



August 12, 2009

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

Re: Tronox Henderson  
Work Order: 232764

Dear Mr. Hagar:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 02, 2009, July 07, 2009, July 08, 2009, July 09, 2009, July 10, 2009, July 11, 2009, July 14, 2009, July 15, 2009 and July 16, 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: 2027.001.00168, 2027.001.00194, 2027.001.00195, 2027.001.00196, 2027.001.00209,  
2027.001.00210, 2027.001.00220, 2027.001.002450, 2027.001.00249, 2027.001.00263 and 2027.001.00267  
Enclosures

**Tronox LLC**  
**Tronox Henderson**  
**SDG:232764**

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# **Case Narrative**



**CASE NARRATIVE**  
**for**  
**Tronox LLC**  
**Tronox Henderson**  
**SDG:232764**

**August 12, 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 02, 2009, July 07, 2009, July 08, 2009, July 09, 2009, July 10, 2009, July 11, 2009, July 14, 2009, July 15, 2009 and July 16, 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. Samples EB070809-SO and EB071009-SO were initially logged under this SDG, but removed and added to existing soil SDGs to be reported separately. The last sample of this SDG was received on July 16, 2009 at which time the SDG was closed. The client was notified through receipt of login review checklist and in the weekly status report. Please see the attached e-mails for further details on all issues.

**Items of Note**

For additional details, please refer to the attached e-mails for reference. For Ra226, 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: 232764003 and 232764004. 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: 232764007, 232764016, 232764017. 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: 232764008, 232764010, 232764011. The following samples do not meet the Tronox QA program tracer yield requirements of 70-120% for Alpha Spec Uranium: 232764017. The following samples do not meet the Tronox QA program required detection limits for U235/236 analysis due to reduced aliquot size: 232764015. The following samples do not meet the Tronox QA program required detection limits for Alpha Spec Thorium: 232764001, 232764014, 232764002, 232764003, 232764004, 232764007, 232764010, 232764013, 232764011, and 232764016. The following samples do not meet the Tronox QA program tracer yield requirements of 70-120% for Alpha Spec Thorium: 232764003, 232764004, 232764005, 232764007, 232764009, 232764010, 232764011, 232764015, 232764016.

**Sample Identification**

The laboratory received the following samples:

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
232764001	M-110B
232764002	M-110BDISS
232764003	I-ARB
232764004	M-117B

232764005	M-120B
232764007	M-103B
232764008	M-118B
232764009	M-121B
232764010	M-10B
232764011	M-10BDISS
232764013	H-11B
232764014	H-11BDISS
232764015	TR-10B
232764016	TR-8B
232764017	M-92B

### **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**

2327041



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. 2027.001.00168  
Page: 1 of 1  
Cooler # 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				<input checked="" type="checkbox"/>			
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)260-9293		QC level Required: Standard		Special EPA Stage 4	
Lab PM: Edith M. Kent		City: Henderson		State: NV		Reimbursement project? <input checked="" type="checkbox"/>		Non-reimbursement project? <input type="checkbox"/>		Mark one	
Phone/Fax: (843)556-8171		Site PM Name: Derrick Willis		Send EDD to: frank.hagar@ngem.com		Send EDD to: frank.hagar@ngem.com		NJ Reduced Deliverable Package?			
Lab PM email: emk@gel.com		Phone/Fax: 949-376-7004		CC Hardcopy report to: PDF Electronic Version Only		CC Hardcopy report to: see additional comments below		MA MCP Cert? <input type="checkbox"/>		CT RCP Cert? <input type="checkbox"/>	
Applicable Lab Quote #:		Site PM Email: derrick.willis@ngem.com						Lab Project ID (lab use)			
ITEM #	SAMPLE ID	Character per box. (A-Z, 0-9 /, -)	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	FIELD FILTERED? (Y/N)	Preservatives	Requested	Comments/Lab Sample I.D.	
1	M-110B	One	WG	7/1/2009	9:00	1	N	Unpreserved H2SO4 HNO3 HCl NaOH Na2S2O3 Methanol Other	X	2 L Poly Clear	
2	M-110B		WG	7/1/2009	9:00	1	N		X	2 L Poly Clear	
3	M-110B DISS		WG	7/1/2009	9:00	1	Y		X	2 L Poly Clear	
4	M-110B DISS		WG	7/1/2009	9:00	1	Y		X	2 L Poly Clear	
5	I-ARB		WG	7/1/2009	11:50	1	N		X	2 L Poly Clear	
6	I-ARB		WG	7/1/2009	11:50	1	N		X	2 L Poly Clear	
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.arnold@ngem.com  
 frank.hagar@ngem.com

DATE: 7/1/09 TIME: 15:30  
 SIGNATURE OF SAMPLER: Dana Bjornh  
 DATE SIGNED: 7/1/09 TIME: 15:30

DATE: 7/1/09 TIME: 15:30  
 SIGNATURE OF SAMPLER: Dana Bjornh  
 DATE SIGNED: 7/1/09 TIME: 15:30



# SAMPLE RECEIPT & REVIEW FORM

Client: <u>KERR/northeast</u>		SDG/ARCOC/Work Order: <u>2327641</u>	
Received By: <u>MK</u>		Date Received: <u>7-2-09</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>CFM-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    dry ice <u>none</u> other (describe) <u>25°</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 4314 0872

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

20090751597

COC No. 2027.001.00194  
 Page: 1 of 1  
 Cooler # 1 of 1

232764



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

# CHAIN-OF-CUSTODY / Analytical Request Document

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

Required Ship to Lab:			Required Project Information:			Required Invoice Information:																									
Lab Name:	GEL Laboratories, LLC	Site ID #:	TRONOX LLC, HENDERSON	Send Invoice to:	Susan Crowley Tronox LLC	TAT: Standard 30 day	<input checked="" type="checkbox"/> Rush	Mark One																							
Address:	2040 Savage Road	Project #:	2027.001	Address:	PO Box 55	If Rush, Date due		EPA Stage																							
Charleston, SC 29407		Site Address	560 W. Lake Mead Drive	City/State	Henderson, NV 89009	Phone #:	(949)260-9293	Special																							
Lab PM:	Edith M. Kent	City	Henderson	Reimbursement project?	<input checked="" type="checkbox"/>	Non-reimbursement project?		4																							
Phone/Fax:	(843)556-8171	Site PM Name	Derrick Willis	Send EDD to	frank.hagar@ngem.com	Mark one																									
Lab PM email	emk@gel.com	Phone/Fax:	949-375-7004	CC Hardcopy report to	PDF Electronic Version Only	MA MCP Cert?	<input type="checkbox"/>	CT RCP Cert?																							
Applicable Lab Quote #:		Site PM Email:	derrick.willis@ngem.com	CC Hardcopy report to	see additional comments below	Lab Project ID (lab use)		Mark One																							
ITEM #	SAMPLE ID	Character per box. (A-Z, 0-9 / -)	Samples IDs MUST BE UNIQUE	Void Matrix Codes	MATRIX	SAMPLE TYPE	MATRIX CODE	G-RAB C-COMP	FIELD FILTERED? (Y/N)	#OF CONTAINERS	SAMPLE TIME	SAMPLE DATE	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	RECEIPT CONDITIONS	Temp in OC	Samples On Ice?	Sample Intact?	Trip Blank?									
																							W	WS	WG	WV	WL	WQ	WA	WB	WC
1	M-117B					G	WG	G	N	1	10:37	7/6/2009	7/6/09	14:30	<i>[Signature]</i>	7/6/09	14:30														
2	M-117B					G	WG	G	N	1	10:37	7/6/2009	7/6/09	08:50	<i>[Signature]</i>	7-7-09	08:50														
3																															
4																															
5																															
6																															
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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.amold@ngem.com  
 frank.hagar@ngem.com

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

SAMPLER NAME AND SIGNATURE:  
 Dana Brown *[Signature]*

PRINT Name of SAMPLER:  
 Dana Brown

SIGNATURE of SAMPLER:  
*[Signature]*

DATE Signed: 7/6/09

TIME: 14:30



# SAMPLE RECEIPT & REVIEW FORM

Client: <u>Kerr/Northgate</u>		SDG/ARCOC/Work Order: <u>232764.1.</u>	
Received By: <u>MK</u>		Date Received: <u>7-7-09</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>9km 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>27c</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: (If yes, immediately deliver to Volatiles laboratory)
7	Are Encore containers present?			<input checked="" type="checkbox"/>	
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 5266 2062

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



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. 2027.001.00196  
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 Cooler # 1 of 1

20090751597

2327641.

Required Ship to Lab:			Required Project Information:			Required Invoice Information:			TAT: Standard 30 day			Rush			Mark One					
Lab Name: GEL Laboratories, LLC			Site ID #: TRONOX LLC - HENDERSON			Send Invoice to: Susan Crowley Tronox, LLC			Address: PO Box 55			If Rush, Date due			Special EPA Stage					
Address: 2040 Savage Road			Project #: 2027.001			City/State: Henderson, NV 89009			Phone #: (949)260-9293			QC level Required: Standard			EPA Stage					
Charleston, SC 29407			Site Address: 560 W. Lake Mead Drive			Reimbursement project? <input checked="" type="checkbox"/>			Non-reimbursement project? <input type="checkbox"/>			NJ Reduced Deliverable Package?			4					
Lab PM: Edith M. Kent			City: Henderson State: NV			Send EDD to: frank.hagar@ngem.com			Send Hardcopy report to: pdf Electronic Version Only			MA MCP Cert? <input type="checkbox"/>			CT RCP Cert? <input type="checkbox"/>					
Phone/Fax: (843)556-8171			Site PM Name: Derrick Willis			CC Hardcopy report to: see additional comments below			Lab Project ID (lab use)						Mark One					
Lab PM email: emk@gel.com			Phone/Fax: 949-375-7004																	
Applicable Lab Quote #:			Site PM Email: derrick.willis@ngem.com																	
#	ITEM	SAMPLE ID Character per box. (A-Z, 0-9 / , -) Samples IDs MUST BE UNIQUE	MATRIX	MATRIX CODE	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	FIELD FILTERED? (Y/N)	Preservatives							Requested Analyses	Comments/Lab Sample I.D.		
										H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other				
1	M-120B		DOMESTIC WATER	WG	G	7/7/2009	8:45	1	N	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>						2 L Poly Clear	
2	M-120B		DOMESTIC WATER	WG	G	7/7/2009	8:45	1	N	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>						2 L Poly Clear	
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.arnold@ngem.com  
 frank.hagar@ngem.com

RELINQUISHED BY - ATTENTION  
 DATE: 7/7/09 13:00  
 TIME: 13:00  
 ACCEPTED BY - APPLICATION  
 DATE: 7/5/09 13:30  
 TIME: 13:30

SHIPPING METHOD (mark as appropriate)  
 UPS COURIER (FEDEX)  
 SIGNATURE OF SAMPLER:  
 DATE SIGNED: 7-7-09  
 TIME: 13:00

US MAIL  
 SIGNATURE OF SAMPLER: [Signature]  
 DATE SIGNED: 7-7-09  
 TIME: 13:00

Temp in 00  
 Samples On Ice?  
 Sample Intact?  
 Trip Blank?





# SAMPLE RECEIPT & REVIEW FORM

Client: <u>Tronox</u>		SDG/ARCOC/Work Order: <u>232704.1</u>	
Received By: <u>C. Duffy</u>		Date Received: <u>7-8-09</u>	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?			<input checked="" type="checkbox"/>
Classified Radioactive II or III by RSO?			<input checked="" type="checkbox"/>
COC/Samples marked containing PCBs?			<input checked="" type="checkbox"/>
Shipped as a DOT Hazardous?			<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>

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

Maximum Counts Observed\*: 10

Hazard Class Shipped: UN#:

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: damaged container   leaking container   other (describe)   seals broken
2 Samples requiring cold preservation within 0 ≤ 6 deg. C?		<input checked="" type="checkbox"/>		Preservation Method: blue ice   dry ice <u>none</u> other (describe)   ice bags <u>20°</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: damaged container   leaking container   other (describe)   seals broken
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: 7977 4320 1315

PM (or PMA) review: Initials CS Date 7/8/09



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. 2027.001.00195  
Page: 1 of 1  
Cooler # 1 of 1

<b>Required Ship to Lab:</b> Lab Name: GEL Laboratories, LLC Address: 2040 Savage Road Charleston, SC 29407		<b>Required Project Information:</b> Site ID #: TRONOX LLC: HENDERSON Project #: 2027.001 Site Address: 560 W. Lake Mead Drive City: Henderson State: NV		<b>Required Invoices Information:</b> Send Invoices to: Susan Crowley Trenox LLC Address: PO Box 55 City/State: Henderson, NV 89009 Phone #: (949) 260-9293		TAT: Standard 30 day <input checked="" type="checkbox"/> Rush If Rush, Date due QC level Required: Standard Special EPA Stage 4 Mark One NJ Reduced Deliverable Package? CT RCP Cert? Mark One	
<b>Lab PM:</b> Edith M. Kent Phone/Fax: (843) 556-8171 Lab PM email: emk@gel.com		Reimbursement project? <input checked="" type="checkbox"/> Non-reimbursement project? Send EDD to: Frank Hagar Northgate Environmental Management, Inc frank.hagar@ngem.com CC Hardcopy report to: PDF Electronic Version Only CC Hardcopy report to: see additional comments below		MA MCP Cert? <input type="checkbox"/> CT RCP Cert? <input type="checkbox"/>		Lab Project ID (lab use)	
<b>Applicable Lab Quote #:</b>		Site PM Name: Derrick Willis Phone/Fax: 949-375-7004 Site PM Email: derrick.willis@ngem.com		FIELD FILTERED? (YN) #OF CONTAINERS SAMPLE TIME SAMPLE DATE MATRIX CODE SAMPLE TYPE G-GRAB G-COMP		Preservatives HCl HNO3 H2SO4 Unpreserved Methanol NaOH Na2S2O3 Other	
<b>SAMPLE ID</b> Character per box. (A-Z, 0-9 / -) Samples IDs MUST BE UNIQUE		Valid Matrix Codes MATRIX WQ WWS SURFACE WATER LF LW LEACHATE SW WASTE WATER SLW WASTE LIQUOR OIL AS AIR AERBIENT AIR SOL SOLIDS		MATRIX CODE WG G WG G G-GRAB G-COMP		EPA 903 TDS-0 EMSL HASL 300 2 L Poly Clear 2 L Poly Clear	
1	M-103B						
2	M-103B						
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

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	TEMP IN DEGREE C	SAMPLES ON ICE?	SAMPLE INTACT?	TRIP BLANK?
<i>[Signature]</i>	7/8/15	1:15	<i>[Signature]</i> GBS	7/8/15	14:15				
<i>[Signature]</i>	7/8/15	1:15	<i>[Signature]</i> M. H. Parker	7/8/15	09:00	27			
SHIPPING METHOD: (mark as appropriate) UPS COURIER <input checked="" type="checkbox"/> FEDEX <input type="checkbox"/> USPS MAIL <input type="checkbox"/> SIGNATURE OF SAMPLER: <i>[Signature]</i> DATE SIGNED: 7-8-15 TIME: 14:15 SAMPLER NAME AND SIGNATURE: DANA R. GROWN									



SAMPLE RECEIPT & REVIEW FORM

Client: KERR/NORTHEAST SDG/ARCOC/Work Order: 232764

Received By: MK Date Received: 7-9-09

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>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>27°</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: <u>* see below</u>
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: \* EB 0708 09 - 50 ON CHAIN  
EB 0708 09 - 501 ON BOTTLES

FX 7977 4720 2501

PM (or PMA) review: Initials DS Date 7.8.9.09

20090751597



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

232764%

# CHAIN-OF-CUSTODY / Analytical Request Document

COC No. 2027.001.00209  
Page: 1 of 1  
Cooler # 1 of 1

Required Ship to Lab:		Required Project Information:		Required Invoice Information:		TAT: Standard 30 day		Rush		Mark One																									
Lab Name: GEL Laboratories, LLC		Site ID #: TRONOX LLC - HENDERSON		Send Invoice to: Susan Crowley Tronox, LLC		Address: PO Box 55																													
Address: 2040 Savage Road		Project #: 2027.001		City/State: Henderson, NV 89009		Phone #: (949)260-9293																													
Charleston, SC 29407		Site Address: 560 W. Lake Mead Drive		Reimbursement project? <input checked="" type="checkbox"/>		Non-reimbursement project? <input type="checkbox"/>				Special EPA Stage Mark one																									
Lab PM: Edith M. Kent		City: Henderson		State: NV						EPA 803/1604.0																									
Phone/Fax: (843)556-8171		Site PM Name: Derrick Willis		Site PM Email: derrick.willis@ngem.com						EPA 803/1604.0																									
Lab PM email: emk@gel.com		Phone/Fax: 948-375-7004								EPA 803/1604.0																									
Applicable Lab Quote #:										EPA 803/1604.0																									
ITEM #	SAMPLE ID Character per box. (A-Z, 0-9 / -)	Valid Matrix Codes	MATRIX	SAMPLE TYPE	G-RAB C-COMP	FIELD FILTERED? (Y/N)	PRESERVATIVES	# OF CONTAINERS	SAMPLE TIME	SAMPLE DATE	DATE	TIME	ACCEPTED BY	APPLIATION	DATE	TIME	SAMPLE RECEIPT CONDITIONS	Temp in 0C	Samples On Ice?	Sample Intact?	Trip Blank?														
																						W WATER	WP POND WATER	WS SURFACE WATER	WV WATER VAPOR	WQ WATER QUALITY	WH WASTEWATER	WI WASTE WATER	WO WASTEWATER OUTFALL	WY WASTEWATER YARD	WZ WASTEWATER ZONE	WAA WASTEWATER AERIAL TREATMENT	WAB WASTEWATER AERIAL TREATMENT	WAC WASTEWATER AERIAL TREATMENT	WAD WASTEWATER AERIAL TREATMENT
1	M-118B		WG	G		N	Unpreserved	1	8:45 AM	7/9/2009	7/9	13:15																							
2	M-118B		WG	G		N	Unpreserved	1	8:45 AM	7/9/2009	7/9	13:15																							

**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.arnold@ngem.com  
 frank.hagar@ngem.com

UPS COURIER (FEDEX)  
 SIGNATURE OF SAMPLER: Dana Brown  
 DATE SIGNED: 7-9-09  
 TIME: 13:15



SAMPLE RECEIPT & REVIEW FORM

Client: <u>KERR/NORTHGATE</u>		SDG/ARCOC/Work Order: <u>232764.1.</u>	
Received By: <u>MK</u>		Date Received: <u>7-10-09</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>CA-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>26°</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 8355 6473

PM (or PMA) review: Initials EM

Date 7/10/09







# SAMPLE RECEIPT & REVIEW FORM

Client: <u>KEPP/NORTHGATE</u>		SDG/ARCO/Work Order: <u>2327047</u>	
Received By: <u>MK</u>		Date Received: <u>7-11-09</u>	
Suspected Hazard Information	Yes	No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Counts Observed*: <u>CPM 10</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken    damaged container    leaking container    other (describe)
2	Samples requiring cold preservation within 0 ≤ 6 deg. C?			<input checked="" type="checkbox"/>	ice bags    blue ice    dry ice <u>none</u> other (describe) <u>24e</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 6736 7632

PM (or PMA) review: Initials EM Date 7/11/09



2327641



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. 2027.001.00249  
Page: 1 of 1  
Cooler # 1 of 1

Required Ship to Lab:		Required Project Information:		Required Invoice Information:		TAT: Standard 30 day		Rush		Mark One		
Lab Name:	GEL Laboratories, LLC	Site ID #:	TRONOX LLC, HENDERSON	Send Invoice to:	Susan Crowley Tronox LLC	Address:	PO Box 55	If Rush, Date due		Special	EPA Stage	Mark one
Address:	2040 Savage Road	Project #:	2027.001	City/State:	Henderson, NV 89009	Phone #:	(949)260-9293	QC level Required:	Standard		4	
Lab Pk:	Edith M. Kent	Site Address:	560 W. Lake Mead Drive	Reimbursement project?	X	Non-reimbursement project?		NJ Reduced Deliverable Package?				
Phone/Fax:	(943)556-8171	City:	Henderson	State:	NV	Send EDD to:	frank.hagar@ngem.com	MA MCP Cert?		CT RCP Cert?		Mark One
Lab PM email:	emk@gel.com	Site PM Name:	Derrick Willis	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 / -)	SAMPLE TYPE	MATRIX CODE	G-GRAB C-COMP	FIELD FILTERED? (Y/N)	Preservatives	Requested Analyses	Comments/Lab Sample I.D.			
1	H-11B		WG	G	G	1	Unpreserved H2SO4 HNO3 HCl NaOH Na2S2O3 Methanol Other	EPA 903, 1904 EML HASL 300	2 L Poly Clear			
2	H-11B		WG	G	G	1			2 L Poly Clear			
3	H-11BDISS		WG	G	G	1			2 L Poly Clear			
4	H-11BDISS		WG	G	G	1			2 L Poly Clear			
5												
6												
7												
8												
9												
10												
11												
12												

RELINQUISHED BY - AFFILIATION	DATE	TIME	ACCEPTED BY - AFFILIATION	DATE	TIME	RECEIPT CONDITIONS
<i>[Signature]</i>	7/13	14:30	<i>[Signature]</i> GES	7/13	14:30	Y/N Y/N Y/N
<i>[Signature]</i> GES	7/13	16:00	<i>[Signature]</i> GES	7/14	10:00	Y/N Y/N Y/N
						Y/N Y/N Y/N
						Y/N Y/N Y/N

SHIPPING METHOD: (mark as appropriate)	SAMPLER NAME AND SIGNATURE
UPS COURIER <i>[Signature]</i>	<i>[Signature]</i>
US MAIL	
PRINT Name of SAMPLER:	Dana Brown
SIGNATURE of SAMPLER:	<i>[Signature]</i>
DATE Signed:	7-13-09
Time:	14:30

**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



Client: <u>Kerr Northwest</u>		SDG/ARCO/Work Order: <u>23271041</u>	
Received By: <u>MK</u>		Date Received: <u>7-14-09</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"/>
Classified Radioactive II or III by RSO?			<input checked="" type="checkbox"/>
COC/Samples marked containing PCBs?			<input checked="" type="checkbox"/>
Shipped as a DOT Hazardous?			<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>
		Hazard Class Shipped: _____ UN#: _____	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken    damaged container    leaking container    other (describe)
2	Samples requiring cold preservation within 0 ≤ 6 deg. C?		<input checked="" type="checkbox"/>		ice bags    blue ice    dry ice <u>none</u> other (describe) <u>27c</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 5855 436

PM (or PMA) review: Initials CS Date 7.14.09

**CHAIN-OF-CUSTODY / Analytical Request Document**  
The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate.

COC No. 2027.001.002450  
Page: 1 of 1  
Cooler # 1 of 1

Required Ship to Lab:		Required Project Information:		Required Invoice Information:		TAT: Standard 30 day		Rush		Mark One											
Lab Name: GEL Laboratories, LLC		Site ID #: TRONOX LLC, HENDERSON		Send Invoice to: Susan Crowley Tronox LLC		Address: PO Box 55															
Address: 2040 Savage Road		Project #: 2027.001		City/State: Henderson, NV 89009		Phone #: (949)260-9293		QC level Required: Standard		Special EPA Stage  Mark one  4											
Charleston, SC 29407		Site Address: 560 W. Lake Mead Drive		Reimbursement project? <input checked="" type="checkbox"/>		Non-reimbursement project? <input type="checkbox"/>		NJ Reduced Deliverable Package?													
Lab PM: Edith M. Kent		City: Henderson		State: NV				MA MCP Cert? <input type="checkbox"/>		CT RCP Cert? <input type="checkbox"/>											
Phone/Fax: (843)556-8171		Site PM Name: Derrick Willis		Send EDD to: frank.hagar@ngem.com		CC Hardcopy report to: PDF Electronic Version Only		Lab Project ID (lab use)													
Lab PM email: emk@gel.com		Phone/Fax: 949-375-7004		Site PM Email: derrick.willis@ngem.com		CC Hardcopy report to: see additional comments below		Requested Analyses		Comments/Lab Sample I.D.											
Applicable Lab Quote #:								EMSL HASL 300*		2 L Poly Clear											
								EPA 803.1700.0		2 L Poly Clear											
#	ITEM	SAMPLE ID	Character per box. (A-Z, 0-9 / , -)	SAMPLES IDs MUST BE UNIQUE	Valid Matrix Codes	MATRIX CODE	SAMPLE TYPE	G=GRAB C=COMP	SAMPLE DATE	SAMPLE TIME	#OF CONTAINERS	FIELD FILTERED? (Y/N)	Preservatives	Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other
1	TR-10B				WG	G	G		7/14/2009	9:00 AM	1	N	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	TR-10B				WG	G	G		7/14/2009	9:00 AM	1	N	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

RTN/DISHED BY - AFFILIATION	DATE	TIME	ACCPY BY - AFFILIATION	DATE	TIME	SAMPLE RECEIPT CONDITIONS	Temp in Cool	Samples on Ice?	Sample Intact?	Trip Blank?
<i>[Signature]</i>	7/14	14:00	<i>[Signature]</i>	7/14	1400					
<i>[Signature]</i>	7/14	16:00	<i>[Signature]</i>	7/15	0900	20				

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.amold@ngem.com  
frank.hagar@ngem.com

Shipping as per (see attached)

UPS COURIER (FEDEX)

US MAIL

GRANT Name of SAMPLER: Dana Brown

SIGNATURE OF SAMPLER: *[Signature]*

DATE Signed: 7/14/09

Time: 14:00



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. 2027.001.00263  
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		If Rush, Date due																		
Address: 2040 Savage Road		Project #: 2027.001		Address: PO Box 55																				
City: Charleston, SC 29407		Site Address: 560 W. Lake Mead Drive		City/State: Henderson, NV 89009		Phone #: (949)260-9293																		
Lab PM: Edith M. Kent		City: Henderson		State: NV		Reimbursement project? <input checked="" type="checkbox"/> Non-reimbursement project? <input type="checkbox"/>		Mark one																
Phone/Fax: (843)556-8171		Site PM Name: Derrick Willis		Send EDD to: Frank Hagar Northgate Environmental Management, Inc		Send EDD to: frank.hagar@ngem.com		Special EPA Stage 4		Mark one														
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		MA MCP Cert? <input type="checkbox"/> CT RCP Cert? <input type="checkbox"/>		Mark one														
Applicable Lab Quote #:		Site PM Email: derrick.willis@ngem.com						Lab Project ID (lab use)																
#	ITEM	SAMPLE ID	Character per box. (A-Z, 0-9 / , -)	Samples IDs MUST BE UNIQUE	Valid Matrix Codes	MATRIX	SAMPLE TYPE	G-RAB C-COMP	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	FIELD FILTERED? (Y/N)	PRESERVATIVES	UNPRESERVED	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analyses	Comments/Lab Sample I.D.	
																								W
1		TR-8B				WG	G		7/14/2009	11:45 AM	1	N			X							X	EPA 905.1/904.0 EMSL HASL 300*	2 L Poly Clear
2		TR-8B				WG	G		7/14/2009	11:45 AM	1	N			X							X		2 L Poly Clear
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.arnold@ngem.com  
 frank.hagar@ngem.com

REUNQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE RECEIPT CONDITIONS
<i>[Signature]</i>	7/14	14:00	<i>[Signature]</i>	7/14	14:00	Y/N Y/N Y/N
<i>[Signature]</i>	7/14	16:00	<i>[Signature]</i>	7/15	09:00	Y/N Y/N Y/N
						Y/N Y/N Y/N
						Y/N Y/N Y/N
						Y/N Y/N Y/N

SHIPPING METHOD (mark as appropriate):  
 UPS COURIER FEDEX  
 SIGNATURE OF SAMPLER: Dana Brown  
 DATE SIGNED: 7/14/09  
 TIME: 14:00



SAMPLE RECEIPT & REVIEW FORM

Client: <u>Tronox</u>		SDG/ARCO/Work Order: <u>2327641</u>	
Received By: <u>C. Duffly</u>		Date Received: <u>7/15/09</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?		X	Maximum Counts Observed*: <u>35</u>
Classified Radioactive II or III by RSO?		X	
COC/Samples marked containing PCBs?		X	
Shipped as a DOT Hazardous?		X	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		X	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	X			Circle Applicable: seals broken    damaged container    leaking container    other (describe)
2	Samples requiring cold preservation within 0 ≤ 6 deg. C?		X		Preservation Method: ice bags    blue ice    dry ice <u>none</u> other (describe) <u>30°</u>
3	Chain of custody documents included with shipment?	X			
4	Sample containers intact and sealed?	X			Circle Applicable: seals broken    damaged container    leaking container    other (describe)
5	Samples requiring chemical preservation at proper pH?	X			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		X		Sample ID's and containers affected:
7	Are Encore containers present?			X	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	X			Id's and tests affected:
9	Sample ID's on COC match ID's on bottles?	X			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	X			Sample ID's affected:
11	Number of containers received match number indicated on COC?	X			Sample ID's affected:
12	COC form is properly signed in relinquished/received sections?	X			

Comments: 7967 7573 2626

PM (or PMA) review: Initials DS Date 7-15-09

20090751597

2327642



**CHAIN-OF-CUSTODY / Analytical Request Document**  
 The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate.

COC No. 2027.001.00267  
 Page: 1 of 1  
 Cooler # 1 of 2

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 Tronex, LLC		Address: PO Box 55		Henderson, NV 89009		Phone #: (949)260-9293	
Address: 2040 Savano Road		Project #: 2027.001		City/State: Henderson NV		Reimbursement project? <input checked="" type="checkbox"/>		Non-reimbursement project? <input type="checkbox"/>		Mark one	
Lab PM: Edith M. Kent		Site Address: 560 W. Lake Mead Drive		Site PM Name: Derrick Willis		Send EDD to: frank.hagar@ngem.com		CC Hardcopy report to: PDF Electronic Version Only		Lab Project ID (lab use)	
Phone/Fax: (849)556-8171		City: Henderson		State: NV		Phone/Fax: 949-375-7004		Site PM Email: derrick.willis@ngem.com		MA MCP Cert? <input type="checkbox"/>	
Lab PM email: emk@gel.com		Site PM Email: derrick.willis@ngem.com		Matrix Code		Sample Type		Sample Date		Sample Time	
Applicable Lab Quote #:		Matrix Code		Sample Type		Sample Date		Sample Time		# of Containers	
1	M-92B	WG	G	7/15/2009	8:45 AM	1	N				2 L Poly Clear
2	M-92B	WG	G	7/15/2009	8:45 AM	1	N				2 L Poly Clear
3	M-92BDISS	WG	G	7/15/2009	8:45 AM	1	Y				2 L Poly Clear
4	M-92BDISS	WG	G	7/15/2009	8:45 AM	1	Y				2 L Poly Clear
5	M-92BMS	WG	G	7/15/2009	8:45 AM	1	N				2 L Poly Clear
6	M-92BMS	WG	G	7/15/2009	8:45 AM	1	N				2 L Poly Clear
7	M-92BMSDISS	WG	G	7/15/2009	8:45 AM	1	Y				2 L Poly Clear
8	M-92BMSDISS	WG	G	7/15/2009	8:45 AM	1	Y				2 L Poly Clear
9	M-92BMSD	WG	G	7/15/2009	8:45 AM	1	N				2 L Poly Clear
10	M-92BMSD	WG	G	7/15/2009	8:45 AM	1	N				2 L Poly Clear
11	M-92BMSDDISS	WG	G	7/15/2009	8:45 AM	1	Y				2 L Poly Clear
12	M-92BMSDDISS	WG	G	7/15/2009	8:45 AM	1	Y				2 L Poly Clear

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Dana R. Brown, NGEM LLC	15-Jul	13:35	GES	7/15	13:35
Derrick Willis, NGEM LLC	7/15/09	16:00	NGEM LLC	7/16/09	08:40

SHIPPING METHOD: (mark as appropriate)	SAMPLER NAME AND SIGNATURE
<input checked="" type="checkbox"/> UPS COURIER	Dana R. Brown
<input type="checkbox"/> FEDEX	
<input type="checkbox"/> US MAIL	

Temp in 00	Samples On Ice?	Sample Intact?	Temp Blank

**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



SAMPLE RECEIPT & REVIEW FORM

Client:	<u>KEPP/NORTHGATE</u>	SDG/ARCOC/Work Order:	<u>2327641</u>
Received By:	<u>MK</u>	Date Received:	<u>7-16-09</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>CN 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>27°</u> <u>29°</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 6675 2090 299  
 7967 7963 3305 279

PM (or PMA) review: Initials

CM

Date

7/16/09

**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)



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**Subject:** GEL SDG 232764 closed

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

**Date:** Fri, 17 Jul 2009 10:44:51 -0400

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

**CC:** Edie Kent <emk@gel.com>, Heather Shaffer <hea01394@gel.com>

Cindy,

Soil SDG 232764 was closed with yesterday's receipts. Attached is a list of the samples in the SDG. As soon as we have completed the login review, you will receive the full receipt package for this SDG.

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)

<b>232764.xls</b>	<b>Content-Type:</b> application/msexcel <b>Content-Encoding:</b> base64
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**Subject:** SDG 232764 QC issues- Alpha Spec Th, Alpha Spec U and Ra-226  
**From:** Heather Shaffer <Heather.Shaffer@gel.com>  
**Date:** Wed, 12 Aug 2009 16:53:15 -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, Alpha Spec U and Ra 226:

**Ra 226 Issues:**

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 Ra-226 and were counted for the maximum time: I-ARB (232764003) and M-117B (232764004).

**Thorium Issues:**

The following sample did not meet the Tronox QA program required detection limits for Th228 and Th230 analysis due to reduced aliquot size: M-110B (232764001) and H-11BDISS(232764014).

The following sample did not meet the Tronox QA program required detection limits for Th230 and Th232 analysis due to reduced aliquot size: M-110BDISS(232764002), I-ARB(232764003), M-117B(232764004).

The following sample did not meet the Tronox QA program required detection limits for Th228, Th230, and Th232 analysis due to reduced aliquot size: M-103B(232764007), M-10B(232764010), H-11B(232764013).

The following sample did not meet the Tronox QA program required detection limits for Th230 due to reduced aliquot size: M-10BDISS (232764011).

The following sample did not meet the Tronox QA program required detection limits for Th228 due to reduced aliquot size: TR-8B(232764016).

The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with activity between 2 and 5 times the MDA for Th228: M-117B(232764004), TR-10B(232764015), M-92B(232764017).

The following samples do not meet the Tronox QA program tracer yield requirements of 70-120% due to matrix issues: I-ARB(232764003), M-117B (232764004), M-120B (232764005), M-103B( 232764007), M-121B(232764009), M-10B(232764010), M-10BDISS (232764011), TR-10B(232764015), and TR-8B(232764016).

**Uranium Issues:**

The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with activity greater than 5 times the MDA for U235/236: M-103B(232764007), TR-8B( 232764016), M-92B (232764017).

The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with activity between 2 and 5 times the MDA for U235/236: M-118B(232764008), M-10B (232764010), M-10BDISS(232764011), and the laboratory duplicate.

The following samples do not meet the Tronox QA program tracer yield requirements of 70-120% due to matrix issues: M-92B (232764017).

The following sample did not meet the Tronox QA program required detection limits for U235/236 analysis due to reduced aliquot size: TR-10B(232764015).

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 12 August 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 232764**

**Method/Analysis Information**

**Product:** Alphaspec Th, Liquid  
Analytical Method: DOE EML HASL-300, Th-01-RC Modified  
Analytical Batch Number: 891789

<b>Sample ID</b>	<b>Client ID</b>
232764001	M-110B
232764002	M-110BDISS
232764003	I-ARB
232764004	M-117B
232764005	M-120B
232764007	M-103B
232764008	M-118B
232764009	M-121B
232764010	M-10B
232764011	M-10BDISS
232764013	H-11B
232764014	H-11BDISS
232764015	TR-10B
232764016	TR-8B
232764017	M-92B
1201896949	Method Blank (MB)
1201896950	232764017(M-92B) Sample Duplicate (DUP)
1201896951	232764017(M-92B) Matrix Spike (MS)
1201896952	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-043 REV# 5.

**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: 232764017 (M-92B).

#### **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 repped 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 720492 was generated due to RDL less than MDA, Failed Recovery for Surrogate or Tracer and Other. 1. Samples 232764001 and 014 do not meet the detection limits for Th-228 and Th-230; Samples 232764002, 003, and 004 do not the detection limits for Th-230 and Th-232; Samples 232764007, 010, and 013 do not meet the detection limits for Th-228, Th-230, and Th-232; Sample 232764011 does not the detection limits for Th-230; Sample 232764016 does not meet the detection limits for Th-228; and Duplicate Sample 1201896950 does not meet the detection limits for Th-232. The method blank 1201896949 does not meet the detection limits for Th-228, Th-230, and Th-232 due to keeping the blank aliquot consistent with the sample aliquots. Samples do not meet the detection limits due to lower yields achieved during the analysis, which were matrix related. Large amounts of precipitates (usually white) were present and as the samples were being cooked down lots of grit appeared, which resemble to be silica gel. Samples were prepped twice with similar chemistry/matrix related issues. Samples were counted for 1000 minutes to achieve the lowest MDA's possible. 2. Samples 232764003, 004, 005, 007, 009, 010, 011, 015, and 016 do not meet the client tracer yield requirements of 70 to 120 percent due to the matrix related issues mentioned above, however the GEL standard tracer yield requirements of 15 to 125 percent were met and the Method Blank 1201896949 and LCS 1201896952 did meet the client tracer yield requirements. 3. Samples 232764004, 232764015, and 232764017 had Th-228 results between 2 and 5 times the MDA and Uncertainties greater than 30 percent of the result. Samples were counted for the maximum count time of 1000 minutes. 1. Project Manager and client notified. Reporting results. 2. Project Manager and client



notified. Reporting results. 3. Project Manager and client 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. Volume was limited due to multiple analysis performed on the samples.

### **Qualifier information**

Manual qualifiers were not required.

### **Method/Analysis Information**

**Product:** Alphaspec U, Liquid  
**Analytical Method:** DOE EML HASL-300, U-02-RC Modified  
**Analytical Batch Number:** 892286

<b>Sample ID</b>	<b>Client ID</b>
232764001	M-110B
232764002	M-110BDISS
232764003	I-ARB
232764004	M-117B
232764005	M-120B
232764007	M-103B
232764008	M-118B
232764009	M-121B
232764010	M-10B
232764011	M-10BDISS
232764013	H-11B
232764014	H-11BDISS
232764015	TR-10B
232764016	TR-8B
232764017	M-92B
1201898106	Method Blank (MB)
1201898107	232764017(M-92B) Sample Duplicate (DUP)
1201898108	232764017(M-92B) Matrix Spike (MS)
1201898109	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 volume in this batch.

**Designated QC**

The following sample was used for QC: 232764017 (M-92B).

**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 720624 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 U235/236 result, and the activity is greater than 5X the MDA, for samples 232764007, 232764016 and 232764017. The uncertainty is greater than 30% of the U235/236 result, and the activity is between 2X and 5X the MDA for samples 232764008, 232764010, 232764011 and 1201898108. 2. Sample 232764017 does not meet the client's tracer yield requirement of 70 - 120%. However, with a value of 67.8%, sample does meet the GEL standard tracer requirement. The blank and the laboratory control sample do meet the client's tracer yield requirements. 3. Sample 232764015 does not meet the required detection limit for U235/236. A larger aliquot could not be used due to the U233/234 and U238 present in the sample and the nature of the matrix. A larger aliquot would result in low tracer yields. 1. Project manager notified. Samples counted for maximum count time to reduce uncertainty. Reporting results. 2. Project manager notified. Reporting results. 3. Project manager notified. Samples counted for maximum count time. 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. The sample and the duplicate, 1201898107 (M-92B) and 232764017 (M-92B), did not meet the relative percent difference requirement for U235/236, however they do meet the relative error ratio requirement with a value of 1.35.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** GFPC, Ra228, Liquid  
**Analytical Method:** EPA 904.0/SW846 9320 Modified  
**Analytical Batch Number:** 886483

<b>Sample ID</b>	<b>Client ID</b>
232764001	M-110B
232764002	M-110BDISS
232764003	I-ARB
232764004	M-117B
232764005	M-120B
232764007	M-103B
232764008	M-118B
232764009	M-121B
232764010	M-10B
232764011	M-10BDISS
232764013	H-11B
232764014	H-11BDISS
232764015	TR-10B
232764016	TR-8B
232764017	M-92B
1201884028	Method Blank (MB)
1201884029	232764017(M-92B) Sample Duplicate (DUP)
1201884030	232764017(M-92B) Matrix Spike (MS)
1201884031	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: 232764017 (M-92B).

**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 1201884028 (MB) was recounted due to a suspected blank false positive. Sample 232764001 (M-110B) was recounted to verify sample result. Second count being reported. Sample 232764011 (M-10BDISS) was recounted due to a negative result greater than three times the error. Second count being reported.

**Chemical Recoveries**

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

**Miscellaneous Information:**

**NCR Documentation**

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

**Additional Comments**

Additional comments were not required for this sample set.

### Qualifier information

Manual qualifiers were not required.

### Method/Analysis Information

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

Analytical Method: EPA 903.1 Modified

Analytical Batch Number: 886504

<b>Sample ID</b>	<b>Client ID</b>
232764001	M-110B
232764002	M-110BDISS
232764003	I-ARB
232764004	M-117B
232764005	M-120B
232764007	M-103B
232764008	M-118B
232764009	M-121B
232764010	M-10B
232764011	M-10BDISS
232764013	H-11B
232764014	H-11BDISS
232764015	TR-10B
232764016	TR-8B
232764017	M-92B
1201884102	Method Blank (MB)
1201884103	232764017(M-92B) Sample Duplicate (DUP)
1201884104	232764017(M-92B) Matrix Spike (MS)
1201884105	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: 232764017 (M-92B).

**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**

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 716464 was generated due to . 1. Samples 232764003, 232764004, and 1201884103 have activity between 2 and 5 times the MDA. Uncertainty is greater than 30 percent and counted the maximum count time. 1. Reporting results.

**Additional Comments**

The sample and the duplicate, 1201884103 (M-92B) and 232764017 (M-92B), did not meet the relative percent difference requirement, however they do meet the relative error ratio requirement with value of 1.8680.

**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:**                     *Paul Wilh* 8/12/09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 12-AUG-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> 891789	<b>Sample Numbers:</b> See Below		

**Potentially affected work order(s)(SDG): 232764**

**Application Issues:**

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

<b>Specification and Requirements Nonconformance Description:</b>	<b>NRG Disposition:</b>
<p>1. Samples 232764001 and 014 do not meet the detection limits for Th-228 and Th-230; Samples 232764002, 003, and 004 do not the detection limits for Th-230 and Th-232; Samples 232764007, 010, and 013 do not meet the detection limits for Th-228, Th-230, and Th-232; Sample 232764011 does not the detection limits for Th-230; Sample 232764016 does not meet the detection limits for Th-228; and Duplicate Sample 1201896950 does not meet the detection limits for Th-232. The method blank 1201896949 does not meet the detection limits for Th-228, Th-230, and Th-232 due to keeping the blank aliquot consistent with the sample aliquots. Samples do not meet the detection limits due to lower yields achieved during the analysis, which were matrix related. Large amounts of precipitates (usually white) were present and as the samples were being cooked down lots of grit appeared, which resemble to be silica gel. Samples were prepped twice with similar chemistry/matrix related issues. Samples were counted for 1000 minutes to achieve the lowest MDA's possible.</p> <p>2. Samples 232764003, 004, 005, 007, 009, 010, 011, 015, and 016 do not meet the client tracer yield requirements of 70 to 120 percent due to the matrix related issues mentioned above, however the GEL standard tracer yield requirements of 15 to 125 percent were met and the Method Blank 1201896949 and LCS 1201896952 did meet the client tracer yield requirements.</p> <p>3. Samples 232764004, 232764015, and 232764017 had Th-228 results between 2 and 5 times the MDA and Uncertainties greater than 30 percent of the result. Samples were counted for the maximum count time of 1000 minutes.</p>	<p>1. Project Manager and client notified. Reporting results.</p> <p>2. Project Manager and client notified. Reporting results.</p> <p>3. Project Manager and client notified. Reporting results.</p>

**Originator's Name:**  
Jessica Downey 12-AUG-09

**Data Validator/Group Leader:**  
Scott Moreland 12-AUG-09



**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 12-AUG-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> 892286	<b>Sample Numbers:</b> See Below		

**Potentially affected work order(s)(SDG): 232764**

**Application Issues:**

- RDL less than MDA
- 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 U235/236 result, and the activity is greater than 5X the MDA, for samples 232764007, 232764016 and 232764017. The uncertainty is greater than 30% of the U235/236 result, and the activity is between 2X and 5X the MDA for samples 232764008, 232764010, 232764011 and 1201898108.</p> <p>2. Sample 232764017 does not meet the client's tracer yield requirement of 70 - 120%. However, with a value of 67.8%, sample does meet the GEL standard tracer requirement. The blank and the laboratory control sample do meet the client's tracer yield requirements.</p> <p>3. Sample 232764015 does not meet the required detection limit for U235/236. A larger aliquot could not be used due to the U233/234 and U238 present in the sample and the nature of the matrix. A larger aliquot would result in low tracer yields.</p>	<p>1. Project manager notified. Samples counted for maximum count time to reduce uncertainty. Reporting results.</p> <p>2. Project manager notified. Reporting results.</p> <p>3. Project manager notified. Samples counted for maximum count time. Reporting results.</p>

**Originator's Name:**  
Joseph Moulden      12-AUG-09

**Data Validator/Group Leader:**  
Scott Moreland      12-AUG-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> LUCAS CELL DETECTOR	<b>Test / Method:</b> EPA 903.1 Modified	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> KERR
<b>Batch ID:</b> 886504	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 232764</b>			
<b>Application Issues:</b> Other			
<b>Specification and Requirements Nonconformance Description:</b>		<b>NRG Disposition:</b>	
1. Samples 232764003, 232764004, and 1201884103 have activity between 2 and 5 times the MDA. Uncertainty is greater than 30 percent and counted the maximum count time.		1. Reporting results.	

**Originator's Name:**  
Lyndsey Pace      29-JUL-09

**Data Validator/Group Leader:**  
Heather McCarty      12-AUG-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: 232764 GEL Work Order: 232764

**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

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## Certificate of Analysis

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

Report Date: August 12, 2009

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

Client Sample ID: M-110B  
Sample ID: 232764001  
Matrix: WG  
Collect Date: 01-JUL-09 09:00  
Receive Date: 02-JUL-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228	U	0.0517	+/-0.0363	0.0539	0.030	pCi/L		MXA 08/10/09	2114	891789	1
Thorium-230	U	0.0121	+/-0.0188	0.0335	0.030	pCi/L					
Thorium-232		0.0425	+/-0.0279	0.0373	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234		24.3	+/-0.489	0.00769	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236		1.12	+/-0.117	0.0095	0.030	pCi/L					
Uranium-238		17.1	+/-0.410	0.00769	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228	U	-2.82	+/-0.924	1.75	3.00	pCi/L		MXS2 07/24/09	1526	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226		0.546	+/-0.321	0.441	1.00	pCi/L		KSD1 07/29/09	1410	886504	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"			70.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			85.8	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			84.2	(15%-125%)

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## Certificate of Analysis

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

Report Date: August 12, 2009

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

Client Sample ID: M-110BDISS  
Sample ID: 232764002  
Matrix: WG  
Collect Date: 01-JUL-09 09:00  
Receive Date: 02-JUL-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228		0.068	+/-0.0343	0.0414	0.030	pCi/L		MXA 08/10/09	2114	891789	1
Thorium-230	U	0.00924	+/-0.020	0.0379	0.030	pCi/L					
Thorium-232	U	-0.00308	+/-0.0135	0.0341	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234		24.3	+/-0.477	0.0326	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236		0.888	+/-0.104	0.0461	0.030	pCi/L					
Uranium-238		17.8	+/-0.408	0.030	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228		3.50	+/-1.62	2.40	3.00	pCi/L		MXS2 07/24/09	1253	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226	U	0.302	+/-0.216	0.311	1.00	pCi/L		KSD1 07/29/09	1410	886504	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"			71.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			93.7	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			71.6	(15%-125%)

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## Certificate of Analysis

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

Report Date: August 12, 2009

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

Client Sample ID:	I-ARB	Project:	KERRHenderson
Sample ID:	232764003	Client ID:	KERR003
Matrix:	WG		
Collect Date:	01-JUL-09 11:50		
Receive Date:	02-JUL-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228		0.080	+/-0.0447	0.0616	0.030	pCi/L		MXA 08/10/09	2114	891789	1
Thorium-230	U	0.00347	+/-0.0152	0.0332	0.030	pCi/L					
Thorium-232	U	0.00	+/-0.0192	0.0426	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234		19.2	+/-0.437	0.0318	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236		0.722	+/-0.0942	0.00959	0.030	pCi/L					
Uranium-238		13.2	+/-0.362	0.0286	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228		2.39	+/-1.28	1.92	3.00	pCi/L		MXS2 07/24/09	1253	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226		1.02	+/-0.324	0.329	1.00	pCi/L		KSD1 07/29/09	1410	886504	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"			64.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			85.3	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			82.9	(15%-125%)

# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Report Date: August 12, 2009

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

Client Sample ID: M-117B  
Sample ID: 232764004  
Matrix: WG  
Collect Date: 06-JUL-09 10:37  
Receive Date: 07-JUL-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228		0.0957	+/-0.0402	0.042	0.030	pCi/L		MXA 08/10/09	2114	891789	1
Thorium-230	U	0.017	+/-0.020	0.0326	0.030	pCi/L					
Thorium-232	U	0.0136	+/-0.0211	0.0377	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234		1.20	+/-0.104	0.0418	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236	U	0.0252	+/-0.0226	0.0345	0.030	pCi/L					
Uranium-238		0.682	+/-0.0786	0.0326	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228	U	0.361	+/-0.849	1.53	3.00	pCi/L		MXS2 07/24/09	1253	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226		1.41	+/-0.439	0.394	1.00	pCi/L		KSD1 07/29/09	1410	886504	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"			63.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			97.6	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			73.4	(15%-125%)



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## Certificate of Analysis

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

Report Date: August 12, 2009

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

Client Sample ID: M-120B  
Sample ID: 232764005  
Matrix: WG  
Collect Date: 07-JUL-09 08:45  
Receive Date: 08-JUL-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228		0.067	+/-0.0405	0.0568	0.030	pCi/L		MXA 08/10/09	2114	891789	1
Thorium-230	U	0.00668	+/-0.0131	0.0255	0.030	pCi/L					
Thorium-232		0.0134	+/-0.0131	0.010	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234		25.4	+/-0.496	0.0337	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236		1.06	+/-0.113	0.0238	0.030	pCi/L					
Uranium-238		15.6	+/-0.388	0.0241	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228	U	0.351	+/-1.23	2.20	3.00	pCi/L		MXS2 07/24/09	1253	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226	U	0.160	+/-0.162	0.253	1.00	pCi/L		KSD1 07/29/09	1410	886504	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"			65.1	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			89.5	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			72.5	(15%-125%)

# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Report Date: August 12, 2009

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

Client Sample ID: M-103B  
Sample ID: 232764007  
Matrix: WG  
Collect Date: 08-JUL-09 09:05  
Receive Date: 09-JUL-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228	U	0.0229	+/-0.0439	0.0778	0.030	pCi/L		MXA 08/10/09	2114	891789	1
Thorium-230	U	-0.0228	+/-0.0181	0.0499	0.030	pCi/L					
Thorium-232	U	-0.013	+/-0.0181	0.0469	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234		2.85	+/-0.163	0.0387	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236		0.107	+/-0.0348	0.00889	0.030	pCi/L					
Uranium-238		1.93	+/-0.134	0.0295	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228	U	0.863	+/-1.03	1.75	3.00	pCi/L		MXS2 07/24/09	1257	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226	U	0.0202	+/-0.0684	0.154	1.00	pCi/L		KSD1 07/29/09	1410	886504	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"			66.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			92.1	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			72.4	(15%-125%)

# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Report Date: August 12, 2009

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

Client Sample ID: M-118B  
Sample ID: 232764008  
Matrix: WG  
Collect Date: 09-JUL-09 08:45  
Receive Date: 10-JUL-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228		0.0388	+/-0.0255	0.033	0.030	pCi/L		MXA 08/10/09	2114	891789	1
Thorium-230	U	0.00892	+/-0.013	0.0228	0.030	pCi/L					
Thorium-232		0.0119	+/-0.0117	0.00892	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234		1.08	+/-0.0988	0.0329	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236		0.0368	+/-0.020	0.00848	0.030	pCi/L					
Uranium-238		0.714	+/-0.0797	0.0219	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228	U	1.27	+/-1.23	2.03	3.00	pCi/L		MXS2 07/24/09	1257	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226	U	0.218	+/-0.218	0.352	1.00	pCi/L		KSD1 07/29/09	1440	886504	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"			72.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			96.2	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			80.2	(15%-125%)

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## Certificate of Analysis

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

Report Date: August 12, 2009

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

Client Sample ID: M-121B  
Sample ID: 232764009  
Matrix: WG  
Collect Date: 10-JUL-09 07:45  
Receive Date: 11-JUL-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228		0.0545	+/-0.0366	0.0522	0.030	pCi/L		MXA 08/10/09	2114	891789	1
Thorium-230		0.0102	+/-0.0115	0.0102	0.030	pCi/L					
Thorium-232	U	-0.0034	+/-0.00941	0.026	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234		4.00	+/-0.185	0.0391	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236		0.131	+/-0.0379	0.0209	0.030	pCi/L					
Uranium-238		2.55	+/-0.148	0.0244	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228		2.55	+/-1.16	1.66	3.00	pCi/L		MXS2 07/24/09	1313	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226	U	0.119	+/-0.134	0.219	1.00	pCi/L		KSD1 07/29/09	1440	886504	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"			63.5	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			98.8	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			83.0	(15%-125%)

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## Certificate of Analysis

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

Report Date: August 12, 2009

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

Client Sample ID: M-10B  
Sample ID: 232764010  
Matrix: WG  
Collect Date: 10-JUL-09 11:45  
Receive Date: 11-JUL-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228	U	0.0475	+/-0.0376	0.0575	0.030	pCi/L		MXA 08/10/09	2114	891789	1
Thorium-230	U	-0.00338	+/-0.0115	0.0324	0.030	pCi/L					
Thorium-232	U	-0.00338	+/-0.0115	0.0324	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234		3.89	+/-0.186	0.0371	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236		0.0993	+/-0.0373	0.038	0.030	pCi/L					
Uranium-238		2.23	+/-0.141	0.0254	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228	U	0.500	+/-1.01	1.78	3.00	pCi/L		MXS2 07/24/09	1313	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226	U	0.343	+/-0.250	0.370	1.00	pCi/L		KSD1 07/29/09	1440	886504	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"			63.1	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			100	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			80.4	(15%-125%)

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## Certificate of Analysis

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

Report Date: August 12, 2009

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

Client Sample ID: M-10BDISS  
Sample ID: 232764011  
Matrix: WG  
Collect Date: 10-JUL-09 11:45  
Receive Date: 11-JUL-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228		0.0857	+/-0.0525	0.0752	0.030	pCi/L		MXA 08/10/09	2114	891789	1
Thorium-230	U	0.0203	+/-0.0239	0.039	0.030	pCi/L					
Thorium-232		0.0122	+/-0.0138	0.0122	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234		3.28	+/-0.193	0.0495	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236		0.134	+/-0.0453	0.0346	0.030	pCi/L					
Uranium-238		1.94	+/-0.148	0.0323	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228	U	0.894	+/-1.26	2.15	3.00	pCi/L		MXS2 07/24/09	1525	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226	U	0.159	+/-0.214	0.368	1.00	pCi/L		KSD1 07/29/09	1440	886504	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"			54.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			103	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			82.1	(15%-125%)

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## Certificate of Analysis

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

Report Date: August 12, 2009

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

Client Sample ID: H-11B  
Sample ID: 232764013  
Matrix: WG  
Collect Date: 13-JUL-09 09:00  
Receive Date: 14-JUL-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228	U	0.00288	+/-0.0246	0.0489	0.030	pCi/L		MXA 08/10/09	2114	891789	1
Thorium-230	U	-0.106	+/-0.036	0.0921	0.030	pCi/L					
Thorium-232	U	-0.0115	+/-0.0195	0.0464	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234	U	0.00602	+/-0.00919	0.0164	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236		0.00793	+/-0.00897	0.00793	0.030	pCi/L					
Uranium-238	U	0.00428	+/-0.00593	0.00641	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228		1.97	+/-0.939	1.24	3.00	pCi/L		MXS2 07/24/09	1325	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226	U	0.134	+/-0.241	0.434	1.00	pCi/L		KSD1 07/29/09	1440	886504	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"			76.2	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			106	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			75.3	(15%-125%)

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## Certificate of Analysis

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

Report Date: August 12, 2009

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

Client Sample ID: H-11BDISS  
Sample ID: 232764014  
Matrix: WG  
Collect Date: 13-JUL-09 09:00  
Receive Date: 14-JUL-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228	U	0.0112	+/-0.0246	0.0454	0.030	pCi/L		MXA 08/10/09	2115	891789	1
Thorium-230	U	-0.0112	+/-0.0134	0.0375	0.030	pCi/L					
Thorium-232	U	0.00	+/-0.011	0.0268	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234	U	-0.0023	+/-0.00752	0.0212	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236	U	0.00547	+/-0.0107	0.0209	0.030	pCi/L					
Uranium-238	U	-0.00221	+/-0.00971	0.0245	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228	U	0.680	+/-0.708	1.16	3.00	pCi/L		MXS2 07/24/09	1325	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226	U	0.0203	+/-0.0889	0.194	1.00	pCi/L		KSD1 07/29/09	1440	886504	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"			78.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			102	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			77.2	(15%-125%)



# GEL LABORATORIES LLC

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## Certificate of Analysis

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

Report Date: August 12, 2009

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

Client Sample ID:	TR-10B	Project:	KERRHenderson
Sample ID:	232764015	Client ID:	KERR003
Matrix:	WG		
Collect Date:	14-JUL-09 09:00		
Receive Date:	15-JUL-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228		0.0929	+/-0.0402	0.0371	0.030	pCi/L		MXA 08/10/09	2115	891789	1
Thorium-230	U	0.00386	+/-0.0131	0.0295	0.030	pCi/L					
Thorium-232	U	0.00386	+/-0.0131	0.0295	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234		2.54	+/-0.153	0.0318	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236	U	0.0352	+/-0.0257	0.0361	0.030	pCi/L					
Uranium-238		1.44	+/-0.115	0.0181	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228	U	1.18	+/-1.04	1.68	3.00	pCi/L		MXS2 07/24/09	1325	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226		0.573	+/-0.315	0.421	1.00	pCi/L		KSD1 07/29/09	1515	886504	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"			56.0	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			97.0	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			80.6	(15%-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: August 12, 2009

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

Client Sample ID: TR-8B  
Sample ID: 232764016  
Matrix: WG  
Collect Date: 14-JUL-09 11:45  
Receive Date: 15-JUL-09  
Collector: Client

Project: KERRHenderson  
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228	U	0.0283	+/-0.0254	0.0386	0.030	pCi/L		MXA 08/10/09	2115	891789	1
Thorium-230	U	0.00	+/-0.00868	0.024	0.030	pCi/L					
Thorium-232	U	-0.00313	+/-0.00868	0.024	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234		2.15	+/-0.140	0.026	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236		0.067	+/-0.0274	0.00873	0.030	pCi/L					
Uranium-238		1.38	+/-0.112	0.018	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228	U	0.837	+/-0.918	1.53	3.00	pCi/L		MXS2 07/24/09	1325	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226		0.480	+/-0.242	0.306	1.00	pCi/L		KSD1 07/29/09	1515	886504	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"			68.2	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			97.4	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			78.4	(15%-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: August 12, 2009

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

Client Sample ID: M-92B  
 Sample ID: 232764017  
 Matrix: WG  
 Collect Date: 15-JUL-09 08:45  
 Receive Date: 16-JUL-09  
 Collector: Client

Project: KERRHenderson  
 Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228		0.084	+/-0.0382	0.0366	0.030	pCi/L		MXA 08/10/09	2115	891789	1
Thorium-230	U	0.0228	+/-0.0211	0.0291	0.030	pCi/L					
Thorium-232	U	0.0152	+/-0.0183	0.0291	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234		3.06	+/-0.200	0.0374	0.030	pCi/L		MXE1 08/11/09	1657	892286	2
Uranium-235/236		0.109	+/-0.0417	0.0125	0.030	pCi/L					
Uranium-238		1.81	+/-0.153	0.0259	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228	U	1.12	+/-0.817	1.23	3.00	pCi/L		MXS2 07/24/09	1325	886483	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226	U	0.132	+/-0.202	0.356	1.00	pCi/L		KSD1 07/29/09	1515	886504	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"			76.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			67.8	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			75.7	(15%-125%)

# QUALITY CONTROL DATA

# GEL LABORATORIES LLC

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

## QC Summary

Report Date: August 12, 2009

Page 1 of 3

Northgate Environmental Management, Inc.

1100 Quail St., Suite 102  
Newport Beach, California

Contact: Mr. Frank Hagar

Workorder: 232764

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	891789										
QC1201896950	232764017	DUP									
Thorium-228		0.084		0.0478	pCi/L	54.9		(0% - 100%)	MXA1	08/10/09	21:15
		+/-0.0382		+/-0.0279							
Thorium-230	U	0.0228	U	0.022	pCi/L	3.71		N/A			
		+/-0.0211		+/-0.0203							
Thorium-232	U	0.0152	U	0.0147	pCi/L	3.71		N/A			
		+/-0.0183		+/-0.0203							
QC1201896952	LCS										
Thorium-228			U	0.0144	pCi/L					08/10/09	21:15
				+/-0.0187							
Thorium-230	2.68			3.06	pCi/L		114	(75%-125%)			
				+/-0.184							
Thorium-232			U	-0.00287	pCi/L			(75%-125%)			
				+/-0.0169							
QC1201896949	MB										
Thorium-228			U	0.0238	pCi/L					08/10/09	21:15
				+/-0.0218							
Thorium-230			U	-0.0237	pCi/L						
				+/-0.0184							
Thorium-232			U	-0.0089	pCi/L						
				+/-0.0116							
QC1201896951	232764017	MS									
Thorium-228		0.084		0.192	pCi/L					08/10/09	21:15
		+/-0.0382		+/-0.0996							
Thorium-230	10.7	U	0.0228	12.2	pCi/L		114	(75%-125%)			
			+/-0.0211	+/-0.749							
Thorium-232	U	0.0152	U	0.0836	pCi/L			(75%-125%)			
		+/-0.0183		+/-0.0702							
Batch	892286										
QC1201898107	232764017	DUP									
Uranium-233/234		3.06		2.82	pCi/L	8.16		(0% - 20%)	MXE1	08/11/09	16:57
		+/-0.200		+/-0.158							
Uranium-235/236		0.109		0.0714	pCi/L	41.7		(0% - 100%)			
		+/-0.0417		+/-0.0301							
Uranium-238		1.81		1.98	pCi/L	8.97		(0% - 20%)			
		+/-0.153		+/-0.133							
QC1201898109	LCS										
Uranium-233/234				3.34	pCi/L					08/11/09	16:57
				+/-0.174							
Uranium-235/236				0.128	pCi/L						
				+/-0.0425							
Uranium-238	3.15			3.07	pCi/L		97.5	(75%-125%)			

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 232764

Page 2 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	892286										
QC1201898106	MB			+/-0.167							
Uranium-233/234			U	-0.0066	pCi/L				MXE1	08/11/09	16:57
				+/-0.00649							
Uranium-235/236			U	0.00579	pCi/L						
				+/-0.00803							
Uranium-238			U	0.00468	pCi/L						
				+/-0.00649							
QC1201898108	232764017	MS									
Uranium-233/234				3.06	pCi/L					08/11/09	16:57
				+/-0.200							
Uranium-235/236				0.109	pCi/L						
				+/-0.0417							
Uranium-238	8.40			1.81	pCi/L		102	(75%-125%)			
				+/-0.153							
				+/-0.496							
<b>Rad Gas Flow</b>											
Batch	886483										
QC1201884029	232764017	DUP									
Radium-228			U	1.12	pCi/L	0.00			N/A MXS2	07/24/09	13:26
				+/-0.817							
QC1201884031	LCS										
Radium-228	20.4			24.2	pCi/L		119	(75%-125%)		07/24/09	13:26
				+/-2.54							
QC1201884028	MB										
Radium-228			U	-1.24	pCi/L					07/24/09	15:26
				+/-1.09							
QC1201884030	232764017	MS									
Radium-228	20.4		U	1.12	pCi/L		106	(75%-125%)		07/24/09	13:26
				+/-0.817							
				+/-2.43							
<b>Rad Ra-226</b>											
Batch	886504										
QC1201884103	232764017	DUP									
Radium-226			U	0.132	pCi/L	112*		(0% - 100%)	KSD1	07/29/09	15:15
				+/-0.202							
QC1201884105	LCS										
Radium-226	24.2			24.1	pCi/L		99.8	(75%-125%)		07/29/09	16:10
				+/-1.50							
QC1201884102	MB										
Radium-226			U	0.295	pCi/L					07/29/09	15:15
				+/-0.226							
QC1201884104	232764017	MS									
Radium-226	121		U	0.132	pCi/L		76.1	(75%-125%)		07/29/09	15:15
				+/-0.202							
				+/-6.00							

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

# GEL LABORATORIES LLC

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

## QC Summary

Workorder: 232764

Page 3 of 3

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
**		Analyte is a surrogate compound									
<		Result is less than value reported									
>		Result is greater than value reported									
A		The TIC is a suspected aldol-condensation product									
B		For General Chemistry and Organic analysis the target analyte was detected in the associated blank.									
BD		Results are either below the MDC or tracer recovery is low									
C		Analyte has been confirmed by GC/MS analysis									
D		Results are reported from a diluted aliquot of the sample									
F		Estimated Value									
H		Analytical holding time was exceeded									
J		Value is estimated									
M		M if above MDC and less than LLD									
M		Matrix Related Failure									
N/A		RPD or %Recovery limits do not apply.									
ND		Analyte concentration is not detected above the detection limit									
NJ		Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
R		Sample results are rejected									
U		Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.									
UI		Gamma Spectroscopy--Uncertain identification									
X		Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier									
Y		QC Samples were not spiked with this compound									
^		RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.									
h		Preparation or preservation holding time was exceeded									

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

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

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

**RAW DATA**



# THORIUM

**Radiochemistry Batch Checklist, Rev 9**

Batch# 891789 Product: Th Date: 8/12/09

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.		✓	NCR# 720492
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%.		✓	NCR# 720492
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.			N/A
Aux data is correct.	✓		
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# 720492
Batch non-conformances second reviewed and disposition verified to be completed.			NCR# 720492
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]* 8/12/09

Secondary Review Performed By:

*[Signature]* 8/12/09

8/12-8/13  
KERR

# Thorium (Ac-227 Tracer) Que Sheet

07-AUG-09

Batch #: 891789 Analyst: MXA1 First Client Due Date: 13-AUG-09 Internal Due Date: 07-AUG-09

Tracer Isotope: Ac-227 Tracer Code: 0387-B-102 Expiration Date: 7/23/10 Vol: 0.1 Ac-227 Separation Date/Time: 8/18/09 AT 12:5 PM

LCS Isotope: Th-230 LCS Code: A2796-2 Expiration Date: 4/13/10 Vol: 0.1

Spike Isotope: Th-230 Spike Code: A2796-2 Expiration Date: 4/13/10 Vol: 0.1

Prep Date: 8/7/09 Initials: SWMB Pipet ID: 2971058 Balance ID: 16750207

Witness: AND 8/7/09

Wet/Dry

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Th Aliquot (g)	Th Det #
232764001-2	M-110B	SAMPLE		.03 pC/L	WATER	KERR003	01-JUL-09	1	1	0.800	173
232764002-2	M-110BDISS	SAMPLE		.03 pC/L	WATER	KERR003	01-JUL-09	2	2	0.800	174
232764003-2	I-ARB	SAMPLE		.03 pC/L	WATER	KERR003	01-JUL-09	3	3	0.800	187
232764004-2	M-117B	SAMPLE		.03 pC/L	WATER	KERR003	06-JUL-09	4	4	0.800	188
232764005-2	M-120B	SAMPLE		.03 pC/L	WATER	KERR003	07-JUL-09	5	5	0.800	189
232764007-2	M-103B	SAMPLE		.03 pC/L	WATER	KERR003	08-JUL-09	6	6	0.800	190
232764008-2	M-118B	SAMPLE		.03 pC/L	WATER	KERR003	09-JUL-09	7	7	0.800	191
232764009-2	M-121B	SAMPLE		.03 pC/L	WATER	KERR003	10-JUL-09	8	8	0.800	192
232764010-2	M-10B	SAMPLE		.03 pC/L	WATER	KERR003	10-JUL-09	9	9	0.800	193
232764011-2	M-10BDISS	SAMPLE		.03 pC/L	WATER	KERR003	10-JUL-09	10	10	0.800	194
232764013-2	H-11B	SAMPLE		.03 pC/L	WATER	KERR003	13-JUL-09	11	11	0.800	195
232764014-2	H-11BDISS	SAMPLE		.03 pC/L	WATER	KERR003	13-JUL-09	12	12	0.800	196
232764015-2	TR-10B	SAMPLE		.03 pC/L	WATER	KERR003	14-JUL-09	13	13	0.800	201
232764016-2	TR-8B	SAMPLE		.03 pC/L	WATER	KERR003	14-JUL-09	14	14	0.800	202
232764017-2	M-92B	SAMPLE		.03 pC/L	WATER	KERR003	15-JUL-09	15	15	0.800	203
1201896949-1	MB for batch 891789	MB		UCF pC/L to	WATER	QC ACCOUNT		16	16	0.800	204
1201896950-2	M-92B(232764017DUP)	DUP		.03 pC/L	WATER	QC ACCOUNT	15-JUL-09	17	17	0.600	205
1201896951-2	M-92B(232764017MS)	MS		.03 pC/L	WATER	QC ACCOUNT	15-JUL-09	18	18	0.200	206
1201896952-1	LCS for batch 891789	LCS		UCF pC/L to	WATER	QC ACCOUNT		19	19	0.800	207

Wet/Dry

NA

Solid Sample Dissolution by: LEACH of DIGESTION

Circle One

Choose SOP Used: GL-RAD-A-045 MDA 8/8/09

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

Data Reviewed By:

Qu On 8/12/09

8/12/09

GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764001\_TH  
SAMPLE QTY: 0.800 L

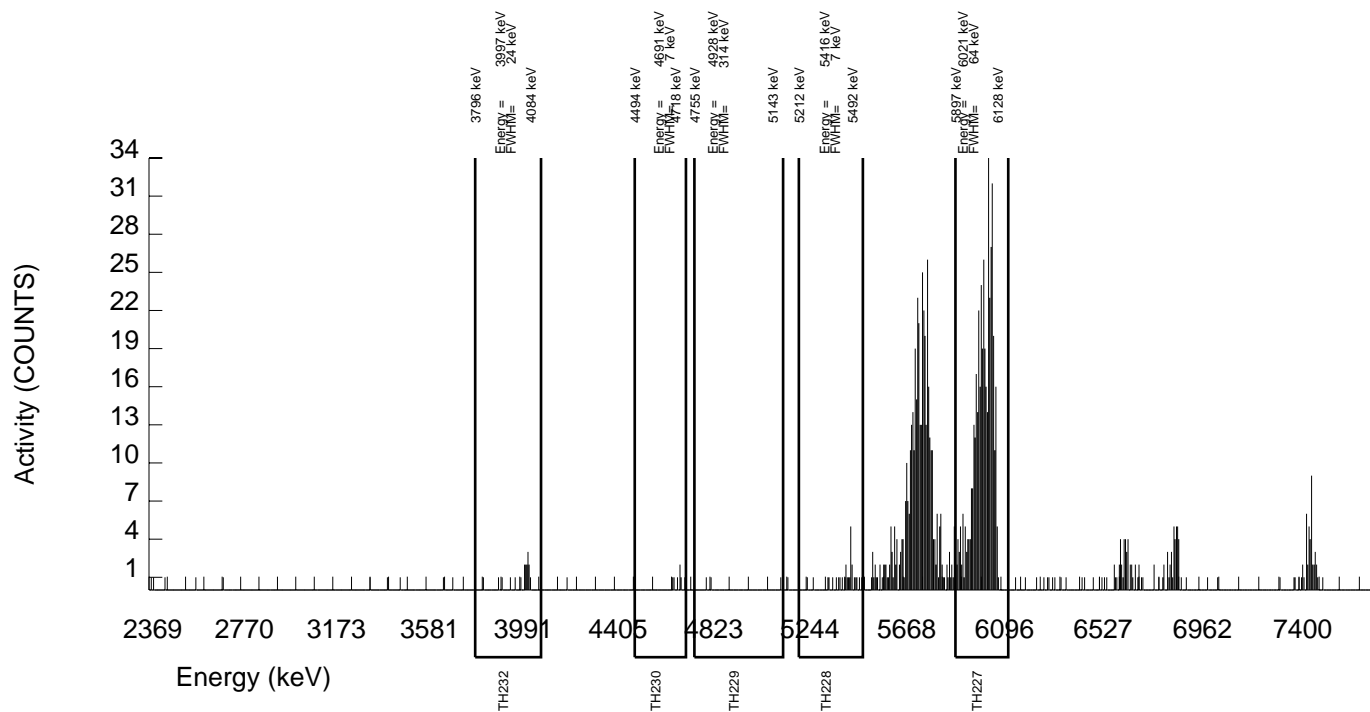
DETECTOR NUMBER :74431  
AVERAGE %EFFICIENCY :26.2319  
% YIELD : 70.779

COUNT DATE:10-AUG-2009 21:14:31  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 2.675E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 2.675E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.91880 dpm RESULTS : 2.77370 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B173.CNF;115 BKG DATE : 9-AUG-2009 EFF FILE : W173.CNF;35 CAL DATE : 22-JUL-2009
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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	448.000	448.000	0.000	0.0000	68.10000	2.21E+00	2.36E-01	1.48E-02	0.00E+00	2.04E-01
TH-228	5363.000	27.000	17.000	10.000	3.1623	99.94000	5.17E-02	3.64E-02	5.39E-02	2.24E-02	3.63E-02
TH229	4900.000	3.000	2.000	1.000	1.0000	99.52000	6.09E-03	1.19E-02	2.33E-02	7.09E-03	1.19E-02
TH-230	4625.000	7.000	4.000	3.000	1.7321	100.0000	1.21E-02	1.88E-02	3.35E-02	1.22E-02	1.88E-02
TH-232	3972.000	18.000	14.000	4.000	2.0000	100.0000	4.25E-02	2.80E-02	3.73E-02	1.41E-02	2.79E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764002\_TH  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :74432  
AVERAGE %EFFICIENCY :25.5394  
% YIELD : 71.563

COUNT DATE:10-AUG-2009 21:14:33  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

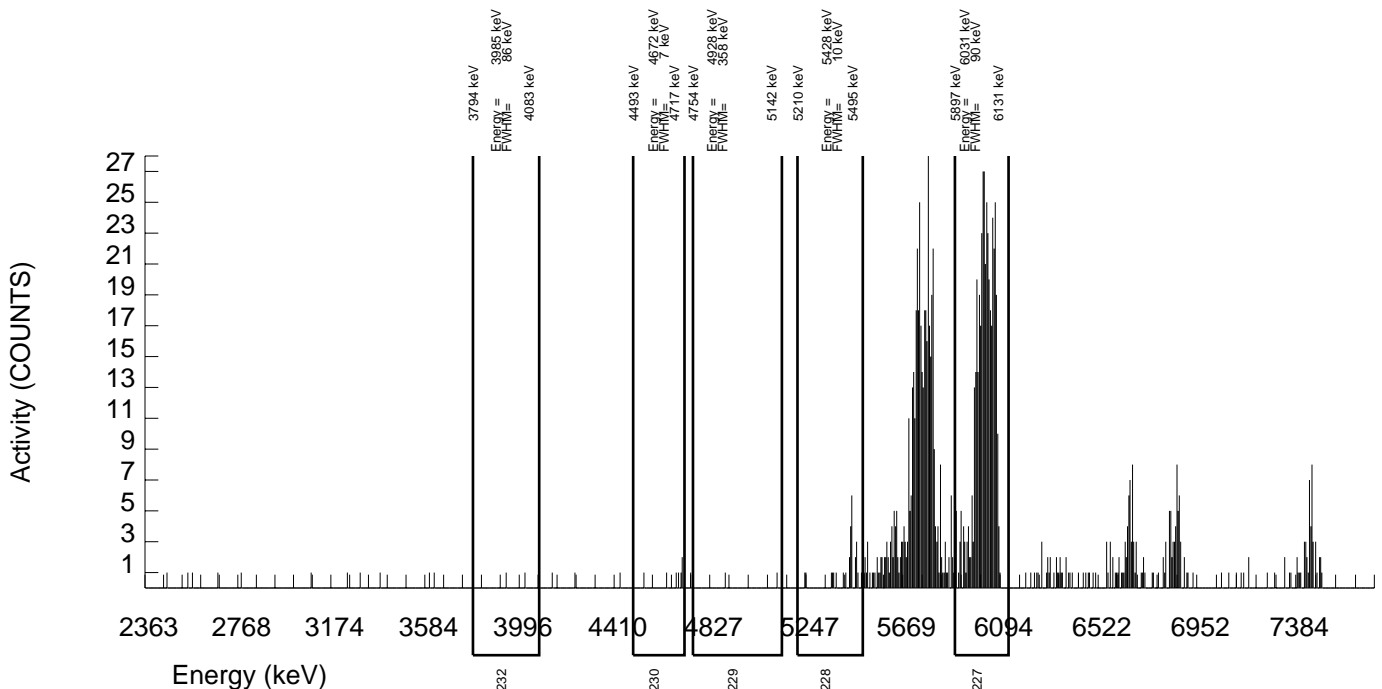
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.91880 dpm  
RESULTS : 2.80439 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B174.CNF;115  
BKG DATE : 9-AUG-2009  
EFF FILE : W174.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	447.000	441.000	6.000	2.4495	68.10000	2.21E+00	2.40E-01	7.20E-02	2.85E-02	2.09E-01
TH-228	5363.000	27.000	22.000	5.000	2.2361	99.94000	6.80E-02	3.45E-02	4.14E-02	1.61E-02	3.43E-02
TH229	4900.000	3.000	-1.000	4.000	2.0000	99.52000	-3.10E-03	1.61E-02	3.81E-02	1.44E-02	1.61E-02
TH-230	4625.000	7.000	3.000	4.000	2.0000	100.0000	9.24E-03	2.00E-02	3.79E-02	1.43E-02	2.00E-02
TH-232	3972.000	2.000	-1.000	3.000	1.7321	100.0000	-3.08E-03	1.35E-02	3.41E-02	1.24E-02	1.35E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764003\_TH  
SAMPLE QTY: 0.800 L

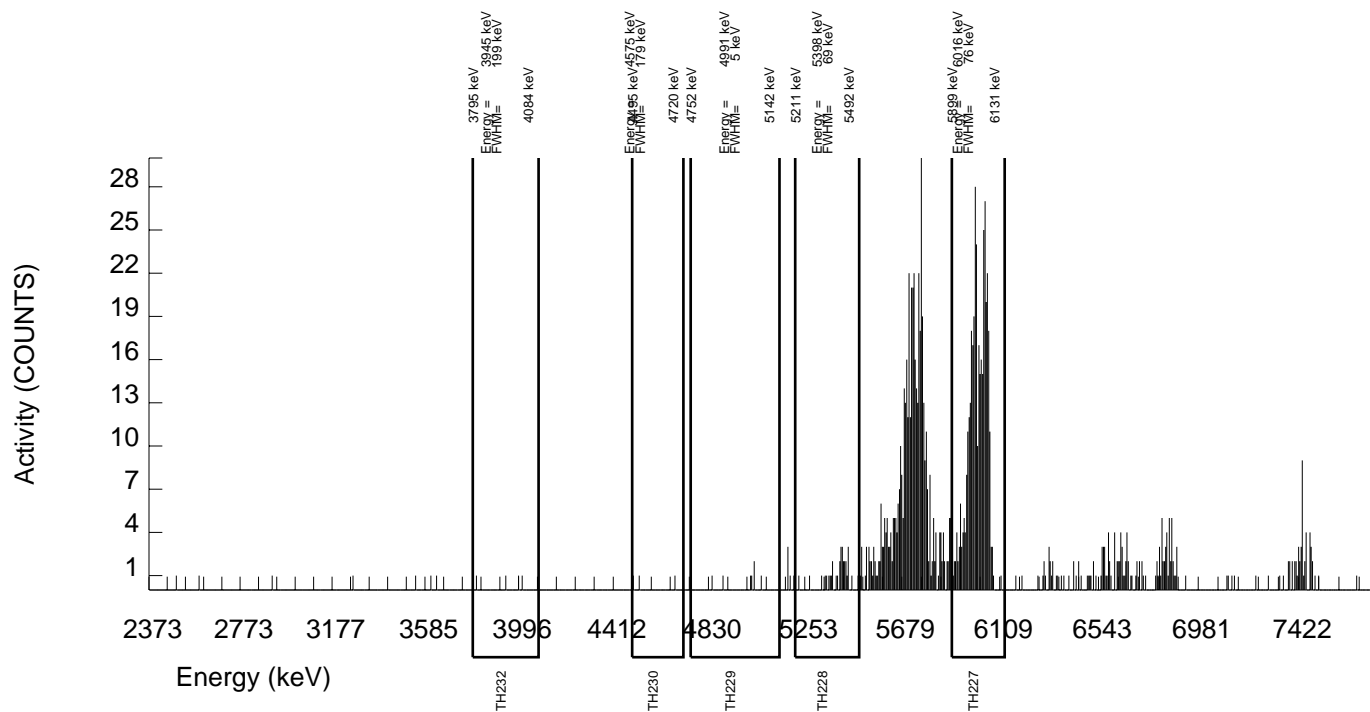
DETECTOR NUMBER :68620  
AVERAGE %EFFICIENCY :25.0189  
% YIELD : 64.935

COUNT DATE:10-AUG-2009 21:14:37  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 2.675E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 2.675E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.91880 dpm RESULTS : 2.54466 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B187.CNF;97 BKG DATE : 9-AUG-2009 EFF FILE : W187.CNF;35 CAL DATE : 22-JUL-2009
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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	396.000	392.000	4.000	2.0000	68.10000	2.21E+00	2.54E-01	6.93E-02	2.62E-02	2.21E-01
TH-228	5363.000	33.000	23.000	10.000	3.1623	99.94000	8.00E-02	4.49E-02	6.16E-02	2.56E-02	4.47E-02
TH229	4900.000	7.000	5.000	2.000	1.4142	99.52000	1.74E-02	2.05E-02	3.34E-02	1.15E-02	2.05E-02
TH-230	4625.000	3.000	1.000	2.000	1.4142	100.0000	3.47E-03	1.52E-02	3.32E-02	1.14E-02	1.52E-02
TH-232	3972.000	4.000	0.000	4.000	2.0000	100.0000	0.00E+00	1.92E-02	4.26E-02	1.61E-02	1.92E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764004\_TH  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :68621  
AVERAGE %EFFICIENCY :26.0109  
% YIELD : 63.573

COUNT DATE:10-AUG-2009 21:14:40  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

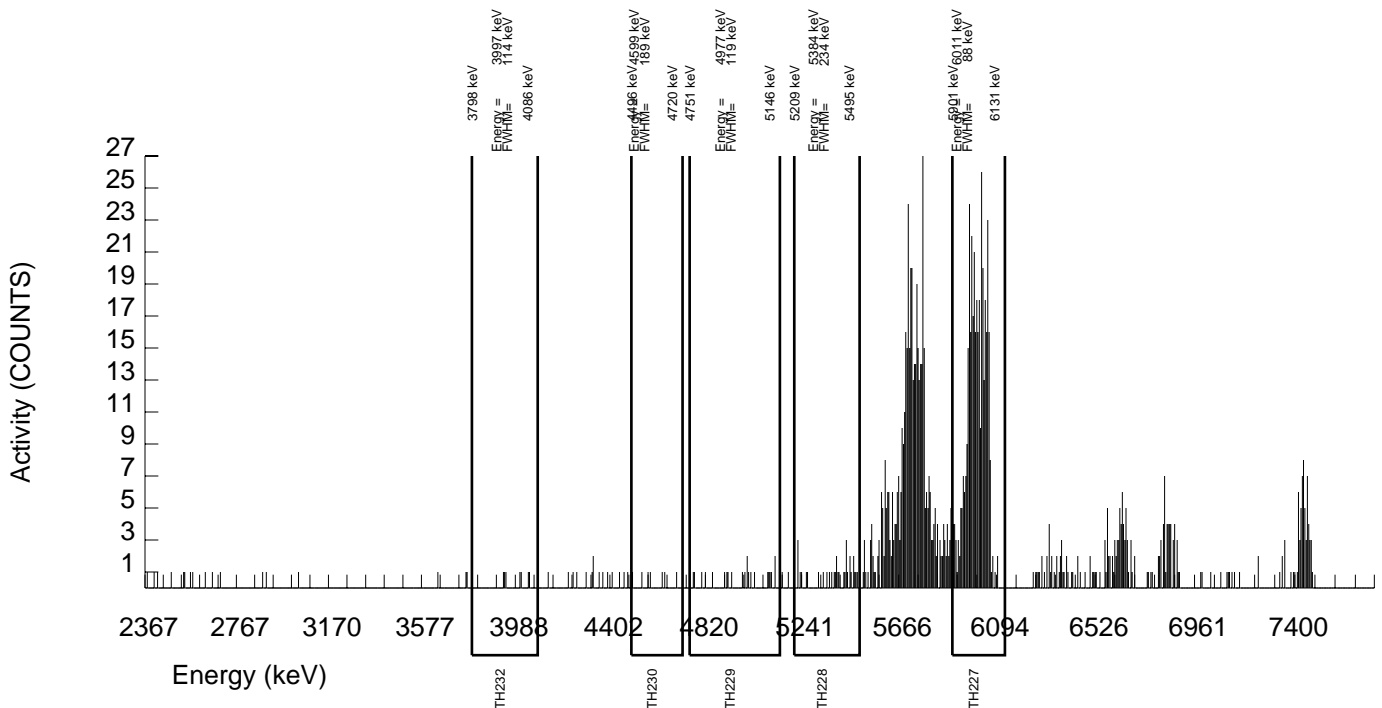
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.91880 dpm  
RESULTS : 2.49132 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B188.CNF;97  
BKG DATE : 9-AUG-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/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
AC-227	6038.010	401.000	399.000	2.000	1.4142	68.10000	2.21E+00	2.48E-01	5.30E-02	1.82E-02	2.18E-01
TH-228	5363.000	32.000	28.000	4.000	2.0000	99.94000	9.57E-02	4.05E-02	4.20E-02	1.59E-02	4.02E-02
TH229	4900.000	22.000	16.000	6.000	2.4495	99.52000	5.47E-02	3.56E-02	4.93E-02	1.95E-02	3.55E-02
TH-230	4625.000	7.000	5.000	2.000	1.4142	100.0000	1.70E-02	2.00E-02	3.26E-02	1.12E-02	2.00E-02
TH-232	3972.000	7.000	4.000	3.000	1.7321	100.0000	1.36E-02	2.11E-02	3.77E-02	1.37E-02	2.11E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764005\_TH  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :68622  
AVERAGE %EFFICIENCY :25.9042  
% YIELD : 65.116

COUNT DATE:10-AUG-2009 21:14:42  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

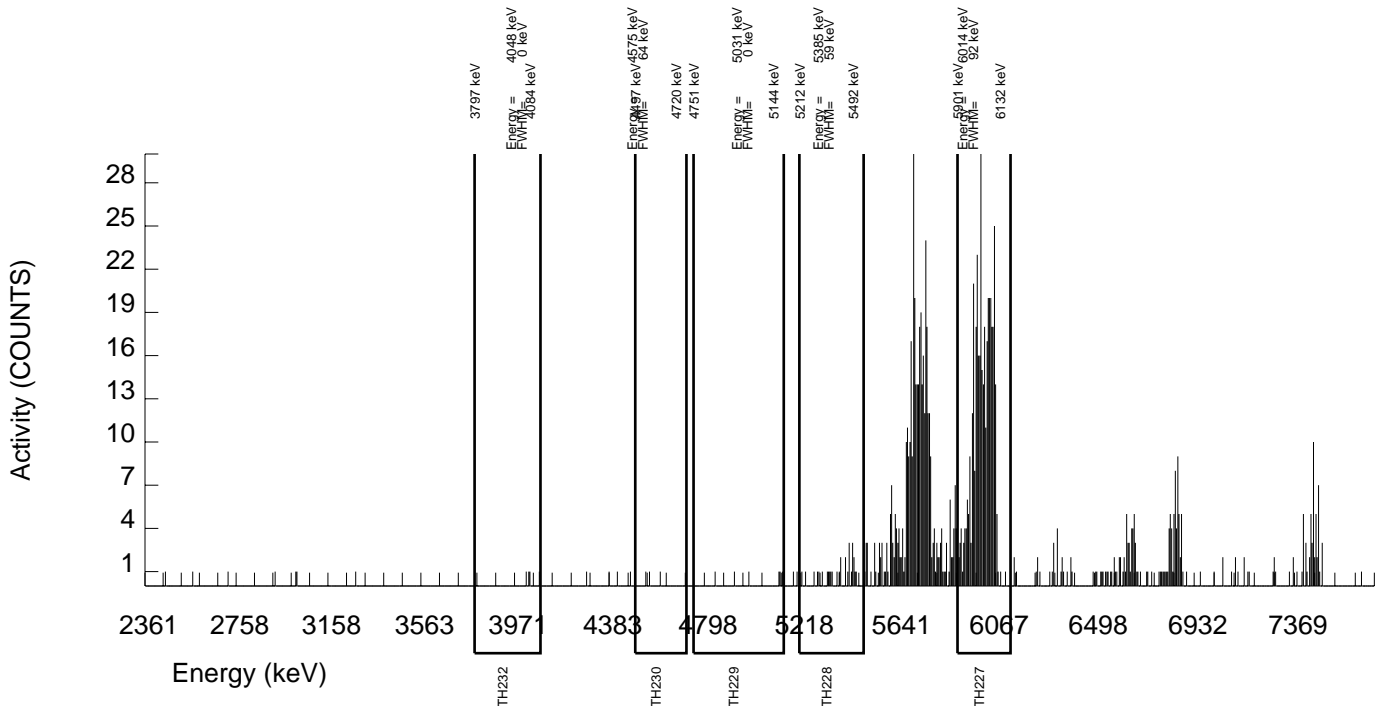
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.91880 dpm  
RESULTS : 2.55175 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B189.CNF;97  
BKG DATE : 9-AUG-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/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
AC-227	6038.010	412.000	407.000	5.000	2.2361	68.10000	2.21E+00	2.51E-01	7.27E-02	2.82E-02	2.17E-01
TH-228	5363.000	29.000	20.000	9.000	3.0000	99.94000	6.70E-02	4.06E-02	5.68E-02	2.34E-02	4.05E-02
TH229	4900.000	6.000	3.000	3.000	1.7321	99.52000	1.01E-02	1.97E-02	3.71E-02	1.35E-02	1.97E-02
TH-230	4625.000	3.000	2.000	1.000	1.0000	100.0000	6.68E-03	1.31E-02	2.55E-02	7.77E-03	1.31E-02
TH-232	3972.000	4.000	4.000	0.000	0.0000	100.0000	1.34E-02	1.31E-02	1.00E-02	0.00E+00	1.31E-02





GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764007\_TH  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :68623  
AVERAGE %EFFICIENCY :26.0642  
% YIELD : 66.306

COUNT DATE:10-AUG-2009 21:14:44  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

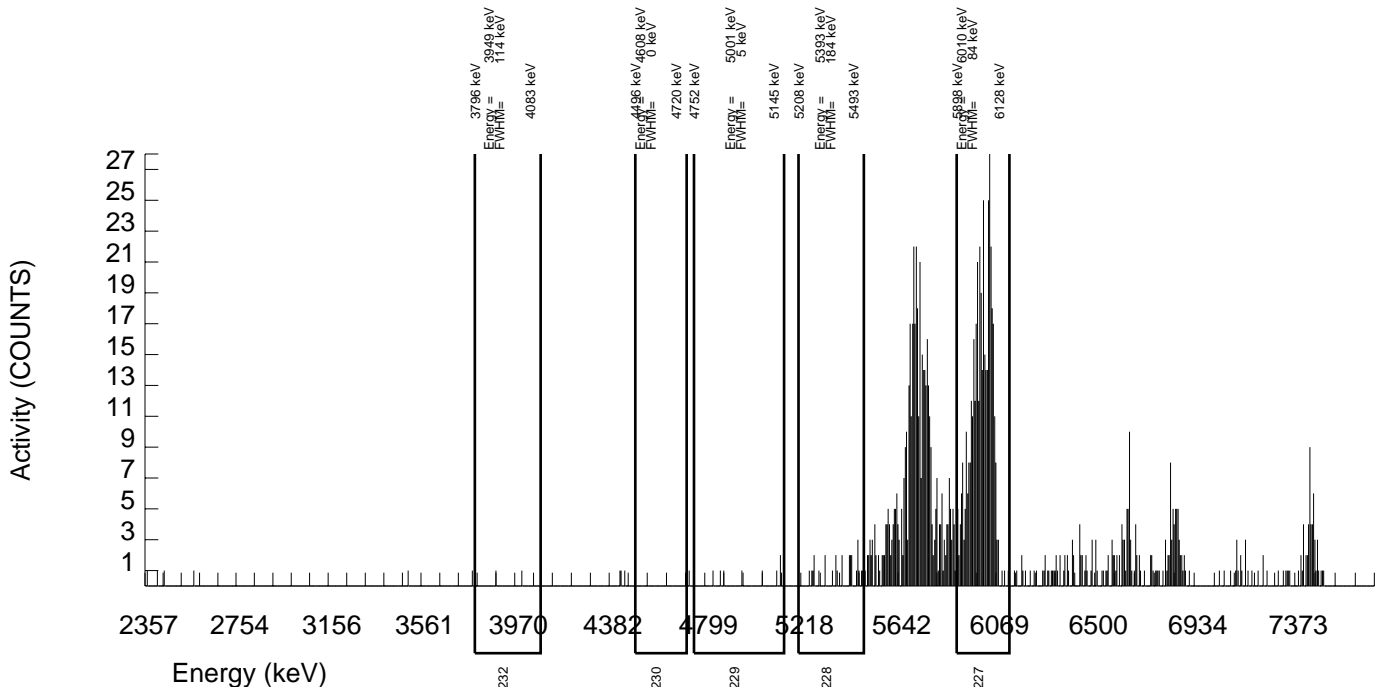
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.91880 dpm  
RESULTS : 2.59840 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B190.CNF;97  
BKG DATE : 9-AUG-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	430.000	417.000	13.000	3.6056	68.10000	2.21E+00	2.49E-01	1.05E-01	4.44E-02	2.18E-01
TH-228	5363.000	27.000	7.000	20.000	4.4721	99.94000	2.29E-02	4.39E-02	7.78E-02	3.40E-02	4.39E-02
TH229	4900.000	8.000	-19.000	27.000	5.1962	99.52000	-6.22E-02	3.80E-02	8.90E-02	3.96E-02	3.80E-02
TH-230	4625.000	0.000	-7.000	7.000	2.6458	100.0000	-2.28E-02	1.81E-02	4.99E-02	2.01E-02	1.81E-02
TH-232	3972.000	2.000	-4.000	6.000	2.4495	100.0000	-1.30E-02	1.81E-02	4.69E-02	1.86E-02	1.81E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764008\_TH  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :68624  
AVERAGE %EFFICIENCY :26.2116  
% YIELD : 72.258

COUNT DATE:10-AUG-2009 21:14:48  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

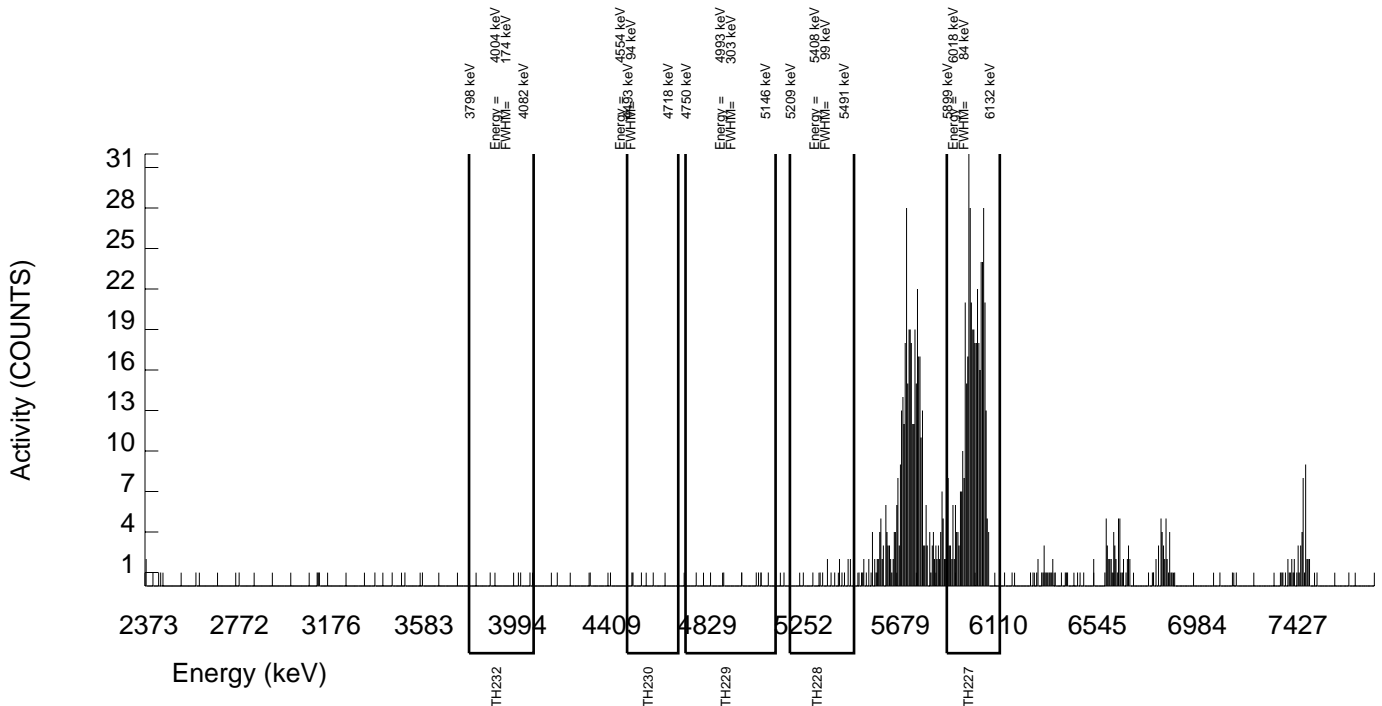
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.91880 dpm  
RESULTS : 2.83163 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B191.CNF;99  
BKG DATE : 9-AUG-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/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
AC-227	6038.010	460.000	457.000	3.000	1.7321	68.10000	2.21E+00	2.40E-01	5.34E-02	1.95E-02	2.04E-01
TH-228	5363.000	16.000	13.000	3.000	1.7321	99.94000	3.88E-02	2.56E-02	3.30E-02	1.20E-02	2.55E-02
TH229	4900.000	8.000	3.000	5.000	2.2361	99.52000	8.96E-03	2.11E-02	4.00E-02	1.55E-02	2.11E-02
TH-230	4625.000	4.000	3.000	1.000	1.0000	100.0000	8.92E-03	1.30E-02	2.28E-02	6.92E-03	1.30E-02
TH-232	3972.000	4.000	4.000	0.000	0.0000	100.0000	1.19E-02	1.17E-02	8.92E-03	0.00E+00	1.17E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764009\_TH  
SAMPLE QTY: 0.800 L

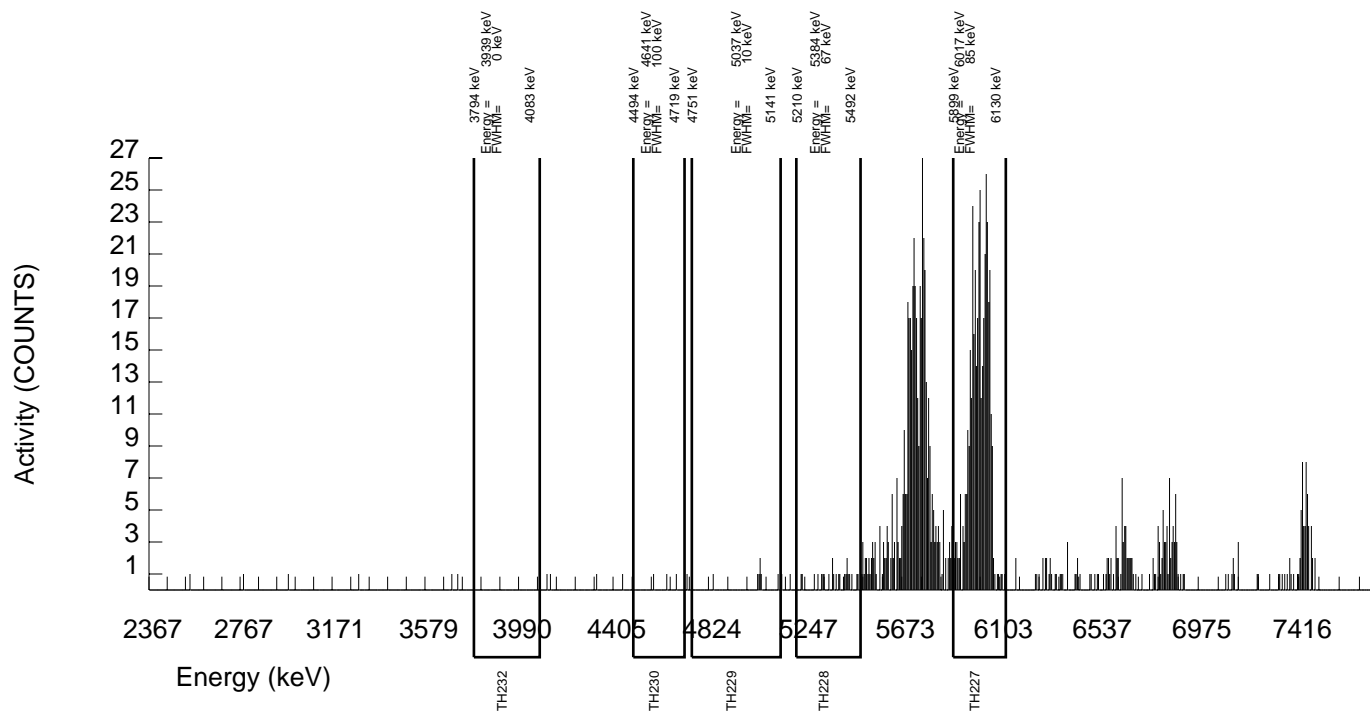
DETECTOR NUMBER :74430  
AVERAGE %EFFICIENCY :26.1047  
% YIELD : 63.504

COUNT DATE:10-AUG-2009 21:14:50  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 2.675E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 2.675E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.91880 dpm RESULTS : 2.48860 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B192.CNF;97 BKG DATE : 9-AUG-2009 EFF FILE : W192.CNF;42 CAL DATE : 22-JUL-2009
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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	406.000	400.000	6.000	2.4495	68.10000	2.21E+00	2.50E-01	7.94E-02	3.14E-02	2.19E-01
TH-228	5363.000	23.000	16.000	7.000	2.6458	99.94000	5.45E-02	3.67E-02	5.22E-02	2.10E-02	3.66E-02
TH229	4900.000	7.000	1.000	6.000	2.4495	99.52000	3.41E-03	2.41E-02	4.91E-02	1.94E-02	2.41E-02
TH-230	4625.000	3.000	3.000	0.000	0.0000	100.0000	1.02E-02	1.15E-02	1.02E-02	0.00E+00	1.15E-02
TH-232	3972.000	0.000	-1.000	1.000	1.0000	100.0000	-3.40E-03	9.42E-03	2.60E-02	7.90E-03	9.41E-03



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764010\_TH  
SAMPLE QTY: 0.800 L

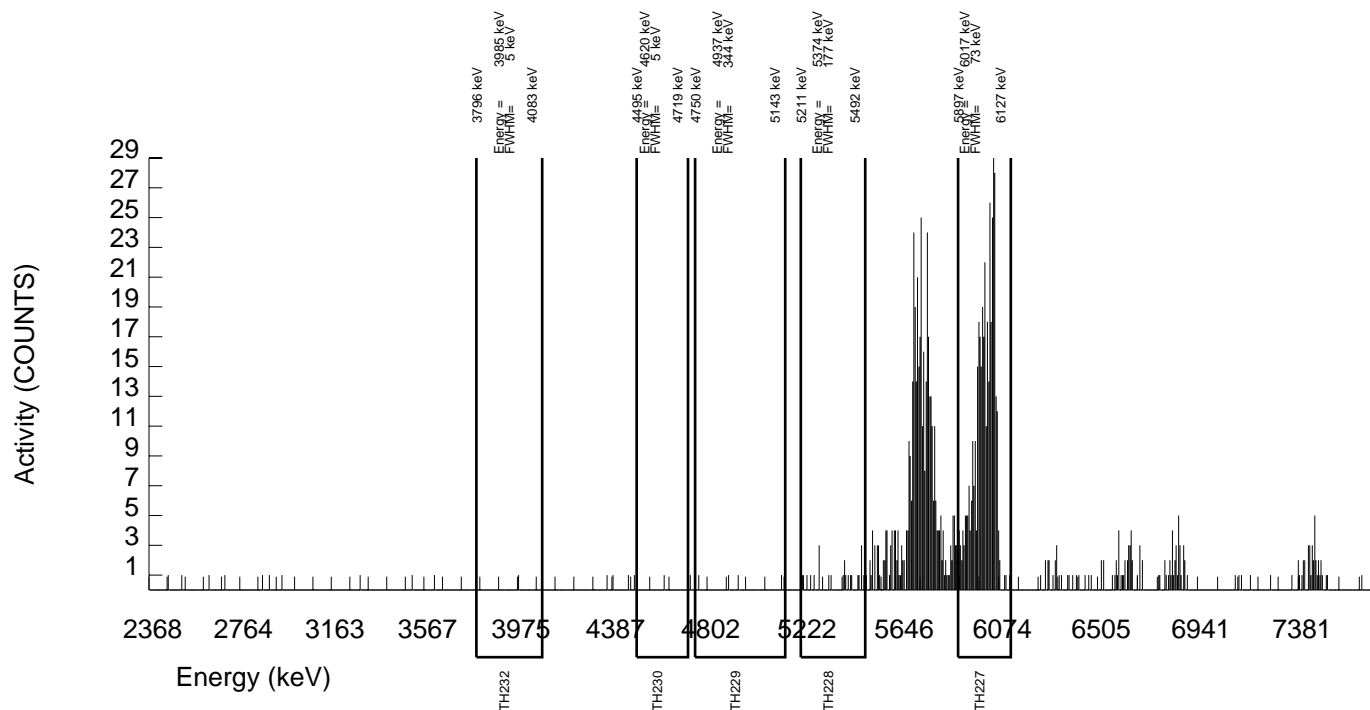
DETECTOR NUMBER :68627  
AVERAGE %EFFICIENCY :26.4072  
% YIELD : 63.091

COUNT DATE:10-AUG-2009 21:14:52  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 2.675E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 2.675E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.91880 dpm RESULTS : 2.47240 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B193.CNF;99 BKG DATE : 9-AUG-2009 EFF FILE : W193.CNF;34 CAL DATE : 22-JUL-2009
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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	409.000	402.000	7.000	2.6458	68.10000	2.21E+00	2.53E-01	8.40E-02	3.38E-02	2.19E-01
TH-228	5363.000	23.000	14.000	9.000	3.0000	99.94000	4.75E-02	3.77E-02	5.75E-02	2.37E-02	3.76E-02
TH229	4900.000	4.000	-5.000	9.000	3.0000	99.52000	-1.70E-02	2.40E-02	5.76E-02	2.37E-02	2.40E-02
TH-230	4625.000	1.000	-1.000	2.000	1.4142	100.0000	-3.38E-03	1.15E-02	3.24E-02	1.11E-02	1.15E-02
TH-232	3972.000	1.000	-1.000	2.000	1.4142	100.0000	-3.38E-03	1.15E-02	3.24E-02	1.11E-02	1.15E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764011\_TH  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :68635  
AVERAGE %EFFICIENCY :25.4957  
% YIELD : 54.293

COUNT DATE:10-AUG-2009 21:14:56  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

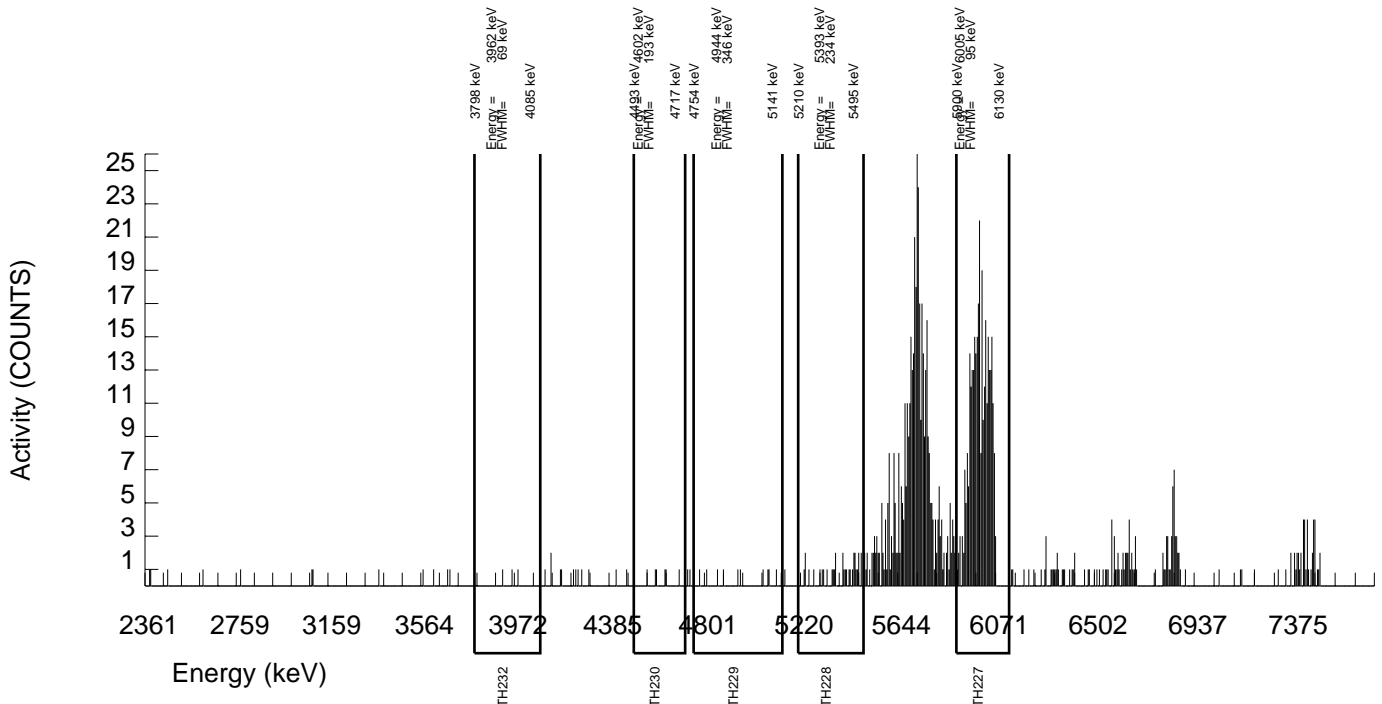
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.91880 dpm  
RESULTS : 2.12763 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B194.CNF;97  
BKG DATE : 9-AUG-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	335.000	334.000	1.000	1.0000	68.10000	2.21E+00	2.66E-01	5.06E-02	1.54E-02	2.37E-01
TH-228	5363.000	32.000	21.000	11.000	3.3166	99.94000	8.57E-02	5.27E-02	7.52E-02	3.15E-02	5.25E-02
TH229	4900.000	11.000	8.000	3.000	1.7321	99.52000	3.27E-02	3.00E-02	4.52E-02	1.65E-02	3.00E-02
TH-230	4625.000	7.000	5.000	2.000	1.4142	100.0000	2.03E-02	2.39E-02	3.90E-02	1.34E-02	2.39E-02
TH-232	3972.000	3.000	3.000	0.000	0.0000	100.0000	1.22E-02	1.38E-02	1.22E-02	0.00E+00	1.38E-02

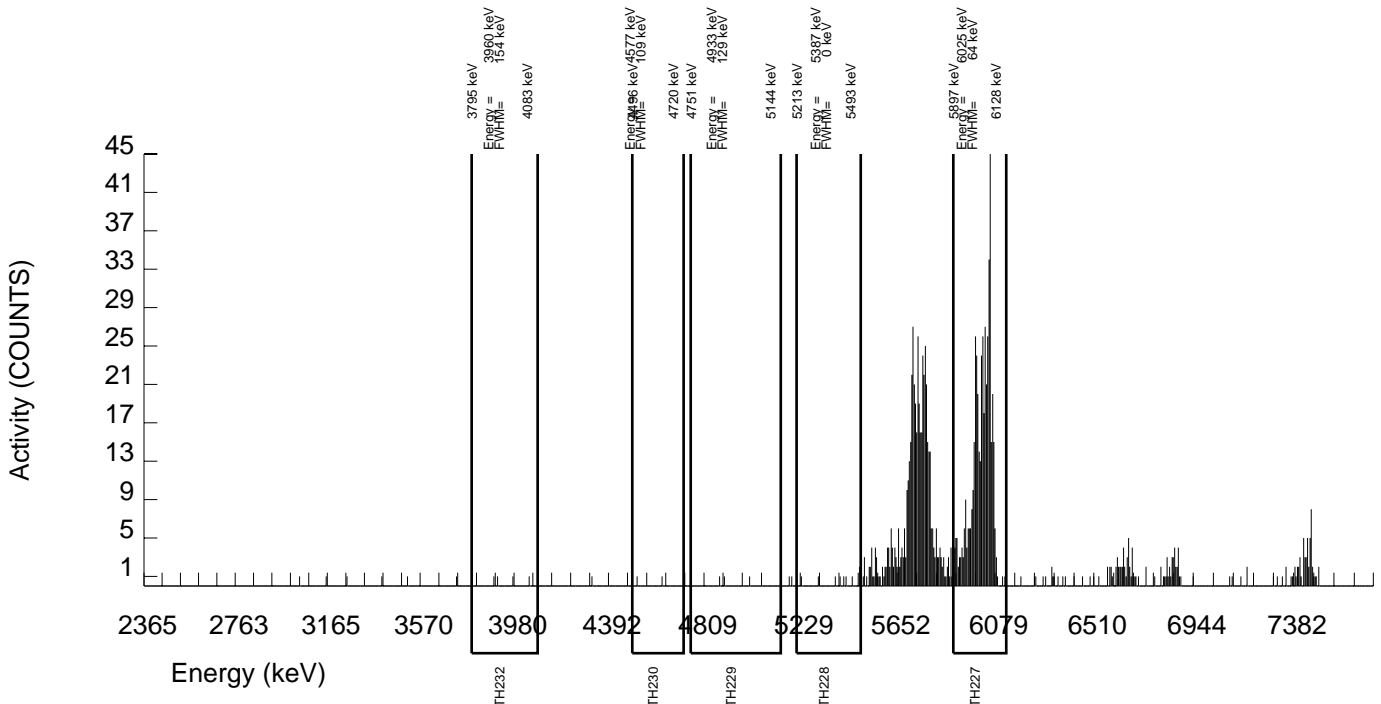


GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789 SAMPLE DATE : 8-AUG-2009 12:15:00.		SAMPLE ID : S0232764013_TH SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :68636 AVERAGE %EFFICIENCY :25.7303 % YIELD : 76.187		COUNT DATE:10-AUG-2009 21:14:58 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXA1	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 2.675E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 2.675E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.91880 dpm RESULTS : 2.98560 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B195.CNF;103 BKG DATE : 9-AUG-2009 EFF FILE : W195.CNF;34 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	481.000	473.000	8.000	2.8284	68.10000	2.21E+00	2.39E-01	7.54E-02	3.07E-02	2.02E-01
TH-228	5363.000	10.000	1.000	9.000	3.0000	99.94000	2.88E-03	2.46E-02	4.89E-02	2.01E-02	2.46E-02
TH229	4900.000	3.000	-11.000	14.000	3.7417	99.52000	-3.17E-02	2.33E-02	5.89E-02	2.51E-02	2.33E-02
TH-230	4625.000	2.000	-37.000	39.000	6.2450	100.0000	-1.06E-01	3.60E-02	9.21E-02	4.17E-02	3.60E-02
TH-232	3972.000	4.000	-4.000	8.000	2.8284	100.0000	-1.15E-02	1.95E-02	4.64E-02	1.89E-02	1.95E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764014\_TH  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :68637  
AVERAGE %EFFICIENCY :25.6679  
% YIELD : 78.310

COUNT DATE:10-AUG-2009 21:15:01  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

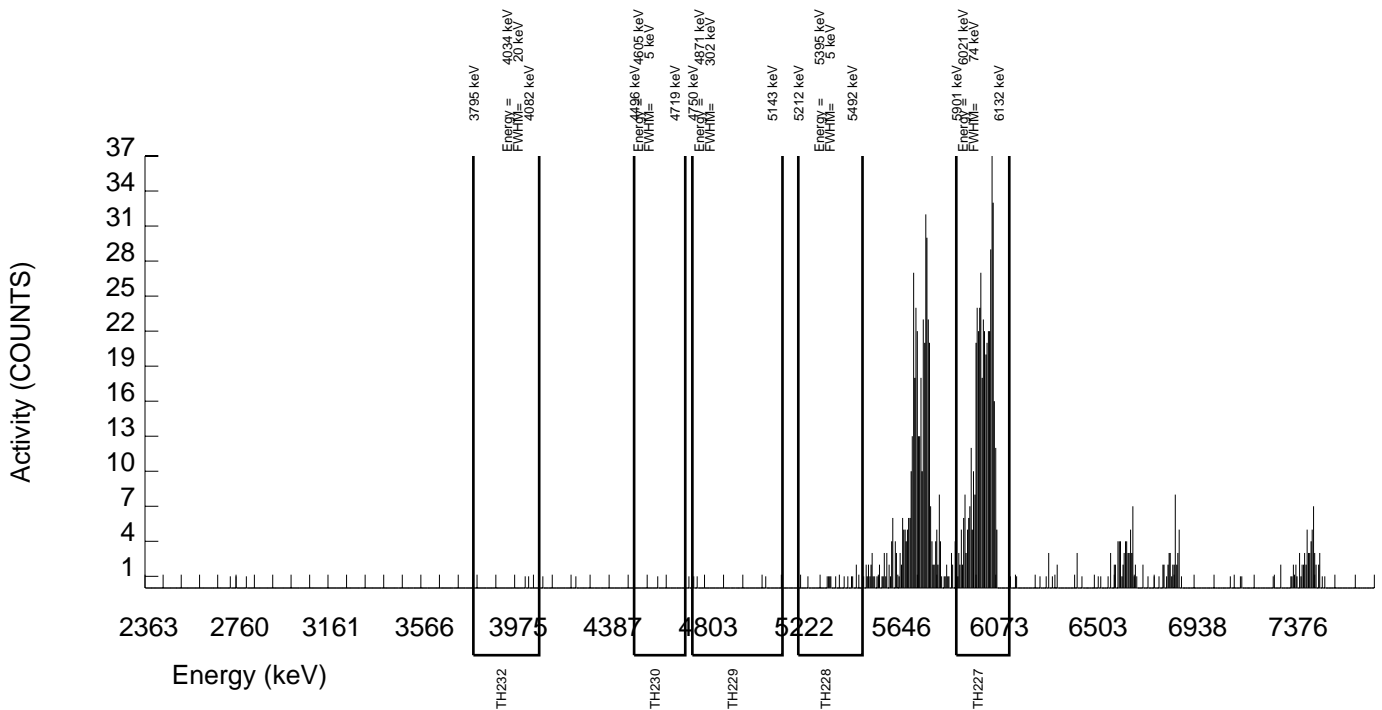
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.91880 dpm  
RESULTS : 3.06880 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B196.CNF;98  
BKG DATE : 9-AUG-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	487.000	485.000	2.000	1.4142	68.10000	2.21E+00	2.30E-01	4.36E-02	1.50E-02	1.97E-01
TH-228	5363.000	12.000	4.000	8.000	2.8284	99.94000	1.12E-02	2.46E-02	4.54E-02	1.85E-02	2.46E-02
TH229	4900.000	3.000	1.000	2.000	1.4142	99.52000	2.81E-03	1.23E-02	2.70E-02	9.26E-03	1.23E-02
TH-230	4625.000	1.000	-4.000	5.000	2.2361	100.0000	-1.12E-02	1.34E-02	3.75E-02	1.46E-02	1.34E-02
TH-232	3972.000	2.000	0.000	2.000	1.4142	100.0000	0.00E+00	1.10E-02	2.68E-02	9.22E-03	1.10E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764015\_TH  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :78902  
AVERAGE %EFFICIENCY :26.0694  
% YIELD : 55.960

COUNT DATE:10-AUG-2009 21:15:03  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

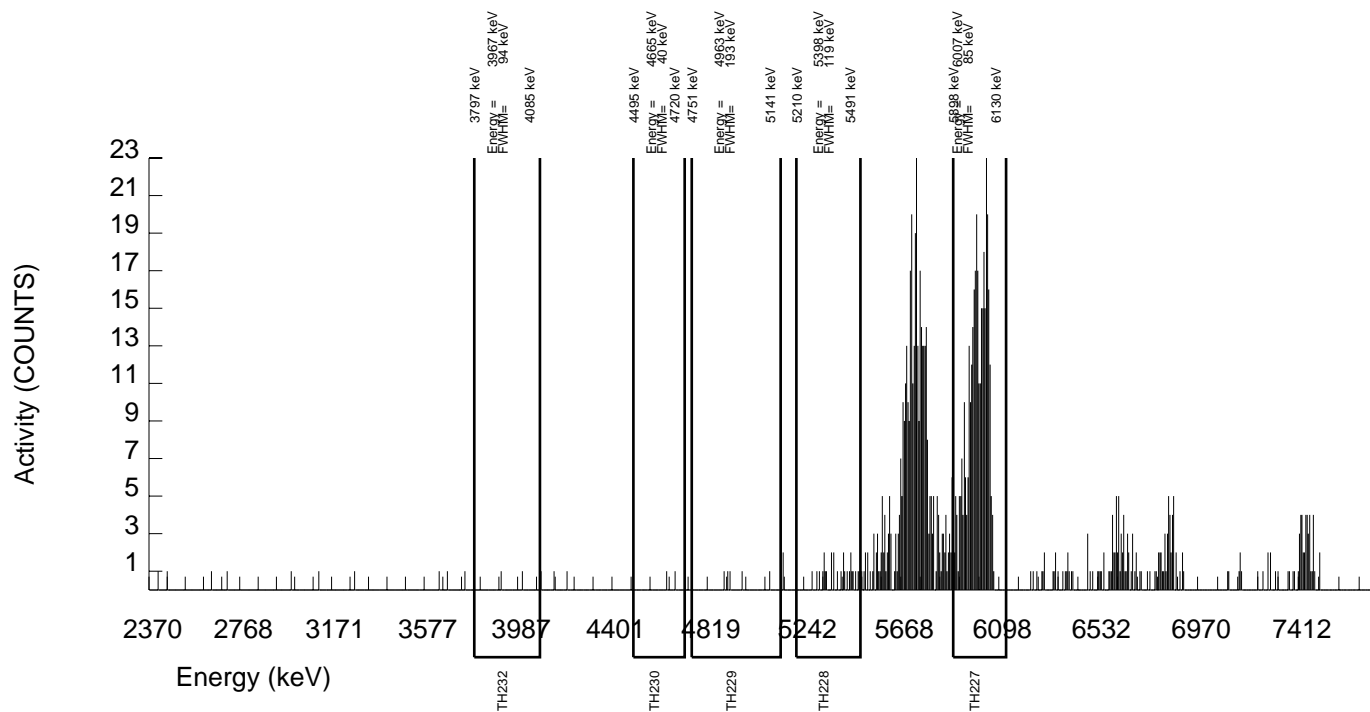
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.91880 dpm  
RESULTS : 2.19295 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B201.CNF;43  
BKG DATE : 9-AUG-2009  
EFF FILE : W201.CNF;32  
CAL DATE : 23-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	354.000	352.000	2.000	1.4142	68.10000	2.21E+00	2.61E-01	6.01E-02	2.06E-02	2.32E-01
TH-228	5363.000	26.000	24.000	2.000	1.4142	99.94000	9.29E-02	4.05E-02	3.71E-02	1.27E-02	4.02E-02
TH229	4900.000	5.000	3.000	2.000	1.4142	99.52000	1.16E-02	2.01E-02	3.72E-02	1.28E-02	2.01E-02
TH-230	4625.000	2.000	1.000	1.000	1.0000	100.0000	3.86E-03	1.31E-02	2.95E-02	8.98E-03	1.31E-02
TH-232	3972.000	2.000	1.000	1.000	1.0000	100.0000	3.86E-03	1.31E-02	2.95E-02	8.98E-03	1.31E-02





GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764016\_TH  
SAMPLE QTY: 0.800 L

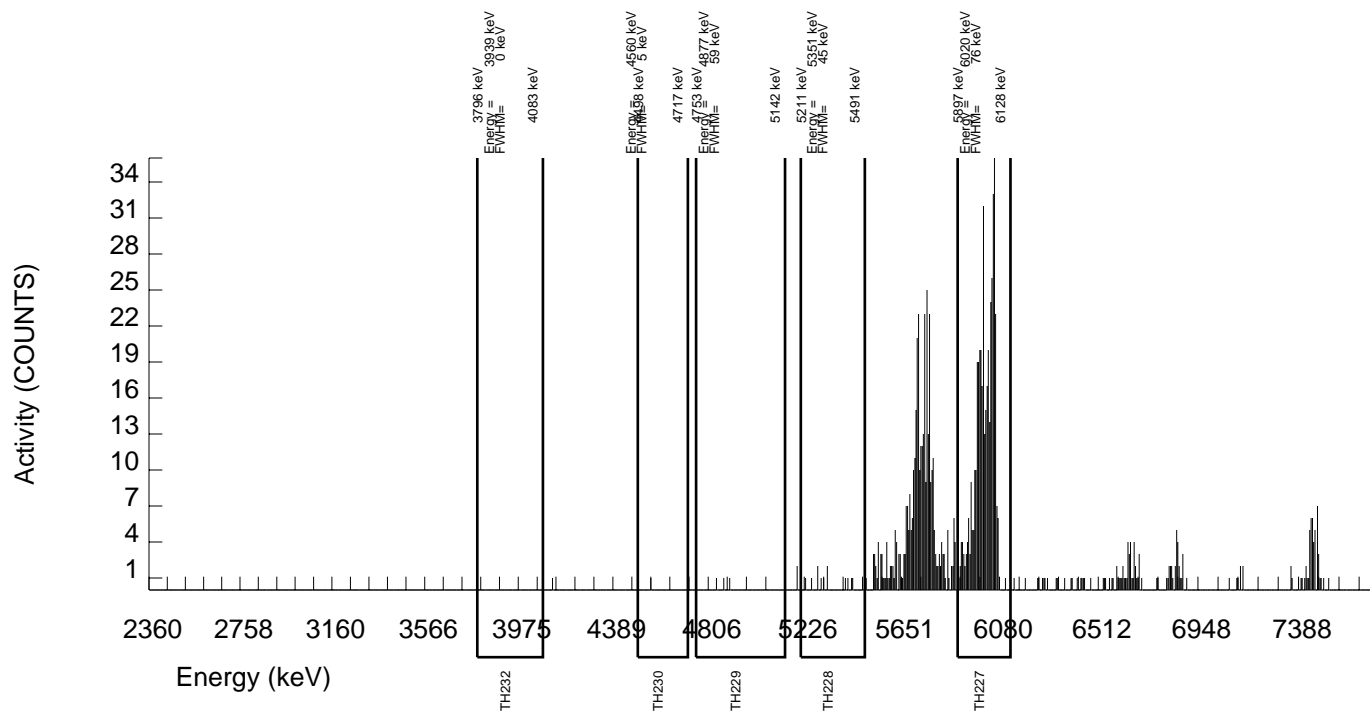
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AVERAGE %EFFICIENCY :26.3766  
% YIELD : 68.192

COUNT DATE:10-AUG-2009 21:15:08  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 2.675E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 2.675E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.91880 dpm RESULTS : 2.67232 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B202.CNF;43 BKG DATE : 9-AUG-2009 EFF FILE : W202.CNF;32 CAL DATE : 23-JUL-2009
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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	437.000	434.000	3.000	1.7321	68.10000	2.21E+00	2.41E-01	5.62E-02	2.05E-02	2.09E-01
TH-228	5363.000	13.000	9.000	4.000	2.0000	99.94000	2.83E-02	2.54E-02	3.86E-02	1.46E-02	2.54E-02
TH229	4900.000	3.000	1.000	2.000	1.4142	99.52000	3.15E-03	1.38E-02	3.01E-02	1.03E-02	1.38E-02
TH-230	4625.000	1.000	0.000	1.000	1.0000	100.0000	0.00E+00	8.68E-03	2.40E-02	7.28E-03	8.68E-03
TH-232	3972.000	0.000	-1.000	1.000	1.0000	100.0000	-3.13E-03	8.68E-03	2.40E-02	7.28E-03	8.68E-03



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S0232764017\_TH  
SAMPLE QTY: 0.600 L

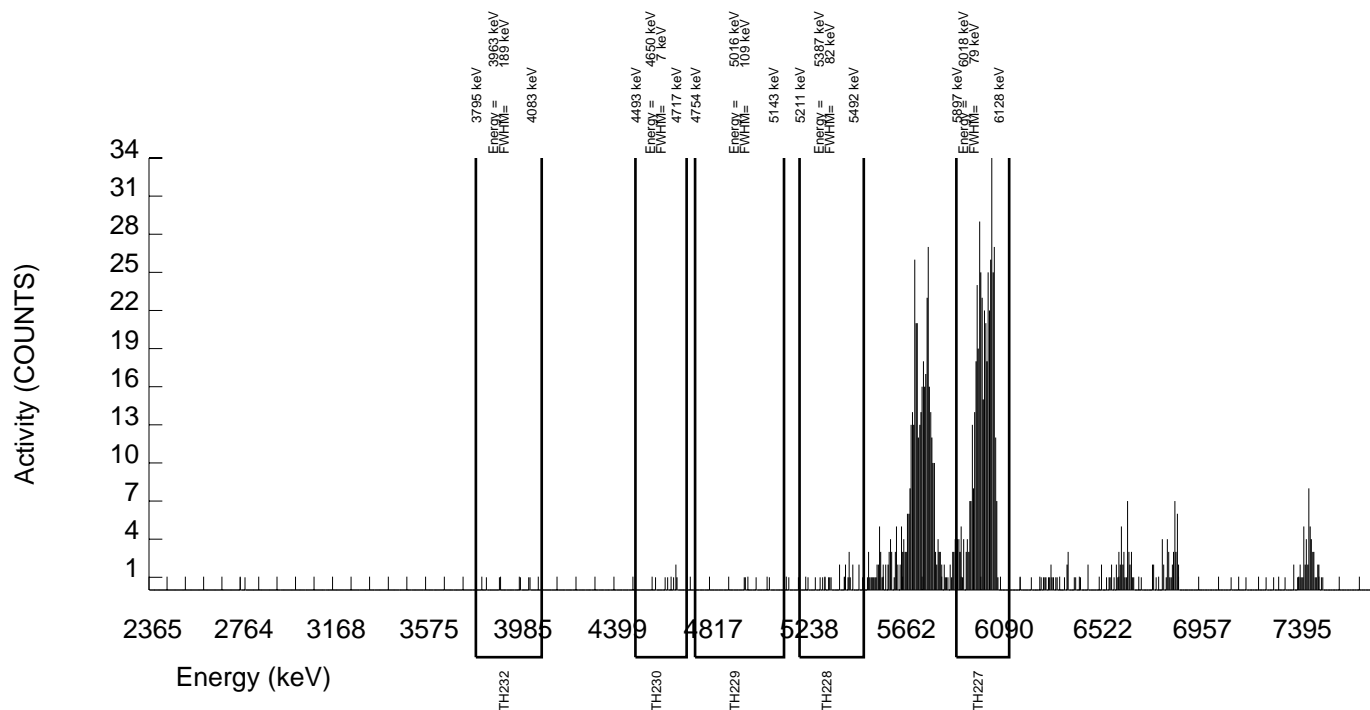
DETECTOR NUMBER :78905  
AVERAGE %EFFICIENCY :25.6941  
% YIELD : 76.778

COUNT DATE:10-AUG-2009 21:15:10  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

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 : 3.91880 dpm RESULTS : 3.00879 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B203.CNF;43 BKG DATE : 9-AUG-2009 EFF FILE : W203.CNF;32 CAL DATE : 23-JUL-2009
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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	481.000	476.000	5.000	2.2361	68.10000	2.94E+00	3.11E-01	8.28E-02	3.22E-02	2.67E-01
TH-228	5363.000	24.000	22.000	2.000	1.4142	99.94000	8.40E-02	3.84E-02	3.66E-02	1.26E-02	3.82E-02
TH229	4900.000	4.000	-1.000	5.000	2.2361	99.52000	-3.82E-03	2.25E-02	5.13E-02	1.99E-02	2.25E-02
TH-230	4625.000	7.000	6.000	1.000	1.0000	100.0000	2.28E-02	2.11E-02	2.91E-02	8.85E-03	2.11E-02
TH-232	3972.000	5.000	4.000	1.000	1.0000	100.0000	1.52E-02	1.83E-02	2.91E-02	8.85E-03	1.83E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S1201896949\_TH  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :78907  
AVERAGE %EFFICIENCY :25.0649  
% YIELD : 75.730

COUNT DATE:10-AUG-2009 21:15:12  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

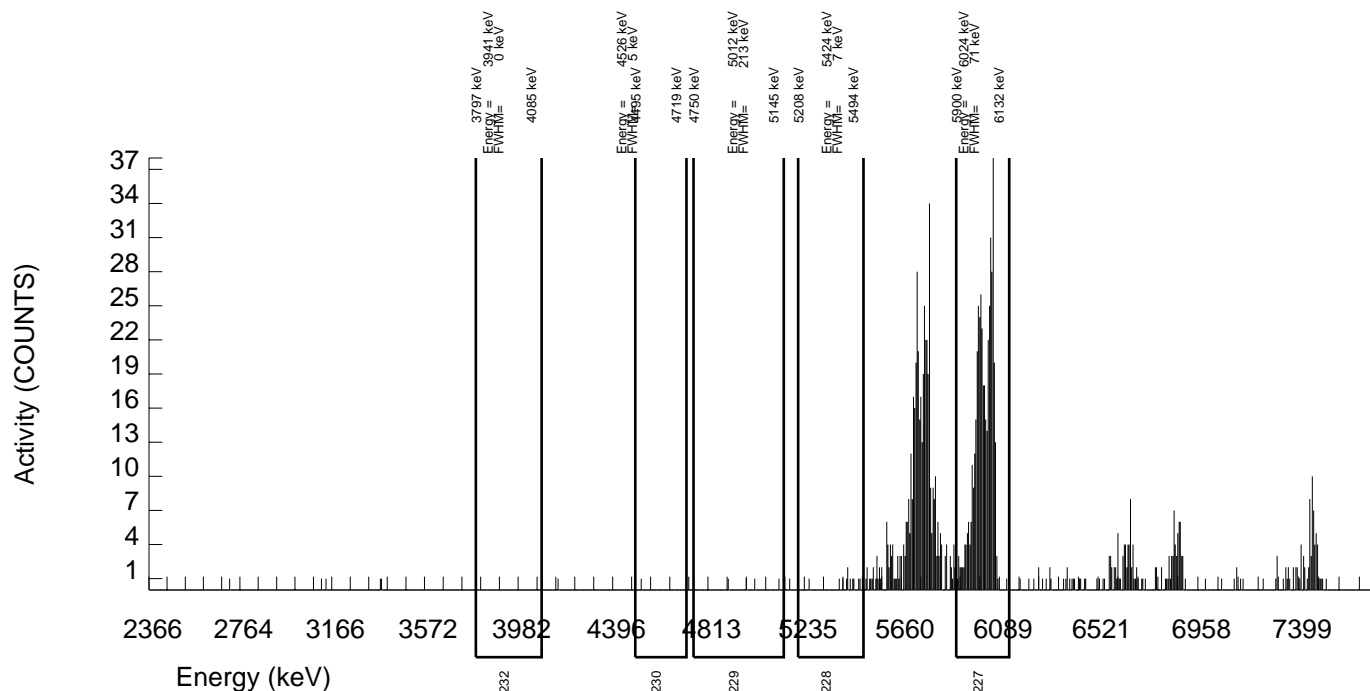
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.91880 dpm  
RESULTS : 2.96769 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B204.CNF;43  
BKG DATE : 9-AUG-2009  
EFF FILE : W204.CNF;32  
CAL DATE : 23-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	459.000	458.000	1.000	1.0000	68.10000	2.21E+00	2.35E-01	3.69E-02	1.12E-02	2.03E-01
TH-228	5363.000	11.000	8.000	3.000	1.7321	99.94000	2.38E-02	2.19E-02	3.29E-02	1.20E-02	2.18E-02
TH229	4900.000	4.000	-2.000	6.000	2.4495	99.52000	-5.96E-03	1.85E-02	4.29E-02	1.70E-02	1.85E-02
TH-230	4625.000	1.000	-8.000	9.000	3.0000	100.0000	-2.37E-02	1.84E-02	5.03E-02	2.07E-02	1.84E-02
TH-232	3972.000	0.000	-3.000	3.000	1.7321	100.0000	-8.90E-03	1.16E-02	3.28E-02	1.20E-02	1.16E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S1201896950\_TH  
SAMPLE QTY: 0.600 L

DETECTOR NUMBER :78908  
AVERAGE %EFFICIENCY :25.0334  
% YIELD : 81.785

COUNT DATE:10-AUG-2009 21:15:15  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

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

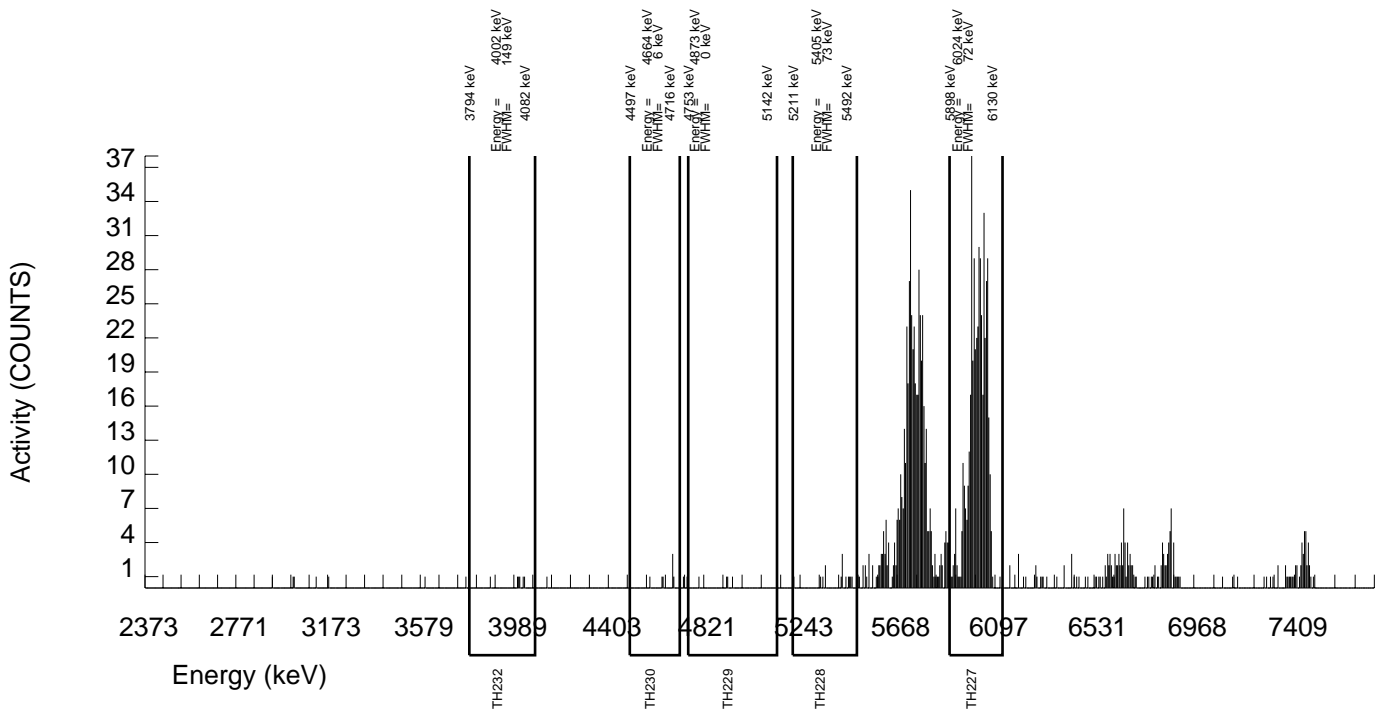
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 3.567E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.91880 dpm  
RESULTS : 3.20498 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B205.CNF;43  
BKG DATE : 9-AUG-2009  
EFF FILE : W205.CNF;32  
CAL DATE : 23-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	496.000	494.000	2.000	1.4142	68.10000	2.94E+00	3.05E-01	5.71E-02	1.96E-02	2.60E-01
TH-228	5363.000	14.000	13.000	1.000	1.0000	99.94000	4.78E-02	2.80E-02	2.82E-02	8.56E-03	2.79E-02
TH229	4900.000	5.000	3.000	2.000	1.4142	99.52000	1.11E-02	1.91E-02	3.53E-02	1.21E-02	1.91E-02
TH-230	4625.000	7.000	6.000	1.000	1.0000	100.0000	2.20E-02	2.04E-02	2.81E-02	8.53E-03	2.03E-02
TH-232	3972.000	6.000	4.000	2.000	1.4142	100.0000	1.47E-02	2.03E-02	3.51E-02	1.21E-02	2.03E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S1201896951\_TH  
SAMPLE QTY: 0.200 L

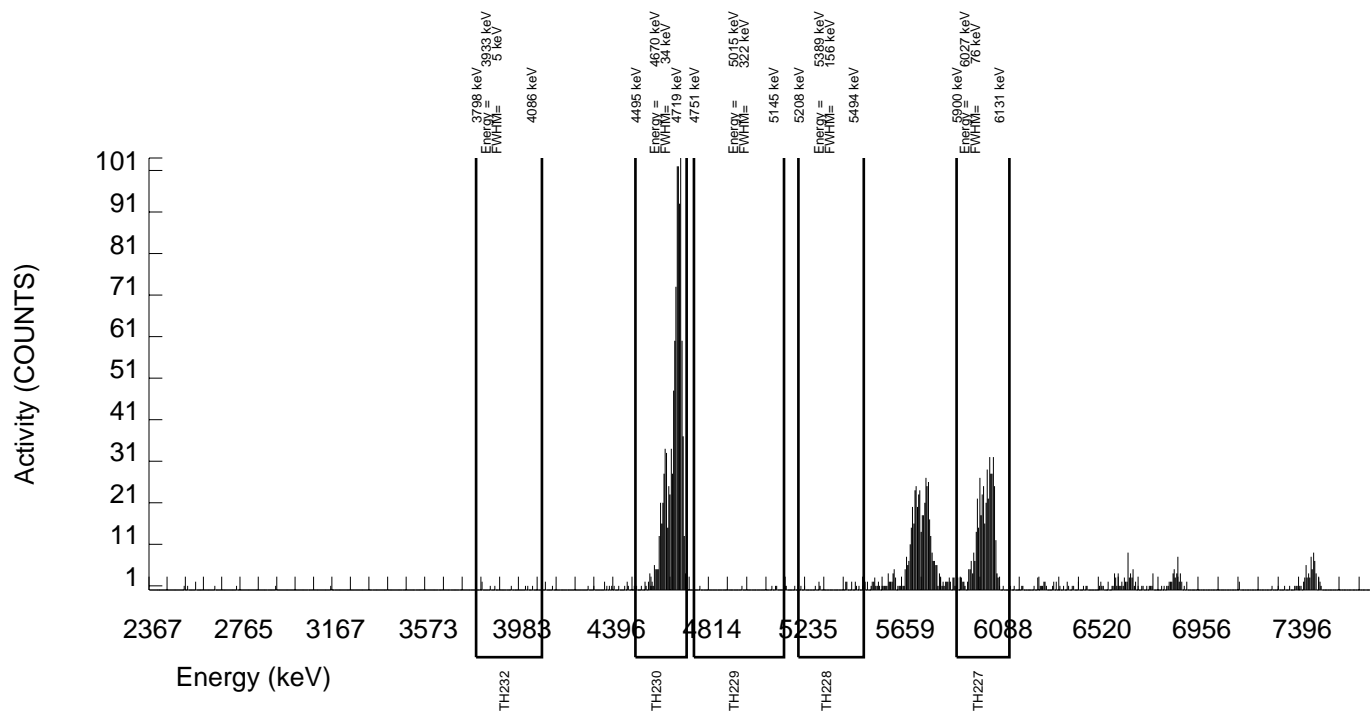
DETECTOR NUMBER :78909  
AVERAGE %EFFICIENCY :25.6293  
% YIELD : 73.577

COUNT DATE:10-AUG-2009 21:15:18  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 1.070E+01	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/L : 1.070E+01	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.91880 dpm RESULTS : 2.88333 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B206.CNF;43 BKG DATE : 9-AUG-2009 EFF FILE : W206.CNF;32 CAL DATE : 23-JUL-2009
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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	456.000	455.000	1.000	1.0000	68.10000	8.83E+00	9.42E-01	1.48E-01	4.51E-02	8.13E-01
TH-228	5363.000	17.000	16.000	1.000	1.0000	99.94000	1.92E-01	1.00E-01	9.17E-02	2.79E-02	9.96E-02
TH229	4900.000	5.000	3.000	2.000	1.4142	99.52000	3.60E-02	6.23E-02	1.15E-01	3.95E-02	6.22E-02
TH-230	4625.000	1024.000	1023.000	1.000	1.0000	100.0000	1.22E+01	9.99E-01	9.14E-02	2.78E-02	7.49E-01
TH-232	3972.000	8.000	7.000	1.000	1.0000	100.0000	8.36E-02	7.04E-02	9.14E-02	2.78E-02	7.02E-02



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 891789  
SAMPLE DATE : 8-AUG-2009 12:15:00.

SAMPLE ID : S1201896952\_TH  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :78910  
AVERAGE %EFFICIENCY :25.5856  
% YIELD : 76.780

COUNT DATE:10-AUG-2009 21:15:21  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXA1

MS/MSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

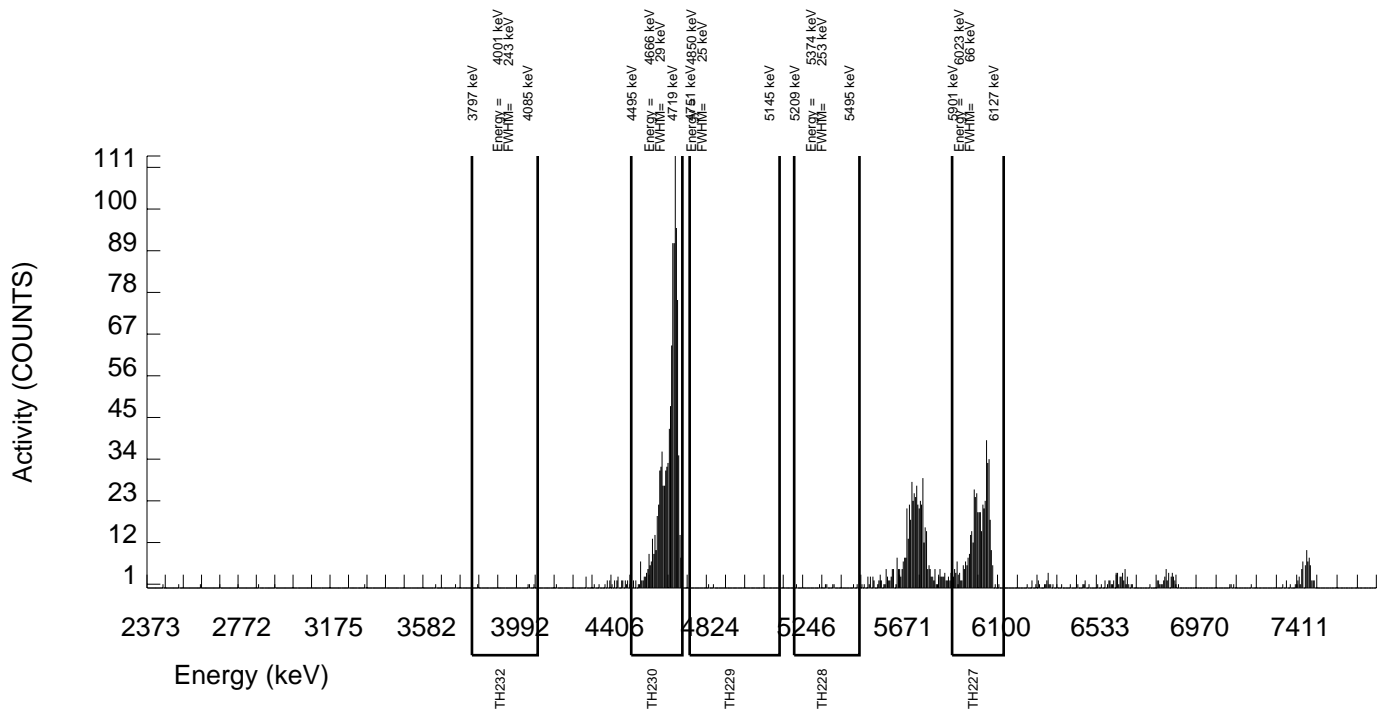
LCS/LCSD  
ID : A2796-J  
ISOTOPE : TH-230  
PCI/L : 2.675E+00

TRACER  
ID : 0387-B-102  
ISOTOPE : AC227  
NOMINAL : 3.91880 dpm  
RESULTS : 3.00887 dpm

LIB FILE : ENV\_ALPHA\_TH.N  
BKG FILE : B207.CNF;43  
BKG DATE : 9-AUG-2009  
EFF FILE : W207.CNF;32  
CAL DATE : 23-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	474.000	1.000	1.0000	68.10000	2.21E+00	2.32E-01	3.56E-02	1.08E-02	1.99E-01
TH-228	5363.000	8.000	5.000	3.000	1.7321	99.94000	1.44E-02	1.87E-02	3.18E-02	1.16E-02	1.87E-02
TH229	4900.000	2.000	-1.000	3.000	1.7321	99.52000	-2.88E-03	1.26E-02	3.19E-02	1.16E-02	1.26E-02
TH-230	4625.000	1070.000	1067.000	3.000	1.7321	100.0000	3.06E+00	2.47E-01	3.17E-02	1.15E-02	1.84E-01
TH-232	3972.000	4.000	-1.000	5.000	2.2361	100.0000	-2.87E-03	1.69E-02	3.84E-02	1.49E-02	1.69E-02



# URANIUM

### Radiochemistry Batch Checklist, Rev 9

Batch# 892286      Product: ✓      Date: 8/12/09

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 720624
Method RDL/ LLD has been met.		✓	NCR 720624
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%.	✓		Case narrative
Or meets the client's required RER acceptance criteria.		✓	NCR 720624
Tracer yield is 15-125% . Carrier yield 25-125%.		✓	NCR 720624
Or meets the client's contract acceptance criteria.		✓	NCR 720624
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.			N/A
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 720624
Batch non-conformances second reviewed and disposition verified to be completed.			NCR 720624
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:

Jop L M L - 8/12/09

Secondary Review Performed By:

JK C... 8/12/09

8/7 8/13

KERR



# Uranium Que Sheet

10-AUG-09

Batch #: 892286 Analyst: MXE1 First Client Due Date: 13-AUG-09 Internal Due Date: 07-AUG-09  
 Tracer Isotope: U-232/0-236 Tracer Code: 1203-E Expiration Date: 1/1/10 Vol: 1  
 LCS Isotope: U-238 LCS Code: 1V3-G Expiration Date: 4/1/10 Vol: 1  
 Spike Isotope: U-238 Spike Code: 1U3-G Expiration Date: 4/1/10 Vol: 1  
 Prep Date: 8/10/09 Initials: MWA Pipet ID: 256755 Balance ID: 160725

Witness: KM 8-10-09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g (µl))	U Det #
232764001-3	M-110B	SAMPLE		.03 pCi/L	WATER	KERR003	01-JUL-09	1		0.3000	135
232764002-3	M-110B DISS	SAMPLE		.03 pCi/L	WATER	KERR003	01-JUL-09	2		0.3000	136
232764003-3	I-ARB	SAMPLE		.03 pCi/L	WATER	KERR003	01-JUL-09	3		0.3000	137
232764004-3	M-117B	SAMPLE		.03 pCi/L	WATER	KERR003	06-JUL-09	4		0.3000	138
232764005-3	M-120B	SAMPLE		.03 pCi/L	WATER	KERR003	07-JUL-09	5		0.3000	139
232764007-3	M-103B	SAMPLE		.03 pCi/L	WATER	KERR003	08-JUL-09	6		0.3000	140
232764008-3	M-118B	SAMPLE		.03 pCi/L	WATER	KERR003	09-JUL-09	7		0.3000	141
232764009-3	M-121B	SAMPLE		.03 pCi/L	WATER	KERR003	10-JUL-09	8		0.3000	142
232764010-3	M-10B	SAMPLE		.03 pCi/L	WATER	KERR003	10-JUL-09	9		0.3000	143
232764011-3	M-10B DISS	SAMPLE		.03 pCi/L	WATER	KERR003	10-JUL-09	10		0.6000	144
232764013-3	H-11B	SAMPLE		.03 pCi/L	WATER	KERR003	13-JUL-09	11		0.3000	145
232764014-3	H-11B DISS	SAMPLE		.03 pCi/L	WATER	KERR003	13-JUL-09	12		0.3000	146
232764015-3	TR-10B	SAMPLE		.03 pCi/L	WATER	KERR003	14-JUL-09	13		0.3000	147
232764016-3	TR-8B	SAMPLE		.03 pCi/L	WATER	KERR003	14-JUL-09	14		0.3000	148
232764017-3	M-92B	SAMPLE		.03 pCi/L	WATER	KERR003	15-JUL-09	15		0.3000	149
1201898106-1	MB for batch 892286	MB		UCF pCi/L to pCi	WATER	QC ACCOUNT		16		0.3000	150
1201898107-3	M-92B(232764017DUP)	DUP		.03 pCi/L	WATER	QC ACCOUNT	15-JUL-09	17		0.3000	151
1201898108-3	M-92B(232764017MS)	MS		.03 pCi/L	WATER	QC ACCOUNT	15-JUL-09	18		0.3000	152
1201898109-1	LCS for batch 892286	LCS		UCF pCi/L to pCi	WATER	QC ACCOUNT		19		0.3000	153

Choose SOP used: GL-RAD-A-011  
GL-RAD-A-038  
 GL-RAD-A-045  
 GL-RAD-A-043  
 GEL Laboratories LLC, Radiochemistry Division

Solid Sample Dissolution by: LEACH or DIGESTION  
 Cite One

Data Reviewed By: Jop-M-L- 8/12/09  
Jop-M-L- 8/12/09

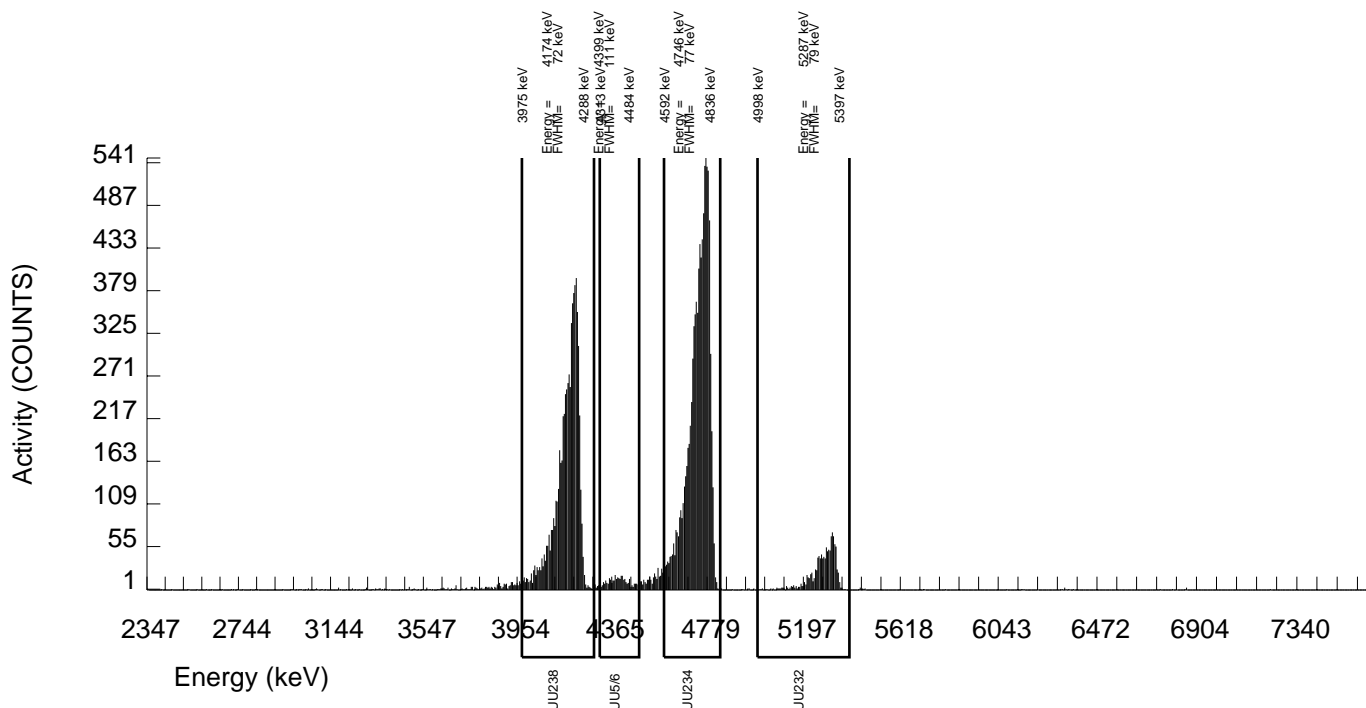
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 1-JUL-2009 00:00:00.		SAMPLE ID : S0232764001_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :64270 AVERAGE %EFFICIENCY :25.5982 % YIELD : 85.817		COUNT DATE:11-AUG-2009 16:57:08 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26816 dpm RESULTS : 4.52096 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B135.CNF;382 BKG DATE : 9-AUG-2009 EFF FILE : W135.CNF;124 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	9482.000	9478.510	0.000	0.0000	100.0000	2.43E+01	3.37E+00	7.69E-03	0.00E+00	4.89E-01
U232	5302.100	1162.000	1156.000	6.000	2.4495	100.0000	2.97E+00	4.41E-01	3.69E-02	1.46E-02	1.72E-01
U-235	4391.000	355.000	355.000	0.000	0.0000	80.90000	1.12E+00	1.94E-01	9.50E-03	0.00E+00	1.17E-01
U-238	4184.730	6654.000	6654.000	0.000	0.0000	100.0000	1.71E+01	2.37E+00	7.69E-03	0.00E+00	4.10E-01

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



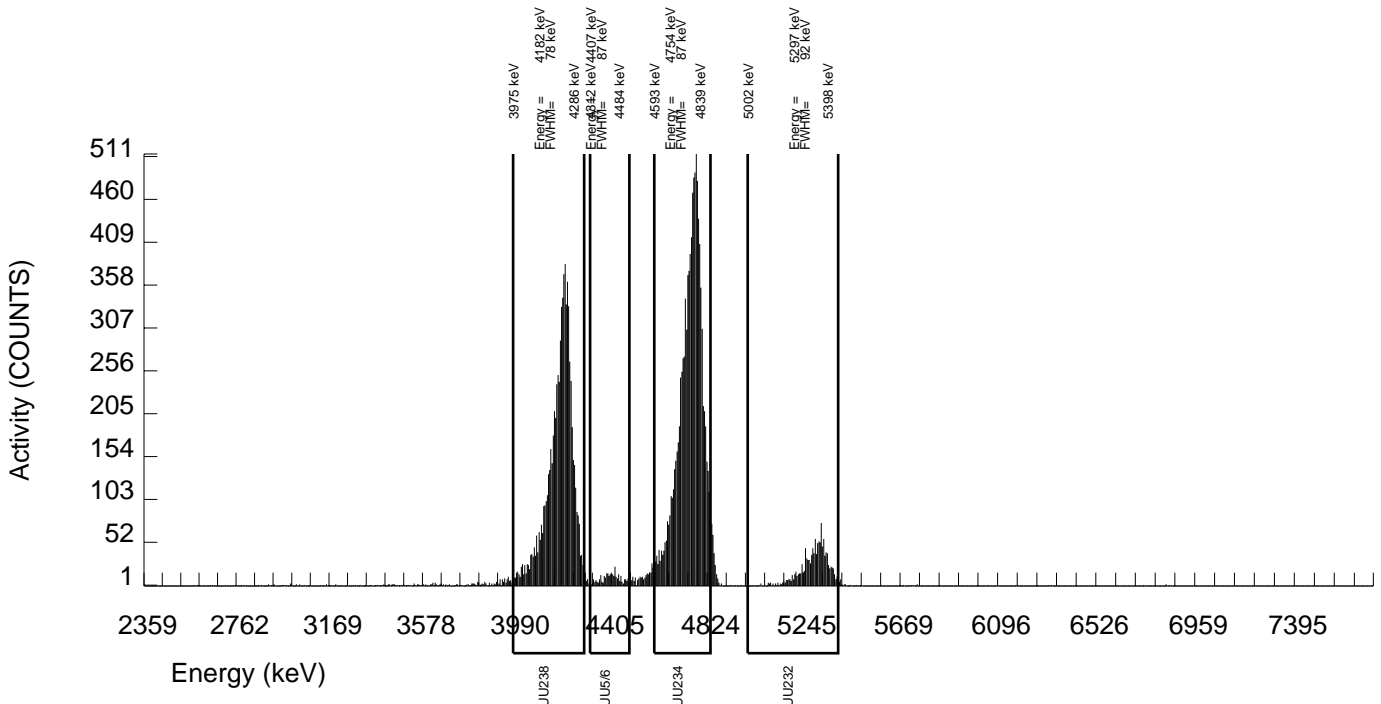
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 1-JUL-2009 00:00:00.		SAMPLE ID : S0232764002_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :68549 AVERAGE %EFFICIENCY :24.6765 % YIELD : 93.719		COUNT DATE:11-AUG-2009 16:57:10 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26816 dpm RESULTS : 4.93727 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B136.CNF;381 BKG DATE : 9-AUG-2009 EFF FILE : W136.CNF;125 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	10008.000	9999.325	5.000	2.2361	100.0000	2.43E+01	3.36E+00	3.26E-02	1.27E-02	4.77E-01
U232	5302.100	1231.000	1217.000	14.000	3.7417	100.0000	2.97E+00	4.39E-01	4.97E-02	2.12E-02	1.69E-01
U-235	4391.000	302.000	295.000	7.000	2.6458	80.90000	8.88E-01	1.60E-01	4.61E-02	1.85E-02	1.04E-01
U-238	4184.730	7315.000	7311.000	4.000	2.0000	100.0000	1.78E+01	2.47E+00	3.00E-02	1.13E-02	4.08E-01

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



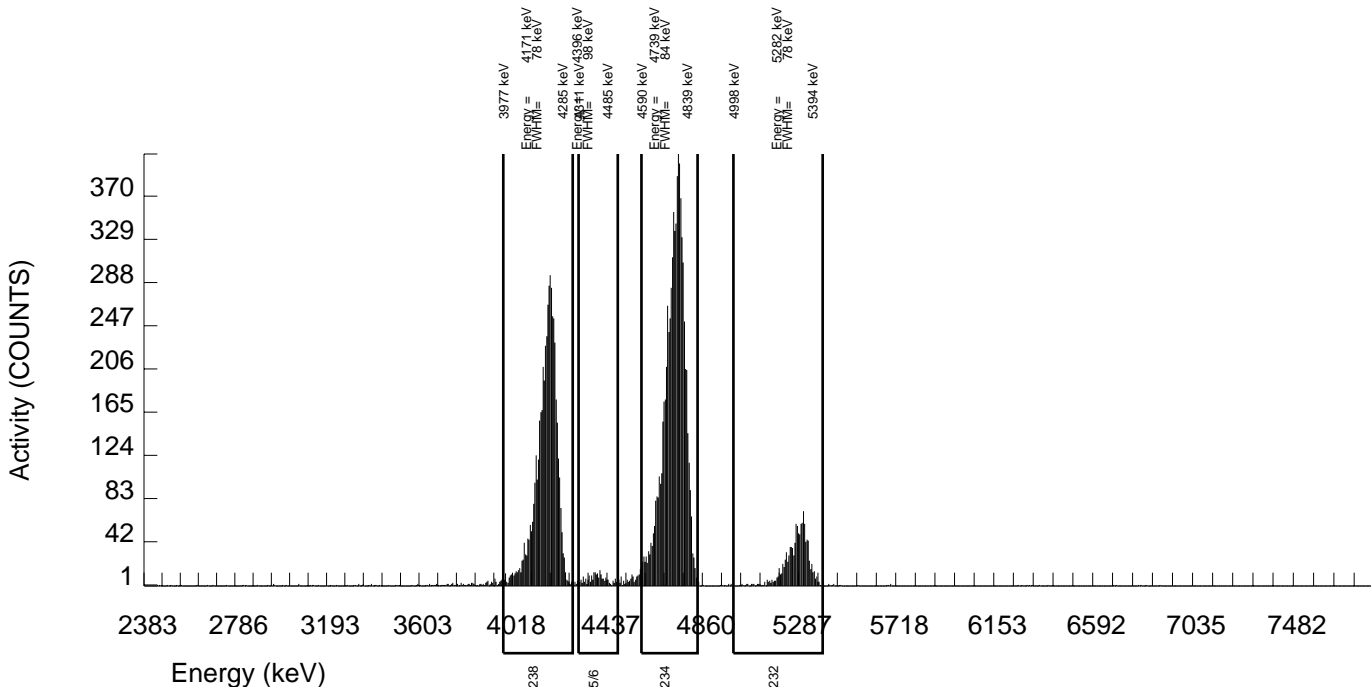
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 1-JUL-2009 00:00:00.		SAMPLE ID : S0232764003_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :64288 AVERAGE %EFFICIENCY :25.5270 % YIELD : 85.311		COUNT DATE:11-AUG-2009 16:57:14 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26816 dpm RESULTS : 4.49434 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B137.CNF;336 BKG DATE : 9-AUG-2009 EFF FILE : W137.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	7444.000	7436.540	4.000	2.0000	100.0000	1.92E+01	2.68E+00	3.18E-02	1.20E-02	4.37E-01
U232	5302.100	1158.000	1146.000	12.000	3.4641	100.0000	2.97E+00	4.43E-01	4.95E-02	2.09E-02	1.74E-01
U-235	4391.000	226.000	226.000	0.000	0.0000	80.90000	7.22E-01	1.37E-01	9.59E-03	0.00E+00	9.42E-02
U-238	4184.730	5101.000	5098.000	3.000	1.7321	100.0000	1.32E+01	1.85E+00	2.86E-02	1.04E-02	3.62E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286  
SAMPLE DATE : 6-JUL-2009 00:00:00.

SAMPLE ID : S0232764004\_UU  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :65877  
AVERAGE %EFFICIENCY :25.4635  
% YIELD : 97.614

COUNT DATE:11-AUG-2009 16:57:16  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXE1

MS/MSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/L : 3.149E+00

LCS/LCSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/L : 3.149E+00

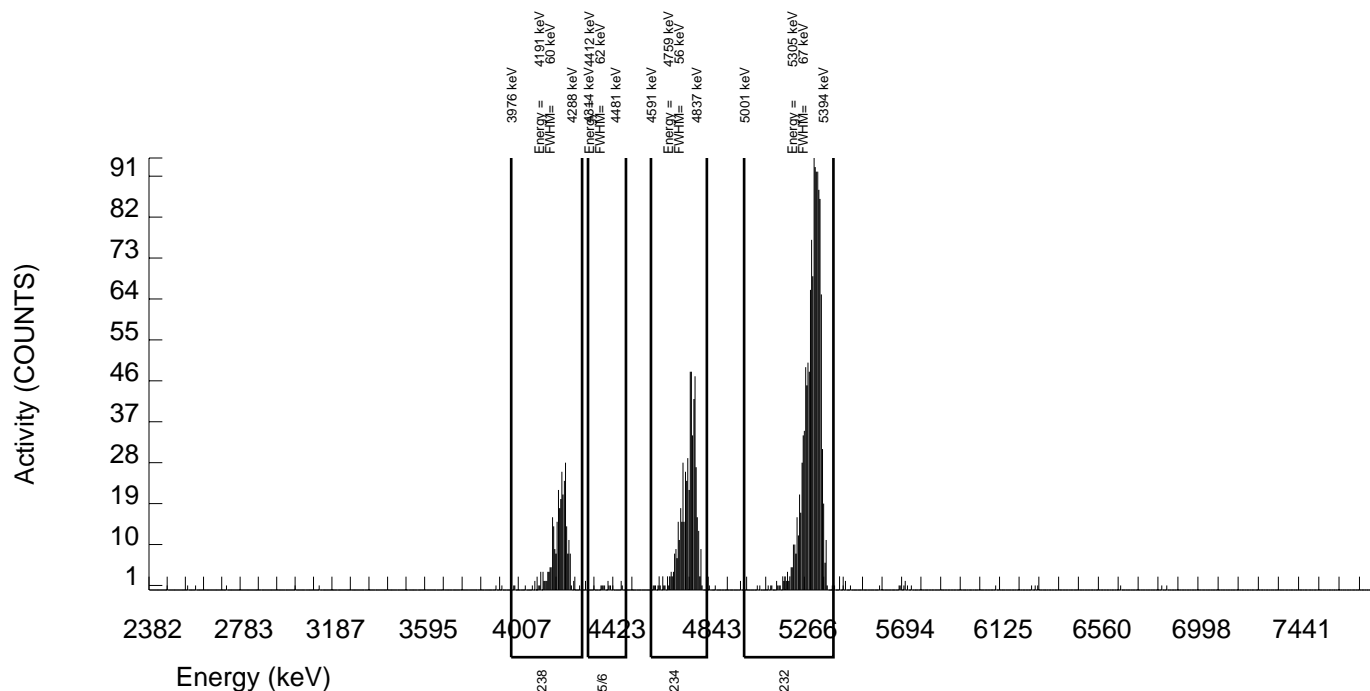
TRACER  
ID : 1283-E  
ISOTOPE : U232  
NOMINAL : 5.26747 dpm  
RESULTS : 5.14178 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B138.CNF;341  
BKG DATE : 9-AUG-2009  
EFF FILE : W138.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	546.000	531.050	11.000	3.3166	100.0000	1.20E+00	1.94E-01	4.18E-02	1.75E-02	1.04E-01
U232	5302.100	1314.000	1308.000	6.000	2.4495	100.0000	2.97E+00	4.34E-01	3.26E-02	1.29E-02	1.61E-01
U-235	4391.000	13.000	9.000	4.000	2.0000	80.90000	2.52E-02	2.29E-02	3.45E-02	1.30E-02	2.26E-02
U-238	4184.730	307.000	301.000	6.000	2.4495	100.0000	6.82E-01	1.21E-01	3.26E-02	1.29E-02	7.86E-02

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286  
SAMPLE DATE : 7-JUL-2009 00:00:00.

