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# Case Narrative

**CASE NARRATIVE**  
**for**  
**Tronox LLC**  
**Tronox Henderson**  
**SDG:236534**

**October 07, 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 September 03, 2009, September 04, 2009 and September 09, 2009 for analysis. Shipping container temperatures were checked, documented, and within specifications. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

**Items of Note**

All samples under this SDG were logged as an open SDG until a sufficient amount of samples were received by the lab. The client was notified that the SDG was closed on September 9, 2009 and the turnaround time would start from then.

**QC Issues**

The following samples did not meet the Tronox QA program sample result uncertainty limit of <30% for Ra-226 with the results between 2 and 5 times the MDA and were counted for the maximum time: 236534006, 236534013, 236534014 and 236534018.. The following samples did not meet the Tronox QA program sample result uncertainty limit of <30% for Alpha Spec Uranium with the results between 2 and 5 times the MDA and were counted for the maximum time: 236534008, 236534017, 236534018 and 236534019.. The following samples did not meet the Tronox QA program sample tracer yield requirements of 70-120% for Alpha Spec Uranium due to matrix issues: 236534001, 236534002, 236534003, 236534004, 236534005, 236534006, 236534007, 236534008, 236534009, 236534010, 236534012, 236534013, 236534014, 236534015, 236534016, 236534018, 236534019 and 236534020.. The following samples did not meet the Tronox QA program sample result uncertainty limit of <30% for Alpha Spec Uranium with the results greater than 5 times the MDA and were counted for the maximum time: 236534003 and 236534005.. The following samples did not meet the Tronox QA program required detection limits for Alpha Spec Thorium due to limited sample volume and were counted for the maximum time: and 236534011.. The following samples did not meet the Tronox QA program required detection limits for Alpha Spec Uranium due to limited sample volume and were counted for the maximum time: 236534002, 236534004, 236534006, 236534010, 236534013, 236534015 and 236534016.. The following samples did not meet the Tronox QA program sample result uncertainty limit of <30% for Ra-226 with the results between 2 and 5 times the MDA and were counted for the maximum time: 236534005. For the water Uranium batch, sample 236534011 did not meet the Tronox QA program tracer yield requirements of 70-120% with a recovery of 67.6%. The blank and LCS met their respective spike recovery requirements. The contract uncertainty requirements were met and the samples were counted the maximum count time.

**Sample Identification**

The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
236534001	SA118-0.5B
236534002	SA118-10B
236534003	SA118-25B
236534004	SA118-40B
236534005	SA118-51B
236534006	SA105-0.5B
236534007	SA105-10B
236534008	SA105009-10B
236534009	SA105-20B
236534010	SA105-31B
236534011	EB090209-SO1
236534012	RSAU7-0.5B
236534013	RSAU7009-0.5B
236534014	RSAU7-10B
236534015	RSAU7-25B
236534016	RSAU7-40B
236534017	RSAU7-54B
236534018	SA54-10B
236534019	SA54-20B
236534020	SA54-31B

**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**

236534%



1100 Quail Street, Suite 102, Newport Beach, CA 92660  
(949) 280-9283

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

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

COC No. 2027.001.00643  
Page: 1 of 1  
Cooler # \_\_\_\_\_ of \_\_\_\_\_  
Collection Area: IV

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 85														
City: Charleston, SC 29407		Site Address: 580 W. Lake Mead Drive		City/State: Henderson, NV 89009		Phone #: (949) 280-9283				Special EPA Stage 4 <input checked="" type="checkbox"/> Mark one								
Lab PM: Edith M. Kent		City: Henderson		State: NV		Reimbursement project? <input checked="" type="checkbox"/>		Non-reimbursement project? <input type="checkbox"/>		NJ Reduced Deliverable Package? <input type="checkbox"/>								
Phone/Fax: (843) 666-8171		Site PM Name: Derrick Willis		Send EDD to: frank.hagar@ngem.com		CC Hardcopy report to: PDF Electronic Version Only		MA MCP Cert? <input type="checkbox"/>		CT RCP Cert? <input type="checkbox"/>								
Lab PM email: emk@gel.com		Phone/Fax: 949-375-7004		CC Hardcopy report to: see additional comments below				Lab Project ID (lab use)		Mark One								
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	Vial Matrix Codes		MATRIX	PRESERVATIVES	FIELD FILTERED? (Y/N)	# OF CONTAINERS	SAMPLE TIME	SAMPLE DATE	Requested	Comments/Lab Sample I.D.					
				DRINKING WATER	WASTE WATER									WASTEWATER	WASTE WATER	WASTEWATER	WASTEWATER	WASTEWATER
1		SA118-0.5B		One	W	W	Hydrochloric	N	1	6:45	9/2/2009	X X X	250 ml Plastic jar					
2		SA118-10B			W	W	Hydrochloric	N	1	7:05	9/2/2009	X X X	250 ml Plastic jar					
3		SA118-25B			W	W	Hydrochloric	N	1	7:30	9/2/2009	X X X	250 ml Plastic jar					
4		SA118-40B			W	W	Hydrochloric	N	1	8:18	9/2/2009	X X X	250 ml Plastic jar					
5		SA118-51B			W	W	Hydrochloric	N	1	8:46	9/2/2009	X X X	250 ml Plastic jar					
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
Additional Comments/Special Instructions:													Sample Receipt Conditions					
FULL DIGESTION SPECIFICATION Radionuclides* includes Thorium (isotopic) and Uranium (isotopic) by EML. HASL 300 modified(alpha spectroscopy)													9309 1845 do Y/N		Y/N		Y/N	
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													13:46		9/2/2009		13:46	
UPS COURIER FEDEX													DATE SIGNED		Time			
SIGNATURE OF SAMPLER: Dana R. Brown													DATE SIGNED		Time			
US MAIL													DATE SIGNED		Time			

**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>Keene / Northgate</u>		SDG/ARCOC/Work Order: <u>2365347</u>	
Received By: <u>MX</u>		Date Received: <u>9-3-09</u>	
Suspected Hazard Information	Yes	No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Counts Observed*: <u>9m 20</u>
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

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

EX 7969 1512 3670

PM (or PMA) review: Initials EM Date 9/3/09



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. 2027.001.00629

Page: 1 of 1

Cooler # 1 of 1

Collection Area: II

Required Ship to Lab:		Required Project Information:		Required Invoice Information:		TAT: Standard 30 day		Rush		Mark One															
Lab Name:	GEL Laboratories, LLC	Site ID #:	TRONOX LLC, HENDERSON	Send Invoice to:	Susan Crowley Trenox LLC	City/State:	Henderson, NV 89009	Phone #:	(949) 260-9293	QC level Required:	Standard	Special	EPA Stage	Mark one											
Address:	2040 Savage Road Charleston, SC 29407	Project #:	2027.001	Address:	PO Box 55	Reimbursement project?	<input checked="" type="checkbox"/>	Non-reimbursement project?	<input type="checkbox"/>	NJ Reduced Deliverable Package?		MA MCP Cert?	<input type="checkbox"/>	CT RCP Cert?	Mark one										
Lab PM:	Edith M. Kent	Site Address:	560 W. Lake Mead Drive Henderson	City/State:	Henderson, NV	Send EDD to:	Frank Hagar Northgate Environmental Management, Inc frank.hagar@ngem.com	CC Hardcopy report to:	PDF Electronic Version Only	Lab Project ID (lab use)															
Phone/Fax:	(643) 556-8171	Site PM Name:	Derrick Willis	Phone/Fax:	(949) 375-7004	Site PM Email:	derrick.willis@ngem.com	CC Hardcopy report to:	see additional comments below	Requested															
Applicable Lab Quote #:		Matrix Codes	WATER WASTE WATER WASTE OIL SLUDGE SOIL OTHER ANIMAL TISSUE	Matrix	W S O S O O A	Matrix Code		Sample Type	G-RAB C-COMP	Sample Date		Sample Time		Field Filtered? (Y/N)	Preservatives	Unpreserved	H2SO4	HNO3	HCl	NaOH	Mg2SO3	Methanol	Other		
Item #		Sample ID	One Character per box. (A-Z, 0-9 / -)	Matrix	W S O S O O A	Matrix Code		Sample Type	G-RAB C-COMP	Sample Date		Sample Time		Field Filtered? (Y/N)	Preservatives	Unpreserved	H2SO4	HNO3	HCl	NaOH	Mg2SO3	Methanol	Other	Comments/Lab Sample I.D.	
1		SA105-0.5B		SO	G	9/2/2009	11:46	1	N	X														250 ml Plastic jar	
2		SA105-10B		SO	G	9/2/2009	12:10	1	N	X														250 ml Plastic jar	
3		SA105009-10B		SO	G	9/2/2009	12:10	1	N	X														250 ml Plastic jar	
4		SA105-20B		SO	G	9/2/2009	12:40	1	N	X														250 ml Plastic jar	
5		SA105-31B		SO	G	9/2/2009	13:05	1	N	X														250 ml Plastic jar	
6																									
7																									
8																									
9																									
10																									
11																									
12																									
13																									

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

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

RELINQUISHED BY / AFFILIATION: *Patrick Ferring*  
 DATE: 9-2-09 TIME: 15:08  
 ACCEPTED BY / AFFILIATION: *Patrick Ferring*  
 DATE: 9-3-09 TIME: 08:45

RECEIVED BY / AFFILIATION: *Patrick Ferring*  
 DATE: 9-2-09 TIME: 15:08

SHIPPING METHOD: (mark as appropriate) **UPS COURIER FEDEX**  
 SIGNATURE OF SAMPLER: *Patrick Ferring*  
 SIGNATURE OF SAMPLER: *Patrick Ferring*  
 DATE SIGNED: 9-2-09 TIME: 15:08

Temp in OC:  Y  N  
 Samples on Ice?  Y  N  
 Sample Intact?  Y  N  
 Trip Blank?  Y  N



SAMPLE RECEIPT & REVIEW FORM

Client: <u>Kepp / Northgate</u>		SDG/ARCOC/Work Order: <u>236534</u>	
Received By: <u>MK</u>		Date Received: <u>9-3-09</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"/>

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>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: 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 7969 1510 0750

PM (or PMA) review: Initials Qu Date 9/3/09



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(949) 260-9293

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

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COC No. 2027.001.00695  
Page: 1 of 1  
Cooler # 1 of 1  
Collection Area: **II**

<b>Required Ship to Lab:</b> Lab Name: GEL Laboratories, LLC Address: 2040 Savage Road Charleston, SC 29407 Lab PM: Edith M. Kent Phone/Fax: (843)556-8171 Lab PM email: emk@gel.com Applicable Lab Quote #:		<b>Required Project Information:</b> Site ID #: TRONOX LLC, HENDERSON Project #: 2027.001 Site Address: 560 W. Lake Mead Drive City: Henderson State: NV Reimbursement project? <input checked="" type="checkbox"/> Non-reimbursement project? <input type="checkbox"/> Mark one Phone/Fax: (949)260-9293 Frank Hagar Northgate Environmental Management, Inc Send EDD to: frank.hagar@ngem.com CC Hardcopy report to: PDF Electronic Version Only CC Hardcopy report to: see additional comments below				<b>Required Invoice Information:</b> Send Invoice to: Susan Crowley Tronox LLC Address: PO Box 55 City/State: Henderson, NV 89009 Phone #: (949)260-9293		TAT: Standard 30 day <input checked="" type="checkbox"/> Rush QC level Required: Standard Special EPA Stage <input type="checkbox"/> Mark one NJ Reduced Deliverable Package? <input type="checkbox"/> MA MCP Cert? <input type="checkbox"/> CT RCP Cert? <input type="checkbox"/> Lab Project ID (lab use)						
ITEM #	SAMPLE ID	MATRIX CODES	SAMPLE TYPE	MATRIX CODE	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	FIELD FILTERED? (Y/N)	PRESERVATIVES	REQUESTED ANALYSES	DATE	TEMP IN °C	SAMPLE RECEIPT CONDITIONS	TRIP BLANK?
1	EB090209-SO1	One Character per box. (A-Z, 0-9 /, -, ) Samples IDs MUST BE UNIQUE	G	W	9/2/2009	13:33	1	N	Unpreserved H2SO4 HNO3 HCl NaOH Na2S2O3 Methanol Other	2 L Poly Clear	9-2 0845	26°C	(Y/N) (Y/N)	(Y/N)
2	EB090209-SO1		G	W	9/2/2009	13:33	1	N		2 L Poly Clear			(Y/N) (Y/N)	(Y/N)
3													(Y/N) (Y/N)	(Y/N)
4													(Y/N) (Y/N)	(Y/N)
5													(Y/N) (Y/N)	(Y/N)
6													(Y/N) (Y/N)	(Y/N)
7													(Y/N) (Y/N)	(Y/N)
8													(Y/N) (Y/N)	(Y/N)
9													(Y/N) (Y/N)	(Y/N)
10													(Y/N) (Y/N)	(Y/N)
11													(Y/N) (Y/N)	(Y/N)
12													(Y/N) (Y/N)	(Y/N)

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

Equipment Blank is associated with SA105-31B.  
 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

REMOVED BY / AFFILIATION: *Patrick Ferringer*  
 DATE: 9-2  
 TIME: 1700  
 ACCEPTED BY / AFFILIATION: *Patricia GEL*  
 DATE: 9-2  
 TIME: 1518  
 SIGNATURE OF SAMPLER: *Patrick Ferringer*  
 DATE SIGNED: 9-2  
 TIME: 1518  
 SHIPPING METHOD: (mark as appropriate) **UPS COURIER**  
 SAMPLE NAME AND SIGNATURE: *Patrick Ferringer*



# SAMPLE RECEIPT & REVIEW FORM

Client: <u>Kerr / Northgate</u>		SDG/ARCOC/Work Order: <u>236534</u> %	
Received By: <u>MK</u>		Date Received: <u>9-3-09</u>	
<b>Suspected Hazard Information</b>		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*: <u>cpm 30</u>	
		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>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 7969 1510 0727

PM (or PMA) review: Initials EM Date 9/3/09

20090953892

2365342



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

**CHAIN-OF-CUSTODY / Analytical Request Document**  
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COC No. 2027.001.00703  
Page: 1 of 1  
Cooler # 1 of 1  
Collection Area: IV

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			
Address: 2040 Savage Road		Project #: 2027.001		City/State: Henderson, NV 89009		Phone #: (949)260-9293		QC level Required: Standard		Special EPA Stage 4/Mark one	
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		Send EDD to: Frank Hagar Northgate Environmental Management, Inc frank.hagar@ngem.com		MA MCP Cert? <input type="checkbox"/>		CT RCP Cert? <input type="checkbox"/>	
Phone/Fax: (843)656-8171		Site PM Name: Derrick Willis		Phone/Fax: 949-375-7004		CC Hardcopy report to: PDF Electronic Version Only		Lab Project ID (lab use)			
Lab PM email: emk@gel.com		Site PM Email: derrick.willis@ngem.com									
Applicable Lab Quota #:											
ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / , -)	MATRIX	Valid Matrix Codes	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	#OF CONTAINERS	FIELD FILTERED? (Y/N)	Preservatives	Requested Analytes	Comments/Lab Sample I.D.
1	RSAU7-0.5B	SO	SO	G	9/3/2009	6:42	1	N	X	X	250 ml Plastic jar
2	RSAU7009-0.5B	SO	SO	G	9/3/2009	6:42	1	N	X	X	250 ml Plastic jar
3	RSAU7-10B	SO	SO	G	9/3/2009	7:00	1	N	X	X	250 ml Plastic jar
4	RSAU7-25B	SO	SO	G	9/3/2009	7:30	1	N	X	X	250 ml Plastic jar
5	RSAU7-40B	SO	SO	G	9/3/2009	8:15	1	N	X	X	250 ml Plastic jar
6	RSAU7-54B	SO	SO	G	9/3/2009	8:59	1	N	X	X	250 ml Plastic jar
7											
8											
9											
10											
11											
12											
13											

RELEASER BY AFFILIATION	DATE	ACCEPTED BY AFFILIATION	DATE	TIME	Sample Receipt Conditions
Wally Dana Brown, NCEM	9/3/09	15:05	15:05	9/3/2009	Y/N Y/N Y/N
[Signature]	9/3/09	16:30	16:30	9-4-09	Y/N Y/N Y/N
					Y/N Y/N Y/N
					Y/N Y/N Y/N
					Y/N Y/N Y/N

UPS COURIER FEDEX	DATE SIGNED: 9/3/2009	TIME: 15:05
US MAIL		
SIGNATURE OF SAMPLER: [Signature]	DATE SIGNED: 9/3/2009	TIME: 15:05
PRINT Name of SAMPLER: Daria Brown		



**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>KERR/NORTHGATE</u>		SDG/ARCOC/Work Order: <u>2365347</u>	
Received By: <u>MK</u>		Date Received: <u>9-4-09</u>	
<b>Suspected Hazard Information</b>		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*: <u>Open 30</u>	
		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    Preservation Method: dry ice <u>none</u> other (describe) <u>dd</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: <u>NO TIME ON CONTAINER SAID 04-45B</u>
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments:

Fx 7979 0686 5986

PM (or PMA) review: Initials EA Date 9/4/09

20090953892

236534%



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. 2027.001.00627  
Page: 1 of 1  
Cooler # 1 of 1  
Collection Area: II

Required Ship to Lab:			Required Project Information:			Required Invoice Information:			TAT: Standard 30 day			Rush			Mark One		
Lab Name: GEL Laboratories, LLC			Site ID #: TRONOX LLC- HENDERSON			Send Invoice to: Susan Crowley Tronox, LLC			If Rush, Date due								
Address: 2040 Savaage 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: Mark one		
Lab P/I: 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?			MA MCP Cert?		
Lab PM email: emk@gel.com			Phone/Fax: (949) 375-7004			CC Hardcopy report to: derrick.willis@ngem.com			CC Hardcopy report to: derrick.willis@ngem.com			CT RCP Cert?			Mark One		
Applicable Lab Quote #:			Site PM Email: derrick.willis@ngem.com			CC Hardcopy report to: see additional comments below						Lab Project ID (lab use)					
ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / -)	SAMPLES IDs MUST BE UNIQUE	MATRIX	MATRIX CODE	SAMPLE TYPE	FIELD FILTERED? (Y/N)	SAMPLE TIME	# OF CONTAINERS	DATE	TIME	DATE	TIME	Requested	Comments/Lab	Sample I.D.		
1	SA54-10B		DRINKING WATER	W	G	N	8:24	1	9/8/2009	9:58	9/9/09	08:55	X		250 ml Plastic jar		
2	SA54-20B		WASTE WATER	W	G	N	8:56	1	9/8/2009				X		250 ml Plastic jar		
3	SA54-31B		WASTE WATER	W	G	N	9:23	1	9/8/2009				X		250 ml Plastic jar		
4	SA54-31BMS		WASTE WATER	W	G	N	9:23	1	9/8/2009				X		250 ml Plastic jar		
5	SA54-31BMSD		WASTE WATER	W	G	N	9:23	1	9/8/2009				X		250 ml Plastic jar		
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	

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

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

RELINQUISHED BY / AFFILIATION: *Patrick Ferring* DATE: 9/8/09 TIME: 10:00  
ACCEPTED BY / AFFILIATION: *Patrick Ferring* DATE: 9/9/09 TIME: 08:55

SHIPPING METHOD: (mark as appropriate)  
UPS COURIER (FEDEX) PRINT Name of SAMPLER: Patrick Ferring DATE Signed: 9/8/09 Time: 1454  
US MAIL SIGNATURE of SAMPLER: *Patrick Ferring* DATE Signed: 9/8/09 Time: 1454

Temp in OC: Samples on ice? Trip Blank? Sample intact?

Client: <u>TRONOX</u>		SDG/ARCOC/Work Order: <u>2365347.</u>	
Received By: <u>C. Duffy</u>		Date Received: <u>9/9/09</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>60</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    none    other (describe) <u>21°</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: 7979 1466 1855

PM (or PMA) review: Initials EM Date 9/9/09

**Subject:** GEL Closed SDGs 236534

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

**Date:** Wed, 09 Sep 2009 15:45:09 -0400

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

**CC:** Heather Shaffer <hea01394@gel.com>

With today's receipts, we closed soil SDG 236534. 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 these 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>236534.xls</b>	<b>Content-Type:</b> application/msexcel <b>Content-Encoding:</b> base64
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**Subject:** SDG 236534 QC issues -Alpha Spec Th, Alpha Spec U, Ra 228 and Ra 226

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

**Date:** Wed, 07 Oct 2009 17:40:10 -0400

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

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

The following are the QC issues regarding this SDG for Alpha Spec Th, Alpha Spec U, Ra 228 and Ra 226:

**\*Soil Ra 226 Issues:\***

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 and were counted the maximum possible count time: 236534005.

**\*Soil Ra 226 Issues:\***

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 and were counted the maximum possible count time: 236534006, 236534013, 236534014, and 236534018.

**\*Soil Uranium Issues:\***

The following samples did not meet the Tronox QA program detection limit requirements for U-235/236: 236534002, 236534004, 236534006, 236534010, 236534013, 236534015, 236534016.

Samples 236534003 and 236534005 do not meet the Tronox QA program sample result uncertainty limit of <30% for U-235/236 with activity greater than 5 times the MDA.

Samples 236534008, 236534017, 236534018, and 236534019 does not meet the Tronox QA program sample result uncertainty limit of <30% for U-233/234 with activity between 2 and 5 times the MDA.

Sample 236534001, 236534002, 236534003, 236534004, 236534005, 236534006, 236534007, 236534008, 236534009, 236534010, 236534012, 236534013, 236534014, 236534015, 236534016, 236534018, 236534019, 236534020 ante the lab duplicate did not meet the Tronox QA program tracer yield requirements of 70-120% but did meet GEL's standard tracer yield requirements. The method blank and the LCS met the contract tracer yield requirements.

- All samples were counted the maximum possible count time to achieve the best possible uncertainties and MDAs.

**\*Water Thorium Issues:\***

Sample 236534011 did not meet the Tronox QA program tracer yield requirements of 70-120% with recovery of 67.6%. The blank and LCS met their respective spike recovery requirements. The contract uncertainty requirements were met and the samples were counted the maximum count time.

Sample 236534011 did not meet the Tronox QA program detection limit requirements for Th-228, Th-230, and Th-232 due to limited sample volume.

- 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  
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Web: [www.gel.com](http://www.gel.com)

# Laboratory Certifications

**List of current GEL Certifications as of 07 October 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 236534**

**Method/Analysis Information**

**Product:** Alphaspec Th, Liquid  
Analytical Method: DOE EML HASL-300, Th-01-RC Modified  
Analytical Batch Number: 901446

<b>Sample ID</b>	<b>Client ID</b>
236534011	EB090209-SO1
1201920746	Method Blank (MB)
1201920747	Laboratory Control Sample (LCS)
1201920748	Laboratory Control Sample Duplicate (LCSD)

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

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

A laboratory duplicate was not run with the analytical batch since it was designated by the client as a field QC. A laboratory control sample duplicate was analyzed for precision. 1201920747 (LCS) and

1201920748 (LCSD).

**QC Information**

Refer to Non-Conformance Report.

**Technical Information:**

**Holding Time**

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

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

Sample 236534011 (EB090209-SO1) was recounted 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 736721 was generated due to RDL less than MDA and Failed Recovery for Surrogate or Tracer. 1. Samples 235860015 and 236077013 did not meet the detection limit for Th-228 and 236534011 did not meet the detection limits for Th-228, Th-230 and Th-232 due to limited sample volume. Blank 1201920746 did not meet the detection limit for Th-228 due to keeping the blank aliquot consistent with the other sample aliquots. 2. Sample 236534011 did not meet the client's tracer yield recovery requirements with an achieved tracer recovery of 67.6%. 1. Sample aliquots were restricted by limited sample volume. Samples were counted 1000 minutes to achieve the best MDA possible. 2. Both the batch blank and LCS met client's tracer yield recovery requirements and the sample meets GEL's standard tracer yield recovery requirements. PM notified, reporting results.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>Alphaspec Th, Solid</b>
Analytical Method:	DOE EML HASL-300, Th-01-RC Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	905065
Prep Batch Number:	901366

<b>Sample ID</b>	<b>Client ID</b>
236534001	SA118-0.5B
236534002	SA118-10B
236534003	SA118-25B
236534004	SA118-40B
236534005	SA118-51B
236534006	SA105-0.5B
236534007	SA105-10B
236534008	SA105009-10B
236534009	SA105-20B
236534010	SA105-31B
236534012	RSAU7-0.5B
236534013	RSAU7009-0.5B
236534014	RSAU7-10B
236534015	RSAU7-25B
236534016	RSAU7-40B
236534017	RSAU7-54B
236534018	SA54-10B
236534019	SA54-20B
236534020	SA54-31B
1201929687	Method Blank (MB)
1201929688	236534020(SA54-31B) Sample Duplicate (DUP)
1201929689	236534020(SA54-31B) Matrix Spike (MS)
1201929690	Laboratory Control Sample (LCS)

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

#### **SOP Reference**

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

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met.

##### **Standards Information**

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

##### **Sample Geometry**

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

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

##### **Blank Information**

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

**Designated QC**

The following sample was used for QC: 236534020 (SA54-31B).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:****Holding Time**

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

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

Samples 1201929687 (MB) and 236534006 (SA105-0.5B) were recounted 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. A nonconformance report (NCR) was not generated for this SDG.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>Alphaspec U, Liquid</b>
Analytical Method:	DOE EML HASL-300, U-02-RC Modified
Analytical Batch Number:	901448

<b>Sample ID</b>	<b>Client ID</b>
236534011	EB090209-SO1
1201920749	Method Blank (MB)
1201920750	Laboratory Control Sample (LCS)
1201920751	Laboratory Control Sample Duplicate (LCSD)

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

### **SOP Reference**

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

### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met.

#### **Standards Information**

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

#### **Sample Geometry**

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

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

#### **Blank Information**

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

#### **Designated QC**

A laboratory duplicate was not run with the analytical batch since it was designated by the client as a field QC. A laboratory control sample duplicate was analyzed for precision. 1201920750 (LCS) and 1201920751 (LCSD).

#### **QC Information**

Refer to Non-Conformance Report.

### **Technical Information:**

#### **Holding Time**

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

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

Sample 1201920749 (MB) was recounted 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 737268 was generated due to Failed Recovery for Surrogate or Tracer and Failed Yield for Surrogates. 1. Samples 235860015 and 236238008, blank 1201920749, laboratory control spike 1201920750 and laboratory control spike duplicate 1201920751 do not meet the client's tracer yield recovery acceptance criteria. 1. Samples were counted the maximum count time and meet the client's uncertainty requirements. The LCS and LCSD both meet their respective spike recovery requirements and meet relative percent difference duplication requirements. Group leader consulted and results were

further evaluated and determined to be of good statistical quality. PM notified, reporting results.

**Manual Integration**

No manual integrations were performed on data in this batch.

**Additional Comments**

The U-238 blank result is greater than the MDA, but less than the detection limit.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>Alphaspec U, Solid</b>
Analytical Method:	DOE EML HASL-300, U-02-RC Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	909230
Prep Batch Number:	901366

<b>Sample ID</b>	<b>Client ID</b>
236534001	SA118-0.5B
236534002	SA118-10B
236534003	SA118-25B
236534004	SA118-40B
236534005	SA118-51B
236534006	SA105-0.5B
236534007	SA105-10B
236534008	SA105009-10B
236534009	SA105-20B
236534010	SA105-31B
236534012	RSAU7-0.5B
236534013	RSAU7009-0.5B
236534014	RSAU7-10B
236534015	RSAU7-25B
236534016	RSAU7-40B
236534017	RSAU7-54B
236534018	SA54-10B
236534019	SA54-20B
236534020	SA54-31B
1201939900	Method Blank (MB)
1201939901	236534020(SA54-31B) Sample Duplicate (DUP)
1201939902	236534020(SA54-31B) Matrix Spike (MS)
1201939903	Laboratory Control Sample (LCS)

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

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**



The following sample was used for QC: 236534020 (SA54-31B).

### **QC Information**

Refer to Non-Conformance Report.

### **Technical Information:**

#### **Holding Time**

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

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

Samples were 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 743156 was generated due to RDL less than MDA, Failed Recovery for Surrogate or Tracer and Other. 1. Samples 236534001, 236534002, 236534003, 236534004, 236534005, 236534006, 236534007, 236534008, 236534009, 236534010, 236534012, 236534013, 236534014, 236534015, 236534016, 236534018, 236534019 236534020 and duplicate 1201939901 do not meet the client's yield recovery requirements. 2. Samples 236534002, 236534004, 236534006, 236534010, 236534013, 236534015 and 236534016 do not meet the detection limit for U-235/236. Method blank 1201939900 does not meet the detection limits for U-233/234, U-235/236 and U-238. 3. Samples 236534003 and 236534005 have Uranium-235/236 activity greater than five times the MDA and uncertainty greater than 30% of that activity. Samples 236534008, 236534017, 236534018 and 236534019 have Uranium-235/236 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity. 4. Samples 236534002, 236534004, 236534005, 236534006, 236534007, 236534008, 236534009, 236534018 and 236534020 do not meet the resolution criteria of having tracer full width half maximum less than or equal to 100 keV. 1. Samples do not meet the yield recovery requirements due to difficulties with the sample matrices. Samples have been repped in the attempt to achieve better yield recoveries. The samples do meet GEL's standard tracer yield recovery requirements and the blank and LCS both meet the client's tracer yield recovery requirements. PM notified, group leader consulted, reporting results. 2. Samples do not meet the U-235/236 detection limit due to low yield recoveries resulting from difficulties with the sample matrices. The blank does not meet the detection limits due to keeping the blank aliquot consistent with the other sample aliquots. Samples were counted 1000 minutes to achieve the lowest possible MDA. PM notified, group leader consulted, reporting results. 3. Samples were all counted the maximum count time of 1000 minutes to achieve the best possible uncertainties. PM notified, group leader notified, reporting results. 4. Sample counts are within their respective regions of interest. Batch has been repped already due to difficulties with sample matrices leading to poor resolution and low tracer yield recoveries. Reporting results.

#### **Manual Integration**

No manual integrations were performed on data in this batch.

#### **Additional Comments**

Additional comments were not required for this sample set.

### **Qualifier information**

Manual qualifiers were not required.

### **Method/Analysis Information**

**Product:** GFPC, Ra228, Liquid  
Analytical Method: EPA 904.0/SW846 9320 Modified  
Analytical Batch Number: 902602

<b>Sample ID</b>	<b>Client ID</b>
236534011	EB090209-SO1
1201923559	Method Blank (MB)
1201923560	Laboratory Control Sample (LCS)
1201923561	Laboratory Control Sample Duplicate (LCSD)

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**

A laboratory duplicate was not run with the analytical batch since it was designated by the client as a field QC. A laboratory control sample duplicate was analyzed for precision. 1201923560 (LCS) and 1201923561 (LCSD).

#### **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.

**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**

The blank result 1201923559 (MB) is greater than the MDC but less than the detection limit.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>Gas Flow Radium 228</b>
Analytical Method:	EPA 904.0/SW846 9320 Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	903231
Prep Batch Number:	901366

<b>Sample ID</b>	<b>Client ID</b>
236534001	SA118-0.5B
236534002	SA118-10B
236534003	SA118-25B
236534004	SA118-40B
236534005	SA118-51B
236534006	SA105-0.5B
236534007	SA105-10B
236534008	SA105009-10B
236534009	SA105-20B
236534010	SA105-31B
236534012	RSAU7-0.5B
236534013	RSAU7009-0.5B
236534014	RSAU7-10B
236534015	RSAU7-25B
236534016	RSAU7-40B
236534017	RSAU7-54B
236534018	SA54-10B
236534019	SA54-20B
236534020	SA54-31B
1201925139	Method Blank (MB)
1201925140	236534020(SA54-31B) Sample Duplicate (DUP)
1201925141	236534020(SA54-31B) Matrix Spike (MS)
1201925142	Laboratory Control Sample (LCS)

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

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**

The following sample was used for QC: 236534020 (SA54-31B).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

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

Sample 1201925142 (LCS) was recounted due to high recovery. Sample 236534014 (RSAU7-10B) was recounted due to high MDA. Samples were re-eluted due to high blank activity. Samples 1201925140 (SA54-31B), 236534001 (SA118-0.5B), 236534004 (SA118-40B), 236534005 (SA118-51B), 236534006 (SA105-0.5B), 236534007 (SA105-10B), 236534009 (SA105-20B), 236534013 (RSAU7009-0.5B) and 236534017 (RSAU7-54B) were recounted due to client uncertainty requirement.

**Chemical Recoveries**

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

**Miscellaneous Information:**

**NCR Documentation**

Nonconformance reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following NCR was generated for this SDG: NCR 743125 was generated due to Other. 1. Sample 236534005 has Radium-228 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity. 1. Samples were all counted the maximum count time of 390 minutes to achieve the best possible uncertainties. PM notified, reporting results.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>Lucas Cell, Ra226, liquid</b>
Analytical Method:	EPA 903.1 Modified
Analytical Batch Number:	900913

<b>Sample ID</b>	<b>Client ID</b>
236534011	EB090209-SO1
1201919502	Method Blank (MB)
1201919503	235816007(KMO-1) Sample Duplicate (DUP)
1201919504	235816007(KMO-1) Matrix Spike (MS)
1201919505	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: 235816007 (KMO-1).

##### **QC Information**

Refer to Non-Conformance Report.

#### **Technical Information:**

##### **Holding Time**

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

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

Sample 1201919505 (LCS) was recounted due to low recovery. Sample 1201919503 (KMO-1) was recounted due to high relative percent difference/relative error ratio.

#### **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 733592 was generated due to RDL less than MDA and Other. 1. Sample 235816007 has Radium-226 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity. The sample was counted the maximum count time of 30 minutes to achieve the best possible uncertainties. 2. Sample 1201919503 did not meet the MDA requirements. The sample counted the maximum count time of 30 minutes. 1. PM notified, reporting results. 2. Reporting results.

#### **Additional Comments**

The sample and the duplicate, 1201919503 (KMO-1), did not meet the relative percent difference requirement, however they do meet the relative error ratio requirement with value of 1.4724.

#### **Qualifier information**

Manual qualifiers were not required.

#### **Method/Analysis Information**

<b>Product:</b>	<b>Lucas Cell, Ra226, solid</b>
Analytical Method:	EPA 903.1 Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	905684
Prep Batch Number:	901366

<b>Sample ID</b>	<b>Client ID</b>
236534001	SA118-0.5B
236534002	SA118-10B
236534003	SA118-25B
236534004	SA118-40B
236534005	SA118-51B
236534006	SA105-0.5B
236534007	SA105-10B
236534008	SA105009-10B
236534009	SA105-20B
236534010	SA105-31B
236534012	RSAU7-0.5B
236534013	RSAU7009-0.5B
236534014	RSAU7-10B
236534015	RSAU7-25B
236534016	RSAU7-40B
236534017	RSAU7-54B
236534018	SA54-10B
236534019	SA54-20B
236534020	SA54-31B
1201931119	Method Blank (MB)
1201931120	236534020(SA54-31B) Sample Duplicate (DUP)
1201931121	236534020(SA54-31B) Matrix Spike (MS)
1201931122	Laboratory Control Sample (LCS)

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

**SOP Reference**

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

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

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

**Sample Geometry**

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

**Quality Control (QC) Information:**

**Blank Information**

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

**Designated QC**



The following sample was used for QC: 236534020 (SA54-31B).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

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

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

Sample 1201931122 (LCS) was recounted due to low recovery. Samples 1201931120 (SA54-31B) and 236534020 (SA54-31B) were recounted due to high relative percent difference/relative error ratio.

**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 742186 was generated due to Other. 1. Samples 236534006, 236534013, 236534014 and 236534018 have Radium-226 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity. Samples were all counted the maximum count time of 30 minutes to achieve the best possible uncertainties. 1. PM notified, reporting results.

**Additional Comments**

The sample and the duplicate, 1201931120 (SA54-31B) and 236534020 (SA54-31B), did not meet the relative percent difference requirement, however they do meet the relative error ratio requirement with value of 1.7716.

**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:  10/7/09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 15-SEP-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> 900913	<b>Sample Numbers:</b> SEE BELOW		
<b>Potentially affected work order(s)(SDG): 235816,236238,236435,236534</b>			
<b>Application Issues:</b> RDL less than MDA Other			
<b>Specification and Requirements</b>		<b>NRG Disposition:</b>	
<b>Nonconformance Description:</b>			
<p>1. Sample 235816007 has Radium-226 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity. The sample was counted the maximum count time of 30 minutes to achieve the best possible uncertainties.</p> <p>2. Sample 1201919503 did not meet the MDA requirements. The sample counted the maximum count time of 30 minutes.</p>		<p>1. PM notified, reporting results.</p> <p>2. Reporting results.</p>	

**Originator's Name:**

Lyndsey Pace      15-SEP-09

**Data Validator/Group Leader:**

Lesley Anderson      15-SEP-09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 22-SEP-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> 901446	<b>Sample Numbers:</b> See Below		

**Potentially affected work order(s)(SDG): 235860,236077,236238,236534**

**Application Issues:**

RDL less than MDA  
Failed Recovery for Surrogate or Tracer

<b>Specification and Requirements Nonconformance Description:</b>	<b>NRG Disposition:</b>
<p>1. Samples 235860015 and 236077013 did not meet the detection limit for Th-228 and 236534011 did not meet the detection limits for Th-228, Th-230 and Th-232 due to limited sample volume. Blank 1201920746 did not meet the detection limit for Th-228 due to keeping the blank aliquot consistent with the other sample aliquots.</p> <p>2. Sample 236534011 did not meet the client's tracer yield recovery requirements with an achieved tracer recovery of 67.6%.</p>	<p>1. Sample aliquots were restricted by limited sample volume. Samples were counted 1000 minutes to achieve the best MDA possible.</p> <p>2. Both the batch blank and LCS met client's tracer yield recovery requirements and the sample meets GEL's standard tracer yield recovery requirements. PM notified, reporting results.</p>

**Originator's Name:**

Eric Brimstin 22-SEP-09

**Data Validator/Group Leader:**

Joseph Moulden 23-SEP-09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 23-SEP-09	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Product
<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> 901448	<b>Sample Numbers:</b> See Below.		
<b>Potentially affected work order(s)(SDG): 235860,236077,236238,236534</b>			
<b>Application Issues:</b> Failed Recovery for Surrogate or Tracer Failed Yield for Surrogates			
<b>Specification and Requirements Nonconformance Description:</b>		<b>NRG Disposition:</b>	
1. Samples 235860015 and 236238008, blank 1201920749, laboratory control spike 1201920750 and laboratory control spike duplicate 1201920751 do not meet the client's tracer yield recovery acceptance criteria.		1. Samples were counted the maximum count time and meet the client's uncertainty requirements. The LCS and LCSD both meet their respective spike recovery requirements and meet relative percent difference duplication requirements. Group leader consulted and results were further evaluated and determined to be of good statistical quality. PM notified, reporting results.	

**Originator's Name:**

Eric Brimstin            23-SEP-09

**Data Validator/Group Leader:**

Jessica Downey            23-SEP-09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 06-OCT-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> Solid	<b>Client Code:</b> KERR
<b>Batch ID:</b> 905684	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 236534</b>			
<b>Application Issues:</b> Other			
<b>Specification and Requirements</b>		<b>NRG Disposition:</b>	
<b>Nonconformance Description:</b>  1. Samples 236534006, 236534013, 236534014 and 236534018 have Radium-226 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity. Samples were all counted the maximum count time of 30 minutes to achieve the best possible uncertainties.		1. PM notified, reporting results.	

**Originator's Name:**

Lesley Anderson      06-OCT-09

**Data Validator/Group Leader:**

Angela Johnson      06-OCT-09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 07-OCT-09	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> GFPC	<b>Test / Method:</b> EPA 904.0/SW846 9320 Modified	<b>Matrix Type:</b> Solid	<b>Client Code:</b> KERR
<b>Batch ID:</b> 903231	<b>Sample Numbers:</b> See Below		
<b>Potentially affected work order(s)(SDG): 236534</b>			
<b>Application Issues:</b> Other			
<b>Specification and Requirements Nonconformance Description:</b>		<b>NRG Disposition:</b>	
1. Sample 236534005 has Radium-228 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity.		1. Samples were all counted the maximum count time of 390 minutes to achieve the best possible uncertainties. PM notified, reporting results.	

**Originator's Name:**  
Spencer Collins      07-OCT-09

**Data Validator/Group Leader:**  
Nat Long                      07-OCT-09

**COMPANY - WIDE NONCONFORMANCE REPORT**

<b>Mo.Day Yr.</b> 07-OCT-09	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> ALPHA SPECTROMETER	<b>Test / Method:</b> DOE EML HASL-300, U-02-RC Modified	<b>Matrix Type:</b> Solid	<b>Client Code:</b> KERR
<b>Batch ID:</b> 909230	<b>Sample Numbers:</b> See Below		

**Potentially affected work order(s)(SDG): 236534**

**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 236534001, 236534002, 236534003, 236534004, 236534005, 236534006, 236534007, 236534008, 236534009, 236534010, 236534012, 236534013, 236534014, 236534015, 236534016, 236534018, 236534019 236534020 and duplicate 1201939901 do not meet the client's yield recovery requirements.</p> <p>2. Samples 236534002, 236534004, 236534006, 236534010, 236534013, 236534015 and 236534016 do not meet the detection limit for U-235/236. Method blank 1201939900 does not meet the detection limits for U-233/234, U-235/236 and U-238.</p> <p>3. Samples 236534003 and 236534005 have Uranium-235/236 activity greater than five times the MDA and uncertainty greater than 30% of that activity. Samples 236534008, 236534017, 236534018 and 236534019 have Uranium-235/236 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity.</p> <p>4. Samples 236534002, 236534004, 236534005, 236534006, 236534007, 236534008, 236534009, 236534018 and 236534020 do not meet the resolution criteria of having tracer full width half maximum less than or equal to 100 keV.</p>	<p>1. Samples do not meet the yield recovery requirements due to difficulties with the sample matrices. Samples have been reprepced in the attempt to achieve better yield recoveries. The samples do meet GEL's standard tracer yield recovery requirements and the blank and LCS both meet the client's tracer yield recovery requirements. PM notified, group leader consulted, reporting results.</p> <p>2. Samples do not meet the U-235/236 detection limit due to low yield recoveries resulting from difficulties with the sample matrices. The blank does not meet the detection limits due to keeping the blank aliquot consistent with the other sample aliquots. Samples were counted 1000 minutes to achieve the lowest possible MDA. PM notified, group leader consulted, reporting results.</p> <p>3. Samples were all counted the maximum count time of 1000 minutes to achieve the best possible uncertainties. PM notified, group leader notified, reporting results.</p> <p>4. Sample counts are within their respective regions of interest. Batch has been reprepced already due to difficulties with sample matrices leading to poor resolution and low tracer yield recoveries. Reporting results.</p>

**Originator's Name:**  
Eric Brimstin                      07-OCT-09

**Data Validator/Group Leader:**  
Eric Brimstin

# 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: 236534 GEL Work Order: 236534

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

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

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

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

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



\_\_\_\_\_  
Reviewed by

# GEL LABORATORIES LLC

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

## Certificate of Analysis

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

Report Date: October 7, 2009

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

Client Sample ID:	SA118-0.5B	Project:	KERRHenderson
Sample ID:	236534001	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-SEP-09 06:45		
Receive Date:	03-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.54	+/-0.230	0.114	0.050	pCi/g		JXD2	09/29/09	1937	905065	1
Thorium-230		0.835	+/-0.169	0.102	0.050	pCi/g						
Thorium-232		1.34	+/-0.215	0.127	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.19	+/-0.269	0.210	0.040	pCi/g		JXD2	10/06/09	2353	909230	2
Uranium-235/236		0.203	+/-0.124	0.130	0.040	pCi/g						
Uranium-238		1.11	+/-0.250	0.151	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		2.02	+/-0.359	0.511	0.500	pCi/g		JXC5	10/06/09	2038	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.793	+/-0.208	0.186	0.500	pCi/g		KSD1	10/05/09	1535	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			83.0	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			25.4	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			96.6	(25%-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: October 7, 2009

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

Client Sample ID:	SA118-10B	Project:	KERRHenderson
Sample ID:	236534002	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-SEP-09 07:05		
Receive Date:	03-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.30	+/-0.223	0.0929	0.050	pCi/g		JXD2	09/29/09	1937	905065	1
Thorium-230		0.896	+/-0.188	0.116	0.050	pCi/g						
Thorium-232		1.12	+/-0.203	0.0722	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.36	+/-0.329	0.295	0.040	pCi/g		JXD2	10/06/09	2353	909230	2
Uranium-235/236	U	0.0823	+/-0.0988	0.157	0.040	pCi/g						
Uranium-238		1.20	+/-0.281	0.127	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.533	+/-0.269	0.363	0.500	pCi/g		JXC5	10/06/09	1752	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.733	+/-0.205	0.161	0.500	pCi/g		KSD1	10/05/09	1535	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			75.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			21.1	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			88.0	(25%-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: October 7, 2009

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

Client Sample ID:	SA118-25B	Project:	KERRHenderson
Sample ID:	236534003	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-SEP-09 07:30		
Receive Date:	03-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		0.728	+/-0.178	0.200	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		1.58	+/-0.211	0.079	0.050	pCi/g						
Thorium-232		0.536	+/-0.126	0.079	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.79	+/-0.207	0.0863	0.040	pCi/g		JXD2	10/06/09	2353	909230	2
Uranium-235/236		0.170	+/-0.0696	0.0222	0.040	pCi/g						
Uranium-238		1.55	+/-0.190	0.0459	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.717	+/-0.358	0.521	0.500	pCi/g		JXC5	10/06/09	1752	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.43	+/-0.297	0.182	0.500	pCi/g		KSD1	10/05/09	1605	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			75.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			60.1	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			89.6	(25%-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: October 7, 2009

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

Client Sample ID:	SA118-40B	Project:	KERRHenderson
Sample ID:	236534004	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-SEP-09 08:18		
Receive Date:	03-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.27	+/-0.178	0.108	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		1.41	+/-0.177	0.0437	0.050	pCi/g						
Thorium-232		0.890	+/-0.143	0.0702	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.87	+/-0.265	0.116	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236	U	0.0697	+/-0.072	0.111	0.040	pCi/g						
Uranium-238		1.62	+/-0.245	0.090	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.836	+/-0.305	0.482	0.500	pCi/g		JXC5	10/06/09	2038	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.965	+/-0.241	0.208	0.500	pCi/g		KSD1	10/05/09	1605	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			97.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			37.8	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			98.4	(25%-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: October 7, 2009

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

Client Sample ID:	SA118-51B	Project:	KERRHenderson
Sample ID:	236534005	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-SEP-09 08:49		
Receive Date:	03-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		0.888	+/-0.146	0.0914	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		3.12	+/-0.260	0.0841	0.050	pCi/g						
Thorium-232		0.736	+/-0.128	0.0676	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		3.88	+/-0.342	0.0859	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236		0.307	+/-0.106	0.0288	0.040	pCi/g						
Uranium-238		3.87	+/-0.342	0.0859	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.02	+/-0.311	0.483	0.500	pCi/g		JXC5	10/06/09	2038	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.83	+/-0.337	0.231	0.500	pCi/g		KSD1	10/05/09	1605	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			95.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			44.0	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			97.1	(25%-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: October 7, 2009

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

Client Sample ID:	SA105-0.5B	Project:	KERRHenderson
Sample ID:	236534006	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-SEP-09 11:46		
Receive Date:	03-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.22	+/-0.230	0.182	0.050	pCi/g		JXD2	09/30/09	2150	905065	1
Thorium-230		0.694	+/-0.161	0.0886	0.050	pCi/g						
Thorium-232		1.21	+/-0.209	0.0708	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.688	+/-0.205	0.179	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236	U	0.0329	+/-0.0456	0.0494	0.040	pCi/g						
Uranium-238		1.33	+/-0.261	0.040	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.20	+/-0.279	0.416	0.500	pCi/g		JXC5	10/06/09	2039	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.653	+/-0.229	0.245	0.500	pCi/g		KSD1	10/05/09	1605	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			72.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			27.1	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			101	(25%-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: October 7, 2009

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

Client Sample ID:	SA105-10B	Project:	KERRHenderson
Sample ID:	236534007	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-SEP-09 12:10		
Receive Date:	03-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.47	+/-0.203	0.163	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		1.11	+/-0.161	0.0718	0.050	pCi/g						
Thorium-232		1.06	+/-0.155	0.0447	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.33	+/-0.248	0.150	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236		0.111	+/-0.0856	0.106	0.040	pCi/g						
Uranium-238		1.16	+/-0.232	0.138	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.55	+/-0.381	0.585	0.500	pCi/g		JXC5	10/06/09	2039	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.10	+/-0.276	0.231	0.500	pCi/g		KSD1	10/05/09	1605	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			97.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			32.0	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			98.2	(25%-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: October 7, 2009

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

Client Sample ID:	SA105009-10B	Project:	KERRHenderson
Sample ID:	236534008	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-SEP-09 12:10		
Receive Date:	03-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.22	+/-0.201	0.196	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		1.03	+/-0.157	0.0582	0.050	pCi/g						
Thorium-232		1.18	+/-0.168	0.0582	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.64	+/-0.259	0.0997	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236		0.129	+/-0.0797	0.0386	0.040	pCi/g						
Uranium-238		1.42	+/-0.240	0.0796	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.02	+/-0.294	0.303	0.500	pCi/g		JXC5	10/06/09	1752	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.850	+/-0.237	0.221	0.500	pCi/g		KSD1	10/05/09	1605	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			91.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			34.5	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			103	(25%-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: October 7, 2009

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

Client Sample ID:	SA105-20B	Project:	KERRHenderson
Sample ID:	236534009	Client ID:	KERR003
Matrix:	SO		
Collect Date:	02-SEP-09 12:40		
Receive Date:	03-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		2.02	+/-0.224	0.182	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		1.93	+/-0.198	0.0927	0.050	pCi/g						
Thorium-232		1.46	+/-0.170	0.0619	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		2.18	+/-0.339	0.128	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236		0.148	+/-0.107	0.126	0.040	pCi/g						
Uranium-238		2.20	+/-0.340	0.128	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.16	+/-0.330	0.508	0.500	pCi/g		JXC5	10/06/09	2039	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.49	+/-0.291	0.210	0.500	pCi/g		KSD1	10/05/09	1605	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			105	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			27.5	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			101	(25%-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: October 7, 2009

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

Client Sample ID: SA105-31B  
 Sample ID: 236534010  
 Matrix: SO  
 Collect Date: 02-SEP-09 13:05  
 Receive Date: 03-SEP-09  
 Collector: Client

Project: KERRHenderson  
 Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		0.628	+/-0.126	0.0959	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		4.23	+/-0.300	0.0608	0.050	pCi/g						
Thorium-232		0.555	+/-0.109	0.0421	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		8.54	+/-0.875	0.420	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236	U	0.136	+/-0.296	0.537	0.040	pCi/g						
Uranium-238		5.65	+/-0.740	0.512	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.04	+/-0.438	0.627	0.500	pCi/g		JXC5	10/06/09	1752	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		2.28	+/-0.368	0.208	0.500	pCi/g		KSD1	10/05/09	1640	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			103	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			16.7	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			91.4	(25%-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: October 7, 2009

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

Client Sample ID:	EB090209-SO1	Project:	KERRHenderson
Sample ID:	236534011	Client ID:	KERR003
Matrix:	W		
Collect Date:	02-SEP-09 13:33		
Receive Date:	03-SEP-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	U	0.0322	+/-0.0334	0.0546	0.030	pCi/L		CXM209/18/09	1936	901446	1
Thorium-230	U	0.00317	+/-0.0256	0.0512	0.030	pCi/L					
Thorium-232	U	-0.00317	+/-0.0164	0.039	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234	U	0.00653	+/-0.0139	0.0259	0.030	pCi/L		CXM209/17/09	1957	901448	2
Uranium-235/236		0.00717	+/-0.00812	0.00717	0.030	pCi/L					
Uranium-238	U	0.00967	+/-0.0114	0.0185	0.030	pCi/L					
<b>Rad Gas Flow Proportional Counting</b>											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228	U	2.38	+/-1.87	2.98	3.00	pCi/L		MXS2 09/18/09	1846	902602	3
<b>Rad Radium-226</b>											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226	U	0.0246	+/-0.160	0.330	1.00	pCi/L		KSD1 09/15/09	0830	900913	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"			67.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			74.0	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			75.6	(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: October 7, 2009

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

Client Sample ID:	RSAU7-0.5B	Project:	KERRHenderson
Sample ID:	236534012	Client ID:	KERR003
Matrix:	SO		
Collect Date:	03-SEP-09 06:42		
Receive Date:	04-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.46	+/-0.228	0.142	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		0.822	+/-0.168	0.109	0.050	pCi/g						
Thorium-232		1.34	+/-0.207	0.078	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.980	+/-0.237	0.135	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236		0.0696	+/-0.0682	0.0522	0.040	pCi/g						
Uranium-238		1.29	+/-0.270	0.135	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.91	+/-0.489	0.602	0.500	pCi/g		JXC5	10/06/09	1752	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.426	+/-0.181	0.215	0.500	pCi/g		KSD1	10/05/09	1640	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			72.0	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			25.2	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			97.1	(25%-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: October 7, 2009

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

Client Sample ID:	RSAU7009-0.5B	Project:	KERRHenderson
Sample ID:	236534013	Client ID:	KERR003
Matrix:	SO		
Collect Date:	03-SEP-09 06:42		
Receive Date:	04-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.39	+/-0.180	0.0954	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		0.782	+/-0.135	0.0884	0.050	pCi/g						
Thorium-232		1.25	+/-0.164	0.0524	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.912	+/-0.246	0.247	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236	U	0.0479	+/-0.0828	0.153	0.040	pCi/g						
Uranium-238		1.16	+/-0.245	0.124	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.875	+/-0.309	0.488	0.500	pCi/g		JXC5	10/06/09	2039	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.535	+/-0.196	0.210	0.500	pCi/g		KSD1	10/05/09	1640	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			99.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			27.8	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			103	(25%-125%)

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## Certificate of Analysis

Company : Northgate Environmental Management, Inc.  
 Address : 1100 Quail St., Suite 102  
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Report Date: October 7, 2009

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

Client Sample ID:	RSAU7-10B	Project:	KERRHenderson
Sample ID:	236534014	Client ID:	KERR003
Matrix:	SO		
Collect Date:	03-SEP-09 07:00		
Receive Date:	04-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.29	+/-0.189	0.154	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		0.889	+/-0.141	0.0546	0.050	pCi/g						
Thorium-232		1.07	+/-0.157	0.0764	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.37	+/-0.288	0.192	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236		0.106	+/-0.085	0.0531	0.040	pCi/g						
Uranium-238		1.17	+/-0.257	0.110	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.28	+/-0.528	0.773	0.500	pCi/g		JXC5	10/06/09	1752	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.607	+/-0.201	0.209	0.500	pCi/g		KSD1	10/05/09	1640	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			86.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			25.0	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			89.2	(25%-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: October 7, 2009

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

Client Sample ID:	RSAU7-25B	Project:	KERRHenderson
Sample ID:	236534015	Client ID:	KERR003
Matrix:	SO		
Collect Date:	03-SEP-09 07:30		
Receive Date:	04-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.49	+/-0.190	0.125	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		2.31	+/-0.222	0.0604	0.050	pCi/g						
Thorium-232		1.23	+/-0.163	0.0604	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		2.47	+/-0.281	0.133	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236	U	0.068	+/-0.0913	0.157	0.040	pCi/g						
Uranium-238		2.21	+/-0.263	0.105	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.764	+/-0.344	0.462	0.500	pCi/g		JXC5	10/06/09	1912	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.47	+/-0.320	0.252	0.500	pCi/g		KSD1	10/05/09	1640	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			97.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			44.2	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			93.5	(25%-125%)



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## Certificate of Analysis

Company : Northgate Environmental Management, Inc.  
 Address : 1100 Quail St., Suite 102  
 Newport Beach, California 92660  
 Contact: Mr. Frank Hagar  
 Project: **Tronox Henderson**

Report Date: October 7, 2009

Client Sample ID:	RSAU7-40B	Project:	KERRHenderson
Sample ID:	236534016	Client ID:	KERR003
Matrix:	SO		
Collect Date:	03-SEP-09 08:15		
Receive Date:	04-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.04	+/-0.170	0.157	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		2.27	+/-0.216	0.0585	0.050	pCi/g						
Thorium-232		0.777	+/-0.128	0.0585	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		3.70	+/-0.509	0.234	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236	U	0.194	+/-0.164	0.239	0.040	pCi/g						
Uranium-238		2.43	+/-0.412	0.193	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.37	+/-0.396	0.443	0.500	pCi/g		JXC5	10/06/09	1752	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.39	+/-0.280	0.206	0.500	pCi/g		KSD1	10/05/09	1640	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			92.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			20.5	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			82.5	(25%-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: October 7, 2009

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

Client Sample ID:	RSAU7-54B	Project:	KERRHenderson
Sample ID:	236534017	Client ID:	KERR003
Matrix:	SO		
Collect Date:	03-SEP-09 08:59		
Receive Date:	04-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.12	+/-0.162	0.0913	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		1.59	+/-0.185	0.0608	0.050	pCi/g						
Thorium-232		1.20	+/-0.159	0.0165	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.99	+/-0.175	0.053	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236		0.112	+/-0.0498	0.0469	0.040	pCi/g						
Uranium-238		1.78	+/-0.166	0.0487	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.07	+/-0.257	0.378	0.500	pCi/g		JXC5	10/06/09	2039	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.23	+/-0.283	0.231	0.500	pCi/g		KSD1	10/05/09	1640	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			101	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			89.4	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			97.4	(25%-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: October 7, 2009

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

Client Sample ID: SA54-10B  
 Sample ID: 236534018  
 Matrix: SO  
 Collect Date: 08-SEP-09 08:24  
 Receive Date: 09-SEP-09  
 Collector: Client

Project: KERRHenderson  
 Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.19	+/-0.164	0.0983	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		0.766	+/-0.129	0.0751	0.050	pCi/g						
Thorium-232		1.06	+/-0.147	0.0499	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.79	+/-0.318	0.194	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236		0.150	+/-0.0979	0.050	0.040	pCi/g						
Uranium-238		1.86	+/-0.310	0.0404	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.881	+/-0.379	0.534	0.500	pCi/g		JXC5	10/06/09	1752	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.732	+/-0.236	0.241	0.500	pCi/g		KSD1	10/05/09	1710	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			103	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			26.1	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			91.7	(25%-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: October 7, 2009

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

Client Sample ID:	SA54-20B	Project:	KERRHenderson
Sample ID:	236534019	Client ID:	KERR003
Matrix:	SO		
Collect Date:	08-SEP-09 08:56		
Receive Date:	09-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.37	+/-0.172	0.0898	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		2.24	+/-0.213	0.0637	0.050	pCi/g						
Thorium-232		1.25	+/-0.160	0.0573	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		2.35	+/-0.219	0.070	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236		0.200	+/-0.0769	0.0714	0.040	pCi/g						
Uranium-238		2.11	+/-0.208	0.0642	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.687	+/-0.369	0.562	0.500	pCi/g		JXC5	10/06/09	1752	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.27	+/-0.280	0.221	0.500	pCi/g		KSD1	10/05/09	1745	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			105	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			66.1	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			94.0	(25%-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: October 7, 2009

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

Client Sample ID:	SA54-31B	Project:	KERRHenderson
Sample ID:	236534020	Client ID:	KERR003
Matrix:	SO		
Collect Date:	08-SEP-09 09:23		
Receive Date:	09-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Alpha Spec Analysis</b>												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.27	+/-0.165	0.0877	0.050	pCi/g		JXD2	09/29/09	1943	905065	1
Thorium-230		2.46	+/-0.220	0.0559	0.050	pCi/g						
Thorium-232		1.07	+/-0.144	0.0152	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		2.44	+/-0.272	0.136	0.040	pCi/g		JXD2	10/06/09	2354	909230	2
Uranium-235/236		0.100	+/-0.0646	0.0699	0.040	pCi/g						
Uranium-238		2.31	+/-0.257	0.0566	0.040	pCi/g						
<b>Rad Gas Flow Proportional Counting</b>												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.958	+/-0.402	0.579	0.500	pCi/g		JXC5	10/06/09	1753	903231	3
<b>Rad Radium-226</b>												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.82	+/-0.344	0.241	0.500	pCi/g		KSD1	10/05/09	2110	905684	4

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	MXM5	09/10/09	1607	901366

**The following Analytical Methods were performed**

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			104	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			49.4	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			96.9	(25%-125%)

# QUALITY CONTROL DATA

# GEL LABORATORIES LLC

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## QC Summary

Report Date: October 7, 2009

Page 1 of 5

Northgate Environmental Management, Inc.

1100 Quail St., Suite 102  
Newport Beach, California

Contact: Mr. Frank Hagar

Workorder: 236534

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	901446										
QC1201920747	LCS										
Thorium-228			U	0.0321	pCi/L				CXM2	09/16/09	17:56
				+/-0.0238							
Thorium-230	2.68			2.81	pCi/L		105	(75%-125%)			
				+/-0.157							
Thorium-232			U	0.00	pCi/L			(75%-125%)			
				+/-0.00893							
QC1201920748	LCSD										
Thorium-228			U	0.0203	pCi/L	45.2				09/16/09	17:56
				+/-0.0303							
Thorium-230	2.68			2.98	pCi/L	6.01	111	(0%-20%)			
				+/-0.160							
Thorium-232			U	0.00224	pCi/L			(0%-20%)			
				+/-0.00759							
QC1201920746	MB										
Thorium-228			U	0.0236	pCi/L					09/16/09	17:56
				+/-0.0207							
Thorium-230			U	-0.00234	pCi/L						
				+/-0.0121							
Thorium-232			U	0.00	pCi/L						
				+/-0.00649							
Batch	901448										
QC1201920750	LCS										
Uranium-233/234				2.76	pCi/L				CXM2	09/17/09	20:03
				+/-0.163							
Uranium-235/236				0.194	pCi/L						
				+/-0.0502							
Uranium-238	3.15			3.03	pCi/L		96.1	(75%-125%)			
				+/-0.170							
QC1201920751	LCSD										
Uranium-233/234				3.20	pCi/L	14.8				09/17/09	20:03
				+/-0.222							
Uranium-235/236				0.152	pCi/L	24.3					
				+/-0.0586							
Uranium-238	3.15			3.13	pCi/L	3.32	99.3	(0%-20%)			
				+/-0.220							
QC1201920749	MB										
Uranium-233/234			U	0.00533	pCi/L					09/18/09	19:36
				+/-0.0165							
Uranium-235/236			U	0.00	pCi/L						
				+/-0.0115							
Uranium-238				0.0143	pCi/L						

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## QC Summary

Workorder: 236534

Page 2 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	901448										
				+/-0.0162							
Batch	905065										
QC1201929688	236534020		DUP								
Thorium-228		1.27		1.20	pCi/g	6.04		(0% - 20%)	JXD2	09/29/09	19:43
		+/-0.165		+/-0.157							
Thorium-230		2.46		2.26	pCi/g	8.54		(0% - 20%)			
		+/-0.220		+/-0.210							
Thorium-232		1.07		1.02	pCi/g	4.54		(0% - 20%)			
		+/-0.144		+/-0.142							
QC1201929690	LCS										
Thorium-228			U	0.070	pCi/g					09/29/09	19:43
				+/-0.0679							
Thorium-230	8.30			6.65	pCi/g		80.1	(75%-125%)			
				+/-0.358							
Thorium-232			U	0.0149	pCi/g			(75%-125%)			
				+/-0.0292							
QC1201929687	MB										
Thorium-228			U	-0.0453	pCi/g					09/30/09	21:50
				+/-0.0732							
Thorium-230			U	0.00	pCi/g						
				+/-0.0431							
Thorium-232			U	-0.018	pCi/g						
				+/-0.0305							
QC1201929689	236534020		MS								
Thorium-228		1.27		1.15	pCi/g					09/29/09	19:43
		+/-0.165		+/-0.145							
Thorium-230	8.46	2.46		8.95	pCi/g		76.7	(75%-125%)			
		+/-0.220		+/-0.387							
Thorium-232		1.07		1.14	pCi/g			(75%-125%)			
		+/-0.144		+/-0.139							
Batch	909230										
QC1201939901	236534020		DUP								
Uranium-233/234		2.44		2.60	pCi/g	6.13		(0% - 20%)	JXD2	10/06/09	23:54
		+/-0.272		+/-0.250							
Uranium-235/236		0.100		0.113	pCi/g	11.4		(0% - 100%)			
		+/-0.0646		+/-0.0607							
Uranium-238		2.31		2.18	pCi/g	5.86		(0% - 20%)			
		+/-0.257		+/-0.228							
QC1201939903	LCS										
Uranium-233/234				4.60	pCi/g					10/06/09	23:54
				+/-0.253							
Uranium-235/236				0.231	pCi/g						
				+/-0.0651							
Uranium-238	4.98			5.03	pCi/g		101	(75%-125%)			
				+/-0.266							



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## QC Summary

Workorder: 236534

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Alpha Spec</b>											
Batch	909230										
QC1201939900	MB										
Uranium-233/234			U	-0.00116 +/-0.0258	pCi/g				JXD2	10/06/09	23:54
Uranium-235/236			U	0.0044 +/-0.0228	pCi/g						
Uranium-238			U	0.00356 +/-0.0209	pCi/g						
QC1201939902	236534020	MS									
Uranium-233/234				2.44 +/-0.272	pCi/g					10/06/09	23:54
Uranium-235/236				0.100 +/-0.0646	pCi/g						
Uranium-238	4.98			2.31 +/-0.257	pCi/g		98.1	(75%-125%)			
<b>Rad Gas Flow</b>											
Batch	902602										
QC1201923560	LCS										
Radium-228		11.4		11.5 +/-1.19	pCi/L		100	(75%-125%)	MXS2	09/18/09	18:46
QC1201923561	LCSD										
Radium-228		11.4		11.2 +/-1.25	pCi/L	2.33	98.1	(0%-20%)		09/18/09	18:46
QC1201923559	MB										
Radium-228				0.561 +/-0.375	pCi/L					09/18/09	18:46
Batch	903231										
QC1201925140	236534020	DUP									
Radium-228				0.958 +/-0.402	pCi/g	55.1		(0% - 100%)	JXC5	10/06/09	20:38
QC1201925142	LCS										
Radium-228		7.08		6.71 +/-1.09	pCi/g		94.8	(75%-125%)		10/06/09	19:12
QC1201925139	MB										
Radium-228			U	0.281 +/-0.302	pCi/g					10/06/09	17:53
QC1201925141	236534020	MS									
Radium-228		79.5		0.958 +/-0.402	pCi/g		90.5	(75%-125%)		10/06/09	17:53
<b>Rad Ra-226</b>											
Batch	900913										
QC1201919503	235816007	DUP									
Radium-226			U	0.712 +/-0.265	pCi/L	61.4		(0% - 100%)	KSD1	09/15/09	12:55
QC1201919505	LCS										
Radium-226		15.1		12.1 +/-1.24	pCi/L		80.2	(75%-125%)		09/15/09	12:55
QC1201919502	MB										

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## QC Summary

Workorder: 236534

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Ra-226</b>											
Batch	900913										
Radium-226			U	0.0518	pCi/L						09/15/09 09:10
				+/-0.112							
QC1201919504	235816007	MS									
Radium-226	121	0.712		121	pCi/L		99.6	(75%-125%)	KSD1	09/15/09	08:30
		+/-0.265		+/-9.23							
Batch	905684										
QC1201931120	236534020	DUP									
Radium-226		1.82		3.02	pCi/g	49.5*		(0% - 20%)	KSD1	10/05/09	21:10
		+/-0.344		+/-0.479							
QC1201931122	LCS										
Radium-226	11.5			8.61	pCi/g		75.1	(75%-125%)		10/05/09	23:20
				+/-0.673							
QC1201931119	MB										
Radium-226			U	0.213	pCi/g					10/05/09	17:10
				+/-0.155							
QC1201931121	236534020	MS									
Radium-226	12.0	1.82		13.6	pCi/g		98.5	(75%-125%)		10/05/09	17:10
		+/-0.344		+/-0.850							

**Notes:**

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- A The TIC is a suspected aldol-condensation product
- B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
- BD Results are either below the MDC or tracer recovery is low
- 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

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## QC Summary

Workorder: 236534

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
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# 901446      Product: Th      Date: 9/22/09

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# 736721
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	✓		
Or meets the client's required RER acceptance criteria.			
Tracer yield is 15-125% . Carrier yield 25-125%.			
Or meets the client's contract acceptance criteria.		✓	NCR# 736721
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.			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 stated.	✓		
QC data entered into QC database and batch is in REVW	✓		
Hit notification complete (if necessary)			N/A
Batch entered into Case Narrative.	✓		
Batch non-conformances completed, if applicable.	✓		NCR# 736721
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCR# 736721
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:  9/22/09

Secondary Review Performed By: Jay LML - 9/23/09

KERR

# Thorium (Ac-227 Tracer) Que Sheet

Batch #: 901446    Analyst: CXM2    First Client Due Date: 24-SEP-09    Internal Due Date: 13-SEP-09  
 Tracer Isotope: Ac-227    Tracer Code: 0387-B-102    Expiration Date: 7/23/10    Vol: 0.1ml    Ac-227 Separation Date/Time: 9/14/09 23:15  
 LCS Isotope: Th-230    LCS Code: A246-S    Expiration Date: 4/13/10    Vol: 0.1ml  
 Spike Isotope: Th-230    Spike Code: \_\_\_\_\_    Expiration Date: \_\_\_\_\_    Vol: \_\_\_\_\_  
 Prep Date: 9/11/09    Initials: CMM    Pipet ID: 291058    Balance ID: 16350207    Witness: ML 9/11/09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry	
										Aliquot (g/μl)	Th Det #
235860015-1	EB082109-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	21-AUG-09	1	1	0.800	39
236077013-1	EB082709-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	27-AUG-09	2	2	0.800	40
236077019-1	EB083109-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	31-AUG-09	3	3	0.800	41
236077021-1	EB090109-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	01-SEP-09	4	4	0.800	42
236238008-1	FB082809-SO	SAMPLE		.03 pCi/L	WATER	KERR003	28-AUG-09	5	5	0.800	43
236534011-1	EB090209-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	02-SEP-09	6	6	0.800	44
1201920746-1	MB for batch 901446	MB		.03 pCi/L	WATER	QC ACCOUNT	21-AUG-09 <sup>9/17/09</sup>	7	7	0.800	45
1201920747-1	LCS for batch 901446	LCS		.03 pCi/L	WATER	QC ACCOUNT	21-AUG-09	8	8	0.800	46
1201920748-1	LCS for batch 901446	LCS		.03 pCi/L	WATER	QC ACCOUNT	21-AUG-09	9	9	0.800	47

Choose SOP Used: GL-RAD-A-038  
 GL-RAD-A-045 \_\_\_\_\_  
 GL-RAD-A-043 \_\_\_\_\_  
 GL-RAD-A-032 \_\_\_\_\_  
 GEL Laboratories LLC, Radiochemistry Division

Solid Sample Dissolution by: N/A    ESS 9/17/09  
LEACH or DIGESTION  
 Circle One

Data Reviewed By: [Signature]    9/22/09

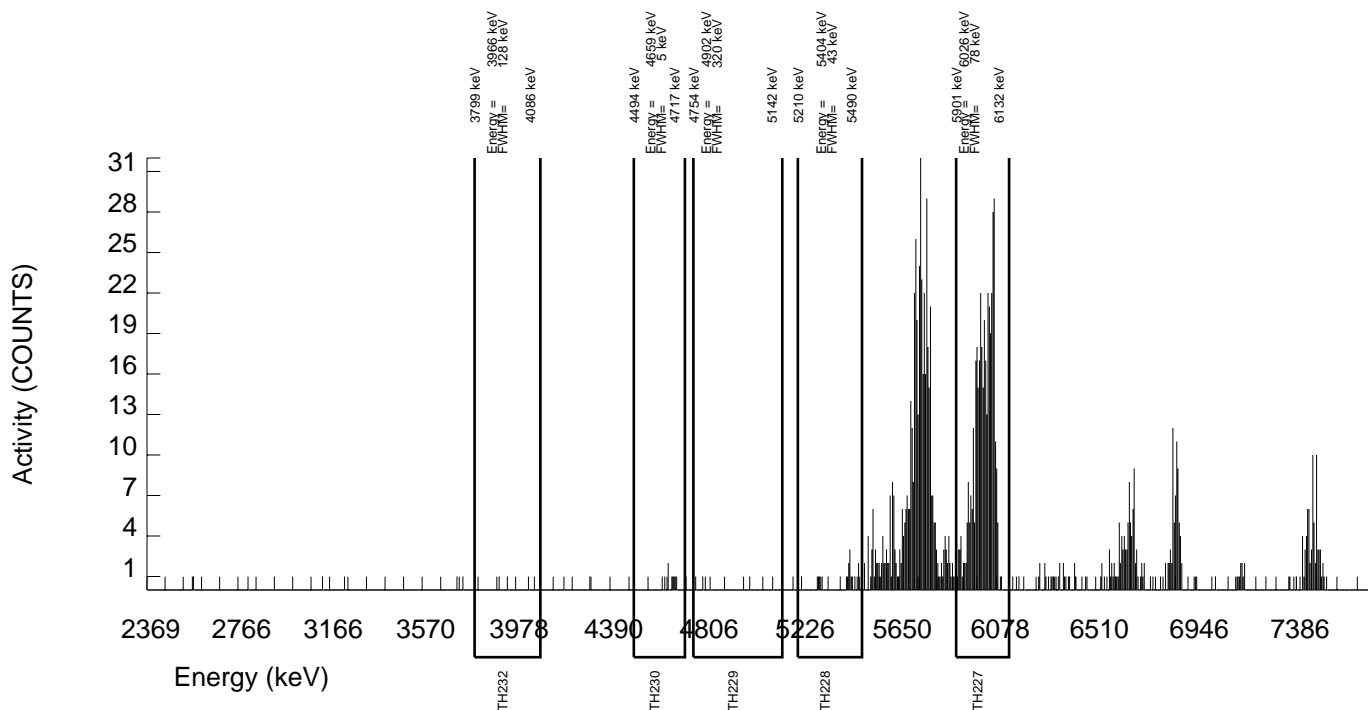
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 901446 SAMPLE DATE : 2-SEP-2009 00:00:00. AC-227 SEPARATION : 14-SEP-2009 23:15:00		SAMPLE ID : S0236534011_TH SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :68627 AVERAGE %EFFICIENCY :26.2903 % YIELD : 67.644		COUNT DATE:18-SEP-2009 19:36:10 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 3.90602 dpm RESULTS : 2.64218 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B193.CNF;110 BKG DATE : 13-SEP-2009 EFF FILE : W193.CNF;37 CAL DATE : 24-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
AC-227	6038.010	409.000	405.000	4.000	2.0000	68.10000	2.20E+00	2.50E-01	6.68E-02	2.53E-02	2.16E-01
TH-228	5363.000	19.000	10.000	9.000	3.0000	99.94000	3.22E-02	3.35E-02	5.46E-02	2.25E-02	3.34E-02
TH229	4900.000	5.000	-6.000	11.000	3.3166	99.52000	-1.91E-02	2.49E-02	5.86E-02	2.45E-02	2.49E-02
TH-230	4625.000	9.000	1.000	8.000	2.8284	100.0000	3.17E-03	2.56E-02	5.12E-02	2.08E-02	2.56E-02
TH-232	3972.000	3.000	-1.000	4.000	2.0000	100.0000	-3.17E-03	1.64E-02	3.90E-02	1.47E-02	1.64E-02

NOTE: Ac-227 results decay corrected to separation date/time.





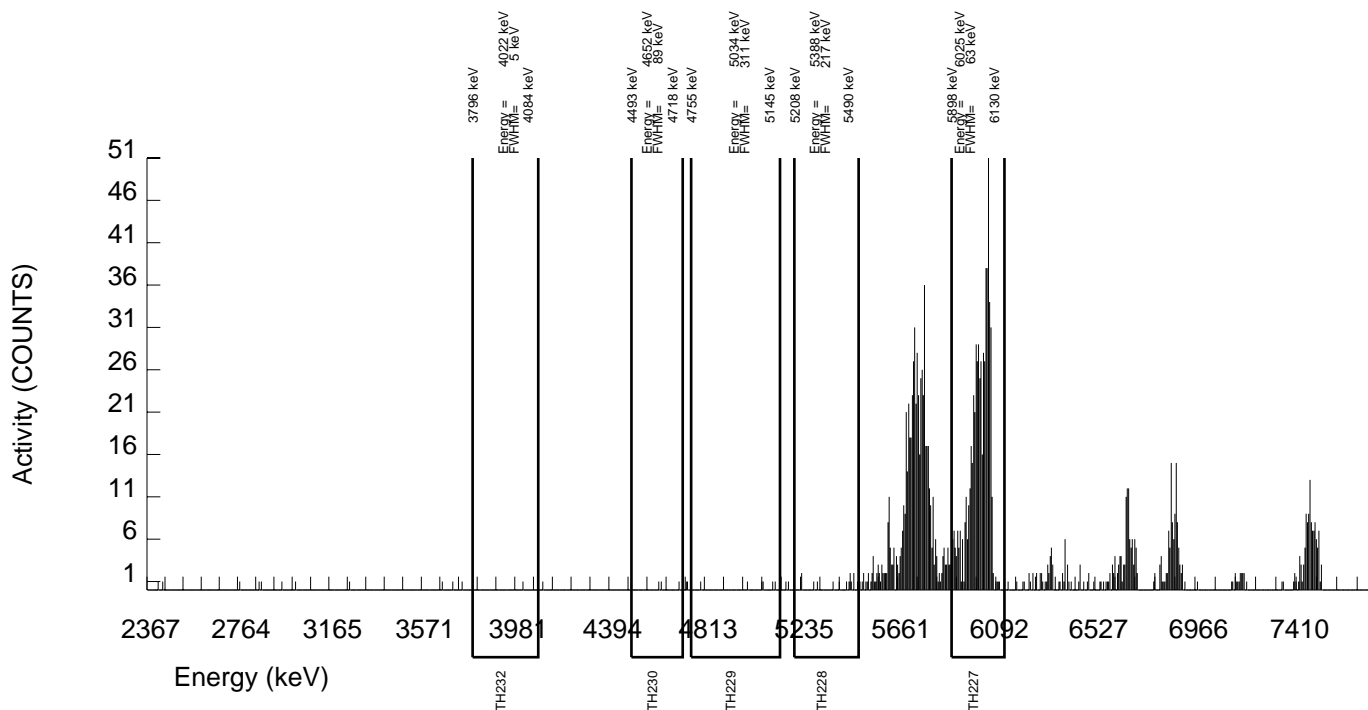
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 901446 SAMPLE DATE : 11-SEP-2009 00:00:00 AC-227 SEPARATION : 14-SEP-2009 23:15:00		SAMPLE ID : S1201920746_TH SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :78783 AVERAGE %EFFICIENCY :33.8617 % YIELD : 70.986		COUNT DATE:16-SEP-2009 17:56:24 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 3.90602 dpm RESULTS : 2.77272 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B045.CNF;1054 BKG DATE : 13-SEP-2009 EFF FILE : W045.CNF;287 CAL DATE : 5-SEP-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	593.000	591.000	2.000	1.4142	68.10000	2.20E+00	2.14E-01	3.57E-02	1.22E-02	1.78E-01
TH-228	5363.000	15.000	10.000	5.000	2.2361	99.94000	2.36E-02	2.07E-02	3.16E-02	1.23E-02	2.07E-02
TH229	4900.000	6.000	2.000	4.000	2.0000	99.52000	4.71E-03	1.46E-02	2.90E-02	1.10E-02	1.46E-02
TH-230	4625.000	3.000	-1.000	4.000	2.0000	100.0000	-2.34E-03	1.21E-02	2.88E-02	1.09E-02	1.21E-02
TH-232	3972.000	1.000	0.000	1.000	1.0000	100.0000	0.00E+00	6.49E-03	1.79E-02	5.45E-03	6.49E-03

NOTE: Ac-227 results decay corrected to separation date/time.



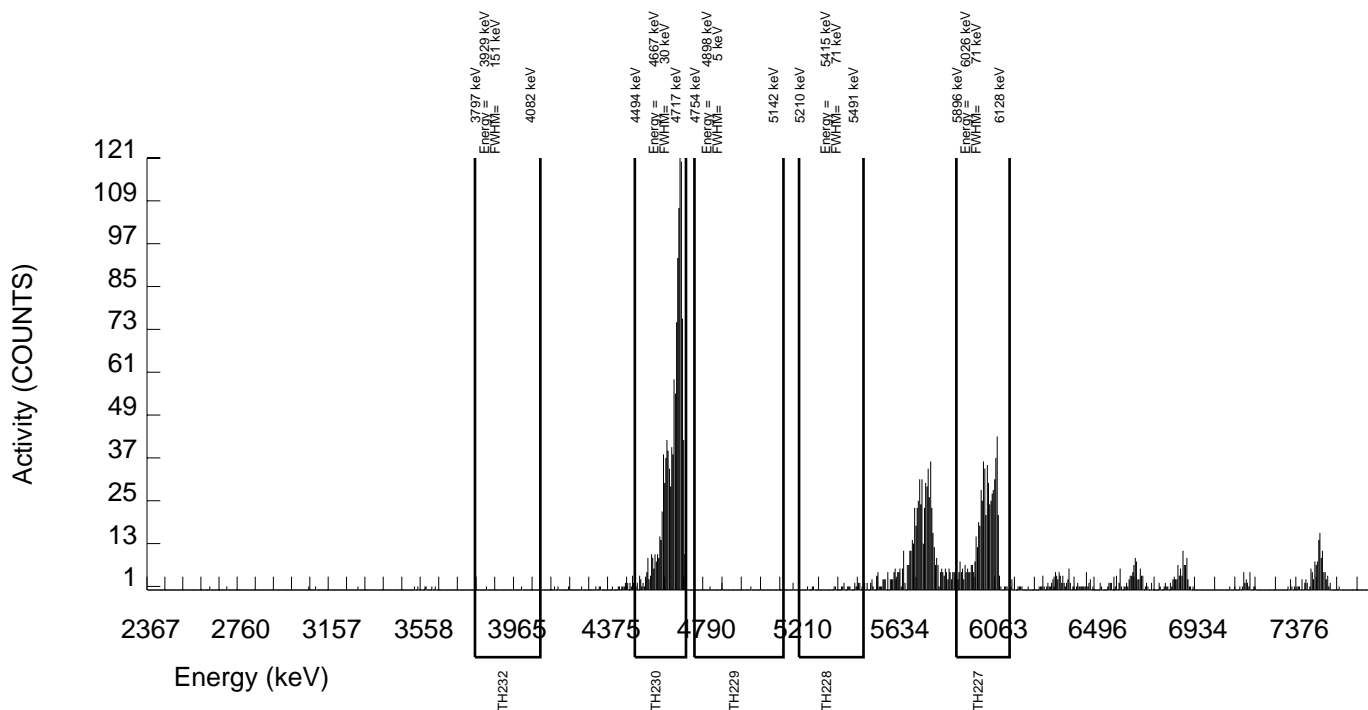
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 901446 SAMPLE DATE : 11-SEP-2009 00:00:00 AC-227 SEPARATION : 14-SEP-2009 23:15:00		SAMPLE ID : S1201920747_TH SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :76544 AVERAGE %EFFICIENCY :34.2883 % YIELD : 72.119		COUNT DATE:16-SEP-2009 17:56:24 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 3.90602 dpm RESULTS : 2.81699 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B046.CNF;1065 BKG DATE : 13-SEP-2009 EFF FILE : W046.CNF;278 CAL DATE : 5-SEP-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	613.000	608.000	5.000	2.2361	68.10000	2.20E+00	2.13E-01	4.85E-02	1.88E-02	1.76E-01
TH-228	5363.000	21.000	14.000	7.000	2.6458	99.94000	3.21E-02	2.38E-02	3.51E-02	1.41E-02	2.38E-02
TH229	4900.000	4.000	-2.000	6.000	2.4495	99.52000	-4.58E-03	1.42E-02	3.29E-02	1.30E-02	1.42E-02
TH-230	4625.000	1238.000	1232.000	6.000	2.4495	100.0000	2.81E+00	2.18E-01	3.28E-02	1.30E-02	1.57E-01
TH-232	3972.000	2.000	0.000	2.000	1.4142	100.0000	0.00E+00	8.93E-03	2.18E-02	7.49E-03	8.93E-03

NOTE: Ac-227 results decay corrected to separation date/time.



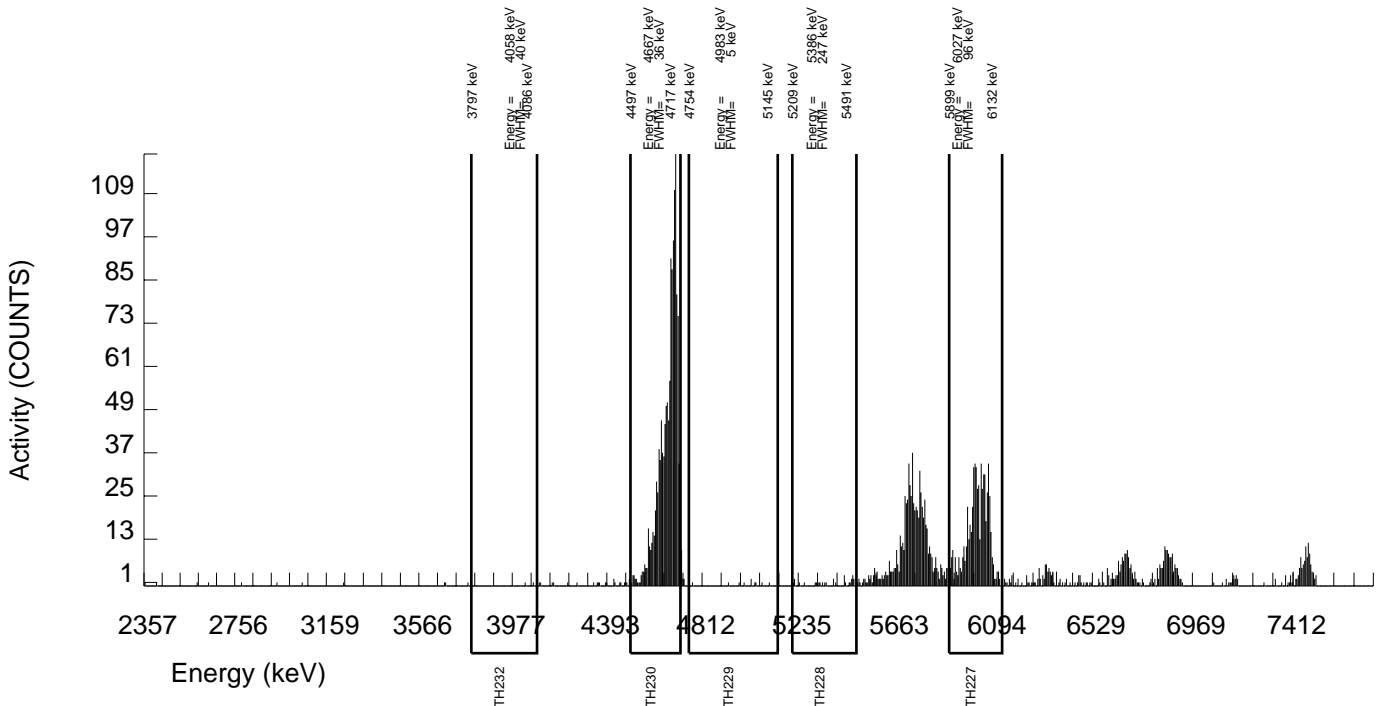
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 901446 SAMPLE DATE : 11-SEP-2009 00:00:00 AC-227 SEPARATION : 14-SEP-2009 23:15:00		SAMPLE ID : S1201920748_TH SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :46-089B1 AVERAGE %EFFICIENCY :34.1455 % YIELD : 73.731		COUNT DATE:16-SEP-2009 17:56:24 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 3.90602 dpm RESULTS : 2.87995 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B047.CNF;1060 BKG DATE : 13-SEP-2009 EFF FILE : W047.CNF;292 CAL DATE : 5-SEP-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	628.000	619.000	9.000	3.0000	68.10000	2.20E+00	2.12E-01	6.03E-02	2.48E-02	1.76E-01
TH-228	5363.000	28.000	9.000	19.000	4.3589	99.94000	2.03E-02	3.03E-02	5.24E-02	2.28E-02	3.03E-02
TH229	4900.000	11.000	6.000	5.000	2.2361	99.52000	1.35E-02	1.76E-02	3.01E-02	1.17E-02	1.76E-02
TH-230	4625.000	1335.000	1332.000	3.000	1.7321	100.0000	2.98E+00	2.27E-01	2.47E-02	9.01E-03	1.60E-01
TH-232	3972.000	2.000	1.000	1.000	1.0000	100.0000	2.24E-03	7.59E-03	1.71E-02	5.20E-03	7.59E-03

NOTE: Ac-227 results decay corrected to separation date/time.



### Radiochemistry Batch Checklist, Rev 9

Batch# 905065 Product: Th Date: 10/2/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			N/A
Samples have been blank corrected (if required)			N/A
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.	✓		
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	✓		
Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%.	✓		
Or meets the client's contract acceptance criteria.	✓		
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.			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.			N/A
Batch non-conformances second reviewed and disposition verified to be completed.			N/A
Aliquot Correction completed if required.			N/A
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC

revised 8/1/08

Primary Review Performed By: E. J. A. 10/2/09

Secondary Review Performed By: Lind 10/2/09

KERR

# Thorium (Ac-227 Tracer) Que Sheet

Batch #: 905065 Analyst: JXD2 First Client Due Date: 07-OCT-09 Internal Due Date: 26-SEP-09  
 Tracer Isotope: Ac-227 Tracer Code: 0387-B-102 Expiration Date: 07/23/10 Vol: 0.1  
 LCS Isotope: Th-230 LCS Code: A2776-J Expiration Date: 04/13/10 Vol: 0.1  
 Spike Isotope: Th-230 Spike Code: A2776-J Expiration Date: 04/13/10 Vol: 0.1  
 Prep Date: 09/23/09 Initials: gpe Pipet ID: 277058 Balance ID: 5040272  
 Witness: MU 9/23/09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Aliquot (g/l/f)	Th Det #
236534001-1	SA118-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-SEP-09	1	1	0.255	207
236534002-1	SA118-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-SEP-09	2	2	0.251	208
236534003-1	SA118-25B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-SEP-09	3	3	0.254	25
236534004-1	SA118-40B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-SEP-09	4	4	0.251	26
236534005-1	SA118-51B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-SEP-09	5	5	0.253	27
236534006-1	SA105-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-SEP-09	6	6	0.252	28 177
236534007-1	SA105-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-SEP-09	7	7	0.251	29
236534008-1	SA105009-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-SEP-09	8	8	0.252	30
236534009-1	SA105-20B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-SEP-09	9	9	0.251	31
236534010-1	SA105-31B	SAMPLE		.05 pCi/g	SOIL	KERR003	02-SEP-09	10	10	0.253	33
236534012-1	RSAU7-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	03-SEP-09	11	11	0.252	35
236534013-1	RSAU7009-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	03-SEP-09	12	12	0.251	36
236534014-1	RSAU7-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	03-SEP-09	13	13	0.258	37
236534015-1	RSAU7-25B	SAMPLE		.05 pCi/g	SOIL	KERR003	03-SEP-09	14	14	0.250	38
236534016-1	RSAU7-40B	SAMPLE		.05 pCi/g	SOIL	KERR003	03-SEP-09	15	15	0.253	39
236534017-1	RSAU7-54B	SAMPLE		.05 pCi/g	SOIL	KERR003	03-SEP-09	16	16	0.253	40
236534018-1	SA54-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	08-SEP-09	17	17	0.255	41
236534019-1	SA54-20B	SAMPLE		.05 pCi/g	SOIL	KERR003	08-SEP-09	18	18	0.254	42
236534020-1	SA54-31B	SAMPLE		.05 pCi/g	SOIL	KERR003	08-SEP-09	19	19	0.253	43
1201929687-1	MB for batch 905065	MB		.05 pCi/g	SOIL	QC ACCOUNT		20	20	0.258	44 178
1201929688-1	SA54-31B(236534020DUP)	DUP		.05 pCi/g	SOIL	QC ACCOUNT		21	21	0.255	45
1201929689-1	SA54-31B(236534020MS)	MS		.05 pCi/g	SOIL	QC ACCOUNT		22	22	0.253	46
1201929690-1	LCS for batch 905065	LCS		.05 pCi/g	SOIL	QC ACCOUNT		23	23	0.258	47

Choose SOP Used: GL-RAD-A-038  
 GL-RAD-A-045  
 GL-RAD-A-043  
 GL-RAD-A-032  
 Solid Sample Dissolution by: LEACH or DIGESTION  
 Circle One  
 Data Reviewed By: [Signature] 10/1/09  
 GEL Laboratories LLC, Radiochemistry Division  
 Page 1 of 1

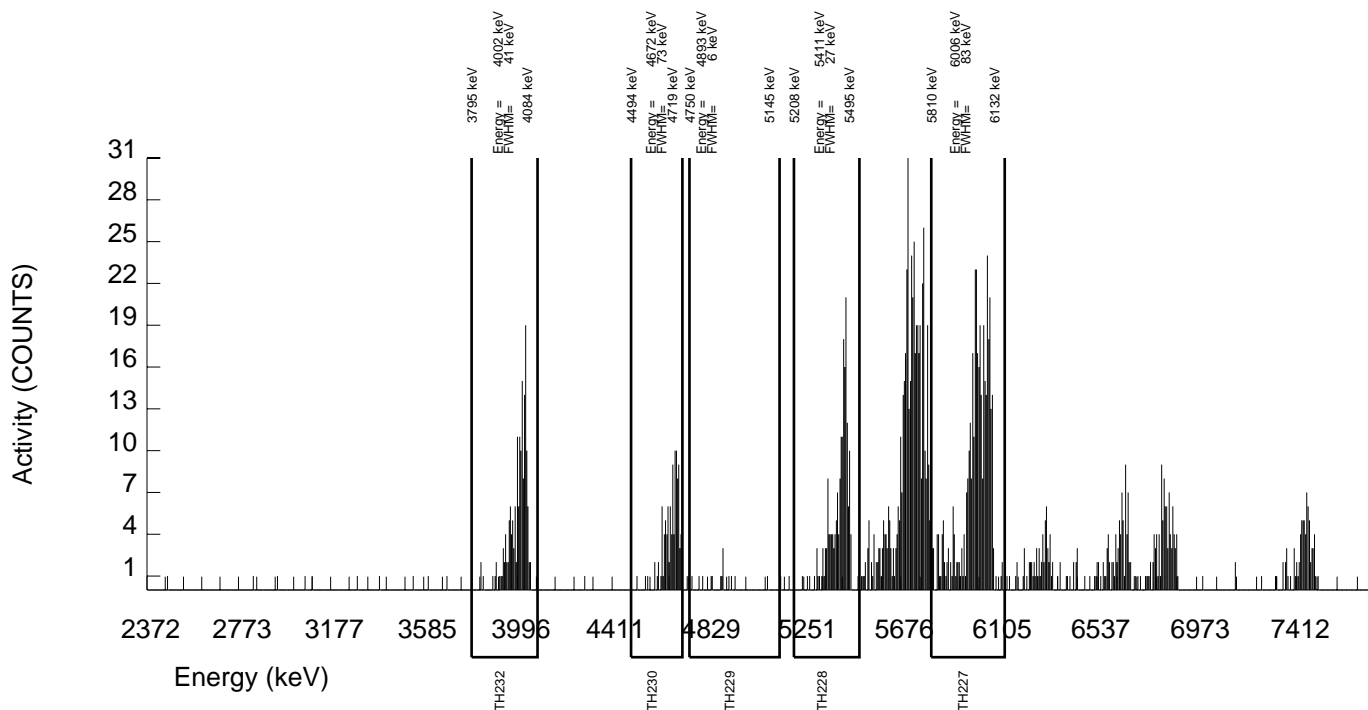
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 2-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534001_TH SAMPLE QTY: 0.255 G	
DETECTOR NUMBER :78910 AVERAGE %EFFICIENCY :25.7346 % YIELD : 83.031		COUNT DATE:29-SEP-2009 19:37:35 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.393E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.393E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 3.24024 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B207.CNF;58 BKG DATE : 27-SEP-2009 EFF FILE : W207.CNF;38 CAL DATE : 21-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	411.000	403.000	8.000	2.8284	57.44000	6.89E+00	8.00E-01	2.76E-01	1.13E-01	6.86E-01
TH-228	5363.000	186.000	181.000	5.000	2.2361	99.94000	1.54E+00	2.48E-01	1.14E-01	4.42E-02	2.30E-01
TH229	4900.000	14.000	10.000	4.000	2.0000	99.52000	8.31E-02	6.93E-02	1.02E-01	3.87E-02	6.91E-02
TH-230	4625.000	105.000	101.000	4.000	2.0000	100.0000	8.35E-01	1.76E-01	1.02E-01	3.85E-02	1.69E-01
TH-232	3972.000	169.000	162.000	7.000	2.6458	100.0000	1.34E+00	2.29E-01	1.27E-01	5.09E-02	2.15E-01

NOTE: Ac-227 results decay corrected to separation date/time.



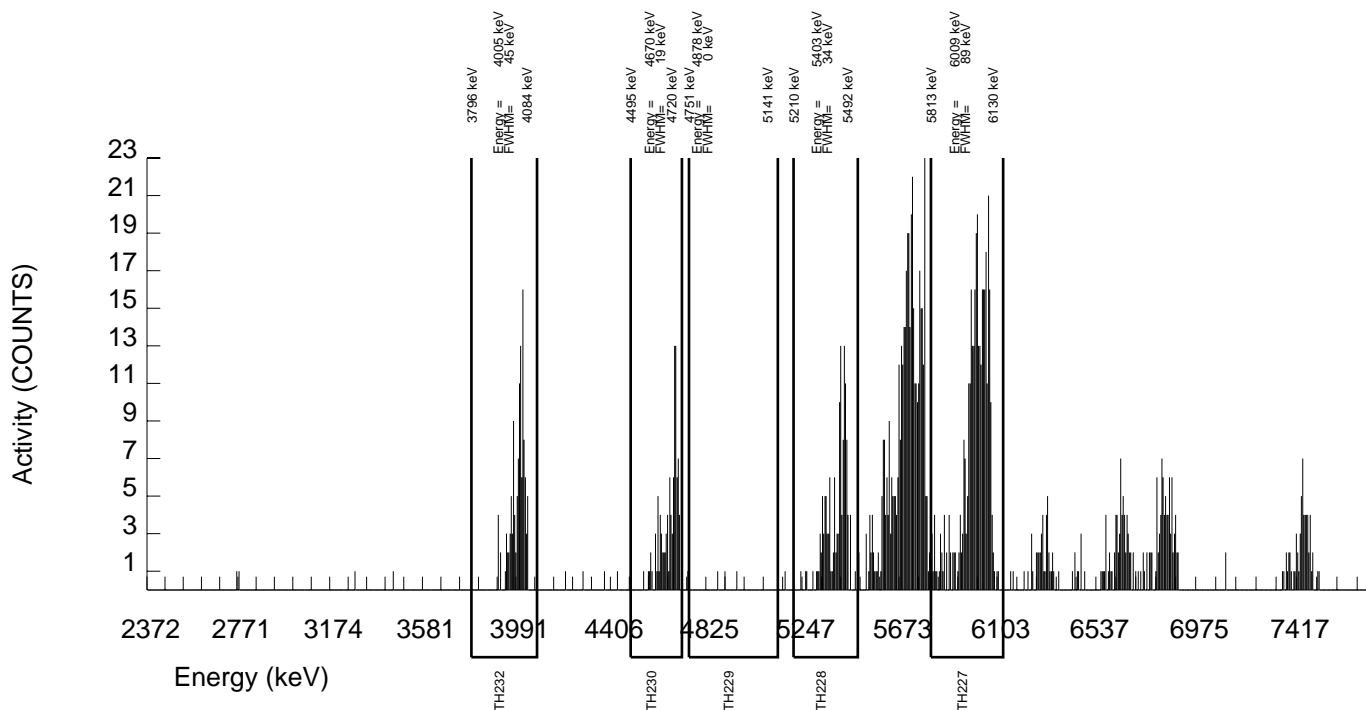
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 2-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534002_TH SAMPLE QTY: 0.251 G	
DETECTOR NUMBER :78911 AVERAGE %EFFICIENCY :25.1006 % YIELD : 75.834		COUNT DATE:29-SEP-2009 19:37:38 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.527E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.527E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 2.95938 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B208.CNF;58 BKG DATE : 27-SEP-2009 EFF FILE : W208.CNF;38 CAL DATE : 21-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	367.000	359.000	8.000	2.8284	57.44000	7.00E+00	8.50E-01	3.15E-01	1.28E-01	7.40E-01
TH-228	5363.000	136.000	134.000	2.000	1.4142	99.94000	1.30E+00	2.36E-01	9.29E-02	3.19E-02	2.23E-01
TH229	4900.000	4.000	0.000	4.000	2.0000	99.52000	0.00E+00	5.25E-02	1.17E-01	4.41E-02	5.25E-02
TH-230	4625.000	99.000	95.000	4.000	2.0000	100.0000	8.96E-01	1.95E-01	1.16E-01	4.39E-02	1.88E-01
TH-232	3972.000	120.000	119.000	1.000	1.0000	100.0000	1.12E+00	2.14E-01	7.22E-02	2.19E-02	2.03E-01

NOTE: Ac-227 results decay corrected to separation date/time.



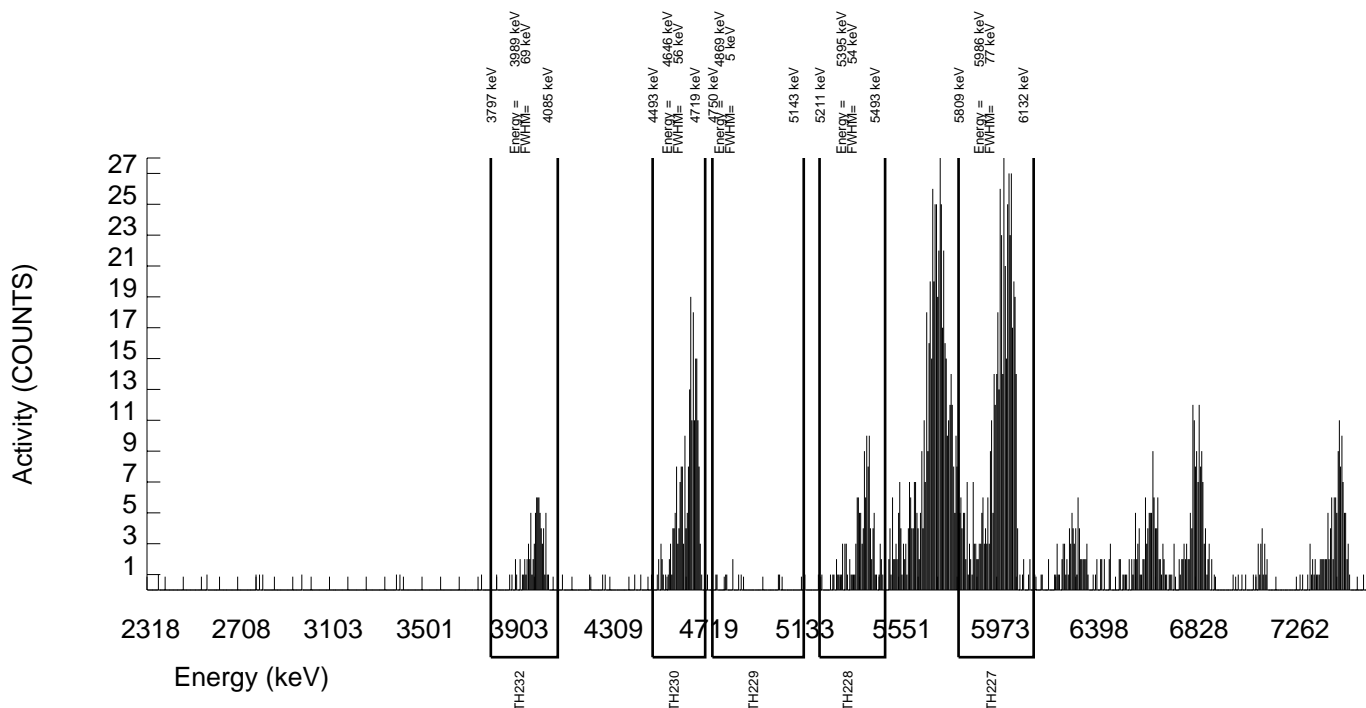
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 2-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534003_TH SAMPLE QTY: 0.254 G	
DETECTOR NUMBER :45-149AA5 AVERAGE %EFFICIENCY :32.7650 % YIELD : 75.744		COUNT DATE:29-SEP-2009 19:43:01 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.426E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.426E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 2.95587 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B025.CNF;1068 BKG DATE : 27-SEP-2009 EFF FILE : W025.CNF;317 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	512.000	468.000	44.000	6.6332	57.44000	6.92E+00	7.98E-01	5.01E-01	2.28E-01	6.83E-01
TH-228	5363.000	126.000	99.000	27.000	5.1962	99.94000	7.28E-01	1.83E-01	2.00E-01	8.89E-02	1.78E-01
TH229	4900.000	10.000	3.000	7.000	2.6458	99.52000	2.15E-02	5.80E-02	1.10E-01	4.42E-02	5.80E-02
TH-230	4625.000	224.000	221.000	3.000	1.7321	100.0000	1.58E+00	2.31E-01	7.90E-02	2.88E-02	2.11E-01
TH-232	3972.000	78.000	75.000	3.000	1.7321	100.0000	5.36E-01	1.30E-01	7.90E-02	2.88E-02	1.26E-01

NOTE: Ac-227 results decay corrected to separation date/time.





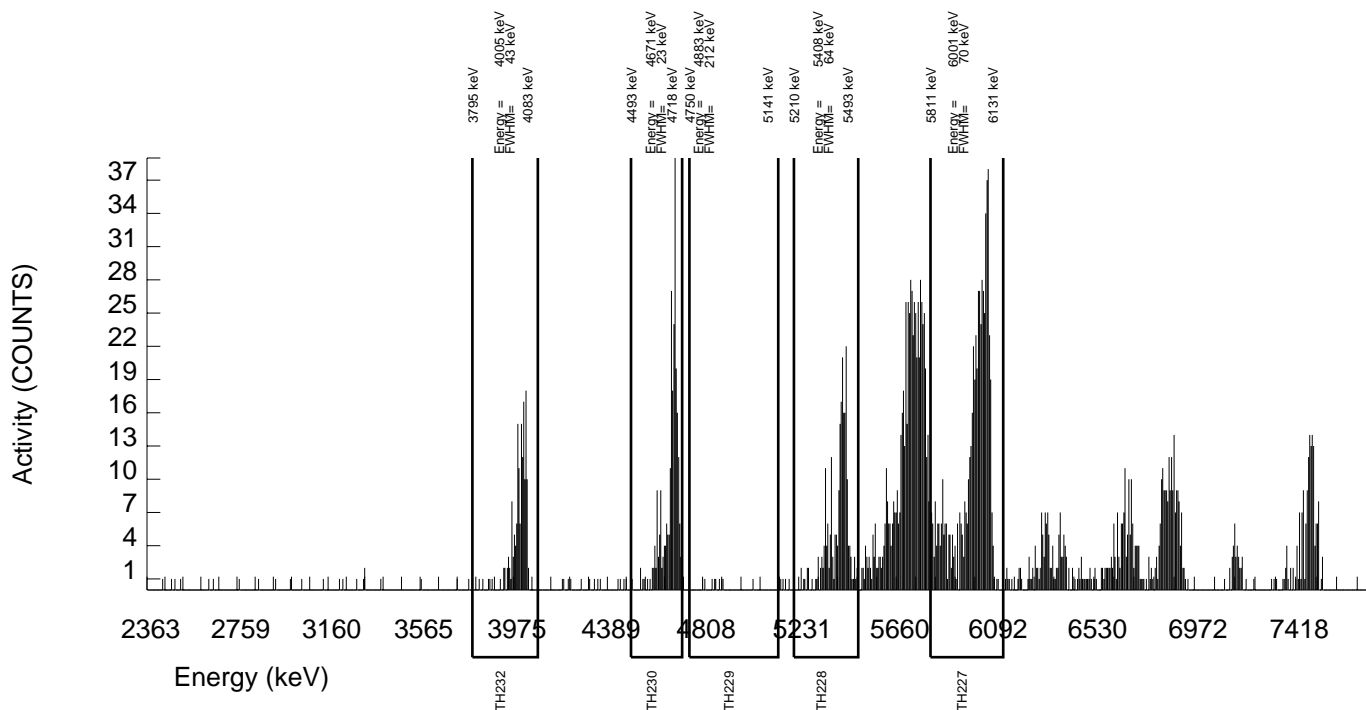
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 2-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534004_TH SAMPLE QTY: 0.251 G	
DETECTOR NUMBER :78204 AVERAGE %EFFICIENCY :32.1305 % YIELD : 97.870		COUNT DATE:29-SEP-2009 19:43:01 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.527E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.527E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 3.81932 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B026.CNF;1069 BKG DATE : 27-SEP-2009 EFF FILE : W026.CNF;291 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	625.000	593.000	32.000	5.6569	57.44000	7.00E+00	7.39E-01	3.46E-01	1.55E-01	5.93E-01
TH-228	5363.000	228.000	217.000	11.000	3.3166	99.94000	1.27E+00	1.95E-01	1.08E-01	4.53E-02	1.78E-01
TH229	4900.000	9.000	3.000	6.000	2.4495	99.52000	1.72E-02	4.35E-02	8.26E-02	3.27E-02	4.35E-02
TH-230	4625.000	248.000	247.000	1.000	1.0000	100.0000	1.41E+00	1.97E-01	4.37E-02	1.33E-02	1.77E-01
TH-232	3972.000	160.000	156.000	4.000	2.0000	100.0000	8.90E-01	1.54E-01	7.02E-02	2.66E-02	1.43E-01

NOTE: Ac-227 results decay corrected to separation date/time.



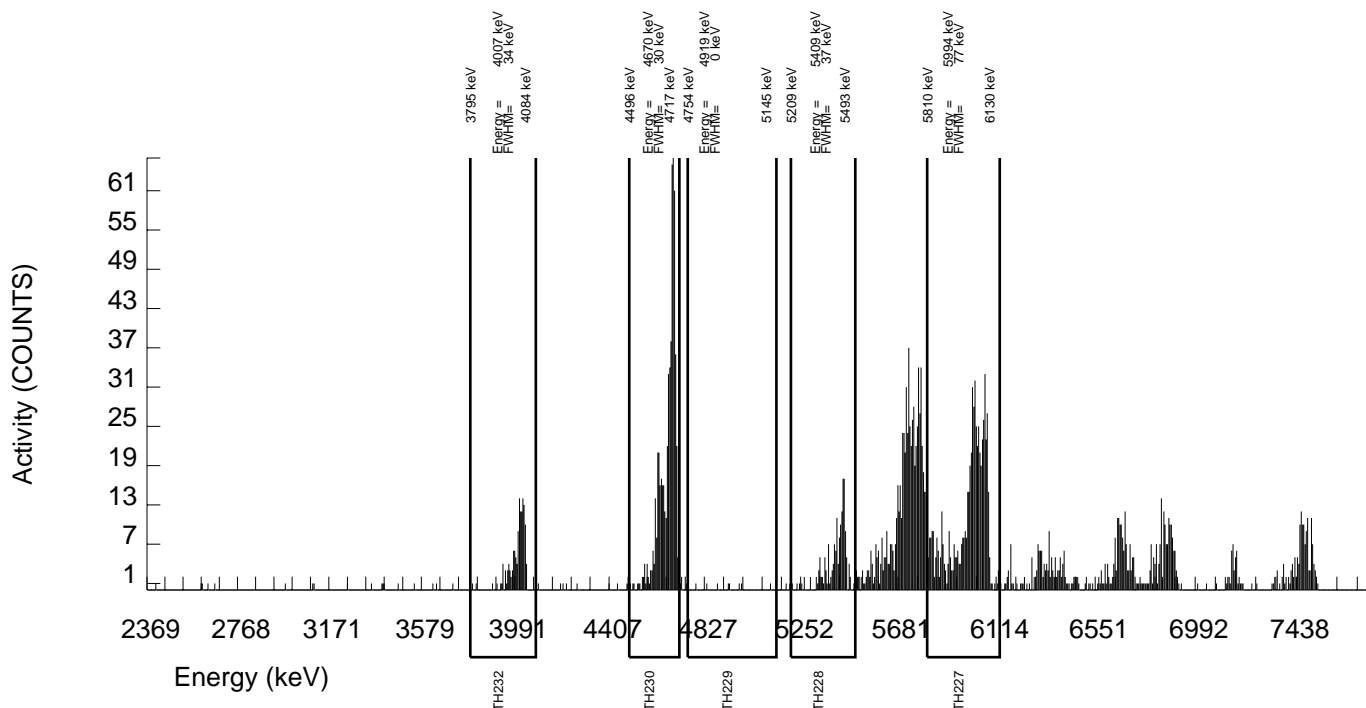
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 2-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534005_TH SAMPLE QTY: 0.253 G	
DETECTOR NUMBER :42484 AVERAGE %EFFICIENCY :33.8551 % YIELD : 95.704		COUNT DATE:29-SEP-2009 19:43:01 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.459E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.459E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 3.73480 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B027.CNF;1075 BKG DATE : 27-SEP-2009 EFF FILE : W027.CNF;318 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	647.000	611.000	36.000	6.0000	57.44000	6.95E+00	7.27E-01	3.52E-01	1.59E-01	5.82E-01
TH-228	5363.000	165.000	157.000	8.000	2.8284	99.94000	8.88E-01	1.56E-01	9.14E-02	3.72E-02	1.46E-01
TH229	4900.000	9.000	1.000	8.000	2.8284	99.52000	5.52E-03	4.46E-02	8.92E-02	3.63E-02	4.46E-02
TH-230	4625.000	574.000	567.000	7.000	2.6458	100.0000	3.12E+00	3.25E-01	8.41E-02	3.38E-02	2.60E-01
TH-232	3972.000	138.000	134.000	4.000	2.0000	100.0000	7.36E-01	1.36E-01	6.76E-02	2.56E-02	1.28E-01

NOTE: Ac-227 results decay corrected to separation date/time.



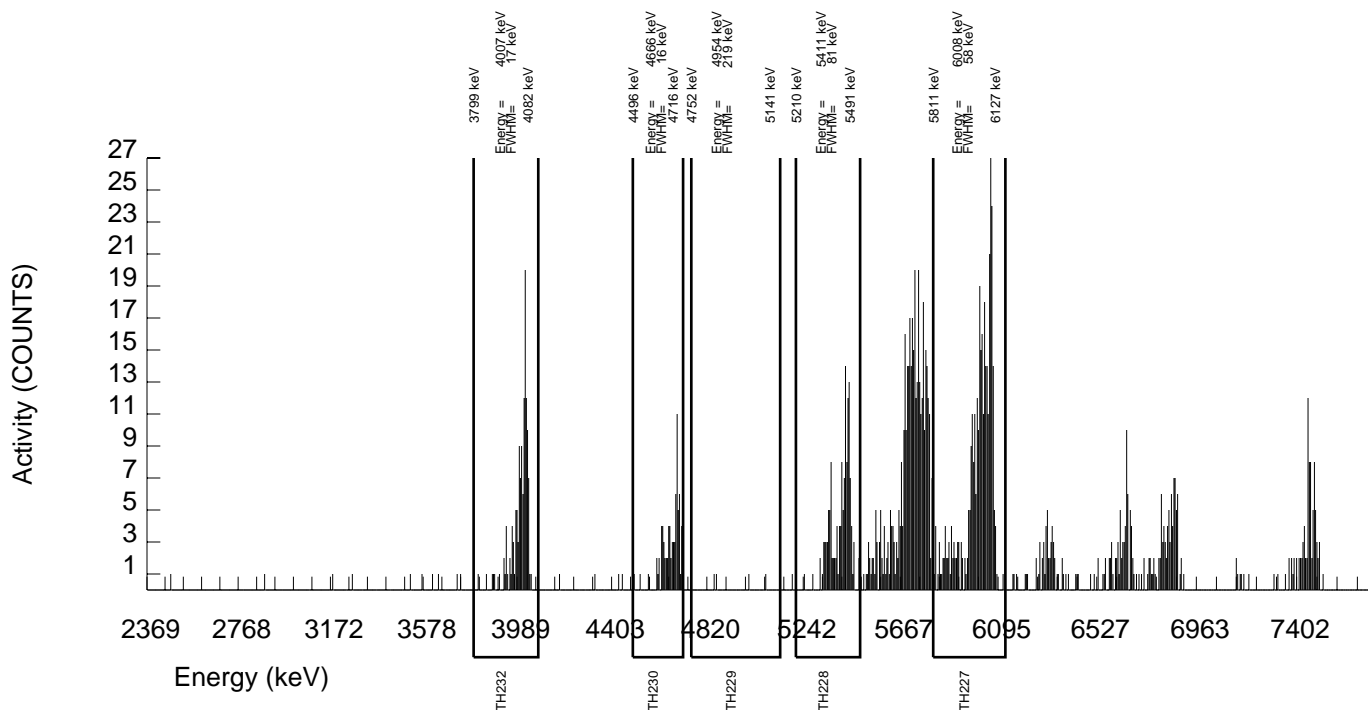
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 2-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534006_TH SAMPLE QTY: 0.252 G	
DETECTOR NUMBER :74435 AVERAGE %EFFICIENCY :26.5975 % YIELD : 72.651		COUNT DATE:30-SEP-2009 21:50:13 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.493E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.493E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 2.83517 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B177.CNF;130 BKG DATE : 28-SEP-2009 EFF FILE : W177.CNF;41 CAL DATE : 21-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	360.000	350.000	10.000	3.1623	57.44000	6.98E+00	8.58E-01	3.53E-01	1.47E-01	7.51E-01
TH-228	5363.000	140.000	128.000	12.000	3.4641	99.94000	1.22E+00	2.41E-01	1.82E-01	7.68E-02	2.30E-01
TH229	4900.000	4.000	-1.000	5.000	2.2361	99.52000	-9.30E-03	5.47E-02	1.25E-01	4.84E-02	5.47E-02
TH-230	4625.000	77.000	75.000	2.000	1.4142	100.0000	6.94E-01	1.66E-01	8.86E-02	3.04E-02	1.61E-01
TH-232	3972.000	132.000	131.000	1.000	1.0000	100.0000	1.21E+00	2.21E-01	7.08E-02	2.15E-02	2.09E-01

NOTE: Ac-227 results decay corrected to separation date/time.



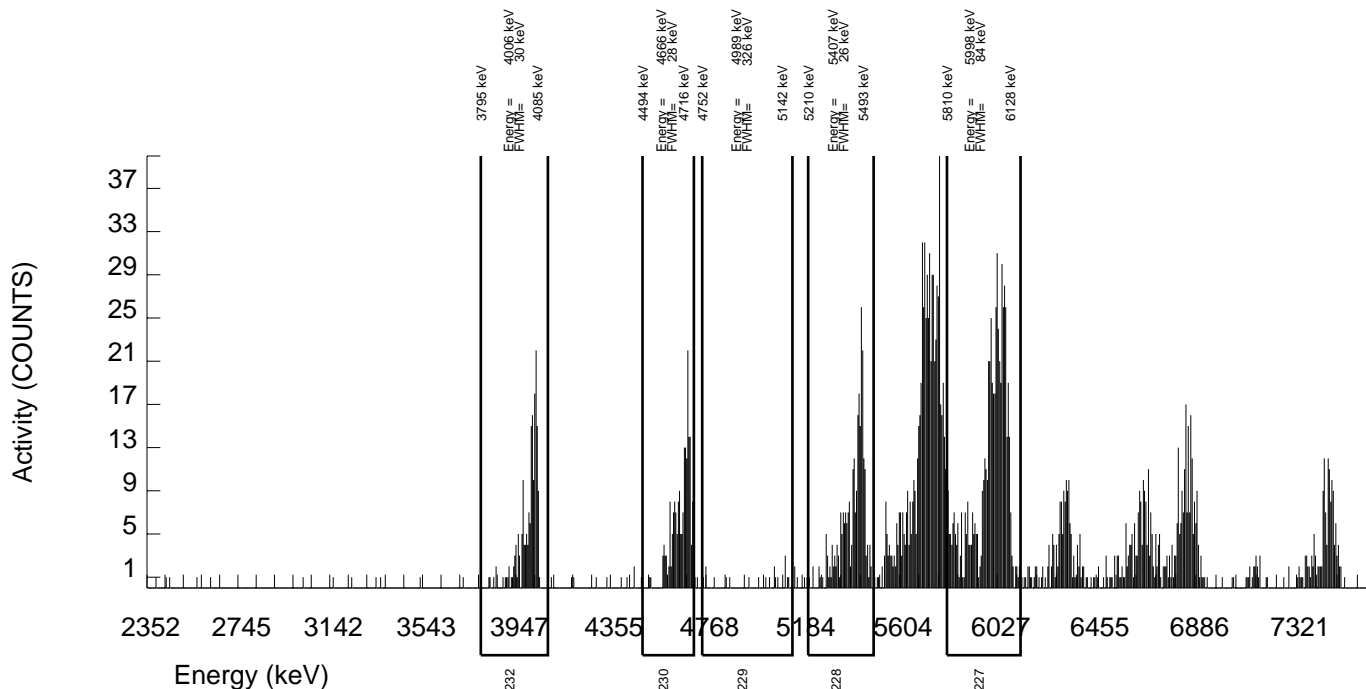
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 2-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534007_TH SAMPLE QTY: 0.251 G	
DETECTOR NUMBER :33454 AVERAGE %EFFICIENCY :31.5115 % YIELD : 97.605		COUNT DATE:29-SEP-2009 19:43:01 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.527E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.527E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 3.80898 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B029.CNF;1070 BKG DATE : 27-SEP-2009 EFF FILE : W029.CNF;309 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	620.000	580.000	40.000	6.3246	57.44000	7.00E+00	7.50E-01	3.92E-01	1.78E-01	6.08E-01
TH-228	5363.000	272.000	245.000	27.000	5.1962	99.94000	1.47E+00	2.23E-01	1.63E-01	7.26E-02	2.03E-01
TH229	4900.000	19.000	8.000	11.000	3.3166	99.52000	4.69E-02	6.30E-02	1.08E-01	4.52E-02	6.29E-02
TH-230	4625.000	195.000	191.000	4.000	2.0000	100.0000	1.11E+00	1.76E-01	7.18E-02	2.71E-02	1.61E-01
TH-232	3972.000	182.000	181.000	1.000	1.0000	100.0000	1.06E+00	1.68E-01	4.47E-02	1.36E-02	1.55E-01

NOTE: Ac-227 results decay corrected to separation date/time.



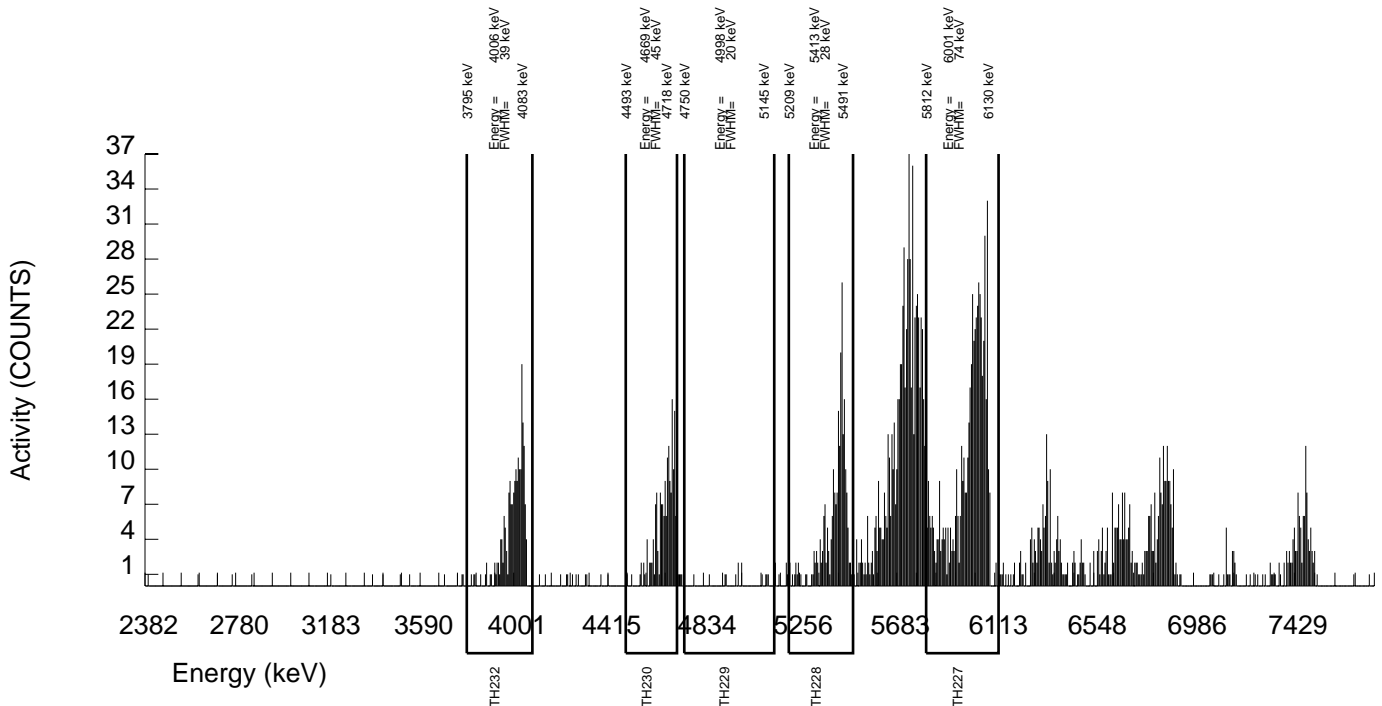
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 2-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534008_TH SAMPLE QTY: 0.252 G	
DETECTOR NUMBER :33447 AVERAGE %EFFICIENCY :32.0314 % YIELD : 91.882		COUNT DATE:29-SEP-2009 19:43:01 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.493E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.493E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 3.58564 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B030.CNF;1067 BKG DATE : 27-SEP-2009 EFF FILE : W030.CNF;294 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	588.000	555.000	33.000	5.7446	57.44000	6.98E+00	7.54E-01	3.74E-01	1.68E-01	6.14E-01
TH-228	5363.000	233.000	196.000	37.000	6.0828	99.94000	1.22E+00	2.15E-01	1.96E-01	8.84E-02	2.01E-01
TH229	4900.000	13.000	-7.000	20.000	4.4721	99.52000	-4.27E-02	6.87E-02	1.45E-01	6.35E-02	6.87E-02
TH-230	4625.000	172.000	170.000	2.000	1.4142	100.0000	1.03E+00	1.70E-01	5.82E-02	2.00E-02	1.57E-01
TH-232	3972.000	197.000	195.000	2.000	1.4142	100.0000	1.18E+00	1.84E-01	5.82E-02	2.00E-02	1.68E-01

NOTE: Ac-227 results decay corrected to separation date/time.



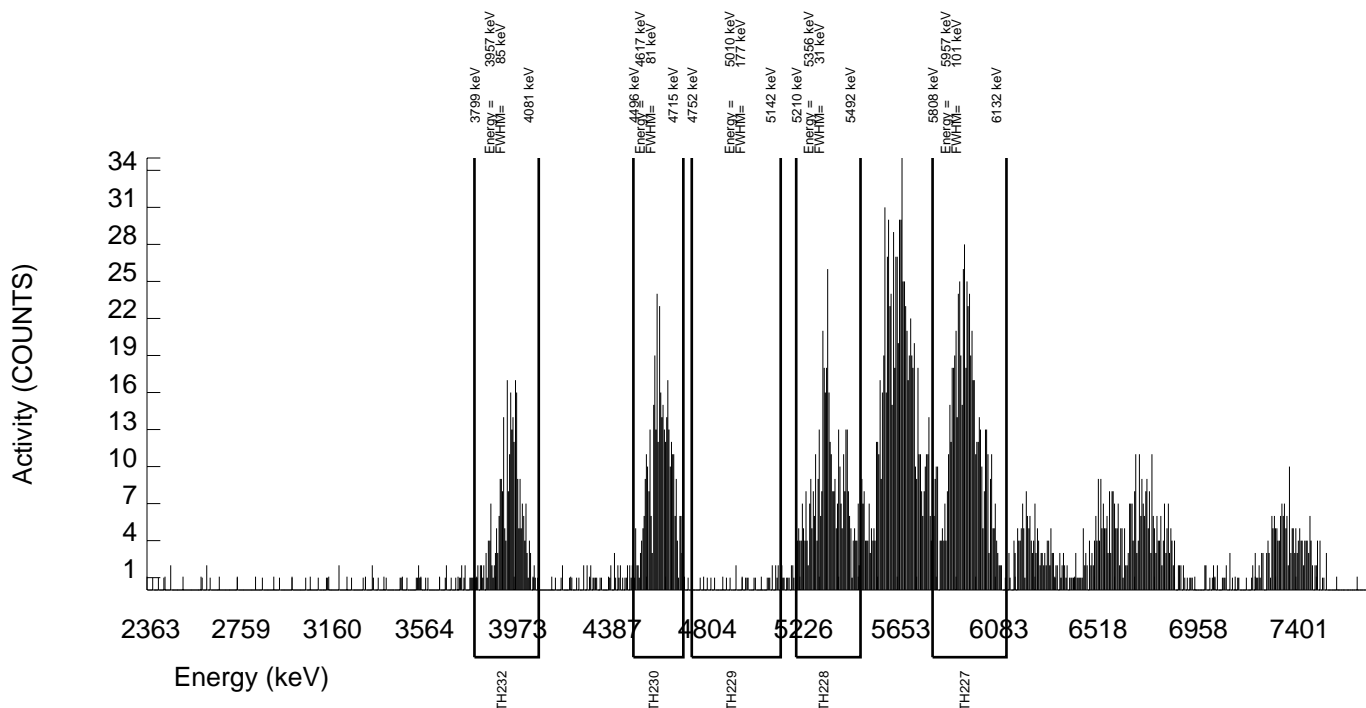
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 2-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534009_TH SAMPLE QTY: 0.255 G	
DETECTOR NUMBER :67042 AVERAGE %EFFICIENCY :33.5313 % YIELD : 104.694		COUNT DATE:29-SEP-2009 19:43:01 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.393E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.393E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 4.08561 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B031.CNF;1065 BKG DATE : 27-SEP-2009 EFF FILE : W031.CNF;329 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	691.000	662.000	29.000	5.3852	57.44000	6.89E+00	6.84E-01	2.92E-01	1.30E-01	5.48E-01
TH-228	5363.000	439.000	391.000	48.000	6.9282	99.94000	2.02E+00	2.54E-01	1.82E-01	8.35E-02	2.24E-01
TH229	4900.000	24.000	6.000	18.000	4.2426	99.52000	3.03E-02	6.43E-02	1.15E-01	4.99E-02	6.42E-02
TH-230	4625.000	394.000	383.000	11.000	3.3166	100.0000	1.93E+00	2.29E-01	9.27E-02	3.88E-02	1.98E-01
TH-232	3972.000	294.000	290.000	4.000	2.0000	100.0000	1.46E+00	1.91E-01	6.19E-02	2.34E-02	1.70E-01

NOTE: Ac-227 results decay corrected to separation date/time.



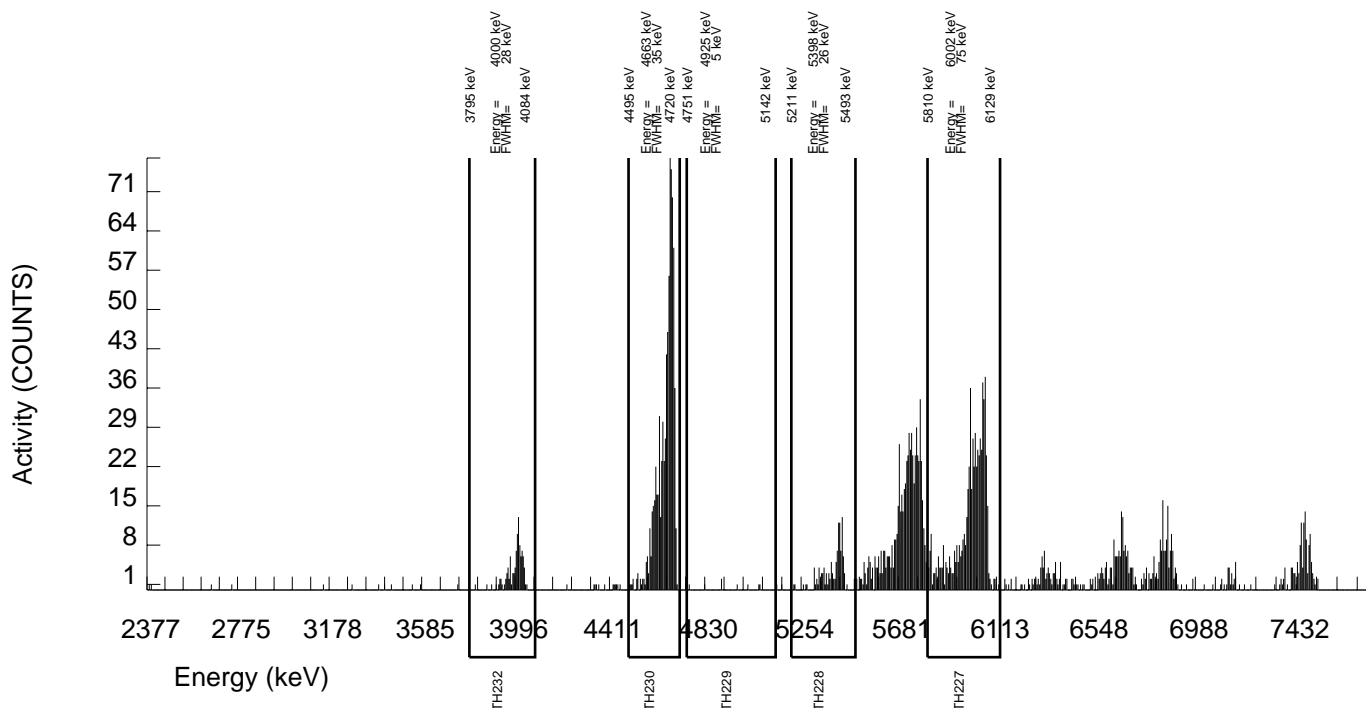
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 2-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534010_TH SAMPLE QTY: 0.253 G	
DETECTOR NUMBER :78785 AVERAGE %EFFICIENCY :31.3483 % YIELD : 103.357		COUNT DATE:29-SEP-2009 19:43:01 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.459E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.459E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 4.03345 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B033.CNF;1064 BKG DATE : 27-SEP-2009 EFF FILE : W033.CNF;319 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	640.000	611.000	29.000	5.3852	57.44000	6.95E+00	7.10E-01	3.19E-01	1.42E-01	5.76E-01
TH-228	5363.000	120.000	111.000	9.000	3.0000	99.94000	6.28E-01	1.31E-01	9.59E-02	3.95E-02	1.26E-01
TH229	4900.000	9.000	3.000	6.000	2.4495	99.52000	1.66E-02	4.19E-02	7.95E-02	3.15E-02	4.19E-02
TH-230	4625.000	772.000	769.000	3.000	1.7321	100.0000	4.23E+00	3.92E-01	6.08E-02	2.21E-02	3.00E-01
TH-232	3972.000	102.000	101.000	1.000	1.0000	100.0000	5.55E-01	1.14E-01	4.21E-02	1.28E-02	1.09E-01

NOTE: Ac-227 results decay corrected to separation date/time.



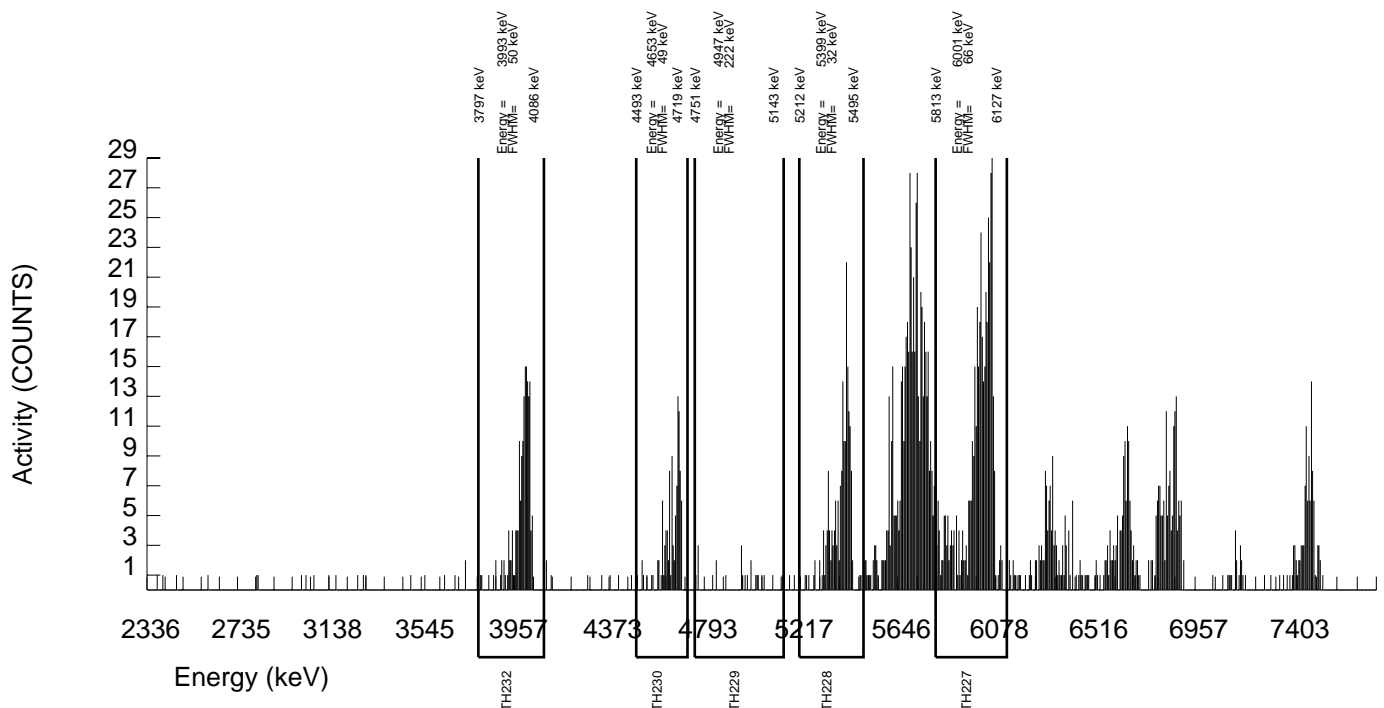
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 3-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534012_TH SAMPLE QTY: 0.252 G	
DETECTOR NUMBER :78202 AVERAGE %EFFICIENCY :30.5099 % YIELD : 71.957		COUNT DATE:29-SEP-2009 19:43:01 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.493E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.493E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 2.80808 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B035.CNF;1062 BKG DATE : 27-SEP-2009 EFF FILE : W035.CNF;308 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	445.000	414.000	31.000	5.5678	57.44000	6.98E+00	8.32E-01	4.87E-01	2.18E-01	7.21E-01
TH-228	5363.000	184.000	175.000	9.000	3.0000	99.94000	1.46E+00	2.44E-01	1.42E-01	5.84E-02	2.28E-01
TH229	4900.000	23.000	3.000	20.000	4.4721	99.52000	2.45E-02	1.05E-01	1.95E-01	8.51E-02	1.05E-01
TH-230	4625.000	106.000	101.000	5.000	2.2361	100.0000	8.22E-01	1.75E-01	1.09E-01	4.24E-02	1.68E-01
TH-232	3972.000	167.000	165.000	2.000	1.4142	100.0000	1.34E+00	2.22E-01	7.80E-02	2.68E-02	2.07E-01

NOTE: Ac-227 results decay corrected to separation date/time.





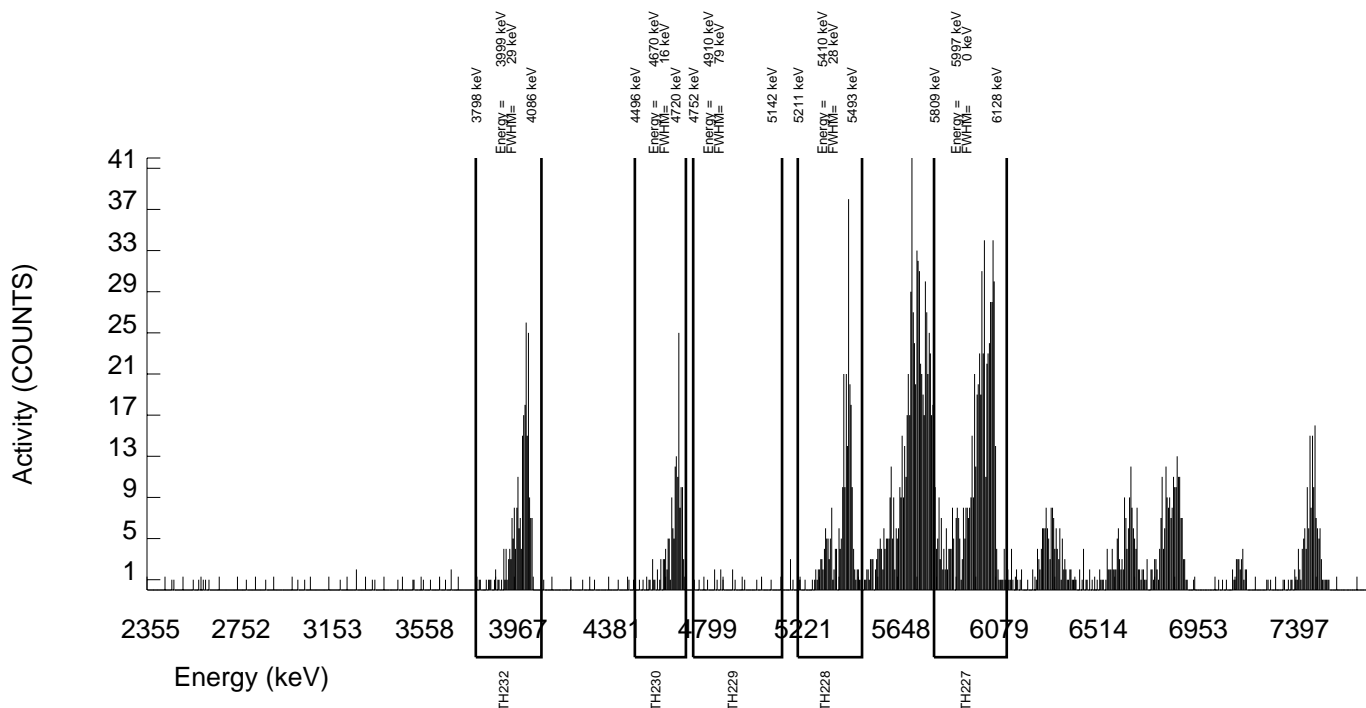
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 3-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534013_TH SAMPLE QTY: 0.255 G	
DETECTOR NUMBER :78203 AVERAGE %EFFICIENCY :32.3699 % YIELD : 99.768		COUNT DATE:29-SEP-2009 19:43:01 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.393E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.393E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 3.89337 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B036.CNF;1060 BKG DATE : 27-SEP-2009 EFF FILE : W036.CNF;320 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	642.000	609.000	33.000	5.7446	57.44000	6.89E+00	7.08E-01	3.37E-01	1.51E-01	5.76E-01
TH-228	5363.000	257.000	248.000	9.000	3.0000	99.94000	1.39E+00	1.98E-01	9.54E-02	3.92E-02	1.80E-01
TH229	4900.000	16.000	6.000	10.000	3.1623	99.52000	3.30E-02	5.50E-02	9.74E-02	4.04E-02	5.49E-02
TH-230	4625.000	151.000	143.000	8.000	2.8284	100.0000	7.82E-01	1.43E-01	8.84E-02	3.60E-02	1.35E-01
TH-232	3972.000	231.000	229.000	2.000	1.4142	100.0000	1.25E+00	1.80E-01	5.24E-02	1.80E-02	1.64E-01

NOTE: Ac-227 results decay corrected to separation date/time.



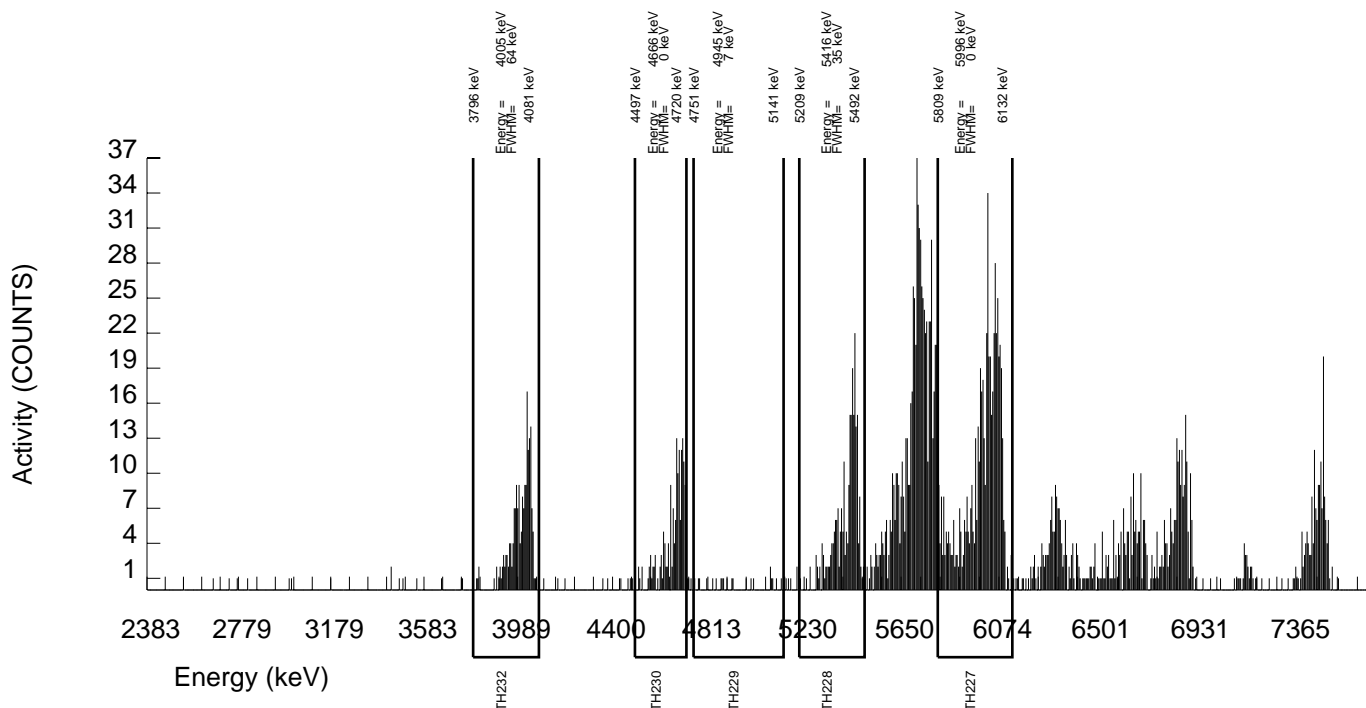
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 3-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534014_TH SAMPLE QTY: 0.258 G	
DETECTOR NUMBER :45-149BB5 AVERAGE %EFFICIENCY :35.2731 % YIELD : 86.896		COUNT DATE:29-SEP-2009 19:43:02 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.295E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.295E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 3.39105 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B037.CNF;1072 BKG DATE : 27-SEP-2009 EFF FILE : W037.CNF;296 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	615.000	578.000	37.000	6.0828	57.44000	6.81E+00	7.15E-01	3.69E-01	1.67E-01	5.90E-01
TH-228	5363.000	246.000	221.000	25.000	5.0000	99.94000	1.29E+00	2.04E-01	1.54E-01	6.81E-02	1.89E-01
TH229	4900.000	21.000	6.000	15.000	3.8730	99.52000	3.43E-02	6.73E-02	1.20E-01	5.16E-02	6.73E-02
TH-230	4625.000	158.000	156.000	2.000	1.4142	100.0000	8.89E-01	1.51E-01	5.46E-02	1.87E-02	1.41E-01
TH-232	3972.000	192.000	187.000	5.000	2.2361	100.0000	1.07E+00	1.69E-01	7.64E-02	2.96E-02	1.57E-01

NOTE: Ac-227 results decay corrected to separation date/time.



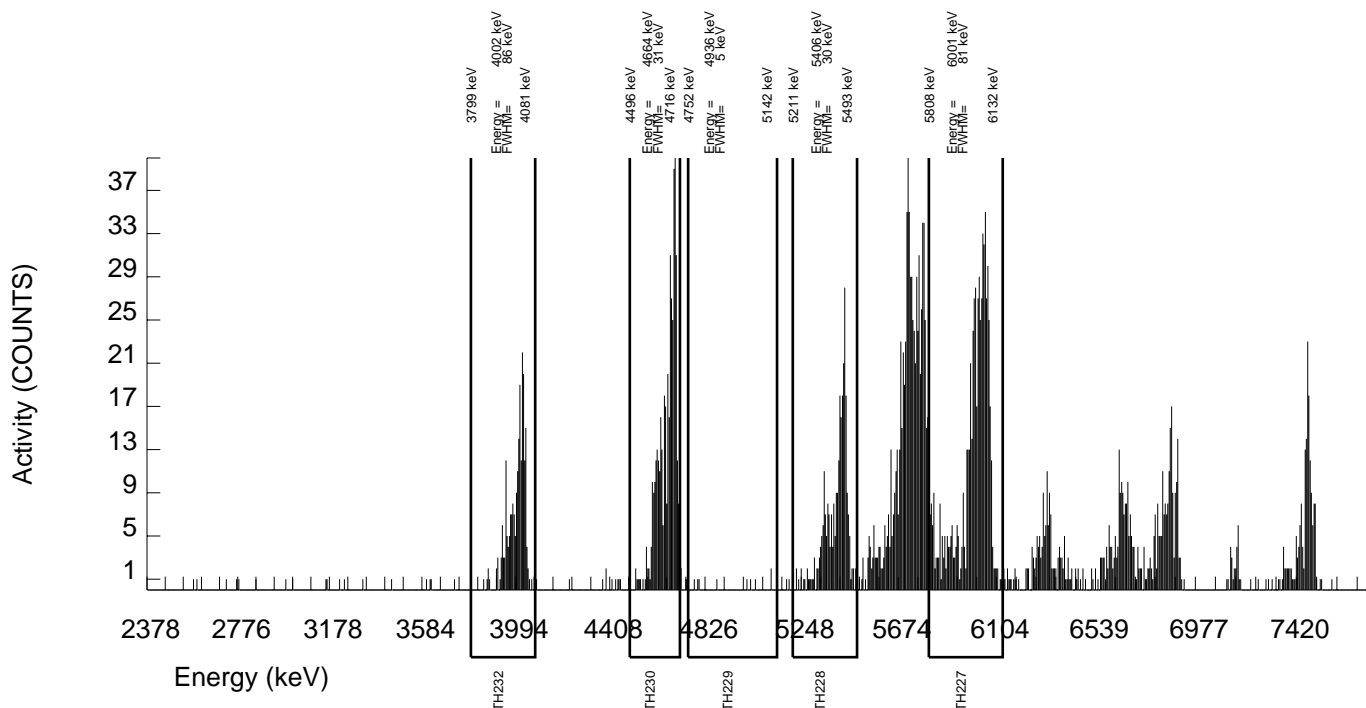
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 3-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534015_TH SAMPLE QTY: 0.250 G	
DETECTOR NUMBER :72532 AVERAGE %EFFICIENCY :33.7466 % YIELD : 97.740		COUNT DATE:29-SEP-2009 19:43:02 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.561E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.561E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 3.81426 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B038.CNF;1069 BKG DATE : 27-SEP-2009 EFF FILE : W038.CNF;310 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	662.000	622.000	40.000	6.3246	57.44000	7.03E+00	7.22E-01	3.67E-01	1.66E-01	5.87E-01
TH-228	5363.000	282.000	265.000	17.000	4.1231	99.94000	1.49E+00	2.10E-01	1.25E-01	5.39E-02	1.90E-01
TH229	4900.000	10.000	2.000	8.000	2.8284	99.52000	1.10E-02	4.56E-02	8.87E-02	3.61E-02	4.56E-02
TH-230	4625.000	425.000	422.000	3.000	1.7321	100.0000	2.31E+00	2.61E-01	6.04E-02	2.20E-02	2.22E-01
TH-232	3972.000	229.000	226.000	3.000	1.7321	100.0000	1.23E+00	1.79E-01	6.04E-02	2.20E-02	1.63E-01

NOTE: Ac-227 results decay corrected to separation date/time.



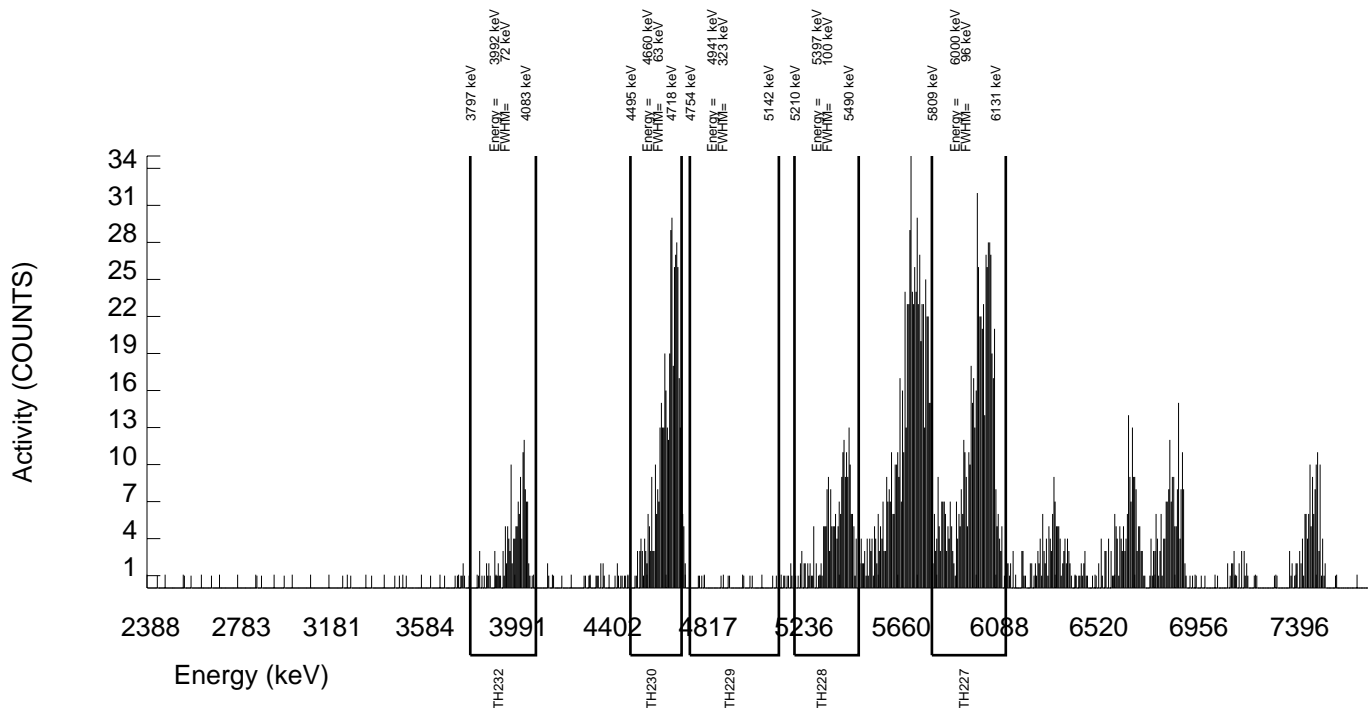
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 3-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534016_TH SAMPLE QTY: 0.253 G	
DETECTOR NUMBER :45-149BB2 AVERAGE %EFFICIENCY :36.3031 % YIELD : 92.757		COUNT DATE:29-SEP-2009 19:43:02 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.459E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.459E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 3.61977 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B039.CNF;1069 BKG DATE : 27-SEP-2009 EFF FILE : W039.CNF;287 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	669.000	635.000	34.000	5.8310	57.44000	6.95E+00	7.03E-01	3.30E-01	1.48E-01	5.69E-01
TH-228	5363.000	223.000	192.000	31.000	5.5678	99.94000	1.04E+00	1.81E-01	1.57E-01	7.04E-02	1.70E-01
TH229	4900.000	12.000	0.000	12.000	3.4641	99.52000	-1.01E-08	5.10E-02	1.02E-01	4.28E-02	5.10E-02
TH-230	4625.000	432.000	429.000	3.000	1.7321	100.0000	2.27E+00	2.55E-01	5.85E-02	2.13E-02	2.16E-01
TH-232	3972.000	150.000	147.000	3.000	1.7321	100.0000	7.77E-01	1.36E-01	5.85E-02	2.13E-02	1.28E-01

NOTE: Ac-227 results decay corrected to separation date/time.



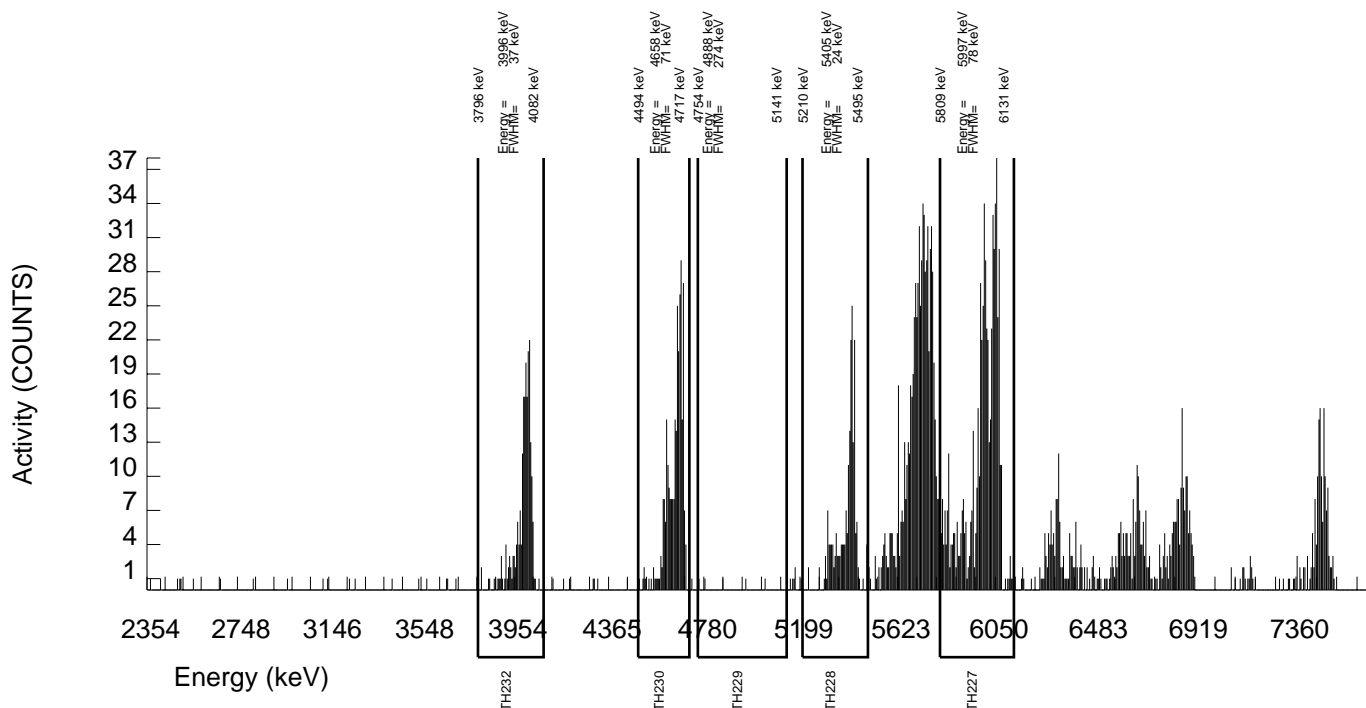
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 3-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534017_TH SAMPLE QTY: 0.253 G	
DETECTOR NUMBER :78773 AVERAGE %EFFICIENCY :32.0737 % YIELD : 101.020		COUNT DATE:29-SEP-2009 19:43:02 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.459E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.459E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 3.94224 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B040.CNF;1072 BKG DATE : 27-SEP-2009 EFF FILE : W040.CNF;306 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	649.000	611.000	38.000	6.1644	57.44000	6.95E+00	7.16E-01	3.60E-01	1.63E-01	5.84E-01
TH-228	5363.000	206.000	198.000	8.000	2.8284	99.94000	1.12E+00	1.75E-01	9.13E-02	3.72E-02	1.62E-01
TH229	4900.000	5.000	0.000	5.000	2.2361	99.52000	-2.63E-09	3.42E-02	7.40E-02	2.87E-02	3.42E-02
TH-230	4625.000	292.000	289.000	3.000	1.7321	100.0000	1.59E+00	2.08E-01	6.08E-02	2.21E-02	1.85E-01
TH-232	3972.000	219.000	219.000	0.000	0.0000	100.0000	1.20E+00	1.75E-01	1.65E-02	0.00E+00	1.59E-01

NOTE: Ac-227 results decay corrected to separation date/time.



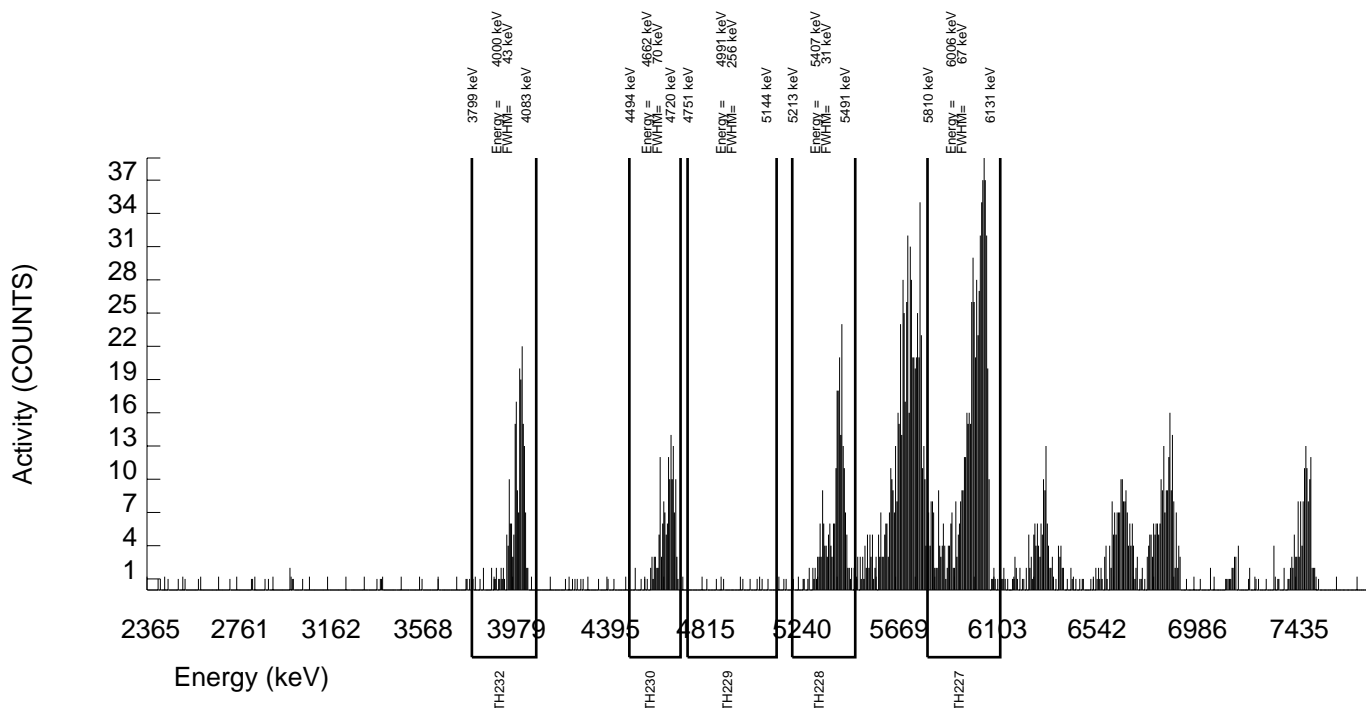
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 8-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534018_TH SAMPLE QTY: 0.255 G	
DETECTOR NUMBER :78205 AVERAGE %EFFICIENCY :32.9883 % YIELD : 102.720		COUNT DATE:29-SEP-2009 19:43:02 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.393E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.393E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 4.00858 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B041.CNF;1065 BKG DATE : 27-SEP-2009 EFF FILE : W041.CNF;310 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	673.000	639.000	34.000	5.8310	57.44000	6.89E+00	6.96E-01	3.25E-01	1.46E-01	5.62E-01
TH-228	5363.000	235.000	224.000	11.000	3.3166	99.94000	1.19E+00	1.79E-01	9.83E-02	4.11E-02	1.64E-01
TH229	4900.000	8.000	-1.000	9.000	3.0000	99.52000	-5.24E-03	4.23E-02	8.88E-02	3.66E-02	4.23E-02
TH-230	4625.000	153.000	147.000	6.000	2.4495	100.0000	7.66E-01	1.37E-01	7.51E-02	2.97E-02	1.29E-01
TH-232	3972.000	205.000	203.000	2.000	1.4142	100.0000	1.06E+00	1.60E-01	4.99E-02	1.72E-02	1.47E-01

NOTE: Ac-227 results decay corrected to separation date/time.



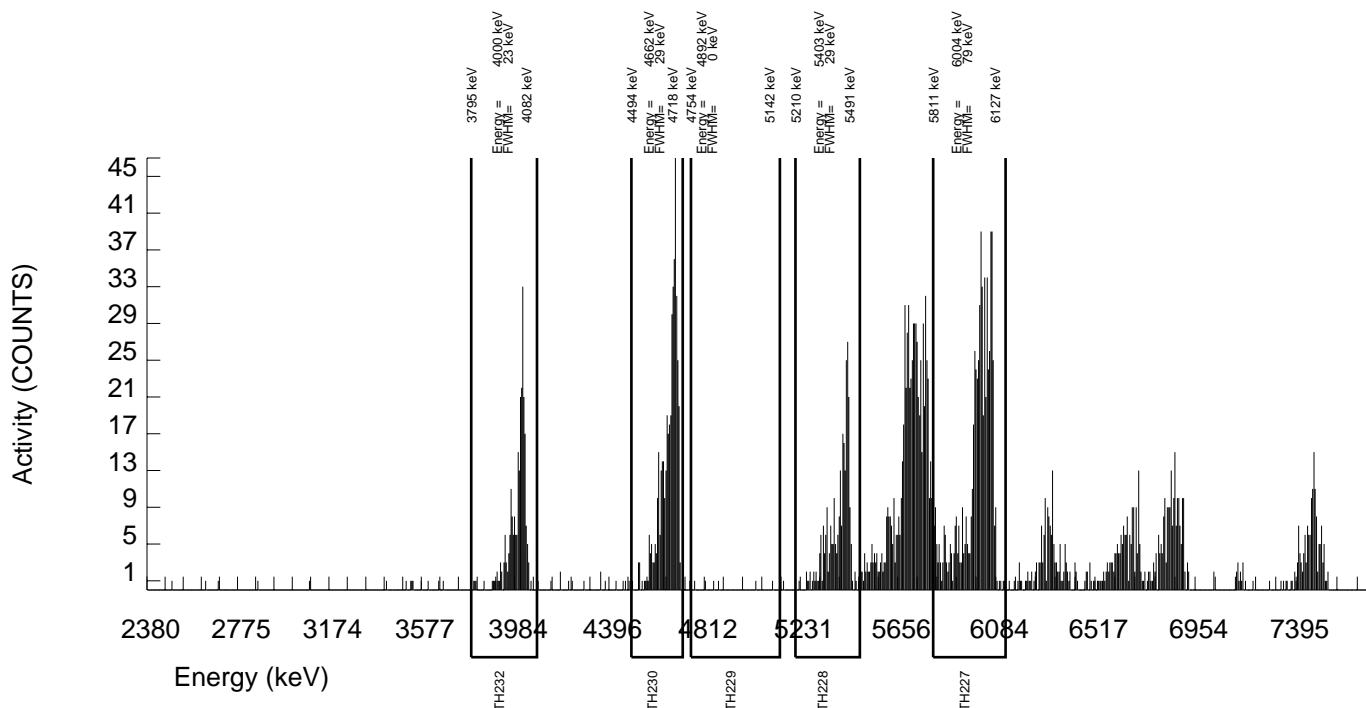
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 8-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534019_TH SAMPLE QTY: 0.254 G	
DETECTOR NUMBER :78793 AVERAGE %EFFICIENCY :32.6249 % YIELD : 105.002		COUNT DATE:29-SEP-2009 19:43:02 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.426E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.426E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 4.09764 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B042.CNF;1064 BKG DATE : 27-SEP-2009 EFF FILE : W042.CNF;283 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	678.000	646.000	32.000	5.6569	57.44000	6.92E+00	6.95E-01	3.14E-01	1.41E-01	5.60E-01
TH-228	5363.000	267.000	258.000	9.000	3.0000	99.94000	1.37E+00	1.91E-01	8.98E-02	3.70E-02	1.72E-01
TH229	4900.000	7.000	-1.000	8.000	2.8284	99.52000	-5.20E-03	3.95E-02	8.41E-02	3.42E-02	3.95E-02
TH-230	4625.000	436.000	432.000	4.000	2.0000	100.0000	2.24E+00	2.51E-01	6.37E-02	2.41E-02	2.13E-01
TH-232	3972.000	245.000	242.000	3.000	1.7321	100.0000	1.25E+00	1.76E-01	5.72E-02	2.09E-02	1.60E-01

NOTE: Ac-227 results decay corrected to separation date/time.



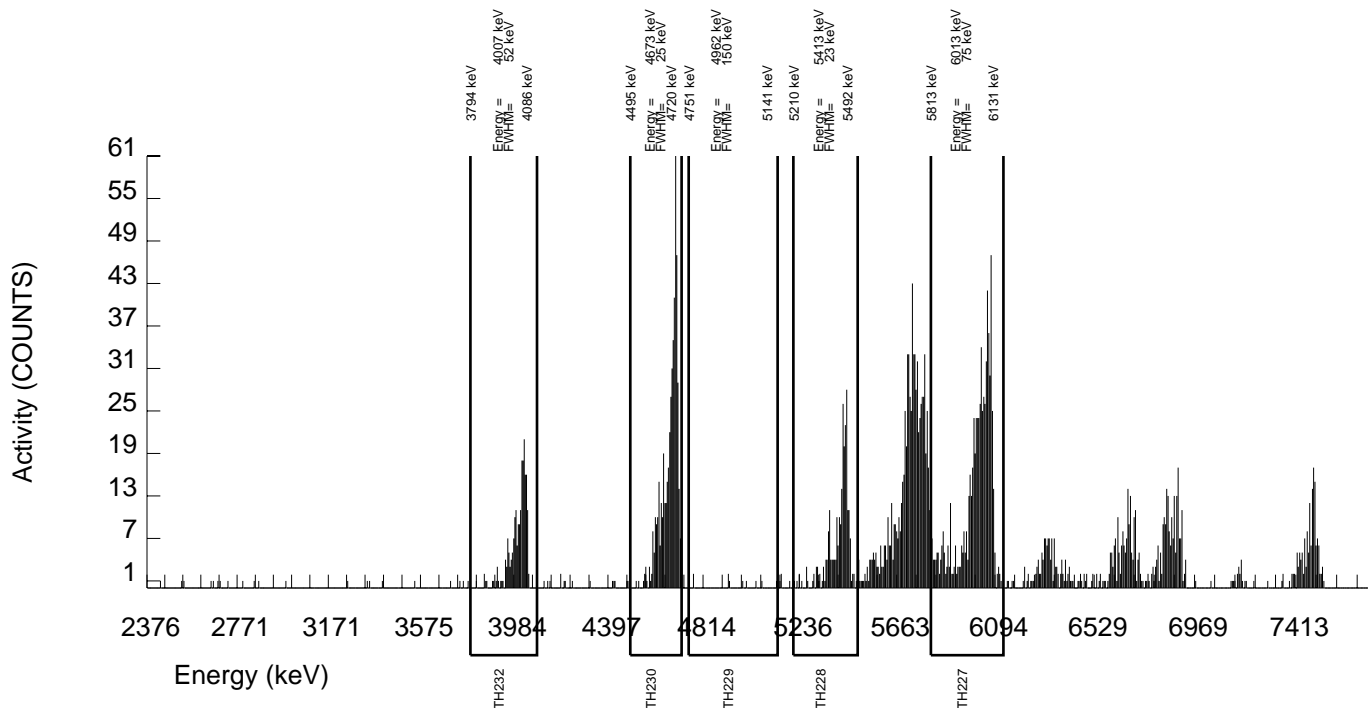
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 8-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S0236534020_TH SAMPLE QTY: 0.253 G	
DETECTOR NUMBER :76543 AVERAGE %EFFICIENCY :33.8839 % YIELD : 103.918		COUNT DATE:29-SEP-2009 19:43:03 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.459E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.459E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 4.05532 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B043.CNF;1060 BKG DATE : 27-SEP-2009 EFF FILE : W043.CNF;275 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	710.000	664.000	46.000	6.7823	57.44000	6.95E+00	6.99E-01	3.62E-01	1.65E-01	5.64E-01
TH-228	5363.000	255.000	246.000	9.000	3.0000	99.94000	1.27E+00	1.81E-01	8.77E-02	3.61E-02	1.65E-01
TH229	4900.000	10.000	5.000	5.000	2.2361	99.52000	2.54E-02	3.86E-02	6.81E-02	2.64E-02	3.86E-02
TH-230	4625.000	489.000	486.000	3.000	1.7321	100.0000	2.46E+00	2.64E-01	5.59E-02	2.04E-02	2.20E-01
TH-232	3972.000	211.000	211.000	0.000	0.0000	100.0000	1.07E+00	1.57E-01	1.52E-02	0.00E+00	1.44E-01

NOTE: Ac-227 results decay corrected to separation date/time.





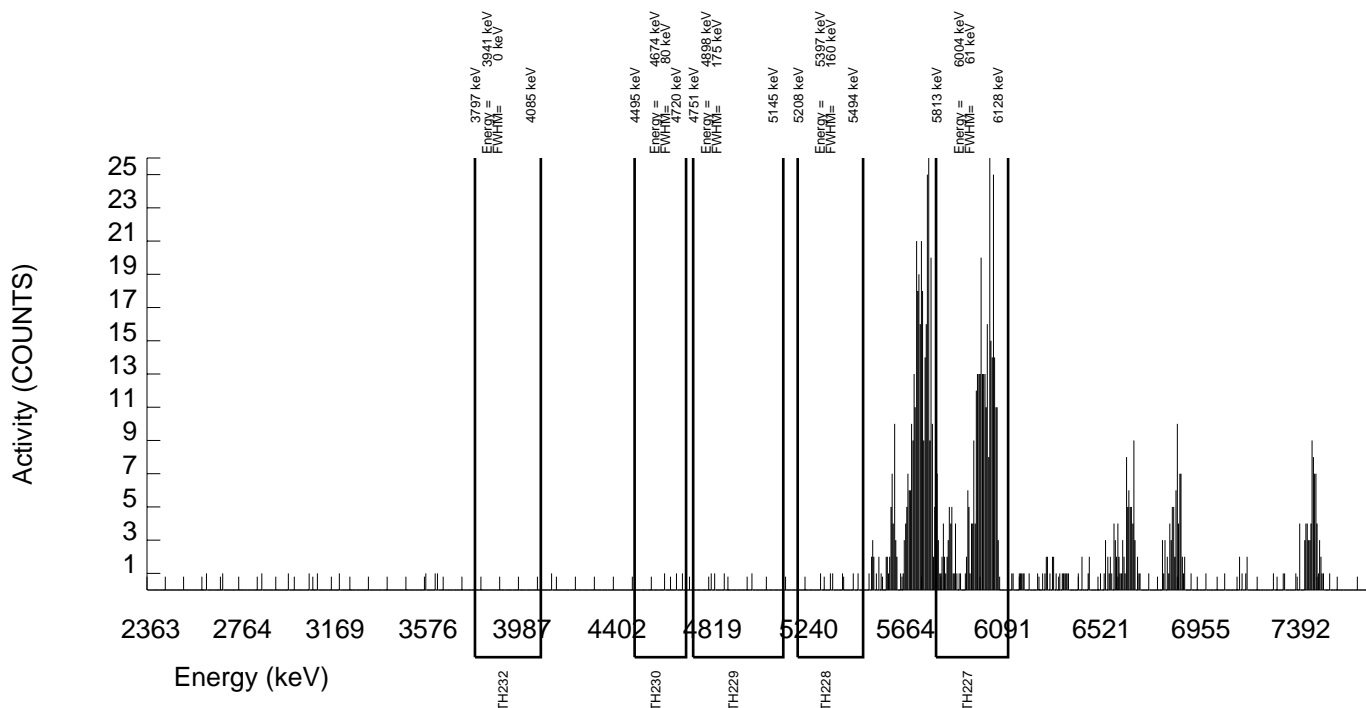
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 23-SEP-2009 00:00:00 AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S1201929687_TH SAMPLE QTY: 0.258 G	
DETECTOR NUMBER :74436 AVERAGE %EFFICIENCY :25.8470 % YIELD : 75.188		COUNT DATE:30-SEP-2009 21:50:15 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.295E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.295E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 2.93416 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B178.CNF;130 BKG DATE : 28-SEP-2009 EFF FILE : W178.CNF;41 CAL DATE : 21-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	360.000	352.000	8.000	2.8284	57.44000	6.81E+00	8.32E-01	3.13E-01	1.27E-01	7.28E-01
TH-228	5363.000	6.000	-5.000	11.000	3.3166	99.94000	-4.53E-02	7.32E-02	1.67E-01	6.99E-02	7.32E-02
TH229	4900.000	4.000	-6.000	10.000	3.1623	99.52000	-5.42E-02	6.62E-02	1.60E-01	6.64E-02	6.62E-02
TH-230	4625.000	3.000	0.000	3.000	1.7321	100.0000	0.00E+00	4.31E-02	9.94E-02	3.62E-02	4.31E-02
TH-232	3972.000	0.000	-2.000	2.000	1.4142	100.0000	-1.80E-02	3.05E-02	8.61E-02	2.96E-02	3.05E-02

NOTE: Ac-227 results decay corrected to separation date/time.



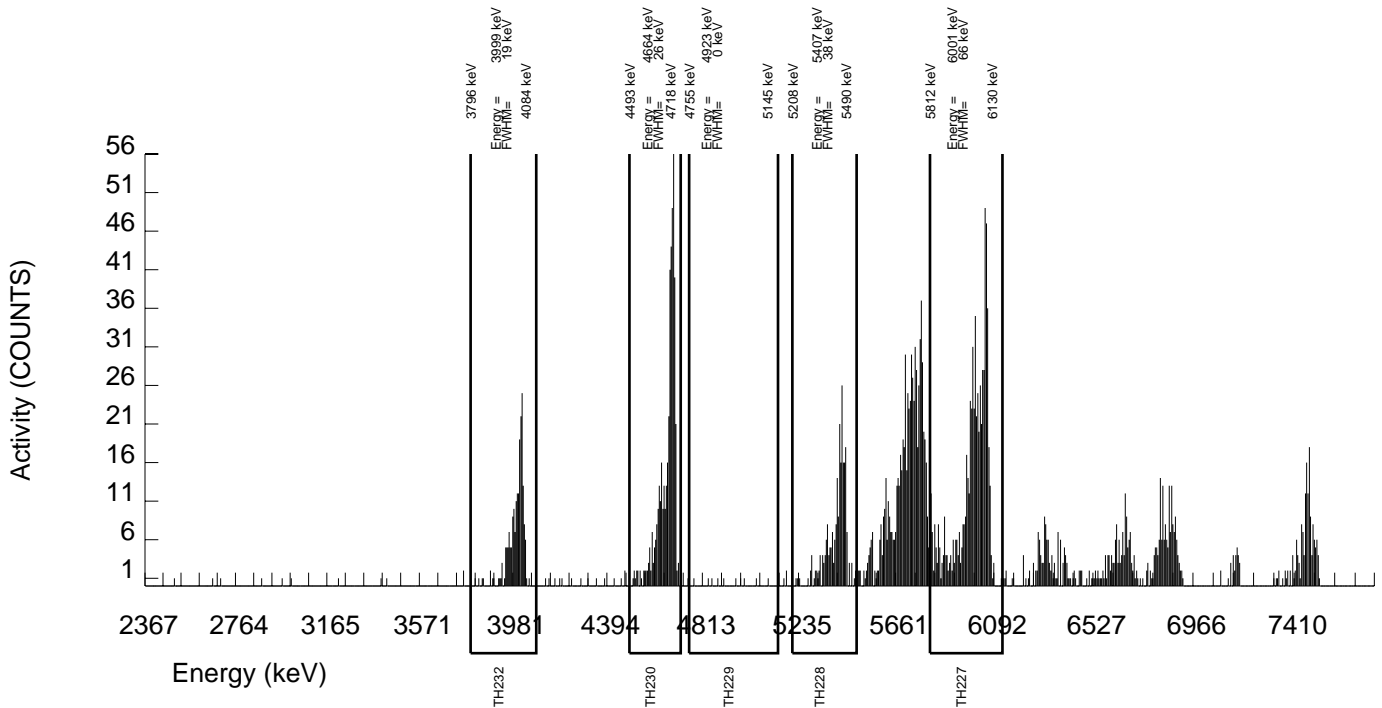
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 8-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S1201929688_TH SAMPLE QTY: 0.255 G	
DETECTOR NUMBER :78783 AVERAGE %EFFICIENCY :33.8617 % YIELD : 103.359		COUNT DATE:29-SEP-2009 19:43:03 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.393E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.393E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 4.03353 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B045.CNF;1059 BKG DATE : 27-SEP-2009 EFF FILE : W045.CNF;287 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	685.000	660.000	25.000	5.0000	57.44000	6.89E+00	6.83E-01	2.74E-01	1.21E-01	5.45E-01
TH-228	5363.000	237.000	232.000	5.000	2.2361	99.94000	1.20E+00	1.73E-01	6.92E-02	2.69E-02	1.57E-01
TH229	4900.000	11.000	4.000	7.000	2.6458	99.52000	2.03E-02	4.22E-02	7.76E-02	3.12E-02	4.22E-02
TH-230	4625.000	448.000	447.000	1.000	1.0000	100.0000	2.26E+00	2.49E-01	3.86E-02	1.17E-02	2.10E-01
TH-232	3972.000	204.000	202.000	2.000	1.4142	100.0000	1.02E+00	1.54E-01	4.84E-02	1.66E-02	1.42E-01

NOTE: Ac-227 results decay corrected to separation date/time.



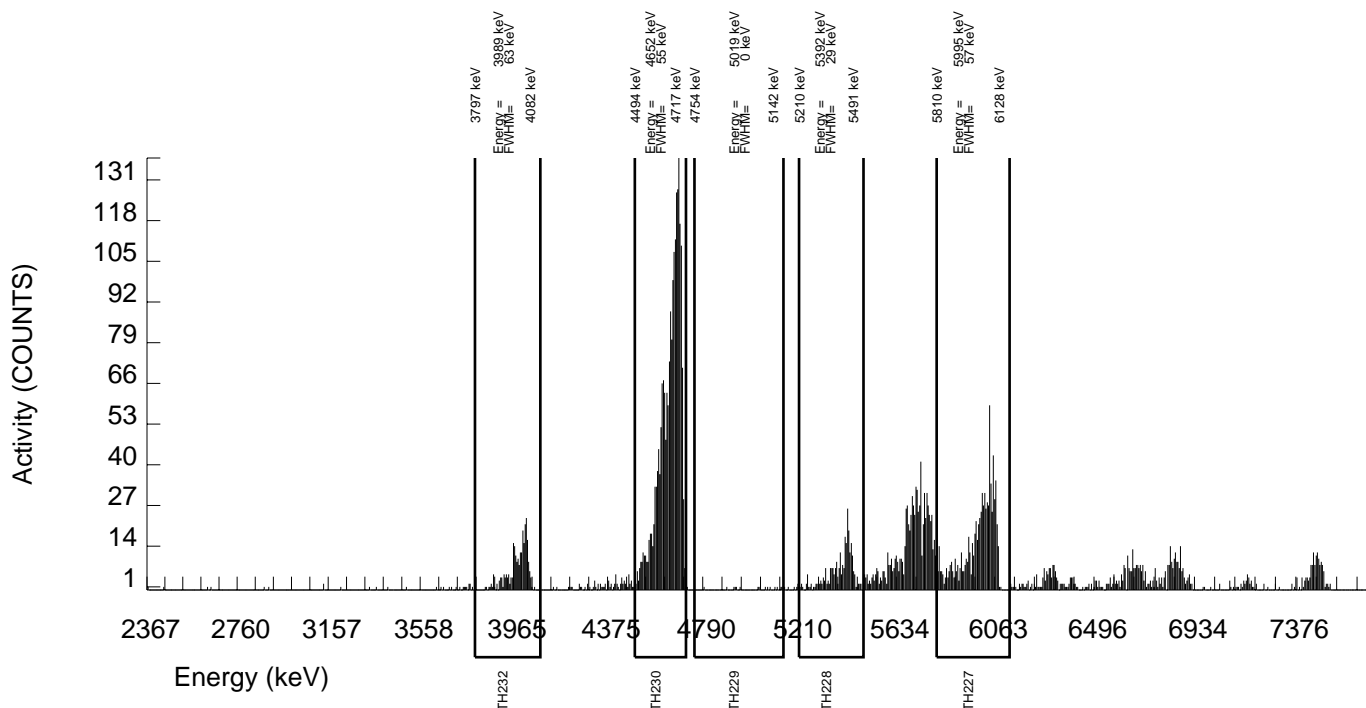
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 8-SEP-2009 00:00:00. AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S1201929689_TH SAMPLE QTY: 0.253 G	
DETECTOR NUMBER :76544 AVERAGE %EFFICIENCY :34.2883 % YIELD : 119.859		COUNT DATE:29-SEP-2009 19:43:03 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.459E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.459E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 4.67741 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B046.CNF;1070 BKG DATE : 27-SEP-2009 EFF FILE : W046.CNF;278 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	807.000	775.000	32.000	5.6569	57.44000	6.95E+00	6.56E-01	2.63E-01	1.18E-01	5.09E-01
TH-228	5363.000	270.000	260.000	10.000	3.1623	99.94000	1.15E+00	1.61E-01	7.85E-02	3.26E-02	1.45E-01
TH229	4900.000	15.000	12.000	3.000	1.7321	99.52000	5.22E-02	3.63E-02	4.81E-02	1.75E-02	3.62E-02
TH-230	4625.000	2074.000	2066.000	8.000	2.8284	100.0000	8.95E+00	6.59E-01	7.00E-02	2.85E-02	3.87E-01
TH-232	3972.000	266.000	263.000	3.000	1.7321	100.0000	1.14E+00	1.55E-01	4.79E-02	1.75E-02	1.39E-01

NOTE: Ac-227 results decay corrected to separation date/time.



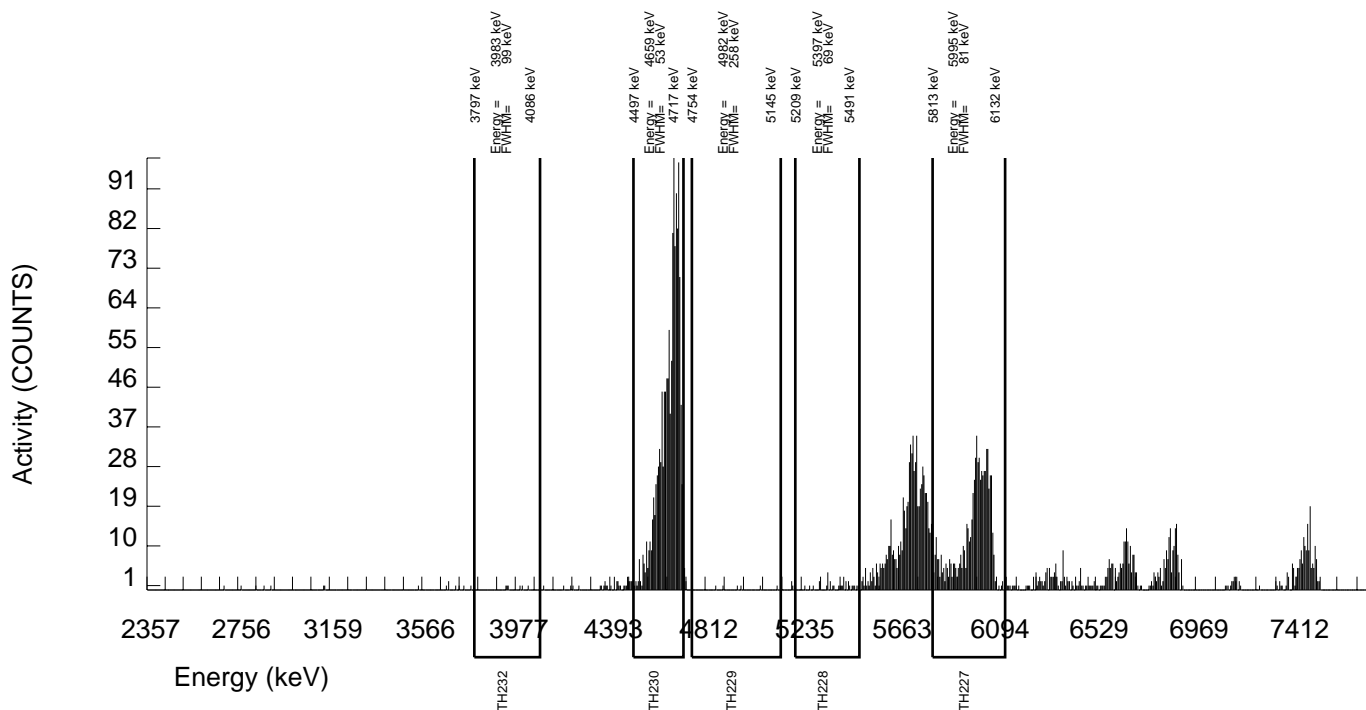
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905065 SAMPLE DATE : 23-SEP-2009 00:00:00 AC-227 SEPARATION : 25-SEP-2009 12:00:00		SAMPLE ID : S1201929690_TH SAMPLE QTY: 0.258 G	
DETECTOR NUMBER :46-089B1 AVERAGE %EFFICIENCY :34.1455 % YIELD : 103.121		COUNT DATE:29-SEP-2009 19:43:03 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.295E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.295E+00	TRACER ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.90244 dpm RESULTS : 4.02425 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B047.CNF;1065 BKG DATE : 27-SEP-2009 EFF FILE : W047.CNF;292 CAL DATE : 5-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	5994.040	722.000	664.000	58.000	7.6158	57.44000	6.81E+00	6.92E-01	3.94E-01	1.82E-01	5.62E-01
TH-228	5363.000	31.000	14.000	17.000	4.1231	99.94000	7.00E-02	6.80E-02	1.11E-01	4.79E-02	6.79E-02
TH229	4900.000	6.000	-5.000	11.000	3.3166	99.52000	-2.49E-02	4.03E-02	9.18E-02	3.84E-02	4.03E-02
TH-230	4625.000	1349.000	1342.000	7.000	2.6458	100.0000	6.65E+00	5.33E-01	7.59E-02	3.05E-02	3.58E-01
TH-232	3972.000	6.000	3.000	3.000	1.7321	100.0000	1.49E-02	2.92E-02	5.48E-02	2.00E-02	2.92E-02

NOTE: Ac-227 results decay corrected to separation date/time.



# URANIUM

### Radiochemistry Batch Checklist, Rev 9

Batch# 901448 Product: U Date: 9/23/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			N/A
Samples have been blank corrected (if required)			N/A
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.	✓		
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	✓		
Or meets the client's required RER acceptance criteria.			
Tracer yield is 15-125% . Carrier yield 25-125%.			
Or meets the client's contract acceptance criteria.		✓	NCR# 787268
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		CASE NARRATIVE
Sample was run within hold time.	✓		
Sample was correctly preserved if required.	✓		
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 stated.	✓		
QC data entered into QC database and batch is in REVW	✓		
Hit notification complete (if necessary)			N/A
Batch entered into Case Narrative.	✓		
Batch non-conformances completed, if applicable.	✓		NCR# 787268
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCR# 787268
Aliquot Correction completed if required.			N/A
Review sample historical results if available (If REMF, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC  
revised 8/1/08

Primary Review Performed By: [Signature] 9/23/09  
Secondary Review Performed By: [Signature] 9/23/09

P

10-SEP-09

# Uranium Que Sheet

Batch #: 901448      Analyst: CXM2      First Client Due Date: 24-SEP-09      Internal Due Date: 13-SEP-09  
 Tracer Isotope: U-232      Tracer Code: 1283-E      Expiration Date: 1/15/10      Vol: 0.1mL  
 LCS Isotope: U-238      LCS Code: 1163-G      Expiration Date: 4/16/10      Vol: 0.1mL  
 Spike Isotope: U-238      Spike Code: 1163-G      Expiration Date: 4/16/10      Vol: 0.1mL  
 Prep Date: 9/11/09      Initials: CMM      Pipet ID: 2971058      Balance ID: 16750207

Witness: MU 9/16/09

9/11/09  
CMM

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g (U)f)	U Det #
235860015-1	EB082109-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	21-AUG-09	1	1	0.800	14
236077013-1	EB082709-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	27-AUG-09	2	2	0.800	125
236077019-1	EB083109-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	31-AUG-09	3	3	0.800	154
236077021-1	EB090109-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	01-SEP-09	4	4	0.800	161
236238008-1	FB082809-SO	SAMPLE		.03 pCi/L	WATER	KERR003	28-AUG-09	5	5	0.800	162
236534011-1	EB090209-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	02-SEP-09	6	6	0.800	166
1201920749-1	MB for batch 901448	MB		.03 pCi/L	WATER	QC ACCOUNT	21-AUG-09	7	7	0.800	121
1201920750-1	LCS for batch 901448	LCS		.03 pCi/L	WATER	QC ACCOUNT	21-AUG-09	8	8	0.800	13
1201920751-1	LCS for batch 901448	LCS		.03 pCi/L	WATER	QC ACCOUNT	21-AUG-09	9	9	0.800	16

9/12/09

N/A  
 Solid Sample Dissolution by: LEACH or DIGESTION 9/11/09  
 Circle One

09/23/09  
 201108 9/23/09

Choose SOP used: GL-RAD-A-01  
 GL-RAD-A-038  
 GL-RAD-A-045  
 GL-RAD-A-043

GEL Laboratories LLC, Radiochemistry Division

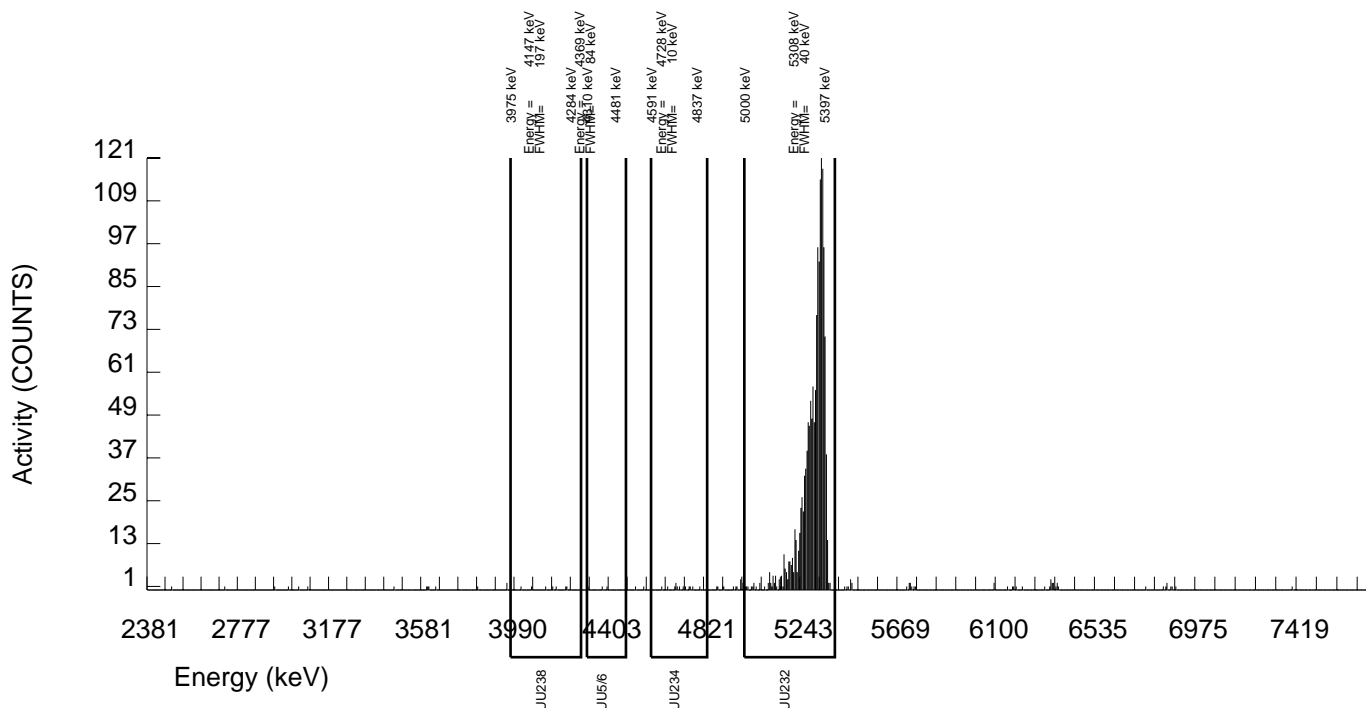
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 901448 SAMPLE DATE : 2-SEP-2009 00:00:00.		SAMPLE ID : S0236534011_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :74545 AVERAGE %EFFICIENCY :39.3094 % YIELD : 74.036		COUNT DATE:17-SEP-2009 19:57:16 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 5.25942 dpm RESULTS : 3.89386 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B166.CNF;125 BKG DATE : 13-SEP-2009 EFF FILE : W166.CNF;40 CAL DATE : 24-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	13.000	3.376	5.000	2.2361	100.0000	6.53E-03	1.39E-02	2.59E-02	1.01E-02	1.39E-02
U232	5302.100	1540.000	1530.000	10.000	3.1623	100.0000	2.96E+00	4.24E-01	3.43E-02	1.42E-02	1.49E-01
U-235	4391.000	3.000	3.000	0.000	0.0000	80.90000	7.17E-03	8.18E-03	7.17E-03	0.00E+00	8.12E-03
U-238	4184.730	7.000	5.000	2.000	1.4142	100.0000	9.67E-03	1.14E-02	1.85E-02	6.37E-03	1.14E-02

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





GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 901448  
SAMPLE DATE : 11-SEP-2009 00:00:00

SAMPLE ID : S1201920749\_UU  
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :75545  
AVERAGE %EFFICIENCY :24.5110  
% YIELD : 48.271

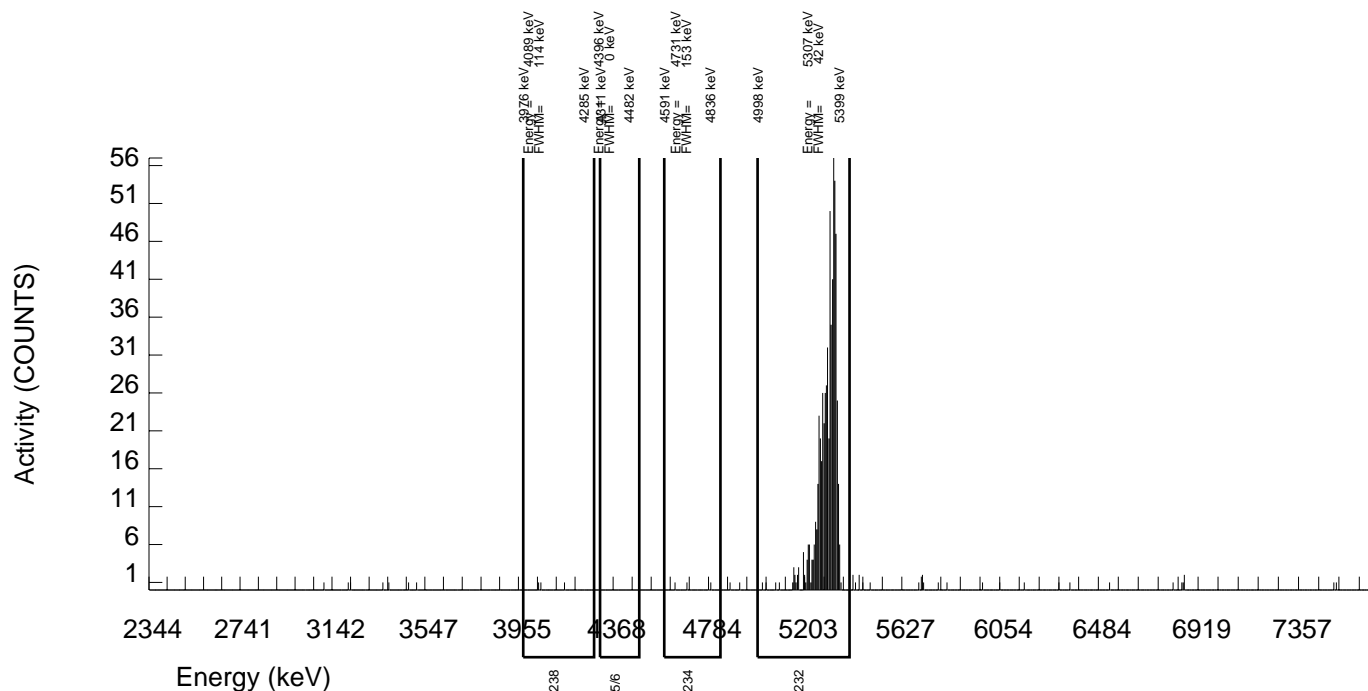
COUNT DATE:18-SEP-2009 19:36:12  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :CXM2

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 : 5.25817 dpm RESULTS : 2.53818 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B121.CNF;394 BKG DATE : 13-SEP-2009 EFF FILE : W121.CNF;108 CAL DATE : 17-SEP-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	4.000	1.120	1.000	1.0000	100.0000	5.33E-03	1.65E-02	3.64E-02	1.11E-02	1.65E-02
U232	5302.100	629.000	622.000	7.000	2.6458	100.0000	2.96E+00	4.96E-01	7.29E-02	2.93E-02	2.35E-01
U-235	4391.000	0.000	0.000	0.000	0.0000	80.90000	0.00E+00	1.16E-02	1.76E-02	0.00E+00	1.15E-02
U-238	4184.730	3.000	3.000	0.000	0.0000	100.0000	1.43E-02	1.63E-02	1.43E-02	0.00E+00	1.62E-02

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



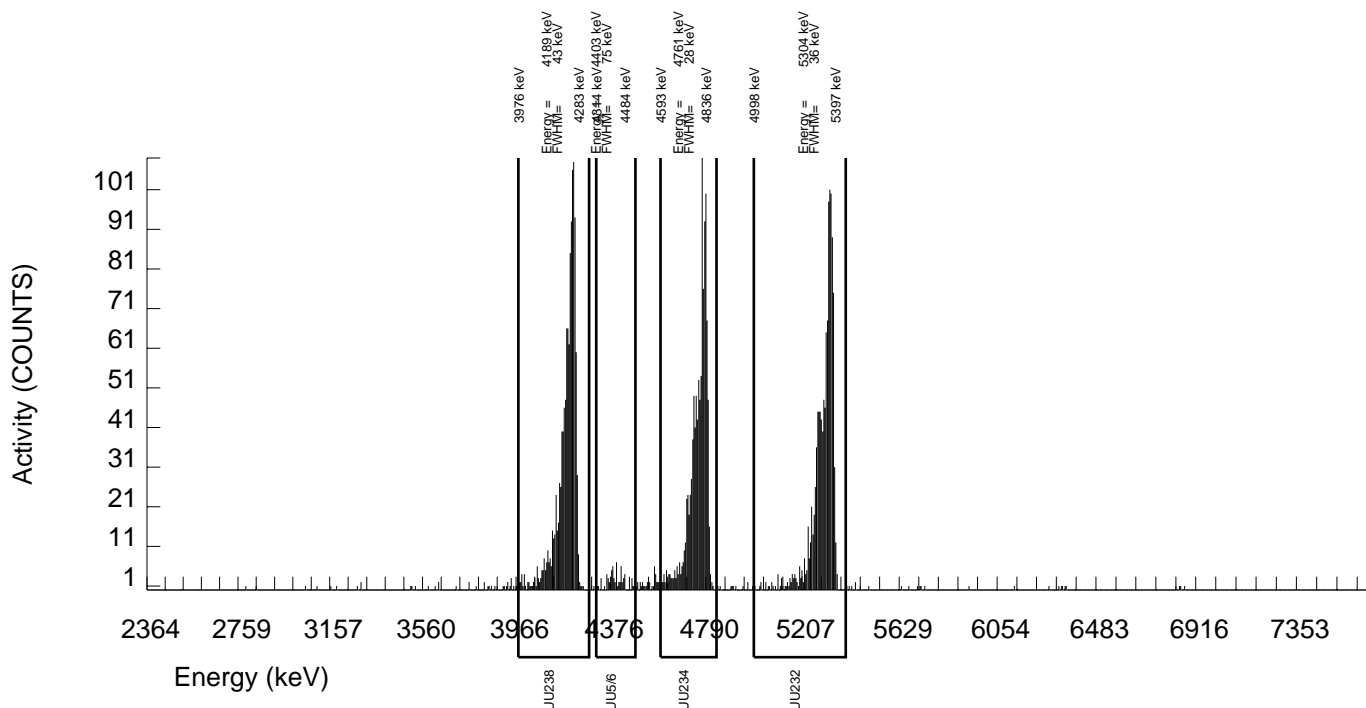
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 901448 SAMPLE DATE : 11-SEP-2009 00:00:00		SAMPLE ID : S1201920750_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :78790 AVERAGE %EFFICIENCY :34.4179 % YIELD : 65.546		COUNT DATE:17-SEP-2009 20:03:08 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 5.25817 dpm RESULTS : 3.44653 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B013.CNF;1045 BKG DATE : 13-SEP-2009 EFF FILE : W013.CNF;315 CAL DATE : 4-SEP-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	1111.000	1105.415	2.000	1.4142	100.0000	2.76E+00	4.11E-01	2.39E-02	8.21E-03	1.63E-01
U232	5302.100	1191.000	1186.000	5.000	2.2361	100.0000	2.96E+00	4.39E-01	3.35E-02	1.30E-02	1.69E-01
U-235	4391.000	66.000	63.000	3.000	1.7321	80.90000	1.94E-01	5.68E-02	3.41E-02	1.24E-02	5.02E-02
U-238	4184.730	1212.000	1212.000	0.000	0.0000	100.0000	3.03E+00	4.47E-01	7.49E-03	0.00E+00	1.70E-01

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



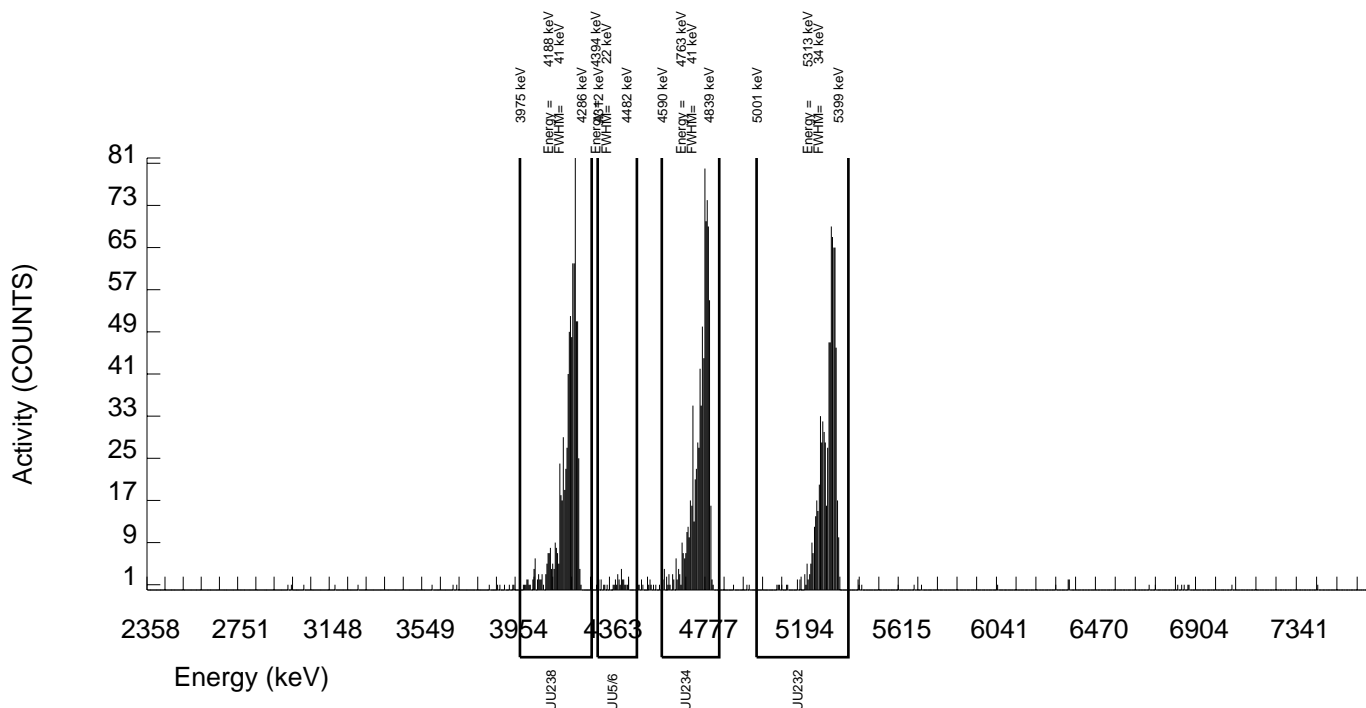
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 901448 SAMPLE DATE : 11-SEP-2009 00:00:00		SAMPLE ID : S1201920751_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :78774 AVERAGE %EFFICIENCY :33.3718 % YIELD : 42.464		COUNT DATE:17-SEP-2009 20:03:08 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :CXM2	
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 : 5.25817 dpm RESULTS : 2.23285 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B016.CNF;1041 BKG DATE : 13-SEP-2009 EFF FILE : W016.CNF;300 CAL DATE : 4-SEP-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	812.000	805.748	4.000	2.0000	100.0000	3.20E+00	5.11E-01	4.89E-02	1.85E-02	2.22E-01
U232	5302.100	750.000	745.000	5.000	2.2361	100.0000	2.96E+00	4.76E-01	5.33E-02	2.07E-02	2.14E-01
U-235	4391.000	34.000	31.000	3.000	1.7321	80.90000	1.52E-01	6.25E-02	5.43E-02	1.98E-02	5.86E-02
U-238	4184.730	791.000	787.000	4.000	2.0000	100.0000	3.13E+00	5.00E-01	4.89E-02	1.85E-02	2.20E-01

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



### Radiochemistry Batch Checklist, Rev 9

Batch# 909230 Product: U Date: 10/7/09

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# 73 <sup>10/10/09</sup> 743156
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%. Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.		✓	NCR# 743156
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.			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 stated.	✓		
QC data entered into QC database and batch is in REVW	✓		
Hit notification complete (if necessary)			N/A
Batch entered into Case Narrative.	✓		
Batch non-conformances completed, if applicable.	✓		NCR# 743156
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCR# 743156
Aliquot Correction completed if required.			N/A
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC

revised 8/1/08

Primary Review Performed By: [Signature] 10/7/09

Secondary Review Performed By: [Signature] 10/7/09

# Uranium Que Sheet

05-OCT-09

Batch #: 909230 Analyst: JXD2 First Client Due Date: 07-OCT-09 Internal Due Date: 01-OCT-09  
 Tracer Isotope: U-232 U-236 Tracer Code: 1183-E Expiration Date: 01/15/10 Vol: 0.1  
 LCS Isotope: U-238 LCS Code: 1163-G Expiration Date: 04/16/10 Vol: 0.1  
 Spike Isotope: U-238 Spike Code: 1163-G Expiration Date: 04/16/10 Vol: 0.1  
 Prep Date: 10/05/09 Initials: JXD Pipet ID: 2921058 Balance ID: 5070272

Witness: M. U. S. B. 10/15/09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	U Aliquot (g/l/f)	U Det #
236534001-3	SA118-0-5B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-SEP-09	1	1	0.501	128
236534002-3	SA118-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-SEP-09	2	2	0.506	121
236534003-3	SA118-25B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-SEP-09	3	3	0.505	127
236534004-3	SA118-40B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-SEP-09	4	4	0.501	128
236534005-3	SA118-51B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-SEP-09	5	5	0.501	129
236534006-3	SA105-0-5B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-SEP-09	6	6	0.502	130
236534007-3	SA105-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-SEP-09	7	7	0.503	131
236534008-3	SA105009-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-SEP-09	8	8	0.501	132
236534009-3	SA105-20B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-SEP-09	9	9	0.504	133
236534010-3	SA105-31B	SAMPLE		.04 pCi/g	SOIL	KERR003	02-SEP-09	10	10	0.501	134
236534012-3	RSAU7-0-5B	SAMPLE		.04 pCi/g	SOIL	KERR003	03-SEP-09	11	11	0.502	135
236534013-3	RSAU7009-0-5B	SAMPLE		.04 pCi/g	SOIL	KERR003	03-SEP-09	12	12	0.505	171
236534014-3	RSAU7-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	03-SEP-09	13	13	0.501	137
236534015-3	RSAU7-25B	SAMPLE		.04 pCi/g	SOIL	KERR003	03-SEP-09	14	14	0.506	138
236534016-3	RSAU7-40B	SAMPLE		.04 pCi/g	SOIL	KERR003	03-SEP-09	15	15	0.506	129
236534017-3	RSAU7-54B	SAMPLE		.04 pCi/g	SOIL	KERR003	03-SEP-09	16	16	0.504	136
236534018-3	SA54-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	08-SEP-09	17	17	0.502	141
236534019-3	SA54-20B	SAMPLE		.04 pCi/g	SOIL	KERR003	08-SEP-09	18	18	0.501	140
236534020-3	SA54-31B	SAMPLE		.04 pCi/g	SOIL	KERR003	08-SEP-09	19	19	0.506	143
1201939900-1	MB for batch 909230	MB		UCF pCi/g to pCi	SOIL	QC ACCOUNT		20	20	0.506	144
1201939901-3	SA54-31B(236534020DUP)	DUP		.04 pCi/g	SOIL	QC ACCOUNT	08-SEP-09	21	21	0.512	145
1201939902-3	SA54-31B(236534020MS)	MS		.04 pCi/g	SOIL	QC ACCOUNT	08-SEP-09	22	22	0.506	141
1201939903-1	LCS for batch 909230	LCS		UCF pCi/g to pCi	SOIL	QC ACCOUNT		23	23	0.506	147

Data Reviewed By: [Signature] 10/17/09

Solid Sample Dissolution by: **LEACH OF DIGESTION**  
 Circle One

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

GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230  
SAMPLE DATE : 2-SEP-2009 00:00:00.

