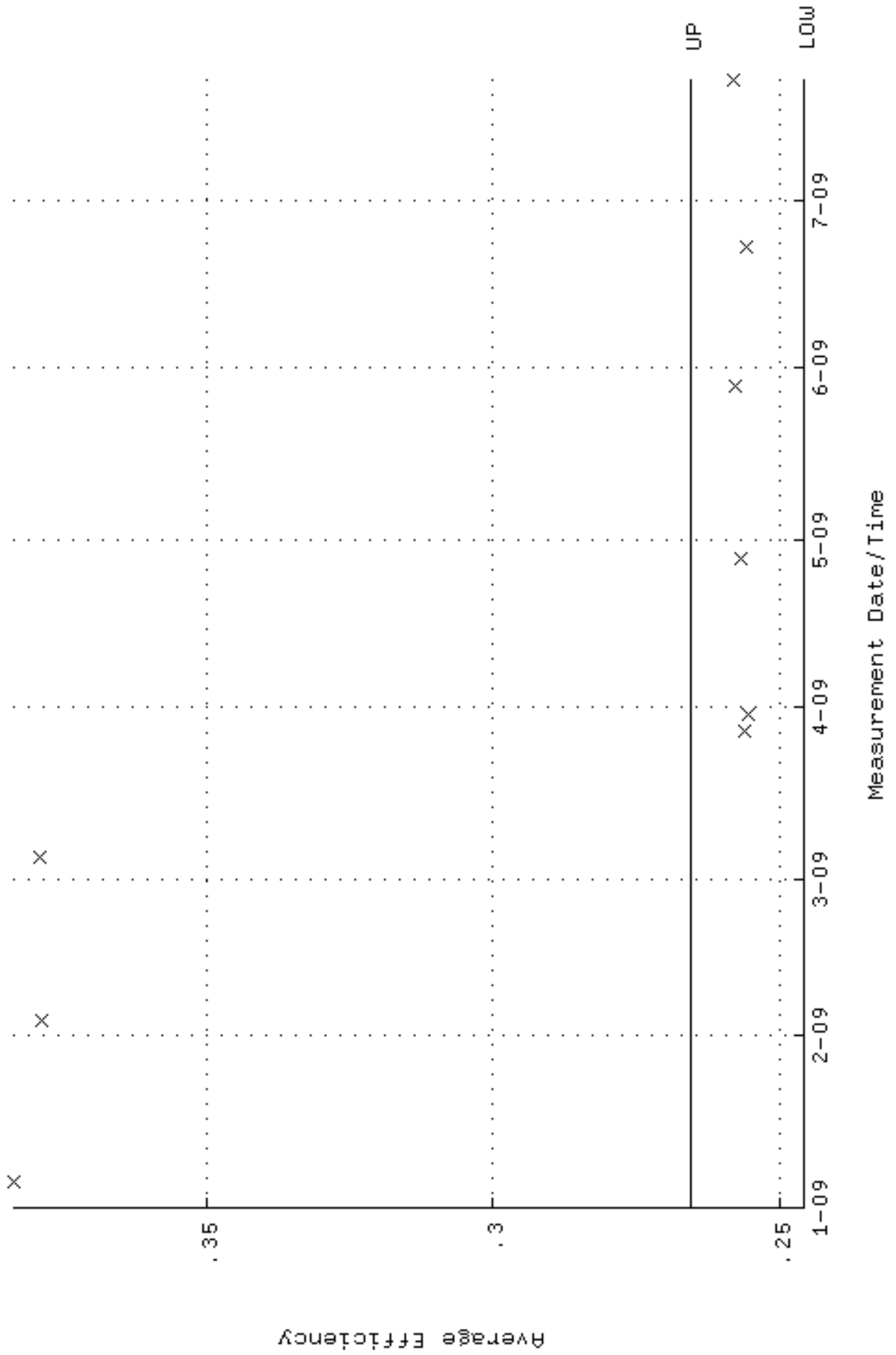




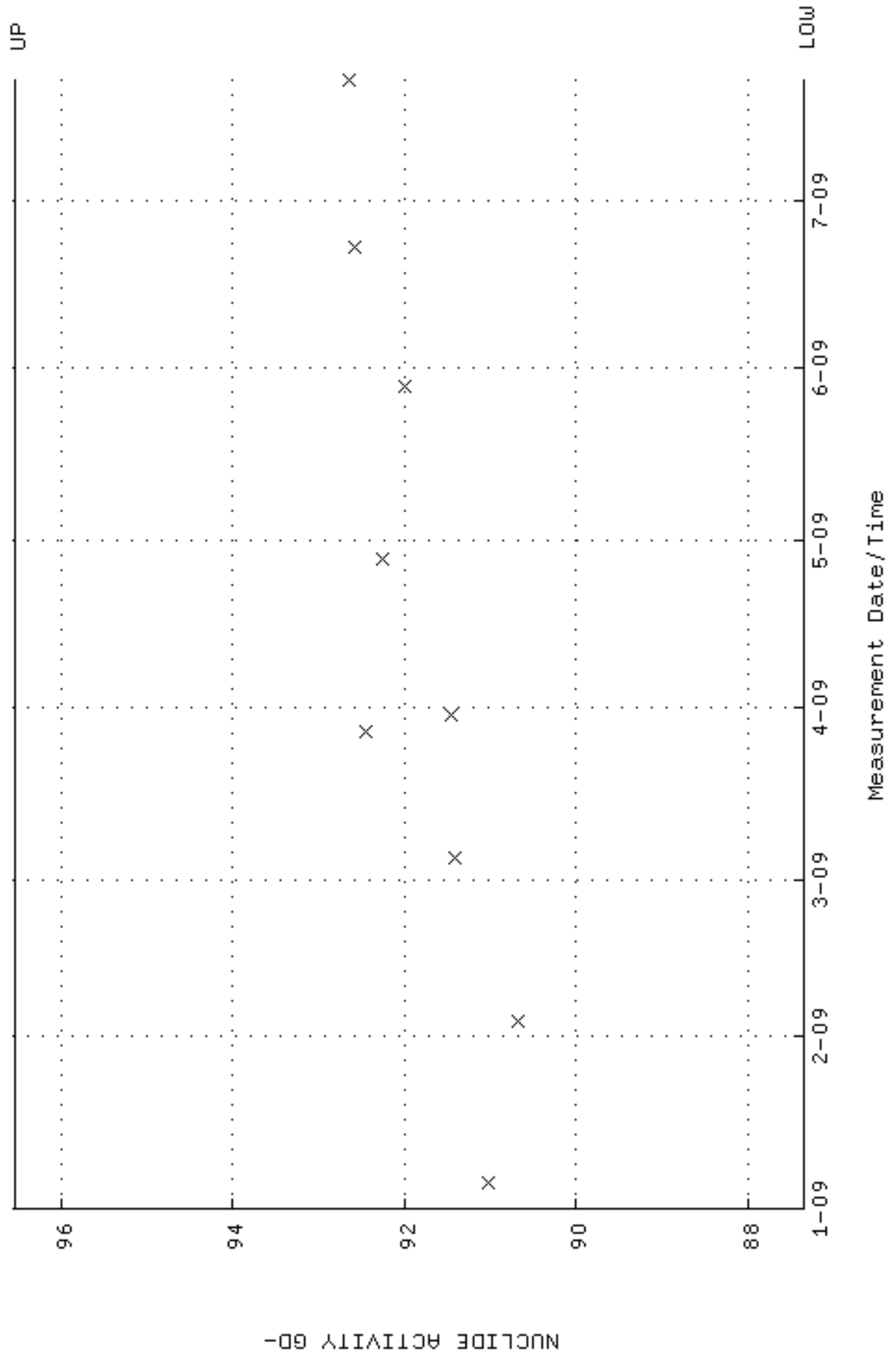
QA filename : DKA100:[ENV\_ALPHA.QA.B]B181.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:21 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



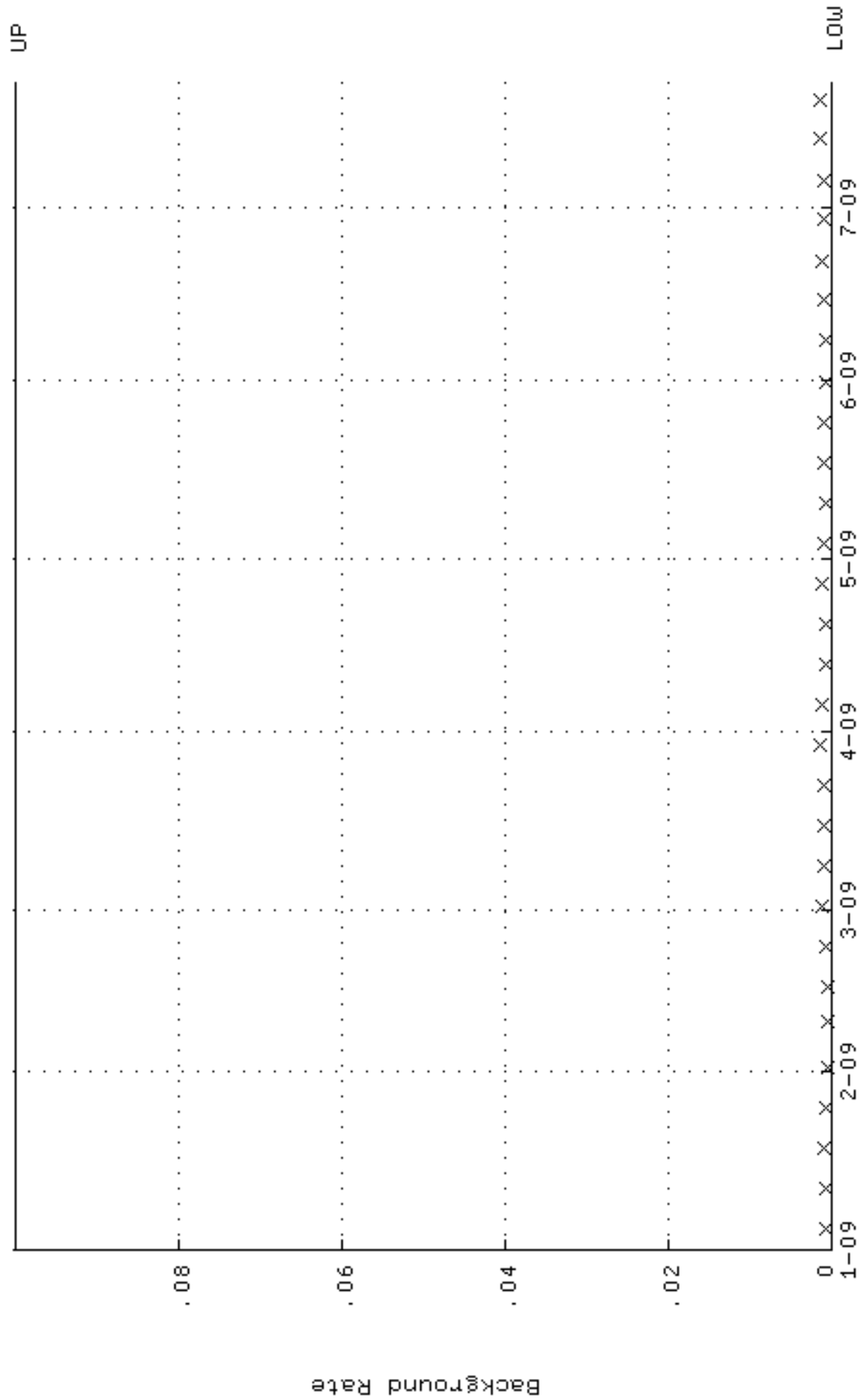
QA filename : DKA100:[ENV\_ALPHA.QA.W]W182.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 5-JAN-2009 12:57:42 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.245707 through 0.265707



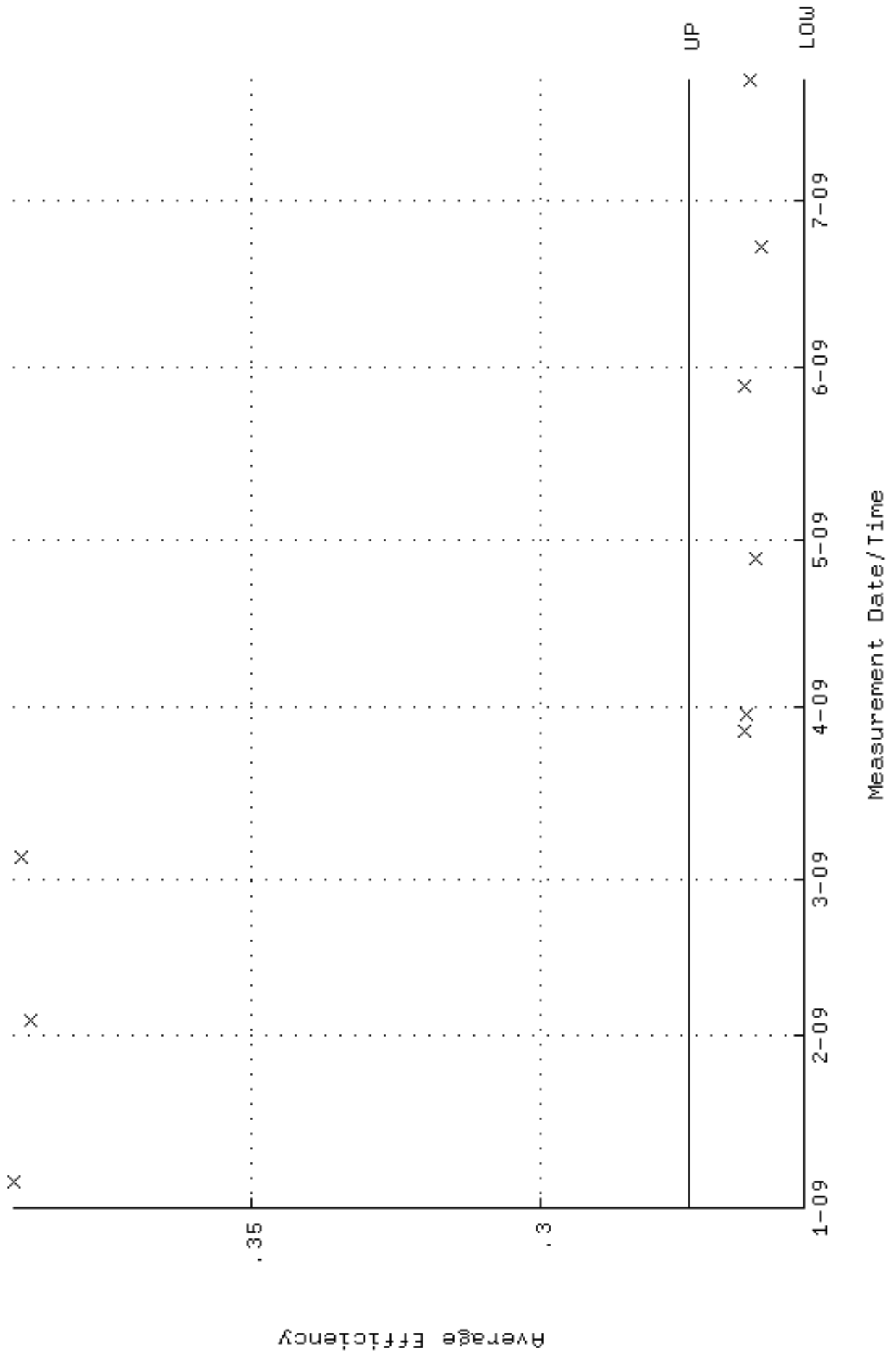
QA filename : DKA100:[ENV\_ALPHA.QA.W]w182.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 5-JAN-2009 12:57:42 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 87.3454 through 96.5396



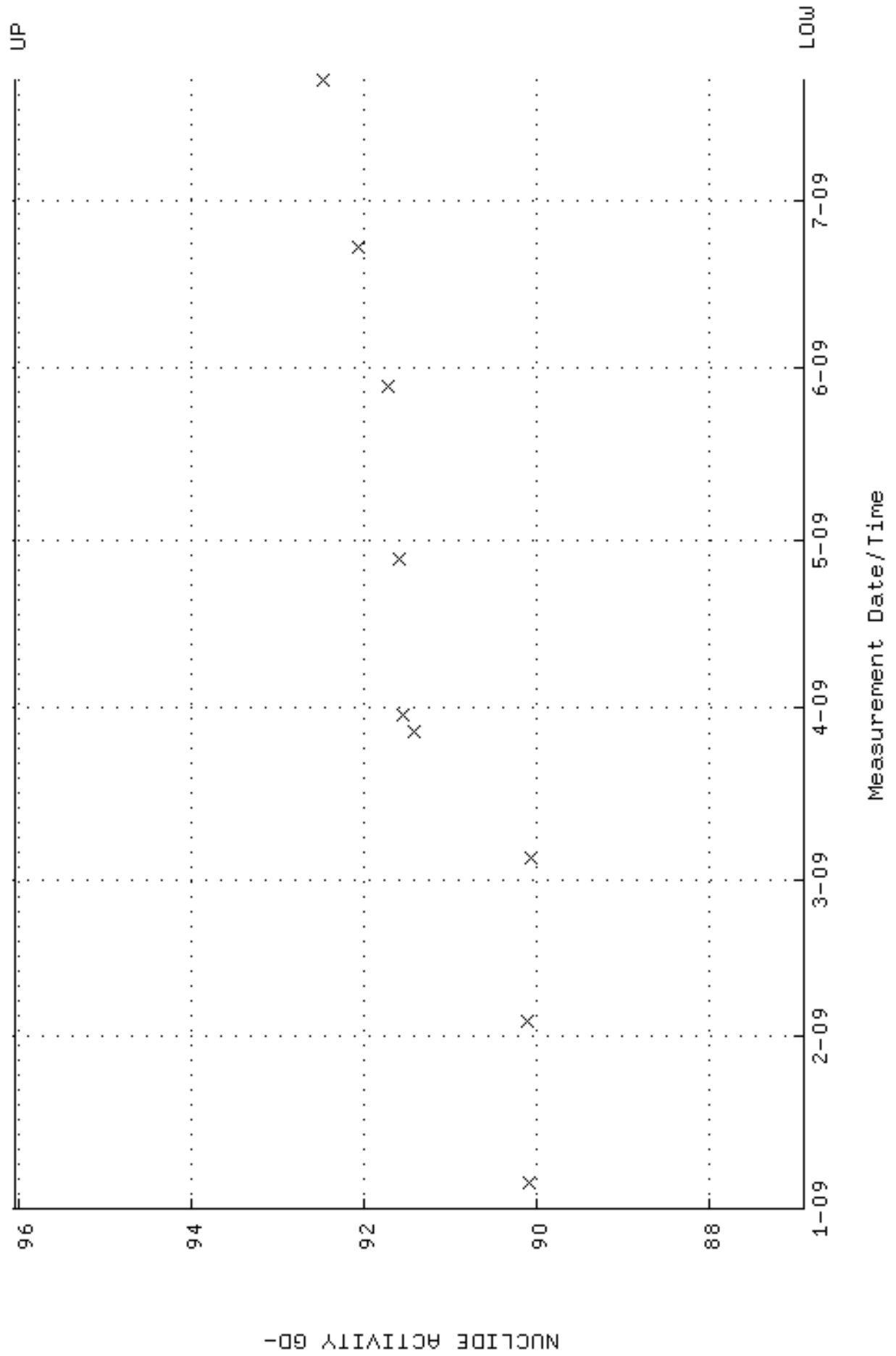
QA filename : DKA100:[ENV\_ALPHA.QA.B]B182.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:24 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



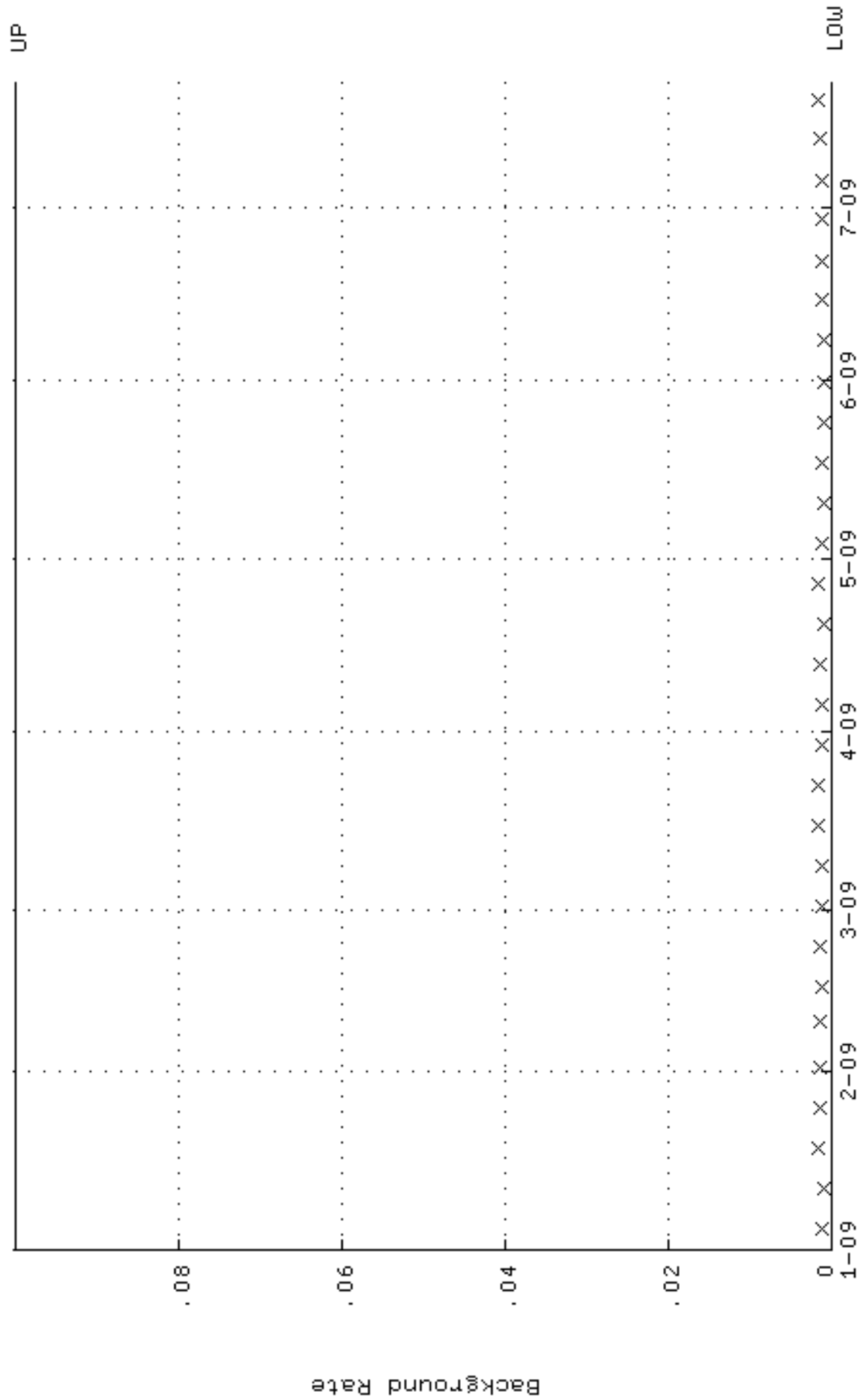
QA filename : DKA100:[ENV\_ALPHA.QA.W]W183.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 5-JAN-2009 12:57:46 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.254364 through 0.274364



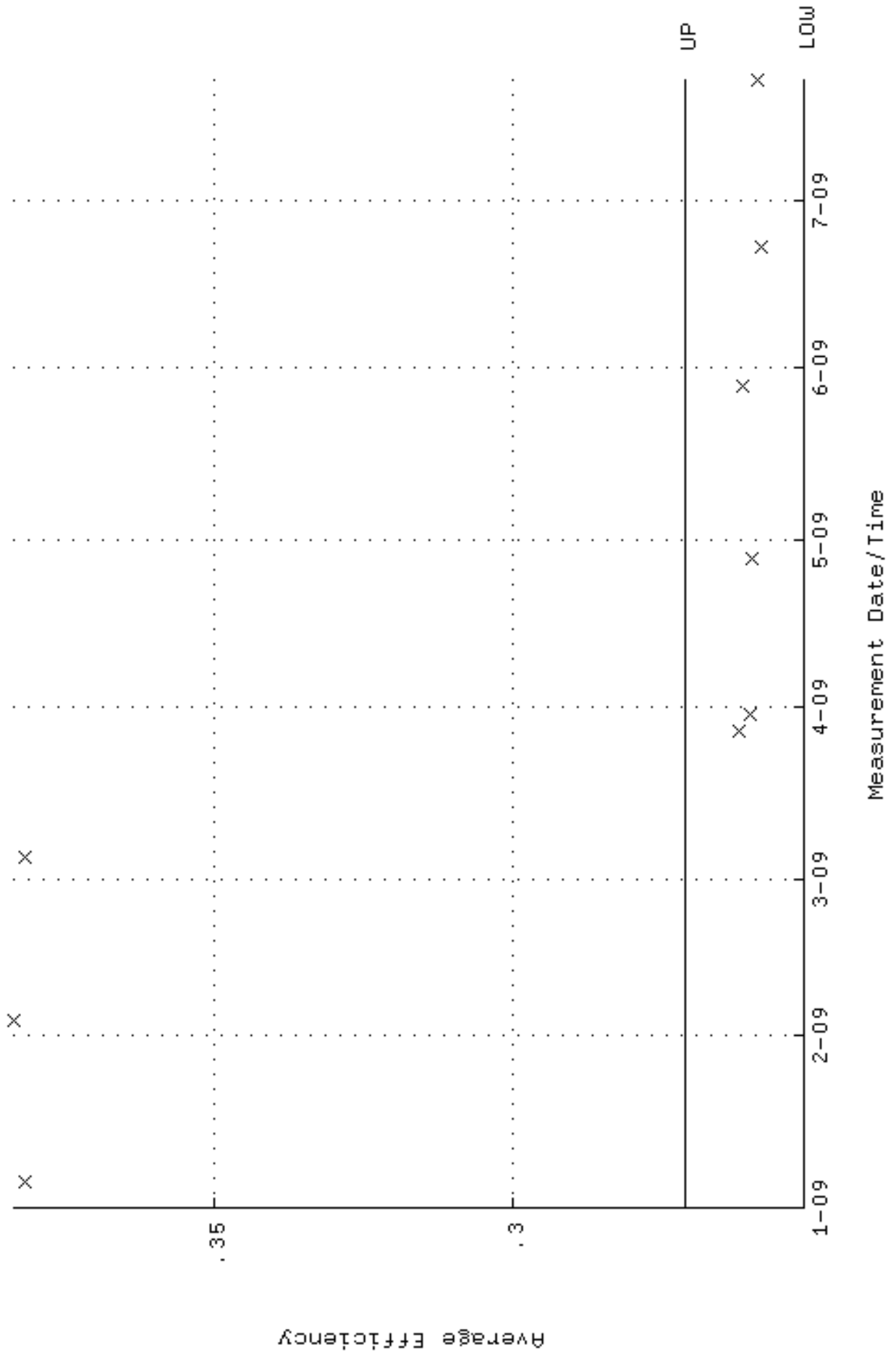
QA filename : DKA100:[ENV\_ALPHA.QA.W]w183.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 5-JAN-2009 12:57:46 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 86.8927 through 96.0393



QA filename : DKA100:[ENV\_ALPHA.QA.B]B183.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:28 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