SAMPLE ID : S0232764005\_UU  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :76231  
AVERAGE %EFFICIENCY :25.0427  
% YIELD : 89.465

COUNT DATE:11-AUG-2009 16:57:20  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXE1

MS/MSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/L : 3.149E+00

LCS/LCSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/L : 3.149E+00

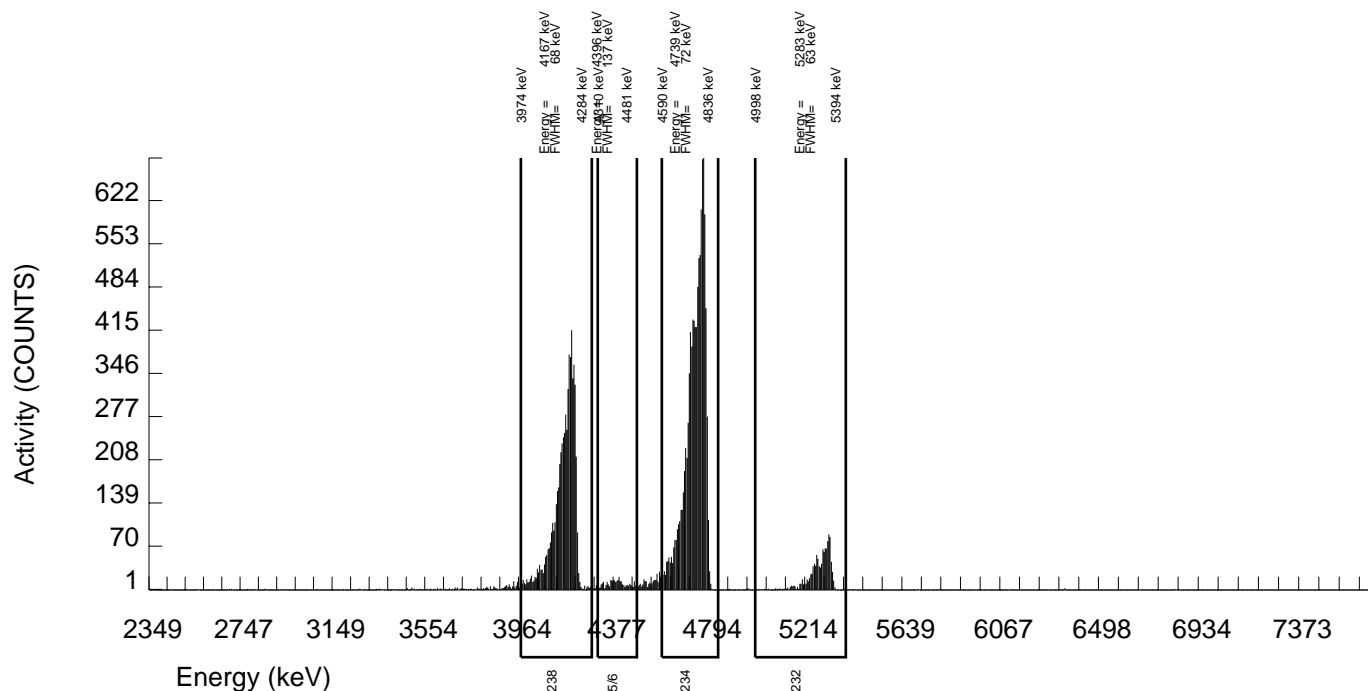
TRACER  
ID : 1283-E  
ISOTOPE : U232  
NOMINAL : 5.26733 dpm  
RESULTS : 4.71242 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B139.CNF;338  
BKG DATE : 9-AUG-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	10123.000	10114.440	5.000	2.2361	100.0000	2.54E+01	3.59E+00	3.37E-02	1.31E-02	4.96E-01
U232	5302.100	1187.000	1179.000	8.000	2.8284	100.0000	2.97E+00	4.48E-01	4.07E-02	1.66E-02	1.70E-01
U-235	4391.000	343.000	342.000	1.000	1.0000	80.90000	1.06E+00	1.87E-01	2.38E-02	7.23E-03	1.13E-01
U-238	4184.730	6201.000	6199.000	2.000	1.4142	100.0000	1.56E+01	2.21E+00	2.41E-02	8.27E-03	3.88E-01

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



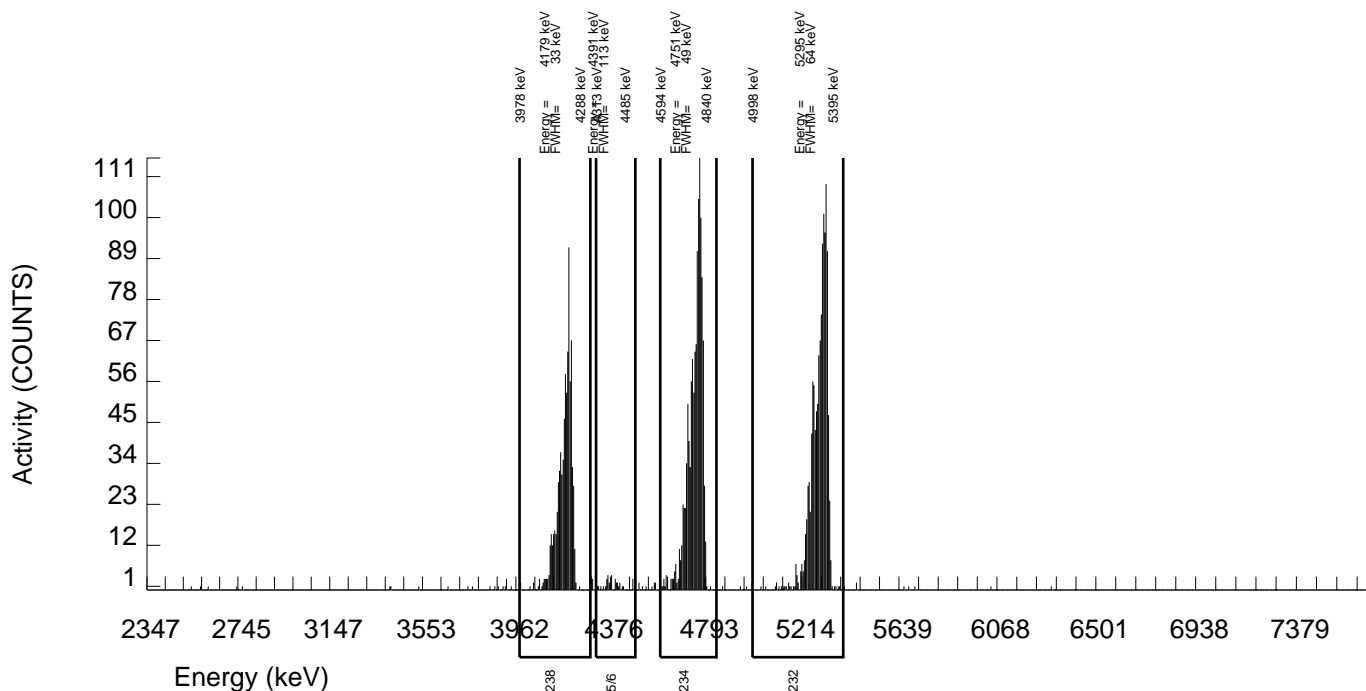
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 8-JUL-2009 00:00:00.		SAMPLE ID : S0232764007_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :78771 AVERAGE %EFFICIENCY :25.5149 % YIELD : 92.055		COUNT DATE:11-AUG-2009 16:57:22 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26719 dpm RESULTS : 4.84871 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B140.CNF;338 BKG DATE : 9-AUG-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	1202.000	1190.268	8.000	2.8284	100.0000	2.85E+00	4.22E-01	3.87E-02	1.58E-02	1.63E-01
U232	5302.100	1238.000	1236.000	2.000	1.4142	100.0000	2.97E+00	4.37E-01	2.30E-02	7.89E-03	1.66E-01
U-235	4391.000	36.000	36.000	0.000	0.0000	80.90000	1.07E-01	3.78E-02	8.89E-03	0.00E+00	3.48E-02
U-238	4184.730	809.000	805.000	4.000	2.0000	100.0000	1.93E+00	2.95E-01	2.95E-02	1.12E-02	1.34E-01

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



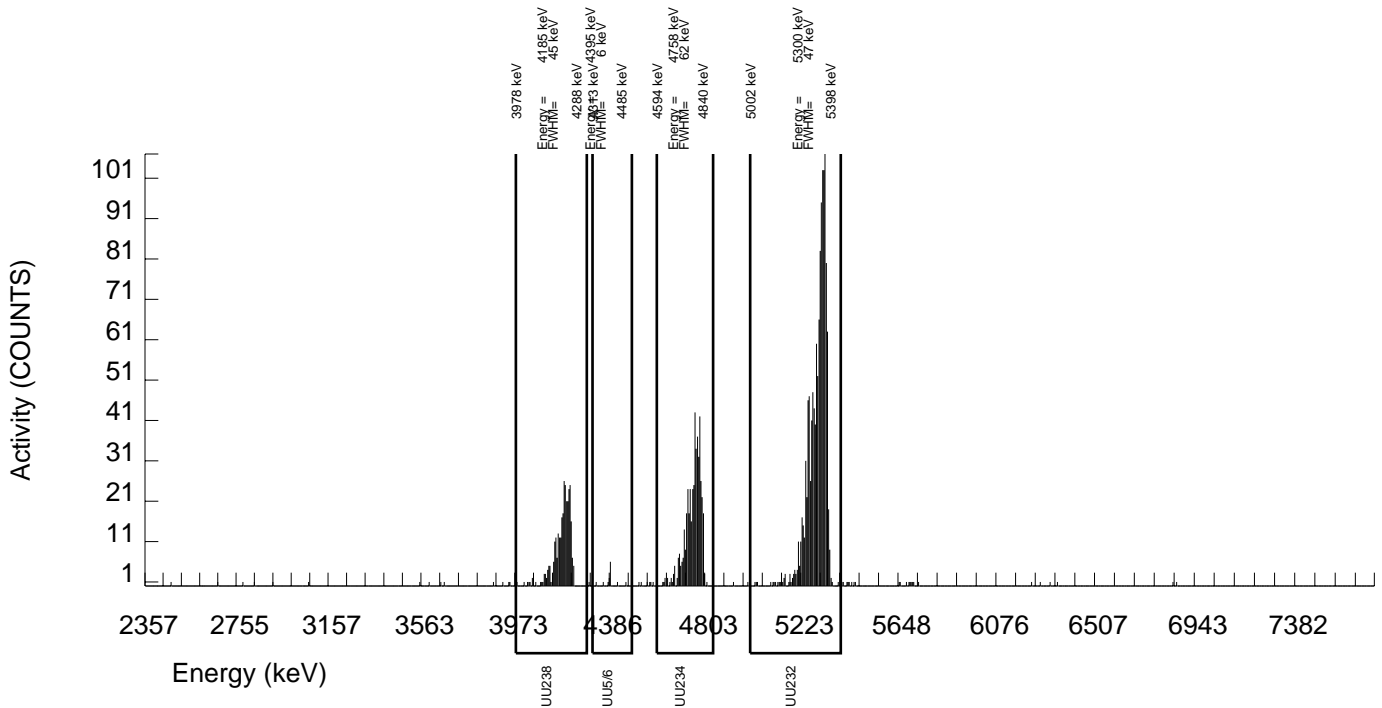
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 9-JUL-2009 00:00:00.		SAMPLE ID : S0232764008_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :76232 AVERAGE %EFFICIENCY :25.5875 % YIELD : 96.176		COUNT DATE:11-AUG-2009 16:57:25 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26705 dpm RESULTS : 5.06562 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B141.CNF;341 BKG DATE : 9-AUG-2009 EFF FILE : W141.CNF;93 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	483.000	473.090	6.000	2.4495	100.0000	1.08E+00	1.80E-01	3.29E-02	1.30E-02	9.88E-02
U232	5302.100	1300.000	1295.000	5.000	2.2361	100.0000	2.97E+00	4.42E-01	3.07E-02	1.19E-02	1.62E-01
U-235	4391.000	13.000	13.000	0.000	0.0000	80.90000	3.68E-02	2.06E-02	8.48E-03	0.00E+00	2.00E-02
U-238	4184.730	314.000	312.000	2.000	1.4142	100.0000	7.14E-01	1.27E-01	2.19E-02	7.53E-03	7.97E-02

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





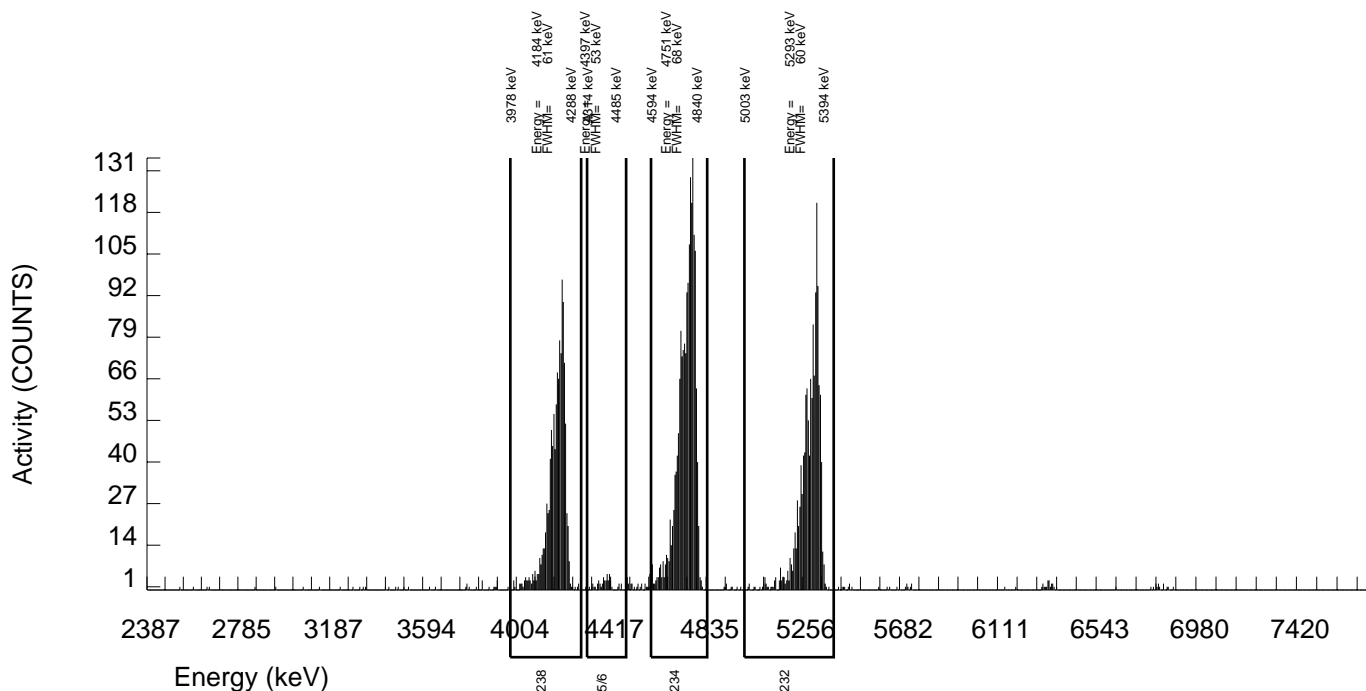
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 10-JUL-2009 00:00:00		SAMPLE ID : S0232764009_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :64261 AVERAGE %EFFICIENCY :25.7861 % YIELD : 98.825		COUNT DATE:11-AUG-2009 16:57:27 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26692 dpm RESULTS : 5.20502 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B142.CNF;335 BKG DATE : 9-AUG-2009 EFF FILE : W142.CNF;97 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	1824.000	1809.951	10.000	3.1623	100.0000	4.00E+00	5.73E-01	3.91E-02	1.63E-02	1.85E-01
U232	5302.100	1351.000	1341.000	10.000	3.1623	100.0000	2.97E+00	4.33E-01	3.92E-02	1.63E-02	1.60E-01
U-235	4391.000	49.000	48.000	1.000	1.0000	80.90000	1.31E-01	4.18E-02	2.09E-02	6.35E-03	3.79E-02
U-238	4184.730	1159.000	1156.000	3.000	1.7321	100.0000	2.55E+00	3.76E-01	2.44E-02	8.90E-03	1.48E-01

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



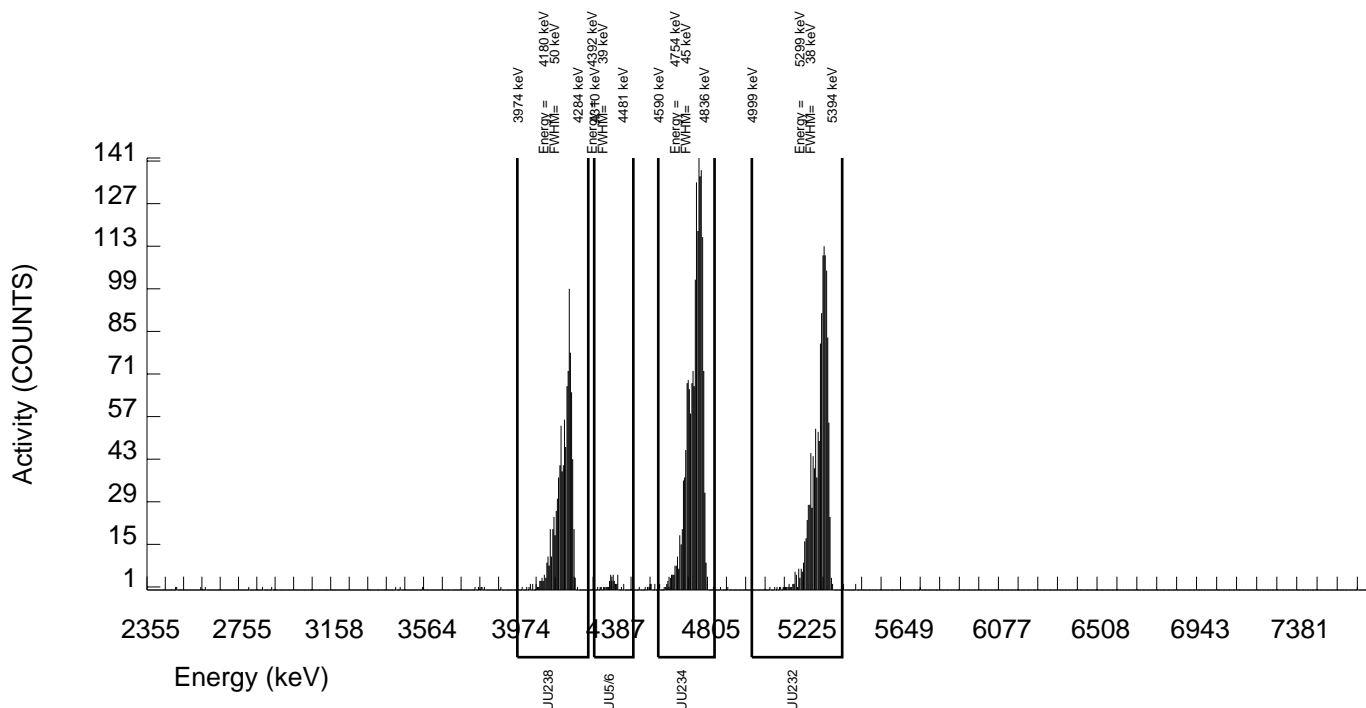
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 10-JUL-2009 00:00:00		SAMPLE ID : S0232764010_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :65882 AVERAGE %EFFICIENCY :24.4660 % YIELD : 100.273		COUNT DATE:11-AUG-2009 16:57:31 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26692 dpm RESULTS : 5.28131 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B143.CNF;338 BKG DATE : 9-AUG-2009 EFF FILE : W143.CNF;100 CAL DATE : 4-AUG-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	1706.000	1694.102	8.000	2.8284	100.0000	3.89E+00	5.71E-01	3.71E-02	1.51E-02	1.86E-01
U232	5302.100	1300.000	1291.000	9.000	3.0000	100.0000	2.97E+00	4.42E-01	3.90E-02	1.60E-02	1.63E-01
U-235	4391.000	40.000	35.000	5.000	2.2361	80.90000	9.93E-02	3.98E-02	3.80E-02	1.48E-02	3.73E-02
U-238	4184.730	975.000	972.000	3.000	1.7321	100.0000	2.23E+00	3.40E-01	2.54E-02	9.25E-03	1.41E-01

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



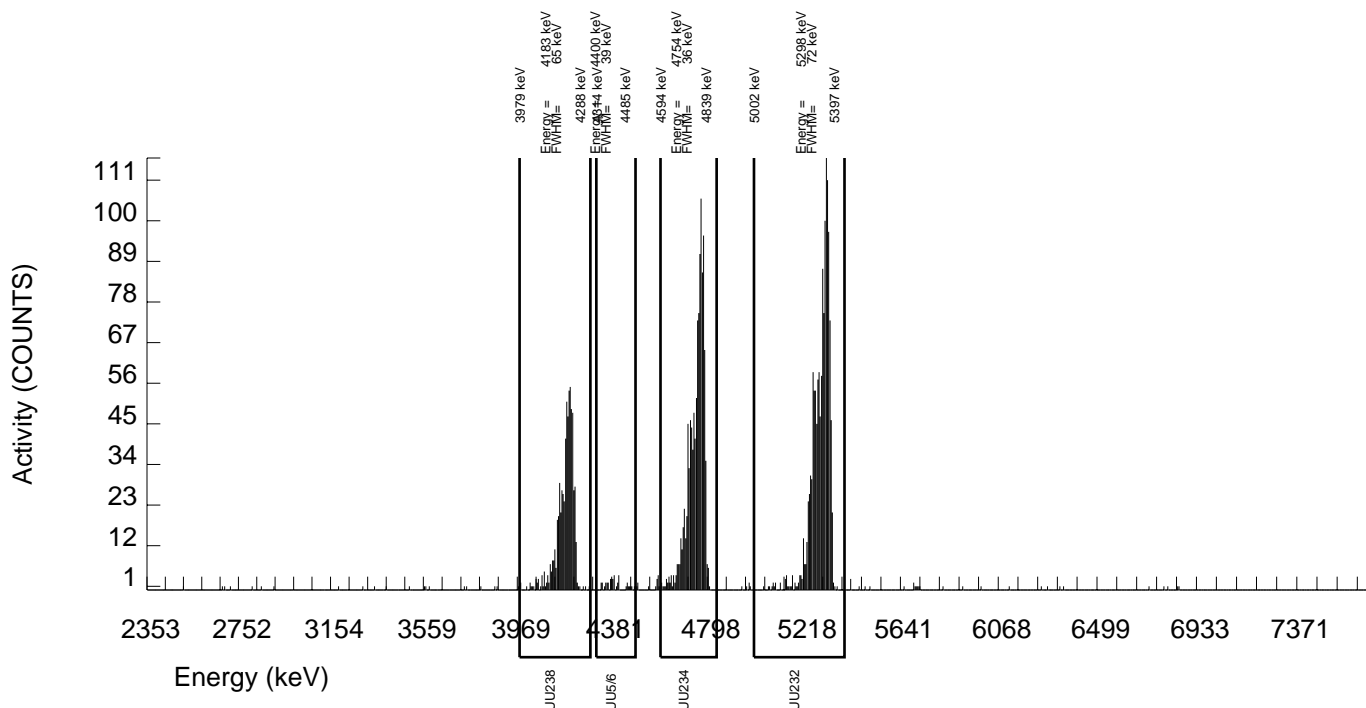
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 10-JUL-2009 00:00:00		SAMPLE ID : S0232764011_UU SAMPLE QTY: 0.600 L	
DETECTOR NUMBER :75551 AVERAGE %EFFICIENCY :24.8919 % YIELD : 103.291		COUNT DATE:11-AUG-2009 16:57:33 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 4.198E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 4.198E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26692 dpm RESULTS : 5.44025 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B144.CNF;337 BKG DATE : 9-AUG-2009 EFF FILE : W144.CNF;94 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	1138.000	1124.915	9.000	3.0000	100.0000	3.28E+00	4.85E-01	4.95E-02	2.04E-02	1.93E-01
U232	5302.100	1359.000	1353.000	6.000	2.4495	100.0000	3.95E+00	5.76E-01	4.21E-02	1.67E-02	2.12E-01
U-235	4391.000	39.000	37.000	2.000	1.4142	80.90000	1.34E-01	4.88E-02	3.46E-02	1.19E-02	4.53E-02
U-238	4184.730	668.000	665.000	3.000	1.7321	100.0000	1.94E+00	3.02E-01	3.23E-02	1.18E-02	1.48E-01

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



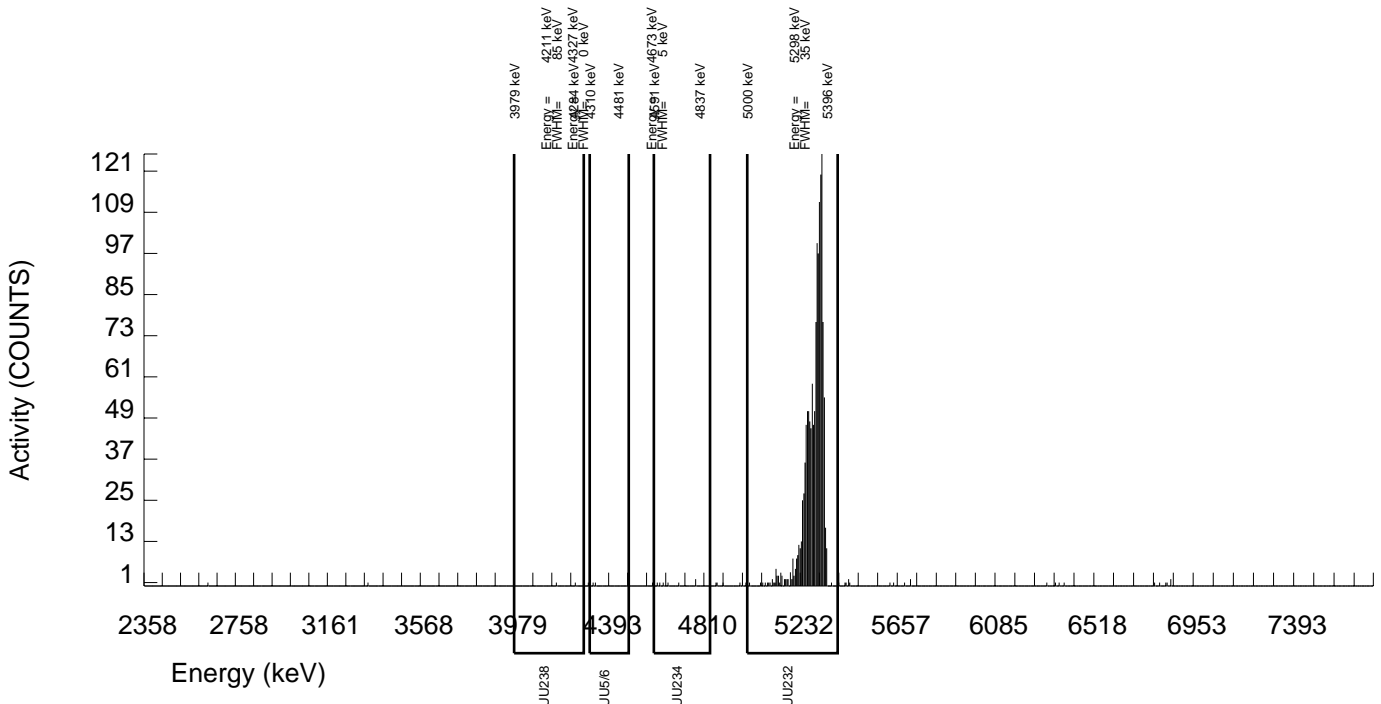
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 13-JUL-2009 00:00:00		SAMPLE ID : S0232764013_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :72526 AVERAGE %EFFICIENCY :24.9557 % YIELD : 105.540		COUNT DATE:11-AUG-2009 16:57:35 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26650 dpm RESULTS : 5.55823 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B145.CNF;335 BKG DATE : 9-AUG-2009 EFF FILE : W145.CNF;99 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	8.000	2.815	1.000	1.0000	100.0000	6.02E-03	9.23E-03	1.64E-02	4.97E-03	9.19E-03
U232	5302.100	1391.000	1386.000	5.000	2.2361	100.0000	2.97E+00	4.38E-01	2.87E-02	1.11E-02	1.57E-01
U-235	4391.000	3.000	3.000	0.000	0.0000	80.90000	7.93E-03	9.04E-03	7.93E-03	0.00E+00	8.97E-03
U-238	4184.730	2.000	2.000	0.000	0.0000	100.0000	4.28E-03	5.95E-03	6.41E-03	0.00E+00	5.93E-03

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



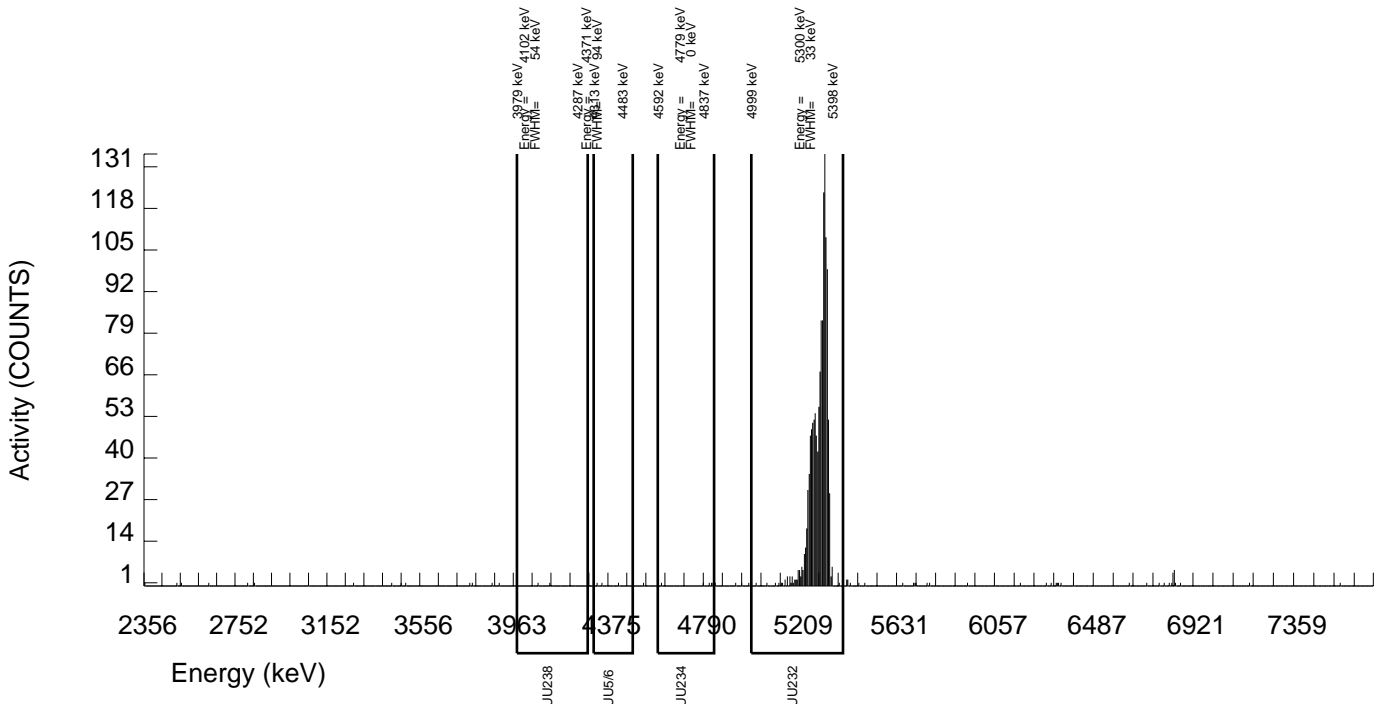
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 13-JUL-2009 00:00:00		SAMPLE ID : S0232764014_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :72527 AVERAGE %EFFICIENCY :24.9569 % YIELD : 101.880		COUNT DATE:11-AUG-2009 16:57:38 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26650 dpm RESULTS : 5.36548 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B146.CNF;340 BKG DATE : 9-AUG-2009 EFF FILE : W146.CNF;101 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	5.000	-1.040	2.000	1.4142	100.0000	-2.30E-03	7.52E-03	2.12E-02	7.29E-03	7.52E-03
U232	5302.100	1342.000	1338.000	4.000	2.0000	100.0000	2.97E+00	4.32E-01	2.73E-02	1.03E-02	1.59E-01
U-235	4391.000	3.000	2.000	1.000	1.0000	80.90000	5.47E-03	1.08E-02	2.09E-02	6.37E-03	1.07E-02
U-238	4184.730	2.000	-1.000	3.000	1.7321	100.0000	-2.21E-03	9.71E-03	2.45E-02	8.92E-03	9.71E-03

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286  
SAMPLE DATE : 14-JUL-2009 00:00:00

SAMPLE ID : S0232764015\_UU  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :75550  
AVERAGE %EFFICIENCY :24.4916  
% YIELD : 96.988

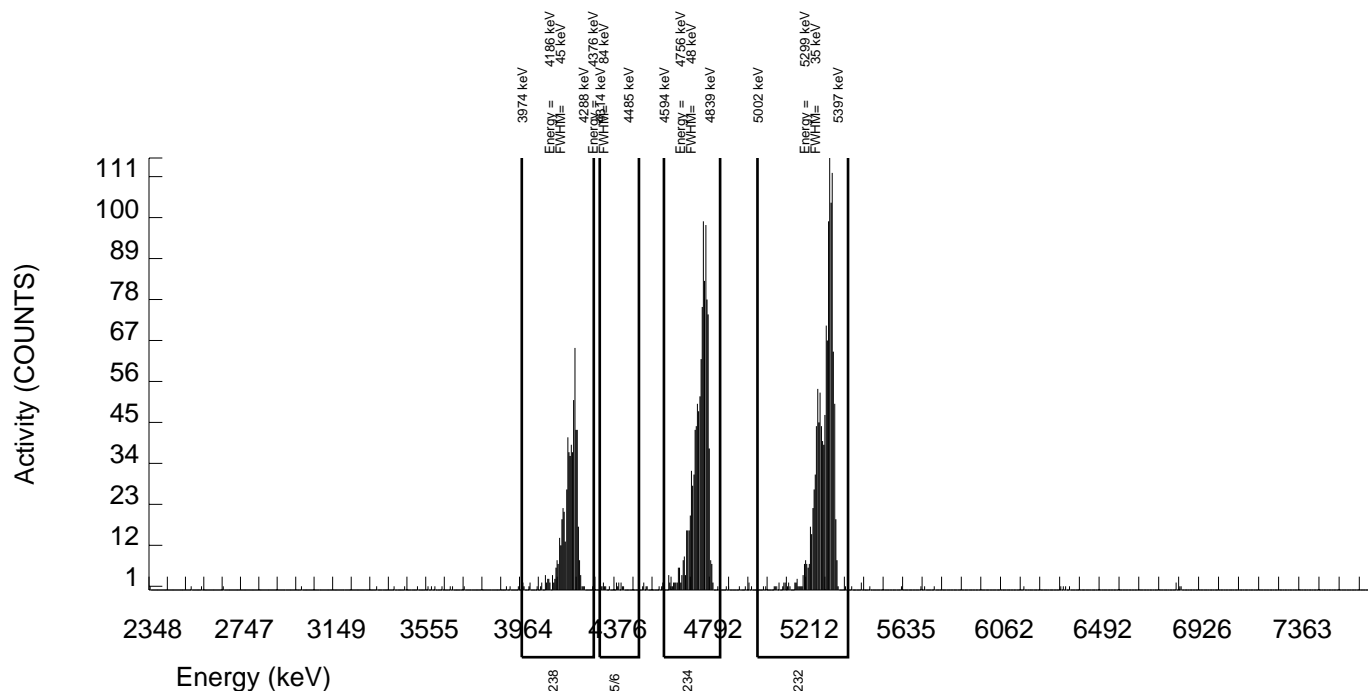
COUNT DATE:11-AUG-2009 16:57:41  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXE1

MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26635 dpm RESULTS : 5.10770 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B147.CNF;340 BKG DATE : 9-AUG-2009 EFF FILE : W147.CNF;100 CAL DATE : 17-JUL-2009
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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	1081.000	1072.226	5.000	2.2361	100.0000	2.54E+00	3.85E-01	3.18E-02	1.23E-02	1.53E-01
U232	5302.100	1256.000	1250.000	6.000	2.4495	100.0000	2.97E+00	4.44E-01	3.42E-02	1.35E-02	1.65E-01
U-235	4391.000	16.000	12.000	4.000	2.0000	80.90000	3.52E-02	2.61E-02	3.61E-02	1.36E-02	2.57E-02
U-238	4184.730	607.000	606.000	1.000	1.0000	100.0000	1.44E+00	2.30E-01	1.81E-02	5.51E-03	1.15E-01

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



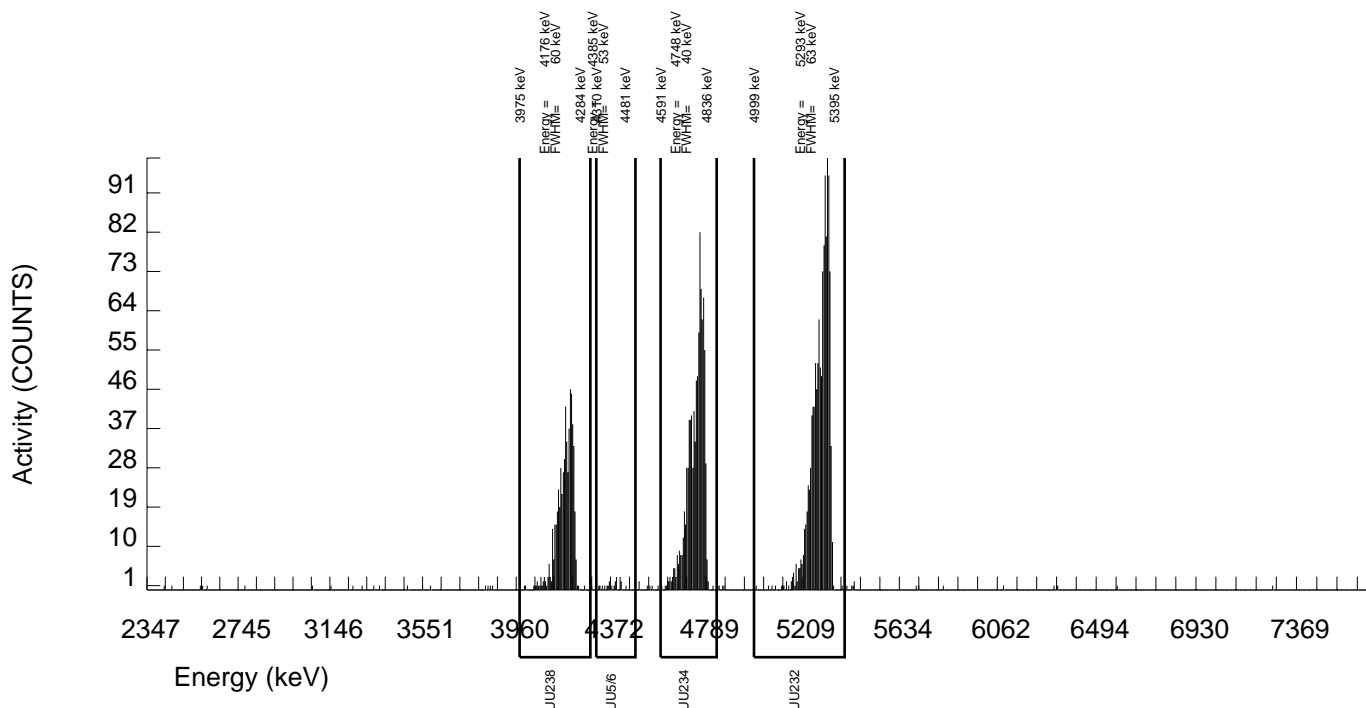
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 14-JUL-2009 00:00:00		SAMPLE ID : S0232764016_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :74429 AVERAGE %EFFICIENCY :24.5449 % YIELD : 97.396		COUNT DATE:11-AUG-2009 16:57:44 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26635 dpm RESULTS : 5.12922 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B148.CNF;339 BKG DATE : 9-AUG-2009 EFF FILE : W148.CNF;115 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	920.000	913.201	3.000	1.7321	100.0000	2.15E+00	3.24E-01	2.60E-02	9.49E-03	1.40E-01
U232	5302.100	1258.000	1258.000	0.000	0.0000	100.0000	2.97E+00	4.36E-01	7.07E-03	0.00E+00	1.64E-01
U-235	4391.000	23.000	23.000	0.000	0.0000	80.90000	6.70E-02	2.88E-02	8.73E-03	0.00E+00	2.74E-02
U-238	4184.730	585.000	584.000	1.000	1.0000	100.0000	1.38E+00	2.18E-01	1.80E-02	5.48E-03	1.12E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286  
SAMPLE DATE : 15-JUL-2009 00:00:00

SAMPLE ID : S0232764017\_UU  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :33449  
AVERAGE %EFFICIENCY :24.5768  
% YIELD : 67.810

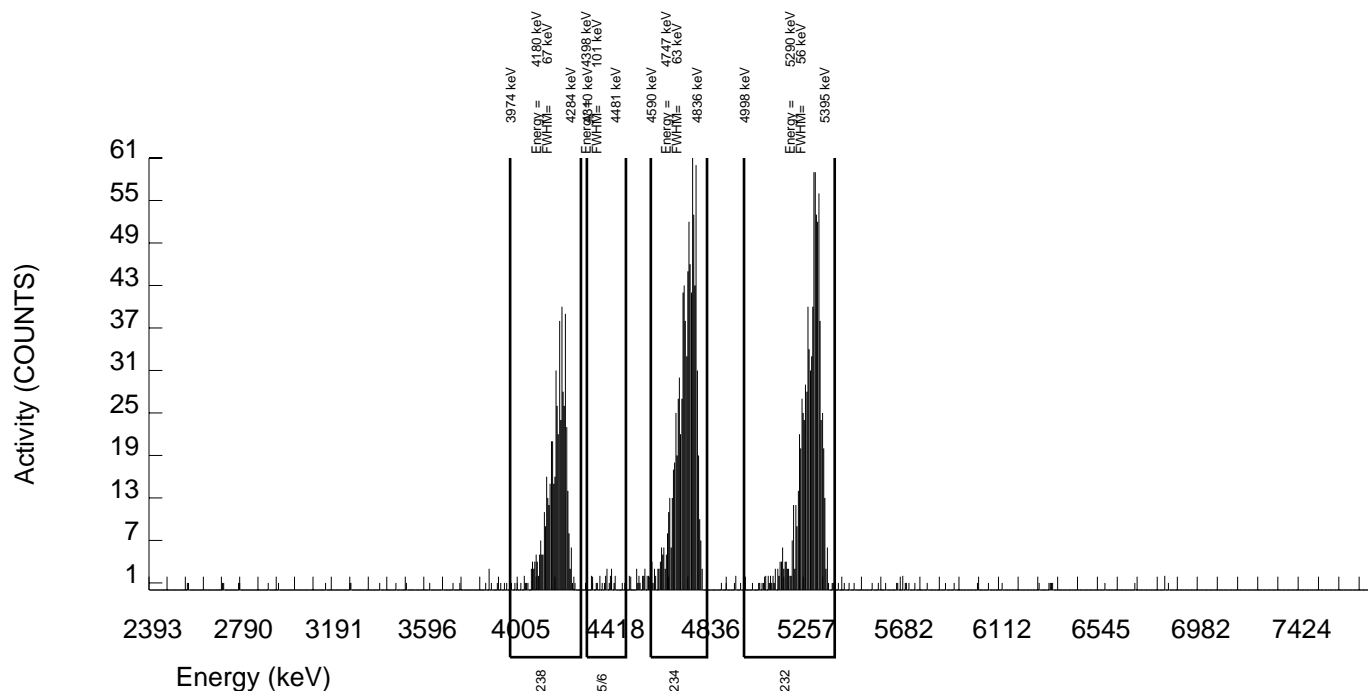
COUNT DATE:11-AUG-2009 16:57:46  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :MXE1

MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26621 dpm RESULTS : 3.57104 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B149.CNF;343 BKG DATE : 9-AUG-2009 EFF FILE : W149.CNF;100 CAL DATE : 17-JUL-2009
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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	911.000	905.352	3.000	1.7321	100.0000	3.06E+00	4.76E-01	3.74E-02	1.36E-02	2.00E-01
U232	5302.100	882.000	877.000	5.000	2.2361	100.0000	2.97E+00	4.63E-01	4.53E-02	1.76E-02	1.97E-01
U-235	4391.000	26.000	26.000	0.000	0.0000	80.90000	1.09E-01	4.45E-02	1.25E-02	0.00E+00	4.17E-02
U-238	4184.730	536.000	535.000	1.000	1.0000	100.0000	1.81E+00	2.98E-01	2.59E-02	7.86E-03	1.53E-01

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





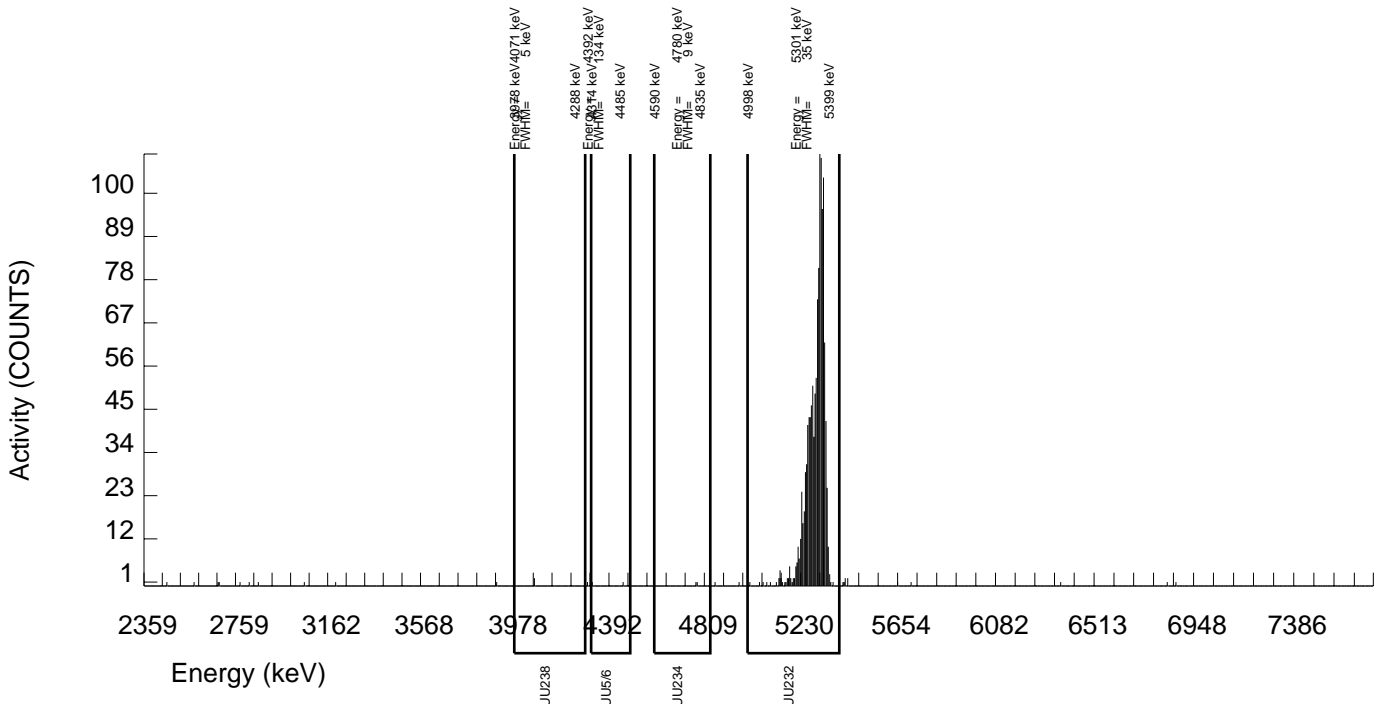
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 10-AUG-2009 00:00:00		SAMPLE ID : S1201898106_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :75552 AVERAGE %EFFICIENCY :24.8730 % YIELD : 96.646		COUNT DATE:11-AUG-2009 16:57:49 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26261 dpm RESULTS : 5.08612 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B150.CNF;344 BKG DATE : 9-AUG-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/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
U-3/4	4763.020	2.000	-2.820	1.000	1.0000	100.0000	-6.60E-03	6.50E-03	1.79E-02	5.45E-03	6.49E-03
U232	5302.100	1273.000	1265.000	8.000	2.8284	100.0000	2.96E+00	4.36E-01	3.79E-02	1.54E-02	1.64E-01
U-235	4391.000	2.000	2.000	0.000	0.0000	80.90000	5.79E-03	8.06E-03	8.69E-03	0.00E+00	8.03E-03
U-238	4184.730	2.000	2.000	0.000	0.0000	100.0000	4.68E-03	6.52E-03	7.03E-03	0.00E+00	6.49E-03

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



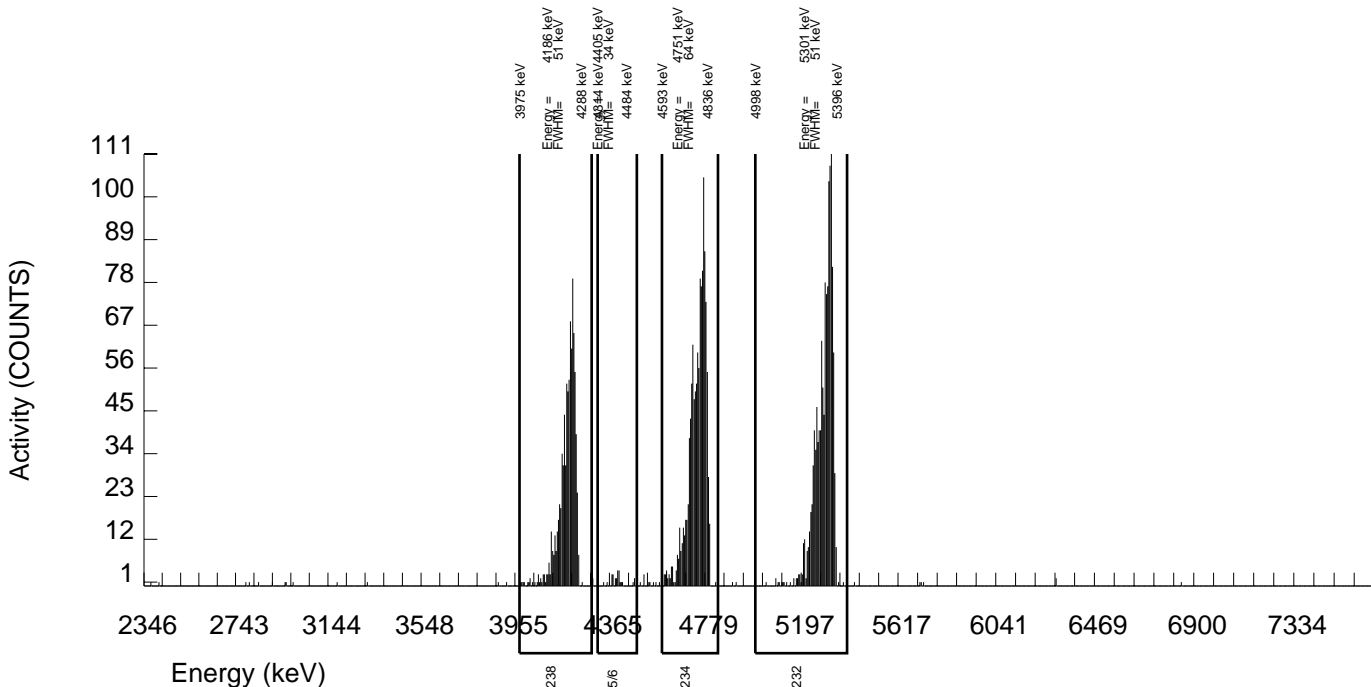
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 15-JUL-2009 00:00:00		SAMPLE ID : S1201898107_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :75556 AVERAGE %EFFICIENCY :24.6203 % YIELD : 99.027		COUNT DATE:11-AUG-2009 16:57:51 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26621 dpm RESULTS : 5.21499 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B151.CNF;339 BKG DATE : 9-AUG-2009 EFF FILE : W151.CNF;106 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	1228.000	1223.126	1.000	1.0000	100.0000	2.82E+00	4.15E-01	1.77E-02	5.37E-03	1.58E-01
U232	5302.100	1287.000	1283.000	4.000	2.0000	100.0000	2.97E+00	4.35E-01	2.84E-02	1.08E-02	1.63E-01
U-235	4391.000	27.000	25.000	2.000	1.4142	80.90000	7.14E-02	3.17E-02	2.73E-02	9.39E-03	3.01E-02
U-238	4184.730	860.000	856.000	4.000	2.0000	100.0000	1.98E+00	3.00E-01	2.84E-02	1.07E-02	1.33E-01

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



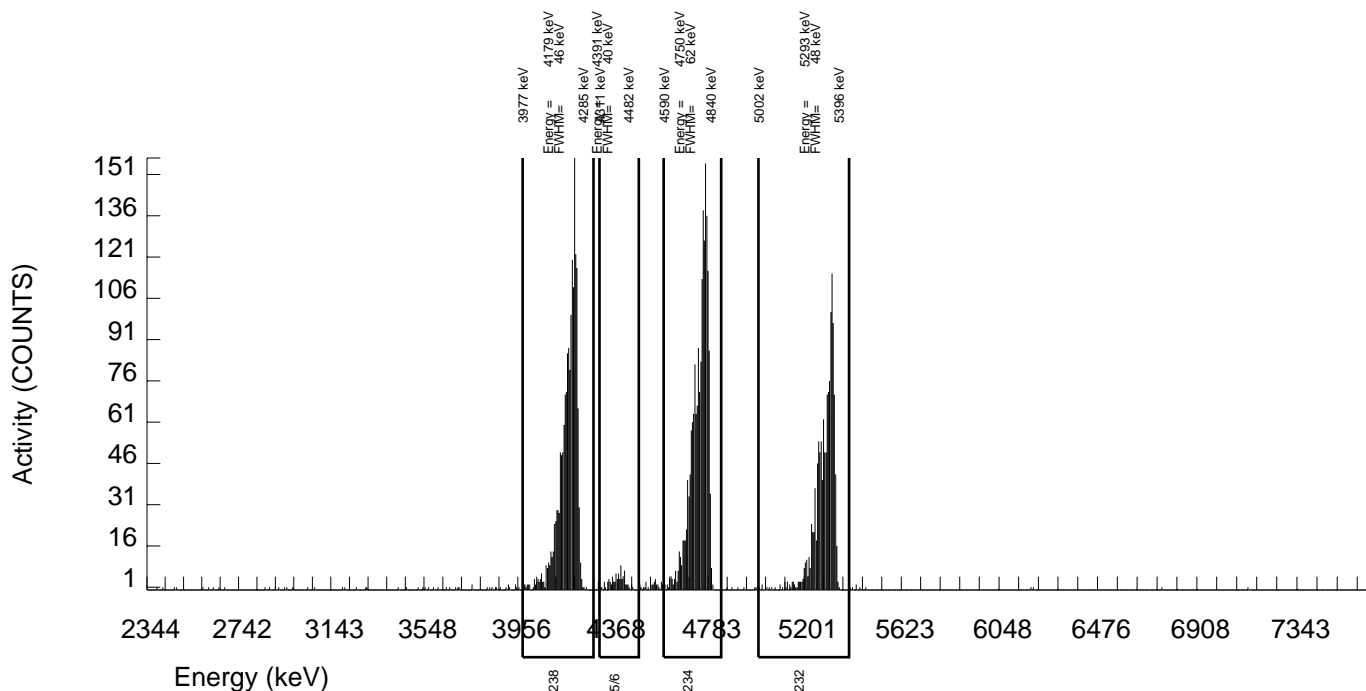
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 15-JUL-2009 00:00:00		SAMPLE ID : S1201898108_UU SAMPLE QTY: 0.300 L	
DETECTOR NUMBER :76222 AVERAGE %EFFICIENCY :24.2462 % YIELD : 100.869		COUNT DATE:11-AUG-2009 16:57:54 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 8.396E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 8.396E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26621 dpm RESULTS : 5.31196 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B152.CNF;336 BKG DATE : 9-AUG-2009 EFF FILE : W152.CNF;93 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	1826.000	1821.114	1.000	1.0000	100.0000	1.12E+01	1.60E+00	4.70E-02	1.43E-02	5.14E-01
U232	5302.100	1293.000	1287.000	6.000	2.4495	100.0000	7.91E+00	1.16E+00	8.85E-02	3.50E-02	4.34E-01
U-235	4391.000	87.000	86.000	1.000	1.0000	80.90000	6.53E-01	1.65E-01	5.81E-02	1.77E-02	1.40E-01
U-238	4184.730	1701.000	1701.000	0.000	0.0000	100.0000	1.04E+01	1.50E+00	1.84E-02	0.00E+00	4.96E-01

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



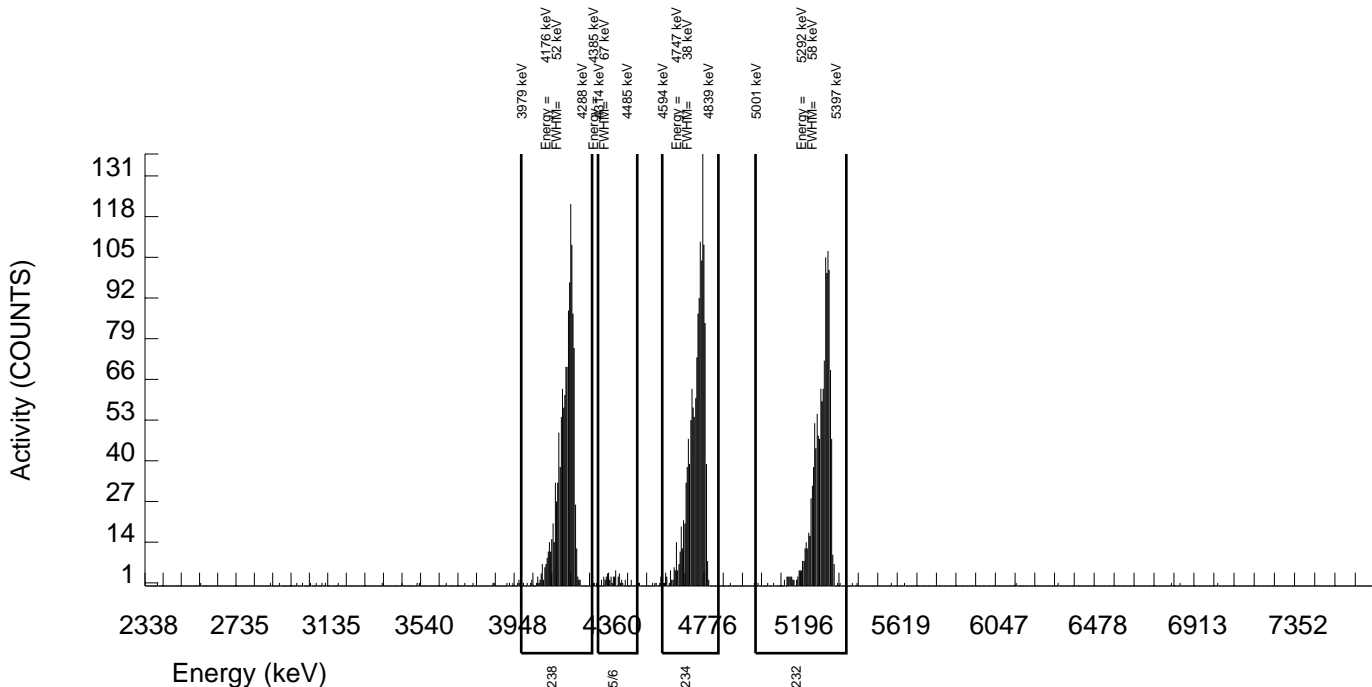
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 892286 SAMPLE DATE : 10-AUG-2009 00:00:00		SAMPLE ID : S1201898109_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :76223 AVERAGE %EFFICIENCY :25.3763 % YIELD : 94.580		COUNT DATE:11-AUG-2009 16:57:57 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :MXE1	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/L : 3.149E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.26261 dpm RESULTS : 4.97736 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B153.CNF;331 BKG DATE : 9-AUG-2009 EFF FILE : W153.CNF;96 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	1433.000	1422.186	7.000	2.6458	100.0000	3.34E+00	4.87E-01	3.59E-02	1.44E-02	1.74E-01
U232	5302.100	1281.000	1263.000	18.000	4.2426	100.0000	2.96E+00	4.37E-01	5.34E-02	2.32E-02	1.66E-01
U-235	4391.000	50.000	44.000	6.000	2.4495	80.90000	1.28E-01	4.60E-02	4.17E-02	1.65E-02	4.25E-02
U-238	4184.730	1313.000	1309.000	4.000	2.0000	100.0000	3.07E+00	4.51E-01	2.89E-02	1.09E-02	1.67E-01

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



# RADIUM 228

### Radiochemistry Batch Checklist, Rev 9

Batch# 806483 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)			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)			ND
Batch entered into Case Narrative.	✓		
Batch non-conformances completed, if applicable.			NA
Batch non-conformances second reviewed and disposition verified to be completed.			ND
Aliquot Correction completed if required.			ND
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:

*[Signature]*

8113  
KERR

Secondary Review Performed By:

*[Signature]*

# Radium-228 Que Sheet

General Engineering Laboratories, Radiochemistry Division  
07/20/2009

Batch #: 886483    Analyst: MXS2    First Client Due Date: 08/13/2009    Internal Due Date: 08/02/2009  
 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: 012-J    Expiration Date: 2-17-10    Vol: 0.1 mL  
 Prep Date: 7-21-09    Initials: JVC    Pipet ID: 210953    Balance ID: 1P55100

Ac-228 Ingrow: 7-22-09 / 1030  
 Ac-228 Separation Date/Time: 7-24-09 / 925  
 Witness: MS 7-21-09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Pos. #	Vol (mL)	Det #	Ba Yield (%)	Gamma Det. #
232764001-1	M-110B	SAMPLE		3 pCi/L	WATER	KERR003	01-JUL-09 09:00 AM	1	400	3D	84.21	
232764002-1	M-110BDISS	SAMPLE		3 pCi/L	WATER	KERR003	01-JUL-09 09:00 AM	2	400	4C	11.58	
232764003-1	I-ARB	SAMPLE		3 pCi/L	WATER	KERR003	01-JUL-09 11:50 AM	3	400	4D	82.94	
232764004-1	M-117B	SAMPLE		3 pCi/L	WATER	KERR003	06-JUL-09 10:37 AM	4	400	5A	73.38	
232764005-1	M-120B	SAMPLE		3 pCi/L	WATER	KERR003	07-JUL-09 08:45 AM	5	400	5B	72.46	
232764007-1	M-103B	SAMPLE		3 pCi/L	WATER	KERR003	08-JUL-09 09:05 AM	6	400	5C	72.37	
232764008-1	M-118B	SAMPLE		3 pCi/L	WATER	KERR003	09-JUL-09 08:45 AM	7	400	5D	80.18	
232764009-1	M-121B	SAMPLE		3 pCi/L	WATER	KERR003	10-JUL-09 07:45 AM	8	400	11B	82.98	
232764010-1	M-10B	SAMPLE		3 pCi/L	WATER	KERR003	10-JUL-09 11:45 AM	9	400	11C	80.40	
232764011-1	M-10BDISS	SAMPLE		3 pCi/L	WATER	KERR003	10-JUL-09 11:45 AM	10	400	14B	82.11	
232764013-1	H-11B	SAMPLE		3 pCi/L	WATER	KERR003	13-JUL-09 09:00 AM	11	400	1A	75.25	
232764014-1	H-11BDISS	SAMPLE		3 pCi/L	WATER	KERR003	13-JUL-09 09:00 AM	12	400	1B	77.24	
232764015-1	TR-10B	SAMPLE		3 pCi/L	WATER	KERR003	14-JUL-09 09:00 AM	13	400	1C	80.57	
232764016-1	TR-8B	SAMPLE		3 pCi/L	WATER	KERR003	14-JUL-09 11:45 AM	14	400	1D	78.38	
232764017-1	M-92B	SAMPLE		3 pCi/L	WATER	KERR003	15-JUL-09 08:45 AM	15	400	2C	75.5	
1201884028-1	MB for batch 886483	MB		3 pCi/L	WATER	QC ACCOUNT		16	400	2D	78.75	
1201884029-1	M-92B(232764017DUP)	DUP		3 pCi/L	WATER	QC ACCOUNT		17	400	3A	74.17	
1201884030-1	M-92B(232764017MS)	MS		3 pCi/L	WATER	QC ACCOUNT		18	400	3C	83.11	
1201884031-1	LCS for batch 886483	LCS		3 pCi/L	WATER	QC ACCOUNT		19	400	4A	82.59	

daily

Comments:

Data Reviewed By: 

# 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) : 181.22  
 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 : 886483  
 Analyst : MXS2  
 Prep Date : 7/21/2009

LCS S/N : 0503-B  
 LCS Exp Date : 9/13/2009  
 LCS Activity (dpm/ml) : 181.22  
 LCS Volume Added : 0.10

Procedure Code : GFC28RAL  
 Parmname : Radium-228  
 Required MDA : 3 pCi/L  
 Half-life of Ra-228 : 5.75 years  
 Half-life of Ac-228 : 6.13 hours

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

Batch counted on : PIC  
 BKG Count time : 500 min

Pos.	Sample Characteristics		Sample Date/Time	Tracer Calculations		Tracer Ref.		Tracer Samp.		Tracer Aliquot (mL)	Tracer Aliquot (mL)	Tracer Aliquot StDev. (mL)
	Sample ID	Sample Aliquot L		Sample Aliquot StDev. L	Tracer Concentration (cpm) (Ba-133 Ref.)	Tracer Count Uncertainty (cpm)	Tracer Count Uncertainty (cpm)	Tracer Concentration (cpm) (Ba-133 Samp.)	Tracer Count Uncertainty (cpm)			
1	232764001.1	0.4000	1.9669E-05	7/1/2009 9:00	228.0	4.14%	192.0	4.58%	0.1	0.000701	0.000701	
2	232764002.1	0.4000	1.9669E-05	7/1/2009 9:00	228.0	4.14%	163.2	5.04%	0.1	0.000701	0.000701	
3	232764003.1	0.4000	1.9669E-05	7/1/2009 11:50	228.0	4.14%	189.1	4.62%	0.1	0.000701	0.000701	
4	232764004.1	0.4000	1.9669E-05	7/6/2009 10:37	228.0	4.14%	167.3	4.96%	0.1	0.000701	0.000701	
5	232764005.1	0.4000	1.9669E-05	7/7/2009 8:45	228.0	4.14%	165.2	5.00%	0.1	0.000701	0.000701	
6	232764007.1	0.4000	1.9669E-05	7/8/2009 9:05	228.0	4.14%	165.0	5.00%	0.1	0.000701	0.000701	
7	232764008.1	0.4000	1.9669E-05	7/9/2009 8:45	228.0	4.14%	182.8	4.71%	0.1	0.000701	0.000701	
8	232764009.1	0.4000	1.9669E-05	7/10/2009 7:45	228.0	4.14%	189.2	4.61%	0.1	0.000701	0.000701	
9	232764010.1	0.4000	1.9669E-05	7/10/2009 11:45	232.1	4.10%	186.6	4.65%	0.1	0.000701	0.000701	
10	232764011.1	0.4000	1.9669E-05	7/10/2009 11:45	228.0	4.14%	187.2	4.64%	0.1	0.000701	0.000701	
11	232764013.1	0.4000	1.9669E-05	7/13/2009 9:00	237.6	4.05%	178.8	4.77%	0.1	0.000701	0.000701	
12	232764014.1	0.4000	1.9669E-05	7/13/2009 9:00	228.0	4.14%	176.1	4.81%	0.1	0.000701	0.000701	
13	232764015.1	0.4000	1.9669E-05	7/14/2009 9:00	228.0	4.14%	183.7	4.70%	0.1	0.000701	0.000701	
14	232764016.1	0.4000	1.9669E-05	7/14/2009 11:45	228.0	4.14%	178.7	4.77%	0.1	0.000701	0.000701	
15	232764017.1	0.4000	1.9669E-05	7/15/2009 8:45	228.0	4.14%	172.7	4.87%	0.1	0.000701	0.000701	
16	1201884028.1	0.4000	1.9669E-05	7/21/2009 0:00	228.0	4.14%	178.4	4.78%	0.1	0.000701	0.000701	
17	1201884029.1	0.4000	1.9669E-05	7/15/2009 8:45	228.0	4.14%	169.1	4.93%	0.1	0.000701	0.000701	
18	1201884030.1	0.4000	1.9669E-05	7/15/2009 8:45	228.0	4.14%	189.5	4.61%	0.1	0.000701	0.000701	
19	1201884031.1	0.4000	1.9669E-05	7/21/2009 0:00	228.0	4.14%	188.3	4.63%	0.1	0.000701	0.000701	



Count raw Data		Counting				Gross Counts		Beta		Detector Efficiency		Detector Efficiency Error		Weekly Bkg		Separation		Count Start		Ra-228 Decay		Ac-228 Decay		Ac-228 Count Correction		Calculated Sample Recovery %		Sample Recovery Error %	
Pos.	Detector ID	Time (min.)	Alpha	Beta	Beta cpm	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	cpm	cpm	cpm	Time (min.)	Count	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Decay	Decay	Decay	Correction	%	%	%	%		
1	14B	370	105	427	1.154	0.6266	0.00816	1.632	500	7/24/2009 9:25	7/24/2009 15:26	0.992	0.506	1.389	84.21%	3.24%													
2	4C	60	20	136	2.267	0.6052	0.00426	1.412	500	7/24/2009 9:25	7/24/2009 12:53	0.992	0.676	1.058	71.58%	3.41%													
3	4D	60	13	107	1.783	0.5873	0.00816	1.128	500	7/24/2009 9:25	7/24/2009 12:53	0.992	0.676	1.058	82.94%	3.26%													
4	5A	60	15	41	0.683	0.6258	0.00816	0.590	500	7/24/2009 9:25	7/24/2009 12:53	0.994	0.675	1.058	73.38%	3.38%													
5	5B	60	5	84	1.400	0.6280	0.00816	1.310	500	7/24/2009 9:25	7/24/2009 12:53	0.994	0.675	1.058	72.46%	3.39%													
6	5C	60	15	61	1.017	0.6368	0.00816	0.794	500	7/24/2009 9:25	7/24/2009 12:57	0.995	0.670	1.058	72.37%	3.39%													
7	5D	60	9	101	1.683	0.6237	0.00816	1.328	500	7/24/2009 9:25	7/24/2009 12:57	0.995	0.670	1.058	80.18%	3.29%													
8	11B	60	30	98	1.633	0.6372	0.00816	0.902	500	7/24/2009 9:25	7/24/2009 13:13	0.995	0.650	1.058	82.98%	3.25%													
9	11C	60	26	67	1.117	0.6352	0.00816	0.978	500	7/24/2009 9:25	7/24/2009 13:13	0.995	0.650	1.058	80.40%	3.25%													
10	11C	60	27	66	1.100	0.6372	0.00816	0.902	500	7/24/2009 9:25	7/24/2009 15:25	0.995	0.507	1.058	82.11%	3.26%													
11	1A	60	4	50	0.833	0.6303	0.00800	0.338	500	7/24/2009 9:25	7/24/2009 13:25	0.996	0.635	1.058	75.25%	3.28%													
12	1B	60	4	29	0.483	0.6282	0.00409	0.308	500	7/24/2009 9:25	7/24/2009 13:25	0.996	0.635	1.058	77.24%	3.32%													
13	1C	60	6	65	1.083	0.6176	0.00344	0.770	500	7/24/2009 9:25	7/24/2009 13:25	0.997	0.635	1.058	80.57%	3.28%													
14	1D	60	8	46	0.767	0.6043	0.00511	0.556	500	7/24/2009 9:25	7/24/2009 13:25	0.997	0.635	1.058	78.38%	3.31%													
15	2C	60	8	34	0.567	0.5969	0.00575	0.298	500	7/24/2009 9:25	7/24/2009 13:25	0.997	0.635	1.058	75.75%	3.35%													
16	11C	60	38	43	0.717	0.6352	0.00816	0.978	500	7/24/2009 9:25	7/24/2009 15:26	0.999	0.506	1.058	78.25%	3.31%													
17	3A	60	5	70	1.167	0.5682	0.00943	1.592	500	7/24/2009 9:25	7/24/2009 13:26	0.997	0.635	1.058	74.17%	3.37%													
18	3C	60	24	403	6.717	0.6164	0.00535	0.834	500	7/24/2009 9:25	7/24/2009 13:26	0.997	0.635	1.058	83.11%	3.25%													
19	4A	60	25	445	7.417	0.6208	0.00744	0.810	500	7/24/2009 9:25	7/24/2009 13:26	0.999	0.635	1.058	82.59%	3.26%													

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

\* - RPD changed to 0% due to activity below MDA for 1201884029.1

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		2 SIGMA		Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
									Counting Uncertainty pCi/L	Total Prop. Uncertainty pCi/L	Counting Uncertainty pCi/L	Total Prop. Uncertainty pCi/L						
1	1.2040	0.8500	3	1.7479	-2.8191	0.1705	-0.4779	0.0799	0.9236	0.9237	0.9237	0.9237	SAMPLE					
2	1.5511	1.0951	3	2.3952	3.5046	0.2383	0.8547	0.2015	1.6195	1.8539	1.8539	1.8539	SAMPLE					
3	1.2329	0.8704	3	1.9232	2.3897	0.2749	0.6553	0.1788	1.2781	1.4181	1.4181	1.4181	SAMPLE					
4	0.9447	0.6669	3	1.5270	0.3606	1.2017	0.0933	0.1121	0.8489	0.8540	0.8540	0.8540	SAMPLE					
5	1.4200	1.0026	3	2.2000	0.3508	1.7903	0.0900	0.1611	1.2306	1.2340	1.2340	1.2340	SAMPLE					
6	1.0999	0.7765	3	1.7470	0.8634	0.6124	0.2227	0.1361	1.0346	1.0583	1.0583	1.0583	SAMPLE					
7	1.3107	0.9254	3	2.0294	1.2696	0.4944	0.3553	0.1752	1.2272	1.2699	1.2699	1.2699	SAMPLE					
8	1.0526	0.7431	3	1.6603	2.5461	0.2354	0.7313	0.1704	1.1625	1.3341	1.3341	1.3341	SAMPLE					
9	1.1347	0.8011	3	1.7824	0.4998	1.0348	0.1387	0.1434	1.0131	1.0212	1.0212	1.0212	SAMPLE					
10	1.3653	0.9639	3	2.1536	0.8941	0.7175	0.1980	0.1419	1.2560	1.2768	1.2768	1.2768	SAMPLE					
11	0.7345	0.5185	3	1.2355	1.9657	0.2459	0.4953	0.1207	0.9387	1.0660	1.0660	1.0660	SAMPLE					
12	0.6853	0.4838	3	1.1616	0.6801	0.5322	0.1753	0.0931	0.7080	0.7293	0.7293	0.7293	SAMPLE					
13	1.0562	0.7457	3	1.6804	1.1847	0.4480	0.3133	0.1400	1.0374	1.0811	1.0811	1.0811	SAMPLE					
14	0.9428	0.6657	3	1.5299	0.8368	0.5604	0.2107	0.1179	0.9175	0.9424	0.9424	0.9424	SAMPLE					
15	0.7229	0.5104	3	1.2288	1.1176	0.3745	0.2687	0.1002	0.8170	0.8661	0.8661	0.8661	SAMPLE					
16	1.4915	1.0530	3	2.3429	-1.2381	0.4524	-0.2613	0.1179	1.0948	1.0950	1.0950	1.0950	MB					
17	1.7933	1.2661	3	2.7553	-1.8989	0.3554	-0.4253	0.1504	1.3163	1.3165	1.3165	1.3165	DUP	0.0%		20.4454	105.7%	
18	1.0676	0.7538	3	1.6911	21.6034	0.0661	5.8827	0.3371	2.4261	6.0549	6.0549	6.0549	MS			20.4075	118.6%	
19	1.0496	0.7410	3	1.6652	24.2036	0.0631	6.6067	0.3539	2.5410	6.7199	6.7199	6.7199	LCS					

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine
232764001	14B	370	105	427	7/24/2009 15:26	7/24/2009 21:36	Protean
232764002	4C	60	20	136	7/24/2009 12:53	7/24/2009 13:53	Protean
232764003	4D	60	13	107	7/24/2009 12:53	7/24/2009 13:53	Protean
232764004	5A	60	15	41	7/24/2009 12:53	7/24/2009 13:53	Protean
232764005	5B	60	5	84	7/24/2009 12:53	7/24/2009 13:53	Protean
232764007	5C	60	15	61	7/24/2009 12:57	7/24/2009 13:57	Protean
232764008	5D	60	9	101	7/24/2009 12:57	7/24/2009 13:57	Protean
232764009	11B	60	30	98	7/24/2009 13:13	7/24/2009 14:13	Protean
232764010	11C	60	26	67	7/24/2009 13:13	7/24/2009 14:13	Protean
232764011	11B	60	27	66	7/24/2009 15:25	7/24/2009 16:25	Protean
232764013	1A	60	4	50	7/24/2009 13:25	7/24/2009 14:25	Protean
232764014	1B	60	4	29	7/24/2009 13:25	7/24/2009 14:25	Protean
232764015	1C	60	6	65	7/24/2009 13:25	7/24/2009 14:25	Protean
232764016	1D	60	8	46	7/24/2009 13:25	7/24/2009 14:25	Protean
232764017	2C	60	8	34	7/24/2009 13:25	7/24/2009 14:25	Protean
1201884028	11C	60	38	43	7/24/2009 15:26	7/24/2009 16:26	Protean
1201884029	3A	60	5	70	7/24/2009 13:26	7/24/2009 14:26	Protean
1201884030	3C	60	24	403	7/24/2009 13:26	7/24/2009 14:26	Protean
1201884031	4A	60	25	445	7/24/2009 13:26	7/24/2009 14:26	Protean

ASSAY 22-Jul-09 9:43:54

Protocol id 8 228\_REC  
Time limit 180  
Count limit 50000  
Isotope Ba-133  
Protocol date 9-Apr-07 10:03:07  
Run id. 78

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	98	1	180	775	228	4.14		09:44:01
2	98	2	180	667	192	4.58	84.21	09:47:13
3	98	3	180	581	163.2	5.04	71.58	09:50:24
4	98	4	180	658	189.1	4.62	82.94	09:53:36
5	98	5	180	593	167.3	4.96	73.38	09:56:47
6	60	6	180	587	165.2	5	72.46	10:00:12
7	60	7	180	586	165	5	72.37	10:03:23
8	60	8	180	640	182.8	4.71	80.18	10:06:35
9	60	9	180	659	189.2	4.61	82.98	10:09:46
<del>10</del>	<del>60</del>	<del>10</del>	<del>180</del>	<del>568</del>	<del>159</del>	<del>5.12</del>	<del>69.74</del>	<del>10:12:57</del>
11	74	11	180	653	187.2	4.64	82.11	10:16:27
<del>12</del>	<del>74</del>	<del>12</del>	<del>180</del>	<del>534</del>	<del>147.6</del>	<del>5.35</del>	<del>64.74</del>	<del>10:19:30</del>
13	74	13	180	620	176.1	4.81	77.24	10:22:50
14	74	14	180	642	183.7	4.7	80.57	10:26:01
15	74	15	180	627	178.7	4.77	78.38	10:29:13
16	70	16	180	609	172.7	4.87	75.75	10:32:32
17	70	17	180	627	178.4	4.78	78.25	10:35:43
18	70	18	180	599	169.1	4.93	74.17	10:38:54
19	70	19	180	660	189.5	4.61	83.11	10:42:06
20	70	20	180	656	188.3	4.63	82.59	10:45:17

END OF ASSAY

\* N 7/28/09

ASSAY 23-Jul-09 5:21:10

Protocol id 8 228\_REC  
Time limit 180  
Count limit 50000  
Isotope Ba-133  
Protocol date 9-Apr-07 10:03:07  
Run id. 82

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	98	1	180	788	232.1	4.1		05:21:13
2	98	2	180	651	186.6	4.65	80.40	05:24:25
<del>3</del>	<del>98</del>	<del>3</del>	<del>180</del>	<del>569</del>	<del>159.4</del>	<del>5.11</del>	<del>68.68</del>	<del>05:27:36</del> * 7128169

END OF ASSAY

ASSAY 23-Jul-09 6:36:14

Protocol id 9 228\_REC2  
Time limit 180  
Count limit 50000  
Isotope Ba-133  
Protocol date 9-Apr-07 10:02:22  
Run id. 95

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	90	1	180	804	237.6	4.05		06:36:16
2	90	2	180	628	178.8	4.77	75.25	06:39:28

END OF ASSAY

# RADIUM 226

**Radiochemistry Batch Checklist, Rev 9**

Batch# 886504      Product: Tl-226      Date: 7/29/09

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.	✓		see case narrative
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 716464
Batch non-conformances second reviewed and disposition verified to be completed.	✓		GEL: 716464
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:

*Lynnday Pace*

*MERR 8/13/09*

Secondary Review Performed By:

*Luzette Yon 7/29/09*



# Radium-226 Que Sheet

07/20/2009

General Engineering Laboratories, Radiochemistry Division

Batch #: 886504 Analyst: KSD1

First Client Due Date: 08/13/2009

Internal Due Date: 08/02/2009

Spike Isotope: Radium-226 Spike Code: 062541

Expiration Date: 1/1/10 Vol: 0.1

Nom Conc: 100.8321

LCS Isotope: Radium-226 LCS Code: 062541

Expiration Date: 1/1/10 Vol: 0.1

Nom Conc: 24.11662

Prep Date: 1/21/09

Pipet ID: 142303

Initials: KC

Witness: DL-72209

Sample Count Time: 30 (Min)

Bkg Count Time: 30 (Min)

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
232764001-1	M-110B	SAMPLE	WATER	1 pCi/L	KERR003 /	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	111	1	8	28
232764002-1	M-110B/DISS	SAMPLE	WATER	1 pCi/L	KERR003 2	500	7/22/09 1114	7/21/09 1025	7/21/09 1410	111	2	4	20
232764003-1	I-ARB	SAMPLE	WATER	1 pCi/L	KERR003 3	500	7/22/09 1116	7/21/09 1025	7/21/09 1410	311	3	8	58
232764004-1	M-117B	SAMPLE	WATER	1 pCi/L	KERR003 4	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	403	4	5	53
232764005-1	M-120B	SAMPLE	WATER	1 pCi/L	KERR003 5	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	500	5	3	10
232764007-1	M-103B	SAMPLE	WATER	1 pCi/L	KERR003 6	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	212	7	1	8
232764008-1	M-118B	SAMPLE	WATER	1 pCi/L	KERR003 7	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	104	1	8	18
232764009-1	M-121B	SAMPLE	WATER	1 pCi/L	KERR003 8	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	211	2	3	9
232764010-1	M-10B	SAMPLE	WATER	1 pCi/L	KERR003 9	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	209	3	8	23
232764011-1	M-10B/DISS	SAMPLE	WATER	1 pCi/L	KERR003 10	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	410	4	8	15
232764013-1	H-11B	SAMPLE	WATER	1 pCi/L	KERR003 11	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	503	5	8	13
232764014-1	H-11B/DISS	SAMPLE	WATER	1 pCi/L	KERR003 12	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	707	7	2	3
232764015-1	TR-10B	SAMPLE	WATER	1 pCi/L	KERR003 13	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	111	1	8	30
232764016-1	TR-8B	SAMPLE	WATER	1 pCi/L	KERR003 14	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	207	2	7	31
232764017-1	M-92B	SAMPLE	WATER	1 pCi/L	KERR003 15	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	308	3	8	14
1201884102-1	MB for batch 886504	MB	WATER	1 pCi/L	QC ACCOUNT 16	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	404	4	8	22
1201884103-1	M-92B(232764017DUP)	DUP	WATER	1 pCi/L	QC ACCOUNT 17	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	510	5	1	17
1201884104-1	M-92B(232764017MS)	MS	WATER	1 pCi/L	QC ACCOUNT 18	100	7/22/09 1110	7/21/09 1025	7/21/09 1410	706	7	3	910
1201884105-1	LCS for batch 886504	LCS	WATER	1 pCi/L	QC ACCOUNT 19	500	7/22/09 1110	7/21/09 1025	7/21/09 1410	107	1	8	1016

122

Comments:  
Instrument ID's:

LUCASI-90988, LUCAS2:136917, LUCAS3:90989, LUCAS4:102753, LUC5:132286, LUC6:170055

Data Reviewed By:

*Sunday Paul 7/29/09*

# Radium-226 Liquid

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

Spike S/N : 0638-H  
 Spike Exp Date : 7/17/2010  
 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 : 886504  
 Analyst : KSD1  
 Prep Date : 7/22/2009  
 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

Pos.	Sample Characteristics		Sample Aliquot L	Sample Aliquot StDev. L	Sample Date/Time	Count Raw Data			Weekly Background			
	Sample ID	Sample Aliquot L				Cell Number	Counting Time (min.)	Gross Counts	Gross CPM	Counts	CPM	Count Time (min.)
1	232764001.1	0.5000	2.0256E-05	7/1/2009 9:00	111	30	28	0.933	8	0.267	30	1.5750
2	232764002.1	0.5000	2.0256E-05	7/1/2009 9:00	201	30	20	0.667	6	0.200	30	1.9930
3	232764003.1	0.5000	2.0256E-05	7/1/2009 11:50	311	30	58	1.933	8	0.267	30	2.1140
4	232764004.1	0.5000	2.0256E-05	7/6/2009 10:37	403	30	53	1.767	5	0.167	30	1.4630
5	232764005.1	0.5000	2.0256E-05	7/7/2009 8:45	502	30	10	0.333	3	0.100	30	1.8780
6	232764007.1	0.5000	2.0256E-05	7/8/2009 9:05	712	30	2	0.067	1	0.033	30	2.1320
7	232764008.1	0.5000	2.0256E-05	7/9/2009 8:45	104	30	18	0.600	8	0.267	30	1.9730
8	232764009.1	0.5000	2.0256E-05	7/10/2009 7:45	211	30	9	0.300	3	0.100	30	2.1710
9	232764010.1	0.5000	2.0256E-05	7/10/2009 11:45	309	30	23	0.767	8	0.267	30	1.8770
10	232764011.1	0.5000	2.0256E-05	7/10/2009 11:45	410	30	15	0.500	8	0.267	30	1.8860
11	232764013.1	0.5000	2.0256E-05	7/13/2009 9:00	503	30	13	0.433	8	0.267	30	1.6010
12	232764014.1	0.5000	2.0256E-05	7/13/2009 9:00	707	30	3	0.100	2	0.067	30	2.1190
13	232764015.1	0.5000	2.0256E-05	7/14/2009 9:00	112	30	30	1.000	8	0.267	30	1.6480
14	232764016.1	0.5000	2.0256E-05	7/14/2009 11:45	207	30	31	1.033	7	0.233	30	2.1460
15	232764017.1	0.5000	2.0256E-05	7/15/2009 8:45	308	30	14	0.467	8	0.267	30	1.9500
16	1201884102.1	0.5000	2.0256E-05	7/22/2009 0:00	409	30	22	0.733	8	0.267	30	2.0360
17	1201884103.1	0.5000	2.0256E-05	7/15/2009 8:45	510	30	17	0.567	1	0.033	30	1.4580
18	1201884104.1	0.1000	1.1370E-05	7/15/2009 8:45	706	30	910	30.333	3	0.100	30	2.1180
19	1201884105.1	0.5000	2.0256E-05	7/22/2009 0:00	107	30	1016	33.867	8	0.267	30	1.7730

Detector Efficiency Error (cpm/dpm)	Cell Calibration Date	Cell Calibration Due Date	De-Gas Date/Time	Rn-222 Ingrow End Date/Time	Count Start Date/Time	De-Gas to Ingrowth	Rn-222 Corrections		Ra-226 Decay
							Ingrowth to Count	During Count	
0.09580	8/29/2008	8/29/2009	7/22/2009 11:10	7/29/2009 10:25	7/29/2009 14:10	0.717	0.972	1.002	1.000
0.07722	12/19/2008	12/19/2009	7/22/2009 11:10	7/29/2009 10:25	7/29/2009 14:10	0.717	0.972	1.002	1.000
0.06082	2/4/2009	2/4/2010	7/22/2009 11:10	7/29/2009 10:25	7/29/2009 14:10	0.717	0.972	1.002	1.000
0.12371	3/2/2009	3/2/2010	7/22/2009 11:10	7/29/2009 10:25	7/29/2009 14:10	0.717	0.972	1.002	1.000
0.14377	3/25/2009	3/25/2010	7/22/2009 11:10	7/29/2009 10:25	7/29/2009 14:10	0.717	0.972	1.002	1.000
0.08547	11/21/2008	11/21/2009	7/22/2009 11:10	7/29/2009 10:25	7/29/2009 14:10	0.717	0.972	1.002	1.000
0.09580	8/29/2008	8/29/2009	7/22/2009 11:10	7/29/2009 10:50	7/29/2009 14:40	0.718	0.971	1.002	1.000
0.07722	12/19/2008	12/19/2009	7/22/2009 11:10	7/29/2009 10:50	7/29/2009 14:40	0.718	0.971	1.002	1.000
0.06082	2/4/2009	2/4/2010	7/22/2009 11:10	7/29/2009 10:50	7/29/2009 14:40	0.718	0.971	1.002	1.000
0.12371	3/2/2009	3/2/2010	7/22/2009 11:10	7/29/2009 10:50	7/29/2009 14:40	0.718	0.971	1.002	1.000
0.14377	3/25/2009	3/25/2010	7/22/2009 11:10	7/29/2009 10:50	7/29/2009 14:40	0.718	0.971	1.002	1.000
0.08547	11/21/2008	11/21/2009	7/22/2009 11:10	7/29/2009 10:50	7/29/2009 14:40	0.718	0.971	1.002	1.000
0.09580	8/29/2008	8/29/2009	7/22/2009 11:10	7/29/2009 11:20	7/29/2009 15:15	0.719	0.971	1.002	1.000
0.07722	12/19/2008	12/19/2009	7/22/2009 11:10	7/29/2009 11:20	7/29/2009 15:15	0.719	0.971	1.002	1.000
0.06082	2/4/2009	2/4/2010	7/22/2009 11:10	7/29/2009 11:20	7/29/2009 15:15	0.719	0.971	1.002	1.000
0.12371	3/2/2009	3/2/2010	7/22/2009 11:10	7/29/2009 11:20	7/29/2009 15:15	0.719	0.971	1.002	1.000
0.14377	3/25/2009	3/25/2010	7/22/2009 11:10	7/29/2009 11:20	7/29/2009 15:15	0.719	0.971	1.002	1.000
0.08547	11/21/2008	11/21/2009	7/22/2009 11:10	7/29/2009 11:20	7/29/2009 15:15	0.719	0.971	1.002	1.000
0.09580	8/29/2008	8/29/2009	7/22/2009 11:10	7/29/2009 13:05	7/29/2009 16:10	0.723	0.977	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 Counting Uncertainty pCi/L	2 SIGMA Total Prop. Uncertainty pCi/L	Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
1	0.2544	0.1796	1	0.4410	0.5459	0.3149	0.6667	0.2000	0.3210	0.3510		SAMPLE				
2	0.1741	0.1229	1	0.3105	0.3020	0.3723	0.4667	0.1700	0.2156	0.2269		SAMPLE				
3	0.1895	0.1338	1	0.3286	1.0167	0.1735	1.6667	0.2708	0.3238	0.3911		SAMPLE				
4	0.2165	0.1528	1	0.3938	1.4103	0.2012	1.6000	0.2539	0.4386	0.6113		SAMPLE				
5	0.1306	0.0922	1	0.2531	0.1602	0.5348	0.2333	0.1202	0.1618	0.1704		SAMPLE				
6	0.0664	0.0469	1	0.1543	0.0202	1.7342	0.0333	0.0577	0.0684	0.0686		SAMPLE				
7	0.2029	0.1433	1	0.3519	0.2177	0.5188	0.3333	0.1700	0.2176	0.2249		SAMPLE				
8	0.1129	0.0797	1	0.2188	0.1187	0.5825	0.2000	0.1155	0.1344	0.1372		SAMPLE				
9	0.2133	0.1506	1	0.3699	0.3433	0.3761	0.5000	0.1856	0.2498	0.2605		SAMPLE				
10	0.2123	0.1499	1	0.3681	0.1594	0.6962	0.2333	0.1599	0.2141	0.2195		SAMPLE				
11	0.2501	0.1766	1	0.4336	0.1342	0.9277	0.1667	0.1528	0.2410	0.2451		SAMPLE				
12	0.0945	0.0667	1	0.1942	0.0203	2.2377	0.0333	0.0745	0.0889	0.0890		SAMPLE				
13	0.2427	0.1714	1	0.4209	0.5730	0.2961	0.7333	0.2055	0.3147	0.3482		SAMPLE				
14	0.1744	0.1231	1	0.3062	0.4800	0.2682	0.8000	0.2055	0.2417	0.2667		SAMPLE				
15	0.2051	0.1448	1	0.3557	0.1321	0.7841	0.2000	0.1563	0.2024	0.2044		SAMPLE				
16	0.1965	0.1387	1	0.3407	0.2951	0.4103	0.4667	0.1826	0.2263	0.2432		MB				
17	0.0970	0.0685	1	0.2253	0.4710	0.3016	0.5333	0.1414	0.2448	0.2911	232764017.1	DUP	112.4%	1.8680	120.8321	76.1%
18	0.5783	0.4083	1	1.1206	91.9048	0.0917	30.2333	1.0072	6.0010	23.3776	232764017.1	MS			24.1662	99.8%
19	0.2231	0.1575	1	0.3868	24.1257	0.1009	33.6000	1.0667	1.5012	6.4511		LCS				

# METHOD CALIBRATION DATA

# 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:

W.M. [Signature] 9-6-02

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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 : 5-AUG-2009 14:45:15  
 Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.768
NP-237	4341	2/28/10	4768.800	4768.589
CM-244	4320A	2/28/10	5795.020	5794.928

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2541.111  
 Energy Calibration Slope : 5.103021  
 Energy Calibration Quadratic : 3.7696620E-04  
 Energy Calibration Range : 8162.000

Instrument : CHAMBER 002  
 Detector : 78266  
 Calibration Date/Time : 5-AUG-2009 14:45:26  
 Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3174.754
NP-237	4341	2/28/10	4768.800	4760.313
CM-244	4320A	2/28/10	5795.020	5783.900

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2454.309  
 Energy Calibration Slope : 5.127246  
 Energy Calibration Quadratic : 2.9634204E-04  
 Energy Calibration Range : 8015.000

Instrument : CHAMBER 003  
 Detector : 67617  
 Calibration Date/Time : 5-AUG-2009 14:45:38  
 Calibration Source Id : AESS-003

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3181.710
NP-237	4341	2/28/10	4768.800	4767.829
CM-244	4320A	2/28/10	5795.020	5794.321

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2595.909  
 Energy Calibration Slope : 5.495871  
 Energy Calibration Quadratic : 3.8085488E-04  
 Energy Calibration Range : 8623.000

Instrument : CHAMBER 004  
 Detector : 64279  
 Calibration Date/Time : 5-AUG-2009 14:45:54  
 Calibration Source Id : AESS-004  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.926  
 NP-237 4341 2/28/10 4768.800 4769.257  
 CM-244 4320A 2/28/10 5795.020 5795.158  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2531.198  
 Energy Calibration Slope : 5.085382  
 Energy Calibration Quadratic : 3.7076508E-04  
 Energy Calibration Range : 8127.000

Instrument : CHAMBER 005  
 Detector : 67612  
 Calibration Date/Time : 5-AUG-2009 14:46:05  
 Calibration Source Id : AESS-005  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.615  
 NP-237 4341 2/28/10 4768.800 4768.917  
 CM-244 4320A 2/28/10 5795.020 5795.262  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.824  
 Energy Calibration Slope : 5.018230  
 Energy Calibration Quadratic : 2.9044802E-04  
 Energy Calibration Range : 7827.000

Instrument : CHAMBER 006  
 Detector : 67613  
 Calibration Date/Time : 5-AUG-2009 14:46:15  
 Calibration Source Id : AESS-006  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.663  
 NP-237 4341 2/28/10 4768.800 4768.540  
 CM-244 4320A 2/28/10 5795.020 5794.813  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2372.455  
 Energy Calibration Slope : 4.968300  
 Energy Calibration Quadratic : 3.0602218E-04  
 Energy Calibration Range : 7781.000

Instrument : CHAMBER 007  
 Detector : 67607  
 Calibration Date/Time : 3-AUG-2009 15:08:14  
 Calibration Source Id : AESS-007

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.242
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 : 2434.070  
 Energy Calibration Slope : 5.126286  
 Energy Calibration Quadratic : 3.2231462E-04  
 Energy Calibration Range : 8021.000

Instrument : CHAMBER 008  
 Detector : 78788  
 Calibration Date/Time : 3-AUG-2009 15:08:25  
 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	4768.886
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2371.872  
 Energy Calibration Slope : 4.982497  
 Energy Calibration Quadratic : 2.9716187E-04  
 Energy Calibration Range : 7786.000

Instrument : CHAMBER 009  
 Detector : 72528  
 Calibration Date/Time : 3-AUG-2009 15:08:37  
 Calibration Source Id : AESS-009

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.048  
 Energy Calibration Slope : 4.954385  
 Energy Calibration Quadratic : 3.3214918E-04  
 Energy Calibration Range : 7798.000

Instrument : CHAMBER 010  
 Detector : 72529  
 Calibration Date/Time : 3-AUG-2009 15:08:47  
 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 : 2369.197  
 Energy Calibration Slope : 4.976785  
 Energy Calibration Quadratic : 2.5434556E-04  
 Energy Calibration Range : 7732.000

Instrument : CHAMBER 011  
 Detector : 72531  
 Calibration Date/Time : 3-AUG-2009 15:10:05  
 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 4768.798  
 CM-244 4320A 2/28/10 5795.020 5794.773  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2352.745  
 Energy Calibration Slope : 4.989676  
 Energy Calibration Quadratic : 3.1640983E-04  
 Energy Calibration Range : 7794.000

Instrument : CHAMBER 012  
 Detector : 67594  
 Calibration Date/Time : 3-AUG-2009 15:10:47  
 Calibration Source Id : AESS-012  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.999  
 NP-237 4341 2/28/10 4768.800 4768.892  
 CM-244 4320A 2/28/10 5795.020 5795.162  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2380.763  
 Energy Calibration Slope : 4.944053  
 Energy Calibration Quadratic : 2.9969949E-04  
 Energy Calibration Range : 7758.000

Instrument : CHAMBER 013  
 Detector : 78790  
 Calibration Date/Time : 3-AUG-2009 15:10:57  
 Calibration Source Id : AESS-013  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.313  
 NP-237 4341 2/28/10 4768.800 4768.407  
 CM-244 4320A 2/28/10 5795.020 5794.604  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.188  
 Energy Calibration Slope : 4.918418  
 Energy Calibration Quadratic : 2.9963398E-04  
 Energy Calibration Range : 7714.000

Instrument : CHAMBER 014  
 Detector : 67616  
 Calibration Date/Time : 3-AUG-2009 15:11:09  
 Calibration Source Id : AESS-014  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.775  
 NP-237 4341 2/28/10 4768.800 4769.221  
 CM-244 4320A 2/28/10 5795.020 5795.274  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2348.951  
 Energy Calibration Slope : 4.947984  
 Energy Calibration Quadratic : 3.1622496E-04  
 Energy Calibration Range : 7747.000

Instrument : CHAMBER 015  
 Detector : 61581  
 Calibration Date/Time : 3-AUG-2009 15:11:19  
 Calibration Source Id : AESS-015  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.428  
 NP-237 4341 2/28/10 4768.800 4768.094  
 CM-244 4320A 2/28/10 5795.020 5794.472  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2351.056  
 Energy Calibration Slope : 4.893757  
 Energy Calibration Quadratic : 3.2378119E-04  
 Energy Calibration Range : 7702.000

Instrument : CHAMBER 016  
 Detector : 78774  
 Calibration Date/Time : 3-AUG-2009 15:11:28  
 Calibration Source Id : AESS-016  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.555  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2352.841  
 Energy Calibration Slope : 4.901042  
 Energy Calibration Quadratic : 2.9683873E-04  
 Energy Calibration Range : 7683.000

Instrument : CHAMBER 017  
 Detector : 78791  
 Calibration Date/Time : 3-AUG-2009 15:12:45  
 Calibration Source Id : AESS-017  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.274  
 NP-237 4341 2/28/10 4768.800 4768.745  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.135  
 Energy Calibration Slope : 4.992663  
 Energy Calibration Quadratic : 2.7446265E-04  
 Energy Calibration Range : 7763.000

Instrument : CHAMBER 018  
 Detector : 78782  
 Calibration Date/Time : 3-AUG-2009 15:12:56  
 Calibration Source Id : AESS-018  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.695  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.113  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2352.853  
 Energy Calibration Slope : 4.963830  
 Energy Calibration Quadratic : 3.1513936E-04  
 Energy Calibration Range : 7766.000

Instrument : CHAMBER 019  
 Detector : 78786  
 Calibration Date/Time : 3-AUG-2009 15:13:21  
 Calibration Source Id : AESS-019

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5794.625

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2342.911  
 Energy Calibration Slope : 5.075375  
 Energy Calibration Quadratic : 2.0290195E-04  
 Energy Calibration Range : 7753.000

Instrument : CHAMBER 020  
 Detector : 78787  
 Calibration Date/Time : 3-AUG-2009 15:13:30  
 Calibration Source Id : AESS-020

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.407
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5794.754

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2341.178  
 Energy Calibration Slope : 4.974929  
 Energy Calibration Quadratic : 3.0557165E-04  
 Energy Calibration Range : 7756.000

Instrument : CHAMBER 021  
 Detector : 67047  
 Calibration Date/Time : 3-AUG-2009 15:13:40  
 Calibration Source Id : AESS-021

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.625
NP-237	4341	2/28/10	4768.800	4768.133
CM-244	4320A	2/28/10	5795.020	5794.606

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2275.519  
 Energy Calibration Slope : 4.971471  
 Energy Calibration Quadratic : 2.7405904E-04  
 Energy Calibration Range : 7654.000



Instrument : CHAMBER 022  
 Detector : 72530  
 Calibration Date/Time : 3-AUG-2009 15:13:53  
 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	4768.547
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.547  
 Energy Calibration Slope : 4.977059  
 Energy Calibration Quadratic : 2.7739155E-04  
 Energy Calibration Range : 7764.000

Instrument : CHAMBER 023  
 Detector : 78264  
 Calibration Date/Time : 3-AUG-2009 15:14:51  
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.979
NP-237	4341	2/28/10	4768.800	4768.454
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.134  
 Energy Calibration Slope : 4.999145  
 Energy Calibration Quadratic : 2.8956190E-04  
 Energy Calibration Range : 7806.000

Instrument : CHAMBER 024  
 Detector : 76542  
 Calibration Date/Time : 3-AUG-2009 15:15:01  
 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 : 2348.727  
 Energy Calibration Slope : 4.965035  
 Energy Calibration Quadratic : 2.7366623E-04  
 Energy Calibration Range : 7720.000

Instrument : CHAMBER 025  
 Detector : 45-149AA5  
 Calibration Date/Time : 3-AUG-2009 15:15:13  
 Calibration Source Id : AESS-025  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.326  
 NP-237 4341 2/28/10 4768.800 4769.288  
 CM-244 4320A 2/28/10 5795.020 5795.321  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2318.480  
 Energy Calibration Slope : 4.856905  
 Energy Calibration Quadratic : 3.0368069E-04  
 Energy Calibration Range : 7610.000

Instrument : CHAMBER 026  
 Detector : 78204  
 Calibration Date/Time : 3-AUG-2009 15:15:23  
 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 4768.821  
 CM-244 4320A 2/28/10 5795.020 5795.028  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2356.528  
 Energy Calibration Slope : 4.940171  
 Energy Calibration Quadratic : 3.3160963E-04  
 Energy Calibration Range : 7763.000

Instrument : CHAMBER 027  
 Detector : 42484  
 Calibration Date/Time : 3-AUG-2009 15:15:36  
 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 4768.779  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.956  
 Energy Calibration Slope : 4.971167  
 Energy Calibration Quadratic : 3.1741365E-04  
 Energy Calibration Range : 7786.000

Instrument : CHAMBER 028  
 Detector : 78792  
 Calibration Date/Time : 3-AUG-2009 15:15:45  
 Calibration Source Id : AESS-028  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.319  
 NP-237 4341 2/28/10 4768.800 4768.977  
 CM-244 4320A 2/28/10 5795.020 5795.122  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2311.473  
 Energy Calibration Slope : 4.929708  
 Energy Calibration Quadratic : 3.5385601E-04  
 Energy Calibration Range : 7731.000

Instrument : CHAMBER 029  
 Detector : 33454  
 Calibration Date/Time : 3-AUG-2009 15:15:55  
 Calibration Source Id : AESS-029  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3184.453  
 NP-237 4341 2/28/10 4768.800 4773.209  
 CM-244 4320A 2/28/10 5795.020 5802.449  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2339.797  
 Energy Calibration Slope : 4.857889  
 Energy Calibration Quadratic : 3.2029144E-04  
 Energy Calibration Range : 7650.000

Instrument : CHAMBER 030  
 Detector : 33447  
 Calibration Date/Time : 3-AUG-2009 15:16:05  
 Calibration Source Id : AESS-030  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.504  
 NP-237 4341 2/28/10 4768.800 4768.116  
 CM-244 4320A 2/28/10 5795.020 5794.519  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2378.547  
 Energy Calibration Slope : 4.952705  
 Energy Calibration Quadratic : 3.1284252E-04  
 Energy Calibration Range : 7778.000

Instrument : CHAMBER 031  
 Detector : 67042  
 Calibration Date/Time : 3-AUG-2009 15:16:16  
 Calibration Source Id : AESS-031  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.466  
 NP-237 4341 2/28/10 4768.800 4769.878  
 CM-244 4320A 2/28/10 5795.020 5796.077  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.033  
 Energy Calibration Slope : 4.931703  
 Energy Calibration Quadratic : 3.3940026E-04  
 Energy Calibration Range : 7770.000

Instrument : CHAMBER 032  
 Detector : 67041  
 Calibration Date/Time : 3-AUG-2009 15:16:28  
 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 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2370.812  
 Energy Calibration Slope : 4.912539  
 Energy Calibration Quadratic : 3.7134811E-04  
 Energy Calibration Range : 7791.000

Instrument : CHAMBER 033  
 Detector : 78785  
 Calibration Date/Time : 3-AUG-2009 15:16:44  
 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 4768.937  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.592  
 Energy Calibration Slope : 4.933960  
 Energy Calibration Quadratic : 3.4911980E-04  
 Energy Calibration Range : 7795.000

Instrument : CHAMBER 034  
 Detector : 61586  
 Calibration Date/Time : 3-AUG-2009 15:16:57  
 Calibration Source Id : AESS-034

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.237
NP-237	4341	2/28/10	4768.800	4768.352
CM-244	4320A	2/28/10	5795.020	5794.135

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2382.364  
 Energy Calibration Slope : 5.064843  
 Energy Calibration Quadratic : 3.7605409E-04  
 Energy Calibration Range : 7963.000

Instrument : CHAMBER 035  
 Detector : 78202  
 Calibration Date/Time : 3-AUG-2009 15:17:07  
 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	4768.976
CM-244	4320A	2/28/10	5795.020	5795.068

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2332.455  
 Energy Calibration Slope : 4.961503  
 Energy Calibration Quadratic : 3.2716690E-04  
 Energy Calibration Range : 7756.000

Instrument : CHAMBER 036  
 Detector : 78203  
 Calibration Date/Time : 3-AUG-2009 15:17:19  
 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	4768.831
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2351.688  
 Energy Calibration Slope : 4.934670  
 Energy Calibration Quadratic : 3.2679725E-04  
 Energy Calibration Range : 7747.000

Instrument : CHAMBER 037  
 Detector : 45-149BB5  
 Calibration Date/Time : 3-AUG-2009 15:17:30  
 Calibration Source Id : AESS-037  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.360  
 NP-237 4341 2/28/10 4768.800 4770.173  
 CM-244 4320A 2/28/10 5795.020 5795.449  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2380.215  
 Energy Calibration Slope : 4.934037  
 Energy Calibration Quadratic : 2.6879812E-04  
 Energy Calibration Range : 7715.000

Instrument : CHAMBER 038  
 Detector : 72532  
 Calibration Date/Time : 3-AUG-2009 15:17:42  
 Calibration Source Id : AESS-038  
 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 4768.694  
 CM-244 4320A 2/28/10 5795.020 5794.956  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2374.738  
 Energy Calibration Slope : 4.941356  
 Energy Calibration Quadratic : 3.2555324E-04  
 Energy Calibration Range : 7776.000

Instrument : CHAMBER 039  
 Detector : 45-149BB2  
 Calibration Date/Time : 3-AUG-2009 15:17:50  
 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 4769.047  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2386.341  
 Energy Calibration Slope : 4.892657  
 Energy Calibration Quadratic : 3.3502636E-04  
 Energy Calibration Range : 7748.000

Instrument : CHAMBER 040  
 Detector : 78773  
 Calibration Date/Time : 3-AUG-2009 15:18:00  
 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	5795.091

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.680  
 Energy Calibration Slope : 4.886324  
 Energy Calibration Quadratic : 3.3744561E-04  
 Energy Calibration Range : 7711.000

Instrument : CHAMBER 041  
 Detector : 78205  
 Calibration Date/Time : 3-AUG-2009 15:18:09  
 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	5795.019

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.991  
 Energy Calibration Slope : 4.934965  
 Energy Calibration Quadratic : 3.5826201E-04  
 Energy Calibration Range : 7790.000

Instrument : CHAMBER 042  
 Detector : 78793  
 Calibration Date/Time : 3-AUG-2009 15:18:18  
 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 : 2378.631  
 Energy Calibration Slope : 4.903480  
 Energy Calibration Quadratic : 3.3252311E-04  
 Energy Calibration Range : 7748.000

Instrument : CHAMBER 043  
 Detector : 76543  
 Calibration Date/Time : 3-AUG-2009 15:18:26  
 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 4768.829  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2368.789  
 Energy Calibration Slope : 4.934124  
 Energy Calibration Quadratic : 3.2330386E-04  
 Energy Calibration Range : 7760.000

Instrument : CHAMBER 044  
 Detector : 79459  
 Calibration Date/Time : 3-AUG-2009 15:18:36  
 Calibration Source Id : AESS-044  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.302  
 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 : 2359.457  
 Energy Calibration Slope : 4.939529  
 Energy Calibration Quadratic : 3.2710869E-04  
 Energy Calibration Range : 7761.000

Instrument : CHAMBER 045  
 Detector : 78783  
 Calibration Date/Time : 3-AUG-2009 15:18:46  
 Calibration Source Id : AESS-045  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.992  
 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 : 2366.479  
 Energy Calibration Slope : 4.912705  
 Energy Calibration Quadratic : 3.5802016E-04  
 Energy Calibration Range : 7773.000



Instrument : CHAMBER 046  
 Detector : 76544  
 Calibration Date/Time : 3-AUG-2009 15:18:55  
 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 : 2361.703  
 Energy Calibration Slope : 4.888400  
 Energy Calibration Quadratic : 3.3994557E-04  
 Energy Calibration Range : 7724.000

Instrument : CHAMBER 047  
 Detector : 46-089B1  
 Calibration Date/Time : 3-AUG-2009 15:19:03  
 Calibration Source Id : AESS-047  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.340  
 NP-237 4341 2/28/10 4768.800 4768.922  
 CM-244 4320A 2/28/10 5795.020 5795.151  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2354.429  
 Energy Calibration Slope : 4.963282  
 Energy Calibration Quadratic : 3.1133511E-04  
 Energy Calibration Range : 7763.000

Instrument : CHAMBER 048  
 Detector : 42483  
 Calibration Date/Time : 3-AUG-2009 15:19:12  
 Calibration Source Id : AESS-048  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.266  
 NP-237 4341 2/28/10 4768.800 4768.972  
 CM-244 4320A 2/28/10 5795.020 5795.095  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2377.788  
 Energy Calibration Slope : 4.957360  
 Energy Calibration Quadratic : 2.8386535E-04  
 Energy Calibration Range : 7752.000

Instrument : CHAMBER 065  
 Detector : 68551  
 Calibration Date/Time : 11-AUG-2009 11:32:36  
 Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.849
NP-237	4341	2/28/10	4768.800	4769.466
CM-244	4320A	2/28/10	5795.020	5795.163

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2372.264  
 Energy Calibration Slope : 4.908353  
 Energy Calibration Quadratic : 3.3354512E-04  
 Energy Calibration Range : 7748.000

Instrument : CHAMBER 066  
 Detector : 46-089C1  
 Calibration Date/Time : 11-AUG-2009 11:33:22  
 Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.390
NP-237	4341	2/28/10	4768.800	4769.085
CM-244	4320A	2/28/10	5795.020	5795.154

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2366.405  
 Energy Calibration Slope : 4.987269  
 Energy Calibration Quadratic : 2.6785664E-04  
 Energy Calibration Range : 7754.000

Instrument : CHAMBER 067  
 Detector : 46-089B4  
 Calibration Date/Time : 11-AUG-2009 11:33:34  
 Calibration Source Id : AESS-003

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
NP-237	4341	2/28/10	4768.800	4768.295
CM-244	4320A	2/28/10	5795.020	5794.813

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2395.106  
 Energy Calibration Slope : 4.966452  
 Energy Calibration Quadratic : 2.8820083E-04  
 Energy Calibration Range : 7783.000

Instrument : CHAMBER 068  
 Detector : 78794  
 Calibration Date/Time : 11-AUG-2009 11:38:02  
 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	4768.980
CM-244	4320A	2/28/10	5795.020	5795.141

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.999  
 Energy Calibration Slope : 4.959627  
 Energy Calibration Quadratic : 3.2675461E-04  
 Energy Calibration Range : 7785.000

Instrument : CHAMBER 069  
 Detector : 78795  
 Calibration Date/Time : 11-AUG-2009 11:38:36  
 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	4768.715
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2374.161  
 Energy Calibration Slope : 4.934980  
 Energy Calibration Quadratic : 3.3370449E-04  
 Energy Calibration Range : 7777.000

Instrument : CHAMBER 070  
 Detector : 46-089B2  
 Calibration Date/Time : 11-AUG-2009 11:38:49  
 Calibration Source Id : AESS-006

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.376
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 : 2384.967  
 Energy Calibration Slope : 4.940035  
 Energy Calibration Quadratic : 3.0117441E-04  
 Energy Calibration Range : 7759.000

Instrument : CHAMBER 071  
 Detector : 64259  
 Calibration Date/Time : 11-AUG-2009 11:39:05  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2380.222  
 Energy Calibration Slope : 4.972534  
 Energy Calibration Quadratic : 3.0923611E-04  
 Energy Calibration Range : 7796.000

Instrument : CHAMBER 072  
 Detector : 45-149AA3  
 Calibration Date/Time : 11-AUG-2009 11:41:05  
 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	5794.779

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.289  
 Energy Calibration Slope : 4.936321  
 Energy Calibration Quadratic : 3.1663457E-04  
 Energy Calibration Range : 7754.000

Instrument : CHAMBER 073  
 Detector : 78775  
 Calibration Date/Time : 11-AUG-2009 11:41:19  
 Calibration Source Id : AESS-009

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2340.294  
 Energy Calibration Slope : 4.933617  
 Energy Calibration Quadratic : 3.0803526E-04  
 Energy Calibration Range : 7715.000

Instrument : CHAMBER 074  
 Detector : 78266  
 Calibration Date/Time : 11-AUG-2009 11:41:50  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2357.238  
 Energy Calibration Slope : 4.957754  
 Energy Calibration Quadratic : 3.2763465E-04  
 Energy Calibration Range : 7778.000

Instrument : CHAMBER 075  
 Detector : 68550  
 Calibration Date/Time : 11-AUG-2009 11:42:08  
 Calibration Source Id : AESS-011

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.795
NP-237	4341	2/28/10	4768.800	4769.246
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2357.909  
 Energy Calibration Slope : 4.956091  
 Energy Calibration Quadratic : 3.1667759E-04  
 Energy Calibration Range : 7765.000

Instrument : CHAMBER 076  
 Detector : 78779  
 Calibration Date/Time : 11-AUG-2009 11:42:40  
 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	5795.193

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.146  
 Energy Calibration Slope : 4.949463  
 Energy Calibration Quadratic : 3.2361425E-04  
 Energy Calibration Range : 7761.000

Instrument : CHAMBER 077  
 Detector : 67576  
 Calibration Date/Time : 11-AUG-2009 11:42:53  
 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	5794.739

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.830  
 Energy Calibration Slope : 4.939044  
 Energy Calibration Quadratic : 3.0275399E-04  
 Energy Calibration Range : 7738.000

Instrument : CHAMBER 078  
 Detector : 67577  
 Calibration Date/Time : 11-AUG-2009 11:43:47  
 Calibration Source Id : AESS-014

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3181.433
NP-237	4341	2/28/10	4768.800	4767.846
CM-244	4320A	2/28/10	5795.020	5793.522

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2407.798  
 Energy Calibration Slope : 4.964797  
 Energy Calibration Quadratic : 3.3742035E-04  
 Energy Calibration Range : 7846.000

Instrument : CHAMBER 079  
 Detector : 67598  
 Calibration Date/Time : 11-AUG-2009 11:44:09  
 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	4768.694
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2369.132  
 Energy Calibration Slope : 4.920986  
 Energy Calibration Quadratic : 3.1385853E-04  
 Energy Calibration Range : 7737.000

Instrument : CHAMBER 080  
 Detector : 78197  
 Calibration Date/Time : 12-AUG-2009 06:47:19  
 Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.250
NP-237	4341	2/28/10	4768.800	4769.057
CM-244	4320A	2/28/10	5795.020	5795.270

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2352.236  
 Energy Calibration Slope : 4.998828  
 Energy Calibration Quadratic : 2.8291933E-04  
 Energy Calibration Range : 7768.000

Instrument : CHAMBER 081  
 Detector : 72533  
 Calibration Date/Time : 11-AUG-2009 11:46:32  
 Calibration Source Id : AESS-017

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3204.930
NP-237	4341	2/28/10	4768.800	4703.826
CM-244	4320A	2/28/10	5795.020	5726.761

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2219.847  
 Energy Calibration Slope : 9.458302  
 Energy Calibration Quadratic : -5.2725184E-03  
 Energy Calibration Range : 6377.000

Instrument : CHAMBER 082  
 Detector : 64263  
 Calibration Date/Time : 11-AUG-2009 11:47:05  
 Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.619
NP-237	4341	2/28/10	4768.800	4767.967
CM-244	4320A	2/28/10	5795.020	5794.591

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2389.567  
 Energy Calibration Slope : 4.987039  
 Energy Calibration Quadratic : 3.1898782E-04  
 Energy Calibration Range : 7831.000

Instrument : CHAMBER 083  
 Detector : 64278  
 Calibration Date/Time : 11-AUG-2009 11:47:29  
 Calibration Source Id : AESS-019  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.777  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2373.204  
 Energy Calibration Slope : 5.041853  
 Energy Calibration Quadratic : 2.3808437E-04  
 Energy Calibration Range : 7786.000

Instrument : CHAMBER 084  
 Detector : 78265  
 Calibration Date/Time : 11-AUG-2009 11:47:52  
 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 5794.867  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.363  
 Energy Calibration Slope : 5.016379  
 Energy Calibration Quadratic : 2.7867779E-04  
 Energy Calibration Range : 7791.000

Instrument : CHAMBER 085  
 Detector : 78776  
 Calibration Date/Time : 11-AUG-2009 11:48:19  
 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 4768.802  
 CM-244 4320A 2/28/10 5795.020 5795.019  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2368.057  
 Energy Calibration Slope : 4.984862  
 Energy Calibration Quadratic : 2.9382212E-04  
 Energy Calibration Range : 7781.000



Instrument : CHAMBER 086  
 Detector : 78198  
 Calibration Date/Time : 11-AUG-2009 11:48:41  
 Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.458
NP-237	4341	2/28/10	4768.800	4768.482
CM-244	4320A	2/28/10	5795.020	5794.558

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.351  
 Energy Calibration Slope : 5.023737  
 Energy Calibration Quadratic : 2.3622859E-04  
 Energy Calibration Range : 7750.000

Instrument : CHAMBER 087  
 Detector : 78199  
 Calibration Date/Time : 11-AUG-2009 11:49:08  
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.717
NP-237	4341	2/28/10	4768.800	4768.539
CM-244	4320A	2/28/10	5795.020	5794.745

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2342.553  
 Energy Calibration Slope : 4.976685  
 Energy Calibration Quadratic : 2.4361881E-04  
 Energy Calibration Range : 7694.000

Instrument : CHAMBER 088  
 Detector : 33452  
 Calibration Date/Time : 11-AUG-2009 11:50:14  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2348.450  
 Energy Calibration Slope : 4.985291  
 Energy Calibration Quadratic : 2.0228673E-04  
 Energy Calibration Range : 7666.000

Instrument : CHAMBER 089  
 Detector : 78262  
 Calibration Date/Time : 11-AUG-2009 11:50:54  
 Calibration Source Id : AESS-025

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.822
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 : 2360.236  
 Energy Calibration Slope : 4.993787  
 Energy Calibration Quadratic : 3.1235311E-04  
 Energy Calibration Range : 7801.000

Instrument : CHAMBER 090  
 Detector : 78263  
 Calibration Date/Time : 11-AUG-2009 11:51:07  
 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	4768.689
CM-244	4320A	2/28/10	5795.020	5794.864

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.944  
 Energy Calibration Slope : 4.912088  
 Energy Calibration Quadratic : 3.3423179E-04  
 Energy Calibration Range : 7748.000

Instrument : CHAMBER 091  
 Detector : 78259  
 Calibration Date/Time : 11-AUG-2009 11:51:19  
 Calibration Source Id : AESS-027

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.501
NP-237	4341	2/28/10	4768.800	4768.562
CM-244	4320A	2/28/10	5795.020	5794.908

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2373.294  
 Energy Calibration Slope : 4.962712  
 Energy Calibration Quadratic : 3.3628431E-04  
 Energy Calibration Range : 7808.000

Instrument : CHAMBER 092  
 Detector : 79457  
 Calibration Date/Time : 11-AUG-2009 11:52:08  
 Calibration Source Id : AESS-028  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.999  
 NP-237 4341 2/28/10 4768.800 4769.086  
 CM-244 4320A 2/28/10 5795.020 5795.236  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.207  
 Energy Calibration Slope : 4.920592  
 Energy Calibration Quadratic : 3.2561756E-04  
 Energy Calibration Range : 7733.000

Instrument : CHAMBER 093  
 Detector : 33206  
 Calibration Date/Time : 11-AUG-2009 11:52:22  
 Calibration Source Id : AESS-029  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.729  
 NP-237 4341 2/28/10 4768.800 4768.662  
 CM-244 4320A 2/28/10 5795.020 5794.973  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2374.507  
 Energy Calibration Slope : 4.905449  
 Energy Calibration Quadratic : 3.4070064E-04  
 Energy Calibration Range : 7755.000

Instrument : CHAMBER 094  
 Detector : 78267  
 Calibration Date/Time : 11-AUG-2009 11:52:36  
 Calibration Source Id : AESS-030  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.615  
 NP-237 4341 2/28/10 4768.800 4768.657  
 CM-244 4320A 2/28/10 5795.020 5794.828  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.661  
 Energy Calibration Slope : 4.944430  
 Energy Calibration Quadratic : 3.0602465E-04  
 Energy Calibration Range : 7749.000

Instrument : CHAMBER 095  
 Detector : 64279  
 Calibration Date/Time : 11-AUG-2009 11:53:20  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5794.924

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.997  
 Energy Calibration Slope : 4.923662  
 Energy Calibration Quadratic : 3.3134571E-04  
 Energy Calibration Range : 7750.000

Instrument : CHAMBER 096  
 Detector : 67605  
 Calibration Date/Time : 11-AUG-2009 11:53:35  
 Calibration Source Id : AESS-032

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.861
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5794.970

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2352.669  
 Energy Calibration Slope : 4.930194  
 Energy Calibration Quadratic : 3.4499675E-04  
 Energy Calibration Range : 7763.000

Instrument : CHAMBER 097  
 Detector : 67599  
 Calibration Date/Time : 11-AUG-2009 11:54:04  
 Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.385
NP-237	4341	2/28/10	4768.800	4768.497
CM-244	4320A	2/28/10	5795.020	5794.575

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2366.630  
 Energy Calibration Slope : 4.955770  
 Energy Calibration Quadratic : 3.2342706E-04  
 Energy Calibration Range : 7780.000

Instrument : CHAMBER 098  
 Detector : 68644  
 Calibration Date/Time : 11-AUG-2009 11:54:57  
 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	4768.677
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.988  
 Energy Calibration Slope : 4.980790  
 Energy Calibration Quadratic : 3.1301824E-04  
 Energy Calibration Range : 7814.000

Instrument : CHAMBER 099  
 Detector : 70317  
 Calibration Date/Time : 11-AUG-2009 11:55:11  
 Calibration Source Id : AESS-035

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.657
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5794.872

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2370.271  
 Energy Calibration Slope : 4.896307  
 Energy Calibration Quadratic : 3.5264078E-04  
 Energy Calibration Range : 7754.000

Instrument : CHAMBER 100  
 Detector : 79456  
 Calibration Date/Time : 11-AUG-2009 11:55:23  
 Calibration Source Id : AESS-046

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.007
NP-237	4341	2/28/10	4768.800	4768.931
CM-244	4320A	2/28/10	5795.020	5795.248

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.091  
 Energy Calibration Slope : 4.889555  
 Energy Calibration Quadratic : 3.4731548E-04  
 Energy Calibration Range : 7724.000

Instrument : CHAMBER 101  
 Detector : 64253  
 Calibration Date/Time : 11-AUG-2009 11:55:41  
 Calibration Source Id : AESS-037

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.482
NP-237	4341	2/28/10	4768.800	4768.628
CM-244	4320A	2/28/10	5795.020	5795.004

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2413.378  
 Energy Calibration Slope : 4.941072  
 Energy Calibration Quadratic : 3.1744229E-04  
 Energy Calibration Range : 7806.000

Instrument : CHAMBER 102  
 Detector : 72525  
 Calibration Date/Time : 11-AUG-2009 11:55:55  
 Calibration Source Id : AESS-038

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	4768.759
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.023  
 Energy Calibration Slope : 4.877947  
 Energy Calibration Quadratic : 3.3410732E-04  
 Energy Calibration Range : 7710.000

Instrument : CHAMBER 103  
 Detector : 79461  
 Calibration Date/Time : 11-AUG-2009 11:56:06  
 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	4768.724
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2388.602  
 Energy Calibration Slope : 4.925415  
 Energy Calibration Quadratic : 3.3399722E-04  
 Energy Calibration Range : 7782.000

Instrument : CHAMBER 104  
 Detector : 72524  
 Calibration Date/Time : 11-AUG-2009 11:56:56  
 Calibration Source Id : AESS-040

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.731
NP-237	4341	2/28/10	4768.800	4768.746
CM-244	4320A	2/28/10	5795.020	5794.950

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.164  
 Energy Calibration Slope : 4.875978  
 Energy Calibration Quadratic : 3.5914616E-04  
 Energy Calibration Range : 7731.000

Instrument : CHAMBER 105  
 Detector : 78777  
 Calibration Date/Time : 11-AUG-2009 11:57:20  
 Calibration Source Id : AESS-041

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2374.957  
 Energy Calibration Slope : 4.877512  
 Energy Calibration Quadratic : 3.5687728E-04  
 Energy Calibration Range : 7744.000

Instrument : CHAMBER 106  
 Detector : 64274  
 Calibration Date/Time : 11-AUG-2009 11:57:33  
 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 : 2386.397  
 Energy Calibration Slope : 4.925849  
 Energy Calibration Quadratic : 3.5619634E-04  
 Energy Calibration Range : 7804.000

Instrument : CHAMBER 107  
 Detector : 67578  
 Calibration Date/Time : 11-AUG-2009 11:58:23  
 Calibration Source Id : AESS-043

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.757
NP-237	4341	2/28/10	4768.800	4768.431
CM-244	4320A	2/28/10	5795.020	5794.760

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.165  
 Energy Calibration Slope : 4.989622  
 Energy Calibration Quadratic : 3.0367926E-04  
 Energy Calibration Range : 7793.000

Instrument : CHAMBER 108  
 Detector : 78778  
 Calibration Date/Time : 11-AUG-2009 12:00:02  
 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	5795.085

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.750  
 Energy Calibration Slope : 4.889173  
 Energy Calibration Quadratic : 3.3859405E-04  
 Energy Calibration Range : 7723.000

Instrument : CHAMBER 109  
 Detector : 79463  
 Calibration Date/Time : 11-AUG-2009 12:00:23  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.011

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.956  
 Energy Calibration Slope : 4.902098  
 Energy Calibration Quadratic : 3.6021773E-04  
 Energy Calibration Range : 7759.000



Instrument : CHAMBER 110  
 Detector : 67602  
 Calibration Date/Time : 11-AUG-2009 12:01:03  
 Calibration Source Id : AESS-046  
 Cal. Isotopes    Source Id    Expiration Date    Standard Energy    Actual Energy  
   GD-148        6445-278      2/28/10            3183.000        3180.240  
   NP-237        4341          2/28/10            4768.800        4767.627  
   CM-244        4320A        2/28/10            5795.020        5792.351  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2450.737  
 Energy Calibration Slope : 5.078455  
 Energy Calibration Quadratic : 3.6329794E-04  
 Energy Calibration Range : 8032.000

Instrument : CHAMBER 111  
 Detector : 79462  
 Calibration Date/Time : 11-AUG-2009 12:01:21  
 Calibration Source Id : AESS-047  
 Cal. Isotopes    Source Id    Expiration Date    Standard Energy    Actual Energy  
   GD-148        6445-278      2/28/10            3183.000        3182.689  
   NP-237        4341          2/28/10            4768.800        4768.620  
   CM-244        4320A        2/28/10            5795.020        5794.913  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.863  
 Energy Calibration Slope : 4.982990  
 Energy Calibration Quadratic : 3.1839884E-04  
 Energy Calibration Range : 7797.000

Instrument : CHAMBER 112  
 Detector : 78261  
 Calibration Date/Time : 11-AUG-2009 12:02:06  
 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        4768.798  
   CM-244        4320A        2/28/10            5795.020        5795.021  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2372.713  
 Energy Calibration Slope : 4.922604  
 Energy Calibration Quadratic : 3.2149741E-04  
 Energy Calibration Range : 7751.000

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 : 4-AUG-2009 07:05:22  
 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 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2326.638  
 Energy Calibration Slope : 5.018264  
 Energy Calibration Quadratic : 2.3354402E-04  
 Energy Calibration Range : 7710.000

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 : 4-AUG-2009 07:05:44  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2350.369  
 Energy Calibration Slope : 4.968978  
 Energy Calibration Quadratic : 2.7712836E-04  
 Energy Calibration Range : 7729.000

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 : 4-AUG-2009 07:05:59  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.666  
 Energy Calibration Slope : 4.932856  
 Energy Calibration Quadratic : 2.9126366E-04  
 Energy Calibration Range : 7724.000

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 : 4-AUG-2009 07:06:12  
 Calibration Source Id : AESS-005

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2378.366  
 Energy Calibration Slope : 4.930755  
 Energy Calibration Quadratic : 3.1649129E-04  
 Energy Calibration Range : 7759.000

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 : 2-AUG-2009 17:38:31  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.927	3299.401	3.000000	0.7200001	57.73503	95.00000
NP-237	4432.428	4902.923	11.000000	2.640001	30.15113	95.00000
CM-244	5533.599	5883.327	10.000000	2.400001	31.62278	95.00000

Instrument : CHAMBER 002  
 Detector : 78266  
 Background Analysis Date/Time : 2-AUG-2009 17:38:31  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.748	3297.924	4.000000	0.9600002	50.00000	95.00000
NP-237	4434.751	4902.555	3.000000	0.7200001	57.73503	95.00000
CM-244	5533.273	5884.668	1.000000	0.2400001	100.0000	95.00000

Instrument : CHAMBER 003  
 Detector : 67617  
 Background Analysis Date/Time : 2-AUG-2009 17:38:31  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.035	3300.027	6.000000	1.440000	40.82483	95.00000
NP-237	4433.783	4901.623	9.000000	2.160001	33.33334	95.00000
CM-244	5533.183	5887.889	9.000000	2.160001	33.33334	95.00000

Instrument : CHAMBER 004  
 Detector : 64279  
 Background Analysis Date/Time : 2-AUG-2009 17:38:31  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.885	3302.347	4.000000	0.9600002	50.00000	95.00000
NP-237	4436.757	4905.540	7.000000	1.680000	37.79645	95.00000
CM-244	5533.807	5887.698	4.000000	0.9600002	50.00000	95.00000

Instrument : CHAMBER 005  
 Detector : 67612  
 Background Analysis Date/Time : 2-AUG-2009 17:38:31  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.194	3301.639	3.000000	0.7200001	57.73503	95.00000
NP-237	4437.588	4901.889	8.000000	1.920000	35.35534	95.00000
CM-244	5531.535	5887.236	1.000000	0.2400001	100.0000	95.00000

Instrument : CHAMBER 006  
 Detector : 67613  
 Background Analysis Date/Time : 2-AUG-2009 17:38:31  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.186	3302.064	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.812	4901.476	9.000000	2.160001	33.33334	95.00000
CM-244	5533.017	5887.020	8.000000	1.920000	35.35534	95.00000

Instrument : CHAMBER 007  
 Detector : 67607  
 Background Analysis Date/Time : 2-AUG-2009 17:38:32  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.468	3299.148	8.000000	1.920000	35.35534	95.00000
NP-237	4433.972	4903.766	11.00000	2.640000	30.15113	95.00000
CM-244	5532.246	5885.701	17.00000	4.080001	24.25356	95.00000

Instrument : CHAMBER 008  
 Detector : 78788  
 Background Analysis Date/Time : 2-AUG-2009 17:38:32  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.215	3298.713	3.000000	0.7200001	57.73503	95.00000
NP-237	4433.303	4905.744	4.000000	0.9600002	50.00000	95.00000
CM-244	5532.461	5886.606	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 009  
 Detector : 72528  
 Background Analysis Date/Time : 2-AUG-2009 17:38:32  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.462	3298.900	5.000000	1.200000	44.72136	95.00000
NP-237	4437.055	4904.570	10.000000	2.400000	31.62278	95.00000
CM-244	5532.536	5882.399	13.000000	3.120001	27.73501	95.00000

Instrument : CHAMBER 010  
 Detector : 72529  
 Background Analysis Date/Time : 2-AUG-2009 17:38:32  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.229	3298.607	8.000000	1.920000	35.35534	95.00000
NP-237	4436.880	4905.484	9.000000	2.160000	33.33334	95.00000
CM-244	5531.409	5886.990	4.000000	0.9600002	50.00000	95.00000

Instrument : CHAMBER 011  
 Detector : 72531  
 Background Analysis Date/Time : 2-AUG-2009 17:38:32  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.538	3301.988	3.000000	0.7200001	57.73503	95.00000
NP-237	4435.957	4905.467	9.000000	2.160000	33.33334	95.00000
CM-244	5530.314	5886.614	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 012  
 Detector : 67594  
 Background Analysis Date/Time : 2-AUG-2009 17:38:32  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.398	3300.615	3.000000	0.7200001	57.73503	95.00000
NP-237	4437.450	4901.503	9.000000	2.160000	33.33334	95.00000
CM-244	5534.709	5886.652	16.000000	3.840001	25.00000	95.00000

Instrument : CHAMBER 013  
 Detector : 78790  
 Background Analysis Date/Time : 2-AUG-2009 17:38:33  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.666	3298.441	1.000000	0.2400001	100.0000	95.00000
NP-237	4435.272	4902.524	6.000000	1.440000	40.82483	95.00000
CM-244	5533.077	5883.559	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 014  
 Detector : 67616  
 Background Analysis Date/Time : 2-AUG-2009 17:38:33  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.504	3300.484	2.000000	0.4800001	70.71068	95.00000
NP-237	4435.990	4902.000	4.000000	0.9600002	50.00000	95.00000
CM-244	5532.918	5886.701	23.00000	5.520001	20.85144	95.00000

Instrument : CHAMBER 015  
 Detector : 61581  
 Background Analysis Date/Time : 2-AUG-2009 17:38:33  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.739	3297.575	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.566	4904.976	10.00000	2.400001	31.62278	95.00000
CM-244	5530.833	5887.242	22.00000	5.280001	21.32007	95.00000

Instrument : CHAMBER 016  
 Detector : 78774  
 Background Analysis Date/Time : 2-AUG-2009 17:38:33  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.015	3299.769	3.000000	0.7200001	57.73503	95.00000
NP-237	4432.750	4903.568	3.000000	0.7200001	57.73503	95.00000
CM-244	5531.945	5886.508	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 017  
 Detector : 78791  
 Background Analysis Date/Time : 2-AUG-2009 17:38:33  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.506	3301.266	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4435.397	4901.753	6.000000	1.440000	40.82483	95.00000
CM-244	5532.102	5885.058	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 018  
 Detector : 78782  
 Background Analysis Date/Time : 2-AUG-2009 17:38:33  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.342	3302.274	1.000000	0.2400001	100.0000	95.00000
NP-237	4435.776	4902.996	4.000000	0.9600002	50.00000	95.00000
CM-244	5535.506	5884.764	1.000000	0.2400001	100.0000	95.00000

Instrument : CHAMBER 019  
 Detector : 78786  
 Background Analysis Date/Time : 2-AUG-2009 17:38:34  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.757	3299.102	1.000000	0.2399998	100.0000	95.00000
NP-237	4436.959	4904.938	5.000000	1.199999	44.72136	95.00000
CM-244	5530.360	5882.637	4.000000	0.9599994	50.00000	95.00000

Instrument : CHAMBER 020  
 Detector : 78787  
 Background Analysis Date/Time : 2-AUG-2009 17:38:34  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.029	3302.537	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.491	4905.035	10.00000	2.399998	31.62278	95.00000
CM-244	5532.389	5886.993	5.000000	1.199999	44.72136	95.00000

Instrument : CHAMBER 021  
 Detector : 67047  
 Background Analysis Date/Time : 2-AUG-2009 17:38:34  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.044	3301.105	4.000000	0.9599994	50.00000	95.00000
NP-237	4432.692	4903.261	8.000000	1.919999	35.35534	95.00000
CM-244	5532.273	5884.483	16.00000	3.839998	25.00000	95.00000

Instrument : CHAMBER 022  
 Detector : 72530  
 Background Analysis Date/Time : 2-AUG-2009 17:38:34  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.876	3301.717	5.000000	1.199999	44.72136	95.00000
NP-237	4432.553	4902.907	4.000000	0.9599994	50.00000	95.00000
CM-244	5531.719	5883.858	21.00000	5.039997	21.82179	95.00000

Instrument : CHAMBER 023  
 Detector : 78264  
 Background Analysis Date/Time : 2-AUG-2009 17:38:34  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.270	3297.465	1.000000	0.2399998	100.0000	95.00000
NP-237	4434.353	4902.238	12.00000	2.879998	28.86751	95.00000
CM-244	5535.006	5884.098	4.000000	0.9599994	50.00000	95.00000

Instrument : CHAMBER 024  
 Detector : 76542  
 Background Analysis Date/Time : 2-AUG-2009 17:38:34  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.735	3301.963	3.000000	0.7199996	57.73503	95.00000
NP-237	4435.585	4904.900	14.00000	3.359998	26.72612	95.00000
CM-244	5532.247	5883.527	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 025  
 Detector : 45-149AA5  
 Background Analysis Date/Time : 2-AUG-2009 17:38:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.576	3302.009	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.518	4905.500	4.000000	0.9600002	50.00000	95.00000
CM-244	5535.553	5882.966	61.00000	14.64000	12.80369	95.00000

Instrument : CHAMBER 026  
 Detector : 78204  
 Background Analysis Date/Time : 2-AUG-2009 17:38:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.278	3302.066	1.000000	0.2400001	100.0000	95.00000
NP-237	4432.530	4904.245	8.000000	1.920000	35.35534	95.00000
CM-244	5530.854	5885.357	35.00000	8.400002	16.90309	95.00000

Instrument : CHAMBER 027  
 Detector : 42484  
 Background Analysis Date/Time : 2-AUG-2009 17:38:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.311	3298.574	1.000000	0.2400001	100.0000	95.00000
NP-237	4433.571	4901.458	4.000000	0.9600002	50.00000	95.00000
CM-244	5534.916	5884.719	37.00000	8.880002	16.43990	95.00000

Instrument : CHAMBER 028  
 Detector : 78792  
 Background Analysis Date/Time : 2-AUG-2009 17:38:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.458	3301.428	1.000000	0.2400001	100.0000	95.00000
NP-237	4433.918	4901.793	10.00000	2.400001	31.62278	95.00000
CM-244	5530.766	5886.861	36.00000	8.640002	16.66667	95.00000



Instrument : CHAMBER 029  
 Detector : 33454  
 Background Analysis Date/Time : 2-AUG-2009 17:38:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.561	3299.264	4.000000	0.9600002	50.00000	95.00000
NP-237	4436.609	4905.813	5.000000	1.200000	44.72136	95.00000
CM-244	5532.652	5886.650	41.00000	9.840002	15.61738	95.00000

Instrument : CHAMBER 030  
 Detector : 33447  
 Background Analysis Date/Time : 2-AUG-2009 17:38:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.462	3300.436	4.000000	0.9600002	50.00000	95.00000
NP-237	4435.706	4901.528	10.00000	2.400001	31.62278	95.00000
CM-244	5532.111	5885.667	49.00000	11.76000	14.28572	95.00000

Instrument : CHAMBER 031  
 Detector : 67042  
 Background Analysis Date/Time : 2-AUG-2009 17:38:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.816	3298.130	4.000000	0.9599994	50.00000	95.00000
NP-237	4432.666	4904.194	11.00000	2.639998	30.15113	95.00000
CM-244	5530.750	5885.317	50.00000	11.99999	14.14214	95.00000

Instrument : CHAMBER 032  
 Detector : 67041  
 Background Analysis Date/Time : 2-AUG-2009 17:38:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.681	3302.442	2.000000	0.4799997	70.71068	95.00000
NP-237	4436.943	4904.070	8.000000	1.919999	35.35534	95.00000
CM-244	5532.476	5883.050	63.00000	15.11999	12.59882	95.00000

Instrument : CHAMBER 033  
 Detector : 78785  
 Background Analysis Date/Time : 2-AUG-2009 17:38:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.750	3301.323	2.000000	0.4799997	70.71068	95.00000
NP-237	4437.327	4904.445	7.000000	1.679999	37.79645	95.00000
CM-244	5532.298	5882.301	47.00000	11.27999	14.58650	95.00000

Instrument : CHAMBER 034  
 Detector : 61586  
 Background Analysis Date/Time : 2-AUG-2009 17:38:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.405	3301.020	3.000000	0.7199996	57.73503	95.00000
NP-237	4436.289	4905.558	6.000000	1.439999	40.82483	95.00000
CM-244	5534.591	5883.408	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 035  
 Detector : 78202  
 Background Analysis Date/Time : 2-AUG-2009 17:38:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.026	3302.211	3.000000	0.7199996	57.73503	95.00000
NP-237	4437.360	4905.577	20.00000	4.799997	22.36068	95.00000
CM-244	5534.350	5884.600	61.00000	14.63999	12.80369	95.00000

Instrument : CHAMBER 036  
 Detector : 78203  
 Background Analysis Date/Time : 2-AUG-2009 17:38:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.680	3301.073	2.000000	0.4799997	70.71068	95.00000
NP-237	4435.041	4905.984	9.000000	2.159999	33.33334	95.00000
CM-244	5531.465	5885.278	47.00000	11.27999	14.58650	95.00000

Instrument : CHAMBER 037  
 Detector : 45-149BB5  
 Background Analysis Date/Time : 2-AUG-2009 17:38:36  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.168	3302.212	3.000000	0.7199995	57.73503	95.00000
NP-237	4432.895	4904.029	13.00000	3.119998	27.73501	95.00000
CM-244	5532.110	5886.157	66.00000	15.83999	12.30915	95.00000

Instrument : CHAMBER 038  
 Detector : 72532  
 Background Analysis Date/Time : 2-AUG-2009 17:38:36  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.472	3300.031	4.000000	0.9599993	50.00000	95.00000
NP-237	4434.591	4905.742	16.00000	3.839997	25.00000	95.00000
CM-244	5531.463	5885.396	50.00000	11.99999	14.14214	95.00000

Instrument : CHAMBER 039  
 Detector : 45-149BB2  
 Background Analysis Date/Time : 2-AUG-2009 17:38:36  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.231	3297.932	6.000000	1.439999	40.82483	95.00000
NP-237	4433.148	4905.972	6.000000	1.439999	40.82483	95.00000
CM-244	5532.651	5884.312	76.00000	18.23999	11.47079	95.00000

Instrument : CHAMBER 040  
 Detector : 78773  
 Background Analysis Date/Time : 2-AUG-2009 17:38:36  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.631	3299.278	2.000000	0.4799997	70.71068	95.00000
NP-237	4434.455	4902.104	2.000000	0.4799997	70.71068	95.00000
CM-244	5534.140	5885.901	43.00000	10.31999	15.24986	95.00000

Instrument : CHAMBER 041  
 Detector : 78205  
 Background Analysis Date/Time : 2-AUG-2009 17:38:36  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.485	3301.427	8.000000	1.919999	35.35534	95.00000
NP-237	4434.095	4902.163	8.000000	1.919999	35.35534	95.00000
CM-244	5531.498	5882.427	43.00000	10.31999	15.24986	95.00000

Instrument : CHAMBER 042  
 Detector : 78793  
 Background Analysis Date/Time : 2-AUG-2009 17:38:36  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.775	3302.182	3.000000	0.7199995	57.73503	95.00000
NP-237	4434.604	4903.031	12.00000	2.879998	28.86751	95.00000
CM-244	5530.666	5882.826	45.00000	10.79999	14.90712	95.00000

Instrument : CHAMBER 043  
 Detector : 76543  
 Background Analysis Date/Time : 2-AUG-2009 17:38:37  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.605	3297.721	2.000000	0.4799997	70.71068	95.00000
NP-237	4435.729	4906.163	7.000000	1.679999	37.79645	95.00000
CM-244	5530.889	5884.237	59.00000	14.15999	13.01889	95.00000

Instrument : CHAMBER 044  
 Detector : 79459  
 Background Analysis Date/Time : 2-AUG-2009 17:38:37  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.053	3299.650	4.000000	0.9599994	50.00000	95.00000
NP-237	4434.444	4905.733	8.000000	1.919999	35.35534	95.00000
CM-244	5531.674	5885.749	67.00000	16.07999	12.21694	95.00000

Instrument : CHAMBER 045  
 Detector : 78783  
 Background Analysis Date/Time : 2-AUG-2009 17:38:37  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.163	3297.674	2.000000	0.4799997	70.71068	95.00000
NP-237	4435.665	4901.796	4.000000	0.9599994	50.00000	95.00000
CM-244	5533.912	5883.468	60.000000	14.399999	12.90994	95.00000

Instrument : CHAMBER 046  
 Detector : 76544  
 Background Analysis Date/Time : 2-AUG-2009 17:38:37  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.013	3297.754	6.000000	1.439999	40.82483	95.00000
NP-237	4433.428	4906.578	9.000000	2.159999	33.33334	95.00000
CM-244	5533.808	5885.833	47.000000	11.27999	14.58650	95.00000

Instrument : CHAMBER 047  
 Detector : 46-089B1  
 Background Analysis Date/Time : 2-AUG-2009 17:38:37  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.788	3298.531	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4436.493	4903.356	9.000000	2.159999	33.33334	95.00000
CM-244	5535.296	5884.198	73.000000	17.51999	11.70411	95.00000

Instrument : CHAMBER 048  
 Detector : 42483  
 Background Analysis Date/Time : 2-AUG-2009 17:38:37  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.838	3299.553	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.268	4906.475	10.000000	2.399998	31.62278	95.00000
CM-244	5533.930	5885.396	49.000000	11.75999	14.28572	95.00000

Instrument : CHAMBER 065  
 Detector : 68551  
 Background Analysis Date/Time : 9-AUG-2009 15:42:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.020	3301.790	4.000000	0.9599993	50.00000	95.00000
NP-237	4435.576	4904.585	11.00000	2.639998	30.15113	95.00000
CM-244	5533.015	5885.628	14.00000	3.359998	26.72612	95.00000

Instrument : CHAMBER 066  
 Detector : 46-089C1  
 Background Analysis Date/Time : 9-AUG-2009 15:42:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.945	3298.217	3.000000	0.7199995	57.73503	95.00000
NP-237	4435.388	4905.987	4.000000	0.9599993	50.00000	95.00000
CM-244	5534.885	5886.957	15.00000	3.599998	25.81989	95.00000

Instrument : CHAMBER 067  
 Detector : 46-089B4  
 Background Analysis Date/Time : 9-AUG-2009 15:42:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.195	3298.405	1.000000	0.2399998	100.0000	95.00000
NP-237	4432.996	4903.114	5.000000	1.199999	44.72136	95.00000
CM-244	5531.881	5884.128	12.00000	2.879998	28.86751	95.00000

Instrument : CHAMBER 068  
 Detector : 78794  
 Background Analysis Date/Time : 9-AUG-2009 15:42:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.058	3297.794	2.000000	0.4799997	70.71068	95.00000
NP-237	4436.694	4904.361	3.000000	0.7199995	57.73503	95.00000
CM-244	5532.395	5887.637	15.00000	3.599998	25.81989	95.00000

Instrument : CHAMBER 069  
 Detector : 78795  
 Background Analysis Date/Time : 9-AUG-2009 15:42:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.230	3298.554	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4432.770	4904.008	12.00000	2.879998	28.86751	95.00000
CM-244	5535.390	5884.253	11.00000	2.639998	30.15113	95.00000

Instrument : CHAMBER 070  
 Detector : 46-089B2  
 Background Analysis Date/Time : 9-AUG-2009 15:42:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.134	3299.079	4.000000	0.9599993	50.00000	95.00000
NP-237	4435.081	4904.079	12.00000	2.879998	28.86751	95.00000
CM-244	5531.689	5883.454	10.00000	2.399998	31.62278	95.00000

Instrument : CHAMBER 071  
 Detector : 64259  
 Background Analysis Date/Time : 9-AUG-2009 15:42:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.474	3300.552	4.000000	0.9599993	50.00000	95.00000
NP-237	4434.375	4901.563	12.00000	2.879998	28.86751	95.00000
CM-244	5533.885	5882.968	9.000000	2.159998	33.33334	95.00000

Instrument : CHAMBER 072  
 Detector : 45-149AA3  
 Background Analysis Date/Time : 9-AUG-2009 15:42:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.276	3301.453	1.000000	0.2399998	100.0000	95.00000
NP-237	4434.016	4904.104	11.00000	2.639998	30.15113	95.00000
CM-244	5533.538	5886.502	15.00000	3.599998	25.81989	95.00000

Instrument : CHAMBER 073  
 Detector : 78775  
 Background Analysis Date/Time : 9-AUG-2009 15:42:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.884	3298.904	2.000000	0.4799997	70.71068	95.00000
NP-237	4435.607	4905.083	10.00000	2.399998	31.62278	95.00000
CM-244	5533.495	5885.787	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 074  
 Detector : 78266  
 Background Analysis Date/Time : 9-AUG-2009 15:42:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.157	3300.875	6.000000	1.439999	40.82483	95.00000
NP-237	4434.541	4902.170	10.00000	2.399998	31.62278	95.00000
CM-244	5535.537	5885.413	5.000000	1.199999	44.72136	95.00000

Instrument : CHAMBER 075  
 Detector : 68550  
 Background Analysis Date/Time : 9-AUG-2009 15:42:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.440	3300.846	3.000000	0.7199995	57.73503	95.00000
NP-237	4432.709	4904.580	14.00000	3.359998	26.72612	95.00000
CM-244	5531.026	5885.258	12.00000	2.879998	28.86751	95.00000

Instrument : CHAMBER 076  
 Detector : 78779  
 Background Analysis Date/Time : 9-AUG-2009 15:42:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.979	3300.154	1.000000	0.2399998	100.0000	95.00000
NP-237	4436.825	4903.508	11.00000	2.639998	30.15113	95.00000
CM-244	5535.510	5884.591	0.000000E+00	0.000000E+00	0.000000E+00	95.00000



Instrument : CHAMBER 077  
 Detector : 67576  
 Background Analysis Date/Time : 9-AUG-2009 15:42:46  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.957	3302.071	2.000000	0.4800001	70.71068	95.00000
NP-237	4433.544	4902.799	6.000000	1.440000	40.82483	95.00000
CM-244	5530.788	5882.782	17.00000	4.080001	24.25356	95.00000

Instrument : CHAMBER 078  
 Detector : 67577  
 Background Analysis Date/Time : 9-AUG-2009 15:42:46  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.255	3302.223	3.000000	0.7200001	57.73503	95.00000
NP-237	4437.236	4905.680	5.000000	1.200000	44.72136	95.00000
CM-244	5535.005	5885.680	6.000000	1.440000	40.82483	95.00000

Instrument : CHAMBER 079  
 Detector : 67598  
 Background Analysis Date/Time : 9-AUG-2009 15:42:46  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.159	3300.331	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.317	4902.854	5.000000	1.200000	44.72136	95.00000
CM-244	5535.480	5887.277	7.000000	1.680000	37.79645	95.00000

Instrument : CHAMBER 080  
 Detector : 78197  
 Background Analysis Date/Time : 9-AUG-2009 15:42:46  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.650	3302.015	2.000000	0.4799997	70.71068	95.00000
NP-237	4433.624	4906.537	7.000000	1.679999	37.79645	95.00000
CM-244	5533.522	5887.645	5.000000	1.199999	44.72136	95.00000

Instrument : CHAMBER 081  
 Detector : 72533  
 Background Analysis Date/Time : 9-AUG-2009 15:42:46  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2994.266	3303.451	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4435.242	4901.625	6.000000	1.440000	40.82483	95.00000
CM-244	5531.807	5884.164	15.00000	3.600001	25.81989	95.00000

Instrument : CHAMBER 082  
 Detector : 64263  
 Background Analysis Date/Time : 9-AUG-2009 15:42:46  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.542	3297.569	2.000000	0.4800001	70.71068	95.00000
NP-237	4435.421	4904.506	14.00000	3.360001	26.72612	95.00000
CM-244	5534.230	5884.907	8.000000	1.920000	35.35534	95.00000

Instrument : CHAMBER 083  
 Detector : 64278  
 Background Analysis Date/Time : 9-AUG-2009 15:42:47  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.854	3298.707	3.000000	0.7199995	57.73503	95.00000
NP-237	4433.271	4906.151	10.00000	2.399998	31.62278	95.00000
CM-244	5531.993	5884.932	8.000000	1.919999	35.35534	95.00000

Instrument : CHAMBER 084  
 Detector : 78265  
 Background Analysis Date/Time : 9-AUG-2009 15:42:47  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.678	3299.931	1.000000	0.2399998	100.0000	95.00000
NP-237	4434.465	4903.170	11.00000	2.639998	30.15113	95.00000
CM-244	5531.407	5886.178	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 085  
 Detector : 78776  
 Background Analysis Date/Time : 9-AUG-2009 15:42:47  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.698	3300.313	4.000000	0.9599993	50.00000	95.00000
NP-237	4435.121	4902.282	7.000000	1.679999	37.79645	95.00000
CM-244	5534.187	5882.859	5.000000	1.199999	44.72136	95.00000

Instrument : CHAMBER 086  
 Detector : 78198  
 Background Analysis Date/Time : 9-AUG-2009 15:42:47  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.009	3300.939	1.000000	0.2399998	100.0000	95.00000
NP-237	4436.927	4902.983	9.000000	2.159998	33.33334	95.00000
CM-244	5531.983	5883.724	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 087  
 Detector : 78199  
 Background Analysis Date/Time : 9-AUG-2009 15:42:47  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.599	3301.987	2.000000	0.4799997	70.71068	95.00000
NP-237	4434.300	4902.242	10.00000	2.399998	31.62278	95.00000
CM-244	5532.304	5887.140	2.000000	0.4799997	70.71068	95.00000

Instrument : CHAMBER 088  
 Detector : 33452  
 Background Analysis Date/Time : 9-AUG-2009 15:42:47  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.881	3297.896	3.000000	0.7199995	57.73503	95.00000
NP-237	4436.727	4902.043	10.00000	2.399998	31.62278	95.00000
CM-244	5532.799	5884.609	11.00000	2.639998	30.15113	95.00000

Instrument : CHAMBER 089  
 Detector : 78262  
 Background Analysis Date/Time : 9-AUG-2009 15:42:48  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.340	3299.886	3.000000	0.7200001	57.73503	95.00000
NP-237	4433.954	4903.393	6.000000	1.440000	40.82483	95.00000
CM-244	5533.423	5884.190	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 090  
 Detector : 78263  
 Background Analysis Date/Time : 9-AUG-2009 15:42:48  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.174	3298.193	2.000000	0.4800001	70.71068	95.00000
NP-237	4432.899	4902.301	9.000000	2.160000	33.33334	95.00000
CM-244	5531.267	5884.186	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 091  
 Detector : 78259  
 Background Analysis Date/Time : 9-AUG-2009 15:42:48  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.796	3297.819	3.000000	0.7200001	57.73503	95.00000
NP-237	4433.118	4901.645	4.000000	0.9600002	50.00000	95.00000
CM-244	5531.054	5887.180	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 092  
 Detector : 79457  
 Background Analysis Date/Time : 9-AUG-2009 15:42:48  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.378	3299.875	108.0000	25.92000	9.622504	95.00000
NP-237	4435.762	4905.401	83.00000	19.92000	10.97643	95.00000
CM-244	5534.466	5887.335	9.000000	2.160000	33.33334	95.00000

Instrument : CHAMBER 093  
 Detector : 33206  
 Background Analysis Date/Time : 9-AUG-2009 15:42:48  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.021	3298.707	5.000000	1.200000	44.72136	95.00000
NP-237	4432.645	4901.916	6.000000	1.440000	40.82483	95.00000
CM-244	5530.870	5883.862	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 094  
 Detector : 78267  
 Background Analysis Date/Time : 9-AUG-2009 15:42:48  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.496	3299.970	8.000000	1.920000	35.35534	95.00000
NP-237	4432.930	4902.883	1.000000	0.2400000	100.0000	95.00000
CM-244	5531.875	5884.464	4.000000	0.9600002	50.00000	95.00000

Instrument : CHAMBER 095  
 Detector : 64279  
 Background Analysis Date/Time : 9-AUG-2009 17:08:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.646	3298.356	3.000000	0.7199996	57.73503	95.00000
NP-237	4435.397	4905.664	11.00000	2.639998	30.15113	95.00000
CM-244	5530.369	5883.804	23.00000	5.519997	20.85144	95.00000

Instrument : CHAMBER 096  
 Detector : 67605  
 Background Analysis Date/Time : 9-AUG-2009 17:08:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.386	3301.860	1.000000	0.2399998	100.0000	95.00000
NP-237	4437.256	4904.015	24.00000	5.759996	20.41241	95.00000
CM-244	5531.292	5886.331	5.000000	1.199999	44.72136	95.00000

Instrument : CHAMBER 097  
 Detector : 67599  
 Background Analysis Date/Time : 9-AUG-2009 17:08:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.155	3299.592	5.000000	1.199999	44.72136	95.00000
NP-237	4437.204	4904.260	9.000000	2.159999	33.33334	95.00000
CM-244	5531.403	5886.106	16.00000	3.839998	25.00000	95.00000

Instrument : CHAMBER 098  
 Detector : 68644  
 Background Analysis Date/Time : 9-AUG-2009 17:08:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.247	3301.860	4.000000	0.9599994	50.00000	95.00000
NP-237	4432.619	4906.019	9.000000	2.159999	33.33334	95.00000
CM-244	5534.382	5884.237	3.000000	0.7199996	57.73503	95.00000

Instrument : CHAMBER 099  
 Detector : 70317  
 Background Analysis Date/Time : 9-AUG-2009 17:08:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.820	3298.212	1.000000	0.2399998	100.0000	95.00000
NP-237	4437.036	4906.585	8.000000	1.919999	35.35534	95.00000
CM-244	5530.871	5884.331	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 100  
 Detector : 79456  
 Background Analysis Date/Time : 9-AUG-2009 17:08:35  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.623	3299.666	6.000000	1.439999	40.82483	95.00000
NP-237	4436.895	4905.650	17.00000	4.079998	24.25356	95.00000
CM-244	5534.086	5886.872	14.00000	3.359998	26.72612	95.00000

Instrument : CHAMBER 101  
 Detector : 64253  
 Background Analysis Date/Time : 9-AUG-2009 15:42:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.814	3297.893	8.000000	1.919999	35.35534	95.00000
NP-237	4435.403	4905.470	6.000000	1.439999	40.82483	95.00000
CM-244	5534.897	5882.499	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 102  
 Detector : 72525  
 Background Analysis Date/Time : 9-AUG-2009 15:42:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.911	3298.890	3.000000	0.7199995	57.73503	95.00000
NP-237	4436.604	4903.163	6.000000	1.439999	40.82483	95.00000
CM-244	5533.661	5884.537	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 103  
 Detector : 79461  
 Background Analysis Date/Time : 9-AUG-2009 15:42:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.467	3301.138	2.000000	0.4799997	70.71068	95.00000
NP-237	4432.983	4903.264	8.000000	1.919999	35.35534	95.00000
CM-244	5533.387	5886.945	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 104  
 Detector : 72524  
 Background Analysis Date/Time : 9-AUG-2009 15:42:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.174	3300.565	4.000000	0.9599993	50.00000	95.00000
NP-237	4436.202	4904.648	8.000000	1.919999	35.35534	95.00000
CM-244	5532.970	5885.836	3.000000	0.7199995	57.73503	95.00000

Instrument : CHAMBER 105  
 Detector : 78777  
 Background Analysis Date/Time : 9-AUG-2009 15:42:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.222	3299.531	4.000000	0.9599993	50.00000	95.00000
NP-237	4434.728	4902.932	3.000000	0.7199995	57.73503	95.00000
CM-244	5530.878	5883.508	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 106  
 Detector : 64274  
 Background Analysis Date/Time : 9-AUG-2009 15:42:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.640	3299.757	6.000000	1.439999	40.82483	95.00000
NP-237	4434.577	4901.415	11.00000	2.639998	30.15113	95.00000
CM-244	5534.428	5884.452	4.000000	0.9599993	50.00000	95.00000

Instrument : CHAMBER 107  
 Detector : 67578  
 Background Analysis Date/Time : 9-AUG-2009 15:42:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.547	3298.638	3.000000	0.7199995	57.73503	95.00000
NP-237	4435.772	4904.146	5.000000	1.199999	44.72136	95.00000
CM-244	5532.554	5882.324	8.000000	1.919999	35.35534	95.00000

Instrument : CHAMBER 108  
 Detector : 78778  
 Background Analysis Date/Time : 9-AUG-2009 15:42:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.136	3297.898	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4433.563	4901.441	2.000000	0.4799997	70.71068	95.00000
CM-244	5533.812	5885.772	9.000000	2.159998	33.33334	95.00000



Instrument : CHAMBER 109  
 Detector : 79463  
 Background Analysis Date/Time : 9-AUG-2009 15:42:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.332	3301.320	1.000000	0.2399998	100.0000	95.00000
NP-237	4437.566	4903.059	2.000000	0.4799997	70.71068	95.00000
CM-244	5534.376	5883.521	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 110  
 Detector : 67602  
 Background Analysis Date/Time : 9-AUG-2009 15:42:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.980	3298.573	1.000000	0.2399998	100.0000	95.00000
NP-237	4433.010	4901.606	8.000000	1.919999	35.35534	95.00000
CM-244	5534.957	5883.028	14.00000	3.359998	26.72612	95.00000

Instrument : CHAMBER 111  
 Detector : 79462  
 Background Analysis Date/Time : 9-AUG-2009 15:42:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.711	3298.714	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4436.440	4905.458	8.000000	1.919999	35.35534	95.00000
CM-244	5535.080	5885.693	4.000000	0.9599993	50.00000	95.00000

Instrument : CHAMBER 112  
 Detector : 78261  
 Background Analysis Date/Time : 9-AUG-2009 15:42:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.059	3299.440	3.000000	0.7199995	57.73503	95.00000
NP-237	4434.653	4903.902	1.000000	0.2399998	100.0000	95.00000
CM-244	5532.350	5884.826	7.000000	1.679999	37.79645	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 : 2-AUG-2009 17:13:22  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.038	3298.754	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.805	4904.661	7.000000	2.100000	37.79645	95.00000
CM-244	5533.044	5884.411	0.0000000E+00	0.0000000E+00	0.0000000E+00	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 : 2-AUG-2009 17:14:08  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.939	3299.406	12.00000	3.600000	28.86751	95.00000
NP-237	4434.236	4904.141	13.00000	3.900000	27.73501	95.00000
CM-244	5532.352	5884.155	9.000000	2.700000	33.33334	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 : 2-AUG-2009 17:21:40  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.824	3300.295	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.927	4901.686	3.000000	0.9000000	57.73503	95.00000
CM-244	5532.705	5883.340	7.000000	2.100000	37.79645	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 : 2-AUG-2009 17:22:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.637	3301.388	7.000000	2.100000	37.79645	95.00000
NP-237	4432.422	4901.883	25.00000	7.500000	20.00000	95.00000
CM-244	5530.486	5882.987	10.00000	3.000000	31.62278	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	0.0000000E+00	0.0000000E+00	0.0000000E+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	0.000000E+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	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.025	4906.060	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.264	5882.788	0.000000E+00	0.000000E+00	0.000000E+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	0.000000E+00	0.000000E+00	0.000000E+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 : 5-AUG-2009 09:23:09  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-AUG-2009 14:45:15  
 Average Efficiency : 0.3129051  
 Average Efficiency Error : 8.6269947E-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	2987.927	3299.401	15169.00	0.3069817	1.3193288E-02	58.42078
NP-237	171.0024	28-FEB-2010	4432.428	4902.923	12984.00	0.3163057	1.6057158E-02	73.48861
CM-244	158.1060	28-FEB-2010	5533.599	5883.327	11428.00	0.3183713	1.6194897E-02	56.66428

Instrument : CHAMBER 002  
 Detector : 78266  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 5-AUG-2009 09:23:09  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-AUG-2009 14:45:26  
 Average Efficiency : 0.3058862  
 Average Efficiency Error : 8.4242094E-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	2990.748	3297.924	14398.00	0.3038373	1.3070637E-02	49.74084
NP-237	200.4990	28-FEB-2010	4434.751	4902.555	14828.00	0.3081331	1.5613098E-02	65.75996
CM-244	196.5558	28-FEB-2010	5533.273	5884.668	13676.00	0.3065576	1.5550442E-02	56.66758

Instrument : CHAMBER 003  
 Detector : 67617  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 5-AUG-2009 09:23:09  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-AUG-2009 14:45:38  
 Average Efficiency : 0.3501697  
 Average Efficiency Error : 9.6245455E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2988.035	3300.027	16505.00	0.3434206	1.4738046E-02	69.44512
NP-237	203.2080	28-FEB-2010	4433.783	4901.623	17421.00	0.3571638	1.8062104E-02	78.56305
CM-244	197.2236	28-FEB-2010	5533.183	5887.889	15808.00	0.3532508	1.7884690E-02	60.67228

Instrument : CHAMBER 004  
 Detector : 64279  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 5-AUG-2009 09:23:09  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-AUG-2009 14:45:54  
 Average Efficiency : 0.3004026  
 Average Efficiency Error : 8.2737673E-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	2991.885	3302.347	14848.00	0.3042404	1.3080551E-02	53.10138
NP-237	204.2586	28-FEB-2010	4436.757	4905.540	14917.00	0.3042575	1.5415543E-02	64.73015
CM-244	198.8100	28-FEB-2010	5533.807	5887.698	13166.00	0.2919180	1.4816008E-02	57.85523

Instrument : CHAMBER 005  
 Detector : 67612  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 5-AUG-2009 09:23:09  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-AUG-2009 14:46:05  
 Average Efficiency : 0.2843162  
 Average Efficiency Error : 7.8336252E-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	2990.194	3301.639	14157.00	0.2837222	1.2209224E-02	51.06648
NP-237	209.5938	28-FEB-2010	4437.588	4901.889	14375.00	0.2857330	1.4484116E-02	69.27464
CM-244	202.7478	28-FEB-2010	5531.535	5887.236	13050.00	0.2837417	1.4402892E-02	60.22887

Instrument : CHAMBER 006  
 Detector : 67613  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 5-AUG-2009 09:23:09  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-AUG-2009 14:46:15  
 Average Efficiency : 0.3150931  
 Average Efficiency Error : 8.6723948E-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	2988.186	3302.064	15061.00	0.3123020	1.3423658E-02	54.65259
NP-237	204.7038	28-FEB-2010	4434.812	4901.476	15598.00	0.3174475	1.6074667E-02	62.21717
CM-244	195.0060	28-FEB-2010	5533.017	5887.020	14013.00	0.3167382	1.6061435E-02	59.32273

Instrument : CHAMBER 007  
 Detector : 67607  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:33  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:08:14  
 Average Efficiency : 0.3026176  
 Average Efficiency Error : 8.3323661E-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	2991.468	3299.148	14693.00	0.3001373	1.2906651E-02	48.67664
NP-237	205.0260	28-FEB-2010	4433.972	4903.766	14977.00	0.3043185	1.5417857E-02	59.64954
CM-244	199.6806	28-FEB-2010	5532.246	5885.701	13798.00	0.3044618	1.5442326E-02	51.23282

Instrument : CHAMBER 008  
 Detector : 78788  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:33  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:08:25  
 Average Efficiency : 0.3224154  
 Average Efficiency Error : 8.8692745E-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	2989.215	3298.713	15734.00	0.3225096	1.3851766E-02	44.71056
NP-237	209.2716	28-FEB-2010	4433.303	4905.744	15863.00	0.3158187	1.5988812E-02	63.33889
CM-244	199.6488	28-FEB-2010	5532.461	5886.606	14925.00	0.3294691	1.6692771E-02	51.66238

Instrument : CHAMBER 009  
 Detector : 72528  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:33  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:08:37  
 Average Efficiency : 0.3431641  
 Average Efficiency Error : 9.4328979E-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	2990.462	3298.900	16457.00	0.3417034	1.4665021E-02	47.76541
NP-237	204.0192	28-FEB-2010	4437.055	4904.570	16959.00	0.3463034	1.7518245E-02	66.91080
CM-244	197.2128	28-FEB-2010	5532.536	5882.399	15320.00	0.3421319	1.7328590E-02	53.20248



Instrument : CHAMBER 010  
 Detector : 72529  
 Standard ID : AESS-010  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:33  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:08:47  
 Average Efficiency : 0.3163380  
 Average Efficiency Error : 8.7065995E-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	2990.229	3298.607	15141.00	0.3165374	1.3604476E-02	54.57225
NP-237	202.9926	28-FEB-2010	4436.880	4905.484	15237.00	0.3127136	1.5839646E-02	70.41494
CM-244	196.2330	28-FEB-2010	5531.409	5886.990	14242.00	0.3198532	1.6215732E-02	59.36025

Instrument : CHAMBER 011  
 Detector : 72531  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:33  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:10:05  
 Average Efficiency : 0.2947833  
 Average Efficiency Error : 8.1152376E-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	2991.538	3301.988	14786.00	0.2934125	1.2615963E-02	51.15865
NP-237	214.4868	28-FEB-2010	4435.957	4905.467	15318.00	0.2975290	1.5069493E-02	57.97636
CM-244	208.4184	28-FEB-2010	5530.314	5886.614	13904.00	0.2940101	1.4910497E-02	52.04412

Instrument : CHAMBER 012  
 Detector : 67594  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:33  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:10:47  
 Average Efficiency : 0.2985670  
 Average Efficiency Error : 8.2218517E-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	2988.398	3300.615	14557.00	0.2981249	1.2822272E-02	47.31236
NP-237	205.8930	28-FEB-2010	4437.450	4901.503	14889.00	0.3012659	1.5264360E-02	60.85177
CM-244	203.1954	28-FEB-2010	5534.709	5886.652	13676.00	0.2965543	1.5043142E-02	54.26840

Instrument : CHAMBER 013  
 Detector : 78790  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:35  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:10:57  
 Average Efficiency : 0.3409691  
 Average Efficiency Error : 9.3713822E-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	2987.666	3298.441	16523.00	0.3426617	1.4705168E-02	49.16812
NP-237	210.2526	28-FEB-2010	4435.272	4902.524	17040.00	0.3376607	1.7080082E-02	61.60270
CM-244	201.9108	28-FEB-2010	5533.077	5883.559	15669.00	0.3420227	1.7318053E-02	54.98487

Instrument : CHAMBER 014  
 Detector : 67616  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:35  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:11:09  
 Average Efficiency : 0.3130623  
 Average Efficiency Error : 8.6121503E-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	2992.504	3300.484	15590.00	0.3066251	1.3171598E-02	52.69585
NP-237	211.7160	28-FEB-2010	4435.990	4902.000	16202.00	0.3188440	1.6137818E-02	68.36411
CM-244	207.3882	28-FEB-2010	5532.918	5886.701	14925.00	0.3169042	1.6056320E-02	53.58373

Instrument : CHAMBER 015  
 Detector : 61581  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:35  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:11:19  
 Average Efficiency : 0.3249588  
 Average Efficiency Error : 8.9409258E-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	2987.739	3297.575	15440.00	0.3196218	1.3732214E-02	68.63618
NP-237	200.6460	28-FEB-2010	4432.566	4904.976	15842.00	0.3289294	1.6652878E-02	78.34551
CM-244	195.9270	28-FEB-2010	5530.833	5887.242	14624.00	0.3288428	1.6665678E-02	73.03269

Instrument : CHAMBER 016  
 Detector : 78774  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:35  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:11:28  
 Average Efficiency : 0.3372796  
 Average Efficiency Error : 9.2755891E-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	2990.015	3299.769	15968.00	0.3304942	1.4191121E-02	47.63641
NP-237	199.3962	28-FEB-2010	4432.750	4903.568	16594.00	0.3467403	1.7544748E-02	65.62801
CM-244	198.6402	28-FEB-2010	5531.945	5886.508	15241.00	0.3381473	1.7127821E-02	51.73166

Instrument : CHAMBER 017  
 Detector : 78791  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:35  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:12:45  
 Average Efficiency : 0.2920910  
 Average Efficiency Error : 8.0447914E-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	2991.506	3301.266	14360.00	0.2887001	1.2420051E-02	46.05902
NP-237	208.5846	28-FEB-2010	4435.397	4901.753	14828.00	0.2961742	1.5007162E-02	55.70656
CM-244	205.5828	28-FEB-2010	5532.102	5885.058	13665.00	0.2929415	1.4859928E-02	50.18596

Instrument : CHAMBER 018  
 Detector : 78782  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:35  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:12:56  
 Average Efficiency : 0.3172097  
 Average Efficiency Error : 8.7289969E-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	2988.342	3302.274	15345.00	0.3205433	1.3773307E-02	42.03425
NP-237	208.8990	28-FEB-2010	4435.776	4902.996	15628.00	0.3116947	1.5782947E-02	59.98587
CM-244	198.1458	28-FEB-2010	5535.506	5884.764	14315.00	0.3183995	1.6140889E-02	46.41229

Instrument : CHAMBER 019  
 Detector : 78786  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:38  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:13:21  
 Average Efficiency : 0.2910323  
 Average Efficiency Error : 8.0228020E-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	2990.757	3299.102	13644.00	0.2815492	1.2124360E-02	48.88054
NP-237	202.9140	28-FEB-2010	4436.959	4904.938	14592.00	0.2996101	1.5184480E-02	53.45035
CM-244	199.3140	28-FEB-2010	5530.360	5882.637	13450.00	0.2972434	1.5081594E-02	50.55271

Instrument : CHAMBER 020  
 Detector : 78787  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:38  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:13:30  
 Average Efficiency : 0.3471871  
 Average Efficiency Error : 9.5441081E-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	2988.029	3302.537	16453.00	0.3380062	1.4506385E-02	51.08092
NP-237	203.4984	28-FEB-2010	4437.491	4905.035	17379.00	0.3557895	1.7993098E-02	61.84319
CM-244	197.1096	28-FEB-2010	5532.389	5886.993	15772.00	0.3526238	1.7853415E-02	51.51802

Instrument : CHAMBER 021  
 Detector : 67047  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:38  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:13:40  
 Average Efficiency : 0.3035440  
 Average Efficiency Error : 8.3565973E-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	2992.044	3301.105	14782.00	0.2995796	1.2881183E-02	58.16195
NP-237	210.1548	28-FEB-2010	4432.692	4903.261	15300.00	0.3033102	1.5362527E-02	64.83363
CM-244	200.7390	28-FEB-2010	5532.273	5884.483	14116.00	0.3096792	1.5701950E-02	51.57142

Instrument : CHAMBER 022  
 Detector : 72530  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:38  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:13:53  
 Average Efficiency : 0.3171063  
 Average Efficiency Error : 8.7253209E-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	2987.876	3301.717	15368.00	0.3095404	1.3300211E-02	46.46027
NP-237	206.8830	28-FEB-2010	4432.553	4902.907	16121.00	0.3246614	1.6433254E-02	59.61079
CM-244	203.0208	28-FEB-2010	5531.719	5883.858	14793.00	0.3210209	1.6266784E-02	54.93265

Instrument : CHAMBER 023  
 Detector : 78264  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:38  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:14:51  
 Average Efficiency : 0.3475247  
 Average Efficiency Error : 9.5510995E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	207.4764	28-FEB-2010	2992.270	3297.465	16655.00	0.3390353	1.4547646E-02	44.65316
NP-237	207.4998	28-FEB-2010	4434.353	4902.238	17621.00	0.3537784	1.7888635E-02	67.17326
CM-244	199.8804	28-FEB-2010	5535.006	5884.098	16062.00	0.3541352	1.7925926E-02	50.59406

Instrument : CHAMBER 024  
 Detector : 76542  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:38  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:15:01  
 Average Efficiency : 0.3329758  
 Average Efficiency Error : 9.1575533E-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	2988.735	3301.963	15751.00	0.3268531	1.4038056E-02	48.09840
NP-237	205.6662	28-FEB-2010	4435.585	4904.900	16552.00	0.3352655	1.6964708E-02	62.82615
CM-244	198.3060	28-FEB-2010	5532.247	5883.527	15292.00	0.3398233	1.7212013E-02	54.96418

Instrument : CHAMBER 025  
 Detector : 45-149AA5  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:40  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:15:13  
 Average Efficiency : 0.3273577  
 Average Efficiency Error : 9.0229549E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2989.576	3302.009	15260.00	0.3295556	1.4161936E-02	65.60141
NP-237	167.9916	28-FEB-2010	4437.518	4905.500	13240.00	0.3283658	1.6664496E-02	71.67536
CM-244	157.2432	28-FEB-2010	5535.553	5882.966	11554.00	0.3234104	1.6448844E-02	64.13462

Instrument : CHAMBER 026  
 Detector : 78204  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:40  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:15:23  
 Average Efficiency : 0.3163501  
 Average Efficiency Error : 9.2731481E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2989.278	3302.066	15073.00	0.3190832	1.6165398E-02	47.54145
NP-237	168.0294	28-FEB-2010	4432.530	4904.245	12818.00	0.3178037	1.6136298E-02	64.89447
CM-244	160.5822	28-FEB-2010	5530.854	5885.357	11388.00	0.3123012	1.5887389E-02	53.07367

Instrument : CHAMBER 027  
 Detector : 42484  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:40  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:15:36  
 Average Efficiency : 0.3396688  
 Average Efficiency Error : 9.9549843E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2989.311	3298.574	15139.00	0.3305598	1.6745884E-02	45.75581
NP-237	161.6154	28-FEB-2010	4433.571	4901.458	13298.00	0.3428161	1.7396733E-02	58.91746
CM-244	148.1754	28-FEB-2010	5534.916	5884.719	11660.00	0.3465259	1.7621491E-02	49.89463

Instrument : CHAMBER 028  
 Detector : 78792  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:40  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:15:45  
 Average Efficiency : 0.3070537  
 Average Efficiency Error : 9.0059368E-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	2988.458	3301.428	14649.00	0.3098790	1.5704965E-02	43.03392
NP-237	168.1992	28-FEB-2010	4433.918	4901.793	12445.00	0.3082309	1.5657367E-02	57.16418
CM-244	156.7614	28-FEB-2010	5530.766	5886.861	10793.00	0.3031792	1.5437813E-02	42.94358

Instrument : CHAMBER 029  
 Detector : 33454  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:40  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:15:55  
 Average Efficiency : 0.3165512  
 Average Efficiency Error : 9.2795976E-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	2991.561	3299.264	14962.00	0.3134704	1.5882587E-02	59.06260
NP-237	169.7700	28-FEB-2010	4436.609	4905.813	12925.00	0.3171891	1.6103044E-02	65.57512
CM-244	154.8234	28-FEB-2010	5532.652	5886.650	11221.00	0.3191230	1.6238619E-02	58.94875

Instrument : CHAMBER 030  
 Detector : 33447  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:40  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:16:05  
 Average Efficiency : 0.3195129  
 Average Efficiency Error : 9.3687959E-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	2992.462	3300.436	14496.00	0.3076674	1.5595090E-02	51.22312
NP-237	166.3758	28-FEB-2010	4435.706	4901.528	13016.00	0.3259090	1.6544048E-02	70.89224
CM-244	157.1856	28-FEB-2010	5532.111	5885.667	11657.00	0.3264974	1.6603231E-02	58.51925

Instrument : CHAMBER 031  
 Detector : 67042  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:41  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:16:16  
 Average Efficiency : 0.3333972  
 Average Efficiency Error : 9.1897855E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2990.816	3298.130	15264.00	0.3328327	1.4302717E-02	63.22559
NP-237	162.9186	28-FEB-2010	4432.666	4904.194	13199.00	0.3374993	1.7128870E-02	85.39982
CM-244	153.1968	28-FEB-2010	5530.750	5885.317	11495.00	0.3302312	1.6797049E-02	69.66753

Instrument : CHAMBER 032  
 Detector : 67041  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:41  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:16:28  
 Average Efficiency : 0.3079946  
 Average Efficiency Error : 8.4994007E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2990.681	3302.442	14237.00	0.3079492	1.3250315E-02	56.35440
NP-237	165.9822	28-FEB-2010	4436.943	4904.070	12286.00	0.3083688	1.5667509E-02	62.42379
CM-244	153.7938	28-FEB-2010	5532.476	5883.050	10756.00	0.3076837	1.5668528E-02	54.99291

Instrument : CHAMBER 033  
 Detector : 78785  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:41  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:16:44  
 Average Efficiency : 0.3159786  
 Average Efficiency Error : 8.7208869E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.4158	28-FEB-2010	2988.750	3301.323	14152.00	0.3105978	1.3365801E-02	46.58186
NP-237	161.7816	28-FEB-2010	4437.327	4904.445	12331.00	0.3175407	1.6132571E-02	57.74305
CM-244	147.2670	28-FEB-2010	5532.298	5882.301	10791.00	0.3224820	1.6420925E-02	47.06204



Instrument : CHAMBER 034  
 Detector : 61586  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:41  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:16:57  
 Average Efficiency : 0.3186626  
 Average Efficiency Error : 8.7871859E-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	2990.405	3301.020	14898.00	0.3137061	1.3486663E-02	63.62747
NP-237	167.2962	28-FEB-2010	4436.289	4905.558	12847.00	0.3199310	1.6243735E-02	89.06429
CM-244	154.4388	28-FEB-2010	5534.591	5883.408	11387.00	0.3247890	1.6522311E-02	62.47897

Instrument : CHAMBER 035  
 Detector : 78202  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:41  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:17:07  
 Average Efficiency : 0.3066753  
 Average Efficiency Error : 8.4610144E-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	2988.026	3302.211	14579.00	0.3098971	1.3328200E-02	45.84651
NP-237	168.2934	28-FEB-2010	4437.360	4905.577	12421.00	0.3074051	1.5615990E-02	59.70762
CM-244	158.8128	28-FEB-2010	5534.350	5884.600	10890.00	0.3016905	1.5359893E-02	46.83206

Instrument : CHAMBER 036  
 Detector : 78203  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:41  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:17:19  
 Average Efficiency : 0.3238717  
 Average Efficiency Error : 8.9277234E-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	2988.680	3301.073	15196.00	0.3187600	1.3699047E-02	53.56891
NP-237	167.4312	28-FEB-2010	4435.041	4905.984	13273.00	0.3302565	1.6759887E-02	68.47729
CM-244	156.4188	28-FEB-2010	5531.465	5885.278	11554.00	0.3251042	1.6534815E-02	54.91026

Instrument : CHAMBER 037  
 Detector : 45-149BB5  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:43  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:17:30  
 Average Efficiency : 0.3588454  
 Average Efficiency Error : 9.8783271E-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	2991.168	3302.212	16427.00	0.3508205	1.5056745E-02	64.60843
NP-237	167.1294	28-FEB-2010	4432.895	4904.029	14662.00	0.3654579	1.8520588E-02	77.87219
CM-244	154.7664	28-FEB-2010	5532.110	5886.157	12816.00	0.3643632	1.8501068E-02	65.29257

Instrument : CHAMBER 038  
 Detector : 72532  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:43  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:17:42  
 Average Efficiency : 0.3401872  
 Average Efficiency Error : 9.3690762E-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	2992.472	3300.031	15896.00	0.3353978	1.4402774E-02	52.10275
NP-237	170.0886	28-FEB-2010	4434.591	4905.742	14074.00	0.3446777	1.7477222E-02	66.10255
CM-244	157.7460	28-FEB-2010	5531.463	5885.396	12284.00	0.3427305	1.7413909E-02	59.13643

Instrument : CHAMBER 039  
 Detector : 45-149BB2  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:43  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:17:50  
 Average Efficiency : 0.3635030  
 Average Efficiency Error : 1.0010615E-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	2988.231	3297.932	16136.00	0.3544406	1.5216673E-02	64.96208
NP-237	159.1506	28-FEB-2010	4433.148	4905.972	14381.00	0.3764731	1.9083694E-02	79.22511
CM-244	151.7142	28-FEB-2010	5532.651	5884.312	12578.00	0.3647127	1.8524269E-02	60.58306

Instrument : CHAMBER 040  
 Detector : 78773  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:43  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:18:00  
 Average Efficiency : 0.3197618  
 Average Efficiency Error : 8.8180574E-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	2989.631	3299.278	14776.00	0.3208454	1.3795648E-02	47.91216
NP-237	166.8174	28-FEB-2010	4434.455	4902.104	12719.00	0.3176762	1.6131660E-02	62.00956
CM-244	155.0100	28-FEB-2010	5534.140	5885.901	11283.00	0.3203784	1.6300978E-02	46.47287

Instrument : CHAMBER 041  
 Detector : 78205  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:43  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:18:09  
 Average Efficiency : 0.3320726  
 Average Efficiency Error : 9.1476394E-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	2988.485	3301.427	15744.00	0.3260407	1.4003299E-02	48.05792
NP-237	171.2268	28-FEB-2010	4434.095	4902.163	13892.00	0.3380044	1.7141877E-02	64.23948
CM-244	159.5796	28-FEB-2010	5531.498	5882.427	12150.00	0.3351395	1.7031105E-02	52.60388

Instrument : CHAMBER 042  
 Detector : 78793  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:43  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:18:18  
 Average Efficiency : 0.3355130  
 Average Efficiency Error : 9.2503820E-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	2991.775	3302.182	14895.00	0.3333198	1.4329934E-02	45.19947
NP-237	159.6558	28-FEB-2010	4434.604	4903.031	12973.00	0.3384922	1.7183678E-02	58.44910
CM-244	150.5208	28-FEB-2010	5530.666	5882.826	11480.00	0.3356853	1.7074790E-02	51.00649

Instrument : CHAMBER 043  
 Detector : 76543  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:44  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:18:26  
 Average Efficiency : 0.3394984  
 Average Efficiency Error : 9.3512600E-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	2990.605	3297.721	15848.00	0.3383991	1.4532390E-02	52.98521
NP-237	168.7422	28-FEB-2010	4435.729	4906.163	13860.00	0.3421971	1.7355058E-02	63.69067
CM-244	156.3252	28-FEB-2010	5530.889	5884.237	12022.00	0.3383877	1.7199298E-02	58.34155

Instrument : CHAMBER 044  
 Detector : 79459  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:44  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:18:36  
 Average Efficiency : 0.3472623  
 Average Efficiency Error : 9.5641837E-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	2992.053	3299.650	16240.00	0.3526795	1.5139417E-02	46.60588
NP-237	166.6248	28-FEB-2010	4434.444	4905.733	13868.00	0.3467396	1.7585307E-02	67.40435
CM-244	155.8290	28-FEB-2010	5531.674	5885.749	12067.00	0.3406831	1.7315021E-02	50.52586

Instrument : CHAMBER 045  
 Detector : 78783  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:44  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:18:46  
 Average Efficiency : 0.3473964  
 Average Efficiency Error : 9.5752627E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	186.9936	28-FEB-2010	2991.163	3297.674	15321.00	0.3460006	1.4867575E-02	42.89996
NP-237	160.8066	28-FEB-2010	4435.665	4901.796	13169.00	0.3411981	1.7317103E-02	61.13550
CM-244	145.8384	28-FEB-2010	5533.912	5883.468	11808.00	0.3562486	1.8112443E-02	45.70908

Instrument : CHAMBER 046  
 Detector : 76544  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:44  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:18:55  
 Average Efficiency : 0.3396656  
 Average Efficiency Error : 9.3595181E-03  
 Confidence : 95.00000

Cal. Istds	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2988.013	3297.754	15574.00	0.3376833	1.4506049E-02	53.28547
NP-237	164.6658	28-FEB-2010	4433.428	4906.578	13320.00	0.3369921	1.7100822E-02	64.03419
CM-244	151.3824	28-FEB-2010	5533.808	5885.833	11881.00	0.3453883	1.7558334E-02	49.95901

Instrument : CHAMBER 047  
 Detector : 46-089B1  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:44  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:19:03  
 Average Efficiency : 0.3416091  
 Average Efficiency Error : 9.4094146E-03  
 Confidence : 95.00000

Cal. Istds	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2989.788	3298.531	15812.00	0.3381371	1.4521689E-02	57.51329
NP-237	168.3948	28-FEB-2010	4436.493	4903.356	13857.00	0.3428169	1.7386565E-02	66.01371
CM-244	154.6032	28-FEB-2010	5535.296	5884.198	12141.00	0.3454518	1.7555740E-02	60.25008

Instrument : CHAMBER 048  
 Detector : 42483  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 3-AUG-2009 10:53:44  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 3-AUG-2009 15:19:12  
 Average Efficiency : 0.3123633  
 Average Efficiency Error : 8.6213006E-03  
 Confidence : 95.00000

Cal. Istds	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2991.838	3299.553	14065.00	0.3096292	1.3325672E-02	54.65192
NP-237	161.5530	28-FEB-2010	4437.268	4906.475	12285.00	0.3167912	1.6095465E-02	66.40394
CM-244	151.1856	28-FEB-2010	5533.930	5885.396	10717.00	0.3119354	1.5885884E-02	57.74399

Instrument : CHAMBER 065  
 Detector : 68551  
 Standard ID : AESS-001  
 Standard Reference Date : 20-FEB-2008 09:54:53  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:10  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:32:36  
 Average Efficiency : 0.3083470  
 Average Efficiency Error : 8.5085379E-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	2991.020	3301.790	14596.00	0.2954247	1.2705522E-02	58.52770
NP-237	171.0024	28-FEB-2010	4435.576	4904.585	13191.00	0.3213498	1.6309390E-02	64.23100
CM-244	158.1060	28-FEB-2010	5533.015	5885.628	11352.00	0.3164231	1.6097672E-02	59.22498

Instrument : CHAMBER 066  
 Detector : 46-089C1  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:10  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:33:22  
 Average Efficiency : 0.3112474  
 Average Efficiency Error : 8.5695526E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1144	28-FEB-2010	2988.945	3298.217	14657.00	0.3093549	1.3303596E-02	55.37485
NP-237	200.4990	28-FEB-2010	4435.388	4905.987	14981.00	0.3113079	1.5771858E-02	67.81973
CM-244	196.5558	28-FEB-2010	5534.885	5886.957	13998.00	0.3138950	1.5917554E-02	57.19744