SAMPLE ID : S0236534001\_UU  
SAMPLE QTY: 0.501 G

DETECTOR NUMBER :75547  
AVERAGE %EFFICIENCY :25.8247  
% YIELD : 25.424

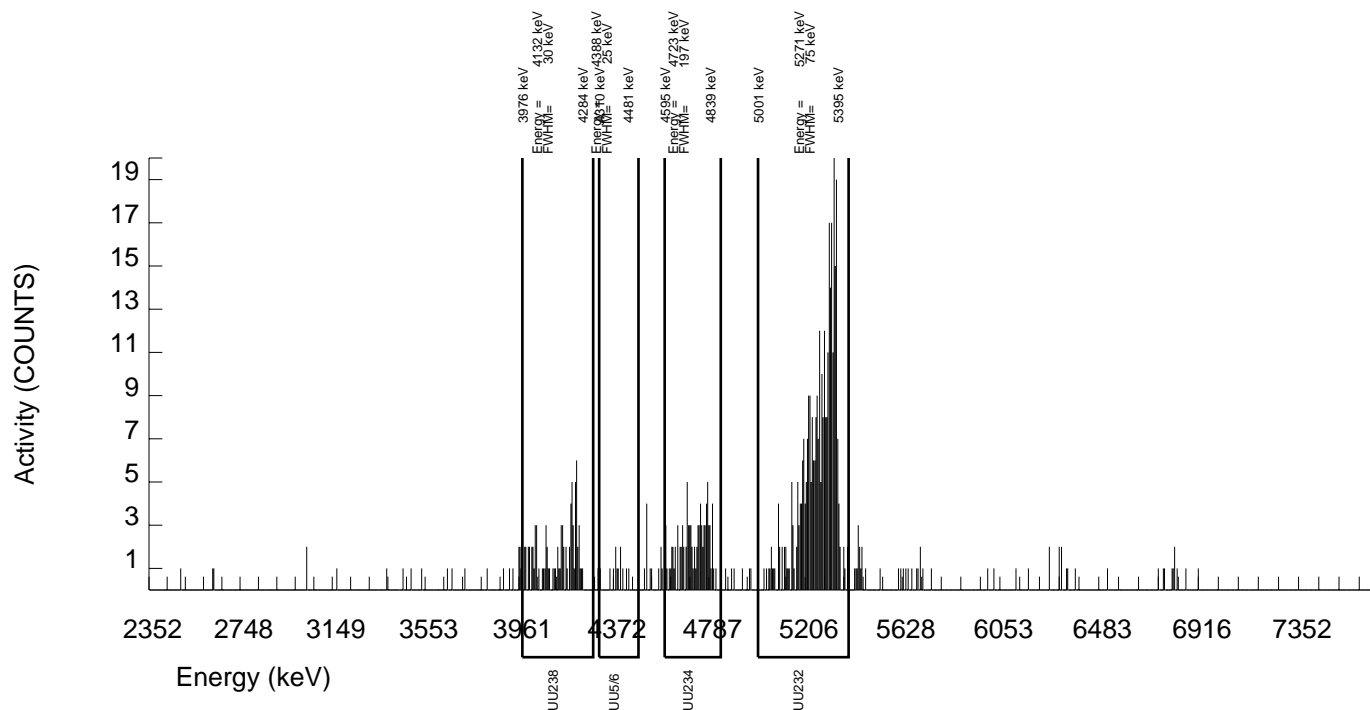
COUNT DATE: 6-OCT-2009 23:53:54  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :JXD2

MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25941 dpm RESULTS : 1.33718 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B125.CNF;406 BKG DATE : 4-OCT-2009 EFF FILE : W125.CNF;121 CAL DATE : 17-SEP-2009
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NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	94.000	86.652	7.000	2.6458	100.0000	1.19E+00	3.33E-01	2.10E-01	8.43E-02	2.69E-01
U232	5302.100	352.000	345.000	7.000	2.6458	100.0000	4.73E+00	9.31E-01	2.10E-01	8.44E-02	5.09E-01
U-235	4391.000	13.000	12.000	1.000	1.0000	80.90000	2.03E-01	1.29E-01	1.30E-01	3.94E-02	1.24E-01
U-238	4184.730	84.000	81.000	3.000	1.7321	100.0000	1.11E+00	3.10E-01	1.51E-01	5.52E-02	2.50E-01

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



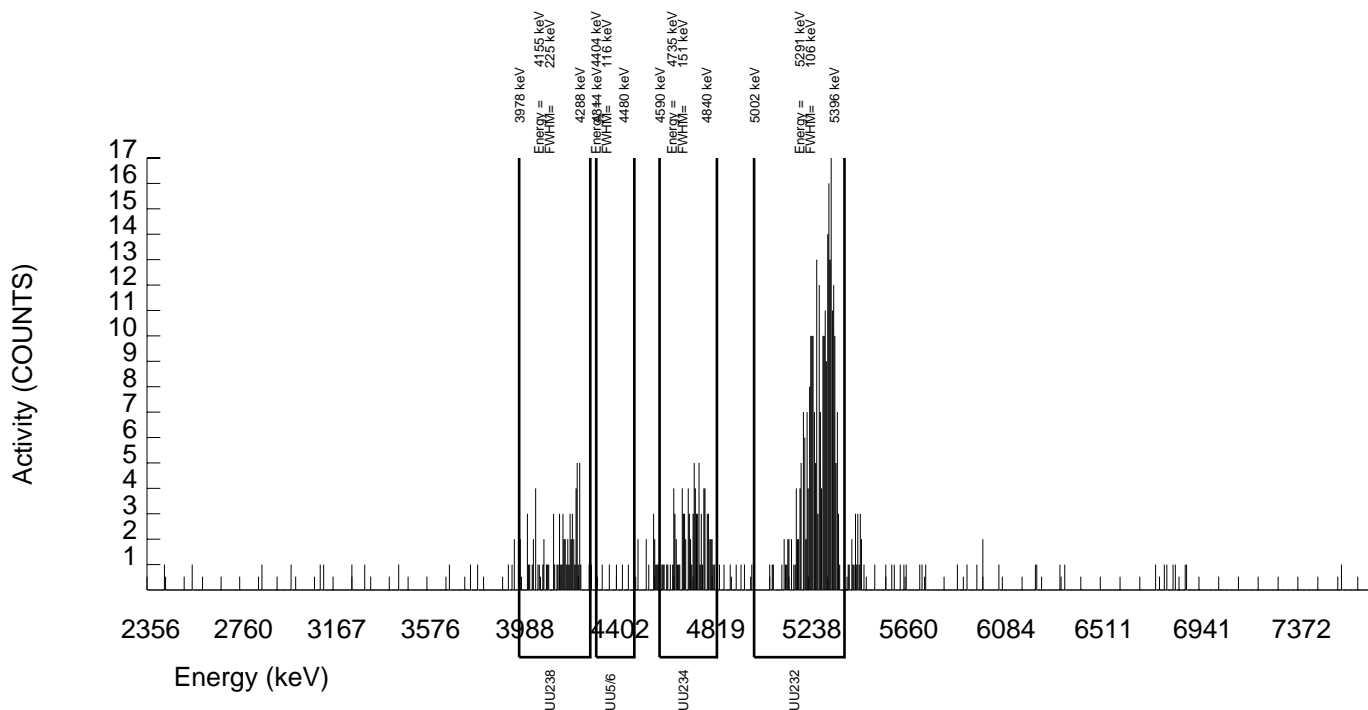
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 2-SEP-2009 00:00:00.		SAMPLE ID : S0236534002_UU SAMPLE QTY: 0.506 G	
DETECTOR NUMBER :75548 AVERAGE %EFFICIENCY :25.2876 % YIELD : 21.148		COUNT DATE: 6-OCT-2009 23:53:55 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.978E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.978E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25941 dpm RESULTS : 1.11225 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B126.CNF;405 BKG DATE : 4-OCT-2009 EFF FILE : W126.CNF;123 CAL DATE : 17-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	92.000	81.717	10.000	3.1623	100.0000	1.36E+00	4.07E-01	2.95E-01	1.22E-01	3.29E-01
U232	5302.100	297.000	281.000	16.000	4.0000	100.0000	4.68E+00	1.00E+00	3.60E-01	1.55E-01	5.78E-01
U-235	4391.000	5.000	4.000	1.000	1.0000	80.90000	8.23E-02	9.98E-02	1.57E-01	4.79E-02	9.88E-02
U-238	4184.730	73.000	72.000	1.000	1.0000	100.0000	1.20E+00	3.51E-01	1.27E-01	3.87E-02	2.81E-01

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



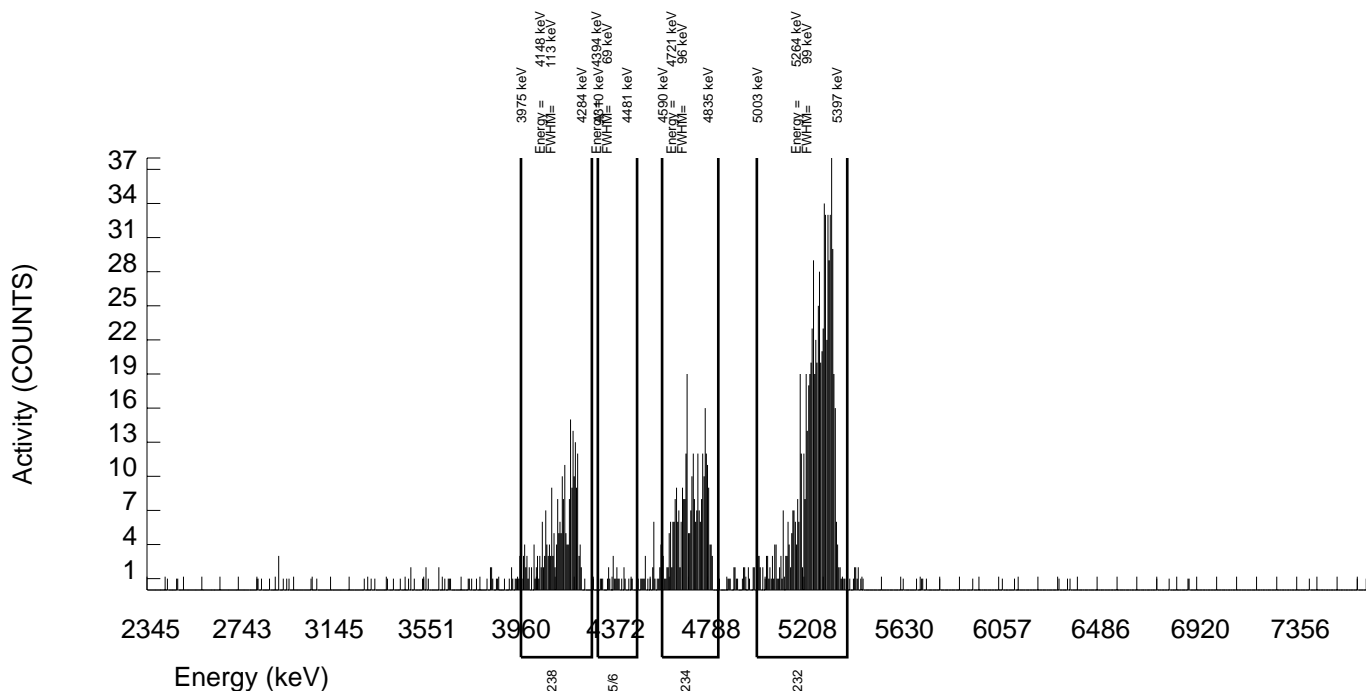
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 2-SEP-2009 00:00:00.		SAMPLE ID : S0236534003_UU SAMPLE QTY: 0.505 G	
DETECTOR NUMBER :78770 AVERAGE %EFFICIENCY :24.7470 % YIELD : 60.138		COUNT DATE: 6-OCT-2009 23:53:58 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.988E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.988E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25942 dpm RESULTS : 3.16293 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B127.CNF;409 BKG DATE : 4-OCT-2009 EFF FILE : W127.CNF;114 CAL DATE : 17-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	306.000	299.212	6.000	2.4495	100.0000	1.79E+00	3.30E-01	8.63E-02	3.42E-02	2.07E-01
U232	5302.100	787.000	782.000	5.000	2.2361	100.0000	4.69E+00	7.50E-01	8.04E-02	3.12E-02	3.31E-01
U-235	4391.000	23.000	23.000	0.000	0.0000	80.90000	1.70E-01	7.38E-02	2.22E-02	0.00E+00	6.96E-02
U-238	4184.730	260.000	259.000	1.000	1.0000	100.0000	1.55E+00	2.93E-01	4.59E-02	1.39E-02	1.90E-01

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





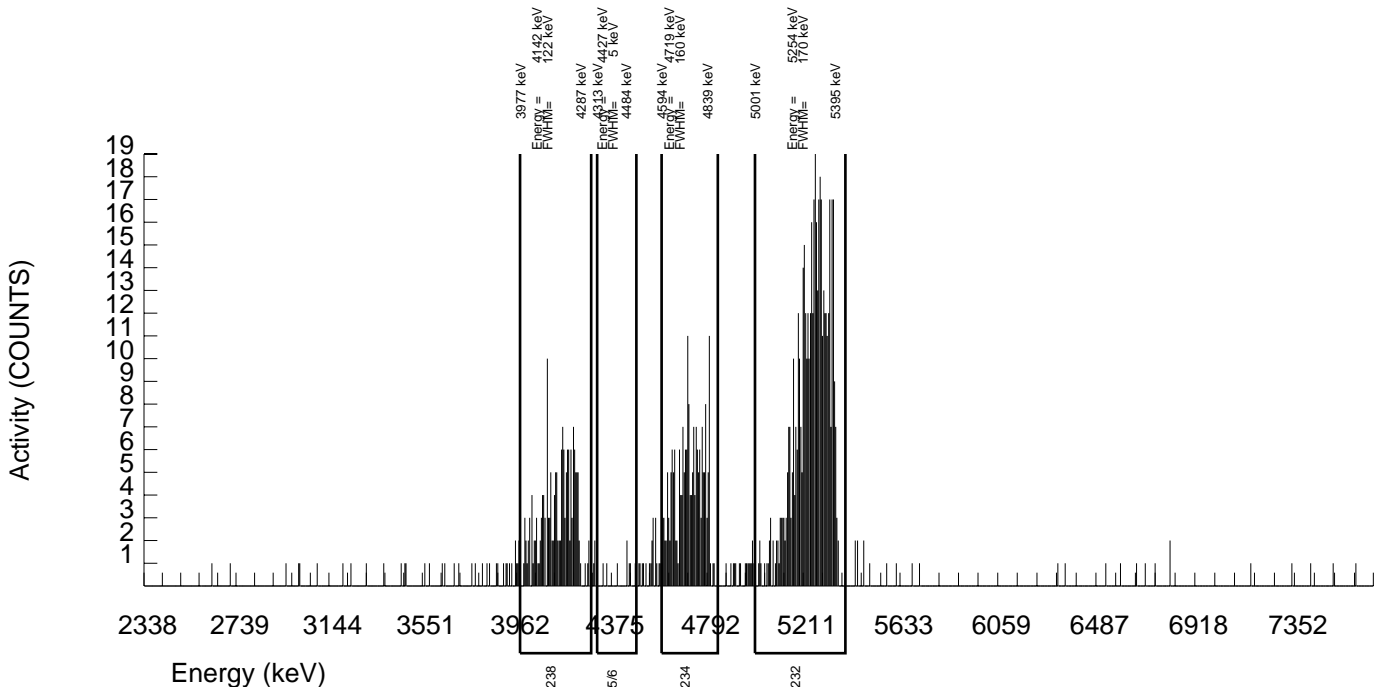
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 2-SEP-2009 00:00:00.		SAMPLE ID : S0236534004_UU SAMPLE QTY: 0.501 G	
DETECTOR NUMBER :75549 AVERAGE %EFFICIENCY :25.3463 % YIELD : 37.768		COUNT DATE: 6-OCT-2009 23:54:01 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25941 dpm RESULTS : 1.98636 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B128.CNF;415 BKG DATE : 4-OCT-2009 EFF FILE : W128.CNF;124 CAL DATE : 17-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	204.000	199.493	4.000	2.0000	100.0000	1.87E+00	3.90E-01	1.16E-01	4.37E-02	2.65E-01
U232	5302.100	507.000	503.000	4.000	2.0000	100.0000	4.73E+00	8.34E-01	1.16E-01	4.37E-02	4.17E-01
U-235	4391.000	8.000	6.000	2.000	1.4142	80.90000	6.97E-02	7.27E-02	1.11E-01	3.82E-02	7.20E-02
U-238	4184.730	175.000	173.000	2.000	1.4142	100.0000	1.62E+00	3.49E-01	9.00E-02	3.09E-02	2.45E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230  
SAMPLE DATE : 2-SEP-2009 00:00:00.

SAMPLE ID : S0236534005\_UU  
SAMPLE QTY: 0.501 G

DETECTOR NUMBER :76227  
AVERAGE %EFFICIENCY :26.3087  
% YIELD : 43.982

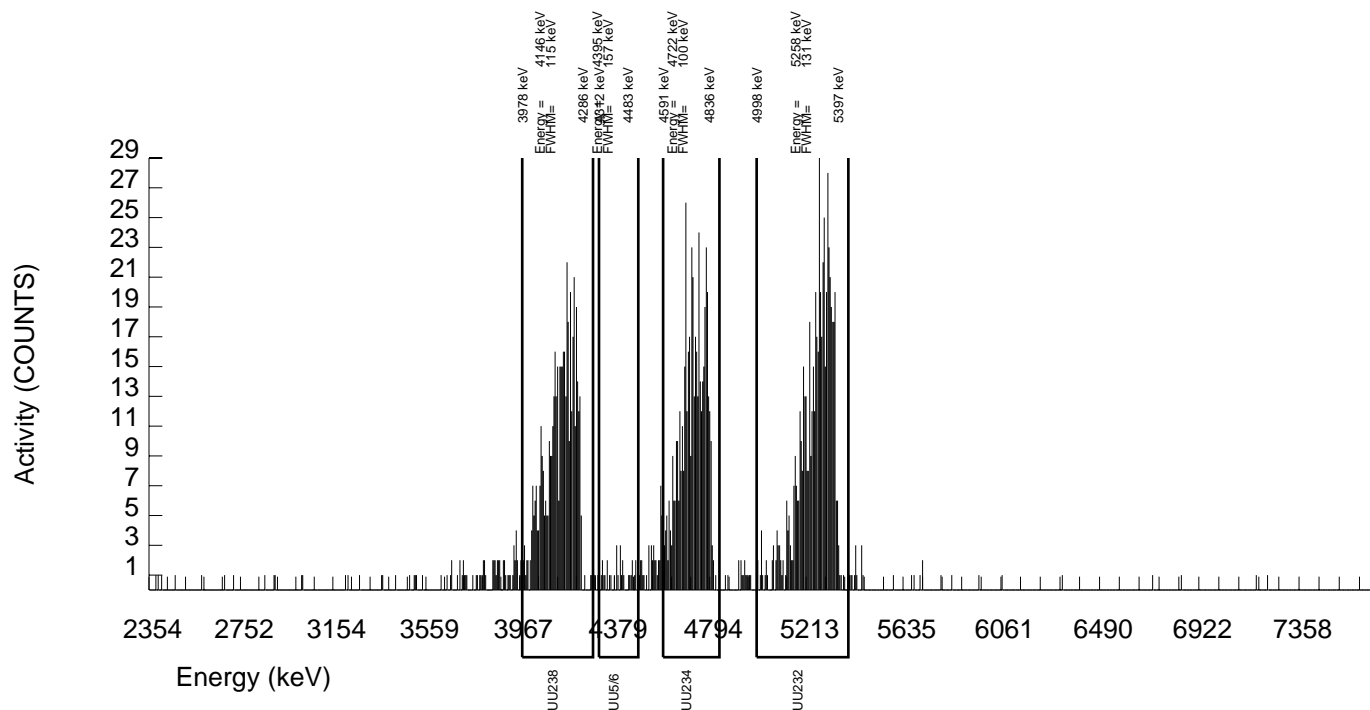
COUNT DATE: 6-OCT-2009 23:54:04  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :JXD2

MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25941 dpm RESULTS : 2.31317 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B129.CNF;404 BKG DATE : 4-OCT-2009 EFF FILE : W129.CNF;119 CAL DATE : 17-SEP-2009
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NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	503.000	499.387	3.000	1.7321	100.0000	3.88E+00	6.70E-01	8.59E-02	3.13E-02	3.42E-01
U232	5302.100	612.000	608.000	4.000	2.0000	100.0000	4.73E+00	7.97E-01	9.57E-02	3.62E-02	3.78E-01
U-235	4391.000	32.000	32.000	0.000	0.0000	80.90000	3.07E-01	1.16E-01	2.88E-02	0.00E+00	1.06E-01
U-238	4184.730	501.000	498.000	3.000	1.7321	100.0000	3.87E+00	6.68E-01	8.59E-02	3.13E-02	3.42E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230  
SAMPLE DATE : 2-SEP-2009 00:00:00.

SAMPLE ID : S0236534006\_UU  
SAMPLE QTY: 0.502 G

DETECTOR NUMBER :76228  
AVERAGE %EFFICIENCY :24.8338  
% YIELD : 27.129

COUNT DATE: 6-OCT-2009 23:54:06  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :JXD2

MS/MSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/G : 5.018E+00

LCS/LCSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/G : 5.018E+00

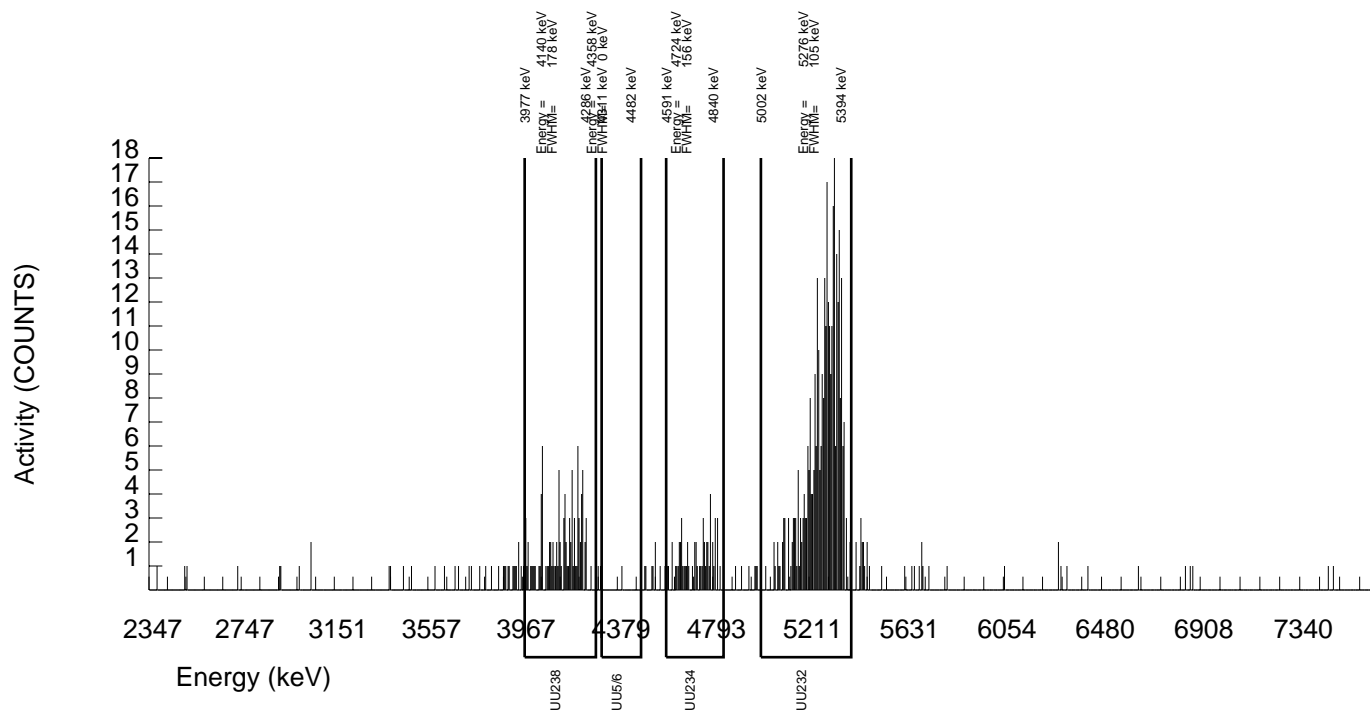
TRACER  
ID : 1283-E  
ISOTOPE : U232  
NOMINAL : 5.25941 dpm  
RESULTS : 1.42680 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B130.CNF;404  
BKG DATE : 4-OCT-2009  
EFF FILE : W130.CNF;121  
CAL DATE : 17-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	57.000	51.643	5.000	2.2361	100.0000	6.88E-01	2.34E-01	1.79E-01	6.93E-02	2.05E-01
U232	5302.100	358.000	354.000	4.000	2.0000	100.0000	4.72E+00	9.17E-01	1.64E-01	6.20E-02	4.97E-01
U-235	4391.000	2.000	2.000	0.000	0.0000	80.90000	3.29E-02	4.60E-02	4.94E-02	0.00E+00	4.56E-02
U-238	4184.730	100.000	100.000	0.000	0.0000	100.0000	1.33E+00	3.40E-01	4.00E-02	0.00E+00	2.61E-01

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



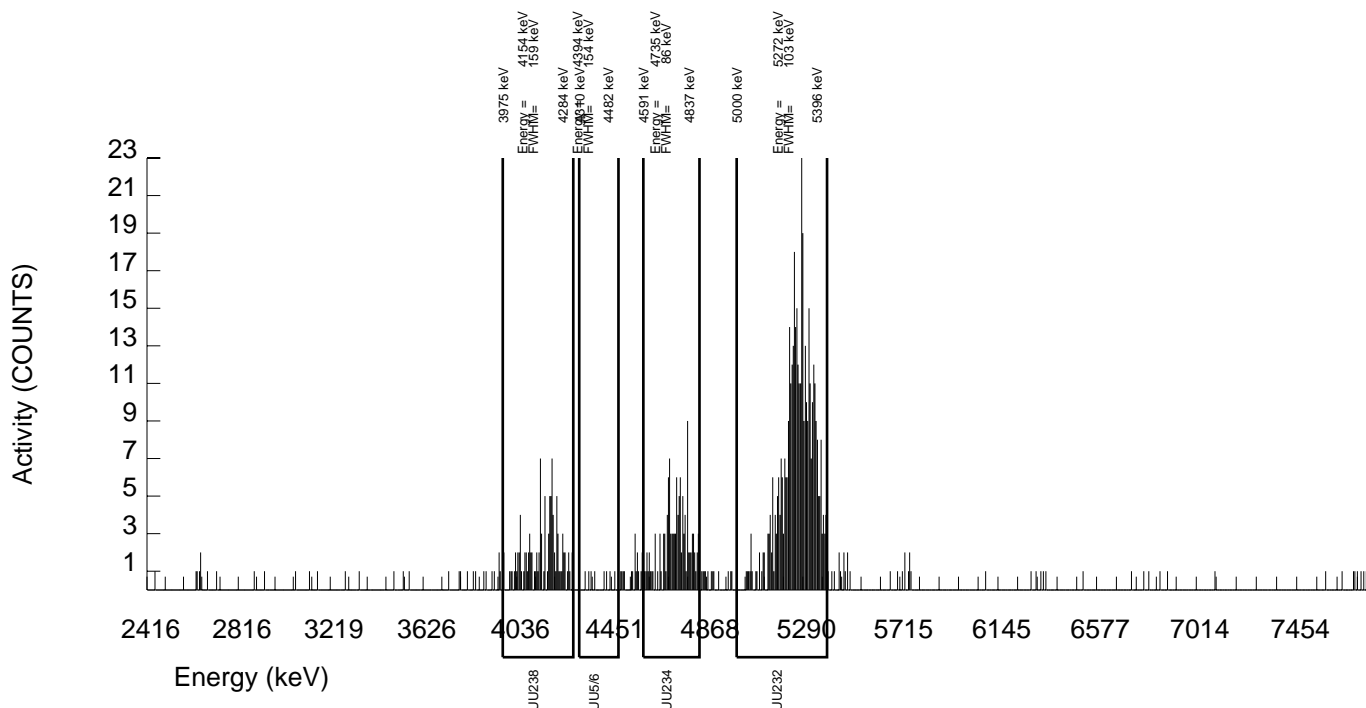
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 2-SEP-2009 00:00:00.		SAMPLE ID : S0236534007_UU SAMPLE QTY: 0.503 G	
DETECTOR NUMBER :33448 AVERAGE %EFFICIENCY :25.0166 % YIELD : 32.027		COUNT DATE: 6-OCT-2009 23:54:09 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.008E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.008E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25941 dpm RESULTS : 1.68445 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B131.CNF;400 BKG DATE : 4-OCT-2009 EFF FILE : W131.CNF;118 CAL DATE : 17-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	124.000	118.576	5.000	2.2361	100.0000	1.33E+00	3.25E-01	1.50E-01	5.81E-02	2.48E-01
U232	5302.100	431.000	421.000	10.000	3.1623	100.0000	4.71E+00	8.78E-01	1.98E-01	8.23E-02	4.60E-01
U-235	4391.000	9.000	8.000	1.000	1.0000	80.90000	1.11E-01	8.74E-02	1.06E-01	3.21E-02	8.56E-02
U-238	4184.730	108.000	104.000	4.000	2.0000	100.0000	1.16E+00	2.96E-01	1.38E-01	5.20E-02	2.32E-01

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



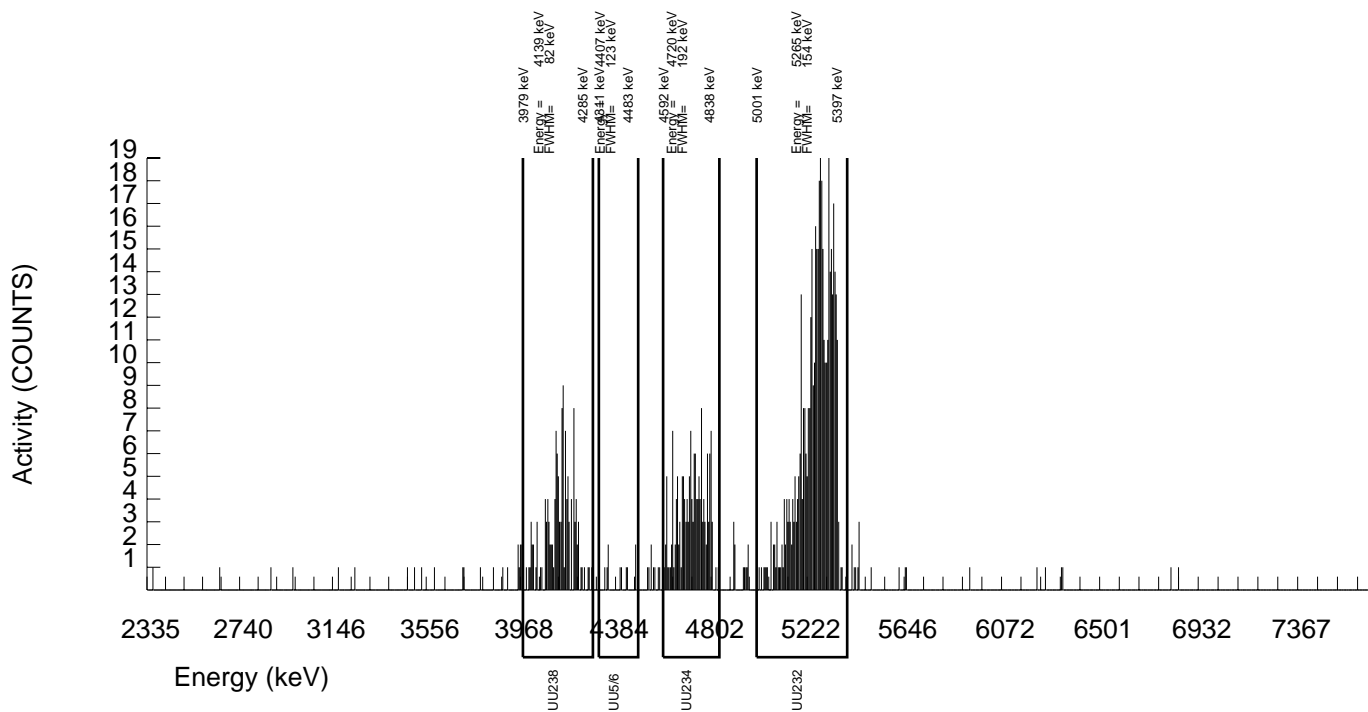
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 2-SEP-2009 00:00:00.		SAMPLE ID : S0236534008_UU SAMPLE QTY: 0.501 G	
DETECTOR NUMBER :67579 AVERAGE %EFFICIENCY :25.0258 % YIELD : 34.525		COUNT DATE: 6-OCT-2009 23:54:11 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25942 dpm RESULTS : 1.81582 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B132.CNF;396 BKG DATE : 4-OCT-2009 EFF FILE : W132.CNF;121 CAL DATE : 17-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	160.000	157.542	2.000	1.4142	100.0000	1.64E+00	3.64E-01	9.97E-02	3.42E-02	2.59E-01
U232	5302.100	460.000	454.000	6.000	2.4495	100.0000	4.73E+00	8.59E-01	1.50E-01	5.94E-02	4.41E-01
U-235	4391.000	10.000	10.000	0.000	0.0000	80.90000	1.29E-01	8.22E-02	3.86E-02	0.00E+00	7.97E-02
U-238	4184.730	137.000	136.000	1.000	1.0000	100.0000	1.42E+00	3.26E-01	7.96E-02	2.42E-02	2.40E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230  
SAMPLE DATE : 2-SEP-2009 00:00:00.

SAMPLE ID : S0236534009\_UU  
SAMPLE QTY: 0.504 G

DETECTOR NUMBER :76229  
AVERAGE %EFFICIENCY :24.3808  
% YIELD : 27.476

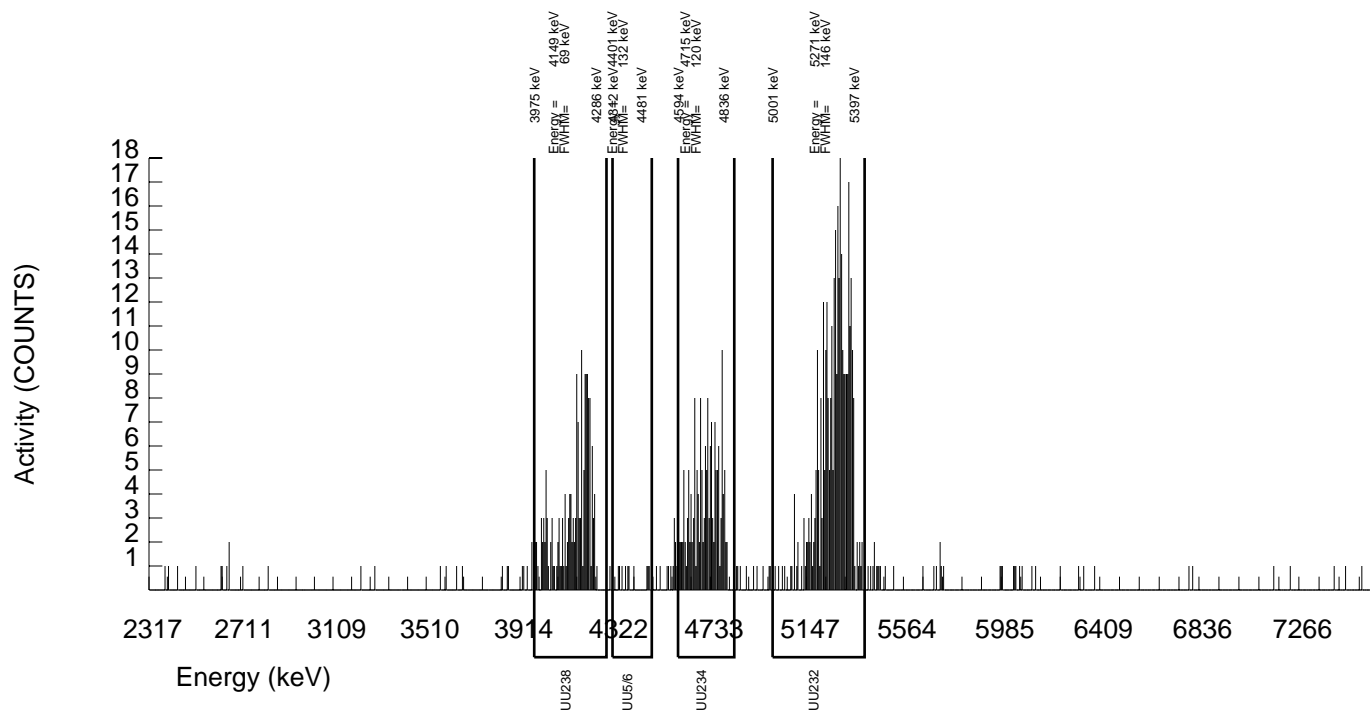
COUNT DATE: 6-OCT-2009 23:54:14  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :JXD2

MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.998E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.998E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25941 dpm RESULTS : 1.44510 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B133.CNF;388 BKG DATE : 4-OCT-2009 EFF FILE : W133.CNF;113 CAL DATE : 17-SEP-2009
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NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	166.000	163.645	2.000	1.4142	100.0000	2.18E+00	4.92E-01	1.28E-01	4.39E-02	3.39E-01
U232	5302.100	357.000	352.000	5.000	2.2361	100.0000	4.70E+00	9.17E-01	1.79E-01	6.95E-02	4.98E-01
U-235	4391.000	10.000	9.000	1.000	1.0000	80.90000	1.48E-01	1.10E-01	1.26E-01	3.84E-02	1.07E-01
U-238	4184.730	167.000	165.000	2.000	1.4142	100.0000	2.20E+00	4.96E-01	1.28E-01	4.39E-02	3.40E-01

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



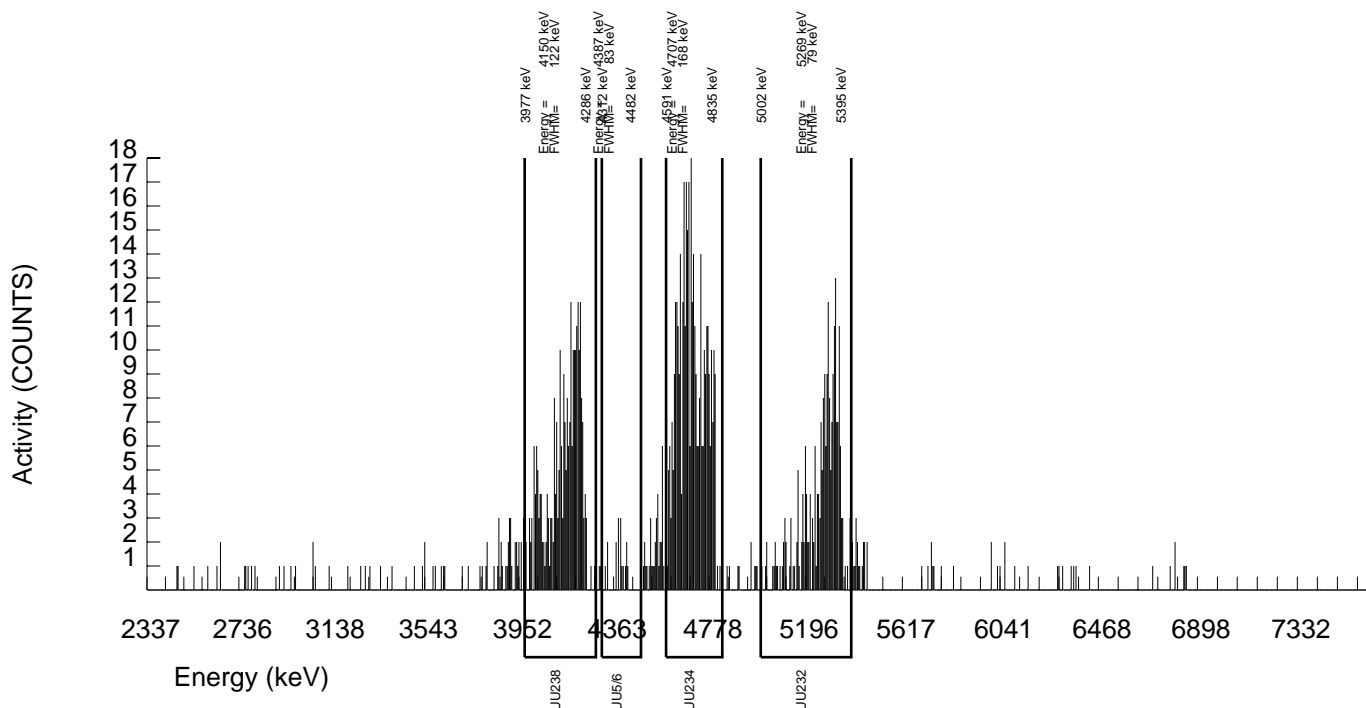
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 2-SEP-2009 00:00:00.		SAMPLE ID : S0236534010_UU SAMPLE QTY: 0.501 G	
DETECTOR NUMBER :76230 AVERAGE %EFFICIENCY :24.4453 % YIELD : 16.738		COUNT DATE: 6-OCT-2009 23:54:16 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25941 dpm RESULTS : 0.88033 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B134.CNF;387 BKG DATE : 4-OCT-2009 EFF FILE : W134.CNF;117 CAL DATE : 17-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	401.000	388.783	12.000	3.4641	100.0000	8.54E+00	1.85E+00	4.20E-01	1.77E-01	8.75E-01
U232	5302.100	233.000	215.000	18.000	4.2426	100.0000	4.73E+00	1.13E+00	5.00E-01	2.17E-01	6.83E-01
U-235	4391.000	18.000	5.000	13.000	3.6056	80.90000	1.36E-01	2.98E-01	5.37E-01	2.28E-01	2.96E-01
U-238	4184.730	276.000	257.000	19.000	4.3589	100.0000	5.65E+00	1.31E+00	5.12E-01	2.23E-01	7.40E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230  
SAMPLE DATE : 3-SEP-2009 00:00:00.

SAMPLE ID : S0236534012\_UU  
SAMPLE QTY: 0.502 G

DETECTOR NUMBER :64270  
AVERAGE %EFFICIENCY :25.2651  
% YIELD : 25.234

COUNT DATE: 6-OCT-2009 23:54:19  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :JXD2

MS/MSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/G : 5.018E+00

LCS/LCSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/G : 5.018E+00

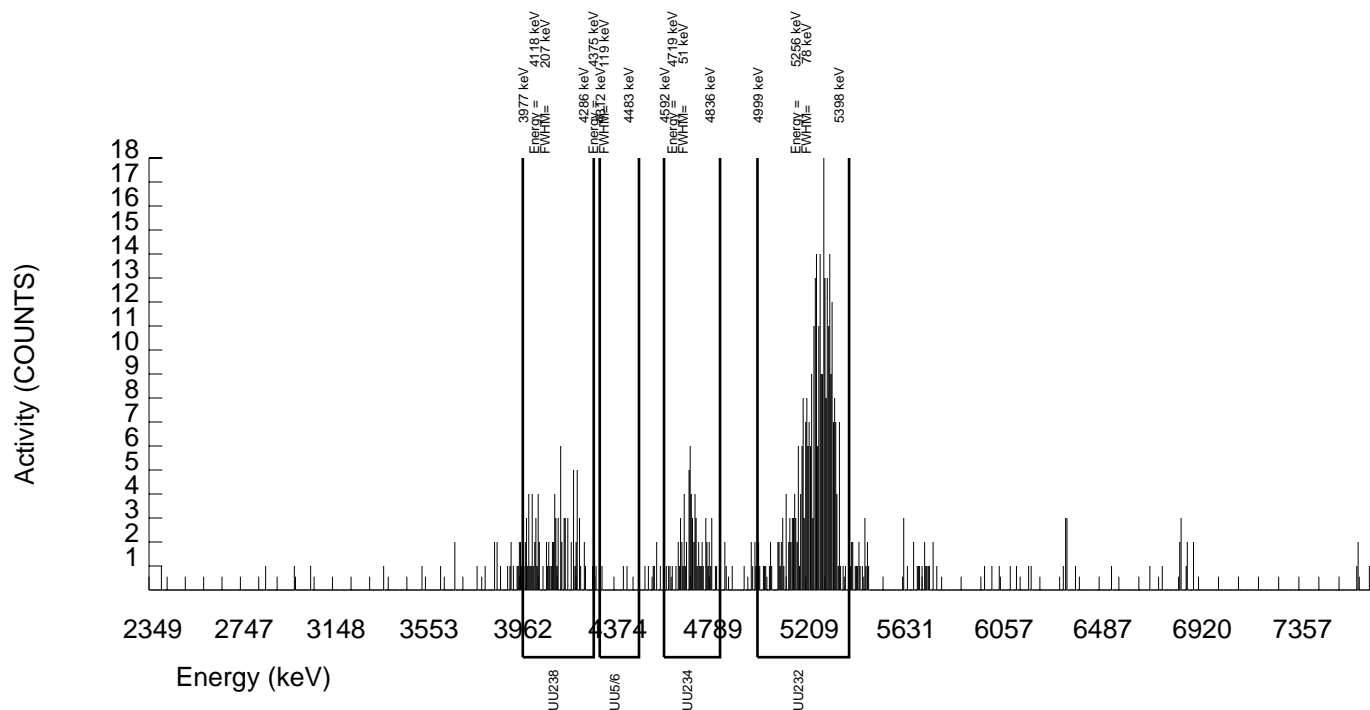
TRACER  
ID : 1283-E  
ISOTOPE : U232  
NOMINAL : 5.25928 dpm  
RESULTS : 1.32714 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B135.CNF;399  
BKG DATE : 4-OCT-2009  
EFF FILE : W135.CNF;128  
CAL DATE : 17-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	72.000	69.662	2.000	1.4142	100.0000	9.80E-01	2.88E-01	1.35E-01	4.63E-02	2.37E-01
U232	5302.100	345.000	335.000	10.000	3.1623	100.0000	4.72E+00	9.43E-01	2.50E-01	1.04E-01	5.20E-01
U-235	4391.000	4.000	4.000	0.000	0.0000	80.90000	6.96E-02	6.92E-02	5.22E-02	0.00E+00	6.82E-02
U-238	4184.730	94.000	92.000	2.000	1.4142	100.0000	1.29E+00	3.46E-01	1.35E-01	4.63E-02	2.70E-01

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





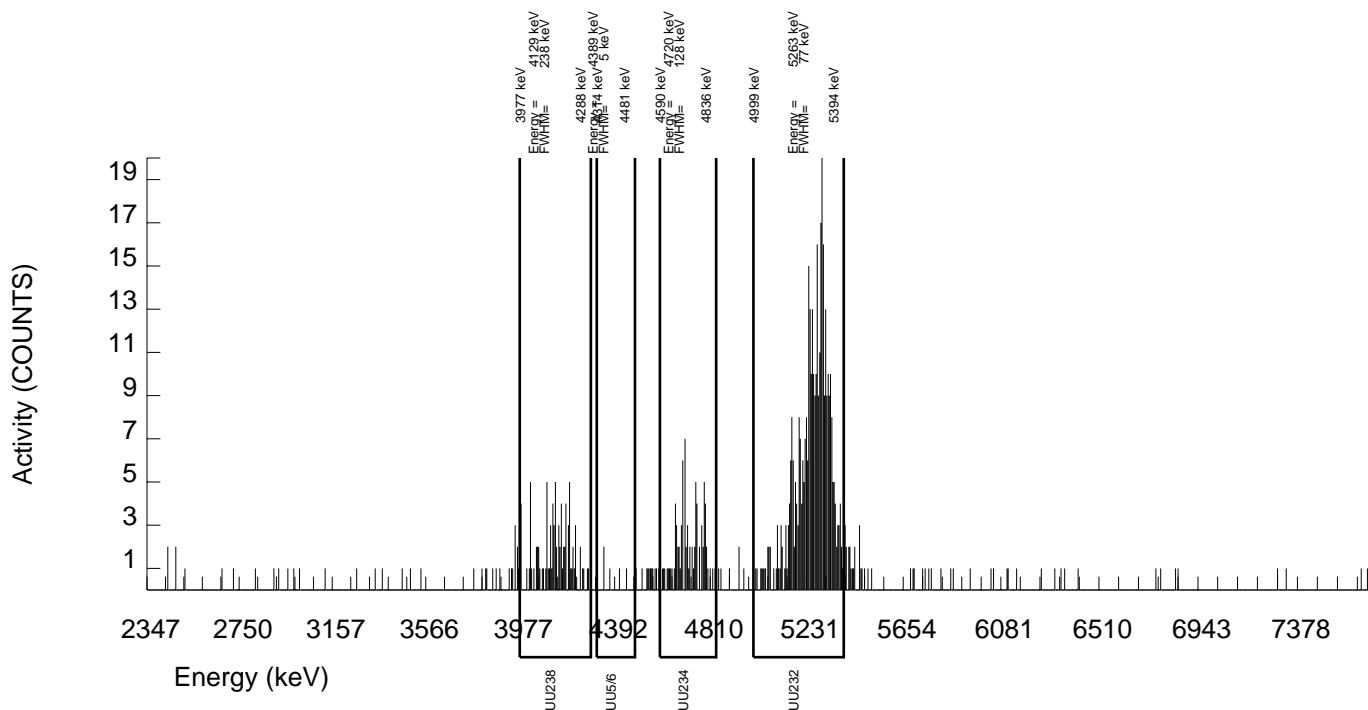
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 3-SEP-2009 00:00:00.		SAMPLE ID : S0236534013_UU SAMPLE QTY: 0.505 G	
DETECTOR NUMBER :68549 AVERAGE %EFFICIENCY :24.8579 % YIELD : 27.791		COUNT DATE: 6-OCT-2009 23:54:21 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.988E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.988E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25929 dpm RESULTS : 1.46162 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B136.CNF;398 BKG DATE : 4-OCT-2009 EFF FILE : W136.CNF;129 CAL DATE : 17-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	83.000	70.634	12.000	3.4641	100.0000	9.12E-01	2.89E-01	2.47E-01	1.04E-01	2.46E-01
U232	5302.100	388.000	363.000	25.000	5.0000	100.0000	4.69E+00	9.35E-01	3.39E-01	1.50E-01	5.15E-01
U-235	4391.000	5.000	3.000	2.000	1.4142	80.90000	4.79E-02	8.31E-02	1.53E-01	5.25E-02	8.28E-02
U-238	4184.730	92.000	90.000	2.000	1.4142	100.0000	1.16E+00	3.12E-01	1.24E-01	4.25E-02	2.45E-01

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



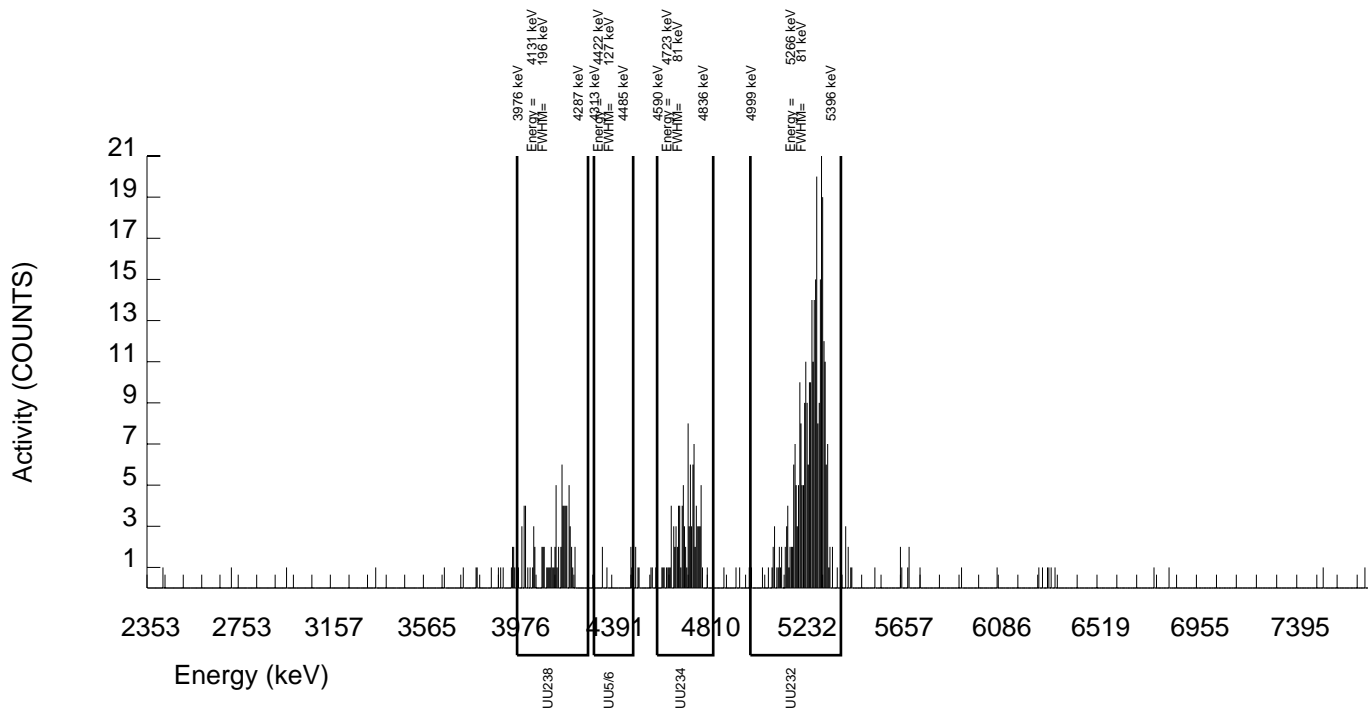
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 3-SEP-2009 00:00:00.		SAMPLE ID : S0236534014_UU SAMPLE QTY: 0.501 G	
DETECTOR NUMBER :79467 AVERAGE %EFFICIENCY :25.0900 % YIELD : 25.031		COUNT DATE: 6-OCT-2009 23:54:24 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25929 dpm RESULTS : 1.31646 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B137.CNF;353 BKG DATE : 4-OCT-2009 EFF FILE : W137.CNF;102 CAL DATE : 29-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	101.000	95.667	5.000	2.2361	100.0000	1.37E+00	3.67E-01	1.92E-01	7.45E-02	2.88E-01
U232	5302.100	331.000	330.000	1.000	1.0000	100.0000	4.73E+00	9.34E-01	1.10E-01	3.33E-02	5.12E-01
U-235	4391.000	6.000	6.000	0.000	0.0000	80.90000	1.06E-01	8.68E-02	5.31E-02	0.00E+00	8.50E-02
U-238	4184.730	83.000	82.000	1.000	1.0000	100.0000	1.17E+00	3.22E-01	1.10E-01	3.33E-02	2.57E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230  
SAMPLE DATE : 3-SEP-2009 00:00:00.

SAMPLE ID : S0236534015\_UU  
SAMPLE QTY: 0.506 G

DETECTOR NUMBER :65877  
AVERAGE %EFFICIENCY :25.6005  
% YIELD : 44.232

COUNT DATE: 6-OCT-2009 23:54:26  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :JXD2

MS/MSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/G : 4.978E+00

LCS/LCSD  
ID : 1163-G  
ISOTOPE : U-238  
PCI/G : 4.978E+00

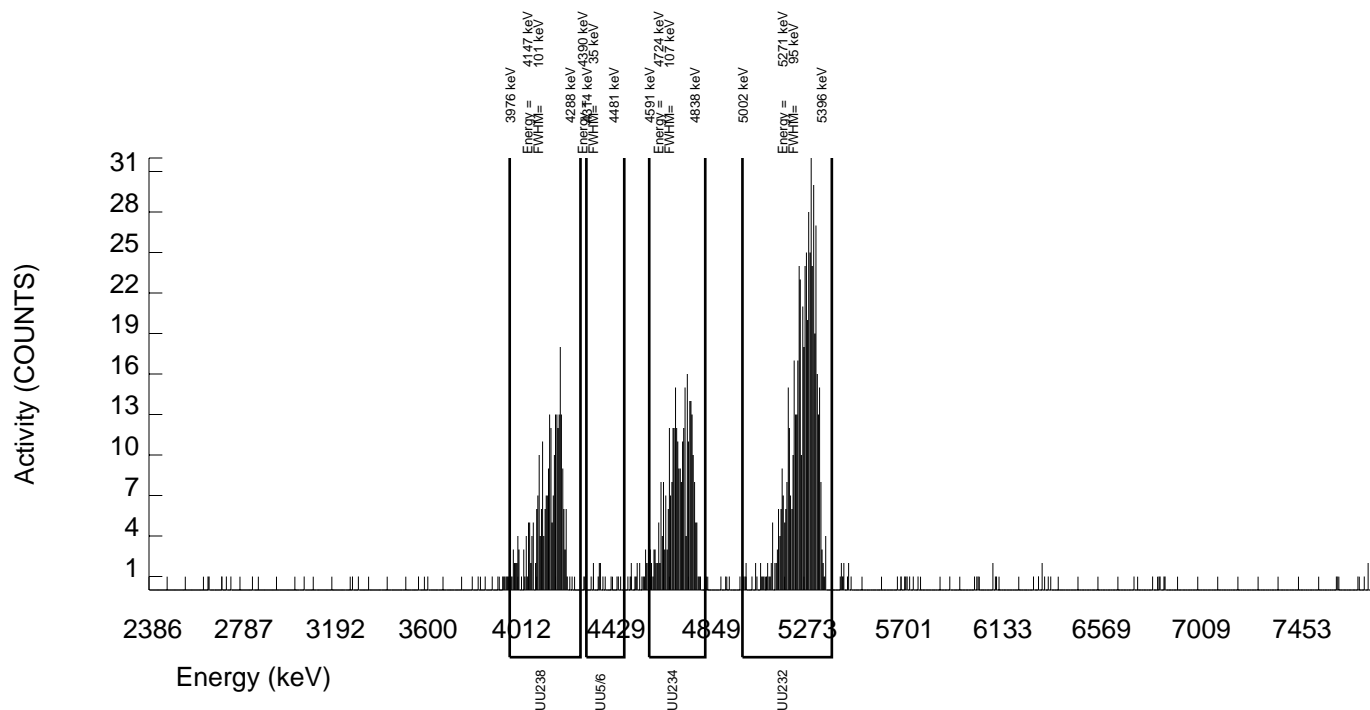
TRACER  
ID : 1283-E  
ISOTOPE : U232  
NOMINAL : 5.25929 dpm  
RESULTS : 2.32628 dpm

LIB FILE : ENV\_ALPHA\_UU.N  
BKG FILE : B138.CNF;358  
BKG DATE : 4-OCT-2009  
EFF FILE : W138.CNF;94  
CAL DATE : 16-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	324.000	314.400	9.000	3.0000	100.0000	2.47E+00	4.64E-01	1.33E-01	5.49E-02	2.81E-01
U232	5302.100	605.000	595.000	10.000	3.1623	100.0000	4.68E+00	7.97E-01	1.39E-01	5.79E-02	3.82E-01
U-235	4391.000	15.000	7.000	8.000	2.8284	80.90000	6.80E-02	9.19E-02	1.57E-01	6.39E-02	9.13E-02
U-238	4184.730	286.000	281.000	5.000	2.2361	100.0000	2.21E+00	4.22E-01	1.05E-01	4.09E-02	2.63E-01

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



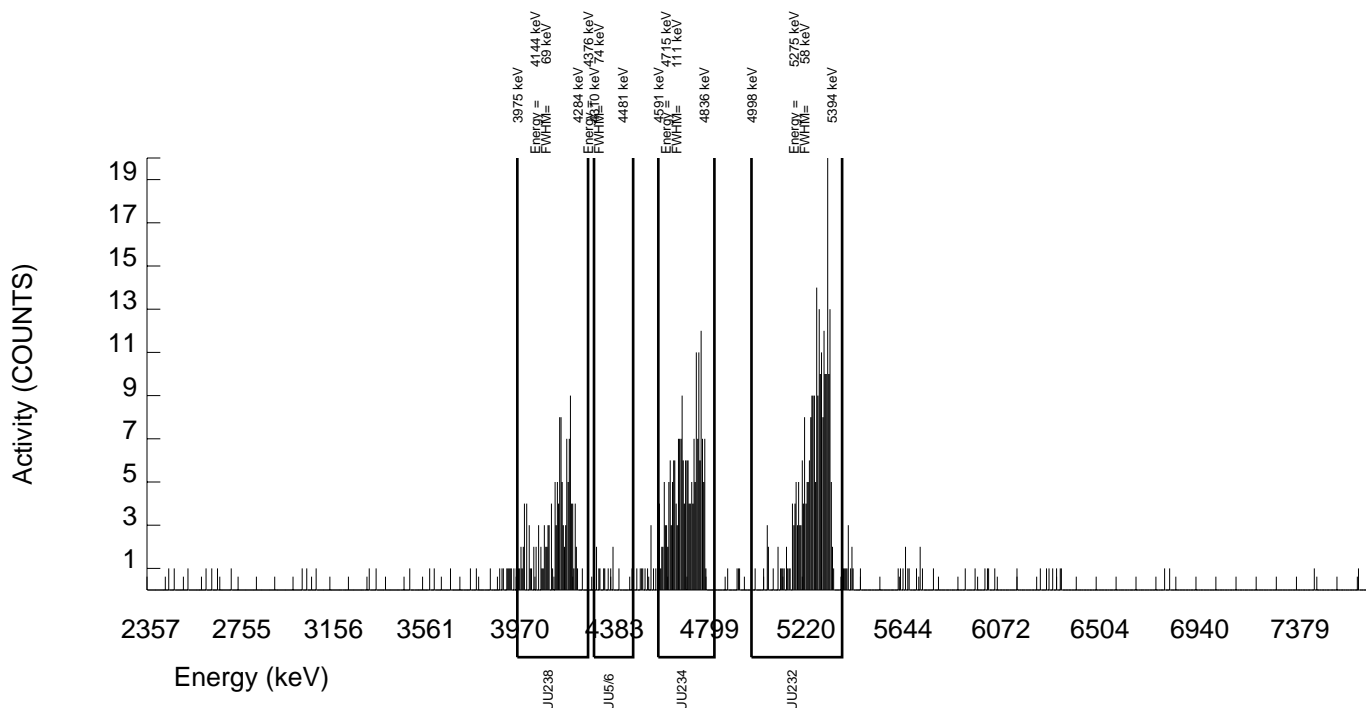
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 3-SEP-2009 00:00:00.		SAMPLE ID : S0236534016_UU SAMPLE QTY: 0.506 G	
DETECTOR NUMBER :76231 AVERAGE %EFFICIENCY :24.9287 % YIELD : 20.460		COUNT DATE: 6-OCT-2009 23:54:28 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.978E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.978E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25929 dpm RESULTS : 1.07604 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B139.CNF;355 BKG DATE : 4-OCT-2009 EFF FILE : W139.CNF;94 CAL DATE : 16-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	217.000	211.730	5.000	2.2361	100.0000	3.70E+00	8.30E-01	2.34E-01	9.08E-02	5.09E-01
U232	5302.100	275.000	268.000	7.000	2.6458	100.0000	4.68E+00	1.01E+00	2.67E-01	1.08E-01	5.75E-01
U-235	4391.000	12.000	9.000	3.000	1.7321	80.90000	1.94E-01	1.67E-01	2.39E-01	8.69E-02	1.64E-01
U-238	4184.730	142.000	139.000	3.000	1.7321	100.0000	2.43E+00	5.96E-01	1.93E-01	7.03E-02	4.12E-01

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



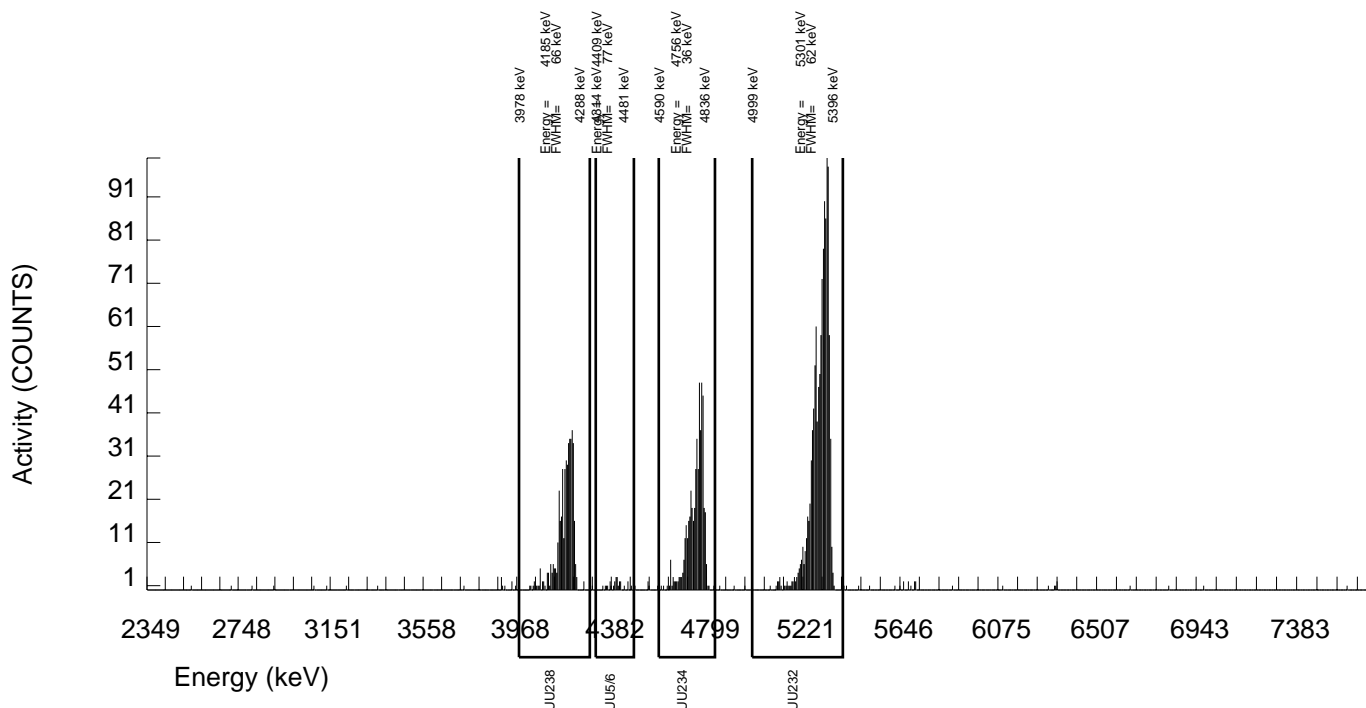
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 3-SEP-2009 00:00:00.		SAMPLE ID : S0236534017_UU SAMPLE QTY: 0.504 G	
DETECTOR NUMBER :78771 AVERAGE %EFFICIENCY :25.2649 % YIELD : 89.413		COUNT DATE: 6-OCT-2009 23:54:31 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.998E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.998E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25929 dpm RESULTS : 4.70246 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B140.CNF;355 BKG DATE : 4-OCT-2009 EFF FILE : W140.CNF;99 CAL DATE : 16-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	508.000	501.803	5.000	2.2361	100.0000	1.99E+00	3.24E-01	5.30E-02	2.06E-02	1.75E-01
U232	5302.100	1194.000	1187.000	7.000	2.6458	100.0000	4.70E+00	7.00E-01	6.06E-02	2.44E-02	2.69E-01
U-235	4391.000	25.000	23.000	2.000	1.4142	80.90000	1.12E-01	5.22E-02	4.69E-02	1.61E-02	4.98E-02
U-238	4184.730	454.000	450.000	4.000	2.0000	100.0000	1.78E+00	2.96E-01	4.87E-02	1.84E-02	1.66E-01

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



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230  
SAMPLE DATE : 8-SEP-2009 00:00:00.

SAMPLE ID : S0236534018\_UU  
SAMPLE QTY: 0.502 G

DETECTOR NUMBER :76232  
AVERAGE %EFFICIENCY :25.4745  
% YIELD : 26.147

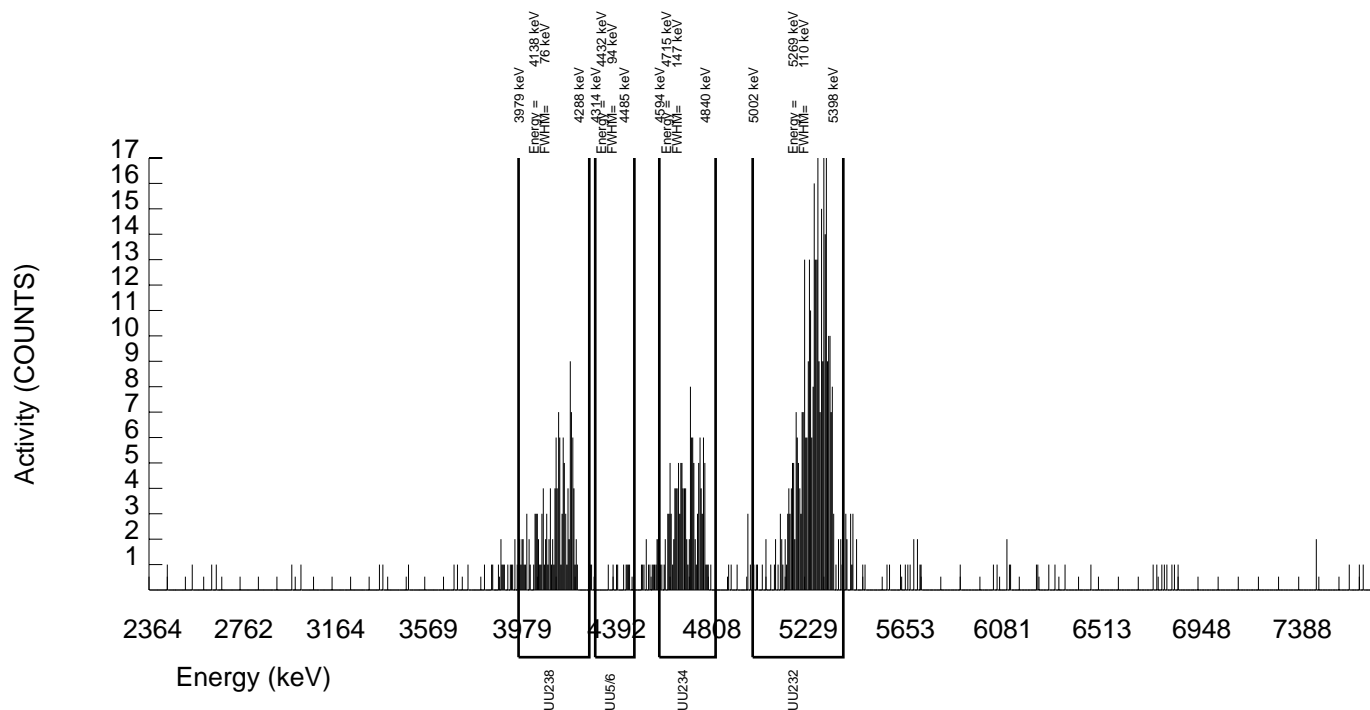
COUNT DATE: 6-OCT-2009 23:54:34  
ELAPSED LIVE TIME(SEC): 60000.00  
ANALYST :JXD2

MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.018E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.018E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25859 dpm RESULTS : 1.37498 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B141.CNF;358 BKG DATE : 4-OCT-2009 EFF FILE : W141.CNF;97 CAL DATE : 16-SEP-2009
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NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	139.000	132.647	6.000	2.4495	100.0000	1.79E+00	4.35E-01	1.94E-01	7.68E-02	3.18E-01
U232	5302.100	357.000	350.000	7.000	2.6458	100.0000	4.72E+00	9.35E-01	2.06E-01	8.30E-02	5.04E-01
U-235	4391.000	9.000	9.000	0.000	0.0000	80.90000	1.50E-01	1.01E-01	5.00E-02	0.00E+00	9.79E-02
U-238	4184.730	138.000	138.000	0.000	0.0000	100.0000	1.86E+00	4.39E-01	4.04E-02	0.00E+00	3.10E-01

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



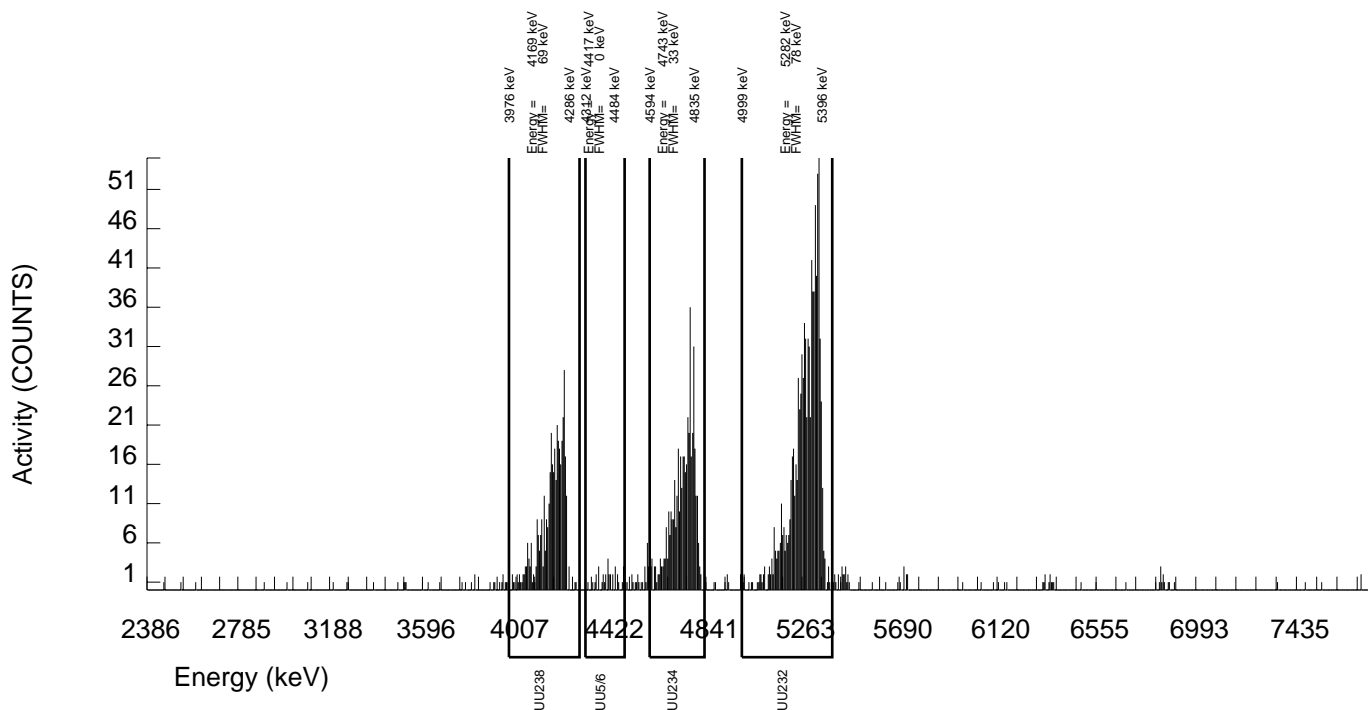
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 8-SEP-2009 00:00:00.		SAMPLE ID : S0236534019_UU SAMPLE QTY: 0.501 G	
DETECTOR NUMBER :64261 AVERAGE %EFFICIENCY :26.0384 % YIELD : 66.146		COUNT DATE: 6-OCT-2009 23:54:36 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.028E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25859 dpm RESULTS : 3.47832 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B142.CNF;352 BKG DATE : 4-OCT-2009 EFF FILE : W142.CNF;101 CAL DATE : 16-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	456.000	450.088	5.000	2.2361	100.0000	2.35E+00	3.98E-01	7.00E-02	2.72E-02	2.19E-01
U232	5302.100	921.000	905.000	16.000	4.0000	100.0000	4.73E+00	7.39E-01	1.13E-01	4.86E-02	3.13E-01
U-235	4391.000	34.000	31.000	3.000	1.7321	80.90000	2.00E-01	8.20E-02	7.14E-02	2.60E-02	7.69E-02
U-238	4184.730	409.000	405.000	4.000	2.0000	100.0000	2.11E+00	3.64E-01	6.42E-02	2.43E-02	2.08E-01

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



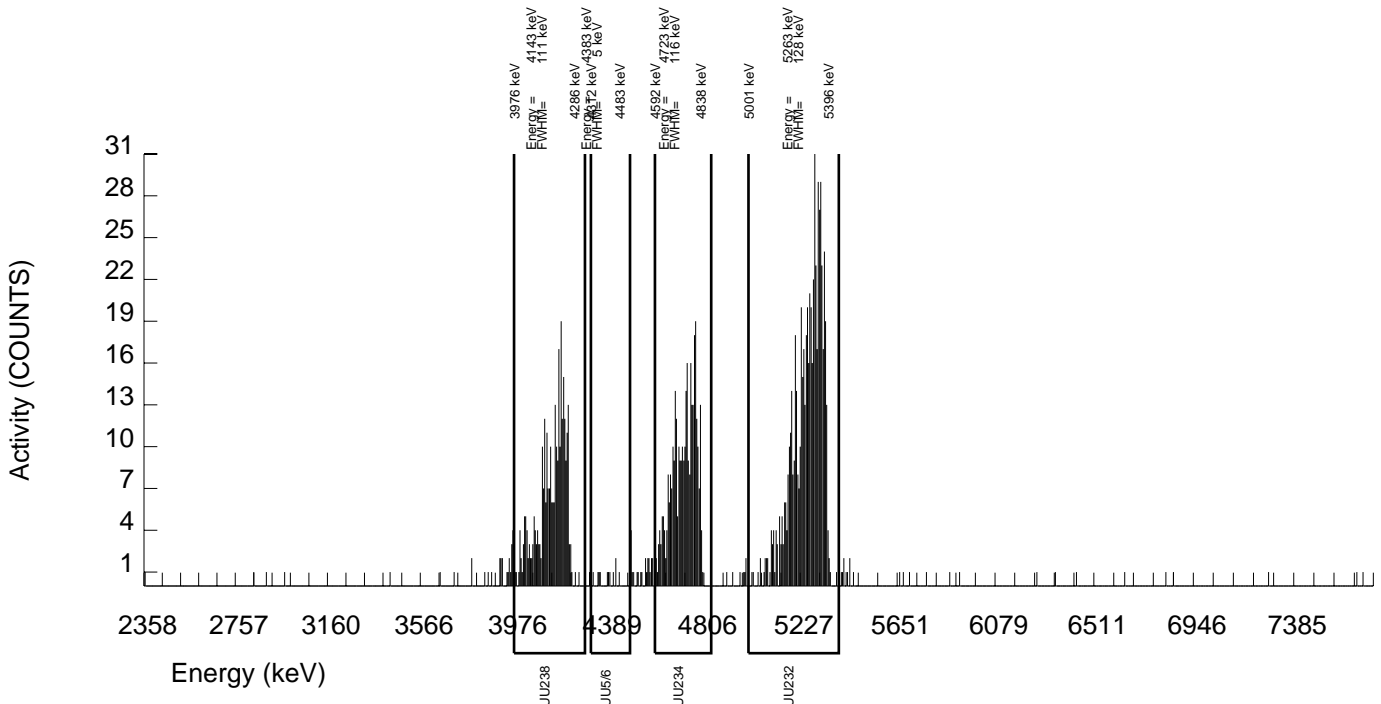
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 8-SEP-2009 00:00:00.		SAMPLE ID : S0236534020_UU SAMPLE QTY: 0.506 G	
DETECTOR NUMBER :65882 AVERAGE %EFFICIENCY :24.3816 % YIELD : 49.409		COUNT DATE: 6-OCT-2009 23:54:39 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.978E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.978E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25859 dpm RESULTS : 2.59822 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B143.CNF;355 BKG DATE : 4-OCT-2009 EFF FILE : W143.CNF;104 CAL DATE : 16-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	342.000	330.362	11.000	3.3166	100.0000	2.44E+00	4.57E-01	1.36E-01	5.70E-02	2.72E-01
U232	5302.100	639.000	633.000	6.000	2.4495	100.0000	4.68E+00	7.94E-01	1.06E-01	4.21E-02	3.68E-01
U-235	4391.000	12.000	11.000	1.000	1.0000	80.90000	1.00E-01	6.63E-02	6.99E-02	2.12E-02	6.46E-02
U-238	4184.730	314.000	313.000	1.000	1.0000	100.0000	2.31E+00	4.32E-01	5.66E-02	1.72E-02	2.57E-01

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





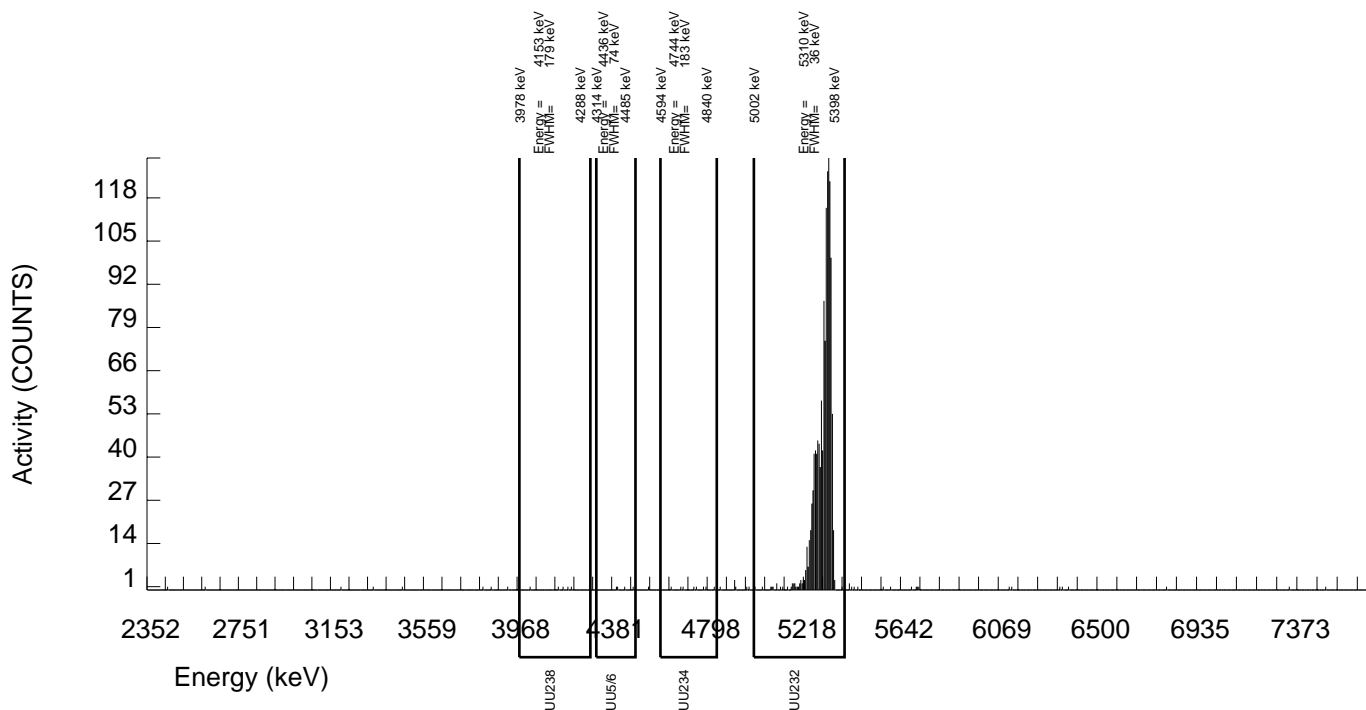
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 5-OCT-2009 00:00:00.		SAMPLE ID : S1201939900_UU SAMPLE QTY: 0.506 G	
DETECTOR NUMBER :75551 AVERAGE %EFFICIENCY :24.3208 % YIELD : 102.900		COUNT DATE: 6-OCT-2009 23:54:40 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.978E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.978E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25485 dpm RESULTS : 5.40723 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B144.CNF;354 BKG DATE : 4-OCT-2009 EFF FILE : W144.CNF;98 CAL DATE : 16-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	8.000	-0.326	7.000	2.6458	100.0000	-1.16E-03	2.58E-02	5.45E-02	2.19E-02	2.58E-02
U232	5302.100	1328.000	1315.000	13.000	3.6056	100.0000	4.68E+00	6.87E-01	7.04E-02	2.98E-02	2.55E-01
U-235	4391.000	4.000	1.000	3.000	1.7321	80.90000	4.40E-03	2.28E-02	4.86E-02	1.77E-02	2.28E-02
U-238	4184.730	5.000	1.000	4.000	2.0000	100.0000	3.56E-03	2.09E-02	4.38E-02	1.66E-02	2.09E-02

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



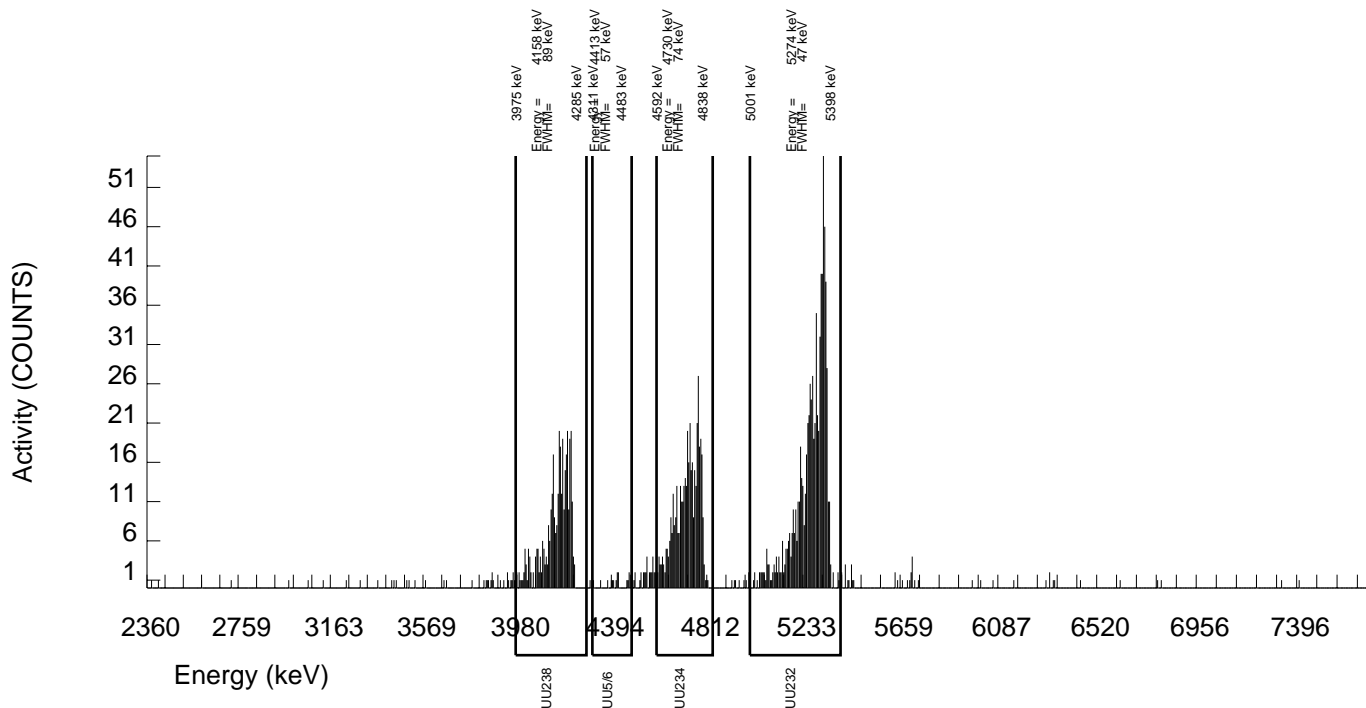
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 8-SEP-2009 00:00:00.		SAMPLE ID : S1201939901_UU SAMPLE QTY: 0.502 G	
DETECTOR NUMBER :72526 AVERAGE %EFFICIENCY :24.9491 % YIELD : 59.193		COUNT DATE: 6-OCT-2009 23:54:43 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.018E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.018E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25859 dpm RESULTS : 3.11274 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B145.CNF;352 BKG DATE : 4-OCT-2009 EFF FILE : W145.CNF;103 CAL DATE : 16-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	434.000	427.218	6.000	2.4495	100.0000	2.60E+00	4.54E-01	8.75E-02	3.46E-02	2.50E-01
U232	5302.100	780.000	776.000	4.000	2.0000	100.0000	4.72E+00	7.67E-01	7.48E-02	2.83E-02	3.34E-01
U-235	4391.000	16.000	15.000	1.000	1.0000	80.90000	1.13E-01	6.29E-02	5.75E-02	1.75E-02	6.07E-02
U-238	4184.730	363.000	359.000	4.000	2.0000	100.0000	2.18E+00	3.92E-01	7.48E-02	2.83E-02	2.28E-01

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



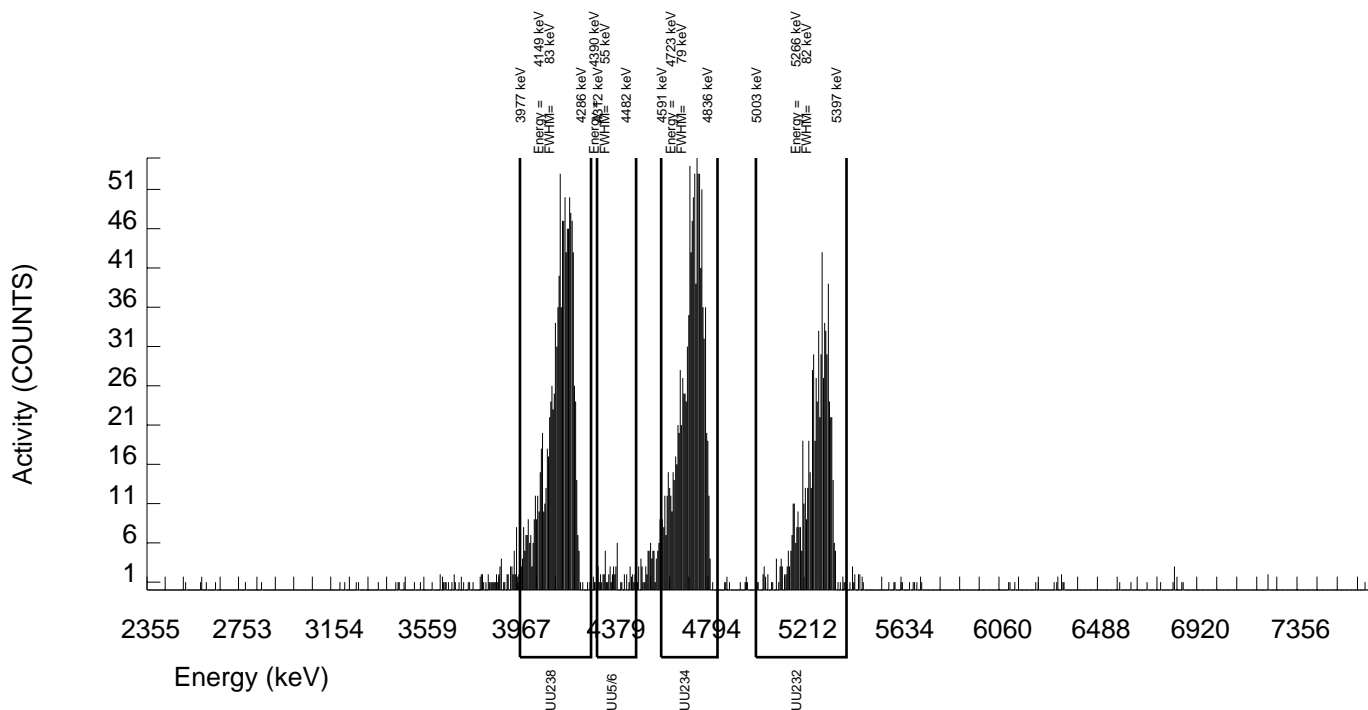
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 8-SEP-2009 00:00:00.		SAMPLE ID : S1201939902_UU SAMPLE QTY: 0.506 G	
DETECTOR NUMBER :72527 AVERAGE %EFFICIENCY :25.2179 % YIELD : 56.072		COUNT DATE: 6-OCT-2009 23:54:45 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.978E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.978E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25859 dpm RESULTS : 2.94860 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B146.CNF;357 BKG DATE : 4-OCT-2009 EFF FILE : W146.CNF;105 CAL DATE : 16-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	1131.000	1124.251	6.000	2.4495	100.0000	7.08E+00	1.10E+00	9.06E-02	3.59E-02	4.16E-01
U232	5302.100	750.000	743.000	7.000	2.6458	100.0000	4.68E+00	7.57E-01	9.65E-02	3.88E-02	3.40E-01
U-235	4391.000	57.000	56.000	1.000	1.0000	80.90000	4.36E-01	1.32E-01	5.96E-02	1.81E-02	1.16E-01
U-238	4184.730	1144.000	1143.000	1.000	1.0000	100.0000	7.20E+00	1.12E+00	4.82E-02	1.46E-02	4.18E-01

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



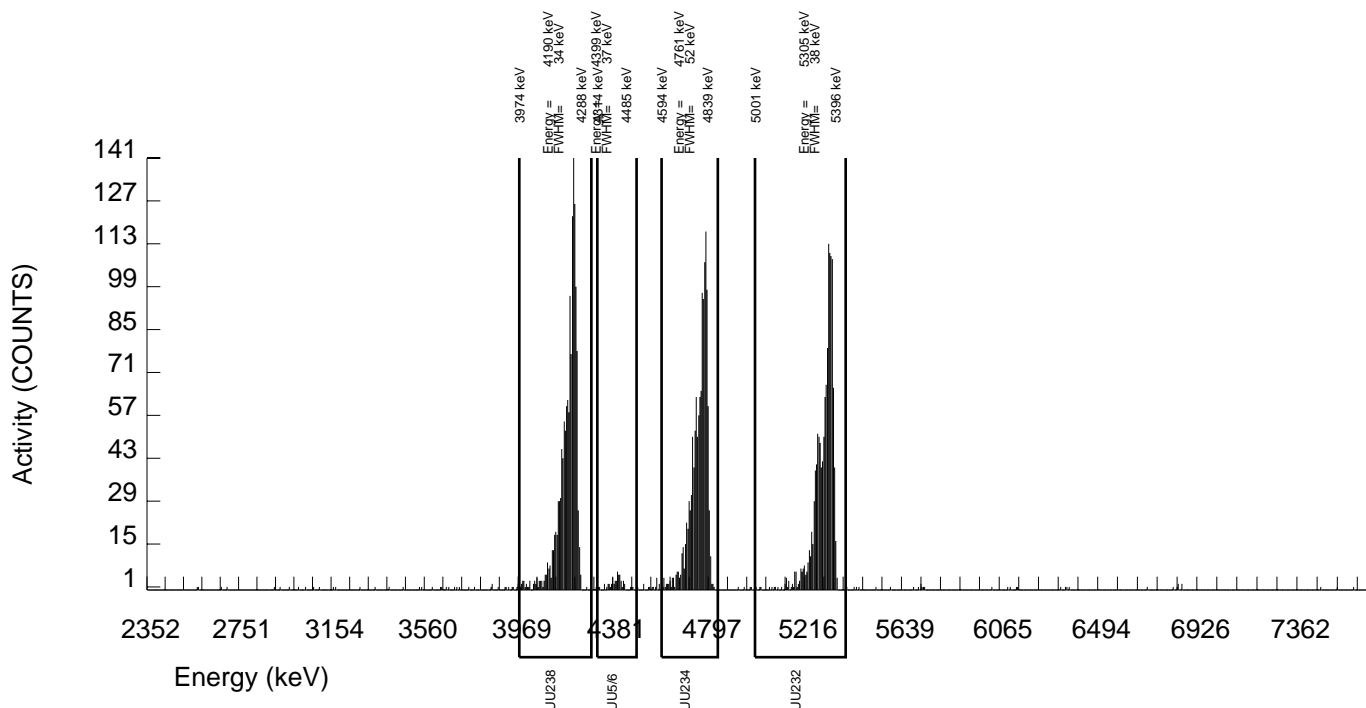
GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 909230 SAMPLE DATE : 5-OCT-2009 00:00:00.		SAMPLE ID : S1201939903_UU SAMPLE QTY: 0.506 G	
DETECTOR NUMBER :75550 AVERAGE %EFFICIENCY :24.6201 % YIELD : 100.644		COUNT DATE: 6-OCT-2009 23:54:50 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.978E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.978E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25485 dpm RESULTS : 5.28869 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B147.CNF;357 BKG DATE : 4-OCT-2009 EFF FILE : W147.CNF;104 CAL DATE : 16-SEP-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	1288.000	1281.688	5.000	2.2361	100.0000	4.60E+00	6.89E-01	4.82E-02	1.87E-02	2.53E-01
U232	5302.100	1313.000	1302.000	11.000	3.3166	100.0000	4.68E+00	7.00E-01	6.62E-02	2.77E-02	2.56E-01
U-235	4391.000	54.000	52.000	2.000	1.4142	80.90000	2.31E-01	7.26E-02	4.25E-02	1.46E-02	6.51E-02
U-238	4184.730	1412.000	1401.000	11.000	3.3166	100.0000	5.03E+00	7.50E-01	6.62E-02	2.77E-02	2.66E-01

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



# RADIUM 228

### Radiochemistry Batch Checklist, Rev 9

Batch# 902602      Product: RA-228      Date: 9.23.09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			N/A
Samples have been blank corrected (if required)			N/A
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.	✓		
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.			N/A
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.			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 stated.	✓		
QC data entered into QC database and batch is in REVW	✓		
Hit notification complete (if necessary)			N/A
Batch entered into Case Narrative.	✓		
Batch non-conformances completed, if applicable.			N/A
Batch non-conformances second reviewed and disposition verified to be completed.			N/A
Alliquot Correction completed if required.			N/A
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC

revised 8/1/08

Primary Review Performed By: Rhyan Brantley

Secondary Review Performed By: [Signature]

KERR  
9.30

# Radium-228 Que Sheet

Batch #: 902602 Analyst: MXS2 First Client Due Date: 09/30/2009 Internal Due Date: 09/19/2009 Ac-228 Ingrow: 9-16-09 / 1105  
 Spike Isotope: Radium-228 Spike Code: \_\_\_\_\_ Expiration Date: \_\_\_\_\_ Vol: \_\_\_\_\_  
 LCS Isotope: Radium-228 LCS Code: 0503-6 Expiration Date: 9-11-10 Vol: 0.1 mL  
 Tracer Isotope: Barium-133 Tracer Code: 0112-3 Expiration Date: 2-17-10 Vol: 0.1 mL  
 Prep Date: 9-15-09 Initials: H5 Pipet ID: 2164953 Balance ID: 17955160 Ac-228 Separation Date/Time: 9-18-09 / 16:40  
 Witness: MCB 9-15-09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Pos. #	Vol (mL)	Det #	Ba Yield (%)	Gamma Det. #
236077013-1	EB082709-SO1	SAMPLE		3 pCi/L	WATER	KERR003	27-AUG-09 10:00 AM	1	200	SA	72.15	
236077019-1	EB083109-SO1	SAMPLE		3 pCi/L	WATER	KERR003	31-AUG-09 10:00 AM	2	200	SC	84.83	
236077021-1	EB090109-SO1	SAMPLE		3 pCi/L	WATER	KERR003	01-SEP-09 12:50 PM	3	200	SD	82.09	
236238008-1	FB082809-SO	SAMPLE		3 pCi/L	WATER	KERR003	28-AUG-09 10:01 AM	4	200	SA	72.28	
236534011-1	EB090209-SO1	SAMPLE		3 pCi/L	WATER	KERR003	02-SEP-09 01:33 PM	5	200	SA	72.59	
236699016-1	EB090309-SO2	SAMPLE		3 pCi/L	WATER	KERR003	03-SEP-09 01:50 PM	6	200	7A	74.49	
236817014-1	EB090809-SO1	SAMPLE		3 pCi/L	WATER	KERR003	08-SEP-09 12:02 PM	7	200	7B	77.03	
236934020-1	Rinsate-1	SAMPLE		1 pCi/L	WATER	BRCM001	09-SEP-09 02:00 PM	8	700	7C	47.96	
1201923559-1	MB for batch 902602	MB		1 pCi/L	WATER	QC ACCOUNT	27-AUG-09 10:00 AM	9	700	7D	81.49	
1201923560-1	LCS for batch 902602	LCS		1 pCi/L	WATER	QC ACCOUNT	27-AUG-09 10:00 AM	10	700	8A	81.55	
1201923561-1	LCS for batch 902602	LCS		1 pCi/L	WATER	QC ACCOUNT	27-AUG-09 10:00 AM	11	700	8B	82.84	

09/22/09  
DAIRY ✓

Data Reviewed By: AD 9/22/09

N/A

Comments: \_\_\_\_\_

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

# Radium-228 Liquid

Filename : RA228.XLS  
 File type : Excel  
 Version # : 1.2.4

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

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

LCS S/N : 0503-B  
 LCS Exp Date : 9/11/2010  
 LCS Activity (dipm/ml) : 177.90  
 LCS Volume Added : 0.10

Procedure Code : GFC28RAL  
 Parmname : Radium-228  
 Required MDA : 1 pCi/L  
 Half-life of Ra-228 : 5.75 years  
 Half-life of Ac-228 : 6.13 hours  
 Batch counted on : PIC  
 BKG Count time : 500 min

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

Calibration Date : 7/2/2009  
 Calibration Due Date : 7/31/2010  
 Geometry: CeF on 25mm Filter

Pos.	Sample Characteristics			Sample			Tracer Calculations			Tracer Samp.			
	Sample ID	Sample Aliquot L	Sample Aliquot L	Sample Aliquot L	Sample StDev.	Sample Date/Time	Tracer Concentration (Ba-133 Ref.) (cpm)	Tracer Count	Tracer Uncertainty (cpm)	Tracer Concentration (Ba-133 Samp.) (cpm)	Tracer Count	Tracer Uncertainty (cpm)	Tracer Aliquot (mL)
1	236077013.1	0.2000	1.6007E-05	1.6007E-05	8/27/2009 10:00	311.7	3.47%	3.47%	224.9	4.17%	4.17%	0.1	0.000701
2	236077019.1	0.2000	1.6007E-05	1.6007E-05	8/31/2009 10:00	311.7	3.47%	3.47%	264.4	3.81%	3.81%	0.1	0.000701
3	236077021.1	0.2000	1.6007E-05	1.6007E-05	9/1/2009 12:50	311.7	3.47%	3.47%	251.5	3.92%	3.92%	0.1	0.000701
4	236238008.1	0.2000	1.6007E-05	1.6007E-05	8/28/2009 10:01	311.7	3.47%	3.47%	225.3	4.17%	4.17%	0.1	0.000701
5	236534011.1	0.2000	1.6007E-05	1.6007E-05	9/2/2009 13:33	311.7	3.47%	3.47%	235.6	4.06%	4.06%	0.1	0.000701
6	236689016.1	0.2000	1.6007E-05	1.6007E-05	9/3/2009 13:50	311.7	3.47%	3.47%	232.2	4.10%	4.10%	0.1	0.000701
7	236817014.1	0.2000	1.6007E-05	1.6007E-05	9/8/2009 12:02	311.7	3.47%	3.47%	240.1	4.02%	4.02%	0.1	0.000701
8	236934020.1	0.7000	2.0772E-05	2.0772E-05	9/9/2009 14:00	311.7	3.47%	3.47%	149.5	5.31%	5.31%	0.1	0.000701
9	1201923559.1	0.7000	2.0772E-05	2.0772E-05	9/15/2009 0:00	311.7	3.47%	3.47%	254.0	3.89%	3.89%	0.1	0.000701
10	1201923560.1	0.7000	2.0772E-05	2.0772E-05	9/15/2009 0:00	311.7	3.47%	3.47%	254.2	3.89%	3.89%	0.1	0.000701
11	1201923561.1	0.7000	2.0772E-05	2.0772E-05	9/15/2009 0:00	311.7	3.47%	3.47%	258.2	3.86%	3.86%	0.1	0.000701



Pos.	Counting		Gross Counts		Beta cpm	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Weekly Bkg Count Time (min.)	Separation Date/Time	Count Start Date/Time	Ra-228 Decay	Ac-228 Decay	Ac-228 Count Correction	Calculated Sample Recovery %	Sample Recovery Error %
	Detector ID	Time (min.)	Alpha	Beta											
1	5A	60	5	35	0.583	0.6258	0.00816	500	9/18/2009 16:40	9/18/2009 18:46	0.993	0.789	1.058	72.15%	2.89%
2	5C	60	14	85	1.417	0.6368	0.00816	500	9/18/2009 16:40	9/18/2009 18:46	0.994	0.789	1.058	84.83%	2.76%
3	5D	60	14	110	1.833	0.6237	0.00816	500	9/18/2009 16:40	9/18/2009 18:46	0.994	0.789	1.058	80.69%	2.80%
4	6A	60	9	112	1.867	0.6221	0.00816	500	9/18/2009 16:40	9/18/2009 18:46	0.993	0.789	1.058	72.28%	2.89%
5	6B	60	15	71	1.183	0.6163	0.00816	500	9/18/2009 16:40	9/18/2009 18:46	0.995	0.789	1.058	75.59%	2.85%
6	7A	60	8	45	0.750	0.6180	0.00816	500	9/18/2009 16:40	9/18/2009 18:46	0.995	0.788	1.058	74.49%	2.86%
7	7B	60	6	51	0.850	0.6280	0.00816	500	9/18/2009 16:40	9/18/2009 18:46	0.997	0.788	1.058	77.03%	2.83%
8	7C	60	7	45	0.750	0.6178	0.00816	500	9/18/2009 16:40	9/18/2009 18:46	0.997	0.788	1.058	47.96%	3.32%
9	7D	60	6	43	0.717	0.6257	0.00816	500	9/18/2009 16:40	9/18/2009 18:46	0.999	0.788	1.058	81.49%	2.79%
10	8A	60	17	453	7.550	0.6247	0.00816	500	9/18/2009 16:40	9/18/2009 18:46	0.999	0.788	1.058	81.55%	2.79%
11	8B	60	6	523	8.717	0.6332	0.00816	500	9/18/2009 16:40	9/18/2009 18:46	0.999	0.788	1.058	82.84%	2.78%

- 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.	Results			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
	Decision Level pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error pCi/L															
1	1.6114	0.1303	5.3879	0.0193	0.1042	1.3761	1.3765	SAMPLE										
2	1.7439	2.6370	0.3420	0.4687	0.1597	1.7613	1.8851	SAMPLE										
3	2.1087	3.7991	0.2900	0.6293	0.1816	2.1482	2.3566	SAMPLE										
4	2.4559	3.8342	0.3254	0.5667	0.1836	2.4350	2.6245	SAMPLE										
5	1.8772	2.3820	0.4011	0.3653	0.1461	1.8676	1.9641	SAMPLE										
6	1.2738	2.5197	0.3026	0.3820	0.1150	1.4874	1.6205	SAMPLE										
7	1.3649	2.3942	0.3231	0.3820	0.1229	1.5096	1.6286	SAMPLE										
8	0.4707	1.4436	0.2334	0.4940	0.1141	0.8533	0.7516	SAMPLE										
9	0.3353	0.5605	0.3423	0.3307	0.1128	0.3747	0.4010	MB									11.4479	100.4%
10	0.4757	11.4921	0.0602	6.7740	0.3569	1.1868	3.1613	LCS									11.4479	98.1%
11	0.7239	11.2269	0.0636	6.8127	0.3861	1.2471	3.1219	LCS							2.3%			

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine
236077013	5A	60	5	35	9/18/2009 18:46	9/18/2009 19:46	Protean
236077019	5C	60	14	85	9/18/2009 18:46	9/18/2009 19:46	Protean
236077021	5D	60	14	110	9/18/2009 18:46	9/18/2009 19:46	Protean
236238008	6A	60	9	112	9/18/2009 18:46	9/18/2009 19:46	Protean
236534011	6B	60	15	71	9/18/2009 18:46	9/18/2009 19:46	Protean
236699016	7A	60	8	45	9/18/2009 18:46	9/18/2009 19:46	Protean
236817014	7B	60	6	51	9/18/2009 18:46	9/18/2009 19:46	Protean
236934020	7C	60	7	45	9/18/2009 18:46	9/18/2009 19:46	Protean
1201923559	7D	60	6	43	9/18/2009 18:46	9/18/2009 19:46	Protean
1201923560	8A	60	17	453	9/18/2009 18:46	9/18/2009 19:46	Protean
1201923561	8B	60	6	523	9/18/2009 18:46	9/18/2009 19:46	Protean

ASSAY 16-Sep-09 16:45:49

Protocol id 9 228\_REC2  
Time limit 180  
Count limit 50000  
Isotope Ba-133  
Protocol date 9-Apr-07 10:02:22  
Run id. 61

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	87	1	180	1026	311.7	3.47		16:45:56
2	87	2	180	766	224.9	4.17	72.15	16:49:07
3	87	3	180	884	264.4	3.81	84.83	16:52:19
4	87	4	180	846	251.5	3.92	80.69	16:55:30
5	87	5	180	767	225.3	4.17	72.28	16:58:41
6	68	6	180	798	235.6	4.06	75.59	17:02:06
7	68	7	180	788	232.2	4.1	74.49	17:05:17
8	68	8	180	811	240.1	4.02	77.03	17:08:29
9	68	9	180	540	149.5	5.31	47.96	17:11:40
10	68	10	180	853	254	3.89	81.49	17:14:51
11	70	11	180	854	254.2	3.89	81.55	17:18:16
12	70	12	180	866	258.2	3.86	82.84	17:21:28

END OF ASSAY

### Radiochemistry Batch Checklist, Rev 9

Batch# 903231 Product: Ra-228 Date: 10/7/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			N/A
Samples have been blank corrected (if required)			N/A
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.	✓		
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%. Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.	✓		
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 stated.	✓		
QC data entered into QC database and batch is in REVW	✓		
Hit notification complete (if necessary)			N/A
Batch entered into Case Narrative.	✓		
Batch non-conformances completed, if applicable.	✓		N/A <sup>NR</sup> 743125
Batch non-conformances second reviewed and disposition verified to be completed.			N/A NR 745125
Aliquot Correction completed if required.			N/A
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC

revised 8/1/08

Primary Review Performed By: [Signature] 10/7/09

Secondary Review Performed By: [Signature]

ICERL  
10/7

# Radium-228 Que Sheet

09/30/2009

Batch #: 903231

Analyst: JXC5

First Client Due Dates: 10/07/2009

Internal Due Date: 09/26/2009

Spike Isotope: Radium-228

Spike Code: 0503-B

Expiration Date: 9-11-10

Vol: 0.1

Ac-228 Ingrow: 10-2-09 / 1420

LCS Isotope: Radium-228

LCS Code: 0503-B

Expiration Date: 9-11-10

Vol: 0.1

Tracer Isotope: Barium-133

Tracer Code: 0102-1

Expiration Date: 2-17-10

Vol: 0.1

Ac-228 Separation Date/Time: 10-5-09 0530

Prep Date: 9-30-09

Initials: *er*

Pipet ID: 2766453

Balance ID: 19360208

Witness: *WLB* 9-30-09

10/7/09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Pos. #	Vol (mL)	Ba Yield (%)	Gamma Det. #
236534001-1	SA118-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-SEP-09 06:45 AM	1	1.032	109.691	1A
236534002-1	SA118-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-SEP-09 07:05 AM	2	1.023	103.50	1B
236534003-1	SA118-25B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-SEP-09 07:30 AM	3	1.042	93.77	1C
236534004-1	SA118-40B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-SEP-09 08:18 AM	4	1.038	110.016	1D
236534005-1	SA118-51B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-SEP-09 08:49 AM	5	1.082	104.19	2A
236534006-1	SA105-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-SEP-09 11:46 AM	6	1.096	112.28	2B
236534007-1	SA105-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-SEP-09 12:10 PM	7	1.028	109.11	2D
236534008-1	SA105009-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-SEP-09 12:10 PM	8	1.063	115.34	3A
236534009-1	SA105-20B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-SEP-09 12:40 PM	9	1.012	101.48	3D
236534010-1	SA105-31B	SAMPLE		.5 pCi/g	SOIL	KERR003	02-SEP-09 01:05 PM	10	1.013	103.21	4A
236534012-1	RSAU7-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	03-SEP-09 06:42 AM	11	1.025	106.89	4C
236534013-1	RSAU7009-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	03-SEP-09 06:42 AM	12	1.001	105.36	4D
236534014-1	RSAU7-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	03-SEP-09 07:00 AM	13	1.002	103.72	5D
236534015-1	RSAU7-25B	SAMPLE		.5 pCi/g	SOIL	KERR003	03-SEP-09 07:30 AM	14	1.057	95.66	6A
236534016-1	RSAU7-40B	SAMPLE		.5 pCi/g	SOIL	KERR003	03-SEP-09 08:15 AM	15	1.049	93.44	6B
236534017-1	RSAU7-54B	SAMPLE		.5 pCi/g	SOIL	KERR003	03-SEP-09 08:59 AM	16	1.096	100.44	6D
236534018-1	SA54-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	08-SEP-09 08:24 AM	17	1.012	104.70	7A
236534019-1	SA54-20B	SAMPLE		.5 pCi/g	SOIL	KERR003	08-SEP-09 08:56 AM	18	1.126	106.16	7D
236534020-1	SA54-31B	SAMPLE		.5 pCi/g	SOIL	KERR003	08-SEP-09 09:23 AM	19	1.059	104.73	8A
1201925139-1	MB for batch 903231	MB		.5 pCi/g	SOIL	QC ACCOUNT	08-SEP-09 09:23 AM	20	1.126	80.10	8B
1201925140-1	SA54-31B(236534020DUP)	DUP		.5 pCi/g	SOIL	QC ACCOUNT	08-SEP-09 09:23 AM	21	1.023	81.98	8C
1201925141-1	SA54-31B(236534020MS)	MS		.5 pCi/g	SOIL	QC ACCOUNT	08-SEP-09 09:23 AM	22	0.101	96.32	9A
1201925142-1	LCS for batch 903231	LCS		.5 pCi/g	SOIL	QC ACCOUNT	08-SEP-09 09:23 AM	23	1.126	91.51	8B

10/7/09

*er*

Data Reviewed By: *er* 10/7/09

# Radium 228 Re-Elute / Reprecipitate

Batch # 903231  
 Ra 228 Spike Code 0503-B  
 LCS Code 0503-B  
 Ba-133 Tracer Code 0112-J

Prep Date 9-30-09 Initials JLC  
 Spike Vol (mls) 0.1 ml  
 LCS Vol (mls) 0.1 ml Ingrow Start Time: 10-5-09 230  
 Tracer Vol (mls) 0.1 ml Separation Time: 10-6-09 1515

Sample ID	Bkr #	g Vol (mls)	Det #	% Yield	Gamma Det #
236534001	1	1.032	<del>1A</del> 3A	96.62	
236534002	2	1.023	1B	87.97	
236534003	3	1.042	1C	89.57	
<del>236534004</del> 236534004 JLC 10-6-09	4	1.038	<del>1D</del> 3C	98.36	
236534005	5	1.082	2A 3D	97.00	
236534006	6	1.096	2B 4A	101.13	
236534007	7	1.028	2C 4C	98.22	
236534008	8	1.063	2D	102.91	
236534009	9	1.012	3A 4D	101.05	
236534010	10	1.013	3C	91.39	
236534012	11	1.025	3D	97.09	
236534013	12	1.001	4A 6A	103.35	
236534014	13	1.002	4C	89.24	
236534015	14	1.057	4B 1D	93.46	
236534016	15	1.049	5A	82.52	
236534017	16	1.096	5B 6B	97.38	
236534018	17	1.012	5C	91.68	
236534019	18	1.126	5D	93.97	
236534020	19	1.059	6A	96.88	
1201925139	20	1.126	6B	84.34	
1201925140	21	1.023	6D	74.42	
1201925141	22	6.101	7A	95.17	
1201925142	23	1.126	7B 4A	90.08	

JLC  
10/7/09

\* 10/7/09

### Radium-228 Solid

File name : RA228.XLS  
 File type : Excel  
 Version # : 1.2.5  
 Batch : 903231  
 Analyst : JXC5  
 Prep Date : 9/30/2009

Spike S/N : 0503-B  
 Spike Exp Date : 9/11/2010  
 Spike Activity (dpm/ml) : 177.02  
 Spike Volume Added : 0.10  
 LCS S/N : 0503-B  
 LCS Exp Date : 9/11/2010  
 LCS Activity (dpm/ml) : 177.02  
 LCS 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

Procedure Code : GFC28RAS  
 Parname : Radium-228  
 Required MDA : 0.5 pCi/G  
 Half-life of Re-228 : 5.75 years  
 Half-life of Ac-228 : 6.13 hours

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

Geometry: CeF on 25mm Filter

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

Pos.	Sample Characteristics			Sample Date/Time	Tracer Calculations			Tracer Ref. Count Uncertainty (cpm)	Tracer Concentration (cpm) (Ba-133 Ref.)	Tracer Samp. Count Uncertainty (cpm)	Tracer Aliquot (mL)	Tracer Aliquot StDev. (mL)
	Sample ID	Sample Aliquot G	Sample Aliquot StDev. G		Tracer Concentration (cpm) (Ba-133 Ref.)	Tracer Ref. Count Uncertainty (cpm)	Tracer Concentration (cpm) (Ba-133 Samp.)					
1	296534001.2	1.0320	3.3267E-03	9/2/2009 6:45	275.2	3.72%	265.9	3.80%	0.1	0.000701		
2	296534002.2	1.0230	3.3257E-03	9/2/2009 7:05	275.2	3.72%	242.1	4.00%	0.1	0.000701		
3	296534003.2	1.0420	3.3277E-03	9/2/2009 7:30	275.2	3.72%	246.5	3.96%	0.1	0.000701		
4	296534004.1	1.0380	3.3273E-03	9/2/2009 8:18	275.2	3.72%	270.7	3.76%	0.1	0.000701		
5	296534005.2	1.0820	3.3319E-03	9/2/2009 8:49	275.2	3.72%	267.1	3.79%	0.1	0.000701		
6	296534006.1	1.0960	3.3333E-03	9/2/2009 11:46	275.2	3.72%	278.3	3.70%	0.1	0.000701		
7	296534007.1	1.0280	3.3263E-03	9/2/2009 12:10	275.2	3.72%	270.3	3.76%	0.1	0.000701		
8	296534008.1	1.0630	3.3299E-03	9/2/2009 12:40	275.2	3.72%	283.2	3.66%	0.1	0.000701		
9	296534009.1	1.0120	3.3246E-03	9/2/2009 12:40	275.2	3.72%	278.1	3.70%	0.1	0.000701		
10	296534010.1	1.0130	3.3247E-03	9/2/2009 13:05	275.2	3.72%	251.5	3.92%	0.1	0.000701		
11	296534012.1	1.0250	3.3259E-03	9/3/2009 6:42	275.2	3.72%	267.2	3.78%	0.1	0.000701		
12	296534013.1	1.0010	3.3234E-03	9/3/2009 6:42	275.2	3.72%	284.5	3.65%	0.1	0.000701		
13	296534014.1	1.0020	3.3235E-03	9/3/2009 7:00	275.2	3.72%	245.6	3.97%	0.1	0.000701		
14	296534015.1	1.0570	3.3293E-03	9/3/2009 7:30	275.2	3.72%	257.2	3.87%	0.1	0.000701		
15	296534016.1	1.0490	3.3284E-03	9/3/2009 8:15	275.2	3.72%	227.1	4.15%	0.1	0.000701		
16	296534017.2	1.0960	3.3333E-03	9/3/2009 8:59	275.2	3.72%	268.0	3.78%	0.1	0.000701		
17	296534018.1	1.0120	3.3246E-03	9/8/2009 8:24	275.2	3.72%	252.3	3.91%	0.1	0.000701		
18	296534019.1	1.1260	3.3364E-03	9/8/2009 8:56	275.2	3.72%	258.6	3.86%	0.1	0.000701		
19	296534020.2	1.0590	3.3295E-03	9/8/2009 9:23	275.2	3.72%	232.1	3.79%	0.1	0.000701		
20	1201925139.2	1.1260	3.3364E-03	9/30/2009 0:00	275.2	3.72%	204.8	4.10%	0.1	0.000701		
21	1201925140.1	1.0230	3.3257E-03	9/8/2009 9:23	275.2	3.72%	261.9	4.41%	0.1	0.000701		
22	1201925141.1	0.1010	3.2296E-03	9/8/2009 9:23	275.2	3.72%	261.9	3.83%	0.1	0.000701		
23	1201925142.1	1.1260	3.3364E-03	9/30/2009 0:00	275.2	3.72%	247.9	3.95%	0.1	0.000701		



Count raw data		Counting				Gross Counts		Beta	Count Start	Separation	Ra-228	Ac-228	Ac-228	Calculated	Sample	Calibration Data			Detector	Weekly Bkg
Pos.	Detector ID	Time (min.)	Alpha	Beta	Beta cpm	Start Date/Time	Date/Time	Decay	Decay	Correction	Recovery %	Recovery Error %	Counted on	Calibration Date	Due Date	Efficiency (cpm/dpm)	Error (cpm/dpm)	cpm	Count Time (min.)	
1	3A	390	99	820	2.103	10/6/2009 20:38	10/6/2009 15:15	0.989	0.543	1.412	96.62%	2.84%	PIC	7/2/2009	7/31/2010	0.5682	0.00943	1.134	500	
2	1B	60	8	49	0.817	10/6/2009 17:52	10/6/2009 15:15	0.989	0.743	1.058	87.97%	2.91%	PIC	7/2/2009	7/31/2010	0.6282	0.00409	0.352	500	
3	1C	60	7	89	1.483	10/6/2009 17:52	10/6/2009 15:15	0.989	0.743	1.058	89.57%	2.89%	PIC	7/2/2009	7/31/2010	0.6176	0.00344	0.846	500	
4	3C	390	47	660	1.692	10/6/2009 20:38	10/6/2009 15:15	0.989	0.543	1.412	98.36%	2.82%	PIC	7/2/2009	7/31/2010	0.6164	0.00535	1.248	500	
5	3D	390	52	702	1.800	10/6/2009 20:38	10/6/2009 15:15	0.989	0.543	1.412	97.06%	2.83%	PIC	7/2/2009	7/31/2010	0.5994	0.00464	1.256	500	
6	4A	390	100	703	1.803	10/6/2009 20:39	10/6/2009 15:15	0.989	0.543	1.412	101.13%	2.80%	PIC	7/2/2009	7/31/2010	0.6208	0.00744	1.108	500	
7	4C	390	52	994	2.549	10/6/2009 20:39	10/6/2009 15:15	0.989	0.543	1.412	98.22%	2.82%	PIC	7/2/2009	7/31/2010	0.6052	0.00426	1.752	500	
8	2D	60	16	84	1.400	10/6/2009 17:52	10/6/2009 15:15	0.989	0.743	1.058	102.91%	2.79%	PIC	7/2/2009	7/31/2010	0.6119	0.00479	0.342	500	
9	4D	390	100	723	1.854	10/6/2009 20:39	10/6/2009 15:15	0.989	0.543	1.412	101.05%	2.80%	PIC	7/2/2009	7/31/2010	0.5873	0.00816	1.264	500	
10	3C	60	13	130	2.167	10/6/2009 17:52	10/6/2009 15:15	0.989	0.743	1.058	91.39%	2.88%	PIC	7/2/2009	7/31/2010	0.6164	0.00535	1.248	500	
11	3D	60	13	181	3.017	10/6/2009 17:52	10/6/2009 15:15	0.989	0.543	1.412	97.09%	2.83%	PIC	7/2/2009	7/31/2010	0.5994	0.00464	1.256	500	
12	6A	390	50	708	1.815	10/6/2009 20:39	10/6/2009 15:15	0.989	0.543	1.412	103.38%	2.79%	PIC	7/2/2009	7/31/2010	0.6221	0.00816	1.340	500	
13	4C	60	12	169	2.817	10/6/2009 17:52	10/6/2009 15:15	0.989	0.743	1.058	89.24%	2.90%	PIC	7/2/2009	7/31/2010	0.6043	0.00511	0.494	500	
14	1D	60	9	66	1.100	10/6/2009 19:12	10/6/2009 15:15	0.989	0.640	1.058	82.52%	2.86%	PIC	7/2/2009	7/31/2010	0.6258	0.00816	0.506	500	
15	5A	60	12	99	1.650	10/6/2009 17:52	10/6/2009 15:15	0.989	0.543	1.412	97.38%	2.83%	PIC	7/2/2009	7/31/2010	0.6163	0.00816	0.828	500	
16	6B	390	116	555	1.423	10/6/2009 20:39	10/6/2009 15:15	0.989	0.743	1.058	91.68%	2.87%	PIC	7/2/2009	7/31/2010	0.6368	0.00816	0.946	500	
17	5C	60	12	105	1.750	10/6/2009 17:52	10/6/2009 15:15	0.991	0.743	1.058	93.97%	2.86%	PIC	7/2/2009	7/31/2010	0.6221	0.00816	1.350	500	
18	5D	60	7	123	2.050	10/6/2009 17:52	10/6/2009 15:15	0.991	0.742	1.058	96.88%	2.83%	PIC	7/2/2009	7/31/2010	0.6120	0.00816	0.828	500	
19	6A	60	15	137	2.283	10/6/2009 17:53	10/6/2009 15:15	0.991	0.742	1.058	84.34%	2.94%	PIC	7/2/2009	7/31/2010	0.6120	0.00816	1.340	500	
20	6B	60	22	65	1.083	10/6/2009 20:38	10/6/2009 15:15	0.998	0.742	1.058	74.42%	3.05%	PIC	7/2/2009	7/31/2010	0.6120	0.00816	0.828	500	
21	6D	390	71	675	1.731	10/6/2009 20:38	10/6/2009 15:15	0.991	0.742	1.058	95.17%	2.85%	PIC	7/2/2009	7/31/2010	0.6180	0.00816	1.066	500	
22	7A	60	32	424	7.067	10/6/2009 17:53	10/6/2009 15:15	0.991	0.742	1.058	90.08%	2.89%	PIC	7/2/2009	7/31/2010	0.6208	0.00744	0.382	500	
23	4A	30	13	208	6.933	10/6/2009 19:12	10/6/2009 15:15	0.998	0.640	1.029	90.08%	2.89%	PIC	7/2/2009	7/31/2010	0.6208	0.00744	1.108	500	

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

Results Pos.	Decision Level pCi/G	Critical Level pCi/G	Required MDA pCi/G	MDA pCi/G	Sample Act. Conc. pCi/G	Sample Act. Error pCi/G	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA Counting Uncertainty pCi/G	2 SIGMA Total Prop. Uncertainty pCi/G	Sample QC	Sample Type	RPD	RER	Nominal pCi/G	Recovery
1	0.3504	0.2474	0.5	0.5109	2.0248	0.0952	0.9686	0.0875	0.3586	0.3779		SAMPLE				
2	0.2166	0.1529	0.5	0.3631	0.5328	0.2592	0.4647	0.1196	0.2689	0.2706		SAMPLE				
3	0.3293	0.2325	0.5	0.5212	0.7167	0.2567	0.6373	0.1625	0.3582	0.3606		SAMPLE				
4	0.3310	0.2337	0.5	0.4818	0.8362	0.1883	0.4443	0.0827	0.3050	0.3086		SAMPLE				
5	0.3820	0.2944	0.5	0.4833	1.0239	0.1579	0.5440	0.0644	0.3114	0.3168		SAMPLE				
6	0.2853	0.2014	0.5	0.4161	1.1961	0.1226	0.6946	0.0827	0.2791	0.2874		SAMPLE				
7	0.4040	0.2853	0.5	0.5854	1.5450	0.1290	0.7967	0.1002	0.3808	0.3907		SAMPLE				
8	0.1803	0.1273	0.5	0.3031	1.0248	0.1492	1.0580	0.1550	0.2942	0.2987		SAMPLE				
9	0.3492	0.2485	0.5	0.5082	1.1638	0.1476	0.5898	0.0853	0.3300	0.3367		SAMPLE				
10	0.4041	0.2853	0.5	0.6275	1.0440	0.2159	0.9187	0.1965	0.4376	0.4418		SAMPLE				
11	0.3877	0.2738	0.5	0.6019	1.9136	0.1337	1.7607	0.2298	0.4894	0.5013		SAMPLE				
12	0.3354	0.2368	0.5	0.4878	0.8751	0.1825	0.4754	0.0656	0.3090	0.3131		SAMPLE				
13	0.5049	0.3565	0.5	0.7729	1.2758	0.2130	1.0647	0.2246	0.5275	0.5326		SAMPLE				
14	0.2922	0.1993	0.5	0.4616	0.7645	0.2312	0.6060	0.1390	0.3437	0.3465		SAMPLE				
15	0.2712	0.1914	0.5	0.4427	1.3699	0.1508	1.1440	0.1689	0.3963	0.4049		SAMPLE				
16	0.2581	0.1822	0.5	0.3783	1.0722	0.1259	0.5951	0.0728	0.2572	0.2646		SAMPLE				
17	0.3394	0.2396	0.5	0.5340	0.8813	0.2212	0.8040	0.1762	0.3786	0.3822		SAMPLE				
18	0.3630	0.2563	0.5	0.5616	0.8869	0.2759	0.7000	0.1920	0.3693	0.3715		SAMPLE				
19	0.3741	0.2641	0.5	0.5789	0.9575	0.2160	0.9433	0.2018	0.4015	0.4054		SAMPLE				
20	0.3183	0.2247	0.5	0.5044	0.2806	0.5507	0.2553	0.1404	0.3024	0.3029		SAMPLE				
21	0.4122	0.2910	0.5	0.6016	1.6662	0.1260	0.6648	0.0811	0.4030	0.4164		MB				
22	2.1459	1.5150	0.5	3.5754	72.9076	0.0675	6.8847	0.3443	7.3601	9.6420	236534020.2	DUP	55.1%		79.5148	90.5%
23	0.5314	0.3752	0.5	0.6657	6.7150	0.0882	5.8253	0.4830	1.0913	1.1605	236534020.2	MS			7.0816	94.8%
												LCS				

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine
236534001	3A	390	99	820	10/6/2009 20:38	10/7/2009 3:08	PIC
236534002	1B	60	8	49	10/6/2009 17:52	10/6/2009 18:52	PIC
236534003	1C	60	7	89	10/6/2009 17:52	10/6/2009 18:52	PIC
236534004	3C	390	47	660	10/6/2009 20:38	10/7/2009 3:08	PIC
236534005	3D	390	52	702	10/6/2009 20:38	10/7/2009 3:08	PIC
236534006	4A	390	100	703	10/6/2009 20:39	10/7/2009 3:09	PIC
236534007	4C	390	52	994	10/6/2009 20:39	10/7/2009 3:09	PIC
236534008	2D	60	16	84	10/6/2009 17:52	10/6/2009 18:52	PIC
236534009	4D	390	100	723	10/6/2009 20:39	10/7/2009 3:09	PIC
236534010	3C	60	13	130	10/6/2009 17:52	10/6/2009 18:52	PIC
236534012	3D	60	13	181	10/6/2009 17:52	10/6/2009 18:52	PIC
236534013	6A	390	50	708	10/6/2009 20:39	10/7/2009 3:09	PIC
236534014	4C	60	12	169	10/6/2009 17:52	10/6/2009 18:52	PIC
236534015	1D	60	9	66	10/6/2009 19:12	10/6/2009 20:12	PIC
236534016	5A	60	12	99	10/6/2009 17:52	10/6/2009 18:52	PIC
236534017	6B	390	116	555	10/6/2009 20:39	10/7/2009 3:09	PIC
236534018	5C	60	12	105	10/6/2009 17:52	10/6/2009 18:52	PIC
236534019	5D	60	7	123	10/6/2009 17:52	10/6/2009 18:52	PIC
236534020	6A	60	15	137	10/6/2009 17:53	10/6/2009 18:53	PIC
1201925139	6B	60	22	65	10/6/2009 17:53	10/6/2009 18:53	PIC
1201925140	6D	390	71	675	10/6/2009 20:38	10/7/2009 3:08	PIC
1201925141	7A	60	32	424	10/6/2009 17:53	10/6/2009 18:53	PIC
1201925142	4A	30	13	208	10/6/2009 19:12	10/6/2009 19:42	PIC

ASSAY 6-Oct-09 12:39:11

Protocol id 8 228\_REC  
Time limit 180  
Count limit 50000  
Isotope Ba-133  
Protocol date 9-Apr-07 10:03:07  
Run id. 30

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	97	1	180	917	275.2	3.72		12:39:18
2	97	2	180	889	265.9	3.8	96.62	12:42:30
3	97	3	180	818	242.1	4	87.97	12:45:41
4	97	4	180	831	246.5	3.96	89.57	12:48:53
5	97	5	180	903	270.7	3.76	98.36	12:52:04
6	51	6	180	892	267.1	3.79	97.06	12:55:29
7	51	7	180	926	278.3	3.7	101.13	12:58:40
8	51	8	180	902	270.3	3.76	98.22	13:01:51
9	51	9	180	941	283.2	3.66	102.91	13:05:03
10	51	10	180	926	278.1	3.7	101.05	13:08:14
11	91	11	180	846	251.5	3.92	91.39	13:11:44
12	91	12	180	893	267.2	3.78	97.09	13:14:56
13	91	13	180	945	284.5	3.65	103.38	13:18:07
14	91	14	180	828	245.6	3.97	89.24	13:21:18
15	91	15	180	863	257.2	3.87	93.46	13:24:30
16	60	16	180	772	227.1	4.15	82.52	13:27:48
17	60	17	180	895	268	3.78	97.38	13:31:00
18	60	18	180	848	252.3	3.91	91.68	13:34:11
19	60	19	180	867	258.6	3.86	93.97	13:37:23
20	60	20	180	891	266.6	3.79	96.88	13:40:34
21	75	21	180	787	232.1	4.1	84.34	13:43:59
22	75	22	180	705	204.8	4.41	74.42	13:47:10
23	75	23	180	877	261.9	3.83	95.17	13:50:21
24	75	24	180	835	247.9	3.95	90.08	13:53:33

END OF ASSAY

# RADIUM 226

**Radiochemistry Batch Checklist, Rev 9**

Batch# 900913 Product: RA-226 Date: 9/15/09

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.	✓	✓	NCR 733592
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%. Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.			NA
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Sample was correctly preserved if required.			NA
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms.	✓		
All line outs initialed and dated.	✓		
No transcription errors are apparent			
Aux data is correct.			NA
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly 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 733592
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCR 733592
Aliquot Correction completed if required.			NA
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC

revised 8/1/08

Primary Review Performed By:

Shirley Pace

Secondary Review Performed By:

Aleneh 9/16/09

KERR 9/21/09

Fax 9/16/09

# Radium-226 Que Sheet

15-SEP-09

FAX Tare 9/14/09

GEL Laboratories, Radiochemistry Division

Batch #: 900913      Analyst: KSD1      First Client Due Date: 09/21/2009      Internal Due Date: 09/10/2009  
 Spike Isotope: Radium-226      Spike Code: 0638-H      Expiration Date: 7/7/10      Vol: 0.1      End Initial/Degas Date/Time: 9/10/09 12:10  
 LCS Isotope: Radium-226      LCS Code: 0638-H      Expiration Date: 7/7/10      Vol: 0.1      End LN De-em Date: 9/15/09  
 Bkg Count Time: 36 (Min)      Sample Count Time: 30 (Min)      Start Count Date: 9/15/09      \*\*COUNT TIME: 15 min  
 Pipet ID: 1429303      Balance ID: 36040216      Initials: KPD      Witness: KKG 9/10/09 recopied AG 9/15/09

Sample I	Client Description	Type	Hazard Code	Matrix	Min CRDL	Client	Position (Label)	Aliquot (mL or g)	End LN De-em Time	Start Count Time	Cell #	Det #	Bkg counts	Total Counts
235816001-1	CD-4	SAMPLE		GROUND WA1.3	.3 pCi/L	KERR003	1	800	0450	9/15/09 07:09	108	1	4	286
235816003-1	EB-5	SAMPLE		GROUND WA1.3	.3 pCi/L	KERR003	2	800	0450	9/16/09 07:09	203	2	8	92
235816005-1	ED-6	SAMPLE		GROUND WA1.3	.3 pCi/L	KERR003	3	800	0450	9/16/09 08:30	308	3	8	63
235816007-1	KMO-1	SAMPLE		GROUND WA1.3	.3 pCi/L	KERR003	4	800	0450	11/10/09 07:09	410	4	8	25
235816013-1	EQUIPMENT BLANK	SAMPLE		GROUND WA1.3	.3 pCi/L	KERR003	5	800	0450	9/15/09 07:09	502	5	1	68
236238008-1	FB082809-SO	SAMPLE		WATER	1 pCi/L	KERR003	6	500	0450	830	611	6	8	20
236435001-1	RM-01-AUGUST 2009 comp	SAMPLE		WATER	.3 pCi/L	KERR003	7	800	0520	830	112	1	8	6
236534011-1	EB090209-SO1	SAMPLE		WATER	1 pCi/L	KERR003	8	500	0520	830	211	2	5	7
1201919502-1	MB for batch 900913	MB		WATER	.3 pCi/L	QC ACCOUNT	9	800	0520	910	312	3	4	22
1201919503-1	KMO-1(235816007DUP)	DUP		GROUND WA1.3	.3 pCi/L	QC ACCOUNT	10	800	0520	255 910	403	4	8	61
1201919504-1	KMO-1(235816007MS)	MS		GROUND WA1.3	.3 pCi/L	QC ACCOUNT	11	100	0520	830	510	5	0	37
1201919505-1	LCS for batch 900913	LCS		WATER	.3 pCi/L	QC ACCOUNT	12	800	0520	255 910	604	6	4	37

\* JP 9/15/09

Comments:

Data Reviewed By: Amber Pace 9/15/09

# Radium-226 Liquid

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

Spike S/N : 0638-H  
 Spike Exp Date : 7/17/2010  
 Spike Activity (dpm/ml): 268.23  
 Spike Volume Added: 0.10

Batch : 900913  
 Analyst : KSD1  
 Prep Date : 9/10/2009  
 Ra-226 Abundance : 1  
 Ra-226 Method Uncertainty : 0.0918

Procedure Code : LUC26RAL  
 Parmname : Radium-226  
 Required MDA : 0.3 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

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

Pos.	Sample Characteristics		Sample Aliquot StDev. L	Sample Date/Time	Count Raw Data			Weekly Background			Detector Efficiency (cpm/dpm)	
	Sample ID	Sample Aliquot L			Cell Number	Counting Time (min.)	Gross Counts	Gross CPM	Counts	CPM		Count Time (min.)
1	235816001.1	0.8000	2.0861E-05	8/19/2009 11:30	108	30	286	9.533	4	0.133	30	1.9460
2	235816003.1	0.8000	2.0861E-05	8/19/2009 14:10	203	30	92	3.067	8	0.267	30	2.2540
3	235816005.1	0.8000	2.0861E-05	8/19/2009 13:55	308	30	68	2.267	8	0.267	30	1.9500
4	235816007.1	0.8000	2.0861E-05	8/18/2009 11:10	410	30	47	1.567	8	0.267	30	1.8860
5	235816013.1	0.8000	2.0861E-05	8/20/2009 14:40	502	30	68	2.267	1	0.033	30	1.8780
6	236238008.1	0.5000	2.0256E-05	8/28/2009 10:01	611	30	83	2.767	8	0.267	30	2.3070
7	236435001.1	0.8000	2.0861E-05	9/1/2009 9:00	112	30	20	0.667	8	0.267	30	1.9310
8	236534011.1	0.5000	2.0256E-05	9/2/2009 13:33	211	30	6	0.200	5	0.167	30	2.1710
9	1201919502.1	0.8000	2.0861E-05	9/10/2009 0:00	312	30	7	0.233	4	0.133	30	1.9440
10	1201919503.1	0.8000	2.0861E-05	8/18/2009 11:10	403	30	24	0.800	8	0.267	30	1.4630
11	1201919504.1	0.1000	1.1370E-05	8/18/2009 11:10	510	30	661	22.033	0	0.000	30	1.4580
12	1201919505.1	0.8000	2.0861E-05	9/10/2009 0:00	604	15	377	25.133	6	0.200	30	2.1330



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	
0.05303	8/31/2009	8/31/2010	9/10/2009 12:10	9/15/2009 4:50	9/15/2009 7:50	0.573	0.978	1.002	1.000
0.07722	12/19/2008	12/19/2009	9/10/2009 12:10	9/15/2009 4:50	9/15/2009 7:50	0.573	0.978	1.002	1.000
0.06082	2/4/2009	2/4/2010	9/10/2009 12:10	9/15/2009 4:50	9/15/2009 8:30	0.573	0.973	1.002	1.000
0.12371	3/2/2009	3/2/2010	9/10/2009 12:10	9/15/2009 4:50	9/15/2009 11:40	0.573	0.950	1.002	1.000
0.14377	3/25/2009	3/25/2010	9/10/2009 12:10	9/15/2009 4:50	9/15/2009 7:50	0.573	0.978	1.002	1.000
0.06605	8/4/2009	8/4/2010	9/10/2009 12:10	9/15/2009 4:50	9/15/2009 8:30	0.573	0.973	1.002	1.000
0.05303	8/31/2009	8/31/2010	9/10/2009 12:10	9/15/2009 5:20	9/15/2009 8:30	0.575	0.976	1.002	1.000
0.07722	12/19/2008	12/19/2009	9/10/2009 12:10	9/15/2009 5:20	9/15/2009 8:30	0.575	0.976	1.002	1.000
0.06082	2/4/2009	2/4/2010	9/10/2009 12:10	9/15/2009 5:20	9/15/2009 9:10	0.571	0.971	1.002	1.000
0.12371	3/2/2009	3/2/2010	9/10/2009 12:10	9/15/2009 5:20	9/15/2009 12:55	0.575	0.944	1.002	1.000
0.14377	3/25/2009	3/25/2010	9/10/2009 12:10	9/15/2009 5:20	9/15/2009 8:30	0.575	0.976	1.002	1.000
0.06605	8/4/2009	8/4/2010	9/10/2009 12:10	9/15/2009 5:20	9/15/2009 12:55	0.575	0.944	1.001	1.000

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

Pos.	Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error pCi/L	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA		Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
									Counting Uncertainty pCi/L	Total Prop. Uncertainty pCi/L						
1	0.1132	0.0800	0.3	0.2115	4.8458	0.0804	9.4000	0.5676	0.5735	1.1588		SAMPLE				
2	0.1383	0.0976	0.3	0.2397	1.2462	0.1419	2.8000	0.3333	0.2908	0.4128		SAMPLE				
3	0.1606	0.1134	0.3	0.2785	1.0341	0.1575	2.0000	0.2906	0.2945	0.3695		SAMPLE				
4	0.1701	0.1201	0.3	0.2949	0.7118	0.2269	1.3000	0.2472	0.2653	0.3414		SAMPLE				
5	0.0587	0.0414	0.3	0.1363	1.1930	0.1898	2.2333	0.2769	0.2899	0.4931		SAMPLE				
6	0.2172	0.1534	1	0.3767	1.7481	0.1433	2.5000	0.3180	0.4358	0.5832		SAMPLE				
7	0.1611	0.1138	0.3	0.2794	0.2075	0.4441	0.4000	0.1764	0.1793	0.1844		SAMPLE				
8	0.1813	0.1280	1	0.3298	0.0246	3.3175	0.0333	0.1106	0.1600	0.1601		SAMPLE				
9	0.1138	0.0803	0.3	0.2124	0.0518	1.1072	0.1000	0.1106	0.1122	0.1128		MB				
10	0.2199	0.1553	0.3	0.3813	0.3775	0.3746	0.5333	0.1886	0.2616	0.2854	235816007.1	DUP	61.4%	1.4724	120.8272	99.6%
11	0.000E+00	0.000E+00	0.3	0.5496	121.0936	0.1489	22.0333	0.8570	9.2316	41.5245	235816007.1	MS			15.1030	80.2%
12	0.1601	0.1131	0.3	0.3233	12.1168	0.0841	24.9333	1.2970	1.2354	2.9563		LCS				

### Radiochemistry Batch Checklist, Rev 9

Batch# 905684 Product: Pa-224 Date: 10/11/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			N/A
Samples have been blank corrected (if required)			N/A
If activity less 10° MDA/ MDC, error is 150% or less of sample activity. If greater 10° MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.	✓		
If duplicate activities are less 5° MDA/ MDC, then RPD is 100% or less. If greater 5° MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	✓		
Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%.	✓		
Or meets the client's contract acceptance criteria.	✓		
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.			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.	✓		N/A NCR 742186
Batch non-conformances second reviewed and disposition verified to be completed.	✓		N/A NCR 742186
Aliquot Correction completed if required.			N/A
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC

revised 8/1/08

Primary Review Performed By: Diana Marietta

Secondary Review Performed By: L. Luch 10/11/09

# Radium-226 Que Sheet

29-SEP-09

GEL Laboratories, Radiochemistry Division

Batch #: 905684    Analyst: KSDI    First Client Due Date: 10/07/2009    Internal Due Date: 09/26/2009  
 Spike Isotope: Radium-226    Spike Code: 91038/14    Expiration Date: 7/11/10    Vol: 0.1  
 LCS Isotope: Radium-226    LCS Code: 002814    Expiration Date: 7/11/10    Vol: 0.1  
 Bkg Count Time: (Min) Sample Count Time: 30    Start Count Date: 10/5/09  
 Pipet ID: 912009    Balance ID: 5010272    Initials: KV    Witness: 09-30-09

Sample I	Client Description	Type	Hazard Code	Matrix	Min CRDL	Client	Position (Label)	Aliquot (mL or $\mu$ g)	End LN De-em Time	Start Count Time	Cell #	Det #	Bkg counts	Total Counts
236534001-1	SA118-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	1	1.054	1730	1535	607	6	8	77
236534002-1	SA118-10B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	2	1.021	1730	1535	703	7	4	60
236534003-1	SA118-25B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	3	1.028	1300	1605	108	1	4	101
236534004-1	SA118-40B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	4	1.020	1300	1605	203	2	8	83
236534005-1	SA118-51B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	5	1.005	1300	1605	305	3	8	136
236534006-1	SA105-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	6	1.009	1300	1605	404	4	8	51
236534007-1	SA105-10B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	7	1.003	1300	1605	512	5	7	80
236534008-1	SA105009-10B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	8	1.012	1300	1605	604	6	8	70
236534009-1	SA105-20B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	9	1.003	1300	1605	707	7	8	123
236534010-1	SA105-31B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	10	1.012	1325	1640	111	1	6	164
236534012-1	RSAU7-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	11	1.011	1325	1640	204	2	8	40
236534013-1	RSAU7009-0.5B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	12	1.019	1325	1640	311	3	7	46
236534014-1	RSAU7-10B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	13	1.080	1325	1640	402	4	8	55
236534015-1	RSAU7-25B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	14	1.029	1325	1640	502	5	8	102
236534016-1	RSAU7-40B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	15	1.029	1325	1640	611	6	8	117
236534017-1	RSAU7-54B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	16	1.003	1325	1640	712	7	8	94
236534018-1	SA54-10B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	17	1.007	1325	1710	101	1	8	57
236534019-1	SA54-20B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	18	1.008	1325	1710	207	2	8	101
236534020-1	SA54-31B	SAMPLE	SOIL	SOIL	.5 pCi/g	KERR003	19	1.005	1325	1710	310	3	8	88
1201931119-1	MB for batch 905684	MB	QC	QC ACCOUNT	.5 pCi/g	QC ACCOUNT	20	1.054	1325	1710	412	4	8	23
1201931120-1	SA54-31B(236534020DUP)	DUP	QC	QC ACCOUNT	.5 pCi/g	QC ACCOUNT	21	1.004	1325	1710	503	5	4	127
1201931121-1	SA54-31B(236534020MS)	MS	QC	QC ACCOUNT	.5 pCi/g	QC ACCOUNT	22	1.008	1325	1710	603	6	8	101
1201931122-1	LCS for batch 905684	LCS	QC	QC ACCOUNT	.5 pCi/g	QC ACCOUNT	23	1.054	1325	1710	708	7	8	152

\*88 130  
\*23  
\*127 164  
\*101  
\*151 652  
\*22/06/09

Comments:

Data Reviewed By: *Noni Newton*

# Radium-226 Solid

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): 268.22  
 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 : 905684  
 Analyst : KSD1  
 Prep Date : 9/30/2009  
 Ra-226 Abundance : 1  
 Ra-226 Method Uncertainty : 0.1153

Procedure Code : LUC26FRAS  
 Parmname : Radium-226  
 Required MDA : 0.5 pCi/G  
 Half-life of Ra-226 : 1600 years  
 Half-life of Rn-222: 3.823 days  
 Batch counted on : LUCAS CELL DETECTOR  
 BKG Count time : 30 min

LCS S/N : 0638-H  
 LCS Exp Date : 7/17/2010  
 LCS Activity (dpm/ml): 268.22  
 LCS Volume Added: 0.10

Pos.	Sample ID	Sample Aliquot G	Sample Aliquot SiDev. G	Sample Date/Time	Count Raw Data			Weekly Background			Detector Efficiency (cpm/dpm)	
					Cell Number	Counting Time (min.)	Gross Counts	Gross CPM	Counts	CPM		Count Time (min.)
1	236534001.1	1.0540	3.3290E-03	9/2/2009 6:45	607	30	77	2.567	8	0.267	30	2.4500
2	236534002.1	1.0210	3.3255E-03	9/2/2009 7:05	703	30	60	2.000	4	0.133	30	2.2210
3	236534003.1	1.0280	3.3263E-03	9/2/2009 7:30	108	30	101	3.367	4	0.133	30	1.9460
4	236534004.1	1.0200	3.3254E-03	9/2/2009 8:18	203	30	83	2.767	8	0.267	30	2.2540
5	236534005.1	1.0050	3.3239E-03	9/2/2009 8:49	305	30	136	4.533	8	0.267	30	2.0570
6	236534006.1	1.0090	3.3243E-03	9/2/2009 11:46	404	30	51	1.700	8	0.267	30	1.9310
7	236534007.1	1.0030	3.3237E-03	9/2/2009 12:10	512	30	80	2.667	7	0.233	30	1.9560
8	236534008.1	1.0120	3.3246E-03	9/2/2009 12:10	604	30	70	2.333	8	0.267	30	2.1330
9	236534009.1	1.0030	3.3237E-03	9/2/2009 12:40	707	30	123	4.100	8	0.267	30	2.2750
10	236534010.1	1.0120	3.3246E-03	9/2/2009 13:05	111	30	164	5.467	6	0.200	30	2.0240
11	236534012.1	1.0110	3.3245E-03	9/3/2009 6:42	204	30	40	1.333	8	0.267	30	2.1930
12	236534013.1	1.0190	3.3253E-03	9/3/2009 6:42	311	30	46	1.533	7	0.233	30	2.1140
13	236534014.1	1.0800	3.3317E-03	9/3/2009 7:00	402	30	55	1.833	8	0.267	30	2.1180
14	236534015.1	1.0090	3.3243E-03	9/3/2009 7:30	502	30	102	3.400	8	0.267	30	1.8780
15	236534016.1	1.0030	3.3237E-03	9/3/2009 8:15	611	30	117	3.900	8	0.267	30	2.3070
16	236534017.1	1.0000	3.3233E-03	9/3/2009 8:59	712	30	94	3.133	8	0.267	30	2.0690
17	236534018.1	1.0070	3.3241E-03	9/8/2009 8:24	101	30	57	1.900	8	0.267	30	1.9560
18	236534019.1	1.0080	3.3242E-03	9/8/2009 8:56	207	30	101	3.367	8	0.267	30	2.1460
19	236534020.1	1.0050	3.3239E-03	9/8/2009 9:23	301	30	130	4.333	8	0.267	30	2.0210
20	1201931119.1	1.0540	3.3290E-03	9/30/2009 0:00	412	30	23	0.767	8	0.267	30	1.9670
21	1201931120.1	1.0040	3.3238E-03	9/8/2009 9:23	503	30	164	5.467	4	0.133	30	1.6010
22	1201931121.1	1.0080	3.3242E-03	9/8/2009 9:23	605	30	1011	33.700	8	0.267	30	2.1490
23	1201931122.1	1.0540	3.3290E-03	9/30/2009 0:00	708	30	652	21.733	8	0.267	30	2.1880

Detector Efficiency Error (cpm/dpm)	Cell Calibration Date	Cell Calibration Due Date	De-Gas Date/Time	Rn-222 Ingrow		Count Start Date/Time	Rn-222 Corrections		Ra-226 Decay
				End Date/Time	De-Gas Ingrowth		Ingrowth to Count	During Count	
0.06605	8/4/2009	8/4/2010	10/1/2009 12:15	10/5/2009 12:30	10/5/2009 15:35	0.517	0.977	1.002	1.000
0.06519	9/30/2009	9/30/2010	10/1/2009 12:15	10/5/2009 12:30	10/5/2009 15:35	0.517	0.977	1.002	1.000
0.05303	8/31/2009	8/31/2010	10/1/2009 12:15	10/5/2009 13:00	10/5/2009 16:05	0.519	0.977	1.002	1.000
0.07722	12/19/2008	12/19/2009	10/1/2009 12:15	10/5/2009 13:00	10/5/2009 16:05	0.519	0.977	1.002	1.000
0.06082	2/4/2009	2/4/2010	10/1/2009 12:15	10/5/2009 13:00	10/5/2009 16:05	0.519	0.977	1.002	1.000
0.12371	3/2/2009	3/2/2010	10/1/2009 12:15	10/5/2009 13:00	10/5/2009 16:05	0.519	0.977	1.002	1.000
0.14377	3/25/2009	3/25/2010	10/1/2009 12:15	10/5/2009 13:00	10/5/2009 16:05	0.519	0.977	1.002	1.000
0.06605	8/4/2009	8/4/2010	10/1/2009 12:15	10/5/2009 13:00	10/5/2009 16:05	0.519	0.977	1.002	1.000
0.06519	9/30/2009	9/30/2010	10/1/2009 12:15	10/5/2009 13:00	10/5/2009 16:05	0.519	0.977	1.002	1.000
0.05303	8/31/2009	8/31/2010	10/1/2009 12:15	10/5/2009 13:25	10/5/2009 16:40	0.520	0.976	1.002	1.000
0.07722	12/19/2008	12/19/2009	10/1/2009 12:15	10/5/2009 13:25	10/5/2009 16:40	0.520	0.976	1.002	1.000
0.06082	2/4/2009	2/4/2010	10/1/2009 12:15	10/5/2009 13:25	10/5/2009 16:40	0.520	0.976	1.002	1.000
0.12371	3/2/2009	3/2/2010	10/1/2009 12:15	10/5/2009 13:25	10/5/2009 16:40	0.520	0.976	1.002	1.000
0.14377	3/25/2009	3/25/2010	10/1/2009 12:15	10/5/2009 13:25	10/5/2009 16:40	0.520	0.976	1.002	1.000
0.06605	8/4/2009	8/4/2010	10/1/2009 12:15	10/5/2009 13:25	10/5/2009 16:40	0.520	0.976	1.002	1.000
0.06519	9/30/2009	9/30/2010	10/1/2009 12:15	10/5/2009 13:25	10/5/2009 16:40	0.520	0.976	1.002	1.000
0.05303	8/31/2009	8/31/2010	10/1/2009 12:15	10/5/2009 13:55	10/5/2009 17:10	0.522	0.971	1.002	1.000
0.07722	12/19/2008	12/19/2009	10/1/2009 12:15	10/5/2009 13:55	10/5/2009 17:10	0.522	0.971	1.002	1.000
0.06082	2/4/2009	2/4/2010	10/1/2009 12:15	10/5/2009 13:55	10/5/2009 17:10	0.522	0.971	1.002	1.000
0.12371	3/2/2009	3/2/2010	10/1/2009 12:15	10/5/2009 13:55	10/5/2009 17:10	0.522	0.971	1.002	1.000
0.14377	3/25/2009	3/25/2010	10/1/2009 12:15	10/5/2009 13:55	10/5/2009 17:10	0.522	0.971	1.002	1.000
0.06605	8/4/2009	8/4/2010	10/1/2009 12:15	10/5/2009 13:55	10/5/2009 17:10	0.522	0.971	1.002	1.000
0.06519	9/30/2009	9/30/2010	10/1/2009 12:15	10/5/2009 13:55	10/5/2009 17:10	0.522	0.971	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		Critical Level	Required MDA	MDA	Sample Act. Conc.	Sample Act. Error	Net Count Rate	Net Count Rate Error	2 SIGMA Counting Uncertainty		Sample QC	Sample Type	RPD	RER	Nominal pCi/G	Recovery
	pCi/G	pCi/G								pCi/G	pCi/G						
1	0.1072	0.0757	0.0757	0.5	0.1858	0.7933	0.1491	2.3000	0.3073	0.2078	0.2930		SAMPLE				
2	0.0863	0.0609	0.0609	0.5	0.1611	0.7932	0.1571	1.8667	0.2667	0.2053	0.2800		SAMPLE				
3	0.0975	0.0688	0.0688	0.5	0.1820	1.4345	0.1182	3.2333	0.3416	0.2970	0.4644		SAMPLE				
4	0.1199	0.0847	0.0847	0.5	0.2079	0.9651	0.1488	2.5000	0.3180	0.2406	0.3561		SAMPLE				
5	0.1334	0.0942	0.0942	0.5	0.2313	1.8318	0.1118	4.2667	0.4000	0.3366	0.5766		SAMPLE				
6	0.1415	0.0999	0.0999	0.5	0.2454	0.6529	0.2173	1.4333	0.2560	0.2286	0.3148		SAMPLE				
7	0.1315	0.0928	0.0928	0.5	0.2309	1.1008	0.1924	2.4333	0.3109	0.2757	0.4839		SAMPLE				
8	0.1277	0.0902	0.0902	0.5	0.2215	0.8497	0.1571	2.0667	0.2944	0.2372	0.3245		SAMPLE				
9	0.1208	0.0853	0.0853	0.5	0.2095	1.4910	0.1190	3.8333	0.3815	0.2909	0.4843		SAMPLE				
10	0.1164	0.0822	0.0822	0.5	0.2076	2.2783	0.0981	5.2667	0.4346	0.3685	0.6761		SAMPLE				
11	0.1242	0.0877	0.0877	0.5	0.2153	0.4263	0.2299	1.0667	0.2309	0.1809	0.2149		SAMPLE				
12	0.1195	0.0844	0.0844	0.5	0.2099	0.5347	0.1964	1.3000	0.2427	0.1956	0.2386		SAMPLE				
13	0.1203	0.0850	0.0850	0.5	0.2087	0.6069	0.2094	1.5667	0.2646	0.2009	0.2843		SAMPLE				
14	0.1453	0.1026	0.1026	0.5	0.2519	1.4652	0.1820	3.1333	0.3496	0.3204	0.6187		SAMPLE				
15	0.1190	0.0840	0.0840	0.5	0.2063	1.3913	0.1220	3.6333	0.3727	0.2797	0.4578		SAMPLE				
16	0.1330	0.0939	0.0939	0.5	0.2307	1.2277	0.1344	2.8667	0.3367	0.2826	0.4260		SAMPLE				
17	0.1393	0.0983	0.0983	0.5	0.2415	0.7322	0.1729	1.6333	0.2687	0.2361	0.2982		SAMPLE				
18	0.1274	0.0899	0.0899	0.5	0.2209	1.2710	0.1363	3.1000	0.3480	0.2797	0.4447		SAMPLE				
19	0.1392	0.0983	0.0983	0.5	0.2414	1.8222	0.1139	4.0667	0.3916	0.3439	0.5789		SAMPLE				
20	0.1323	0.0934	0.0934	0.5	0.2294	0.2129	0.3913	0.5000	0.1856	0.1549	0.1702		MB				
21	0.1244	0.0878	0.0878	0.5	0.2322	3.0196	0.1651	5.3333	0.4320	0.4795	1.1916	236534020.1	DUP	49.5%	1.7716	11.9865	98.5%
22	0.1266	0.0894	0.0894	0.5	0.2196	13.6282	0.0734	33.4333	1.0641	0.8501	3.6508	236534020.1	MS			11.4631	75.1%
23	0.1246	0.0880	0.0880	0.5	0.2161	8.6110	0.0765	21.4667	0.8563	0.6733	2.3353		LCS				

# METHOD CALIBRATION DATA



# 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?	✓		
	✓		
	✓		
	✓		
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 Brown

Date: 8/31/09

Reviewed By: Angela G

Date: 8/31/09

Effective Date: 8/31/09

# Ra-226 Cell Constants

standard ID: 0299-H  
 Volume added (mL): 0.1  
 Standard Reference Activity (DPM/mL): 2483.21

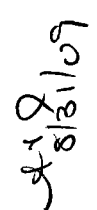
Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	Bkg Counts cpm	total counts	count time min	Known activity dpm	t1 (days)		t2 (days)		t3 (days)		Decay from Std Ref Date to count
										end-degas to flush	to flush	end-flush to count	to count	Std Ref Date to count	Std Ref Date to count	
101	1.846	cal 7	8/27/2009 16:35	8/27/2009 13:30	8/21/2009 11:30	4479	15	298.60	248.32	6.08333	0.12847	3544	0.9958			
101	1.960	cal 9	8/24/2009 14:20	8/24/2009 9:30	8/18/2009 13:40	4581	15	305.40	248.32	5.82639	0.20139	3541	0.9958			
101	2.060	cal 1	8/21/2009 15:00	8/21/2009 9:30	8/18/2009 13:40	2945	15	196.33	248.32	2.82639	0.22917	3538	0.9958			
102	1.862	cal 5	8/27/2009 15:50	8/27/2009 12:40	8/21/2009 10:50	4510	15	300.67	248.32	6.07639	0.13194	3544	0.9958			
102	1.850	cal 10	8/24/2009 14:45	8/24/2009 9:55	8/18/2009 13:40	4330	15	288.67	248.32	5.84375	0.20139	3541	0.9958			
102	1.853	cal 2	8/21/2009 15:20	8/21/2009 9:50	8/18/2009 13:40	2659	15	177.27	248.32	2.84028	0.22917	3538	0.9958			

104	2.073	Average	1.972	cal 1	8/27/2009 14:25	8/27/2009 9:35	8/24/2009 11:00	3070	15	204.67	248.32	2.94097	0.20139	3544	0.9958
104	1.855	Stdev	0.110	cal 11	8/24/2009 15:15	8/24/2009 10:15	8/18/2009 13:40	4343	15	289.53	248.32	5.85764	0.20833	3541	0.9958
104	1.987	cal 3	8/21/2009 15:50	8/21/2009 10:10	8/18/2009 13:40	2858	15	190.53	248.32	2.85417	0.23611	3538	0.9958		

106	1.985	Average	1.836	cal 2	8/27/2009 14:55	8/27/2009 10:00	8/24/2009 11:20	2940	15	196.00	248.32	2.94444	0.20466	3544	0.9958
106	1.738	Stdev	0.131	cal 12	8/24/2009 15:35	8/24/2009 10:40	8/18/2009 13:40	4078	15	271.87	248.32	5.87500	0.20466	3541	0.9958
106	1.786	cal 4	8/21/2009 16:30	8/21/2009 10:30	8/18/2009 13:40	2572	15	171.47	248.32	2.86806	0.25000	3538	0.9958		
107	2.025	Average	1.981	cal 8	8/27/2009 16:55	8/27/2009 13:50	8/21/2009 11:55	4910	15	327.33	248.32	6.07986	0.12847	3544	0.9958
107	2.054	Stdev	0.102	cal 1	8/24/2009 15:55	8/24/2009 11:00	8/21/2009 10:50	3090	15	206.00	248.32	3.00694	0.20466	3541	0.9958
107	1.864	cal 5	8/21/2009 16:45	8/21/2009 10:50	8/18/2009 13:40	2696	15	179.73	248.32	2.88194	0.24653	3538	0.9958		
108	1.906	Average	1.946	cal 6	8/27/2009 16:05	8/27/2009 13:05	8/21/2009 11:15	4623	15	308.20	248.32	6.07639	0.12500	3544	0.9958
108	1.975	Stdev	0.036	cal 2	8/24/2009 16:25	8/24/2009 11:20	8/21/2009 10:50	2978	15	198.53	248.32	3.02083	0.21181	3541	0.9958
108	1.957	cal 6	8/21/2009 17:00	8/21/2009 11:15	8/18/2009 13:40	2846	15	189.73	248.32	2.89931	0.23958	3538	0.9958		

111	2.162	Average	2.024	cal 3	8/27/2009 15:12	8/27/2009 10:20	8/24/2009 12:25	3177	15	211.80	248.32	2.91319	0.20278	3544	0.9958
111	2.051	Stdev	0.153	cal 3	8/24/2009 17:00	8/24/2009 12:25	8/21/2009 10:50	3139	15	209.27	248.32	3.06597	0.19097	3541	0.9958
111	1.859	cal 7	8/21/2009 17:15	8/21/2009 11:30	8/18/2009 13:40	2712	15	180.80	248.32	2.90972	0.23958	3538	0.9958		
112	1.962	Average	1.931	cal 4	8/27/2009 15:30	8/27/2009 10:50	8/24/2009 12:40	2895	15	193.00	248.32	2.92361	0.19444	3544	0.9958
112	1.967	Stdev	0.059	cal 4	8/24/2009 17:15	8/24/2009 12:40	8/21/2009 10:50	3019	15	201.27	248.32	3.07639	0.19097	3541	0.9958
112	1.863	cal 8	8/21/2009 17:35	8/21/2009 11:55	8/18/2009 13:40	2731	15	182.07	248.32	2.92708	0.23611	3538	0.9958		

EffErr 0.053028 <- Put in Machines.xls (Lucas Cell Tab)

  
 8/31/09

VW 8/31/09

# Ra-226 Calibration Sheet

Standard ID: 0119-H  
 Volume Added (mL): 0.1  
 Expiration Date: 8/1/10

$\frac{219}{8/13/09} = 900$   
 $\frac{219}{8/13/09}$   
 \* count time 15 min

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 1	500	8/18/09 1340	8/21/09 0930	1500 1410 8/21/09 1230	101	1	<del>3142</del> 2945
Cal 2	500	8/18/09 1340	8/21/09 0950	1500 1425 8/21/09 1305	102	1	<del>4050</del> 2659
Cal 3	500	8/18/09 1340	8/21/09 1010	1550 8/21/09 1445	104	1	<del>2182</del> 2858
Cal 4	500	8/18/09 1340	8/21/09 1030	8/21/09 1630	106	1	2572
Cal 5	500	8/18/09 1340	8/21/09 1050	8/21/09 1645	107	1	2696
Cal 6	500	8/18/09 1340	8/21/09 1115	8/21/09 1700	108	1	2846
Cal 7	500	8/18/09 1340	8/21/09 1130	8/21/09 1715	111	1	2712
Cal 8	500	8/18/09 1340	8/21/09 1155	8/21/09 1735	112	1	2731
Cal 9							
Cal 10							
Cal 11							
Cal 12							

WSP/BSM

10/8/2010

8/13/09

Voltage - 0.9

### Ra-226 Calibration Sheet

Standard ID: Q226-A  
Volume Added (mL): 0.1  
Expiration Date: 07/11/09

Count time = 15 mins

4581

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 9	500	8/18/09 1340	8/24/09 1120	8/24/09 1435 <sup>1420</sup>	101	1	<del>8434</del> 4581
Cal 10	500	8/18/09 1340	8/24/09 1155	8/24/09 1445 <sup>1430</sup>	102	1	<del>8441</del> 4330
Cal 11	500	8/18/09 1340	8/24/09 1015	8/24/09 1455 <sup>1515</sup>	104	1	4343
Cal 12	500	8/18/09 1340	8/24/09 1040	8/24/09 1535	106	1	4078
Cal 1	500	8/24/09 1050	8/24/09 1100	8/24/09 1555	107	1	3090
Cal 2	500	8/24/09 1050	8/24/09 1120	8/24/09 1625	108	1	2978
Cal 3	500	8/24/09 1050	8/24/09 1225	8/24/09 1700	111	1	3139
Cal 4	500	8/24/09 1050	8/24/09 1240	8/24/09 1715	112	1	3019
<del>Cal 5</del>							
<del>Cal 6</del>							
<del>Cal 7</del>							
<del>Cal 8</del>							
<del>Cal 13</del>							
<del>Cal 14</del>							
W. S. D. M.							

8/31/09

140 8/28/09

Voltage - 0.9

### Ra-226 Calibration Sheet

Standard ID: D444-H  
Volume Added (mL): 1.1  
Expiration Date: 8/1/10

\* 15 min counts

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 1	500	8/24/09 1100	8/27/09 0435	8/27/09 1425	104	1	3070
Cal 2	500	8/24/09 1120	8/27/09 1000	8/27/09 1455	106	1	2940
Cal 3	500	8/24/09 1225	8/27/09 1020	8/27/09 1512	111	1	3177
Cal 4	500	8/24/09 1240	8/27/09 1050	8/27/09 1530	112	1	2895
Cal 5	500	8/24/09 1050	8/27/09 1240	8/27/09 1550	102	1	4510
Cal 6	500	8/24/09 1115	8/27/09 1305	8/27/09 1605	108	1	41623
Cal 7	500	8/24/09 1130	8/27/09 1330	8/27/09 1635	101	1	4479
Cal 8	500	8/24/09 1155	8/27/09 1350	8/27/09 1655	107	1	4910

10/24/10

8/23/09

14/8/2010

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-RAD-A-008 Isotope RA-226  
 Date Standards Prepared 4/5/05 Cocktail Type Used NA  
 Standard ID 0799-H Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or ml) 2483.233 Type of Scintillation Vial NA  
 Reference Date 12/15/99 Pipette ID Used 1429303  
 Expiration Date 8/1/10 Balance ID Used 38080204  
 Residue/Carrier Agent D-IMHCl Quenching Agent NA

	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				
	<del>100502105</del>				

Prepared By: Kelli Dorego Date 8/31/09  
 Reviewed By: Angela J Gh Date 8/31/09

Rev 1 RLM 9/10/97

ee'd

8-21-00

Nycomed Amersham plc  
Amersham Laboratories

0299



CALIBRATION  
No. 0140



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

ISSUED FOR: AEA Technology plc  
Isotrak  
Amersham Laboratories  
White Lion Road  
Amersham  
Buckinghamshire  
HP7 9LL

Description Principal radionuclide: Radium-226

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

Measurement Reference time: 1200 GMT on 15 December 1999

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

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

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

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

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

Date of issue 17/1

17<sup>th</sup> December 1999

VO 8131105

Nycomed



# GEL 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

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

### 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	01/26/2009	01/26/2010
08/07/2009	Mary Aders	5.0767	250	0299-H	2483.2133 dpm/mL	08/07/2009	08/07/2010

GEL Laboratories LLC  
Version 1.0 9/18/2000

*WJ 8/26/05*

## Voltage Curve Ludlum #1

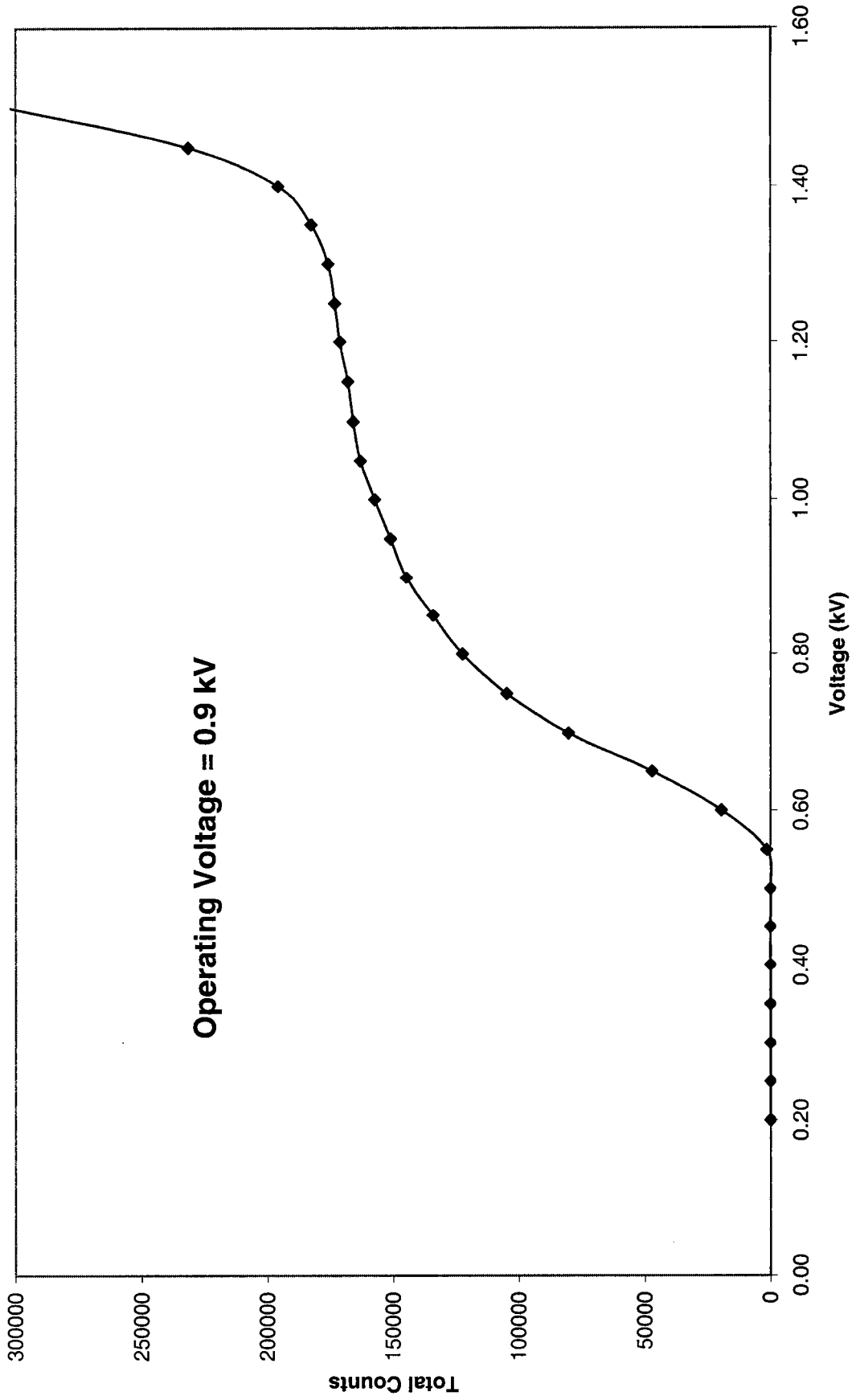
Voltage (kV)	Count Time (min)	Counts	Date/Time
0.20	1.00	0	8/21/09 13:20
0.25	1.00	0	8/21/09 13:21
0.30	1.00	0	8/21/09 13:22
0.35	1.00	0	8/21/09 13:23
0.40	1.00	0	8/21/09 13:24
0.45	1.00	0	8/21/09 13:25
0.50	1.00	0	8/21/09 13:26
0.55	1.00	1534	8/21/09 13:27
0.60	1.00	19637	8/21/09 13:28
0.65	1.00	47206	8/21/09 13:29
0.70	1.00	80410	8/21/09 13:30
0.75	1.00	104945	8/21/09 13:31
0.80	1.00	122514	8/21/09 13:32
0.85	1.00	134160	8/21/09 13:33
0.90	1.00	144753	8/21/09 13:34
0.95	1.00	151057	8/21/09 13:35
1.00	1.00	157429	8/21/09 13:36
1.05	1.00	163110	8/21/09 13:37
1.10	1.00	166034	8/21/09 13:38
1.15	1.00	168121	8/21/09 13:39
1.20	1.00	171347	8/21/09 13:40
1.25	1.00	173388	8/21/09 13:41
1.30	1.00	175958	8/21/09 13:42
1.35	1.00	182719	8/21/09 13:43
1.40	1.00	195871	8/21/09 13:44
1.45	1.00	231584	8/21/09 13:45
1.50	1.00	303021	8/21/09 13:46
1.55	1.00	387838	8/21/09 13:47

Detector set to operate at 0.90 kV

*Handwritten:* 19  
8/31/09

### Ludlum Detector Voltage Curve

—◆— Voltage Curve Ludlum #1



8/9  
8/31/09

# Control Limits for Lucas Cell Counter #1

Analyst: KSD1  
Date: 8/31/2009

Count #	Detector #1
1	138383
2	138269
3	141307
4	140521
5	132825
6	135924
7	139231
8	138298
9	135342
10	138056
11	138123
12	139159
13	138410
14	138251
15	138438
16	138080
17	137814
18	137961
19	137248
20	137477

Average = 137955.9  
Std. Dev. = 1775.5

+3 S. D. = 143282.4266  
+2 S. D. = 141506.901  
Mean = 137955.9  
-2 S. D. = 134404.799  
-3 S. D. = 132629.2734

**Control Limits**      **8/31/2009**      \* Operating Voltage changed to 0.9 kV  
**Detector #1**  
**Upper Limit**      **143282**  
**Lower Limit**      **132629**

*Handwritten signature*  
8/31/09

	<b>Eff</b>	<b>Cal Date</b>
101	1.956	8/31/2009
102	1.855	8/31/2009
104	1.972	8/31/2009
106	1.836	8/31/2009
107	1.981	8/31/2009
108	1.946	8/31/2009
111	2.024	8/31/2009
112	1.931	8/31/2009

<b>Lucas</b>	<b>Ra-226</b>	
Oldest Cal	01/23/2008	
<b>Detector</b>	<b>Eff Error</b>	<b>Cal Date</b>
1	0.0530	8/31/2009
2	0.0772	12/19/2008
3	0.0608	1/23/2008
4	0.1237	3/2/2009
5	0.1438	3/25/2009
6	0.0661	8/4/2009
7	0.0855	11/21/2008

# Ra-226 WATER

Batch : LCSVER  
 Date : 8/20/2008  
 Analyst : KSD1  
 Bkg Count Time: 30 min  
 Procedure Code : LUC26RAL  
 Parmname : Radium-226  
 MDA : 1 pCi/L  
 Instrument Used : LUCAS CELL DETECTOR

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME
Ver 2	0.500	30	689	101	1.956	0.267	0.5907	25.3156	1.9236	8/31/2009 14:35
Ver 6	0.500	30	697	102	1.855	0.133	0.4721	27.1986	2.0367	8/31/2009 15:05
Ver 2	0.500	30	656	104	1.972	0.267	0.6303	25.7021	2.0032	8/28/2009 14:00
Ver 4	0.500	30	638	106	1.836	0.267	0.6304	24.9919	1.9762	8/31/2009 15:40
Ver 7	0.500	30	629	107	1.981	0.267	0.6257	24.4533	1.9479	8/28/2009 17:50
Ver 5	0.500	30	693	108	1.946	0.267	0.5959	25.6861	1.9459	8/31/2009 16:15
Ver 3	0.500	30	672	111	2.024	0.267	0.6129	25.6096	1.9713	8/28/2009 14:35
Ver 4	0.500	30	631	112	1.931	0.267	0.6411	25.1365	1.9990	8/28/2009 15:10

*JLQ*  
8/31/09

Sample ID	Sample Dup	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
Ver 2		1	8/31/2009 14:35	LCS	0638-H	24.17	pCi/L	105%
Ver 3		1	8/31/2009 15:05	LCS	0638-H	24.17	pCi/L	113%
Ver 2		1	8/28/2009 14:00	LCS	0638-H	24.17	pCi/L	106%
Ver 4		1	8/31/2009 15:40	LCS	0638-H	24.17	pCi/L	103%
Ver 7		1	8/28/2009 17:50	LCS	0638-H	24.17	pCi/L	101%
Ver 8		1	8/31/2009 16:15	LCS	0638-H	24.17	pCi/L	106%
Ver 3		1	8/28/2009 14:35	LCS	0638-H	24.17	pCi/L	106%
Ver 4		1	8/28/2009 15:10	LCS	0638-H	24.17	pCi/L	104%

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM	Ingrowth constant
8/28/2009 10:20	8/31/2009 11:10	72.83	3.42	0.4230	0.9745	1.0019	22.7000	0.4130
8/28/2009 10:40	8/31/2009 11:30	72.83	3.58	0.4230	0.9733	1.0019	23.1000	0.4125
8/25/2009 16:00	8/28/2009 10:20	66.33	3.67	0.3940	0.9727	1.0019	21.6000	0.3839
8/28/2009 11:00	8/31/2009 11:55	72.92	3.75	0.4234	0.9721	1.0019	21.0000	0.4123
8/25/2009 16:00	8/28/2009 12:00	68.00	5.83	0.4015	0.9569	1.0019	20.7000	0.3850
8/28/2009 11:20	8/31/2009 12:15	72.92	4.00	0.4234	0.9703	1.0019	22.8333	0.4115
8/25/2009 16:00	8/28/2009 10:40	66.67	3.92	0.3955	0.9709	1.0019	22.1333	0.3847
8/25/2009 16:00	8/28/2009 11:00	67.00	4.17	0.3970	0.9690	1.0019	20.7667	0.3854

Handwritten signature and date: 8/31/09



062584 CAP: 11/110

Ra-226 Verification Sheet

\* 1 .9 voltage

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	8/25/09 1600	8/28/09 0555	8/28/09 1310	101	1	8	525
VEN 2	500	8/28/09 1600	8/28/09 1020	8/28/09 1400	104	1	8	654
VEN 3	500	8/28/09 1600	8/28/09 1040	8/28/09 1435	111	1	8	672
VEN 4	500	8/28/09 1600	8/28/09 1100	8/28/09 1510	112	1	8	631
VEN 5	500	8/28/09 1600	8/28/09 1120	8/28/09 1510	106	1	8	678
VEN 6	500	8/28/09 1600	8/28/09 1140	8/28/09 1610	107	1	4	654
VEN 7	500	8/28/09 1600	8/28/09 1200	8/28/09 1750 1750 1750 1750 1750	107	1	8	629
VEN 8	500	8/28/09 1600	8/28/09 1305	8/28/09 1820	108	1	8	736
VEN 1	500	8/28/09 1020	8/31/09 1110	8/31/09 1435	101	1	8	689
VEN 3	500	8/28/09 1040	8/31/09 1130	8/31/09 1505	102	1	4	697
VEN 4	500	8/28/09 1050	8/31/09 1155	8/31/09 1540	106	1	8	638
VEN 5	500	8/28/09 1120	8/31/09 1215	8/31/09 1615	108	1	8	693

VEN 2  
VEN 6

W 8/30/09  
W 8/31/09

8/31/09

W 8/31/09

W 8/31/09

### General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number <u>UL-DAP-A-1056</u>	Isotope <u>U-236</u>
Date Standards Prepared <u>7/23/08</u>	Cocktail Type Used <u>NA</u>
Standard ID <u>OC38-H</u>	Matrix of Vial/Planchett <u>NA</u>
Amount Used (g or mL) <u>0.1</u>	<u>NA</u>
Standard Activity (DPM/g or mL) <del>408</del> <u>268.8845</u> <u>20812109</u>	Type of Scintillation Vial <u>NA</u>
Reference Date <u>1/23/04</u>	Pipette ID Used <u>1424303</u>
Expiration Date <u>7/17/10</u>	Balance ID Used <u>38080104</u>
Residue/Carrier Agent <u>NA</u>	Quenching Agent <u>NA</u>

	Standard Number	Quenching Vol (uL)/ Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	Ver 1				
2	Ver 2				
3	Ver 3				
4	Ver 4				
5	Ver 5				
6	Ver 6				
7	Ver 7				
8	Ver 8				

Prepared By: Kelli S Deane Date: 8/31/08  
Reviewed By: Angela D. Ghera Date: 8/31/09

**ANALYTICS**

1380 Seaboard Industrial Blvd.  
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677  
Fax (404) 352-2837

0638

**CERTIFICATE OF CALIBRATION**  
**Standard Radionuclide Source**

67519-278

Ra-226 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 participation in a Measurements Assurance Program as described in USNRC Reg. Guide 4.15, Revision 1, February 1979.

ISOTOPE:	Ra-226
ACTIVITY (dps):	2.353 E4
HALF-LIFE:	1.600 E3 years
CALIBRATION DATE:	January 23, 2004 12:00 EST
RELATIVE EXPANDED UNCERTAINTY (k=2):	3.3%

Impurities:  $\gamma$ -impurities (other than decay products) <0.1%

5.01065 grams 0.1M HCl solution with 50  $\mu$ g/g Ba carrier.

P O NUMBER 3231RD, Item 5

SOURCE PREPARED BY:

M. D. Currie  
M. D. Currie, Radiochemist

Q A APPROVED:

ACUWA 1/26/04

W 8731105

## Standard Traceability Log Rad

**WARNING! Training must be completed!!**

**Alphalims will be locked out if training is not completed within 1 week of assignment Contact Quality if additional time is needed to complete training**

Source Material Info	
Parent Code:	0638
Prepared By:	Amanda Fehr
Carrier Conc:	0.1M HCl
Reference Date:	01/23/2004
Ampoule Mass (g):	5.01065 g
Uncertainty:	+/- 3.3 %
LogBook No:	RC-S-037-037

A Solution Material Info	
Isotope:	Radium-226
Prepared By:	Amanda Fehr
Prep Date:	01/16/2006
Verification Date:	04/09/2009
Expiration Date:	04/09/2010
Primary Code:	0638-A
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

$(\text{Mass of parent(g)} * (\text{Parent Activity (dps)} * (\text{conversion dpm to dps}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)})$
$(\text{Mass of parent(g)} * (\text{Parent Activity (dps)} * (\text{conversion dpm to dps}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)})$
$(4.8398 \text{ g}) * (23530 \text{ dps}) * (\text{conversion dpm to dps}) * (60 \text{ dpm/dps}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13636.6133 \text{ dpm/mL}$
$(4.8398 \text{ g}) * (23530 \text{ dps}) * (60 \text{ dpm/dps}) / (1.0266 \text{ g/mL}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13282.9676 \text{ dpm/g}$

W 8/28/09

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	04/09/2009	04/09/2010
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	03/02/2009	03/02/2010
07/23/2008	Daniel Roy	5.0607	250	0638-H	268.8845 dpm/ml	07/17/2009	07/17/2010

GEL Laboratories LLC  
Version 1.0 9/18/2000

10/13/09

## Verification for Ra-226 Standard 0638-H

D. Roy 7/23/2008	Isotope	Value	Uncertainty
	0638-H	11.852	1.1079
	0638-H	12.092	1.1141
	0638-H	12.372	1.1216
<b>Mean Value (Counting) =</b>	12.106	100.13	<b>Pass</b>
<b>Stdev =</b>	0.260353631		<b>Rule 3 (Pass/Fail)</b>
<b>Target =</b>	12.09		
<b>Lower Limit =</b>	11.5848594		
<b>Upper Limit =</b>	12.62627393		
<b>Rule 1 Pass/Fail</b>	<b>Pass</b>		
<b>Two sigma =</b>	0.520707263		
<b>10 % of Mean =</b>	1.210556667		
<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 Ra-226 source 0638-H by transferring portions of the degassed standard into tared glass liquid scintillation vials. 10 mL of DI Water and 10 mL of mineral oil were added to each vial and the vials were shaken. A Blank vial was prepared in a similar fashion using 10 mL of DI Water and 10 mL of mineral oil. The standard verification vials and Background source were dark adapted for two hours and counted on LSC RED using source standard verification. 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. Roy 8/14/08*  
*Ver. L. Jones 8/14/08*

*VAD 8/20/08*

# 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 second 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	7656	30	255.20	243.02	4.04167	0.21675	3213	0.9962
208	2.239	Average	9/15/2008 22:15	9/15/2008 12:15	9/12/2008 13:20	0.267	6289	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	2.94798	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

NU 12/19/08

NU 12/19/08

NU 12/19/08



Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degs Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Ca114	500	9/25/08 1000	9/25/08 0015	9/25/08 1935	201	2	0	5361
<del>Ca113</del>	<del>500</del>	<del>9/25/08 1000</del>	<del>9/25/08 0015</del>	<del>9/25/08 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						

140  
121848

FORBIV  
2/11/08

KW  
121848

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 14	500	9/12/08 1320	9/15/08 0905	9/15/08 1545	201	2	8	5596
Cal 13	500	9/12/08 1320	9/15/08 0935	9/15/08 1620	202	2	8	6779
Cal 43	500	9/12/08 1320	9/15/08 1000	9/15/08 1650	203	2	8	6300
Cal 15	500	9/12/08 1320	9/15/08 1030	9/15/08 1725	204	2	8	6132
<del>Cal 44</del>	<del>500</del>	<del>9/12/08 1320</del>	<del>9/15/08 1055</del>	<del>9/15/08 1805</del>	<del>205</del>	<del>2</del>	<del>5</del>	<del>6132</del>
Cal 46	500	9/12/08 1320	9/15/08 1115	9/15/08 2110	206	2	7	6216
Cal 36	500	9/12/08 1320	9/15/08 1150	9/15/08 2140	207	2	8	6094
<del>Cal 38</del>	<del>500</del>	<del>9/12/08 1320</del>	<del>9/15/08 1215</del>	<del>9/15/08 2215</del>	<del>208</del>	<del>2</del>	<del>8</del>	<del>6258</del>
Cal 19	500	9/12/08 1320	9/15/08 1350	9/15/08 2245	209	2	1	7073
Cal 47	500	9/12/08 1320	9/15/08 1415	9/15/08 2315	210	2	1	6665
Cal 37	500	9/12/08 1320	9/15/08 1430	9/15/08 2350	211	2	1	6150
Cal 42	500	9/12/08 1320	9/15/08 1450	9/16/08 0020	212	2	1	6426

140  
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140  
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12/19/08  
12/19/08  
140  
12/19/08

140  
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
15	500	9/20/08 0945	9/20/08 0910	9/20/08 1405	204	2	4	7535
44	500	9/20/08 0945	9/20/08 0940	9/30/08 1445	205	2	5	7170
46	500	9/20/08 0945	9/30/08 1015	9/30/08 1520	206	2	8	8125
36	500	9/20/08 0945	9/30/08 1015	9/30/08 1410	207	2	7	7656
<del>30</del>	<del>500</del>	<del>9/20/08 0945</del>	<del>9/30/08 1110</del>	<del>9/30/08 1635</del>	<del>208</del>	<del>2</del>	<del>1</del>	<del>7681</del>
19	500	9/20/08 0945	9/30/08 1140	9.30.08 1725	209	2	3	8795
47	500	9/20/08 0945	9/30/08 1205	9.30.08 1800	210	2	1	8116
37	500	9/20/08 0945	9/30/08 1335	9.30.08 1830	211	2	3	7917
42	500	9/20/08 0945	9/30/08 1400	9.30.08 1950	212	2	8	8287

100 12/19/08

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1469  
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	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	6013
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>6379</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 1255	9/18/08 2220	211	2	4	6207
Cal 42	500	9/15/08 1450	9/18/08 1250	9/18/08 2255	212	2	8	6405

KC  
12/19/08

KC  
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KC  
12/19/08

9/18/08  
KC

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	10/18/08 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								

100  
12/19/08

100 12/19/08  
12/28  
12/19/08

# Verification for Ra-226 Standard 0299-G

4/2/2008  
D. Roy

Isotope  
0299-G N1  
0299-G N2  
0299-G N3

Detector CPM  
2536.9600  
2520.2500  
2532.5000

BKG CPM  
52.4000  
52.4000  
52.4000

NET CPM  
2484.5600  
2467.8500  
2480.1000

Detector Eff  
1.917186  
1.917186  
1.917186

Mass. Used (G)  
0.5057  
0.5056  
0.5042

Average =

Source DPM/G  
2562.667649  
2545.935781  
2565.677715  
2558.093715

Mean Value (Counting) = 2558.093715  
Stdev = 10.63610098

104.944421  
0.00415782

Pass  
Rule 3 (Pass/Fail)

Certificate Value = 2437.6 dpm/mL  
Lower Limit = 2536.821513 dpm/mL  
Upper Limit = 2579.365917 dpm/mL  
Rule 1 Pass/Fail Fail \*exception taken due to full recovery of standard  
Two sigma = 21.27220197 dpm/mL  
10 % of Mean = 255.8093715 dpm/mL  
Rule 2 (Pass/Fail) Pass

### Verification Rules

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 = The determined mean value shall be within 10% of the certificate value.

The analyst prepared three standard verification sources for Ra-226 source 0299-G by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Gold for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 4/02/08 using source 0024-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0024. Each verification source calculation was performed as follows:

Source dpm/g = (A - B)/(C)(D)  
where:  
A = Ver. source cpm,  
B = BKG cpm,  
C = System efficiency, (cpm/dpm), and  
D = mass used for standard verification.

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	Cal14				
13	Cal13				
43	Cal43				
15	Cal15				
44	Cal44				
46	Cal46				
36	Cal36				
19	Cal19				
47	Cal47				
37	Cal37				
42	Cal42				

*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:  $\pm 1.3\%$

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

Carrier free in 0.5M HCl

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

1 year = 365.25 days

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

*Handwritten:*  
12/19/99  
12/19/98

# Ra-226 WATER

Batch : LCSVER  
Date : 10/31/2008  
Analyst : KSD1

Procedure Code : LUC26RAL

Parname : Radium-226

MDA : 1 pCi/L

Instrument Used : LUCAS CELL DETECTOR

Bkg Count Time: 30 min

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME
VER 1	0.500	30	1014	201	1.993	0.267	0.3504	22.1841	1.3817	11/17/2008 15:10
VER 2	0.500	30	1056	202	2.261	0.267	0.3089	20.3702	1.2427	11/17/2008 15:45
VER 3	0.500	30	726	203	2.254	0.267	0.5419	24.4866	1.8110	10/30/2008 16:05
VER 4	0.500	30	737	204	2.193	0.267	0.5519	25.3188	1.8580	10/30/2008 18:20
VER 5	0.500	30	937	205	1.799	0.267	0.3882	22.6936	1.4718	11/17/2008 16:20
VER 6	0.500	30	780	206	2.259	0.267	0.5373	26.1045	1.8604	10/30/2008 20:20
VER 7	0.500	30	711	207	2.146	0.267	0.5705	25.2245	1.8858	10/30/2008 22:00
VER 3	<del>0.500</del>	<del>30</del>	<del>593</del>	<del>208</del>	<del>2.283</del>	<del>0.267</del>	<del>0.5132</del>	<del>16.9552</del>	<del>1.4723</del>	<del>11/20/2008 16:40</del> <sup>12/19/08</sup>
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 12/19/08

Sample ID	Sample Dup	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
201		2	11/17/2008 10:20	LCS	0638-F	24.10	pCi/L	92%
202		2	11/17/2008 10:45	LCS	0638-F	24.10	pCi/L	85%
203		2	10/30/2008 11:05	LCS	0638-F	24.10	pCi/L	102%
204		2	10/30/2008 12:30	LCS	0638-F	24.10	pCi/L	105%
205		2	11/17/2008 11:10	LCS	0638-F	24.10	pCi/L	94%
206		2	10/30/2008 13:10	LCS	0638-F	24.10	pCi/L	108%
207		2	10/30/2008 13:25	LCS	0638-F	24.10	pCi/L	105%
208		2	11/20/2008 11:45	LCS	0638-F	24.10	pCi/L	70% <i>W</i>
209		2	10/30/2008 14:05	LCS	0638-F	24.10	pCi/L	87% <i>W</i>
210		2	10/30/2008 14:25	LCS	0638-F	24.10	pCi/L	98% <i>W</i>
211		2	11/17/2008 12:20	LCS	0638-F	24.10	pCi/L	92%
212		2	10/30/2008 14:55	LCS	0638-F	24.10	pCi/L	94%

*W*  
*12/18/08*

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM	Ingrowth constant
11/10/2008 15:35	11/17/2008 10:20	162.75	4.83	0.7073	0.9642	1.0019	33.5333	0.6833
11/10/2008 15:35	11/17/2008 10:45	163.17	5.00	0.7083	0.9630	1.0019	34.9333	0.6833
10/27/2008 14:20	10/30/2008 11:05	68.75	5.00	0.4049	0.9630	1.0019	23.9333	0.3907
10/27/2008 14:20	10/30/2008 12:30	70.17	5.83	0.4113	0.9569	1.0019	24.3000	0.3943
11/10/2008 15:35	11/17/2008 11:10	163.58	5.17	0.7092	0.9617	1.0019	30.9667	0.6833
10/27/2008 14:20	10/30/2008 13:10	70.83	7.17	0.4142	0.9473	1.0019	25.7333	0.3931
10/27/2008 14:20	10/30/2008 13:25	71.08	8.58	0.4153	0.9373	1.0019	23.4330	0.3900
11/17/2008 11:10	11/20/2008 11:45	72.58	4.92	0.4219	0.9696	1.0019	17.5900	0.4073
10/27/2008 14:20	10/30/2008 14:05	71.75	9.58	0.4182	0.9302	1.0019	20.8670	0.3898
10/27/2008 14:20	10/30/2008 14:25	72.08	10.83	0.4197	0.9215	1.0019	23.0003	0.3875
11/10/2008 15:35	11/17/2008 12:20	164.75	9.58	0.7117	0.9302	1.0019	35.3000	0.6633
10/27/2008 14:20	10/30/2008 14:55	72.58	18.33	0.4219	0.8707	1.0019	21.4670	0.3681

*W*  
*12/18/08*

*W*  
*12/19/08*  
*W*  
*12/18/08*

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
✓ VCV 1	500	1110108 1535 10110108 1450 10110108 1450	1111108 1020	1111108 1510	201	2	8	1014
✓ 2	500	11110108 1535	1111108 1045	1111108 1545	202	2	8	1054
✓ 3	500	11110108 1535	1111108 1110	1111108 1020	205	2	8	937
✓ 4	500	11110108 1535	1111108 1145	111708 2050	208	2	8	786
✓ 5	500	11110108 1535	1111108 1150	111708 2120	209	2	8	1200
✓ 6	500	11110108 1535	1111108 1200	111708 2155	211	2	8	1067
✓ 7	500	11110108 1535	1111108 1245	1111108 1330	701	1	8	982
✓ 8	500	11110108 1535	1111108 0900	1111108 1415	708	1	8	1194
✓ 9	500	11110108 1535	1111108 0920	1111108 1435	705	1	8	1110
✓ 10								
✓ 11								
✓ 12								
✓ VCV 3	500	1111108 1110	11110108 1115	11110108 1040	208	2	8	533

VV  
12/18/08  
VV  
12/18/08  
VV  
11/21/08

VV 12/14/08

VV 12/14/08  
VV 12/18/08

VV 12/18/08  
199

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

12/18/08  
100

12/18/08  
100

12/18/08  
100

12/18/08  
100

12/18/08  
100

12/18/08  
100

12/18/08  
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

*Handwritten signature and date:*  
1/4/07  
Amanda L. Fehr 1/4/07

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GE-RAD-A-008 Isotope RA-226  
 Date Standards Prepared 12/18/07 Cocktail Type Used NA  
 Standard ID 0638-F Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or mL) 117.519 Type of Scintillation Vial NA  
 Reference Date 1/23/04 Pipette ID Used 1429303  
 Expiration Date 12/20/08 Balance ID Used 3604046  
 Residue/Carrier Agent 0.1M HCl Quenching Agent NA

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	Ver 1				
2	Ver 2				
3	Ver 3				
4	Ver 4				
5	Ver 5				
6	Ver 6				
7	Ver 7				
8	Ver 8				
9	Ver 9				
10	Ver 10				
11	Ver 11				
12	Ver 12				

12/19/08

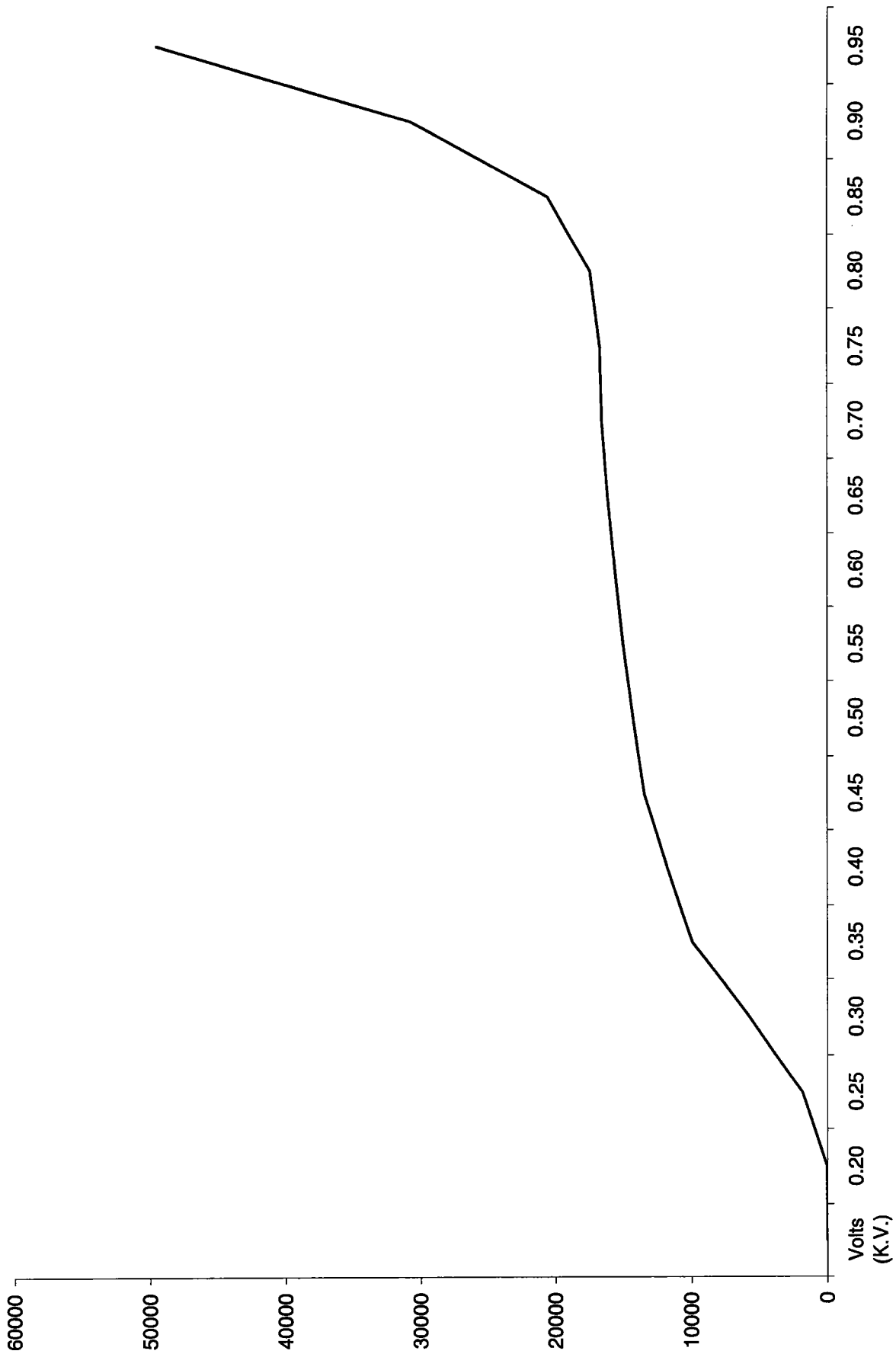
Prepared By: Kelli Dieriel Date: 12/19/08  
 Reviewed By: Mary Jo Adams Date: 12/19/08

Rev 1 RLM.9/10/97

Voltage Curve Ludlum # 2				
Volts (K.V.)	Counts	Date	Time	Detector
0.20	0	9/19/2008	10:00	2
0.25	0	9/19/2008	10:00	2
0.30	0	9/19/2008	10:00	2
0.35	0	9/19/2008	10:00	2
0.40	0	9/19/2008	10:00	2
0.45	36	9/19/2008	10:00	2
0.50	1860	9/19/2008	10:00	2
0.55	5751	9/19/2008	10:00	2
0.60	9916	9/19/2008	10:00	2
0.65	11761	9/19/2008	10:00	2
0.70	13431	9/19/2008	10:00	2
0.75	14254	9/19/2008	10:00	2
0.80	14984	9/19/2008	10:00	2
0.85	15598	9/19/2008	10:00	2
0.90	16129	9/19/2008	10:00	2
0.95	16562	9/19/2008	10:00	2
1.00	16711	9/19/2008	10:00	2
1.05	17428	9/19/2008	10:00	2
1.10	20558	9/19/2008	10:00	2
1.15	30722	9/19/2008	10:00	2
1.20	49527	9/19/2008	10:00	2
1.25	71509	9/19/2008	10:00	2
1.30	115018	9/19/2008	10:00	2

*W 12/19/08*  
*U 12/19/08*





mut 12/19/08  
12/19/08

201	1.993	12/19/2008
202	2.261	12/19/2008
203	2.254	12/19/2008
204	2.193	12/19/2008
205	1.799	12/19/2008
206	2.259	12/19/2008
207	2.146	12/19/2008
209	2.291	12/19/2008
210	2.253	12/19/2008
211	2.171	12/19/2008
212	2.322	12/19/2008

*Next  
12/19/08*

12/19/2008 10:48 AM

# General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414

(843)556-8171

## Lucas Cell Calibration Package

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the second standard(s) documentation? standard preparation information? standard < 1 Year old or verified?	✓		
	✓		
	✓		
	✓		
2) Is the efficiency calibration report included ?	✓		
3) Is the raw count data included for: Cell constant determination? Plateau generation?	✓		
	✓		
4) Are the calibration verifications included?	✓		
5) Are the instrument settings included: HVPS settings?	✓		
6) Has the CELLEFF.xls file been updated ?	✓		
7) Have the calibration dates been updated in ALPHALIMS ?	✓		

Prepared By: Kellipanel

Date: 2/3/09

Reviewed By: W. G. Hens

Date: 2/4/09

Effective Date: 2/4/09

# Ra-226 Cell Constants

Standard Reference date: 12/15/1999  
standard ID: 0299-G  
Volume added (mL): 0.1  
Standard Reference Activity (DPM/mL): 2446.35

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/time end of degas	bkg cpm	total counts	count time min	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	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	Stddev	1/29/2009 17:10	1/29/2009 11:35	1/28/2009 13:00	0.167	5814	30	193.80	243.67	2.94097	0.23264	3334	0.9961
312	1.946		1/27/2009 11:10	1/26/2009 14:00	1/22/2009 9:10	0.267	6446	30	214.87	243.67	4.20139	0.88194	3331	0.9961

K0 2/3/09

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
981	500	1126109 1300	1126109 0830	1126109 1130	302	3	8	7401
981	500	1126105 1300	1126109 0855	1126109 1200	304	3	8	7101
981	500	1126105 1300	1126109 0910	1126109 1255	307	3	8	7442
A diagonal line is drawn across the remaining empty rows of the table.								

KD 213109

KD 213109

KD 214109  
KD 213109

#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
Ca1143	500	11/26/09 1300	11/26/09 0850	11/26/09 1150	301	3	8	6239
Ca1147	500	11/26/09 1300	11/26/09 0920	11/26/09 1330	302	3	7	6335
Ca1149	500	11/26/09 1300	11/26/09 0450	11/26/09 1400	304	3	2	6472
Ca1130	500	11/26/09 1300	11/26/09 1020	11/26/09 1430	306	3	7	4809
Ca1142	500	11/26/09 1300	11/26/09 1045	11/26/09 1515	307	3	3	<del>6668</del>
Ca1144	500	11/26/09 1300	11/26/09 1105	11/26/09 1550	308	3	4	6149
Ca1145	500	11/26/09 1300	11/26/09 1120	1/29/09 1640	311	3	8	6176
Ca1144	500	11/26/09 1300	11/26/09 1135	1/29/09 1710	312	3	5	5814
Ca1113	500	11/26/09 1300						
Ca1128	500	11/26/09 1300						
Ca1136	500	11/26/09 1300						
Ca1137	500	11/26/09 1300						

100  
2/13/09  
140 2/13/09

140  
2/13/09  
140  
2/14/09

100 2/13/09

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 43	500	11/9/09 1545	11/9/09 1010	11/20/09 1105	301	3	8	9355
<del>Cal 44</del>	<del>500</del>	<del>11/9/09 1545</del>	<del>11/9/09 1040</del>	<del>11/20/09 1150</del>	<del>302</del>	<del>3</del>	<del>8</del>	<del>8433</del>
Cal 49	500	11/9/09 1545	11/9/09 1100	11/20/09 1340	303	3	8	9095
<del>Cal 50</del>	<del>500</del>	<del>11/9/09 1545</del>	<del>11/9/09 1140</del>	<del>11/20/09 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

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
Ca1143	500	1122109 0910	1126109 0955	1126109 1455	301	3	8	7282
Ca1147	500	1122109 0910	1126109 0955	1126109 1530	302	3	8	1555
Ca115	500	1122109 0910	1126109 1025	1126109 1710	303	3	8	8028
Ca130	500	1122109 0910	1126109 1050	1126109 1645	304	3		5162
Ca142	500	1122109 0910	1126109 1100	1126109 2300	305	3	8	7280
Ca144	500	1122109 0910	1126109 1150	1126109 2330	306	3	8	6387
Ca115	500	1122109 0910	1126109 1210	1127109 0005	307	3	8	6598
Ca114	500	1122109 0910	1126109 1315	1127109 0830	308	3	8	6226
Ca113	500	1122109 0910	1126109 1330	1127109 0905	309	3	8	6046
Ca128	500	1122109 0910	1126109 1345	1127109 1015	311	3	8	6607
Ca136	500	1122109 1510	1126109 1400	1127109 1110	312	3	8	6446
Ca137								

Ca 213109

Ca 213109

Ca 214159

# Verification for Ra-226 Standard 0299-G

4/2/2008  
D. Roy

Isotope  
0299-G N1  
0299-G N2  
0299-G N3

Detector CPM  
2536.9600  
2520.2500  
2532.5000

BKG CPM  
52.4000  
52.4000  
52.4000

NET CPM  
2484.5600  
2467.8500  
2480.1000

Detector Eff  
1.917186  
1.917186  
1.917186

Mass. Used (G)  
0.5057  
0.5056  
0.5042

Average =

Source DPM/G  
2562.667649  
2545.935781  
2565.677715  
2558.093715

Mean Value (Counting) = 2558.093715  
Stdev = 10.63610098

104.944421  
0.00415782

Pass  
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:*  
1.5 ml water  
5/10/08  
M. N. 23103



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0299	Isotope:	Radium-226
Prepared By:	Angela Johnson	Prepared By:	Angela Johnson
Carrier Conc:	0.5 M HCL	Prep Date:	09/15/2000
Reference Date:	12/15/1999	Verification Date:	01/23/2008
Ampoule Mass (g):	5.0368 g	Expiration Date:	01/23/2009
Uncertainty:	+/- 2.5 %	Primary Code:	0299-A
LogBook No:	RC S 027 128	Dilution(mL):	100 mL
		Mass of Parent(g):	4.6634 g
		Density(g/mL):	1.0012
		Balance ID:	

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

$$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$$

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

$$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 122414.2500 \text{ dpm/mL}$$

$$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0012 \text{ g/mL}) / (100 \text{ mL}) = 122273.3377 \text{ dpm/g}$$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
08/26/2003	Angela Johnson	1.9909	100	0299-E	2434.34 dpm/mL	11/04/2004	11/04/2005
08/26/2003	Angela Johnson	1.9872	100	0299-F	2429.82 dpm/mL	08/26/2004	08/26/2005
04/05/2005	Amanda Fehr	5.0018	250	0299-G	2446.3471 dpm/mL	04/02/2008	04/02/2009

GEL Laboratories LLC  
Version 1.0 9/18/2000

LD 2/3/09  
ALLA 2/4/09

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-RAD-A-008 Isotope RA-226  
 Date Standards Prepared 4/5/09 Cocktail Type Used NA  
 Standard ID 02896 Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or mL) 2446.347 Type of Scintillation Vial NA  
 Reference Date 12/15/99 Pipette ID Used 1429303  
 Expiration Date 4/21/09 Balance ID Used 30040216  
 Residue/Carrier Agent 0.5 M HCl Quenching Agent NA

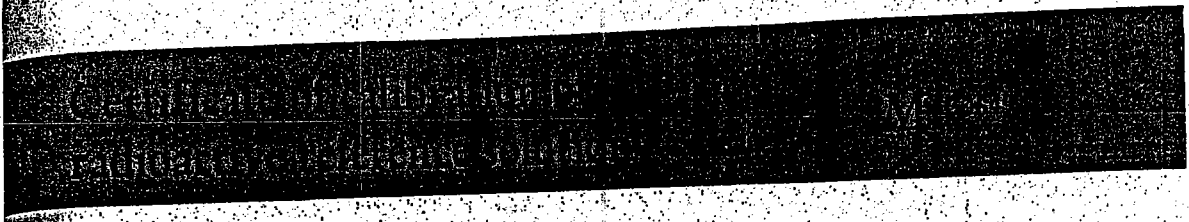
	Standard Number	Quenching Vol (uL)/ Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
43	Cal 43				
47	Cal 47				
19	Cal 19				
30	Cal 30				
42	Cal 42				
44	Cal 44				
15	Cal 15				
14	Cal 14				
13	Cal 13				
28	Cal 28				
36	Cal 36				

160  
2/3/09

Prepared By: Kelli Brown Date: 2/3/09  
 Reviewed By: Raymond Jones Date: 2/4/09

Rev 1 RLM 9/10/97

0299



UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

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

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

Calibration date: 15 December 1999

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

Expanded uncertainty in the radioactive concentration quoted above:  $\pm 2.5\%$

Combined Type A uncertainty:  $\pm 0.2\%$

Combined Type B uncertainty:  $\pm 1.3\%$

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

Chemical Carrier free in 0.5M HCL

Physical position

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

1 year = 365.25 days

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

KB 21/3/09  
WMA 21/11/09

# Ra-226 WATER

Batch : LCSVER  
 Date : 1/2/2009  
 Analyst : KSD1

Procedure Code : LUC26RAL  
 Parmname : Radium-226

MDA : 1 pCi/L

Instrument Used : LUCAS CELL DETECTOR

Bkg Count Time: 30 min

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME
1	0.500	30	656	301	2.021	0.267	0.4919	20.0589	1.5634	1/30/2009 15:05
1	0.500	30	655	302	2.131	0.267	0.5554	22.6149	1.7640	2/2/2009 13:40
2	0.500	30	914	303	2.136	0.267	0.4647	26.4838	1.7397	1/30/2009 15:40
3	0.500	30	791	305	2.057	0.267	0.4845	23.8718	1.6891	1/30/2009 17:05
4	0.500	30	768	306	1.747	0.267	0.5709	27.2885	1.9605	1/30/2009 17:37
2	0.500	30	720	307	1.931	0.267	0.6113	27.3779	2.0335	2/2/2009 14:15
5	0.500	30	730	308	1.950	0.267	0.5149	23.3957	1.7254	1/30/2009 19:05
6	0.500	30	764	309	1.877	0.267	0.5908	28.0944	2.0238	1/31/2009 10:20
7	0.500	30	594	311	2.114	0.267	0.5510	20.3087	1.6667	1/31/2009 17:20
8	0.500	30	542	312	1.944	0.267	0.8009	26.8983	2.3154	2/2/2009 8:25

601112  
 CW

*Handwritten signature*

Sample ID	Cell #	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
1	301	3	1/30/2009 10:40	LCS	0638-F	24.10	pCi/L	83%
2	302	3	2/2/2009 9:15	LCS	0638-F	24.10	pCi/L	94%
2	303	3	1/30/2009 11:05	LCS	0638-F	24.10	pCi/L	110%
3	305	3	1/30/2009 11:30	LCS	0638-F	24.10	pCi/L	99%
4	306	3	1/30/2009 11:45	LCS	0638-F	24.10	pCi/L	113%
2	307	3	2/2/2009 9:40	LCS	0638-F	24.10	pCi/L	114%
5	308	3	1/30/2009 12:00	LCS	0638-F	24.10	pCi/L	97%
3	309	3	1/30/2009 13:05	LCS	0638-F	24.10	pCi/L	117%
7	311	3	1/30/2009 13:20	LCS	0638-F	24.10	pCi/L	84%
8	312	3	1/30/2009 13:40	LCS	0638-F	24.10	pCi/L	112%

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	Net CPM	Ingrowth constant
1/26/2009 16:05	1/30/2009 10:40	90.58	4.42	0.9672	1.0019	21.6000	0.4800
1/30/2009 10:00	2/2/2009 9:15	71.25	4.42	0.9672	1.0019	21.5667	0.4032
1/26/2009 16:05	1/30/2009 11:05	91.00	4.58	0.9660	1.0019	30.1997	0.4809
1/26/2009 16:05	1/30/2009 11:30	91.42	5.58	0.9587	1.0019	26.1000	0.4788
1/26/2009 16:05	1/30/2009 11:45	91.67	5.87	0.9567	1.0019	25.3330	0.4787
1/30/2009 10:00	2/2/2009 9:40	71.67	4.58	0.9660	1.0019	23.7330	0.4044
1/26/2009 16:05	1/30/2009 12:00	91.92	7.08	0.9479	1.0019	24.0667	0.4753
1/26/2009 16:05	1/30/2009 13:05	93.00	21.25	0.8518	1.0019	25.1997	0.4305
1/26/2009 16:05	1/30/2009 13:20	93.25	28.00	0.8095	1.0019	19.5330	0.4099
1/26/2009 16:05	1/30/2009 13:40	93.58	66.75	0.6041	1.0019	17.7997	0.3067

5/11/12  
 071  
 LEWA 2141.04

Ra-226 Verification Sheet

#3

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VER 1	500	1120109 1605	1120109 1040	1120109 1505	301	3	8	656
VER 2	500	1120109 1605	1120109 1105	1120109 1540	303	3	8	914
VER 3	500	1120109 1605	1120109 1130	1130109 1705	305	3	8	791
VER 4	500	1120109 1605	1120109 1145	<del>1130109 1737</del> 1.31.09 1737	306	3	8	768
VER 5	500	1120109 1605	1120109 1200	<del>1130109 1905</del> 1.31.09 1905	308	3	8	730
VER 6	500	1120109 1605	1120109 1305	1.31.09 1020	309	3	8	764
VER 7	500	1120109 1605	1120109 1320	13109 1720	311	3	8	594
VER 8	500	1120109 1605	1120109 1340	1120109 0805	312	3	8	542
<del>VER 9</del>	500	1120109 1605						
VER 10	500	1120109 1605						
VER 11	500	1120109 1605						
VER 12	500	1120109 1605						

1120109

VER  
1120109



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	2/2/09 0915	2/2/09 1340	504	3	8	655
VUN 2	500	11/20/09 1000	2/2/09 0940	2/2/09 1415	507	3	8	120
VUN 3	500	11/20/09 1000	2/2/09 1115	2/2/09 1450	509	3	8	754

LV 213109

601312 071

601312 071

## Verification for Ra-226 Standard 0638-F

	Isotope	Value	Uncertainty
D. Roy 2/2/2009	0638-F #1	24.629	1.7426
	0638-F #2	24.438	1.7557
	0638-F #3	22.791	1.6808
<b>Mean Value (Counting) =</b>	23.953	99.60	<b>Pass</b>
<b>Stdev =</b>	1.010781096		<b>Rule 3 (Pass/Fail)</b>
<b>Target =</b>	24.05		
<b>Lower Limit =</b>	21.93100448		
<b>Upper Limit =</b>	25.97412886		
<b>Rule 1 Pass/Fail</b>	<b>Pass</b>		
<b>Two sigma =</b>	2.021562191		
<b>10 % of Mean =</b>	2.395256667		
<b>Rule 2 (Pass/Fail)</b>	<b>Pass</b>		

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements**
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**
- Rule 3 = The determined mean value shall be within 5% of the certificate value.**

The analyst prepared three standard verification sources for standard 0638-F using 0.1 mL for each source. Each source was counted using routine Lucas cell procedures. Calibration for 0299-G was used in this verification.

140 24109  
*[Signature]* 2/2/09  
 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

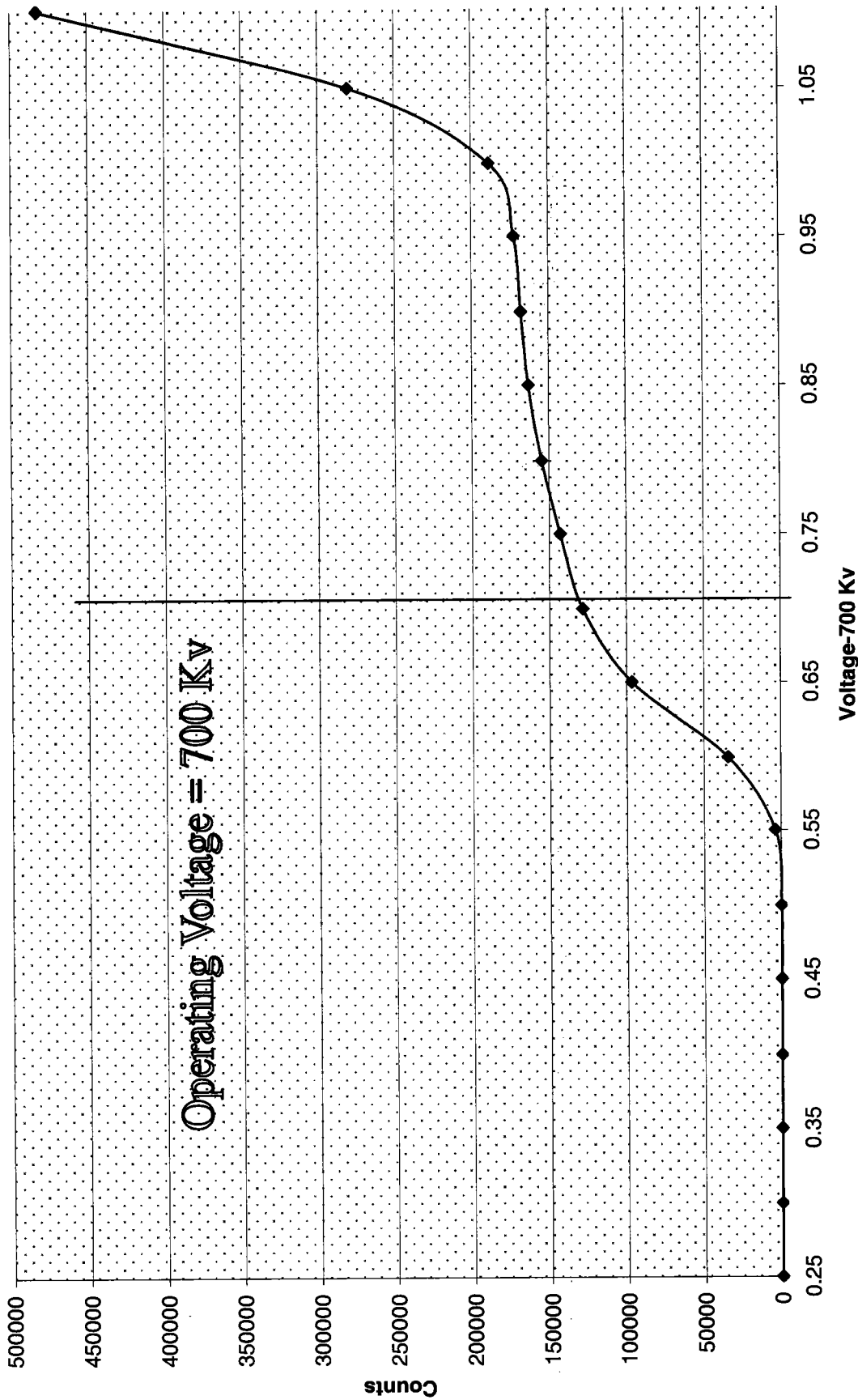
Prepared By: Kelli Brunell Date 2/13/09  
 Reviewed By: [Signature] Date 2/14/09

## 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



KO 213109

213109  
KOA

301	2.021	2/4/2009
302	2.131	2/4/2009
303	2.136	2/4/2009
305	2.057	2/4/2009
306	1.747	2/4/2009
307	1.931	2/4/2009
308	1.950	2/4/2009
309	1.877	2/4/2009
311	2.114	2/4/2009
312	1.944	2/4/2009

RE UT  
2/4/09

~~RE UT~~  
2/4/09  
RE UT  
2/4/09

# General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414

(843)556-8171

## Lucas Cell Calibration Package

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the secondary standard(s) documentation? standard preparation information? standard < 1 Year old or verified?	✓		
	✓		
	✓		
	✓		
2) Is the efficiency calibration report included ?	✓		
3) Is the raw count data included for: Cell constant determination? Plateau generation?	✓		
	✓		
4) Are the calibration verifications included?	✓		
5) Are the instrument settings included: HVPS settings?	✓		
6) Has the CELLEFF.xls file been updated ?	✓		
7) Have the calibration dates been updated in ALPHALIMS ?	✓		

Prepared By: Kelli Dorrel

Date: 2/28/09

Reviewed By: Angela Johnson

Date: 3/2/09

Effective Date: 3/2/09

**Ra-226 Cell Constants**

Standard Reference date : 12/15/1999  
 standard ID : 0.299-G  
 Volume added (mL): 0.1  
 Standard Reference Activity (DPM/mL): 2446.35

Lucas cell #	Call constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	bkg cpm	total counts	count time min	cpm	Known activity dpm	11 (days) end-degas to flush	12 (days) end-flush to count	13 (days) Std Ref Date to count	Decay from Std Ref Date to count
401	1.689	Average	2/23/2009 16:15	2/23/2009 10:30	2/20/2009 17:25	0.267	4580	30	152.67	243.66	2.71181	0.23958	3359	0.9960
401	1.585	Stdev	2/27/2009 13:15	2/27/2009 9:00	2/23/2009 16:05	0.267	5474	30	182.47	243.66	3.70486	0.17708	3363	0.9960
401	1.448		2/25/2009 14:40	2/25/2009 7:55	2/20/2009 17:25	0.267	5677	30	189.23	243.66	4.60417	0.28125	3361	0.9960
402	2.133	Average	2/23/2009 16:55	2/23/2009 11:05	2/20/2009 17:25	0.267	5817	30	193.90	243.66	2.73611	0.24306	3359	0.9960
402	2.173	Stdev	2/27/2009 14:10	2/27/2009 9:30	2/23/2009 16:05	0.267	7507	30	250.23	243.66	3.72569	0.19444	3363	0.9960
402	2.048		2/25/2009 15:25	2/25/2009 8:15	2/20/2009 17:25	0.267	8017	30	267.23	243.66	4.61806	0.29861	3361	0.9960
403	1.475	Average	2/23/2009 18:30	2/23/2009 11:30	2/20/2009 17:25	0.267	4011	30	133.70	243.66	2.75347	0.29167	3359	0.9960
403	1.495	Stdev	2/27/2009 14:50	2/27/2009 10:00	2/23/2009 16:05	0.267	5182	30	172.73	243.66	3.74853	0.20139	3363	0.9960
403	1.419		2/25/2009 15:55	2/25/2009 8:35	2/20/2009 17:25	0.267	5582	30	185.40	243.66	4.63194	0.30556	3361	0.9960
404	1.792	Average	2/23/2009 19:05	2/23/2009 13:10	2/20/2009 17:25	0.267	5005	30	166.83	243.66	2.82292	0.24653	3359	0.9960
404	2.142	Stdev	2/27/2009 15:25	2/27/2009 10:30	2/23/2009 16:05	0.267	7443	30	248.10	243.66	3.76736	0.20486	3363	0.9960
404	1.859		2/25/2009 20:20	2/25/2009 8:55	2/20/2009 17:25	0.267	7075	30	235.83	243.66	4.64583	0.47569	3361	0.9960
405	2.066	Average	3/2/2009 13:40	3/2/2009 10:30	2/25/2009 14:00	0.267	8602	30	286.73	243.66	4.85417	0.13194	3366	0.9960
405	1.899	Stdev	2/27/2009 16:00	2/27/2009 10:55	2/23/2009 16:05	0.267	6612	30	220.40	243.66	3.78472	0.21181	3363	0.9960
405	1.745		2/25/2009 20:55	2/25/2009 10:10	2/20/2009 17:25	0.267	6721	30	224.03	243.66	4.69792	0.44792	3361	0.9960
409	1.805	Average	2/24/2009 0:30	2/23/2009 15:20	2/20/2009 17:25	0.267	5039	30	167.97	243.66	2.91319	0.38194	3359	0.9960
409	2.153	Stdev	2/3/2009 21:10	2/3/2009 15:00	1/30/2009 10:50	0.267	7949	30	264.97	243.67	4.17361	0.25694	3339	0.9960
409	2.149		2/27/2009 16:35	2/27/2009 11:30	2/23/2009 16:05	0.267	7516	30	250.53	243.66	3.80903	0.21181	3363	0.9960
410	1.869	Average	2/26/2009 8:50	2/25/2009 13:05	2/20/2009 17:25	0.267	6838	30	227.93	243.66	4.31944	0.82292	3361	0.9960
410	1.965	Stdev	2/4/2009 8:30	2/3/2009 15:30	1/30/2009 10:50	0.267	6708	30	223.60	243.67	4.19444	0.70853	3339	0.9960
410	1.824		2/24/2009 8:00	2/23/2009 15:40	2/20/2009 17:25	0.267	4840	30	161.33	243.66	2.92708	0.68056	3359	0.9960
411	1.824	Average	2/24/2009 8:40	2/23/2009 15:55	2/20/2009 17:25	0.267	4839	30	161.30	243.66	2.93750	0.69792	3359	0.9960
411	1.911	Stdev	2/27/2009 17:45	2/27/2009 12:20	2/23/2009 16:05	0.267	6357	30	211.90	243.66	3.84375	0.22569	3363	0.9960
411	1.836		2/26/2009 9:30	2/25/2009 13:40	2/20/2009 17:25	0.267	6734	30	224.47	243.66	4.84375	0.82639	3361	0.9960
412	1.947	Average	2/26/2009 10:15	2/25/2009 14:05	2/20/2009 17:25	0.267	7137	30	237.90	243.66	4.86111	0.84028	3361	0.9960
412	2.131	Stdev	2/27/2009 18:20	2/27/2009 12:45	2/23/2009 16:05	0.267	7495	30	249.83	243.66	3.86111	0.23264	3363	0.9960
412	1.822		2/24/2009 9:40	2/23/2009 16:10	2/20/2009 17:25	0.267	4818	30	160.60	243.66	2.94792	0.72917	3359	0.9960

EffErr 0.123705 <- Put in Machines.xls (Lucas Cell Tab)

*Angela J. ... 3/2/09*  
*Miki Davel 3/2/09*



401	1.574	3/2/2009
402	2.118	3/2/2009
403	1.463	3/2/2009
404	1.931	3/2/2009
405	1.903	3/2/2009
409	2.036	3/2/2009
410	1.886	3/2/2009
411	1.824	3/2/2009
412	1.967	3/2/2009

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GLRAD-A-008 Isotope Pu-239  
 Date Standards Prepared 4/15/09 Cocktail Type Used NA  
 Standard ID 02996 Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or mL) 2446.347 Type of Scintillation Vial NA  
 Reference Date 4/15/09 Pipette ID Used 1429303  
 Expiration Date 4/15/09 Balance ID Used 3604026  
 Residue/Carrier Agent 0.5M HCl Quenching Agent NA

	Standard Number	Quenching Vol (uL) Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
3	CA13				
43	CA143				
7	CA17				
42	CA142				
13	CA143				
44	CA144				
30	CA130				
48	CA148				
36	CA136				
35	CA135				
38	CA138				
15	CA115				
14	CA114				
46	CA146				
47	CA147				

*W 3/2/09*

Prepared By: Kell 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 KA-226  
 Date Standards Prepared 4/15/09 Cocktail Type Used NA  
 Standard ID 0299G Matrix of Vial/Planchet NA  
 Amount Used (g or ml) 0.103109 NA  
 Standard Activity (DPM/g or ml) 2.446.347 Type of Scintillation Vial NA  
 Reference Date 12/15/09 Pipette ID Used 1429305  
 Expiration Date 4/2/09 Balance ID Used 3604026  
 Residue/Carrier Agent 0.5M HCl Quenching Agent NA

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
16	CA116				
25	CA125				
23	CA123				
28	CA128				
9	CA19				
34	CA134				

*10/3/2009*

Prepared By: Valli Perera Date 3/2/09  
 Reviewed By: Aylee A. G. Date 3/2/09  
Rev 1 RLM 9/10/97

# Standard Traceability Log Rad

A Solution Material Info	
Isotope:	Radium-226
Prepared By:	Angela Johnson
Prep Date:	09/15/2000
Verification Date:	01/23/2008
Expiration Date:	01/23/2009
Primary Code:	0299-A
Dilution(mL):	100 mL
Mass of Parent(g):	4.6634 g
Density(g/mL):	1.0012
Balance ID:	

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

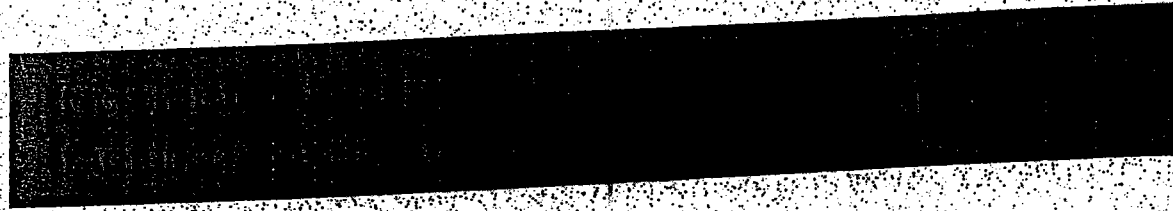
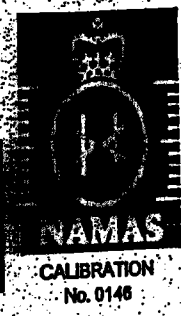
### Calculations Converting parent activity to dpm/mL|dpm/g

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

### 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

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)            -     $6.5 \pm 2.1$
- 6.54(21)        -     $6.54 \pm 0.21$
- 6.543(21)      -     $6.543 \pm 0.021$

Date of issue: 17<sup>th</sup> December 1999

Nycomed Amersham  
Via 31/05

# Verification for Ra-226 Standard 0299-G

4/2/2008	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard Mass. Used (G)	Source DPM/G
D. Roy	0299-G N1	2536.9600	52.4000	2484.5600	1.917186	0.5057	2562.667649
	0299-G N2	2520.2500	52.4000	2467.8500	1.917186	0.5056	2545.935781
	0299-G N3	2532.5000	52.4000	2480.1000	1.917186	0.5042	2565.677715
						Average =	2558.093715

Mean Value (Counting) = 2558.093715 **Pass**  
 Stdev = 10.63610098 **0.00415782 Rule 3 (Pass/Fail)**

Certificate Value = 2437.6 dpm/mL  
 Lower Limit = 2536.821513 dpm/mL  
 Upper Limit = 2579.365917 dpm/mL  
**Rule 1 Pass/Fail** \*exception taken due to full recovery of standard  
 Two sigma = 21.27220197 dpm/mL  
 10 % of Mean = 255.8093715 dpm/mL  
**Rule 2 (Pass/Fail)** **Pass**

### Verification Rules

- Rule 1 =** The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 =** The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 =** The determined mean value shall be within 10% of the certificate value.