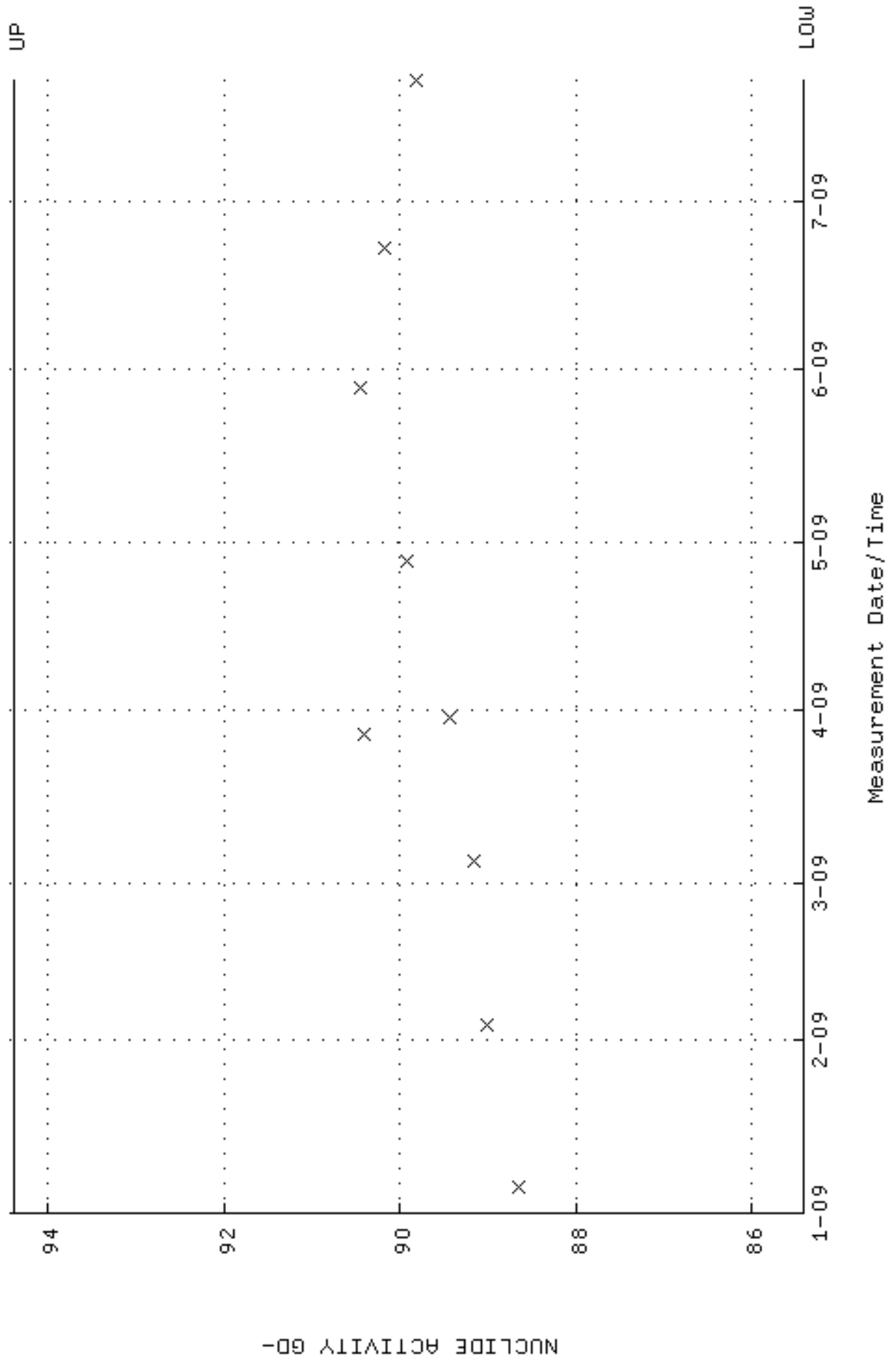


QA filename : DKA100:[ENV\_ALPHA.QA.W]W184.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 5-JAN-2009 12:57:51 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.251367 through 0.271367

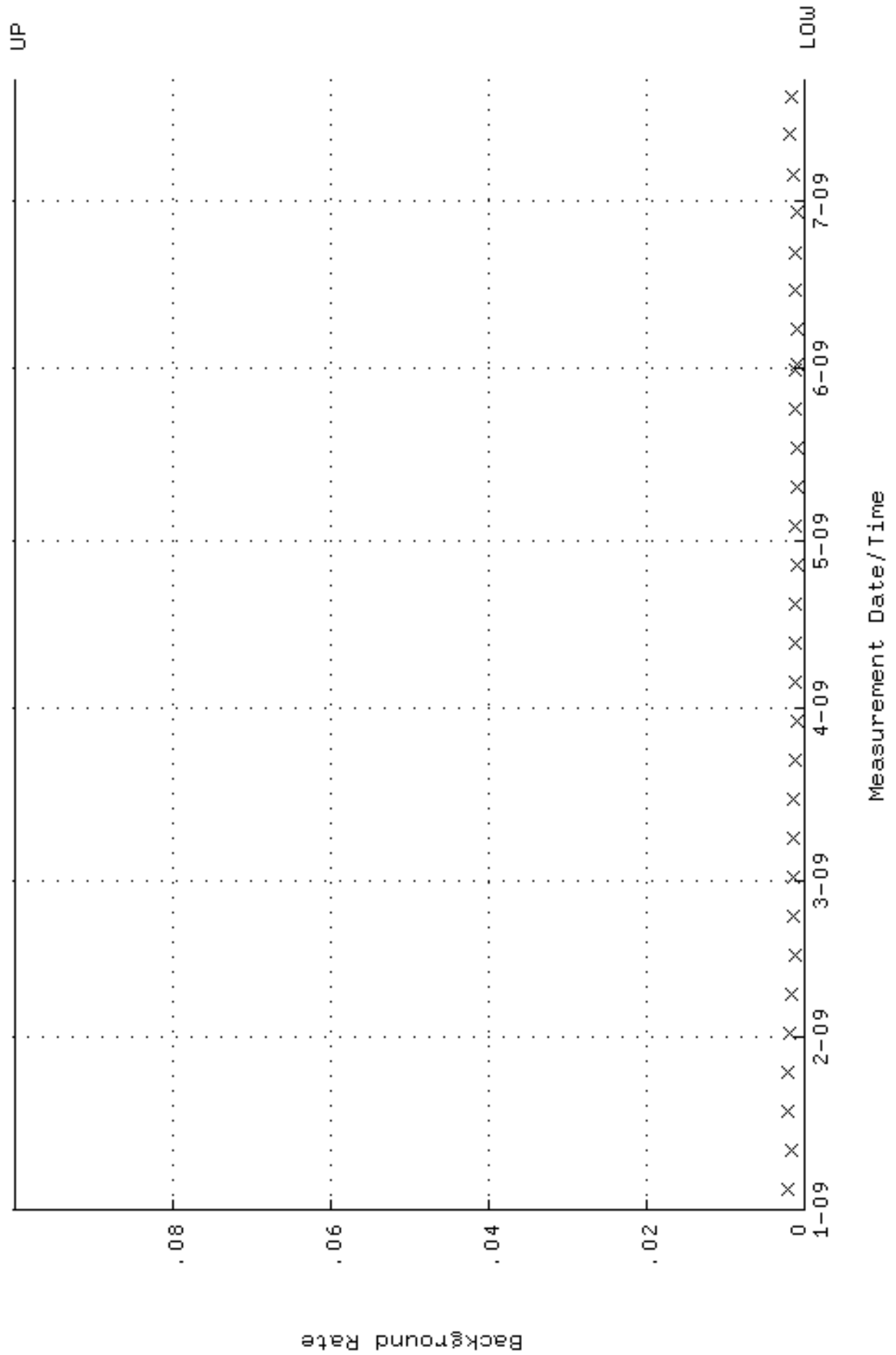




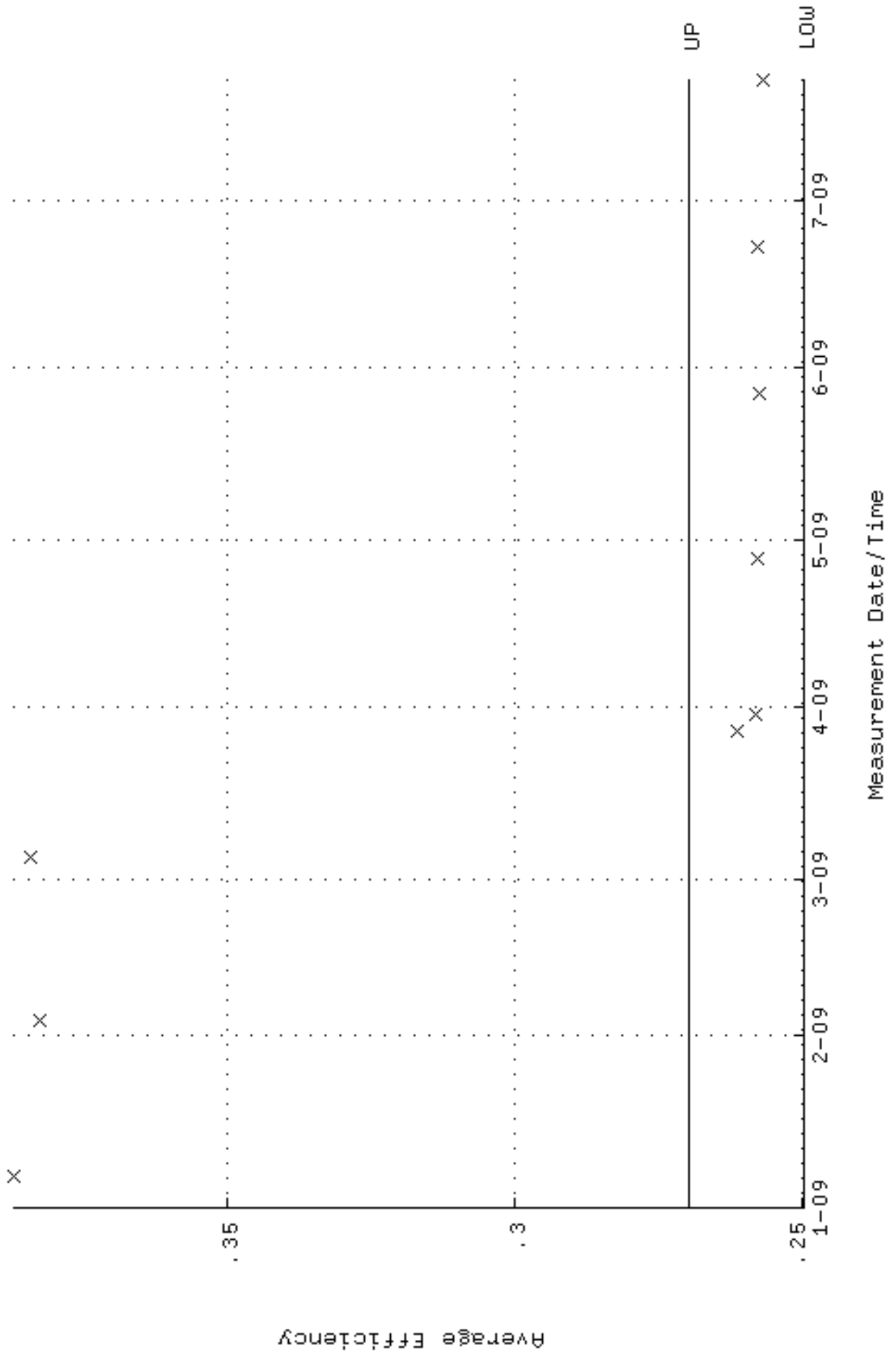
QA filename : DKA100:[ENV\_ALPHA.QA.W]w184.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 5-JAN-2009 12:57:51 through 22-JUL-2009 12:00:00  
Lower/Upper Lmts: 85.4139 through 94.4049



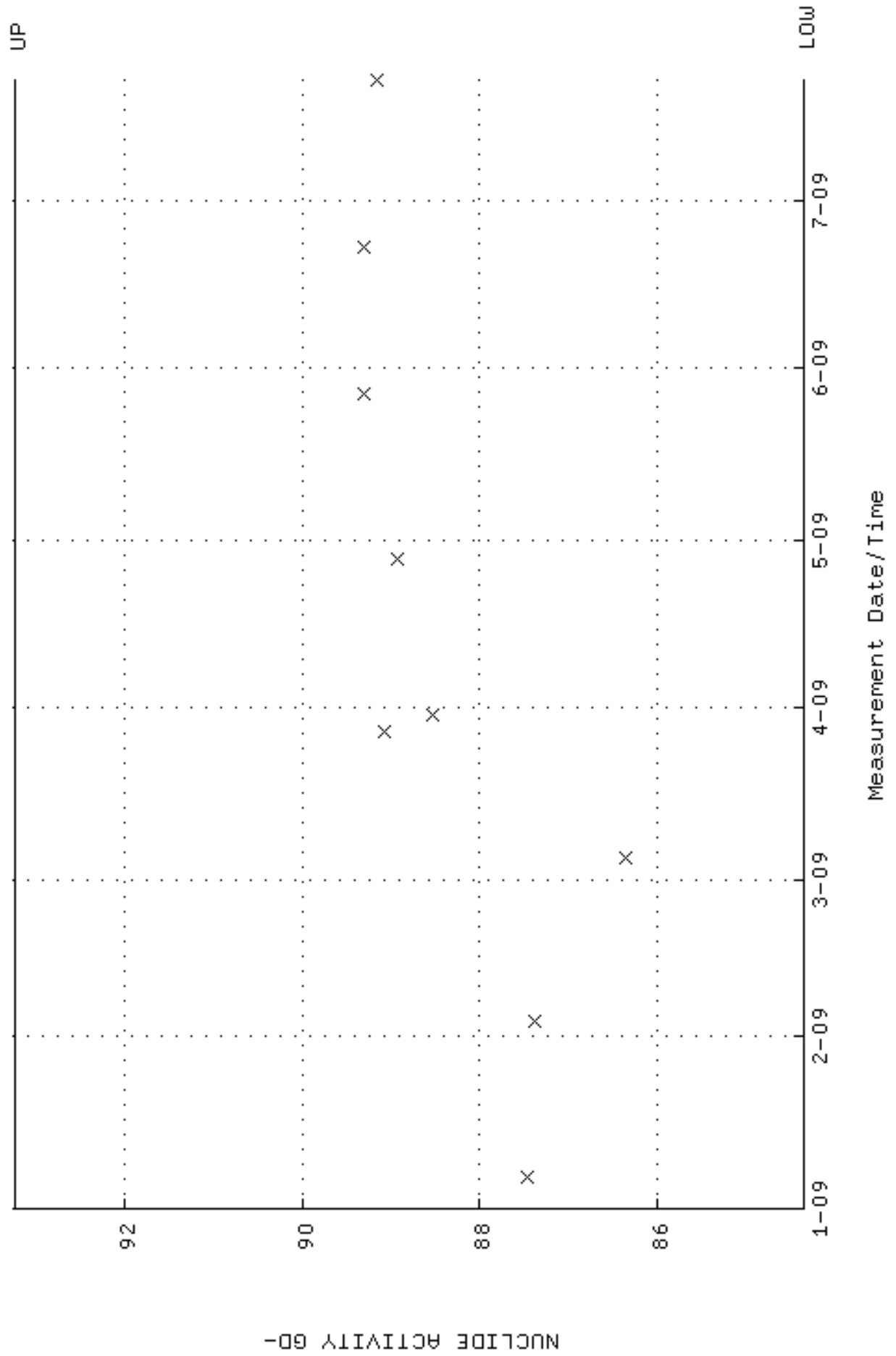
QA filename : DKA100:[ENV\_ALPHA.QA.B]B184.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:32 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



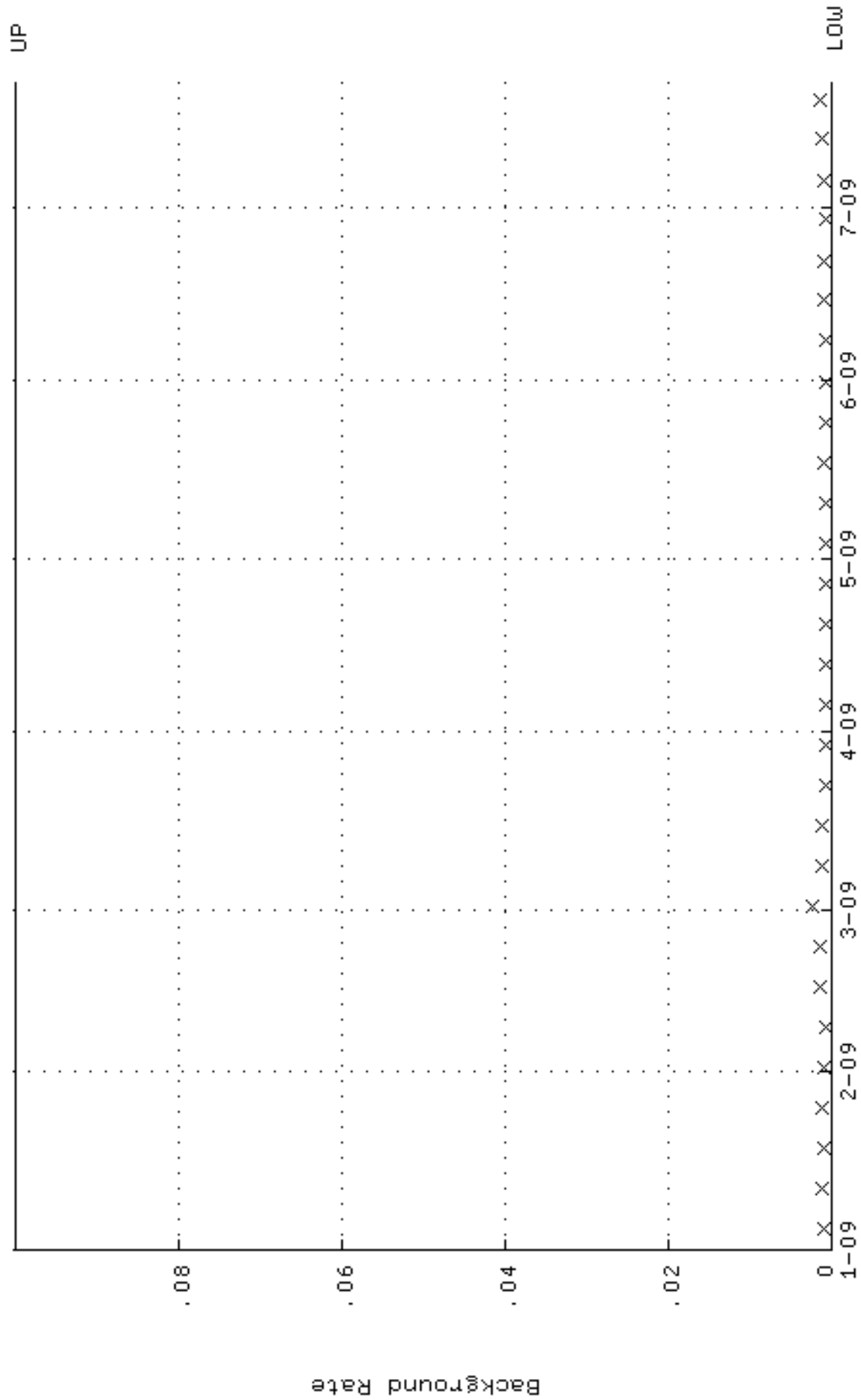
QA filename : DKA100:[ENV\_ALPHA.QA.W]W185.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:29 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.249628 through 0.269628



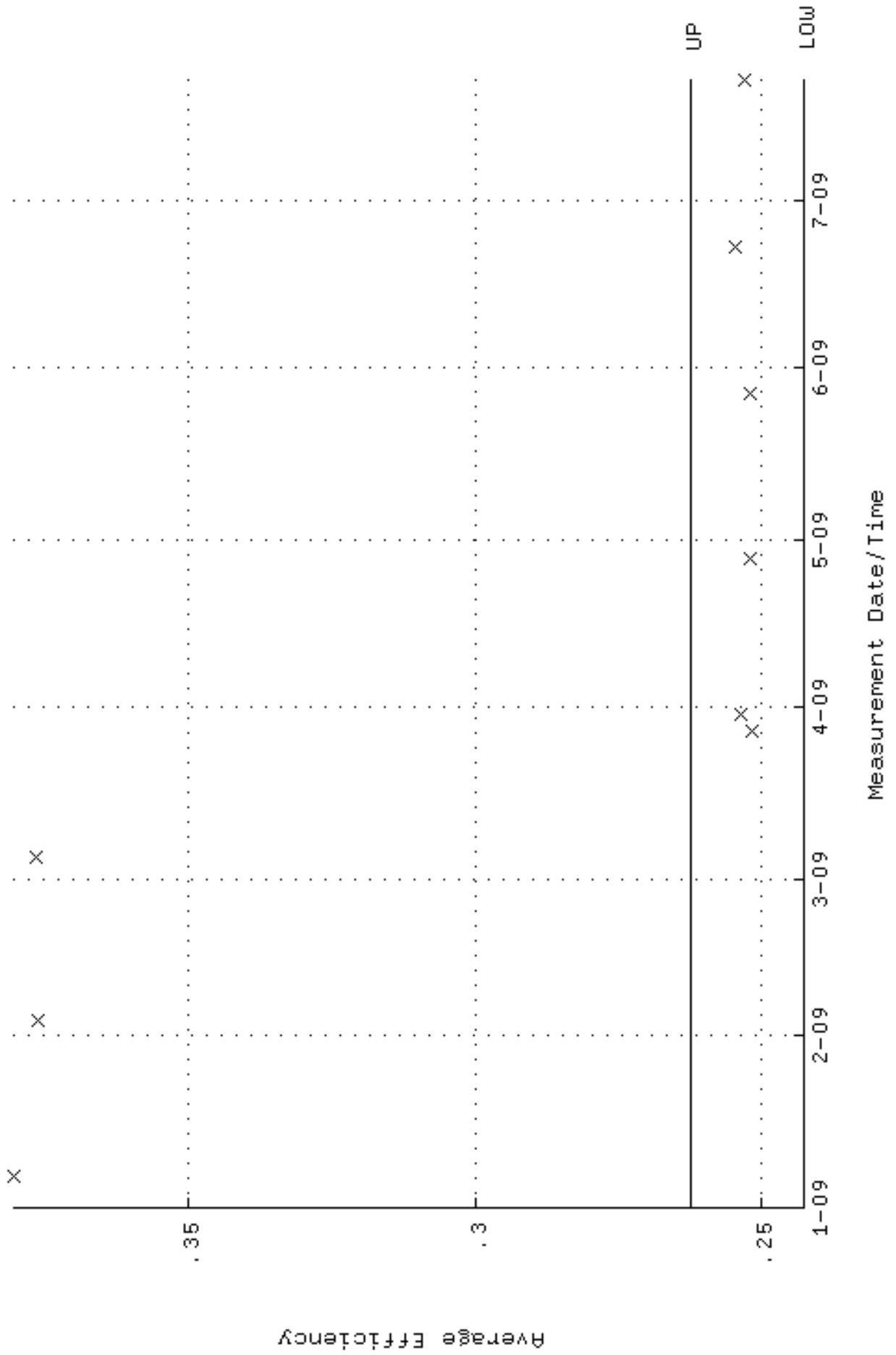
QA filename : DKA100:[ENV\_ALPHA.QA.W]W185.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:29 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.3502 through 93.2292



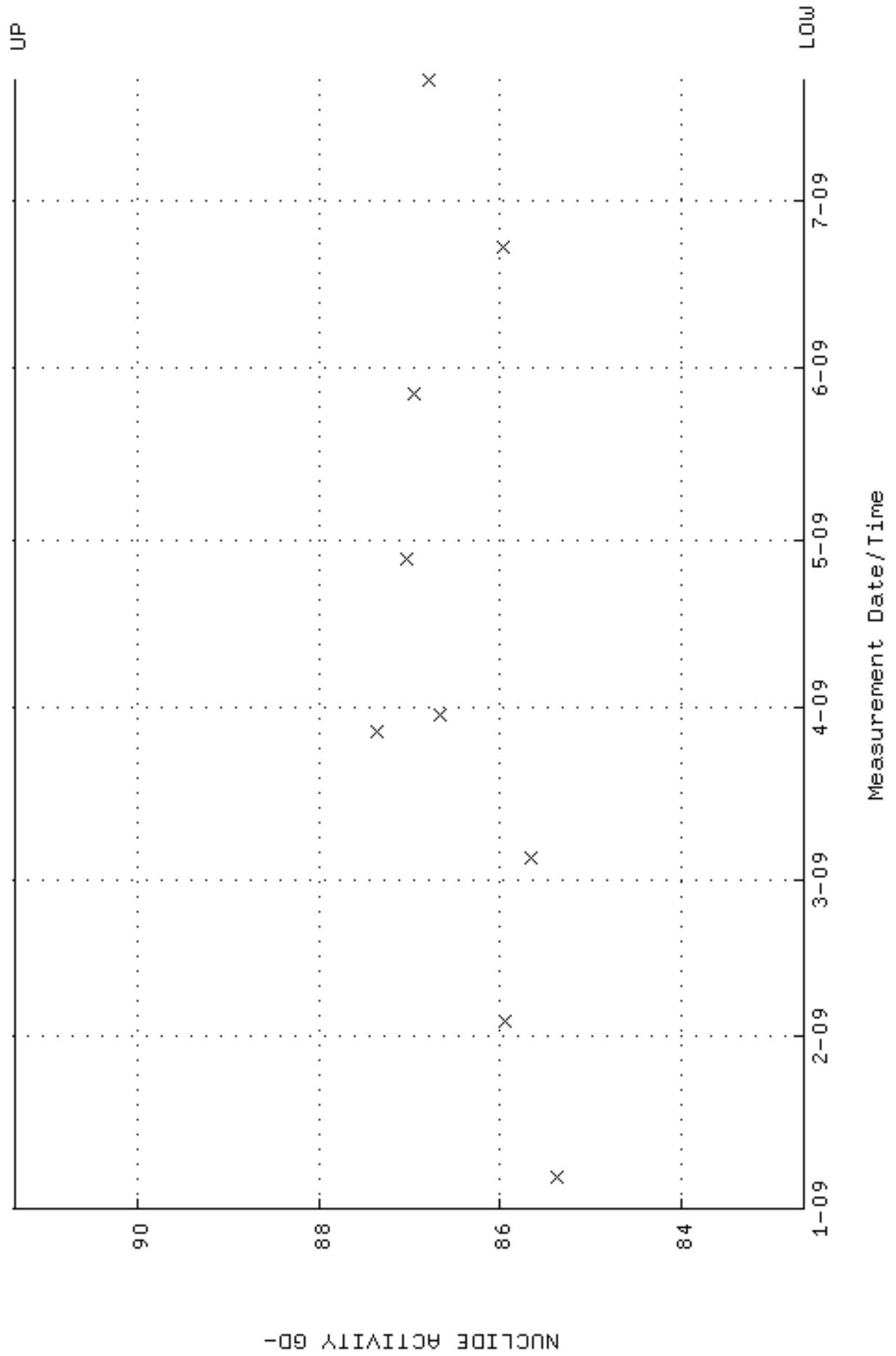
QA filename : DKA100:[ENV\_ALPHA.QA.B]B185.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:36 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



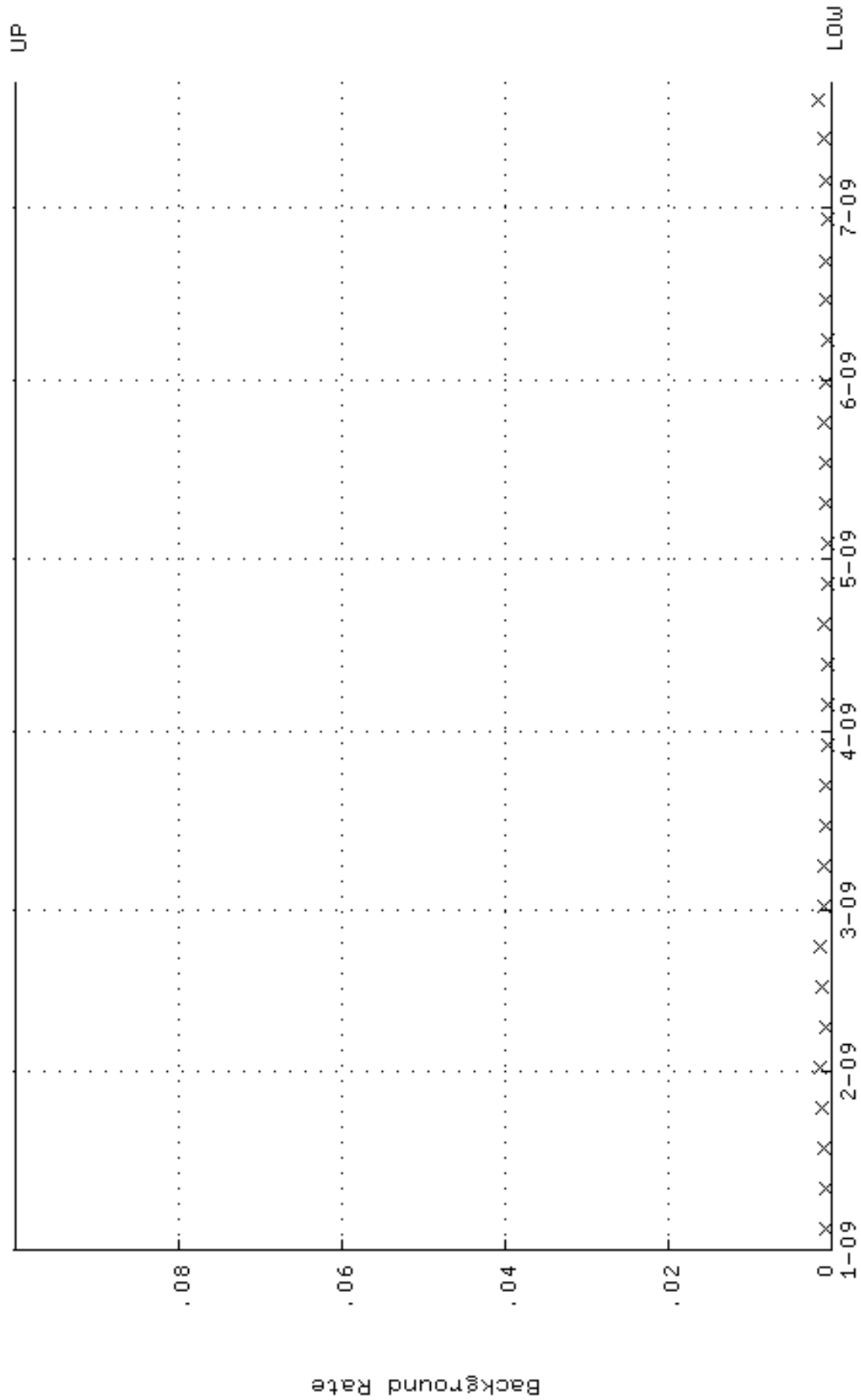
QA filename : DKA100:[ENV\_ALPHA.QA.W]W186.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:33 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.242649 through 0.262649