Instrument : CHAMBER 067  
 Detector : 46-089B4  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:10  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:33:34  
 Average Efficiency : 0.3251616  
 Average Efficiency Error : 8.9453170E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2990.195	3298.405	15523.00	0.3230599	1.3878663E-02	73.01379
NP-237	203.2080	28-FEB-2010	4432.996	4903.114	16006.00	0.3281700	1.6612297E-02	79.50097
CM-244	197.2236	28-FEB-2010	5531.881	5884.128	14543.00	0.3251645	1.6480407E-02	73.28760

Instrument : CHAMBER 068  
 Detector : 78794  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:10  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:38:02  
 Average Efficiency : 0.2988316  
 Average Efficiency Error : 8.2298918E-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	2989.058	3297.794	14610.00	0.2994183	1.2877054E-02	47.51308
NP-237	204.2586	28-FEB-2010	4436.694	4904.361	14617.00	0.2981576	1.5110506E-02	57.11169
CM-244	198.8100	28-FEB-2010	5532.395	5887.637	13466.00	0.2986969	1.5155178E-02	48.38633

Instrument : CHAMBER 069  
 Detector : 78795  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:10  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:38:36  
 Average Efficiency : 0.3175282  
 Average Efficiency Error : 8.7343659E-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	2991.230	3298.554	15670.00	0.3141076	1.3491860E-02	49.70101
NP-237	209.5938	28-FEB-2010	4432.770	4904.008	16141.00	0.3208218	1.6238715E-02	60.15531
CM-244	202.7478	28-FEB-2010	5535.390	5884.253	14673.00	0.3191766	1.6174993E-02	51.27451

Instrument : CHAMBER 070  
 Detector : 46-089B2  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:10  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:38:49  
 Average Efficiency : 0.3529845  
 Average Efficiency Error : 9.7008841E-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	2992.134	3299.079	16742.00	0.3471912	1.4896408E-02	63.07681
NP-237	204.7038	28-FEB-2010	4435.081	4904.079	17300.00	0.3520767	1.7806258E-02	82.77227
CM-244	195.0060	28-FEB-2010	5531.689	5883.454	16039.00	0.3627528	1.8362503E-02	70.00533

Instrument : CHAMBER 071  
 Detector : 64259  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:39:05  
 Average Efficiency : 0.3208804  
 Average Efficiency Error : 8.8285562E-03  
 Confidence : 95.00000

Cal. Istds	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2991.474	3300.552	15413.00	0.3149293	1.3531087E-02	62.47171
NP-237	205.0260	28-FEB-2010	4434.375	4901.563	15925.00	0.3235798	1.6380999E-02	71.98354
CM-244	199.6806	28-FEB-2010	5533.885	5882.968	14807.00	0.3270442	1.6571697E-02	60.00851

Instrument : CHAMBER 072  
 Detector : 45-149AA3  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:41:05  
 Average Efficiency : 0.3267370  
 Average Efficiency Error : 8.9871846E-03  
 Confidence : 95.00000

Cal. Istds	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.0418	28-FEB-2010	2989.276	3301.453	15650.00	0.3208615	1.3782272E-02	51.51645
NP-237	209.2716	28-FEB-2010	4434.016	4904.104	16413.00	0.3267362	1.6534751E-02	70.18485
CM-244	199.6488	28-FEB-2010	5533.538	5886.502	15197.00	0.3356811	1.7003637E-02	59.25634

Instrument : CHAMBER 073  
 Detector : 78775  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:41:19  
 Average Efficiency : 0.3329331  
 Average Efficiency Error : 9.1557140E-03  
 Confidence : 95.00000

Cal. Istds	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.3736	28-FEB-2010	2991.884	3298.904	15903.00	0.3302805	1.4182931E-02	45.72569
NP-237	204.0192	28-FEB-2010	4435.607	4905.083	16398.00	0.3348464	1.6945357E-02	65.14548
CM-244	197.2128	28-FEB-2010	5533.495	5885.787	14977.00	0.3348103	1.6962610E-02	52.22756



Instrument : CHAMBER 074  
 Detector : 78266  
 Standard ID : AESS-010  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:41:50  
 Average Efficiency : 0.3171463  
 Average Efficiency Error : 8.7284483E-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	2992.157	3300.875	15091.00	0.3155650	1.3563500E-02	48.84003
NP-237	202.9926	28-FEB-2010	4434.541	4902.170	15525.00	0.3186204	1.6135018E-02	61.89280
CM-244	196.2330	28-FEB-2010	5535.537	5885.413	14144.00	0.3179084	1.6118674E-02	53.87412

Instrument : CHAMBER 075  
 Detector : 68550  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:42:08  
 Average Efficiency : 0.2994908  
 Average Efficiency Error : 8.2427450E-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	2992.440	3300.846	15058.00	0.2988699	1.2846401E-02	51.75235
NP-237	214.4868	28-FEB-2010	4432.709	4904.580	15499.00	0.3010221	1.5244178E-02	70.86993
CM-244	208.4184	28-FEB-2010	5531.026	5885.258	14123.00	0.2988416	1.5152307E-02	52.88081

Instrument : CHAMBER 076  
 Detector : 78779  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:42:40  
 Average Efficiency : 0.3028130  
 Average Efficiency Error : 8.3379308E-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	2991.979	3300.154	14630.00	0.2996896	1.2888389E-02	45.27155
NP-237	205.8930	28-FEB-2010	4436.825	4903.508	15329.00	0.3101608	1.5709149E-02	64.17129
CM-244	203.1954	28-FEB-2010	5535.510	5884.591	13832.00	0.3002685	1.5228972E-02	51.27063

Instrument : CHAMBER 077  
 Detector : 67576  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:42:53  
 Average Efficiency : 0.3266060  
 Average Efficiency Error : 8.9822784E-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	2989.957	3302.071	15788.00	0.3274788	1.4064389E-02	50.84729
NP-237	210.2526	28-FEB-2010	4433.544	4902.799	16283.00	0.3226589	1.6329939E-02	64.60262
CM-244	201.9108	28-FEB-2010	5530.788	5882.782	15087.00	0.3295008	1.6692154E-02	50.76959

Instrument : CHAMBER 078  
 Detector : 67577  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:43:47  
 Average Efficiency : 0.3266194  
 Average Efficiency Error : 8.9784693E-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	2988.255	3302.223	16485.00	0.3242883	1.3917238E-02	54.47247
NP-237	211.7160	28-FEB-2010	4437.236	4905.680	16830.00	0.3311986	1.6755598E-02	62.86163
CM-244	207.3882	28-FEB-2010	5535.005	5885.680	15311.00	0.3254575	1.6484126E-02	54.68671

Instrument : CHAMBER 079  
 Detector : 67598  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:44:09  
 Average Efficiency : 0.3272116  
 Average Efficiency Error : 9.0027396E-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	2989.159	3300.331	15511.00	0.3211554	1.3797027E-02	50.97751
NP-237	200.6460	28-FEB-2010	4434.317	4902.854	16177.00	0.3359110	1.7001966E-02	61.88776
CM-244	195.9270	28-FEB-2010	5535.480	5887.277	14557.00	0.3276861	1.6607955E-02	52.62397

Instrument : CHAMBER 080  
 Detector : 78197  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 11-AUG-2009 12:17:29  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 12-AUG-2009 06:47:19  
 Average Efficiency : 0.3321076  
 Average Efficiency Error : 9.1349650E-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	2991.650	3302.015	15752.00	0.3260951	1.4005513E-02	48.00739
NP-237	199.3962	28-FEB-2010	4433.624	4906.537	16268.00	0.3399083	1.7203139E-02	68.49010
CM-244	198.6402	28-FEB-2010	5533.522	5887.645	15012.00	0.3333320	1.6887236E-02	53.20805

Instrument : CHAMBER 081  
 Detector : 72533  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:46:32  
 Average Efficiency : 6.1864634E-03  
 Average Efficiency Error : 2.9860463E-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	2994.266	3303.451	1475.000	2.9659975E-02	2.4708204E-03	0.0000000E+00
NP-237	208.5846	28-FEB-2010	4435.242	4901.625	202.0000	4.0063704E-03	3.4766502E-04	575.4393
CM-244	205.5828	28-FEB-2010	5531.807	5884.164	427.0000	9.0843663E-03	3.3504453E-04	562.1900

Instrument : CHAMBER 082  
 Detector : 64263  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:47:05  
 Average Efficiency : 0.3226976  
 Average Efficiency Error : 8.8783512E-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	2987.542	3297.569	15428.00	0.3223361	1.3849068E-02	64.65321
NP-237	208.8990	28-FEB-2010	4435.421	4904.506	15892.00	0.3169125	1.6043896E-02	93.68992
CM-244	198.1458	28-FEB-2010	5534.230	5884.907	14803.00	0.3294876	1.6695555E-02	84.86885

Instrument : CHAMBER 083  
 Detector : 64278  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:14  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:47:29  
 Average Efficiency : 0.3395500  
 Average Efficiency Error : 9.3379803E-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	2991.854	3298.707	15947.00	0.3291289	1.4132823E-02	53.16394
NP-237	202.9140	28-FEB-2010	4433.271	4906.151	16931.00	0.3476149	1.7584924E-02	67.04104
CM-244	199.3140	28-FEB-2010	5531.993	5884.932	15718.00	0.3476342	1.7601561E-02	59.50858

Instrument : CHAMBER 084  
 Detector : 78265  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:14  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:47:52  
 Average Efficiency : 0.3397457  
 Average Efficiency Error : 9.3453201E-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	2988.678	3299.931	15922.00	0.3271575	1.4048551E-02	47.08979
NP-237	203.4984	28-FEB-2010	4434.465	4903.170	17250.00	0.3531433	1.7860783E-02	67.92932
CM-244	197.1096	28-FEB-2010	5531.407	5886.178	15482.00	0.3464514	1.7544933E-02	50.18247

Instrument : CHAMBER 085  
 Detector : 78776  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:14  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:48:19  
 Average Efficiency : 0.3272626  
 Average Efficiency Error : 8.9994660E-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	2990.698	3300.313	15918.00	0.3226679	1.3855824E-02	49.75027
NP-237	210.1548	28-FEB-2010	4435.121	4902.282	16630.00	0.3296844	1.6681336E-02	59.70044
CM-244	200.7390	28-FEB-2010	5534.187	5882.859	15098.00	0.3315589	1.6796166E-02	51.87433

Instrument : CHAMBER 086  
 Detector : 78198  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:14  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:48:41  
 Average Efficiency : 0.3012526  
 Average Efficiency Error : 8.2951793E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2990.009	3300.939	14622.00	0.2945913	1.2669257E-02	46.73733
NP-237	206.8830	28-FEB-2010	4436.927	4902.983	15242.00	0.3069340	1.5546833E-02	58.46733
CM-244	203.0208	28-FEB-2010	5531.983	5883.724	14065.00	0.3055728	1.5494397E-02	51.66624

Instrument : CHAMBER 087  
 Detector : 78199  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:14  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:49:08  
 Average Efficiency : 0.3135695  
 Average Efficiency Error : 8.6297104E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	207.4764	28-FEB-2010	2988.599	3301.987	15111.00	0.3076608	1.3223418E-02	48.25697
NP-237	207.4998	28-FEB-2010	4434.300	4902.242	15867.00	0.3185670	1.6127942E-02	61.93990
CM-244	199.8804	28-FEB-2010	5532.304	5887.140	14381.00	0.3173418	1.6086275E-02	50.20942

Instrument : CHAMBER 088  
 Detector : 33452  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:14  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:50:14  
 Average Efficiency : 0.3028336  
 Average Efficiency Error : 8.3410190E-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	2989.881	3297.896	14259.00	0.2959496	1.2733680E-02	60.40763
NP-237	205.6662	28-FEB-2010	4436.727	4902.043	15208.00	0.3080562	1.5604130E-02	68.20498
CM-244	198.3060	28-FEB-2010	5532.799	5884.609	13848.00	0.3079579	1.5618804E-02	57.90837

Instrument : CHAMBER 089  
 Detector : 78262  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:50:54  
 Average Efficiency : 0.2999636  
 Average Efficiency Error : 8.2814181E-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	2989.340	3299.886	14192.00	0.3065364	1.3190371E-02	47.47885
NP-237	167.9916	28-FEB-2010	4433.954	4903.393	12026.00	0.2982433	1.5158199E-02	61.37537
CM-244	157.2432	28-FEB-2010	5533.423	5884.190	10453.00	0.2932044	1.4938097E-02	52.58473

Instrument : CHAMBER 090  
 Detector : 78263  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:51:07  
 Average Efficiency : 0.3280271  
 Average Efficiency Error : 9.6107582E-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	2992.174	3298.193	15340.00	0.3247949	1.6451096E-02	48.79327
NP-237	168.0294	28-FEB-2010	4432.899	4902.301	13513.00	0.3350319	1.6997805E-02	59.73701
CM-244	160.5822	28-FEB-2010	5531.267	5884.186	11821.00	0.3246754	1.6506171E-02	54.24763

Instrument : CHAMBER 091  
 Detector : 78259  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:51:19  
 Average Efficiency : 0.3422945  
 Average Efficiency Error : 1.0031743E-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	2988.796	3297.819	15212.00	0.3322093	1.6828449E-02	48.17033
NP-237	161.6154	28-FEB-2010	4433.118	4901.645	13301.00	0.3428935	1.7400602E-02	71.25236
CM-244	148.1754	28-FEB-2010	5531.054	5887.180	11864.00	0.3531335	1.7951898E-02	54.03432

Instrument : CHAMBER 092  
 Detector : 79457  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:52:08  
 Average Efficiency : 0.3126248  
 Average Efficiency Error : 9.1664707E-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	2988.378	3299.875	14752.00	0.3115867	1.5790872E-02	44.92863
NP-237	168.1992	28-FEB-2010	4435.762	4905.401	12691.00	0.3138909	1.5940819E-02	59.90319
CM-244	156.7614	28-FEB-2010	5534.466	5887.335	11106.00	0.3124176	1.5899830E-02	46.96757

Instrument : CHAMBER 093  
 Detector : 33206  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:52:22  
 Average Efficiency : 0.3223998  
 Average Efficiency Error : 9.4486484E-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	2988.021	3298.707	15183.00	0.3181591	1.6117128E-02	52.68830
NP-237	169.7700	28-FEB-2010	4432.645	4901.916	13165.00	0.3230736	1.6397305E-02	66.05635
CM-244	154.8234	28-FEB-2010	5530.870	5883.862	11451.00	0.3262046	1.6592693E-02	55.78003

Instrument : CHAMBER 094  
 Detector : 78267  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:15  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:52:36  
 Average Efficiency : 0.3070784  
 Average Efficiency Error : 9.0072202E-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	2987.496	3299.970	14244.00	0.3023582	1.5329675E-02	44.82082
NP-237	166.3758	28-FEB-2010	4432.930	4902.883	12450.00	0.3117883	1.5837880E-02	57.18416
CM-244	157.1856	28-FEB-2010	5531.875	5884.464	10956.00	0.3073991	1.5648084E-02	55.69304

Instrument : CHAMBER 095  
 Detector : 64279  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:16  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:53:20  
 Average Efficiency : 0.3112848  
 Average Efficiency Error : 8.5905641E-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	2991.646	3298.356	14103.00	0.3075817	1.3236930E-02	52.02211
NP-237	162.9186	28-FEB-2010	4435.397	4905.664	12249.00	0.3132029	1.5913907E-02	59.25825
CM-244	153.1968	28-FEB-2010	5530.369	5883.804	10942.00	0.3147666	1.6023749E-02	56.52655

Instrument : CHAMBER 096  
 Detector : 67605  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:16  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:53:35  
 Average Efficiency : 0.3007939  
 Average Efficiency Error : 8.3044088E-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	2989.386	3301.860	13969.00	0.3022173	1.3008440E-02	46.72513
NP-237	165.9822	28-FEB-2010	4437.256	4904.015	11834.00	0.2969258	1.5095386E-02	61.08714
CM-244	153.7938	28-FEB-2010	5531.292	5886.331	10564.00	0.3028315	1.5425657E-02	47.63036

Instrument : CHAMBER 097  
 Detector : 67599  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:16  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:54:04  
 Average Efficiency : 0.3450123  
 Average Efficiency Error : 9.5089795E-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	2991.155	3299.592	15339.00	0.3367012	1.4467746E-02	59.45457
NP-237	161.7816	28-FEB-2010	4437.204	4904.260	13605.00	0.3503401	1.7772736E-02	79.89651
CM-244	147.2670	28-FEB-2010	5531.403	5886.106	11772.00	0.3523416	1.7914115E-02	60.43928



Instrument : CHAMBER 098  
 Detector : 68644  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:16  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:54:57  
 Average Efficiency : 0.3358550  
 Average Efficiency Error : 9.2535829E-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	2992.247	3301.860	15657.00	0.3297495	1.4163947E-02	50.47488
NP-237	167.2962	28-FEB-2010	4432.619	4906.019	13588.00	0.3383684	1.7165720E-02	63.83917
CM-244	154.4388	28-FEB-2010	5534.382	5884.237	11997.00	0.3424924	1.7407812E-02	51.17926

Instrument : CHAMBER 099  
 Detector : 70317  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:16  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:55:11  
 Average Efficiency : 0.3432277  
 Average Efficiency Error : 9.4517590E-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	2987.820	3298.212	15976.00	0.3396714	1.4585057E-02	54.44847
NP-237	168.2934	28-FEB-2010	4437.036	4906.585	14008.00	0.3467679	1.7584279E-02	71.12630
CM-244	158.8128	28-FEB-2010	5530.871	5884.331	12421.00	0.3448446	1.7517686E-02	52.96134

Instrument : CHAMBER 100  
 Detector : 79456  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:16  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:55:23  
 Average Efficiency : 0.3455574  
 Average Efficiency Error : 9.5195137E-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	2989.623	3299.666	15783.00	0.3422834	1.4700302E-02	52.09954
NP-237	164.6658	28-FEB-2010	4436.895	4905.650	13580.00	0.3435225	1.7427422E-02	69.24625
CM-244	151.3824	28-FEB-2010	5534.086	5886.872	12110.00	0.3525722	1.7917577E-02	56.51697

Instrument : CHAMBER 101  
 Detector : 64253  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:17  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:55:41  
 Average Efficiency : 0.3333714  
 Average Efficiency Error : 9.1898674E-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	2990.814	3297.893	15101.00	0.3225393	1.3863103E-02	69.71876
NP-237	167.1294	28-FEB-2010	4435.403	4905.470	13614.00	0.3393782	1.7216442E-02	75.26087
CM-244	154.7664	28-FEB-2010	5534.897	5882.499	12090.00	0.3444314	1.7504154E-02	64.32682

Instrument : CHAMBER 102  
 Detector : 72525  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:17  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:55:55  
 Average Efficiency : 0.3351222  
 Average Efficiency Error : 9.2311725E-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	2989.911	3298.890	15784.00	0.3331057	1.4306106E-02	52.96164
NP-237	170.0886	28-FEB-2010	4436.604	4903.163	13774.00	0.3373874	1.7112618E-02	67.26456
CM-244	157.7460	28-FEB-2010	5533.661	5884.537	12012.00	0.3357387	1.7064173E-02	56.82374

Instrument : CHAMBER 103  
 Detector : 79461  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:17  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:56:06  
 Average Efficiency : 0.3326890  
 Average Efficiency Error : 9.1751814E-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	2989.467	3301.138	14760.00	0.3242984	1.3944432E-02	47.60223
NP-237	159.1506	28-FEB-2010	4432.983	4903.264	13171.00	0.3447756	1.7498676E-02	57.68694
CM-244	151.7142	28-FEB-2010	5533.387	5886.945	11484.00	0.3337491	1.6975598E-02	51.22444

Instrument : CHAMBER 104  
 Detector : 72524  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:17  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:56:56  
 Average Efficiency : 0.3150799  
 Average Efficiency Error : 8.6921128E-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	2991.174	3300.565	14723.00	0.3197476	1.3749403E-02	50.59072
NP-237	166.8174	28-FEB-2010	4436.202	4904.648	12311.00	0.3074494	1.5620295E-02	55.80039
CM-244	155.0100	28-FEB-2010	5532.970	5885.836	11138.00	0.3167908	1.6121507E-02	49.72461

Instrument : CHAMBER 105  
 Detector : 78777  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:17  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:57:20  
 Average Efficiency : 0.3276281  
 Average Efficiency Error : 9.0270750E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.9034	28-FEB-2010	2990.222	3299.531	15562.00	0.3223552	1.3847793E-02	46.50069
NP-237	171.2268	28-FEB-2010	4434.728	4902.932	13744.00	0.3344322	1.6963221E-02	65.77631
CM-244	159.5796	28-FEB-2010	5530.878	5883.508	11897.00	0.3287036	1.6709210E-02	49.01804

Instrument : CHAMBER 106  
 Detector : 64274  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:17  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:57:33  
 Average Efficiency : 0.3250493  
 Average Efficiency Error : 8.9671388E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	188.7090	28-FEB-2010	2987.640	3299.757	14336.00	0.3208575	1.3803991E-02	53.47353
NP-237	159.6558	28-FEB-2010	4434.577	4901.415	12565.00	0.3278506	1.6651530E-02	72.39591
CM-244	150.5208	28-FEB-2010	5534.428	5884.452	11211.00	0.3283702	1.6708910E-02	56.10339

Instrument : CHAMBER 107  
 Detector : 67578  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:19  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 11:58:23  
 Average Efficiency : 0.3085136  
 Average Efficiency Error : 8.5112611E-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	2988.547	3298.638	14405.00	0.3076421	1.3234209E-02	50.64014
NP-237	168.7422	28-FEB-2010	4435.772	4904.146	12514.00	0.3089727	1.5693650E-02	62.76998
CM-244	156.3252	28-FEB-2010	5532.554	5882.324	10968.00	0.3092847	1.5743818E-02	52.78785

Instrument : CHAMBER 108  
 Detector : 78778  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:19  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 12:00:02  
 Average Efficiency : 0.3507076  
 Average Efficiency Error : 9.6569844E-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	2988.136	3297.898	16033.00	0.3482739	1.4953526E-02	49.59322
NP-237	166.6248	28-FEB-2010	4433.563	4901.441	14165.00	0.3542025	1.7958457E-02	66.29896
CM-244	155.8290	28-FEB-2010	5533.812	5885.772	12398.00	0.3507225	1.7816888E-02	52.33121

Instrument : CHAMBER 109  
 Detector : 79463  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:19  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 12:00:23  
 Average Efficiency : 0.3572300  
 Average Efficiency Error : 9.8411189E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	186.9936	28-FEB-2010	2990.332	3301.320	15964.00	0.3605992	1.5483866E-02	43.37672
NP-237	160.8066	28-FEB-2010	4437.566	4903.059	13542.00	0.3508754	1.7801007E-02	56.95218
CM-244	145.8384	28-FEB-2010	5534.376	5883.521	11884.00	0.3592313	1.8261438E-02	45.65917

Instrument : CHAMBER 110  
 Detector : 67602  
 Standard ID : AESS-046  
 Standard Reference Date : 8-JAN-2007 09:29:00  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:19  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 12:01:03  
 Average Efficiency : 0.3231843  
 Average Efficiency Error : 8.9130215E-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	2987.980	3298.573	14814.00	0.3198501	1.3754530E-02	53.58074
NP-237	164.3834	28-FEB-2010	4433.010	4901.606	12984.00	0.3290606	1.6704626E-02	68.74621
CM-244	159.4253	28-FEB-2010	5534.957	5883.028	11170.00	0.3222606	1.6399227E-02	53.66474

Instrument : CHAMBER 111  
 Detector : 79462  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:19  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 12:01:21  
 Average Efficiency : 0.3397023  
 Average Efficiency Error : 9.3582701E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2988.711	3298.714	15668.00	0.3351243	1.4394601E-02	47.62338
NP-237	168.3948	28-FEB-2010	4436.440	4905.458	13711.00	0.3392103	1.7206213E-02	64.03130
CM-244	154.6032	28-FEB-2010	5535.080	5885.693	12172.00	0.3470925	1.7637538E-02	47.05465

Instrument : CHAMBER 112  
 Detector : 78261  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 11-AUG-2009 07:20:19  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 11-AUG-2009 12:02:06  
 Average Efficiency : 0.3161603  
 Average Efficiency Error : 8.7240264E-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	2988.059	3299.440	14279.00	0.3143869	1.3526597E-02	45.81523
NP-237	161.5530	28-FEB-2010	4434.653	4903.902	12390.00	0.3195488	1.6233314E-02	58.56979
CM-244	151.1856	28-FEB-2010	5532.350	5884.826	10815.00	0.3153441	1.6056247E-02	49.68813

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 : 3-AUG-2009 15:01:01  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 4-AUG-2009 07:05:22  
 Average Efficiency : 0.2523917  
 Average Efficiency Error : 6.9445390E-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	2988.038	3298.754	15362.00	0.2475464	1.0636533E-02	49.38146
NP-237	206.8830	28-FEB-2010	4433.805	4904.661	15831.00	0.2550381	1.2912051E-02	62.38403
CM-244	203.0208	28-FEB-2010	5533.044	5884.411	14796.00	0.2569614	1.3020590E-02	52.60632

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 : 3-AUG-2009 15:01:06  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 4-AUG-2009 07:05:44  
 Average Efficiency : 0.2446600  
 Average Efficiency Error : 7.1762474E-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	2990.939	3299.406	14312.00	0.2421445	1.2276043E-02	47.17155
NP-237	168.1992	28-FEB-2010	4434.236	4904.141	12518.00	0.2480016	1.2596779E-02	57.06334
CM-244	156.7614	28-FEB-2010	5532.352	5884.155	10851.00	0.2439863	1.2422267E-02	48.94917

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 : 3-AUG-2009 15:03:36  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 4-AUG-2009 07:05:59  
 Average Efficiency : 0.3711236  
 Average Efficiency Error : 1.0165478E-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	2988.824	3300.295	22155.00	0.3620965	1.5474160E-02	57.26881
NP-237	205.0260	28-FEB-2010	4433.927	4901.686	23319.00	0.3791083	1.9117314E-02	71.55396
CM-244	199.6806	28-FEB-2010	5532.705	5883.340	21344.00	0.3768574	1.9018669E-02	56.37528

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 : 3-AUG-2009 15:03:40  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 4-AUG-2009 07:06:12  
 Average Efficiency : 0.3776897  
 Average Efficiency Error : 1.0342728E-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	2989.637	3301.388	22865.00	0.3665610	1.5658973E-02	55.40712
NP-237	209.5938	28-FEB-2010	4432.422	4901.883	24233.00	0.3852773	1.9422315E-02	82.01970
CM-244	202.7478	28-FEB-2010	5530.486	5882.987	22275.00	0.3873385	1.9540109E-02	60.16400



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. Istds	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. Istds	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. Istds	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

# LUCAS CELL COUNTERS

# General Engineering Laboratories

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

## Lucas Cell Calibration Package

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the second standard(s) documentation? standard preparation information? standard < 1 Year old or verified?	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
2) Is the efficiency calibration report included ?	<input checked="" type="checkbox"/>		
3) Is the raw count data included for: Cell constant determination? Plateau generation?	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
4) Are the calibration verifications included?	<input checked="" type="checkbox"/>		
5) Are the instrument settings included: HVPS settings?	<input checked="" type="checkbox"/>		
6) Has the CELLEFF.xls file been updated ?	<input checked="" type="checkbox"/>		
7) Have the calibration dates been updated in ALPHALIMS ?	<input checked="" type="checkbox"/>		

Prepared By: Kelli S. Demee

Date: 8/29/08

Reviewed By: Mark J. Idem

Date: 9/12/08

Effective Date: 9/24/08

# Ra-226 Cell Constants

standard ID: 0299-G  
 Volume added (mL): 0.1  
 Standard Reference Activity (DPM/mL): 2446.35

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/time flushed to cell	Date/time end of degas	Bkg Counts	bkg cpm	total counts	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	<del>6/13/08 1410</del>						
Cal 13	500	<del>6/15/08 1410</del>						
Cal 10	500	<del>6/15/08 1410</del>						
Cal 14	500	<del>6/15/08 1410</del>						
Cal 24	500	<del>6/15/08 1410</del>						
Cal 21	500	6/12/08 0950	6/12/08 1410	6/12/08 1720	104	1	8	7275
<del>Cal 20</del>	500	<del>6/12/08 0950</del>	<del>6/12/08 1430</del>	<del>6/24/08 1820</del>	<del>107</del>	<del>1</del>	<del>8</del>	<del>18</del>
<del>Cal 25</del>	500	<del>6/12/08 0950</del>	<del>6/12/08 1450</del>	<del>6/24/08 1921</del>	<del>108</del>	<del>1</del>	<del>8</del>	<del>7547</del>
Cal 36	500	6/12/08 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
<del>Cal 17</del>	500	<del>6/12/08 0950</del>	<del>6/12/08 1545</del>	<del>6/24/08 2305</del>	<del>112</del>	<del>1</del>	<del>8</del>	<del>5592</del>
<del>Cal 3</del>	500	<del>6/12/08 0950</del>	<del>6/12/08 1405</del>	<del>6/25/08 1708</del>	<del>109</del>	<del>1</del>	<del>8</del>	<del>8275</del>
<del>Cal 32</del>	500	<del>6/12/08 0950</del>	<del>6/12/08 1420</del>	<del>6/25/08 1740</del>	<del>101</del>	<del>1</del>	<del>8</del>	<del>3362</del>
<del>Cal 41</del>	500	<del>6/12/08 0950</del>	<del>6/12/08 1445</del>	<del>6/25/08 1820</del>	<del>103</del>	<del>1</del>	<del>8</del>	<del>8905</del>
<del>Cal 39</del>	500	<del>6/12/08 0950</del>	<del>6/12/08 1510</del>	<del>6/25/08 1851</del>	<del>105</del>	<del>1</del>	<del>8</del>	<del>9300</del>
<del>Cal 43</del>	500	<del>6/12/08 0950</del>	<del>6/12/08 1525</del>	<del>6/25/08 1930</del>	<del>109</del>	<del>1</del>	<del>8</del>	<del>8121</del>
<del>Cal 47</del>	500	<del>6/12/08 0950</del>	<del>6/12/08 1540</del>	<del>6/25/08 2000</del>	<del>100</del>	<del>1</del>	<del>8</del>	<del>8413</del>

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Ca147	500	6/5/08 1410	6/11/08 0940	6/11/08 1340	103	1	8	8220
Ca13	500	6/5/08 1410	6/11/08 1000	6/11/08 1410	104	1	6	8955
Ca127	500	6/5/08 1410	6/11/08 1015	6/11/08 1440	105	1	4	9424
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						

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8/29/08

Ra-226 Verification Sheet

1197

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 14	500	7/28/08 1055	7/31/08 0855	7/31/08 1535	101	1	8	4938
Cal 144	500	7/28/08 1055	7/31/08 0920	7/31/08 1610	102	1	8	4680
Cal 140	500	7/28/08 1055	7/31/08 0950	7/31/08 1640	103	1	7	4862
Cal 119	500	7/28/08 1055	7/31/08 1015	7/31/08 1720	104	1	8	5964
Cal 130	500	7/28/08 1055	7/31/08 1045	7/31/08 1755	105	1	4	4933
Cal 146	500	7/28/08 1055	7/31/08 1115	7/31/08 1825	106	1	8	4209
Cal 113	500	7/28/08 1055	7/31/08 1140	7/31/08 1905	107	1	7	5721
<del>Cal 113</del>	<del>500</del>	<del>7/28/08 1055</del>	<del>7/31/08 1205</del>	<del>8/1/08 0815</del>	<del>108</del>	<del>1</del>	<del>8</del>	<del>3759</del>
Cal 142	500	7/28/08 1055	7/31/08 1305	8/1/08 0855	109	1	6	3894
<del>Cal 113</del>	<del>500</del>	<del>7/28/08 1055</del>	<del>7/31/08 1330</del>	<del>8/1/08 0930</del>	<del>110</del>	<del>1</del>	<del>6</del>	<del>3185</del>
Cal 143	500	7/28/08 1055	7/31/08 1400	8/1/08 1030	111	1	8	4120
Cal 137	500	7/28/08 1055	7/31/08 1415	8/1/08 1100	112	1	8	4294

100  
8/2/08

Ra-226 Verification Sheet

Run 1

VP  
8/29/08

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
<del>41</del>	500	<del>8/11/08 1330</del>	<del>8/4/08 0615</del>	<del>8/4/08 1550</del>	101	1	8	3638
44	500	8/11/08 1330	8/4/08 0645	8.4.08 1635	102	1	8	4570
30	500	8/11/08 1330	8/4/08 1015	8.4.08 1710	103	1	7	4796
<del>19</del>	500	<del>8/11/08 1330</del>	<del>8/4/08 1035</del>	<del>8.4.08 1745</del>	104	1	6	4733
35	500	8/11/08 1330	8/4/08 1105	8.4.08 1835	105	1	1	4605
<del>46</del>	500	<del>8/11/08 1330</del>	<del>8/4/08 1130</del>	<del>8.4.08 1910</del>	106	1	6	3725
13	500	8/11/08 1330	8/4/08 1200	8.4.08 1940	107	1	8	5105
<del>25</del>	500	<del>8/11/08 1330</del>	<del>8/4/08 1310</del>	<del>8.4.08 2010</del>	108	1	8	4575
42	500	8/11/08 1330	8/4/08 1340	8.4.08 2040	109	1	8	4226
15	500	8/11/08 1330	8/4/08 1405	8.4.08 2110	110	1	8	4103
43	500	8/11/08 1330	8/4/08 1430	8.4.08 2135	111	1	7	4636
37	500	8/11/08 1330	8/4/08 1450	8.4.08 2200	112	1	8	4599

VP 8/29/08

Ra-226 Verification Sheet

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

8/15/08

8/15/08

30

# 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.

RAD.SOP.M-001

W 8/17/08  
 Nancy E. Jackson 4/9/08  
 David Roy 4/10/08



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0299	Isotope:	Radium-226
Prepared By:	Angela Johnson	Prepared By:	Angela Johnson
Carrier Conc:	0.5 M HCL	Prep Date:	09/15/2000
Reference Date:	12/15/1999	Verification Date:	01/23/2008
Ampoule Mass (g):	5.0368 g	Expiration Date:	01/23/2009
Uncertainty:	+/- 2.5 %	Primary Code:	0299-A
LogBook No:	RC S 027 128	Dilution(mL):	100 mL
		Mass of Parent(g):	4.6634 g
		Density(g/mL):	1.0012
		Balance ID:	

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

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

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
08/26/2003	Angela Johnson	1.9909	100	0299-E	2434.34 dpm/mL	11/04/2004	11/04/2005
08/26/2003	Angela Johnson	1.9872	100	0299-F	2429.82 dpm/mL	08/26/2004	08/26/2005
04/05/2005	Amanda Fehr	5.0018	250	0299-G	2446.3471 dpm/mL	04/02/2008	04/02/2009

GEL Laboratories LLC  
Version 1.0 9/18/2000

*140  
8/28/08*

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-KAD-A-008 Isotope Ka-226  
 Date Standards Prepared 4/5/05 Cocktail Type Used N/A  
 Standard ID 0299-6 Matrix of Vial/Planchett N/A  
 Amount Used (g or ml) 0.1 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. (mg)
1	CAL 1				
2	CAL 2				
3	CAL 3				
4	CAL 4				
5	CAL 5				
6	CAL 6				
7	CAL 7				
8	CAL 8				
9	CAL 9				
10	CAL 10				
11	CAL 11				
12	CAL 12				
13	CAL 13				
14	CAL 14				
15	CAL 15				

No. of Standards

Prepared By: Kyle B. Dancer Date: 8/23/05  
 Reviewed By: John G. Adams Date: 8/28/08

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 02991-6 Matrix of Vial/Planchett N/A  
 Amount Used (g or ml) 0.1 N/A  
 Standard Activity (DPM/g or ml) 2446.347 Type of Scintillation Vial N/A  
 Reference Date 12/15/99 Pipette ID Used 1429303  
 Expiration Date 4/12/09 Balance ID Used 36040216  
 Residue/Carrier Agent 0.5M HCl Quenching Agent N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
16	CAL 16				
17	CAL 17				
18	CAL 18				
19	CAL 19				
20	CAL 20				
21	CAL 21				
22	CAL 22				
23	CAL 23				
24	CAL 24				
25	CAL 25				
26	CAL 26				
27	CAL 27				
28	CAL 28				
29	CAL 29				
30	CAL 30				

8/22/08  
 8/22/08

Prepared By: Kelli Powell Date: 8/22/08  
 Reviewed By: John J. Identi Date: 8/22/08

Rev 1 RLM.9/10/97

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-KAD-A-008 Isotope Ka-226  
 Date Standards Prepared 4/15/05 Cocktail Type Used N/A  
 Standard ID 0299-6 Matrix of Vial/Planchet N/A  
 Amount Used (g or ml) 0.1 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. (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				

8/25/08  
 8/25/08

Prepared By: Kelli Brownlee Date: 8/25/08  
 Reviewed By: James G. Jones Date: 8/25/08

## 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>1.0000</del>
47	CAL 47				<del>1.0000</del>
48	CAL 48				<del>1.0000</del>

Prepared By: Vello's Dione Date: 8/1/05  
 Reviewed By: John J. Adams Date: 3/28/08

Rev 1 RLM 9/10/97

0299



Nycomed Amersham plc  
Radiation & Radioactivity  
Calibration Laboratory  
Amersham Laboratories  
White Lion Road  
Amersham  
Buckinghamshire  
HP7 9LL

ISSUED  
FOR:

AEA Technology plc  
Isotrak  
Amersham Laboratories  
White Lion Road  
Amersham  
Buckinghamshire  
HP7 9LL

ion Principal radionuclide: Radium-226

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

ment Reference time: 1200 GMT on 15 December 1999

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

ion of The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$ , which  
inties for a  $t$ -distribution with  $\nu_{\text{eff}} = \infty$  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

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ory

Date of  
issue

373

17<sup>th</sup> December 1999

KAP 8/11/99

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*

Ra-226 Verification Sheet

Via 1

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VEN 1	500	8/21/08 1530	8/21/08 1300	8/21/08 1610	101	1	8	138
VEN 2	500	8/21/08 1530	8/21/08 1330	8/21/08 1765	102	1	8	770
VEN 3	500	8/21/08 1530	8/21/08 1355	8/22/08 1748	103	1	8	716
VEN 4	500	8/21/08 1530	8/21/08 1425	8/22/08 1815	104	1	8	820
VEN 5	500	8/21/08 1530	8/21/08 1445	8/22/08 1900	106	1	8	656
VEN 6	500	8/21/08 1530	8/21/08 1505	8/22/08 1935	107	1	8	800
VEN 7	500	8/21/08 1530	8/21/08 1525	8/22/08 2010	108	1	8	867
VEN 8	500	8/21/08 1530	8/21/08 1540	8/22/08 2040	110	1	8	756
VEN 9	500	8/21/08 1530	8/21/08 1555	8/22/08 2110	111	1	4	827
VEN 10	500	8/21/08 1530	8/21/08 1610	8/22/08 2145	112	1	8	851
VEN 11	500	8/21/08 1530						
VEN 12	500	8/21/08 1530						

VP 8/22/08

# Verification for Ra-226 Standard 0638-F

D Roy  
12/27/2007

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass. Used (mL)	Source DPM/mL
0638-F N1	1239.9000	31.5000	1208.4000	1.0000	261.3311626
0638-F N2	1222.8000	31.5000	1191.3000	1.0000	257.6330801
0638-F N3	1219.4000	31.5000	1187.9000	1.0000	256.8977889
				Average =	258.6206772

Mean Value (Counting) = 258.6206772  
 Stdev = 2.375965421

Certificate Value = 267.1  
 Lower Limit = 253.8687464  
 Upper Limit = 263.3726081  
 Rule 1 Pass/Fail **Fail**  
 Two sigma = 4.751930843  
 10 % of Mean = 25.86206772  
 Rule 2 (Pass/Fail) **Pass**

\*exception taken due to full recovery of standard

## Verification Rules

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 = The determined mean value shall be within 5% of the certificate value.

The analyst prepared three standard verification sources for Ra-226 source 0638-F by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and 10 mL Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC YELLOW using source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 12/27/07 using source 0024-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 (0024-A). Each verification source calculation was performed as follows:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

where:

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

Reference RAD SOP M-001

VAD  
 8/27/08  
 Amanda L. Fehr 1/4/07  
 Amanda L. Fehr 1/4/07



**General Engineering Laboratories  
Verification Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-008

Isotope Ra-226

Date Standards Prepared 12/18/07

Cocktail Type Used N/A

Standard ID 0638-F

Matrix of Vial/Planchett N/A

Amount Used (g or ml) 0.1

N/A  
N/A

Standard Activity (DPM/g or mL) 267.519

Type of Scintillation Vial N/A

Reference Date 1/23/04

Pipette ID Used 1429303

Expiration Date 12/20/08

Balance ID Used 3604046

Residue/Carrier Agent 0.1M HCl

Quenching Agent N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	ver 1				
2	ver 2				
3	ver 3				
4	ver 4				
5	ver 5				
6	ver 6				
7	ver 7				
8	ver 8				
9	ver 9				
10	ver 10				
11	ver 11				
12	ver 12				
13	ver 13				
14	ver 14				
15	ver 15				

Prepared By: Kelli Percele Date 8/29/08

Reviewed By: Man G. Jaur Date 8/29/08

**General Engineering Laboratories  
Verification Source Preparation Sheet**

Applicable SOP Number GL-MWD-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				

Blank 2/28/08

Prepared By: Kelly Daniel Date 8/29/08

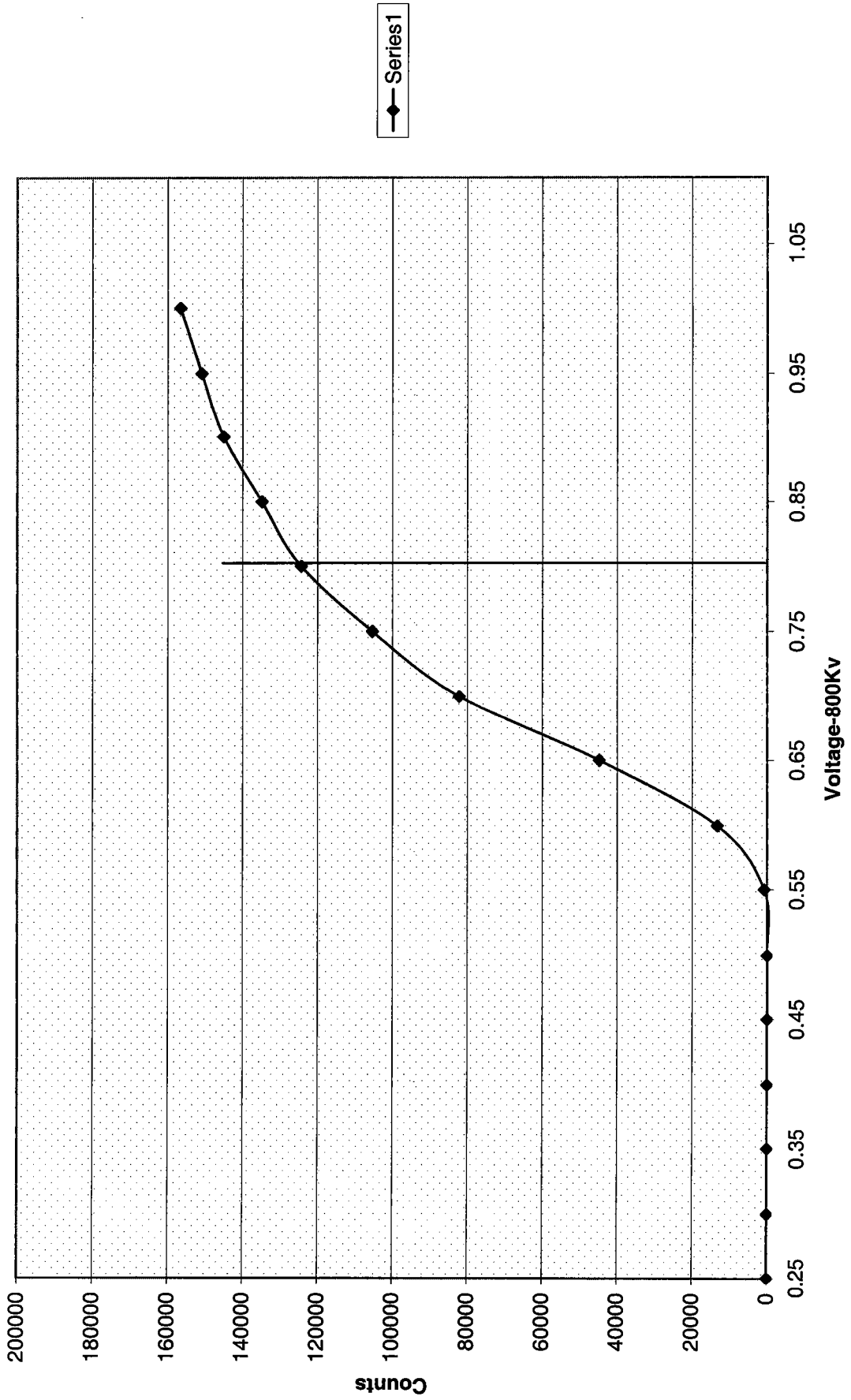
Reviewed By: John J. Adams Date 3/28/08

VOLTAGE CURVE 08

Voltage Curve Ludlum # 1				
Volts	Counts	Date	Time	Detector
0.00	0	8/19/2008	11:00	1
0.05	0	8/19/2008	11:00	1
0.10	0	8/19/2008	11:00	1
0.15	0	8/19/2008	11:00	1
0.20	0	8/19/2008	11:00	1
0.25	0	8/19/2008	11:00	1
0.30	0	8/19/2008	11:00	1
0.35	0	8/19/2008	11:00	1
0.40	0	8/19/2008	11:00	1
0.45	0	8/19/2008	11:00	1
0.50	0	8/19/2008	11:00	1
0.55	813	8/19/2008	11:00	1
0.60	13369	8/19/2008	11:00	1
0.65	44807	8/19/2008	11:00	1
0.70	82131	8/19/2008	11:00	1
0.75	105365	8/19/2008	11:00	1
0.80	124405	8/19/2008	11:00	1
0.85	134938	8/19/2008	11:00	1
0.90	145048	8/19/2008	11:00	1
0.95	150949	8/19/2008	11:00	1
1.00	156594	8/19/2008	11:00	1

*MD  
Shaner*

Ludlum 1 Voltage Curve



10 8/29/08

101	1.751	8/29/2008
102	1.647	8/29/2008
103	1.752	8/29/2008
104	1.973	8/29/2008
105	1.749	8/29/2008
106	1.486	8/29/2008
107	1.773	8/29/2008
108	1.840	8/29/2008
109	1.512	8/29/2008
110	1.544	8/29/2008
111	1.575	8/29/2008
112	1.648	8/29/2008

# General Engineering Laboratories

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

## Lucas Cell Calibration Package

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate?	✓	✓	
the secondary standard(s) documentation?	✓	✓	
standard preparation information?	✓	✓	
standard < 1 Year old or verified?	✓	✓	
2) Is the efficiency calibration report included?	✓	✓	
3) Is the raw count data included for: Cell constant determination?	✓	✓	
Plateau generation?	✓	✓	
4) Are the calibration verifications included?	✓	✓	
5) Are the instrument settings included: HVPS settings?	✓	✓	
6) Has the CELLEFF.xls file been updated?	✓	✓	
7) Have the calibration dates been updated in ALPHALIMS?	✓	✓	

Prepared By: Kelli Donnell

Date: 12/19/08

Reviewed By: Mark G. Adams

Date: 12/19/08

Effective Date: 12/19/08

NU 12/19/08

### Ra-226 Cell Constants

Standard Reference date: 12/15/1999  
 standard ID: 0299-G  
 Volume added (mL): 0.1  
 Standard Reference Activity (DPM/mL): 2446.35

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	bkg cpm	total counts	count time min	cpm	Known activity dpm	11 (days) end-degas to flush	12 (days) end-flush to count	13 (days) Std Ref Date to count	Decay from Std Ref Date to count
201	2.021	Average	9/15/2008 15:45	9/15/2008 9:05	9/12/2008 13:20	0.267	5596	30	186.53	243.02	2.82292	0.27778	3198	0.9962
201	2.043	Stdv	9/18/2008 13:00	9/18/2008 8:10	9/15/2008 9:05	0.267	5949	30	198.30	243.02	2.96181	0.20139	3201	0.9962
201	1.915		9/25/2008 19:35	9/25/2008 9:15	9/22/2008 10:00	0.267	5361	30	178.70	243.02	2.96875	0.49056	3208	0.9962
202	2.436	Average	9/15/2008 16:20	9/15/2008 9:35	9/12/2008 13:20	0.267	6779	30	225.97	243.02	2.84375	0.28125	3198	0.9962
202	2.209	Stdv	9/18/2008 13:50	9/18/2008 8:45	9/15/2008 9:35	0.267	6425	30	214.17	243.02	2.96528	0.21181	3201	0.9962
202	2.137		10/21/2008 13:50	10/20/2008 13:45	10/13/2008 16:00	0.267	9248	30	308.27	243.02	6.90625	1.00347	3234	0.9962
203	2.255	Average	9/15/2008 16:50	9/15/2008 10:00	9/12/2008 13:20	0.267	6300	30	210.00	243.02	2.86111	0.28472	3198	0.9962
203	2.273	Stdv	9/18/2008 14:25	9/18/2008 9:15	9/15/2008 10:00	0.267	6613	30	220.43	243.02	2.96875	0.21528	3201	0.9962
203	2.234		9/25/2008 21:00	9/25/2008 10:15	9/22/2008 10:00	0.267	6298	30	209.93	243.02	3.01042	0.44782	3208	0.9962
204	2.184	Average	9/15/2008 17:25	9/15/2008 10:30	9/12/2008 13:20	0.267	6132	30	204.40	243.02	2.88194	0.28819	3198	0.9962
204	2.300	Stdv	9/18/2008 14:55	9/18/2008 9:35	9/15/2008 10:30	0.267	6671	30	222.37	243.02	2.96181	0.22222	3201	0.9962
204	2.096		9/30/2008 14:05	9/30/2008 9:10	9/28/2008 9:45	0.133	7535	30	251.17	243.02	3.97569	0.20486	3213	0.9962
205	1.677	Average	10/21/2008 8:30	10/20/2008 14:05	10/13/2008 16:00	0.267	7584	30	252.80	243.02	6.32014	0.76736	3233	0.9962
205	1.730	Stdv	9/18/2008 16:00	9/18/2008 10:05	9/15/2008 10:55	0.167	4989	30	166.63	243.02	2.96528	0.24653	3201	0.9962
205	1.990		9/30/2008 14:45	9/30/2008 9:40	9/28/2008 9:45	0.187	7170	30	239.00	243.02	3.89653	0.21181	3213	0.9962
206	2.240	Average	9/15/2008 21:10	9/15/2008 11:25	9/12/2008 13:20	0.233	6216	30	207.20	243.02	2.32014	0.40825	3198	0.9962
206	2.293	Stdv	9/18/2008 16:35	9/18/2008 10:25	9/15/2008 11:25	0.267	6604	30	220.13	243.02	2.95833	0.25694	3201	0.9962
206	2.245		9/30/2008 15:20	9/30/2008 10:15	9/28/2008 9:45	0.267	8125	30	270.83	243.02	4.02083	0.21181	3213	0.9962
207	2.187	Average	9/15/2008 21:40	9/15/2008 11:50	9/12/2008 13:20	0.267	6084	30	203.13	243.02	2.33750	0.40972	3198	0.9962
207	2.141	Stdv	9/18/2008 17:55	9/18/2008 10:40	9/15/2008 11:50	0.267	6105	30	203.50	243.02	2.95139	0.30208	3201	0.9962
207	2.110		9/30/2008 16:00	9/30/2008 10:45	9/28/2008 9:45	0.233	7856	30	255.20	243.02	4.04167	0.21875	3213	0.9962
208	2.239	Average	9/15/2008 22:15	9/15/2008 12:15	9/12/2008 13:20	0.267	6288	30	208.60	243.02	2.85486	0.41667	3198	0.9962
208	2.243	Stdv	9/18/2008 19:30	9/18/2008 11:00	9/15/2008 12:15	0.133	6374	30	212.47	243.02	2.94786	0.41290	3201	0.9962
208	2.148		9/30/2008 16:55	9/30/2008 11:10	9/28/2008 9:45	0.695	7691	30	236.03	243.02	4.96989	0.89569	3213	0.9962
209	2.471	Average	9/15/2008 22:45	9/15/2008 13:50	9/12/2008 13:20	0.033	7073	30	235.77	243.02	3.02083	0.37153	3198	0.9962
209	2.212	Stdv	9/18/2008 19:15	9/18/2008 11:15	9/15/2008 13:50	0.067	6170	30	205.67	243.02	2.89236	0.33333	3201	0.9962
209	2.420		9/30/2008 17:25	9/30/2008 11:40	9/28/2008 9:45	0.100	8795	30	293.17	243.02	4.07986	0.23958	3213	0.9962
210	2.320	Average	9/15/2008 23:15	9/15/2008 14:15	9/12/2008 13:20	0.033	6665	30	222.17	243.02	3.03819	0.37500	3198	0.9962
210	2.210	Stdv	9/18/2008 19:45	9/18/2008 11:30	9/15/2008 14:15	0.100	6142	30	204.73	243.02	2.88542	0.34375	3201	0.9962
210	2.230		9/30/2008 18:00	9/30/2008 12:05	9/28/2008 9:45	0.033	8116	30	270.53	243.02	4.09722	0.24653	3213	0.9962
211	2.140	Average	9/15/2008 23:50	9/15/2008 14:30	9/12/2008 13:20	0.033	6150	30	205.00	243.02	3.04661	0.36889	3198	0.9962
211	2.238	Stdv	9/18/2008 22:20	9/18/2008 12:35	9/15/2008 14:30	0.133	6207	30	206.90	243.02	2.92014	0.40625	3201	0.9962
211	2.136		9/30/2008 18:30	9/30/2008 13:35	9/28/2008 9:45	0.100	7917	30	263.90	243.02	4.15972	0.20486	3213	0.9962
212	2.405	Average	9/16/2008 0:20	9/15/2008 14:50	9/12/2008 13:20	0.033	6926	30	230.87	243.02	3.06250	0.39563	3198	0.9962
212	2.315	Stdv	9/18/2008 22:55	9/18/2008 12:50	9/15/2008 14:50	0.267	6405	30	213.50	243.02	2.91667	0.42014	3201	0.9962
212	2.244		9/30/2008 19:50	9/30/2008 14:00	9/28/2008 9:45	0.267	8287	30	276.23	243.02	4.17708	0.24306	3213	0.9962

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Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Ca114	500	9/25/08 1000	9/25/08 0915	9/25/08 1935	201	2	0	5361
<del>Ca113</del>	<del>500</del>	<del>9/25/08 1000</del>	<del>9/25/08 0915</del>	<del>9/25/08 2100</del>	<del>202</del>	<del>2</del>	<del>0</del>	<del>5845</del>
Ca143	500	9/22/08 1000	9/25/08 1015	9/25/08 2100	203	2	0	6298
Ca115	500	9/22/08 1000						
Ca144	500	9/22/08 1000						
Ca146	500	9/22/08 1000						
Ca136	500	9/22/08 1000						
Ca130	500	9/22/08 1000						
Ca119	500	9/22/08 1000						
Ca147	500	9/22/08 1000						
Ca137	500	9/22/08 1000						
Ca142	500	9/22/08 1000						

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12/11/08  
12/11/08

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Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 14	500	9/12/08 1320	9/15/08 1405	9/15/08 1545	201	2	8	5596
Cal 13	500	9/12/08 1320	9/15/08 0935	9/15/08 1620	202	2	8	6779
Cal 43	500	9/12/08 1320	9/15/08 1000	9/15/08 1650	203	2	8	6300
Cal 15	500	9/12/08 1320	9/15/08 1030	9/15/08 1725	204	2	8	6132
<del>Cal 44</del>	<del>500</del>	<del>9/12/08 1320</del>	<del>9/15/08 1055</del>	<del>9/15/08 1805</del>	<del>205</del>	<del>2</del>	<del>5</del>	<del>6132</del>
Cal 46	500	9/12/08 1320	9/15/08 1115	9/15/08 2110	206	2	7	6216
Cal 36	500	9/12/08 1320	9/15/08 1150	9/15/08 2140	207	2	8	6094
<del>Cal 38</del>	<del>500</del>	<del>9/12/08 1320</del>	<del>9/15/08 1215</del>	<del>9/15/08 2215</del>	<del>208</del>	<del>2</del>	<del>8</del>	<del>6258</del>
Cal 19	500	9/12/08 1320	9/15/08 1350	9/15/08 2245	209	2	1	7073
Cal 47	500	9/12/08 1320	9/15/08 1415	9/15/08 2315	210	2	1	6665
Cal 37	500	9/12/08 1320	9/15/08 1430	9/15/08 2350	211	2	1	6150
Cal 42	500	9/12/08 1320	9/15/08 1450	9/16/08 0020	212	2	1	6426

140  
12/18/08

140  
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140  
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Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
15	500	9/22/08 0945	9/30/08 0910	9/30/08 1405	204	2	4	7535
44	500	9/22/08 0945	9/30/08 0940	9/30/08 1445	205	2	5	7170
46	500	9/22/08 0945	9/30/08 1015	9/30/08 1520	206	2	8	8125
36	500	9/22/08 0945	9/30/08 1045	9/30/08 1410	207	2	7	7456
30	500	9/22/08 0945	9/30/08 1110	9/30/08 1635	208	2	1	7681
19	500	9/22/08 0945	9/30/08 1140	9-30-08 1725	209	2	3	8795
47	500	9/22/08 0945	9/30/08 1205	9-30-08 1800	210	2	1	8116
37	500	9/22/08 0945	9/30/08 1335	9-30-08 1830	211	2	3	7917
42	500	9/22/08 0945	9/30/08 1400	9-30-08 1950	212	2	8	8287

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Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 14	500	9/15/08 0945	9/18/08 0810	9/18/08 1300	201	2	8	59449
Cal 13	500	9/15/08 0935	9/18/08 0845	9/18/08 1350	202	2	8	6425
Cal 43	500	9/15/08 1000	9/18/08 0915	9/18/08 1425	203	2	8	6613
Cal 15	500	9/15/08 1030	9/18/08 0935	9/18/08 1455	204	2	8	6671
Cal 44	500	9/15/08 1055	9/18/08 1005	9/18/08 1600	205	2	5	4999
Cal 46	500	9/15/08 1125	9/18/08 1025	9/18/08 1635	206	2	8	6604
Cal 36	500	9/15/08 1150	9/18/08 1040	9/18/08 1755	207	2	8	6105
<del>Cal 30</del>	<del>500</del>	<del>9/15/08 1215</del>	<del>9/18/08 1100</del>	<del>9/18/08 1830</del>	<del>208</del>	<del>2</del>	<del>4</del>	<del>6374</del>
Cal 19	500	9/15/08 1350	9/18/08 1115	9/18/08 1915	209	2	2	6170
Cal 47	500	9/15/08 1415	9/18/08 1130	9/18/08 1945	210	2	3	6142
Cal 37	500	9/15/08 1430	9/18/08 1235	9/18/08 2230	211	2	4	6207
Cal 42	500	9/15/08 1450	9/18/08 1250	9/18/08 2255	212	2	8	6405

100  
12/19/08

100  
12/19/08  
12/19/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 14	500	10/13/08 1600	10/20/08 1345	10-21-08 1350 <del>10/20/08</del> <del>1350</del>	202	2	8	9748
13	500	10/13/08 1600	10/20/08 1405	10/21/08 1430	205	2	8	7584
43								
44								
15								
36								
46								
30								
19								
47								
37								
42								

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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

*Mut 12/19/08*  
*W 17/19/08*  
*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				

*See table*

Prepared By: <u>Kelli S. Deroso</u>	Date: <u>12/19/08</u>
Reviewed By: <u>M. G. Johnson</u>	Date: <u>12/19/08</u>

Rev 1 RLM 9/10/97

0299

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

Reference time for solution number R4/131/89:	1200 GMT on 15 December 1999
Radioactive concentration of radium-226:	43.75 kilobecquerels per gram of solution
which is equivalent to:	1.183 microcuries per gram of solution
Mass of solution:	5.0368 grams
Total activity of radium-226:	220.4 kilobecquerels
which is equivalent to:	5.956 microcuries
Recommended half life:	1600 years
Method of measurement:	
The activity of the solution was measured using a high pressure re-entrant ionisation chamber calibrated with a large number of absolutely standardised solutions.	

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

Expanded uncertainty in the radioactive concentration quoted above:  $\pm 2.5\%$   
 Combined Type A uncertainty:  $\pm 0.2\%$   
 Combined Type B uncertainty:  $\pm 1.3\%$

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*

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
<del>VCV 1</del>	<del>500</del>	<del>1110108 1535</del>	<del>1111108 1020</del>	<del>1117108 1510</del>	<del>201</del>	<del>2</del>	<del>8</del>	<del>1014</del>
<del>2</del>	<del>500</del>	<del>11110108 1535</del>	<del>1111108 1045</del>	<del>1117108 1545</del>	<del>202</del>	<del>2</del>	<del>8</del>	<del>1054</del>
<del>3</del>	<del>500</del>	<del>11110108 1535</del>	<del>1111108 1110</del>	<del>1117108 1020</del>	<del>205</del>	<del>2</del>	<del>8</del>	<del>937</del>
<del>4</del>	<del>500</del>	<del>11110108 1535</del>	<del>1117108 1145</del>	<del>111708 2050</del>	<del>208</del>	<del>2</del>	<del>8</del>	<del>786</del>
<del>5</del>	<del>500</del>	<del>11110108 1535</del>	<del>1117108 1150</del>	<del>1117.00 2120</del>	<del>209</del>	<del>2</del>	<del>8</del>	<del>1200</del>
<del>6</del>	<del>500</del>	<del>11110108 1535</del>	<del>1117108 1200</del>	<del>1117.08 2155</del>	<del>211</del>	<del>2</del>	<del>8</del>	<del>1067</del>
<del>7</del>	<del>500</del>	<del>11110108 1535</del>	<del>1117108 1845</del>	<del>1117108 1330</del>	<del>701</del>	<del>1</del>	<del>8</del>	<del>982</del>
<del>8</del>	<del>500</del>	<del>11110108 1535</del>	<del>1117108 0900</del>	<del>1117108 1405</del>	<del>708</del>	<del>7</del>	<del>8</del>	<del>1194</del>
<del>9</del>	<del>500</del>	<del>11110108 1535</del>	<del>1117108 0900</del>	<del>1117108 1435</del>	<del>705</del>	<del>7</del>	<del>8</del>	<del>1121</del>
10								
11								
12								
<del>VCV 3</del>	<del>500</del>	<del>1117108 1110</del>	<del>1117108 1145</del>	<del>1117108 1140</del>	<del>208</del>	<del>2</del>	<del>8</del>	<del>533</del>

12/18/08

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12/19/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
<del>VEN 1</del>	<del>500</del>	<del>10/27/08 1420</del>	<del>10/30/08 1045</del>	<del>10/30/08 1500</del>	<del>201</del>	<del>2</del>	<del>4</del>	<del>152</del>
<del>VEN 2</del>	<del>500</del>	<del>10/27/08 1420</del>	<del>10/30/08 1005</del>	<del>10/30/08 1535</del>	<del>202</del>	<del>2</del>	<del>4</del>	<del>189</del>
VEN 3	500	10/27/08 1420	10/30/08 1105	10/30/08 1605	203	2	8	726
VEN 4	500	10/27/08 1420	10/30/08 1230	10/30/08 1820	204	2	8	737
<del>VEN 5</del>	<del>500</del>	<del>10/27/08 1420</del>	<del>10/30/08 1050</del>	<del>10/30/08 1900</del>	<del>205</del>	<del>2</del>	<del>6</del>	<del>663</del>
VEN 6	500	10/27/08 1420	10/30/08 1310	10/30/08 2020	206	2	8	780
VEN 7	500	10/27/08 1420	10/30/08 1425	10/30/08 2200	207	2	8	711
<del>VEN 8</del>	<del>500</del>	<del>10/27/08 1420</del>	<del>10/30/08 1345</del>	<del>10/30/08 2300</del>	<del>208</del>	<del>2</del>	<del>4</del>	<del>497</del>
VEN 9	500	10/27/08 1420	10/30/08 1405	10/30/08 2340	209	2	4	630
VEN 10	500	10/27/08 1420	10/30/08 1425	10/31/08 0115	210	2	1	691
<del>VEN 11</del>	<del>500</del>	<del>10/27/08 1420</del>	<del>10/30/08 1440</del>	<del>10/31/08 0835</del>	<del>211</del>	<del>2</del>	<del>3</del>	<del>423</del>
VEN 12	500	10/27/08 1420	10/30/08 1455	10/31/08 0915	212	2	4	648

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100

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100

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100

# 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 = 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

96.8384646 Pass  
0.00918707 Rule 3 (Pass/Fail)

## 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

1/4/07  
Amanda L. Fehe 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 0635-F Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or mL) 147.519 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				

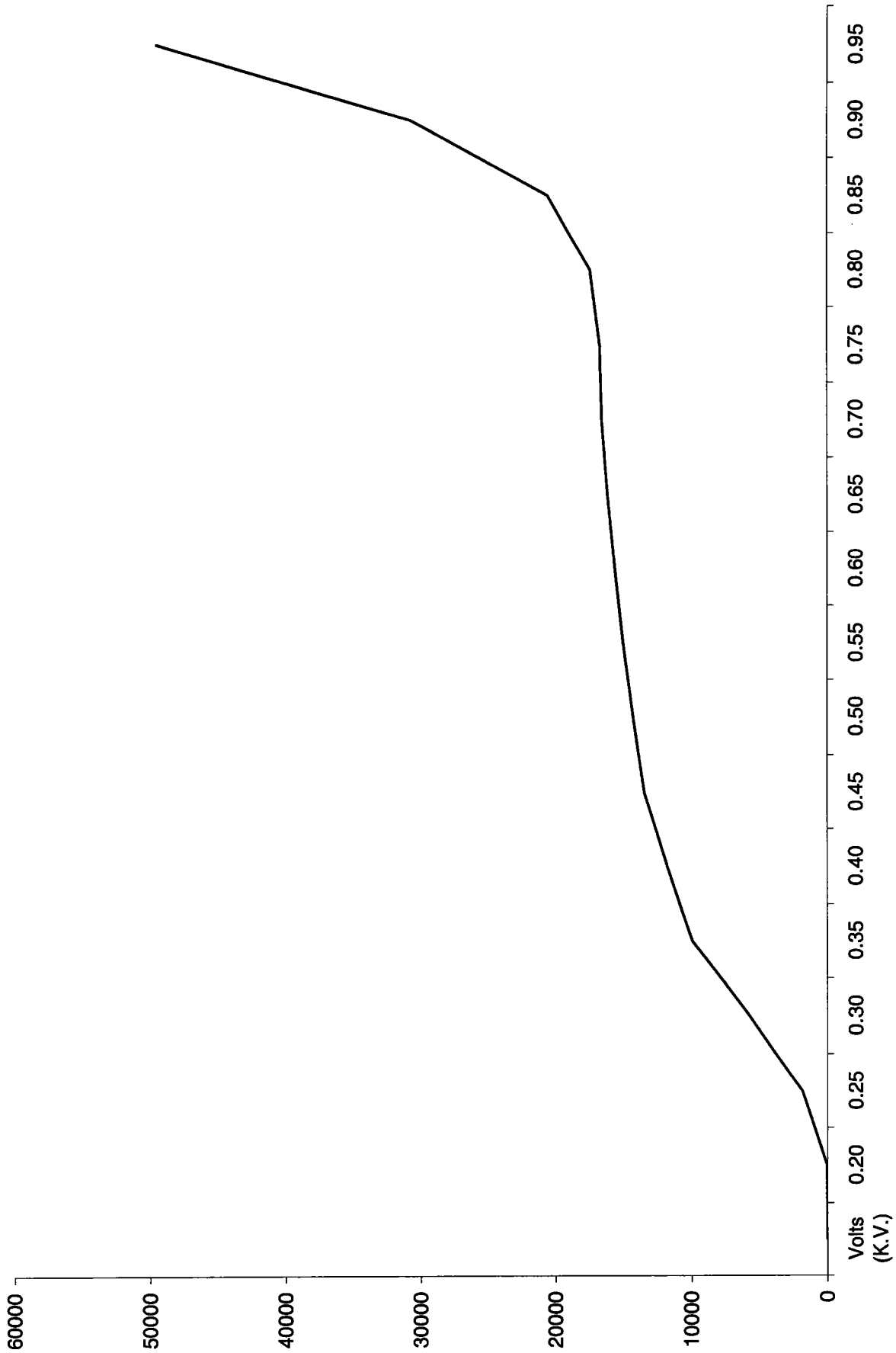
12/19/08

Prepared By: Kelli Dieriel Date: 12/19/08  
 Reviewed By: Mary Jo Adams Date: 12/19/08

VoltageCurve det2

Voltage Curve Ludlum # 2				
Volts (K.V.)	Counts	Date	Time	Detector
0.20	0	9/19/2008	10:00	2
0.25	0	9/19/2008	10:00	2
0.30	0	9/19/2008	10:00	2
0.35	0	9/19/2008	10:00	2
0.40	0	9/19/2008	10:00	2
0.45	36	9/19/2008	10:00	2
0.50	1860	9/19/2008	10:00	2
0.55	5751	9/19/2008	10:00	2
0.60	9916	9/19/2008	10:00	2
0.65	11761	9/19/2008	10:00	2
0.70	13431	9/19/2008	10:00	2
0.75	14254	9/19/2008	10:00	2
0.80	14984	9/19/2008	10:00	2
0.85	15598	9/19/2008	10:00	2
0.90	16129	9/19/2008	10:00	2
0.95	16562	9/19/2008	10:00	2
1.00	16711	9/19/2008	10:00	2
1.05	17428	9/19/2008	10:00	2
1.10	20558	9/19/2008	10:00	2
1.15	30722	9/19/2008	10:00	2
1.20	49527	9/19/2008	10:00	2
1.25	71509	9/19/2008	10:00	2
1.30	115018	9/19/2008	10:00	2

*WJ* 12/19/08  
12/19/08



mut 12/19/08  
VW 12/19/08



201	1.993	12/19/2008
202	2.261	12/19/2008
203	2.254	12/19/2008
204	2.193	12/19/2008
205	1.799	12/19/2008
206	2.259	12/19/2008
207	2.146	12/19/2008
209	2.291	12/19/2008
210	2.253	12/19/2008
211	2.171	12/19/2008
212	2.322	12/19/2008

*Next  
12/19/08*

# General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414

(843)556-8171

## Lucas Cell Calibration Package

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the secondary standard(s) documentation? standard preparation information? standard < 1 Year old or verified?	✓		
	✓		
	✓		
	✓		
2) Is the efficiency calibration report included ?	✓		
3) Is the raw count data included for: Cell constant determination? Plateau generation?	✓		
	✓		
4) Are the calibration verifications included?	✓		
5) Are the instrument settings included: HVPS settings?	✓		
6) Has the CELLEFF.xls file been updated ?	✓		
7) Have the calibration dates been updated in ALPHALIMS ?	✓		

Prepared By: Kellipanel

Date: 2/3/09

Reviewed By: M. G. Hens

Date: 2/4/09

Effective Date: 2/4/09

# Ra-226 Cell Constants

Standard Reference date: 12/15/1999  
standard ID: 0299-G  
Volume added (mL): 0.1  
Standard Reference Activity (DPM/mL): 2446.35

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	bkg cpm	total counts	count time min	cpm	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count
301	1.867	Average	1/20/2009 11:05	1/19/2009 10:10	1/19/2009 15:45	0.267	9355	30	311.83	243.67	9.76736	1.03819	3324	0.9961
301	2.184	Stdev	1/29/2009 11:50	1/29/2009 8:50	1/28/2009 13:00	0.267	6239	30	207.97	243.67	2.82639	0.12500	3333	0.9961
301	2.011		1/26/2009 14:35	1/26/2009 9:25	1/22/2009 9:10	0.267	7282	30	242.73	243.67	4.01042	0.21528	3331	0.9961
302	2.082	Average	1/30/2009 11:30	1/30/2009 8:30	1/28/2009 13:00	0.267	7401	30	246.70	243.67	3.81250	0.12500	3334	0.9961
302	2.225	Stdev	1/29/2009 13:30	1/29/2009 9:20	1/28/2009 13:00	0.233	6335	30	211.17	243.67	2.84722	0.17361	3334	0.9961
302	2.086		1/26/2009 15:30	1/26/2009 9:55	1/22/2009 9:10	0.267	7555	30	251.83	243.67	4.03125	0.23264	3331	0.9961
303	1.958	Average	1/20/2009 13:40	1/19/2009 11:00	1/19/2009 15:45	0.267	9695	30	323.17	243.67	9.80208	1.11111	3325	0.9961
303	2.218	Stdev	1/22/2009 20:35	1/22/2009 10:05	1/19/2009 15:00	0.267	5938	30	197.93	243.67	2.79514	0.43750	3327	0.9961
303	2.231		1/26/2009 17:20	1/26/2009 10:25	1/22/2009 9:10	0.267	8028	30	267.60	243.67	4.05208	0.28819	3331	0.9961

305	1.897	Average	1/20/2009 14:50	1/19/2009 11:35	1/19/2009 15:45	0.200	9357	30	311.90	243.67	9.82639	1.13542	3325	0.9961
305	2.191	Stdev	1/22/2009 21:50	1/22/2009 11:05	1/19/2009 15:00	0.267	5921	30	197.37	243.67	2.83681	0.44792	3327	0.9961
305	2.083		1/26/2009 23:00	1/26/2009 11:20	1/22/2009 9:10	0.267	7280	30	242.67	243.67	4.09028	0.48611	3331	0.9961
306	1.730	Average	1/20/2009 15:20	1/19/2009 11:50	1/19/2009 15:45	0.167	8521	30	284.03	243.67	9.83681	1.14593	3325	0.9961
306	1.891	Stdev	1/29/2009 14:30	1/29/2009 10:20	1/28/2009 13:00	0.233	4869	30	162.30	243.67	2.88889	0.17361	3334	0.9961
306	1.821		1/26/2009 23:30	1/26/2009 11:50	1/22/2009 9:10	0.267	6387	30	212.90	243.67	4.11111	0.48611	3331	0.9961
307	1.818	Average	1/20/2009 15:50	1/19/2009 12:05	1/19/2009 15:45	0.267	8944	30	298.13	243.67	9.84722	1.15625	3325	0.9961
307	2.095	Stdev	1/30/2009 12:55	1/30/2009 9:10	1/28/2009 13:00	0.267	7442	30	248.07	243.67	3.84028	0.15625	3335	0.9961
307	1.881		1/27/2009 0:05	1/26/2009 12:10	1/22/2009 9:10	0.267	6598	30	219.93	243.67	4.12500	0.49653	3331	0.9961
308	2.129	Average	1/29/2009 15:50	1/29/2009 11:05	1/28/2009 13:00	0.133	6149	30	204.97	243.67	2.92014	0.19792	3334	0.9961
308	1.858	Stdev	1/23/2009 9:35	1/22/2009 13:45	1/19/2009 15:00	0.267	4829	30	160.97	243.67	2.94792	0.82639	3327	0.9961
308	1.862		1/27/2009 8:30	1/26/2009 13:15	1/22/2009 9:10	0.267	6226	30	207.53	243.67	4.17014	0.80208	3331	0.9961
309	1.857	Average	1/20/2009 17:20	1/19/2009 13:35	1/19/2009 15:45	0.033	9149	30	304.97	243.67	9.90972	1.15625	3325	0.9961
309	1.964	Stdev	1/23/2009 10:30	1/22/2009 14:05	1/19/2009 15:00	0.267	5100	30	170.00	243.67	2.96181	0.85069	3327	0.9961
309	1.810		1/27/2009 9:05	1/26/2009 13:30	1/22/2009 9:10	0.267	6046	30	201.53	243.67	4.18056	0.81597	3331	0.9961

311	2.140	Average	1/29/2009 16:40	1/29/2009 11:20	1/28/2009 13:00	0.267	6176	30	205.87	243.67	2.93056	0.22222	3334	0.9961
311	2.212	Stdev	1/23/2009 12:20	1/22/2009 14:25	1/19/2009 15:00	0.267	5698	30	189.93	243.67	2.97569	0.91319	3328	0.9961
311	1.988		1/27/2009 10:15	1/26/2009 13:45	1/22/2009 9:10	0.267	6607	30	220.23	243.67	4.19097	0.85417	3331	0.9961
312	1.871	Average	1/20/2009 19:16	1/19/2009 14:10	1/19/2009 15:45	0.100	9135	30	304.50	243.67	9.93403	1.21250	3325	0.9961
312	2.014	Stdev	1/29/2009 17:10	1/29/2009 11:35	1/28/2009 13:00	0.167	5814	30	193.80	243.67	2.94097	0.23264	3334	0.9961
312	1.946		1/27/2009 11:10	1/26/2009 14:00	1/22/2009 9:10	0.267	6446	30	214.87	243.67	4.20139	0.88194	3331	0.9961

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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	1126109 1300	1126109 0820	1126109 1130	302	3	8	7401
Cal 28	500	1126105 1300	1126109 0855	1126109 1200	304	3	8	7101
Cal 34	500	1126105 1300	1126109 0910	1126109 1255	307	3	8	7442
<del>Cal 35</del>								
<del>Cal 36</del>								
<del>Cal 37</del>								
<del>Cal 38</del>								
<del>Cal 39</del>								
<del>Cal 40</del>								
<del>Cal 41</del>								
<del>Cal 42</del>								
<del>Cal 43</del>								
<del>Cal 44</del>								
<del>Cal 45</del>								
<del>Cal 46</del>								
<del>Cal 47</del>								
<del>Cal 48</del>								
<del>Cal 49</del>								
<del>Cal 50</del>								

Cal 213109

Cal 213109

Cal 214109  
Cal 213109

Cal 35

#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 44	500	11/26/09 1300	11/26/09 1105	11/26/09 1550	308	3	4	6149
Cal 15	500	11/26/09 1300	11/26/09 1120	1/29/09 1640	311	3	8	6176
Cal 14	500	11/26/09 1300	11/26/09 1135	1/29/09 1710	312	3	5	5814
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  
2/13/09  
140 2/13/09

KD  
2/13/09  
MVA  
2/11/09

W 2/13/09

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Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 43	500	11/9/09 1545	11/9/09 1010	11/20/09 1105	301	3	8	9355
<del>Cal 44</del>	<del>500</del>	<del>11/9/09 1545</del>	<del>11/9/09 1040</del>	<del>11/20/09 1150</del>	<del>302</del>	<del>3</del>	<del>8</del>	<del>8433</del>
Cal 49	500	11/9/09 1545	11/9/09 1100	11/20/09 1340	303	3	8	9095
<del>Cal 50</del>	<del>500</del>	<del>11/9/09 1545</del>	<del>11/9/09 1100</del>	<del>11/20/09 1440</del>	<del>304</del>	<del>3</del>	<del>8</del>	<del>10650</del>
Cal 42	500	11/9/09 1545	11/9/09 1135	11/20/09 1450	305	3	5	9957
Cal 44	500	11/9/09 1545	11/9/09 1150	11/20/09 1520 <del>1440</del>	306	3	7	8521
Cal 15	500	11/9/09 1545	11/9/09 1205	11/20/09 1550 <del>1440</del>	307	3	8	8944
<del>Cal 14</del>	<del>500</del>	<del>11/9/09 1545</del>	<del>11/9/09 1315</del>	<del>11/20/09 1645</del>	<del>308</del>	<del>3</del>	<del>3</del>	<del>6938</del>
Cal 13	500	11/9/09 1545	11/9/09 1325	11/20/09 1720	309	3	1	9149
<del>Cal 28</del>	<del>500</del>	<del>11/9/09 1545</del>	<del>11/9/09 1355</del>	<del>11/20/09 1840</del>	<del>311</del>	<del>3</del>	<del>8</del>	<del>8648</del>
Cal 36	500	11/9/09 1545	11/9/09 1410	11/20/09 1916	312	3	1	9135
<del>Cal 37</del>	<del>500</del>	<del>11/9/09 1545</del>						

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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>	500	<del>11/11/09 1500</del>	<del>11/22/09 0410</del>	<del>11/22/09 1525</del>	<del>301</del>	<del>3</del>	<del>8</del>	<del>6110</del>
<del>Cal 44</del>	500	<del>11/11/09 1500</del>	<del>11/22/09 0435</del>	<del>11/22/09 1605</del>	<del>302</del>	<del>3</del>	<del>8</del>	<del>6498</del>
Cal 119	500	11/11/09 1500	11/22/09 1005	11/22/09 2035	303	3	8	5938
Cal 130	500	11/11/09 1500	11/22/09 1035	11/22/09 2120	304	3	8	5240
Cal 142	500	11/11/09 1500	11/22/09 1105	11/22/09 2150	305	3	8	5921
<del>Cal 144</del>	500	<del>11/11/09 1500</del>	<del>11/22/09 1135</del>	<del>11/22/09 1840</del>	<del>306</del>	<del>3</del>	<del>8</del>	<del>5393</del>
<del>Cal 15</del>	500	<del>11/11/09 1500</del>	<del>11/22/09 1320</del>	<del>11/23/09 0950</del>	<del>307</del>	<del>3</del>	<del>8</del>	<del>5870</del>
Cal 114	500	11/11/09 1500	11/22/09 1345	11/23/09 0935	308	3	8	4824
Cal 13	500	11/11/09 1500	11/22/09 1405	11/23/09 1000	309	3	8	5100
Cal 20	500	11/11/09 1500	11/22/09 1425	11/23/09 1220	311	3	8	5698
<del>Cal 36</del>	500	<del>11/11/09 1500</del>	<del>11/22/09 1440</del>	<del>11/23/09 1345</del>	<del>312</del>	<del>3</del>	<del>8</del>	<del>5881</del>
<del>Cal 27</del>	500	11/11/09 1500	11/22/09					

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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 1710	303	3	8	8028
<del>Ca130</del>	<del>500</del>	<del>1122109 0910</del>	<del>1126109 1050</del>	<del>1126109 1645</del>	<del>304</del>	<del>3</del>		<del>5162</del>
Ca142	500	1122109 0910	1126109 1100	1126109 2300	305	3	8	7280
Ca141	500	1122109 0910	1126109 1150	1126109 2330	306	3	8	6387
Ca115	500	1122109 0910	1126109 1210	1127109 0005	307	3	8	6598
Ca114	500	1122109 0910	1126109 1315	1127109 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>								

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# 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

104.944421 Pass  
 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:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

where:

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

IRAD-SOP-M-001

*Handwritten notes:*  
 5/10/08  
 M. M. M. M.  
 1.5 ml water



# 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

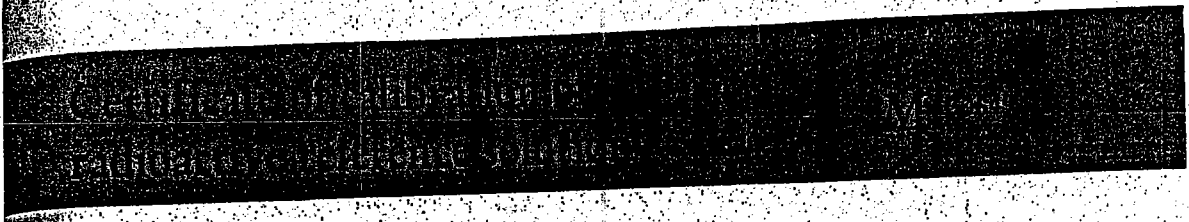
Applicable SOP Number GL RAD-A 008 Isotope RA 221  
 Date Standards Prepared 4/5/09 Cocktail Type Used NA  
 Standard ID 02896 Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or mL) 2446.347 Type of Scintillation Vial NA  
 Reference Date 12/15/99 Pipette ID Used 1429303  
 Expiration Date 4/2/09 Balance ID Used 30040216  
 Residue/Carrier Agent 0.5 M HCl Quenching Agent NA

	Standard Number	Quenching Vol (uL) Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
43	Cal 43				
47	Cal 47				
19	Cal 19				
30	Cal 30				
42	Cal 42				
44	Cal 44				
15	Cal 15				
14	Cal 14				
13	Cal 13				
28	Cal 28				
36	Cal 36				

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

Chemical form: Carrier free in 0.5M HCL

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

1 year = 365.25 days

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

KB 21/3/09  
WMA 21/11/09

# Ra-226 WATER

Batch : LCSVER  
 Date : 1/2/2009  
 Analyst : KSD1

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

Instrument Used : LUCAS CELL DETECTOR

Bkg Count Time: 30 min

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME
1	0.500	30	656	301	2.021	0.267	0.4919	20.0589	1.5634	1/30/2009 15:05
1	0.500	30	655	302	2.131	0.267	0.5554	22.6149	1.7640	2/2/2009 13:40
2	0.500	30	914	303	2.136	0.267	0.4647	26.4838	1.7397	1/30/2009 15:40
3	0.500	30	791	305	2.057	0.267	0.4845	23.8718	1.6891	1/30/2009 17:05
4	0.500	30	768	306	1.747	0.267	0.5709	27.2885	1.9605	1/30/2009 17:37
2	0.500	30	720	307	1.931	0.267	0.6113	27.3779	2.0335	2/2/2009 14:15
5	0.500	30	730	308	1.950	0.267	0.5149	23.3957	1.7254	1/30/2009 19:05
6	0.500	30	764	309	1.877	0.267	0.5908	28.0944	2.0238	1/31/2009 10:20
7	0.500	30	594	311	2.114	0.267	0.5510	20.3087	1.6667	1/31/2009 17:20
8	0.500	30	542	312	1.944	0.267	0.8009	26.8983	2.3154	2/2/2009 8:25

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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

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 LEWA 2141.04

Ra-226 Verification Sheet

#3

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VER 1	500	1126109 1605	1126109 1040	1126109 1505	301	3	8	656
VER 2	500	1126109 1605	1126109 1105	1126109 1540	303	3	8	914
VER 3	500	1126109 1605	1126109 1130	1130109 1705	305	3	8	791
VER 4	500	1126109 1605	1126109 1145	<del>1130109 1737</del> 1.31.09 1020	306	3	8	768
VER 5	500	1126109 1605	1126109 1200	<del>1130109 1905</del> 1.31.09 1020	308	3	8	730
VER 6	500	1126109 1605	1126109 1305	1.31.09 1020	309	3	8	764
VER 7	500	1126109 1605	1126109 1320	13109 1720	311	3	8	594
VER 8	500	1126109 1605	1126109 1340	1126109 0845	312	3	8	542
<del>VER 9</del>	500	1126109 1605						
VER 10	500	1126109 1605						
VER 11	500	1126109 1605						
VER 12	500	1126109 1605						

VER 2/3/09

1126109

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 1000	12/2/09 0915	2/1/09 1310	304	3	8	655
VUN 2	500	11/20/09 1000	12/2/09 0940	2/2/09 1415	307	3	8	120
<del>VUN 3</del>	<del>500</del>	<del>11/20/09 1000</del>	<del>12/2/09 1115</del>	<del>2/1/09 1450</del>	<del>309</del>	<del>3</del>	<del>8</del>	<del>754</del>

Ko 213109

601812 CRT

601812 CRT



## Verification for Ra-226 Standard 0638-F

D. Roy 2/2/2009	Isotope	Value	Uncertainty
	0638-F #1	24.629	1.7426
	0638-F #2	24.438	1.7557
	0638-F #3	22.791	1.6808
<b>Mean Value (Counting) =</b>	23.953	99.60	<b>Pass</b>
<b>Stdev =</b>	1.010781096		<b>Rule 3 (Pass/Fail)</b>
<b>Target =</b>	24.05		
<b>Lower Limit =</b>	21.93100448		
<b>Upper Limit =</b>	25.97412886		
<b>Rule 1 Pass/Fail</b>	<b>Pass</b>		
<b>Two sigma =</b>	2.021562191		
<b>10 % of Mean =</b>	2.395256667		
<b>Rule 2 (Pass/Fail)</b>	<b>Pass</b>		

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements**
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**
- Rule 3 = The determined mean value shall be within 5% of the certificate value.**

The analyst prepared three standard verification sources for standard 0638-F using 0.1 mL for each source. Each source was counted using routine Lucas cell procedures. Calibration for 0299-G was used in this verification.

140 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*

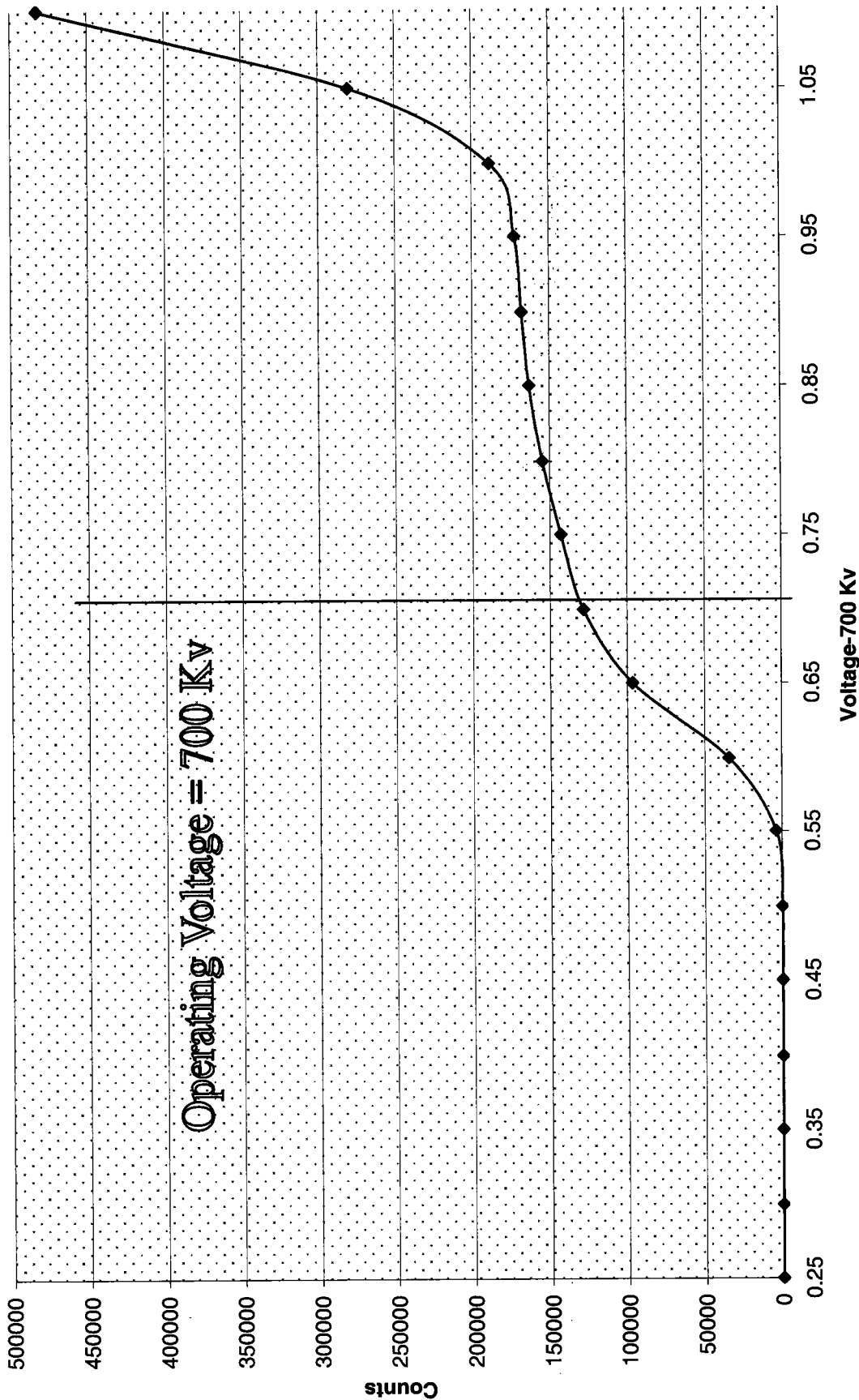
Prepared By: Kelli Brunell Date 2/13/09  
 Reviewed By: [Signature] Date 2/14/09

## 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

LLA 2/4/09  
LW  
2/3/09

Ludlum 3 Voltage Curve



LCM  
2/11/09

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 Dorrell

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*

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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 36040216  
 Expiration Date 4/12/09 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 Deneke 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 226-Ra  
 Date Standards Prepared 4/5/09 Cocktail Type Used NA  
 Standard ID 0299G Matrix of Vial/Planchet NA  
 Amount Used (g or ml) 0.103109 Matrix of Vial/Planchet NA  
 Standard Activity (DPM/g or ml) 2.446347 Type of Scintillation Vial NA  
 Reference Date 12/5/99 Pipette ID Used 1429305  
 Expiration Date 4/2/09 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				
18	CA128				
9	CA19				
34	CA134				

Prepared By: Valeri Perese Date 3/2/09  
 Reviewed By: Ayle Agha Date 3/2/09  
 Rev 1 RLM 9/10/97

# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0299	Isotope:	Radium-226
Prepared By:	Angela Johnson	Prepared By:	Angela Johnson
Carrier Conc:	0.5 M HCL	Prep Date:	09/15/2000
Reference Date:	12/15/1999	Verification Date:	01/23/2008
Ampoule Mass (g):	5.0368 g	Expiration Date:	01/23/2009
Uncertainty:	+/- 2.5 %	Primary Code:	0299-A
LogBook No:	RC S 027 128	Dilution(mL):	100 mL
		Mass of Parent(g):	4.6634 g
		Density(g/mL):	1.0012
		Balance ID:	

4208

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

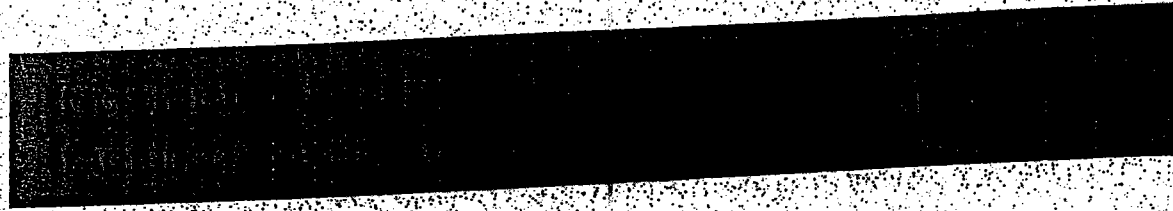
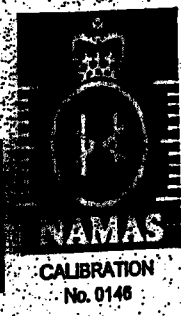
$(\text{Mass of parent(g)}) * (\text{Parent Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parent Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) =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

## 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

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 17<sup>th</sup> December 1999

Nycomed  
Amersham  
Via 31/10/99

# 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
Cal 3	500	2/20/09 1725	2/23/09 1030	2/23/09 1615	401	4	0	4580
43	500	2/20/09 1725	2/23/09 1105	2/23/09 1655	402	4	0	5877 4877
7	500	2/20/09 1725	2/23/09 1130	2.22.09 1930	403	4	0	4011
42	500	2/20/09 1725	2/23/09 1310	2.23.09 1908	404	4	0	5005
13	500	2/20/09 1725	2/23/09 1340	2.23.09 1955	405	4	0	4224
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
49	500	2/20/09 1725	2/23/09 1455	2.24.09 00:00	408	4		2598
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 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 3/2/09

K40 3/2/09

K40 2/25/09

43

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
CA1 098	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	7004
44	500	2/20/09 1725	2/25/09 1110	2.25.09 22:05	407	4	8	2827
42	500	2/20/09 1725	2/25/09 1145	<del>2.25.09 22:40</del> <del>2.26.09 22:55</del>	408	4	8	5137
43	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 1340	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

40 3/2/09  
47 3/2/09  
42 3/2/09  
43 3/2/09

100 3/2/09

100 3/2/09

100 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 13	500	2/23/09 1605	2/27/09 0930	2/27/09 1215	401	4	8	5474
Cal 14	500	2/23/09 1605	2/27/09 0930	2/27/09 1416	402	4	8	7507
Cal 15	500	2/23/09 1605	2/27/09 1030	2/27/09 1450	403	4	8	5182
Cal 16	500	2/23/09 1605	2/27/09 1030	2/27/09 1525	404	4	8	7443
Cal 17	500	2/23/09 1605	2/27/09 1055	2/27/09 1600	405	4	8	6612
Cal 18	500	2/23/09 1605	2/27/09 1130	2/27/09 1635	409	4	8	7516
Cal 19	500	2/23/09 1605	2/27/09 1150	2/27/09 1715	410	4	8	7850
Cal 20	500	2/23/09 1605	2/27/09 1220	2/27/09 1745	411	4	8	2357
Cal 21	500	2/23/09 1605	2/27/09 1245	2/27/09 1820	412	4	8	7495

1603/2/10/9  
6357  
1640  
2/28/10/9

1640  
3/2/10/9

NO WORK

434

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 38	500	11/25/09 14:00	3/2/09 10:30	3/2/09 13:40	405	4	8	8622

AT  
5012/E

AT  
5012/E

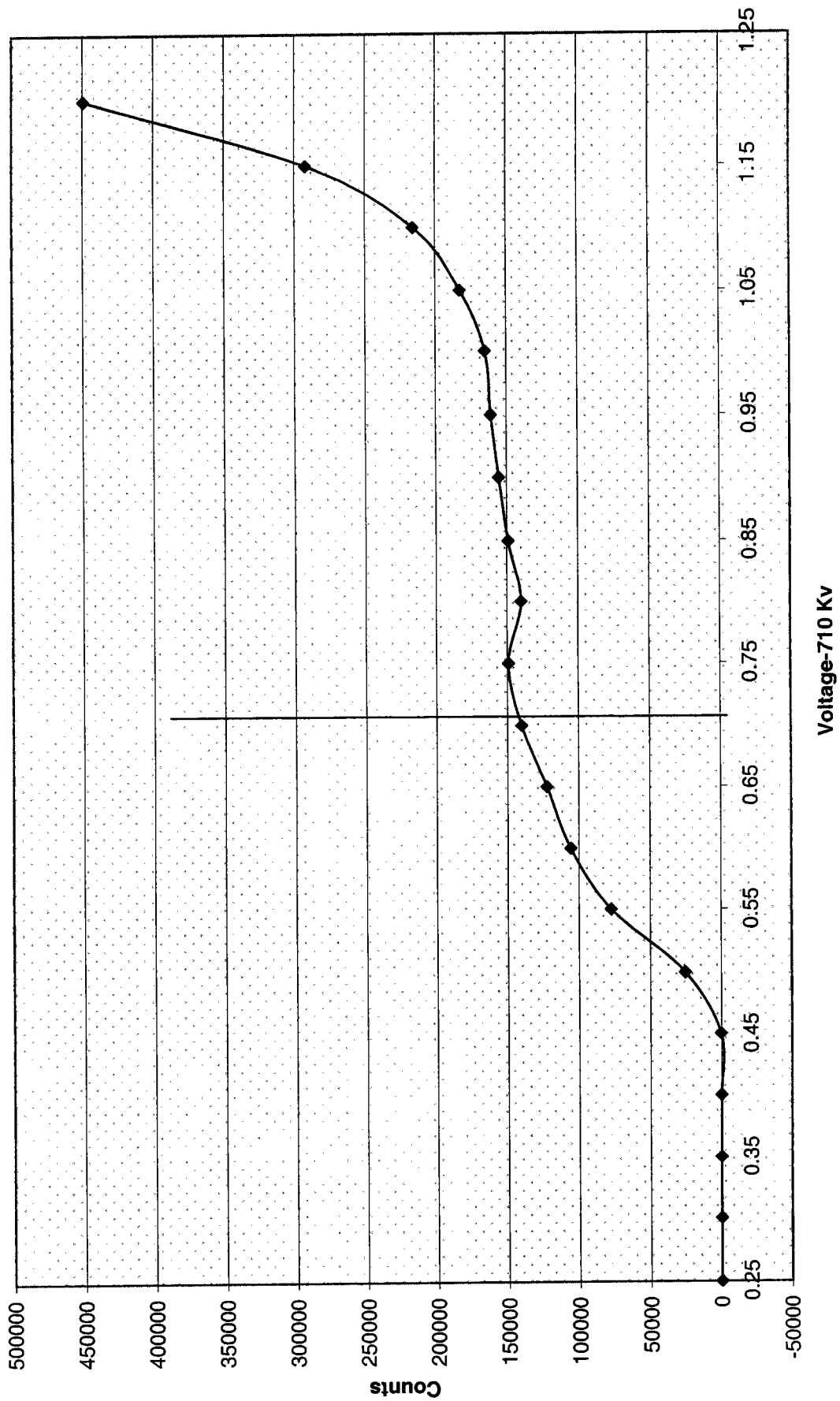
60  
5012/E

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



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 S. Dancer

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	cpm	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count
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	3/6/2009 14:00	8653	30	288.43	243.03	7.00000	0.95833	3382	0.9960

EffErr 0.143768 <- Put in Machines.xls (Lucas Cell Tab) \*Backgrounds are not significant enough to be considered in calculations. ANSI N42.25-1997 (B.2).

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

Cal # 5

3/24/09  
3/19/09

3/19/09

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 15	500	2/25/09 1400	3/2/09 0815	3/6/09 0750	501	5	8	5281
<del>Cal 14</del>	<del>500</del>	<del>2/25/09 1400</del>	<del>2/27/09 0845</del>	<del>3/6/09 0840</del>	<del>502</del>	<del>5</del>	<del>1</del>	<del>4200</del>
		2/25/09 1400	3/3/09		503	5	100 3/3/09	6800
Cal 46	500	2/25/09 1400	3/5/09 0920	3/6/09 0900	503	5	3	7250
Cal 47	500	2/25/09 1400	3/5/09 0940	3/6/09 1030	504	5	1	7262
Cal 48	500	2/25/09 1400	3/5/09 1005	3/6/09 1040	505	5	3	10654
Cal 45	500	2/25/09 1400	3/5/09 1030	3/6/09 1016	506	5	8	8576
Cal 23	500	2/25/09 1400	3/5/09 1055	3/6/09 1345	507	5	4	7695
Cal 39	500	2/25/09 1400	3/5/09 1125	3/6/09 1420	508	5	1	7236
Cal 28	500	2/25/09 1400	3/5/09 1145	3/6/09 1450	509	5	8	7795
Cal 9	500	2/25/09 1400	3/5/09 1210	3/6/09 1525	510	5	2	6578
Cal 34	500	2/25/09 1400	3/5/09 1220	3/6/09 1630	511	5	6	8316

Calibration

Ra-226 Verification Sheet

219 3116109

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 9	500	3/5/09 1400	3/10/09 1250	3/11/09 1040	501	5	8	7611
Cal 14	500	3/5/09 1400	3/10/09 1370	3/11/09 1115	502	5	5	7474
<del>Cal 15</del>	<del>500</del>	<del>3/5/09 1400</del>	<del>3/10/09 1345</del>	<del>3/11/09 1155</del>	<del>503</del>	<del>5</del>	<del>8</del>	<del>7352</del>
Cal 16	500	3/5/09 1400	3/10/09 1405	3/11/09 1230	504	5	4	5889
Cal 17	500	3/5/09 1400	3/10/09 1430	3/11/09 1280	505	5	2	8924
Cal 17	500	3/5/09 1400	3/10/09 1505	3/11/09 1530	506	5	8	7804
<del>Cal 18</del>	<del>500</del>	<del>3/5/09 1400</del>	<del>3/10/09 1527</del>	<del>3/11/09 1410</del>	<del>507</del>	<del>5</del>	<del>4</del>	<del>6315</del>
<del>Cal 19</del>	<del>500</del>	<del>3/5/09 1400</del>	<del>3/10/09 1550</del>	<del>3/11/09 1455</del>	<del>508</del>	<del>5</del>	<del>4</del>	<del>6423</del>
Cal 29	500	3/5/09 1400	3/10/09 1605	3/11/09 1525	509	5	8	6810
Cal 28	500	3/5/09 1400	3/10/09 1620	3/11/09 1610	510	5	3	5246
Cal 44	500	3/5/09 1400	3/10/09 1635	3/11/09 1650	511	5	8	7283
Cal 48	500	3/5/09 1400	3/10/09 1650	3/11/09 1735	512	5	8	6542

219 3124109

219 3124109

219 3124109

219 3116109





Calibration  
 Ra-226 Verification Sheet  
 3/25/09

Cal #5's

✓  
 3/24/09  
 ✓  
 3/24/09

3/25/09  
 3/25/09

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 114	500	3/10/09 1400	3/17/09 1250	3/18/09 0825	502	5	5	7951
<del>Cal 119</del>	<del>500</del>	<del>3/16/09 1400</del>	<del>3/17/09 1325</del>	<del>3/18/09 0855</del>	<del>503</del>	<del>5</del>		<del>6855</del>
<del>Cal 128</del>	<del>500</del>	<del>3/10/09 1400</del>	<del>3/17/09 1345</del>	<del>3/18/09 1005</del>	<del>504</del>	<del>5</del>		<del>6804</del>
Cal 140	500	3/10/09 1400	3/17/09 1400	3/18/09 1300	512	5	8	8053
Cal 125	500	3/15/09 1400	3/10/09 1527	3/11/09 1420	507	5	4	6315

3/24/09  
 3/24/09

# Ra-226 Calibration Sheet

Standard ID: 0124109

Volume Added (mL): 1.1

Expiration Date: 4/12/09

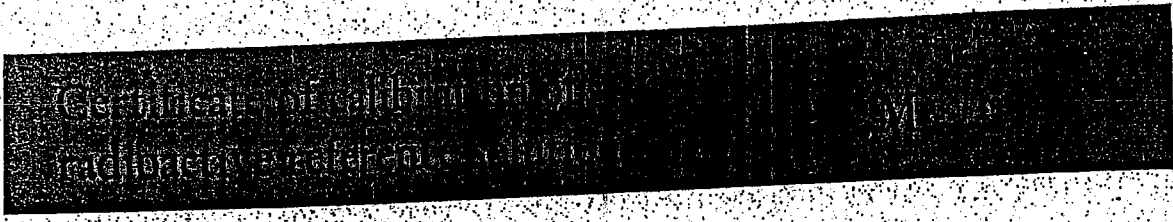
Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 42	500	3/12/09 1210	3/12/09 1515	3/19/09 2015	503	85	8282
Cal 19	500	3/12/09 1210	3/12/09 1530	3/19/09 2030	504	5	8310
Cal 44	500	3/12/09 1210	3/12/09 1545	3/19/09 2130	508	5	7561
<del>Cal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

Date of

445 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**

### 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 Dwan Date 3/24/09  
 Reviewed By: \_\_\_\_\_ Date \_\_\_\_\_

Rev 1 RLM 9/10/97

**General Engineering Laboratories**  
**Verification Source Preparation Sheet**  
*Calibration*

*3/25/09*

Applicable SOP Number GLDMP-A-008 Isotope DIA 226

Date Standards Prepared 4/5/09 Cocktail Type Used NA

Standard ID 02996 Matrix of Vial/Planchett NA  
NA  
NA

Amount Used (g or ml) 0.1 Type of Scintillation Vial NA

Standard Activity (DPM/g or mL) 2146.347 Pipette ID Used 1429303

Reference Date 12/15/99 Balance ID Used 3604026

Expiration Date 4/2/09 Quenching Agent NA

Residue/Carrier Agent 0.5M HCl

	Standard Number	Quenching Vol (uL)/ Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
<i>43</i>	<i>Cal 43</i>				
<i>3</i>	<i>Cal 3</i>				
<i>36</i>	<i>Cal 36</i>				
<i>35</i>	<i>Cal 35</i>				
<i>37</i>	<i>Cal 37</i>				
<i>38</i>	<i>Cal 38</i>				

*160 3/24/09*

Prepared By: Kelli Duce Date 3/24/09

Reviewed By: \_\_\_\_\_ Date \_\_\_\_\_

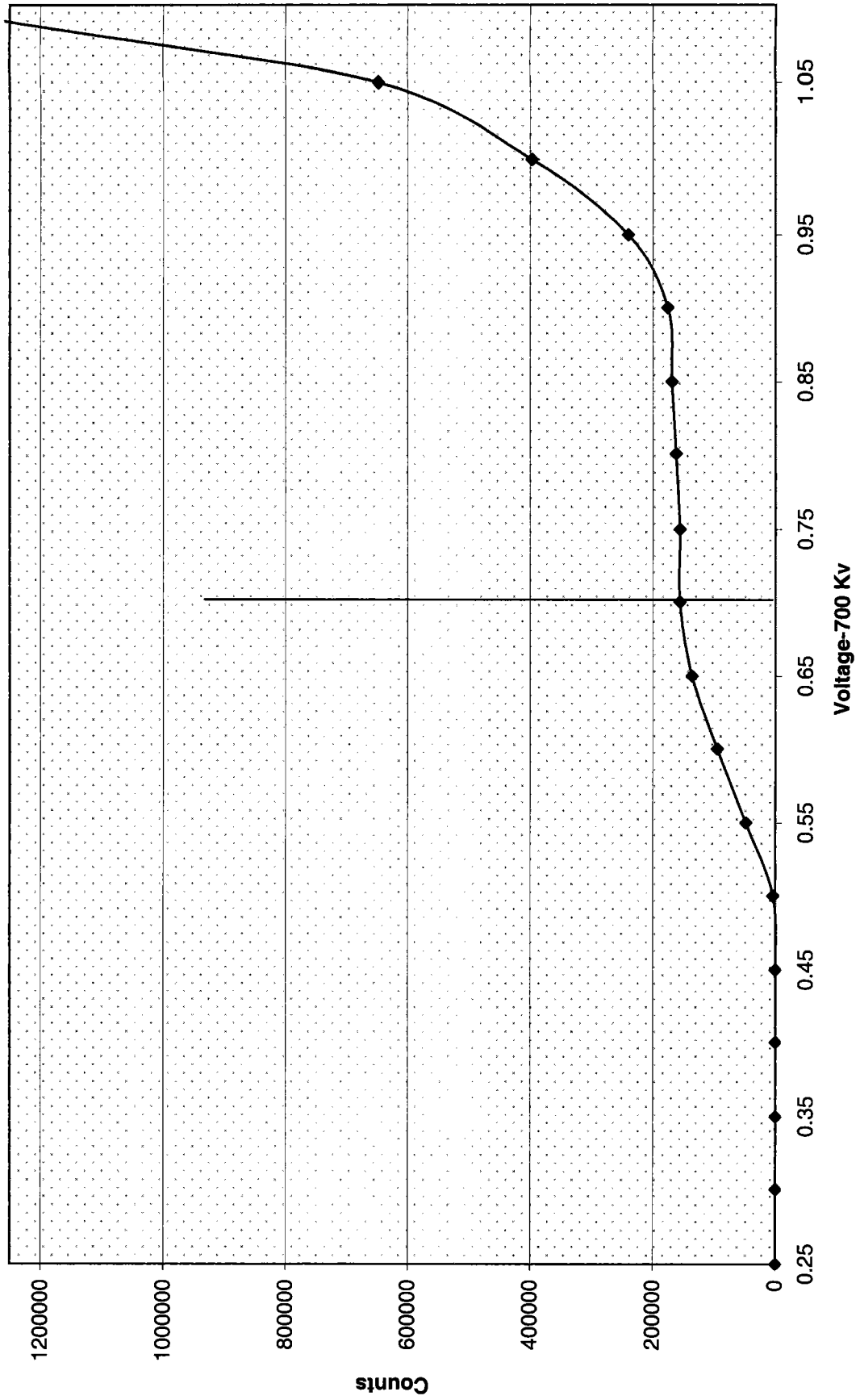


Voltage

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

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	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
VUX 1	500	3/16/09 1530	3/16/09 0945	3/16/09 1510 <del>3/16/09 1510</del> SEE 3/16/09	501	5	8	766
VUX 2	500	3/13/09 1530	3/16/09 1010	3/16/09 1925	502	5	85 140 3/12/09	537
VUX 3	500	3/13/09 1530	3/16/09 1030	3/16/09 2020	503	5	8	518
<del>VUX 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>
VUX 5	500	3/13/09 1530	3/16/09 1125	3/16/09 2200	505	5	8 140 3/12/09	680
<del>VUX 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>
VUX 7	500	3/13/09 1530	3/16/09 1320	3/16/09 2300	507	5	8	488
VUX 8	500	3/13/09 1530	3/16/09 1350	3/16/09 2330	508	5	8 140 3/12/09	544
<del>VUX 9</del>	<del>500</del>	<del>3/13/09 1530</del>	<del>3/16/09 1410</del>	<del>3/17/09 0415</del> <del>0345</del> <del>0375</del> <del>0375</del> <del>0375</del>	<del>509</del>	<del>5</del>	<del>8</del>	<del>640</del>
VUX 10	500	3/13/09 1530	3/16/09 1415	3/17/09 0500	510	5	8 140 3/12/09	432
VUX 11	500	3/13/09 1530	3/16/09 1445	3/17/09 0535	511	5	8	577
VUX 12	500	3/13/09 1530	3/16/09 1500	3/17/09 0610	512	5	8	723

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3/25/09  
3/25/09

3/17/09  
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# 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

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-APP-B-008 Isotope PA 226

Date Standards Prepared 11/6/09 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) 267.519 Type of Scintillation Vial NA

Reference Date 1/23/04 Pipette ID Used 1429303

Expiration Date 2/2/10 Balance ID Used 38080204

Residue/Carrier Agent NA 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				

~~11/0 3/25/09~~

Prepared By: Kelli Daniels Date 3/24/09

Reviewed By: Angela A. G... Date 3/25/09

Rev 1 RLM 9/10/97

# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0638	Isotope:	Radium-226
Prepared By:	Amanda Fehr	Prepared By:	Amanda Fehr
Carrier Conc:	0.1M HCl	Prep Date:	01/16/2006
Reference Date:	01/23/2004	Verification Date:	03/04/2007
Ampoule Mass (g):	5.01065 g	Expiration Date:	03/04/2008
Uncertainty:	+/- 3.3 %	Primary Code:	0638-A
LogBook No:	RC-S-037-037	Dilution(mL):	100 mL
		Mass of Parent(g):	4.8398 g
		Density(g/mL):	1.0266
		Balance ID:	38080204

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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.8398 \text{ g}) * (23530 \text{ dps}) * (60 \text{ dpm/dps}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13636.6133 \text{ dpm/mL}$
$(4.8398 \text{ g}) * (23530 \text{ dps}) * (60 \text{ dpm/dps}) / (1.0266 \text{ g/mL}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13282.9676 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
01/17/2006	Amanda Fehr	2.1041	100	0638-B	279.0211 dpm/mL	01/17/2007	01/17/2008
07/17/2006	Mary Aders	2.1313	100	0638-C	282.6281 dpm/mL	07/26/2006	07/26/2007
03/28/2007	Daniel Roy	2.1025	100	0638-D	279.2744 dpm/ml	04/08/2007	04/08/2008
03/28/2007	Daniel Roy	45.468	250	0638-E	2415.7999 dpm/ml	04/09/2008	04/08/2009
12/18/2007	Daniel Roy	2.014	100	0638-F	267.519 dpm/ml	02/02/2009	02/02/2010
02/12/2008	Daniel Roy	.5004	100	0638-G	66.468 dpm/ml	03/04/2008	03/04/2009
07/23/2008	Daniel Roy	5.0607	250	0638-H	268.8845 dpm/ml	07/23/2008	07/23/2009



## Verification for Ra-226 Standard 0638-F

D. Roy 2/2/2009	<b>Isotope</b>	<b>Value</b>	<b>Uncertainty</b>
	0638-F #1	24.629	1.7426
	0638-F #2	24.438	1.7557
	0638-F #3	22.791	1.6808
<b>Mean Value (Counting) =</b>	23.953	99.60	<b>Pass</b>
<b>Stdev =</b>	1.010781096		<b>Rule 3 (Pass/Fail)</b>
<b>Target =</b>	24.05		
<b>Lower Limit =</b>	21.93100448		
<b>Upper Limit =</b>	25.97412886		
<b>Rule 1 Pass/Fail</b>	<b>Pass</b>		
<b>Two sigma =</b>	2.021562191		
<b>10 % of Mean =</b>	2.395256667		
<b>Rule 2 (Pass/Fail)</b>	<b>Pass</b>		

**Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements**

**Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule 3 = The determined mean value shall be within 5% of the certificate value.**

The analyst prepared three standard verification sources for standard 0638-F using 0.1 mL for each source. Each source was counted using routine Lucas cell procedures. Calibration for 0299-G was used in this verification.

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# General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414

(843)556-8171

## Lucas Cell Calibration Package

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the secondary standard(s) documentation? standard preparation information? standard < 1 Year old or verified?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2) Is the efficiency calibration report included ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3) Is the raw count data included for: Cell constant determination? Plateau generation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4) Are the calibration verifications included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5) Are the instrument settings included: HVPS settings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6) Has the CELLEFF.xls file been updated ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7) Have the calibration dates been updated in ALPHALIMS ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Prepared By: Kelli Derrell

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	bkg 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	11/20/2008 16:40	11/20/2008 12:00	11/13/2008 12:20	0.267	10056	30	335.20	243.02	6.98611	0.19444	3264	0.9961
701	1.720	Sidev	10/15/2008 14:35	10/15/2008 10:40	10/10/2008 14:20	0.267	7095	30	236.50	243.02	4.84722	0.16319	3228	0.9962
701	1.728		10/13/2008 16:15	10/13/2008 9:35	10/10/2008 14:20	0.267	4760	30	158.67	243.02	2.80208	0.27778	3226	0.9962
702	1.820	Average	10/20/2008 15:45	10/20/2008 9:40	10/15/2008 14:10	0.233	7352	30	245.07	243.02	4.81250	0.25347	3233	0.9962
702	2.014	Sidev	10/15/2008 15:20	10/15/2008 10:55	10/10/2008 14:20	0.100	8282	30	276.07	243.02	4.85764	0.18403	3228	0.9962
702	1.963		10/13/2008 20:25	10/13/2008 10:10	10/10/2008 14:20	0.267	5296	30	176.53	243.02	2.82639	0.42708	3226	0.9962
703	1.899	Average	11/13/2008 15:20	11/13/2008 12:20	11/10/2008 16:15	0.267	5428	30	180.99	243.02	2.83681	0.12500	3257	0.9961
703	2.126	Sidev	10/15/2008 15:55	10/15/2008 11:10	10/10/2008 14:20	0.267	8738	30	291.27	243.02	4.86806	0.19792	3228	0.9962
703	2.222		10/13/2008 20:55	10/13/2008 10:35	10/10/2008 14:20	0.267	6019	30	200.63	243.02	2.84375	0.43056	3226	0.9962
704	2.116	Average	10/20/2008 17:00	10/20/2008 10:30	10/15/2008 14:10	0.233	8560	30	285.33	243.02	4.84722	0.27083	3233	0.9962
704	2.390	Sidev	10/15/2008 17:30	10/15/2008 12:30	10/10/2008 14:20	0.267	9909	30	330.30	243.02	4.92361	0.18750	3228	0.9962
704	2.239		10/13/2008 21:30	10/13/2008 11:00	10/10/2008 14:20	0.267	6084	30	202.80	243.02	2.86111	0.43750	3226	0.9962
705	2.189	Average	10/20/2008 17:35	10/20/2008 10:55	10/15/2008 14:10	0.233	8905	30	296.83	243.02	4.86458	0.27778	3233	0.9962
705	2.050	Sidev	10/15/2008 17:30	10/15/2008 12:45	10/10/2008 14:20	0.267	8495	30	283.17	243.02	4.93403	0.19792	3228	0.9962
705	2.232		10/13/2008 22:00	10/13/2008 11:20	10/10/2008 14:20	0.267	6081	30	202.70	243.02	2.87500	0.44444	3226	0.9962
706	2.099	Average	10/20/2008 18:05	10/20/2008 11:15	10/15/2008 14:10	0.233	8504	30	283.47	243.02	4.87847	0.28472	3233	0.9962
706	2.040	Sidev	10/15/2008 18:00	10/15/2008 13:00	10/10/2008 14:20	0.267	8452	30	281.73	243.02	4.94444	0.20883	3228	0.9962
706	2.213		10/13/2008 22:30	10/13/2008 11:40	10/10/2008 14:20	0.267	6044	30	201.47	243.02	2.88889	0.45139	3226	0.9962
707	2.069	Average	10/20/2008 18:35	10/20/2008 11:30	10/15/2008 14:10	0.233	8378	30	279.27	243.02	4.88889	0.29514	3233	0.9962
707	2.057	Sidev	10/15/2008 18:35	10/15/2008 13:25	10/10/2008 14:20	0.267	8527	30	284.23	243.02	4.96181	0.21528	3228	0.9962
707	2.230		10/13/2008 23:00	10/13/2008 13:20	10/10/2008 14:20	0.267	6255	30	208.50	243.02	2.95833	0.40278	3226	0.9962
708	1.652	Average	10/20/2008 22:00	10/20/2008 12:50	10/15/2008 14:10	0.233	6632	30	221.07	243.02	4.94444	0.38194	3233	0.9962
708	1.772	Sidev	10/15/2008 19:20	10/15/2008 13:40	10/10/2008 14:20	0.267	7329	30	244.30	243.02	4.97222	0.23611	3228	0.9962
708	1.954		11/13/2008 15:50	11/13/2008 12:50	11/10/2008 16:15	0.267	5614	30	187.13	243.02	2.85764	0.12500	3257	0.9961
709	1.890	Average	10/20/2008 22:35	10/20/2008 13:05	10/15/2008 14:10	0.233	7578	30	252.60	243.02	4.95486	0.39583	3233	0.9962
709	1.817	Sidev	10/15/2008 20:35	10/15/2008 13:55	10/10/2008 14:20	0.267	7469	30	248.97	243.02	4.98264	0.27778	3228	0.9962
709	2.127		10/14/2008 9:00	10/13/2008 14:05	10/10/2008 14:20	0.267	5608	30	186.93	243.02	2.96958	0.78819	3226	0.9962
710	1.965	Average	10/20/2008 23:05	10/20/2008 13:25	10/15/2008 14:10	0.233	7882	30	262.73	243.02	4.96875	0.40278	3233	0.9962
710	2.009	Sidev	10/15/2008 21:40	10/15/2008 14:15	10/10/2008 14:20	0.267	8224	30	274.13	243.02	4.99653	0.30903	3228	0.9962
710	2.152		10/14/2008 10:00	10/13/2008 14:25	10/10/2008 14:20	0.267	5666	30	188.87	243.02	3.00347	0.81597	3226	0.9962
711	2.283	Average	10/20/2008 23:55	10/20/2008 13:45	10/15/2008 14:10	0.233	9136	30	304.53	243.02	4.98264	0.42361	3233	0.9962
711	2.208	Sidev	10/16/2008 8:30	10/15/2008 14:30	10/10/2008 14:20	0.267	8357	30	278.57	243.02	5.00894	0.75000	3228	0.9962
711	2.122		10/14/2008 10:55	10/13/2008 14:45	10/10/2008 14:20	0.267	5581	30	186.03	243.02	3.01736	0.84028	3226	0.9962
712	2.049	Average	10/21/2008 1:00	10/20/2008 14:05	10/15/2008 14:10	0.233	8170	30	272.33	243.02	4.99653	0.45486	3233	0.9962
712	2.174	Sidev	10/16/2008 19:15	10/15/2008 14:50	10/10/2008 14:20	0.267	7618	30	253.93	243.02	5.02083	1.18403	3229	0.9962
712	2.174		10/14/2008 11:25	10/13/2008 16:15	10/10/2008 14:20	0.267	5852	30	195.07	243.02	3.07986	0.79861	3226	0.9962

*On the Johnson 11/21/08*

*Kelli Powell 11/21/08*

# General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GLRPP-12008 Isotope Ka-226  
 Date Standards Prepared 4/15/08 Cocktail Type Used NA  
 Standard ID 6+ 0299-6 Matrix of Vial/Planchett NA  
ED Titration NA  
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 12/15/09 Balance ID Used 36040216  
 Expiration Date 4/12/09 Quenching Agent NSA  
 Residue/Carrier Agent 0.5 M HCl

	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  
 1/12/08

Prepared By: Kelli Doree Date: 10/21/08  
 Reviewed By: Angela Johnson Date: 11/21/08

Rev 1 RLM 9/10/97

## 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)  
11/21/08

Prepared By: Kelli Damer Date: 11/21/08  
 Reviewed By: Angie 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

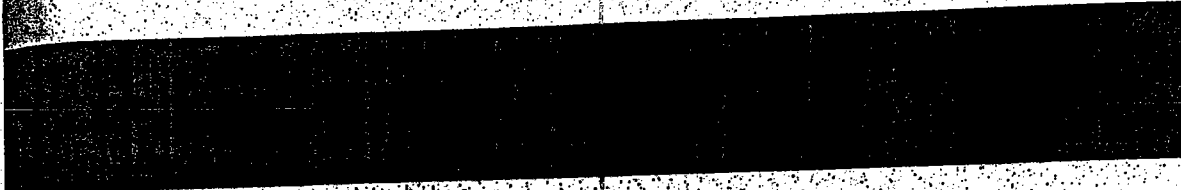
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Date of  
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17<sup>th</sup> December 1999

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	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  
 Stddev = 10.63610098  
 Rule 3 (Pass/Fail) Pass

Certificate Value = 2437.6 dpm/mL  
 Lower Limit = 2536.821513 dpm/mL  
 Upper Limit = 2579.365917 dpm/mL  
 Rule 1 Pass/Fail Fail  
 Two sigma = 21.27220197 dpm/mL  
 10 % of Mean = 255.8093715 dpm/mL  
 Rule 2 (Pass/Fail) Pass

\*exception taken due to full recovery of standard

### Verification Rules

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 = The determined mean value shall be within 10% of the certificate value.

The analyst prepared three standard verification sources for Ra-226 source 0299-G by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Gold for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 4/02/08 using source 0024-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0024. Each verification source calculation was performed as follows:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

where:

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

BAD.SOP.M-001

*Mary E. Johnson 4/9/08*  
*Daniel Dwyer 4/10/08*

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
14	500	<del>10/10/08 1420</del> 10/11/08 1420	<del>10/13/08 1010</del> 10/13/08	10/13/08 1015	101	7	8	4760
13	500	10/11/08 1420	10/13/08 1010	10-13-08 2025	102	7	8	5296
43	500	10/10/08 1420	10/13/08 1035	10-13-08 2055	703	7	8	6019
44	500	10/11/08 1420	10/13/08 1100	10-13-08 2130	704	7	8	6084
15	500	10/10/08 1420	10/13/08 1120	10-13-08 2200	705	7	8	6081
46	500	10/10/08 1420	10/13/08 1140	10-13-08 2230	706	7	8	6044
47	500	10/10/08 1420	10/13/08 1320	10-13-08 2300	707	7	8	6255
<del>30</del>	<del>500</del>	<del>10/10/08 1420</del>	<del>10/13/08 1345</del>	<del>10-13-08 2330</del>	<del>708</del>	<del>7</del>	<del>8</del>	<del>6081</del>
47	500	10/10/08 1420	10/13/08 1405	10-14-08 0900	709	7	8	5608
19	500	10/10/08 1420	10/13/08 1425	10/14/08 1000	710	7	8	5666
31	500	10/10/08 1420	10/13/08 1445	10/14/08 1055	711	7	8	5501
42	500	10/10/08 1420	10/13/08 1615	10/14/08 1125	712	7	8	5852
<div style="display: flex; justify-content: space-between;"> <span>KB</span> <span>11/2/10</span> </div>								
<div style="display: flex; justify-content: space-between;"> <span>467</span> <span>11/2/10</span> </div>								

140  
11/2/10

11/2/10

11/2/10



Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
<del>Cal 18</del>	<del>500</del>	<del>10/15/08 1410</del>	<del>10/20/08 1410</del>	<del>10/20/08 1450</del>	<del>101</del>	<del>7</del>		<del>8513</del>
Cal 9	500	10/15/08 1410	10/20/08 1440	10/20/08 1545	102	7	7=0.233	7352
<del>Cal 7</del>	<del>500</del>	<del>10/15/08 1410</del>	<del>10/20/08 1405</del>	<del>10/20/08 1625</del>	<del>103</del>	<del>7</del>		<del>7555</del>
Cal 23	500	10/15/08 1410	10/20/08 1430	10/20/08 1700	104	7	7=0.237	8560
Cal 48	500	10/15/08 1410	10/20/08 1055	10/20/08 1735	105	7	7=0.233	8905
Cal 35	500	10/15/08 1410	10/20/08 1115	10/20/08 1805	106	7	7=0.233	8504
Cal 34	500	10/15/08 1410	10/20/08 1130	10/20/08 1835	107	7	7=0.233	8378
Cal 38	500	10/15/08 1410	10/20/08 1250	10/20/08 2200	108	7	7=0.233	6632
Cal 25	500	10/15/08 1410	10/20/08 1305	10/20/08 2235	109	7	7=0.233	7578
Cal 5	500	10/15/08 1410	10/20/08 1325	10/20/08 2305	110	7	7=0.233	7882
Cal 16	500	10/15/08 1410	10/20/08 1345	10/20/08 2355	111	7	7=0.233	9136
Cal 39	500	10/15/08 1410	10/20/08 1405	10/21/08 0900 <del>1030</del> <small>205 1030</small>	112	7	7=0.233	8170

100  
11/21/08

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100 11/21/08

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11/21/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
<del>Cell 13</del>	<del>500</del>	<del>11/10/08 1015</del>	<del>11/13/08 1055</del>	<del>11/13/08 1435</del>	<del>701</del>	<del>7</del>	<del>8</del>	<del>7318</del>
Cell 43	500	11/10/08 1015	11/13/08 1220	11/13/08 1520	703	7	8	6428
Cell 14	500	11/10/08 1015	11/13/08 1250	11/13/08 1650	708	7	8	5614
<del>Cell 15</del>	<del>500</del>	<del>11/10/08 1015</del>	<del>11/13/08 1220</del>	<del>11/13/08 1520</del>	<del>705</del>	<del>7</del>	<del>8</del>	<del>7013</del>
<del>Cell 44</del>	<del>500</del>	<del>11/10/08 1015</del>	<del>11/13/08 1220</del>	<del>11/13/08 1520</del>	<del>705</del>	<del>7</del>	<del>8</del>	<del>7013</del>
Cell 43	500	11/13/08 1220	11/20/08 1200	11/20/08 1040	701	7	8	16056

NO LITHOS

NO LITHOS

NO LITHOS

160 112108

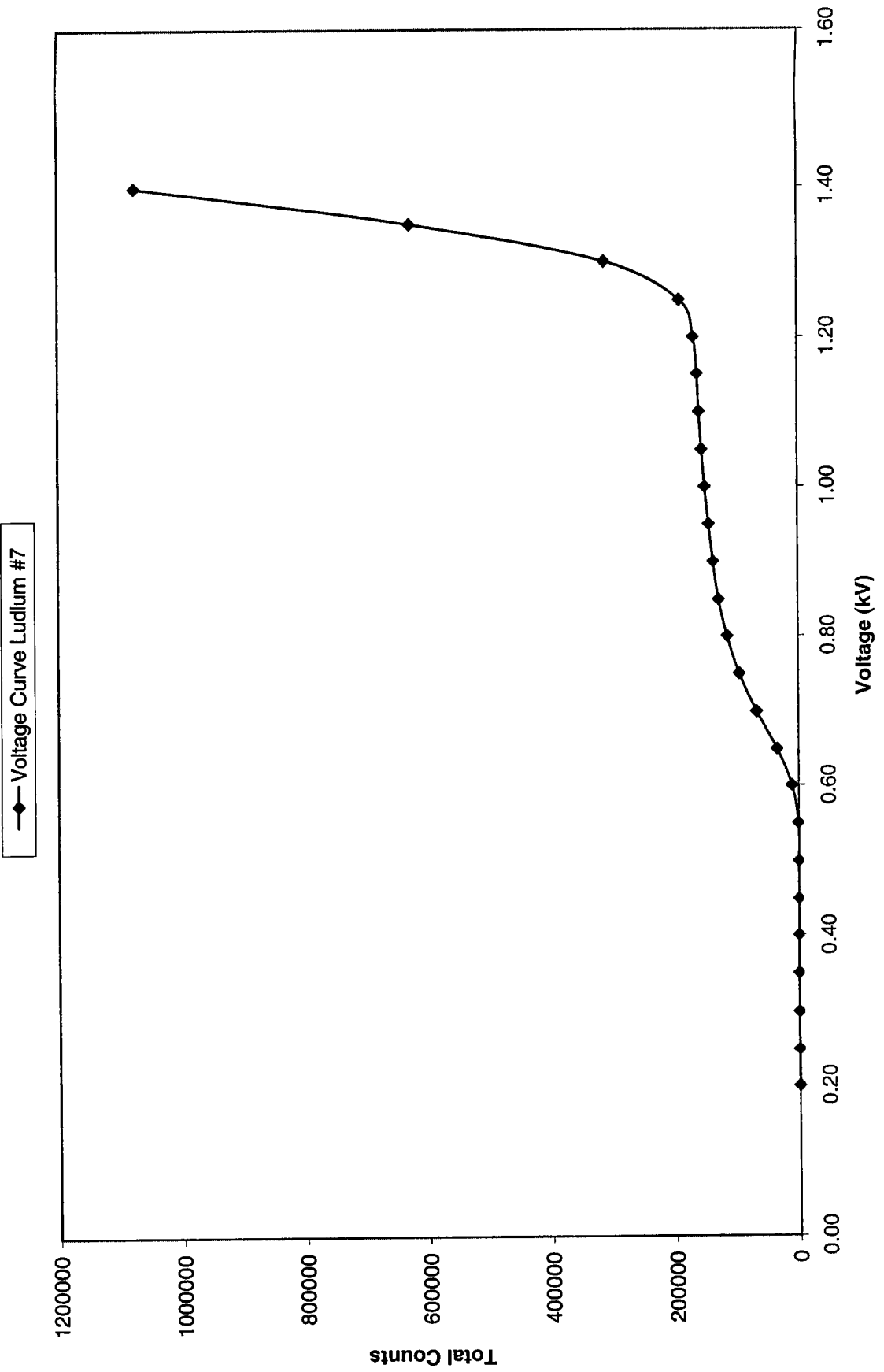
## Voltage Curve Ludlum #7

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

# **GAS FLOW PROPORTIONAL COUNTERS**

**General Engineering Laboratories**

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

**Gas Flow Proportional Counter Calibration Package**

Method: Po-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







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

419  
7/2/09

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



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

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

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

Radium-228 Liquid

File name : RA228.LXS
Spike S/N : N/A
Spike Exp Date : N/A
Spike Activity (dpm/ml) : N/A
Spike Volume Added: N/A

Batch : 595514
LCS S/N : 0503-B
LCS Exp Date : 9/13/2009
LCS Activity (dpm/ml) : 182.42
LCS Volume Added: 2.00

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

Pipet, 0.1 ml Stdev: +/- 0.000701 ml
Pipet, 0.5 ml Stdev: +/- 0.002564 ml
Pipet, 1 ml Stdev: +/- 0.005480 ml
Procedure Code : GFC90SRL
Pararmame : Radium-228
Required MDA : 1 pCi/L
Half-life of Re-228 : 5.75 years
Half-life of Ac-228 : 6.13 hours
Batch counted on : PIC
BKG Count time : 500 min

Table with columns: Pos., Sample Characteristics, Counting Time, Detector ID, Gross Counts, Beta, Detector Efficiency, Weekly Bkg, Separation Date, Count Start, Ra-228 Decay, Ac-228 Correction, Calculated Sample Recovery, Sample Recovery Error, Results.

Handwritten number: 485

Notes:  
 1 - Results are decay corrected to Sample Date/Time  
 2 - Reference date for Spike Activity (dpm/m) 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	2 SIGMA Counting		Total Prop. Uncertainty	Sample Type	Nominal pCi/L	Recovery
				Conc. pCi/L	pCi/L				Rate CPM	Rate CPM				
0.3471	0.2451	1	0.6937	134.0279	0.0254	131.6880	2.9666	5.9178	21.6466	164.3409	LCS	164.3409	81.6%	
0.3647	0.2575	1	0.7192	133.0399	0.0251	130.2580	2.9508	5.9071	21.4655	164.3409	LCS	164.3409	81.0%	
0.5889	0.3790	1	0.9659	145.2921	0.0243	139.8173	3.0611	6.2347	23.3752	164.3409	LCS	164.3409	88.4%	
0.4695	0.3314	1	0.8755	159.8828	0.0239	150.4760	3.1730	6.6057	25.6756	164.3409	LCS	164.3409	97.3%	
0.4261	0.3008	1	0.8097	127.0000	0.0257	122.0833	2.8583	5.8279	20.5368	164.3409	LCS	164.3409	77.3%	
0.7599	0.5395	1	1.2813	141.0616	0.0247	135.4387	3.0211	6.1673	22.7300	164.3409	LCS	164.3409	85.8%	
0.3798	0.2681	1	0.7515	141.8559	0.0253	131.7993	2.9681	6.2613	22.9053	164.3409	LCS	164.3409	86.3%	
0.4150	0.2930	1	0.8072	145.8182	0.0251	131.8887	2.9696	6.4352	23.5274	164.3409	LCS	164.3409	88.7%	
0.6347	0.4481	1	1.1343	129.9854	0.0284	108.9047	2.7042	6.3116	21.1935	164.3409	LCS	164.3409	78.9%	
0.9035	0.6379	1	1.5022	135.4510	0.0266	119.6900	2.8455	6.3115	21.9803	164.3409	LCS	164.3409	82.4%	
0.6078	0.4291	1	1.0779	141.2594	0.0255	128.6447	2.9382	6.3235	22.8259	164.3409	LCS	164.3409	86.0%	
0.5473	0.3864	1	0.9987	155.5960	0.0247	137.7700	3.0378	6.7244	25.0636	164.3409	LCS	164.3409	94.7%	
0.6283	0.4436	1	1.1054	135.5336	0.0264	124.2433	2.8986	6.1761	21.9739	164.3409	LCS	164.3409	83.3%	
0.9036	0.6379	1	1.4942	136.9155	0.0254	125.4287	2.9134	6.2333	22.1127	164.3409	LCS	164.3409	88.8%	
0.7676	0.5419	1	1.3079	145.9826	0.0252	130.3400	2.9624	6.5032	23.5621	164.3409	LCS	164.3409	90.0%	
0.4809	0.3395	1	0.9027	134.9611	0.0269	120.7040	2.8427	6.2312	21.9265	164.3409	LCS	164.3409	82.1%	
0.8974	0.4924	1	1.2076	131.4742	0.0271	117.9500	2.8170	6.1544	21.3797	164.3409	LCS	164.3409	80.0%	
0.6530	0.4610	1	1.1419	148.2299	0.0259	132.9873	2.9894	6.4406	23.6659	164.3409	LCS	164.3409	89.0%	
0.7661	0.5409	1	1.3064	156.3706	0.0255	139.2187	3.0605	6.7377	25.2668	164.3409	LCS	164.3409	95.2%	
0.6899	0.4871	1	1.1997	134.1863	0.0270	118.9960	2.8288	6.2523	21.8127	164.3409	LCS	164.3409	81.7%	
0.6079	0.4292	1	1.0862	137.0396	0.0269	120.3027	2.8412	6.3436	22.2643	164.3409	LCS	164.3409	83.4%	
0.9509	0.6713	1	1.5725	146.0056	0.0264	127.0307	2.9917	6.6044	23.6775	164.3409	LCS	164.3409	88.8%	
0.4376	0.3090	1	0.8562	144.5849	0.0276	113.7227	2.7577	6.3903	23.4785	164.3409	LCS	164.3409	88.0%	
0.4227	0.2984	1	0.8330	134.2390	0.0275	118.4887	2.8152	6.4094	22.3723	164.3409	LCS	164.3409	92.4%	
0.4360	0.3079	1	0.8480	137.6373	0.0270	118.4887	2.8152	6.4094	22.3723	164.3409	LCS	164.3409	92.4%	
0.3962	0.2797	1	0.7956	151.8935	0.0262	128.6313	2.9319	6.6518	23.4785	164.3409	LCS	164.3409	88.0%	
0.4480	0.3091	1	0.8657	152.1131	0.0261	130.4707	2.9539	6.7499	24.6318	164.3409	LCS	164.3409	92.6%	
0.6932	0.4470	1	1.1278	127.8251	0.0279	109.4120	2.7108	6.2072	20.8618	164.3409	LCS	164.3409	77.8%	
0.8917	0.6931	1	1.6167	135.1471	0.0273	117.2540	2.8197	6.3699	21.9896	164.3409	LCS	164.3409	82.2%	
0.5779	0.4080	1	1.0463	148.5864	0.0263	127.3240	2.9214	6.5922	23.7610	164.3409	LCS	164.3409	89.2%	
0.8422	0.5946	1	1.4301	141.4935	0.0272	117.4880	2.8147	6.6441	23.0149	164.3409	LCS	164.3409	86.1%	
0.4379	0.3091	1	0.8509	130.5505	0.0276	112.2200	2.7400	6.2478	21.2682	164.3409	LCS	164.3409	79.4%	
0.7972	0.5629	1	1.3635	133.7974	0.0277	112.5273	2.7540	6.4182	21.9026	164.3409	LCS	164.3409	81.4%	
0.4475	0.3159	1	0.8728	144.2924	0.0269	119.7633	2.8301	6.6832	23.4437	164.3409	LCS	164.3409	87.8%	
0.8154	0.5757	1	1.3663	150.8313	0.0263	128.3747	2.9406	6.7718	24.4459	164.3409	LCS	164.3409	91.8%	
0.4063	0.2868	1	0.8104	134.4151	0.0285	119.5507	2.7553	6.3927	21.8871	164.3409	LCS	164.3409	81.8%	
1.9322	1.3641	1	2.9747	135.0540	0.0265	109.6040	2.7857	6.7277	22.0820	164.3409	LCS	164.3409	82.2%	
0.4205	0.2969	1	0.8358	146.9063	0.0268	121.4093	2.8489	6.7565	23.8548	164.3409	LCS	164.3409	89.4%	
0.4437	0.3182	1	0.8728	144.8386	0.0271	117.5853	2.8041	6.7699	23.5500	164.3409	LCS	164.3409	88.1%	
0.3432	0.2423	1	0.6763	135.4546	0.0253	141.3227	3.0730	5.7736	21.8705	164.3409	LCS	164.3409	82.4%	
0.3289	0.2322	1	0.6397	131.8931	0.0247	150.2887	3.1694	5.4434	21.2189	164.3409	LCS	164.3409	80.1%	
0.2949	0.2082	1	0.5922	148.3038	0.0237	169.2980	3.3626	5.7929	23.8966	164.3409	LCS	164.3409	90.5%	
0.3379	0.2385	1	0.6530	151.8473	0.0235	172.6707	3.3968	5.8549	24.3615	164.3409	LCS	164.3409	92.4%	
0.4616	0.3400	1	0.8577	131.6889	0.0249	148.2120	3.2186	5.4891	21.2301	164.3409	LCS	164.3409	80.1%	
0.7498	0.5287	1	1.2332	134.8566	0.0246	153.3673	3.3053	5.8483	21.7215	164.3409	LCS	164.3409	82.1%	
0.4447	0.3140	1	0.8052	148.8317	0.0238	162.8880	3.3090	5.8232	23.8982	164.3409	LCS	164.3409	90.8%	
0.6180	0.4363	1	1.0494	143.9479	0.0241	162.8880	3.3090	5.7315	23.1384	164.3409	LCS	164.3409	87.6%	
0.3427	0.2420	1	0.6680	135.0873	0.0248	148.3533	3.1490	5.6202	21.7752	164.3409	LCS	164.3409	82.2%	
0.5997	0.4234	1	1.0256	129.5009	0.0251	144.7940	3.1202	5.4697	20.8960	164.3409	LCS	164.3409	78.9%	
0.3316	0.2341	1	0.6469	146.0021	0.0240	163.4967	3.3053	5.7852	23.4616	164.3409	LCS	164.3409	88.8%	
0.6355	0.4487	1	1.0805	159.6717	0.0235	174.3747	3.4225	6.1425	25.6134	164.3409	LCS	164.3409	97.2%	
0.3136	0.2214	1	0.6255	132.0625	0.0251	144.5507	3.1078	5.5650	21.3060	164.3409	LCS	164.3409	80.4%	
1.4618	1.0321	1	2.2506	135.6135	0.0254	145.4707	3.1861	5.8215	21.9790	164.3409	LCS	164.3409	82.5%	
0.3185	0.2249	1	0.6330	141.6298	0.0245	154.5427	3.2193	5.7718	22.7000	164.3409	LCS	164.3409	86.2%	
0.3327	0.2349	1	0.6546	146.7439	0.0242	158.8520	3.2579	5.8988	23.6017	164.3409	LCS	164.3409	89.3%	

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

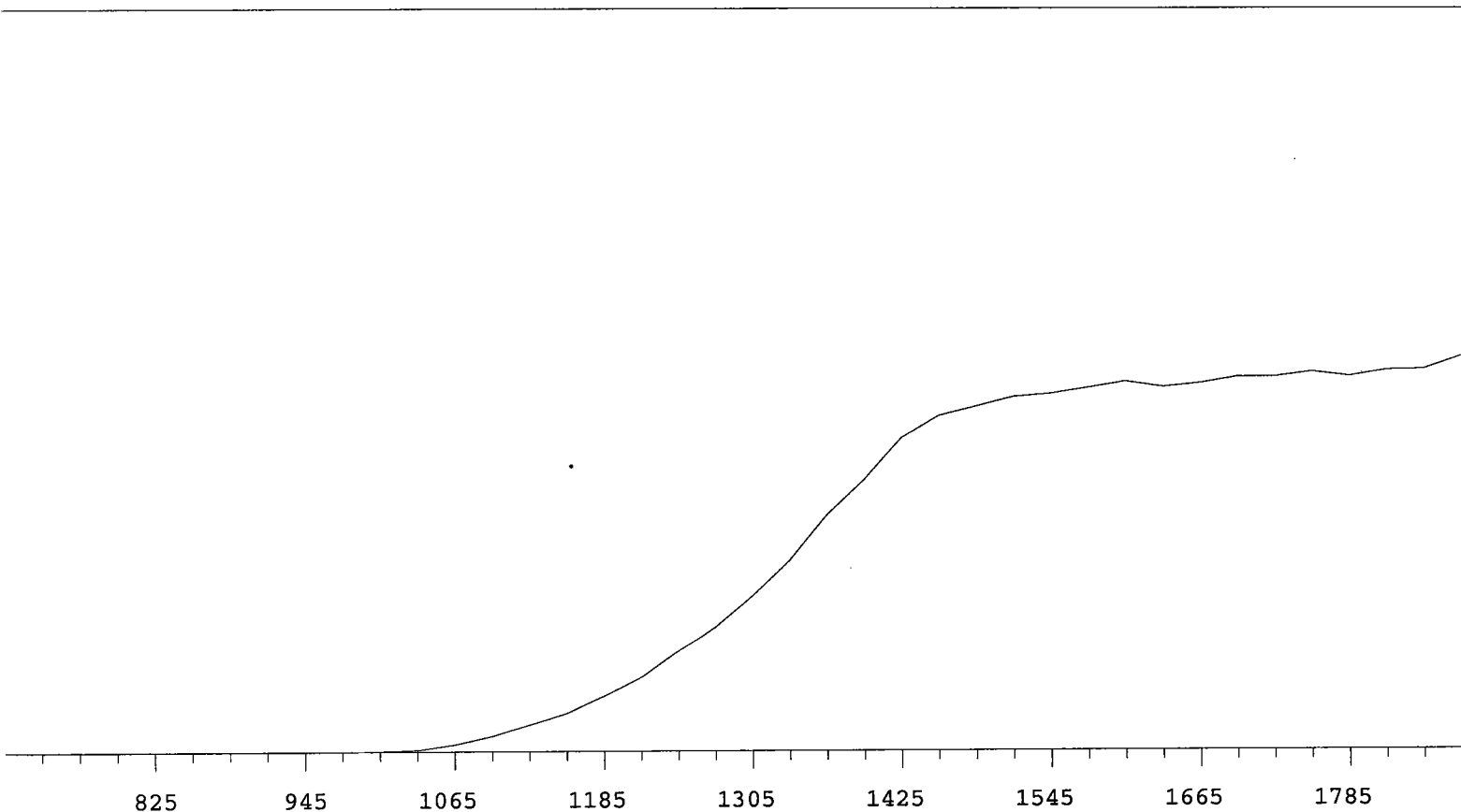
219  
7/2/09

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				

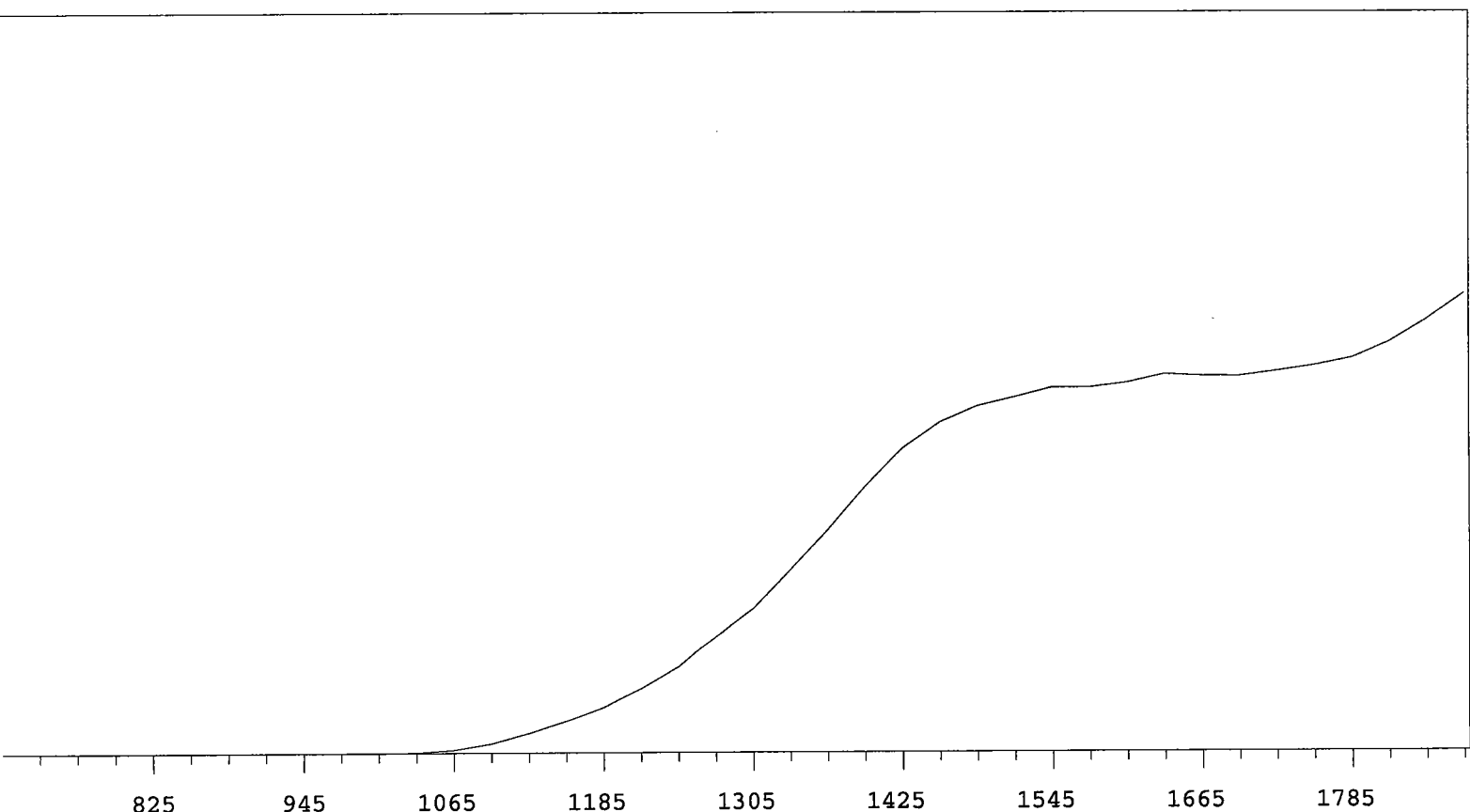


<b>13B</b>	6.52643E-01
<b>13C</b>	6.53798E-01
<b>13D</b>	6.37701E-01
<b>14A</b>	6.39290E-01
<b>14B</b>	6.26611E-01
<b>14C</b>	6.37531E-01
<b>14D</b>	6.32609E-01



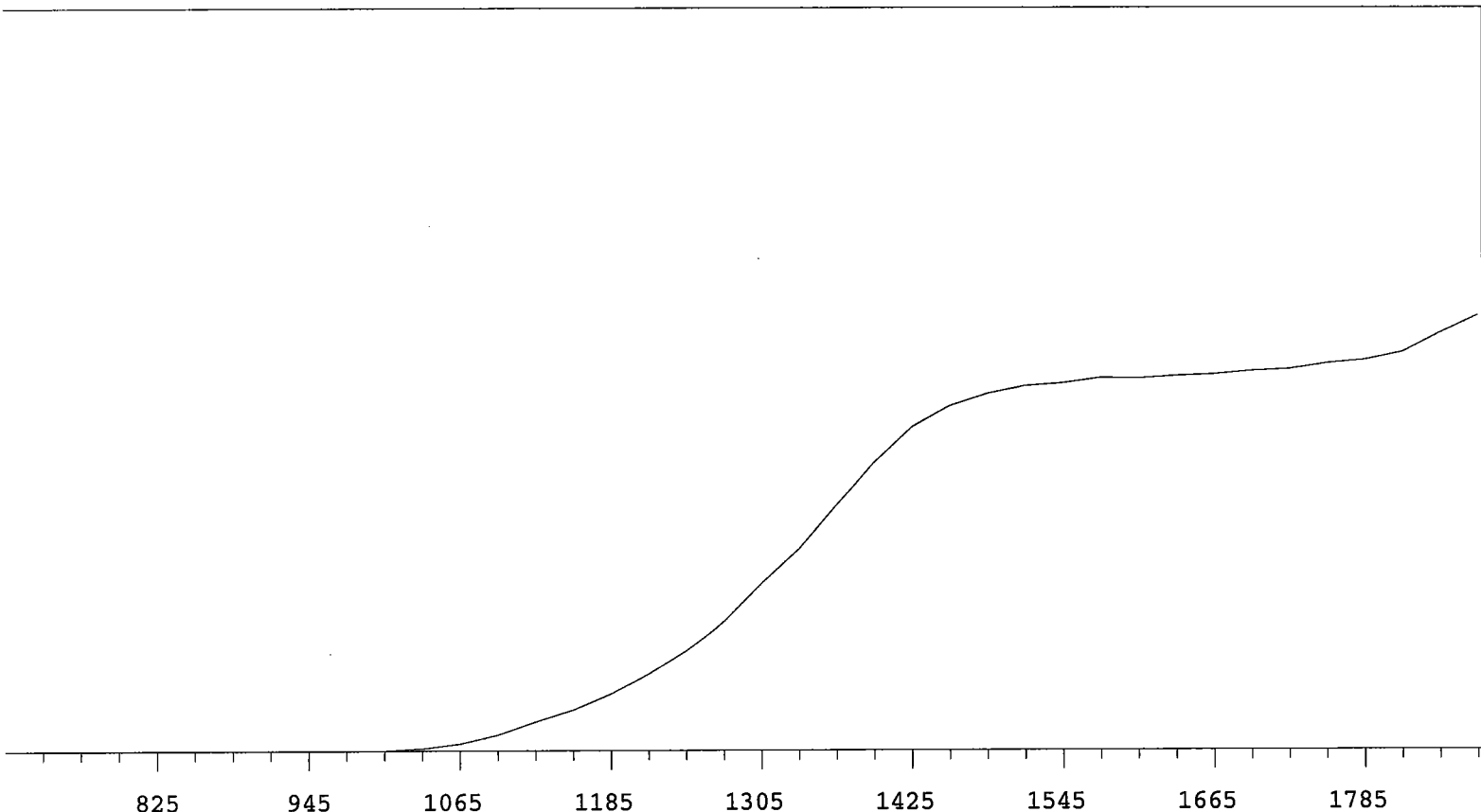
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	11640	+69.78
735	1		1335	14241	+62.88
765	0		1365	17534	+55.91
795	0	+0.00	1395	20127	+45.04
825	0	>100	1425	23254	+31.29
855	1	>100	1455	24902	+20.41
885	0	+55.56	1485	25605	+10.49
915	2	+66.67	1515	26310	+6.44
945	0	>100	1545	26535	+5.31
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

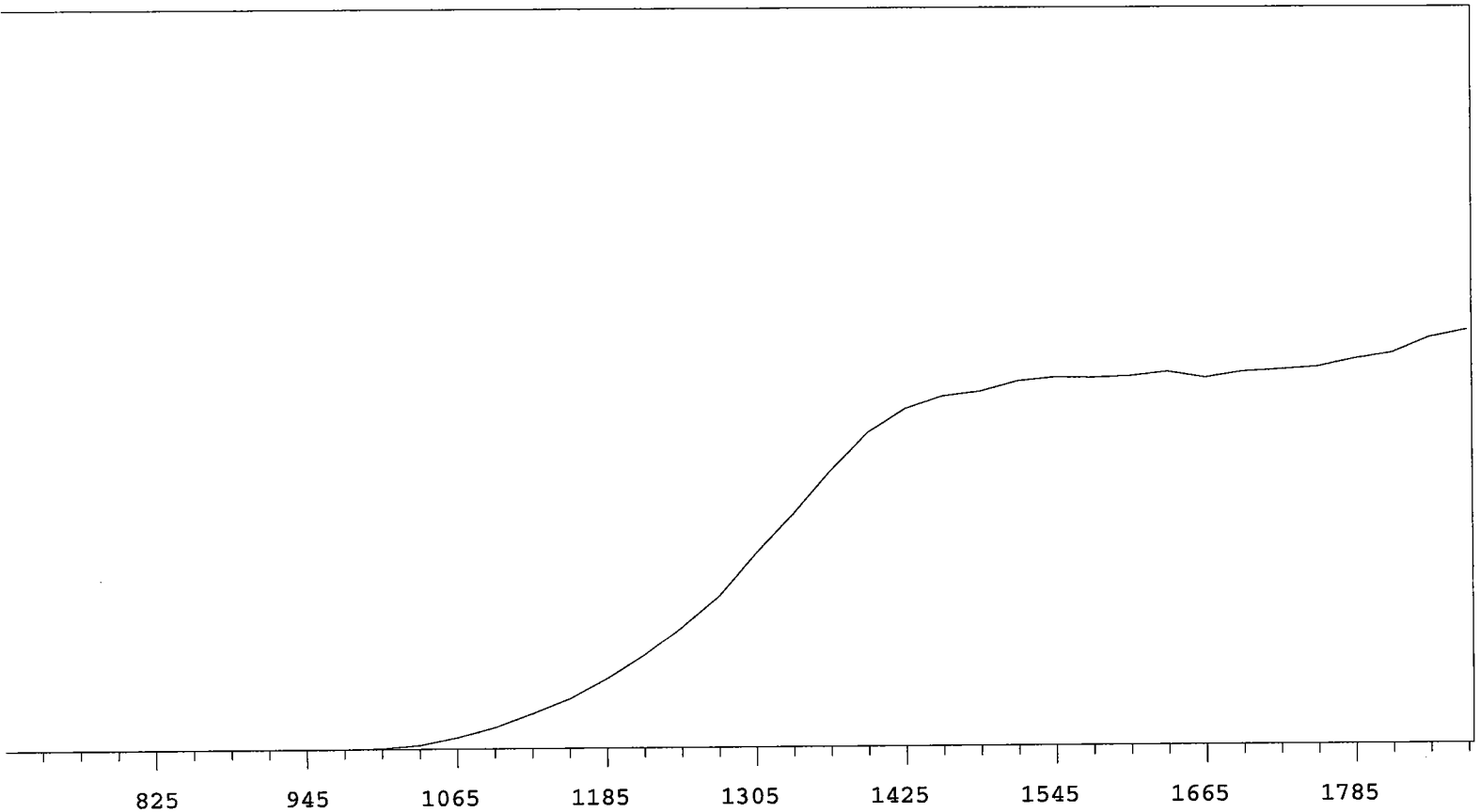


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	13188	+75.92
735	0		1335	16818	+67.60
765	0	+55.56	1365	20420	+59.86
795	1	+83.33	1395	24341	+47.85
825	1	+55.56	1425	27854	+35.51
855	0	>100	1455	30288	+23.26
885	1	+0.00	1485	31798	+14.54
915	0	+0.00	1515	32622	+8.32
945	1	>100	1545	33496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

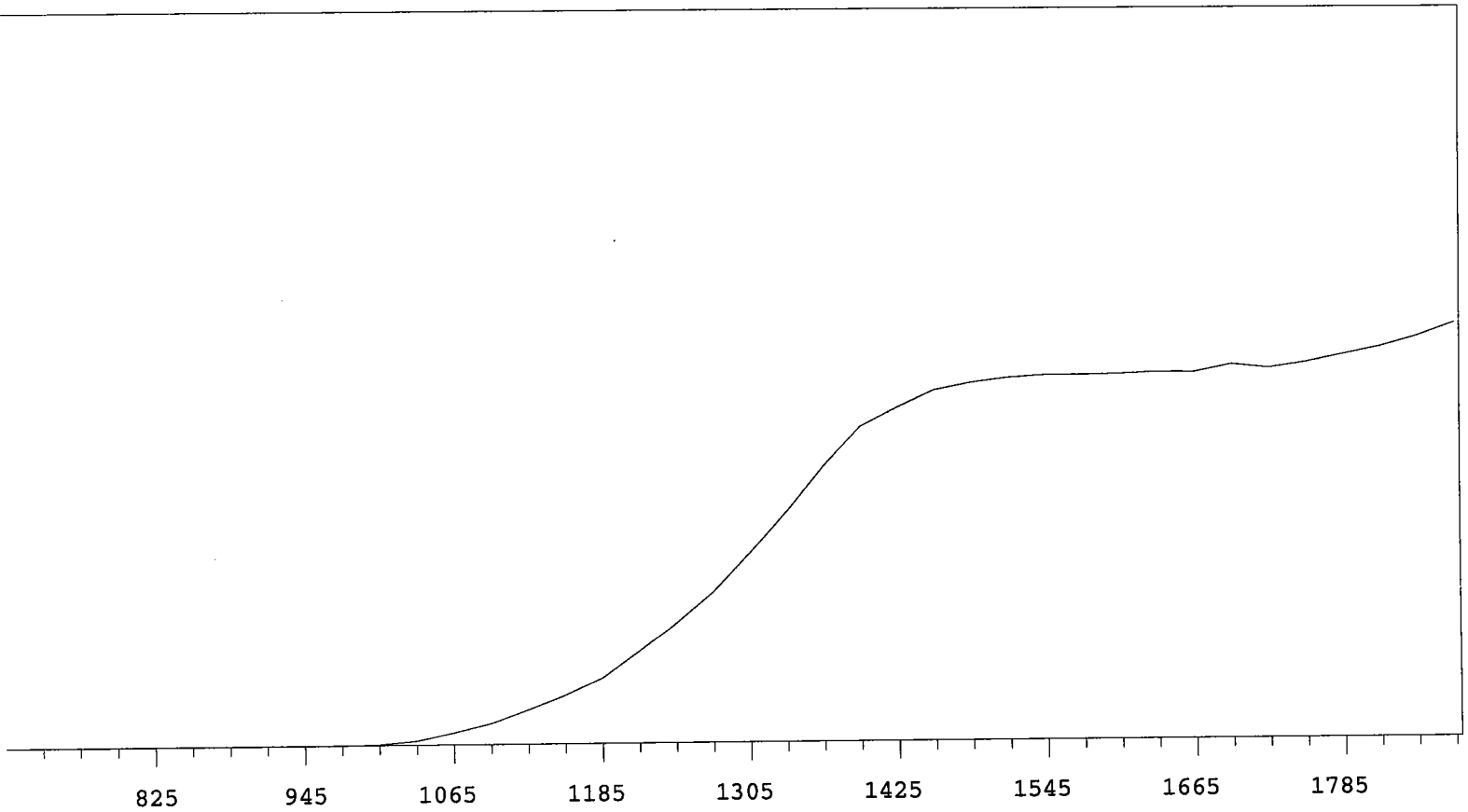


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15202	+66.36
735	1		1335	18216	+57.86
765	0	+0.00	1365	21597	+45.58
795	1	+0.00	1395	24648	+32.96
825	0	+0.00	1425	26505	+19.92
855	1	>100	1455	27475	+11.42
885	0	>100	1485	27836	+7.08
915	0	>100	1515	28609	+4.51
945	0	>100	1545	28896	+2.93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

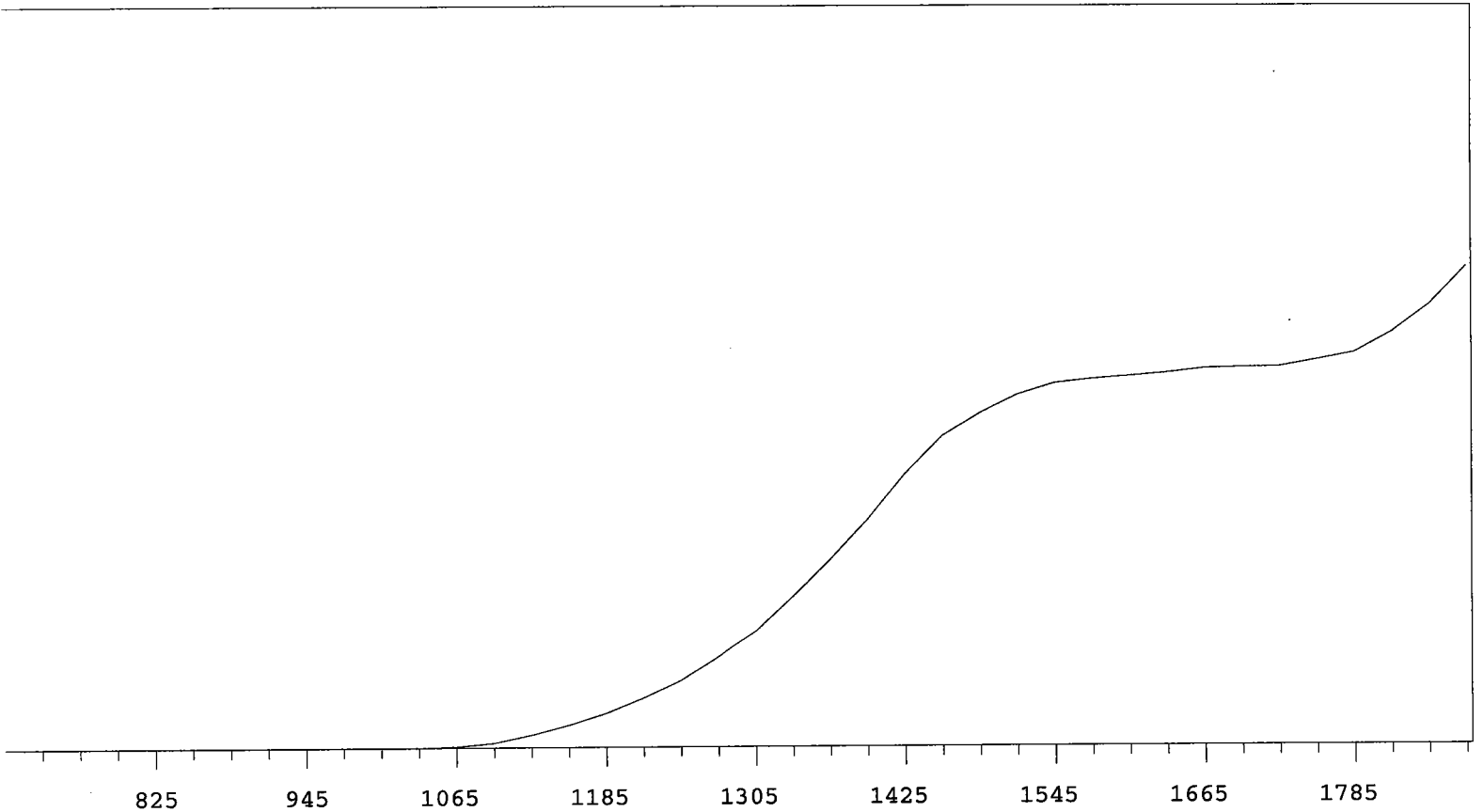


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19017	+67.45
735	1		1335	23157	+59.23
765	0	+83.33	1365	27625	+45.78
795	0	-83.33	1395	31465	+32.72
825	1	>100	1425	33352	+20.41
855	0	>100	1455	35084	+11.74
885	1	+100.00	1485	35819	+7.11
915	1	>100	1515	36292	+3.35
945	2	>100	1545	36527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

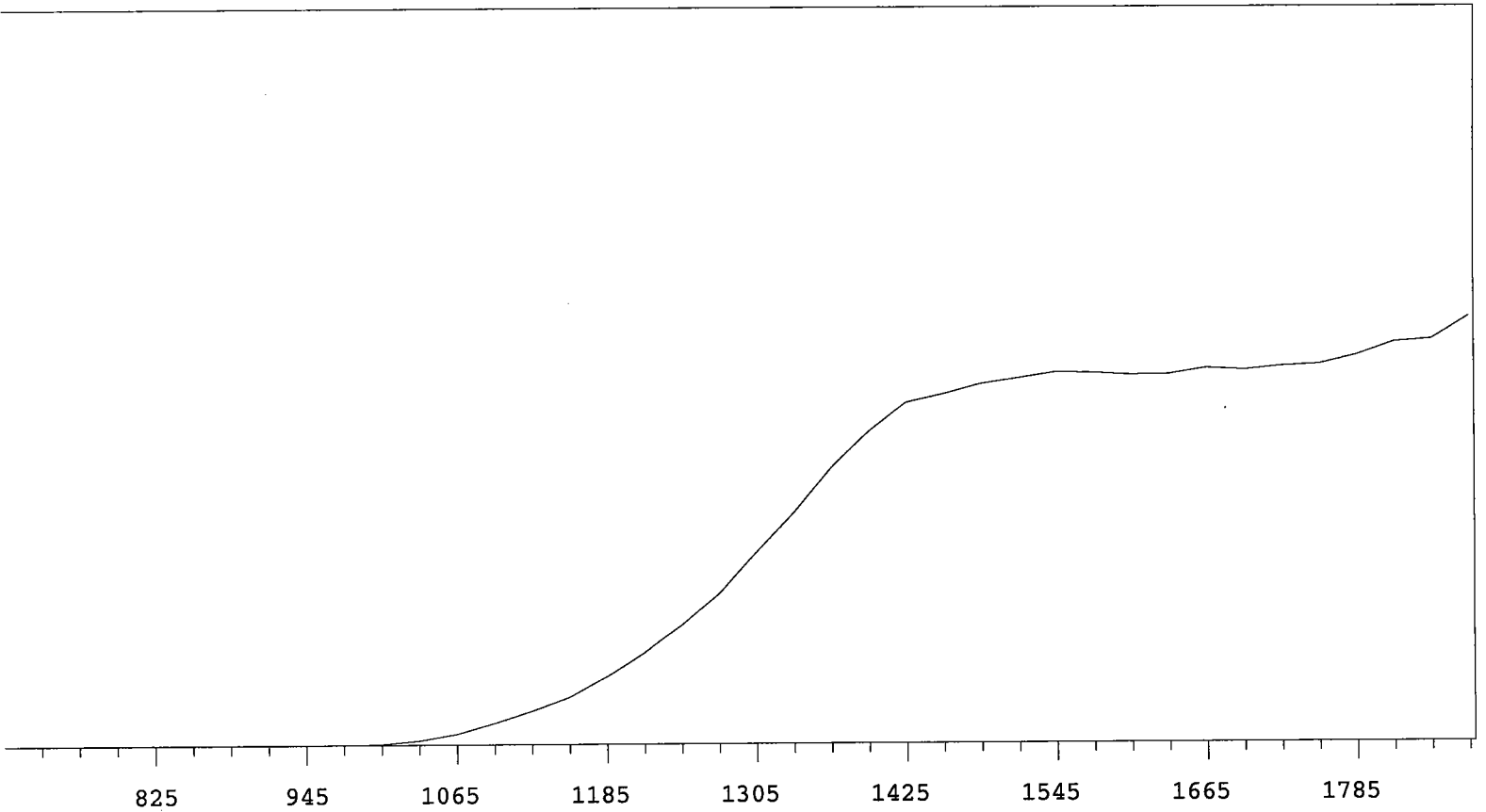
MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 2 MPC 9604 Detector B  
 Beta Volts: 1575

7/1/2009



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	



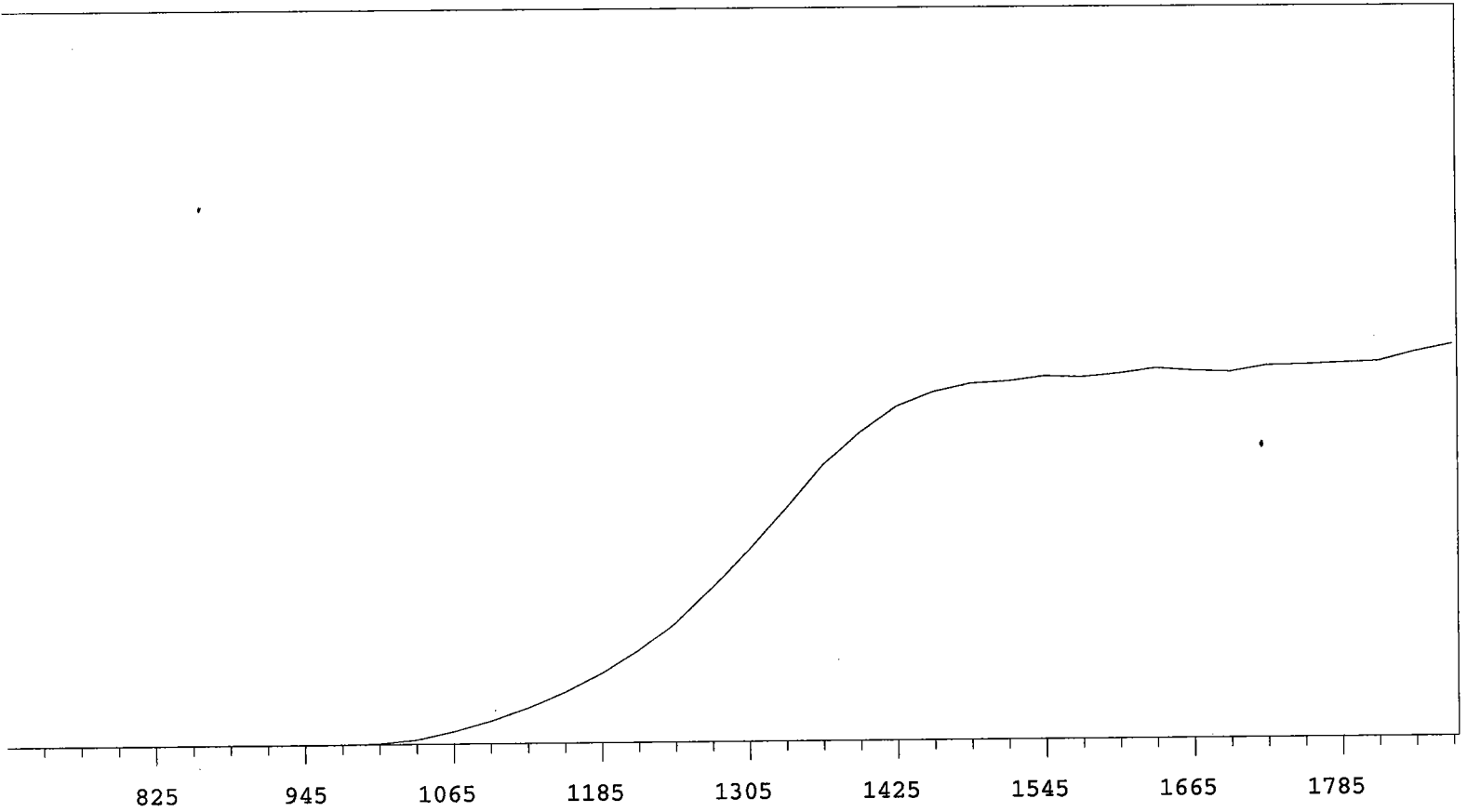
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18216	+67.74
735	0		1335	21995	+58.11
765	0		1365	26173	+46.11
795	0	>100	1395	29479	+32.75
825	0	>100	1425	32186	+20.62
855	0	>100	1455	33022	+12.13
885	0	>100	1485	33981	+7.22
915	1	>100	1515	34520	+4.95
945	0	>100	1545	35095	+2.07
975	17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



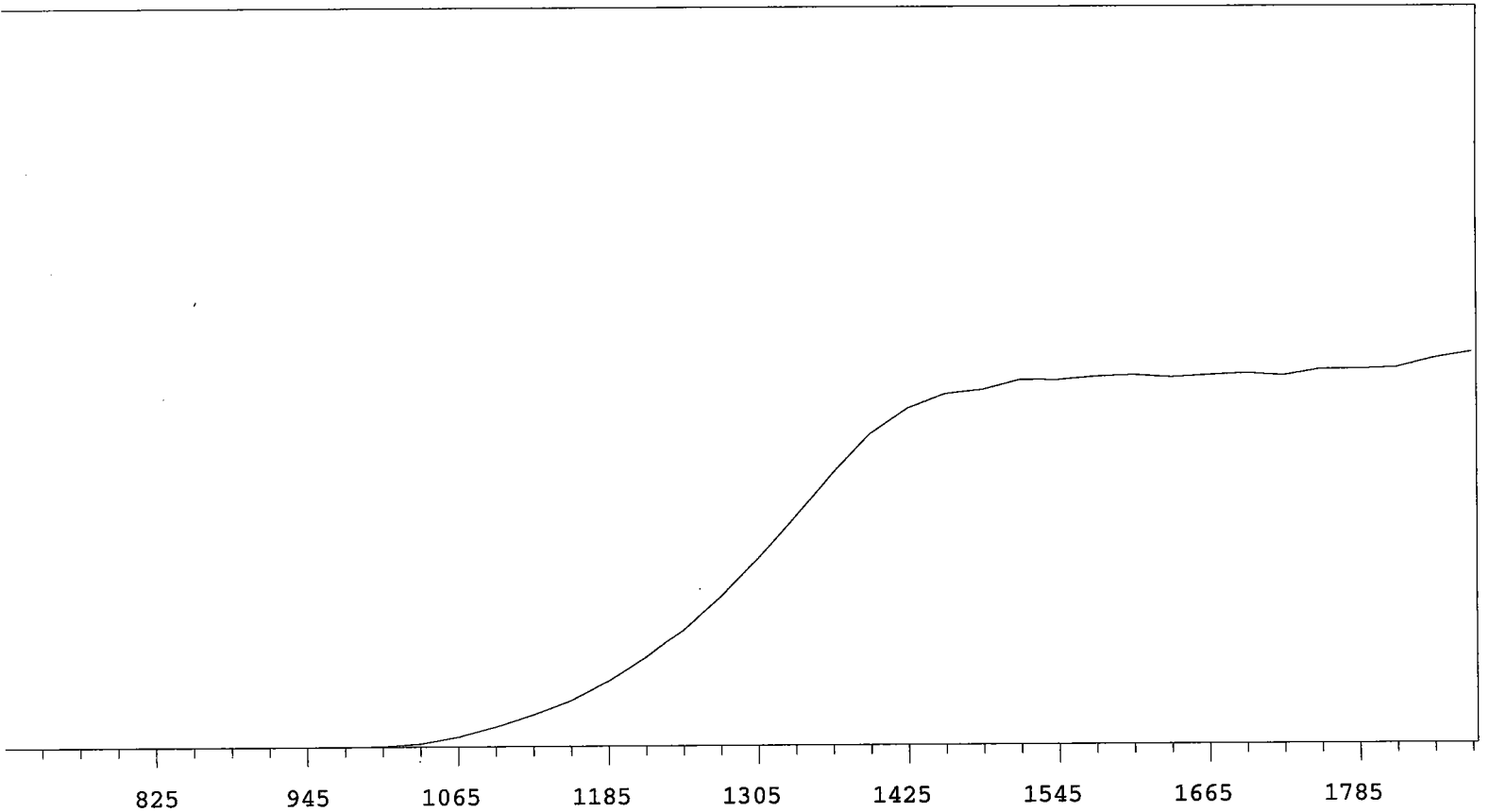
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 2 MPC 9604 Detector D  
Beta Volts: 1575