The analyst prepared three standard verification sources for Ra-226 source 0299-G by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Gold for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 4/02/08 using source 0024-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0024. Each verification source calculation was performed as follows:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

where:

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

RAD.SOP.M-001

*Henry St. Johnson 4/19/08*  
*David Dwyer 4/10/08*  
*WJN*

Ra-226 Verification Sheet

Cal #4

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
<del>141</del>	<del>1050</del>	<del>1130/09</del>	<del>2/3/09 1335</del>	<del>2/3/09 1710</del>	<del>401</del>	<del>4</del>	<del>8</del>	<del>6763</del>
<del>142</del>	<del>1050</del>	<del>1130/09</del>	<del>2/3/09 1335</del>	<del>2/3/09 1710</del>	<del>401</del>	<del>4</del>	<del>8</del>	<del>6763</del>
<del>143</del>	<del>1050</del>	<del>1130/09</del>	<del>2/3/09 1335</del>	<del>2/3/09 1710</del>	<del>401</del>	<del>4</del>	<del>8</del>	<del>6763</del>
<del>47</del>	<del>1050</del>	<del>1130/09</del>	<del>2/3/09 1335</del>	<del>2/3/09 1710</del>	<del>402</del>	<del>4</del>	<del>8</del>	<del>9067</del>
<del>14</del>	<del>1050</del>	<del>1130/09</del>	<del>2/3/09 1335</del>	<del>2/3/09 1710</del>	<del>403</del>	<del>4</del>	<del>8</del>	<del>7092</del>
<del>30</del>	<del>1050</del>	<del>1130/09</del>	<del>2/3/09 1400</del>	<del>2/3/09 1915</del>	<del>404</del>	<del>4</del>	<del>8</del>	<del>7877</del>
<del>42</del>	<del>1050</del>	<del>1130/09</del>	<del>2/3/09 1475</del>	<del>2/3/09 2035</del>	<del>405</del>	<del>4</del>	<del>8</del>	<del>8700</del>
<del>44</del>	<del>1050</del>	<del>1130/09</del>	<del>2/3/09 1500</del>	<del>2/3/09 2110</del>	<del>409</del>	<del>4</del>	<del>8</del>	<del>7949</del>
<del>15</del>	<del>1050</del>	<del>1130/09</del>	<del>2/3/09 1530</del>	<del>2/3/09 0830</del>	<del>410</del>	<del>4</del>	<del>8</del>	<del>1108</del>
<del>14</del>	<del>1050</del>	<del>1130/09</del>	<del>2/3/09 1545</del>	<del>2/3/09 1115</del>	<del>411</del>	<del>4</del>	<del>8</del>	<del>7582</del>
<del>13</del>	<del>1050</del>	<del>1130/09</del>	<del>2/3/09 1600</del>	<del>2/3/09 1150</del>	<del>412</del>	<del>4</del>	<del>8</del>	<del>9523</del>
<del>38</del>								
<del>36</del>								

16M 3/2/09  
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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 <del>4877</del>
7	500	2/20/09 1725	2/23/09 1130	2-23-09 1930	403	4	0	4011
42	500	2/20/09 1725	2/23/09 1310	2-23-09 1908	404	4	0	5005
<del>13</del>	<del>500</del>	<del>2/20/09 1725</del>	<del>2/23/09 1340</del>	<del>2-23-09 1955</del>	<del>405</del>	<del>4</del>	<del>0</del>	<del>4224</del>
31	500	2/20/09 1725	2/23/09 1405	2-23-09 2250	406	4		2355
44	500	2/20/09 1725	2/23/09 1435	2-23-09 2330	407	4		2359
<del>19</del>	<del>500</del>	<del>2/20/09 1725</del>	<del>2/23/09 1455</del>	<del>2-24-09 00:00</del>	<del>408</del>	<del>4</del>		<del>2598</del>
30	500	2/20/09 1725	2/23/09 1520	2-24-09 00:30	409	4	8	5887 <del>5887</del>
48	500	2/20/09 1725	2/23/09 1540	<del>2-24-09 0800</del> 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

140 2/23/09

140 2/18/09  
140 2/22/09

2/28/09-140

140 2/28/09

140 2/24/09

2/2/09  
3/2/09

140 3/2/09

140 2/25/09



Re-226 Verification Sheet

#4

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
28	500	2/20/09 1725	2/25/09 0755	2/25/09 1440	401	4	8	5677
15	500	2/20/09 1725	2/25/09 0815	2/25/09 1525	402	4	8	8017
14	500	2/20/09 1725	2/25/09 0835	2/25/09 1555	403	4	8	5562
40	500	2/20/09 1725	2/25/09 0855	2.25.09 20:20	404	4	8	7075
47	500	2/20/09 1725	2/25/09 1010	2.25.09 20:55	405	4	8	6721
10	500	2/20/09 1725	2/25/09 1040	2.26.09 09:22	406	4	8	7001
25	500	2/20/09 1725	2/25/09 1110	2.25.09 22:05	407	4	8	2827
22	500	2/20/09 1725	2/25/09 1145	2.25.09 22:45	408	4	8	5137
29	500	2/20/09 1725	2/25/09 1210	2/26/09 0810	409	4	8	5169
28	500	2/20/09 1725	2/25/09 1305	2/26/09 0850	410	4	8	6838
9	500	2/20/09 1725	2/25/09 1310	2/26/09 0930	411	4	8	6734
34	500	2/20/09 1725	2/25/09 1405	2/26/09 1015	412	4	8	7137

HQ 3/2/09  
 HQ 3/2/09  
 HQ 3/2/09  
 HQ 3/2/09

NOV 3/2/09

3/2/09

NOV 3/2/09

Cal # 4

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	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
NO MORE								

160312109  
6357  
160  
2/28/09

160  
312109

Ra-226 Verification Sheet

Cal # 4

5/10/12  
H2  
E

160  
2/12/09

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 38	500	1/25/09 14:00	3/2/09 10:30	3/2/09 13:40	405	4	8	8000

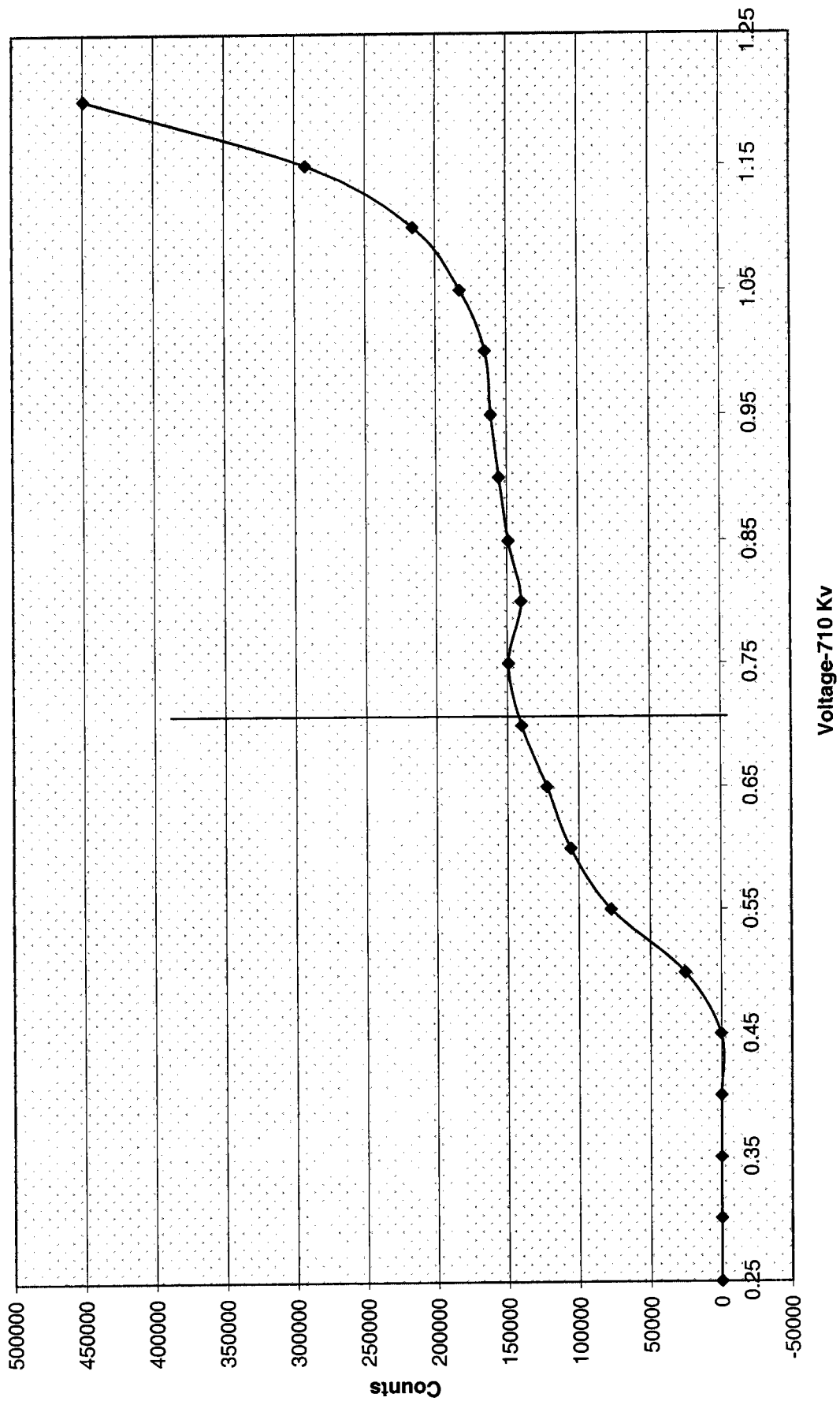
50/12/0

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

W 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 second standard standard(s) documentation? standard preparation information? standard < 1 Year old or verified?	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
2) Is the efficiency calibration report included ?	<input checked="" type="checkbox"/>		
3) Is the raw count data included for: Cell constant determination? Plateau generation?	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
4) Are the calibration verifications included?	<input checked="" type="checkbox"/>		
5) Are the instrument settings included: HVPS settings?	<input checked="" type="checkbox"/>		
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	3376	0.9960
504	1.592	47	3/6/2009 10:30	3/5/2009 9:40	2/25/2009 14:00	7282	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	3/11/2009 16:50	3/10/2009 16:35	3/5/2009 14:00	7283	30	242.77	243.03	5.10764	1.01042	3375	0.9960
511	2.041	37	3/12/2009 22:40	3/12/2009 13:10	3/6/2009 15:25	9088	30	302.27	243.03	5.90625	0.39583	3376	0.9960
512	1.796	48	3/11/2009 17:35	3/10/2009 16:50	3/5/2009 14:00	6542	30	218.07	243.03	5.11806	1.03125	3375	0.9960
512	2.100	38	3/12/2009 23:15	3/12/2009 13:30	3/6/2009 15:25	9322	30	310.73	243.03	5.92014	0.40625	3376	0.9960
512	1.972	48	3/18/2009 13:00	3/17/2009 14:00	3/10/2009 14:00	8653	30	288.43	243.03	7.00000	0.95833	3382	0.9960

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

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

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

Cal # 5

no 3124109  
3119109

3/19/09

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 15	500	2/25/09 1400	3/3/09 0815	3/6/09 0750	501	5	8	5781
<del>Cal 14</del>	<del>500</del>	<del>2/25/09 1400</del>	<del>2/25/09 0845</del>	<del>3/6/09 0840</del>	<del>502</del>	<del>5</del>	<del>1</del>	<del>4700</del>
		2/25/09 1400	3/3/09		503	5	100 313109	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



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

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219 3116109

Calibration  
Ra-226 Verification Sheet  
3/19/09

WD 3124109

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 42	500	3/6/09 1525	3/12/09 1110	3/11/09 1330	501	5	8	10210
Cal 19	500	3/6/09 1525	3/12/09 1035 1045 1055	3/11/09 1470	502	5	8	8243
Cal 44	500	3/6/09 1525	3/12/09 1000	3/12/09 1450	503	5	2	7214
<del>Cal 40</del>	<del>500</del>	<del>3/6/09 1525</del>	<del>3/12/09 1035</del>	<del>3/11/09 1535</del>	<del>504</del>	<del>5</del>	<del>0</del>	<del>4202</del>
Cal 7	500	3/6/09 1525	3/12/09 1050	3/12/09 1701	505	5	5	9884
Cal 13	500	3/6/09 1525	3/12/09 1115	3/12/09 17:40	506	5	8	8554
Cal 43	500	3/6/09 1525	3/12/09 1135	3/12/09 18:30	507	5	6	7535
Cal 2	500	3/6/09 1525 1403/12/09	3/12/09 1200	3/12/09 20:45	508	5	0	6680
Cal 36	500	3/6/09 1525	3/12/09 1235	3/12/09 21:20	509	5	8	8049
Cal 35	500	3/6/09 1525	3/12/09 1250	3/12/09 21:55	510	5	1	6589
Cal 37	500	3/6/09 1525	3/12/09 1310	3/12/09 22:40	511	5	8	9068
Cal 38	500	3/6/09 1525	3/12/09 1330	3/12/09 23:15	512	5	5	9322

3/19/09

Calibration  
Ra-226 Verification Sheet

Cal # 5's

3/25/09

VLO  
3/22/09  
VLO  
3/22/09

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>3/10/09 1400</del>	<del>3/17/09 1250</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	3/5/09 1400	3/10/09 1527	3/11/09 1420	507	5	4	6315

3/25/09  
3/25/09

# 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>

100 3124109

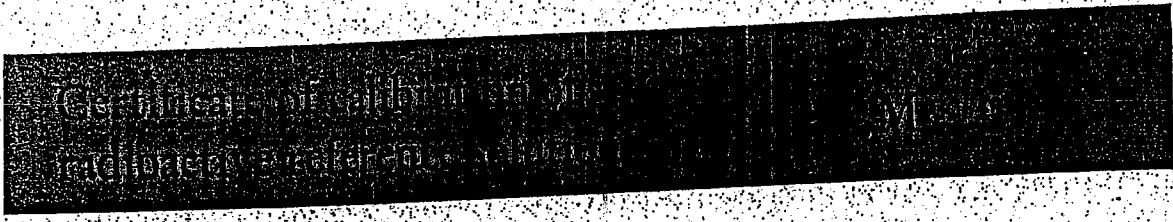
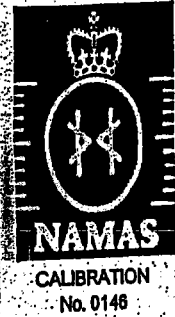
3/12/09  
CM

3/12/09  
3124109

8-21-00

Nycomed Amersham plc  
Amersham Laboratories

0299



Nycomed Amersham plc  
Radiation & Radioactivity  
Calibration Laboratory  
Amersham Laboratories  
White Lion Road  
Amersham  
Buckinghamshire  
HP7 9LL

ISSUED  
FOR:

AEA Technology plc  
Isotrak  
Amersham Laboratories  
White Lion Road  
Amersham  
Buckinghamshire  
HP7 9LL

ion Principal radionuclide: Radium-226

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

ment Reference time: 1200 GMT on 15 December 1999

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

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

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

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

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



# Standard Traceability Log Rad

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

A Solution Material Info	
Isotope:	Radium-226
Prepared By:	Angela Johnson
Prep Date:	09/15/2000
Verification Date:	01/23/2008
Expiration Date:	01/23/2009
Primary Code:	0299-A
Dilution(mL):	100 mL
Mass of Parent(g):	4.6634 g
Density(g/mL):	1.0012
Balance ID:	

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

$$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$$

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

$$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 122414.2500 \text{ dpm/mL}$$

$$(4.6634 \text{ g}) * (43.75 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0012 \text{ g/mL}) / (100 \text{ mL}) = 122273.3377 \text{ dpm/g}$$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
08/26/2003	Angela Johnson	1.9909	100	0299-E	2434.34 dpm/mL	11/04/2004	11/04/2005
08/26/2003	Angela Johnson	1.9872	100	0299-F	2429.82 dpm/mL	08/26/2004	08/26/2005
04/05/2005	Amanda Fehr	5.0018	250	0299-G	2446.3471 dpm/mL	04/02/2008	04/02/2009

GEL Laboratories LLC  
Version 1.0 9/18/2000

*Kelli Dorell*

# Verification for Ra-226 Standard 0299-G

4/2/2008	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard Mass. Used (G)	Source DPM/G
D. Roy	0299-G N1	2536.9600	52.4000	2484.5600	1.917186	0.5057	2562.667649
	0299-G N2	2520.2500	52.4000	2467.8500	1.917186	0.5056	2545.935781
	0299-G N3	2532.5000	52.4000	2480.1000	1.917186	0.5042	2565.677715
						Average =	2558.093715

Mean Value (Counting) = 2558.093715  
 Stdev = 10.63610098

Certificate Value = 2437.6 dpm/mL  
 Lower Limit = 2536.821513 dpm/mL  
 Upper Limit = 2579.365917 dpm/mL  
 Rule 1 Pass/Fail = **Fail** \*exception taken due to full recovery of standard  
 Two sigma = 21.27220197 dpm/mL  
 10 % of Mean = 255.8093715 dpm/mL  
 Rule 2 (Pass/Fail) = **Pass**

### Verification Rules

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 = The determined mean value shall be within 10% of the certificate value.

The analyst prepared three standard verification sources for Ra-226 source 0299-G by transferring portions of the standard into tared glass liquid scintillation vials. One mL of DI Water and ten mLs of Ready Gel liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ready Gel cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Gold for Radium source standard verification. The Ra-226 efficiency calibration which was used for verification calculations was performed on 4/02/08 using source 0024-A (Ra-226). Calibration data is recorded in this logbook under Ra-226 0024. Each verification source calculation was performed as follows:

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  
 41912  
 David Dwyer 4/10/08

**General Engineering Laboratories**  
**Verification Source Preparation Sheet**  
*Calibration*

Applicable SOP Number GL RAD-A-008 Isotope RA-226  
 Date Standards Prepared 4/15/09 Cocktail Type Used NA  
 Standard ID 0249-G Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 NA  
 Standard Activity (DPM/g or ml) 2446.347 Type of Scintillation Vial NA  
 Reference Date 12/15/99 Pipette ID Used 1429303  
 Expiration Date 4/2/09 Balance ID Used 36240216  
 Residue/Carrier Agent D.5M HCl Quenching Agent NA

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
15	Ca115				
46	Ca146				
47	Ca147				
16	Ca116				
25	Ca125				
23	Ca123				
39	Ca139				
28	Ca128				
9	Ca19				
34	Ca134				
42	Ca142				
19	Ca119				
44	Ca144				
7	Ca17				
13	Ca113				

VLD 3/24/09

Prepared By: Kelli D'Amore Date 3/24/09  
 Reviewed By: \_\_\_\_\_ Date \_\_\_\_\_

Rev 1 RLM 9/10/97



**General Engineering Laboratories**  
**Verification Source Preparation Sheet**  
*Calibration*

*3/25/09*

Applicable SOP Number GLDMP-A-008 Isotope DIA 226

Date Standards Prepared 4/5/09 Cocktail Type Used NA

Standard ID 02946 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 \_\_\_\_\_

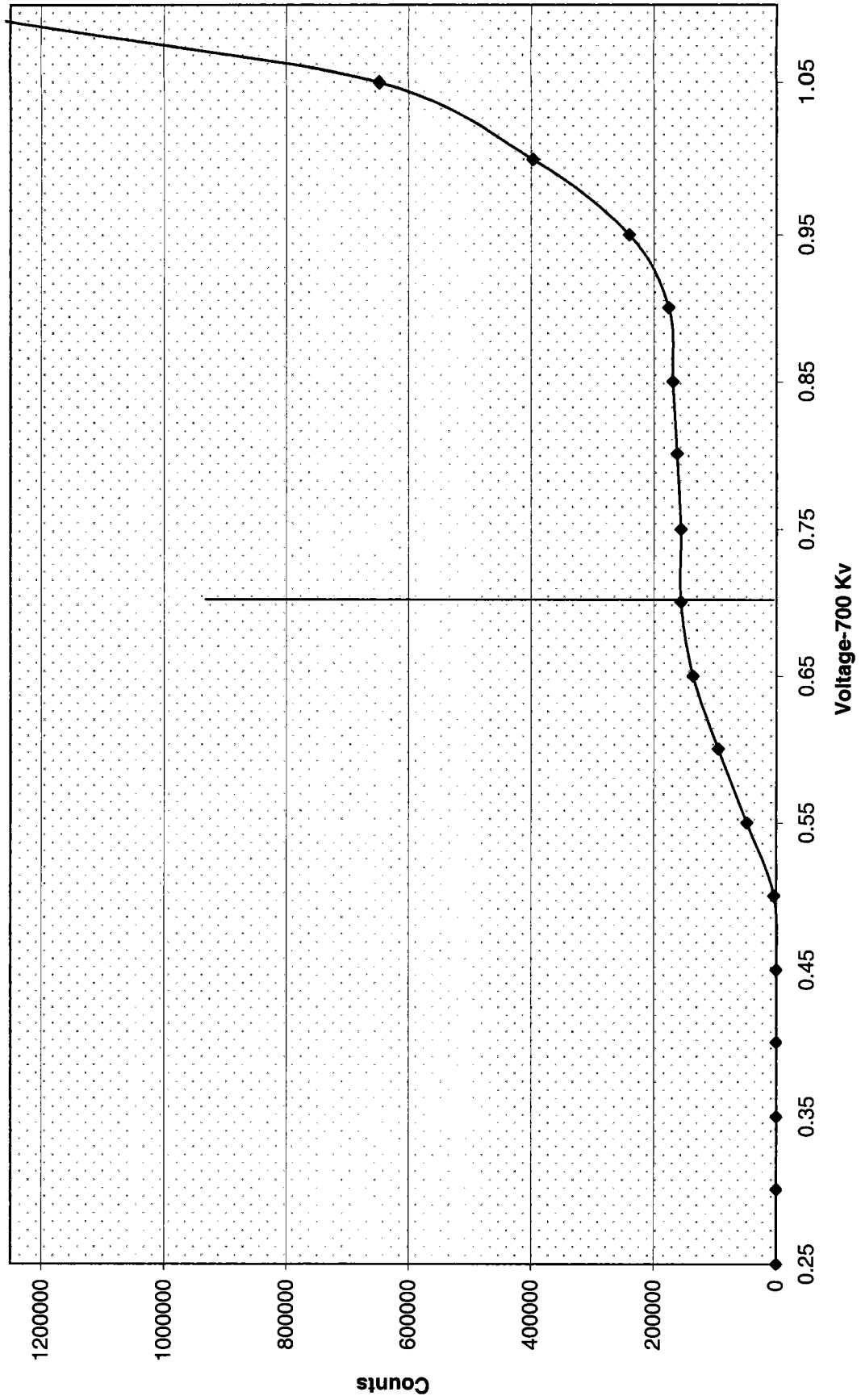
Rev 1 RLM.9/10/97

Voltage

Voltage Curve Ludlum # 5				
Volts	Counts	Date	Time	Detector
0.00	0	2/25/2009	9:20	5
0.05	0	2/25/2009	9:20	5
0.10	0	2/25/2009	9:20	5
0.15	0	2/25/2009	9:20	5
0.20	0	2/25/2009	9:20	5
0.25	0	2/25/2009	9:20	5
0.30	0	2/25/2009	9:20	5
0.35	0	2/25/2009	9:20	5
0.40	0	2/25/2009	9:20	5
0.45	0	2/25/2009	9:20	5
0.50	3611	2/25/2009	9:20	5
0.55	47984	2/25/2009	9:20	5
0.60	94752	2/25/2009	9:20	5
0.65	135854	2/25/2009	9:20	5
0.70	155952	2/25/2009	9:20	5
0.75	155696	2/25/2009	9:20	5
0.80	161972	2/25/2009	9:20	5
0.85	168840	2/25/2009	9:20	5
0.90	175598	2/25/2009	9:20	5
0.95	239969	2/25/2009	9:20	5
1.00	397249	2/25/2009	9:20	5

UD 3/25/09

# Ludlum 5 Voltage Curve



KAP 3/24/09

# Ra-226 WATER

Batch : LCSVER  
 Date : 2/20/2008  
 Analyst : DXM2

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

Bkg Count Time: 30 min Instrument Used : LUCAS CELL DETECTOR

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	Ra-226 RESULT pCi/L	Ra-226 ERROR pCi/L	COUNT DATE/TIME
Ver 1	0.500	30	766	501	2.087	0.267	0.6041	28.8142	2.0728	3/16/2009 15:10
Ver 2	0.500	30	537	502	1.878	0.167	0.5682	23.0223	1.9747	3/16/2009 19:25
Ver 3	0.500	30	518	503	1.601	0.267	0.8071	25.9035	2.2832	3/16/2009 20:20
Ver 4	0.500	30	701	504	1.615	0.267	0.6021	26.2570	1.9774	3/20/2009 19:00
Ver 5	0.500	30	680	505	2.331	0.033	0.2559	23.5744	1.7758	3/16/2009 22:00
Ver 6	0.500	30	893	506	2.004	0.267	0.4859	27.0593	1.7988	3/20/2009 19:40
Ver 7	0.500	30	488	507	1.701	0.267	0.7287	22.0004	2.0008	3/16/2009 23:00
Ver 8	0.500	30	544	508	1.534	0.033	0.3760	27.7023	2.3344	3/16/2009 23:30
Ver 9	0.500	30	768	509	1.798	0.267	0.5430	25.9694	1.8657	3/20/2009 20:50
Ver 10	0.500	30	432	510	1.458	0.033	0.3700	21.6379	2.0476	3/17/2009 5:00
Ver 11	0.500	30	577	511	1.959	0.267	0.5934	21.2369	1.7694	3/17/2009 5:35
Ver 12	0.500	30	723	512	1.956	0.267	0.5945	26.7349	1.9815	3/17/2009 6:10

Sample ID	Sample Dup	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
501		5	3/16/2009 15:10	LCS	0638-F	24.05	pCi/L	120%
502		5	3/16/2009 19:25	LCS	0638-F	24.05	pCi/L	96%
503		5	3/16/2009 20:20	LCS	0638-F	24.05	pCi/L	108%
504		5	3/20/2009 19:00	LCS	0638-F	24.05	pCi/L	109%
505		5	3/16/2009 22:00	LCS	0638-F	24.05	pCi/L	98%
506		5	3/20/2009 19:40	LCS	0638-F	24.05	pCi/L	113%
507		5	3/16/2009 23:00	LCS	0638-F	24.05	pCi/L	91%
508		5	3/16/2009 23:30	LCS	0638-F	24.05	pCi/L	115%
509		5	3/20/2009 20:50	LCS	0638-F	24.05	pCi/L	108%
510		5	3/17/2009 5:00	LCS	0638-F	24.05	pCi/L	90%
511		5	3/17/2009 5:35	LCS	0638-F	24.05	pCi/L	88%
512		5	3/17/2009 6:10	LCS	0638-F	24.05	pCi/L	111%

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM	Ingrowth constant
3/13/2009 15:30	3/16/2009 9:45	66.25	5.42	0.3936	0.9599	1.0019	25.2667	0.3785
3/13/2009 15:30	3/16/2009 10:10	66.67	9.25	0.3955	0.9325	1.0019	17.7333	0.3695
3/13/2009 15:30	3/16/2009 10:30	67.00	9.83	0.3970	0.9284	1.0019	17.0000	0.3693
3/16/2009 14:00	3/20/2009 13:05	95.08	5.92	0.5122	0.9563	1.0019	23.1000	0.4908
3/13/2009 15:30	3/16/2009 11:25	67.92	10.58	0.4012	0.9232	1.0019	22.6333	0.3711
3/16/2009 14:00	3/20/2009 13:20	95.33	6.33	0.5131	0.9533	1.0019	29.5000	0.4901
3/13/2009 15:30	3/16/2009 13:50	70.33	9.17	0.4120	0.9331	1.0019	15.9997	0.3852
3/13/2009 15:30	3/16/2009 13:50	70.33	9.67	0.4120	0.9296	1.0019	18.1000	0.3837
3/16/2009 14:00	3/20/2009 13:45	95.75	7.08	0.5147	0.9479	1.0019	25.3333	0.4888
3/13/2009 5:30	3/16/2009 14:25	80.92	14.58	0.4571	0.8957	1.0019	14.3667	0.4103
3/13/2009 5:30	3/16/2009 14:45	81.25	14.83	0.4585	0.8941	1.0019	18.9663	0.4107
3/13/2009 5:30	3/16/2009 15:00	81.50	15.17	0.4595	0.8918	1.0019	23.8330	0.4106

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
<del>VUX 1</del>	<del>500</del>	<del>3/16/09 1530</del>	<del>3/16/09 0945</del>	<del>3/16/09 1510</del>	<del>501</del>	<del>5</del>	<del>8</del>	<del>766</del>
VUX 2	500	3/13/09 1530	3/16/09 1010	3/16/09 1925	502	5	85 <small>140 3124109</small>	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 <small>140 3124109</small>	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 <small>140 3124109</small>	544
<del>VUX 9</del>	<del>500</del>	<del>3/13/09 1530</del>	<del>3/16/09 1410</del>	<del>3/17/09 0445</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 <small>0535</small>	510	5	8 <small>140 3124109</small>	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

140  
3124109

140  
3124109

140  
3124109

3/25/09  
3/25/09

3/17/09  
140

# Ra-226 Verification Sheet

Standard ID: 0638F  
 Volume Added (mL): 0.1  
 Expiration Date: 12/10

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background Counts	Total Counts
<del>VEN 1</del>	<del>500</del>	<del>3/16/09 1400</del>	<del>3/20/09 1245</del>	<del>3/20/09 1820</del>	<del>501</del>	<del>5</del>	<del>8</del>	<del>70</del>
VEN 2	500	3/16/09 1400	3/20/09 1305	3/20/09 1900	504	5	8	701
VEN 3	500	3/16/09 1400	3/20/09 1320	3/30/09 1940 <i>10/10/09 1940</i>	506	5	8	893
VEN 4	500	3/16/09 1400	3/20/09 1345	3/30/09 2050 <i>10/10/09 2050</i>	509	5	8	768

AV 3/24/09

6/17/09

100 3/24/09

## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number <u>GL-APP-D-008</u>	Isotope <u>PA 226</u>
Date Standards Prepared <u>11/6/09</u>	Cocktail Type Used <u>NA</u>
Standard ID <u>0638-F</u>	Matrix of Vial/Planchett <u>NA</u>
Amount Used (g or mL) <u>0.1</u>	<u>NA</u>
Standard Activity (DPM/g or mL) <u>267.519</u>	Type of Scintillation Vial <u>NA</u>
Reference Date <u>11/23/04</u>	Pipette ID Used <u>1429303</u>
Expiration Date <u>2/2/10</u>	Balance ID Used <u>38080204</u>
Residue/Carrier Agent <u>NA</u>	Quenching Agent <u>NA</u>

#	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	Ver 1				
2	Ver 2				
3	Ver 3				
4	Ver 4				
5	Ver 5				
6	Ver 6				
7	Ver 7				
8	Ver 8				
9	Ver 9				
10	Ver 10				
11	Ver 11				
12	Ver 12				

Prepared By: Kelli Daniels Date: 3/24/09  
 Reviewed By: Angela A. G... Date: 3/25/09



# GEL Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0638	Isotope:	Radium-226
Prepared By:	Amanda Fehr	Prepared By:	Amanda Fehr
Carrier Conc:	0.1M HCl	Prep Date:	01/16/2006
Reference Date:	01/23/2004	Verification Date:	03/04/2007
Ampoule Mass (g):	5.01065 g	Expiration Date:	03/04/2008
Uncertainty:	+/- 3.3 %	Primary Code:	0638-A
LogBook No:	RC-S-037-037	Dilution(mL):	100 mL
		Mass of Parent(g):	4.8398 g
		Density(g/mL):	1.0266
		Balance ID:	38080204

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

$(\text{Mass of parent(g)}) * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.8398 \text{ g}) * (23530 \text{ dps}) * (60 \text{ dpm/dps}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13636.6133 \text{ dpm/mL}$
$(4.8398 \text{ g}) * (23530 \text{ dps}) * (60 \text{ dpm/dps}) / (1.0266 \text{ g/mL}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13282.9676 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
01/17/2006	Amanda Fehr	2.1041	100	0638-B	279.0211 dpm/mL	01/17/2007	01/17/2008
07/17/2006	Mary Aders	2.1313	100	0638-C	282.6281 dpm/mL	07/26/2006	07/26/2007
03/28/2007	Daniel Roy	2.1025	100	0638-D	279.2744 dpm/ml	04/08/2007	04/08/2008
03/28/2007	Daniel Roy	45.468	250	0638-E	2415.7999 dpm/ml	04/09/2008	04/08/2009
12/18/2007	Daniel Roy	2.014	100	0638-F	267.519 dpm/ml	02/02/2009	02/02/2010
02/12/2008	Daniel Roy	.5004	100	0638-G	66.468 dpm/ml	03/04/2008	03/04/2009
07/23/2008	Daniel Roy	5.0607	250	0638-H	268.8845 dpm/ml	07/23/2008	07/23/2009

## Verification for Ra-226 Standard 0638-F

D. Roy 2/2/2009	<b>Isotope</b>	<b>Value</b>	<b>Uncertainty</b>
	0638-F #1	24.629	1.7426
	0638-F #2	24.438	1.7557
	0638-F #3	22.791	1.6808
<b>Mean Value (Counting) =</b>	23.953	99.60	<b>Pass</b>
<b>Stdev =</b>	1.010781096		<b>Rule 3 (Pass/Fail)</b>
<b>Target =</b>	24.05		
<b>Lower Limit =</b>	21.93100448		
<b>Upper Limit =</b>	25.97412886		
<b>Rule 1 Pass/Fail</b>	<b>Pass</b>		
<b>Two sigma =</b>	2.021562191		
<b>10 % of Mean =</b>	2.395256667		
<b>Rule 2 (Pass/Fail)</b>	<b>Pass</b>		

**Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements**

**Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.**

**Rule 3 = The determined mean value shall be within 5% of the certificate value.**

The analyst prepared three standard verification sources for standard 0638-F using 0.1 mL for each source. Each source was counted using routine Lucas cell procedures. Calibration for 0299-G was used in this verification.

140 3124109

**General Engineering Laboratories**

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

**Lucas Cell Calibration Package**

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate?	✓		
the second 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: KD Denee

Date: 8/4/09

Reviewed By: Angela Ghe

Date: 8/6/09

Effective Date: 8/4/09

*KD 8/6/09*

# Ra-226 Cell Constants

Standard Reference date: 12/15/1999  
 Standard ID: 0299-G  
 Volume added (mL): 0.1  
 Standard Reference Activity (DPM/mL): 2446.3471

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/time flushed to cell	Date/time end of degas	total counts	count time min	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count
601	2.164	Average	5/26/2009 13:30	5/26/2009 9:30	5/19/2009 14:00	10883	30	362.77	6.81250	0.16667	3451	0.9959
601	2.253	Stdev	5/22/2009 12:55	5/22/2009 9:15	5/19/2009 14:00	6378	30	212.60	2.80208	0.15278	3447	0.9959
601	2.126		5/29/2009 14:45	5/29/2009 9:50	5/22/2009 10:45	10735	30	357.83	6.96181	0.20486	3454	0.9959
602	2.007	Average	5/29/2009 15:20	5/29/2009 10:15	5/22/2009 10:45	10133	30	337.77	6.97917	0.21181	3454	0.9959
602	2.194	Stdev	5/26/2009 14:05	5/26/2009 9:55	5/19/2009 14:00	11033	30	367.77	6.82986	0.17361	3451	0.9959
602	2.304		6/2/2009 14:45	6/2/2009 11:30	5/29/2009 9:50	8575	30	285.83	4.06944	0.13542	3458	0.9959
604	2.244	Average	6/2/2009 15:50	6/2/2009 11:50	5/29/2009 9:50	8321	30	277.37	4.08333	0.16667	3458	0.9959
604	2.076	Stdev	5/29/2009 15:55	5/29/2009 10:45	5/22/2009 12:00	10451	30	348.37	6.94792	0.21528	3454	0.9959
604	2.079		5/26/2009 15:45	5/26/2009 10:20	5/19/2009 14:00	10372	30	345.73	6.84722	0.22569	3451	0.9959
605	2.096	Average	5/26/2009 16:15	5/26/2009 10:50	5/19/2009 14:00	10474	30	349.13	6.86806	0.22569	3451	0.9959
605	2.228	Stdev	5/22/2009 16:25	5/22/2009 10:45	5/19/2009 14:00	6318	30	210.60	2.86458	0.23611	3447	0.9959
605	2.122		5/29/2009 17:15	5/29/2009 11:05	5/22/2009 12:50	10587	30	352.90	6.92708	0.25694	3454	0.9959
606	2.543	Average	5/29/2009 17:45	5/29/2009 13:10	5/26/2009 9:30	7816	30	260.53	3.15278	0.19097	3454	0.9959
606	2.202	Stdev	5/26/2009 16:45	5/26/2009 12:25	5/22/2009 12:00	8057	30	268.57	4.01736	0.18056	3451	0.9959
606	2.298		6/2/2009 18:20	6/2/2009 12:55	5/29/2009 9:50	8495	30	283.17	4.12847	0.22569	3458	0.9959
607	2.454	Average	6/2/2009 19:00	6/2/2009 13:10	5/29/2009 9:50	9057	30	301.90	4.13889	0.24306	3458	0.9959
607	2.572	Stdev	5/29/2009 19:00	5/29/2009 13:25	5/26/2009 9:55	7832	30	261.07	3.14583	0.23264	3454	0.9959
607	2.325		5/26/2009 17:15	5/26/2009 12:50	5/22/2009 12:00	8527	30	284.23	4.03472	0.18403	3451	0.9959
609	2.277	Average	5/26/2009 19:20	5/26/2009 13:10	5/22/2009 12:00	8261	30	275.37	4.04861	0.25694	3451	0.9959
609	2.280	Stdev	5/22/2009 19:20	5/22/2009 12:00	5/19/2009 14:00	6473	30	215.77	2.91667	0.30556	3447	0.9959
609	2.392		5/29/2009 19:40	5/29/2009 13:45	5/26/2009 10:20	7261	30	242.03	3.14236	0.24653	3454	0.9959
611	2.488	Average	5/29/2009 20:20	5/29/2009 14:00	5/26/2009 10:50	7510	30	250.33	3.13194	0.26389	3454	0.9959
611	2.245	Stdev	5/26/2009 22:00	5/26/2009 13:25	5/22/2009 12:00	8010	30	267.00	4.05903	0.35764	3451	0.9959
611	2.187		6/2/2009 19:50	6/2/2009 13:25	5/29/2009 9:50	8052	30	268.40	4.14931	0.26736	3458	0.9959

EffEr 0.066051 ← Put in Machines.xls (Lucas Cell Tab)

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

*Original of 9/16/09*  
*WJ 8/16/09*

601	2.181	8/4/2009
602	2.168	8/4/2009
604	2.133	8/4/2009
605	2.149	8/4/2009
606	2.348	8/4/2009
607	2.45	8/4/2009
609	2.316	8/4/2009
611	2.307	8/4/2009

<b>Lucas</b>	<b>Ra-226</b>	
<b>Oldest Cal</b>	<b>01/23/2008</b>	
<b>Detector</b>	<b>Eff Error</b>	<b>Cal Date</b>
1	0.0958	8/29/2008
2	0.0772	12/19/2008
3	0.0608	1/23/2008
4	0.1237	3/2/2009
5	0.1438	3/25/2009
6	0.0661	8/4/2009
7	0.0855	11/21/2008

**General Engineering Laboratories  
Calibration Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-008

Isotope Ra226

Date Standards Prepared 4/5/05

Cocktail Type Used NA

Standard ID 0299-G

Matrix of Vial/Planchett NA

Amount Used (g or ml) 0.1

NA  
NA

Standard Activity (DPM/g or mL) 2446.3471

Type of Scintillation Vial NA

Reference Date 12/15/99

Pipette ID Used 1429303

Expiration Date 1/26/10

Balance ID Used 38080204

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	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				

JBG  
8/4/09

JBG  
8/4/09

Prepared By: Kelli Rowell Date 8/4/09

Reviewed By: Angel J Gh Date 8/4/09

Rev 1 RLM 9/10/97

10/8/10/05

# Ra-226 Calibration Sheet

Standard ID: ~~0299-G~~ 0299-G  
 Volume Added (mL): 0.1 \*19814109

Expiration Date: ~~4/4/10~~ \*19814109

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 5	500	5/22/09 1045	5/24/09 0950	5/29/09 14:45	601	6	10735
Cal 6	500	5/22/09 1045	5/24/09 1015	5/29/09 15:20	602	6	10133
Cal 7	500	5/22/09 1200	5/24/09 1045	5/29/09 15:55	604	6	10451
Cal 8	500	5/22/09 1250	5/24/09 1105	5/29/09 17:15 <del>17:20</del>	605	6	10587
Cal 9	500	5/24/09 0930	5/24/09 1310	5/29/09 17:45	606	6	7816
Cal 10	500	5/24/09 0955	5/24/09 1325	5/29/09 19:00	607	6	7832
Cal 11	500	5/24/09 1000	5/24/09 1345	5/29/09 19:40	609	6	7261
Cal 12	500	5/24/09 1050	5/24/09 1400	5/29/09 20:20	611	6	7510
					608	6	

\*19814109  
 \*19814109



# Ra-226 Calibration Sheet

Standard ID: ~~0299-6~~ 0299-6  
 Volume Added (mL): 0.1 ~~1126110~~ 1126110  
 Expiration Date: ~~1126110~~ 1126110

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 1	500	5/19/09 1400	5/22/09 0915	5/20/09 1255	601	6	6318
<del>Cal 2</del>	<del>500</del>	<del>5/19/09 1400</del>	<del>5/22/09 0945</del>	<del>5/22/09 1325</del>	<del>602</del>	<del>6</del>	<del>6358</del>
<del>Cal 3</del>	<del>500</del>	<del>5/19/09 1400</del>	<del>5/22/09 1010</del>	<del>5/22/09 1420</del>	<del>604</del>	<del>6</del>	<del>4600</del>
Cal 4	500	5/19/09 1400	5/22/09 1045	5/22/09 1625	605	6	6318
<del>Cal 5</del>	<del>500</del>	<del>5/19/09 1400</del>	<del>5/22/09 1115</del>	<del>5/22/09 1700</del>	<del>606</del>	<del>6</del>	<del>6494</del>
<del>Cal 6</del>	<del>500</del>	<del>5/19/09 1400</del>	<del>5/22/09 1140</del>	<del>5/22/09 1735</del>	<del>607</del>	<del>6</del>	<del>6428</del>
Cal 7	500	5/19/09 1400	5/22/09 1200	5/22/09 1920	609	6	6473
<del>Cal 8</del>	<del>500</del>	<del>5/19/09 1400</del>	<del>5/22/09 1250</del>	<del>5/22/09 2035</del>	<del>611</del>	<del>6</del>	<del>6455</del>
Cal 9							
Cal 10							
Cal 11							
Cal 12							

100 814109  
 100 814109  
 100 814109  
 100 814109  
 100 814109  
 6162-100 814109

11/11/09

249  
 814109  
 100 816109

### Ra-226 Calibration Sheet

Standard ID: ~~0299-G~~ 0299-G  
 Volume Added (mL): 0.1 ~~0.1~~ 0.1 ~~0.1~~ 0.1 ~~0.1~~ 0.1 ~~0.1~~ 0.1  
 Expiration Date: 4/24/09 ~~1/26/10~~ 04/24/09 ~~04/24/09~~

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 5	500	5/24/09 0450	6/12/09 1130	6/12/09 1445	602	6	8575
Cal 6	500	5/24/09 0450	6/12/09 1150	6/12/09 1650	604	6	8321
Cal 7	500	5/24/09 0450	6/12/09 1255	6.2.09 1820	606	6	8495
Cal 8	500	5/24/09 0450	6/12/09 1310	6.2.09 1900	607	6	9057
Cal 9	500	5/24/09 0450	6/12/09 1325	6.2.09 1950	611	6	8052
MA 8/11/09							

8/11/09  
 RA  
 04876605

### Ra-226 Calibration Sheet

Standard ID: ~~10386~~ 0299-G  
 Volume Added (mL): 0.1 419 814109  
 Expiration Date: ~~11/26/10~~ 419 514109

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 9	500	5/19/09 1400	5/26/09 1430	5/26/09 1330	601	6	10883
Cal 10	500	5/19/09 1400	5/26/09 1455	5/26/09 1405	602	6	11033
Cal 11	500	5/19/09 1400	5/26/09 1020	5/26/09 1545	604	6	10372
Cal 12	500	5/19/09 1400	5/26/09 1050	5/26/09 1615	605	6	10474
Cal 1	500	5/22/09 1200	5/26/09 1725	5/26/09 1645	606	6	8857
Cal 2	500	5/22/09 1200	5/26/09 1250	5/26/09 1715	607	6	8527
Cal 3	500	5/22/09 1200	5/26/09 1310	5/26/09 1920	609	6	8261
Cal 4	500	5/22/09 1200	5/26/09 1325	5/26/09 2200	611	6	8010
				608			

419 814109  
 419 814109

EEC

8-21-00

Nycomed Amersham plc  
Amersham Laboratories

0299

CALIBRATION  
No. 0146

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

ISSUED FOR: AEA Technology plc  
Isotrak  
Amersham Laboratories  
White Lion Road  
Amersham  
Buckinghamshire  
HP7 9LL

Description Principal radionuclide: Radium-226

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

Measurement Reference time: 1200 GMT on 15 December 1999

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

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

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

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

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

Approved  
Signature

Date of issue

17<sup>th</sup> December 1999

Nycomed  
Amersham

## Verification for Ra-226 Standard 0299-G

M. Aders 1/26/2009	Isotope	Value DPM	Uncertainty
	0299-A #1	220.970	0.2670
	0299-A #2	241.730	0.2670
	0299-A #3	257.470	0.2670
<b>Mean Value (Counting) =</b>	240.057	98.52	<b>Pass</b>
<b>Stdev =</b>	18.30744475		<b>Rule 3 (Pass/Fail)</b>
<b>Target =</b>	243.67		
<b>Lower Limit =</b>	203.4417772		
<b>Upper Limit =</b>	276.6715562		
<b>Rule 1 Pass/Fail</b>	<b>Pass</b>		
<b>Two sigma =</b>	36.6148895		
<b>10 % of Mean =</b>	24.00566667		
<b>Rule 2 (Pass/Fail)</b>	<b>Fail</b>	<b>*exception taken due to full recovery of standard</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 0299-A using 0.1 mL for each source. Each standard was degassed and transferred according to SOP GL-RAD-A-008. Each source was counted using Ra-226 procedures.

*M. Aders 241.9*  
*August 9th 8/4/09*

# Ra-226 Cell Constants

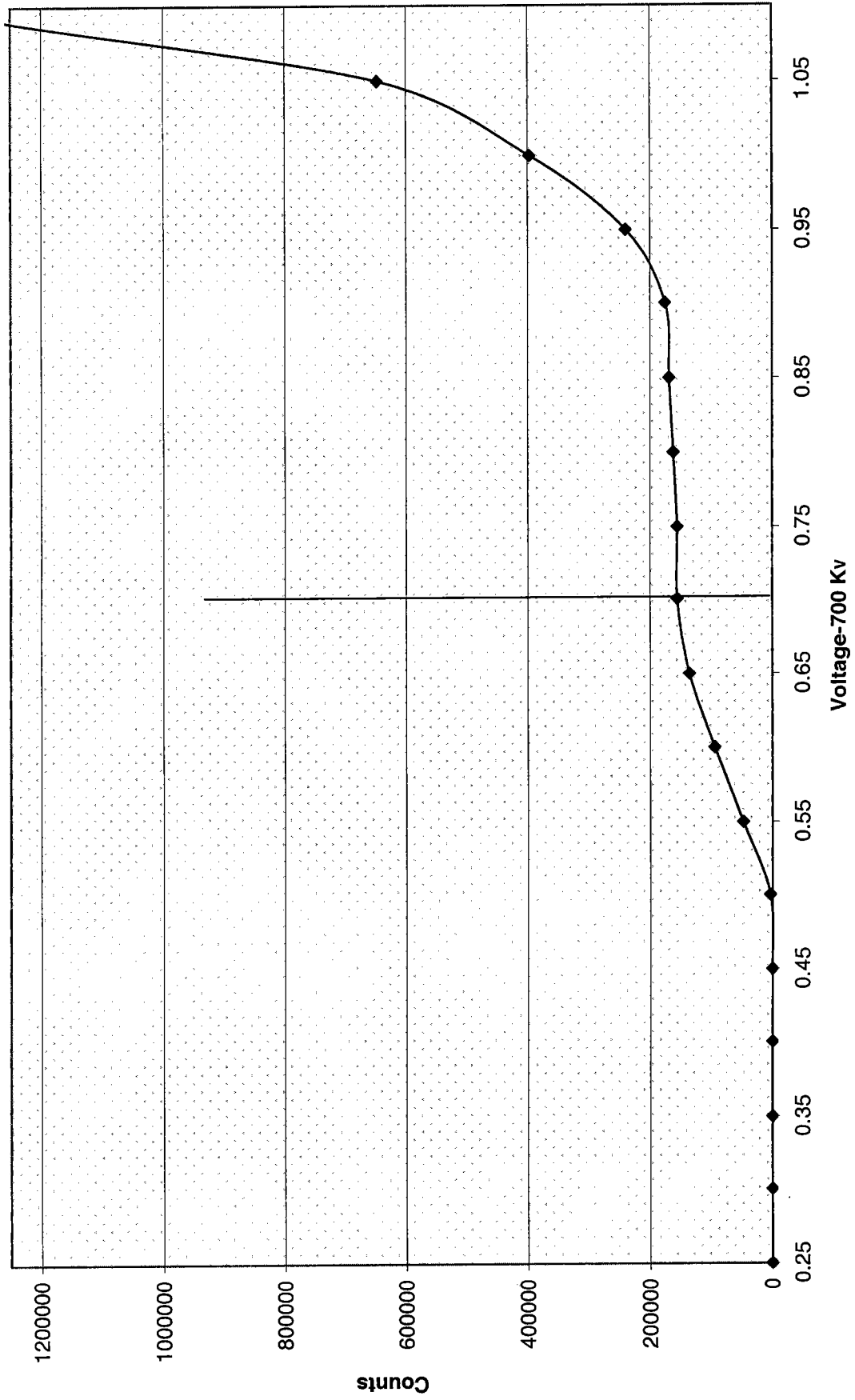
Standard Reference date: 12/15/1999  
standard ID: 0299-G  
Volume added (mL): 0.1  
Standard Reference Activity (DPM/mL): 2446.35

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	2.021	43	39839.60764	39839.39236	39835.38194	0.267	7282	30	242.73	243.6698	4.01041667	0.2152778	3330.607639	0.996055555
302	2.131	47	39839.64583	39839.41319	39835.38194	0.267	7555	30	251.83	243.6698	4.03125	0.2326389	3330.645833	0.996055551
303	2.136	19	39839.72222	39839.43403	39835.38194	0.267	8028	30	267.60	243.6697	4.05208333	0.2881944	3330.722222	0.996055419

Voltage Curve Ludlum # 6				
Volts	Counts	Date	Time	Detector
0.00	0	5/20/2009	9:00	6
0.05	0	5/20/2009	9:01	6
0.10	0	5/20/2009	9:02	6
0.15	0	5/20/2009	9:03	6
0.20	0	5/20/2009	9:04	6
0.25	0	5/20/2009	9:05	6
0.30	0	5/20/2009	9:06	6
0.35	0	5/20/2009	9:07	6
0.40	0	5/20/2009	9:08	6
0.45	512	5/20/2009	9:09	6
0.50	3625	5/20/2009	9:10	6
0.55	47990	5/20/2009	9:11	6
0.60	94752	5/20/2009	9:12	6
0.65	135854	5/20/2009	9:13	6
0.70	155952	5/20/2009	9:14	6
0.75	155700	5/20/2009	9:15	6
0.80	161972	5/20/2009	9:16	6
0.85	168860	5/20/2009	9:17	6
0.90	175598	5/20/2009	9:18	6
0.95	239969	5/20/2009	9:19	6
1.00	397270	5/20/2009	9:20	6

*W 8/4/09*

Ludlum 6 Voltage Curve



WGS/105



# Ra-226 WATER

Batch : LCSVER  
Date : 6/2/2009  
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
ver 1	0.800	30	1018	601	2.181	0.267	0.2115	13.4431	0.8356	6/8/2009 15:35
ver 2	0.800	30	994	602	2.168	0.100	0.1442	13.2563	0.8279	6/8/2009 16:05
ver 3	0.800	30	955	604	2.133	0.167	0.1786	12.9119	0.8254	6/8/2009 16:40
ver 4	0.800	30	1144	605	2.149	0.267	0.2143	15.3201	0.8971	6/8/2009 17:15
ver 5	0.800	30	1046	606	2.348	0.233	0.1867	12.8971	0.7895	6/8/2009 18:30
ver 6	0.800	30	1001	607	2.450	0.267	0.1893	11.8239	0.7413	6/8/2009 19:15
ver 7	0.800	30	1060	609	2.316	0.267	0.2007	13.2848	0.8089	6/8/2009 20:05
ver 8	0.800	30	943	611	2.307	0.267	0.2053	12.0754	0.7806	6/8/2009 23:10

Handwritten notes: 28/6/09 and 10/8/09

Sample ID	Cell #	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
ver 1	601	6	6/8/2009 15:35	LCS	0638-F	15.03	pCi/L	89%
ver 2	602	6	6/8/2009 16:05	LCS	0638-F	15.03	pCi/L	88%
ver 3	604	6	6/8/2009 16:40	LCS	0638-F	15.03	pCi/L	86%
ver 4	605	6	6/8/2009 17:15	LCS	0638-F	15.03	pCi/L	102%
ver 5	606	6	6/8/2009 18:30	LCS	0638-F	15.03	pCi/L	86%
ver 6	607	6	6/8/2009 19:15	LCS	0638-F	15.03	pCi/L	79%
ver 7	609	6	6/8/2009 20:05	LCS	0638-F	15.03	pCi/L	88%
ver 8	611	6	6/8/2009 23:10	LCS	0638-F	15.03	pCi/L	80%

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM	Ingrowth constant
6/2/2009 12:40	6/8/2009 12:15	143.58	3.33	0.6618	0.9751	1.0019	33.6667	0.6466
6/2/2009 12:40	6/8/2009 12:40	144.00	3.42	0.6628	0.9745	1.0019	33.0333	0.6472
6/2/2009 12:40	6/8/2009 13:05	144.42	3.58	0.6639	0.9733	1.0019	31.6663	0.6474
6/2/2009 12:40	6/8/2009 13:30	144.83	3.75	0.6650	0.9721	1.0019	37.8667	0.6476
6/2/2009 12:40	6/8/2009 13:50	145.17	4.67	0.6658	0.9654	1.0019	34.6333	0.6440
6/2/2009 12:40	6/8/2009 14:15	145.58	5.00	0.6668	0.9630	1.0019	33.0997	0.6434
6/2/2009 12:40	6/8/2009 14:35	145.92	5.50	0.6677	0.9593	1.0019	35.0667	0.6417
6/2/2009 12:40	6/8/2009 15:00	146.33	8.17	0.6687	0.9402	1.0019	31.1663	0.6299

Handwritten notes: 8/16/09 and 11/18/10/09

Re-226 Verification Sheet

VEV #6

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VEV 1	500	6/2/09 1240	6/18/09 1415	6-8-09 1535	601	6	8	1018
VEV 2	500	6/2/09 1240	6/18/09 1240	6-8-09 1605	602	6	3	994
VEV 3	500	6/2/09 1240	6/18/09 1305	6-8-09 1640	604	6	5	955
VEV 4	500	6/2/09 1240	6/18/09 1330	6-8-09 1715	605	6	8	1144
VEV 5	500	6/2/09 1240	6/18/09 1350	6-8-09 1830	606	6	7	1046
VEV 6	500	6/2/09 1240	6/18/09 1415	6-8-09 1915	607	6	8	1001
VEV 7	500	6/2/09 1240	6/18/09 1435	6-8-09 2005	609	6	8	1060
VEV 8	500	6/2/09 1240	6/18/09 1500	6-8-09 2310	611	6	8	943
VEV 9	500							
VEV 10	500							
VEV 11	500							
VEV 12	500							

NO SIGNATURE

6/18/09  
212  
10818

6/18/09

## General Engineering Laboratories Verification Source Preparation Sheet

*A W 8/4/09*

Applicable SOP Number <u>GL 2307-008</u>	Isotope <u>Yt-91</u>
Date Standards Prepared <u>11/16/09</u>	Cocktail Type Used <u>NA</u>
Standard ID <u>0635-F</u>	Matrix of Vial/Planchett <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>267.519</u>	Pipette ID Used <u>1175203</u>
Reference Date <u>1/23/04</u>	Balance ID Used <u>38080104</u>
Expiration Date <u>2/1/10</u>	Quenching Agent <u>NA</u>
Residue/Carrier Agent <u>NA</u>	

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	Ver 1				
2	Ver 2				
3	Ver 3				
4	Ver 4				
5	Ver 5				
6	Ver 6				
7	Ver 7				
8	Ver 8				
<i>A W 8/4/09</i>					

Prepared By: *Willi + Dave* Date: 8/4/09

Reviewed By: *Angela G* Date: 8/4/09

Rev 1 RLM.9/10/97

*A W 8/4/09*

0638

**CERTIFICATE OF CALIBRATION**  
**Standard Radionuclide Source**

67519-278

Ra-226 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 participation in a Measurements Assurance Program as described in USNRC Reg. Guide 4.15, Revision 1, February 1979.

ISOTOPE:	Ra-226
ACTIVITY (dps):	2.353 E4
HALF-LIFE:	1.600 E3 years
CALIBRATION DATE:	January 23, 2004 12:00 EST
RELATIVE EXPANDED UNCERTAINTY (k=2):	3.3%

Impurities:  $\gamma$ -impurities (other than decay products) <0.1%

5.01065 grams 0.1M HCl solution with 50  $\mu\text{g/g}$  Ba carrier.

P O NUMBER 3231RD, Item 5

SOURCE PREPARED BY:

M. D. Currie  
M. D. Currie, Radiochemist

Q A APPROVED:

RCUW 1/26/04

WD 8/4/09

2C-S-037-037a

# Standard Traceability Log Rad

Source Material Info	
Parent Code:	0638
Prepared By:	Amanda Fehr
Carrier Conc:	0.1M HCl
Reference Date:	01/23/2004
Ampoule Mass (g):	5.01065 g
Uncertainty:	+/- 3.3 %
LogBook No:	RC-S-037-037

A Solution Material Info	
Isotope:	Radium-226
Prepared By:	Amanda Fehr
Prep Date:	01/16/2006
Verification Date:	04/09/2009
Expiration Date:	04/09/2010
Primary Code:	0638-A
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

$$(\text{Mass of parent(g)}) * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$$

$$(\text{Mass of parent(g)}) * (\text{Parm Activity (dps)}) * (\text{conversion dpm to dps}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$$

$$(4.8398 \text{ g}) * (23530 \text{ dps}) * (60 \text{ dpm/dps}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13636.6133 \text{ dpm/mL}$$

$$(4.8398 \text{ g}) * (23530 \text{ dps}) * (60 \text{ dpm/dps}) / (1.0266 \text{ g/mL}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13282.9676 \text{ dpm/g}$$

WMO 8/14/09

**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	04/09/2009	04/09/2010
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	03/02/2009	03/02/2010
07/23/2008	Daniel Roy	5.0607	250	0638-H	268.8845 dpm/ml	07/17/2009	07/17/2010

VW 8/4/09

GEL Laboratories LLC  
Version 1.0 9/18/2000

## Verification for Ra-226 Standard 0638-F

	Isotope	Value	Uncertainty
D. Roy			
2/2/2009	0638-F #1	24.629	1.7426
	0638-F #2	24.438	1.7557
	0638-F #3	22.791	1.6808
<b>Mean Value (Counting) =</b>	23.953	99.60	<b>Pass</b>
<b>Stdev =</b>	1.010781096		<b>Rule 3 (Pass/Fail)</b>
<b>Target =</b>	24.05		
<b>Lower Limit =</b>	21.93100448		
<b>Upper Limit =</b>	25.97412886		
<b>Rule 1 Pass/Fail</b>	<b>Pass</b>		
<b>Two sigma =</b>	2.021562191		
<b>10 % of Mean =</b>	2.395256667		
<b>Rule 2 (Pass/Fail)</b>	<b>Pass</b>		

Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements

Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule 3 = The determined mean value shall be within 5% of the certificate value.

The analyst prepared three standard verification sources for standard 0638-F using 0.1 mL for each source. Each source was counted using routine Lucas cell procedures. Calibration for 0299-G was used in this verification.

*Handwritten notes:*  
 0638-F #1  
 2/2/2009  
 Amanda [Signature]



# Radium-226 Que Sheet

General Engineering Laboratories, Radiochemistry Division

02/03/2009

Batch #: 838839

Analyst: KSDI

First Client Due Date:

Internal Due Date: 02/07/2009

Spike Isotope: Radium-226 Spike Code: 0003-1

Expiration Date: 12/27/08 Vol: 1

Nom Conc:

LCS Isotope: Radium-226 LCS Code: 003000

Expiration Date: 12/27/08 Vol: 1

Nom Conc:

Prep Date: 12/27/08 Pipet ID: \_\_\_\_\_ Initials: VSD Witness: \_\_\_\_\_

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 Date/Time	De-em Date/Time	Start Count Date/Time	Cell #	Det #	Bkg counts	Total Counts
1201770521-1	LCS for batch 838839	LCS	GROUND	WAJ 1	1 pCi/L	QC ACCOUNT	500	1/26/09 10:05	1/26/09 11:30	1/30/09 17:05	1/30/09 17:05	305	3	9	701
1201770522-1	LCS for batch 838839	LCS	GROUND	WAJ 1	1 pCi/L	QC ACCOUNT	500	1/26/09 10:05	1/26/09 11:45	1/30/09 17:57	1/30/09 17:57	304	3	9	708
1201770523-1	LCS for batch 838839	LCS	GROUND	WAJ 1	1 pCi/L	QC ACCOUNT	500	1/26/09 10:05	1/26/09 12:00	1/30/09 17:05	1/30/09 17:05	305	3	9	708

VO 8/16/09

Data Reviewed By:

Comments: \_\_\_\_\_  
 Instrument ID #: \_\_\_\_\_  
 LUGAS: 5028, LUGAS: 130517, LUGAS: 90899, LUGAS: 102753, LUGAS: 132286, LFC6: 17055

# Radium-226 Liquid

Filename : RA226.XLS  
 File type : Excel  
 Version # : 1.2.3

Spike S/N : N/A  
 Spike Exp Date : N/A  
 Spike Activity (dpm/ml) : N/A  
 Spike Volume Added : N/A  
 Pipet, 0.1 ml Stdev : +/- 0.000701 ml  
 Pipet, 0.5 ml Stdev : +/- 0.002564 ml  
 Pipet, 1 ml Stdev : +/- 0.005480 ml

Batch : 838839  
 Analyst : KSD1  
 Prep Date : 1/26/2009  
 Ra-226 Abundance : 1  
 Ra-226 Method Uncertainty : 0.0918

Procedure Code : LUC26RAL  
 Parmname : Radium-226  
 Required MDA : 1 pCi/L  
 Half-life of Ra-226 : 1600 years  
 Half-life of Rn-222 : 3.823 days  
 Batch counted on : LUCAS CELL DETECTOR  
 BKG Count time : 30 min

LCS S/N : 0638-F  
 LCS Exp Date : 12/20/2008  
 LCS Activity (dpm/ml) : 266.94  
 LCS Volume Added : 0.10

Sample Characteristics		Count Raw Data			Weekly Background			Detector Efficiency			
Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Sample Date/Time	Cell Number	Counting Time (min.)	Gross Counts	Gross CPM	Counts	CPM	Count Time (min.)	Detector Efficiency (cpm/dpm)
1201770521.1	0.5000	2.0256E-05	1/26/2009 0:00	305	30	791	26.367	8	0.267	30	1.9930
1201770522.1	0.5000	2.0256E-05	1/26/2009 0:00	306	30	768	25.600	8	0.267	30	1.9500
1201770523.1	0.5000	2.0256E-05	1/26/2009 0:00	308	30	730	24.333	8	0.267	30	2.0010

Handwritten notes and signatures at the top right of the page.

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 Ingrowth to Count	During Count	Ra-226 Decay
0.06082	1/23/2008	1/22/2009	1/26/2009 16:05	1/30/2009 11:30	1/30/2009 17:05	0.499	0.959	1.002	1.000
0.06082	1/23/2008	1/22/2009	1/26/2009 16:05	1/30/2009 11:45	1/30/2009 17:37	0.500	0.957	1.002	1.000
0.06082	1/23/2008	1/22/2009	1/26/2009 16:05	1/30/2009 12:00	1/30/2009 19:05	0.501	0.948	1.002	1.000

K0816104  
04/21/09

Notes.

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

Results		MDA	Sample Act.	Sample Act.	Net Count	Net Count	Net Count	2 SIGMA	2 SIGMA	Sample	Sample	RER	Recovery
Decision	Critical	pCi/L	Conc.	Error	Rate	Rate	Rate	Counting	Total Prop.	QC	Type	RPD	Recovery
Level	Level	pCi/L	pCi/L	pCi/L	CPM	CPM	CPM	Uncertainty	Uncertainty				
pCi/L	pCi/L							pCi/L	pCi/L				pCi/L
0.2932	0.2070	0.5083	24.6287	0.0707	26.1000	0.9422	0.9422	1.7426	5.5940		LCS		102.4%
0.2997	0.2116	0.5196	24.4384	0.0710	25.3333	0.9286	0.9286	1.7557	5.5591		LCS		101.6%
0.2942	0.2077	0.5101	22.7906	0.0715	24.0667	0.9055	0.9055	1.6808	5.1982		LCS		94.8%

11/28/10  
(15)

# General Engineering Laboratories

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

## Lucas Cell Calibration Package

(701-712)

	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?	✓		
	✓		
	✓		
	✓		
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 Spence

Date: 9/30/09

Reviewed By: Angela G

Date: 9/30/09

Effective Date: 9/30/09

Ra-226 Cell Constants

Standard Reference date: 12/15/1999  
 standard ID: 0299-H  
 Volume added (mL): 0.1  
 Standard Reference Activity (DPM/mL): 2483.21

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	cpm	total counts	count time min	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count		
701	2.180	Average	2.107	Cal 12	9/21/2009 17:00	9/21/2009 12:55	9/18/2009 17:00	6158	30	205.27	243.02	2.82986	0.17014	3569	0.9958
701	2.025	Sidev	0.078	Cal 1	9/15/2009 17:45	9/15/2009 13:45	9/12/2009 10:30	6595	15	439.67	243.02	14.13542	0.16667	3563	0.9958
701	2.117	Cal 1	9/18/2009 18:15	9/18/2009 13:20	9/15/2009 10:00		3219	15	214.60	243.02	3.13889	0.20486		3566	0.9958
702	2.101	Average	2.033	Cal 2	9/24/2009 18:05	9/24/2009 14:05	9/21/2009 17:00	3014	15	200.93	243.02	2.87847	0.16667	3572	0.9958
702	2.020	Sidev	0.063	Cal 2	9/15/2009 18:10	9/15/2009 14:10	9/12/2009 10:30	6583	15	438.87	243.02	14.15278	0.16667	3563	0.9958
702	1.977	Cal 11	9/21/2009 17:25	9/21/2009 13:20	9/18/2009 17:00		5611	30	187.03	243.02	2.84722	0.17014		3569	0.9958
703	2.218	Average	2.221	Cal 10	9/21/2009 18:00	9/21/2009 13:45	9/18/2009 17:00	6317	30	210.57	243.02	2.86458	0.17708	3569	0.9958
703	2.279	Sidev	0.057	Cal 3	9/24/2009 18:25	9/24/2009 14:35	9/21/2009 17:00	3282	15	219.47	243.02	2.89931	0.15972	3572	0.9958
703	2.165	Cal 3	9/18/2009 19:00	9/18/2009 14:55	9/15/2009 10:00		3364	15	224.27	243.02	3.20486	0.17014		3566	0.9958
704	2.302	Average	2.235	Cal 9	9/21/2009 18:35	9/21/2009 14:20	9/18/2009 17:00	6599	30	219.97	243.02	2.89889	0.17708	3569	0.9958
704	2.255	Sidev	0.079	Cal 4	9/24/2009 18:45	9/24/2009 15:00	9/21/2009 17:00	3274	15	218.27	243.02	2.91667	0.15625	3572	0.9958
704	2.148	Cal 4	9/18/2009 19:15	9/18/2009 15:20	9/15/2009 10:00		3356	15	223.73	243.02	3.22222	0.16319		3566	0.9958
705	2.032	Average	2.107	Cal 5	9/18/2009 19:40	9/18/2009 15:45	9/15/2009 10:00	3187	15	212.47	243.02	3.23958	0.16319	3566	0.9958
705	2.090	Sidev	0.084	Cal 5	9/24/2009 19:05	9/24/2009 15:25	9/21/2009 17:00	3050	15	203.33	243.02	2.93403	0.15278	3572	0.9958
705	2.198	Cal 8	9/21/2009 19:10	9/21/2009 14:45	9/18/2009 17:00		6321	30	210.70	243.02	2.90625	0.18403		3569	0.9958
706	2.093	Average	2.142	Cal 7	9/21/2009 20:07	9/21/2009 15:05	9/18/2009 17:00	6013	30	200.43	243.02	2.92014	0.20972	3569	0.9958
706	2.109	Sidev	0.071	Cal 6	9/24/2009 19:25	9/24/2009 15:45	9/21/2009 17:00	3089	15	205.93	243.02	2.94792	0.15278	3572	0.9958
706	2.223	Cal 6	9/18/2009 19:55	9/18/2009 16:10	9/15/2009 10:00		3505	15	233.67	243.02	3.25694	0.15625		3566	0.9958
707	2.154	Average	2.275	Cal 7	9/18/2009 20:15	9/18/2009 16:30	9/15/2009 10:00	3406	15	227.07	243.02	3.27083	0.15625	3566	0.9958
707	2.386	Sidev	0.116	Cal 7	9/24/2009 19:45	9/24/2009 16:05	9/21/2009 17:00	3506	15	233.73	243.02	2.96181	0.15278	3572	0.9958
707	2.287	Cal 6	9/21/2009 20:35	9/21/2009 15:25	9/18/2009 17:00		6586	30	219.53	243.02	2.93403	0.21528		3569	0.9958
708	2.253	Average	2.188	Cal 8	9/24/2009 20:00	9/24/2009 16:30	9/21/2009 17:00	3330	15	222.00	243.02	2.97917	0.14583	3572	0.9958
708	2.110	Sidev	0.180	Cal 1	9/28/2009 18:35	9/28/2009 15:05	9/24/2009 17:00	7591	30	253.03	243.02	3.92014	0.14583	3576	0.9958
708	1.923	Cal 8	9/18/2009 20:25	9/18/2009 16:50	9/15/2009 10:00		3055	15	203.67	243.02	3.28472	0.14931		3566	0.9958
709	2.088	Average	2.285	Cal 9	9/18/2009 21:03	9/18/2009 17:15	9/15/2009 10:00	3324	15	221.60	243.02	3.30208	0.15833	3566	0.9958
709	2.352	Sidev	0.168	Cal 4	9/21/2009 21:50	9/21/2009 16:20	9/18/2009 17:00	6823	30	227.43	243.02	2.97222	0.22917	3569	0.9958
709	2.400	Cal 9	9/24/2009 20:20	9/24/2009 16:45	9/21/2009 17:00		3554	15	236.93	243.02	2.98958	0.14931		3572	0.9958
710	2.512	Average	2.409	Cal 3	9/21/2009 22:21	9/21/2009 16:35	9/18/2009 17:00	7291	30	243.03	243.02	2.98284	0.24028	3569	0.9958
710	2.436	Sidev	0.119	cal 10	9/24/2009 20:50	9/24/2009 17:00	9/21/2009 17:00	3611	15	240.73	243.02	3.00000	0.15972	3572	0.9958
710	2.279	Cal 10	9/18/2009 21:20	9/18/2009 17:30	9/15/2009 10:00		3635	15	242.39	243.02	3.31250	0.15972		3566	0.9958
711	2.212	Average	2.242	Cal 11	9/18/2009 21:37	9/18/2009 17:45	9/15/2009 10:00	3536	15	235.73	243.02	3.32292	0.16111	3566	0.9958
711	2.302	Sidev	0.052	Cal 11	9/24/2009 22:05	9/24/2009 17:15	9/21/2009 17:00	3395	15	226.33	243.02	3.01042	0.20139	3572	0.9958
711	2.211	Cal 2	9/21/2009 22:52	9/21/2009 16:55	9/18/2009 17:00		6432	30	214.40	243.02	2.99653	0.24792		3569	0.9958
712	2.292	Average	2.069	Cal 1	9/21/2009 23:40	9/21/2009 17:10	9/18/2009 17:00	6657	30	221.90	243.02	3.00694	0.27083	3569	0.9958
712	1.928	Sidev	0.195	Cal 11	9/15/2009 22:15	9/15/2009 17:35	9/12/2009 10:30	6263	15	417.53	243.02	14.29514	0.19444	3563	0.9958
712	1.989	Cal 12	9/24/2009 22:27	9/24/2009 17:30	9/21/2009 17:00		2938	15	195.87	243.02	3.02083	0.20625		3572	0.9958

EffEr 0.065186 <- Put in Machines.xls (Lucas Cell Tab)

ADG  
9/30/09

#7

**Ra-226 Calibration Sheet**

Standard ID: 0299-H  
 Volume Added (mL): 0.1  
 Expiration Date: 8/1/10 \* 15 min

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 1	500	9/11/09 10:30	9/15/09 13:45	9/15/09 17:45	701	7	6595
Cal 2	500	9/11/09 10:30	9/15/09 14:10	9/15/09 18:10	702	7	6583
Cal 3	500	9/11/09 10:30	9/15/09 14:35	9/15/09 18:45	703	7	5072
Cal 4		9/11/09 10:30	9/15/09 15:15	9/15/09 19:00	704	7	6039
Cal 5		9/11/09 10:30	9/15/09 15:40	9/15/09 19:15	705	7	5579
Cal 6		9/11/09 10:30	9/15/09 16:05	9/15/09 19:45	706	7	5347
Cal 7		9/11/09 10:30	9/15/09 16:30	9/15/09 20:00	707	7	5376
Cal 8		9/11/09 10:30	9/15/09 16:45	9/15/09 20:30	708	7	6203
Cal 9		9/11/09 10:30	9/15/09 17:05	9/15/09 21:10	710	7	6458
Cal 10		9/11/09 10:30	9/15/09 17:20	9/15/09 21:55	711	7	5935
Cal 11	500	9/11/09 10:30	9/15/09 17:35	9/15/09 22:15	712	7	6263

9/13/09

9/13/09

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9/13/09

9/13/09

# Ra-226 Calibration Sheet

Standard ID: 62M-4  
 Volume Added (mL): 0.1  
 Expiration Date: 6/11/10

\* 15min

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 1	500	<del>9/15/09</del> 9/15/09	9/18/09 1320	9/18/09 1815	101	7	3219
<del>Cal 2</del>	<del>500</del>	<del>9/15/09 1000</del>	<del>9/18/09 1425</del>	<del>9/18/09 1835</del>	<del>102</del>	<del>7</del>	<del>3420</del>
Cal 3	500	9/15/09 1000	9/18/09 1455	9/18/09 1900	103	7	3364
Cal 4	500	9/15/09 1000	9/18/09 1520	9/18/09 1915	104	7	3356
Cal 5	500	9/15/09 1000	9/18/09 1545	9/18/09 1940	105	7	3187
Cal 6	500	9/15/09 1000	9/18/09 1610	9/18/09 1965	106	7	3505
Cal 7	500	9/15/09 1000	9/18/09 <del>1630</del> 1630	9/18/09 2015	107	7	3406
Cal 8	500	9/15/09 1000	9/18/09 1650	9/18/09 2025	108	7	3055
Cal 9	500	9/15/09 1000	9/18/09 1715	9/18/09 2103	109	7	3324
Cal 10	500	9/15/09 1000	9/18/09 1730	9/18/09 2120	110	7	3635
Cal 11	500	9/15/09 1000	9/18/09 1745	9/18/09 <del>2137</del> 2142	111	7	3536
Cal 12	500	9/11/09 1000	9/18/09 1800	9/18/09 2218	112	7	5663

10/1/09

11/09/130105

\* 9/30/09

11/09/130105



# Ra-226 Calibration Sheet

Standard ID: 02944  
 Volume Added (mL): 0.1  
 Expiration Date: 9/1/10

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 17	500	9/18/09 1700	9/21/09 1555	9/21/09 1700	701	7	6158
Cal 11	500	9/18/09 1700	9/21/09 1520	9/21/09 1725	702	7	5611
Cal 10	500	9/18/09 1700	9/21/09 1545	9/21/09 1800	703	7	6317
Cal 9	500	9/18/09 1700	9/21/09 1420	9/21/09 1835	704	7	6599
Cal 8	500	9/18/09 1700	9/21/09 1445	9/21/09 1910	705	7	6321
Cal 7	500	9/18/09 1700	9/21/09 1505	9/21/09 2007	706	7	6013
Cal 6	500	9/18/09 1700	9/21/09 1525	9/21/09 2035	707	7	6586
<del>Cal 5</del>	<del>500</del>	<del>9/18/09 1700</del>	<del>9/21/09 1005</del>	<del>9/21/09 2112</del>	<del>708</del>	<del>7</del>	<del>7155</del>
Cal 4	500	9/18/09 1700	9/21/09 1620	9/21/09 2150	709	7	6823
Cal 3	500	9/18/09 1700	9/21/09 1635	9/21/09 2221	710	7	7291
Cal 2	500	9/18/09 1700	9/21/09 1655	9/21/09 2252	711	7	6432
Cal 1	500	9/18/09 1700	9/21/09 1710	9/21/09 2340	712	7	6657

9/21/09

UN 0120109

9/30/09

# Ra-226 Calibration Sheet

Standard ID: 01199-1

Volume Added (mL): 0.1

Expiration Date: 07/10

\* 15 min counts

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
<del>Cal 1</del>	<del>500</del>	<del>01/21/09 1700</del>	<del>01/21/09 1730</del>	<del>01/24/09 1745</del>	<del>701</del>	<del>7</del>	<del>3125</del>
Cal 2	500	01/21/09 1700	01/21/09 1705	01/24/09 1805	702	7	3014
Cal 3	500	01/21/09 1700	01/21/09 1735	01/24/09 1825	703	7	3292
Cal 4	500	01/21/09 1700	01/21/09 1900	01/24/09 1845	704	7	3274
Cal 5	500	01/21/09 1700	01/21/09 1525	01/24/09 1905	705	7	3050
Cal 6	500	01/21/09 1700	01/21/09 1945	01/24/09 1925	706	7	3089
Cal 7	500	01/21/09 1700	01/21/09 1605	01/24/09 1945	707	7	3506
Cal 8	500	01/21/09 1700	01/21/09 1630	01/24/09 2000	708	7	3330
Cal 9	500	01/21/09 1700	01/21/09 1645	01/24/09 2020	709	7	3554
Cal 10	500	01/21/09 1700	01/21/09 1700	01/24/09 2050	710	7	3611
Cal 11	500	01/21/09 1700	01/21/09 1715	01/24/09 2205	711	7	3395
Cal 12	500	01/21/09 1700	01/21/09 1730	01/24/09 2227	712	7	2938

01/21/09

01/20/09

01/30/09

### Ra-226 Calibration Sheet

Standard ID: 091011

Volume Added (mL): 0.1

Expiration Date: 8/11/10

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cell 1	500	01/24/09 1100	01/28/09 1505	09/28/09 1835	708	7	7591

*W 09/28/09*

NO 9130105

9/28/09

410  
9/30/09

**General Engineering Laboratories  
Verification Source Preparation Sheet  
Calibration**

Applicable SOP Number GL RAD-A-708 Isotope RA-226  
 Date Standards Prepared 4/5/05 Cocktail Type Used NA  
 Standard ID 0219-H 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) 2483.2133 Pipette ID Used 1429303  
 Reference Date 12/15/99 Balance ID Used 38080204  
 Expiration Date 8/1/10 Quenching Agent NA  
 Residue/Carrier Agent 0.1 M 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				

*Handwritten note: 410 9/30/09*

Prepared By: Kelli S. Dorsey Date: 9/30/09  
 Reviewed By: Angela J. Gibson Date: 9/30/09

Rev 1 RLM 9/10/97

ee'd

8-21-00

Nycomed Amersham plc  
Amersham Laboratories

0299



CALIBRATION  
No. 0148



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

ISSUED FOR: AEA Technology plc  
Isotrak  
Amersham Laboratories  
White Lion Road  
Amersham  
Buckinghamshire  
HP7 9LL

Description Principal radionuclide: Radium-226

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

Measurement Reference time: 1200 GMT on 15 December 1999

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

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

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

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

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

Date of issue  
296

17<sup>th</sup> December 1999

WD91280109

Nycomed

# 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/dppm/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	01/26/2009	01/26/2010
08/07/2009	Mary Aders	5.0767	250	0299-H	2483.2133 dpm/mL	08/07/2009	08/07/2010

GEL Laboratories LLC  
Version 1.0 9/18/2000

409120108

## Verification for Ra-226 Standard 0299-H

M. Aders 8/7/2009	Isotope	Value	Uncertainty
	0299-H	111.440	2.5408
	0299-H	115.924	2.5878
	0299-H	111.780	2.5407
<b>Mean Value (Counting) =</b>	113.048	101.49	<b>Pass</b>
<b>Stdev =</b>	2.496414563		<b>Rule 3 (Pass/Fail)</b>
<b>Target =</b>	111.39		
<b>Lower Limit =</b>	108.0550709		
<b>Upper Limit =</b>	118.0407291		
<b>Rule 1 Pass/Fail</b>	<b>Pass</b>		
<b>Two sigma =</b>	4.992829126		
<b>10 % of Mean =</b>	11.30479		
<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 Ra-226 source 0299-H by transferring portions of the degassed standard into tared glass liquid scintillation vials. 10 mL of DI Water and 10 mL of mineral oil were added to each vial and the vials were shaken. A Blank vial was prepared in a similar fashion using 10 mL of DI Water and 10 mL of mineral oil. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Red using source standard verification. 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

*Handwritten signature: Amanda L. Fein 8/13/09*

# Radon-222 Liquid

Filename : RN222.XLS  
 File type : Excel  
 Version # : 1.2.4

LCS S/N : 0299-H  
 Spike S/N : N/A  
 Spike Exp Date : 8/7/2010  
 Spike Activity (dpm/ml) : 2472.85  
 Spike Volume Added : 0.10

Batch : 891920  
 Analyst : MLA  
 Prep Date : 8/7/2009

Procedure Code : LSC22RNL  
 Parmname : Radon-222  
 Required MDA : 200 pCi/L  
 Half-life of Radon-222 : 3.823 days

Rn-222 Abundance : 1  
 Rn-222 Method Uncertainty : 0.1111  
 Geometry : 10ML MINERAL OIL/10ML  
 SAMPLE

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

Sample Characteristics			Count raw Data							
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Rack Position #	Counting Time (min.)	Quench#	Gross cpm	Background Count Time (min.)	Count Start Date/Time	Sample Decay
1	1201897268.1	1.0000	2.0399E-05	8-2	15	43.3	517.53	8.47 15	8/12/2009 7:48	0.380
2	1201897269.1	1.0000	2.0399E-05	8-3	15	44.6	538.8	8.47 15	8/12/2009 8:04	0.380
3	1201897270.1	1.0000	2.0399E-05	8-4	15	45	520.6	8.47 15	8/12/2009 8:20	0.379

0.379



Calibration Data				Detector Efficiency				Backgrounds			Correction Factors			Net Sample Activity
Pos.	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Rack Position #	Count Start Date/Time	Spike Date/Time	Rn-222 Ingrowth	Rn-222 Count Correction	Net Sample Activity for MS pCi/L			
1	LSCRED	7/28/2009	7/31/2010	3.5654	0.00792	8-1	8/12/2009 7:31	8/7/2009 14:00	0.577	0.577	0.577			
2	LSCRED	7/28/2009	7/31/2010	3.5654	0.00792	8-1	8/12/2009 7:31	8/7/2009 14:00	0.578	0.578	0.578			
3	LSCRED	7/28/2009	7/31/2010	3.5654	0.00792	8-1	8/12/2009 7:31	8/7/2009 14:00	0.579	0.579	0.579			

8/13/09

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

Pos.	Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error pCi/L	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA		Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
									Counting Uncertainty pCi/L	Total Prop. Uncertainty pCi/L						
1	0.5420	0.3827	200	0.8092	111.4397	0.0141	509.0600	5.9217	2.5408	24.4606		LCS			111.3896	100.0%
2	0.5412	0.3821	200	0.8080	115.9238	0.0139	530.3300	6.0403	2.5678	25.4391		LCS			111.3896	104.1%
3	0.5404	0.3816	200	0.8068	111.7802	0.0140	512.1300	5.9390	2.5407	24.5345		LCS			111.3896	100.4%

REV 2/13/04

ID: R14-232

12 AUG 2009 07:48

USER:IC

COMMENT:RED

PRESET TIME : 15.00  
 DATA CALC : CPM HH : YES SAMPLE REPEATS : 1 PRINTER : EDIT  
 COUNT BLANK : NO ICW : NO REPLICATES : 1 RS232 : EDIT  
 TWO PHASE : NO AQW : NO CYCLE REPEATS : 1 DISK : OFF  
 SCINTILLATOR : LIQUID LUMEX : NO LOW SAMPLE RES : 0  
 LOW LEVEL : YES HALF LIFE CORRECTION DATE : none

CHAN: 600.0 - 975.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

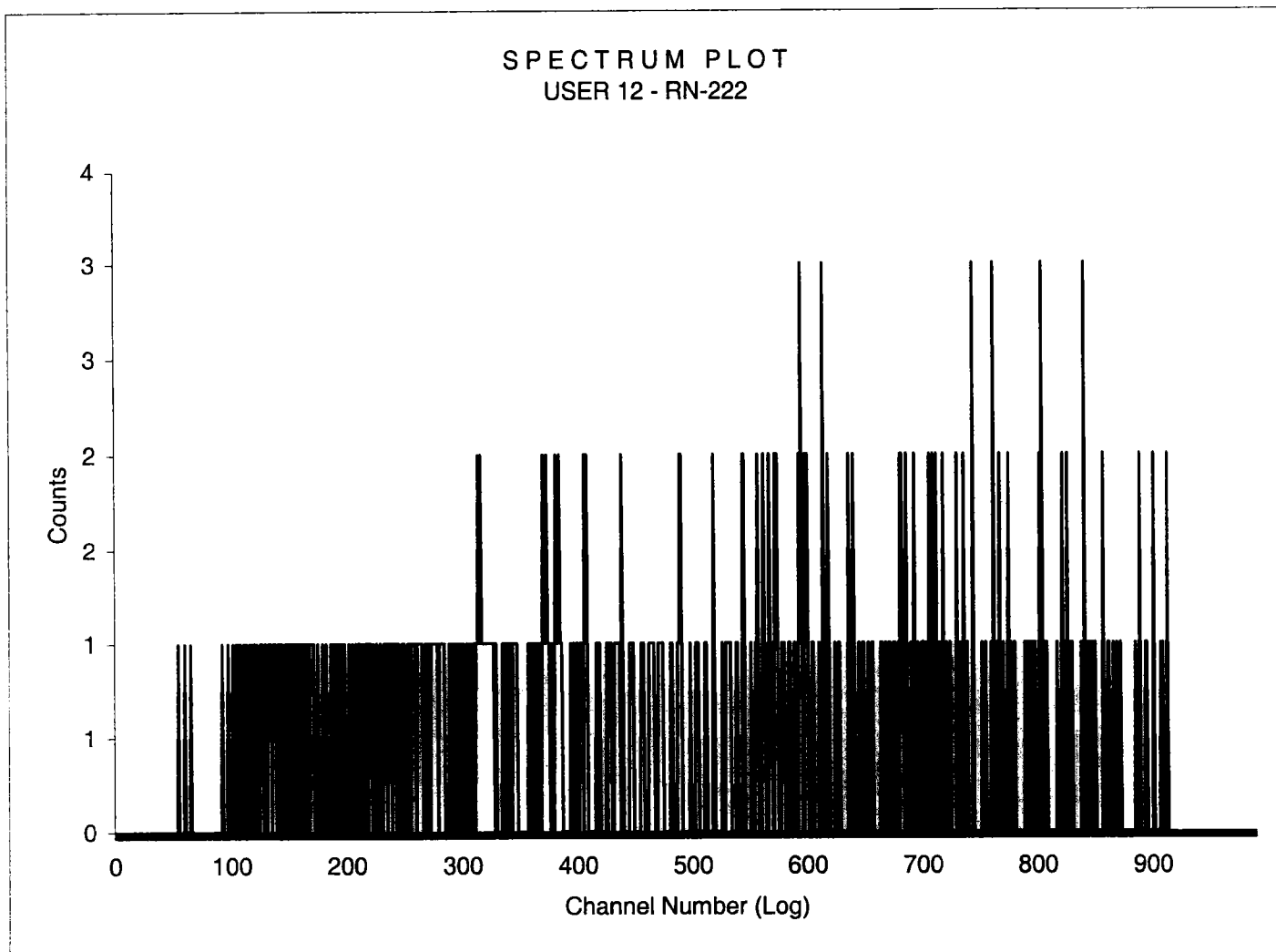
CHAN: 0.0 - 900.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

ALPHA-BETA DISCRIMINATION: NO

SAM NO	POS	TIME MIN	HH	WIND1 RAW CPM	WIND2 RAW CPM	WIND1		WIND2		LUMEX %	ELAPSED TIME
						CPM	%ERROR	CPM	%ERROR		
1	3-1	15.00	39.1	9.47	27.73	9.47	17.75	27.73	9.81	0.07	15.00
2	3-2	15.00	43.3	517.53	607.33	517.53	2.27	607.33	2.10	0.07	15.00
3	3-3	15.00	44.6	538.80	628.67	538.80	2.22	628.67	2.06	0.07	15.00
4	3-4	15.00	45.0	520.60	610.00	520.60	2.26	610.00	2.09	0.07	15.00

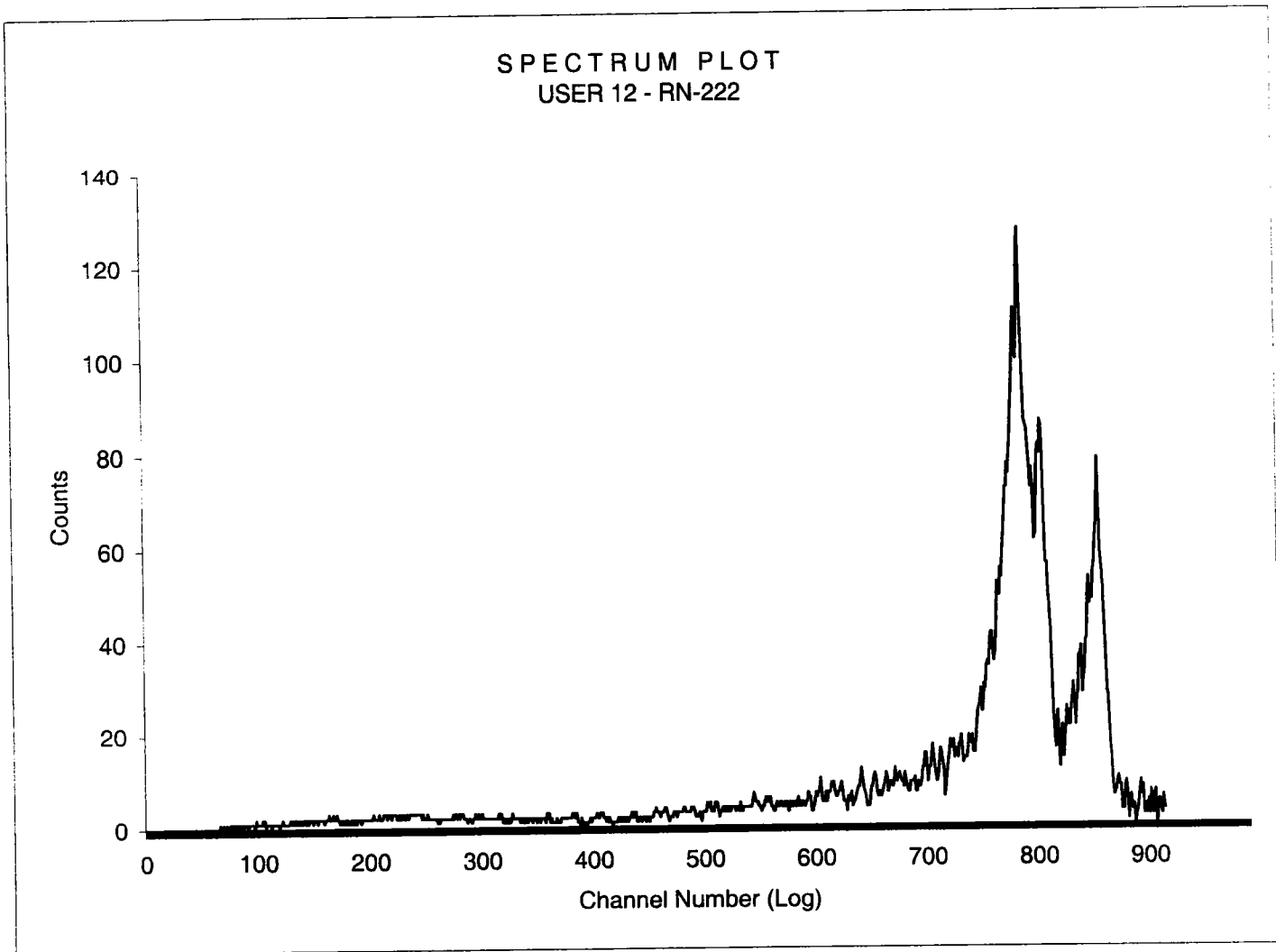
*Handwritten mark*

Sample Count Start Time:	12 Aug 2009 07:31:52		
Data Capture Date	12 Aug 2009 07:47:25		
User Filename	S12081208-1A.XLS		
	U12081208-1A.XLS		
Spectrum Type	Log Counts		
User Number	12		
User Id	RN-222		
User Comment	RED		
Isotope Name	14C		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	1	8-1	15.00
H#, Total Counts:	39.1	422	
Start, End, X-Axis:	0	990	Channel Number



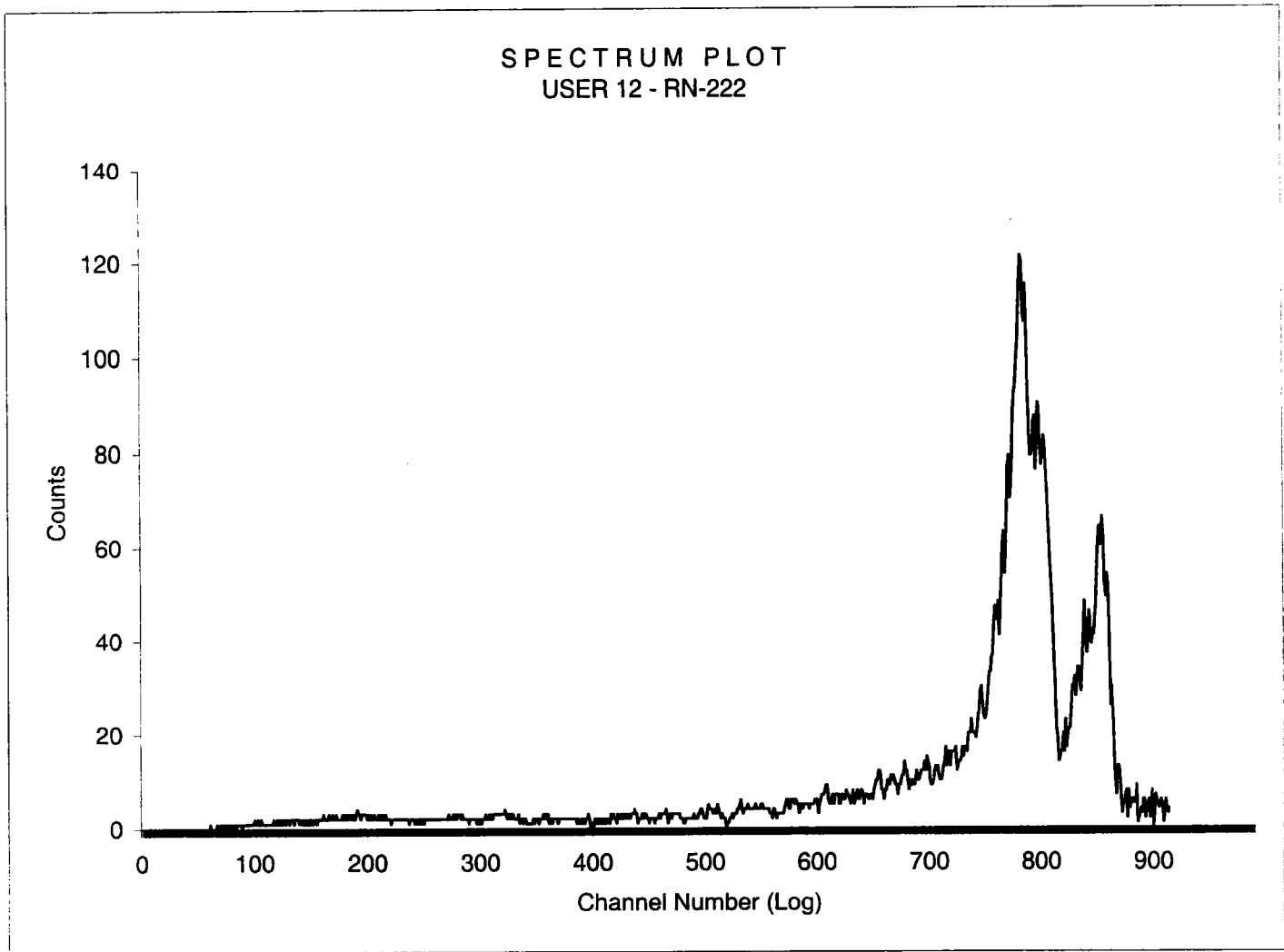
*Handwritten:* 07/31/09

Sample Count Start Time: 12 Aug 2009 07:48:04  
Data Capture Date: 12 Aug 2009 08:03:28  
User Filename: S12081208-2A.XLS  
U12081208-1A.XLS  
Spectrum Type: Log Counts  
User Number: 12  
User Id: RN-222  
User Comment: RED  
Isotope Name: 14C  
Scintillator: LIQUID  
Sample, Rack-Pos, Time: 2 8-2 15.00  
H#, Total Counts: 43.3 9166  
Start, End, X-Axis: 0 990 Channel Number

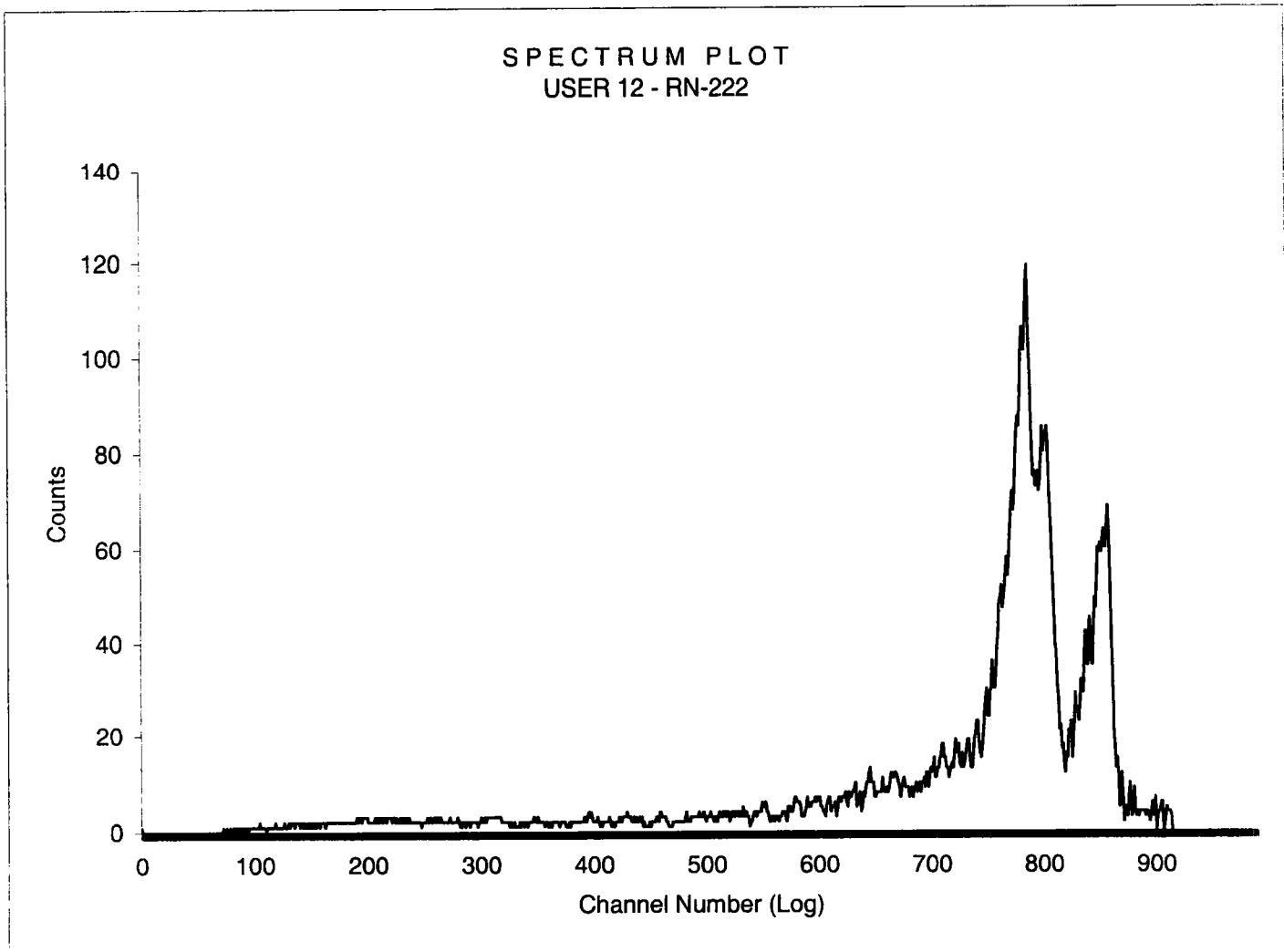


*Handwritten:*  
3/13/07

Sample Count Start Time: 12 Aug 2009 08:04:11  
Data Capture Date 12 Aug 2009 08:19:35  
User Filename S12081208-3A.XLS  
U12081208-1A.XLS  
Spectrum Type Log Counts  
User Number 12  
User Id RN-222  
User Comment RED  
Isotope Name  $^{14}\text{C}$   
Scintillator LIQUID  
Sample, Rack-Pos, Time: 3 8-3 15.00  
H#, Total Counts: 44.6 9492  
Start, End, X-Axis: 0 990 Channel Number



Sample Count Start Time: 12 Aug 2009 08:20:17  
Data Capture Date: 12 Aug 2009 08:35:41  
User Filename: S12081208-4A.XLS  
U12081208-1A.XLS  
Spectrum Type: Log Counts  
User Number: 12  
User Id: RN-222  
User Comment: RED  
Isotope Name: 14C  
Scintillator: LIQUID  
Sample, Rack-Pos, Time: 4 8-4 15.00  
H#, Total Counts: 45.0 9197  
Start, End, X-Axis: 0 990 Channel Number



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# Radon 222 Que Sheet

Batch #: 891920 Analyst: MLA First Client Due Date: Internal Due Date: 08/17/2009  
 Spike Isotope: Radium-226 Spike Code: 0299-A Expiration Date: 02/29/10 Vol: 1 Norm Conc: \_\_\_\_\_  
 LCS Isotope: Radium-226 LCS Code: 0299-A Expiration Date: 02/29/10 Vol: 1 Norm Conc: \_\_\_\_\_  
 Prep Date: 07/21/09 Pipet ID: 270908 Initials: MLA Witness: \_\_\_\_\_

Comments

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Label	Wet/Dry Sample Mass (g/mL)	LSC Rack #	Time Spike Added
1201897268-1	LCS for batch 891920	LCS		.2 pCi/mL	DRINKING WATQC ACCOUNT		20-JUL-09 12:00 PM	<u>1400</u>			1400
1201897269-1	LCS for batch 891920	LCS		.2 pCi/mL	DRINKING WATQC ACCOUNT		20-JUL-09 12:00 PM	<u>1400</u>			1400
1201897270-1	LCS for batch 891920	LCS		.2 pCi/mL	DRINKING WATQC ACCOUNT		20-JUL-09 12:00 PM	<u>1400</u>			1400

Bkg Rack #:

Comments: \_\_\_\_\_ Data Reviewed By: \_\_\_\_\_

Instrument Used: LS6000 (Red) 7065155, LS6500 (Black) 7069123, LS6500 (Blue) 7067083, LS6500 (Green) 7067404  
 Wallac (Yellow) 4040127, Wallac (Pink) 2200082, Purple 7069123, Silver 7060656

GEL Laboratories LLC, Radiochemistry Division

08/12/09



## Voltage Curve Ludlum #7

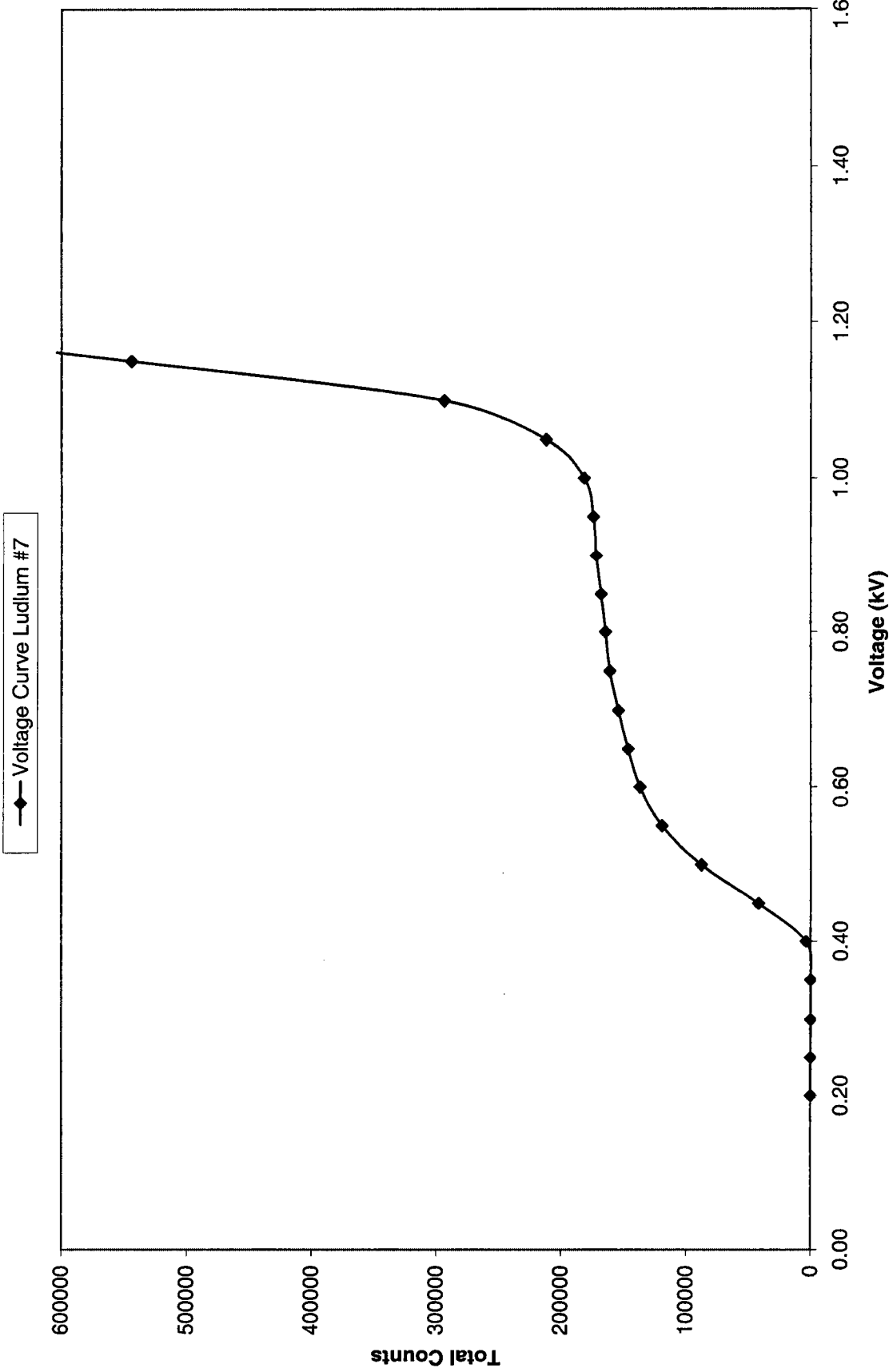
Voltage (kV)	Count Time (min)	Counts	Date/Time
0.20	1.00	0	9/15/09 12:13
0.25	1.00	0	9/15/09 12:14
0.30	1.00	0	9/15/09 12:15
0.35	1.00	0	9/15/09 12:16
0.40	1.00	3788	9/15/09 12:17
0.45	1.00	41827	9/15/09 12:18
0.50	1.00	87578	9/15/09 12:19
0.55	1.00	119153	9/15/09 12:20
0.60	1.00	136757	9/15/09 12:21
0.65	1.00	146242	9/15/09 12:22
0.70	1.00	154066	9/15/09 12:23
0.75	1.00	160997	9/15/09 12:24
0.80	1.00	164506	9/15/09 12:25
0.85	1.00	168023	9/15/09 12:26
0.90	1.00	171900	9/15/09 12:27
0.95	1.00	174082	9/15/09 12:28
1.00	1.00	181331	9/15/09 12:29
1.05	1.00	211928	9/15/09 12:30
1.10	1.00	293552	9/15/09 12:31
1.15	1.00	544079	9/15/09 12:32
1.20	1.00	827973	9/15/09 12:33
1.25	1.00	1214090	9/15/09 12:34

Detector set to operate at 0.70 kV

JK  
9/30/09

OK  
9/30/09

Ludlum Detector Voltage Curve



### DAILY CALIBRATION RANGE

Trial	Counts	Date	Time	Detector
1	154335	9/15/2009	13:30	7
2	153698	9/15/2009	13:31	7
3	153933	9/15/2009	13:32	7
4	154196	9/15/2009	13:33	7
5	154114	9/15/2009	13:34	7
6	153766	9/15/2009	13:35	7
7	154409	9/15/2009	13:36	7
8	154086	9/15/2009	13:37	7
9	153833	9/15/2009	13:38	7
10	153689	9/15/2009	13:39	7
11	148183	9/16/2009	10:25	7
12	148142	9/16/2009	10:35	7
13	148193	9/16/2009	10:36	7
14	147463	9/16/2009	10:37	7
15	147251	9/16/2009	10:39	7
16	146697	9/17/2009	4:25	7
17	146925	9/17/2009	5:45	7
18	147238	9/17/2009	6:00	7
19	147239	9/17/2009	6:15	7
20	146836	9/17/2009	6:30	7

STATISTICS	
Average	150711.30
St. Dev.	3407.47
+ 3 S.D.	160933.72
+ 2 S.D.	157526.25
Average	150711.30
- 2 S.D.	143896.35
- 3 S.D.	140488.88
<b>UPPER</b>	<b>160934</b>
<b>LOWER</b>	<b>140489</b>

*Handwritten:* 712  
9/30/09

701	2.107	9/30/2009
702	2.033	9/30/2009
703	2.221	9/30/2009
704	2.235	9/30/2009
705	2.107	9/30/2009
706	2.142	9/30/2009
707	2.275	9/30/2009
708	2.188	9/30/2009
709	2.285	9/30/2009
710	2.409	9/30/2009
711	2.242	9/30/2009
712	2.069	9/30/2009

Handwritten signature and date: 9/30/09

# Ra-226 WATER

Batch : LCSVER  
 Date : 9/22/2009  
 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	15	636	701	2.107	0.267	0.5512	24.6163	1.9283	9/30/2009 9:20
VER 2	0.500	15	625	702	2.033	0.267	0.5247	27.0835	2.1404	9/29/2009 16:10
VER 3	0.500	15	625	703	2.221	0.267	0.4811	24.8342	1.9627	9/29/2009 16:45
VER 4	0.500	15	587	704	2.235	0.267	0.4786	23.1944	1.8925	9/29/2009 17:15
VER 5	0.500	15	511	705	2.107	0.267	0.5081	21.4146	1.8751	9/29/2009 17:50
VER 6	0.500	15	580	706	2.142	0.267	0.4998	23.9310	1.9645	9/29/2009 18:25
VER 7	0.500	15	539	707	2.275	0.267	0.4643	20.6372	1.7586	9/29/2009 18:40
VER 8	0.500	15	525	708	2.188	0.267	0.4816	20.8572	1.8013	9/29/2009 19:00
VER 9	0.500	15	559	709	2.285	0.267	0.4615	21.2888	1.7807	9/29/2009 19:40
VER 10	0.500	15	694	710	2.409	0.267	0.4093	23.4767	1.7593	9/30/2009 9:50
VER 11	0.500	15	537	711	2.242	0.267	0.4690	20.7776	1.7739	9/29/2009 20:20
VER 12	0.500	15	552	712	2.069	0.267	0.5096	23.2132	1.9542	9/29/2009 21:10

Handwritten signature and date: 9/30/09

Sample ID	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
701	7	9/29/2009 15:35	LCS	0638-F	24.05	pCi/L	102%
702	7	9/29/2009 16:10	LCS	0638-F	24.05	pCi/L	113%
703	7	9/29/2009 16:45	LCS	0638-F	24.05	pCi/L	103%
704	7	9/29/2009 17:15	LCS	0638-F	24.05	pCi/L	96%
705	7	9/29/2009 17:50	LCS	0638-F	24.05	pCi/L	89%
706	7	9/29/2009 18:25	LCS	0638-F	24.05	pCi/L	100%
707	7	9/29/2009 18:40	LCS	0638-F	24.05	pCi/L	86%
708	7	9/29/2009 19:00	LCS	0638-F	24.05	pCi/L	87%
709	7	9/29/2009 19:40	LCS	0638-F	24.05	pCi/L	89%
710	7	9/29/2009 20:00	LCS	0638-F	24.05	pCi/L	98%
711	7	9/29/2009 20:20	LCS	0638-F	24.05	pCi/L	86%
712	7	9/29/2009 21:10	LCS	0638-F	24.05	pCi/L	97%

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	Net CPM	Ingrowth constant
9/22/2009 14:30	9/30/2009 6:00	183.50	3.33	0.9751	1.0009	42.1333	0.7318
9/22/2009 14:30	9/29/2009 10:00	163.50	6.17	0.9545	1.0009	41.4000	0.6774
9/22/2009 14:30	9/29/2009 10:15	163.75	6.50	0.9521	1.0009	41.4000	0.6762
9/22/2009 14:30	9/29/2009 10:30	164.00	6.75	0.9503	1.0009	38.8667	0.6755
9/22/2009 14:30	9/29/2009 10:50	164.33	7.00	0.9485	1.0009	33.8000	0.6749
9/22/2009 14:30	9/29/2009 11:15	164.75	7.17	0.9473	1.0009	38.4000	0.6749
9/22/2009 14:30	9/29/2009 12:45	166.25	5.92	0.9563	1.0009	35.6663	0.6844
9/22/2009 14:30	9/29/2009 13:10	166.67	5.83	0.9569	1.0009	34.7333	0.6857
9/22/2009 14:30	9/29/2009 13:35	167.08	6.08	0.9551	1.0009	37.0000	0.6852
9/22/2009 14:30	9/30/2009 6:30	184.00	3.33	0.9751	1.0009	46.0000	0.7328
9/22/2009 14:30	9/29/2009 14:20	167.83	6.00	0.9557	1.0009	35.5333	0.6872
9/22/2009 14:30	9/29/2009 14:40	168.17	6.50	0.9521	1.0009	36.5333	0.6853

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Re-226 Verification Sheet

VNS #7

count time: 15 min

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
<del>VN1</del>	<del>500</del>	<del>9/29/09 1430</del>	<del>9/29/09 1040</del>	<del>9/29/09 1535</del>	<del>701</del>	<del>7</del>	<del>8</del>	<del>488</del>
VN 2	500	9/29/09 1430	9/29/09 1000	9/29/09 1610	702	7	8	685
VN 3	500	9/29/09 1430	9/29/09 1015	9/29/09 1645	703	7	1	625
VN 4	500	9/29/09 1430	9/29/09 1030	9/29/09 1715	704	7	3	587
VN 5	500	9/29/09 1430	9/29/09 1050	9/29/09 1750	705	7	1	511
VN 6	500	9/29/09 1430	9/29/09 1115	9/29/09 1825	706	7	6	580
VN 7	500	9/29/09 1430	9/29/09 1145	9/29/09 1840	707	7	1	539
VN 8	500	9/29/09 1430	9/29/09 1310	9/29/09 1900	708	7	6	525
VN 9	500	9/29/09 1430	9/29/09 1335	9/29/09 1940	709	7	5	559
<del>VN 10</del>	<del>500</del>	<del>9/29/09 1430</del>	<del>9/29/09 1400</del>	<del>9/29/09 2000</del>	<del>710</del>	<del>7</del>	<del>4</del>	<del>322</del>
VN 11	500	9/29/09 1430	9/29/09 1420	9/29/09 2020	711	7	7	537
VN 12	500	9/29/09 1430	9/29/09 1440	9/29/09 2110	712	7	3	552

419  
9/30/09

419  
9/30/09

419  
9/30/09

Ra-226 Verification Sheet

\* COUNT 15 min

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VER 16	500	9/22/09 1430	9/30/09 600	9/30/09 0920	701	7	3	636
VER 17	500	9/22/09 1430	9/30/09 630	9/30/09 0950	710	7	8	694

JHQ 9/30/09

JHQ 9/30/09



## General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL RAD-A-008 Isotope RA 226  
 Date Standards Prepared 11/3/09 Cocktail Type Used NA  
 Standard ID DL2814 Matrix of Vial/Planchett NA  
 Amount Used (g or ml) 0.1 Type of Scintillation Vial NA  
 Standard Activity (DPM/g or mL) 268.8845 Pipette ID Used 1429303  
 Reference Date 11/23/09 Balance ID Used 38080104  
 Expiration Date 1/17/10 Quenching Agent NA  
 Residue/Carrier Agent NA

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	VEN 1				
2	VEN 2				
3	VEN 3				
4	VEN 4				
5	VEN 5				
6	VEN 6				
7	VEN 7				
8	VEN 8				
9	VEN 9				
10	VEN 10				
11	VEN 11				
12	VEN 12				
13	VEN 16				
14	VEN 17				

~~/~~

11/30/09  
 9/30/09

Prepared By: Kelli & Denise Date: 9/30/09  
 Reviewed By: Aggie & Jk Date: 9/30/09

Rev 1 RLM 9/10/97

0638

Phone (404) 352-8677

Fax (404) 352-2837

## CERTIFICATE OF CALIBRATION

### Standard Radionuclide Source

67519-278

Ra-226 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 participation in a Measurements Assurance Program as described in USNRC Reg. Guide 4.15, Revision 1, February 1979.

ISOTOPE:	Ra-226
ACTIVITY (dps):	2.353 E4
HALF-LIFE:	1.600 E3 years
CALIBRATION DATE:	January 23, 2004 12:00 EST
RELATIVE EXPANDED UNCERTAINTY (k=2):	3.3%

Impurities:  $\gamma$ -impurities (other than decay products) <0.1%

5.01065 grams 0.1M HCl solution with 50  $\mu$ g/g Ba carrier.

P O NUMBER 3231RD, Item 5

SOURCE PREPARED BY:

M. D. Currie  
M. D. Currie, Radiochemist

Q A APPROVED:

MCW 1/26/04

# Standard Traceability Log Rad

**WARNING! Training must be completed!!**  
**Alphalims will be locked out if training is not completed within 1 week of assignment Contact**  
**Quality if additional time is needed to complete training**

Source Material Info	
Parent Code:	0638
Prepared By:	Amanda Fehr
Carrier Conc:	0.1M HCl
Reference Date:	01/23/2004
Ampoule Mass (g):	5.01065 g
Uncertainty:	+/- 3.3 %
LogBook No:	RC-S-037-037

A Solution Material Info	
Isotope:	Radium-226
Prepared By:	Amanda Fehr
Prep Date:	01/16/2006
Verification Date:	04/09/2009
Expiration Date:	04/09/2010
Primary Code:	0638-A
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**

$(\text{Mass of parent(g)} * (\text{Parm Activity (dps)} * (\text{conversion dpm to dps}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol}))) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (dps)} * (\text{conversion dpm to dps}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.8398 \text{ g}) * (23530 \text{ dps}) * (60 \text{ dpm/dps}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13636.6133 \text{ dpm/mL}$
$(4.8398 \text{ g}) * (23530 \text{ dps}) * (60 \text{ dpm/dps}) / (1.0266 \text{ g/mL}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13282.9676 \text{ dpm/g}$

*AM 4/20/10*

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	04/09/2009	04/09/2010
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	03/02/2009	03/02/2010
07/23/2008	Daniel Roy	5.0607	250	0638-H	268.8845 dpm/ml	07/17/2009	07/17/2010

GEL Laboratories LLC  
Version 1.0 9/18/2000

VN 61260106

# Verification for Ra-226 Standard 0638-H

M. Aders 7/17/2009	<b>Isotope</b> 0638-H 0638-H 0638-H	<b>Value</b> 12.025 10.739 12.348	<b>Uncertainty</b> 1.2237 1.1752 1.2298
<b>Mean Value (Counting) =</b>	11.704	96.86	<b>Pass</b>
<b>Stdev =</b>	0.85081728		<b>Rule 3 (Pass/Fail)</b>
<b>Target =</b>	12.08		
<b>Lower Limit =</b>	10.00223211		
<b>Upper Limit =</b>	13.40550123		
<b>Rule 1 Pass/Fail</b>	<b>Pass</b>		
<b>Two sigma =</b>	1.701634559		
<b>10 % of Mean =</b>	1.170386667		
<b>Rule 2 (Pass/Fail)</b>	<b>Fail</b>		<b>*Exception taken due to full recovery of standard</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 Ra-226 source 0638-H by transferring portions of the degassed standard into tared glass liquid scintillation vials. 10 mL of DI Water and 10 mL of mineral oil were added to each vial and the vials were shaken. A Blank vial was prepared in a similar fashion using 10 mL of DI Water and 10 mL of mineral oil. The standard verification vials and Background source were dark adapted for two hours and counted on LSC Green using source standard verification. 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

*Angela D. H. 7/30/09*  
*Henry J. Adams 7/20/09*  
*Nancy M. Hart 7/15/09*

# Radon-222 Liquid

Filename : RN222.XLS  
 File type : Excel  
 Version # : 1.2.4

Spike S/N : N/A  
 Spike Exp Date : N/A  
 Spike Activity (dpm/ml) : N/A  
 Spike Volume Added : N/A  
 Spike Date/Time : 7/17/2009 15:00

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

Batch : 886194  
 Analyst : MLA  
 Prep Date : 7/17/2009

Procedure Code : LSC99TCL  
 Parmname : Radon-222  
 Required MDA : 50  
 Half-life of Radon-222 : 3.823 days

Rn-222 Abundance : 1  
 Rn-222 Method Uncertainty : 0.0556  
 Geometry : 10ML MINERAL OIL/10ML SAMPLE

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

Sample Characteristics			Count raw Data				Background		Sample Decay	
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Rack Position #	Counting Time (min.)	Quench#	Gross cpm	Count Time (min.)	Count Start Date/Time	Sample Decay
1	1201883284.1	1.0000	2.0399E-05	22-2	15	50.3	43.73	15	7/20/2009 11:53	0.594
2	1201883285.1	1.0000	2.0399E-05	22-3	15	50	38.2	15	7/20/2009 12:09	0.592
3	1201883286.1	1.0000	2.0399E-05	22-4	15	49.1	45.4	15	7/20/2009 12:26	0.591

Calibration Data				Backgrounds				Correction Factors			Net Sample Activity for MS pCi/L	
Pos.	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Rack Position #	Count Start Date/Time	Spike Date/Time	Rn-222 Ingrowth	Rn-222 Count Correction	Net Sample Activity for MS pCi/L	
1	LSCGREEN	3/25/2009	3/31/2010	3.4365	0.00792	22-1	7/20/2009 11:36	7/17/2009 15:00	0.406	0.406	0.406	
2	LSCGREEN	3/25/2009	3/31/2010	3.4365	0.00792	22-1	7/20/2009 11:36	7/17/2009 15:00	0.408	0.408	0.408	
3	LSCGREEN	3/25/2009	3/31/2010	3.4365	0.00792	22-1	7/20/2009 11:36	7/17/2009 15:00	0.409	0.409	0.409	

- 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		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	0.8104	0.5722	50	1.2114	12.0246	0.0525	35.8600	1.8619	1.2237	1.8026	1.8026	1.8026		LCS			12.0832	99.5%
2	0.8078	0.5703	50	1.2075	10.7393	0.0564	32.1300	1.7939	1.1752	1.6669	1.6669	1.6669		LCS			12.0832	88.9%
3	0.8053	0.5685	50	1.2037	12.3477	0.0514	37.0600	1.8833	1.2298	1.8330	1.8330	1.8330		LCS			12.0832	102.2%



# Radon 222 Que Sheet

Batch #: 886194      Analyst: MLA      First Client Due Date: \_\_\_\_\_      Internal Due Date: 07/22/2009  
 Spike Isotope: Radium-226      Spike Code: C03281      Expiration Date: 7/23/09      Vol: 0.1      Nom Conc: \_\_\_\_\_  
 LCS Isotope: Radium-226      LCS Code: \_\_\_\_\_      Expiration Date: \_\_\_\_\_      Vol: \_\_\_\_\_      Nom Conc: \_\_\_\_\_  
 Prep Date: 7/17/09      Pipet ID: 2971055      Initials: MLA      Witness: \_\_\_\_\_      Comments: \_\_\_\_\_

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Label	Wet/Dry Sample Mass (g/mL)	LSC Rack #	Time Spike Added
1201883284-1	LCS for batch 886194	LCS	50	pCi/L	WATER	QC ACCOUNT	15-JUL-09 10:45 AM	1		22-2	
1201883285-1	LCS for batch 886194	LCS	50	pCi/L	WATER	QC ACCOUNT	15-JUL-09 10:45 AM	2		22-3	
1201883286-1	LCS for batch 886194	LCS	50	pCi/L	WATER	QC ACCOUNT	15-JUL-09 10:45 AM	3		22-4	

Bkg Rack #: 22-1

Comments: \_\_\_\_\_

Data Reviewed By: \_\_\_\_\_

Instrument Used: LS6000 (Red) 7065155, LS6500 (Black) 7069123, LS6500 (Blue) 7067083, LS6500 (Green) 7067404  
 Wallac (Yellow) 4040127, Wallac (Pink) 2200082, Purple 7069123, Silver 7060656

GEL Laboratories LLC, Radiochemistry Division

20 JUL 2009 11:46

ID: RIV-222

USER: LA COMMENT: GREEN

PRESET TIME: 15.00

DATA CALC:	CPM	H#	: YES	SAMPLE REPEATS:	1	PRINTER	: EDIT
COUNT BLANK:	NO	IC#	: NO	REPLICATES:	1	RS232	: EDIT
T&D PHASE:	NO	ADC	: NO	CYCLE REPEATS:	1	DISK	: OFF
SCINTILLATOR:	LIQUID	LUMEX:	YES	LOW SAMPLE REJ:	0	RWM LIST	: OFF
LOW LEVEL:	YES	HALF LIFE CORRECTION DATE:				none	

CHAN: 600.0 - 875.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

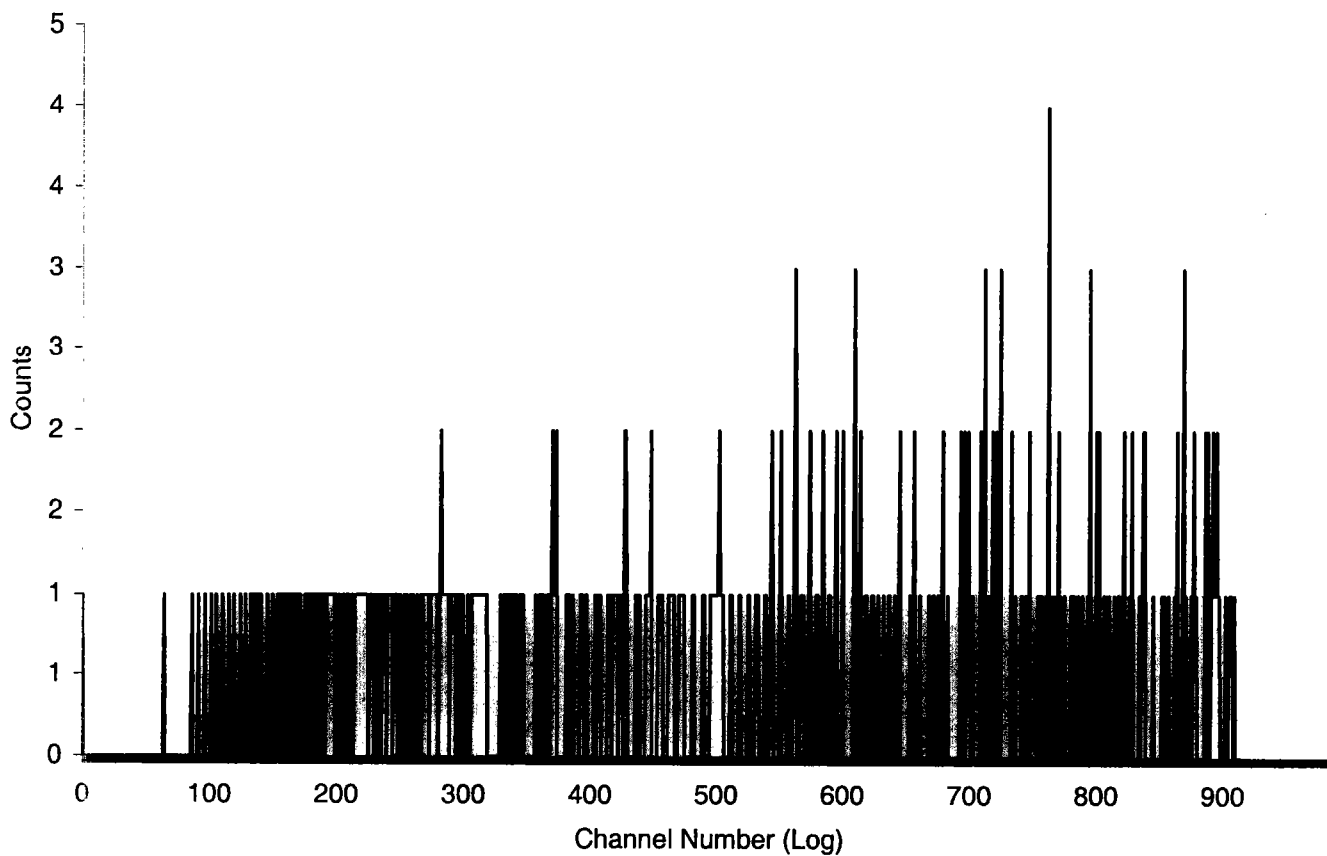
CHAN: 300.0 - 900.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

ALPHA-BETA DISCRIMINATION: NO

SAM NO	POS	TIME MIN	H#	WIND1		WIND2		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
1	20-1	15.00	47.9	8.20	18.03	19.13	11.81	0.38	15.92
2	20-2	15.00	50.3	43.73	7.81	60.67	6.63	0.16	32.28
3	20-3	15.00	50.0	38.20	8.36	52.27	7.14	0.17	48.66
4	20-4	15.00	49.1	45.40	7.66	62.93	6.51	0.15	65.03

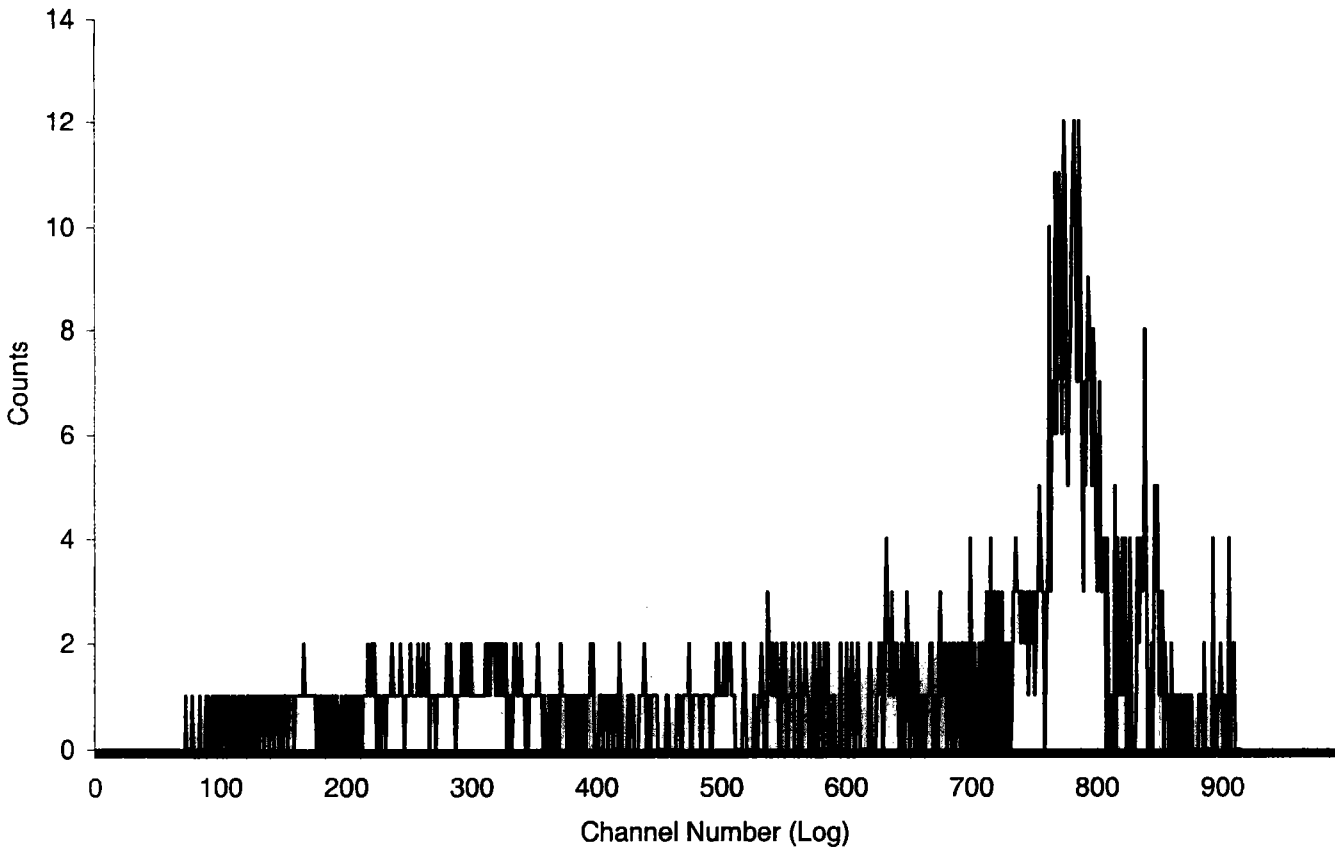
Sample Count Start Time:	20 Jul 2009 11:36:58		
Data Capture Date	20 Jul 2009 11:52:21		
User Filename	S16072022-1B.XLS		
	U16072022-1B.XLS		
Spectrum Type	Log Counts		
User Number	16		
User Id	RN-222		
User Comment	GREEN		
Isotope Name	14C		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	1	22-1	15.00
H#, Total Counts:	47.9	412	
Start, End, X-Axis:	0	990	Channel Number

SPECTRUM PLOT  
USER 16 - RN-222



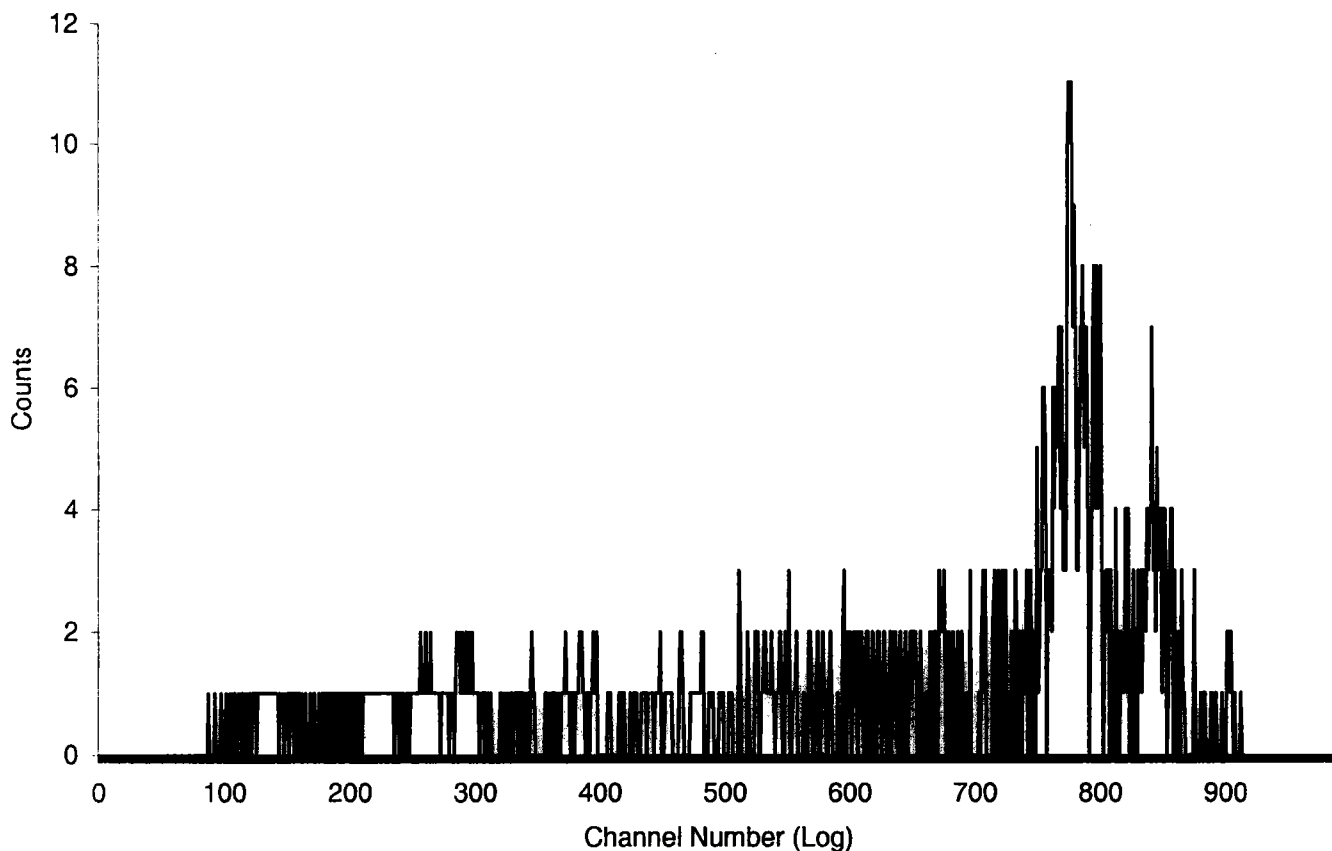
Sample Count Start Time:	20 Jul 2009 11:53:20		
Data Capture Date	20 Jul 2009 12:08:43		
User Filename	S16072022-2B.XLS		
	U16072022-1B.XLS		
Spectrum Type	Log Counts		
User Number	16		
User Id	RN-222		
User Comment	GREEN		
Isotope Name	14C		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	2	22-2	15.00
H#, Total Counts:	50.3	1100	
Start, End, X-Axis:	0	990	Channel Number

SPECTRUM PLOT  
USER 16 - RN-222



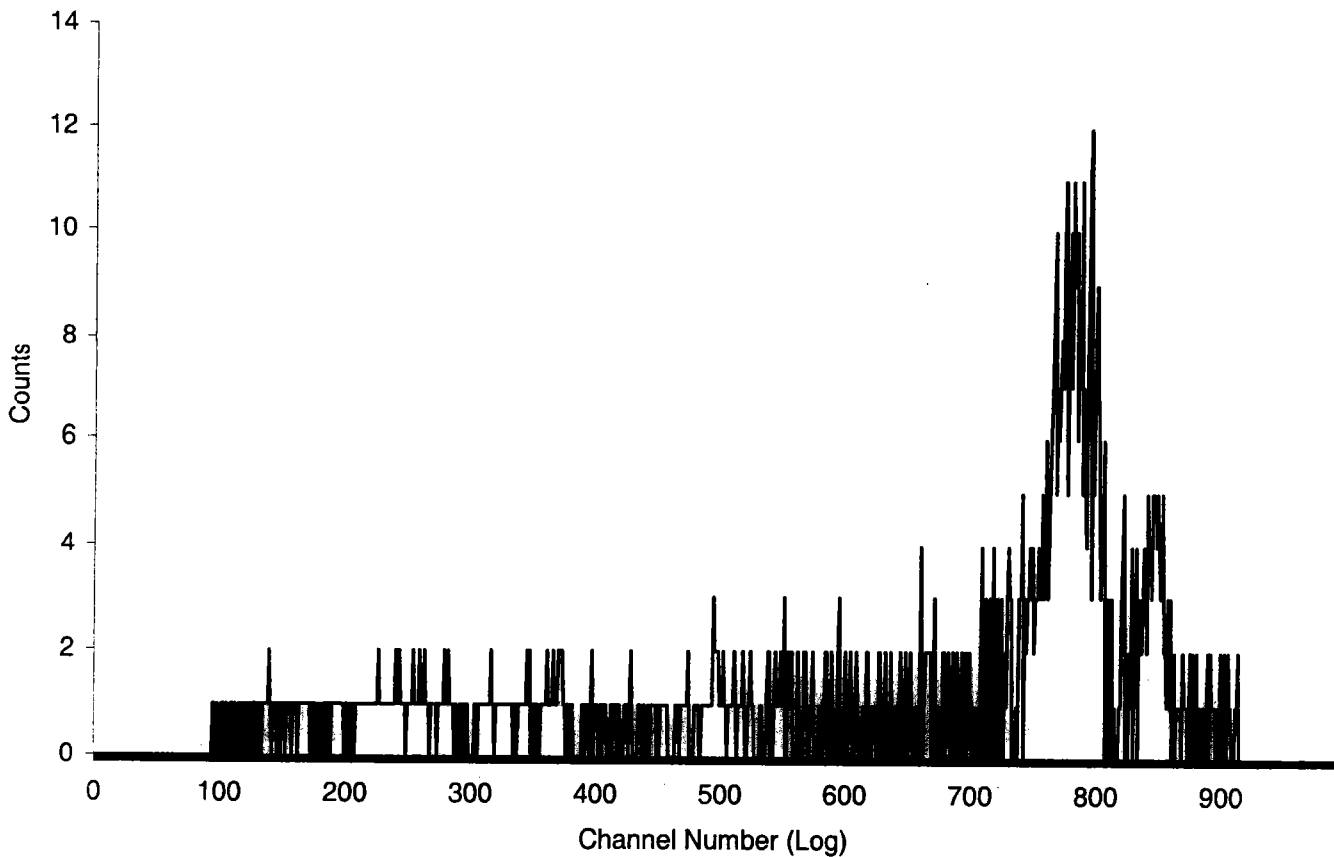
Sample Count Start Time:	20 Jul 2009 12:09:43		
Data Capture Date	20 Jul 2009 12:25:05		
User Filename	S16072022-3B.XLS		
	U16072022-1B.XLS		
Spectrum Type	Log Counts		
User Number	16		
User Id	RN-222		
User Comment	GREEN		
Isotope Name	14C		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	3	22-3	15.00
H#, Total Counts:	50.0	956	
Start, End, X-Axis:	0	990	Channel Number

SPECTRUM PLOT  
USER 16 - RN-222



Sample Count Start Time:	20 Jul 2009 12:26:05		
Data Capture Date	20 Jul 2009 12:41:28		
User Filename	S16072022-4B.XLS		
	U16072022-1B.XLS		
Spectrum Type	Log Counts		
User Number	16		
User Id	RN-222		
User Comment	GREEN		
Isotope Name	14C		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	4	22-4	15.00
H#, Total Counts:	49.1	1123	
Start, End, X-Axis:	0	990	Channel Number

SPECTRUM PLOT  
USER 16 - RN-222



# **GAS FLOW PROPORTIONAL COUNTERS**

# General Engineering Laboratories

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

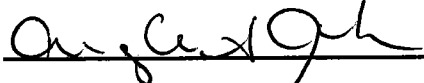
## Gas Flow Proportional Counter Calibration Package

Method: Pa-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





July 7/2/09

Notes:

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

indicates results calculated at 100% recovery

Decision Level	Critical Level	Required MDA	MDA	Sample Act. Conc.		Net Count Rate	Net Count Rate	2 SIGMA Counting		Total Prop. Uncertainty	Sample Type	Nominal pCi/L	Recovery
				pCi/L	Conc.			CPM	CPM				
0.3471	0.2451	1	0.6937	134.0279	0.0254	131.6880	2.9666	5.9178	21.6466	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	122.0633	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	6.4352	22.9053	164.3409	LCS	164.3409	86.3%
0.4150	0.2830	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	129.8854	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%
0.7520	0.5309	1	1.3000	147.9661	0.0266	124.2633	2.8910	6.7471	24.0105	164.3409	LCS	164.3409	82.1%
0.4809	0.3395	1	0.9027	134.9611	0.0269	120.7040	2.8427	6.2312	21.9265	164.3409	LCS	164.3409	80.0%
0.8974	0.4924	1	1.2076	131.4742	0.0271	117.9500	2.8170	6.1544	21.3797	164.3409	LCS	164.3409	89.0%
0.6530	0.4610	1	1.1419	148.2299	0.0259	132.9873	2.9894	6.4406	23.6659	164.3409	LCS	164.3409	95.2%
0.7661	0.5409	1	1.3064	156.3706	0.0255	139.2187	3.0605	6.7377	25.2668	164.3409	LCS	164.3409	81.7%
0.6899	0.4871	1	1.1997	134.1863	0.0270	118.9960	2.8288	6.2523	21.8127	164.3409	LCS	164.3409	83.4%
0.6079	0.4292	1	1.0862	137.0396	0.0269	120.3027	2.8412	6.3436	22.2643	164.3409	LCS	164.3409	88.8%
0.9509	0.6713	1	1.5725	146.0056	0.0264	127.0307	2.9317	6.6044	23.6775	164.3409	LCS	164.3409	88.0%
0.4376	0.3090	1	0.8562	144.5849	0.0276	113.7227	2.7577	6.3903	21.8573	164.3409	LCS	164.3409	89.8%
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	6.7858	24.6088	164.3409	LCS	164.3409	92.6%
0.3962	0.2797	1	0.7956	151.8935	0.0262	128.6313	2.9319	6.6518	23.4785	164.3409	LCS	164.3409	77.8%
0.4480	0.3163	1	0.8657	152.1131	0.0261	130.4707	2.9539	6.7489	24.6318	164.3409	LCS	164.3409	82.2%
0.6332	0.4470	1	1.1278	127.8251	0.0279	109.4120	2.7108	6.2072	20.8618	164.3409	LCS	164.3409	89.2%
0.9817	0.6931	1	1.6167	135.1471	0.0273	117.2540	2.8197	6.3699	21.9896	164.3409	LCS	164.3409	86.1%
0.5779	0.4080	1	1.0463	146.5864	0.0263	127.3240	2.8214	6.5922	23.7610	164.3409	LCS	164.3409	86.1%
0.8422	0.5946	1	1.4301	141.4935	0.0272	117.4880	2.8147	6.6441	23.0149	164.3409	LCS	164.3409	79.4%
0.4379	0.3091	1	0.8509	130.5505	0.0276	112.2200	2.7400	6.2478	21.2682	164.3409	LCS	164.3409	81.4%
0.7972	0.5629	1	1.3635	133.7974	0.0277	112.5273	2.7540	6.4182	21.9026	164.3409	LCS	164.3409	87.8%
0.4475	0.3159	1	0.8728	144.2924	0.0269	119.7633	2.8301	6.6832	23.4437	164.3409	LCS	164.3409	91.8%
0.8154	0.5757	1	1.3863	150.8313	0.0263	128.3747	2.9406	6.7718	24.4459	164.3409	LCS	164.3409	81.8%
0.4063	0.2868	1	0.8104	134.4151	0.0285	118.5507	2.7553	6.3927	21.8871	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	86.1%
0.3432	0.2423	1	0.6763	135.4546	0.0253	141.3227	3.0733	5.7736	21.8705	164.3409	LCS	164.3409	82.4%
0.3289	0.2322	1	0.6397	131.8931	0.0247	150.2887	3.1684	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	153.3873	3.3053	5.8282	23.8982	164.3409	LCS	164.3409	82.1%
0.4447	0.3140	1	0.8052	148.8317	0.0238	162.8880	3.3080	5.7315	23.1384	164.3409	LCS	164.3409	97.6%
0.6180	0.4363	1	1.0494	143.9479	0.0241	162.8880	3.3080	5.6202	21.7752	164.3409	LCS	164.3409	82.2%
0.3427	0.2420	1	0.6680	135.0873	0.0248	148.3533	3.1202	5.4697	20.8960	164.3409	LCS	164.3409	78.9%
0.5997	0.4234	1	1.0256	129.5009	0.0251	144.7940	3.0552	5.7852	23.4616	164.3409	LCS	164.3409	88.8%
0.3316	0.2341	1	0.6469	146.0021	0.0240	163.4967	3.3053	5.4225	25.6134	164.3409	LCS	164.3409	97.2%
0.6355	0.4487	1	1.0805	159.6717	0.0235	174.3747	3.4225	6.1425	26.6194	164.3409	LCS	164.3409	80.4%
0.3136	0.2214	1	0.6255	132.0625	0.0251	144.5507	3.1078	5.5650	21.3060	164.3409	LCS	164.3409	82.5%
1.4618	1.0321	1	2.2506	135.6135	0.0254	145.4707	3.1861	5.8215	22.7970	164.3409	LCS	164.3409	86.2%
0.3185	0.2249	1	0.6330	141.6298	0.0245	154.5427	3.2193	5.7718	21.9090	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%

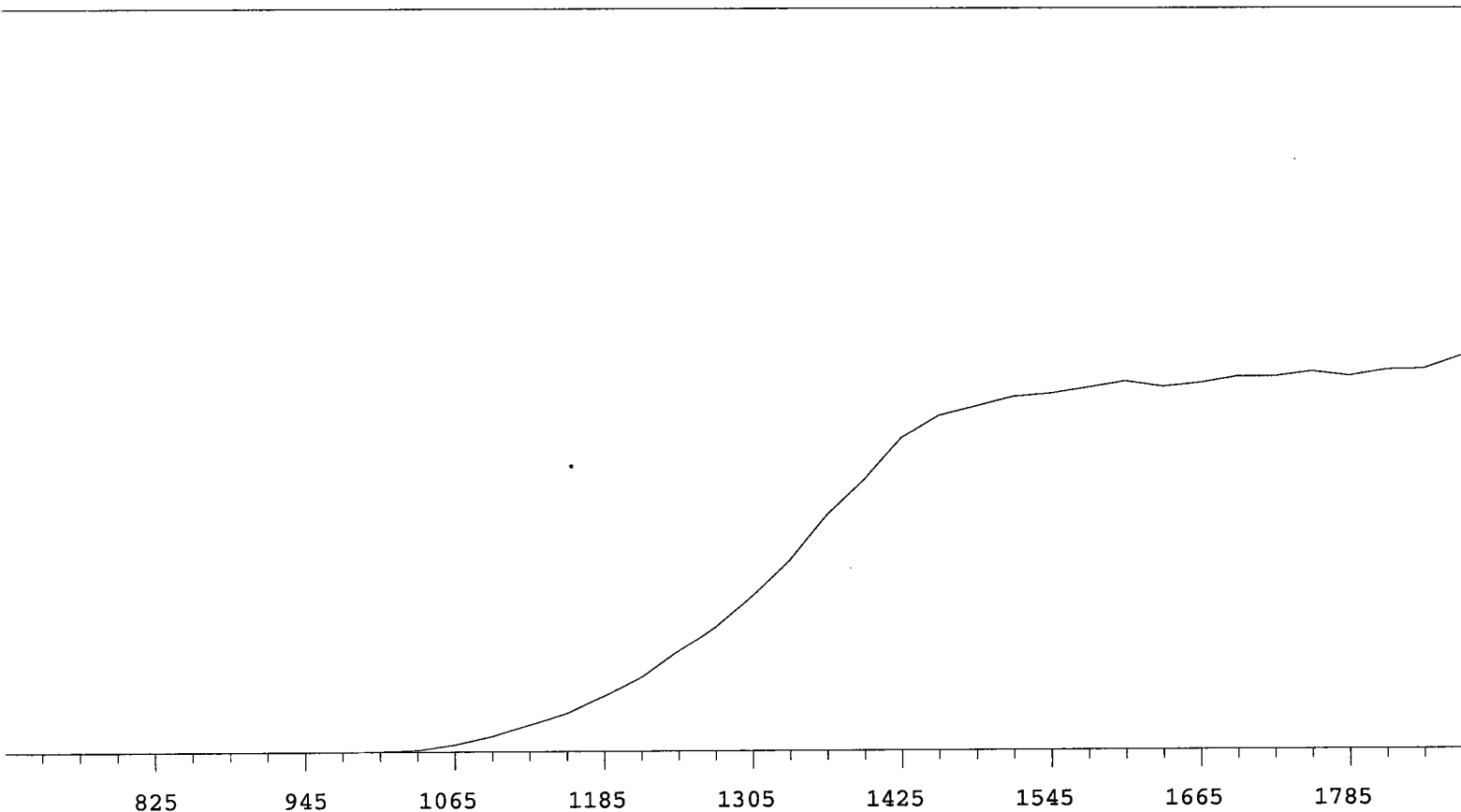
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3	1C	15	44	2108	7/2/2009 8:40	7/2/2009 8:55	Protean
4	1D	15	108	2265	7/2/2009 8:40	7/2/2009 8:55	Protean
5	2A	15	69	1838	7/2/2009 8:40	7/2/2009 8:55	Protean
6	2B	15	8	2053	7/2/2009 8:40	7/2/2009 8:55	Protean
7	2C	15	96	1982	7/2/2009 8:40	7/2/2009 8:55	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

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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

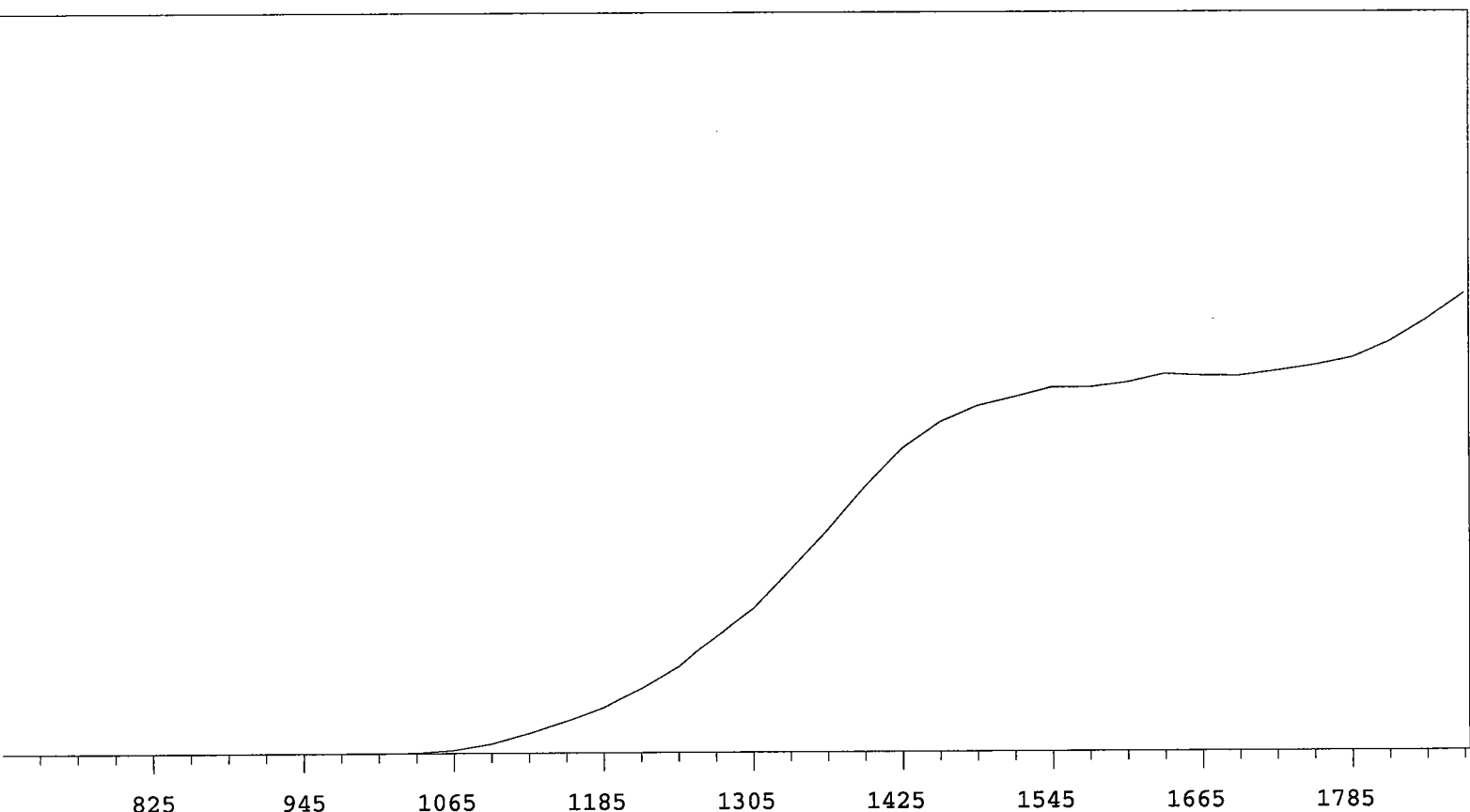
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2B	6.16681E-01				
2C	5.96919E-01				
2D	6.11886E-01				
3A	5.68218E-01				
3B	5.98041E-01				
3C	6.16431E-01				
3D	5.99405E-01				
4A	6.20765E-01				
4B	6.20459E-01				
4C	6.05183E-01				
4D	5.87325E-01				
5A	6.25790E-01				
5B	6.28027E-01				
5C	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	

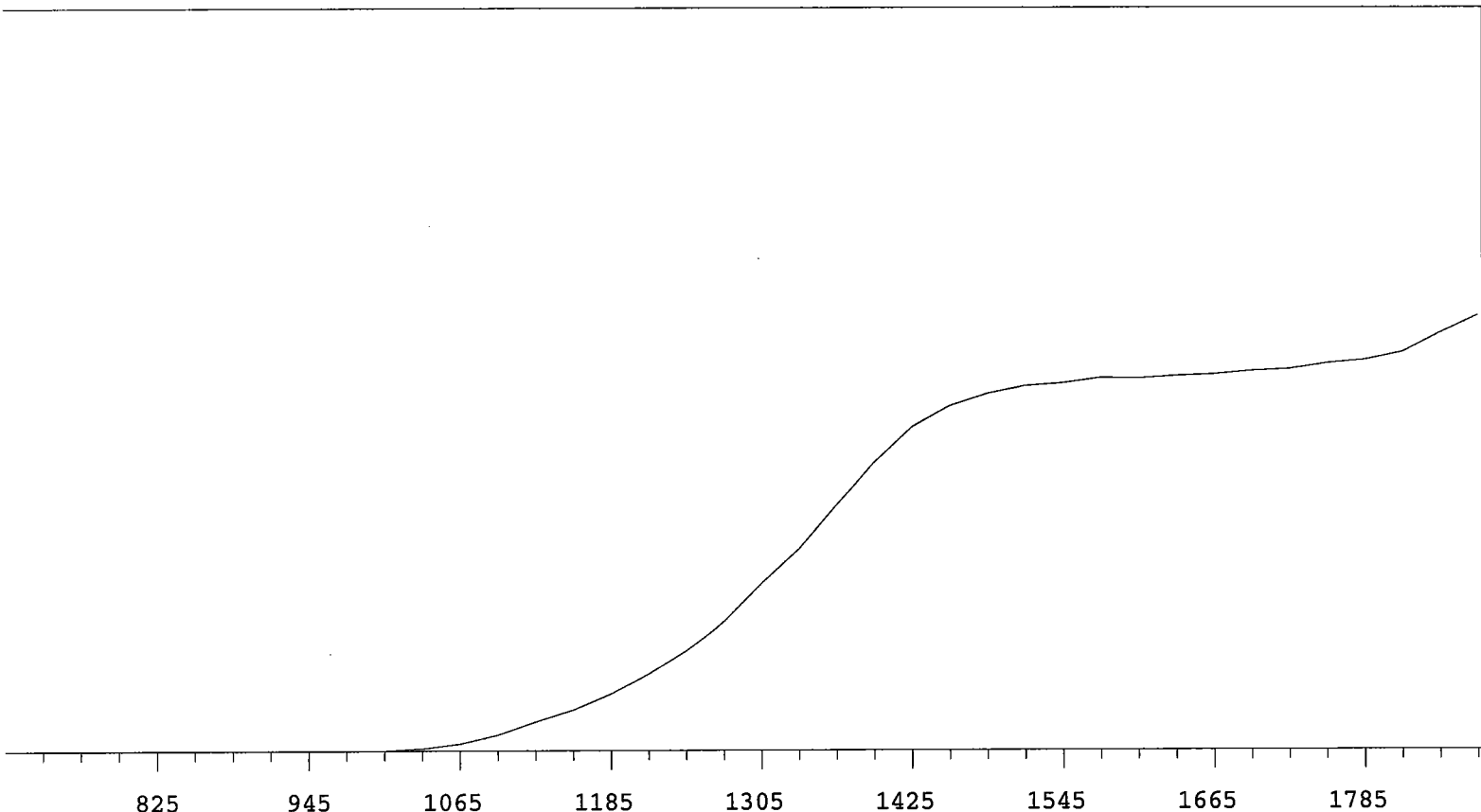
Alpha Volts: 1575 Beta Volts: 1575



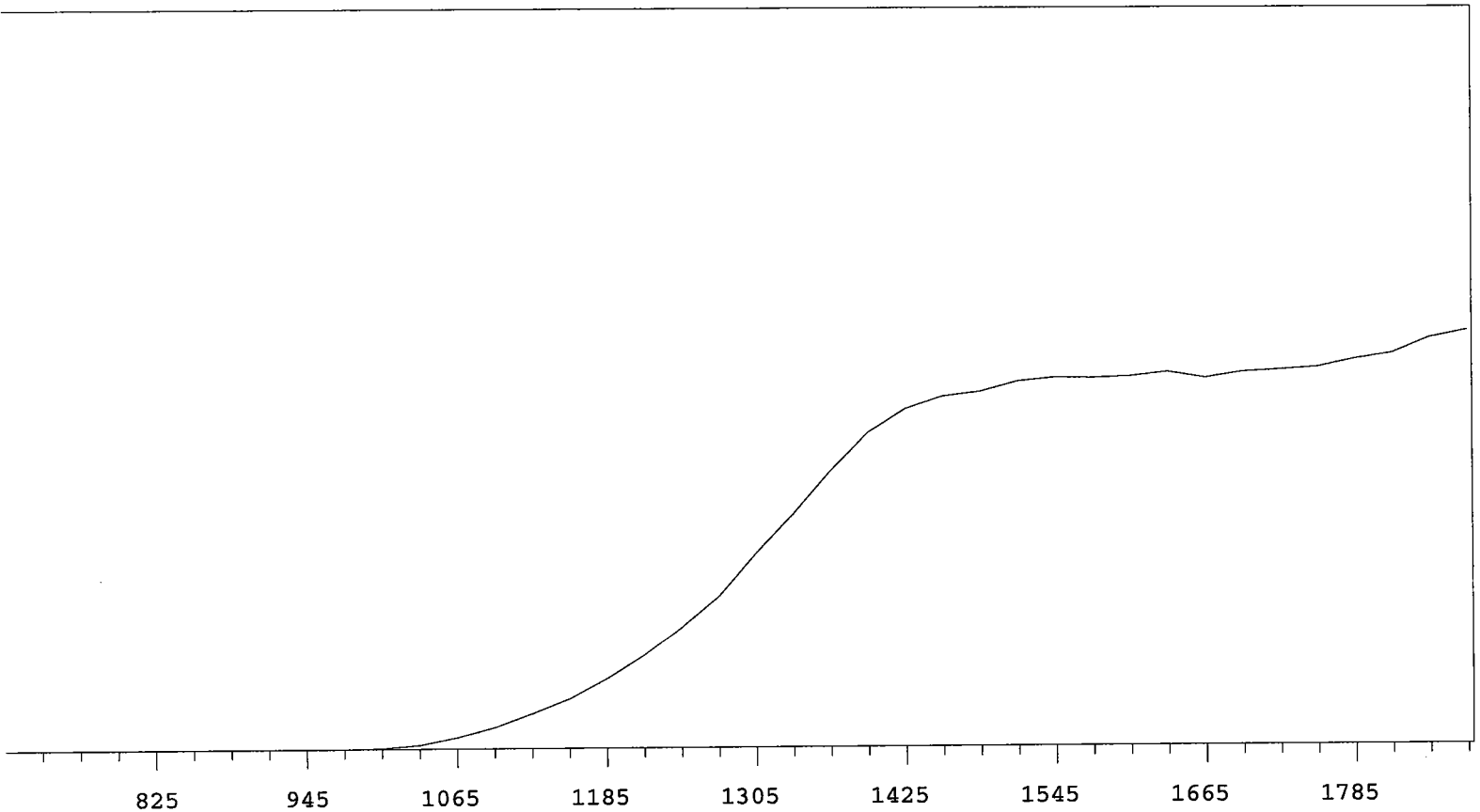
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	13188	+75.92
735	0		1335	16818	+67.60
765	0	+55.56	1365	20420	+59.86
795	1	+83.33	1395	24341	+47.85
825	1	+55.56	1425	27854	+35.51
855	0	>100	1455	30288	+23.26
885	1	+0.00	1485	31798	+14.54
915	0	+0.00	1515	32622	+8.32
945	1	>100	1545	33496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



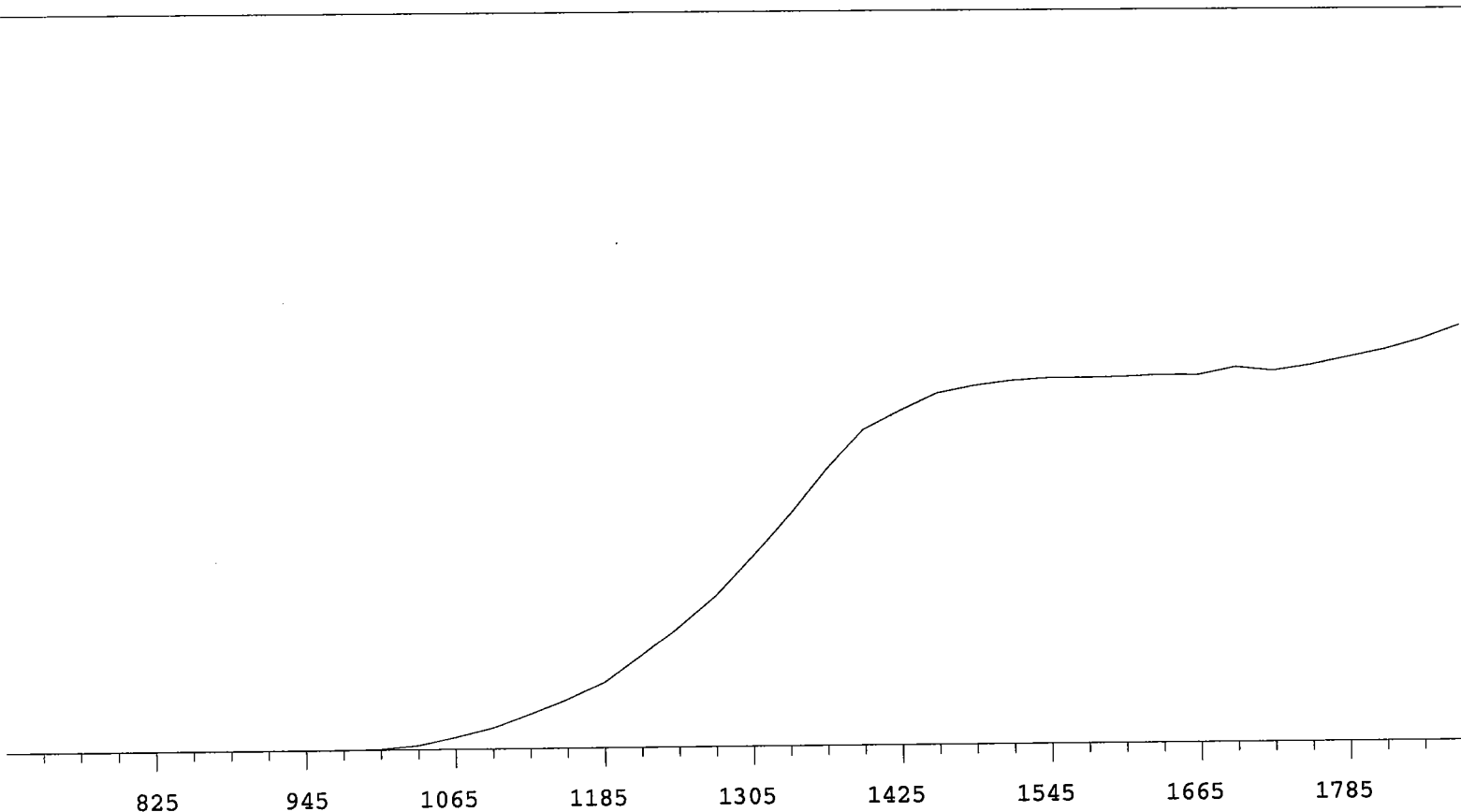
Alpha Volts: 1575 Beta Volts: 1575



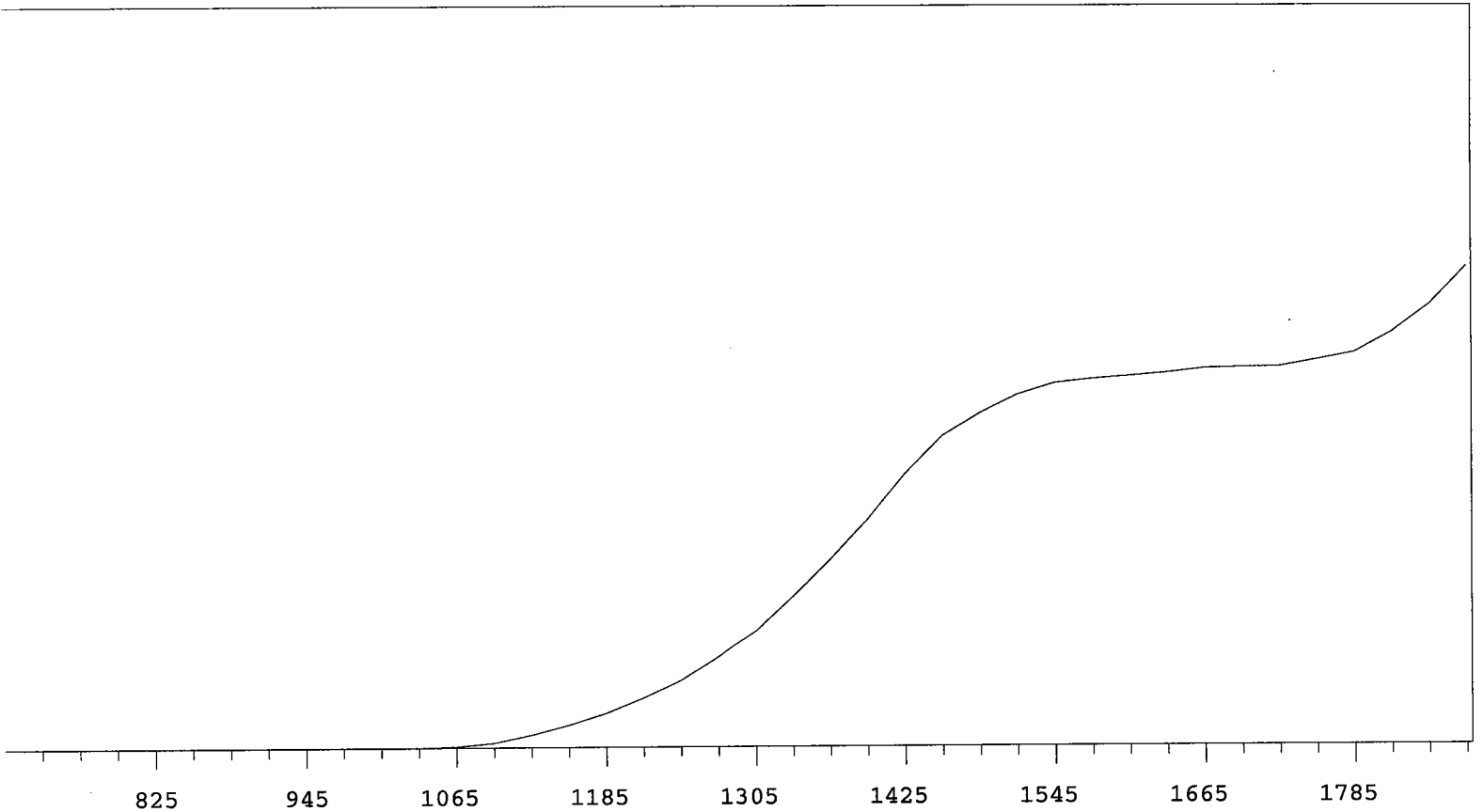
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	14817	+71.06
735	0		1335	17823	+63.34
765	1	+0.00	1365	21704	+53.63
795	0	>100	1395	25422	+42.55
825	1	-55.56	1425	28424	+29.21
855	1	+55.56	1455	30244	+18.11
885	0	>100	1485	31305	+10.10
915	1	>100	1515	31989	+6.07
945	0	>100	1545	32223	+3.43
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	



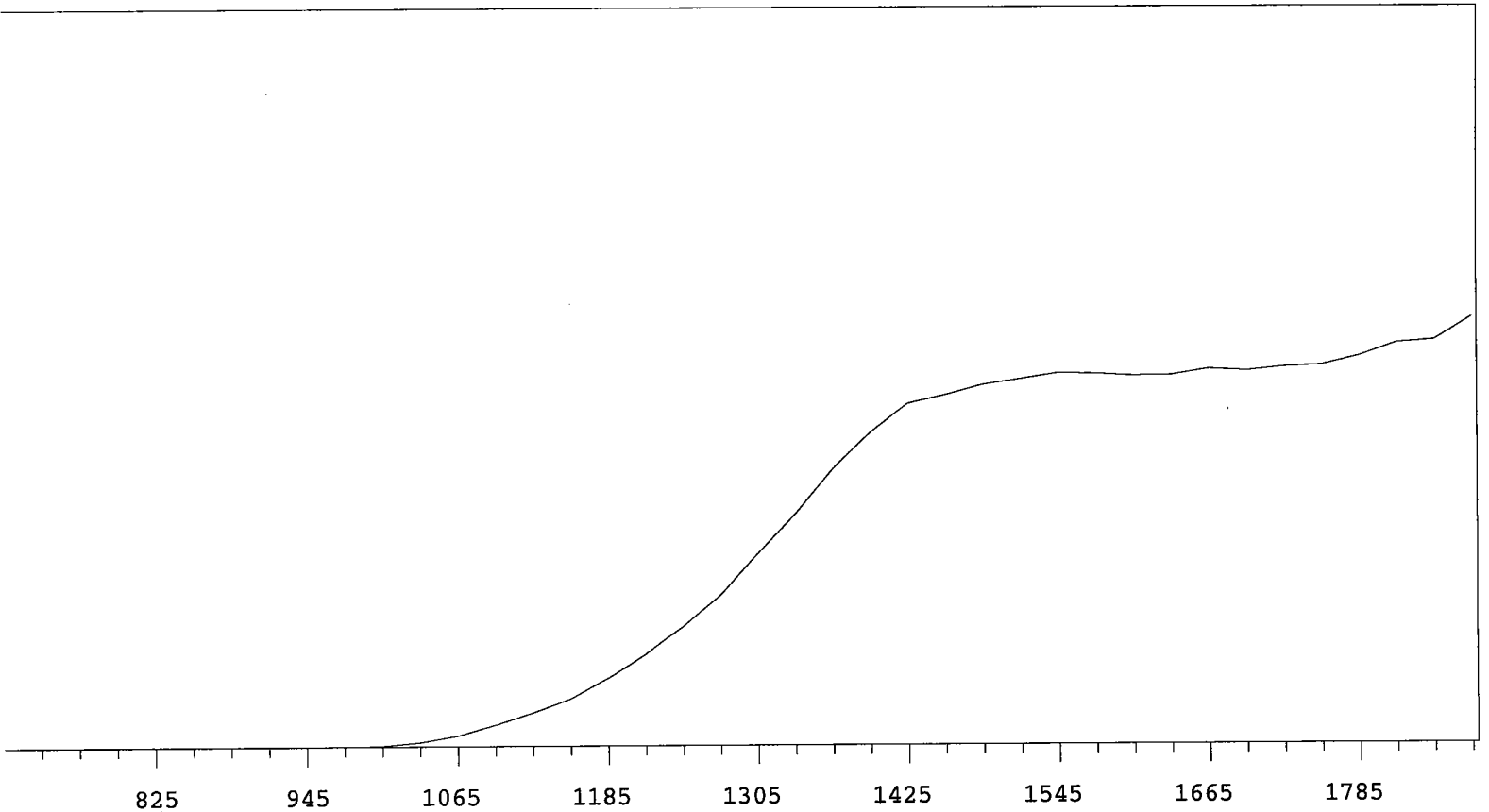
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15202	+66.36
735	1		1335	18216	+57.86
765	0	+0.00	1365	21597	+45.58
795	1	+0.00	1395	24648	+32.96
825	0	+0.00	1425	26505	+19.92
855	1	>100	1455	27475	+11.42
885	0	>100	1485	27836	+7.08
915	0	>100	1515	28609	+4.51
945	0	>100	1545	28896	+2.93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



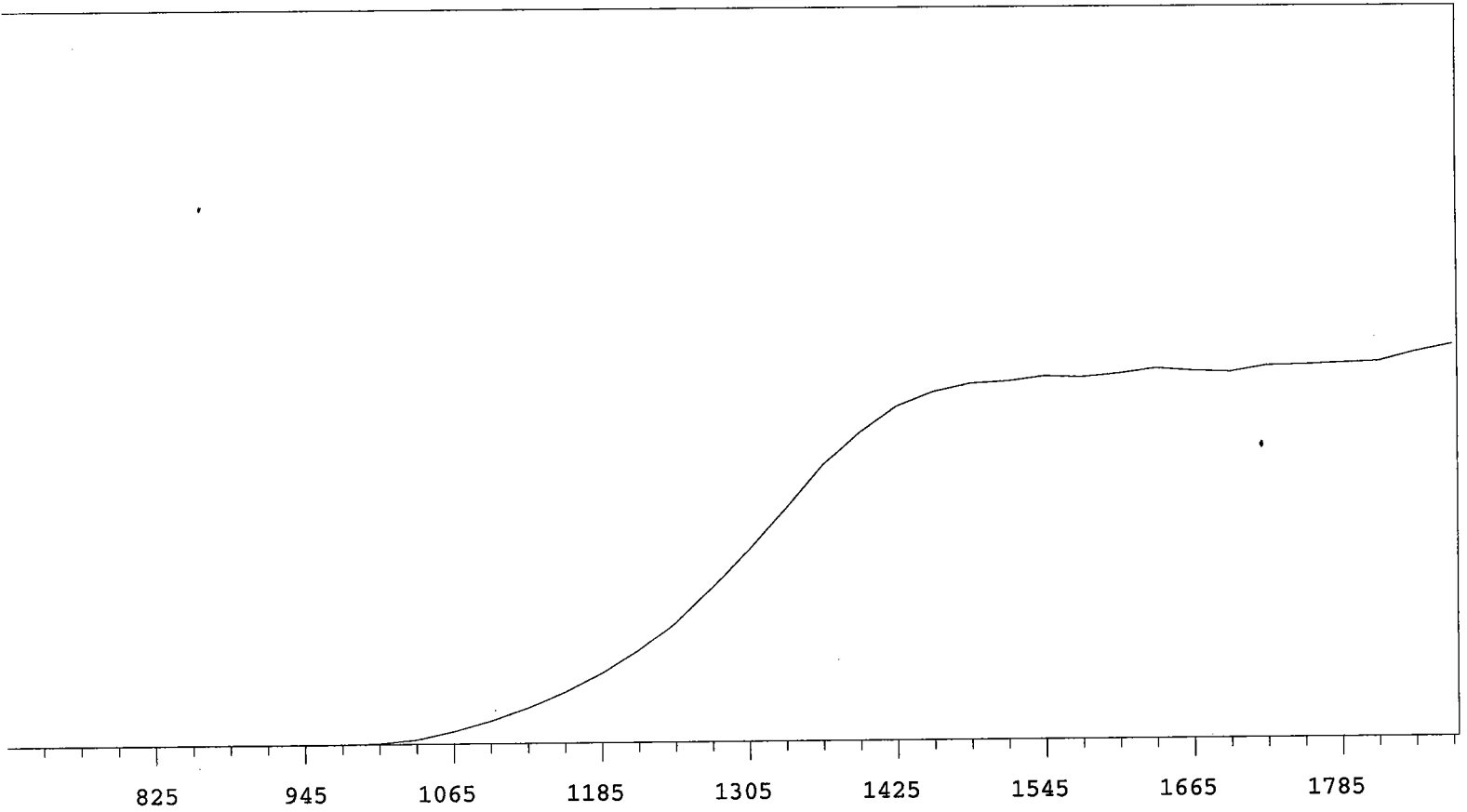
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19017	+67.45
735	1		1335	23157	+59.23
765	0	+83.33	1365	27625	+45.78
795	0	-83.33	1395	31465	+32.72
825	1	>100	1425	33352	+20.41
855	0	>100	1455	35084	+11.74
885	1	+100.00	1485	35819	+7.11
915	1	>100	1515	36292	+3.35
945	2	>100	1545	36527	+1.63
975	12	>100	1575	36540	+0.87
1005	91	>100	1605	36585	+0.48
1035	421	>100	1635	36742	+1.76
1065	1239	>100	1665	36691	+1.53
1095	2155	>100	1695	37461	+1.89
1125	3527	>100	1725	37073	+3.07
1155	4974	>100	1755	37603	+4.02
1185	6647	+97.44	1785	38346	+6.58
1215	9250	+89.00	1815	39111	+7.95
1245	12041	+82.15	1845	40115	
1275	15094	+73.81	1875	41409	



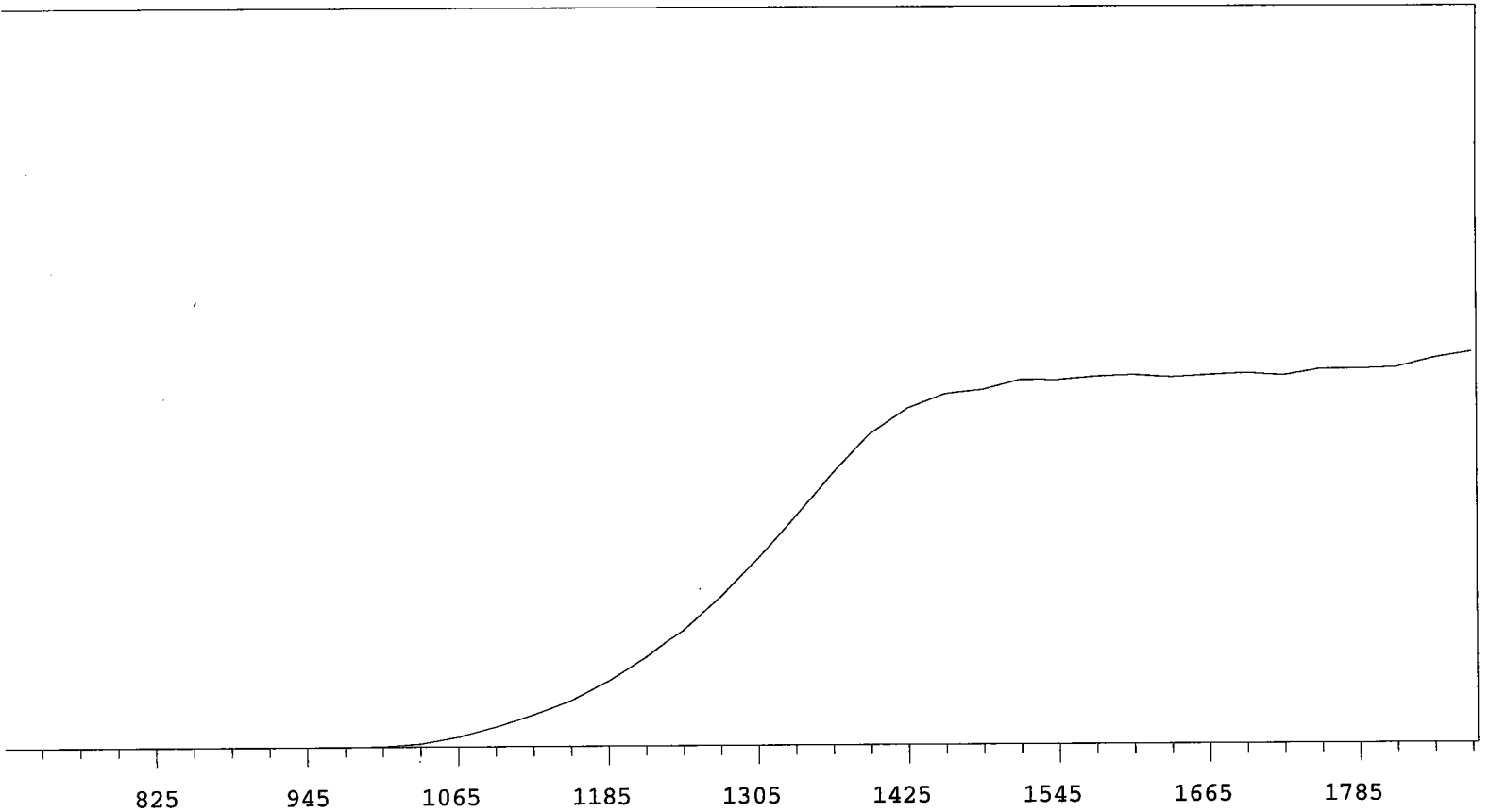
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	12541	+83.18
735	1		1335	16192	+74.48
765	0		1365	20083	+67.17
795	0	>100	1395	24273	+58.43
825	0	>100	1425	29090	+46.86
855	0	>100	1455	33223	+34.56
885	0	>100	1485	35608	+22.67
915	0	>100	1515	37581	+13.63
945	1	>100	1545	38762	+8.18
975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



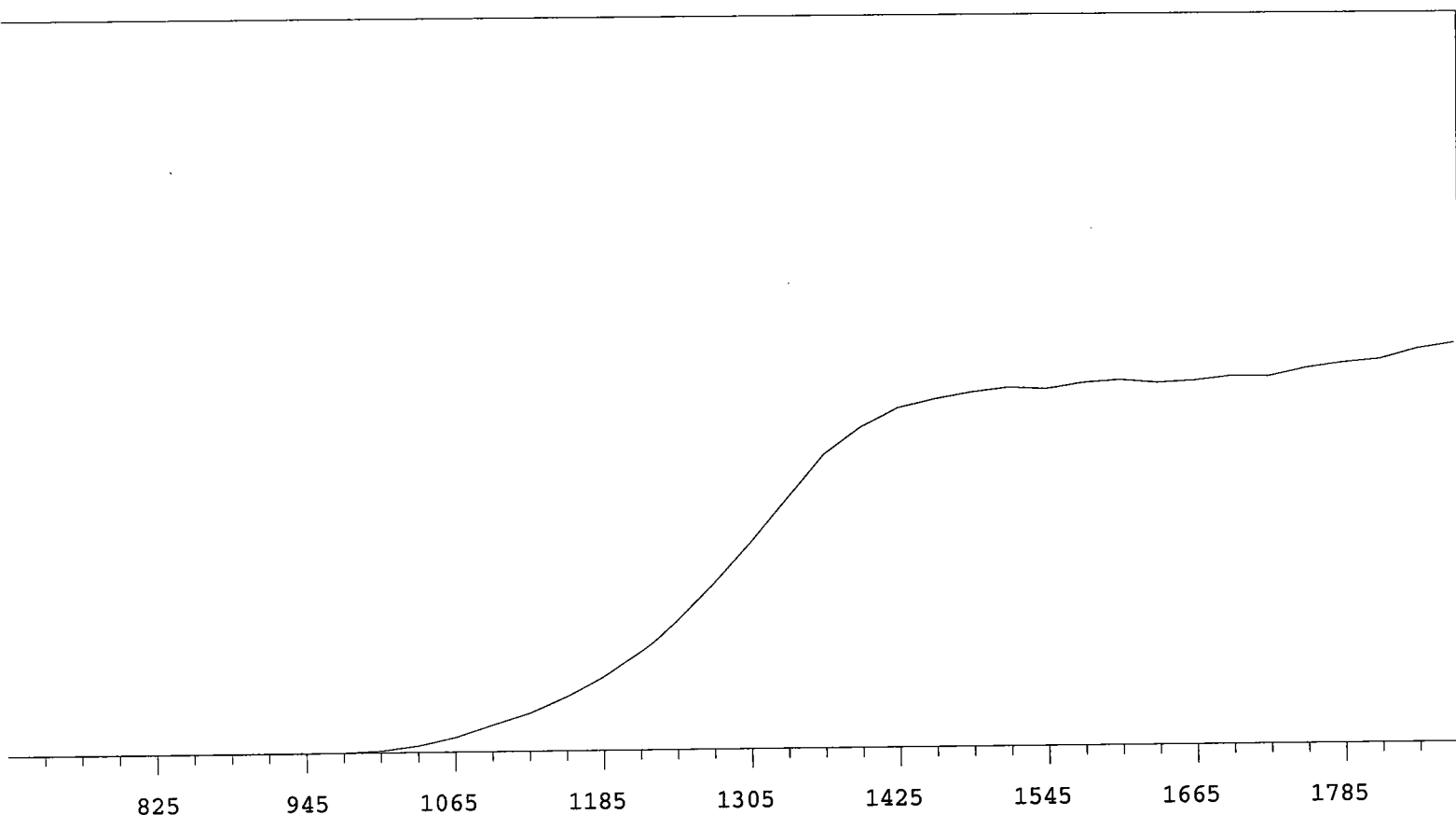
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18216	+67.74
735	0		1335	21995	+58.11
765	0		1365	26173	+46.11
795	0	>100	1395	29479	+32.75
825	0	>100	1425	32186	+20.62
855	0	>100	1455	33022	+12.13
885	0	>100	1485	33981	+7.22
915	1	>100	1515	34520	+4.95
945	0	>100	1545	35095	+2.07
975	17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



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	

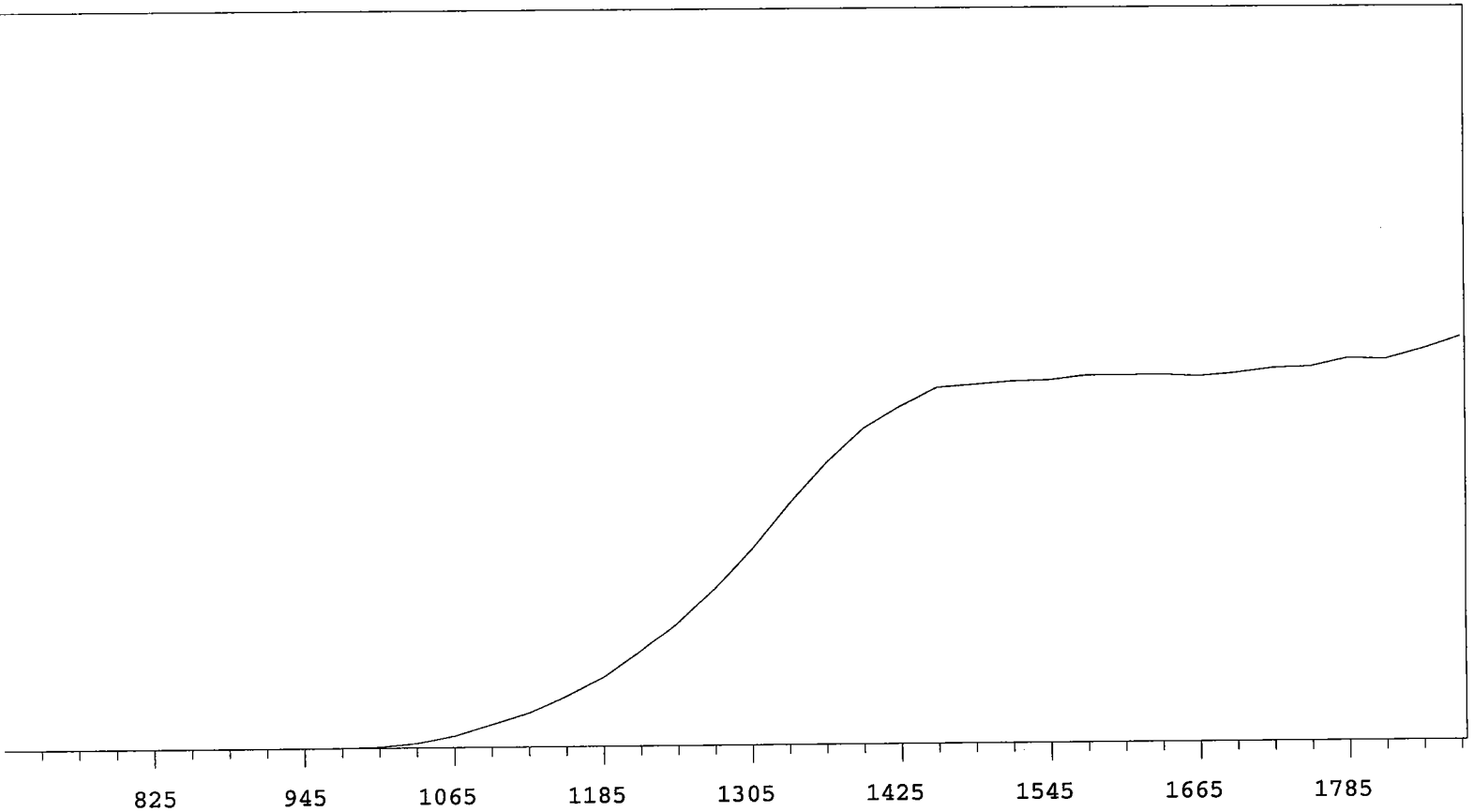


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	16654	+68.57
735	0		1335	20416	+59.26
765	0	+55.56	1365	24191	+47.28
795	1	>100	1395	27643	+34.04
825	1	+0.00	1425	29891	+21.08
855	1	>100	1455	31183	+12.30
885	0	>100	1485	31558	+6.67
915	0	>100	1515	32444	+4.05
945	0	>100	1545	32413	+2.90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

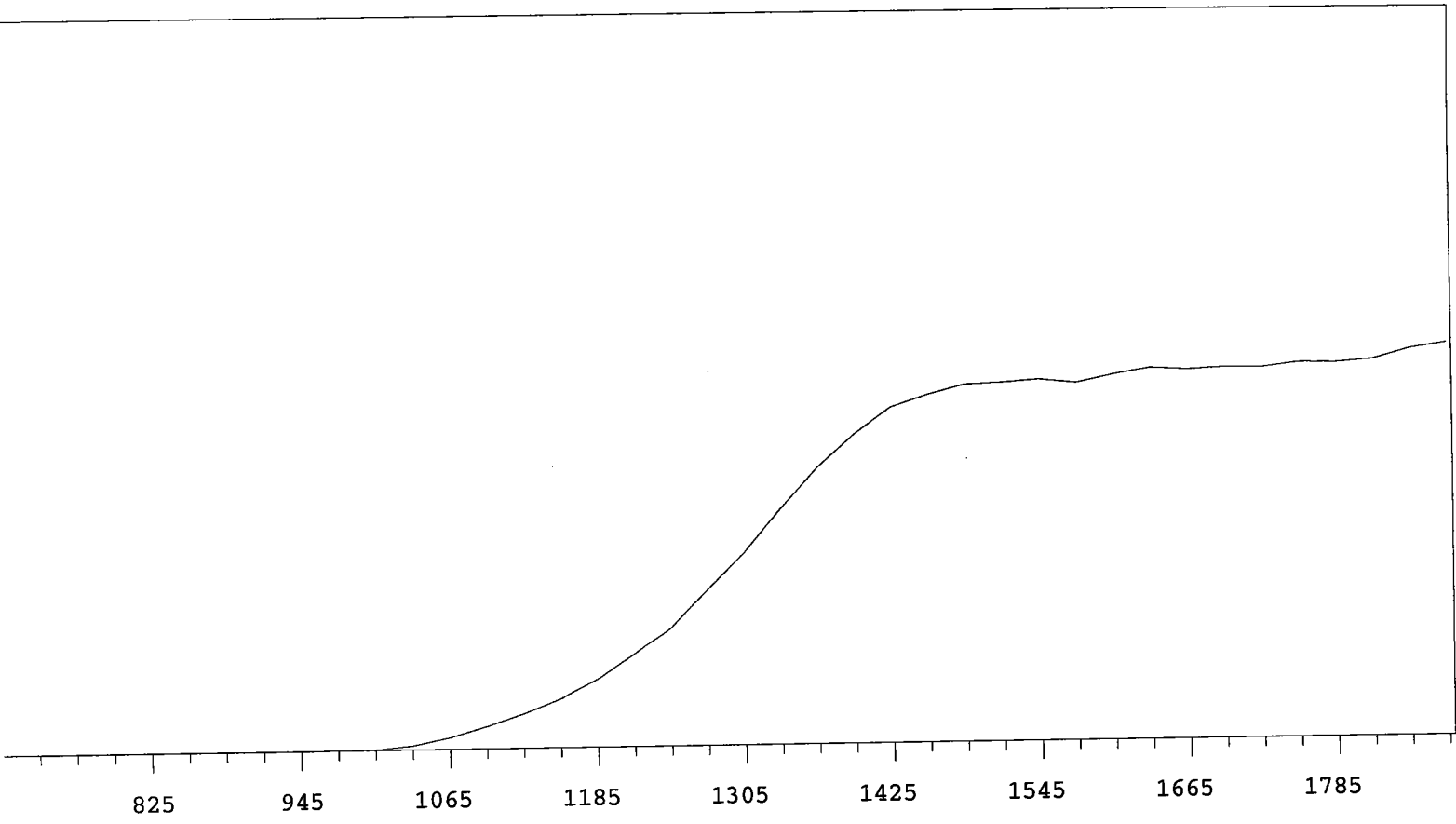


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	19810	+64.73
735	1		1335	23962	+52.62
765	0	-55.56	1365	28091	+39.27
795	0	>100	1395	30594	+25.61
825	1	>100	1425	32381	+14.86
855	3	+33.33	1455	33206	+8.91
885	0	+0.00	1485	33832	+4.41
915	1	>100	1515	34260	+3.01
945	2	>100	1545	34071	+2.33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

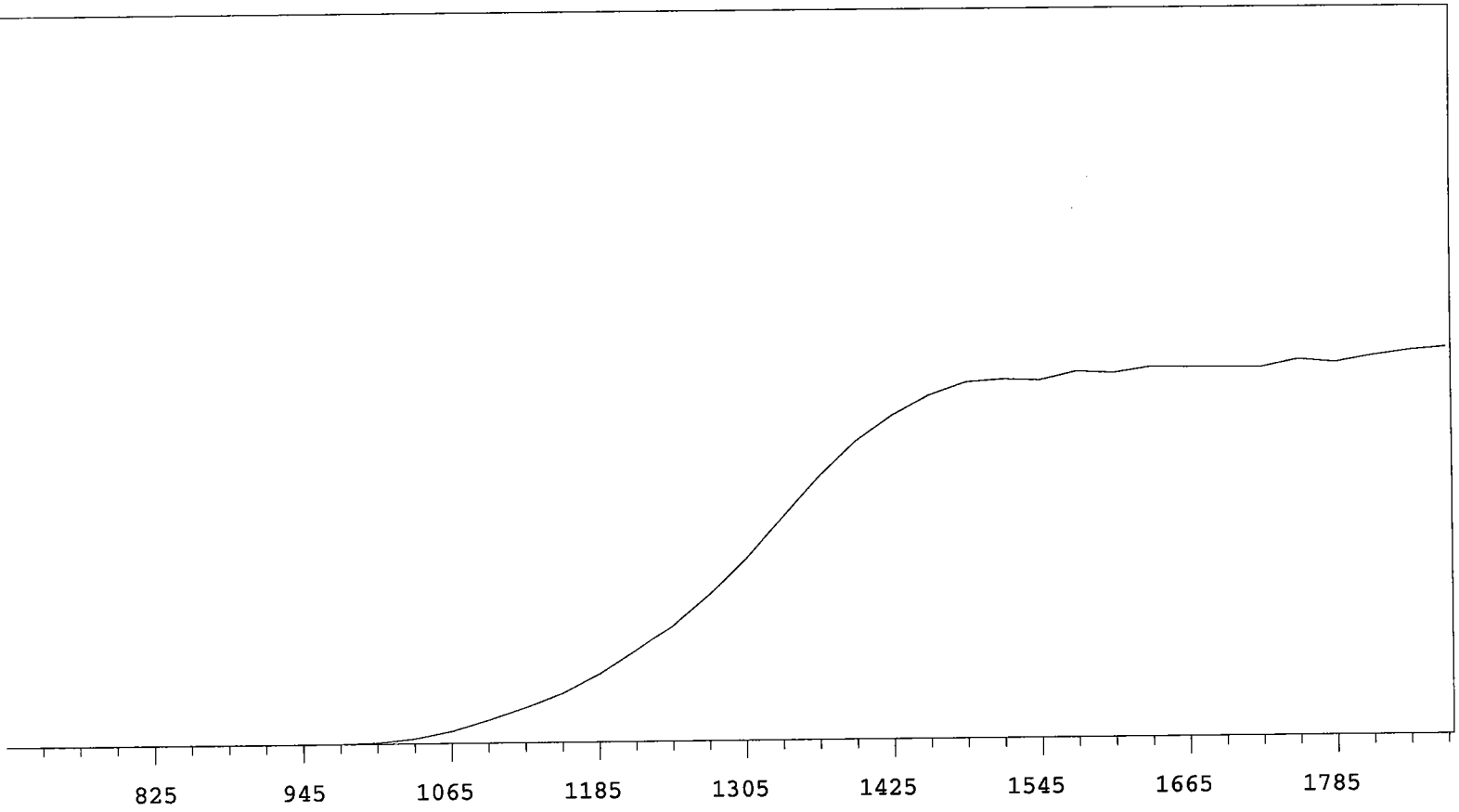




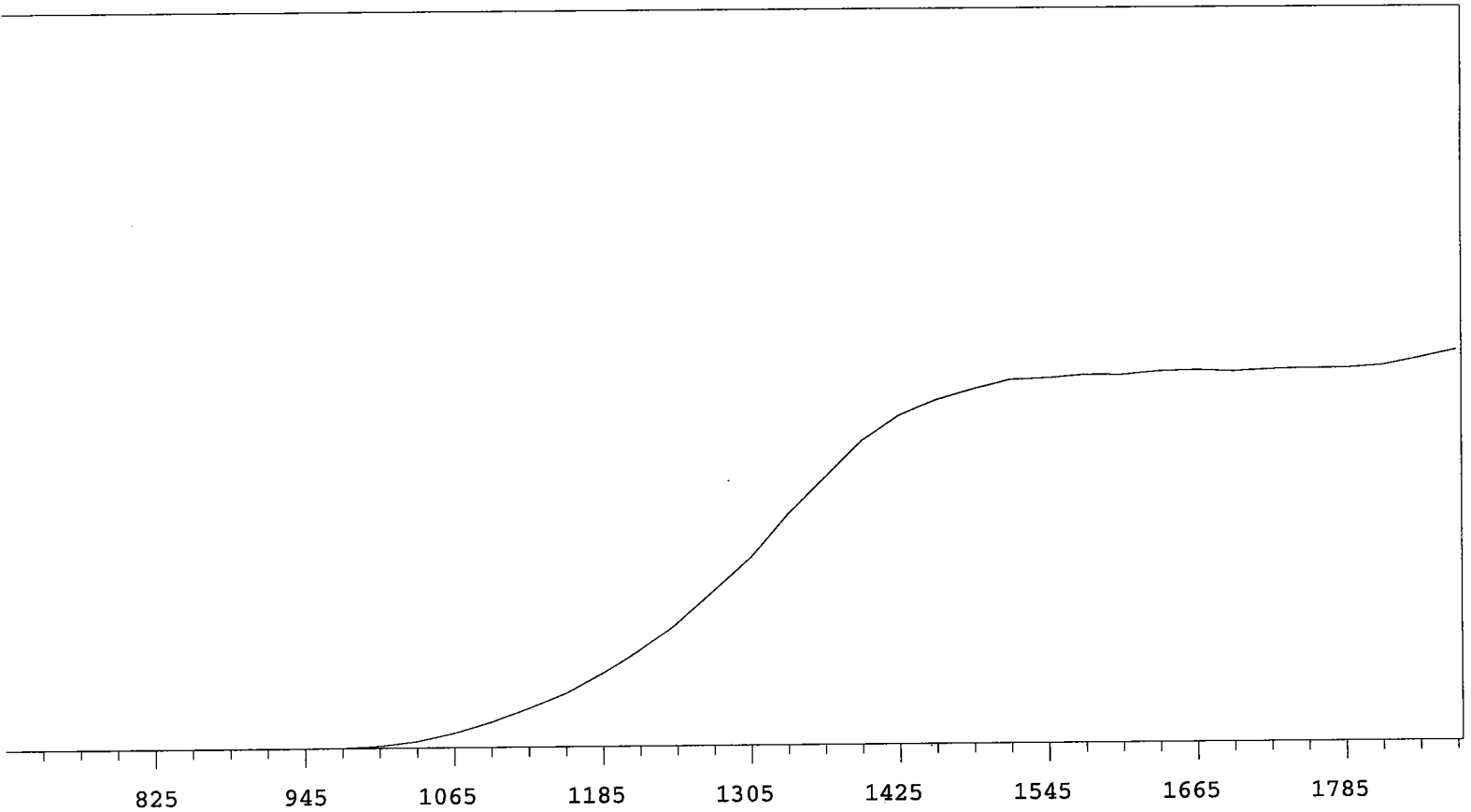
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	21412	+66.80
735	1		1335	26262	+56.32
765	1		1365	30679	+43.71
795	0	>100	1395	34466	+31.61
825	0	+0.00	1425	36949	+20.14
855	0	>100	1455	38998	+11.16
885	1	>100	1485	39313	+5.34
915	1	>100	1515	39625	+2.44
945	1	>100	1545	39751	+2.04
975	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	



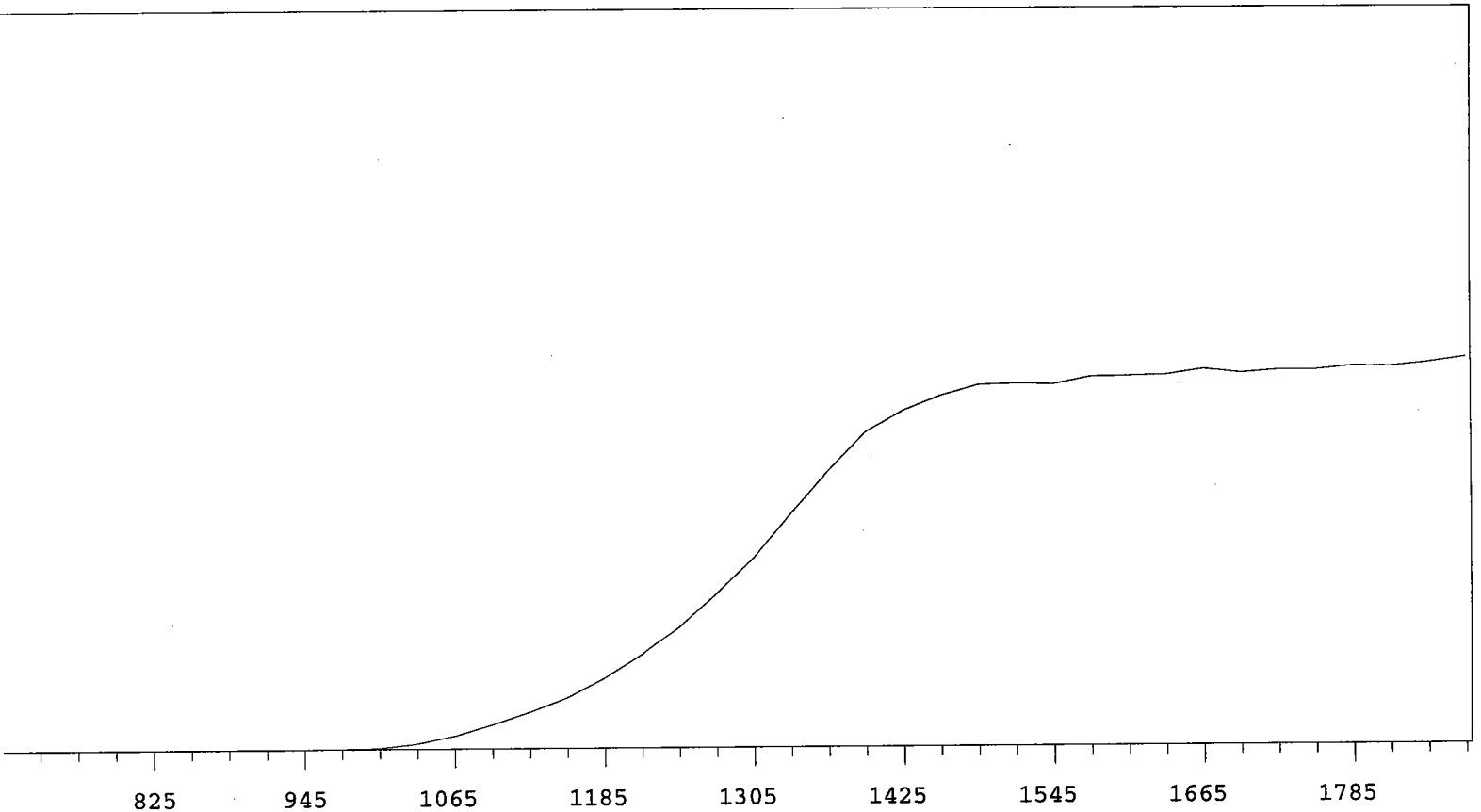
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14171	+66.45
735	1		1335	17362	+54.90
765	0	+0.00	1365	20310	+43.83
795	1	>100	1395	22647	+30.82
825	0	+83.33	1425	24551	+20.19
855	0	-83.33	1455	25440	+11.69
885	1	>100	1485	26124	+5.90
915	0	>100	1515	26245	+2.21
945	1	>100	1545	26428	+1.39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

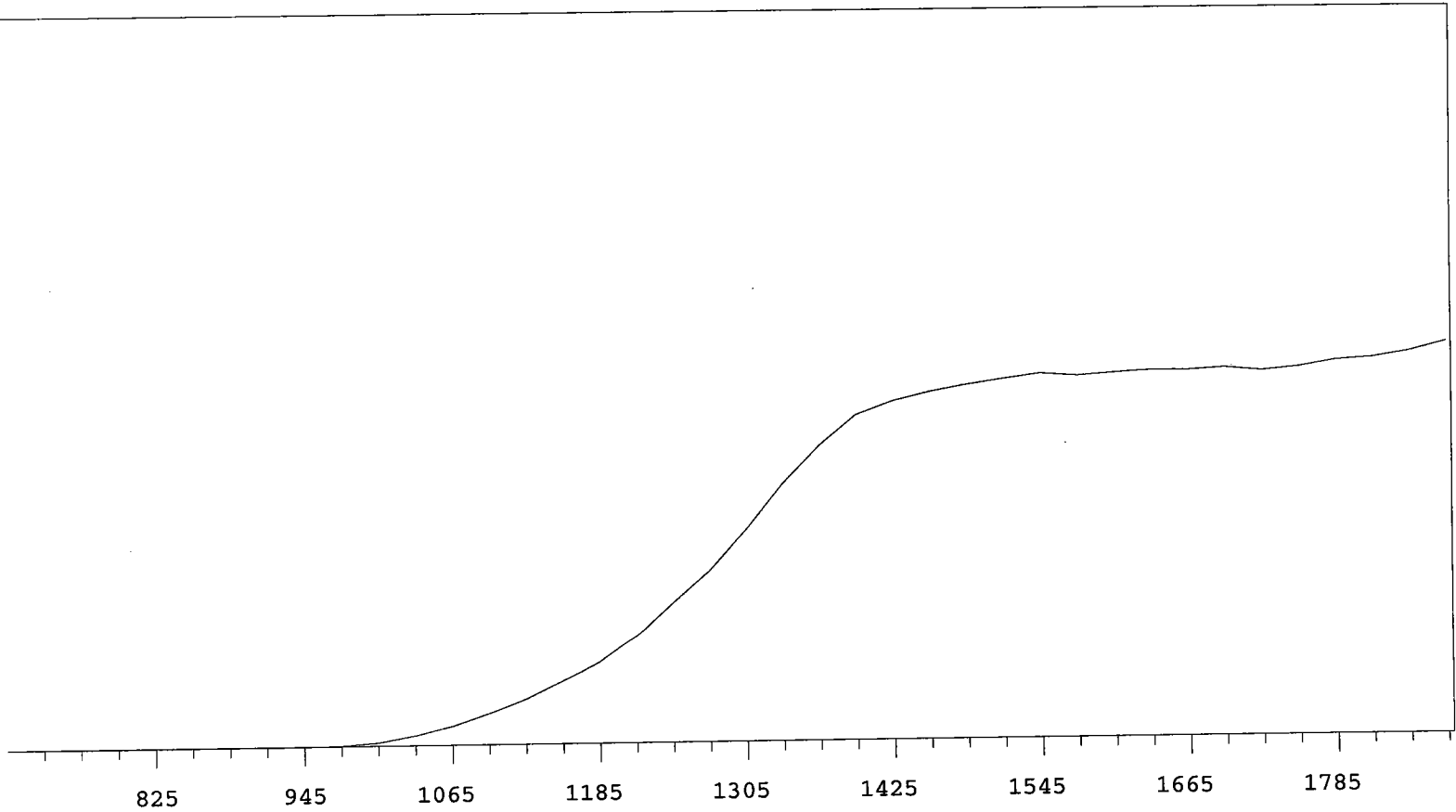


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19796	+65.77
735	1		1335	24338	+57.55
765	0	+55.56	1365	28686	+45.86
795	2	+0.00	1395	32750	+32.27
825	0	-55.56	1425	34919	+20.83
855	1	>100	1455	36434	+11.45
885	0	>100	1485	37487	+5.80
915	0	>100	1515	37623	+3.32
945	2	>100	1545	37528	+2.07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