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-JUL-2009 12:00:00  
Lower/Upper Lmts: 82.6495 through 91.3495

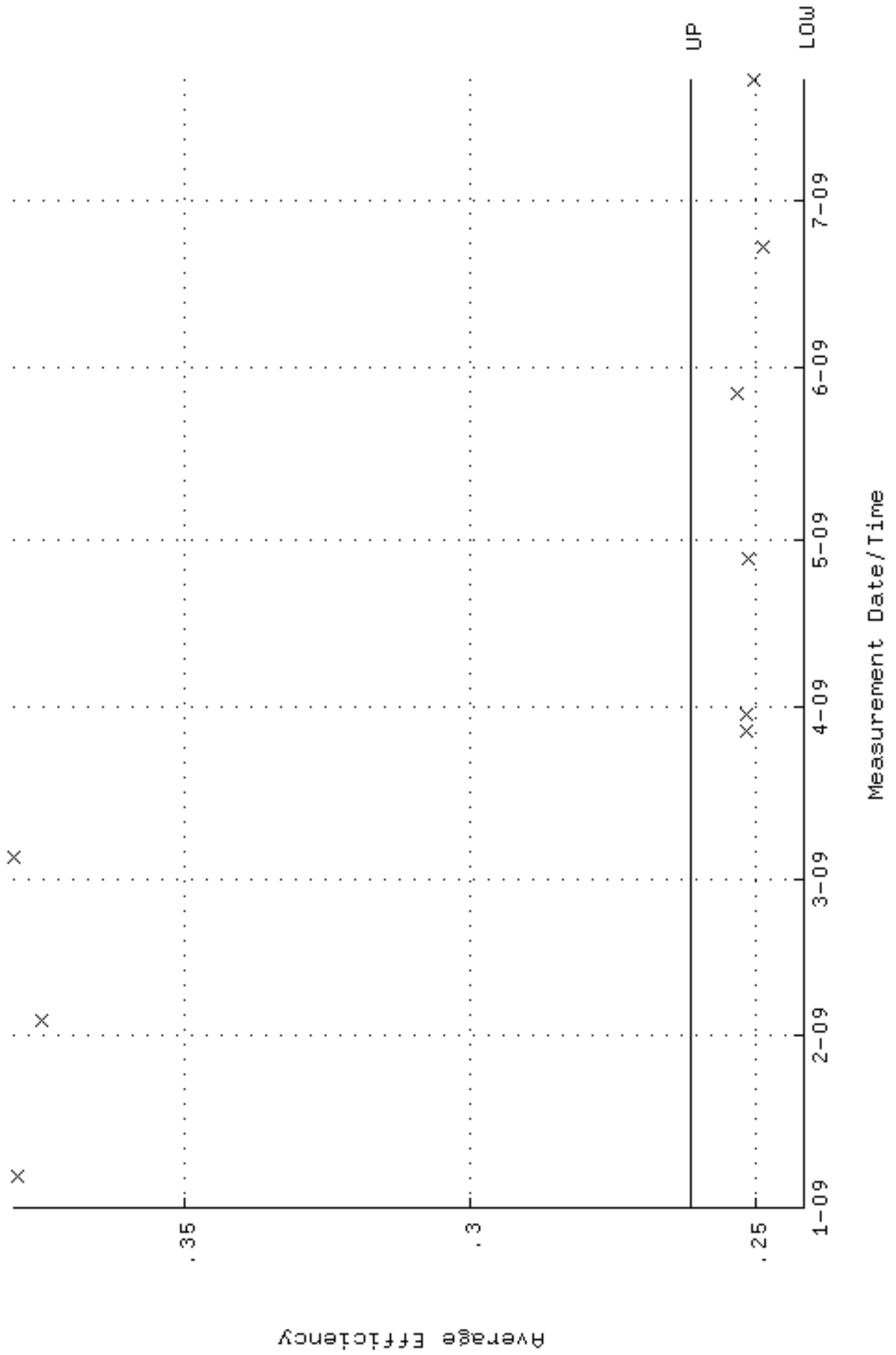


QA filename : DKA100:[ENV\_ALPHA.QA.B]B186.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:40 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

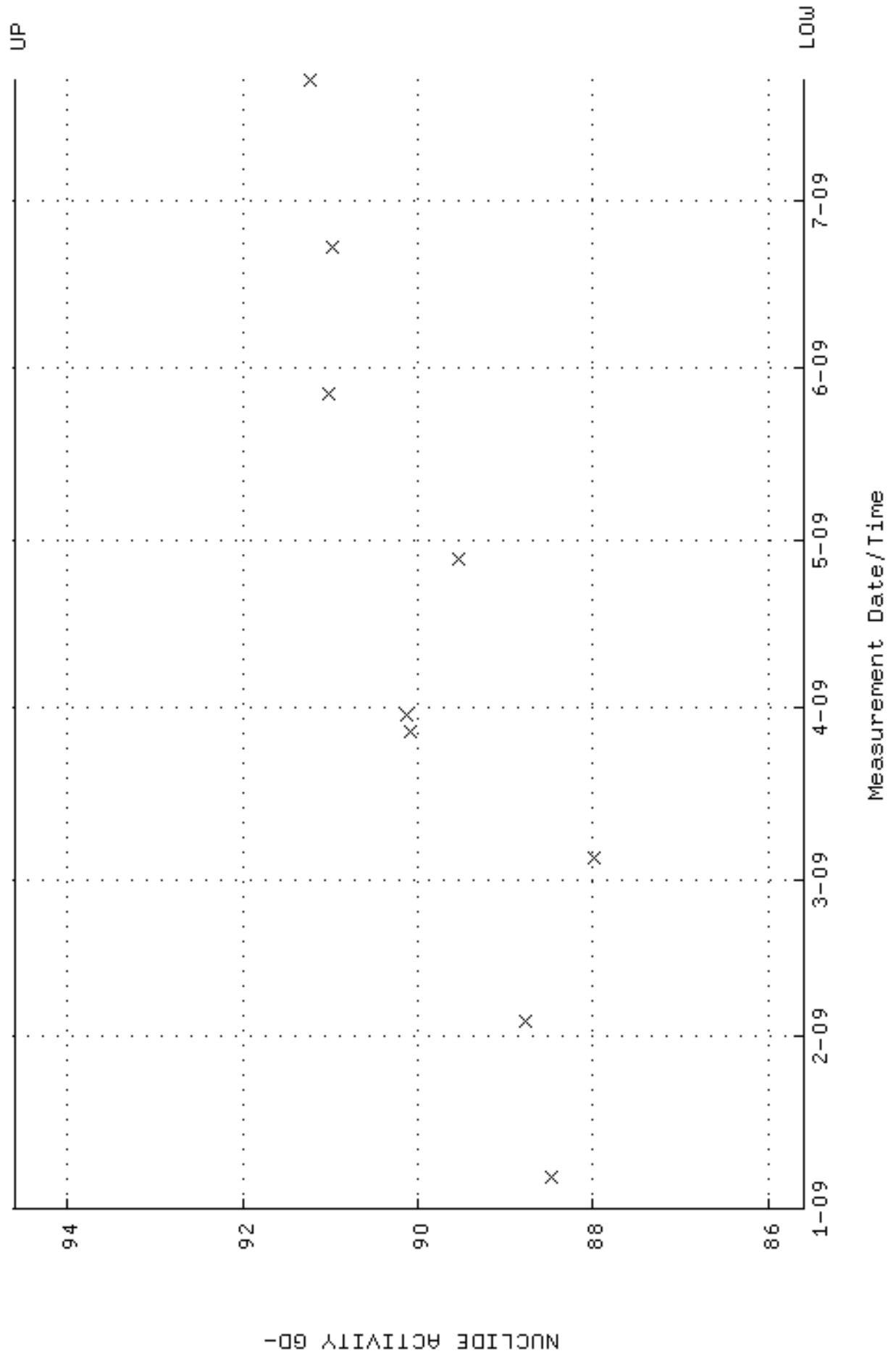




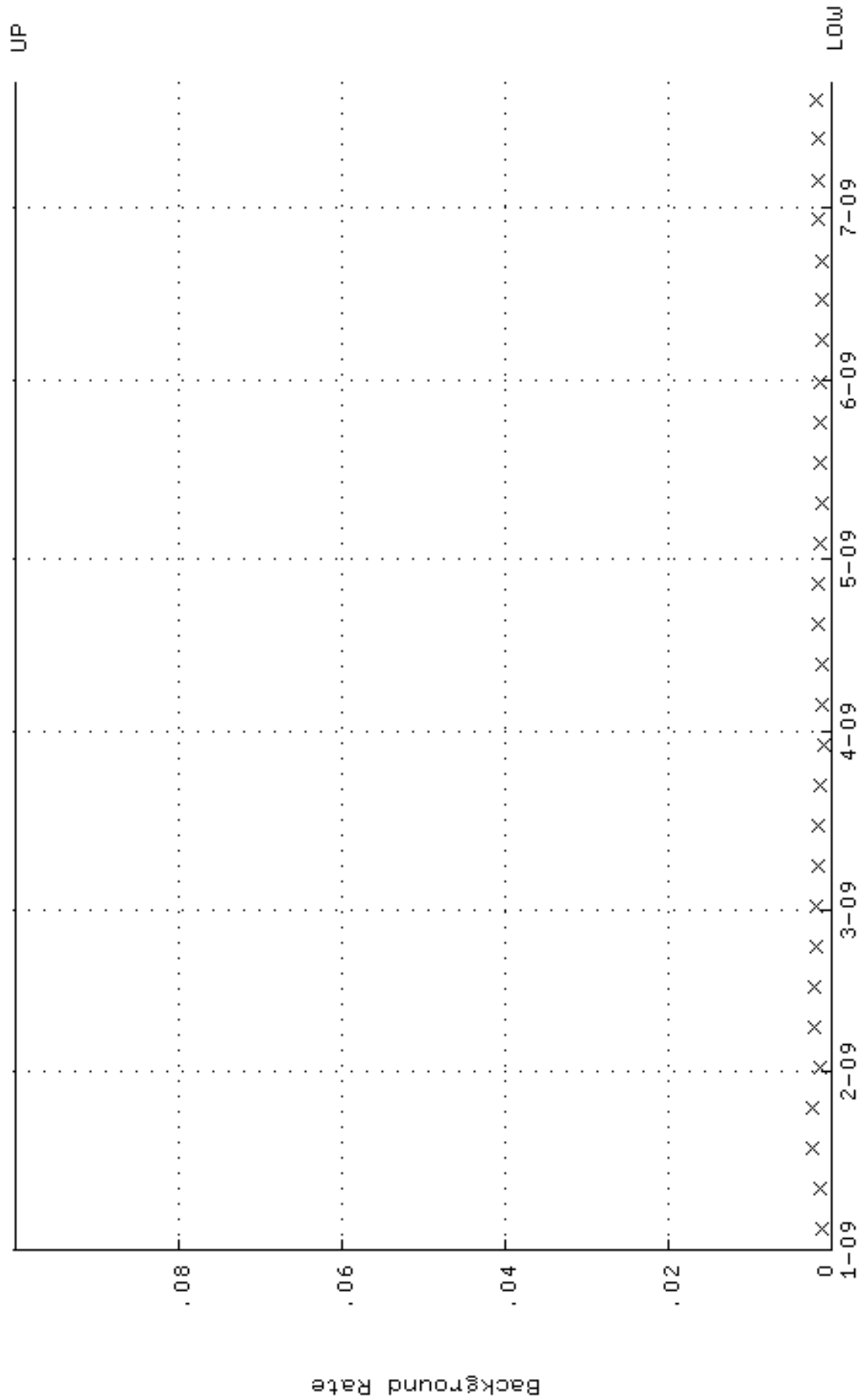
QA filename : DKA100:[ENV\_ALPHA.QA.W]W187.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:37 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.241464 through 0.261464



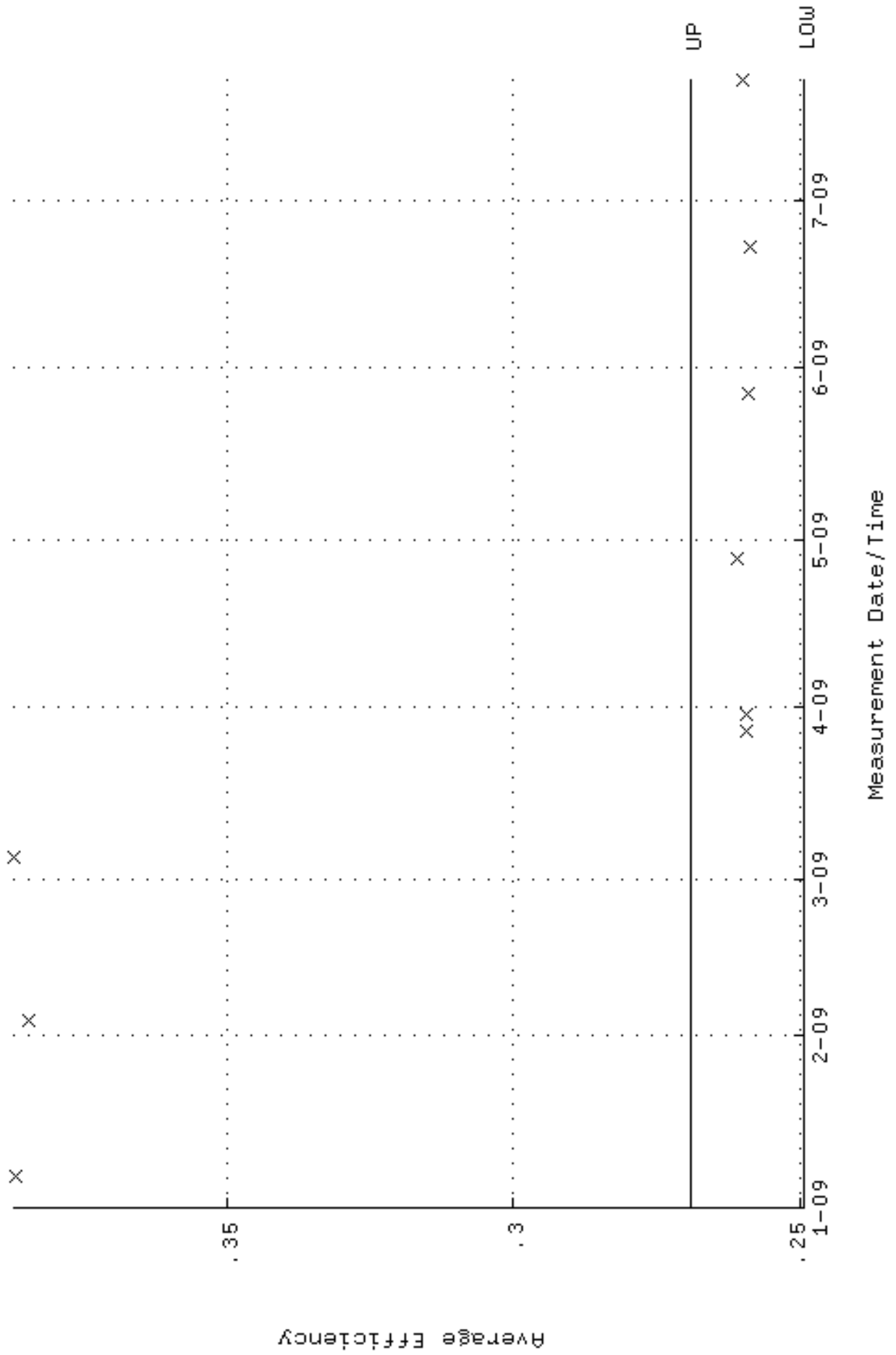
QA filename : DKA100:[ENV\_ALPHA.QA.W]w187.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:37 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.5888 through 94.5982



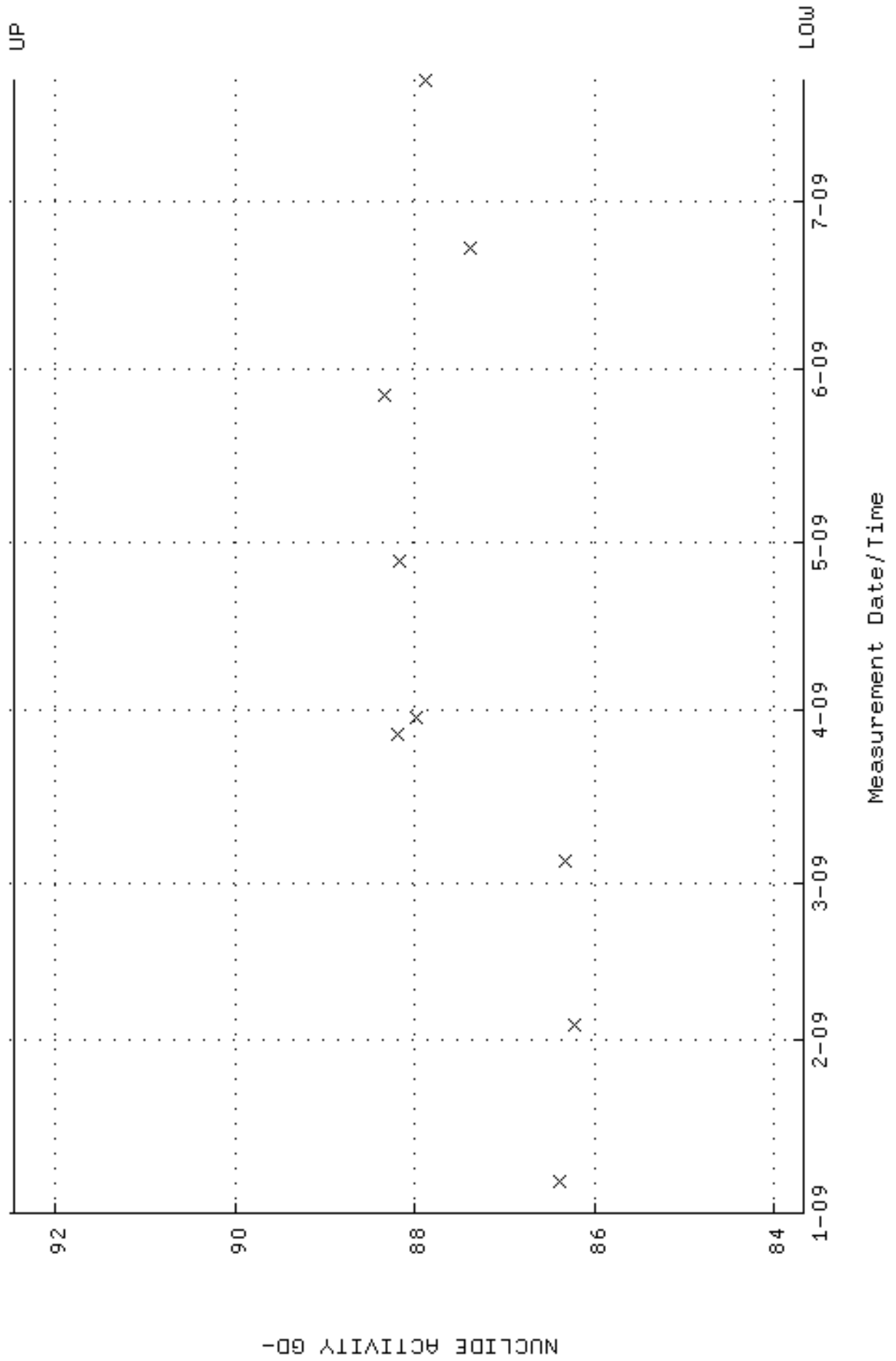
QA filename : DKA100:[ENV\_ALPHA.QA.B]B187.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:44 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



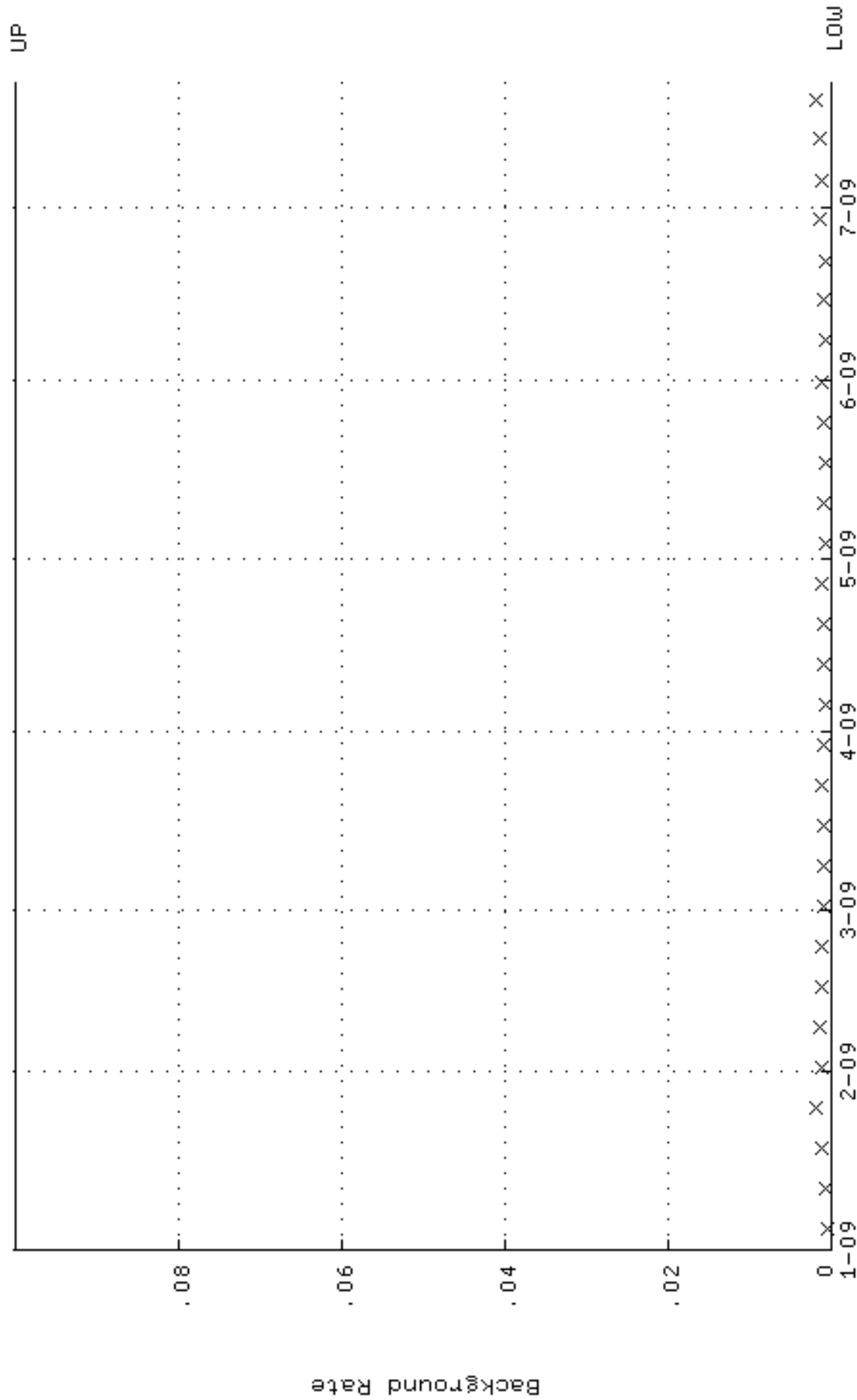
QA filename : DKA100:[ENV\_ALPHA.QA.W]W188.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:41 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.249341 through 0.269341



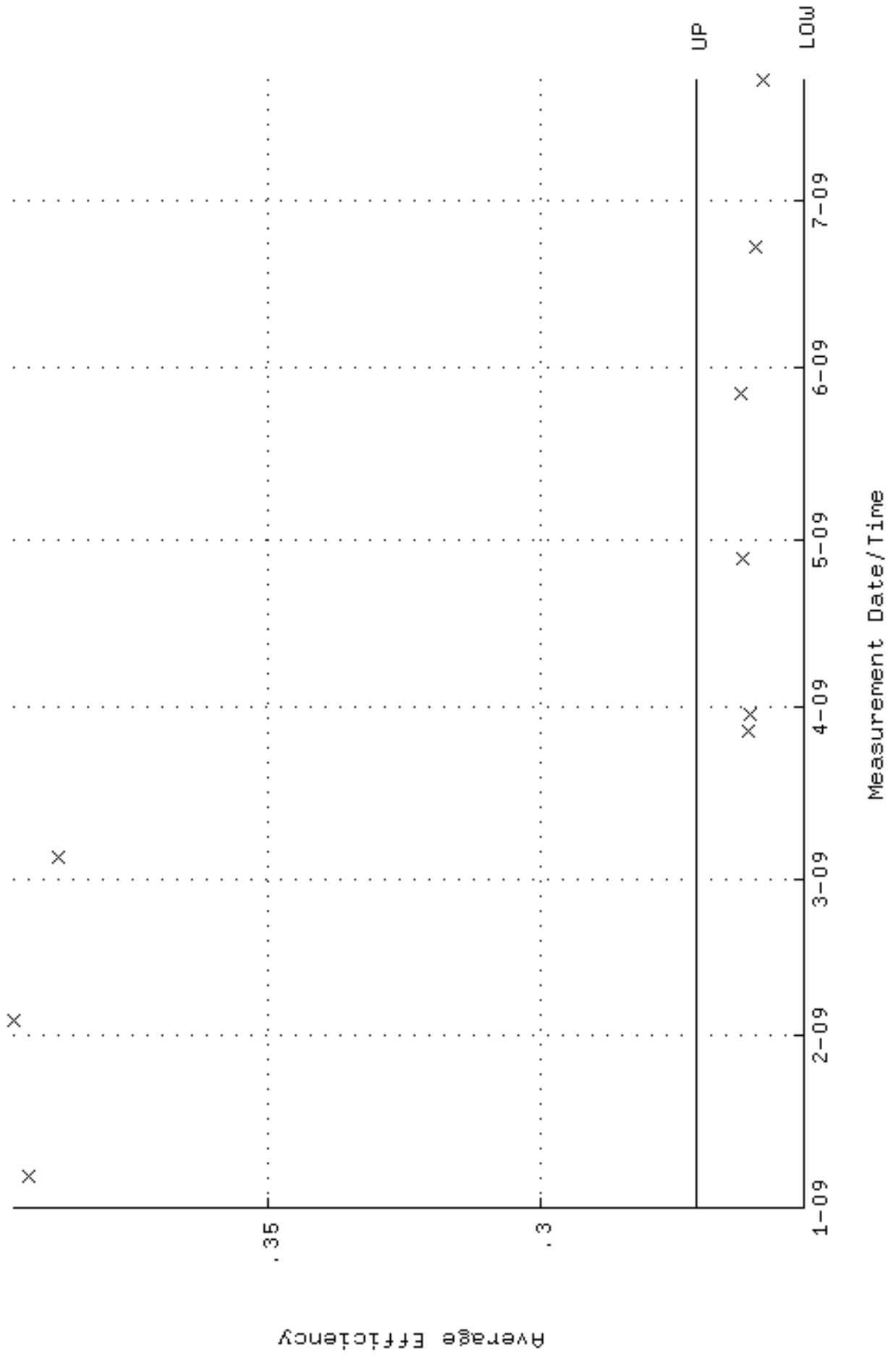
QA filename : DKA100:[ENV\_ALPHA.QA.W]w188.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:41 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 83.6747 through 92.4825