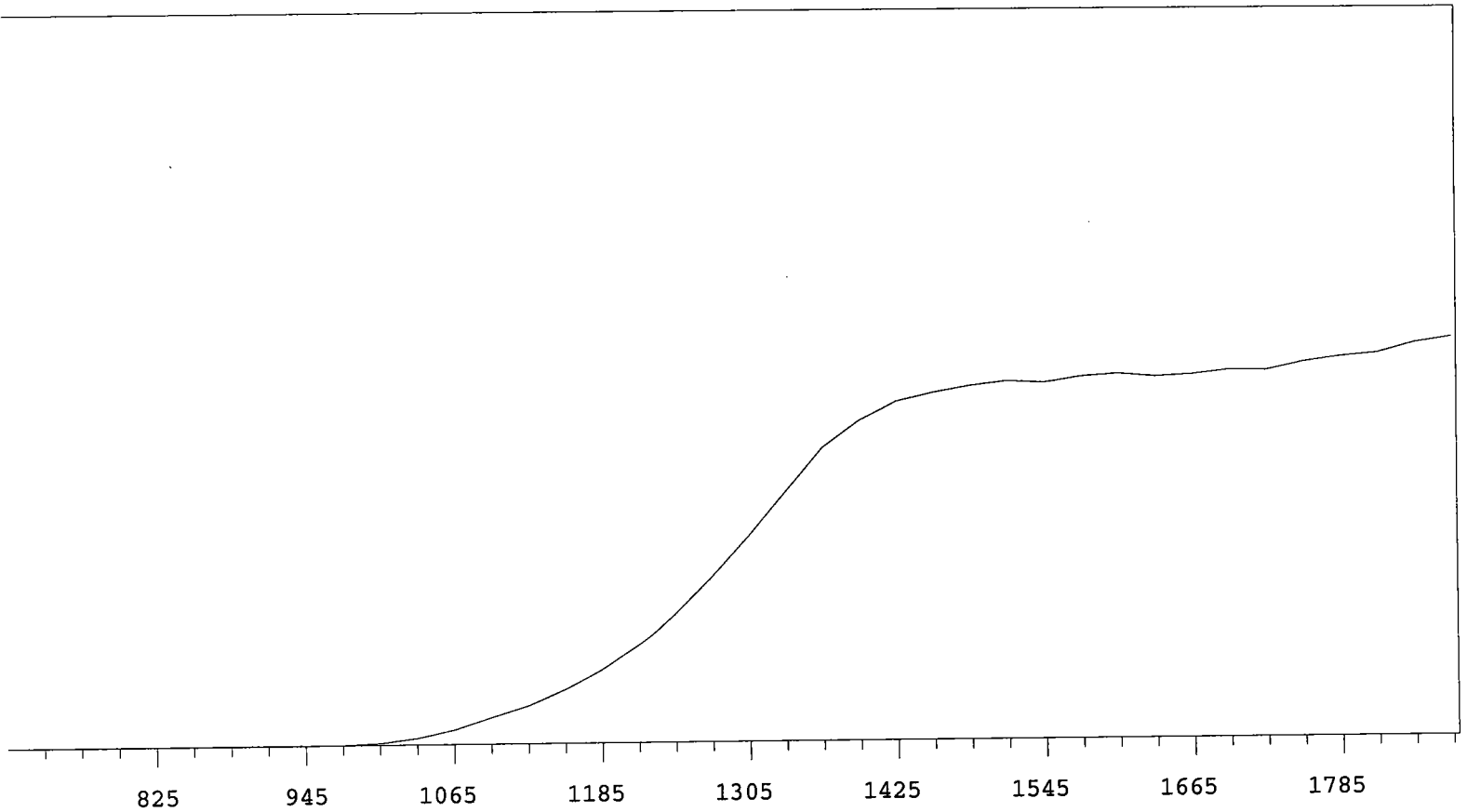
7/1/2009



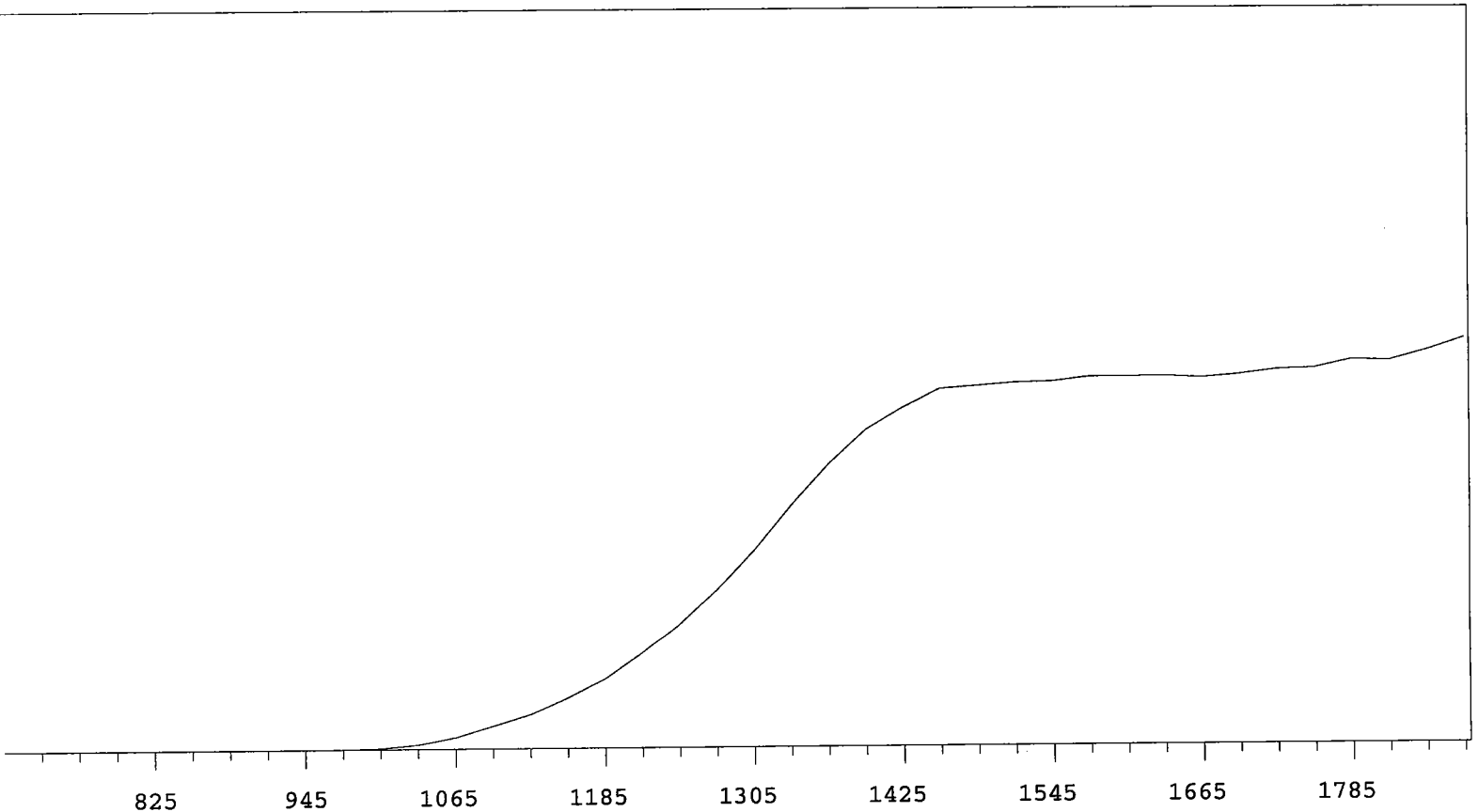
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18675	+65.94
735	0		1335	22620	+55.69
765	0	+83.33	1365	26869	+44.63
795	2	+55.56	1395	29957	+32.08
825	1	>100	1425	32494	+20.49
855	0	>100	1455	33836	+11.98
885	0	>100	1485	34627	+6.45
915	0	>100	1515	34849	+3.22
945	2	>100	1545	35298	+1.98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



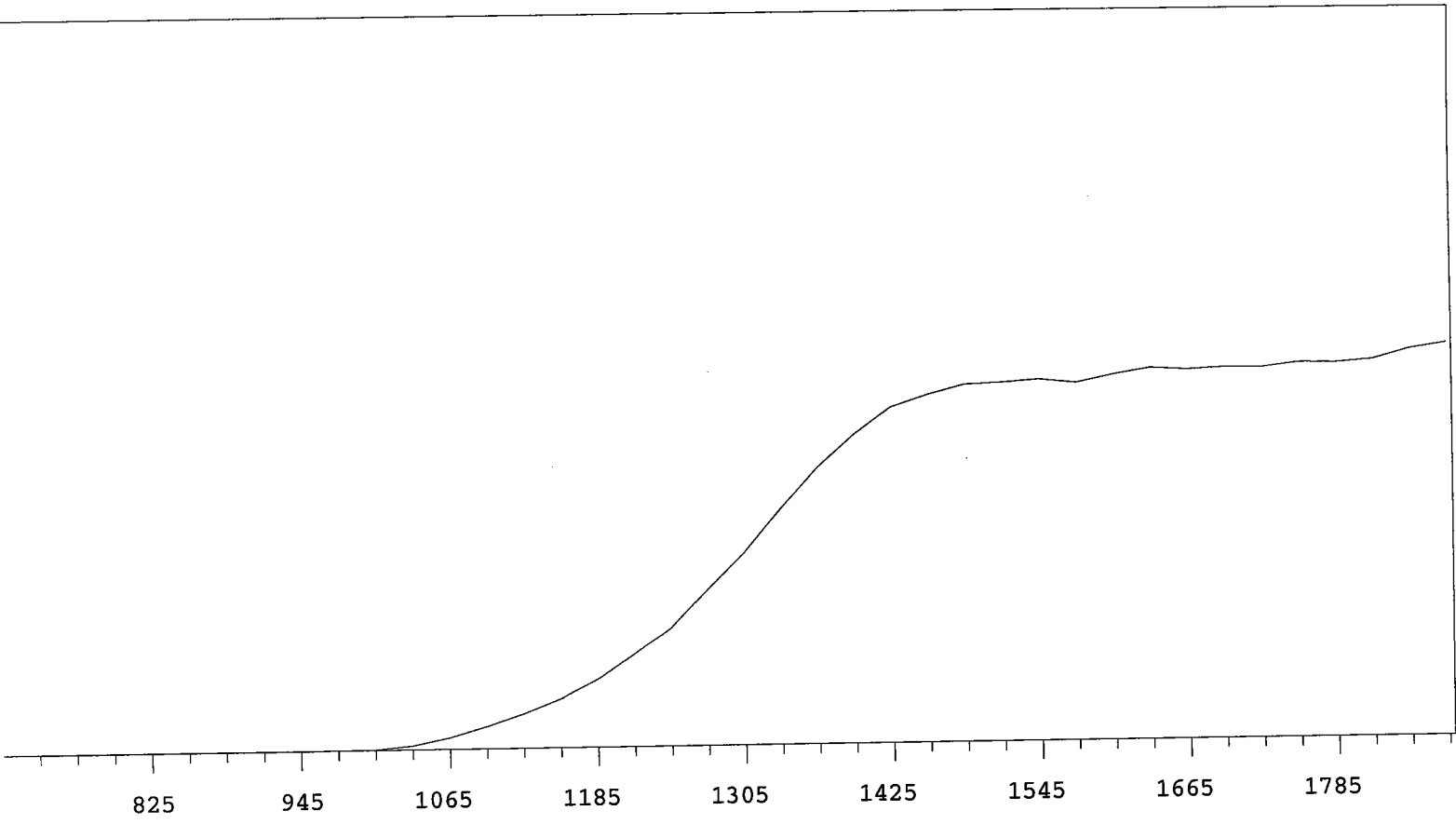
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	16654	+68.57
735	0		1335	20416	+59.26
765	0	+55.56	1365	24191	+47.28
795	1	>100	1395	27643	+34.04
825	1	+0.00	1425	29891	+21.08
855	1	>100	1455	31183	+12.30
885	0	>100	1485	31558	+6.67
915	0	>100	1515	32444	+4.05
945	0	>100	1545	32413	+2.90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



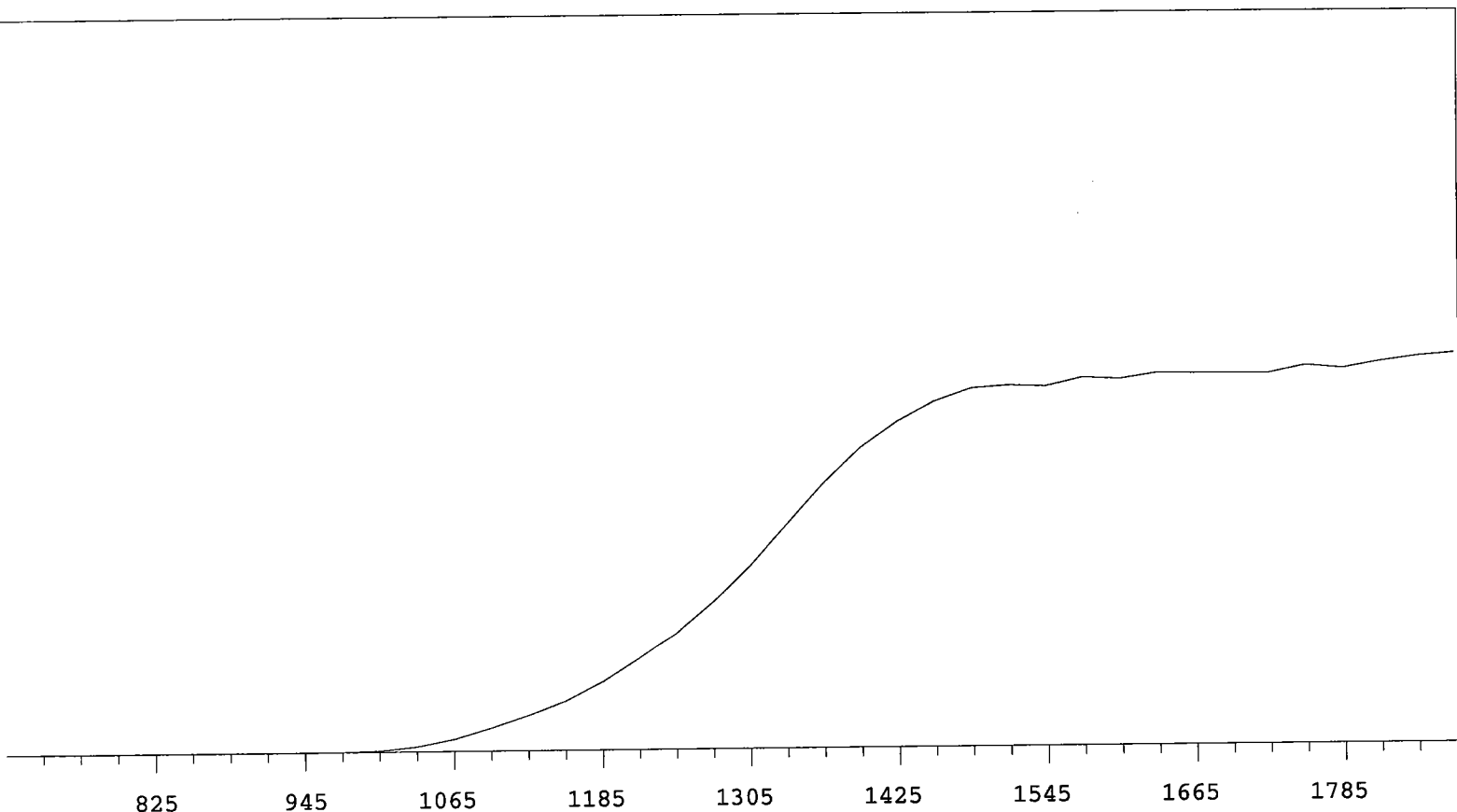
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	19810	+64.73
735	1		1335	23962	+52.62
765	0	-55.56	1365	28091	+39.27
795	0	>100	1395	30594	+25.61
825	1	>100	1425	32381	+14.86
855	3	+33.33	1455	33206	+8.91
885	0	+0.00	1485	33832	+4.41
915	1	>100	1515	34260	+3.01
945	2	>100	1545	34071	+2.33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



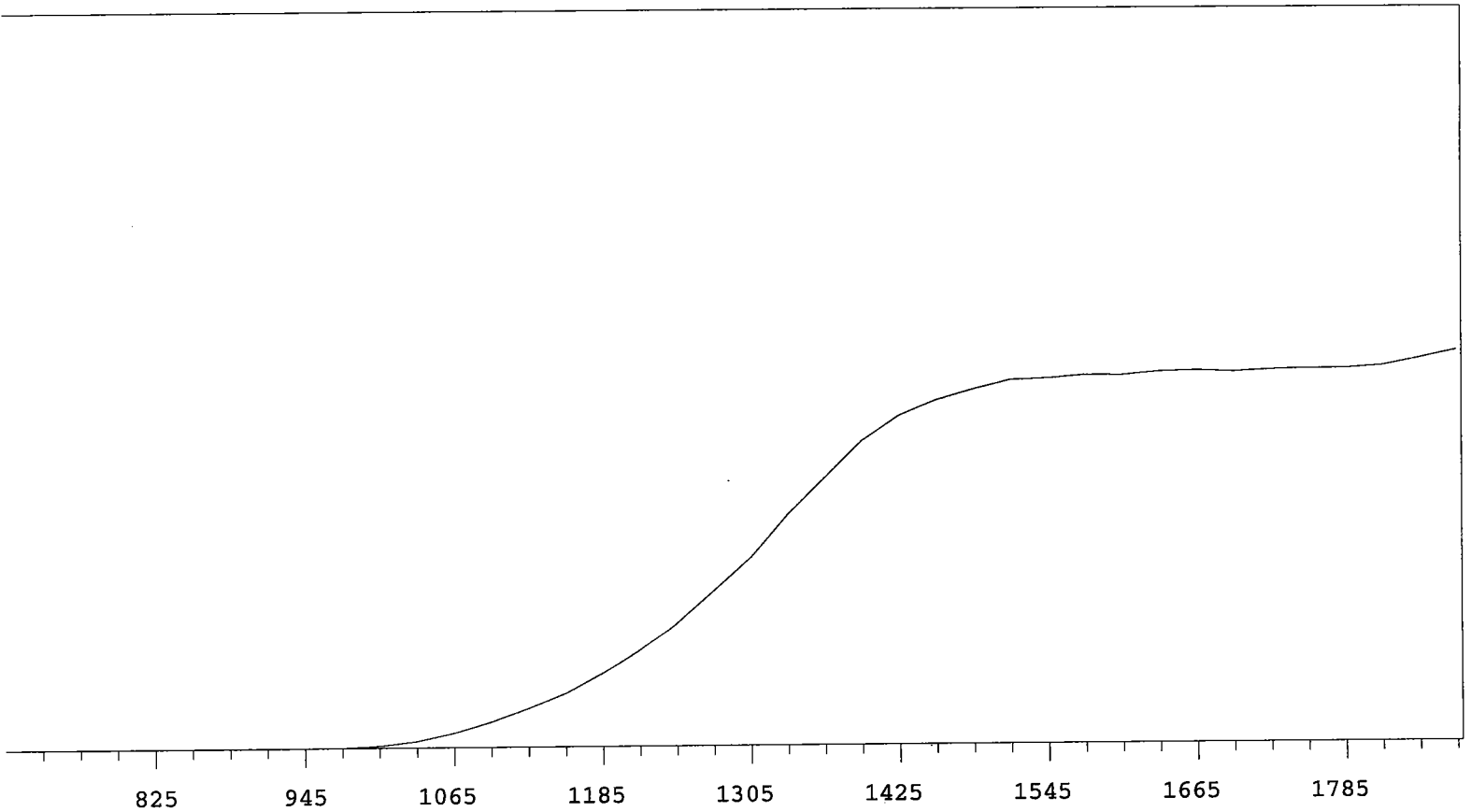
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	21412	+66.80
735	1		1335	26262	+56.32
765	1		1365	30679	+43.71
795	0	>100	1395	34466	+31.61
825	0	+0.00	1425	36949	+20.14
855	0	>100	1455	38998	+11.16
885	1	>100	1485	39313	+5.34
915	1	>100	1515	39625	+2.44
945	1	>100	1545	39751	+2.04
975	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	



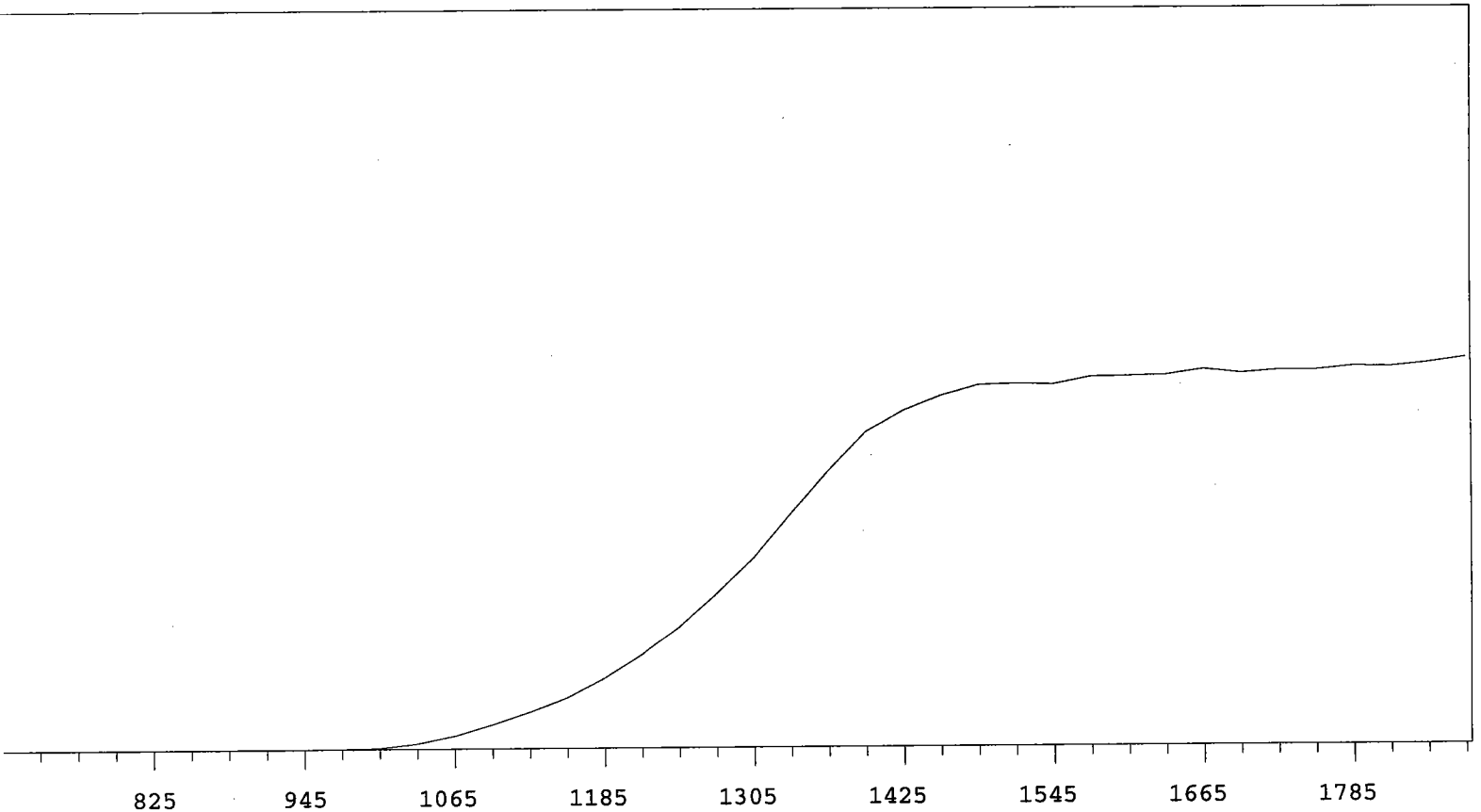
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14171	+66.45
735	1		1335	17362	+54.90
765	0	+0.00	1365	20310	+43.83
795	1	>100	1395	22647	+30.82
825	0	+83.33	1425	24551	+20.19
855	0	-83.33	1455	25440	+11.69
885	1	>100	1485	26124	+5.90
915	0	>100	1515	26245	+2.21
945	1	>100	1545	26428	+1.39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



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	



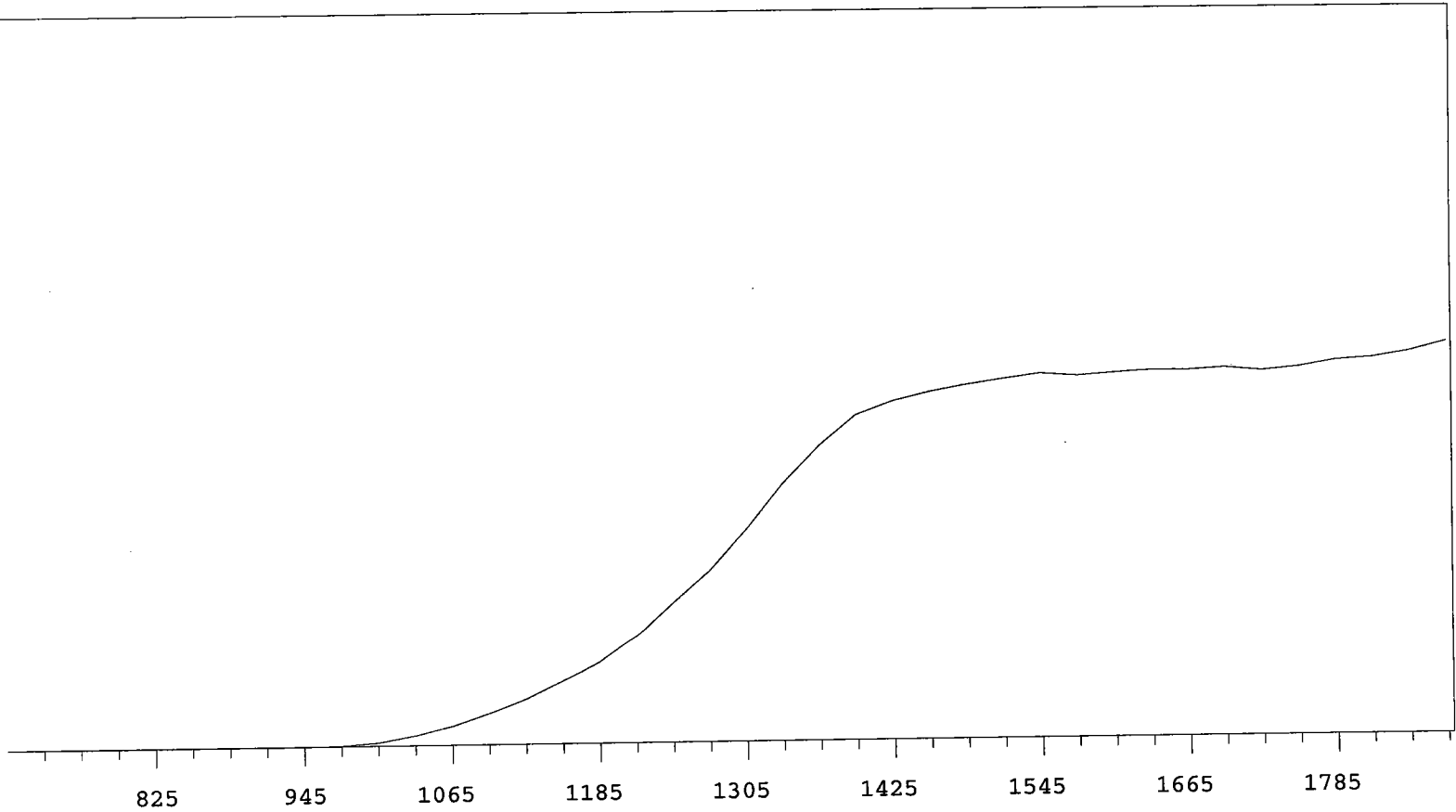
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19796	+65.77
735	1		1335	24338	+57.55
765	0	+55.56	1365	28686	+45.86
795	2	+0.00	1395	32750	+32.27
825	0	-55.56	1425	34919	+20.83
855	1	>100	1455	36434	+11.45
885	0	>100	1485	37487	+5.80
915	0	>100	1515	37623	+3.32
945	2	>100	1545	37528	+2.07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



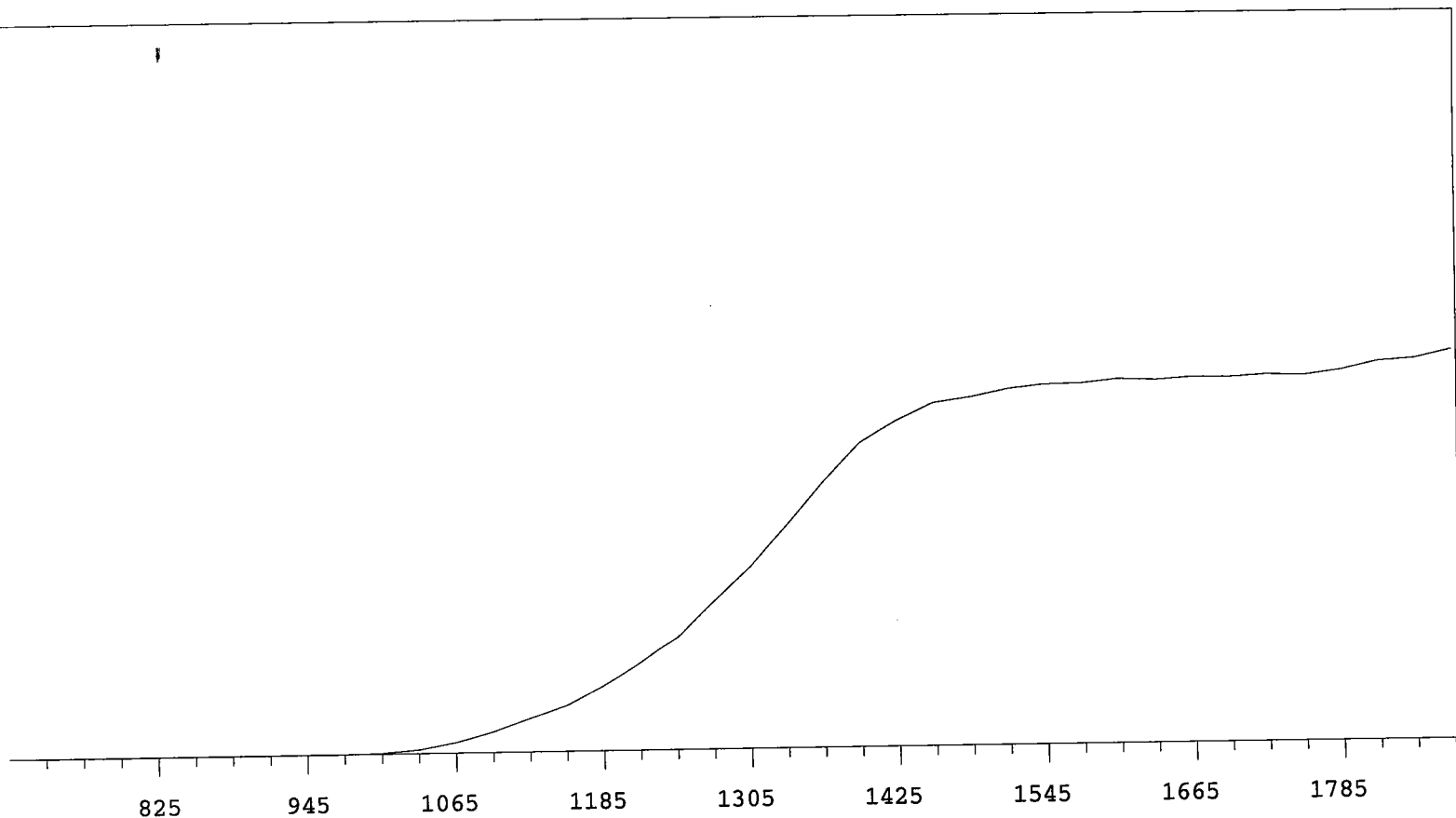
MPC 9600 Plateau  
Alpha Volts: 705

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	

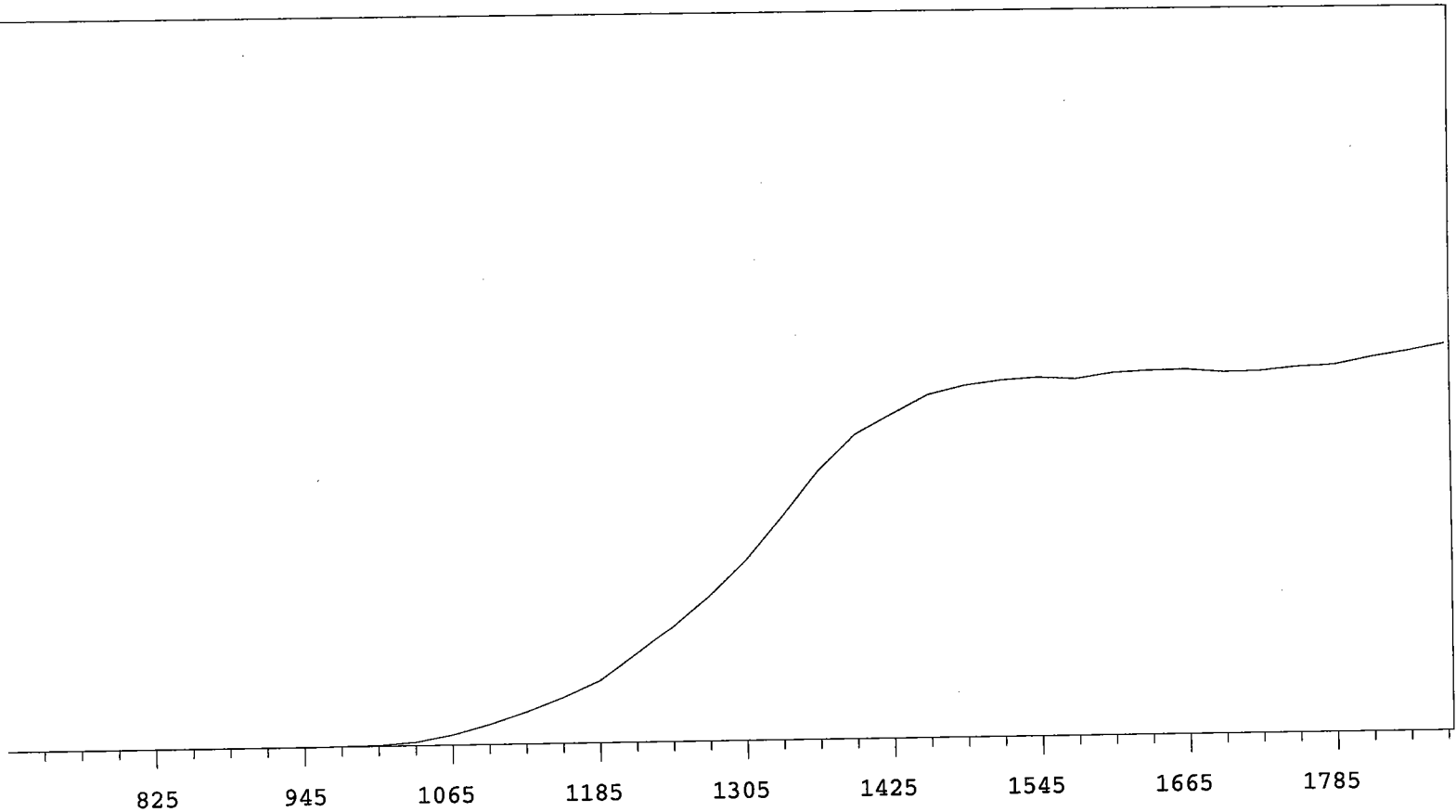


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13974	+68.00
735	0		1335	17170	+58.62
765	1		1365	20456	+47.04
795	1	+83.33	1395	23332	+33.83
825	1	-83.33	1425	24996	+21.10
855	1	>100	1455	26290	+12.40
885	0	-55.56	1485	26683	+7.74
915	0	>100	1515	27270	+4.43
945	1	>100	1545	27590	+3.48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

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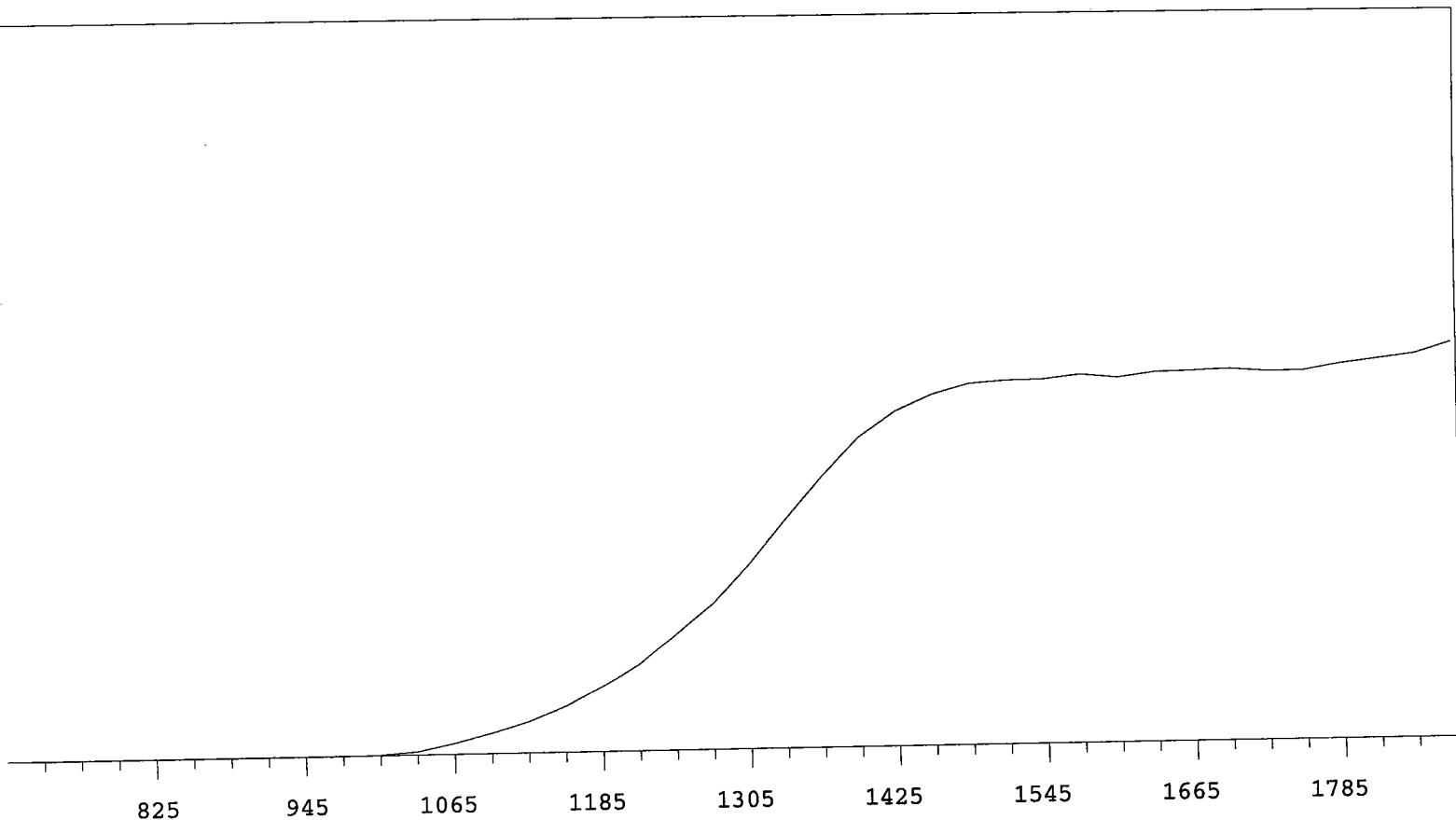


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17414	+68.46
735	0		1335	21540	+59.98
765	0		1365	25854	+46.75
795	0	>100	1395	29222	+33.38
825	1	>100	1425	31128	+21.52
855	1	+41.67	1455	32995	+13.26
885	2	-33.33	1485	33846	+8.09
915	0	>100	1515	34289	+3.25
945	1	>100	1545	34528	+2.00
975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

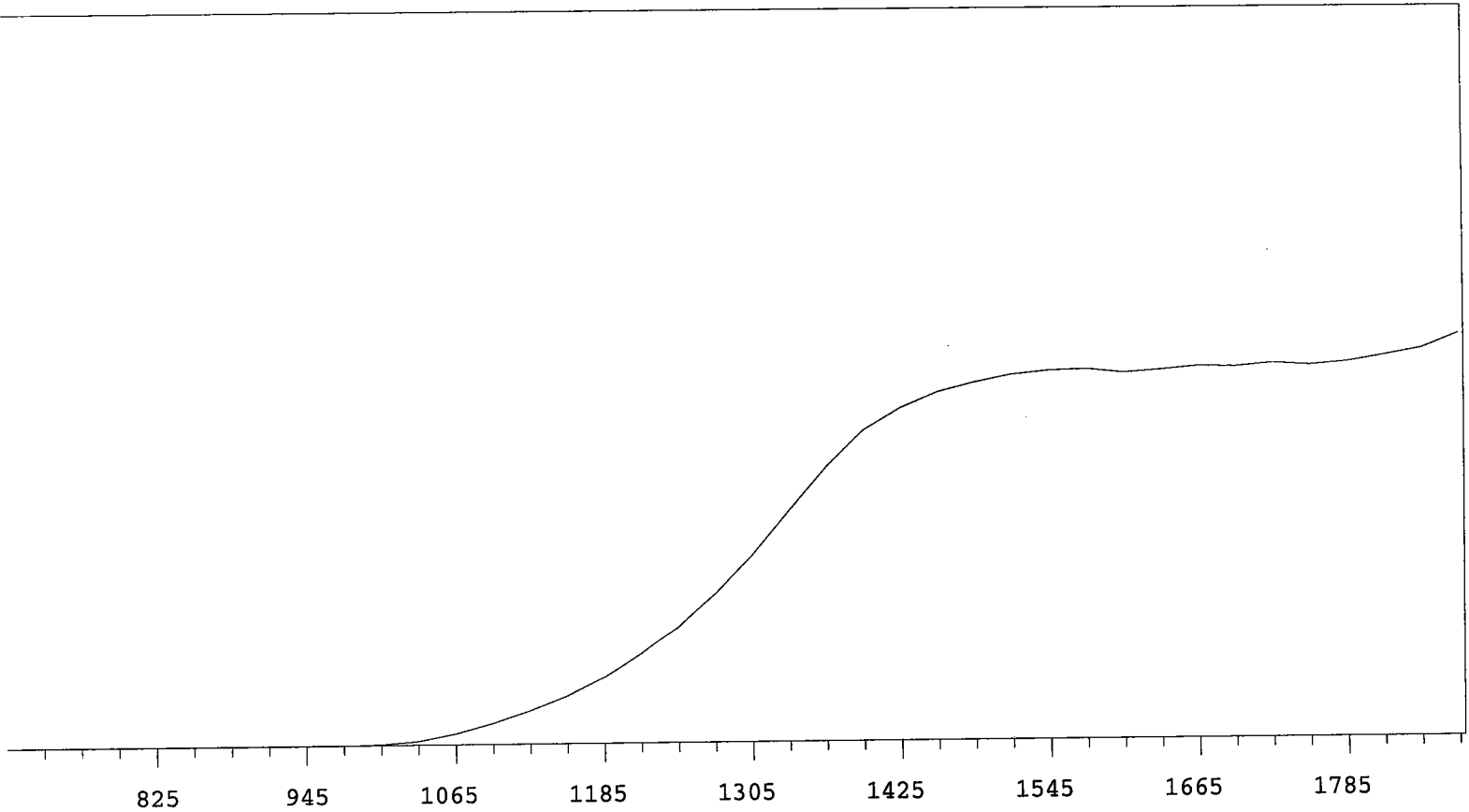
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 5 MPC 9604 Detector C  
Beta Volts: 1575

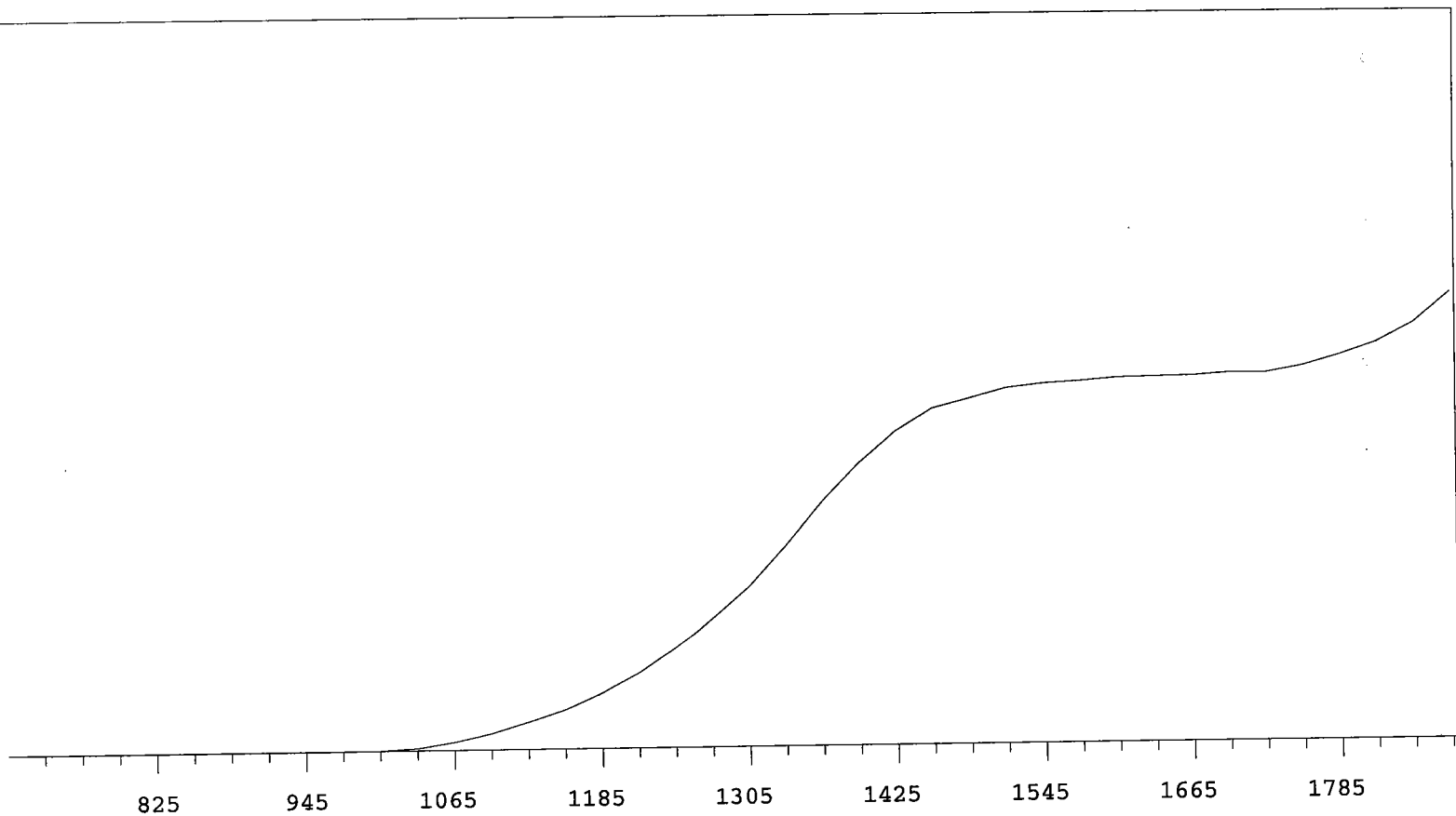
7/1/2009



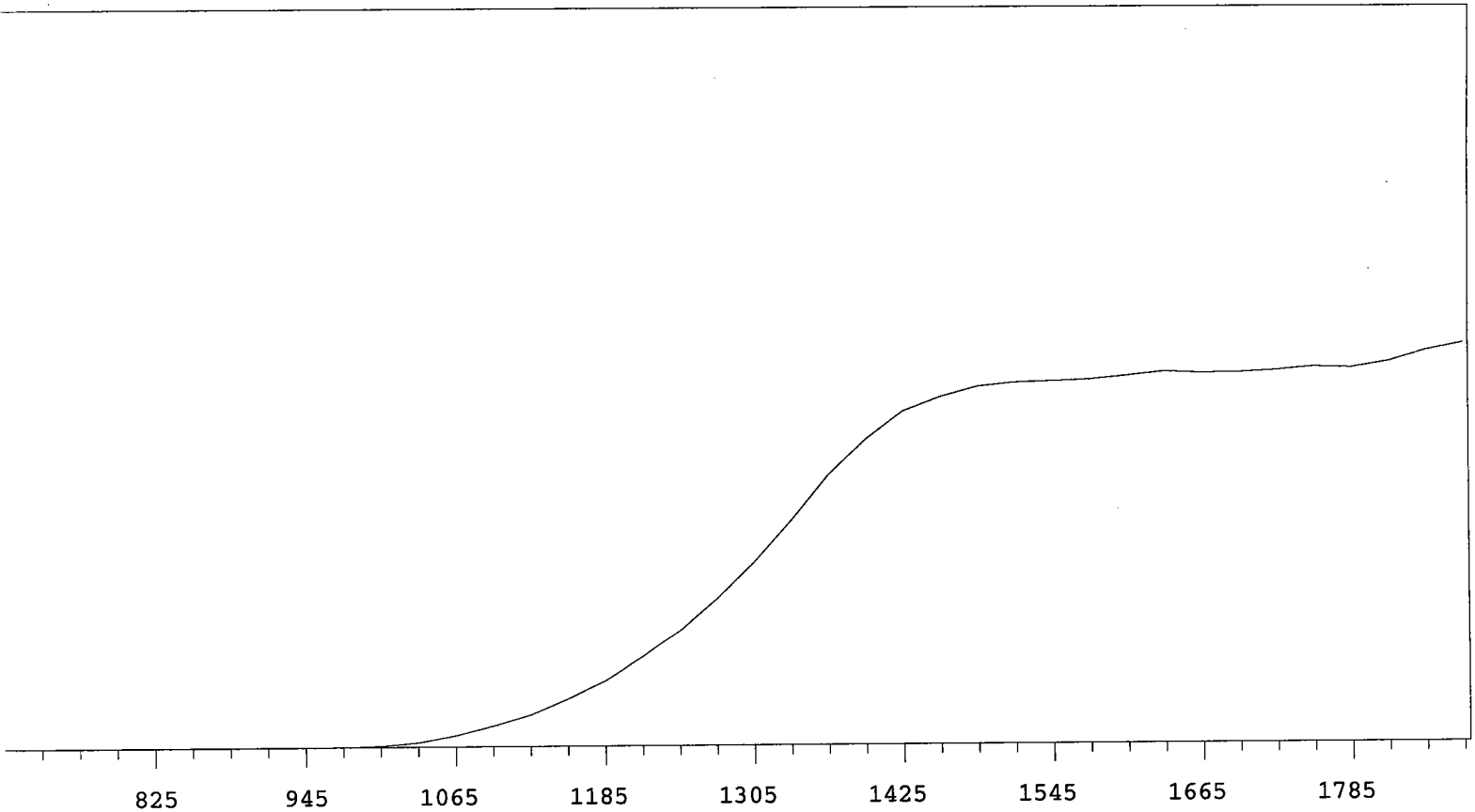
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17085	+68.24
735	0		1335	21135	+59.99
765	0		1365	25066	+47.39
795	0	>100	1395	28530	+33.93
825	0	>100	1425	30823	+22.30
855	1	>100	1455	32287	+12.93
885	0	>100	1485	33217	+6.71
915	1	>100	1515	33474	+3.57
945	2	>100	1545	33517	+1.17
975	7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



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



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

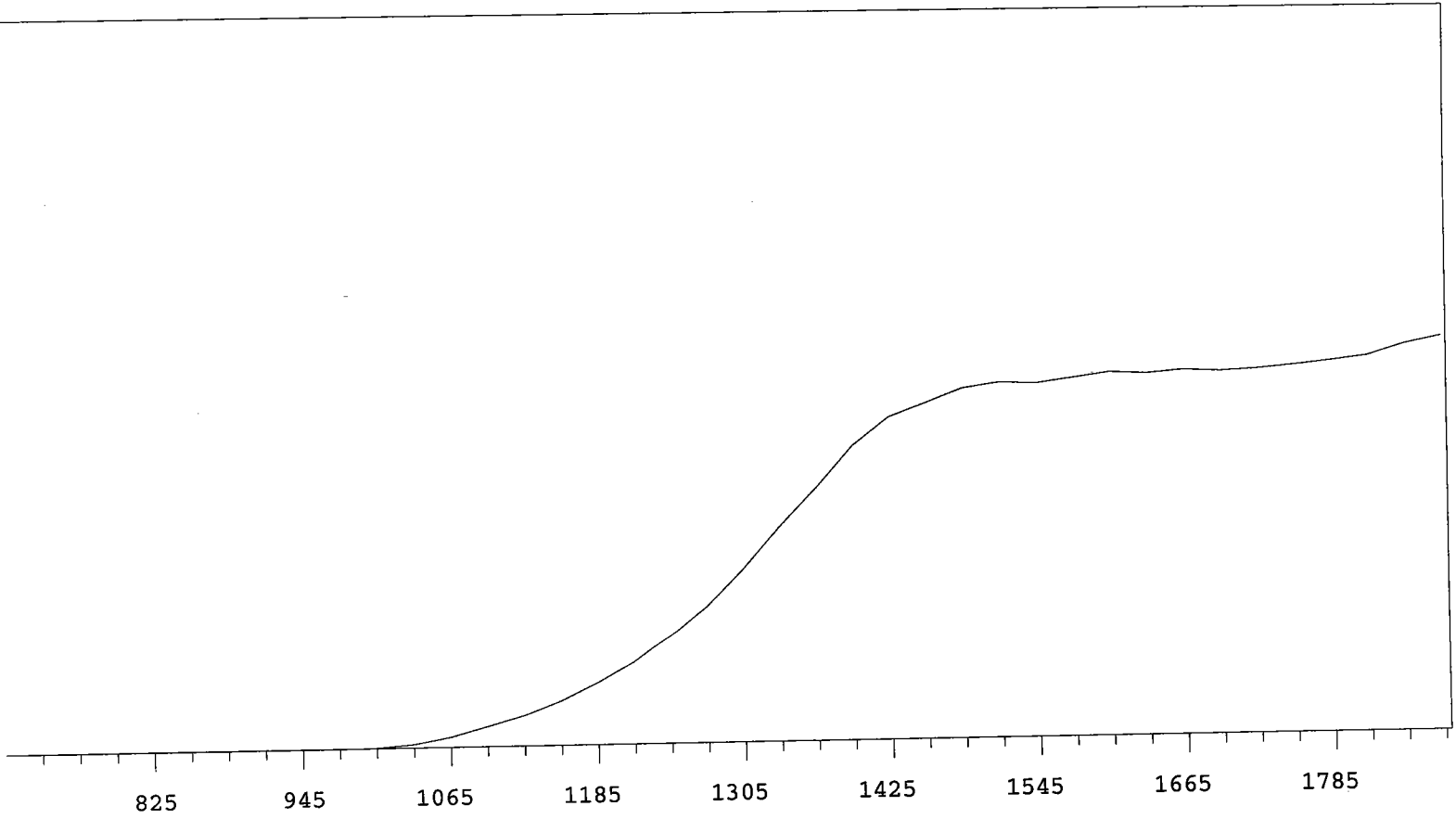


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	20094	+68.67
735	0		1335	24665	+59.40
765	0		1365	29591	+47.86
795	0	>100	1395	33376	+34.51
825	1	+83.33	1425	36440	+22.50
855	1	-83.33	1455	38024	+13.58
885	0	>100	1485	39187	+7.04
915	0	>100	1515	39608	+3.63
945	5	>100	1545	39722	+2.10
975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

MPC 9600 Plateau  
 Alpha Volts: 705

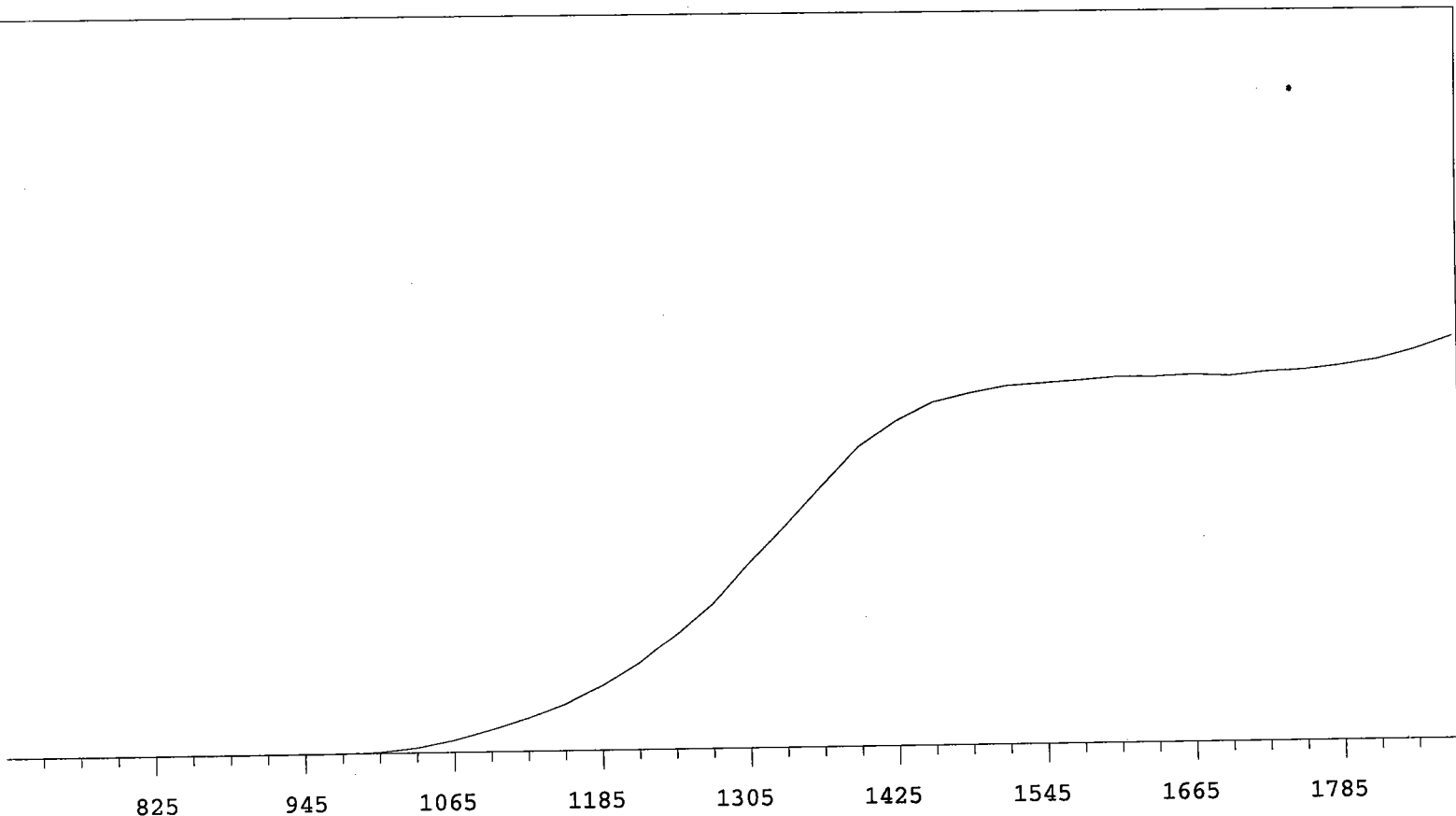
Instrument 6 MPC 9604 Detector C  
 Beta Volts: 1575

7/1/2009



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



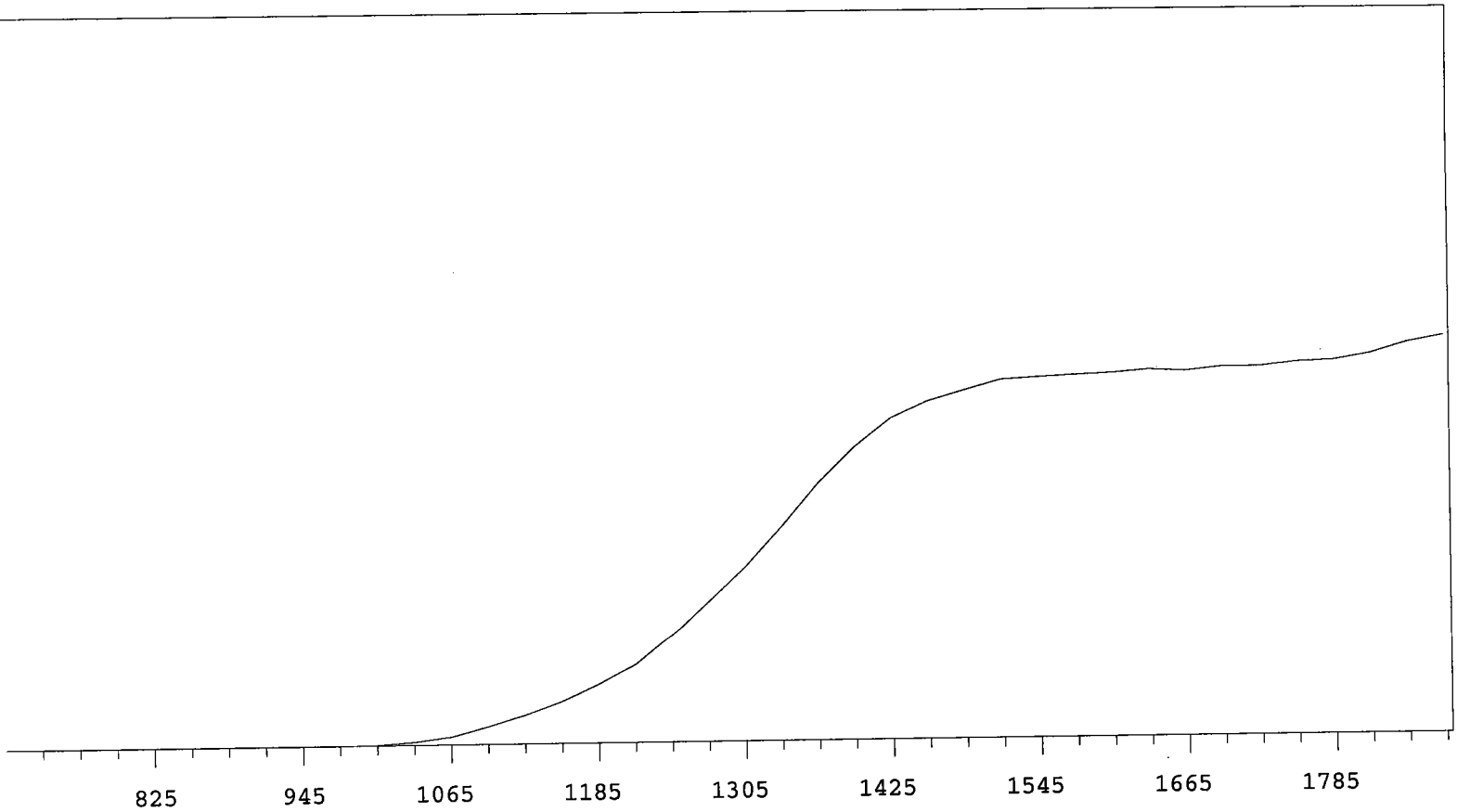


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17954	+65.82
735	0		1335	21482	+57.64
765	0		1365	25373	+45.78
795	1	+0.00	1395	29042	+34.80
825	0	>100	1425	31373	+23.29
855	0	+0.00	1455	33143	+14.25
885	0	>100	1485	34006	+8.49
915	1	>100	1515	34662	+4.71
945	0	>100	1545	34892	+3.14
975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

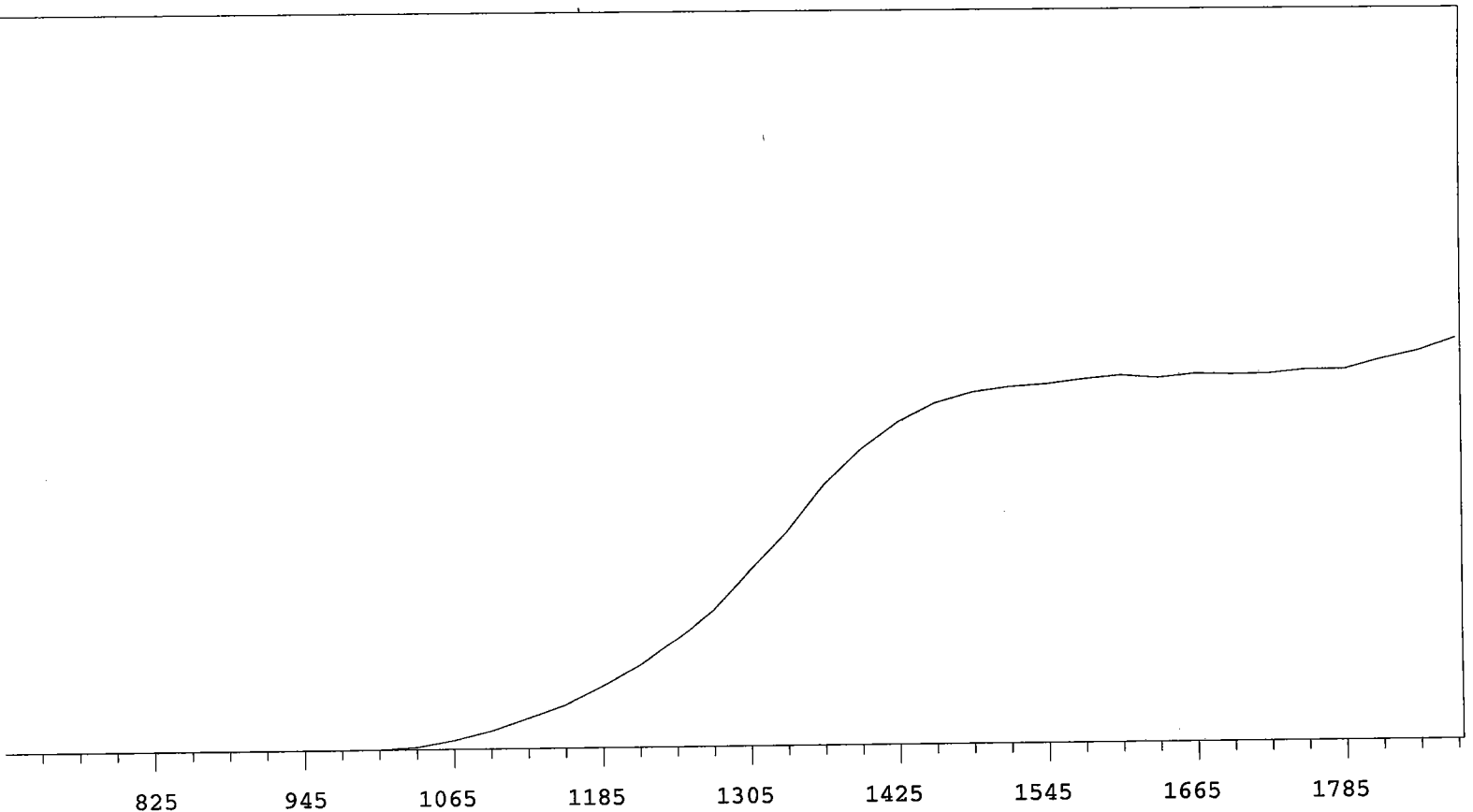
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 7 MPC 9604 Detector A  
Beta Volts: 1575

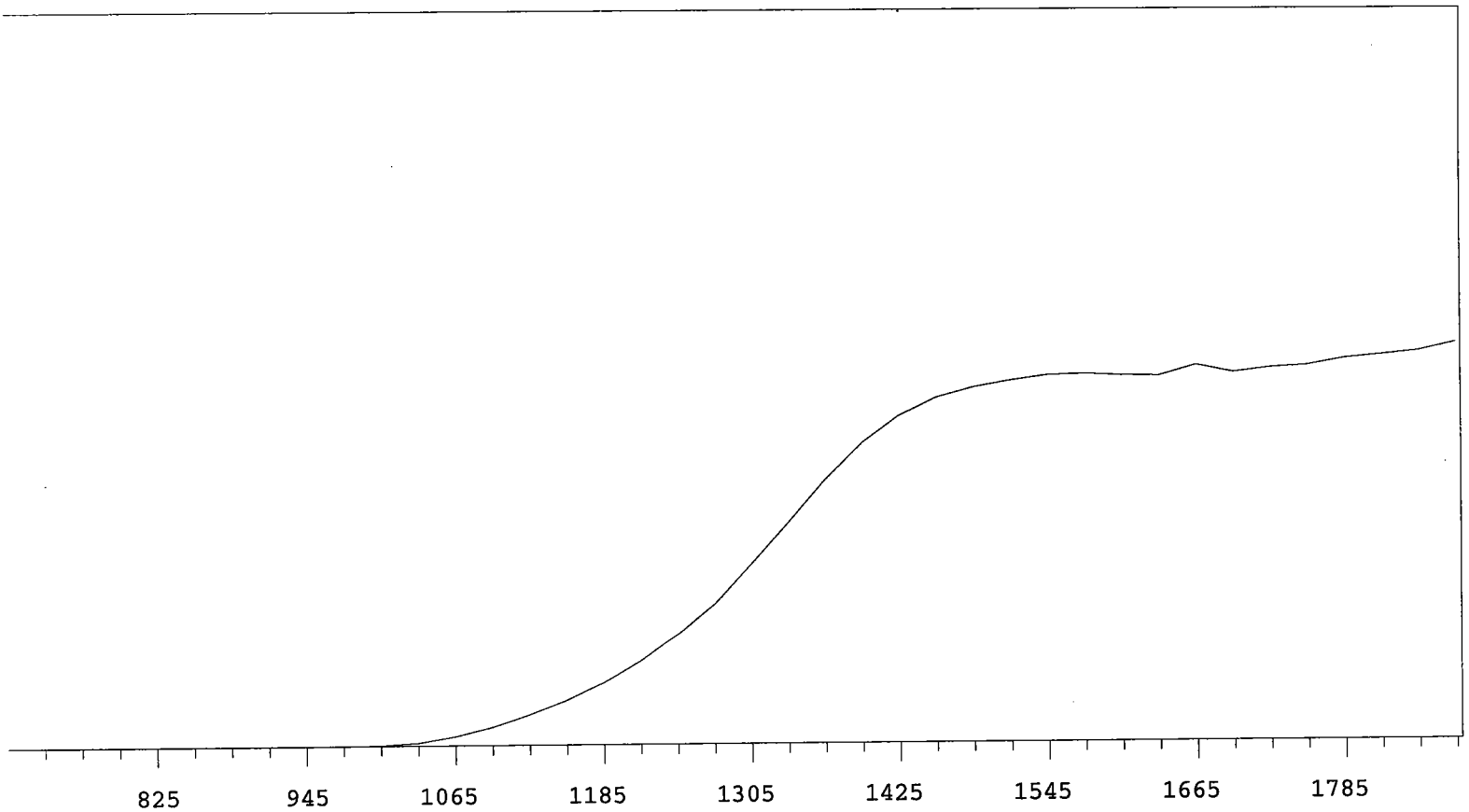
7/1/2009



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



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

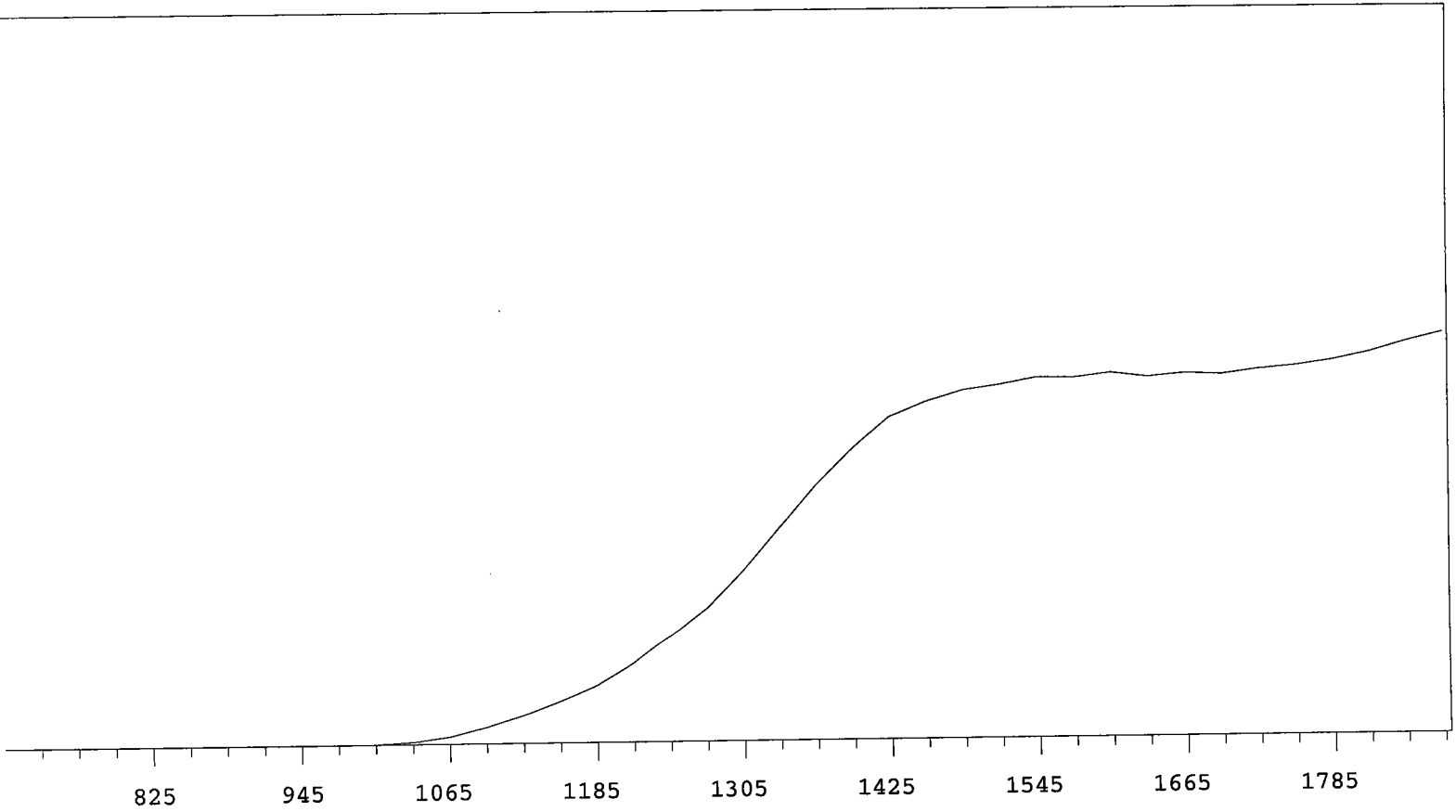


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16543	+70.03
735	0		1335	20257	+60.71
765	0		1365	24245	+48.17
795	0	>100	1395	27602	+35.50
825	0	>100	1425	30019	+23.48
855	0	>100	1455	31614	+14.53
885	0	>100	1485	32522	+8.91
915	0	>100	1515	33103	+5.28
945	0	>100	1545	33572	+2.60
975	4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

MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 7 MPC 9604 Detector D  
 Beta Volts: 1575

7/1/2009

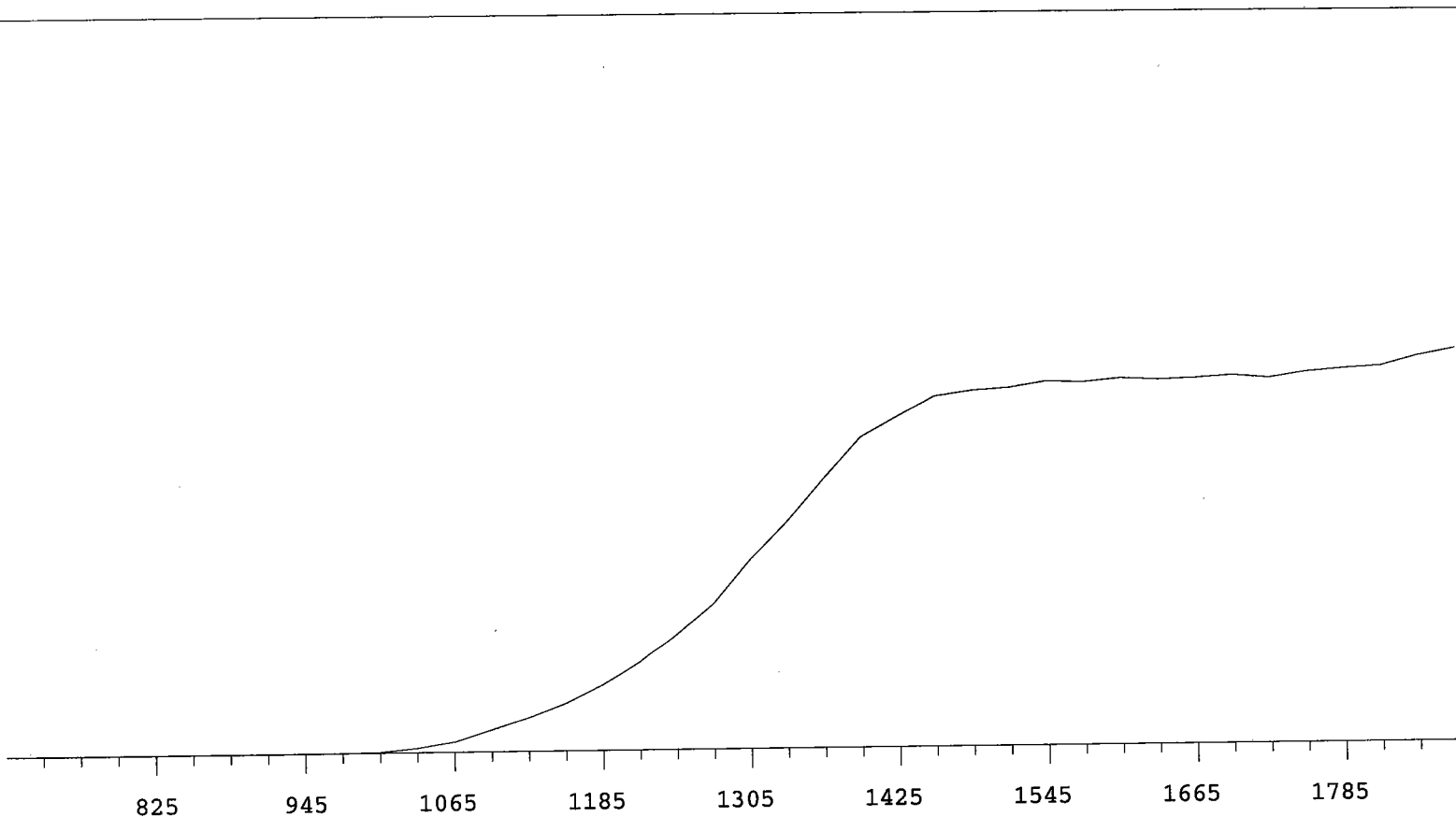


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14016	+71.42
735	0		1335	17436	+62.21
765	0		1365	20814	+50.32
795	0	>100	1395	23760	+36.91
825	0	>100	1425	26302	+24.91
855	0	>100	1455	27519	+15.17
885	0	>100	1485	28410	+8.91
915	0	>100	1515	28843	+5.41
945	0	>100	1545	29396	+3.58
975	5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

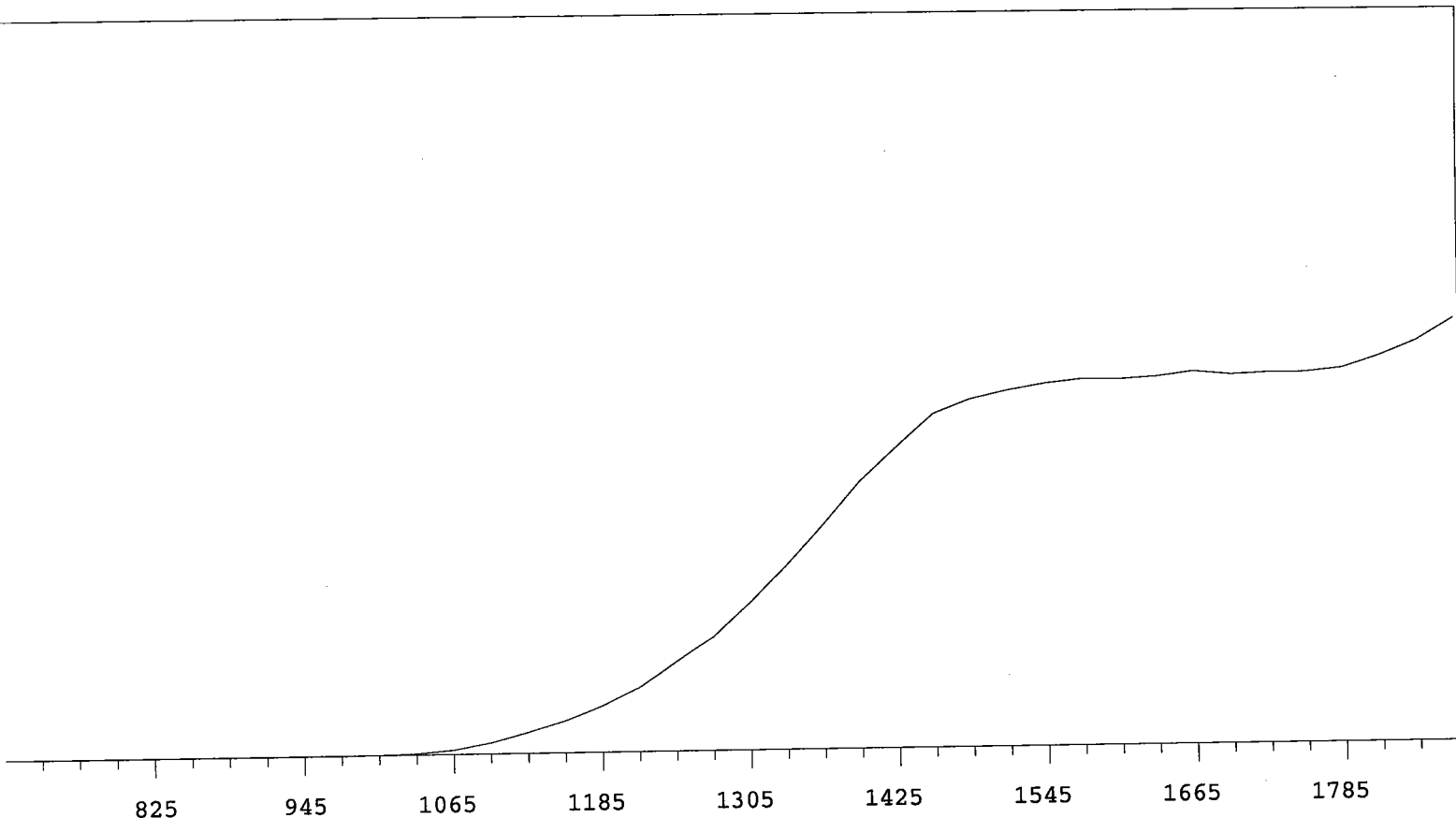
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 8 MPC 9604 Detector A  
Beta Volts: 1575

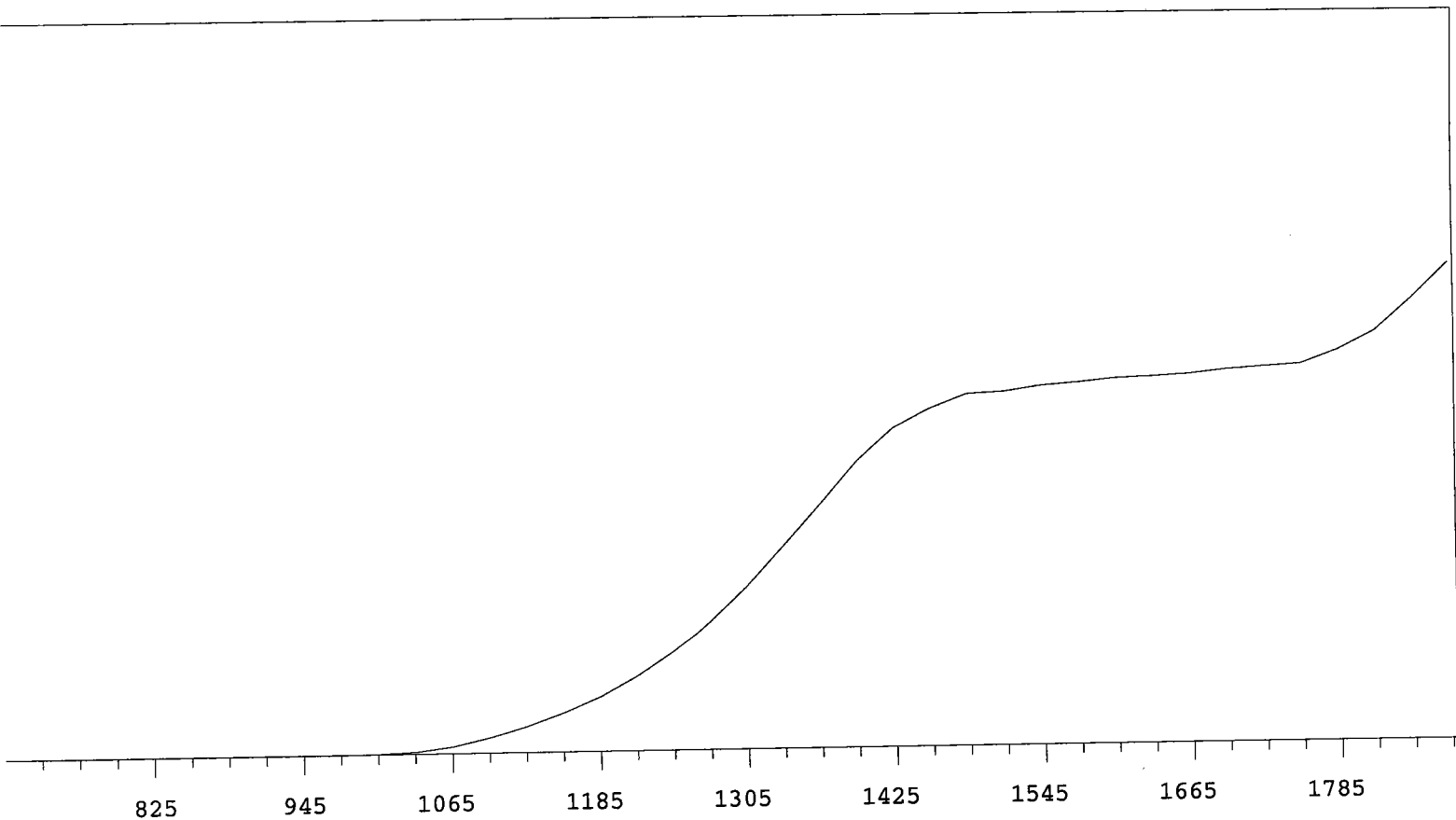
7/1/2009



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

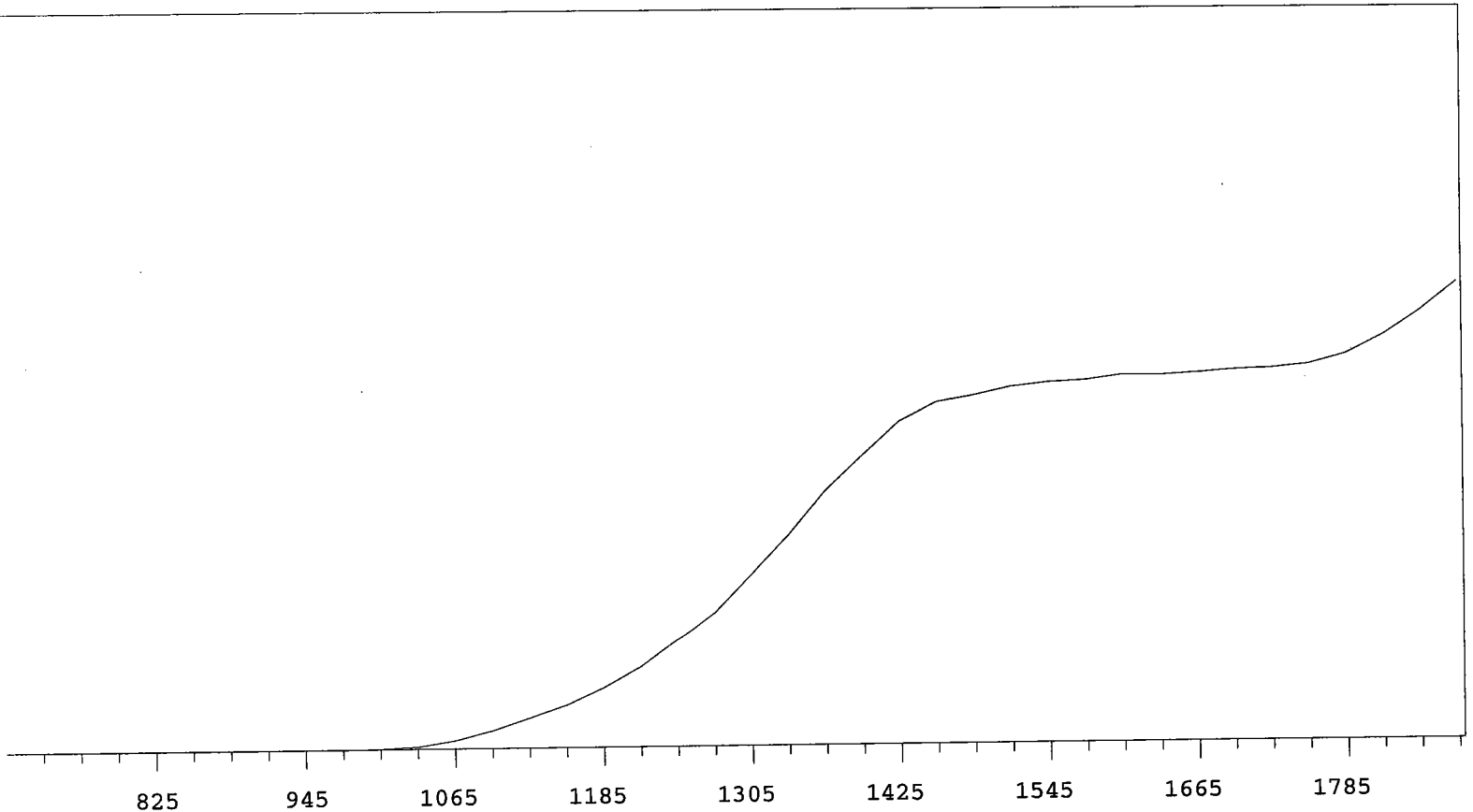


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16337	+74.91
735	0		1335	20471	+68.07
765	0		1365	25012	+57.86
795	0	>100	1395	29694	+47.48
825	0	>100	1425	33409	+35.17
855	0	>100	1455	37013	+23.27
885	0	>100	1485	38629	+14.35
915	0	>100	1515	39529	+7.69
945	0	>100	1545	40284	+4.34
975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

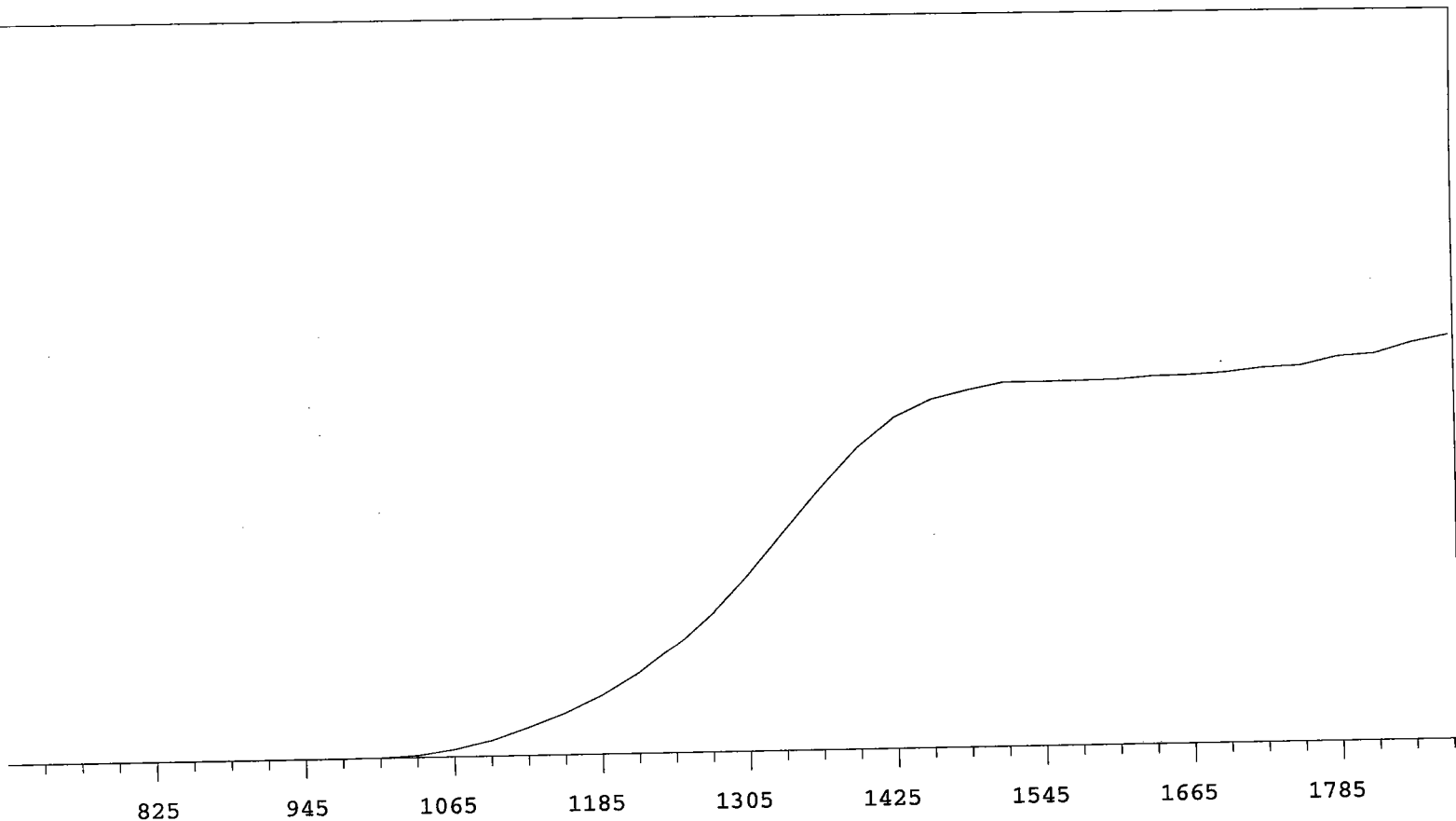


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16303	+72.82
735	0		1335	20309	+64.32
765	0		1365	24364	+53.82
795	0	>100	1395	28527	+40.95
825	0	>100	1425	31774	+28.74
855	0	>100	1455	33631	+16.87
885	0	>100	1485	35030	+9.25
915	0	>100	1515	35208	+5.21
945	0	>100	1545	35741	+3.27
975	4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

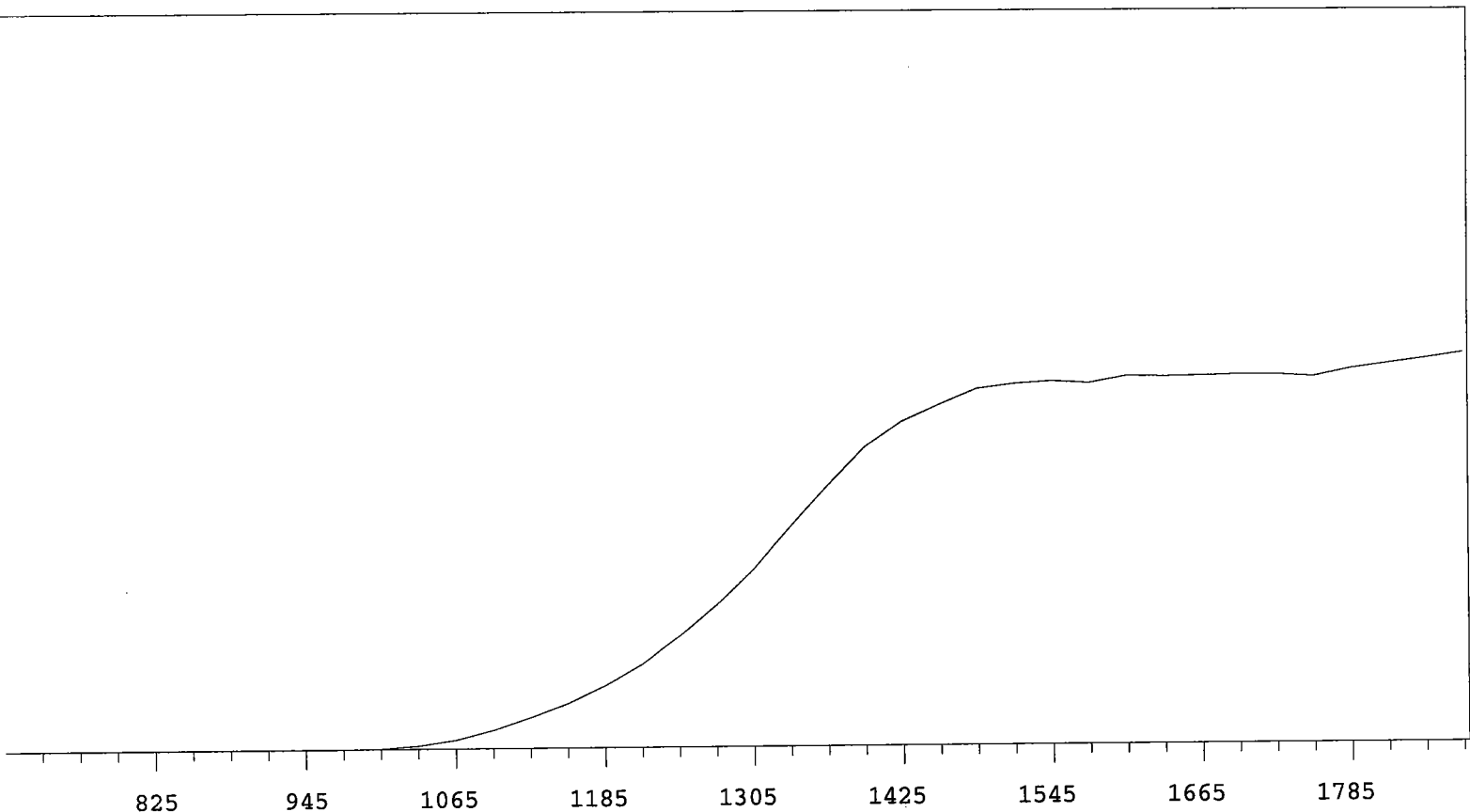




VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16889	+70.18
735	0		1335	20600	+61.29
765	1	+0.00	1365	24824	+50.40
795	0	>100	1395	28208	+38.85
825	0	>100	1425	31539	+25.79
855	0	>100	1455	33391	+16.06
885	0	>100	1485	33991	+8.60
915	0	>100	1515	34782	+5.01
945	0	>100	1545	35201	+4.10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



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



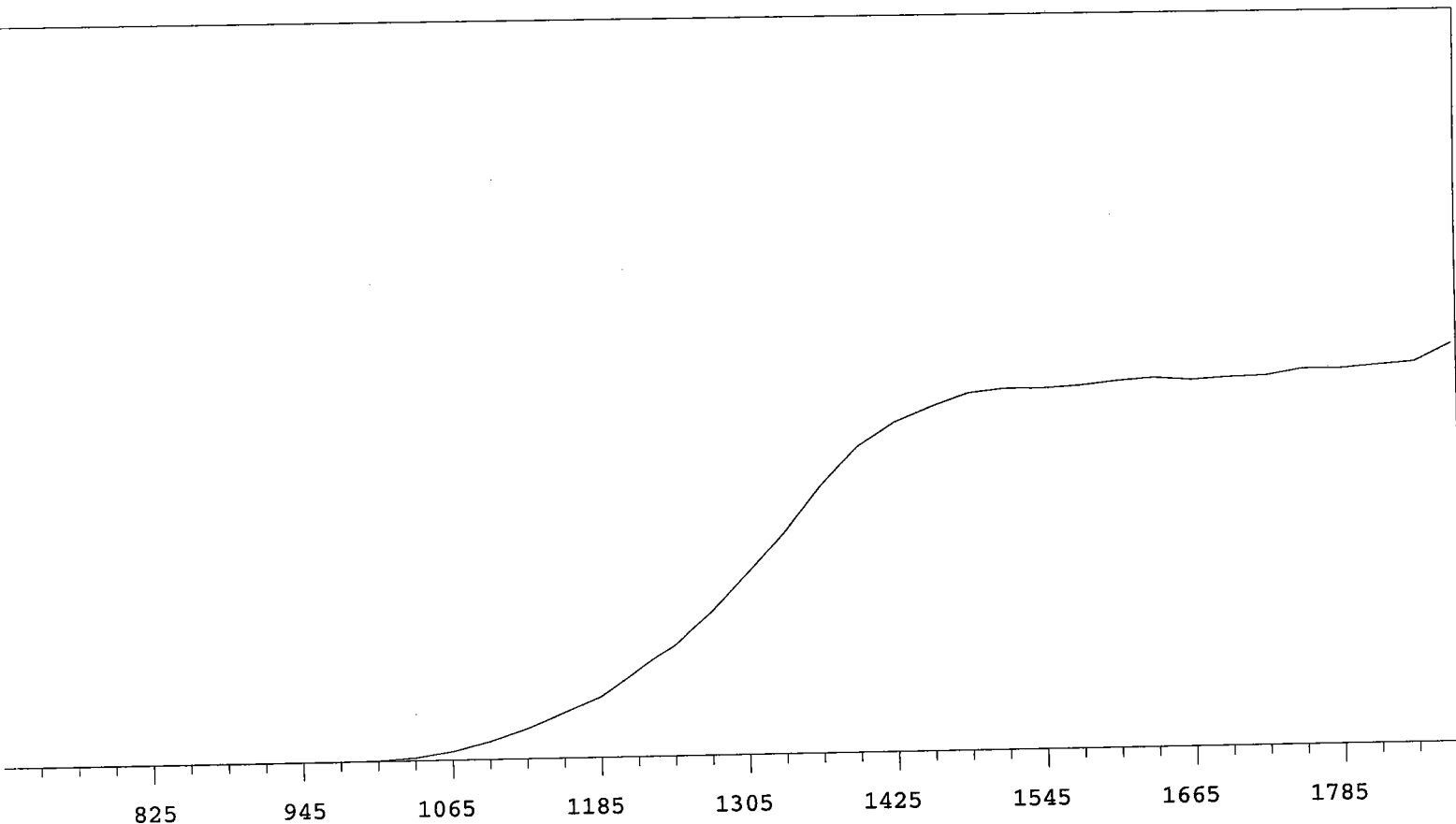
VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	4	>100
1005	45	>100
1035	300	>100
1065	836	>100
1095	1742	>100
1125	2896	>100
1155	4198	>100
1185	5849	>100
1215	7887	+92.20
1245	10561	+83.55
1275	13442	+76.62

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

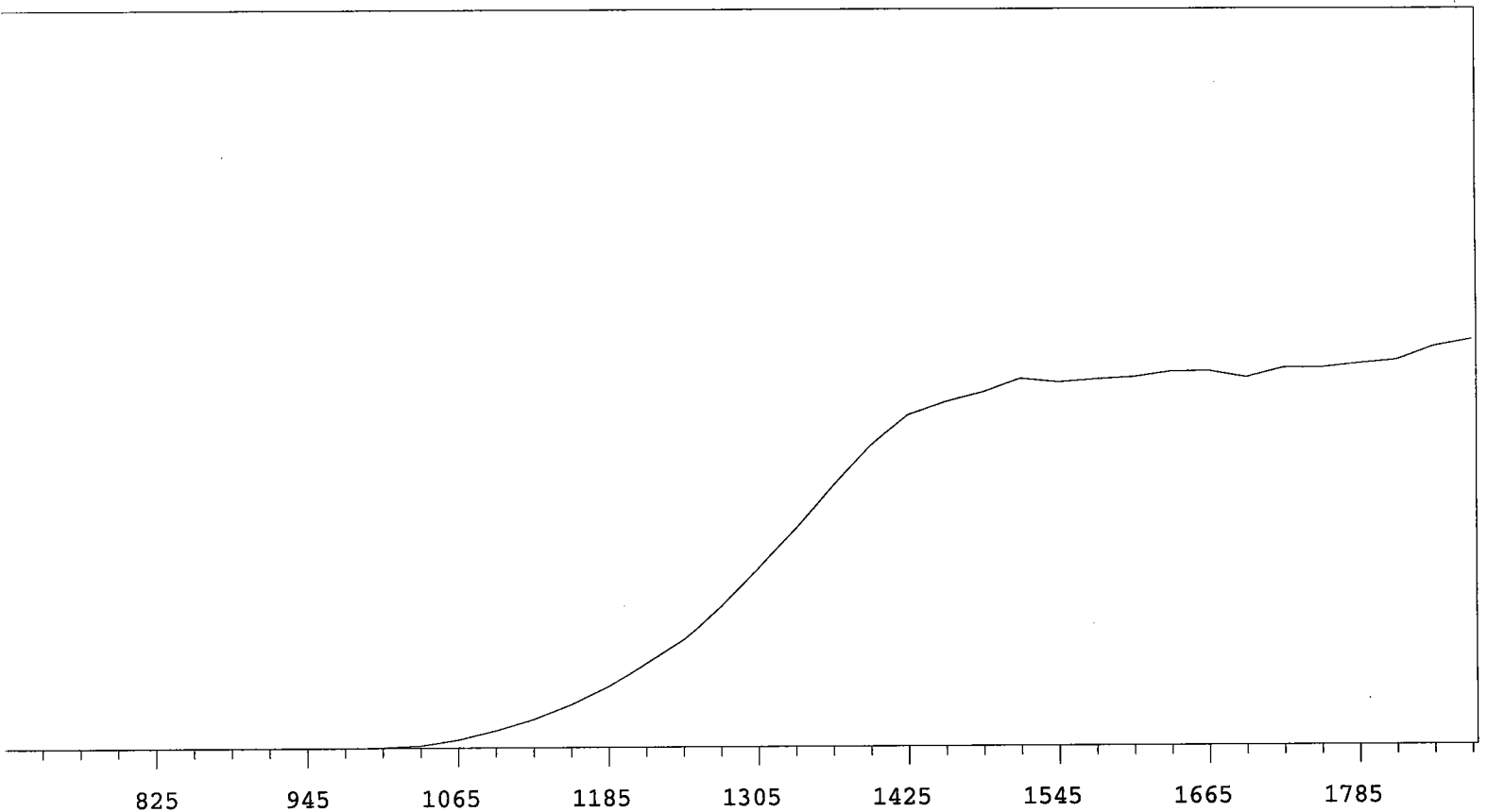
MPC 9600 Plateau  
Alpha Volts: 870

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	



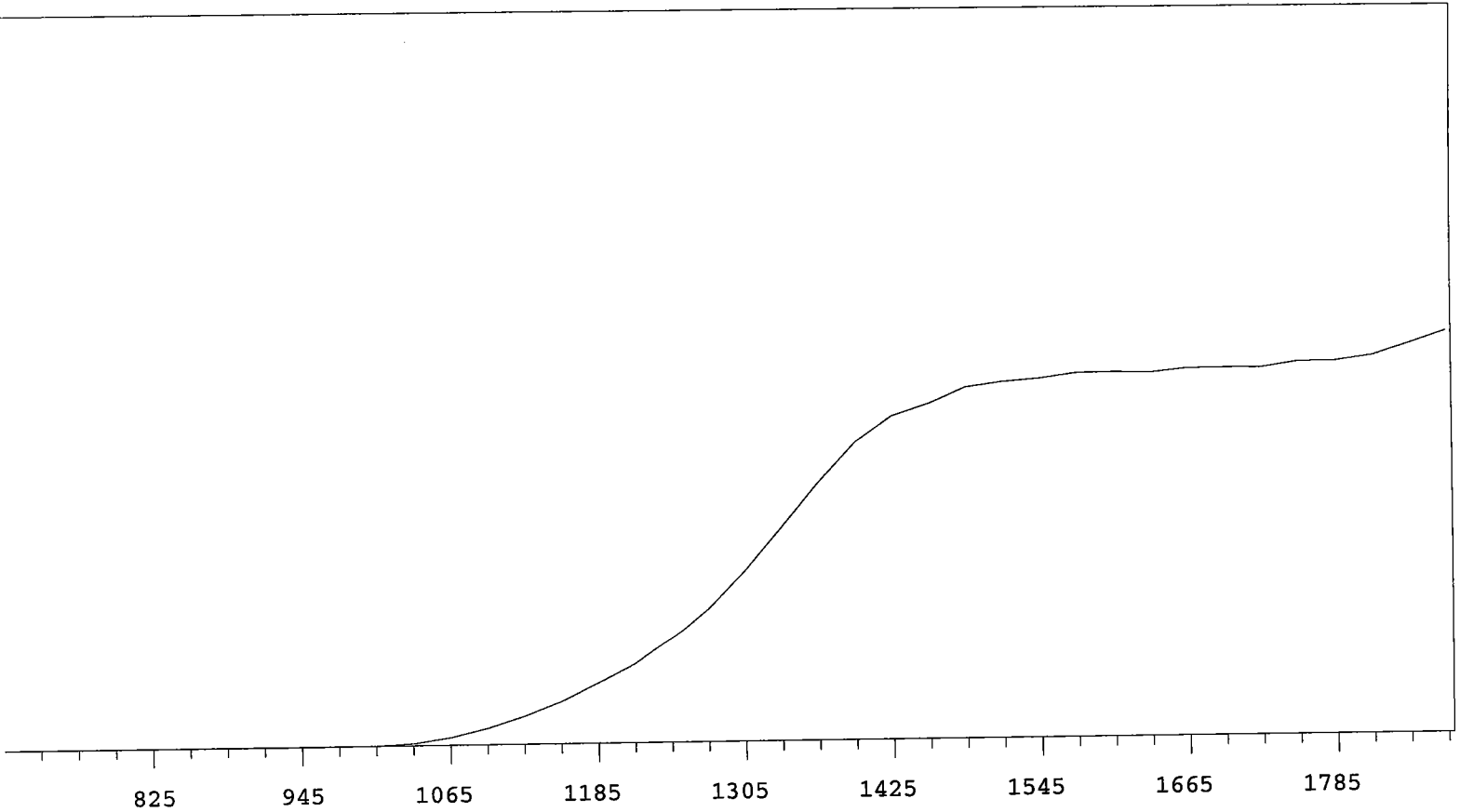
VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	5	>100
1005	35	>100
1035	186	>100
1065	618	>100
1095	1280	>100
1125	2141	>100
1155	3268	>100
1185	4659	>100
1215	6343	+90.68
1245	8064	+83.46
1275	10497	+77.03

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	

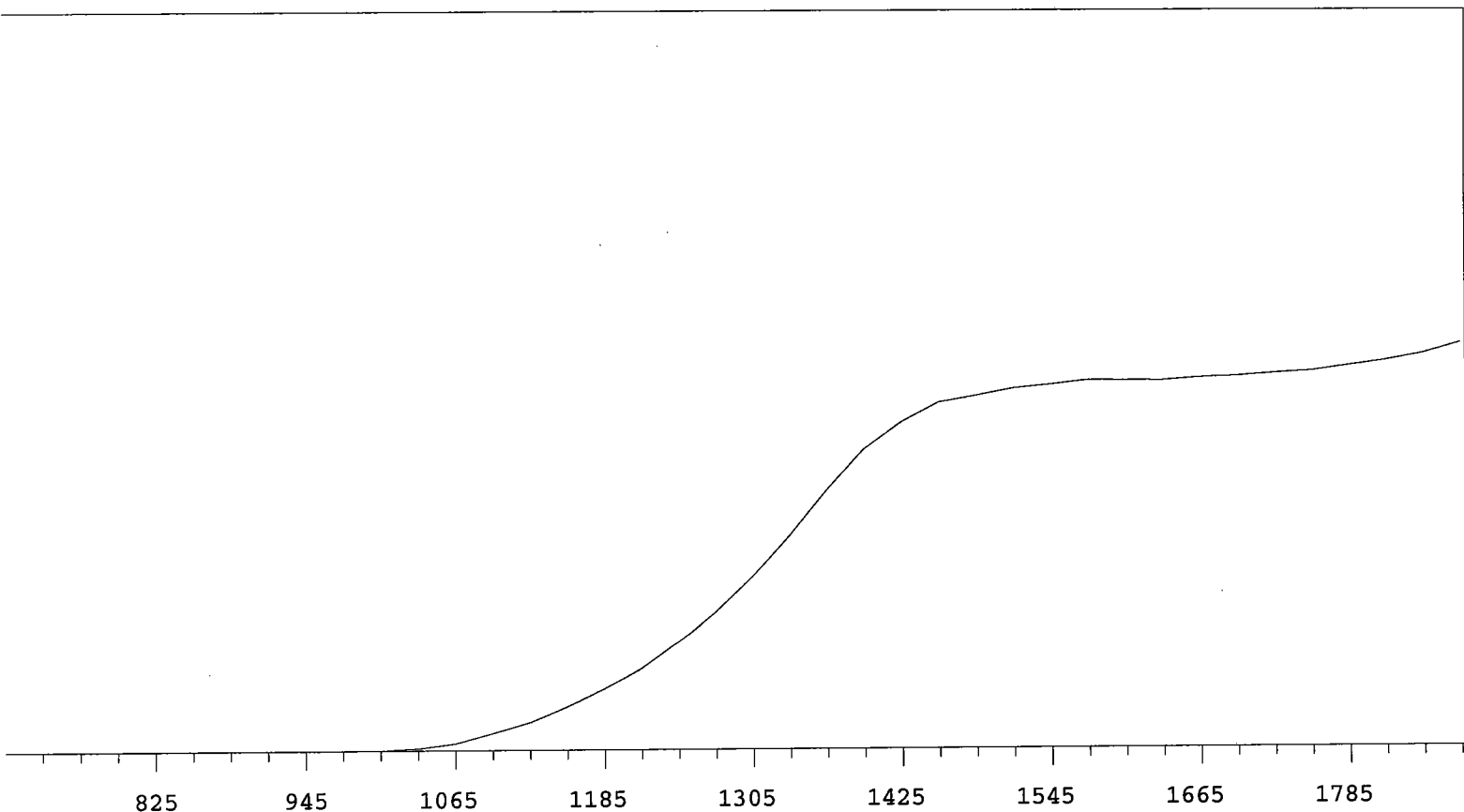
MPC 9600 Plateau  
 Alpha Volts: 870

Instrument 10 MPC 9604 Detector A  
 Beta Volts: 1552

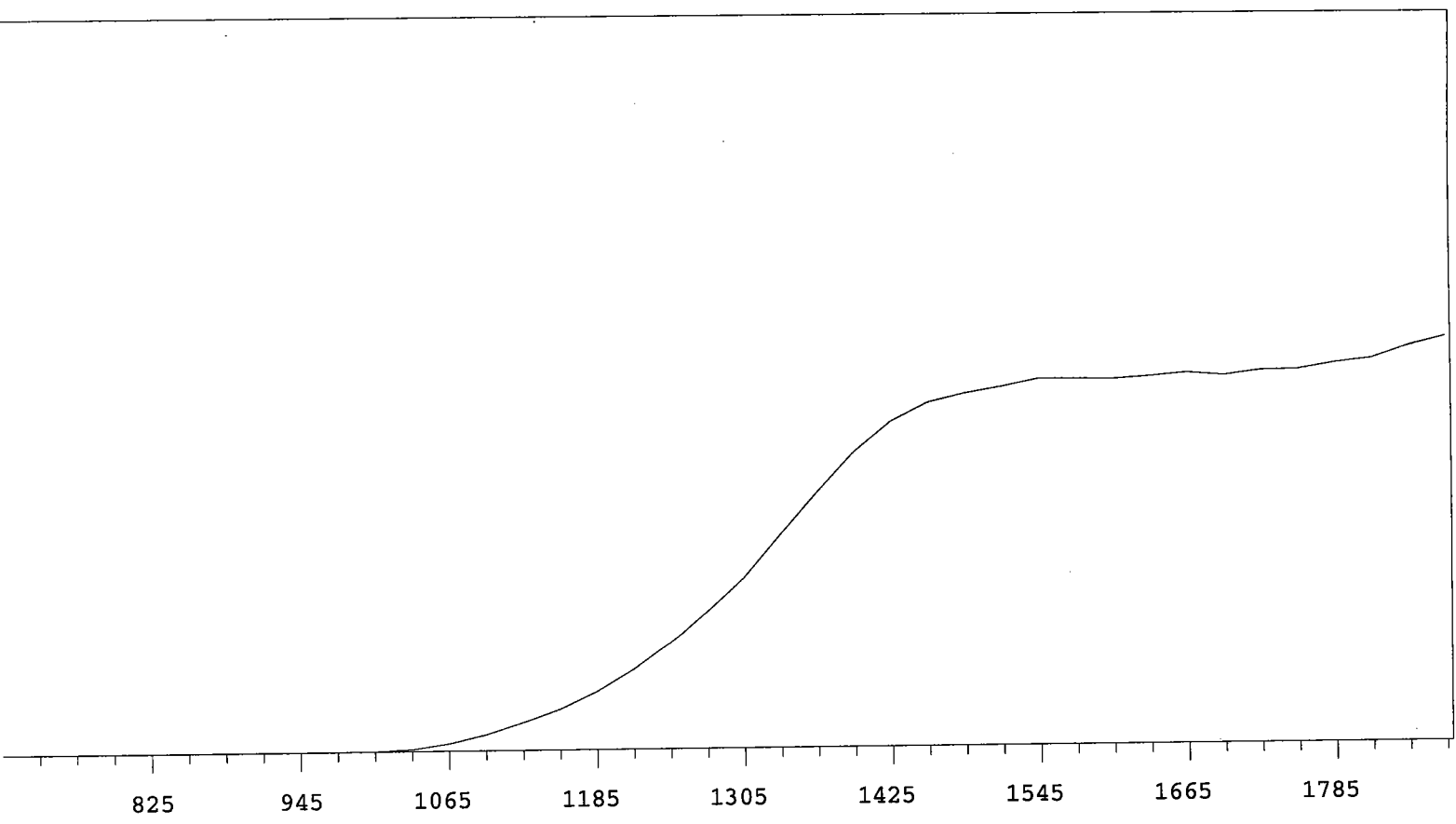
7/1/2009



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	

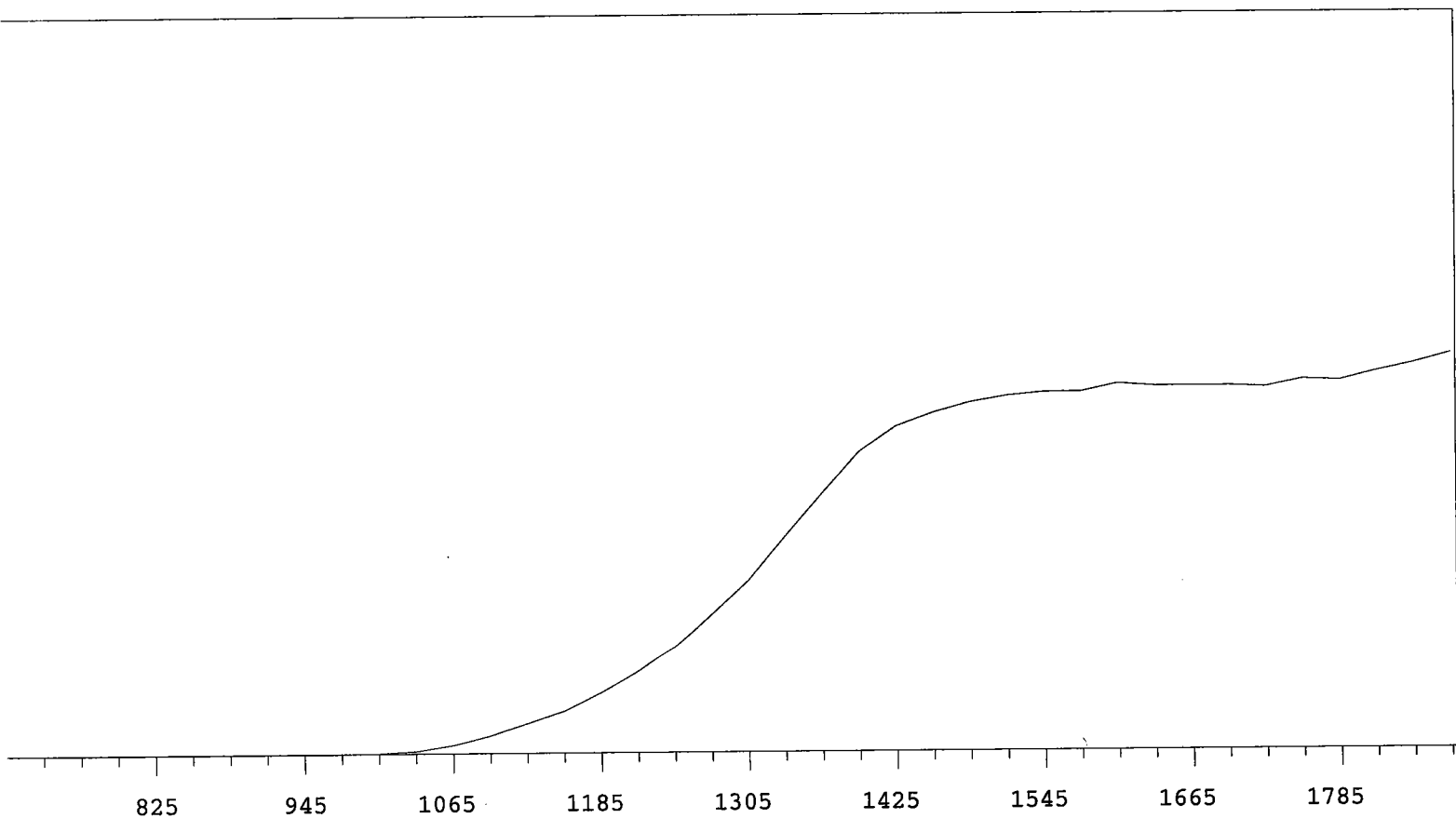


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14469	+71.08
735	0		1335	17904	+63.07
765	0		1365	21677	+51.20
795	0	>100	1395	25027	+38.06
825	0	>100	1425	27237	+24.55
855	0	>100	1455	28914	+14.61
885	0	>100	1485	29480	+8.48
915	0	>100	1515	30075	+5.06
945	1	>100	1545	30374	+3.42
975	7	>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	



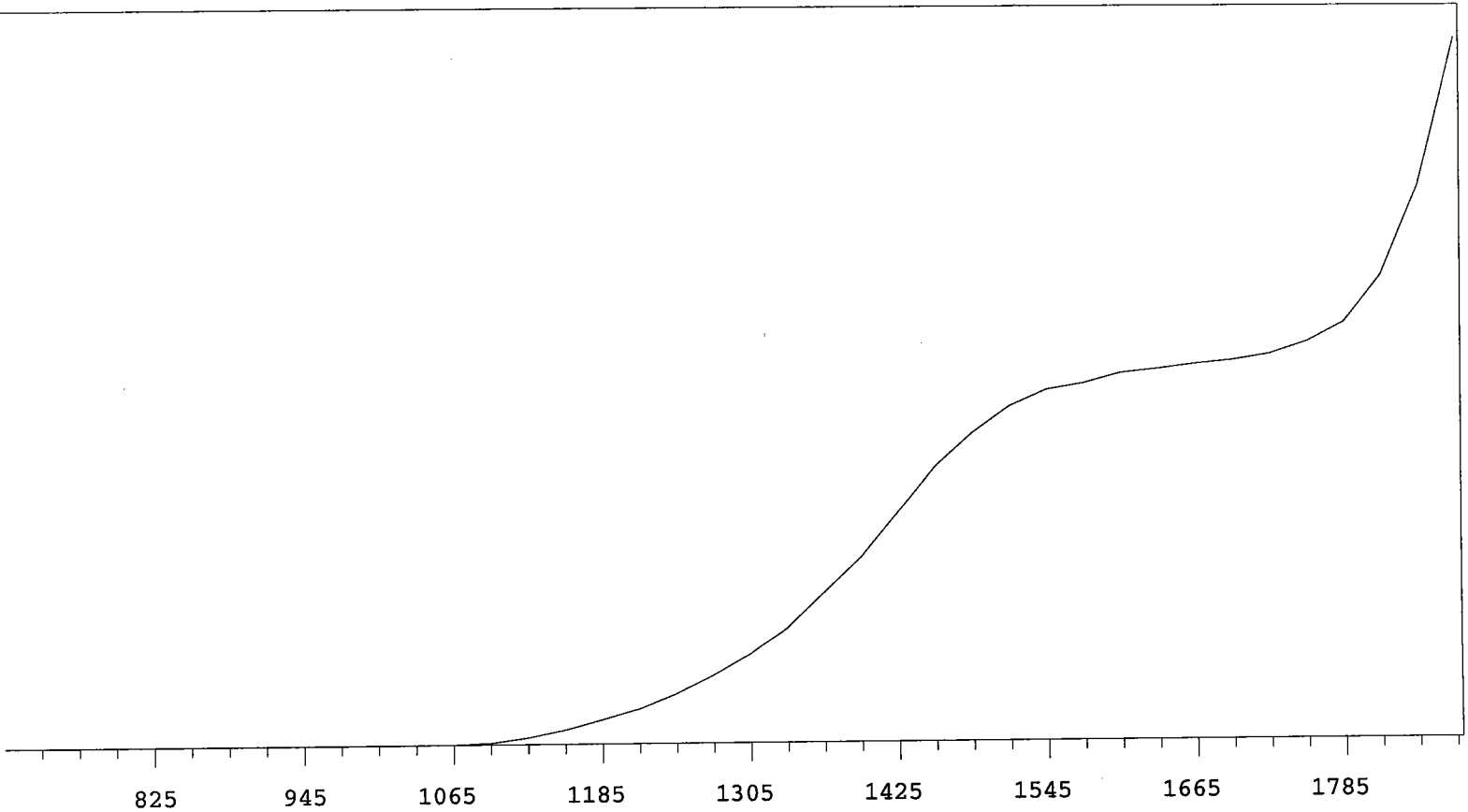
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18051	+71.16
735	0		1335	22586	+62.34
765	0		1365	26973	+51.47
795	0	>100	1395	31137	+38.24
825	0	>100	1425	34321	+25.70
855	0	>100	1455	36267	+15.37
885	1	>100	1485	37197	+9.21
915	0	>100	1515	37851	+5.38
945	2	>100	1545	38622	+3.00
975	2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



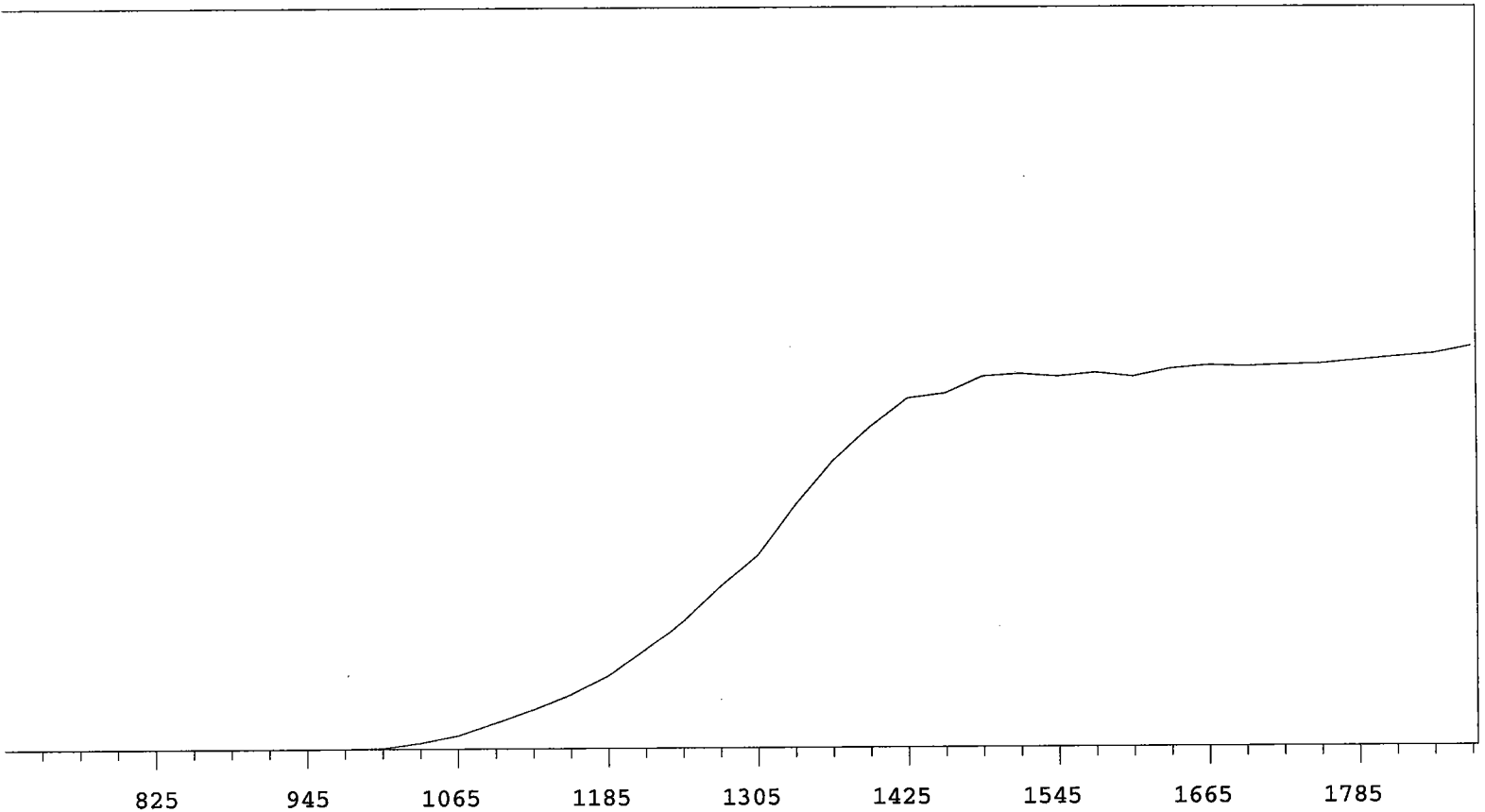


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15430	+69.87
735	0		1335	19258	+61.49
765	0		1365	23018	+50.06
795	0	>100	1395	26562	+35.34
825	0	>100	1425	28750	+22.67
855	0	>100	1455	29911	+13.20
885	0	>100	1485	30798	+8.01
915	0	>100	1515	31375	+4.83
945	0	>100	1545	31684	+3.74
975	3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

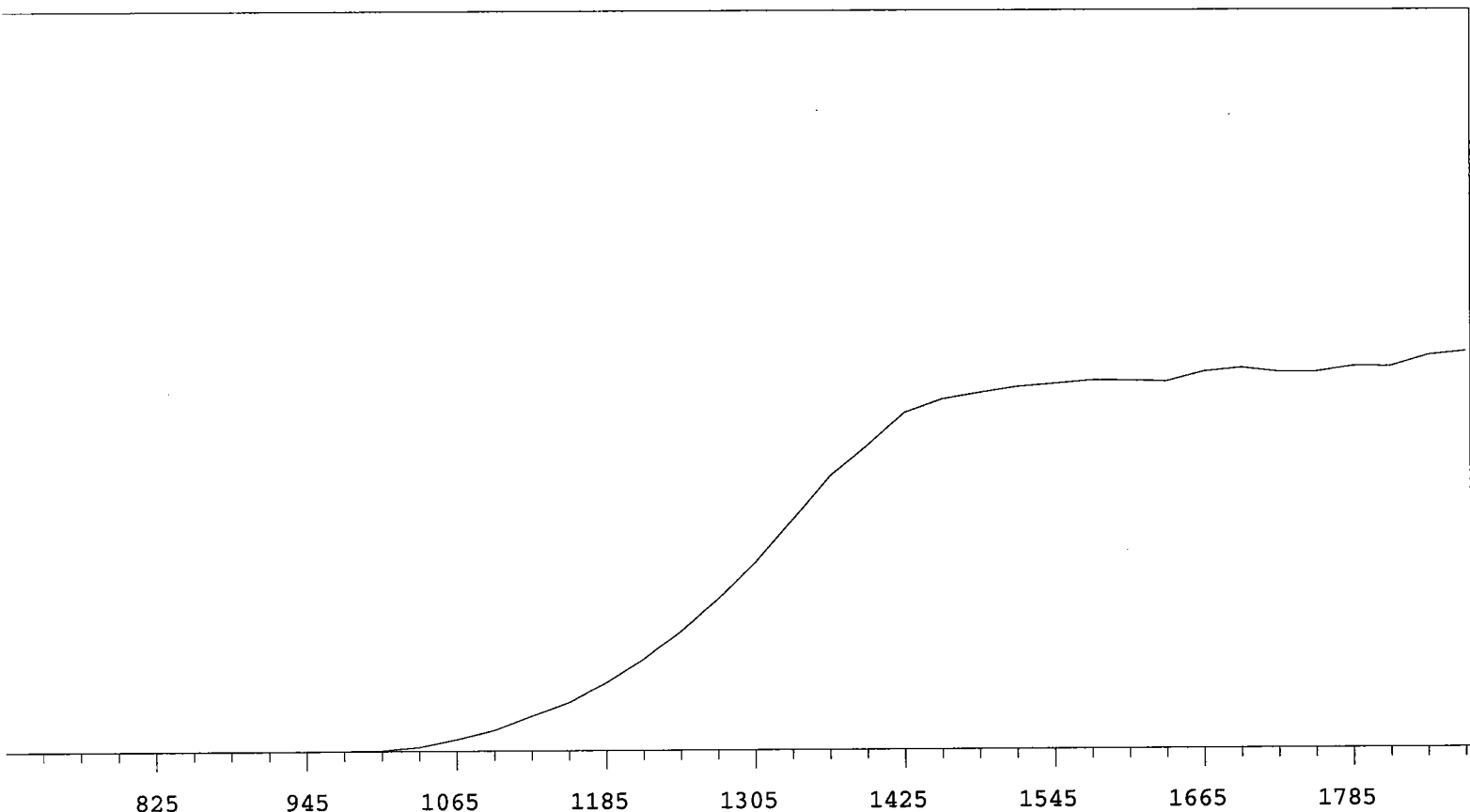
Alpha Volts: 1515 Beta Volts: 1515



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	

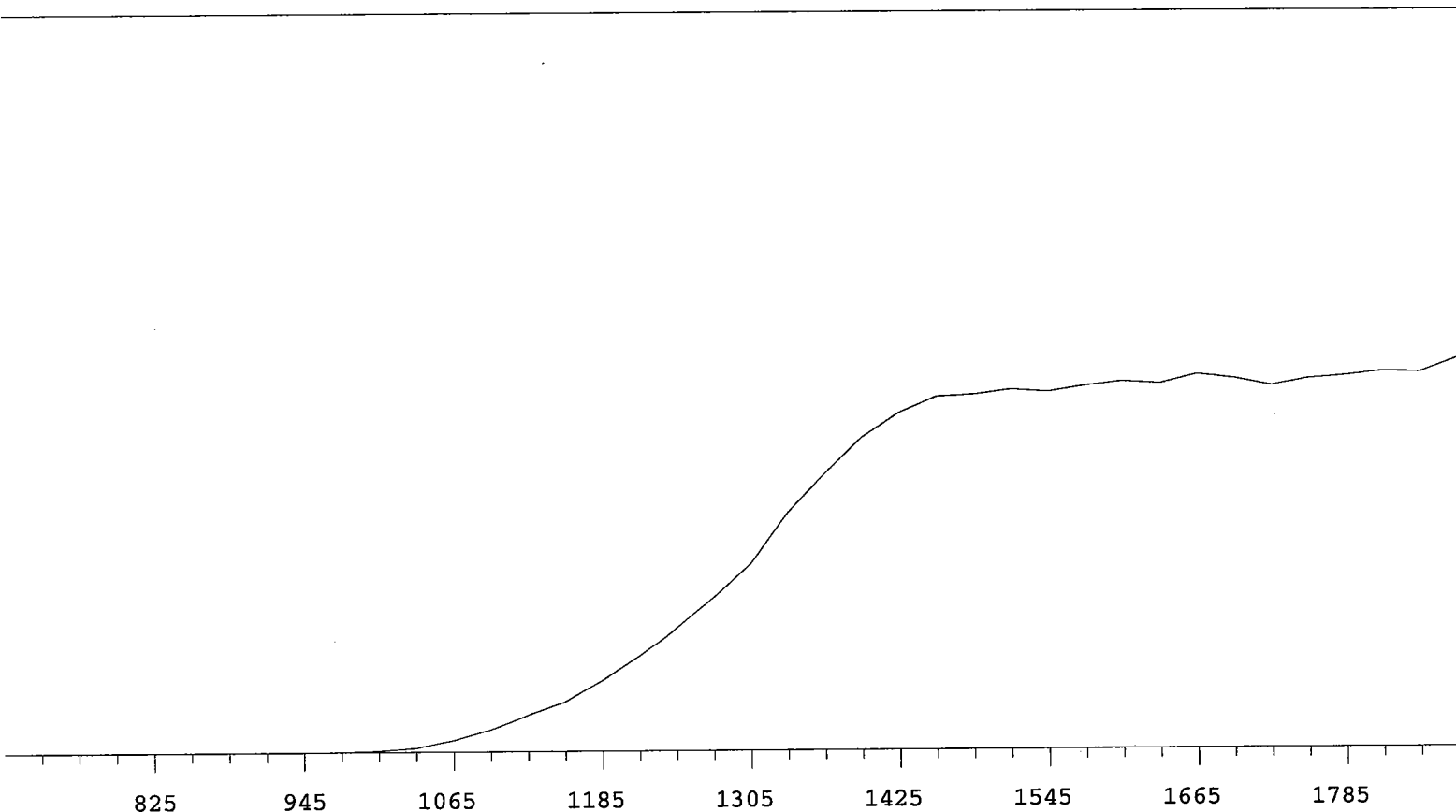


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8947	+65.63
735	0		1335	11238	+56.58
765	0		1365	13246	+46.66
795	0	>100	1395	14838	+30.69
825	0	>100	1425	16166	+20.11
855	0	>100	1455	16396	+11.95
885	0	>100	1485	17161	+5.61
915	1	>100	1515	17274	+3.59
945	0	>100	1545	17144	-0.00
975	11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

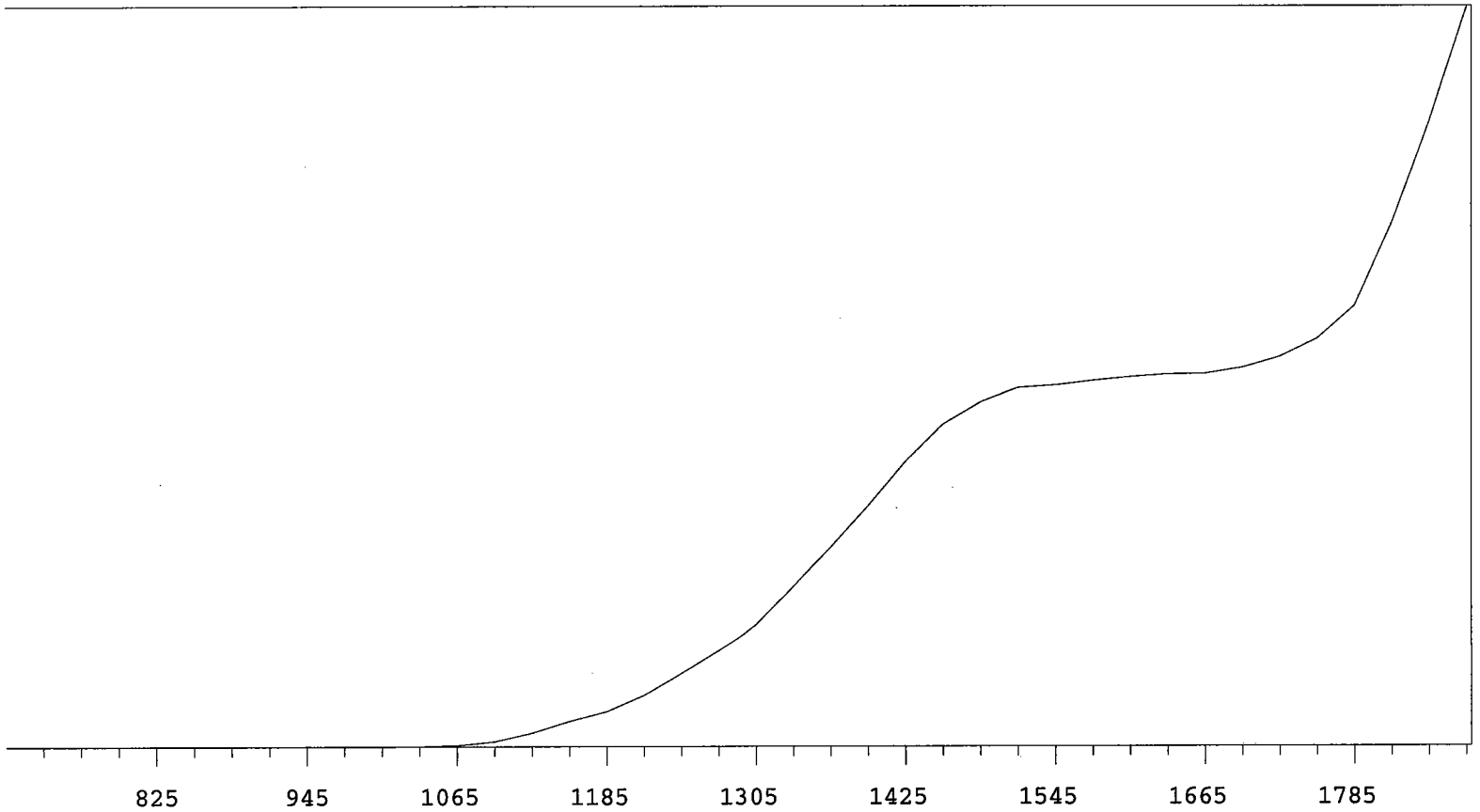


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	8636	+66.44
735	0		1335	10593	+56.56
765	0	+0.00	1365	12582	+46.23
795	0	>100	1395	13957	+33.45
825	1	+0.00	1425	15443	+21.49
855	0	>100	1455	16048	+13.14
885	0	+0.00	1485	16331	+6.45
915	0	>100	1515	16603	+4.19
945	1	>100	1545	16736	+2.73
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	

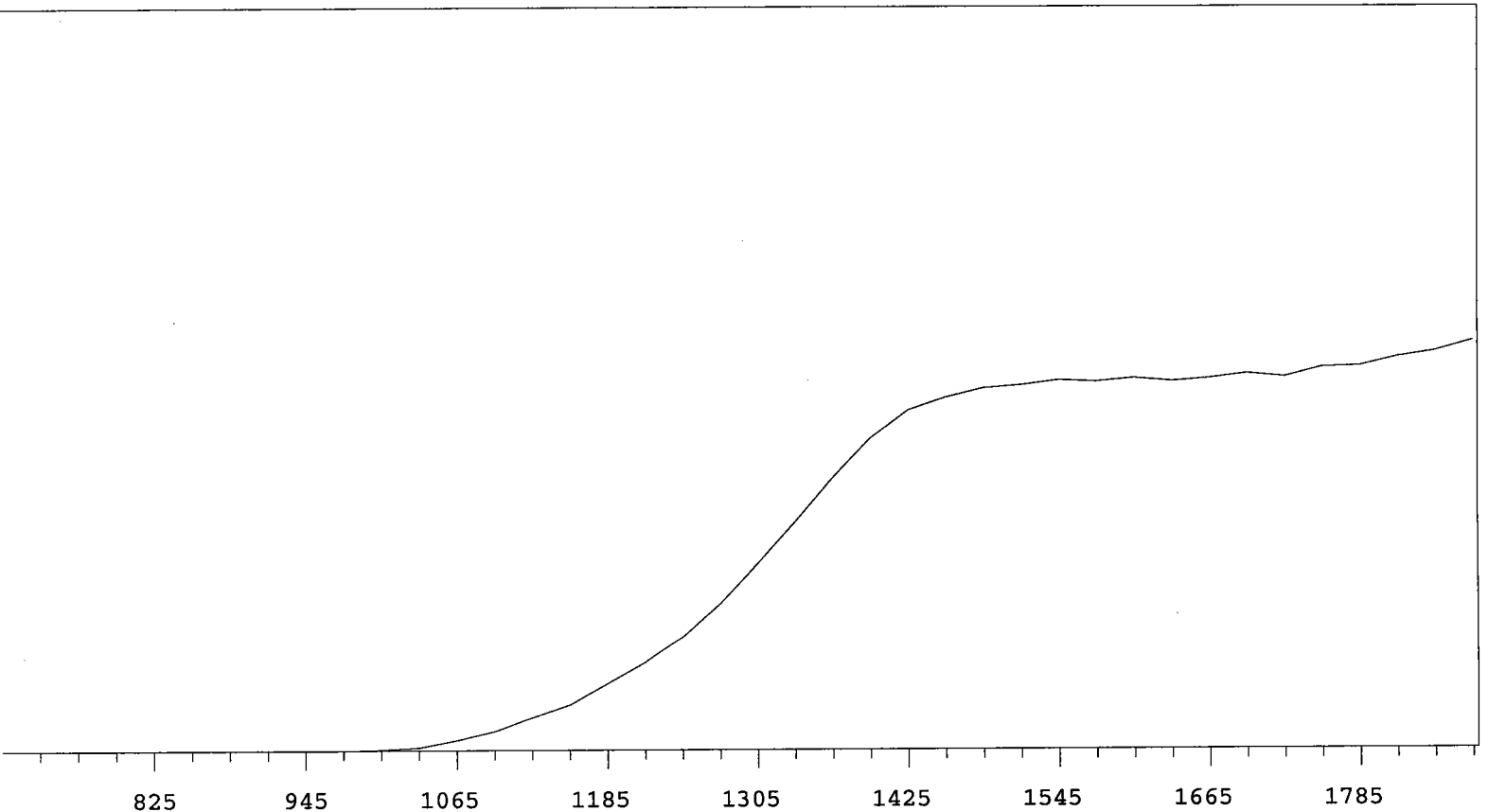
Alpha Volts: 1515 Beta Volts: 1515



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	



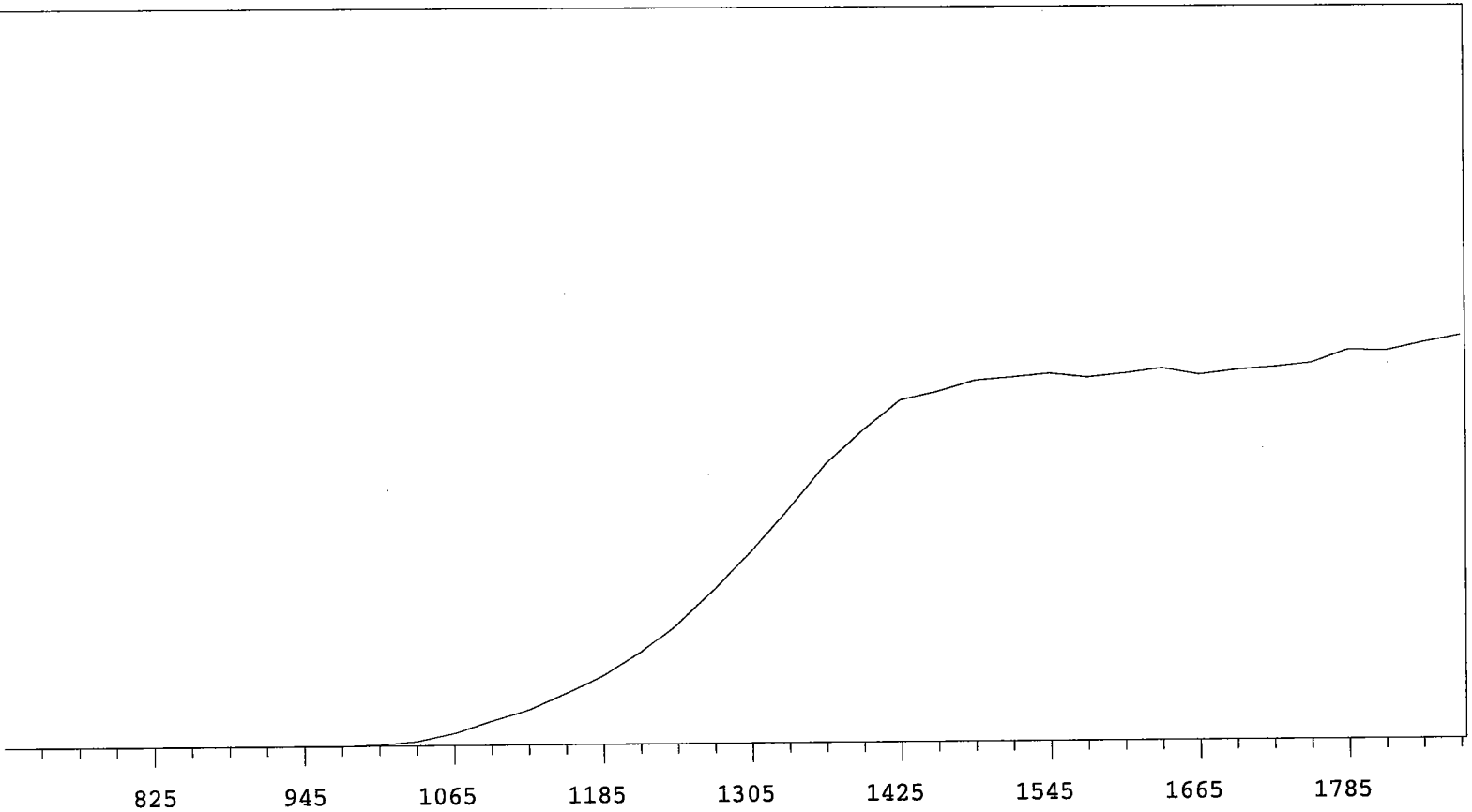
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	6302	+80.03
735	1		1335	8191	+73.78
765	0		1365	10140	+66.18
795	0	>100	1395	12247	+55.83
825	0	>100	1425	14468	+43.92
855	0	>100	1455	16303	+31.28
885	0	>100	1485	17411	+18.64
915	0	>100	1515	18150	+9.87
945	0	>100	1545	18275	+5.30
975	1	>100	1575	18496	+3.16
1005	3	>100	1605	18685	+2.66
1035	17	>100	1635	18820	+2.63
1065	84	>100	1665	18855	+4.16
1095	267	>100	1695	19152	+7.70
1125	709	>100	1725	19706	+13.90
1155	1299	>100	1755	20640	+26.51
1185	1813	>100	1785	22308	+40.92
1215	2638	>100	1815	26460	+51.46
1245	3777	+96.47	1845	31616	
1275	4915	+87.98	1875	37348	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	10207	+70.42
735	0		1335	12473	+60.75
765	0		1365	14900	+48.87
795	0	>100	1395	17101	+35.36
825	0	>100	1425	18643	+22.53
855	1	+83.33	1455	19350	+12.34
885	1	-83.33	1485	19848	+6.68
915	0	-55.56	1515	20014	+3.51
945	0	>100	1545	20278	+2.03
975	1	>100	1575	20186	+0.80
1005	43	>100	1605	20375	+0.32
1035	165	>100	1635	20209	+1.36
1065	557	>100	1665	20364	+0.83
1095	1055	>100	1695	20607	+2.43
1125	1775	>100	1725	20429	+2.51
1155	2470	>100	1755	20924	+3.64
1185	3617	+98.46	1785	20984	+5.11
1215	4757	+90.95	1815	21470	+5.63
1245	6186	+83.59	1845	21773	
1275	8021	+77.85	1875	22346	

Alpha Volts: 705

Beta Volts: 1515

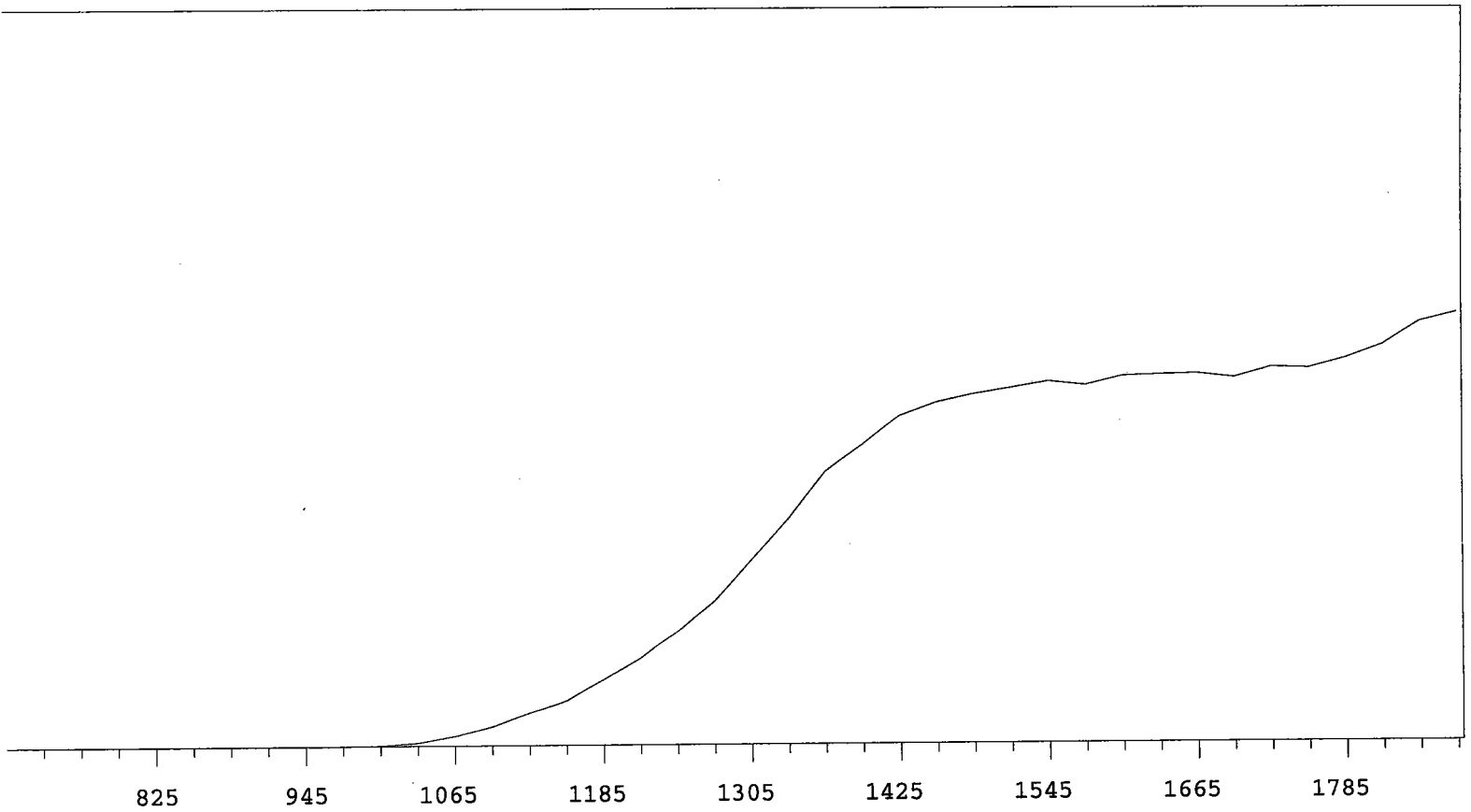


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	9543	+67.01
735	0		1335	11617	+56.47
765	0		1365	13791	+45.47
795	0	>100	1395	15387	+31.66
825	0	>100	1425	16819	+20.02
855	0	>100	1455	17210	+11.63
885	1	+0.00	1485	17742	+6.05
915	0	>100	1515	17892	+3.04
945	0	>100	1545	18070	+1.09
975	7	>100	1575	17856	+1.43
1005	52	>100	1605	18054	+0.42
1035	214	>100	1635	18287	+1.06
1065	590	>100	1665	17969	+0.78
1095	1201	>100	1695	18187	+1.48
1125	1759	>100	1725	18317	+4.89
1155	2569	>100	1755	18518	+4.76
1185	3440	+95.13	1785	19156	+5.18
1215	4583	+87.74	1815	19100	+5.18
1245	5985	+81.67	1845	19496	
1275	7682	+74.54	1875	19842	

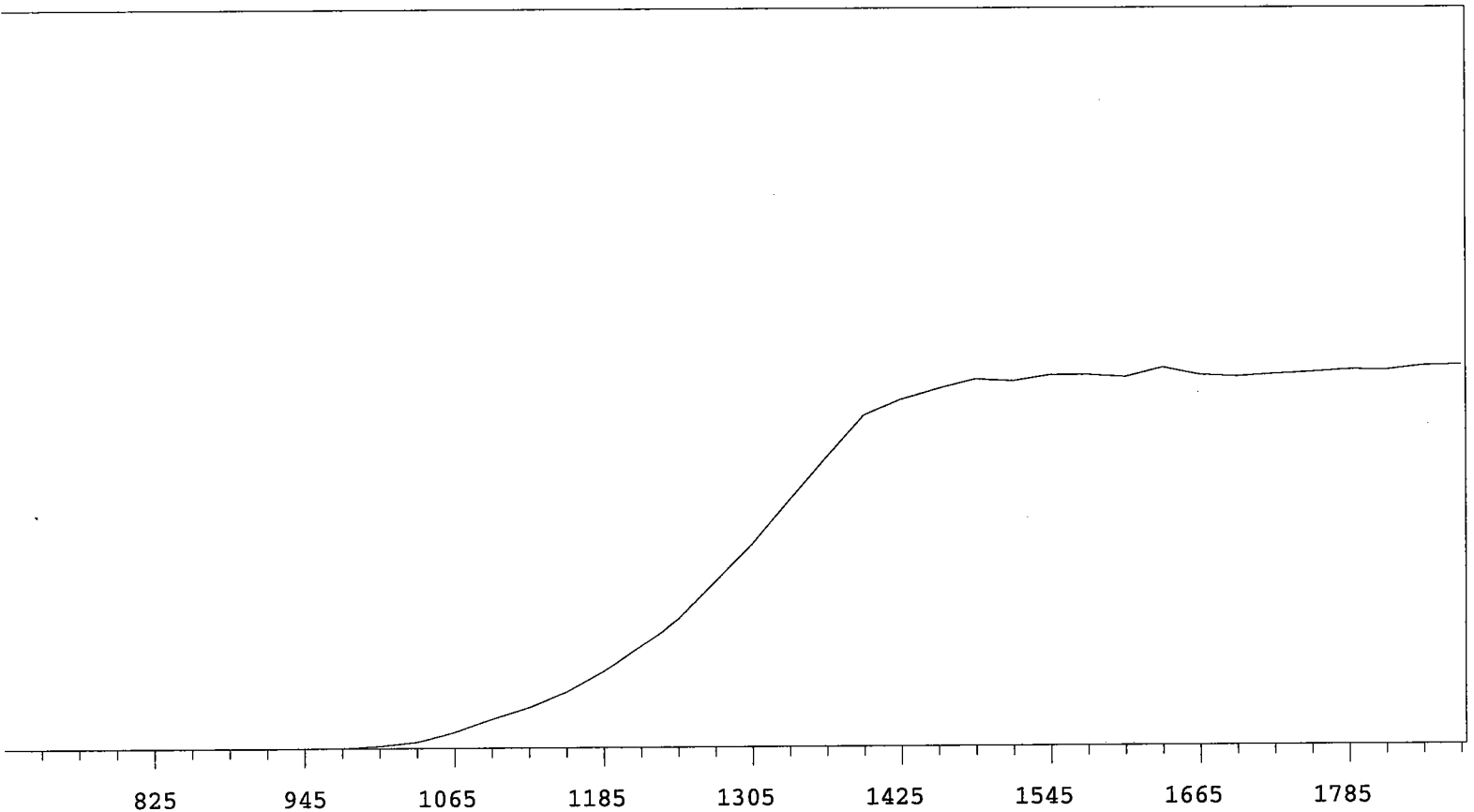


Alpha Volts: 705

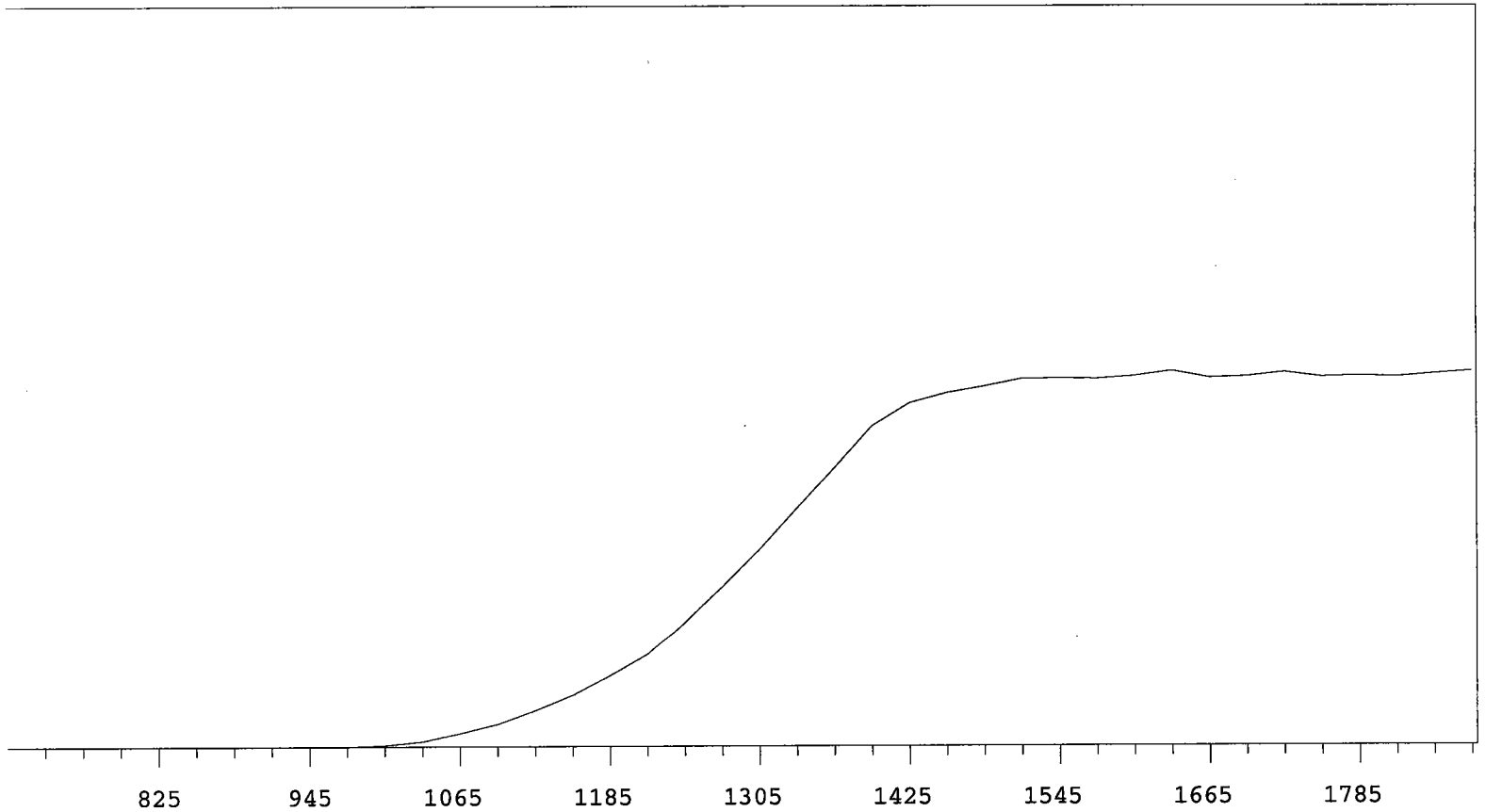
Beta Volts: 1515



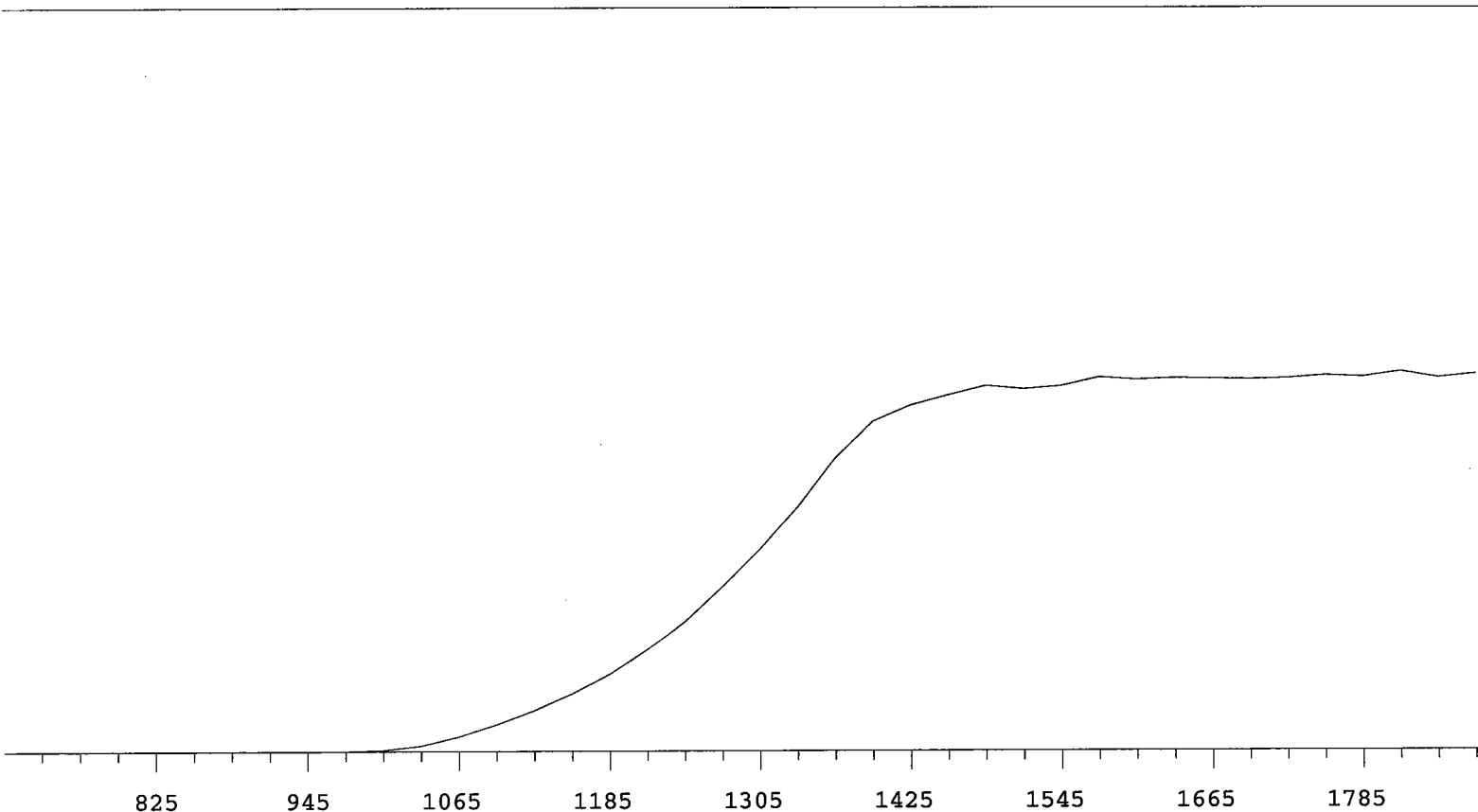
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9144	+69.92
735	0		1335	11120	+58.43
765	0		1365	13399	+45.40
795	0	>100	1395	14711	+32.57
825	0	>100	1425	16134	+20.69
855	0	>100	1455	16805	+13.46
885	0	>100	1485	17209	+7.90
915	0	>100	1515	17500	+4.31
945	0	>100	1545	17812	+3.48
975	4	>100	1575	17629	+2.80
1005	26	>100	1605	18066	+2.23
1035	169	>100	1635	18122	+1.44
1065	483	>100	1665	18166	+1.20
1095	955	>100	1695	17967	+1.60
1125	1639	>100	1725	18469	+3.41
1155	2233	>100	1755	18409	+6.35
1185	3262	+98.61	1785	18884	+9.47
1215	4306	+89.77	1815	19535	+11.98
1245	5662	+82.36	1845	20630	
1275	7113	+76.36	1875	21076	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9209	+64.55
735	1		1335	11200	+55.94
765	0	+55.56	1365	13123	+43.27
795	2	>100	1395	14957	+29.04
825	0	+0.00	1425	15658	+17.41
855	0	>100	1455	16123	+8.01
885	1	>100	1485	16530	+4.92
915	0	>100	1515	16437	+2.71
945	1	>100	1545	16704	+0.83
975	14	>100	1575	16707	+2.14
1005	104	>100	1605	16602	+0.55
1035	281	>100	1635	17024	-0.28
1065	720	>100	1665	16684	-0.42
1095	1302	>100	1695	16597	-0.85
1125	1834	>100	1725	16711	+1.27
1155	2544	>100	1755	16796	+1.51
1185	3485	+92.28	1785	16903	+1.57
1215	4624	+85.50	1815	16880	+1.46
1245	5878	+77.82	1845	17066	
1275	7515	+71.49	1875	17085	



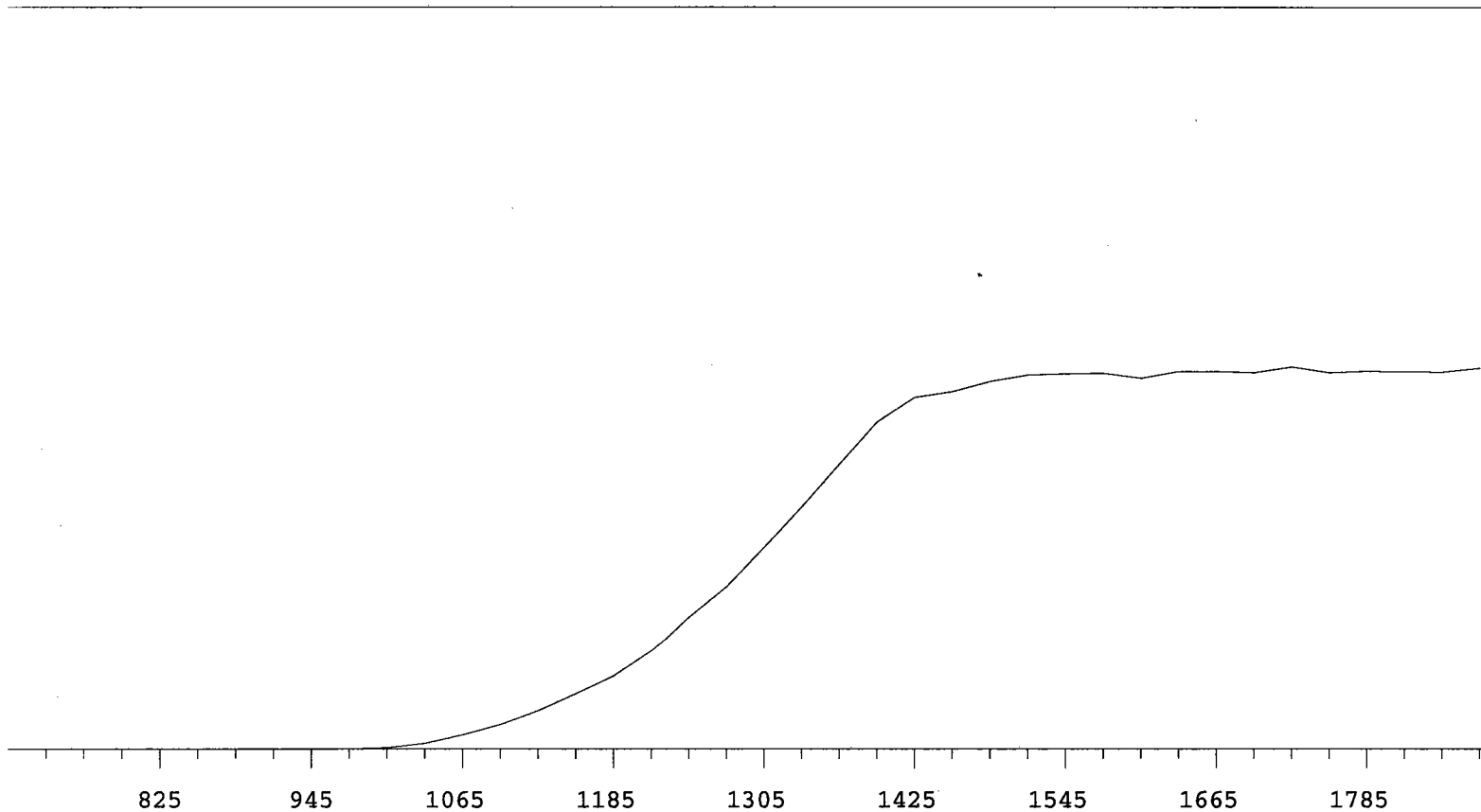
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9666	+64.39
735	0		1335	11722	+55.91
765	0		1365	13680	+44.91
795	0	>100	1395	15677	+31.56
825	0	>100	1425	16786	+19.46
855	0	>100	1455	17283	+10.57
885	0	>100	1485	17608	+5.95
915	1	>100	1515	17972	+3.32
945	0	>100	1545	18006	+1.84
975	4	>100	1575	17970	+1.58
1005	70	>100	1605	18104	+0.74
1035	257	>100	1635	18351	+0.24
1065	648	>100	1665	18016	+0.16
1095	1116	>100	1695	18080	-0.63
1125	1784	>100	1725	18283	+0.29
1155	2560	>100	1755	18047	-0.47
1185	3531	+96.11	1785	18110	-0.32
1215	4568	+89.22	1815	18040	+1.17
1245	6137	+81.65	1845	18200	
1275	7855	+74.42	1875	18320	



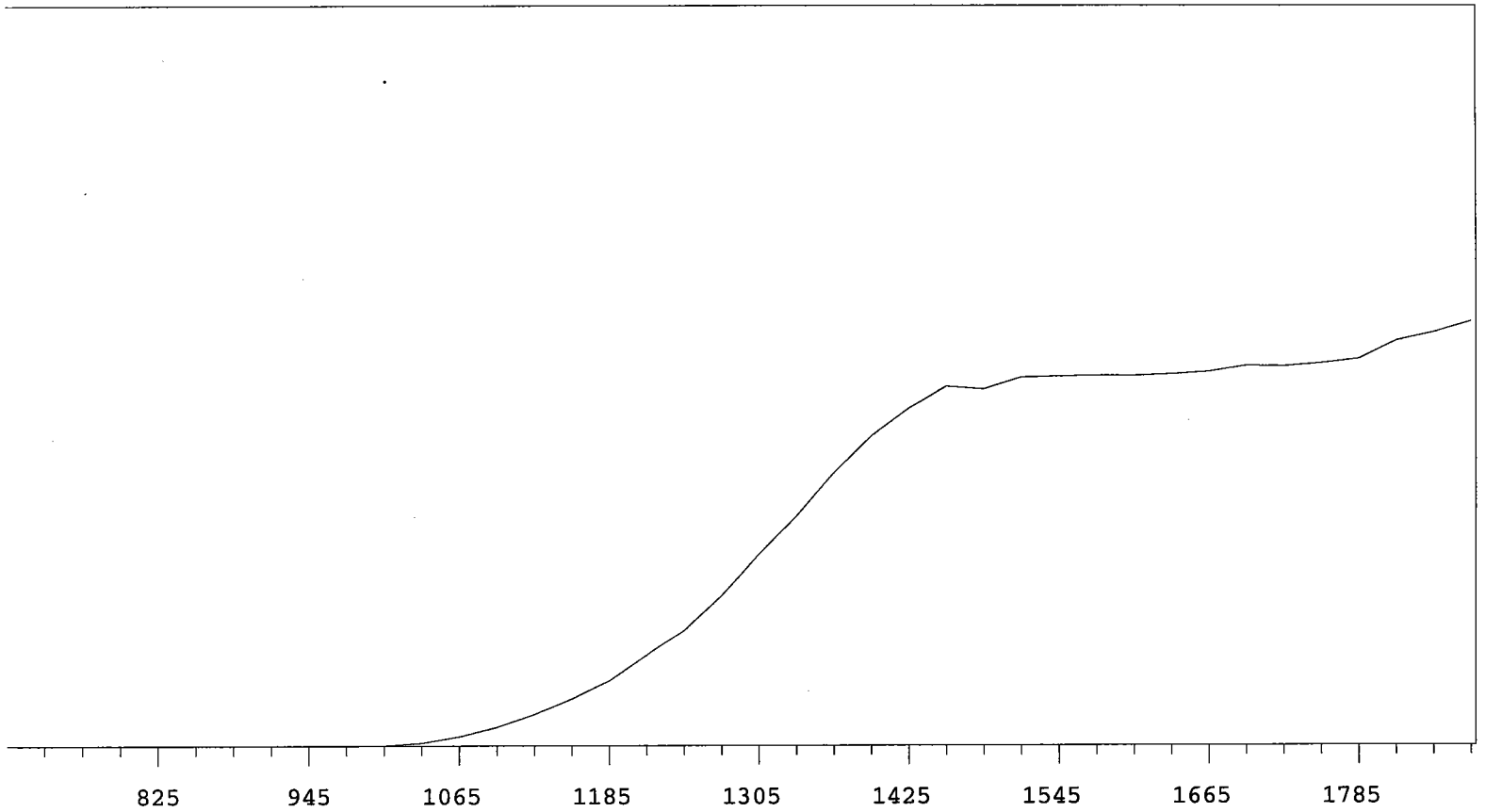
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	11573	+64.95
735	0		1335	13929	+56.47
765	0		1365	16726	+43.82
795	0	>100	1395	18834	+29.38
825	0	>100	1425	19743	+16.84
855	0	>100	1455	20314	+7.95
885	0	>100	1485	20860	+4.16
915	0	>100	1515	20670	+3.23
945	0	>100	1545	20844	+2.09
975	9	>100	1575	21330	+2.48
1005	93	>100	1605	21188	+1.16
1035	325	>100	1635	21280	-0.32
1065	834	>100	1665	21237	+0.08
1095	1525	>100	1695	21202	+0.42
1125	2318	>100	1725	21254	+0.60
1155	3233	>100	1755	21406	+1.41
1185	4357	+92.07	1785	21326	+0.42
1215	5755	+85.64	1815	21619	+0.16
1245	7438	+78.35	1845	21282	
1275	9463	+70.89	1875	21478	

Alpha Volts: 705

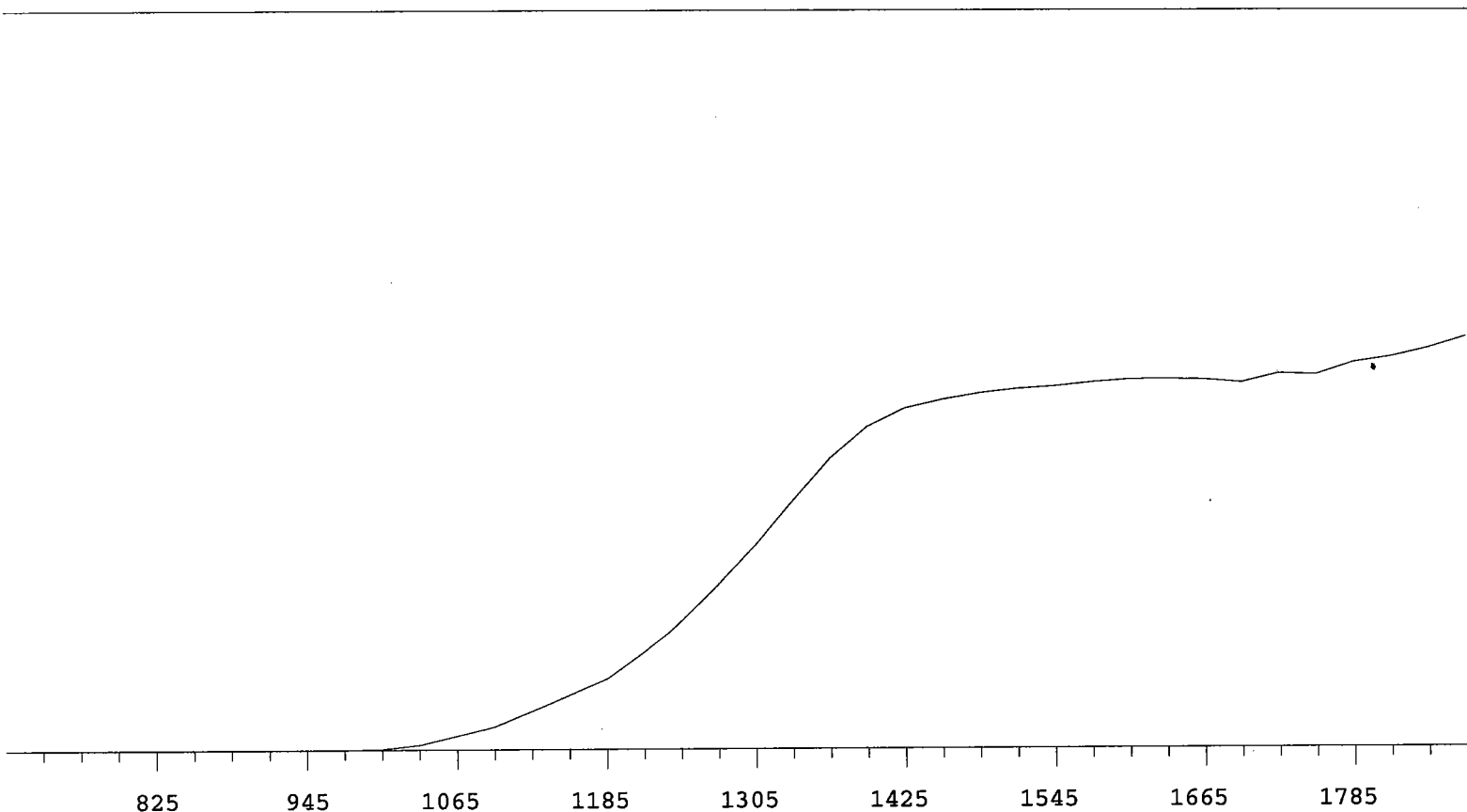
Beta Volts: 1515



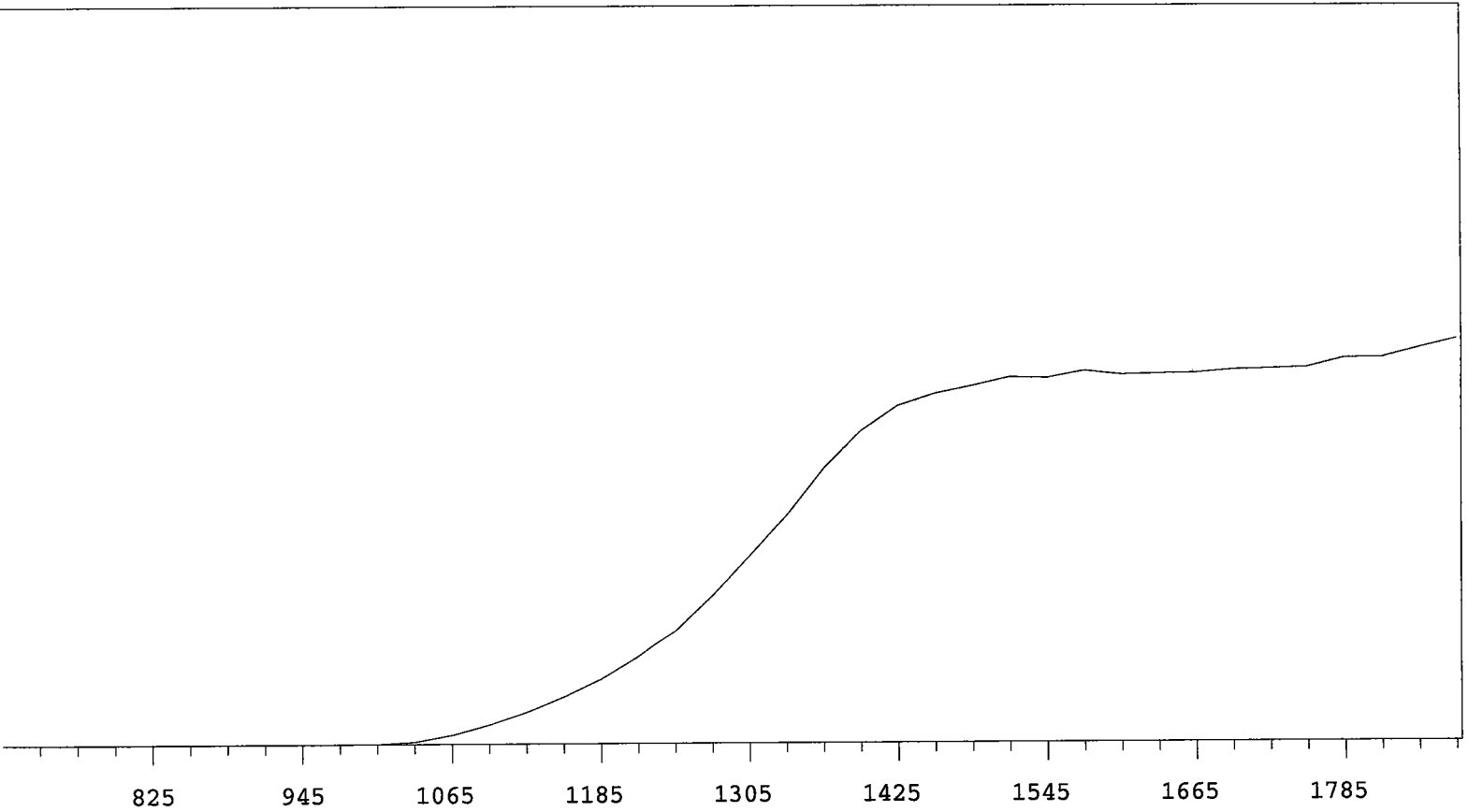
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	7524	+61.93
735	0		1335	9002	+55.36
765	0		1365	10542	+44.70
795	0	>100	1395	12064	+31.21
825	0	>100	1425	12981	+19.20
855	0	>100	1455	13192	+10.41
885	0	>100	1485	13570	+5.93
915	0	>100	1515	13820	+4.08
945	0	>100	1545	13866	+0.75
975	9	>100	1575	13880	+0.21
1005	58	>100	1605	13695	+0.59
1035	228	>100	1635	13950	+0.77
1065	544	>100	1665	13954	+1.92
1095	936	>100	1695	13911	+0.19
1125	1468	>100	1725	14116	+0.02
1155	2110	>100	1755	13908	-0.24
1185	2770	+94.71	1785	13960	-0.81
1215	3670	+85.91	1815	13939	+0.71
1245	4937	+79.46	1845	13931	
1275	6066	+70.79	1875	14071	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8778	+67.49
735	0		1335	10502	+57.68
765	0		1365	12516	+46.36
795	0	>100	1395	14215	+35.88
825	0	>100	1425	15472	+22.01
855	0	>100	1455	16469	+12.99
885	1	+0.00	1485	16342	+6.70
915	0	>100	1515	16874	+3.07
945	0	>100	1545	16918	+2.53
975	0	>100	1575	16950	+0.58
1005	18	>100	1605	16943	+0.95
1035	137	>100	1635	17008	+2.13
1065	430	>100	1665	17130	+2.45
1095	865	>100	1695	17403	+2.43
1125	1444	>100	1725	17377	+2.43
1155	2151	>100	1755	17515	+4.88
1185	2981	>100	1785	17710	+7.54
1215	4168	+92.14	1815	18533	+9.04
1245	5377	+84.73	1845	18905	
1275	6924	+74.92	1875	19415	

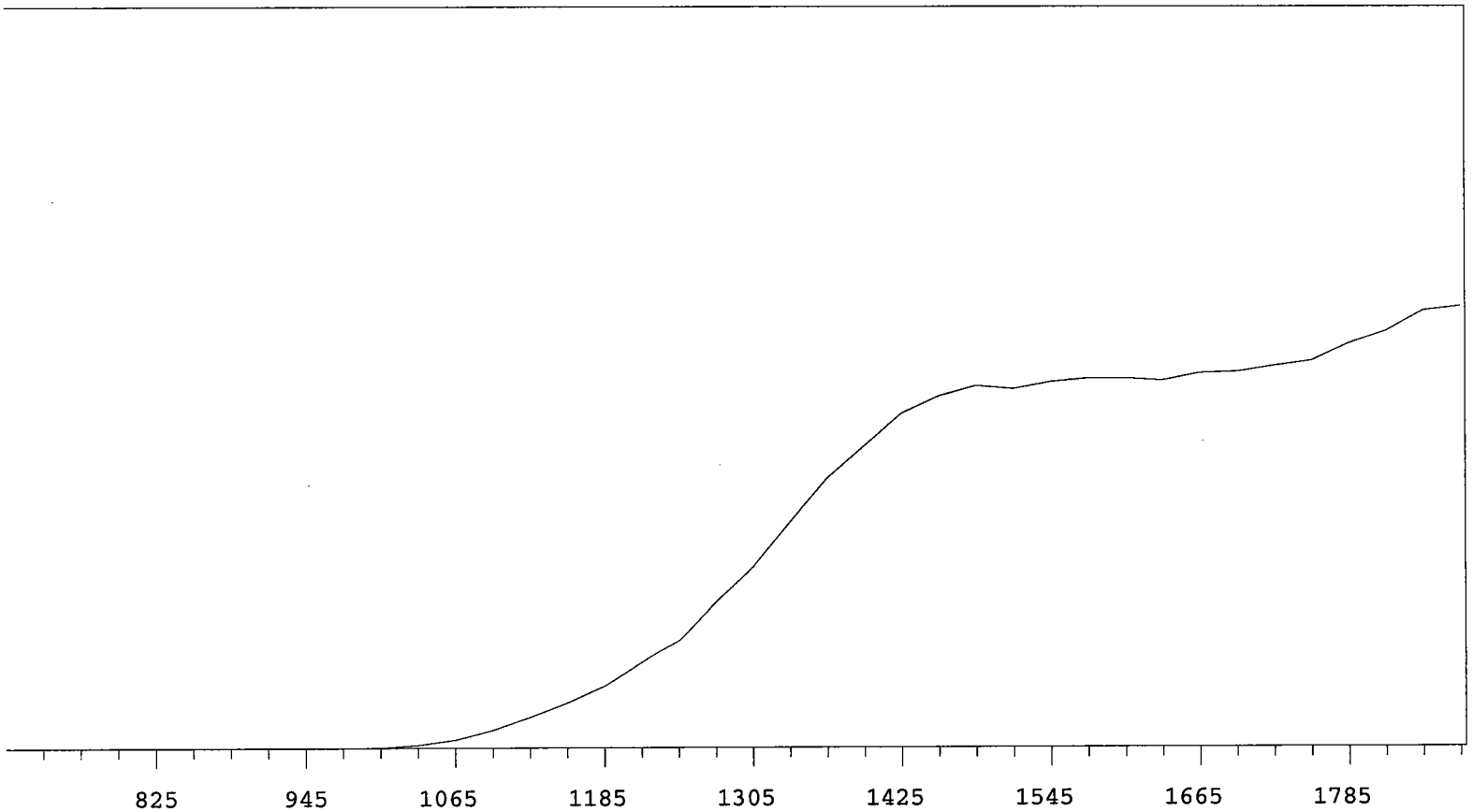


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8797	+65.44
735	0		1335	10726	+54.47
765	0		1365	12570	+41.11
795	0	>100	1395	13917	+26.79
825	0	>100	1425	14687	+15.44
855	1	+0.00	1455	15048	+8.47
885	0	>100	1485	15318	+5.00
915	0	>100	1515	15494	+3.76
945	0	>100	1545	15606	+3.04
975	3	>100	1575	15776	+2.35
1005	40	>100	1605	15889	+1.44
1035	210	>100	1635	15907	-0.16
1065	590	>100	1665	15881	+0.64
1095	983	>100	1695	15741	+1.21
1125	1645	>100	1725	16124	+3.63
1155	2342	>100	1755	16076	+5.41
1185	3045	+96.43	1785	16588	+5.79
1215	4201	+90.42	1815	16830	+7.53
1245	5579	+83.64	1845	17185	
1275	7121	+74.44	1875	17682	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	10118	+69.76
735	0		1335	12269	+59.65
765	0		1365	14810	+47.35
795	0	>100	1395	16773	+33.46
825	0	>100	1425	18104	+20.13
855	0	>100	1455	18720	+11.98
885	1	+0.00	1485	19122	+6.50
915	0	>100	1515	19580	+4.77
945	0	>100	1545	19527	+2.48
975	2	>100	1575	19902	+0.81
1005	21	>100	1605	19690	+0.53
1035	132	>100	1635	19739	+0.23
1065	491	>100	1665	19765	+1.29
1095	1036	>100	1695	19932	+1.40
1125	1698	>100	1725	19976	+2.72
1155	2517	>100	1755	20051	+2.92
1185	3468	>100	1785	20523	+4.26
1215	4721	+91.83	1815	20542	+5.57
1245	6175	+85.13	1845	21035	
1275	8025	+76.82	1875	21528	





VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	1	>100
1005	14	>100
1035	130	>100
1065	363	>100
1095	785	>100
1125	1357	>100
1155	1996	>100
1185	2735	+99.45
1215	3785	+94.20
1245	4857	+86.43
1275	6571	+78.80
1305	8095	+71.16
1335	10052	+58.38
1365	11990	+47.92
1395	13400	+35.01
1425	14808	+23.58
1455	15554	+13.45
1485	15987	+6.39
1515	15861	+3.45
1545	16156	+2.18
1575	16297	+1.72
1605	16297	+1.33
1635	16208	+1.62
1665	16526	+2.92
1695	16581	+3.94
1725	16832	+5.91
1755	17039	+8.68
1785	17800	+11.53
1815	18351	+11.46
1845	19265	
1875	19468	

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

# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

66002-278

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Ra-228
ACTIVITY (dps):	2.367 E4
HALF-LIFE:	5.75 years
CALIBRATION DATE:	April 23, 2003 12:00 EST
TOTAL UNCERTAINTY*:	2.4%

\*95% Confidence Level

Impurities:  $\gamma$ -impurities (other than decay products) <0.1%,  
Ra-226 <0.1%

5.31628 grams 4M HCl solution with 100  $\mu$ g/g Ba carrier.