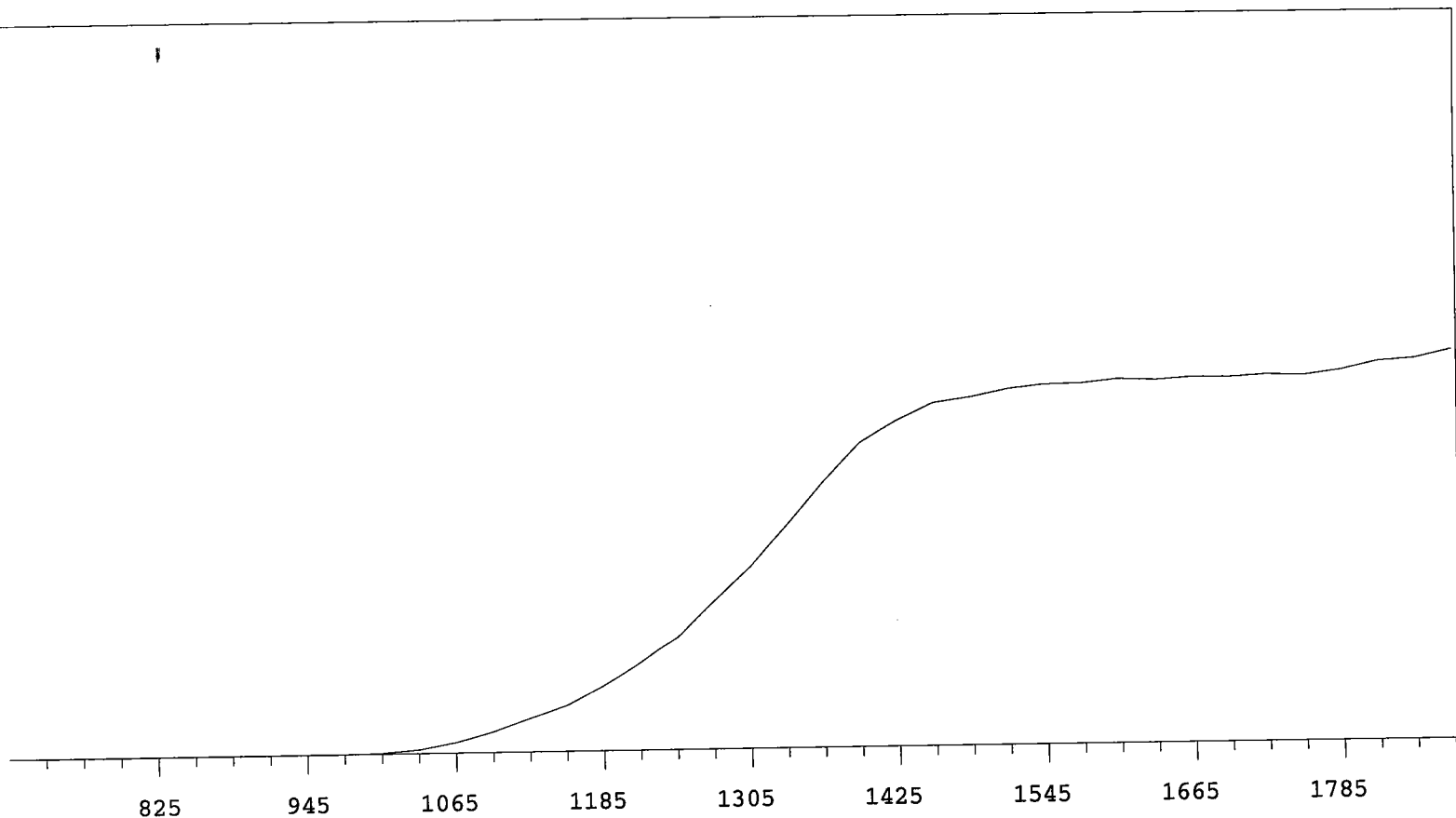
MPC 9600 Plateau  
Alpha Volts: 705

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	

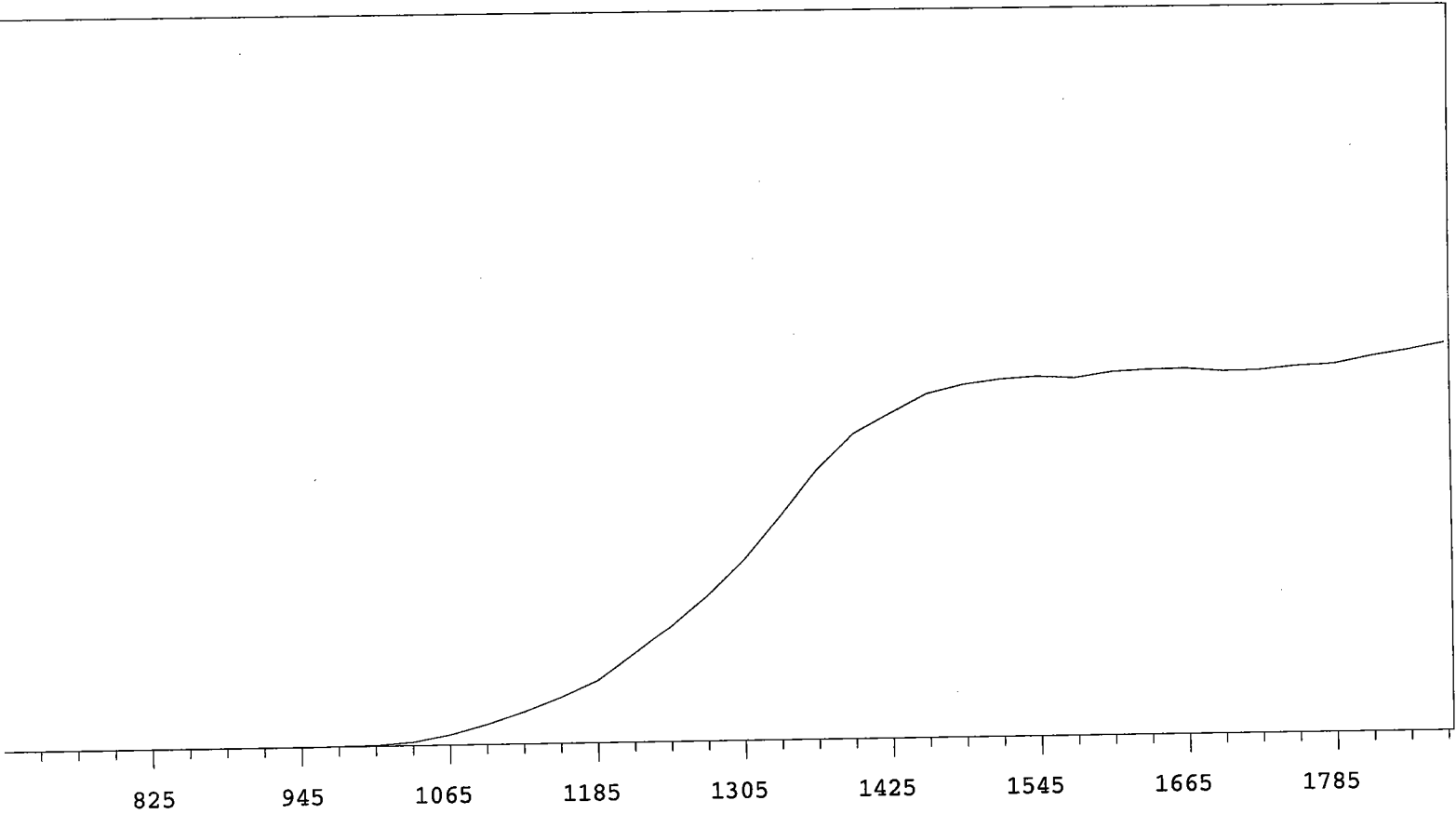


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13974	+68.00
735	0		1335	17170	+58.62
765	1		1365	20456	+47.04
795	1	+83.33	1395	23332	+33.83
825	1	-83.33	1425	24996	+21.10
855	1	>100	1455	26290	+12.40
885	0	-55.56	1485	26683	+7.74
915	0	>100	1515	27270	+4.43
945	1	>100	1545	27590	+3.48
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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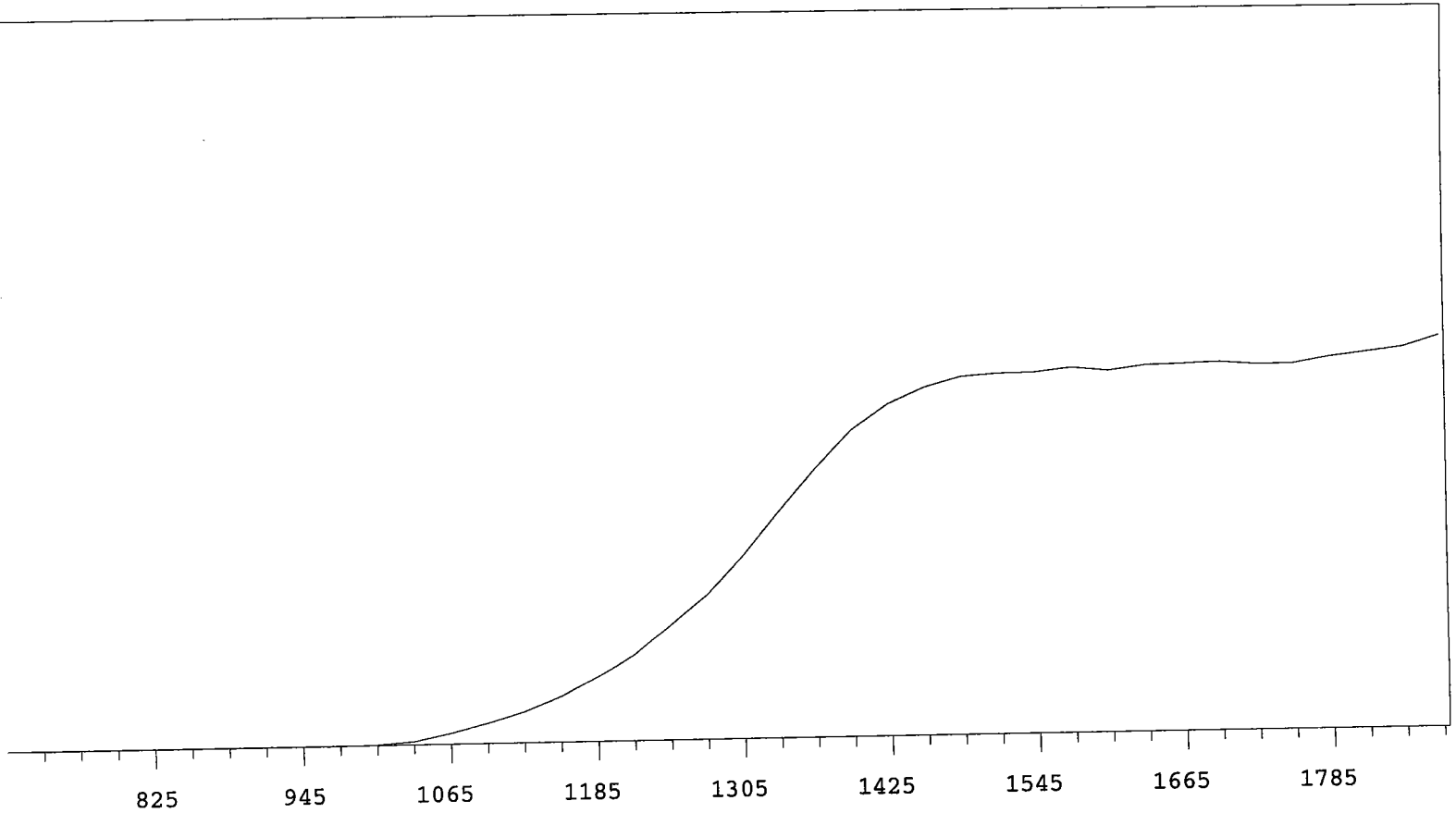
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17414	+68.46
735	0		1335	21540	+59.98
765	0		1365	25854	+46.75
795	0	>100	1395	29222	+33.38
825	1	>100	1425	31128	+21.52
855	1	+41.67	1455	32995	+13.26
885	2	-33.33	1485	33846	+8.09
915	0	>100	1515	34289	+3.25
945	1	>100	1545	34528	+2.00
975	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	



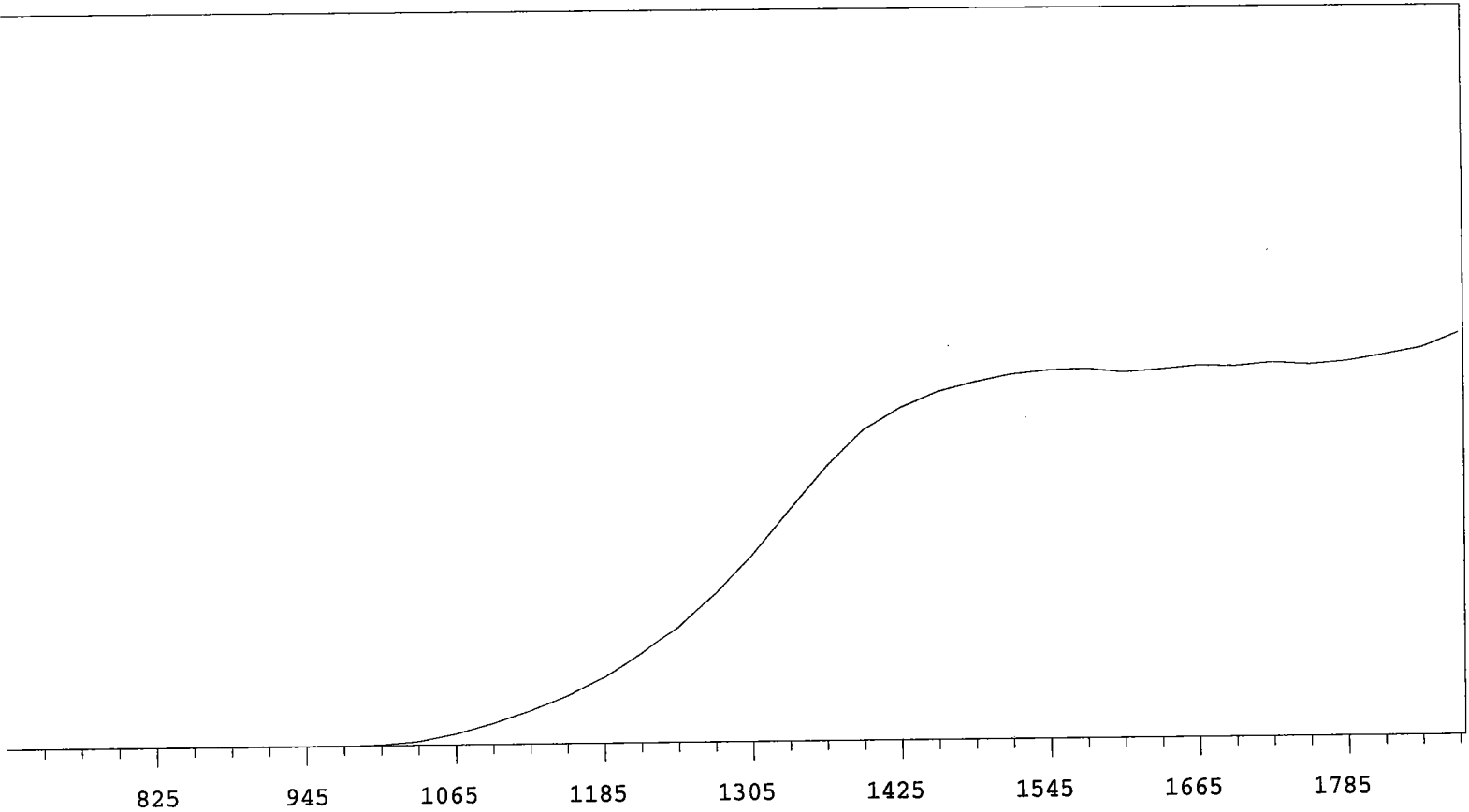
MPC 9600 Plateau  
Alpha Volts: 705

Instrument 5 MPC 9604 Detector C  
Beta Volts: 1575

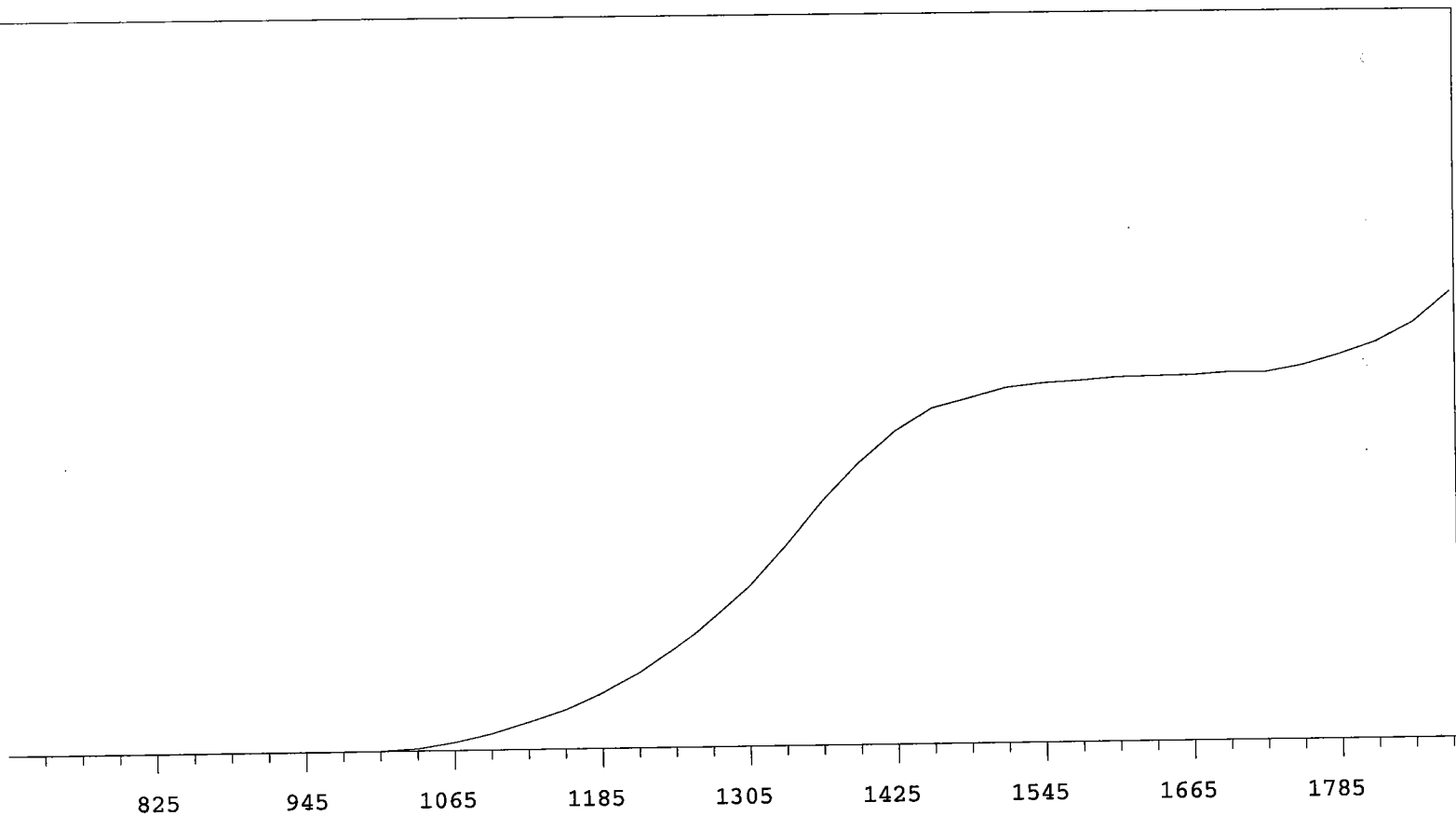
7/1/2009



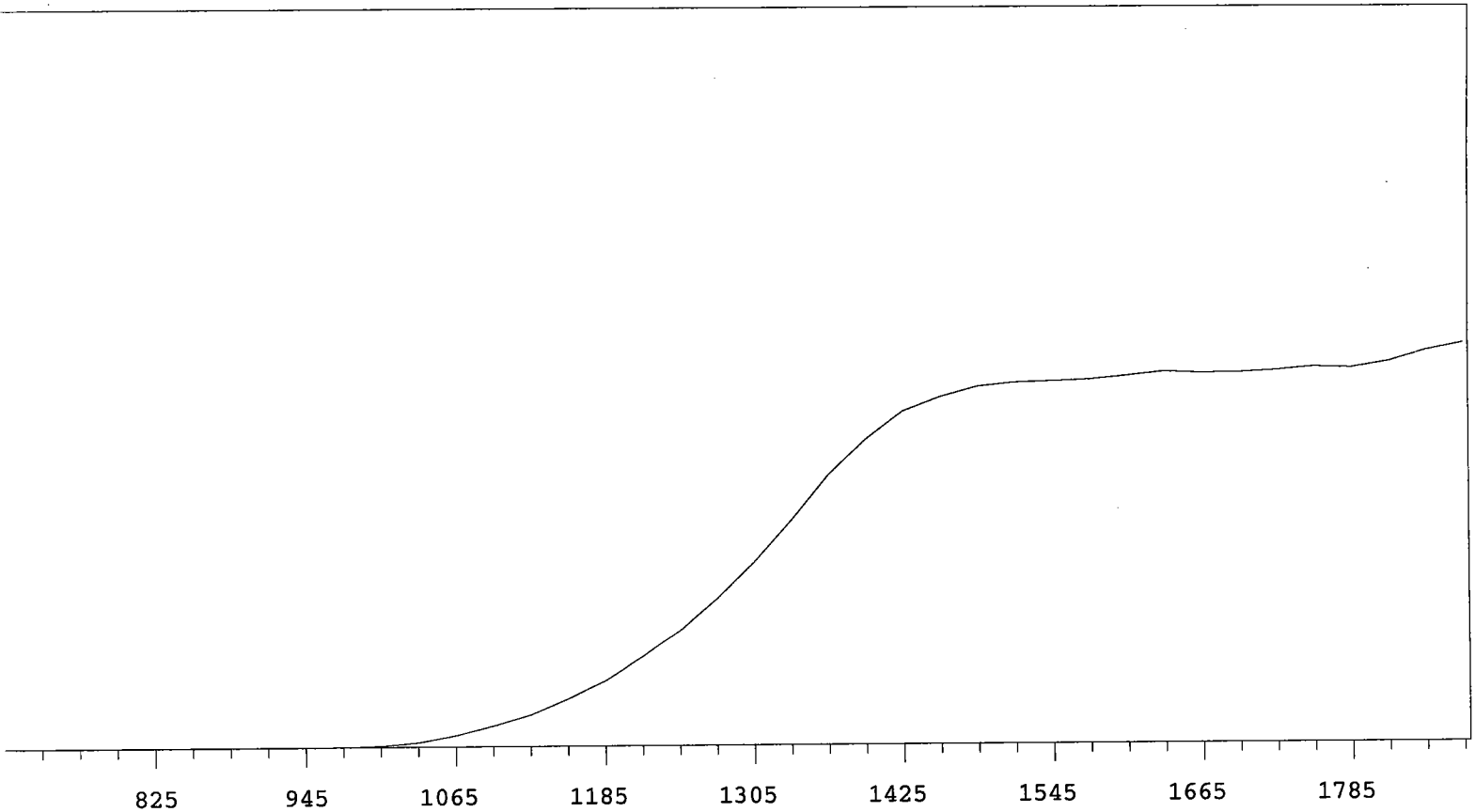
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17085	+68.24
735	0		1335	21135	+59.99
765	0		1365	25066	+47.39
795	0	>100	1395	28530	+33.93
825	0	>100	1425	30823	+22.30
855	1	>100	1455	32287	+12.93
885	0	>100	1485	33217	+6.71
915	1	>100	1515	33474	+3.57
945	2	>100	1545	33517	+1.17
975	7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

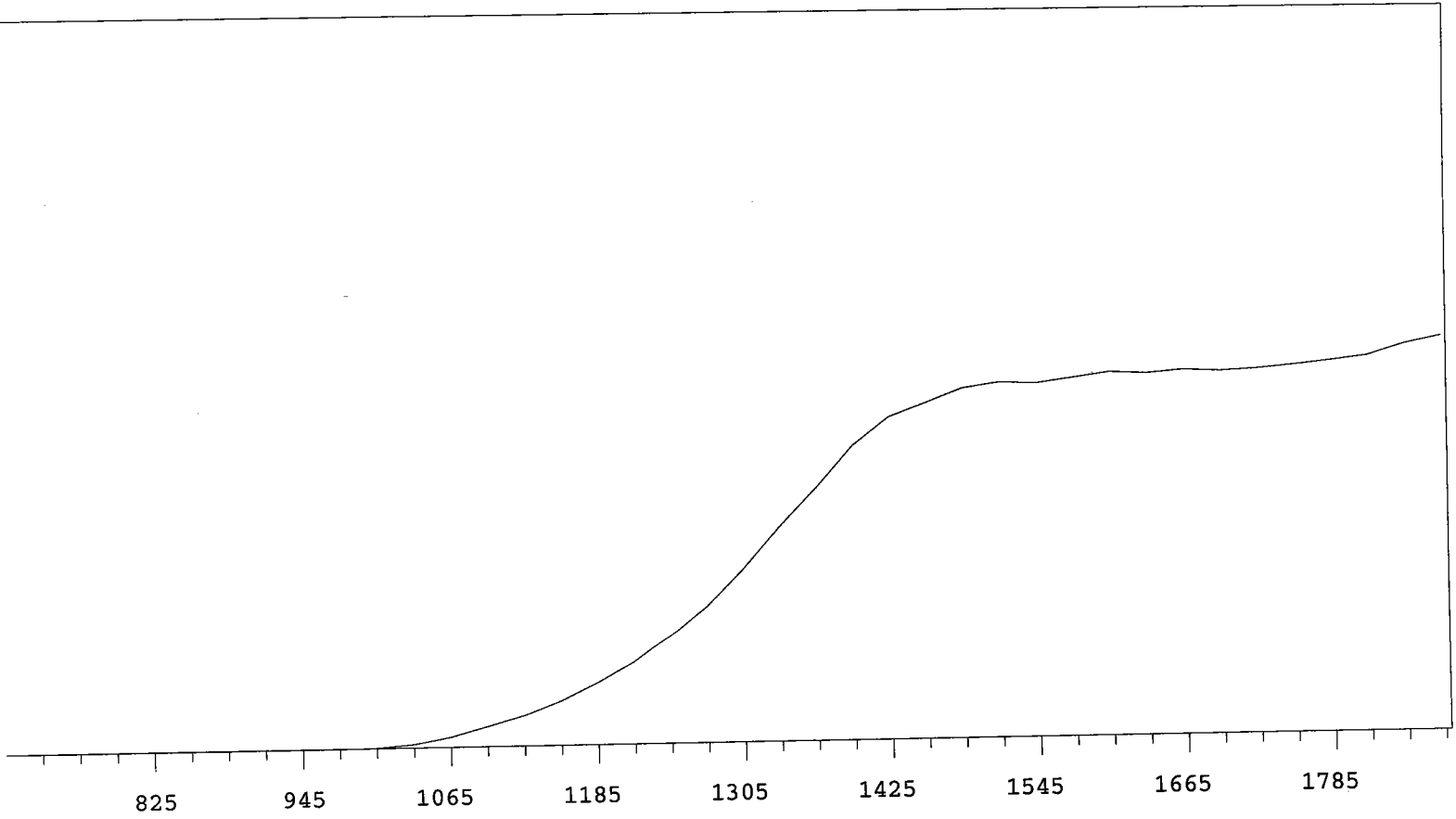


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	20094	+68.67
735	0		1335	24665	+59.40
765	0		1365	29591	+47.86
795	0	>100	1395	33376	+34.51
825	1	+83.33	1425	36440	+22.50
855	1	-83.33	1455	38024	+13.58
885	0	>100	1485	39187	+7.04
915	0	>100	1515	39608	+3.63
945	5	>100	1545	39722	+2.10
975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

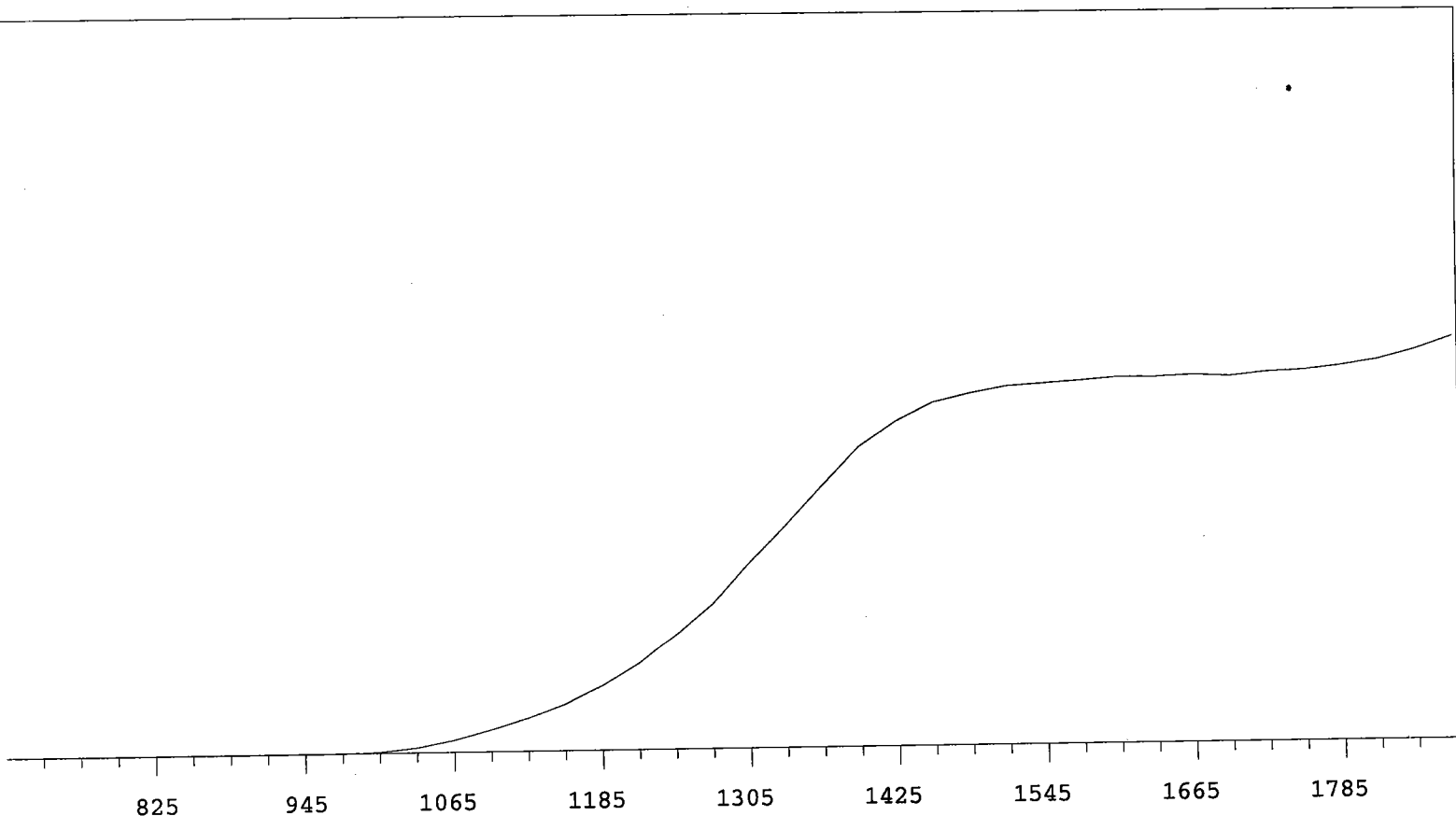
MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 6 MPC 9604 Detector C  
 Beta Volts: 1575

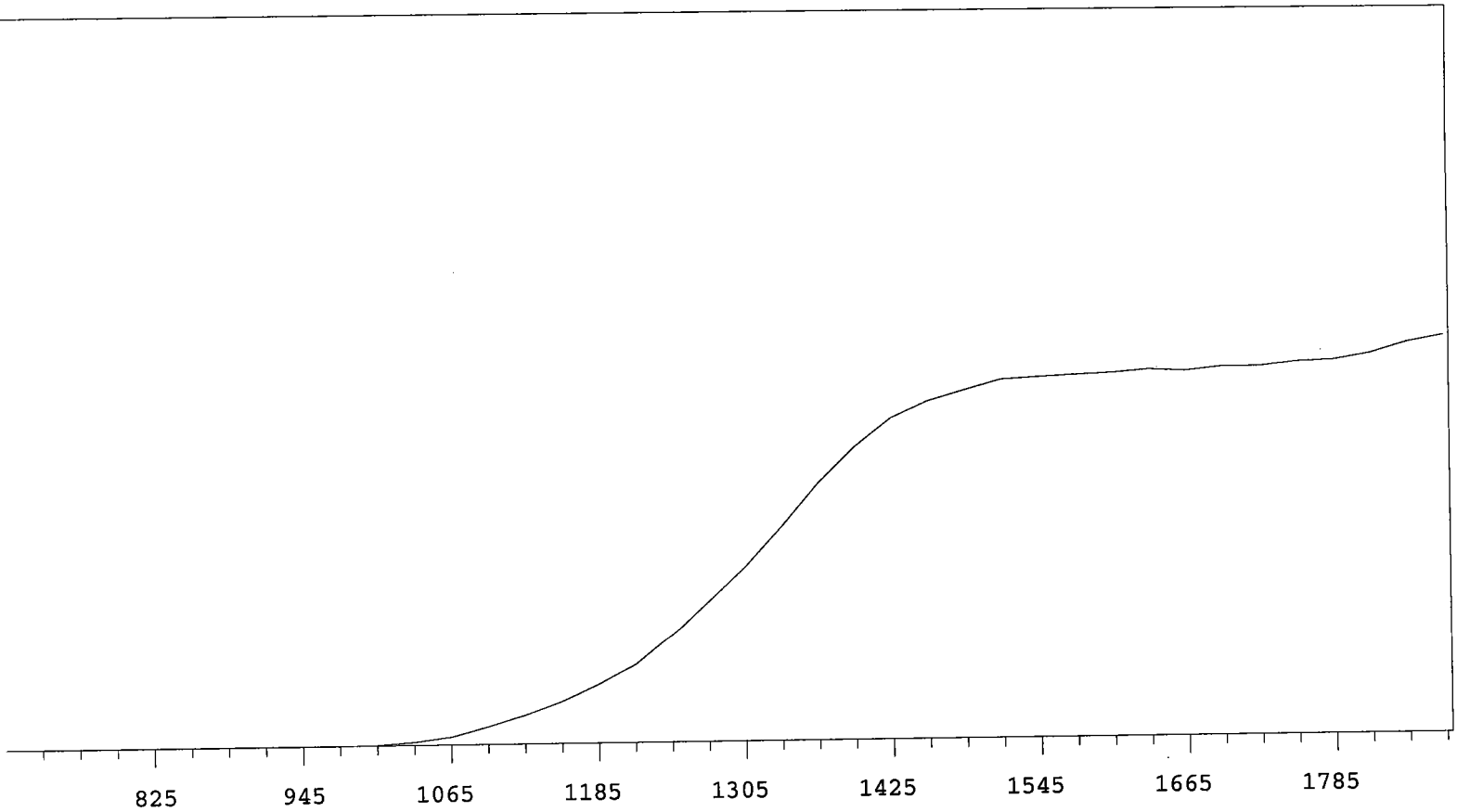
7/1/2009



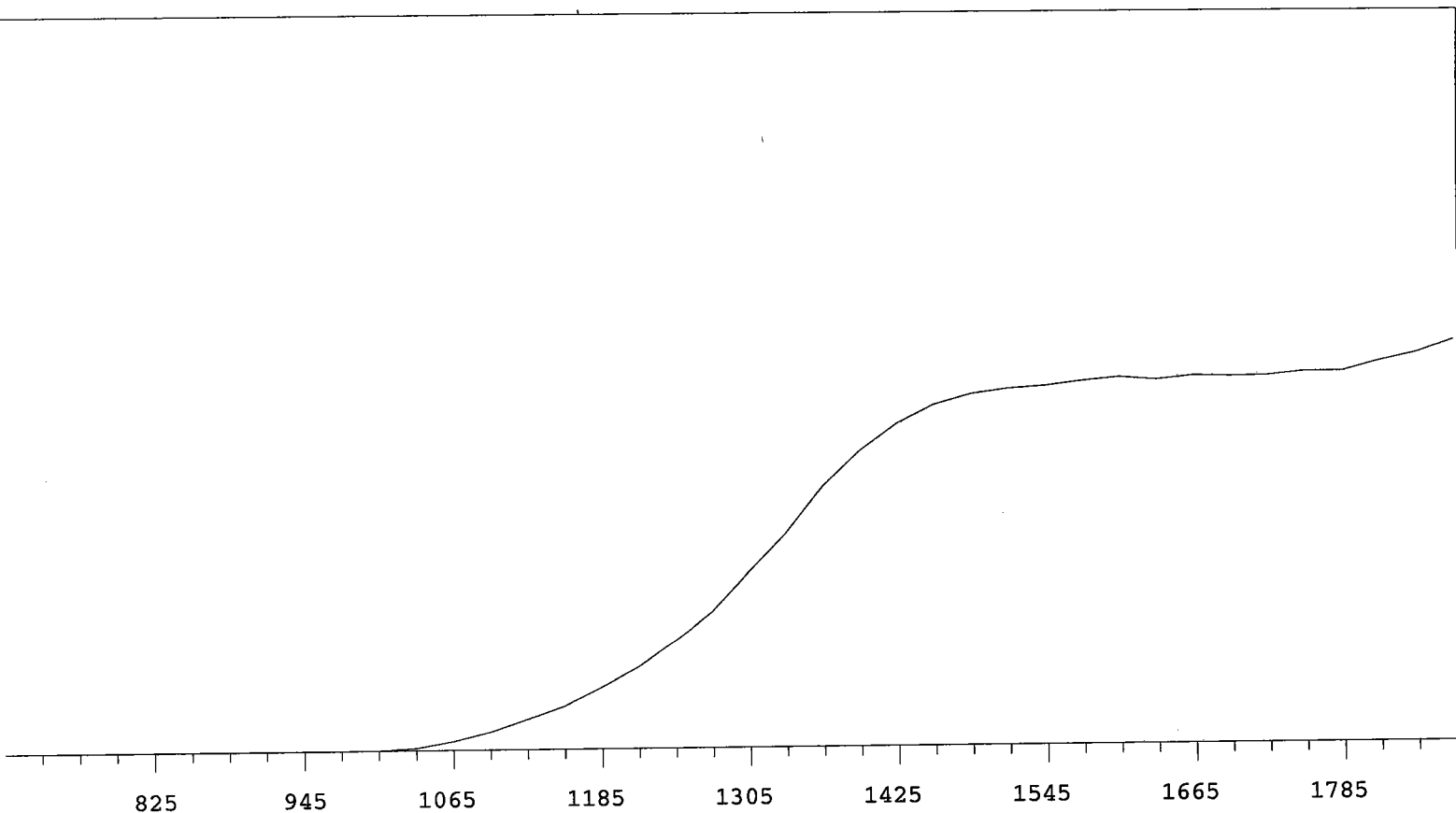
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17350	+67.80
735	0		1335	21371	+60.27
765	1	+0.00	1365	25084	+49.32
795	0	>100	1395	29177	+36.15
825	0	+0.00	1425	31927	+24.86
855	0	>100	1455	33217	+14.70
885	1	>100	1485	34545	+7.74
915	1	>100	1515	35097	+4.64
945	2	>100	1545	34927	+2.96
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	

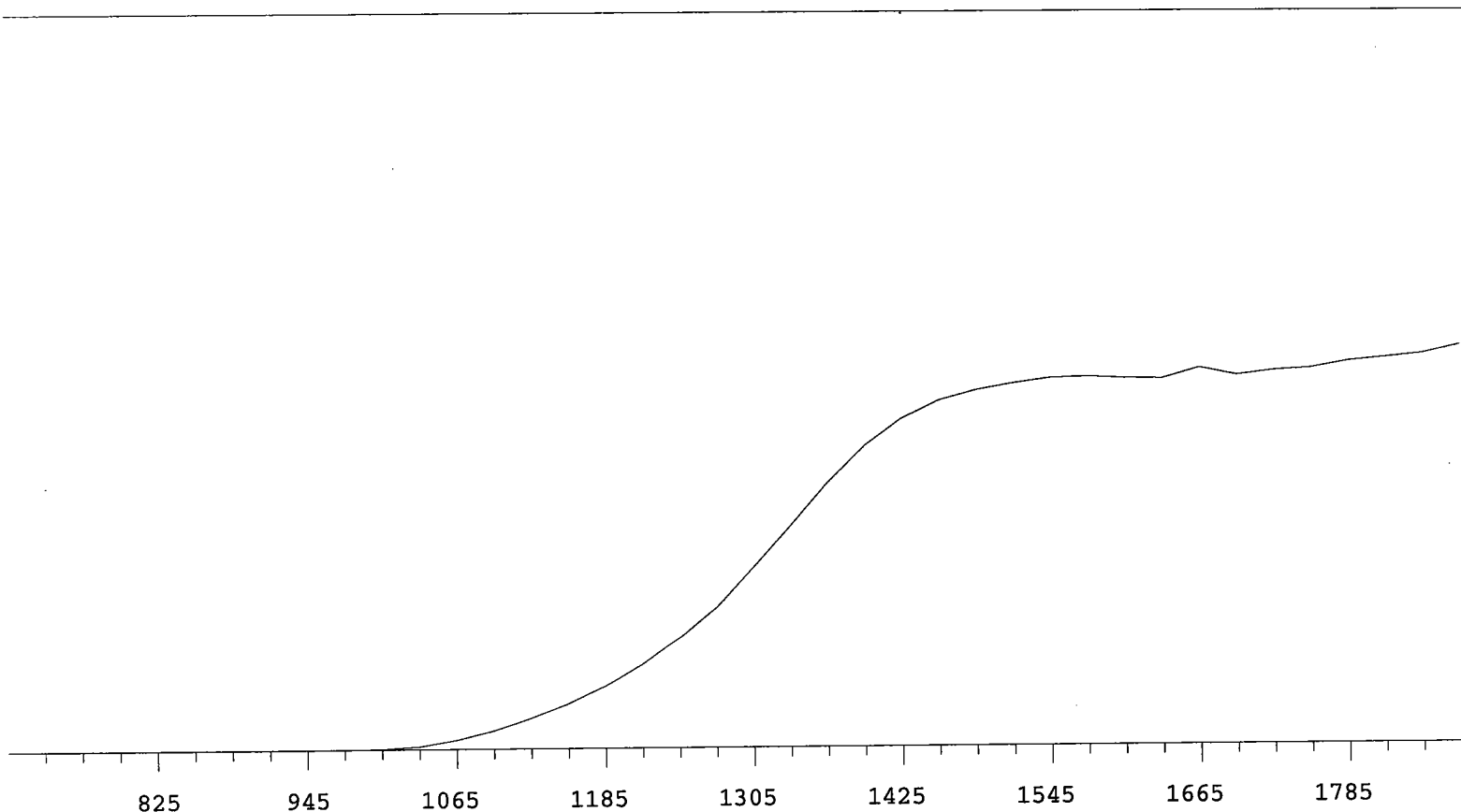


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13228	+70.36
735	0		1335	16271	+60.12
765	0		1365	19506	+49.19
795	0	>100	1395	22188	+36.46
825	1	+83.33	1425	24373	+24.43
855	1	-83.33	1455	25649	+15.99
885	0	-55.56	1485	26433	+9.58
915	0	>100	1515	27195	+5.74
945	1	>100	1545	27367	+3.24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

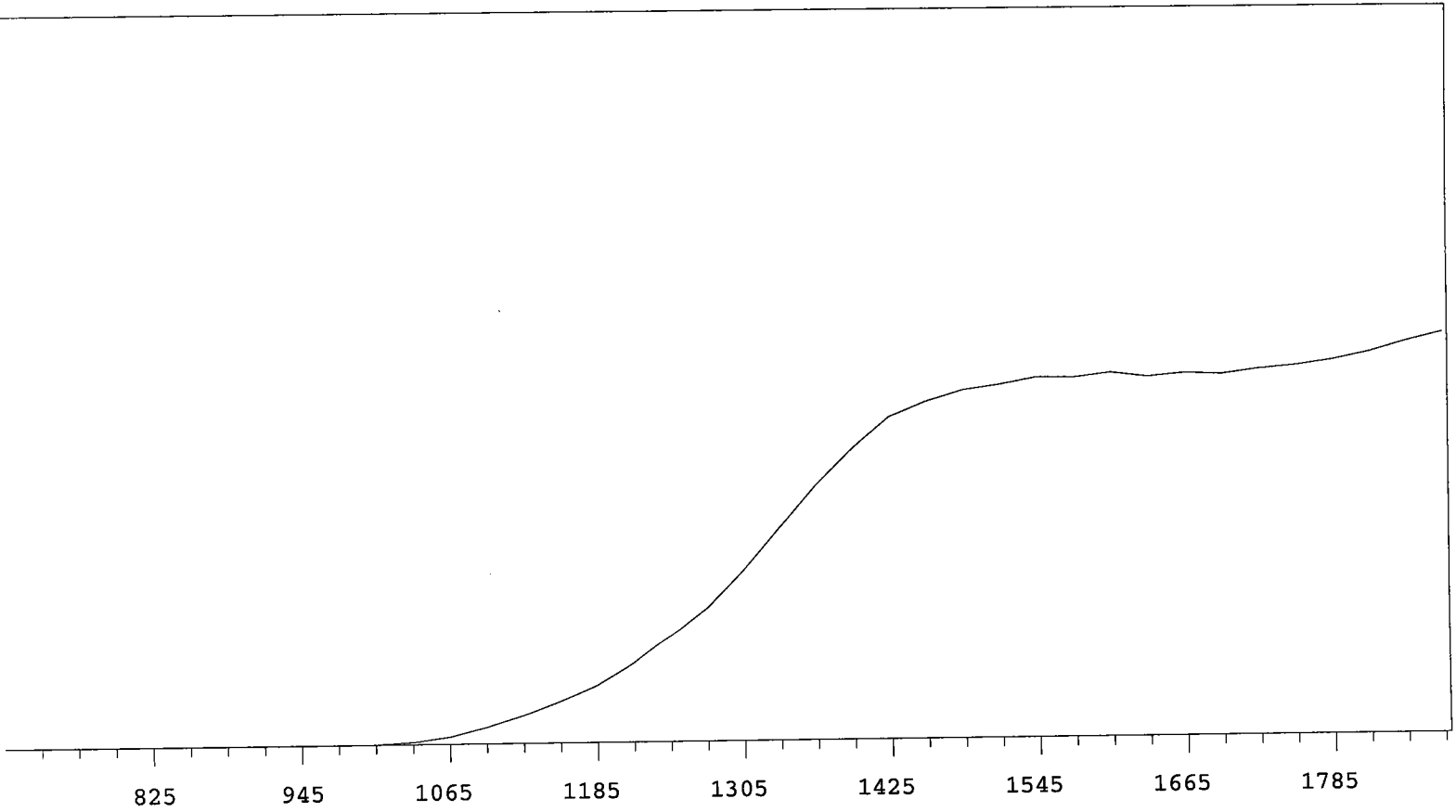


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16978	+70.97
735	0		1335	20569	+61.39
765	0		1365	24989	+48.97
795	0	>100	1395	28389	+36.69
825	0	>100	1425	30977	+24.05
855	0	>100	1455	32727	+14.93
885	0	>100	1485	33697	+8.42
915	1	>100	1515	34195	+4.89
945	1	>100	1545	34437	+3.49
975	3	>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	

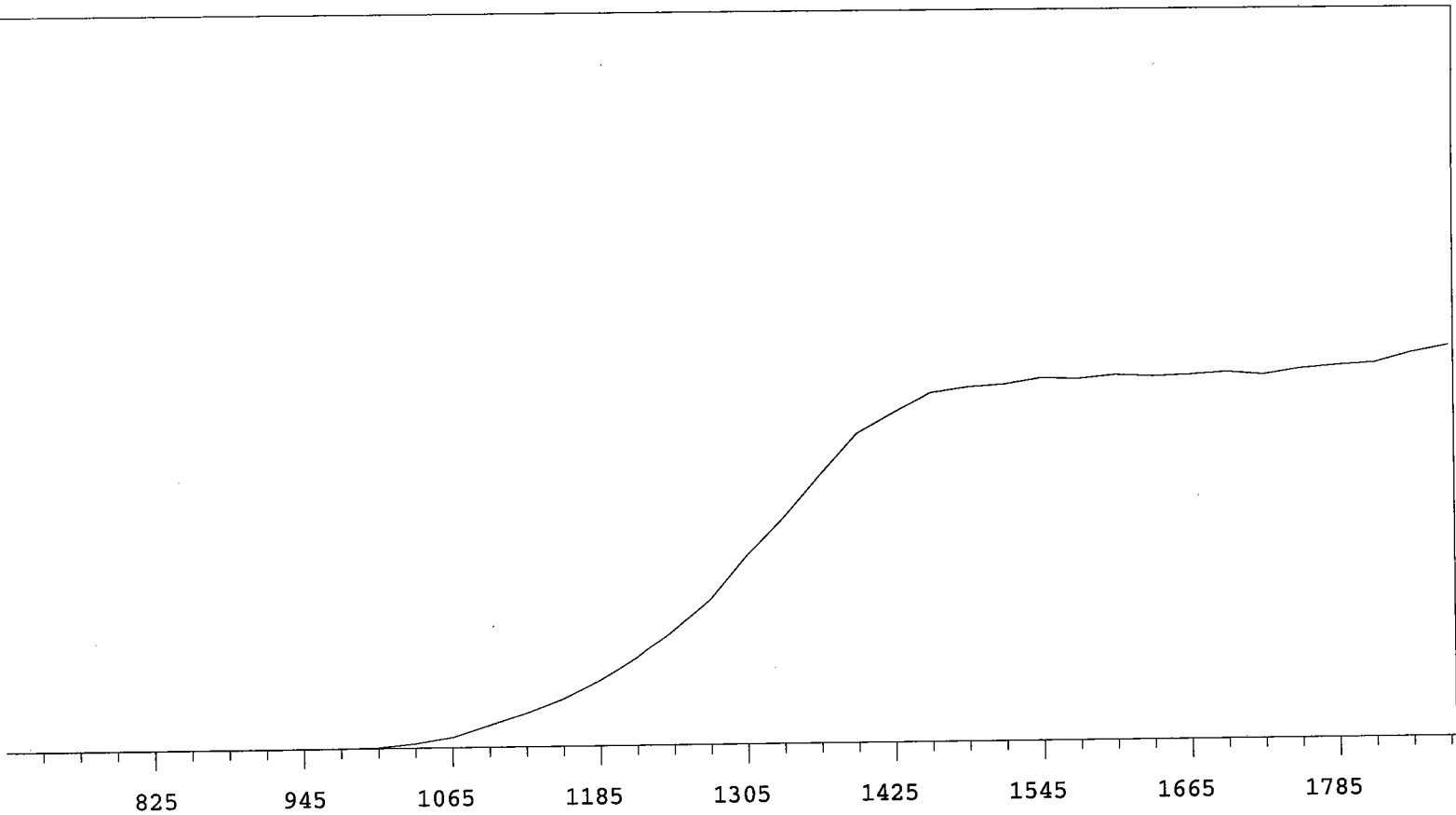




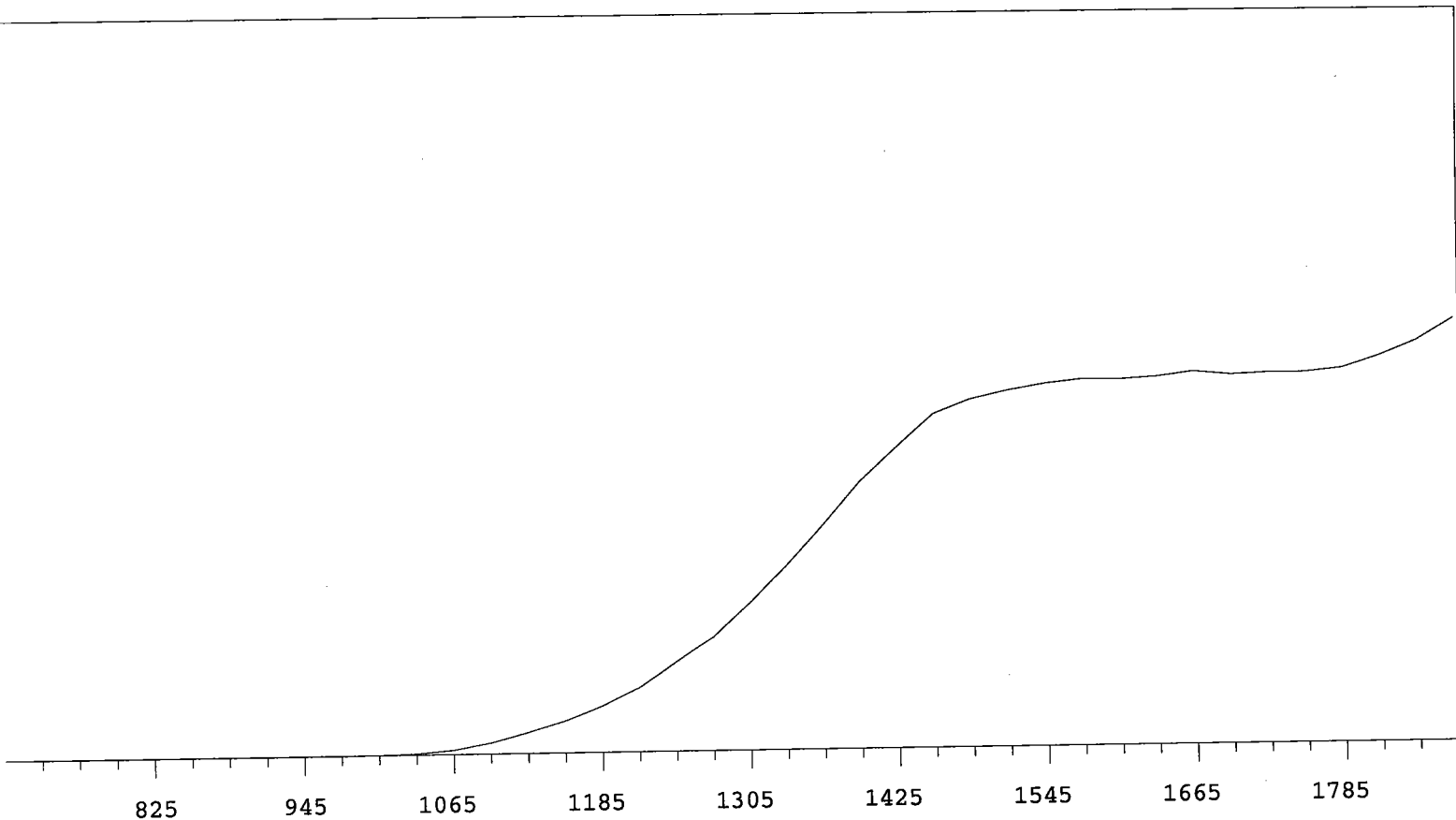
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16543	+70.03
735	0		1335	20257	+60.71
765	0		1365	24245	+48.17
795	0	>100	1395	27602	+35.50
825	0	>100	1425	30019	+23.48
855	0	>100	1455	31614	+14.53
885	0	>100	1485	32522	+8.91
915	0	>100	1515	33103	+5.28
945	0	>100	1545	33572	+2.60
975	4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



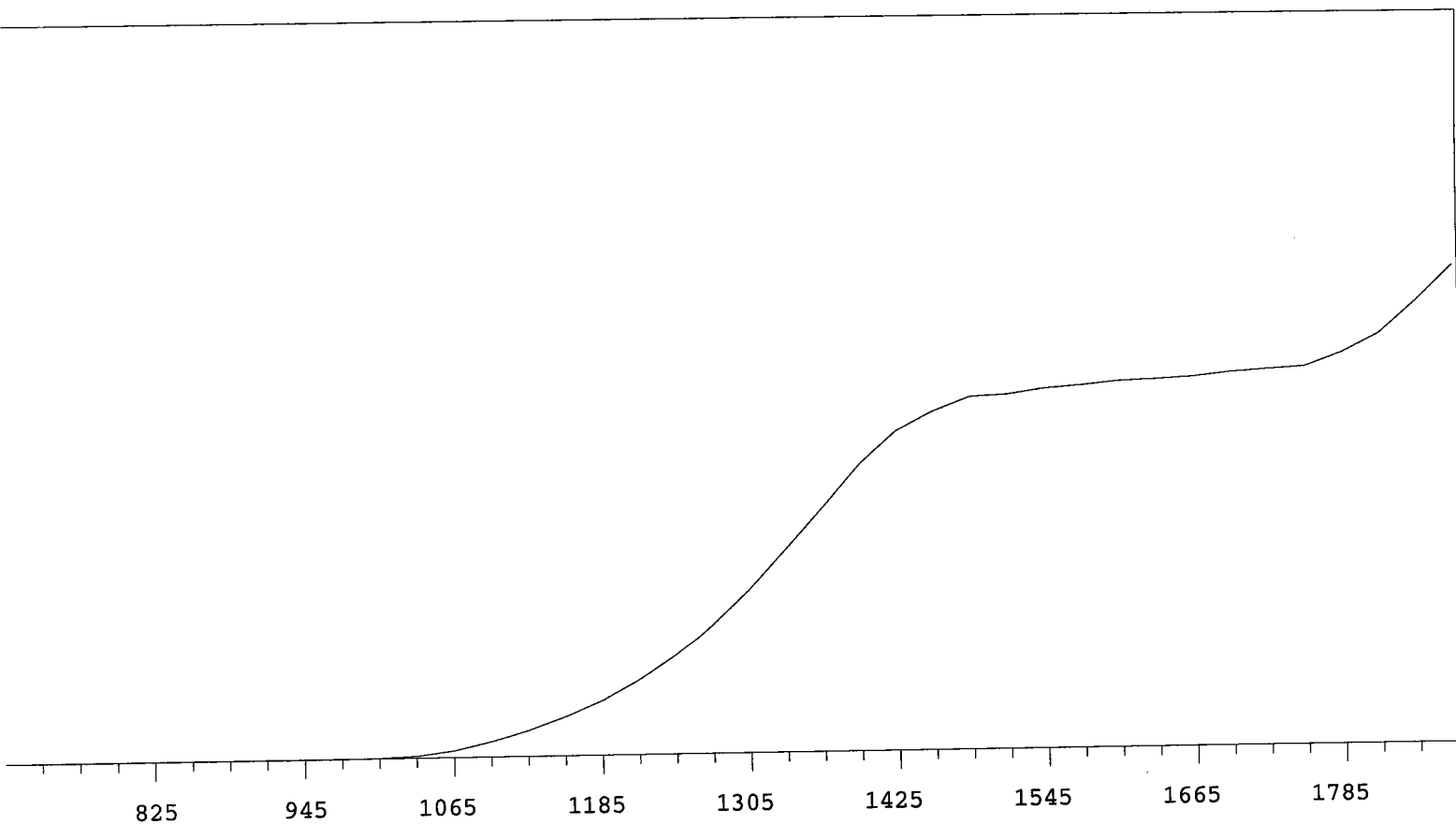
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14016	+71.42
735	0		1335	17436	+62.21
765	0		1365	20814	+50.32
795	0	>100	1395	23760	+36.91
825	0	>100	1425	26302	+24.91
855	0	>100	1455	27519	+15.17
885	0	>100	1485	28410	+8.91
915	0	>100	1515	28843	+5.41
945	0	>100	1545	29396	+3.58
975	5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



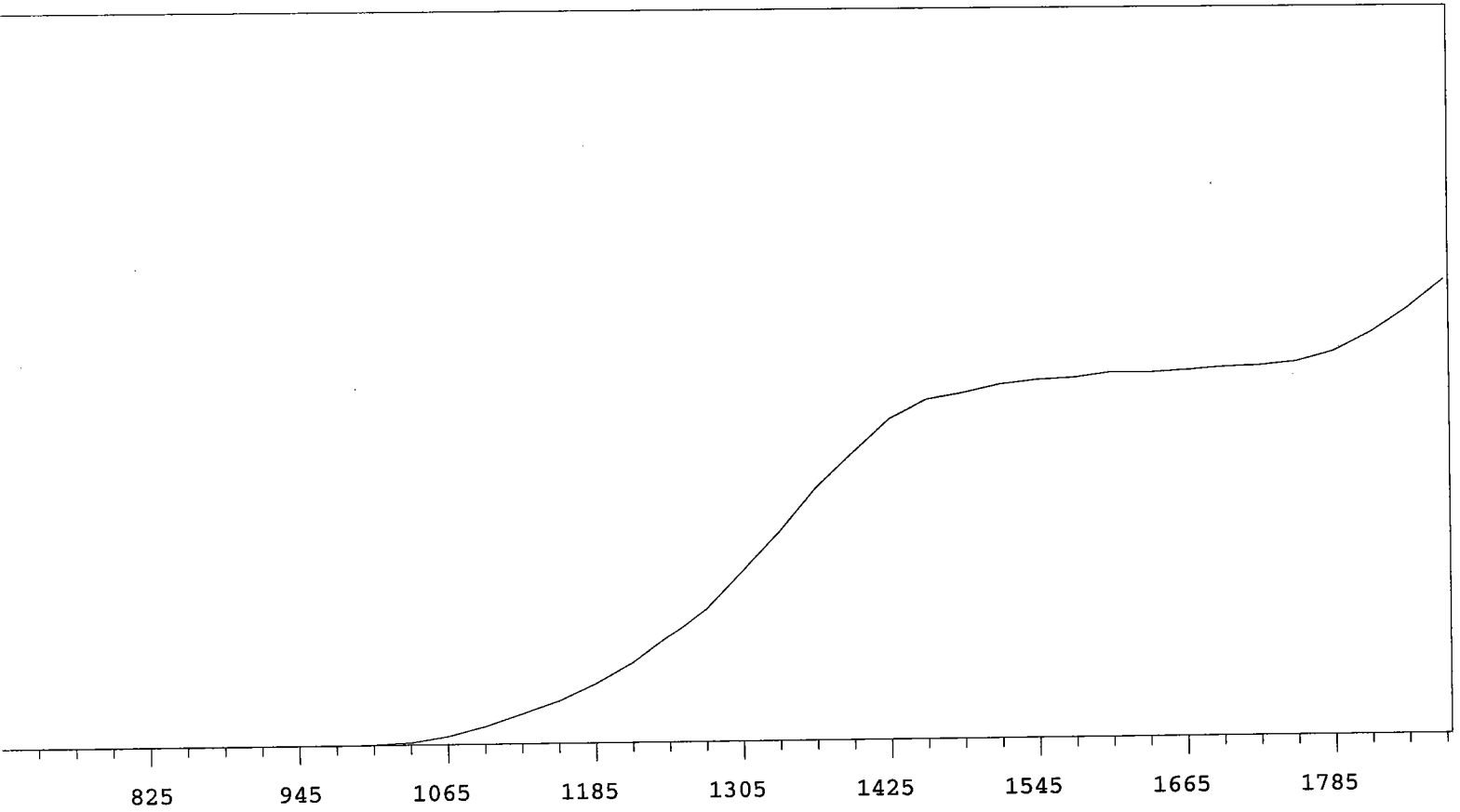
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19482	+67.45
735	0		1335	23344	+59.35
765	0		1365	27793	+45.86
795	0	>100	1395	31916	+34.29
825	0	>100	1425	33979	+21.61
855	0	>100	1455	35993	+11.71
885	0	>100	1485	36530	+7.04
915	0	>100	1515	36796	+3.11
945	1	>100	1545	37393	+2.44
975	9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



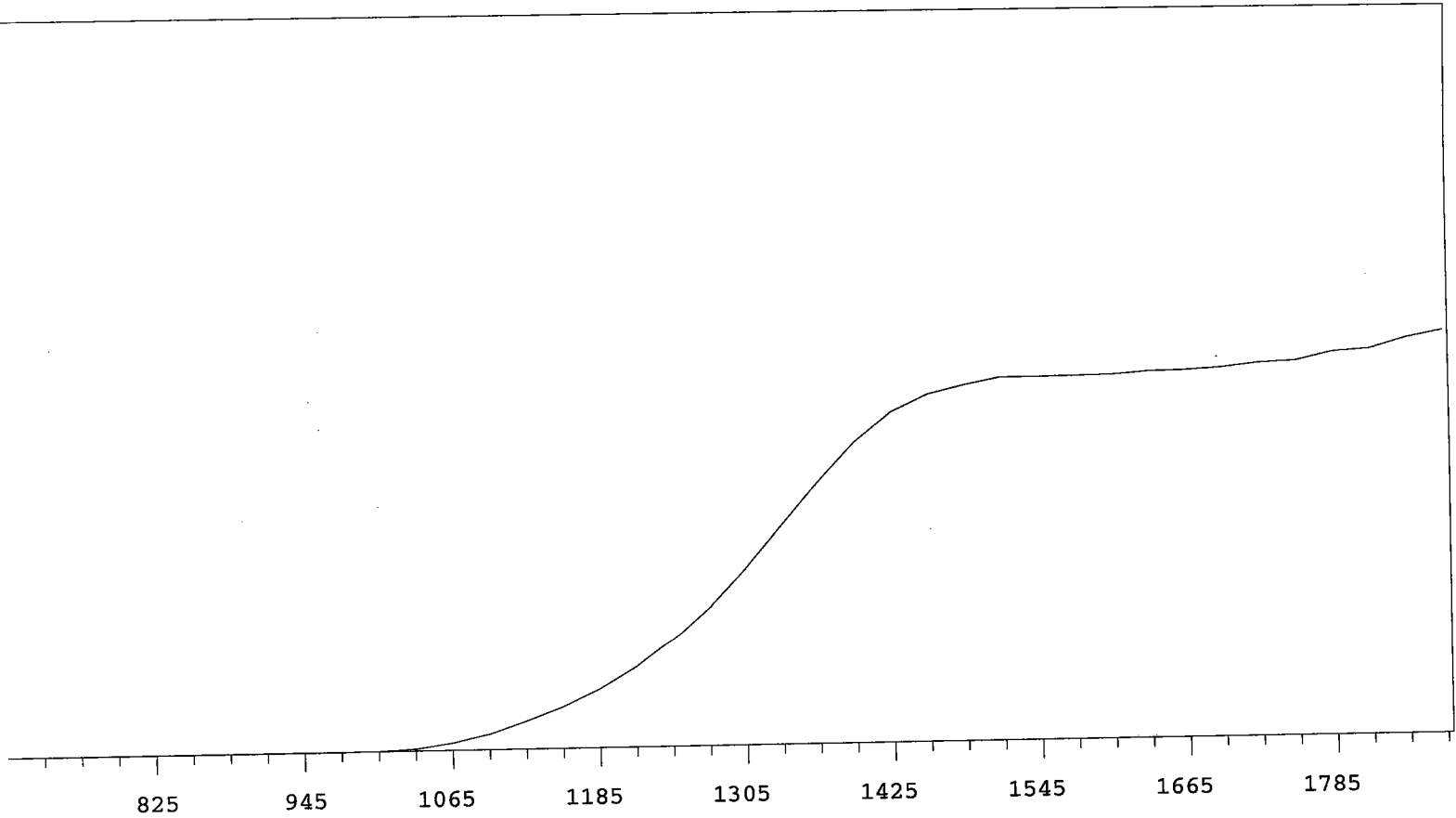
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16337	+74.91
735	0		1335	20471	+68.07
765	0		1365	25012	+57.86
795	0	>100	1395	29694	+47.48
825	0	>100	1425	33409	+35.17
855	0	>100	1455	37013	+23.27
885	0	>100	1485	38629	+14.35
915	0	>100	1515	39529	+7.69
945	0	>100	1545	40284	+4.34
975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



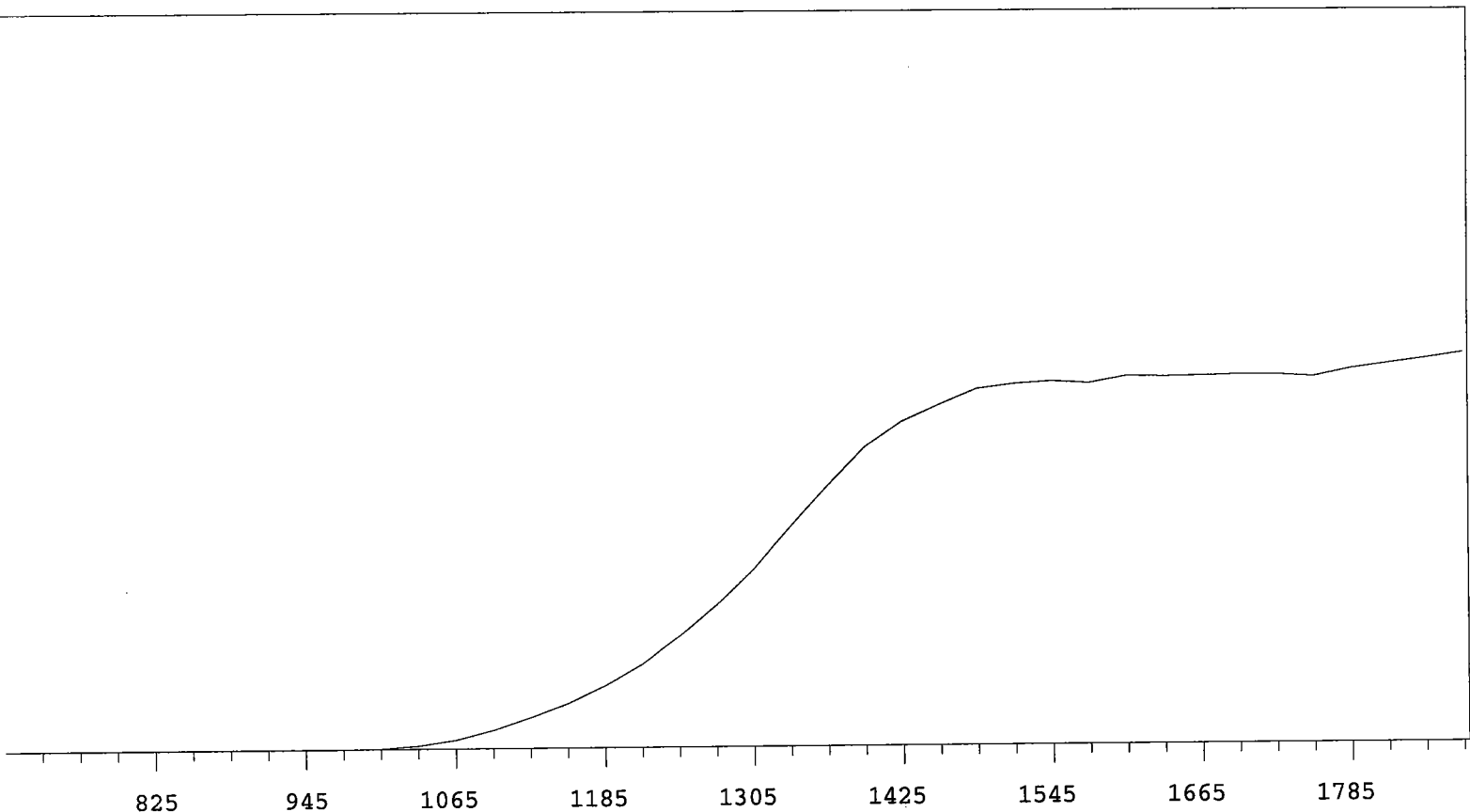
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16303	+72.82
735	0		1335	20309	+64.32
765	0		1365	24364	+53.82
795	0	>100	1395	28527	+40.95
825	0	>100	1425	31774	+28.74
855	0	>100	1455	33631	+16.87
885	0	>100	1485	35030	+9.25
915	0	>100	1515	35208	+5.21
945	0	>100	1545	35741	+3.27
975	4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



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



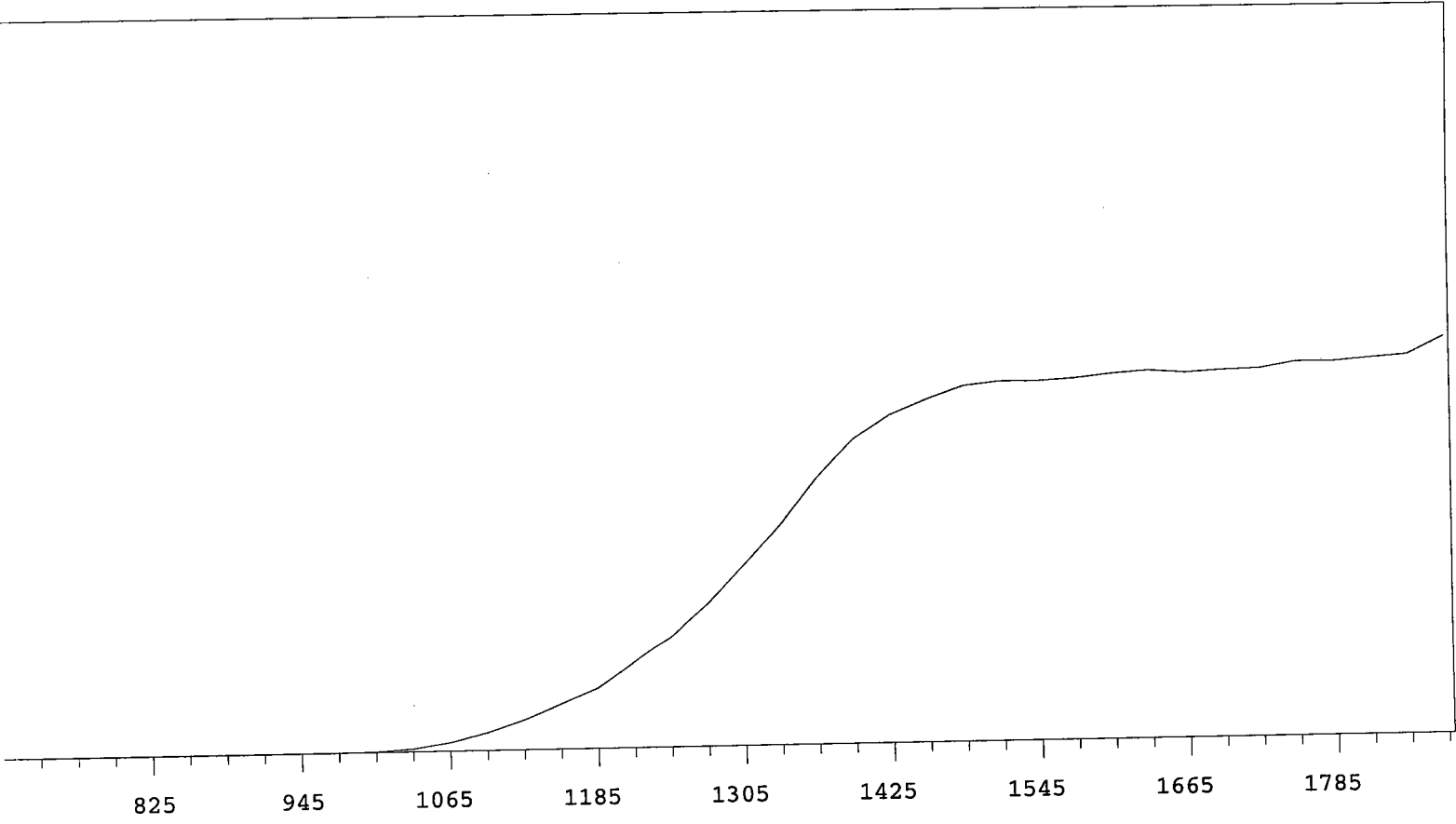
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16226	+71.71
735	0		1335	20083	+61.95
765	1	+0.00	1365	23913	+49.99
795	0	>100	1395	27526	+36.97
825	0	>100	1425	30193	+24.54
855	0	>100	1455	31747	+14.71
885	0	>100	1485	32544	+7.71
915	0	>100	1515	33198	+3.66
945	0	>100	1545	33188	+1.51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



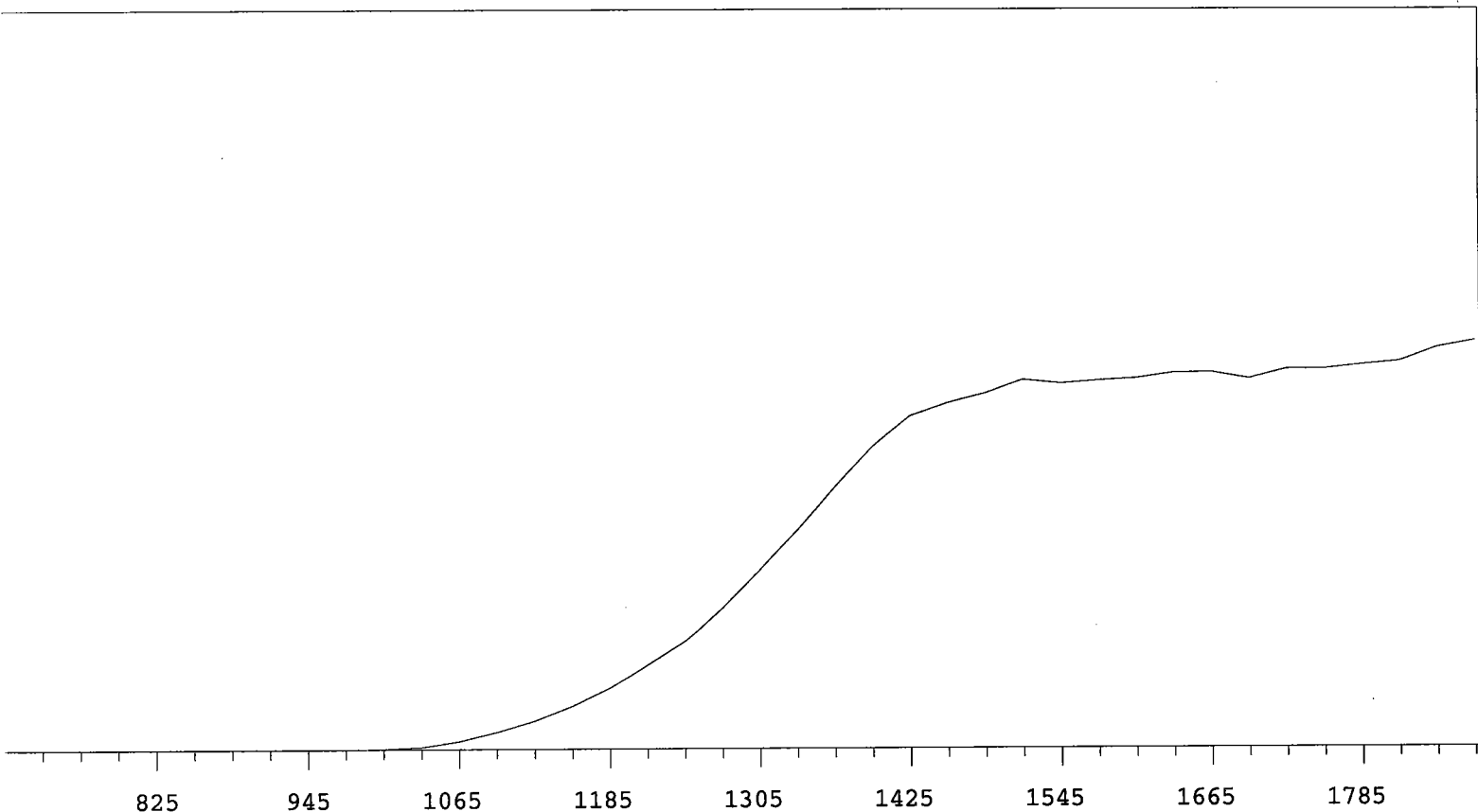
VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	4	>100
1005	45	>100
1035	300	>100
1065	836	>100
1095	1742	>100
1125	2896	>100
1155	4198	>100
1185	5849	>100
1215	7887	+92.20
1245	10561	+83.55
1275	13442	+76.62

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	





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	



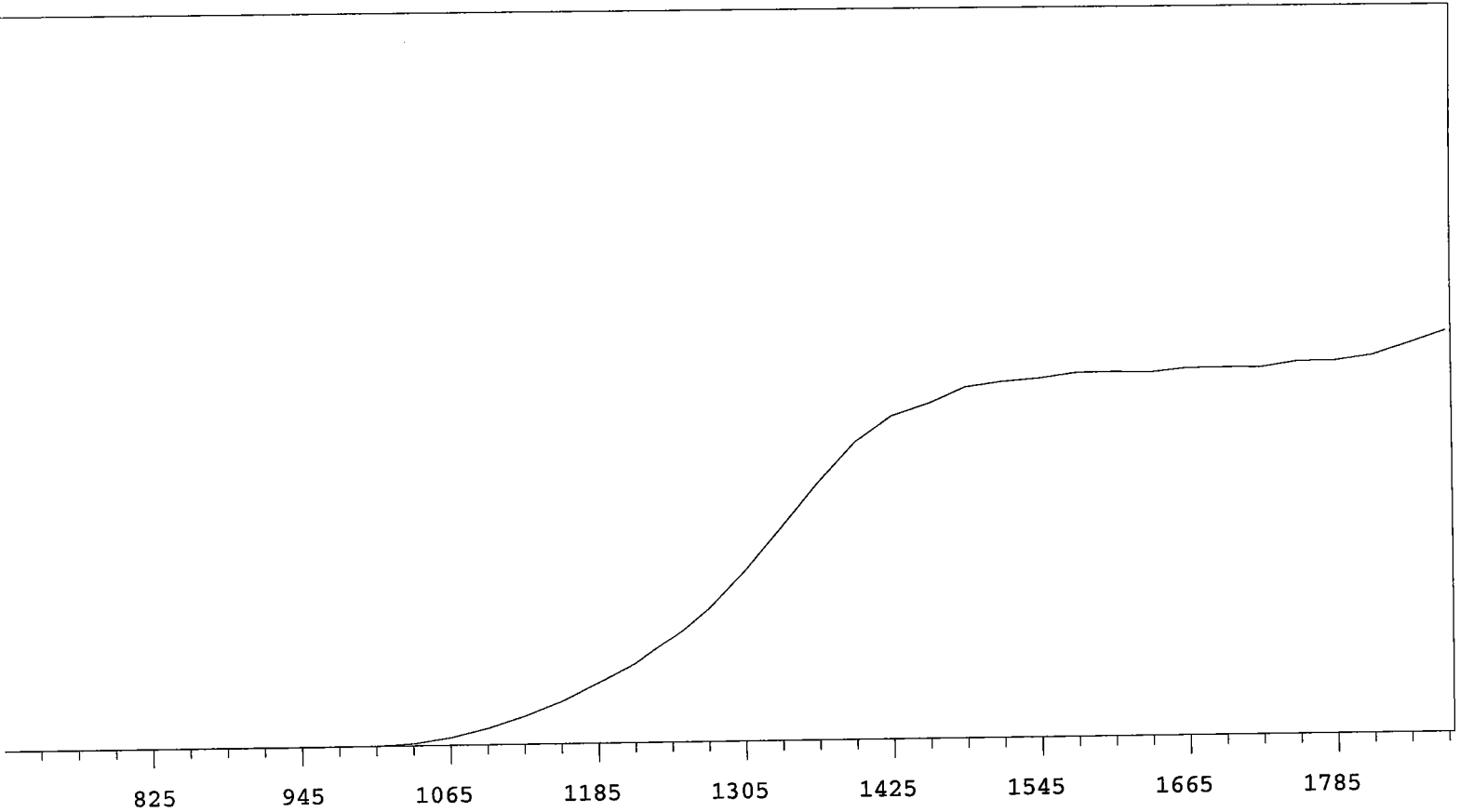
VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	5	>100
1005	35	>100
1035	186	>100
1065	618	>100
1095	1280	>100
1125	2141	>100
1155	3268	>100
1185	4659	>100
1215	6343	+90.68
1245	8064	+83.46
1275	10497	+77.03

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	

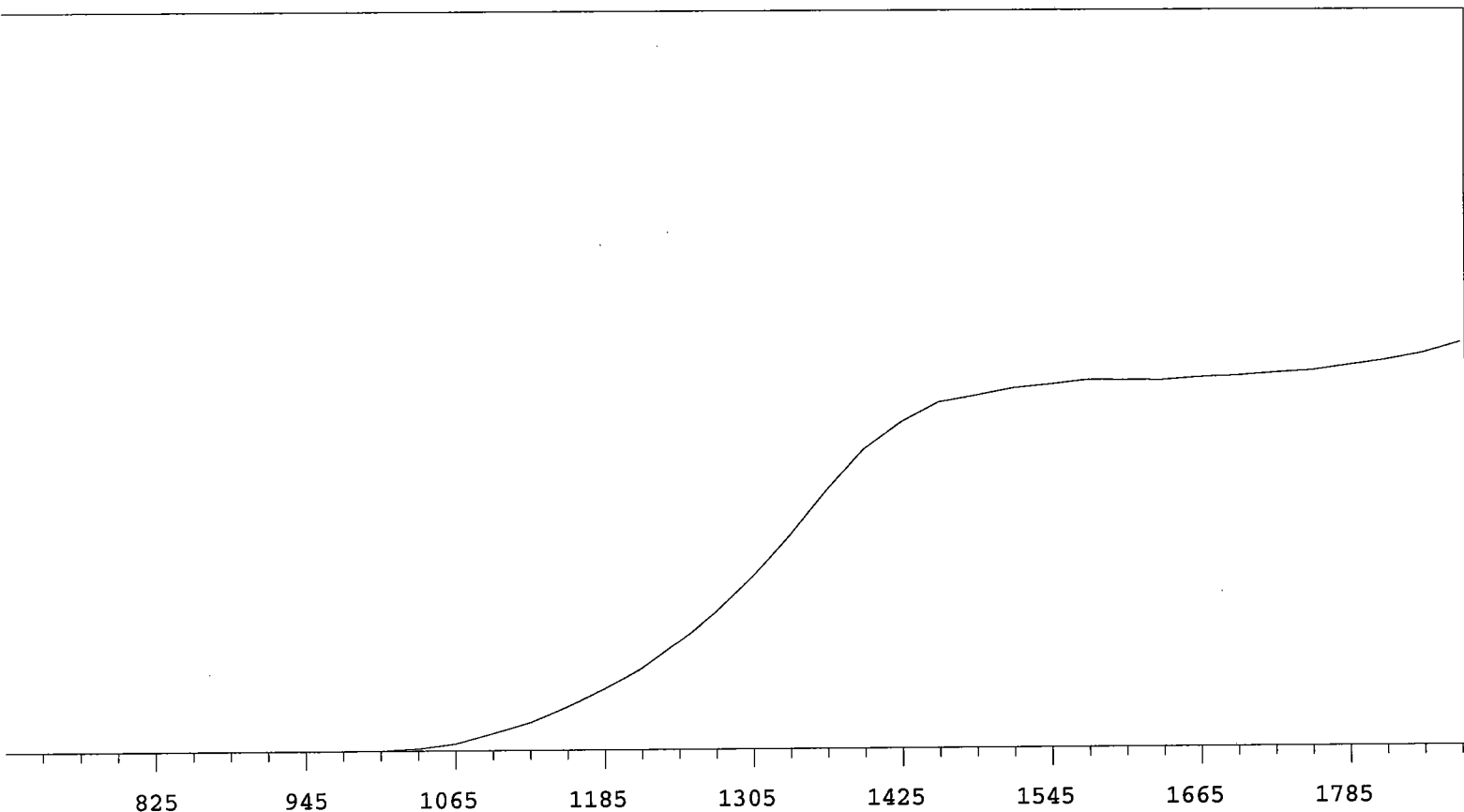
MPC 9600 Plateau  
Alpha Volts: 870

Instrument 10 MPC 9604 Detector A  
Beta Volts: 1552

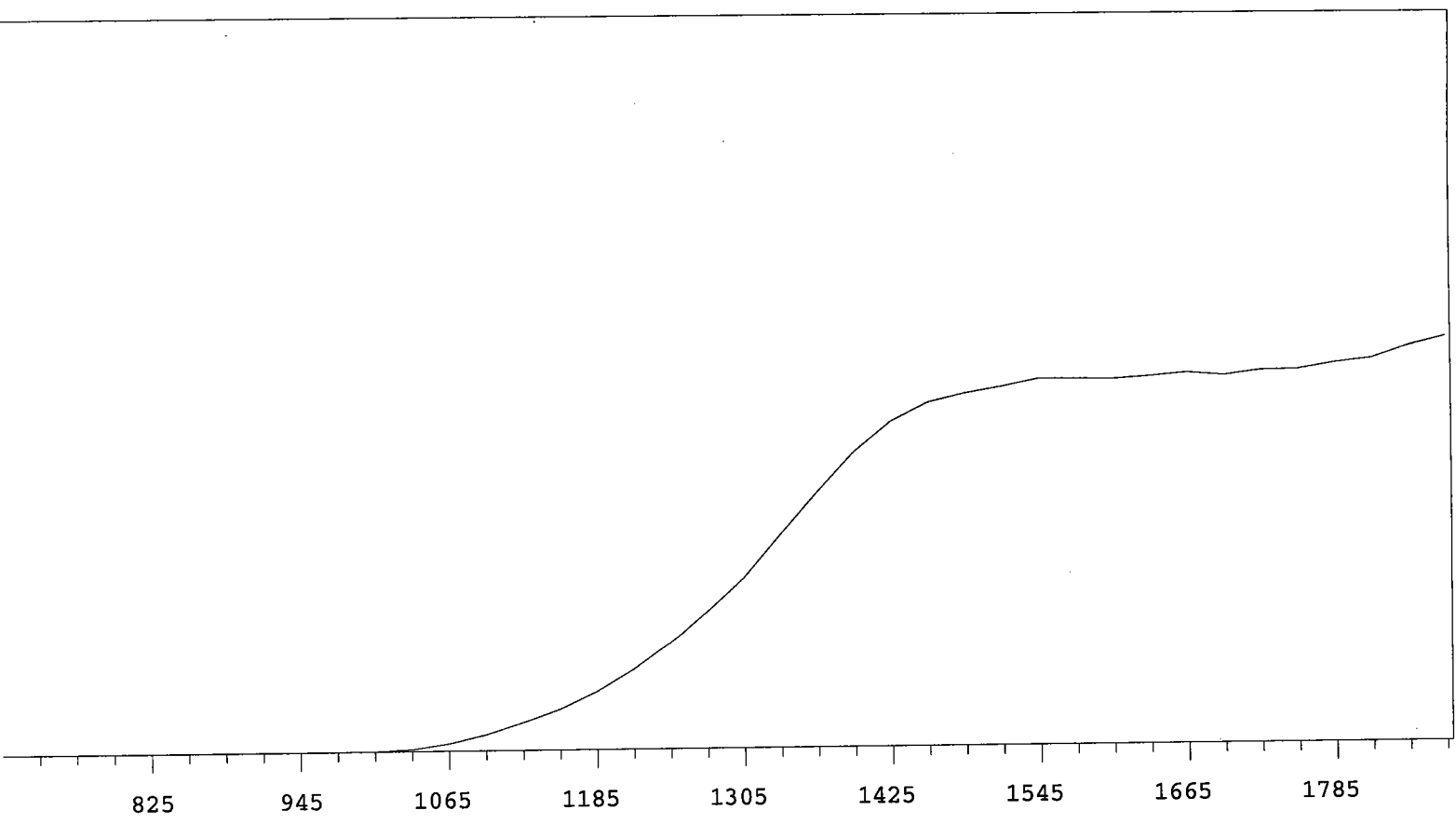
7/1/2009



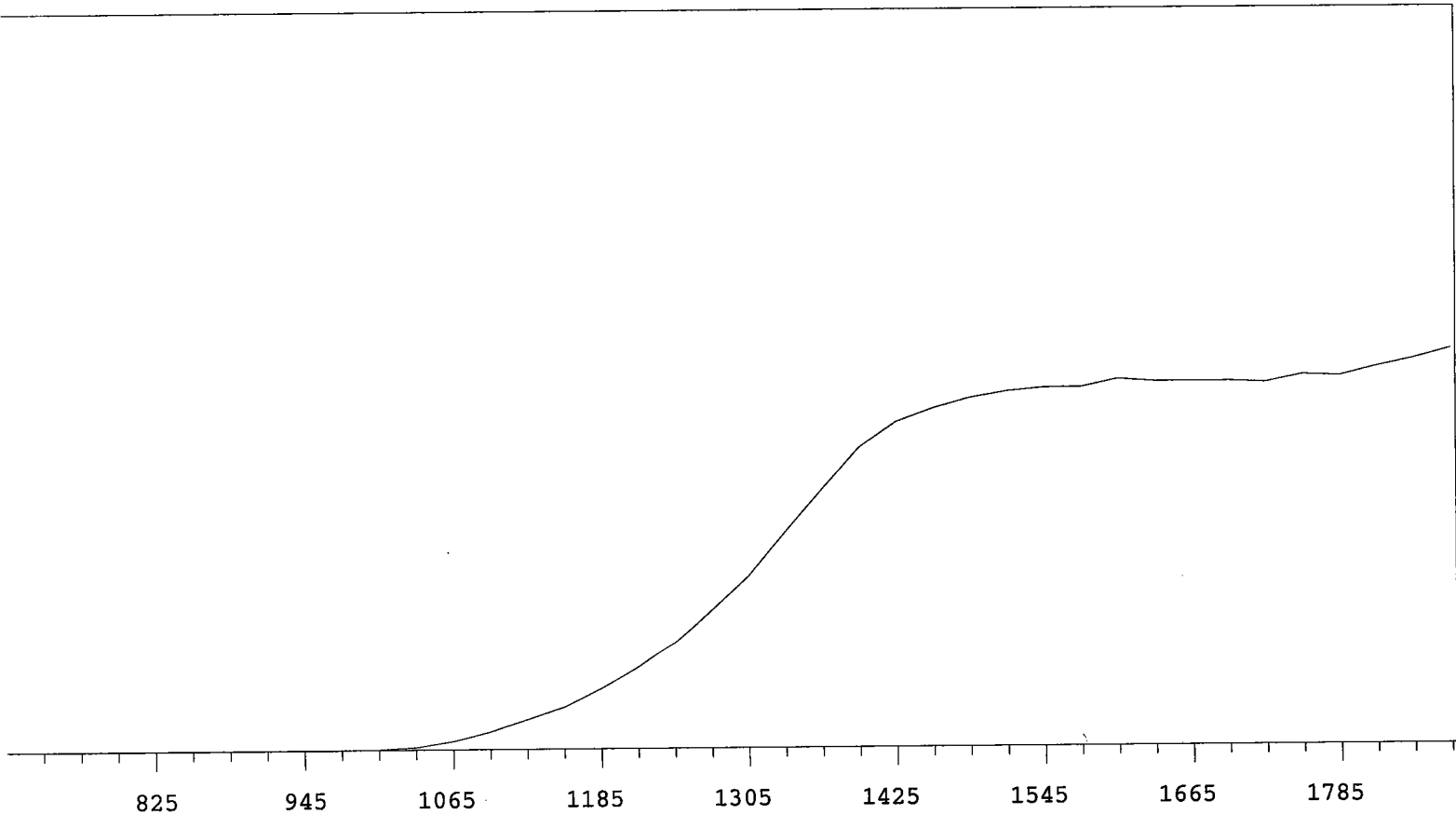
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16076	+72.76
735	1		1335	19985	+63.85
765	0		1365	24102	+50.95
795	0	>100	1395	27819	+36.01
825	0	>100	1425	30228	+23.86
855	0	>100	1455	31343	+14.40
885	0	>100	1485	32811	+8.77
915	0	>100	1515	33243	+6.10
945	0	>100	1545	33518	+3.25
975	1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

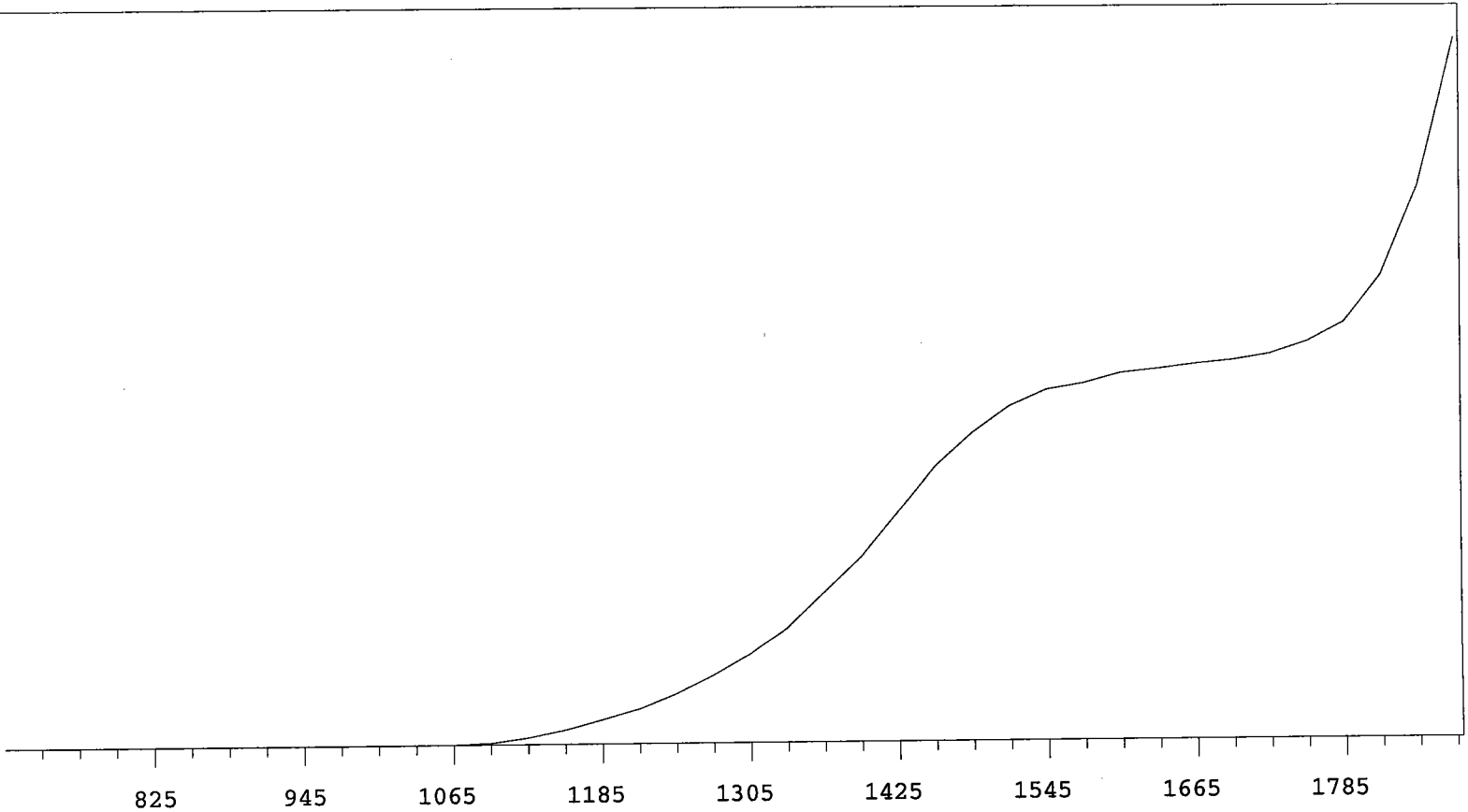


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18051	+71.16
735	0		1335	22586	+62.34
765	0		1365	26973	+51.47
795	0	>100	1395	31137	+38.24
825	0	>100	1425	34321	+25.70
855	0	>100	1455	36267	+15.37
885	1	>100	1485	37197	+9.21
915	0	>100	1515	37851	+5.38
945	2	>100	1545	38622	+3.00
975	2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

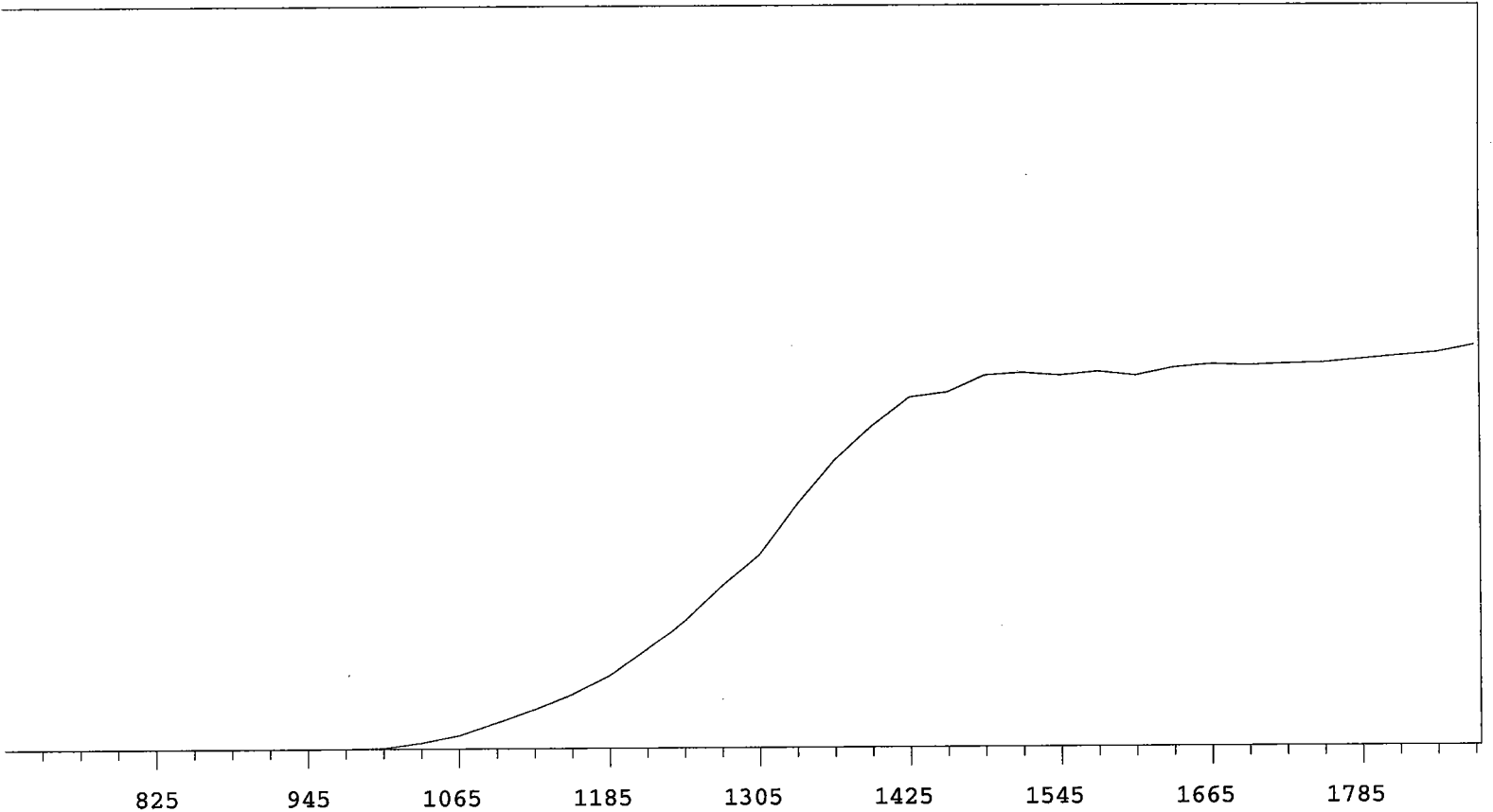


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15430	+69.87
735	0		1335	19258	+61.49
765	0		1365	23018	+50.06
795	0	>100	1395	26562	+35.34
825	0	>100	1425	28750	+22.67
855	0	>100	1455	29911	+13.20
885	0	>100	1485	30798	+8.01
915	0	>100	1515	31375	+4.83
945	0	>100	1545	31684	+3.74
975	3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



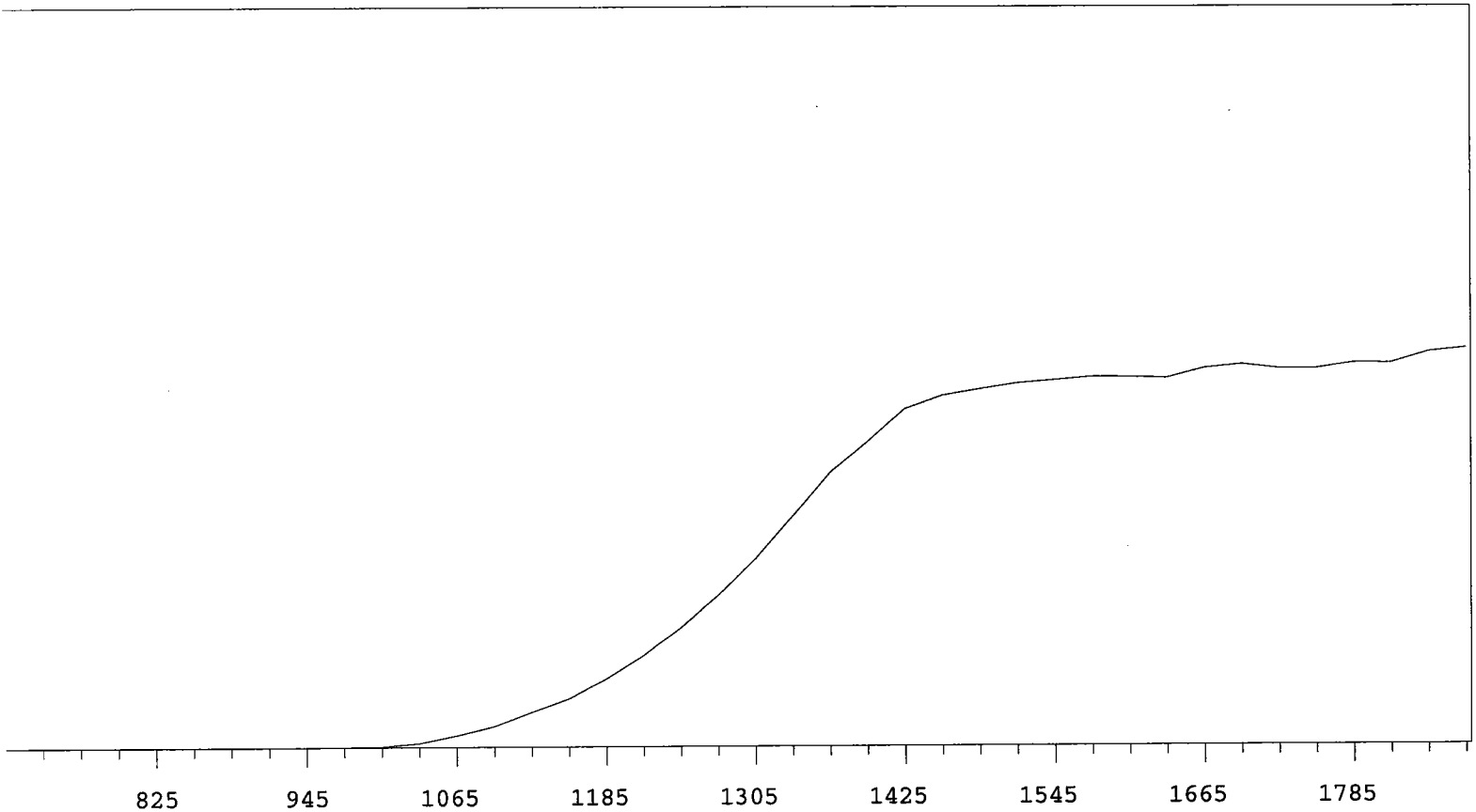
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	3225	+87.64
735	1		1335	4189	+80.15
765	0		1365	5428	+75.12
795	0	>100	1395	6662	+68.60
825	0	>100	1425	8241	+58.14
855	0	>100	1455	9857	+46.65
885	0	>100	1485	11018	+33.24
915	0	>100	1515	11953	+21.01
945	1	+0.00	1545	12538	+13.57
975	0	>100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



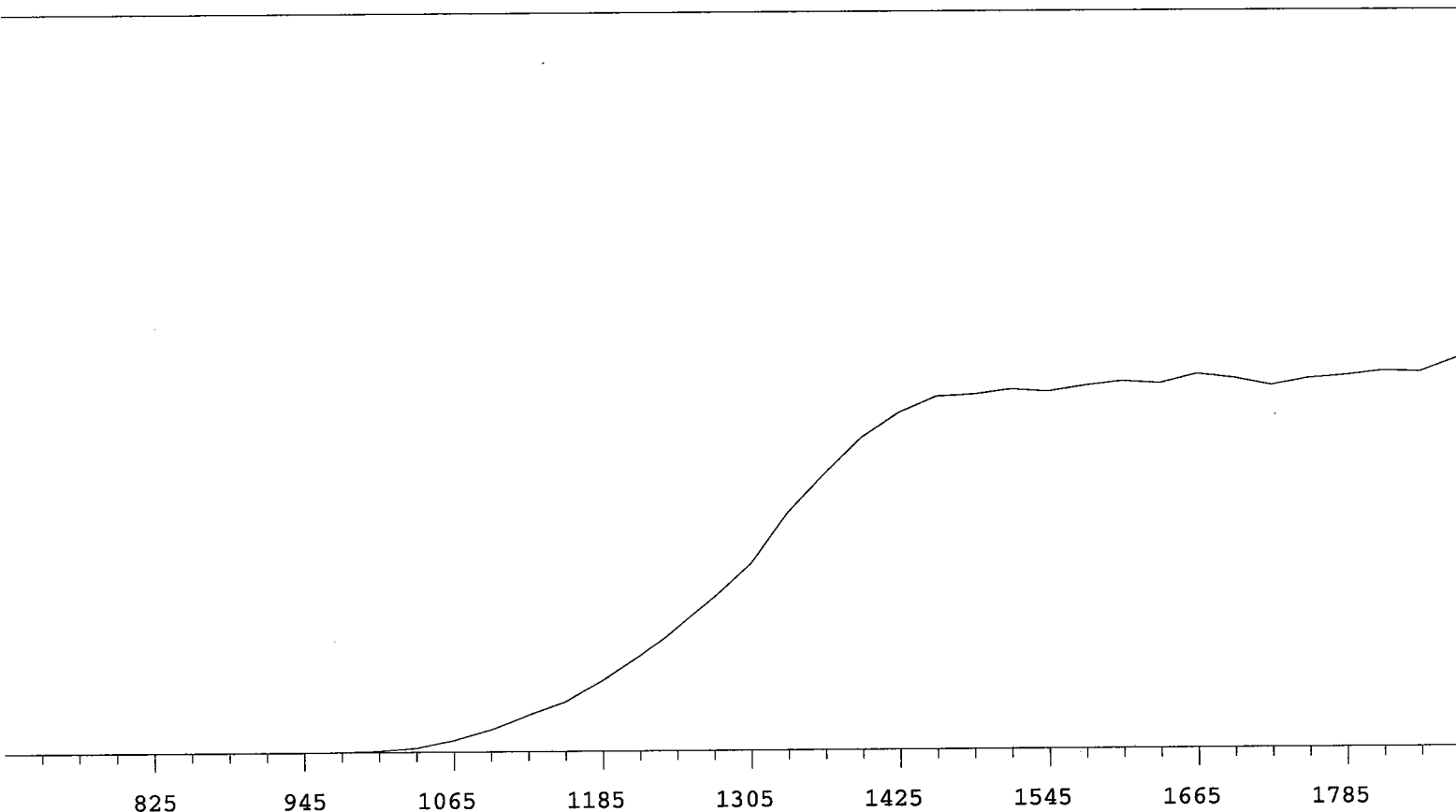
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8947	+65.63
735	0		1335	11238	+56.58
765	0		1365	13246	+46.66
795	0	>100	1395	14838	+30.69
825	0	>100	1425	16166	+20.11
855	0	>100	1455	16396	+11.95
885	0	>100	1485	17161	+5.61
915	1	>100	1515	17274	+3.59
945	0	>100	1545	17144	-0.00
975	11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



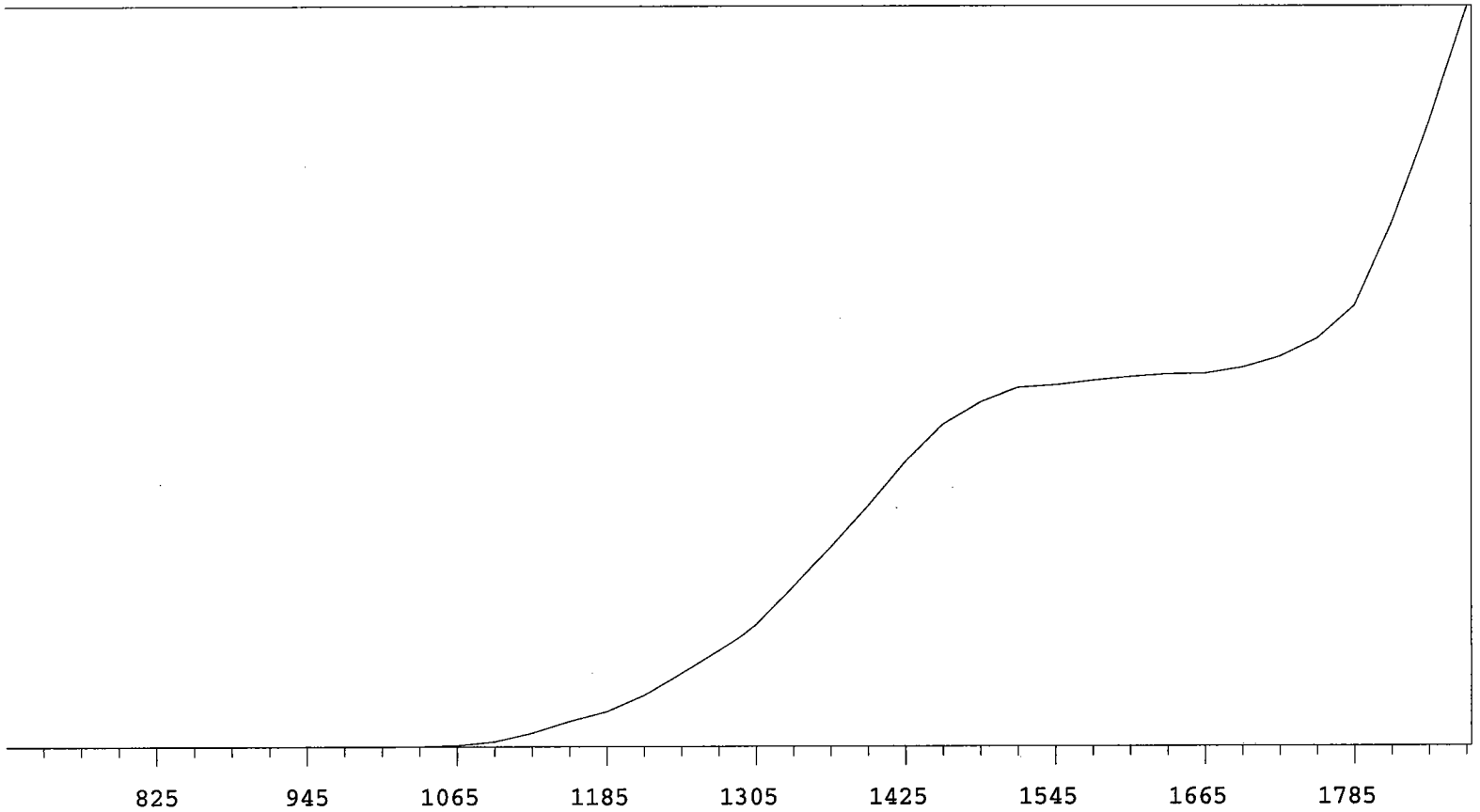
Alpha Volts: 1515 Beta Volts: 1515



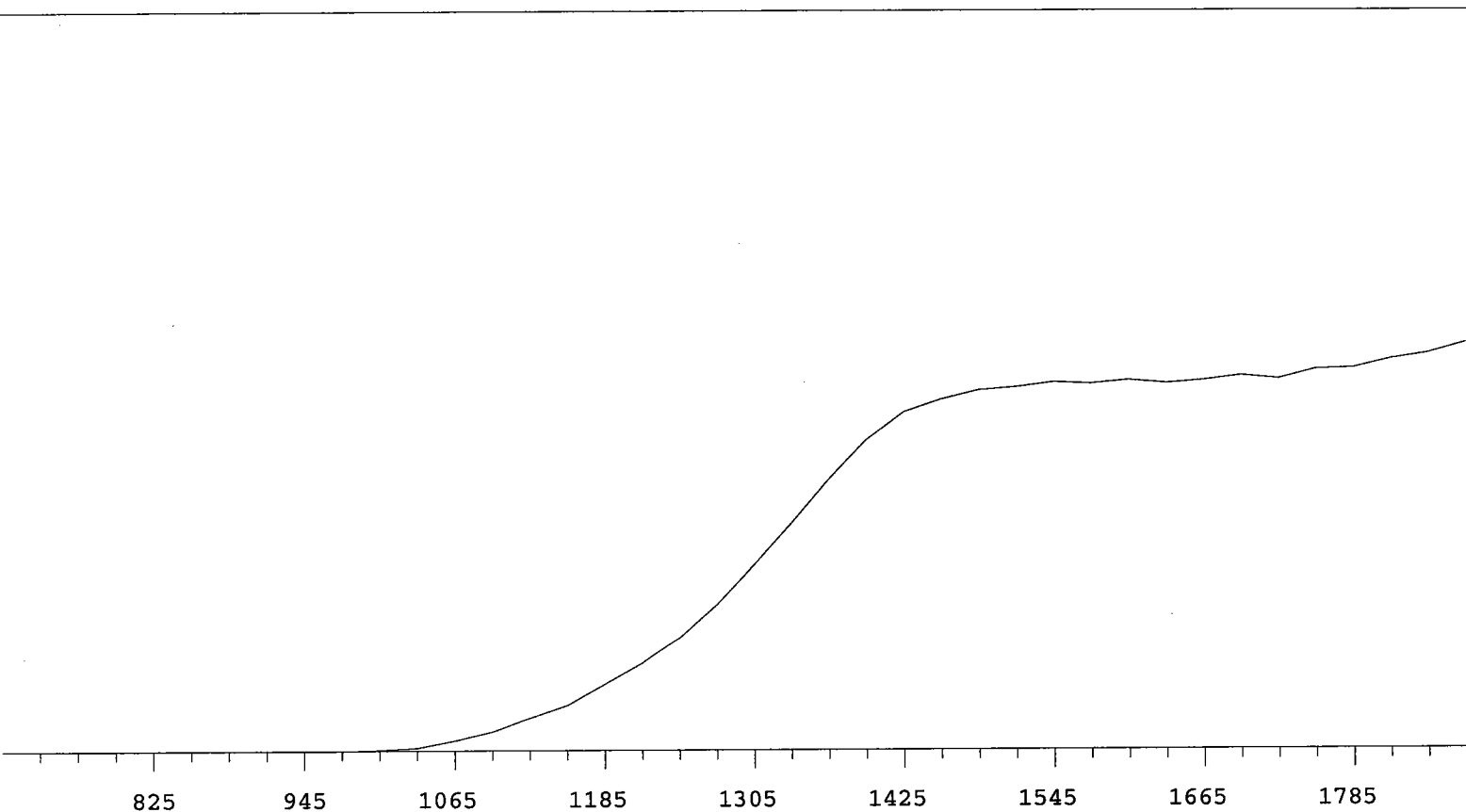
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	8636	+66.44
735	0		1335	10593	+56.56
765	0	+0.00	1365	12582	+46.23
795	0	>100	1395	13957	+33.45
825	1	+0.00	1425	15443	+21.49
855	0	>100	1455	16048	+13.14
885	0	+0.00	1485	16331	+6.45
915	0	>100	1515	16603	+4.19
945	1	>100	1545	16736	+2.73
975	7	>100	1575	16884	+1.11
1005	46	>100	1605	16875	+1.91
1035	191	>100	1635	16813	+2.86
1065	540	>100	1665	17257	+2.60
1095	957	>100	1695	17425	+1.58
1125	1597	>100	1725	17238	+0.49
1155	2217	>100	1755	17230	+0.63
1185	3154	+98.74	1785	17482	+3.27
1215	4239	+89.75	1815	17468	+4.46
1245	5550	+79.98	1845	17977	
1275	6980	+73.12	1875	18163	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	7679	+65.97
735	0		1335	9737	+57.57
765	0		1365	11301	+45.87
795	0	>100	1395	12767	+31.71
825	0	>100	1425	13767	+19.90
855	1	+83.33	1455	14399	+10.72
885	1	+55.56	1485	14467	+4.38
915	0	>100	1515	14671	+2.12
945	1	>100	1545	14576	+2.61
975	9	>100	1575	14808	+1.80
1005	60	>100	1605	14974	+3.15
1035	173	>100	1635	14872	+1.76
1065	480	>100	1665	15248	-0.41
1095	911	>100	1695	15067	-0.27
1125	1508	>100	1725	14784	-0.43
1155	2024	>100	1755	15044	+2.01
1185	2872	+97.38	1785	15163	+2.82
1215	3858	+89.30	1815	15333	+3.61
1245	5070	+78.02	1845	15278	
1275	6322	+73.30	1875	15817	

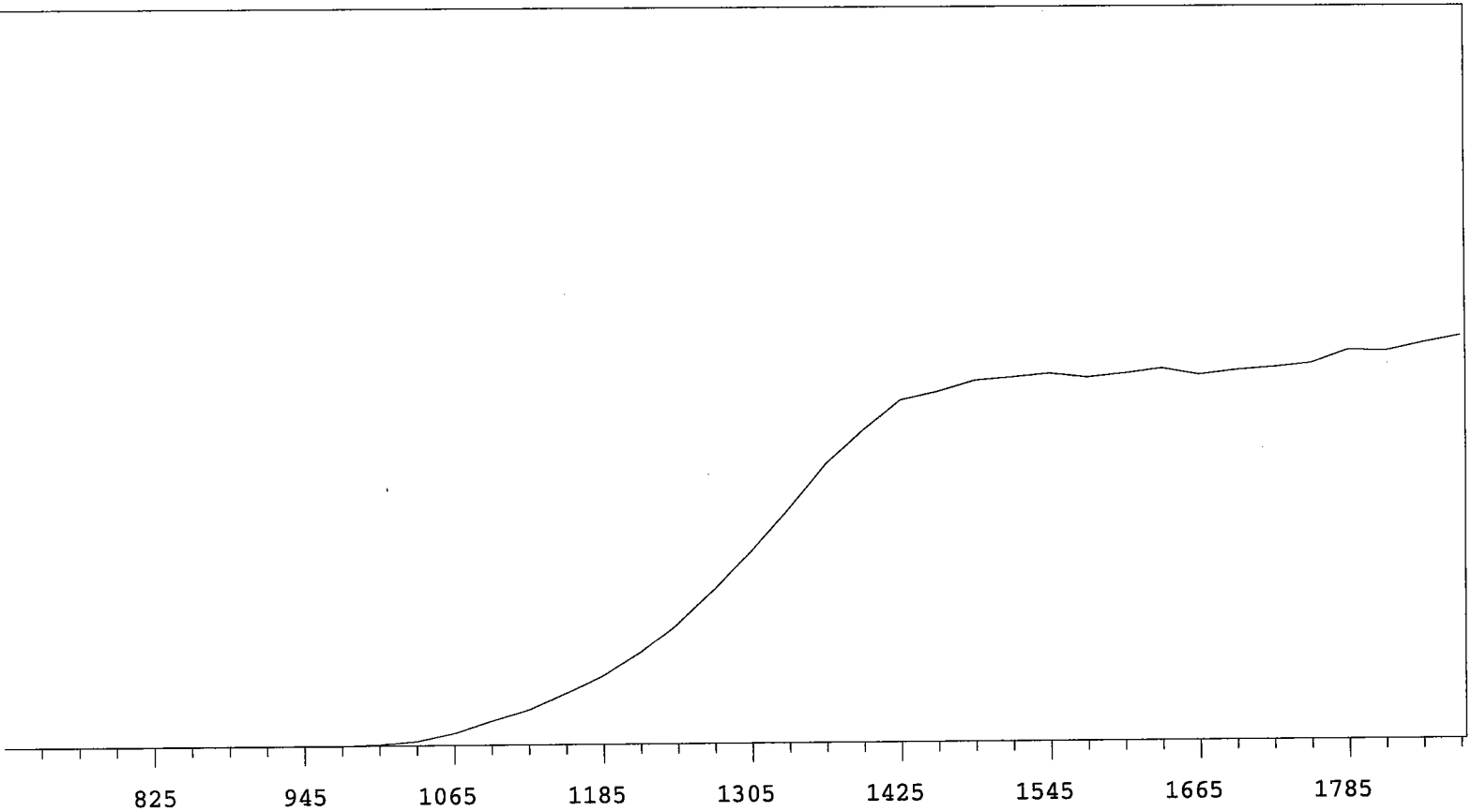


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	6302	+80.03
735	1		1335	8191	+73.78
765	0		1365	10140	+66.18
795	0	>100	1395	12247	+55.83
825	0	>100	1425	14468	+43.92
855	0	>100	1455	16303	+31.28
885	0	>100	1485	17411	+18.64
915	0	>100	1515	18150	+9.87
945	0	>100	1545	18275	+5.30
975	1	>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
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	1	+83.33
885	1	-83.33
915	0	-55.56
945	0	>100
975	1	>100
1005	43	>100
1035	165	>100
1065	557	>100
1095	1055	>100
1125	1775	>100
1155	2470	>100
1185	3617	+98.46
1215	4757	+90.95
1245	6186	+83.59
1275	8021	+77.85
1305	10207	+70.42
1335	12473	+60.75
1365	14900	+48.87
1395	17101	+35.36
1425	18643	+22.53
1455	19350	+12.34
1485	19848	+6.68
1515	20014	+3.51
1545	20278	+2.03
1575	20186	+0.80
1605	20375	+0.32
1635	20209	+1.36
1665	20364	+0.83
1695	20607	+2.43
1725	20429	+2.51
1755	20924	+3.64
1785	20984	+5.11
1815	21470	+5.63
1845	21773	
1875	22346	

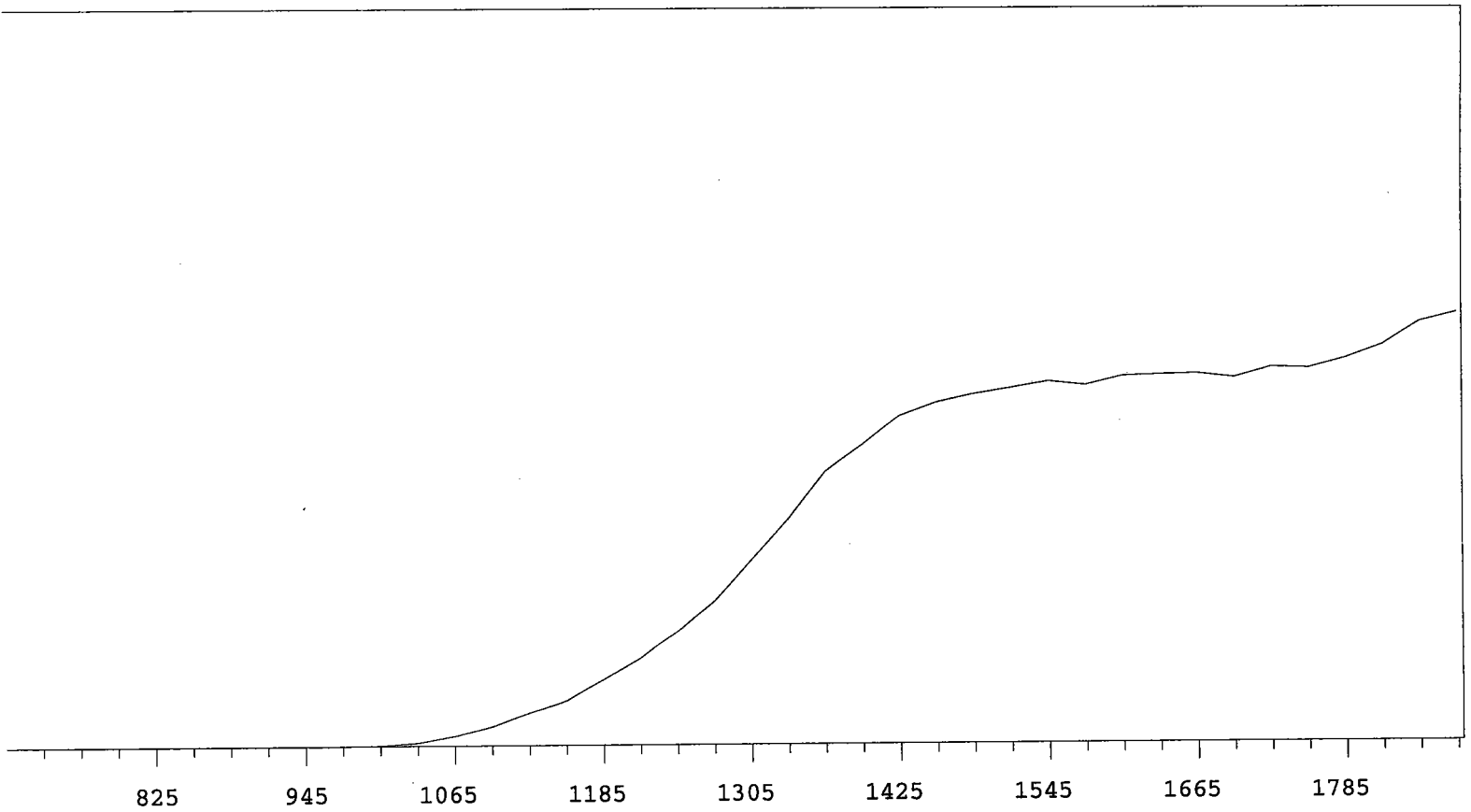
VOLTS	COUNTS	%/100 Volts
1305	10207	+70.42
1335	12473	+60.75
1365	14900	+48.87
1395	17101	+35.36
1425	18643	+22.53
1455	19350	+12.34
1485	19848	+6.68
1515	20014	+3.51
1545	20278	+2.03
1575	20186	+0.80
1605	20375	+0.32
1635	20209	+1.36
1665	20364	+0.83
1695	20607	+2.43
1725	20429	+2.51
1755	20924	+3.64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



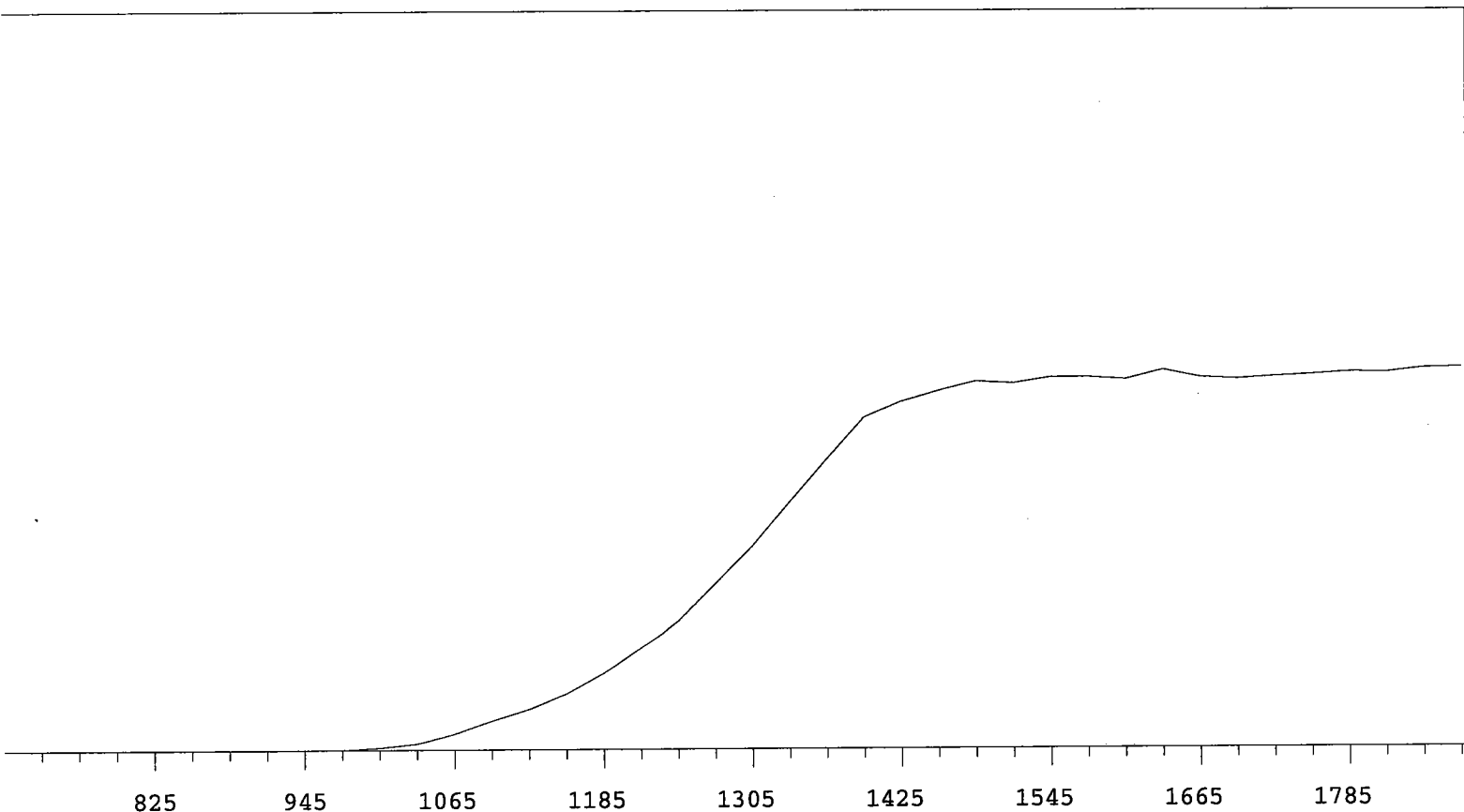
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	9543	+67.01
735	0		1335	11617	+56.47
765	0		1365	13791	+45.47
795	0	>100	1395	15387	+31.66
825	0	>100	1425	16819	+20.02
855	0	>100	1455	17210	+11.63
885	1	+0.00	1485	17742	+6.05
915	0	>100	1515	17892	+3.04
945	0	>100	1545	18070	+1.09
975	7	>100	1575	17856	+1.43
1005	52	>100	1605	18054	+0.42
1035	214	>100	1635	18287	+1.06
1065	590	>100	1665	17969	+0.78
1095	1201	>100	1695	18187	+1.48
1125	1759	>100	1725	18317	+4.89
1155	2569	>100	1755	18518	+4.76
1185	3440	+95.13	1785	19156	+5.18
1215	4583	+87.74	1815	19100	+5.18
1245	5985	+81.67	1845	19496	
1275	7682	+74.54	1875	19842	

Alpha Volts: 705

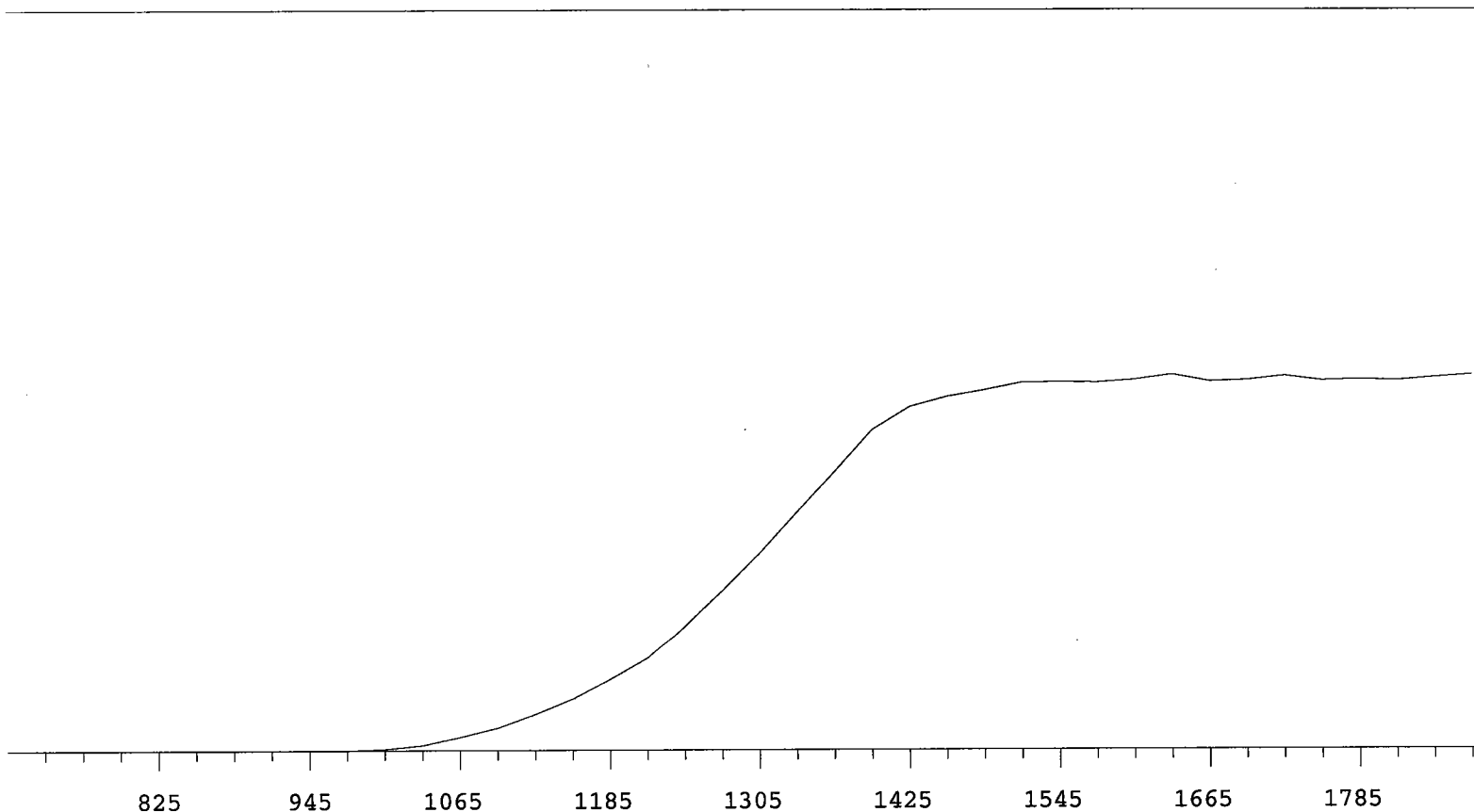
Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9144	+69.92
735	0		1335	11120	+58.43
765	0		1365	13399	+45.40
795	0	>100	1395	14711	+32.57
825	0	>100	1425	16134	+20.69
855	0	>100	1455	16805	+13.46
885	0	>100	1485	17209	+7.90
915	0	>100	1515	17500	+4.31
945	0	>100	1545	17812	+3.48
975	4	>100	1575	17629	+2.80
1005	26	>100	1605	18066	+2.23
1035	169	>100	1635	18122	+1.44
1065	483	>100	1665	18166	+1.20
1095	955	>100	1695	17967	+1.60
1125	1639	>100	1725	18469	+3.41
1155	2233	>100	1755	18409	+6.35
1185	3262	+98.61	1785	18884	+9.47
1215	4306	+89.77	1815	19535	+11.98
1245	5662	+82.36	1845	20630	
1275	7113	+76.36	1875	21076	

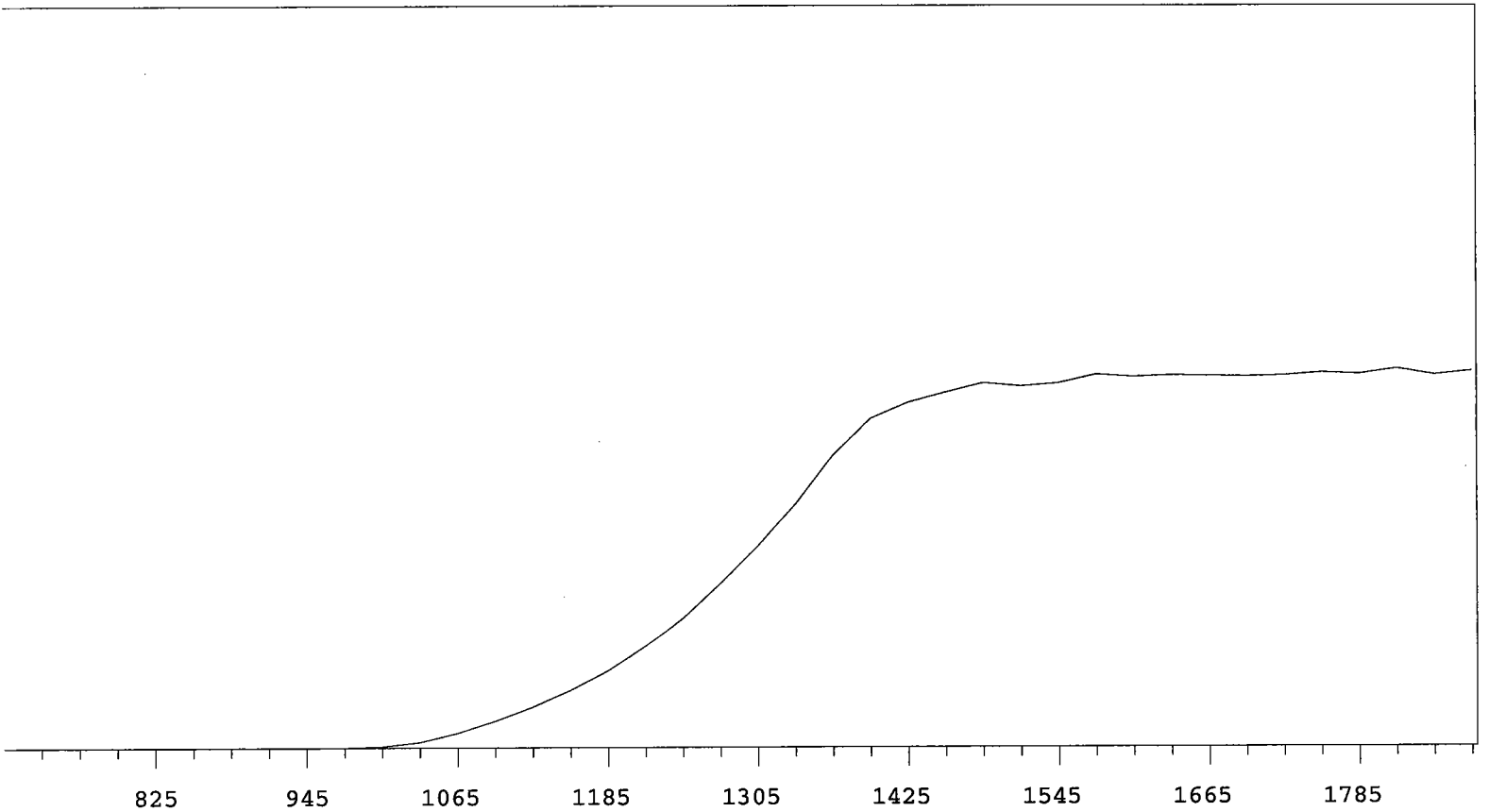


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9209	+64.55
735	1		1335	11200	+55.94
765	0	+55.56	1365	13123	+43.27
795	2	>100	1395	14957	+29.04
825	0	+0.00	1425	15658	+17.41
855	0	>100	1455	16123	+8.01
885	1	>100	1485	16530	+4.92
915	0	>100	1515	16437	+2.71
945	1	>100	1545	16704	+0.83
975	14	>100	1575	16707	+2.14
1005	104	>100	1605	16602	+0.55
1035	281	>100	1635	17024	-0.28
1065	720	>100	1665	16684	-0.42
1095	1302	>100	1695	16597	-0.85
1125	1834	>100	1725	16711	+1.27
1155	2544	>100	1755	16796	+1.51
1185	3485	+92.28	1785	16903	+1.57
1215	4624	+85.50	1815	16880	+1.46
1245	5878	+77.82	1845	17066	
1275	7515	+71.49	1875	17085	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9666	+64.39
735	0		1335	11722	+55.91
765	0		1365	13680	+44.91
795	0	>100	1395	15677	+31.56
825	0	>100	1425	16786	+19.46
855	0	>100	1455	17283	+10.57
885	0	>100	1485	17608	+5.95
915	1	>100	1515	17972	+3.32
945	0	>100	1545	18006	+1.84
975	4	>100	1575	17970	+1.58
1005	70	>100	1605	18104	+0.74
1035	257	>100	1635	18351	+0.24
1065	648	>100	1665	18016	+0.16
1095	1116	>100	1695	18080	-0.63
1125	1784	>100	1725	18283	+0.29
1155	2560	>100	1755	18047	-0.47
1185	3531	+96.11	1785	18110	-0.32
1215	4568	+89.22	1815	18040	+1.17
1245	6137	+81.65	1845	18200	
1275	7855	+74.42	1875	18320	

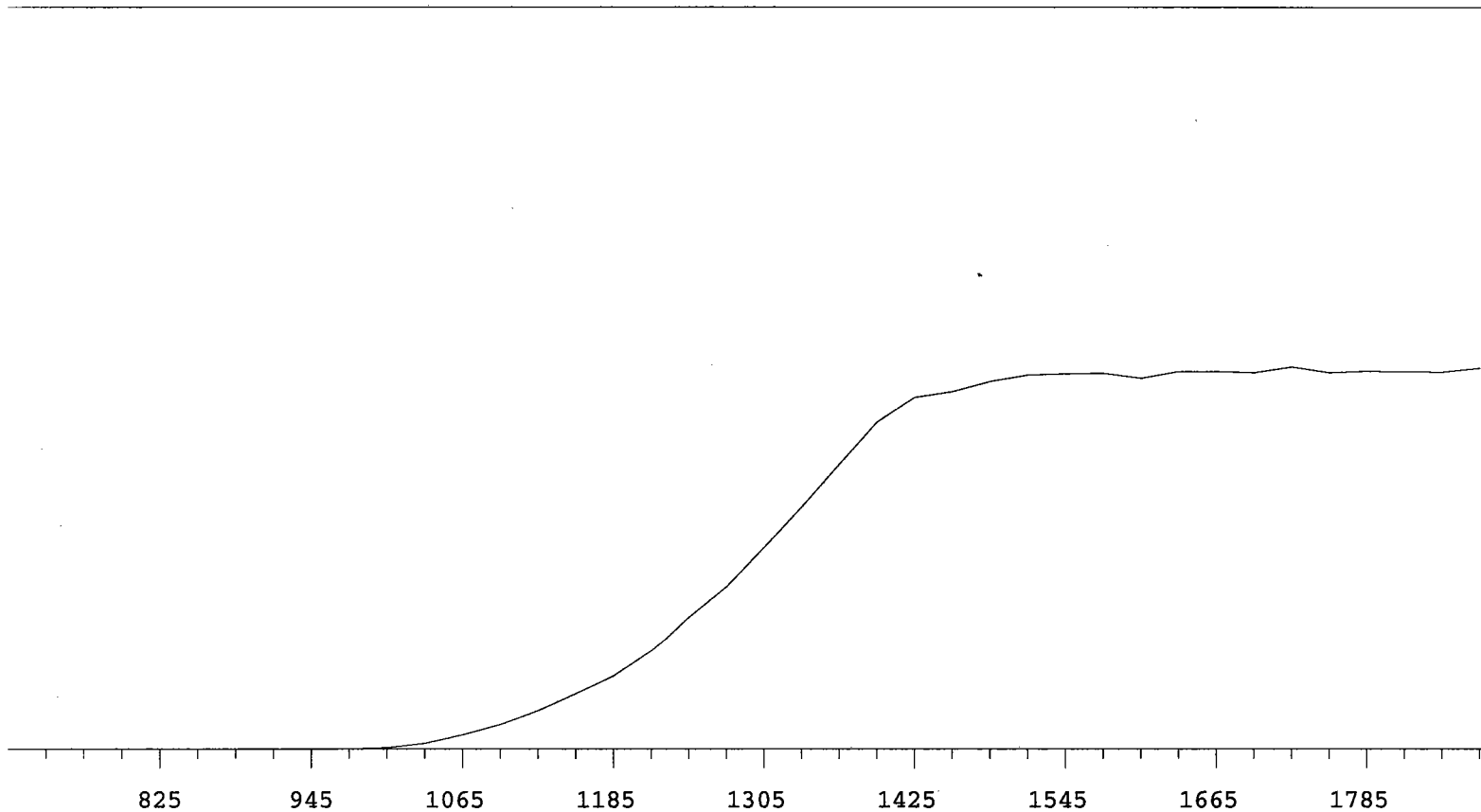




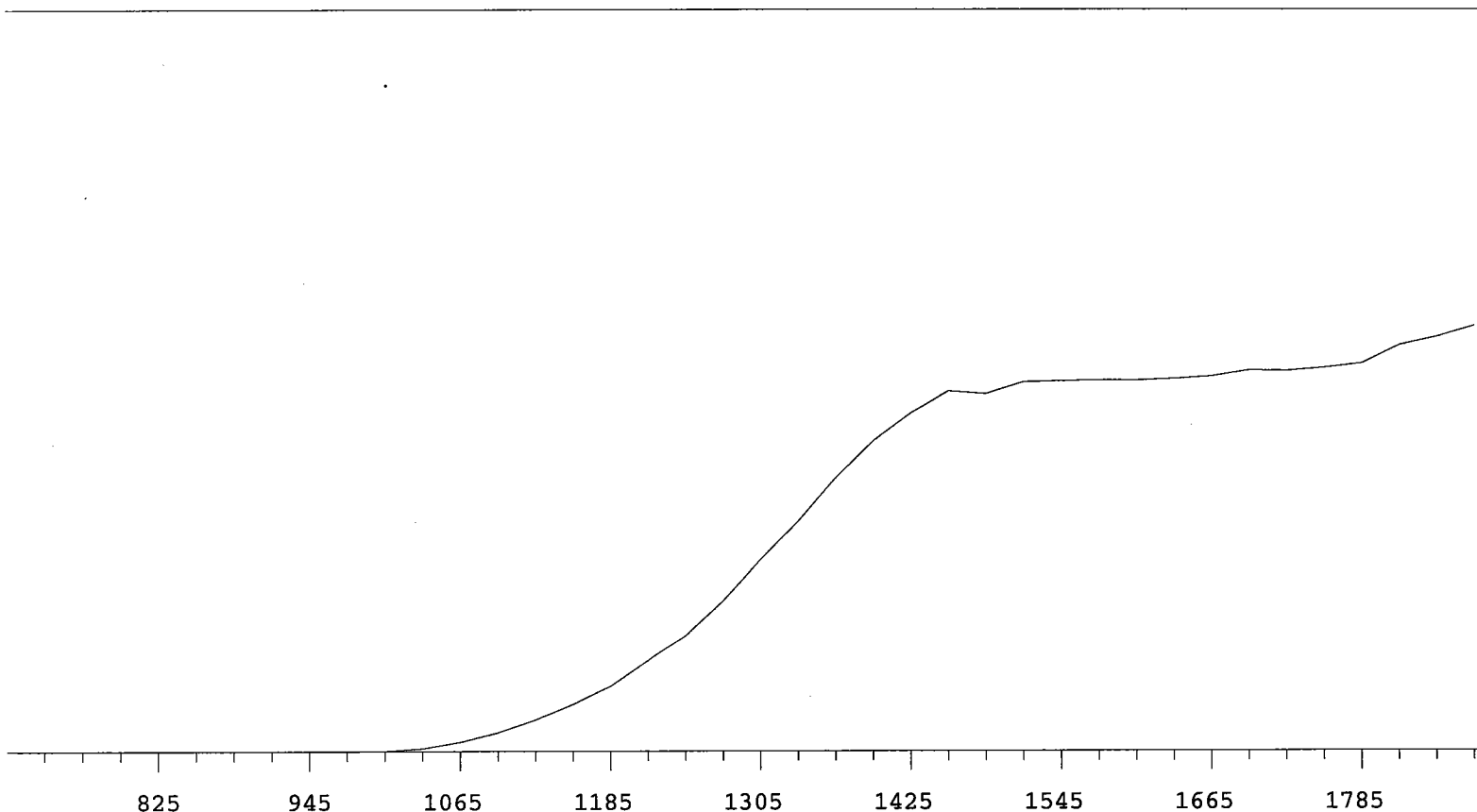
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	11573	+64.95
735	0		1335	13929	+56.47
765	0		1365	16726	+43.82
795	0	>100	1395	18834	+29.38
825	0	>100	1425	19743	+16.84
855	0	>100	1455	20314	+7.95
885	0	>100	1485	20860	+4.16
915	0	>100	1515	20670	+3.23
945	0	>100	1545	20844	+2.09
975	9	>100	1575	21330	+2.48
1005	93	>100	1605	21188	+1.16
1035	325	>100	1635	21280	-0.32
1065	834	>100	1665	21237	+0.08
1095	1525	>100	1695	21202	+0.42
1125	2318	>100	1725	21254	+0.60
1155	3233	>100	1755	21406	+1.41
1185	4357	+92.07	1785	21326	+0.42
1215	5755	+85.64	1815	21619	+0.16
1245	7438	+78.35	1845	21282	
1275	9463	+70.89	1875	21478	

Alpha Volts: 705

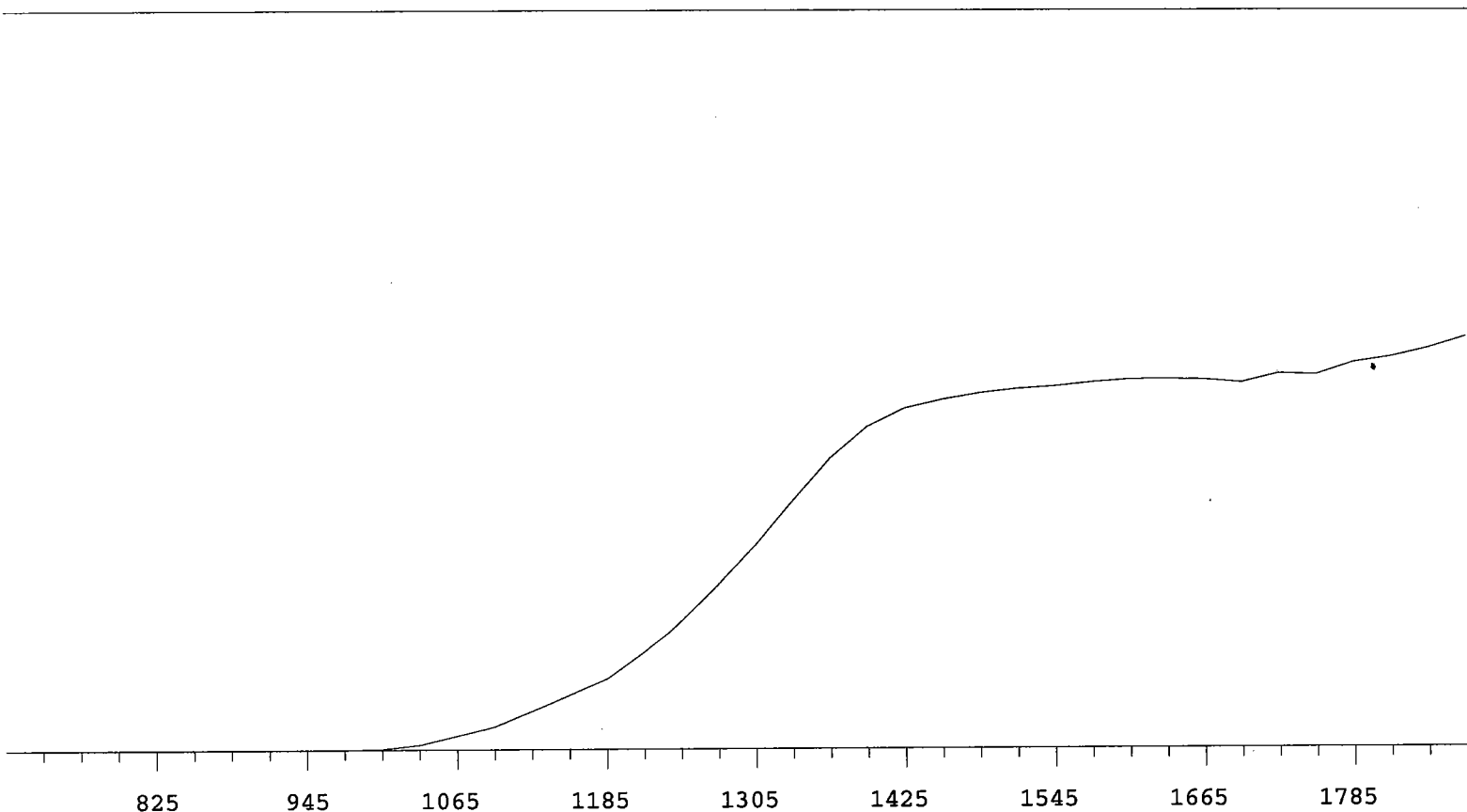
Beta Volts: 1515



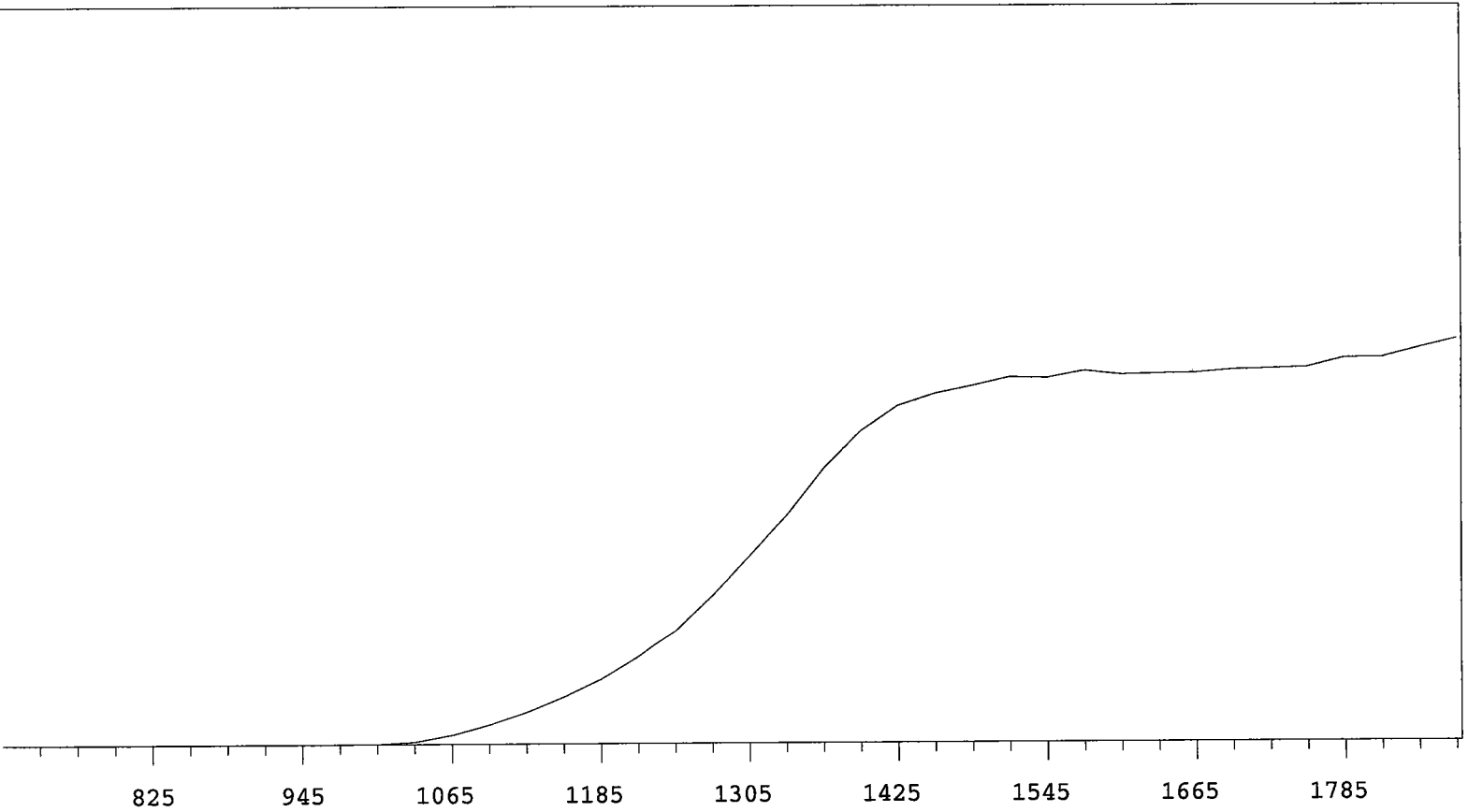
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	7524	+61.93
735	0		1335	9002	+55.36
765	0		1365	10542	+44.70
795	0	>100	1395	12064	+31.21
825	0	>100	1425	12981	+19.20
855	0	>100	1455	13192	+10.41
885	0	>100	1485	13570	+5.93
915	0	>100	1515	13820	+4.08
945	0	>100	1545	13866	+0.75
975	9	>100	1575	13880	+0.21
1005	58	>100	1605	13695	+0.59
1035	228	>100	1635	13950	+0.77
1065	544	>100	1665	13954	+1.92
1095	936	>100	1695	13911	+0.19
1125	1468	>100	1725	14116	+0.02
1155	2110	>100	1755	13908	-0.24
1185	2770	+94.71	1785	13960	-0.81
1215	3670	+85.91	1815	13939	+0.71
1245	4937	+79.46	1845	13931	
1275	6066	+70.79	1875	14071	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8778	+67.49
735	0		1335	10502	+57.68
765	0		1365	12516	+46.36
795	0	>100	1395	14215	+35.88
825	0	>100	1425	15472	+22.01
855	0	>100	1455	16469	+12.99
885	1	+0.00	1485	16342	+6.70
915	0	>100	1515	16874	+3.07
945	0	>100	1545	16918	+2.53
975	0	>100	1575	16950	+0.58
1005	18	>100	1605	16943	+0.95
1035	137	>100	1635	17008	+2.13
1065	430	>100	1665	17130	+2.45
1095	865	>100	1695	17403	+2.43
1125	1444	>100	1725	17377	+2.43
1155	2151	>100	1755	17515	+4.88
1185	2981	>100	1785	17710	+7.54
1215	4168	+92.14	1815	18533	+9.04
1245	5377	+84.73	1845	18905	
1275	6924	+74.92	1875	19415	



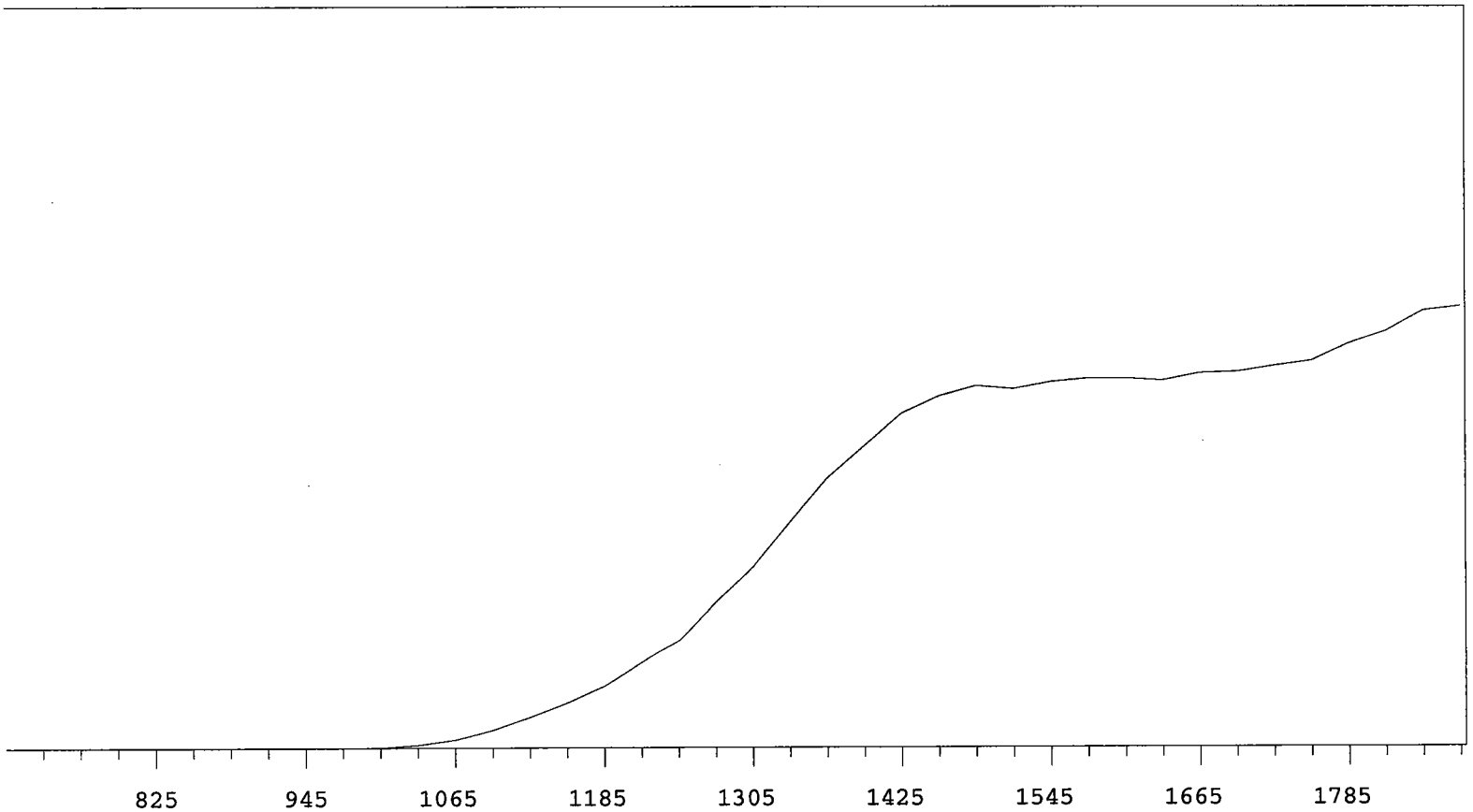
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8797	+65.44
735	0		1335	10726	+54.47
765	0		1365	12570	+41.11
795	0	>100	1395	13917	+26.79
825	0	>100	1425	14687	+15.44
855	1	+0.00	1455	15048	+8.47
885	0	>100	1485	15318	+5.00
915	0	>100	1515	15494	+3.76
945	0	>100	1545	15606	+3.04
975	3	>100	1575	15776	+2.35
1005	40	>100	1605	15889	+1.44
1035	210	>100	1635	15907	-0.16
1065	590	>100	1665	15881	+0.64
1095	983	>100	1695	15741	+1.21
1125	1645	>100	1725	16124	+3.63
1155	2342	>100	1755	16076	+5.41
1185	3045	+96.43	1785	16588	+5.79
1215	4201	+90.42	1815	16830	+7.53
1245	5579	+83.64	1845	17185	
1275	7121	+74.44	1875	17682	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	10118	+69.76
735	0		1335	12269	+59.65
765	0		1365	14810	+47.35
795	0	>100	1395	16773	+33.46
825	0	>100	1425	18104	+20.13
855	0	>100	1455	18720	+11.98
885	1	+0.00	1485	19122	+6.50
915	0	>100	1515	19580	+4.77
945	0	>100	1545	19527	+2.48
975	2	>100	1575	19902	+0.81
1005	21	>100	1605	19690	+0.53
1035	132	>100	1635	19739	+0.23
1065	491	>100	1665	19765	+1.29
1095	1036	>100	1695	19932	+1.40
1125	1698	>100	1725	19976	+2.72
1155	2517	>100	1755	20051	+2.92
1185	3468	>100	1785	20523	+4.26
1215	4721	+91.83	1815	20542	+5.57
1245	6175	+85.13	1845	21035	
1275	8025	+76.82	1875	21528	

Alpha Volts: 705

Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8095	+71.16
735	0		1335	10052	+58.38
765	0		1365	11990	+47.92
795	0	>100	1395	13400	+35.01
825	0	>100	1425	14808	+23.58
855	0	>100	1455	15554	+13.45
885	0	>100	1485	15987	+6.39
915	0	>100	1515	15861	+3.45
945	0	>100	1545	16156	+2.18
975	1	>100	1575	16297	+1.72
1005	14	>100	1605	16297	+1.33
1035	130	>100	1635	16208	+1.62
1065	363	>100	1665	16526	+2.92
1095	785	>100	1695	16581	+3.94
1125	1357	>100	1725	16832	+5.91
1155	1996	>100	1755	17039	+8.68
1185	2735	+99.45	1785	17800	+11.53
1215	3785	+94.20	1815	18351	+11.46
1245	4857	+86.43	1845	19265	
1275	6571	+78.80	1875	19468	

# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

66002-278

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Ra-228
ACTIVITY (dps):	2.367 E4
HALF-LIFE:	5.75 years
CALIBRATION DATE:	April 23, 2003 12:00 EST
TOTAL UNCERTAINTY*:	2.4%

\*95% Confidence Level

Impurities:  $\gamma$ -impurities (other than decay products) <0.1%,  
Ra-226 <0.1%

5.31628 grams 4M HCl solution with 100  $\mu$ g/g Ba carrier.

P O NUMBER 3219 RD, Item 1

SOURCE PREPARED BY:

M. Taskaeva  
M. Taskaeva, Radiochemist

Q A APPROVED:

J.M. Muth 4-23-03



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0553-A	Isotope:	Radium-228 SPIKE
Prepared By:	Lonnie Morris	Prepared By:	Lonnie Morris
Carrier Conc:	0.5M HCl	Prep Date:	04/25/2003
Reference Date:	04/23/2003	Verification Date:	04/27/2005
Ampoule Mass (g):	5.0235 g	Expiration Date:	04/27/2006
Uncertainty:	+/-	Primary Code:	0553-B
LogBook No:	RC-S-035-068	Dilution(mL):	1000 mL
		Mass of Parent(g):	30.535 g
		Density(g/mL):	
		Balance ID:	

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

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

### Secondary Standards

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

GEL Laboratories LLC  
Version 1.0 9/18/2000



# CERTIFICATE OF CALIBRATION

## Standard Radionuclide Source

64673-278

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Ra-228
ACTIVITY (dps):	1.939 E4
HALF-LIFE:	5.75 years
CALIBRATION DATE:	October 1, 2002 12:00 EST
TOTAL UNCERTAINTY*:	3.6%
SYSTEMATIC:	3.4%
RANDOM:	1.1%

\*99% Confidence Level

Impurities:  $\gamma$ -impurities <0.1%

5.02617 grams 0.1M HCl solution with 110  $\mu\text{g/g}$  Ba carrier.

P O NUMBER 3208RD, Item 2

SOURCE PREPARED BY:

M. Taskaeva  
M. Taskaeva, Radiochemist

Q A APPROVED:

M. M. T. 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  
26

PAGE: 1

16 SEP 2008 16:24

**ID: TOTAL ACTIVITY**

USER:11 COMMENT:GOLD

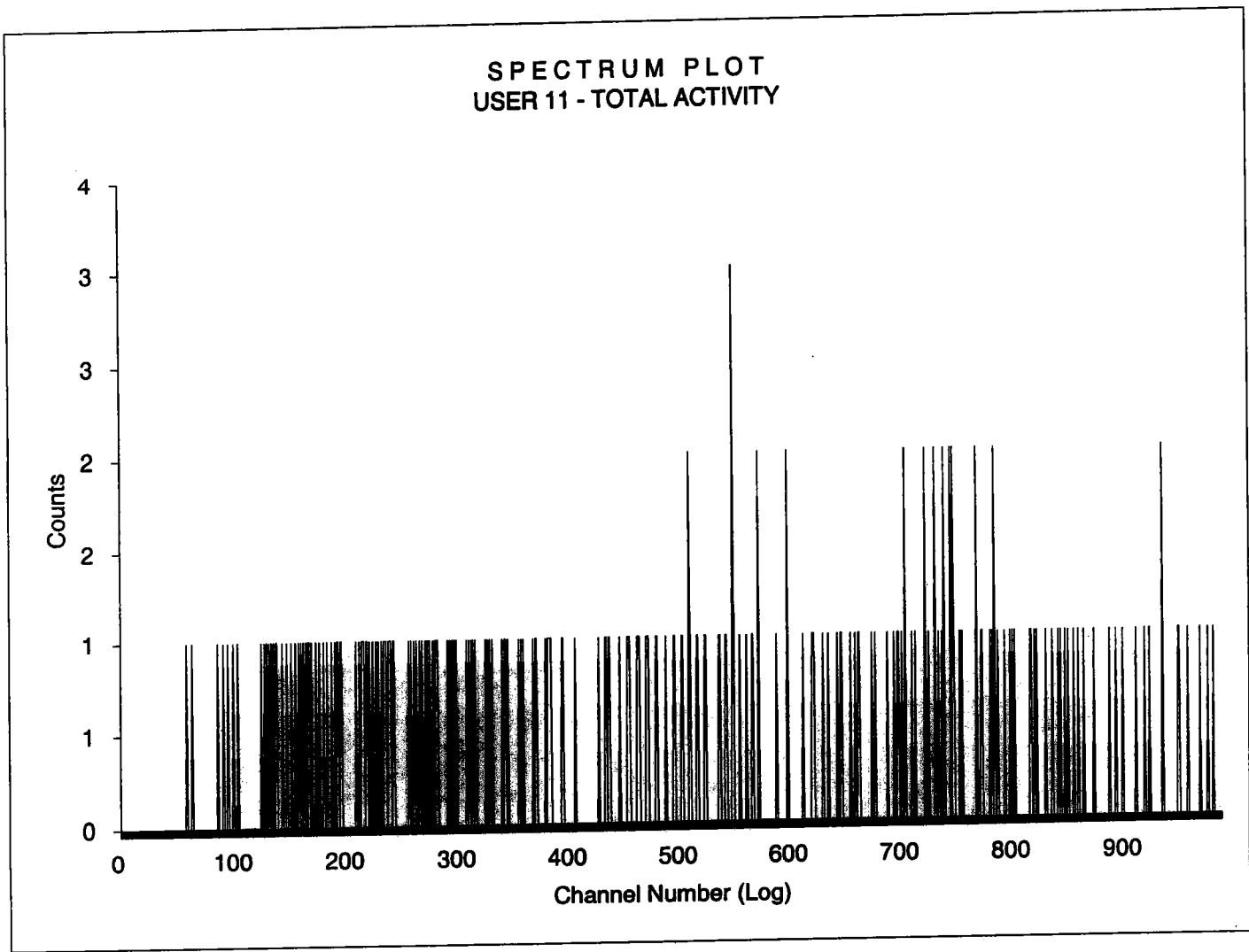
PRESET TIME : 5.00  
 DATA CALC : CPM H# :YES SAMPLE REPEATS: 1 PRINTER : STD  
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 :EDIT  
 TWO PHASE : NO AQC : NO CYCLE REPEATS : 1 DISK : OFF  
 SCINTILLATOR: LIQUID LUMEX:YES LOW SAMPLE REJ: 0  
 LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

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

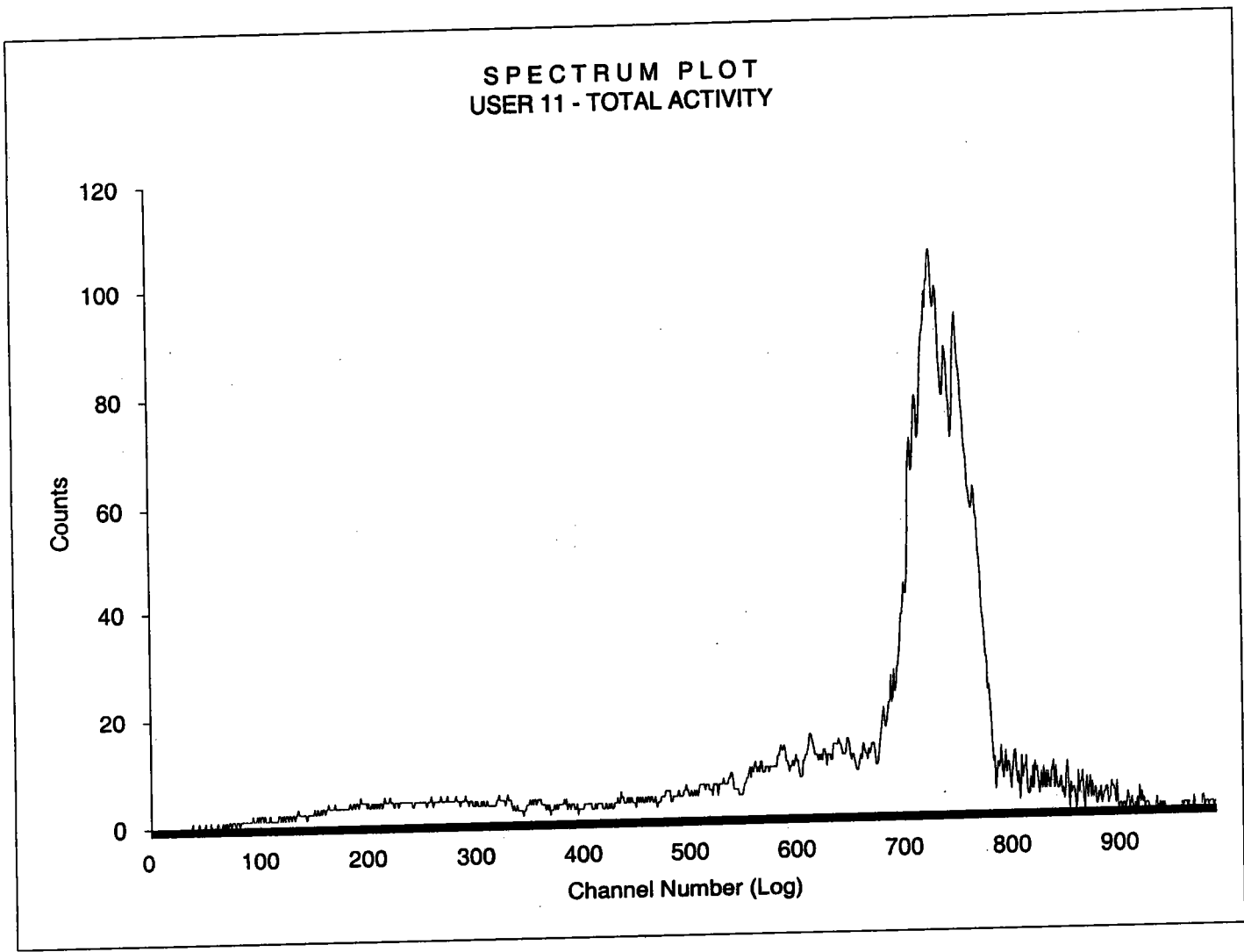
8/16/08  
28

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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

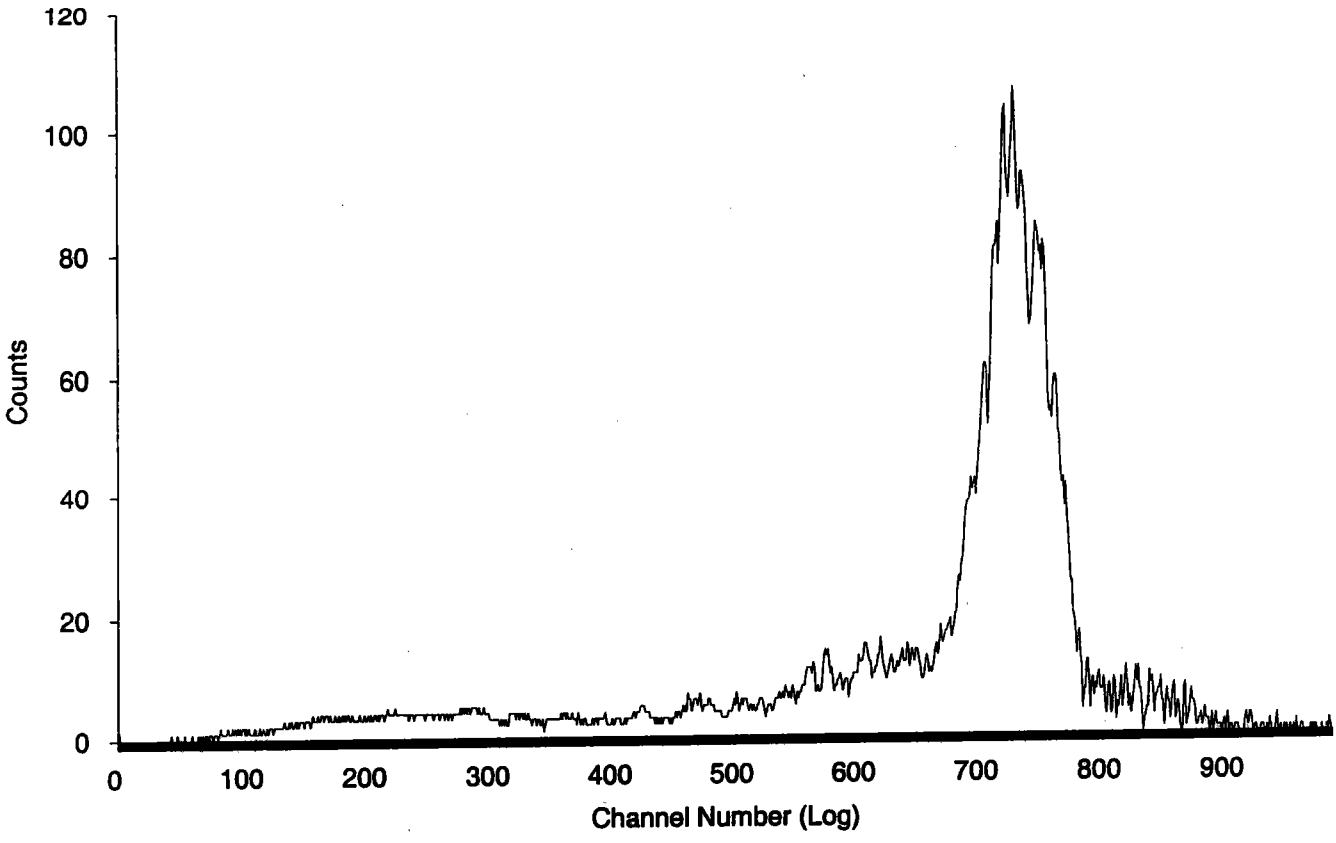
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User Number: 11  
User Id: TOTAL ACTIVITY  
User Comment: GOLD  
Isotope Name: 14C  
Scintillator: LIQUID  
Sample, Rack-Pos, Time: 6 11-6 5.00  
H#, Total Counts: 110.7 7666  
Start, End, X-Axis: 0 990 Channel Number



8/16/08  
SLS

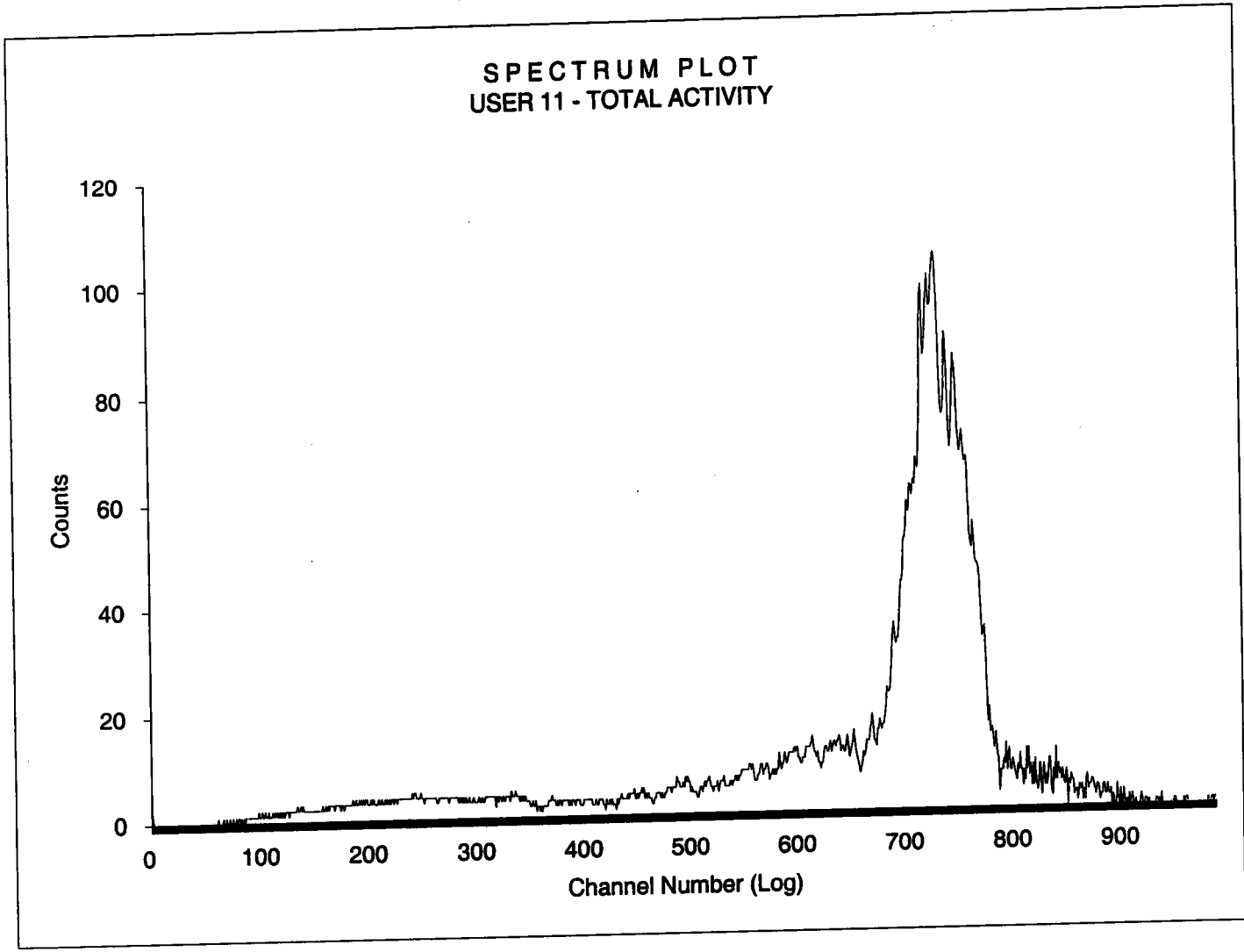
Sample Count Start Time: 16 Sep 2008 16:59:07  
Data Capture Date: 9/16/2008 17:04:12  
User Filename: S11091611-7A.WK1  
U11091611-1A.WK1  
Spectrum Type: Log Counts  
User Number: 11  
User Id: TOTAL ACTIVITY  
User Comment: GOLD  
Isotope Name: 14C  
Scintillator: LIQUID  
Sample, Rack-Pos, Time: 7 11-7 5.00  
H#, Total Counts: 110.8 7726  
Start, End, X-Axis: 0 990 Channel Number

SPECTRUM PLOT  
USER 11 - TOTAL ACTIVITY



9/16/08  
11-8

Sample Count Start Time: 16 Sep 2008 17:05:13  
Data Capture Date: 9/16/2008 17:10:18  
User Filename: S11091611-8A.WK1  
U11091611-1A.WK1  
Spectrum Type: Log Counts  
User Number: 11  
User Id: TOTAL ACTIVITY  
User Comment: GOLD  
Isotope Name: 14C  
Scintillator: LIQUID  
Sample, Rack-Pos, Time: 8 11-8 5.00  
H#, Total Counts: 110.7 7557  
Start, End, X-Axis: 0 990 Channel Number





# Radium-228 Que Sheet

SR 6/30/09

Batch #: 881540  
 Spike Isotope: Radium-228  
 LCS Isotope: Radium-228  
 Tracer Isotope: Barium-133  
 Prep Date: 6/30/09  
 Analyst: DXM2  
 Spike Code: NA  
 LCS Code: 0503-B  
 Tracer Code: 0112-2  
 Initials: JRS  
 First Client Due Date: NA  
 Expiration Date: 9/13/09  
 Expiration Date: 2/17/10  
 Pipet ID: 1734212  
 Internal Due Date: 07/03/2009  
 Ac-228 Ingrow: 2025 6/30/09  
 Ac-228 Separation Date/Time: 7-2-09 0540  
 Witness: JRS 6/30/09  
 Balance ID: NA

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Pos. #	Vol (mL)	Det #	Ba Yield (%)	Gamma Det. #
1201872112-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	1	20		100.83	↑
1201872113-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	2	20		108.20	
1201872114-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	3	20		114.22	
1201872115-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	4	20		120.58	WZAL
1201872116-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	5	20		105.84	
1201872117-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	6	20		102.70	
1201872118-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	7	20		112.82	
1201872119-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	8	20		111.91	↓

JRS 7/2/09

SLC 7/2/09

Data Reviewed By:

Comments:

ASSAY 30-Jun-09 19:32:06

Protocol id 8 228\_REC  
Time limit 180  
Count limit 50000  
Isotope Ba-133  
Protocol date 9-Apr-07 10:03:07  
Run id. 54

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT	TIME
1	97	1	180	779	229.3	4.13			19:32:13
2	97	2	180	785	231.2	4.11	100.83		19:35:24
3	97	3	180	835	248.1	3.95	108.20		19:38:35
4	97	4	180	877	261.9	3.83	114.22		19:41:47
5	97	5	180	921	276.5	3.71	120.58		19:44:58
6	72	6	180	819	242.7	4	105.84		19:48:17
7	72	7	180	798	235.5	4.07	102.70		19:51:28
8	72	8	180	867	258.7	3.85	112.82		19:54:40
9	72	9	180	861	256.6	3.87	111.91		19:57:51

END OF ASSAY

*[Handwritten signature]*  
7/2/09

# ALPHA SPECTROSCOPY

## 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 : 4-SEP-2009 12:35:32  
 Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.226
NP-237	4341	2/28/10	4768.800	4768.853
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2535.497  
 Energy Calibration Slope : 5.123575  
 Energy Calibration Quadratic : 3.5177087E-04  
 Energy Calibration Range : 8151.000

Instrument : CHAMBER 002  
 Detector : 78266  
 Calibration Date/Time : 4-SEP-2009 12:35:41  
 Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3181.913
NP-237	4341	2/28/10	4768.800	4768.018
CM-244	4320A	2/28/10	5795.020	5794.179

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2471.037  
 Energy Calibration Slope : 5.125078  
 Energy Calibration Quadratic : 3.3477767E-04  
 Energy Calibration Range : 8070.000

Instrument : CHAMBER 003  
 Detector : 67617  
 Calibration Date/Time : 4-SEP-2009 12:35:49  
 Calibration Source Id : AESS-003

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.431
NP-237	4341	2/28/10	4768.800	4767.487
CM-244	4320A	2/28/10	5795.020	5793.671

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2603.599  
 Energy Calibration Slope : 5.520661  
 Energy Calibration Quadratic : 3.8628373E-04  
 Energy Calibration Range : 8662.000

Instrument : CHAMBER 004  
 Detector : 64279  
 Calibration Date/Time : 4-SEP-2009 12:35:56  
 Calibration Source Id : AESS-004  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.248  
 NP-237 4341 2/28/10 4768.800 4768.163  
 CM-244 4320A 2/28/10 5795.020 5794.666  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2539.883  
 Energy Calibration Slope : 5.106114  
 Energy Calibration Quadratic : 3.6220285E-04  
 Energy Calibration Range : 8148.000

Instrument : CHAMBER 005  
 Detector : 67612  
 Calibration Date/Time : 4-SEP-2009 12:36:04  
 Calibration Source Id : AESS-005  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.596  
 NP-237 4341 2/28/10 4768.800 4768.626  
 CM-244 4320A 2/28/10 5795.020 5794.885  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2389.695  
 Energy Calibration Slope : 5.003819  
 Energy Calibration Quadratic : 3.1809139E-04  
 Energy Calibration Range : 7847.000

Instrument : CHAMBER 006  
 Detector : 67613  
 Calibration Date/Time : 4-SEP-2009 12:36:12  
 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 4768.970  
 CM-244 4320A 2/28/10 5795.020 5795.230  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2372.089  
 Energy Calibration Slope : 4.968963  
 Energy Calibration Quadratic : 2.9746475E-04  
 Energy Calibration Range : 7772.000

Instrument : CHAMBER 007  
 Detector : 67607  
 Calibration Date/Time : 4-SEP-2009 12:36:20  
 Calibration Source Id : AESS-007

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3194.223
NP-237	4341	2/28/10	4768.800	4774.131
CM-244	4320A	2/28/10	5795.020	5795.286

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2411.533  
 Energy Calibration Slope : 5.136289  
 Energy Calibration Quadratic : 3.6015504E-04  
 Energy Calibration Range : 8049.000

Instrument : CHAMBER 008  
 Detector : 78788  
 Calibration Date/Time : 4-SEP-2009 12:36:40  
 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	4768.947
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2374.892  
 Energy Calibration Slope : 4.958869  
 Energy Calibration Quadratic : 3.2790817E-04  
 Energy Calibration Range : 7797.000

Instrument : CHAMBER 009  
 Detector : 72528  
 Calibration Date/Time : 4-SEP-2009 12:36:51  
 Calibration Source Id : AESS-009

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.331
NP-237	4341	2/28/10	4768.800	4768.908
CM-244	4320A	2/28/10	5795.020	5795.229

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2369.859  
 Energy Calibration Slope : 4.969983  
 Energy Calibration Quadratic : 3.0930861E-04  
 Energy Calibration Range : 7783.000

Instrument : CHAMBER 010  
 Detector : 72529  
 Calibration Date/Time : 4-SEP-2009 12:37:00  
 Calibration Source Id : AESS-010

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.738
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 : 2375.295  
 Energy Calibration Slope : 4.946028  
 Energy Calibration Quadratic : 2.9286626E-04  
 Energy Calibration Range : 7747.000

Instrument : CHAMBER 011  
 Detector : 72531  
 Calibration Date/Time : 4-SEP-2009 12:37:27  
 Calibration Source Id : AESS-011

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.151

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2351.281  
 Energy Calibration Slope : 4.995483  
 Energy Calibration Quadratic : 3.1063837E-04  
 Energy Calibration Range : 7792.000

Instrument : CHAMBER 012  
 Detector : 67594  
 Calibration Date/Time : 4-SEP-2009 12:37:37  
 Calibration Source Id : AESS-012

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.665
CM-244	4320A	2/28/10	5795.020	5794.701

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2380.536  
 Energy Calibration Slope : 4.954679  
 Energy Calibration Quadratic : 2.8732172E-04  
 Energy Calibration Range : 7755.000

Instrument : CHAMBER 013  
 Detector : 78790  
 Calibration Date/Time : 4-SEP-2009 12:37:47  
 Calibration Source Id : AESS-013

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.702
NP-237	4341	2/28/10	4768.800	4769.527
CM-244	4320A	2/28/10	5795.020	5795.398

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.963  
 Energy Calibration Slope : 4.909760  
 Energy Calibration Quadratic : 2.9884593E-04  
 Energy Calibration Range : 7700.000

Instrument : CHAMBER 014  
 Detector : 67616  
 Calibration Date/Time : 4-SEP-2009 12:37:57  
 Calibration Source Id : AESS-014

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.690
NP-237	4341	2/28/10	4768.800	4768.619
CM-244	4320A	2/28/10	5795.020	5794.719

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2351.225  
 Energy Calibration Slope : 4.953602  
 Energy Calibration Quadratic : 3.2283107E-04  
 Energy Calibration Range : 7762.000

Instrument : CHAMBER 015  
 Detector : 61581  
 Calibration Date/Time : 4-SEP-2009 12:38:32  
 Calibration Source Id : AESS-015

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.566
NP-237	4341	2/28/10	4768.800	4769.887
CM-244	4320A	2/28/10	5795.020	5795.771

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2340.391  
 Energy Calibration Slope : 4.902360  
 Energy Calibration Quadratic : 2.9459049E-04  
 Energy Calibration Range : 7669.000



Instrument : CHAMBER 016  
 Detector : 78774  
 Calibration Date/Time : 4-SEP-2009 12:39:14  
 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	4768.862
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2352.881  
 Energy Calibration Slope : 4.887459  
 Energy Calibration Quadratic : 3.1538753E-04  
 Energy Calibration Range : 7688.000

Instrument : CHAMBER 017  
 Detector : 78791  
 Calibration Date/Time : 4-SEP-2009 12:39:56  
 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	4768.864
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.881  
 Energy Calibration Slope : 4.992493  
 Energy Calibration Quadratic : 2.7980251E-04  
 Energy Calibration Range : 7767.000

Instrument : CHAMBER 018  
 Detector : 78782  
 Calibration Date/Time : 4-SEP-2009 12:40:11  
 Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5794.892

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2354.269  
 Energy Calibration Slope : 4.957198  
 Energy Calibration Quadratic : 3.2317592E-04  
 Energy Calibration Range : 7769.000

Instrument : CHAMBER 019  
 Detector : 78786  
 Calibration Date/Time : 4-SEP-2009 12:40:24  
 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	4768.321
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2346.765  
 Energy Calibration Slope : 5.052913  
 Energy Calibration Quadratic : 2.4091676E-04  
 Energy Calibration Range : 7774.000

Instrument : CHAMBER 020  
 Detector : 78787  
 Calibration Date/Time : 4-SEP-2009 12:40:33  
 Calibration Source Id : AESS-020

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.527
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2338.013  
 Energy Calibration Slope : 4.982131  
 Energy Calibration Quadratic : 2.9908412E-04  
 Energy Calibration Range : 7753.000

Instrument : CHAMBER 021  
 Detector : 67047  
 Calibration Date/Time : 4-SEP-2009 12:40:41  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2273.506  
 Energy Calibration Slope : 4.978734  
 Energy Calibration Quadratic : 2.7200553E-04  
 Energy Calibration Range : 7657.000

Instrument : CHAMBER 022  
 Detector : 72530  
 Calibration Date/Time : 4-SEP-2009 12:40:50  
 Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.361
NP-237	4341	2/28/10	4768.800	4769.133
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2375.240  
 Energy Calibration Slope : 4.980961  
 Energy Calibration Quadratic : 2.7447013E-04  
 Energy Calibration Range : 7764.000

Instrument : CHAMBER 023  
 Detector : 78264  
 Calibration Date/Time : 4-SEP-2009 12:40:59  
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.015
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5794.708

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2381.774  
 Energy Calibration Slope : 5.002218  
 Energy Calibration Quadratic : 2.9209474E-04  
 Energy Calibration Range : 7810.000

Instrument : CHAMBER 024  
 Detector : 76542  
 Calibration Date/Time : 4-SEP-2009 12:41:10  
 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 : 2348.764  
 Energy Calibration Slope : 4.960187  
 Energy Calibration Quadratic : 2.8149344E-04  
 Energy Calibration Range : 7723.000

Instrument : CHAMBER 025  
 Detector : 45-149AA5  
 Calibration Date/Time : 5-SEP-2009 13:36:12  
 Calibration Source Id : AESS-025

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.301
NP-237	4341	2/28/10	4768.800	4769.169
CM-244	4320A	2/28/10	5795.020	5795.134

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2313.345  
 Energy Calibration Slope : 4.853284  
 Energy Calibration Quadratic : 3.0770546E-04  
 Energy Calibration Range : 7606.000

Instrument : CHAMBER 026  
 Detector : 78204  
 Calibration Date/Time : 5-SEP-2009 13:36:22  
 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	4768.929
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.057  
 Energy Calibration Slope : 4.920322  
 Energy Calibration Quadratic : 3.5937896E-04  
 Energy Calibration Range : 7773.000

Instrument : CHAMBER 027  
 Detector : 42484  
 Calibration Date/Time : 5-SEP-2009 13:36:31  
 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	4768.819
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.651  
 Energy Calibration Slope : 4.963936  
 Energy Calibration Quadratic : 3.2873321E-04  
 Energy Calibration Range : 7791.000

Instrument : CHAMBER 028  
 Detector : 78792  
 Calibration Date/Time : 5-SEP-2009 13:36:41  
 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	5795.019

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2311.599  
 Energy Calibration Slope : 4.936965  
 Energy Calibration Quadratic : 3.4681335E-04  
 Energy Calibration Range : 7731.000

Instrument : CHAMBER 029  
 Detector : 33454  
 Calibration Date/Time : 5-SEP-2009 13:36:49  
 Calibration Source Id : AESS-029

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.046
NP-237	4341	2/28/10	4768.800	4768.273
CM-244	4320A	2/28/10	5795.020	5794.838

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2346.906  
 Energy Calibration Slope : 4.889407  
 Energy Calibration Quadratic : 2.9813289E-04  
 Energy Calibration Range : 7666.000

Instrument : CHAMBER 030  
 Detector : 33447  
 Calibration Date/Time : 5-SEP-2009 13:36:58  
 Calibration Source Id : AESS-030

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.621  
 Energy Calibration Slope : 4.959564  
 Energy Calibration Quadratic : 3.0966211E-04  
 Energy Calibration Range : 7780.000

Instrument : CHAMBER 031  
 Detector : 67042  
 Calibration Date/Time : 5-SEP-2009 13:37:09  
 Calibration Source Id : AESS-031

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.344
NP-237	4341	2/28/10	4768.800	4769.750
CM-244	4320A	2/28/10	5795.020	5795.848

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.347  
 Energy Calibration Slope : 4.922678  
 Energy Calibration Quadratic : 3.3807335E-04  
 Energy Calibration Range : 7754.000

Instrument : CHAMBER 032  
 Detector : 67041  
 Calibration Date/Time : 5-SEP-2009 13:37:21  
 Calibration Source Id : AESS-032

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3082.708
NP-237	4341	2/28/10	4768.800	4596.952
CM-244	4320A	2/28/10	5795.020	5590.557

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2480.957  
 Energy Calibration Slope : 5.431309  
 Energy Calibration Quadratic :  
 Energy Calibration Range : 8043.000

Instrument : CHAMBER 033  
 Detector : 78785  
 Calibration Date/Time : 5-SEP-2009 13:37:30  
 Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.293
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 : 2371.628  
 Energy Calibration Slope : 4.957000  
 Energy Calibration Quadratic : 3.2105893E-04  
 Energy Calibration Range : 7784.000

Instrument : CHAMBER 034  
 Detector : 61586  
 Calibration Date/Time : 5-SEP-2009 13:37:40  
 Calibration Source Id : AESS-034

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3048.128
NP-237	4341	2/28/10	4768.800	4505.317
CM-244	4320A	2/28/10	5795.020	5654.358

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2505.085  
 Energy Calibration Slope : 5.306273  
 Energy Calibration Quadratic :  
 Energy Calibration Range : 7939.000

Instrument : CHAMBER 035  
 Detector : 78202  
 Calibration Date/Time : 5-SEP-2009 13:37:51  
 Calibration Source Id : AESS-035

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.195
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 : 2331.502  
 Energy Calibration Slope : 4.956956  
 Energy Calibration Quadratic : 3.3284936E-04  
 Energy Calibration Range : 7756.000

Instrument : CHAMBER 036  
 Detector : 78203  
 Calibration Date/Time : 5-SEP-2009 13:38:00  
 Calibration Source Id : AESS-036

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.261
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.112

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2349.949  
 Energy Calibration Slope : 4.931112  
 Energy Calibration Quadratic : 3.3396695E-04  
 Energy Calibration Range : 7750.000

Instrument : CHAMBER 037  
 Detector : 45-149BB5  
 Calibration Date/Time : 5-SEP-2009 13:38:11  
 Calibration Source Id : AESS-037

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4769.328
CM-244	4320A	2/28/10	5795.020	5795.274

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2377.698  
 Energy Calibration Slope : 4.936130  
 Energy Calibration Quadratic : 2.6397177E-04  
 Energy Calibration Range : 7709.000

Instrument : CHAMBER 038  
 Detector : 72532  
 Calibration Date/Time : 5-SEP-2009 13:38:20  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.173

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2373.418  
 Energy Calibration Slope : 4.945736  
 Energy Calibration Quadratic : 3.1779311E-04  
 Energy Calibration Range : 7771.000

Instrument : CHAMBER 039  
 Detector : 45-149BB2  
 Calibration Date/Time : 5-SEP-2009 13:38:28  
 Calibration Source Id : AESS-039

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.413
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.597  
 Energy Calibration Slope : 4.901721  
 Energy Calibration Quadratic : 3.2673960E-04  
 Energy Calibration Range : 7746.000



Instrument : CHAMBER 040  
 Detector : 78773  
 Calibration Date/Time : 5-SEP-2009 13:38:36  
 Calibration Source Id : AESS-040  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.203  
 NP-237 4341 2/28/10 4768.800 4768.877  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2349.601  
 Energy Calibration Slope : 4.890684  
 Energy Calibration Quadratic : 3.3607692E-04  
 Energy Calibration Range : 7710.000

Instrument : CHAMBER 041  
 Detector : 78205  
 Calibration Date/Time : 5-SEP-2009 13:38:44  
 Calibration Source Id : AESS-041  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.316  
 NP-237 4341 2/28/10 4768.800 4768.914  
 CM-244 4320A 2/28/10 5795.020 5795.124  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2359.603  
 Energy Calibration Slope : 4.927306  
 Energy Calibration Quadratic : 3.6796945E-04  
 Energy Calibration Range : 7791.000

Instrument : CHAMBER 042  
 Detector : 78793  
 Calibration Date/Time : 5-SEP-2009 13:38:52  
 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 4768.945  
 CM-244 4320A 2/28/10 5795.020 5795.068  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2375.562  
 Energy Calibration Slope : 4.905127  
 Energy Calibration Quadratic : 3.3096116E-04  
 Energy Calibration Range : 7745.000

Instrument : CHAMBER 043  
 Detector : 76543  
 Calibration Date/Time : 5-SEP-2009 13:38:59  
 Calibration Source Id : AESS-043

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.008
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.285

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2370.828  
 Energy Calibration Slope : 4.912446  
 Energy Calibration Quadratic : 3.4794814E-04  
 Energy Calibration Range : 7766.000

Instrument : CHAMBER 044  
 Detector : 79459  
 Calibration Date/Time : 5-SEP-2009 13:39:07  
 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	4768.899
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2357.678  
 Energy Calibration Slope : 4.935909  
 Energy Calibration Quadratic : 3.3428424E-04  
 Energy Calibration Range : 7763.000

Instrument : CHAMBER 045  
 Detector : 78783  
 Calibration Date/Time : 5-SEP-2009 13:39:15  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.021  
 Energy Calibration Slope : 4.936533  
 Energy Calibration Quadratic : 3.2874785E-04  
 Energy Calibration Range : 7762.000

Instrument : CHAMBER 046  
 Detector : 76544  
 Calibration Date/Time : 5-SEP-2009 13:39:23  
 Calibration Source Id : AESS-046

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.265
NP-237	4341	2/28/10	4768.800	4768.973
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.969  
 Energy Calibration Slope : 4.880176  
 Energy Calibration Quadratic : 3.5064379E-04  
 Energy Calibration Range : 7727.000

Instrument : CHAMBER 047  
 Detector : 46-089B1  
 Calibration Date/Time : 5-SEP-2009 13:39:31  
 Calibration Source Id : AESS-047

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.348
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 : 2352.118  
 Energy Calibration Slope : 4.961685  
 Energy Calibration Quadratic : 3.1629670E-04  
 Energy Calibration Range : 7765.000

Instrument : CHAMBER 048  
 Detector : 42483  
 Calibration Date/Time : 5-SEP-2009 13:39:40  
 Calibration Source Id : AESS-048

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.138
NP-237	4341	2/28/10	4768.800	4768.944
CM-244	4320A	2/28/10	5795.020	5795.069

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2374.542  
 Energy Calibration Slope : 4.945658  
 Energy Calibration Quadratic : 2.9861915E-04  
 Energy Calibration Range : 7752.000

## Subsection 2: Background Calibration

Instrument : CHAMBER 001  
 Detector : 78788  
 Background Analysis Date/Time : 30-AUG-2009 16:15:10  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.095	3301.491	2.000000	0.4800001	70.71068	95.00000
NP-237	4436.328	4901.460	12.00000	2.880001	28.86751	95.00000
CM-244	5531.570	5886.270	6.000000	1.440000	40.82483	95.00000

Instrument : CHAMBER 002  
 Detector : 78266  
 Background Analysis Date/Time : 30-AUG-2009 16:15:10  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.085	3299.620	1.000000	0.2400001	100.0000	95.00000
NP-237	4434.644	4904.846	7.000000	1.680000	37.79645	95.00000
CM-244	5534.154	5882.659	0.000000E+00	0.000000E+00	0.000000E+00	95.00000

Instrument : CHAMBER 003  
 Detector : 67617  
 Background Analysis Date/Time : 30-AUG-2009 16:15:10  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.938	3299.717	3.000000	0.7200001	57.73503	95.00000
NP-237	4432.844	4902.827	10.00000	2.400001	31.62278	95.00000
CM-244	5531.440	5887.803	4.000000	0.9600002	50.00000	95.00000

Instrument : CHAMBER 004  
 Detector : 64279  
 Background Analysis Date/Time : 30-AUG-2009 16:15:10  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.026	3298.308	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4435.760	4905.548	7.000000	1.680000	37.79645	95.00000
CM-244	5534.947	5883.809	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 005  
 Detector : 67612  
 Background Analysis Date/Time : 30-AUG-2009 16:15:10  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.654	3300.689	4.000000	0.9600002	50.00000	95.00000
NP-237	4436.859	4901.997	5.000000	1.200000	44.72136	95.00000
CM-244	5533.435	5885.045	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 006  
 Detector : 67613  
 Background Analysis Date/Time : 30-AUG-2009 16:15:10  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.771	3301.528	3.000000	0.7200001	57.73503	95.00000
NP-237	4433.310	4904.612	10.00000	2.400001	31.62278	95.00000
CM-244	5535.175	5883.158	9.000000	2.160001	33.33334	95.00000

Instrument : CHAMBER 007  
 Detector : 67607  
 Background Analysis Date/Time : 30-AUG-2009 16:15:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.315	3300.370	2.000000	0.4799997	70.71068	95.00000
NP-237	4436.975	4905.147	7.000000	1.679999	37.79645	95.00000
CM-244	5533.959	5885.477	23.00000	5.519996	20.85144	95.00000

Instrument : CHAMBER 008  
 Detector : 78788  
 Background Analysis Date/Time : 30-AUG-2009 16:15:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.794	3298.426	2.000000	0.4799997	70.71068	95.00000
NP-237	4437.020	4904.595	6.000000	1.439999	40.82483	95.00000
CM-244	5532.536	5882.336	4.000000	0.9599993	50.00000	95.00000

Instrument : CHAMBER 009  
 Detector : 72528  
 Background Analysis Date/Time : 30-AUG-2009 16:15:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.892	3299.892	4.000000	0.9599993	50.00000	95.00000
NP-237	4433.436	4905.789	10.00000	2.399998	31.62278	95.00000
CM-244	5532.687	5887.081	9.000000	2.159998	33.33334	95.00000

Instrument : CHAMBER 010  
 Detector : 72529  
 Background Analysis Date/Time : 30-AUG-2009 16:15:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.087	3300.334	3.000000	0.7199995	57.73503	95.00000
NP-237	4436.842	4905.812	6.000000	1.439999	40.82483	95.00000
CM-244	5533.178	5884.706	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 011  
 Detector : 72531  
 Background Analysis Date/Time : 30-AUG-2009 16:15:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.718	3301.411	3.000000	0.7199995	57.73503	95.00000
NP-237	4435.900	4905.463	15.00000	3.599998	25.81989	95.00000
CM-244	5535.617	5886.431	10.00000	2.399998	31.62278	95.00000

Instrument : CHAMBER 012  
 Detector : 67594  
 Background Analysis Date/Time : 30-AUG-2009 16:15:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.283	3301.924	2.000000	0.4799997	70.71068	95.00000
NP-237	4434.309	4903.502	10.00000	2.399998	31.62278	95.00000
CM-244	5531.028	5882.575	10.00000	2.399998	31.62278	95.00000

Instrument : CHAMBER 013  
 Detector : 78790  
 Background Analysis Date/Time : 30-AUG-2009 16:15:12  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.309	3297.583	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4432.512	4904.184	11.00000	2.640001	30.15113	95.00000
CM-244	5533.734	5883.657	4.000000	0.9600002	50.00000	95.00000

Instrument : CHAMBER 014  
 Detector : 67616  
 Background Analysis Date/Time : 30-AUG-2009 16:15:12  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.575	3298.988	3.000000	0.7200001	57.73503	95.00000
NP-237	4436.470	4903.458	8.000000	1.920000	35.35534	95.00000
CM-244	5530.496	5885.133	26.00000	6.240001	19.61161	95.00000

Instrument : CHAMBER 015  
 Detector : 61581  
 Background Analysis Date/Time : 30-AUG-2009 16:15:12  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.656	3297.520	3.000000	0.7200001	57.73503	95.00000
NP-237	4435.901	4901.612	9.000000	2.160001	33.33334	95.00000
CM-244	5535.255	5884.514	26.00000	6.240001	19.61161	95.00000

Instrument : CHAMBER 016  
 Detector : 78774  
 Background Analysis Date/Time : 30-AUG-2009 16:15:12  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.611	3297.891	1.000000	0.2400001	100.0000	95.00000
NP-237	4435.494	4901.479	2.000000	0.4800001	70.71068	95.00000
CM-244	5530.741	5886.030	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 017  
 Detector : 78791  
 Background Analysis Date/Time : 30-AUG-2009 16:15:12  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.315	3299.165	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4433.955	4905.994	7.000000	1.680000	37.79645	95.00000
CM-244	5531.756	5885.157	1.000000	0.2400001	100.0000	95.00000

Instrument : CHAMBER 018  
 Detector : 78782  
 Background Analysis Date/Time : 30-AUG-2009 16:15:12  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.045	3297.645	5.000000	1.200000	44.72136	95.00000
NP-237	4435.824	4903.103	6.000000	1.440000	40.82483	95.00000
CM-244	5530.534	5885.395	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 019  
 Detector : 78786  
 Background Analysis Date/Time : 30-AUG-2009 16:15:13  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.371	3300.084	2.000000	0.4800001	70.71068	95.00000
NP-237	4432.711	4901.697	6.000000	1.440000	40.82483	95.00000
CM-244	5534.730	5883.386	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 020  
 Detector : 78787  
 Background Analysis Date/Time : 30-AUG-2009 16:15:13  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.745	3300.511	3.000000	0.7200001	57.73503	95.00000
NP-237	4436.191	4903.850	11.00000	2.640001	30.15113	95.00000
CM-244	5531.198	5885.719	4.000000	0.9600002	50.00000	95.00000



Instrument : CHAMBER 021  
 Detector : 67047  
 Background Analysis Date/Time : 30-AUG-2009 16:15:13  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.027	3300.488	2.000000	0.4800001	70.71068	95.00000
NP-237	4433.390	4904.438	6.000000	1.440000	40.82483	95.00000
CM-244	5534.035	5886.544	16.00000	3.840001	25.00000	95.00000

Instrument : CHAMBER 022  
 Detector : 72530  
 Background Analysis Date/Time : 30-AUG-2009 16:15:13  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.050	3301.029	39.00000	9.360003	16.01282	95.00000
NP-237	4437.549	4902.815	18.00000	4.320001	23.57022	95.00000
CM-244	5531.706	5883.854	12.00000	2.880001	28.86751	95.00000

Instrument : CHAMBER 023  
 Detector : 78264  
 Background Analysis Date/Time : 30-AUG-2009 16:15:13  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.319	3301.853	1.000000	0.2400001	100.0000	95.00000
NP-237	4434.632	4902.993	6.000000	1.440000	40.82483	95.00000
CM-244	5531.100	5885.960	8.000000	1.920000	35.35534	95.00000

Instrument : CHAMBER 024  
 Detector : 76542  
 Background Analysis Date/Time : 30-AUG-2009 16:15:13  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.280	3301.361	1.000000	0.2400001	100.0000	95.00000
NP-237	4434.951	4904.473	14.00000	3.360001	26.72612	95.00000
CM-244	5532.286	5883.922	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 025  
 Detector : 45-149AA5  
 Background Analysis Date/Time : 30-AUG-2009 16:15:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.958	3301.287	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4436.686	4904.740	7.000000	1.680000	37.79645	95.00000
CM-244	5534.991	5882.562	76.00000	18.24000	11.47079	95.00000

Instrument : CHAMBER 026  
 Detector : 78204  
 Background Analysis Date/Time : 30-AUG-2009 16:15:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.735	3300.836	2.000000	0.4800001	70.71068	95.00000
NP-237	4435.801	4902.784	4.000000	0.9600002	50.00000	95.00000
CM-244	5530.708	5886.284	60.00000	14.40000	12.90994	95.00000

Instrument : CHAMBER 027  
 Detector : 42484  
 Background Analysis Date/Time : 30-AUG-2009 16:15:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.280	3298.316	9.000000	2.160000	33.33334	95.00000
NP-237	4433.196	4906.637	9.000000	2.160000	33.33334	95.00000
CM-244	5535.439	5885.723	61.00000	14.64000	12.80369	95.00000

Instrument : CHAMBER 028  
 Detector : 78792  
 Background Analysis Date/Time : 30-AUG-2009 16:15:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.441	3297.640	2.000000	0.4800001	70.71068	95.00000
NP-237	4435.847	4903.788	13.00000	3.120001	27.73501	95.00000
CM-244	5532.676	5883.223	65.00000	15.60000	12.40347	95.00000

Instrument : CHAMBER 029  
 Detector : 33454  
 Background Analysis Date/Time : 30-AUG-2009 16:15:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.567	3301.667	2.000000	0.4800001	70.71068	95.00000
NP-237	4432.493	4902.470	13.000000	3.120001	27.73501	95.00000
CM-244	5535.032	5883.746	87.000000	20.88000	10.72113	95.00000

Instrument : CHAMBER 030  
 Detector : 33447  
 Background Analysis Date/Time : 30-AUG-2009 16:15:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.332	3299.665	1.000000	0.2400000	100.0000	95.00000
NP-237	4436.037	4902.215	13.000000	3.120001	27.73501	95.00000
CM-244	5533.195	5886.933	97.000000	23.28000	10.15346	95.00000

Instrument : CHAMBER 031  
 Detector : 67042  
 Background Analysis Date/Time : 30-AUG-2009 16:15:14  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.980	3300.809	8.000000	1.919999	35.35534	95.00000
NP-237	4433.475	4904.204	10.000000	2.399998	31.62278	95.00000
CM-244	5535.021	5883.627	87.000000	20.87999	10.72113	95.00000

Instrument : CHAMBER 032  
 Detector : 67041  
 Background Analysis Date/Time : 30-AUG-2009 16:15:14  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.500	3301.085	2.000000	0.4799997	70.71068	95.00000
NP-237	4436.228	4903.321	14.000000	3.359998	26.72612	95.00000
CM-244	5533.353	5886.388	25.000000	5.999996	20.00000	95.00000

Instrument : CHAMBER 033  
 Detector : 78785  
 Background Analysis Date/Time : 30-AUG-2009 16:15:14  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.232	3299.661	3.000000	0.7199996	57.73503	95.00000
NP-237	4437.092	4904.010	7.000000	1.679999	37.79645	95.00000
CM-244	5530.913	5885.453	49.00000	11.75999	14.28572	95.00000

Instrument : CHAMBER 034  
 Detector : 61586  
 Background Analysis Date/Time : 30-AUG-2009 16:15:14  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.956	3301.026	2.000000	0.4799997	70.71068	95.00000
NP-237	4436.568	4903.521	30.00000	7.199996	18.25742	95.00000
CM-244	5534.967	5885.181	31.00000	7.439995	17.96053	95.00000

Instrument : CHAMBER 035  
 Detector : 78202  
 Background Analysis Date/Time : 30-AUG-2009 16:15:14  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.620	3300.593	2.000000	0.4799997	70.71068	95.00000
NP-237	4435.499	4903.774	16.00000	3.839998	25.00000	95.00000
CM-244	5532.763	5883.199	70.00000	16.79999	11.95229	95.00000

Instrument : CHAMBER 036  
 Detector : 78203  
 Background Analysis Date/Time : 30-AUG-2009 16:15:14  
 Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.620	3298.917	2.000000	0.4799997	70.71068	95.00000
NP-237	4433.050	4904.263	7.000000	1.679999	37.79645	95.00000
CM-244	5535.616	5884.466	51.00000	12.23999	14.00280	95.00000

Instrument : CHAMBER 037  
 Detector : 45-149BB5  
 Background Analysis Date/Time : 30-AUG-2009 16:15:15  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.836	3299.917	5.000000	1.199999	44.72136	95.00000
NP-237	4435.582	4906.557	19.00000	4.559997	22.94157	95.00000
CM-244	5534.307	5882.810	72.00000	17.27999	11.78511	95.00000

Instrument : CHAMBER 038  
 Detector : 72532  
 Background Analysis Date/Time : 30-AUG-2009 16:15:15  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.576	3299.256	2.000000	0.4799997	70.71068	95.00000
NP-237	4433.771	4904.686	10.00000	2.399998	31.62278	95.00000
CM-244	5535.244	5883.467	79.00000	18.95999	11.25088	95.00000

Instrument : CHAMBER 039  
 Detector : 45-149BB2  
 Background Analysis Date/Time : 30-AUG-2009 16:15:15  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.453	3301.599	1.000000	0.2399998	100.0000	95.00000
NP-237	4432.722	4905.688	12.00000	2.879998	28.86751	95.00000
CM-244	5532.346	5883.894	84.00000	20.15999	10.91089	95.00000

Instrument : CHAMBER 040  
 Detector : 78773  
 Background Analysis Date/Time : 30-AUG-2009 16:15:15  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.070	3301.002	6.000000	1.439999	40.82483	95.00000
NP-237	4437.116	4905.104	4.000000	0.9599993	50.00000	95.00000
CM-244	5532.249	5884.180	66.00000	15.83999	12.30915	95.00000

Instrument : CHAMBER 041  
 Detector : 78205  
 Background Analysis Date/Time : 30-AUG-2009 16:15:15  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.305	3298.942	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4436.425	4904.659	10.00000	2.399998	31.62278	95.00000
CM-244	5534.452	5885.748	82.00000	19.67999	11.04315	95.00000

Instrument : CHAMBER 042  
 Detector : 78793  
 Background Analysis Date/Time : 30-AUG-2009 16:15:15  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.887	3299.366	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.123	4905.630	11.00000	2.639998	30.15113	95.00000
CM-244	5533.333	5885.512	81.00000	19.43999	11.11111	95.00000

Instrument : CHAMBER 043  
 Detector : 76543  
 Background Analysis Date/Time : 30-AUG-2009 16:15:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.321	3301.623	1.000000	0.2400000	100.0000	95.00000
NP-237	4433.027	4903.519	5.000000	1.200000	44.72136	95.00000
CM-244	5534.268	5882.956	61.00000	14.64000	12.80369	95.00000

Instrument : CHAMBER 044  
 Detector : 79459  
 Background Analysis Date/Time : 30-AUG-2009 16:15:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.930	3302.506	5.000000	1.200000	44.72136	95.00000
NP-237	4437.594	4903.934	14.00000	3.360001	26.72612	95.00000
CM-244	5530.392	5884.844	80.00000	19.20000	11.18034	95.00000

Instrument : CHAMBER 045  
 Detector : 78783  
 Background Analysis Date/Time : 30-AUG-2009 16:15:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.243	3301.709	2.000000	0.4800001	70.71068	95.00000
NP-237	4436.057	4901.945	5.000000	1.200000	44.72136	95.00000
CM-244	5533.013	5887.031	74.00000	17.76000	11.62476	95.00000

Instrument : CHAMBER 046  
 Detector : 76544  
 Background Analysis Date/Time : 30-AUG-2009 16:15:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.377	3301.861	2.000000	0.4800001	70.71068	95.00000
NP-237	4437.291	4905.414	7.000000	1.680000	37.79645	95.00000
CM-244	5533.098	5885.505	74.00000	17.76000	11.62476	95.00000

Instrument : CHAMBER 047  
 Detector : 46-089B1  
 Background Analysis Date/Time : 30-AUG-2009 16:15:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.396	3301.175	5.000000	1.200000	44.72136	95.00000
NP-237	4434.358	4901.480	17.00000	4.080001	24.25356	95.00000
CM-244	5533.889	5883.104	83.00000	19.92000	10.97643	95.00000

Instrument : CHAMBER 048  
 Detector : 42483  
 Background Analysis Date/Time : 30-AUG-2009 16:15:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.395	3299.708	1.000000	0.2400000	100.0000	95.00000
NP-237	4436.890	4906.295	16.00000	3.840001	25.00000	95.00000
CM-244	5534.380	5886.375	85.00000	20.40000	10.84652	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 : 4-SEP-2009 07:36:39  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:35:32  
 Average Efficiency : 0.3122659  
 Average Efficiency Error : 8.6114258E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.6698	28-FEB-2010	2989.095	3301.491	15006.00	0.3039177	1.3064248E-02	58.79536
NP-237	171.0024	28-FEB-2010	4436.328	4901.460	12916.00	0.3146430	1.5974019E-02	71.14886
CM-244	158.1060	28-FEB-2010	5531.570	5886.270	11555.00	0.3229480	1.6424600E-02	57.32594

Instrument : CHAMBER 002  
 Detector : 78266  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:39  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:35:41  
 Average Efficiency : 0.3090980  
 Average Efficiency Error : 8.5114390E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1144	28-FEB-2010	2992.085	3299.620	14650.00	0.3094049	1.3305944E-02	45.54427
NP-237	200.4990	28-FEB-2010	4434.644	4904.846	15015.00	0.3119993	1.5806440E-02	68.48380
CM-244	196.5558	28-FEB-2010	5534.154	5882.659	13603.00	0.3058844	1.5517467E-02	51.44160

Instrument : CHAMBER 003  
 Detector : 67617  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:39  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:35:49  
 Average Efficiency : 0.3361934  
 Average Efficiency Error : 9.2456024E-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	2991.938	3299.717	15919.00	0.3314925	1.4234867E-02	68.71011
NP-237	203.2080	28-FEB-2010	4432.844	4902.827	16799.00	0.3444051	1.7424129E-02	74.30300
CM-244	197.2236	28-FEB-2010	5531.440	5887.803	14947.00	0.3350840	1.6976947E-02	62.51212



Instrument : CHAMBER 004  
 Detector : 64279  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:39  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:35:56  
 Average Efficiency : 0.3331009  
 Average Efficiency Error : 9.1593768E-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	2992.026	3298.308	16101.00	0.3301861	1.4176016E-02	53.22534
NP-237	204.2586	28-FEB-2010	4435.760	4905.548	16353.00	0.3335505	1.6880305E-02	62.94835
CM-244	198.8100	28-FEB-2010	5534.947	5883.809	15145.00	0.3368652	1.7064264E-02	54.23564

Instrument : CHAMBER 005  
 Detector : 67612  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:39  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:36:04  
 Average Efficiency : 0.2950116  
 Average Efficiency Error : 8.1236903E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.7452	28-FEB-2010	2989.654	3300.689	14685.00	0.2945226	1.2665418E-02	52.17361
NP-237	209.5938	28-FEB-2010	4436.859	4901.997	14804.00	0.2942757	1.4911278E-02	59.02256
CM-244	202.7478	28-FEB-2010	5533.435	5885.045	13592.00	0.2964495	1.5039029E-02	52.51872