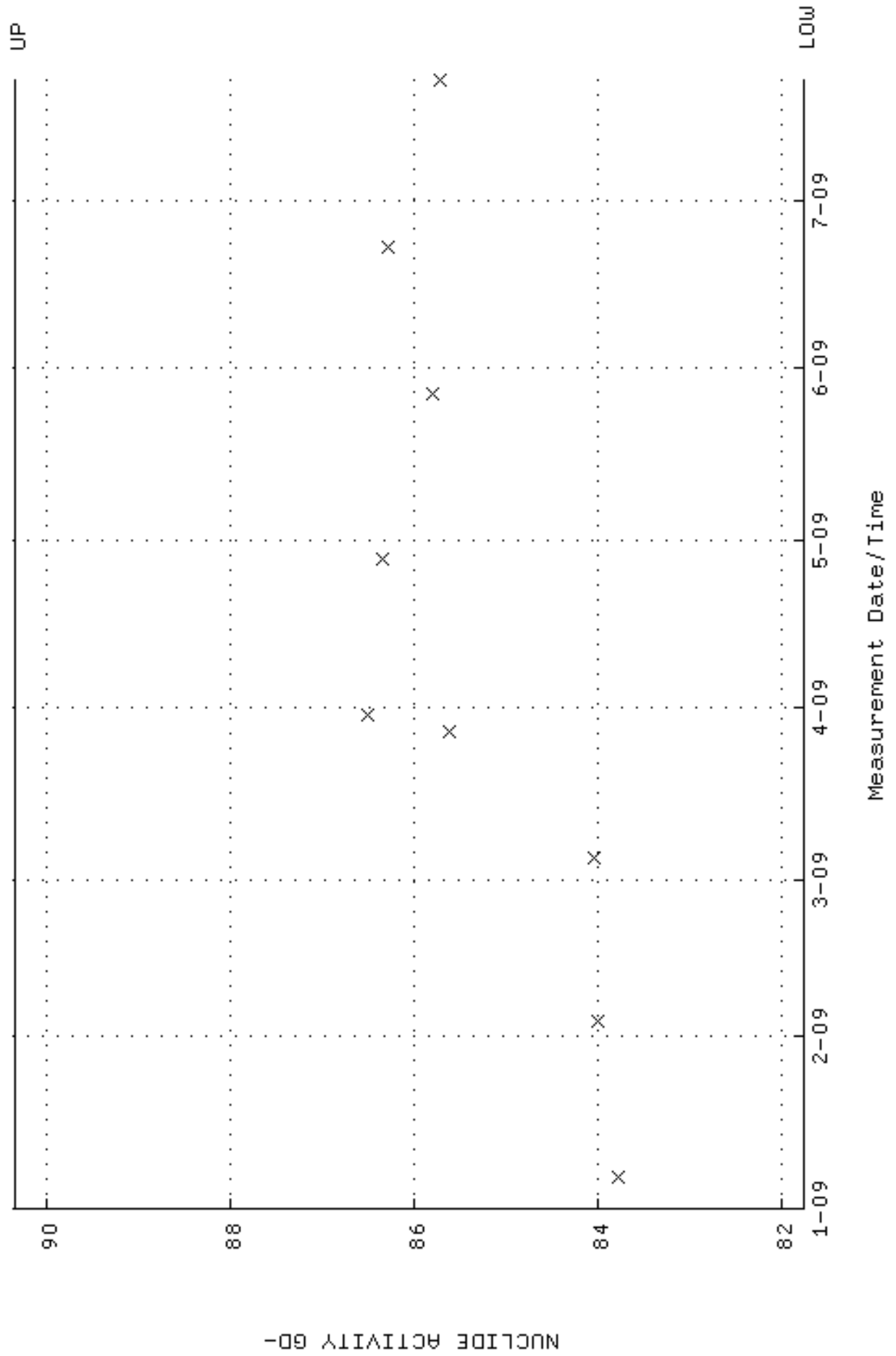
QA filename : DKA100:[ENV\_ALPHA.QA.B]B188.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:47 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



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-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.251590 through 0.271590

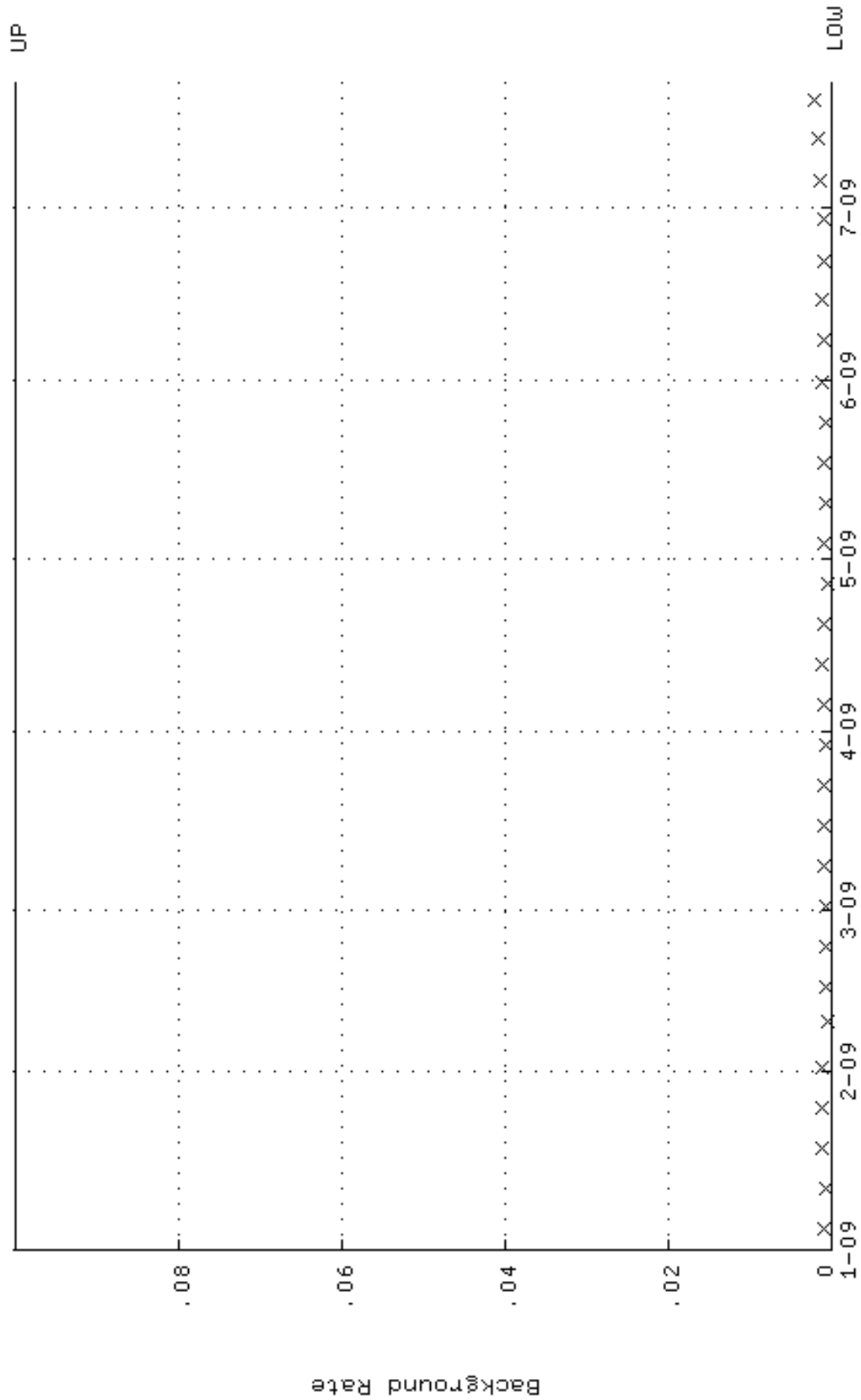


QA filename : DKA100:[ENV\_ALPHA.QA.W]w189.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:46 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 81.7473 through 90.3523

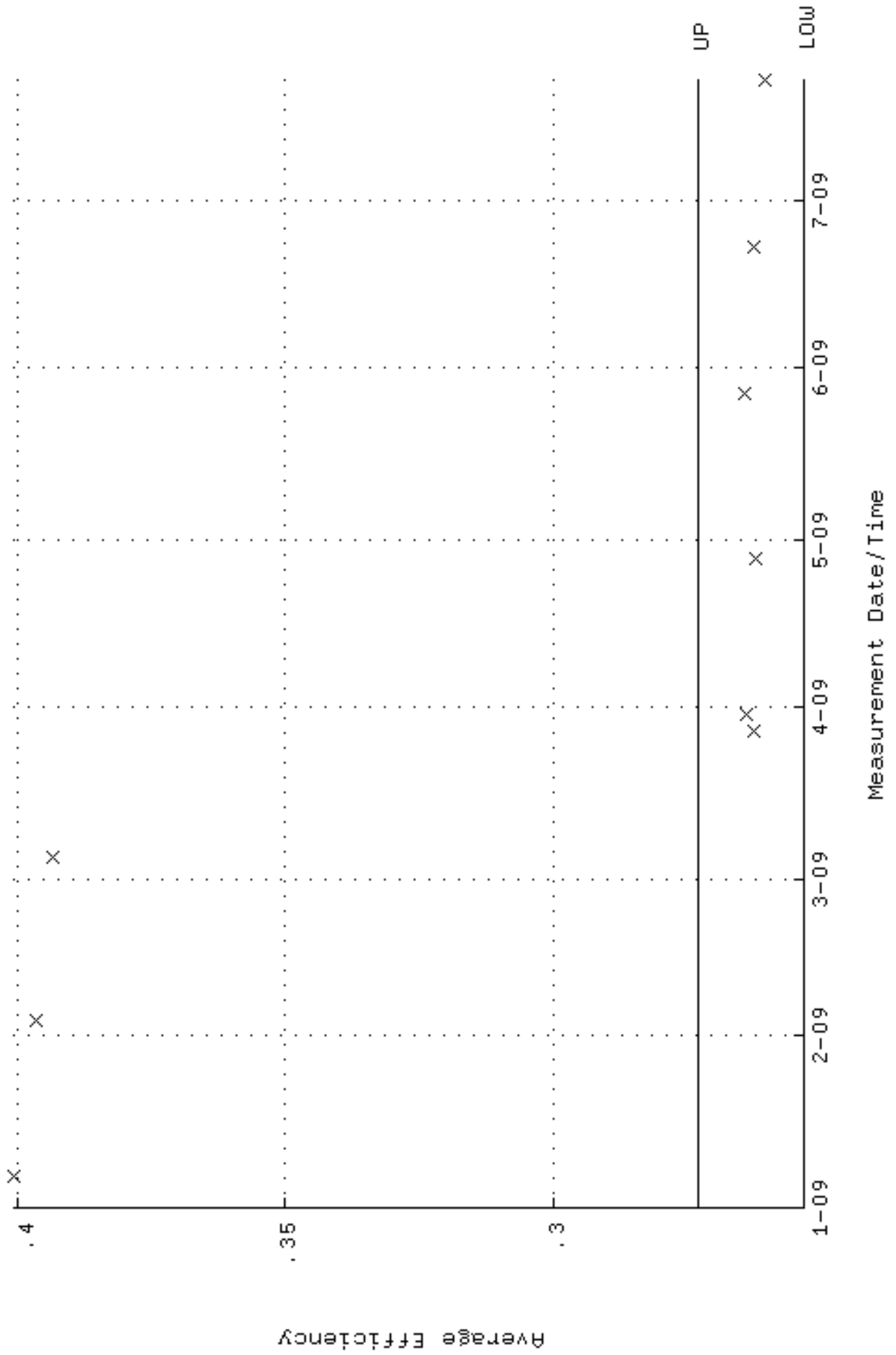




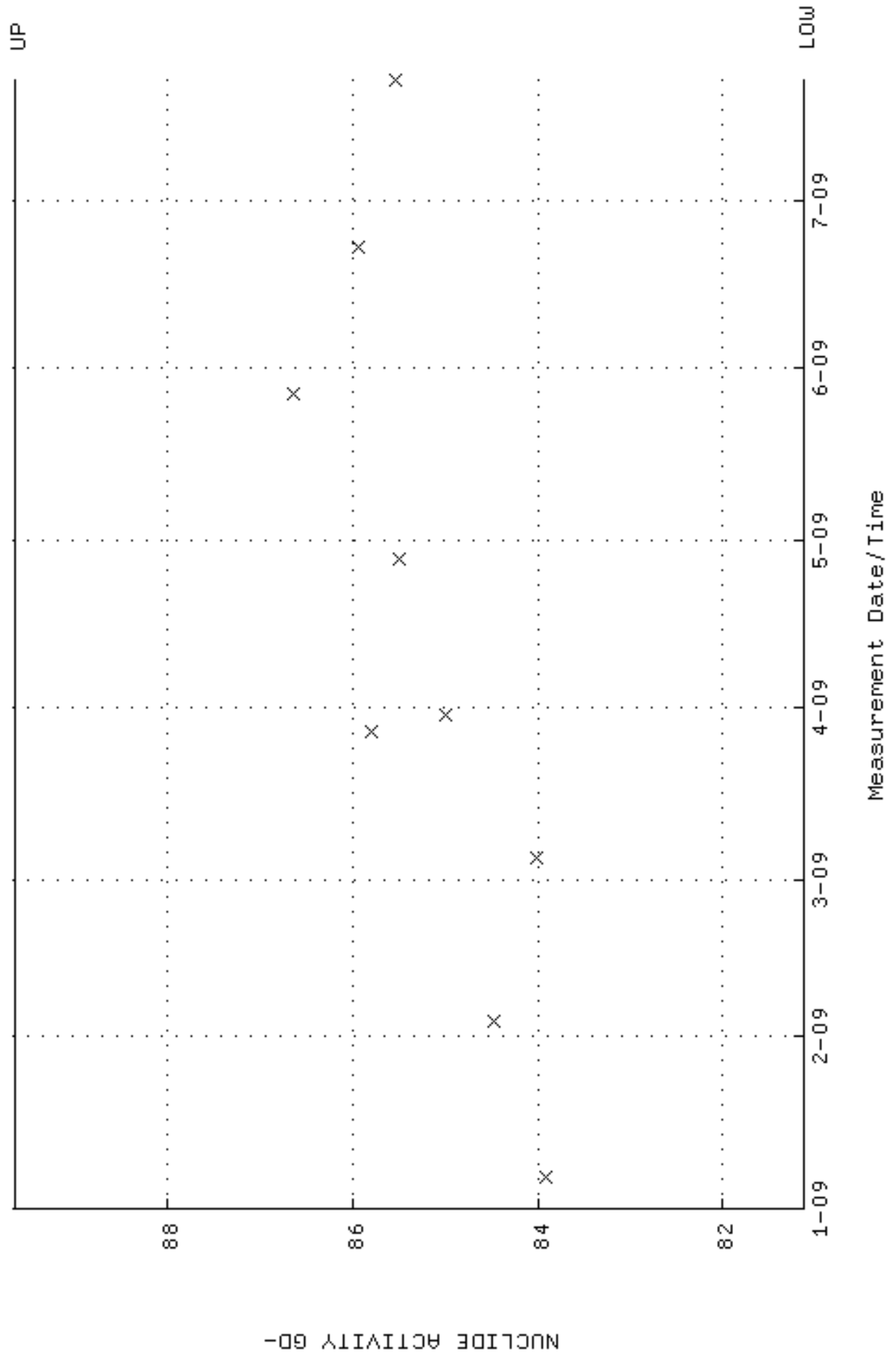
QA filename : DKA100:[ENV\_ALPHA.QA.B]B189.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:51 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



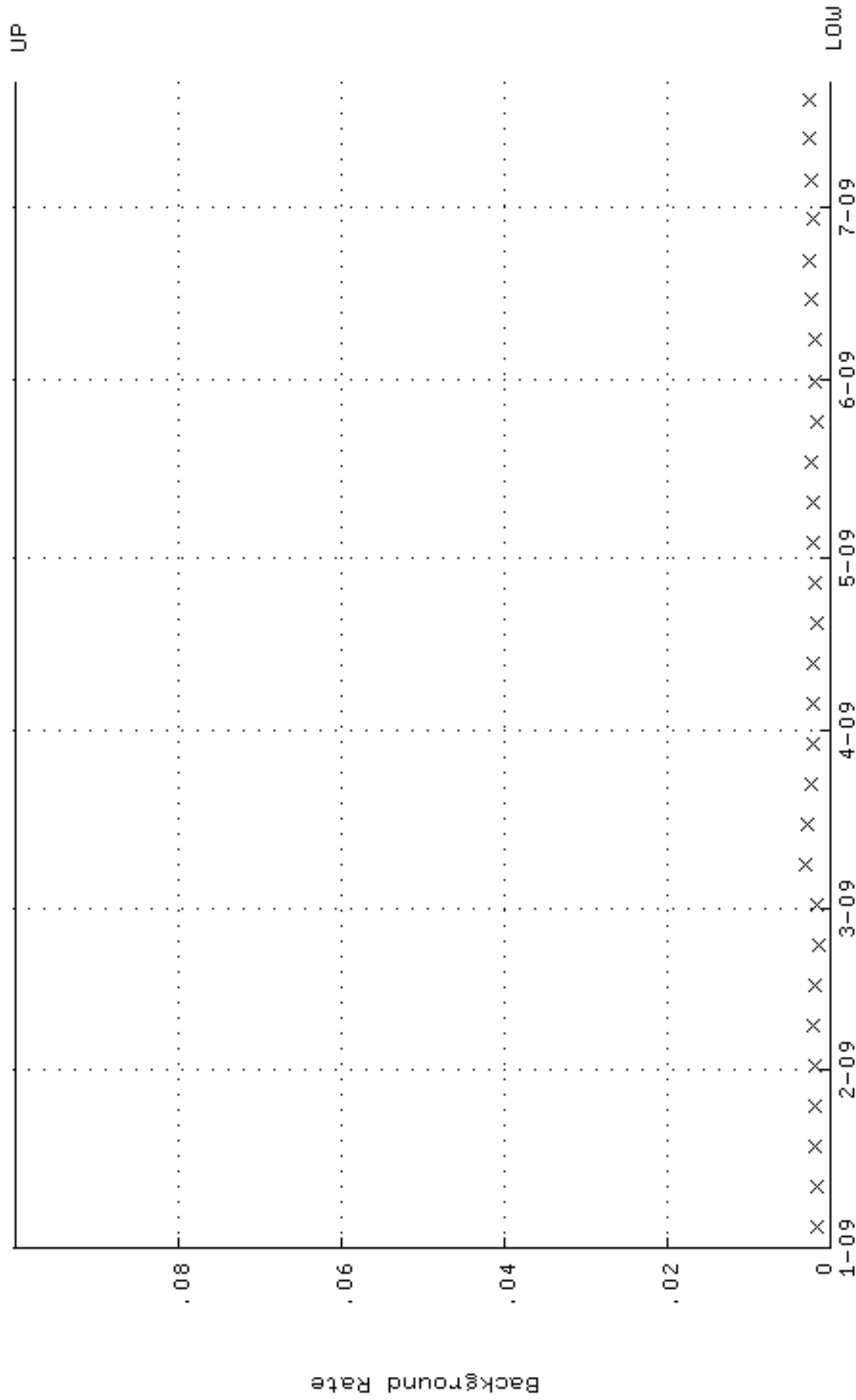
QA filename : DKA100:[ENV\_ALPHA.QA.W]W190.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:49 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.253504 through 0.273504



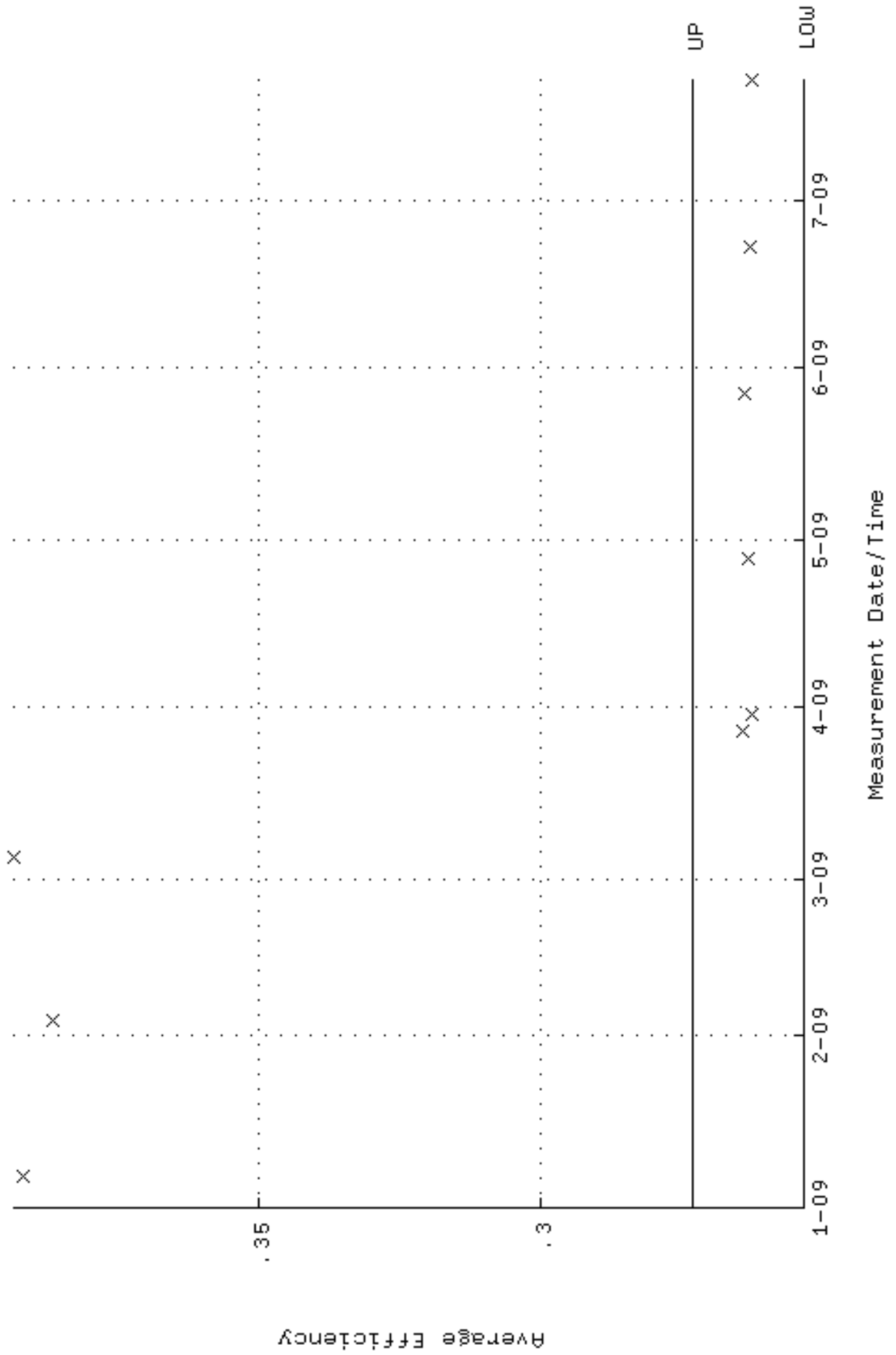
QA filename : DKA100:[ENV\_ALPHA.QA.W]W190.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:49 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 81.1176 through 89.6562



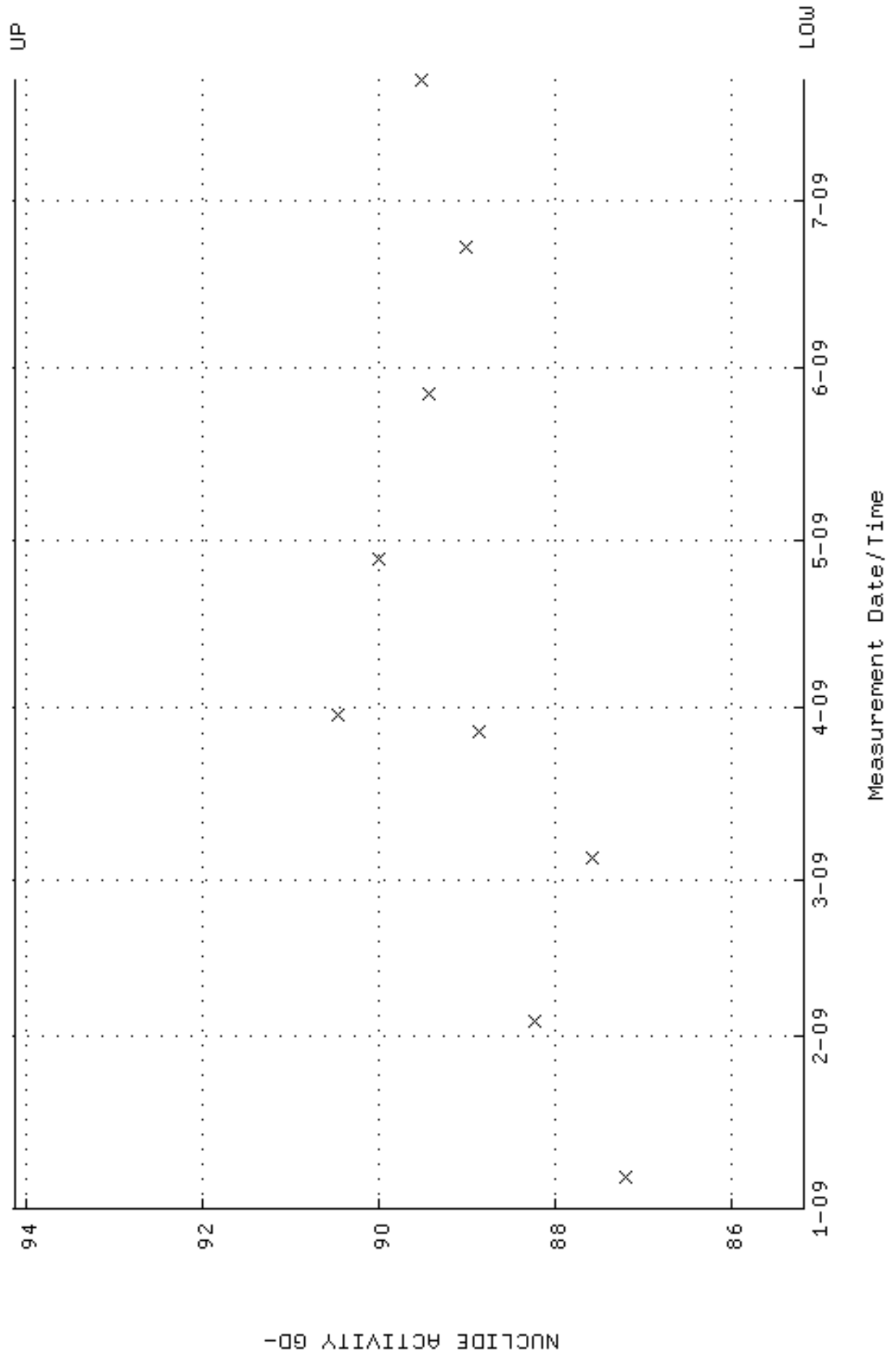
QA filename : DKA100:[ENV\_ALPHA.QA.B]B190.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:55 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



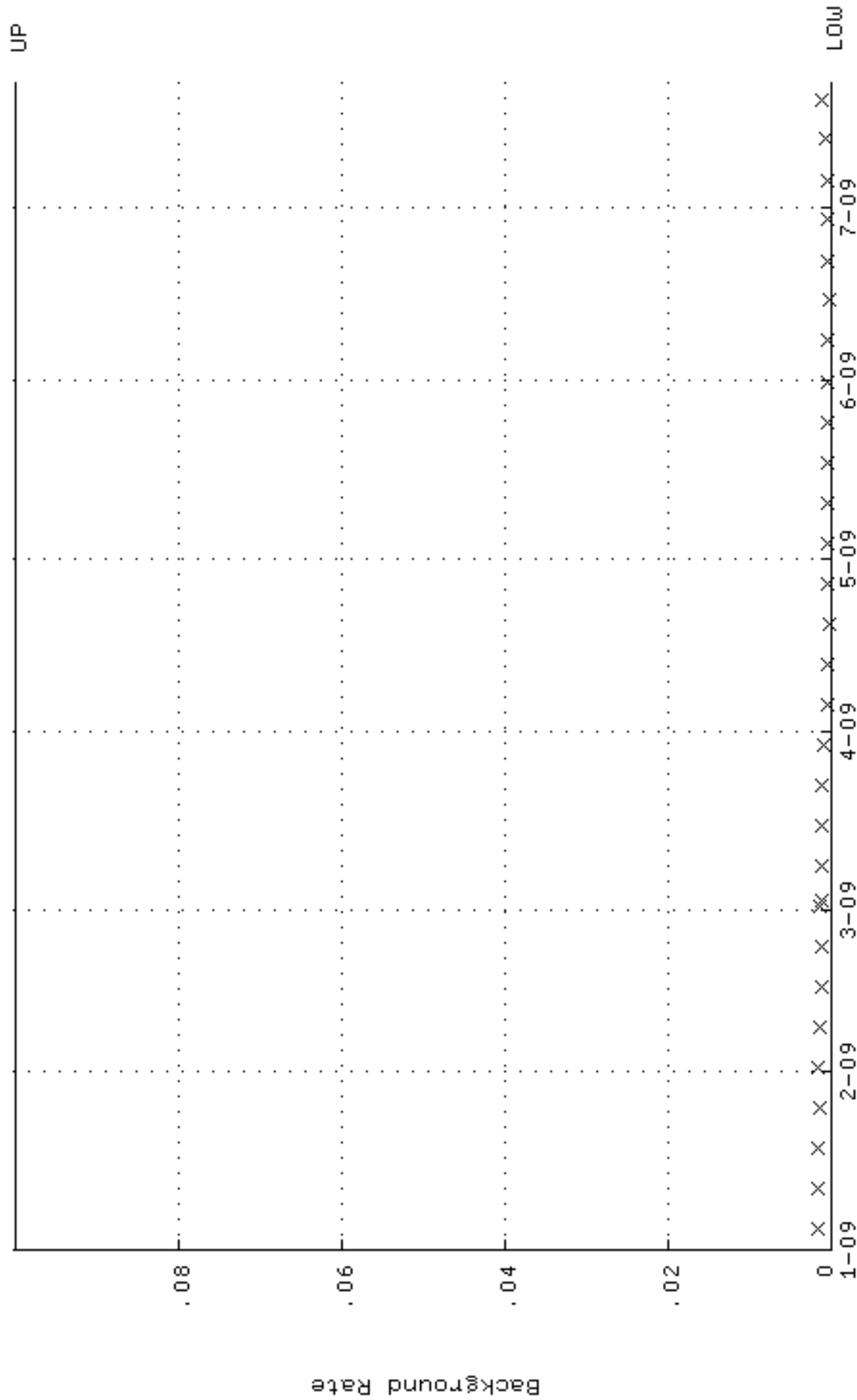
QA filename : DKA100:[ENV\_ALPHA.QA.W]W191.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:54 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.252993 through 0.272993