P O NUMBER 3219 RD, Item 1

SOURCE PREPARED BY:

M. Taskaeva  
M. Taskaeva, Radiochemist

Q A APPROVED:

J.M. Muth 4-23-03



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0553-A	Isotope:	Radium-228 SPIKE
Prepared By:	Lonnie Morris	Prepared By:	Lonnie Morris
Carrier Conc:	0.5M HCl	Prep Date:	04/25/2003
Reference Date:	04/23/2003	Verification Date:	04/27/2005
Ampoule Mass (g):	5.0235 g	Expiration Date:	04/27/2006
Uncertainty:	+/-	Primary Code:	0553-B
LogBook No:	RC-S-035-068	Dilution(mL):	1000 mL
		Mass of Parent(g):	30.535 g
		Density(g/mL):	
		Balance ID:	

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

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

### Secondary Standards

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

GEL Laboratories LLC  
Version 1.0 9/18/2000

# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

64673-278

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Ra-228
ACTIVITY (dps):	1.939 E4
HALF-LIFE:	5.75 years
CALIBRATION DATE:	October 1, 2002 12:00 EST
TOTAL UNCERTAINTY*:	3.6%
SYSTEMATIC:	3.4%
RANDOM:	1.1%

\*99% Confidence Level

Impurities:  $\gamma$ -impurities <0.1%

5.02617 grams 0.1M HCl solution with 110  $\mu\text{g/g}$  Ba carrier.

P O NUMBER 3208RD, Item 2

SOURCE PREPARED BY: M. Taskaeva  
M. Taskaeva, Radiochemist

Q A APPROVED: M. M. 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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.4737 \text{ g}) * (19390 \text{ dps}) * (60 \text{ dpm/dps}) / (5.02617 \text{ g} * 100 \text{ mL}) = 10355.2060 \text{ dpm/mL}$
$(4.4737 \text{ g}) * (19390 \text{ dps}) * (60 \text{ dpm/dps}) / (0.9992 \text{ g/mL}) / (5.02617 \text{ g} * 100 \text{ mL}) = 10363.0820 \text{ dpm/g}$

### 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		Standard	
Isotope	Detector CPM	NET CPM	Detector Eff. Mass. Used (mL)
0503-B	1962.0000	1916.4000	1.0000
0503-B	1983.2000	1937.6000	1.0000
0503-B	1927.0000	1881.4000	1.0000
			Source DPM/mL
			206.8705773
			209.1590642
			203.092415
			206.3740189

Mean Value (Counting) = 206.3740189 dpm/mL      102.890426      Pass  
 Stdev = 3.063655617 dpm/mL      0.01484516      Rule 3 (Pass/Fail)

Certificate Value = 200.596 dpm/mL  
 Lower Limit = 200.2467076 dpm/mL  
 Upper Limit = 212.5013301 dpm/mL  
 Rule 1 Pass/Fail Pass  
 Two sigma = 6.127311233  
 10 % of Mean = 20.63740189  
 Rule 2 (Pass/Fail) Pass

### Verification Rules

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 = The determined mean value shall be within 10% of the certificate value.

The analyst prepared three standard verification sources for Ra-228 source 0503-B by transferring portions of the standard into glass liquid scintillation vials. Ten mL of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Gold for Ra-228 source standard verification. The Ra-228 efficiency calibration which was used for verification calculations was performed on 9/13/08 using source 0683-A (Ra-228). Calibration data is recorded in this logbook under Ra-228 0683-A. Each verification source calculation was performed as follows:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

where:

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

Reference RAD SOP M-001

*David D. Perry 9/16/08*

*Angela Johnson 9/17/08*

5/19/16

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:

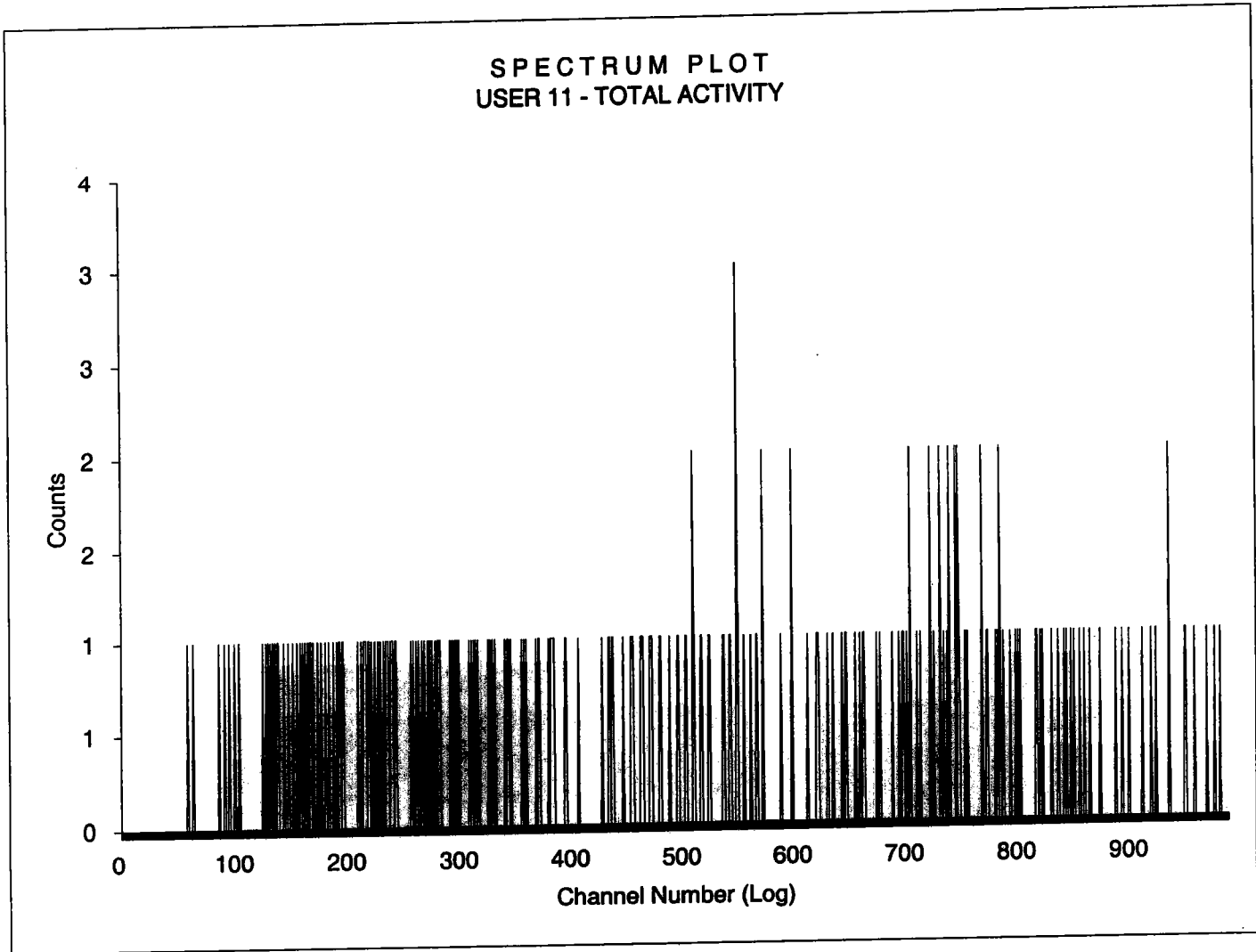
5 11-5 5.00

H#, Total Counts:

97.9 69

Start, End, X-Axis:

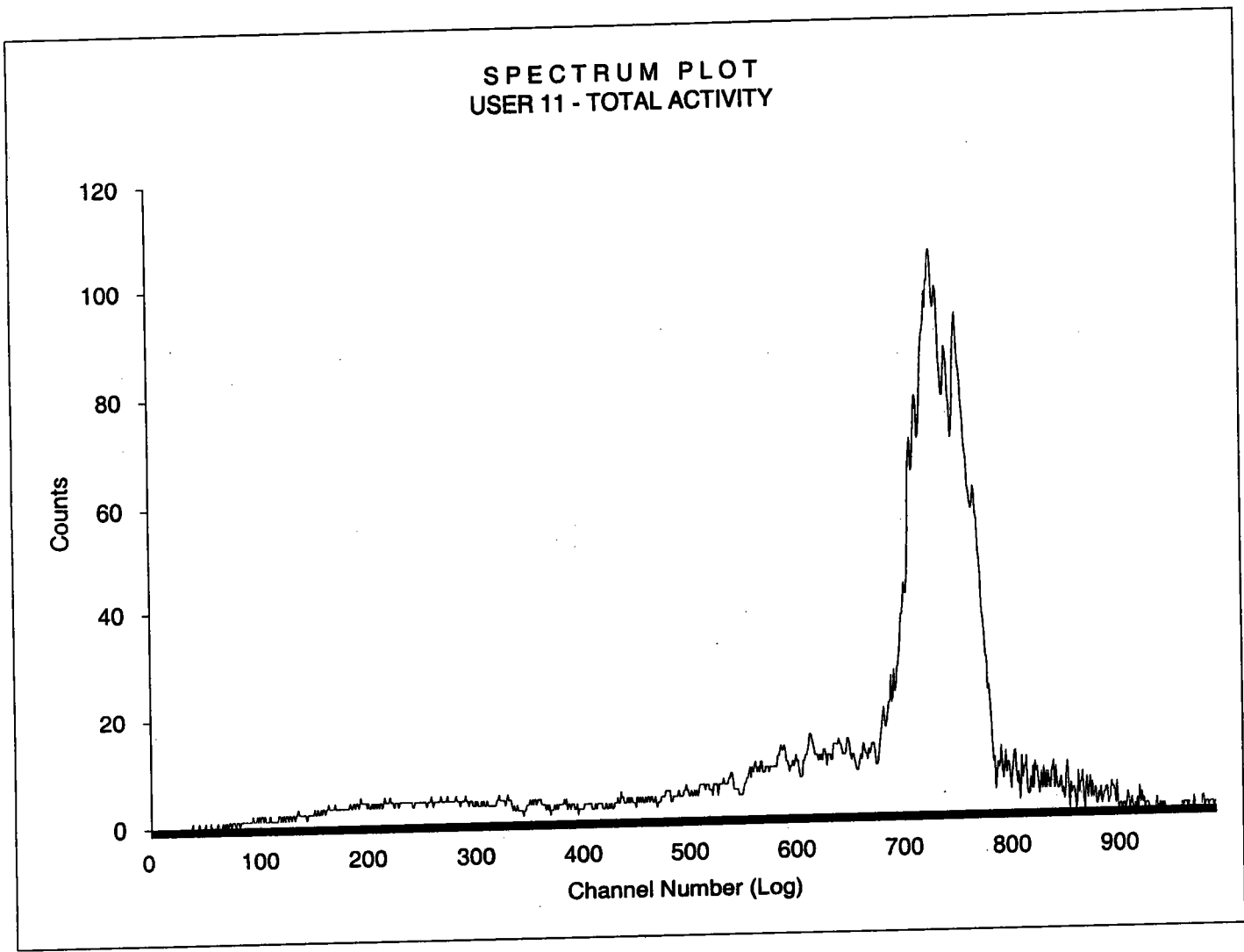
0 990 Channel Number





50/9/16  
25

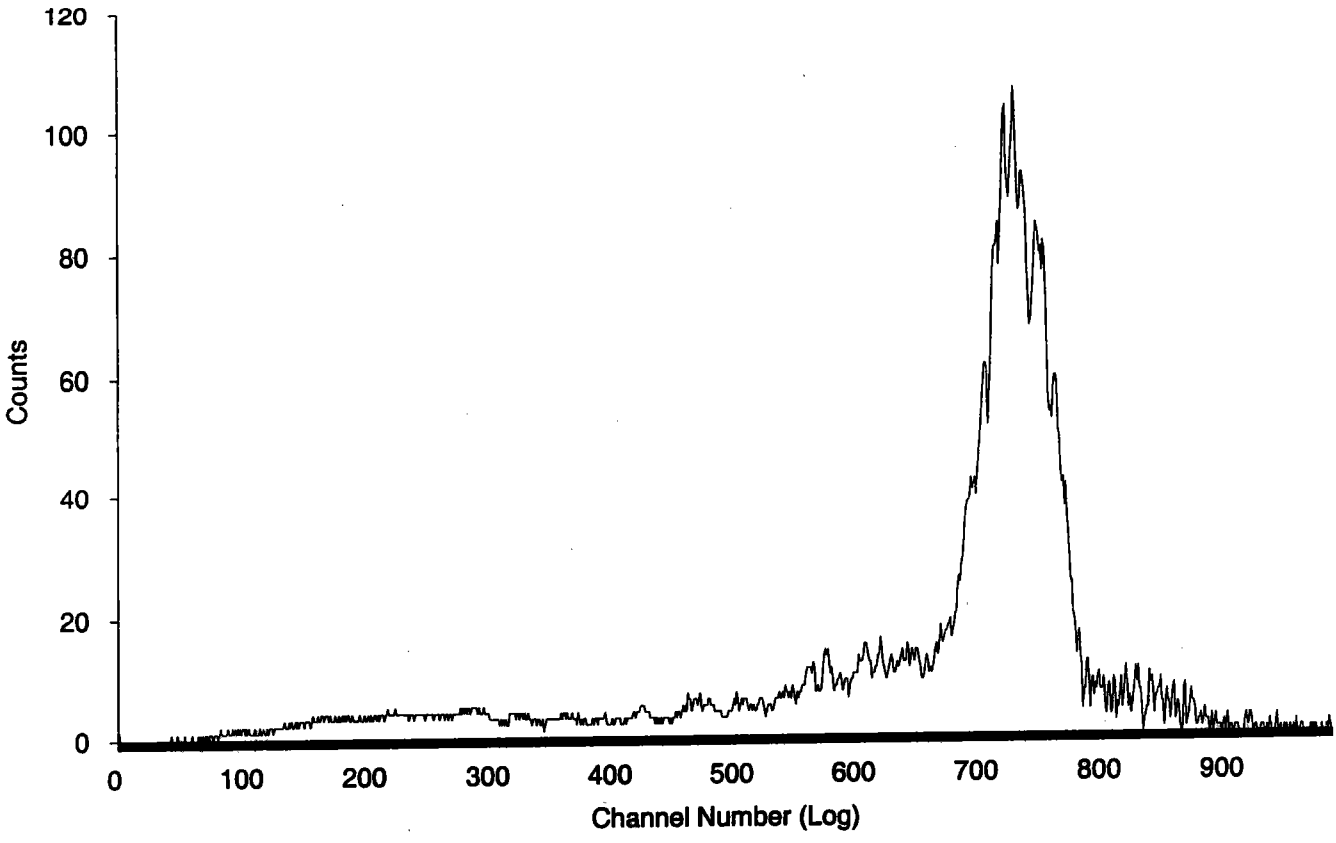
Sample Count Start Time: 16 Sep 2008 16:53:01  
Data Capture Date: 9/16/2008 16:58:06  
User Filename: S11091611-6A.WK1  
U11091611-1A.WK1  
Spectrum Type: Log Counts  
User Number: 11  
User Id: TOTAL ACTIVITY  
User Comment: GOLD  
Isotope Name: 14C  
Scintillator: LIQUID  
Sample, Rack-Pos, Time: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



8/16/08  
SJS

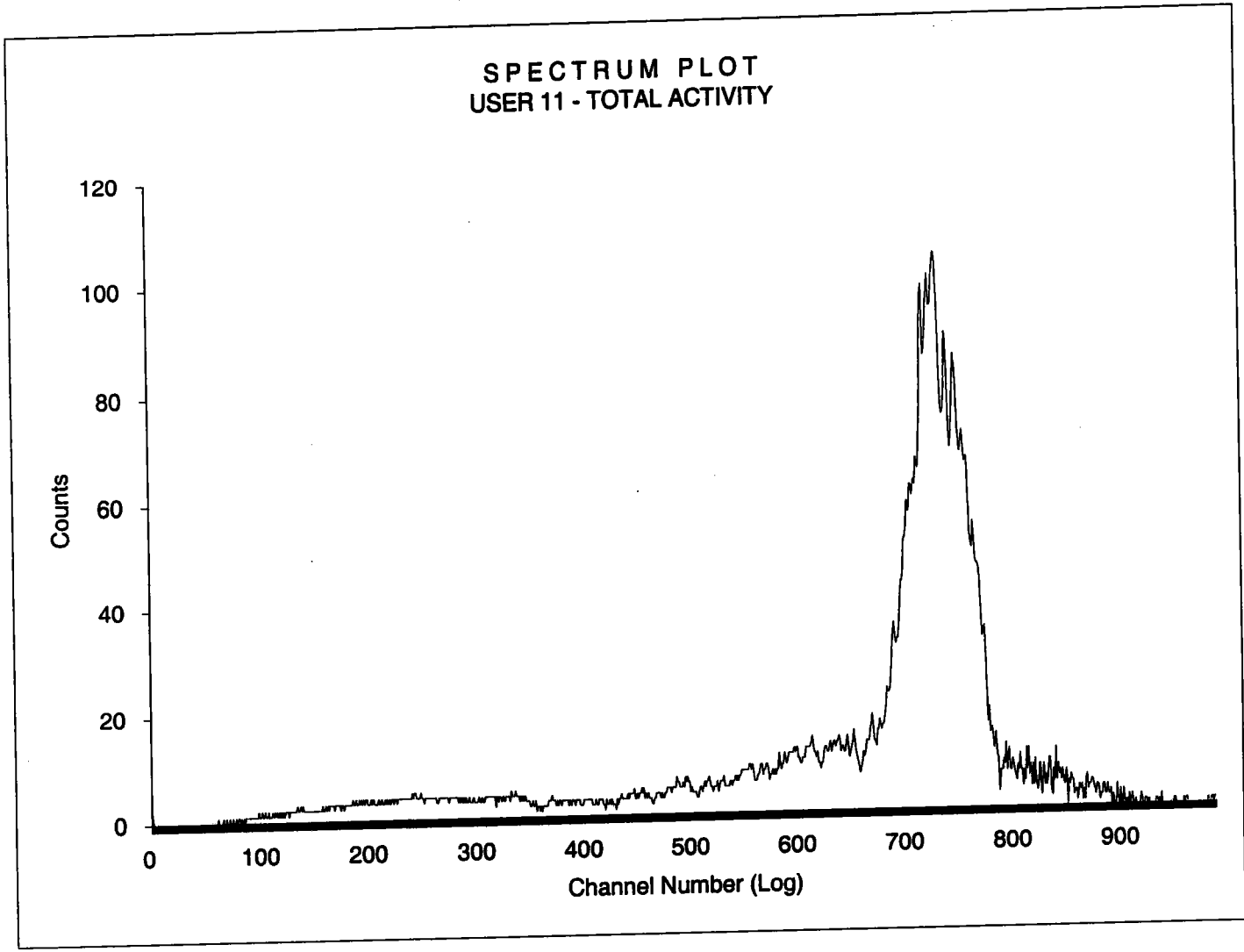
Sample Count Start Time: 16 Sep 2008 16:59:07  
Data Capture Date: 9/16/2008 17:04:12  
User Filename: S11091611-7A.WK1  
U11091611-1A.WK1  
Spectrum Type: Log Counts  
User Number: 11  
User Id: TOTAL ACTIVITY  
User Comment: GOLD  
Isotope Name: 14C  
Scintillator: LIQUID  
Sample, Rack-Pos, Time: 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: 07/03/2009  
 Ac-228 Ingrow: 2025 6/30/09  
 Ac-228 Separation Date/Time: 7-2-09 0540  
 Witness: JRS 6/30/09  
 Balance ID: NA

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Pos. #	Vol (mL)	Det #	Ba Yield (%)	Gamma Det. #
1201872112-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	1	20		100.83	↑
1201872113-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	2	20		108.20	
1201872114-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	3	20		114.22	
1201872115-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	4	20		120.58	WZAL
1201872116-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	5	20		105.84	
1201872117-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	6	20		102.70	
1201872118-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	7	20		112.82	
1201872119-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	8	20		111.91	↓

JRS 7/2/09

JRS 7/2/09

Data Reviewed By:

Comments:

ASSAY 30-Jun-09 19:32:06

Protocol id 8 228\_REC  
Time limit 180  
Count limit 50000  
Isotope Ba-133  
Protocol date 9-Apr-07 10:03:07  
Run id. 54

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT	TIME
1	97	1	180	779	229.3	4.13			19:32:13
2	97	2	180	785	231.2	4.11	100.83		19:35:24
3	97	3	180	835	248.1	3.95	108.20		19:38:35
4	97	4	180	877	261.9	3.83	114.22		19:41:47
5	97	5	180	921	276.5	3.71	120.58		19:44:58
6	72	6	180	819	242.7	4	105.84		19:48:17
7	72	7	180	798	235.5	4.07	102.70		19:51:28
8	72	8	180	867	258.7	3.85	112.82		19:54:40
9	72	9	180	861	256.6	3.87	111.91		19:57:51

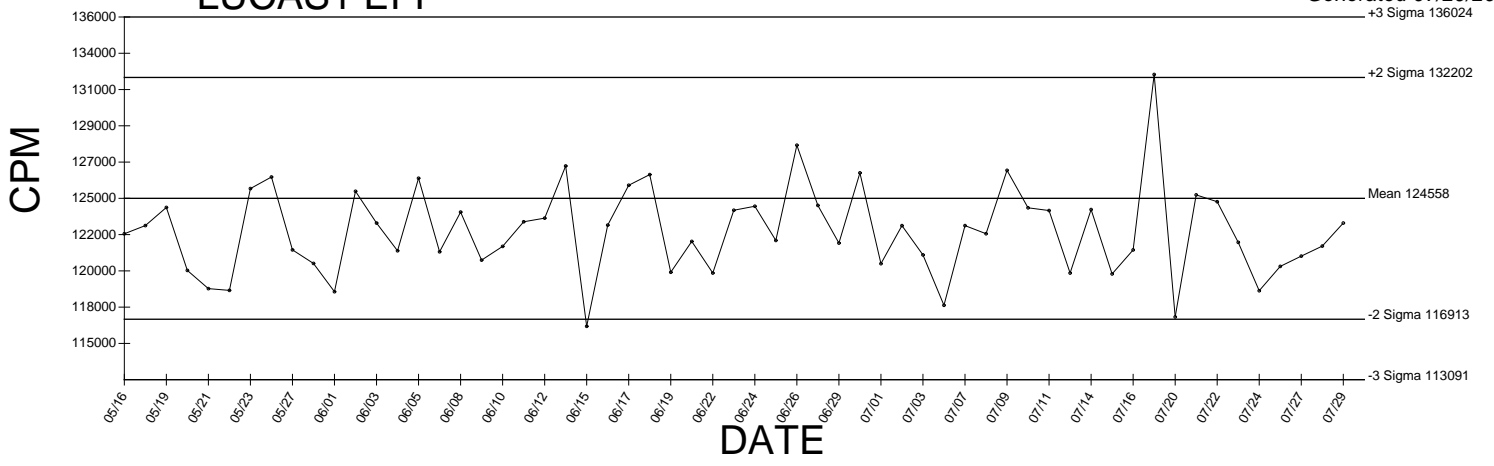
END OF ASSAY

*[Handwritten signature]*  
7/2/09

# BACKGROUND AND EFFICIENCY DATA

# LUCAS1 EFF

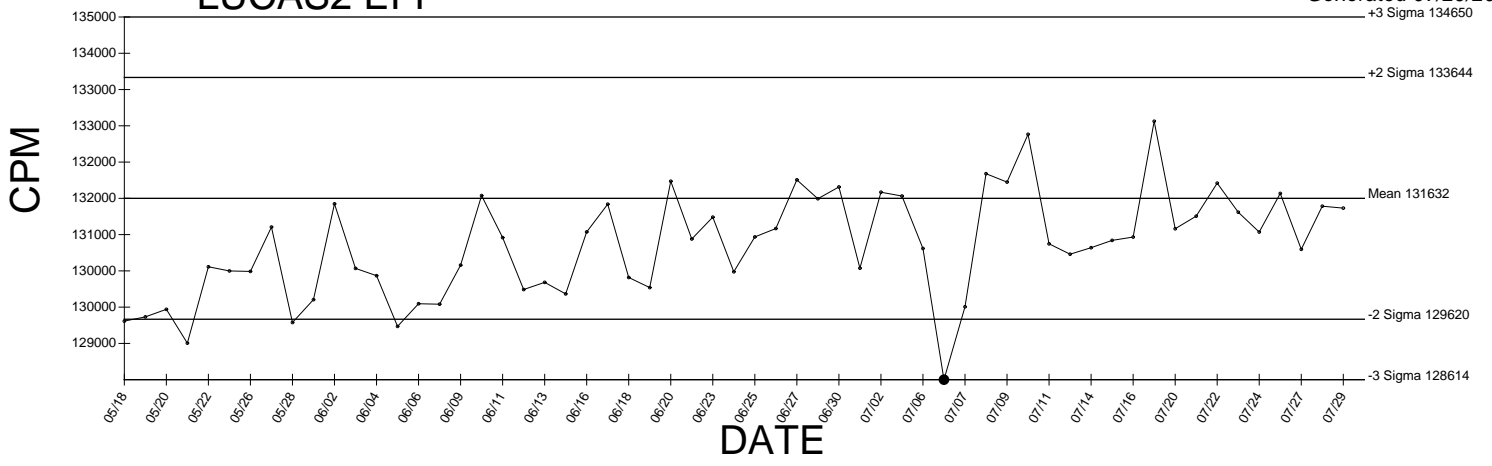
Generated 07/29/2009



● Denotes Outlier

# LUCAS2 EFF

Generated 07/29/2009

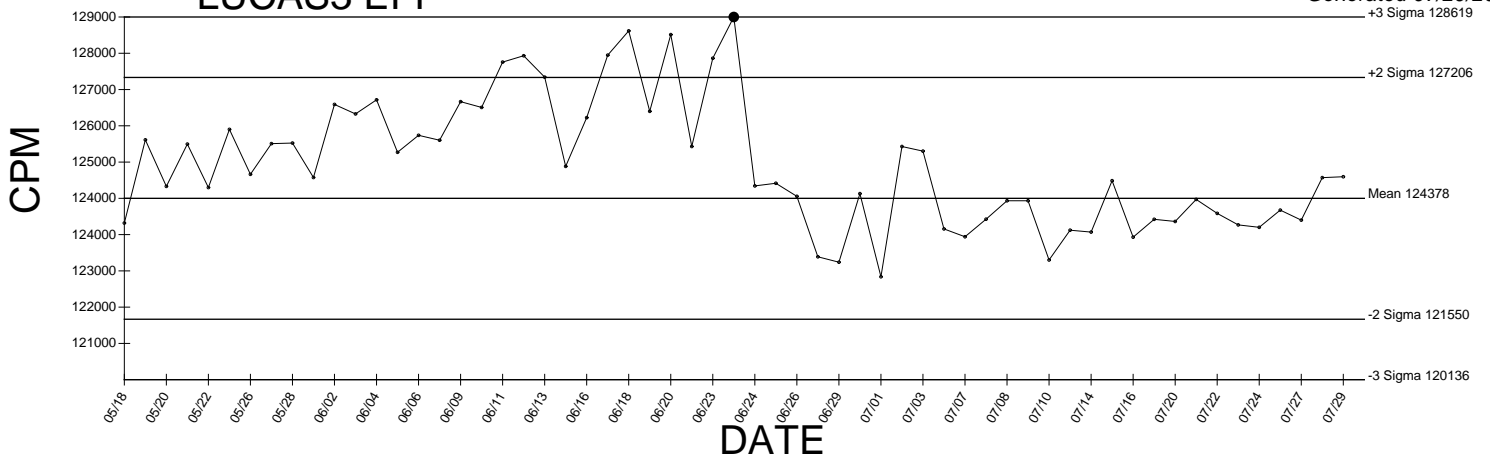


● Denotes Outlier



# LUCAS3 EFF

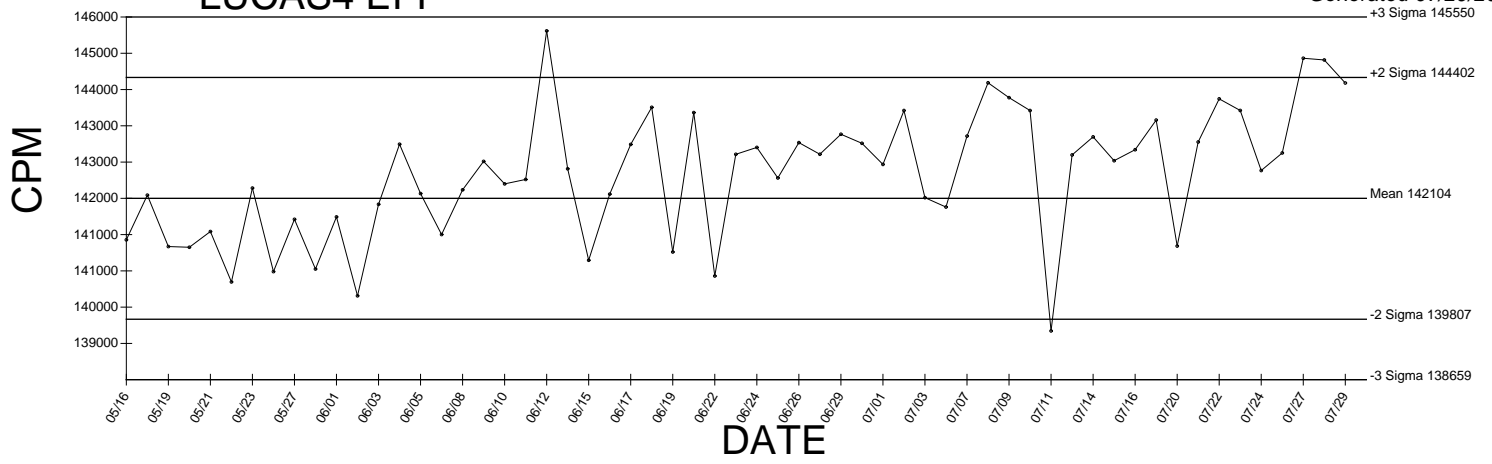
Generated 07/29/2009



● Denotes Outlier

# LUCAS4 EFF

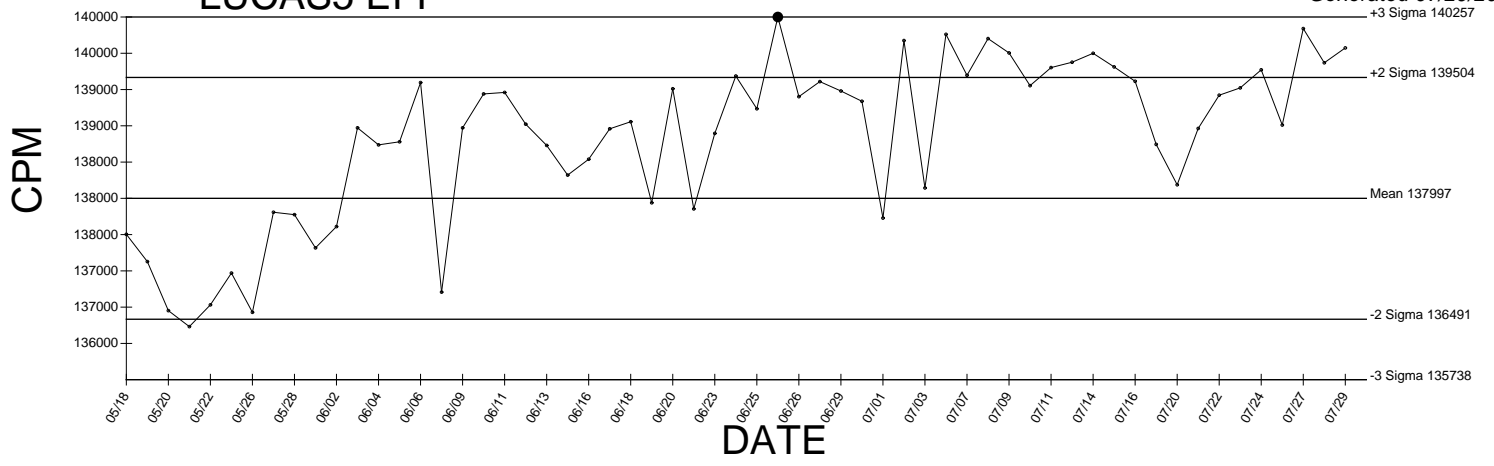
Generated 07/29/2009



● Denotes Outlier

# LUCAS5 EFF

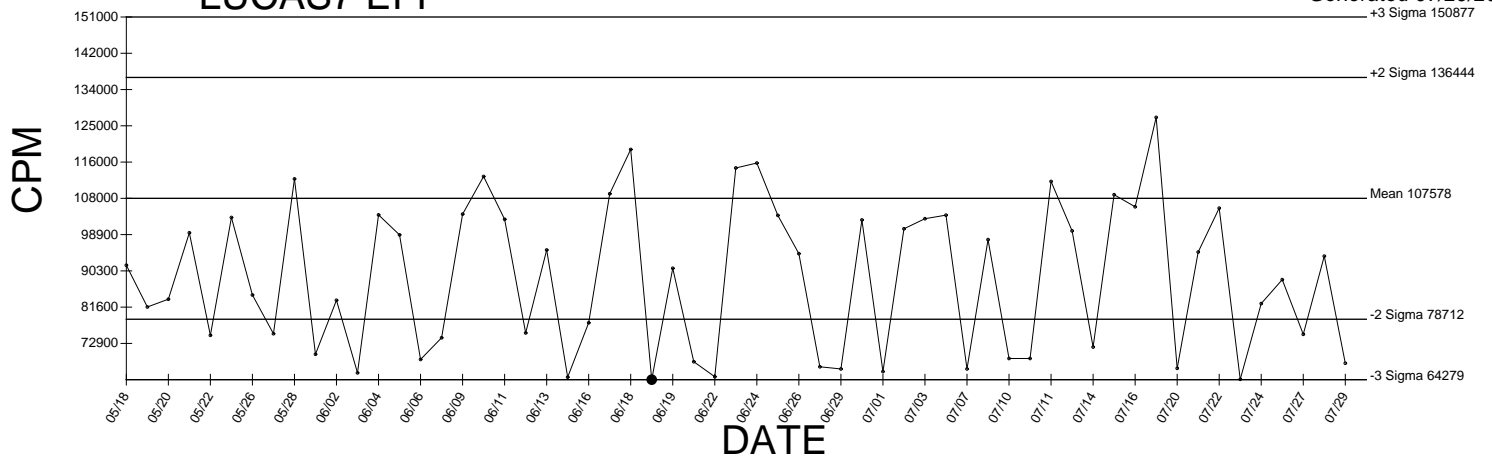
Generated 07/29/2009



● Denotes Outlier

# LUCAS7 EFF

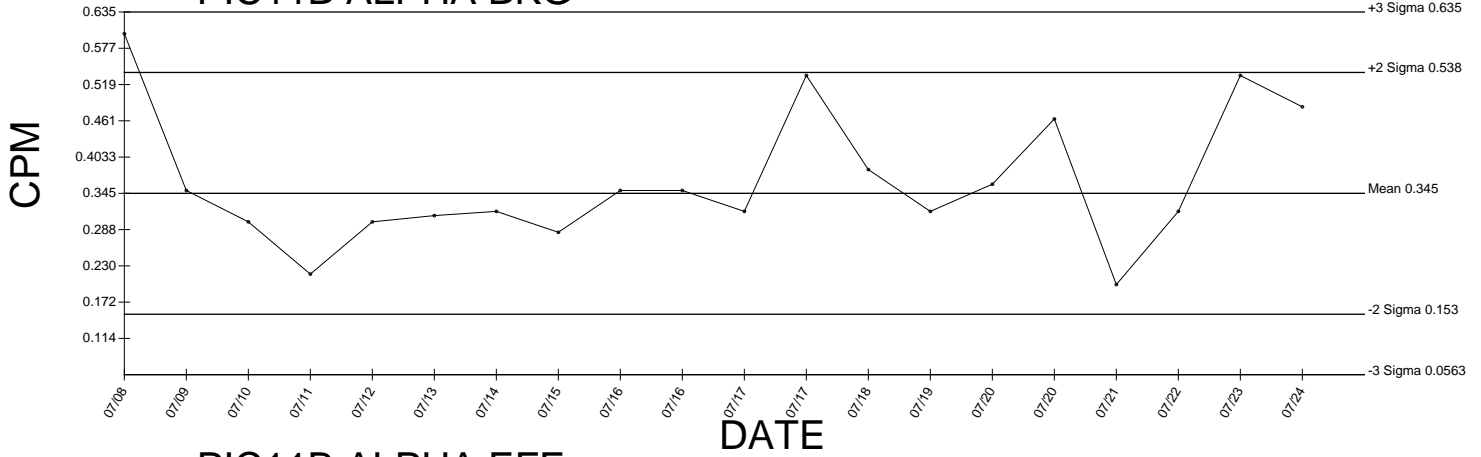
Generated 07/29/2009



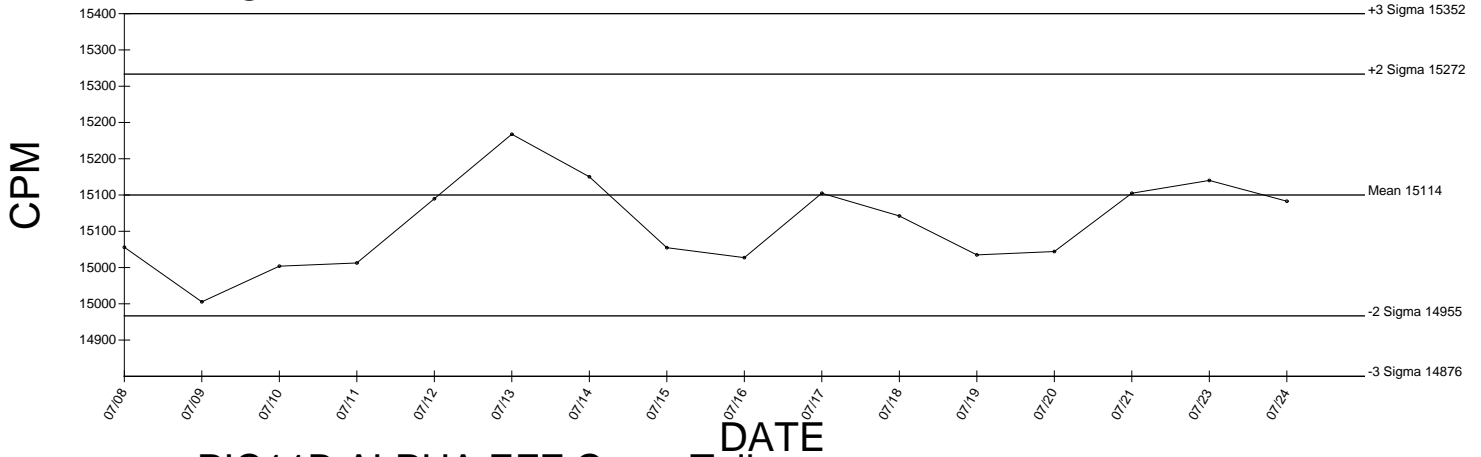
● Denotes Outlier

# PIC11B ALPHA BKG

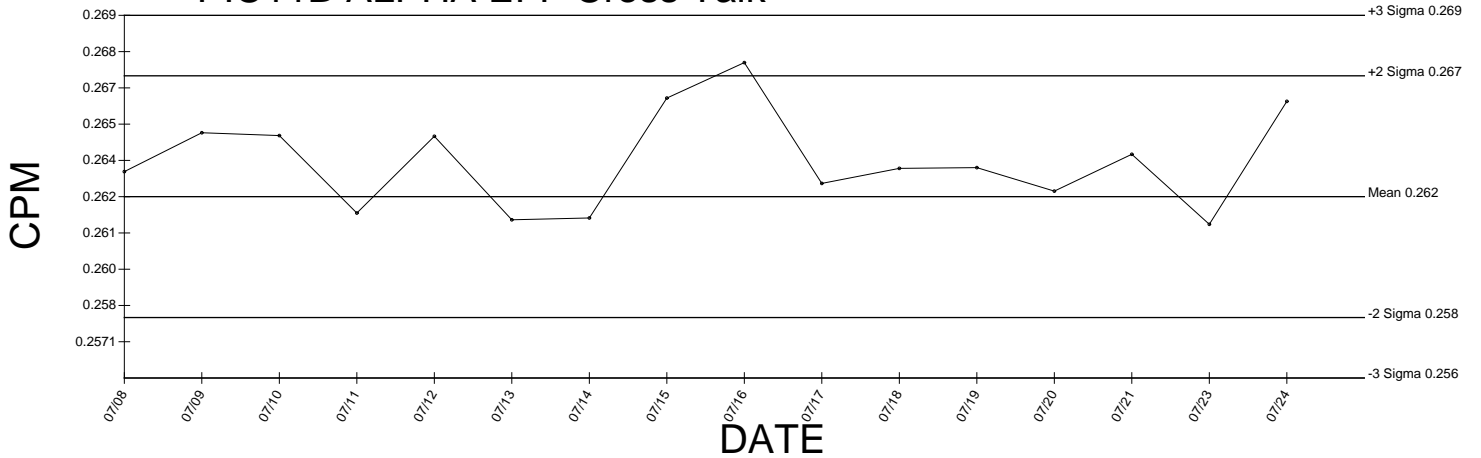
Generated 07/24/2009



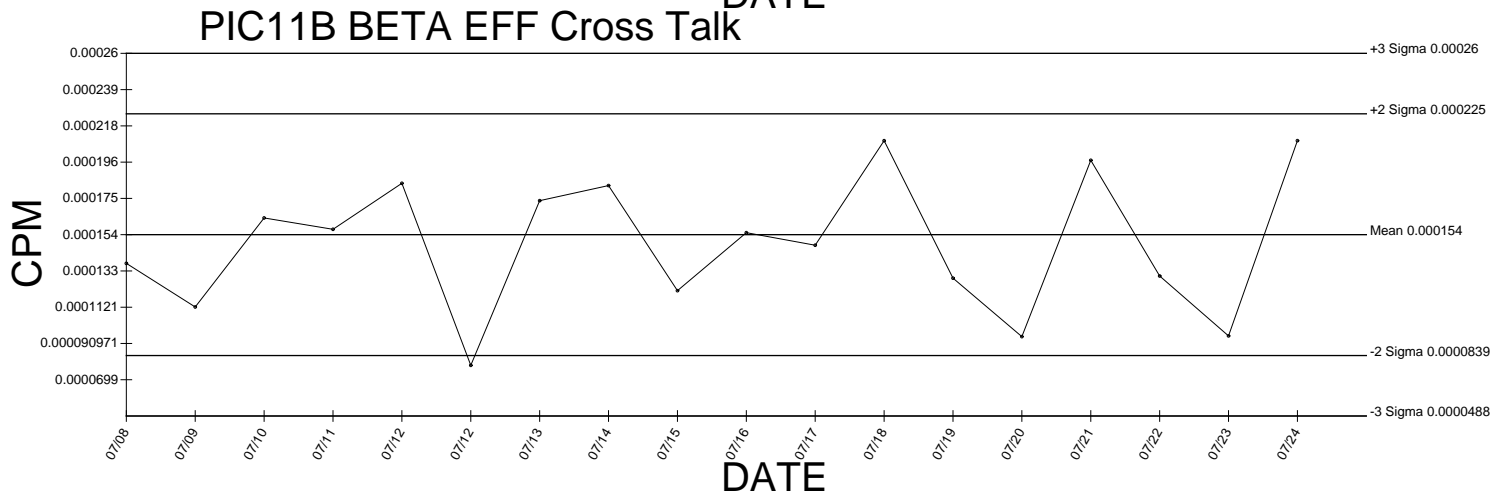
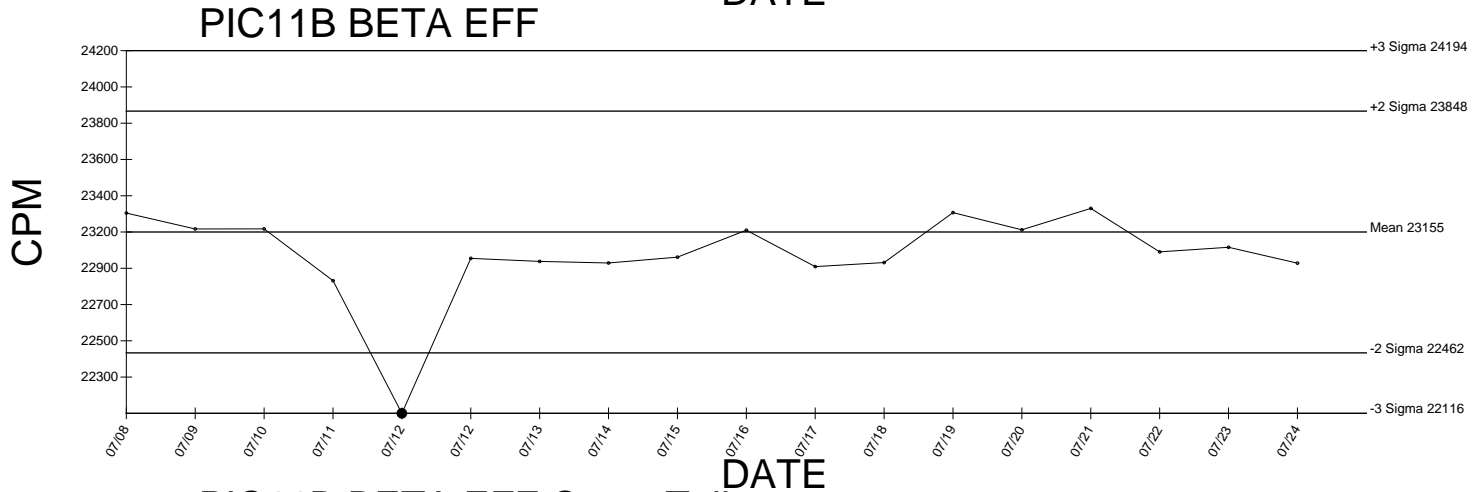
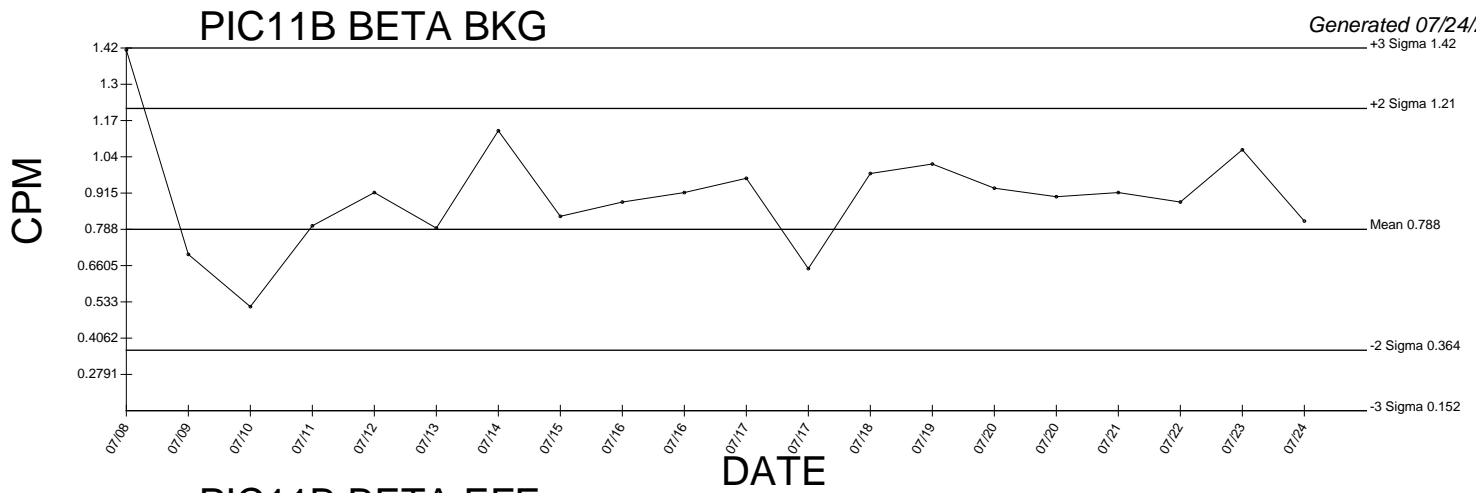
# PIC11B ALPHA EFF



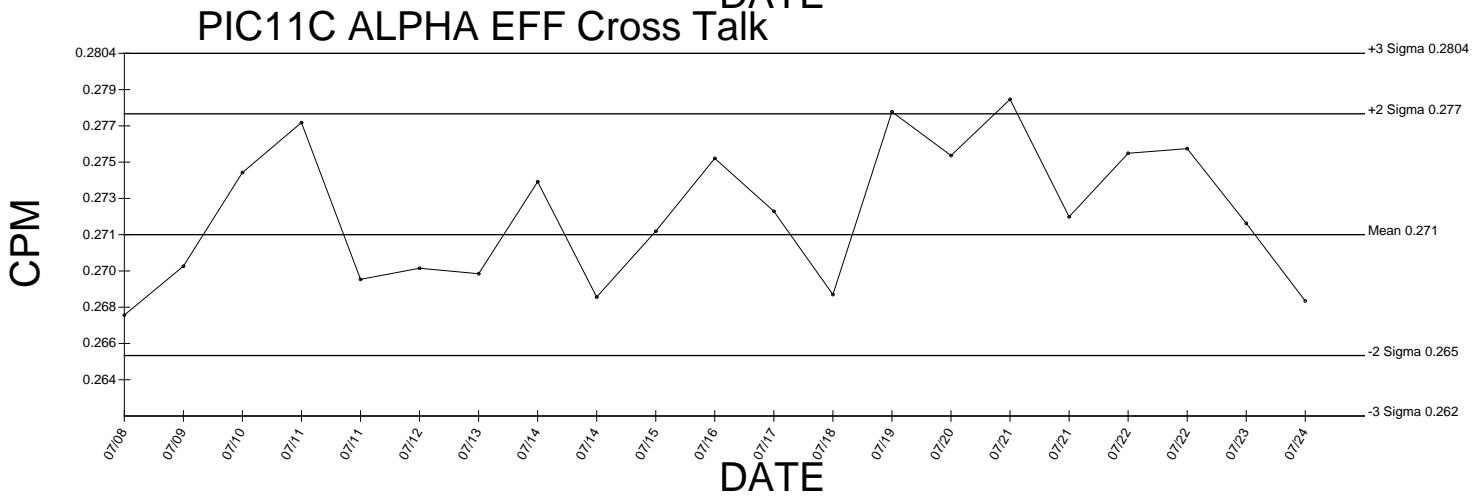
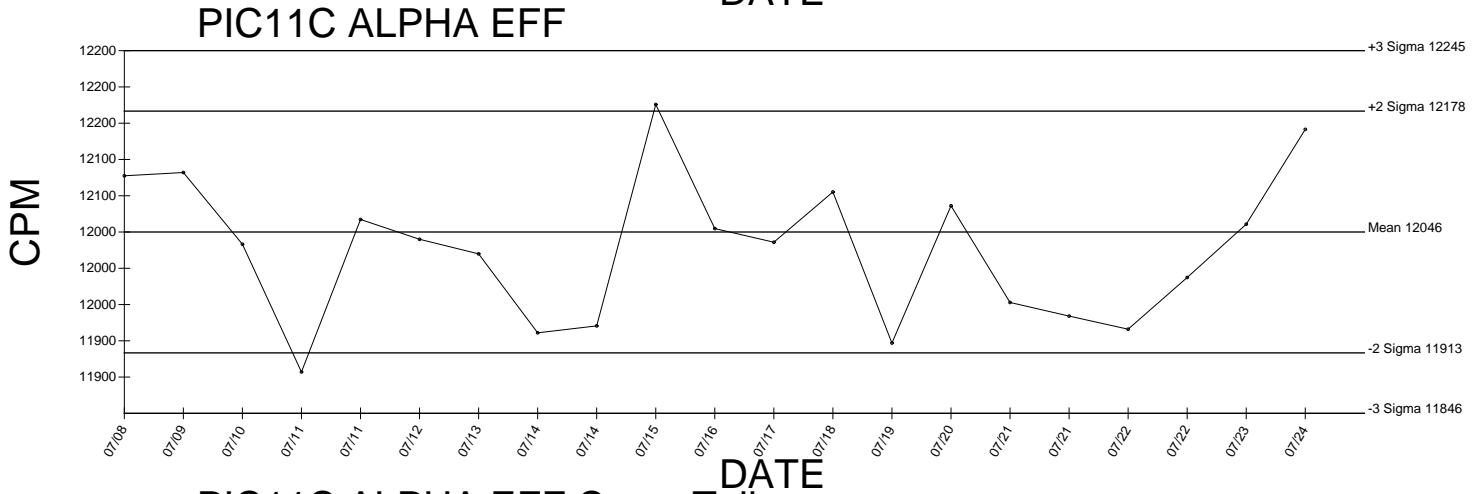
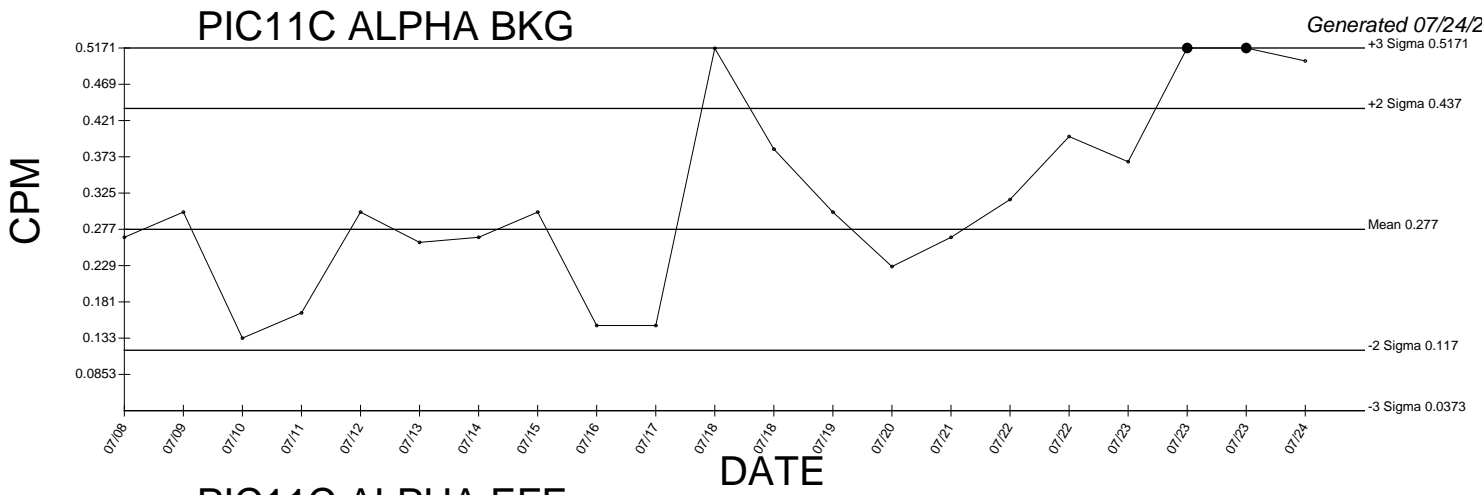
# PIC11B ALPHA EFF Cross Talk



● Denotes Outlier

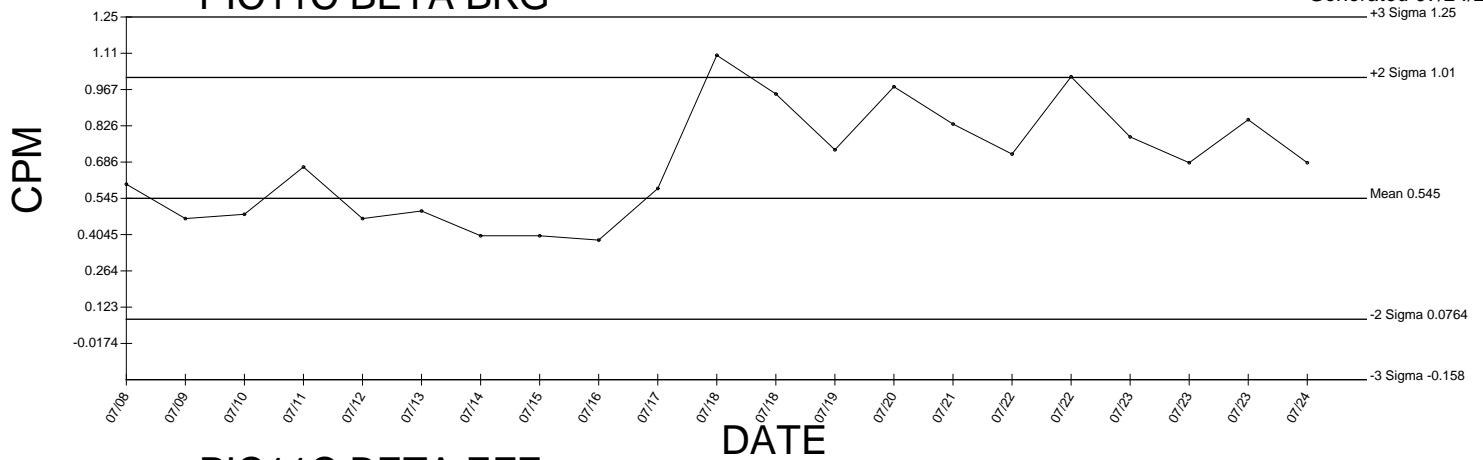


● Denotes Outlier

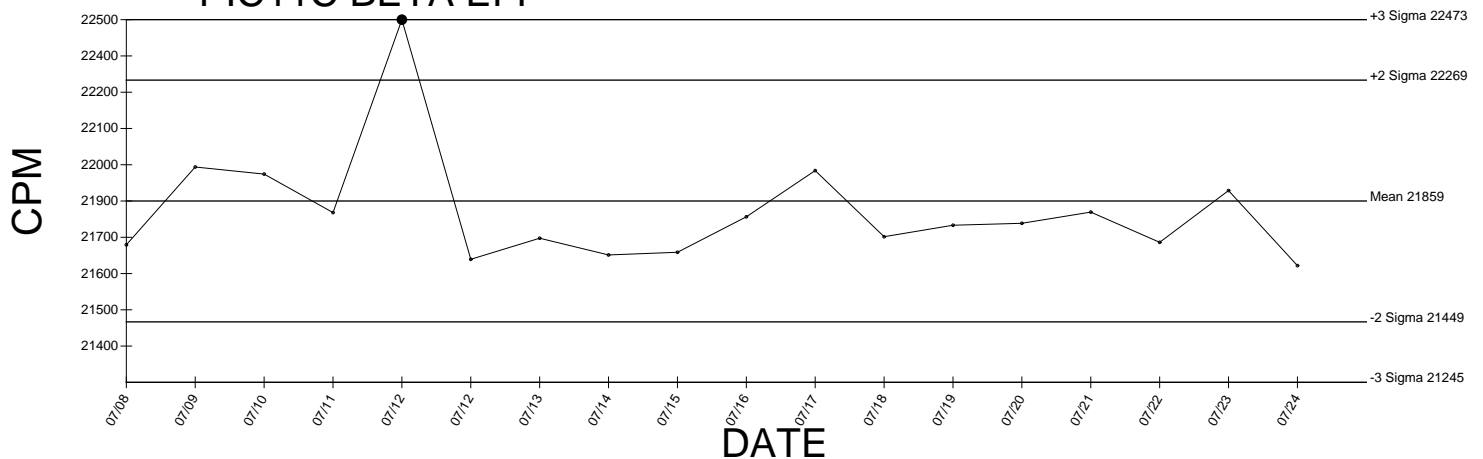


● Denotes Outlier

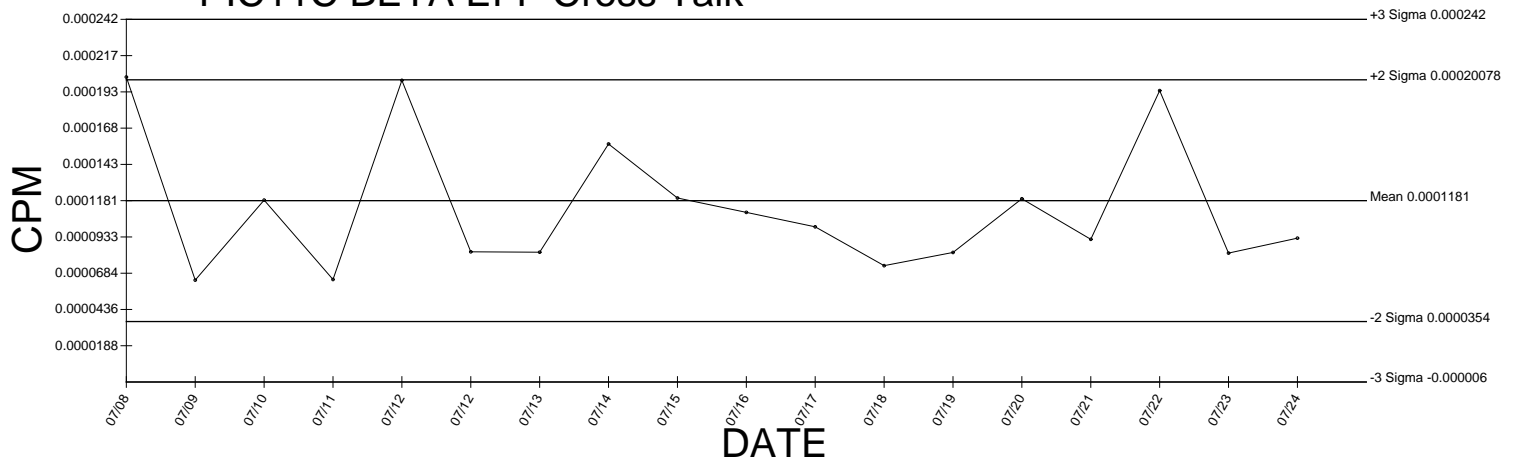
### PIC11C BETA BKG



### PIC11C BETA EFF



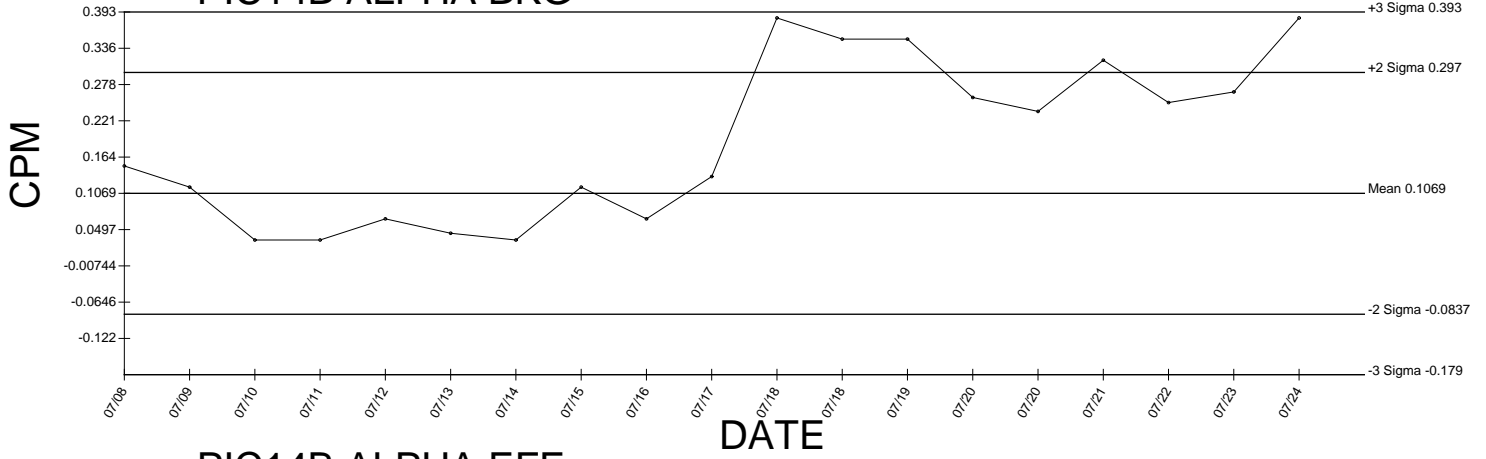
### PIC11C BETA EFF Cross Talk



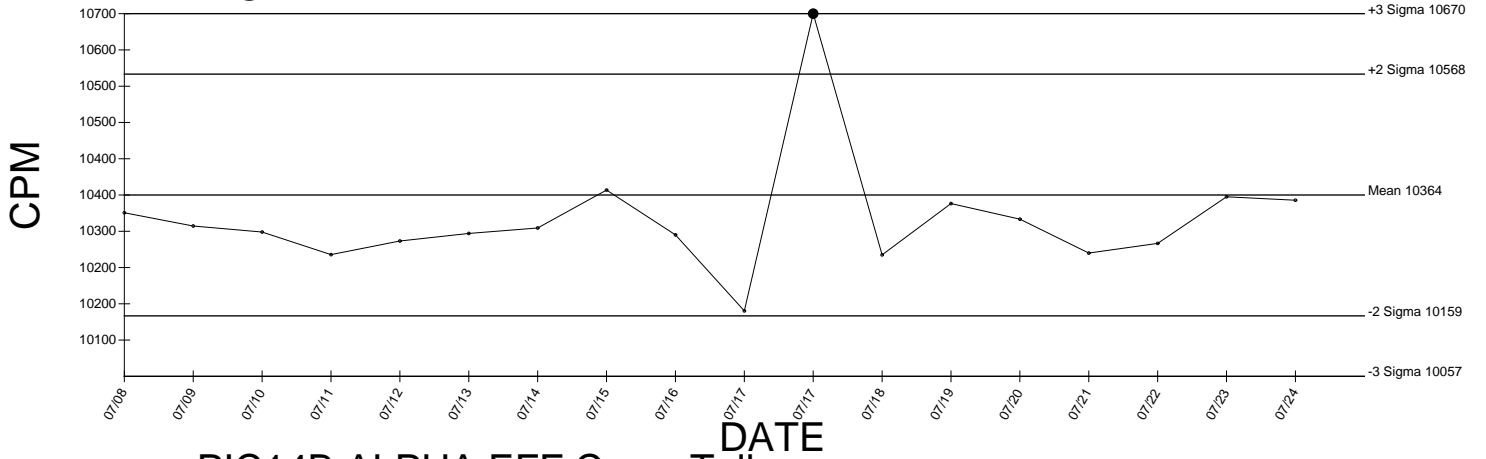
● Denotes Outlier



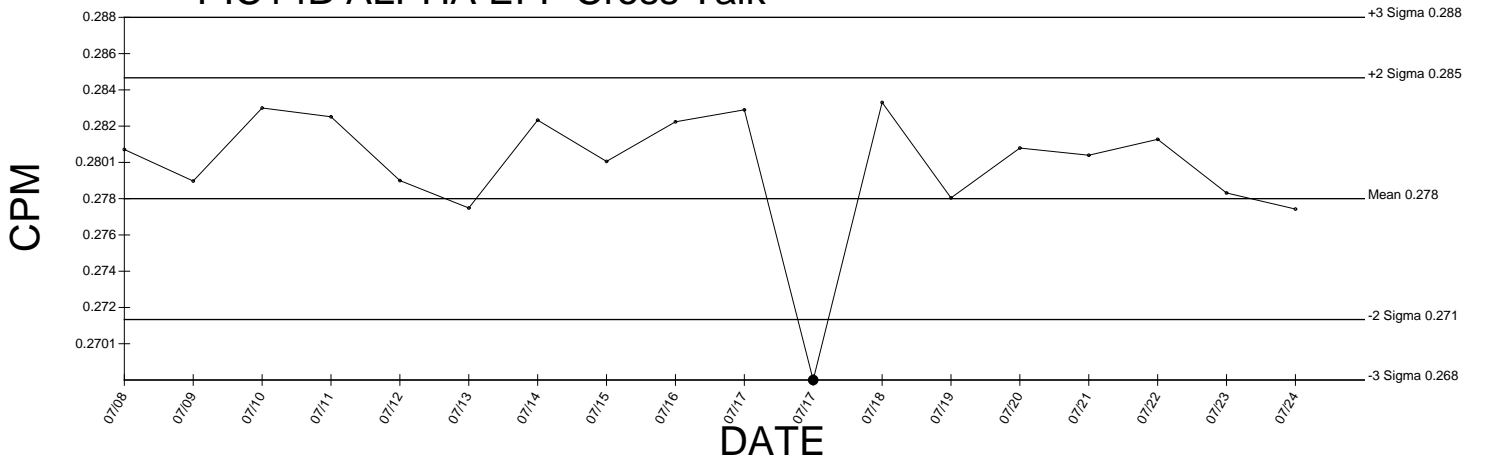
### PIC14B ALPHA BKG



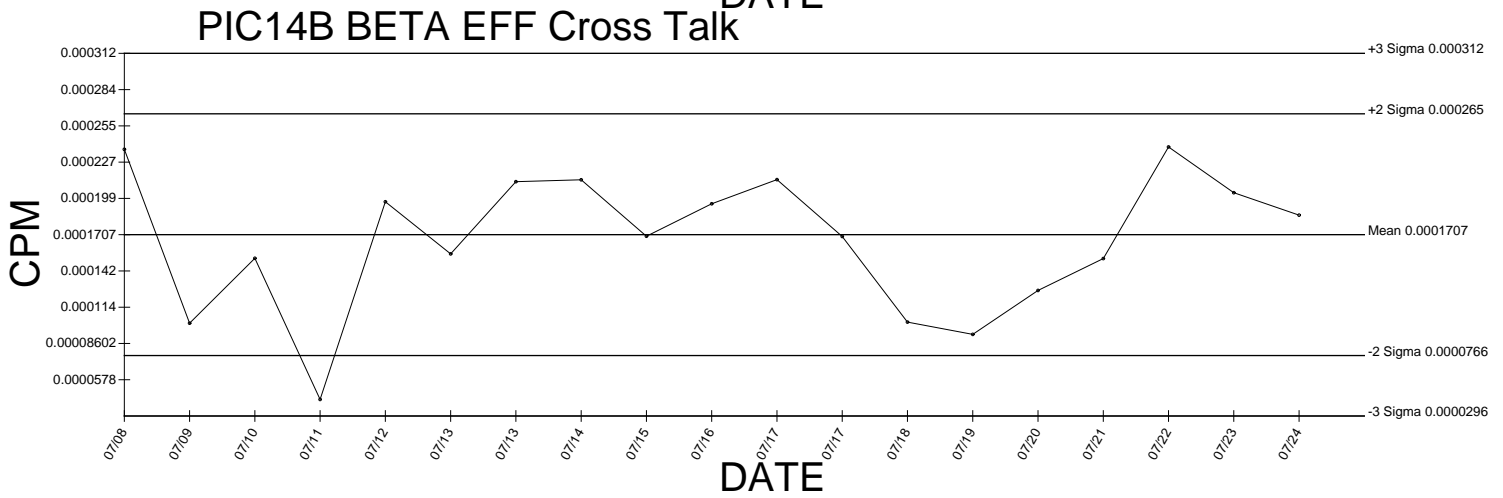
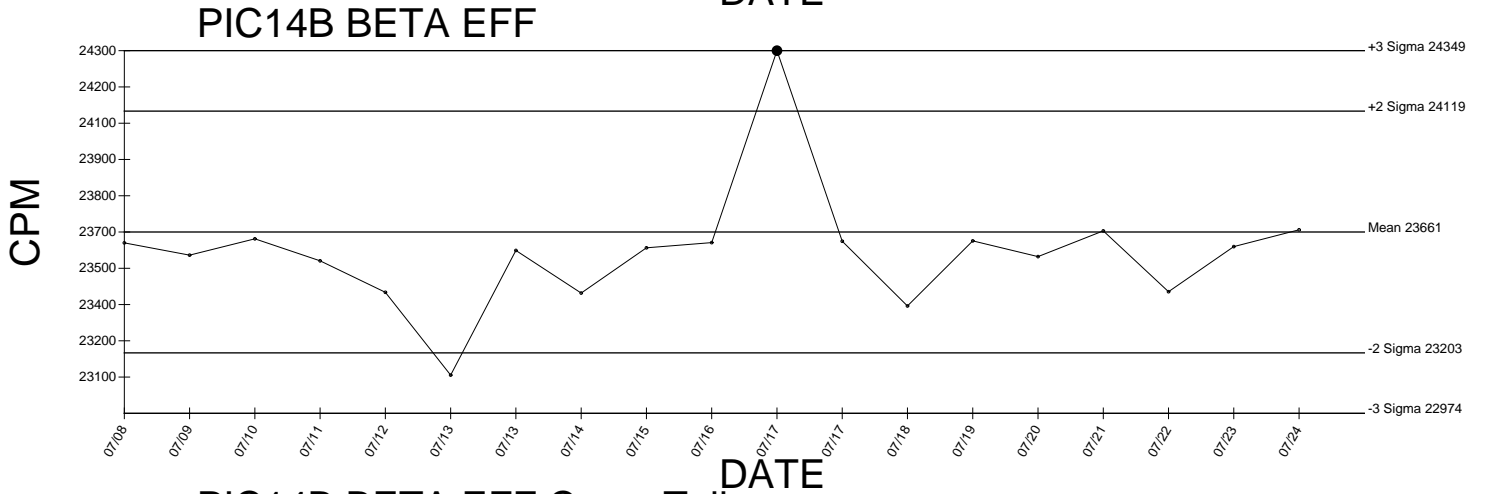
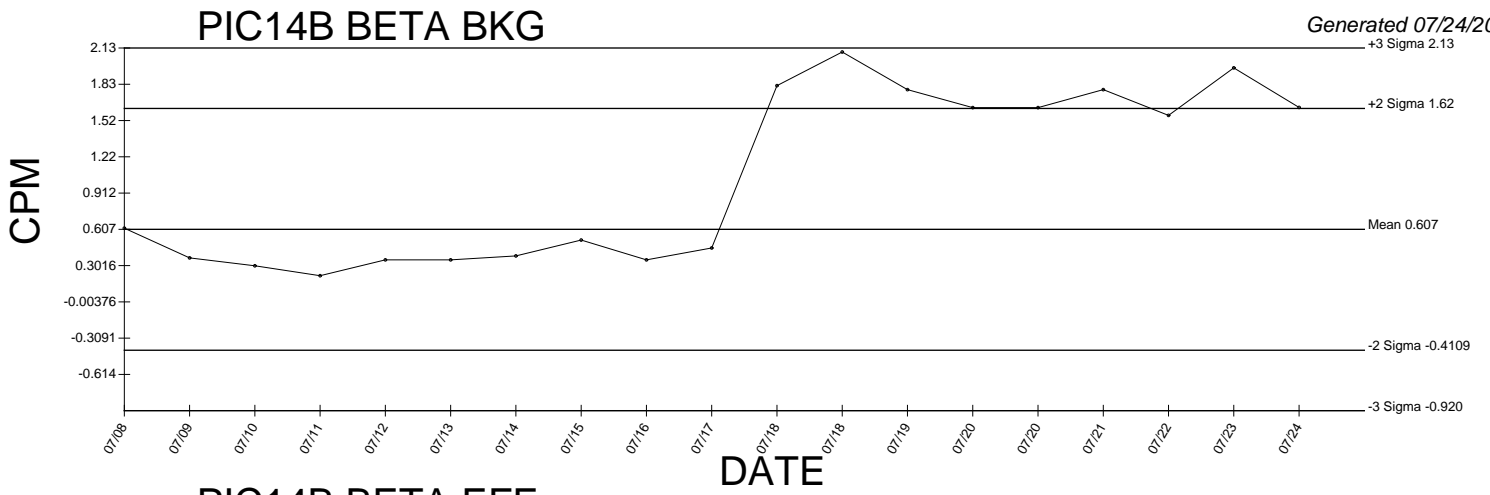
### PIC14B ALPHA EFF



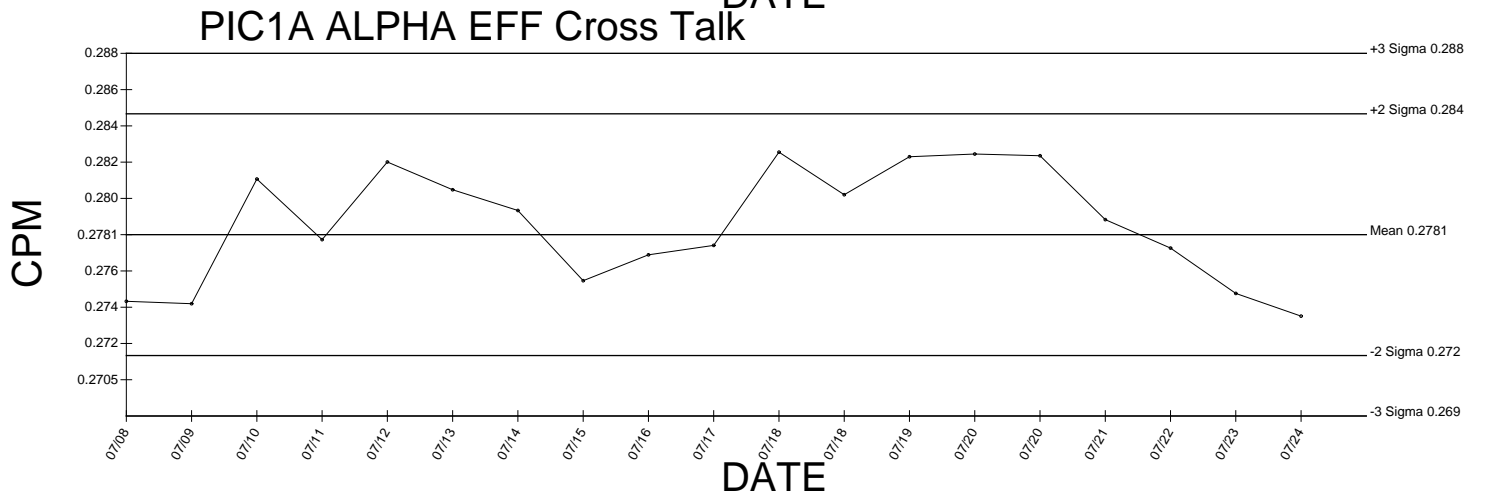
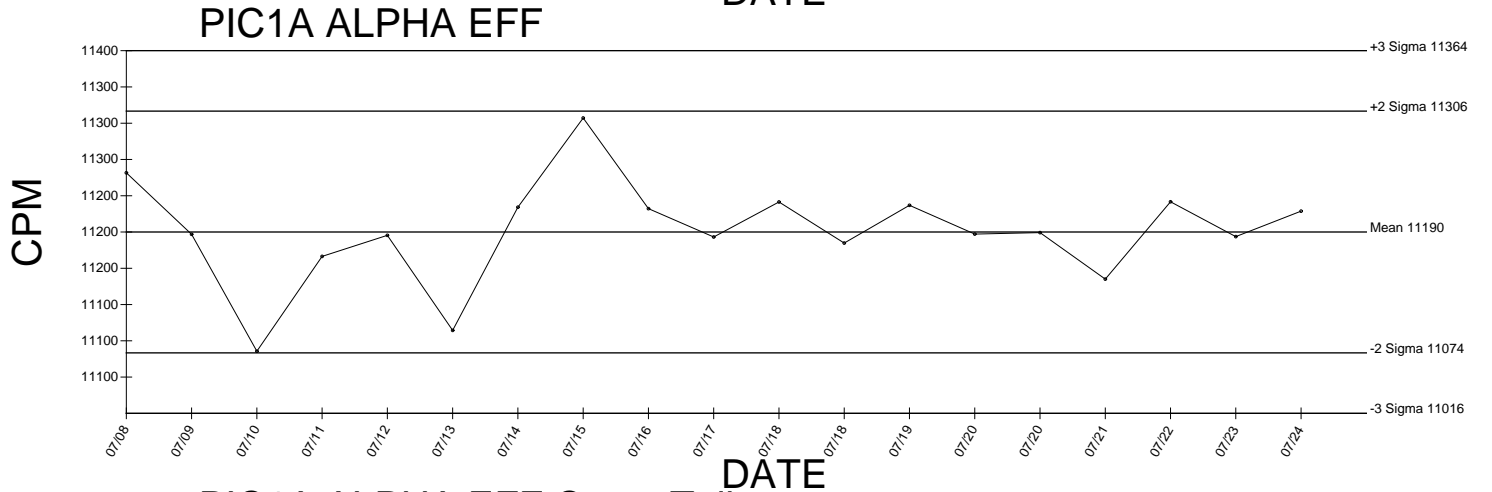
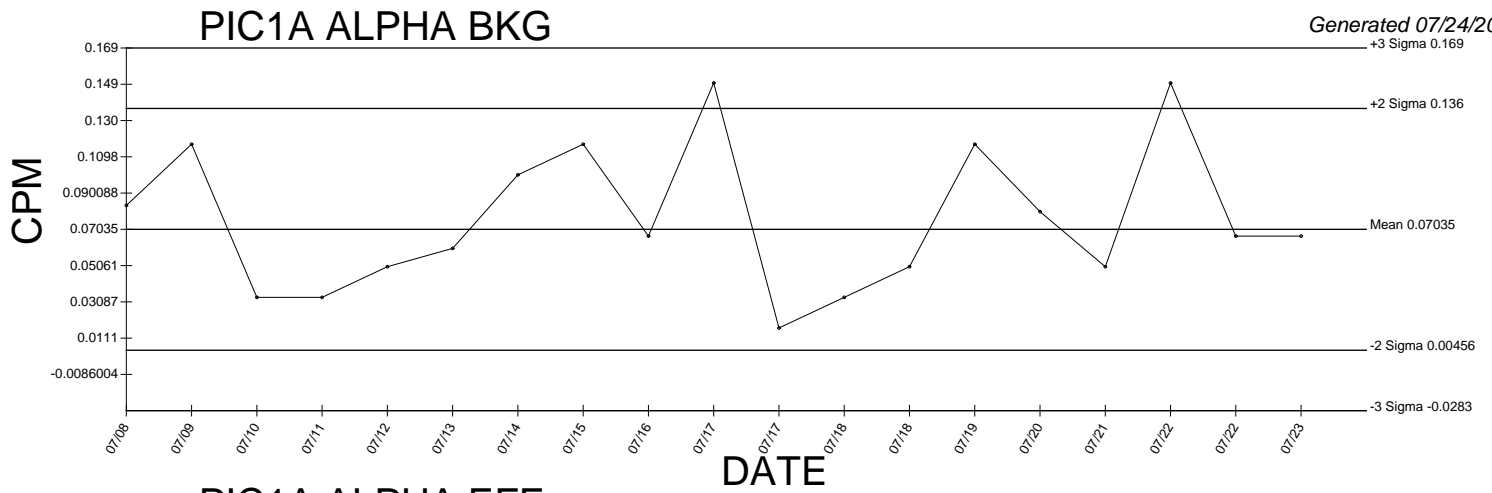
### PIC14B ALPHA EFF Cross Talk



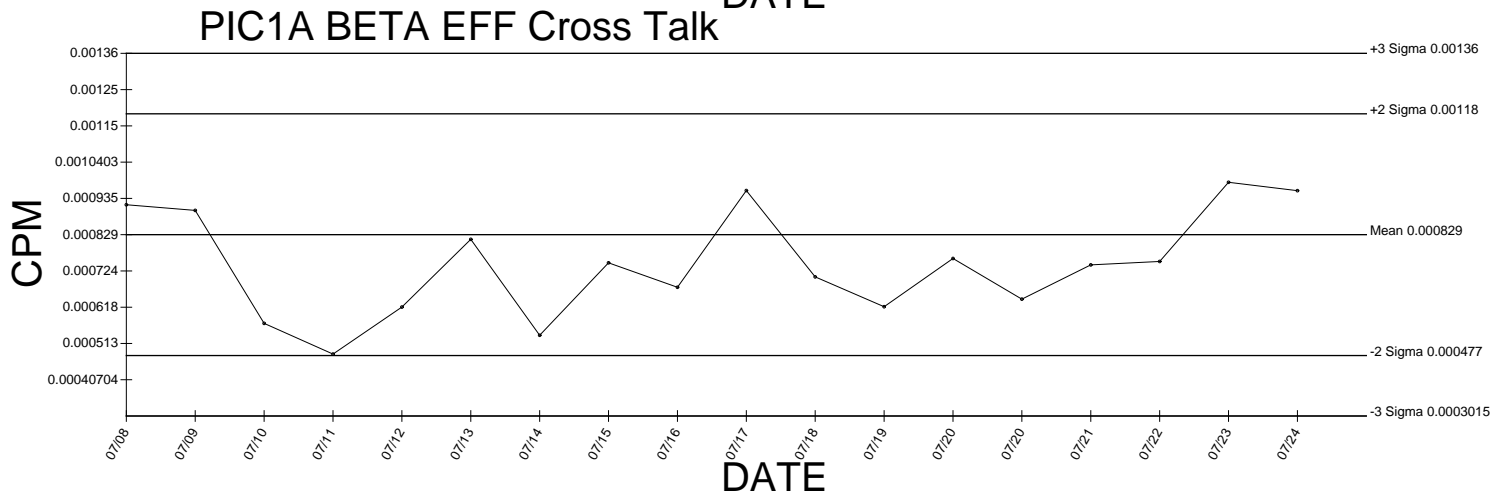
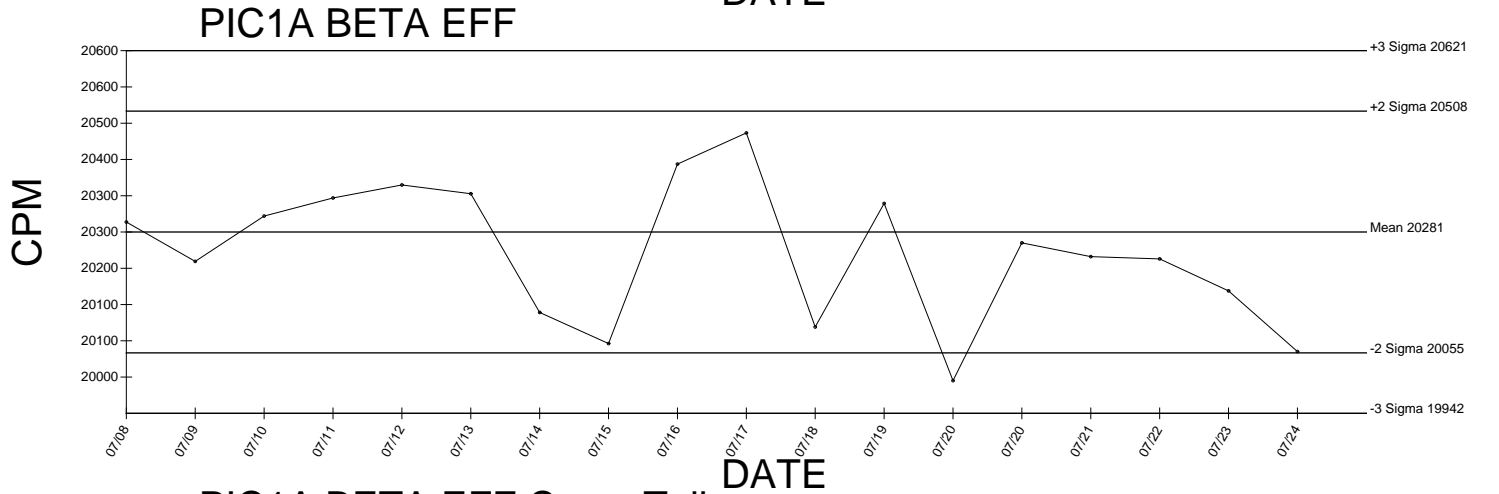
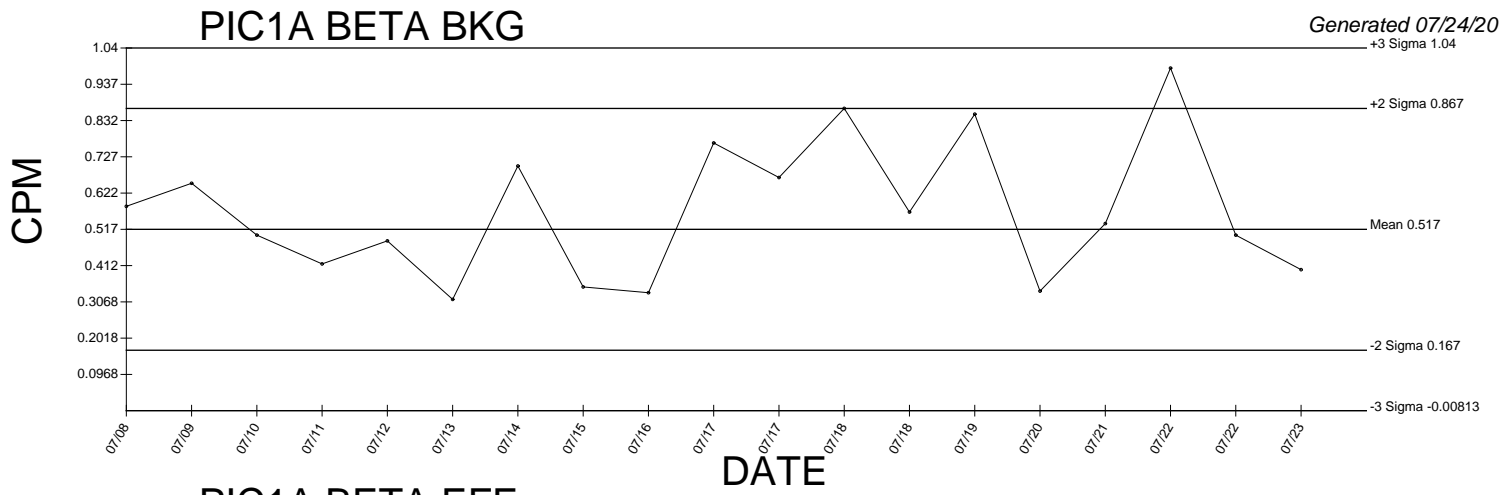
● Denotes Outlier



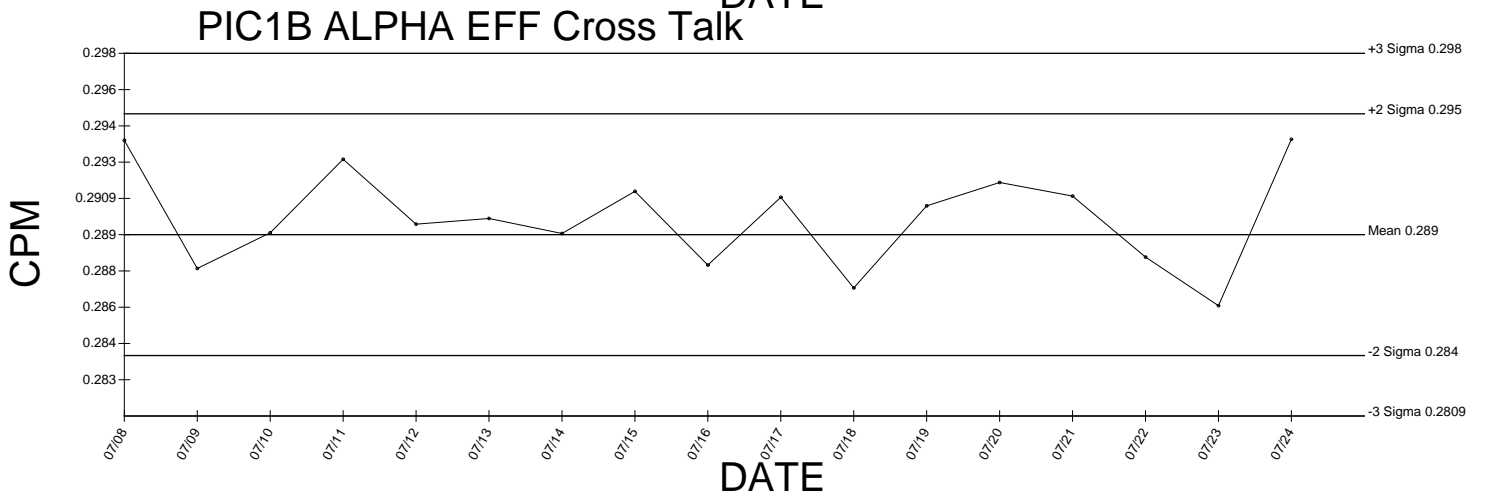
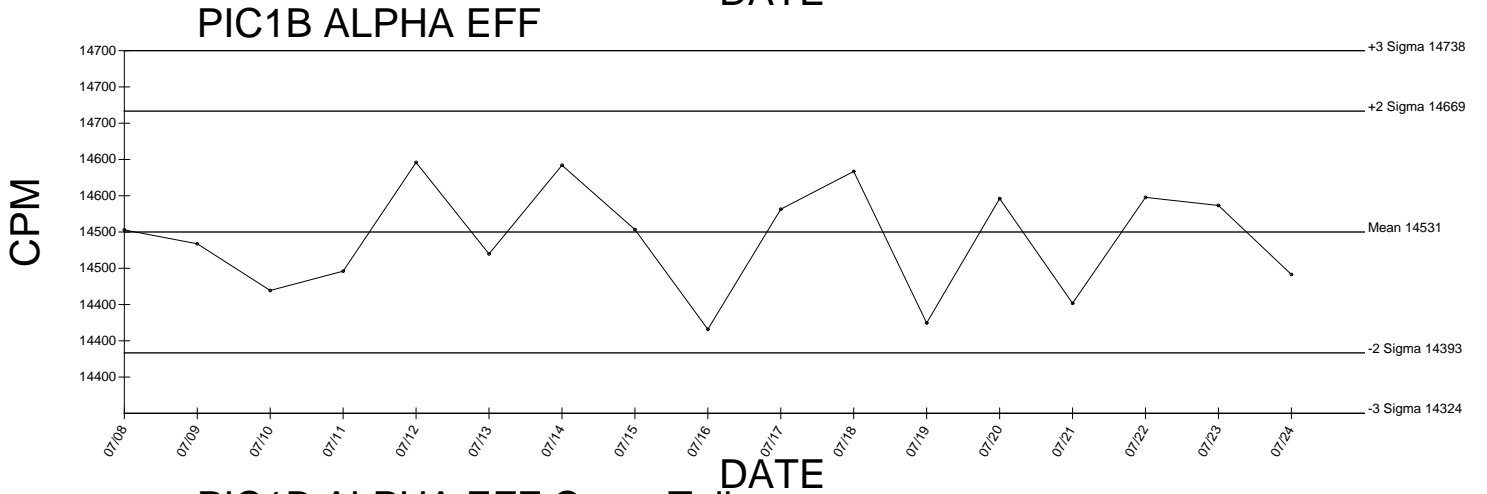
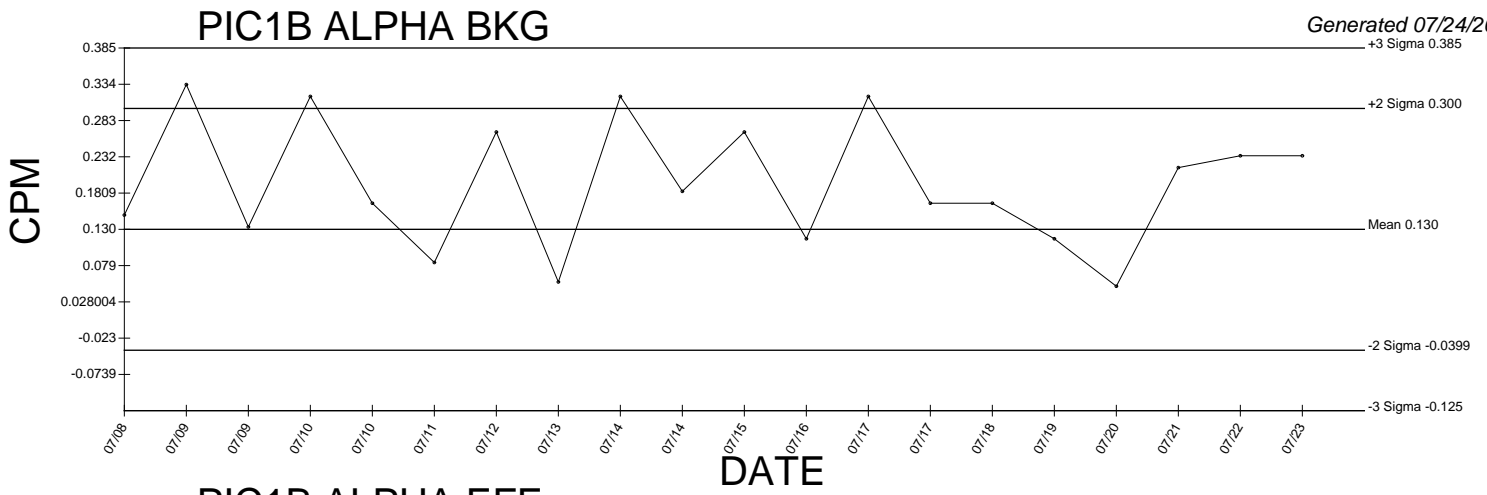
● Denotes Outlier



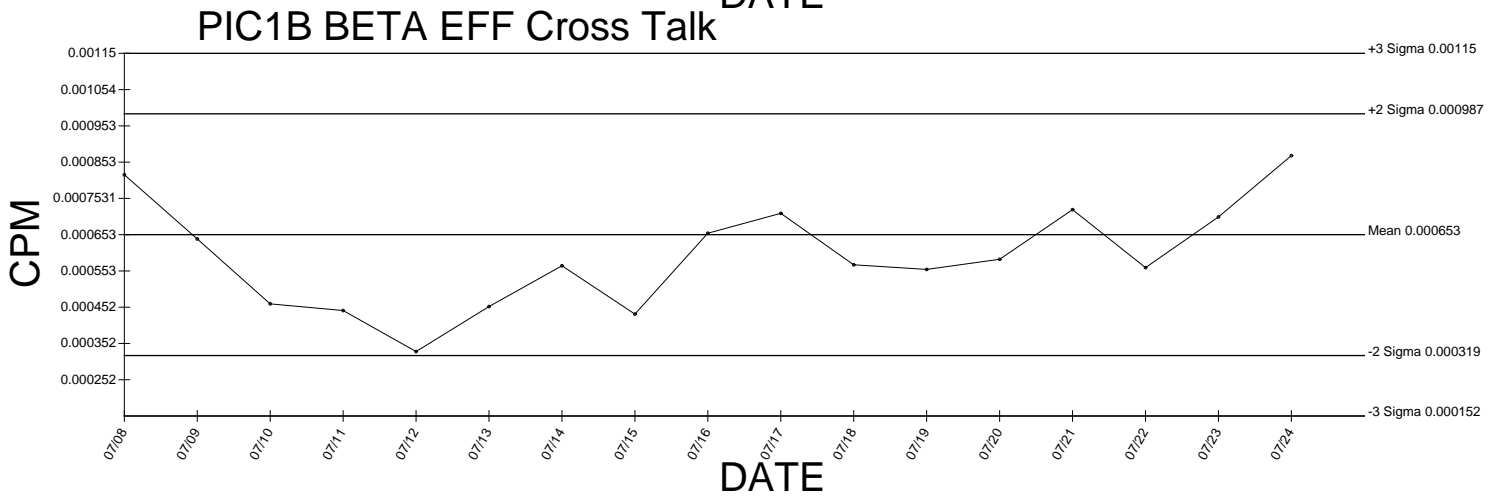
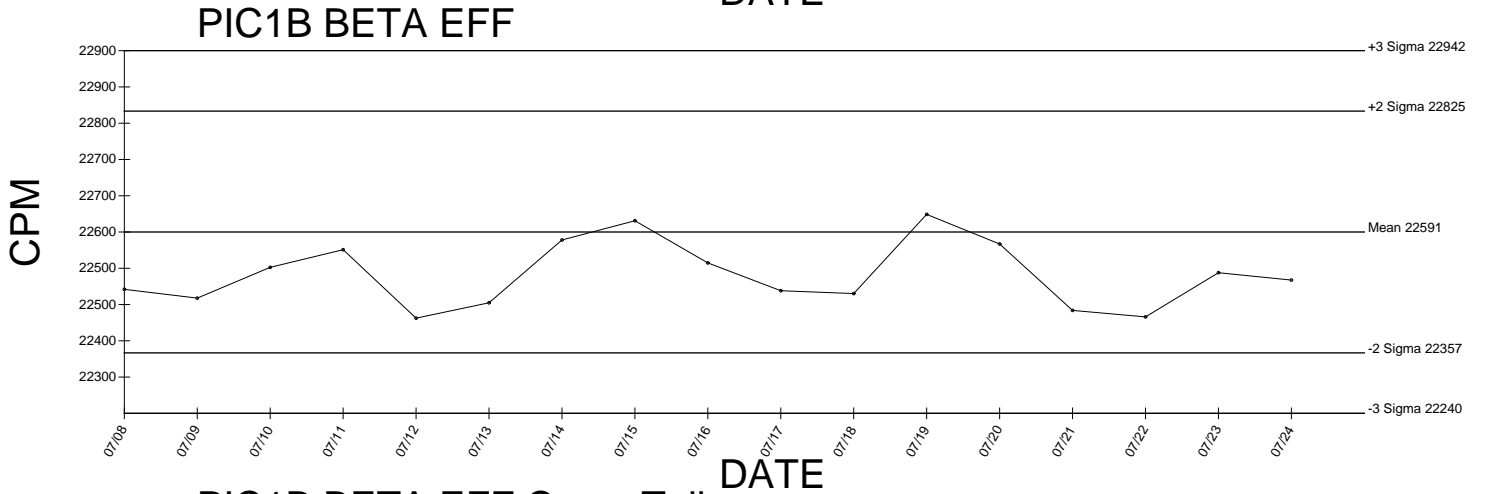
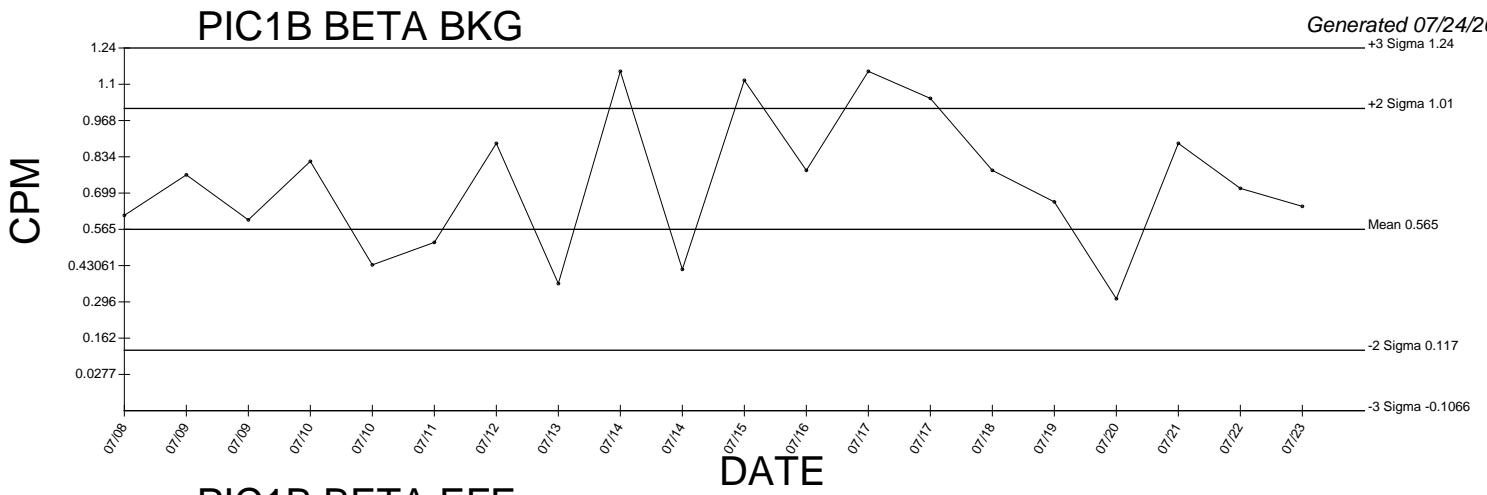
● Denotes Outlier



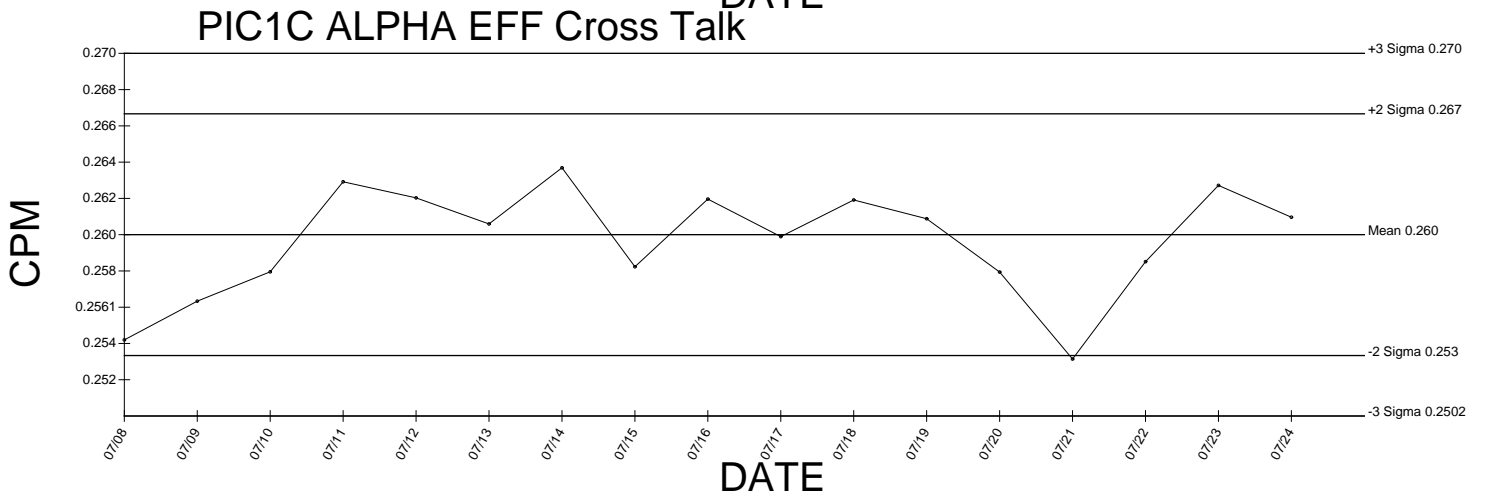
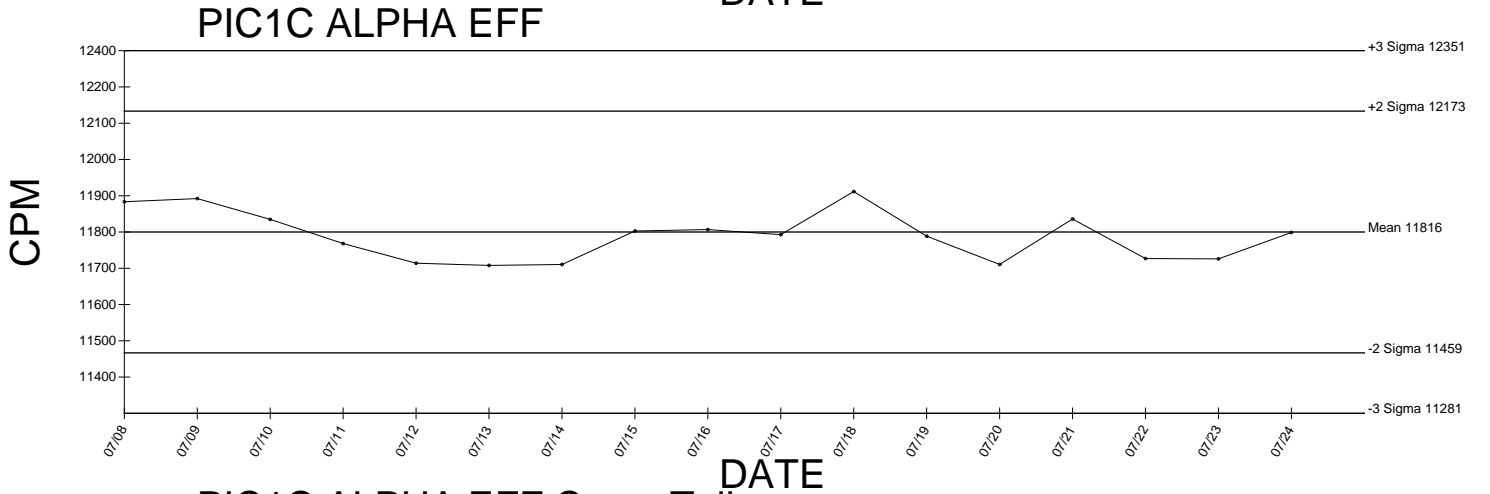
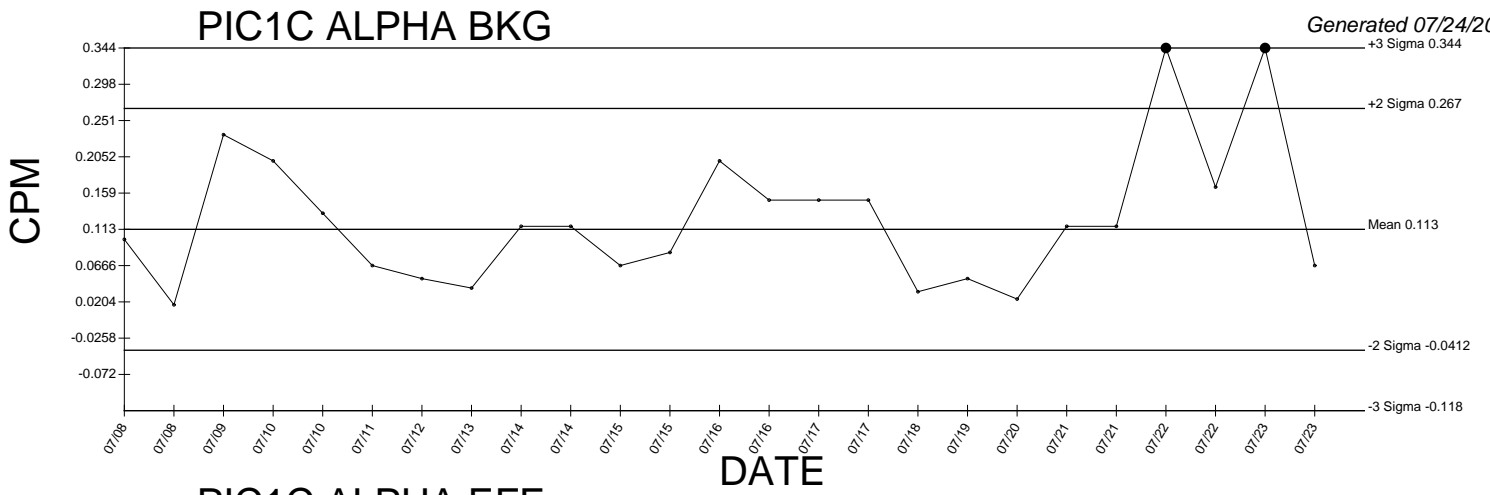
● Denotes Outlier



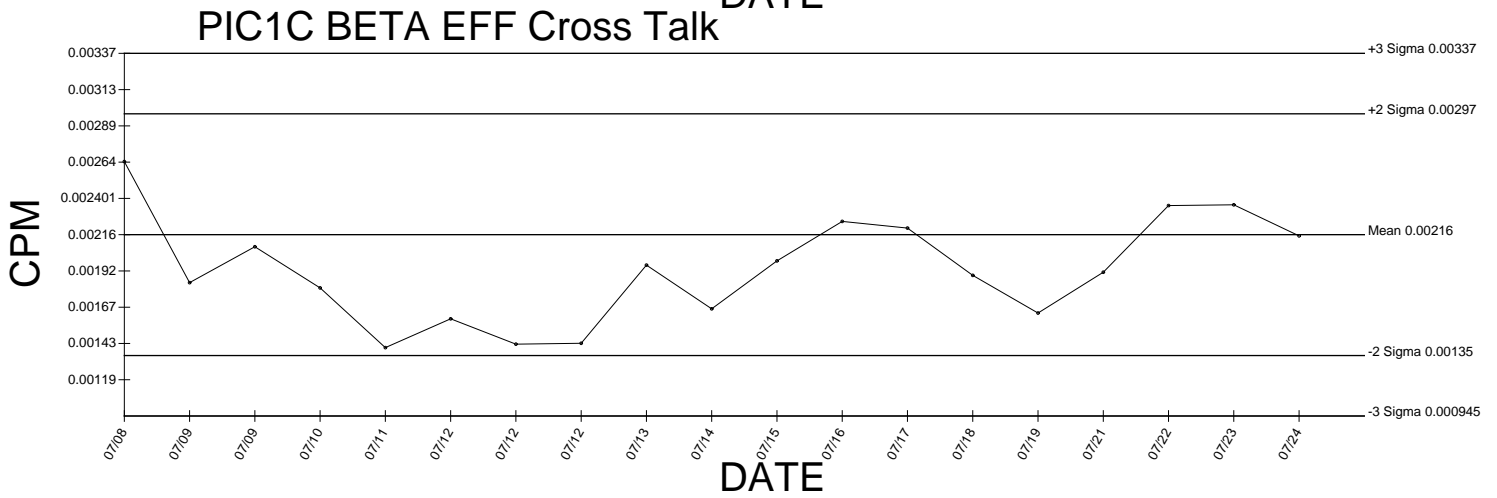
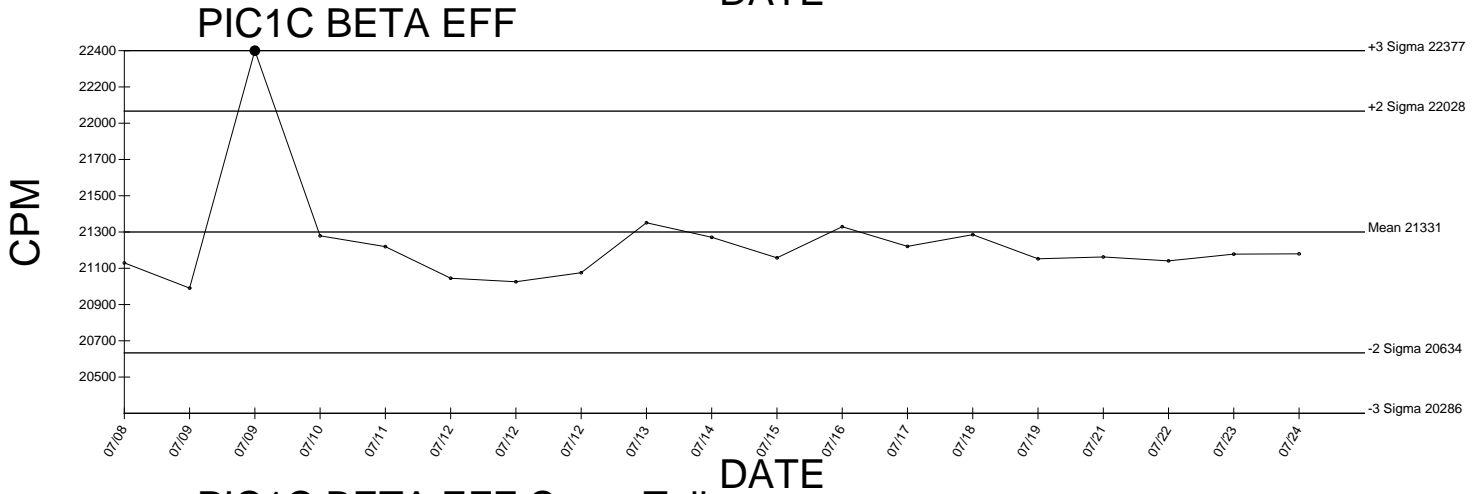
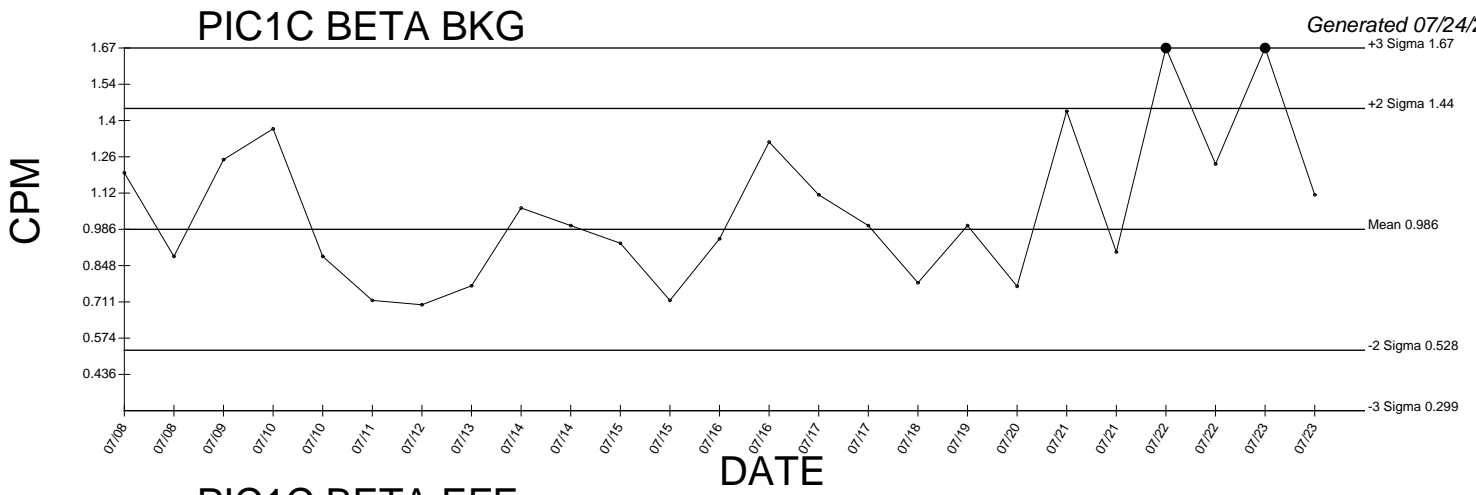
● Denotes Outlier



● Denotes Outlier



● Denotes Outlier

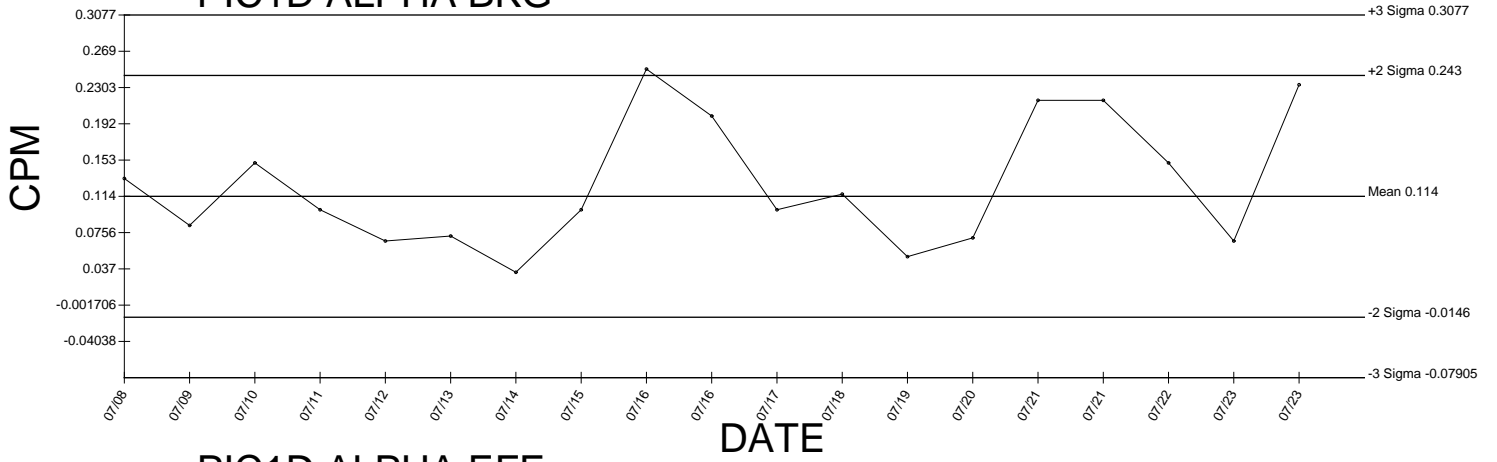


● Denotes Outlier

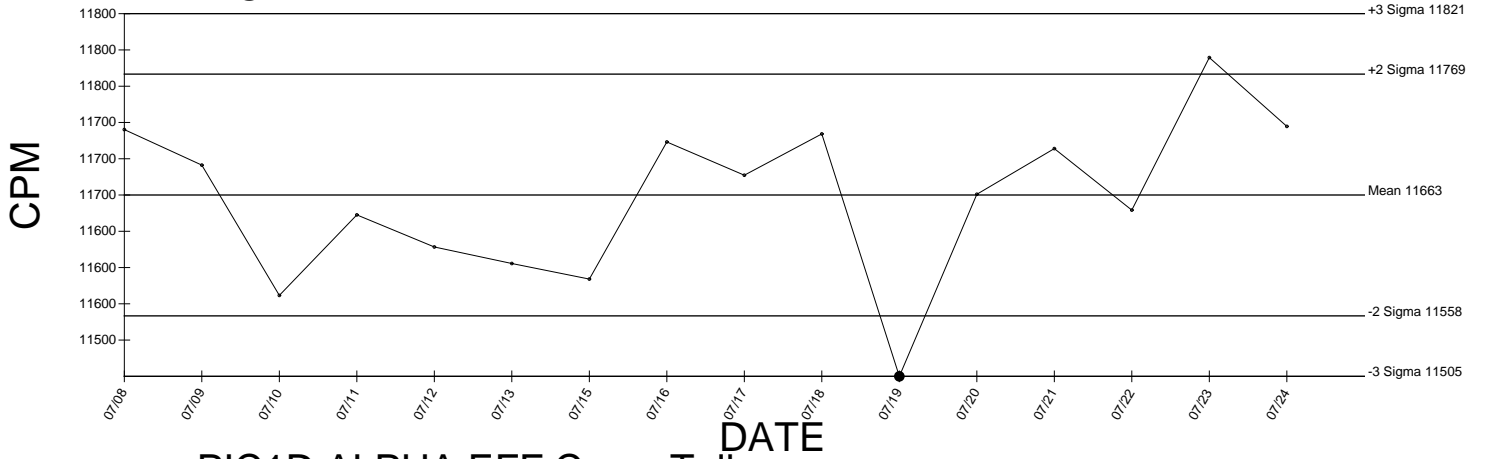


# PIC1D ALPHA BKG

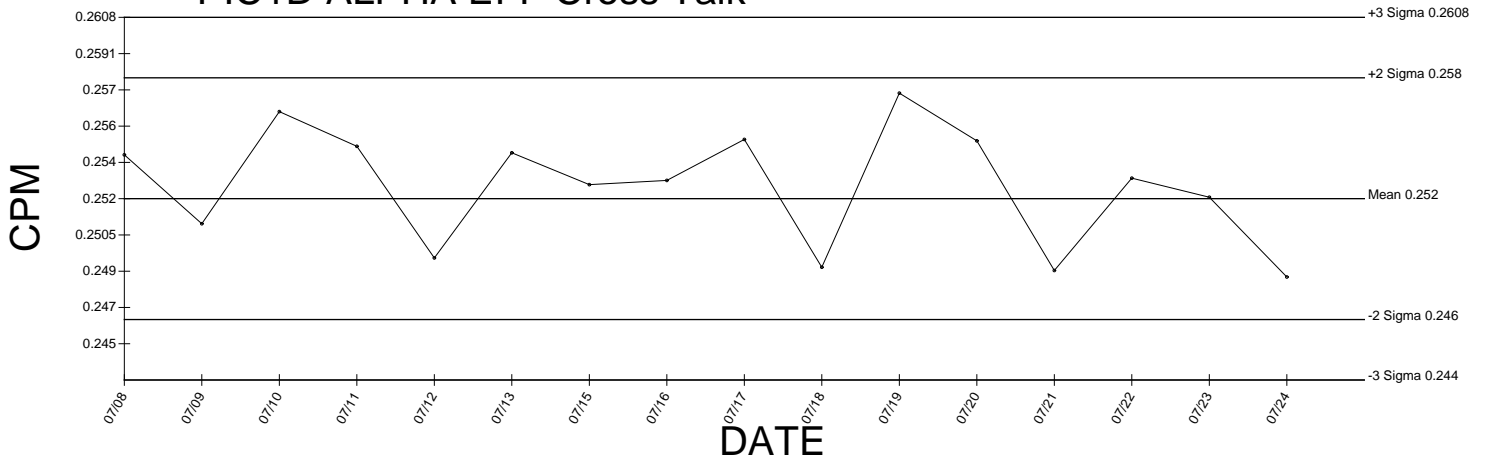
Generated 07/24/2009



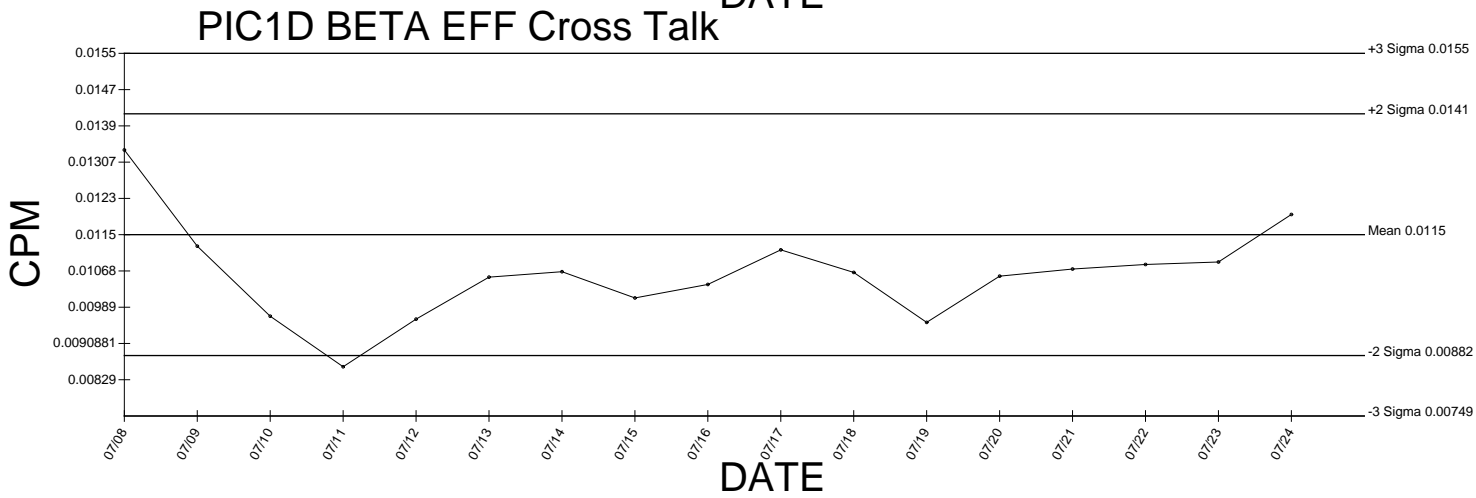
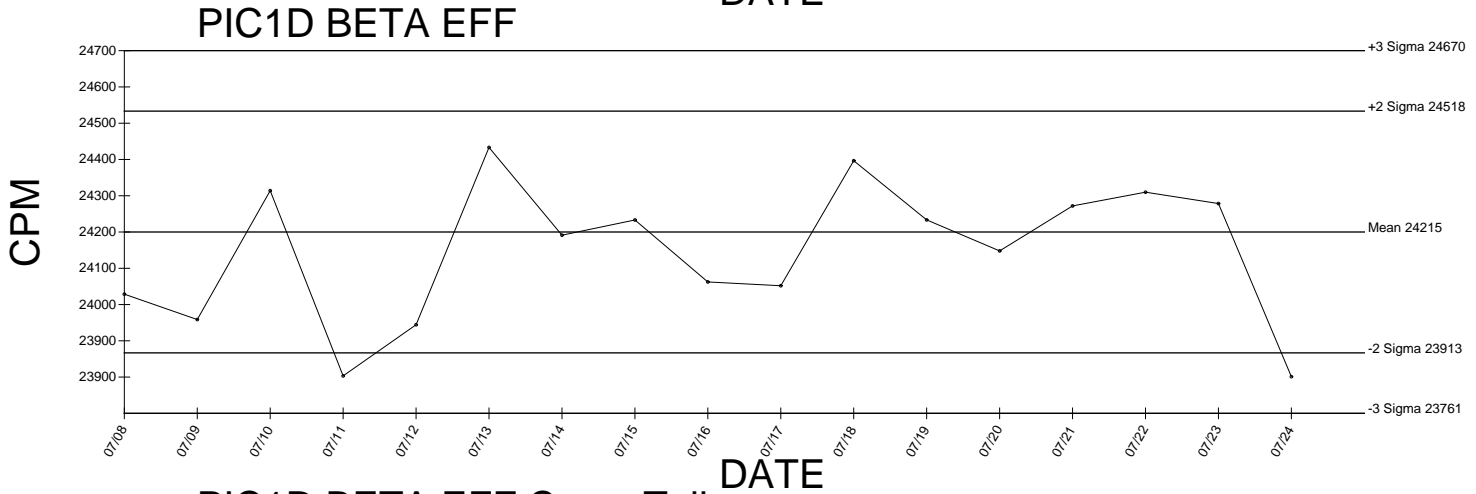
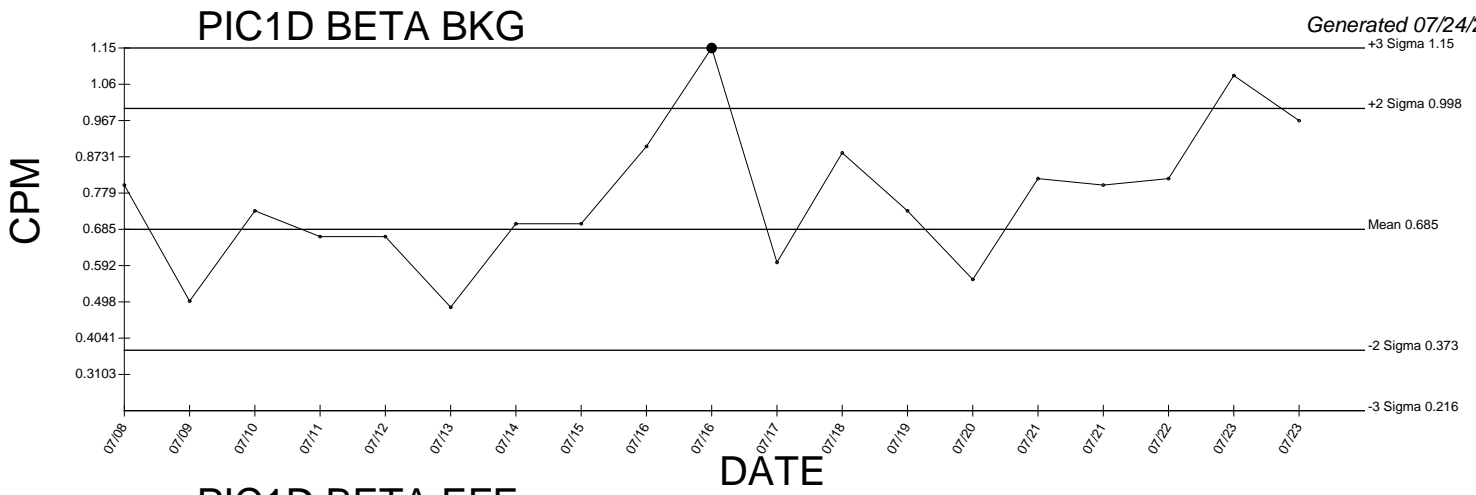
# PIC1D ALPHA EFF



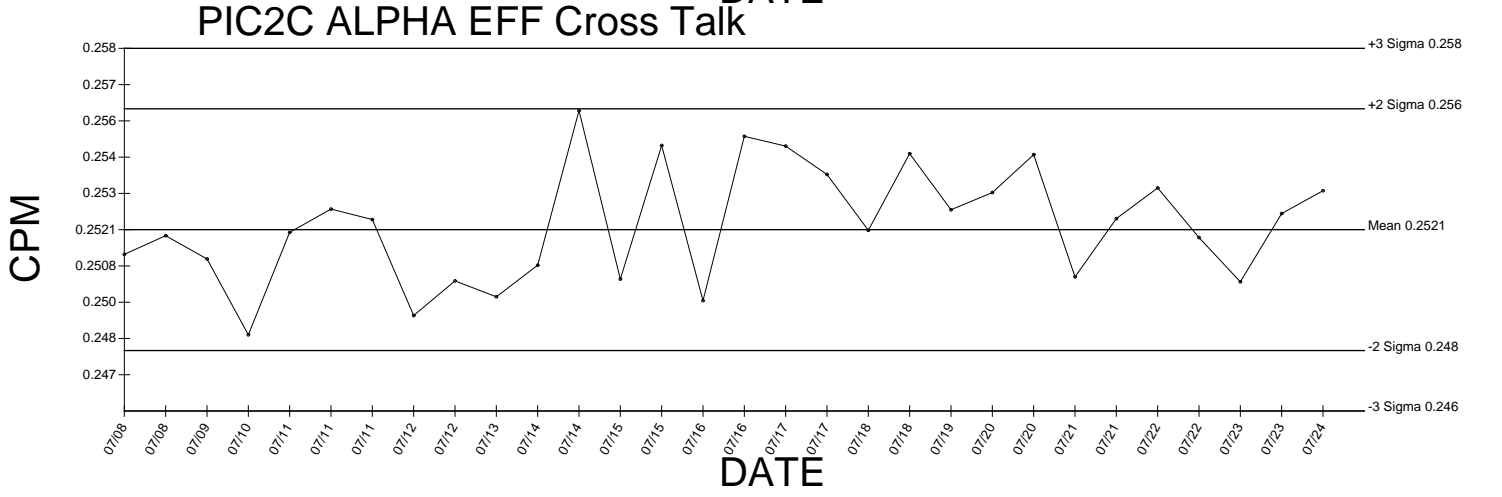
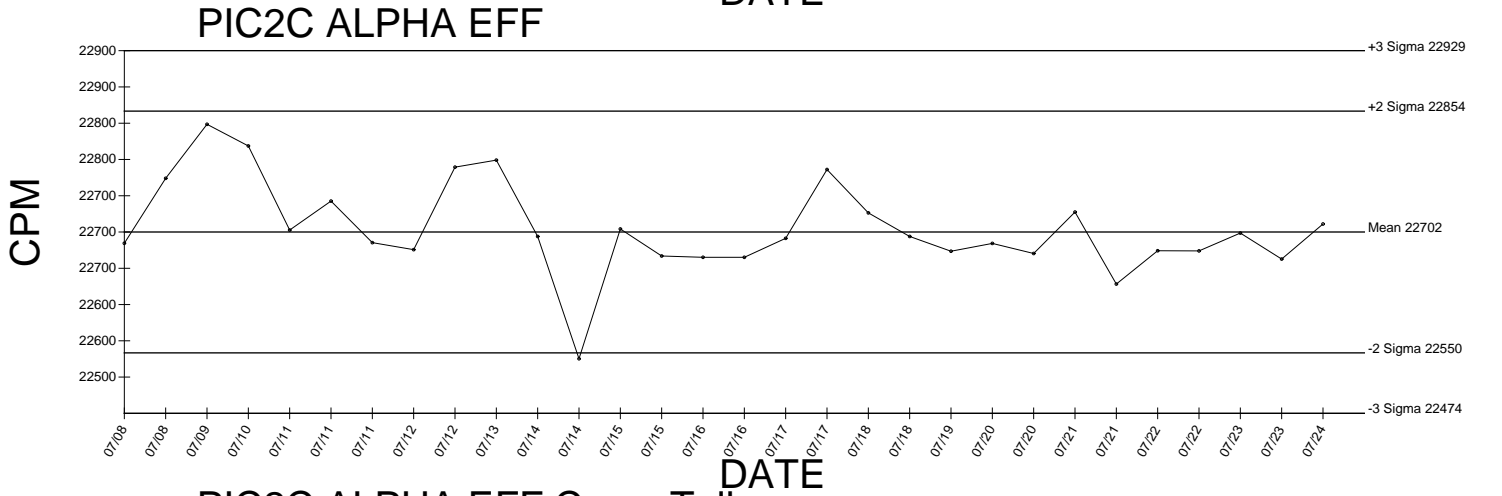
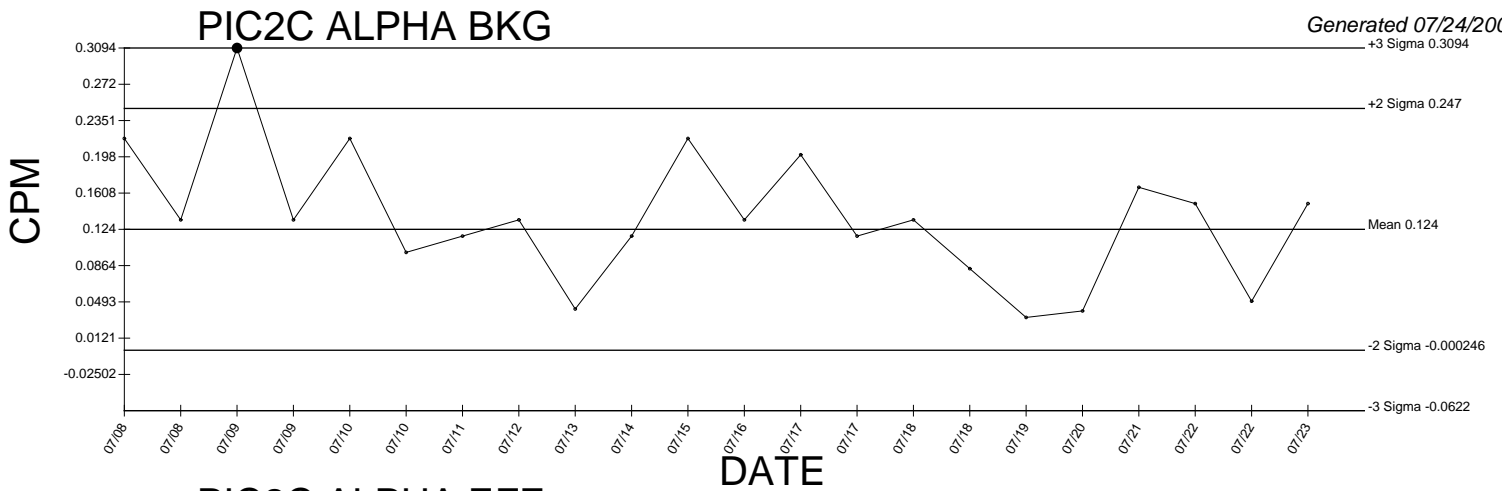
# PIC1D ALPHA EFF Cross Talk



● Denotes Outlier



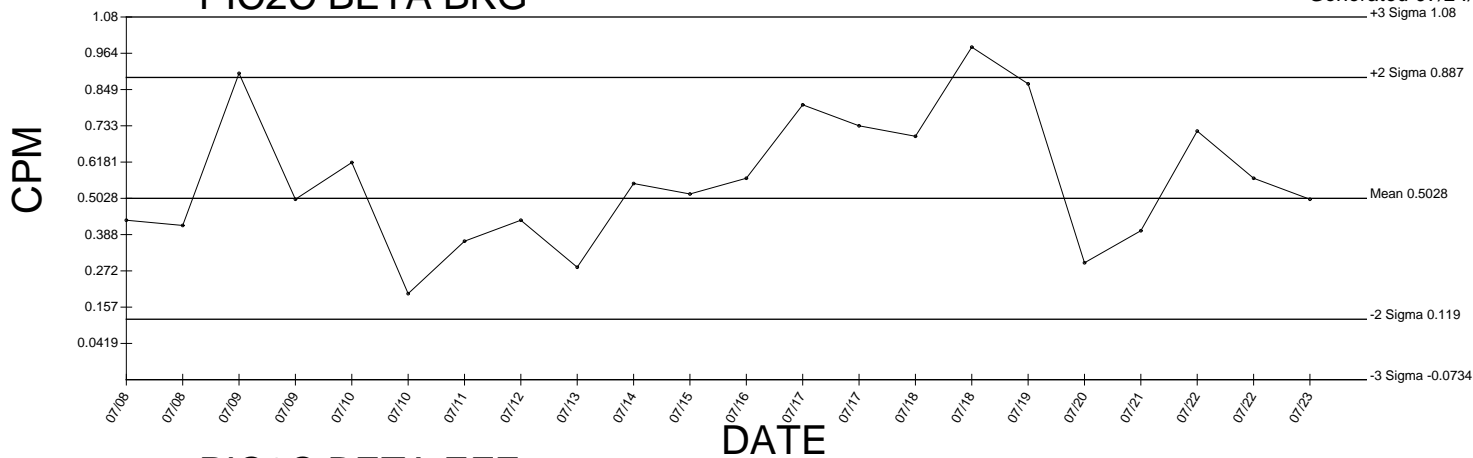
● Denotes Outlier



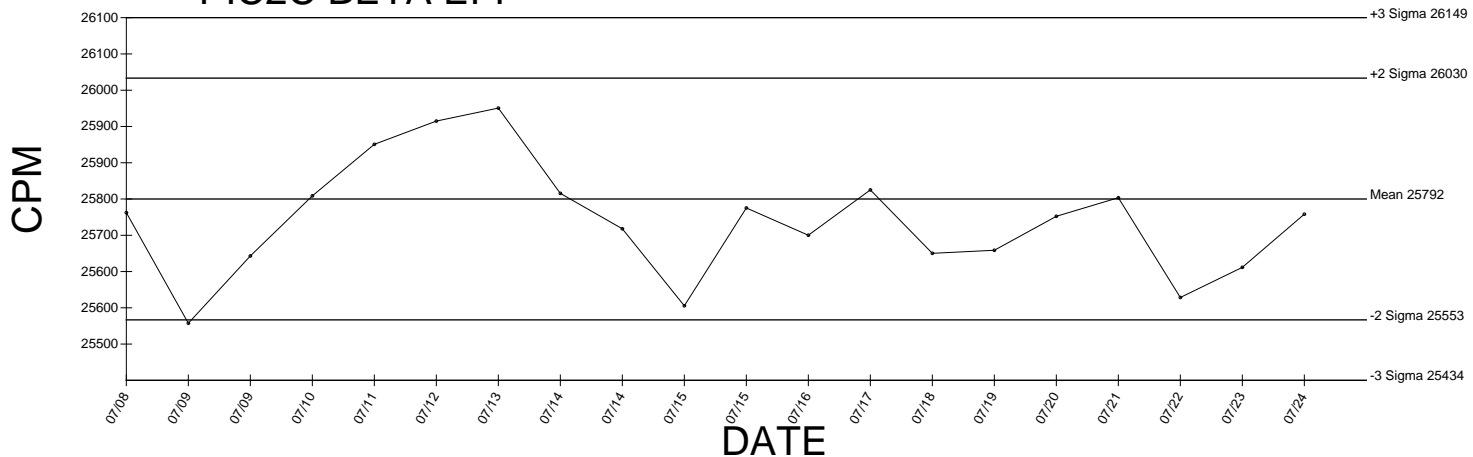
● Denotes Outlier

# PIC2C BETA BKG

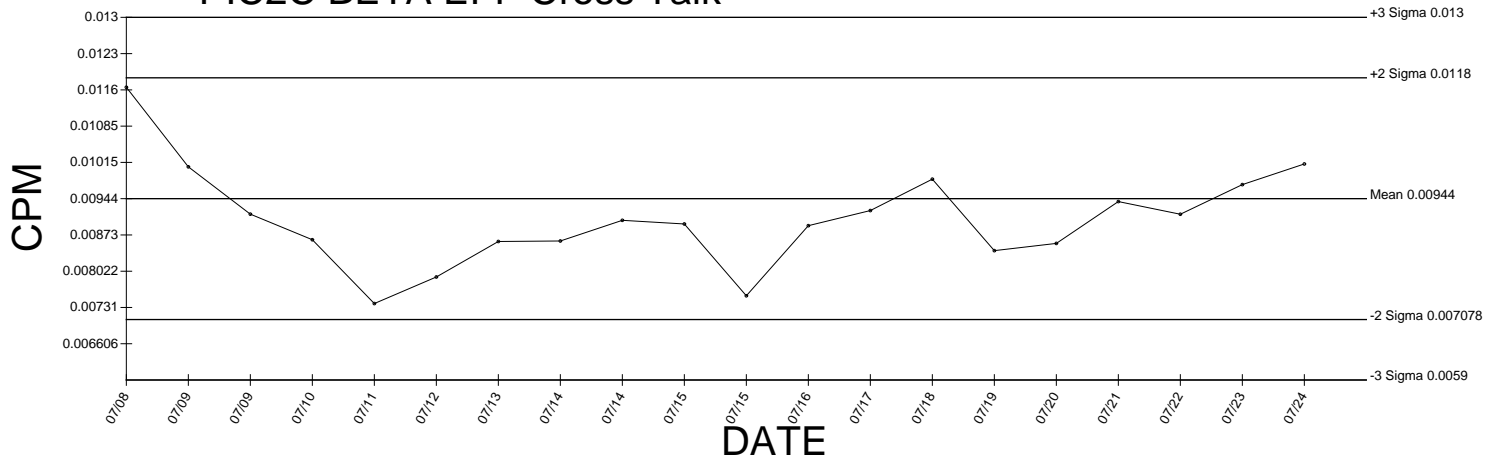
Generated 07/24/2009



# PIC2C BETA EFF



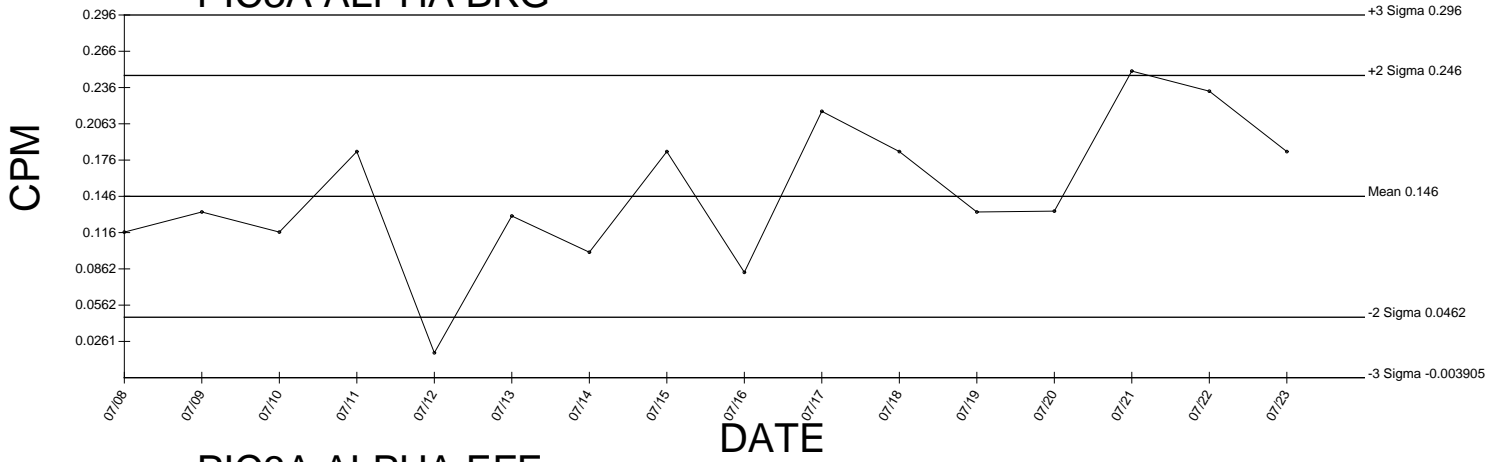
# PIC2C BETA EFF Cross Talk



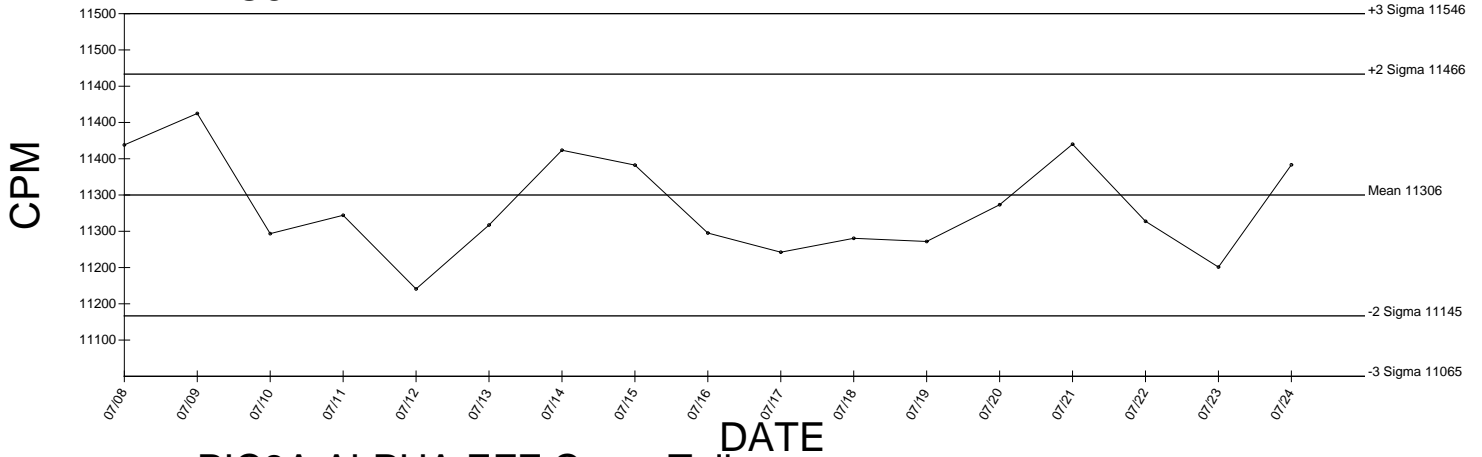
● Denotes Outlier

# PIC3A ALPHA BKG

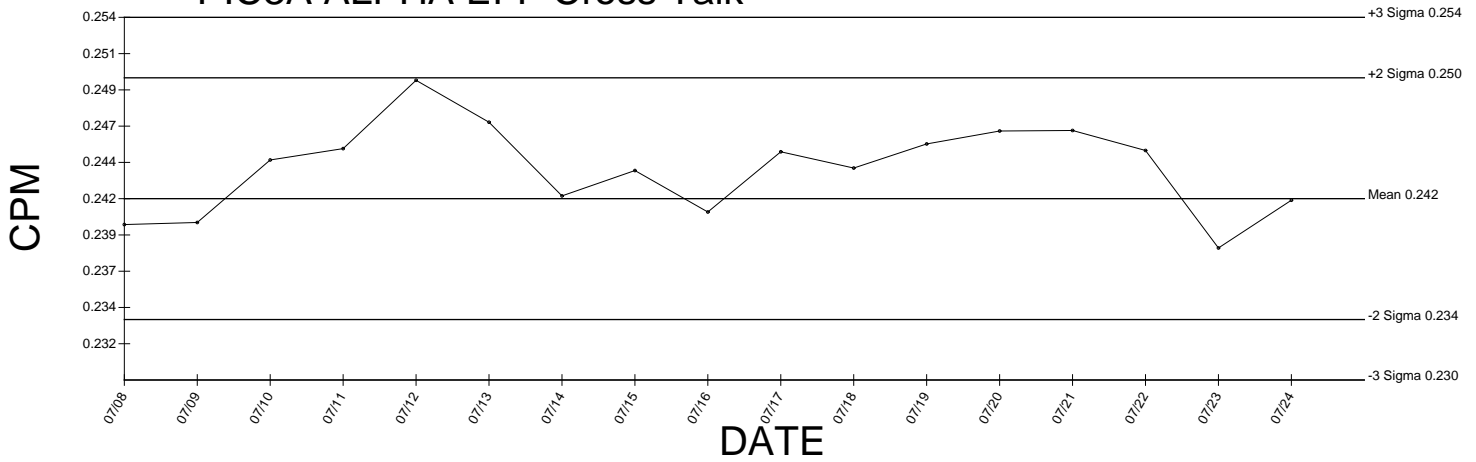
Generated 07/24/2009



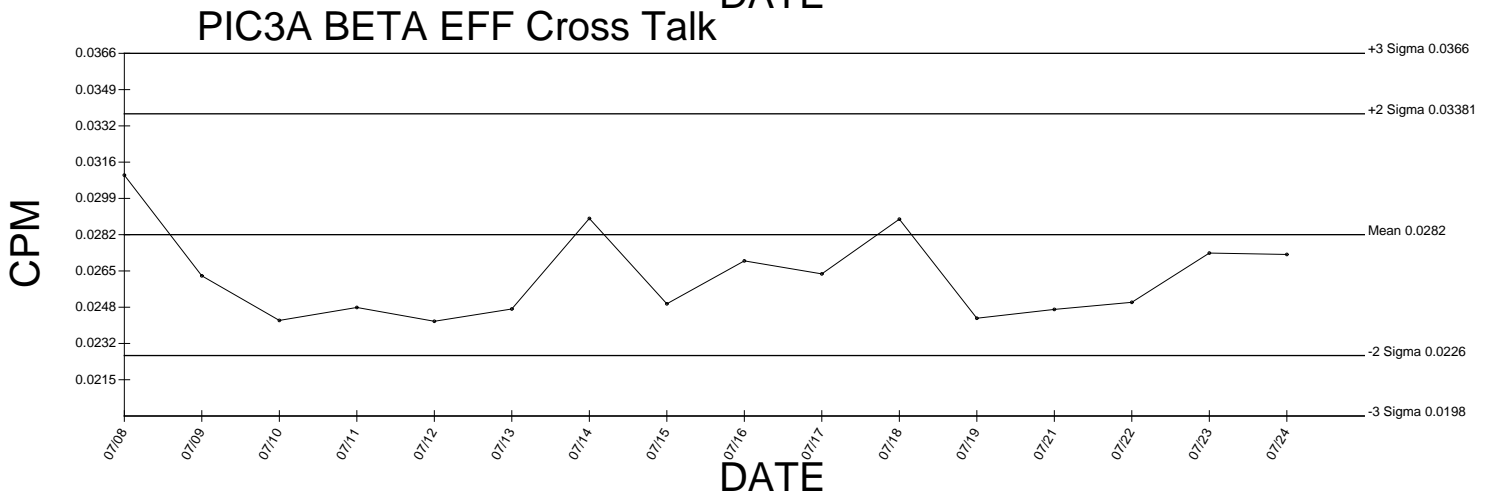
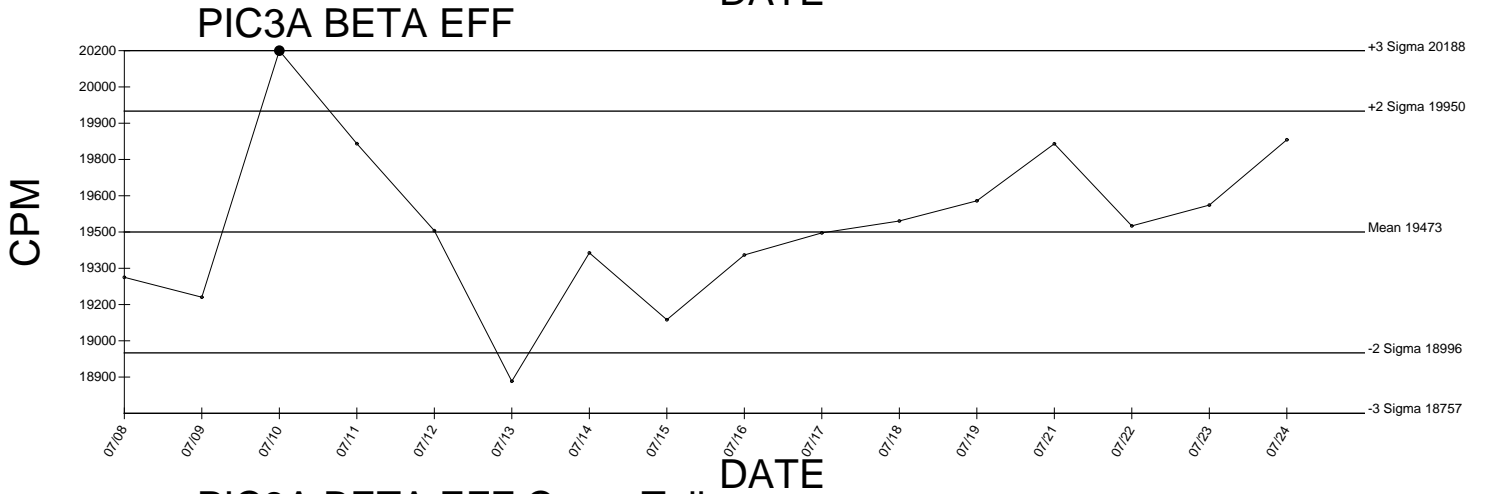
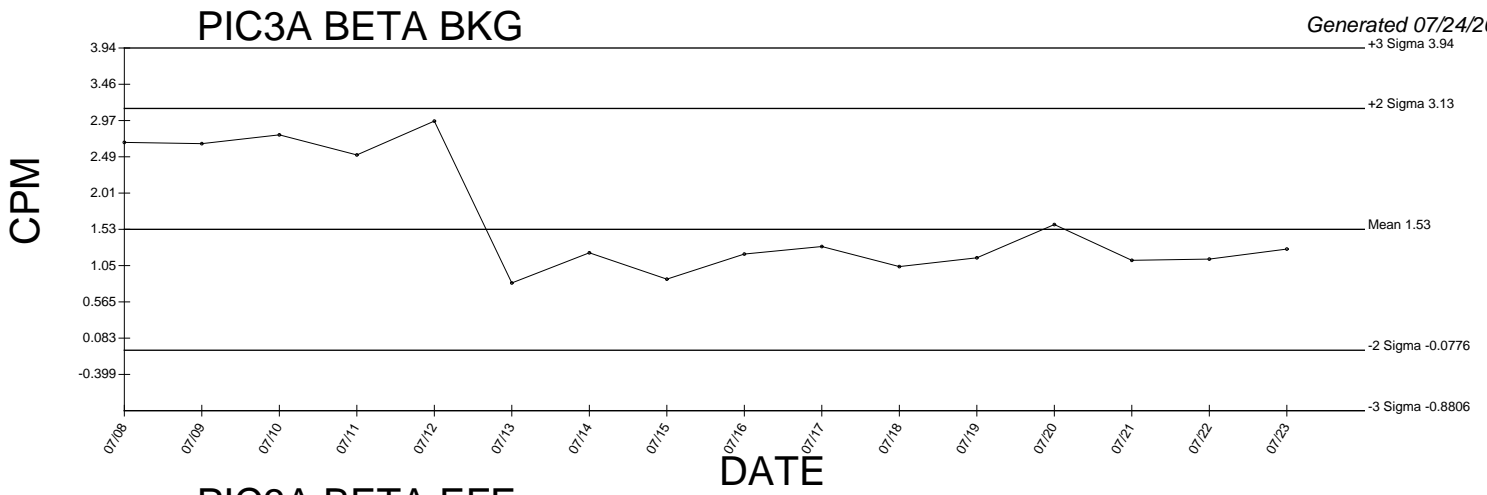
# PIC3A ALPHA EFF



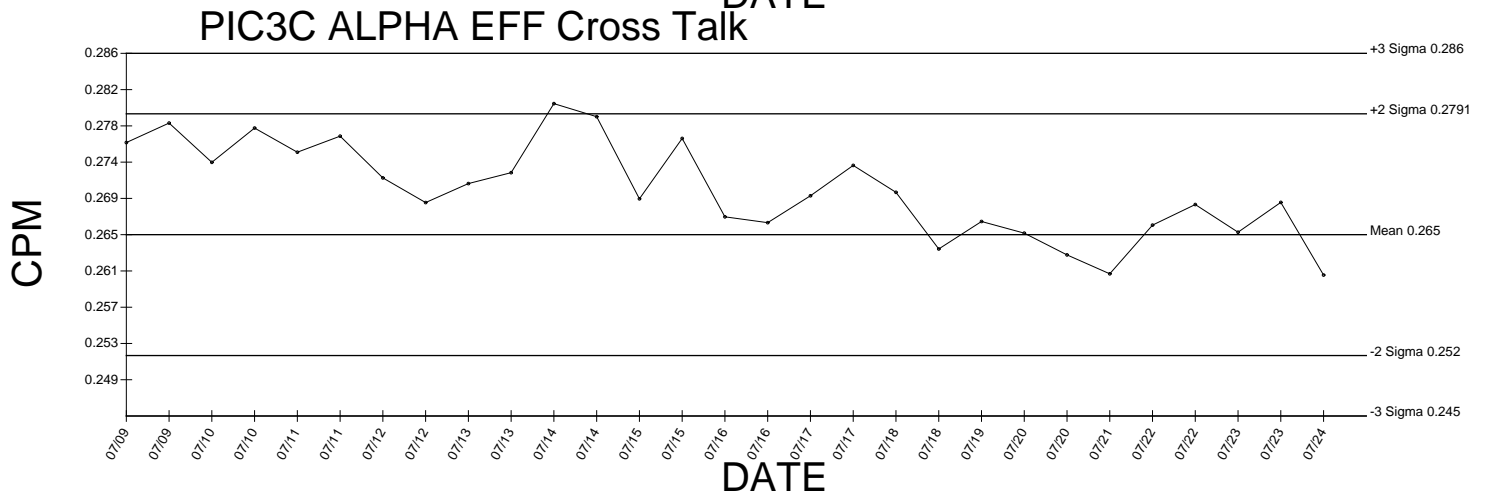
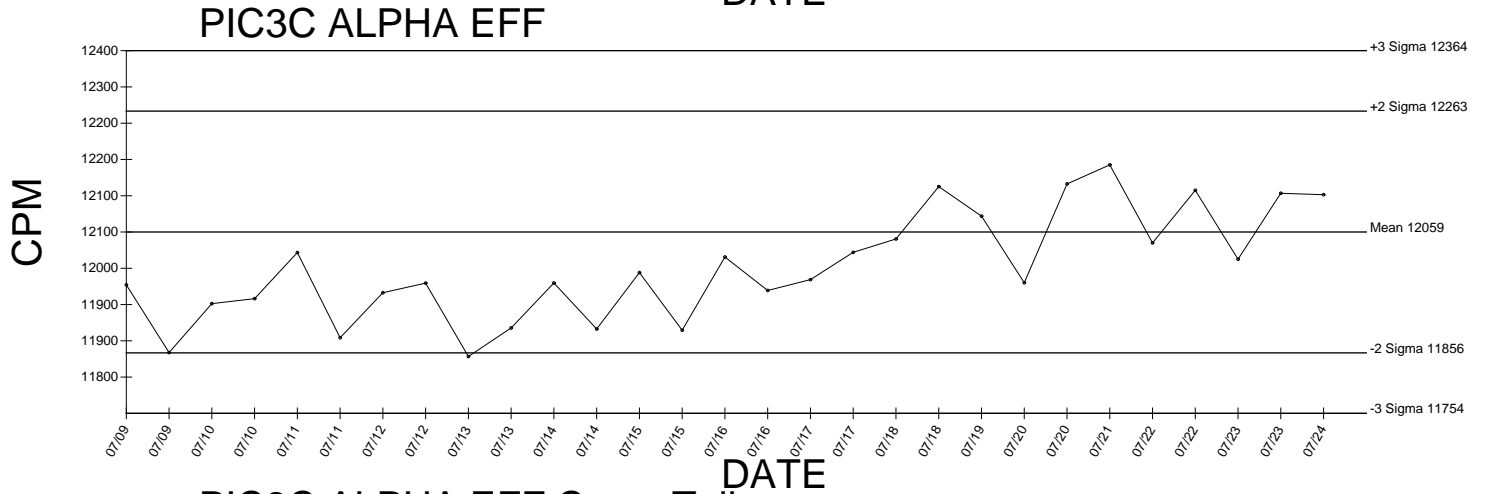
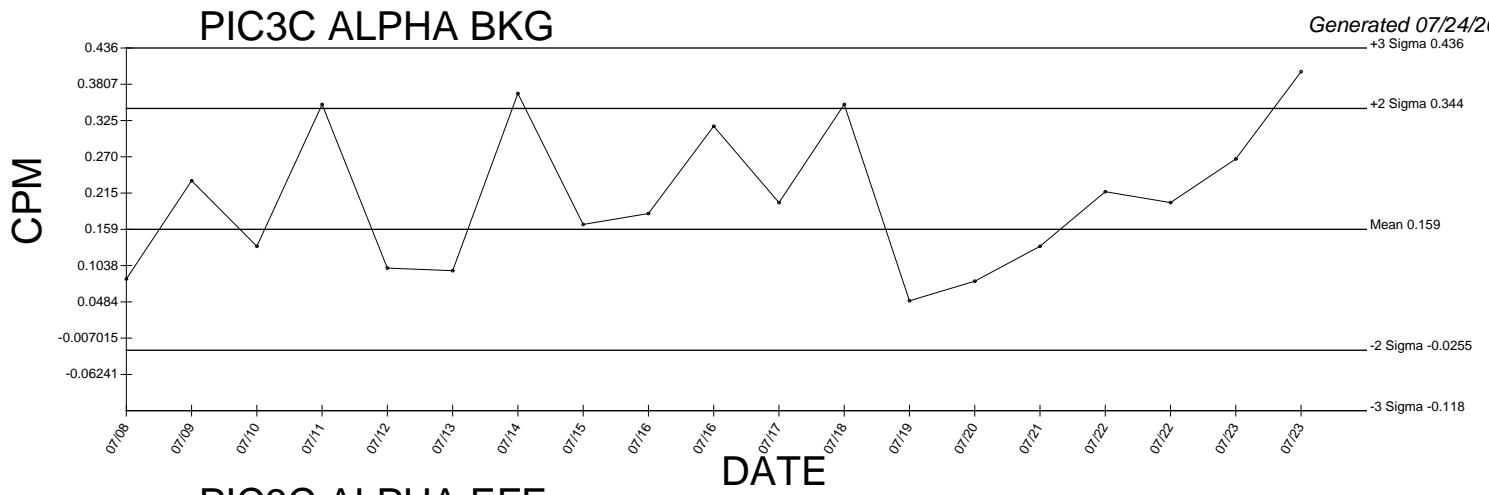
# PIC3A ALPHA EFF Cross Talk



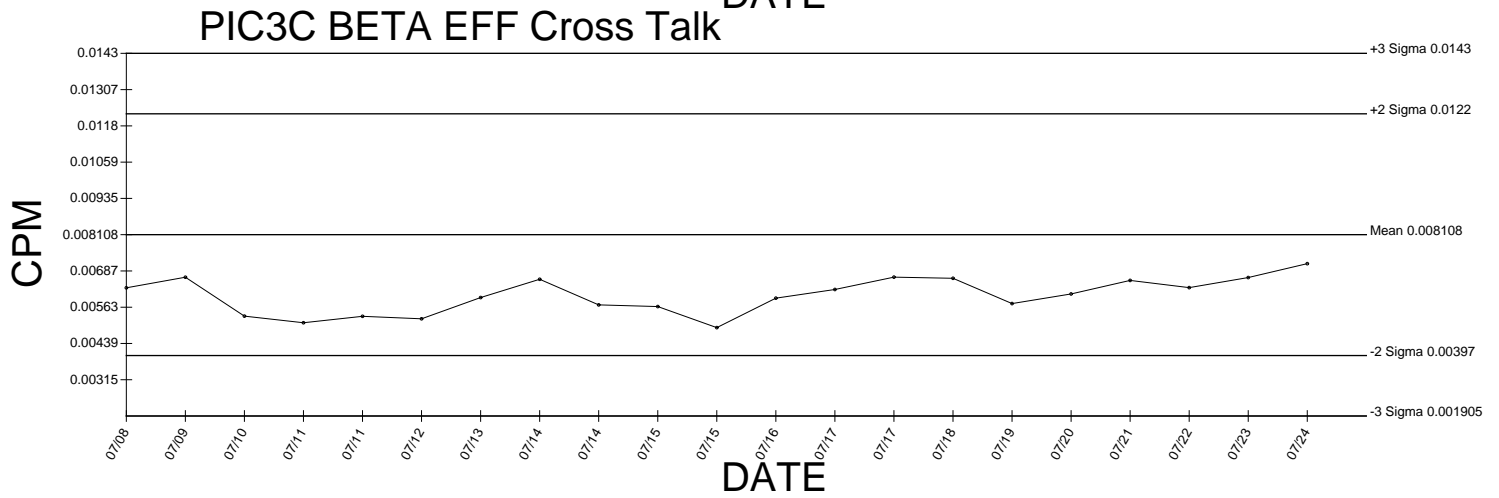
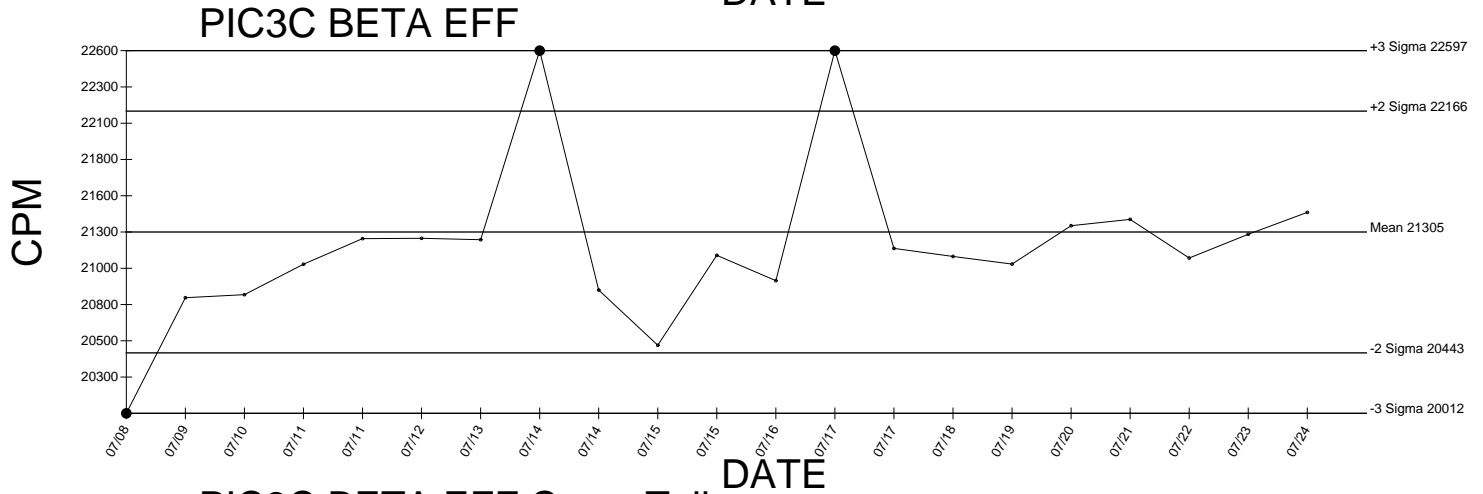
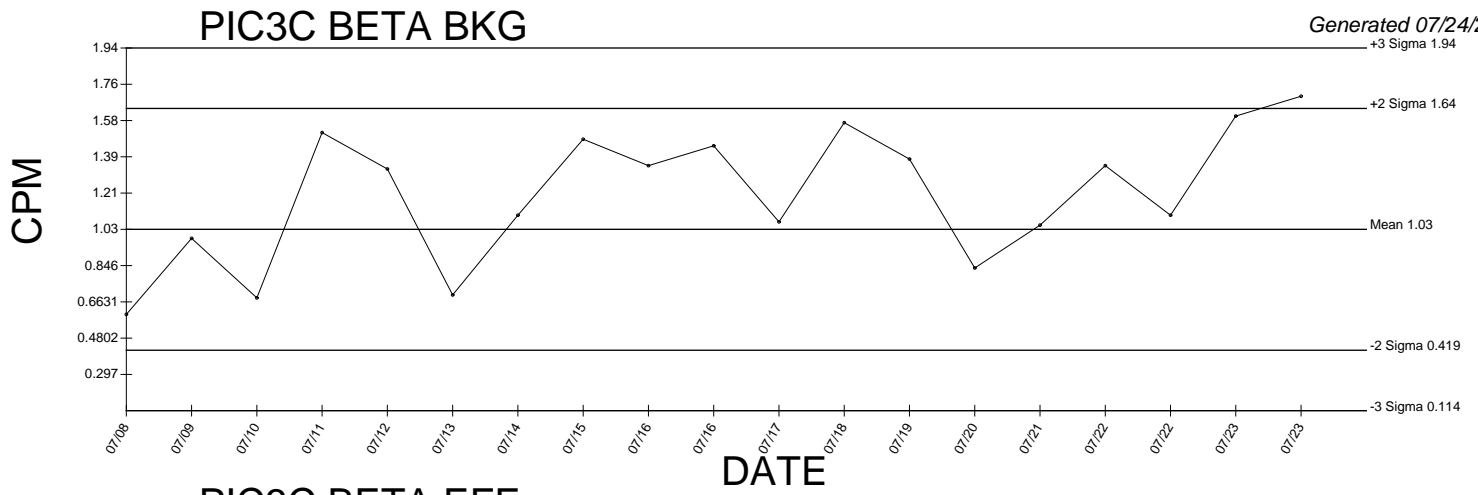
● Denotes Outlier