Instrument : CHAMBER 006  
 Detector : 67613  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:39  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:36:12  
 Average Efficiency : 0.3072436  
 Average Efficiency Error : 8.4615378E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2987.771	3301.528	14462.00	0.3000935	1.2908642E-02	53.74769
NP-237	204.7038	28-FEB-2010	4433.310	4904.612	15292.00	0.3112141	1.5762975E-02	64.28081
CM-244	195.0060	28-FEB-2010	5535.175	5883.158	13852.00	0.3140766	1.5929047E-02	53.04362

Instrument : CHAMBER 007  
 Detector : 67607  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:40  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:36:20  
 Average Efficiency : 0.2367712  
 Average Efficiency Error : 6.6109751E-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	2991.315	3300.370	13798.00	0.2821096	1.2145956E-02	48.72938
NP-237	205.0260	28-FEB-2010	4436.975	4905.147	11957.00	0.2429639	1.2349783E-02	65.83331
CM-244	199.6806	28-FEB-2010	5533.959	5885.477	9051.000	0.2003213	1.0235304E-02	52.23785

Instrument : CHAMBER 008  
 Detector : 78788  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:40  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:36:40  
 Average Efficiency : 0.3205987  
 Average Efficiency Error : 8.8198772E-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	2989.794	3298.426	15461.00	0.3171742	1.3626882E-02	47.98743
NP-237	209.2716	28-FEB-2010	4437.020	4904.595	16084.00	0.3202048	1.6208146E-02	61.69046
CM-244	199.6488	28-FEB-2010	5532.536	5882.336	14721.00	0.3260421	1.6522150E-02	43.41613

Instrument : CHAMBER 009  
 Detector : 72528  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:40  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:36:51  
 Average Efficiency : 0.3402912  
 Average Efficiency Error : 9.3554687E-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	2990.892	3299.892	16250.00	0.3376825	1.4495632E-02	49.34795
NP-237	204.0192	28-FEB-2010	4433.436	4905.789	16617.00	0.3393191	1.7169004E-02	62.72510
CM-244	197.2128	28-FEB-2010	5532.687	5887.081	15400.00	0.3450909	1.7477276E-02	53.13368

Instrument : CHAMBER 010  
 Detector : 72529  
 Standard ID : AESS-010  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:40  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:37:00  
 Average Efficiency : 0.3139585  
 Average Efficiency Error : 8.6422609E-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	2988.087	3300.334	14912.00	0.3120262	1.3414358E-02	49.22013
NP-237	202.9926	28-FEB-2010	4436.842	4905.812	15310.00	0.3142270	1.5915314E-02	60.15851
CM-244	196.2330	28-FEB-2010	5533.178	5884.706	14044.00	0.3164504	1.6046330E-02	53.33372

Instrument : CHAMBER 011  
 Detector : 72531  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:40  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:37:27  
 Average Efficiency : 0.2979373  
 Average Efficiency Error : 8.2009137E-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	2990.718	3301.411	14912.00	0.2961519	1.2731905E-02	50.71152
NP-237	214.4868	28-FEB-2010	4435.900	4905.463	15442.00	0.2999101	1.5188582E-02	60.36610
CM-244	208.4184	28-FEB-2010	5535.617	5886.431	14071.00	0.2985013	1.5135813E-02	50.96436

Instrument : CHAMBER 012  
 Detector : 67594  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:40  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:37:37  
 Average Efficiency : 0.2994823  
 Average Efficiency Error : 8.2469489E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.2200	28-FEB-2010	2989.283	3301.924	14660.00	0.3004818	1.2922071E-02	52.00318
NP-237	205.8930	28-FEB-2010	4434.309	4903.502	14933.00	0.3021517	1.5308659E-02	64.10130
CM-244	203.1954	28-FEB-2010	5531.028	5882.575	13584.00	0.2955756	1.4994888E-02	57.14846

Instrument : CHAMBER 013  
 Detector : 78790  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:41  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:37:47  
 Average Efficiency : 0.3441789  
 Average Efficiency Error : 9.4585977E-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	2992.309	3297.583	16707.00	0.3467621	1.4878578E-02	47.93691
NP-237	210.2526	28-FEB-2010	4432.512	4904.184	17205.00	0.3409068	1.7242415E-02	63.48001
CM-244	201.9108	28-FEB-2010	5533.734	5883.657	15707.00	0.3439779	1.7416557E-02	53.05471

Instrument : CHAMBER 014  
 Detector : 67616  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:41  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:37:57  
 Average Efficiency : 0.3126531  
 Average Efficiency Error : 8.6011579E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2990.575	3298.988	15569.00	0.3064544	1.3164708E-02	48.59332
NP-237	211.7160	28-FEB-2010	4436.470	4903.458	16179.00	0.3183725	1.6114254E-02	68.41453
CM-244	207.3882	28-FEB-2010	5530.496	5885.133	14842.00	0.3161798	1.6020818E-02	54.78078

Instrument : CHAMBER 015  
 Detector : 61581  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:41  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:38:32  
 Average Efficiency : 0.3250474  
 Average Efficiency Error : 8.9431657E-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	2987.656	3297.520	15498.00	0.3210663	1.3793531E-02	58.50532
NP-237	200.6460	28-FEB-2010	4435.901	4901.612	15878.00	0.3296820	1.6690506E-02	70.32646
CM-244	195.9270	28-FEB-2010	5535.255	5884.514	14460.00	0.3262195	1.6535265E-02	60.28641

Instrument : CHAMBER 016  
 Detector : 78774  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:41  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:39:14  
 Average Efficiency : 0.3337179  
 Average Efficiency Error : 9.1785332E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2988.611	3297.891	15952.00	0.3304393	1.4189126E-02	48.70612
NP-237	199.3962	28-FEB-2010	4435.494	4901.479	16393.00	0.3425452	1.7334972E-02	61.52191
CM-244	198.6402	28-FEB-2010	5530.741	5886.030	14827.00	0.3300566	1.6723992E-02	56.19504

Instrument : CHAMBER 017  
 Detector : 78791  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:41  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:39:56  
 Average Efficiency : 0.2932511  
 Average Efficiency Error : 8.0763726E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.0798	28-FEB-2010	2989.315	3299.165	14535.00	0.2924541	1.2578820E-02	44.96824
NP-237	208.5846	28-FEB-2010	4433.955	4905.994	14930.00	0.2982117	1.5109048E-02	56.65096
CM-244	205.5828	28-FEB-2010	5531.756	5885.157	13466.00	0.2896459	1.4695838E-02	49.42458

Instrument : CHAMBER 018  
 Detector : 78782  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:41  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:40:11  
 Average Efficiency : 0.3229291  
 Average Efficiency Error : 8.8838805E-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	2989.045	3297.645	15448.00	0.3229351	1.3874616E-02	44.39913
NP-237	208.8990	28-FEB-2010	4435.824	4903.103	16130.00	0.3216979	1.6283154E-02	64.50001
CM-244	198.1458	28-FEB-2010	5530.534	5885.395	14527.00	0.3241743	1.6430404E-02	51.39432

Instrument : CHAMBER 019  
 Detector : 78786  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:42  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:40:24  
 Average Efficiency : 0.2905655  
 Average Efficiency Error : 8.0145085E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.6468	28-FEB-2010	2992.371	3300.084	13452.00	0.2778059	1.1966659E-02	44.41962
NP-237	202.9140	28-FEB-2010	4432.711	4901.697	14988.00	0.3077365	1.5590836E-02	62.76942
CM-244	199.3140	28-FEB-2010	5534.730	5883.386	13290.00	0.2946945	1.4954864E-02	50.33946

Instrument : CHAMBER 020  
 Detector : 78787  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:42  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:40:33  
 Average Efficiency : 0.3434685  
 Average Efficiency Error : 9.4453506E-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	2990.745	3300.511	16134.00	0.3317050	1.4240759E-02	49.47922
NP-237	203.4984	28-FEB-2010	4436.191	4903.850	17194.00	0.3519965	1.7803436E-02	60.99994
CM-244	197.1096	28-FEB-2010	5531.198	5885.719	15755.00	0.3534269	1.7894309E-02	50.27258

Instrument : CHAMBER 021  
 Detector : 67047  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:42  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:40:41  
 Average Efficiency : 0.3053718  
 Average Efficiency Error : 8.4061036E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2991.027	3300.488	14910.00	0.3024271	1.3001683E-02	54.25101
NP-237	210.1548	28-FEB-2010	4433.390	4904.438	15336.00	0.3040332	1.5398674E-02	66.84158
CM-244	200.7390	28-FEB-2010	5534.035	5886.544	14134.00	0.3111110	1.5774274E-02	53.45971

Instrument : CHAMBER 022  
 Detector : 72530  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:42  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:40:50  
 Average Efficiency : 0.3167550  
 Average Efficiency Error : 8.7174345E-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	2992.050	3301.029	15236.00	0.3069546	1.3191545E-02	48.80446
NP-237	206.8830	28-FEB-2010	4437.549	4902.815	16171.00	0.3256005	1.6480263E-02	64.55595
CM-244	203.0208	28-FEB-2010	5531.706	5883.854	14838.00	0.3231215	1.6372502E-02	53.46963

Instrument : CHAMBER 023  
 Detector : 78264  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:42  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:40:59  
 Average Efficiency : 0.3319828  
 Average Efficiency Error : 9.1288136E-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	2991.319	3301.853	16017.00	0.3263104	1.4010864E-02	47.06707
NP-237	207.4998	28-FEB-2010	4434.632	4902.993	16663.00	0.3345701	1.6928136E-02	62.52299
CM-244	199.8804	28-FEB-2010	5531.100	5885.960	15271.00	0.3377988	1.7109787E-02	47.13729

Instrument : CHAMBER 024  
 Detector : 76542  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 4-SEP-2009 07:36:42  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 4-SEP-2009 12:41:10  
 Average Efficiency : 0.3282878  
 Average Efficiency Error : 9.0300748E-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	2988.280	3301.361	15578.00	0.3235334	1.3898253E-02	49.01440
NP-237	205.6662	28-FEB-2010	4434.951	4904.473	16364.00	0.3314564	1.6774241E-02	73.72572
CM-244	198.3060	28-FEB-2010	5532.286	5883.922	14893.00	0.3320678	1.6824935E-02	56.15541

Instrument : CHAMBER 025  
 Detector : 45-149AA5  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:08  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:36:12  
 Average Efficiency : 0.3276502  
 Average Efficiency Error : 9.0310313E-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	2988.958	3301.287	15226.00	0.3290954	1.4142862E-02	57.79382
NP-237	167.9916	28-FEB-2010	4436.686	4904.740	13253.00	0.3286704	1.6679743E-02	71.75627
CM-244	157.2432	28-FEB-2010	5534.991	5882.562	11563.00	0.3246800	1.6513394E-02	67.10056

Instrument : CHAMBER 026  
 Detector : 78204  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:08  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:36:22  
 Average Efficiency : 0.3213052  
 Average Efficiency Error : 9.4170934E-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	2988.735	3300.836	15089.00	0.3196830	1.6195688E-02	50.04417
NP-237	168.0294	28-FEB-2010	4435.801	4902.784	13239.00	0.3282672	1.6659509E-02	56.07543
CM-244	160.5822	28-FEB-2010	5530.708	5886.284	11504.00	0.3164098	1.6093958E-02	50.89248

Instrument : CHAMBER 027  
 Detector : 42484  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:08  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:36:31  
 Average Efficiency : 0.3385510  
 Average Efficiency Error : 9.9218553E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2989.280	3298.316	15261.00	0.3334595	1.6891224E-02	44.29322
NP-237	161.6154	28-FEB-2010	4433.196	4906.637	13292.00	0.3426305	1.7387481E-02	57.33553
CM-244	148.1754	28-FEB-2010	5535.439	5885.723	11402.00	0.3398517	1.7288936E-02	52.16496



Instrument : CHAMBER 028  
 Detector : 78792  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:08  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:36:41  
 Average Efficiency : 0.3044925  
 Average Efficiency Error : 8.9324238E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2989.441	3297.640	14137.00	0.2992923	1.5175839E-02	43.30858
NP-237	168.1992	28-FEB-2010	4435.847	4903.788	12490.00	0.3093279	1.5712239E-02	58.21876
CM-244	156.7614	28-FEB-2010	5532.676	5883.223	10835.00	0.3052154	1.5540821E-02	45.24567

Instrument : CHAMBER 029  
 Detector : 33454  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:08  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:36:49  
 Average Efficiency : 0.3151154  
 Average Efficiency Error : 9.2400359E-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	2987.567	3301.667	14598.00	0.3061087	1.5514722E-02	59.98596
NP-237	169.7700	28-FEB-2010	4432.493	4902.470	13008.00	0.3191791	1.6202597E-02	64.76778
CM-244	154.8234	28-FEB-2010	5535.032	5883.746	11258.00	0.3209674	1.6332163E-02	52.83419

Instrument : CHAMBER 030  
 Detector : 33447  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:08  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:36:58  
 Average Efficiency : 0.3203139  
 Average Efficiency Error : 9.3901874E-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	2991.332	3299.665	14751.00	0.3133562	1.5879847E-02	54.85928
NP-237	166.3758	28-FEB-2010	4436.037	4902.215	13026.00	0.3261414	1.6555686E-02	71.82014
CM-244	157.1856	28-FEB-2010	5533.195	5886.933	11469.00	0.3220125	1.6380262E-02	58.73045

Instrument : CHAMBER 031  
 Detector : 67042  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:09  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:37:09  
 Average Efficiency : 0.3353133  
 Average Efficiency Error : 9.2432722E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2988.980	3300.809	15051.00	0.3284457	1.4117910E-02	62.13078
NP-237	162.9186	28-FEB-2010	4433.475	4904.204	13378.00	0.3420834	1.7358093E-02	78.83074
CM-244	153.1968	28-FEB-2010	5535.021	5883.627	11764.00	0.3388719	1.7230390E-02	60.52183

Instrument : CHAMBER 032  
 Detector : 67041  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:09  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:37:21  
 Average Efficiency : 0.2159665  
 Average Efficiency Error : 6.2416224E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2991.500	3301.085	12930.00	0.2799107	1.2067080E-02	108.5704
NP-237	165.9822	28-FEB-2010	4436.228	4903.321	11857.00	0.2975635	1.5127208E-02	150.4912
CM-244	153.7938	28-FEB-2010	5533.353	5886.388	5601.000	0.1608285	8.3242906E-03	0.0000000E+00

Instrument : CHAMBER 033  
 Detector : 78785  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:09  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:37:30  
 Average Efficiency : 0.3134830  
 Average Efficiency Error : 8.6526405E-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	2991.232	3299.661	14169.00	0.3112248	1.3392622E-02	46.76679
NP-237	161.7816	28-FEB-2010	4437.092	4904.010	12161.00	0.3131624	1.5913626E-02	60.14054
CM-244	147.2670	28-FEB-2010	5530.913	5885.453	10575.00	0.3170980	1.6152723E-02	52.75375

Instrument : CHAMBER 034  
 Detector : 61586  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:09  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:37:40  
 Average Efficiency : 5.4748973E-05  
 Average Efficiency Error : 8.9538866E-05  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2987.956	3301.026	9319.000	0.1963924	8.5345702E-03	80.18852
NP-237	167.2962	28-FEB-2010	4436.568	4903.521	7134.000	0.1774998	9.1209533E-03	0.0000000E+00
CM-244	154.4388	28-FEB-2010	5534.967	5885.181	8.000000	1.6030130E-05	6.59548113E-05	5.306273

Instrument : CHAMBER 035  
 Detector : 78202  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:09  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:37:51  
 Average Efficiency : 0.3050995  
 Average Efficiency Error : 8.4187118E-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	2991.620	3300.593	14168.00	0.3014163	1.2970550E-02	45.14441
NP-237	168.2934	28-FEB-2010	4435.499	4903.774	12515.00	0.3097561	1.5733534E-02	52.82528
CM-244	158.8128	28-FEB-2010	5532.763	5883.199	11004.00	0.3058464	1.5568729E-02	51.98632

Instrument : CHAMBER 036  
 Detector : 78203  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:09  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:38:00  
 Average Efficiency : 0.3236991  
 Average Efficiency Error : 8.9239618E-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	2991.620	3298.917	15082.00	0.3166323	1.3609574E-02	51.84582
NP-237	167.4312	28-FEB-2010	4433.050	4904.263	13282.00	0.3304925	1.6771674E-02	66.46858
CM-244	156.4188	28-FEB-2010	5535.616	5884.466	11603.00	0.3275855	1.6659884E-02	53.86180

Instrument : CHAMBER 037  
 Detector : 45-149BB5  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:38:11  
 Average Efficiency : 0.3527313  
 Average Efficiency Error : 9.7141266E-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	2988.836	3299.917	16029.00	0.3425954	1.4709930E-02	69.97938
NP-237	167.1294	28-FEB-2010	4435.582	4906.557	14502.00	0.3614331	1.8319361E-02	87.55756
CM-244	154.7664	28-FEB-2010	5534.307	5882.810	12611.00	0.3597120	1.8269511E-02	71.60854

Instrument : CHAMBER 038  
 Detector : 72532  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:38:20  
 Average Efficiency : 0.3374661  
 Average Efficiency Error : 9.2953844E-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	2991.576	3299.256	15782.00	0.3332799	1.4313720E-02	52.53116
NP-237	170.0886	28-FEB-2010	4433.771	4904.686	13898.00	0.3404015	1.7263360E-02	67.00319
CM-244	157.7460	28-FEB-2010	5535.244	5883.467	12174.00	0.3406372	1.7310385E-02	53.71938

Instrument : CHAMBER 039  
 Detector : 45-149BB2  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:38:28  
 Average Efficiency : 0.3630306  
 Average Efficiency Error : 9.9983541E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2991.453	3301.599	16042.00	0.3526957	1.5143363E-02	60.09052
NP-237	159.1506	28-FEB-2010	4432.722	4905.688	14315.00	0.3747012	1.8995127E-02	78.06614
CM-244	151.7142	28-FEB-2010	5532.346	5883.894	12631.00	0.3674615	1.8662771E-02	63.39179

Instrument : CHAMBER 040  
 Detector : 78773  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:38:36  
 Average Efficiency : 0.3207370  
 Average Efficiency Error : 8.8450955E-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	2991.070	3301.002	14629.00	0.3178972	1.3671570E-02	46.05933
NP-237	166.8174	28-FEB-2010	4437.116	4905.104	12857.00	0.3211111	1.6303439E-02	59.80341
CM-244	155.0100	28-FEB-2010	5532.249	5884.180	11394.00	0.3244938	1.6507916E-02	47.50864

Instrument : CHAMBER 041  
 Detector : 78205  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:38:44  
 Average Efficiency : 0.3298833  
 Average Efficiency Error : 9.0887686E-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	2991.305	3298.942	15596.00	0.3232844	1.3887258E-02	46.32725
NP-237	171.2268	28-FEB-2010	4436.425	4904.659	13704.00	0.3334179	1.6912539E-02	62.94285
CM-244	159.5796	28-FEB-2010	5534.452	5885.748	12158.00	0.3362667	1.7088668E-02	51.06727

Instrument : CHAMBER 042  
 Detector : 78793  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:11  
 Calibration Count Time : 239.9998  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:38:52  
 Average Efficiency : 0.3262490  
 Average Efficiency Error : 8.9996839E-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	2988.887	3299.366	14425.00	0.3230868	1.3898331E-02	45.61874
NP-237	159.6558	28-FEB-2010	4437.123	4905.630	12564.00	0.3278245	1.6650224E-02	58.62441
CM-244	150.5208	28-FEB-2010	5533.333	5885.512	11230.00	0.3292493	1.6754221E-02	49.02582

Instrument : CHAMBER 043  
 Detector : 76543  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:38:59  
 Average Efficiency : 0.3388386  
 Average Efficiency Error : 9.3338015E-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	2990.321	3301.623	15716.00	0.3358650	1.4425773E-02	53.08127
NP-237	168.7422	28-FEB-2010	4433.027	4903.519	13744.00	0.3393443	1.7212395E-02	71.29913
CM-244	156.3252	28-FEB-2010	5534.268	5882.956	12132.00	0.3426539	1.7413609E-02	49.48456

Instrument : CHAMBER 044  
 Detector : 79459  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:39:07  
 Average Efficiency : 0.3461110  
 Average Efficiency Error : 9.5328372E-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	2989.930	3302.506	16084.00	0.3495771	1.5008831E-02	49.84488
NP-237	166.6248	28-FEB-2010	4437.594	4903.934	13869.00	0.3467283	1.7584775E-02	67.30765
CM-244	155.8290	28-FEB-2010	5530.392	5884.844	12036.00	0.3408923	1.7326539E-02	50.42044

Instrument : CHAMBER 045  
 Detector : 78783  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:39:15  
 Average Efficiency : 0.3386171  
 Average Efficiency Error : 9.3369978E-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	2989.243	3301.709	15126.00	0.3418811	1.4694056E-02	41.09813
NP-237	160.8066	28-FEB-2010	4436.057	4901.945	12808.00	0.3318377	1.6849035E-02	59.62828
CM-244	145.8384	28-FEB-2010	5533.013	5887.031	11276.00	0.3412594	1.7364025E-02	48.59882

Instrument : CHAMBER 046  
 Detector : 76544  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:39:23  
 Average Efficiency : 0.3428833  
 Average Efficiency Error : 9.4477413E-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	2992.377	3301.861	15517.00	0.3367483	1.4466916E-02	50.54656
NP-237	164.6658	28-FEB-2010	4437.291	4905.414	13709.00	0.3468411	1.7593319E-02	60.02387
CM-244	151.3824	28-FEB-2010	5533.098	5885.505	11938.00	0.3480568	1.7692965E-02	49.85977

Instrument : CHAMBER 047  
 Detector : 46-089B1  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:39:31  
 Average Efficiency : 0.3414553  
 Average Efficiency Error : 9.4057210E-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	2992.396	3301.175	15755.00	0.3371730	1.4481370E-02	53.45372
NP-237	168.3948	28-FEB-2010	4434.358	4901.480	13876.00	0.3432392	1.7407728E-02	75.59270
CM-244	154.6032	28-FEB-2010	5533.889	5883.104	12119.00	0.3459478	1.7581582E-02	61.01867

Instrument : CHAMBER 048  
 Detector : 42483  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 5-SEP-2009 09:03:12  
 Calibration Count Time : 240.0000  
 Efficiency Calibration Date/Time : 5-SEP-2009 13:39:40  
 Average Efficiency : 0.3165880  
 Average Efficiency Error : 8.7361159E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2992.395	3299.708	14224.00	0.3133849	1.3484558E-02	54.26610
NP-237	161.5530	28-FEB-2010	4436.890	4906.295	12281.00	0.3166445	1.6088169E-02	68.16459
CM-244	151.1856	28-FEB-2010	5534.380	5886.375	11007.00	0.3212399	1.6352450E-02	58.44775

## 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 113  
 Detector : 45-111B4  
 Calibration Date/Time : 17-SEP-2009 15:08:33  
 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	4768.774
CM-244	4320A	2/28/10	5795.020	5794.950

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2386.732  
 Energy Calibration Slope : 5.009326  
 Energy Calibration Quadratic : 2.6770448E-04  
 Energy Calibration Range : 7797.000

Instrument : CHAMBER 114  
 Detector : 78258  
 Calibration Date/Time : 17-SEP-2009 15:08:44  
 Calibration Source Id : AESS-007

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.722
NP-237	4341	2/28/10	4768.800	4768.568
CM-244	4320A	2/28/10	5795.020	5794.894

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2339.893  
 Energy Calibration Slope : 4.993507  
 Energy Calibration Quadratic : 2.3911390E-04  
 Energy Calibration Range : 7704.000

Instrument : CHAMBER 115  
 Detector : 45-132FF4  
 Calibration Date/Time : 17-SEP-2009 15:08:54  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5794.872

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.262  
 Energy Calibration Slope : 5.000648  
 Energy Calibration Quadratic : 2.6309560E-04  
 Energy Calibration Range : 7758.000



Instrument : CHAMBER 116  
 Detector : 45-132FF2  
 Calibration Date/Time : 17-SEP-2009 15:09:06  
 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 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2359.730  
 Energy Calibration Slope : 4.985509  
 Energy Calibration Quadratic : 2.6726534E-04  
 Energy Calibration Range : 7745.000

Instrument : CHAMBER 117  
 Detector : 33450  
 Calibration Date/Time : 17-SEP-2009 15:09:16  
 Calibration Source Id : AESS-003  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.491  
 NP-237 4341 2/28/10 4768.800 4768.339  
 CM-244 4320A 2/28/10 5795.020 5794.819  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2385.651  
 Energy Calibration Slope : 4.970261  
 Energy Calibration Quadratic : 2.8056922E-04  
 Energy Calibration Range : 7769.000

Instrument : CHAMBER 118  
 Detector : 75544  
 Calibration Date/Time : 17-SEP-2009 15:09:28  
 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 : 2346.819  
 Energy Calibration Slope : 4.967181  
 Energy Calibration Quadratic : 2.8012006E-04  
 Energy Calibration Range : 7727.000

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 3112.902  
 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 : 17-SEP-2009 15:09:40  
 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 4768.710  
 CM-244 4320A 2/28/10 5795.020 5795.020  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2314.428  
 Energy Calibration Slope : 4.966161  
 Energy Calibration Quadratic : 2.5640638E-04  
 Energy Calibration Range : 7669.000

Instrument : CHAMBER 121  
 Detector : 75545  
 Calibration Date/Time : 17-SEP-2009 15:09:49  
 Calibration Source Id : AESS-005  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2338.861  
 Energy Calibration Slope : 4.942947  
 Energy Calibration Quadratic : 2.9029930E-04  
 Energy Calibration Range : 7705.000

Instrument : CHAMBER 122  
 Detector : 75546  
 Calibration Date/Time : 17-SEP-2009 15:09:59  
 Calibration Source Id : AESS-011

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5794.807

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2335.373  
 Energy Calibration Slope : 4.957498  
 Energy Calibration Quadratic : 2.7508504E-04  
 Energy Calibration Range : 7700.000

Instrument : CHAMBER 123  
 Detector : 45-142V3  
 Calibration Date/Time : 17-SEP-2009 15:10:08  
 Calibration Source Id : AESS-006

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.112

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2378.713  
 Energy Calibration Slope : 4.974333  
 Energy Calibration Quadratic : 2.5756090E-04  
 Energy Calibration Range : 7743.000

Instrument : CHAMBER 124  
 Detector : 45-142V2  
 Calibration Date/Time : 17-SEP-2009 15:10:17  
 Calibration Source Id : AESS-012

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.748
NP-237	4341	2/28/10	4768.800	4768.555
CM-244	4320A	2/28/10	5795.020	5794.792

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2392.695  
 Energy Calibration Slope : 5.013852  
 Energy Calibration Quadratic : 2.6642549E-04  
 Energy Calibration Range : 7806.000

Instrument : CHAMBER 125  
 Detector : 75547  
 Calibration Date/Time : 17-SEP-2009 15:10:26  
 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 4768.724  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2346.597  
 Energy Calibration Slope : 4.937986  
 Energy Calibration Quadratic : 2.8199228E-04  
 Energy Calibration Range : 7699.000

Instrument : CHAMBER 126  
 Detector : 75548  
 Calibration Date/Time : 17-SEP-2009 15:10:43  
 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 4768.630  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2351.075  
 Energy Calibration Slope : 5.037023  
 Energy Calibration Quadratic : 1.9564512E-04  
 Energy Calibration Range : 7714.000

Instrument : CHAMBER 127  
 Detector : 78770  
 Calibration Date/Time : 17-SEP-2009 15:10:52  
 Calibration Source Id : AESS-014  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.015  
 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 : 2339.960  
 Energy Calibration Slope : 4.959275  
 Energy Calibration Quadratic : 2.7139953E-04  
 Energy Calibration Range : 7703.000

Instrument : CHAMBER 128  
 Detector : 75549  
 Calibration Date/Time : 17-SEP-2009 15:11:01  
 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	4768.687
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2332.893  
 Energy Calibration Slope : 5.000373  
 Energy Calibration Quadratic : 2.3169331E-04  
 Energy Calibration Range : 7696.000

Instrument : CHAMBER 129  
 Detector : 76227  
 Calibration Date/Time : 17-SEP-2009 15:11:11  
 Calibration Source Id : AESS-015

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.775
NP-237	4341	2/28/10	4768.800	4768.764
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2349.422  
 Energy Calibration Slope : 4.954164  
 Energy Calibration Quadratic : 2.6775626E-04  
 Energy Calibration Range : 7703.000

Instrument : CHAMBER 130  
 Detector : 76228  
 Calibration Date/Time : 17-SEP-2009 15:11:20  
 Calibration Source Id : AESS-021

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.546
NP-237	4341	2/28/10	4768.800	4768.433
CM-244	4320A	2/28/10	5795.020	5794.777

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2341.580  
 Energy Calibration Slope : 4.993090  
 Energy Calibration Quadratic : 2.1626826E-04  
 Energy Calibration Range : 7681.000

Instrument : CHAMBER 131  
 Detector : 33448  
 Calibration Date/Time : 17-SEP-2009 15:11:29  
 Calibration Source Id : AESS-016  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.958  
 NP-237 4341 2/28/10 4768.800 4768.209  
 CM-244 4320A 2/28/10 5795.020 5794.532  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2411.500  
 Energy Calibration Slope : 4.968785  
 Energy Calibration Quadratic : 2.8956254E-04  
 Energy Calibration Range : 7803.000

Instrument : CHAMBER 132  
 Detector : 67579  
 Calibration Date/Time : 17-SEP-2009 15:11:39  
 Calibration Source Id : AESS-022  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.807  
 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 : 2330.434  
 Energy Calibration Slope : 5.033886  
 Energy Calibration Quadratic : 2.1528341E-04  
 Energy Calibration Range : 7711.000

Instrument : CHAMBER 133  
 Detector : 76229  
 Calibration Date/Time : 17-SEP-2009 15:11:48  
 Calibration Source Id : AESS-017  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.772  
 NP-237 4341 2/28/10 4768.800 4768.493  
 CM-244 4320A 2/28/10 5795.020 5795.019  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2312.054  
 Energy Calibration Slope : 4.909425  
 Energy Calibration Quadratic : 2.5591909E-04  
 Energy Calibration Range : 7608.000

Instrument : CHAMBER 134  
 Detector : 76230  
 Calibration Date/Time : 17-SEP-2009 15:11:57  
 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	4768.690
CM-244	4320A	2/28/10	5795.020	5794.888

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2332.446  
 Energy Calibration Slope : 4.965801  
 Energy Calibration Quadratic : 2.4601555E-04  
 Energy Calibration Range : 7675.000

Instrument : CHAMBER 135  
 Detector : 64270  
 Calibration Date/Time : 17-SEP-2009 15:12:06  
 Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.697
NP-237	4341	2/28/10	4768.800	4768.428
CM-244	4320A	2/28/10	5795.020	5794.686

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2343.759  
 Energy Calibration Slope : 4.952811  
 Energy Calibration Quadratic : 2.7405450E-04  
 Energy Calibration Range : 7703.000

Instrument : CHAMBER 136  
 Detector : 68549  
 Calibration Date/Time : 17-SEP-2009 15:12:16  
 Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.402
NP-237	4341	2/28/10	4768.800	4769.943
CM-244	4320A	2/28/10	5795.020	5797.448

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2342.322  
 Energy Calibration Slope : 5.020517  
 Energy Calibration Quadratic : 2.2833873E-04  
 Energy Calibration Range : 7723.000

Instrument : CHAMBER 137  
 Detector : 64288  
 Calibration Date/Time : 16-SEP-2009 12:25:39  
 Calibration Source Id : AESS-025

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.831
NP-237	4341	2/28/10	4768.800	4768.466
CM-244	4320A	2/28/10	5795.020	5794.813

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.608  
 Energy Calibration Slope : 5.017363  
 Energy Calibration Quadratic : 3.1012692E-04  
 Energy Calibration Range : 7848.000

Instrument : CHAMBER 138  
 Detector : 65877  
 Calibration Date/Time : 16-SEP-2009 12:25:51  
 Calibration Source Id : AESS-031

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.721
NP-237	4341	2/28/10	4768.800	4768.624
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2381.507  
 Energy Calibration Slope : 4.981775  
 Energy Calibration Quadratic : 3.0701407E-04  
 Energy Calibration Range : 7805.000

Instrument : CHAMBER 139  
 Detector : 76231  
 Calibration Date/Time : 16-SEP-2009 12:26:02  
 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	4768.667
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2352.536  
 Energy Calibration Slope : 4.942561  
 Energy Calibration Quadratic : 2.9986945E-04  
 Energy Calibration Range : 7728.000



Instrument : CHAMBER 140  
 Detector : 78771  
 Calibration Date/Time : 16-SEP-2009 12:26:12  
 Calibration Source Id : AESS-032

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.880
NP-237	4341	2/28/10	4768.800	4768.746
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2344.410  
 Energy Calibration Slope : 4.964199  
 Energy Calibration Quadratic : 2.9030148E-04  
 Energy Calibration Range : 7732.000

Instrument : CHAMBER 141  
 Detector : 76232  
 Calibration Date/Time : 16-SEP-2009 12:26:23  
 Calibration Source Id : AESS-027

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.756
NP-237	4341	2/28/10	4768.800	4768.664
CM-244	4320A	2/28/10	5795.020	5794.921

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2359.530  
 Energy Calibration Slope : 4.949186  
 Energy Calibration Quadratic : 2.9451301E-04  
 Energy Calibration Range : 7736.000

Instrument : CHAMBER 142  
 Detector : 64261  
 Calibration Date/Time : 16-SEP-2009 12:26:33  
 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	4768.702
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2380.580  
 Energy Calibration Slope : 4.968856  
 Energy Calibration Quadratic : 3.0223309E-04  
 Energy Calibration Range : 7786.000

Instrument : CHAMBER 143  
 Detector : 65882  
 Calibration Date/Time : 16-SEP-2009 12:26:43  
 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 : 2353.411  
 Energy Calibration Slope : 4.964171  
 Energy Calibration Quadratic : 2.8231755E-04  
 Energy Calibration Range : 7733.000

Instrument : CHAMBER 144  
 Detector : 75551  
 Calibration Date/Time : 16-SEP-2009 12:26:53  
 Calibration Source Id : AESS-034  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 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 : 2347.296  
 Energy Calibration Slope : 4.959377  
 Energy Calibration Quadratic : 2.8099009E-04  
 Energy Calibration Range : 7720.000

Instrument : CHAMBER 145  
 Detector : 72526  
 Calibration Date/Time : 16-SEP-2009 12:27:03  
 Calibration Source Id : AESS-029  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2354.857  
 Energy Calibration Slope : 4.970427  
 Energy Calibration Quadratic : 2.8643355E-04  
 Energy Calibration Range : 7745.000

Instrument : CHAMBER 146  
 Detector : 72527  
 Calibration Date/Time : 16-SEP-2009 12:27:13  
 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	5795.019

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2349.628  
 Energy Calibration Slope : 4.953955  
 Energy Calibration Quadratic : 2.6576858E-04  
 Energy Calibration Range : 7701.000

Instrument : CHAMBER 147  
 Detector : 75550  
 Calibration Date/Time : 16-SEP-2009 12:27:23  
 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 : 2346.748  
 Energy Calibration Slope : 4.969914  
 Energy Calibration Quadratic : 2.5925279E-04  
 Energy Calibration Range : 7708.000

Instrument : CHAMBER 148  
 Detector : 74429  
 Calibration Date/Time : 16-SEP-2009 12:27:33  
 Calibration Source Id : AESS-036

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2346.190  
 Energy Calibration Slope : 4.957554  
 Energy Calibration Quadratic : 2.8058770E-04  
 Energy Calibration Range : 7717.000

Instrument : CHAMBER 149  
 Detector : 33449  
 Calibration Date/Time : 15-SEP-2009 13:29:50  
 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	4768.962
CM-244	4320A	2/28/10	5795.020	5795.120

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2390.249  
 Energy Calibration Slope : 4.945051  
 Energy Calibration Quadratic : 3.1025134E-04  
 Energy Calibration Range : 7779.000

Instrument : CHAMBER 150  
 Detector : 75552  
 Calibration Date/Time : 15-SEP-2009 13:30:04  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2355.846  
 Energy Calibration Slope : 4.963627  
 Energy Calibration Quadratic : 2.8320536E-04  
 Energy Calibration Range : 7736.000

Instrument : CHAMBER 151  
 Detector : 75556  
 Calibration Date/Time : 15-SEP-2009 13:30:37  
 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	4768.876
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2346.769  
 Energy Calibration Slope : 4.917734  
 Energy Calibration Quadratic : 2.9527576E-04  
 Energy Calibration Range : 7692.000

Instrument : CHAMBER 152  
 Detector : 76222  
 Calibration Date/Time : 15-SEP-2009 13:30:48  
 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	4768.772
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2342.471  
 Energy Calibration Slope : 4.955277  
 Energy Calibration Quadratic : 2.6035175E-04  
 Energy Calibration Range : 7690.000

Instrument : CHAMBER 153  
 Detector : 76223  
 Calibration Date/Time : 15-SEP-2009 13:31:00  
 Calibration Source Id : AESS-039

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.192
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 : 2333.990  
 Energy Calibration Slope : 4.951685  
 Energy Calibration Quadratic : 2.7959119E-04  
 Energy Calibration Range : 7698.000

Instrument : CHAMBER 154  
 Detector : 76224  
 Calibration Date/Time : 15-SEP-2009 13:31:26  
 Calibration Source Id : AESS-045

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2342.016  
 Energy Calibration Slope : 4.948280  
 Energy Calibration Quadratic : 2.8570730E-04  
 Energy Calibration Range : 7709.000

Instrument : CHAMBER 155  
 Detector : 75553  
 Calibration Date/Time : 15-SEP-2009 13:31:39  
 Calibration Source Id : AESS-040  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.184  
 NP-237 4341 2/28/10 4768.800 4768.936  
 CM-244 4320A 2/28/10 5795.020 5795.140  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2366.281  
 Energy Calibration Slope : 4.966718  
 Energy Calibration Quadratic : 2.9833001E-04  
 Energy Calibration Range : 7765.000

Instrument : CHAMBER 156  
 Detector : 75554  
 Calibration Date/Time : 15-SEP-2009 13:31:49  
 Calibration Source Id : AESS-046  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3189.446  
 NP-237 4341 2/28/10 4768.800 5162.066  
 CM-244 4320A 2/28/10 5795.020 5800.248  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.858  
 Energy Calibration Slope : 4.985206  
 Energy Calibration Quadratic : 2.8685082E-04  
 Energy Calibration Range : 7769.000

Instrument : CHAMBER 157  
 Detector : 75555  
 Calibration Date/Time : 15-SEP-2009 13:32:00  
 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 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.555  
 Energy Calibration Slope : 4.963046  
 Energy Calibration Quadratic : 2.9731516E-04  
 Energy Calibration Range : 7754.000

Instrument : CHAMBER 158  
 Detector : 33451  
 Calibration Date/Time : 15-SEP-2009 13:32:11  
 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	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2391.673  
 Energy Calibration Slope : 4.990663  
 Energy Calibration Quadratic : 3.2096857E-04  
 Energy Calibration Range : 7839.000

Instrument : CHAMBER 159  
 Detector : 76225  
 Calibration Date/Time : 15-SEP-2009 13:32:21  
 Calibration Source Id : AESS-042

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.819
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 : 2354.535  
 Energy Calibration Slope : 4.988183  
 Energy Calibration Quadratic : 2.8453415E-04  
 Energy Calibration Range : 7761.000

Instrument : CHAMBER 160  
 Detector : 76226  
 Calibration Date/Time : 15-SEP-2009 13:32:31  
 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	4768.745
CM-244	4320A	2/28/10	5795.020	5794.943

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2354.507  
 Energy Calibration Slope : 5.015394  
 Energy Calibration Quadratic : 2.5826940E-04  
 Energy Calibration Range : 7761.000

## Subsection 2: Background Calibration

Instrument : CHAMBER 113  
 Detector : 45-111B4  
 Background Analysis Date/Time : 13-SEP-2009 12:07:37  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.706	3302.190	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.295	4905.578	9.000000	2.700000	33.33334	95.00000
CM-244	5531.363	5884.629	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 114  
 Detector : 78258  
 Background Analysis Date/Time : 13-SEP-2009 12:07:42  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.034	3302.376	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.616	4901.658	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.073	5883.287	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 115  
 Detector : 45-132FF4  
 Background Analysis Date/Time : 13-SEP-2009 12:07:47  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.454	3300.485	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.893	4906.309	7.000000	2.100000	37.79645	95.00000
CM-244	5530.846	5883.358	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 116  
 Detector : 45-132FF2  
 Background Analysis Date/Time : 13-SEP-2009 12:07:52  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.147	3301.366	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4433.104	4903.545	7.000000	2.100000	37.79645	95.00000
CM-244	5532.219	5884.159	18.00000	5.400000	23.57022	95.00000



Instrument : CHAMBER 117  
 Detector : 33450  
 Background Analysis Date/Time : 13-SEP-2009 12:07:56  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.160	3299.532	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.233	4904.181	9.000000	2.700000	33.33334	95.00000
CM-244	5532.536	5884.461	14.00000	4.200000	26.72612	95.00000

Instrument : CHAMBER 118  
 Detector : 75544  
 Background Analysis Date/Time : 13-SEP-2009 12:08:02  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.246	3300.695	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.648	4905.687	4.000000	1.200000	50.00000	95.00000
CM-244	5534.149	5886.128	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 119  
 Detector : 74429  
 Background Analysis Date/Time : 13-SEP-2009 12:08:06  
 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	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.548	4906.013	0.0000000E+00	0.0000000E+00	0.0000000E+00	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 : 13-SEP-2009 12:08:12  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.533	3297.646	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.084	4903.407	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.300	5884.438	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 121  
 Detector : 75545  
 Background Analysis Date/Time : 13-SEP-2009 12:08:17  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.369	3298.608	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.997	4903.847	3.000000	0.9000000	57.73503	95.00000
CM-244	5530.990	5882.362	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 122  
 Detector : 75546  
 Background Analysis Date/Time : 13-SEP-2009 12:08:22  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.526	3302.417	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.926	4903.828	13.00000	3.900000	27.73501	95.00000
CM-244	5530.663	5887.014	17.00000	5.100000	24.25356	95.00000

Instrument : CHAMBER 123  
 Detector : 45-142V3  
 Background Analysis Date/Time : 13-SEP-2009 12:08:27  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.415	3297.641	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.564	4904.117	4.000000	1.200000	50.00000	95.00000
CM-244	5535.344	5885.681	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 124  
 Detector : 45-142V2  
 Background Analysis Date/Time : 13-SEP-2009 12:08:33  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.039	3298.711	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.637	4902.902	5.000000	1.500000	44.72136	95.00000
CM-244	5534.267	5882.317	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 125  
 Detector : 75547  
 Background Analysis Date/Time : 13-SEP-2009 12:08:38  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.290	3300.040	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.085	4901.751	2.000000	0.6000000	70.71068	95.00000
CM-244	5532.412	5882.738	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 126  
 Detector : 75548  
 Background Analysis Date/Time : 13-SEP-2009 12:08:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.846	3299.840	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.552	4902.802	10.00000	3.000000	31.62278	95.00000
CM-244	5533.398	5882.628	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 127  
 Detector : 78770  
 Background Analysis Date/Time : 13-SEP-2009 12:08:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.252	3302.146	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.433	4903.142	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.926	5885.739	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 128  
 Detector : 75549  
 Background Analysis Date/Time : 13-SEP-2009 12:08:54  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.918	3301.506	2.000000	0.6000000	70.71068	95.00000
NP-237	4437.567	4901.469	5.000000	1.500000	44.72136	95.00000
CM-244	5532.764	5882.821	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 129  
 Detector : 76227  
 Background Analysis Date/Time : 13-SEP-2009 12:08:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.942	3300.379	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.988	4903.888	7.000000	2.100000	37.79645	95.00000
CM-244	5534.503	5884.627	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 130  
 Detector : 76228  
 Background Analysis Date/Time : 13-SEP-2009 12:09:04  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.288	3298.075	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.444	4902.612	12.00000	3.600000	28.86751	95.00000
CM-244	5530.953	5884.486	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 131  
 Detector : 33448  
 Background Analysis Date/Time : 13-SEP-2009 12:09:09  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.775	3300.047	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.944	4905.225	5.000000	1.500000	44.72136	95.00000
CM-244	5534.242	5886.644	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 132  
 Detector : 67579  
 Background Analysis Date/Time : 13-SEP-2009 12:09:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.478	3299.760	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.728	4906.447	7.000000	2.100000	37.79645	95.00000
CM-244	5534.199	5884.992	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 133  
 Detector : 76229  
 Background Analysis Date/Time : 13-SEP-2009 12:09:19  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.448	3299.164	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.532	4903.111	3.000000	0.9000000	57.73503	95.00000
CM-244	5532.731	5884.588	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 134  
 Detector : 76230  
 Background Analysis Date/Time : 13-SEP-2009 12:09:24  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.219	3300.010	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.624	4902.916	35.00000	10.50000	16.90309	95.00000
CM-244	5532.171	5886.589	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 135  
 Detector : 64270  
 Background Analysis Date/Time : 13-SEP-2009 12:09:28  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.256	3299.743	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.015	4904.361	7.000000	2.100000	37.79645	95.00000
CM-244	5530.434	5886.345	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 136  
 Detector : 68549  
 Background Analysis Date/Time : 13-SEP-2009 12:09:33  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.690	3299.356	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.911	4904.417	19.00000	5.700000	22.94157	95.00000
CM-244	5532.210	5883.186	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 137  
 Detector : 64288  
 Background Analysis Date/Time : 13-SEP-2009 12:09:37  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.157	3297.781	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.908	4901.616	4.000000	1.200000	50.00000	95.00000
CM-244	5533.626	5885.457	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 138  
 Detector : 65877  
 Background Analysis Date/Time : 13-SEP-2009 12:09:42  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.797	3298.359	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.795	4901.574	16.00000	4.800000	25.00000	95.00000
CM-244	5534.629	5884.088	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 139  
 Detector : 76231  
 Background Analysis Date/Time : 13-SEP-2009 12:09:46  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.097	3302.448	7.000000	2.100000	37.79645	95.00000
NP-237	4434.583	4904.027	9.000000	2.700000	33.33334	95.00000
CM-244	5532.194	5884.250	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 140  
 Detector : 78771  
 Background Analysis Date/Time : 13-SEP-2009 12:09:51  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.623	3298.088	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.734	4904.340	8.000000	2.400000	35.35534	95.00000
CM-244	5533.806	5886.466	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 141  
 Detector : 76232  
 Background Analysis Date/Time : 13-SEP-2009 12:09:56  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.803	3300.386	27.00000	8.100000	19.24501	95.00000
NP-237	4433.014	4902.508	26.00000	7.800000	19.61161	95.00000
CM-244	5530.609	5882.563	14.00000	4.200000	26.72612	95.00000

Instrument : CHAMBER 142  
 Detector : 64261  
 Background Analysis Date/Time : 13-SEP-2009 12:10:00  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.279	3300.003	3.000000	0.9000000	57.73503	95.00000
NP-237	4437.328	4903.684	13.00000	3.900000	27.73501	95.00000
CM-244	5534.720	5883.018	16.00000	4.800000	25.00000	95.00000

Instrument : CHAMBER 143  
 Detector : 65882  
 Background Analysis Date/Time : 13-SEP-2009 12:10:05  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.414	3301.724	9.000000	2.700000	33.33334	95.00000
NP-237	4436.178	4906.076	12.00000	3.600000	28.86751	95.00000
CM-244	5534.405	5886.338	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 144  
 Detector : 75551  
 Background Analysis Date/Time : 13-SEP-2009 12:10:09  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.731	3299.721	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.065	4902.473	11.00000	3.300000	30.15113	95.00000
CM-244	5535.430	5887.007	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 145  
 Detector : 72526  
 Background Analysis Date/Time : 13-SEP-2009 12:10:13  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.721	3299.421	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.677	4906.422	5.000000	1.500000	44.72136	95.00000
CM-244	5530.652	5883.277	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 146  
 Detector : 72527  
 Background Analysis Date/Time : 13-SEP-2009 12:10:17  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.088	3300.474	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.771	4903.488	6.000000	1.800000	40.82483	95.00000
CM-244	5533.810	5883.749	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 147  
 Detector : 75550  
 Background Analysis Date/Time : 13-SEP-2009 12:10:22  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.181	3300.391	5.000000	1.500000	44.72136	95.00000
NP-237	4433.176	4901.748	17.00000	5.100000	24.25356	95.00000
CM-244	5533.043	5883.438	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 148  
 Detector : 74429  
 Background Analysis Date/Time : 13-SEP-2009 12:10:27  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.384	3298.254	7.000000	2.100000	37.79645	95.00000
NP-237	4436.330	4905.591	5.000000	1.500000	44.72136	95.00000
CM-244	5533.038	5884.458	5.000000	1.500000	44.72136	95.00000



Instrument : CHAMBER 149  
 Detector : 33449  
 Background Analysis Date/Time : 13-SEP-2009 12:10:31  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.123	3300.525	5.000000	1.500000	44.72136	95.00000
NP-237	4433.492	4903.565	7.000000	2.100000	37.79645	95.00000
CM-244	5532.823	5885.611	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 150  
 Detector : 75552  
 Background Analysis Date/Time : 13-SEP-2009 12:10:36  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.795	3299.018	4.000000	1.200000	50.00000	95.00000
NP-237	4433.345	4903.215	6.000000	1.800000	40.82483	95.00000
CM-244	5531.531	5883.467	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 151  
 Detector : 75556  
 Background Analysis Date/Time : 13-SEP-2009 12:10:41  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.065	3301.859	4.000000	1.200000	50.00000	95.00000
NP-237	4433.320	4905.527	3.000000	0.9000000	57.73503	95.00000
CM-244	5530.408	5885.912	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 152  
 Detector : 76222  
 Background Analysis Date/Time : 13-SEP-2009 12:10:46  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.057	3298.427	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.408	4906.063	4.000000	1.200000	50.00000	95.00000
CM-244	5530.659	5885.565	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 153  
 Detector : 76223  
 Background Analysis Date/Time : 13-SEP-2009 12:10:51  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.484	3300.080	6.000000	1.800000	40.82483	95.00000
NP-237	4437.092	4905.894	12.000000	3.600000	28.86751	95.00000
CM-244	5532.708	5883.766	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 154  
 Detector : 76224  
 Background Analysis Date/Time : 13-SEP-2009 12:10:55  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.121	3297.561	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.389	4903.288	1.000000	0.300000	100.0000	95.00000
CM-244	5530.382	5887.013	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 155  
 Detector : 75553  
 Background Analysis Date/Time : 13-SEP-2009 12:11:00  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.782	3300.412	1.000000	0.300000	100.0000	95.00000
NP-237	4437.153	4903.167	6.000000	1.800000	40.82483	95.00000
CM-244	5533.649	5886.970	10.000000	3.000000	31.62278	95.00000

Instrument : CHAMBER 156  
 Detector : 75554  
 Background Analysis Date/Time : 13-SEP-2009 12:11:05  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.491	3301.031	8.000000	2.400000	35.35534	95.00000
NP-237	4435.135	4901.821	15.000000	4.500000	25.81989	95.00000
CM-244	5532.917	5886.438	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 157  
 Detector : 75555  
 Background Analysis Date/Time : 13-SEP-2009 12:11:09  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.619	3299.042	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.971	4905.888	4.000000	1.200000	50.00000	95.00000
CM-244	5530.610	5883.642	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 158  
 Detector : 33451  
 Background Analysis Date/Time : 13-SEP-2009 12:11:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.107	3300.392	6.000000	1.800000	40.82483	95.00000
NP-237	4434.046	4903.553	8.000000	2.400000	35.35534	95.00000
CM-244	5533.886	5884.921	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 159  
 Detector : 76225  
 Background Analysis Date/Time : 13-SEP-2009 12:11:19  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.563	3302.370	0.000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4437.078	4903.944	7.000000	2.100000	37.79645	95.00000
CM-244	5535.224	5883.443	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 160  
 Detector : 76226  
 Background Analysis Date/Time : 13-SEP-2009 12:11:23  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.547	3301.417	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.329	4905.681	15.00000	4.500000	25.81989	95.00000
CM-244	5531.326	5884.399	7.000000	2.100000	37.79645	95.00000

### Subsection 3: Efficiency Calibration

Instrument : CHAMBER 113  
 Detector : 45-111B4  
 Standard ID : AESS-001  
 Standard Reference Date : 20-FEB-2008 09:54:53  
 Calibration Analysis Date/Time : 17-SEP-2009 07:22:34  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:08:33  
 Average Efficiency : 0.2493664  
 Average Efficiency Error : 6.8753385E-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	2991.706	3302.190	15200.00	0.2463616	1.0587734E-02	67.05293
NP-237	171.0024	28-FEB-2010	4433.295	4905.578	12844.00	0.2503200	1.2709484E-02	68.82748
CM-244	158.1060	28-FEB-2010	5531.363	5884.629	11294.00	0.2528249	1.2863314E-02	69.69121

Instrument : CHAMBER 114  
 Detector : 78258  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 17-SEP-2009 07:22:42  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:08:44  
 Average Efficiency : 0.2549134  
 Average Efficiency Error : 7.0137801E-03  
 Confidence : 95.00000

Cal. Isteps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2988.034	3302.376	15415.00	0.2522229	1.0836960E-02	47.39108
NP-237	205.0260	28-FEB-2010	4432.616	4901.658	15874.00	0.2580762	1.3065383E-02	60.20995
CM-244	199.6806	28-FEB-2010	5533.073	5883.287	14411.00	0.2556491	1.2958678E-02	47.07045

Instrument : CHAMBER 115  
 Detector : 45-132FF4  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 17-SEP-2009 07:22:48  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:08:54  
 Average Efficiency : 0.2607451  
 Average Efficiency Error : 7.1741594E-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	2990.454	3300.485	15582.00	0.2633568	1.1313187E-02	59.06649
NP-237	200.4990	28-FEB-2010	4434.893	4906.309	15600.00	0.2593181	1.3131134E-02	67.99342
CM-244	196.5558	28-FEB-2010	5530.846	5883.358	14362.00	0.2586598	1.3111949E-02	66.45667

Instrument : CHAMBER 116  
 Detector : 45-132FF2  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 17-SEP-2009 07:22:54  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:09:06  
 Average Efficiency : 0.2642209  
 Average Efficiency Error : 7.2657783E-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	2992.147	3301.366	15928.00	0.2614976	1.1229084E-02	58.63169
NP-237	209.2716	28-FEB-2010	4433.104	4903.545	16584.00	0.2641209	1.3364404E-02	67.71608
CM-244	199.6488	28-FEB-2010	5532.219	5884.159	15127.00	0.2683146	1.3592103E-02	63.73655

Instrument : CHAMBER 117  
 Detector : 33450  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 17-SEP-2009 07:22:59  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:09:16  
 Average Efficiency : 0.2539330  
 Average Efficiency Error : 6.9886767E-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	2991.160	3299.532	15096.00	0.2515729	1.0813041E-02	72.94815
NP-237	203.2080	28-FEB-2010	4434.233	4904.181	15475.00	0.2538008	1.2853066E-02	68.32410
CM-244	197.2236	28-FEB-2010	5532.536	5884.461	14342.00	0.2575089	1.3053890E-02	66.10744

Instrument : CHAMBER 118  
 Detector : 75544  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 17-SEP-2009 07:23:06  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:09:28  
 Average Efficiency : 0.2562016  
 Average Efficiency Error : 7.0496872E-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	2992.246	3300.695	15488.00	0.2575730	1.1065898E-02	48.08698
NP-237	204.0192	28-FEB-2010	4435.648	4905.687	15474.00	0.2527997	1.2802343E-02	51.47660
CM-244	197.2128	28-FEB-2010	5534.149	5886.128	14364.00	0.2578340	1.3070064E-02	51.26923

Instrument : CHAMBER 119  
 Detector : 74429  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 17-SEP-2009 07:23:12  
 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	14305.00	0.2936279	1.2630888E-02	65.91196
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 : 17-SEP-2009 07:23:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:09:40  
 Average Efficiency : 0.2607642  
 Average Efficiency Error : 7.1738800E-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	2989.533	3297.646	15530.00	0.2600539	1.1171980E-02	51.65312
NP-237	202.9926	28-FEB-2010	4435.084	4903.407	15890.00	0.2609192	1.3209156E-02	58.42772
CM-244	196.2330	28-FEB-2010	5534.300	5884.438	14492.00	0.2616084	1.3259737E-02	53.52900

Instrument : CHAMBER 121  
 Detector : 75545  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 17-SEP-2009 07:23:26  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:09:49  
 Average Efficiency : 0.2451099  
 Average Efficiency Error : 6.7468924E-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	2991.369	3298.608	14990.00	0.2406018	1.0342800E-02	48.96049
NP-237	209.5938	28-FEB-2010	4434.997	4903.847	15464.00	0.2459217	1.2454119E-02	62.72179
CM-244	202.7478	28-FEB-2010	5530.990	5882.362	14372.00	0.2510890	1.2728020E-02	56.59771

Instrument : CHAMBER 122  
 Detector : 75546  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 17-SEP-2009 07:23:33  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:09:59  
 Average Efficiency : 0.2511206  
 Average Efficiency Error : 6.9071823E-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	2989.526	3302.417	15637.00	0.2485339	1.0675786E-02	50.53908
NP-237	214.4868	28-FEB-2010	4434.926	4903.828	16238.00	0.2522937	1.2769196E-02	58.55772
CM-244	208.4184	28-FEB-2010	5530.663	5887.014	14930.00	0.2536814	1.2853005E-02	49.92265

Instrument : CHAMBER 123  
 Detector : 45-142V3  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 17-SEP-2009 07:23:40  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:10:08  
 Average Efficiency : 0.2596290  
 Average Efficiency Error : 7.1429913E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2989.415	3297.641	15549.00	0.2582173	1.1092825E-02	65.43886
NP-237	204.7038	28-FEB-2010	4435.564	4904.117	15822.00	0.2576210	1.3042886E-02	67.03554
CM-244	195.0060	28-FEB-2010	5535.344	5885.681	14523.00	0.2637896	1.3369960E-02	69.14881

Instrument : CHAMBER 124  
 Detector : 45-142V2  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 17-SEP-2009 07:23:47  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:10:17  
 Average Efficiency : 0.2573053  
 Average Efficiency Error : 7.0782932E-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	2988.039	3298.711	15522.00	0.2546119	1.0938271E-02	67.72288
NP-237	205.8930	28-FEB-2010	4435.637	4902.902	16168.00	0.2617298	1.3247415E-02	71.34655
CM-244	203.1954	28-FEB-2010	5534.267	5882.317	14734.00	0.2568478	1.3015599E-02	72.65984

Instrument : CHAMBER 125  
 Detector : 75547  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-SEP-2009 07:23:54  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:10:26  
 Average Efficiency : 0.2582467  
 Average Efficiency Error : 7.1037016E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2988.290	3300.040	15695.00	0.2606819	1.1196902E-02	49.19345
NP-237	210.2526	28-FEB-2010	4434.085	4901.751	16039.00	0.2542721	1.2871174E-02	57.62983
CM-244	201.9108	28-FEB-2010	5532.412	5882.738	14766.00	0.2590335	1.3125989E-02	51.15325

Instrument : CHAMBER 126  
 Detector : 75548  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 17-SEP-2009 07:24:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:10:43  
 Average Efficiency : 0.2528757  
 Average Efficiency Error : 6.9609745E-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	2988.846	3299.840	14908.00	0.2463797	1.0592219E-02	51.21568
NP-237	202.9140	28-FEB-2010	4433.552	4902.802	15759.00	0.2588291	1.3104737E-02	56.16846
CM-244	199.3140	28-FEB-2010	5533.398	5882.628	14458.00	0.2568124	1.3017087E-02	52.26496

Instrument : CHAMBER 127  
 Detector : 78770  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 17-SEP-2009 07:24:09  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:10:52  
 Average Efficiency : 0.2474696  
 Average Efficiency Error : 6.8085734E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2989.252	3302.146	15471.00	0.2437071	1.0470388E-02	48.16148
NP-237	211.7160	28-FEB-2010	4434.433	4903.142	15929.00	0.2507826	1.2695607E-02	58.40179
CM-244	207.3882	28-FEB-2010	5534.926	5885.739	14624.00	0.2496737	1.2653272E-02	52.79491



Instrument : CHAMBER 128  
 Detector : 75549  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 17-SEP-2009 07:24:16  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:11:01  
 Average Efficiency : 0.2534627  
 Average Efficiency Error : 6.9763800E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	205.5870	28-FEB-2010	2991.918	3301.506	15064.00	0.2478480	1.0653354E-02	48.72564
NP-237	203.4984	28-FEB-2010	4437.567	4901.469	15680.00	0.2568161	1.3003596E-02	61.32889
CM-244	197.1096	28-FEB-2010	5532.764	5882.821	14387.00	0.2585539	1.3106194E-02	50.94863

Instrument : CHAMBER 129  
 Detector : 76227  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-SEP-2009 07:24:21  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:11:11  
 Average Efficiency : 0.2630869  
 Average Efficiency Error : 7.2373999E-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	2987.942	3300.379	15637.00	0.2592492	1.1136069E-02	51.14825
NP-237	200.6460	28-FEB-2010	4435.988	4903.888	16067.00	0.2668864	1.3509459E-02	61.16219
CM-244	195.9270	28-FEB-2010	5534.503	5884.627	14653.00	0.2649124	1.3425237E-02	55.22726

Instrument : CHAMBER 130  
 Detector : 76228  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 17-SEP-2009 07:24:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:11:20  
 Average Efficiency : 0.2483380  
 Average Efficiency Error : 6.8345908E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2989.288	3298.075	15085.00	0.2448552	1.0524444E-02	49.62173
NP-237	210.1548	28-FEB-2010	4435.444	4902.612	15873.00	0.2517098	1.2743165E-02	56.97301
CM-244	200.7390	28-FEB-2010	5530.953	5884.486	14177.00	0.2500546	1.2677893E-02	51.59090

Instrument : CHAMBER 131  
 Detector : 33448  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-SEP-2009 07:24:30  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:11:29  
 Average Efficiency : 0.2501664  
 Average Efficiency Error : 6.8896543E-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	2991.775	3300.047	14580.00	0.2416933	1.0394993E-02	94.70427
NP-237	199.3962	28-FEB-2010	4434.944	4905.225	15408.00	0.2575527	1.3043756E-02	97.00230
CM-244	198.6402	28-FEB-2010	5534.242	5886.644	14360.00	0.2560634	1.2980316E-02	84.26888

Instrument : CHAMBER 132  
 Detector : 67579  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 17-SEP-2009 07:24:36  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:11:39  
 Average Efficiency : 0.2502582  
 Average Efficiency Error : 6.8874490E-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	2988.478	3299.760	15157.00	0.2445240	1.0509308E-02	47.44493
NP-237	206.8830	28-FEB-2010	4435.728	4906.447	15902.00	0.2561820	1.2969248E-02	59.39411
CM-244	203.0208	28-FEB-2010	5534.199	5884.992	14501.00	0.2530044	1.2823543E-02	54.36437

Instrument : CHAMBER 133  
 Detector : 76229  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-SEP-2009 07:24:41  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:11:48  
 Average Efficiency : 0.2438080  
 Average Efficiency Error : 6.7106839E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.0798	28-FEB-2010	2989.448	3299.164	15021.00	0.2418610	1.0396539E-02	54.98614
NP-237	208.5846	28-FEB-2010	4434.532	4903.111	15484.00	0.2474312	1.2530360E-02	61.05153
CM-244	205.5828	28-FEB-2010	5532.731	5884.588	14106.00	0.2430393	1.2323108E-02	54.34287

Instrument : CHAMBER 134  
 Detector : 76230  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 17-SEP-2009 07:24:46  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:11:57  
 Average Efficiency : 0.2444534  
 Average Efficiency Error : 6.7299884E-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	2992.219	3300.010	14779.00	0.2409492	1.0360401E-02	46.56962
NP-237	207.4998	28-FEB-2010	4435.624	4902.916	15337.00	0.2462044	1.2469973E-02	55.22544
CM-244	199.8804	28-FEB-2010	5532.171	5886.589	13986.00	0.2478311	1.2567575E-02	48.04740

Instrument : CHAMBER 135  
 Detector : 64270  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-SEP-2009 07:24:53  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:12:06  
 Average Efficiency : 0.2526507  
 Average Efficiency Error : 6.9530043E-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	2992.256	3299.743	15152.00	0.2534960	1.0894979E-02	56.63107
NP-237	208.8990	28-FEB-2010	4436.015	4904.361	15645.00	0.2496088	1.2639027E-02	67.14091
CM-244	198.1458	28-FEB-2010	5530.434	5886.345	14246.00	0.2546374	1.2909472E-02	60.82066

Instrument : CHAMBER 136  
 Detector : 68549  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 17-SEP-2009 07:24:58  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-SEP-2009 15:12:16  
 Average Efficiency : 0.2485794  
 Average Efficiency Error : 6.8427753E-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	2988.690	3299.356	14903.00	0.2476970	1.0648914E-02	56.69555
NP-237	205.6662	28-FEB-2010	4433.911	4904.417	15511.00	0.2513022	1.2726229E-02	83.91869
CM-244	198.3060	28-FEB-2010	5532.210	5883.186	13838.00	0.2471603	1.2535414E-02	66.08641

Instrument : CHAMBER 137  
 Detector : 64288  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 16-SEP-2009 07:03:27  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-SEP-2009 12:25:39  
 Average Efficiency : 0.2528386  
 Average Efficiency Error : 6.9739525E-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	2991.157	3297.781	14785.00	0.2557061	1.0994853E-02	66.23147
NP-237	167.9916	28-FEB-2010	4435.908	4901.616	12861.00	0.2551677	1.2955310E-02	79.15361
CM-244	157.2432	28-FEB-2010	5533.626	5885.457	10964.00	0.2468996	1.2568292E-02	71.74486

Instrument : CHAMBER 138  
 Detector : 65877  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 16-SEP-2009 07:03:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-SEP-2009 12:25:51  
 Average Efficiency : 0.2560047  
 Average Efficiency Error : 7.0619099E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2988.797	3298.359	14674.00	0.2562743	1.1020770E-02	57.98399
NP-237	162.9186	28-FEB-2010	4433.795	4901.574	12708.00	0.2599091	1.3198568E-02	62.78986
CM-244	153.1968	28-FEB-2010	5534.629	5884.088	10904.00	0.2519520	1.2826724E-02	60.43048

Instrument : CHAMBER 139  
 Detector : 76231  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 16-SEP-2009 07:03:37  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-SEP-2009 12:26:02  
 Average Efficiency : 0.2492872  
 Average Efficiency Error : 7.3094456E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2990.097	3302.448	14822.00	0.2512630	1.2732445E-02	51.16375
NP-237	168.0294	28-FEB-2010	4434.583	4904.027	12686.00	0.2516089	1.2777339E-02	56.09538
CM-244	160.5822	28-FEB-2010	5532.194	5884.250	11118.00	0.2451757	1.2477465E-02	51.18374

Instrument : CHAMBER 140  
 Detector : 78771  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 16-SEP-2009 07:03:42  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-SEP-2009 12:26:12  
 Average Efficiency : 0.2526492  
 Average Efficiency Error : 6.9693825E-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	2989.623	3298.088	14531.00	0.2517187	1.0826853E-02	46.10829
NP-237	165.9822	28-FEB-2010	4433.734	4904.340	12513.00	0.2512438	1.2761484E-02	54.69451
CM-244	153.7938	28-FEB-2010	5533.806	5886.466	11096.00	0.2554495	1.3000681E-02	47.20534

Instrument : CHAMBER 141  
 Detector : 76232  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 16-SEP-2009 07:03:47  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-SEP-2009 12:26:23  
 Average Efficiency : 0.2547455  
 Average Efficiency Error : 7.4726613E-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	2987.803	3300.386	14389.00	0.2514884	1.2749074E-02	55.20152
NP-237	161.6154	28-FEB-2010	4433.014	4902.508	12459.00	0.2568074	1.3045154E-02	58.63324
CM-244	148.1754	28-FEB-2010	5530.609	5882.563	10718.00	0.2560930	1.3041621E-02	54.14653

Instrument : CHAMBER 142  
 Detector : 64261  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 16-SEP-2009 07:03:52  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-SEP-2009 12:26:33  
 Average Efficiency : 0.2603842  
 Average Efficiency Error : 7.1830968E-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	2991.279	3300.003	14554.00	0.2558129	1.1002630E-02	53.68588
NP-237	161.7816	28-FEB-2010	4437.328	4903.684	12703.00	0.2616512	1.3287083E-02	68.08553
CM-244	147.2670	28-FEB-2010	5534.720	5883.018	11068.00	0.2659896	1.3537915E-02	58.50507

Instrument : CHAMBER 143  
 Detector : 65882  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 16-SEP-2009 07:03:57  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-SEP-2009 12:26:43  
 Average Efficiency : 0.2438162  
 Average Efficiency Error : 7.1521485E-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	2988.414	3301.724	14343.00	0.2429526	1.2316748E-02	45.85791
NP-237	168.1992	28-FEB-2010	4436.178	4906.076	12465.00	0.2469572	1.2544546E-02	55.41743
CM-244	156.7614	28-FEB-2010	5534.405	5886.338	10698.00	0.2416553	1.2306704E-02	49.25873

Instrument : CHAMBER 144  
 Detector : 75551  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 16-SEP-2009 07:04:02  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-SEP-2009 12:26:53  
 Average Efficiency : 0.2432079  
 Average Efficiency Error : 6.7124735E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2991.731	3299.721	14149.00	0.2386236	1.0268736E-02	49.42162
NP-237	167.2962	28-FEB-2010	4433.065	4902.473	12333.00	0.2456661	1.2481030E-02	52.43185
CM-244	154.4388	28-FEB-2010	5535.430	5887.007	10803.00	0.2476103	1.2607776E-02	51.75169

Instrument : CHAMBER 145  
 Detector : 72526  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 16-SEP-2009 07:04:08  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-SEP-2009 12:27:03  
 Average Efficiency : 0.2494907  
 Average Efficiency Error : 7.3155323E-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	2990.721	3299.421	14837.00	0.2489683	1.2615955E-02	50.61446
NP-237	169.7700	28-FEB-2010	4435.677	4906.422	12664.00	0.2486207	1.2625882E-02	55.75652
CM-244	154.8234	28-FEB-2010	5530.652	5883.277	10970.00	0.2509164	1.2772597E-02	53.06380

Instrument : CHAMBER 146  
 Detector : 72527  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 16-SEP-2009 07:04:13  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-SEP-2009 12:27:13  
 Average Efficiency : 0.2521794  
 Average Efficiency Error : 6.9540716E-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	2988.088	3300.474	14792.00	0.2518262	1.0827903E-02	50.57500
NP-237	168.2934	28-FEB-2010	4435.771	4903.488	12795.00	0.2533910	1.2866129E-02	58.62805
CM-244	158.8128	28-FEB-2010	5533.810	5883.749	11284.00	0.2514743	1.2794847E-02	52.59344

Instrument : CHAMBER 147  
 Detector : 75550  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 16-SEP-2009 07:04:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-SEP-2009 12:27:23  
 Average Efficiency : 0.2462009  
 Average Efficiency Error : 7.2221002E-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	2992.181	3300.391	14151.00	0.2405333	1.2196311E-02	44.26603
NP-237	166.3758	28-FEB-2010	4433.176	4901.748	12552.00	0.2513769	1.2767726E-02	56.17089
CM-244	157.1856	28-FEB-2010	5533.043	5883.438	10973.00	0.2472064	1.2583700E-02	52.54537

Instrument : CHAMBER 148  
 Detector : 74429  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 16-SEP-2009 07:04:24  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 16-SEP-2009 12:27:33  
 Average Efficiency : 0.2474463  
 Average Efficiency Error : 6.8263425E-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	2990.384	3298.254	14523.00	0.2439571	1.0493157E-02	54.37553
NP-237	167.4312	28-FEB-2010	4436.330	4905.591	12624.00	0.2512974	1.2762434E-02	58.03280
CM-244	156.4188	28-FEB-2010	5533.038	5884.458	10990.00	0.2487361	1.2661190E-02	52.85587

Instrument : CHAMBER 149  
 Detector : 33449  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 15-SEP-2009 07:17:20  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-SEP-2009 13:29:50  
 Average Efficiency : 0.2442746  
 Average Efficiency Error : 6.7418939E-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	2988.123	3300.525	14041.00	0.2401365	1.0335403E-02	63.60672
NP-237	167.1294	28-FEB-2010	4433.492	4903.565	12391.00	0.2470920	1.2552506E-02	63.37567
CM-244	154.7664	28-FEB-2010	5532.823	5885.611	10826.00	0.2475891	1.2606204E-02	58.70196

Instrument : CHAMBER 150  
 Detector : 75552  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 15-SEP-2009 07:17:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-SEP-2009 13:30:04  
 Average Efficiency : 0.2497773  
 Average Efficiency Error : 6.8896711E-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	2990.795	3299.018	14579.00	0.2492991	1.0722128E-02	50.95595
NP-237	168.7422	28-FEB-2010	4433.345	4903.215	12583.00	0.2485292	1.2622490E-02	60.02569
CM-244	156.3252	28-FEB-2010	5531.531	5883.467	11119.00	0.2517459	1.2811826E-02	53.55379

Instrument : CHAMBER 151  
 Detector : 75556  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 15-SEP-2009 07:17:30  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-SEP-2009 13:30:37  
 Average Efficiency : 0.2445973  
 Average Efficiency Error : 6.7483815E-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	2991.065	3301.859	14594.00	0.2466028	1.0605961E-02	51.54713
NP-237	170.0886	28-FEB-2010	4433.320	4905.527	12551.00	0.2459524	1.2492075E-02	61.04260
CM-244	157.7460	28-FEB-2010	5530.408	5885.912	10724.00	0.2406166	1.2253285E-02	55.41215



Instrument : CHAMBER 152  
 Detector : 76222  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 15-SEP-2009 07:17:36  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-SEP-2009 13:30:48  
 Average Efficiency : 0.2467650  
 Average Efficiency Error : 6.8100104E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2991.057	3298.427	14281.00	0.2483825	1.0686823E-02	51.43459
NP-237	166.6248	28-FEB-2010	4433.408	4906.063	12493.00	0.2498989	1.2693445E-02	55.87722
CM-244	155.8290	28-FEB-2010	5530.659	5885.565	10640.00	0.2416724	1.2308771E-02	51.92970

Instrument : CHAMBER 153  
 Detector : 76223  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 15-SEP-2009 07:17:41  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-SEP-2009 13:31:00  
 Average Efficiency : 0.2530614  
 Average Efficiency Error : 6.9837277E-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	2992.484	3300.080	14284.00	0.2512709	1.0811096E-02	45.25198
NP-237	159.1506	28-FEB-2010	4437.092	4905.894	12330.00	0.2581708	1.3116390E-02	53.88176
CM-244	151.7142	28-FEB-2010	5532.708	5883.766	10746.00	0.2507173	1.2767147E-02	50.96059

Instrument : CHAMBER 154  
 Detector : 76224  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 15-SEP-2009 07:17:46  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-SEP-2009 13:31:26  
 Average Efficiency : 0.2566059  
 Average Efficiency Error : 7.0827994E-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	2990.121	3297.561	14209.00	0.2569968	1.1058494E-02	47.64388
NP-237	160.8066	28-FEB-2010	4434.389	4903.288	12086.00	0.2505226	1.2731740E-02	51.56582
CM-244	145.8384	28-FEB-2010	5530.382	5887.013	10826.00	0.2627504	1.3378122E-02	46.75677

Instrument : CHAMBER 155  
 Detector : 75553  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 15-SEP-2009 07:17:52  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-SEP-2009 13:31:39  
 Average Efficiency : 0.2586447  
 Average Efficiency Error : 7.1315672E-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	2991.782	3300.412	14971.00	0.2603490	1.1191908E-02	52.31090
NP-237	166.8174	28-FEB-2010	4437.153	4903.167	12889.00	0.2575112	1.3073887E-02	61.10300
CM-244	155.0100	28-FEB-2010	5533.649	5886.970	11275.00	0.2574479	1.3098875E-02	53.76326

Instrument : CHAMBER 156  
 Detector : 75554  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 15-SEP-2009 07:17:57  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-SEP-2009 13:31:49  
 Average Efficiency : 0.2458351  
 Average Efficiency Error : 6.7870235E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2991.491	3301.031	12844.31	0.2400144	1.0333307E-02	49.77089
NP-237	164.6658	28-FEB-2010	4435.135	4901.821	97.08801	0.2506796	1.2734897E-02	61.19961
CM-244	151.3824	28-FEB-2010	5532.917	5886.438	10151.71	0.0000000E+00	0.0000000E+00	52.61485

Instrument : CHAMBER 157  
 Detector : 75555  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 15-SEP-2009 07:18:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-SEP-2009 13:32:00  
 Average Efficiency : 0.2474201  
 Average Efficiency Error : 6.8232059E-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	2990.619	3299.042	14777.00	0.2450977	1.0538791E-02	51.15771
NP-237	171.2268	28-FEB-2010	4434.971	4905.888	12804.00	0.2492367	1.2655036E-02	55.90152
CM-244	159.5796	28-FEB-2010	5530.610	5883.642	11223.00	0.2489554	1.2667720E-02	51.75545

Instrument : CHAMBER 158  
 Detector : 33451  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 15-SEP-2009 07:18:08  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-SEP-2009 13:32:11  
 Average Efficiency : 0.2493795  
 Average Efficiency Error : 6.8797250E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2990.107	3300.392	14422.00	0.2469665	1.0623971E-02	68.44221
NP-237	168.3948	28-FEB-2010	4434.046	4903.553	12588.00	0.2491289	1.2652891E-02	70.67268
CM-244	154.6032	28-FEB-2010	5533.886	5884.921	11059.00	0.2531897	1.2886493E-02	68.82631

Instrument : CHAMBER 159  
 Detector : 76225  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 15-SEP-2009 07:18:13  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-SEP-2009 13:32:21  
 Average Efficiency : 0.2508302  
 Average Efficiency Error : 6.9238753E-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	2987.563	3302.370	14009.00	0.2510785	1.0806765E-02	45.91304
NP-237	159.6558	28-FEB-2010	4437.078	4903.944	12079.00	0.2521446	1.2814357E-02	56.71059
CM-244	150.5208	28-FEB-2010	5535.224	5883.443	10596.00	0.2491983	1.2692972E-02	51.46926

Instrument : CHAMBER 160  
 Detector : 76226  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 15-SEP-2009 07:18:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 15-SEP-2009 13:32:31  
 Average Efficiency : 0.2441046  
 Average Efficiency Error : 6.7402101E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2990.547	3301.417	13828.00	0.2437831	1.0495425E-02	76.67180
NP-237	161.5530	28-FEB-2010	4433.329	4905.681	11940.00	0.2462660	1.2518029E-02	87.79373
CM-244	151.1856	28-FEB-2010	5531.326	5884.399	10356.00	0.2424449	1.2354254E-02	77.67188

## 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 161  
 Detector : 70321  
 Calibration Date/Time : 21-SEP-2009 14:45:33  
 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	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.675  
 Energy Calibration Slope : 4.903314  
 Energy Calibration Quadratic : 3.3071014E-04  
 Energy Calibration Range : 7744.000

Instrument : CHAMBER 162  
 Detector : 70323  
 Calibration Date/Time : 21-SEP-2009 14:45:43  
 Calibration Source Id : AESS-007

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2372.249  
 Energy Calibration Slope : 4.921350  
 Energy Calibration Quadratic : 3.0858925E-04  
 Energy Calibration Range : 7735.000

Instrument : CHAMBER 163  
 Detector : 70324  
 Calibration Date/Time : 21-SEP-2009 14:46:06  
 Calibration Source Id : AESS-002

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.315  
 Energy Calibration Slope : 4.921310  
 Energy Calibration Quadratic : 3.3110939E-04  
 Energy Calibration Range : 7770.000

Instrument : CHAMBER 164  
 Detector : 70325  
 Calibration Date/Time : 21-SEP-2009 14:46:16  
 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 : 2381.492  
 Energy Calibration Slope : 4.935361  
 Energy Calibration Quadratic : 3.1875577E-04  
 Energy Calibration Range : 7770.000

Instrument : CHAMBER 165  
 Detector : 72544  
 Calibration Date/Time : 21-SEP-2009 14:46:29  
 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 : 2386.890  
 Energy Calibration Slope : 4.958474  
 Energy Calibration Quadratic : 2.9448030E-04  
 Energy Calibration Range : 7773.000

Instrument : CHAMBER 166  
 Detector : 74545  
 Calibration Date/Time : 21-SEP-2009 14:47:27  
 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 : 2376.522  
 Energy Calibration Slope : 4.921530  
 Energy Calibration Quadratic : 3.3686910E-04  
 Energy Calibration Range : 7769.000

Instrument : CHAMBER 167  
 Detector : 72546  
 Calibration Date/Time : 21-SEP-2009 14:48:04  
 Calibration Source Id : AESS-004

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2378.613  
 Energy Calibration Slope : 4.924971  
 Energy Calibration Quadratic : 3.2533024E-04  
 Energy Calibration Range : 7763.000

Instrument : CHAMBER 168  
 Detector : 72547  
 Calibration Date/Time : 21-SEP-2009 14:48:25  
 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 : 2381.283  
 Energy Calibration Slope : 4.946027  
 Energy Calibration Quadratic : 3.0436489E-04  
 Energy Calibration Range : 7765.000

Instrument : CHAMBER 169  
 Detector : 72548  
 Calibration Date/Time : 21-SEP-2009 14:48:47  
 Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.302  
 Energy Calibration Slope : 4.926007  
 Energy Calibration Quadratic : 3.2111545E-04  
 Energy Calibration Range : 7765.000

Instrument : CHAMBER 170  
 Detector : 72549  
 Calibration Date/Time : 21-SEP-2009 14:49:16  
 Calibration Source Id : AESS-011

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2384.736  
 Energy Calibration Slope : 4.931669  
 Energy Calibration Quadratic : 3.3333997E-04  
 Energy Calibration Range : 7784.000

Instrument : CHAMBER 171  
 Detector : 78260  
 Calibration Date/Time : 21-SEP-2009 14:49:40  
 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	4768.120
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2375.901  
 Energy Calibration Slope : 4.923372  
 Energy Calibration Quadratic : 3.1892414E-04  
 Energy Calibration Range : 7752.000

Instrument : CHAMBER 172  
 Detector : 78772  
 Calibration Date/Time : 21-SEP-2009 14:49:54  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2374.003  
 Energy Calibration Slope : 4.928030  
 Energy Calibration Quadratic : 3.2592146E-04  
 Energy Calibration Range : 7762.000

Instrument : CHAMBER 173  
 Detector : 74431  
 Calibration Date/Time : 21-SEP-2009 14:50:04  
 Calibration Source Id : AESS-013

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2368.870  
 Energy Calibration Slope : 4.977422  
 Energy Calibration Quadratic : 2.7764533E-04  
 Energy Calibration Range : 7757.000

Instrument : CHAMBER 174  
 Detector : 74432  
 Calibration Date/Time : 21-SEP-2009 14:50:13  
 Calibration Source Id : AESS-019

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.911  
 Energy Calibration Slope : 5.039232  
 Energy Calibration Quadratic : 2.0001861E-04  
 Energy Calibration Range : 7732.000

Instrument : CHAMBER 175  
 Detector : 74433  
 Calibration Date/Time : 21-SEP-2009 14:50:24  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.263  
 Energy Calibration Slope : 4.969145  
 Energy Calibration Quadratic : 2.8674255E-04  
 Energy Calibration Range : 7753.000



Instrument : CHAMBER 176  
 Detector : 74434  
 Calibration Date/Time : 21-SEP-2009 14:50:36  
 Calibration Source Id : AESS-020

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2359.390  
 Energy Calibration Slope : 5.025916  
 Energy Calibration Quadratic : 2.3010977E-04  
 Energy Calibration Range : 7747.000

Instrument : CHAMBER 177  
 Detector : 74435  
 Calibration Date/Time : 21-SEP-2009 14:50:46  
 Calibration Source Id : AESS-015

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.896  
 Energy Calibration Slope : 4.971116  
 Energy Calibration Quadratic : 2.8296176E-04  
 Energy Calibration Range : 7751.000

Instrument : CHAMBER 178  
 Detector : 74436  
 Calibration Date/Time : 21-SEP-2009 14:50:57  
 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 : 2357.960  
 Energy Calibration Slope : 4.995038  
 Energy Calibration Quadratic : 2.5281982E-04  
 Energy Calibration Range : 7738.000

Instrument : CHAMBER 179  
 Detector : 74437  
 Calibration Date/Time : 21-SEP-2009 14:51:07  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.475  
 Energy Calibration Slope : 4.962544  
 Energy Calibration Quadratic : 2.9229760E-04  
 Energy Calibration Range : 7751.000

Instrument : CHAMBER 180  
 Detector : 74438  
 Calibration Date/Time : 21-SEP-2009 14:51:16  
 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 : 2357.168  
 Energy Calibration Slope : 5.024229  
 Energy Calibration Quadratic : 2.2182068E-04  
 Energy Calibration Range : 7735.000

Instrument : CHAMBER 181  
 Detector : 74439  
 Calibration Date/Time : 21-SEP-2009 14:51:26  
 Calibration Source Id : AESS-017

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.833  
 Energy Calibration Slope : 4.977290  
 Energy Calibration Quadratic : 2.7170058E-04  
 Energy Calibration Range : 7743.000

Instrument : CHAMBER 182  
 Detector : 74440  
 Calibration Date/Time : 21-SEP-2009 14:51:42  
 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	4768.675
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2351.365  
 Energy Calibration Slope : 5.006705  
 Energy Calibration Quadratic : 2.3110739E-04  
 Energy Calibration Range : 7721.000

Instrument : CHAMBER 183  
 Detector : 74441  
 Calibration Date/Time : 21-SEP-2009 14:51:54  
 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 : 2365.306  
 Energy Calibration Slope : 4.968304  
 Energy Calibration Quadratic : 2.8504903E-04  
 Energy Calibration Range : 7752.000

Instrument : CHAMBER 184  
 Detector : 74442  
 Calibration Date/Time : 21-SEP-2009 14:52:17  
 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 : 2357.045  
 Energy Calibration Slope : 5.026213  
 Energy Calibration Quadratic : 2.2053947E-04  
 Energy Calibration Range : 7735.000

Instrument : CHAMBER 185  
 Detector : 68615  
 Calibration Date/Time : 21-SEP-2009 14:52:26  
 Calibration Source Id : AESS-025

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.439  
 Energy Calibration Slope : 4.921171  
 Energy Calibration Quadratic : 2.9912216E-04  
 Energy Calibration Range : 7716.000

Instrument : CHAMBER 186  
 Detector : 68616  
 Calibration Date/Time : 21-SEP-2009 14:52:35  
 Calibration Source Id : AESS-031

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.841  
 Energy Calibration Slope : 4.954493  
 Energy Calibration Quadratic : 2.7342763E-04  
 Energy Calibration Range : 7723.000

Instrument : CHAMBER 187  
 Detector : 68620  
 Calibration Date/Time : 21-SEP-2009 14:52:45  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2375.999  
 Energy Calibration Slope : 4.962572  
 Energy Calibration Quadratic : 3.0889659E-04  
 Energy Calibration Range : 7782.000

Instrument : CHAMBER 188  
 Detector : 68621  
 Calibration Date/Time : 21-SEP-2009 14:57:16  
 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 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2372.483  
 Energy Calibration Slope : 4.952415  
 Energy Calibration Quadratic : 3.0726261E-04  
 Energy Calibration Range : 7766.000

Instrument : CHAMBER 189  
 Detector : 68622  
 Calibration Date/Time : 21-SEP-2009 14:53:03  
 Calibration Source Id : AESS-027  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5795.021  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.450  
 Energy Calibration Slope : 4.959707  
 Energy Calibration Quadratic : 2.6419348E-04  
 Energy Calibration Range : 7716.000

Instrument : CHAMBER 190  
 Detector : 68623  
 Calibration Date/Time : 21-SEP-2009 14:53:12  
 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 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2356.994  
 Energy Calibration Slope : 4.952447  
 Energy Calibration Quadratic : 2.7996209E-04  
 Energy Calibration Range : 7722.000

Instrument : CHAMBER 191  
 Detector : 68624  
 Calibration Date/Time : 21-SEP-2009 14:53:21  
 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 : 2375.194  
 Energy Calibration Slope : 4.970817  
 Energy Calibration Quadratic : 3.1015038E-04  
 Energy Calibration Range : 7791.000

Instrument : CHAMBER 192  
 Detector : 74430  
 Calibration Date/Time : 21-SEP-2009 14:53:32  
 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 : 2368.673  
 Energy Calibration Slope : 4.975485  
 Energy Calibration Quadratic : 3.0052042E-04  
 Energy Calibration Range : 7779.000

Instrument : CHAMBER 193  
 Detector : 68627  
 Calibration Date/Time : 21-SEP-2009 14:53:41  
 Calibration Source Id : AESS-029

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2366.307  
 Energy Calibration Slope : 4.926867  
 Energy Calibration Quadratic : 3.0849138E-04  
 Energy Calibration Range : 7735.000

Instrument : CHAMBER 194  
 Detector : 68635  
 Calibration Date/Time : 21-SEP-2009 14:53:50  
 Calibration Source Id : AESS-035

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2363.136  
 Energy Calibration Slope : 4.944215  
 Energy Calibration Quadratic : 2.9438949E-04  
 Energy Calibration Range : 7735.000

Instrument : CHAMBER 195  
 Detector : 68636  
 Calibration Date/Time : 21-SEP-2009 14:53:59  
 Calibration Source Id : AESS-030

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.925  
 Energy Calibration Slope : 4.962630  
 Energy Calibration Quadratic : 2.7555652E-04  
 Energy Calibration Range : 7736.000

Instrument : CHAMBER 196  
 Detector : 68637  
 Calibration Date/Time : 21-SEP-2009 14:54:08  
 Calibration Source Id : AESS-036

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
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 : 2367.455  
 Energy Calibration Slope : 4.936808  
 Energy Calibration Quadratic : 2.9704699E-04  
 Energy Calibration Range : 7734.000

Instrument : CHAMBER 197  
 Detector : 78894  
 Calibration Date/Time : 21-SEP-2009 14:42:21  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.634  
 Energy Calibration Slope : 4.977818  
 Energy Calibration Quadratic : 2.8380580E-04  
 Energy Calibration Range : 7763.000

Instrument : CHAMBER 198  
 Detector : 78895  
 Calibration Date/Time : 21-SEP-2009 14:54:28  
 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 : 2368.665  
 Energy Calibration Slope : 4.961154  
 Energy Calibration Quadratic : 2.8666743E-04  
 Energy Calibration Range : 7749.000

Instrument : CHAMBER 199  
 Detector : 78896  
 Calibration Date/Time : 21-SEP-2009 14:54:37  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2369.988  
 Energy Calibration Slope : 4.975040  
 Energy Calibration Quadratic : 2.8448759E-04  
 Energy Calibration Range : 7763.000



Instrument : CHAMBER 200  
 Detector : 78900  
 Calibration Date/Time : 21-SEP-2009 14:54:46  
 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 : 2368.958  
 Energy Calibration Slope : 4.954888  
 Energy Calibration Quadratic : 3.0549458E-04  
 Energy Calibration Range : 7763.000

Instrument : CHAMBER 201  
 Detector : 78902  
 Calibration Date/Time : 21-SEP-2009 14:54:55  
 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 : 2361.867  
 Energy Calibration Slope : 4.974102  
 Energy Calibration Quadratic : 2.9147897E-04  
 Energy Calibration Range : 7761.000

Instrument : CHAMBER 202  
 Detector : 78903  
 Calibration Date/Time : 21-SEP-2009 14:55:05  
 Calibration Source Id : AESS-045  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2354.252  
 Energy Calibration Slope : 4.963346  
 Energy Calibration Quadratic : 2.8640320E-04  
 Energy Calibration Range : 7737.000

Instrument : CHAMBER 203  
 Detector : 78905  
 Calibration Date/Time : 21-SEP-2009 14:55:14  
 Calibration Source Id : AESS-040

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.971  
 Energy Calibration Slope : 4.956215  
 Energy Calibration Quadratic : 3.0086067E-04  
 Energy Calibration Range : 7757.000

Instrument : CHAMBER 204  
 Detector : 78907  
 Calibration Date/Time : 21-SEP-2009 14:55:23  
 Calibration Source Id : AESS-046

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
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 : 2364.131  
 Energy Calibration Slope : 4.970463  
 Energy Calibration Quadratic : 2.7864033E-04  
 Energy Calibration Range : 7746.000

Instrument : CHAMBER 205  
 Detector : 78908  
 Calibration Date/Time : 21-SEP-2009 14:55:32  
 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 : 2369.855  
 Energy Calibration Slope : 4.963379  
 Energy Calibration Quadratic : 2.9518205E-04  
 Energy Calibration Range : 7762.000

Instrument : CHAMBER 206  
 Detector : 78909  
 Calibration Date/Time : 21-SEP-2009 14:55:41  
 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 : 2367.801  
 Energy Calibration Slope : 4.940775  
 Energy Calibration Quadratic : 3.1145863E-04  
 Energy Calibration Range : 7754.000

Instrument : CHAMBER 207  
 Detector : 78910  
 Calibration Date/Time : 21-SEP-2009 14:55:50  
 Calibration Source Id : AESS-042  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.800  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.063  
 Energy Calibration Slope : 4.985894  
 Energy Calibration Quadratic : 2.7485727E-04  
 Energy Calibration Range : 7761.000

Instrument : CHAMBER 208  
 Detector : 78911  
 Calibration Date/Time : 21-SEP-2009 14:56:00  
 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 : 2366.635  
 Energy Calibration Slope : 4.964264  
 Energy Calibration Quadratic : 3.0284186E-04  
 Energy Calibration Range : 7768.000

## Subsection 2: Background Calibration

Instrument : CHAMBER 161  
 Detector : 70321  
 Background Analysis Date/Time : 20-SEP-2009 15:51:51  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.771	3300.133	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.452	4905.776	11.00000	3.300000	30.15113	95.00000
CM-244	5533.229	5885.267	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 162  
 Detector : 70323  
 Background Analysis Date/Time : 20-SEP-2009 15:51:55  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.239	3298.296	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.702	4904.841	3.000000	0.9000000	57.73503	95.00000
CM-244	5531.500	5882.828	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 163  
 Detector : 70324  
 Background Analysis Date/Time : 20-SEP-2009 15:52:00  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.643	3300.046	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.946	4905.743	20.00000	6.000000	22.36068	95.00000
CM-244	5535.155	5882.911	12.00000	3.600000	28.86751	95.00000

Instrument : CHAMBER 164  
 Detector : 70325  
 Background Analysis Date/Time : 20-SEP-2009 15:52:04  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.351	3300.390	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.597	4902.599	13.00000	3.900000	27.73501	95.00000
CM-244	5531.973	5884.930	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 165  
 Detector : 72544  
 Background Analysis Date/Time : 20-SEP-2009 15:52:09  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.177	3299.087	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.981	4902.991	5.000000	1.500000	44.72136	95.00000
CM-244	5531.772	5884.104	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 166  
 Detector : 74545  
 Background Analysis Date/Time : 20-SEP-2009 15:52:13  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.972	3298.535	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.387	4905.732	7.000000	2.100000	37.79645	95.00000
CM-244	5530.676	5884.311	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 167  
 Detector : 72546  
 Background Analysis Date/Time : 20-SEP-2009 15:52:18  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.306	3300.867	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.966	4901.435	16.00000	4.800000	25.00000	95.00000
CM-244	5530.518	5883.394	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 168  
 Detector : 72547  
 Background Analysis Date/Time : 20-SEP-2009 15:52:22  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.229	3301.657	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.347	4904.144	14.00000	4.200000	26.72612	95.00000
CM-244	5532.888	5885.320	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 169  
 Detector : 72548  
 Background Analysis Date/Time : 20-SEP-2009 15:52:26  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.054	3301.559	7.000000	2.100000	37.79645	95.00000
NP-237	4437.192	4906.601	22.000000	6.600000	21.32007	95.00000
CM-244	5535.250	5882.471	13.000000	3.900000	27.73501	95.00000

Instrument : CHAMBER 170  
 Detector : 72549  
 Background Analysis Date/Time : 20-SEP-2009 15:52:31  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.361	3298.395	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.739	4902.328	14.000000	4.200000	26.72612	95.00000
CM-244	5533.108	5887.023	12.000000	3.600000	28.86751	95.00000

Instrument : CHAMBER 171  
 Detector : 78260  
 Background Analysis Date/Time : 20-SEP-2009 15:52:36  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.303	3297.640	3.000000	0.9000000	57.73503	95.00000
NP-237	4432.543	4901.594	10.000000	3.000000	31.62278	95.00000
CM-244	5535.033	5887.339	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 172  
 Detector : 78772  
 Background Analysis Date/Time : 20-SEP-2009 15:52:40  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.091	3301.893	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.700	4903.740	15.000000	4.500000	25.81989	95.00000
CM-244	5533.343	5886.514	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 173  
 Detector : 74431  
 Background Analysis Date/Time : 20-SEP-2009 15:52:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.339	3299.195	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.469	4905.977	7.000000	2.100000	37.79645	95.00000
CM-244	5534.997	5887.255	28.00000	8.400001	18.89822	95.00000

Instrument : CHAMBER 174  
 Detector : 74432  
 Background Analysis Date/Time : 20-SEP-2009 15:52:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.852	3301.015	5.000000	1.500000	44.72136	95.00000
NP-237	4435.608	4905.341	7.000000	2.100000	37.79645	95.00000
CM-244	5531.406	5886.389	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 175  
 Detector : 74433  
 Background Analysis Date/Time : 20-SEP-2009 15:52:53  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.886	3298.444	3.000000	0.9000000	57.73503	95.00000
NP-237	4434.203	4904.756	10.00000	3.000000	31.62278	95.00000
CM-244	5534.062	5886.590	23.00000	6.900000	20.85144	95.00000

Instrument : CHAMBER 176  
 Detector : 74434  
 Background Analysis Date/Time : 20-SEP-2009 15:52:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.225	3302.172	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.630	4903.602	3.000000	0.9000000	57.73503	95.00000
CM-244	5532.053	5883.416	19.00000	5.700000	22.94157	95.00000

Instrument : CHAMBER 177  
 Detector : 74435  
 Background Analysis Date/Time : 20-SEP-2009 15:53:02  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.707	3298.313	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.012	4904.435	5.000000	1.500000	44.72136	95.00000
CM-244	5533.475	5885.809	18.00000	5.400000	23.57022	95.00000

Instrument : CHAMBER 178  
 Detector : 74436  
 Background Analysis Date/Time : 20-SEP-2009 15:53:06  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.348	3300.873	3.000000	0.9000000	57.73503	95.00000
NP-237	4432.820	4902.942	9.000000	2.700000	33.33334	95.00000
CM-244	5530.837	5887.508	19.00000	5.700000	22.94157	95.00000

Instrument : CHAMBER 179  
 Detector : 74437  
 Background Analysis Date/Time : 20-SEP-2009 15:53:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.396	3300.692	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.850	4906.313	3.000000	0.9000000	57.73503	95.00000
CM-244	5535.639	5882.885	32.00000	9.600000	17.67767	95.00000

Instrument : CHAMBER 180  
 Detector : 74438  
 Background Analysis Date/Time : 20-SEP-2009 15:53:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.663	3299.349	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.569	4903.757	13.00000	3.900000	27.73501	95.00000
CM-244	5530.967	5886.867	29.00000	8.700001	18.56953	95.00000



Instrument : CHAMBER 181  
 Detector : 74439  
 Background Analysis Date/Time : 20-SEP-2009 15:53:20  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.239	3302.087	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.597	4902.658	3.000000	0.9000000	57.73503	95.00000
CM-244	5530.942	5882.719	27.00000	8.100000	19.24501	95.00000

Instrument : CHAMBER 182  
 Detector : 74440  
 Background Analysis Date/Time : 20-SEP-2009 15:53:24  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.945	3300.794	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.572	4902.020	5.000000	1.500000	44.72136	95.00000
CM-244	5533.775	5884.077	33.00000	9.900001	17.40777	95.00000

Instrument : CHAMBER 183  
 Detector : 74441  
 Background Analysis Date/Time : 20-SEP-2009 15:53:29  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.798	3299.272	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.624	4904.963	5.000000	1.500000	44.72136	95.00000
CM-244	5533.945	5886.272	42.00000	12.60000	15.43033	95.00000

Instrument : CHAMBER 184  
 Detector : 74442  
 Background Analysis Date/Time : 20-SEP-2009 15:53:33  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.768	3299.551	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.041	4904.303	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.580	5887.500	28.00000	8.400001	18.89822	95.00000

Instrument : CHAMBER 185  
 Detector : 68615  
 Background Analysis Date/Time : 20-SEP-2009 15:53:38  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.255	3299.191	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4436.568	4904.026	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5534.840	5885.460	35.00000	10.50000	16.90309	95.00000

Instrument : CHAMBER 186  
 Detector : 68616  
 Background Analysis Date/Time : 20-SEP-2009 15:53:42  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.448	3298.893	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.968	4903.217	3.000000	0.9000000	57.73503	95.00000
CM-244	5534.439	5884.968	30.00000	9.000000	18.25742	95.00000

Instrument : CHAMBER 187  
 Detector : 68620  
 Background Analysis Date/Time : 20-SEP-2009 15:53:46  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.069	3299.571	4.000000	1.200000	50.00000	95.00000
NP-237	4436.508	4902.892	10.00000	3.000000	31.62278	95.00000
CM-244	5534.129	5882.618	35.00000	10.50000	16.90309	95.00000

Instrument : CHAMBER 188  
 Detector : 68621  
 Background Analysis Date/Time : 20-SEP-2009 15:53:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.307	3299.196	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4433.812	4904.473	3.000000	0.9000000	57.73503	95.00000
CM-244	5534.433	5887.575	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 189  
 Detector : 68622  
 Background Analysis Date/Time : 20-SEP-2009 15:53:55  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.567	3302.212	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.165	4906.352	5.000000	1.500000	44.72136	95.00000
CM-244	5531.737	5887.138	29.00000	8.700001	18.56953	95.00000

Instrument : CHAMBER 190  
 Detector : 68623  
 Background Analysis Date/Time : 20-SEP-2009 15:53:59  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.470	3297.949	3.000000	0.9000000	57.73503	95.00000
NP-237	4434.559	4903.208	45.00000	13.50000	14.90712	95.00000
CM-244	5535.128	5886.122	75.00000	22.50000	11.54701	95.00000

Instrument : CHAMBER 191  
 Detector : 68624  
 Background Analysis Date/Time : 20-SEP-2009 15:54:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.297	3300.325	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.026	4906.466	4.000000	1.200000	50.00000	95.00000
CM-244	5533.499	5882.588	39.00000	11.70000	16.01282	95.00000

Instrument : CHAMBER 192  
 Detector : 74430  
 Background Analysis Date/Time : 20-SEP-2009 15:54:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.254	3299.423	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.037	4905.173	6.000000	1.800000	40.82483	95.00000
CM-244	5531.571	5885.579	27.00000	8.100000	19.24501	95.00000

Instrument : CHAMBER 193  
 Detector : 68627  
 Background Analysis Date/Time : 20-SEP-2009 15:54:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.990	3298.419	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.001	4901.628	20.00000	6.000000	22.36068	95.00000
CM-244	5534.240	5885.963	35.00000	10.50000	16.90309	95.00000

Instrument : CHAMBER 194  
 Detector : 68635  
 Background Analysis Date/Time : 20-SEP-2009 15:54:15  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.781	3297.998	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.565	4903.602	2.000000	0.6000000	70.71068	95.00000
CM-244	5531.095	5882.711	16.00000	4.800000	25.00000	95.00000

Instrument : CHAMBER 195  
 Detector : 68636  
 Background Analysis Date/Time : 20-SEP-2009 15:54:19  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.560	3297.508	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.548	4904.654	6.000000	1.800000	40.82483	95.00000
CM-244	5531.770	5882.945	25.00000	7.500000	20.00000	95.00000

Instrument : CHAMBER 196  
 Detector : 68637  
 Background Analysis Date/Time : 20-SEP-2009 15:54:23  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.197	3301.025	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.299	4904.887	12.00000	3.600000	28.86751	95.00000
CM-244	5531.851	5883.206	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 197  
 Detector : 78894  
 Background Analysis Date/Time : 20-SEP-2009 15:54:27  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.248	3298.244	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4435.410	4906.453	2.000000	0.6000000	70.71068	95.00000
CM-244	5531.008	5883.783	22.00000	6.600000	21.32007	95.00000

Instrument : CHAMBER 198  
 Detector : 78895  
 Background Analysis Date/Time : 20-SEP-2009 15:54:30  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.256	3301.357	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.341	4905.168	3.000000	0.9000000	57.73503	95.00000
CM-244	5533.514	5885.508	20.00000	6.000000	22.36068	95.00000

Instrument : CHAMBER 199  
 Detector : 78896  
 Background Analysis Date/Time : 20-SEP-2009 15:54:35  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.267	3300.107	3.000000	0.9000000	57.73503	95.00000
NP-237	4436.748	4902.339	6.000000	1.800000	40.82483	95.00000
CM-244	5531.913	5884.562	27.00000	8.100000	19.24501	95.00000

Instrument : CHAMBER 200  
 Detector : 78900  
 Background Analysis Date/Time : 20-SEP-2009 15:54:38  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.062	3301.136	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.203	4901.740	14.00000	4.200000	26.72612	95.00000
CM-244	5531.761	5884.914	26.00000	7.800000	19.61161	95.00000

Instrument : CHAMBER 201  
 Detector : 78902  
 Background Analysis Date/Time : 20-SEP-2009 15:54:42  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.184	3302.217	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.609	4905.994	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5531.184	5884.407	20.00000	6.000000	22.36068	95.00000

Instrument : CHAMBER 202  
 Detector : 78903  
 Background Analysis Date/Time : 20-SEP-2009 15:54:47  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.216	3297.484	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.369	4902.276	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5530.984	5883.177	24.00000	7.200000	20.41241	95.00000

Instrument : CHAMBER 203  
 Detector : 78905  
 Background Analysis Date/Time : 20-SEP-2009 15:54:51  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.199	3298.236	9.000000	2.700000	33.33334	95.00000
NP-237	4432.988	4903.526	7.000000	2.100000	37.79645	95.00000
CM-244	5533.164	5886.048	26.00000	7.800000	19.61161	95.00000

Instrument : CHAMBER 204  
 Detector : 78907  
 Background Analysis Date/Time : 20-SEP-2009 15:54:55  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.792	3298.277	15.00000	4.500000	25.81989	95.00000
NP-237	4433.265	4903.277	16.00000	4.800000	25.00000	95.00000
CM-244	5531.668	5883.589	51.00000	15.30000	14.00280	95.00000

Instrument : CHAMBER 205  
 Detector : 78908  
 Background Analysis Date/Time : 20-SEP-2009 15:54:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.853	3298.183	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.644	4904.311	4.000000	1.200000	50.00000	95.00000
CM-244	5533.979	5886.811	26.00000	7.800000	19.61161	95.00000

Instrument : CHAMBER 206  
 Detector : 78909  
 Background Analysis Date/Time : 20-SEP-2009 15:55:02  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.264	3297.560	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.483	4905.550	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.828	5887.642	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 207  
 Detector : 78910  
 Background Analysis Date/Time : 20-SEP-2009 15:55:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.540	3298.860	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.642	4902.427	8.000000	2.400000	35.35534	95.00000
CM-244	5532.022	5884.565	36.00000	10.80000	16.66667	95.00000

Instrument : CHAMBER 208  
 Detector : 78911  
 Background Analysis Date/Time : 20-SEP-2009 15:55:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.900	3300.465	2.000000	0.6000000	70.71068	95.00000
NP-237	4437.256	4903.414	3.000000	0.9000000	57.73503	95.00000
CM-244	5534.200	5882.369	22.00000	6.600000	21.32007	95.00000

### Subsection 3: Efficiency Calibration

Instrument : CHAMBER 161  
 Detector : 70321  
 Standard ID : AESS-001  
 Standard Reference Date : 20-FEB-2008 09:54:53  
 Calibration Analysis Date/Time : 21-SEP-2009 09:28:18  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:45:33  
 Average Efficiency : 0.3689128  
 Average Efficiency Error : 1.0123267E-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	2989.771	3300.133	21764.00	0.3527895	1.5079973E-02	62.09401
NP-237	171.0024	28-FEB-2010	4437.452	4905.776	19466.00	0.3793849	1.9163225E-02	75.59914
CM-244	158.1060	28-FEB-2010	5533.229	5885.267	17188.00	0.3849835	1.9471968E-02	61.24743

Instrument : CHAMBER 162  
 Detector : 70323  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 21-SEP-2009 09:28:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:45:43  
 Average Efficiency : 0.3711489  
 Average Efficiency Error : 1.0169771E-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	2992.239	3298.296	21845.00	0.3574707	1.5279390E-02	61.21131
NP-237	205.0260	28-FEB-2010	4436.702	4904.841	23392.00	0.3802952	1.9176660E-02	80.07285
CM-244	199.6806	28-FEB-2010	5531.500	5882.828	21627.00	0.3837951	1.9366477E-02	60.40187

Instrument : CHAMBER 163  
 Detector : 70324  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 21-SEP-2009 09:28:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:46:06  
 Average Efficiency : 0.3784813  
 Average Efficiency Error : 1.0368052E-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	2988.643	3300.046	21830.00	0.3690017	1.5772363E-02	62.20918
NP-237	200.4990	28-FEB-2010	4435.946	4905.743	23254.00	0.3865025	1.9490723E-02	75.42545
CM-244	196.5558	28-FEB-2010	5535.155	5882.911	21361.00	0.3848922	1.9424047E-02	59.52460



Instrument : CHAMBER 164  
 Detector : 70325  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 21-SEP-2009 09:28:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:46:16  
 Average Efficiency : 0.3791597  
 Average Efficiency Error : 1.0381414E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.0418	28-FEB-2010	2988.351	3300.390	22809.00	0.3744951	1.5998594E-02	58.40551
NP-237	209.2716	28-FEB-2010	4432.597	4902.599	23895.00	0.3805439	1.9185850E-02	71.09055
CM-244	199.6488	28-FEB-2010	5531.973	5884.930	21669.00	0.3846071	1.9407105E-02	56.87473

Instrument : CHAMBER 165  
 Detector : 72544  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 21-SEP-2009 09:28:46  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:46:29  
 Average Efficiency : 0.3786044  
 Average Efficiency Error : 1.0371909E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2991.177	3299.087	21994.00	0.3665624	1.5666667E-02	68.94492
NP-237	203.2080	28-FEB-2010	4432.981	4902.991	23569.00	0.3865909	1.9492906E-02	76.46336
CM-244	197.2236	28-FEB-2010	5531.772	5884.104	21676.00	0.3894331	1.9650551E-02	69.10842

Instrument : CHAMBER 166  
 Detector : 74545  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 21-SEP-2009 09:28:52  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:47:27  
 Average Efficiency : 0.3925645  
 Average Efficiency Error : 1.0746635E-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	2991.972	3298.535	23250.00	0.3867014	1.6516251E-02	56.08769
NP-237	204.0192	28-FEB-2010	4435.387	4905.732	24303.00	0.3970365	2.0014562E-02	79.13438
CM-244	197.2128	28-FEB-2010	5530.676	5884.311	22089.00	0.3967021	2.0013960E-02	55.09056

Instrument : CHAMBER 167  
 Detector : 72546  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 21-SEP-2009 09:28:59  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:48:04  
 Average Efficiency : 0.3871779  
 Average Efficiency Error : 1.0602054E-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	2989.306	3300.867	22941.00	0.3765221	1.6084069E-02	55.09563
NP-237	204.2586	28-FEB-2010	4436.966	4901.435	24233.00	0.3953844	1.9931784E-02	76.26476
CM-244	198.8100	28-FEB-2010	5530.518	5883.394	22180.00	0.3953461	1.9944822E-02	56.09549

Instrument : CHAMBER 168  
 Detector : 72547  
 Standard ID : AESS-010  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 21-SEP-2009 09:29:07  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:48:25  
 Average Efficiency : 0.3895916  
 Average Efficiency Error : 1.0669101E-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	2989.229	3301.657	22631.00	0.3790159	1.6193239E-02	61.00068
NP-237	202.9926	28-FEB-2010	4434.347	4904.144	24065.00	0.3951014	1.9918641E-02	83.09320
CM-244	196.2330	28-FEB-2010	5532.888	5885.320	22172.00	0.4003809	2.0198891E-02	61.18747

Instrument : CHAMBER 169  
 Detector : 72548  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 21-SEP-2009 09:29:13  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:48:47  
 Average Efficiency : 0.3742271  
 Average Efficiency Error : 1.0248713E-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	2990.054	3301.559	22666.00	0.3638192	1.5543718E-02	59.25828
NP-237	209.5938	28-FEB-2010	4437.192	4906.601	23965.00	0.3810294	1.9209908E-02	71.80399
CM-244	202.7478	28-FEB-2010	5535.250	5882.471	21940.00	0.3834514	1.9346640E-02	60.12471

Instrument : CHAMBER 170  
 Detector : 72549  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 21-SEP-2009 09:29:20  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:49:16  
 Average Efficiency : 0.3642089  
 Average Efficiency Error : 9.9735176E-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	2991.361	3298.395	22497.00	0.3575987	1.5279310E-02	63.36363
NP-237	214.4868	28-FEB-2010	4436.739	4902.328	23611.00	0.3668730	1.8498441E-02	80.98635
CM-244	208.4184	28-FEB-2010	5533.108	5887.023	21846.00	0.3714186	1.8740255E-02	58.50939

Instrument : CHAMBER 171  
 Detector : 78260  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 21-SEP-2009 09:29:26  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:49:40  
 Average Efficiency : 0.3810605  
 Average Efficiency Error : 1.0438851E-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	2991.303	3297.640	22193.00	0.3685752	1.5750948E-02	59.60153
NP-237	204.7038	28-FEB-2010	4432.543	4901.594	23828.00	0.3879591	1.9560140E-02	73.97815
CM-244	195.0060	28-FEB-2010	5535.033	5887.339	21671.00	0.3938129	1.9871602E-02	62.27898

Instrument : CHAMBER 172  
 Detector : 78772  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 21-SEP-2009 09:29:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:49:54  
 Average Efficiency : 0.3822589  
 Average Efficiency Error : 1.0466043E-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	2990.091	3301.893	22979.00	0.3769604	1.6102478E-02	57.80247
NP-237	205.8930	28-FEB-2010	4433.700	4903.740	24203.00	0.3917651	1.9749530E-02	76.25694
CM-244	203.1954	28-FEB-2010	5533.343	5886.514	21835.00	0.3808052	1.9213919E-02	58.76520

Instrument : CHAMBER 173  
 Detector : 74431  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 21-SEP-2009 09:29:38  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:50:04  
 Average Efficiency : 0.2602993  
 Average Efficiency Error : 7.1600322E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2990.339	3299.195	15911.00	0.2643020	1.1349737E-02	50.51283
NP-237	210.2526	28-FEB-2010	4435.469	4905.977	15987.00	0.2534239	1.2828780E-02	57.29033
CM-244	201.9108	28-FEB-2010	5534.997	5887.255	14946.00	0.2621880	1.3283902E-02	53.12511

Instrument : CHAMBER 174  
 Detector : 74432  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 21-SEP-2009 09:29:43  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:50:13  
 Average Efficiency : 0.2533270  
 Average Efficiency Error : 6.9733807E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.6468	28-FEB-2010	2989.852	3301.015	14930.00	0.2467540	1.0608066E-02	48.02879
NP-237	202.9140	28-FEB-2010	4435.608	4905.341	15850.00	0.2603388	1.3180215E-02	57.62176
CM-244	199.3140	28-FEB-2010	5531.406	5886.389	14432.00	0.2563750	1.2995369E-02	54.02073

Instrument : CHAMBER 175  
 Detector : 74433  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 21-SEP-2009 09:29:50  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:50:24  
 Average Efficiency : 0.2543943  
 Average Efficiency Error : 6.9960668E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2989.886	3298.444	16030.00	0.2525296	1.0842831E-02	50.61414
NP-237	211.7160	28-FEB-2010	4434.203	4904.756	16439.00	0.2587745	1.3095257E-02	57.23130
CM-244	207.3882	28-FEB-2010	5534.062	5886.590	14808.00	0.2528055	1.2810053E-02	51.72563

Instrument : CHAMBER 176  
 Detector : 74434  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 21-SEP-2009 09:29:58  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:50:36  
 Average Efficiency : 0.2547762  
 Average Efficiency Error : 7.0115663E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	205.5870	28-FEB-2010	2991.225	3302.172	15206.00	0.2502103	1.0753103E-02	46.19209
NP-237	203.4984	28-FEB-2010	4432.630	4903.602	15838.00	0.2594141	1.3133497E-02	58.51922
CM-244	197.1096	28-FEB-2010	5532.053	5883.416	14295.00	0.2569134	1.3024328E-02	51.87393

Instrument : CHAMBER 177  
 Detector : 74435  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 21-SEP-2009 09:30:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:50:46  
 Average Efficiency : 0.2659749  
 Average Efficiency Error : 7.3150843E-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	2989.707	3298.313	15952.00	0.2645041	1.1357911E-02	48.05111
NP-237	200.6460	28-FEB-2010	4434.012	4904.435	16053.00	0.2666638	1.3498317E-02	54.07773
CM-244	195.9270	28-FEB-2010	5533.475	5885.809	14787.00	0.2673737	1.3548458E-02	55.83525

Instrument : CHAMBER 178  
 Detector : 74436  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 21-SEP-2009 09:30:10  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:50:57  
 Average Efficiency : 0.2584701  
 Average Efficiency Error : 7.1088150E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2991.348	3300.873	15813.00	0.2566991	1.1024418E-02	46.60859
NP-237	210.1548	28-FEB-2010	4432.820	4902.942	16293.00	0.2583858	1.3076977E-02	58.74612
CM-244	200.7390	28-FEB-2010	5530.837	5887.508	14803.00	0.2611073	1.3230741E-02	51.69608

Instrument : CHAMBER 179  
 Detector : 74437  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 21-SEP-2009 09:30:16  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:51:07  
 Average Efficiency : 0.2656665  
 Average Efficiency Error : 7.3066968E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2992.396	3300.692	16018.00	0.2655541	1.1402219E-02	48.47999
NP-237	199.3962	28-FEB-2010	4435.850	4906.313	16096.00	0.2690641	1.3619361E-02	58.18980
CM-244	198.6402	28-FEB-2010	5535.639	5882.885	14727.00	0.2625763	1.3306193E-02	54.75912

Instrument : CHAMBER 180  
 Detector : 74438  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 21-SEP-2009 09:30:22  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:51:16  
 Average Efficiency : 0.2482043  
 Average Efficiency Error : 6.8309689E-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	2988.663	3299.349	15136.00	0.2442104	1.0496107E-02	47.14516
NP-237	206.8830	28-FEB-2010	4433.569	4903.757	15632.00	0.2518027	1.2750288E-02	52.81374
CM-244	203.0208	28-FEB-2010	5530.967	5886.867	14358.00	0.2504804	1.2697529E-02	50.18464

Instrument : CHAMBER 181  
 Detector : 74439  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 21-SEP-2009 09:30:28  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:51:26  
 Average Efficiency : 0.2568994  
 Average Efficiency Error : 7.0653898E-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	3302.087	16106.00	0.2593535	1.1134949E-02	50.88416
NP-237	208.5846	28-FEB-2010	4432.597	4902.658	16106.00	0.2573713	1.3027404E-02	57.22441
CM-244	205.5828	28-FEB-2010	5530.942	5882.719	14695.00	0.2531832	1.2830525E-02	53.69027

Instrument : CHAMBER 182  
 Detector : 74440  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 21-SEP-2009 09:30:34  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:51:42  
 Average Efficiency : 0.2555217  
 Average Efficiency Error : 7.0314407E-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	2990.945	3300.794	15263.00	0.2488660	1.0694612E-02	45.64035
NP-237	207.4998	28-FEB-2010	4432.572	4902.020	16228.00	0.2606671	1.3193036E-02	52.09262
CM-244	199.8804	28-FEB-2010	5533.775	5884.077	14703.00	0.2605115	1.3201850E-02	48.97062

Instrument : CHAMBER 183  
 Detector : 74441  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 21-SEP-2009 09:30:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:51:54  
 Average Efficiency : 0.2611987  
 Average Efficiency Error : 7.1849022E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.1856	28-FEB-2010	2990.798	3299.272	15703.00	0.2627467	1.1285488E-02	47.53299
NP-237	208.8990	28-FEB-2010	4434.624	4904.963	16100.00	0.2568786	1.3002539E-02	53.88460
CM-244	198.1458	28-FEB-2010	5533.945	5886.272	14750.00	0.2635892	1.3357328E-02	53.93570

Instrument : CHAMBER 184  
 Detector : 74442  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 21-SEP-2009 09:30:45  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:52:17  
 Average Efficiency : 0.2584583  
 Average Efficiency Error : 7.1114316E-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	2988.768	3299.551	15277.00	0.2539344	1.0912240E-02	50.31911
NP-237	205.6662	28-FEB-2010	4434.041	4904.303	16050.00	0.2601255	1.3167357E-02	58.63404
CM-244	198.3060	28-FEB-2010	5531.580	5887.500	14754.00	0.2635180	1.3353555E-02	51.04471

Instrument : CHAMBER 185  
 Detector : 68615  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 21-SEP-2009 09:30:51  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:52:26  
 Average Efficiency : 0.2578048  
 Average Efficiency Error : 7.1078530E-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	2988.255	3299.191	14889.00	0.2575537	1.1072870E-02	57.86859
NP-237	167.9916	28-FEB-2010	4436.568	4904.026	13054.00	0.2590211	1.3147981E-02	60.38557
CM-244	157.2432	28-FEB-2010	5534.840	5885.460	11412.00	0.2569523	1.3071318E-02	57.79462

Instrument : CHAMBER 186  
 Detector : 68616  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 21-SEP-2009 09:30:57  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:52:35  
 Average Efficiency : 0.2488432  
 Average Efficiency Error : 6.8683540E-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	2991.448	3298.893	14023.00	0.2449313	1.0542010E-02	55.63848
NP-237	162.9186	28-FEB-2010	4434.968	4903.217	12465.00	0.2550169	1.2953850E-02	61.88278
CM-244	153.1968	28-FEB-2010	5534.439	5884.968	10759.00	0.2485880	1.2658793E-02	53.78214

Instrument : CHAMBER 187  
 Detector : 68620  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 21-SEP-2009 09:31:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:52:45  
 Average Efficiency : 0.2500139  
 Average Efficiency Error : 7.3307389E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2991.069	3299.571	14686.00	0.2490046	1.2619531E-02	51.85893
NP-237	168.0294	28-FEB-2010	4436.508	4902.892	12870.00	0.2552532	1.2959577E-02	54.96236
CM-244	160.5822	28-FEB-2010	5534.129	5882.618	11163.00	0.2461146	1.2524742E-02	53.45123



Instrument : CHAMBER 188  
 Detector : 68621  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 21-SEP-2009 09:31:08  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:57:16  
 Average Efficiency : 0.2573678  
 Average Efficiency Error : 7.0972578E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2991.307	3299.196	14948.00	0.2589918	1.1133890E-02	51.99499
NP-237	165.9822	28-FEB-2010	4433.812	4904.473	12790.00	0.2568368	1.3041135E-02	63.01558
CM-244	153.7938	28-FEB-2010	5534.433	5887.575	11106.00	0.2556783	1.3012402E-02	52.96853

Instrument : CHAMBER 189  
 Detector : 68622  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 21-SEP-2009 09:31:15  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:53:03  
 Average Efficiency : 0.2613129  
 Average Efficiency Error : 7.6623494E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2989.567	3302.212	14738.00	0.2577560	1.3062426E-02	55.08699
NP-237	161.6154	28-FEB-2010	4433.165	4906.352	12695.00	0.2618049	1.3294927E-02	59.92243
CM-244	148.1754	28-FEB-2010	5531.737	5887.138	11072.00	0.2645886	1.3466716E-02	57.86366

Instrument : CHAMBER 190  
 Detector : 68623  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 21-SEP-2009 09:31:22  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:53:12  
 Average Efficiency : 0.2619864  
 Average Efficiency Error : 7.2268778E-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	2990.470	3297.949	14602.00	0.2566898	1.1039688E-02	51.16143
NP-237	161.7816	28-FEB-2010	4434.559	4903.208	12864.00	0.2647705	1.3443264E-02	59.23622
CM-244	147.2670	28-FEB-2010	5535.128	5886.122	11129.00	0.2671734	1.3597734E-02	49.90292

Instrument : CHAMBER 191  
 Detector : 68624  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 21-SEP-2009 09:31:28  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:53:21  
 Average Efficiency : 0.2625601  
 Average Efficiency Error : 7.6934313E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2991.297	3300.325	15252.00	0.2584319	1.3090833E-02	50.79485
NP-237	168.1992	28-FEB-2010	4434.026	4906.466	13308.00	0.2637113	1.3382300E-02	58.03377
CM-244	156.7614	28-FEB-2010	5533.499	5882.588	11769.00	0.2657853	1.3513734E-02	53.41747

Instrument : CHAMBER 192  
 Detector : 74430  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 21-SEP-2009 09:31:34  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:53:32  
 Average Efficiency : 0.2544576  
 Average Efficiency Error : 7.0170104E-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	2990.254	3299.423	14893.00	0.2511986	1.0799594E-02	50.05982
NP-237	167.2962	28-FEB-2010	4433.037	4905.173	12941.00	0.2578104	1.3088287E-02	62.20525
CM-244	154.4388	28-FEB-2010	5531.571	5885.579	11163.00	0.2558767	1.3021424E-02	54.21256

Instrument : CHAMBER 193  
 Detector : 68627  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 21-SEP-2009 09:31:40  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:53:41  
 Average Efficiency : 0.2615199  
 Average Efficiency Error : 7.6632542E-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	2991.990	3298.419	15396.00	0.2583720	1.3086254E-02	50.38469
NP-237	169.7700	28-FEB-2010	4433.001	4901.628	13286.00	0.2607451	1.3232258E-02	58.19065
CM-244	154.8234	28-FEB-2010	5534.240	5885.963	11618.00	0.2656835	1.3511403E-02	53.47323

Instrument : CHAMBER 194  
 Detector : 68635  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 21-SEP-2009 09:31:45  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:53:50  
 Average Efficiency : 0.2542233  
 Average Efficiency Error : 7.0097935E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2990.781	3297.998	14819.00	0.2523236	1.0848935E-02	51.65903
NP-237	168.2934	28-FEB-2010	4434.565	4903.602	13013.00	0.2577325	1.3083202E-02	59.92809
CM-244	158.8128	28-FEB-2010	5531.095	5882.711	11369.00	0.2534982	1.2896180E-02	53.05344

Instrument : CHAMBER 195  
 Detector : 68636  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 21-SEP-2009 09:31:51  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:53:59  
 Average Efficiency : 0.2554399  
 Average Efficiency Error : 7.4881674E-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	2989.560	3297.508	14812.00	0.2518228	1.2760897E-02	51.28571
NP-237	166.3758	28-FEB-2010	4435.548	4904.654	12878.00	0.2579744	1.3097576E-02	59.53444
CM-244	157.1856	28-FEB-2010	5531.770	5882.945	11394.00	0.2567084	1.3059122E-02	52.18182

Instrument : CHAMBER 196  
 Detector : 68637  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 21-SEP-2009 09:31:58  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:54:08  
 Average Efficiency : 0.2560611  
 Average Efficiency Error : 7.0601865E-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	2989.197	3301.025	14971.00	0.2515414	1.0813317E-02	54.46194
NP-237	167.4312	28-FEB-2010	4436.299	4904.887	13068.00	0.2600951	1.3202412E-02	58.47227
CM-244	156.4188	28-FEB-2010	5531.851	5883.206	11431.00	0.2587482	1.3162114E-02	55.12206

Instrument : CHAMBER 197  
 Detector : 78894  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 21-SEP-2009 09:32:04  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:42:21  
 Average Efficiency : 0.2524827  
 Average Efficiency Error : 6.9639706E-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	2989.248	3298.244	14631.00	0.2502923	1.0764122E-02	53.79660
NP-237	167.1294	28-FEB-2010	4435.410	4906.453	12637.00	0.2520285	1.2799331E-02	65.84109
CM-244	154.7664	28-FEB-2010	5531.008	5883.783	11198.00	0.2561660	1.3035372E-02	58.58810

Instrument : CHAMBER 198  
 Detector : 78895  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 21-SEP-2009 09:32:10  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:54:28  
 Average Efficiency : 0.2546443  
 Average Efficiency Error : 7.0217522E-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	2988.256	3301.357	14781.00	0.2528079	1.0870277E-02	53.58070
NP-237	168.7422	28-FEB-2010	4435.341	4905.168	12907.00	0.2549473	1.2943417E-02	60.79170
CM-244	156.3252	28-FEB-2010	5533.514	5885.508	11347.00	0.2569917	1.3074390E-02	55.00752

Instrument : CHAMBER 199  
 Detector : 78896  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 21-SEP-2009 09:32:15  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:54:37  
 Average Efficiency : 0.2501853  
 Average Efficiency Error : 6.8995738E-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	2991.267	3300.107	14889.00	0.2516318	1.0818291E-02	52.50020
NP-237	170.0886	28-FEB-2010	4436.748	4902.339	12711.00	0.2490705	1.2648016E-02	63.29102
CM-244	157.7460	28-FEB-2010	5531.913	5884.562	11110.00	0.2493175	1.2688680E-02	53.66205

Instrument : CHAMBER 200  
 Detector : 78900  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 21-SEP-2009 09:32:21  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:54:46  
 Average Efficiency : 0.2682398  
 Average Efficiency Error : 7.3923203E-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	2988.062	3301.136	15568.00	0.2708094	1.1633540E-02	50.91508
NP-237	166.6248	28-FEB-2010	4436.203	4901.740	13553.00	0.2710442	1.3750886E-02	57.22134
CM-244	155.8290	28-FEB-2010	5531.761	5884.914	11543.00	0.2622247	1.3336830E-02	45.01981

Instrument : CHAMBER 201  
 Detector : 78902  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 21-SEP-2009 09:32:27  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:54:55  
 Average Efficiency : 0.2589892  
 Average Efficiency Error : 7.1445713E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2988.184	3302.217	14648.00	0.2577410	1.1084234E-02	45.65341
NP-237	159.1506	28-FEB-2010	4434.609	4905.994	12631.00	0.2645504	1.3435334E-02	55.65960
CM-244	151.7142	28-FEB-2010	5531.184	5884.407	10948.00	0.2554961	1.3006385E-02	45.41114

Instrument : CHAMBER 202  
 Detector : 78903  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 21-SEP-2009 09:32:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:55:05  
 Average Efficiency : 0.2665268  
 Average Efficiency Error : 7.3516225E-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	2989.216	3297.484	14828.00	0.2682285	1.1532663E-02	43.97738
NP-237	160.8066	28-FEB-2010	4437.369	4902.276	12547.00	0.2600848	1.3209904E-02	52.01093
CM-244	145.8384	28-FEB-2010	5530.984	5883.177	11169.00	0.2711185	1.3796896E-02	50.67951

Instrument : CHAMBER 203  
 Detector : 78905  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 21-SEP-2009 09:32:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:55:14  
 Average Efficiency : 0.2582881  
 Average Efficiency Error : 7.1221651E-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	2990.199	3298.236	14936.00	0.2597386	1.1166240E-02	50.45560
NP-237	166.8174	28-FEB-2010	4432.988	4903.526	12999.00	0.2597034	1.3183516E-02	56.72982
CM-244	155.0100	28-FEB-2010	5533.164	5886.048	11164.00	0.2549590	1.2974691E-02	53.05425

Instrument : CHAMBER 204  
 Detector : 78907  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 21-SEP-2009 09:32:45  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:55:23  
 Average Efficiency : 0.2496188  
 Average Efficiency Error : 6.8885502E-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	2989.792	3298.277	14212.00	0.2467715	1.0618629E-02	52.28694
NP-237	164.6658	28-FEB-2010	4433.265	4903.277	12386.00	0.2506330	1.2732573E-02	55.30292
CM-244	151.3824	28-FEB-2010	5531.668	5883.589	10818.00	0.2527654	1.2870559E-02	51.63226

Instrument : CHAMBER 205  
 Detector : 78908  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 21-SEP-2009 09:32:51  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:55:32  
 Average Efficiency : 0.2549397  
 Average Efficiency Error : 7.0272260E-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	2989.853	3298.183	15200.00	0.2521578	1.0836856E-02	49.40310
NP-237	171.2268	28-FEB-2010	4433.644	4904.311	13124.00	0.2554664	1.2966554E-02	56.83091
CM-244	159.5796	28-FEB-2010	5533.979	5886.811	11652.00	0.2584914	1.3144889E-02	54.55809

Instrument : CHAMBER 206  
 Detector : 78909  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 21-SEP-2009 09:32:57  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:55:41  
 Average Efficiency : 0.2541434  
 Average Efficiency Error : 7.0085586E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2990.264	3297.560	14794.00	0.2533972	1.0895449E-02	48.44042
NP-237	168.3948	28-FEB-2010	4435.483	4905.550	12839.00	0.2541331	1.2903095E-02	60.11407
CM-244	154.6032	28-FEB-2010	5534.828	5887.642	11143.00	0.2552143	1.2987950E-02	53.79968

Instrument : CHAMBER 207  
 Detector : 78910  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 21-SEP-2009 09:33:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:55:50  
 Average Efficiency : 0.2573462  
 Average Efficiency Error : 7.1005006E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	188.7090	28-FEB-2010	2989.540	3298.860	14353.00	0.2572728	1.1068305E-02	52.62569
NP-237	159.6558	28-FEB-2010	4436.642	4902.427	12327.00	0.2573162	1.3072978E-02	61.37923
CM-244	150.5208	28-FEB-2010	5532.022	5884.565	10951.00	0.2574795	1.3107520E-02	49.75304

Instrument : CHAMBER 208  
 Detector : 78911  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 21-SEP-2009 09:33:08  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 21-SEP-2009 14:56:00  
 Average Efficiency : 0.2510063  
 Average Efficiency Error : 6.9273296E-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	2991.900	3300.465	14140.00	0.2493222	1.0729297E-02	51.69543
NP-237	161.5530	28-FEB-2010	4437.256	4903.414	12240.00	0.2525304	1.2831211E-02	60.66938
CM-244	151.1856	28-FEB-2010	5534.200	5882.369	10757.00	0.2518900	1.2826865E-02	52.12144

## 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 : 17-AUG-2009 14:57:05  
 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	4768.693
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2388.351  
 Energy Calibration Slope : 4.986037  
 Energy Calibration Quadratic : 2.9112995E-04  
 Energy Calibration Range : 7799.000

Instrument : CHAMBER 114  
 Detector : 78258  
 Calibration Date/Time : 17-AUG-2009 14:57:42  
 Calibration Source Id : AESS-007

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.738
NP-237	4341	2/28/10	4768.800	4768.375
CM-244	4320A	2/28/10	5795.020	5794.878

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2341.717  
 Energy Calibration Slope : 4.967946  
 Energy Calibration Quadratic : 2.6719994E-04  
 Energy Calibration Range : 7709.000

Instrument : CHAMBER 115  
 Detector : 45-132FF4  
 Calibration Date/Time : 17-AUG-2009 14:57:55  
 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	4768.996
CM-244	4320A	2/28/10	5795.020	5795.124

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.484  
 Energy Calibration Slope : 5.001271  
 Energy Calibration Quadratic : 2.5857674E-04  
 Energy Calibration Range : 7753.000



Instrument : CHAMBER 116  
 Detector : 45-132FF2  
 Calibration Date/Time : 17-AUG-2009 14:58:06  
 Calibration Source Id : AESS-008  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.296  
 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 : 2358.140  
 Energy Calibration Slope : 4.998592  
 Energy Calibration Quadratic : 2.4986797E-04  
 Energy Calibration Range : 7739.000

Instrument : CHAMBER 117  
 Detector : 33450  
 Calibration Date/Time : 17-AUG-2009 14:58:17  
 Calibration Source Id : AESS-003  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.212  
 NP-237 4341 2/28/10 4768.800 4768.136  
 CM-244 4320A 2/28/10 5795.020 5794.829  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2377.331  
 Energy Calibration Slope : 4.984442  
 Energy Calibration Quadratic : 2.6023277E-04  
 Energy Calibration Range : 7754.000

Instrument : CHAMBER 118  
 Detector : 75544  
 Calibration Date/Time : 17-AUG-2009 14:58:27  
 Calibration Source Id : AESS-009  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.453  
 NP-237 4341 2/28/10 4768.800 4768.624  
 CM-244 4320A 2/28/10 5795.020 5794.893  
  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2343.030  
 Energy Calibration Slope : 4.970738  
 Energy Calibration Quadratic : 2.7650801E-04  
 Energy Calibration Range : 7723.000

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	3001.688
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 : 18-AUG-2009 13:38:55  
 Calibration Source Id : AESS-010

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.734
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5794.984

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2316.127  
 Energy Calibration Slope : 4.939470  
 Energy Calibration Quadratic : 2.8824760E-04  
 Energy Calibration Range : 7676.000

Instrument : CHAMBER 121  
 Detector : 75545  
 Calibration Date/Time : 17-AUG-2009 14:58:37  
 Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.992
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5794.910

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2338.077  
 Energy Calibration Slope : 4.950966  
 Energy Calibration Quadratic : 2.8139201E-04  
 Energy Calibration Range : 7703.000

Instrument : CHAMBER 122  
 Detector : 75546  
 Calibration Date/Time : 17-AUG-2009 14:58:49  
 Calibration Source Id : AESS-011

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.767
NP-237	4341	2/28/10	4768.800	4768.557
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2334.596  
 Energy Calibration Slope : 4.961221  
 Energy Calibration Quadratic : 2.6947071E-04  
 Energy Calibration Range : 7697.000

Instrument : CHAMBER 123  
 Detector : 45-142V3  
 Calibration Date/Time : 17-AUG-2009 14:58:58  
 Calibration Source Id : AESS-006

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.626
NP-237	4341	2/28/10	4768.800	4768.419
CM-244	4320A	2/28/10	5795.020	5794.913

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2377.630  
 Energy Calibration Slope : 4.988592  
 Energy Calibration Quadratic : 2.4062325E-04  
 Energy Calibration Range : 7738.000

Instrument : CHAMBER 124  
 Detector : 45-142V2  
 Calibration Date/Time : 17-AUG-2009 14:59:08  
 Calibration Source Id : AESS-012

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.737
NP-237	4341	2/28/10	4768.800	4768.348
CM-244	4320A	2/28/10	5795.020	5794.822

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2389.445  
 Energy Calibration Slope : 5.014465  
 Energy Calibration Quadratic : 2.5700411E-04  
 Energy Calibration Range : 7794.000

Instrument : CHAMBER 125  
 Detector : 75547  
 Calibration Date/Time : 17-AUG-2009 14:59:18  
 Calibration Source Id : AESS-013

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.519
NP-237	4341	2/28/10	4768.800	4768.590
CM-244	4320A	2/28/10	5795.020	5794.968

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2346.234  
 Energy Calibration Slope : 4.935012  
 Energy Calibration Quadratic : 2.8653492E-04  
 Energy Calibration Range : 7700.000

Instrument : CHAMBER 126  
 Detector : 75548  
 Calibration Date/Time : 17-AUG-2009 14:59:32  
 Calibration Source Id : AESS-019

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.586
NP-237	4341	2/28/10	4768.800	4768.494
CM-244	4320A	2/28/10	5795.020	5794.836

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2351.831  
 Energy Calibration Slope : 5.025319  
 Energy Calibration Quadratic : 2.1107355E-04  
 Energy Calibration Range : 7719.000

Instrument : CHAMBER 127  
 Detector : 78770  
 Calibration Date/Time : 17-AUG-2009 14:59:46  
 Calibration Source Id : AESS-014

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.831
NP-237	4341	2/28/10	4768.800	4768.741
CM-244	4320A	2/28/10	5795.020	5794.894

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2339.154  
 Energy Calibration Slope : 4.970251  
 Energy Calibration Quadratic : 2.5652250E-04  
 Energy Calibration Range : 7698.000

Instrument : CHAMBER 128  
 Detector : 75549  
 Calibration Date/Time : 17-AUG-2009 15:00:39  
 Calibration Source Id : AESS-020

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.531
NP-237	4341	2/28/10	4768.800	4768.610
CM-244	4320A	2/28/10	5795.020	5794.838

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2330.388  
 Energy Calibration Slope : 5.000057  
 Energy Calibration Quadratic : 2.3812153E-04  
 Energy Calibration Range : 7700.000

Instrument : CHAMBER 129  
 Detector : 76227  
 Calibration Date/Time : 17-AUG-2009 15:00:50  
 Calibration Source Id : AESS-015

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.843
NP-237	4341	2/28/10	4768.800	4768.717
CM-244	4320A	2/28/10	5795.020	5794.874

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2351.215  
 Energy Calibration Slope : 4.930460  
 Energy Calibration Quadratic : 2.9455224E-04  
 Energy Calibration Range : 7709.000

Instrument : CHAMBER 130  
 Detector : 76228  
 Calibration Date/Time : 17-AUG-2009 15:01:00  
 Calibration Source Id : AESS-021

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.985
NP-237	4341	2/28/10	4768.800	4768.658
CM-244	4320A	2/28/10	5795.020	5794.729

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2337.606  
 Energy Calibration Slope : 4.982665  
 Energy Calibration Quadratic : 2.2944069E-04  
 Energy Calibration Range : 7680.000

Instrument : CHAMBER 131  
 Detector : 33448  
 Calibration Date/Time : 17-AUG-2009 15:01:10  
 Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3178.948
NP-237	4341	2/28/10	4768.800	4766.564
CM-244	4320A	2/28/10	5795.020	5793.610

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2408.823  
 Energy Calibration Slope : 4.963500  
 Energy Calibration Quadratic : 2.8727154E-04  
 Energy Calibration Range : 7793.000

Instrument : CHAMBER 132  
 Detector : 67579  
 Calibration Date/Time : 17-AUG-2009 15:01:19  
 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	4768.495
CM-244	4320A	2/28/10	5795.020	5794.895

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2326.639  
 Energy Calibration Slope : 5.034670  
 Energy Calibration Quadratic : 2.1709618E-04  
 Energy Calibration Range : 7710.000

Instrument : CHAMBER 133  
 Detector : 76229  
 Calibration Date/Time : 17-AUG-2009 15:01:29  
 Calibration Source Id : AESS-017

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.802
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5794.855

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2310.723  
 Energy Calibration Slope : 4.901457  
 Energy Calibration Quadratic : 2.6648620E-04  
 Energy Calibration Range : 7609.000

Instrument : CHAMBER 134  
 Detector : 76230  
 Calibration Date/Time : 17-AUG-2009 15:01:38  
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.670
NP-237	4341	2/28/10	4768.800	4768.734
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2328.671  
 Energy Calibration Slope : 4.971330  
 Energy Calibration Quadratic : 2.3919715E-04  
 Energy Calibration Range : 7670.000

Instrument : CHAMBER 135  
 Detector : 64270  
 Calibration Date/Time : 17-AUG-2009 15:01:50  
 Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.220
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 : 2334.713  
 Energy Calibration Slope : 4.950563  
 Energy Calibration Quadratic : 2.6665861E-04  
 Energy Calibration Range : 7684.000

Instrument : CHAMBER 136  
 Detector : 68549  
 Calibration Date/Time : 17-AUG-2009 15:02:00  
 Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.547
NP-237	4341	2/28/10	4768.800	4769.648
CM-244	4320A	2/28/10	5795.020	5795.176

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2352.961  
 Energy Calibration Slope : 4.996480  
 Energy Calibration Quadratic : 2.6544984E-04  
 Energy Calibration Range : 7748.000

Instrument : CHAMBER 137  
 Detector : 64288  
 Calibration Date/Time : 18-AUG-2009 09:58:00  
 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	4768.426
CM-244	4320A	2/28/10	5795.020	5794.897

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.854  
 Energy Calibration Slope : 5.032813  
 Energy Calibration Quadratic : 2.8756596E-04  
 Energy Calibration Range : 7832.000

Instrument : CHAMBER 138  
 Detector : 65877  
 Calibration Date/Time : 17-AUG-2009 15:10:23  
 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	4768.778
CM-244	4320A	2/28/10	5795.020	5794.902

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.472  
 Energy Calibration Slope : 4.997972  
 Energy Calibration Quadratic : 2.8433124E-04  
 Energy Calibration Range : 7793.000

Instrument : CHAMBER 139  
 Detector : 76231  
 Calibration Date/Time : 17-AUG-2009 15:10:36  
 Calibration Source Id : AESS-026

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.807
NP-237	4341	2/28/10	4768.800	4768.778
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.050  
 Energy Calibration Slope : 4.923675  
 Energy Calibration Quadratic : 3.2614564E-04  
 Energy Calibration Range : 7737.000



Instrument : CHAMBER 140  
 Detector : 78771  
 Calibration Date/Time : 17-AUG-2009 15:10:53  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5794.950

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2343.606  
 Energy Calibration Slope : 4.949296  
 Energy Calibration Quadratic : 3.0935110E-04  
 Energy Calibration Range : 7736.000

Instrument : CHAMBER 141  
 Detector : 76232  
 Calibration Date/Time : 17-AUG-2009 15:11:05  
 Calibration Source Id : AESS-027

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.704
NP-237	4341	2/28/10	4768.800	4768.701
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2354.080  
 Energy Calibration Slope : 4.967496  
 Energy Calibration Quadratic : 2.7667297E-04  
 Energy Calibration Range : 7731.000

Instrument : CHAMBER 142  
 Detector : 64261  
 Calibration Date/Time : 17-AUG-2009 15:11:22  
 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	5794.996

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2377.858  
 Energy Calibration Slope : 4.966272  
 Energy Calibration Quadratic : 3.0408424E-04  
 Energy Calibration Range : 7782.000

Instrument : CHAMBER 143  
 Detector : 65882  
 Calibration Date/Time : 17-AUG-2009 15:11:35  
 Calibration Source Id : AESS-028  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.838  
 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 : 2353.476  
 Energy Calibration Slope : 4.958334  
 Energy Calibration Quadratic : 2.9036327E-04  
 Energy Calibration Range : 7735.000

Instrument : CHAMBER 144  
 Detector : 75551  
 Calibration Date/Time : 17-AUG-2009 15:11:48  
 Calibration Source Id : AESS-034  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.149  
 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 : 2348.280  
 Energy Calibration Slope : 4.953019  
 Energy Calibration Quadratic : 2.9027942E-04  
 Energy Calibration Range : 7725.000

Instrument : CHAMBER 145  
 Detector : 72526  
 Calibration Date/Time : 17-AUG-2009 15:12:06  
 Calibration Source Id : AESS-029  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.799  
 CM-244 4320A 2/28/10 5795.020 5794.950  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.188  
 Energy Calibration Slope : 4.950538  
 Energy Calibration Quadratic : 3.1101296E-04  
 Energy Calibration Range : 7754.000

Instrument : CHAMBER 146  
 Detector : 72527  
 Calibration Date/Time : 17-AUG-2009 15:12:19  
 Calibration Source Id : AESS-035

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.841
NP-237	4341	2/28/10	4768.800	4768.589
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2352.896  
 Energy Calibration Slope : 4.936564  
 Energy Calibration Quadratic : 2.8588294E-04  
 Energy Calibration Range : 7708.000

Instrument : CHAMBER 147  
 Detector : 75550  
 Calibration Date/Time : 17-AUG-2009 15:12:37  
 Calibration Source Id : AESS-030

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.991
NP-237	4341	2/28/10	4768.800	4768.681
CM-244	4320A	2/28/10	5795.020	5794.852

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2344.357  
 Energy Calibration Slope : 4.979820  
 Energy Calibration Quadratic : 2.4974984E-04  
 Energy Calibration Range : 7706.000

Instrument : CHAMBER 148  
 Detector : 74429  
 Calibration Date/Time : 17-AUG-2009 15:12:57  
 Calibration Source Id : AESS-036

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.790
NP-237	4341	2/28/10	4768.800	4768.746
CM-244	4320A	2/28/10	5795.020	5794.901

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2347.048  
 Energy Calibration Slope : 4.952481  
 Energy Calibration Quadratic : 2.8881739E-04  
 Energy Calibration Range : 7721.000

Instrument : CHAMBER 149  
 Detector : 33449  
 Calibration Date/Time : 17-AUG-2009 15:02:09  
 Calibration Source Id : AESS-037

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.635
NP-237	4341	2/28/10	4768.800	4768.444
CM-244	4320A	2/28/10	5795.020	5794.948

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2393.262  
 Energy Calibration Slope : 4.951241  
 Energy Calibration Quadratic : 3.0021602E-04  
 Energy Calibration Range : 7778.000

Instrument : CHAMBER 150  
 Detector : 75552  
 Calibration Date/Time : 17-AUG-2009 15:02:19  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2357.177  
 Energy Calibration Slope : 4.964990  
 Energy Calibration Quadratic : 2.8429780E-04  
 Energy Calibration Range : 7739.000

Instrument : CHAMBER 151  
 Detector : 75556  
 Calibration Date/Time : 17-AUG-2009 15:02:29  
 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	4768.755
CM-244	4320A	2/28/10	5795.020	5794.925

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2344.746  
 Energy Calibration Slope : 4.932197  
 Energy Calibration Quadratic : 2.7974858E-04  
 Energy Calibration Range : 7689.000

Instrument : CHAMBER 152  
 Detector : 76222  
 Calibration Date/Time : 17-AUG-2009 15:02:41  
 Calibration Source Id : AESS-044

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.811
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5794.877

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2344.480  
 Energy Calibration Slope : 4.936235  
 Energy Calibration Quadratic : 2.8715734E-04  
 Energy Calibration Range : 7700.000

Instrument : CHAMBER 153  
 Detector : 76223  
 Calibration Date/Time : 17-AUG-2009 15:02:59  
 Calibration Source Id : AESS-039

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.810
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5794.996

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2337.684  
 Energy Calibration Slope : 4.933674  
 Energy Calibration Quadratic : 3.0187287E-04  
 Energy Calibration Range : 7706.000

Instrument : CHAMBER 154  
 Detector : 76224  
 Calibration Date/Time : 17-AUG-2009 15:03:12  
 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	5795.019

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2342.948  
 Energy Calibration Slope : 4.948957  
 Energy Calibration Quadratic : 2.8683257E-04  
 Energy Calibration Range : 7711.000

Instrument : CHAMBER 155  
 Detector : 75553  
 Calibration Date/Time : 17-AUG-2009 15:03:49  
 Calibration Source Id : AESS-040  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.770  
 NP-237 4341 2/28/10 4768.800 4768.662  
 CM-244 4320A 2/28/10 5795.020 5794.902  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.728  
 Energy Calibration Slope : 4.983710  
 Energy Calibration Quadratic : 2.8808211E-04  
 Energy Calibration Range : 7773.000

Instrument : CHAMBER 156  
 Detector : 75554  
 Calibration Date/Time : 17-AUG-2009 15:03:58  
 Calibration Source Id : AESS-046  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.851  
 NP-237 4341 2/28/10 4768.800 4768.705  
 CM-244 4320A 2/28/10 5795.020 5794.899  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.355  
 Energy Calibration Slope : 4.999010  
 Energy Calibration Quadratic : 2.6741659E-04  
 Energy Calibration Range : 7762.000

Instrument : CHAMBER 157  
 Detector : 75555  
 Calibration Date/Time : 17-AUG-2009 15:04:07  
 Calibration Source Id : AESS-041  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3182.868  
 NP-237 4341 2/28/10 4768.800 4768.768  
 CM-244 4320A 2/28/10 5795.020 5794.925  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.092  
 Energy Calibration Slope : 4.979420  
 Energy Calibration Quadratic : 2.8018607E-04  
 Energy Calibration Range : 7751.000

Instrument : CHAMBER 158  
 Detector : 33451  
 Calibration Date/Time : 17-AUG-2009 15:04:18  
 Calibration Source Id : AESS-047

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.449
NP-237	4341	2/28/10	4768.800	4768.432
CM-244	4320A	2/28/10	5795.020	5794.938

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2389.976  
 Energy Calibration Slope : 5.006801  
 Energy Calibration Quadratic : 3.0287215E-04  
 Energy Calibration Range : 7835.000

Instrument : CHAMBER 159  
 Detector : 76225  
 Calibration Date/Time : 17-AUG-2009 15:04:28  
 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 : 2354.720  
 Energy Calibration Slope : 4.980748  
 Energy Calibration Quadratic : 2.9428111E-04  
 Energy Calibration Range : 7764.000

Instrument : CHAMBER 160  
 Detector : 76226  
 Calibration Date/Time : 17-AUG-2009 15:04:40  
 Calibration Source Id : AESS-048

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2355.649  
 Energy Calibration Slope : 4.990073  
 Energy Calibration Quadratic : 2.8874222E-04  
 Energy Calibration Range : 7768.000

Instrument : CHAMBER 161  
 Detector : 70321  
 Calibration Date/Time : 24-AUG-2009 14:06:47  
 Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
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 : 2374.961  
 Energy Calibration Slope : 4.910189  
 Energy Calibration Quadratic : 3.2356248E-04  
 Energy Calibration Range : 7742.000

Instrument : CHAMBER 162  
 Detector : 70323  
 Calibration Date/Time : 24-AUG-2009 14:06:56  
 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 : 2369.767  
 Energy Calibration Slope : 4.933752  
 Energy Calibration Quadratic : 2.9582490E-04  
 Energy Calibration Range : 7732.000

Instrument : CHAMBER 163  
 Detector : 70324  
 Calibration Date/Time : 24-AUG-2009 14:07:06  
 Calibration Source Id : AESS-002

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2380.833  
 Energy Calibration Slope : 4.951450  
 Energy Calibration Quadratic : 2.9602056E-04  
 Energy Calibration Range : 7762.000



Instrument : CHAMBER 164  
 Detector : 70325  
 Calibration Date/Time : 24-AUG-2009 14:07:20  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2382.319  
 Energy Calibration Slope : 4.937610  
 Energy Calibration Quadratic : 3.1754762E-04  
 Energy Calibration Range : 7771.000

Instrument : CHAMBER 165  
 Detector : 72544  
 Calibration Date/Time : 24-AUG-2009 14:07:34  
 Calibration Source Id : AESS-003

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2383.801  
 Energy Calibration Slope : 4.978922  
 Energy Calibration Quadratic : 2.7212233E-04  
 Energy Calibration Range : 7768.000

Instrument : CHAMBER 166  
 Detector : 74545  
 Calibration Date/Time : 24-AUG-2009 14:07:42  
 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	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.102  
 Energy Calibration Slope : 4.917744  
 Energy Calibration Quadratic : 3.4292034E-04  
 Energy Calibration Range : 7771.000

Instrument : CHAMBER 167  
 Detector : 72546  
 Calibration Date/Time : 24-AUG-2009 14:07:51  
 Calibration Source Id : AESS-004

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2378.657  
 Energy Calibration Slope : 4.932514  
 Energy Calibration Quadratic : 3.1670861E-04  
 Energy Calibration Range : 7762.000

Instrument : CHAMBER 168  
 Detector : 72547  
 Calibration Date/Time : 24-AUG-2009 14:07:59  
 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 : 2383.249  
 Energy Calibration Slope : 4.927288  
 Energy Calibration Quadratic : 3.2642024E-04  
 Energy Calibration Range : 7771.000

Instrument : CHAMBER 169  
 Detector : 72548  
 Calibration Date/Time : 24-AUG-2009 14:08:11  
 Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2381.642  
 Energy Calibration Slope : 4.923596  
 Energy Calibration Quadratic : 3.2521432E-04  
 Energy Calibration Range : 7764.000

Instrument : CHAMBER 170  
 Detector : 72549  
 Calibration Date/Time : 24-AUG-2009 14:08:20  
 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	4768.492
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2382.004  
 Energy Calibration Slope : 4.926051  
 Energy Calibration Quadratic : 3.3877406E-04  
 Energy Calibration Range : 7782.000

Instrument : CHAMBER 171  
 Detector : 78260  
 Calibration Date/Time : 24-AUG-2009 14:08:29  
 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	4769.426
CM-244	4320A	2/28/10	5795.020	5795.289

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2366.691  
 Energy Calibration Slope : 4.935659  
 Energy Calibration Quadratic : 3.0618926E-04  
 Energy Calibration Range : 7742.000

Instrument : CHAMBER 172  
 Detector : 78772  
 Calibration Date/Time : 24-AUG-2009 14:08:40  
 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	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2367.995  
 Energy Calibration Slope : 4.907234  
 Energy Calibration Quadratic : 3.5045875E-04  
 Energy Calibration Range : 7760.000

Instrument : CHAMBER 173  
 Detector : 74431  
 Calibration Date/Time : 24-AUG-2009 14:08:49  
 Calibration Source Id : AESS-013  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.808  
 Energy Calibration Slope : 4.998088  
 Energy Calibration Quadratic : 2.5220143E-04  
 Energy Calibration Range : 7747.000

Instrument : CHAMBER 174  
 Detector : 74432  
 Calibration Date/Time : 24-AUG-2009 14:08:58  
 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 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2359.695  
 Energy Calibration Slope : 5.048626  
 Energy Calibration Quadratic : 1.8959134E-04  
 Energy Calibration Range : 7728.000

Instrument : CHAMBER 175  
 Detector : 74433  
 Calibration Date/Time : 24-AUG-2009 14:09:06  
 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 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.396  
 Energy Calibration Slope : 4.978646  
 Energy Calibration Quadratic : 2.7462494E-04  
 Energy Calibration Range : 7751.000

Instrument : CHAMBER 176  
 Detector : 74434  
 Calibration Date/Time : 24-AUG-2009 14:09:15  
 Calibration Source Id : AESS-020

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.332  
 Energy Calibration Slope : 5.014320  
 Energy Calibration Quadratic : 2.4356594E-04  
 Energy Calibration Range : 7752.000

Instrument : CHAMBER 177  
 Detector : 74435  
 Calibration Date/Time : 24-AUG-2009 14:09:24  
 Calibration Source Id : AESS-015

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.740  
 Energy Calibration Slope : 4.964604  
 Energy Calibration Quadratic : 2.9061688E-04  
 Energy Calibration Range : 7753.000

Instrument : CHAMBER 178  
 Detector : 74436  
 Calibration Date/Time : 24-AUG-2009 14:09:35  
 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	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.420  
 Energy Calibration Slope : 4.990875  
 Energy Calibration Quadratic : 2.6006214E-04  
 Energy Calibration Range : 7742.000

Instrument : CHAMBER 179  
 Detector : 74437  
 Calibration Date/Time : 24-AUG-2009 14:09:44  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2360.365  
 Energy Calibration Slope : 4.967896  
 Energy Calibration Quadratic : 2.8685154E-04  
 Energy Calibration Range : 7748.000

Instrument : CHAMBER 180  
 Detector : 74438  
 Calibration Date/Time : 24-AUG-2009 14:09:54  
 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 : 2358.338  
 Energy Calibration Slope : 5.025792  
 Energy Calibration Quadratic : 2.1654682E-04  
 Energy Calibration Range : 7732.000

Instrument : CHAMBER 181  
 Detector : 74439  
 Calibration Date/Time : 24-AUG-2009 14:10:03  
 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	4768.697
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.787  
 Energy Calibration Slope : 4.972206  
 Energy Calibration Quadratic : 2.7814286E-04  
 Energy Calibration Range : 7746.000

Instrument : CHAMBER 182  
 Detector : 74440  
 Calibration Date/Time : 24-AUG-2009 14:10:14  
 Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2353.051  
 Energy Calibration Slope : 4.986979  
 Energy Calibration Quadratic : 2.5764259E-04  
 Energy Calibration Range : 7730.000

Instrument : CHAMBER 183  
 Detector : 74441  
 Calibration Date/Time : 24-AUG-2009 14:10:29  
 Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.208  
 Energy Calibration Slope : 4.980685  
 Energy Calibration Quadratic : 2.7016739E-04  
 Energy Calibration Range : 7746.000

Instrument : CHAMBER 184  
 Detector : 74442  
 Calibration Date/Time : 24-AUG-2009 14:10:41  
 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 : 2359.055  
 Energy Calibration Slope : 5.010284  
 Energy Calibration Quadratic : 2.3703104E-04  
 Energy Calibration Range : 7738.000

Instrument : CHAMBER 185  
 Detector : 68615  
 Calibration Date/Time : 24-AUG-2009 14:10:54  
 Calibration Source Id : AESS-025

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.699
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.733  
 Energy Calibration Slope : 4.933492  
 Energy Calibration Quadratic : 2.8617174E-04  
 Energy Calibration Range : 7714.000

Instrument : CHAMBER 186  
 Detector : 68616  
 Calibration Date/Time : 24-AUG-2009 14:11:06  
 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	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.753  
 Energy Calibration Slope : 4.935731  
 Energy Calibration Quadratic : 2.9755512E-04  
 Energy Calibration Range : 7732.000

Instrument : CHAMBER 187  
 Detector : 68620  
 Calibration Date/Time : 24-AUG-2009 14:11:16  
 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	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2376.047  
 Energy Calibration Slope : 4.966012  
 Energy Calibration Quadratic : 3.0612116E-04  
 Energy Calibration Range : 7782.000



Instrument : CHAMBER 188  
 Detector : 68621  
 Calibration Date/Time : 24-AUG-2009 14:11:25  
 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 : 2368.519  
 Energy Calibration Slope : 4.967674  
 Energy Calibration Quadratic : 2.9094989E-04  
 Energy Calibration Range : 7761.000

Instrument : CHAMBER 189  
 Detector : 68622  
 Calibration Date/Time : 24-AUG-2009 14:11:34  
 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 : 2363.805  
 Energy Calibration Slope : 4.932057  
 Energy Calibration Quadratic : 3.0281782E-04  
 Energy Calibration Range : 7732.000

Instrument : CHAMBER 190  
 Detector : 68623  
 Calibration Date/Time : 24-AUG-2009 14:11:43  
 Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2358.846  
 Energy Calibration Slope : 4.945598  
 Energy Calibration Quadratic : 2.9230170E-04  
 Energy Calibration Range : 7730.000

Instrument : CHAMBER 191  
 Detector : 68624  
 Calibration Date/Time : 24-AUG-2009 14:11:54  
 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	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2370.757  
 Energy Calibration Slope : 4.964250  
 Energy Calibration Quadratic : 3.1056980E-04  
 Energy Calibration Range : 7780.000

Instrument : CHAMBER 192  
 Detector : 74430  
 Calibration Date/Time : 24-AUG-2009 14:12:04  
 Calibration Source Id : AESS-034

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.552  
 Energy Calibration Slope : 4.984001  
 Energy Calibration Quadratic : 2.9122332E-04  
 Energy Calibration Range : 7775.000

Instrument : CHAMBER 193  
 Detector : 68627  
 Calibration Date/Time : 24-AUG-2009 14:12:15  
 Calibration Source Id : AESS-029

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.432  
 Energy Calibration Slope : 4.926356  
 Energy Calibration Quadratic : 3.1079396E-04  
 Energy Calibration Range : 7735.000

Instrument : CHAMBER 194  
 Detector : 68635  
 Calibration Date/Time : 24-AUG-2009 14:12:24  
 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 : 2361.972  
 Energy Calibration Slope : 4.949121  
 Energy Calibration Quadratic : 2.8917161E-04  
 Energy Calibration Range : 7733.000

Instrument : CHAMBER 195  
 Detector : 68636  
 Calibration Date/Time : 24-AUG-2009 14:12:38  
 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	4768.802
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.575  
 Energy Calibration Slope : 4.972611  
 Energy Calibration Quadratic : 2.6226370E-04  
 Energy Calibration Range : 7729.000

Instrument : CHAMBER 196  
 Detector : 68637  
 Calibration Date/Time : 24-AUG-2009 14:12:49  
 Calibration Source Id : AESS-036

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.691  
 Energy Calibration Slope : 4.926461  
 Energy Calibration Quadratic : 3.1398068E-04  
 Energy Calibration Range : 7739.000

Instrument : CHAMBER 197  
 Detector : 78894  
 Calibration Date/Time : 24-AUG-2009 14:12:58  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2371.940  
 Energy Calibration Slope : 4.962372  
 Energy Calibration Quadratic : 3.0214558E-04  
 Energy Calibration Range : 7770.000

Instrument : CHAMBER 198  
 Detector : 78895  
 Calibration Date/Time : 24-AUG-2009 14:13:11  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2366.058  
 Energy Calibration Slope : 4.966545  
 Energy Calibration Quadratic : 2.8346200E-04  
 Energy Calibration Range : 7749.000

Instrument : CHAMBER 199  
 Detector : 78896  
 Calibration Date/Time : 24-AUG-2009 14:13:20  
 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	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2368.399  
 Energy Calibration Slope : 4.967513  
 Energy Calibration Quadratic : 2.9532972E-04  
 Energy Calibration Range : 7765.000

Instrument : CHAMBER 200  
 Detector : 78900  
 Calibration Date/Time : 24-AUG-2009 14:13:29  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2366.221  
 Energy Calibration Slope : 4.968300  
 Energy Calibration Quadratic : 2.9352392E-04  
 Energy Calibration Range : 7762.000

Instrument : CHAMBER 201  
 Detector : 78902  
 Calibration Date/Time : 24-AUG-2009 14:13:38  
 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	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2362.156  
 Energy Calibration Slope : 4.974658  
 Energy Calibration Quadratic : 2.9066936E-04  
 Energy Calibration Range : 7761.000

Instrument : CHAMBER 202  
 Detector : 78903  
 Calibration Date/Time : 24-AUG-2009 14:13:47  
 Calibration Source Id : AESS-045

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2356.033  
 Energy Calibration Slope : 4.956886  
 Energy Calibration Quadratic : 2.9409473E-04  
 Energy Calibration Range : 7740.000

Instrument : CHAMBER 203  
 Detector : 78905  
 Calibration Date/Time : 24-AUG-2009 14:16:33  
 Calibration Source Id : AESS-040

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.159  
 Energy Calibration Slope : 4.957525  
 Energy Calibration Quadratic : 3.0185276E-04  
 Energy Calibration Range : 7757.000

Instrument : CHAMBER 204  
 Detector : 78907  
 Calibration Date/Time : 24-AUG-2009 14:14:37  
 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	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2361.336  
 Energy Calibration Slope : 4.953297  
 Energy Calibration Quadratic : 3.0559121E-04  
 Energy Calibration Range : 7754.000

Instrument : CHAMBER 205  
 Detector : 78908  
 Calibration Date/Time : 24-AUG-2009 14:14:46  
 Calibration Source Id : AESS-041

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

Energy/Channel Equation : see above  
 Energy Calibration Zero : 2366.916  
 Energy Calibration Slope : 4.956555  
 Energy Calibration Quadratic : 3.0603251E-04  
 Energy Calibration Range : 7763.000

Instrument : CHAMBER 206  
 Detector : 78909  
 Calibration Date/Time : 24-AUG-2009 14:14:55  
 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 : 2362.312  
 Energy Calibration Slope : 4.958225  
 Energy Calibration Quadratic : 2.9557038E-04  
 Energy Calibration Range : 7749.000

Instrument : CHAMBER 207  
 Detector : 78910  
 Calibration Date/Time : 24-AUG-2009 14:15:04  
 Calibration Source Id : AESS-042  
 Cal. Isotopes Source Id Expiration Date Standard Energy Actual Energy  
 GD-148 6445-278 2/28/10 3183.000 3183.000  
 NP-237 4341 2/28/10 4768.800 4768.801  
 CM-244 4320A 2/28/10 5795.020 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2365.581  
 Energy Calibration Slope : 4.980759  
 Energy Calibration Quadratic : 2.8388310E-04  
 Energy Calibration Range : 7764.000

Instrument : CHAMBER 208  
 Detector : 78911  
 Calibration Date/Time : 24-AUG-2009 14:15:14  
 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 5795.020  
 Energy/Channel Equation : see above  
 Energy Calibration Zero : 2364.472  
 Energy Calibration Slope : 4.972521  
 Energy Calibration Quadratic : 2.9282621E-04  
 Energy Calibration Range : 7763.000

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	11.00000	2.640001	30.15113	95.00000
CM-244	5533.599	5883.327	10.00000	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	10.000000	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	10.000000	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	14.000000	3.359998	26.72612	95.00000
CM-244	5531.026	5885.258	12.000000	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	11.000000	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	0.000000E+00	0.000000E+00	0.000000E+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	9.000000	2.159998	33.33334	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	82.00000	19.68000	11.04315	95.00000
CM-244	5534.466	5887.335	8.000000	1.920000	35.35534	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	12.00000	2.879998	28.86751	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	5.000000	1.199999	44.72136	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	2.000000	0.4799997	70.71068	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 : 16-AUG-2009 16:34:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.867	3300.361	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.565	4901.409	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5532.822	5886.571	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 114  
 Detector : 78258  
 Background Analysis Date/Time : 16-AUG-2009 16:34:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.066	3300.343	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.866	4902.961	2.000000	0.6000000	70.71068	95.00000
CM-244	5535.155	5886.142	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 115  
 Detector : 45-132FF4  
 Background Analysis Date/Time : 16-AUG-2009 16:34:55  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.683	3299.666	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.623	4904.729	6.000000	1.800000	40.82483	95.00000
CM-244	5534.066	5886.268	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 116  
 Detector : 45-132FF2  
 Background Analysis Date/Time : 16-AUG-2009 16:34:59  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.930	3301.615	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.958	4904.160	3.000000	0.9000000	57.73503	95.00000
CM-244	5532.087	5883.400	11.00000	3.300000	30.15113	95.00000



Instrument : CHAMBER 117  
 Detector : 33450  
 Background Analysis Date/Time : 16-AUG-2009 16:35:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.306	3298.199	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.520	4903.152	3.000000	0.9000000	57.73503	95.00000
CM-244	5530.582	5887.083	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 118  
 Detector : 75544  
 Background Analysis Date/Time : 16-AUG-2009 16:35:08  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.856	3302.528	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.711	4902.773	2.000000	0.6000000	70.71068	95.00000
CM-244	5531.177	5883.080	18.00000	5.400000	23.57022	95.00000

Instrument : CHAMBER 119  
 Detector : 74429  
 Background Analysis Date/Time : 16-AUG-2009 16:35:12  
 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	0.0000000E+00	0.0000000E+00	0.0000000E+00	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 : 16-AUG-2009 16:35:17  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.209	3300.389	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.370	4904.997	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5531.794	5882.950	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 121  
 Detector : 75545  
 Background Analysis Date/Time : 16-AUG-2009 16:35:22  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.483	3299.036	4.000000	1.200000	50.00000	95.00000
NP-237	4436.007	4904.843	6.000000	1.800000	40.82483	95.00000
CM-244	5531.746	5882.876	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 122  
 Detector : 75546  
 Background Analysis Date/Time : 16-AUG-2009 16:35:26  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.140	3302.149	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.728	4903.501	14.00000	4.200000	26.72612	95.00000
CM-244	5535.323	5886.133	13.00000	3.900000	27.73501	95.00000

Instrument : CHAMBER 123  
 Detector : 45-142V3  
 Background Analysis Date/Time : 16-AUG-2009 16:35:30  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.820	3298.601	3.000000	0.9000000	57.73503	95.00000
NP-237	4437.478	4905.941	6.000000	1.800000	40.82483	95.00000
CM-244	5531.339	5886.453	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 124  
 Detector : 45-142V2  
 Background Analysis Date/Time : 16-AUG-2009 16:35:35  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.806	3300.376	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.352	4902.974	9.000000	2.700000	33.33334	95.00000
CM-244	5533.246	5885.946	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 125  
 Detector : 75547  
 Background Analysis Date/Time : 16-AUG-2009 16:35:39  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.619	3299.275	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.269	4906.266	6.000000	1.800000	40.82483	95.00000
CM-244	5531.959	5882.482	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 126  
 Detector : 75548  
 Background Analysis Date/Time : 16-AUG-2009 16:35:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.372	3298.946	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4437.297	4901.551	15.00000	4.500000	25.81989	95.00000
CM-244	5532.806	5882.587	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 127  
 Detector : 78770  
 Background Analysis Date/Time : 16-AUG-2009 16:35:48  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.622	3297.830	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.622	4904.092	1.000000	0.3000000	100.0000	95.00000
CM-244	5535.184	5885.434	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 128  
 Detector : 75549  
 Background Analysis Date/Time : 16-AUG-2009 16:35:52  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.482	3299.177	135.0000	40.50000	8.606629	95.00000
NP-237	4436.028	4905.664	84.00000	25.20000	10.91089	95.00000
CM-244	5532.549	5883.141	32.00000	9.600000	17.67767	95.00000

Instrument : CHAMBER 129  
 Detector : 76227  
 Background Analysis Date/Time : 16-AUG-2009 16:35:57  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.146	3298.635	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.563	4905.761	8.000000	2.400000	35.35534	95.00000
CM-244	5531.918	5882.796	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 130  
 Detector : 76228  
 Background Analysis Date/Time : 16-AUG-2009 16:36:01  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.230	3297.665	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.582	4901.937	8.000000	2.400000	35.35534	95.00000
CM-244	5530.859	5884.881	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 131  
 Detector : 33448  
 Background Analysis Date/Time : 16-AUG-2009 16:36:05  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.455	3301.428	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.994	4904.668	4.000000	1.200000	50.00000	95.00000
CM-244	5532.826	5884.723	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 132  
 Detector : 67579  
 Background Analysis Date/Time : 16-AUG-2009 16:36:09  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.906	3301.298	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.560	4903.500	5.000000	1.500000	44.72136	95.00000
CM-244	5531.586	5882.587	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 133  
 Detector : 76229  
 Background Analysis Date/Time : 16-AUG-2009 16:36:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.199	3301.674	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.849	4905.652	3.000000	0.9000000	57.73503	95.00000
CM-244	5530.602	5882.872	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 134  
 Detector : 76230  
 Background Analysis Date/Time : 16-AUG-2009 16:36:19  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.055	3302.112	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.969	4905.408	21.00000	6.300000	21.82179	95.00000
CM-244	5534.460	5883.375	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 135  
 Detector : 64270  
 Background Analysis Date/Time : 16-AUG-2009 16:36:23  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.813	3300.105	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.123	4902.752	2.000000	0.6000000	70.71068	95.00000
CM-244	5532.979	5882.877	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 136  
 Detector : 68549  
 Background Analysis Date/Time : 16-AUG-2009 16:36:27  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.796	3301.682	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.713	4901.780	14.00000	4.200000	26.72612	95.00000
CM-244	5531.520	5884.028	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 137  
 Detector : 64288  
 Background Analysis Date/Time : 16-AUG-2009 16:36:31  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.035	3302.352	4.000000	1.200000	50.00000	95.00000
NP-237	4435.990	4901.349	6.000000	1.800000	40.82483	95.00000
CM-244	5532.344	5883.346	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 138  
 Detector : 65877  
 Background Analysis Date/Time : 16-AUG-2009 16:36:35  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.457	3300.623	3.000000	0.9000000	57.73503	95.00000
NP-237	4436.833	4904.301	13.00000	3.900000	27.73501	95.00000
CM-244	5531.035	5885.034	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 139  
 Detector : 76231  
 Background Analysis Date/Time : 16-AUG-2009 16:36:40  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.624	3300.322	4.000000	1.200000	50.00000	95.00000
NP-237	4436.965	4901.673	8.000000	2.400000	35.35534	95.00000
CM-244	5531.099	5884.173	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 140  
 Detector : 78771  
 Background Analysis Date/Time : 16-AUG-2009 16:36:43  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.243	3300.208	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.227	4906.111	12.00000	3.600000	28.86751	95.00000
CM-244	5531.085	5884.403	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 141  
 Detector : 76232  
 Background Analysis Date/Time : 16-AUG-2009 16:36:48  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.414	3297.748	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.262	4901.753	5.000000	1.500000	44.72136	95.00000
CM-244	5534.971	5886.637	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 142  
 Detector : 64261  
 Background Analysis Date/Time : 16-AUG-2009 16:36:52  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.269	3301.948	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.864	4905.404	11.00000	3.300000	30.15113	95.00000
CM-244	5531.110	5884.773	12.00000	3.600000	28.86751	95.00000

Instrument : CHAMBER 143  
 Detector : 65882  
 Background Analysis Date/Time : 16-AUG-2009 16:36:56  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.868	3300.973	10.00000	3.000000	31.62278	95.00000
NP-237	4435.203	4905.234	16.00000	4.800000	25.00000	95.00000
CM-244	5533.941	5886.181	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 144  
 Detector : 75551  
 Background Analysis Date/Time : 16-AUG-2009 16:37:00  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.050	3299.833	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.005	4902.603	12.00000	3.600000	28.86751	95.00000
CM-244	5530.735	5882.656	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 145  
 Detector : 72526  
 Background Analysis Date/Time : 16-AUG-2009 16:37:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.923	3299.882	3.000000	0.9000000	57.73503	95.00000
NP-237	4434.984	4905.949	4.000000	1.200000	50.00000	95.00000
CM-244	5531.069	5884.490	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 146  
 Detector : 72527  
 Background Analysis Date/Time : 16-AUG-2009 16:37:08  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.460	3301.164	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.288	4903.095	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.042	5884.573	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 147  
 Detector : 75550  
 Background Analysis Date/Time : 16-AUG-2009 16:37:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.910	3299.539	10.00000	3.000000	31.62278	95.00000
NP-237	4433.251	4901.935	8.000000	2.400000	35.35534	95.00000
CM-244	5533.139	5883.368	12.00000	3.600000	28.86751	95.00000

Instrument : CHAMBER 148  
 Detector : 74429  
 Background Analysis Date/Time : 16-AUG-2009 16:37:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.725	3298.446	6.000000	1.800000	40.82483	95.00000
NP-237	4436.496	4905.977	7.000000	2.100000	37.79645	95.00000
CM-244	5533.919	5885.716	8.000000	2.400000	35.35534	95.00000



Instrument : CHAMBER 149  
 Detector : 33449  
 Background Analysis Date/Time : 16-AUG-2009 16:37:20  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.734	3299.272	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.371	4901.944	4.000000	1.200000	50.00000	95.00000
CM-244	5530.548	5882.851	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 150  
 Detector : 75552  
 Background Analysis Date/Time : 16-AUG-2009 16:37:24  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.316	3300.643	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.415	4905.497	7.000000	2.100000	37.79645	95.00000
CM-244	5534.121	5886.240	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 151  
 Detector : 75556  
 Background Analysis Date/Time : 16-AUG-2009 16:37:28  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.659	3302.040	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.623	4901.634	4.000000	1.200000	50.00000	95.00000
CM-244	5531.364	5886.469	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 152  
 Detector : 76222  
 Background Analysis Date/Time : 16-AUG-2009 16:37:32  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.044	3297.777	4.000000	1.200000	50.00000	95.00000
NP-237	4437.300	4905.285	5.000000	1.500000	44.72136	95.00000
CM-244	5531.209	5887.199	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 153  
 Detector : 76223  
 Background Analysis Date/Time : 16-AUG-2009 16:37:35  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.175	3301.127	4.000000	1.200000	50.00000	95.00000
NP-237	4437.148	4906.174	10.00000	3.000000	31.62278	95.00000
CM-244	5533.838	5885.640	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 154  
 Detector : 76224  
 Background Analysis Date/Time : 16-AUG-2009 16:37:40  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.160	3298.663	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.792	4904.845	6.000000	1.800000	40.82483	95.00000
CM-244	5532.170	5883.602	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 155  
 Detector : 75553  
 Background Analysis Date/Time : 16-AUG-2009 16:37:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.137	3299.574	8.000000	2.400000	35.35534	95.00000
NP-237	4433.383	4905.252	9.000000	2.700000	33.33334	95.00000
CM-244	5530.995	5884.485	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 156  
 Detector : 75554  
 Background Analysis Date/Time : 16-AUG-2009 16:37:48  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.410	3301.423	6.000000	1.800000	40.82483	95.00000
NP-237	4436.034	4902.390	17.00000	5.100000	24.25356	95.00000
CM-244	5532.563	5885.336	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 157  
 Detector : 75555  
 Background Analysis Date/Time : 16-AUG-2009 16:37:52  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.948	3299.042	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.337	4902.073	9.000000	2.700000	33.33334	95.00000
CM-244	5531.733	5884.378	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 158  
 Detector : 33451  
 Background Analysis Date/Time : 16-AUG-2009 16:37:56  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.074	3301.013	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.907	4905.421	10.00000	3.000000	31.62278	95.00000
CM-244	5535.323	5885.904	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 159  
 Detector : 76225  
 Background Analysis Date/Time : 16-AUG-2009 16:38:00  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.022	3301.502	4.000000	1.200000	50.00000	95.00000
NP-237	4435.853	4902.842	7.000000	2.100000	37.79645	95.00000
CM-244	5534.528	5883.086	12.00000	3.600000	28.86751	95.00000

Instrument : CHAMBER 160  
 Detector : 76226  
 Background Analysis Date/Time : 16-AUG-2009 16:38:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.982	3298.890	6.000000	1.800000	40.82483	95.00000
NP-237	4434.439	4901.761	20.00000	6.000000	22.36068	95.00000
CM-244	5533.753	5882.414	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 161  
 Detector : 70321  
 Background Analysis Date/Time : 23-AUG-2009 11:54:11  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.799	3299.450	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.354	4905.712	6.000000	1.800000	40.82483	95.00000
CM-244	5533.034	5884.911	14.00000	4.200000	26.72612	95.00000

Instrument : CHAMBER 162  
 Detector : 70323  
 Background Analysis Date/Time : 23-AUG-2009 11:54:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.108	3297.679	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.157	4905.370	5.000000	1.500000	44.72136	95.00000
CM-244	5531.808	5882.856	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 163  
 Detector : 70324  
 Background Analysis Date/Time : 23-AUG-2009 11:54:21  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.316	3301.922	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.725	4904.333	12.00000	3.600000	28.86751	95.00000
CM-244	5532.622	5884.699	13.00000	3.900000	27.73501	95.00000

Instrument : CHAMBER 164  
 Detector : 70325  
 Background Analysis Date/Time : 23-AUG-2009 11:54:26  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.433	3301.590	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.137	4904.243	9.000000	2.700000	33.33334	95.00000
CM-244	5533.726	5886.727	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 165  
 Detector : 72544  
 Background Analysis Date/Time : 23-AUG-2009 11:54:31  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.235	3298.979	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.502	4904.549	7.000000	2.100000	37.79645	95.00000
CM-244	5532.823	5884.601	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 166  
 Detector : 74545  
 Background Analysis Date/Time : 23-AUG-2009 11:54:35  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.175	3297.621	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4434.428	4904.926	5.000000	1.500000	44.72136	95.00000
CM-244	5535.556	5884.119	12.000000	3.600000	28.86751	95.00000

Instrument : CHAMBER 167  
 Detector : 72546  
 Background Analysis Date/Time : 23-AUG-2009 11:54:40  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.148	3302.011	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.463	4903.100	12.000000	3.600000	28.86751	95.00000
CM-244	5531.940	5884.576	10.000000	3.000000	31.62278	95.00000

Instrument : CHAMBER 168  
 Detector : 72547  
 Background Analysis Date/Time : 23-AUG-2009 11:54:44  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.237	3300.921	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.534	4902.237	16.000000	4.800000	25.00000	95.00000
CM-244	5531.663	5884.741	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 169  
 Detector : 72548  
 Background Analysis Date/Time : 23-AUG-2009 11:54:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.165	3298.594	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.229	4903.754	13.00000	3.900000	27.73501	95.00000
CM-244	5532.658	5885.433	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 170  
 Detector : 72549  
 Background Analysis Date/Time : 23-AUG-2009 11:54:54  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.025	3299.867	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.622	4903.408	16.00000	4.800000	25.00000	95.00000
CM-244	5534.316	5882.981	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 171  
 Detector : 78260  
 Background Analysis Date/Time : 23-AUG-2009 11:54:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.433	3300.366	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.595	4905.826	9.000000	2.700000	33.33334	95.00000
CM-244	5533.870	5885.935	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 172  
 Detector : 78772  
 Background Analysis Date/Time : 23-AUG-2009 11:55:03  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.870	3297.903	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.678	4903.969	9.000000	2.700000	33.33334	95.00000
CM-244	5534.514	5883.121	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 173  
 Detector : 74431  
 Background Analysis Date/Time : 23-AUG-2009 11:55:07  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.449	3298.086	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4435.604	4905.905	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.021	5885.467	32.00000	9.600000	17.67767	95.00000

Instrument : CHAMBER 174  
 Detector : 74432  
 Background Analysis Date/Time : 23-AUG-2009 11:55:12  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.639	3300.179	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.486	4905.219	9.000000	2.700000	33.33334	95.00000
CM-244	5531.026	5885.734	20.00000	6.000000	22.36068	95.00000

Instrument : CHAMBER 175  
 Detector : 74433  
 Background Analysis Date/Time : 23-AUG-2009 11:55:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.018	3300.926	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.197	4902.367	8.000000	2.400000	35.35534	95.00000
CM-244	5531.134	5883.215	22.00000	6.600000	21.32007	95.00000

Instrument : CHAMBER 176  
 Detector : 74434  
 Background Analysis Date/Time : 23-AUG-2009 11:55:21  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.853	3298.318	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.083	4904.101	7.000000	2.100000	37.79645	95.00000
CM-244	5532.948	5884.695	23.00000	6.900000	20.85144	95.00000

Instrument : CHAMBER 177  
 Detector : 74435  
 Background Analysis Date/Time : 23-AUG-2009 11:55:26  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.857	3298.211	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.475	4903.934	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.213	5885.773	29.00000	8.700001	18.56953	95.00000

Instrument : CHAMBER 178  
 Detector : 74436  
 Background Analysis Date/Time : 23-AUG-2009 11:55:31  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.399	3300.807	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.785	4903.123	10.00000	3.000000	31.62278	95.00000
CM-244	5531.481	5883.158	22.00000	6.600000	21.32007	95.00000

Instrument : CHAMBER 179  
 Detector : 74437  
 Background Analysis Date/Time : 23-AUG-2009 11:55:36  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.874	3299.393	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.018	4905.518	5.000000	1.500000	44.72136	95.00000
CM-244	5534.758	5887.251	32.00000	9.600000	17.67767	95.00000

Instrument : CHAMBER 180  
 Detector : 74438  
 Background Analysis Date/Time : 23-AUG-2009 11:55:40  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.946	3300.627	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.505	4904.405	9.000000	2.700000	33.33334	95.00000
CM-244	5531.104	5886.649	23.00000	6.900000	20.85144	95.00000



Instrument : CHAMBER 181  
 Detector : 74439  
 Background Analysis Date/Time : 23-AUG-2009 11:55:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.658	3302.315	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4432.549	4902.677	7.000000	2.100000	37.79645	95.00000
CM-244	5531.208	5883.203	33.00000	9.900001	17.40777	95.00000

Instrument : CHAMBER 182  
 Detector : 74440  
 Background Analysis Date/Time : 23-AUG-2009 11:55:49  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.553	3299.709	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.824	4905.707	3.000000	0.9000000	57.73503	95.00000
CM-244	5533.404	5884.684	13.00000	3.900000	27.73501	95.00000

Instrument : CHAMBER 183  
 Detector : 74441  
 Background Analysis Date/Time : 23-AUG-2009 11:55:54  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.015	3297.962	3.000000	0.9000000	57.73503	95.00000
NP-237	4434.099	4904.342	4.000000	1.200000	50.00000	95.00000
CM-244	5532.826	5884.696	34.00000	10.20000	17.14986	95.00000

Instrument : CHAMBER 184  
 Detector : 74442  
 Background Analysis Date/Time : 23-AUG-2009 11:55:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.045	3299.169	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4437.505	4902.470	5.000000	1.500000	44.72136	95.00000
CM-244	5535.333	5886.318	24.00000	7.200000	20.41241	95.00000

Instrument : CHAMBER 185  
 Detector : 68615  
 Background Analysis Date/Time : 23-AUG-2009 11:56:04  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.897	3299.344	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.571	4905.243	2.000000	0.6000000	70.71068	95.00000
CM-244	5530.503	5886.106	27.00000	8.100000	19.24501	95.00000

Instrument : CHAMBER 186  
 Detector : 68616  
 Background Analysis Date/Time : 23-AUG-2009 11:56:08  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.379	3299.140	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.242	4902.774	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.982	5886.349	23.00000	6.900000	20.85144	95.00000

Instrument : CHAMBER 187  
 Detector : 68620  
 Background Analysis Date/Time : 23-AUG-2009 11:56:12  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.498	3300.157	4.000000	1.200000	50.00000	95.00000
NP-237	4437.493	4903.961	8.000000	2.400000	35.35534	95.00000
CM-244	5535.243	5883.722	18.00000	5.400000	23.57022	95.00000

Instrument : CHAMBER 188  
 Detector : 68621  
 Background Analysis Date/Time : 23-AUG-2009 11:56:16  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.985	3297.497	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.354	4904.064	5.000000	1.500000	44.72136	95.00000
CM-244	5533.683	5886.437	31.00000	9.300000	17.96053	95.00000

Instrument : CHAMBER 189  
 Detector : 68622  
 Background Analysis Date/Time : 23-AUG-2009 11:56:21  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.052	3301.735	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.853	4905.539	4.000000	1.200000	50.00000	95.00000
CM-244	5532.776	5884.354	29.00000	8.700001	18.56953	95.00000

Instrument : CHAMBER 190  
 Detector : 68623  
 Background Analysis Date/Time : 23-AUG-2009 11:56:25  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.652	3298.950	4.000000	1.200000	50.00000	95.00000
NP-237	4435.677	4904.720	25.00000	7.500000	20.00000	95.00000
CM-244	5532.170	5883.736	36.00000	10.80000	16.66667	95.00000

Instrument : CHAMBER 191  
 Detector : 68624  
 Background Analysis Date/Time : 23-AUG-2009 11:56:29  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.100	3299.772	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.436	4904.158	1.000000	0.3000000	100.0000	95.00000
CM-244	5530.545	5884.668	27.00000	8.100000	19.24501	95.00000

Instrument : CHAMBER 192  
 Detector : 74430  
 Background Analysis Date/Time : 23-AUG-2009 11:56:33  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.046	3297.560	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.061	4903.990	4.000000	1.200000	50.00000	95.00000
CM-244	5535.519	5883.955	25.00000	7.500000	20.00000	95.00000

Instrument : CHAMBER 193  
 Detector : 68627  
 Background Analysis Date/Time : 23-AUG-2009 11:56:37  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.087	3301.572	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.483	4905.309	7.000000	2.100000	37.79645	95.00000
CM-244	5532.931	5884.819	32.00000	9.600000	17.67767	95.00000

Instrument : CHAMBER 194  
 Detector : 68635  
 Background Analysis Date/Time : 23-AUG-2009 11:56:41  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.152	3297.570	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.536	4903.587	4.000000	1.200000	50.00000	95.00000
CM-244	5530.970	5882.461	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 195  
 Detector : 68636  
 Background Analysis Date/Time : 23-AUG-2009 11:56:45  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.288	3300.624	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.057	4902.978	3.000000	0.9000000	57.73503	95.00000
CM-244	5534.813	5885.542	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 196  
 Detector : 68637  
 Background Analysis Date/Time : 23-AUG-2009 11:56:50  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.410	3301.963	3.000000	0.9000000	57.73503	95.00000
NP-237	4437.321	4906.417	5.000000	1.500000	44.72136	95.00000
CM-244	5534.476	5886.645	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 197  
 Detector : 78894  
 Background Analysis Date/Time : 23-AUG-2009 11:56:54  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.920	3300.320	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4436.468	4902.348	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.745	5886.065	12.00000	3.600000	28.86751	95.00000

Instrument : CHAMBER 198  
 Detector : 78895  
 Background Analysis Date/Time : 23-AUG-2009 11:56:58  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.305	3299.642	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.397	4904.448	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
CM-244	5533.011	5885.087	30.00000	9.000000	18.25742	95.00000

Instrument : CHAMBER 199  
 Detector : 78896  
 Background Analysis Date/Time : 23-AUG-2009 11:57:02  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.912	3297.497	0.000000E+00	0.000000E+00	0.000000E+00	95.00000
NP-237	4433.891	4904.941	5.000000	1.500000	44.72136	95.00000
CM-244	5535.121	5882.869	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 200  
 Detector : 78900  
 Background Analysis Date/Time : 23-AUG-2009 11:57:06  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.845	3300.480	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.941	4902.709	10.00000	3.000000	31.62278	95.00000
CM-244	5532.744	5885.759	30.00000	9.000000	18.25742	95.00000

Instrument : CHAMBER 201  
 Detector : 78902  
 Background Analysis Date/Time : 23-AUG-2009 11:57:10  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.531	3297.499	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.991	4906.359	5.000000	1.500000	44.72136	95.00000
CM-244	5531.510	5884.700	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 202  
 Detector : 78903  
 Background Analysis Date/Time : 23-AUG-2009 11:57:14  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.301	3298.322	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.596	4902.750	0.000000E+00	0.0000000E+00	0.000000E+00	95.00000
CM-244	5531.710	5884.137	13.00000	3.900000	27.73501	95.00000

Instrument : CHAMBER 203  
 Detector : 78905  
 Background Analysis Date/Time : 23-AUG-2009 11:57:19  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.566	3301.771	4.000000	1.200000	50.00000	95.00000
NP-237	4437.077	4902.609	6.000000	1.800000	40.82483	95.00000
CM-244	5532.534	5885.590	12.00000	3.600000	28.86751	95.00000

Instrument : CHAMBER 204  
 Detector : 78907  
 Background Analysis Date/Time : 23-AUG-2009 11:57:23  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.303	3298.289	13.00000	3.900000	27.73501	95.00000
NP-237	4433.152	4903.866	12.00000	3.600000	28.86751	95.00000
CM-244	5533.856	5886.993	34.00000	10.20000	17.14986	95.00000

Instrument : CHAMBER 205  
 Detector : 78908  
 Background Analysis Date/Time : 23-AUG-2009 11:57:27  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.267	3299.423	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.928	4905.917	1.000000	0.3000000	100.0000	95.00000
CM-244	5530.946	5884.256	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 206  
 Detector : 78909  
 Background Analysis Date/Time : 23-AUG-2009 11:57:31  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.740	3299.836	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.469	4904.811	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5534.058	5886.660	13.00000	3.900000	27.73501	95.00000

Instrument : CHAMBER 207  
 Detector : 78910  
 Background Analysis Date/Time : 23-AUG-2009 11:57:35  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.560	3301.824	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.563	4905.877	4.000000	1.200000	50.00000	95.00000
CM-244	5530.790	5883.765	14.00000	4.200000	26.72612	95.00000

Instrument : CHAMBER 208  
 Detector : 78911  
 Background Analysis Date/Time : 23-AUG-2009 11:57:40  
 Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.613	3299.492	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.795	4902.883	7.000000	2.100000	37.79645	95.00000
CM-244	5533.327	5886.561	13.00000	3.900000	27.73501	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. Istps	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. Istps	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. Istps	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. Istps	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. Istps	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. Istps	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. Istps	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. Istps	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. Istps	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. Istds	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. Istds	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. Istds	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. Istps	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. Istps	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. Istps	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. Istps	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. Istps	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. Istps	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 : 17-AUG-2009 09:40:49  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 14:57:05  
 Average Efficiency : 0.2505672  
 Average Efficiency Error : 6.9084223E-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	2990.867	3300.361	15169.00	0.2456670	1.0558164E-02	69.86203
NP-237	171.0024	28-FEB-2010	4434.565	4901.409	13130.00	0.2559362	1.2990281E-02	75.93420
CM-244	158.1060	28-FEB-2010	5532.822	5886.571	11319.00	0.2525721	1.2849954E-02	69.15296

Instrument : CHAMBER 114  
 Detector : 78258  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 17-AUG-2009 09:40:56  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 14:57:42  
 Average Efficiency : 0.2566939  
 Average Efficiency Error : 7.0618941E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2992.066	3300.343	15529.00	0.2538896	1.0907058E-02	46.46336
NP-237	205.0260	28-FEB-2010	4433.866	4902.961	15975.00	0.2597136	1.3147265E-02	59.75802
CM-244	199.6806	28-FEB-2010	5535.155	5886.142	14576.00	0.2577351	1.3062422E-02	48.49145

Instrument : CHAMBER 115  
 Detector : 45-132FF4  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 17-AUG-2009 09:41:02  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 14:57:55  
 Average Efficiency : 0.2653268  
 Average Efficiency Error : 7.2980789E-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	2989.683	3299.666	15797.00	0.2667769	1.1457291E-02	62.01321
NP-237	200.4990	28-FEB-2010	4433.623	4904.729	15897.00	0.2642607	1.3378277E-02	65.74837
CM-244	196.5558	28-FEB-2010	5534.066	5886.268	14729.00	0.2644131	1.3399067E-02	62.30648

Instrument : CHAMBER 116  
 Detector : 45-132FF2  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 17-AUG-2009 09:41:08  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 14:58:06  
 Average Efficiency : 0.2617015  
 Average Efficiency Error : 7.1968301E-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	2991.930	3301.615	15931.00	0.2613424	1.1222276E-02	57.22266
NP-237	209.2716	28-FEB-2010	4433.958	4904.160	16458.00	0.2621330	1.3264989E-02	65.63932
CM-244	199.6488	28-FEB-2010	5532.087	5883.400	14804.00	0.2617715	1.3264321E-02	58.02108

Instrument : CHAMBER 117  
 Detector : 33450  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 17-AUG-2009 09:41:13  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 14:58:17  
 Average Efficiency : 0.2525579  
 Average Efficiency Error : 6.9512939E-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	2989.306	3298.199	15015.00	0.2500224	1.0747343E-02	65.18716
NP-237	203.2080	28-FEB-2010	4433.520	4903.152	15609.00	0.2560285	1.2964435E-02	69.72454
CM-244	197.2236	28-FEB-2010	5530.582	5887.083	14123.00	0.2527719	1.2816428E-02	63.59301

Instrument : CHAMBER 118  
 Detector : 75544  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 17-AUG-2009 09:41:17  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 14:58:27  
 Average Efficiency : 0.2576301  
 Average Efficiency Error : 7.0881532E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.3736	28-FEB-2010	2988.856	3302.528	15454.00	0.2568017	1.1033086E-02	48.57111
NP-237	204.0192	28-FEB-2010	4432.711	4902.773	15795.00	0.2580543	1.3065088E-02	53.80557
CM-244	197.2128	28-FEB-2010	5531.177	5883.080	14443.00	0.2583711	1.3096387E-02	48.23898

Instrument : CHAMBER 119  
 Detector : 74429  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 18-AUG-2009 08:34:33  
 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	1406.000	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 : 18-AUG-2009 08:35:01  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 18-AUG-2009 13:38:55  
 Average Efficiency : 0.2589359  
 Average Efficiency Error : 7.1242545E-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	2988.209	3300.389	15391.00	0.2575360	1.1065440E-02	43.23295
NP-237	202.9926	28-FEB-2010	4436.370	4904.997	15823.00	0.2598289	1.3154631E-02	56.74783
CM-244	196.2330	28-FEB-2010	5531.794	5882.950	14449.00	0.2600255	1.3180019E-02	54.60671

Instrument : CHAMBER 121  
 Detector : 75545  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 17-AUG-2009 09:41:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 14:58:37  
 Average Efficiency : 0.2477992  
 Average Efficiency Error : 6.8184505E-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	2991.483	3299.036	15409.00	0.2471195	1.0617682E-02	50.47642
NP-237	209.5938	28-FEB-2010	4436.007	4904.843	15591.00	0.2479274	1.2554423E-02	56.89366
CM-244	202.7478	28-FEB-2010	5531.746	5882.876	14277.00	0.2486278	1.2604386E-02	50.04906

Instrument : CHAMBER 122  
 Detector : 75546  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 17-AUG-2009 09:41:30  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 14:58:49  
 Average Efficiency : 0.2511526  
 Average Efficiency Error : 6.9076614E-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	2989.140	3302.149	15817.00	0.2511983	1.0788003E-02	55.71524
NP-237	214.4868	28-FEB-2010	4434.728	4903.501	16008.00	0.2487148	1.2590243E-02	57.96050
CM-244	208.4184	28-FEB-2010	5535.323	5886.133	14974.00	0.2536270	1.2849721E-02	53.77795

Instrument : CHAMBER 123  
 Detector : 45-142V3  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 17-AUG-2009 09:41:34  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 14:58:58  
 Average Efficiency : 0.2594329  
 Average Efficiency Error : 7.1380134E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2989.820	3298.601	15515.00	0.2574363	1.1059616E-02	71.81727
NP-237	204.7038	28-FEB-2010	4437.478	4905.941	15738.00	0.2562436	1.2974020E-02	72.62444
CM-244	195.0060	28-FEB-2010	5531.339	5886.453	14683.00	0.2658339	1.3471606E-02	67.85081

Instrument : CHAMBER 124  
 Detector : 45-142V2  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 17-AUG-2009 09:41:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 14:59:08  
 Average Efficiency : 0.2622745  
 Average Efficiency Error : 7.2123613E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.2200	28-FEB-2010	2989.806	3300.376	16169.00	0.2650077	1.1376831E-02	65.10977
NP-237	205.8930	28-FEB-2010	4436.352	4902.974	16128.00	0.2610630	1.3214089E-02	71.08579
CM-244	203.1954	28-FEB-2010	5533.246	5885.946	14953.00	0.2598179	1.3163561E-02	70.97868

Instrument : CHAMBER 125  
 Detector : 75547  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-AUG-2009 09:41:44  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 14:59:18  
 Average Efficiency : 0.2577128  
 Average Efficiency Error : 7.0888288E-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	2987.619	3299.275	15570.00	0.2584035	1.1100472E-02	45.32409
NP-237	210.2526	28-FEB-2010	4433.269	4906.266	16194.00	0.2567104	1.2993116E-02	55.37461
CM-244	201.9108	28-FEB-2010	5531.959	5882.482	14741.00	0.2577693	1.3062201E-02	51.62124

Instrument : CHAMBER 126  
 Detector : 75548  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 17-AUG-2009 09:41:49  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 14:59:32  
 Average Efficiency : 0.2528252  
 Average Efficiency Error : 6.9586127E-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	2988.372	3298.946	15025.00	0.2481292	1.0665805E-02	51.29427
NP-237	202.9140	28-FEB-2010	4437.297	4901.551	15728.00	0.2582902	1.3077814E-02	59.55880
CM-244	199.3140	28-FEB-2010	5532.806	5882.587	14367.00	0.2543760	1.2894685E-02	53.51087

Instrument : CHAMBER 127  
 Detector : 78770  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 17-AUG-2009 09:41:53  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 14:59:46  
 Average Efficiency : 0.2467646  
 Average Efficiency Error : 6.7887292E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2989.622	3297.830	15608.00	0.2456636	1.0552737E-02	45.17228
NP-237	211.7160	28-FEB-2010	4435.622	4904.092	15815.00	0.2489925	1.2606090E-02	55.68476
CM-244	207.3882	28-FEB-2010	5535.184	5885.434	14463.00	0.2461215	1.2475103E-02	51.99955



Instrument : CHAMBER 128  
 Detector : 75549  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 17-AUG-2009 09:41:59  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:00:39  
 Average Efficiency : 0.2557978  
 Average Efficiency Error : 7.0393290E-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	2989.482	3299.177	15312.00	0.2510756	1.0789989E-02	50.23243
NP-237	203.4984	28-FEB-2010	4436.028	4905.664	15805.00	0.2584755	1.3086889E-02	59.26414
CM-244	197.1096	28-FEB-2010	5532.549	5883.141	14531.00	0.2601309	1.3184624E-02	52.60558

Instrument : CHAMBER 129  
 Detector : 76227  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-AUG-2009 09:42:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:00:50  
 Average Efficiency : 0.2636167  
 Average Efficiency Error : 7.2512124E-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	2992.146	3298.635	15855.00	0.2626581	1.1279699E-02	51.01081
NP-237	200.6460	28-FEB-2010	4432.563	4905.761	16101.00	0.2674463	1.3537456E-02	55.64974
CM-244	195.9270	28-FEB-2010	5531.918	5882.796	14498.00	0.2612732	1.3242676E-02	51.23387

Instrument : CHAMBER 130  
 Detector : 76228  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 17-AUG-2009 09:42:09  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:01:00  
 Average Efficiency : 0.2500172  
 Average Efficiency Error : 6.8798582E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2989.230	3297.665	15254.00	0.2474099	1.0632024E-02	49.47410
NP-237	210.1548	28-FEB-2010	4434.582	4901.937	15716.00	0.2492386	1.2619579E-02	59.00264
CM-244	200.7390	28-FEB-2010	5530.859	5884.881	14487.00	0.2546751	1.2908396E-02	49.18253

Instrument : CHAMBER 131  
 Detector : 33448  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-AUG-2009 09:42:13  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:01:10  
 Average Efficiency : 0.2486686  
 Average Efficiency Error : 6.8503493E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2988.455	3301.428	14427.00	0.2389750	1.0279993E-02	88.46142
NP-237	199.3962	28-FEB-2010	4434.994	4904.668	15550.00	0.2599315	1.3162703E-02	91.50983
CM-244	198.6402	28-FEB-2010	5532.826	5884.723	14238.00	0.2530668	1.2829903E-02	81.92683

Instrument : CHAMBER 132  
 Detector : 67579  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 17-AUG-2009 09:42:18  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:01:19  
 Average Efficiency : 0.2503150  
 Average Efficiency Error : 6.8899435E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2989.906	3301.298	15059.00	0.2427482	1.0434108E-02	48.23922
NP-237	206.8830	28-FEB-2010	4432.560	4903.500	15980.00	0.2574485	1.3032571E-02	59.84295
CM-244	203.0208	28-FEB-2010	5531.586	5882.587	14657.00	0.2549047	1.2918007E-02	51.83584

Instrument : CHAMBER 133  
 Detector : 76229  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-AUG-2009 09:42:22  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:01:29  
 Average Efficiency : 0.2444916  
 Average Efficiency Error : 6.7288522E-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	2992.199	3301.674	15088.00	0.2427499	1.0433814E-02	51.73604
NP-237	208.5846	28-FEB-2010	4436.849	4905.652	15341.00	0.2451461	1.2416095E-02	59.86903
CM-244	205.5828	28-FEB-2010	5530.602	5882.872	14343.00	0.2463241	1.2486813E-02	55.80942

Instrument : CHAMBER 134  
 Detector : 76230  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 17-AUG-2009 09:42:27  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:01:38  
 Average Efficiency : 0.2444722  
 Average Efficiency Error : 6.7306994E-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	2989.055	3302.112	14731.00	0.2399838	1.0319396E-02	45.58716
NP-237	207.4998	28-FEB-2010	4432.969	4905.408	15414.00	0.2475136	1.2535379E-02	52.40787
CM-244	199.8804	28-FEB-2010	5534.460	5883.375	14046.00	0.2480791	1.2579419E-02	47.39998

Instrument : CHAMBER 135  
 Detector : 64270  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 17-AUG-2009 09:42:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:01:50  
 Average Efficiency : 0.2546879  
 Average Efficiency Error : 7.0084208E-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	2987.813	3300.105	15110.00	0.2525907	1.0856513E-02	49.36219
NP-237	208.8990	28-FEB-2010	4435.123	4902.752	15878.00	0.2533506	1.2826114E-02	62.03614
CM-244	198.1458	28-FEB-2010	5532.979	5882.877	14546.00	0.2591602	1.3135060E-02	51.79539

Instrument : CHAMBER 136  
 Detector : 68549  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 17-AUG-2009 09:42:37  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:02:00  
 Average Efficiency : 0.2475998  
 Average Efficiency Error : 6.8165381E-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	2991.796	3301.682	14741.00	0.2447980	1.0526305E-02	60.65231
NP-237	205.6662	28-FEB-2010	4435.713	4901.780	15573.00	0.2523313	1.2777670E-02	84.66249
CM-244	198.3060	28-FEB-2010	5531.520	5884.028	13875.00	0.2470199	1.2527825E-02	70.83999

Instrument : CHAMBER 137  
 Detector : 64288  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 17-AUG-2009 15:19:29  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 18-AUG-2009 09:58:00  
 Average Efficiency : 0.2555233  
 Average Efficiency Error : 7.0462842E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2990.035	3302.352	15040.00	0.2599163	1.1172320E-02	62.16771
NP-237	167.9916	28-FEB-2010	4435.990	4901.349	12745.00	0.2528539	1.2839622E-02	74.72440
CM-244	157.2432	28-FEB-2010	5532.344	5883.346	11242.00	0.2523895	1.2842122E-02	61.62554

Instrument : CHAMBER 138  
 Detector : 65877  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 17-AUG-2009 10:05:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:10:23  
 Average Efficiency : 0.2550827  
 Average Efficiency Error : 7.0365570E-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	2990.457	3300.623	14458.00	0.2522955	1.0852579E-02	60.07153
NP-237	162.9186	28-FEB-2010	4436.833	4904.301	12578.00	0.2572678	1.3066470E-02	64.63396
CM-244	153.1968	28-FEB-2010	5531.035	5885.034	11155.00	0.2569406	1.3075489E-02	58.61239

Instrument : CHAMBER 139  
 Detector : 76231  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 17-AUG-2009 10:05:40  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:10:36  
 Average Efficiency : 0.2493770  
 Average Efficiency Error : 7.3113223E-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	2988.624	3300.322	14789.00	0.2505293	1.2695529E-02	52.23651
NP-237	168.0294	28-FEB-2010	4436.965	4901.673	12535.00	0.2486135	1.2627549E-02	58.33430
CM-244	160.5822	28-FEB-2010	5531.099	5884.173	11327.00	0.2489982	1.2667944E-02	53.91700

Instrument : CHAMBER 140  
 Detector : 78771  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 17-AUG-2009 10:05:55  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:10:53  
 Average Efficiency : 0.2545226  
 Average Efficiency Error : 7.0204390E-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	2992.243	3300.208	14492.00	0.2508534	1.0790074E-02	46.38138
NP-237	165.9822	28-FEB-2010	4435.227	4906.111	12782.00	0.2566222	1.3030458E-02	51.74347
CM-244	153.7938	28-FEB-2010	5531.085	5884.403	11234.00	0.2578183	1.3118429E-02	44.44519

Instrument : CHAMBER 141  
 Detector : 76232  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 17-AUG-2009 10:06:09  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:11:05  
 Average Efficiency : 0.2584702  
 Average Efficiency Error : 7.5807418E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2989.414	3297.748	14427.00	0.2520987	1.2779256E-02	53.56795
NP-237	161.6154	28-FEB-2010	4437.262	4901.753	12660.00	0.2610831	1.3258832E-02	57.80217
CM-244	148.1754	28-FEB-2010	5534.971	5886.637	11030.00	0.2627913	1.3375781E-02	54.14219

Instrument : CHAMBER 142  
 Detector : 64261  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 17-AUG-2009 10:06:21  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:11:22  
 Average Efficiency : 0.2600435  
 Average Efficiency Error : 7.1729934E-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	2988.269	3301.948	14656.00	0.2574165	1.1070056E-02	54.03382
NP-237	161.7816	28-FEB-2010	4433.864	4905.404	12714.00	0.2618904	1.3299029E-02	57.43495
CM-244	147.2670	28-FEB-2010	5531.110	5884.773	10935.00	0.2619993	1.3337597E-02	54.46835

Instrument : CHAMBER 143  
 Detector : 65882  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 17-AUG-2009 10:06:30  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:11:35  
 Average Efficiency : 0.2441945  
 Average Efficiency Error : 7.1629179E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2987.868	3300.973	14504.00	0.2454895	1.2443409E-02	48.86588
NP-237	168.1992	28-FEB-2010	4435.203	4905.234	12409.00	0.2458239	1.2487897E-02	54.42411
CM-244	156.7614	28-FEB-2010	5533.941	5886.181	10719.00	0.2413527	1.2290902E-02	48.55591

Instrument : CHAMBER 144  
 Detector : 75551  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 17-AUG-2009 10:06:42  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:11:48  
 Average Efficiency : 0.2468767  
 Average Efficiency Error : 6.8111387E-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	2992.050	3299.833	14487.00	0.2441242	1.0500696E-02	46.56598
NP-237	167.2962	28-FEB-2010	4433.005	4902.603	12463.00	0.2482506	1.2610275E-02	54.14901
CM-244	154.4388	28-FEB-2010	5530.735	5882.656	10920.00	0.2495103	1.2702089E-02	51.83741

Instrument : CHAMBER 145  
 Detector : 72526  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 17-AUG-2009 10:06:50  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:12:06  
 Average Efficiency : 0.2516074  
 Average Efficiency Error : 7.3767379E-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	2991.923	3299.882	14896.00	0.2497595	1.2655314E-02	52.44717
NP-237	169.7700	28-FEB-2010	4434.984	4905.949	12721.00	0.2497460	1.2682147E-02	64.14503
CM-244	154.8234	28-FEB-2010	5531.069	5884.490	11206.00	0.2555142	1.3001818E-02	51.97158

Instrument : CHAMBER 146  
 Detector : 72527  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 17-AUG-2009 10:06:56  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:12:19  
 Average Efficiency : 0.2487766  
 Average Efficiency Error : 6.8616522E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2989.460	3301.164	14683.00	0.2497765	1.0741138E-02	52.75697
NP-237	168.2934	28-FEB-2010	4435.288	4903.095	12451.00	0.2466013	1.2526580E-02	54.23803
CM-244	158.8128	28-FEB-2010	5534.042	5884.573	11233.00	0.2496148	1.2701104E-02	51.22379

Instrument : CHAMBER 147  
 Detector : 75550  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 17-AUG-2009 10:07:03  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:12:37  
 Average Efficiency : 0.2470976  
 Average Efficiency Error : 7.2475495E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.9792	28-FEB-2010	2990.910	3299.539	14303.00	0.2429080	1.2314880E-02	46.94440
NP-237	166.3758	28-FEB-2010	4433.251	4901.935	12590.00	0.2521924	1.2808450E-02	53.36894
CM-244	157.1856	28-FEB-2010	5533.139	5883.368	10980.00	0.2465573	1.2550585E-02	53.24918

Instrument : CHAMBER 148  
 Detector : 74429  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 17-AUG-2009 10:07:10  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:12:57  
 Average Efficiency : 0.2480969  
 Average Efficiency Error : 6.8435837E-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	2990.725	3298.446	14645.00	0.2458259	1.0571792E-02	53.02917
NP-237	167.4312	28-FEB-2010	4436.496	4905.977	12647.00	0.2517435	1.2784752E-02	56.62496
CM-244	156.4188	28-FEB-2010	5533.919	5885.716	10983.00	0.2477803	1.2612724E-02	51.14078

Instrument : CHAMBER 149  
 Detector : 33449  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 17-AUG-2009 09:46:49  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:02:09  
 Average Efficiency : 0.2465136  
 Average Efficiency Error : 6.8024271E-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	2991.734	3299.272	14178.00	0.2423231	1.0427443E-02	68.70028
NP-237	167.1294	28-FEB-2010	4437.371	4901.944	12533.00	0.2499420	1.2695006E-02	68.91545
CM-244	154.7664	28-FEB-2010	5530.548	5882.851	10933.00	0.2492944	1.2690787E-02	65.41205

Instrument : CHAMBER 150  
 Detector : 75552  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 17-AUG-2009 09:47:06  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:02:19  
 Average Efficiency : 0.2486527  
 Average Efficiency Error : 6.8590841E-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	2992.316	3300.643	14670.00	0.2506822	1.0780259E-02	53.31720
NP-237	168.7422	28-FEB-2010	4435.415	4905.497	12565.00	0.2481675	1.2604410E-02	58.05605
CM-244	156.3252	28-FEB-2010	5534.121	5886.240	10915.00	0.2463857	1.2543092E-02	53.10606

Instrument : CHAMBER 151  
 Detector : 75556  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 17-AUG-2009 09:47:22  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:02:29  
 Average Efficiency : 0.2450182  
 Average Efficiency Error : 6.7593171E-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	2990.659	3302.040	14473.00	0.2443945	1.0512492E-02	52.21863
NP-237	170.0886	28-FEB-2010	4434.623	4901.634	12448.00	0.2439277	1.2390838E-02	56.98894
CM-244	157.7460	28-FEB-2010	5531.364	5886.469	11043.00	0.2470334	1.2573502E-02	57.42078



Instrument : CHAMBER 152  
 Detector : 76222  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 17-AUG-2009 09:47:27  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:02:41  
 Average Efficiency : 0.2490164  
 Average Efficiency Error : 6.8703890E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2991.044	3297.777	14243.00	0.2475301	1.0650607E-02	47.08284
NP-237	166.6248	28-FEB-2010	4437.300	4905.285	12419.00	0.2484124	1.2619114E-02	60.94747
CM-244	155.8290	28-FEB-2010	5531.209	5887.199	11119.00	0.2517907	1.2814093E-02	54.11842

Instrument : CHAMBER 153  
 Detector : 76223  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 17-AUG-2009 09:47:33  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:02:59  
 Average Efficiency : 0.2519075  
 Average Efficiency Error : 6.9520962E-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	2989.175	3301.127	14308.00	0.2515197	1.0821341E-02	47.18059
NP-237	159.1506	28-FEB-2010	4437.148	4906.174	12220.00	0.2558792	1.3001786E-02	54.79121
CM-244	151.7142	28-FEB-2010	5533.838	5885.640	10690.00	0.2486704	1.2664073E-02	49.37799

Instrument : CHAMBER 154  
 Detector : 76224  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 17-AUG-2009 09:47:38  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:03:12  
 Average Efficiency : 0.2559401  
 Average Efficiency Error : 7.0637148E-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	2991.160	3298.663	14169.00	0.2560697	1.1019127E-02	49.27927
NP-237	160.8066	28-FEB-2010	4435.792	4904.845	12224.00	0.2533519	1.2873255E-02	55.70718
CM-244	145.8384	28-FEB-2010	5532.170	5883.602	10681.00	0.2584613	1.3162896E-02	52.40295

Instrument : CHAMBER 155  
 Detector : 75553  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 17-AUG-2009 09:47:43  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:03:49  
 Average Efficiency : 0.2604031  
 Average Efficiency Error : 7.1793078E-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	2990.137	3299.574	15144.00	0.2631285	1.1309024E-02	51.70325
NP-237	166.8174	28-FEB-2010	4433.383	4905.252	13025.00	0.2602106	1.3208893E-02	58.26657
CM-244	155.0100	28-FEB-2010	5530.995	5884.485	11287.00	0.2569496	1.3073267E-02	54.09868

Instrument : CHAMBER 156  
 Detector : 75554  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 17-AUG-2009 09:47:48  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:03:58  
 Average Efficiency : 0.2478251  
 Average Efficiency Error : 6.8396293E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2991.410	3301.423	14146.00	0.2454547	1.0562697E-02	50.29560
NP-237	164.6658	28-FEB-2010	4436.034	4902.390	12227.00	0.2474083	1.2571326E-02	54.83716
CM-244	151.3824	28-FEB-2010	5532.563	5885.336	10800.00	0.2517493	1.2818515E-02	50.76693

Instrument : CHAMBER 157  
 Detector : 75555  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 17-AUG-2009 09:47:53  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:04:07  
 Average Efficiency : 0.2459567  
 Average Efficiency Error : 6.7838337E-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	2989.948	3299.042	14635.00	0.2425698	1.0431849E-02	49.95551
NP-237	171.2268	28-FEB-2010	4436.337	4902.073	12880.00	0.2506870	1.2727586E-02	53.18868
CM-244	159.5796	28-FEB-2010	5531.733	5884.378	11136.00	0.2462586	1.2532219E-02	53.03581

Instrument : CHAMBER 158  
 Detector : 33451  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 17-AUG-2009 09:47:59  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:04:18  
 Average Efficiency : 0.2470825  
 Average Efficiency Error : 6.8179565E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2990.074	3301.013	14195.00	0.2429217	1.0452971E-02	65.65772
NP-237	168.3948	28-FEB-2010	4435.907	4905.421	12486.00	0.2470921	1.2551059E-02	76.64585
CM-244	154.6032	28-FEB-2010	5535.323	5885.904	11102.00	0.2534059	1.2896620E-02	68.27572

Instrument : CHAMBER 159  
 Detector : 76225  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 17-AUG-2009 09:48:04  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:04:28  
 Average Efficiency : 0.2536185  
 Average Efficiency Error : 6.9992472E-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	2992.022	3301.502	14176.00	0.2538644	1.0924136E-02	47.45573
NP-237	159.6558	28-FEB-2010	4435.853	4902.842	12186.00	0.2543722	1.2925758E-02	52.94994
CM-244	150.5208	28-FEB-2010	5534.528	5883.086	10773.00	0.2525320	1.2859062E-02	52.36504

Instrument : CHAMBER 160  
 Detector : 76226  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 17-AUG-2009 09:48:09  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 17-AUG-2009 15:04:40  
 Average Efficiency : 0.2450936  
 Average Efficiency Error : 6.7667966E-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	2988.982	3298.890	13916.00	0.2451341	1.0552234E-02	50.78497
NP-237	161.5530	28-FEB-2010	4434.439	4901.761	11957.00	0.2465858	1.2534058E-02	58.31113
CM-244	151.1856	28-FEB-2010	5533.753	5882.414	10437.00	0.2435748	1.2410097E-02	52.51821

Instrument : CHAMBER 161  
 Detector : 70321  
 Standard ID : AESS-001  
 Standard Reference Date : 20-FEB-2008 09:54:53  
 Calibration Analysis Date/Time : 24-AUG-2009 08:39:50  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:06:47  
 Average Efficiency : 0.3731306  
 Average Efficiency Error : 1.0235887E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.6698	28-FEB-2010	2988.799	3299.450	22121.00	0.3583271	1.5313427E-02	65.76945
NP-237	171.0024	28-FEB-2010	4437.354	4905.712	19775.00	0.3854371	1.9465830E-02	75.53835
CM-244	158.1060	28-FEB-2010	5533.034	5884.911	17229.00	0.3847365	1.9458989E-02	65.65879

Instrument : CHAMBER 162  
 Detector : 70323  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 24-AUG-2009 08:39:56  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:06:56  
 Average Efficiency : 0.3723955  
 Average Efficiency Error : 1.0201765E-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	2991.108	3297.679	22068.00	0.3608688	1.5422536E-02	59.05890
NP-237	205.0260	28-FEB-2010	4437.157	4905.370	23621.00	0.3840082	1.9362321E-02	75.93850
CM-244	199.6806	28-FEB-2010	5531.808	5882.856	21406.00	0.3787849	1.9115422E-02	59.17039

Instrument : CHAMBER 163  
 Detector : 70324  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 24-AUG-2009 08:40:01  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:07:06  
 Average Efficiency : 0.3784964  
 Average Efficiency Error : 1.0368022E-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	2989.316	3301.922	21875.00	0.3695002	1.5793122E-02	75.87975
NP-237	200.4990	28-FEB-2010	4434.725	4904.333	23130.00	0.3844810	1.9389626E-02	89.93044
CM-244	196.5558	28-FEB-2010	5532.622	5884.699	21494.00	0.3861476	1.9486297E-02	68.44479

Instrument : CHAMBER 164  
 Detector : 70325  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 24-AUG-2009 08:40:07  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:07:20  
 Average Efficiency : 0.3795241  
 Average Efficiency Error : 1.0392675E-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	2989.433	3301.590	22711.00	0.3726217	1.5919240E-02	60.22451
NP-237	209.2716	28-FEB-2010	4434.137	4904.243	23751.00	0.3782692	1.9072101E-02	72.85822
CM-244	199.6488	28-FEB-2010	5533.726	5886.727	22121.00	0.3914949	1.9750981E-02	58.50513