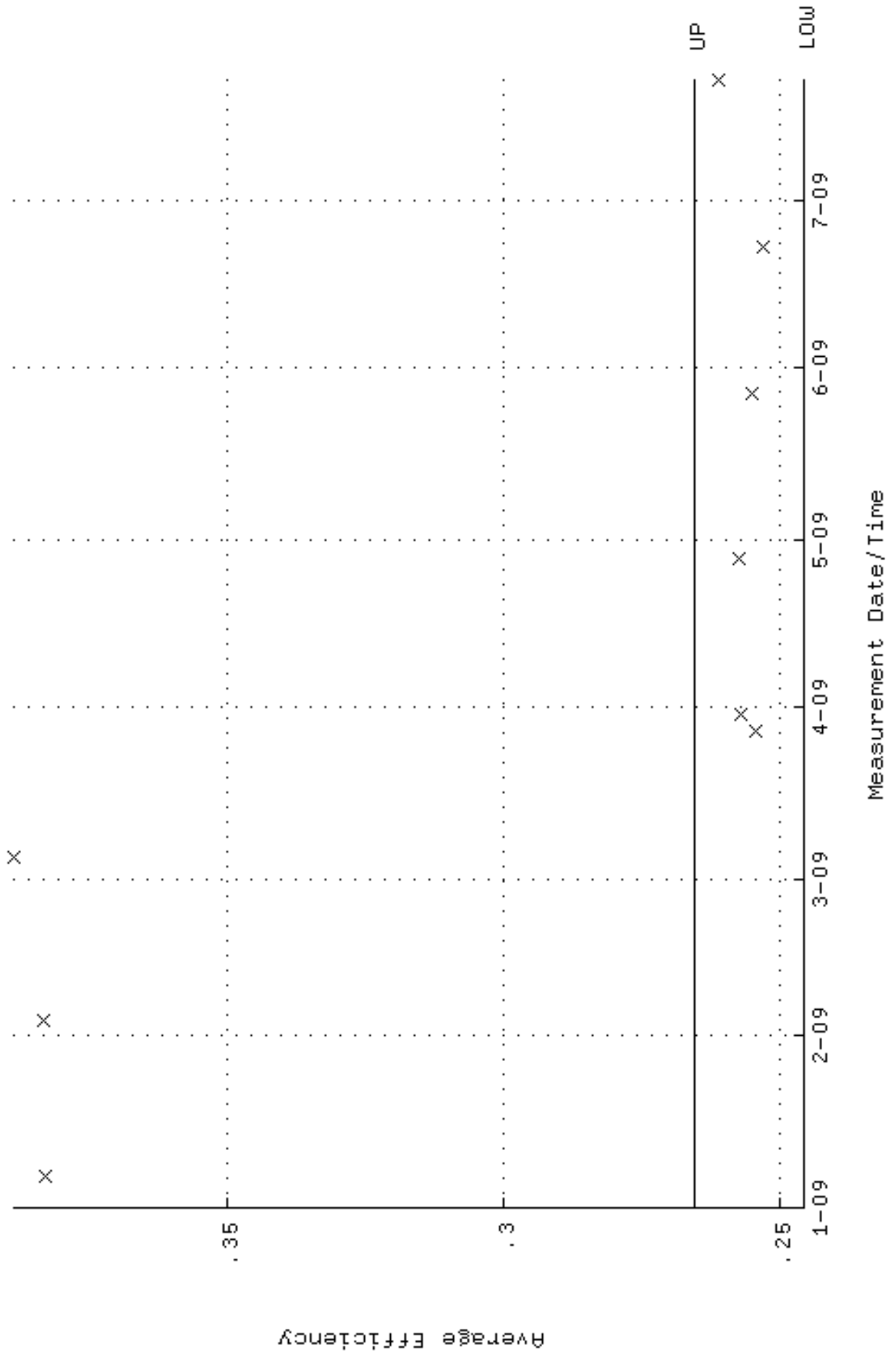
QA filename : DKA100:[ENV\_ALPHA.QA.W]w191.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:54 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.1712 through 94.1366



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-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

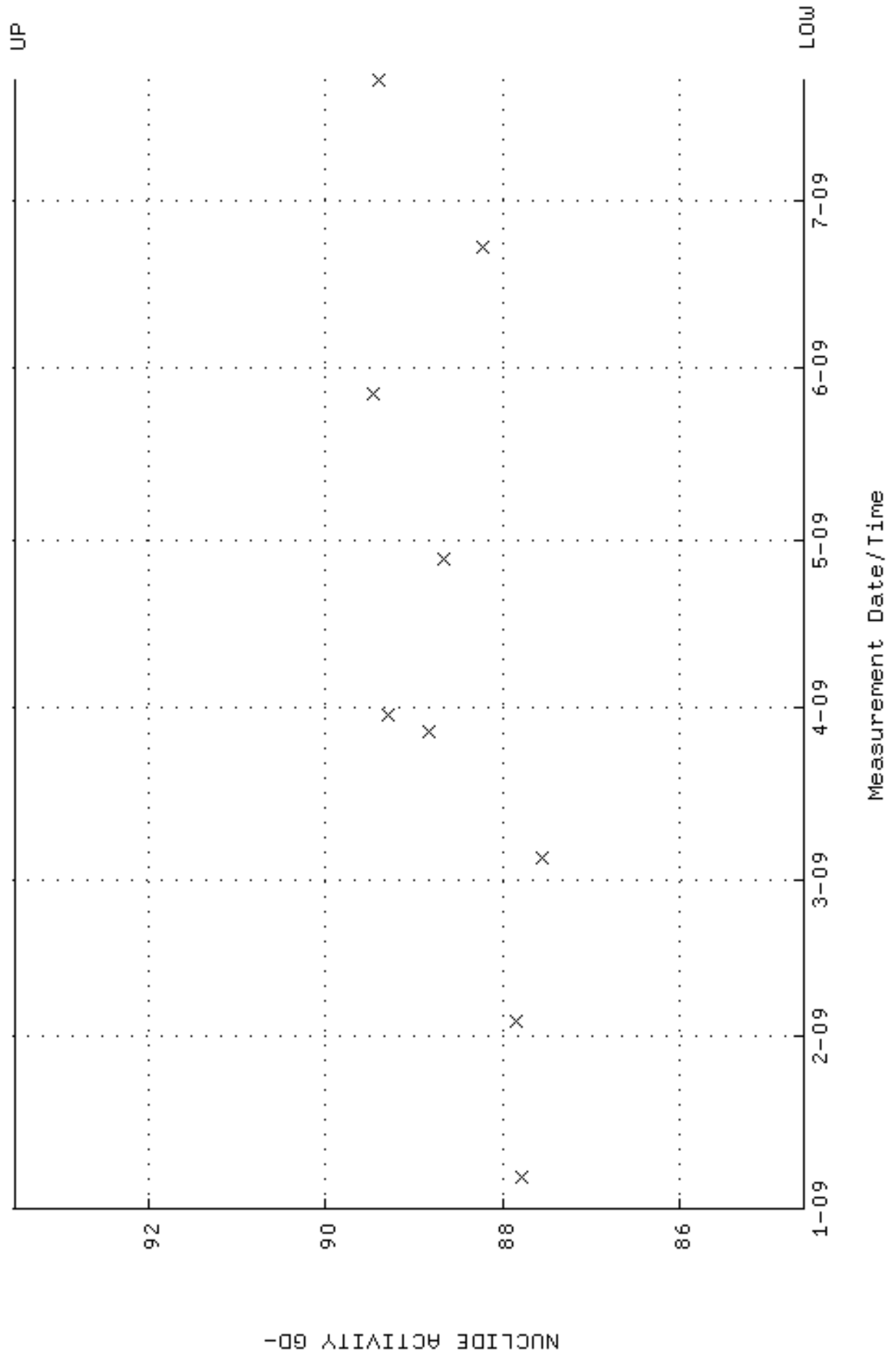


QA filename : DKA100:[ENV\_ALPHA.QA.W]W192.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:58 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.245663 through 0.265663

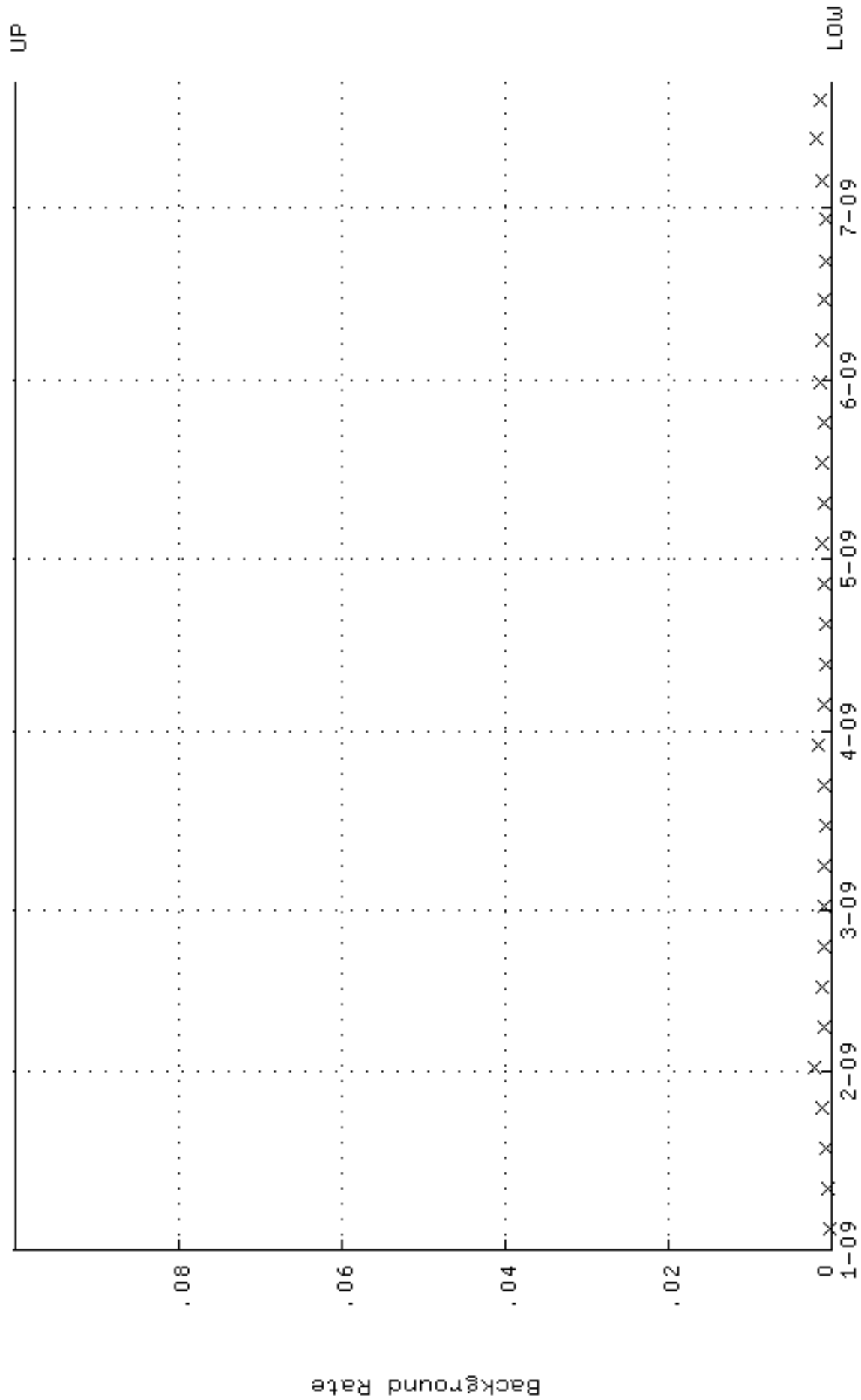




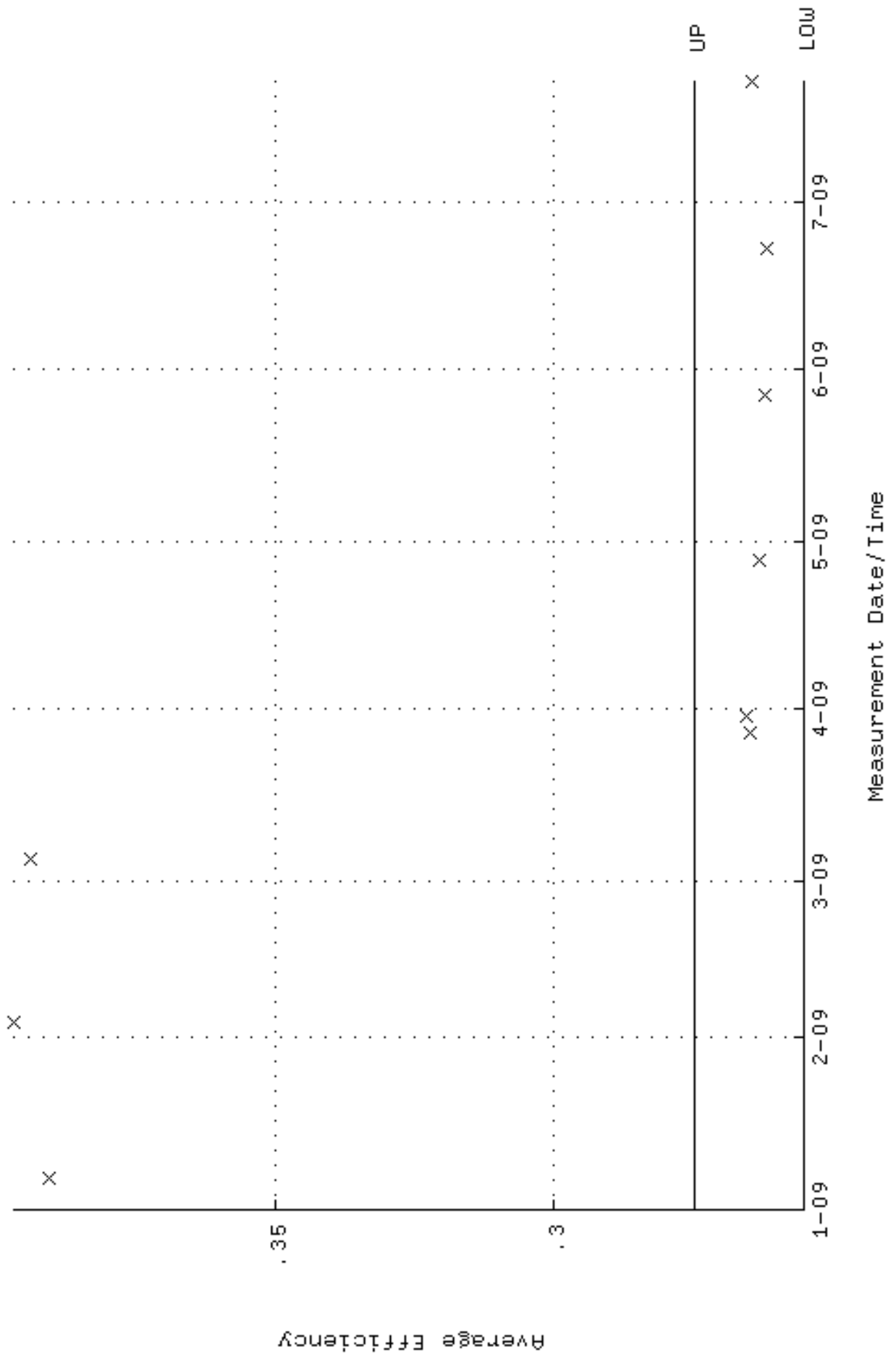
QA filename : DKA100:[ENV\_ALPHA.QA.W]w192.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:58 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.6037 through 93.5093



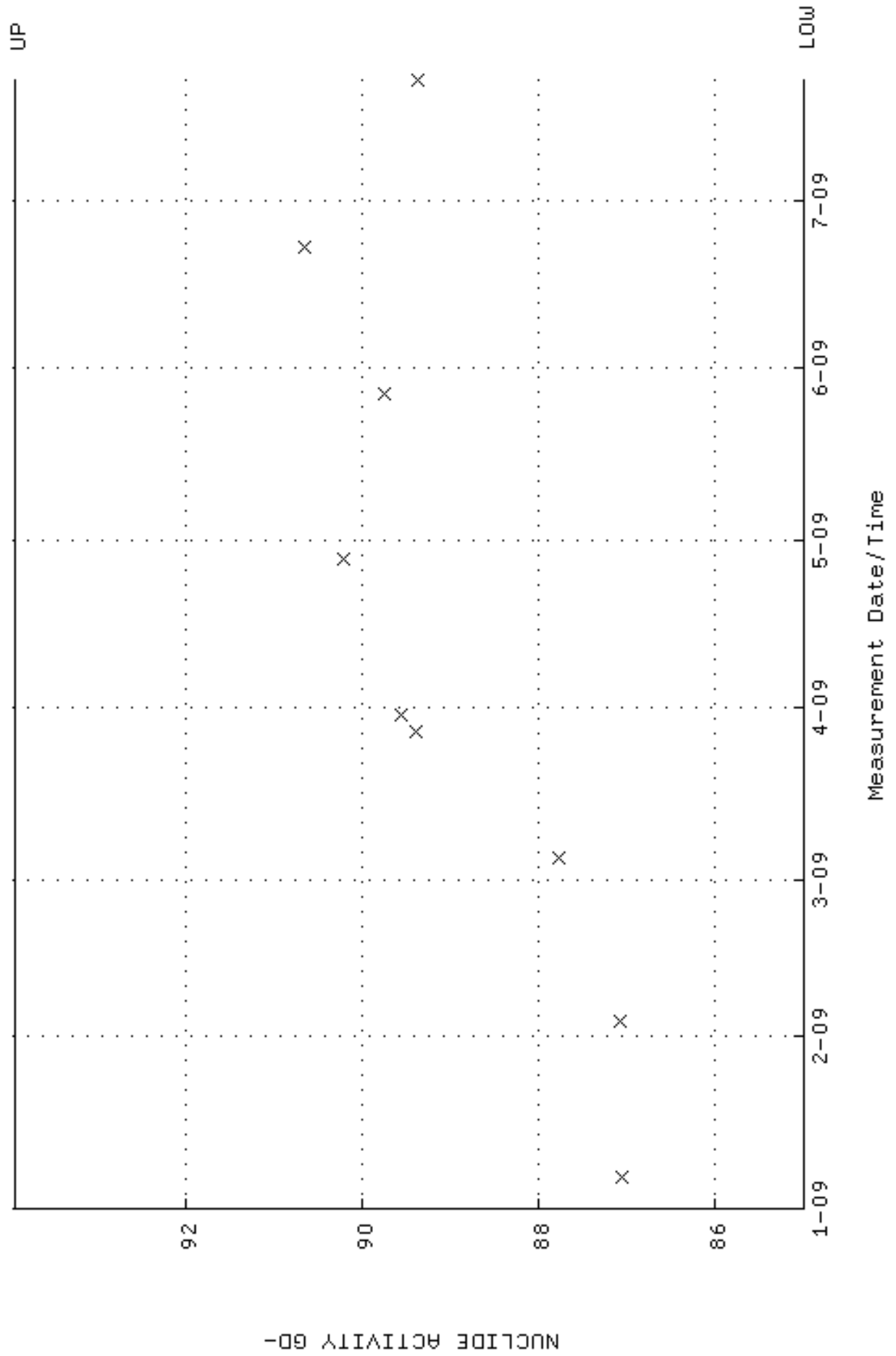
QA filename : DKA100:[ENV\_ALPHA.QA.B]B192.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:27:03 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



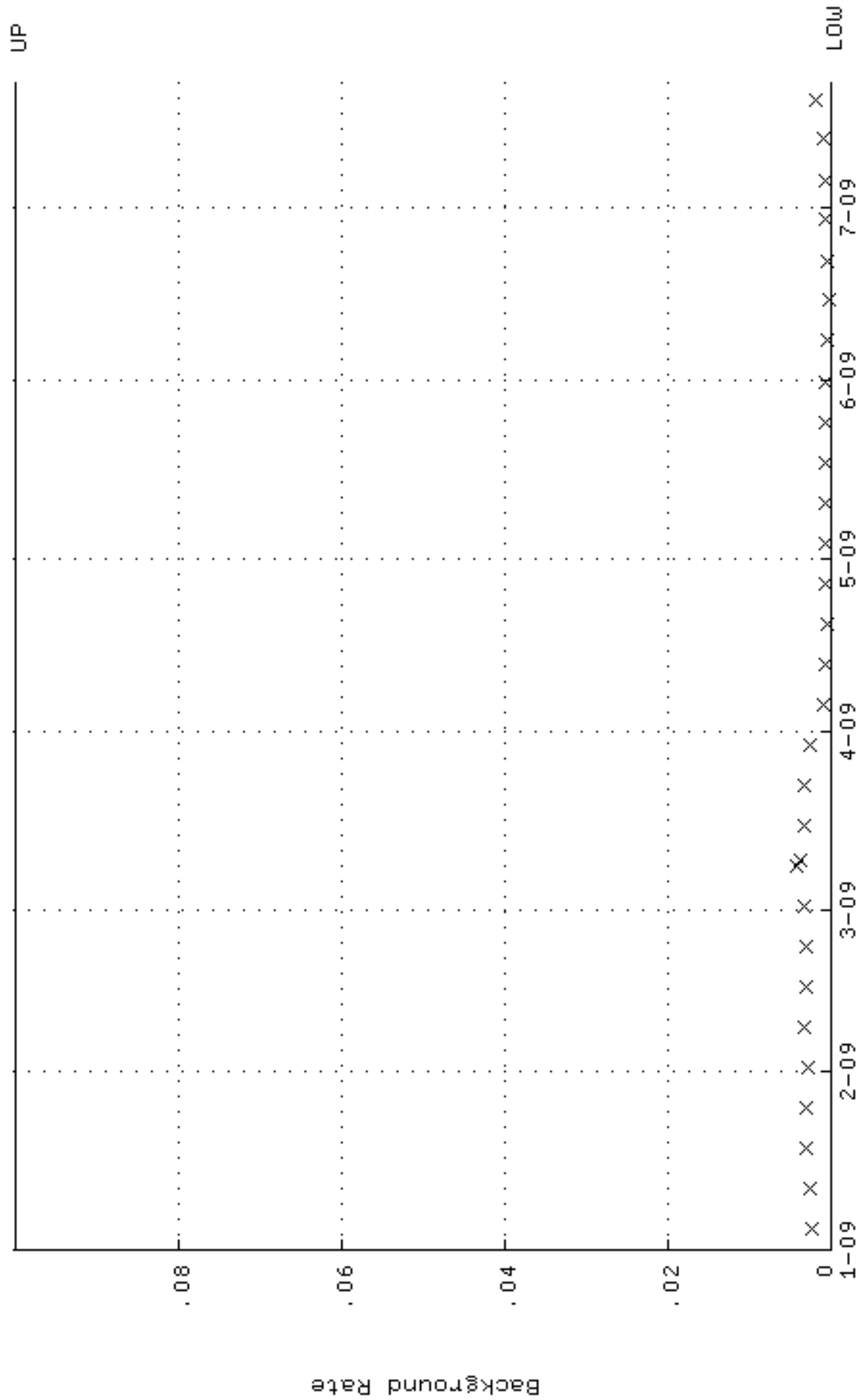
QA filename : DKA100:[ENV\_ALPHA.QA.W]W193.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:32:01 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.254861 through 0.274861



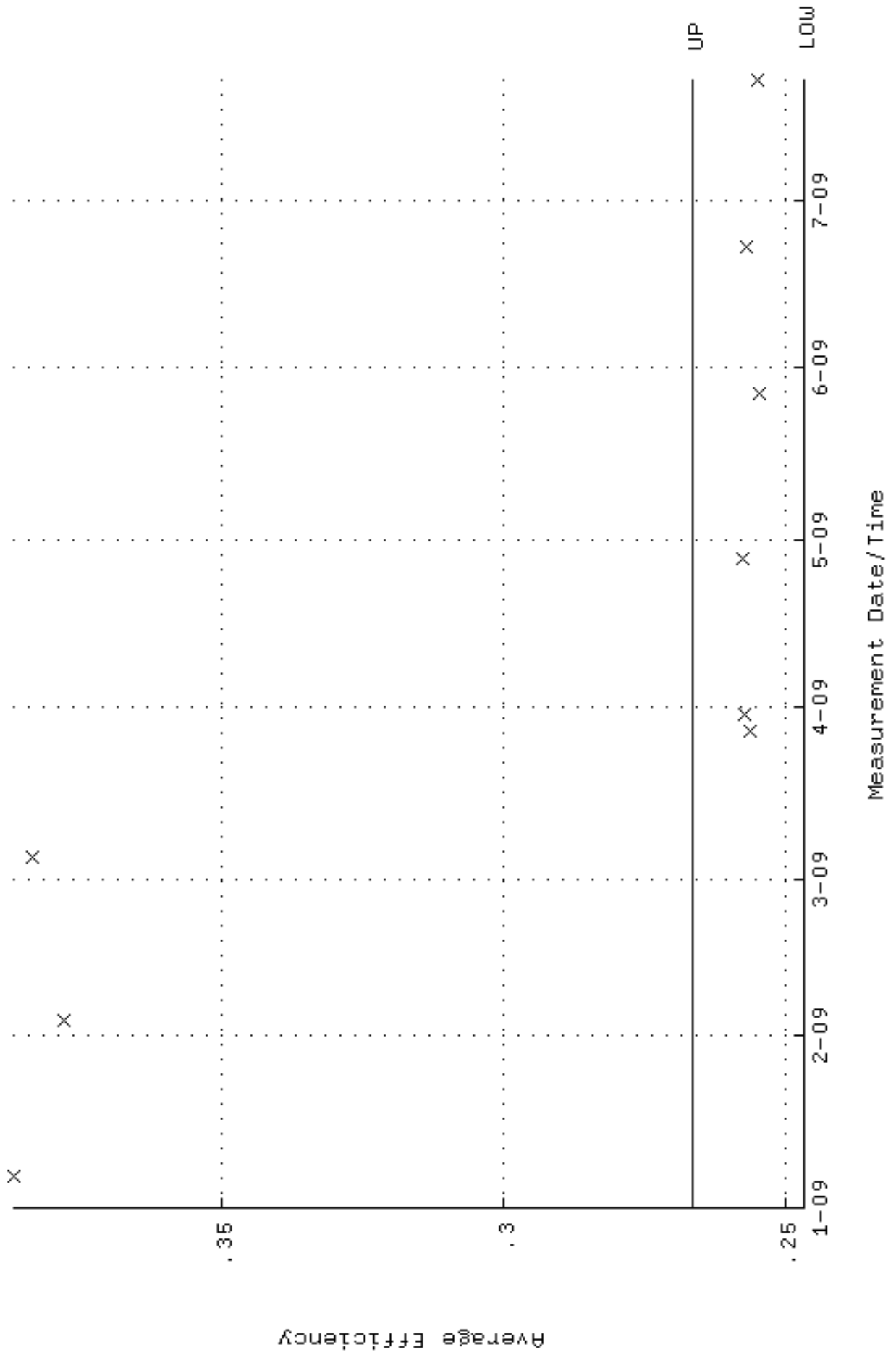
QA filename : DKA100:[ENV\_ALPHA.QA.W]w193.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:32:01 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.9815 through 93.9269