● Denotes Outlier

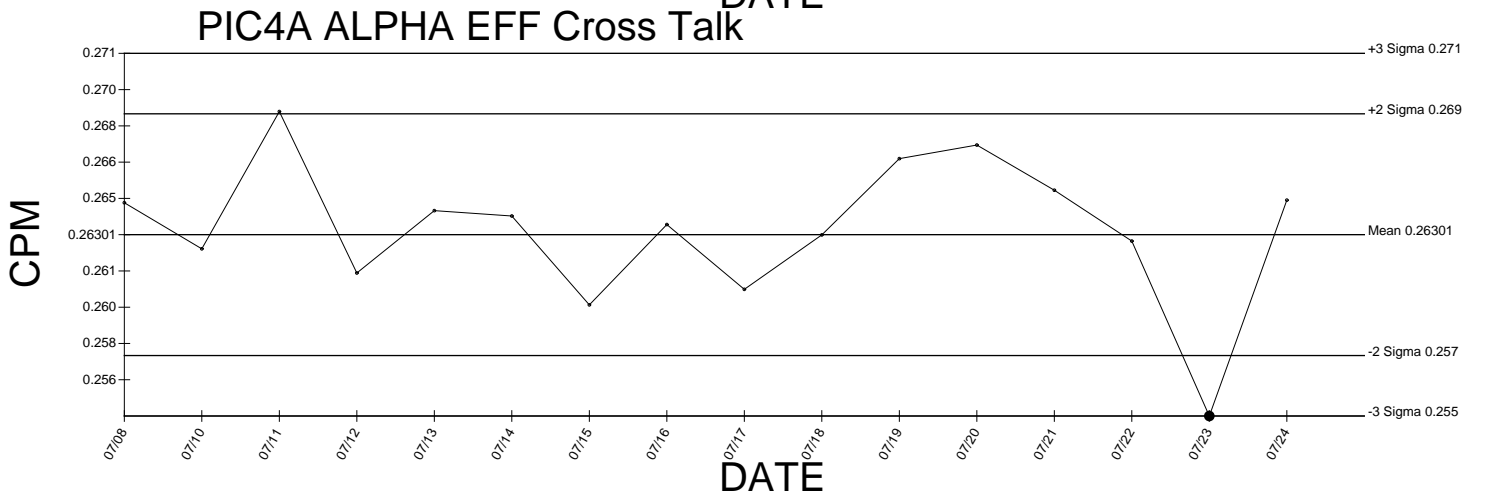
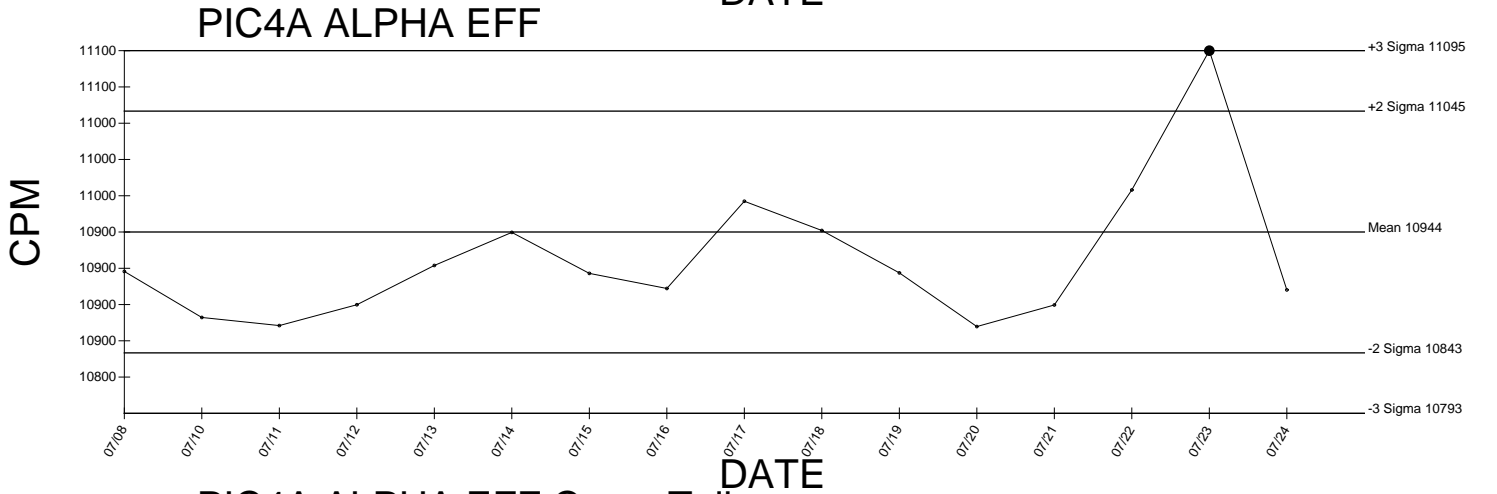
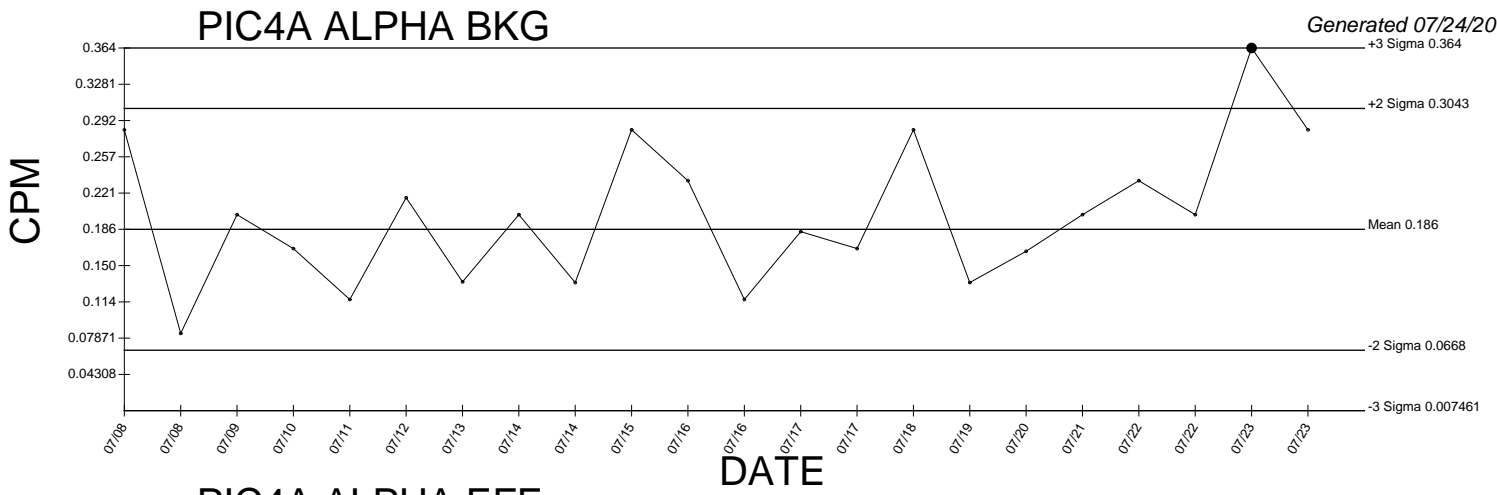


● Denotes Outlier



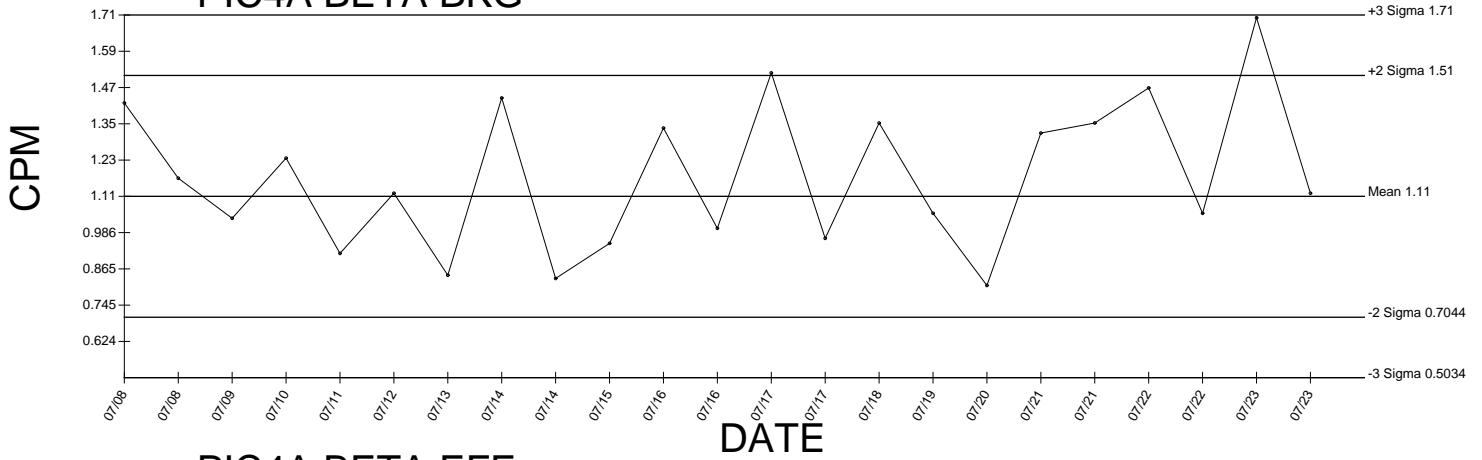
● Denotes Outlier



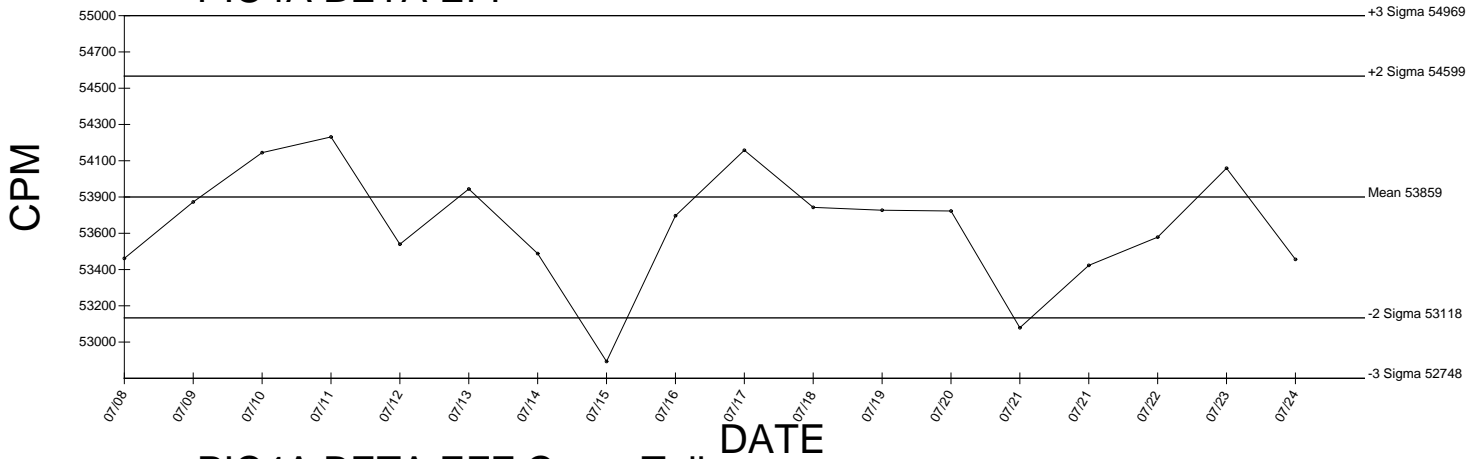


● Denotes Outlier

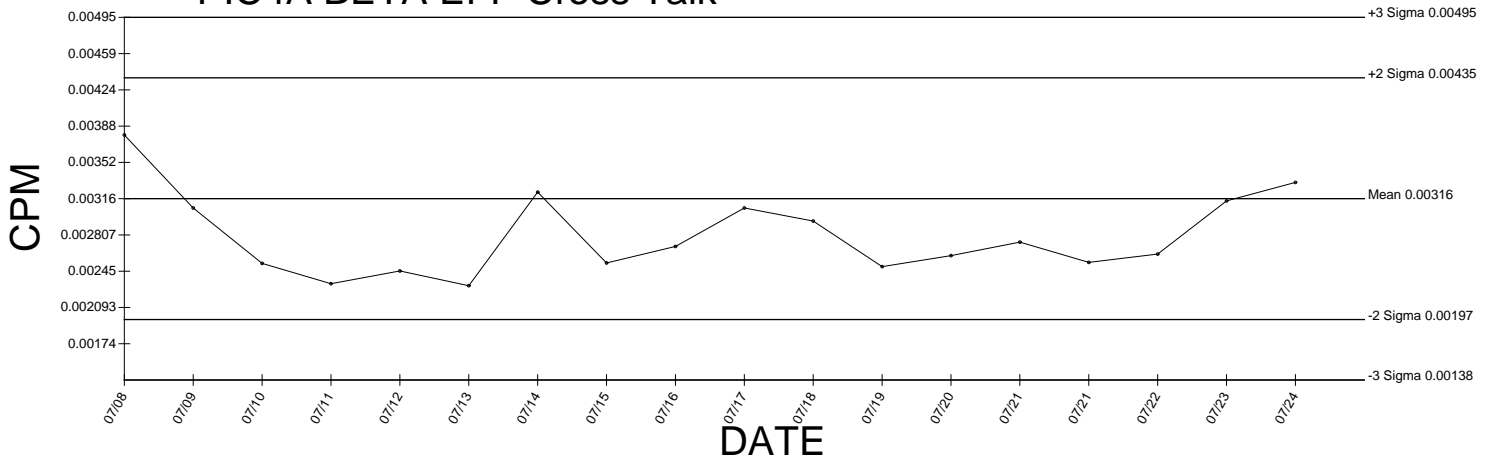
### PIC4A BETA BKG



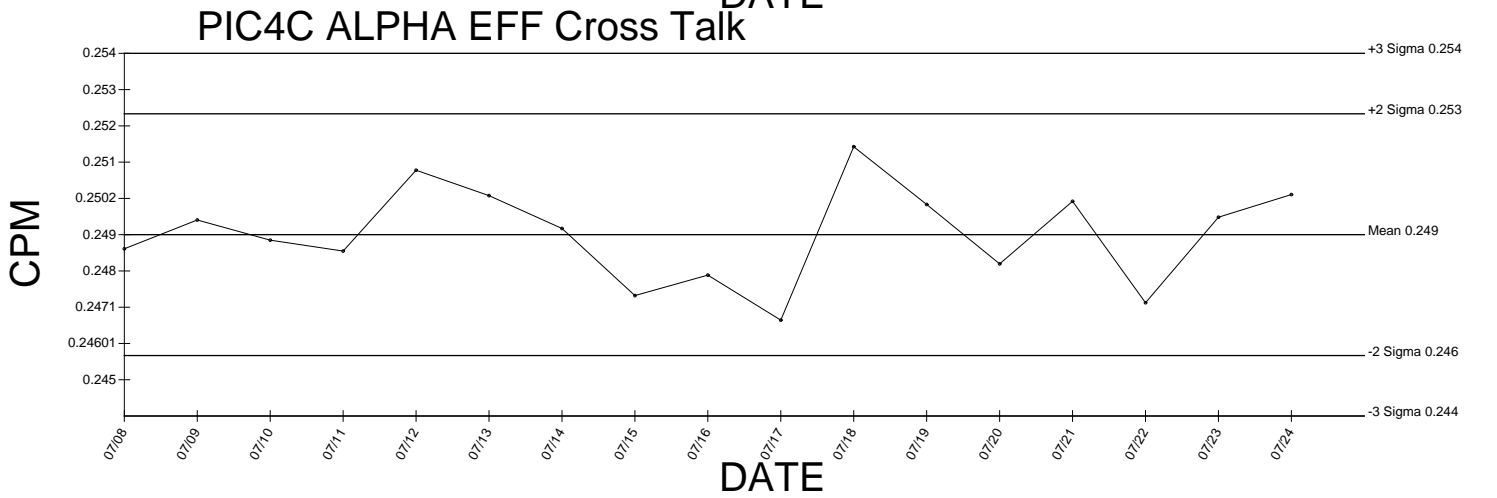
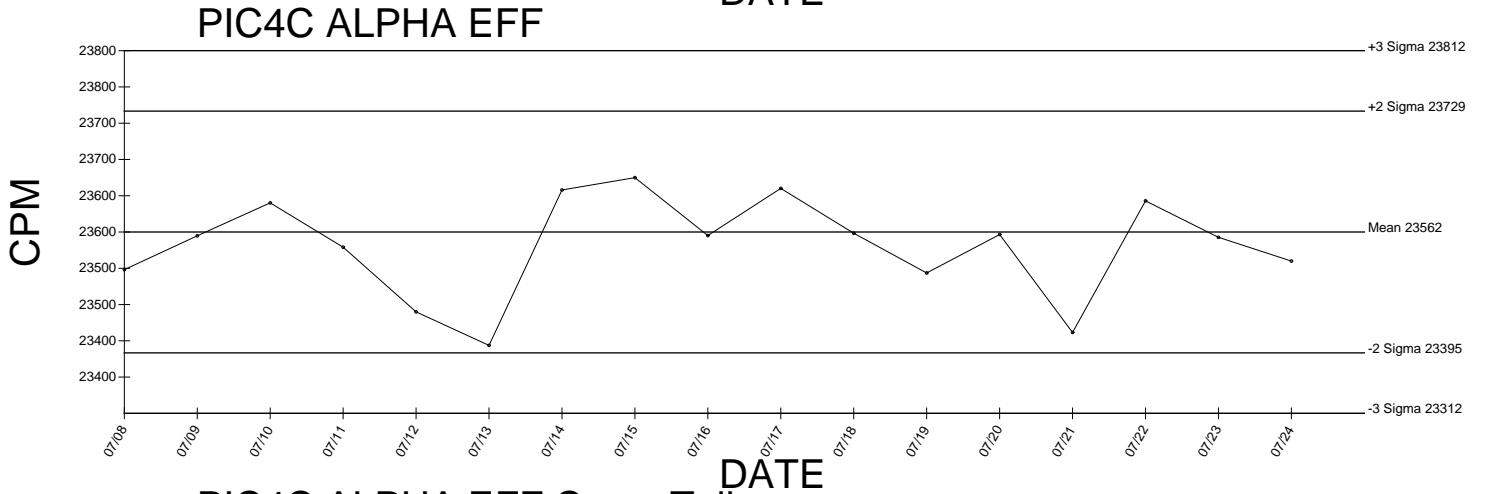
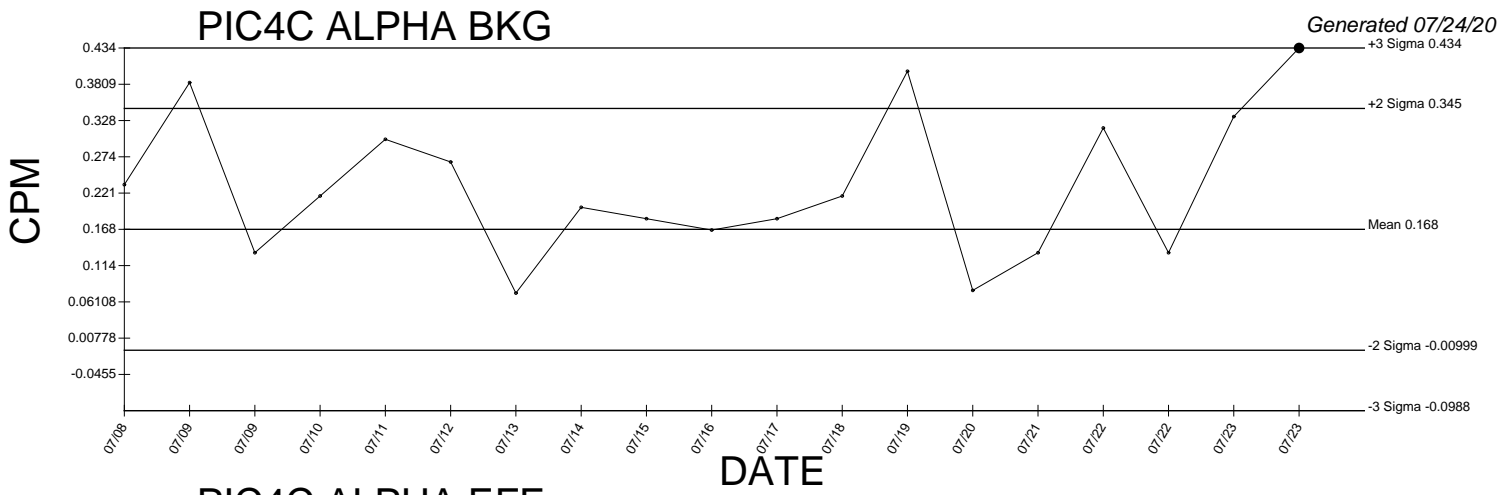
### PIC4A BETA EFF



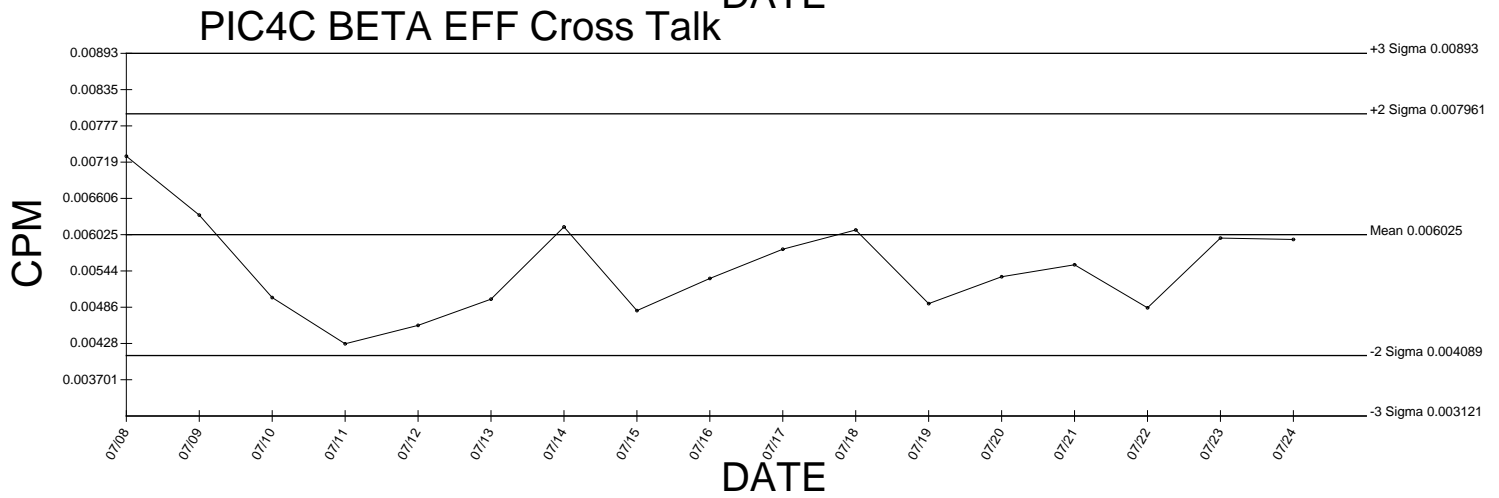
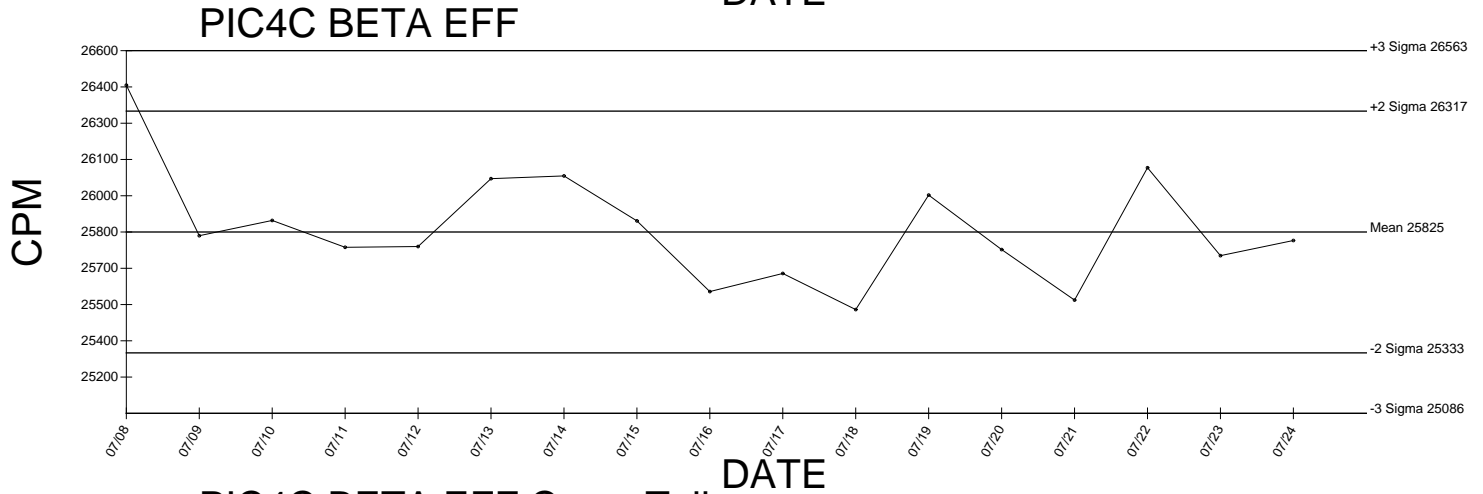
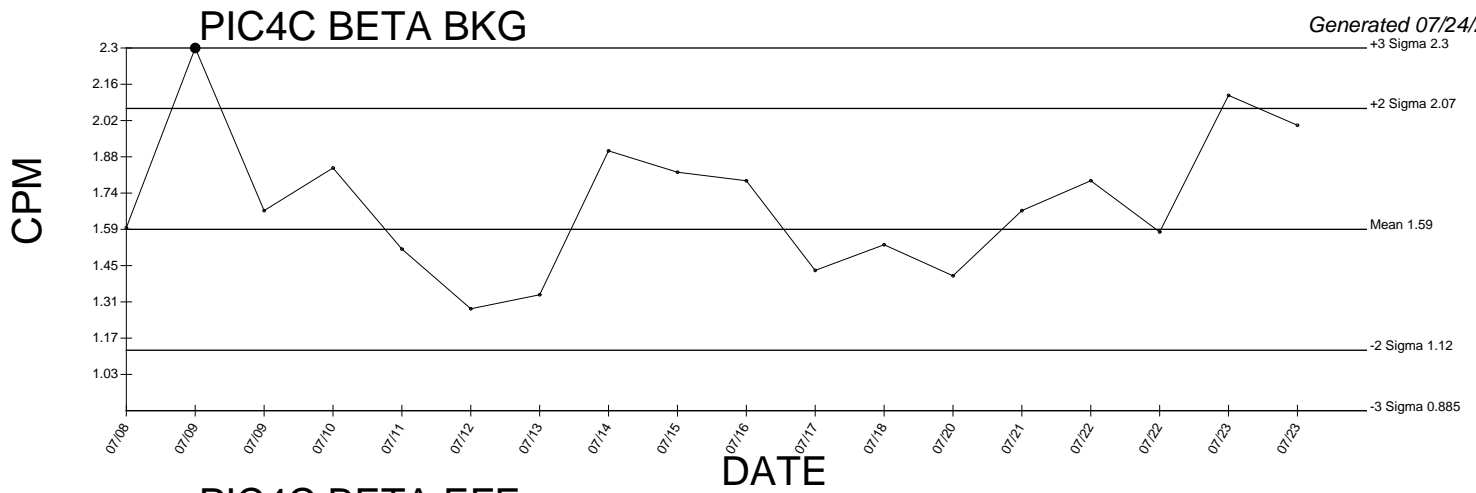
### PIC4A BETA EFF Cross Talk



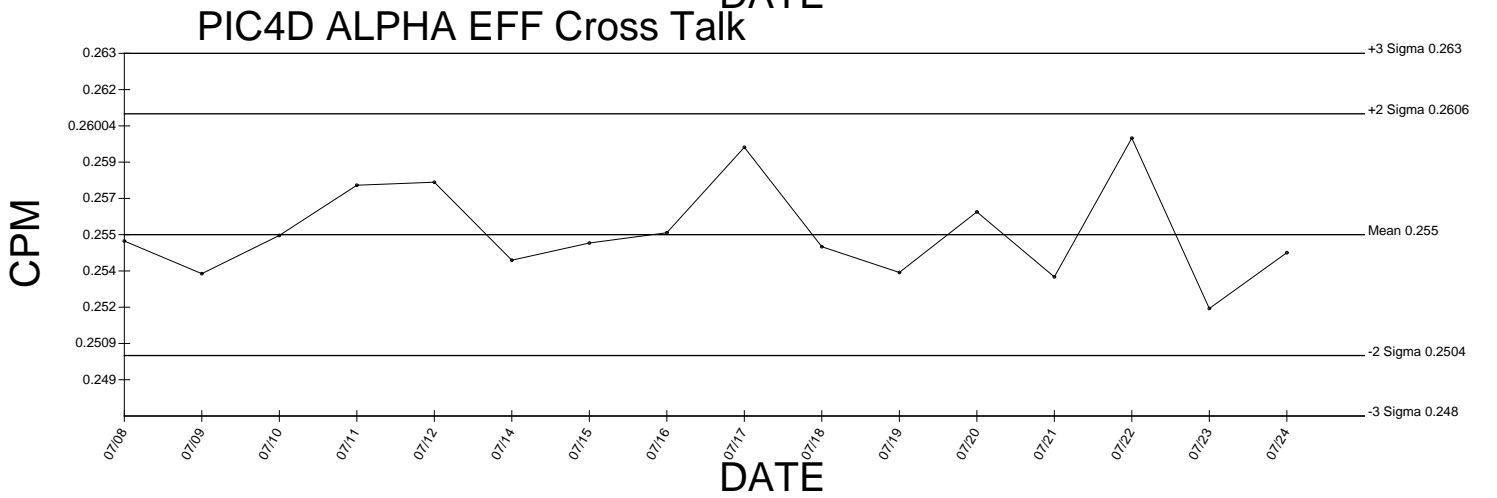
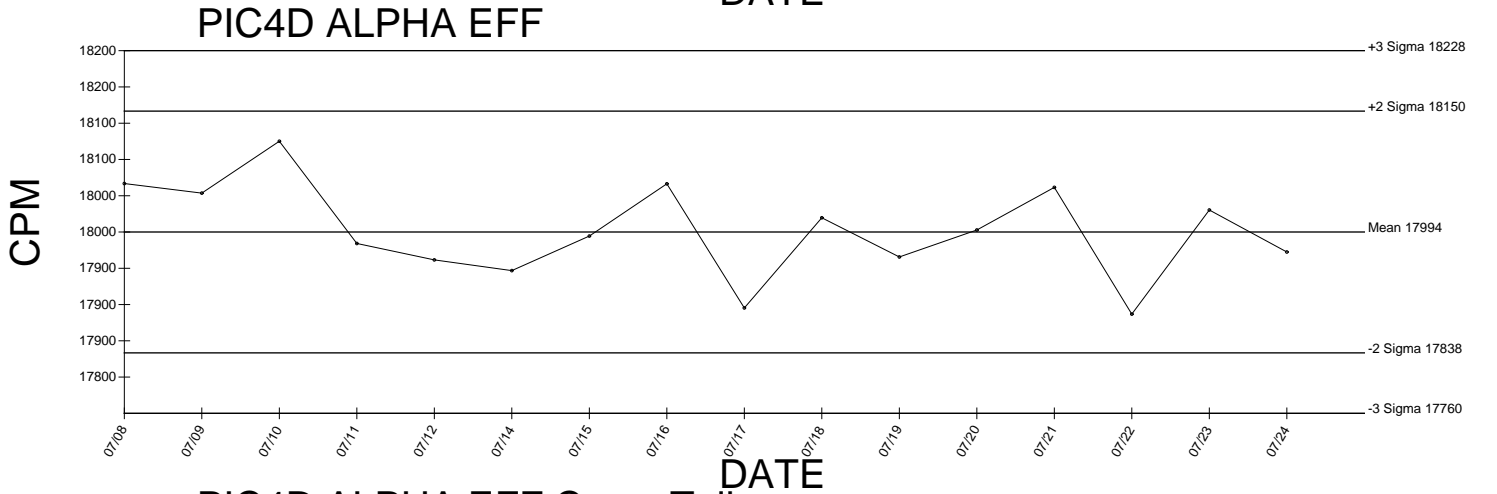
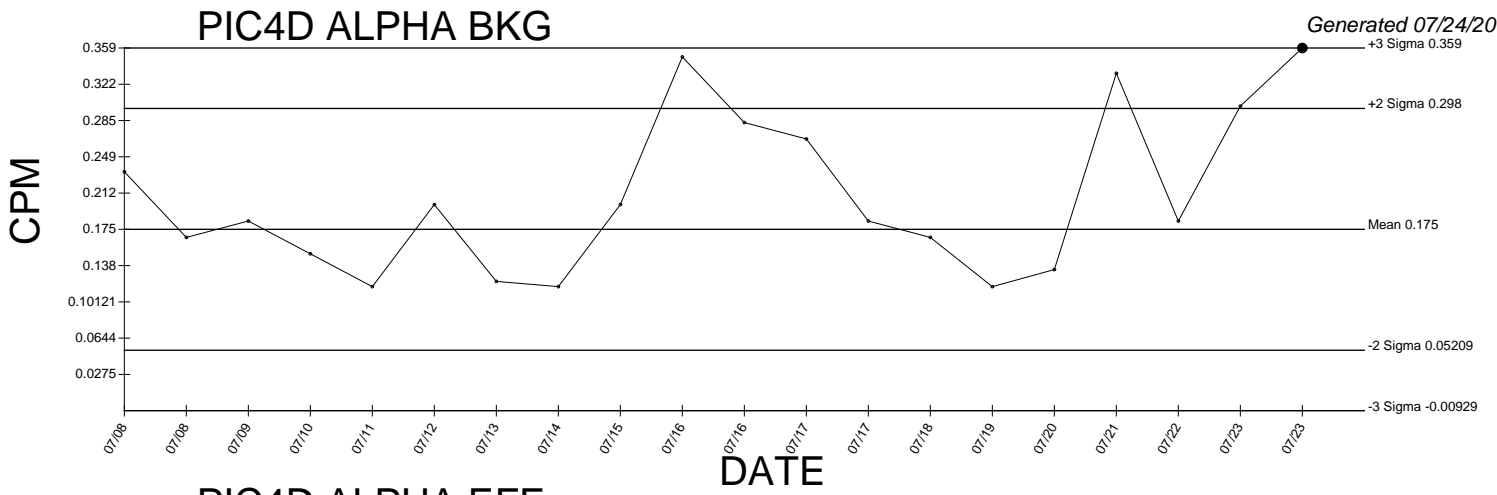
● Denotes Outlier



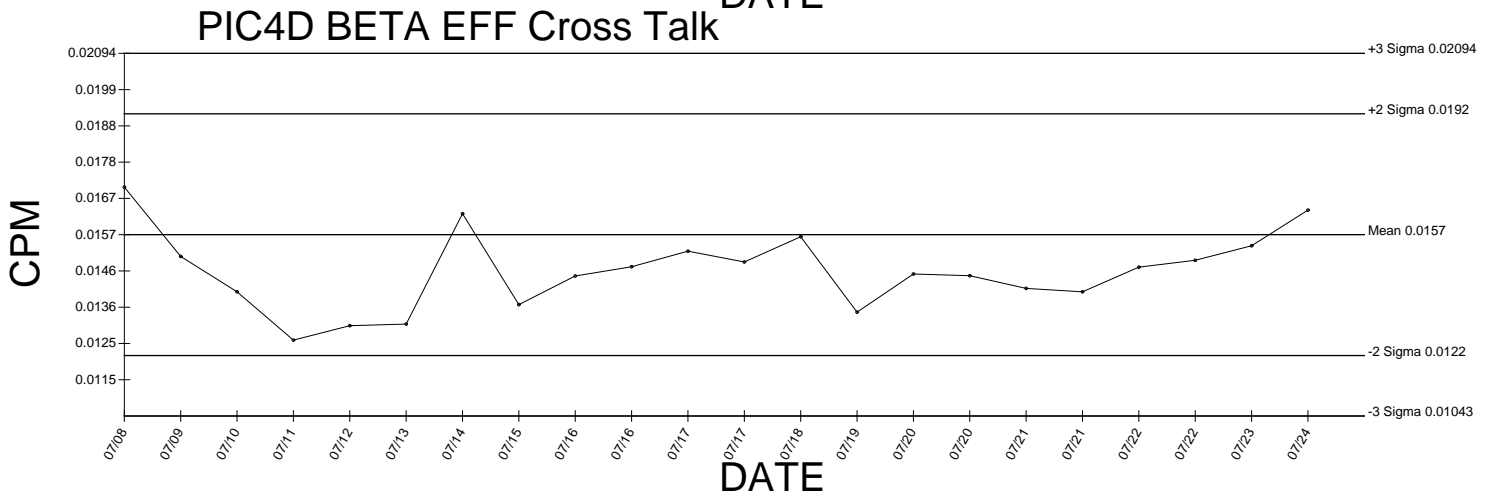
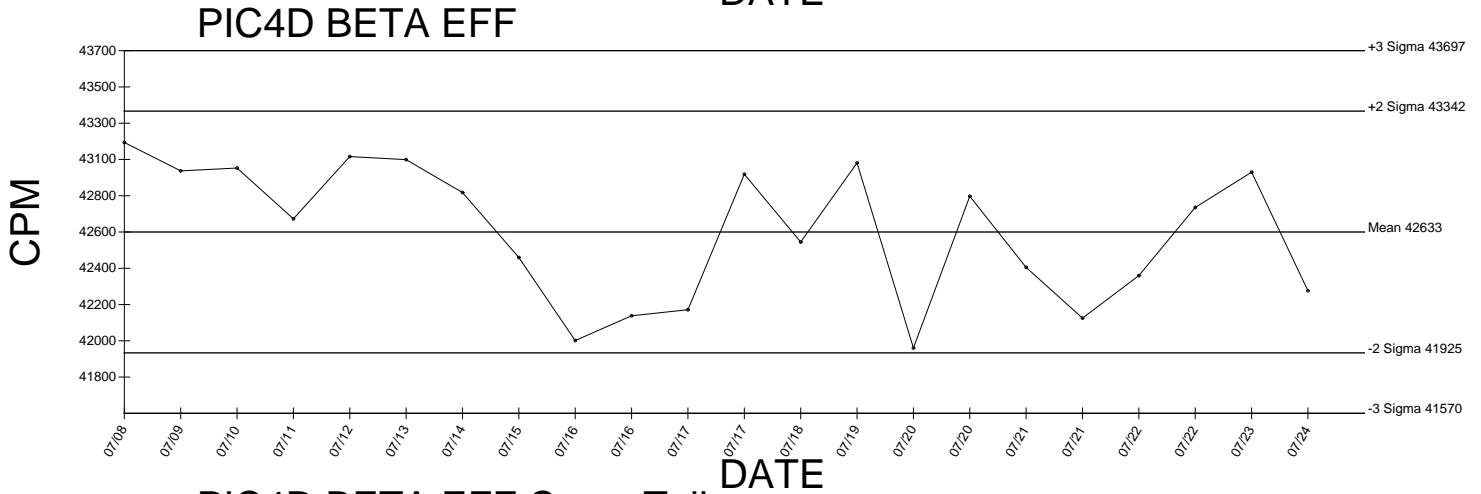
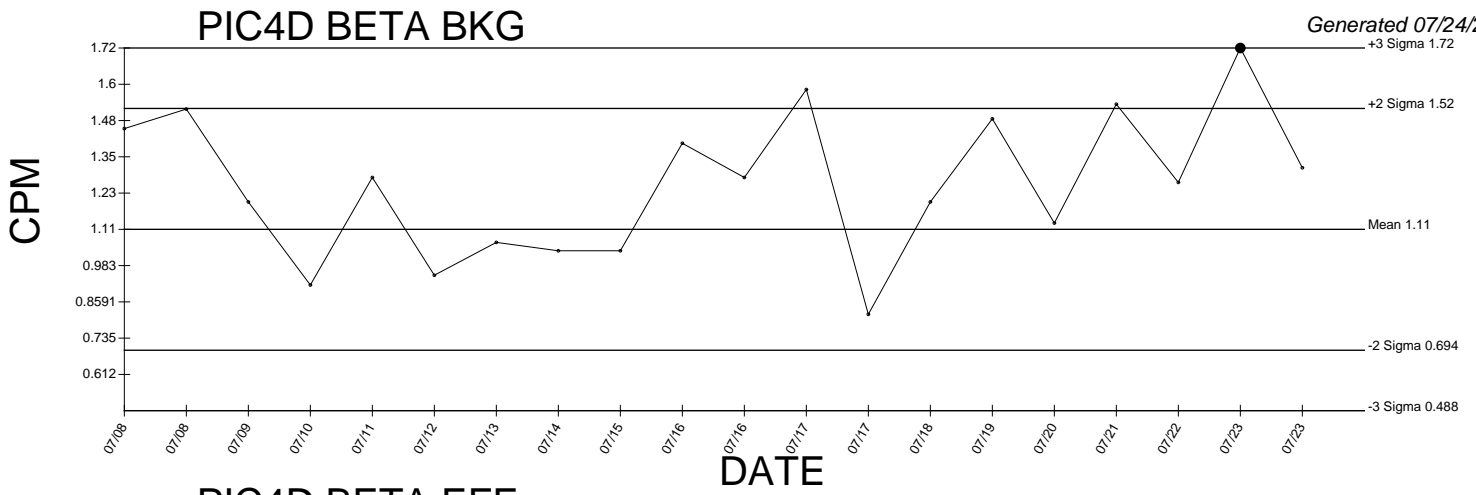
● Denotes Outlier



● Denotes Outlier

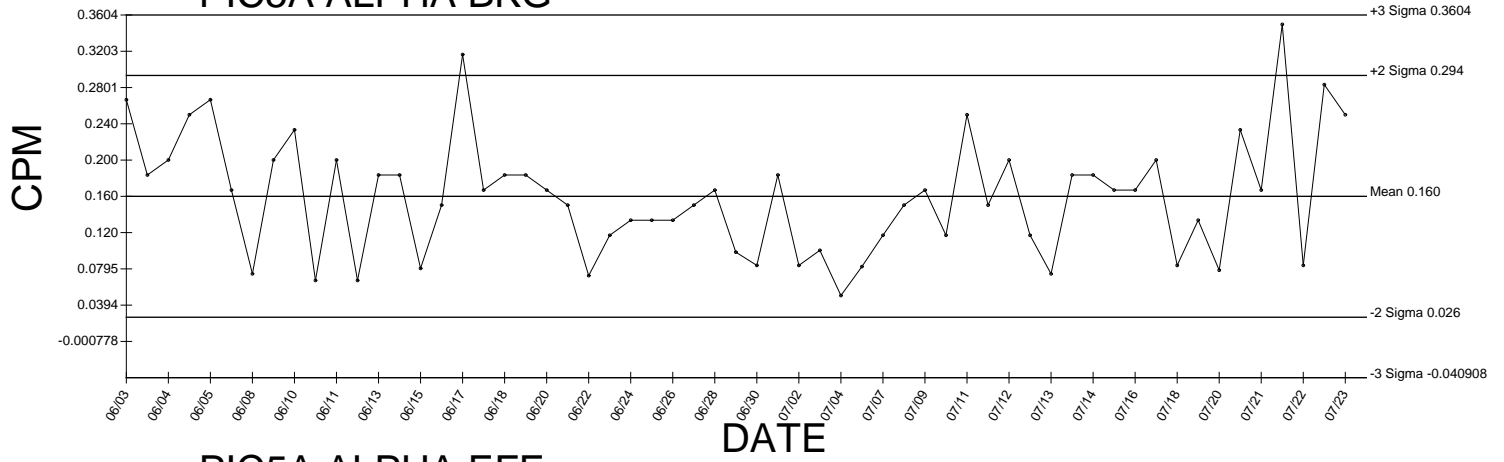


● Denotes Outlier

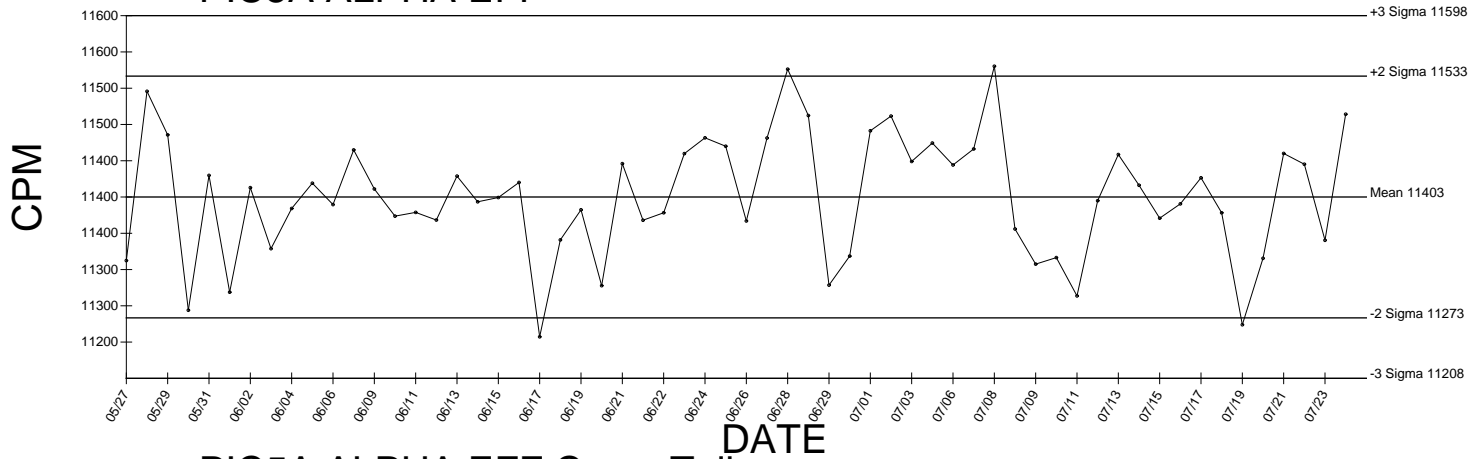


● Denotes Outlier

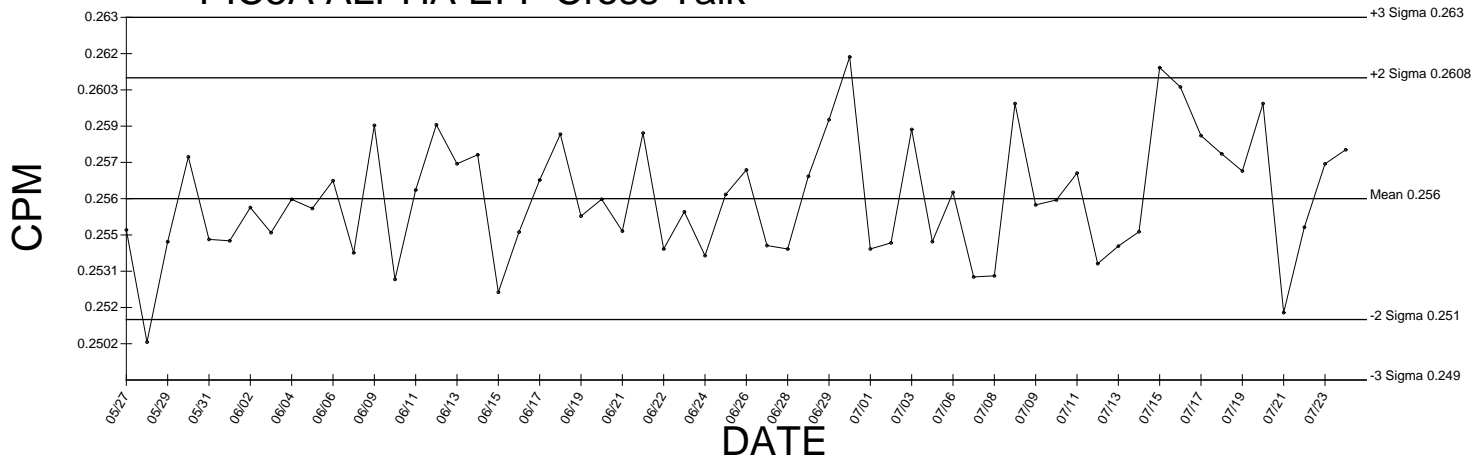
### PIC5A ALPHA BKG



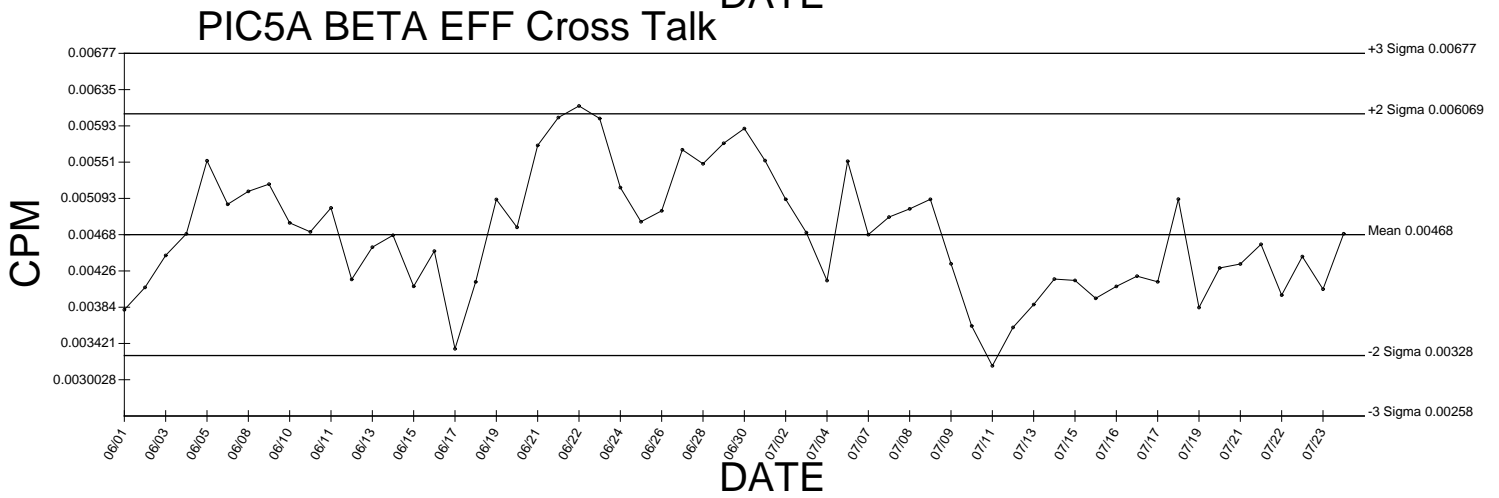
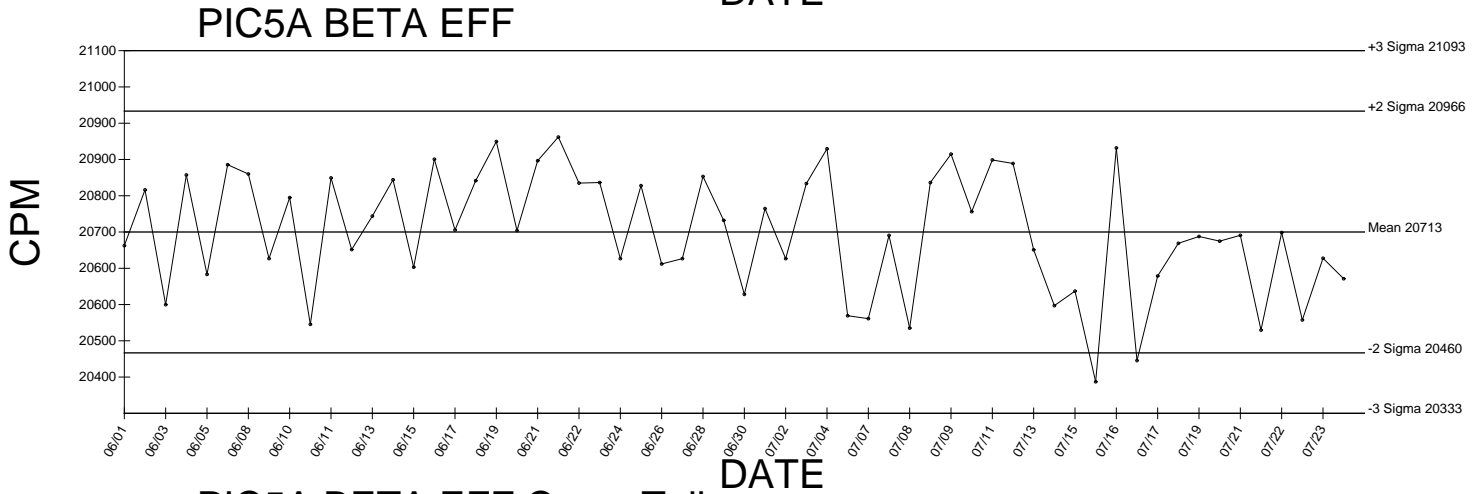
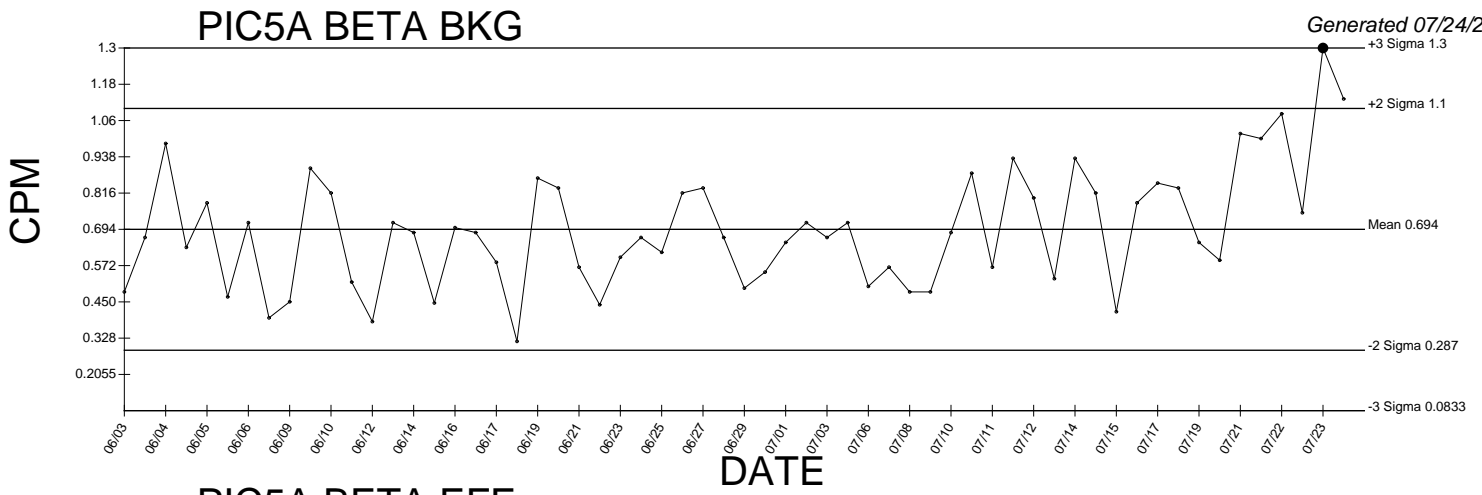
### PIC5A ALPHA EFF



### PIC5A ALPHA EFF Cross Talk

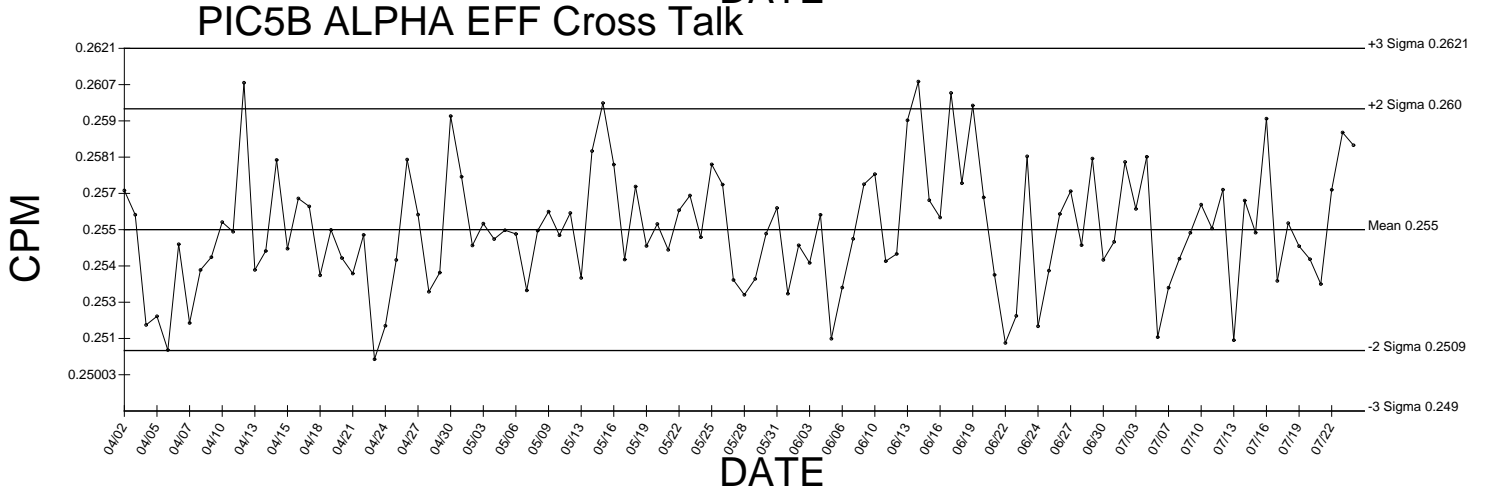
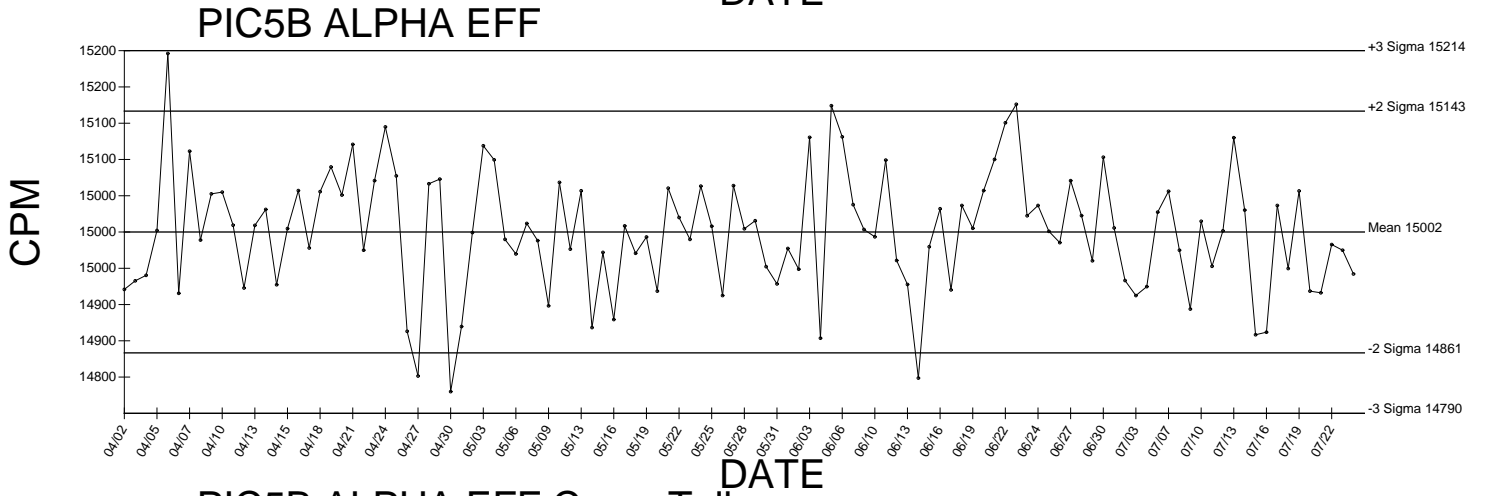
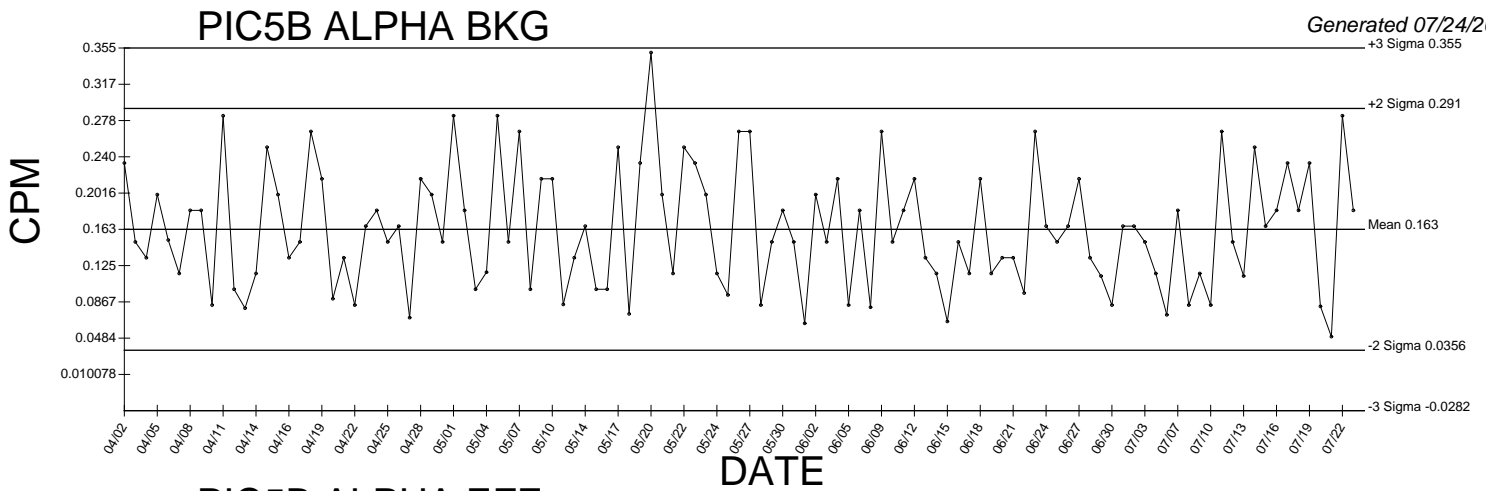


● Denotes Outlier



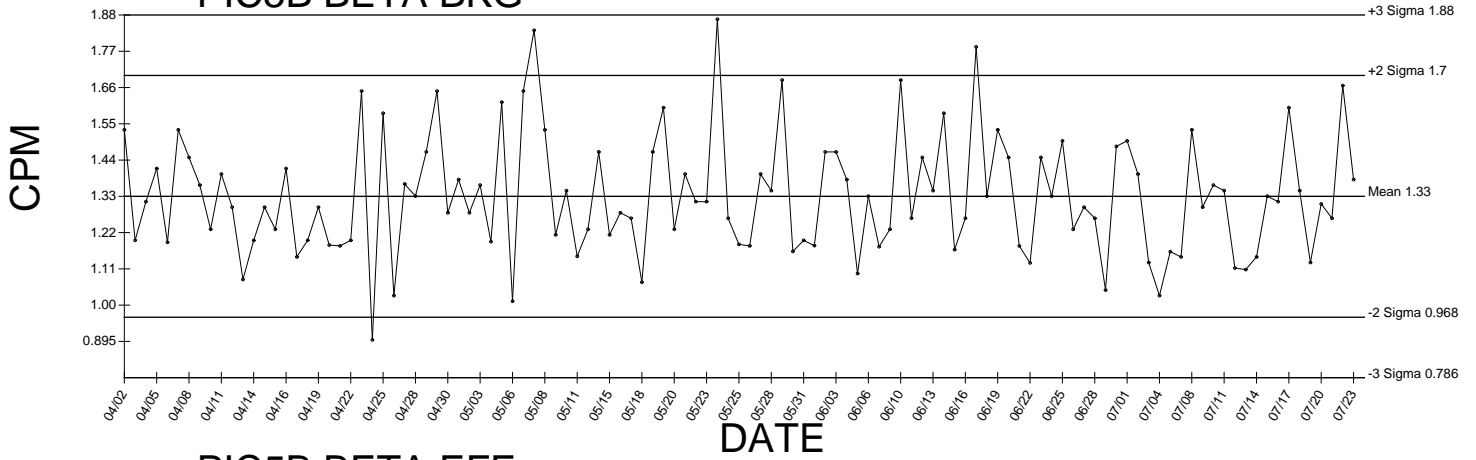
● Denotes Outlier



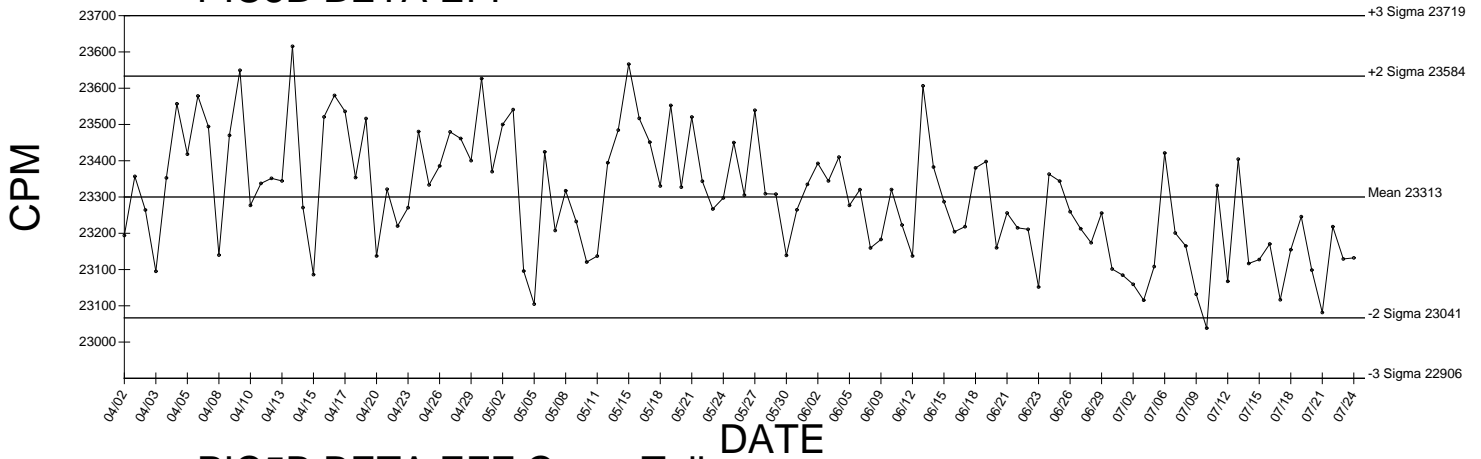


● Denotes Outlier

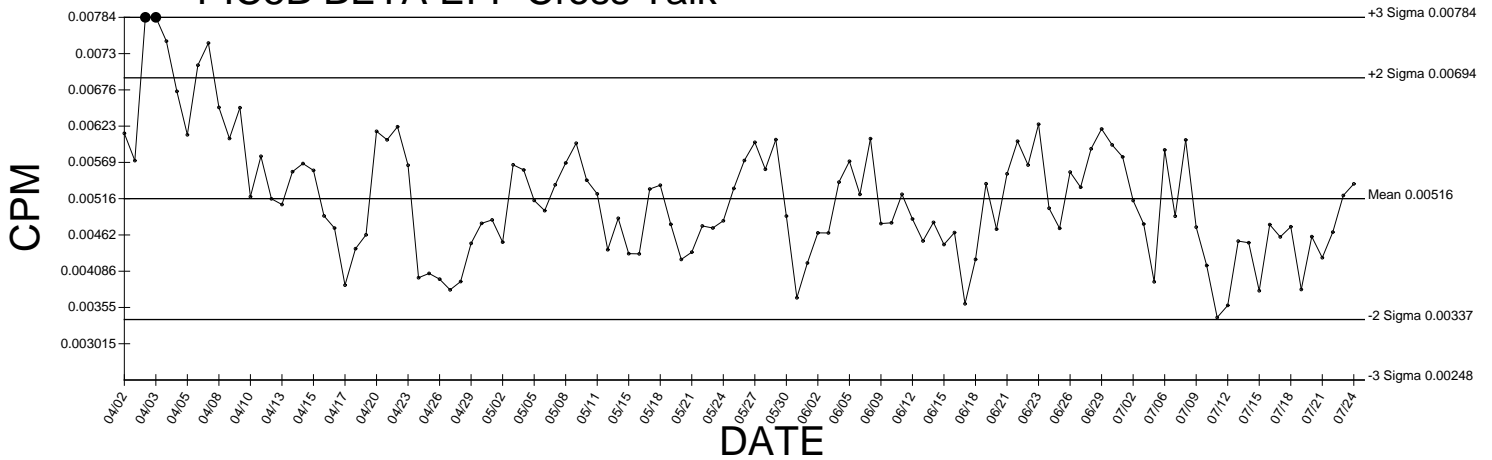
### PIC5B BETA BKG



### PIC5B BETA EFF



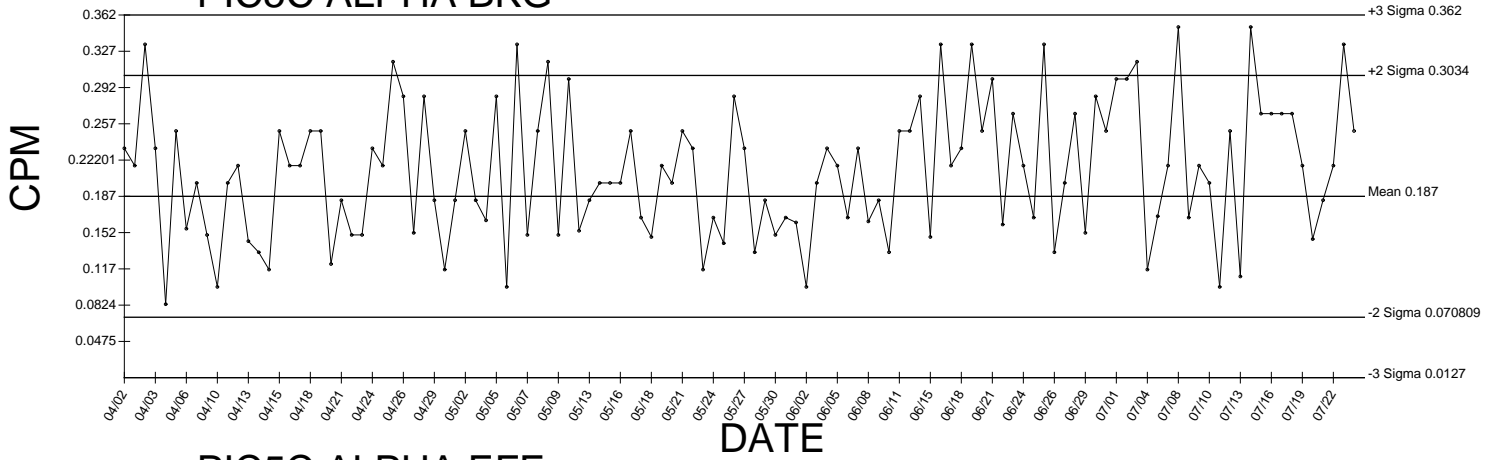
### PIC5B BETA EFF Cross Talk



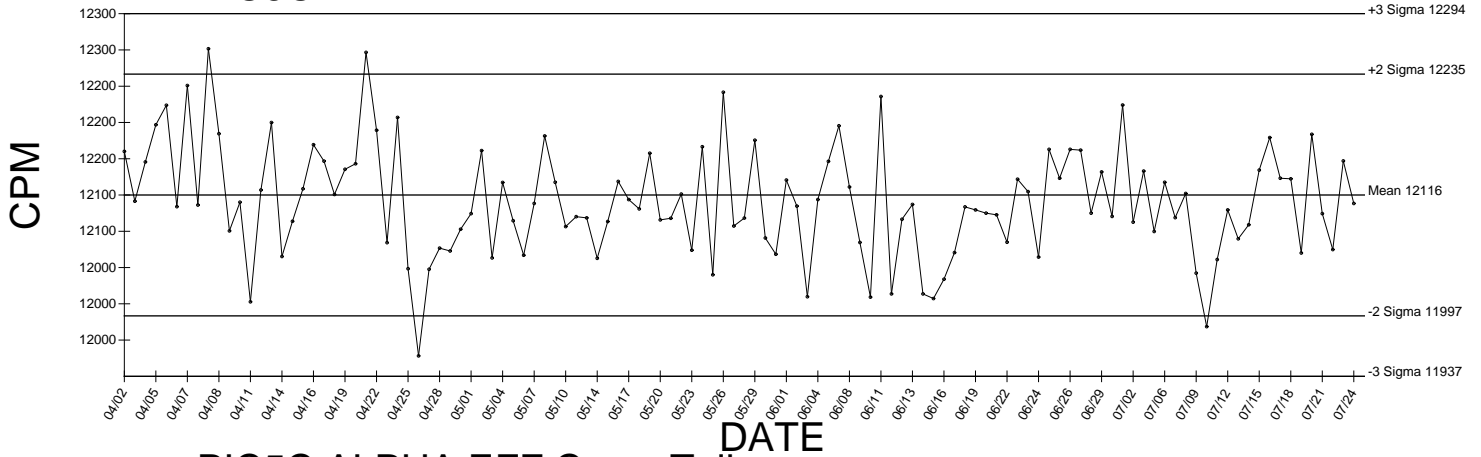
● Denotes Outlier

# PIC5C ALPHA BKG

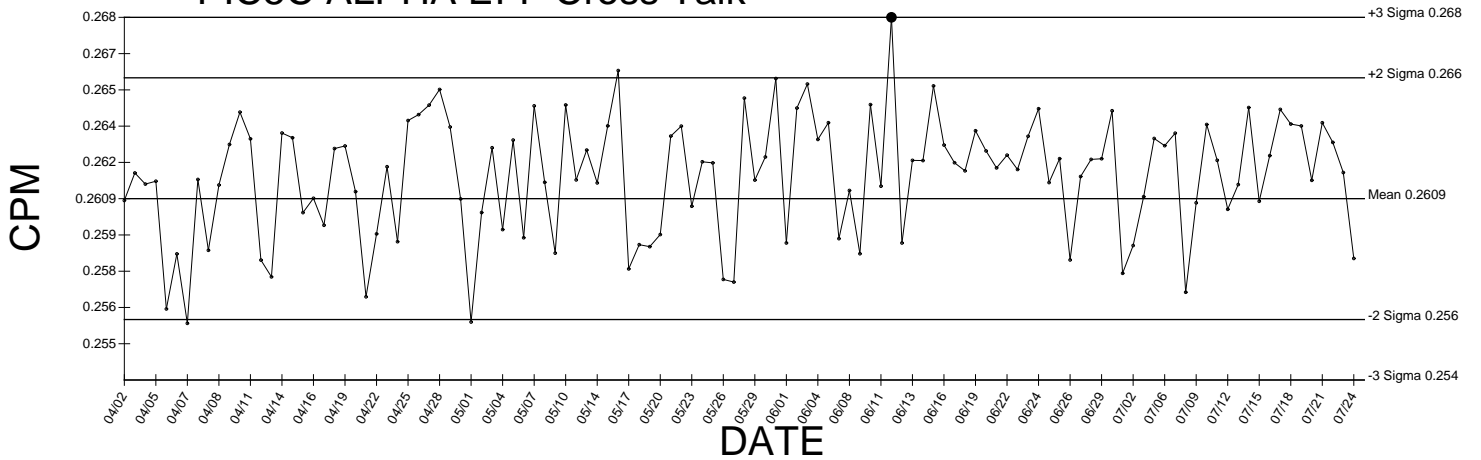
Generated 07/24/2009



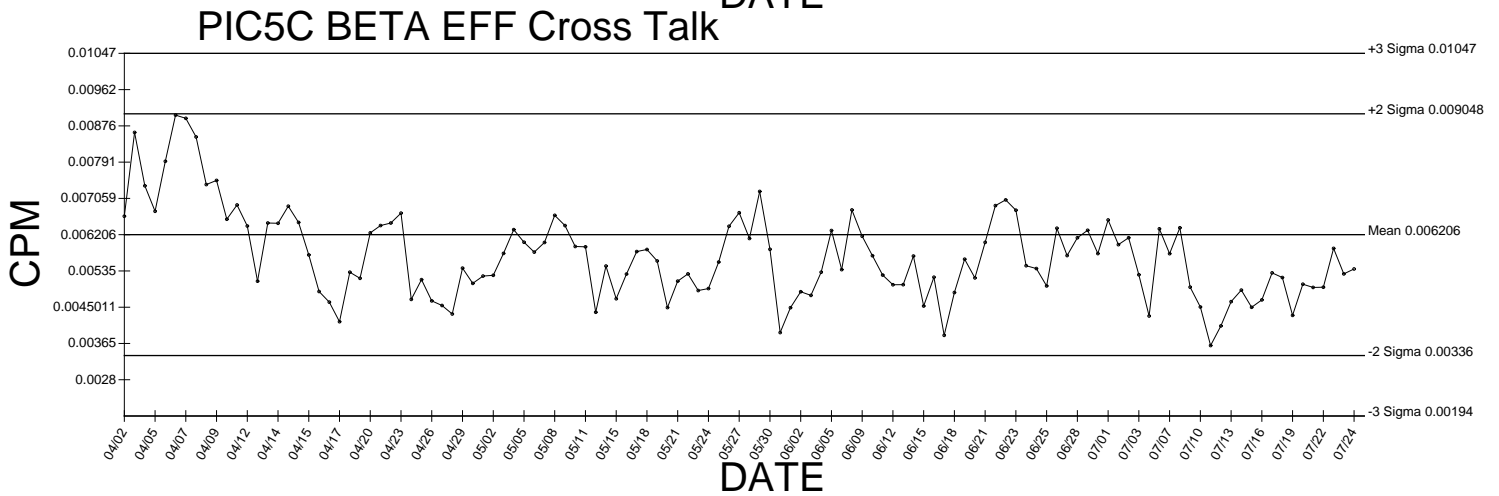
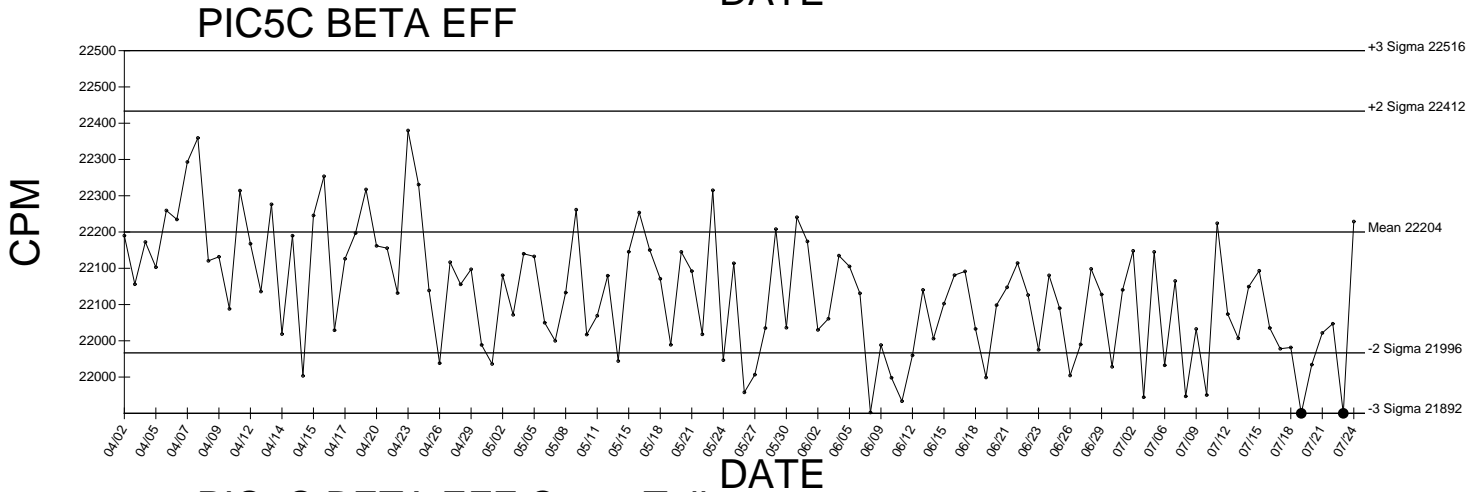
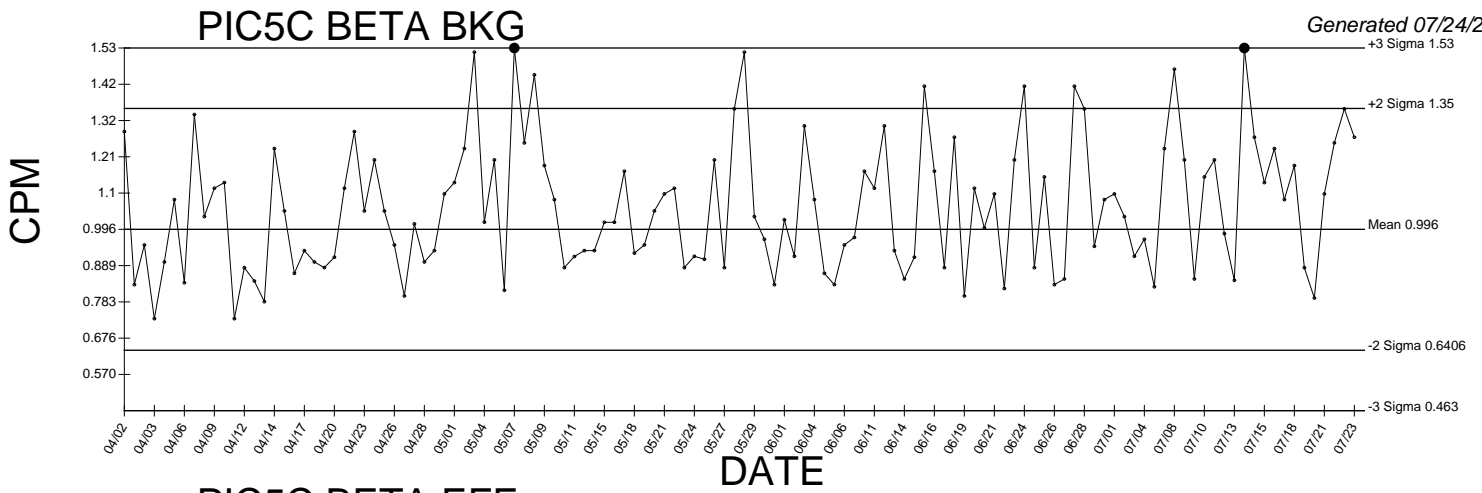
# PIC5C ALPHA EFF



# PIC5C ALPHA EFF Cross Talk



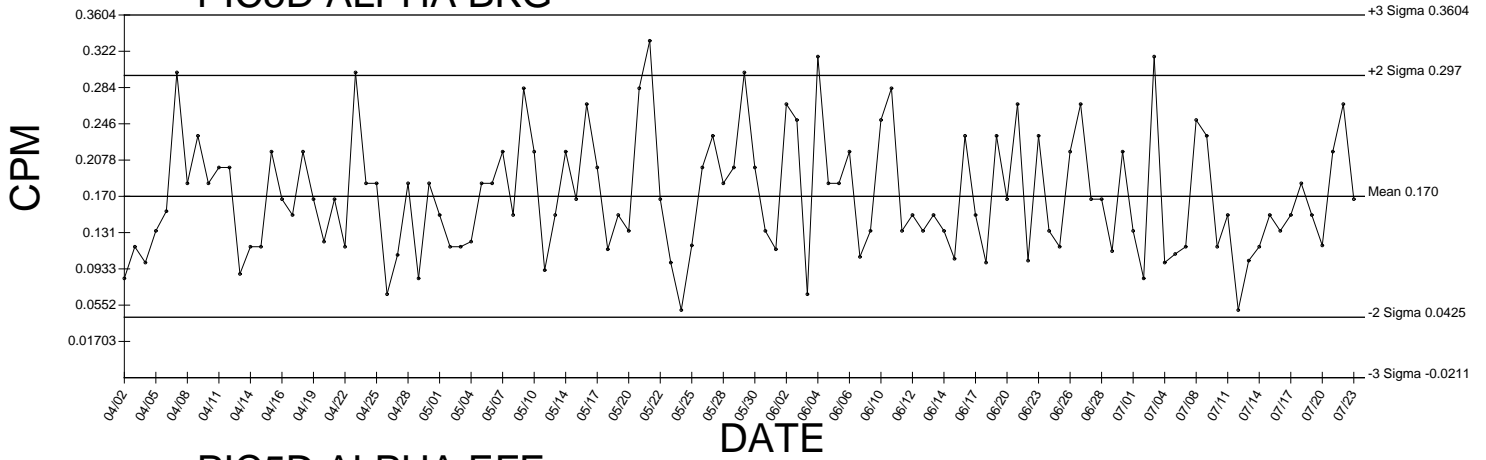
● Denotes Outlier



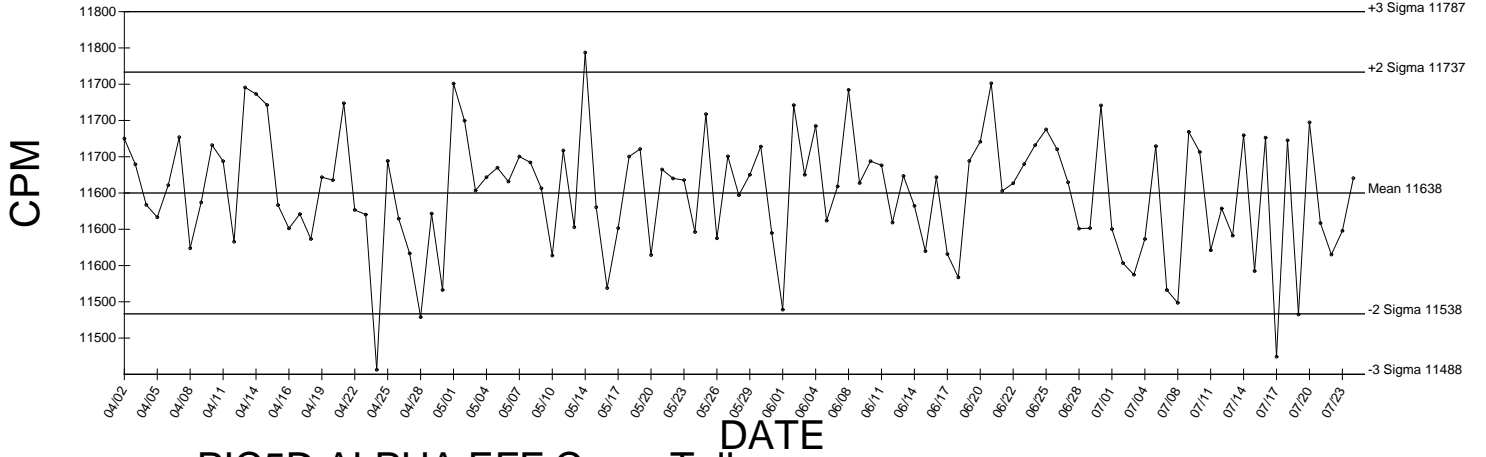
● Denotes Outlier

# PIC5D ALPHA BKG

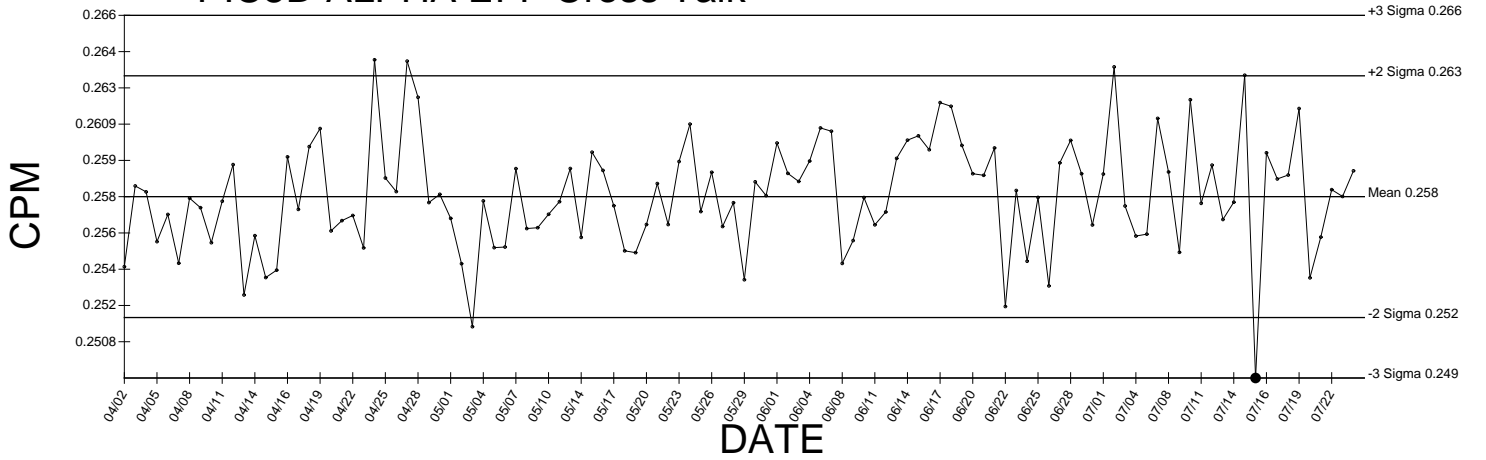
Generated 07/24/2009



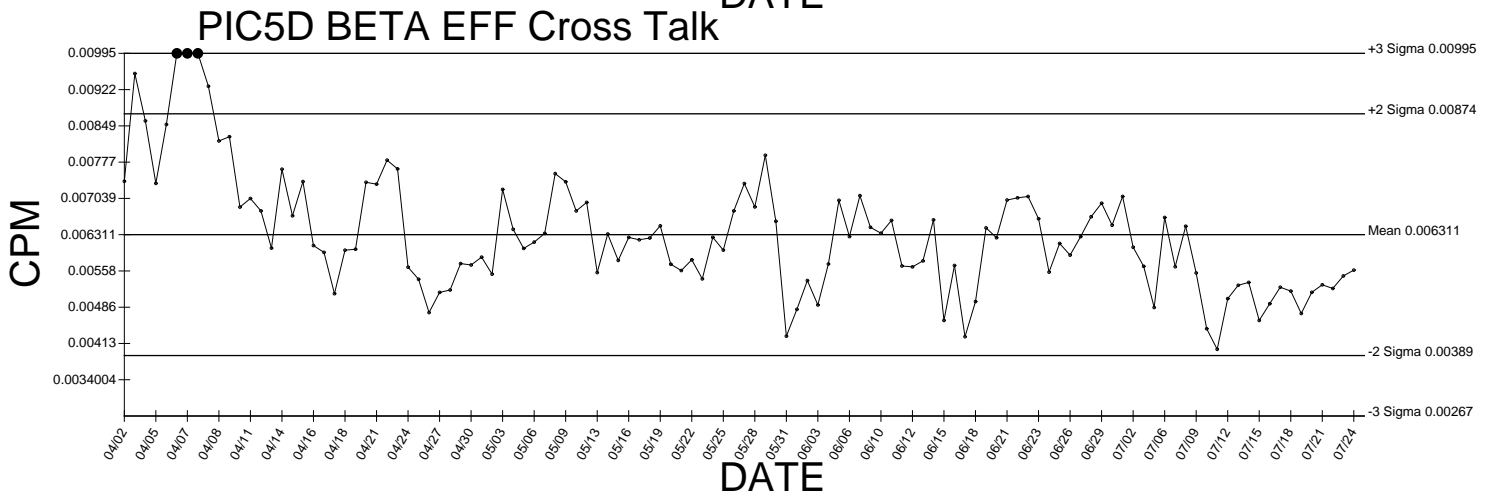
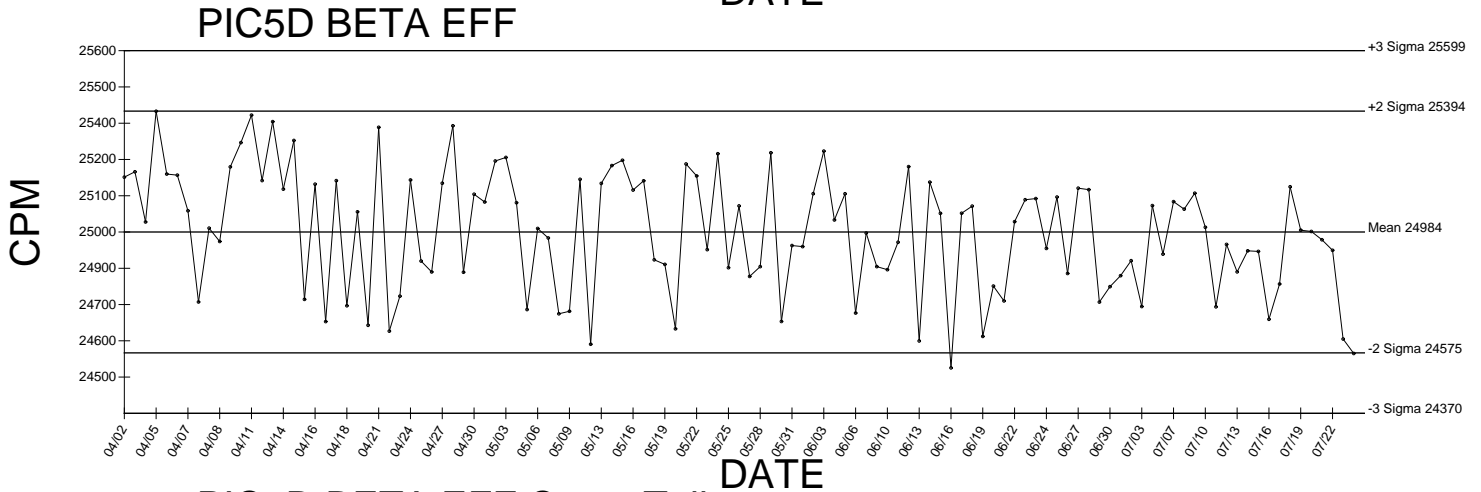
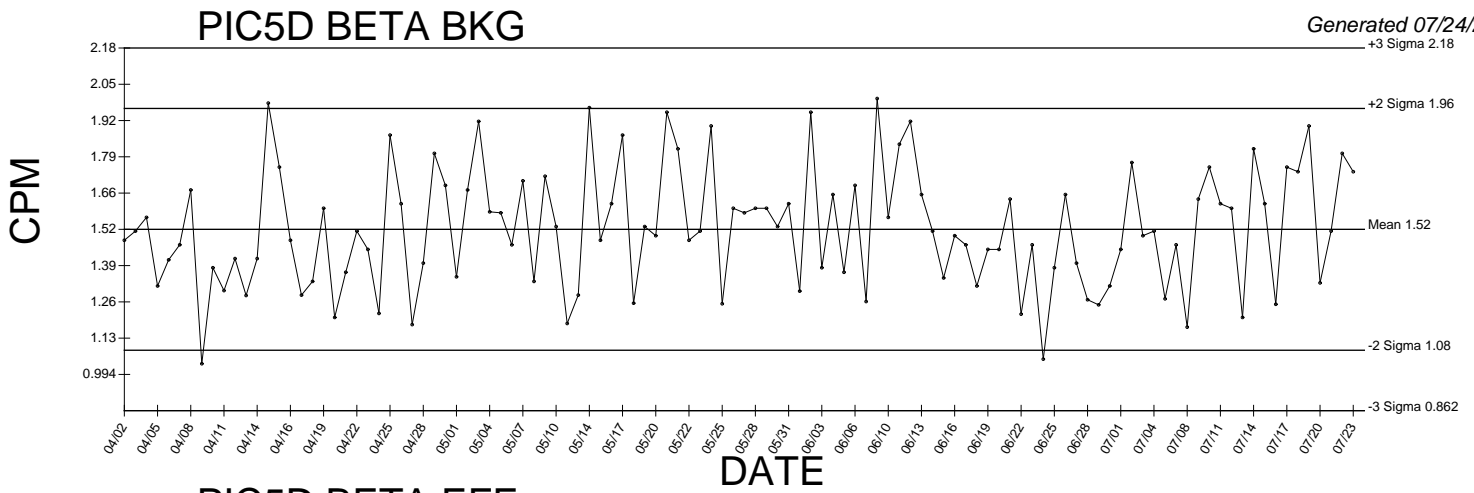
# PIC5D ALPHA EFF



# PIC5D ALPHA EFF Cross Talk

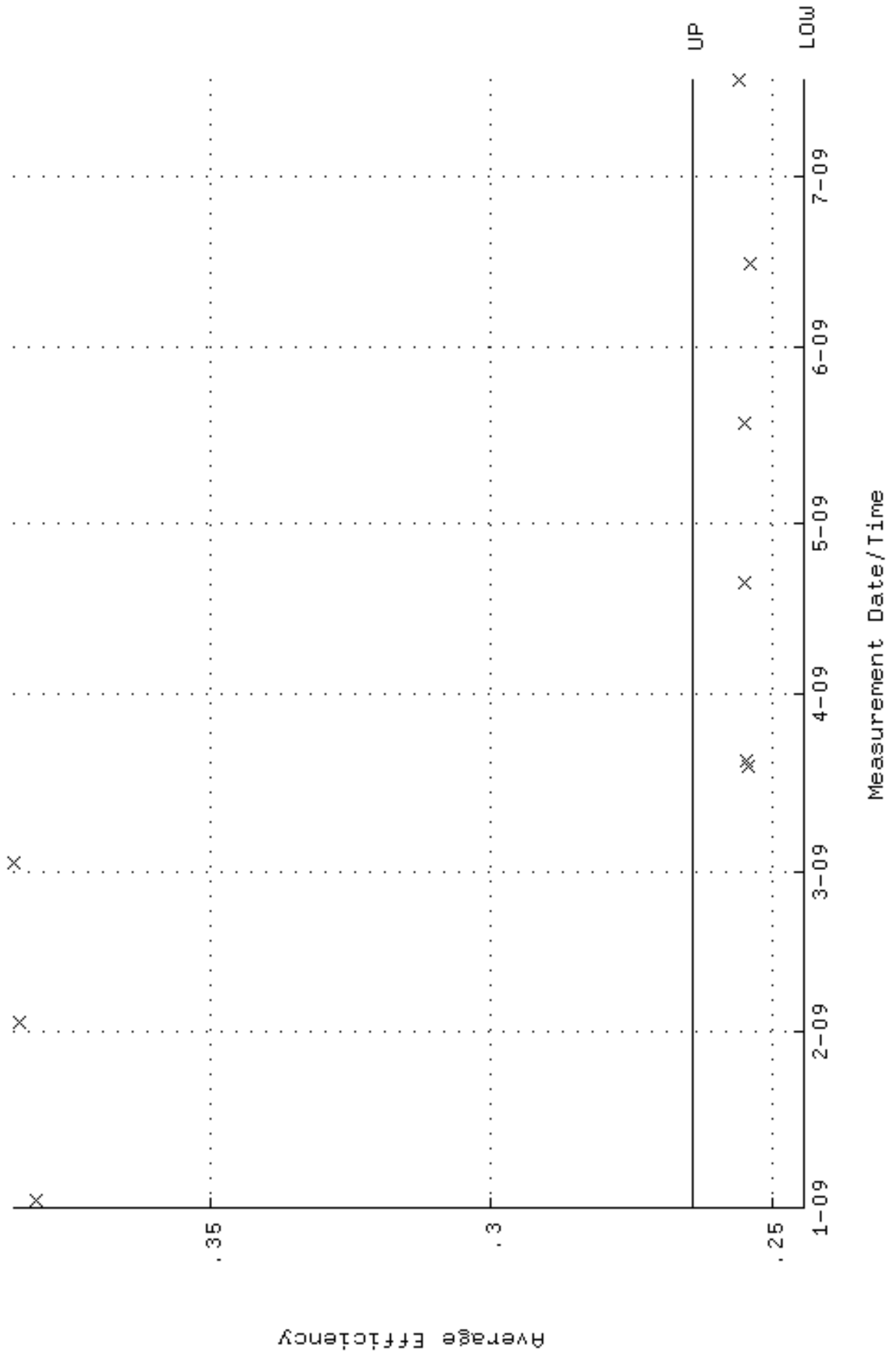


● Denotes Outlier

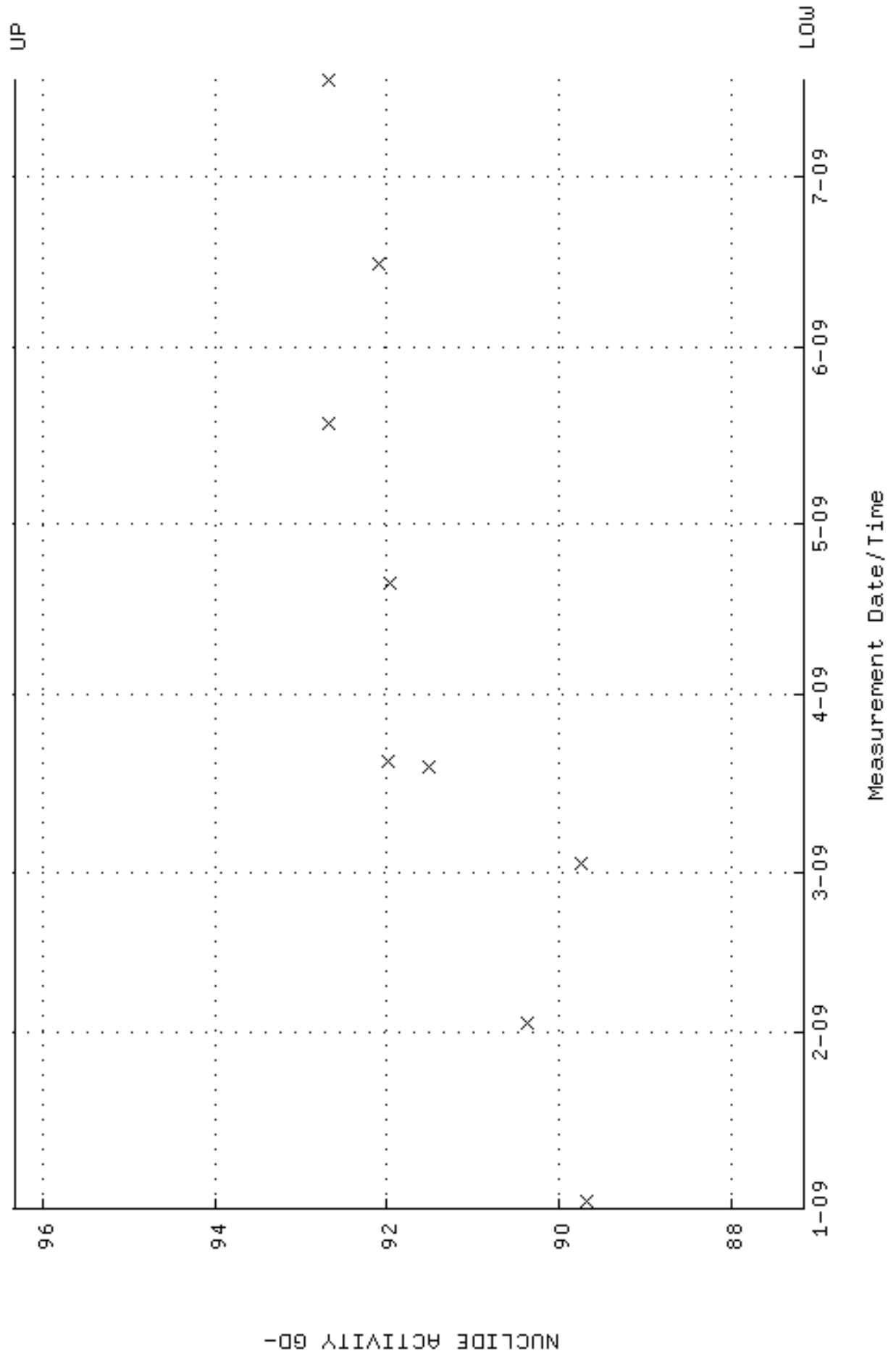


● Denotes Outlier

QA filename : DKA100:[ENV\_ALPHA.QA.W]W135.QAF;2  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:28 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.244305 through 0.264305

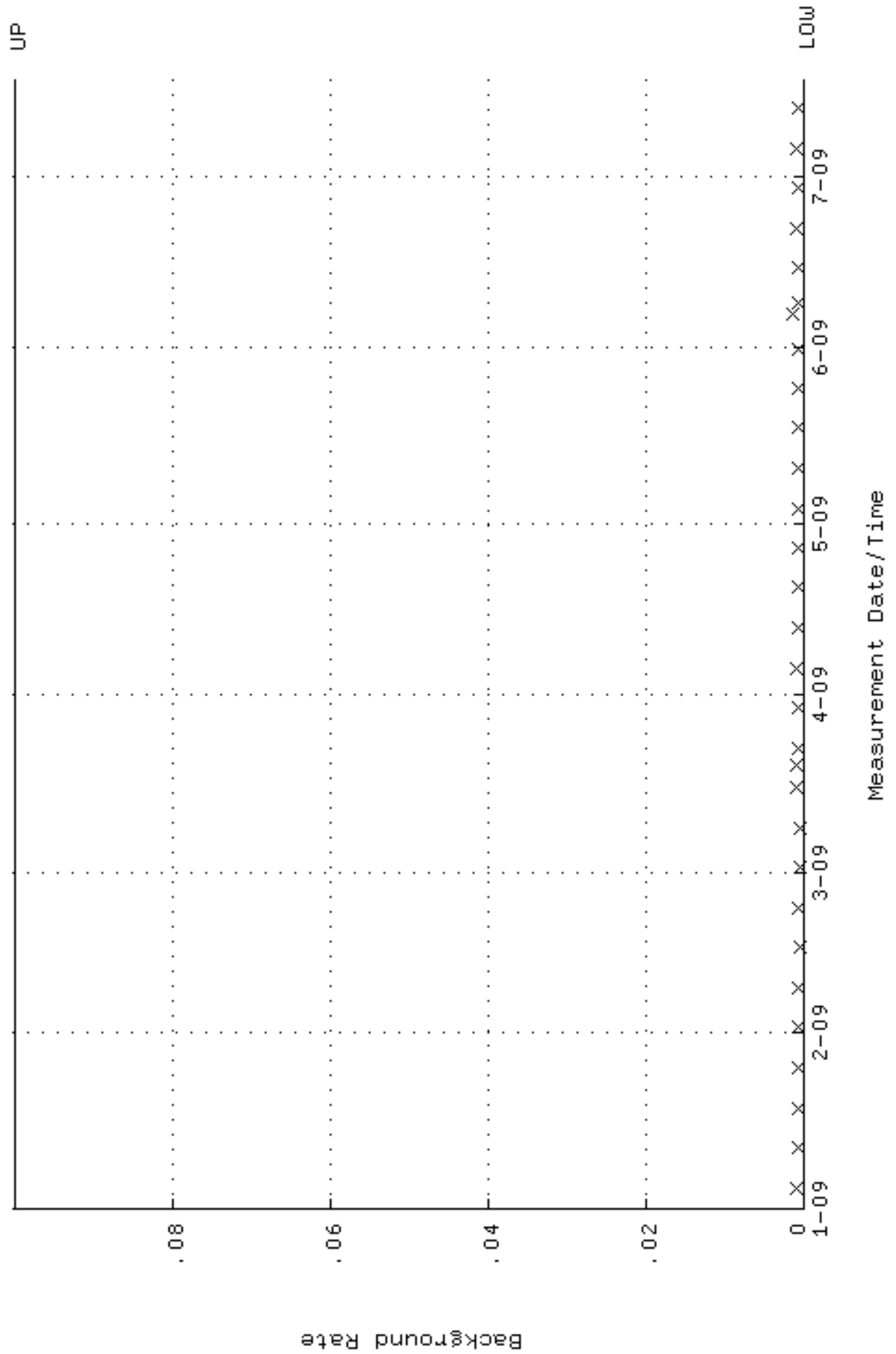


QA filename : DKA100:[ENV\_ALPHA.QA.W]W135.QAF;2  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:24:28 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 87.1482 through 96.3217

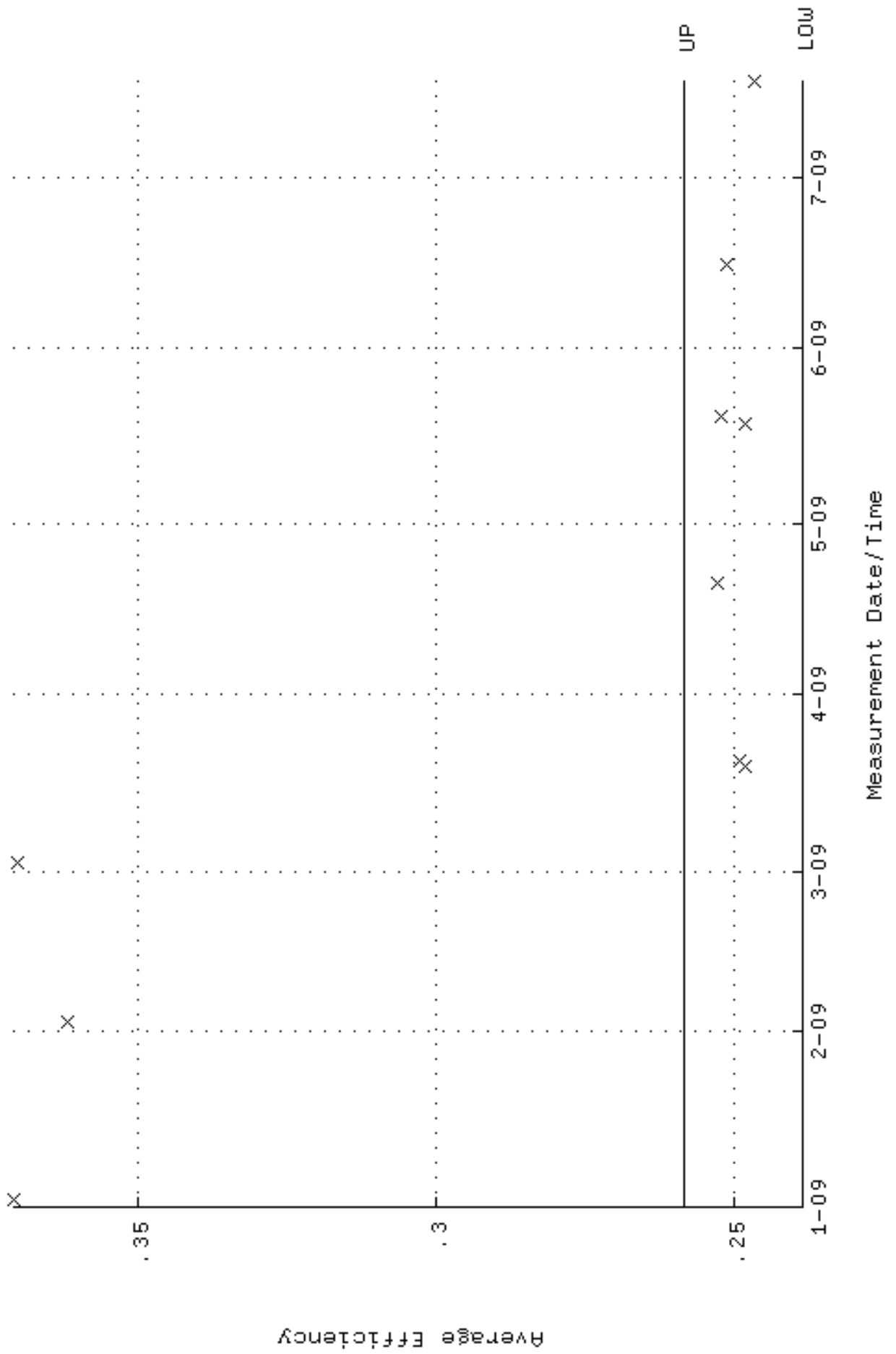




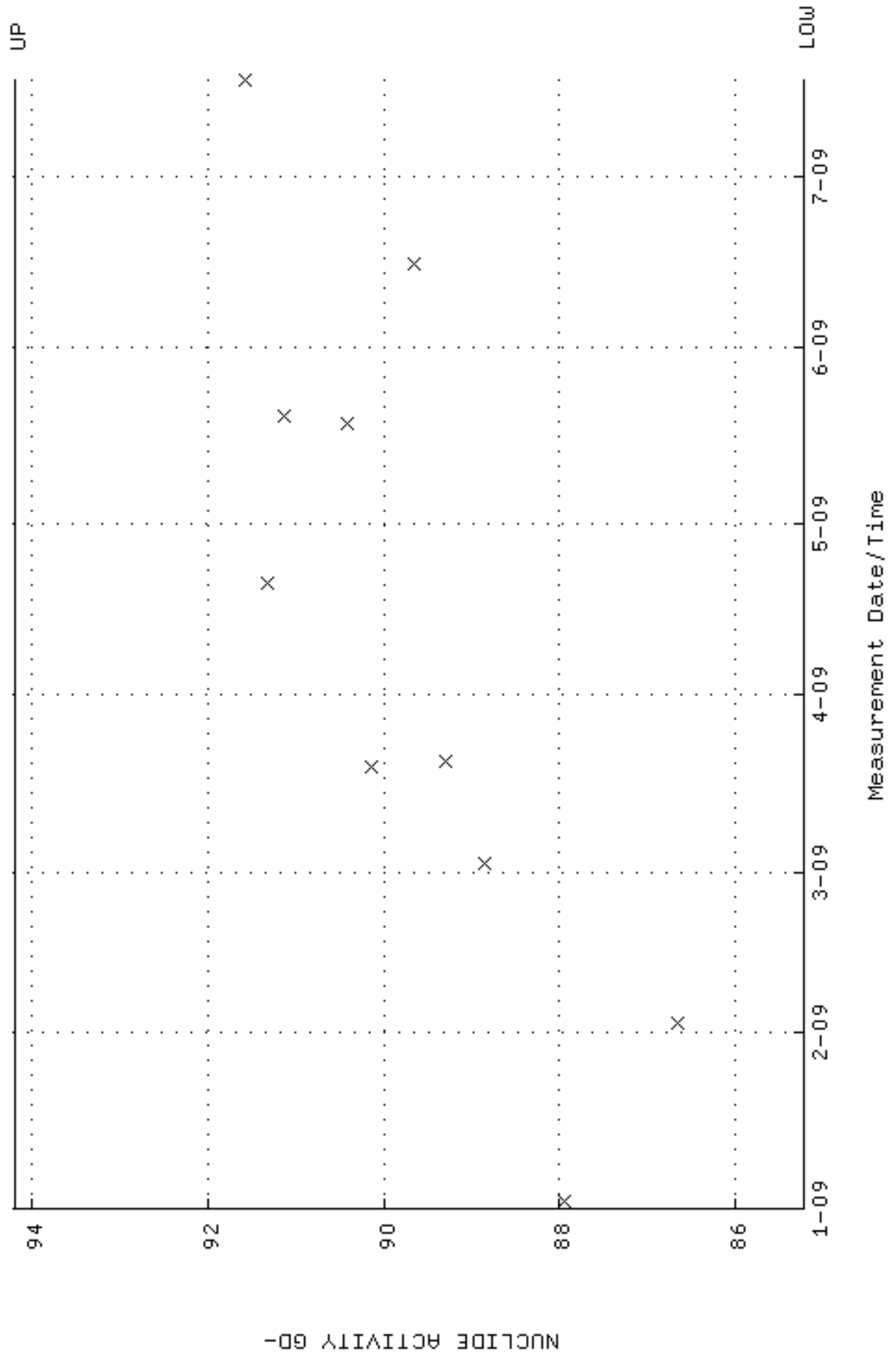
QA filename : DKA100:[ENV\_ALPHA.QA.B]B135.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:22 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



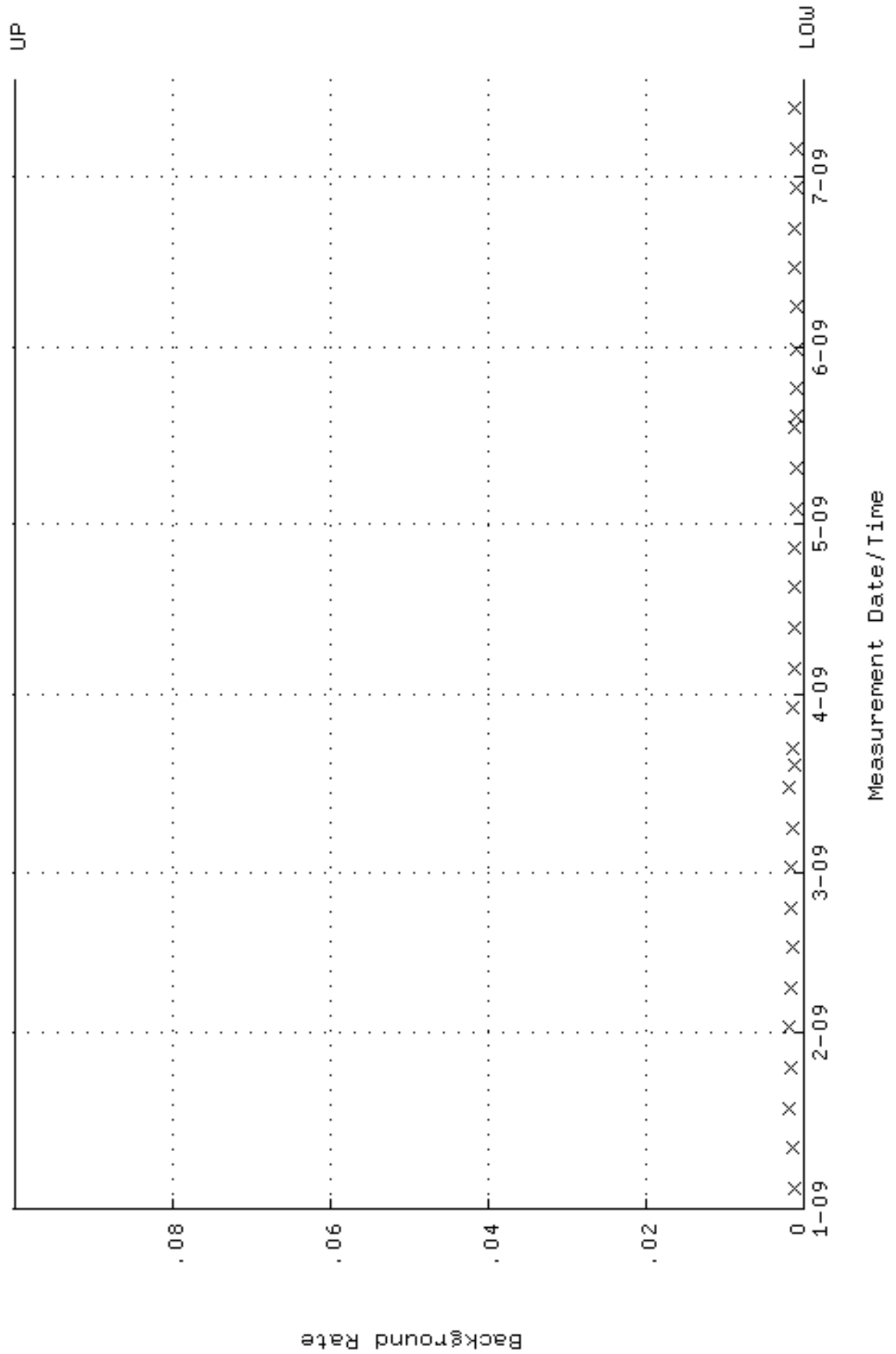
QA filename : DKA100:[ENV\_ALPHA.QA.W]W136.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:32 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.238568 through 0.258568



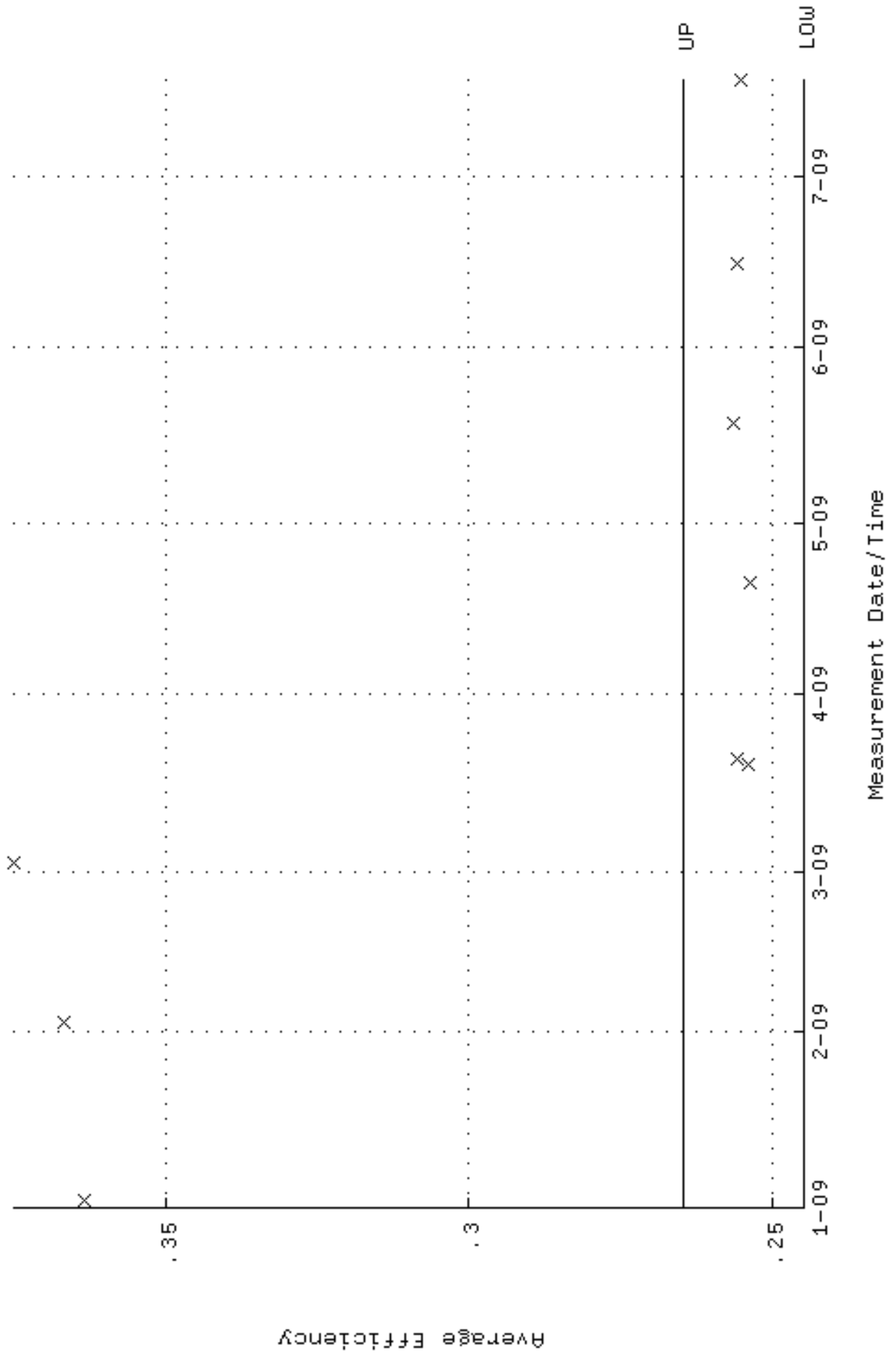
QA filename : DKA100:[ENV\_ALPHA.QA.W]W136.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:24:32 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.2214 through 94.1920



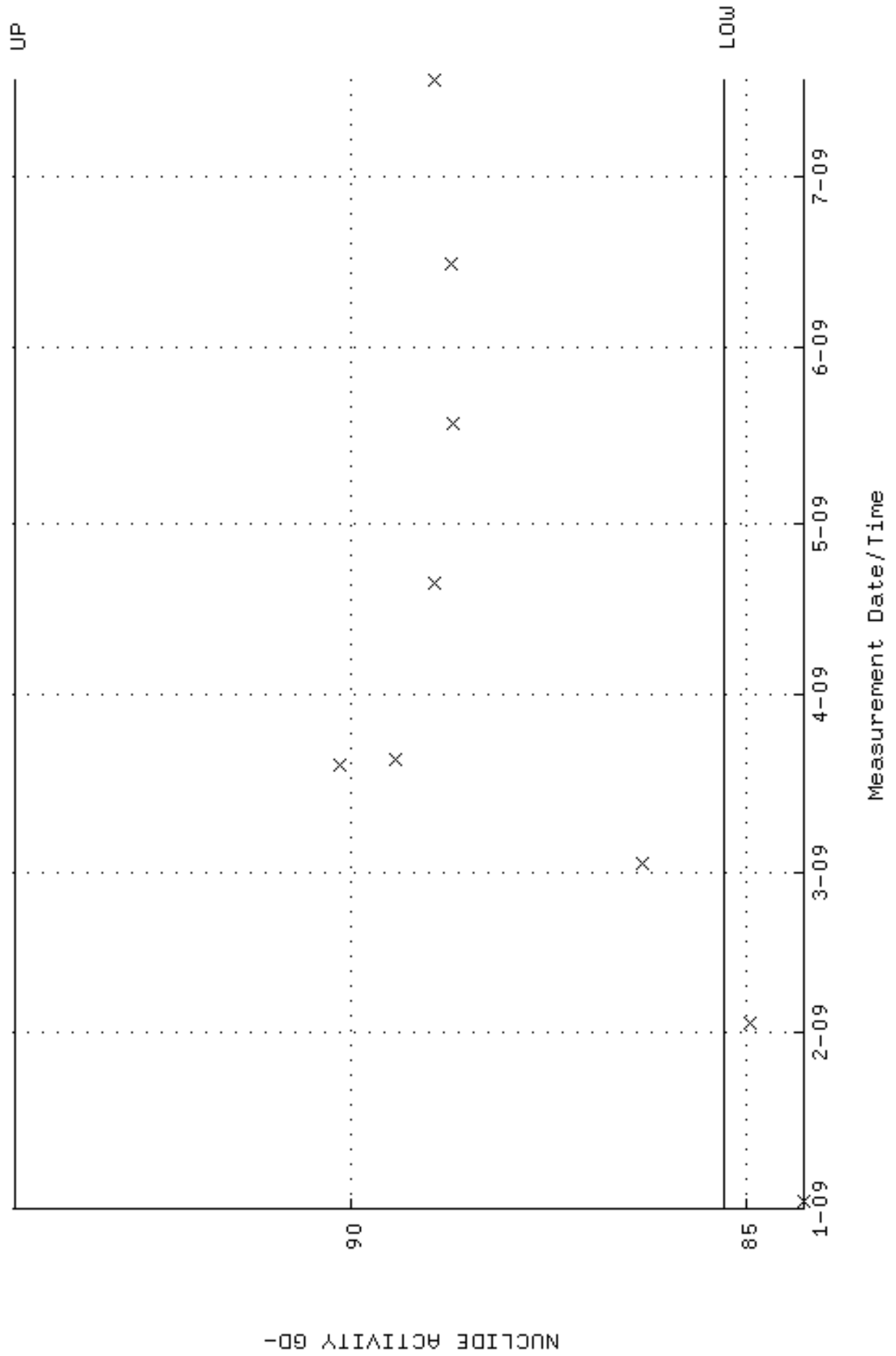
QA filename : DKA100:[ENV\_ALPHA.QA.B]B136.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:26 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



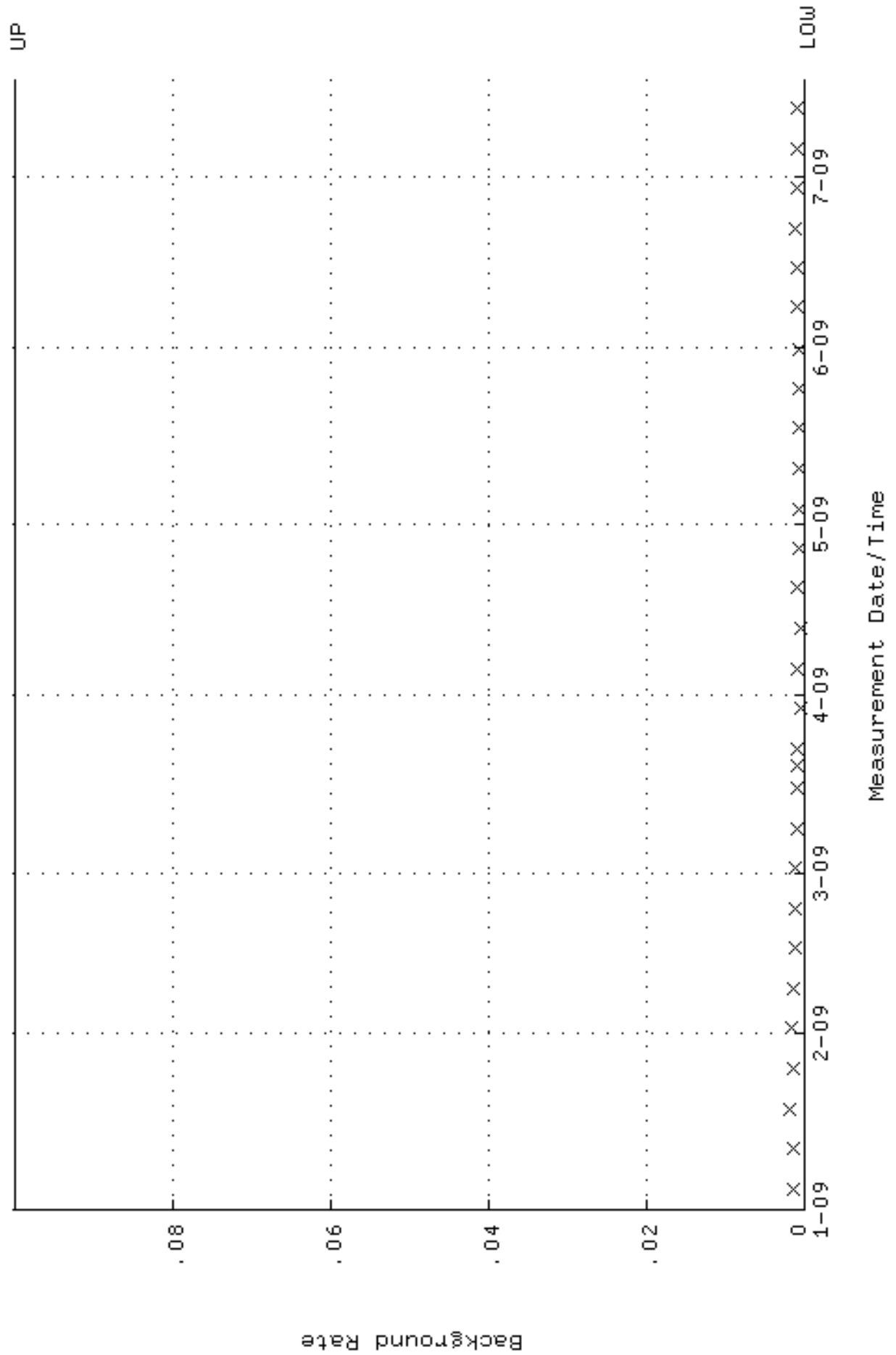
QA filename : DKA100:[ENV\_ALPHA.QA.W]W137.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:36 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.244801 through 0.264801



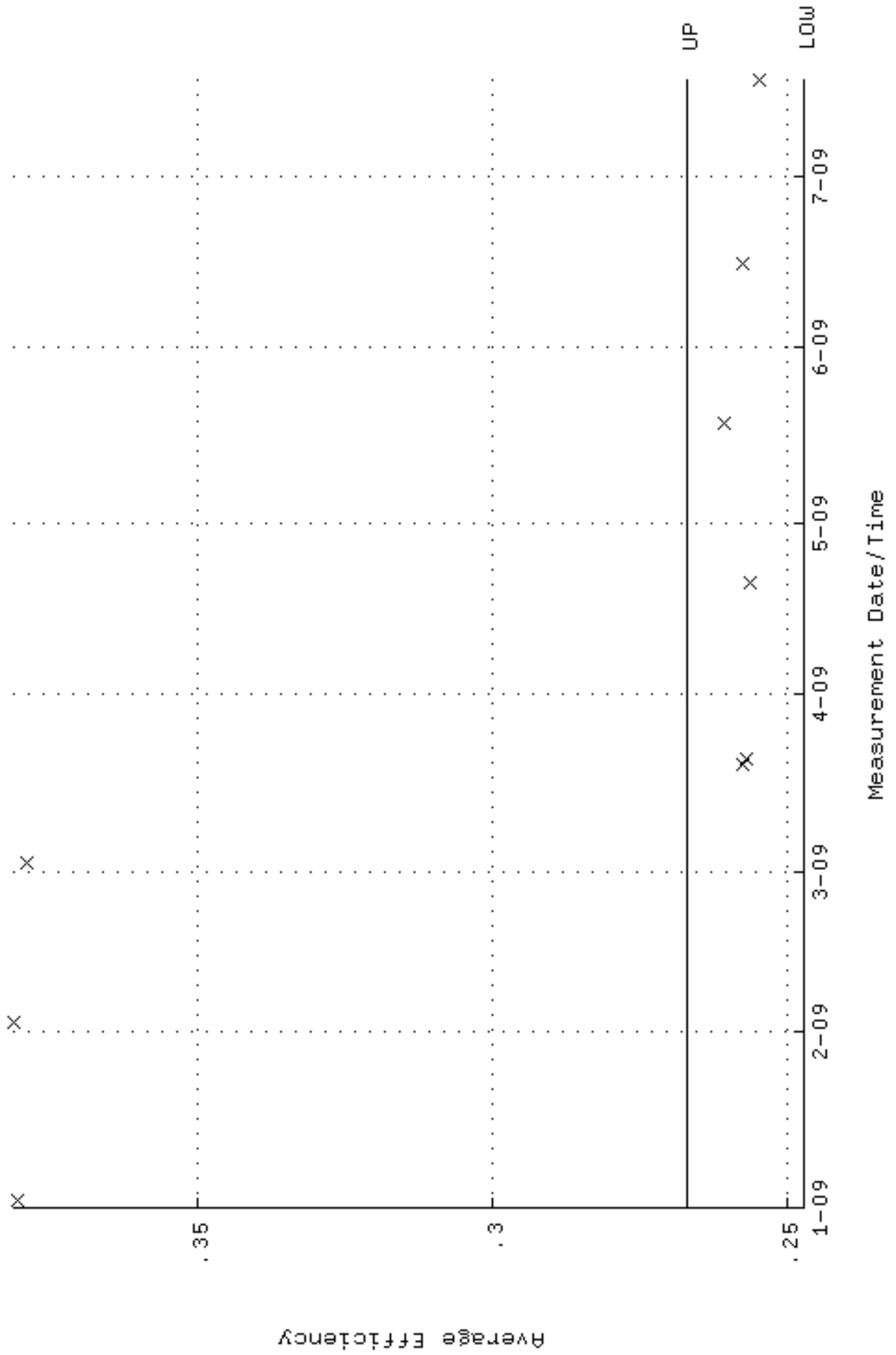
QA filename : DKA100:[ENV\_ALPHA.QA.W]W137.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:24:36 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.2880 through 94.2656



QA filename : DKA100:[ENV\_ALPHA.QA.B]B137.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:31 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

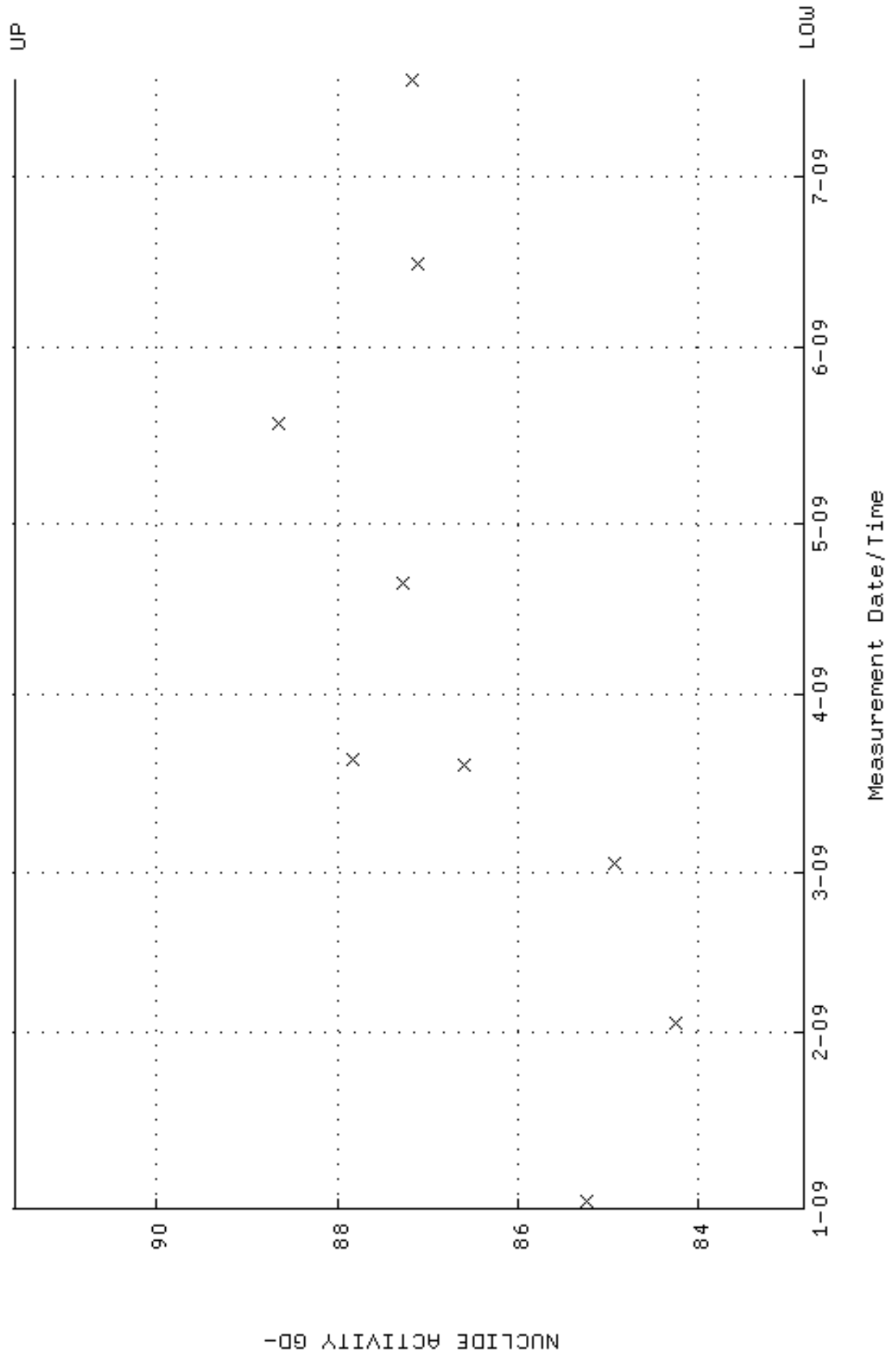


QA filename : DKA100:[ENV\_ALPHA.QA.W]W138.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:41 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.247085 through 0.267085

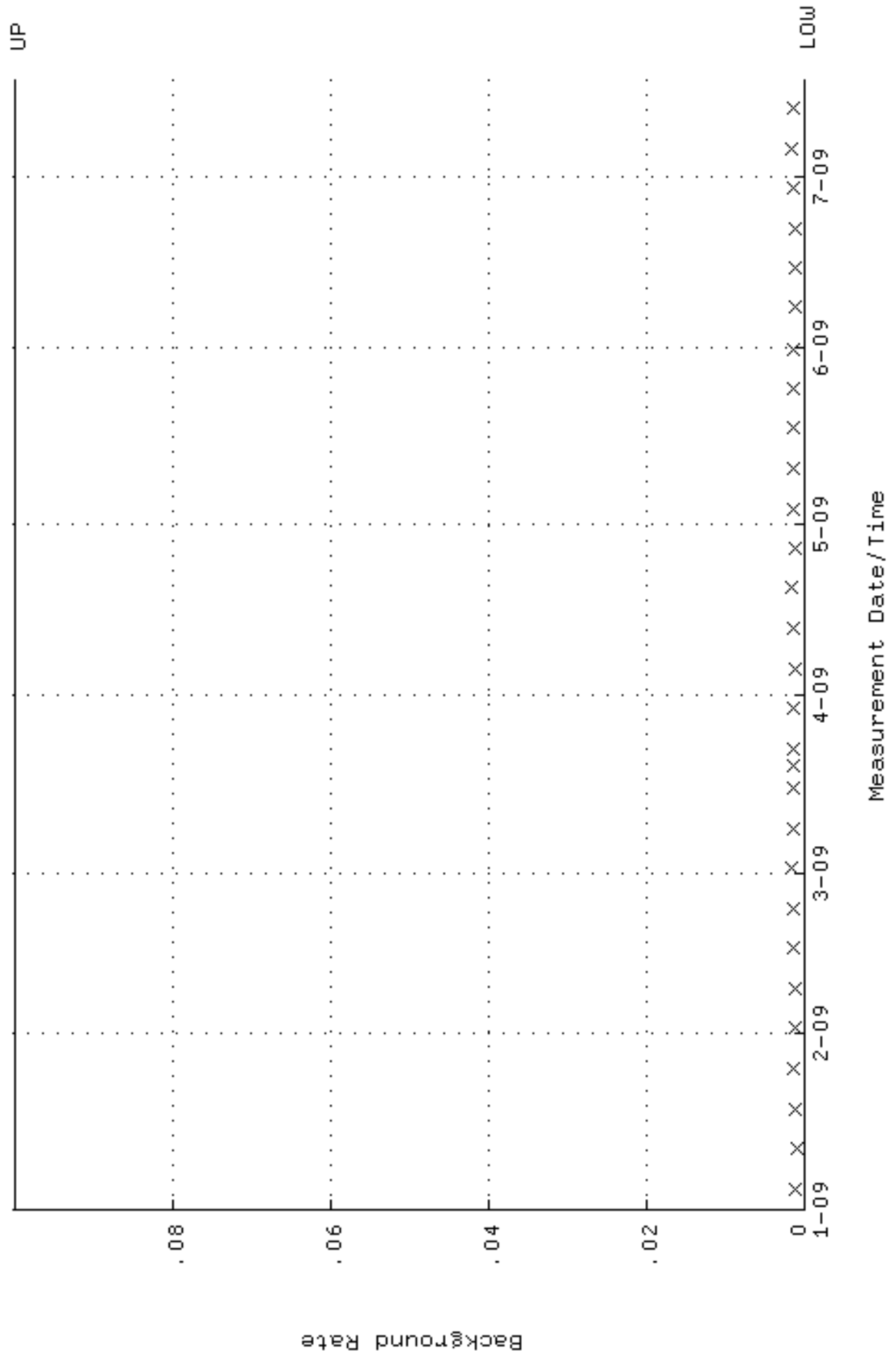




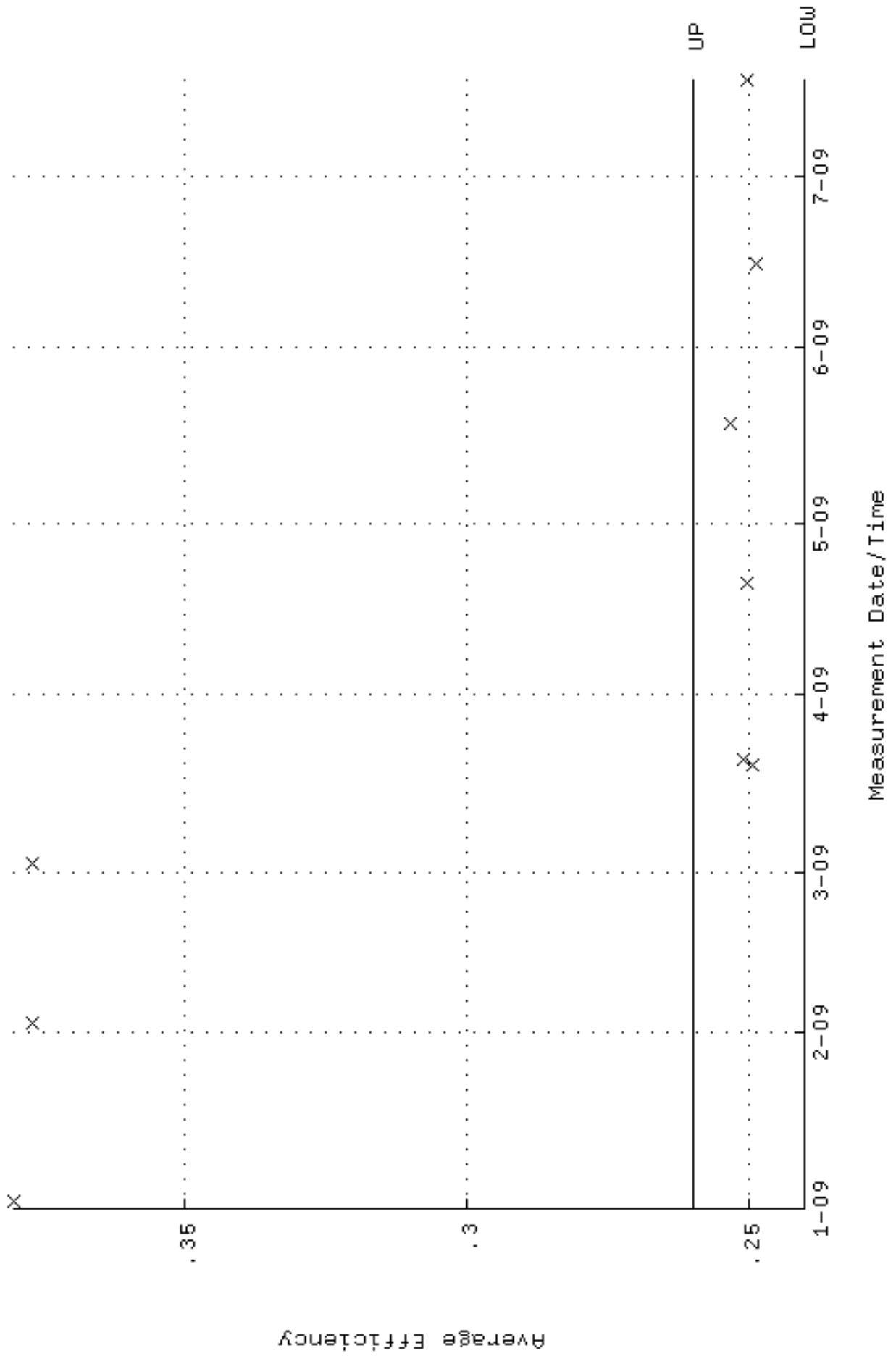
QA filename : DKA100:[ENV\_ALPHA.QA.W]W138.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:24:41 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 82.8399 through 91.5599



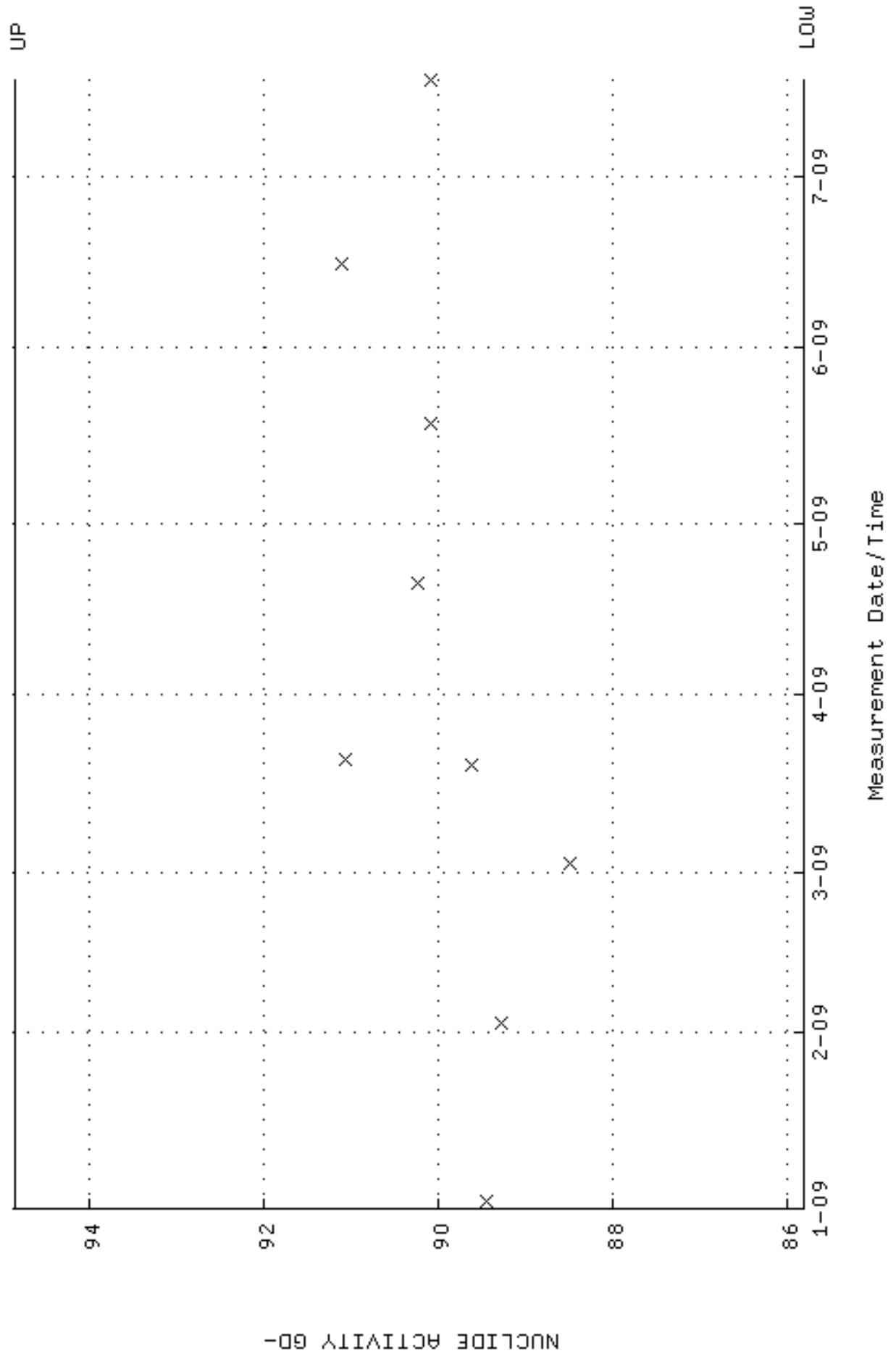
QA filename : DKA100:[ENV\_ALPHA.QA.B]B138.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:35 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



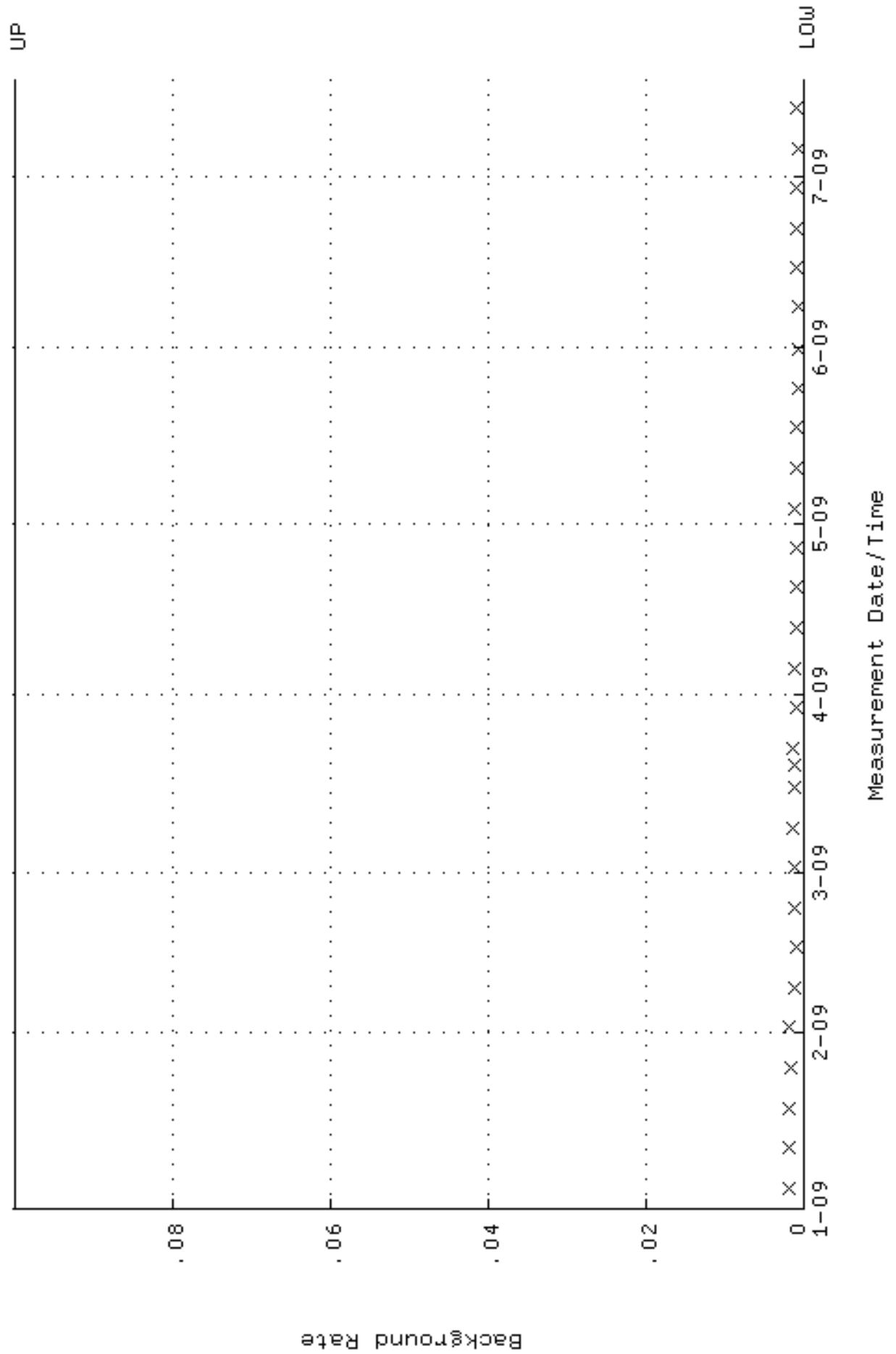
QA filename : DKA100:[ENV\_ALPHA.QA.W]W139.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:47 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.240299 through 0.260299



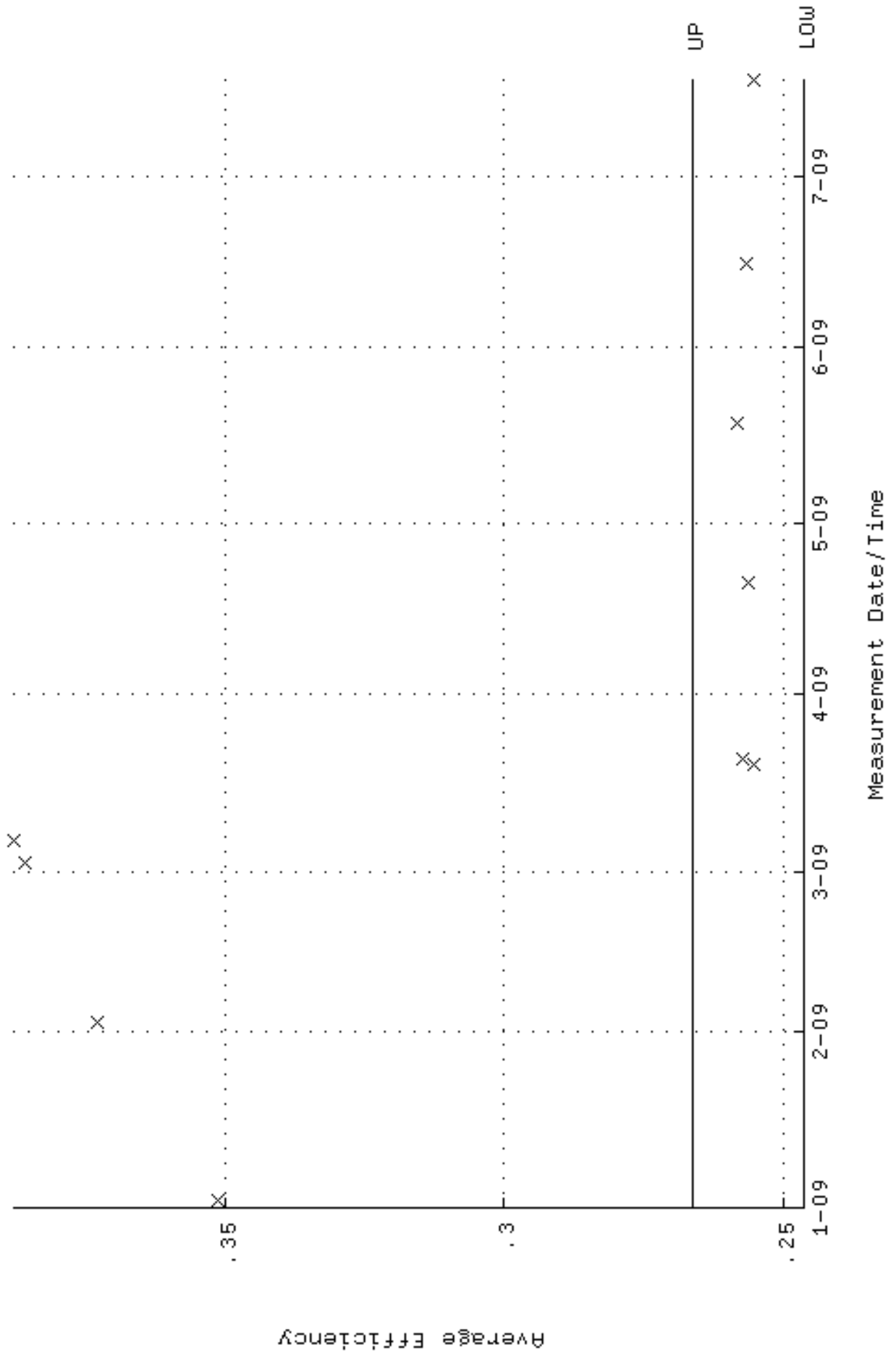
QA filename : DKA100:[ENV\_ALPHA.QA.W]w139.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:24:47 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.8145 through 94.8477



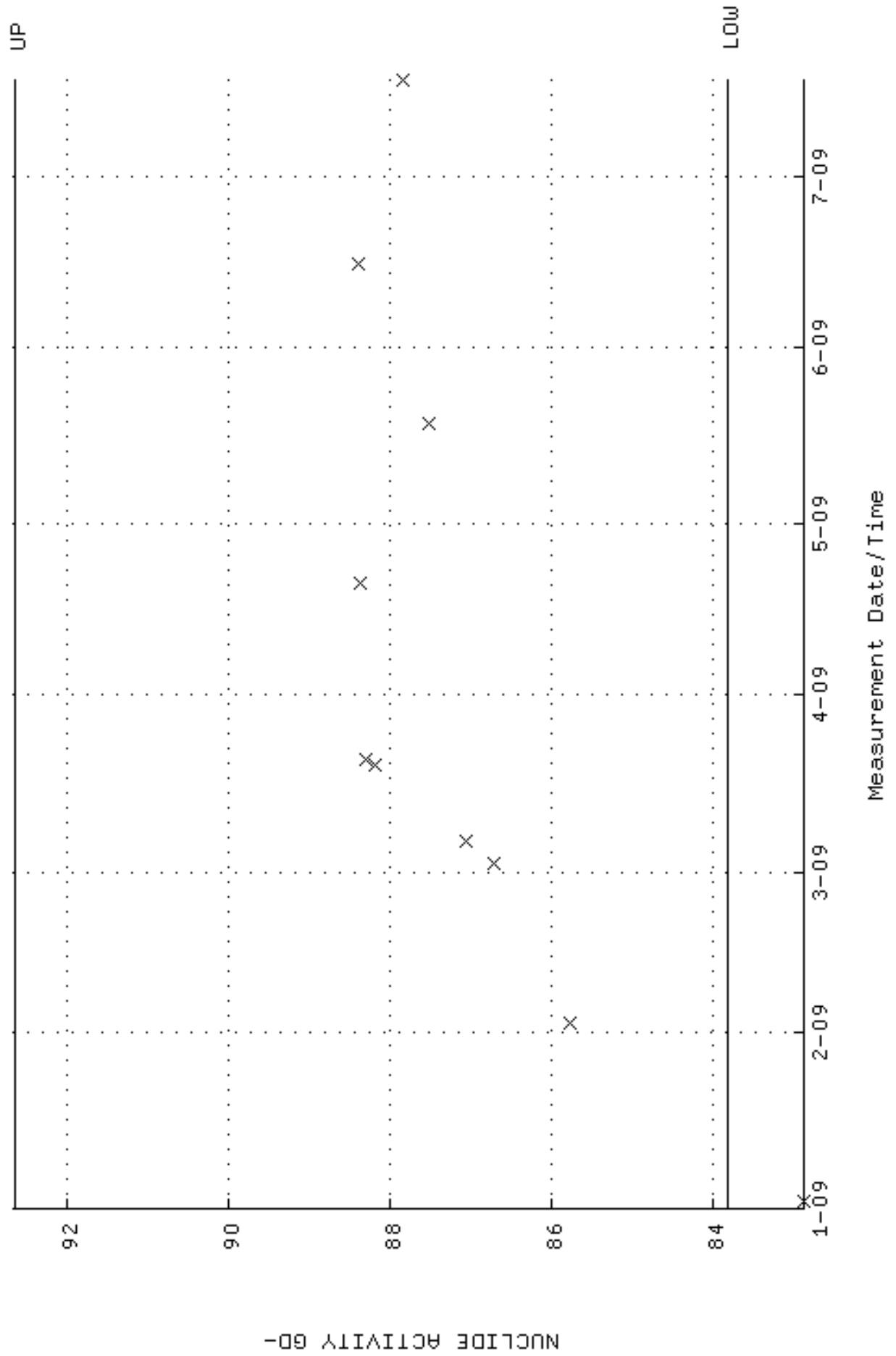
QA filename : DKA100:[ENV\_ALPHA.QA.B]B139.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:39 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



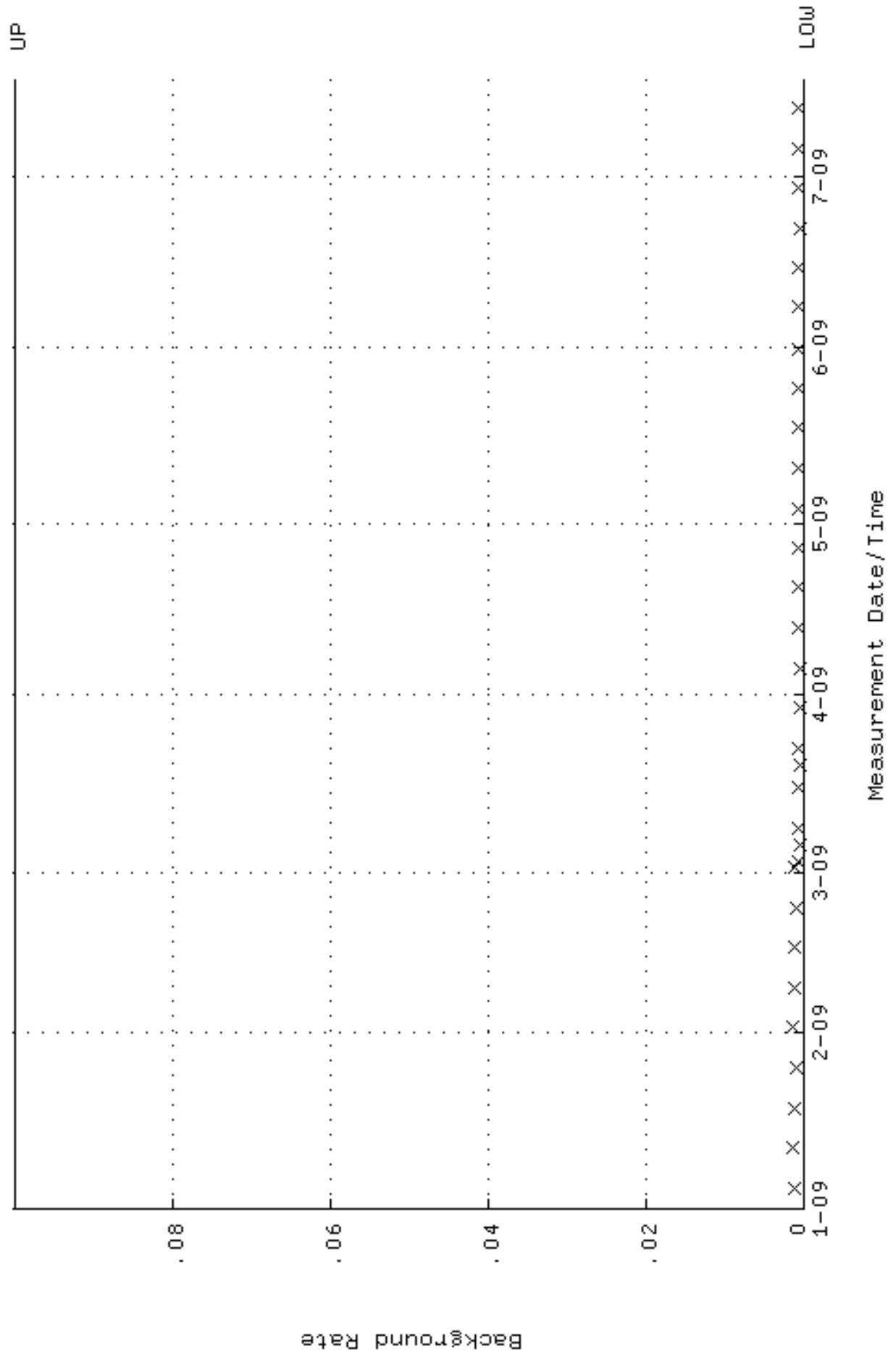
QA filename : DKA100:[ENV\_ALPHA.QA.W]W140.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:52 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.246178 through 0.266178



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

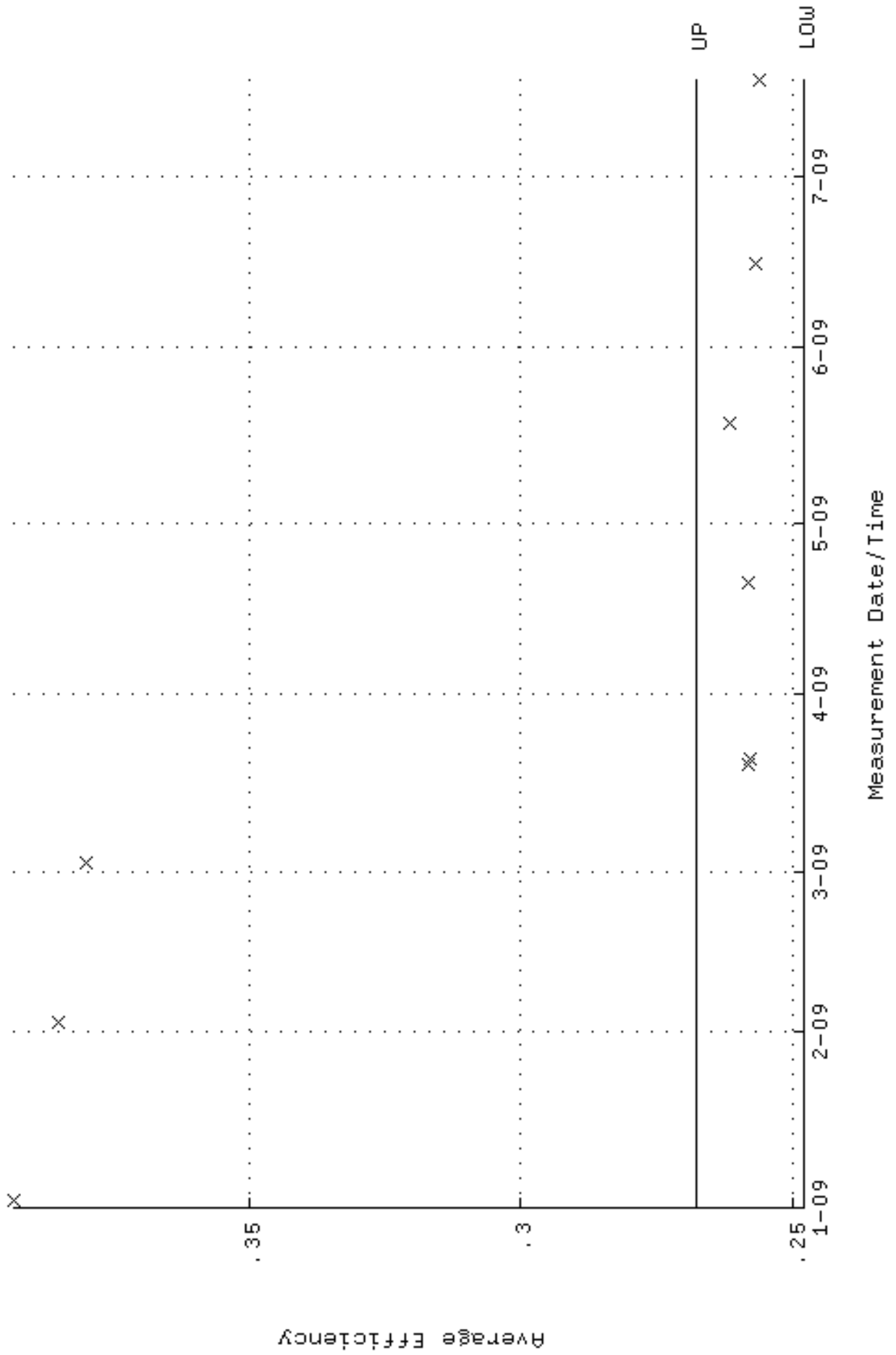


QA filename : DKA100:[ENV\_ALPHA.QA.B]B140.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:43 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

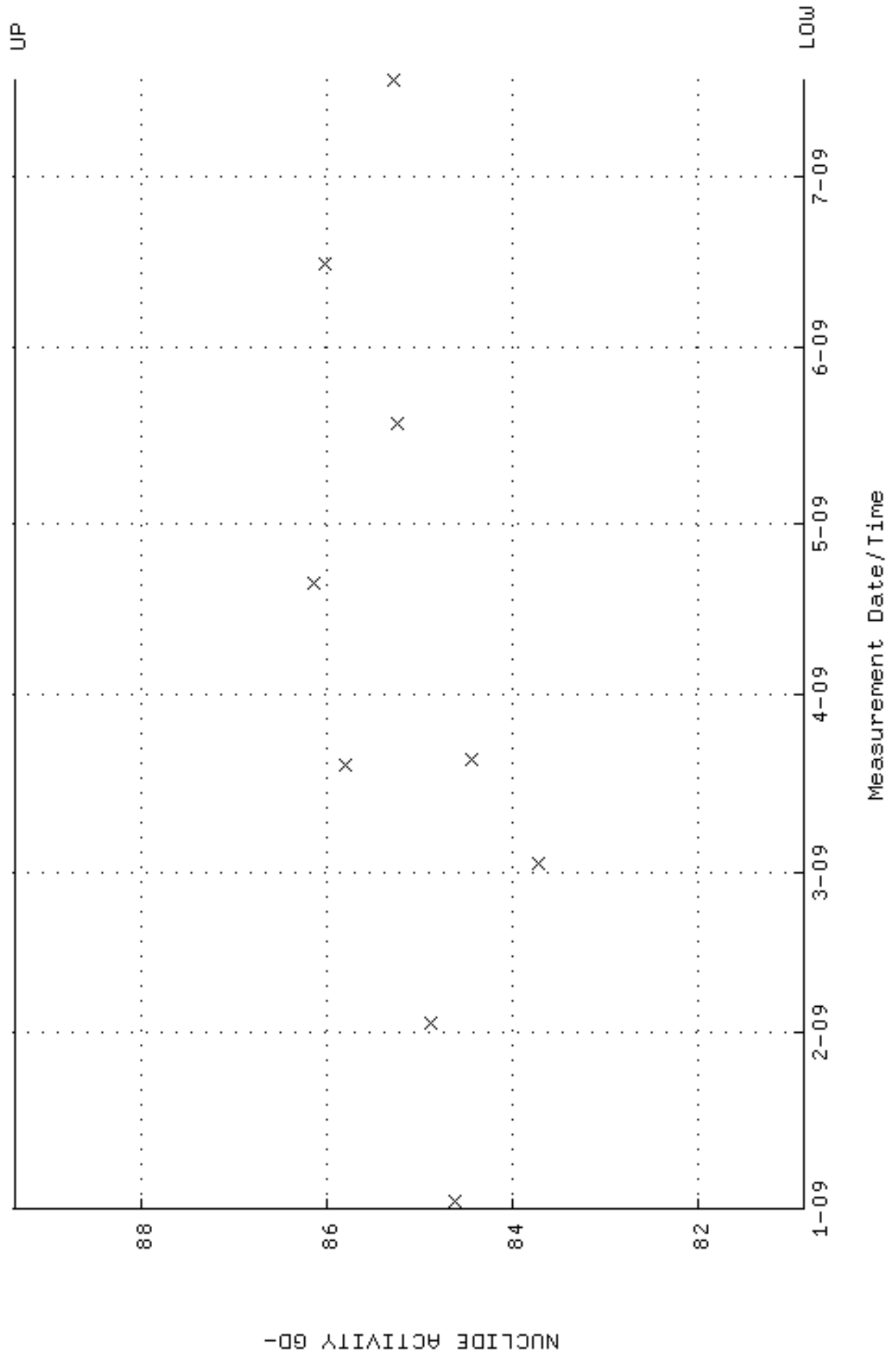




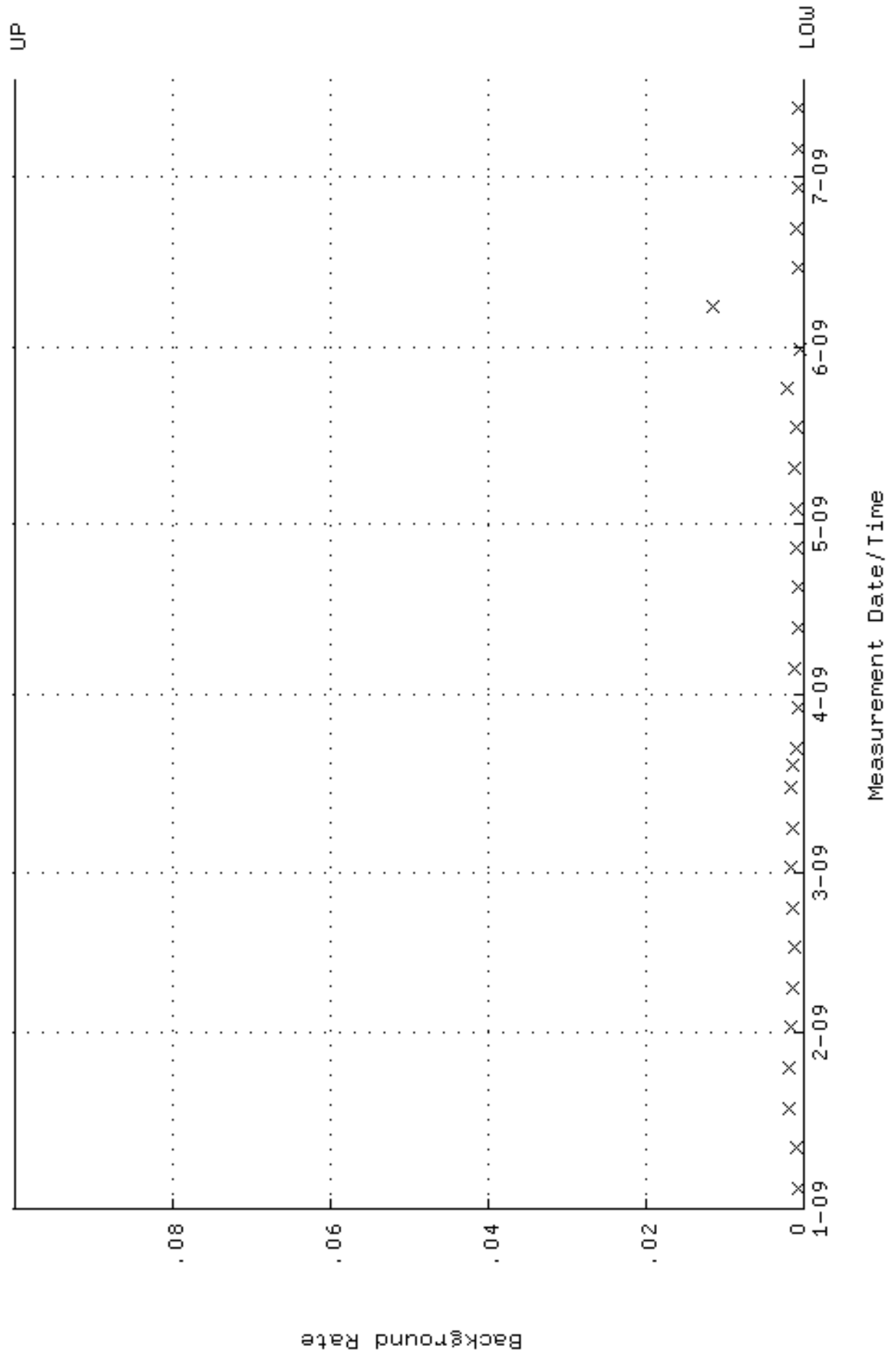
QA filename : DKA100:[ENV\_ALPHA.QA.W]W141.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:24:56 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.247845 through 0.267845



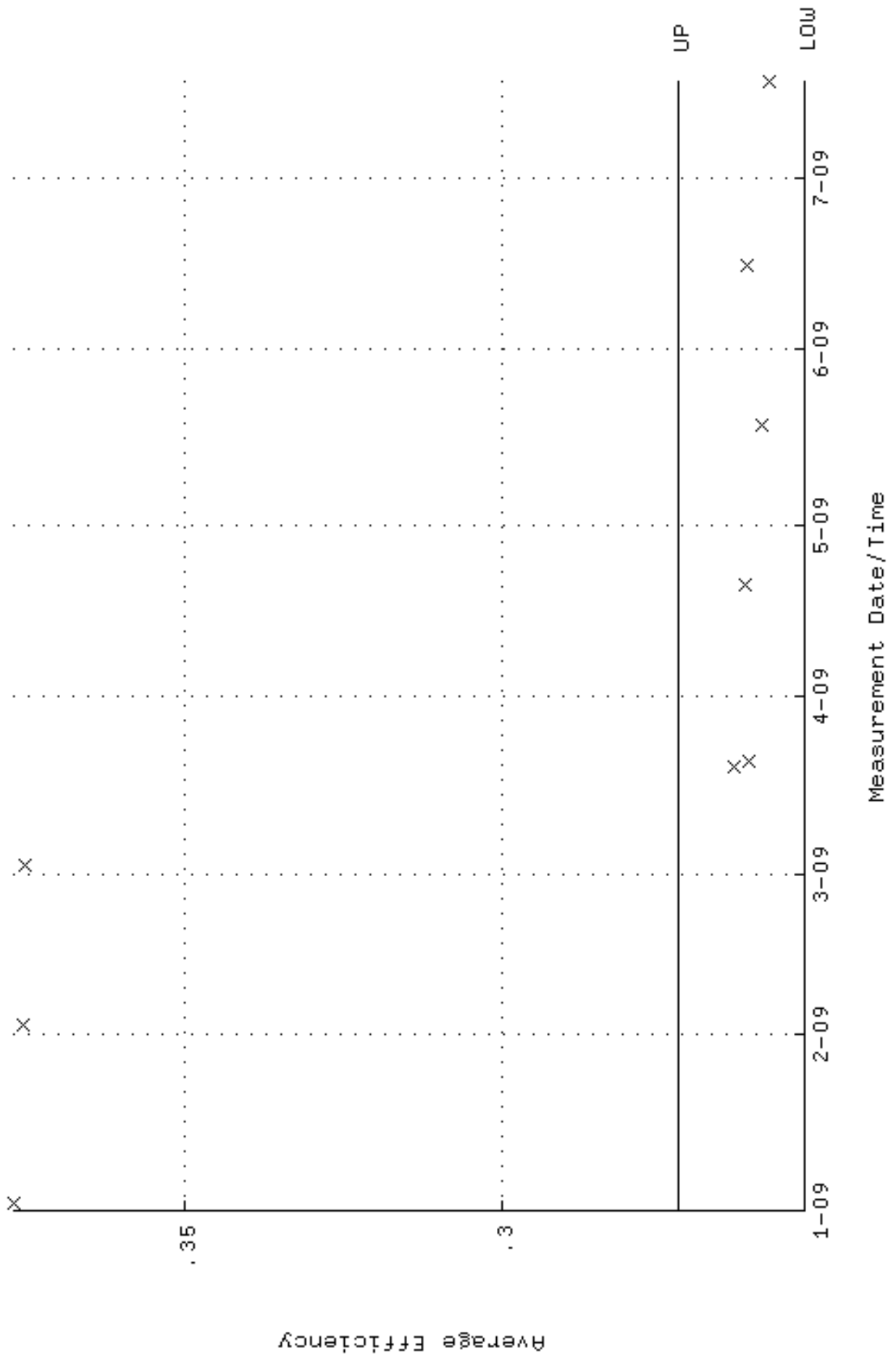
QA filename : DKA100:[ENV\_ALPHA.QA.W]w141.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 2-JAN-2009 07:24:56 through 17-JUL-2009 12:00:00  
Lower/Upper Lmts: 80.8595 through 89.3711