Instrument : CHAMBER 165  
 Detector : 72544  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 24-AUG-2009 08:40:14  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:07:34  
 Average Efficiency : 0.3818519  
 Average Efficiency Error : 1.0458693E-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	2990.235	3298.979	22293.00	0.3712923	1.5866017E-02	64.67880
NP-237	203.2080	28-FEB-2010	4434.502	4904.549	23821.00	0.3907148	1.9699110E-02	89.80749
CM-244	197.2236	28-FEB-2010	5532.823	5884.601	21728.00	0.3892223	1.9639486E-02	65.21038

Instrument : CHAMBER 166  
 Detector : 74545  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 24-AUG-2009 08:40:20  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:07:42  
 Average Efficiency : 0.3930937  
 Average Efficiency Error : 1.0762543E-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	2991.175	3297.621	23070.00	0.3834404	1.6378330E-02	51.93287
NP-237	204.0192	28-FEB-2010	4434.428	4904.926	24581.00	0.4015882	2.0242147E-02	75.61842
CM-244	197.2128	28-FEB-2010	5535.556	5884.119	22299.00	0.3992831	2.0142501E-02	56.82180

Instrument : CHAMBER 167  
 Detector : 72546  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 24-AUG-2009 08:40:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:07:51  
 Average Efficiency : 0.3896100  
 Average Efficiency Error : 1.0666691E-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	2990.148	3302.011	23242.00	0.3811870	1.6280681E-02	60.73105
NP-237	204.2586	28-FEB-2010	4433.463	4903.100	24426.00	0.3985536	2.0090239E-02	78.42995
CM-244	198.8100	28-FEB-2010	5531.940	5884.576	22136.00	0.3933990	1.9846944E-02	60.41788

Instrument : CHAMBER 168  
 Detector : 72547  
 Standard ID : AESS-010  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 24-AUG-2009 08:40:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:07:59  
 Average Efficiency : 0.3891803  
 Average Efficiency Error : 1.0657012E-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	2989.237	3300.921	22691.00	0.3797462	1.6223785E-02	60.45912
NP-237	202.9926	28-FEB-2010	4437.534	4902.237	24096.00	0.3956006	1.9943606E-02	81.13048
CM-244	196.2330	28-FEB-2010	5531.663	5884.741	22054.00	0.3970870	2.0033659E-02	60.17071

Instrument : CHAMBER 169  
 Detector : 72548  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 24-AUG-2009 08:40:37  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:08:11  
 Average Efficiency : 0.3755721  
 Average Efficiency Error : 1.0284009E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.7452	28-FEB-2010	2992.165	3298.594	22868.00	0.3668304	1.5670519E-02	63.17508
NP-237	209.5938	28-FEB-2010	4434.229	4903.754	23971.00	0.3811674	1.9216783E-02	80.00423
CM-244	202.7478	28-FEB-2010	5532.658	5885.433	21988.00	0.3832155	1.9334303E-02	60.82853

Instrument : CHAMBER 170  
 Detector : 72549  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 24-AUG-2009 08:40:43  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:08:20  
 Average Efficiency : 0.3679080  
 Average Efficiency Error : 1.0074493E-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	2988.025	3299.867	22620.00	0.3593037	1.5351000E-02	55.68573
NP-237	214.4868	28-FEB-2010	4432.622	4903.408	24183.00	0.3757574	1.8942678E-02	83.32780
CM-244	208.4184	28-FEB-2010	5534.316	5882.981	22007.00	0.3730944	1.8823531E-02	57.78218

Instrument : CHAMBER 171  
 Detector : 78260  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 24-AUG-2009 08:40:49  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:08:29  
 Average Efficiency : 0.3855957  
 Average Efficiency Error : 1.0559761E-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	2988.433	3300.366	22641.00	0.3757591	1.6053872E-02	54.75708
NP-237	204.7038	28-FEB-2010	4436.595	4905.826	23976.00	0.3903738	1.9680876E-02	77.89750
CM-244	195.0060	28-FEB-2010	5533.870	5885.935	21851.00	0.3959031	1.9975597E-02	57.65449

Instrument : CHAMBER 172  
 Detector : 78772  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 24-AUG-2009 08:40:55  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:08:40  
 Average Efficiency : 0.3797724  
 Average Efficiency Error : 1.0397769E-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	2991.870	3297.903	22889.00	0.3752128	1.6028440E-02	52.39552
NP-237	205.8930	28-FEB-2010	4433.678	4903.969	23812.00	0.3854640	1.9434443E-02	82.21458
CM-244	203.1954	28-FEB-2010	5534.514	5883.121	21897.00	0.3807611	1.9211210E-02	56.07287

Instrument : CHAMBER 173  
 Detector : 74431  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 24-AUG-2009 08:41:01  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:08:49  
 Average Efficiency : 0.2601730  
 Average Efficiency Error : 7.1557011E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2988.449	3298.086	15819.00	0.2625923	1.1277330E-02	48.84491
NP-237	210.2526	28-FEB-2010	4435.604	4905.905	16223.00	0.2571892	1.3017043E-02	57.42966
CM-244	201.9108	28-FEB-2010	5534.021	5885.467	14862.00	0.2599279	1.3170394E-02	53.55892

Instrument : CHAMBER 174  
 Detector : 74432  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 24-AUG-2009 08:41:06  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:08:58  
 Average Efficiency : 0.2560052  
 Average Efficiency Error : 7.0460425E-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	2988.639	3300.179	15066.00	0.2488402	1.0695883E-02	51.37117
NP-237	202.9140	28-FEB-2010	4435.486	4905.219	15899.00	0.2611338	1.3219978E-02	60.89258
CM-244	199.3140	28-FEB-2010	5531.026	5885.734	14784.00	0.2618657	1.3269406E-02	47.62206

Instrument : CHAMBER 175  
 Detector : 74433  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 24-AUG-2009 08:41:12  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:09:06  
 Average Efficiency : 0.2541471  
 Average Efficiency Error : 6.9896011E-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	2992.018	3300.926	15876.00	0.2499355	1.0733101E-02	50.54956
NP-237	211.7160	28-FEB-2010	4437.197	4902.367	16318.00	0.2568789	1.3000464E-02	57.64658
CM-244	207.3882	28-FEB-2010	5531.134	5883.215	15134.00	0.2576209	1.3050339E-02	53.56906



Instrument : CHAMBER 176  
 Detector : 74434  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 24-AUG-2009 08:41:18  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:09:15  
 Average Efficiency : 0.2565841  
 Average Efficiency Error : 7.0622312E-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	2987.853	3298.318	15148.00	0.2490841	1.0705328E-02	47.98410
NP-237	203.4984	28-FEB-2010	4433.083	4904.101	15833.00	0.2593126	1.3128439E-02	58.20272
CM-244	197.1096	28-FEB-2010	5532.948	5884.695	14821.00	0.2655677	1.3456577E-02	49.33431

Instrument : CHAMBER 177  
 Detector : 74435  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 24-AUG-2009 08:41:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:09:24  
 Average Efficiency : 0.2668152  
 Average Efficiency Error : 7.3382389E-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	2989.857	3298.211	15920.00	0.2637714	1.1326759E-02	49.45098
NP-237	200.6460	28-FEB-2010	4433.475	4903.934	16338.00	0.2714185	1.3736055E-02	53.30935
CM-244	195.9270	28-FEB-2010	5533.213	5885.773	14796.00	0.2666922	1.3513907E-02	53.74039

Instrument : CHAMBER 178  
 Detector : 74436  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 24-AUG-2009 08:41:30  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:09:35  
 Average Efficiency : 0.2595187  
 Average Efficiency Error : 7.1381964E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2991.399	3300.807	15690.00	0.2545363	1.0932880E-02	44.11681
NP-237	210.1548	28-FEB-2010	4432.785	4903.123	16730.00	0.2653126	1.3423340E-02	55.16845
CM-244	200.7390	28-FEB-2010	5531.481	5883.158	14852.00	0.2611876	1.3234260E-02	50.76077

Instrument : CHAMBER 179  
 Detector : 74437  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 24-AUG-2009 08:41:36  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:09:44  
 Average Efficiency : 0.2718232  
 Average Efficiency Error : 7.4735158E-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	2990.874	3299.393	16266.00	0.2694745	1.1567459E-02	45.58660
NP-237	199.3962	28-FEB-2010	4435.018	4905.518	16480.00	0.2754735	1.3939864E-02	58.76590
CM-244	198.6402	28-FEB-2010	5534.758	5887.251	15277.00	0.2715900	1.3756392E-02	54.51526

Instrument : CHAMBER 180  
 Detector : 74438  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 24-AUG-2009 08:41:41  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:09:54  
 Average Efficiency : 0.2528372  
 Average Efficiency Error : 6.9568004E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2989.946	3300.627	15376.00	0.2479020	1.0651710E-02	47.69878
NP-237	206.8830	28-FEB-2010	4434.505	4904.405	15995.00	0.2576708	1.3043700E-02	52.34612
CM-244	203.0208	28-FEB-2010	5531.104	5886.649	14679.00	0.2553639	1.2941188E-02	49.43889

Instrument : CHAMBER 181  
 Detector : 74439  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 24-AUG-2009 08:41:46  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:10:03  
 Average Efficiency : 0.2567677  
 Average Efficiency Error : 7.0618824E-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	2988.658	3302.315	15809.00	0.2543999	1.0925616E-02	48.94121
NP-237	208.5846	28-FEB-2010	4432.549	4902.677	16291.00	0.2603085	1.3174290E-02	56.85185
CM-244	205.5828	28-FEB-2010	5531.208	5883.203	14943.00	0.2566723	1.3004515E-02	53.00024

Instrument : CHAMBER 182  
 Detector : 74440  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 24-AUG-2009 08:41:51  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:10:14  
 Average Efficiency : 0.2534730  
 Average Efficiency Error : 6.9745579E-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	2990.553	3299.709	15297.00	0.2492435	1.0710318E-02	46.65529
NP-237	207.4998	28-FEB-2010	4435.824	4905.707	15977.00	0.2566445	1.2991886E-02	50.94455
CM-244	199.8804	28-FEB-2010	5533.404	5884.684	14515.00	0.2565299	1.3002145E-02	46.18616

Instrument : CHAMBER 183  
 Detector : 74441  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 24-AUG-2009 08:41:56  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:10:29  
 Average Efficiency : 0.2637588  
 Average Efficiency Error : 7.2541810E-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	2989.015	3297.962	16012.00	0.2677119	1.1494849E-02	47.11412
NP-237	208.8990	28-FEB-2010	4434.099	4904.342	16303.00	0.2601227	1.3164749E-02	52.97176
CM-244	198.1458	28-FEB-2010	5532.826	5884.696	14712.00	0.2621811	1.3286361E-02	53.53780

Instrument : CHAMBER 184  
 Detector : 74442  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 24-AUG-2009 08:42:02  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:10:41  
 Average Efficiency : 0.2604004  
 Average Efficiency Error : 7.1640476E-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	2989.045	3299.169	15378.00	0.2554370	1.0975426E-02	49.39055
NP-237	205.6662	28-FEB-2010	4437.505	4902.470	16322.00	0.2645144	1.3386835E-02	57.05146
CM-244	198.3060	28-FEB-2010	5535.333	5886.318	14804.00	0.2636573	1.3359983E-02	50.92117

Instrument : CHAMBER 185  
 Detector : 68615  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 24-AUG-2009 08:42:07  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:10:54  
 Average Efficiency : 0.2583998  
 Average Efficiency Error : 7.1241027E-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	2987.897	3299.344	14977.00	0.2588871	1.1128917E-02	59.70583
NP-237	167.9916	28-FEB-2010	4432.571	4905.243	13169.00	0.2612911	1.3261506E-02	62.76381
CM-244	157.2432	28-FEB-2010	5530.503	5886.106	11355.00	0.2549717	1.2971560E-02	55.40694

Instrument : CHAMBER 186  
 Detector : 68616  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 24-AUG-2009 08:42:13  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:11:06  
 Average Efficiency : 0.2578412  
 Average Efficiency Error : 7.1111098E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2992.379	3299.140	14692.00	0.2564398	1.1027561E-02	55.81911
NP-237	162.9186	28-FEB-2010	4434.242	4902.774	12639.00	0.2585895	1.3132489E-02	57.78773
CM-244	153.1968	28-FEB-2010	5534.982	5886.349	11244.00	0.2590897	1.3183227E-02	55.94541

Instrument : CHAMBER 187  
 Detector : 68620  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 24-AUG-2009 08:42:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:11:16  
 Average Efficiency : 0.2520546  
 Average Efficiency Error : 7.3888451E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2991.498	3300.157	14978.00	0.2537758	1.2857930E-02	50.69514
NP-237	168.0294	28-FEB-2010	4437.493	4903.961	12739.00	0.2526664	1.2830210E-02	58.36928
CM-244	160.5822	28-FEB-2010	5535.243	5883.722	11357.00	0.2497735	1.2706947E-02	53.40160

Instrument : CHAMBER 188  
 Detector : 68621  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 24-AUG-2009 08:42:24  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:11:25  
 Average Efficiency : 0.2590206  
 Average Efficiency Error : 7.1418569E-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	2988.985	3297.497	14940.00	0.2586645	1.1119837E-02	50.77880
NP-237	165.9822	28-FEB-2010	4433.354	4904.064	12857.00	0.2581703	1.3107833E-02	59.69577
CM-244	153.7938	28-FEB-2010	5533.683	5886.437	11347.00	0.2603945	1.3247656E-02	50.83346

Instrument : CHAMBER 189  
 Detector : 68622  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 24-AUG-2009 08:42:30  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:11:34  
 Average Efficiency : 0.2605012  
 Average Efficiency Error : 7.6393606E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2990.052	3301.735	14579.00	0.2547995	1.2914370E-02	54.11663
NP-237	161.6154	28-FEB-2010	4436.853	4905.539	12669.00	0.2612749	1.3268417E-02	57.74998
CM-244	148.1754	28-FEB-2010	5532.776	5884.354	11162.00	0.2659585	1.3534531E-02	55.68552

Instrument : CHAMBER 190  
 Detector : 68623  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 24-AUG-2009 08:42:35  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:11:43  
 Average Efficiency : 0.2627709  
 Average Efficiency Error : 7.2474247E-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	2991.652	3298.950	14837.00	0.2606309	1.1205810E-02	49.34105
NP-237	161.7816	28-FEB-2010	4435.677	4904.720	12625.00	0.2599701	1.3203092E-02	52.76612
CM-244	147.2670	28-FEB-2010	5532.170	5883.736	11225.00	0.2689729	1.3686700E-02	52.48962

Instrument : CHAMBER 191  
 Detector : 68624  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 24-AUG-2009 08:42:40  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:11:54  
 Average Efficiency : 0.2621362  
 Average Efficiency Error : 7.6808794E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2991.100	3299.772	15569.00	0.2636111	1.3349629E-02	49.40056
NP-237	168.1992	28-FEB-2010	4437.436	4904.158	13280.00	0.2631744	1.3355431E-02	53.16087
CM-244	156.7614	28-FEB-2010	5530.545	5884.668	11529.00	0.2596773	1.3207550E-02	53.47022

Instrument : CHAMBER 192  
 Detector : 74430  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 24-AUG-2009 08:42:45  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:12:04  
 Average Efficiency : 0.2555450  
 Average Efficiency Error : 7.0466422E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2988.046	3297.560	14899.00	0.2511216	1.0796109E-02	50.91946
NP-237	167.2962	28-FEB-2010	4437.061	4903.990	12977.00	0.2585397	1.3124744E-02	59.22014
CM-244	154.4388	28-FEB-2010	5535.519	5883.955	11337.00	0.2591194	1.3182904E-02	51.43979

Instrument : CHAMBER 193  
 Detector : 68627  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 24-AUG-2009 08:42:50  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:12:15  
 Average Efficiency : 0.2629034  
 Average Efficiency Error : 7.7030240E-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	2990.087	3301.572	15539.00	0.2605920	1.3197066E-02	51.03585
NP-237	169.7700	28-FEB-2010	4436.483	4905.309	13298.00	0.2610572	1.3247789E-02	60.49369
CM-244	154.8234	28-FEB-2010	5532.931	5884.819	11722.00	0.2672982	1.3591460E-02	49.40217

Instrument : CHAMBER 194  
 Detector : 68635  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 24-AUG-2009 08:42:56  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:12:24  
 Average Efficiency : 0.2559154  
 Average Efficiency Error : 7.0551960E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2990.152	3297.570	15094.00	0.2568187	1.1038445E-02	52.22760
NP-237	168.2934	28-FEB-2010	4434.536	4903.587	12941.00	0.2562945	1.3011310E-02	57.01247
CM-244	158.8128	28-FEB-2010	5530.970	5882.461	11437.00	0.2543004	1.2935611E-02	52.26905

Instrument : CHAMBER 195  
 Detector : 68636  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 24-AUG-2009 08:43:02  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:12:38  
 Average Efficiency : 0.2667065  
 Average Efficiency Error : 7.8130718E-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	2992.288	3300.624	15672.00	0.2662604	1.3482675E-02	51.81870
NP-237	166.3758	28-FEB-2010	4434.057	4902.978	13400.00	0.2684508	1.3621432E-02	55.01876
CM-244	157.1856	28-FEB-2010	5534.813	5885.542	11813.00	0.2654414	1.3495106E-02	48.18431

Instrument : CHAMBER 196  
 Detector : 68637  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 24-AUG-2009 08:43:07  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:12:49  
 Average Efficiency : 0.2563491  
 Average Efficiency Error : 7.0671304E-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	2990.410	3301.963	15144.00	0.2542627	1.0927959E-02	54.37652
NP-237	167.4312	28-FEB-2010	4437.321	4906.417	12971.00	0.2582058	1.3107896E-02	61.84642
CM-244	156.4188	28-FEB-2010	5534.476	5886.645	11409.00	0.2574924	1.3098660E-02	57.13540

Instrument : CHAMBER 197  
 Detector : 78894  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 24-AUG-2009 08:43:12  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:12:58  
 Average Efficiency : 0.2565553  
 Average Efficiency Error : 7.0746746E-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	2991.920	3300.320	14773.00	0.2525423	1.0858861E-02	53.38351
NP-237	167.1294	28-FEB-2010	4436.468	4902.348	13097.00	0.2612088	1.3258392E-02	59.72187
CM-244	154.7664	28-FEB-2010	5532.745	5886.065	11302.00	0.2578566	1.3119171E-02	59.33312

Instrument : CHAMBER 198  
 Detector : 78895  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 24-AUG-2009 08:43:18  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:13:11  
 Average Efficiency : 0.2541020  
 Average Efficiency Error : 7.0067579E-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	2991.305	3299.642	14821.00	0.2533123	1.0891330E-02	54.52969
NP-237	168.7422	28-FEB-2010	4434.397	4904.448	12902.00	0.2548661	1.2939337E-02	62.13729
CM-244	156.3252	28-FEB-2010	5533.011	5885.087	11271.00	0.2544529	1.2946853E-02	57.18044

Instrument : CHAMBER 199  
 Detector : 78896  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 24-AUG-2009 08:43:24  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:13:20  
 Average Efficiency : 0.2501573  
 Average Efficiency Error : 6.8986462E-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	2988.912	3297.497	14841.00	0.2506579	1.0776930E-02	55.76347
NP-237	170.0886	28-FEB-2010	4433.891	4904.941	12813.00	0.2510752	1.2748260E-02	59.43263
CM-244	157.7460	28-FEB-2010	5535.121	5882.869	11103.00	0.2485638	1.2650183E-02	55.23568



Instrument : CHAMBER 200  
 Detector : 78900  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 24-AUG-2009 08:43:29  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:13:29  
 Average Efficiency : 0.2684568  
 Average Efficiency Error : 7.3974063E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2991.845	3300.480	15537.00	0.2700785	1.1602442E-02	51.63891
NP-237	166.6248	28-FEB-2010	4436.941	4902.709	13461.00	0.2692276	1.3660024E-02	60.85046
CM-244	155.8290	28-FEB-2010	5532.744	5885.759	11723.00	0.2655081	1.3500395E-02	52.11015

Instrument : CHAMBER 201  
 Detector : 78902  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 24-AUG-2009 08:43:34  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:13:38  
 Average Efficiency : 0.2592217  
 Average Efficiency Error : 7.1504964E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2988.531	3297.499	14697.00	0.2584198	1.1112645E-02	48.26062
NP-237	159.1506	28-FEB-2010	4434.991	4906.359	12598.00	0.2638277	1.3399226E-02	56.82220
CM-244	151.7142	28-FEB-2010	5531.510	5884.700	10999.00	0.2559689	1.3029314E-02	45.31117

Instrument : CHAMBER 202  
 Detector : 78903  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 24-AUG-2009 08:43:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:13:47  
 Average Efficiency : 0.2636107  
 Average Efficiency Error : 7.2720256E-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	2990.301	3298.322	14668.00	0.2651460	1.1402297E-02	43.51926
NP-237	160.8066	28-FEB-2010	4432.596	4902.750	12471.00	0.2585094	1.3131124E-02	55.44957
CM-244	145.8384	28-FEB-2010	5531.710	5884.137	11024.00	0.2668914	1.3584715E-02	46.64507

Instrument : CHAMBER 203  
 Detector : 78905  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 24-AUG-2009 08:43:44  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:16:33  
 Average Efficiency : 0.2640079  
 Average Efficiency Error : 7.2768405E-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	2988.566	3301.771	15299.00	0.2658898	1.1425615E-02	49.79924
NP-237	166.8174	28-FEB-2010	4437.077	4902.609	13111.00	0.2619471	1.3295709E-02	56.73104
CM-244	155.0100	28-FEB-2010	5532.534	5885.590	11568.00	0.2635126	1.3401660E-02	53.98056

Instrument : CHAMBER 204  
 Detector : 78907  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 24-AUG-2009 08:43:49  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:14:37  
 Average Efficiency : 0.2523464  
 Average Efficiency Error : 6.9619059E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2990.303	3298.289	14571.00	0.2528380	1.0874456E-02	50.39679
NP-237	164.6658	28-FEB-2010	4433.152	4903.866	12403.00	0.2510013	1.2750966E-02	53.81767
CM-244	151.3824	28-FEB-2010	5533.856	5886.993	10856.00	0.2530294	1.2882944E-02	47.99111

Instrument : CHAMBER 205  
 Detector : 78908  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 24-AUG-2009 08:43:54  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:14:46  
 Average Efficiency : 0.2560018  
 Average Efficiency Error : 7.0556081E-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	2991.267	3299.423	15358.00	0.2545983	1.0939639E-02	47.30880
NP-237	171.2268	28-FEB-2010	4434.928	4905.917	13265.00	0.2582288	1.3104673E-02	60.39516
CM-244	159.5796	28-FEB-2010	5530.946	5884.256	11561.00	0.2557920	1.3009178E-02	54.31215

Instrument : CHAMBER 206  
 Detector : 78909  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 24-AUG-2009 08:44:00  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:14:55  
 Average Efficiency : 0.2539860  
 Average Efficiency Error : 7.0044687E-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	2991.740	3299.836	14668.00	0.2510710	1.0797012E-02	49.54147
NP-237	168.3948	28-FEB-2010	4434.469	4904.811	12921.00	0.2557680	1.2984839E-02	58.90450
CM-244	154.6032	28-FEB-2010	5534.058	5886.660	11229.00	0.2564440	1.3048770E-02	52.29348

Instrument : CHAMBER 207  
 Detector : 78910  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 24-AUG-2009 08:44:06  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:15:04  
 Average Efficiency : 0.2567169  
 Average Efficiency Error : 7.0834220E-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	2987.560	3301.824	14325.00	0.2565888	1.1039187E-02	52.32441
NP-237	159.6558	28-FEB-2010	4434.563	4905.877	12409.00	0.2590533	1.3159815E-02	57.42267
CM-244	150.5208	28-FEB-2010	5530.790	5883.765	10855.00	0.2546263	1.2963978E-02	55.85357

Instrument : CHAMBER 208  
 Detector : 78911  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 24-AUG-2009 08:44:11  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 24-AUG-2009 14:15:14  
 Average Efficiency : 0.2558721  
 Average Efficiency Error : 7.0590605E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2990.613	3299.492	14536.00	0.2561232	1.1016136E-02	49.47414
NP-237	161.5530	28-FEB-2010	4436.795	4902.883	12269.00	0.2531039	1.2859914E-02	57.37383
CM-244	151.1856	28-FEB-2010	5533.327	5886.561	11065.00	0.2584097	1.3152145E-02	53.34291

Instrument : CHAMBER 209  
 Detector : 79188  
 Standard ID : AESS-001  
 Standard Reference Date : 20-FEB-2008 09:54:53  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:13  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 13:59:46  
 Average Efficiency : 0.3720503  
 Average Efficiency Error : 1.0203380E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.6698	28-FEB-2010	2989.310	3300.226	22310.00	0.3611241	1.5431225E-02	61.07782
NP-237	171.0024	28-FEB-2010	4435.667	4905.853	19559.00	0.3812561	1.9256754E-02	78.47396
CM-244	158.1060	28-FEB-2010	5530.947	5884.845	17057.00	0.3798239	1.9212671E-02	62.16251

Instrument : CHAMBER 210  
 Detector : 79189  
 Standard ID : AESS-002  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 13:59:55  
 Average Efficiency : 0.3939427  
 Average Efficiency Error : 1.0785731E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1144	28-FEB-2010	2990.620	3297.977	22918.00	0.3868399	1.6524704E-02	56.73992
NP-237	200.4990	28-FEB-2010	4435.731	4905.552	24207.00	0.4024462	2.0287881E-02	74.58759
CM-244	196.5558	28-FEB-2010	5534.352	5886.824	22110.00	0.3960794	1.9982373E-02	58.11366

Instrument : CHAMBER 211  
 Detector : 79190  
 Standard ID : AESS-003  
 Standard Reference Date : 15-FEB-2008 13:12:27  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:25  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:03  
 Average Efficiency : 0.3799735  
 Average Efficiency Error : 1.0408110E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2988.121	3301.259	22155.00	0.3687188	1.5757136E-02	56.93997
NP-237	203.2080	28-FEB-2010	4436.737	4902.524	23738.00	0.3893826	1.9632483E-02	71.62598
CM-244	197.2236	28-FEB-2010	5532.952	5886.368	21725.00	0.3879907	1.9577414E-02	62.12684

Instrument : CHAMBER 212  
 Detector : 79191  
 Standard ID : AESS-004  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:11  
 Average Efficiency : 0.3809828  
 Average Efficiency Error : 1.0432592E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.1222	28-FEB-2010	2989.135	3301.447	22739.00	0.3726791	1.5921319E-02	60.42460
NP-237	204.2586	28-FEB-2010	4434.433	4904.665	23808.00	0.3885271	1.9588865E-02	78.17927
CM-244	198.8100	28-FEB-2010	5534.267	5887.313	21781.00	0.3859496	1.9473951E-02	58.94521

Instrument : CHAMBER 213  
 Detector : 79192  
 Standard ID : AESS-005  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:39  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:20  
 Average Efficiency : 0.3632684  
 Average Efficiency Error : 9.9503463E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.7452	28-FEB-2010	2990.470	3298.036	22131.00	0.3547624	1.5160903E-02	63.50857
NP-237	209.5938	28-FEB-2010	4436.689	4901.687	23169.00	0.3684698	1.8581852E-02	80.13203
CM-244	202.7478	28-FEB-2010	5531.037	5883.842	21347.00	0.3709584	1.8720919E-02	62.77599

Instrument : CHAMBER 214  
 Detector : 79193  
 Standard ID : AESS-006  
 Standard Reference Date : 14-FEB-2008 09:35:18  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:45  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:29  
 Average Efficiency : 0.3836091  
 Average Efficiency Error : 1.0504629E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2990.553	3297.788	22693.00	0.3763517	1.6078612E-02	56.27348
NP-237	204.7038	28-FEB-2010	4436.227	4901.574	23647.00	0.3850555	1.9414932E-02	74.54285
CM-244	195.0060	28-FEB-2010	5531.780	5885.252	21759.00	0.3931459	1.9837169E-02	56.86452

Instrument : CHAMBER 215  
 Detector : 79194  
 Standard ID : AESS-007  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:51  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:38  
 Average Efficiency : 0.3803512  
 Average Efficiency Error : 1.0415906E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2989.364	3302.121	22674.00	0.3705170	1.5829490E-02	58.59007
NP-237	205.0260	28-FEB-2010	4437.186	4903.222	23893.00	0.3884499	1.9584402E-02	72.67680
CM-244	199.6806	28-FEB-2010	5534.359	5882.968	21950.00	0.3872738	1.9539375E-02	61.41080

Instrument : CHAMBER 216  
 Detector : 79195  
 Standard ID : AESS-008  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 27-JUL-2009 11:47:57  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:46  
 Average Efficiency : 0.3731616  
 Average Efficiency Error : 1.0220583E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.0418	28-FEB-2010	2990.730	3302.451	22182.00	0.3636904	1.5542008E-02	60.14384
NP-237	209.2716	28-FEB-2010	4434.761	4905.361	23781.00	0.3787806	1.9097654E-02	75.39853
CM-244	199.6488	28-FEB-2010	5530.680	5884.547	21648.00	0.3820059	1.9275997E-02	60.78160

Instrument : CHAMBER 217  
 Detector : 79410  
 Standard ID : AESS-009  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:04  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:00:55  
 Average Efficiency : 0.3778184  
 Average Efficiency Error : 1.0346431E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.3736	28-FEB-2010	2988.264	3300.395	22447.00	0.3728177	1.5929710E-02	59.20551
NP-237	204.0192	28-FEB-2010	4433.666	4904.432	23270.00	0.3801880	1.9172091E-02	76.02460
CM-244	197.2128	28-FEB-2010	5535.108	5883.550	21438.00	0.3827657	1.9316062E-02	61.20031

Instrument : CHAMBER 218  
 Detector : 79411  
 Standard ID : AESS-010  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:10  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:01:03  
 Average Efficiency : 0.3940997  
 Average Efficiency Error : 1.0791861E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.0008	28-FEB-2010	2991.480	3299.092	22843.00	0.3820206	1.6319500E-02	60.57081
NP-237	202.9926	28-FEB-2010	4433.463	4904.366	24456.00	0.4015617	2.0241646E-02	78.79704
CM-244	196.2330	28-FEB-2010	5534.949	5883.207	22582.00	0.4054522	2.0451389E-02	60.53443

Instrument : CHAMBER 219  
 Detector : 79412  
 Standard ID : AESS-011  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:16  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:01:48  
 Average Efficiency : 0.3662424  
 Average Efficiency Error : 1.0028155E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	212.8284	28-FEB-2010	2991.558	3298.478	22686.00	0.3600933	1.5384067E-02	58.88719
NP-237	214.4868	28-FEB-2010	4436.677	4902.329	24003.00	0.3730206	1.8805804E-02	79.43044
CM-244	208.4184	28-FEB-2010	5533.300	5887.374	21804.00	0.3685999	1.8598294E-02	60.23553

Instrument : CHAMBER 220  
 Detector : 79413  
 Standard ID : AESS-012  
 Standard Reference Date : 14-FEB-2008 13:39:25  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:23  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:00  
 Average Efficiency : 0.3800345  
 Average Efficiency Error : 1.0404716E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.2200	28-FEB-2010	2990.238	3297.635	22946.00	0.3758968	1.6057028E-02	61.95944
NP-237	205.8930	28-FEB-2010	4436.067	4906.404	23867.00	0.3863981	1.9481128E-02	76.81815
CM-244	203.1954	28-FEB-2010	5530.768	5883.799	21903.00	0.3797704	1.9161157E-02	61.74461

Instrument : CHAMBER 221  
 Detector : 79414  
 Standard ID : AESS-013  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:29  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:09  
 Average Efficiency : 0.3757081  
 Average Efficiency Error : 1.0287202E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2988.031	3301.906	22489.00	0.3730499	1.5939282E-02	52.97857
NP-237	210.2526	28-FEB-2010	4434.520	4906.347	23758.00	0.3766535	1.8990556E-02	73.94412
CM-244	201.9108	28-FEB-2010	5532.427	5886.301	21697.00	0.3785694	1.9102205E-02	60.49401

Instrument : CHAMBER 222  
 Detector : 79415  
 Standard ID : AESS-014  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:37  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:19  
 Average Efficiency : 0.3486046  
 Average Efficiency Error : 9.5541952E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2988.828	3299.834	21348.00	0.3358505	1.4359185E-02	53.28439
NP-237	211.7160	28-FEB-2010	4436.567	4903.132	22784.00	0.3587198	1.8092748E-02	75.86924
CM-244	207.3882	28-FEB-2010	5532.999	5885.314	21129.00	0.3587538	1.8106727E-02	62.25880

Instrument : CHAMBER 223  
 Detector : 79416  
 Standard ID : AESS-015  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:43  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:29  
 Average Efficiency : 0.3842350  
 Average Efficiency Error : 1.0522764E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0270	28-FEB-2010	2988.719	3302.203	22642.00	0.3749019	1.6017098E-02	52.37010
NP-237	200.6460	28-FEB-2010	4434.717	4901.802	23720.00	0.3940558	1.9868227E-02	70.08206
CM-244	195.9270	28-FEB-2010	5534.370	5883.775	21616.00	0.3886585	1.9611971E-02	55.34917



Instrument : CHAMBER 224  
 Detector : 79417  
 Standard ID : AESS-016  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:51  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:37  
 Average Efficiency : 0.3844876  
 Average Efficiency Error : 1.0532029E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2991.902	3302.451	22483.00	0.3722161	1.5903715E-02	55.77303
NP-237	199.3962	28-FEB-2010	4433.496	4905.621	23986.00	0.4009725	2.0215105E-02	74.29817
CM-244	198.6402	28-FEB-2010	5531.081	5884.107	21855.00	0.3876156	1.9557375E-02	62.08027

Instrument : CHAMBER 225  
 Detector : 79418  
 Standard ID : AESS-017  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 27-JUL-2009 11:48:57  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:46  
 Average Efficiency : 0.3784786  
 Average Efficiency Error : 1.0361850E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.0798	28-FEB-2010	2989.698	3301.928	23097.00	0.3714026	1.5863828E-02	56.57831
NP-237	208.5846	28-FEB-2010	4436.047	4902.115	24170.00	0.3862496	1.9471634E-02	72.01178
CM-244	205.5828	28-FEB-2010	5533.662	5882.674	22249.00	0.3812986	1.9235564E-02	61.39241

Instrument : CHAMBER 226  
 Detector : 79419  
 Standard ID : AESS-018  
 Standard Reference Date : 14-FEB-2008 17:45:04  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:04  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:02:55  
 Average Efficiency : 0.3808596  
 Average Efficiency Error : 1.0428368E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.1856	28-FEB-2010	2990.229	3299.048	22549.00	0.3767624	1.6097387E-02	54.38462
NP-237	208.8990	28-FEB-2010	4436.278	4902.399	23852.00	0.3805940	1.9188609E-02	81.14477
CM-244	198.1458	28-FEB-2010	5532.943	5886.259	21774.00	0.3871692	1.9535474E-02	57.36676

Instrument : CHAMBER 227  
 Detector : 79420  
 Standard ID : AESS-019  
 Standard Reference Date : 19-FEB-2008 11:05:22  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:10  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:04  
 Average Efficiency : 0.3843335  
 Average Efficiency Error : 1.0524626E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.6468	28-FEB-2010	2988.495	3300.898	22690.00	0.3745091	1.5999891E-02	56.91222
NP-237	202.9140	28-FEB-2010	4435.132	4906.286	23781.00	0.3906433	1.9695761E-02	72.78109
CM-244	199.3140	28-FEB-2010	5532.133	5886.196	22245.00	0.3930259	1.9827209E-02	61.27127

Instrument : CHAMBER 228  
 Detector : 79421  
 Standard ID : AESS-020  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:16  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:13  
 Average Efficiency : 0.3819269  
 Average Efficiency Error : 1.0460673E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	205.5870	28-FEB-2010	2990.613	3298.829	22551.00	0.3705553	1.5832171E-02	51.70354
NP-237	203.4984	28-FEB-2010	4434.639	4905.792	23625.00	0.3869812	1.9512173E-02	70.48917
CM-244	197.1096	28-FEB-2010	5531.072	5884.538	22079.00	0.3946491	1.9910410E-02	54.39862

Instrument : CHAMBER 229  
 Detector : 79422  
 Standard ID : AESS-021  
 Standard Reference Date : 19-FEB-2008 15:31:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:22  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:22  
 Average Efficiency : 0.3798401  
 Average Efficiency Error : 1.0399979E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2990.805	3298.464	23010.00	0.3730097	1.5933167E-02	54.32673
NP-237	210.1548	28-FEB-2010	4434.226	4906.242	23918.00	0.3793714	1.9126525E-02	69.91097
CM-244	200.7390	28-FEB-2010	5533.427	5882.943	22277.00	0.3907950	1.9714409E-02	60.50524

Instrument : CHAMBER 230  
 Detector : 79423  
 Standard ID : AESS-022  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:29  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:31  
 Average Efficiency : 0.3762562  
 Average Efficiency Error : 1.0304146E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2989.308	3297.622	22698.00	0.3656987	1.5623449E-02	50.65837
NP-237	206.8830	28-FEB-2010	4433.975	4905.433	24027.00	0.3871273	1.9516820E-02	69.68443
CM-244	203.0208	28-FEB-2010	5531.188	5884.956	21996.00	0.3817128	1.9258413E-02	56.82364

Instrument : CHAMBER 231  
 Detector : 79424  
 Standard ID : AESS-023  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:35  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:40  
 Average Efficiency : 0.3847702  
 Average Efficiency Error : 1.0534914E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	207.4764	28-FEB-2010	2990.586	3298.189	23057.00	0.3754197	1.6035730E-02	56.58625
NP-237	207.4998	28-FEB-2010	4432.432	4903.240	24264.00	0.3897645	1.9648222E-02	77.05042
CM-244	199.8804	28-FEB-2010	5533.660	5887.186	22354.00	0.3940257	1.9876782E-02	61.75343

Instrument : CHAMBER 232  
 Detector : 79425  
 Standard ID : AESS-024  
 Standard Reference Date : 14-FEB-2008 21:55:55  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:42  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:48  
 Average Efficiency : 0.3748871  
 Average Efficiency Error : 1.0271599E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.5218	28-FEB-2010	2989.229	3299.258	21761.00	0.3612023	1.5439365E-02	56.38522
NP-237	205.6662	28-FEB-2010	4433.403	4904.597	23806.00	0.3858308	1.9452941E-02	74.06577
CM-244	198.3060	28-FEB-2010	5534.062	5886.338	21708.00	0.3856767	1.9460704E-02	58.09093

Instrument : CHAMBER 233  
 Detector : 79426  
 Standard ID : AESS-025  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:48  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:03:57  
 Average Efficiency : 0.3793921  
 Average Efficiency Error : 1.0403312E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2989.053	3300.219	21850.00	0.3774274	1.6132066E-02	56.42078
NP-237	167.9916	28-FEB-2010	4437.148	4902.933	19321.00	0.3833666	1.9365741E-02	74.45728
CM-244	157.2432	28-FEB-2010	5534.654	5884.028	16885.00	0.3782761	1.9136583E-02	61.18657

Instrument : CHAMBER 234  
 Detector : 79427  
 Standard ID : AESS-026  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:49:54  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:04:08  
 Average Efficiency : 0.3700874  
 Average Efficiency Error : 1.0797138E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2990.497	3297.542	21594.00	0.3656335	1.8451264E-02	61.40455
NP-237	168.0294	28-FEB-2010	4434.922	4904.935	19043.00	0.3777652	1.9085610E-02	76.29016
CM-244	160.5822	28-FEB-2010	5534.289	5887.217	16745.00	0.3673259	1.8584441E-02	59.63282

Instrument : CHAMBER 235  
 Detector : 79428  
 Standard ID : AESS-027  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:01  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:04:17  
 Average Efficiency : 0.3932829  
 Average Efficiency Error : 1.1475780E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2988.334	3300.717	21681.00	0.3786630	1.9108076E-02	53.32552
NP-237	161.6154	28-FEB-2010	4435.003	4906.236	19404.00	0.4001970	2.0215055E-02	77.72460
CM-244	148.1754	28-FEB-2010	5532.236	5886.409	16945.00	0.4028875	2.0380763E-02	59.12006

Instrument : CHAMBER 236  
 Detector : 79429  
 Standard ID : AESS-028  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:07  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:04:27  
 Average Efficiency : 0.3837650  
 Average Efficiency Error : 1.1193846E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2987.761	3298.777	22073.00	0.3734792	1.8843459E-02	56.09225
NP-237	168.1992	28-FEB-2010	4435.283	4906.214	19676.00	0.3898810	1.9691262E-02	74.38795
CM-244	156.7614	28-FEB-2010	5532.557	5887.291	17304.00	0.3888687	1.9666921E-02	61.23972

Instrument : CHAMBER 237  
 Detector : 79430  
 Standard ID : AESS-029  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:14  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:04:36  
 Average Efficiency : 0.3796787  
 Average Efficiency Error : 1.1077547E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.5742	28-FEB-2010	2990.197	3297.861	21831.00	0.3658611	1.8460920E-02	57.27552
NP-237	169.7700	28-FEB-2010	4432.935	4904.354	19680.00	0.3864051	1.9515611E-02	75.85569
CM-244	154.8234	28-FEB-2010	5530.478	5884.662	17077.00	0.3885164	1.9652124E-02	63.51448

Instrument : CHAMBER 238  
 Detector : 79431  
 Standard ID : AESS-030  
 Standard Reference Date : 15-FEB-2008 09:06:52  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:20  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:04:46  
 Average Efficiency : 0.3810317  
 Average Efficiency Error : 1.1114767E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.9792	28-FEB-2010	2987.703	3299.637	22045.00	0.3742708	1.8883610E-02	56.22876
NP-237	166.3758	28-FEB-2010	4437.459	4902.787	19439.00	0.3894599	1.9672327E-02	69.82738
CM-244	157.1856	28-FEB-2010	5533.171	5886.843	16955.00	0.3799904	1.9222379E-02	58.92646

Instrument : CHAMBER 239  
 Detector : 79432  
 Standard ID : AESS-031  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:26  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:04:55  
 Average Efficiency : 0.3927835  
 Average Efficiency Error : 1.0770131E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2990.694	3302.472	22065.00	0.3848595	1.6447702E-02	55.29106
NP-237	162.9186	28-FEB-2010	4436.142	4902.540	19439.00	0.3976750	2.0087343E-02	70.90855
CM-244	153.1968	28-FEB-2010	5534.989	5884.715	17391.00	0.3998017	2.0218691E-02	58.92552

Instrument : CHAMBER 240  
 Detector : 79433  
 Standard ID : AESS-032  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:32  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:04  
 Average Efficiency : 0.3772089  
 Average Efficiency Error : 1.0348574E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2990.448	3302.009	21172.00	0.3663063	1.5662992E-02	53.41883
NP-237	165.9822	28-FEB-2010	4434.377	4905.282	19119.00	0.3839507	1.9397326E-02	73.43593
CM-244	153.7938	28-FEB-2010	5531.249	5885.600	16917.00	0.3873951	1.9597435E-02	58.29160

Instrument : CHAMBER 241  
 Detector : 79434  
 Standard ID : AESS-033  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:38  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:13  
 Average Efficiency : 0.3940109  
 Average Efficiency Error : 1.0806140E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.4158	28-FEB-2010	2990.069	3301.257	21921.00	0.3848144	1.6447132E-02	59.39081
NP-237	161.7816	28-FEB-2010	4433.036	4904.033	19316.00	0.3979853	2.0104248E-02	71.72956
CM-244	147.2670	28-FEB-2010	5530.409	5885.133	16898.00	0.4041099	2.0443266E-02	59.86270

Instrument : CHAMBER 242  
 Detector : 79435  
 Standard ID : AESS-034  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:45  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:21  
 Average Efficiency : 0.3872019  
 Average Efficiency Error : 1.0618003E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2987.986	3300.537	22304.00	0.3756698	1.6052835E-02	60.14239
NP-237	167.2962	28-FEB-2010	4434.402	4905.006	19728.00	0.3930755	1.9852022E-02	81.49045
CM-244	154.4388	28-FEB-2010	5535.112	5883.069	17513.00	0.3993755	2.0195547E-02	60.38340

Instrument : CHAMBER 243  
 Detector : 79436  
 Standard ID : AESS-035  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:51  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:30  
 Average Efficiency : 0.3689618  
 Average Efficiency Error : 1.0121634E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2988.831	3301.144	21270.00	0.3616530	1.5463094E-02	51.17657
NP-237	168.2934	28-FEB-2010	4435.437	4901.520	19256.00	0.3813798	1.9266052E-02	75.58389
CM-244	158.8128	28-FEB-2010	5533.039	5887.402	16593.00	0.3679604	1.8618485E-02	58.44908

Instrument : CHAMBER 244  
 Detector : 79437  
 Standard ID : AESS-036  
 Standard Reference Date : 18-FEB-2008 11:28:15  
 Calibration Analysis Date/Time : 27-JUL-2009 11:50:57  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:39  
 Average Efficiency : 0.3687662  
 Average Efficiency Error : 1.0117218E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.3204	28-FEB-2010	2990.561	3301.814	21334.00	0.3579595	1.5304583E-02	62.36397
NP-237	167.4312	28-FEB-2010	4433.746	4904.768	18977.00	0.3778012	1.9088112E-02	75.63606
CM-244	156.4188	28-FEB-2010	5531.146	5885.854	16722.00	0.3765100	1.9049343E-02	61.05648

Instrument : CHAMBER 245  
 Detector : 79438  
 Standard ID : AESS-037  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:02  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:48  
 Average Efficiency : 0.3877061  
 Average Efficiency Error : 1.0631136E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7372	28-FEB-2010	2990.519	3298.200	22136.00	0.3781450	1.6160103E-02	62.31918
NP-237	167.1294	28-FEB-2010	4434.025	4906.060	19910.00	0.3970917	2.0053044E-02	78.86944
CM-244	154.7664	28-FEB-2010	5533.264	5882.788	17268.00	0.3929479	1.9873664E-02	61.71907

Instrument : CHAMBER 246  
 Detector : 78912  
 Standard ID : AESS-038  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:08  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:05:57  
 Average Efficiency : 0.3708842  
 Average Efficiency Error : 1.0172031E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1408	28-FEB-2010	2989.883	3302.161	21584.00	0.3642771	1.5572389E-02	64.71516
NP-237	170.0886	28-FEB-2010	4436.171	4902.069	19259.00	0.3774192	1.9065937E-02	76.67652
CM-244	157.7460	28-FEB-2010	5533.279	5887.441	16761.00	0.3742064	1.8932275E-02	58.21912

Instrument : CHAMBER 247  
 Detector : 79440  
 Standard ID : AESS-039  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:13  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:06:06  
 Average Efficiency : 0.3957888  
 Average Efficiency Error : 1.0855773E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2989.314	3301.154	21842.00	0.3837782	1.6403578E-02	54.27637
NP-237	159.1506	28-FEB-2010	4435.427	4902.237	19566.00	0.4097880	2.0697797E-02	74.12901
CM-244	151.7142	28-FEB-2010	5535.390	5885.574	17262.00	0.4007001	2.0265834E-02	60.50509



Instrument : CHAMBER 248  
 Detector : 79441  
 Standard ID : AESS-040  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:19  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:06:15  
 Average Efficiency : 0.3937030  
 Average Efficiency Error : 1.0792862E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4828	28-FEB-2010	2989.045	3301.474	22331.00	0.3878492	1.6573036E-02	60.09726
NP-237	166.8174	28-FEB-2010	4436.389	4902.813	19896.00	0.3975548	2.0076567E-02	79.69174
CM-244	155.0100	28-FEB-2010	5534.872	5884.178	17540.00	0.3984762	2.0149769E-02	58.60526

Instrument : CHAMBER 249  
 Detector : 79442  
 Standard ID : AESS-041  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:24  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:10:21  
 Average Efficiency : 0.3675877  
 Average Efficiency Error : 1.0082438E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.9034	28-FEB-2010	2991.808	3298.538	21645.00	0.3585607	1.5327478E-02	53.17529
NP-237	171.2268	28-FEB-2010	4433.459	4906.270	19414.00	0.3779393	1.9090647E-02	76.86456
CM-244	159.5796	28-FEB-2010	5535.492	5886.613	16816.00	0.3711205	1.8775435E-02	56.57472

Instrument : CHAMBER 250  
 Detector : 79443  
 Standard ID : AESS-042  
 Standard Reference Date : 18-FEB-2008 15:31:47  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:30  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:07:02  
 Average Efficiency : 0.3960947  
 Average Efficiency Error : 1.0862177E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	188.7090	28-FEB-2010	2988.616	3300.155	21788.00	0.3900070	1.6670316E-02	52.60693
NP-237	159.6558	28-FEB-2010	4432.911	4904.182	19368.00	0.4043324	2.0424359E-02	73.85986
CM-244	150.5208	28-FEB-2010	5530.811	5885.622	16966.00	0.3969653	2.0080892E-02	59.65899

Instrument : CHAMBER 251  
 Detector : 79444  
 Standard ID : AESS-043  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:36  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:07:11  
 Average Efficiency : 0.3862193  
 Average Efficiency Error : 1.0589682E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7708	28-FEB-2010	2990.845	3297.824	22101.00	0.3774794	1.6131971E-02	54.21589
NP-237	168.7422	28-FEB-2010	4433.069	4905.749	19931.00	0.3937052	1.9881824E-02	74.21349
CM-244	156.3252	28-FEB-2010	5534.571	5885.360	17400.00	0.3919745	1.9822748E-02	57.06868

Instrument : CHAMBER 252  
 Detector : 79445  
 Standard ID : AESS-044  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:43  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:07:24  
 Average Efficiency : 0.3698718  
 Average Efficiency Error : 1.0146284E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2990.916	3302.142	21075.00	0.3660958	1.5654918E-02	61.30944
NP-237	166.6248	28-FEB-2010	4434.879	4906.631	18642.00	0.3729277	1.8845377E-02	80.38726
CM-244	155.8290	28-FEB-2010	5534.322	5884.528	16473.00	0.3722862	1.8838966E-02	60.16105

Instrument : CHAMBER 253  
 Detector : 79446  
 Standard ID : AESS-045  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:49  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:07:35  
 Average Efficiency : 0.4175173  
 Average Efficiency Error : 1.1444525E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	186.9936	28-FEB-2010	2987.796	3301.166	22755.00	0.4110381	1.7559895E-02	55.81194
NP-237	160.8066	28-FEB-2010	4435.182	4903.720	20118.00	0.4169668	2.1054644E-02	75.83978
CM-244	145.8384	28-FEB-2010	5533.610	5884.813	17722.00	0.4279359	2.1636952E-02	56.91713

Instrument : CHAMBER 254  
 Detector : 79447  
 Standard ID : AESS-046  
 Standard Reference Date : 19-FEB-2008 19:35:48  
 Calibration Analysis Date/Time : 27-JUL-2009 11:51:54  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:07:52  
 Average Efficiency : 0.4058467  
 Average Efficiency Error : 1.1127573E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2991.474	3298.982	22591.00	0.3918256	1.6740572E-02	58.61956
NP-237	164.6658	28-FEB-2010	4434.396	4906.361	20593.00	0.4168403	2.1043487E-02	82.24182
CM-244	151.3824	28-FEB-2010	5533.560	5883.122	17929.00	0.4170516	2.1083934E-02	61.14439

Instrument : CHAMBER 255  
 Detector : 79448  
 Standard ID : AESS-047  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 27-JUL-2009 11:52:00  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:08:10  
 Average Efficiency : 0.3643631  
 Average Efficiency Error : 9.9972216E-03  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2992.107	3299.169	20953.00	0.3583827	1.5326263E-02	55.06876
NP-237	168.3948	28-FEB-2010	4434.844	4902.471	18382.00	0.3638436	1.8389078E-02	74.38364
CM-244	154.6032	28-FEB-2010	5531.565	5882.529	16422.00	0.3740352	1.8928226E-02	58.14114

Instrument : CHAMBER 256  
 Detector : 79449  
 Standard ID : AESS-048  
 Standard Reference Date : 19-FEB-2008 00:32:27  
 Calibration Analysis Date/Time : 27-JUL-2009 11:52:06  
 Calibration Count Time : 300.0000  
 Efficiency Calibration Date/Time : 28-JUL-2009 14:08:26  
 Average Efficiency : 0.3831320  
 Average Efficiency Error : 1.0509511E-02  
 Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2989.102	3301.350	21361.00	0.3761188	1.6080733E-02	55.66320
NP-237	161.5530	28-FEB-2010	4435.732	4901.991	18891.00	0.3897299	1.9691780E-02	78.88689
CM-244	151.1856	28-FEB-2010	5533.871	5883.102	16615.00	0.3870071	1.9581940E-02	56.91294

## 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 137		
	Detector	:	64288		
	Calibration Date/Time	:	29-SEP-2009 07:09:48		
	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	4768.799	
	CM-244	4320A 2/28/10	5795.020	5795.166	

Energy/Channel Equation	:	see above
Energy Calibration Zero	:	2347.665
Energy Calibration Slope	:	4.984977
Energy Calibration Quadratic	:	2.7776926E-04
Energy Calibration Range	:	7744.000

## Subsection 2: Background Calibration

Instrument : CHAMBER 137  
Detector : 64288  
Background Analysis Date/Time : 27-SEP-2009 18:42:40  
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.293	3299.748	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.986	4904.334	3.000000	0.9000000	57.73503	95.00000
CM-244	5534.468	5887.346	2.000000	0.6000000	70.71068	95.00000

### Subsection 3: Efficiency Calibration

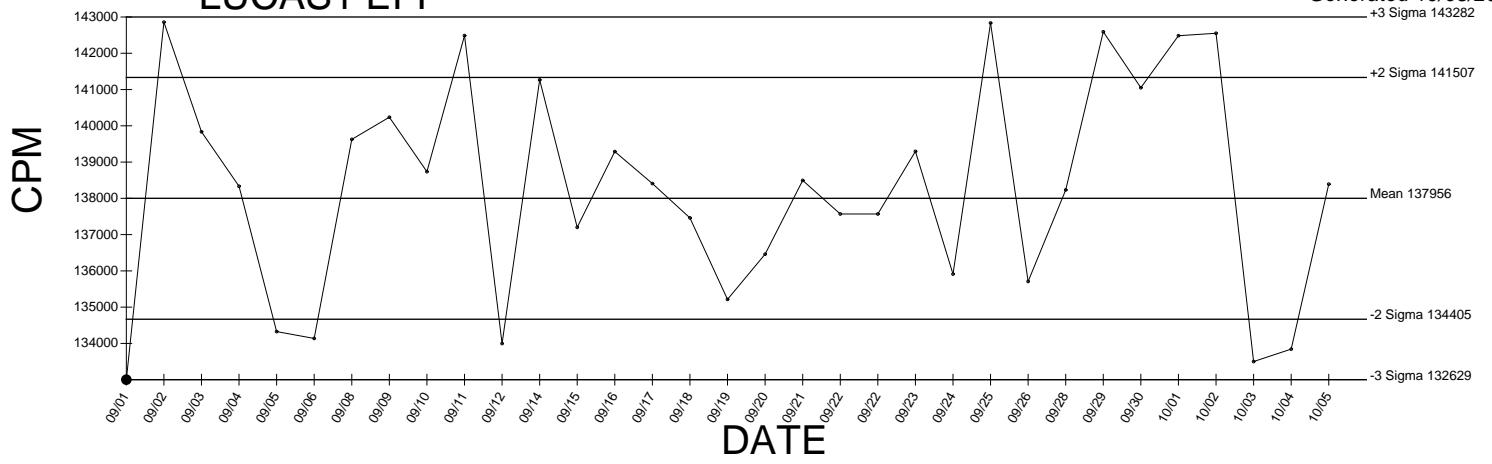
Instrument : CHAMBER 137  
Detector : 64288  
Standard ID : AESS-025  
Standard Reference Date : 15-FEB-2008 09:06:52  
Calibration Analysis Date/Time : 28-SEP-2009 12:47:21  
Calibration Count Time : 300.0000  
Efficiency Calibration Date/Time : 29-SEP-2009 07:09:48  
Average Efficiency : 0.2508998  
Average Efficiency Error : 6.9208592E-03  
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2990.293	3299.748	14585.00	0.2523354	1.0852666E-02	47.12407
NP-237	167.9916	28-FEB-2010	4432.986	4904.334	12708.00	0.2521377	1.2803786E-02	61.68194
CM-244	157.2432	28-FEB-2010	5534.468	5887.346	10986.00	0.2477600	1.2611548E-02	51.22959

# BACKGROUND AND EFFICIENCY DATA

# LUCAS1 EFF

Generated 10/05/2009

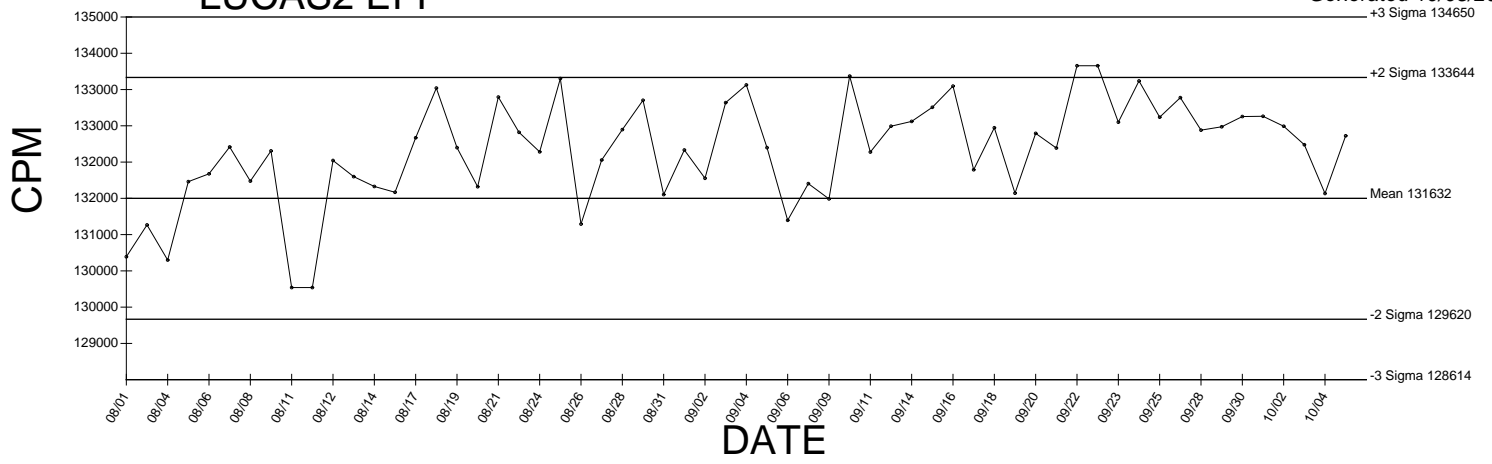


● Denotes Outlier



# LUCAS2 EFF

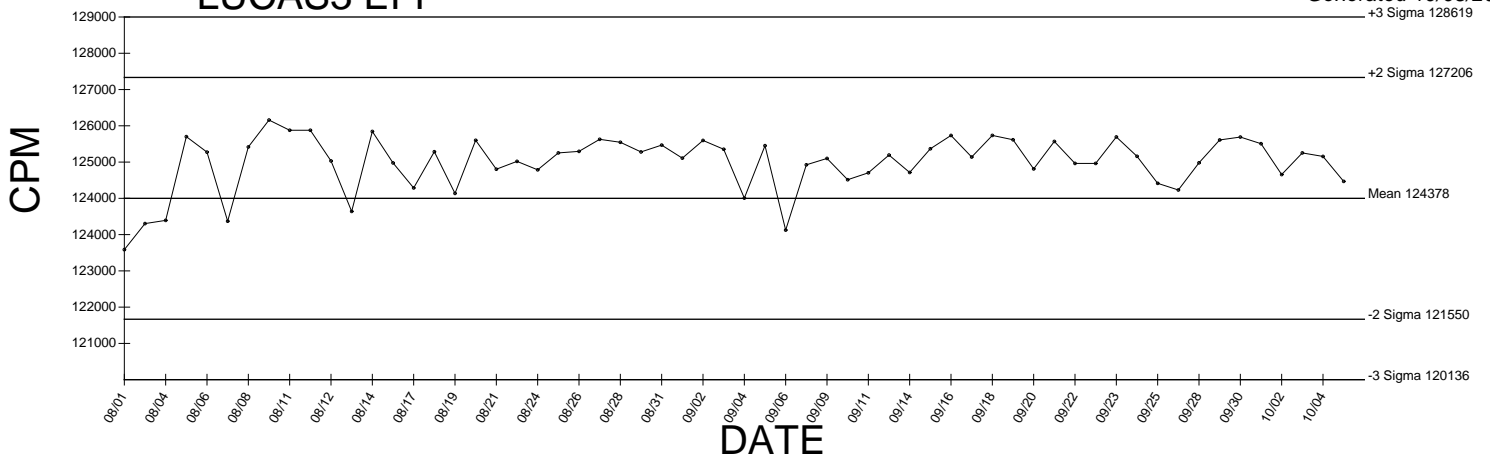
Generated 10/05/2009



● Denotes Outlier

# LUCAS3 EFF

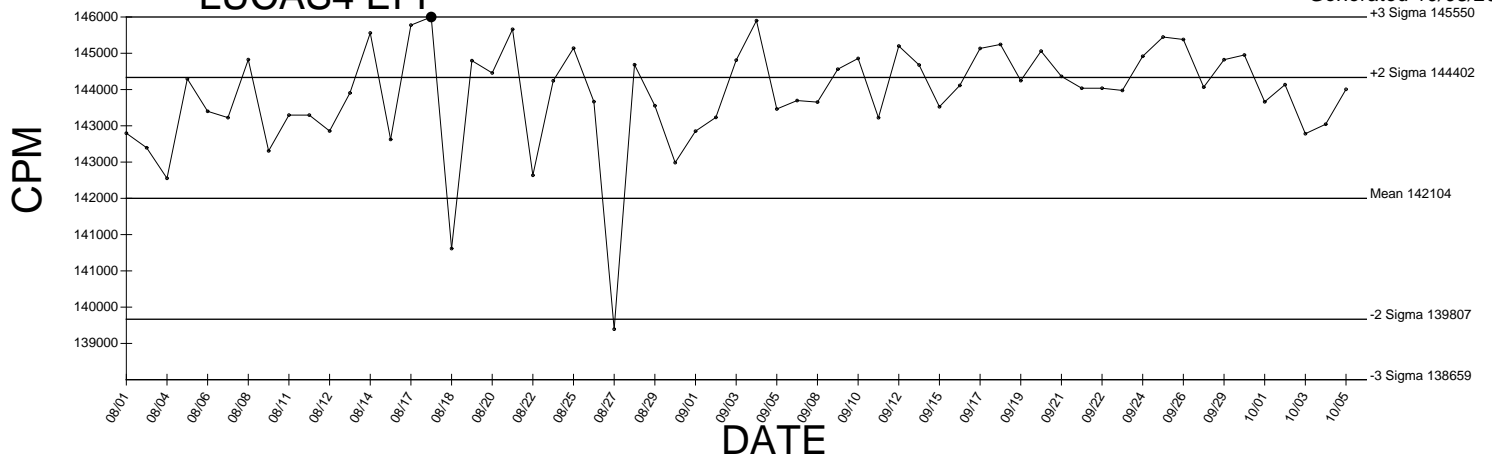
Generated 10/05/2009



● Denotes Outlier

# LUCAS4 EFF

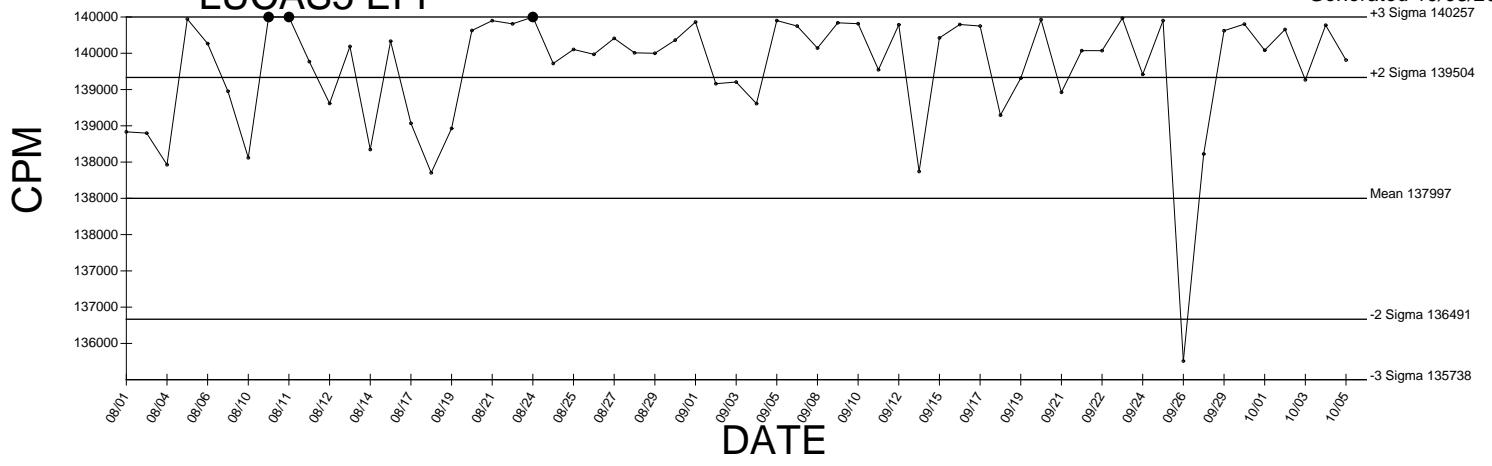
Generated 10/05/2009



● Denotes Outlier

# LUCAS5 EFF

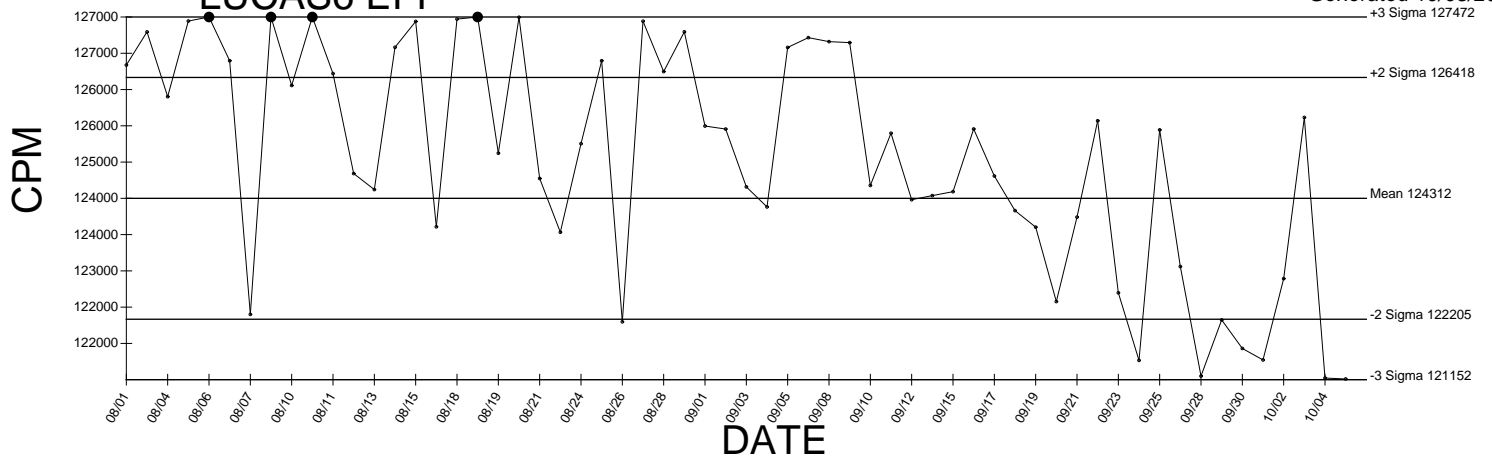
Generated 10/05/2009



● Denotes Outlier

# LUCAS6 EFF

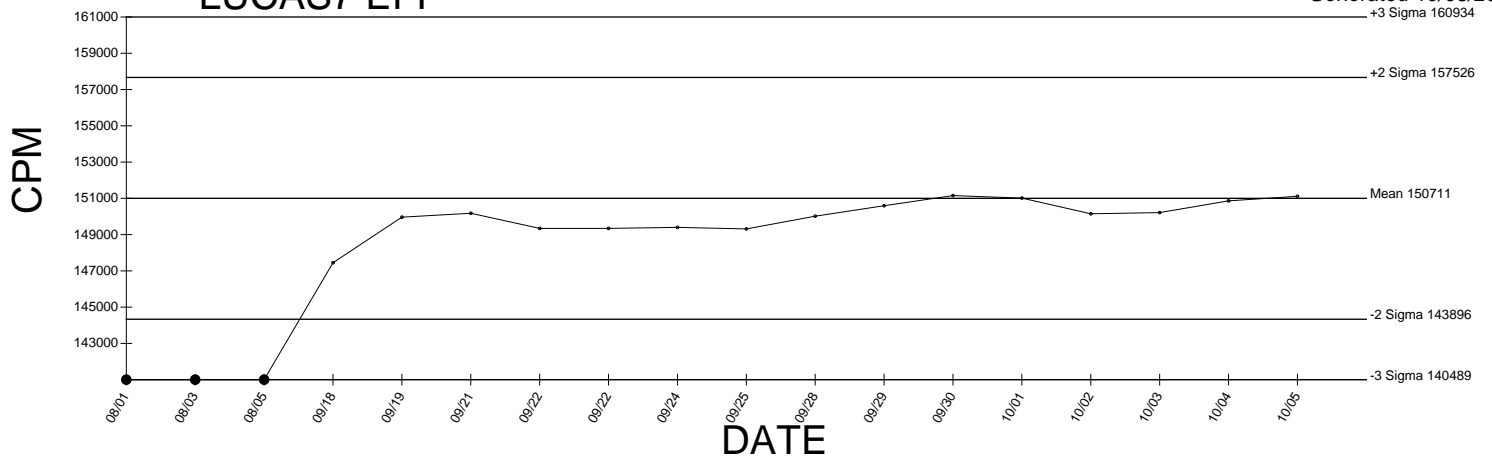
Generated 10/05/2009



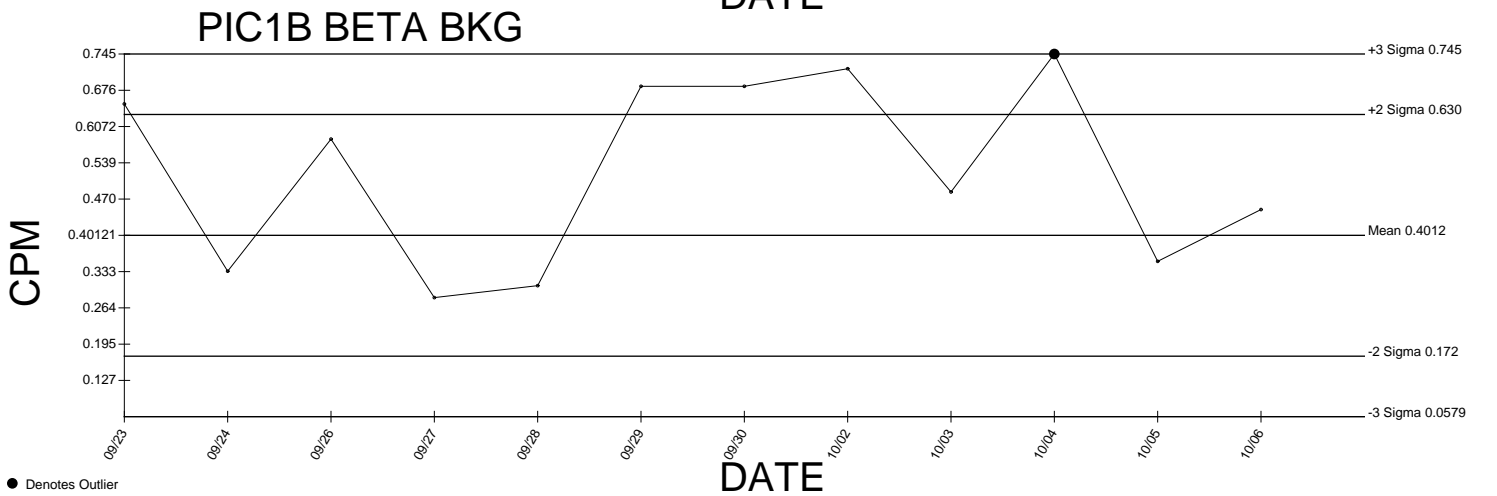
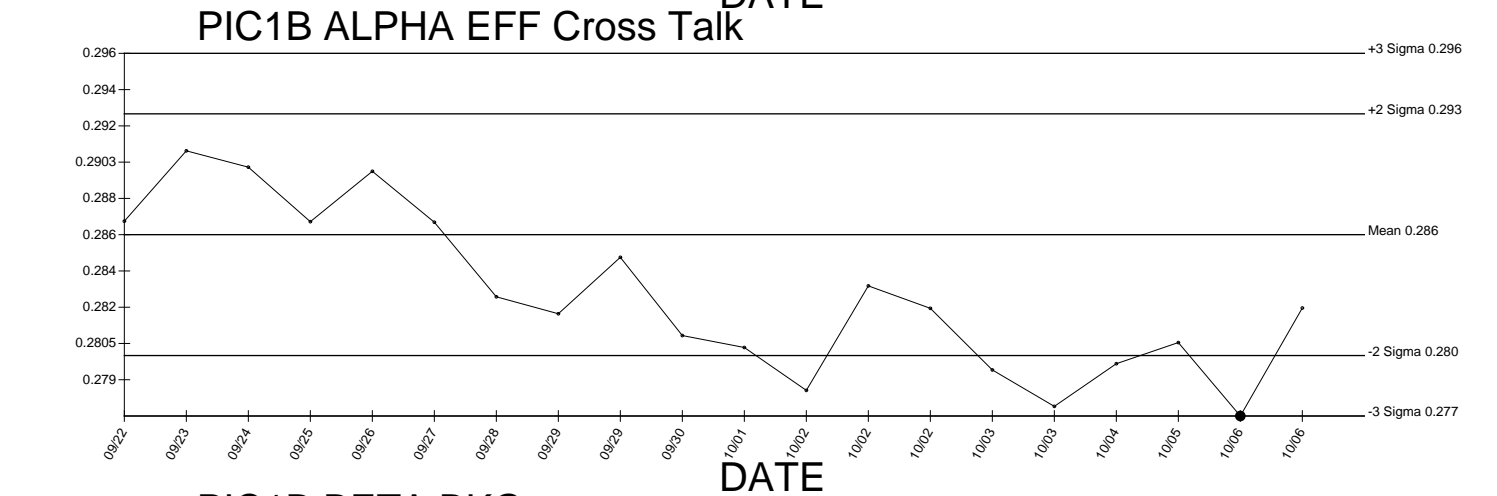
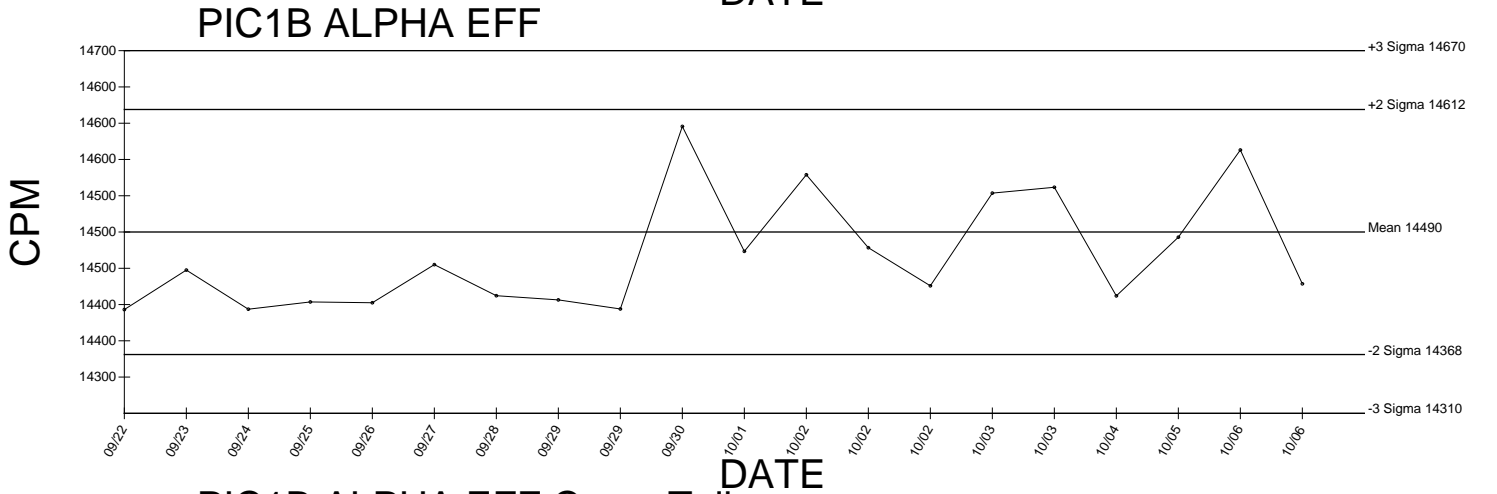
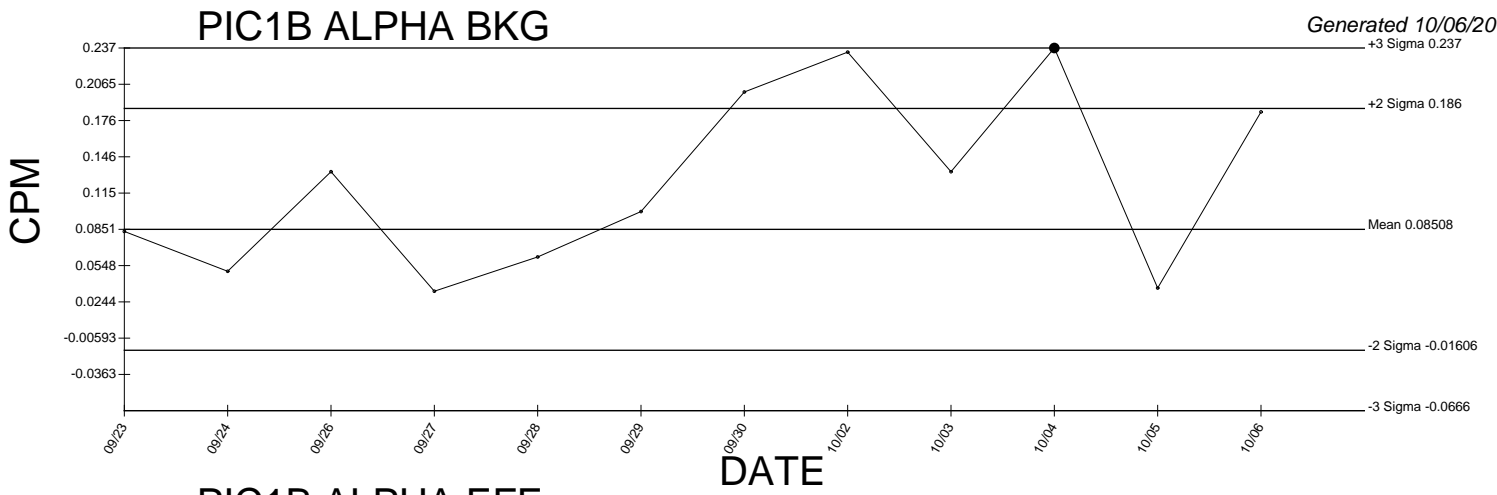
● Denotes Outlier

# LUCAS7 EFF

Generated 10/05/2009



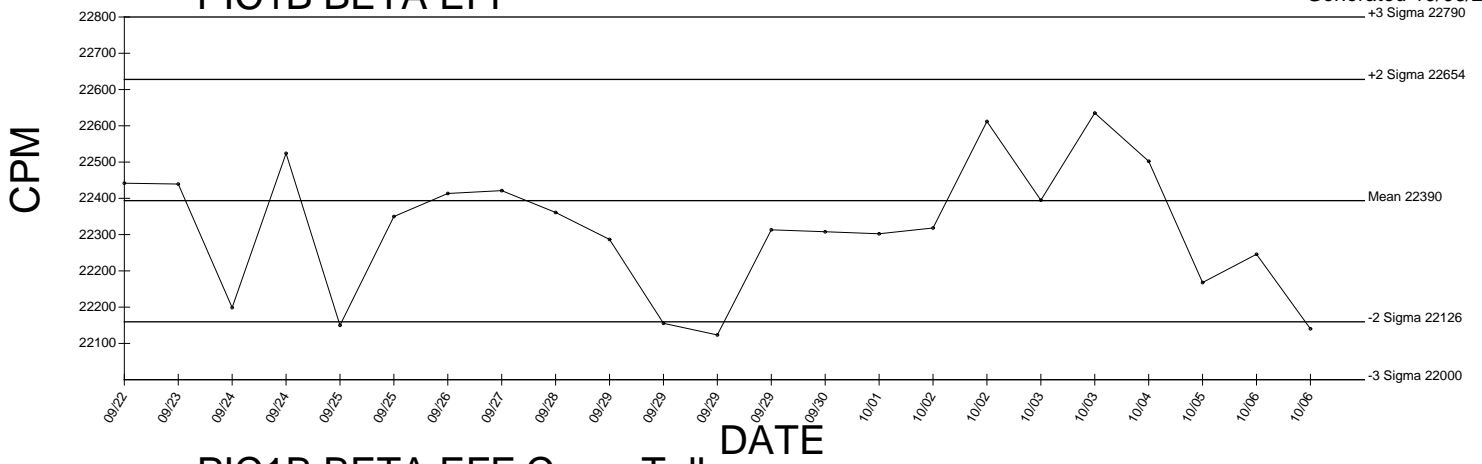
● Denotes Outlier



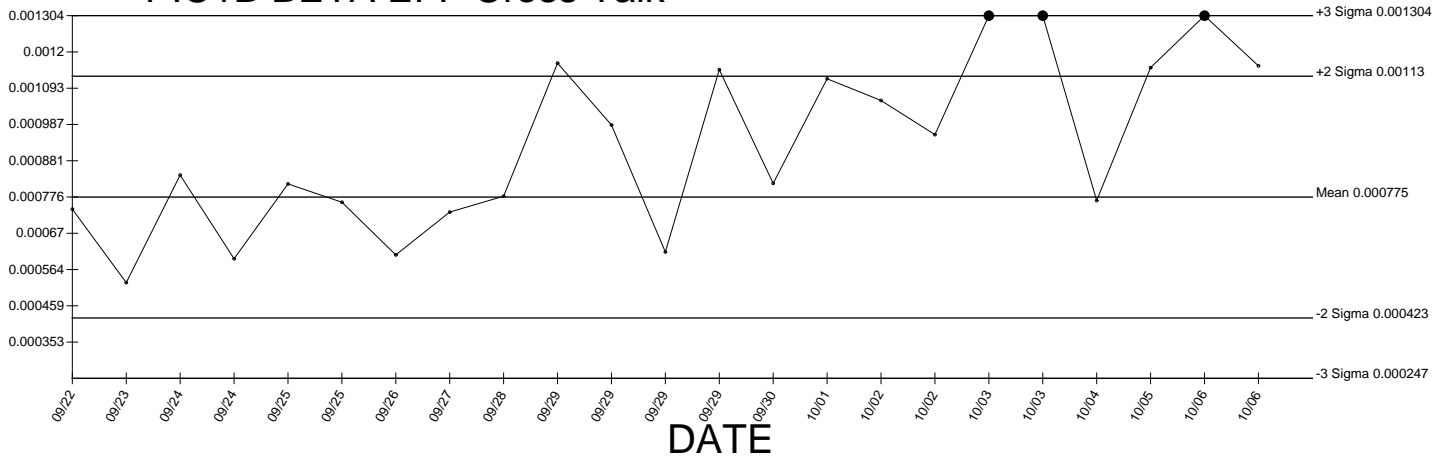
● Denotes Outlier

# PIC1B BETA EFF

Generated 10/06/2009

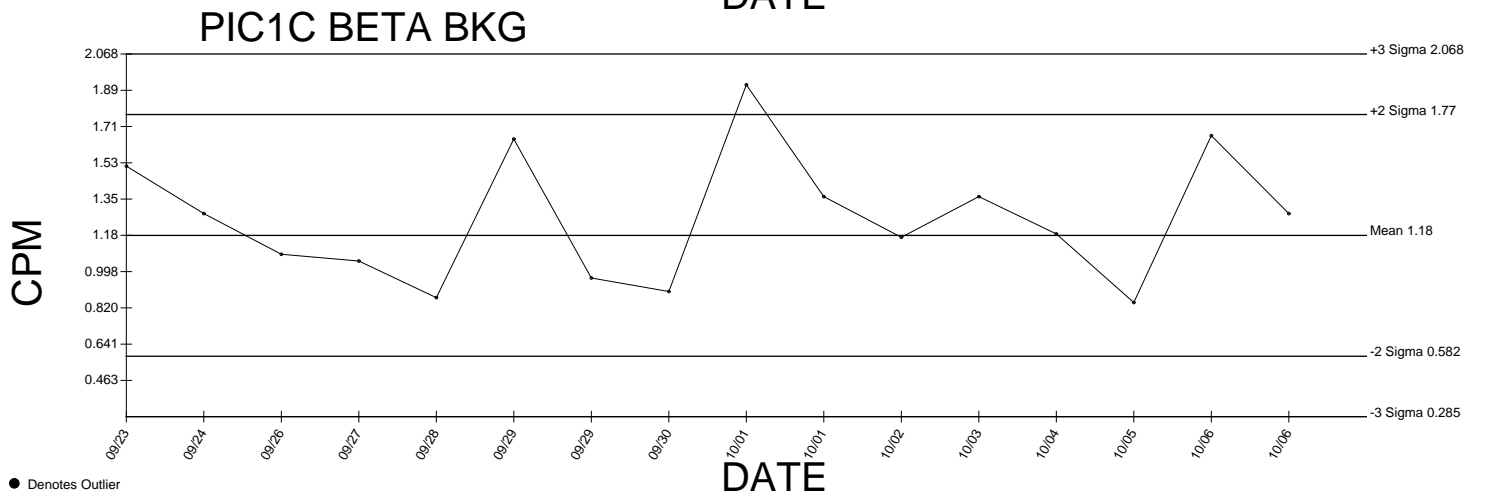
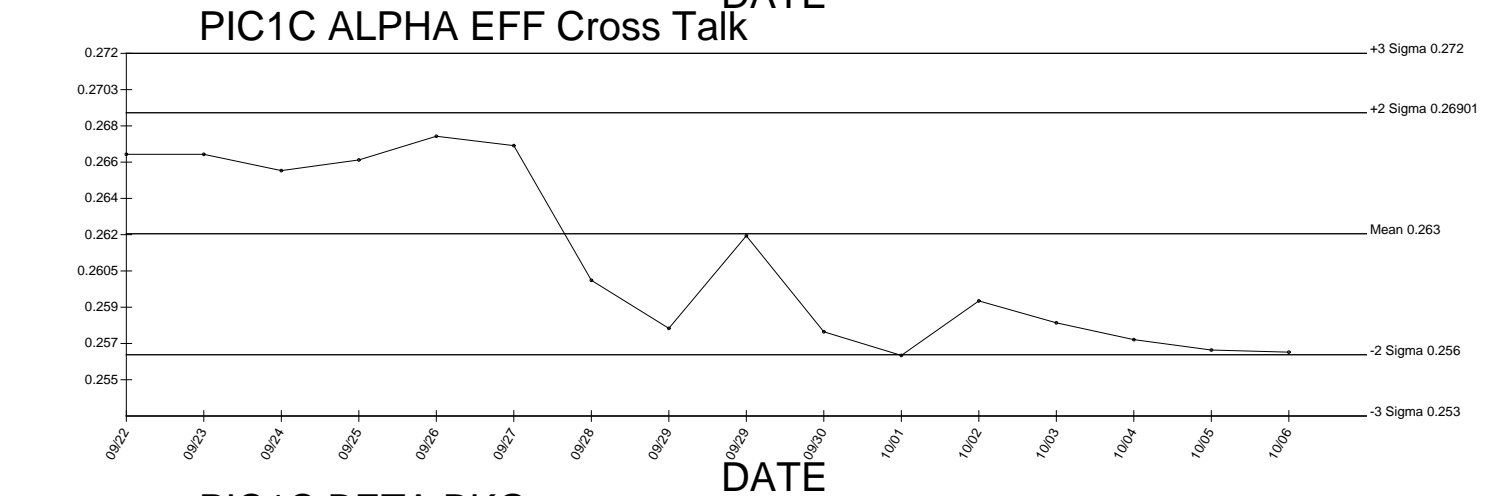
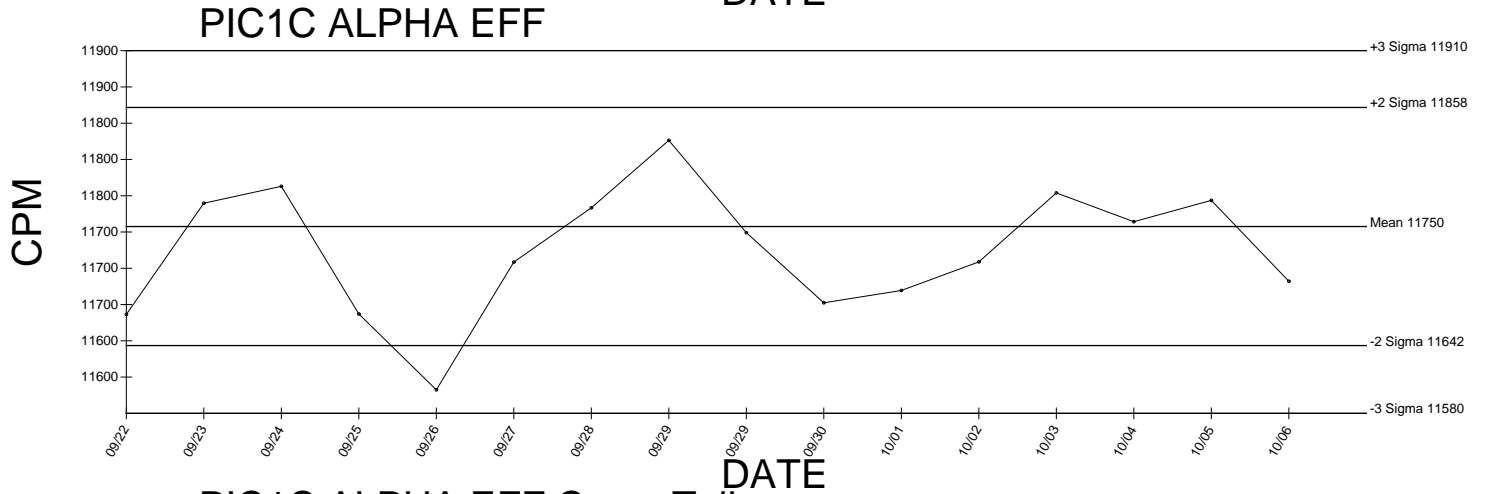
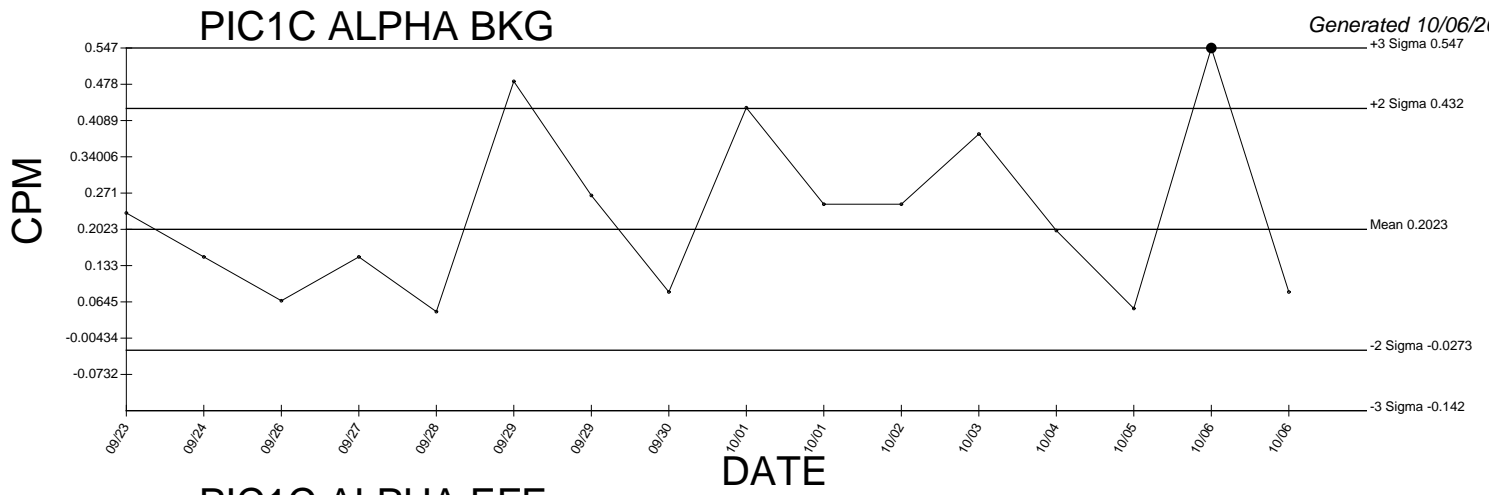


# PIC1B BETA EFF Cross Talk



● Denotes Outlier

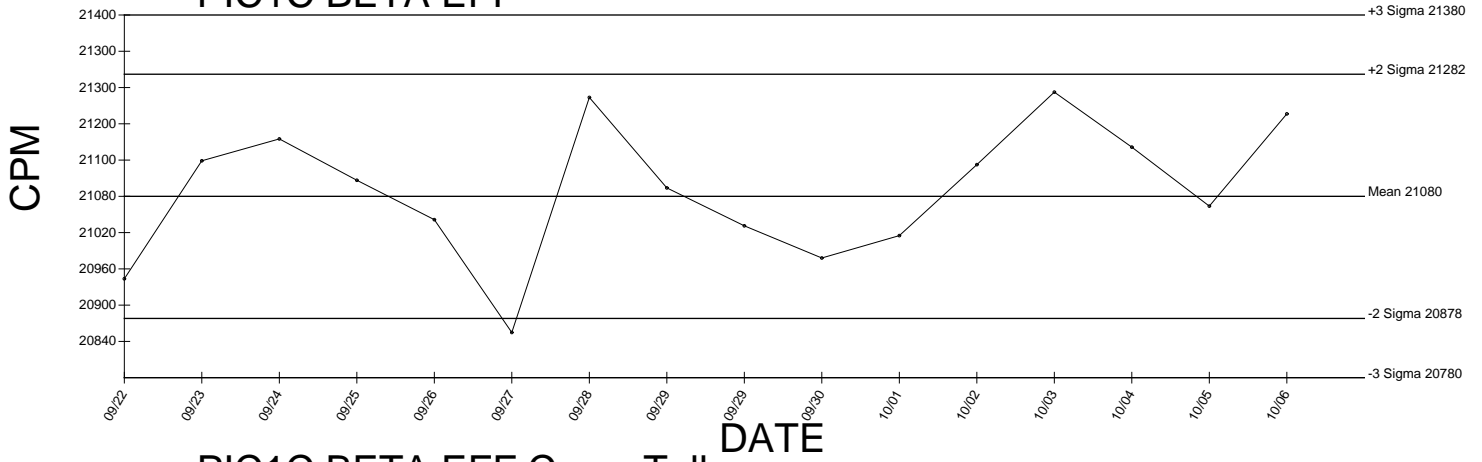




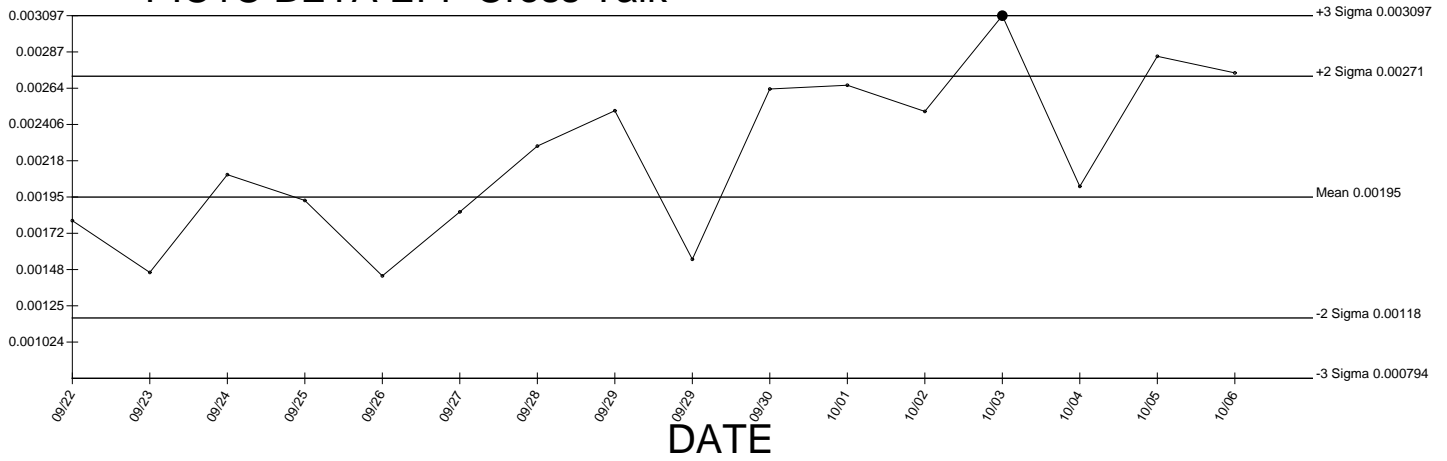
● Denotes Outlier

# PIC1C BETA EFF

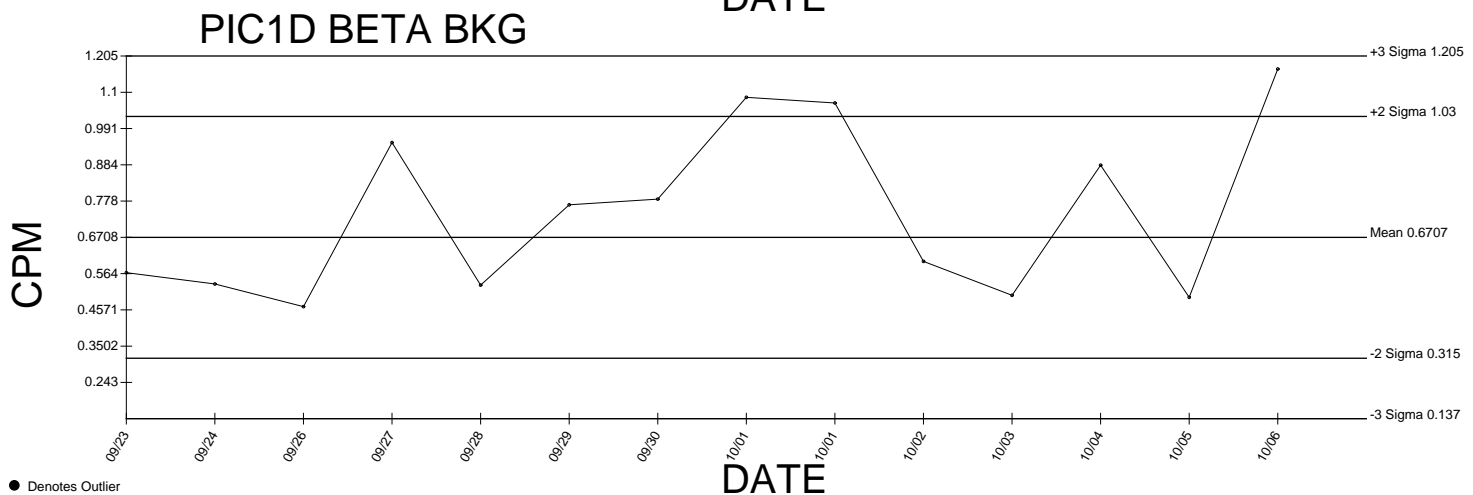
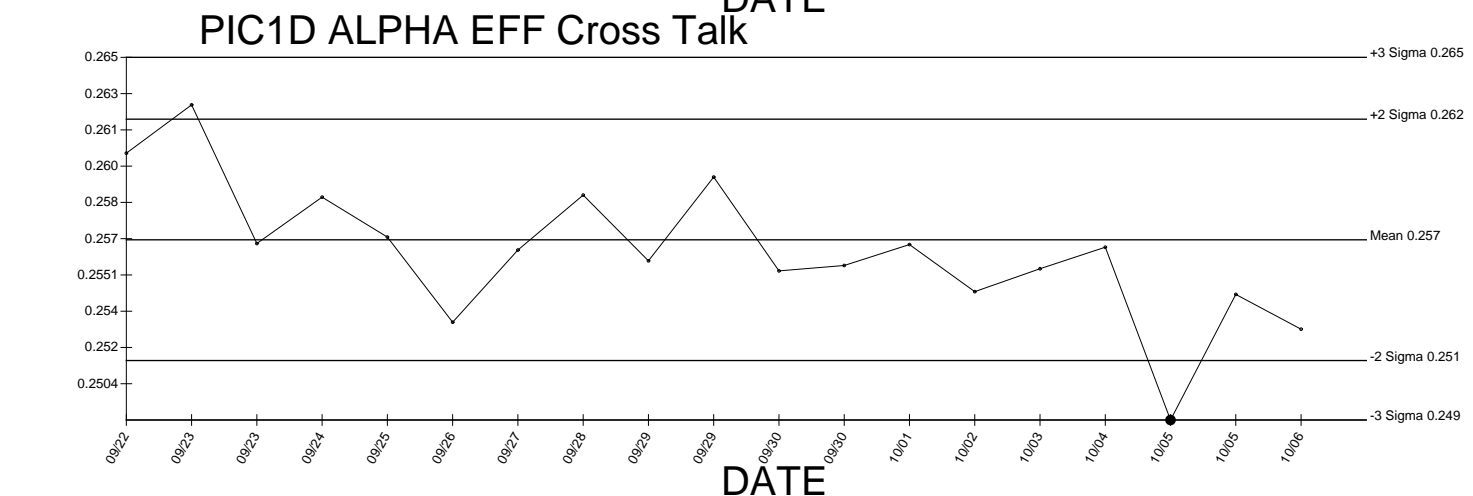
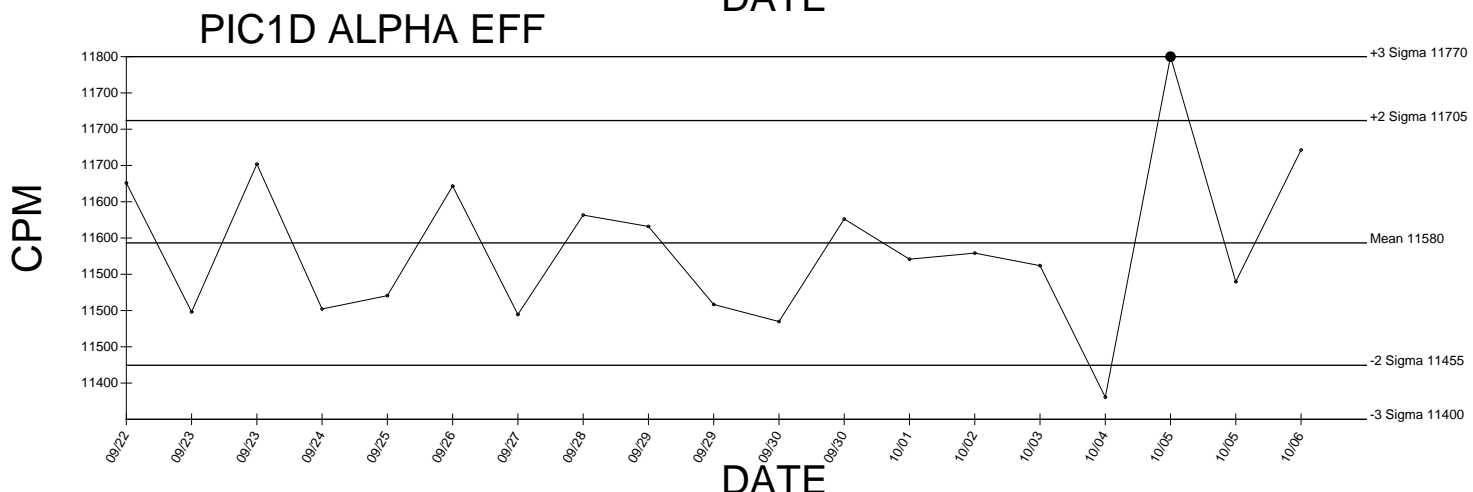
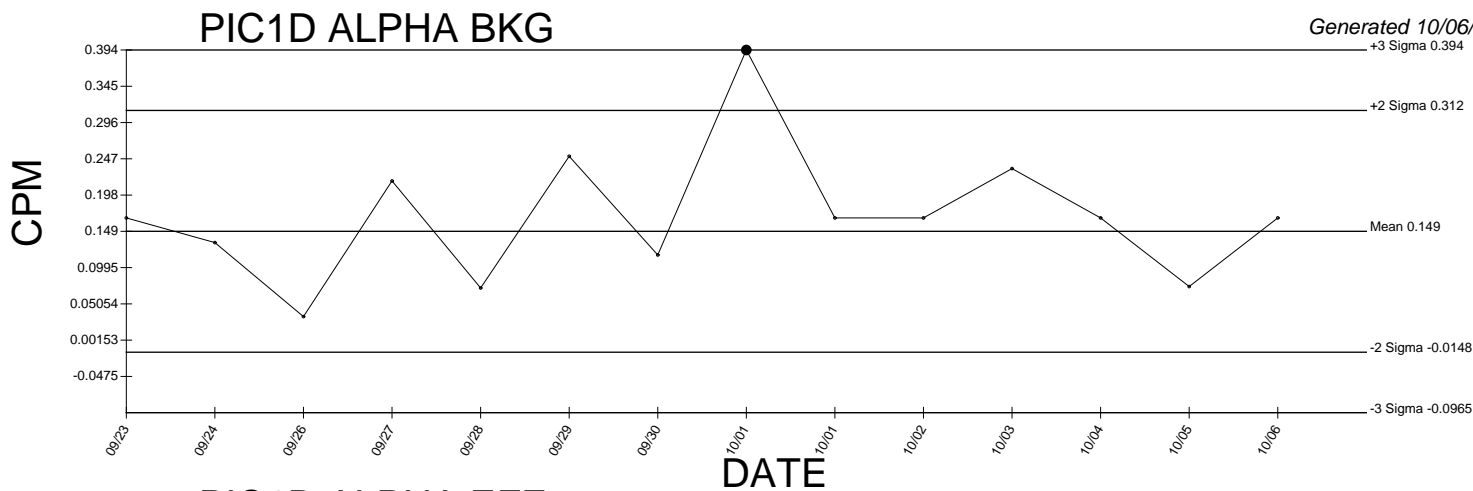
Generated 10/06/2009



# PIC1C BETA EFF Cross Talk



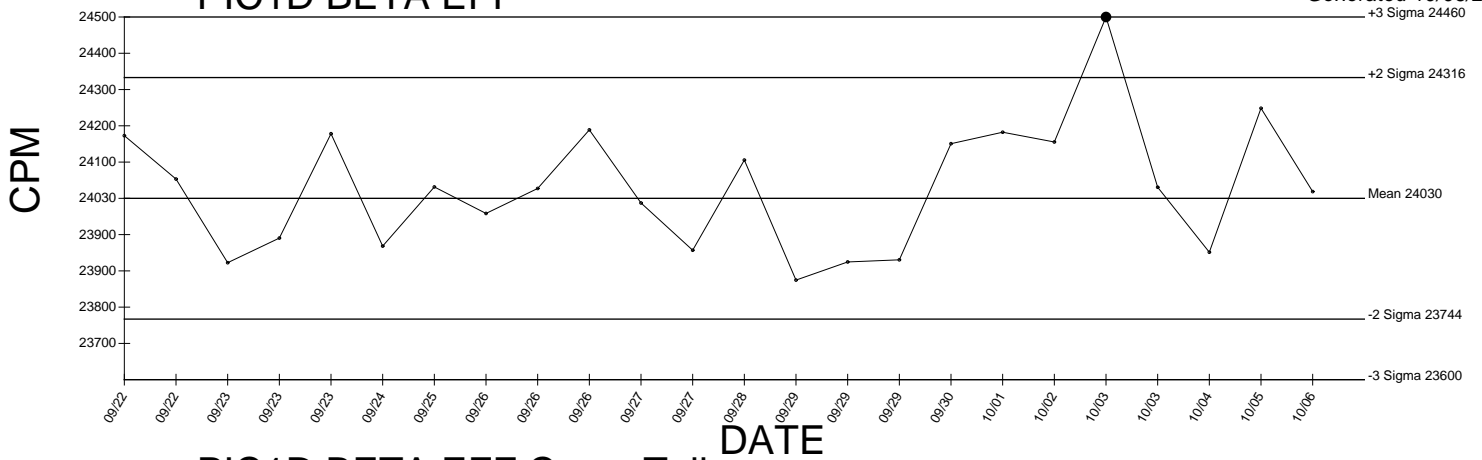
● Denotes Outlier



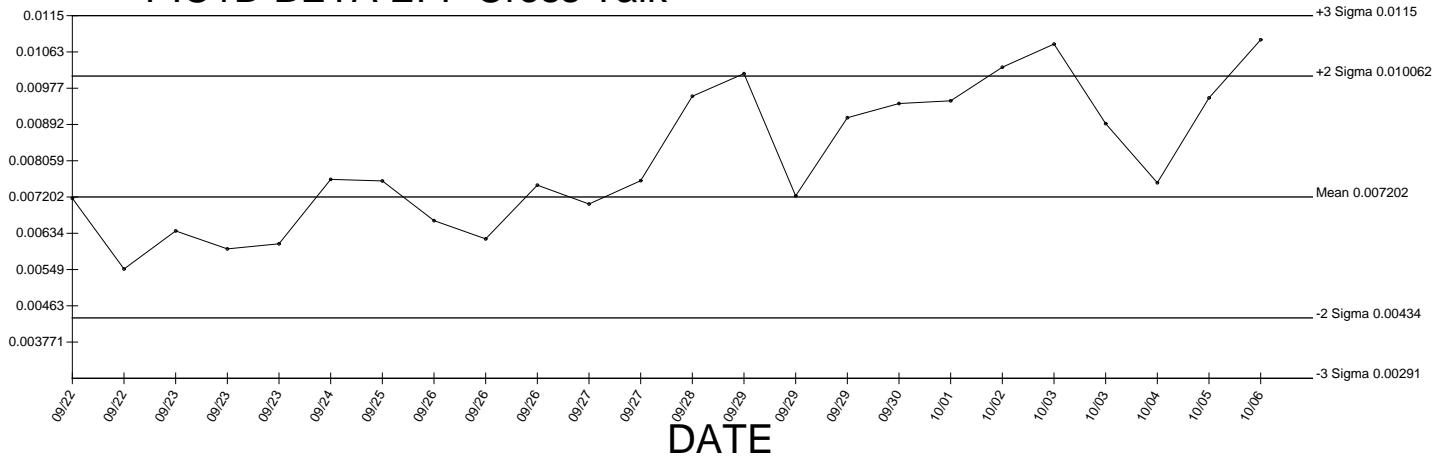
● Denotes Outlier

# PIC1D BETA EFF

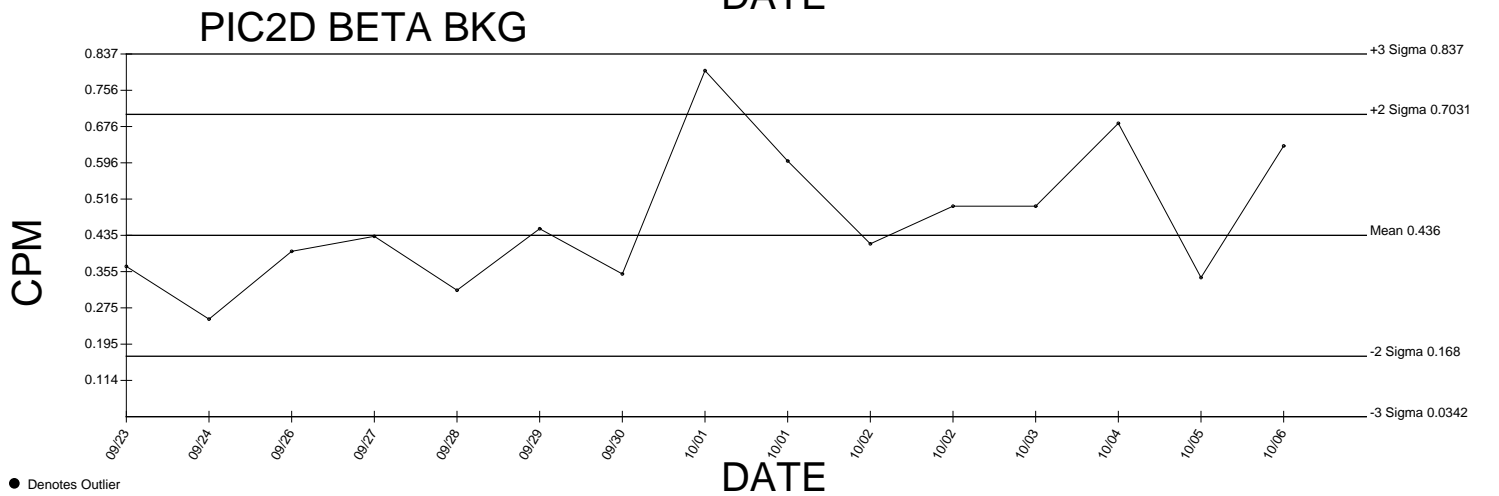
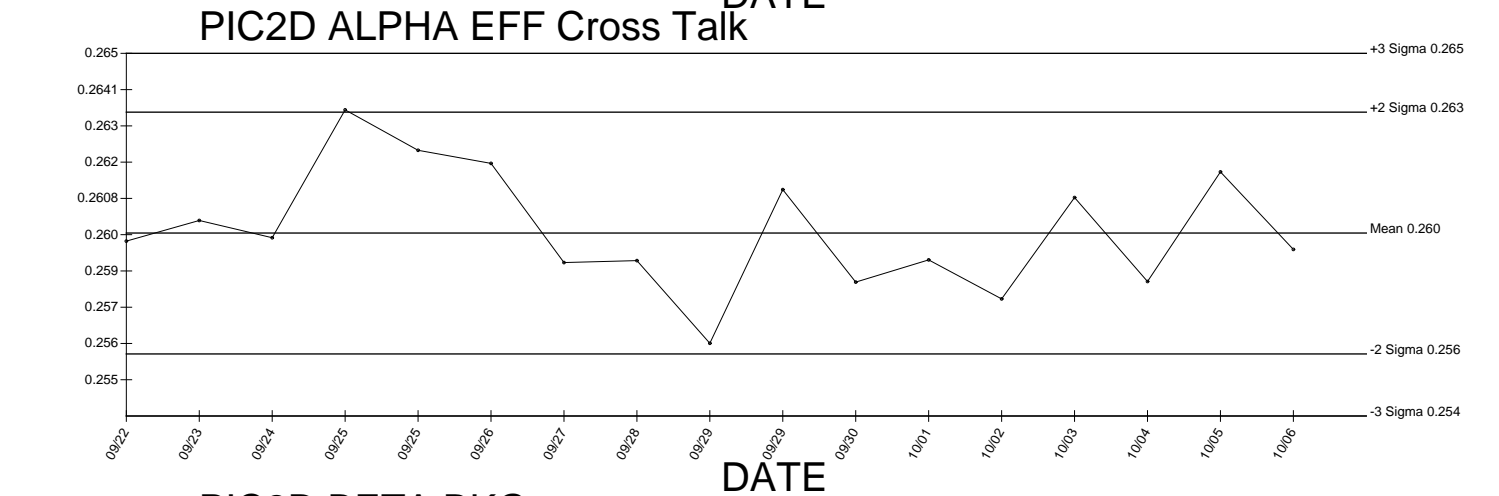
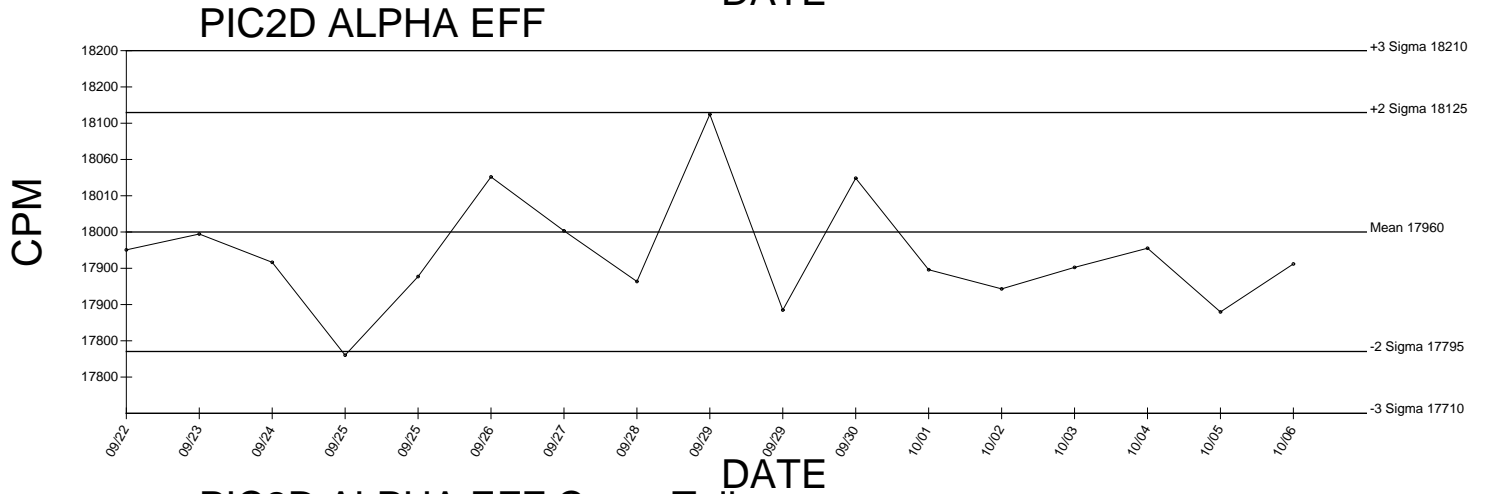
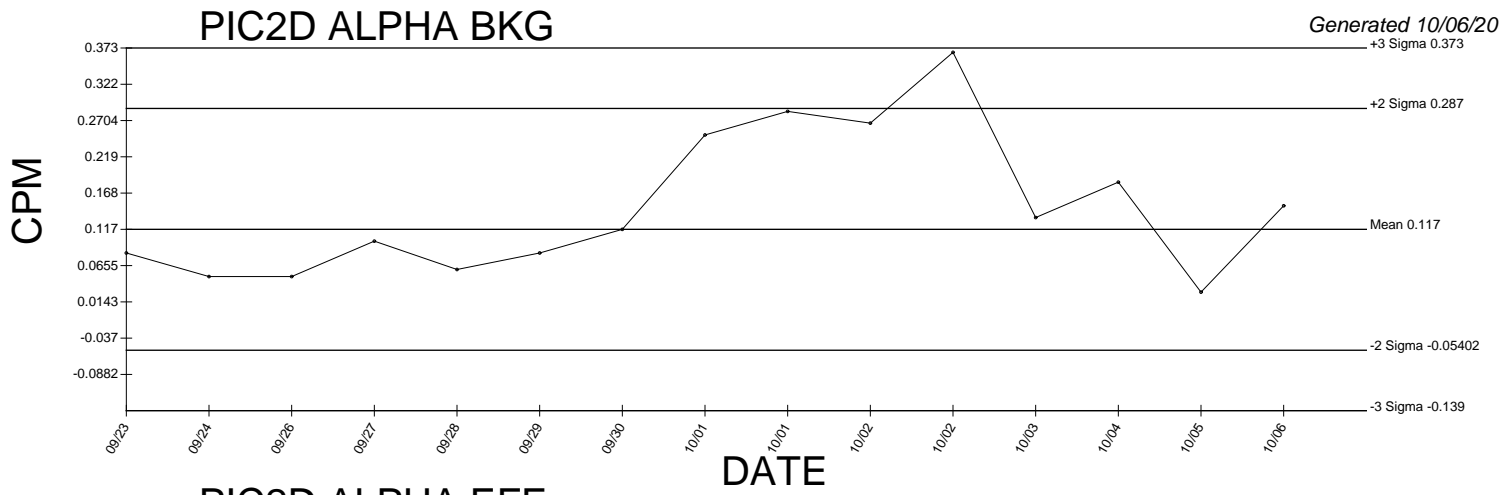
Generated 10/06/2009



# PIC1D BETA EFF Cross Talk



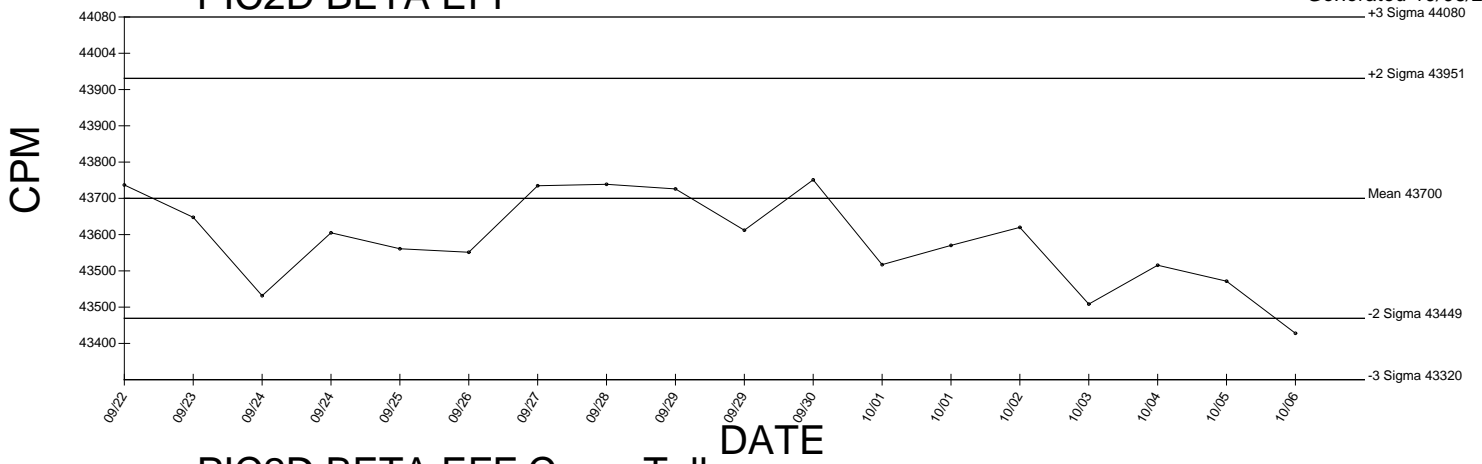
● Denotes Outlier



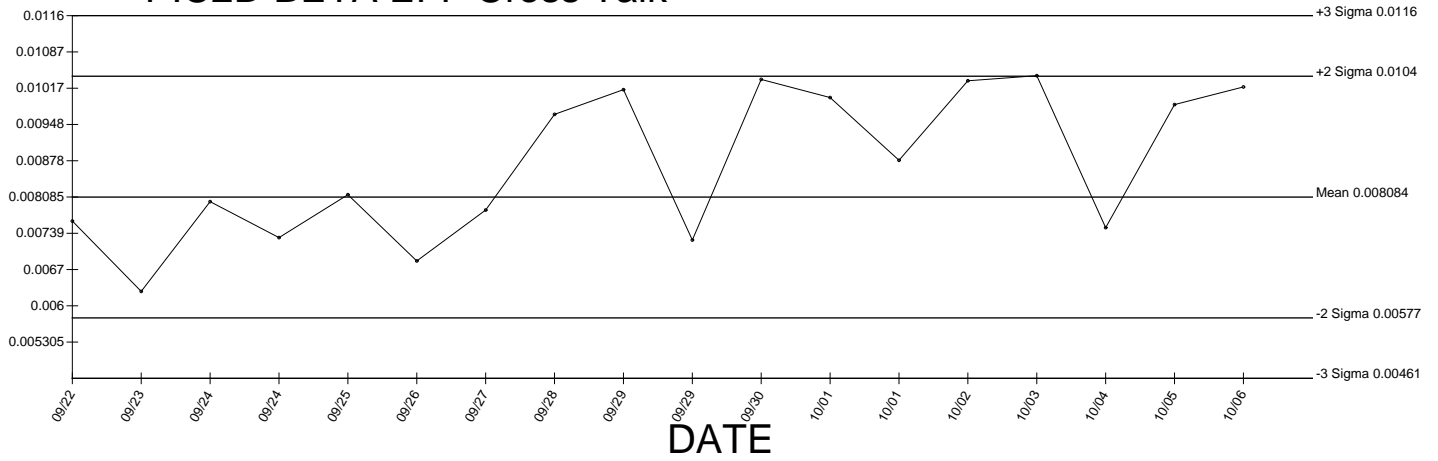
● Denotes Outlier

# PIC2D BETA EFF

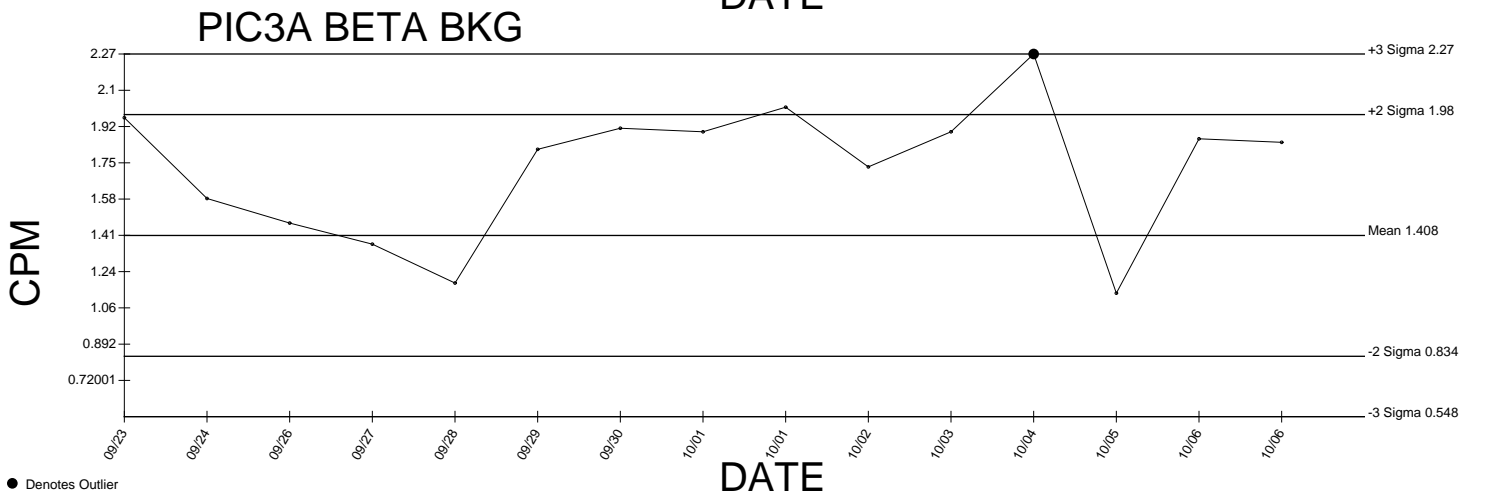
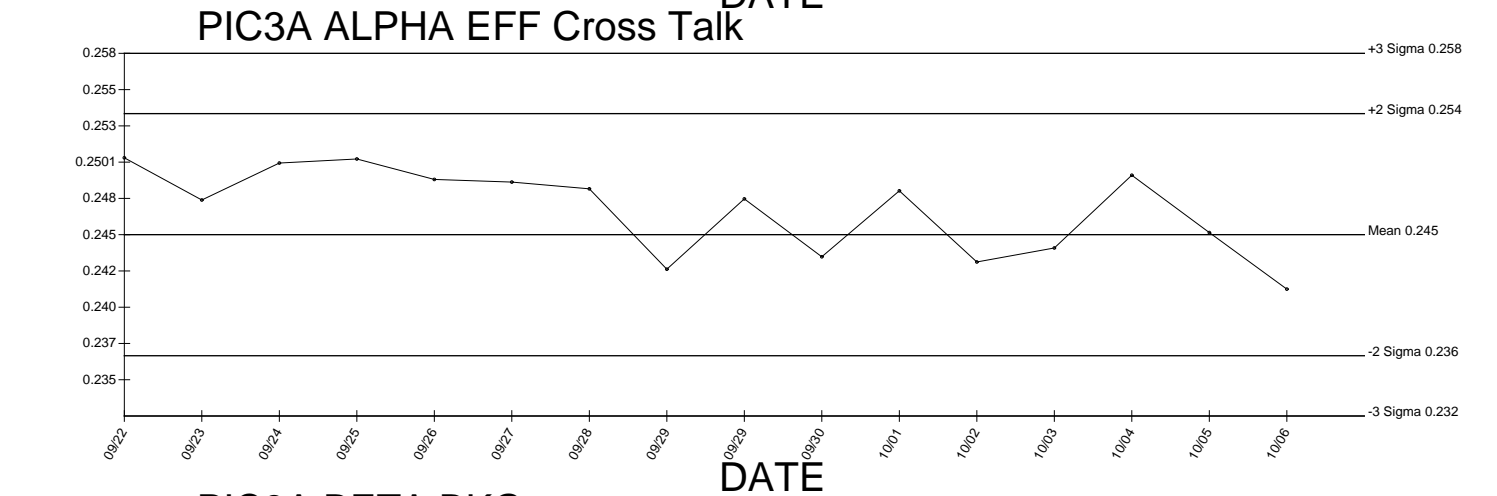
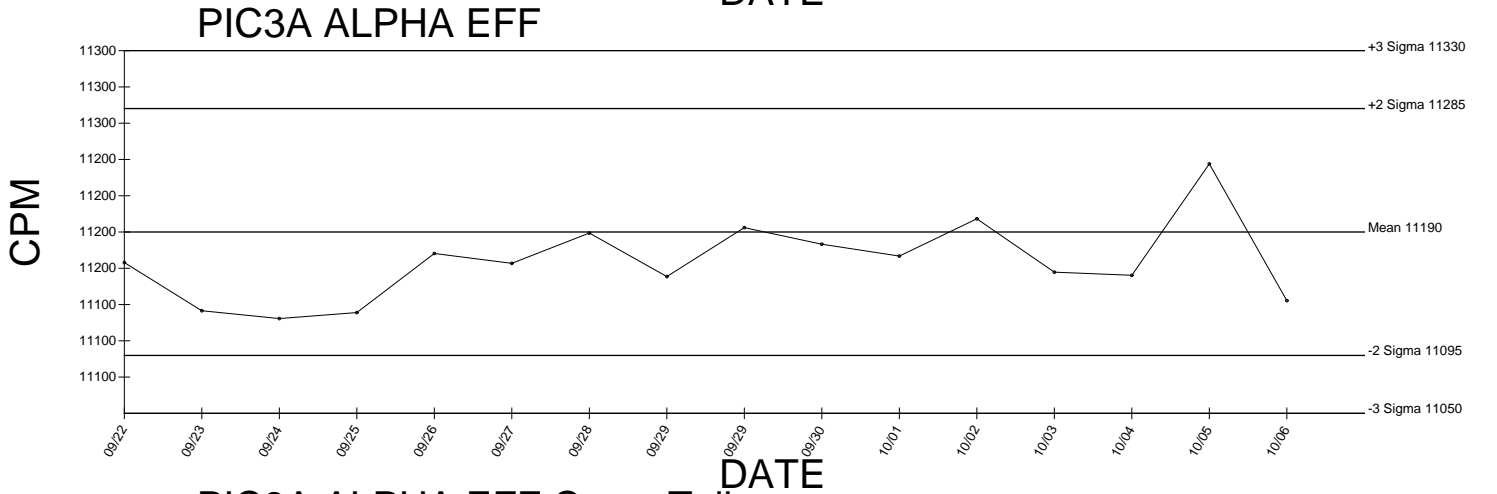
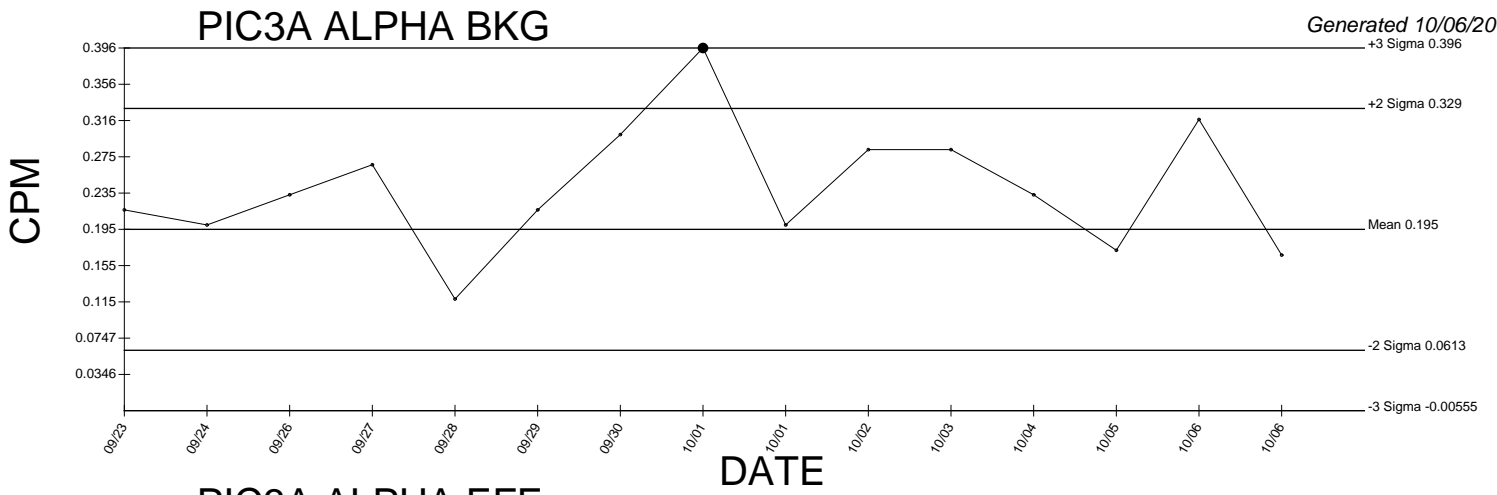
Generated 10/06/2009



# PIC2D BETA EFF Cross Talk



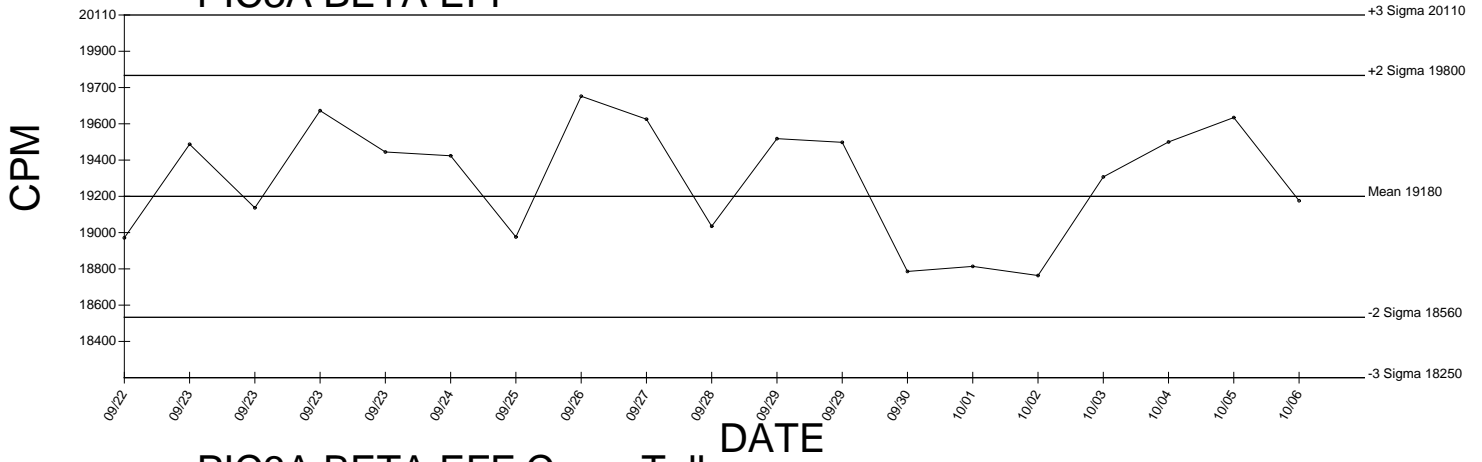
● Denotes Outlier



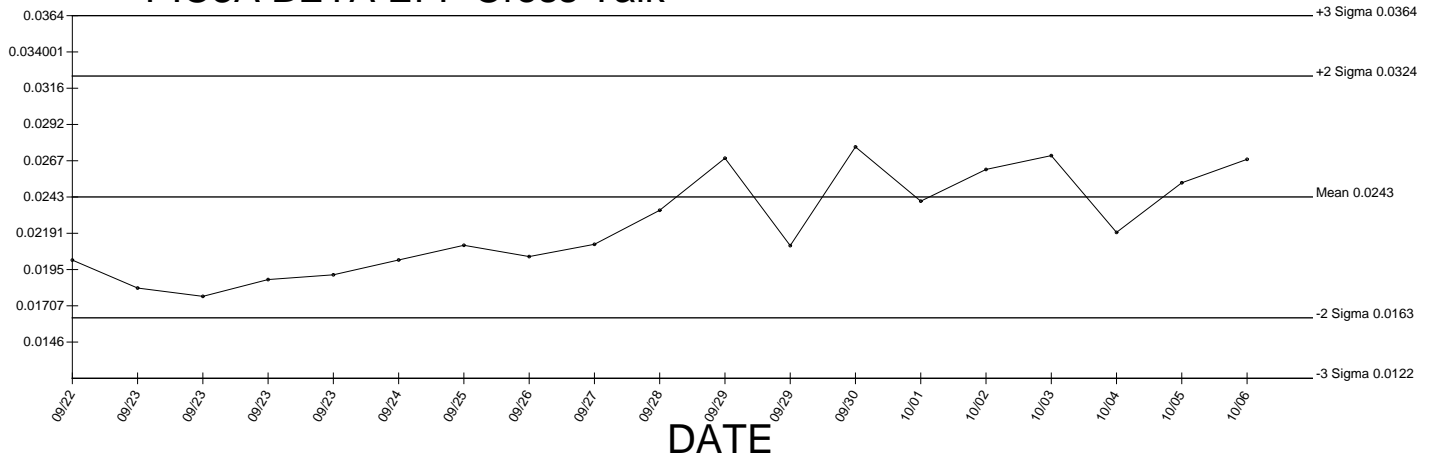
● Denotes Outlier

# PIC3A BETA EFF

Generated 10/06/2009

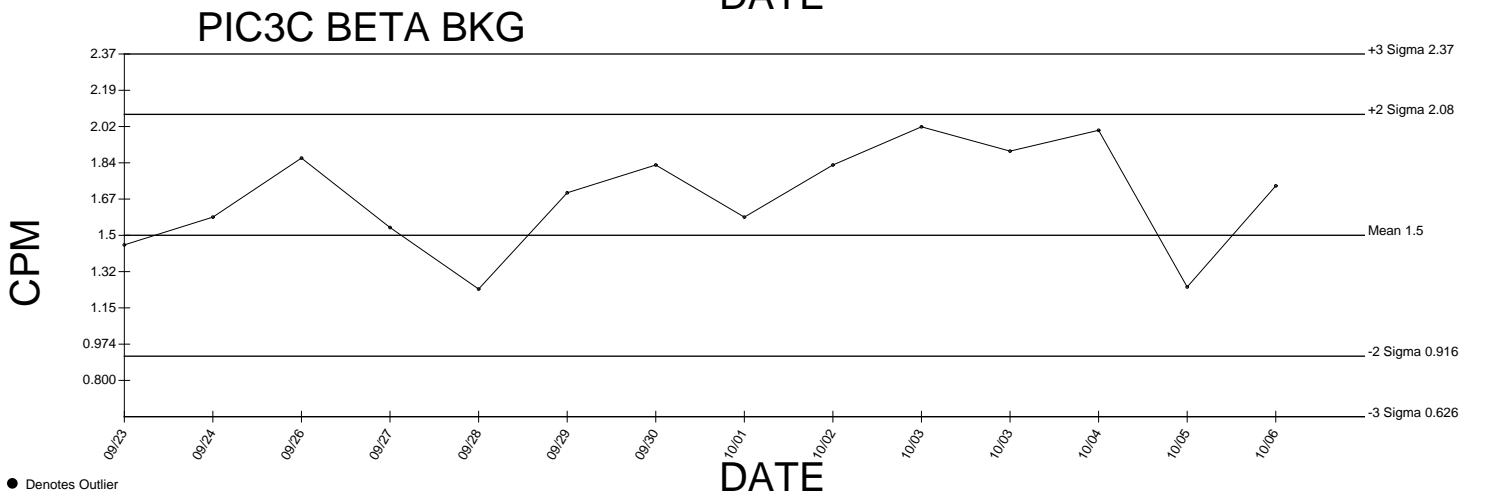
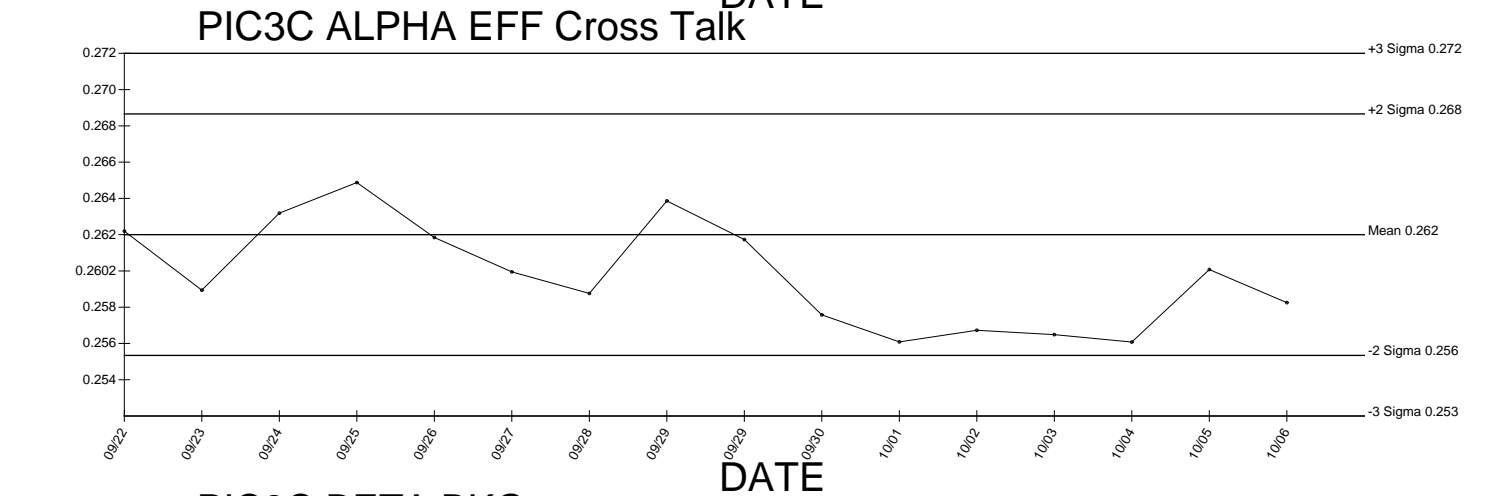
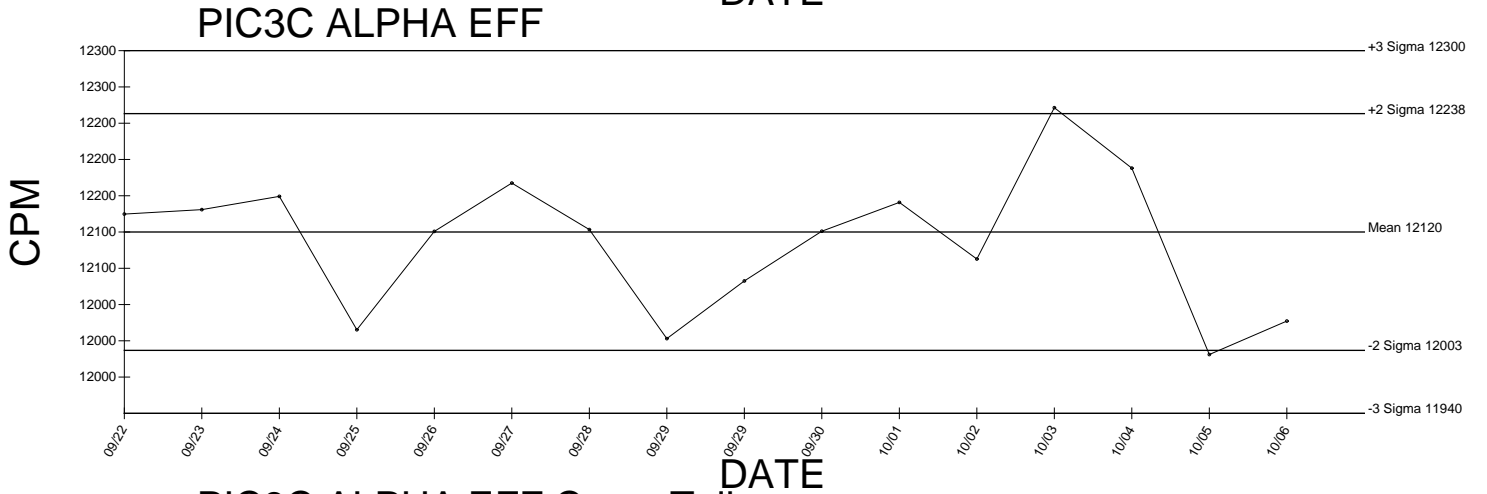
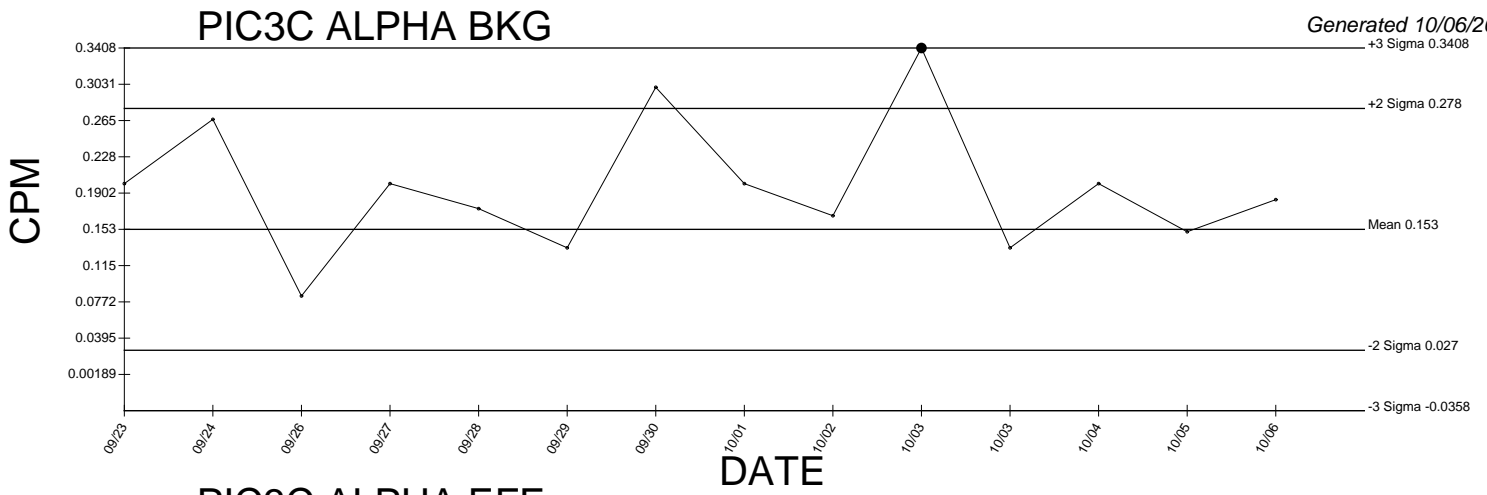


# PIC3A BETA EFF Cross Talk



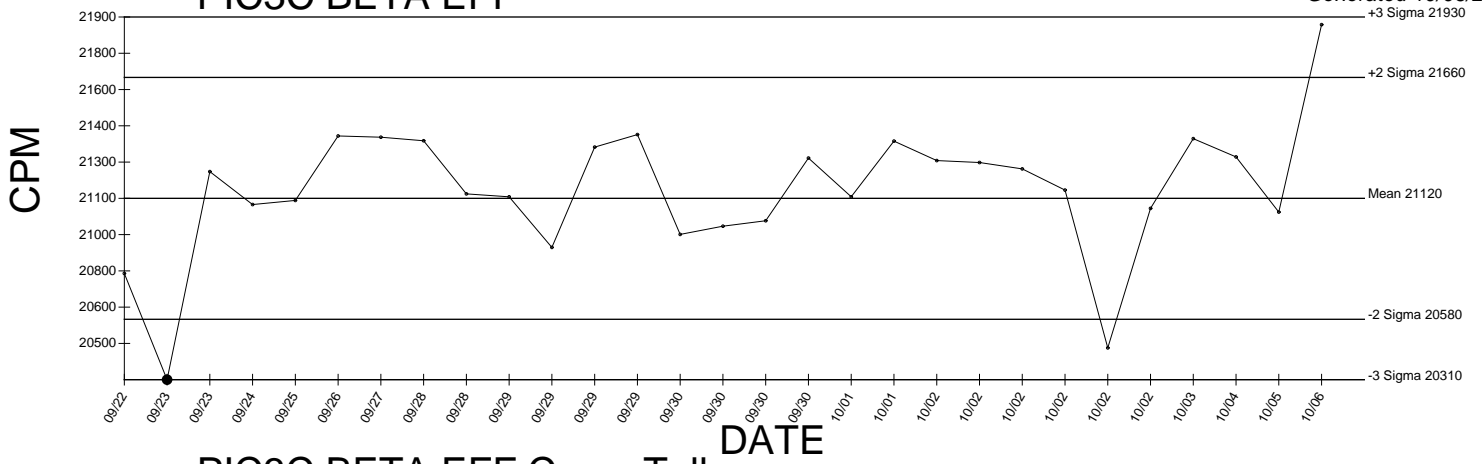
● Denotes Outlier



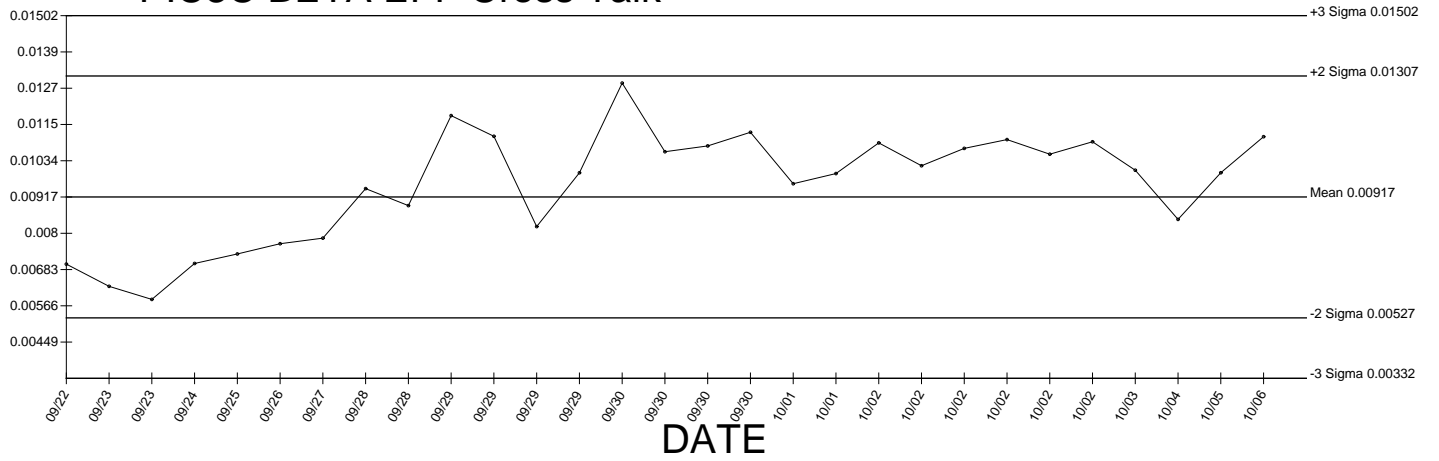


● Denotes Outlier

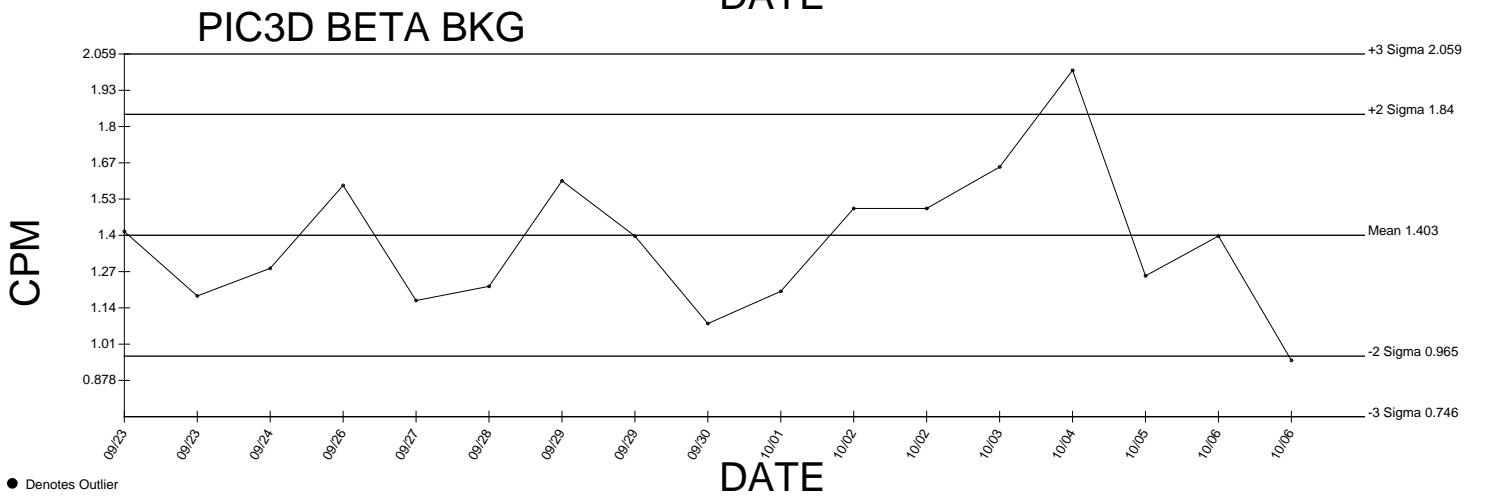
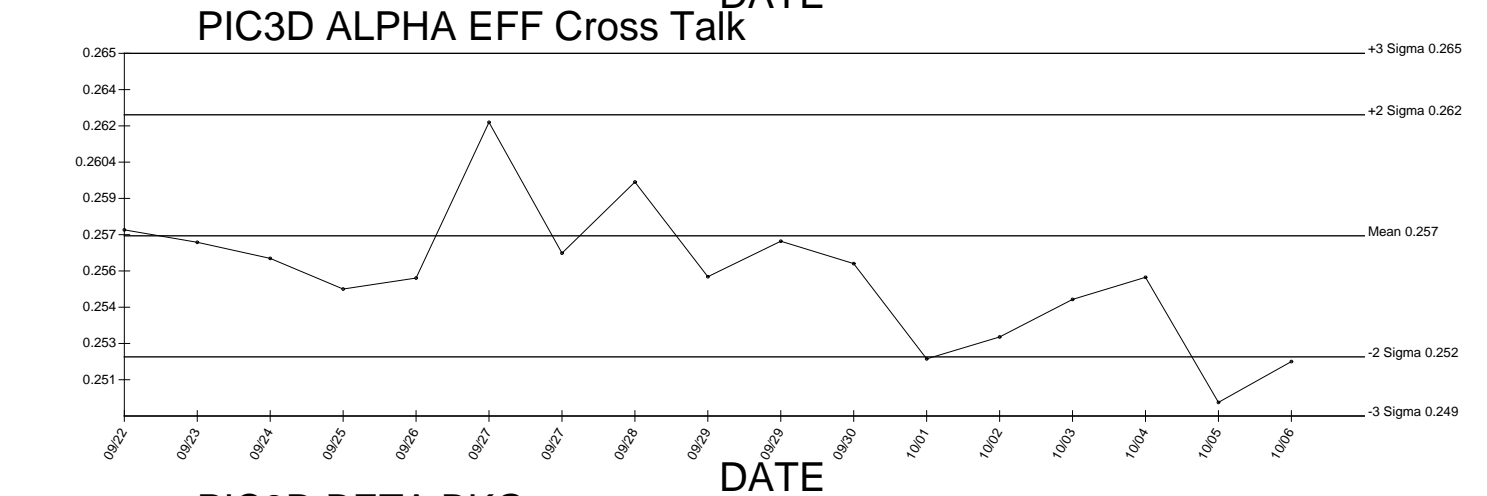
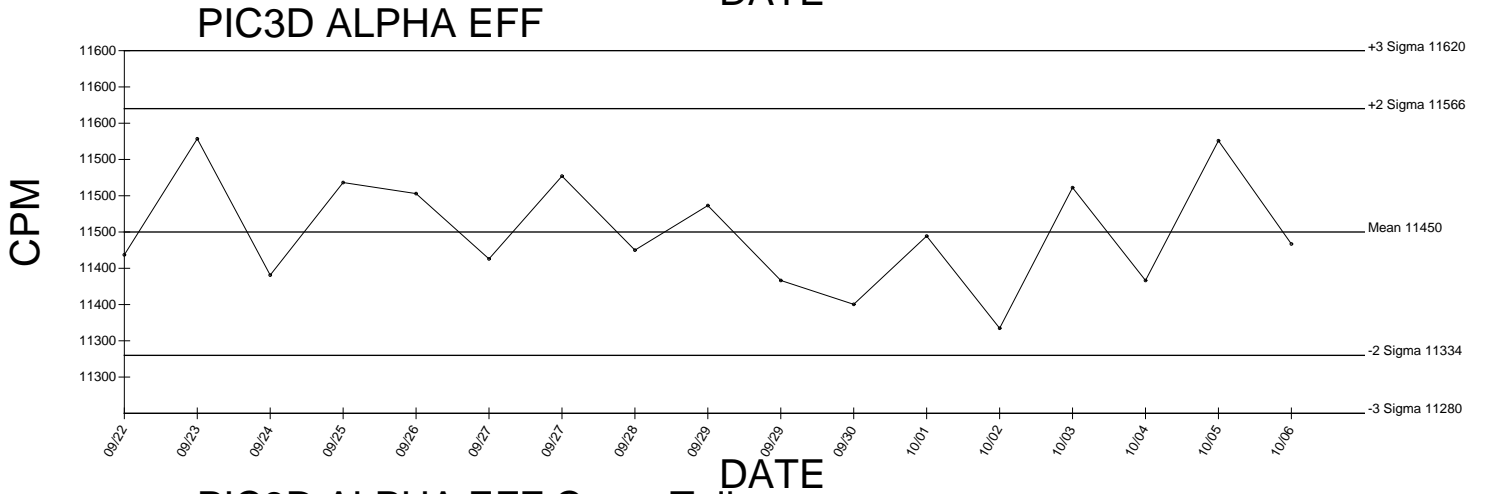
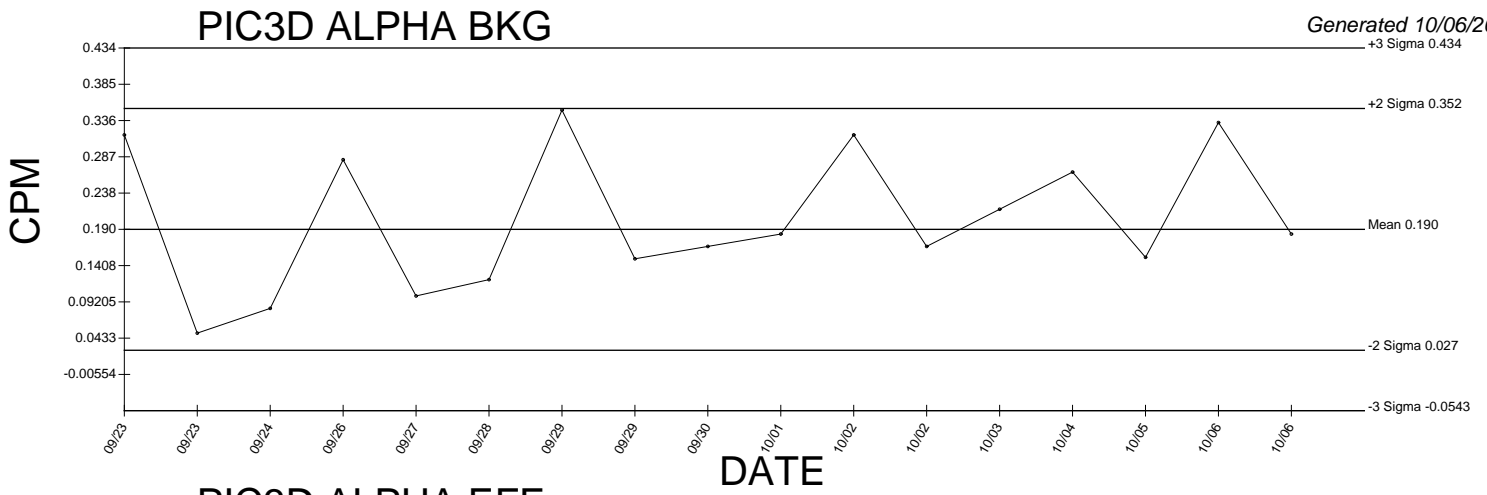
# PIC3C BETA EFF



# PIC3C BETA EFF Cross Talk



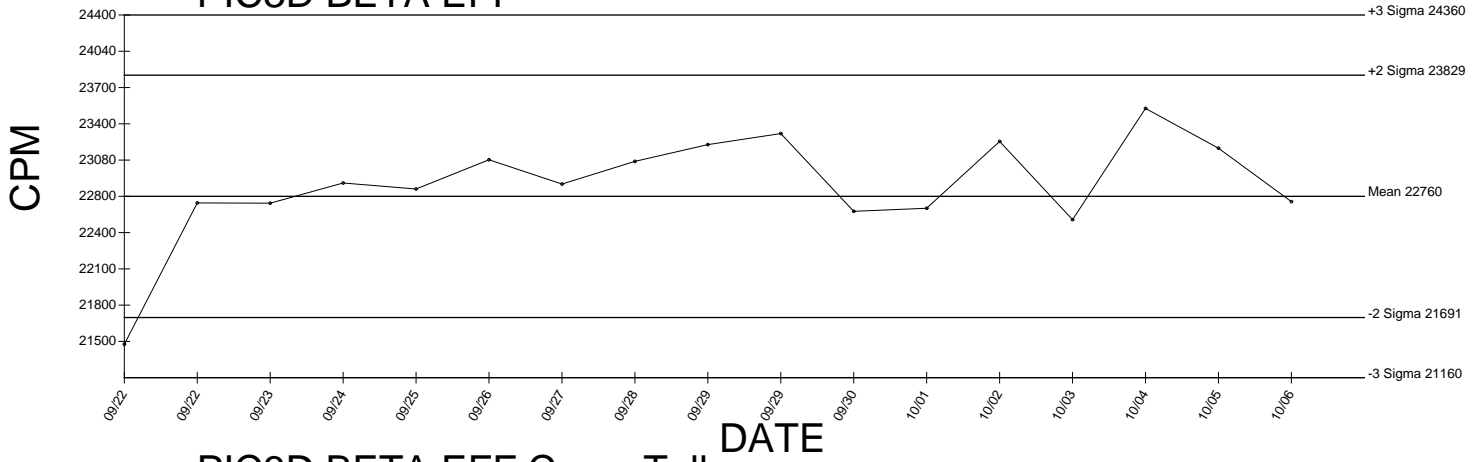
● Denotes Outlier



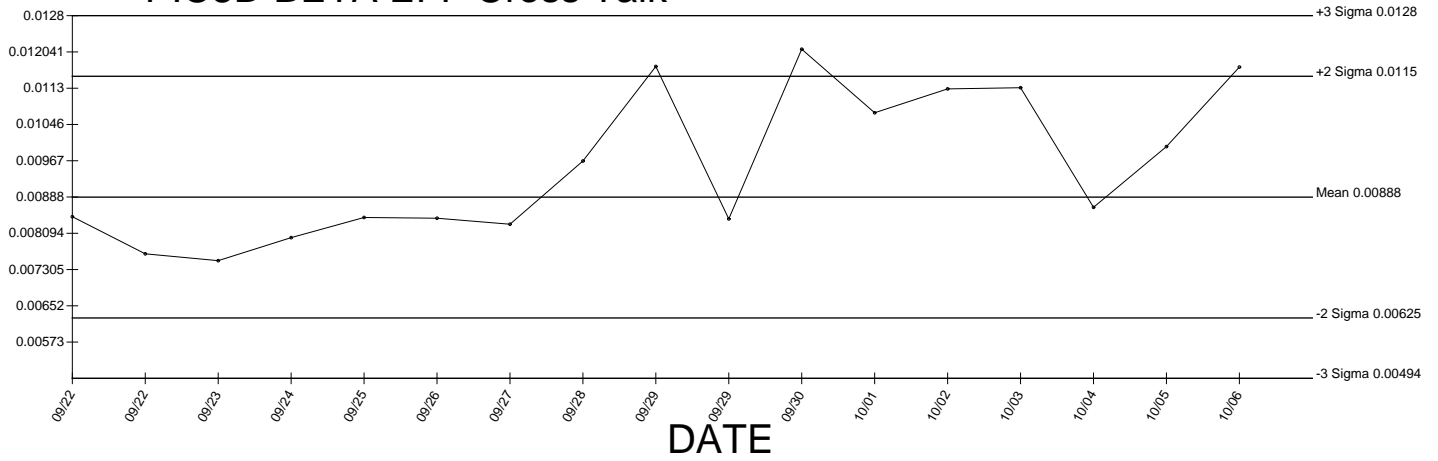
● Denotes Outlier

# PIC3D BETA EFF

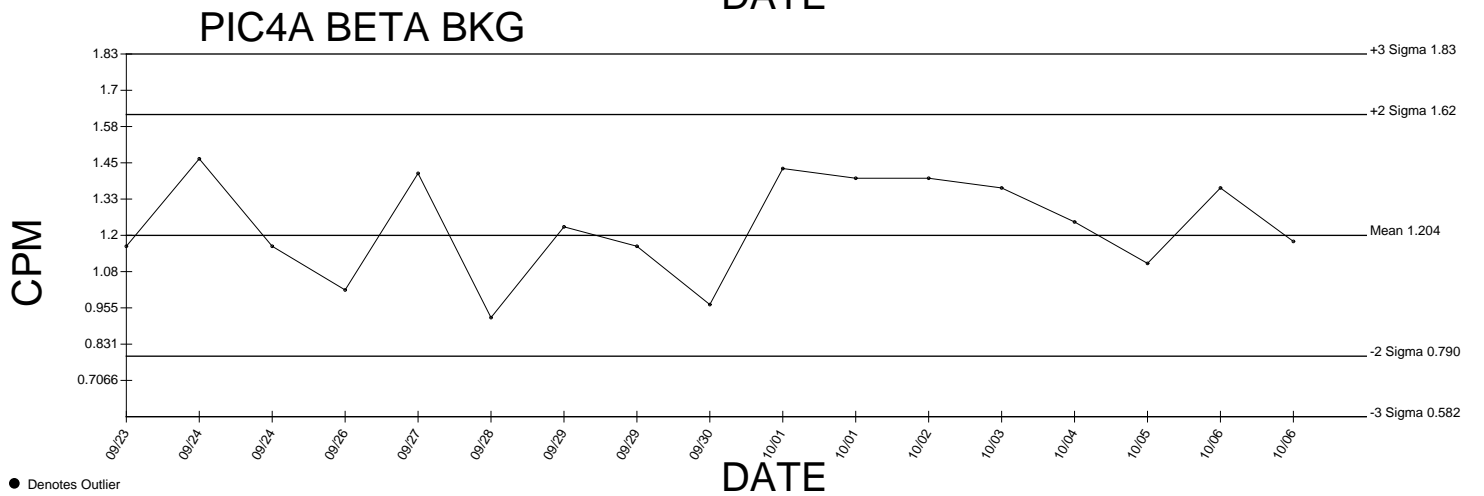
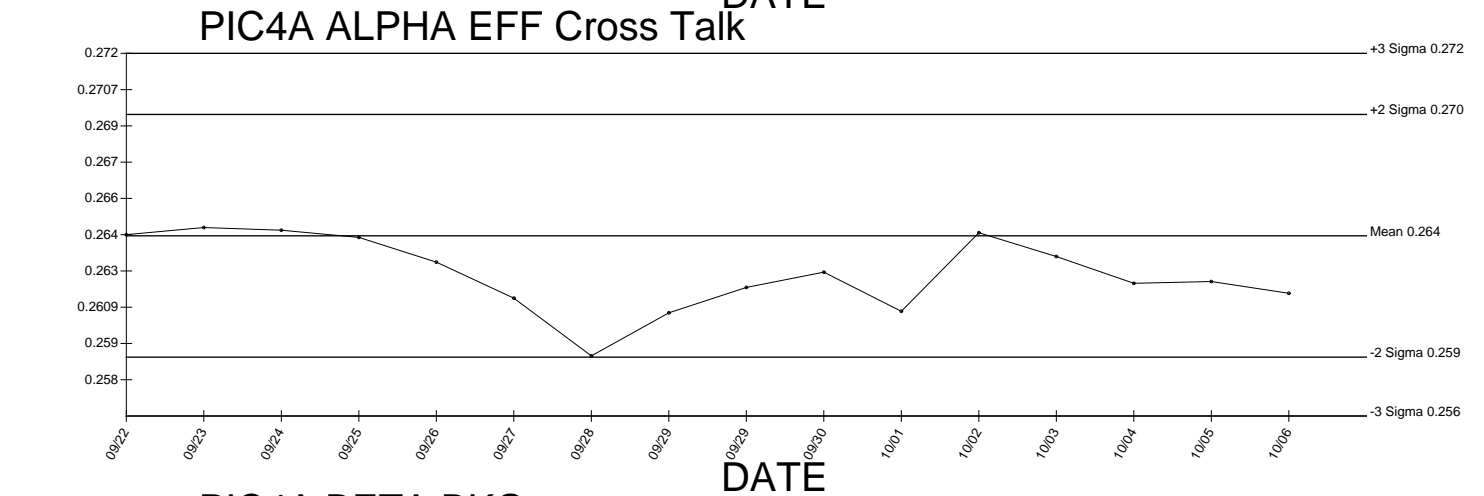
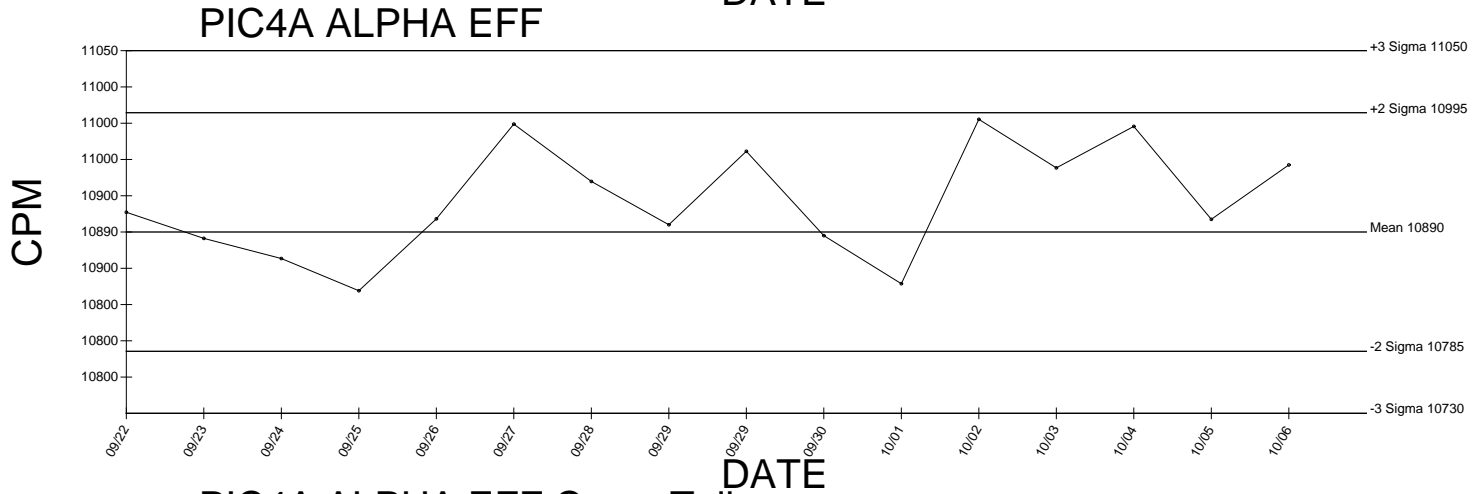
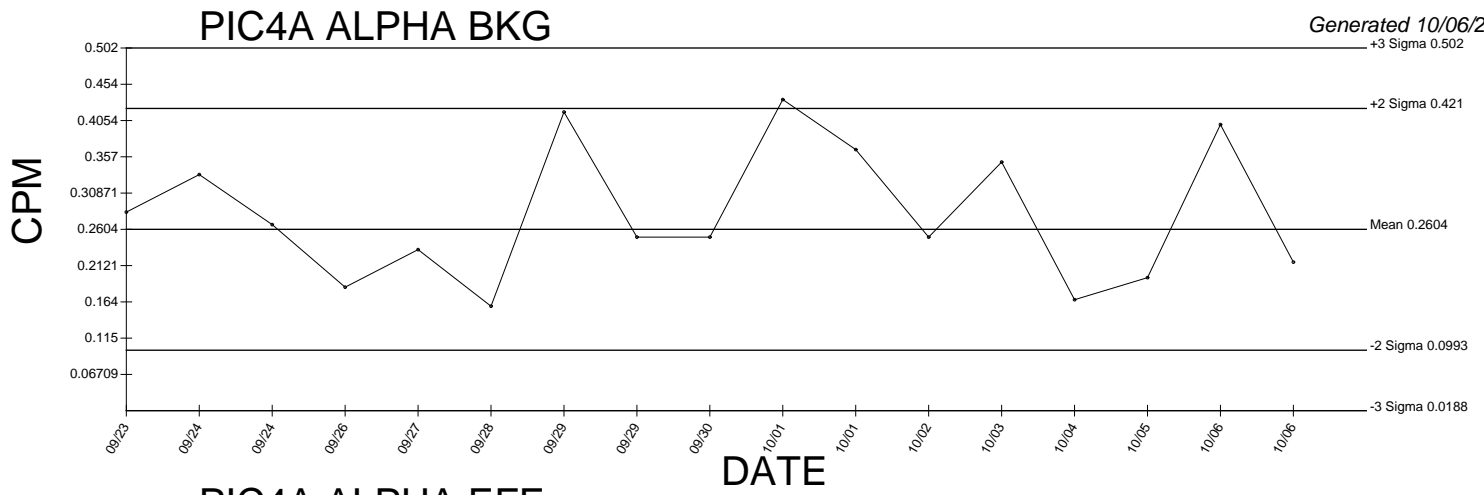
Generated 10/06/2009



# PIC3D BETA EFF Cross Talk



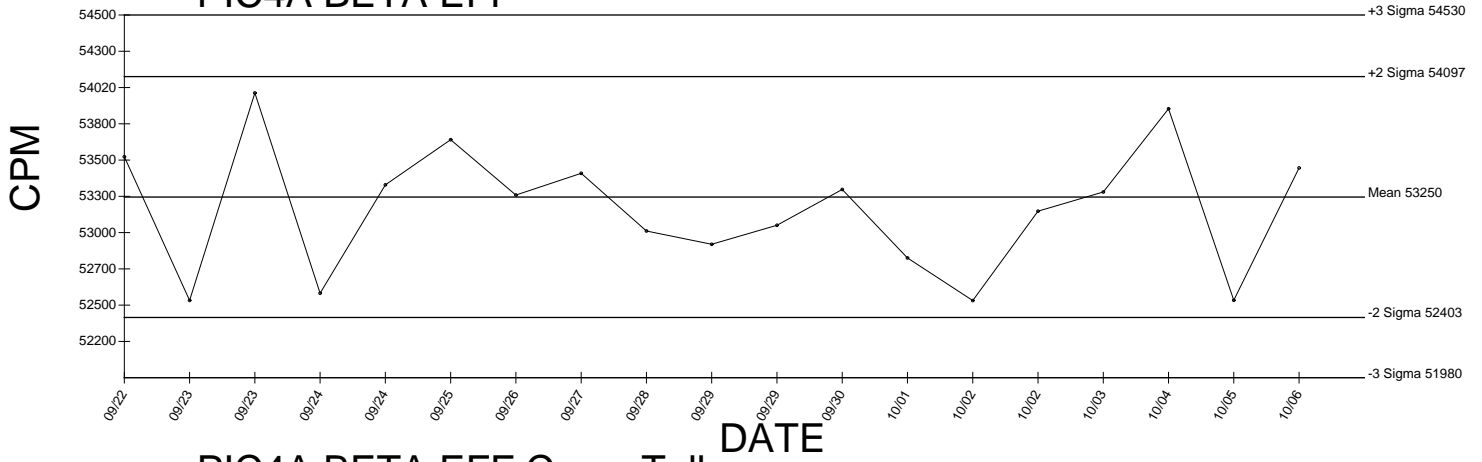
● Denotes Outlier



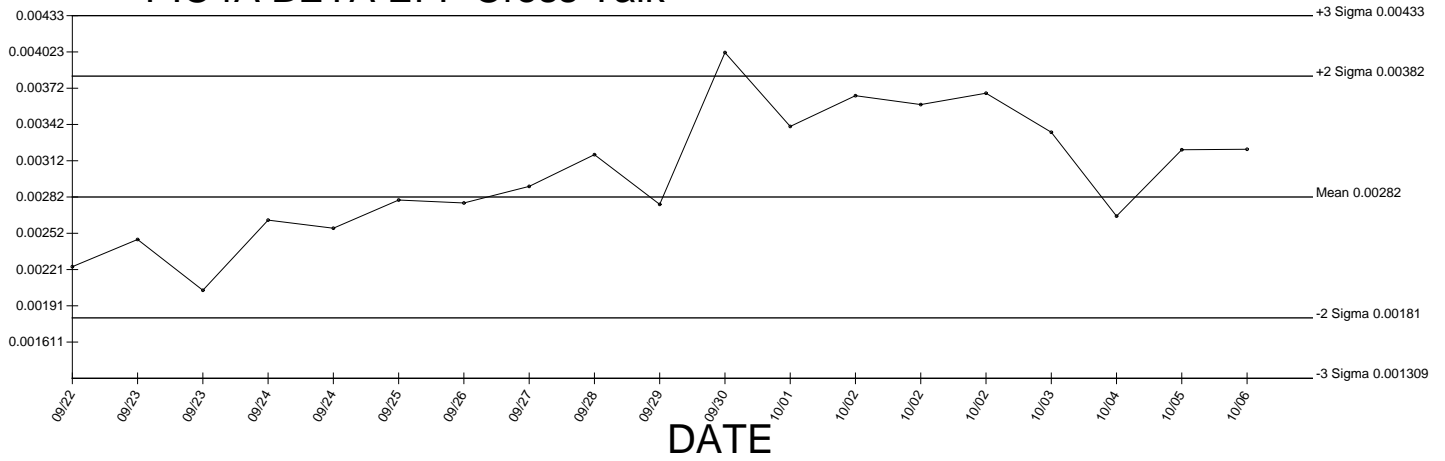
● Denotes Outlier

# PIC4A BETA EFF

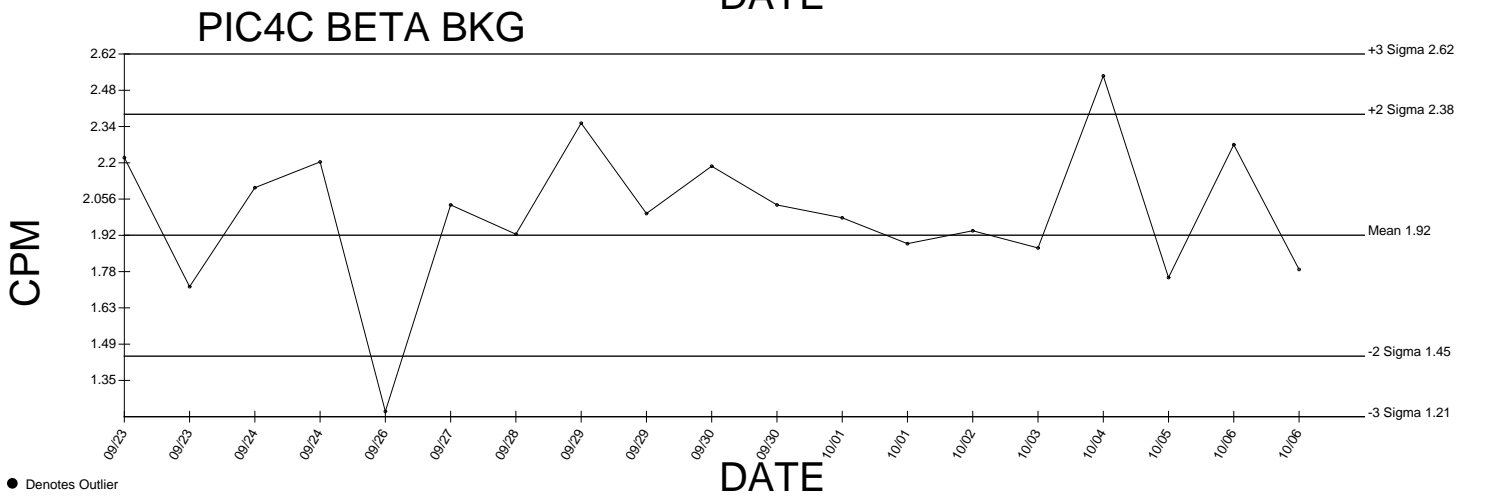
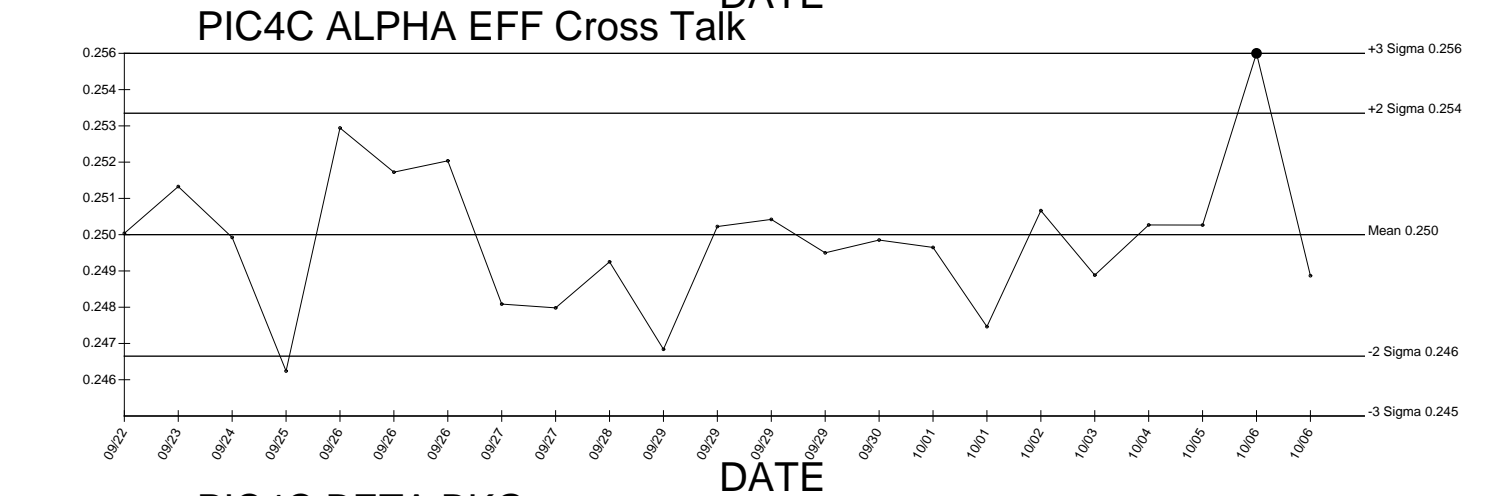
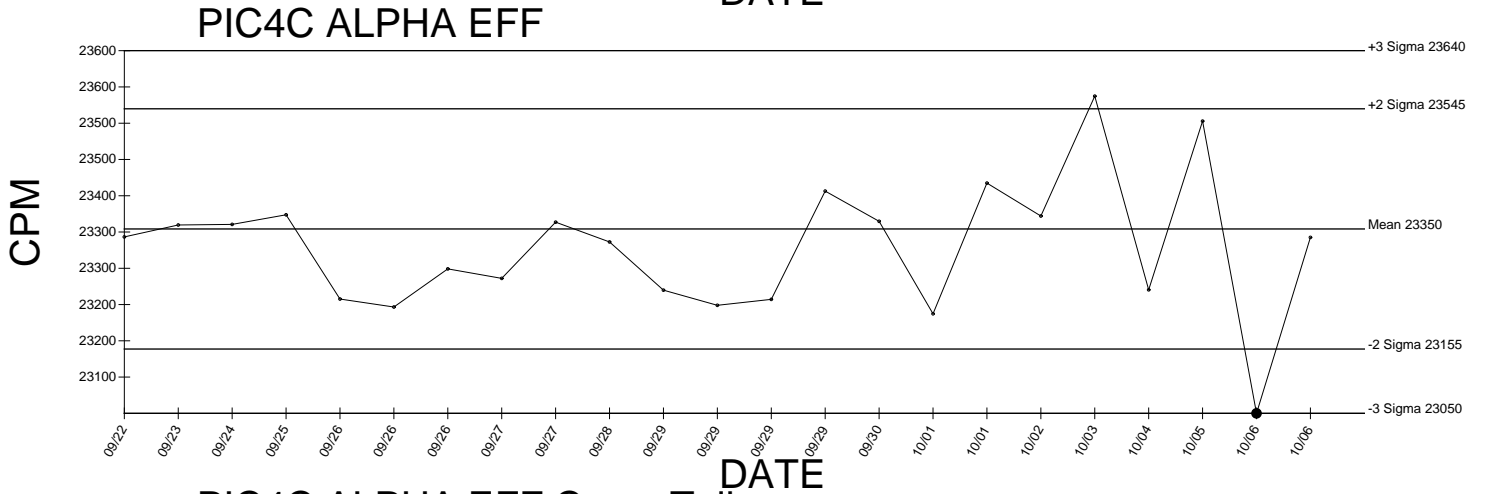
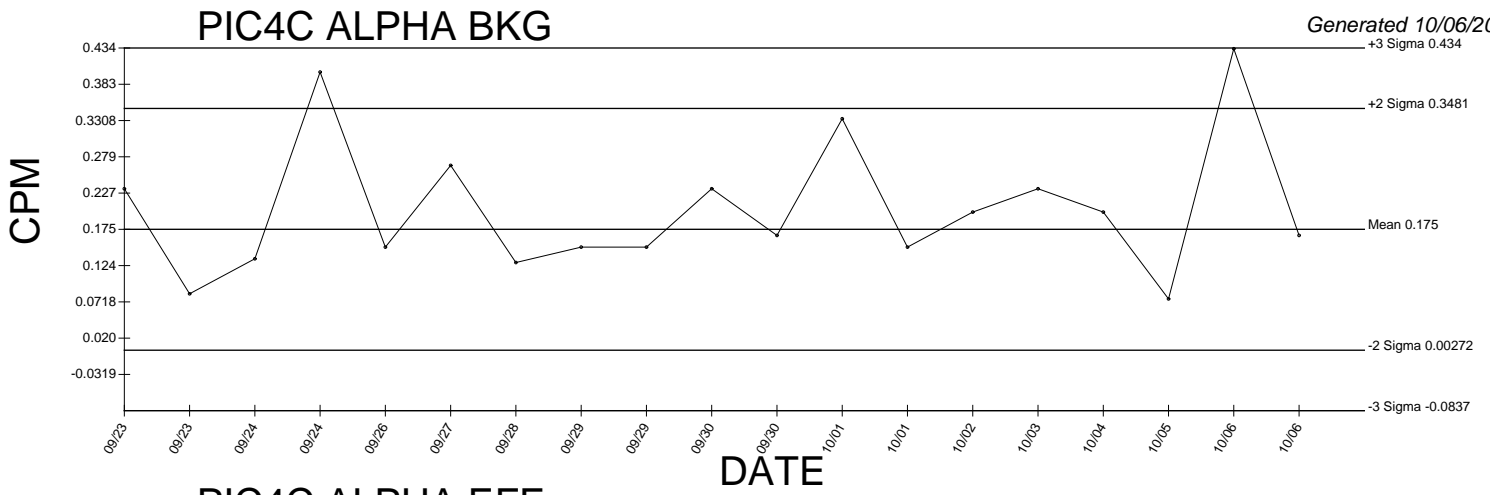
Generated 10/06/2009



# PIC4A BETA EFF Cross Talk



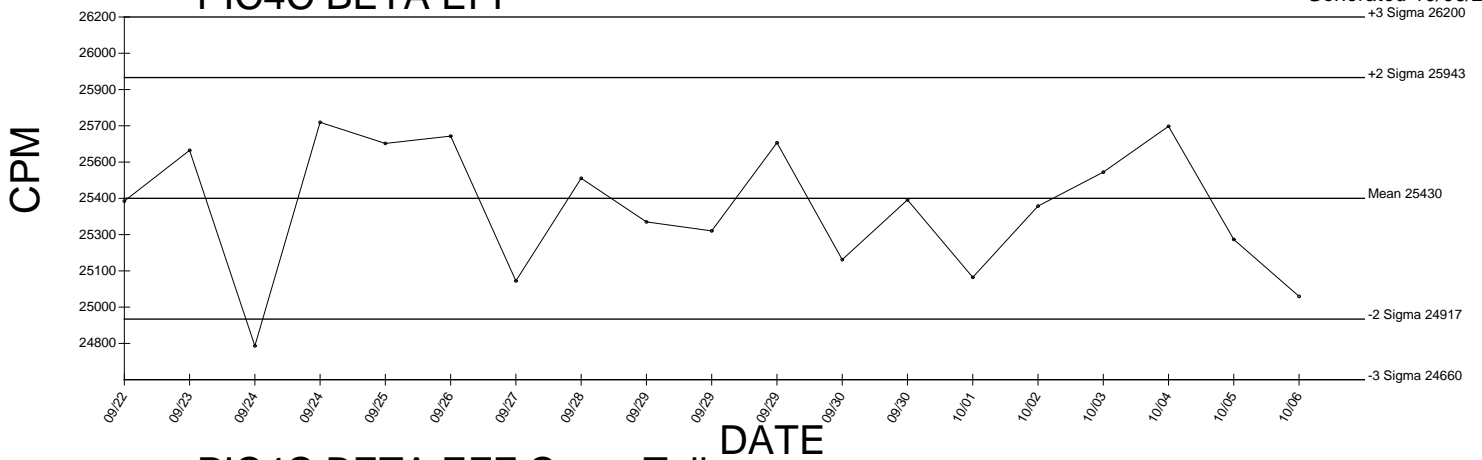
● Denotes Outlier



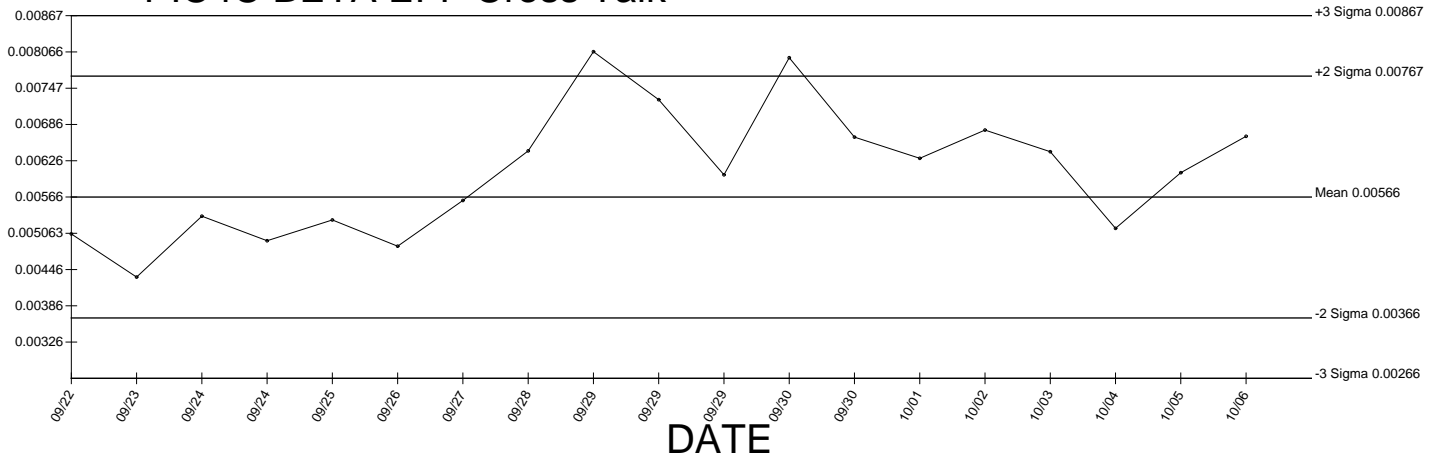
● Denotes Outlier

# PIC4C BETA EFF

Generated 10/06/2009

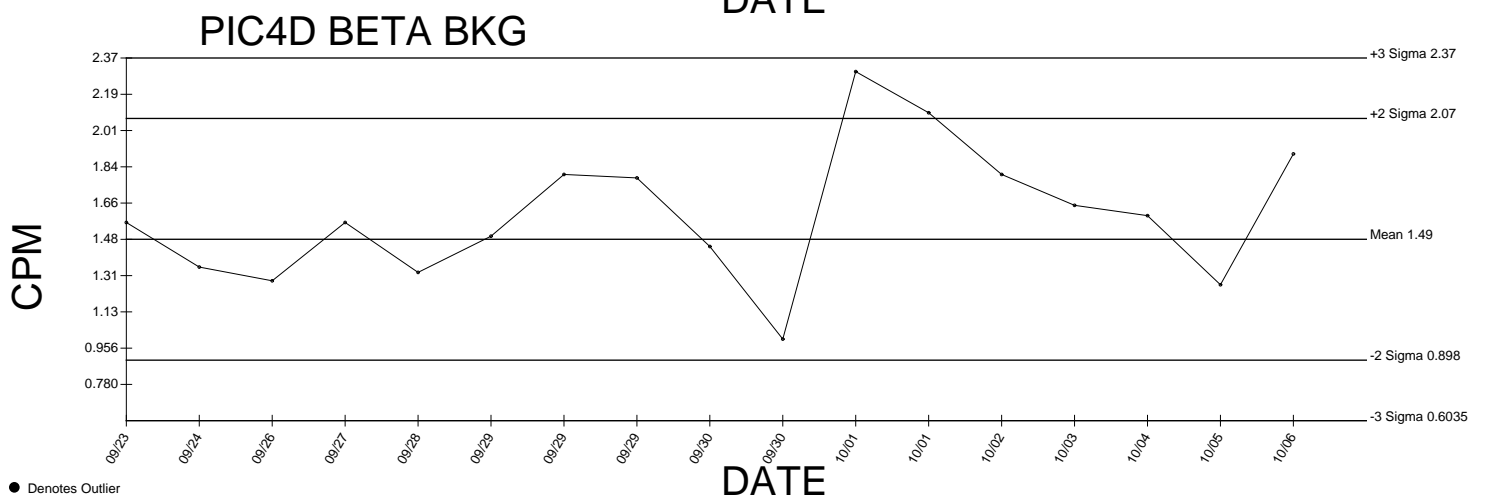
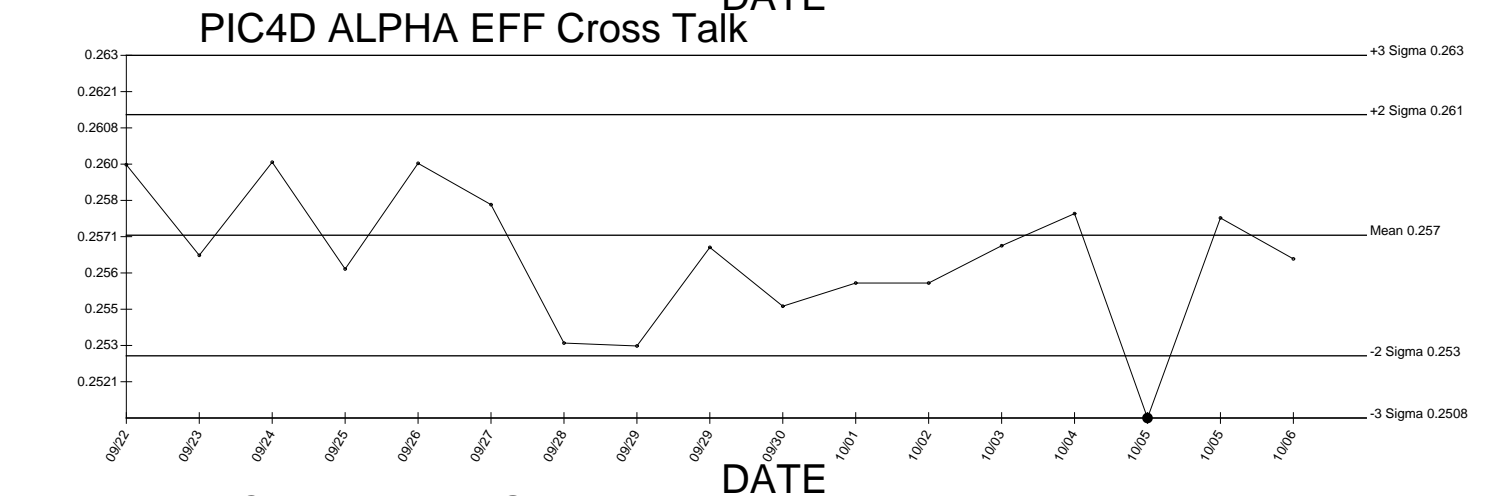
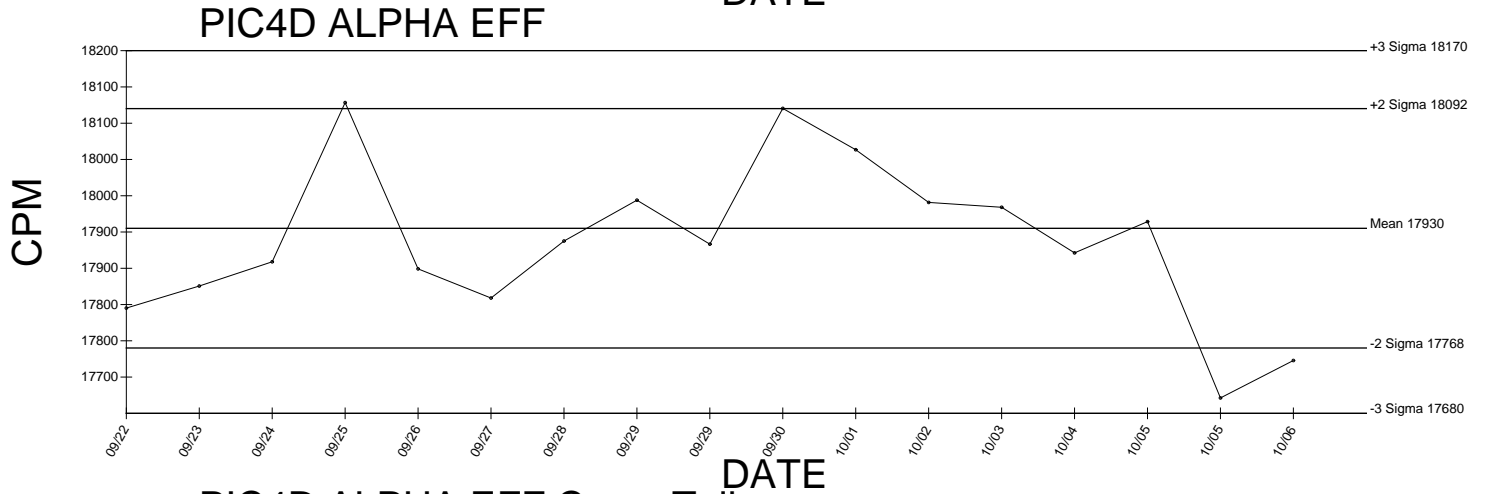
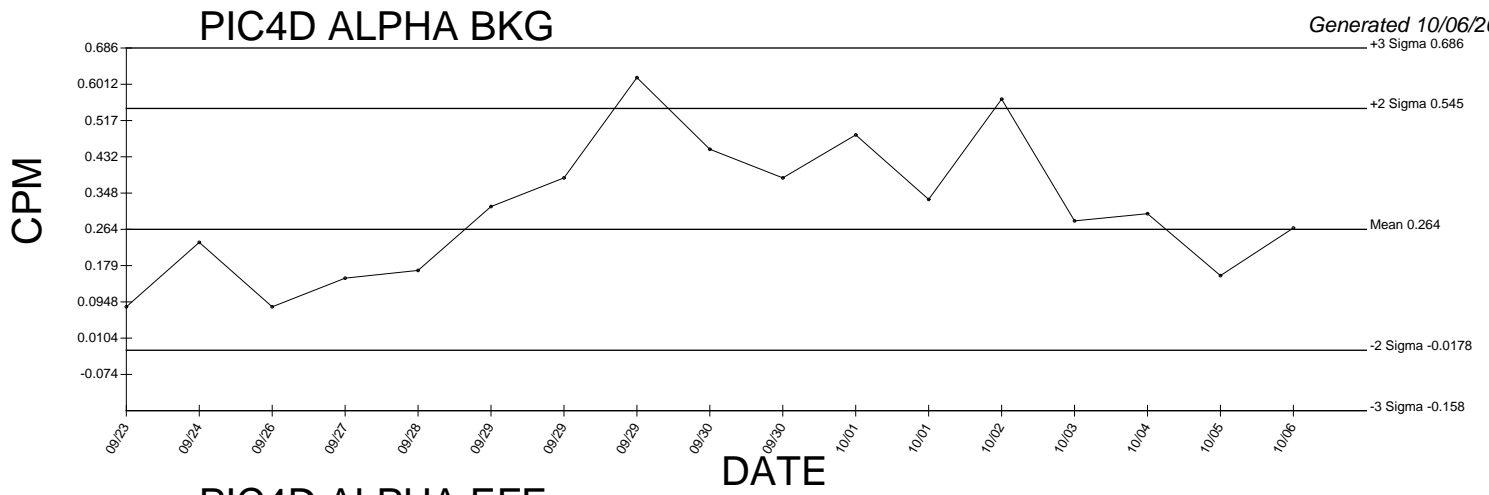


# PIC4C BETA EFF Cross Talk



● Denotes Outlier

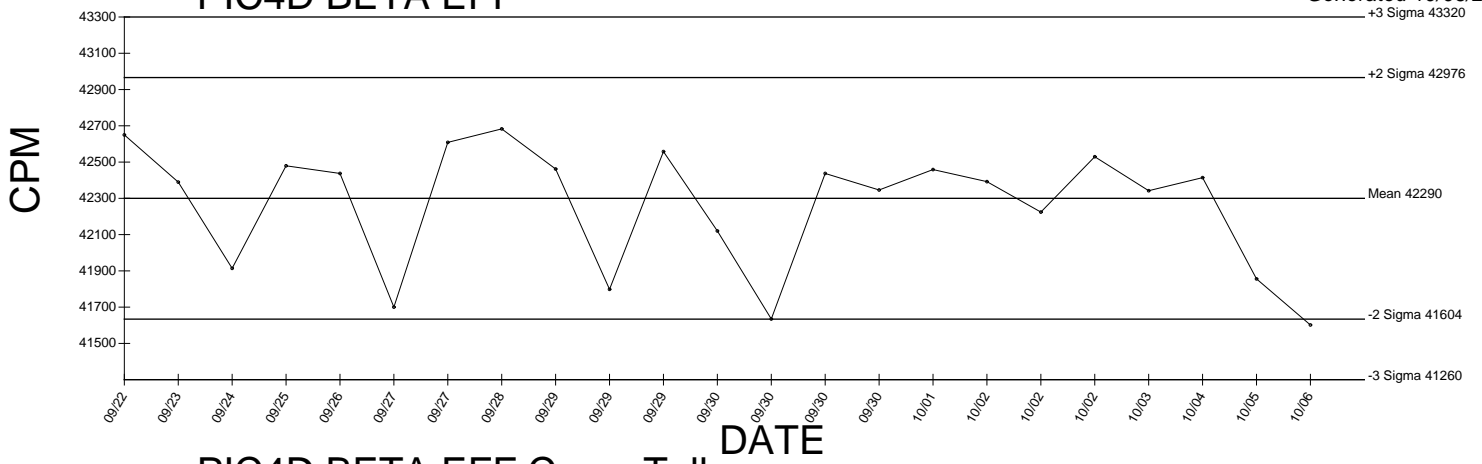




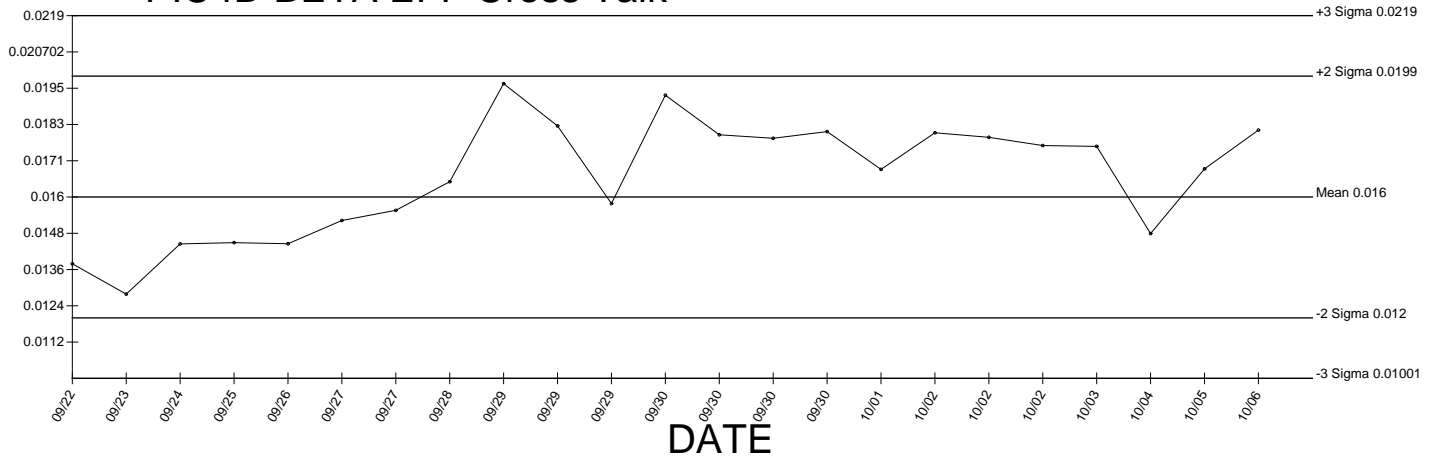
● Denotes Outlier

# PIC4D BETA EFF

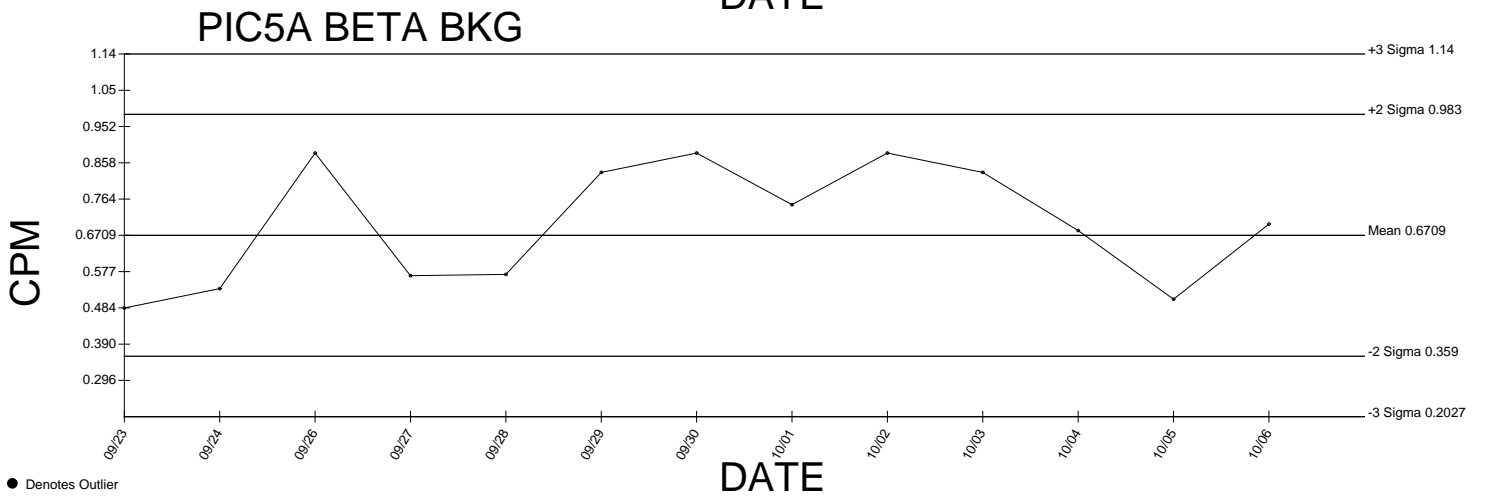
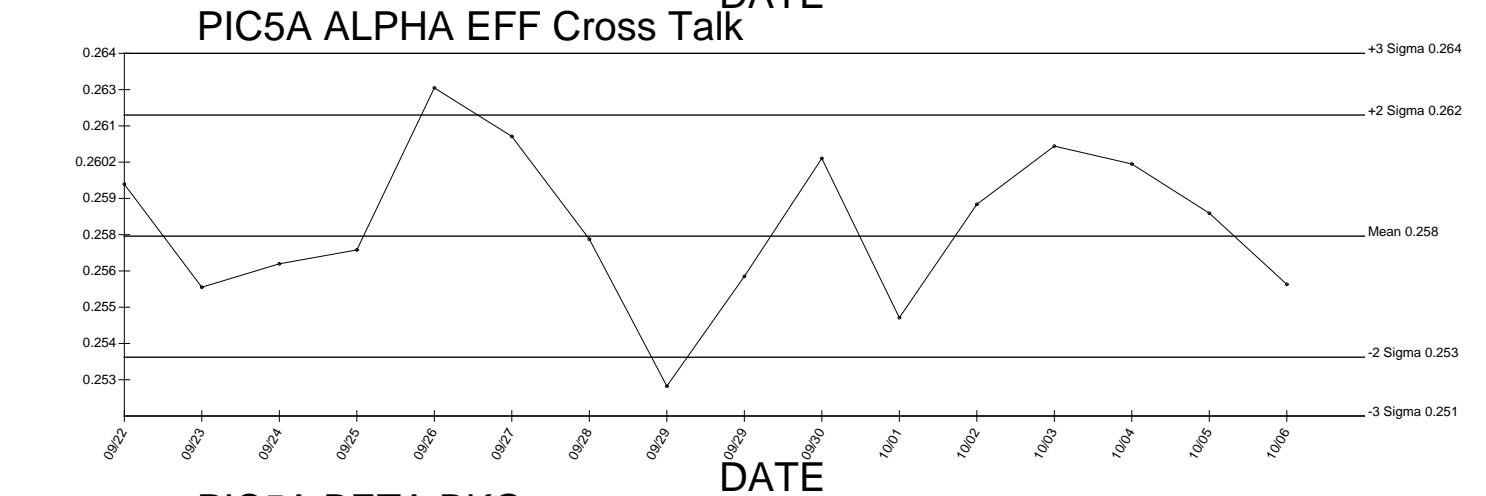
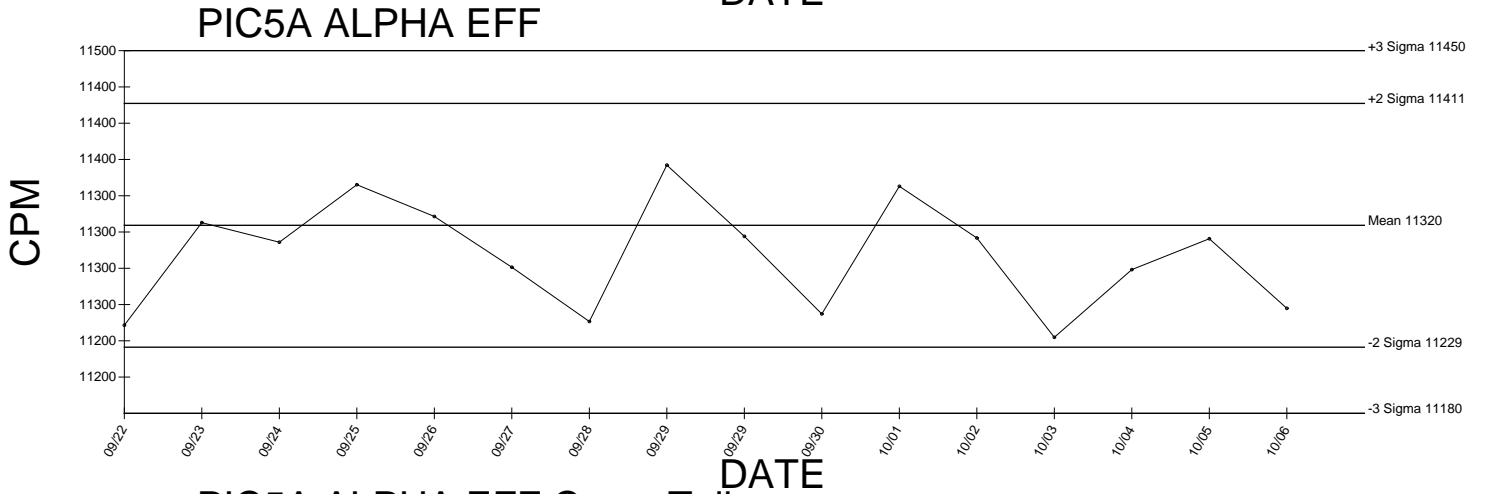
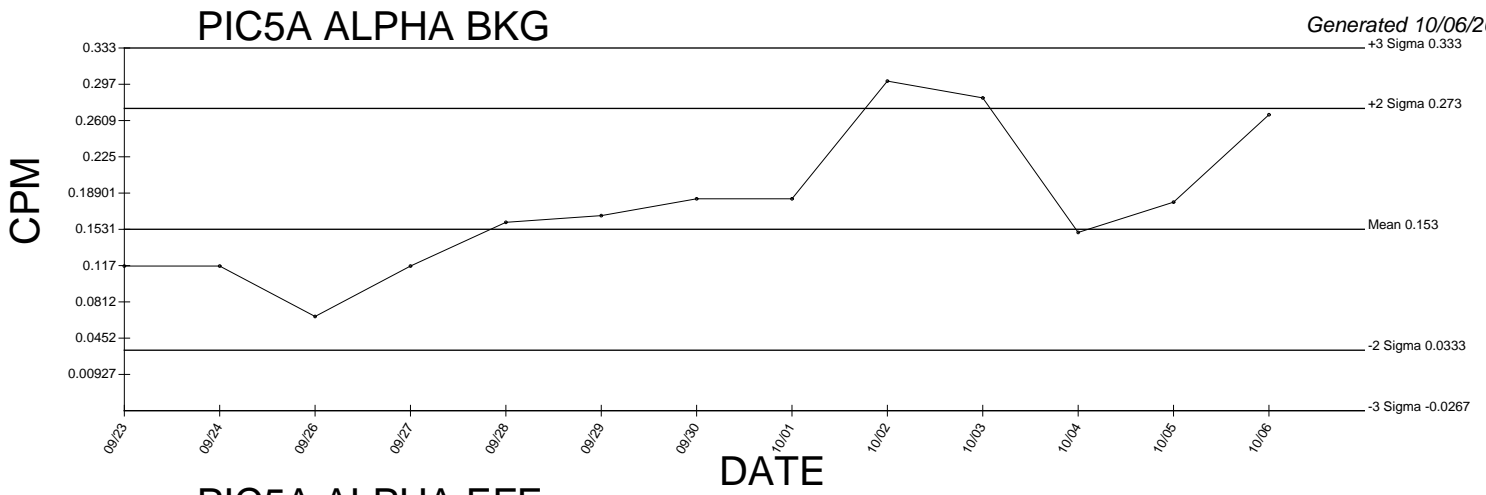
Generated 10/06/2009