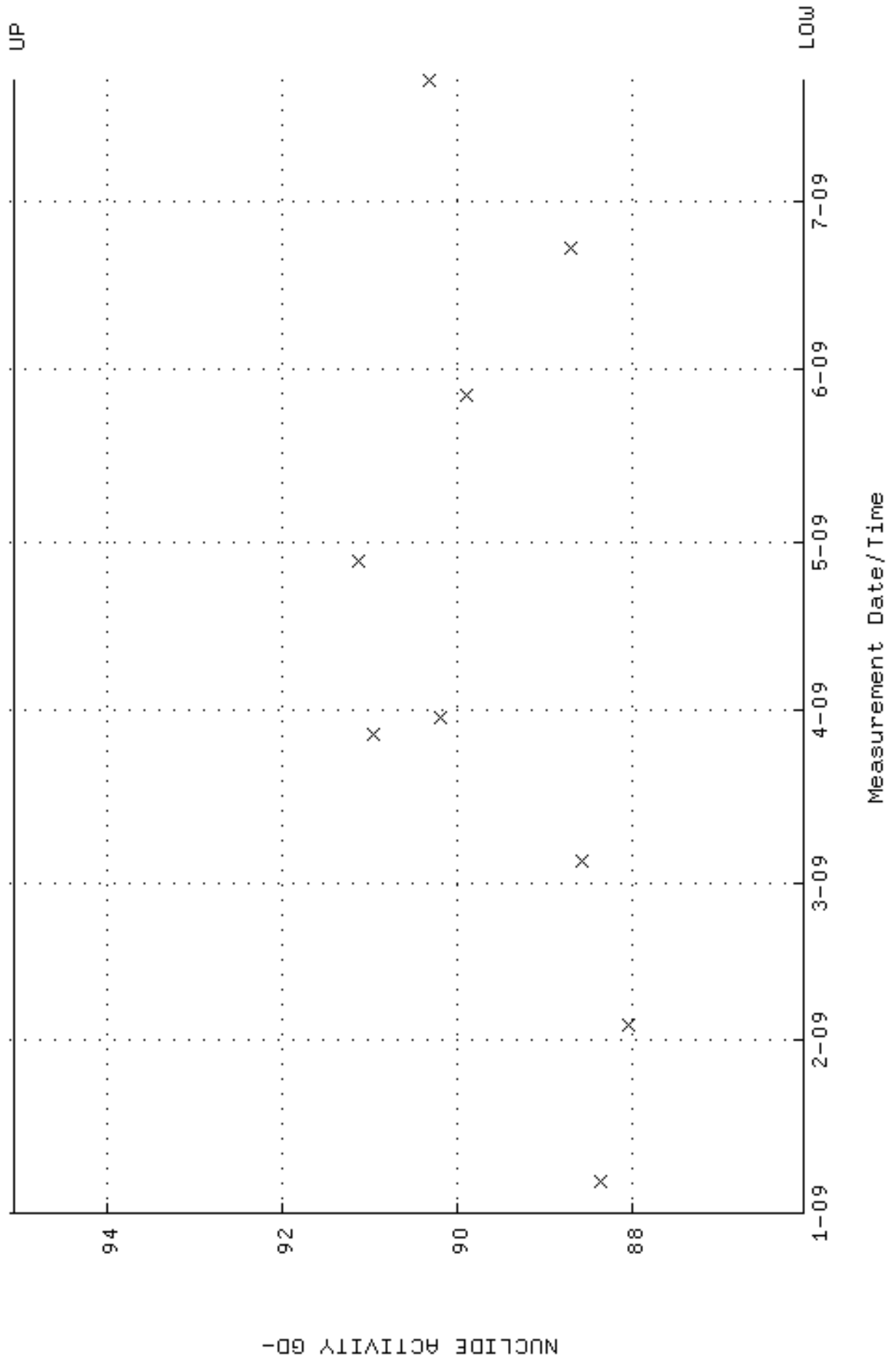
QA filename : DKA100:[ENV\_ALPHA.QA.B]B193.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:27:07 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



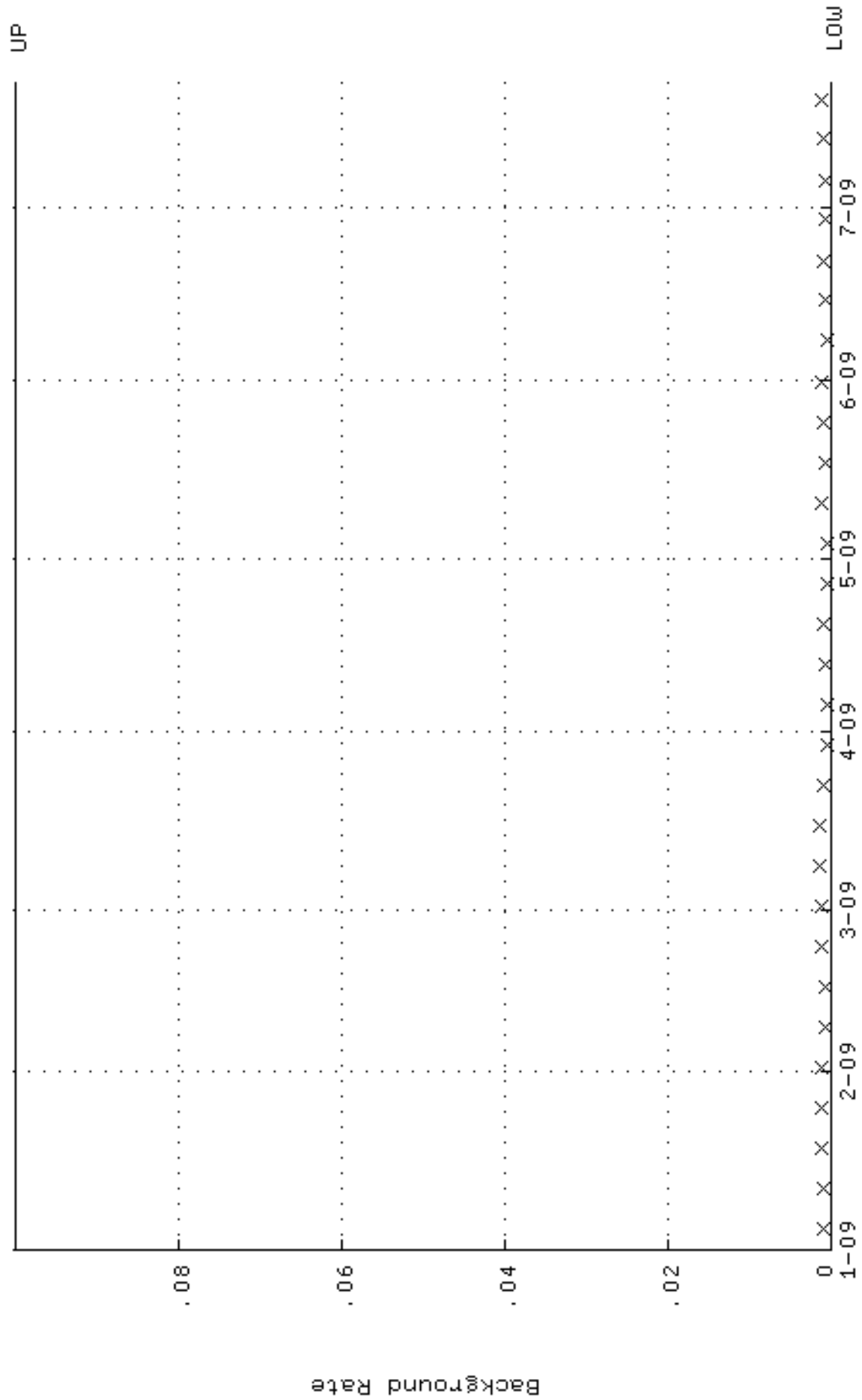
QA filename : DKA100:[ENV\_ALPHA.QA.W]W194.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:32:05 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.246760 through 0.266760



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-JUL-2009 12:00:00  
 Lower/Upper Lmts: 86.0376 through 95.0942

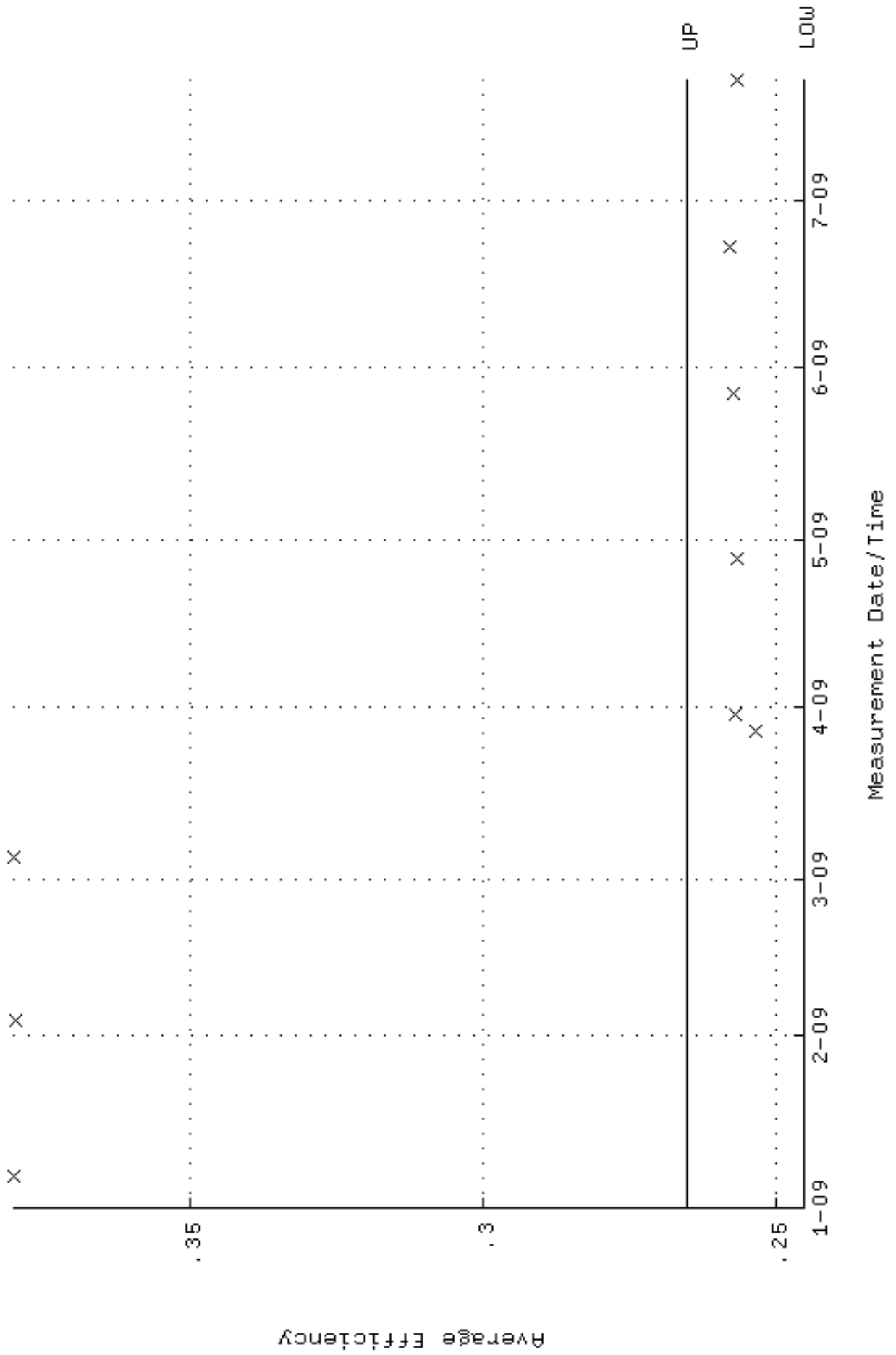


QA filename : DKA100:[ENV\_ALPHA.QA.B]B194.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:27:10 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

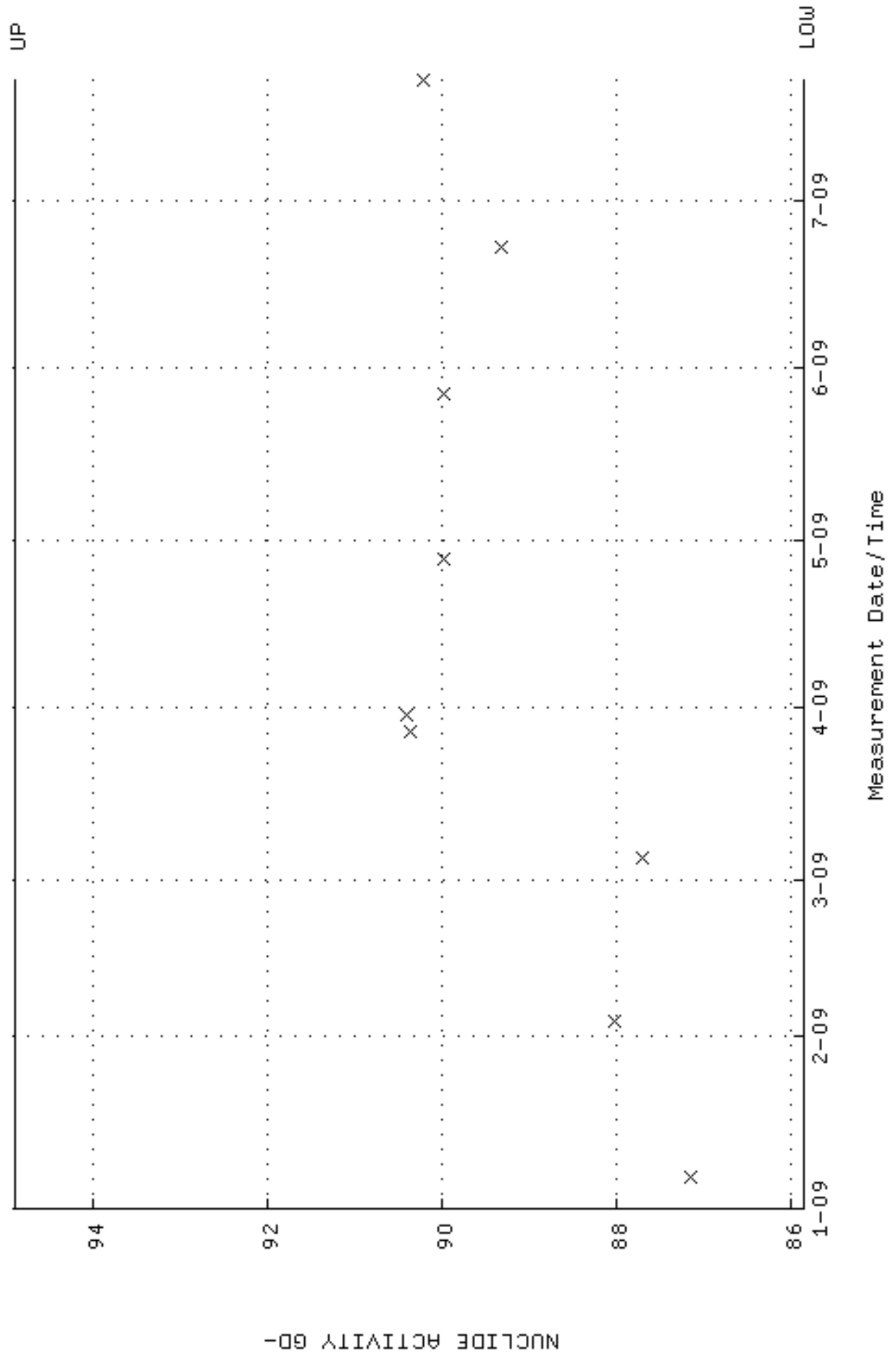




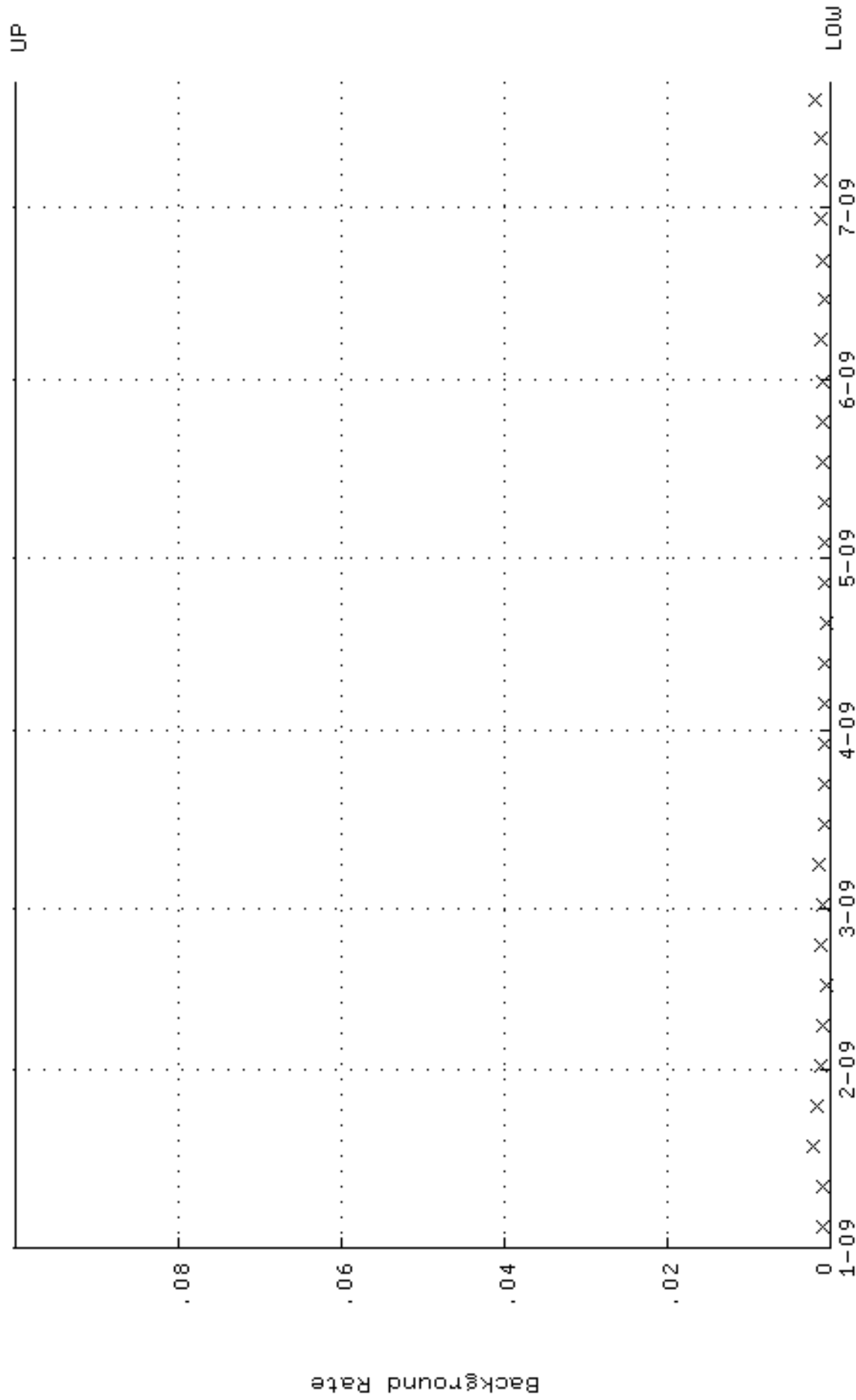
QA filename : DKA100:[ENV\_ALPHA.QA.W]W196.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:32:14 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.245168 through 0.265168



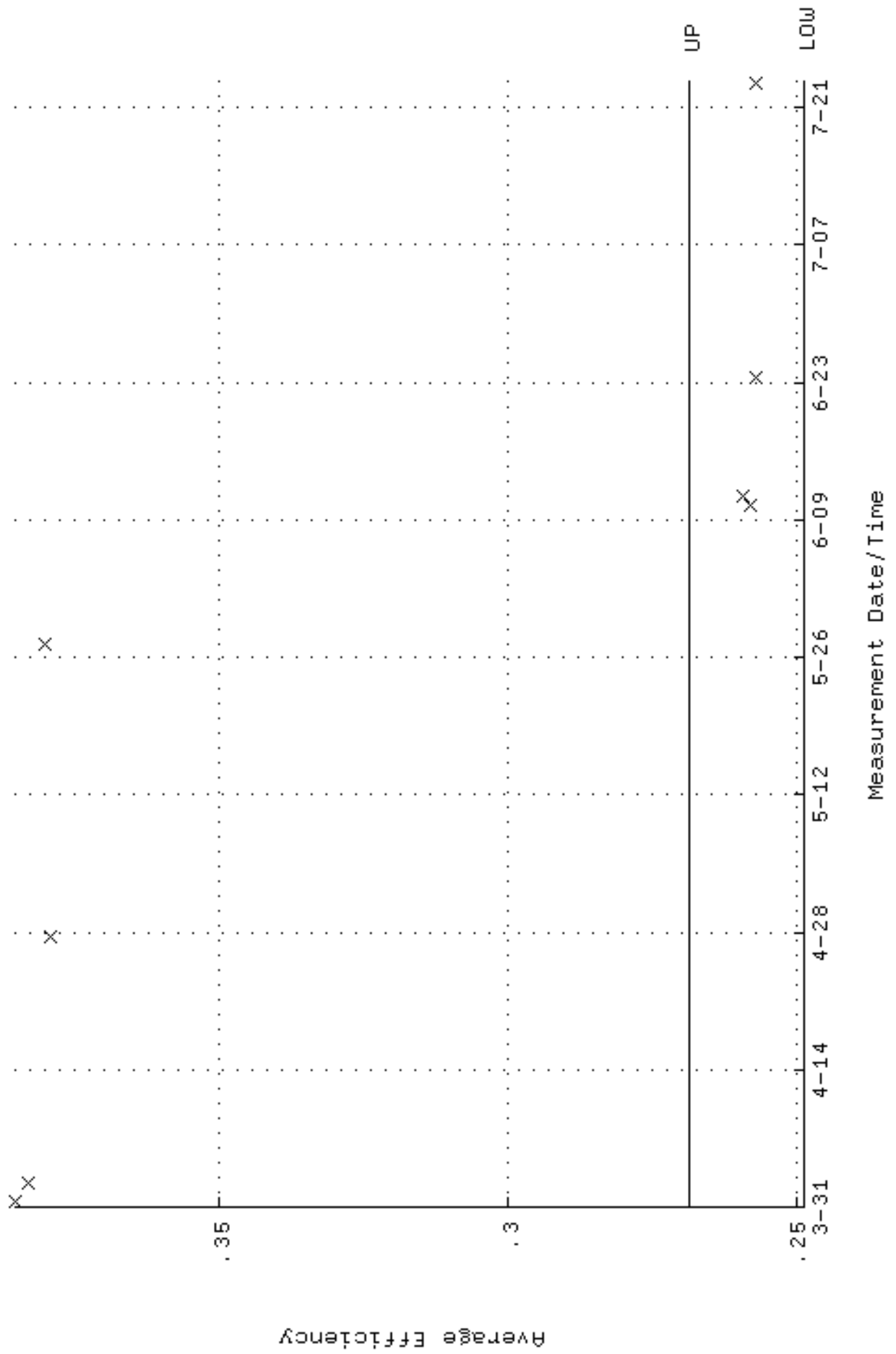
QA filename : DKA100:[ENV\_ALPHA.QA.W]w196.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:32:14 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.8592 through 94.8970



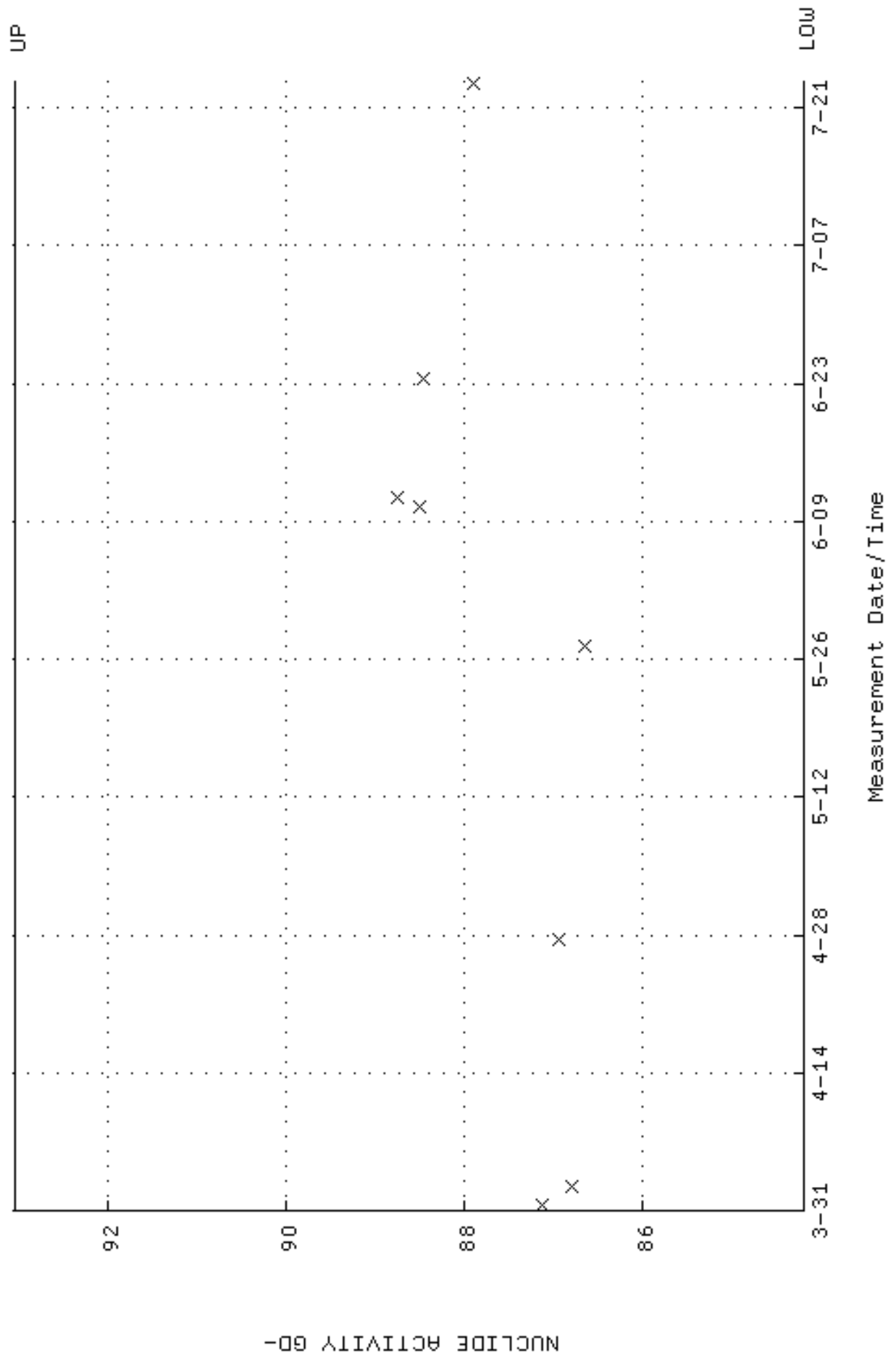
QA filename : DKA100:[ENV\_ALPHA.QA.B]B196.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:27:18 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