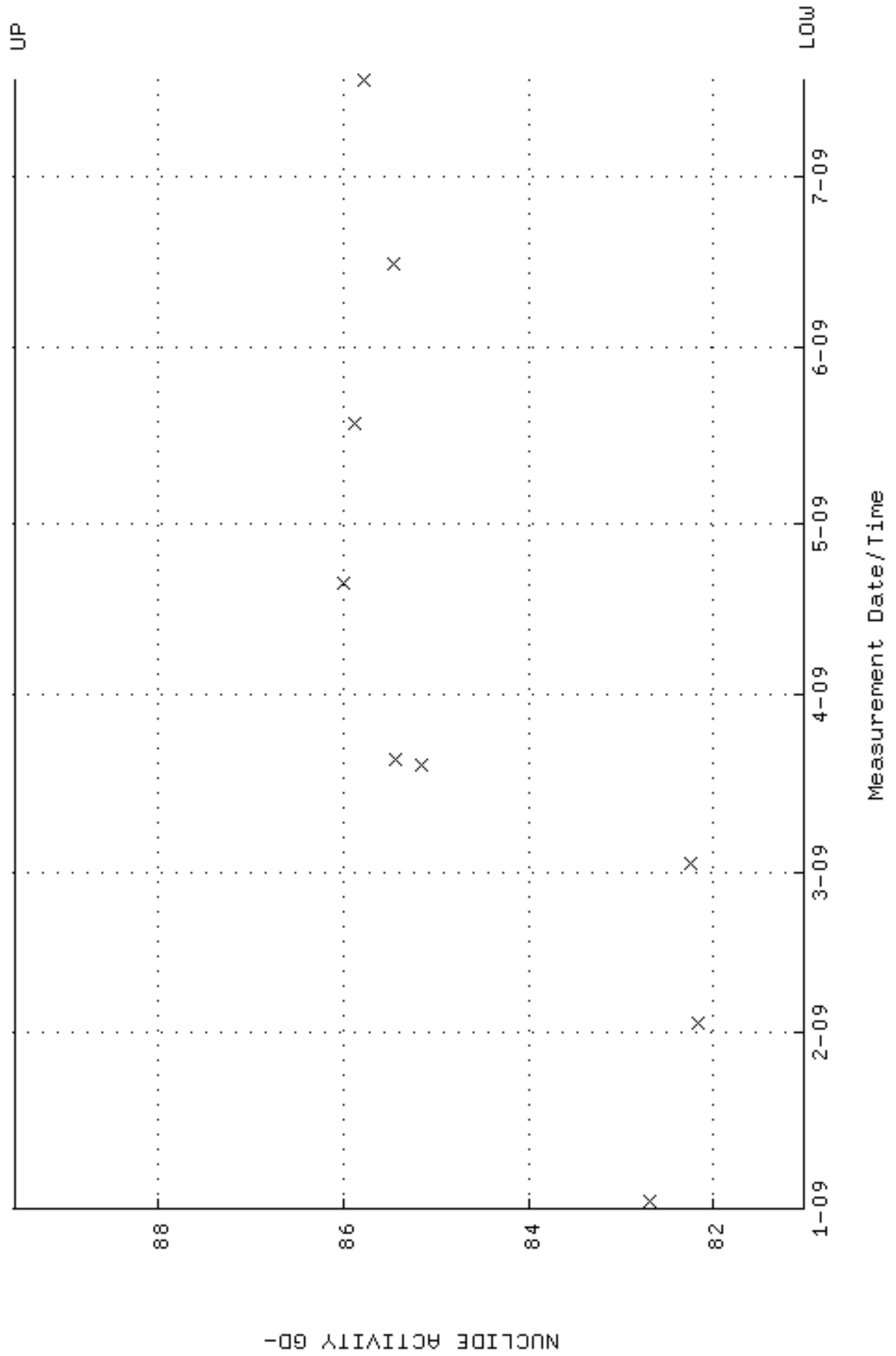
QA filename : DKA100:[ENV\_ALPHA.QA.B]B141.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:47 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



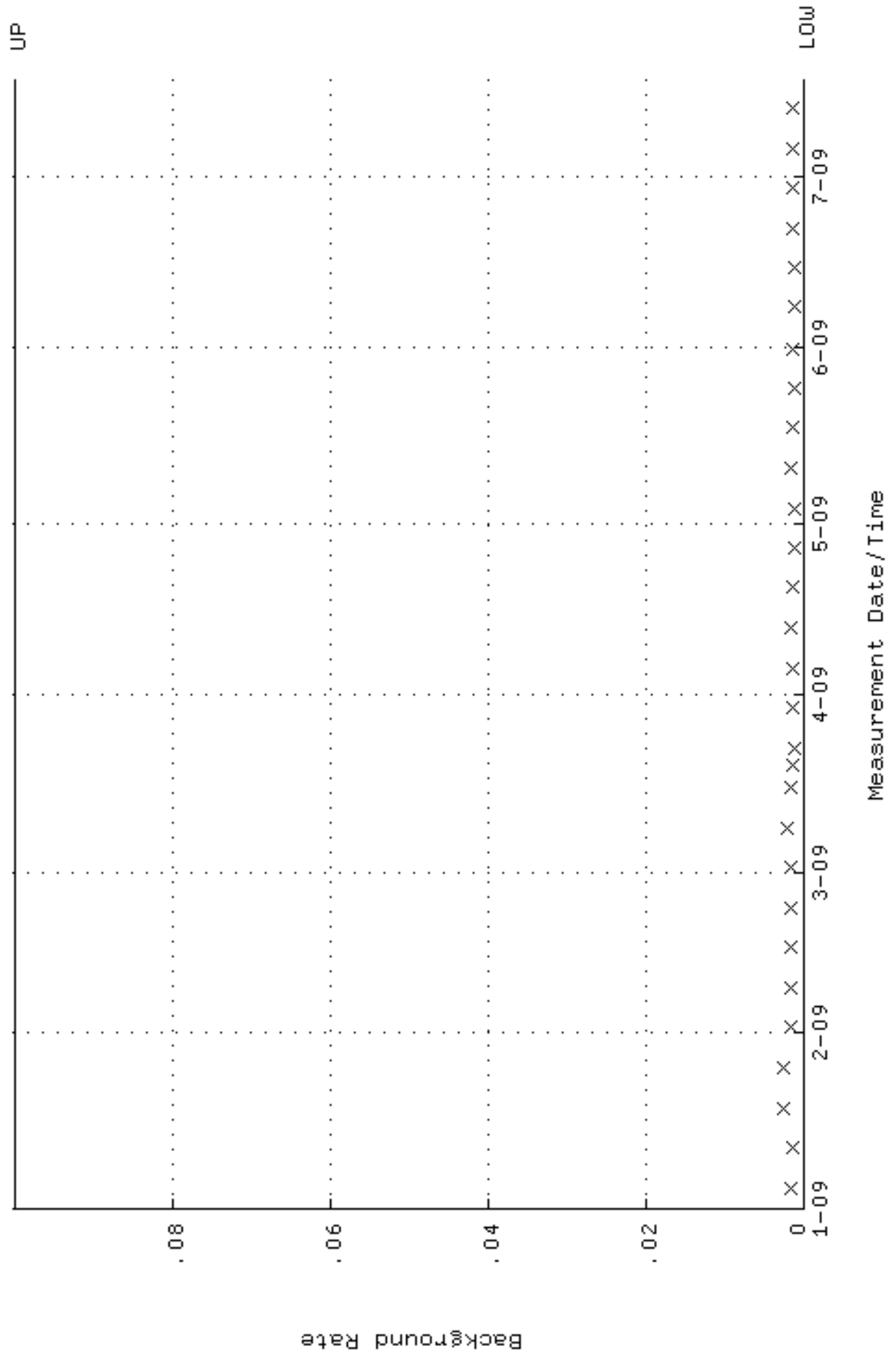
QA filename : DKA100:[ENV\_ALPHA.QA.W]W142.QAF;2  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:02 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.252182 through 0.272182



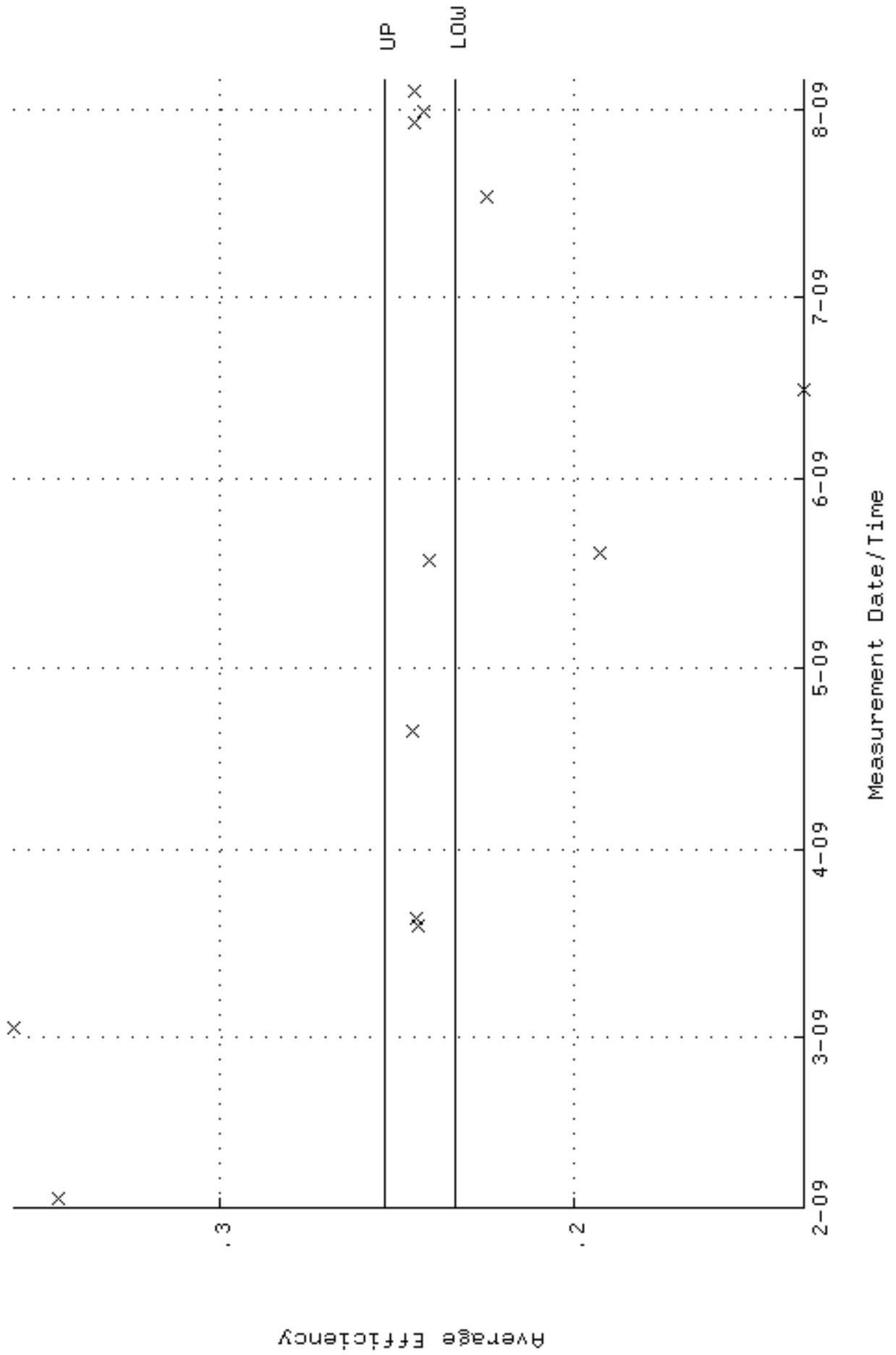
QA filename : DKA100:[ENV\_ALPHA.QA.W]W142.QAF;2  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:25:02 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 81.0245 through 89.5533



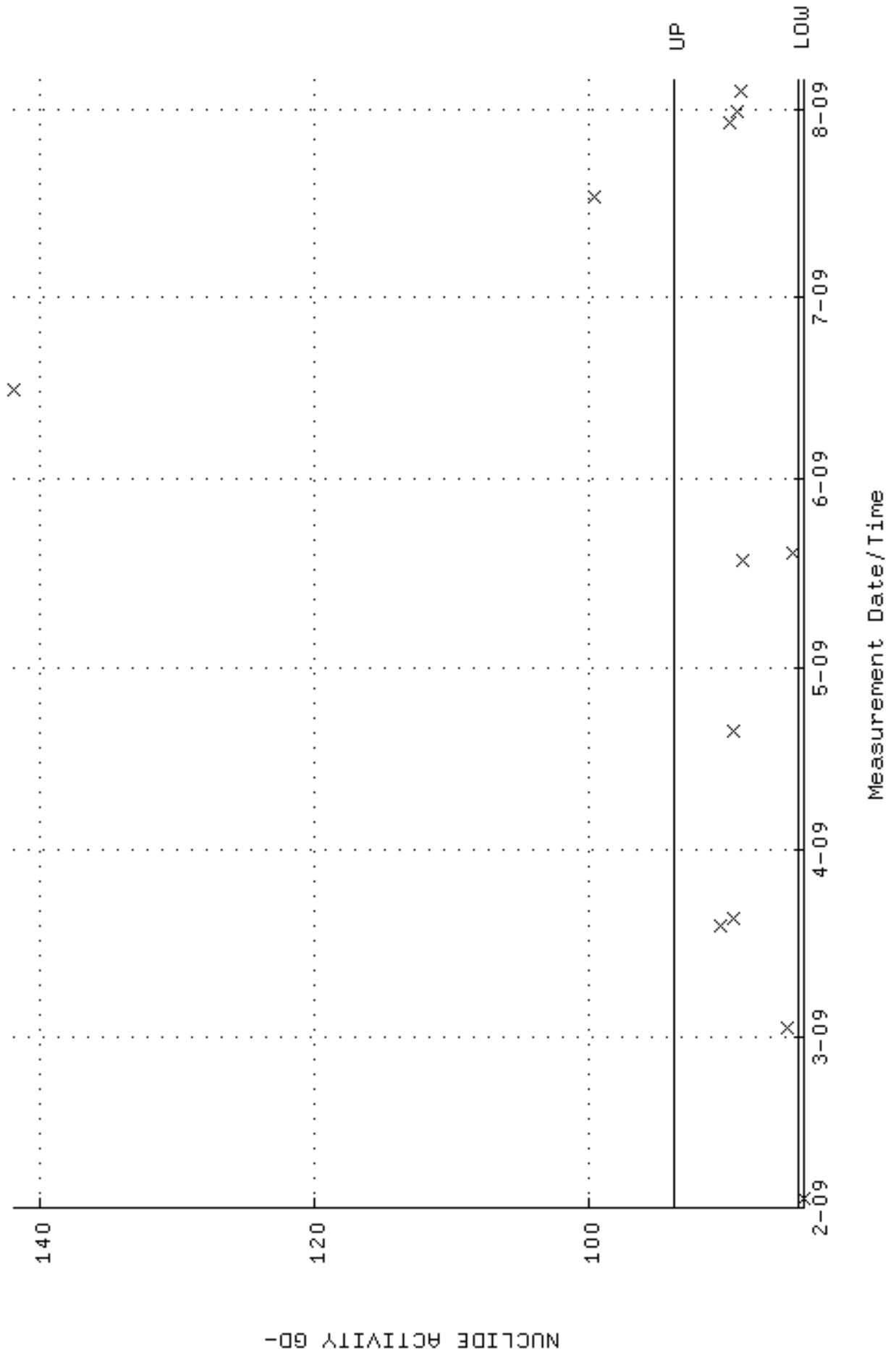
QA filename : DKA100:[ENV\_ALPHA.QA.B]B142.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:23:51 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W143.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-FEB-2009 10:34:35 through 5-AUG-2009 12:00:00  
 Lower/Upper Lmts: 0.233879 through 0.253879

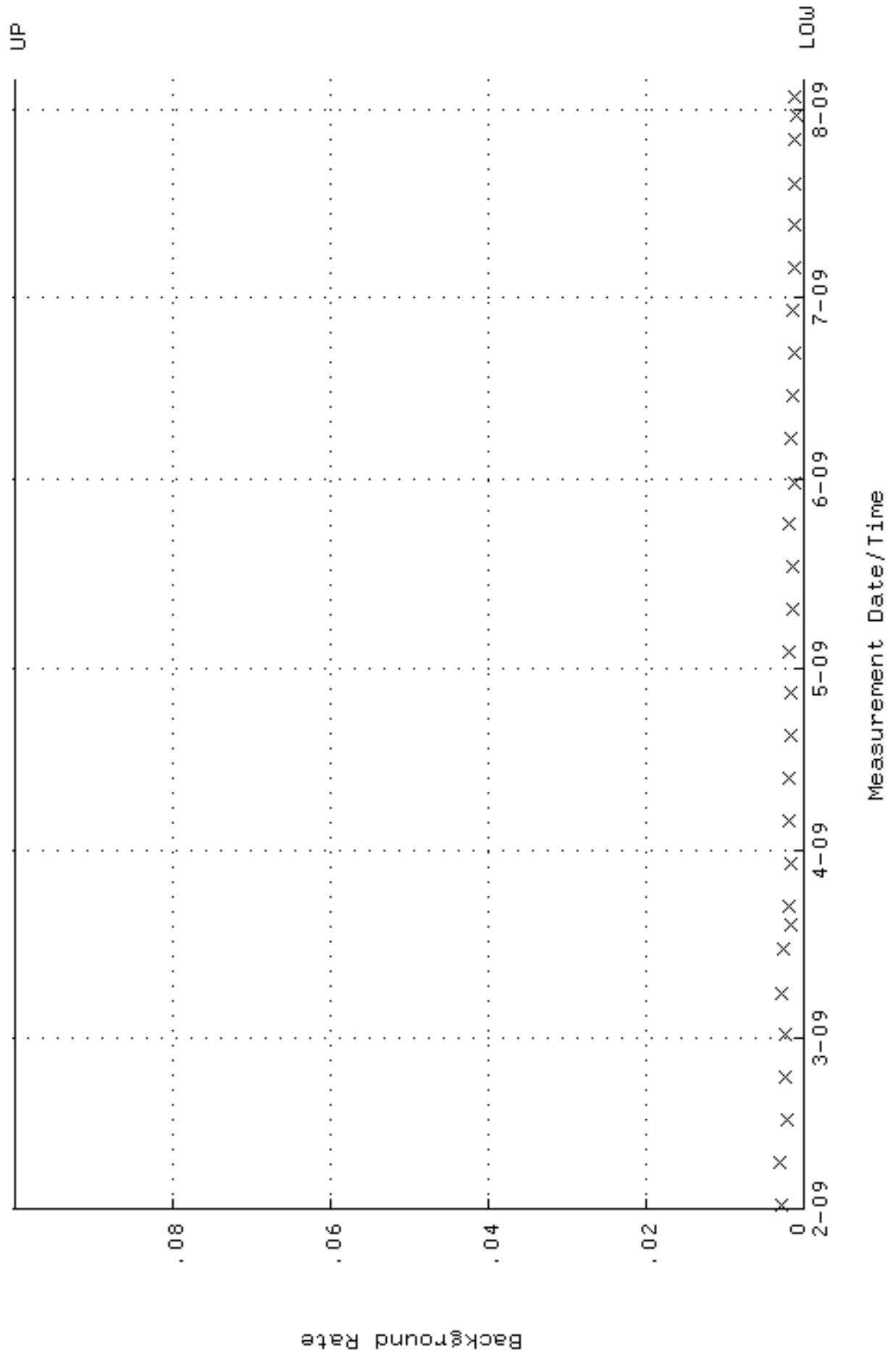


QA filename : DKA100:[ENV\_ALPHA.QA.W]W143.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-FEB-2009 10:34:35 through 5-AUG-2009 12:00:00  
 Lower/Upper Lmts: 84.9200 through 93.8590

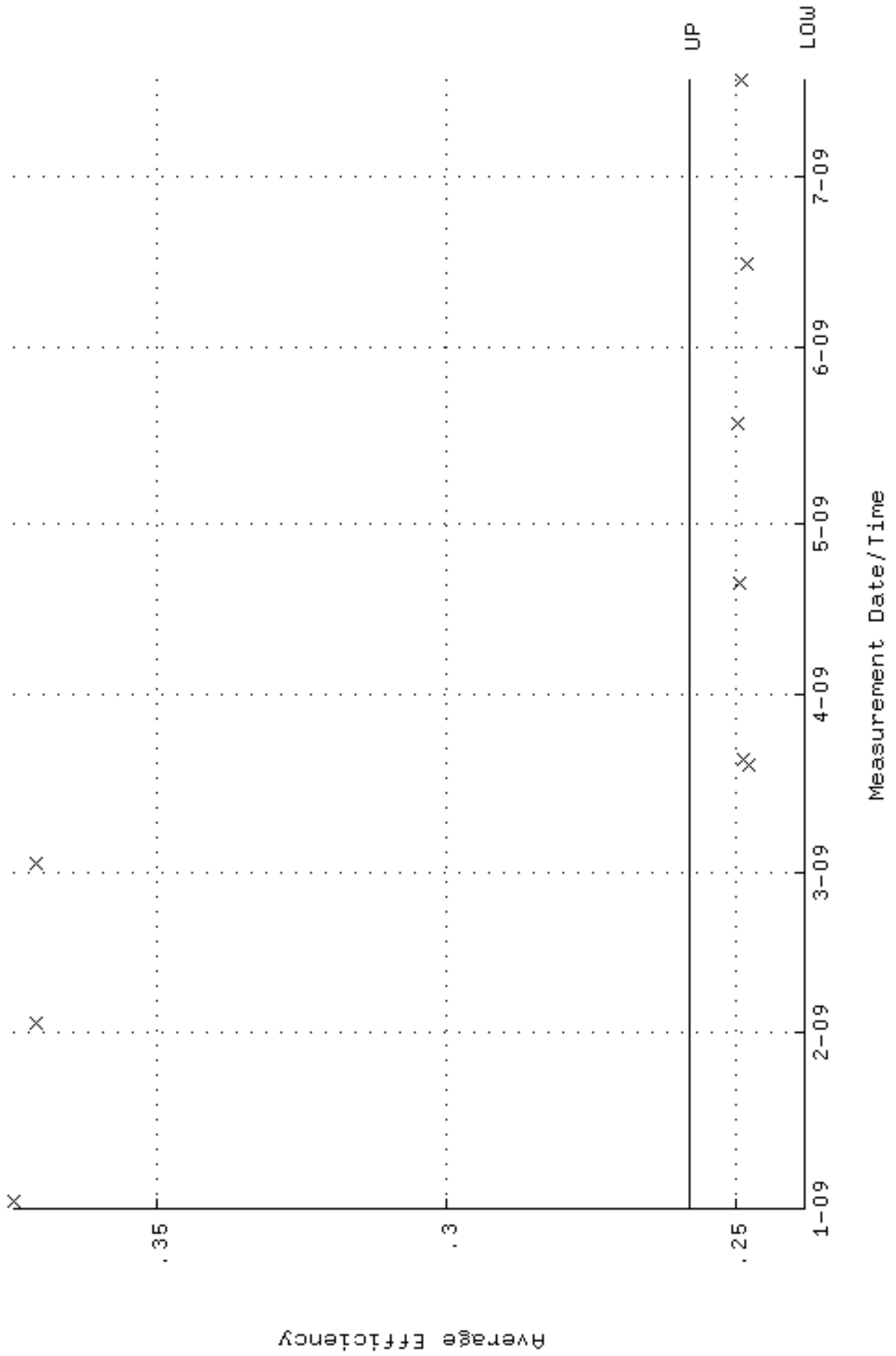




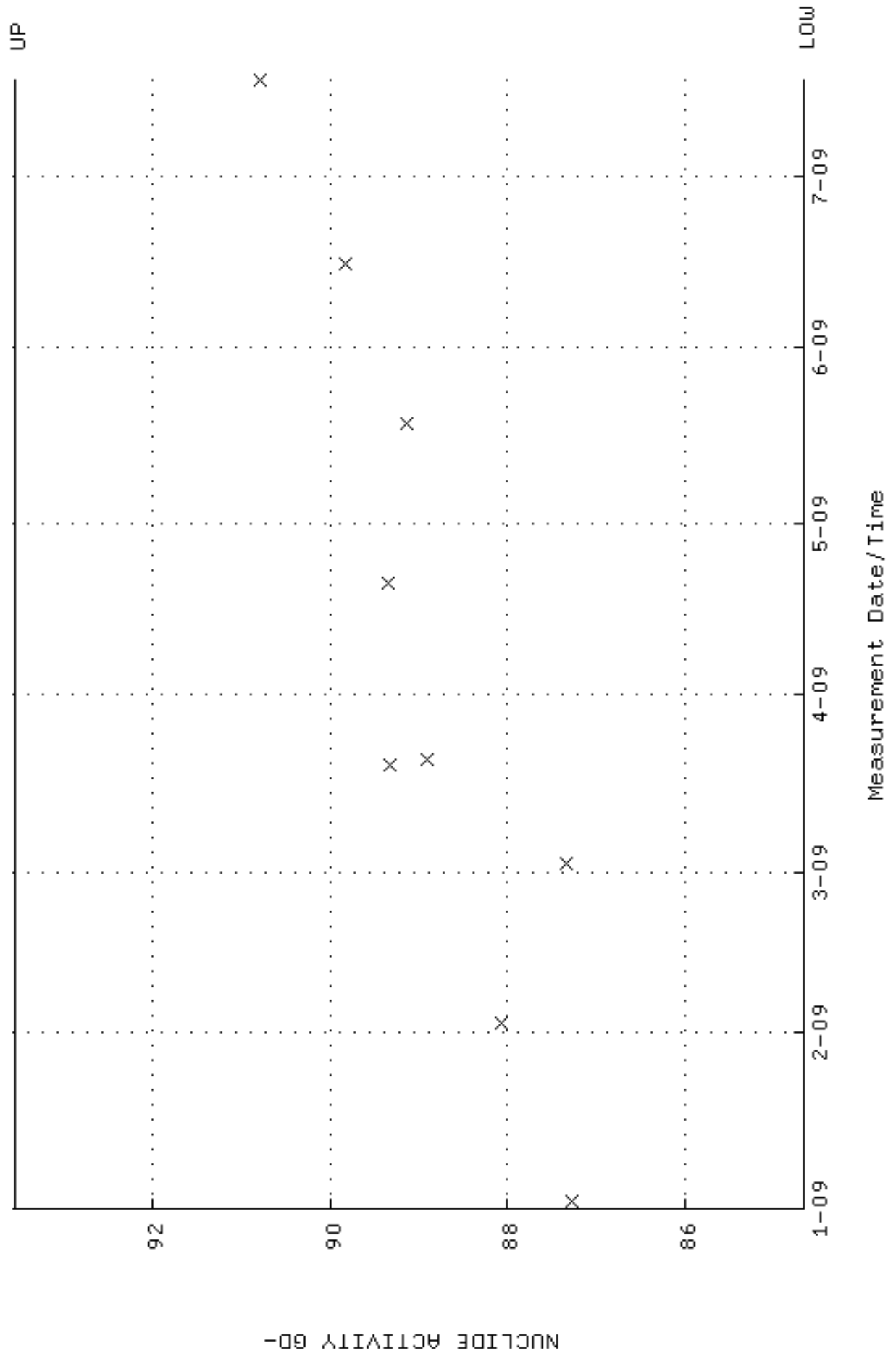
QA filename : DKA100:[ENV\_ALPHA.QA.B]B143.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-FEB-2009 17:07:31 through 5-AUG-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



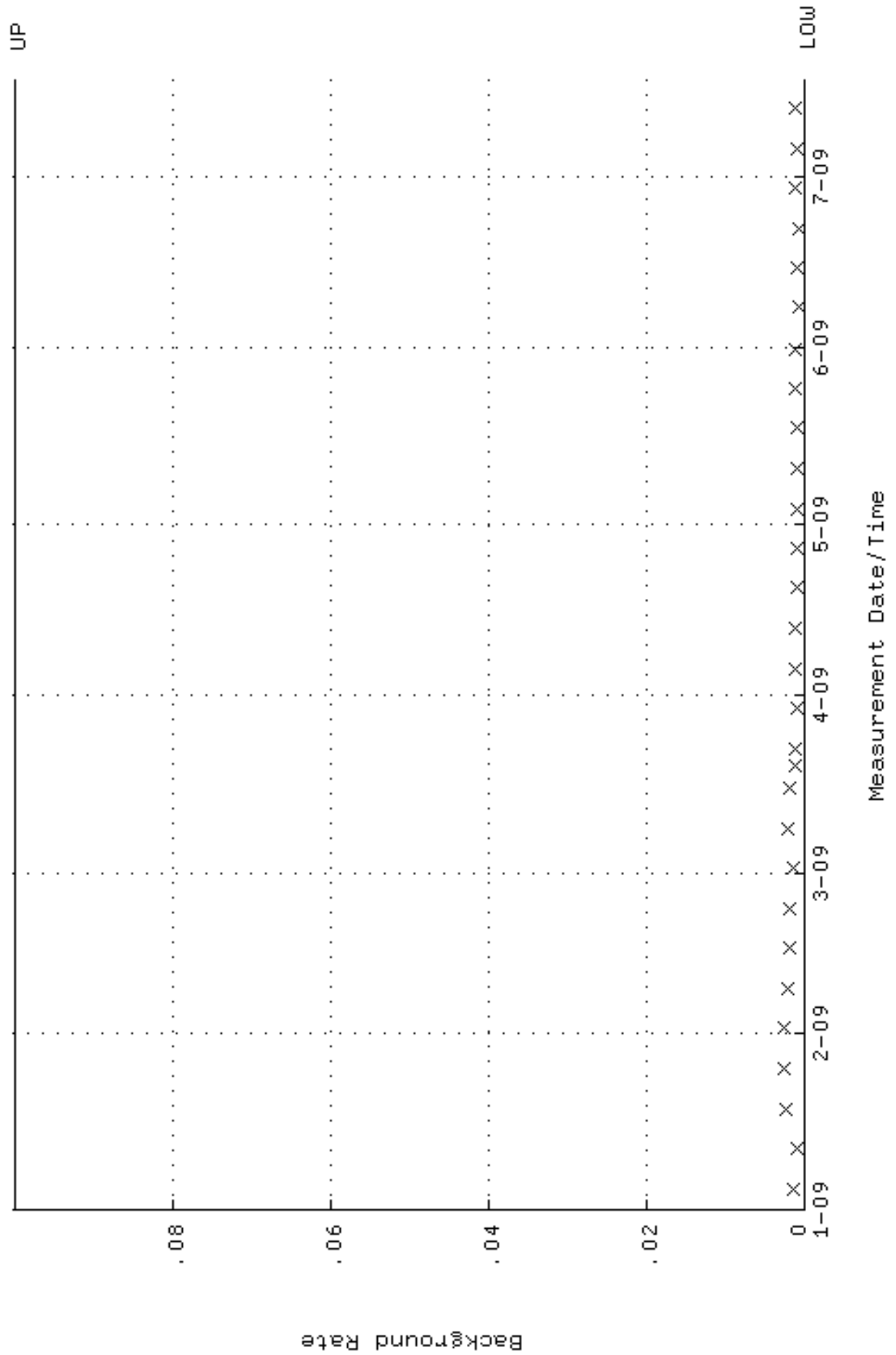
QA filename : DKA100:[ENV\_ALPHA.QA.W]W144.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:11 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.237963 through 0.257963



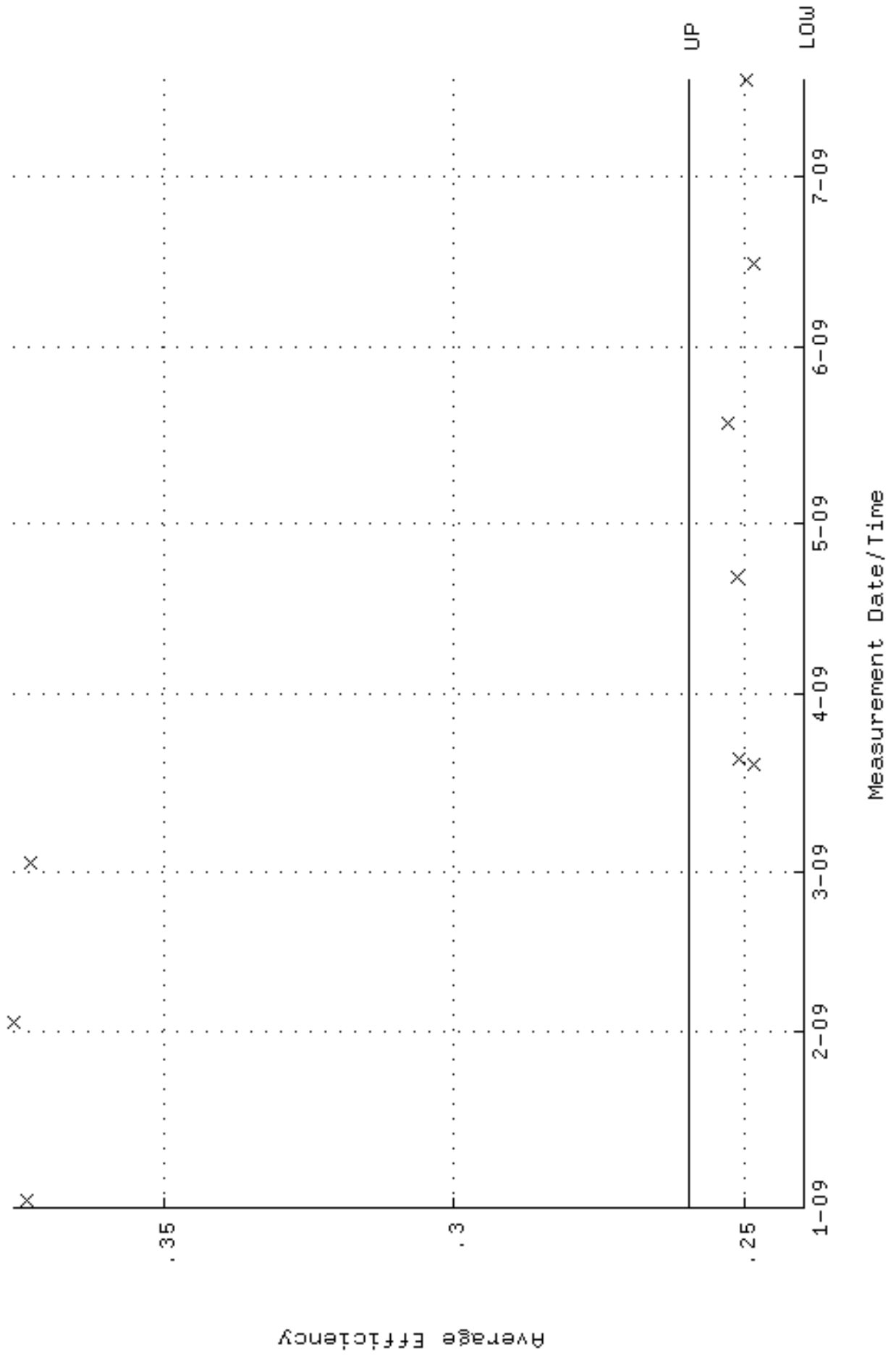
QA filename : DKA100:[ENV\_ALPHA.QA.W]w144.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:25:11 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.6507 through 93.5613



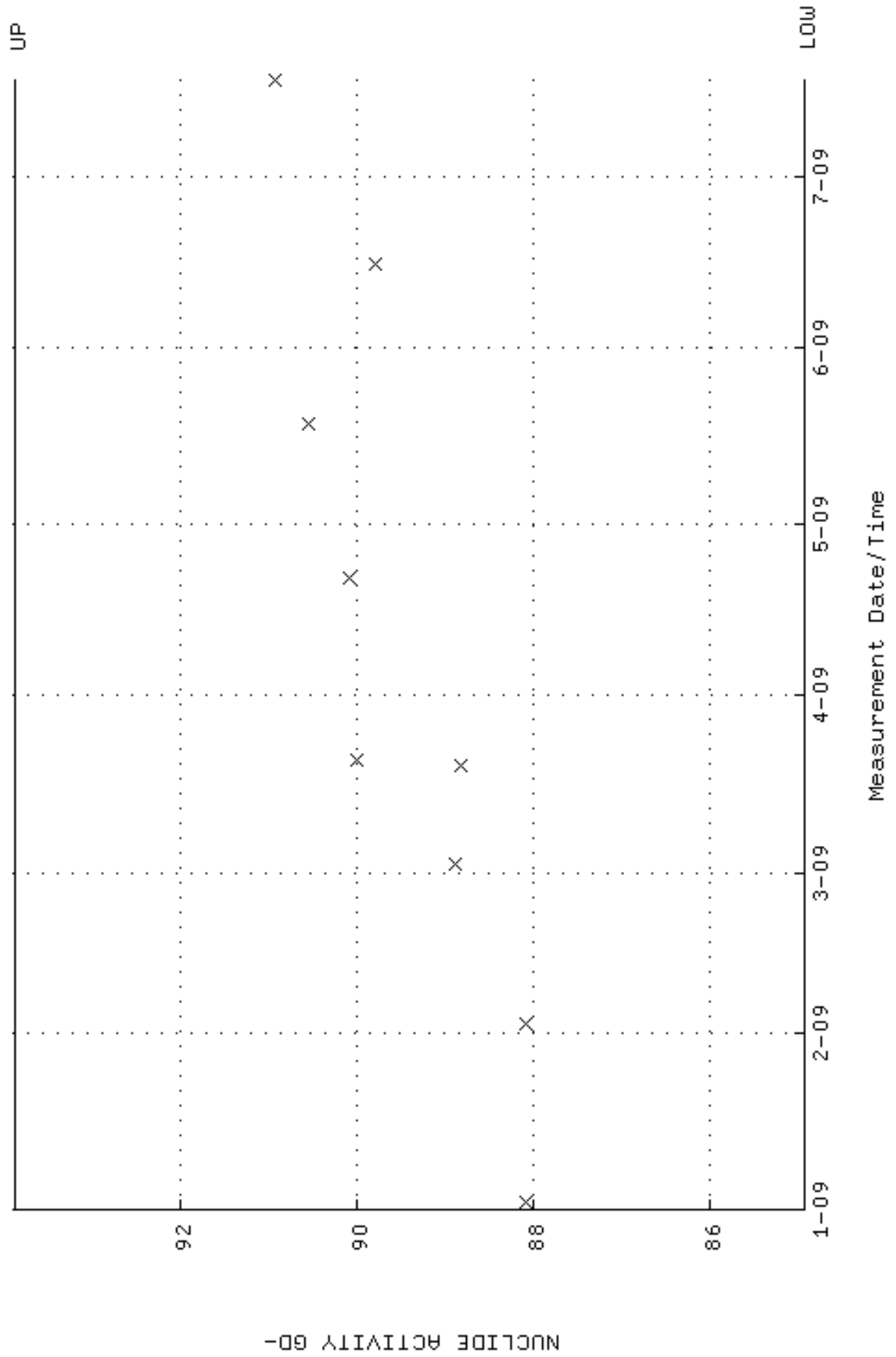
QA filename : DKA100:[ENV\_ALPHA.QA.B]B144.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:00 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



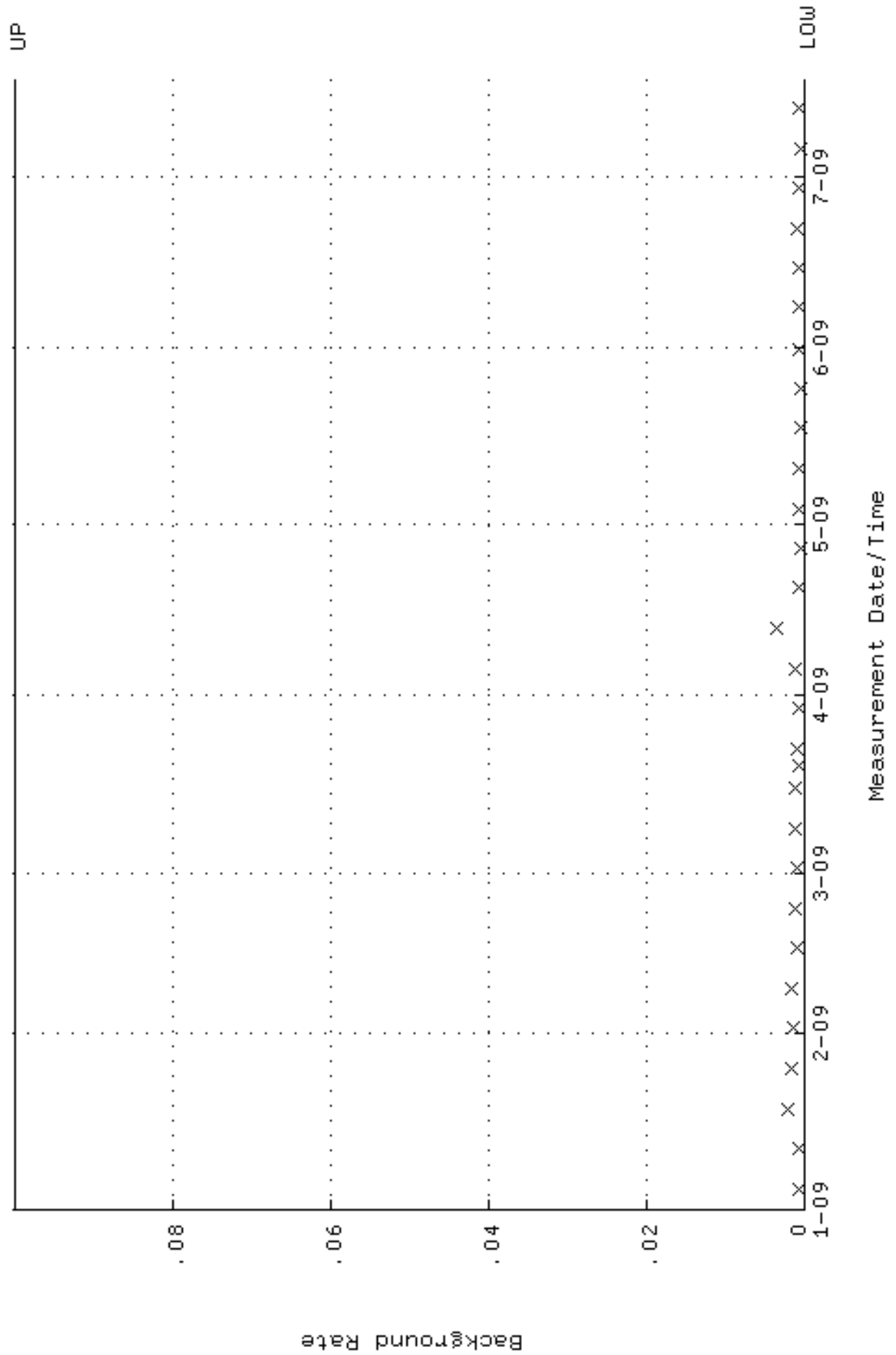
QA filename : DKA100:[ENV\_ALPHA.QA.W]W145.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:15 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.239850 through 0.259850



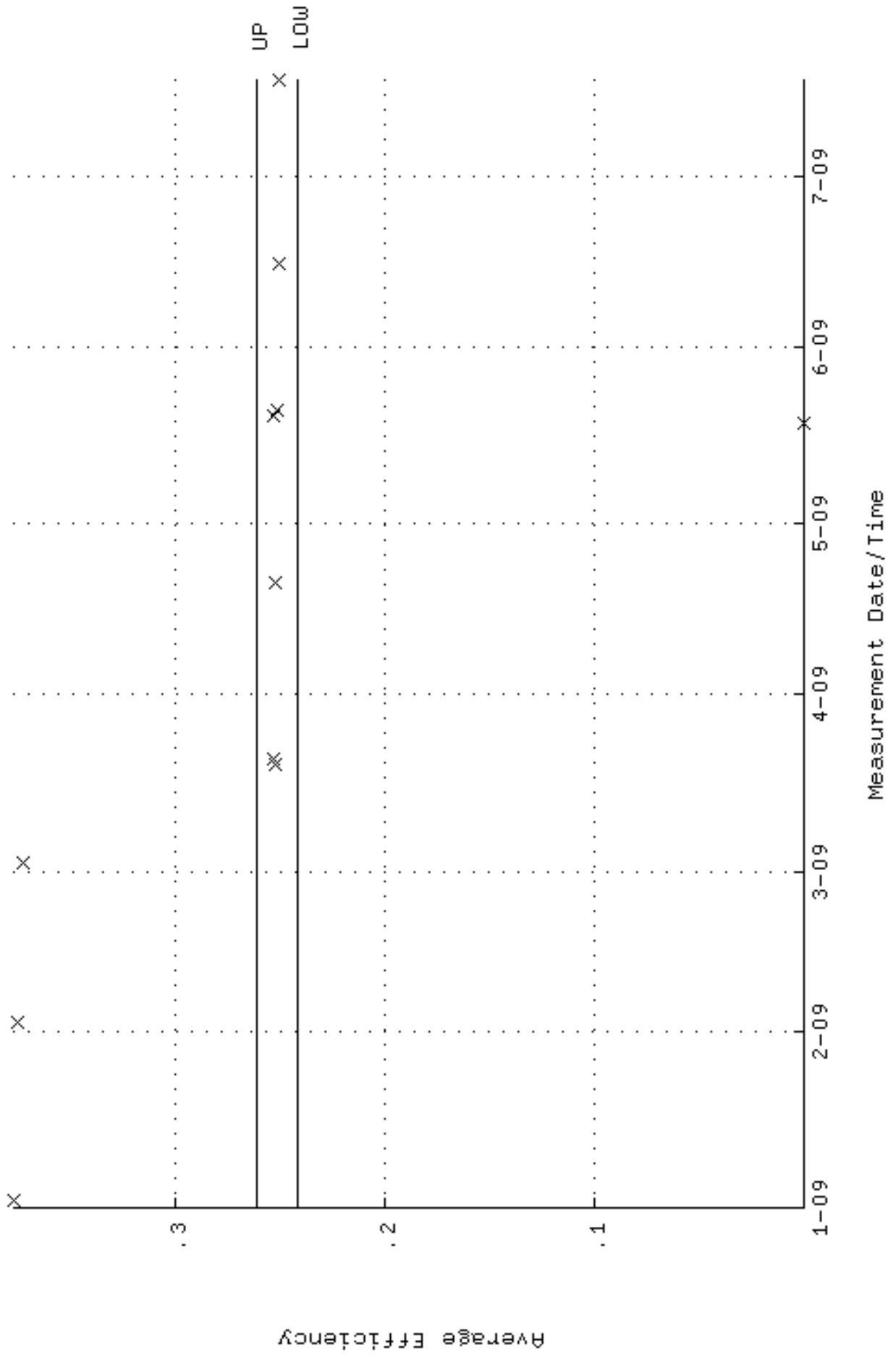
QA filename : DKA100:[ENV\_ALPHA.QA.W]W145.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 2-JAN-2009 07:25:15 through 17-JUL-2009 12:00:00  
Lower/Upper Lmts: 84.9354 through 93.8760



QA filename : DKA100:[ENV\_ALPHA.QA.B]B145.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:04 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

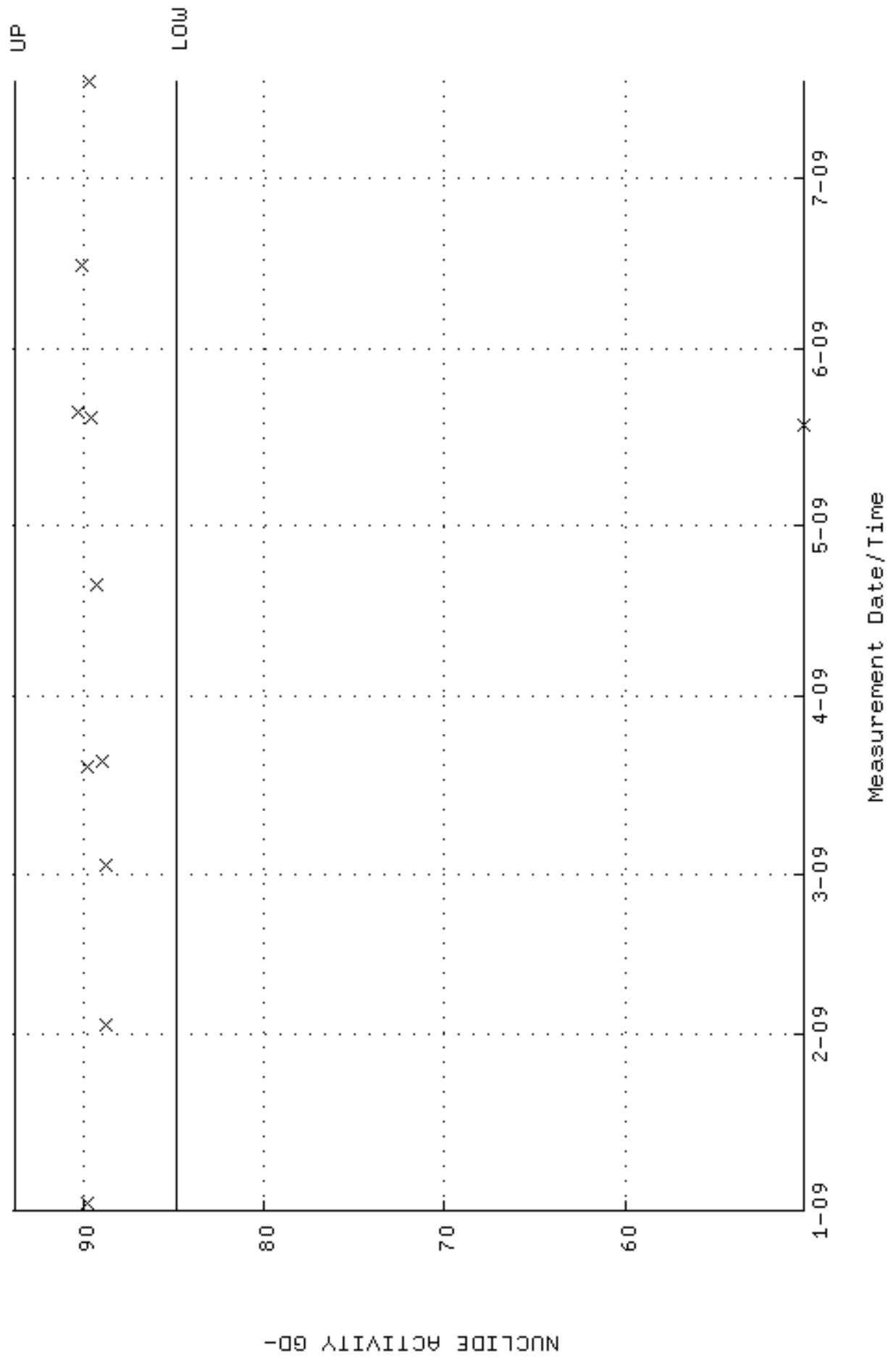


QA filename : DKA100:[ENV\_ALPHA.QA.W]W146.QAF;2  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:19 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.241831 through 0.261831

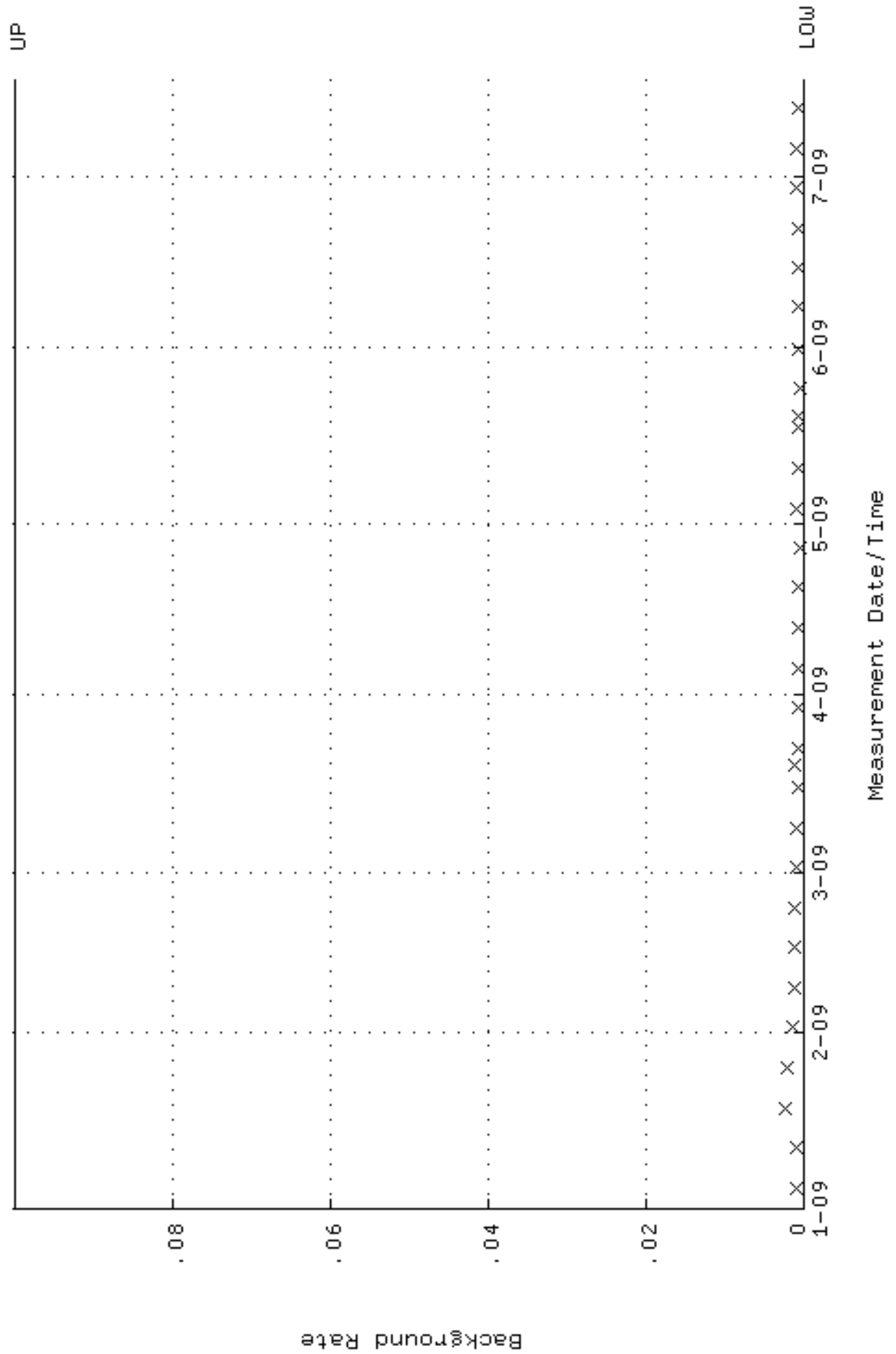




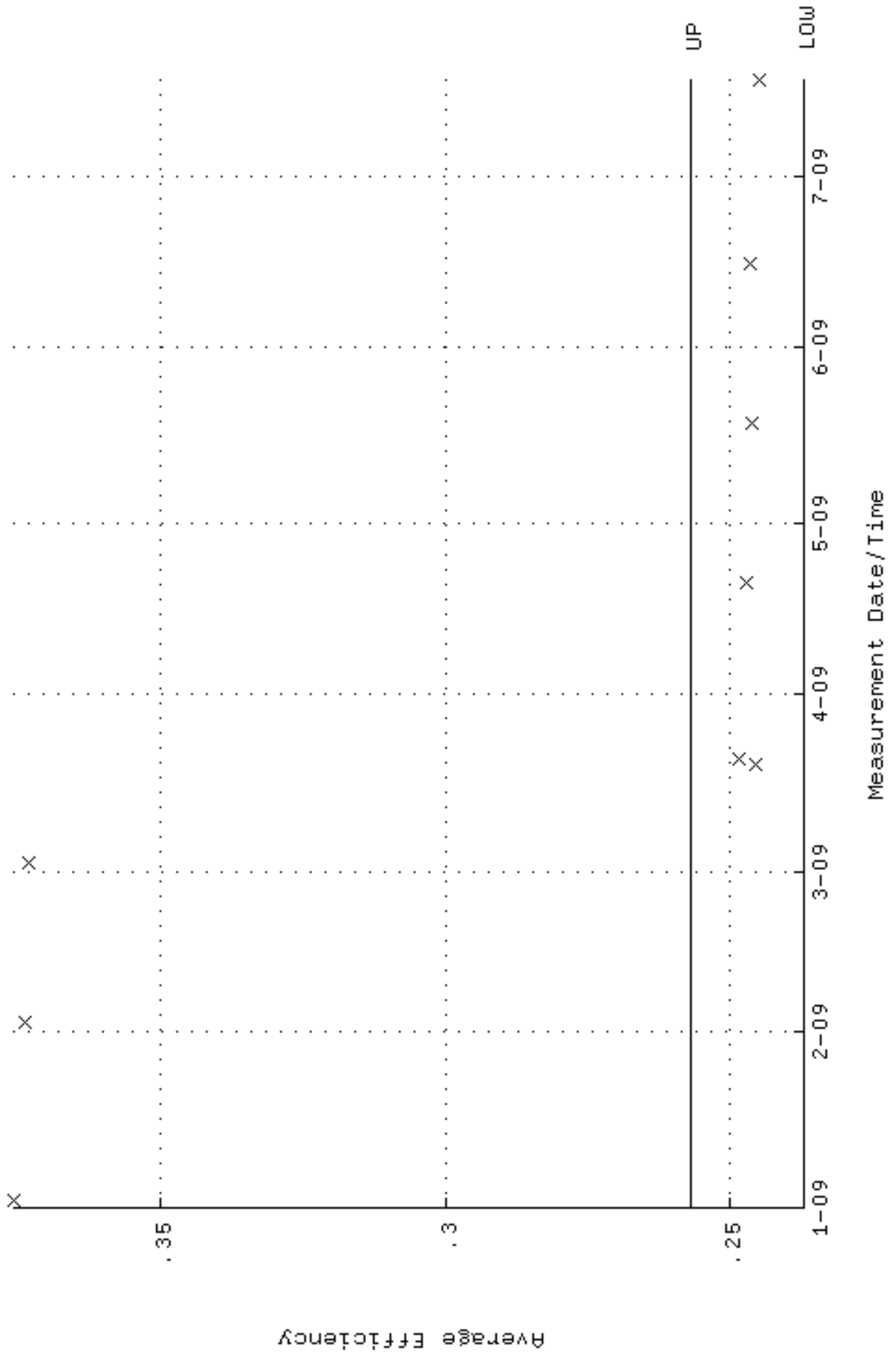
QA filename : DKA100:[ENV\_ALPHA.QA.W]W146.QAF;2  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:25:19 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.8578 through 93.7902



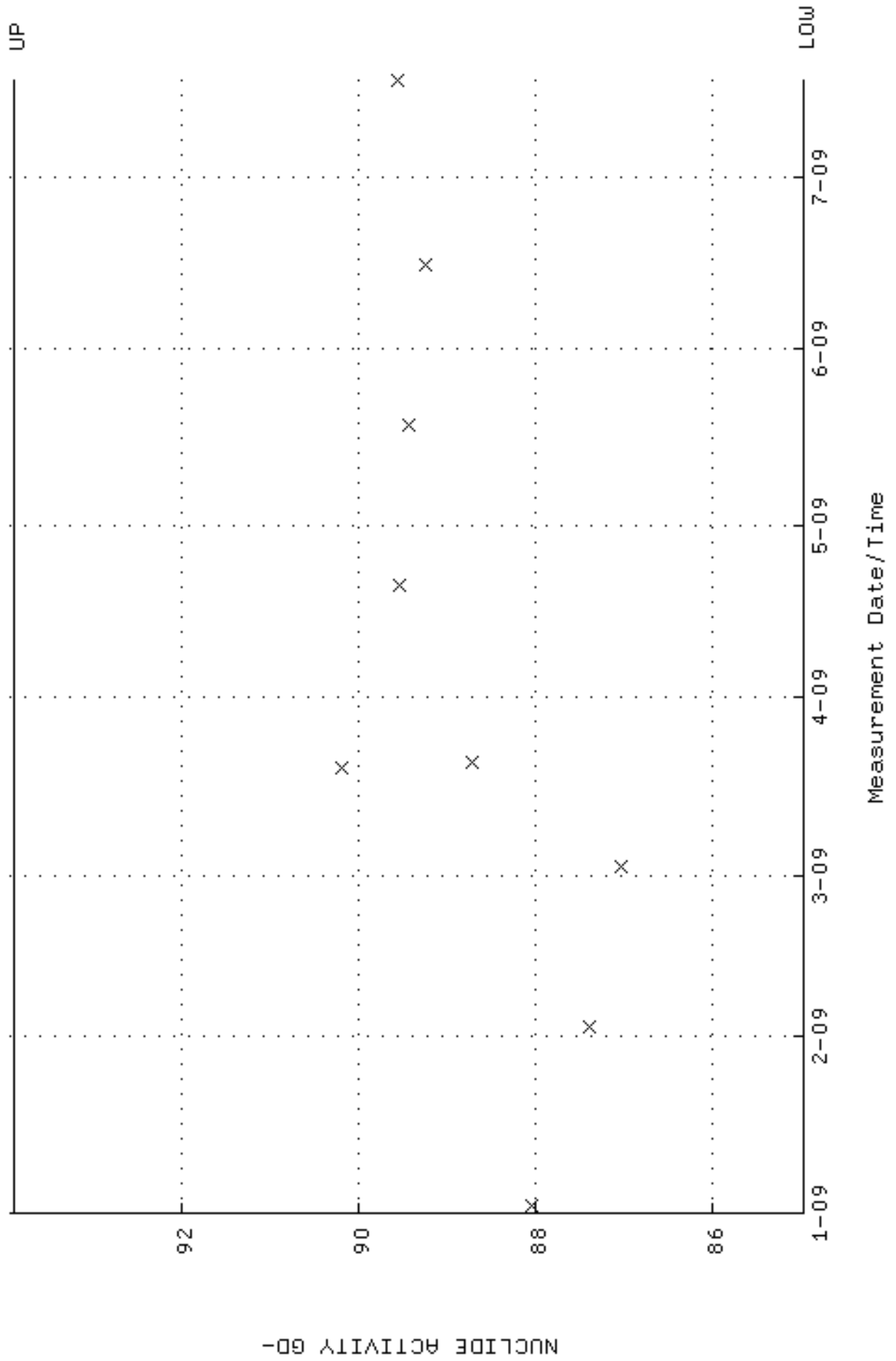
QA filename : DKA100:[ENV\_ALPHA.QA.B]B146.QAF;2  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:09 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



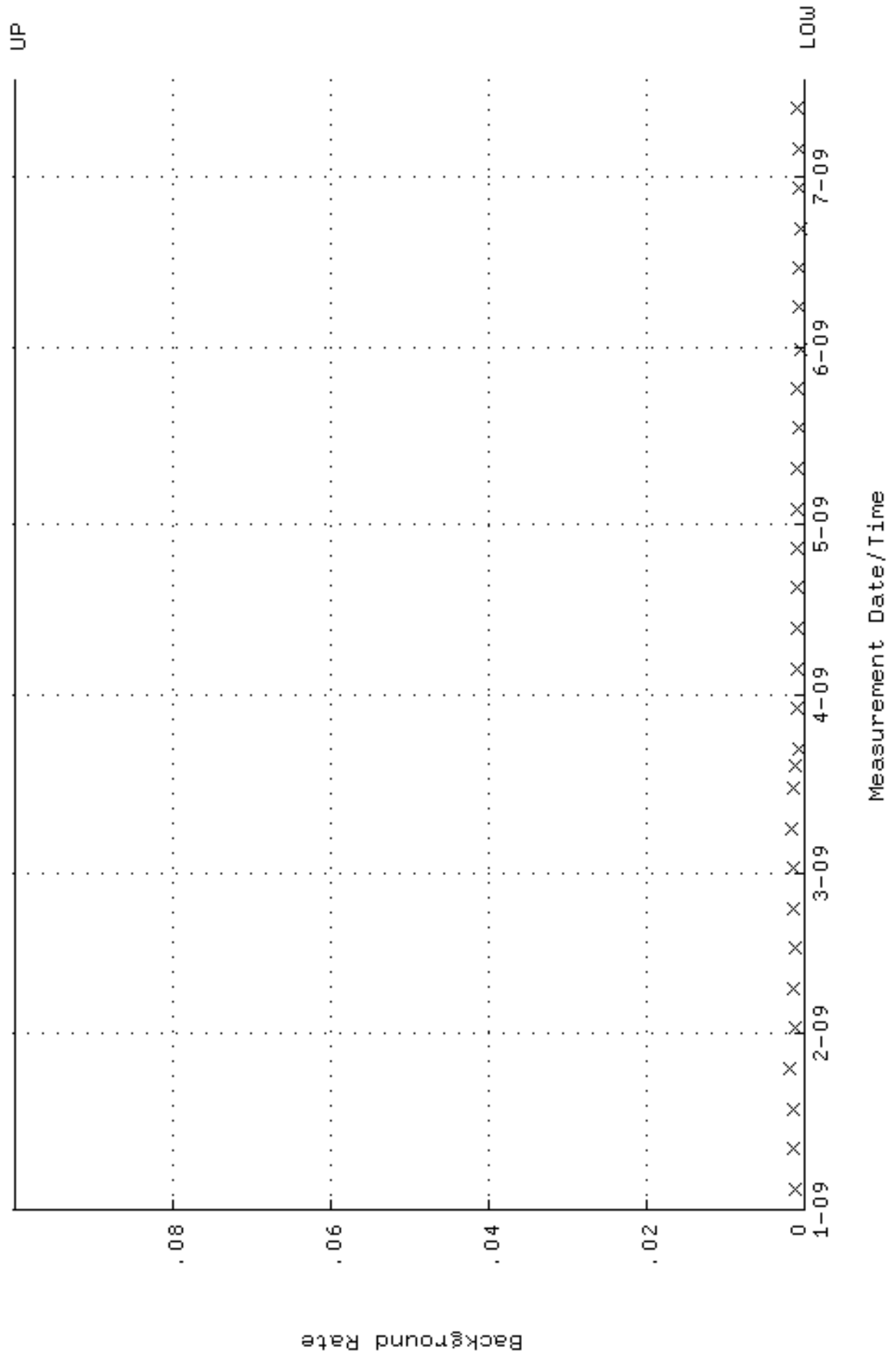
QA filename : DKA100:[ENV\_ALPHA.QA.W]W147.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:24 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.237046 through 0.257046



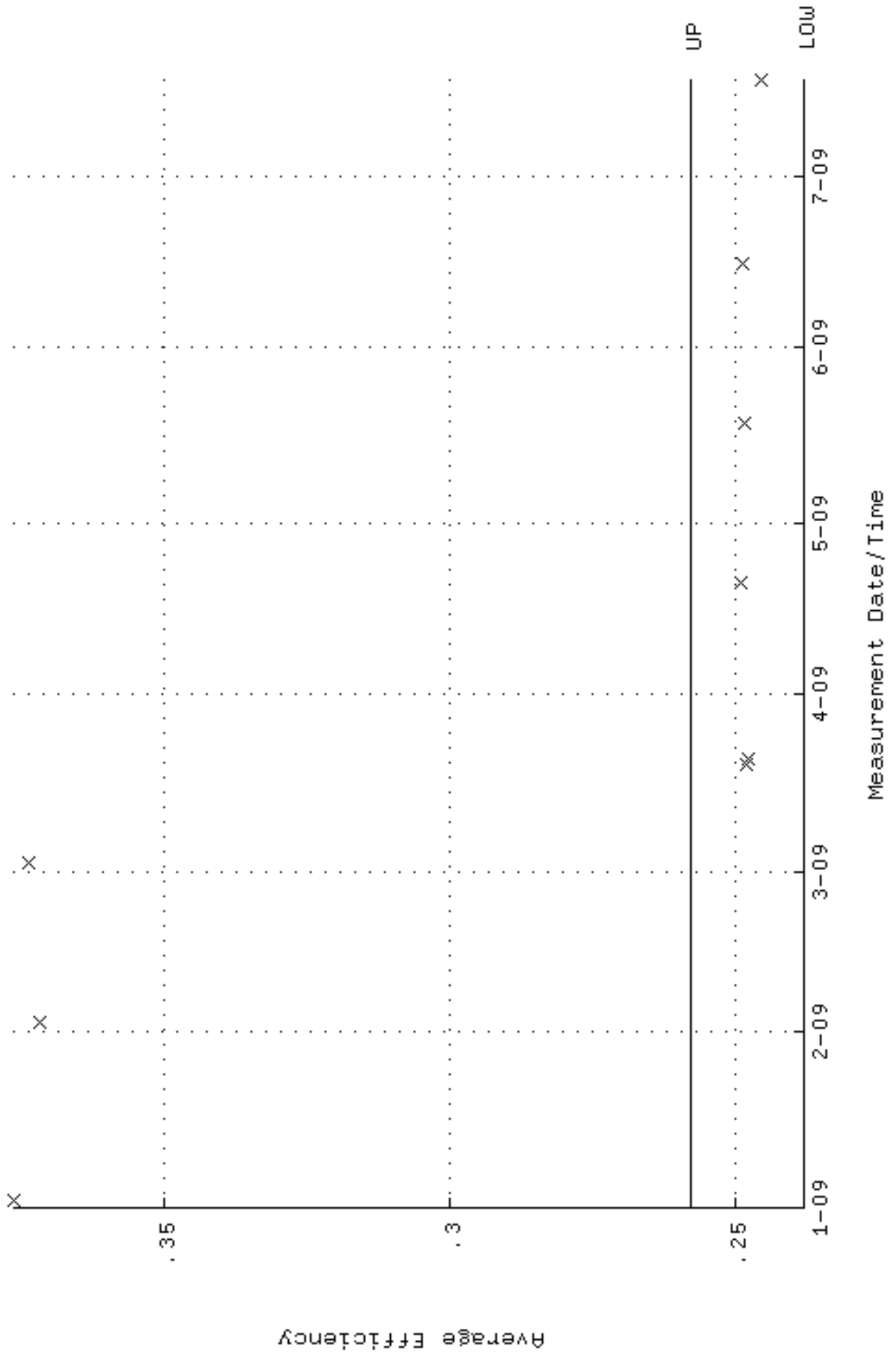
QA filename : DKA100:[ENV\_ALPHA.QA.W]w147.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:25:24 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.9777 through 93.9227



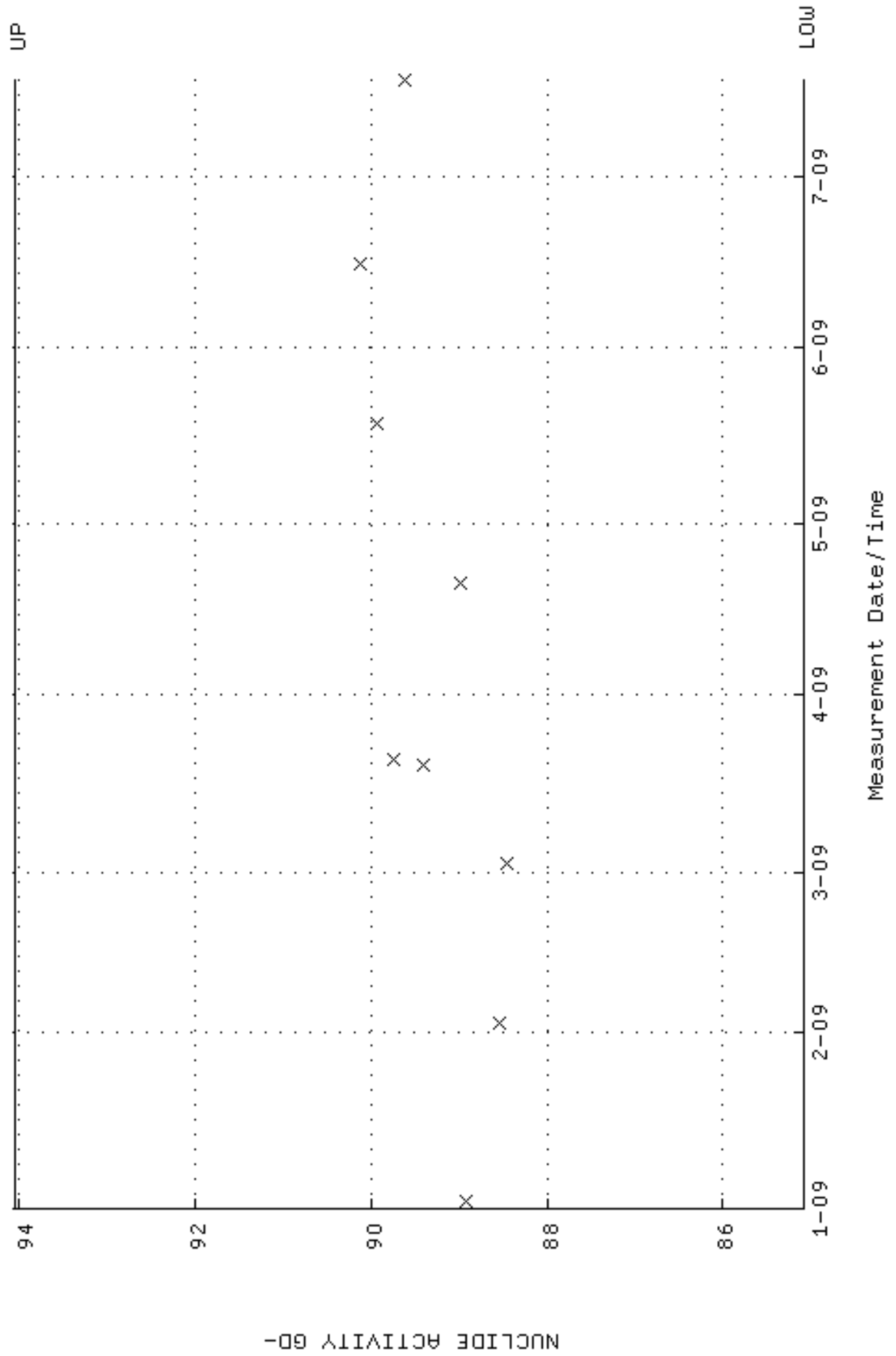
QA filename : DKA100:[ENV\_ALPHA.QA.B]B147.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:13 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



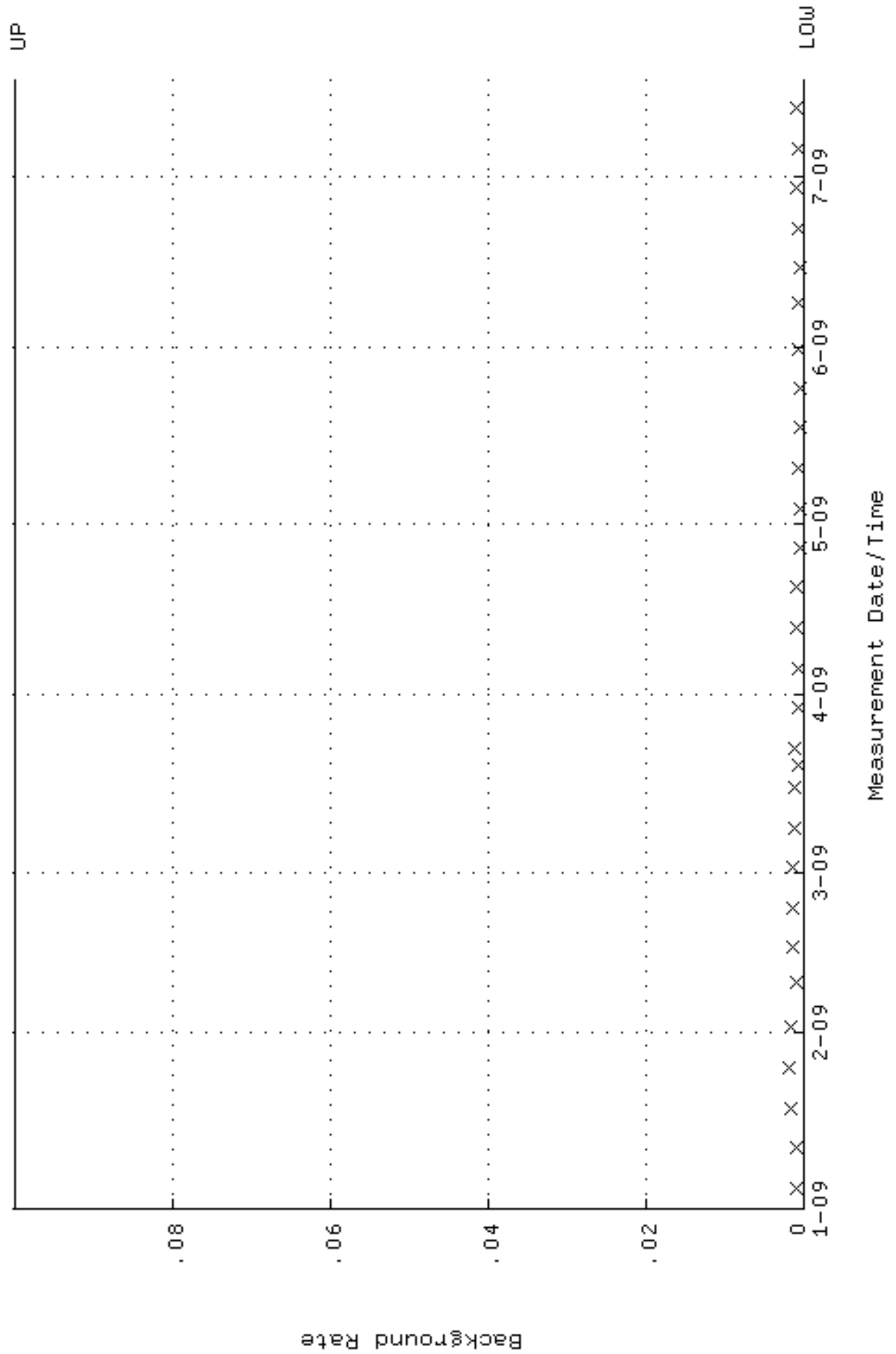
QA filename : DKA100:[ENV\_ALPHA.QA.W]W148.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:28 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.237934 through 0.257934



QA filename : DKA100:[ENV\_ALPHA.QA.W]W148.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:25:28 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.0831 through 94.0393

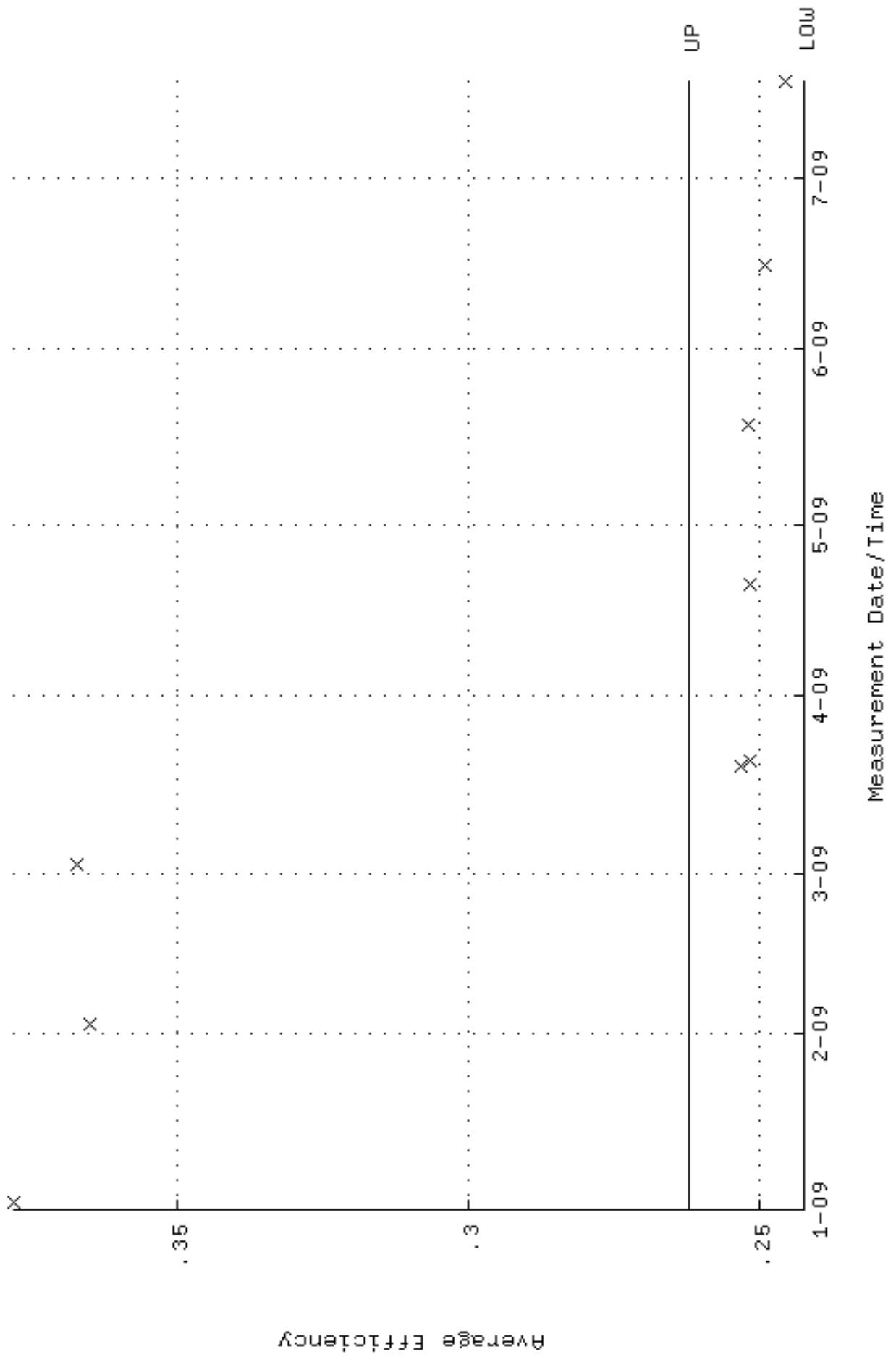


QA filename : DKA100:[ENV\_ALPHA.QA.B]B148.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:17 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

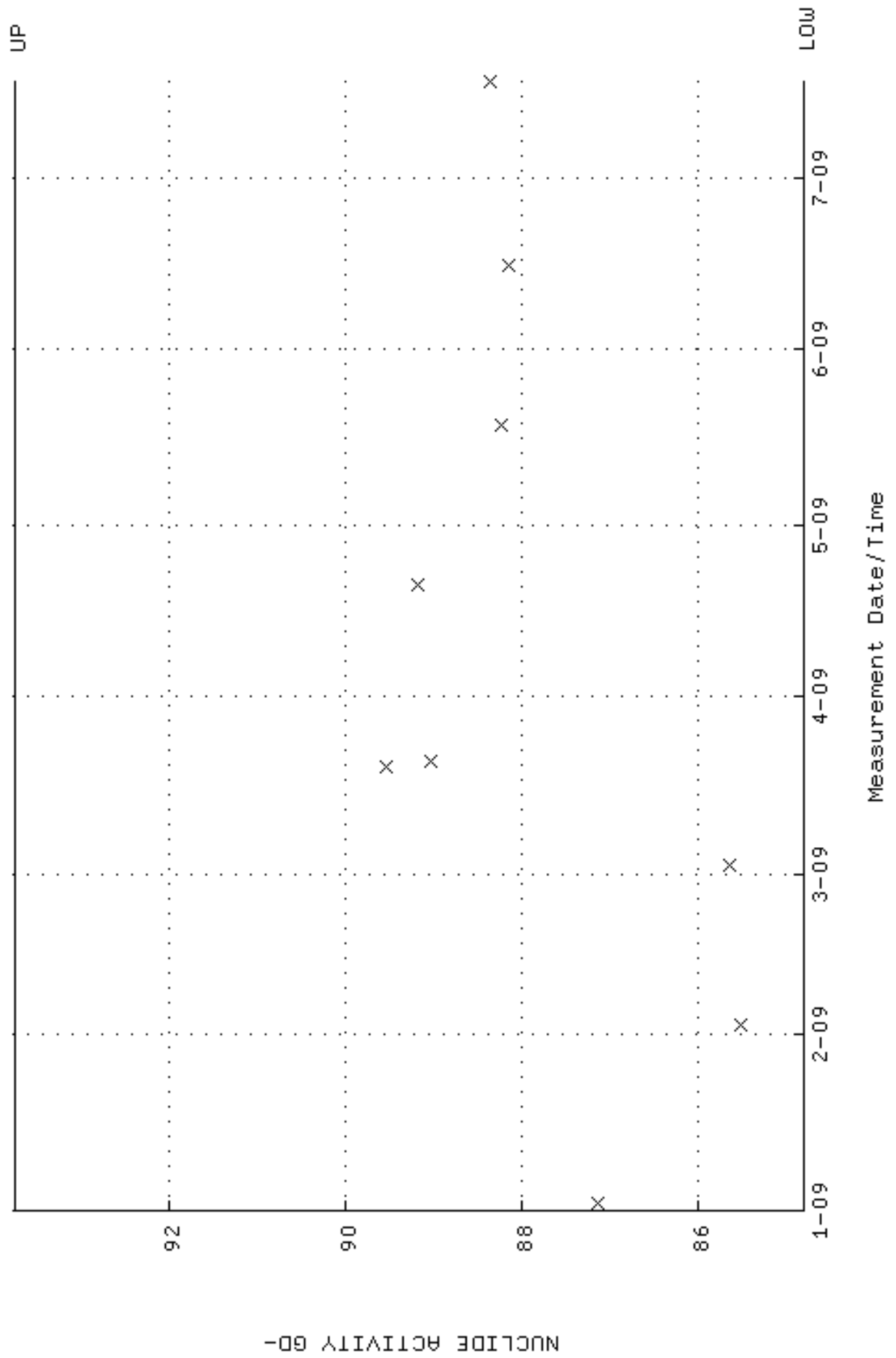




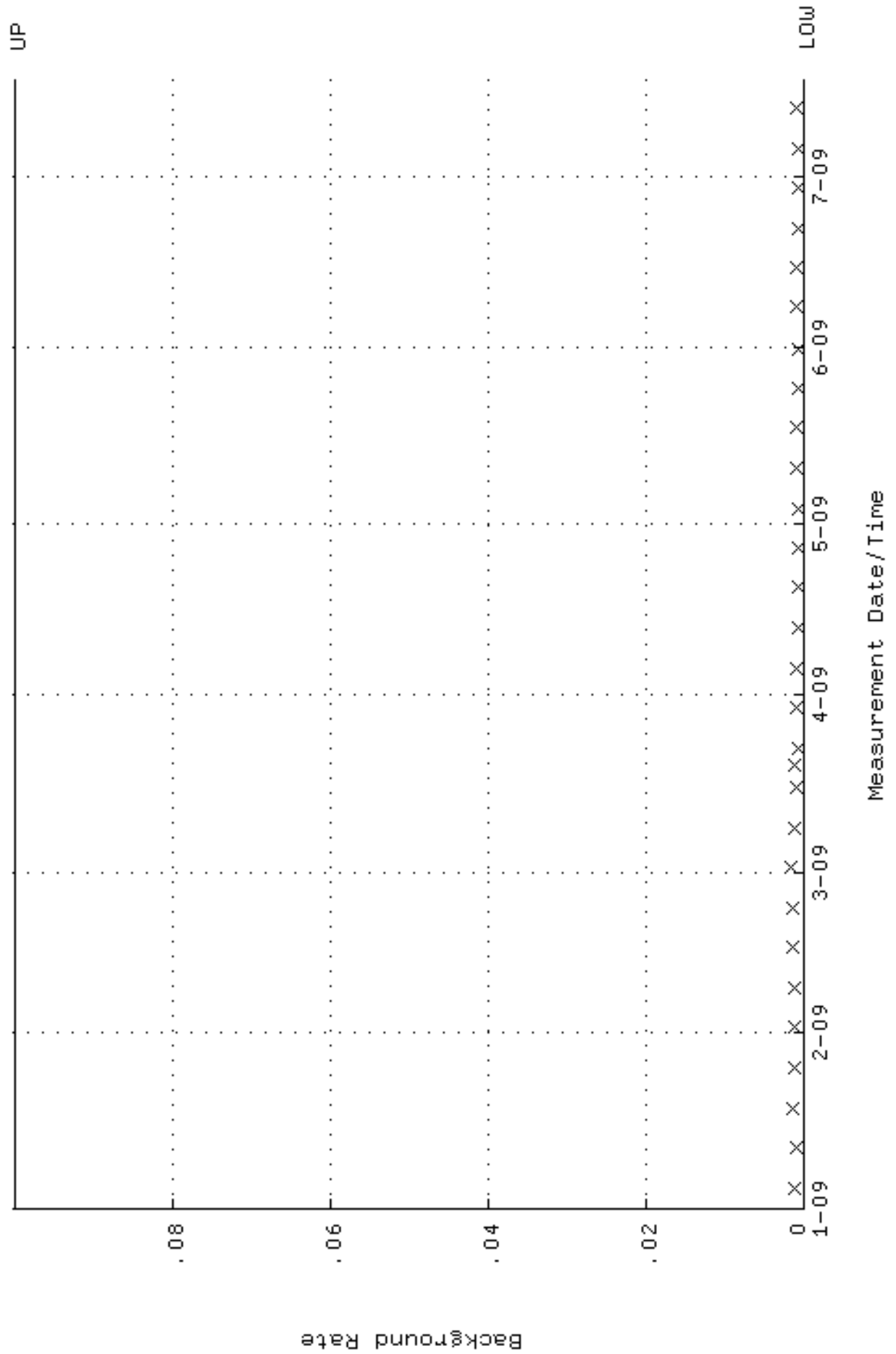
QA filename : DKA100:[ENV\_ALPHA.QA.W]W149.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:32 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.242495 through 0.262495



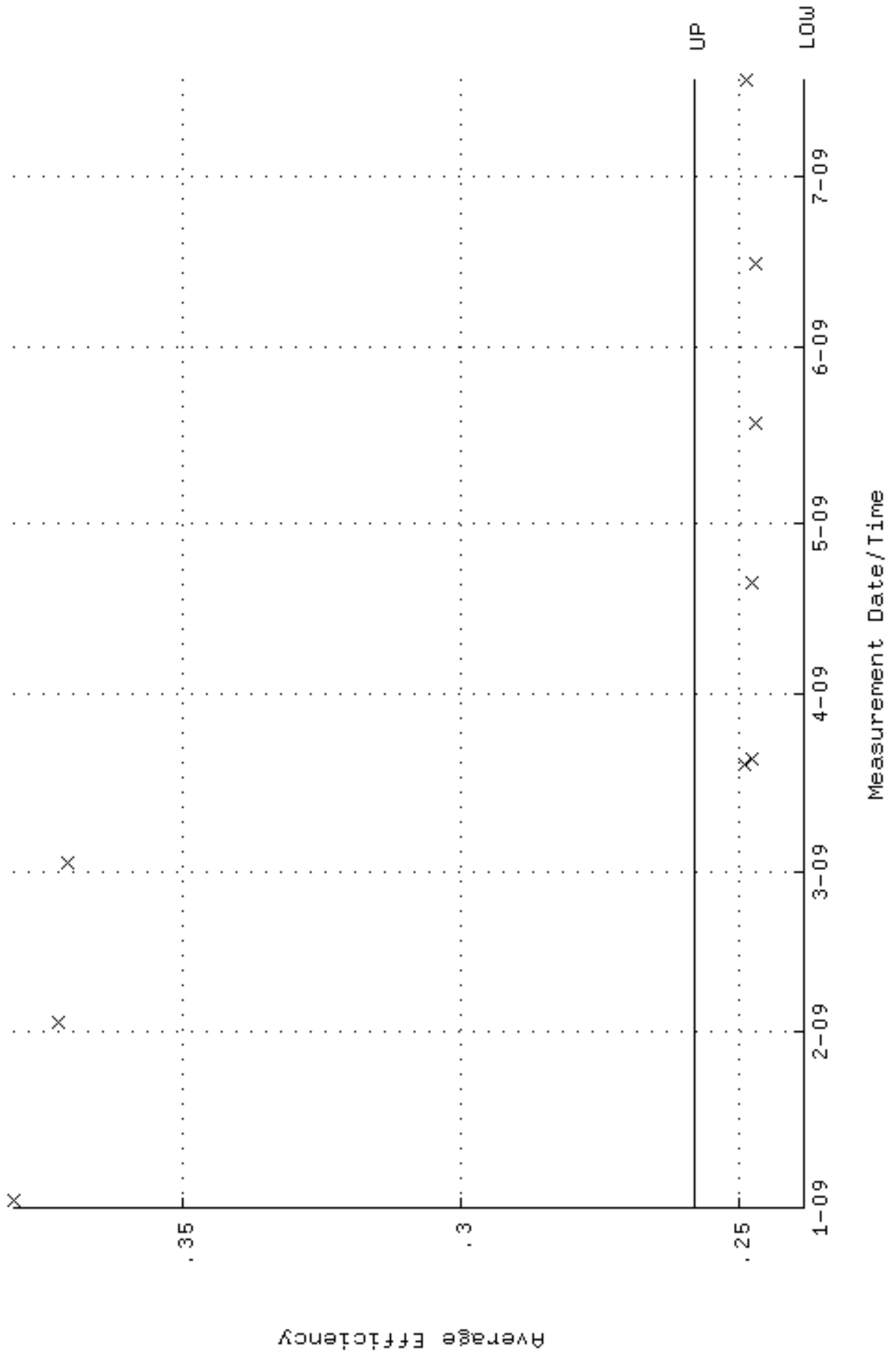
QA filename : DKA100:[ENV\_ALPHA.QA.W]w149.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:25:32 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.8126 through 93.7402



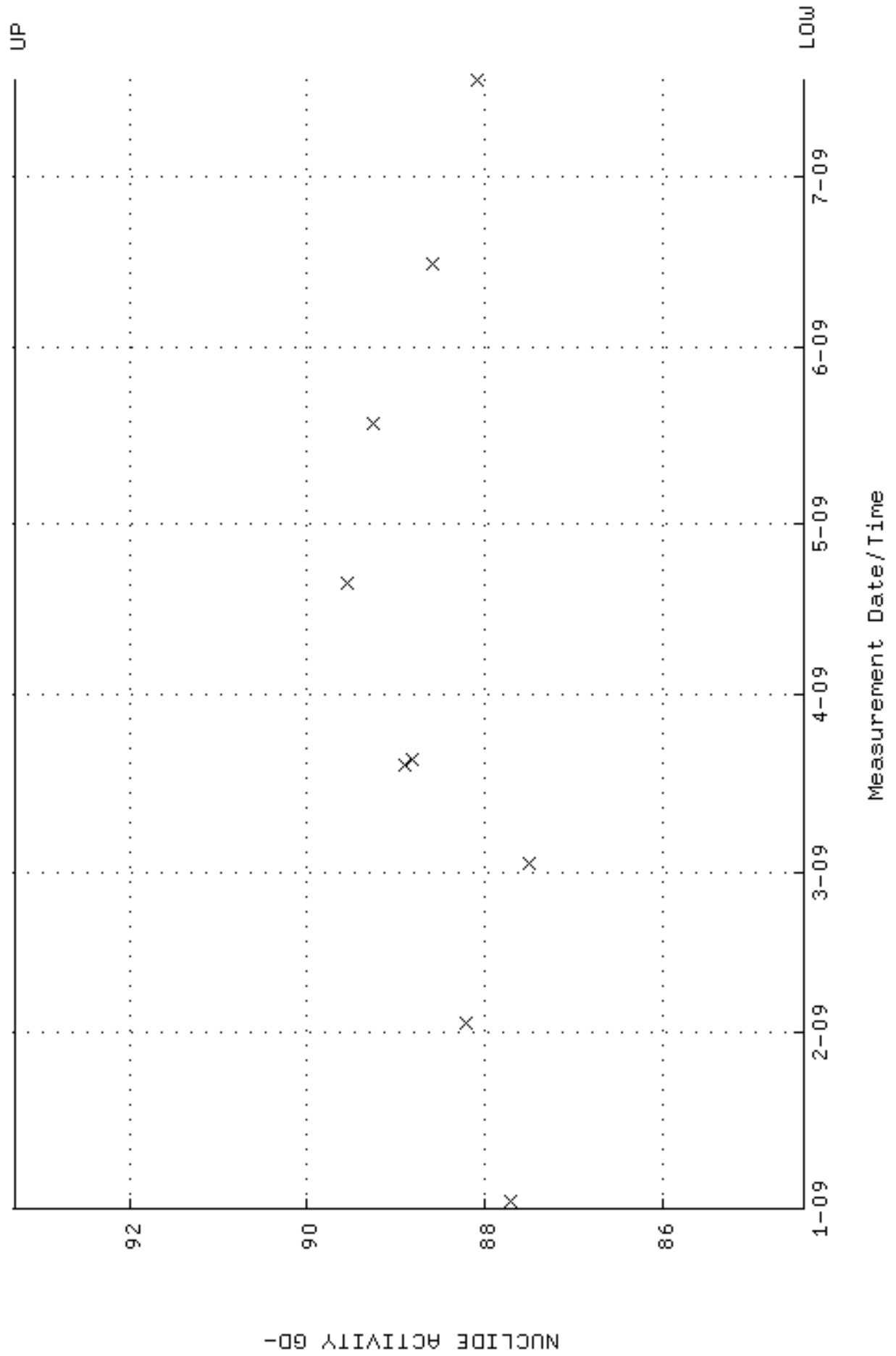
QA filename : DKA100:[ENV\_ALPHA.QA.B]B149.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:21 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



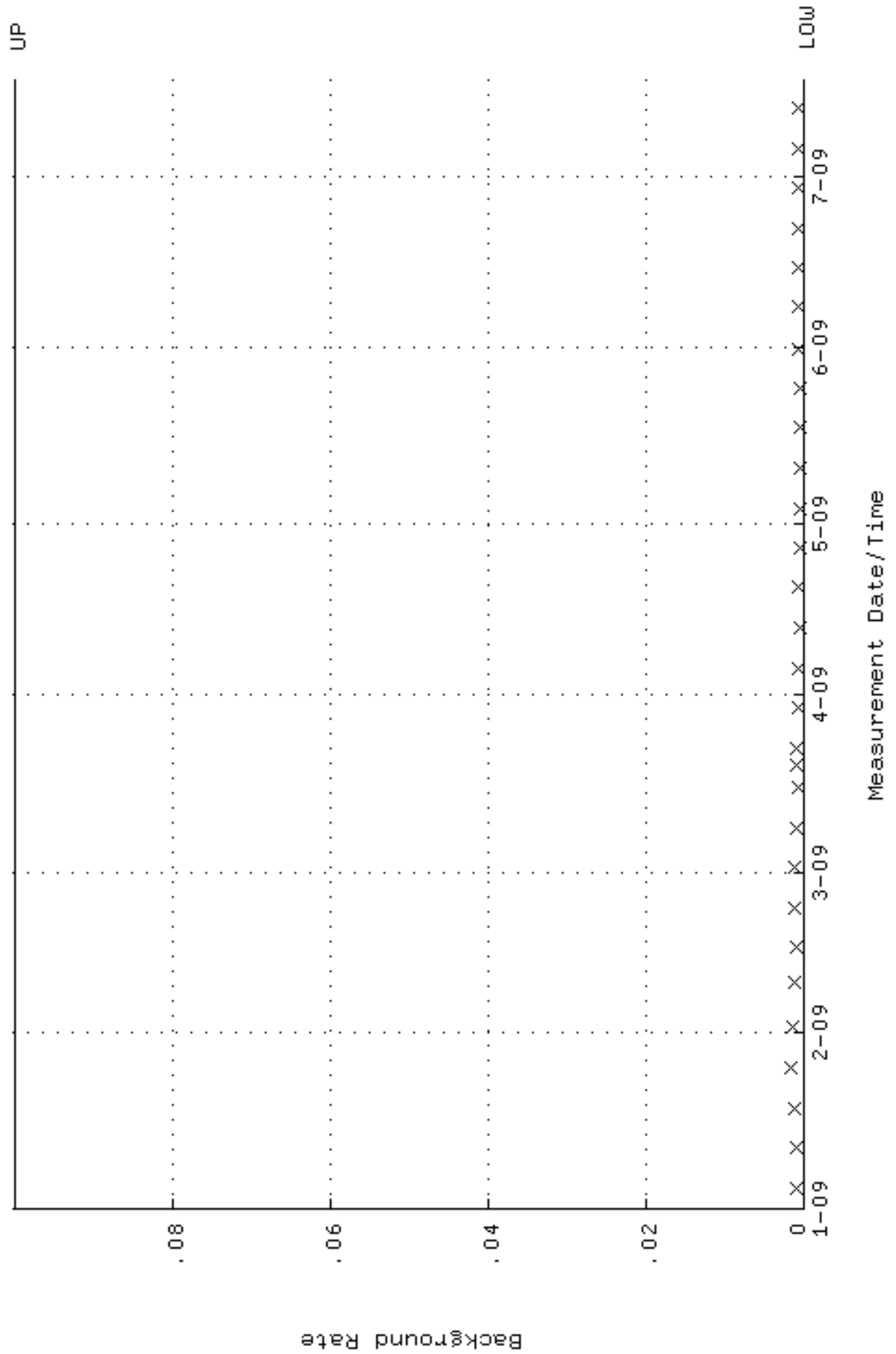
QA filename : DKA100:[ENV\_ALPHA.QA.W]W150.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:37 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.238314 through 0.258314



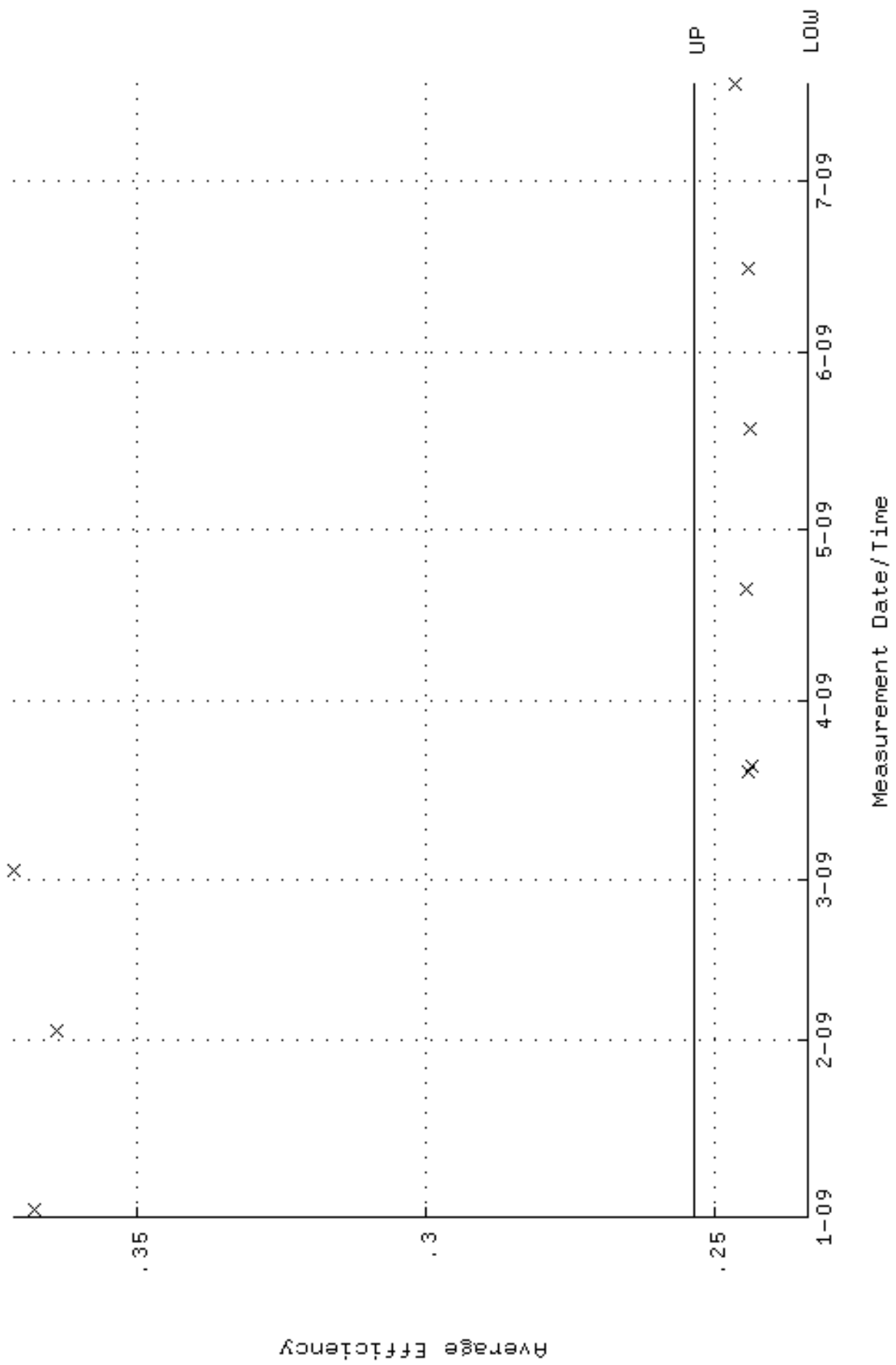
QA filename : DKA100:[ENV\_ALPHA.QA.W]w150.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 2-JAN-2009 07:25:37 through 17-JUL-2009 12:00:00  
Lower/Upper Lmts: 84.4039 through 93.2885



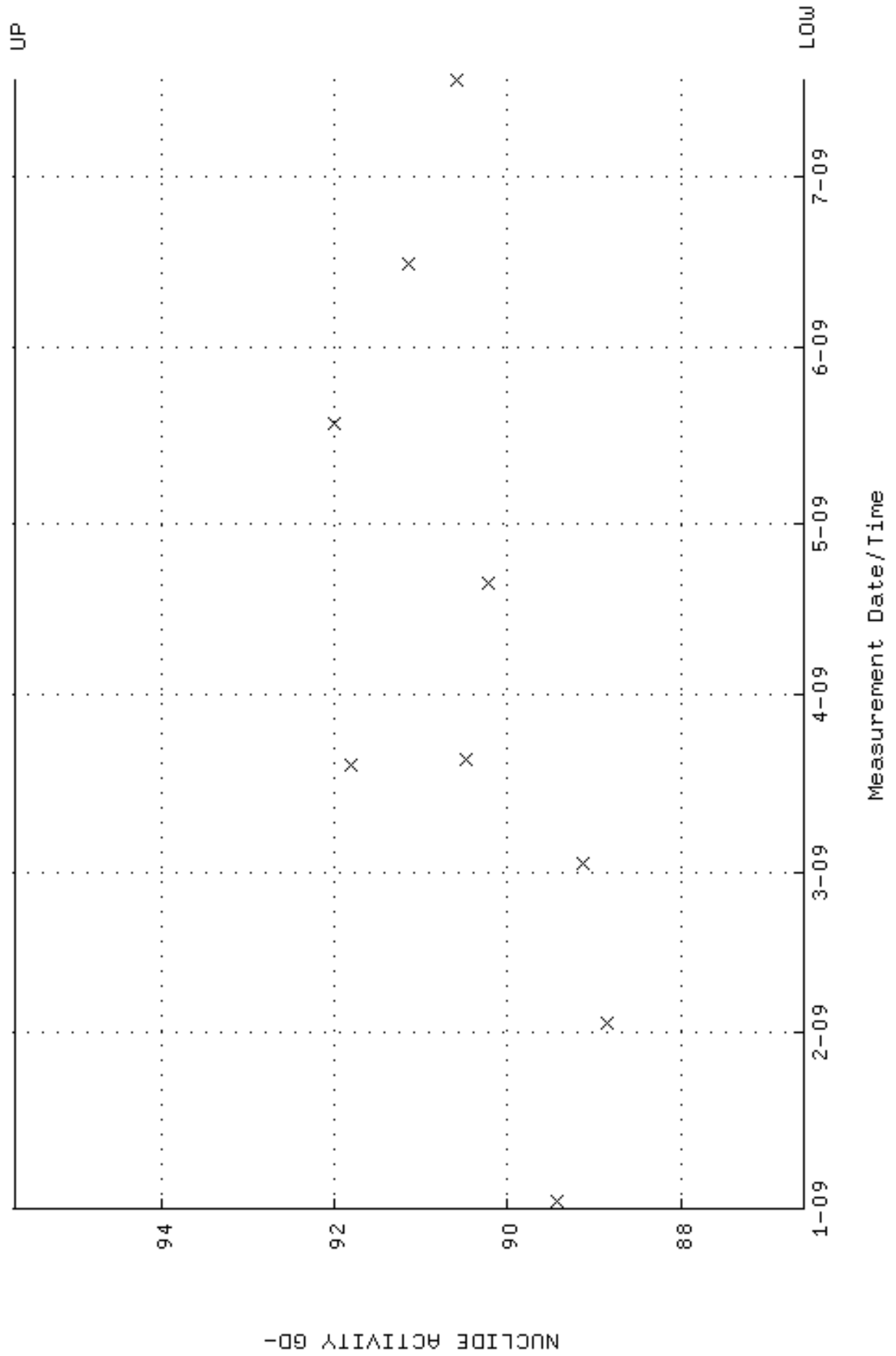
QA filename : DKA100:[ENV\_ALPHA.QA.B]B150.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:24 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W151.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:42 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.233693 through 0.253693

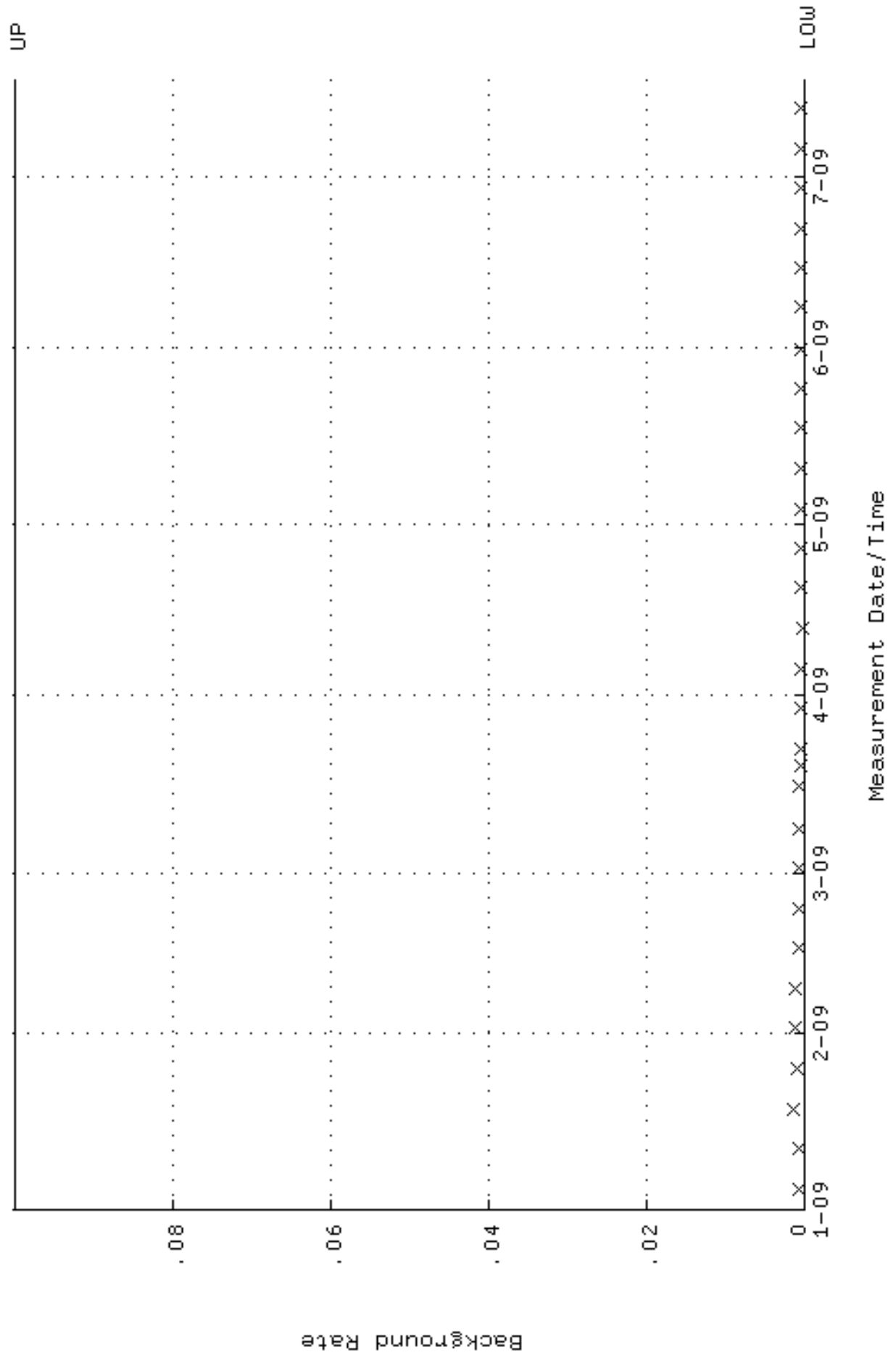


QA filename : DKA100:[ENV\_ALPHA.QA.W]w151.QAF;1  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 2-JAN-2009 07:25:42 through 17-JUL-2009 12:00:00  
Lower/Upper Lmts: 86.5749 through 95.6881

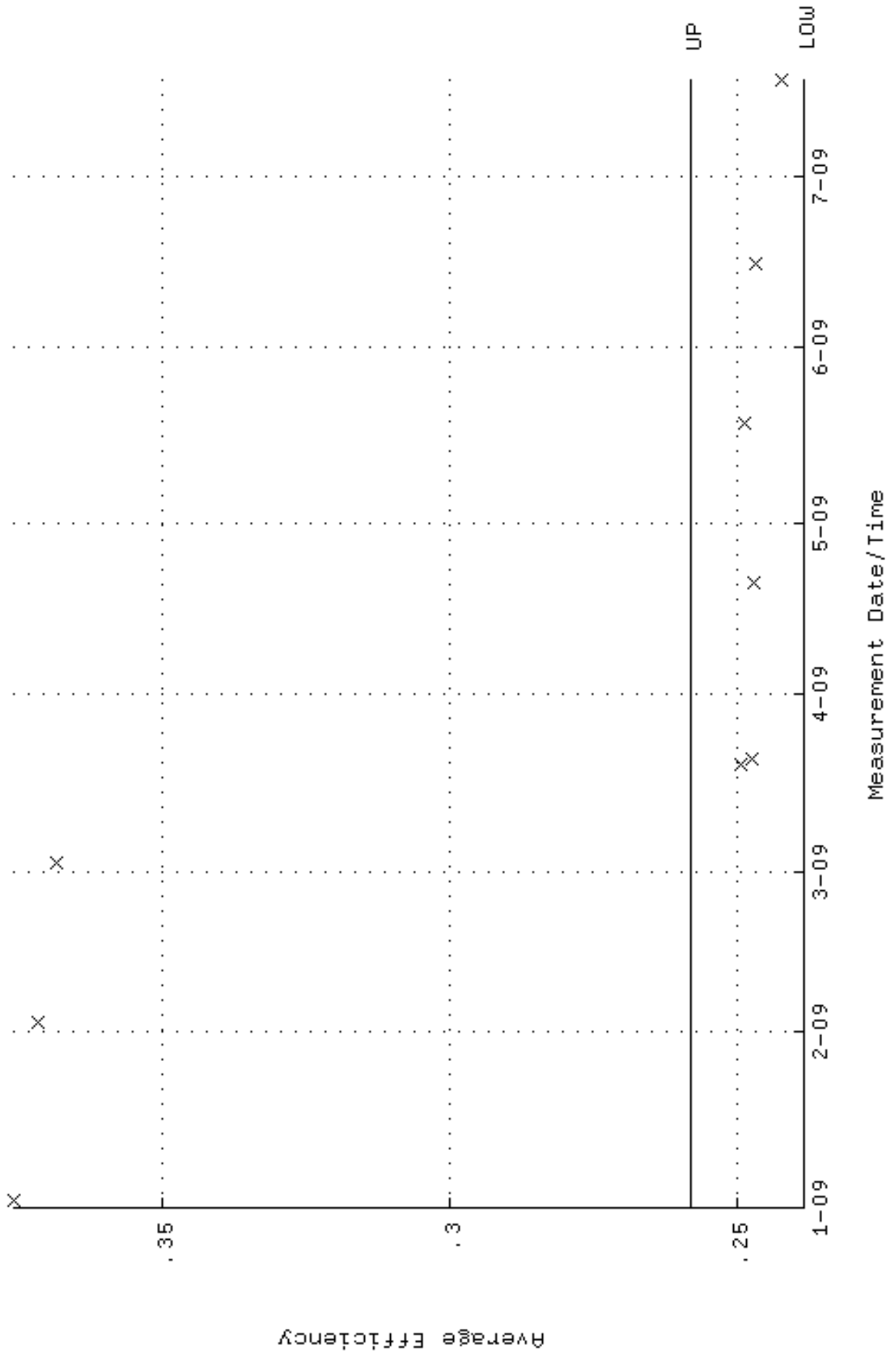




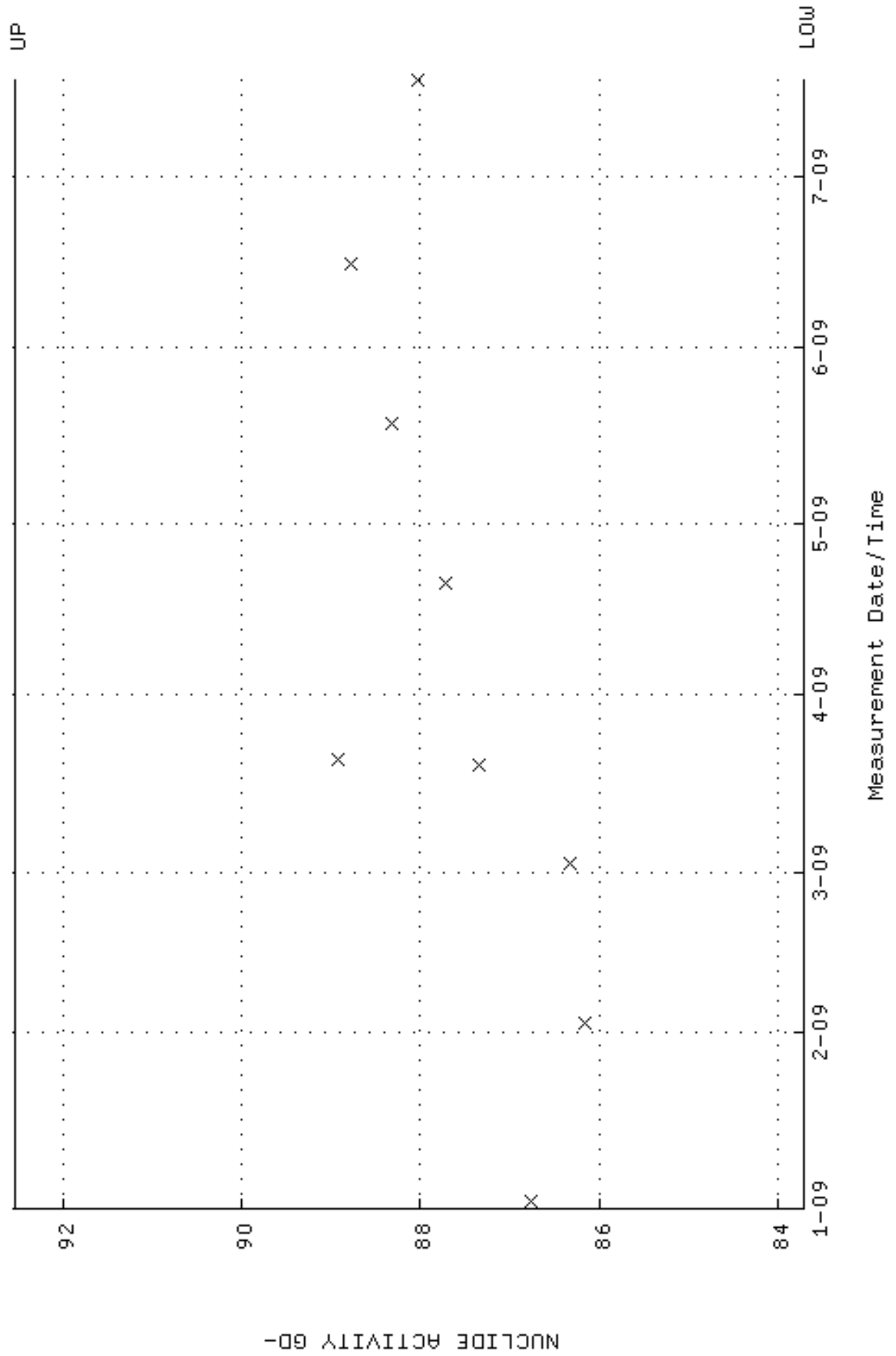
QA filename : DKA100:[ENV\_ALPHA.QA.B]B151.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:28 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



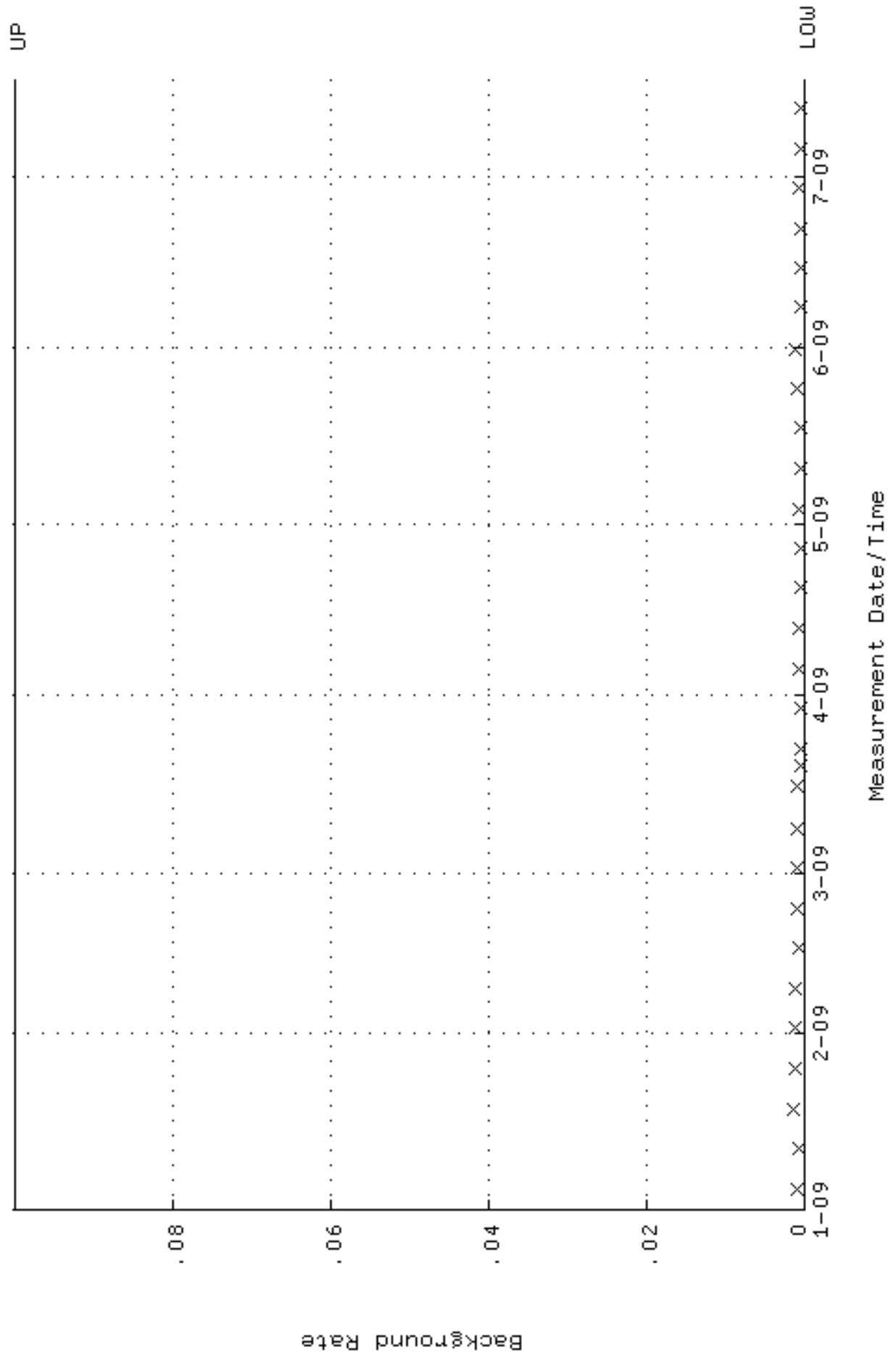
QA filename : DKA100:[ENV\_ALPHA.QA.W]W152.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:46 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.238479 through 0.258479



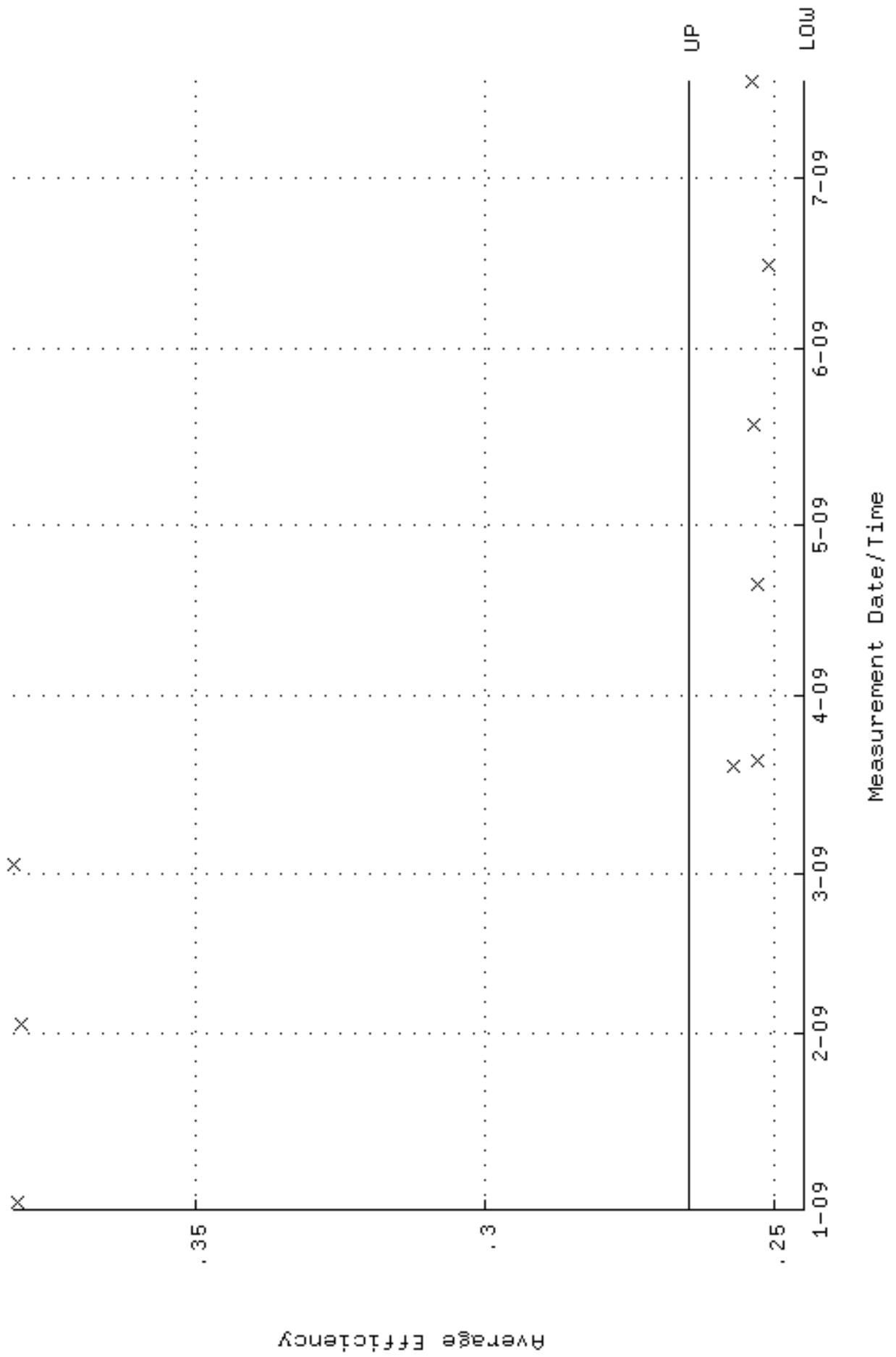
QA filename : DKA100:[ENV\_ALPHA.QA.W]w152.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:25:46 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 83.7180 through 92.5304



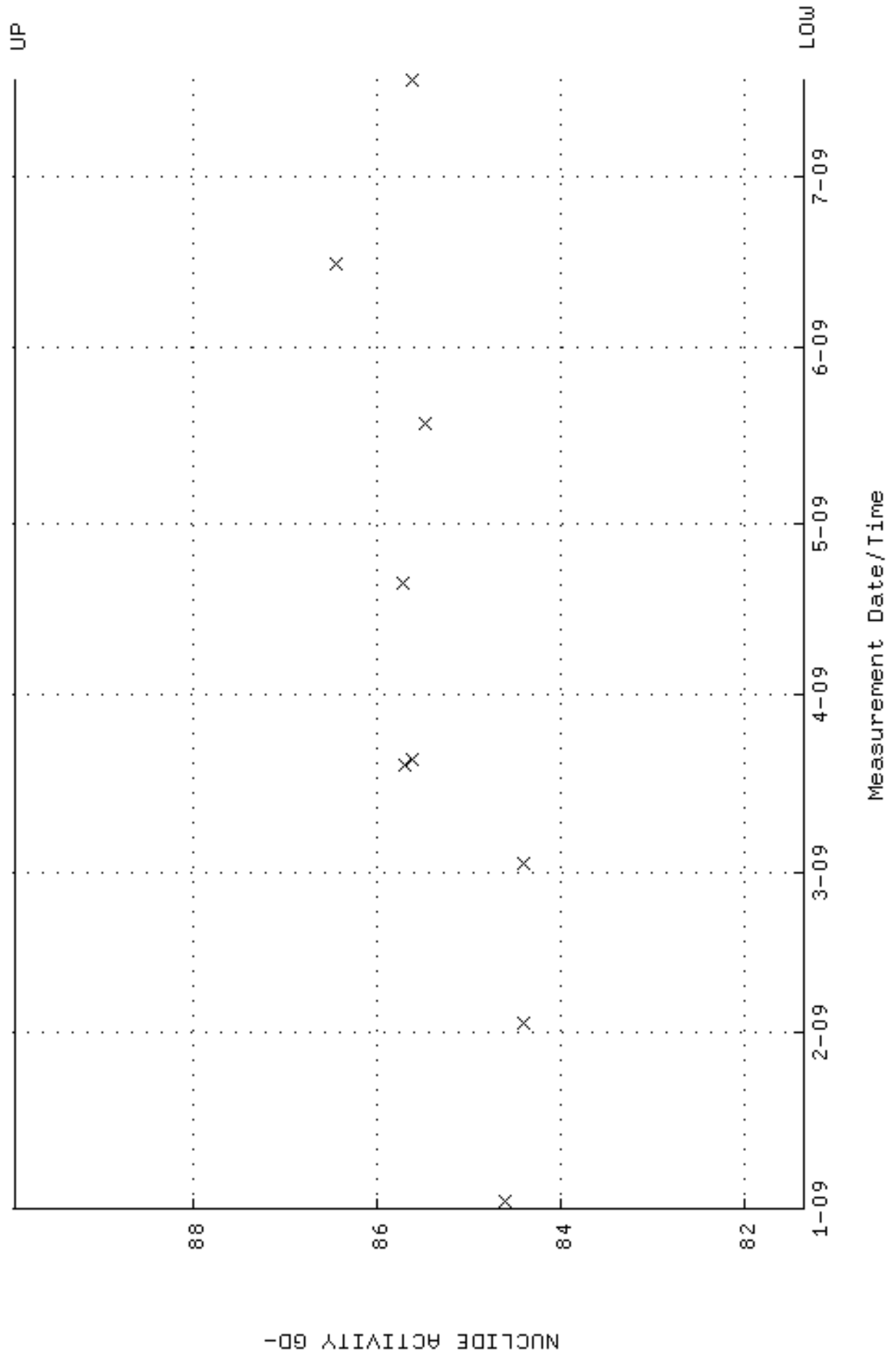
QA filename : DKA100:[ENV\_ALPHA.QA.B]B152.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:32 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



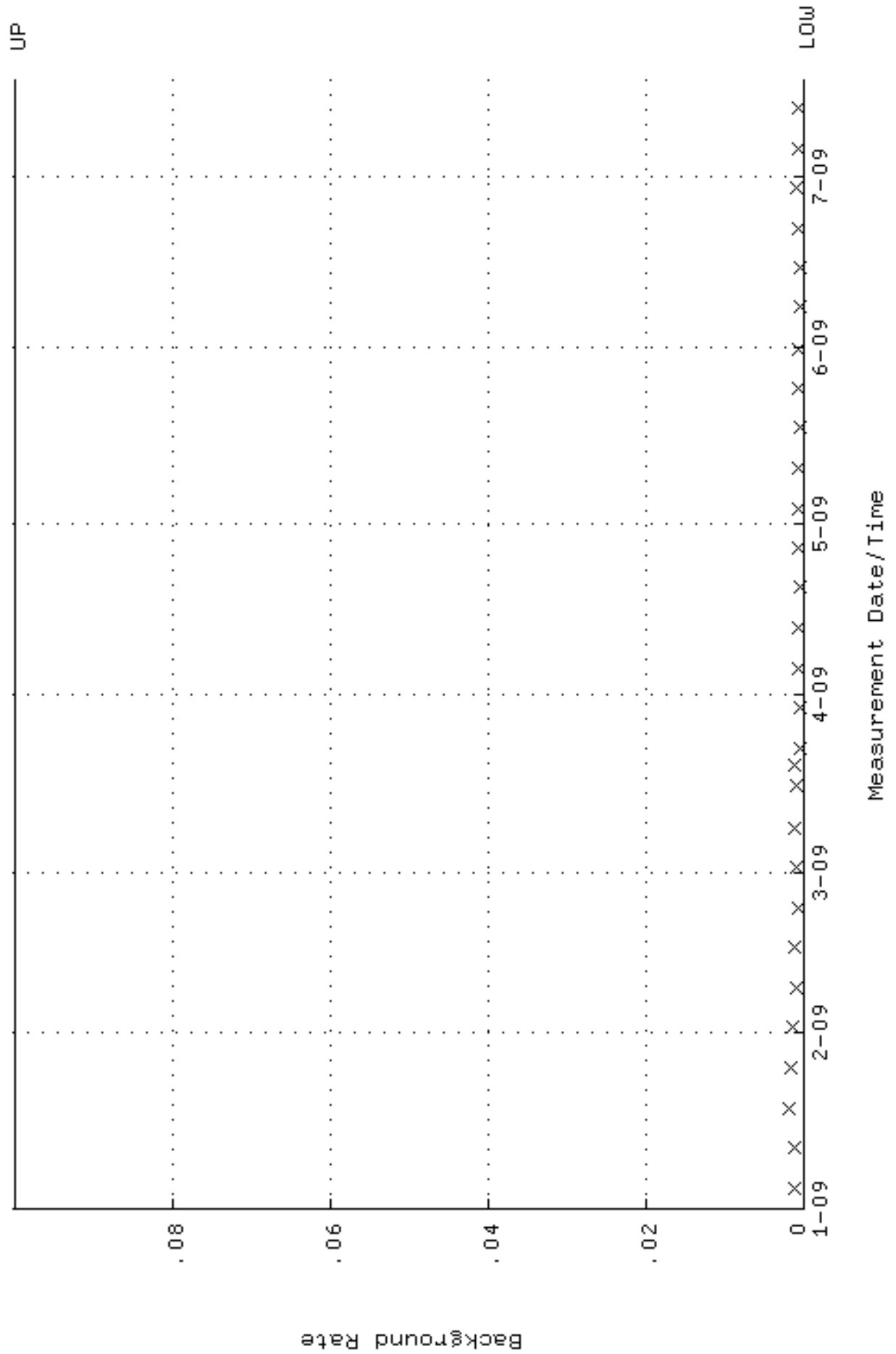
QA filename : DKA100:[ENV\_ALPHA.QA.W]W153.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-JAN-2009 07:25:51 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.244738 through 0.264738



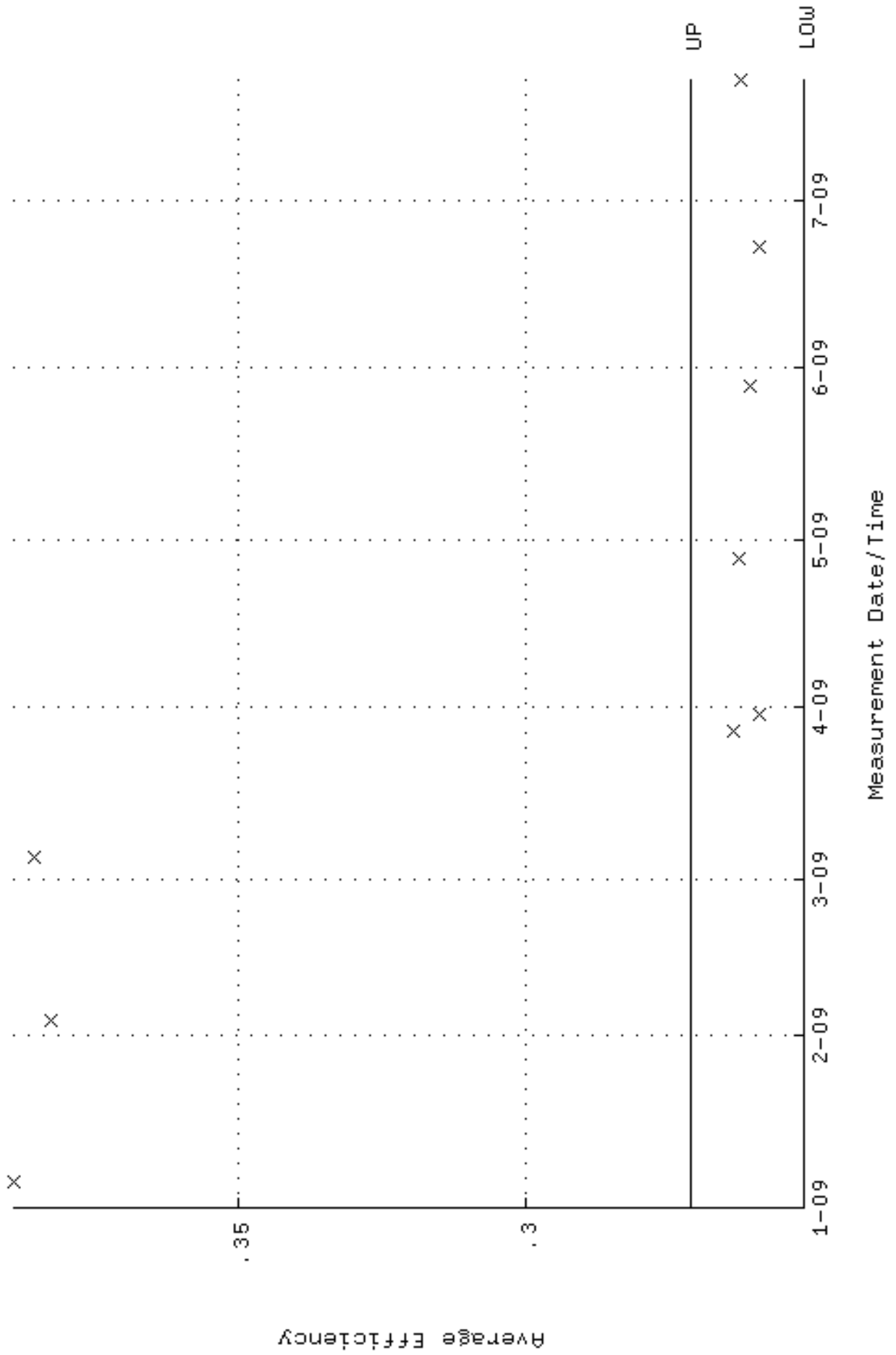
QA filename : DKA100:[ENV\_ALPHA.QA.W]w153.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-JAN-2009 07:25:51 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 81.3634 through 89.9280



QA filename : DKA100:[ENV\_ALPHA.QA.B]B153.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:24:36 through 17-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

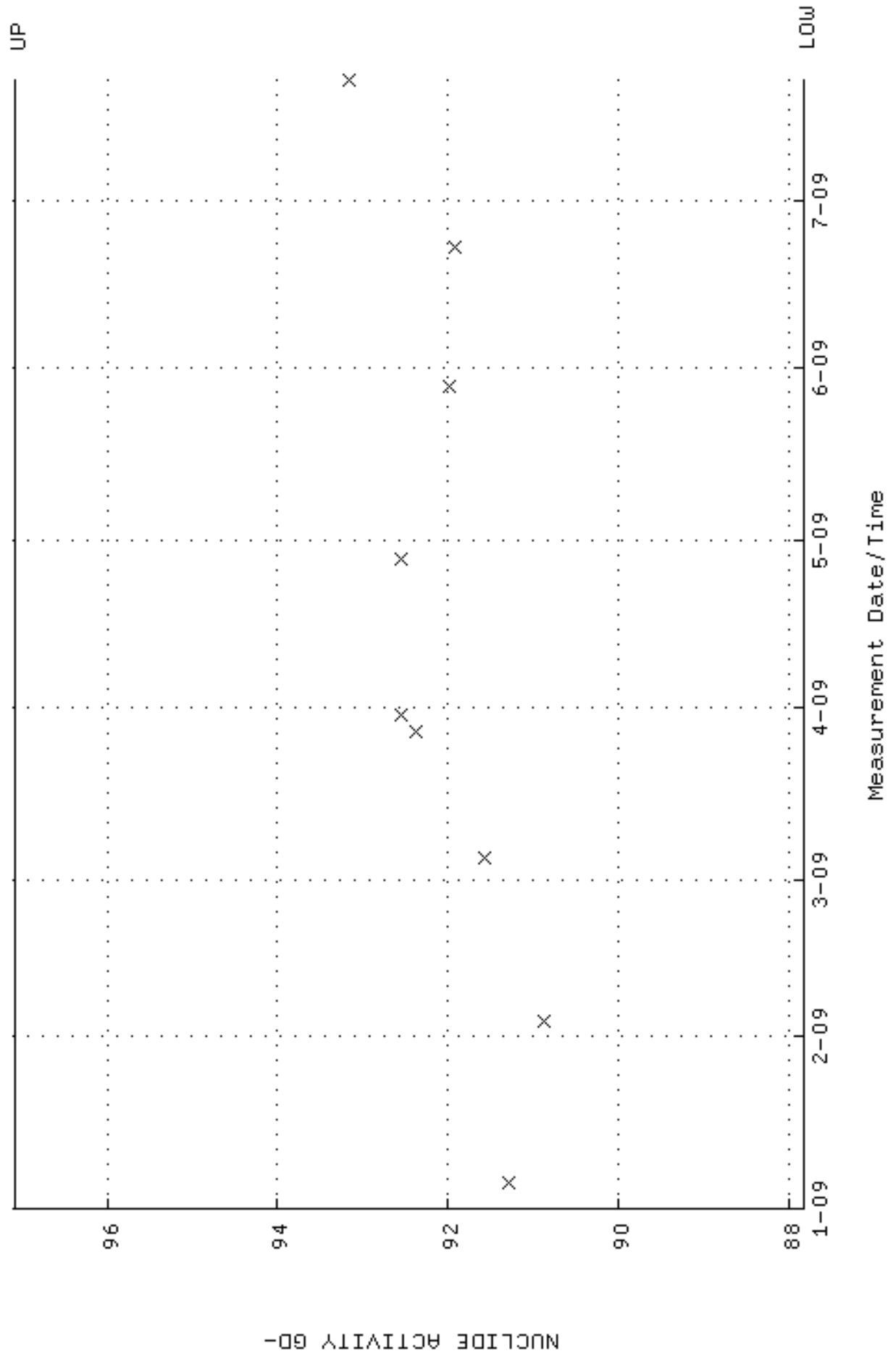


QA filename : DKA100:[ENV\_ALPHA.QA.W]W173.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 5-JAN-2009 12:56:51 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.251498 through 0.271498

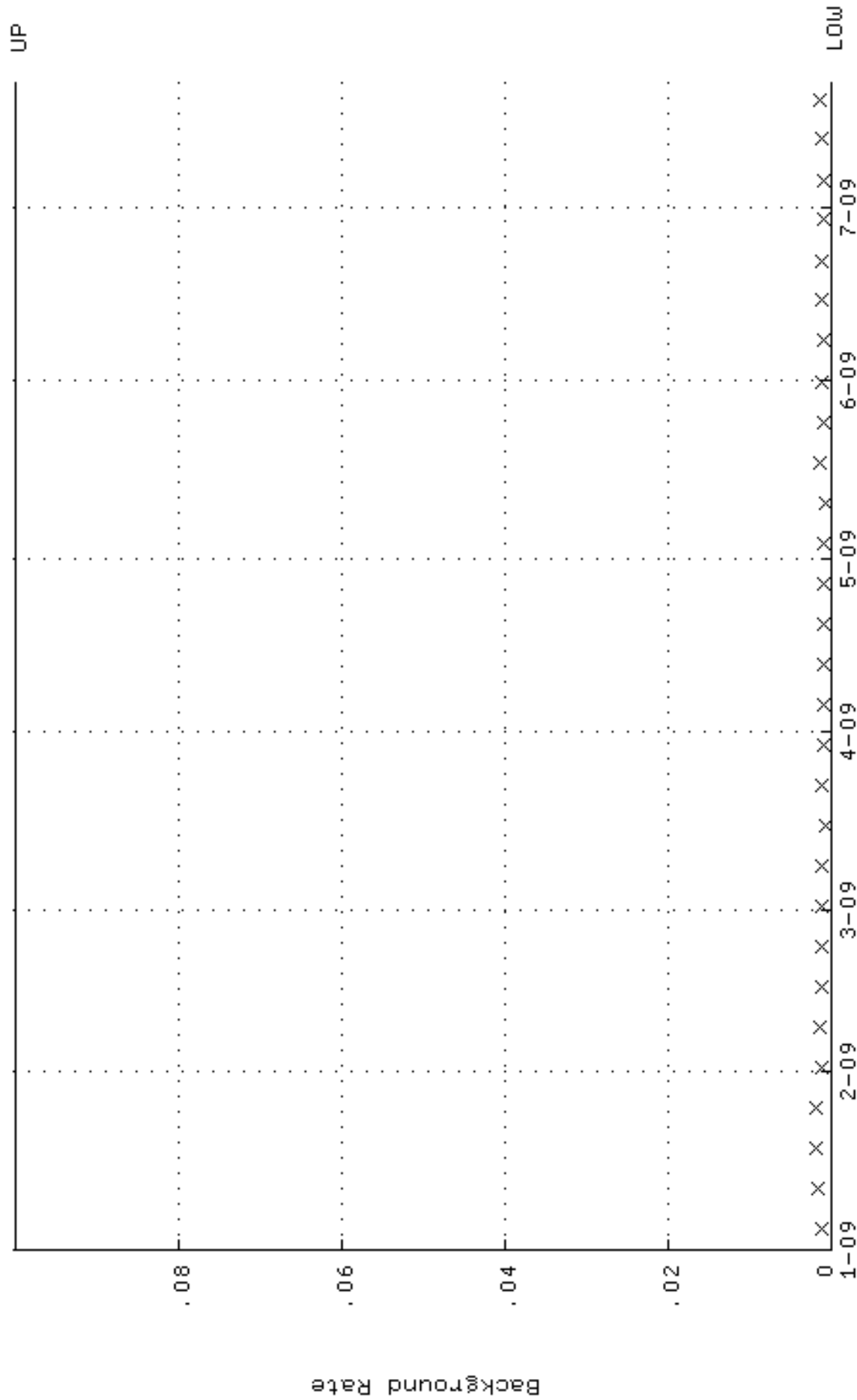




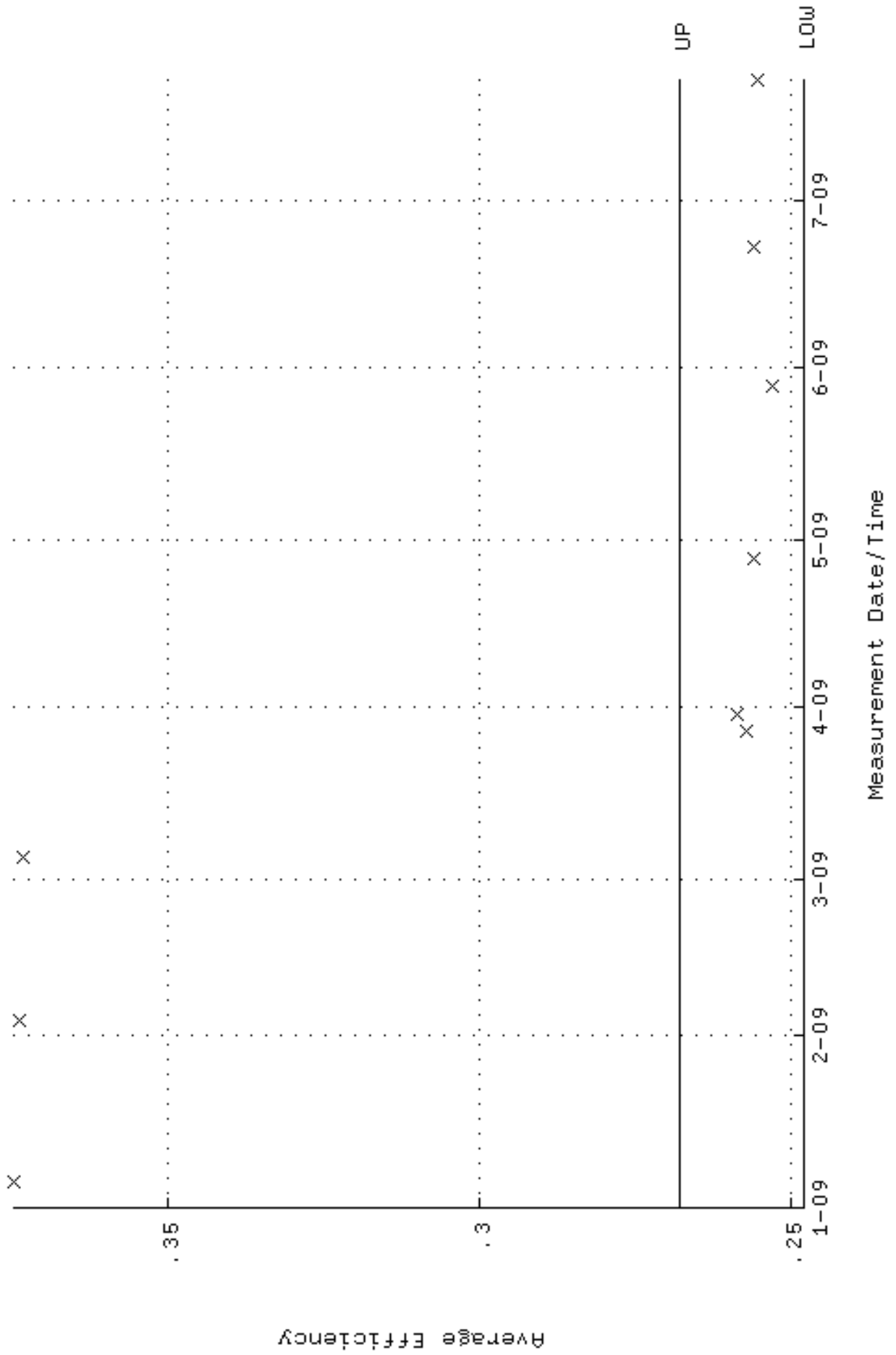
QA filename : DKA100:[ENV\_ALPHA.QA.W]w173.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 5-JAN-2009 12:56:51 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 87.8322 through 97.0776



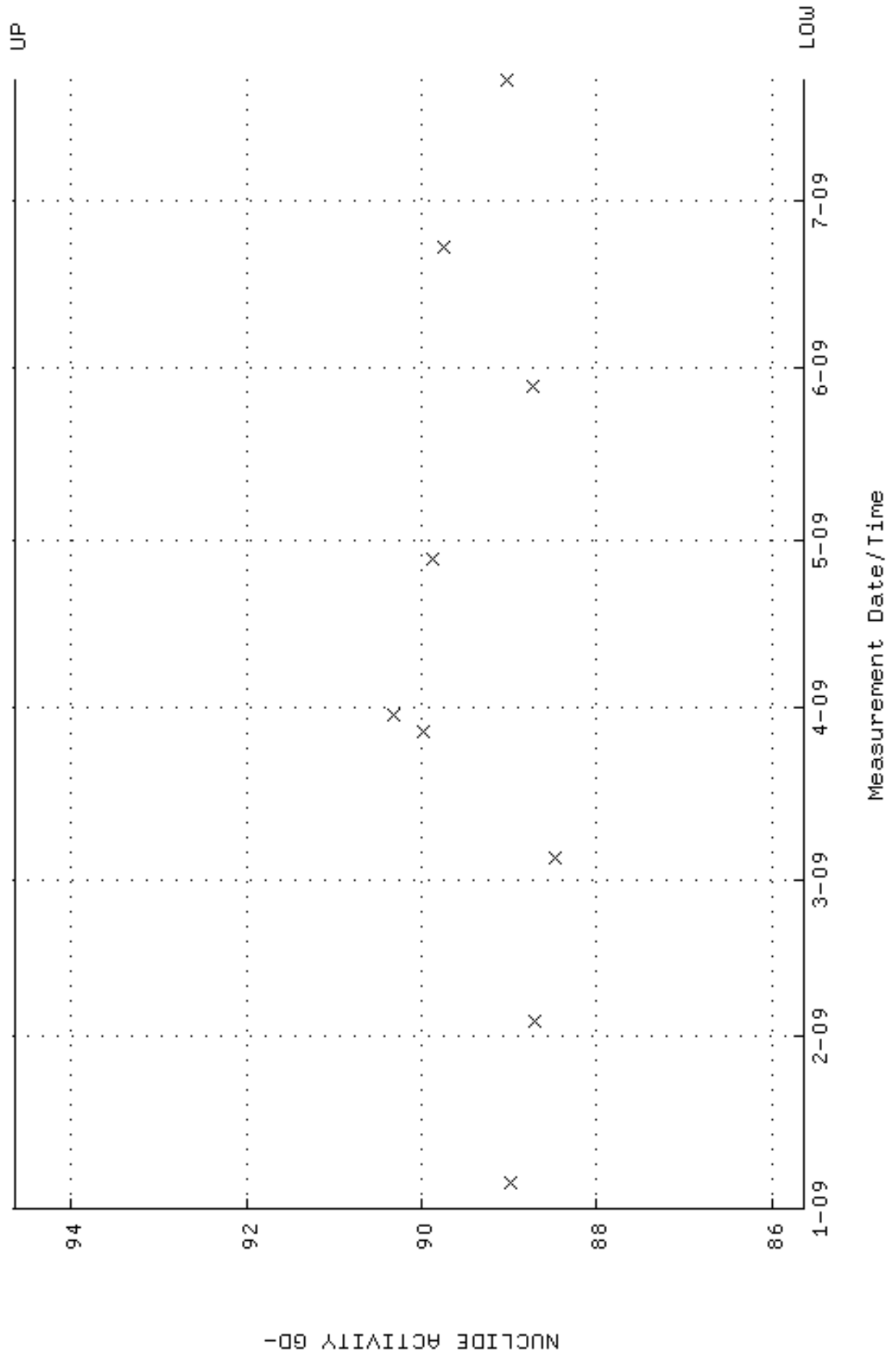
QA filename : DKA100:[ENV\_ALPHA.QA.B]B173.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:49 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



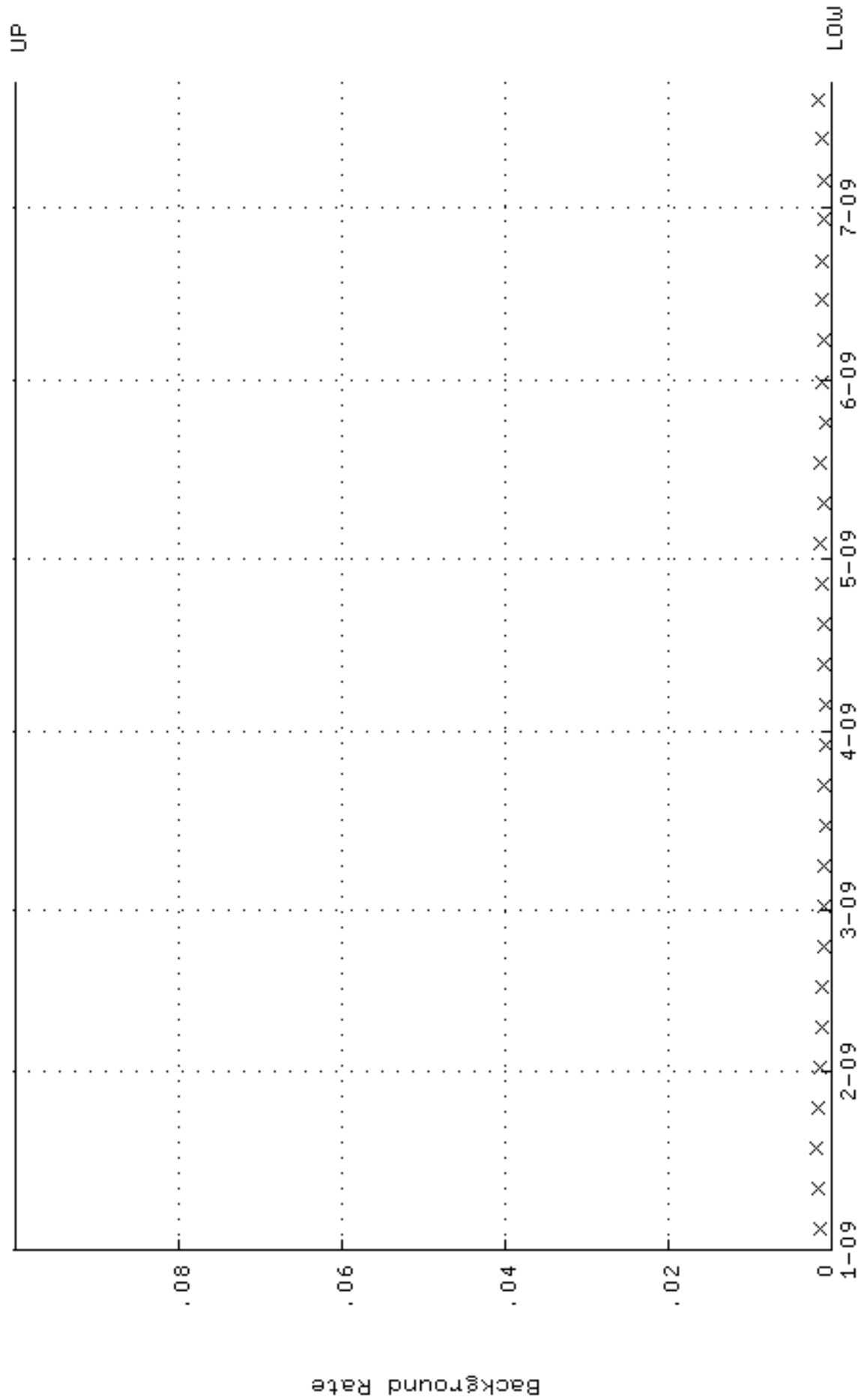
QA filename : DKA100:[ENV\_ALPHA.QA.W]W174.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 5-JAN-2009 12:56:57 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.248038 through 0.268038



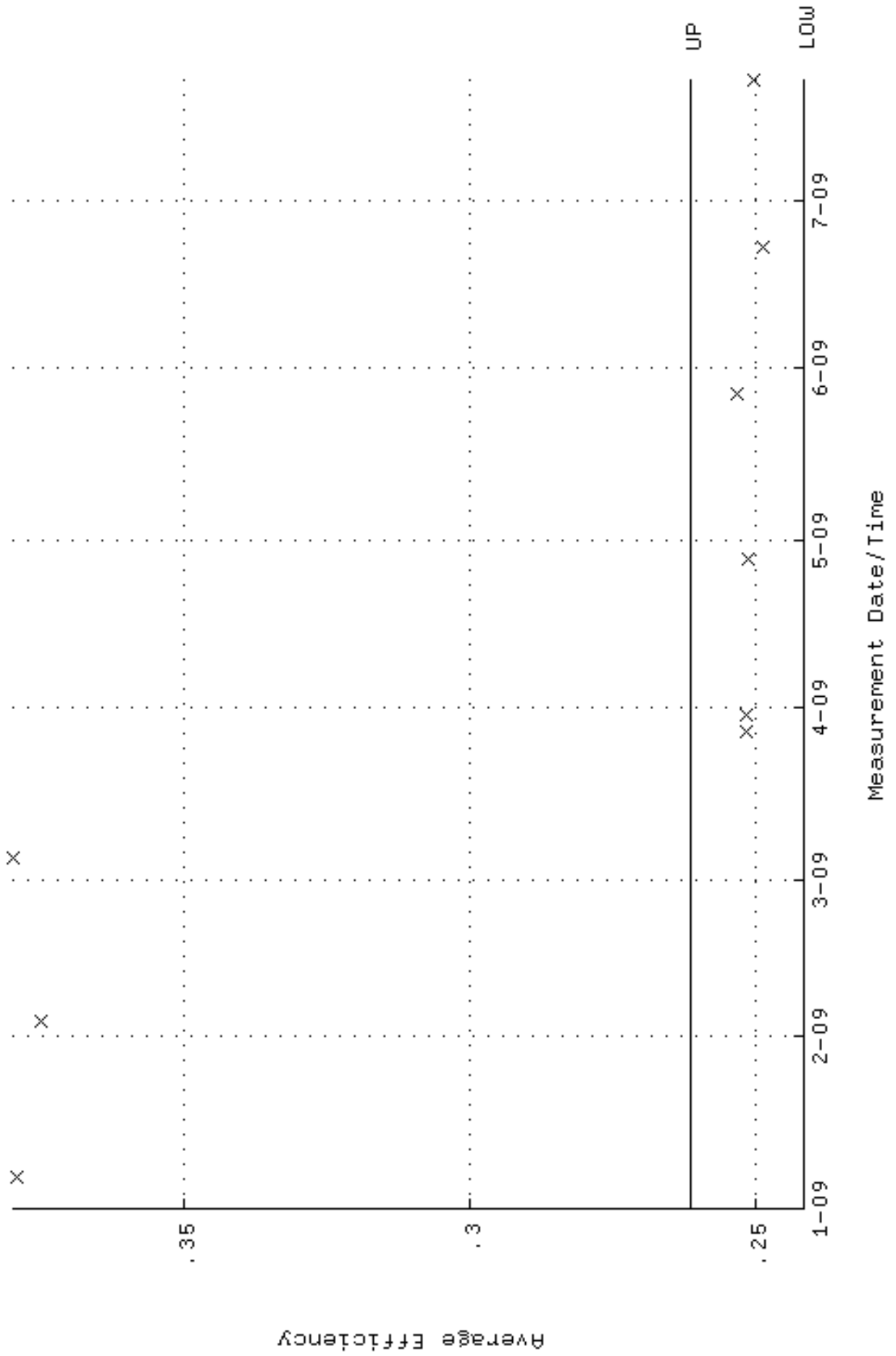
QA filename : DKA100:[ENV\_ALPHA.QA.W]W174.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 5-JAN-2009 12:56:57 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.6304 through 94.6442



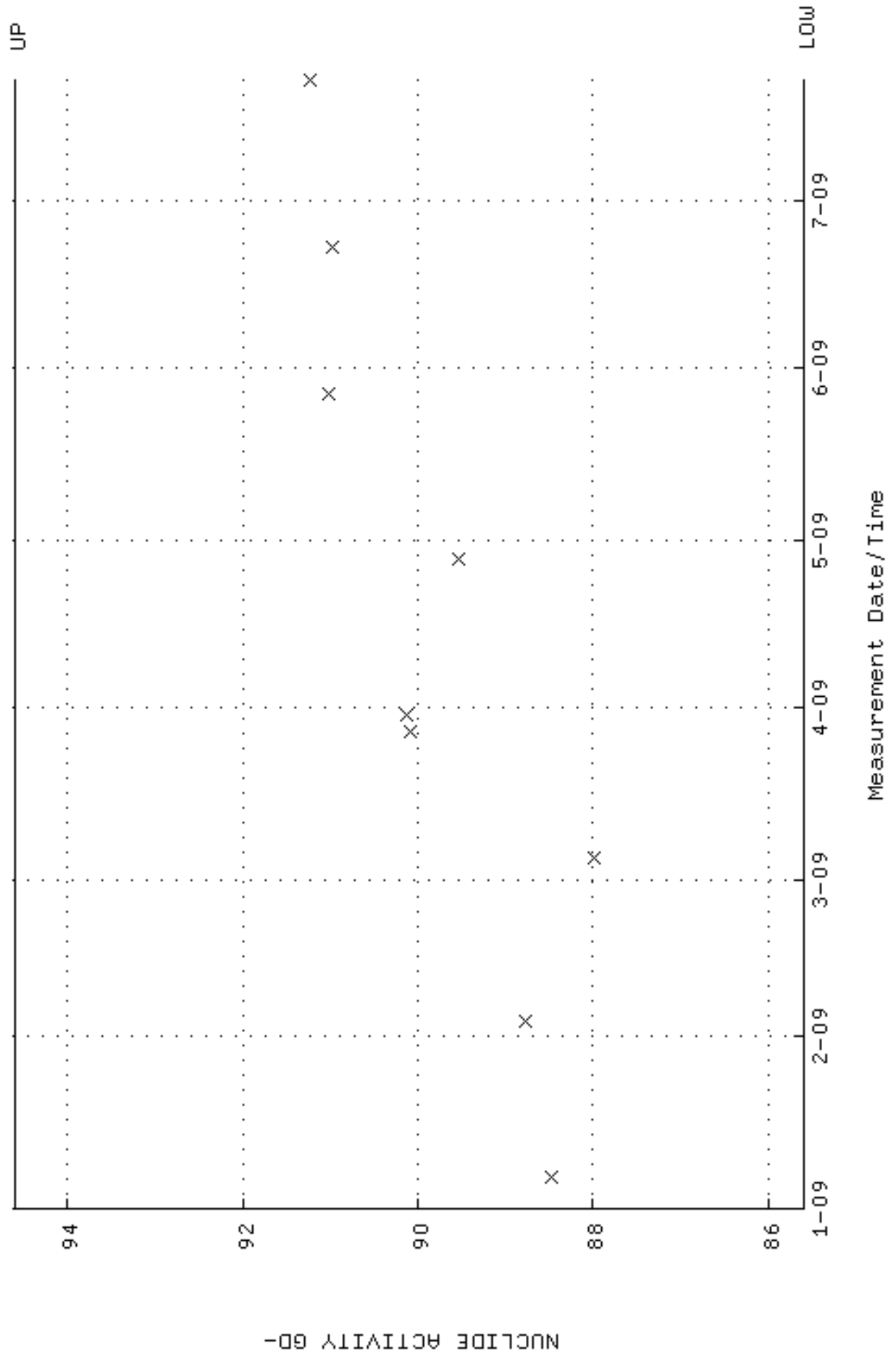
QA filename : DKA100:[ENV\_ALPHA.QA.B]B174.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:25:54 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



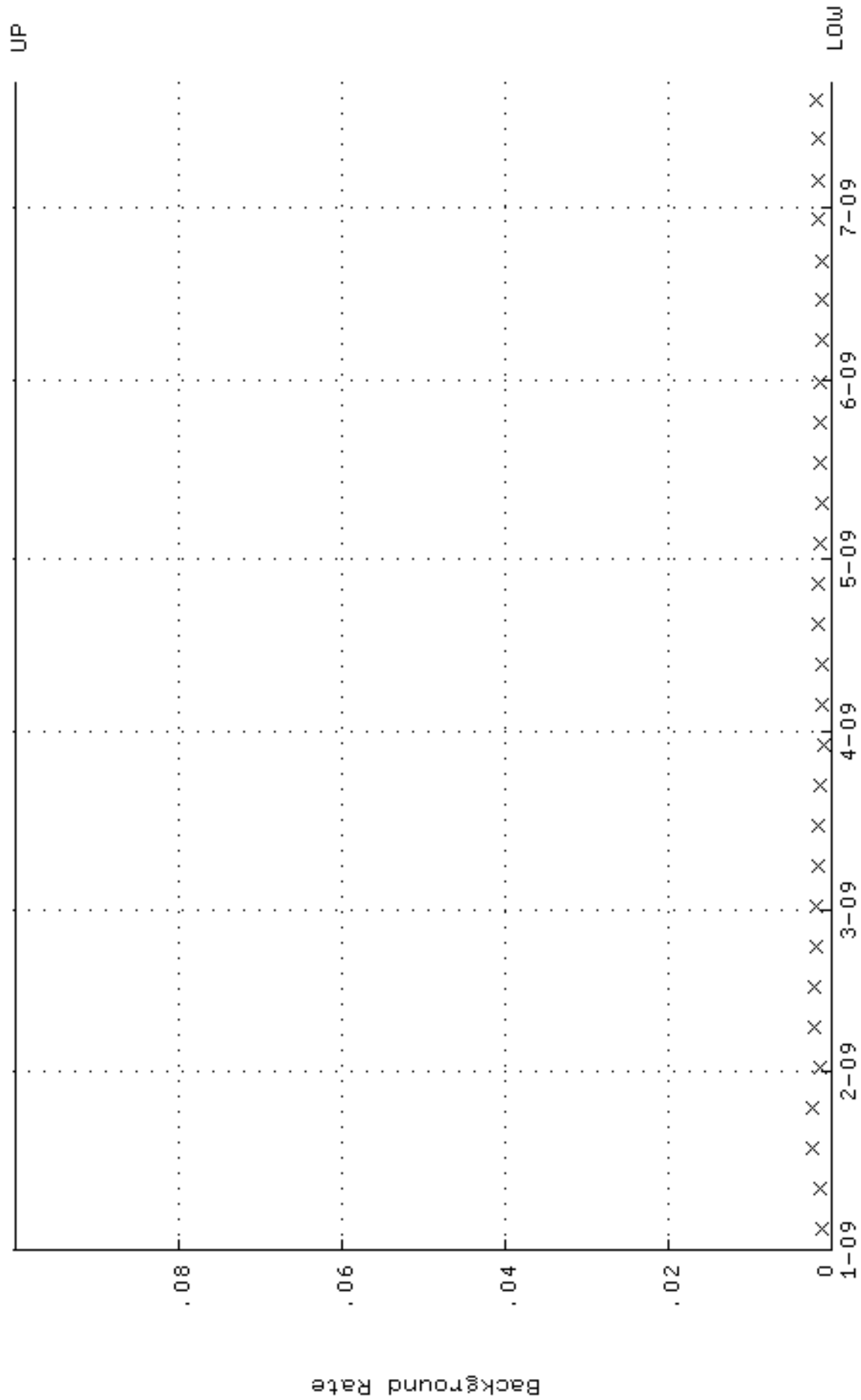
QA filename : DKA100:[ENV\_ALPHA.QA.W]W187.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:37 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.241464 through 0.261464



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

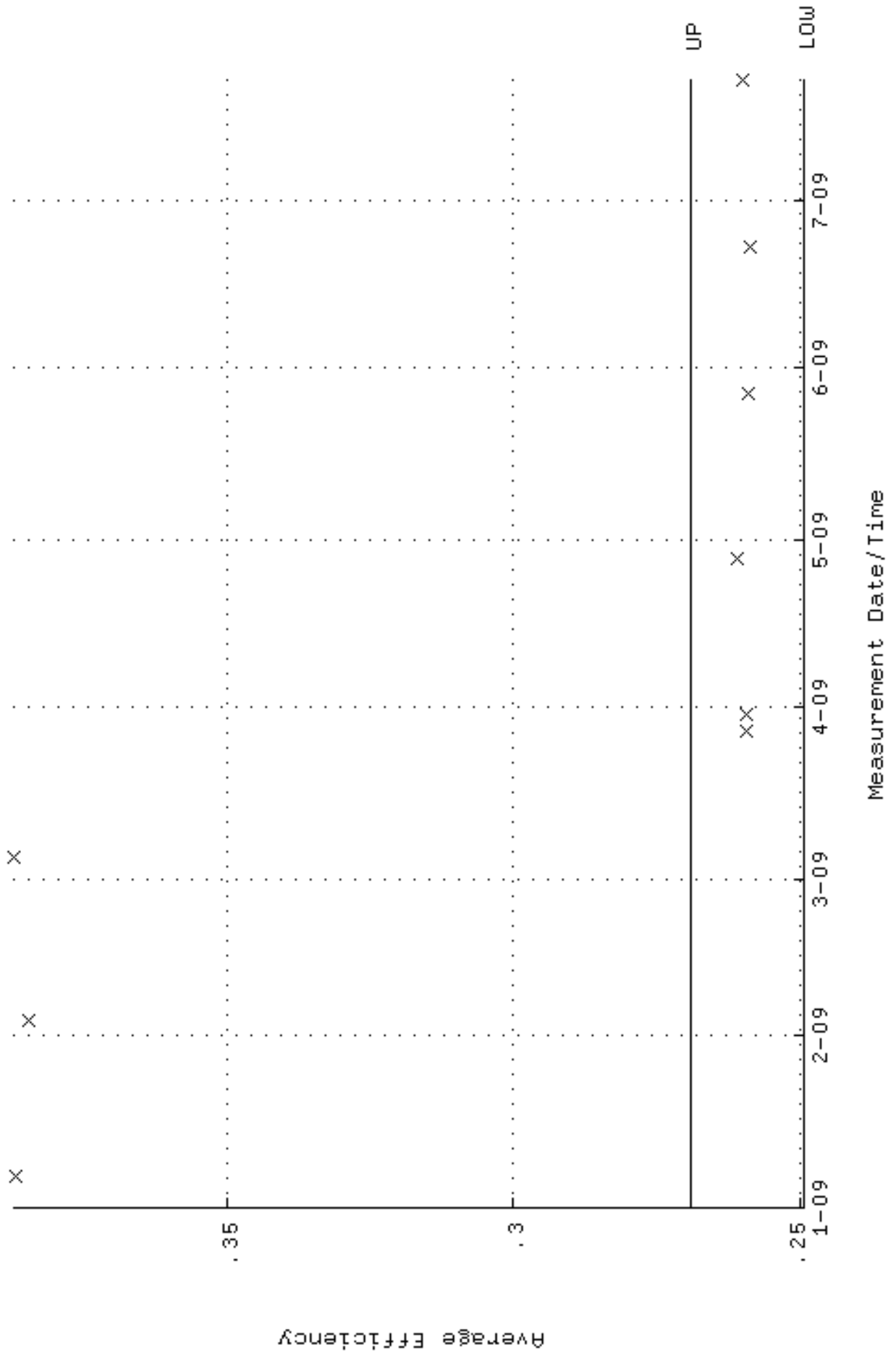


QA filename : DKA100:[ENV\_ALPHA.QA.B]B187.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:44 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

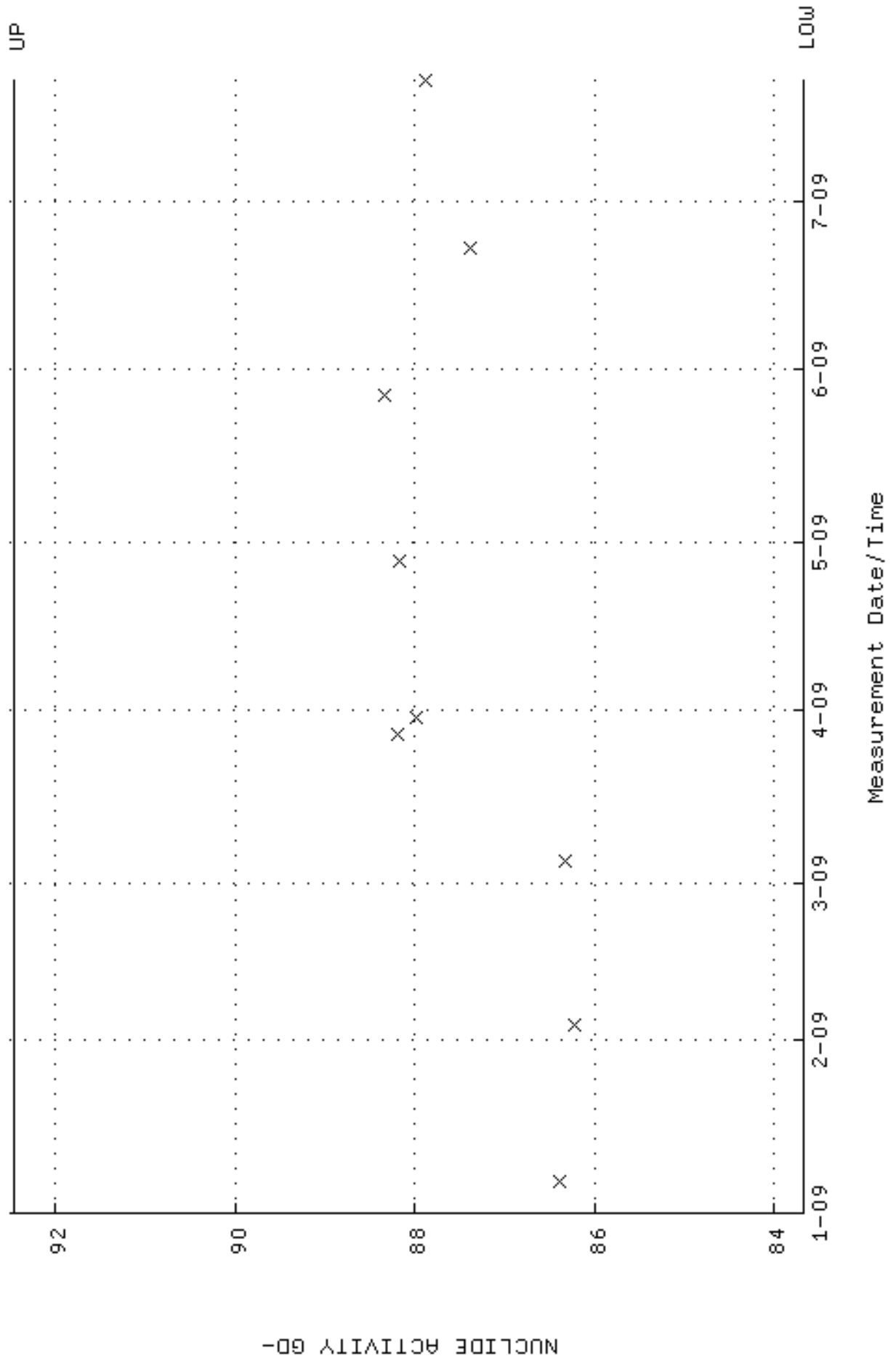




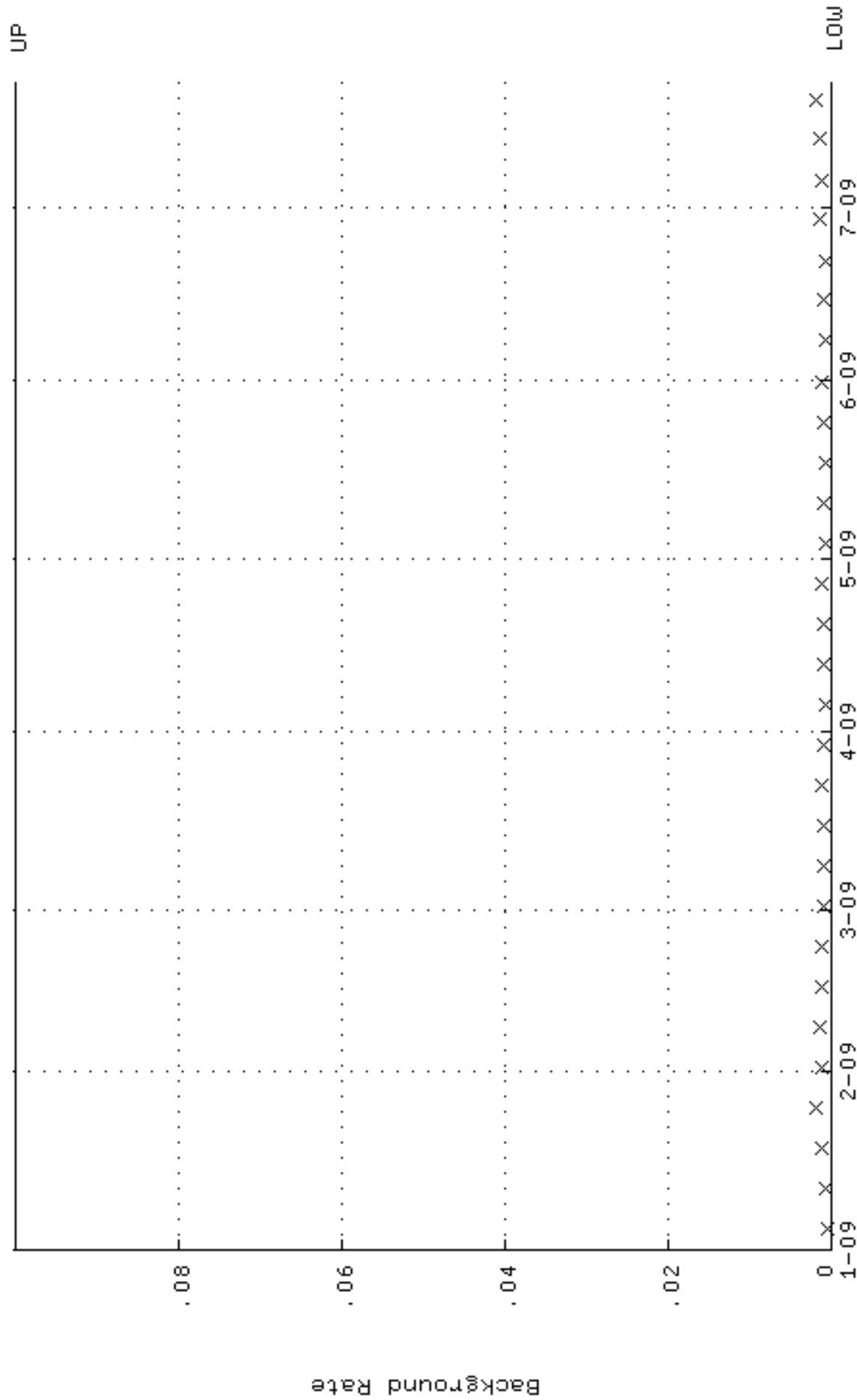
QA filename : DKA100:[ENV\_ALPHA.QA.W]W188.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:41 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.249341 through 0.269341