# PIC4D BETA EFF Cross Talk



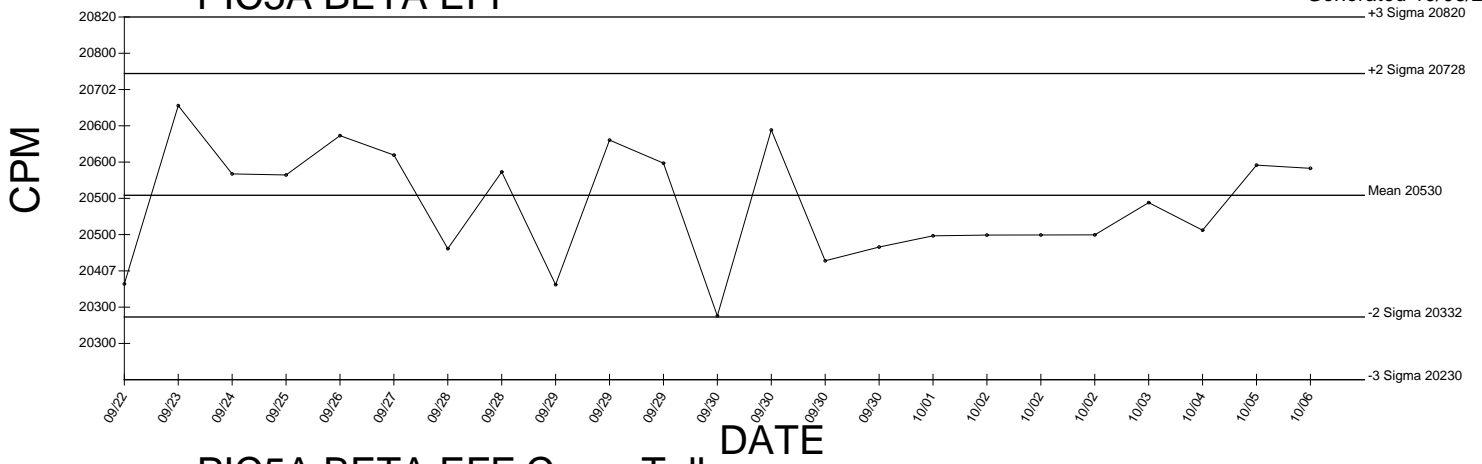
● Denotes Outlier



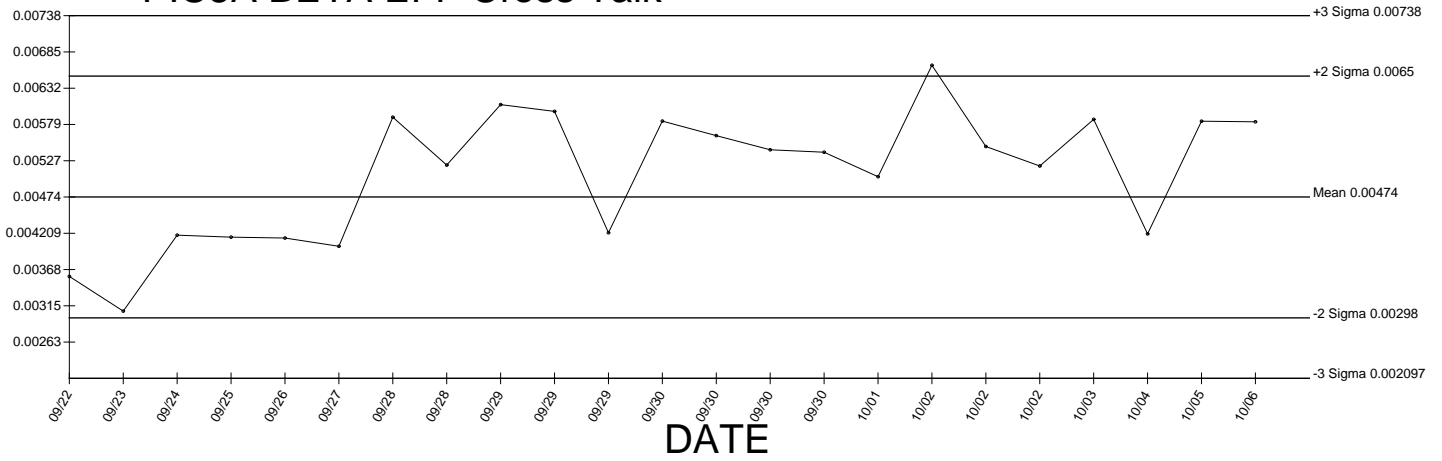
● Denotes Outlier

# PIC5A BETA EFF

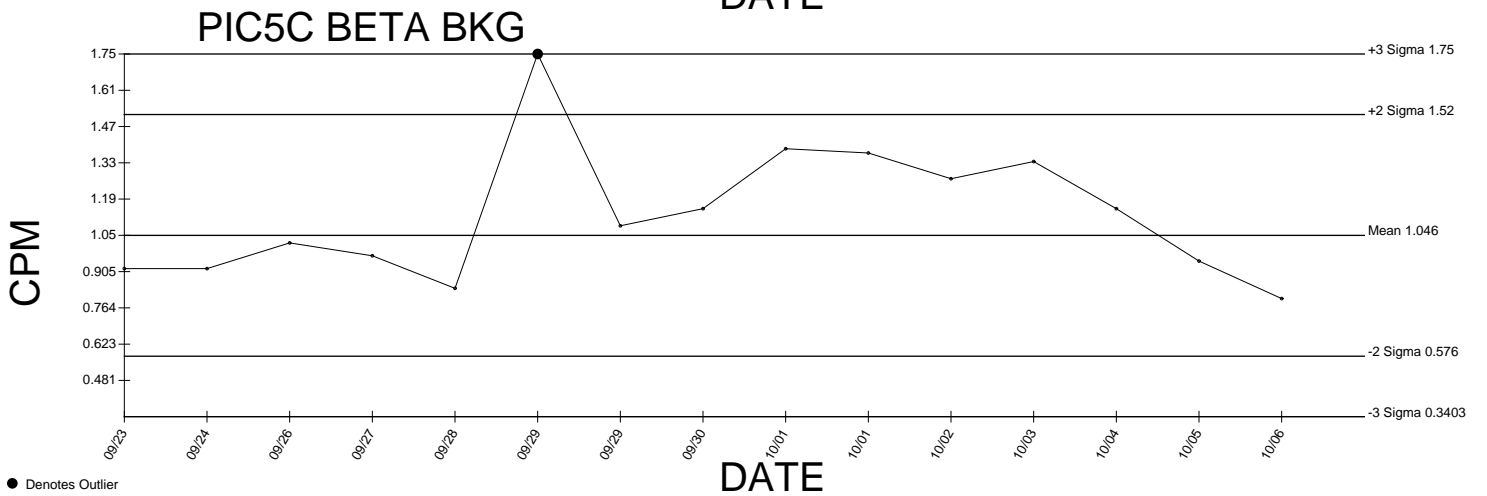
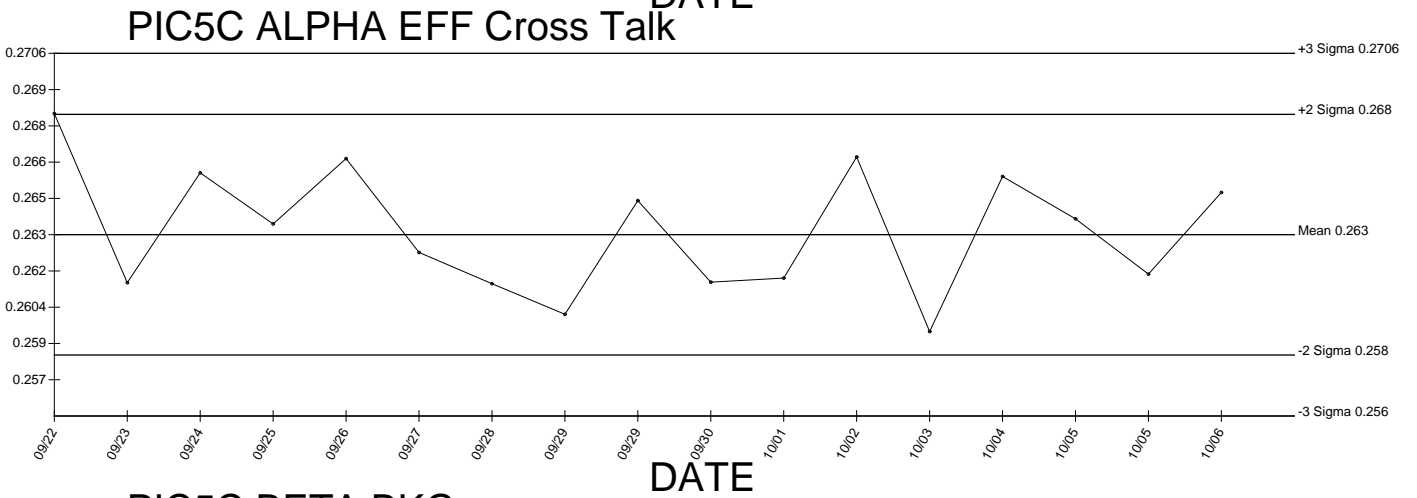
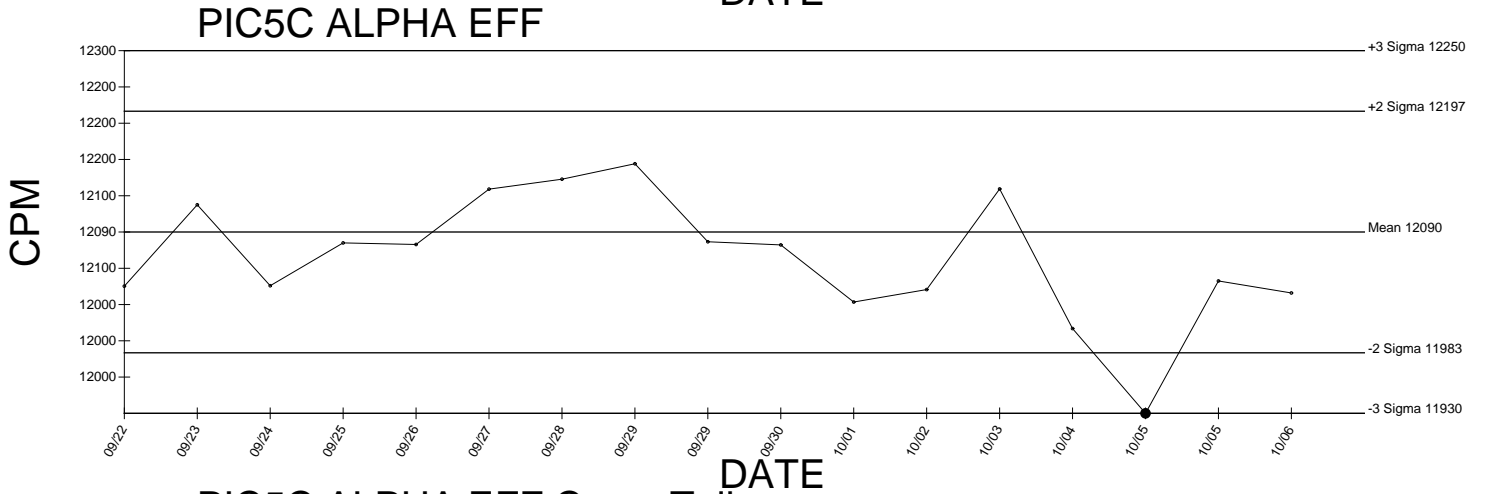
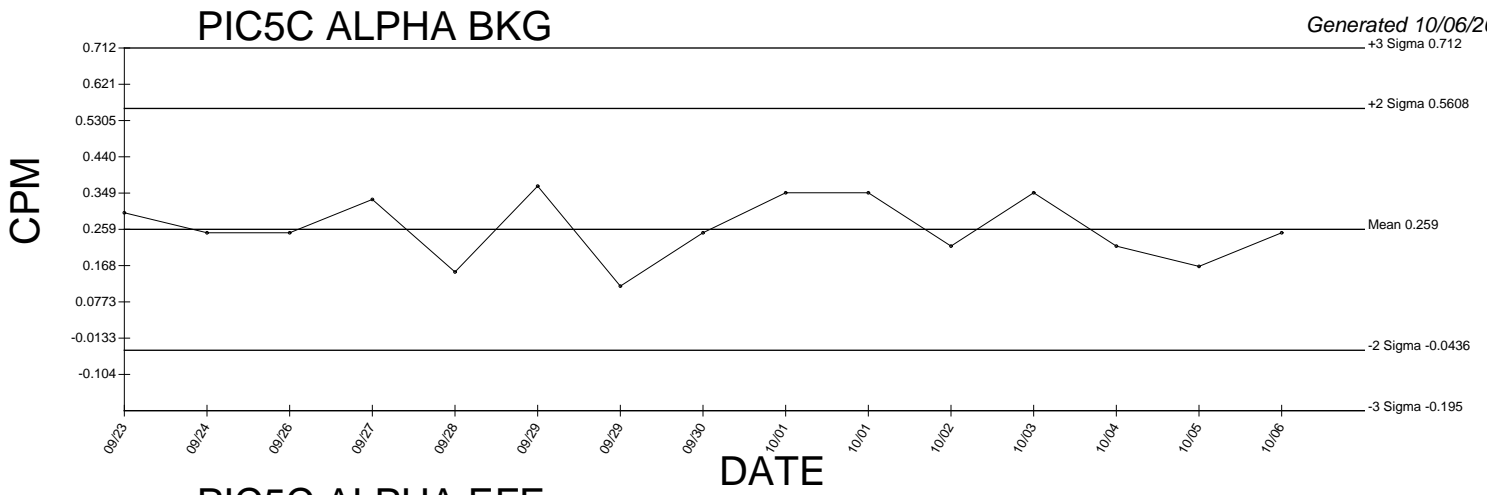
Generated 10/06/2009



# PIC5A BETA EFF Cross Talk



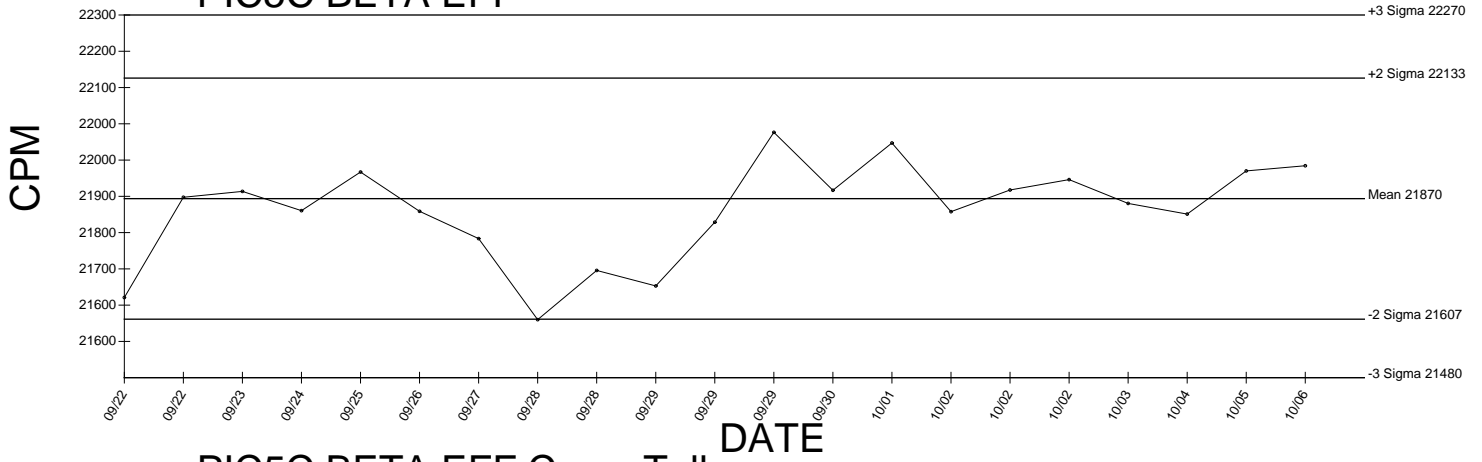
● Denotes Outlier



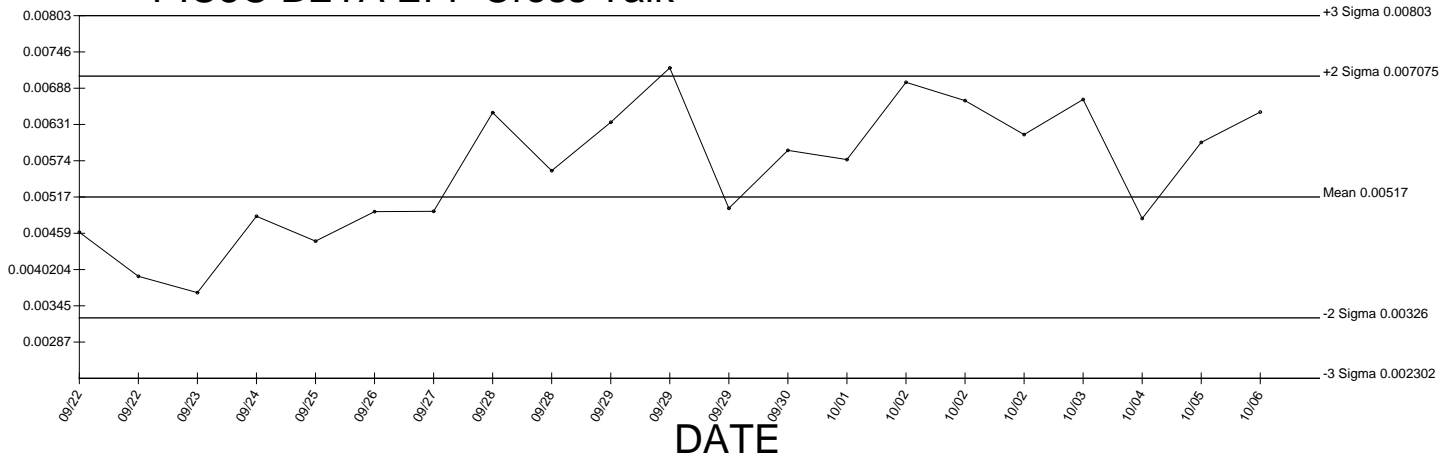
● Denotes Outlier

# PIC5C BETA EFF

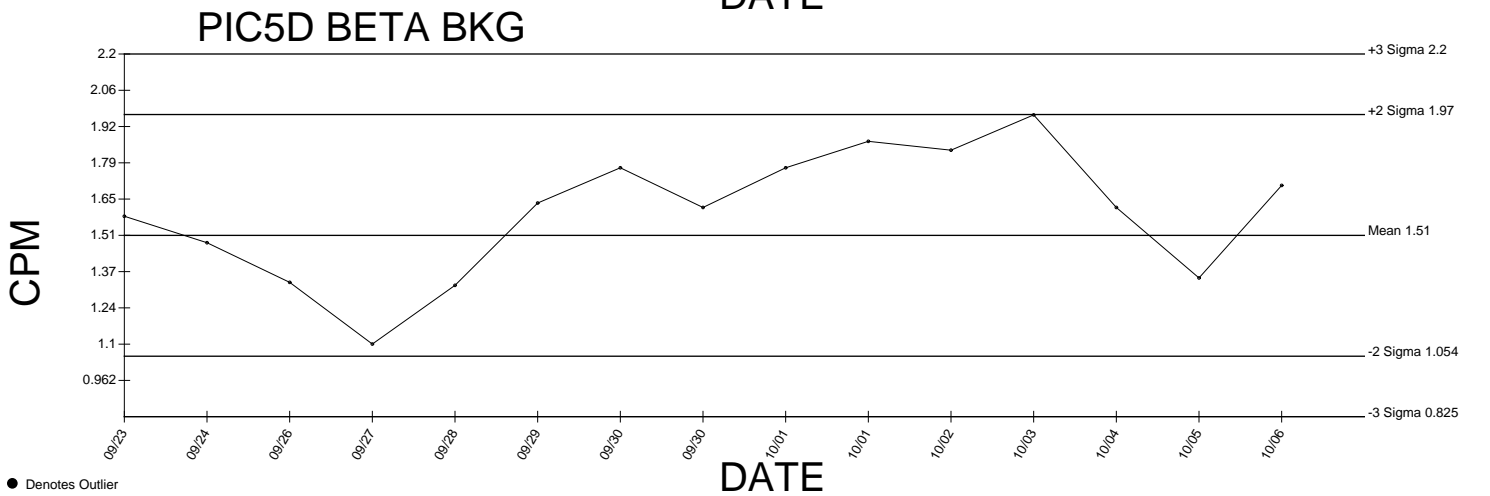
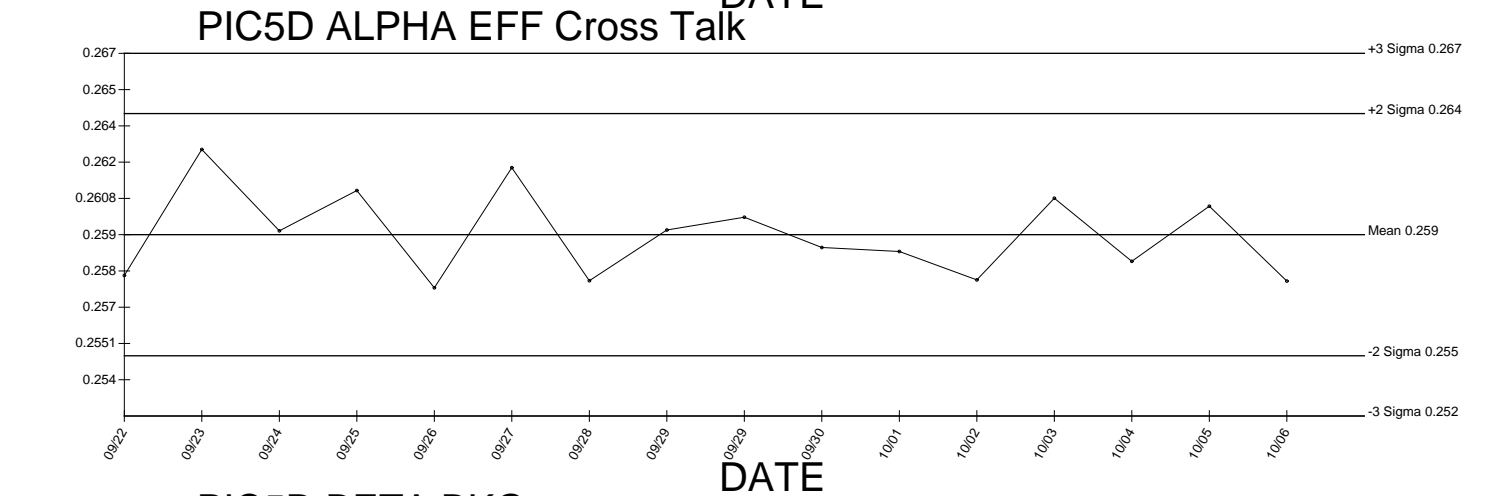
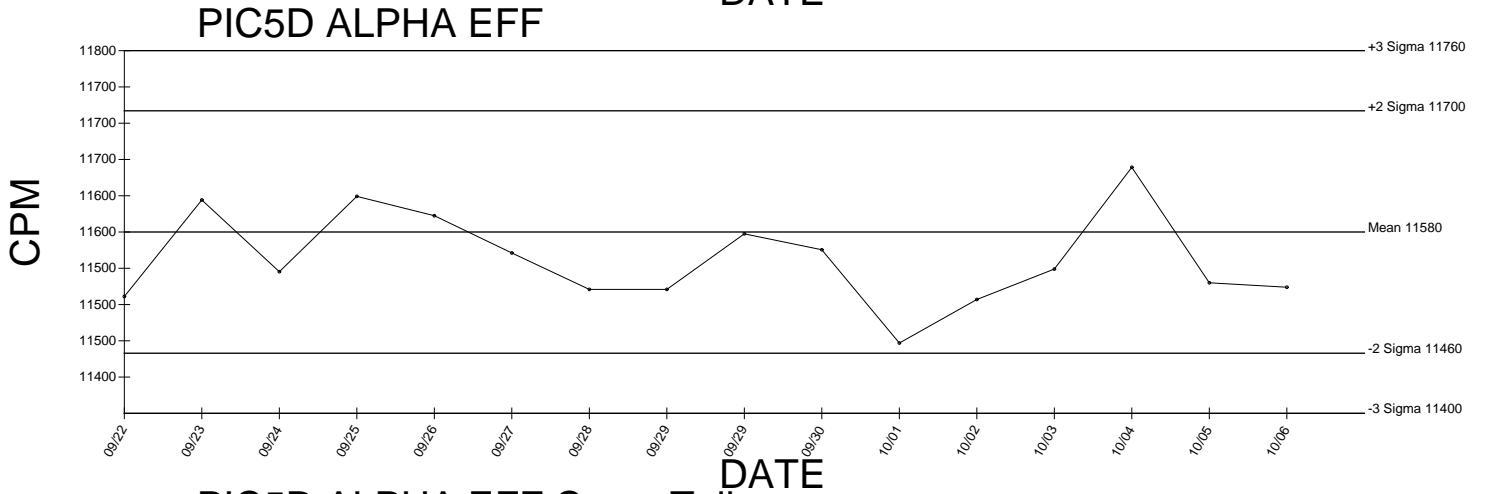
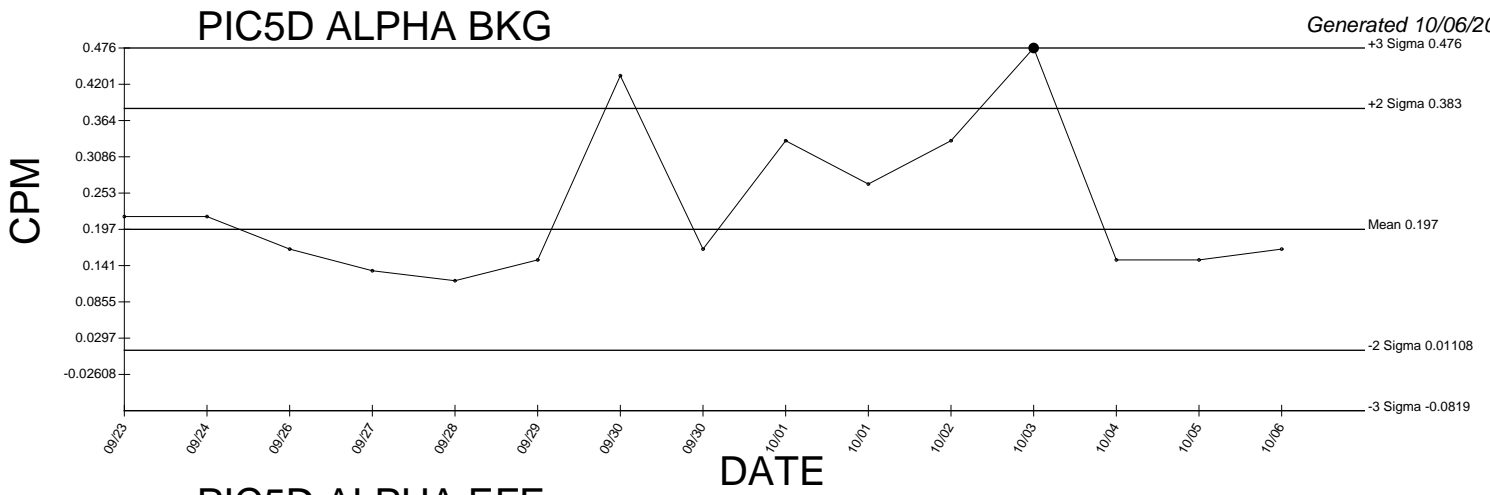
Generated 10/06/2009



# PIC5C BETA EFF Cross Talk



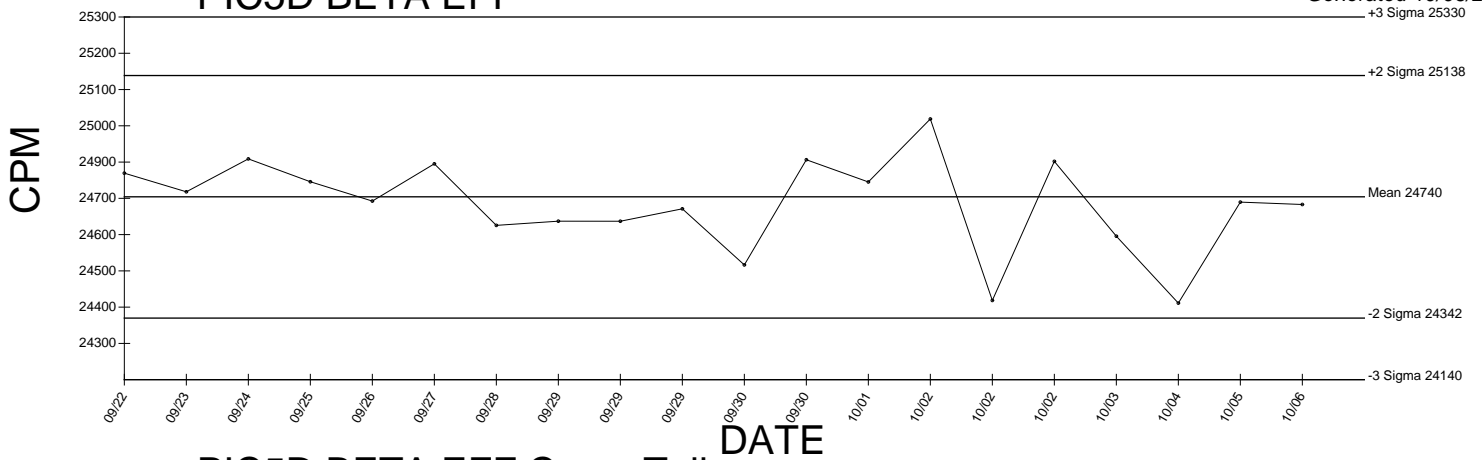
● Denotes Outlier



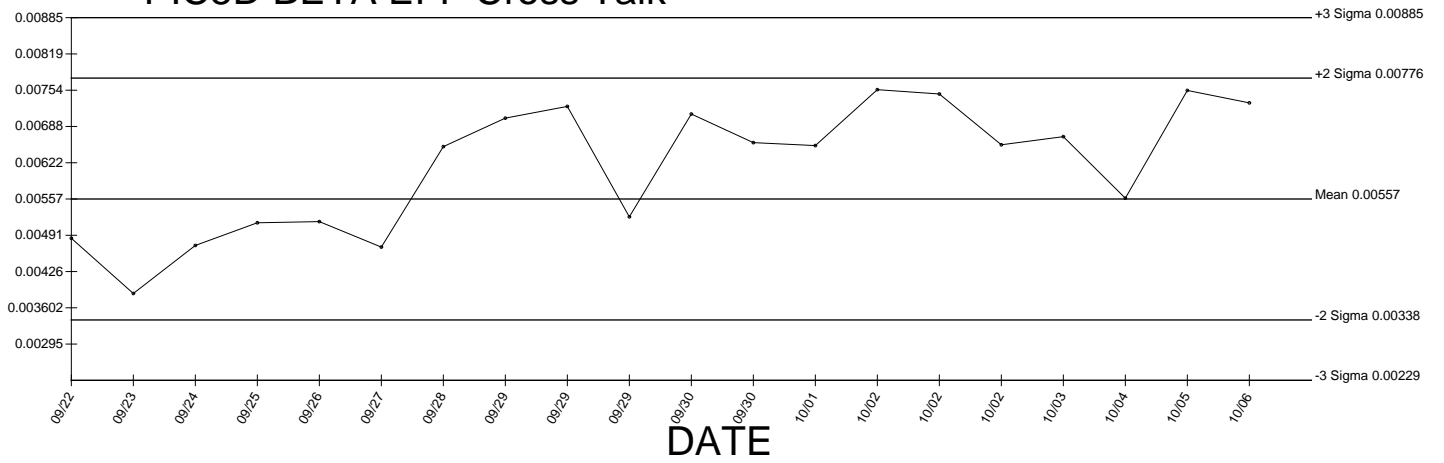
● Denotes Outlier

# PIC5D BETA EFF

Generated 10/06/2009

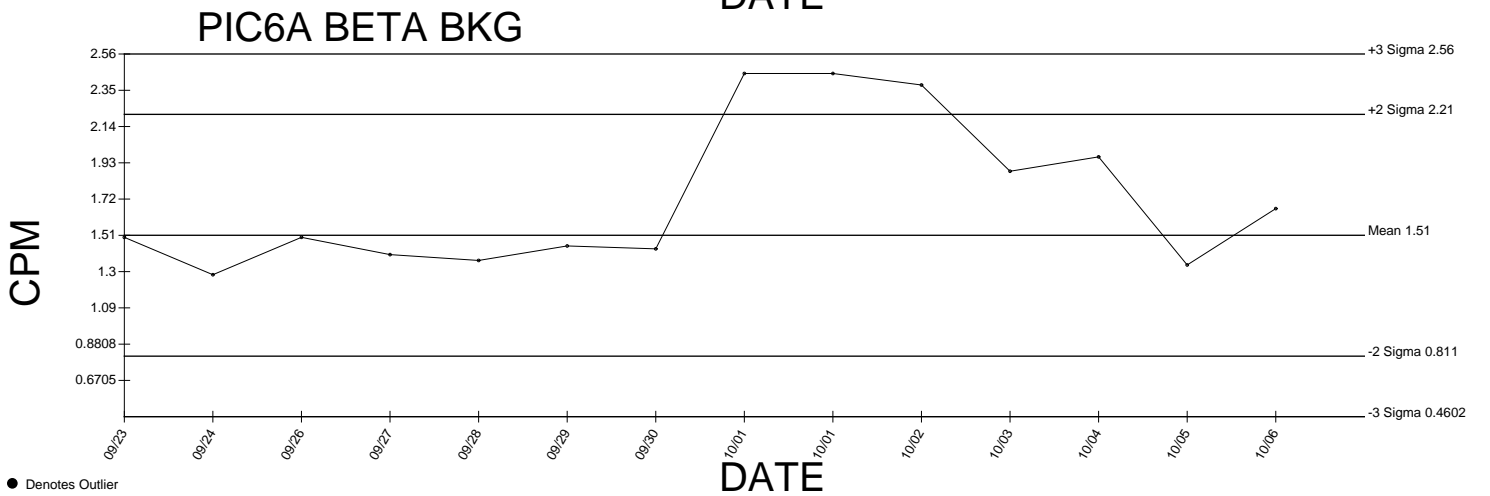
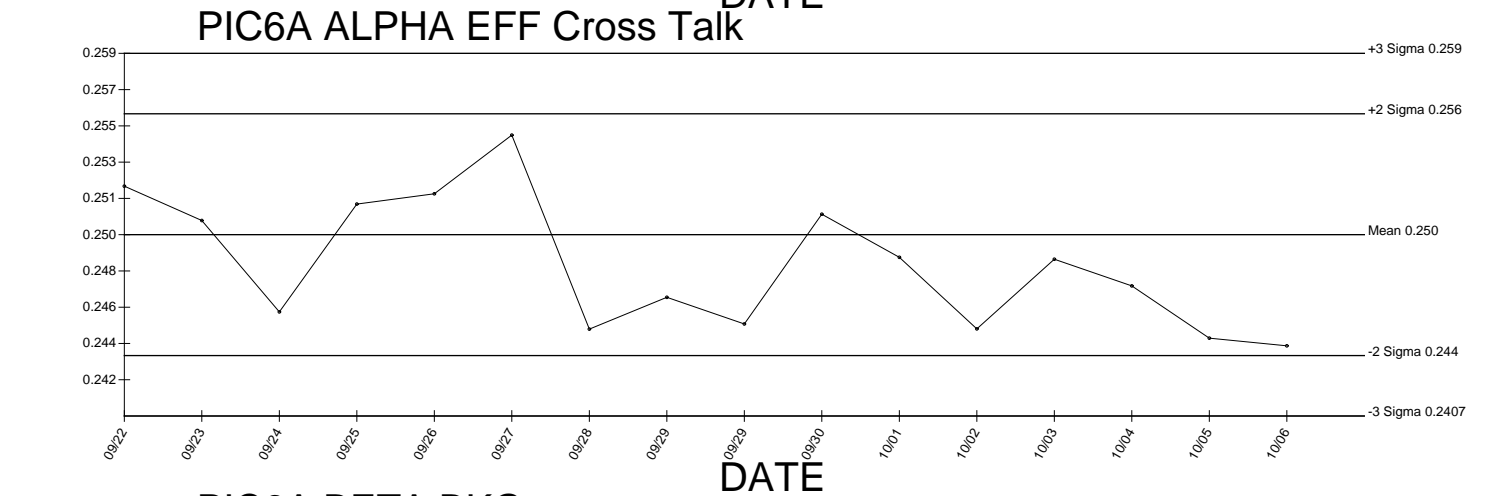
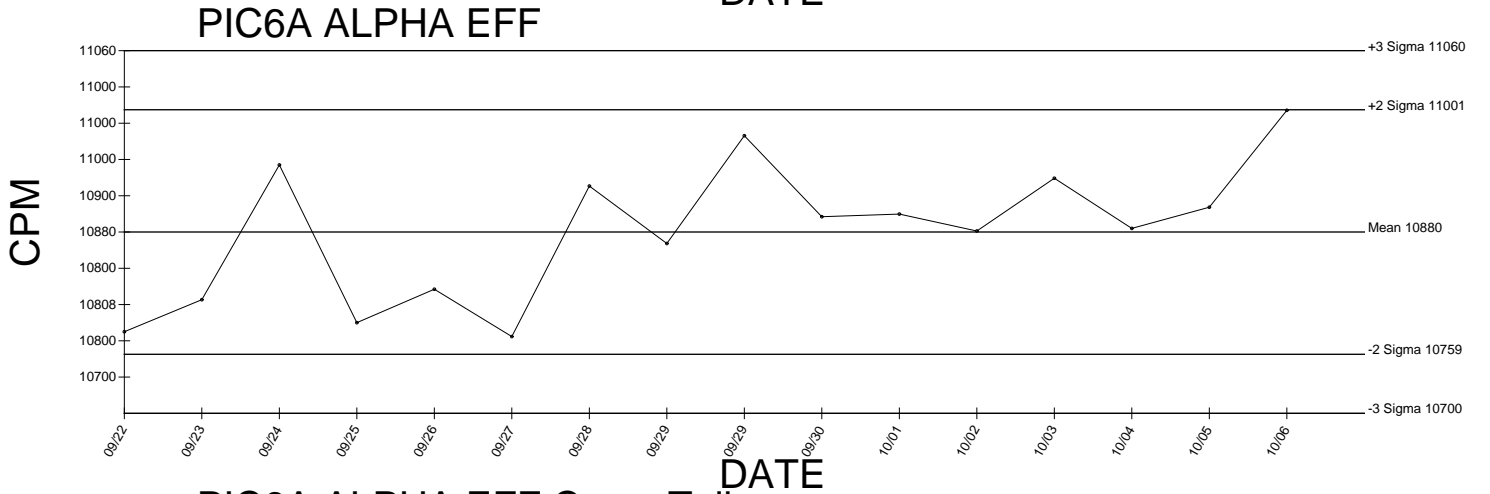
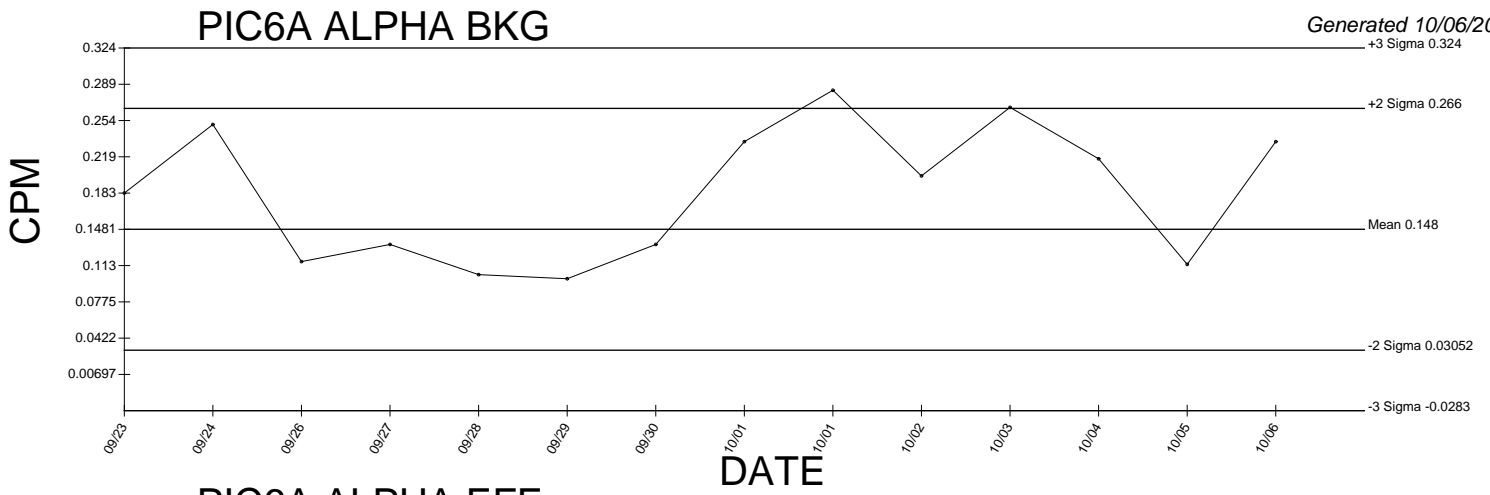


# PIC5D BETA EFF Cross Talk



● Denotes Outlier

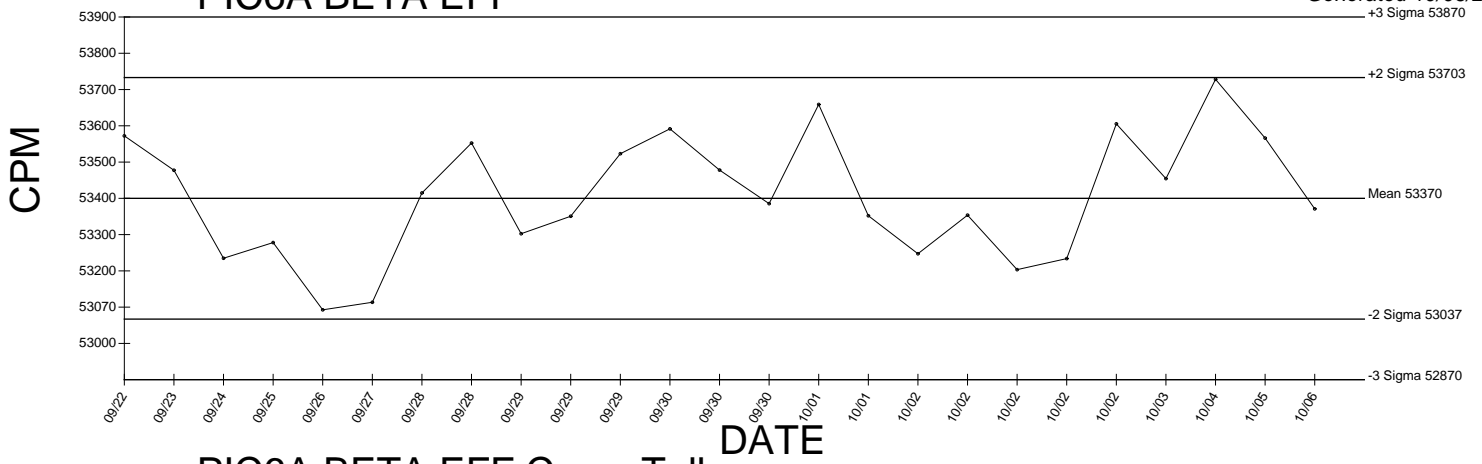




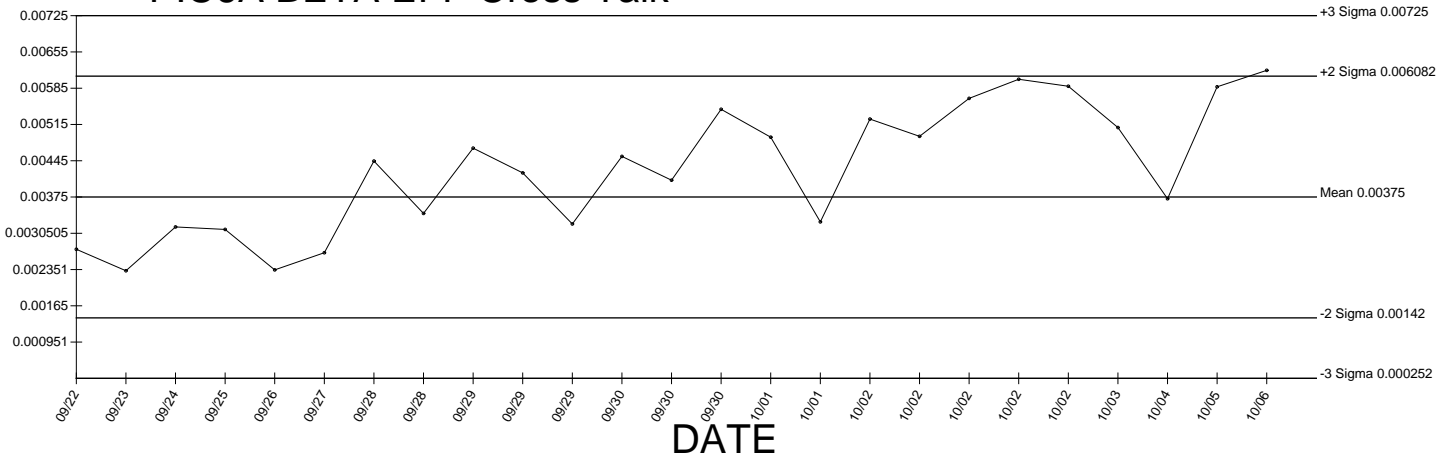
● Denotes Outlier

# PIC6A BETA EFF

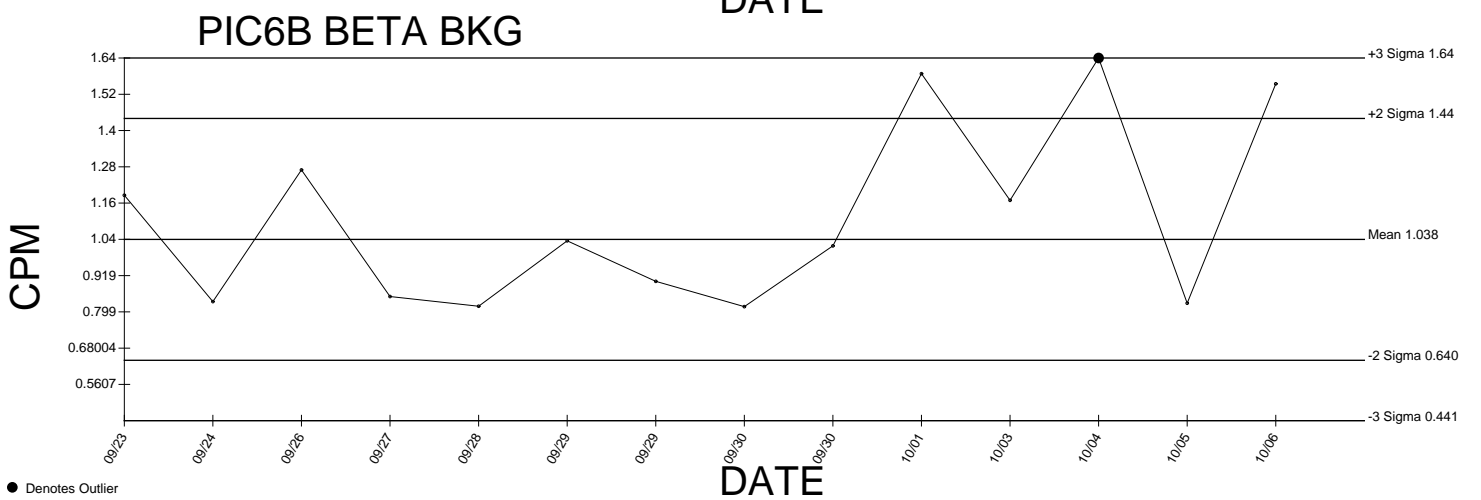
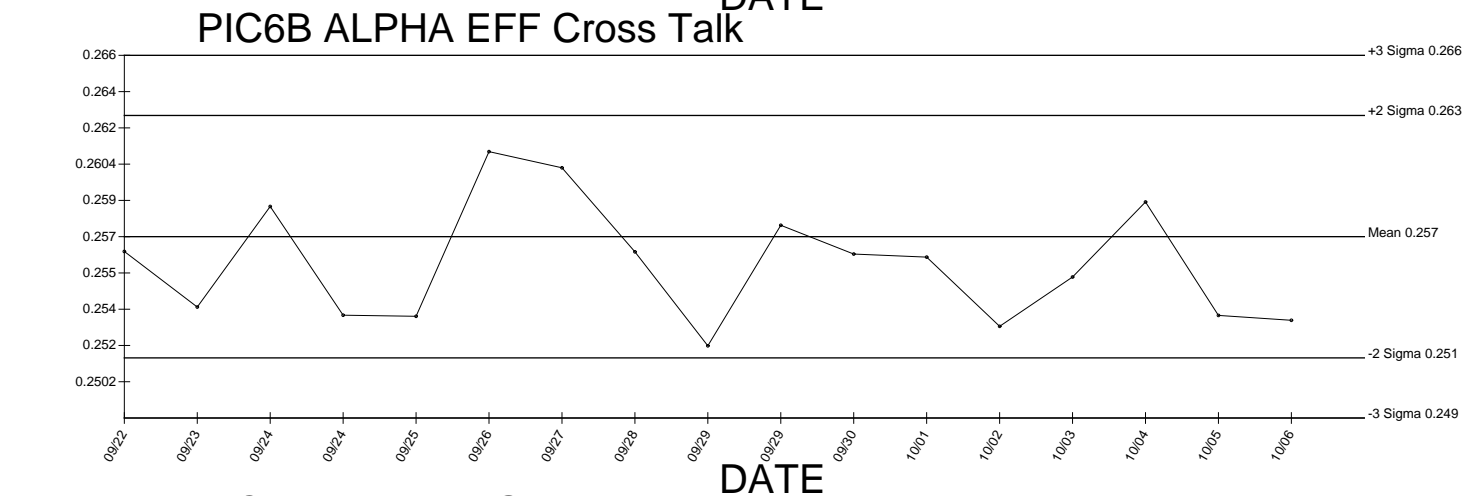
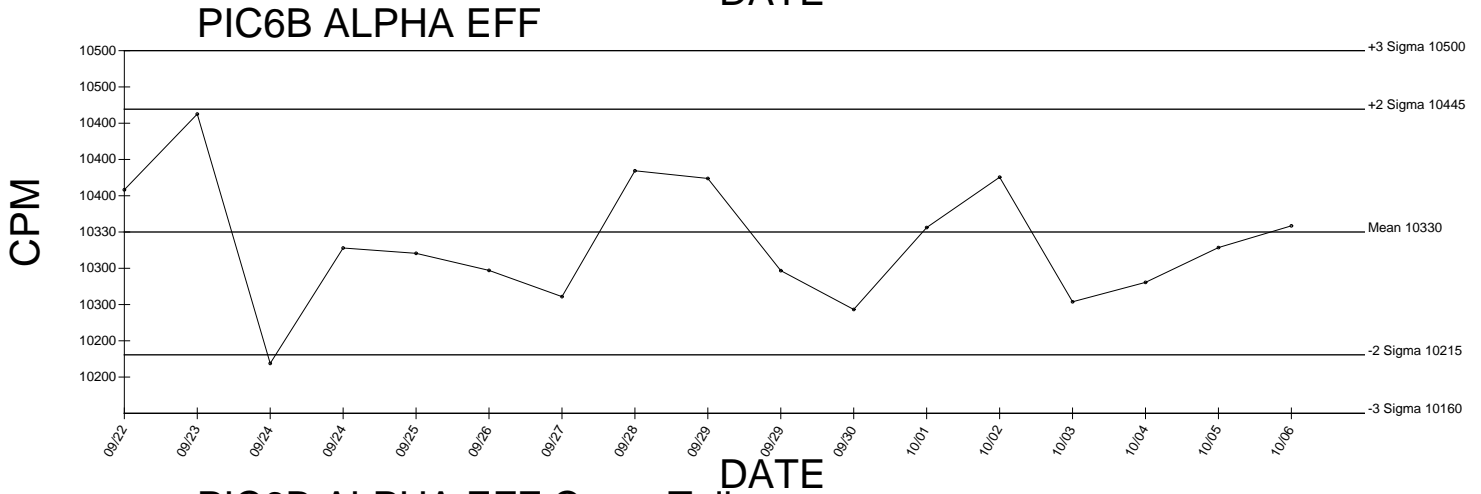
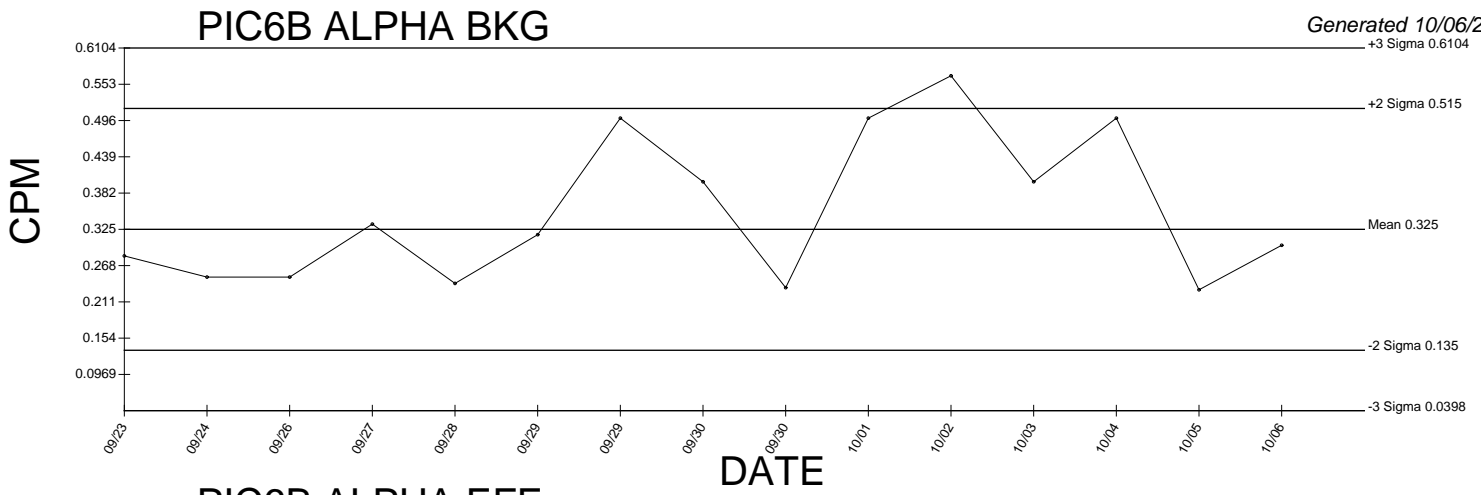
Generated 10/06/2009



# PIC6A BETA EFF Cross Talk



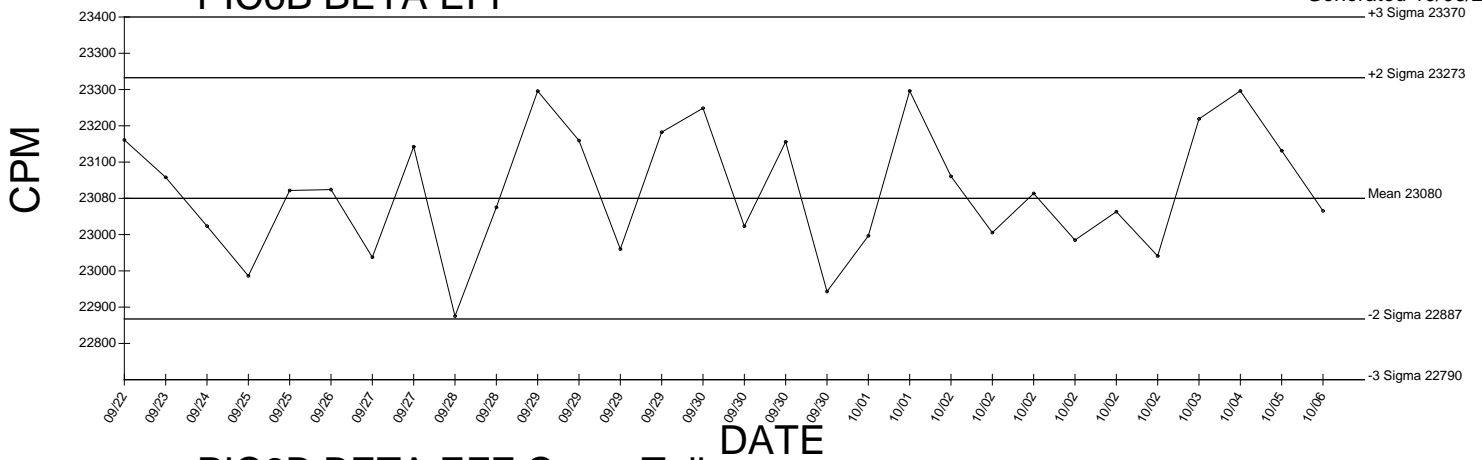
● Denotes Outlier



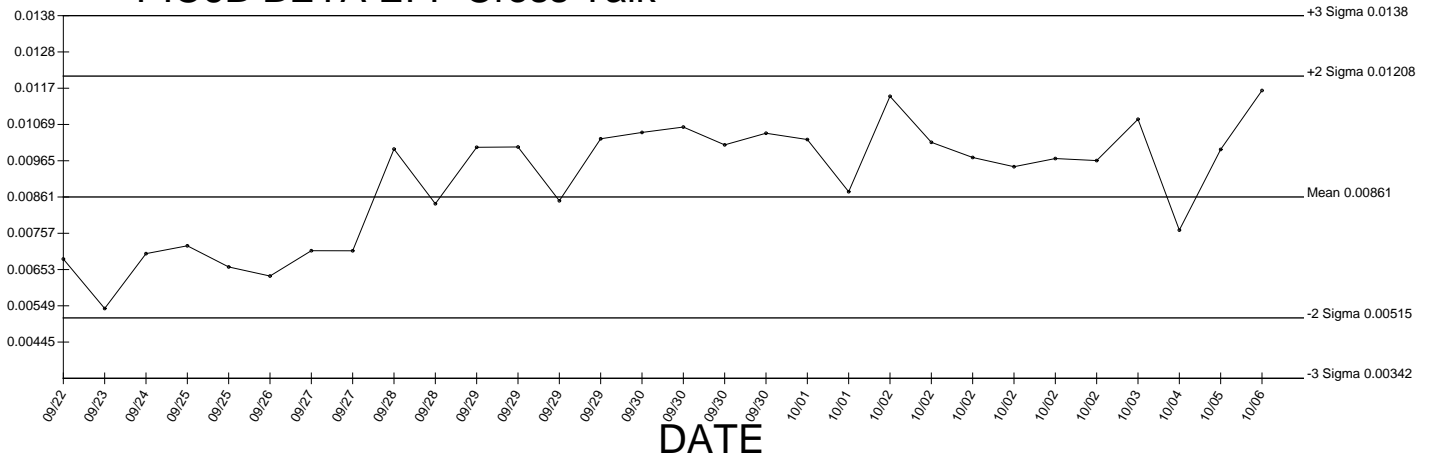
● Denotes Outlier

# PIC6B BETA EFF

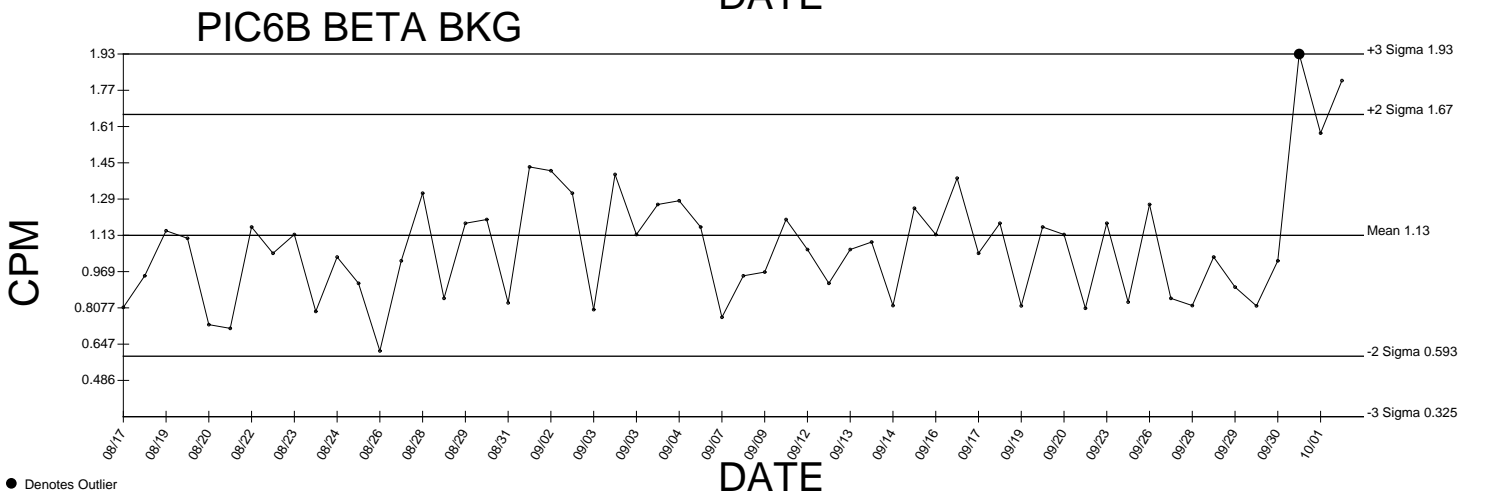
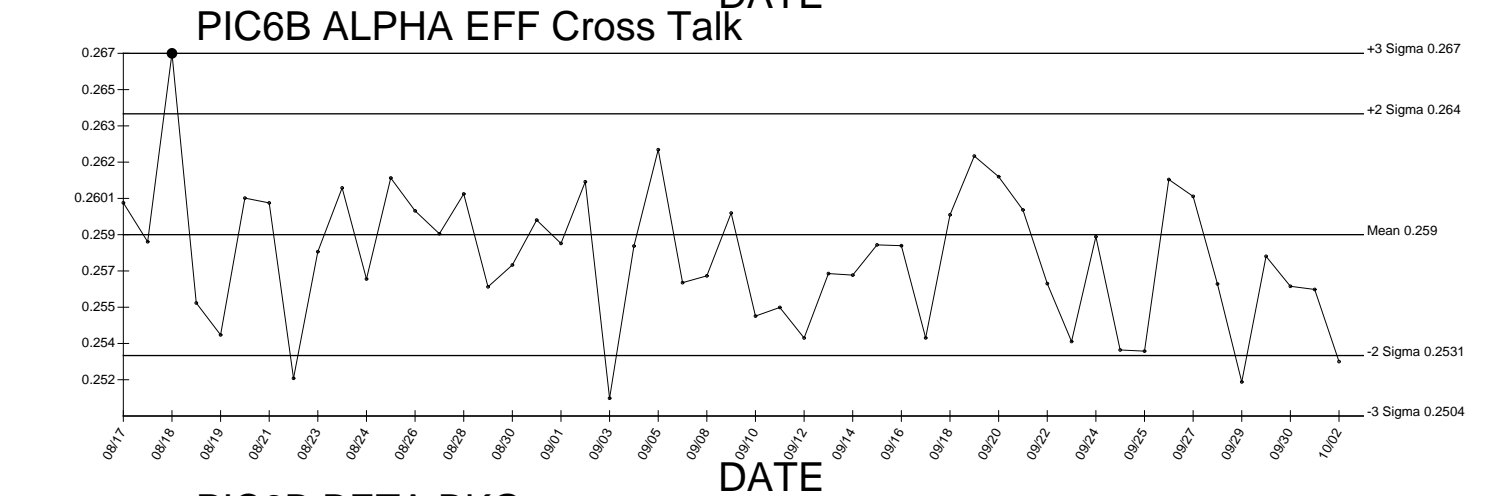
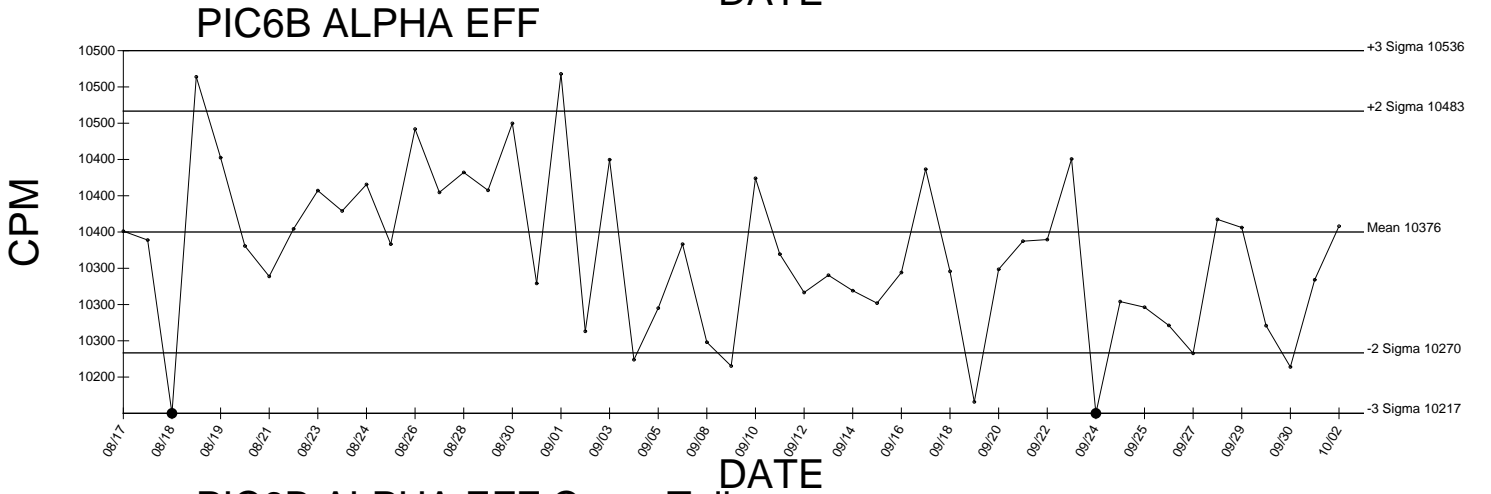
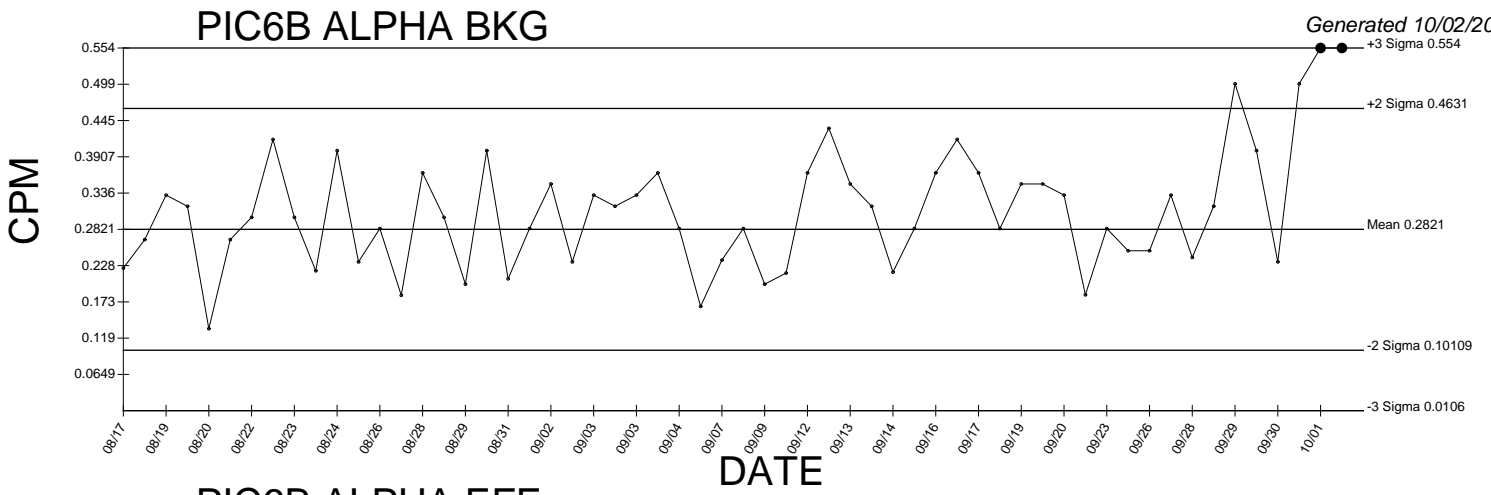
Generated 10/06/2009



# PIC6B BETA EFF Cross Talk



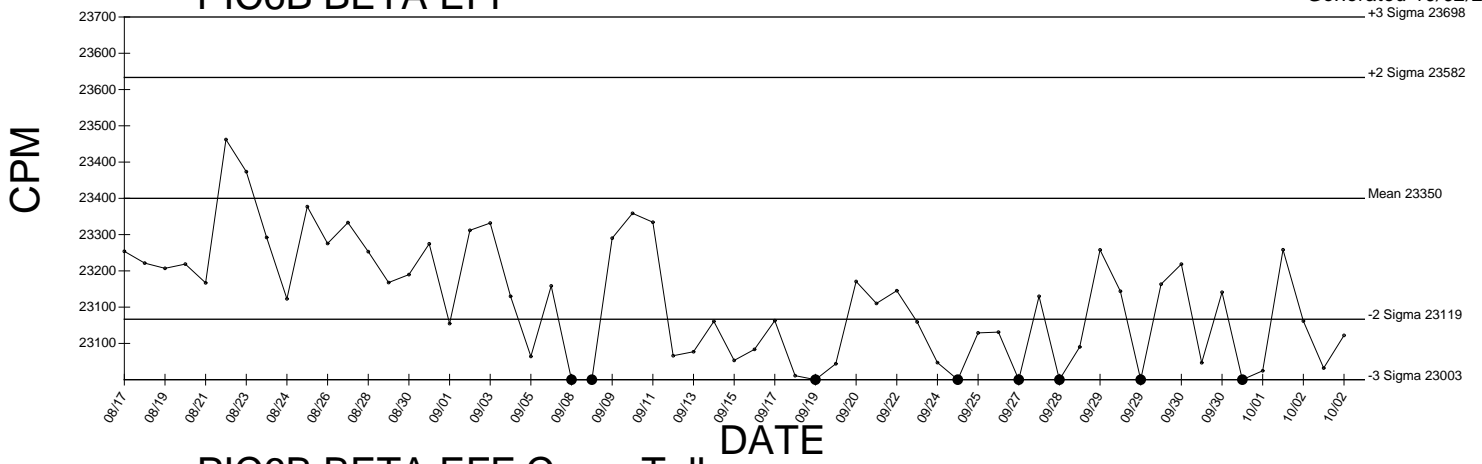
● Denotes Outlier



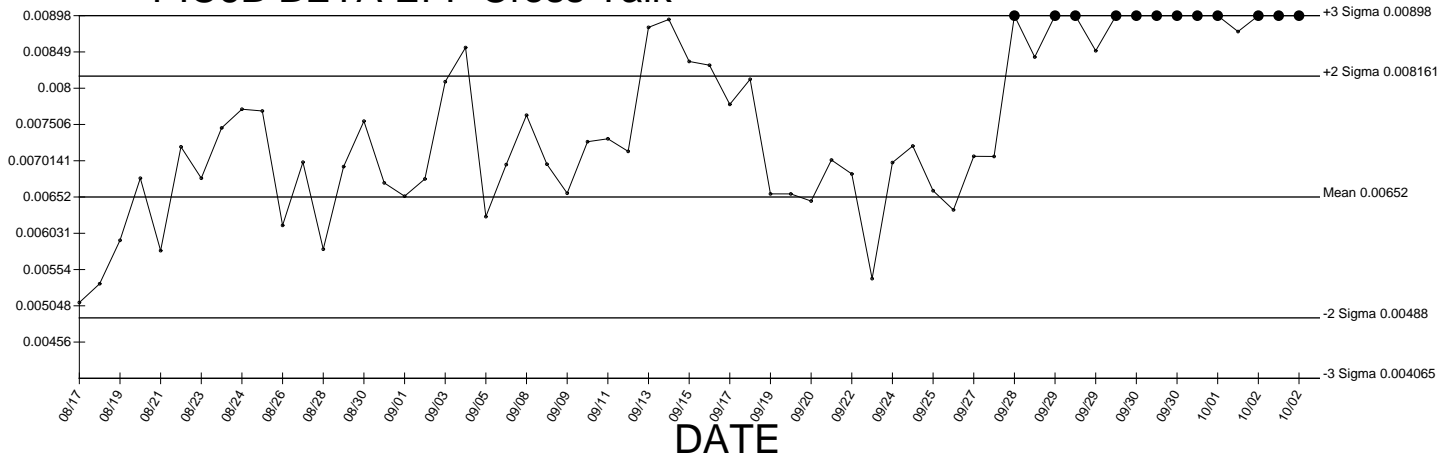
● Denotes Outlier

# PIC6B BETA EFF

Generated 10/02/2009



# PIC6B BETA EFF Cross Talk

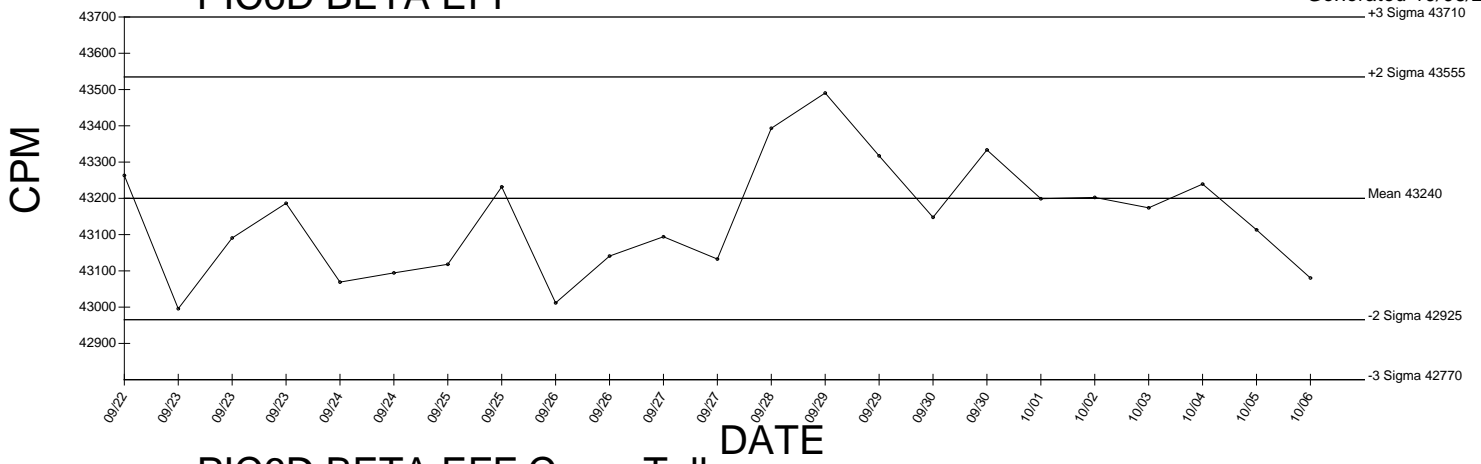


● Denotes Outlier

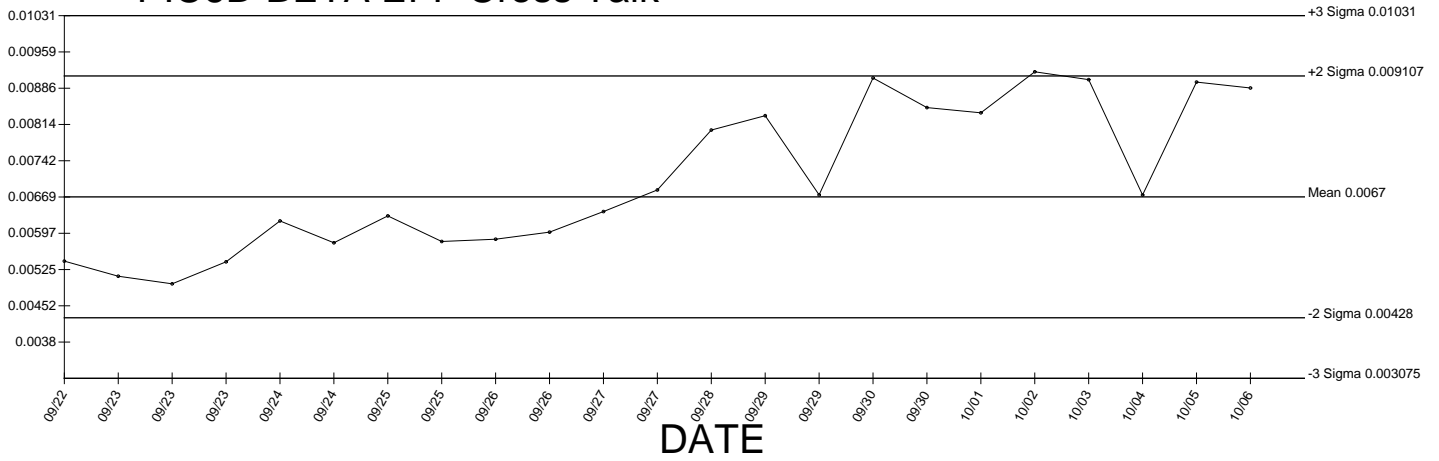


# PIC6D BETA EFF

Generated 10/06/2009

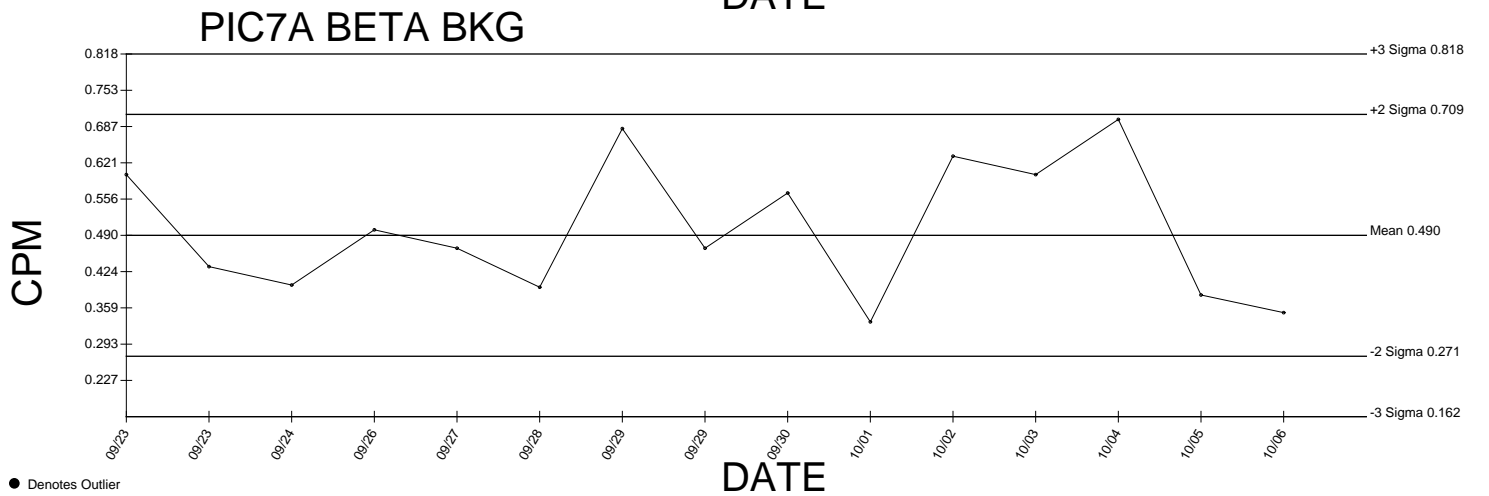
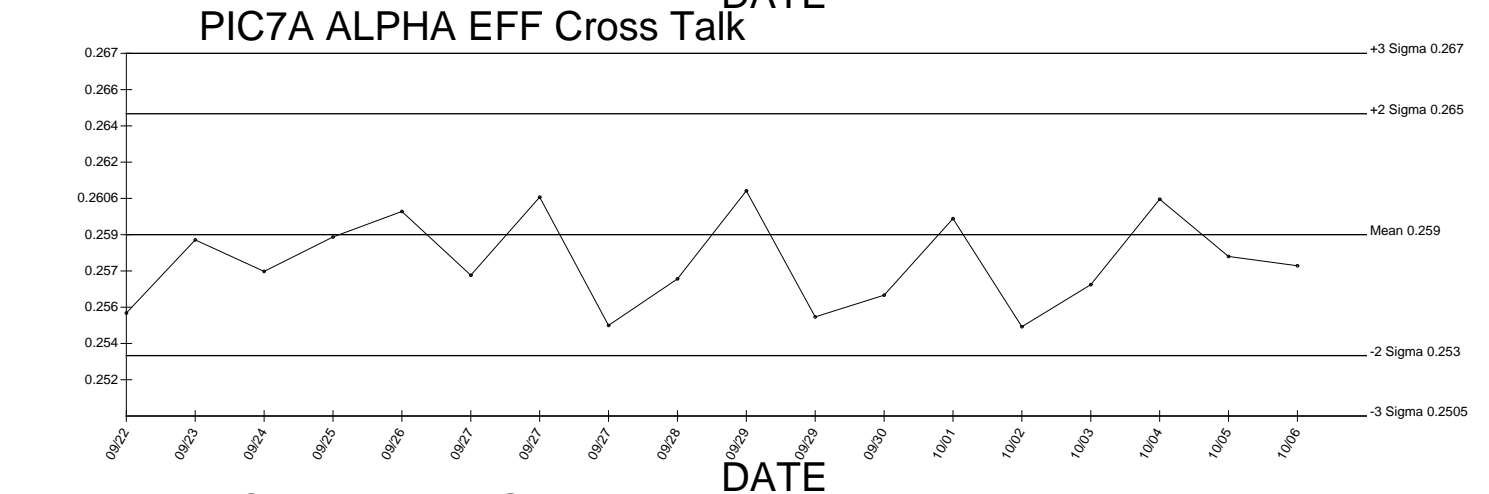
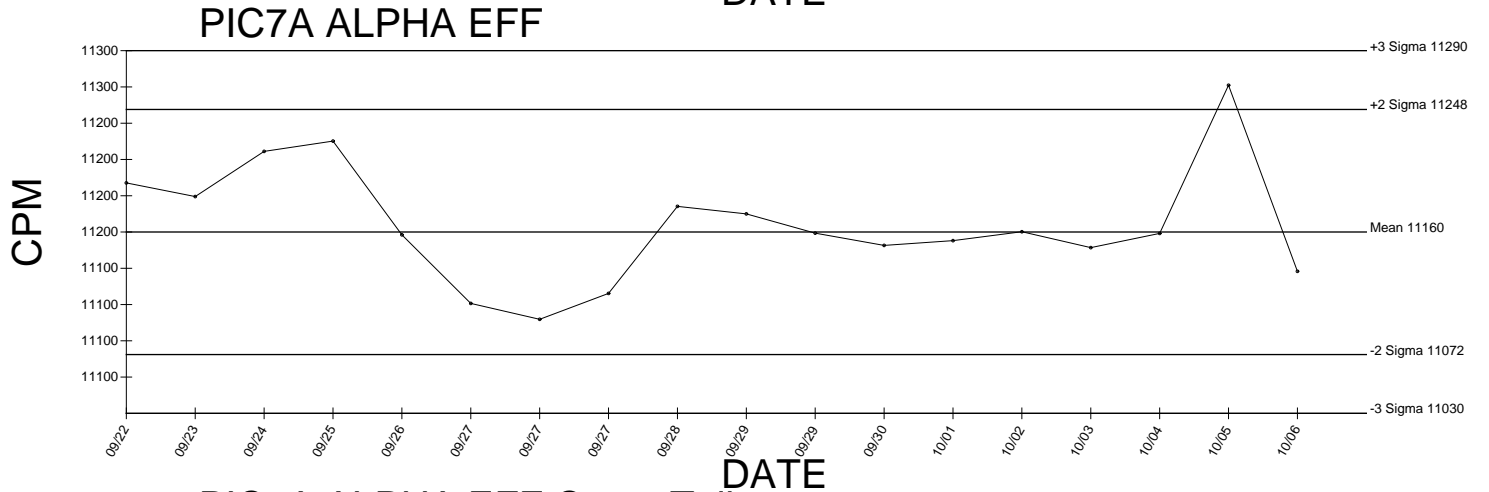
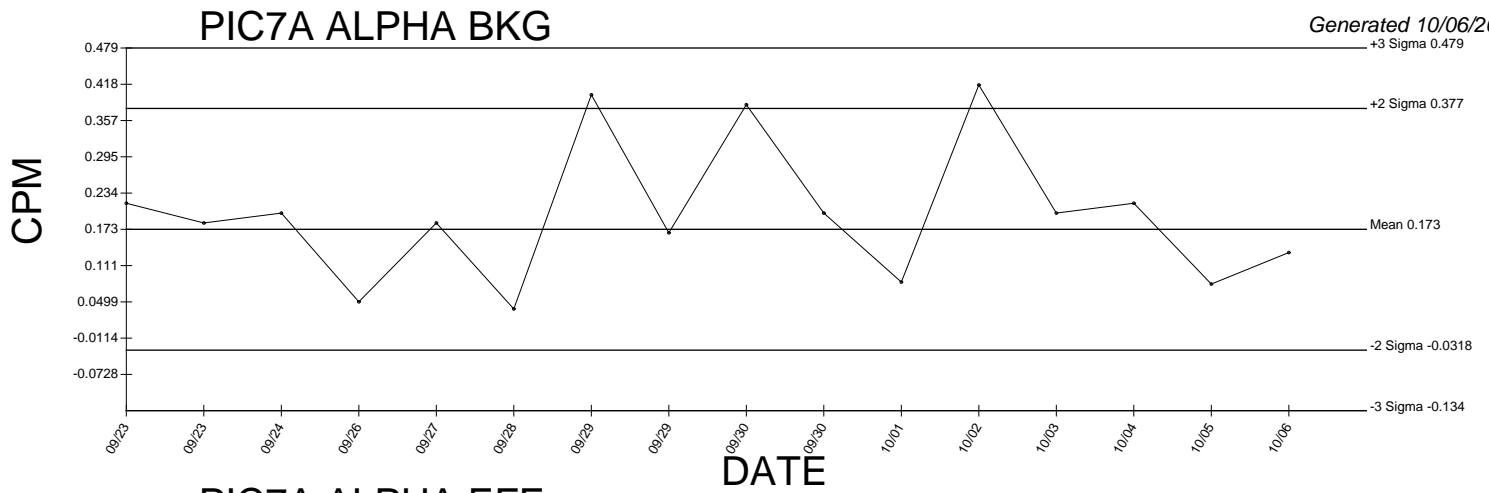


# PIC6D BETA EFF Cross Talk



● Denotes Outlier

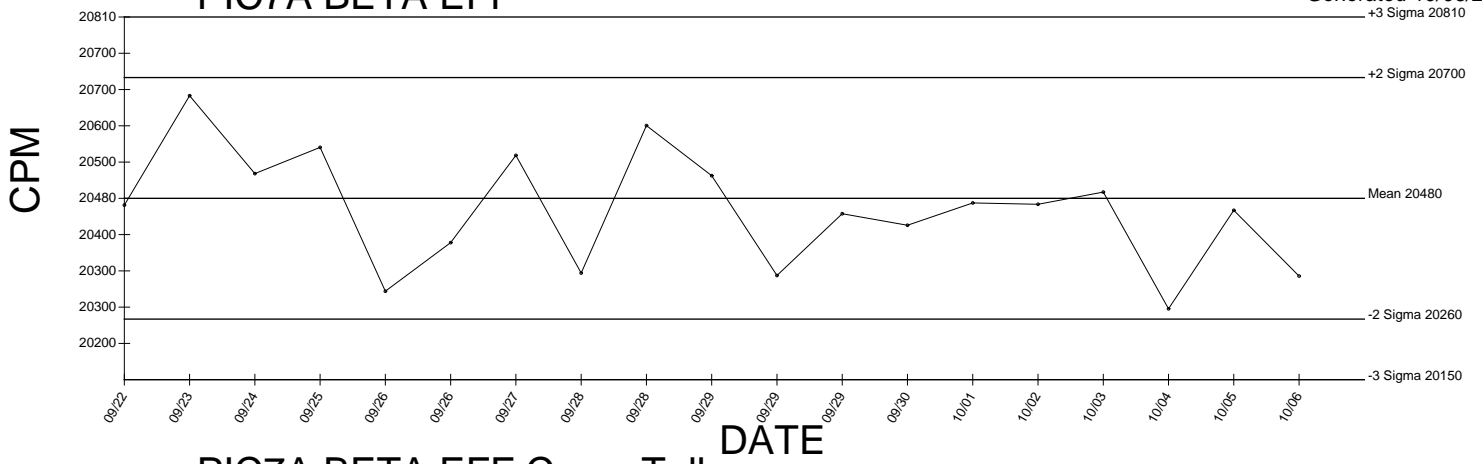




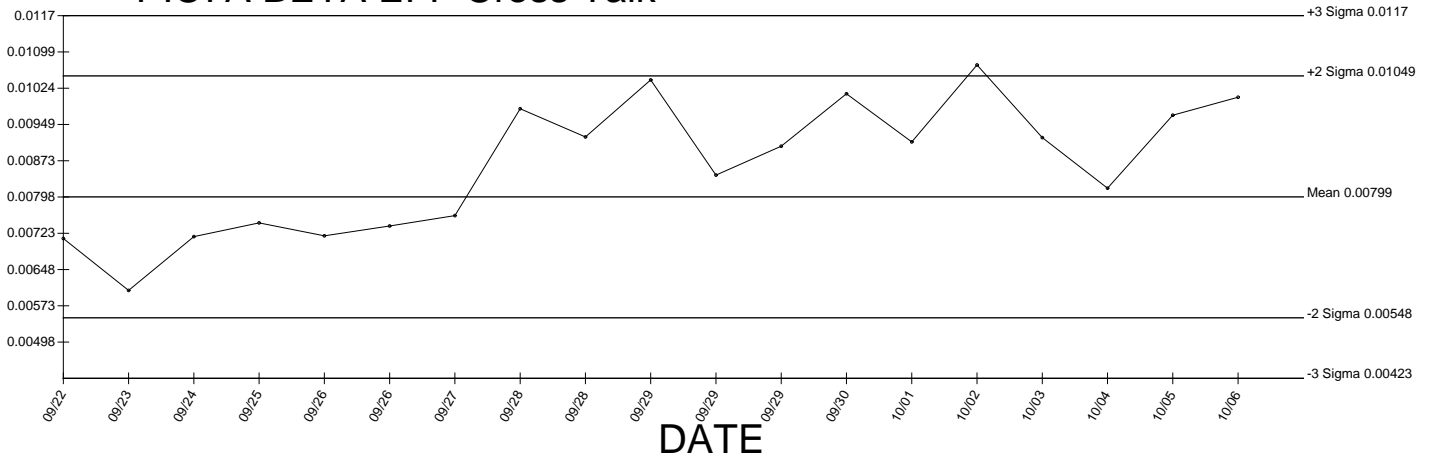
● Denotes Outlier

# PIC7A BETA EFF

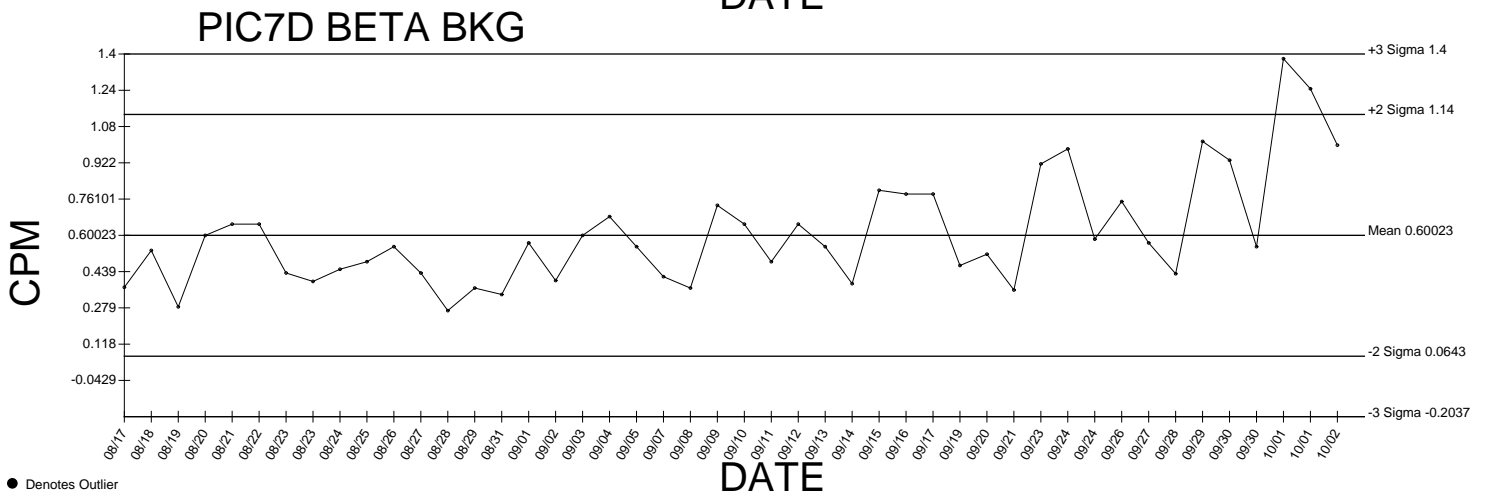
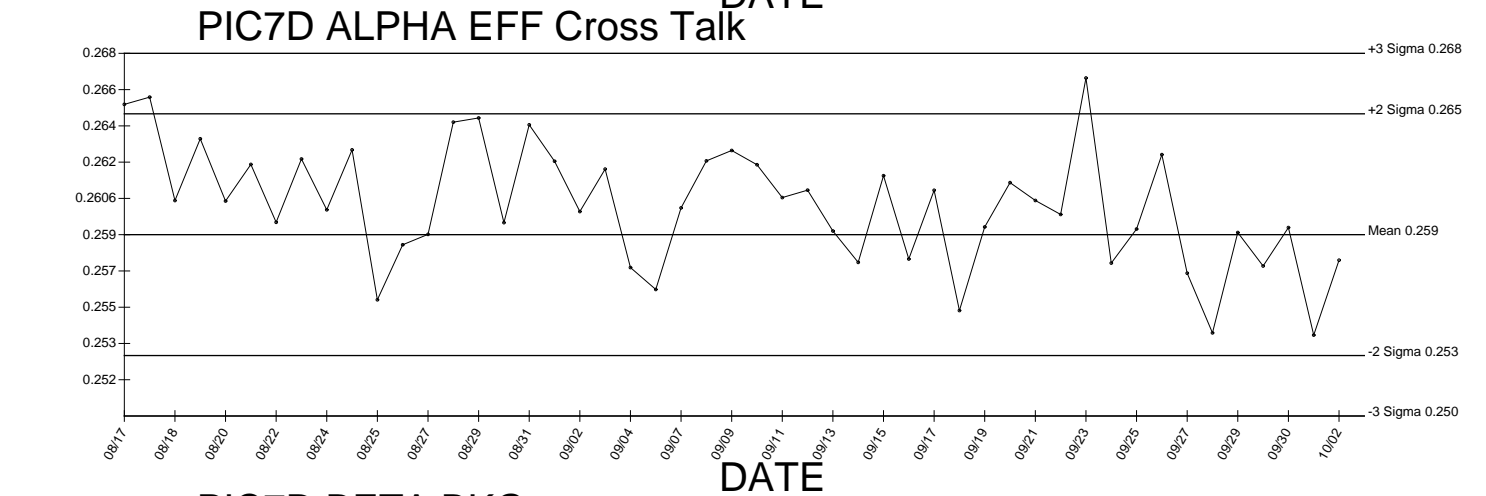
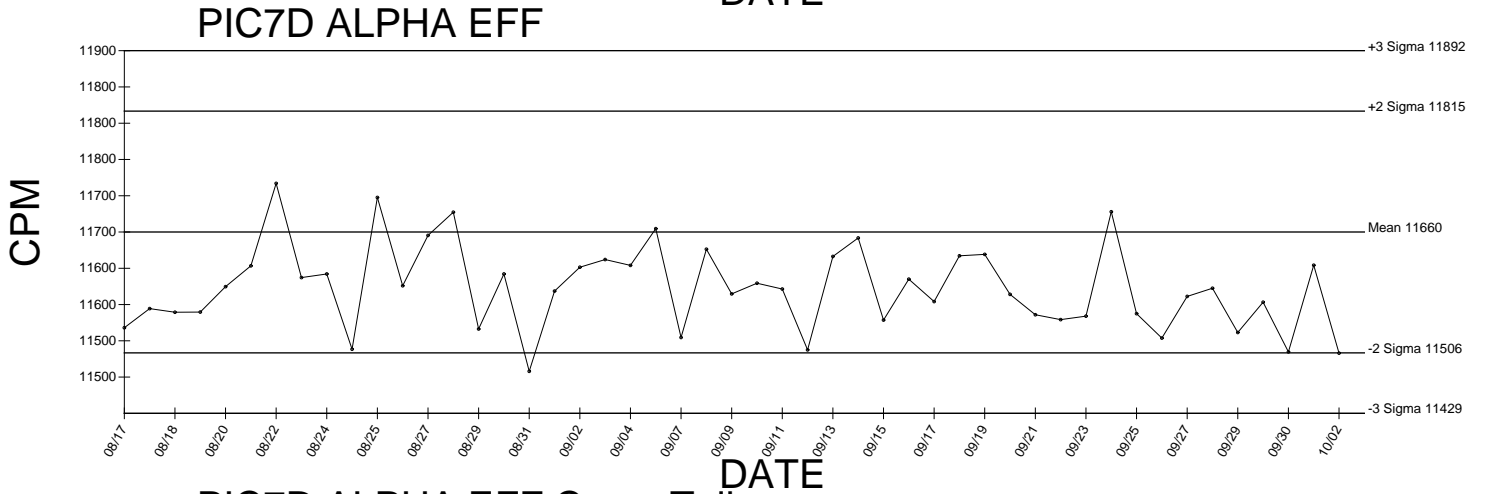
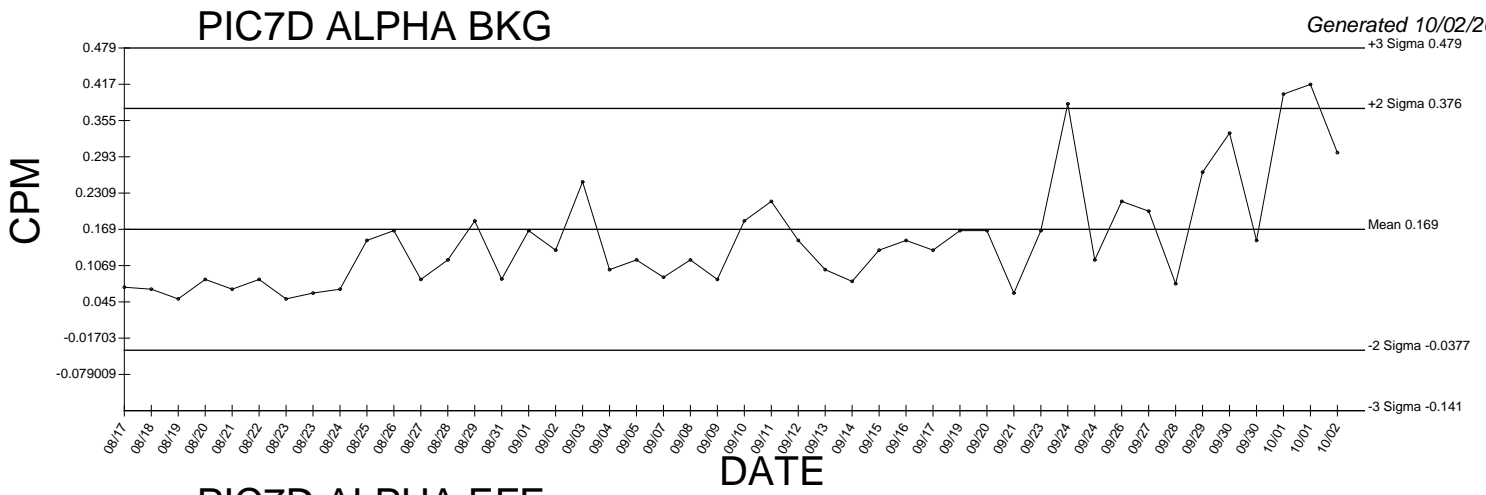
Generated 10/06/2009



# PIC7A BETA EFF Cross Talk



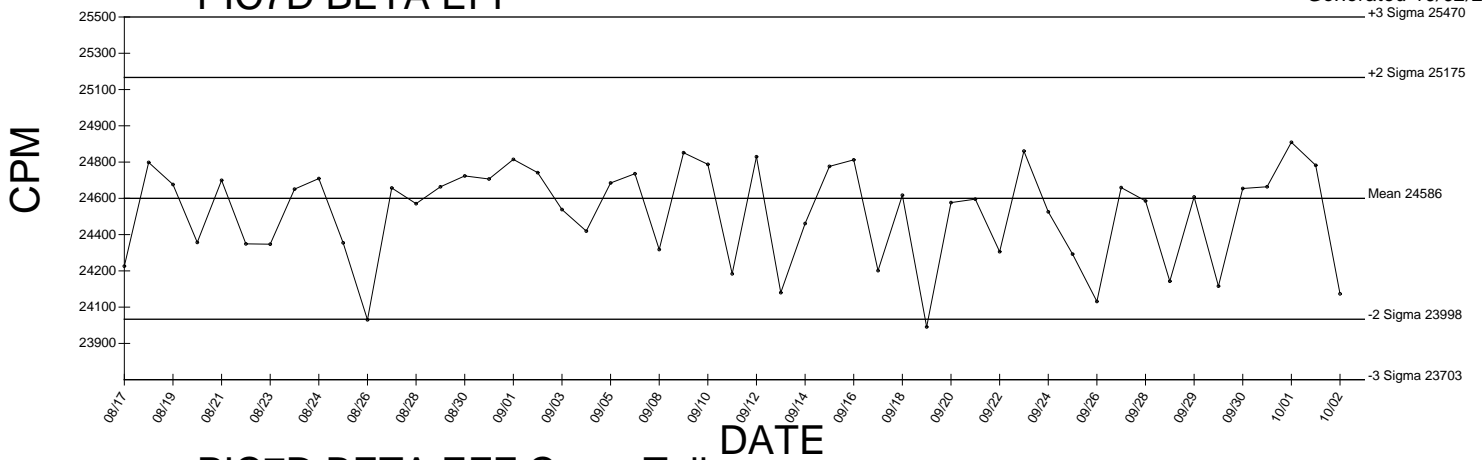
● Denotes Outlier



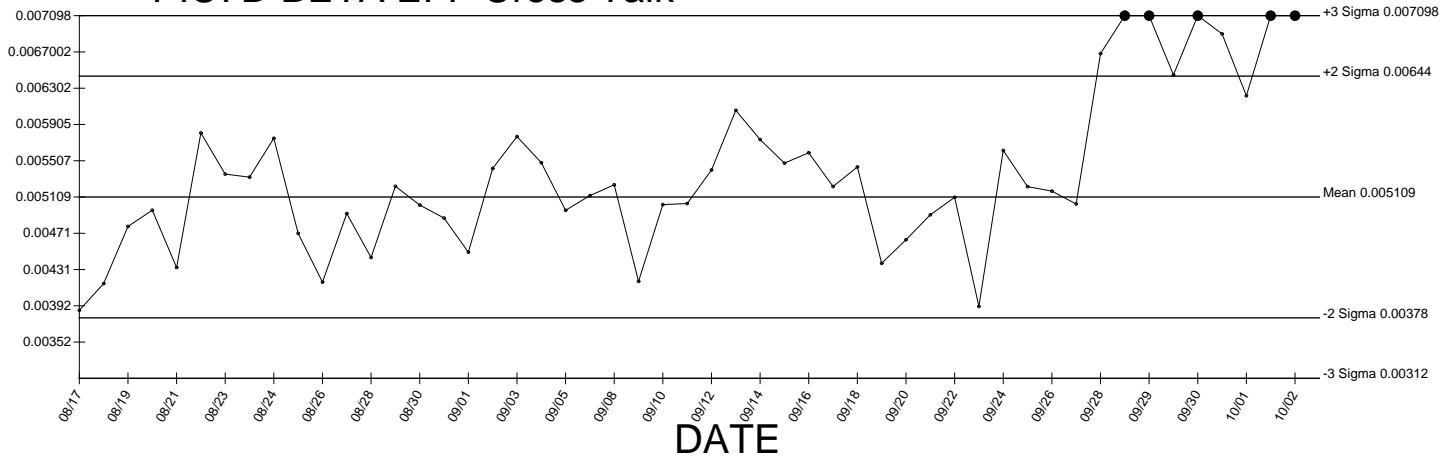
● Denotes Outlier

# PIC7D BETA EFF

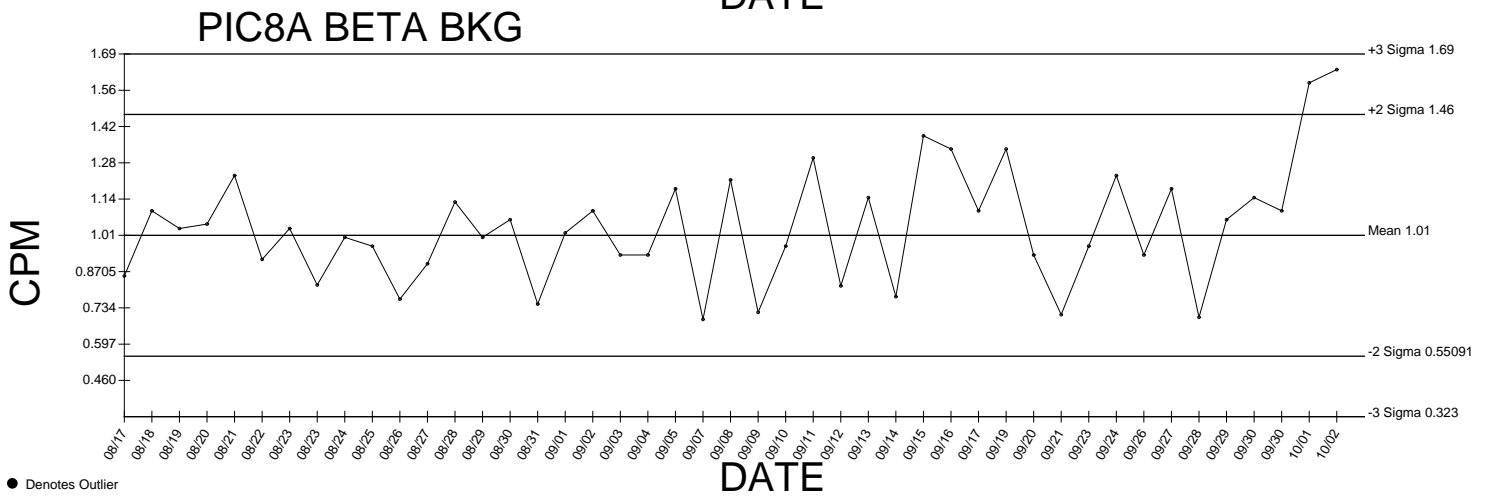
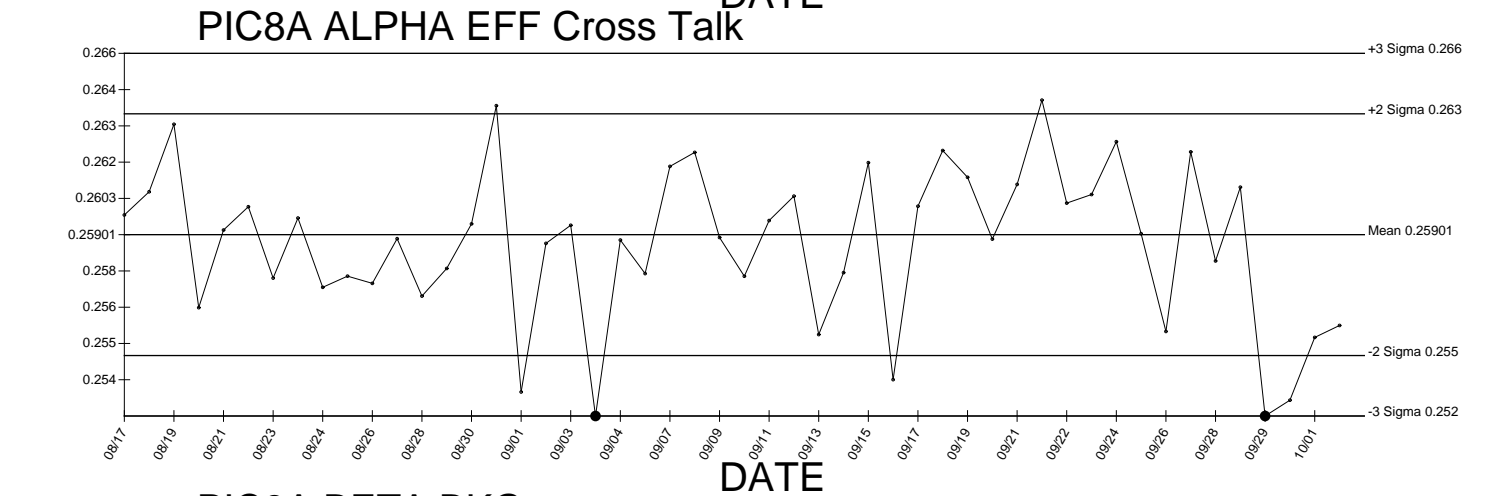
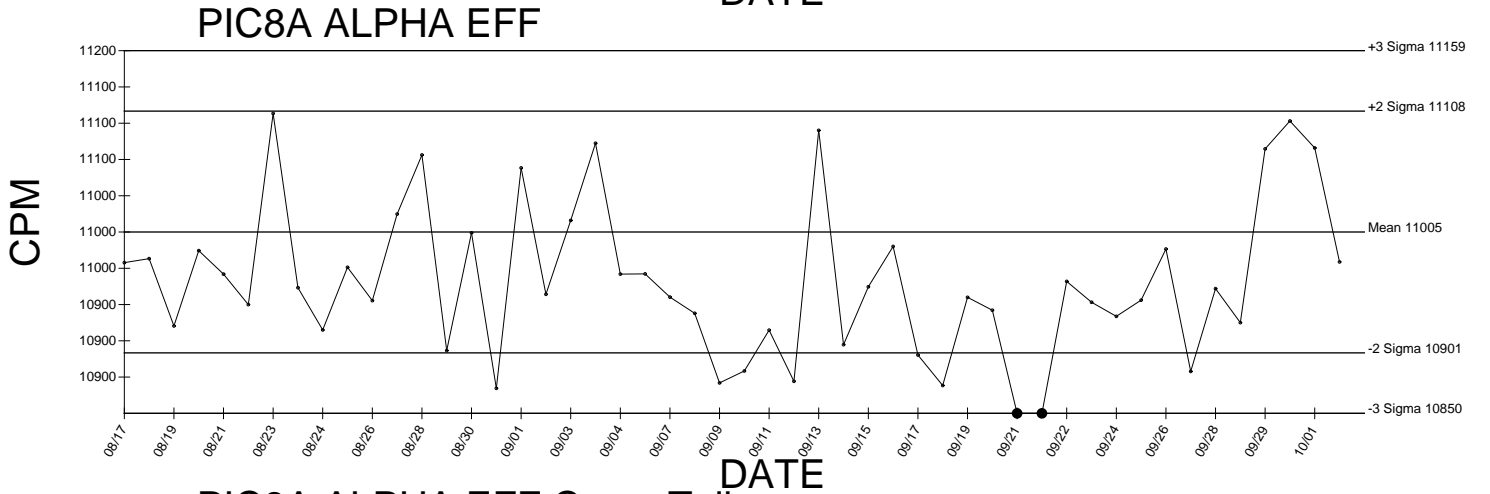
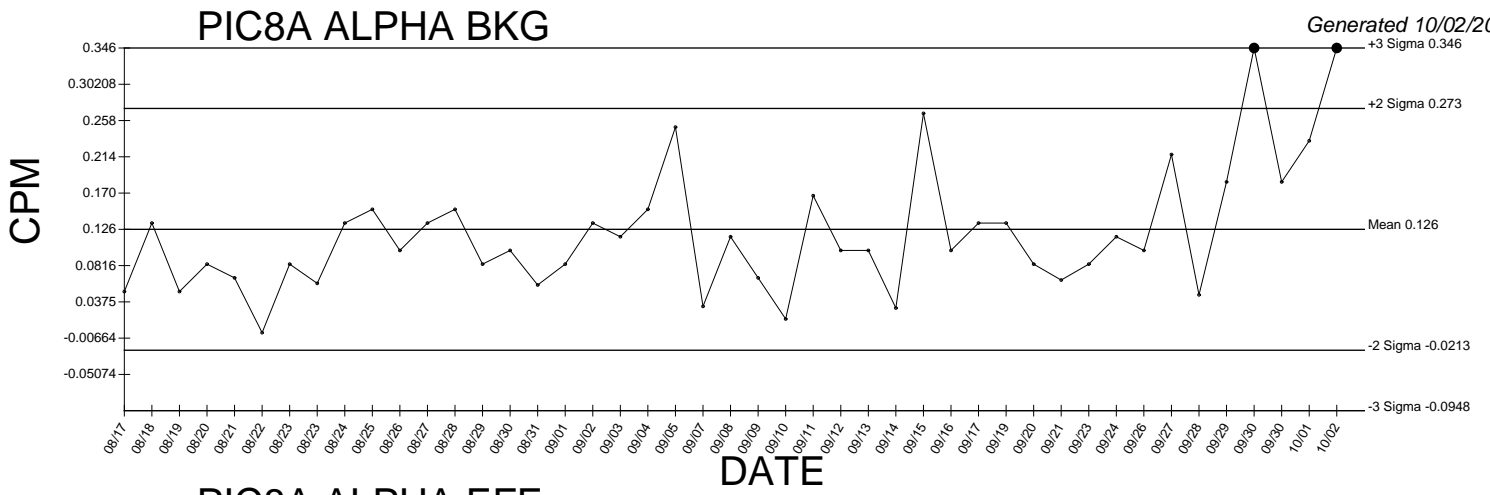
Generated 10/02/2009



# PIC7D BETA EFF Cross Talk



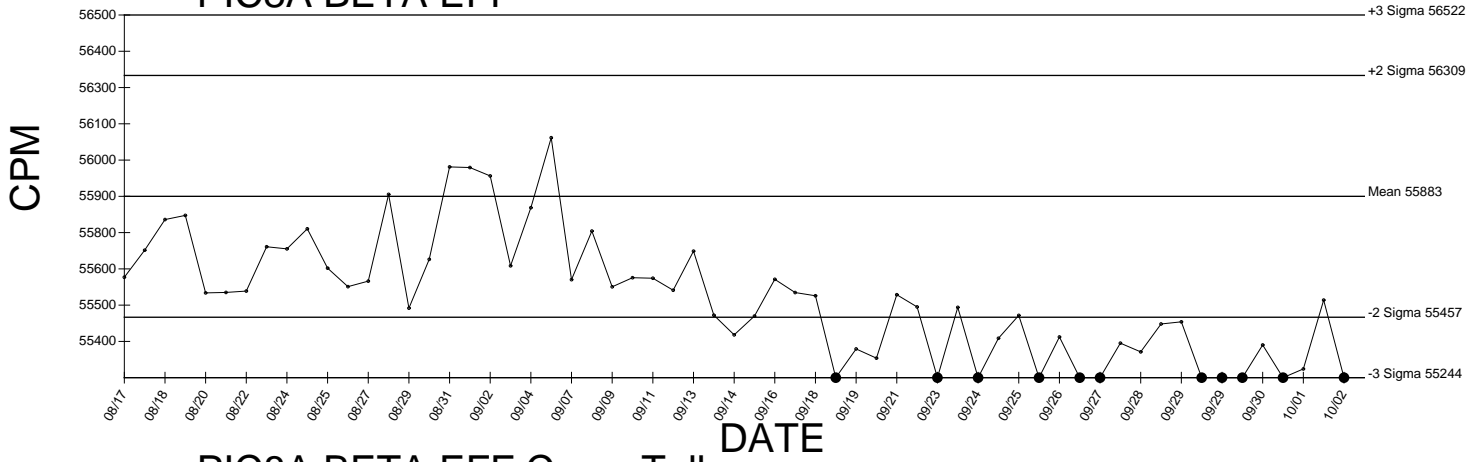
● Denotes Outlier



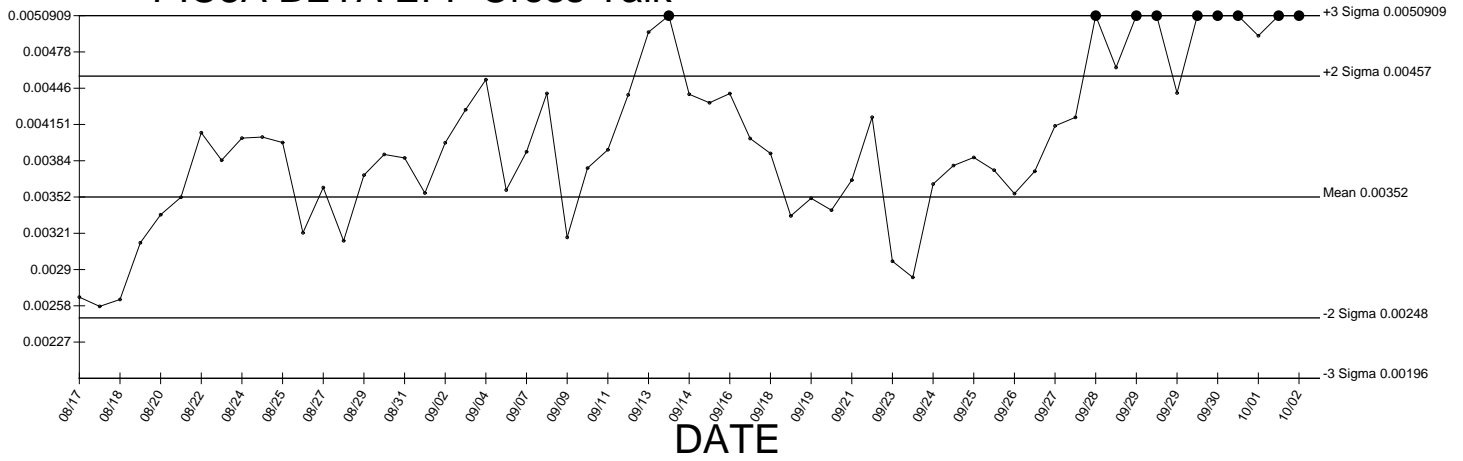
● Denotes Outlier

# PIC8A BETA EFF

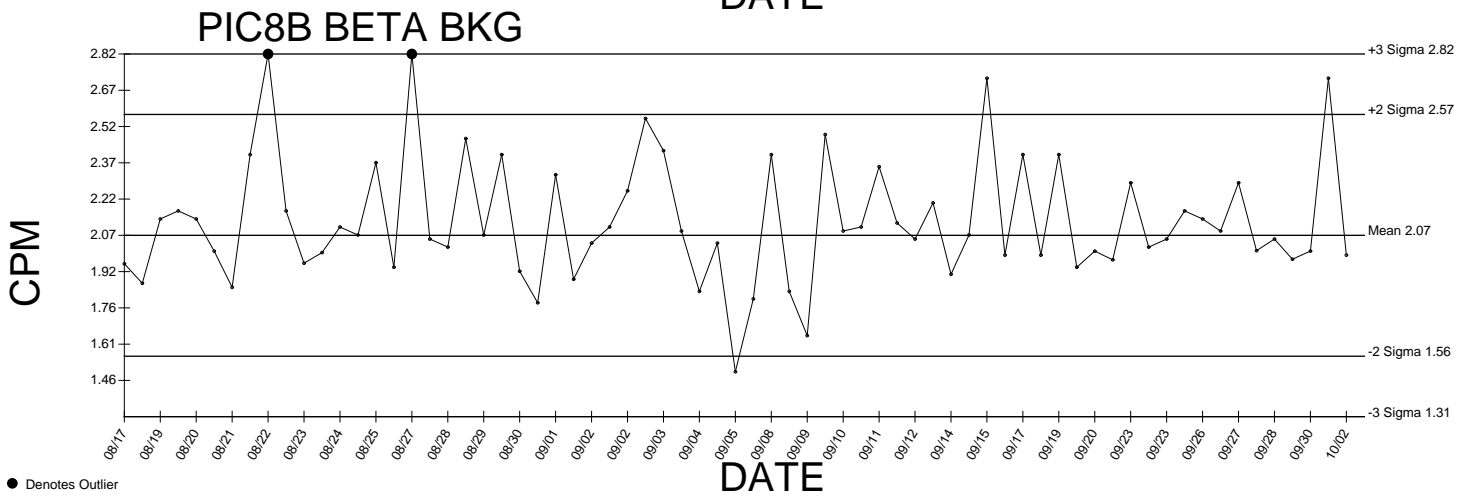
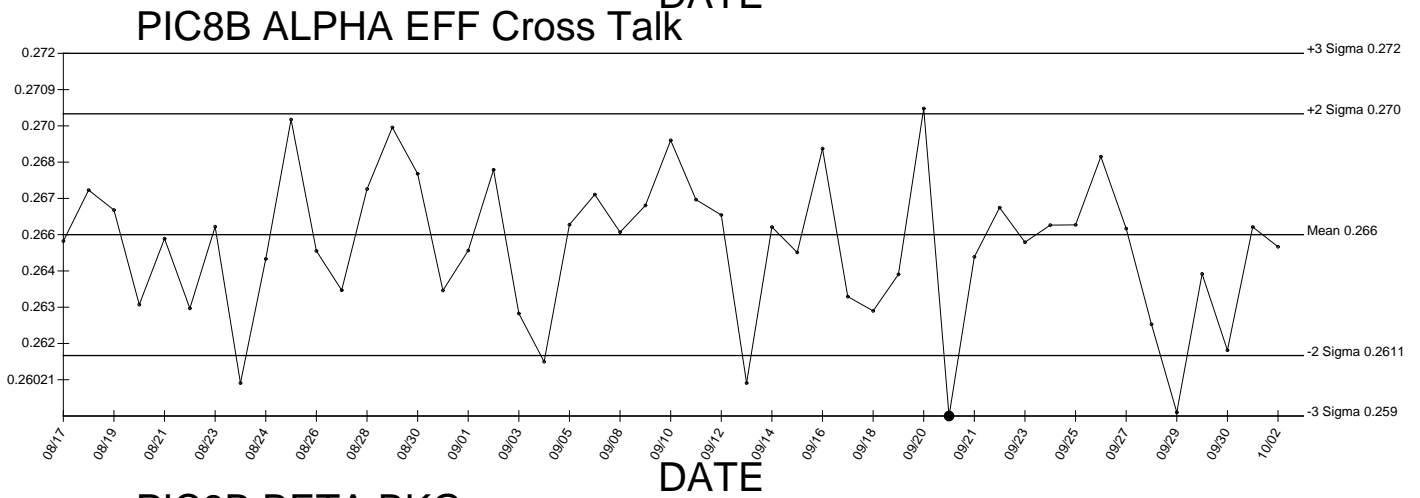
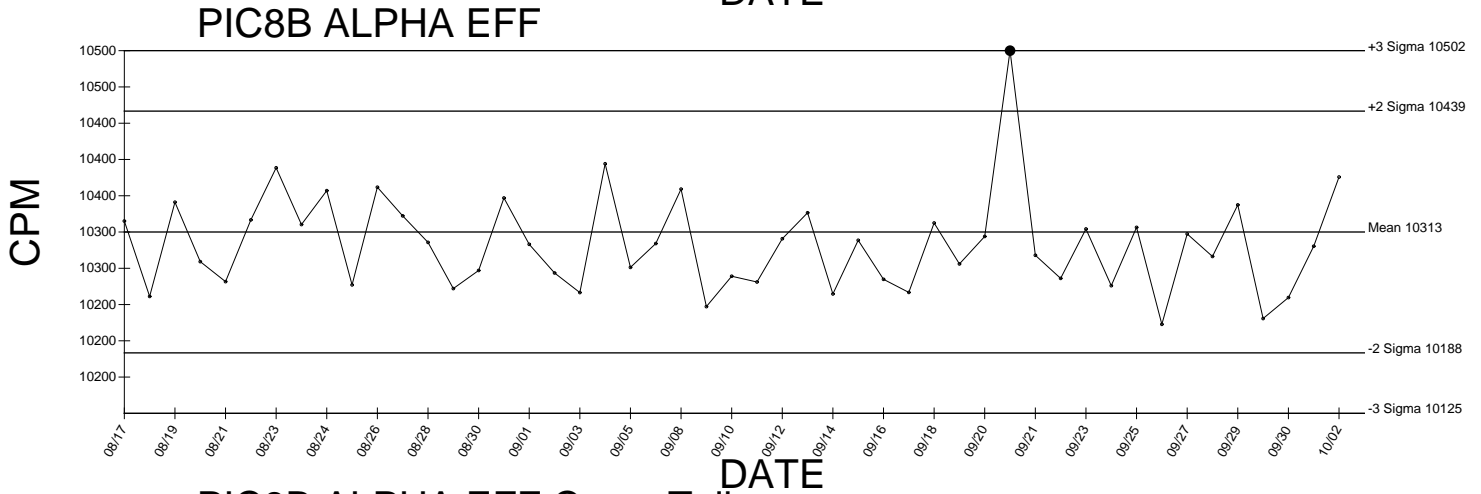
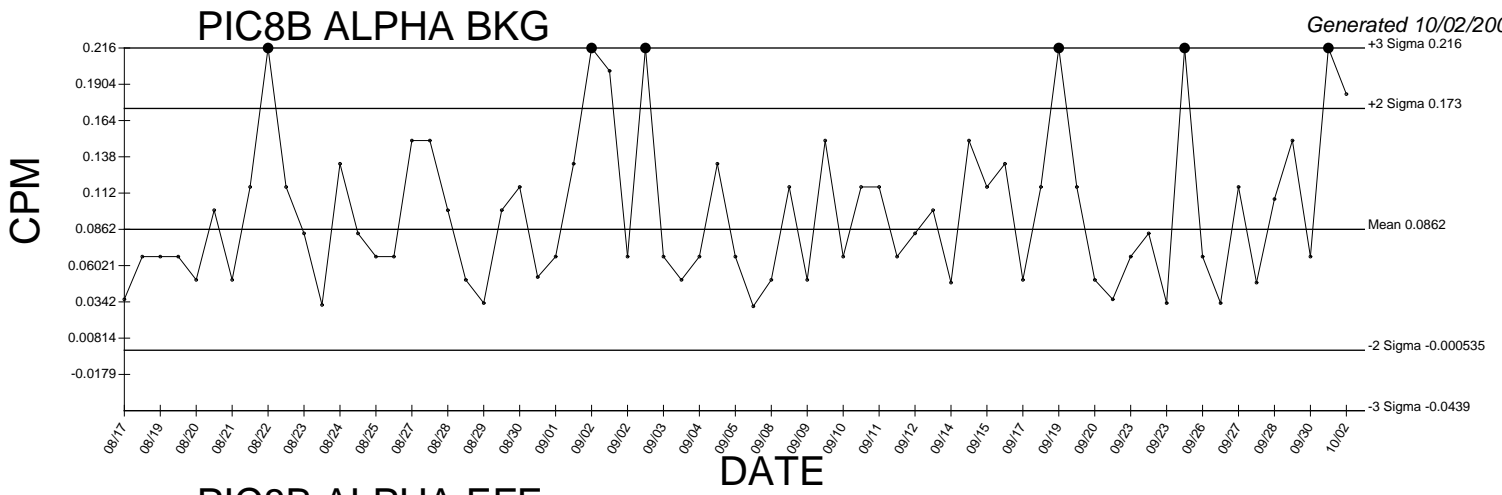
Generated 10/02/2009



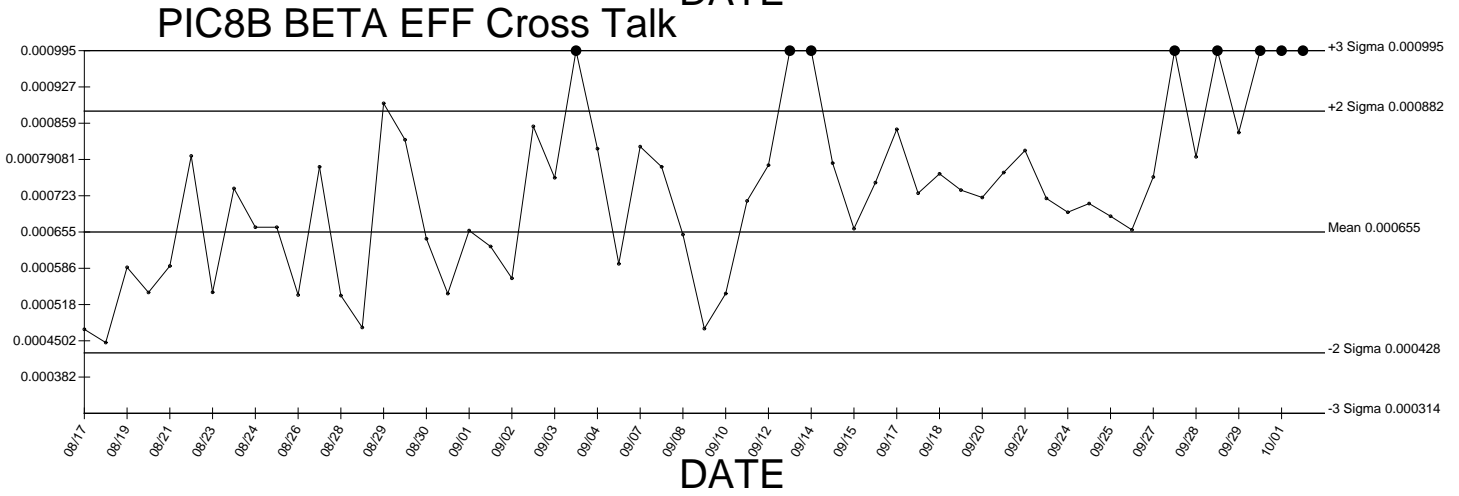
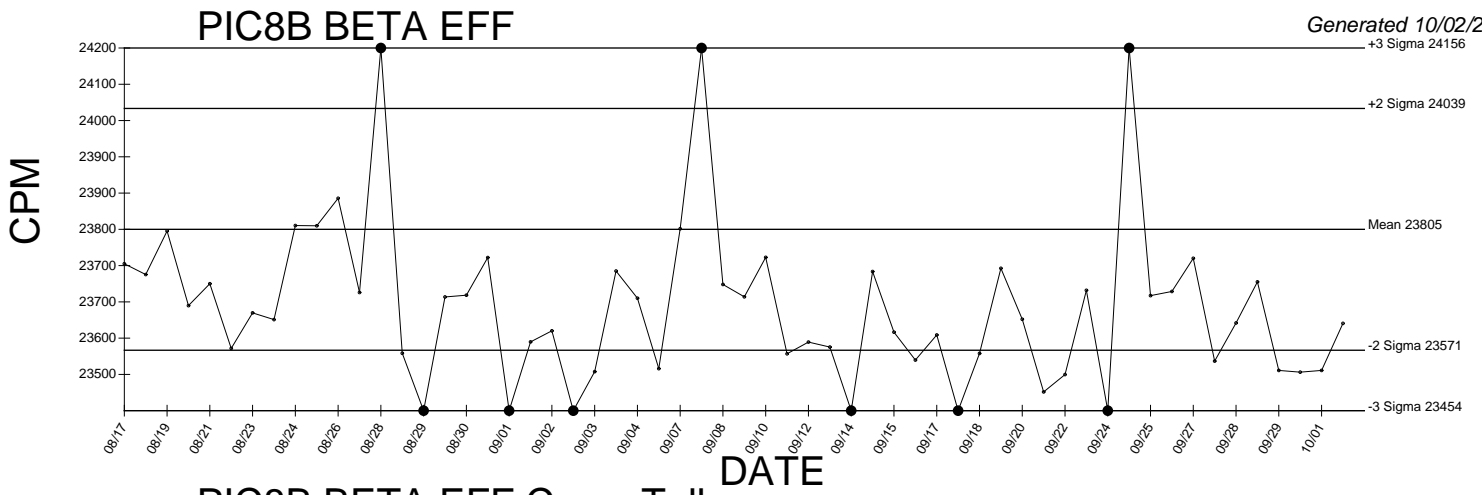
# PIC8A BETA EFF Cross Talk



● Denotes Outlier



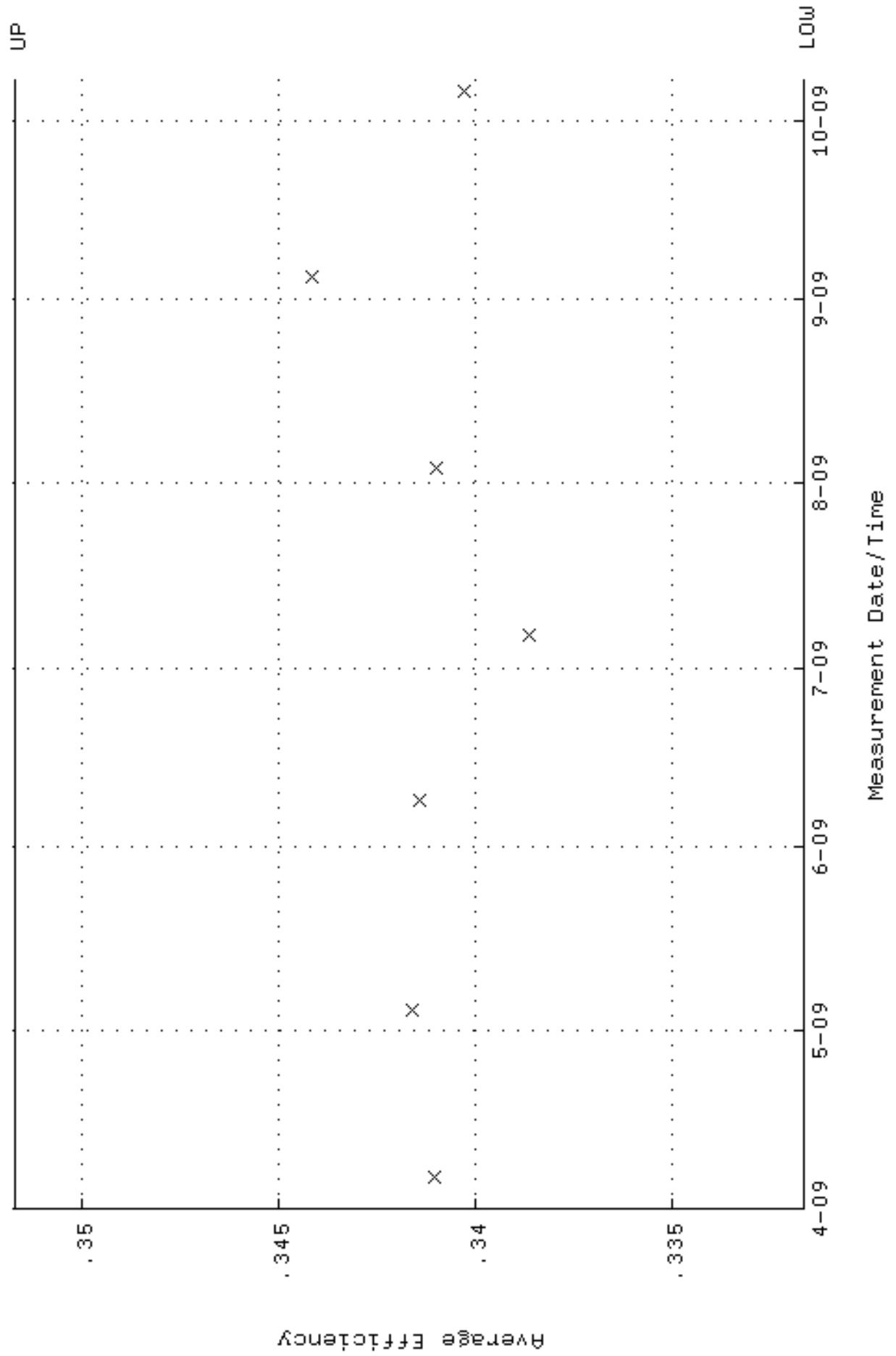
● Denotes Outlier



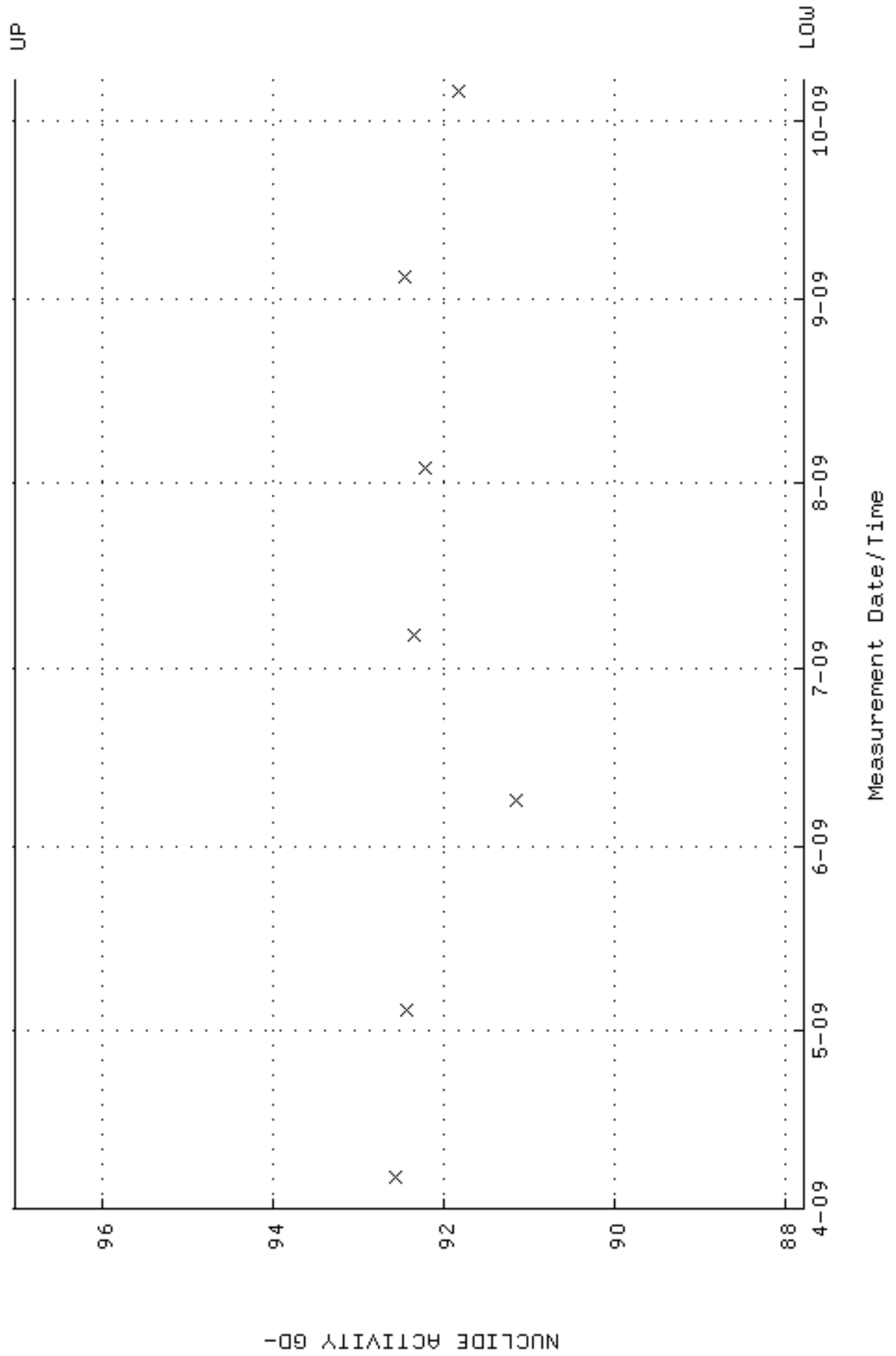
● Denotes Outlier



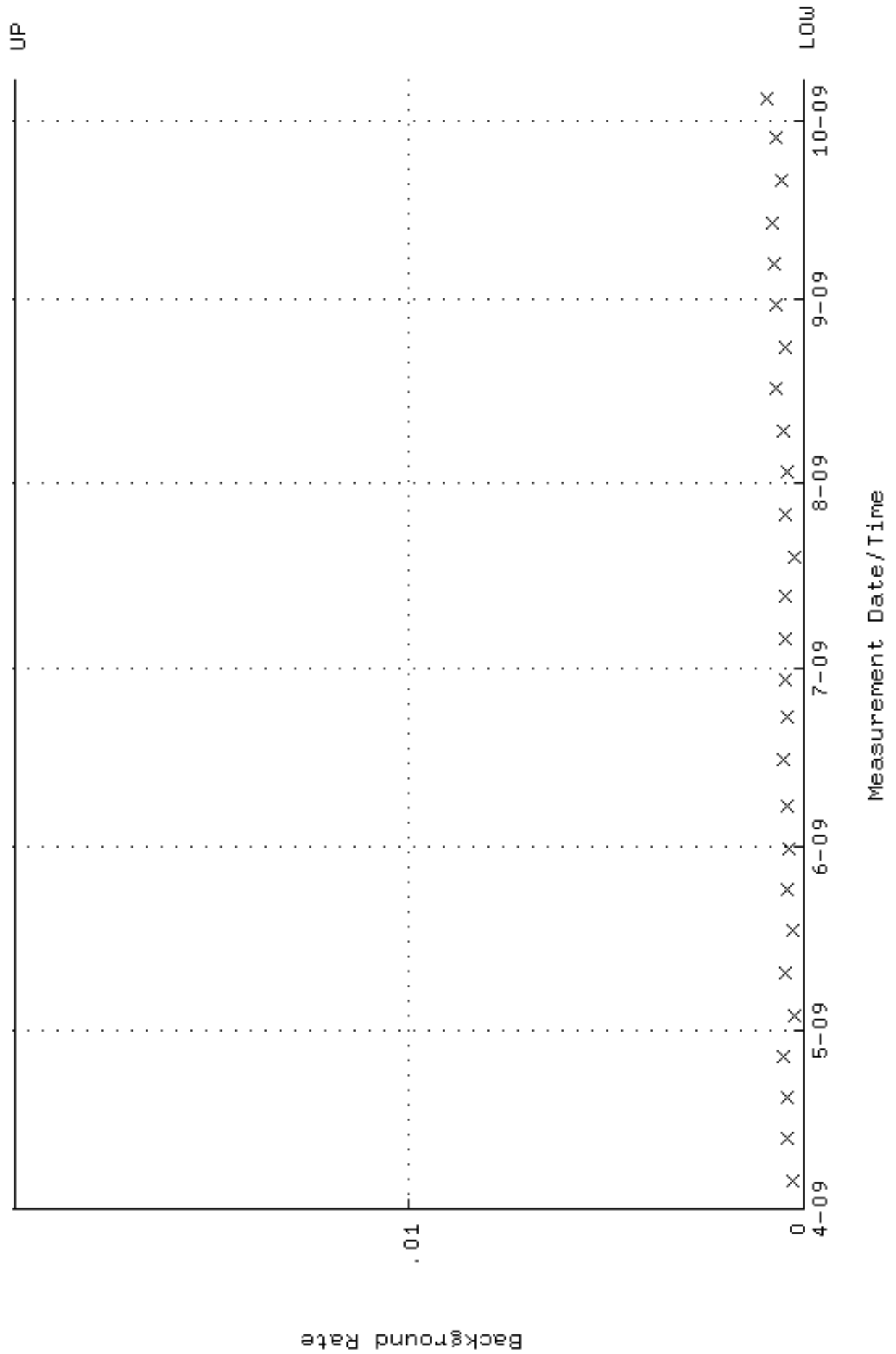
QA filename : DKA100:[ENV\_ALPHA.QA.W]W013.QAF;2  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:02 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.331676 through 0.351676



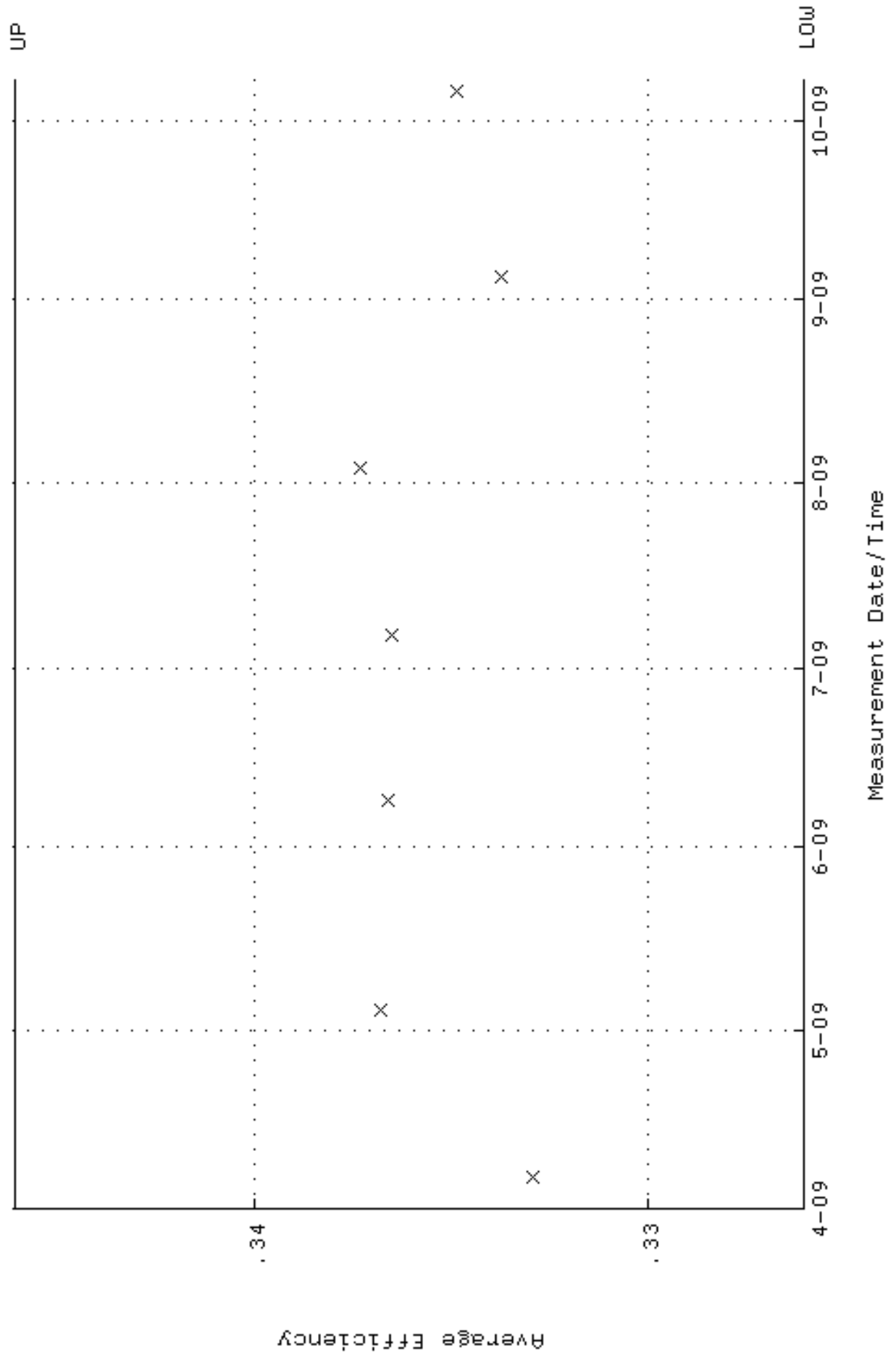
QA filename : DKA100:[ENV\_ALPHA.QA.W]W013.QAF;2  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:02 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 87.7736 through 97.0130



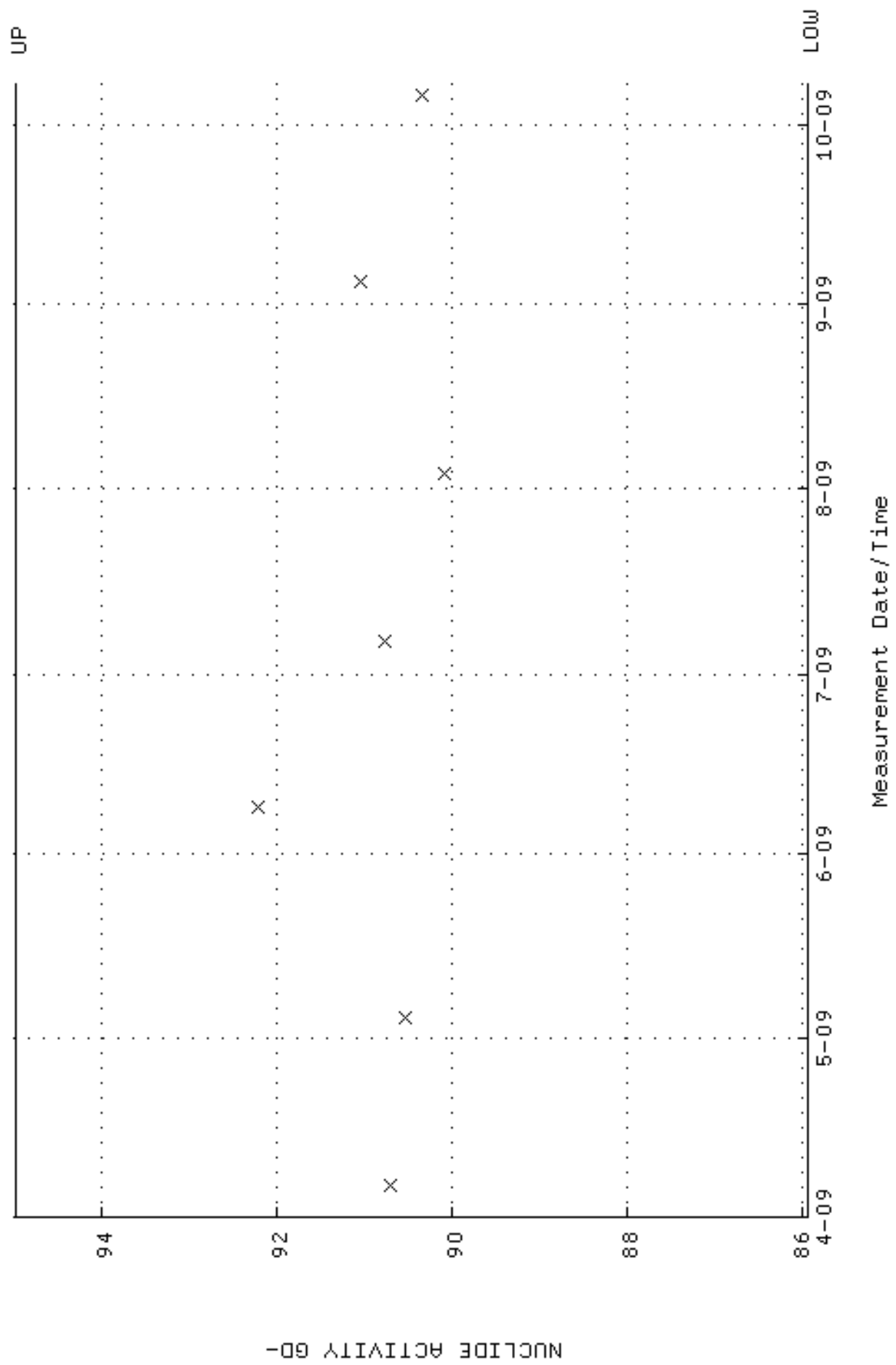
QA filename : DKA100:[ENV\_ALPHA.QA.B]B013.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:09 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



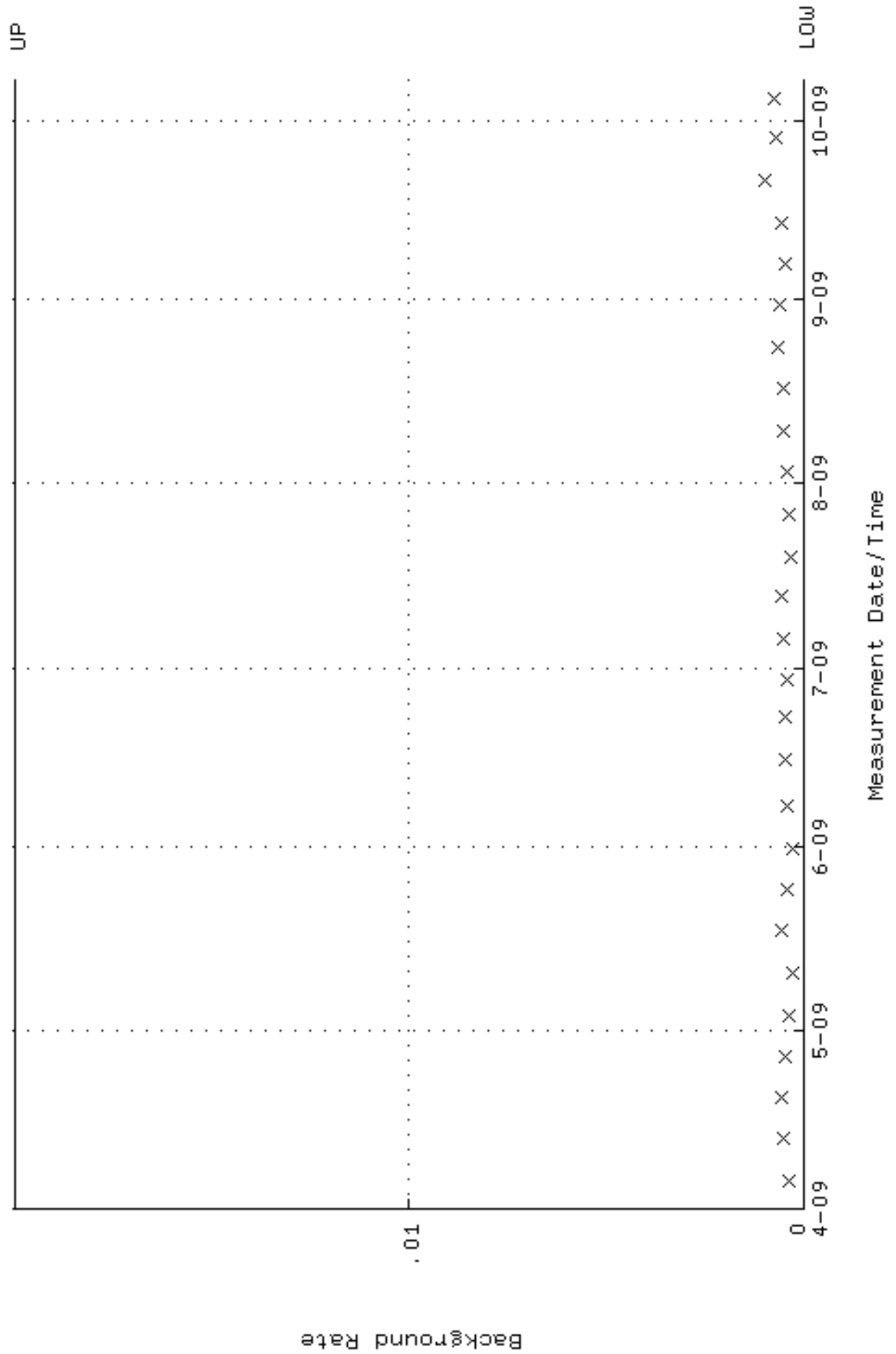
QA filename : DKA100:[ENV\_ALPHA.QA.W]W016.QAF;3  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:02 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.326058 through 0.346058



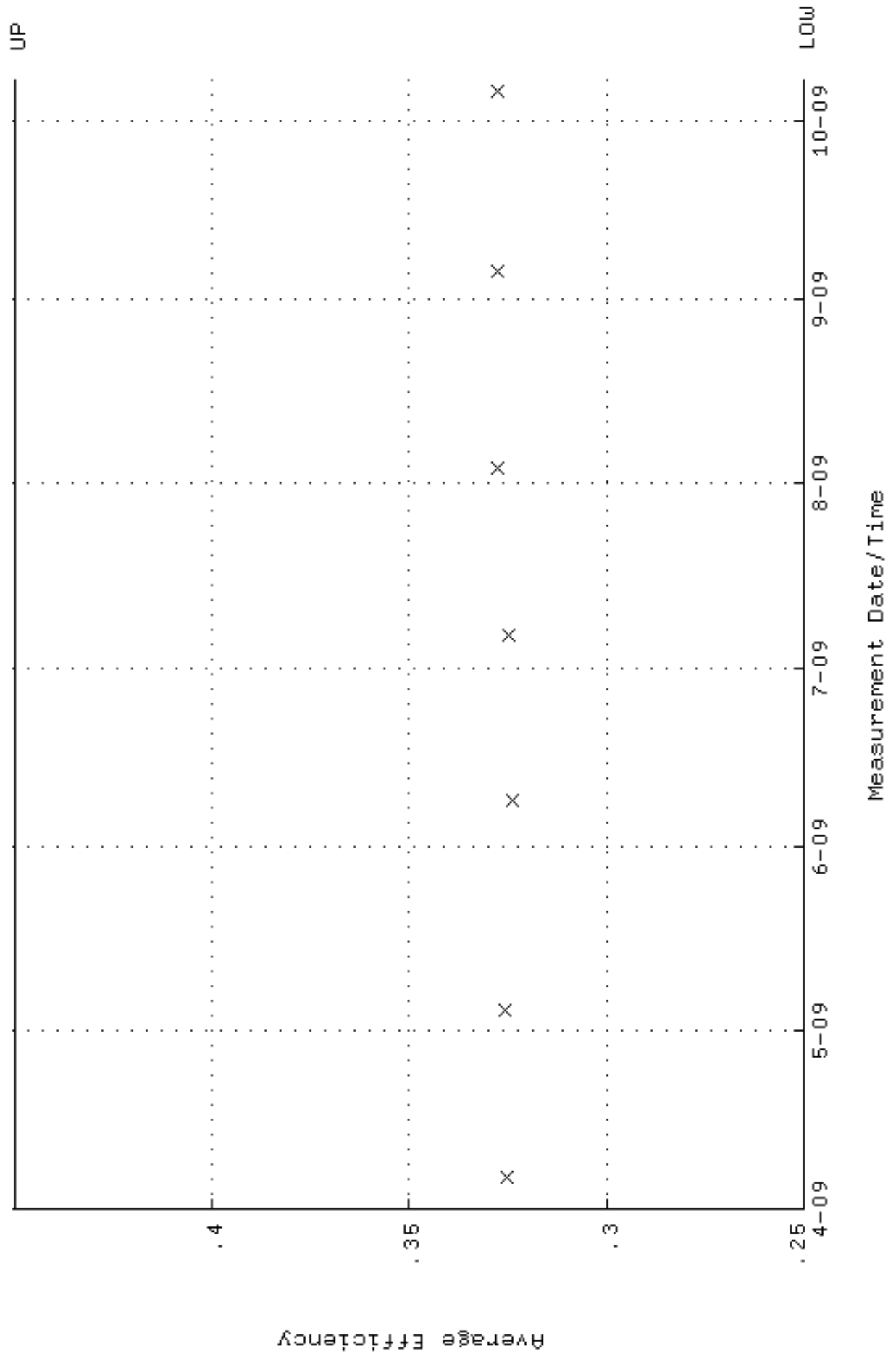
QA filename : DKA100:[ENV\_ALPHA.QA.W]W016.QAF;3  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:02 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 85.9280 through 94.9730



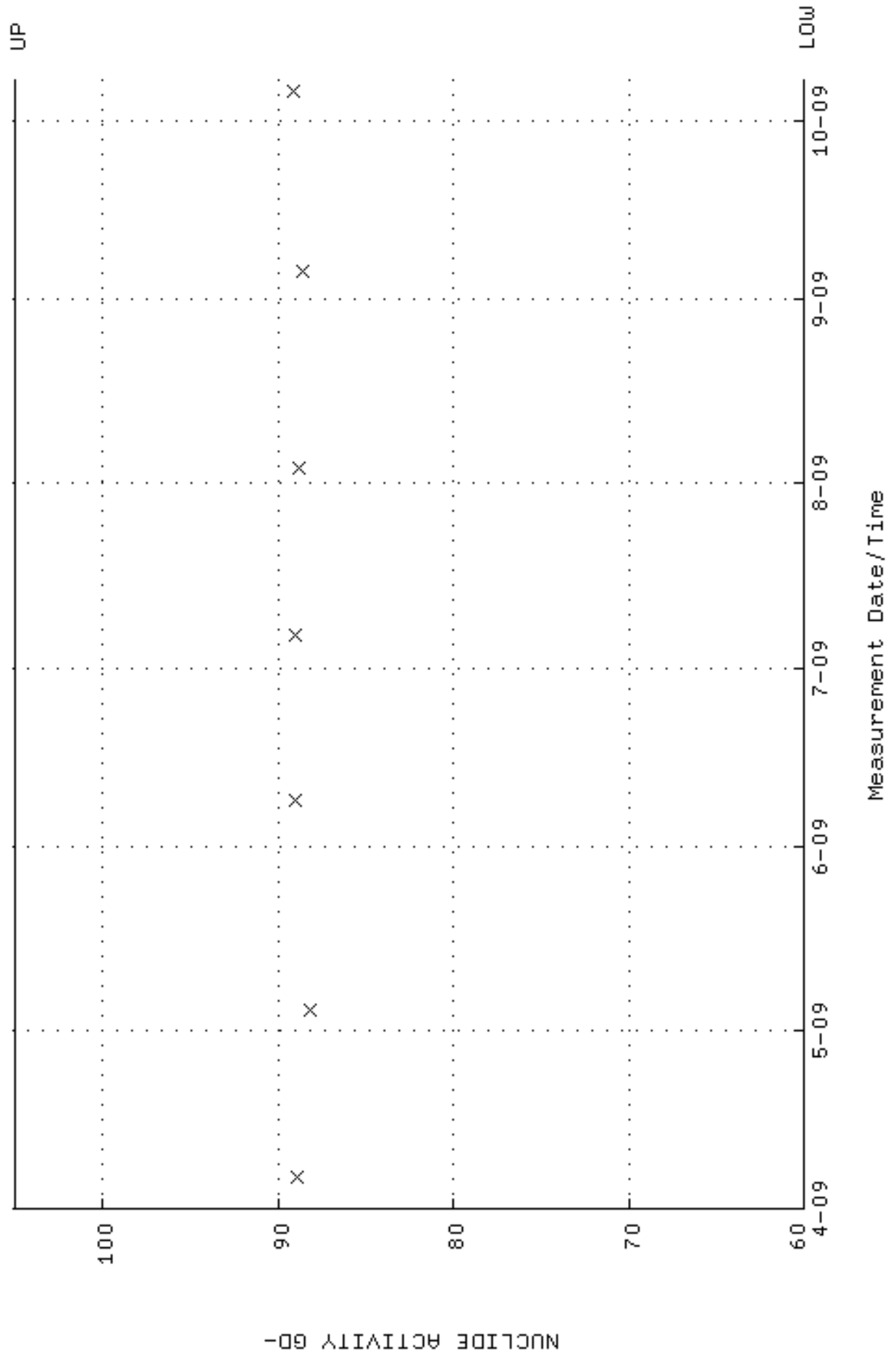
QA filename : DKA100:[ENV\_ALPHA.QA.B]B016.QAF;2  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:09 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



QA filename : DKA100:[ENV\_ALPHA.QA.W]W025.QAF;4  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:04 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.250000 through 0.450000



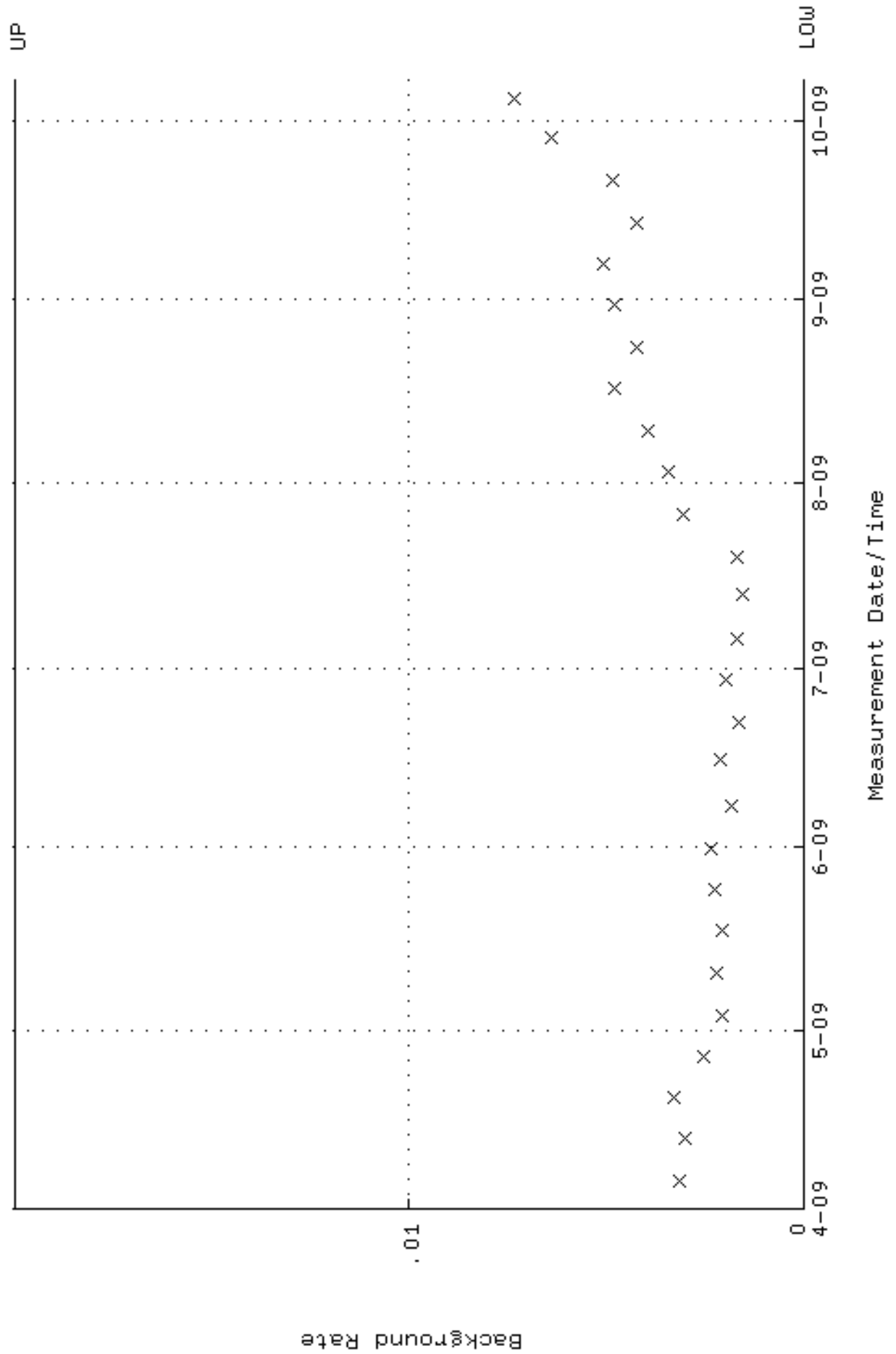
QA filename : DKA100:[ENV\_ALPHA.QA.W]W025.QAF;4  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:04 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 60.0000 through 105.0000



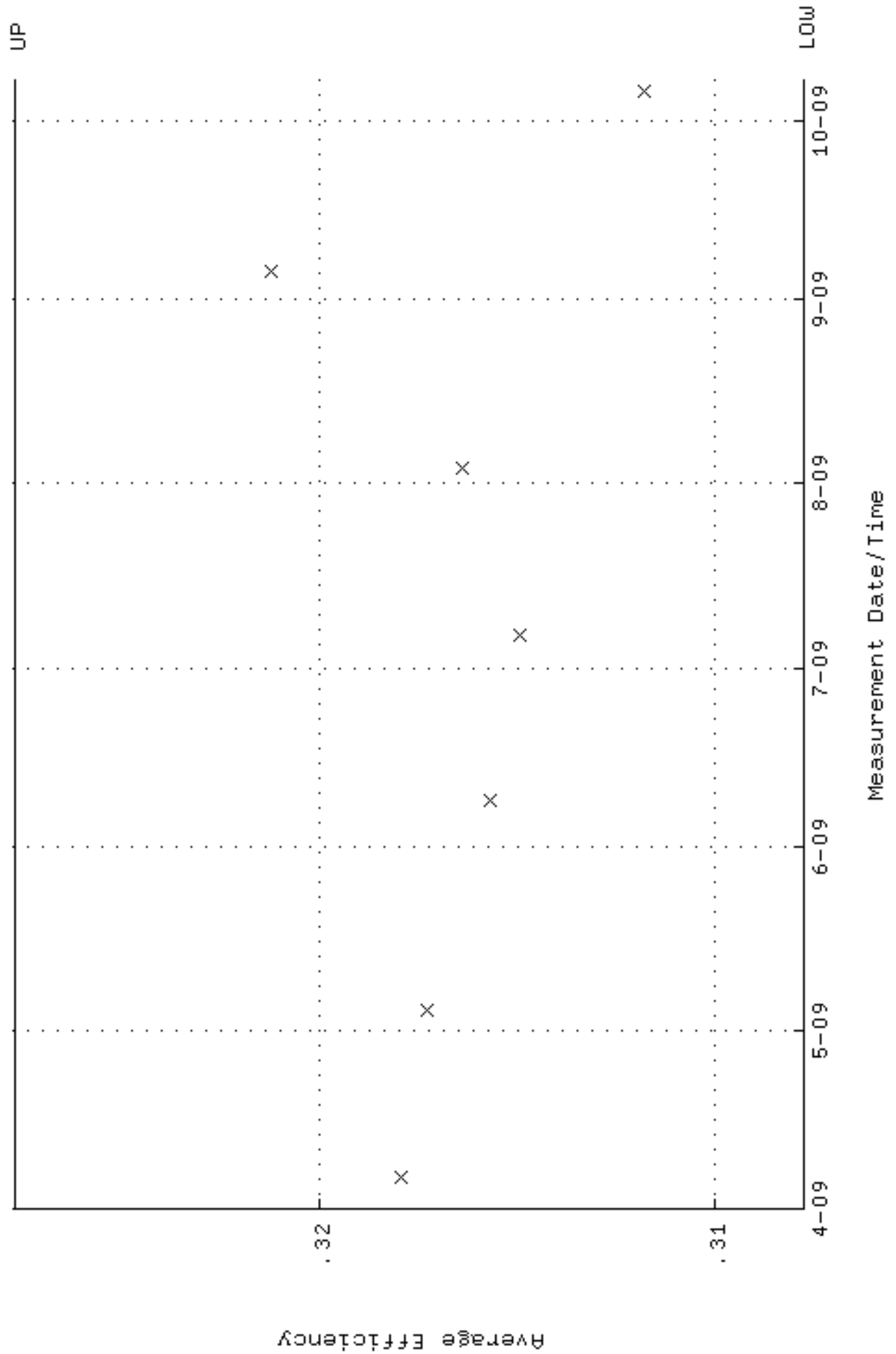
NUCLIDE ACTIVITY GD-



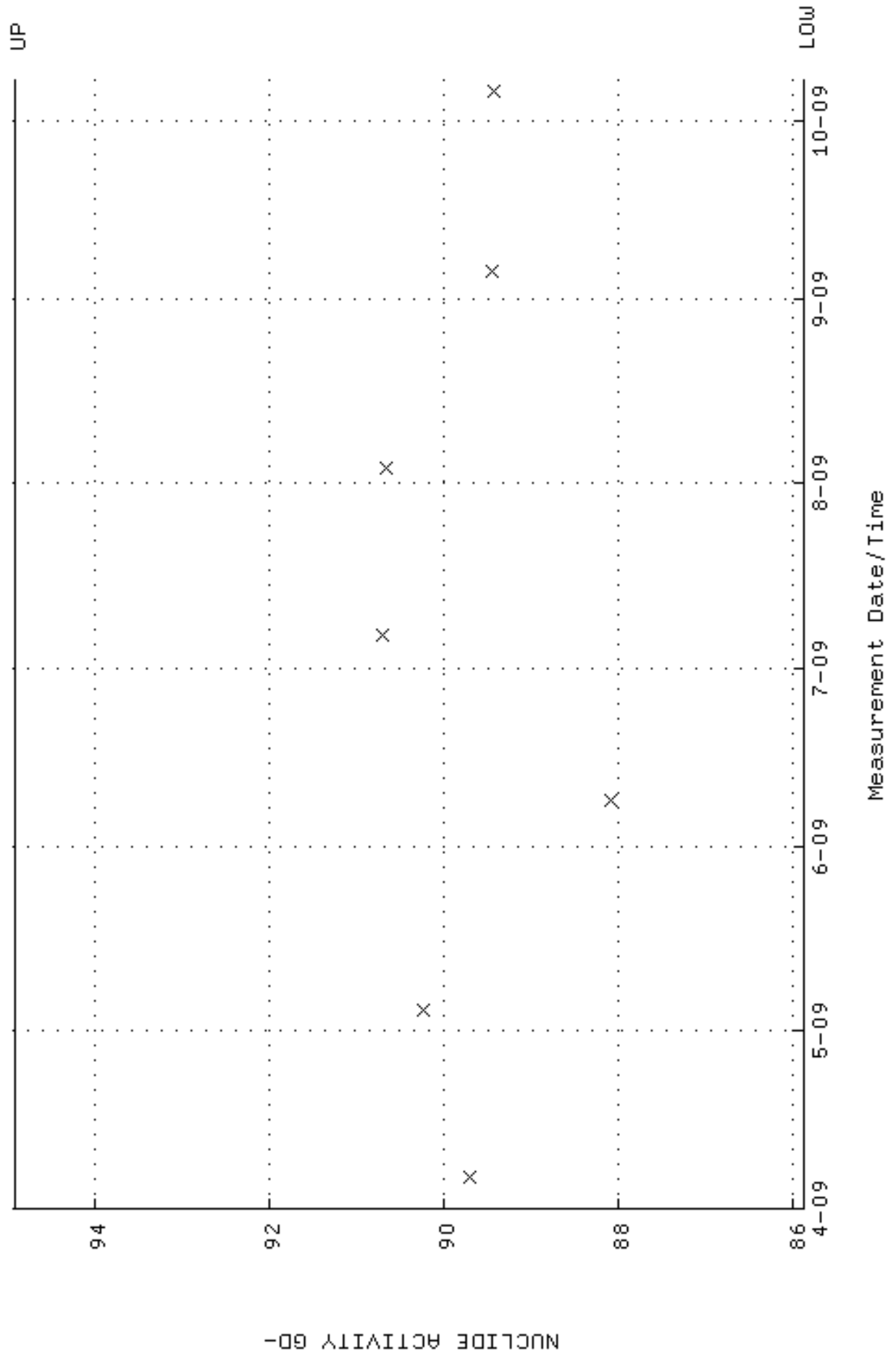
QA filename : DKA100:[ENV\_ALPHA.QA.B]B025.QAF;2  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:12 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



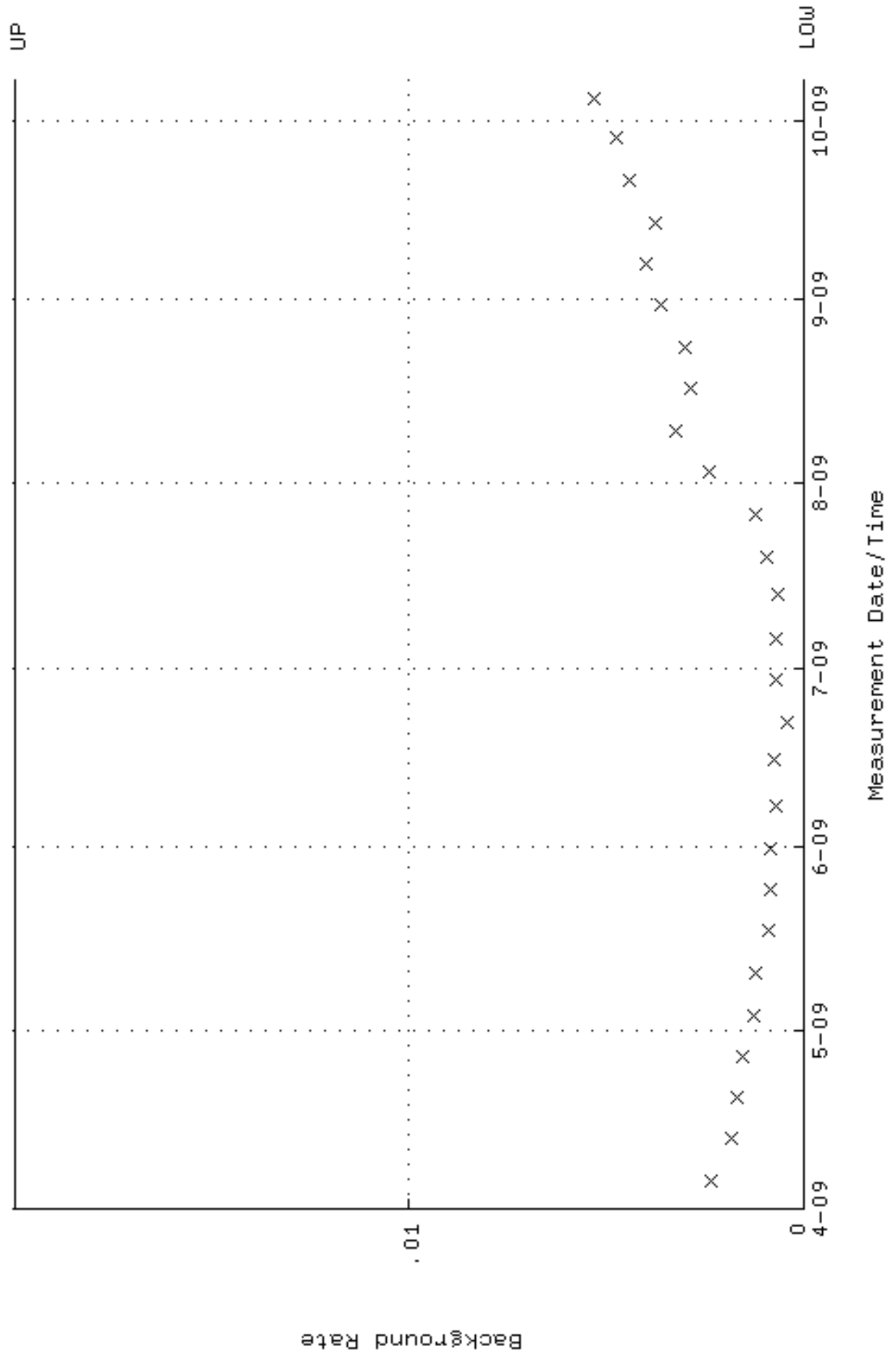
QA filename : DKA100:[ENV\_ALPHA.QA.W]W026.QAF;3  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:04 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.307728 through 0.327728



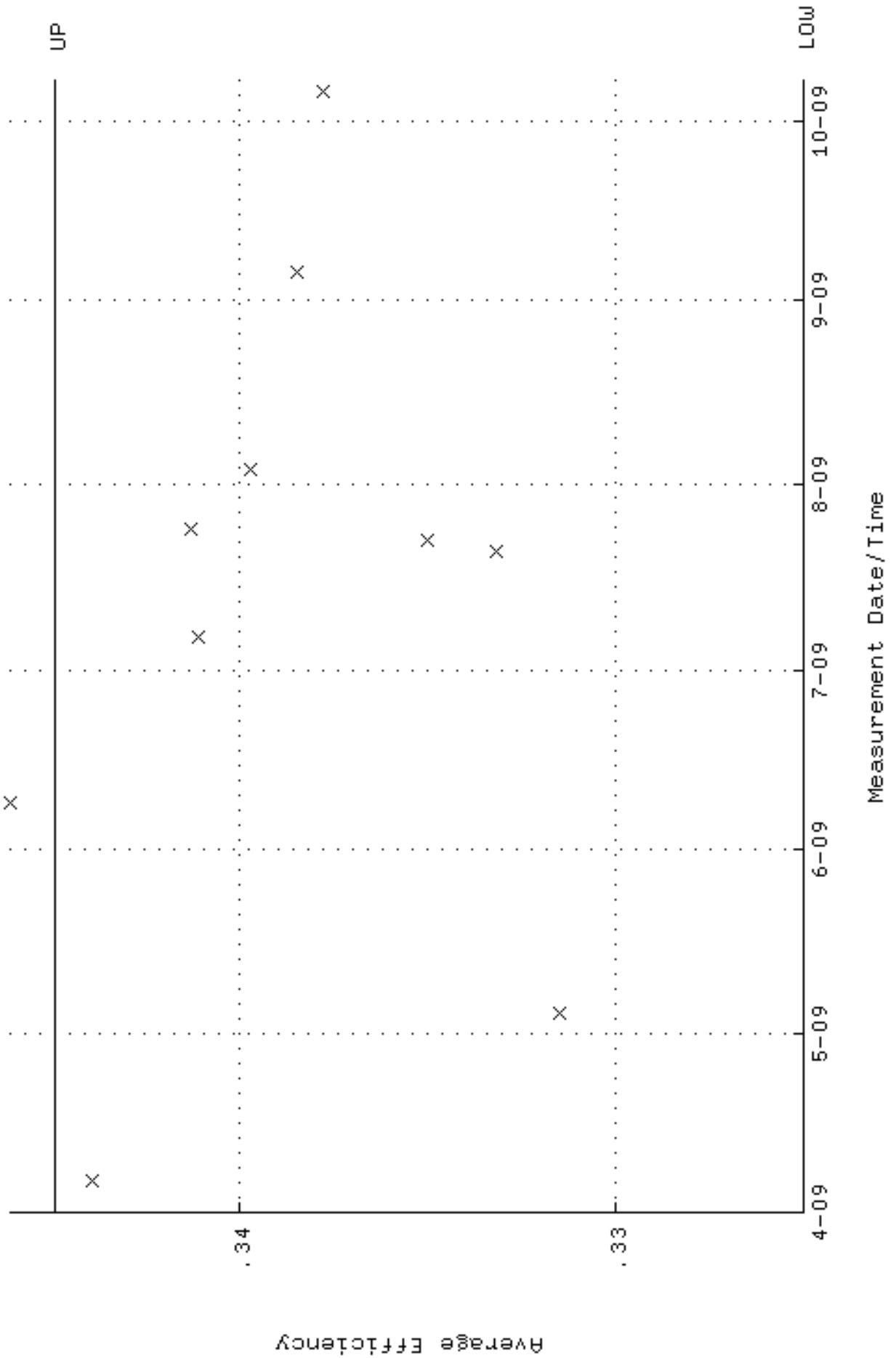
QA filename : DKA100:[ENV\_ALPHA.QA.W]W026.QAF;3  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:04 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 85.8763 through 94.9159



QA filename : DKA100:[ENV\_ALPHA.QA.B]B026.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:12 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



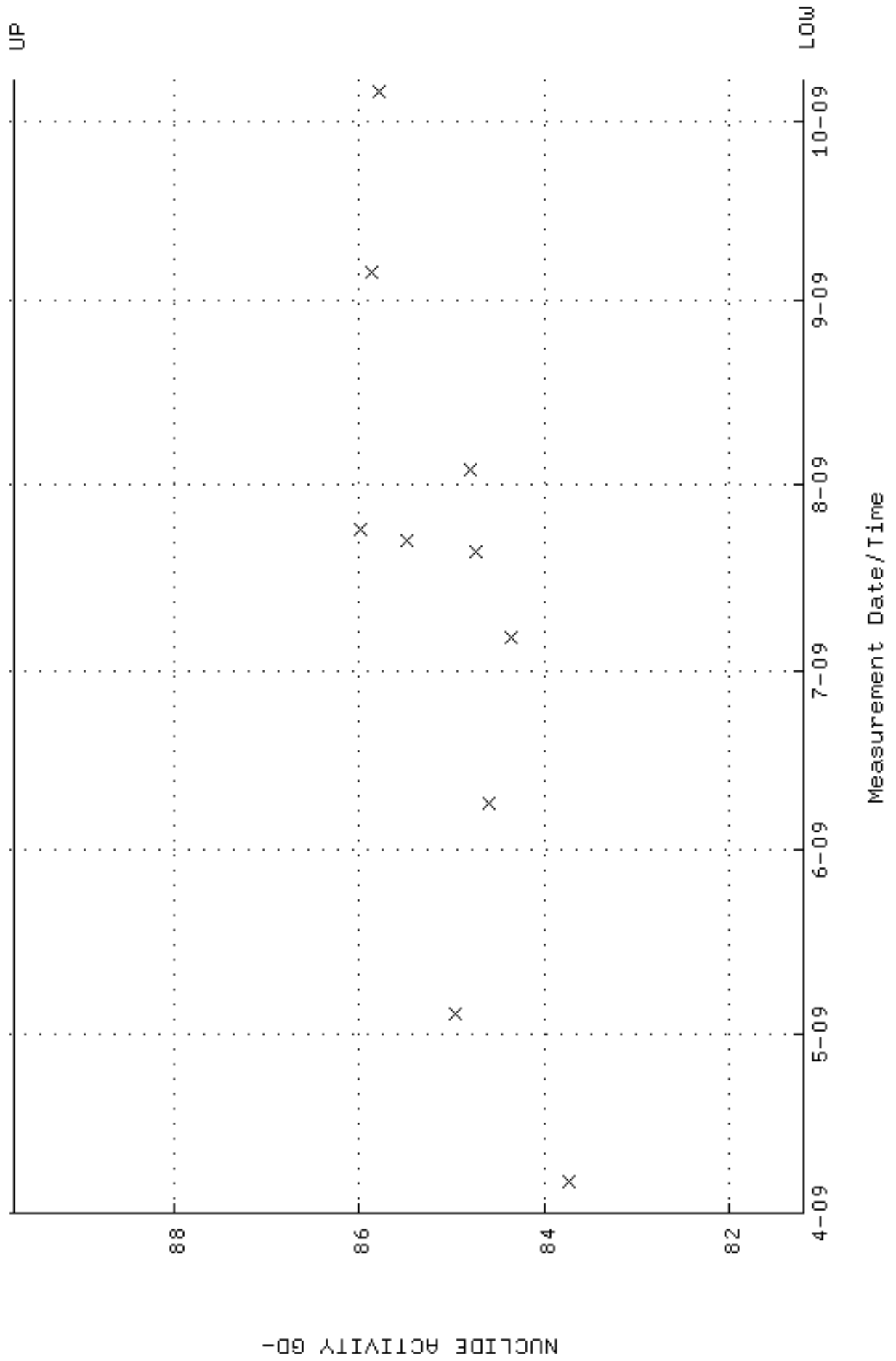
QA filename : DKA100:[ENV\_ALPHA.QA.W]W027.QAF;4  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:04 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.324980 through 0.344980



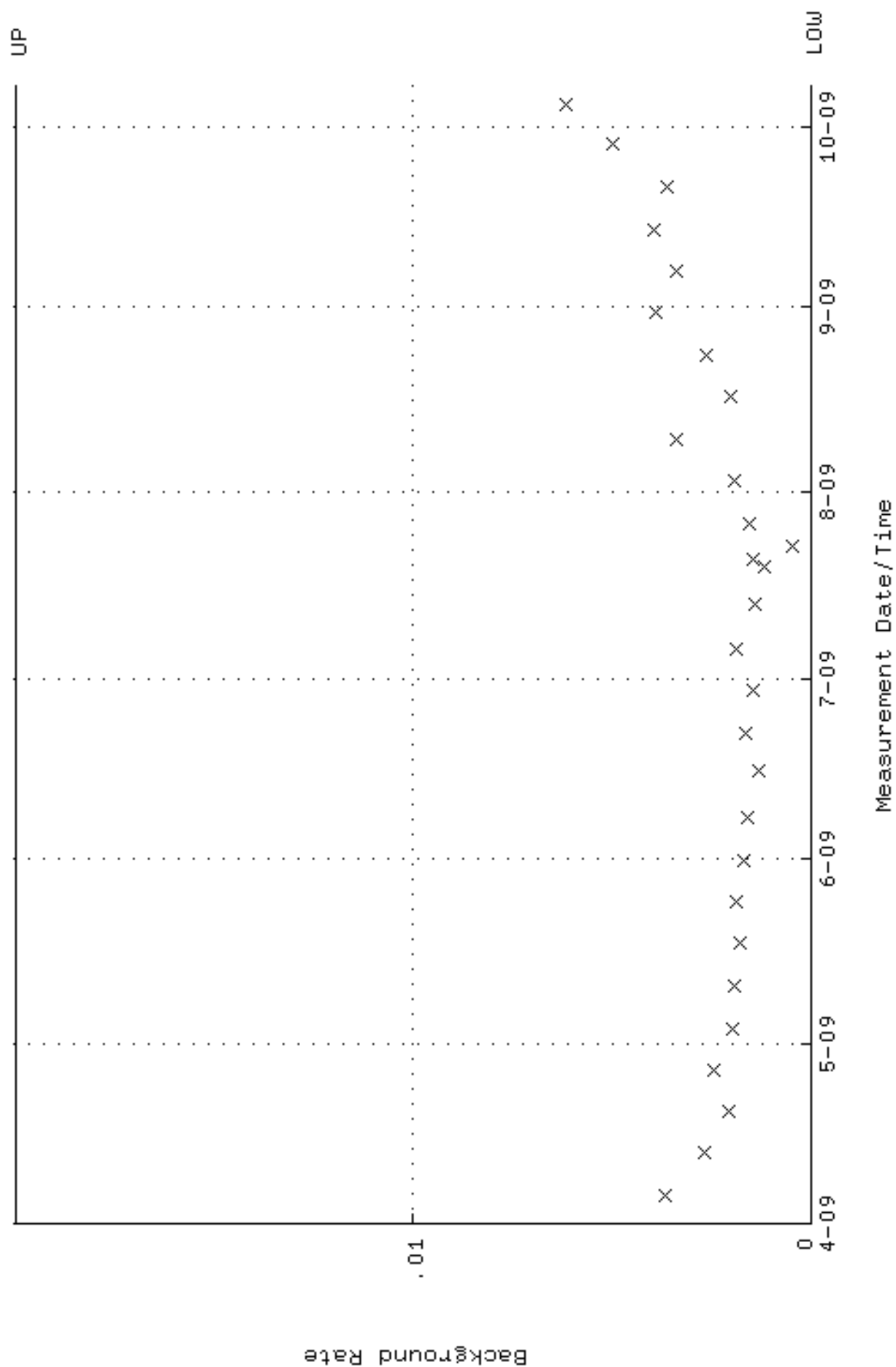
Average Efficiency

Measurement Date/Time

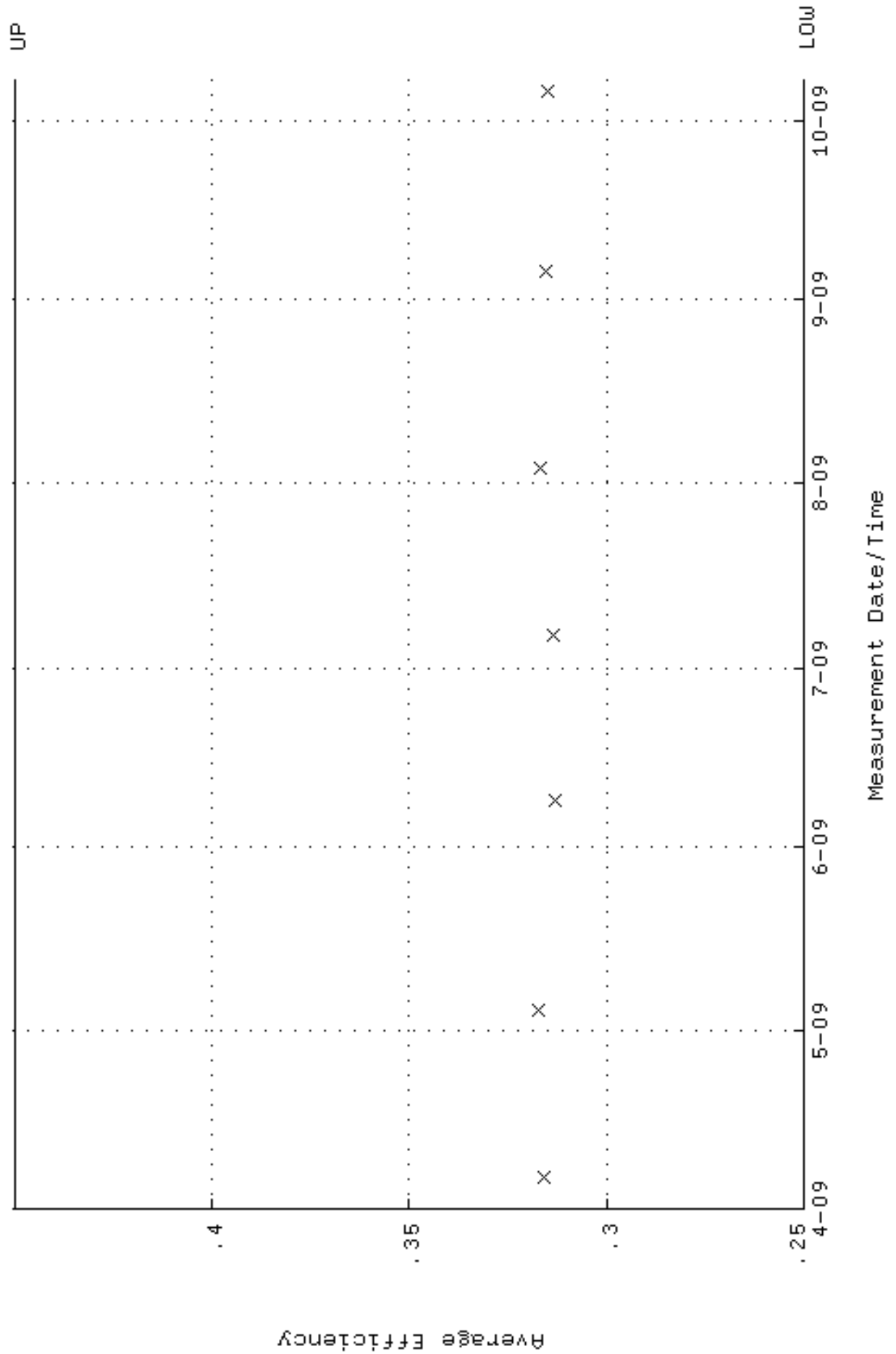
QA filename : DKA100:[ENV\_ALPHA.QA.W]W027.QAF;4  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:04 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 81.2030 through 89.7506



QA filename : DKA100:[ENV\_ALPHA.QA.B]B027.QAF;1  
Parameter Name : BACKRATE (Background Rate)  
Start/End Dates : 5-APR-2009 15:33:12 through 7-OCT-2009 12:00:00  
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02

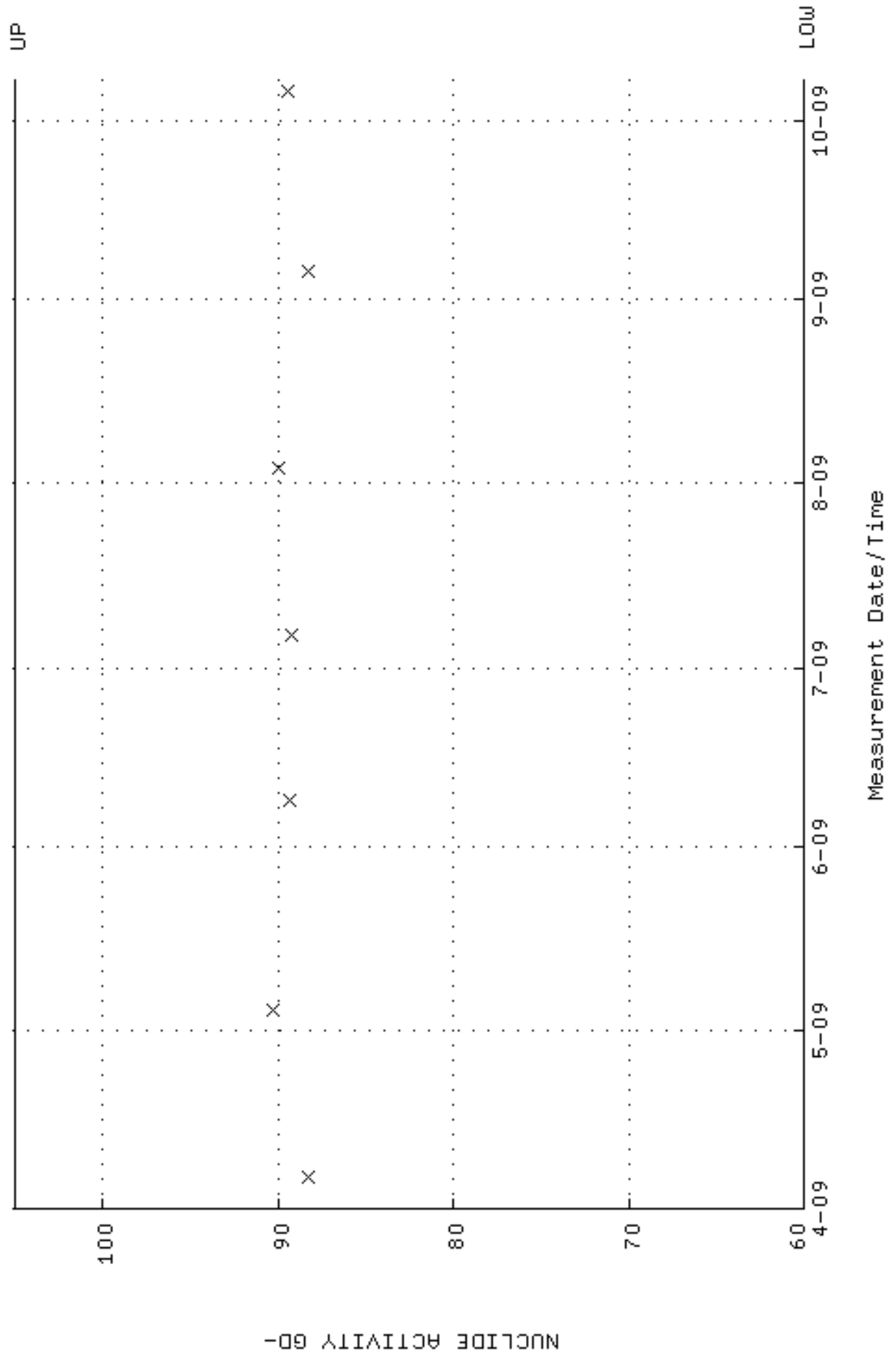


QA filename : DKA100:[ENV\_ALPHA.QA.W]W029.QAF;6  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:04 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.250000 through 0.450000

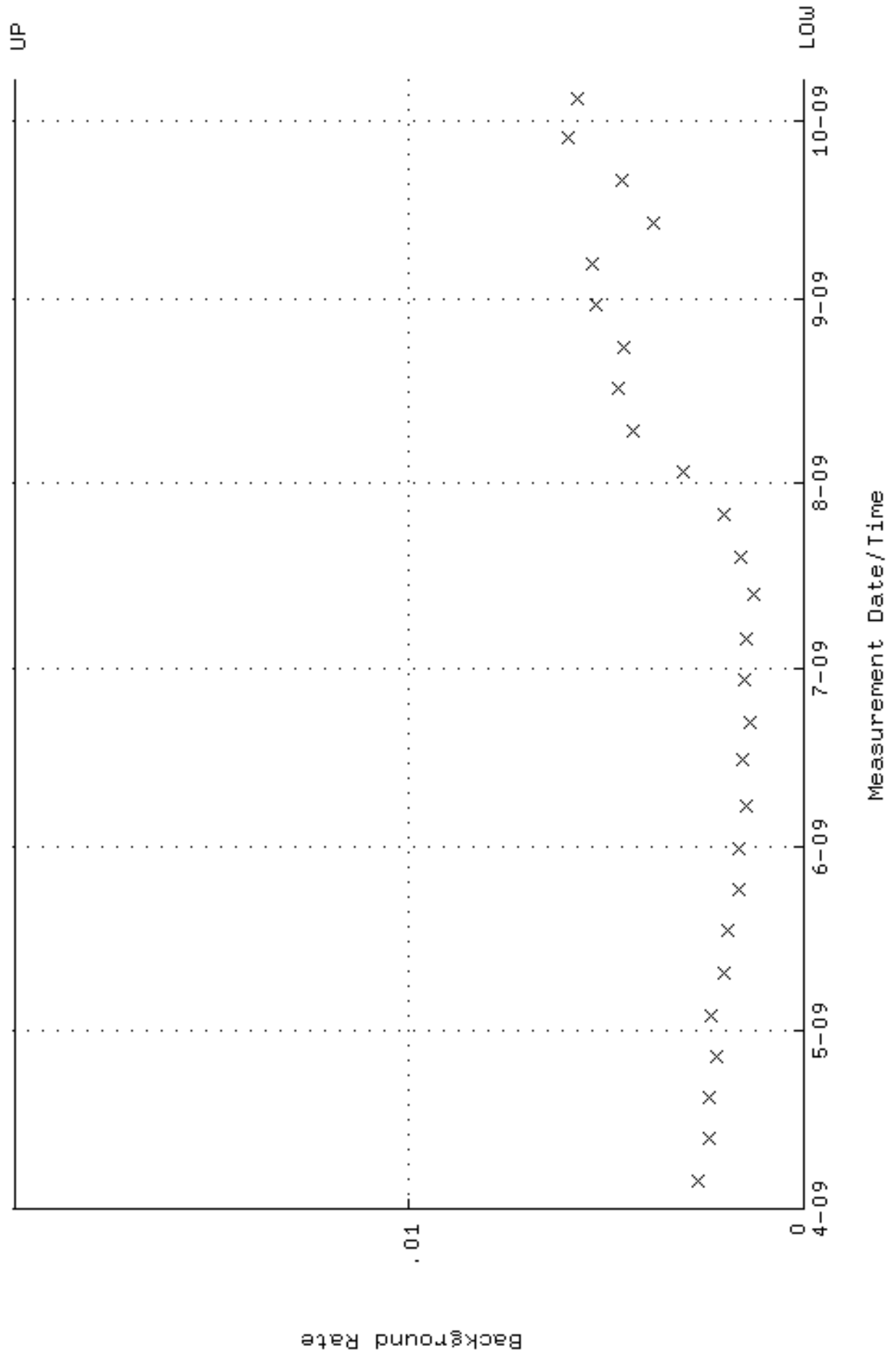




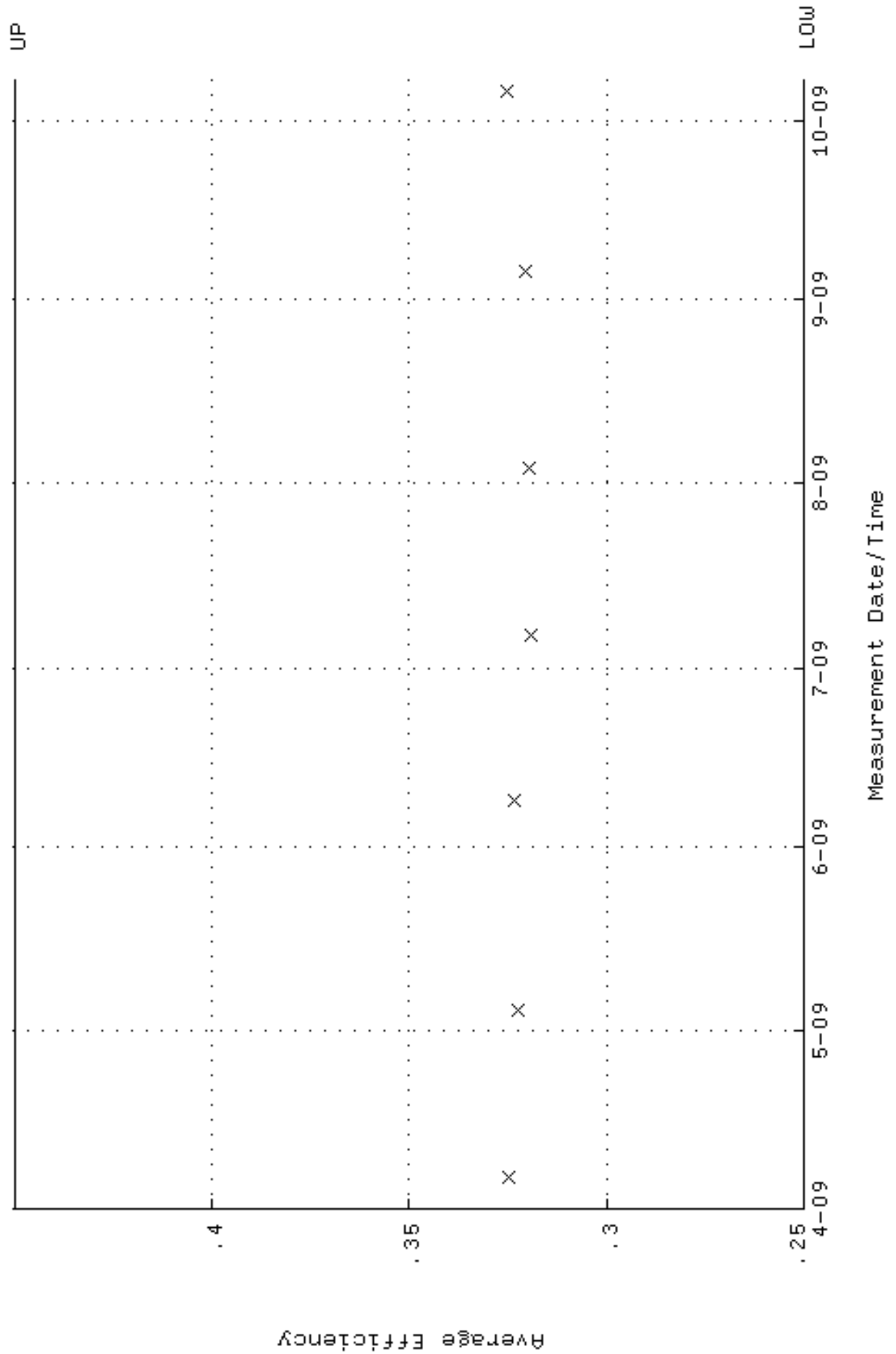
QA filename : DKA100:[ENV\_ALPHA.QA.W]W029.QAF;6  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:04 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 60.0000 through 105.0000



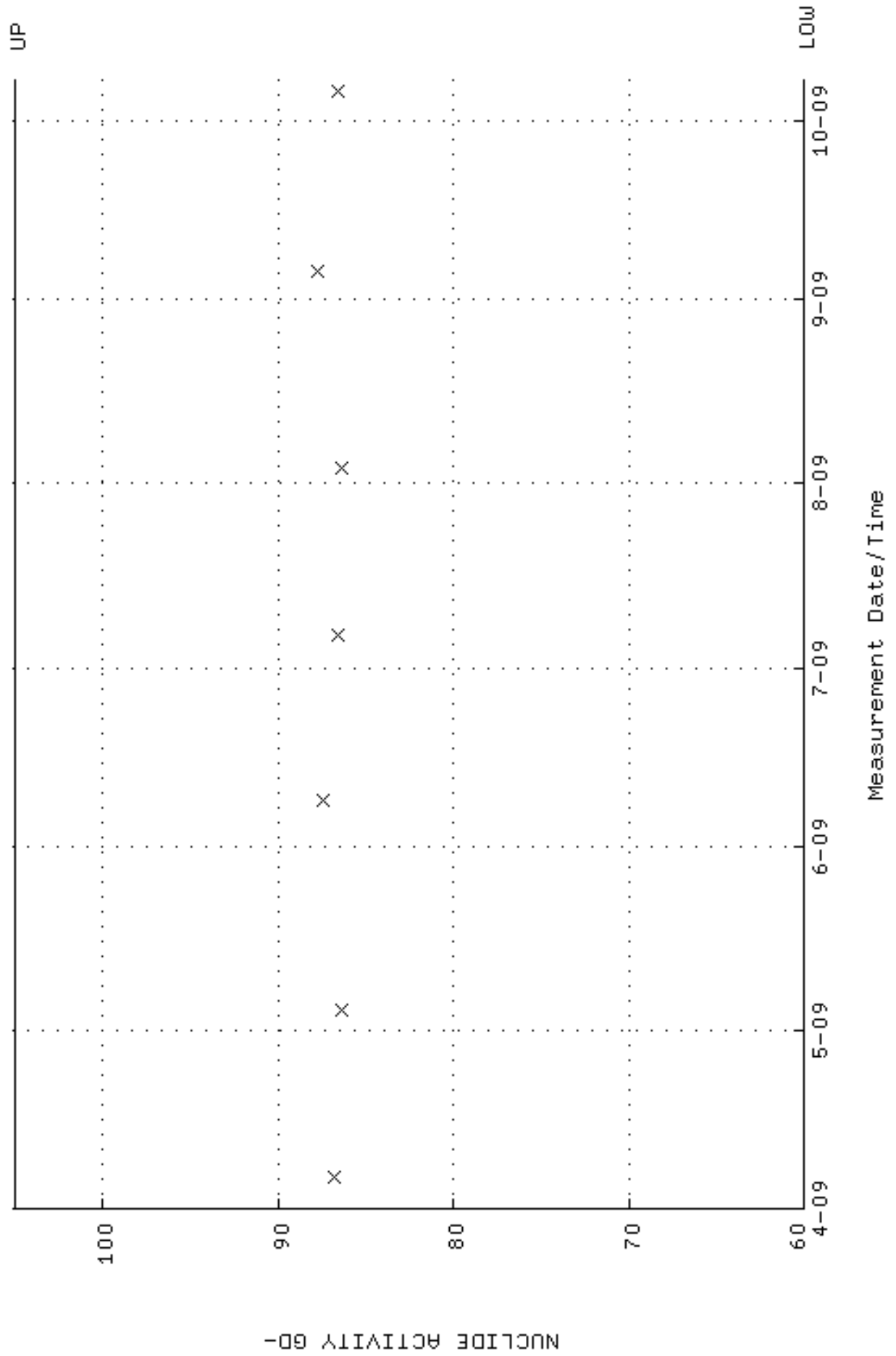
QA filename : DKA100:[ENV\_ALPHA.QA.B]B029.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:12 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



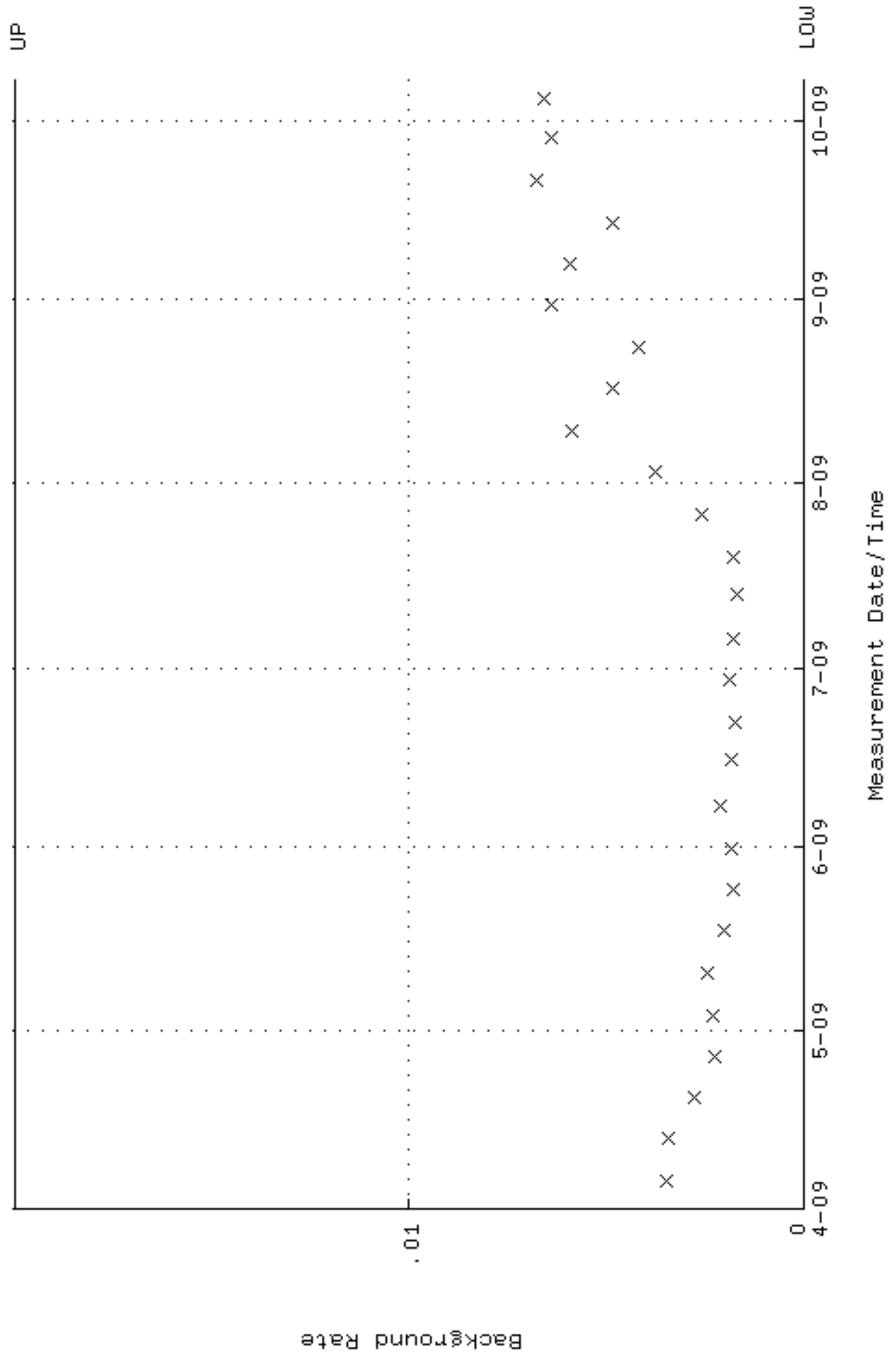
QA filename : DKA100:[ENV\_ALPHA.QA.W]W030.QAF;3  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:04 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.250000 through 0.450000



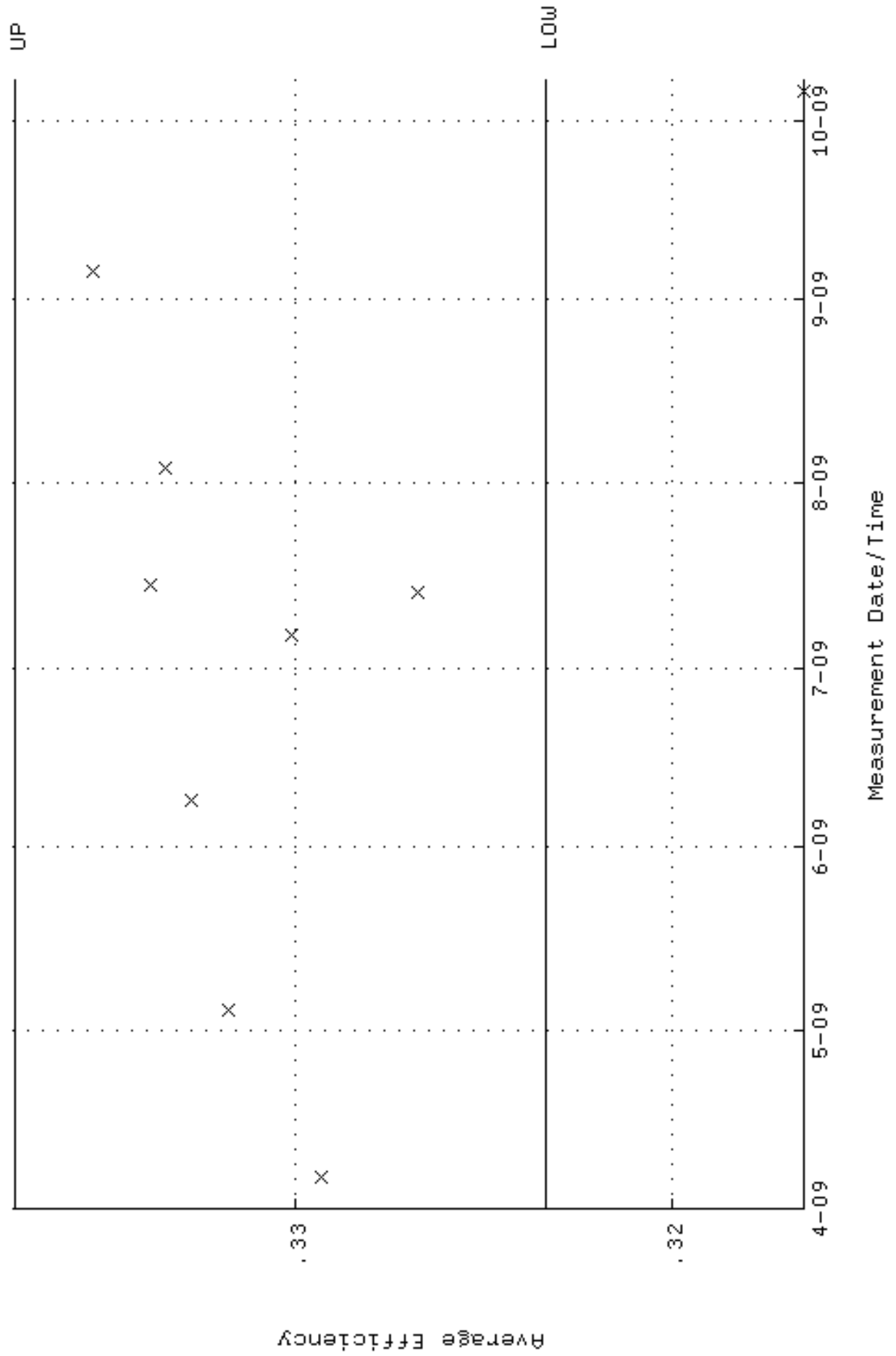
QA filename : DKA100:[ENV\_ALPHA.QA.W]W030.QAF;3  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:04 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 60.0000 through 105.0000



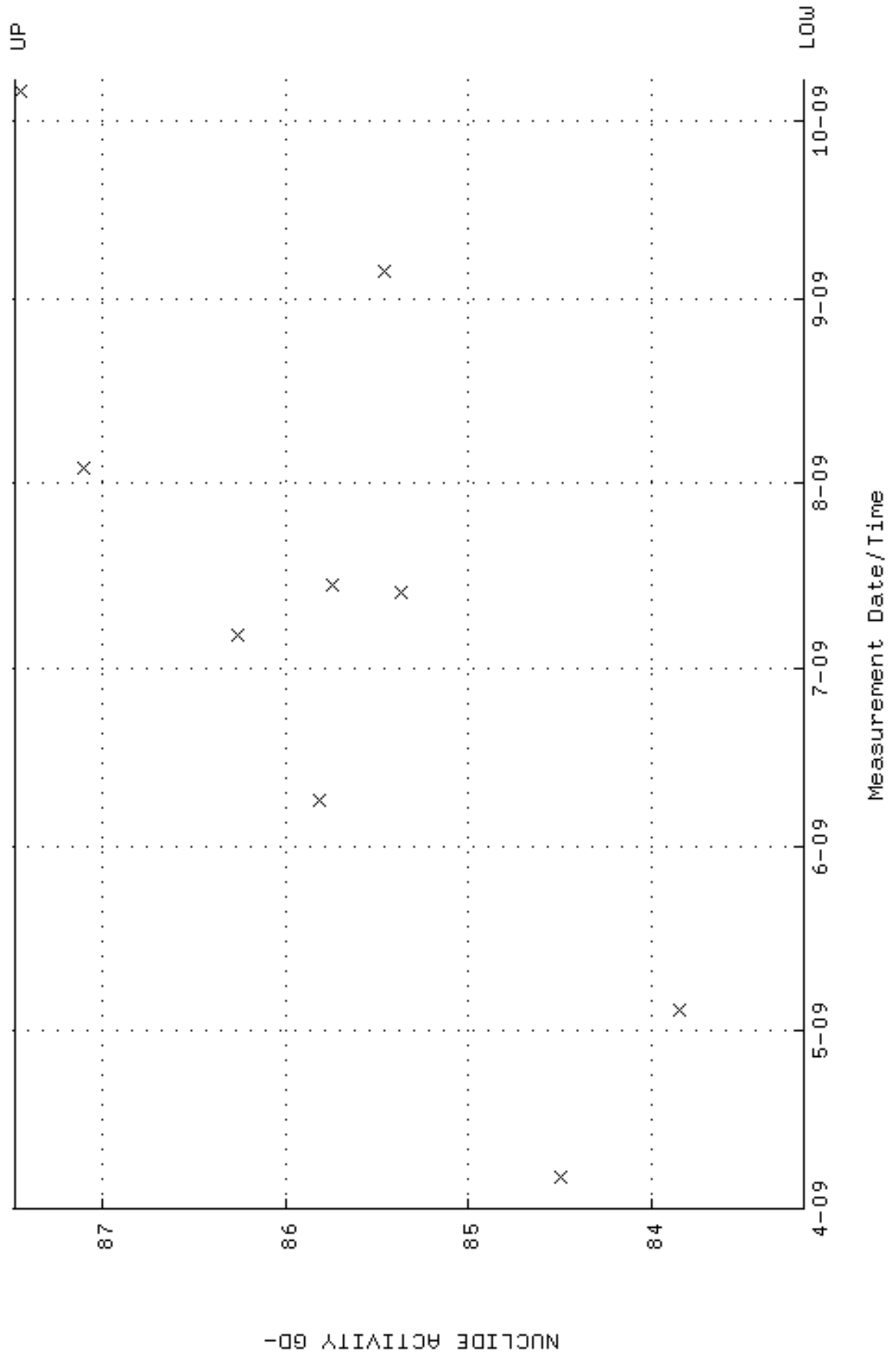
QA filename : DKA100:[ENV\_ALPHA.QA.B]B030.QAF;1  
Parameter Name : BACKRATE (Background Rate)  
Start/End Dates : 5-APR-2009 15:33:12 through 7-OCT-2009 12:00:00  
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



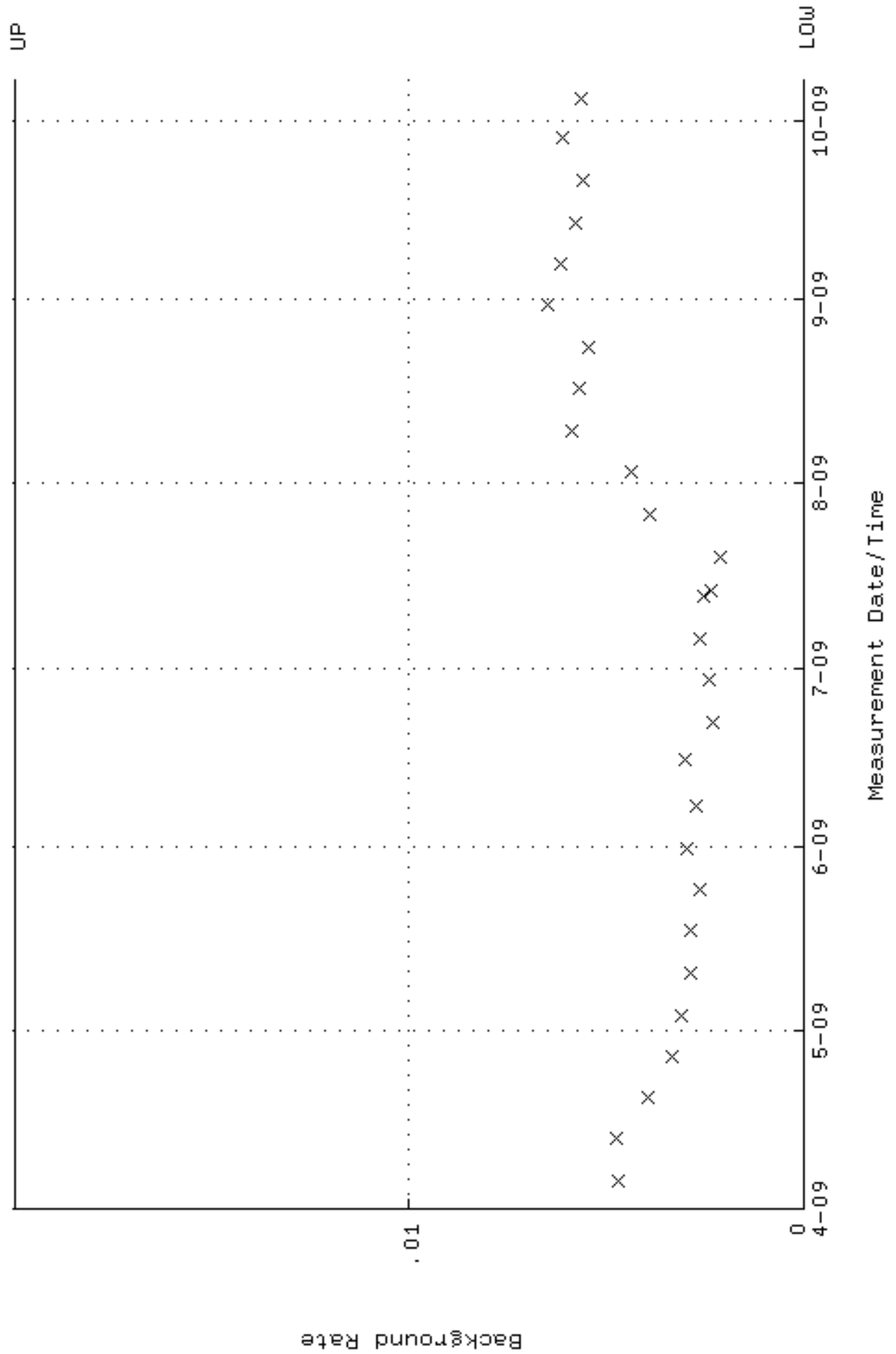
QA filename : DKA100:[ENV\_ALPHA.QA.W]W031.QAF;4  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:05 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.323399 through 0.337447



QA filename : DKA100:[ENV\_ALPHA.QA.W]W031.QAF;4  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:05 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 83.1638 through 87.4767

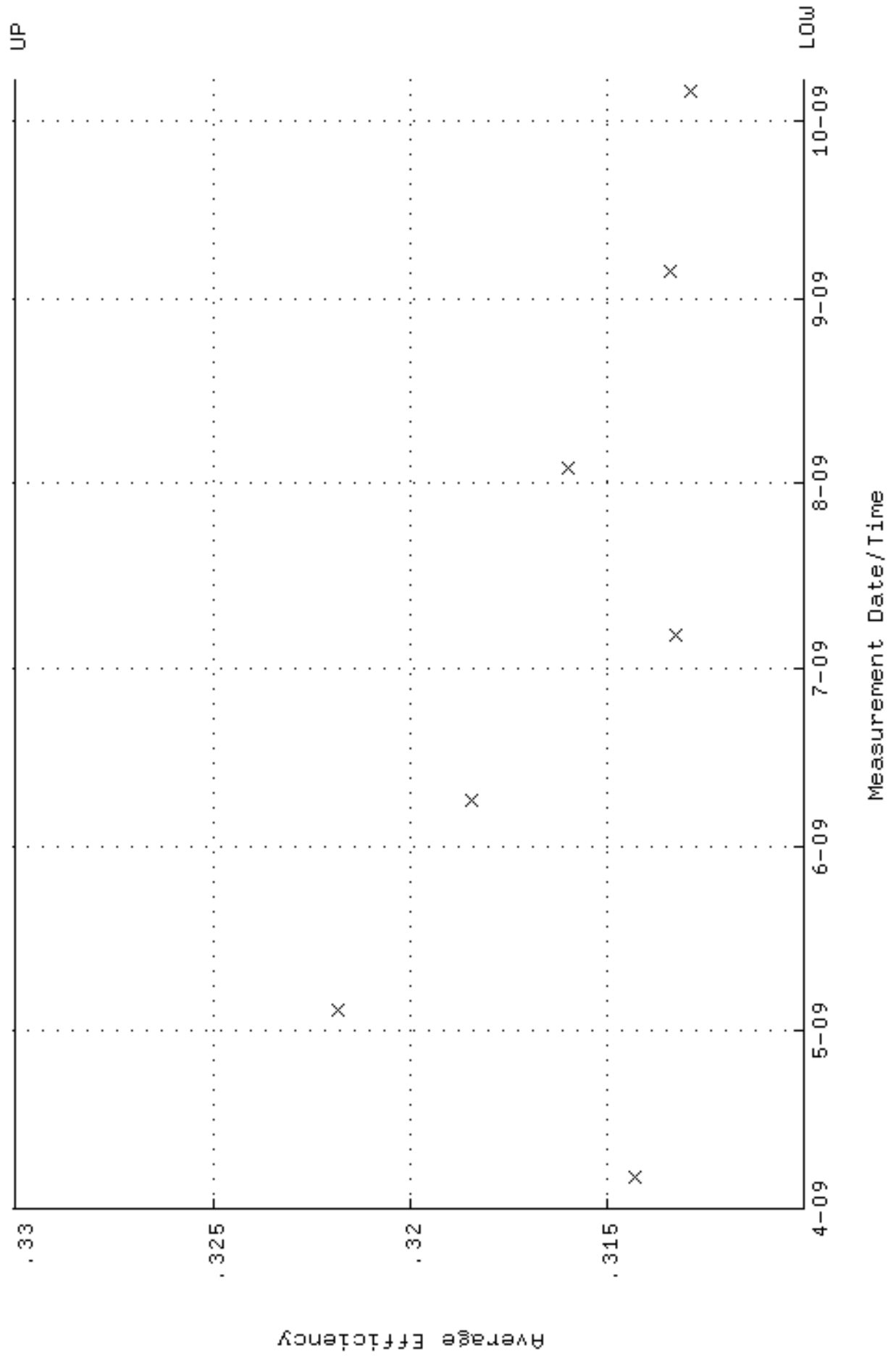


QA filename : DKA100:[ENV\_ALPHA.QA.B]B031.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:12 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02