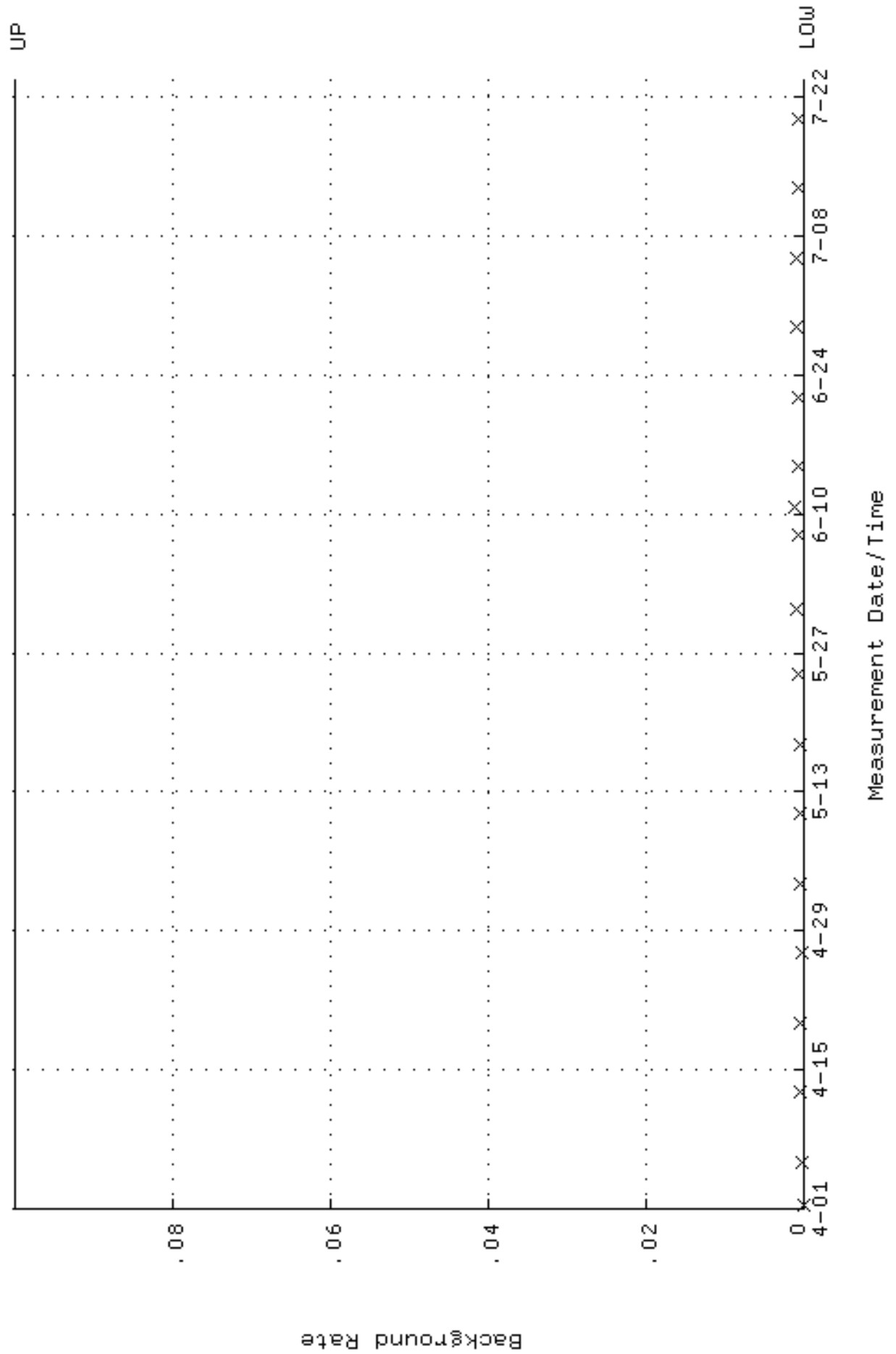
QA filename : DKA100:[ENV\_ALPHA.QA.W]W197.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:03:56 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.248572 through 0.268572



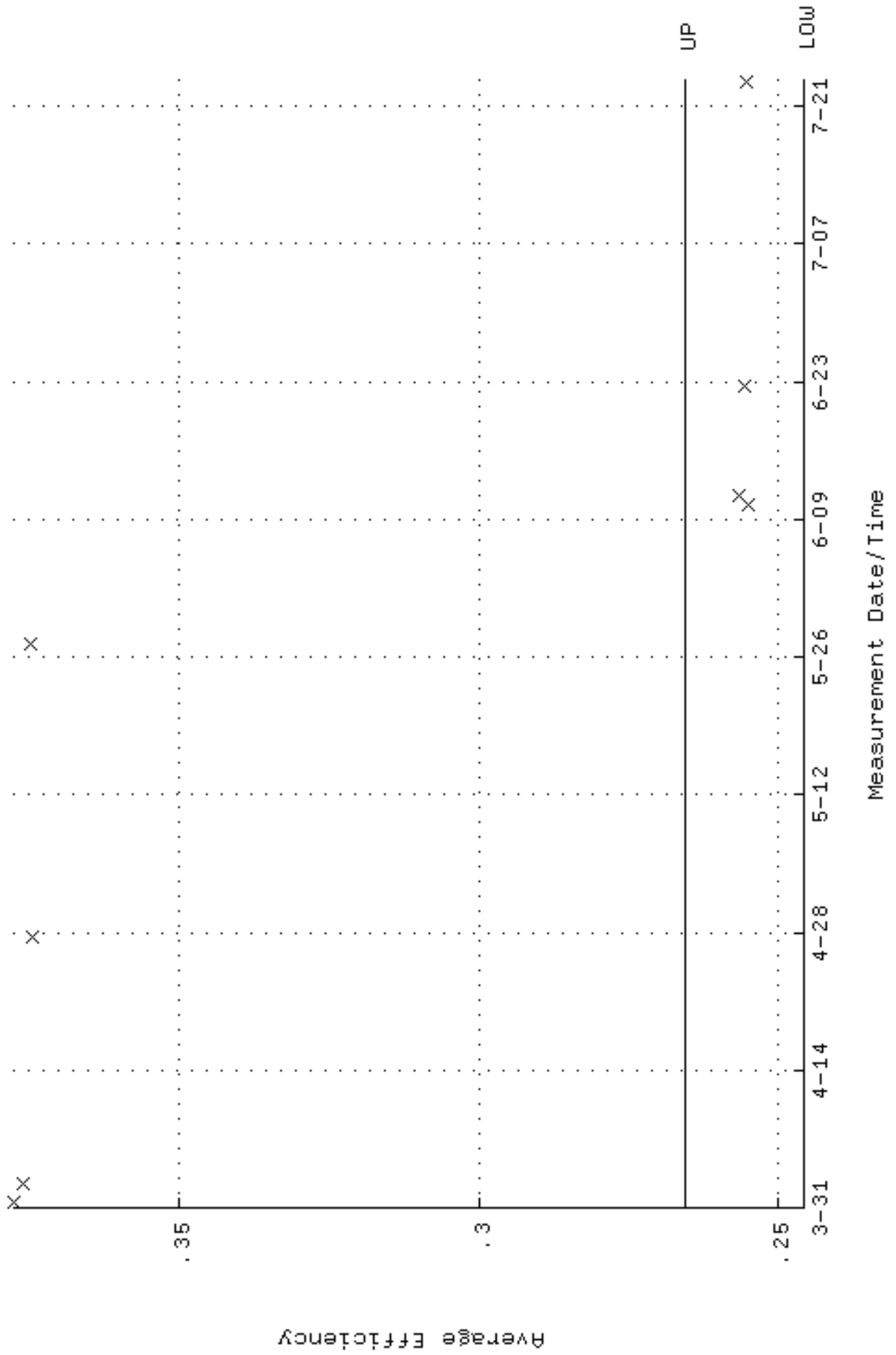
QA filename : DKA100:[ENV\_ALPHA.QA.W]W197.QAF;1  
 Parameter Name : NACTIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:03:56 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.1772 through 93.0380



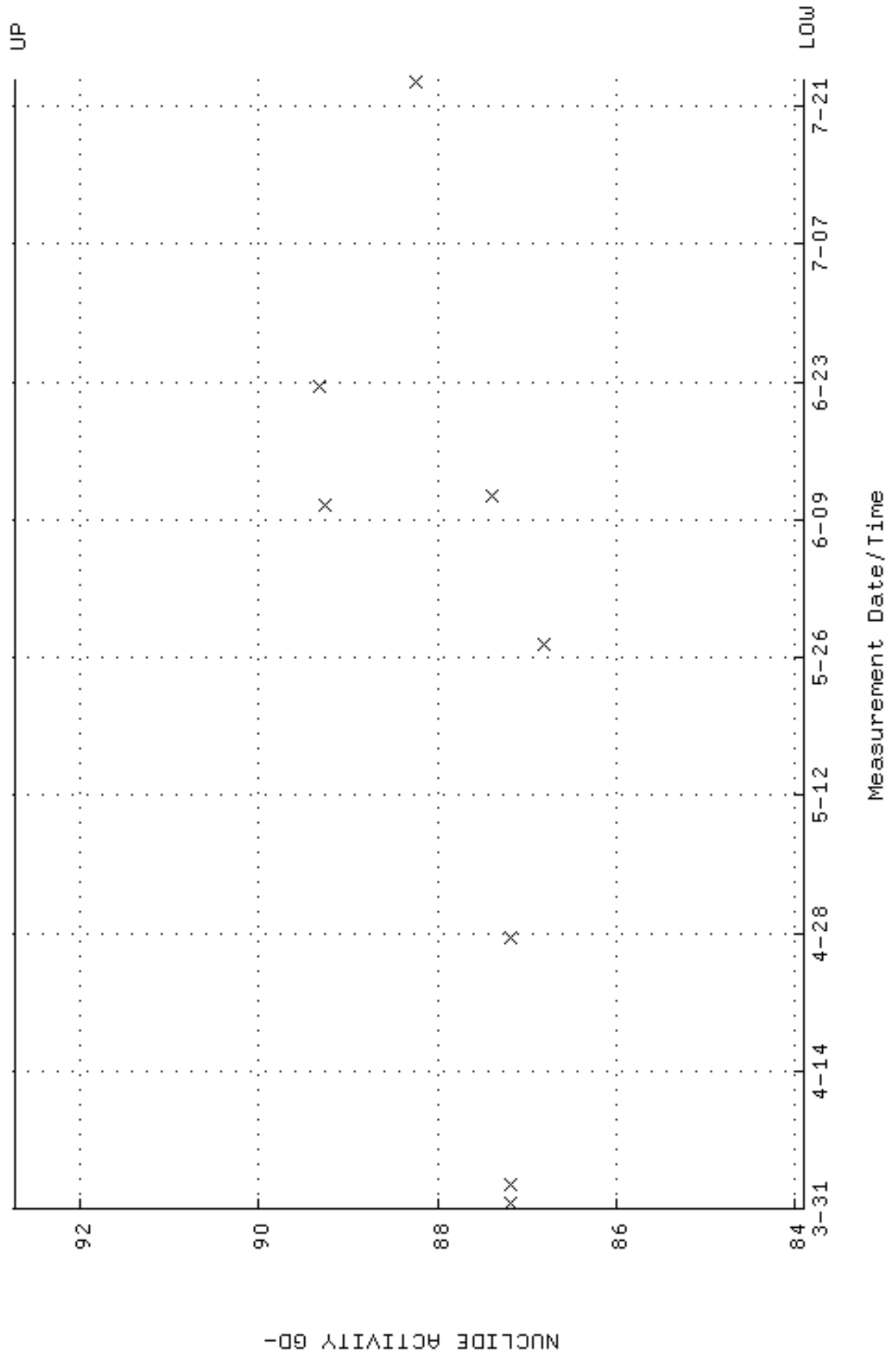
QA filename : DKA100:[ENV\_ALPHA.QA.B]B197.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:18 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



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 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.245817 through 0.265817

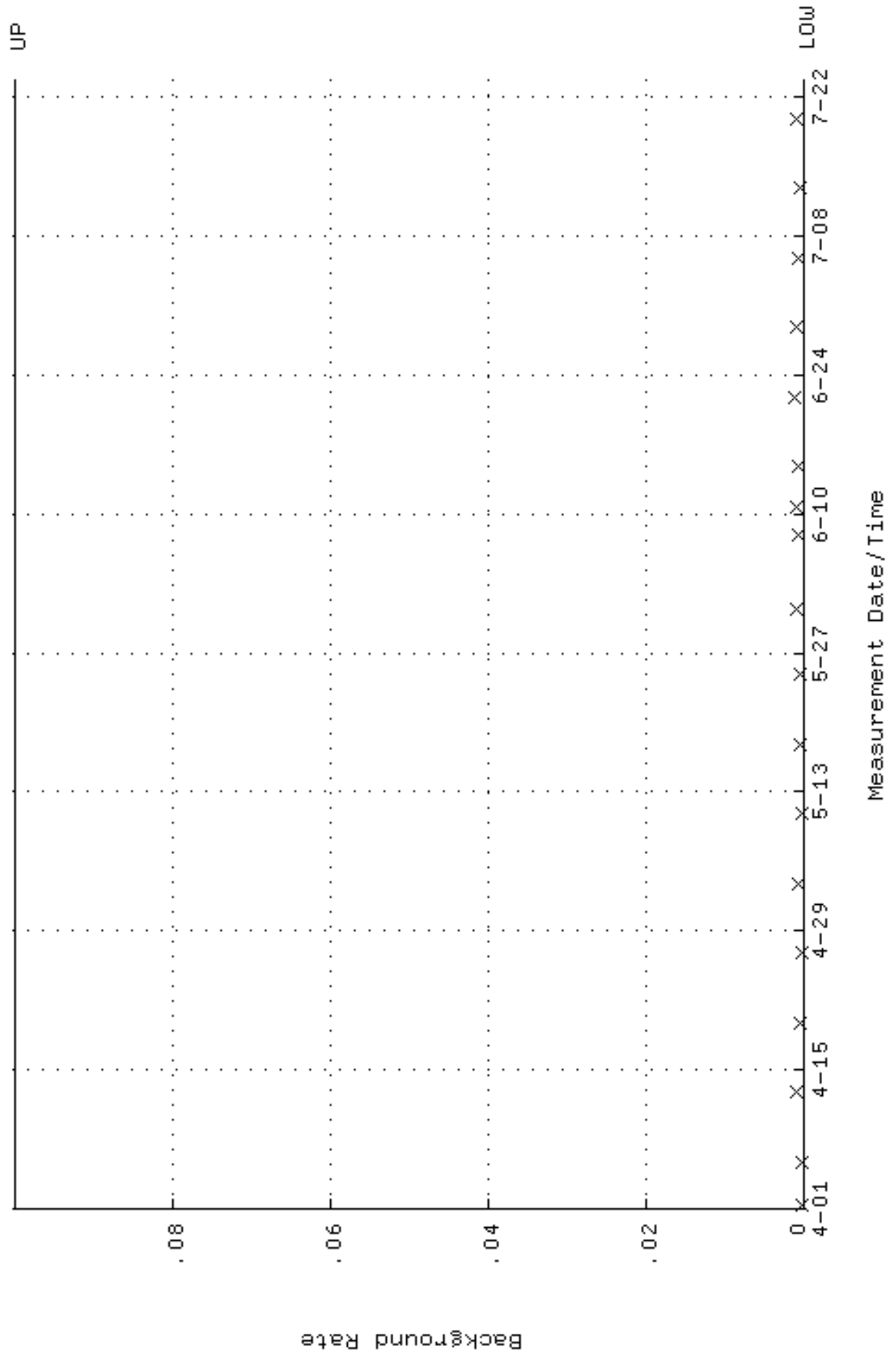


QA filename : DKA100:[ENV\_ALPHA.QA.W]W198.QAF;1  
 Parameter Name : NACTIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:06:01 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 83.8978 through 92.7292

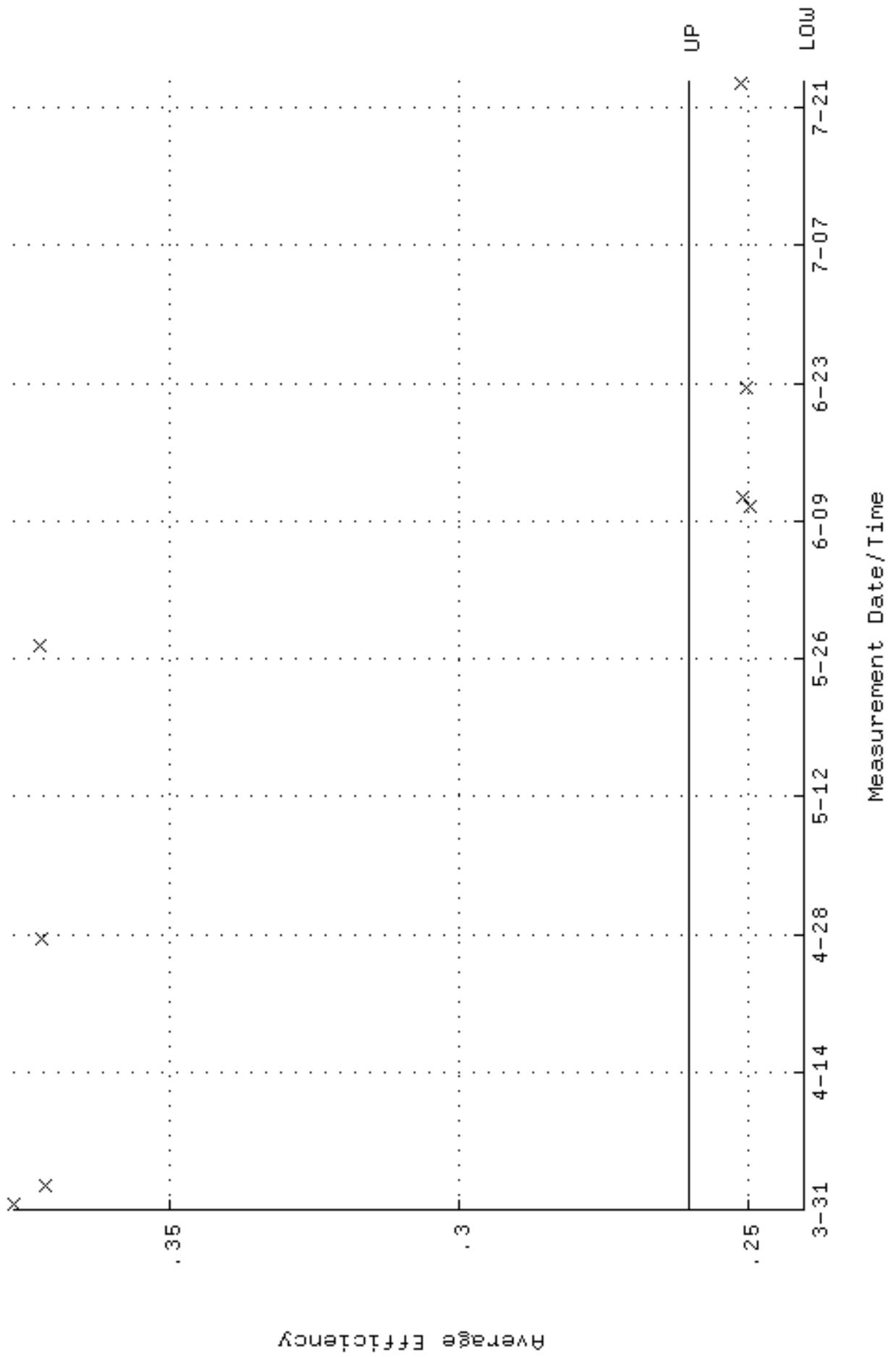




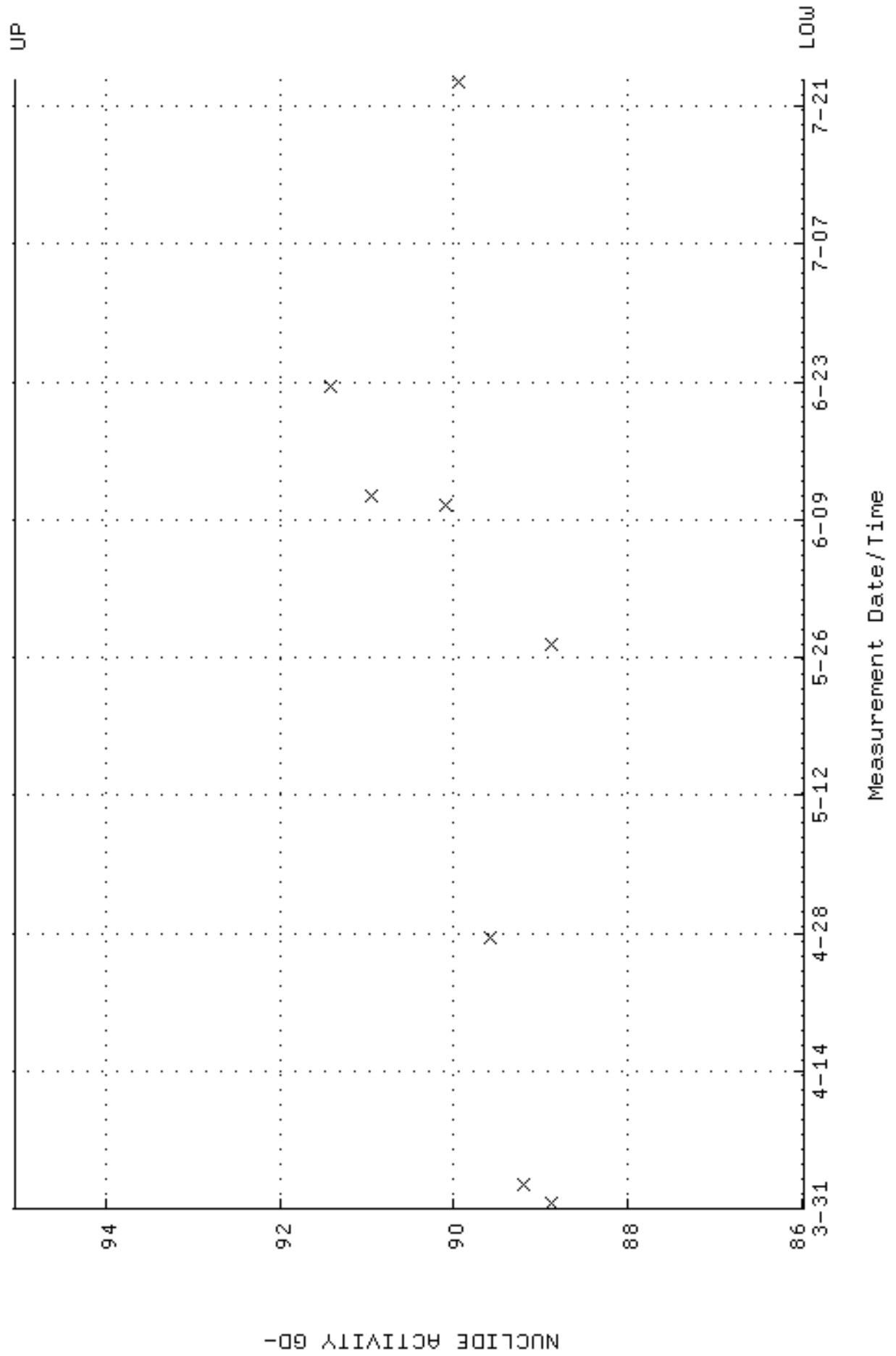
QA filename : DKA100:[ENV\_ALPHA.QA.B]B198.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:23 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



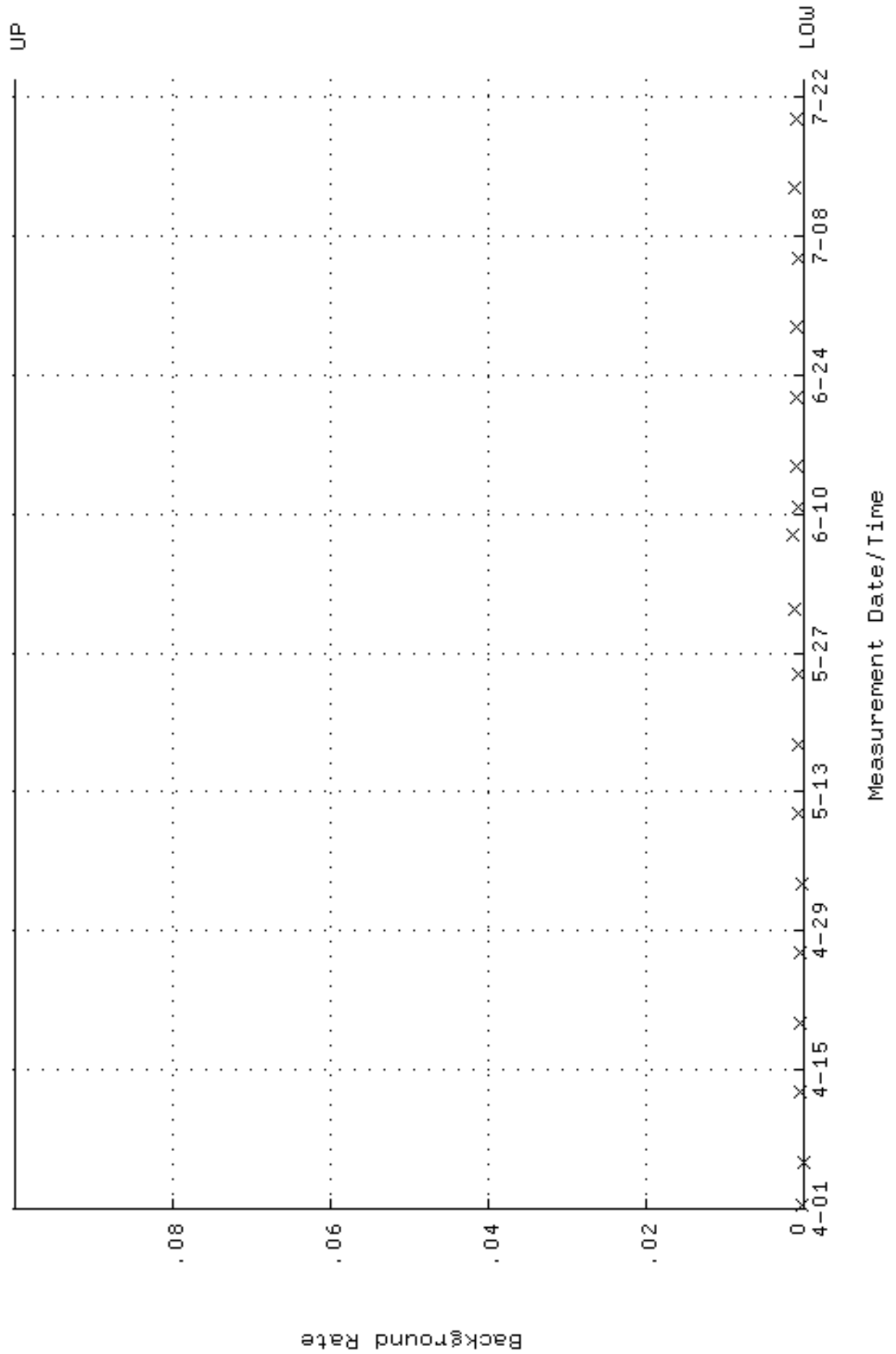
QA filename : DKA100:[ENV\_ALPHA.QA.W]W199.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:22 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.240278 through 0.260278



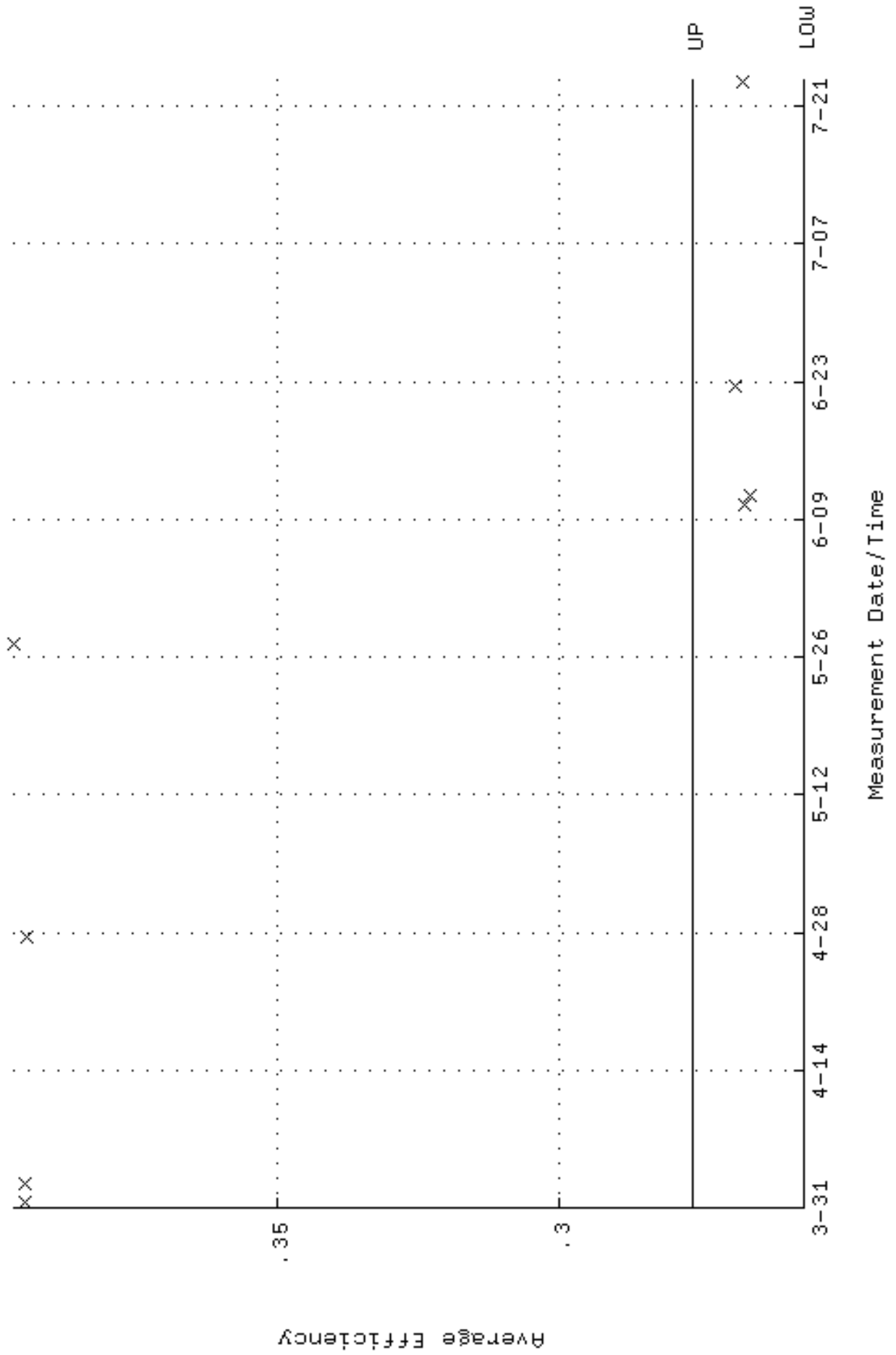
QA filename : DKA100:[ENV\_ALPHA.QA.W]w199.QAF;1  
Parameter Name : NACTIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 31-MAR-2009 15:10:22 through 23-JUL-2009 12:00:00  
Lower/Upper Lmts: 85.9853 through 95.0363