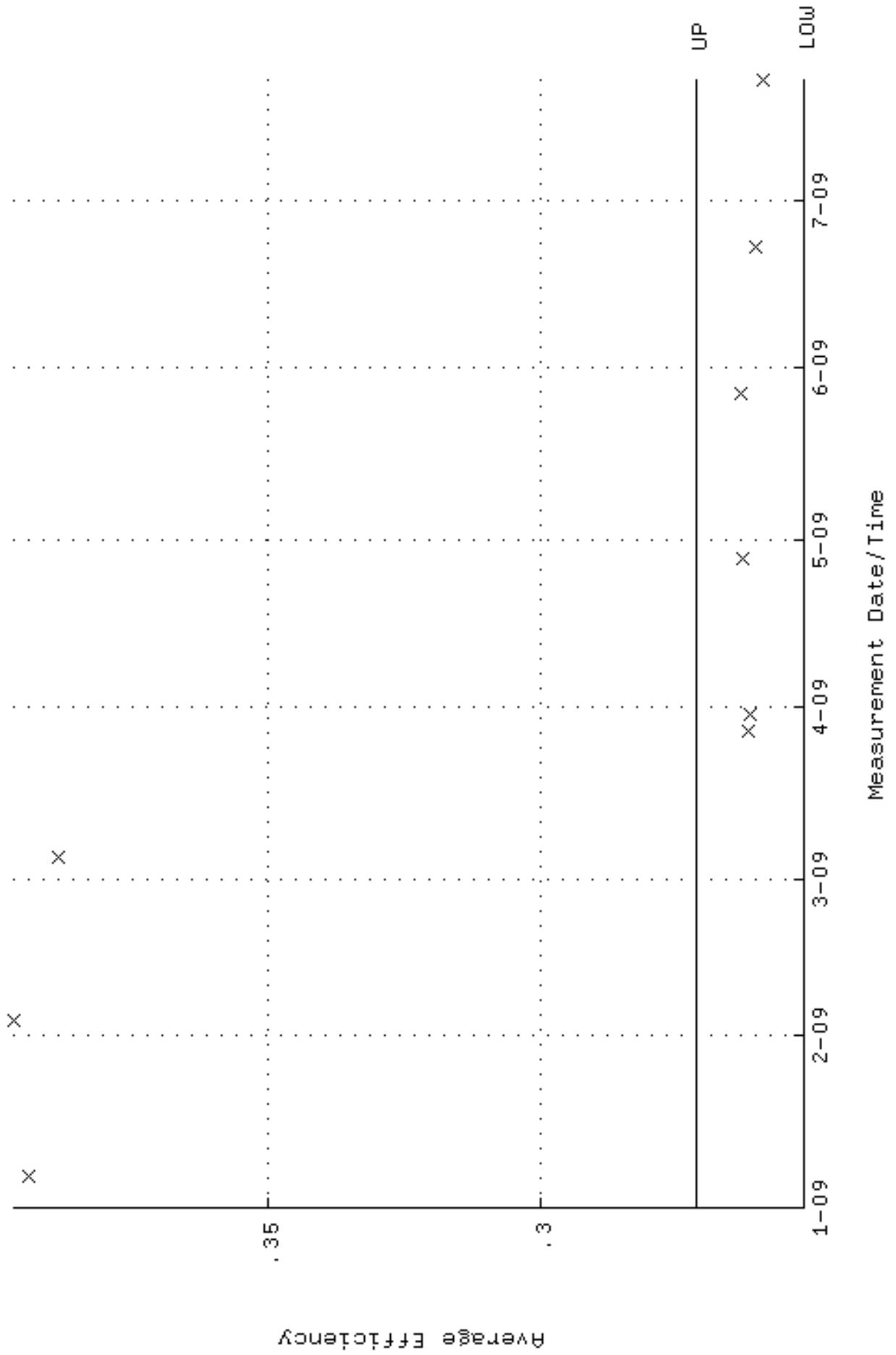
QA filename : DKA100:[ENV\_ALPHA.QA.W]w188.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:41 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 83.6747 through 92.4825



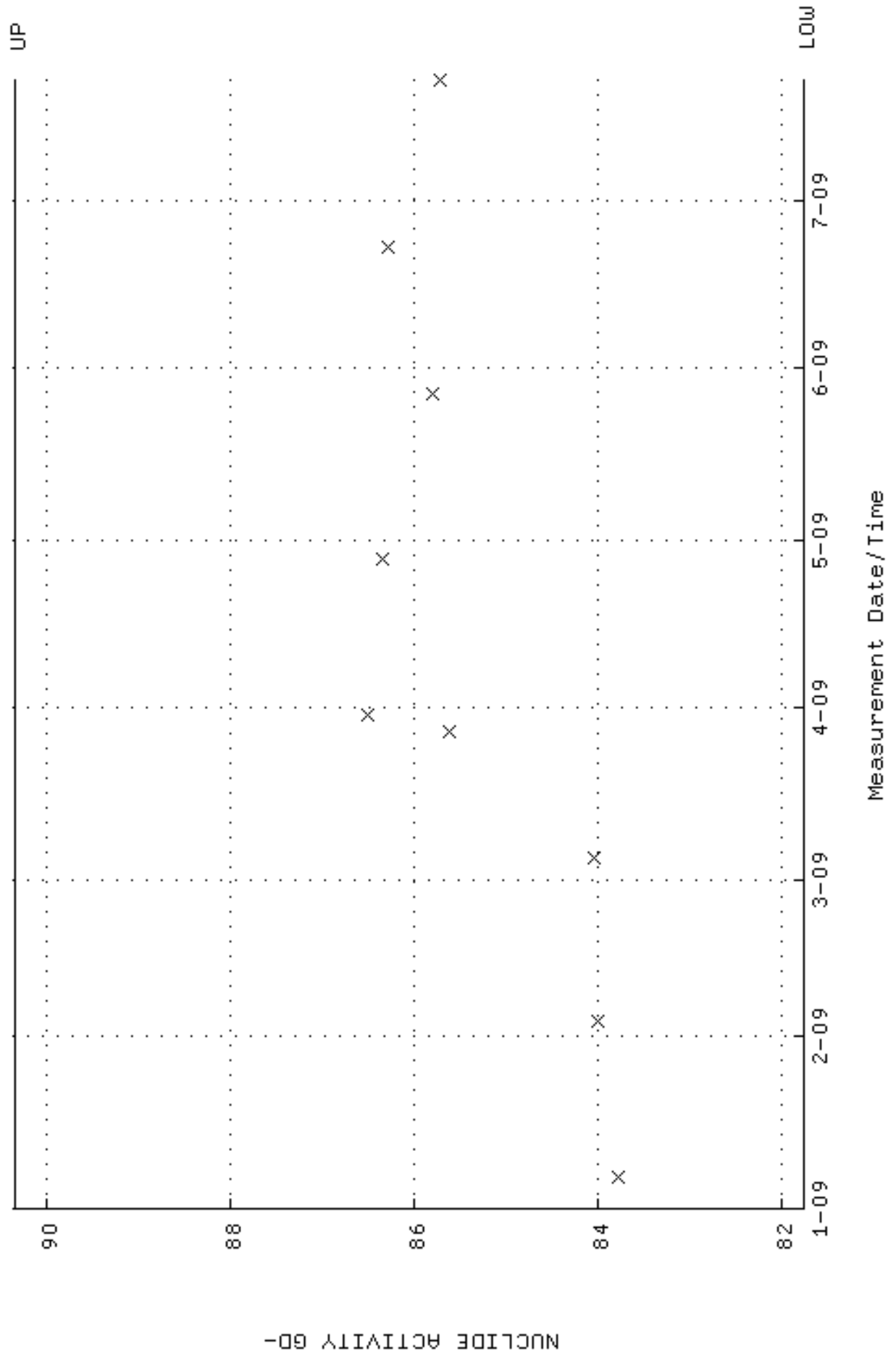
QA filename : DKA100:[ENV\_ALPHA.QA.B]B188.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:47 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



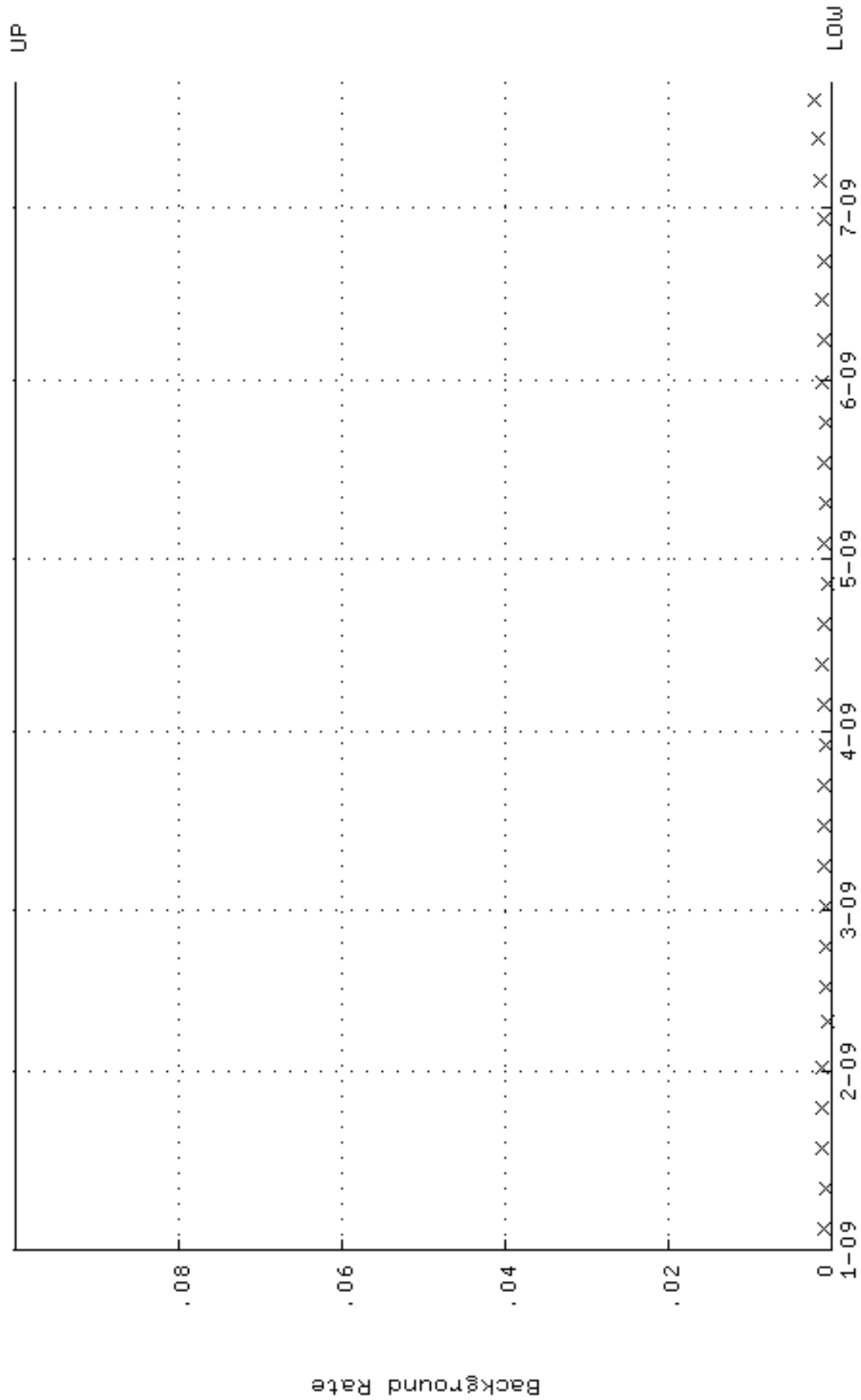
QA filename : DKA100:[ENV\_ALPHA.QA.W]W189.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:46 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.251590 through 0.271590



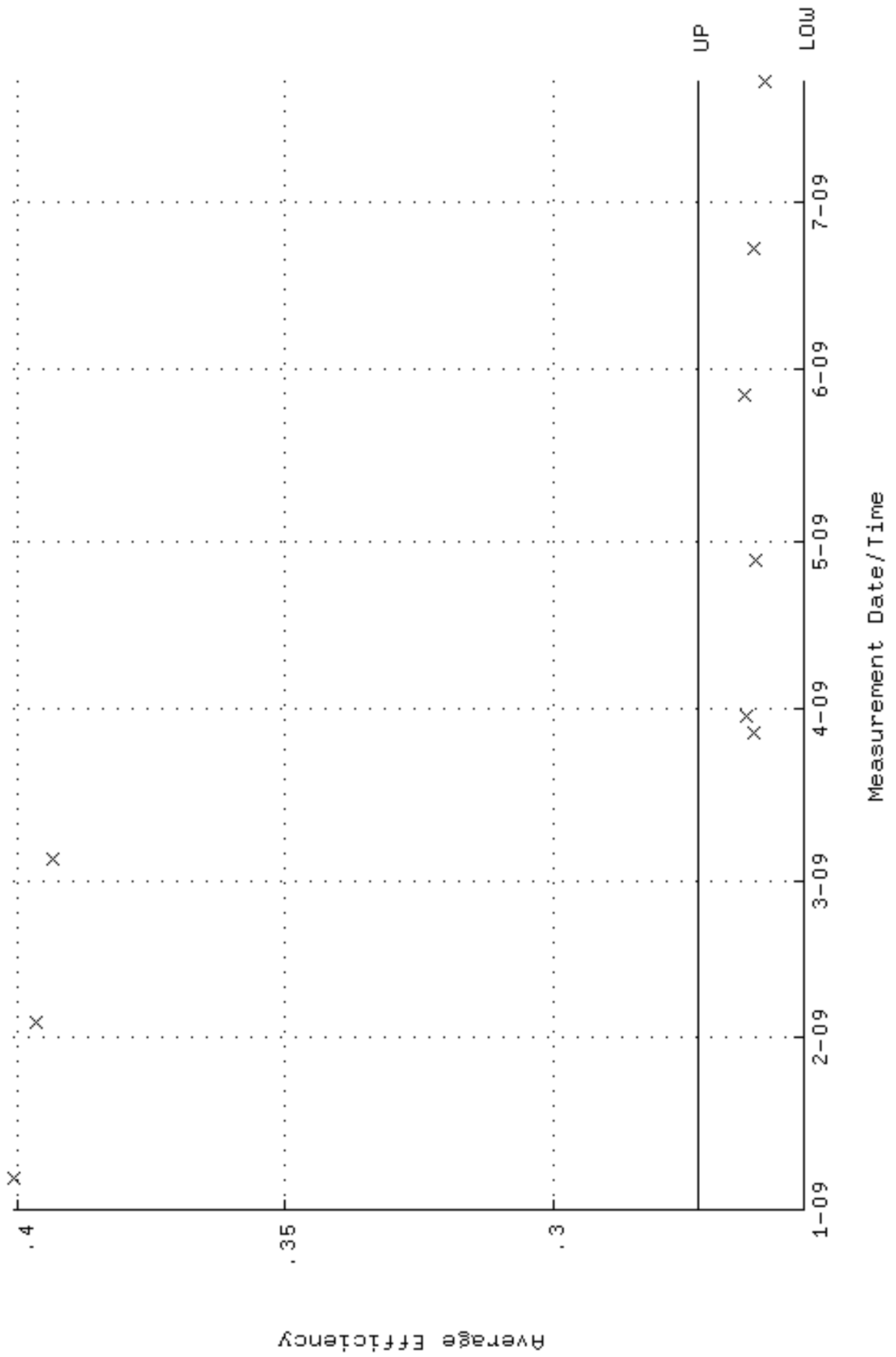
QA filename : DKA100:[ENV\_ALPHA.QA.W]w189.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:46 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 81.7473 through 90.3523



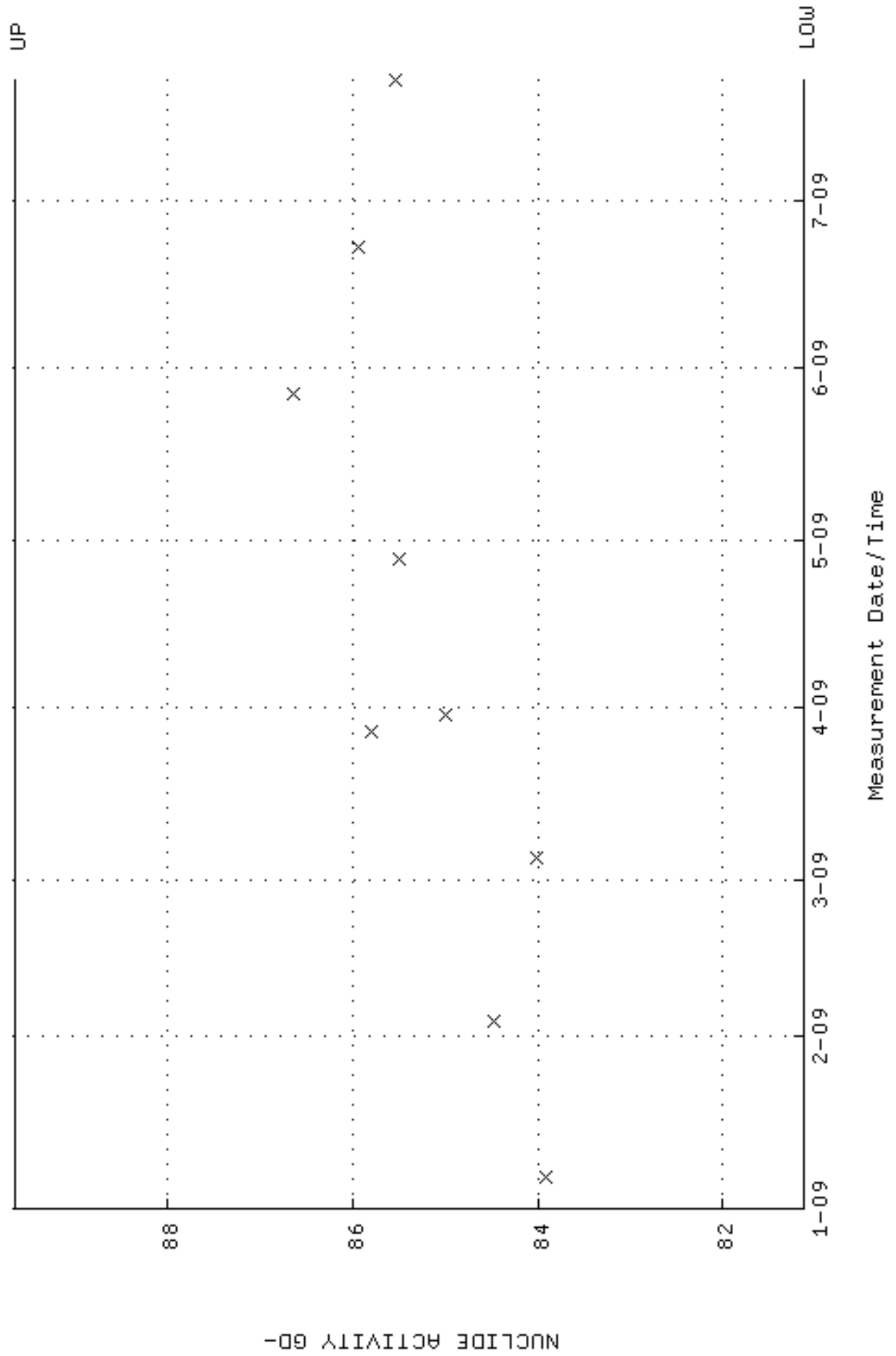
QA filename : DKA100:[ENV\_ALPHA.QA.B]B189.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:51 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



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

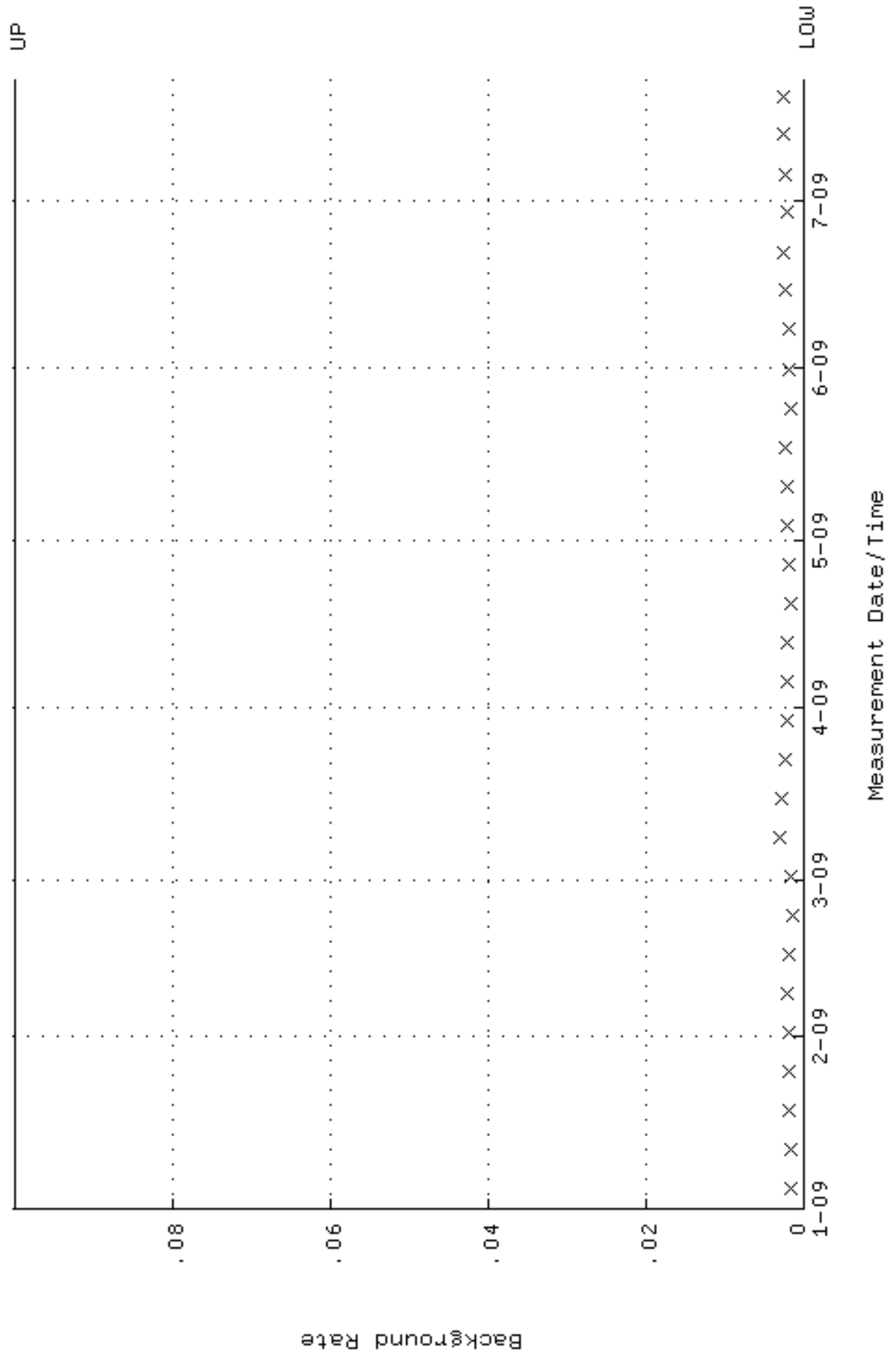


QA filename : DKA100:[ENV\_ALPHA.QA.W]W190.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:49 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 81.1176 through 89.6562

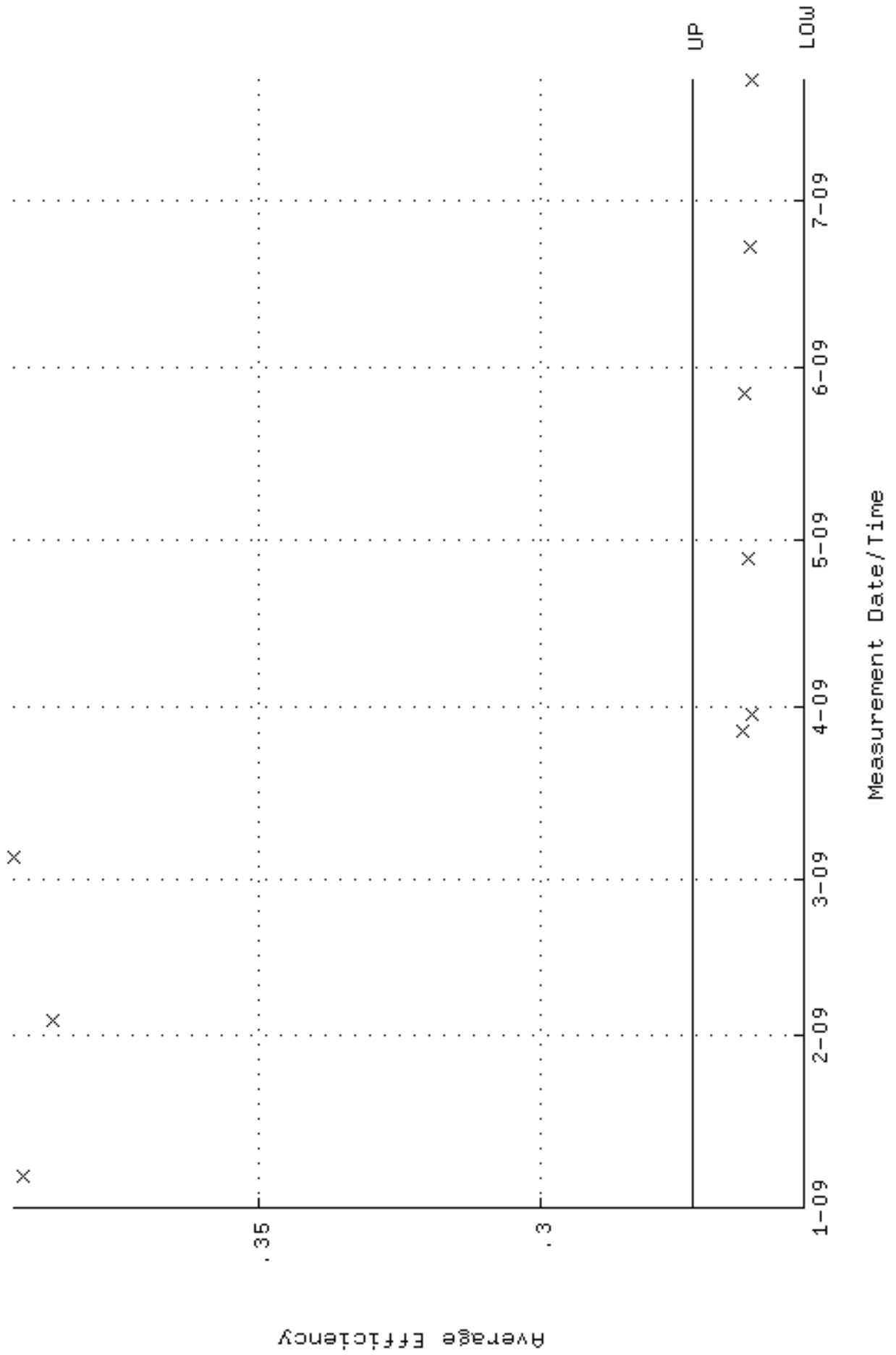




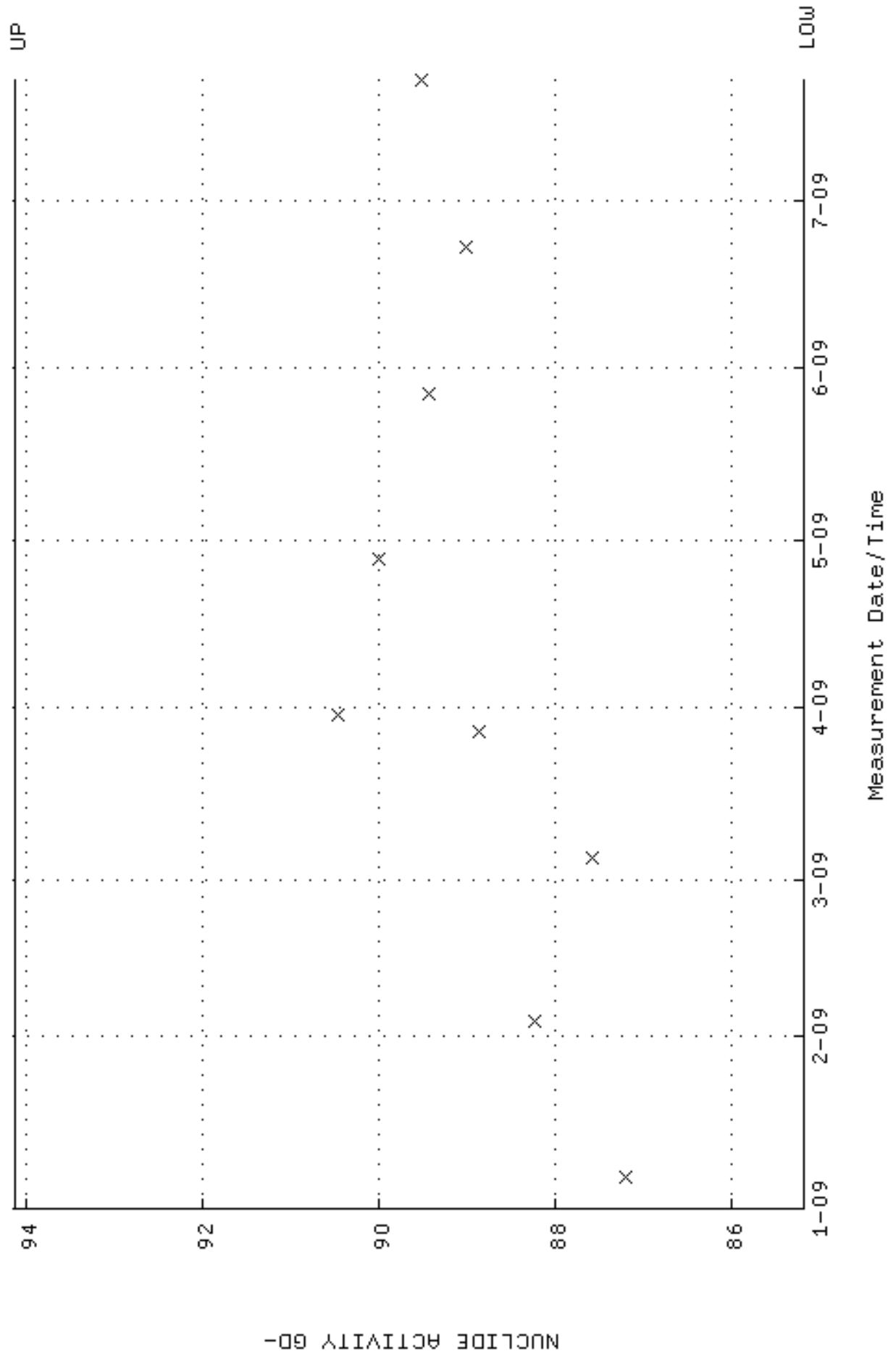
QA filename : DKA100:[ENV\_ALPHA.QA.B]B190.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:55 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



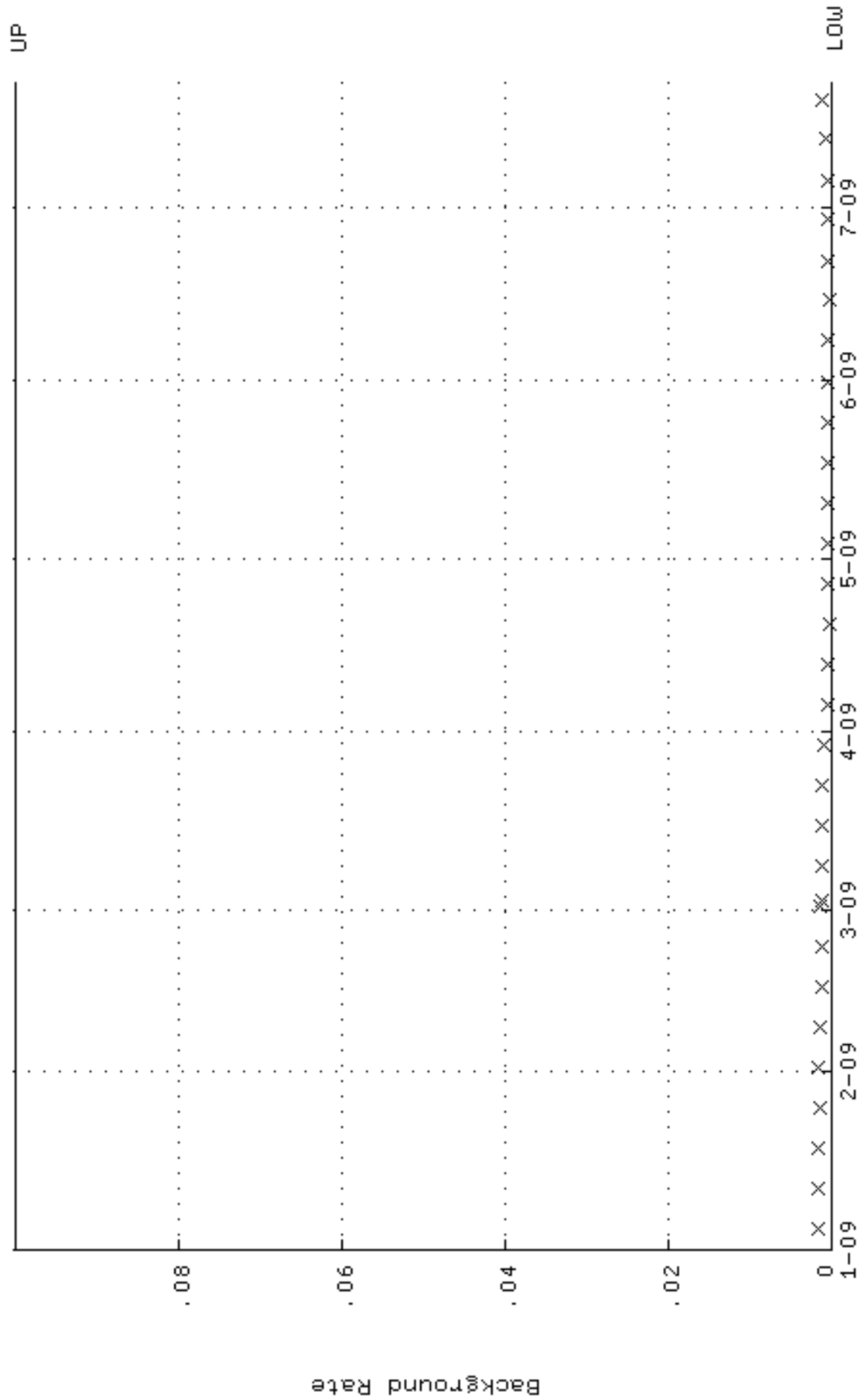
QA filename : DKA100:[ENV\_ALPHA.QA.W]W191.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:54 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.252993 through 0.272993



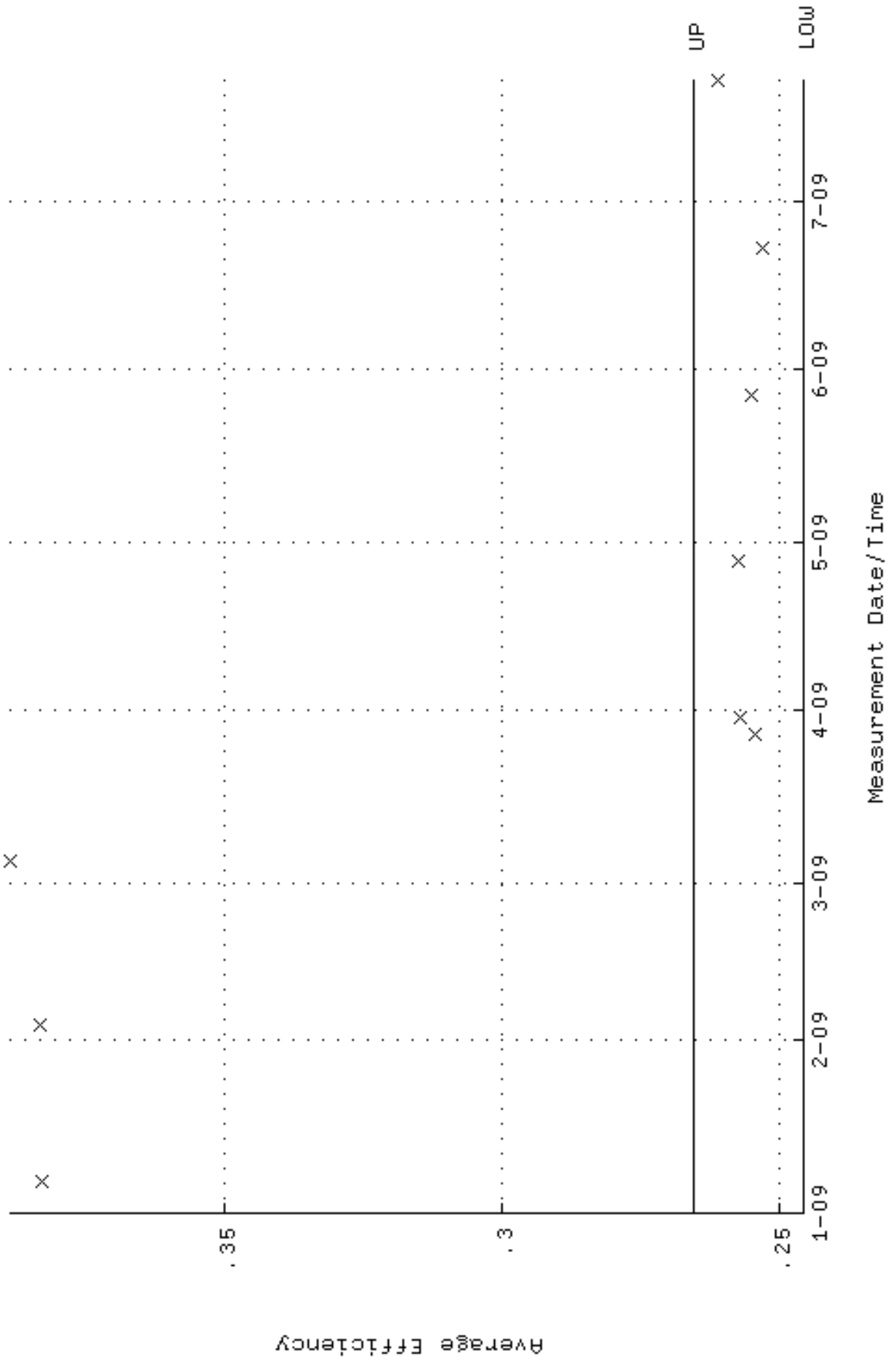
QA filename : DKA100:[ENV\_ALPHA.QA.W]w191.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:54 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.1712 through 94.1366



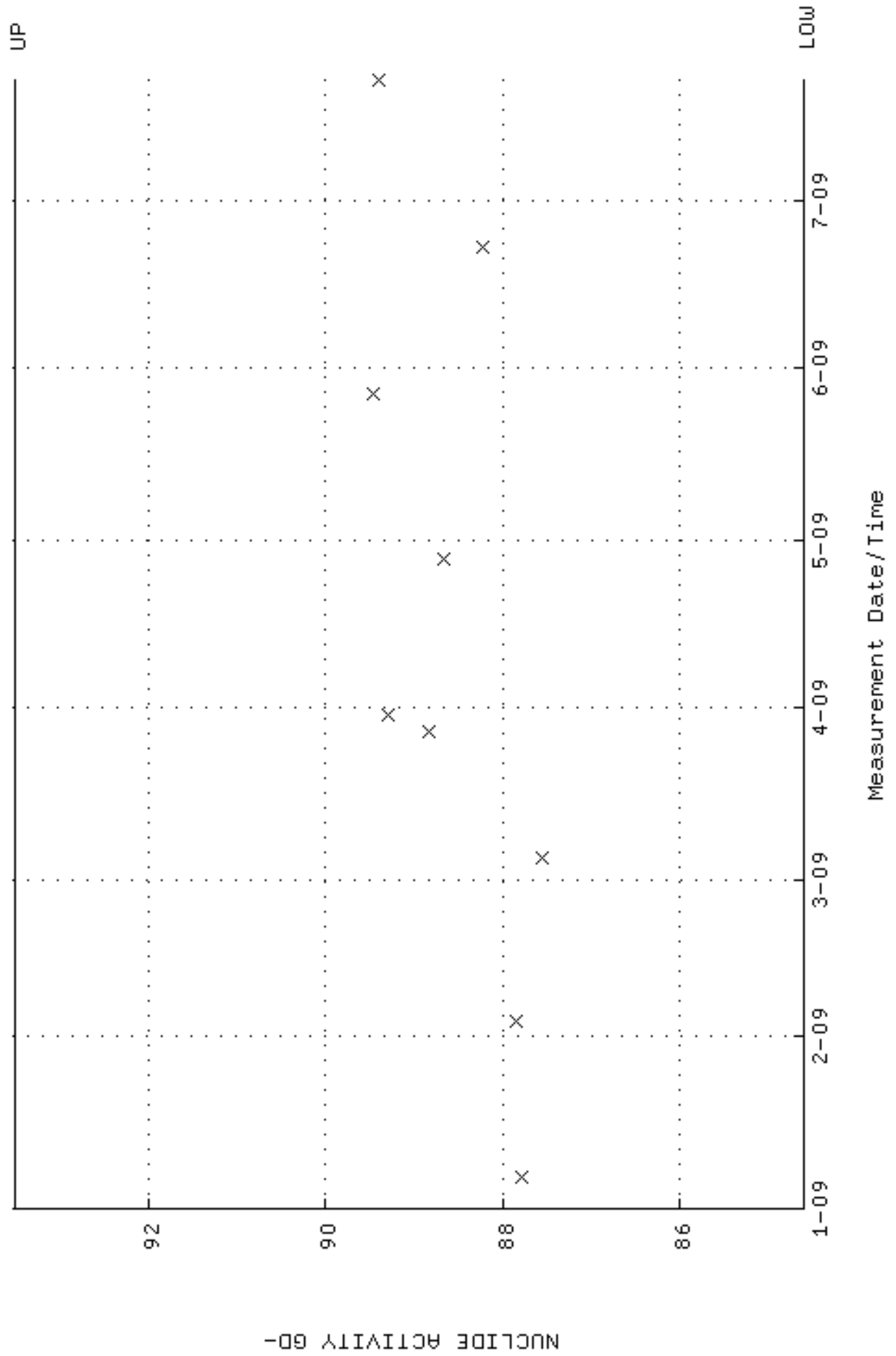
QA filename : DKA100:[ENV\_ALPHA.QA.B]B191.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:26:58 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



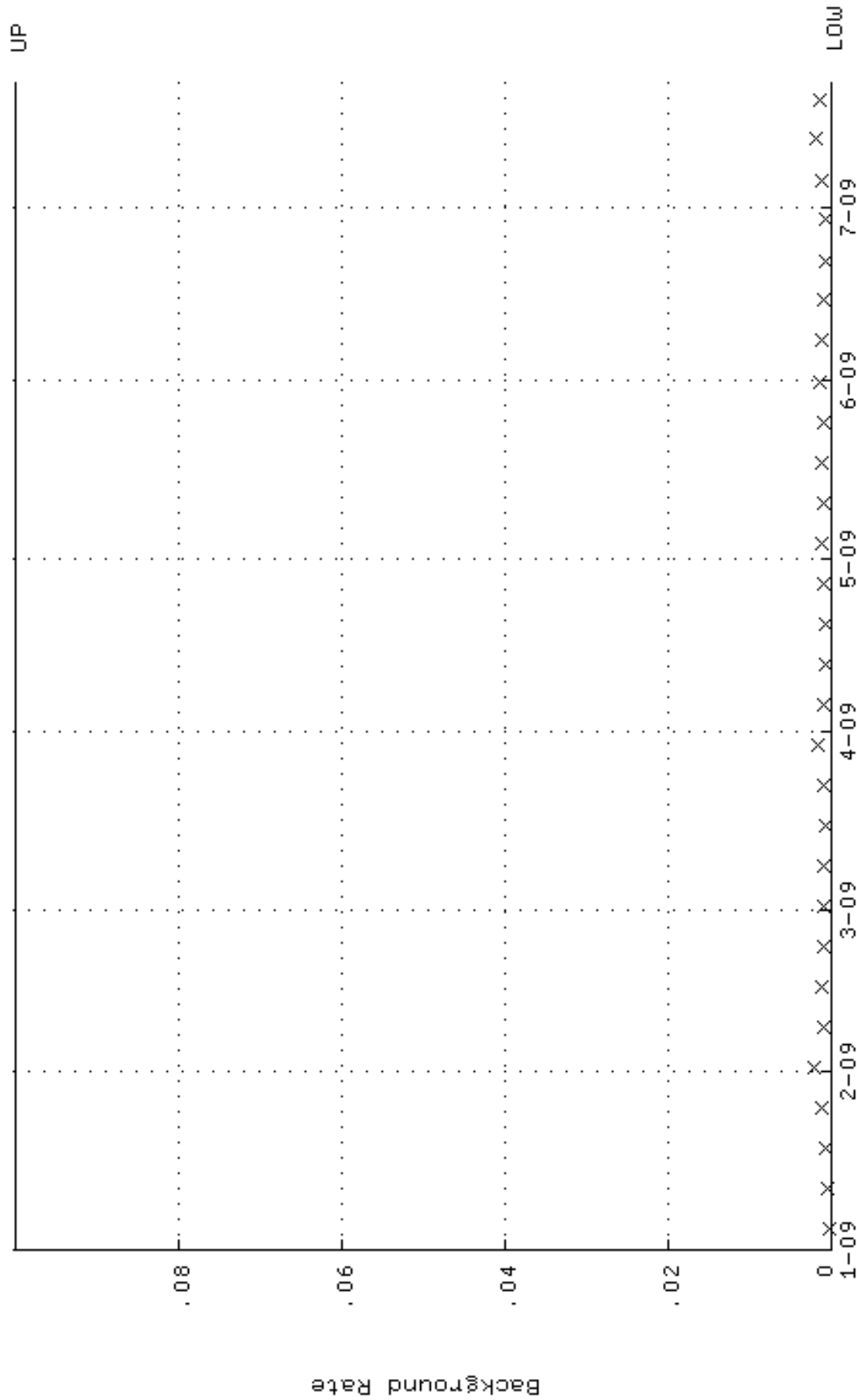
QA filename : DKA100:[ENV\_ALPHA.QA.W]W192.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:31:58 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.245663 through 0.265663



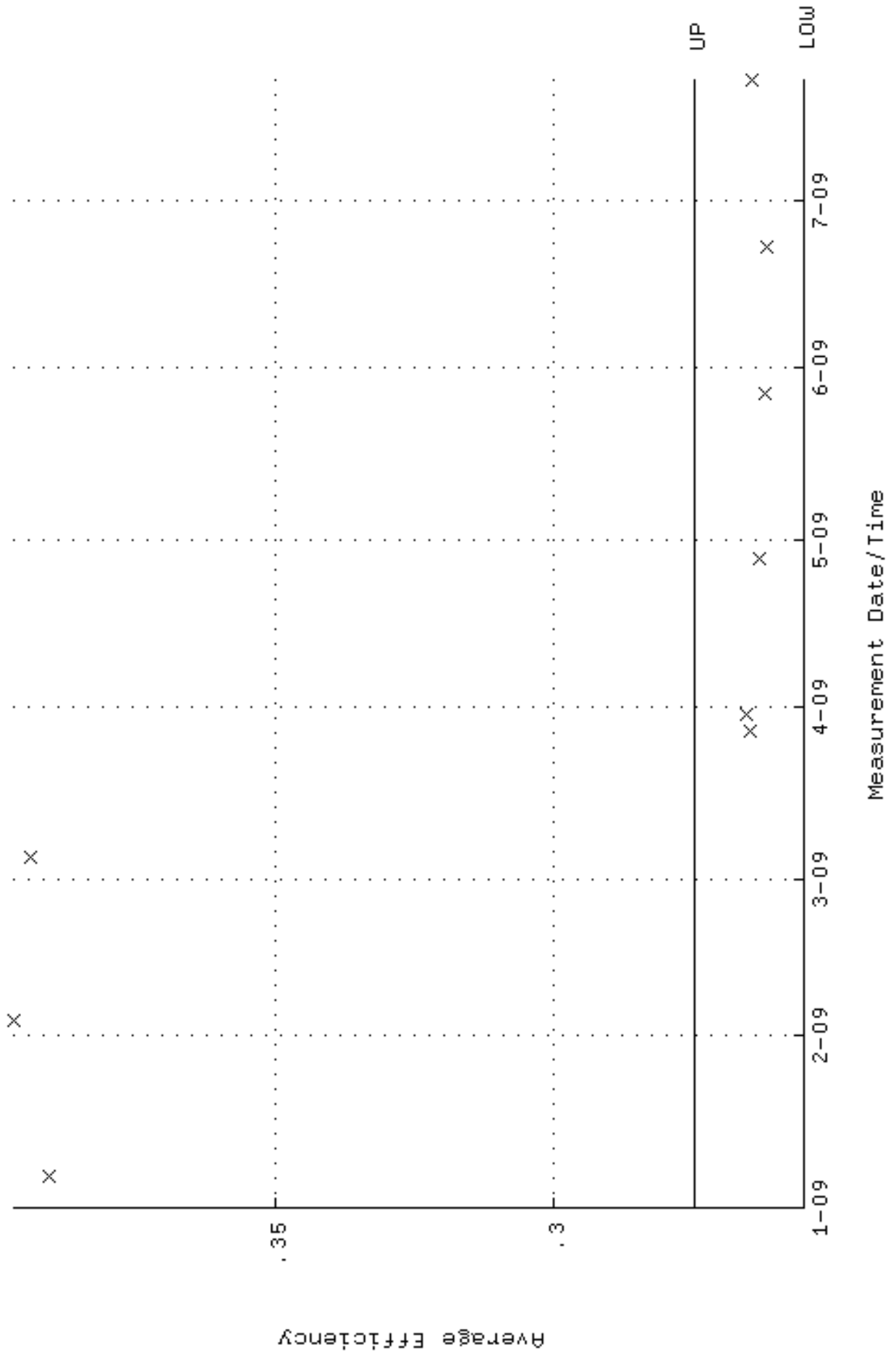
QA filename : DKA100:[ENV\_ALPHA.QA.W]W192.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:31:58 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.6037 through 93.5093



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

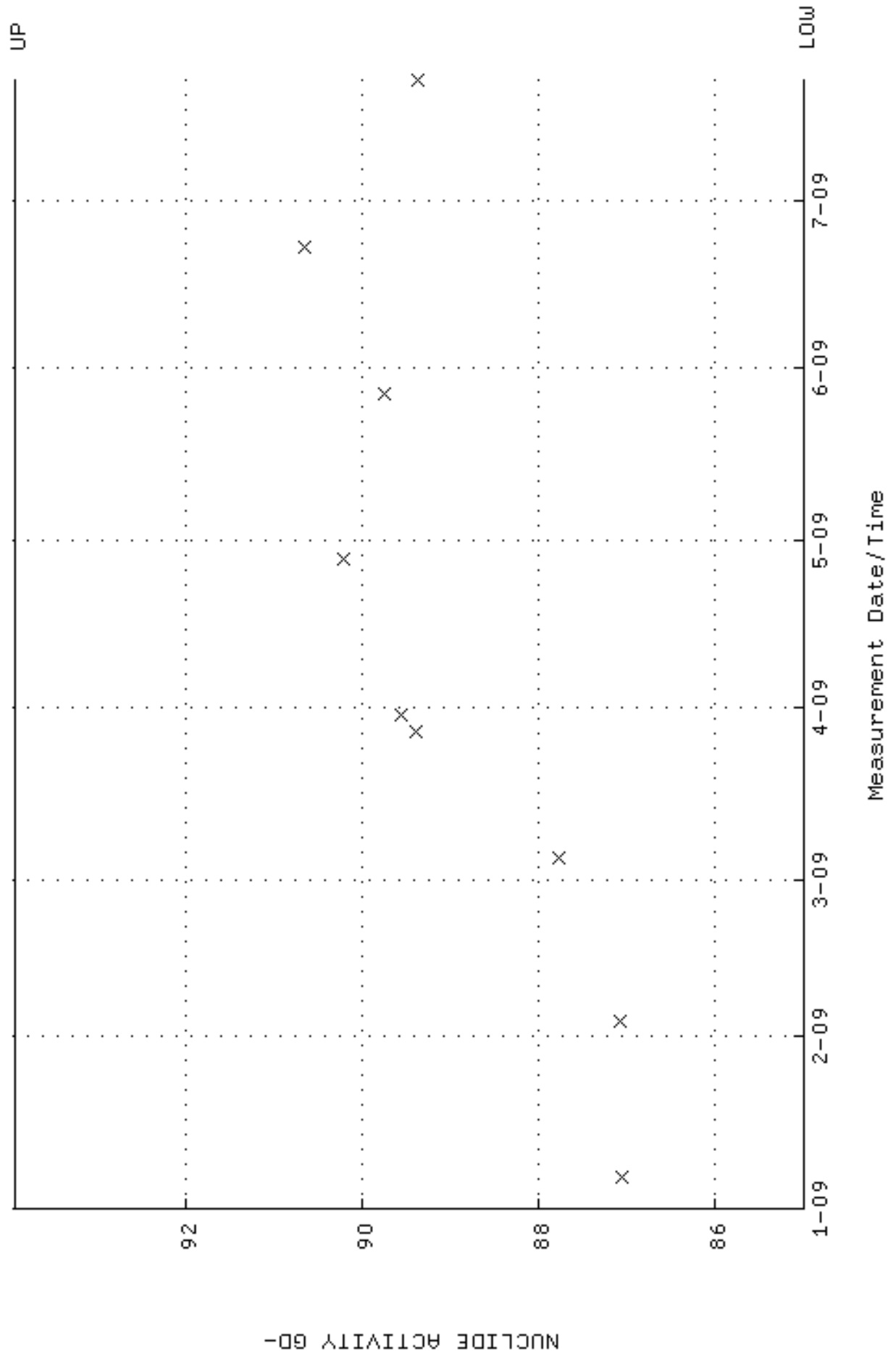


QA filename : DKA100:[ENV\_ALPHA.QA.W]W193.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:32:01 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.254861 through 0.274861

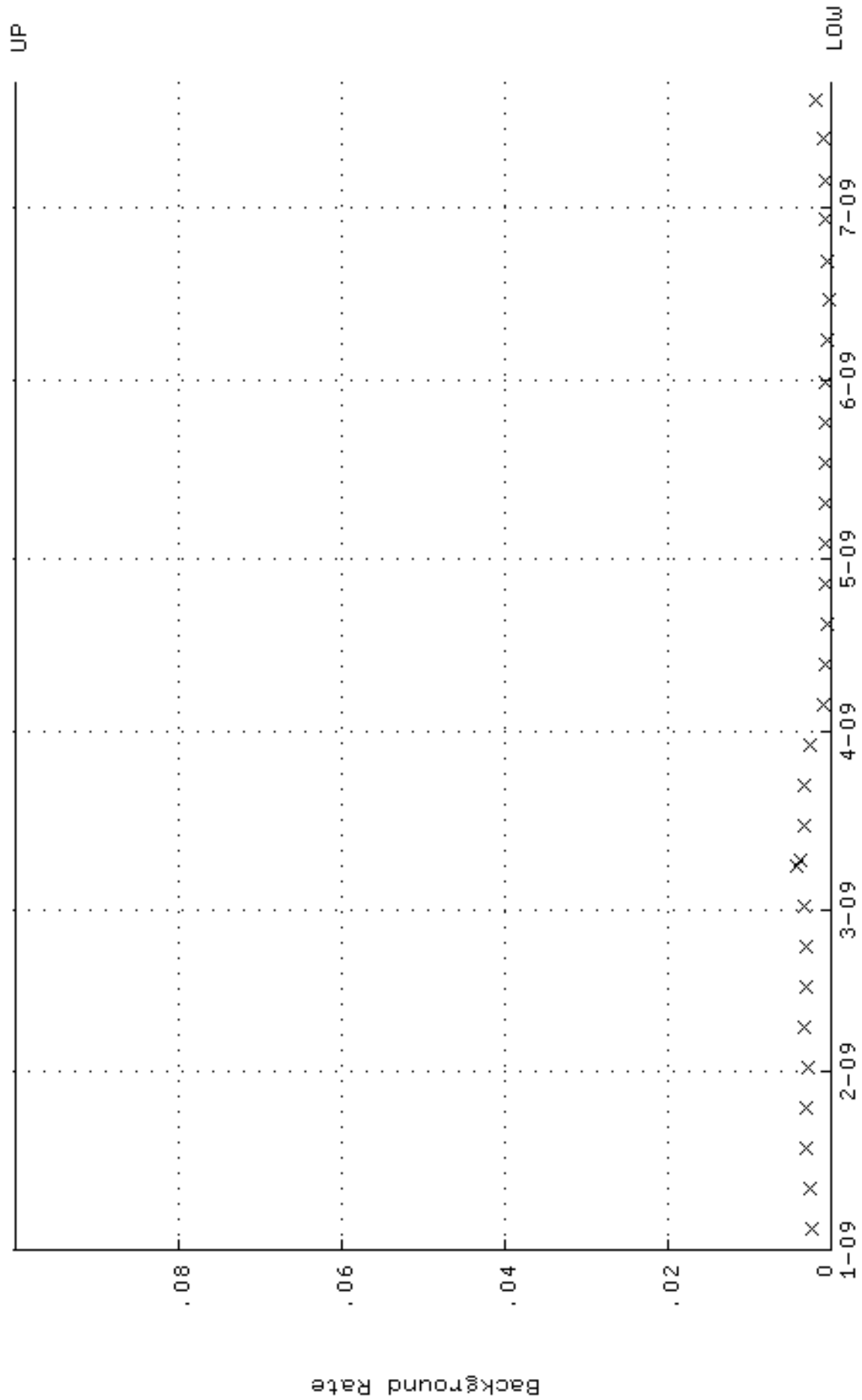




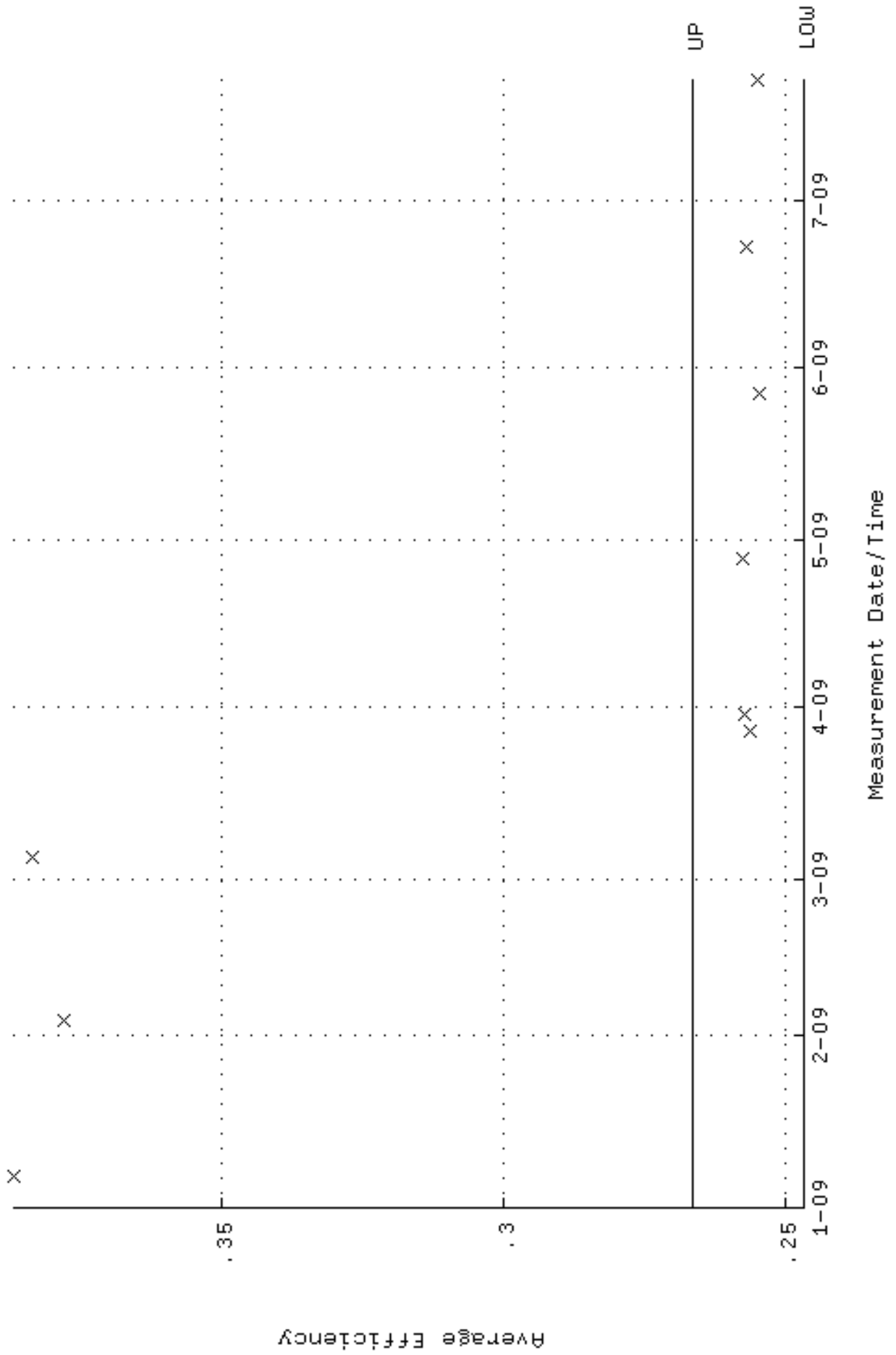
QA filename : DKA100:[ENV\_ALPHA.QA.W]w193.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:32:01 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.9815 through 93.9269



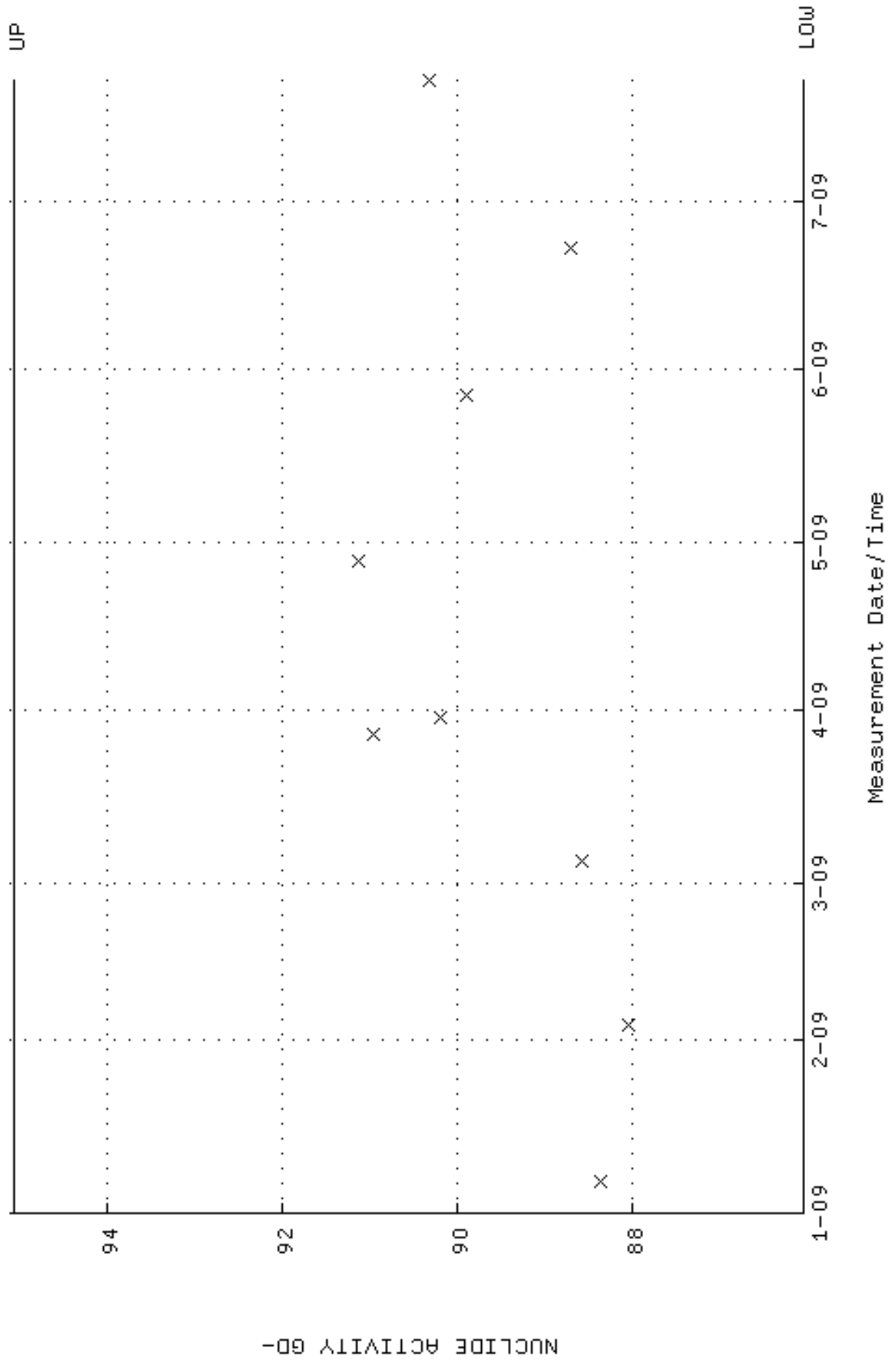
QA filename : DKA100:[ENV\_ALPHA.QA.B]B193.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:27:07 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



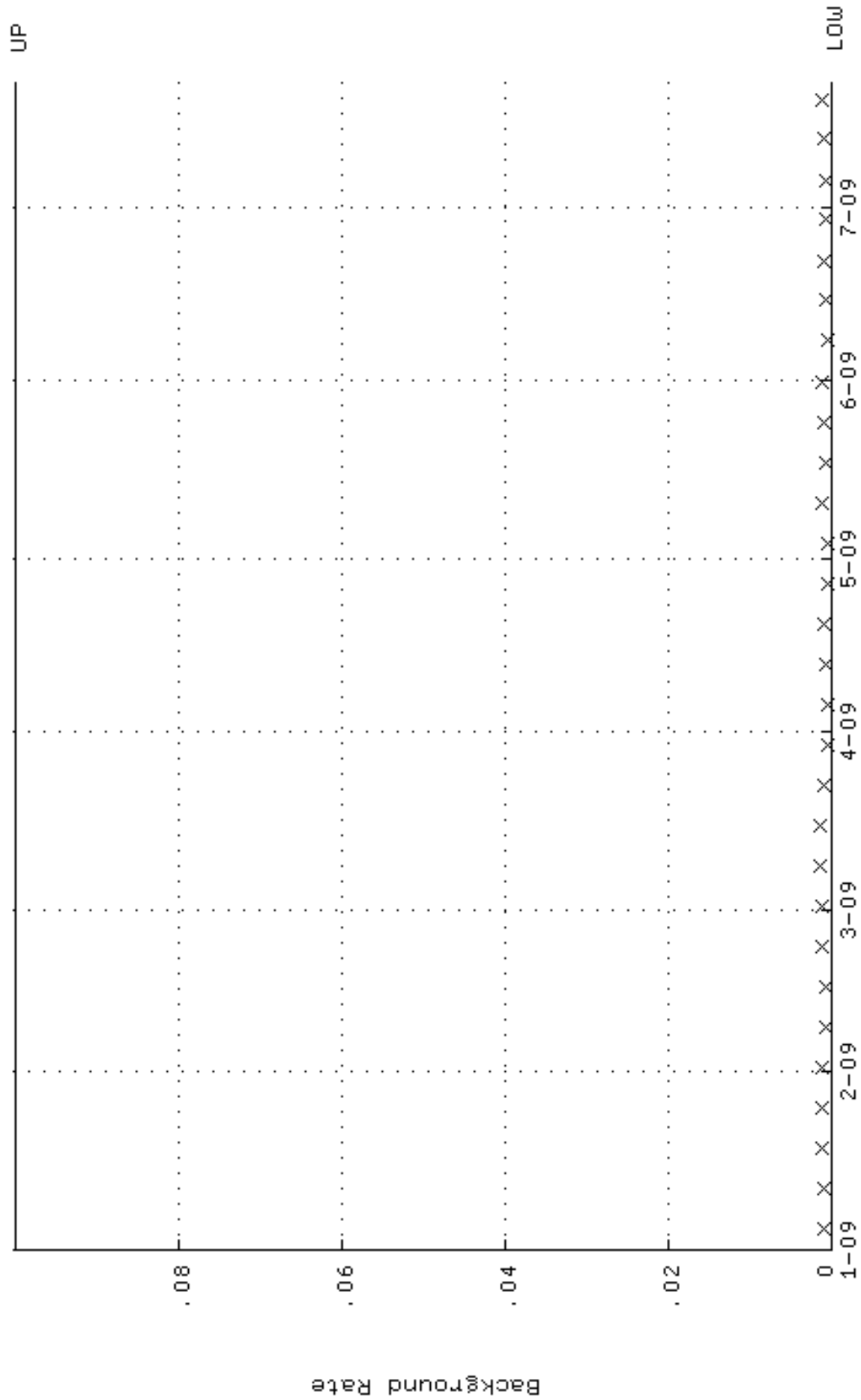
QA filename : DKA100:[ENV\_ALPHA.QA.W]W194.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:32:05 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.246760 through 0.266760



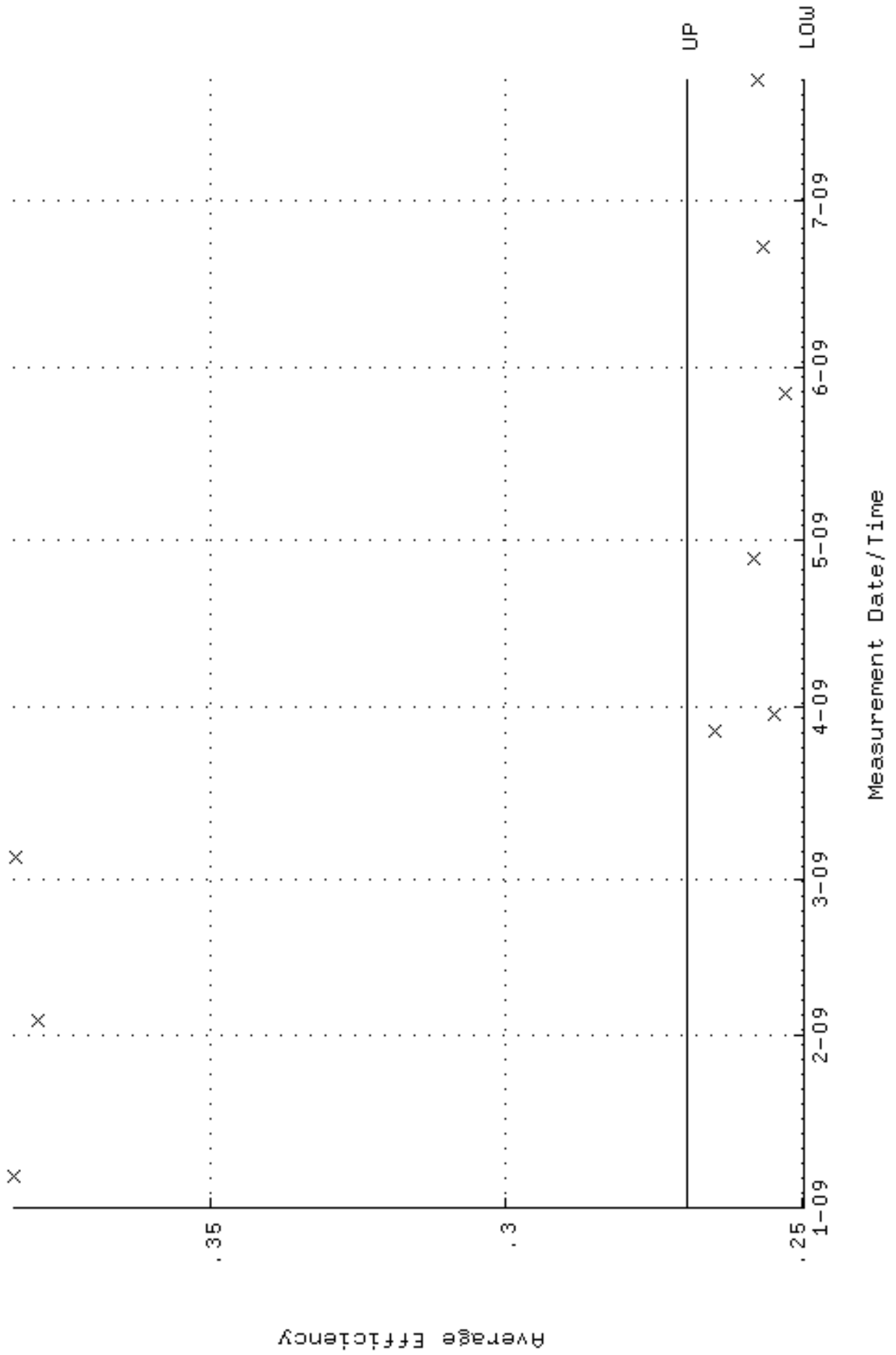
QA filename : DKA100:[ENV\_ALPHA.QA.W]w194.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:32:05 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 86.0376 through 95.0942



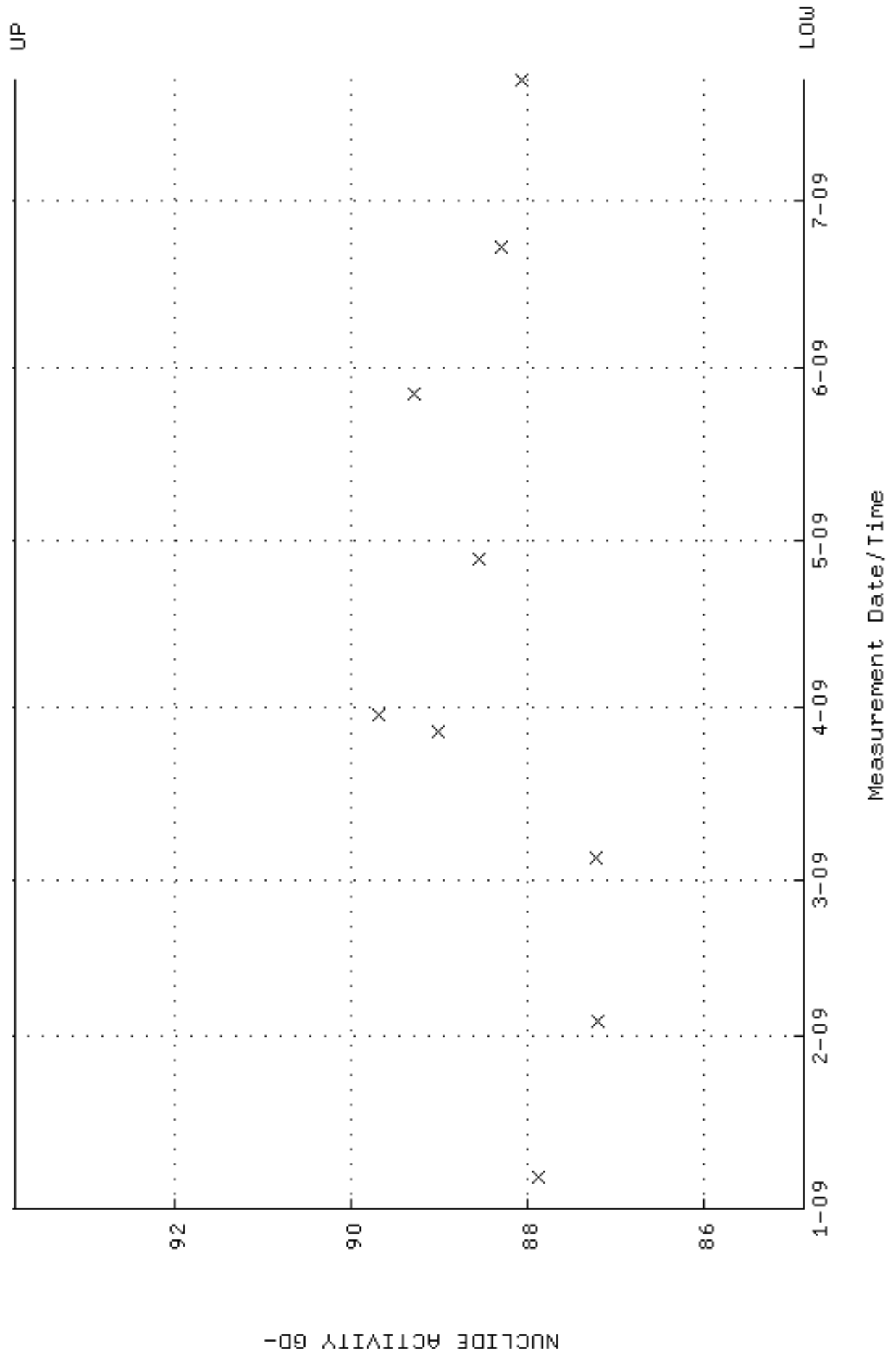
QA filename : DKA100:[ENV\_ALPHA.QA.B]B194.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:27:10 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



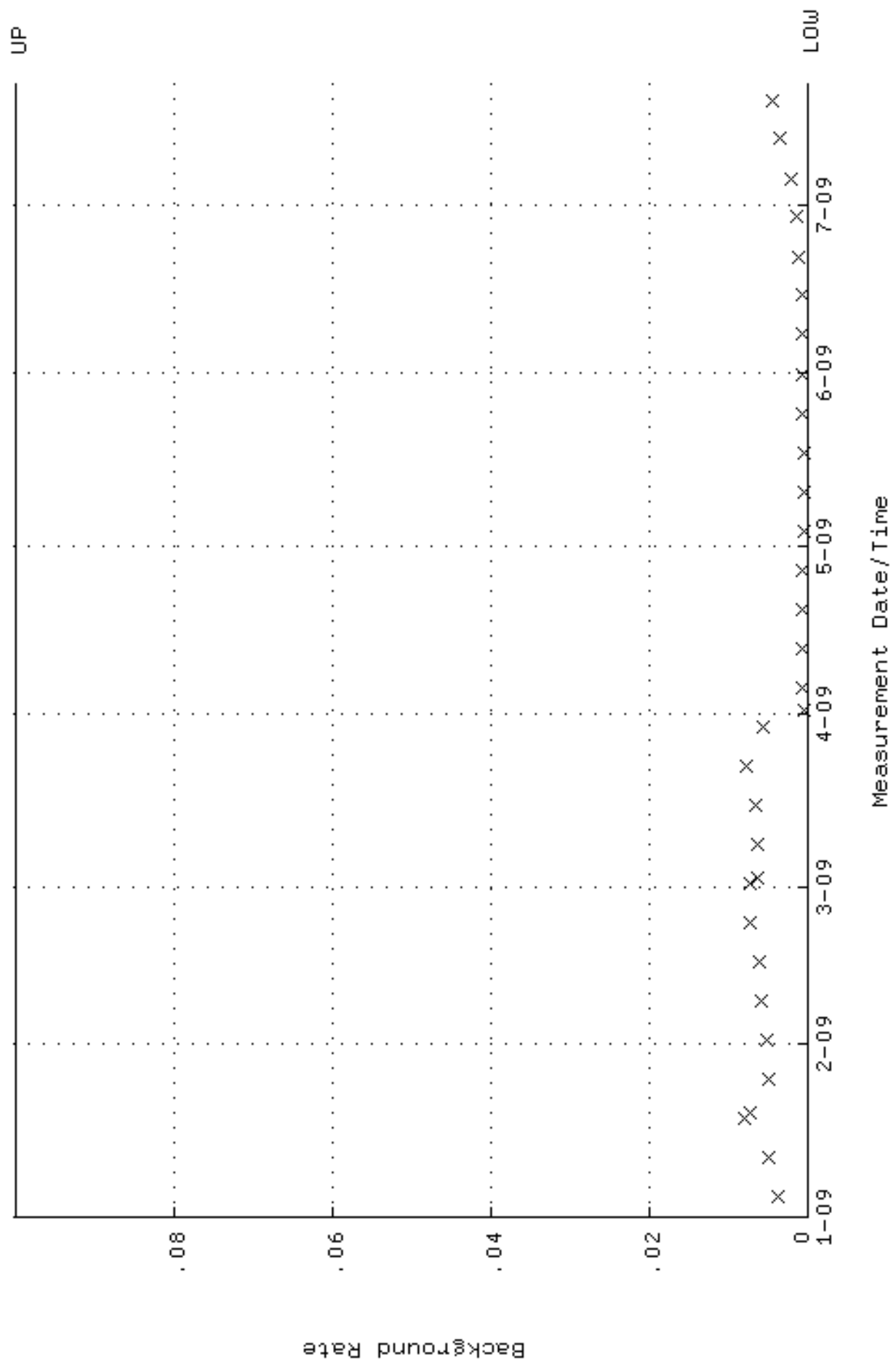
QA filename : DKA100:[ENV\_ALPHA.QA.W]W195.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:32:09 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.249622 through 0.269622



QA filename : DKA100:[ENV\_ALPHA.QA.W]W195.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:32:09 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 84.8653 through 93.7985

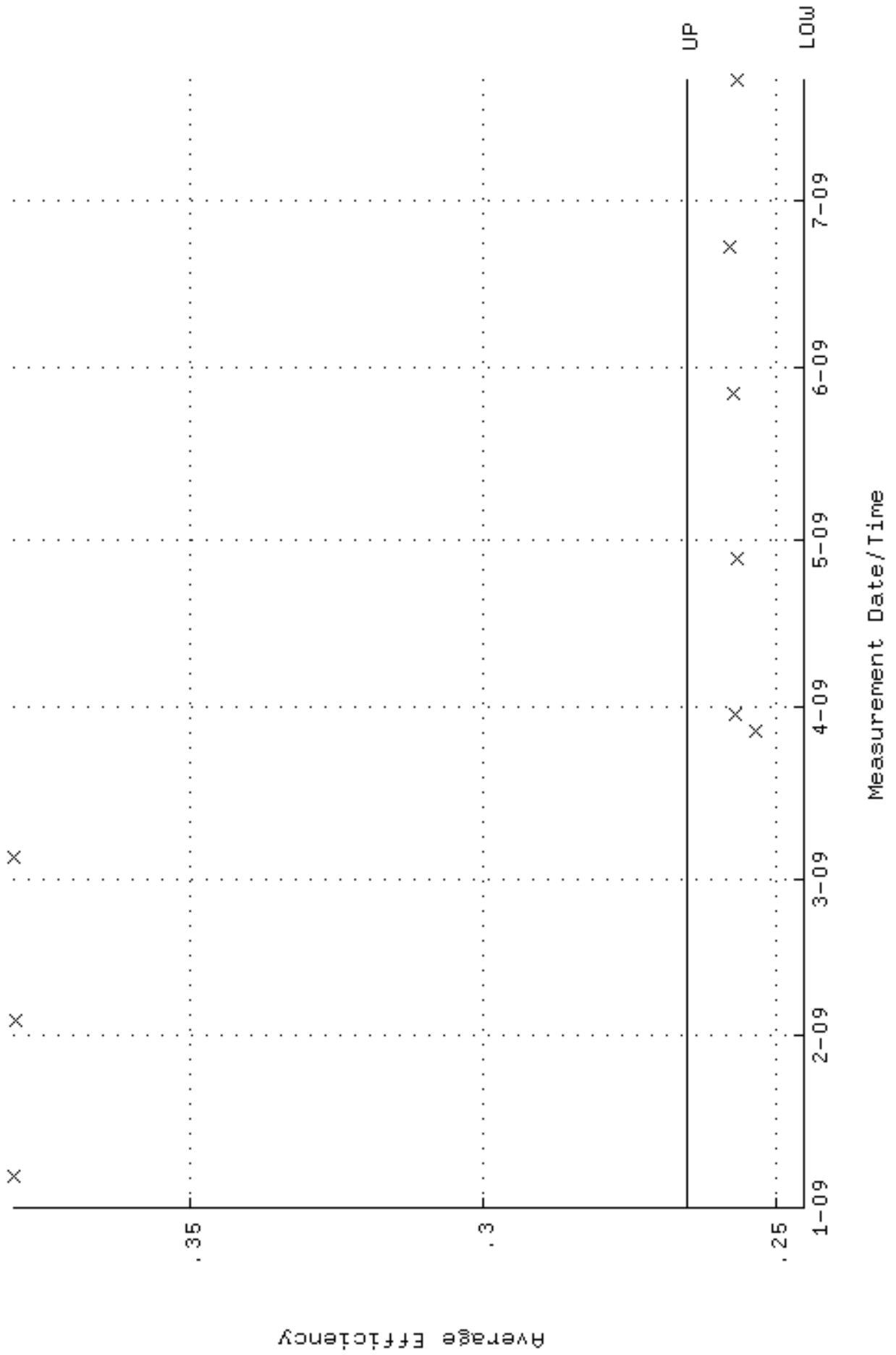


QA filename : DKA100:[ENV\_ALPHA.QA.B]B195.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:27:14 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

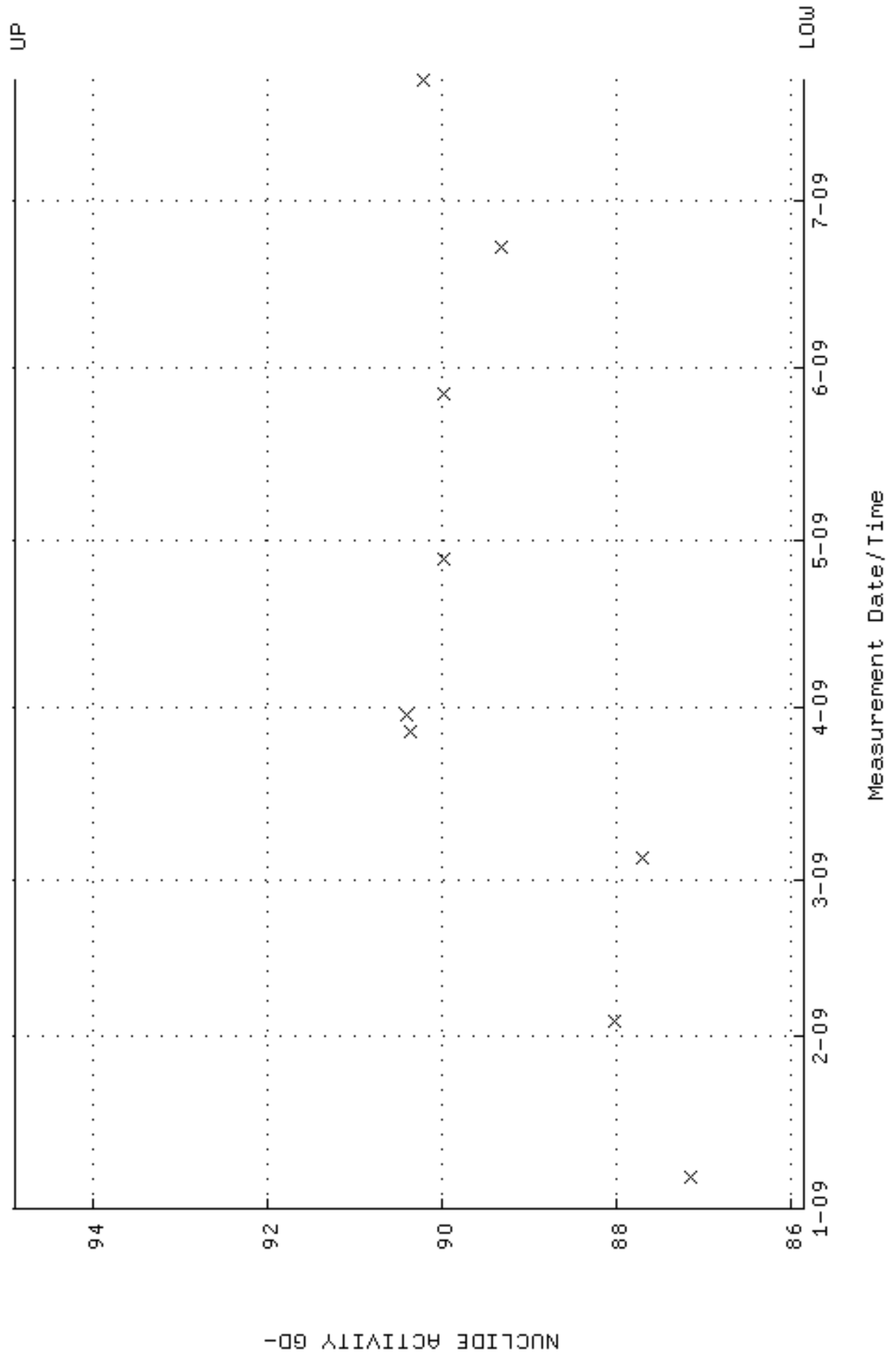




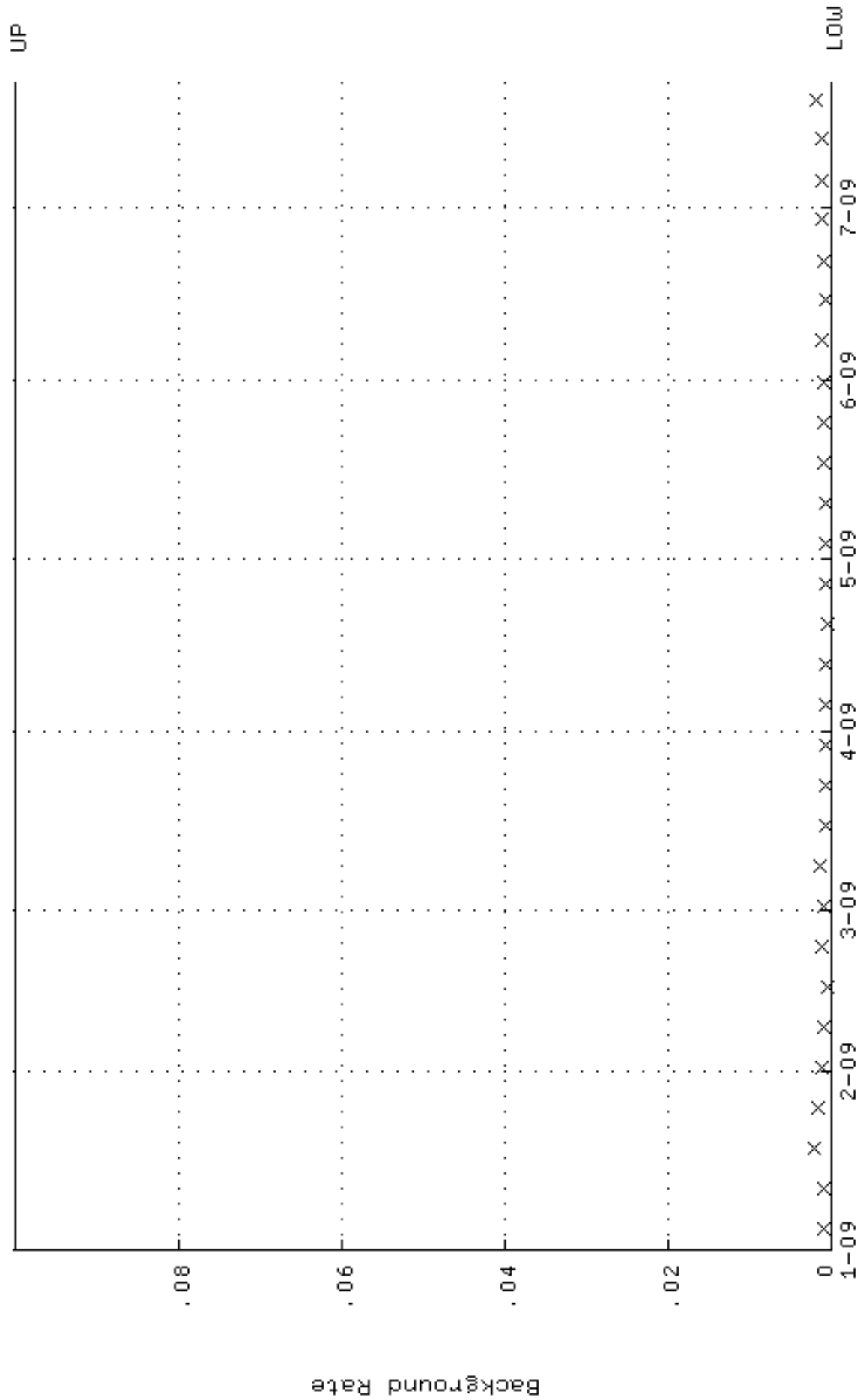
QA filename : DKA100:[ENV\_ALPHA.QA.W]W196.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-JAN-2009 19:32:14 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.245168 through 0.265168



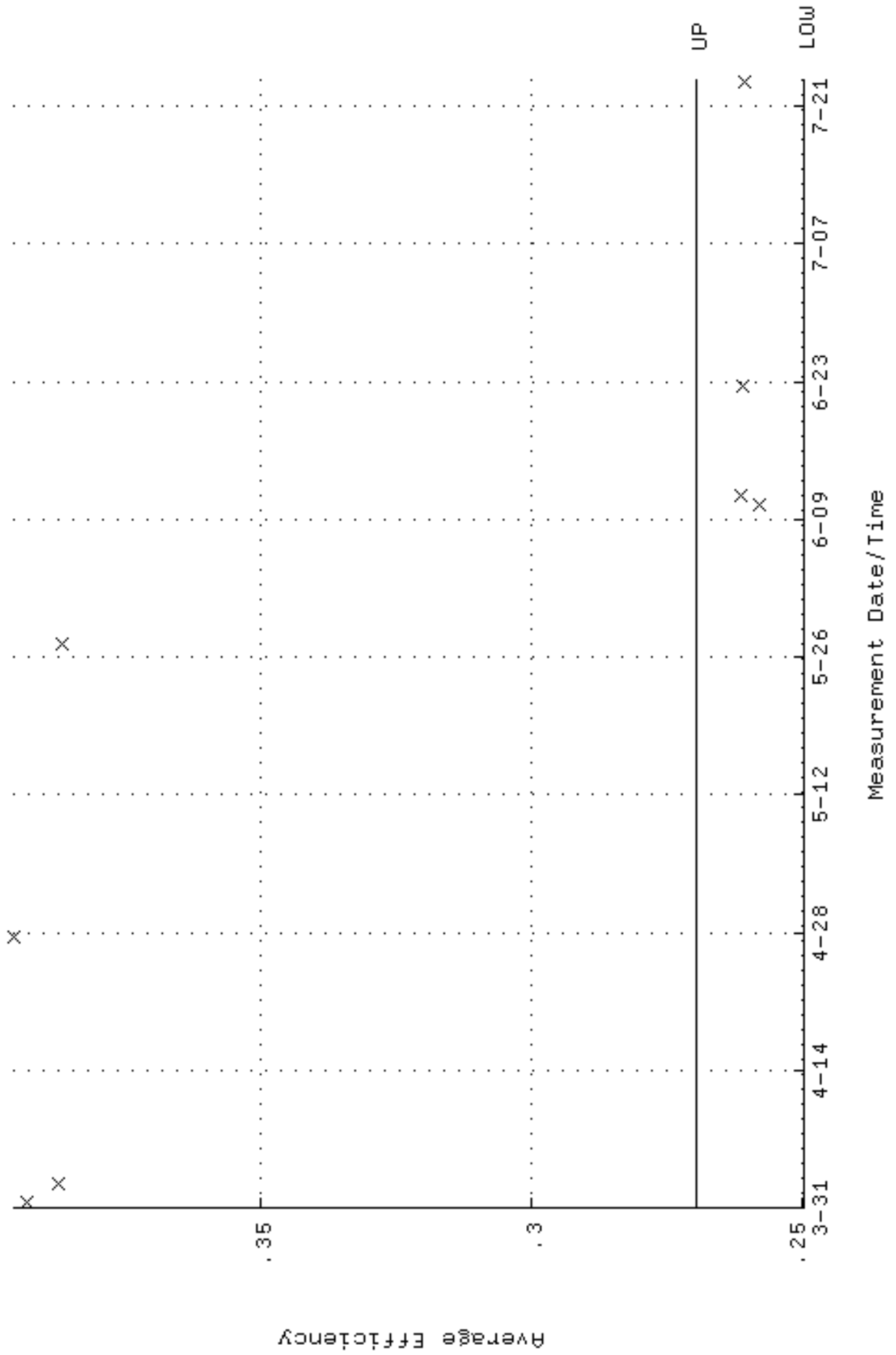
QA filename : DKA100:[ENV\_ALPHA.QA.W]w196.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-JAN-2009 19:32:14 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.8592 through 94.8970



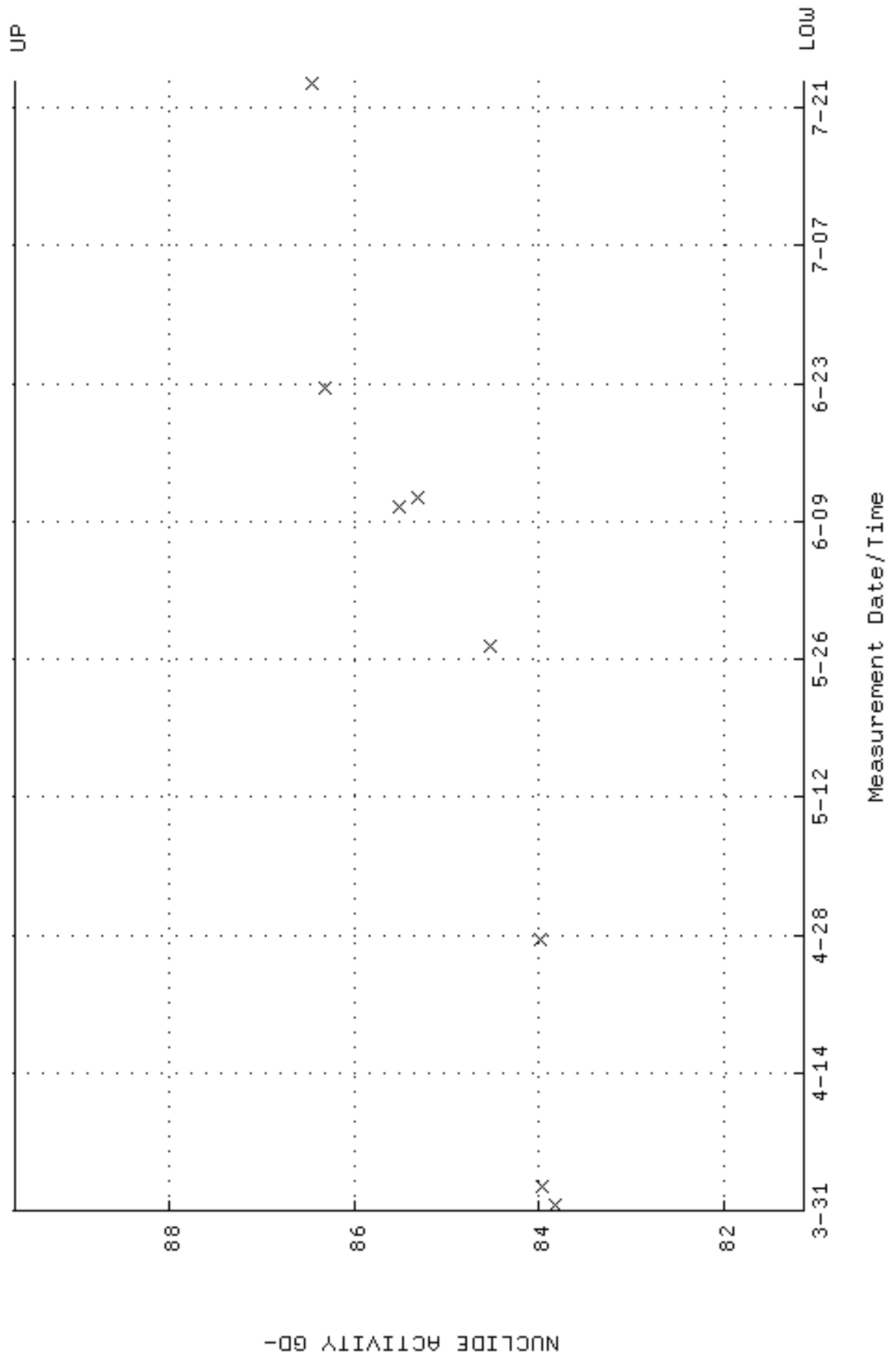
QA filename : DKA100:[ENV\_ALPHA.QA.B]B196.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 4-JAN-2009 17:27:18 through 22-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



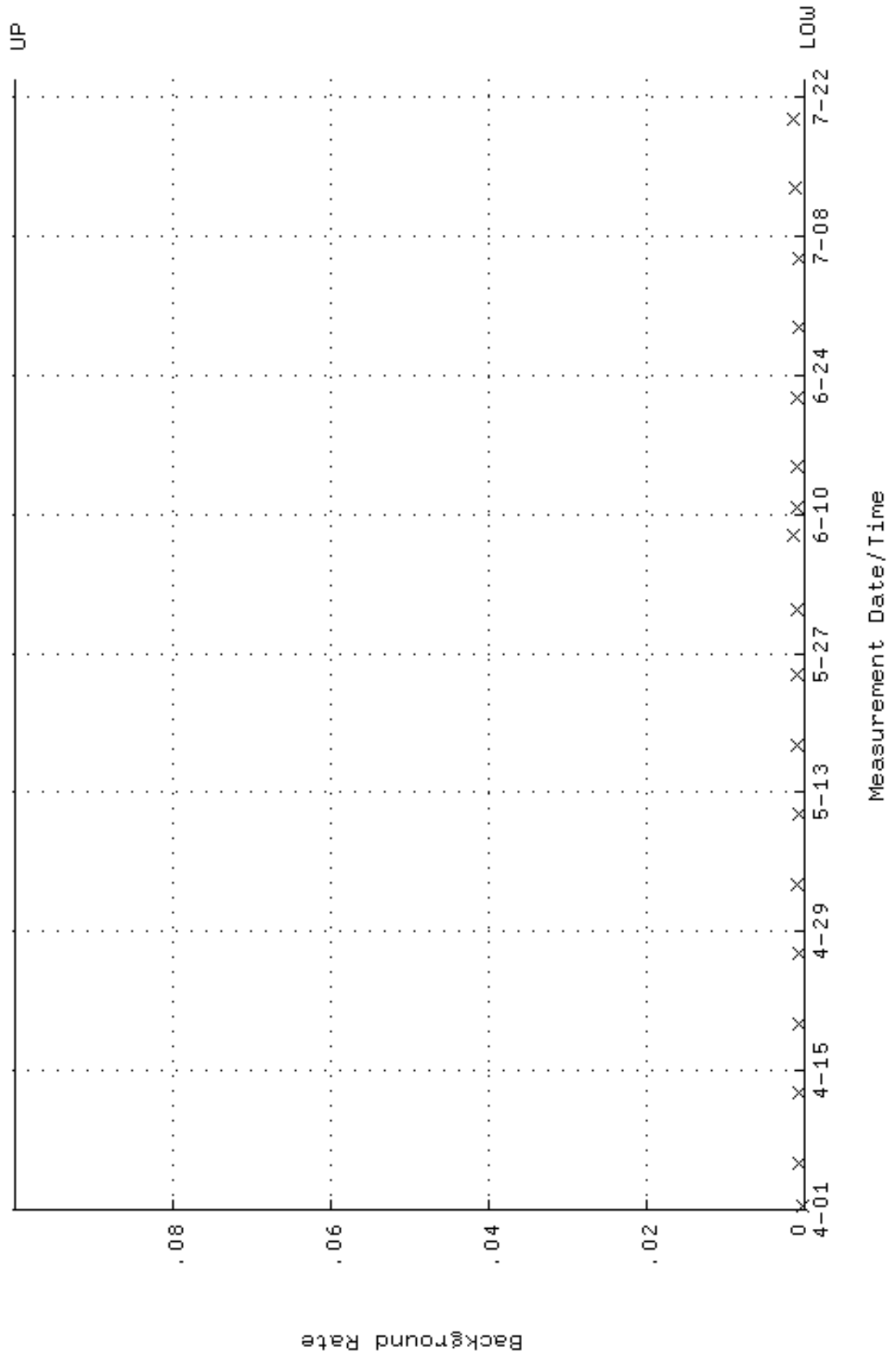
QA filename : DKA100:[ENV\_ALPHA.QA.W]W201.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:26 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.249568 through 0.269568



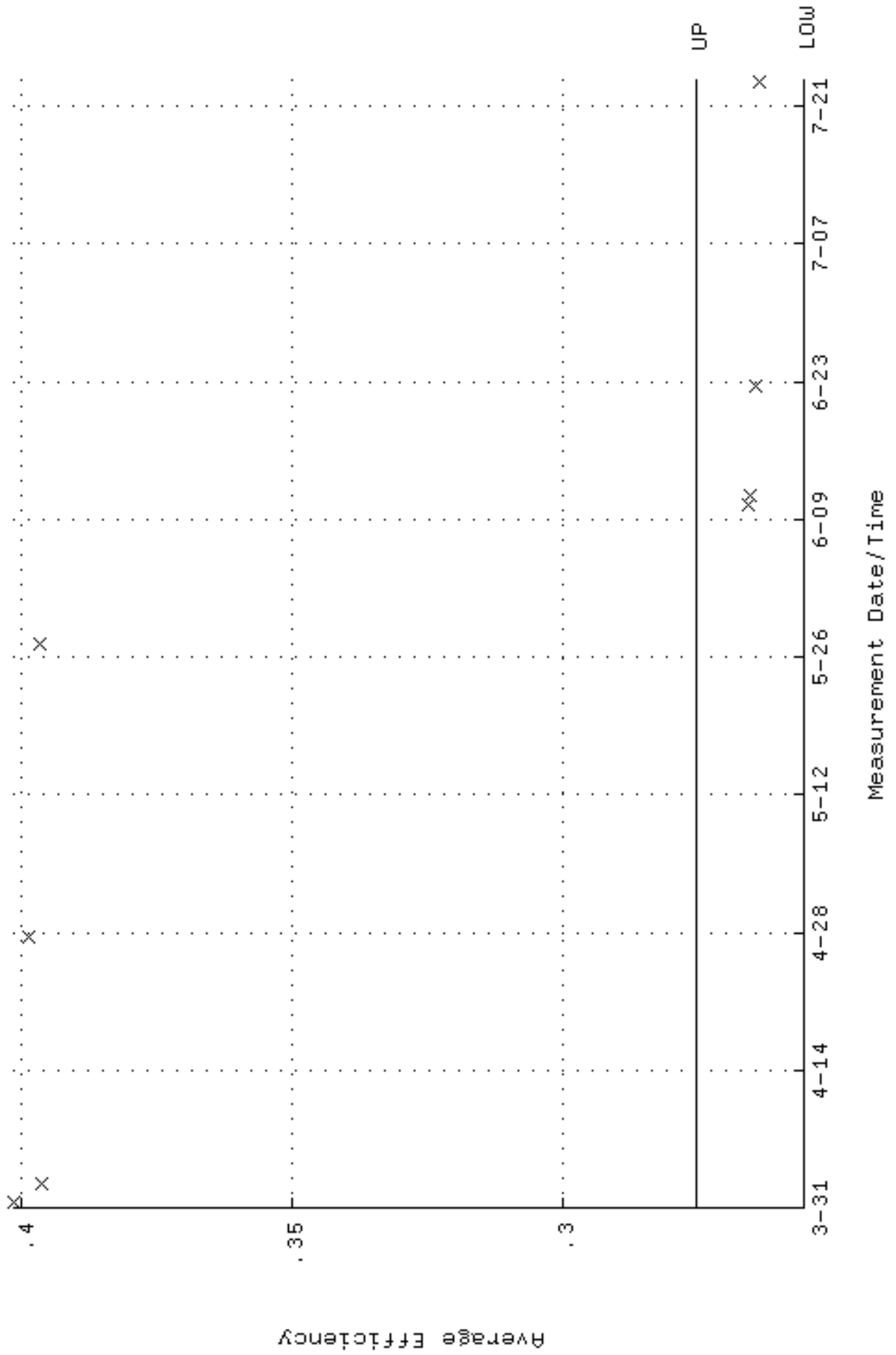
QA filename : DKA100:[ENV\_ALPHA.QA.W]w201.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:26 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 81.1299 through 89.6699



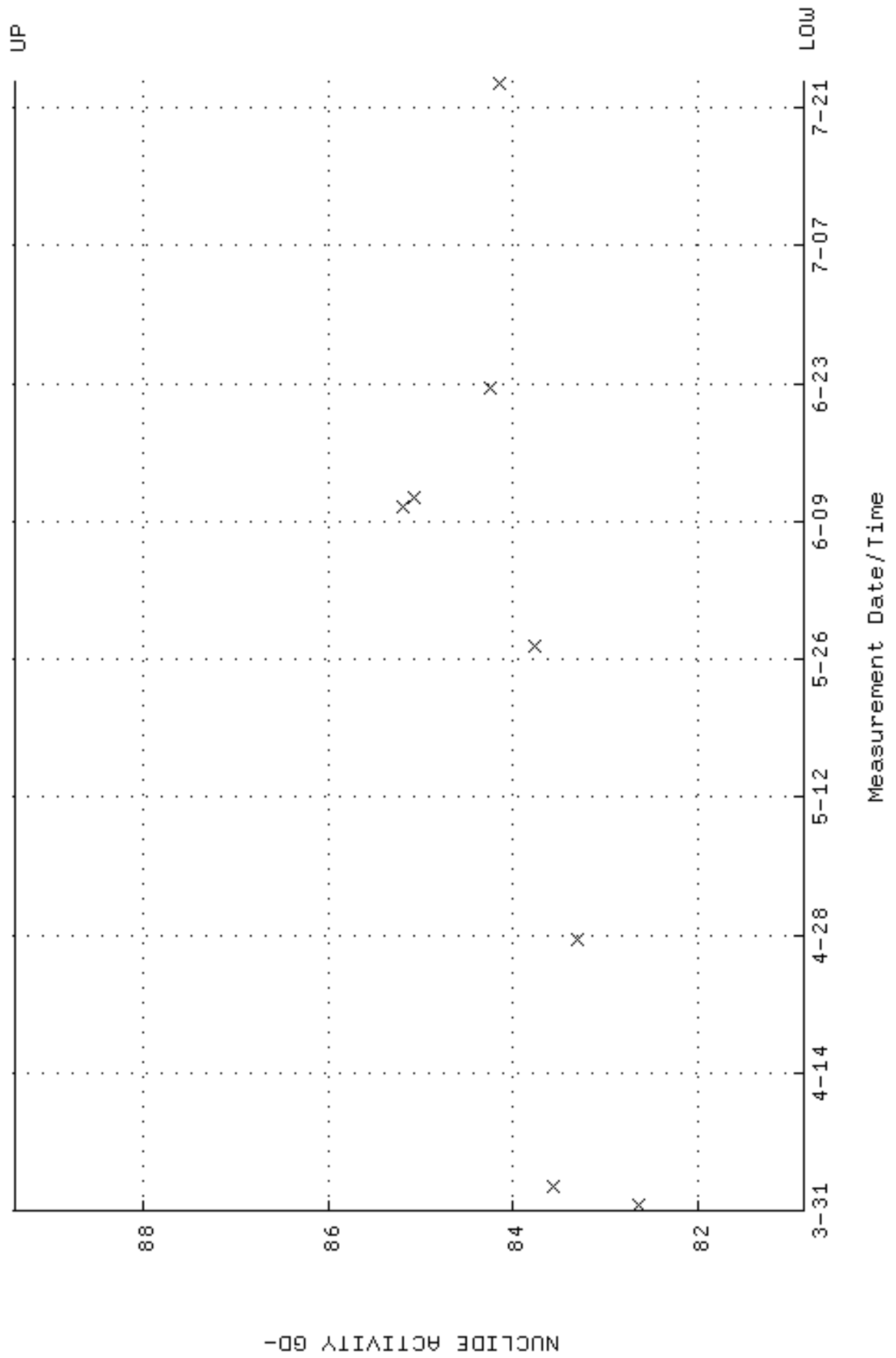
QA filename : DKA100:[ENV\_ALPHA.QA.B]B201.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:39 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W202.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:28 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.255511 through 0.275511

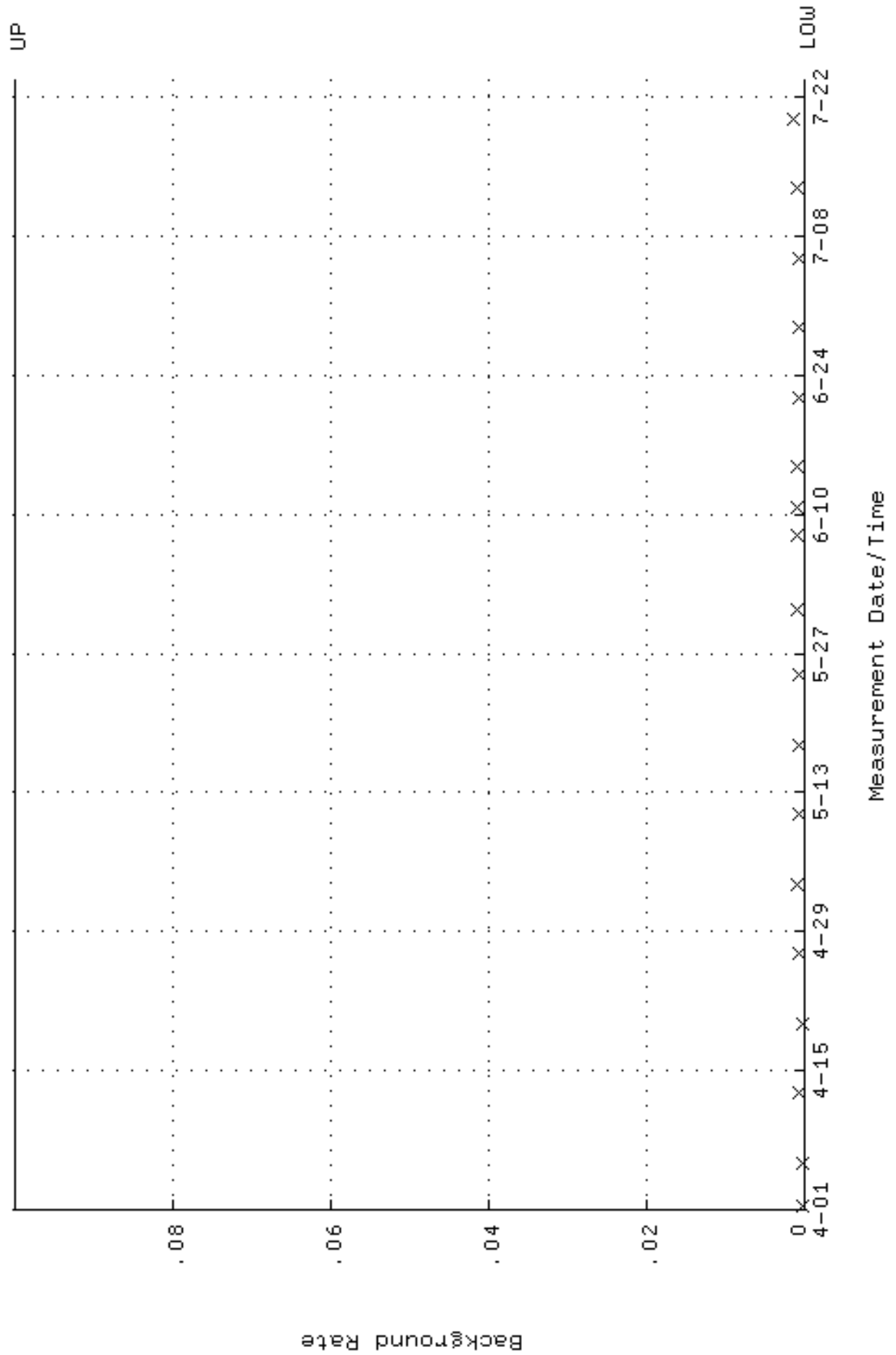


QA filename : DKA100:[ENV\_ALPHA.QA.W]w202.QAF;1  
 Parameter Name : NACTIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:28 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 80.8649 through 89.3769

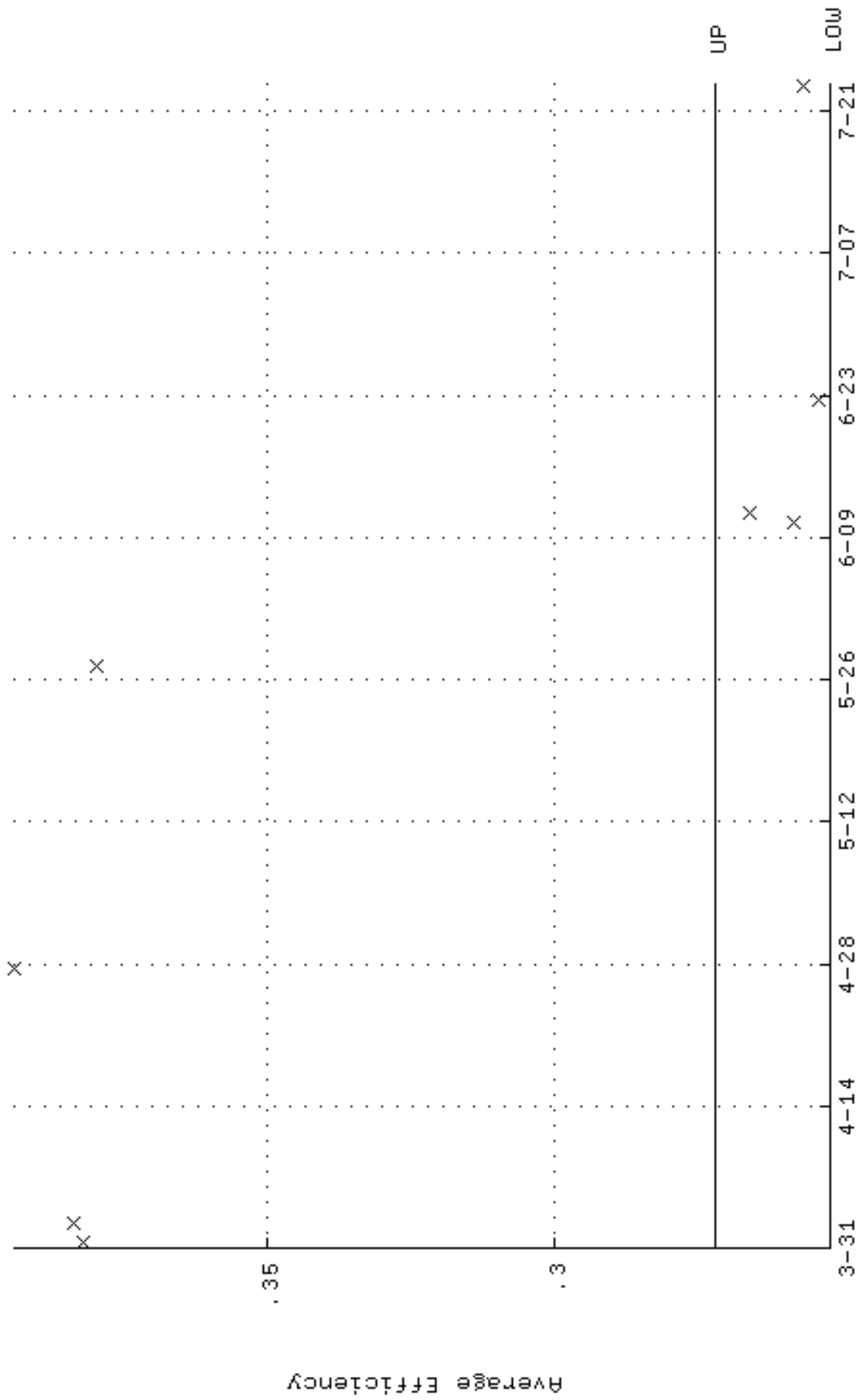




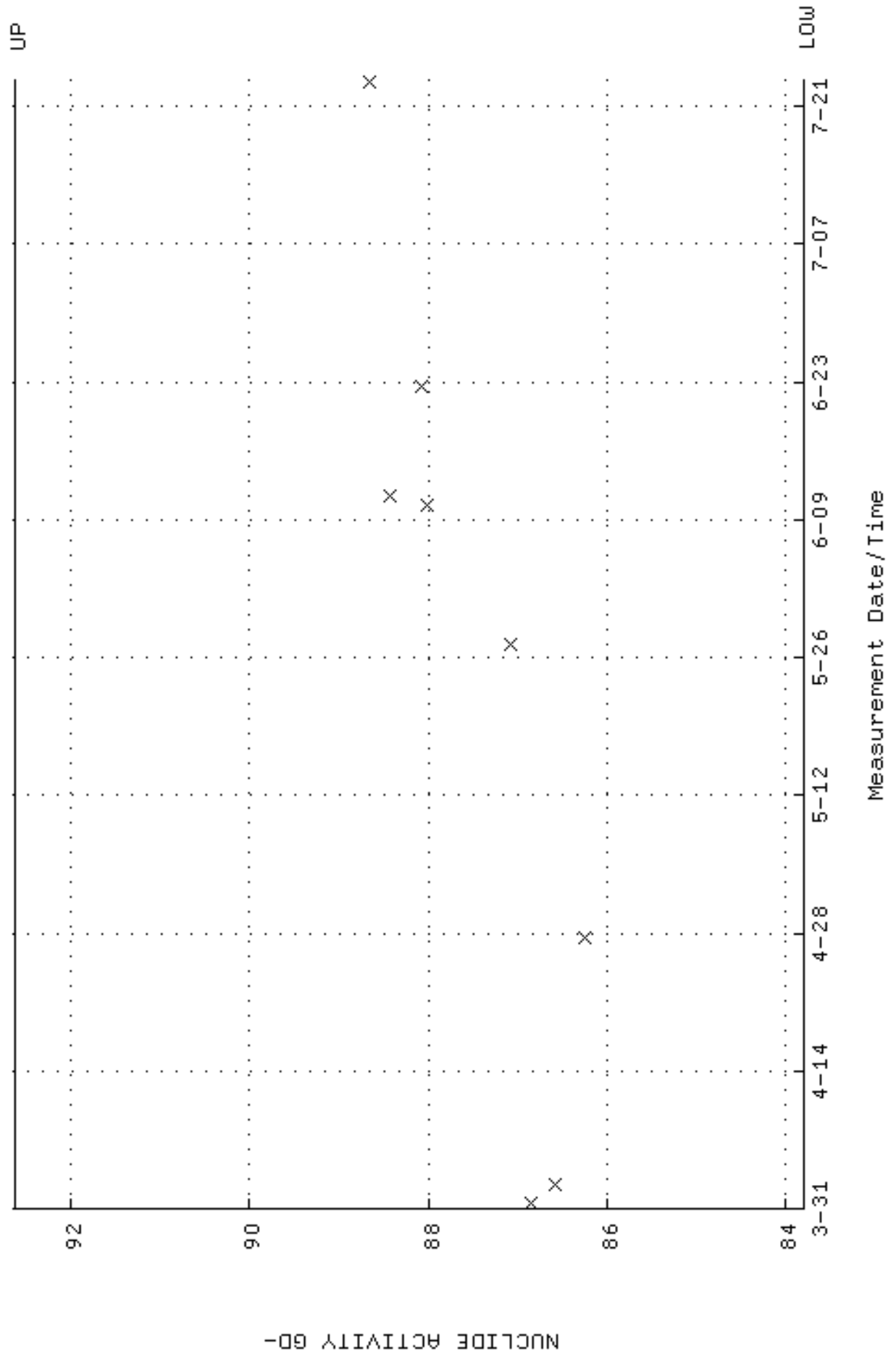
QA filename : DKA100:[ENV\_ALPHA.QA.B]B202.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:44 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



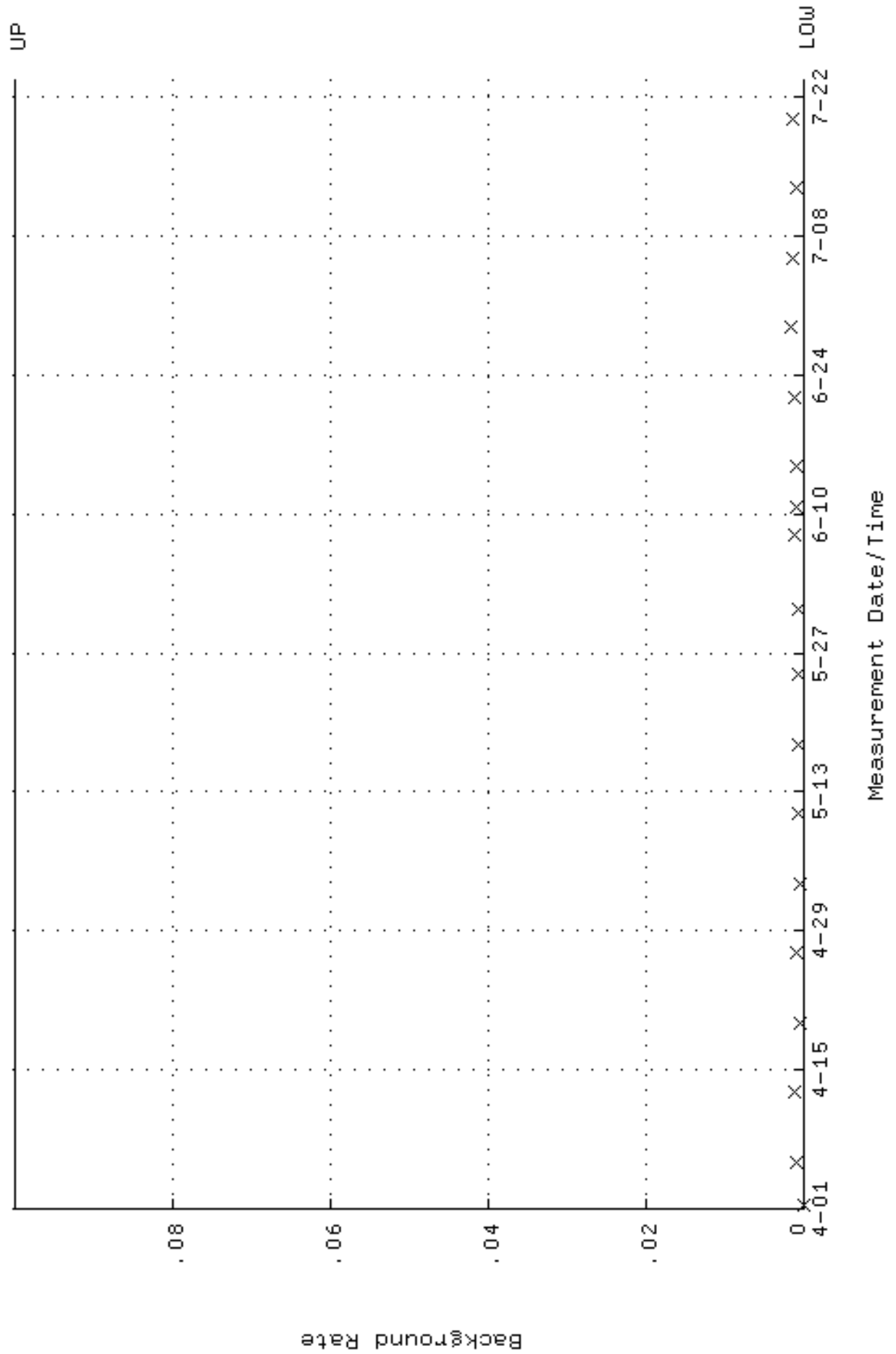
QA filename : DKA100:[ENV\_ALPHA.QA.W]W203.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:29 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.252203 through 0.272203



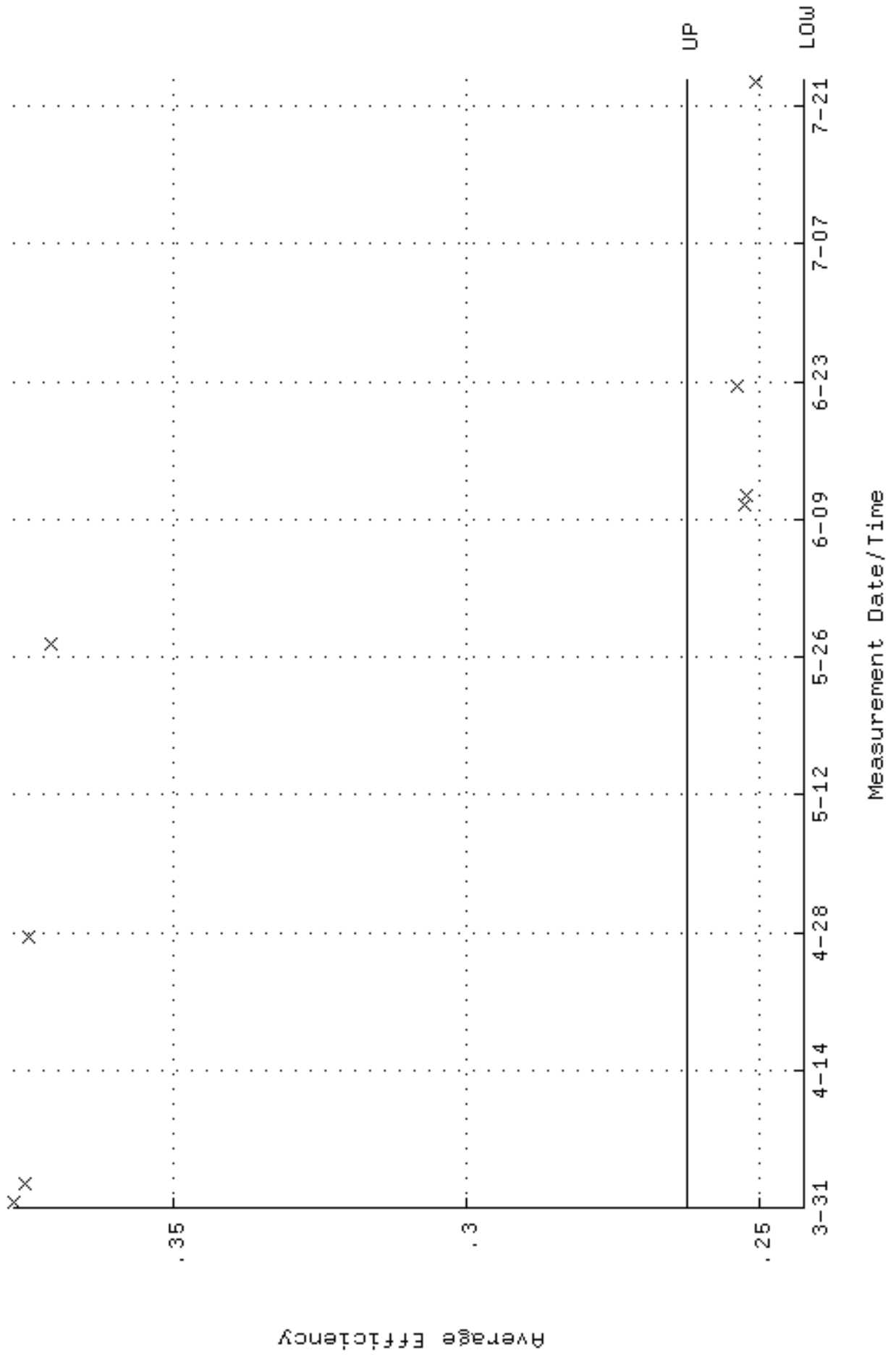
QA filename : DKA100:[ENV\_ALPHA.QA.W]W203.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:29 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 83.7993 through 92.6203



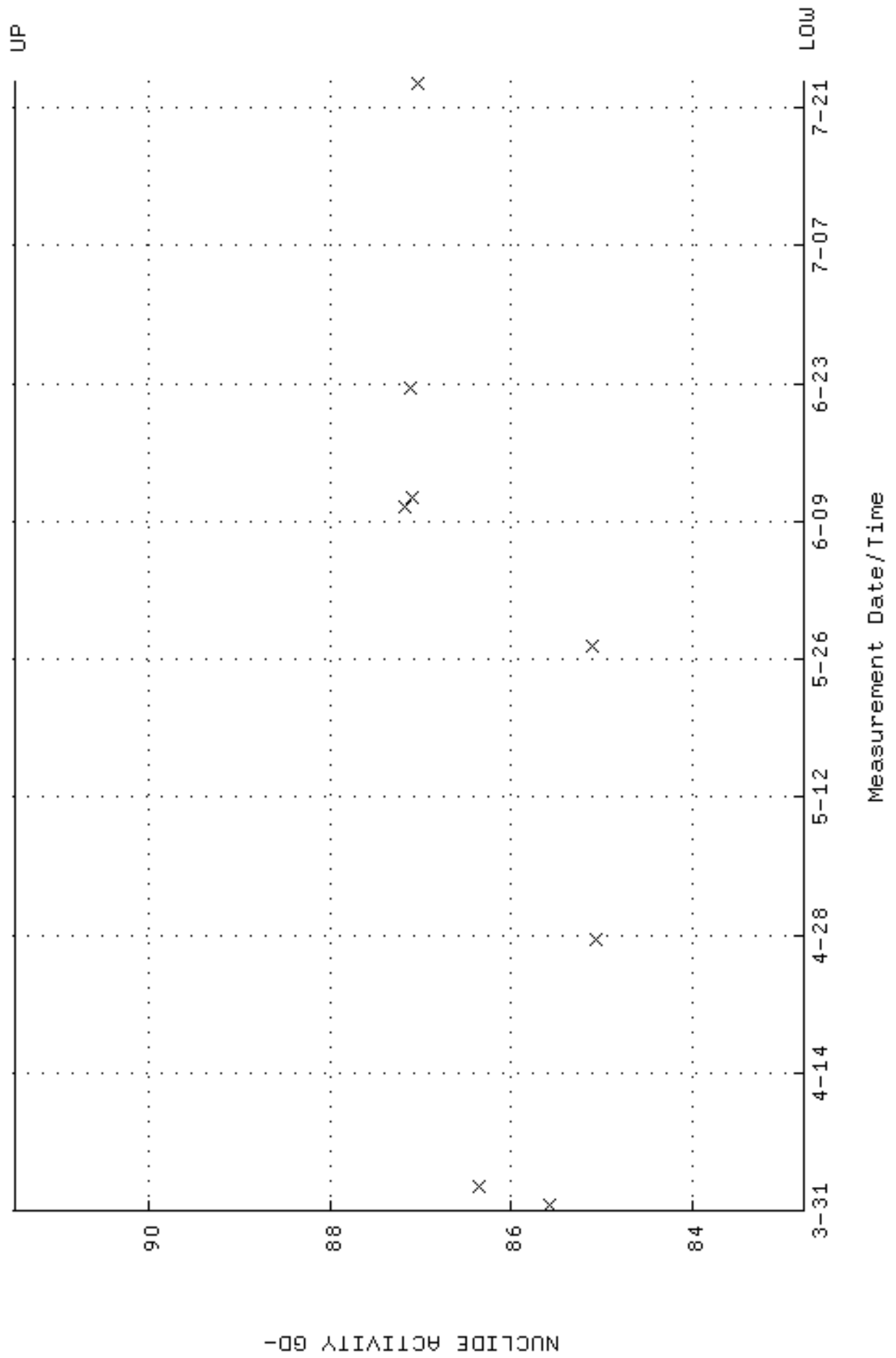
QA filename : DKA100:[ENV\_ALPHA.QA.B]B203.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:49 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



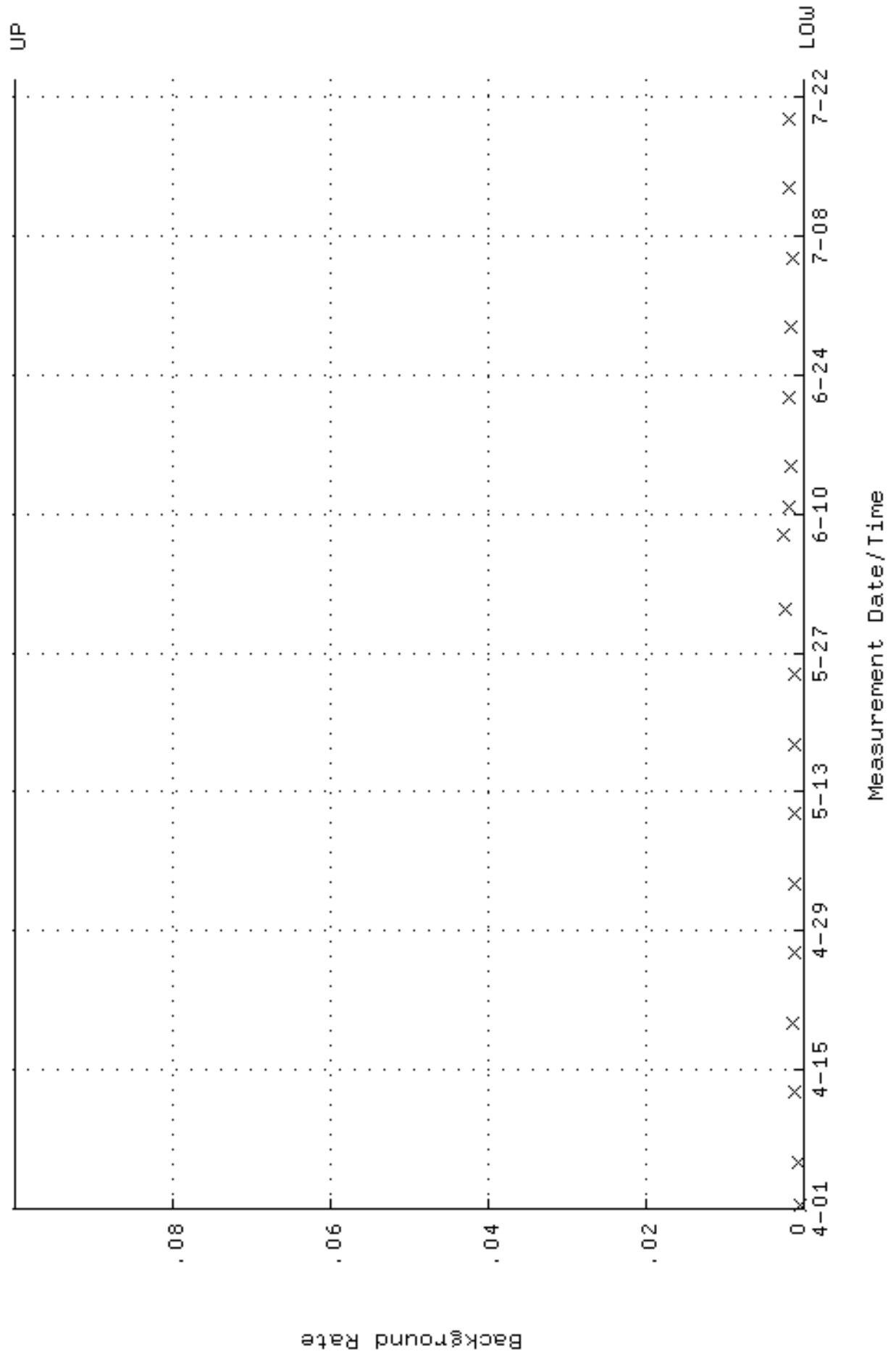
QA filename : DKA100:[ENV\_ALPHA.QA.W]W204.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:31 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.242368 through 0.262368



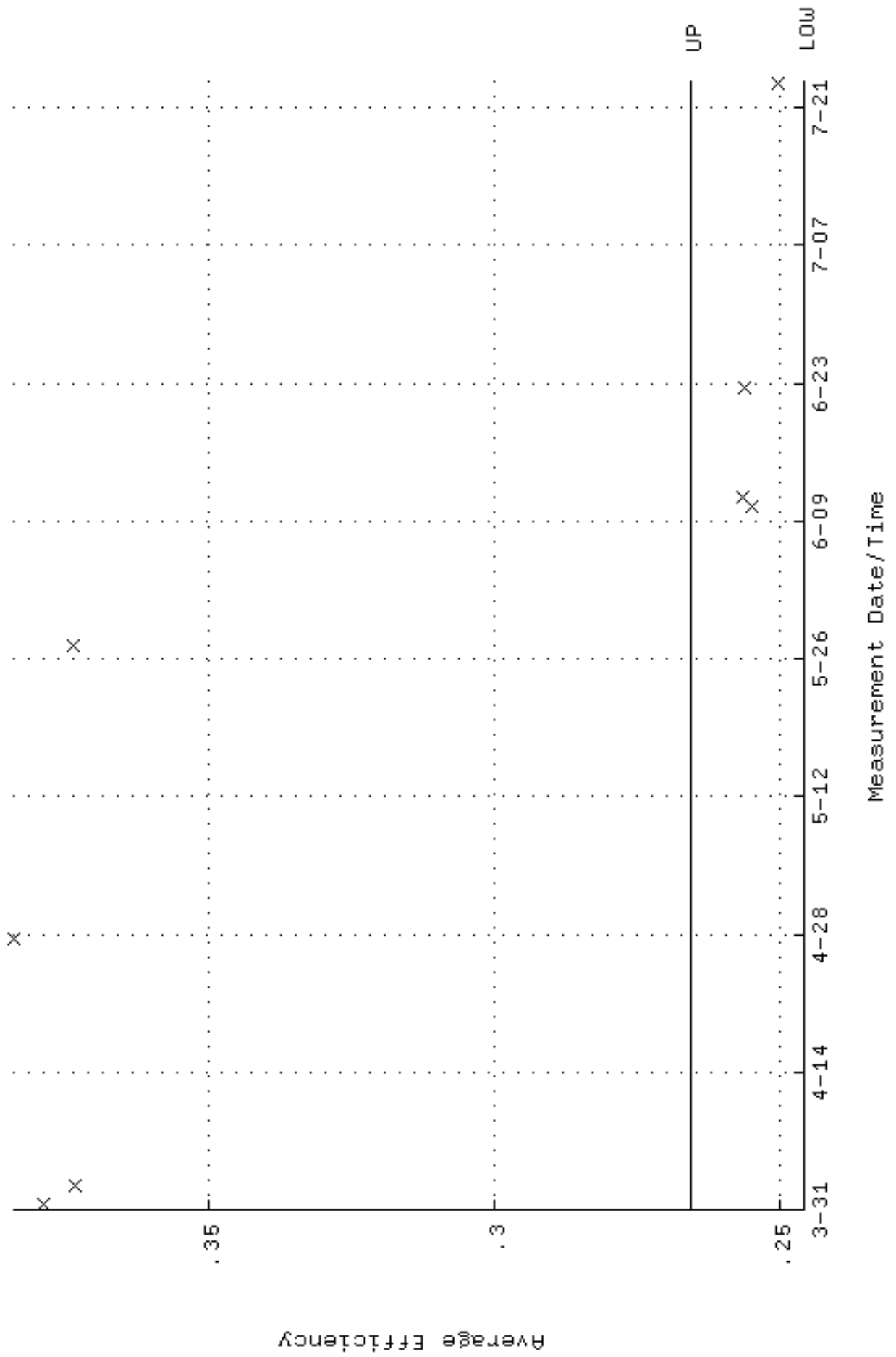
QA filename : DKA100:[ENV\_ALPHA.QA.W]w204.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:31 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 82.7661 through 91.4783



QA filename : DKA100:[ENV\_ALPHA.QA.B]B204.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:02:55 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

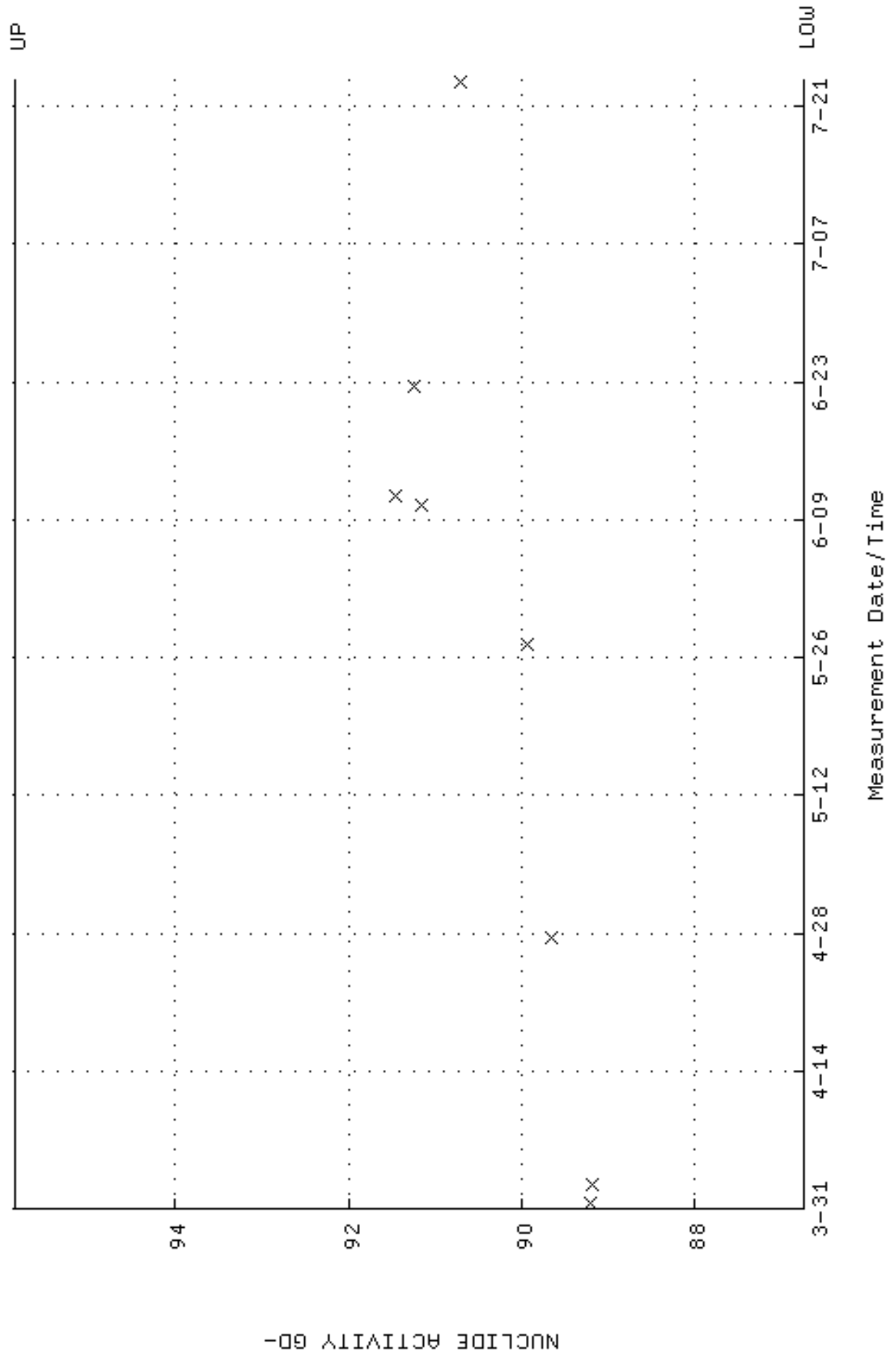


QA filename : DKA100:[ENV\_ALPHA.QA.W]W205.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:33 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.245702 through 0.265702

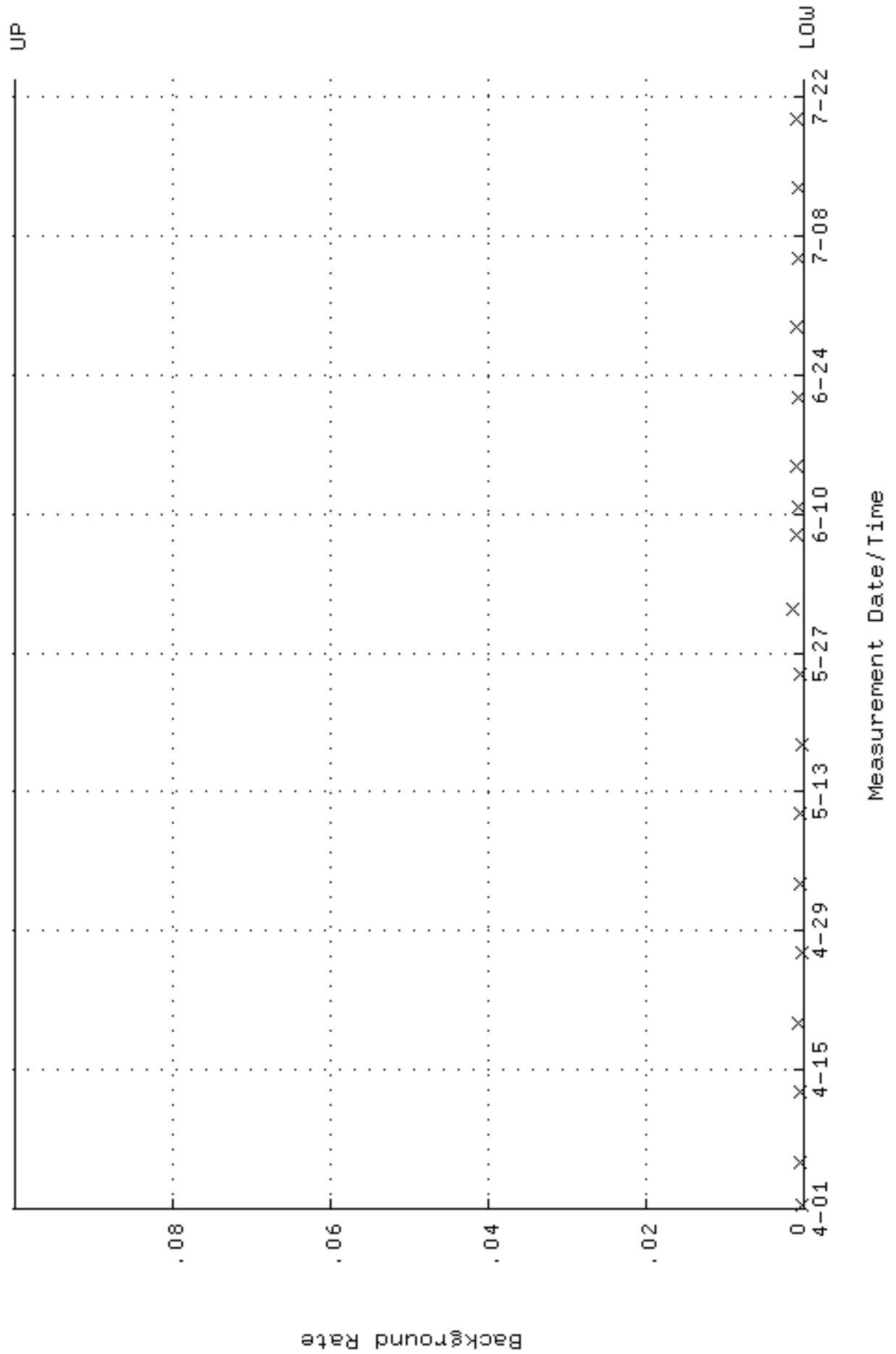




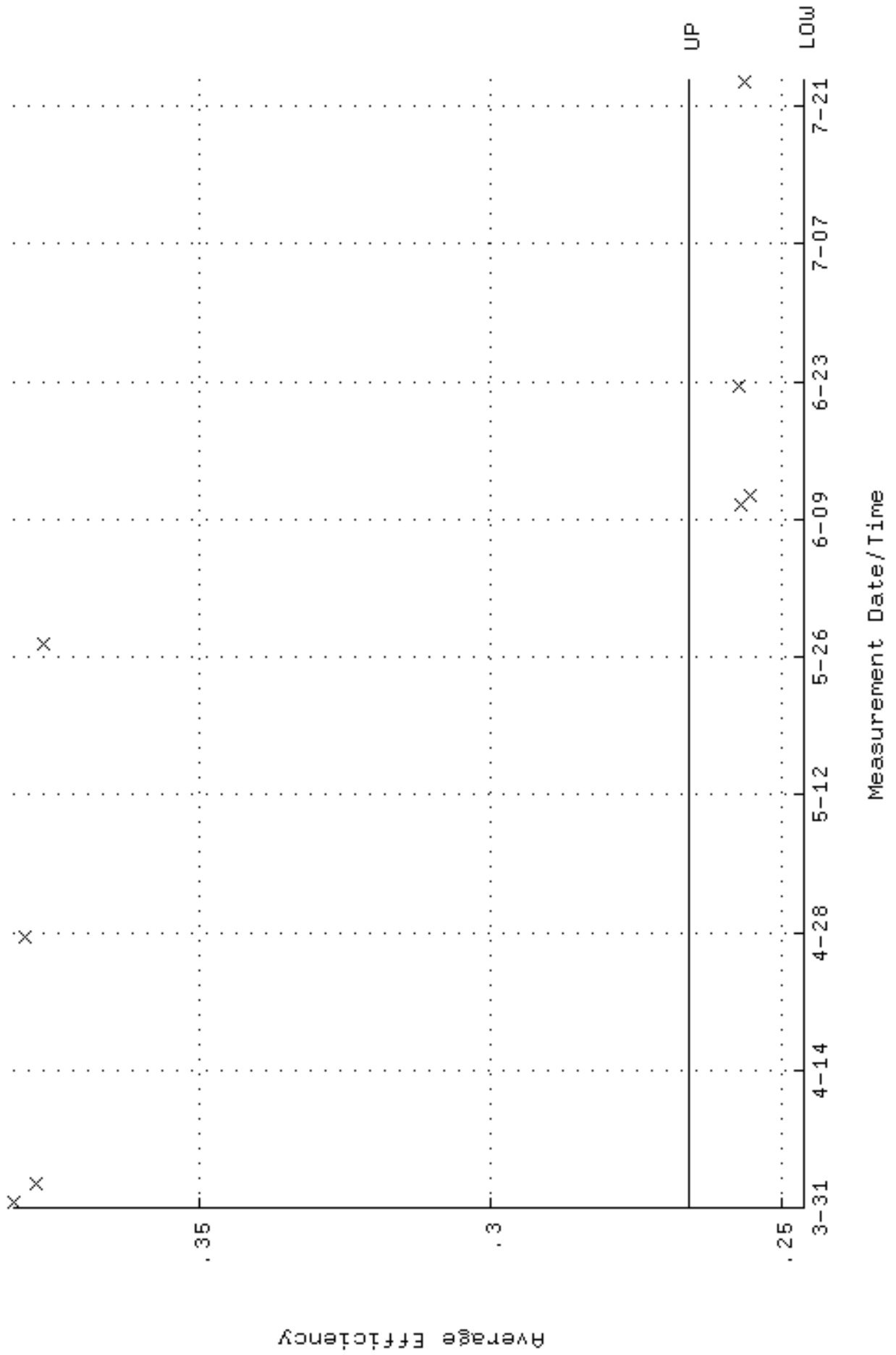
QA filename : DKA100:[ENV\_ALPHA.QA.W]w205.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:33 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 86.7285 through 95.8579



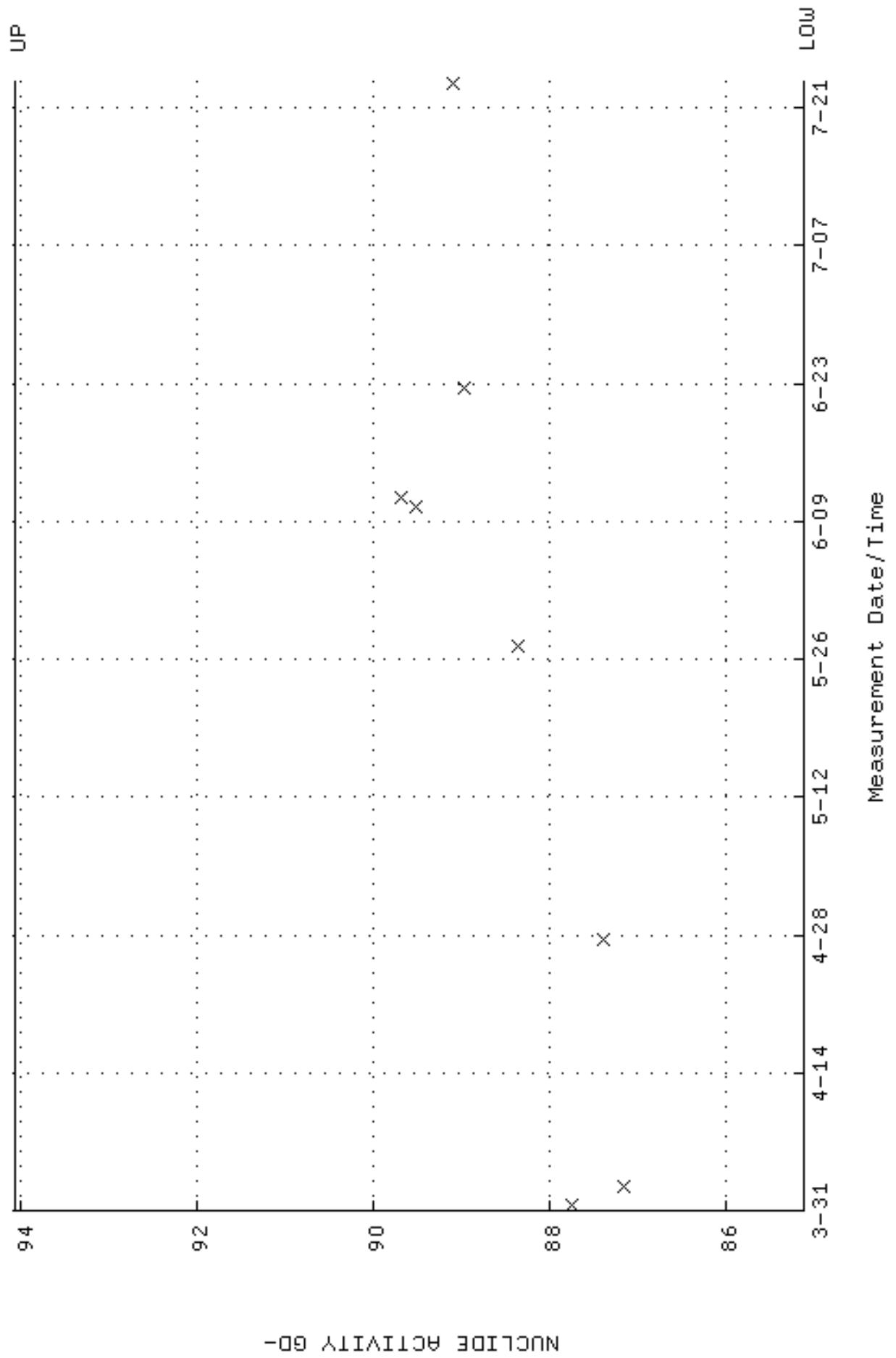
QA filename : DKA100:[ENV\_ALPHA.QA.B]B205.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:03:01 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



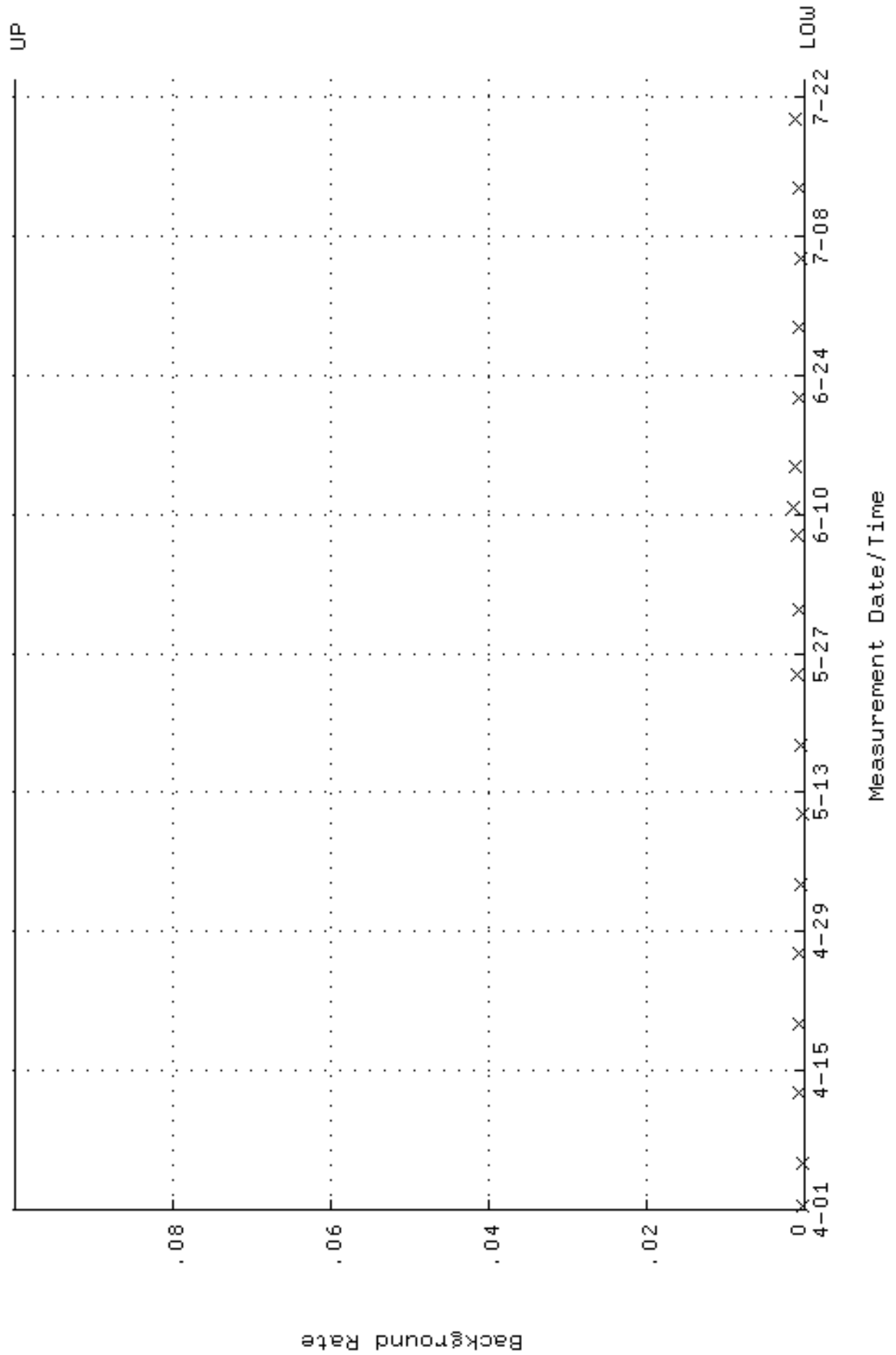
QA filename : DKA100:[ENV\_ALPHA.QA.W]W206.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:35 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.246228 through 0.266228



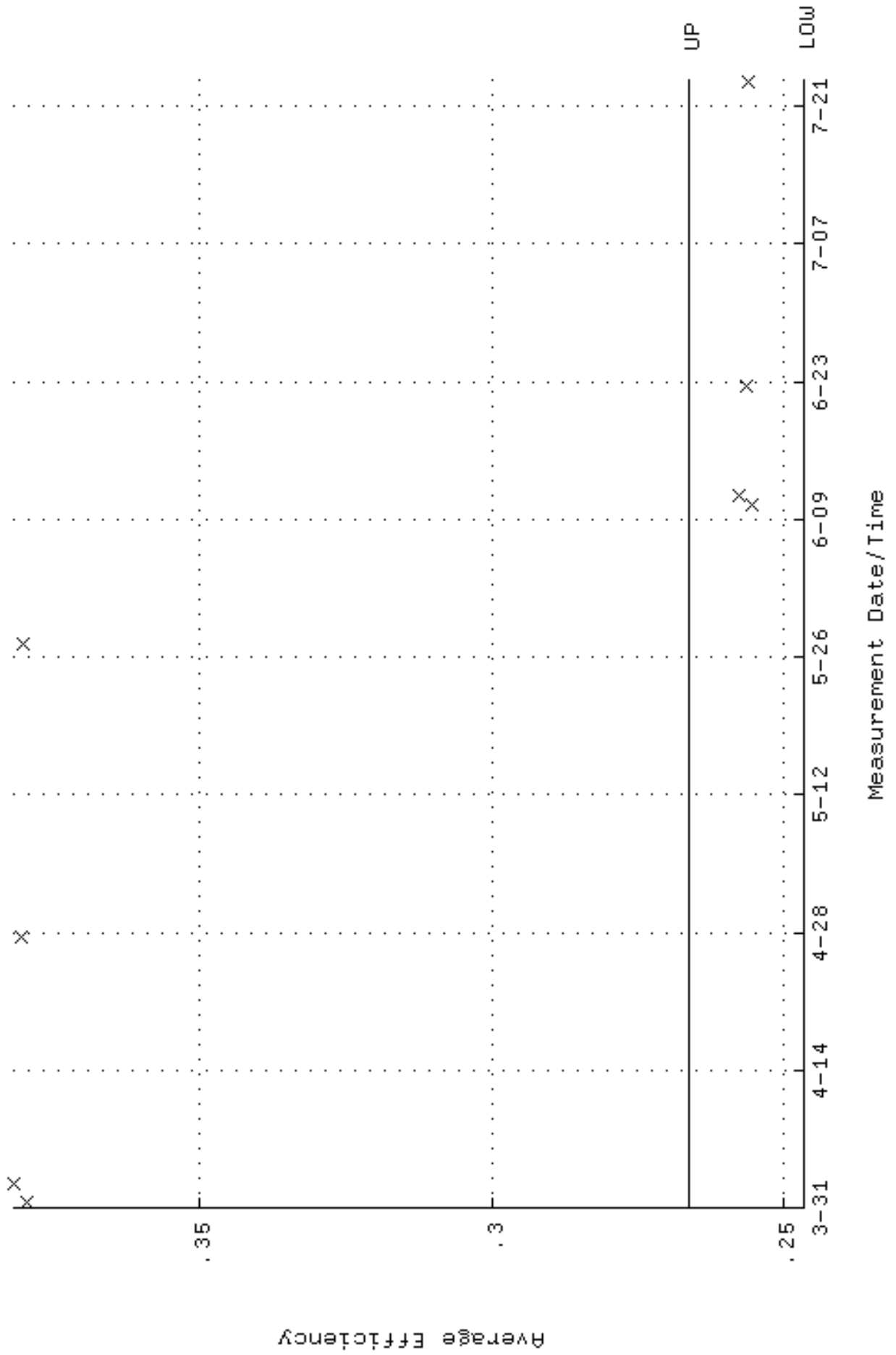
QA filename : DKA100:[ENV\_ALPHA.QA.W]w206.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:35 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 85.1104 through 94.0694



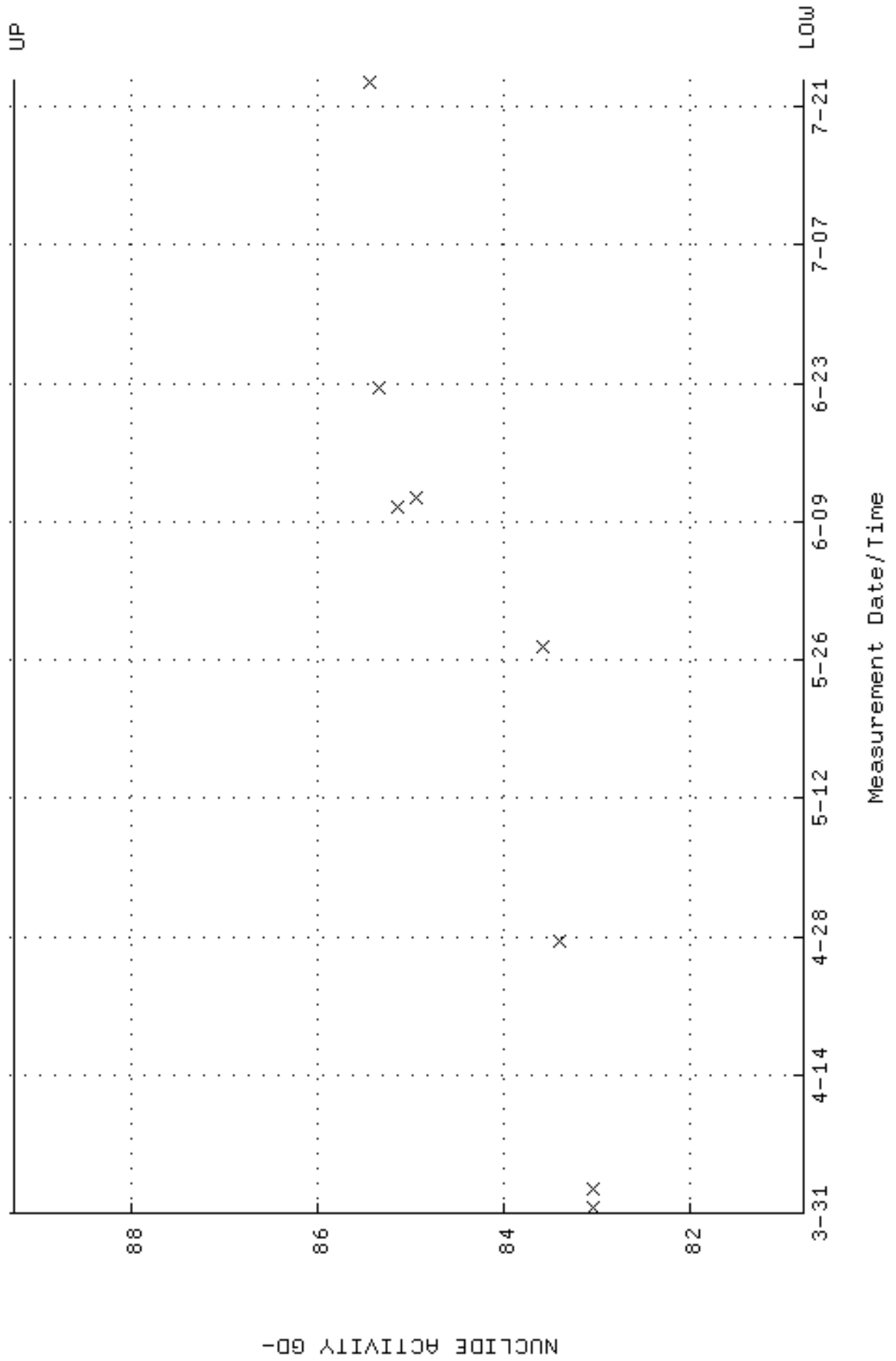
QA filename : DKA100:[ENV\_ALPHA.QA.B]B206.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:03:06 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



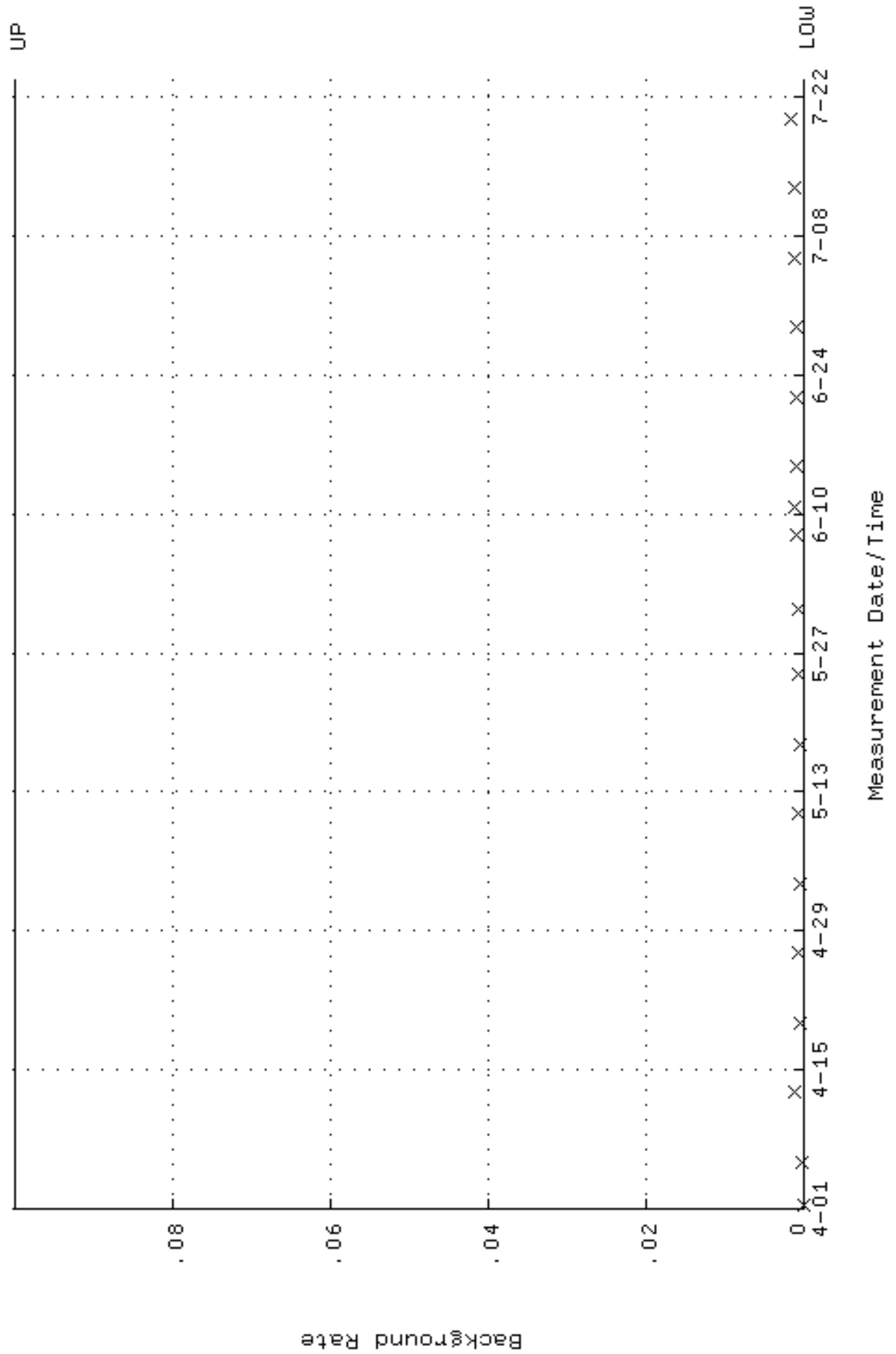
QA filename : DKA100:[ENV\_ALPHA.QA.W]W207.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:38 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.246432 through 0.266432



QA filename : DKA100:[ENV\_ALPHA.QA.W]w207.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:38 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 80.7759 through 89.2787



QA filename : DKA100:[ENV\_ALPHA.QA.B]B207.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:03:11 through 23-JUL-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000





# RUNLOGS

# Instrument Run Log

Instrument Type: GFPC

Batch ID: 886483

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232764002	SAMPLE	MXS2	PIC4C	24-JUL-09 12:53	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764003	SAMPLE	MXS2	PIC4D	24-JUL-09 12:53	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764004	SAMPLE	MXS2	PIC5A	24-JUL-09 12:53	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764005	SAMPLE	MXS2	PIC5B	24-JUL-09 12:53	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764007	SAMPLE	MXS2	PIC5C	24-JUL-09 12:57	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764008	SAMPLE	MXS2	PIC5D	24-JUL-09 12:57	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764010	SAMPLE	MXS2	PIC11C	24-JUL-09 13:13	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764009	SAMPLE	MXS2	PIC11B	24-JUL-09 13:13	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764015	SAMPLE	MXS2	PIC1C	24-JUL-09 13:25	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764016	SAMPLE	MXS2	PIC1D	24-JUL-09 13:25	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764017	SAMPLE	MXS2	PIC2C	24-JUL-09 13:25	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764013	SAMPLE	MXS2	PIC1A	24-JUL-09 13:25	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764014	SAMPLE	MXS2	PIC1B	24-JUL-09 13:25	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201884029	DUP	MXS2	PIC3A	24-JUL-09 13:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201884030	MS	MXS2	PIC3C	24-JUL-09 13:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201884031	LCS	MXS2	PIC4A	24-JUL-09 13:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764011	SAMPLE	MXS2	PIC11B	24-JUL-09 15:25	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201884028	MB	MXS2	PIC11C	24-JUL-09 15:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232764001	SAMPLE	MXS2	PIC14B	24-JUL-09 15:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00

# Instrument Run Log

Instrument Type: LUCAS CELL DETECTOR

Batch ID: 886504

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232764001	SAMPLE	KSD1	LUCAS1	29-JUL-09 14:10	DONE	Lucas Cell	29-AUG-08 00:00
232764002	SAMPLE	KSD1	LUCAS2	29-JUL-09 14:10	DONE	Lucas Cell	19-DEC-08 00:00
232764003	SAMPLE	KSD1	LUCAS3	29-JUL-09 14:10	DONE	Lucas Cell	04-FEB-09 00:00
232764004	SAMPLE	KSD1	LUCAS4	29-JUL-09 14:10	DONE	Lucas Cell	02-MAR-09 00:00
232764005	SAMPLE	KSD1	LUCAS5	29-JUL-09 14:10	DONE	Lucas Cell	25-MAR-09 00:00
232764007	SAMPLE	KSD1	LUCAS7	29-JUL-09 14:10	DONE	Lucas Cell	21-NOV-08 00:00
232764008	SAMPLE	KSD1	LUCAS1	29-JUL-09 14:40	DONE	Lucas Cell	29-AUG-08 00:00
232764009	SAMPLE	KSD1	LUCAS2	29-JUL-09 14:40	DONE	Lucas Cell	19-DEC-08 00:00
232764010	SAMPLE	KSD1	LUCAS3	29-JUL-09 14:40	DONE	Lucas Cell	04-FEB-09 00:00
232764011	SAMPLE	KSD1	LUCAS4	29-JUL-09 14:40	DONE	Lucas Cell	02-MAR-09 00:00
232764013	SAMPLE	KSD1	LUCAS5	29-JUL-09 14:40	DONE	Lucas Cell	25-MAR-09 00:00
232764014	SAMPLE	KSD1	LUCAS7	29-JUL-09 14:40	DONE	Lucas Cell	21-NOV-08 00:00
232764015	SAMPLE	KSD1	LUCAS1	29-JUL-09 15:15	DONE	Lucas Cell	29-AUG-08 00:00
232764016	SAMPLE	KSD1	LUCAS2	29-JUL-09 15:15	DONE	Lucas Cell	19-DEC-08 00:00
232764017	SAMPLE	KSD1	LUCAS3	29-JUL-09 15:15	DONE	Lucas Cell	04-FEB-09 00:00
1201884102	MB	KSD1	LUCAS4	29-JUL-09 15:15	DONE	Lucas Cell	02-MAR-09 00:00
1201884103	DUP	KSD1	LUCAS5	29-JUL-09 15:15	DONE	Lucas Cell	25-MAR-09 00:00
1201884104	MS	KSD1	LUCAS7	29-JUL-09 15:15	DONE	Lucas Cell	21-NOV-08 00:00
1201884105	LCS	KSD1	LUCAS1	29-JUL-09 16:10	DONE	Lucas Cell	29-AUG-08 00:00

# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 891789

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232764001	SAMPLE	MXA1	1173	10-AUG-09 21:14	DONE		
232764002	SAMPLE	MXA1	1174	10-AUG-09 21:14	DONE		
232764003	SAMPLE	MXA1	1187	10-AUG-09 21:14	DONE		
232764004	SAMPLE	MXA1	1188	10-AUG-09 21:14	DONE		
232764005	SAMPLE	MXA1	1189	10-AUG-09 21:14	DONE		
232764007	SAMPLE	MXA1	1190	10-AUG-09 21:14	DONE		
232764008	SAMPLE	MXA1	1191	10-AUG-09 21:14	DONE		
232764009	SAMPLE	MXA1	1192	10-AUG-09 21:14	DONE		
232764010	SAMPLE	MXA1	1193	10-AUG-09 21:14	DONE		
232764011	SAMPLE	MXA1	1194	10-AUG-09 21:14	DONE		
232764013	SAMPLE	MXA1	1195	10-AUG-09 21:14	DONE		
232764014	SAMPLE	MXA1	1196	10-AUG-09 21:15	DONE		
232764015	SAMPLE	MXA1	1201	10-AUG-09 21:15	DONE		
232764016	SAMPLE	MXA1	1202	10-AUG-09 21:15	DONE		
232764017	SAMPLE	MXA1	1203	10-AUG-09 21:15	DONE		
1201896949	MB	MXA1	1204	10-AUG-09 21:15	DONE		
1201896950	DUP	MXA1	1205	10-AUG-09 21:15	DONE		
1201896951	MS	MXA1	1206	10-AUG-09 21:15	DONE		
1201896952	LCS	MXA1	1207	10-AUG-09 21:15	DONE		

# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 892286

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232764001	SAMPLE	MXE1	1135	11-AUG-09 16:57	DONE		
232764002	SAMPLE	MXE1	1136	11-AUG-09 16:57	DONE		
232764003	SAMPLE	MXE1	1137	11-AUG-09 16:57	DONE		
232764004	SAMPLE	MXE1	1138	11-AUG-09 16:57	DONE		
232764005	SAMPLE	MXE1	1139	11-AUG-09 16:57	DONE		
232764007	SAMPLE	MXE1	1140	11-AUG-09 16:57	DONE		
232764008	SAMPLE	MXE1	1141	11-AUG-09 16:57	DONE		
232764009	SAMPLE	MXE1	1142	11-AUG-09 16:57	DONE		
232764010	SAMPLE	MXE1	1143	11-AUG-09 16:57	DONE		
232764011	SAMPLE	MXE1	1144	11-AUG-09 16:57	DONE		
232764013	SAMPLE	MXE1	1145	11-AUG-09 16:57	DONE		
232764014	SAMPLE	MXE1	1146	11-AUG-09 16:57	DONE		
232764015	SAMPLE	MXE1	1147	11-AUG-09 16:57	DONE		
232764016	SAMPLE	MXE1	1148	11-AUG-09 16:57	DONE		
232764017	SAMPLE	MXE1	1149	11-AUG-09 16:57	DONE		
1201898106	MB	MXE1	1150	11-AUG-09 16:57	DONE		
1201898107	DUP	MXE1	1151	11-AUG-09 16:57	DONE		
1201898108	MS	MXE1	1152	11-AUG-09 16:57	DONE		
1201898109	LCS	MXE1	1153	11-AUG-09 16:57	DONE		