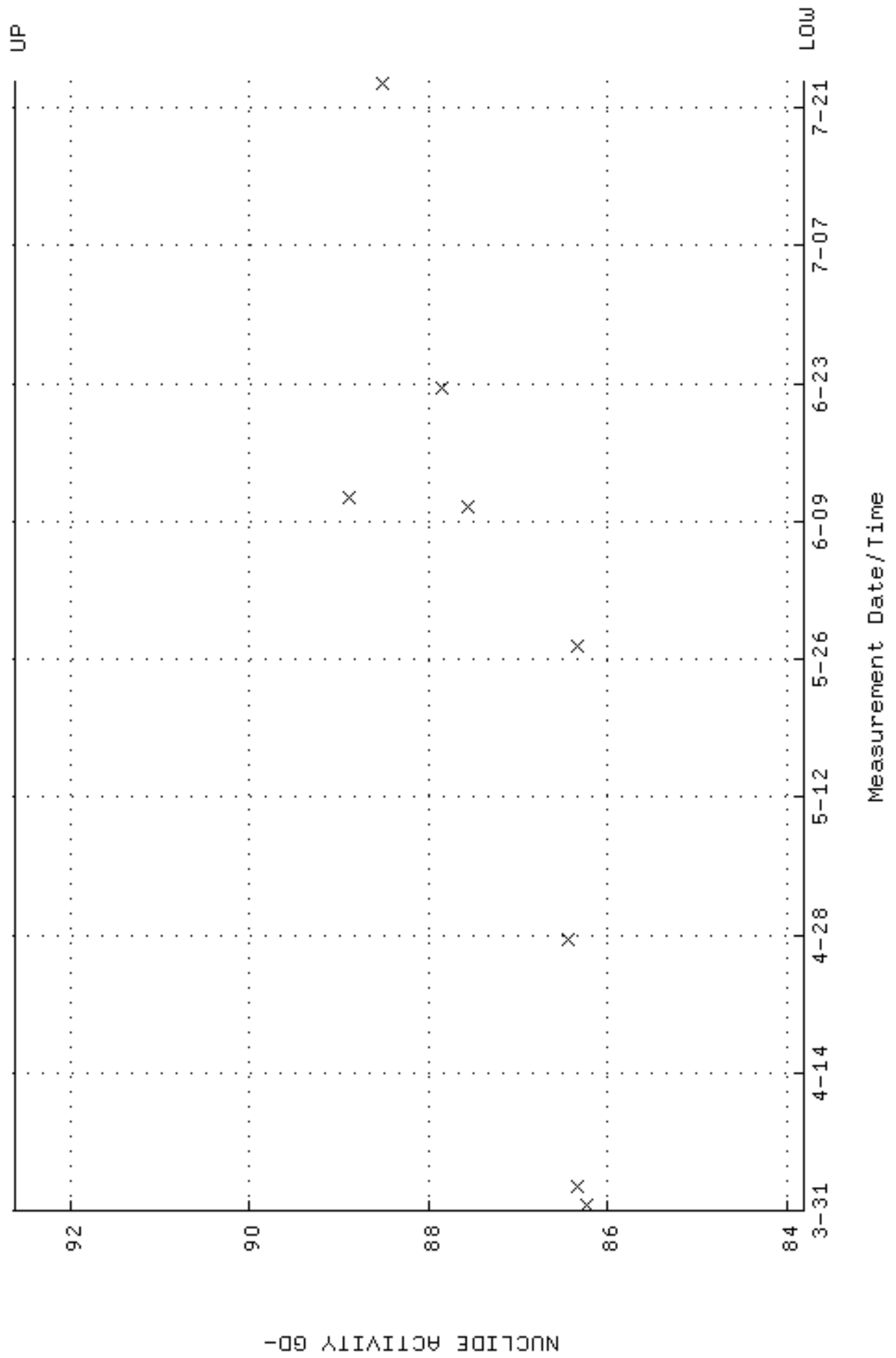
QA filename : DKA100:[ENV\_ALPHA.QA.B]B199.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:28 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



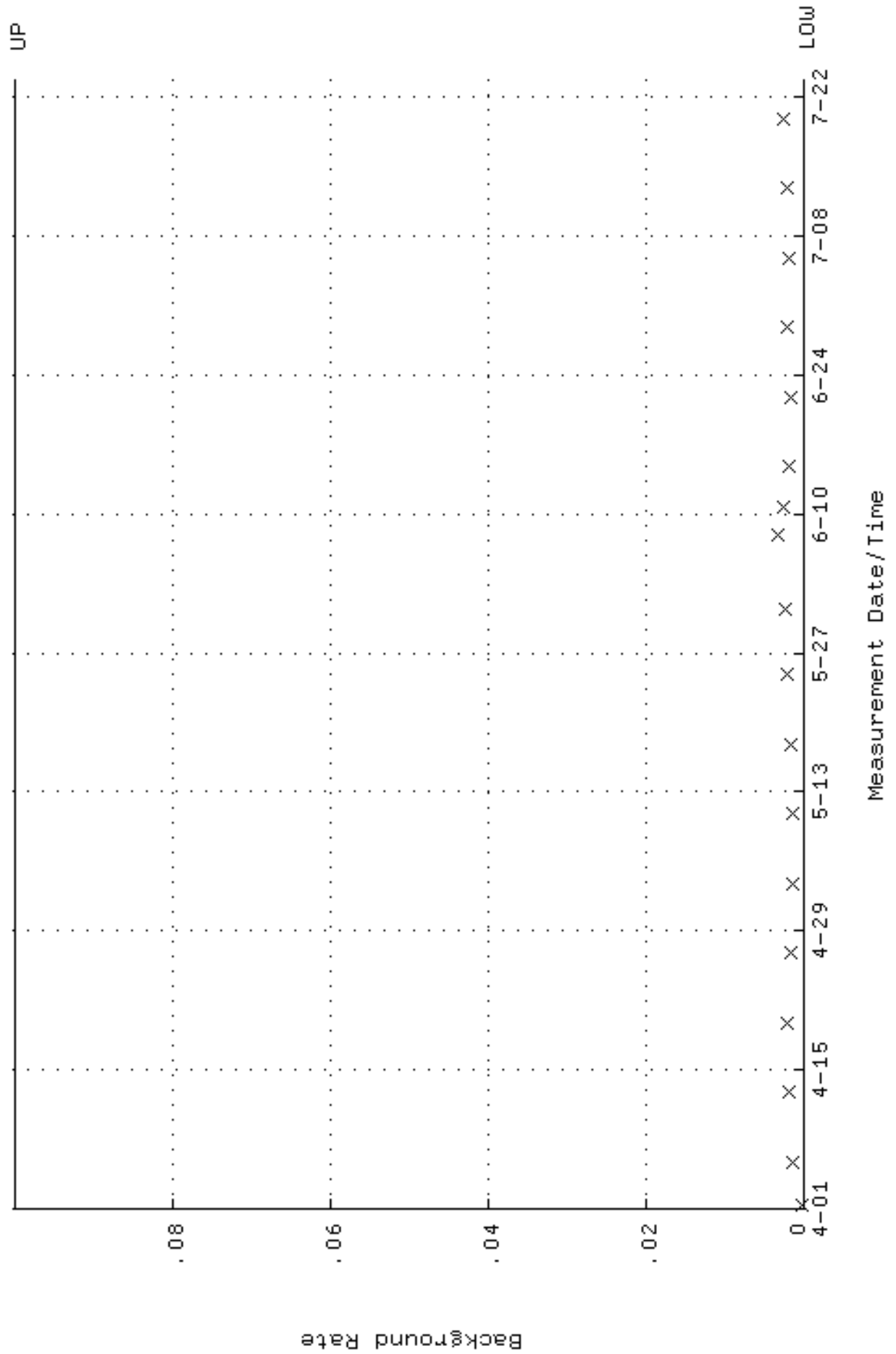
QA filename : DKA100:[ENV\_ALPHA.QA.W]W200.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:24 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.256586 through 0.276586



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 23-JUL-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 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



# RUNLOGS



# Instrument Run Log

Instrument Type: GFPC

Batch ID: 882963

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232727002	SAMPLE	JXC5	PIC1B	16-JUL-09 16:39	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727003	SAMPLE	JXC5	PIC2A	16-JUL-09 16:39	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727004	SAMPLE	JXC5	PIC2C	16-JUL-09 16:39	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727018	SAMPLE	JXC5	PIC11C	16-JUL-09 16:39	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727019	SAMPLE	JXC5	PIC11D	16-JUL-09 16:39	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727006	SAMPLE	JXC5	PIC5A	16-JUL-09 16:40	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727007	SAMPLE	JXC5	PIC3D	16-JUL-09 16:40	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201875411	MB	JXC5	PIC13A	16-JUL-09 16:40	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727008	SAMPLE	JXC5	PIC4A	16-JUL-09 16:40	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201875413	MS	JXC5	PIC14B	16-JUL-09 16:40	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201875414	LCS	JXC5	PIC14D	16-JUL-09 16:40	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727009	SAMPLE	JXC5	PIC5C	16-JUL-09 16:40	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727010	SAMPLE	JXC5	PIC6B	16-JUL-09 16:40	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727011	SAMPLE	JXC5	PIC8A	16-JUL-09 16:41	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727012	SAMPLE	JXC5	PIC8C	16-JUL-09 16:41	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727014	SAMPLE	JXC5	PIC9C	16-JUL-09 16:41	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727016	SAMPLE	JXC5	PIC10C	16-JUL-09 16:42	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727017	SAMPLE	JXC5	PIC10D	16-JUL-09 16:42	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201875412	DUP	JXC5	PIC9B	16-JUL-09 20:31	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727001	SAMPLE	JXC5	PIC7A	16-JUL-09 20:31	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727005	SAMPLE	JXC5	PIC7B	16-JUL-09 20:31	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727013	SAMPLE	JXC5	PIC7C	16-JUL-09 20:31	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727015	SAMPLE	JXC5	PIC7D	16-JUL-09 20:31	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727020	SAMPLE	JXC5	PIC9A	16-JUL-09 20:31	DONE	CeF on 25mm Filter	02-JUL-09 00:00

# Instrument Run Log

Instrument Type: LUCAS CELL DETECTOR

Batch ID: 883008

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232727001	SAMPLE	KSD1	LUCAS1	27-JUL-09 17:50	DONE	Lucas Cell	29-AUG-08 00:00
232727002	SAMPLE	KSD1	LUCAS2	27-JUL-09 17:50	DONE	Lucas Cell	19-DEC-08 00:00
232727003	SAMPLE	KSD1	LUCAS3	27-JUL-09 17:50	DONE	Lucas Cell	04-FEB-09 00:00
232727004	SAMPLE	KSD1	LUCAS4	27-JUL-09 17:50	DONE	Lucas Cell	02-MAR-09 00:00
232727005	SAMPLE	KSD1	LUCAS5	27-JUL-09 17:50	DONE	Lucas Cell	25-MAR-09 00:00
232727006	SAMPLE	KSD1	LUCAS7	27-JUL-09 17:50	DONE	Lucas Cell	21-NOV-08 00:00
232727007	SAMPLE	KSD1	LUCAS1	27-JUL-09 18:25	DONE	Lucas Cell	29-AUG-08 00:00
232727008	SAMPLE	KSD1	LUCAS2	27-JUL-09 18:25	DONE	Lucas Cell	19-DEC-08 00:00
232727009	SAMPLE	KSD1	LUCAS3	27-JUL-09 18:25	DONE	Lucas Cell	04-FEB-09 00:00
232727010	SAMPLE	KSD1	LUCAS4	27-JUL-09 18:25	DONE	Lucas Cell	02-MAR-09 00:00
232727011	SAMPLE	KSD1	LUCAS5	27-JUL-09 18:25	DONE	Lucas Cell	25-MAR-09 00:00
232727012	SAMPLE	KSD1	LUCAS7	27-JUL-09 18:25	DONE	Lucas Cell	21-NOV-08 00:00
232727013	SAMPLE	KSD1	LUCAS1	27-JUL-09 18:55	DONE	Lucas Cell	29-AUG-08 00:00
232727014	SAMPLE	KSD1	LUCAS2	27-JUL-09 18:55	DONE	Lucas Cell	19-DEC-08 00:00
232727015	SAMPLE	KSD1	LUCAS3	27-JUL-09 18:55	DONE	Lucas Cell	04-FEB-09 00:00
232727016	SAMPLE	KSD1	LUCAS4	27-JUL-09 18:55	DONE	Lucas Cell	02-MAR-09 00:00
232727017	SAMPLE	KSD1	LUCAS5	27-JUL-09 18:55	DONE	Lucas Cell	25-MAR-09 00:00
232727018	SAMPLE	KSD1	LUCAS7	27-JUL-09 18:55	DONE	Lucas Cell	21-NOV-08 00:00
232727019	SAMPLE	KSD1	LUCAS1	27-JUL-09 19:30	DONE	Lucas Cell	29-AUG-08 00:00
232727020	SAMPLE	KSD1	LUCAS2	27-JUL-09 19:30	DONE	Lucas Cell	19-DEC-08 00:00
1201875553	MB	KSD1	LUCAS3	27-JUL-09 19:30	DONE	Lucas Cell	04-FEB-09 00:00
1201875554	DUP	KSD1	LUCAS4	27-JUL-09 19:30	DONE	Lucas Cell	02-MAR-09 00:00
1201875555	MS	KSD1	LUCAS5	27-JUL-09 19:30	DONE	Lucas Cell	25-MAR-09 00:00
1201875556	LCS	KSD1	LUCAS7	27-JUL-09 19:30	DONE	Lucas Cell	21-NOV-08 00:00

# Instrument Run Log

Instrument Type: LUCAS CELL DETECTOR

Batch ID: 883675

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232135001	SAMPLE	KSD1	LUCAS2	14-JUL-09 13:10	DONE	Lucas Cell	19-DEC-08 00:00
232135002	SAMPLE	KSD1	LUCAS3	14-JUL-09 13:10	DONE	Lucas Cell	04-FEB-09 00:00
232135004	SAMPLE	KSD1	LUCAS4	14-JUL-09 13:10	DONE	Lucas Cell	02-MAR-09 00:00
232135005	SAMPLE	KSD1	LUCAS5	14-JUL-09 13:10	DONE	Lucas Cell	25-MAR-09 00:00
232135006	SAMPLE	KSD1	LUCAS7	14-JUL-09 13:10	DONE	Lucas Cell	21-NOV-08 00:00
232135007	SAMPLE	KSD1	LUCAS1	14-JUL-09 13:55	DONE	Lucas Cell	29-AUG-08 00:00
232135008	SAMPLE	KSD1	LUCAS2	14-JUL-09 13:55	DONE	Lucas Cell	19-DEC-08 00:00
232135009	SAMPLE	KSD1	LUCAS3	14-JUL-09 13:55	DONE	Lucas Cell	04-FEB-09 00:00
232135010	SAMPLE	KSD1	LUCAS4	14-JUL-09 13:55	DONE	Lucas Cell	02-MAR-09 00:00
232135011	SAMPLE	KSD1	LUCAS5	14-JUL-09 13:55	DONE	Lucas Cell	25-MAR-09 00:00
232135012	SAMPLE	KSD1	LUCAS7	14-JUL-09 13:55	DONE	Lucas Cell	21-NOV-08 00:00
232135013	SAMPLE	KSD1	LUCAS1	14-JUL-09 14:30	DONE	Lucas Cell	29-AUG-08 00:00
232395021	SAMPLE	KSD1	LUCAS2	14-JUL-09 14:30	DONE	Lucas Cell	19-DEC-08 00:00
232135015	SAMPLE	KSD1	LUCAS3	14-JUL-09 14:30	DONE	Lucas Cell	04-FEB-09 00:00
232135016	SAMPLE	KSD1	LUCAS4	14-JUL-09 14:30	DONE	Lucas Cell	02-MAR-09 00:00
232135017	SAMPLE	KSD1	LUCAS5	14-JUL-09 14:30	DONE	Lucas Cell	25-MAR-09 00:00
232135018	SAMPLE	KSD1	LUCAS7	14-JUL-09 14:30	DONE	Lucas Cell	21-NOV-08 00:00
232135019	SAMPLE	KSD1	LUCAS1	14-JUL-09 15:05	DONE	Lucas Cell	29-AUG-08 00:00
232727021	SAMPLE	KSD1	LUCAS2	14-JUL-09 15:05	DONE	Lucas Cell	19-DEC-08 00:00
1201877244	MB	KSD1	LUCAS3	14-JUL-09 15:05	DONE	Lucas Cell	04-FEB-09 00:00
1201877245	DUP	KSD1	LUCAS4	14-JUL-09 15:05	DONE	Lucas Cell	02-MAR-09 00:00
1201877247	LCS	KSD1	LUCAS7	14-JUL-09 15:05	DONE	Lucas Cell	21-NOV-08 00:00
1201877246	MS	KSD1	LUCAS5	14-JUL-09 16:05	DONE	Lucas Cell	25-MAR-09 00:00

# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 884765

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232727001	SAMPLE	CXM2	1168	18-JUL-09 18:21	DONE		
232727002	SAMPLE	CXM2	1170	18-JUL-09 18:21	DONE		
232727003	SAMPLE	CXM2	1171	18-JUL-09 18:21	DONE		
232727004	SAMPLE	CXM2	1172	18-JUL-09 18:21	DONE		
232727005	SAMPLE	CXM2	1161	20-JUL-09 14:35	DONE		
232727006	SAMPLE	CXM2	1163	20-JUL-09 14:35	DONE		
232727007	SAMPLE	CXM2	1164	20-JUL-09 14:35	DONE		
232727008	SAMPLE	CXM2	1165	20-JUL-09 14:35	DONE		
232727009	SAMPLE	CXM2	1166	20-JUL-09 14:35	DONE		
232727010	SAMPLE	CXM2	1167	20-JUL-09 14:35	DONE		
232727011	SAMPLE	CXM2	1168	20-JUL-09 14:35	DONE		
232727012	SAMPLE	CXM2	1169	20-JUL-09 14:35	DONE		
232727013	SAMPLE	CXM2	1170	20-JUL-09 14:35	DONE		
232727014	SAMPLE	CXM2	1171	20-JUL-09 14:35	DONE		
232727015	SAMPLE	CXM2	1172	20-JUL-09 14:35	DONE		
232727016	SAMPLE	CXM2	1149	20-JUL-09 15:04	DONE		
232727017	SAMPLE	CXM2	1150	20-JUL-09 15:04	DONE		
232727018	SAMPLE	CXM2	1155	20-JUL-09 15:04	DONE		
232727019	SAMPLE	CXM2	1156	20-JUL-09 15:04	DONE		
232727020	SAMPLE	CXM2	1157	20-JUL-09 15:04	DONE		
1201879827	MB	CXM2	1158	20-JUL-09 15:04	DONE		
1201879828	DUP	CXM2	1159	20-JUL-09 15:04	DONE		
1201879829	MS	CXM2	1160	20-JUL-09 15:04	DONE		
1201879830	LCS	CXM2	1131	21-JUL-09 12:45	DONE		

# Instrument Run Log

Instrument Type: GFPC

Batch ID: 885330

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232135001	SAMPLE	MXS2	PIC1A	27-JUL-09 07:44	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201881212	MB	MXS2	PIC6D	27-JUL-09 07:44	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201881213	DUP	MXS2	PIC7A	27-JUL-09 07:44	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201881215	LCS	MXS2	PIC7C	27-JUL-09 07:45	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135002	SAMPLE	MXS2	PIC1C	27-JUL-09 07:45	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135004	SAMPLE	MXS2	PIC1D	27-JUL-09 07:45	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135005	SAMPLE	MXS2	PIC2A	27-JUL-09 07:45	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135006	SAMPLE	MXS2	PIC7D	27-JUL-09 07:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135008	SAMPLE	MXS2	PIC3A	27-JUL-09 07:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135009	SAMPLE	MXS2	PIC3B	27-JUL-09 07:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135010	SAMPLE	MXS2	PIC3C	27-JUL-09 07:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135011	SAMPLE	MXS2	PIC3D	27-JUL-09 07:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135012	SAMPLE	MXS2	PIC4A	27-JUL-09 07:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135013	SAMPLE	MXS2	PIC4C	27-JUL-09 07:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232395021	SAMPLE	MXS2	PIC4D	27-JUL-09 07:47	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135015	SAMPLE	MXS2	PIC5A	27-JUL-09 07:47	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135016	SAMPLE	MXS2	PIC5B	27-JUL-09 07:47	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135017	SAMPLE	MXS2	PIC5C	27-JUL-09 07:47	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135018	SAMPLE	MXS2	PIC5D	27-JUL-09 07:47	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135019	SAMPLE	MXS2	PIC8A	27-JUL-09 07:48	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232727021	SAMPLE	MXS2	PIC6B	27-JUL-09 07:48	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232135007	SAMPLE	MXS2	PIC12B	27-JUL-09 11:12	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201881214	MS	MXS2	PIC8A	27-JUL-09 16:06	DONE	CeF on 25mm Filter	02-JUL-09 00:00

# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 886957

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232135001	SAMPLE	CXM2	1137	23-JUL-09 21:51	DONE		
232135002	SAMPLE	CXM2	1138	23-JUL-09 21:51	DONE		
232135004	SAMPLE	CXM2	1139	23-JUL-09 21:51	DONE		
232135005	SAMPLE	CXM2	1140	23-JUL-09 21:51	DONE		
232135006	SAMPLE	CXM2	1141	23-JUL-09 21:51	DONE		
232135007	SAMPLE	CXM2	1142	23-JUL-09 21:52	DONE		
232135008	SAMPLE	CXM2	1144	23-JUL-09 21:52	DONE		
232135009	SAMPLE	CXM2	1145	23-JUL-09 21:52	DONE		
232135010	SAMPLE	CXM2	1146	23-JUL-09 21:52	DONE		
232135011	SAMPLE	CXM2	1147	23-JUL-09 21:52	DONE		
232135012	SAMPLE	CXM2	1148	23-JUL-09 21:52	DONE		
232135013	SAMPLE	CXM2	1149	23-JUL-09 21:52	DONE		
232135015	SAMPLE	CXM2	1150	23-JUL-09 21:52	DONE		
232135016	SAMPLE	CXM2	1151	23-JUL-09 21:52	DONE		
232135017	SAMPLE	CXM2	1152	23-JUL-09 21:52	DONE		
232135018	SAMPLE	CXM2	1153	23-JUL-09 21:52	DONE		
232135019	SAMPLE	CXM2	1154	23-JUL-09 21:52	DONE		
232395021	SAMPLE	CXM2	1155	23-JUL-09 21:52	DONE		
232727021	SAMPLE	CXM2	1156	23-JUL-09 21:52	DONE		
1201885396	MB	CXM2	1157	23-JUL-09 21:52	DUSE		
1201885397	DUP	CXM2	1158	23-JUL-09 21:52	DONE		
1201885400	MS	CXM2	1159	23-JUL-09 21:52	DONE		
1201885403	LCS	CXM2	1160	23-JUL-09 21:52	DONE		
1201885396	MB	CXM2	1140	27-JUL-09 12:10	DONE		

# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 888328

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232135001	SAMPLE	CXM2	1173	28-JUL-09 11:56	DONE		
232135008	SAMPLE	CXM2	1174	28-JUL-09 11:56	DONE		
232135002	SAMPLE	CXM2	1175	28-JUL-09 11:56	DONE		
232135009	SAMPLE	CXM2	1176	28-JUL-09 11:56	DONE		
232135004	SAMPLE	CXM2	1177	28-JUL-09 11:56	DONE		
232135010	SAMPLE	CXM2	1178	28-JUL-09 11:56	DONE		
232135005	SAMPLE	CXM2	1179	28-JUL-09 11:56	DONE		
232135011	SAMPLE	CXM2	1180	28-JUL-09 11:56	DONE		
232135006	SAMPLE	CXM2	1181	28-JUL-09 11:56	DONE		
232135012	SAMPLE	CXM2	1182	28-JUL-09 11:56	DONE		
232135007	SAMPLE	CXM2	1183	28-JUL-09 11:56	DONE		
232135013	SAMPLE	CXM2	1184	28-JUL-09 11:56	DONE		
232135015	SAMPLE	CXM2	1185	28-JUL-09 11:56	DONE		
232727021	SAMPLE	CXM2	1186	28-JUL-09 11:56	DONE		
232135016	SAMPLE	CXM2	1187	28-JUL-09 11:56	DONE		
233587015	SAMPLE	CXM2	1188	28-JUL-09 11:56	DONE		
232135017	SAMPLE	CXM2	1189	28-JUL-09 11:56	DONE		
1201888813	MB	CXM2	1190	28-JUL-09 11:56	DONE		
232135018	SAMPLE	CXM2	1191	28-JUL-09 11:57	DONE		
1201888814	DUP	CXM2	1192	28-JUL-09 11:57	DONE		
232135019	SAMPLE	CXM2	1193	28-JUL-09 11:57	DONE		
1201888818	MS	CXM2	1194	28-JUL-09 11:57	DONE		
232395021	SAMPLE	CXM2	1195	28-JUL-09 11:57	DONE		
1201888822	LCS	CXM2	1196	28-JUL-09 11:57	DONE		

# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 888783

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232727001	SAMPLE	CXM2	1175	29-JUL-09 17:12	DONE		
232727002	SAMPLE	CXM2	1176	29-JUL-09 17:12	DONE		
232727003	SAMPLE	CXM2	1177	29-JUL-09 17:12	DONE		
232727004	SAMPLE	CXM2	1178	29-JUL-09 17:12	DONE		
232727005	SAMPLE	CXM2	1179	29-JUL-09 17:12	DONE		
232727006	SAMPLE	CXM2	1180	29-JUL-09 17:12	DONE		
232727007	SAMPLE	CXM2	1181	29-JUL-09 17:12	DONE		
232727008	SAMPLE	CXM2	1182	29-JUL-09 17:12	DONE		
232727009	SAMPLE	CXM2	1183	29-JUL-09 17:12	DONE		
232727010	SAMPLE	CXM2	1184	29-JUL-09 17:12	DONE		
232727011	SAMPLE	CXM2	1185	29-JUL-09 17:12	DONE		
232727012	SAMPLE	CXM2	1186	29-JUL-09 17:12	DONE		
232727013	SAMPLE	CXM2	1187	29-JUL-09 17:12	DONE		
232727014	SAMPLE	CXM2	1188	29-JUL-09 17:12	DONE		
232727015	SAMPLE	CXM2	1189	29-JUL-09 17:12	DONE		
232727016	SAMPLE	CXM2	1190	29-JUL-09 17:12	DONE		
232727017	SAMPLE	CXM2	1191	29-JUL-09 17:12	DONE		
232727018	SAMPLE	CXM2	1192	29-JUL-09 17:12	DONE		
232727019	SAMPLE	CXM2	1193	29-JUL-09 17:12	DONE		
232727020	SAMPLE	CXM2	1194	29-JUL-09 17:12	DONE		
1201890003	MB	CXM2	1197	29-JUL-09 17:12	DONE		
1201890004	DUP	CXM2	1198	29-JUL-09 17:13	DONE		
1201890005	MS	CXM2	1199	29-JUL-09 17:13	DONE		
1201890006	LCS	CXM2	1200	29-JUL-09 17:13	DONE		