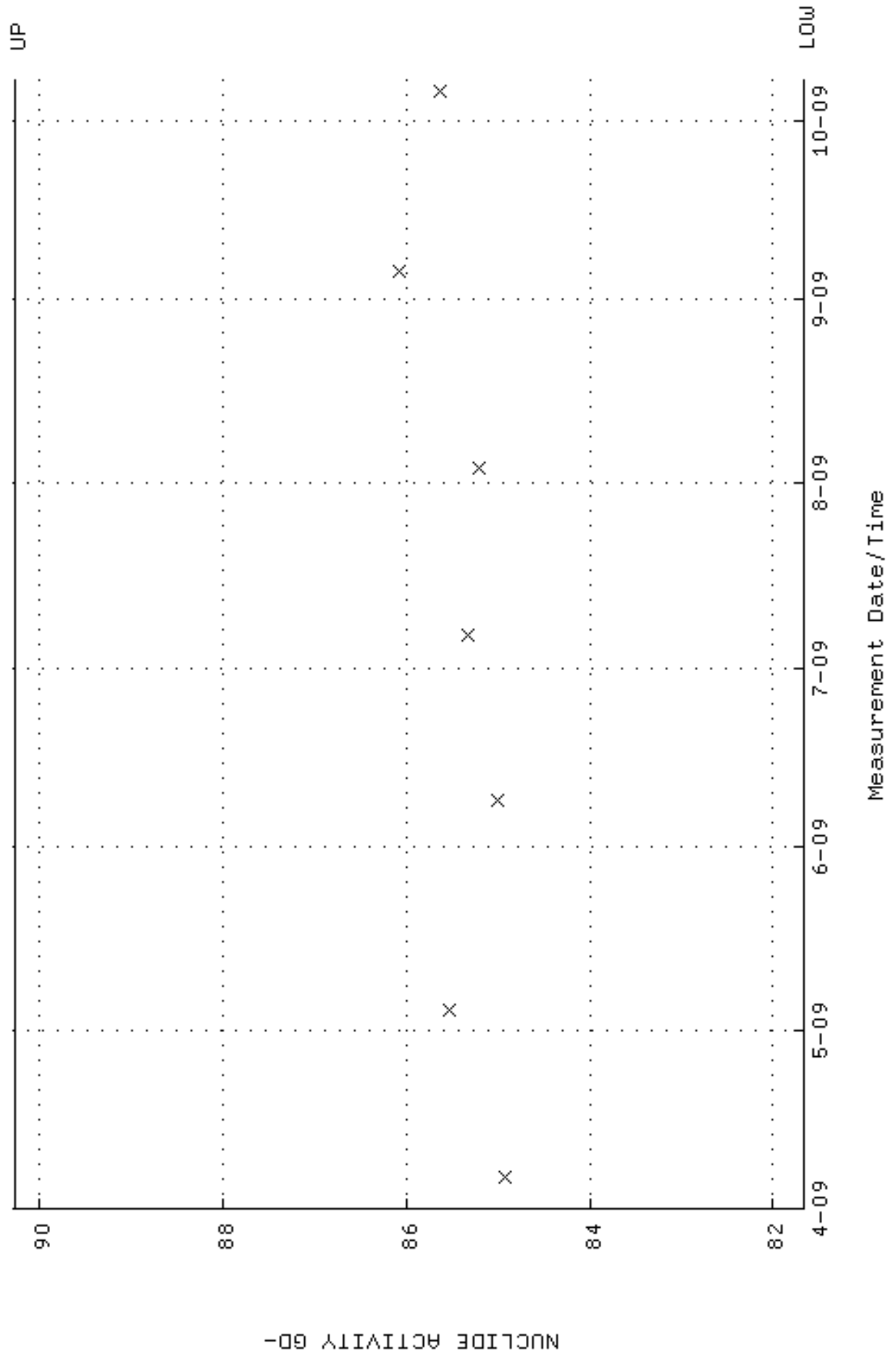




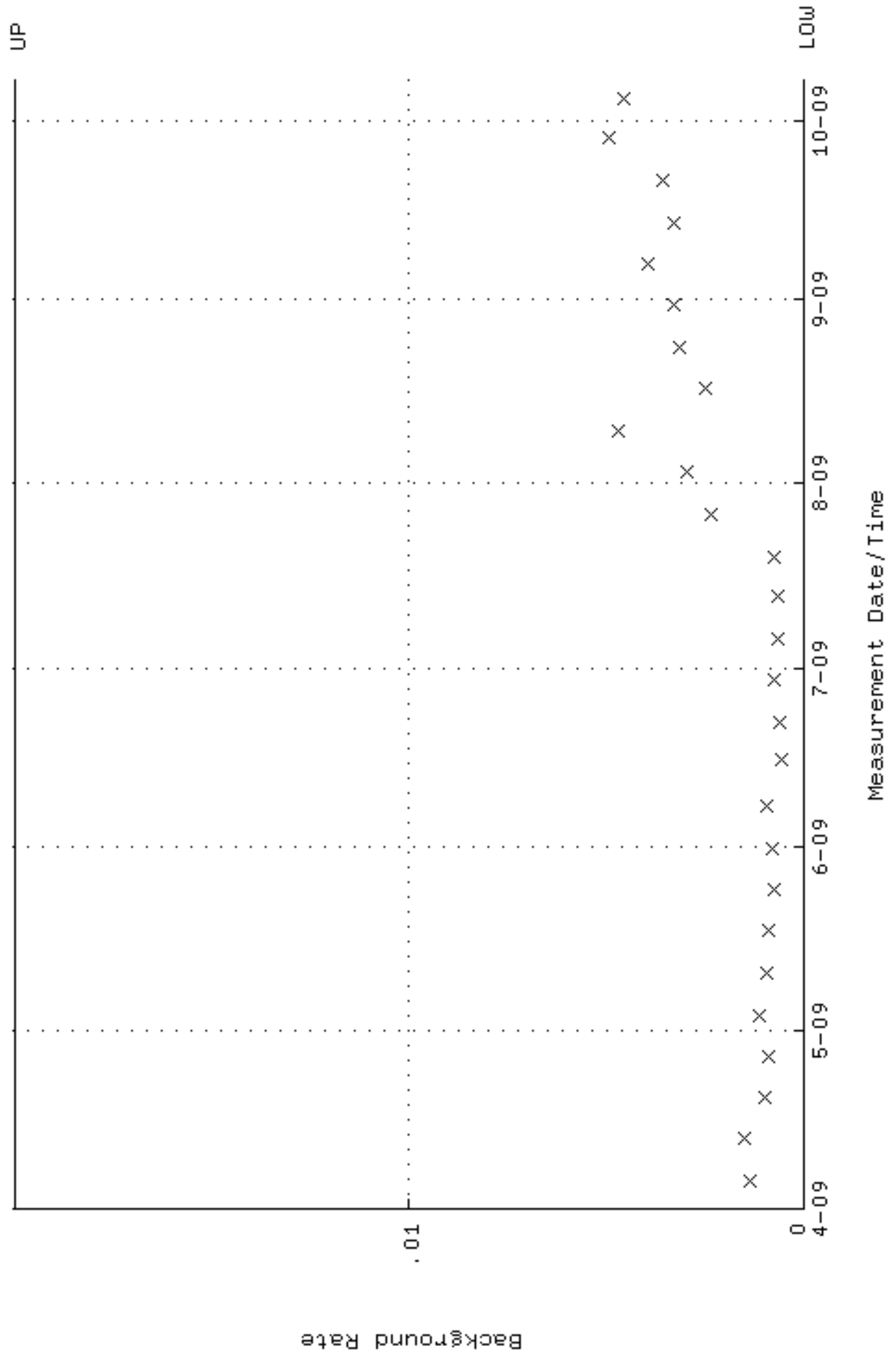
QA filename : DKA100:[ENV\_ALPHA.QA.W]W033.QAF;3  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:05 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.310023 through 0.330023



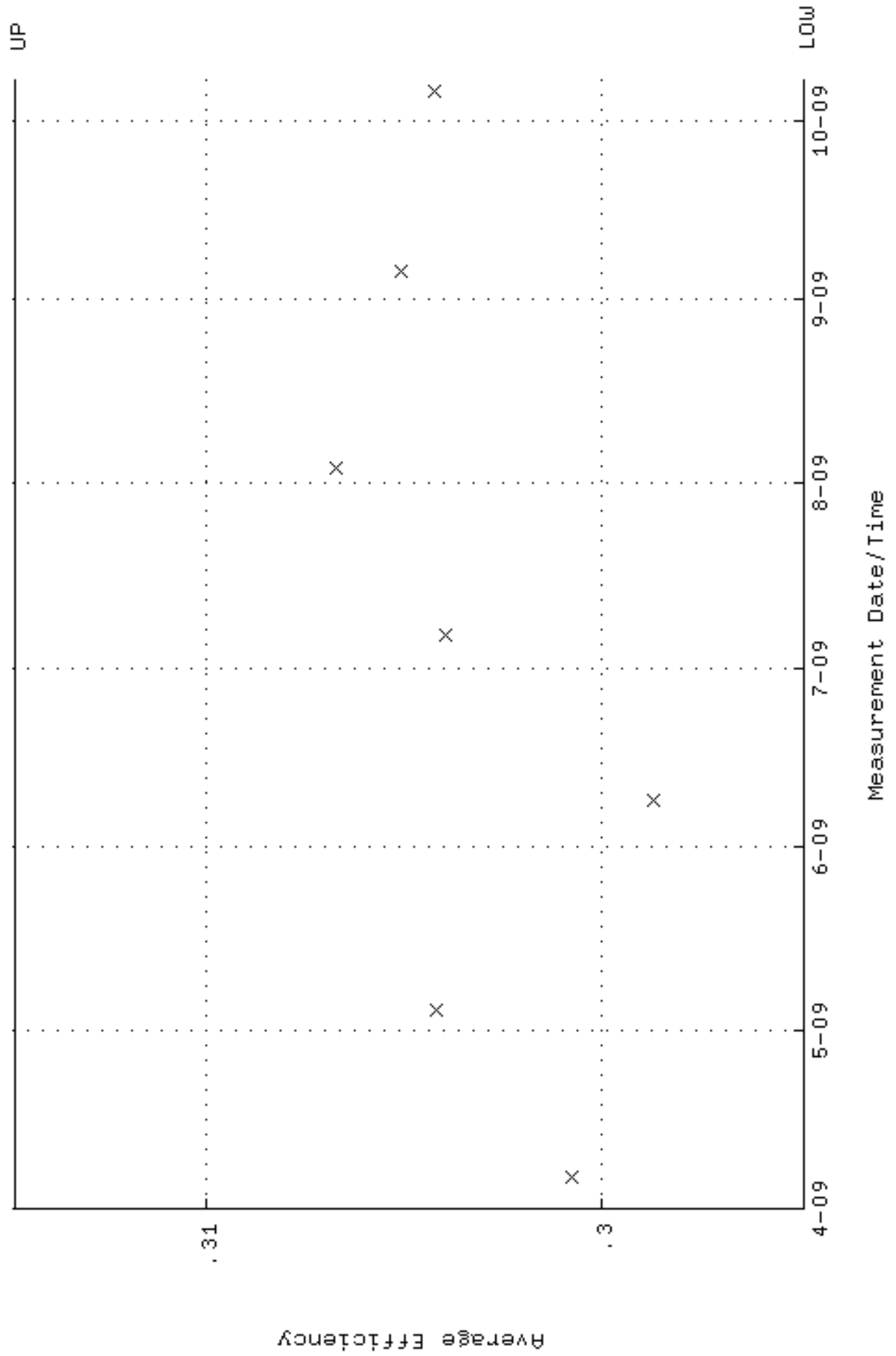
QA filename : DKA100:[ENV\_ALPHA.QA.W]W033.QAF;3  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:05 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 81.6649 through 90.2613



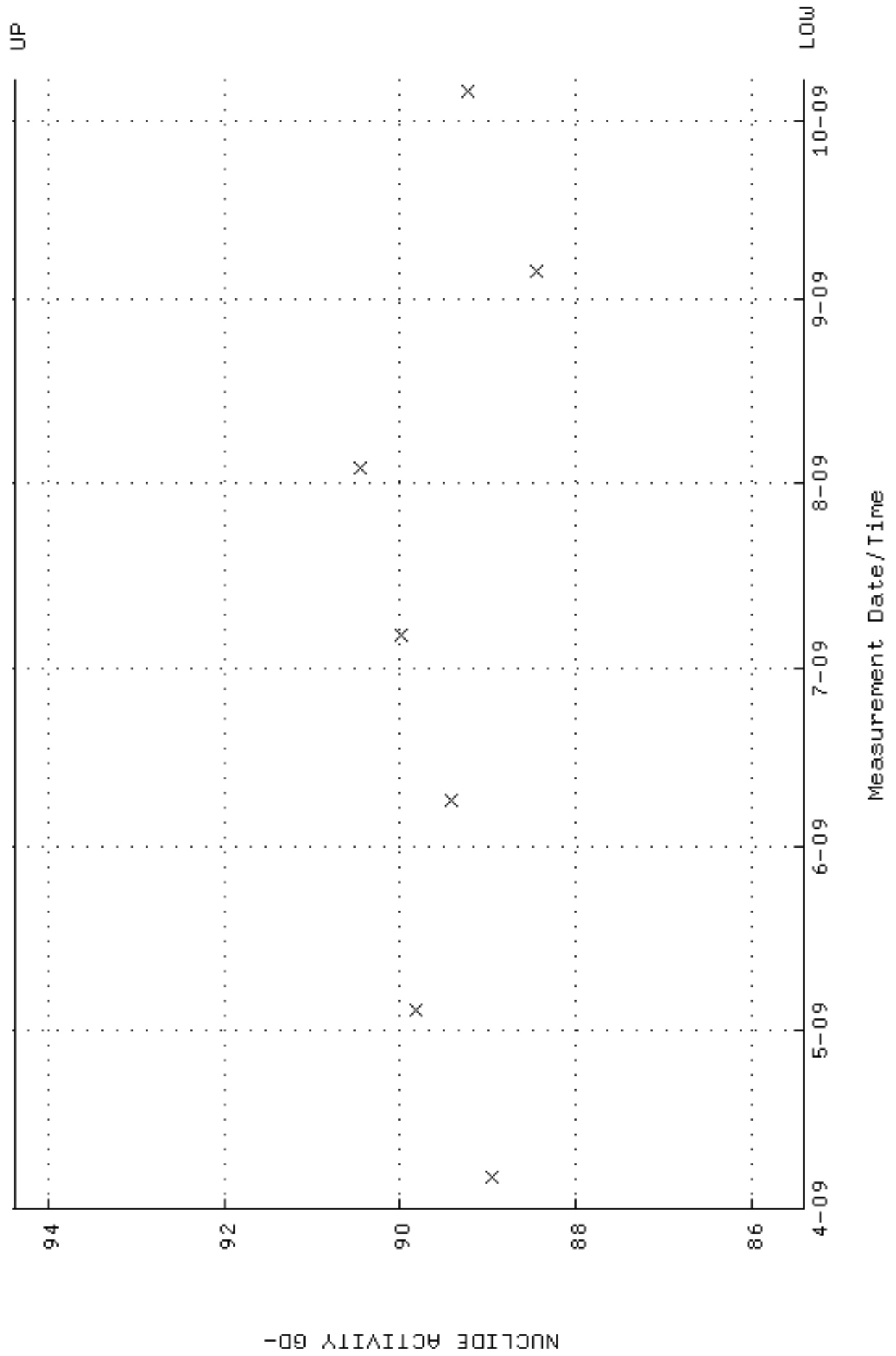
QA filename : DKA100:[ENV\_ALPHA.QA.B]B033.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:12 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



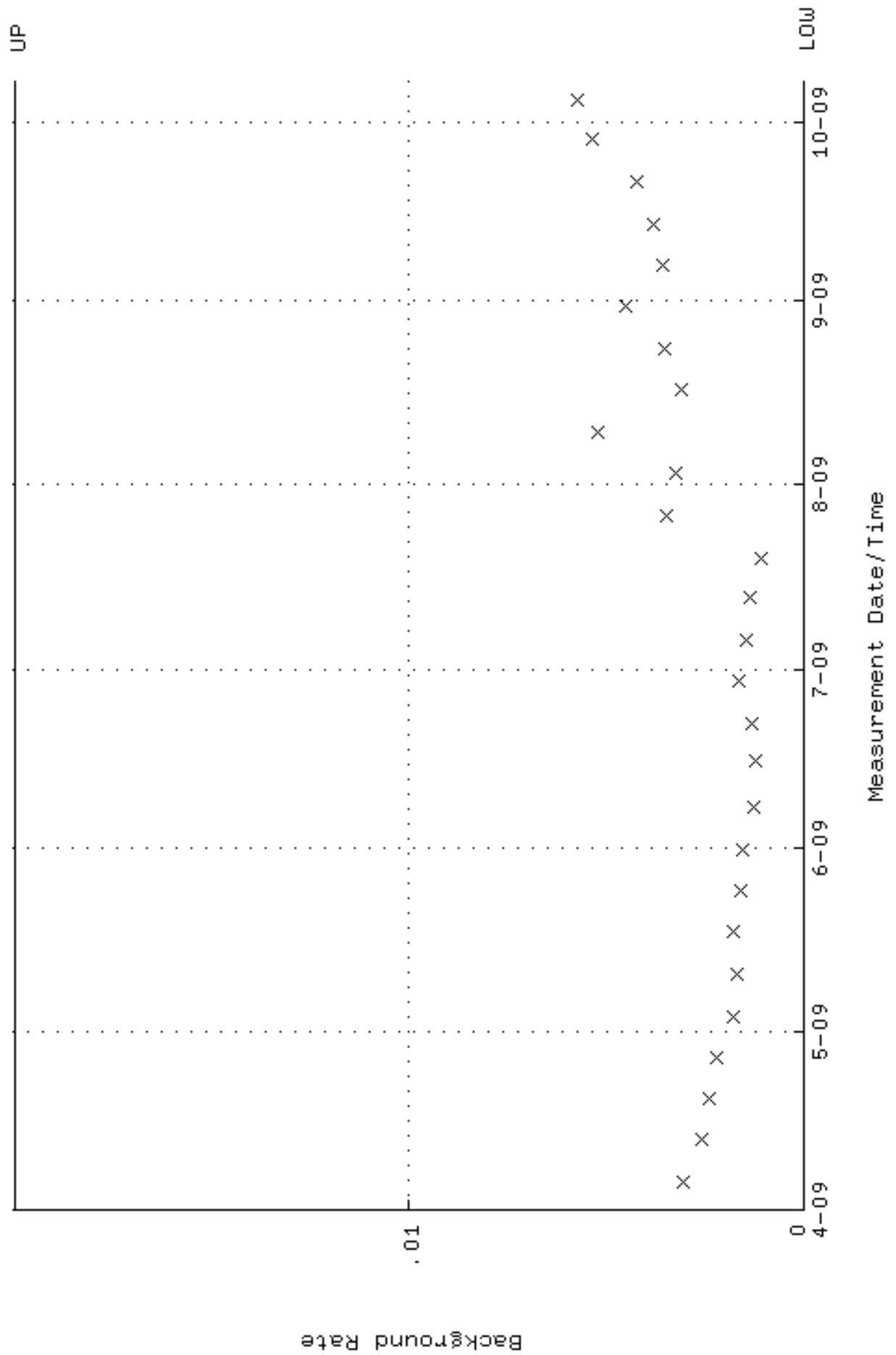
QA filename : DKA100:[ENV\_ALPHA.QA.W]W035.QAF;3  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:05 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.294859 through 0.314859



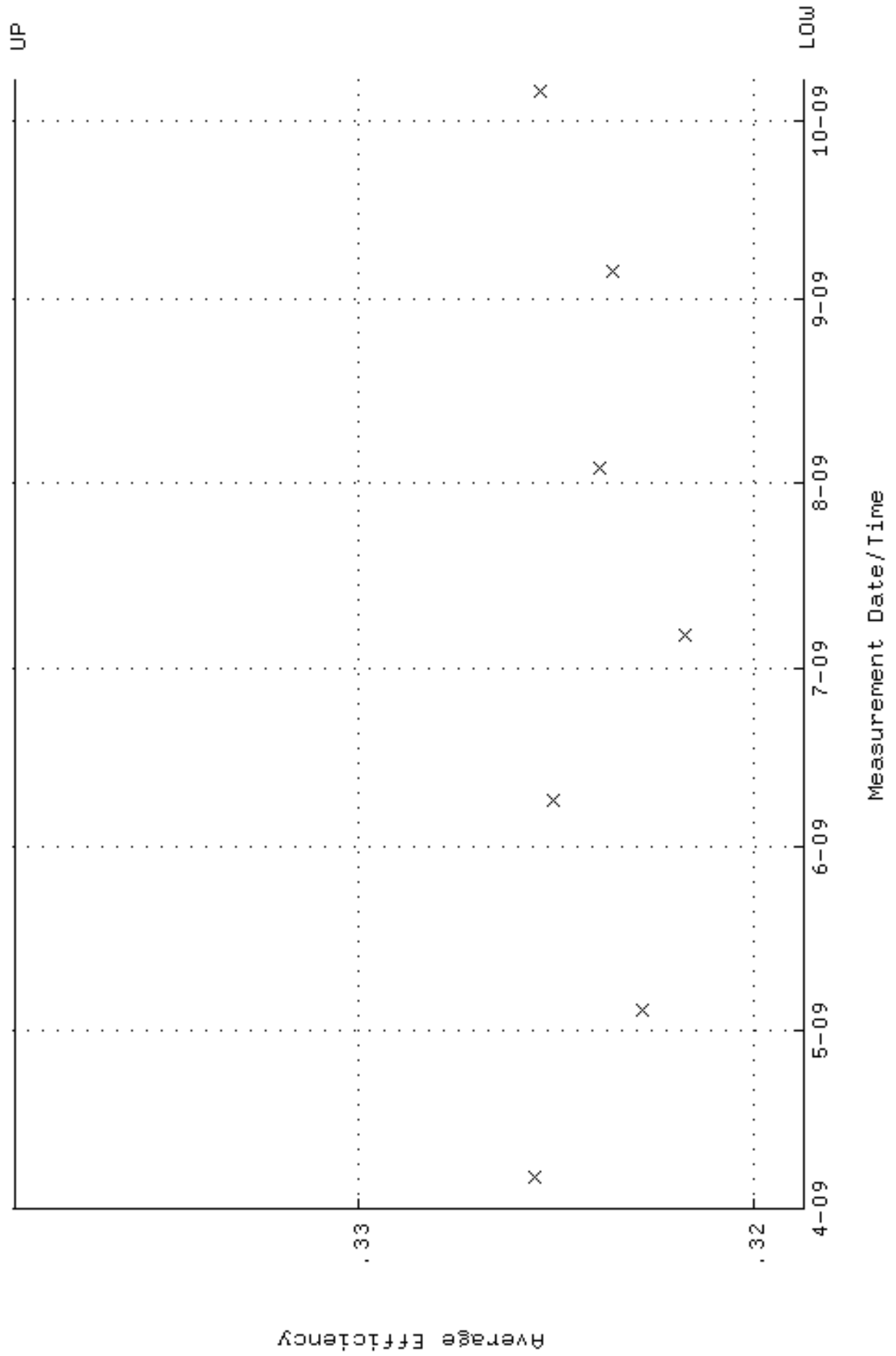
QA filename : DKA100:[ENV\_ALPHA.QA.W]W035.QAF;3  
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
Start/End Dates : 6-APR-2009 08:44:05 through 7-OCT-2009 12:00:00  
Lower/Upper Lmts: 85.3984 through 94.3878



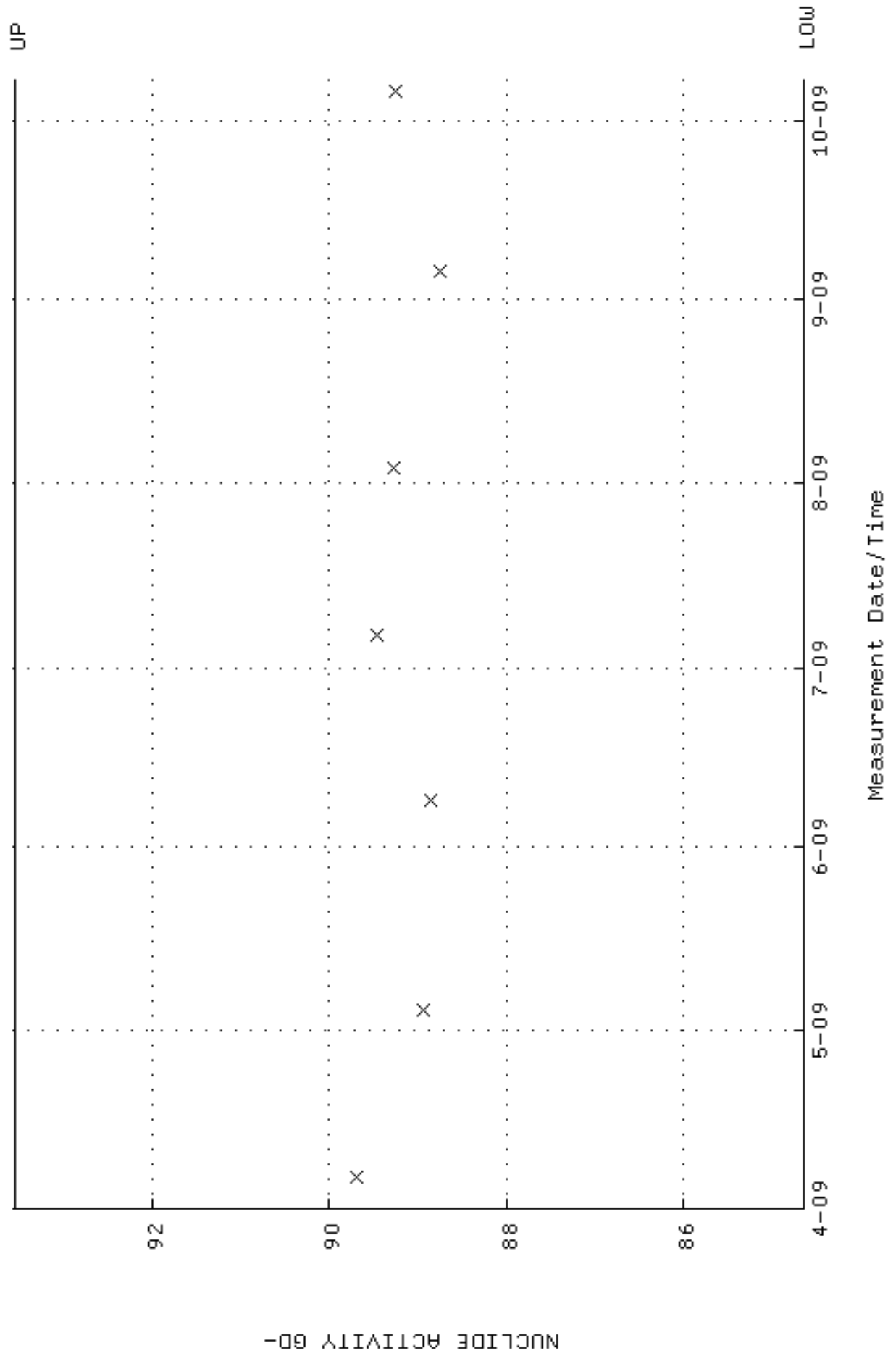
QA filename : DKA100:[ENV\_ALPHA.QA.B]B035.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:12 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



QA filename : DKA100:[ENV\_ALPHA.QA.W]W036.QAF;2  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:05 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.318717 through 0.338717

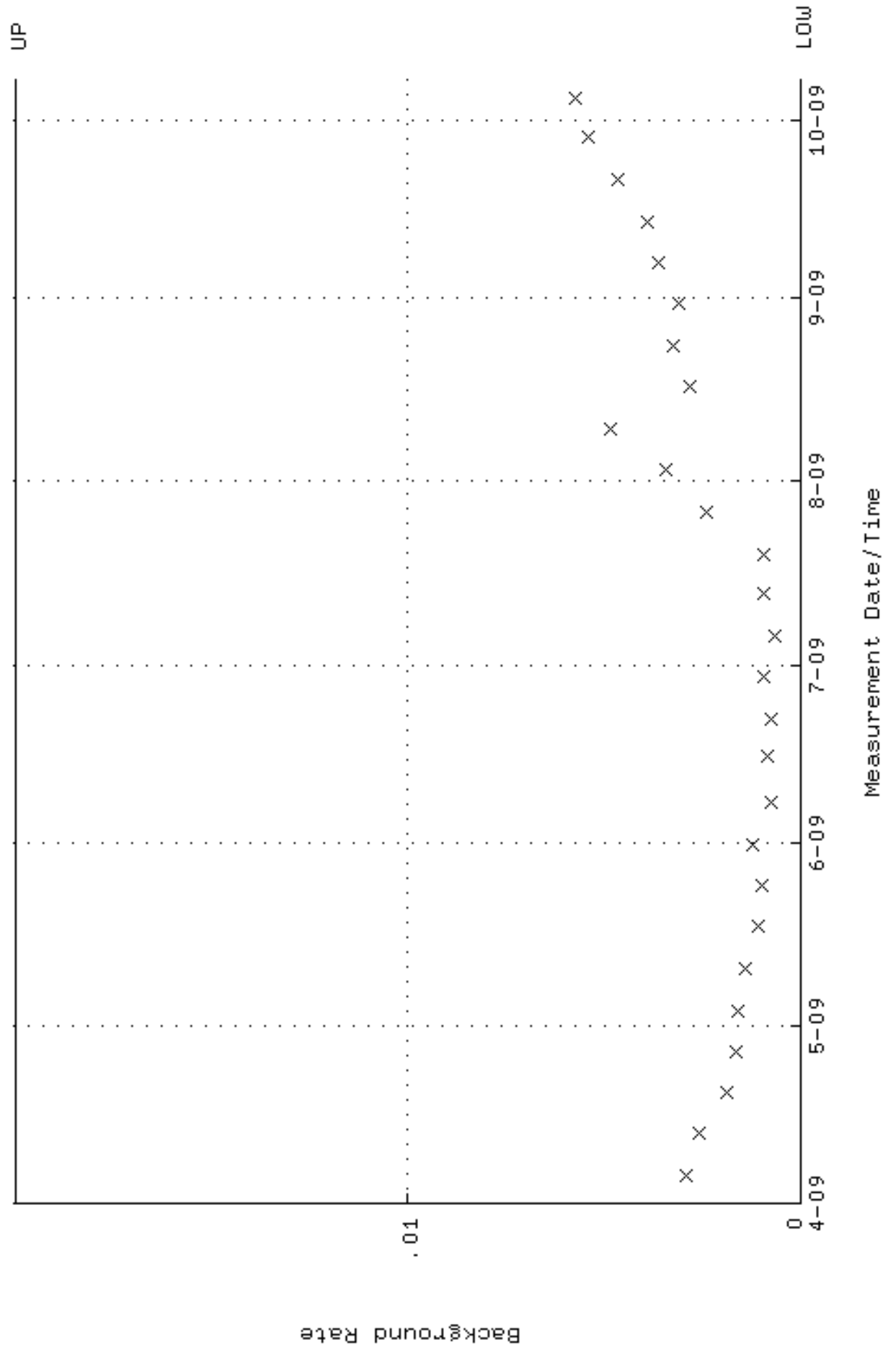


QA filename : DKA100:[ENV\_ALPHA.QA.W]W036.QAF;2  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:05 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 84.6422 through 93.5518

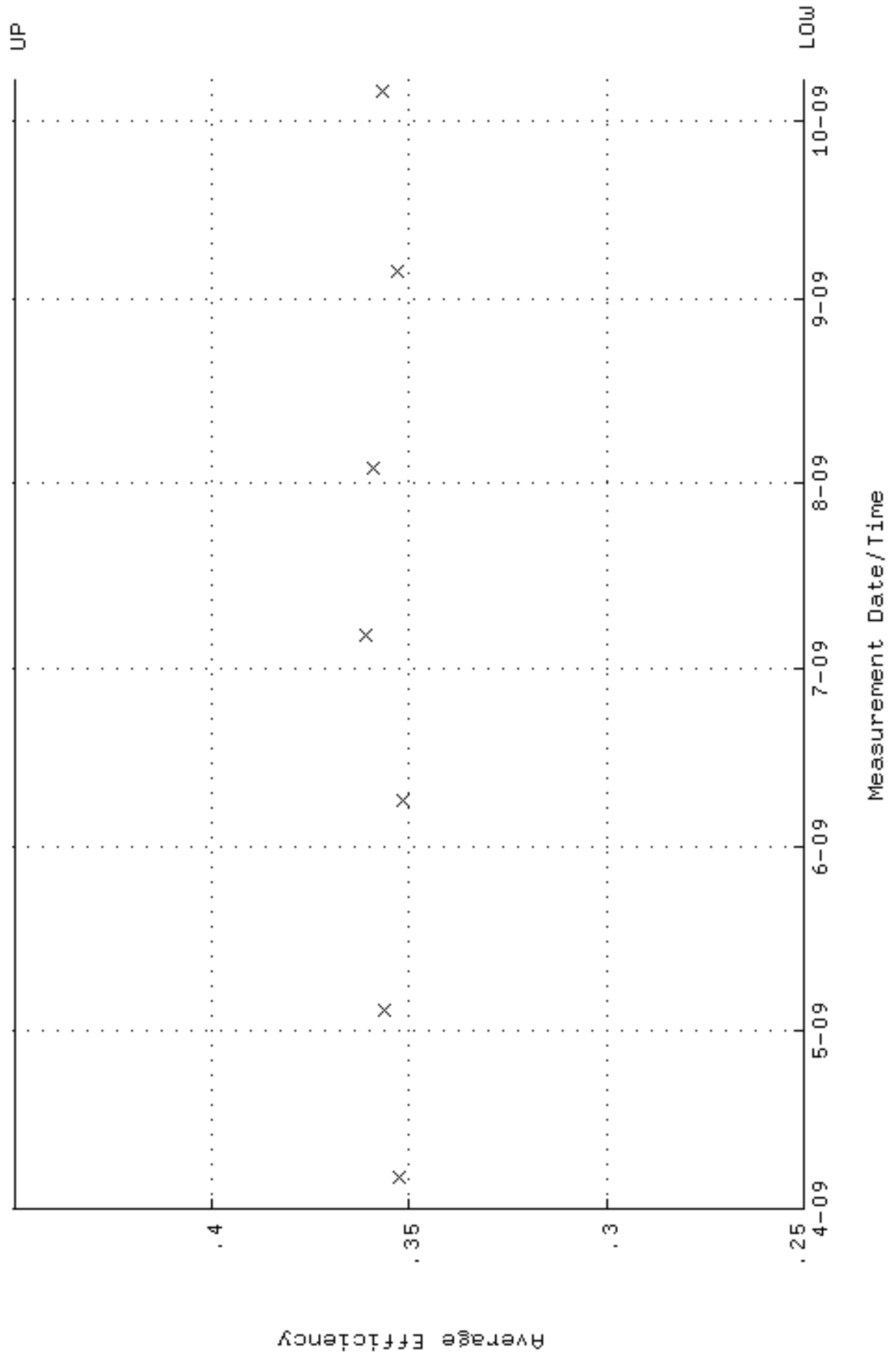




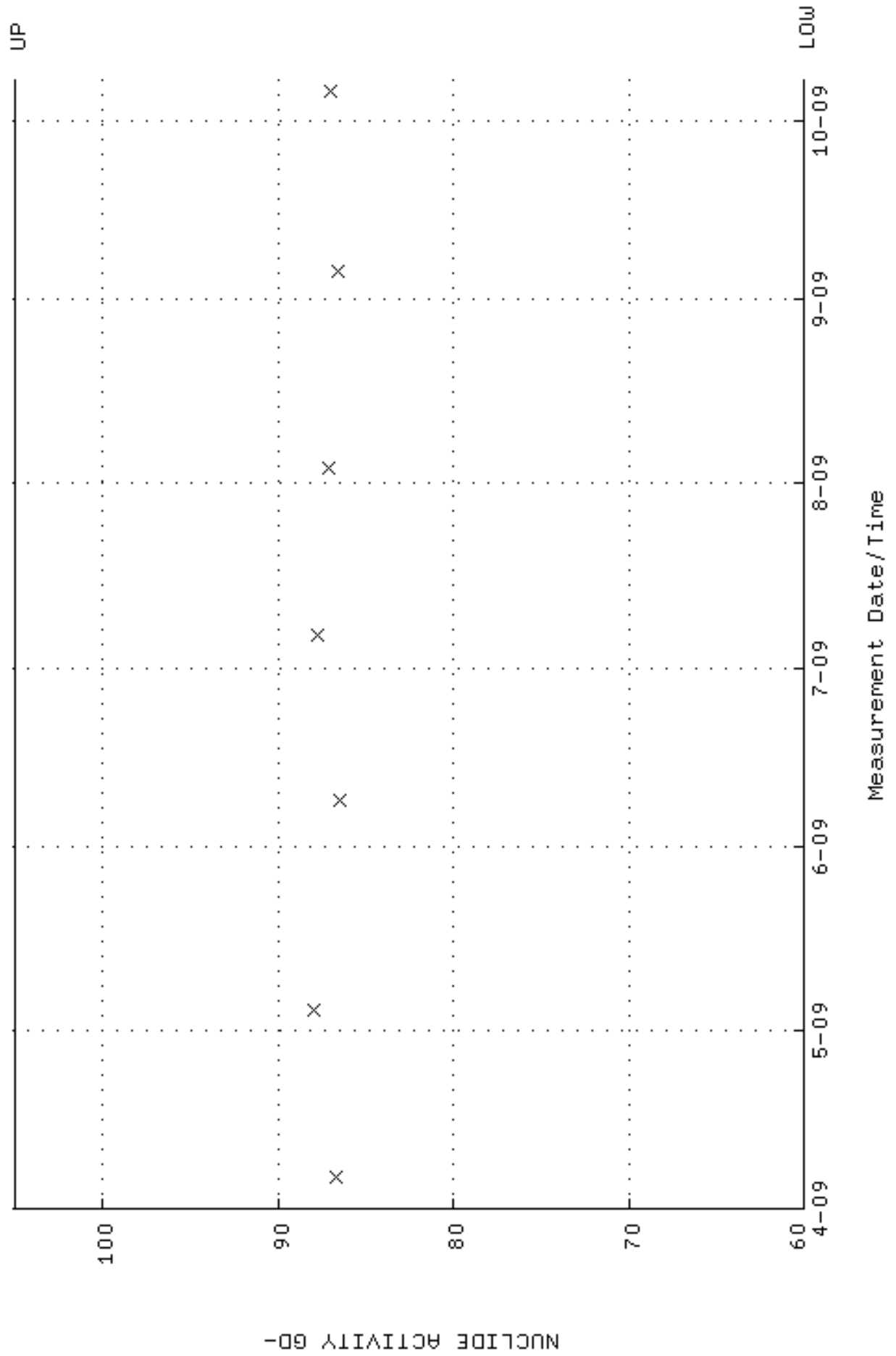
QA filename : DKA100:[ENV\_ALPHA.QA.B]B036.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:12 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



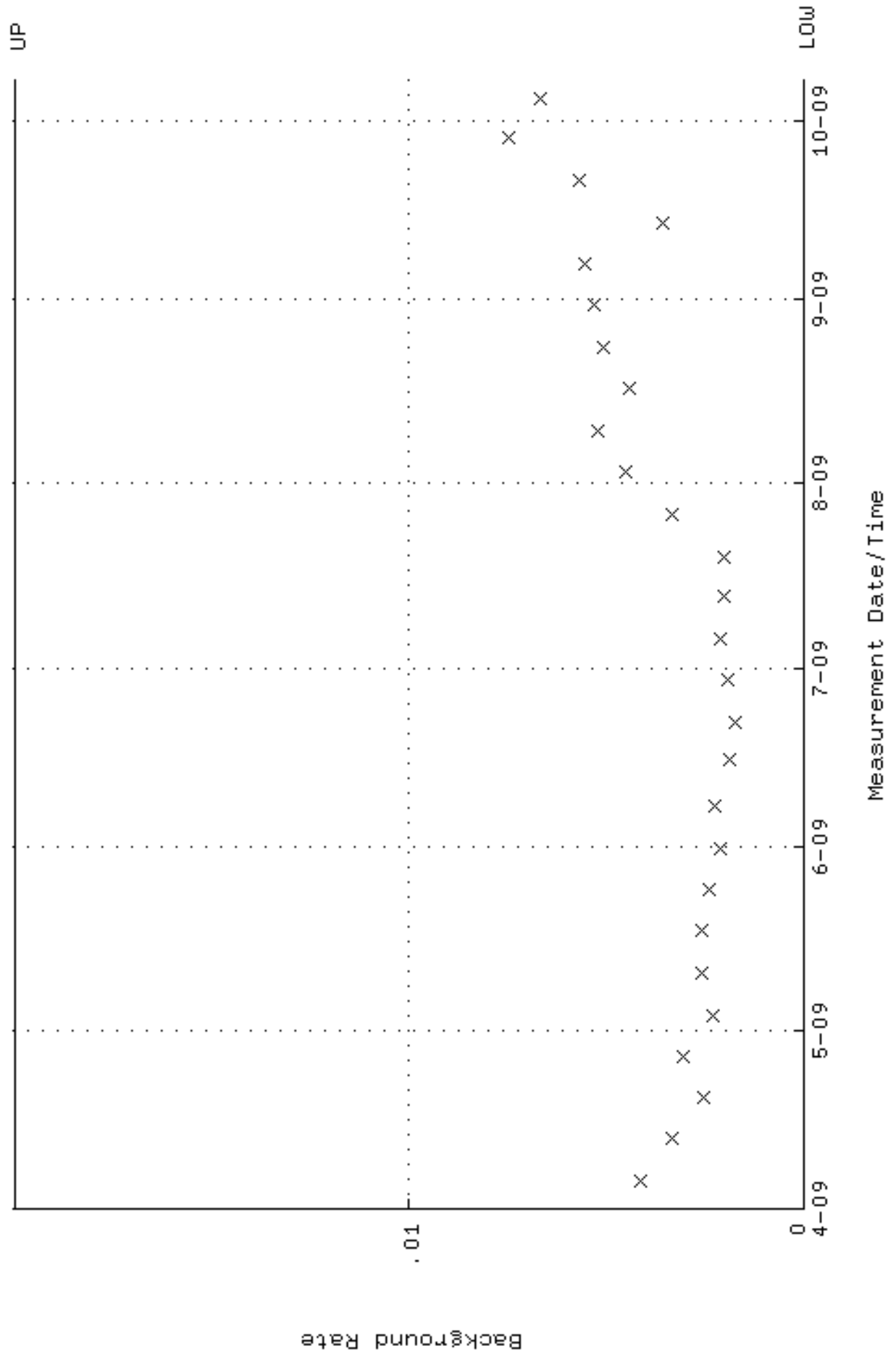
QA filename : DKA100:[ENV\_ALPHA.QA.W]W037.QAF;4  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.250000 through 0.450000



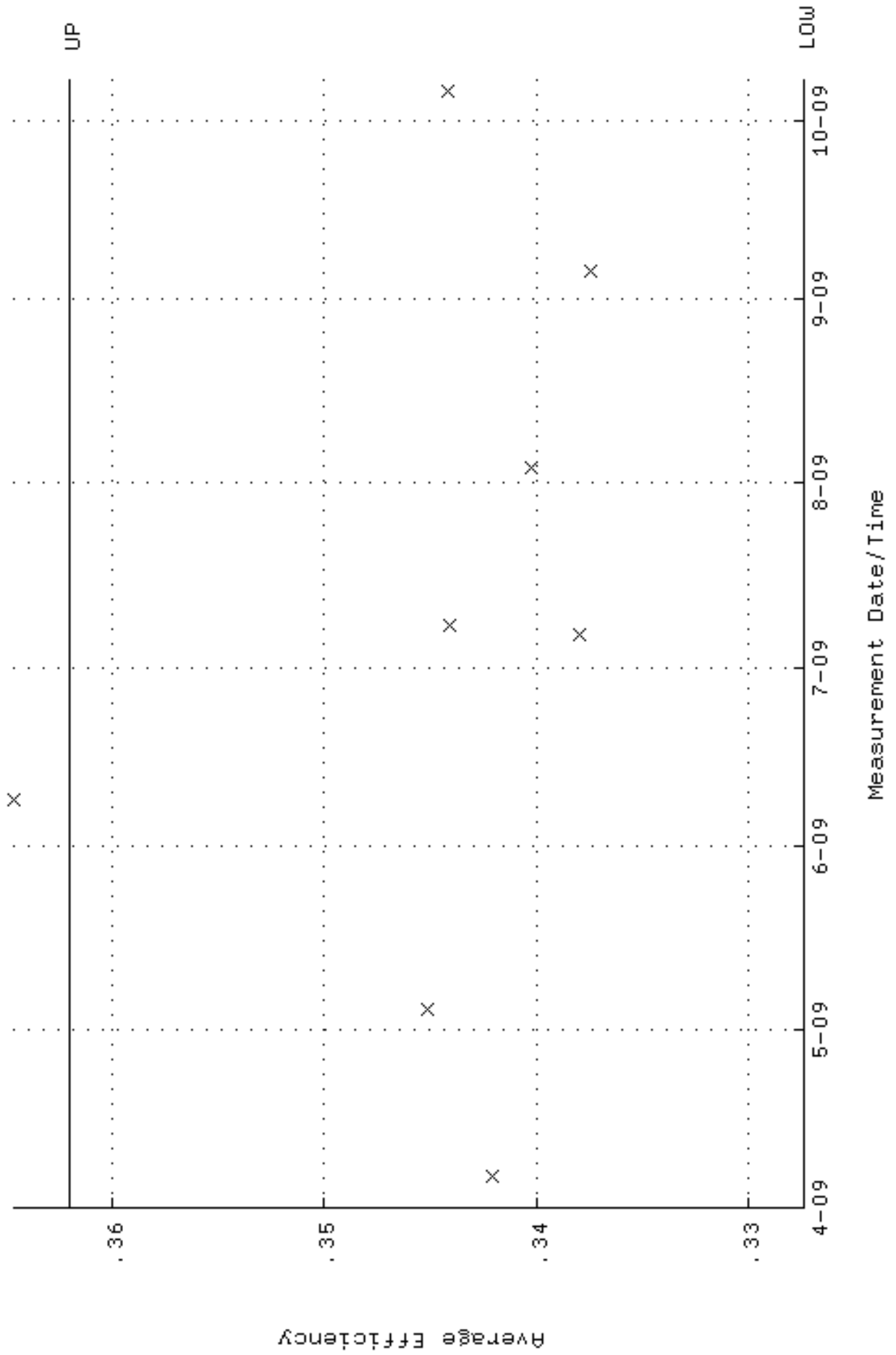
QA filename : DKA100:[ENV\_ALPHA.QA.W]W037.QAF;4  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 60.0000 through 105.0000



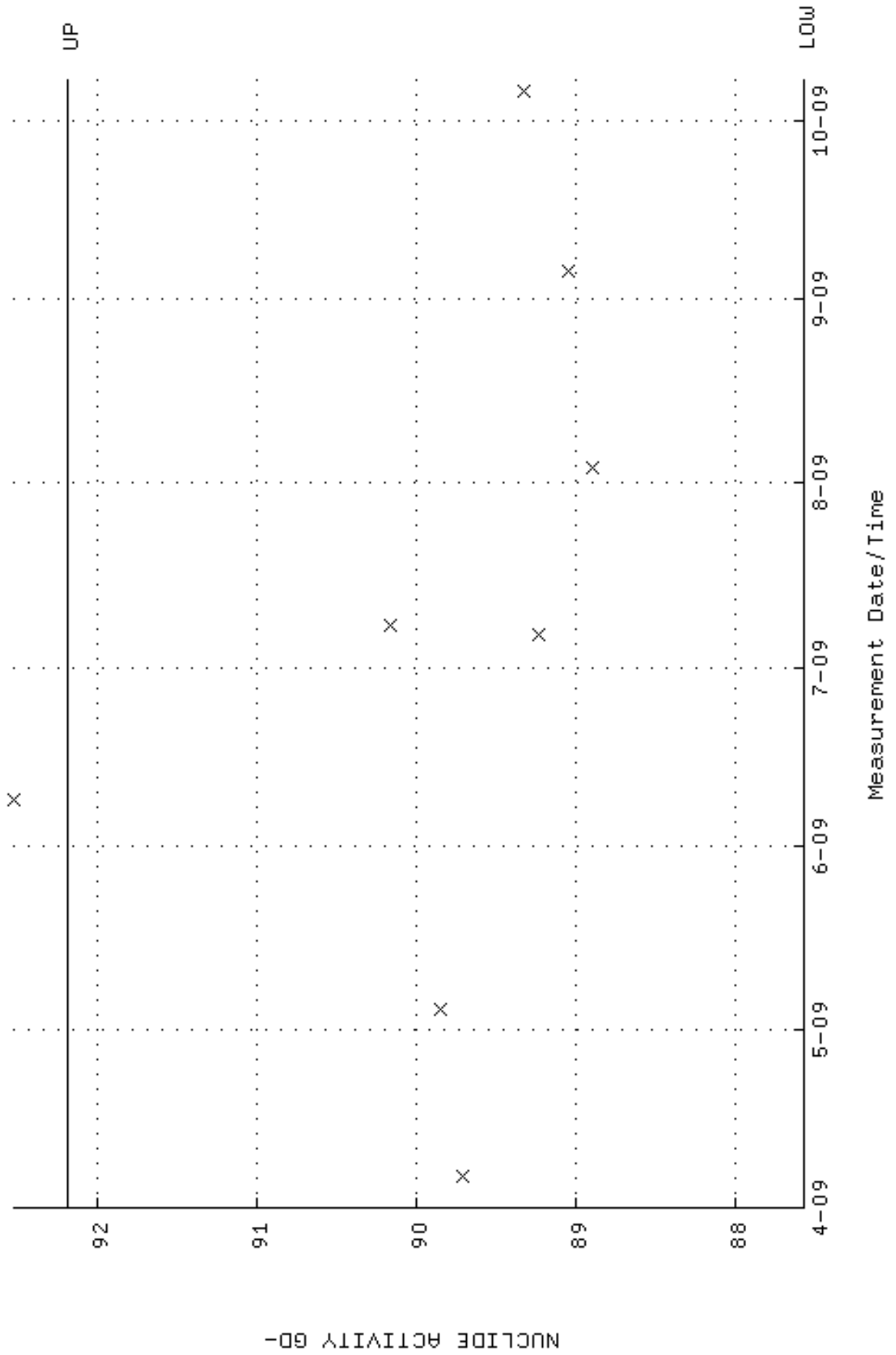
QA filename : DKA100:[ENV\_ALPHA.QA.B]B037.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:13 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



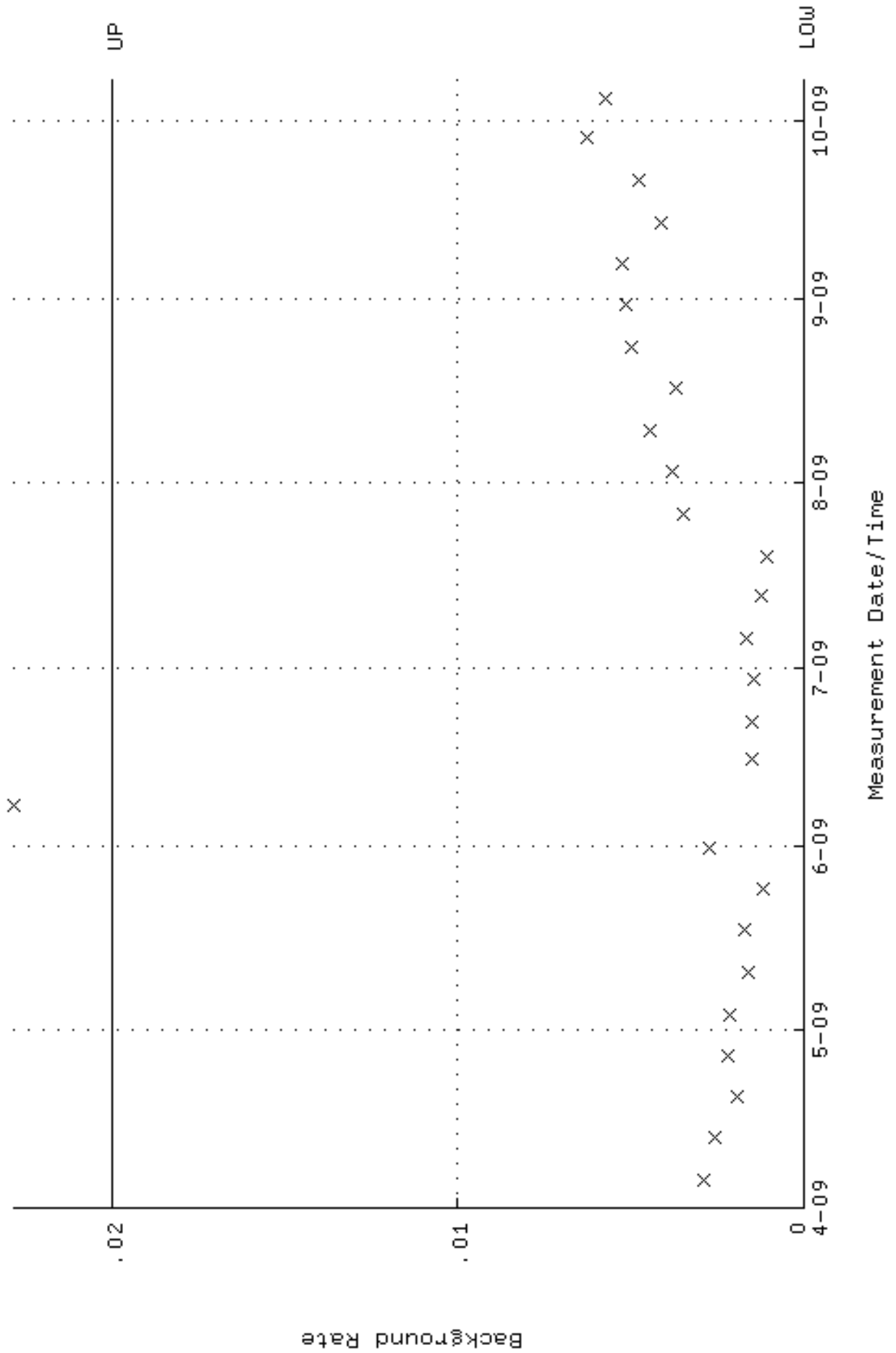
QA filename : DKA100:[ENV\_ALPHA.QA.W]W038.QAF;3  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.327380 through 0.362086



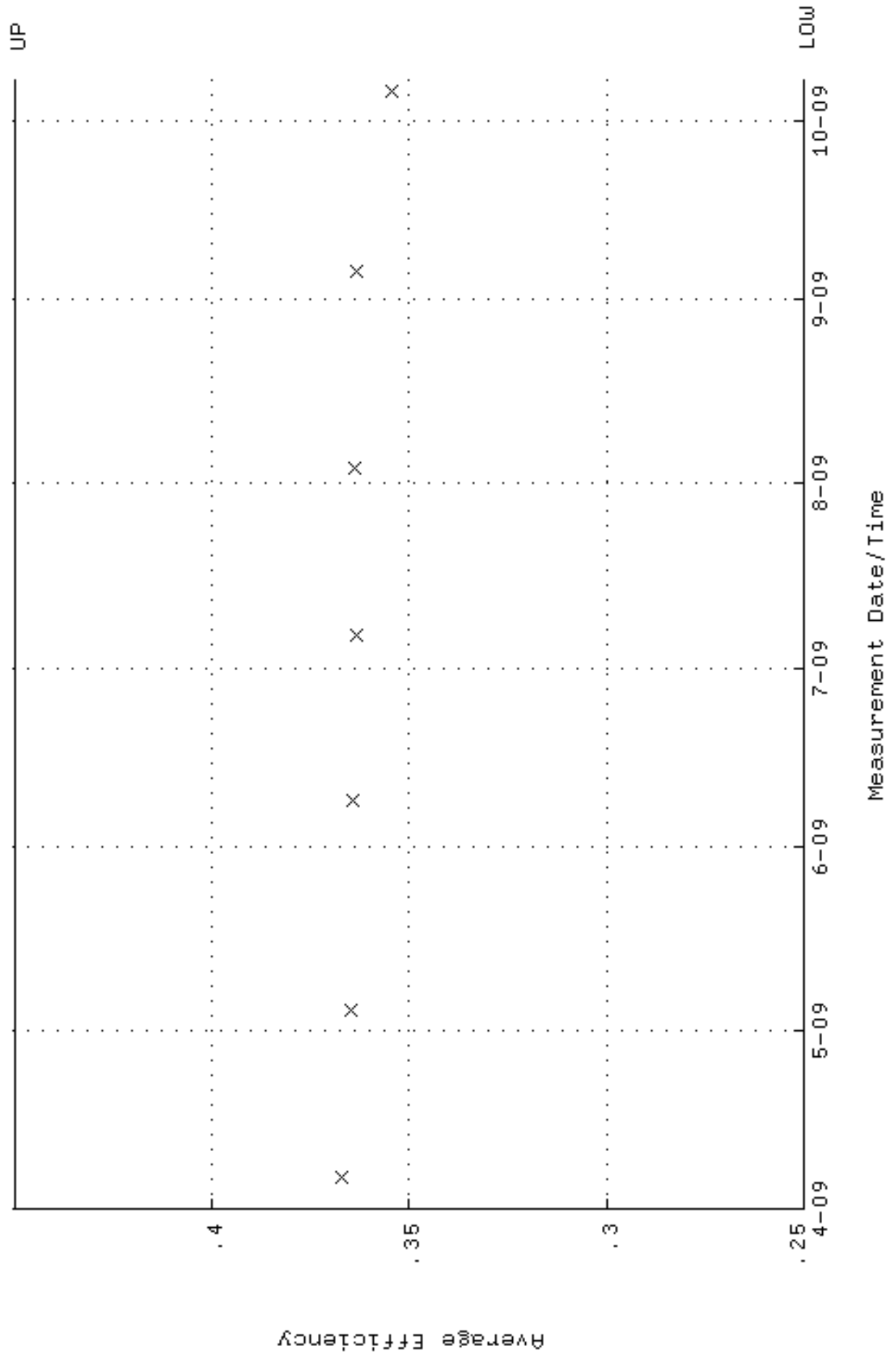
QA filename : DKA100:[ENV\_ALPHA.QA.W]W038.QAF;3  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 87.5715 through 92.1899



QA filename : DKA100:[ENV\_ALPHA.QA.B]B038.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:13 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02

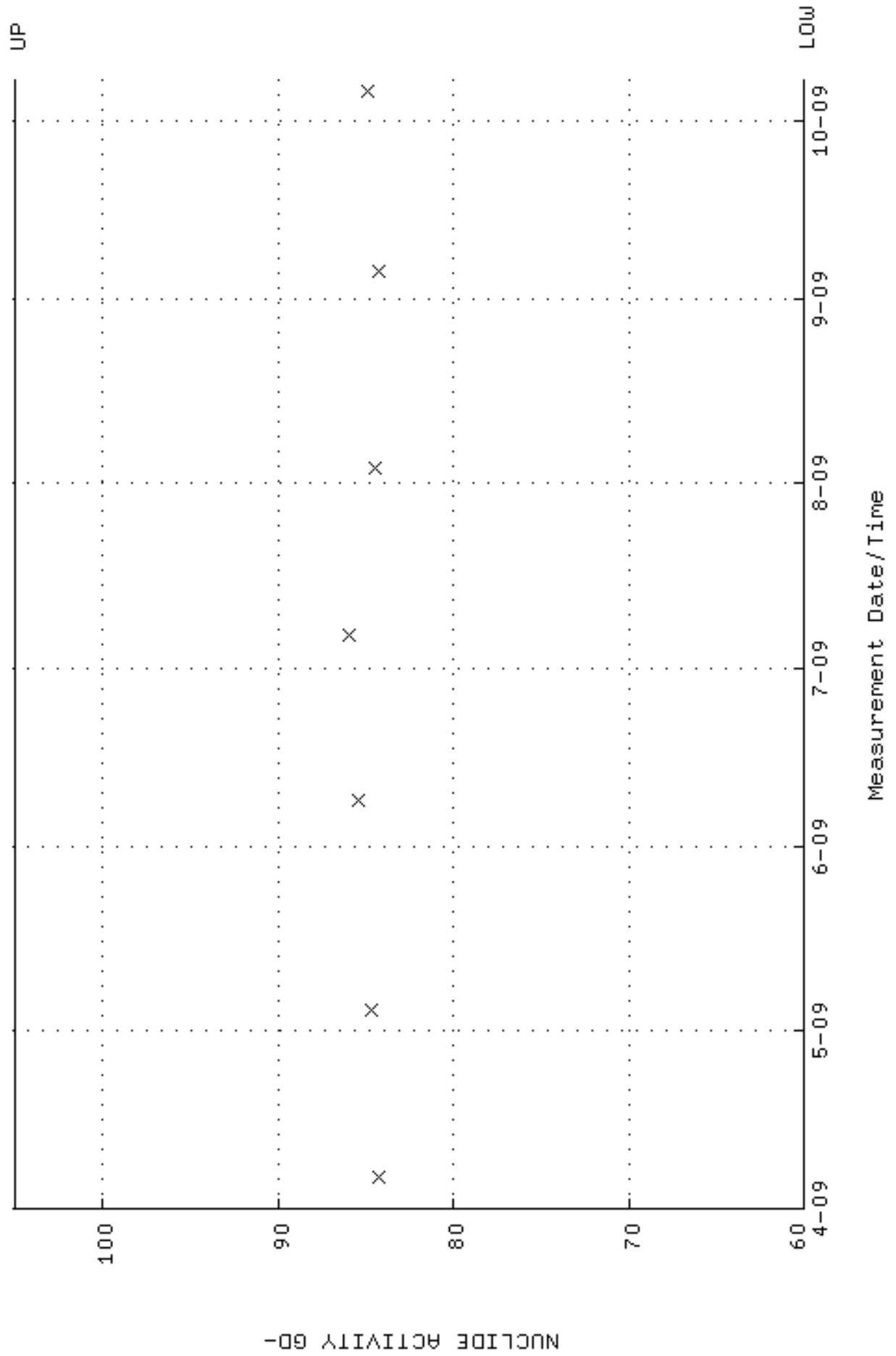


QA filename : DKA100:[ENV\_ALPHA.QA.W]W039.QAF;3  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.250000 through 0.450000

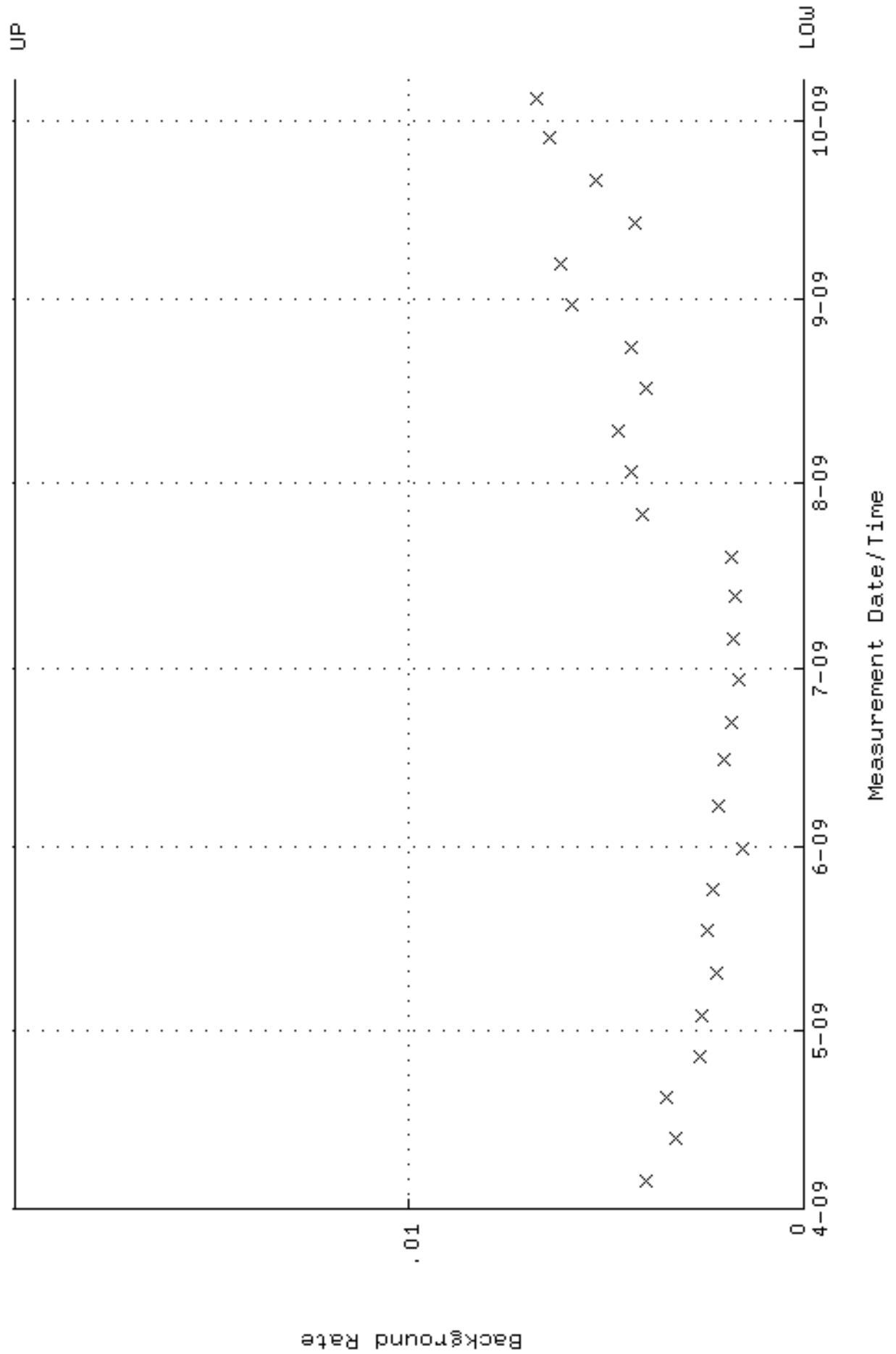




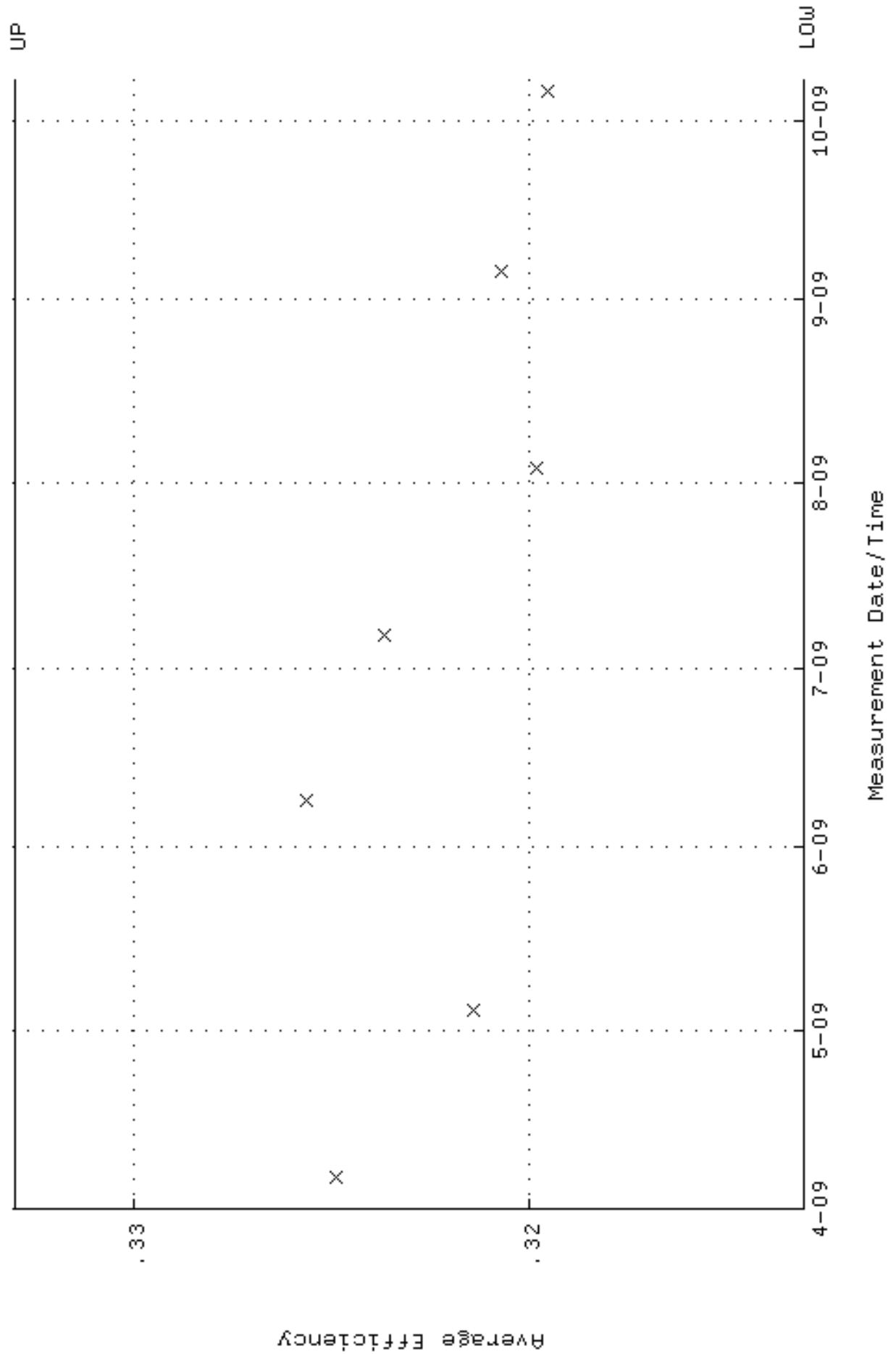
QA filename : DKA100:[ENV\_ALPHA.QA.W]W039.QAF;3  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 60.0000 through 105.0000



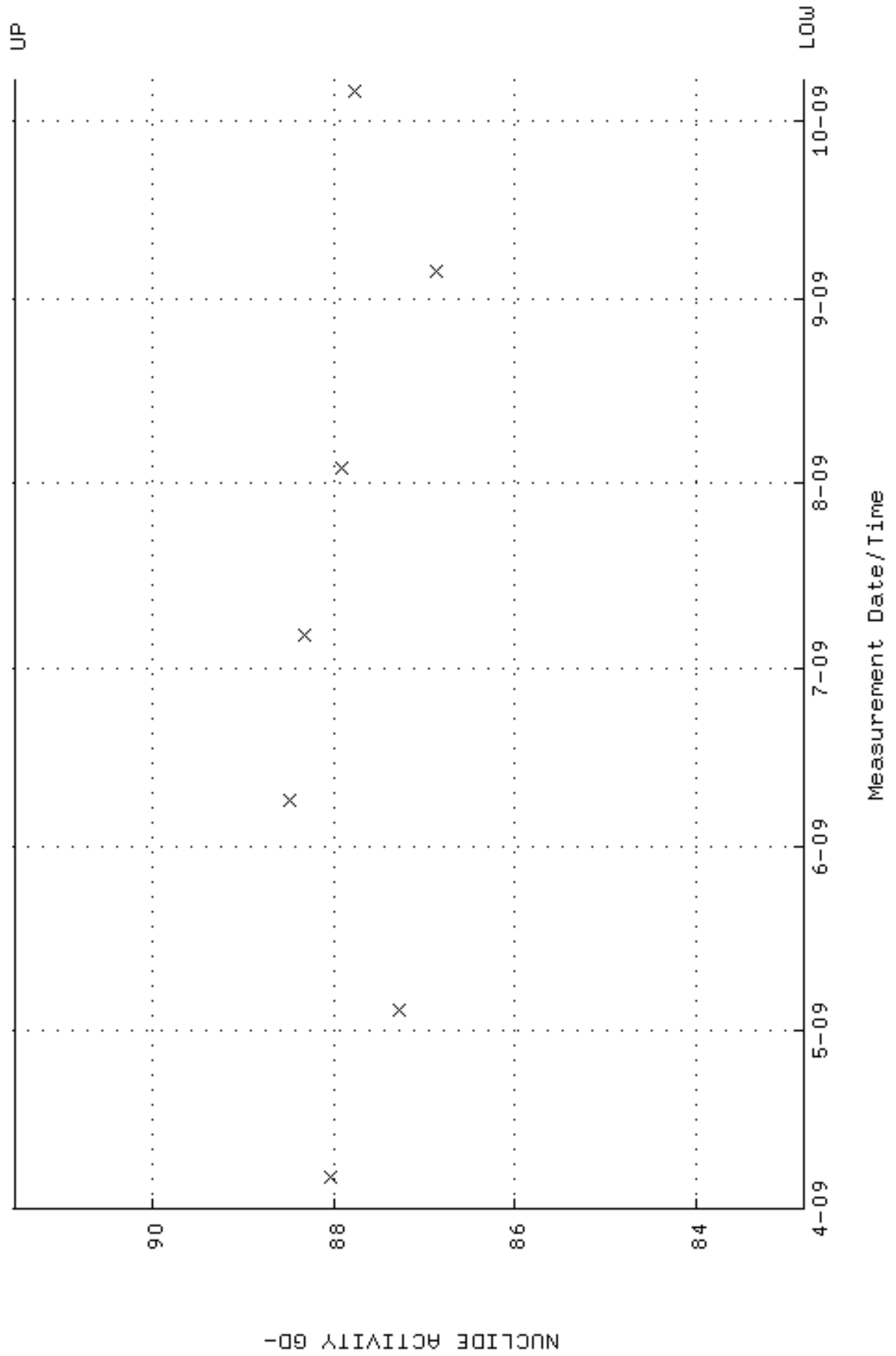
QA filename : DKA100:[ENV\_ALPHA.QA.B]B039.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:13 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



QA filename : DKA100:[ENV\_ALPHA.QA.W]W040.QAF;3  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.313016 through 0.333016

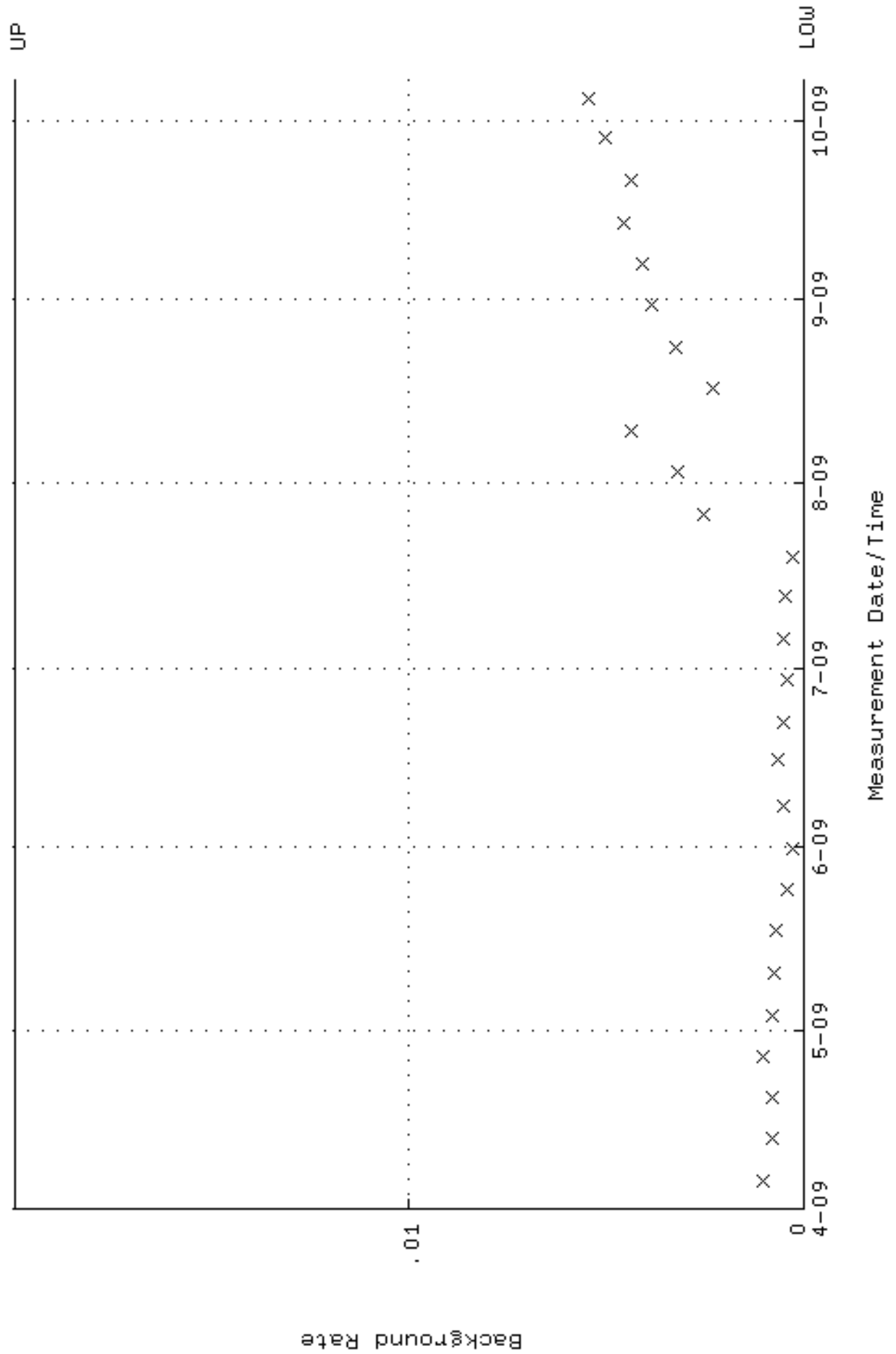


QA filename : DKA100:[ENV\_ALPHA.QA.W]W040.QAF;3  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 82.8065 through 91.5229

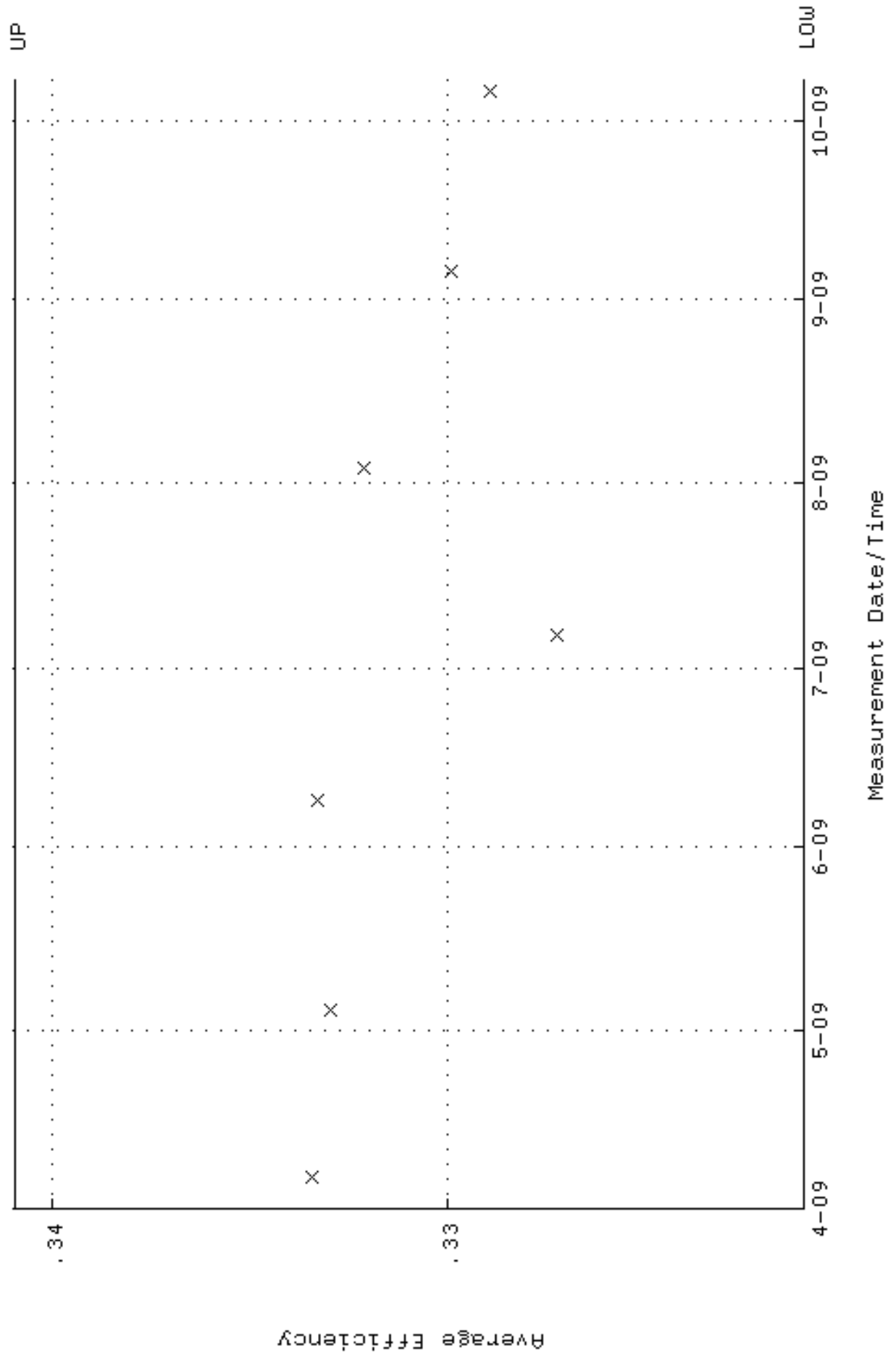


NUCLIDE ACTIVITY GD-

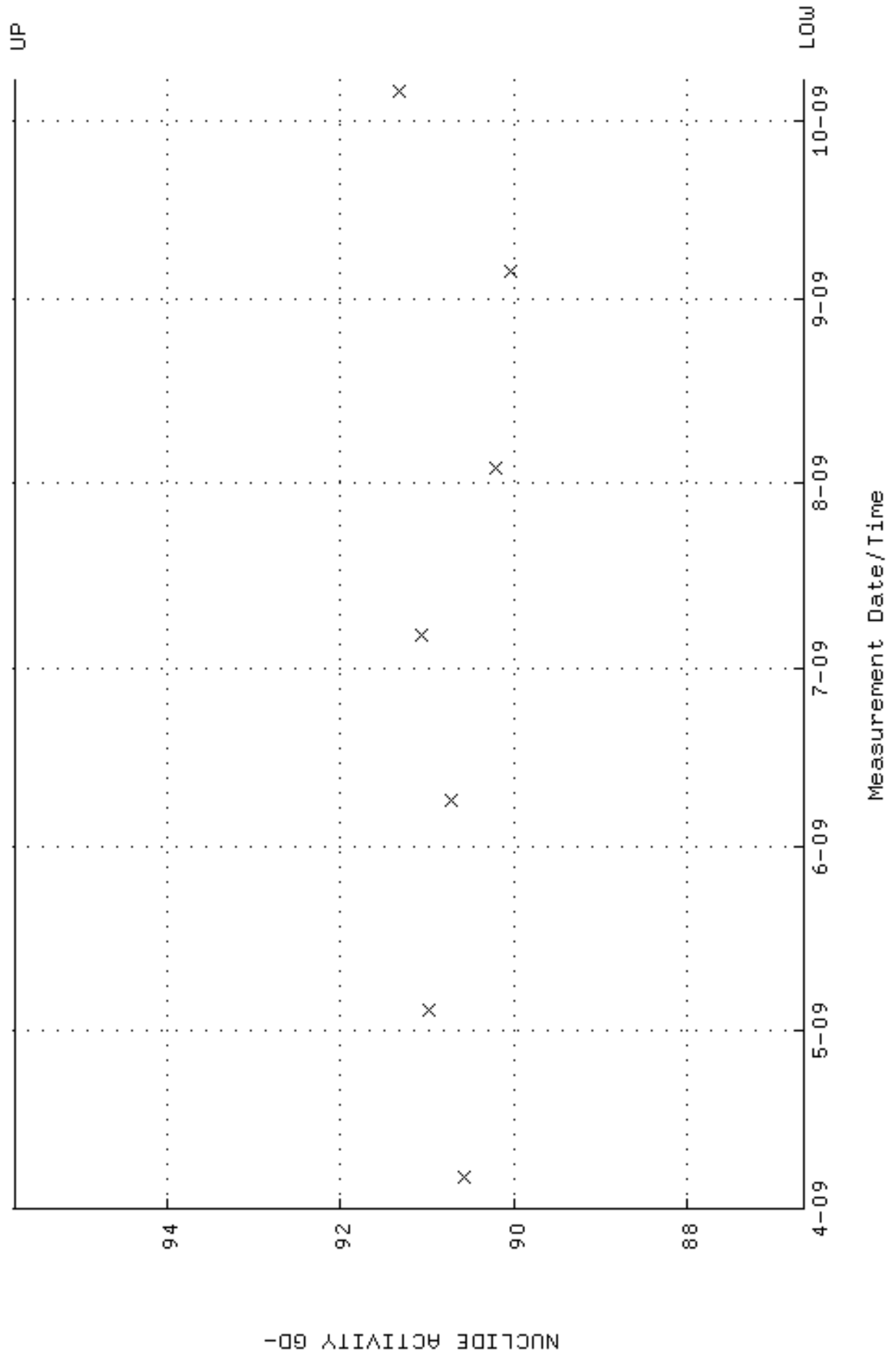
QA filename : DKA100:[ENV\_ALPHA.QA.B]B040.QAF;1  
Parameter Name : BACKRATE (Background Rate)  
Start/End Dates : 5-APR-2009 15:33:13 through 7-OCT-2009 12:00:00  
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



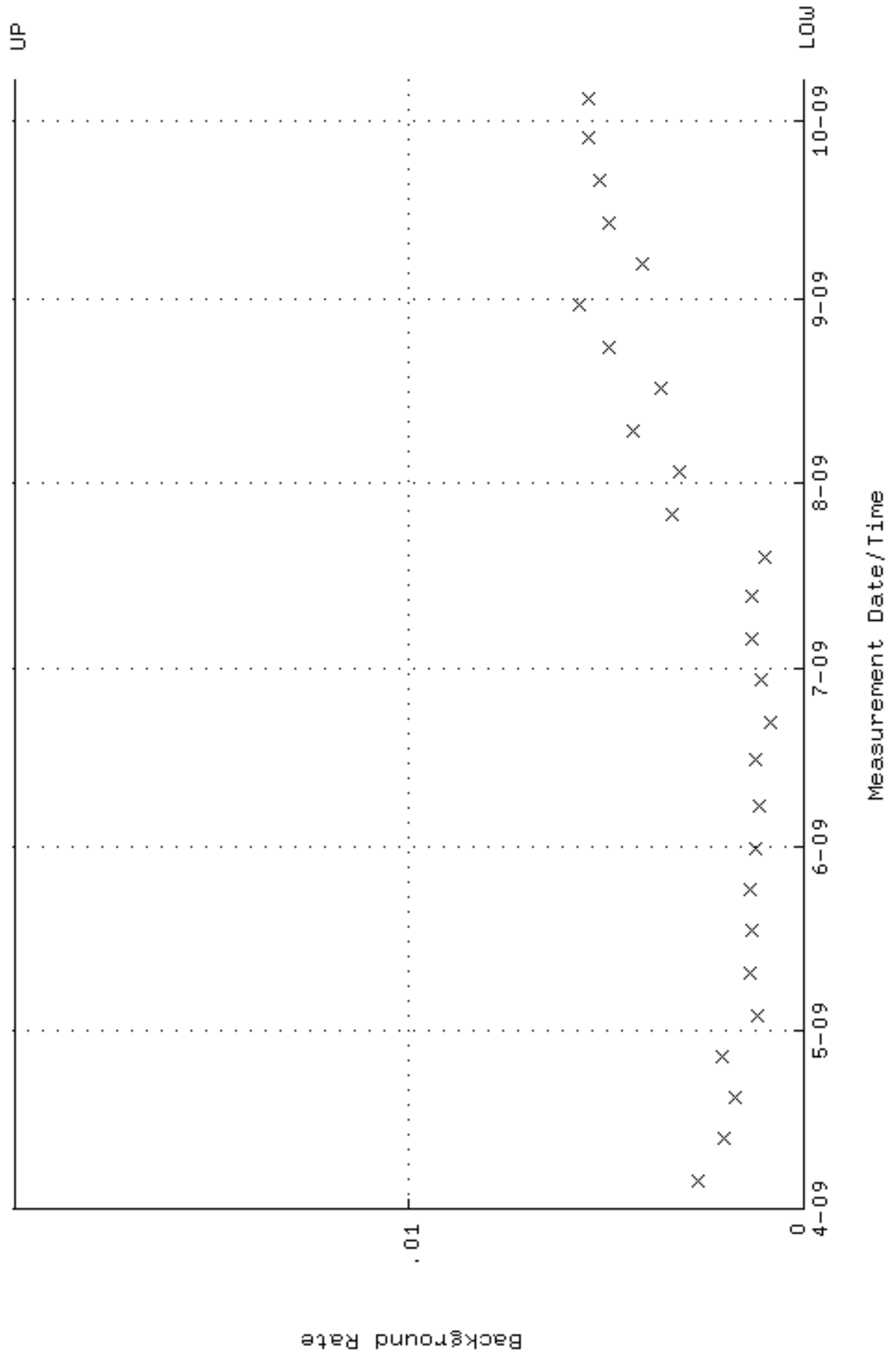
QA filename : DKA100:[ENV\_ALPHA.QA.W]W041.QAF;5  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.320943 through 0.340943



QA filename : DKA100:[ENV\_ALPHA.QA.W]W041.QAF;5  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 86.6435 through 95.7639

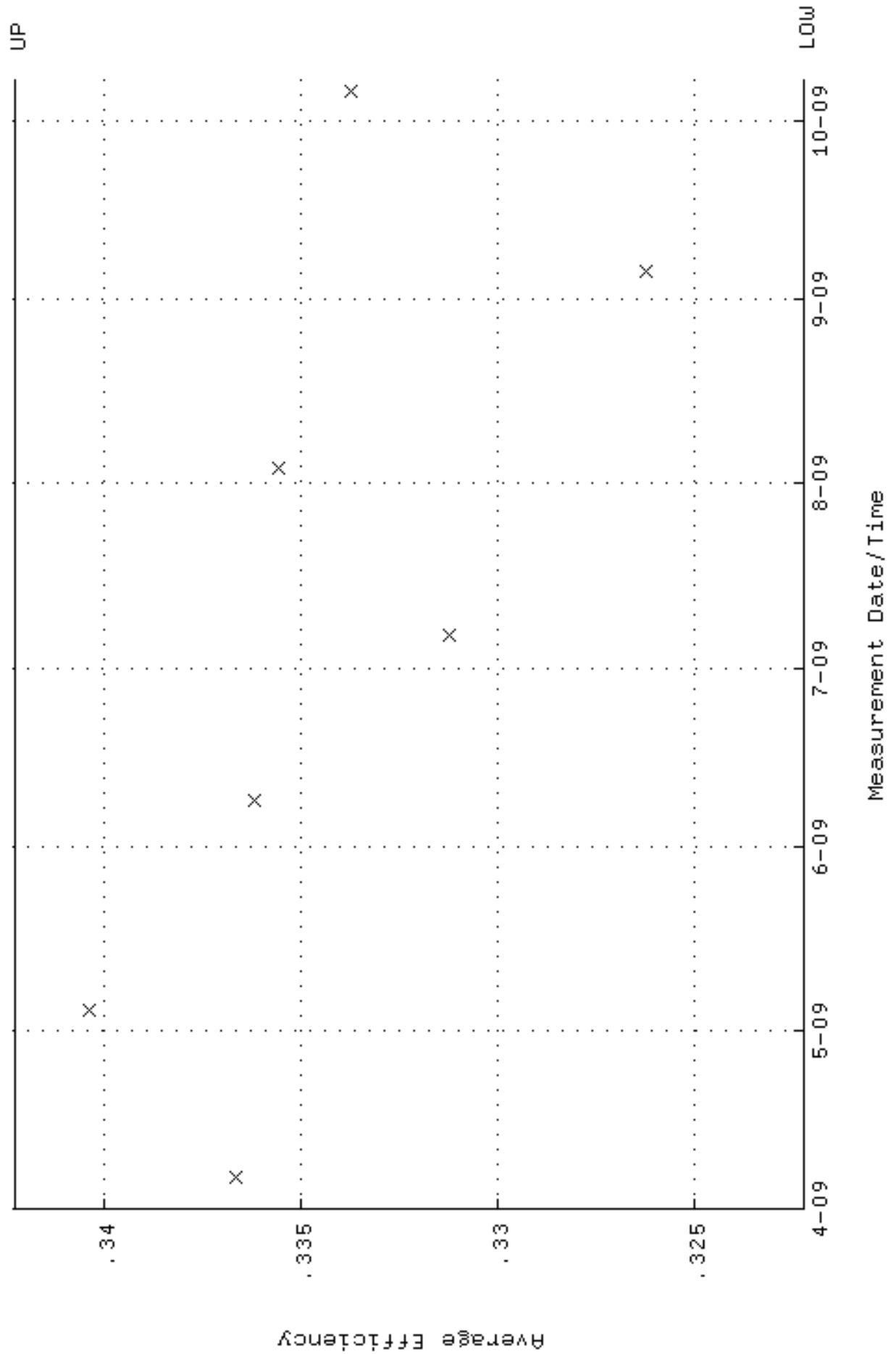


QA filename : DKA100:[ENV\_ALPHA.QA.B]B041.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:13 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02

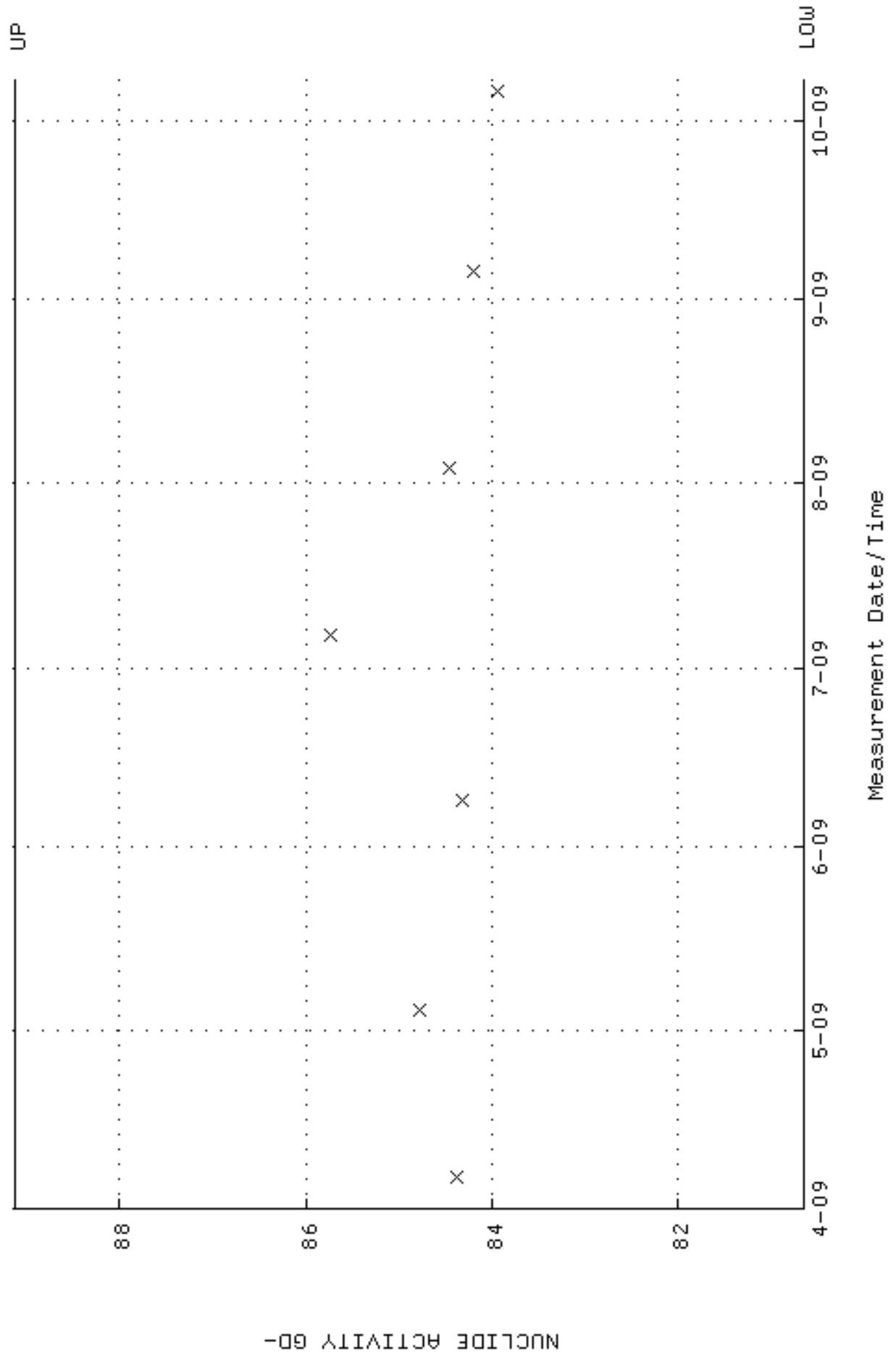




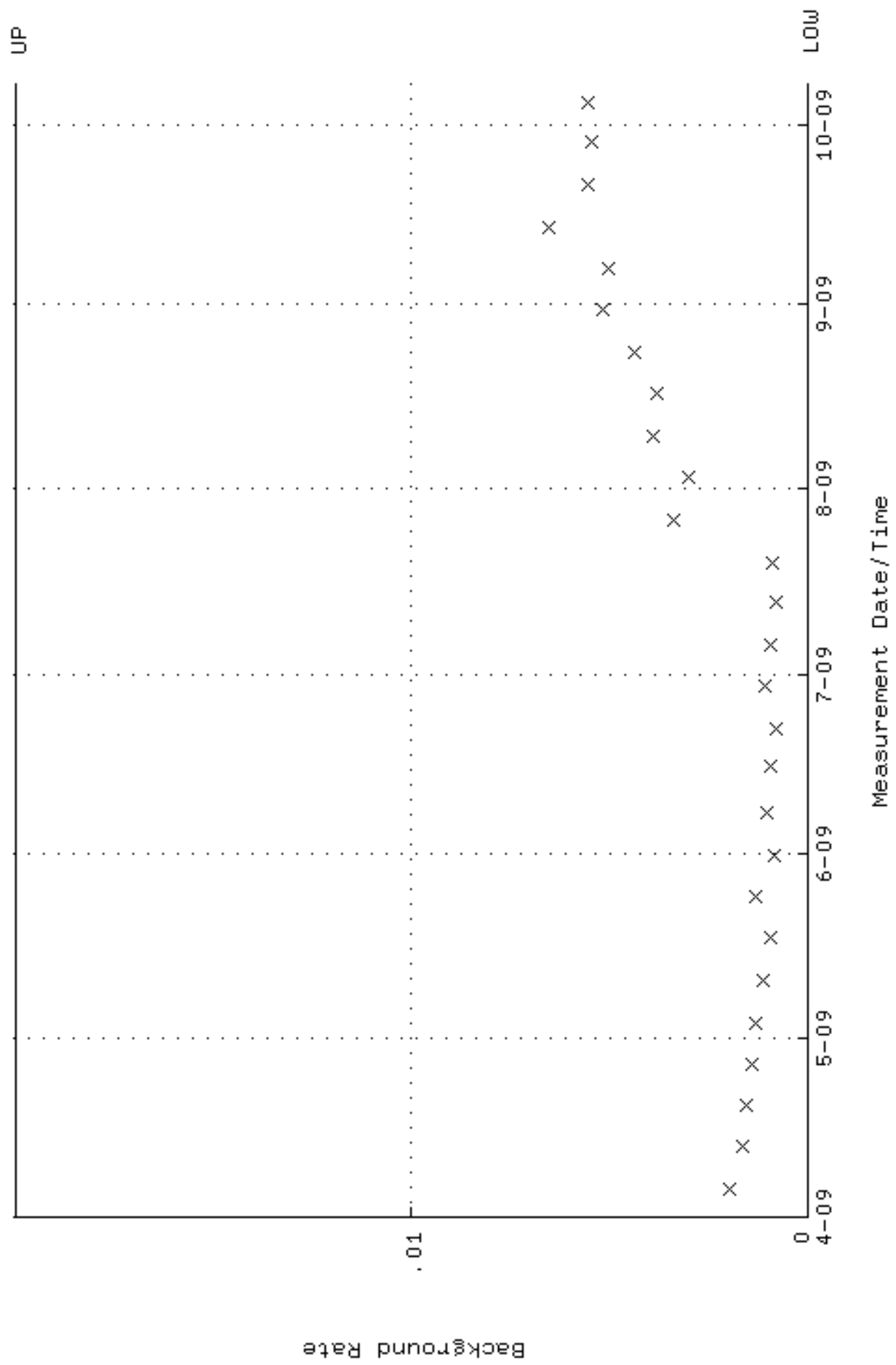
QA filename : DKA100:[ENV\_ALPHA.QA.W]W042.QAF;3  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.322243 through 0.342243



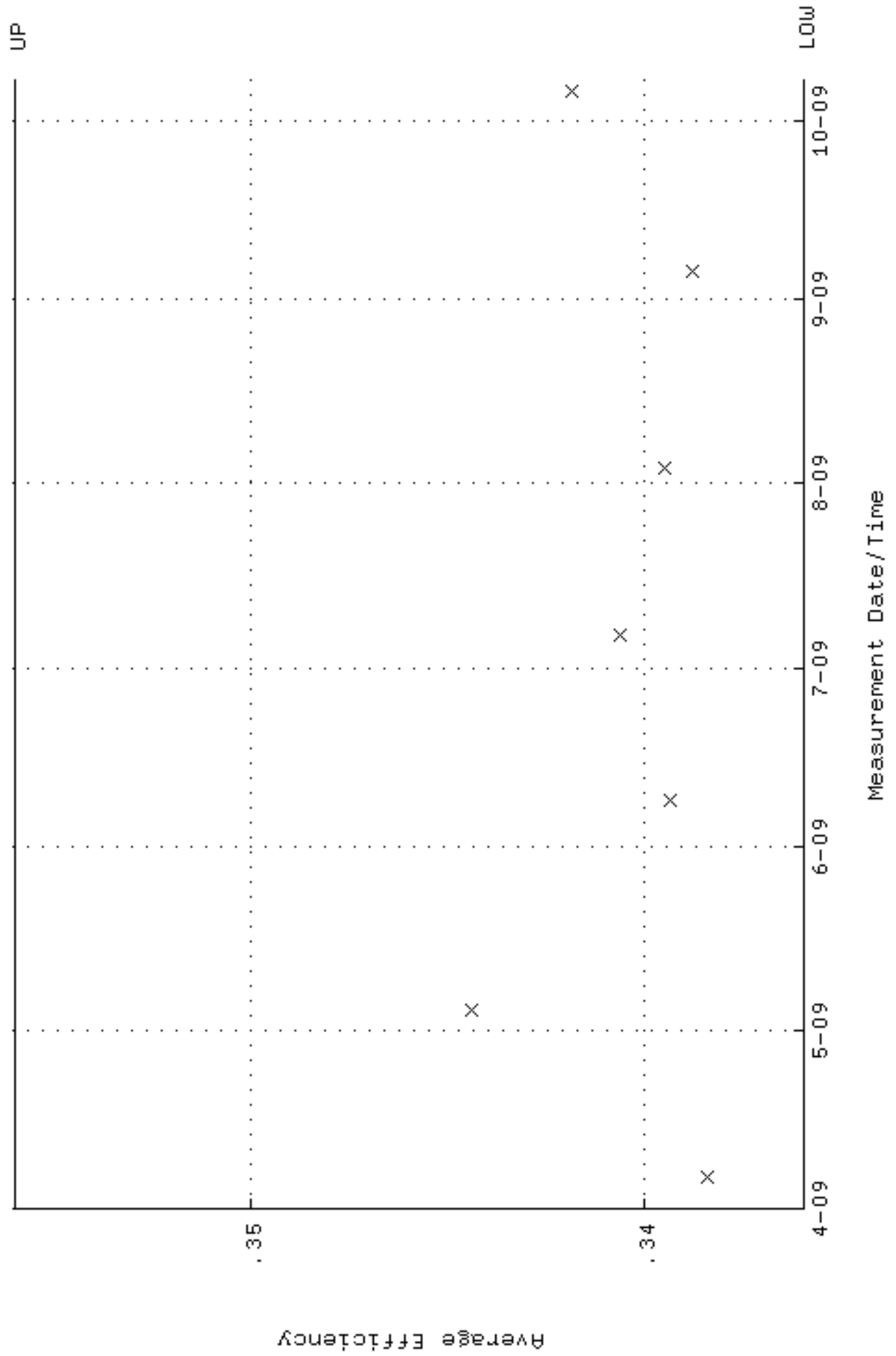
QA filename : DKA100:[ENV\_ALPHA.QA.W]W042.QAF;3  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 80.6389 through 89.1273



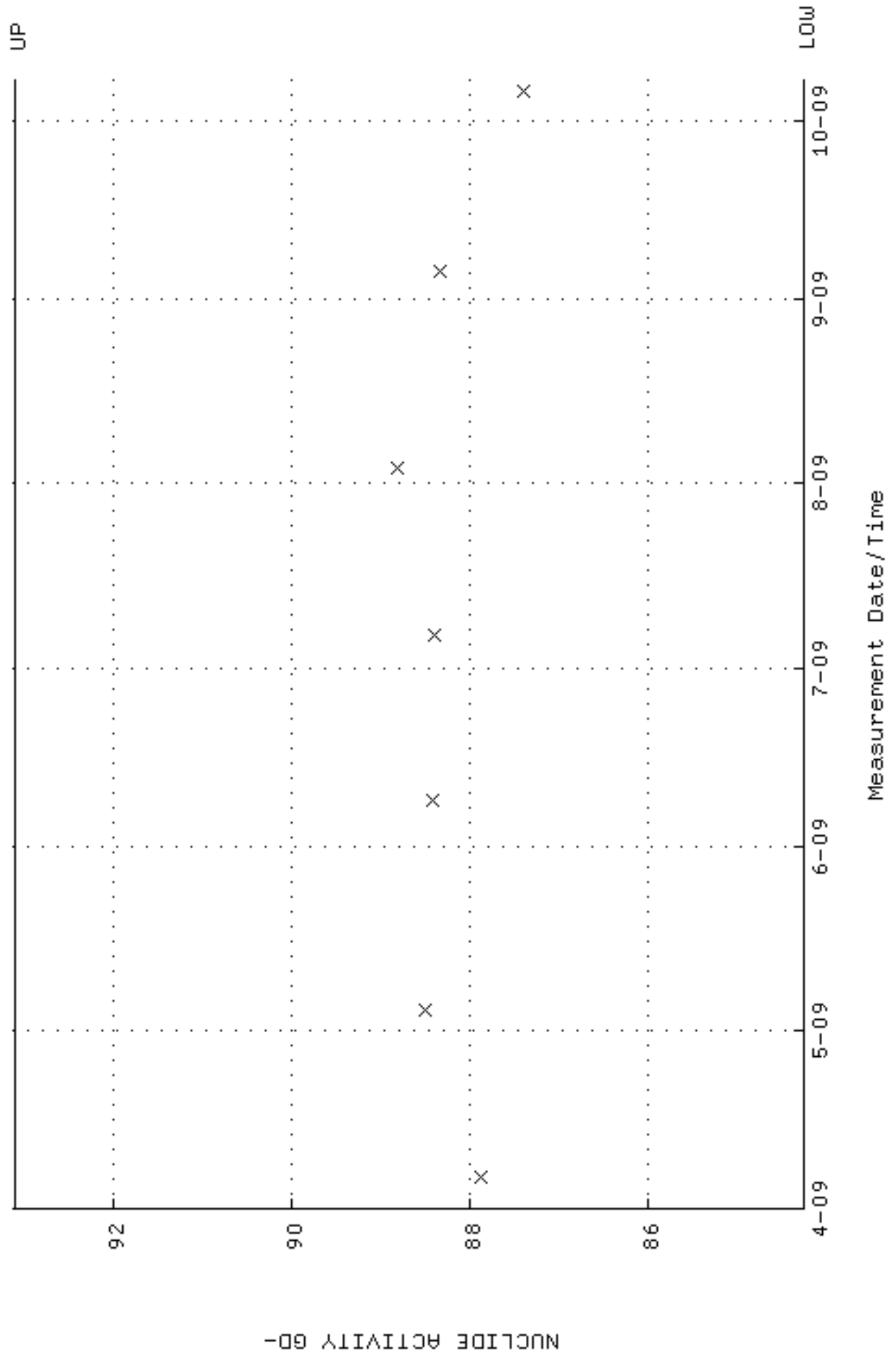
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 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:13 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



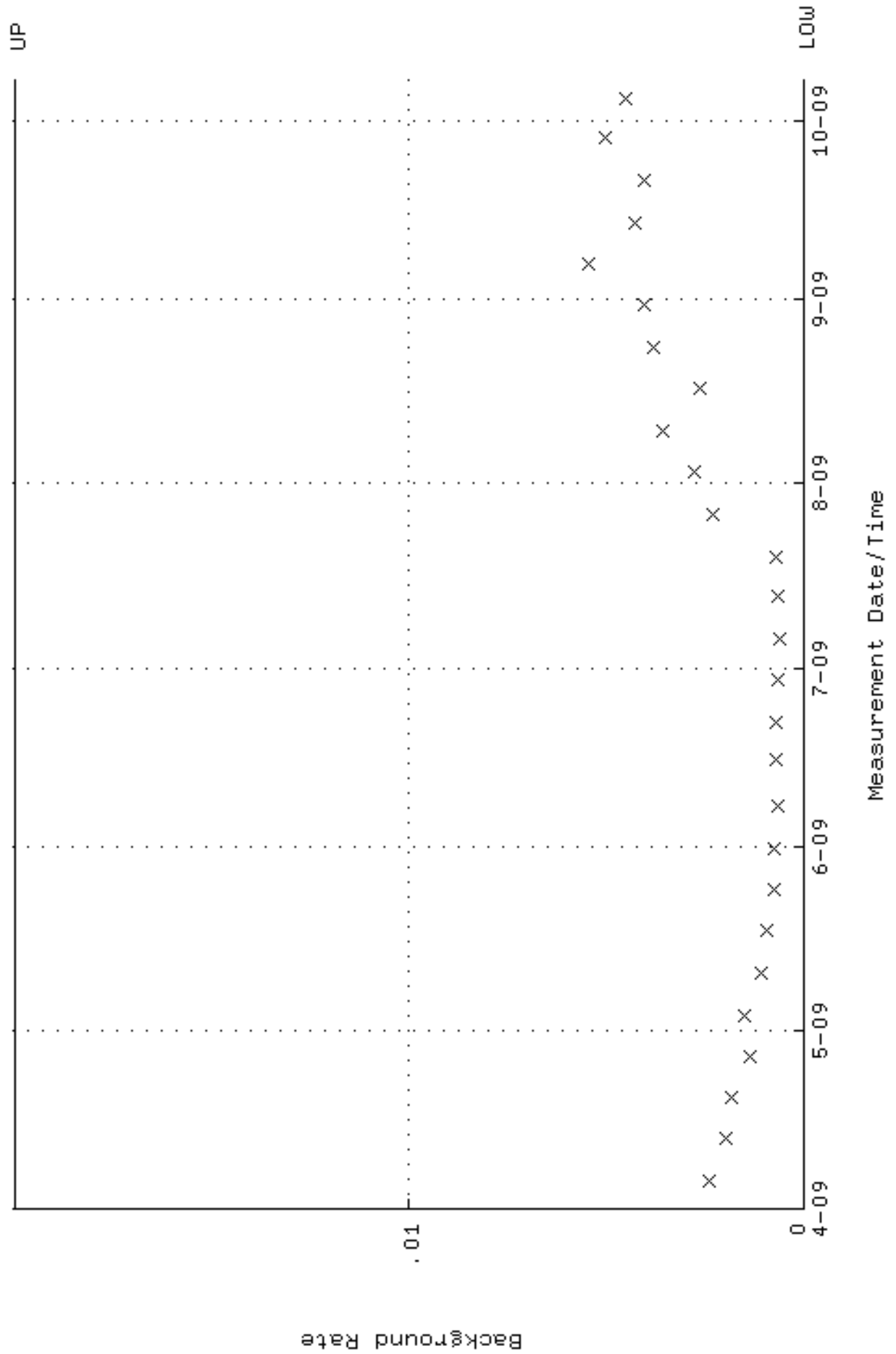
QA filename : DKA100:[ENV\_ALPHA.QA.W]W043.QAF;102  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:08 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.335973 through 0.355973



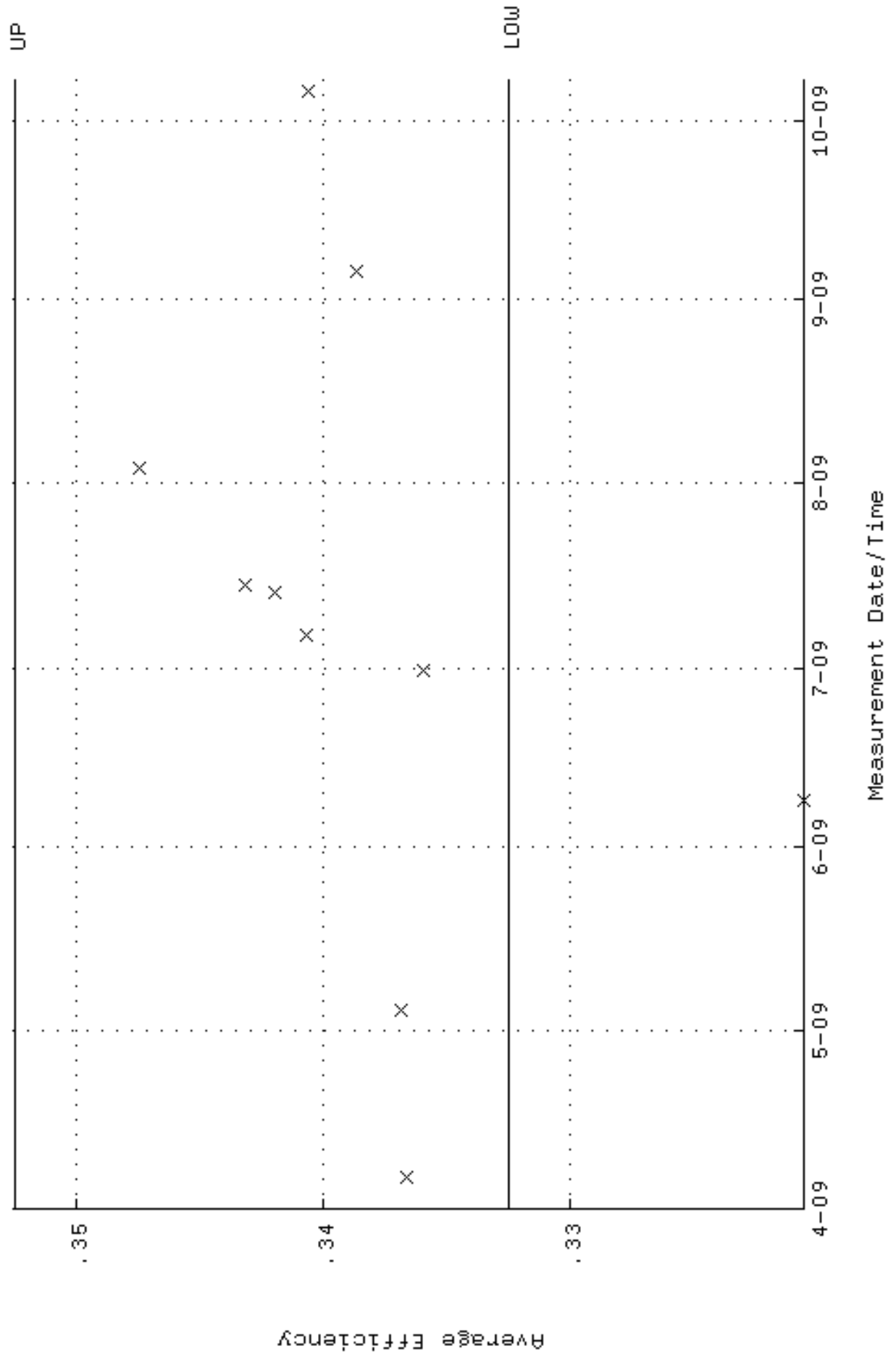
QA filename : DKA100:[ENV\_ALPHA.QA.W]W043.QAF;102  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:08 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 84.2440 through 93.1118



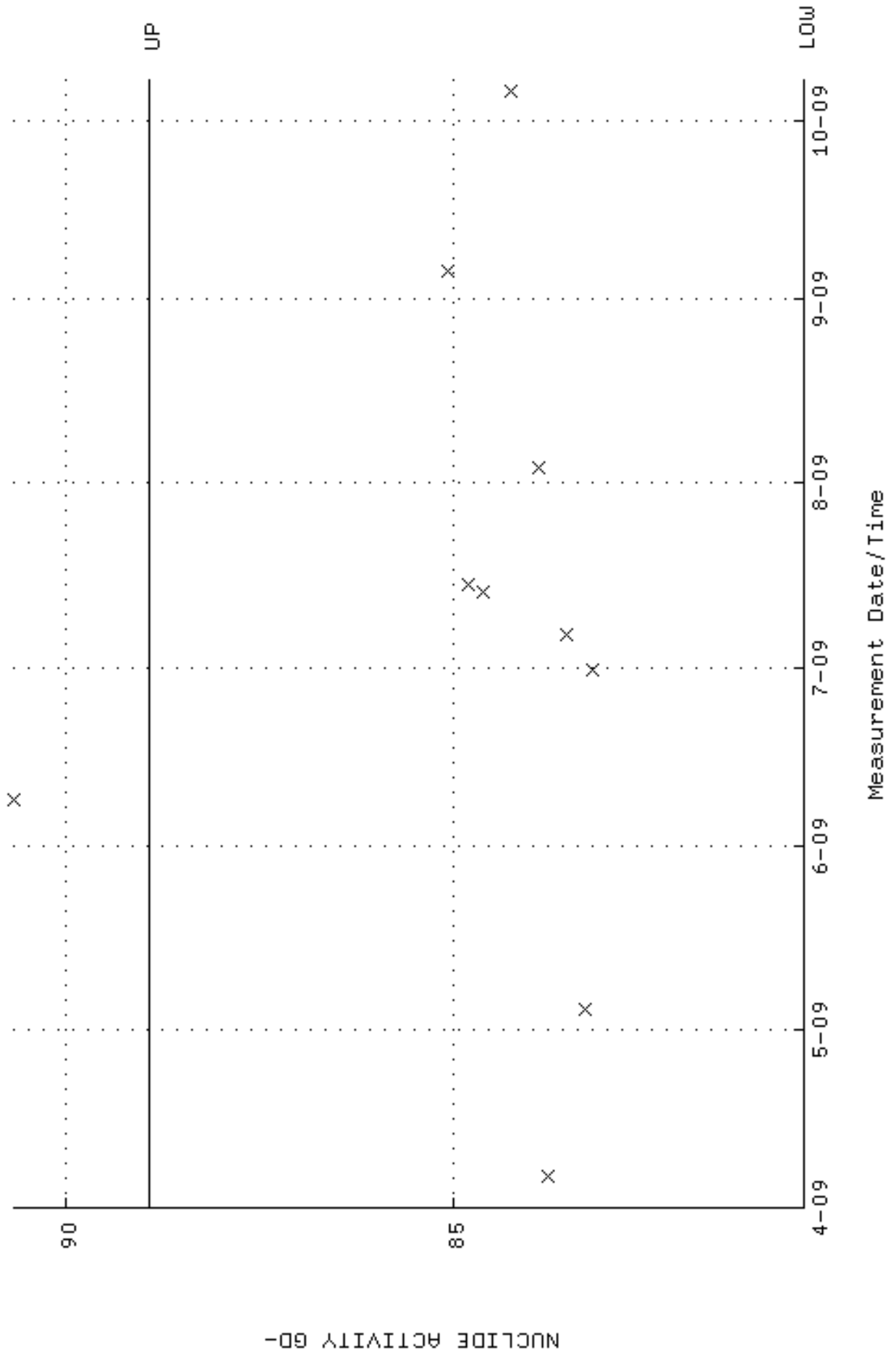
QA filename : DKA100:[ENV\_ALPHA.QA.B]B043.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:15 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



QA filename : DKA100:[ENV\_ALPHA.QA.W]W045.QAF;5  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:08 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.332472 through 0.352472



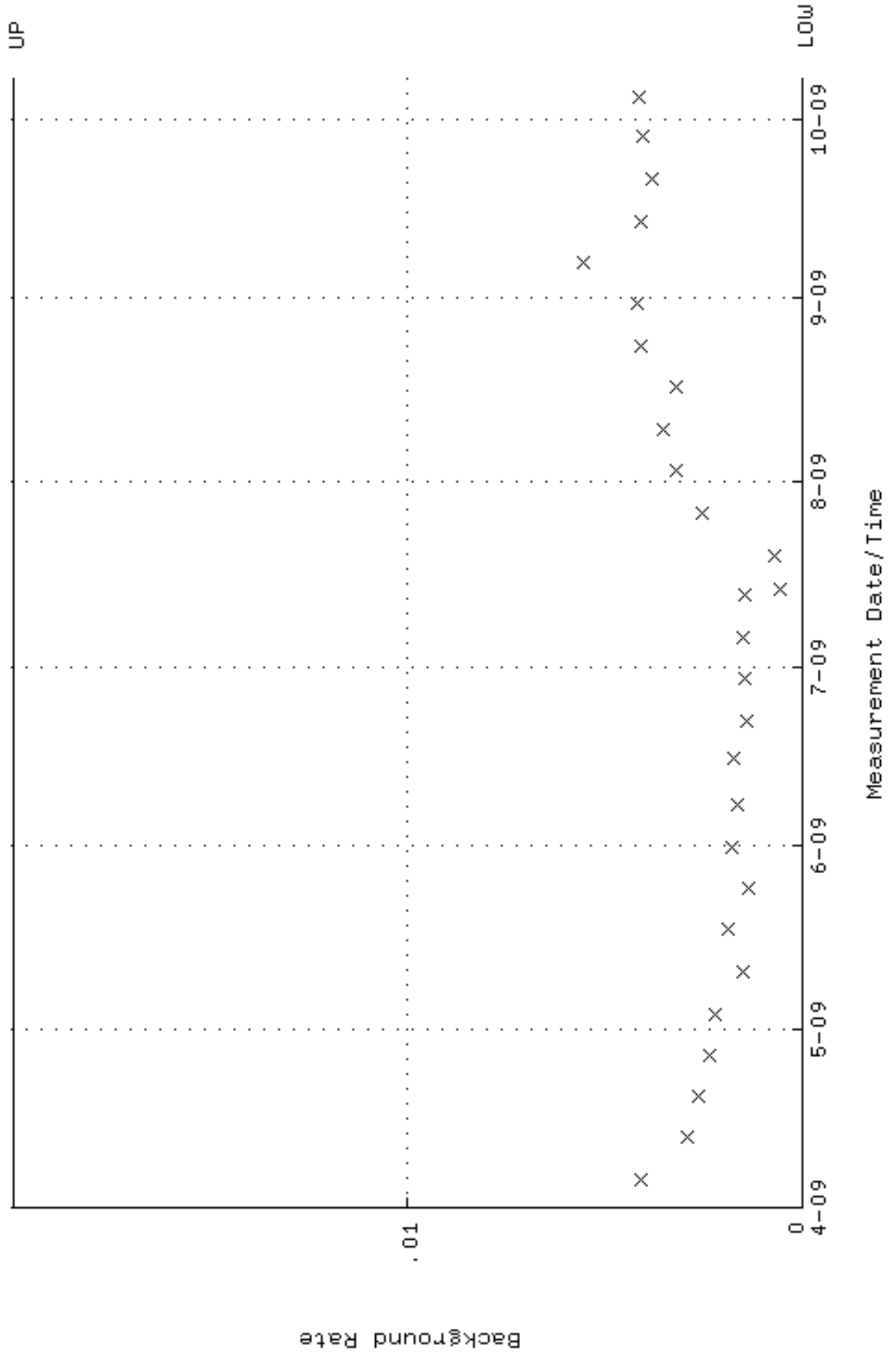
QA filename : DKA100:[ENV\_ALPHA.QA.W]W045.QAF;5  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:08 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 80.4622 through 88.9320



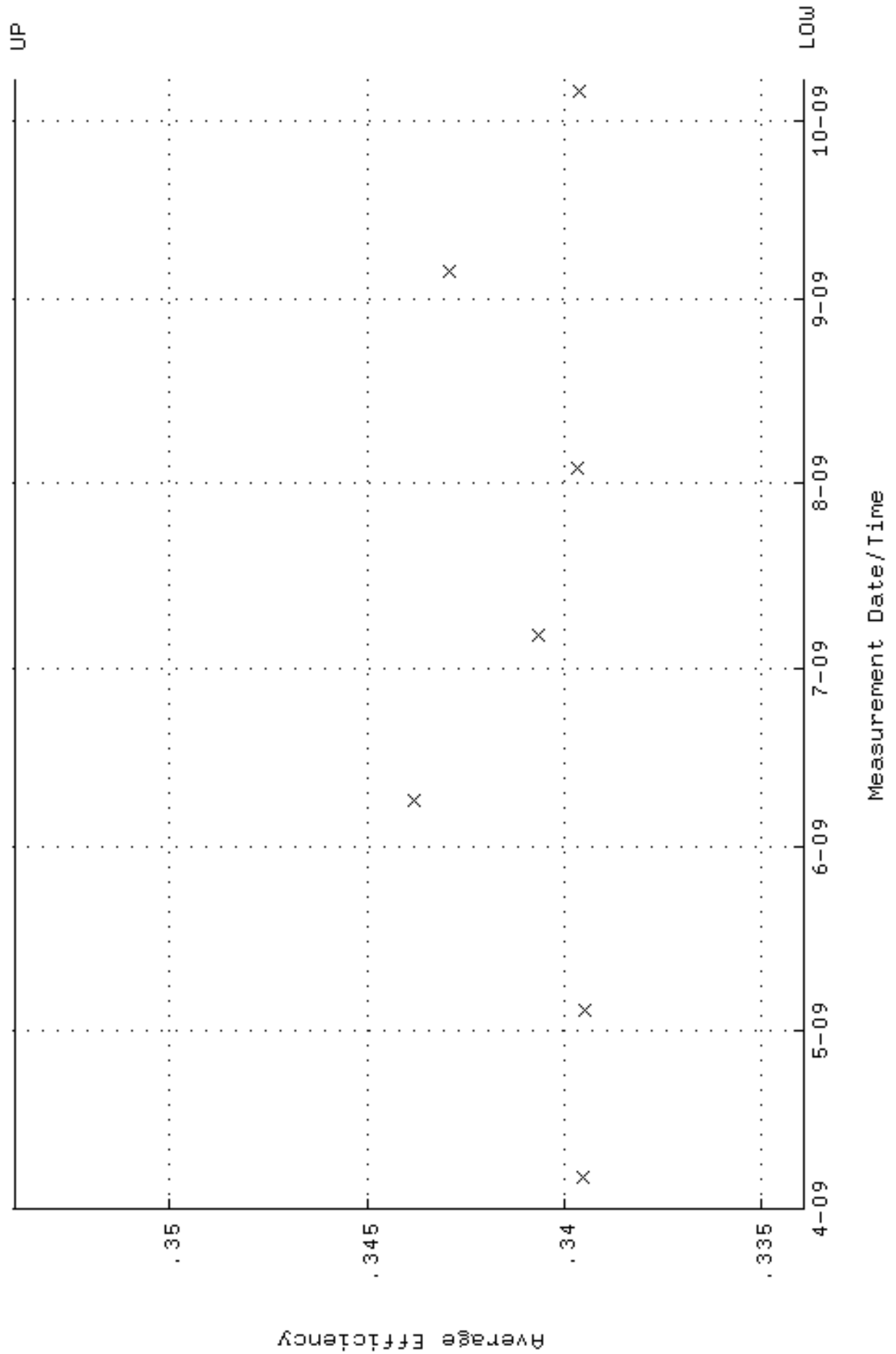
NUCLIDE ACTIVITY GD-



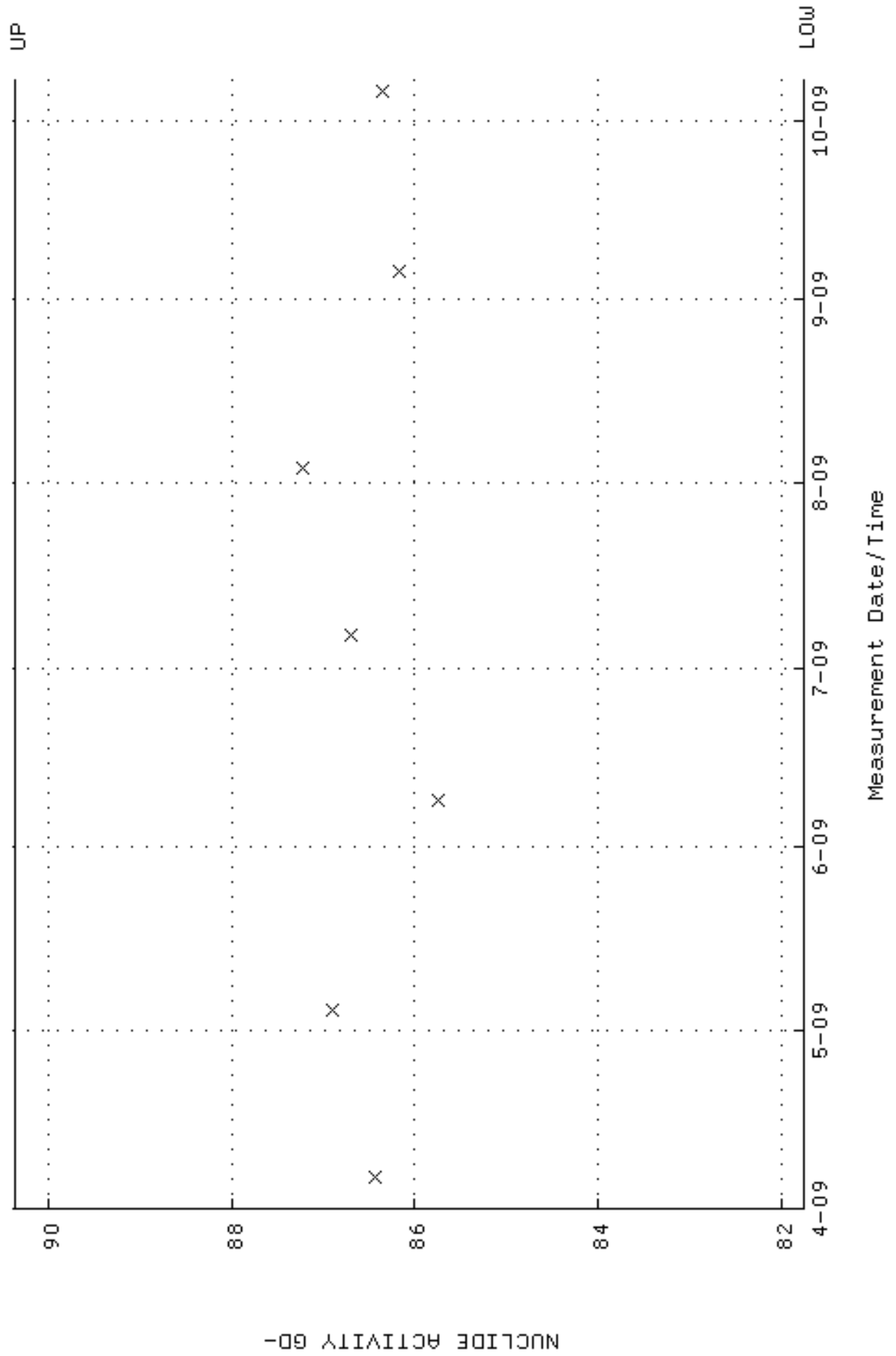
QA filename : DKA100:[ENV\_ALPHA.QA.B]B045.QAF;1  
Parameter Name : BACKRATE (Background Rate)  
Start/End Dates : 5-APR-2009 15:33:15 through 7-OCT-2009 12:00:00  
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



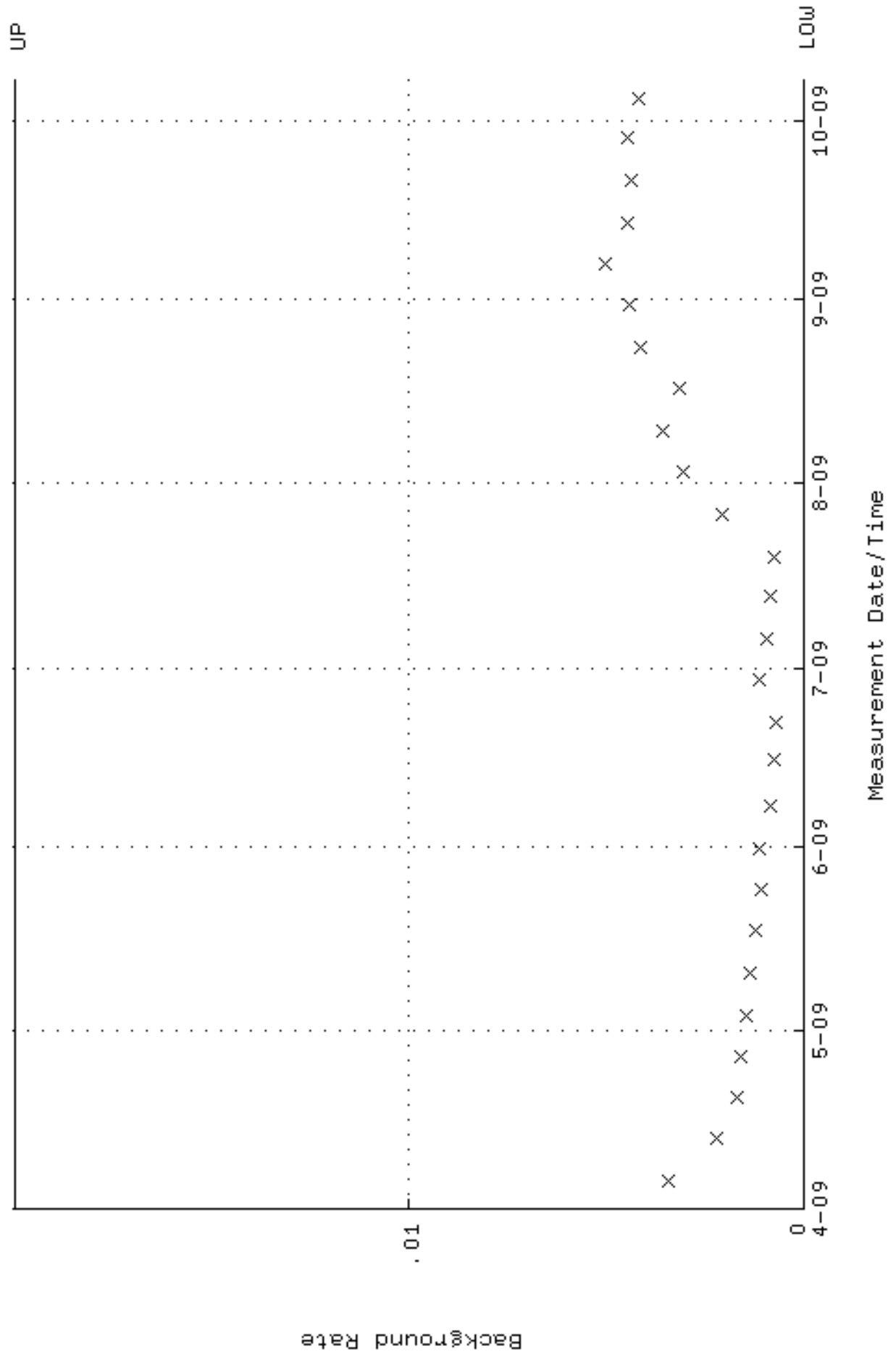
QA filename : DKA100:[ENV\_ALPHA.QA.W]W046.QAF;4  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:08 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.333927 through 0.353927



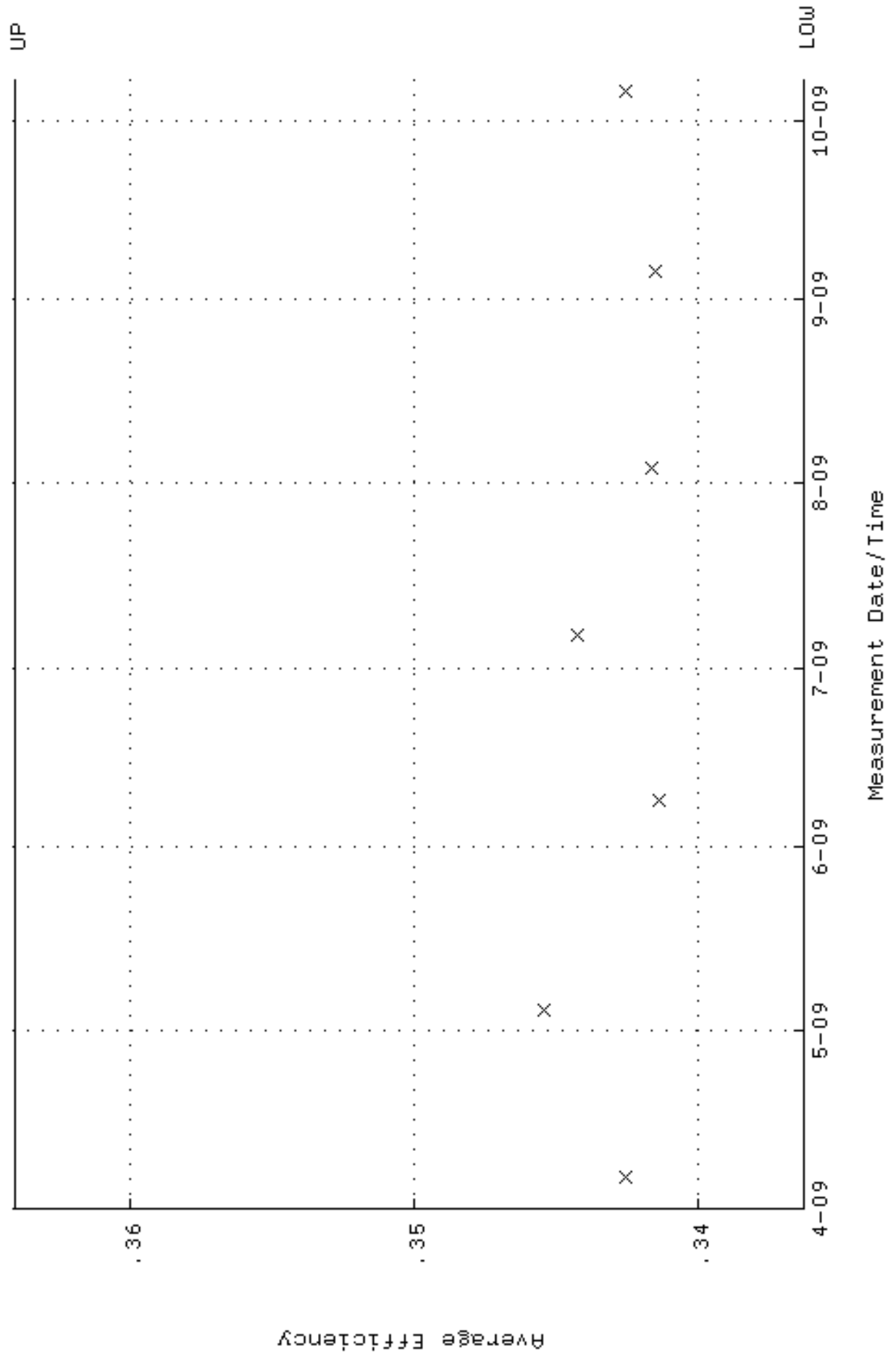
QA filename : DKA100:[ENV\_ALPHA.QA.W]W046.QAF;4  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:08 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 81.7568 through 90.3628



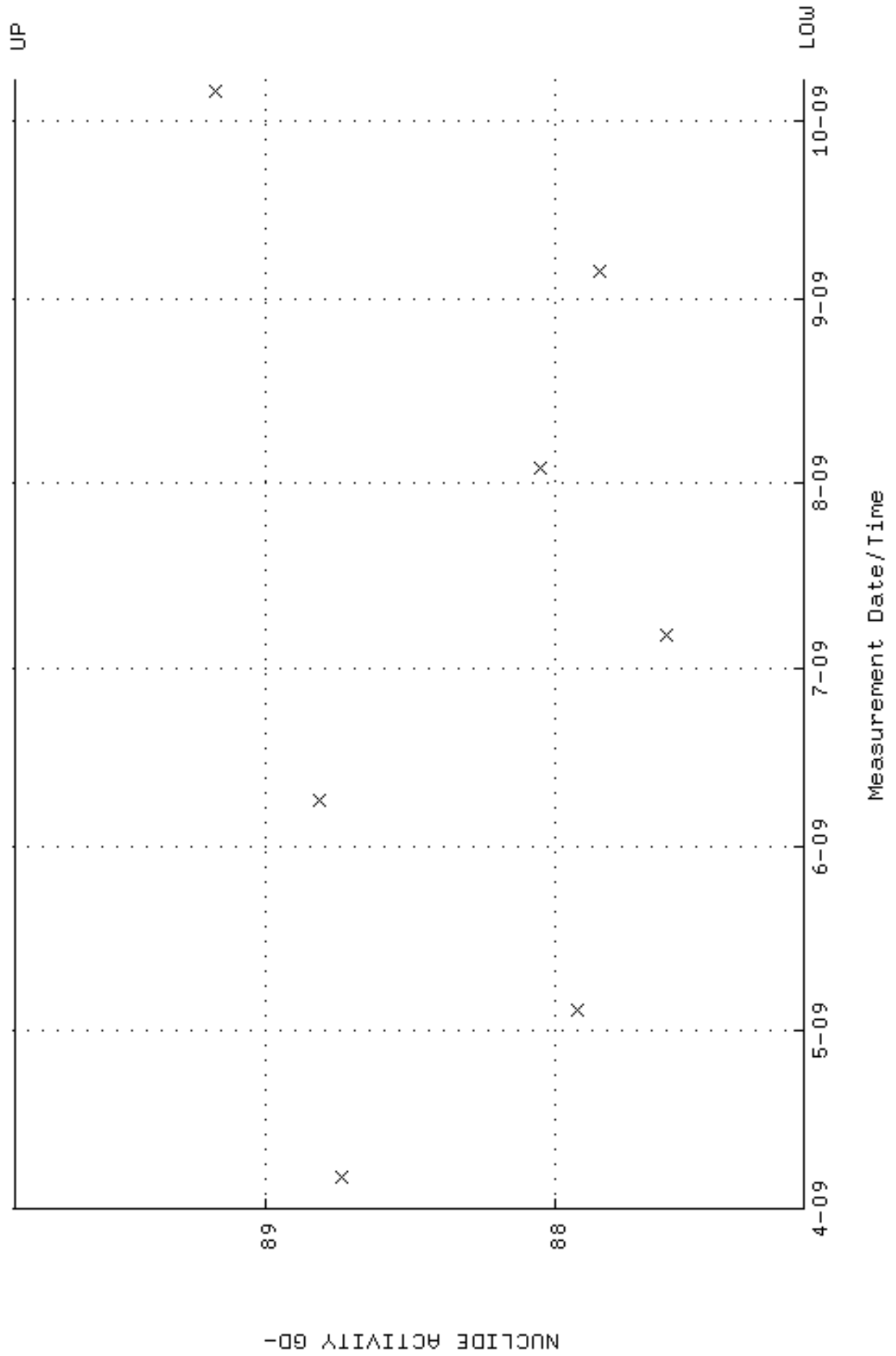
QA filename : DKA100:[ENV\_ALPHA.QA.B]B046.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:15 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



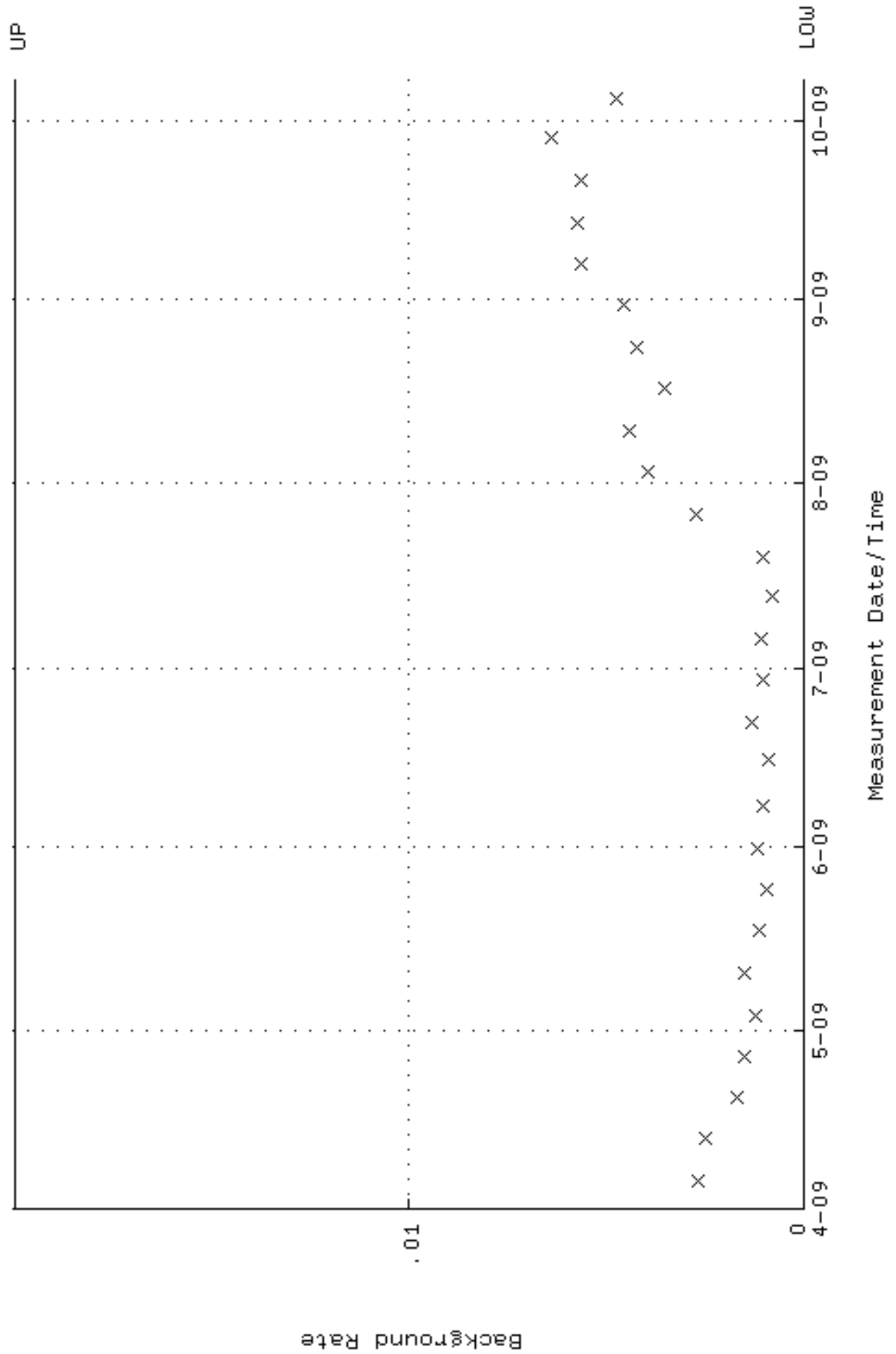
QA filename : DKA100:[ENV\_ALPHA.QA.W]W047.QAF;5  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 6-APR-2009 08:44:08 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.336276 through 0.364038



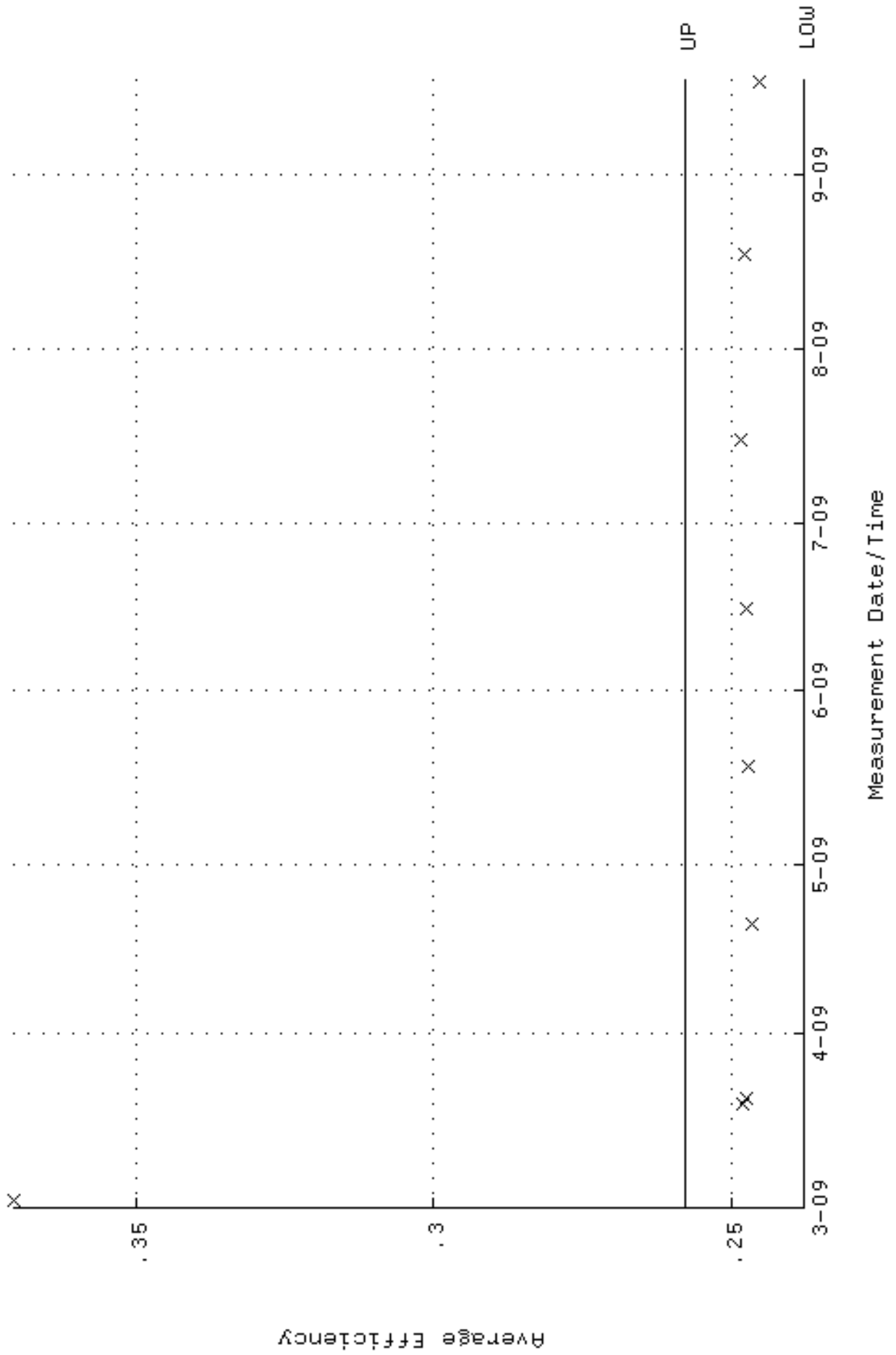
QA filename : DKA100:[ENV\_ALPHA.QA.W]W047.QAF;5  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 6-APR-2009 08:44:08 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 87.1403 through 89.8631



QA filename : DKA100:[ENV\_ALPHA.QA.B]B047.QAF;2  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 5-APR-2009 15:33:15 through 7-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02

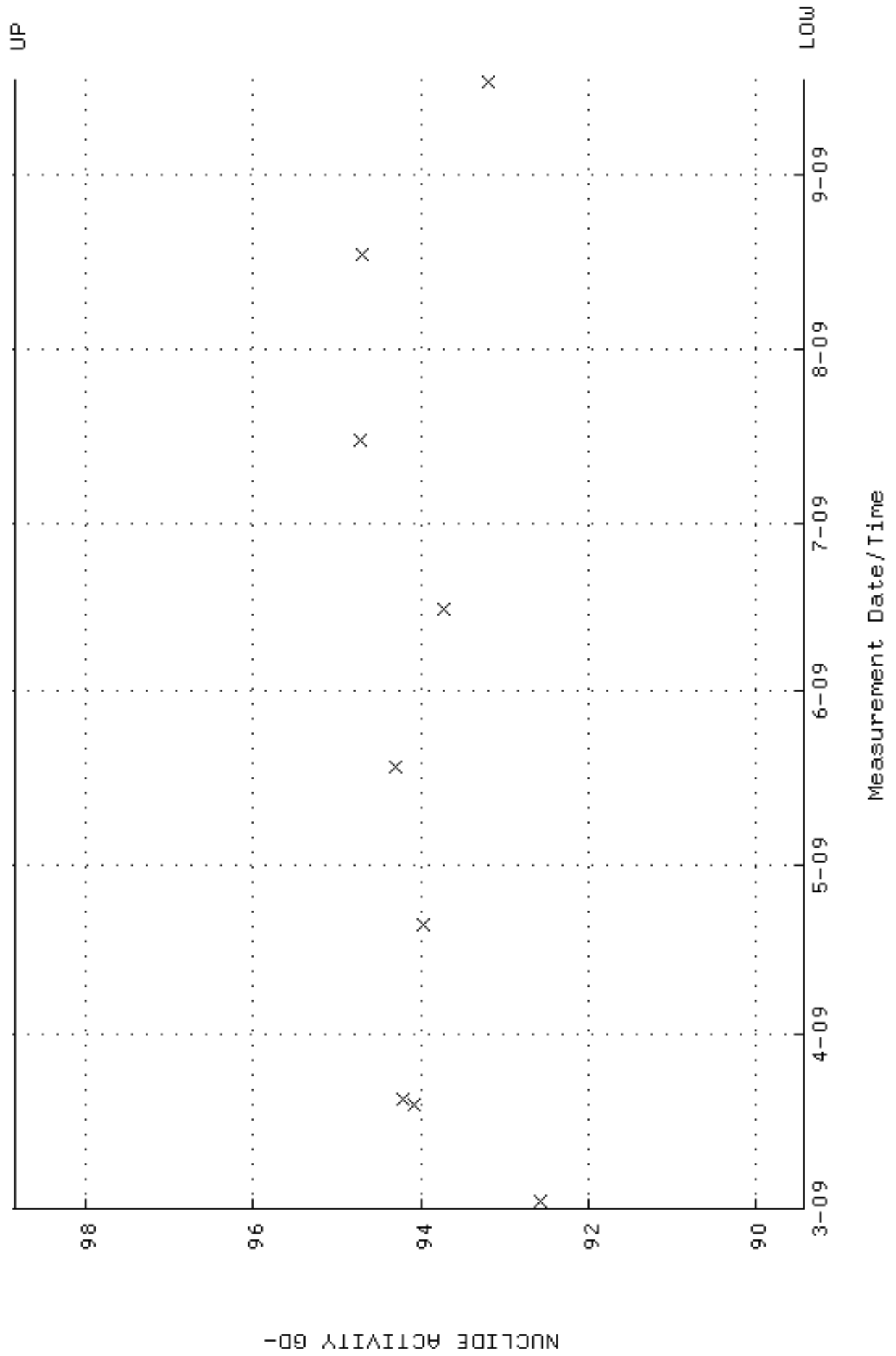


QA filename : DKA100:[ENV\_ALPHA.QA.W]W121.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:08:28 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.237686 through 0.257686

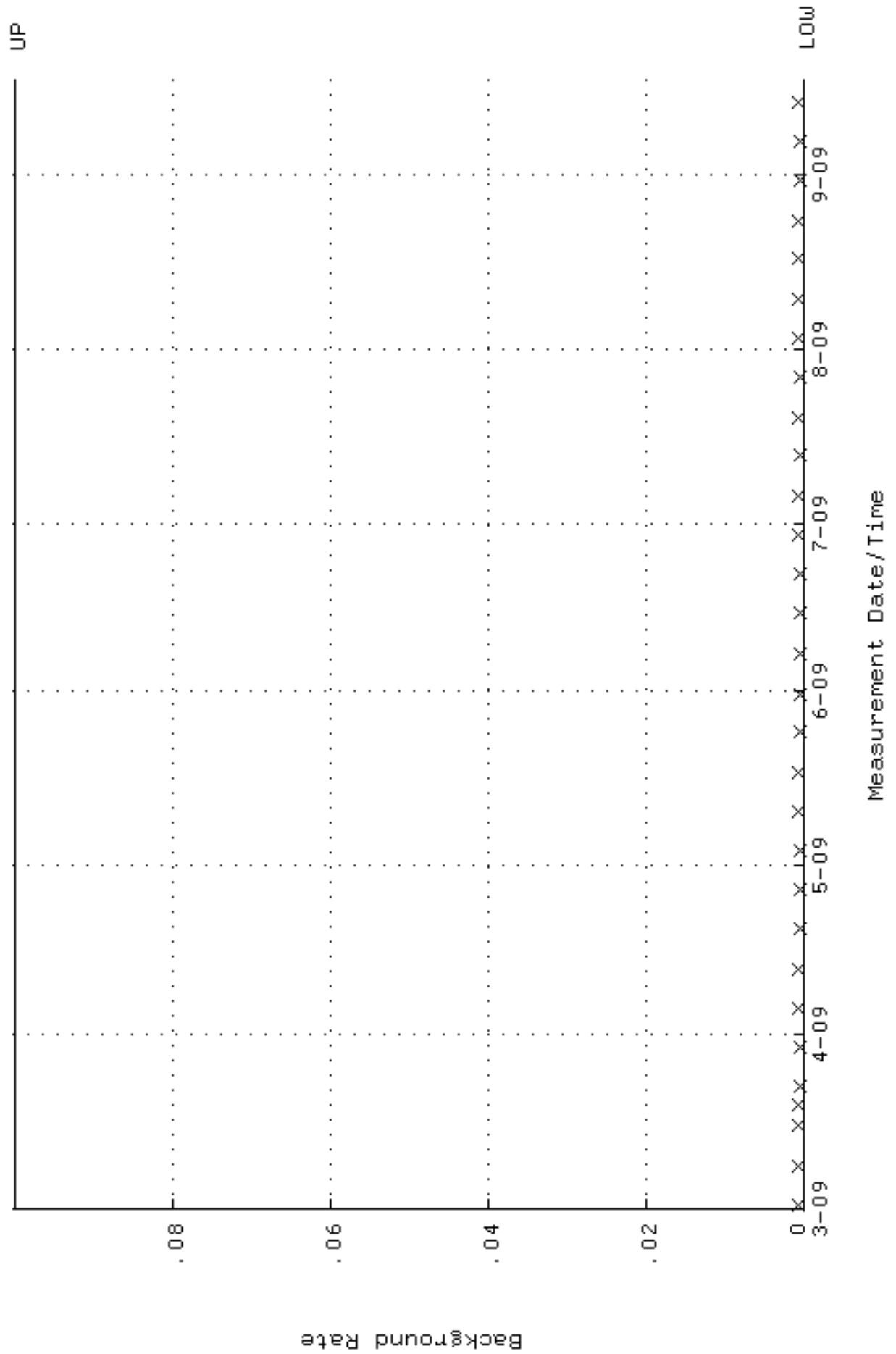




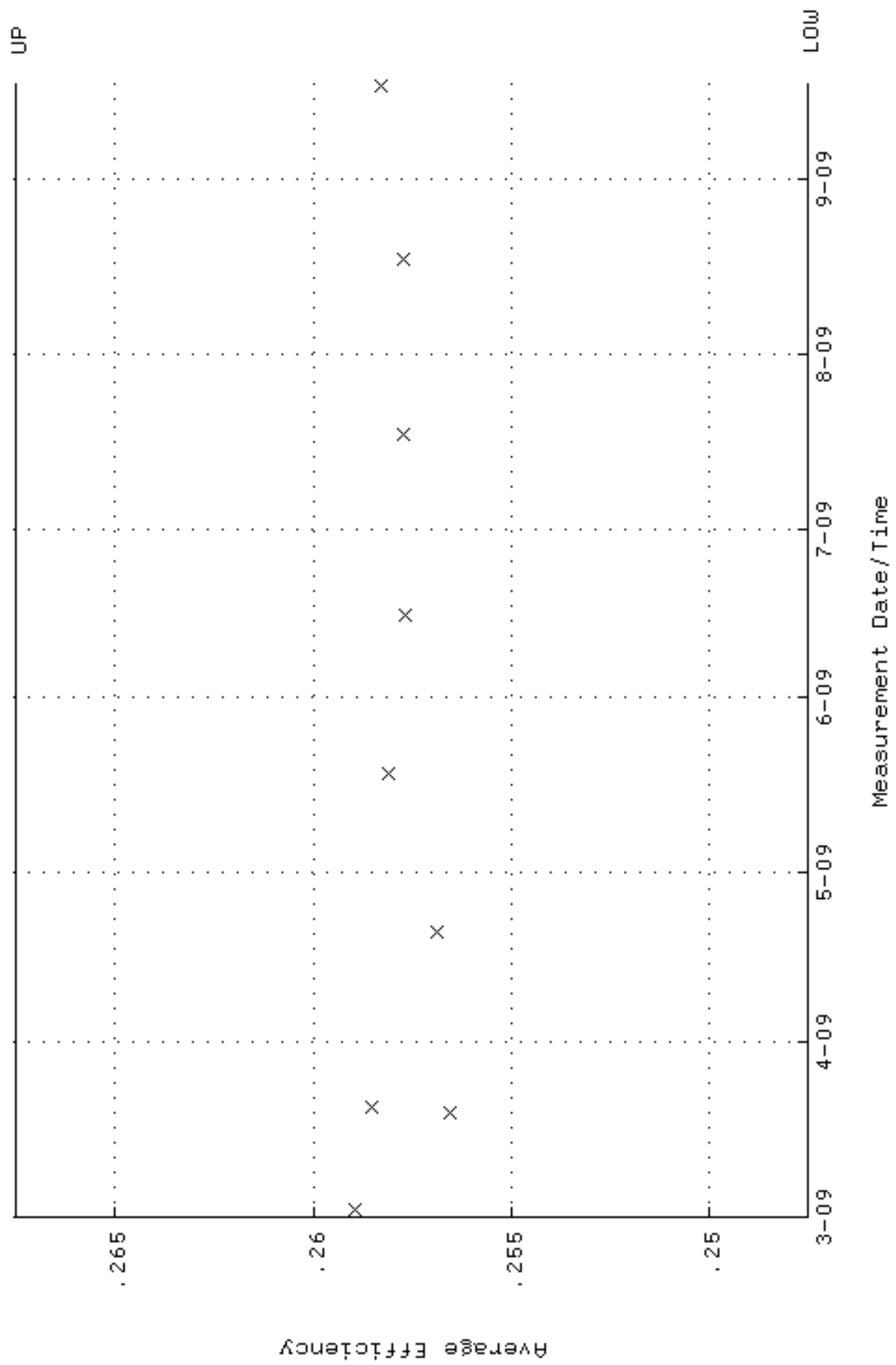
QA filename : DKA100:[ENV\_ALPHA.QA.W]w121.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:08:28 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 89.4263 through 98.8395



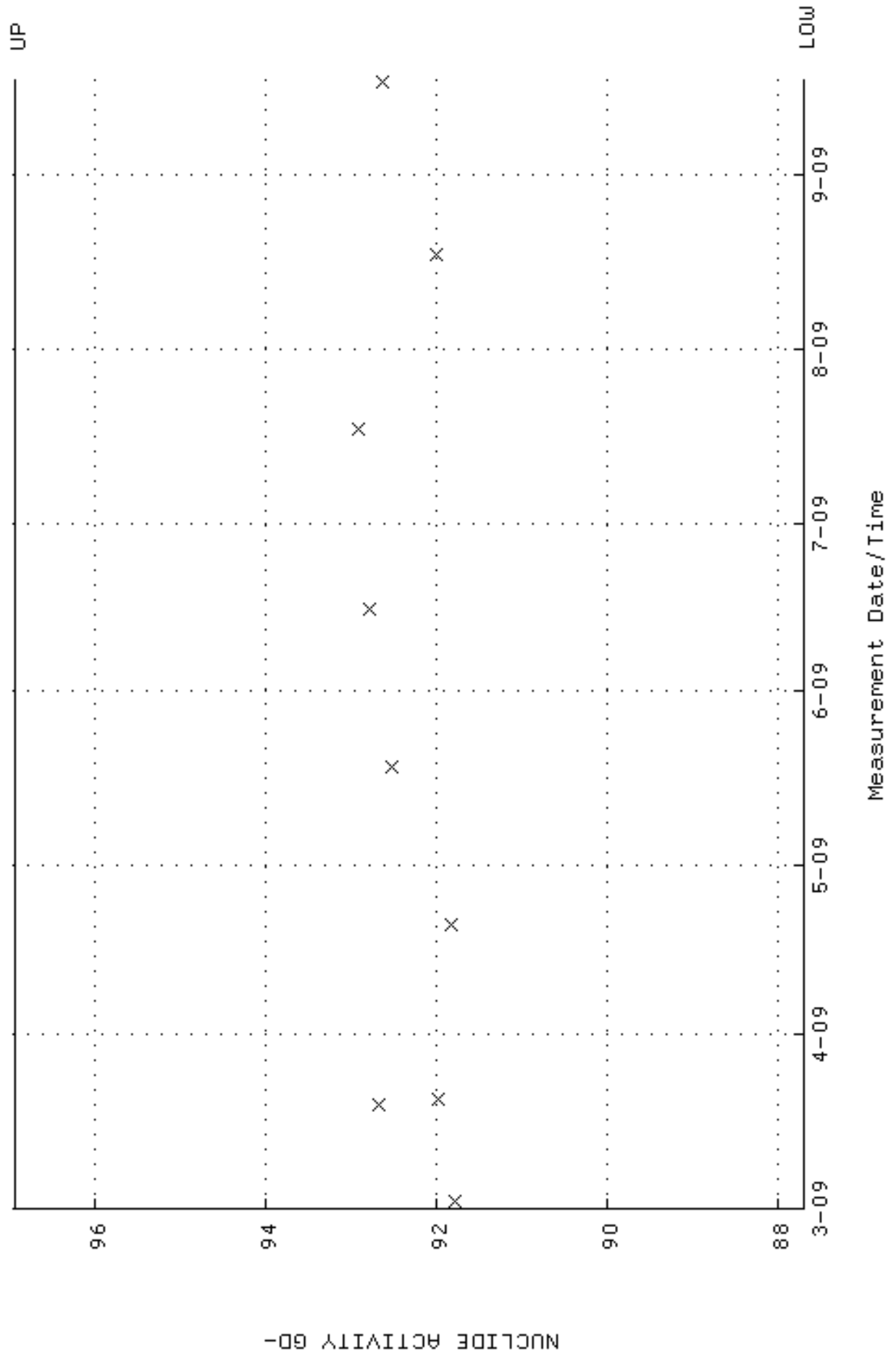
QA filename : DKA100:[ENV\_ALPHA.QA.B]B121.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:18:21 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W125.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:08:55 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.247512 through 0.267512

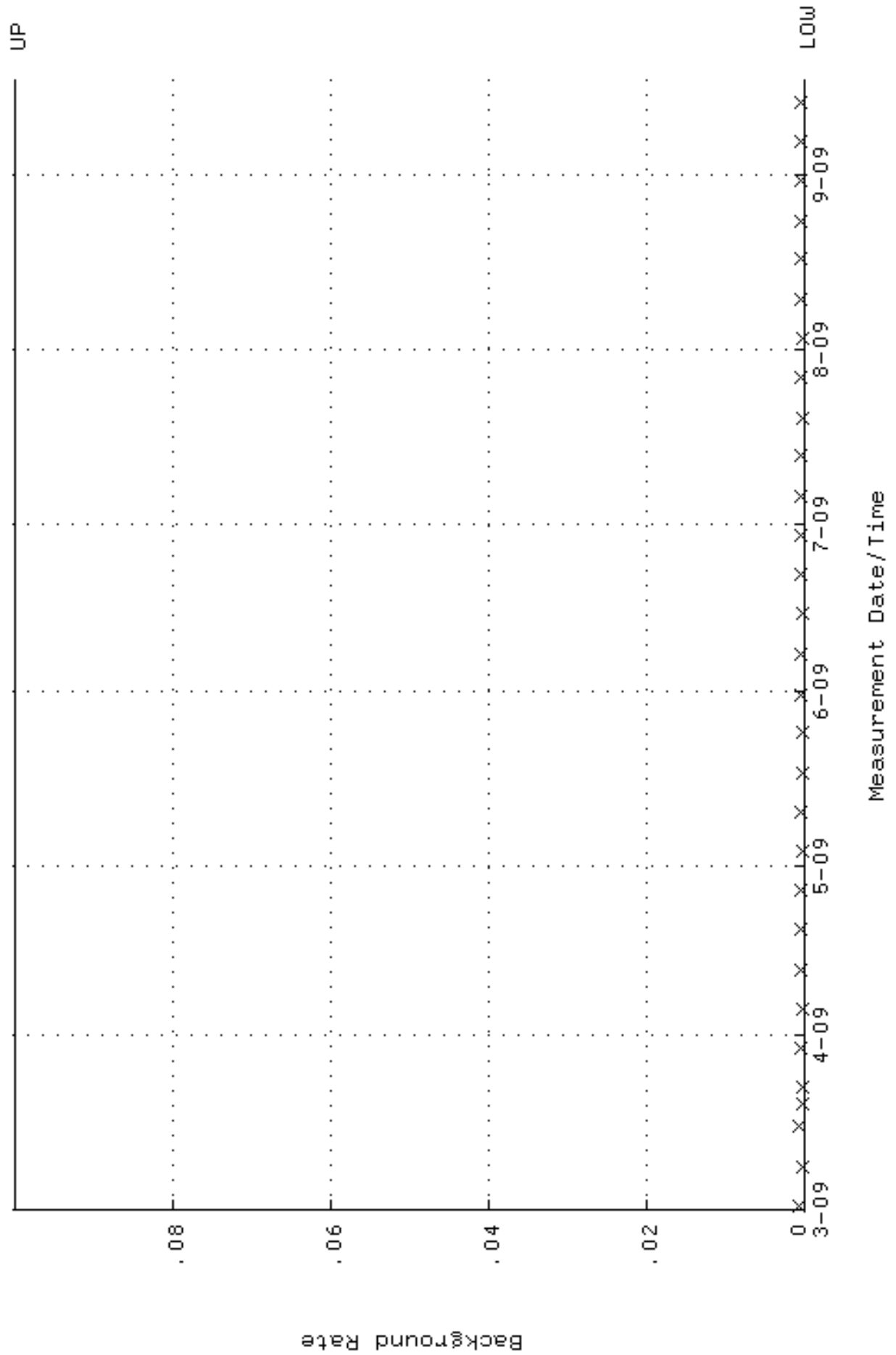


QA filename : DKA100:[ENV\_ALPHA.QA.W]W125.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:08:55 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 87.6956 through 96.9268

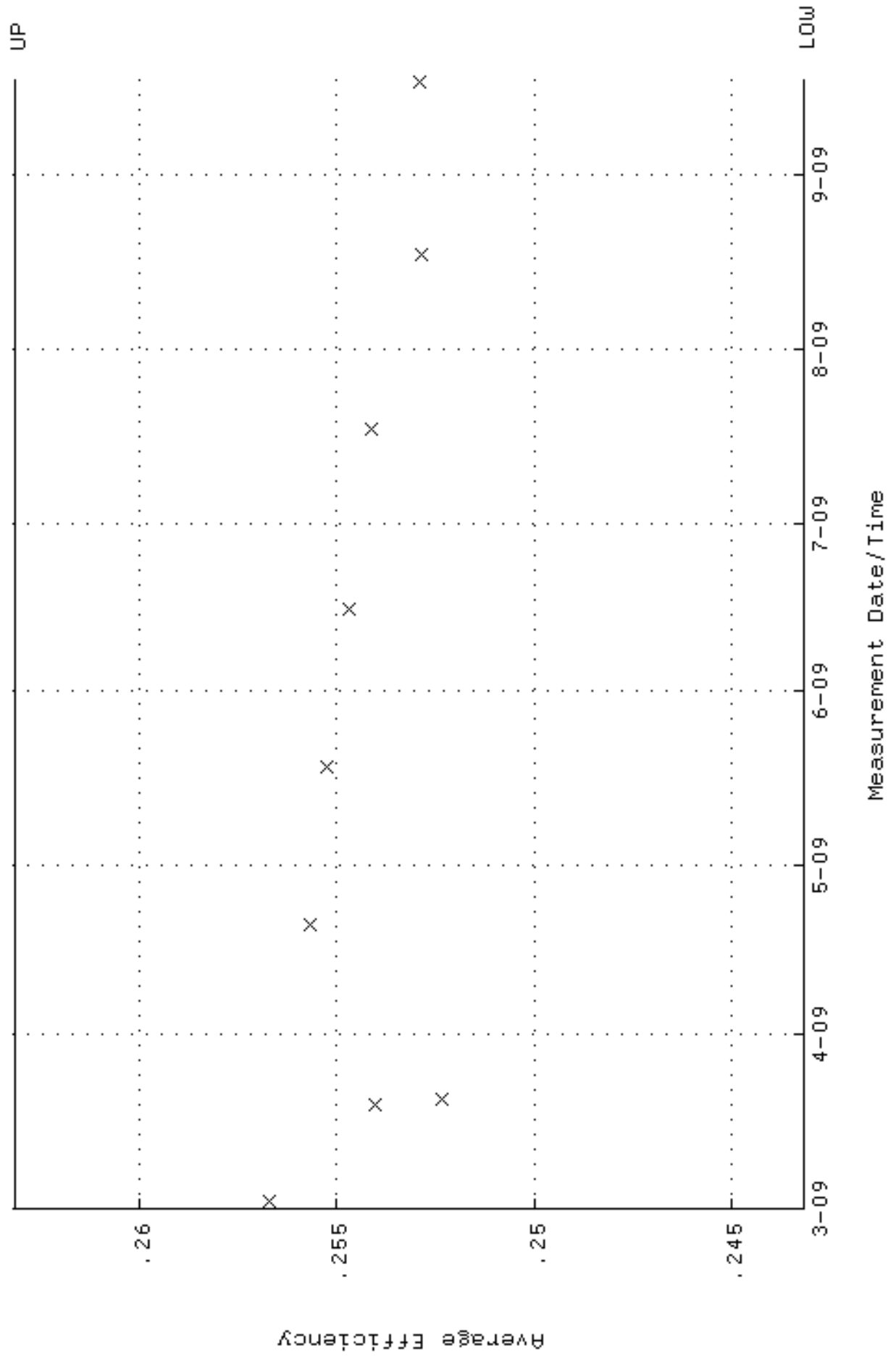


NUCLIDE ACTIVITY GD-

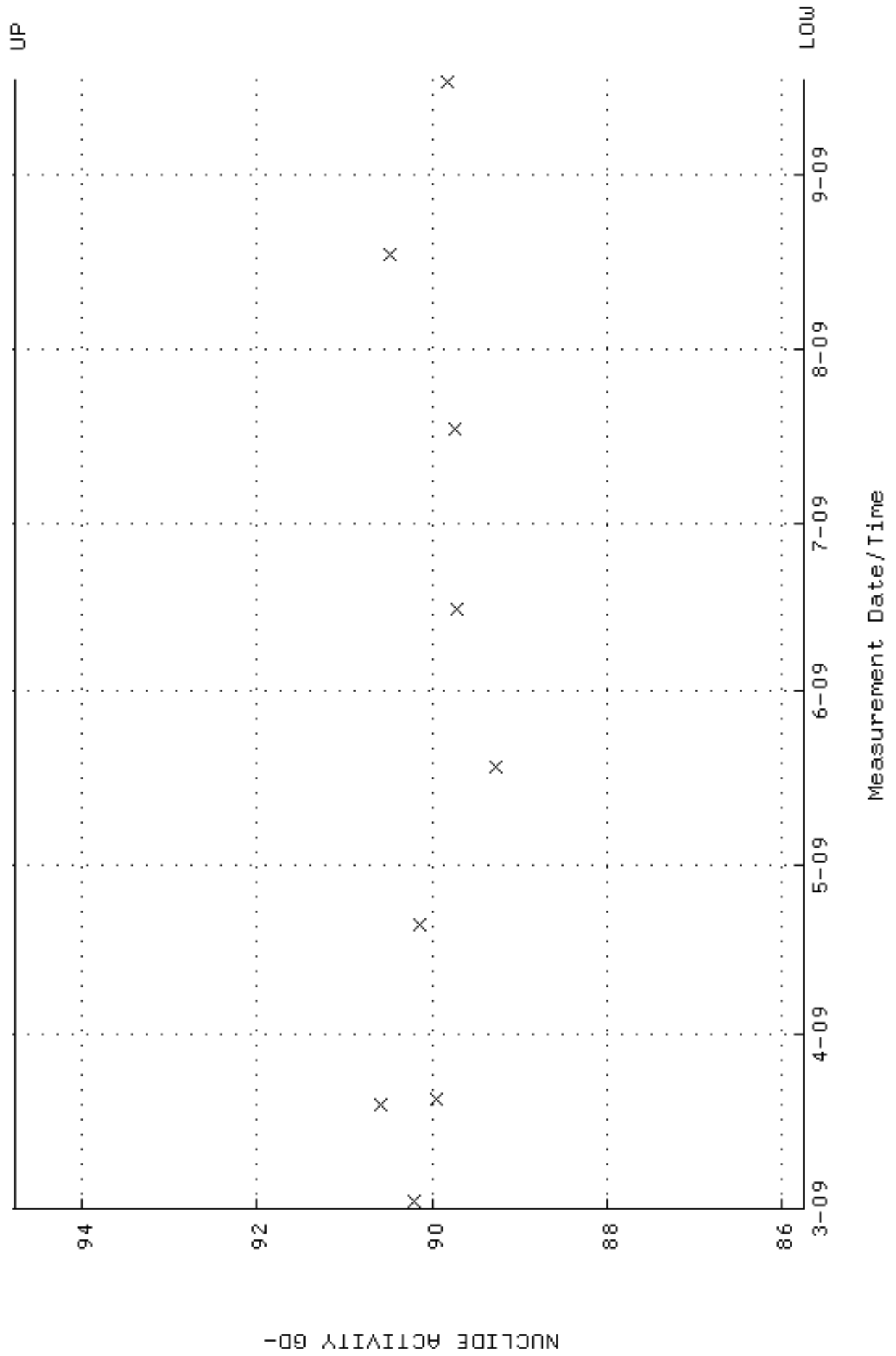
QA filename : DKA100:[ENV\_ALPHA.QA.B]B125.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:18:39 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



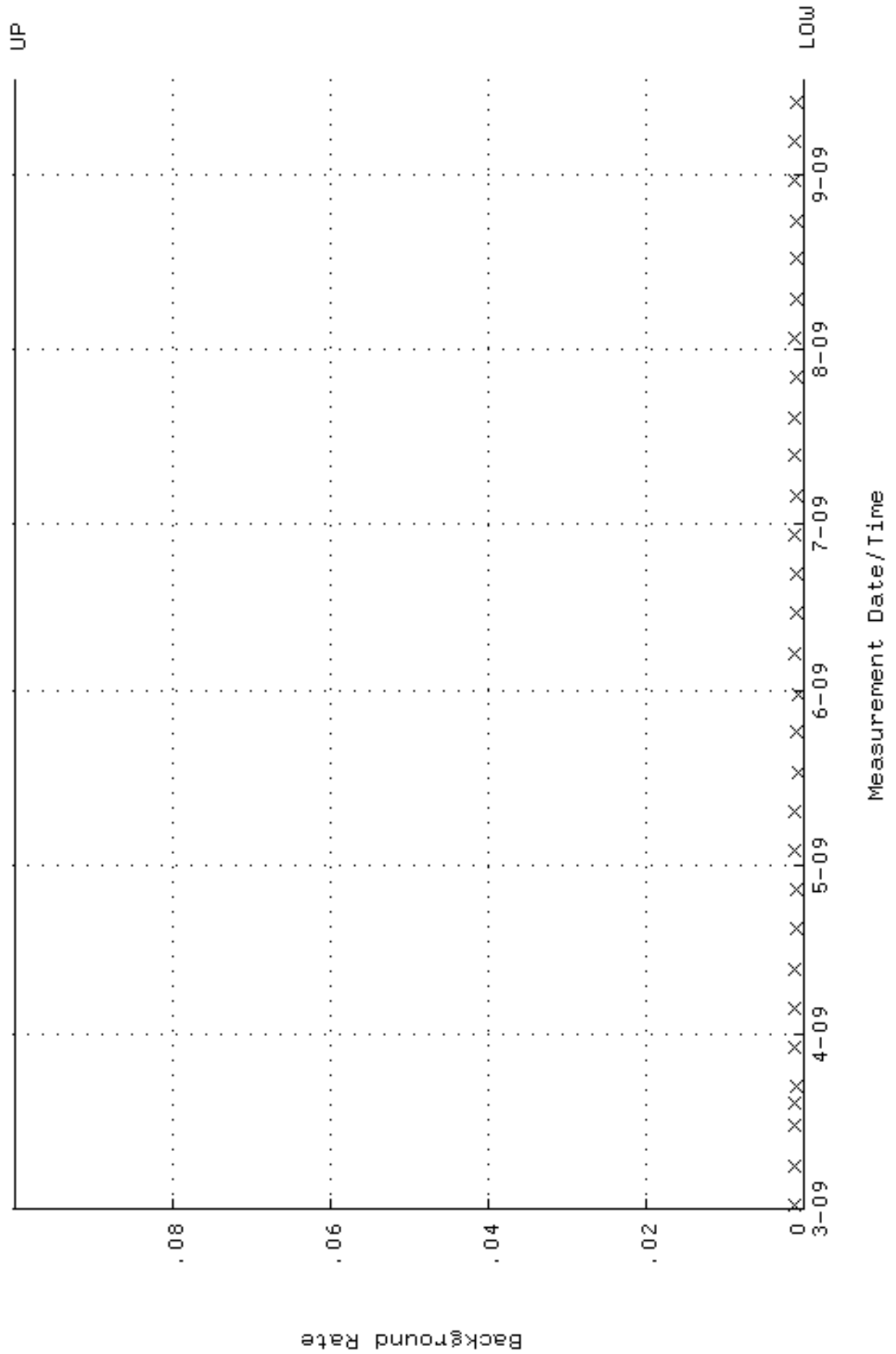
QA filename : DKA100:[ENV\_ALPHA.QA.W]W126.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:09:01 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.243156 through 0.263156



QA filename : DKA100:[ENV\_ALPHA.QA.W]W126.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:09:01 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 85.7449 through 94.7707

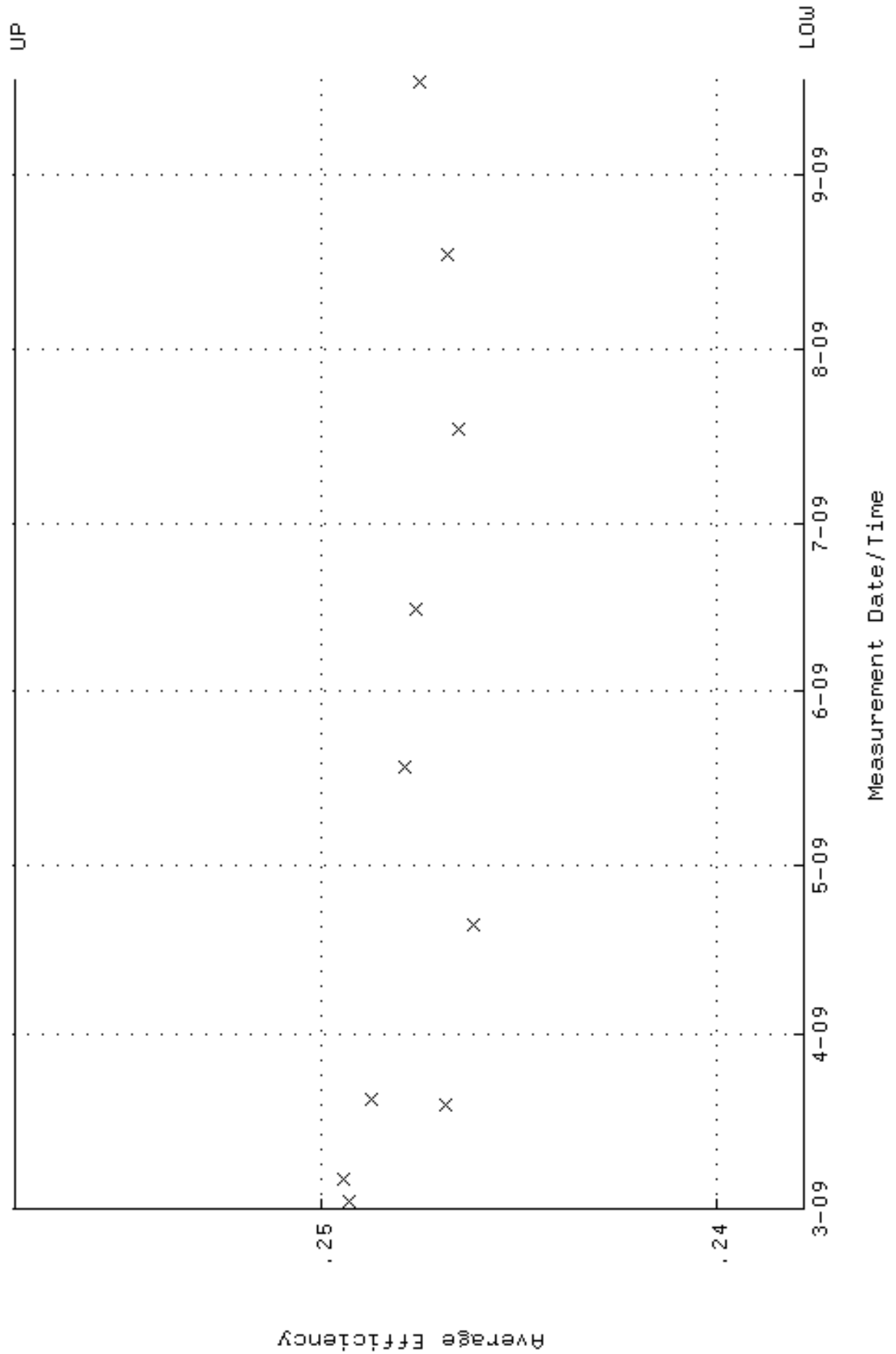


QA filename : DKA100:[ENV\_ALPHA.QA.B]B126.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:18:43 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

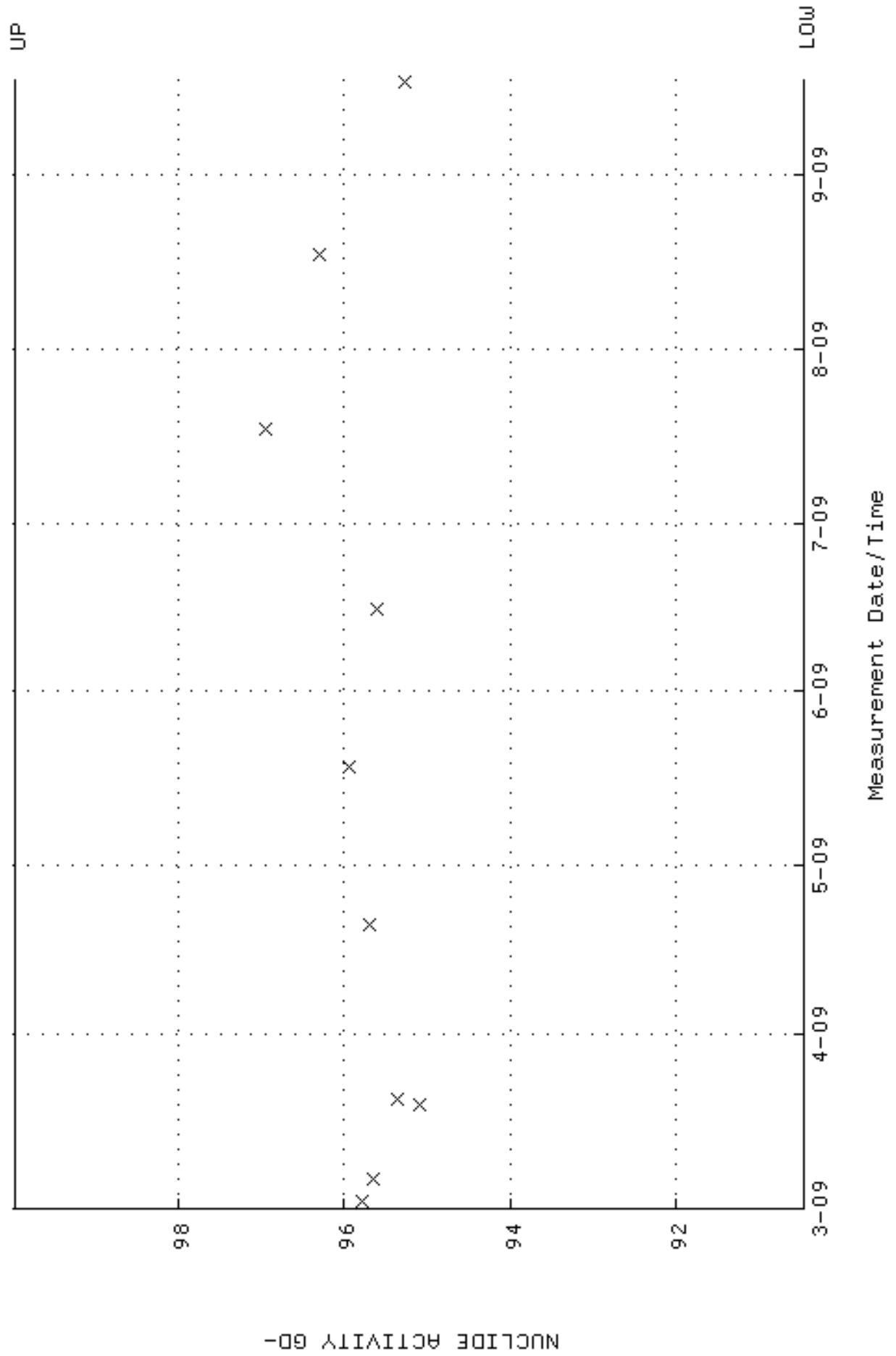




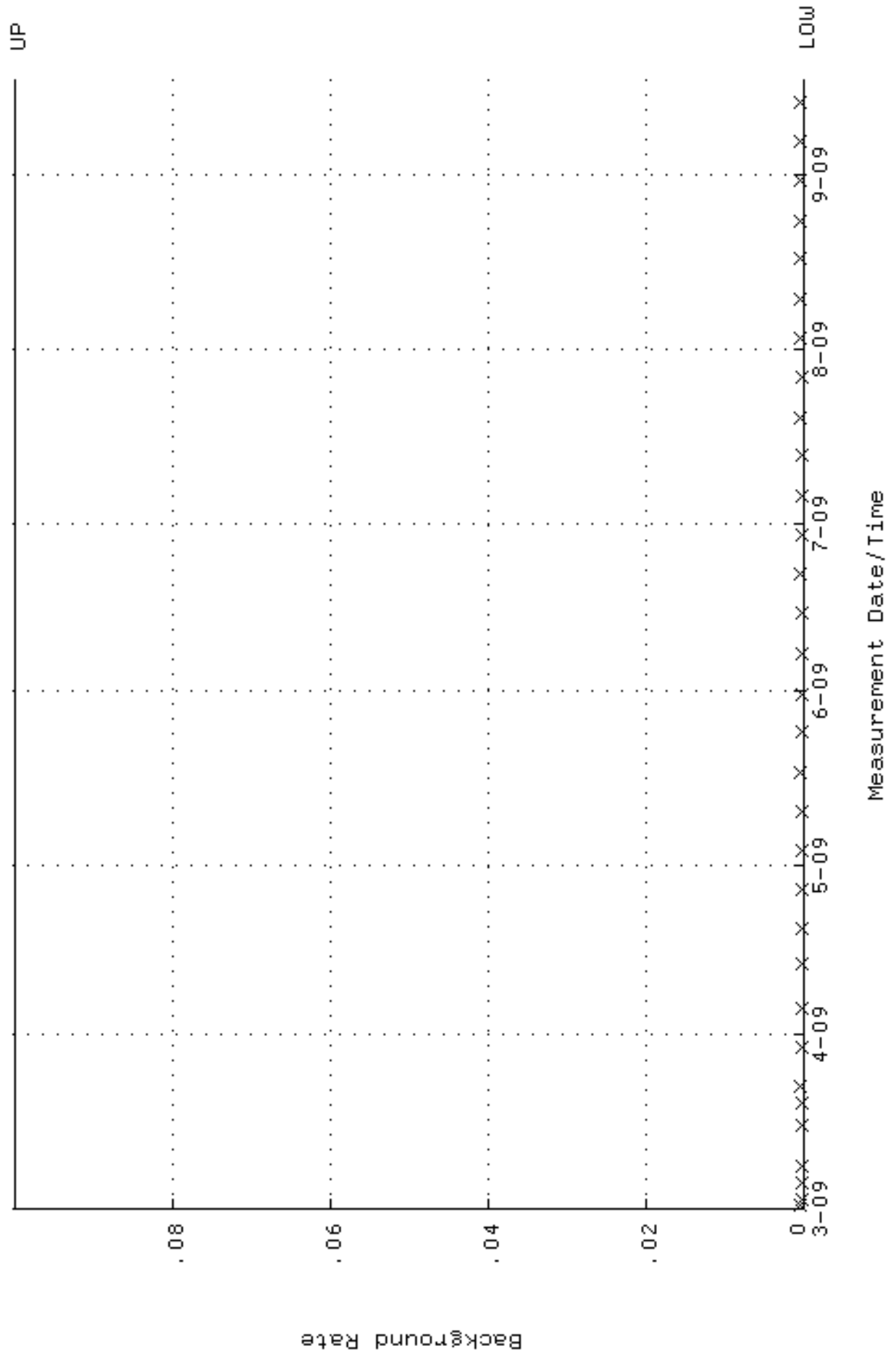
QA filename : DKA100:[ENV\_ALPHA.QA.W]W127.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:09:07 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.237773 through 0.257773



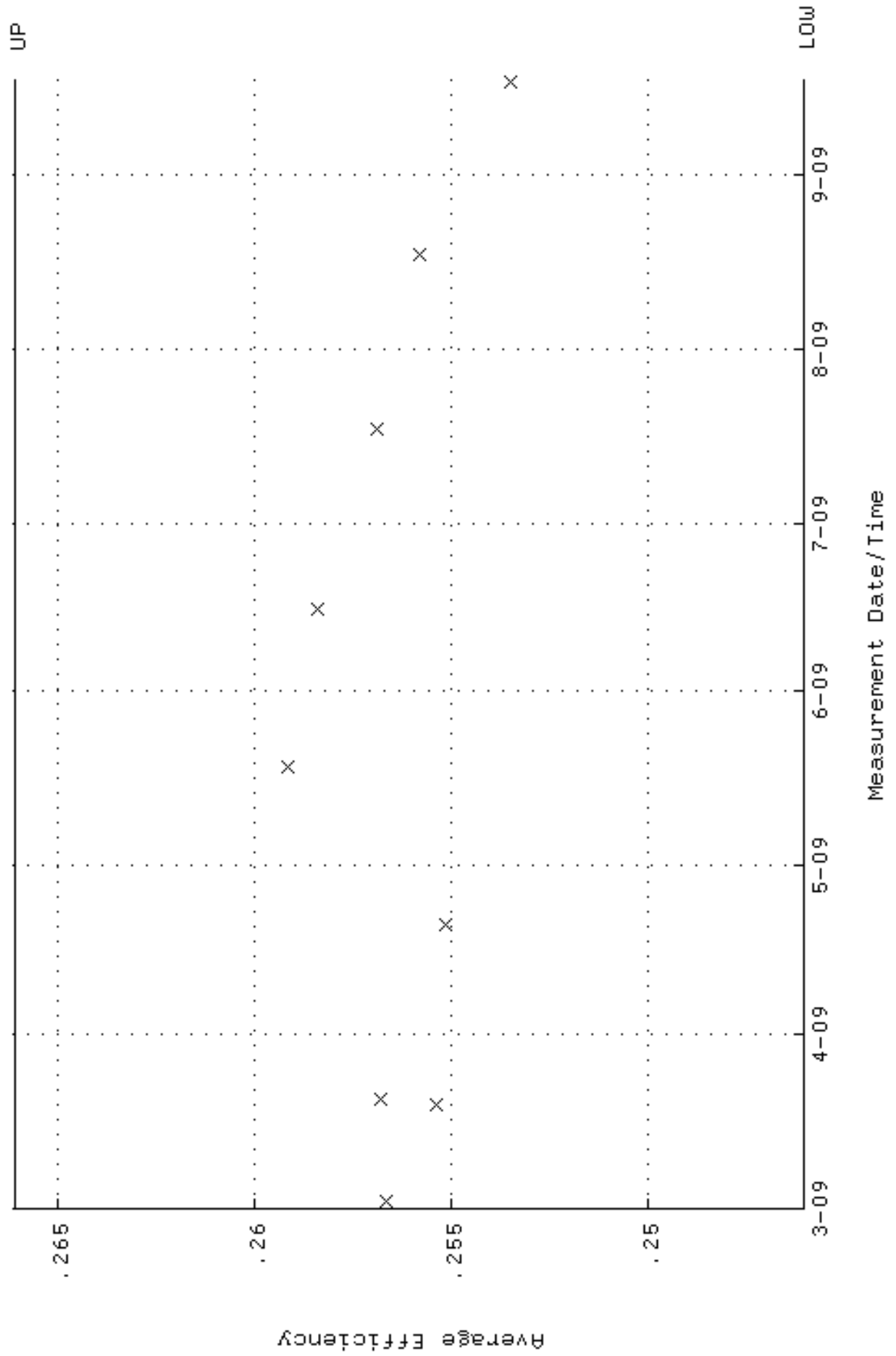
QA filename : DKA100:[ENV\_ALPHA.QA.W]W127.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:09:07 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 90.4503 through 99.9713



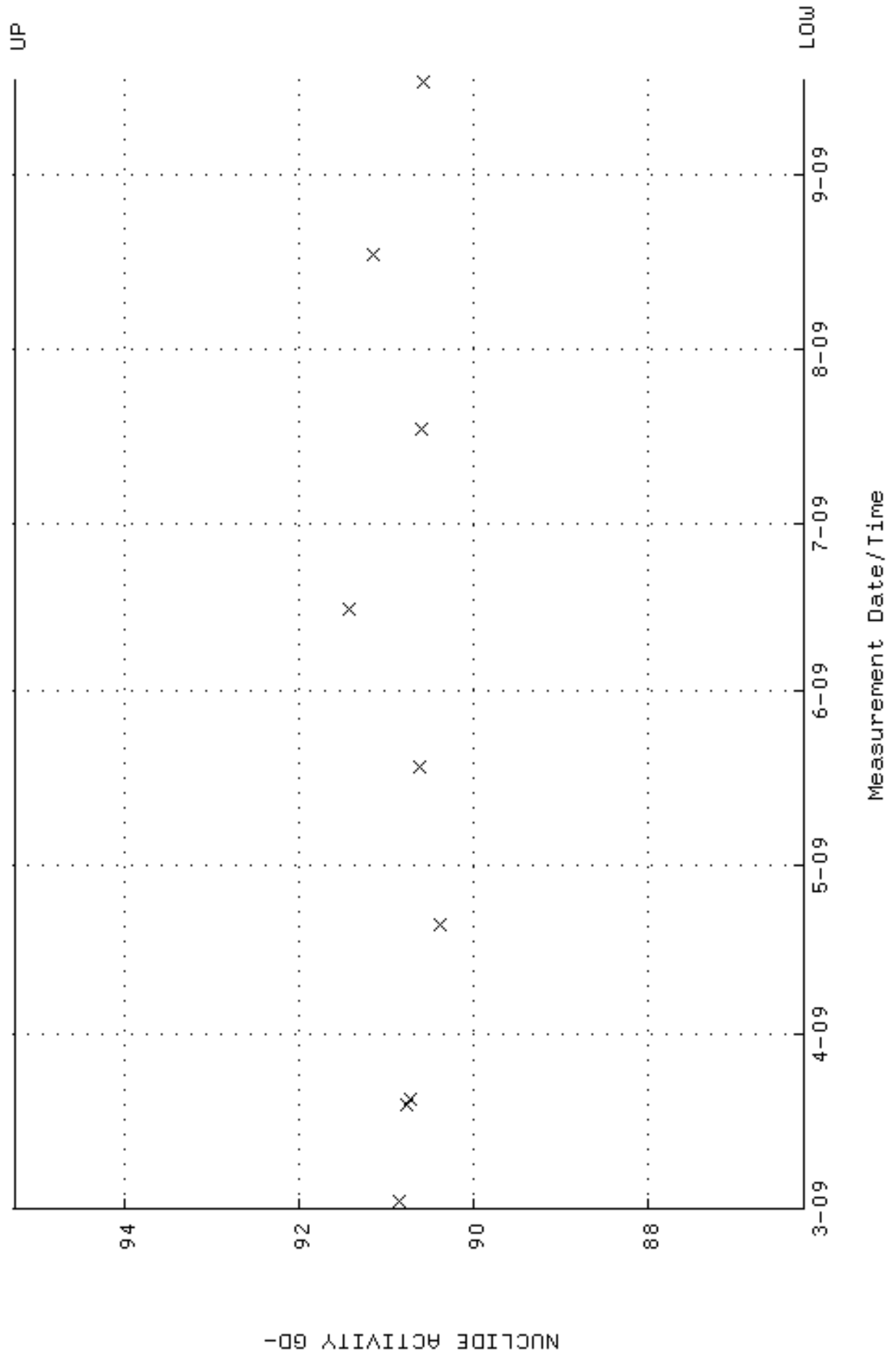
QA filename : DKA100:[ENV\_ALPHA.QA.B]B127.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:18:47 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



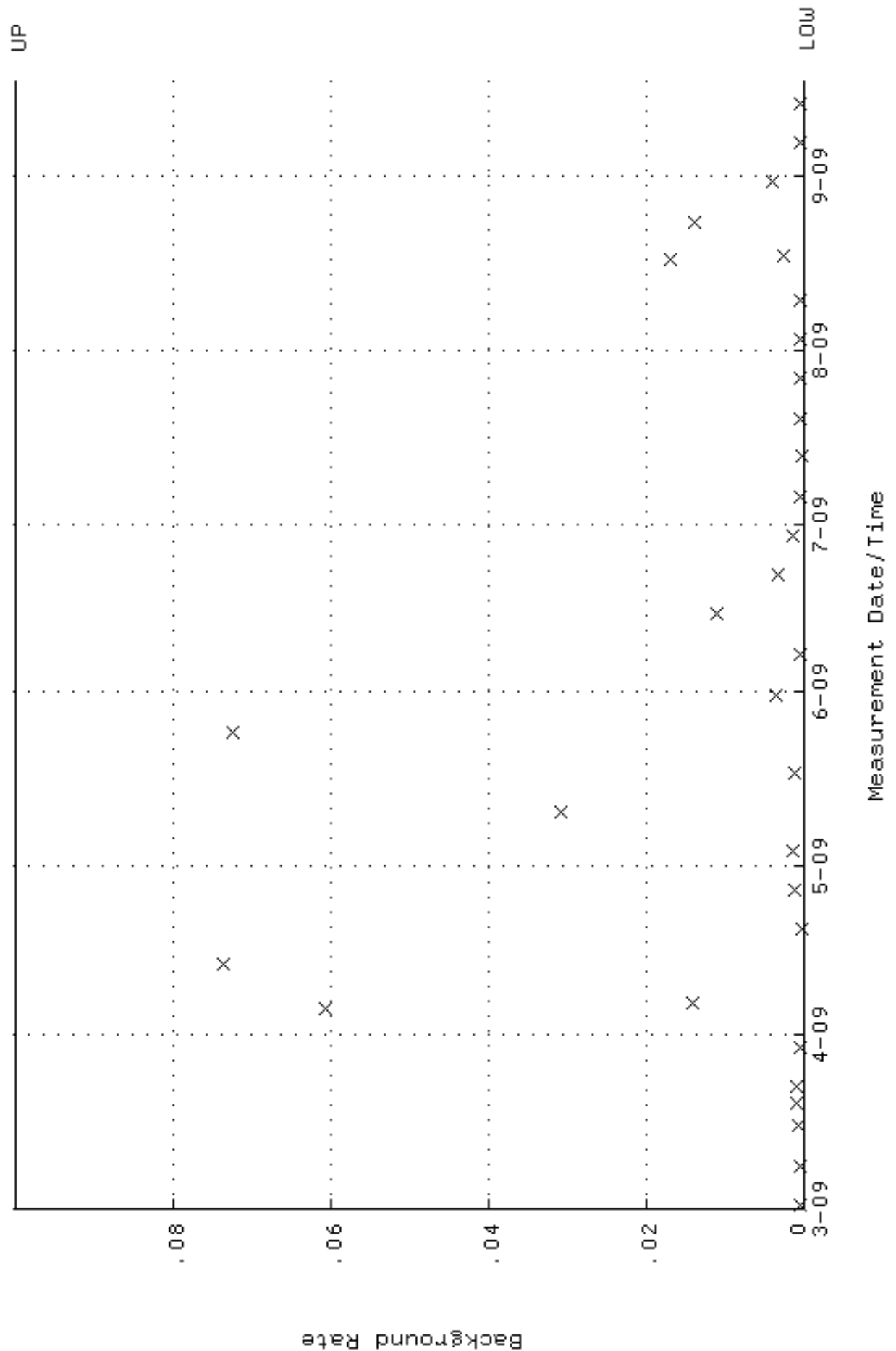
QA filename : DKA100:[ENV\_ALPHA.QA.W]W128.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:09:14 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.246062 through 0.266062



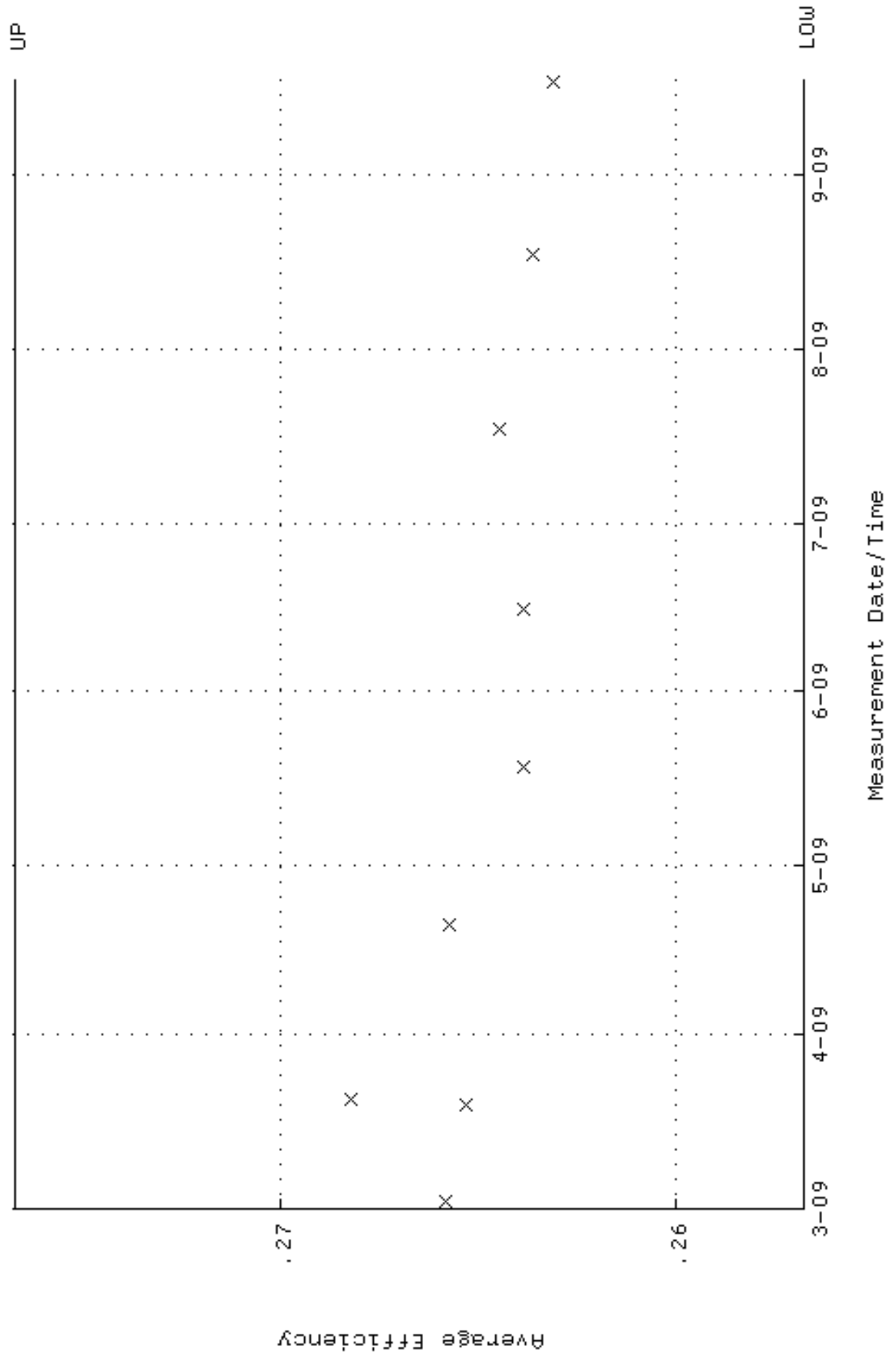
QA filename : DKA100:[ENV\_ALPHA.QA.W]W128.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:09:14 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 86.1964 through 95.2697



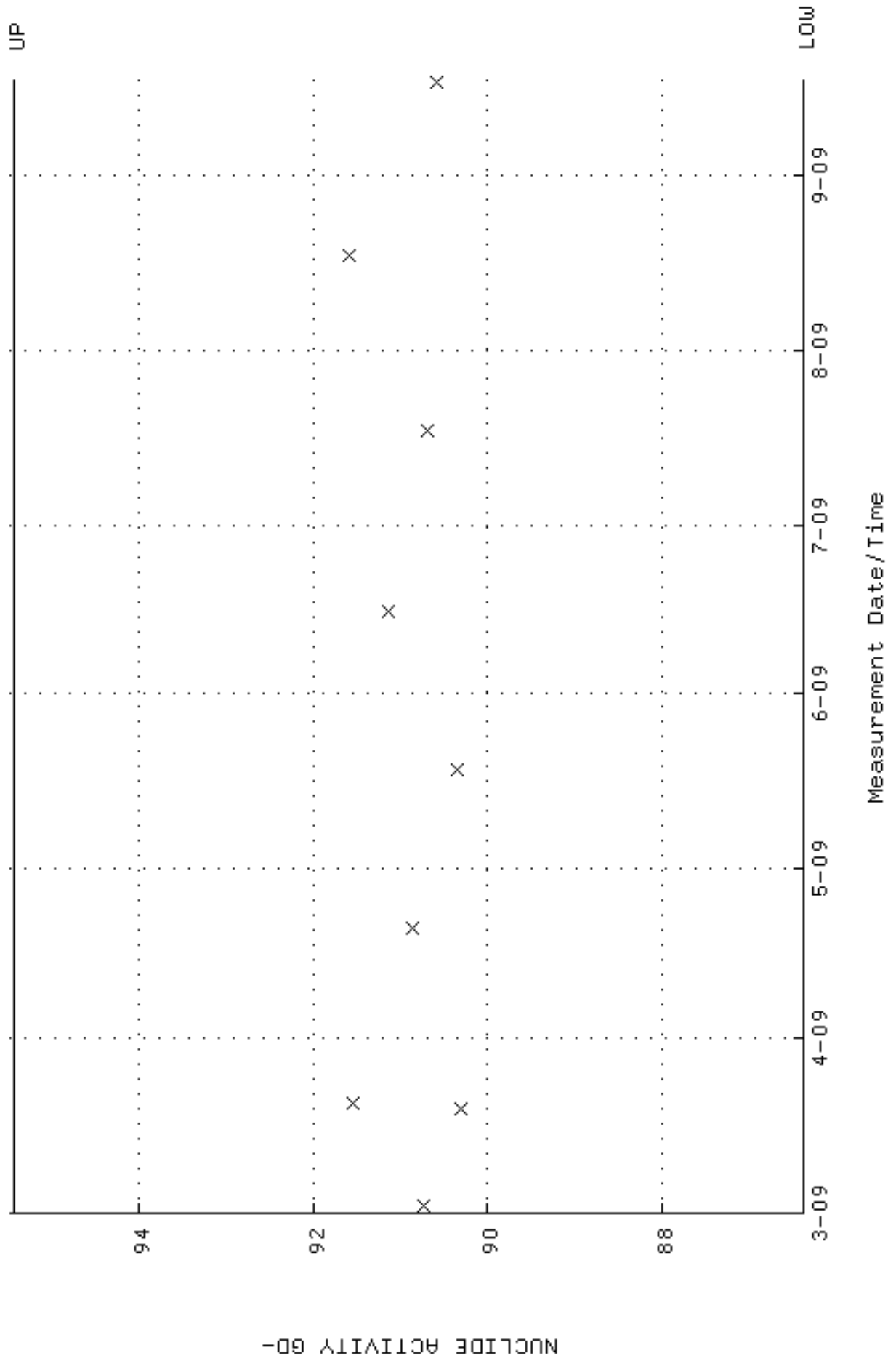
QA filename : DKA100:[ENV\_ALPHA.QA.B]B128.QAF;1  
Parameter Name : BACKRATE (Background Rate)  
Start/End Dates : 1-MAR-2009 17:18:51 through 17-SEP-2009 12:00:00  
Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W129.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:09:20 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.256741 through 0.276741

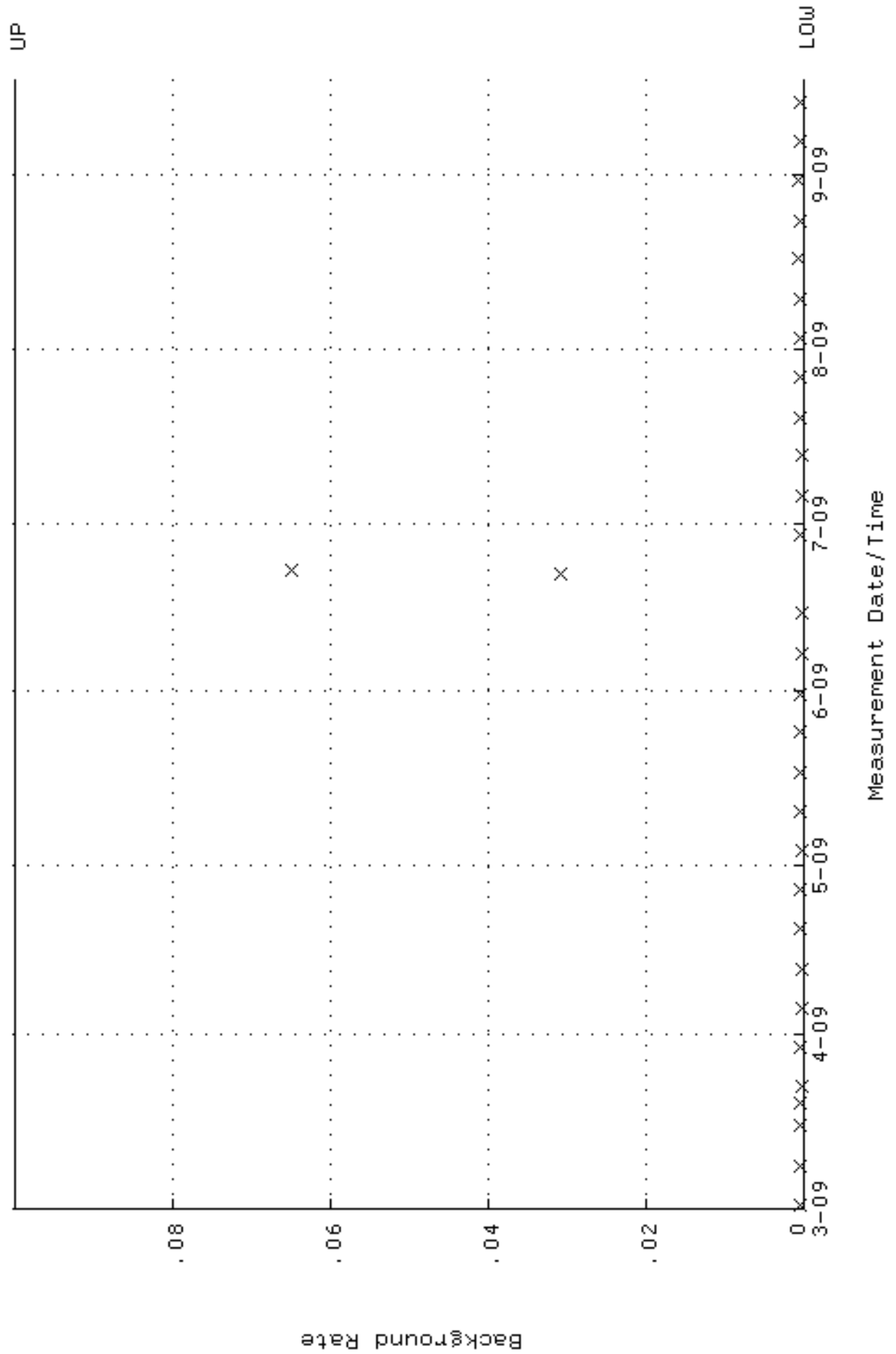


QA filename : DKA100:[ENV\_ALPHA.QA.W]W129.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:09:20 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 86.3646 through 95.4556

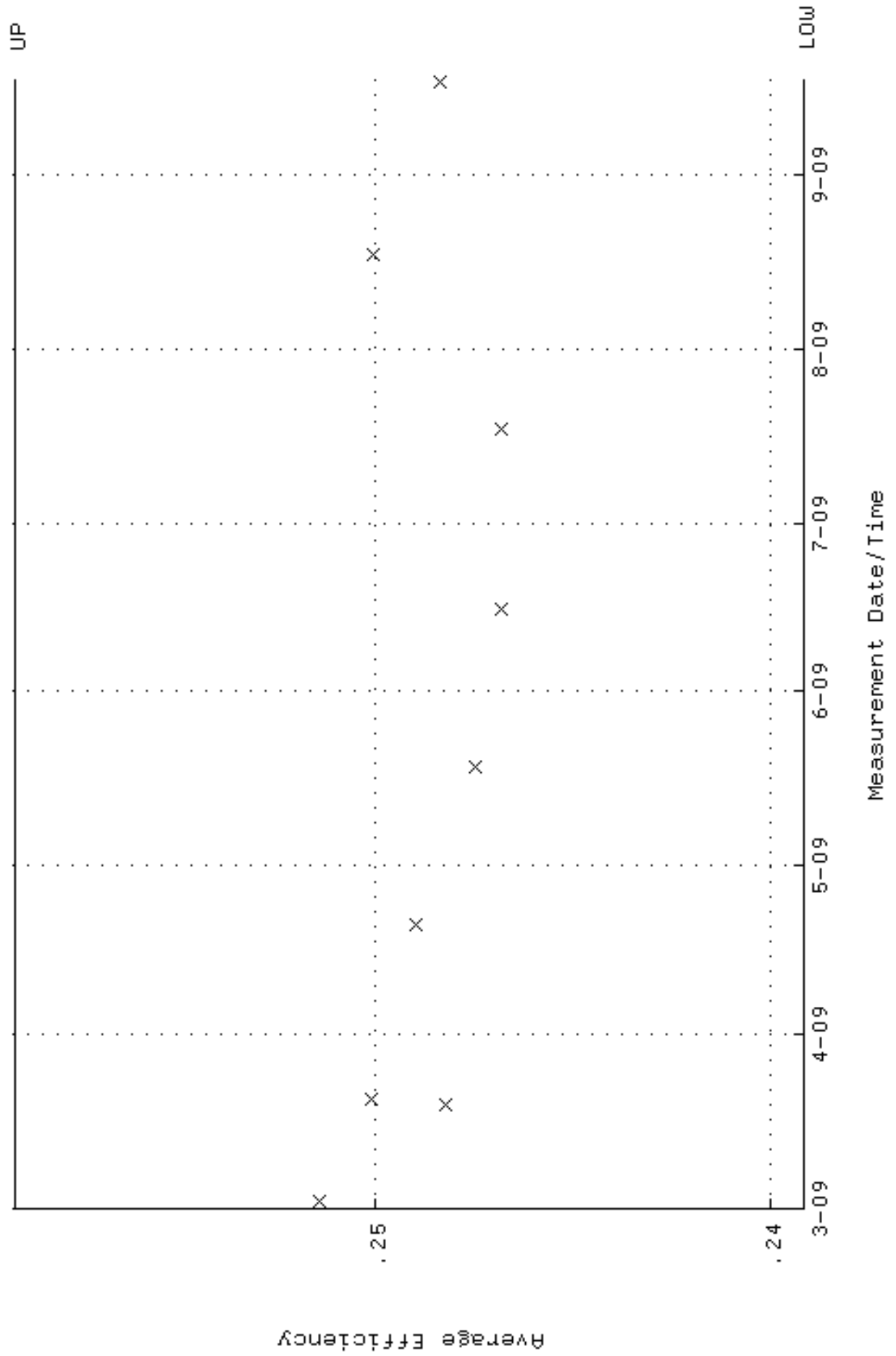




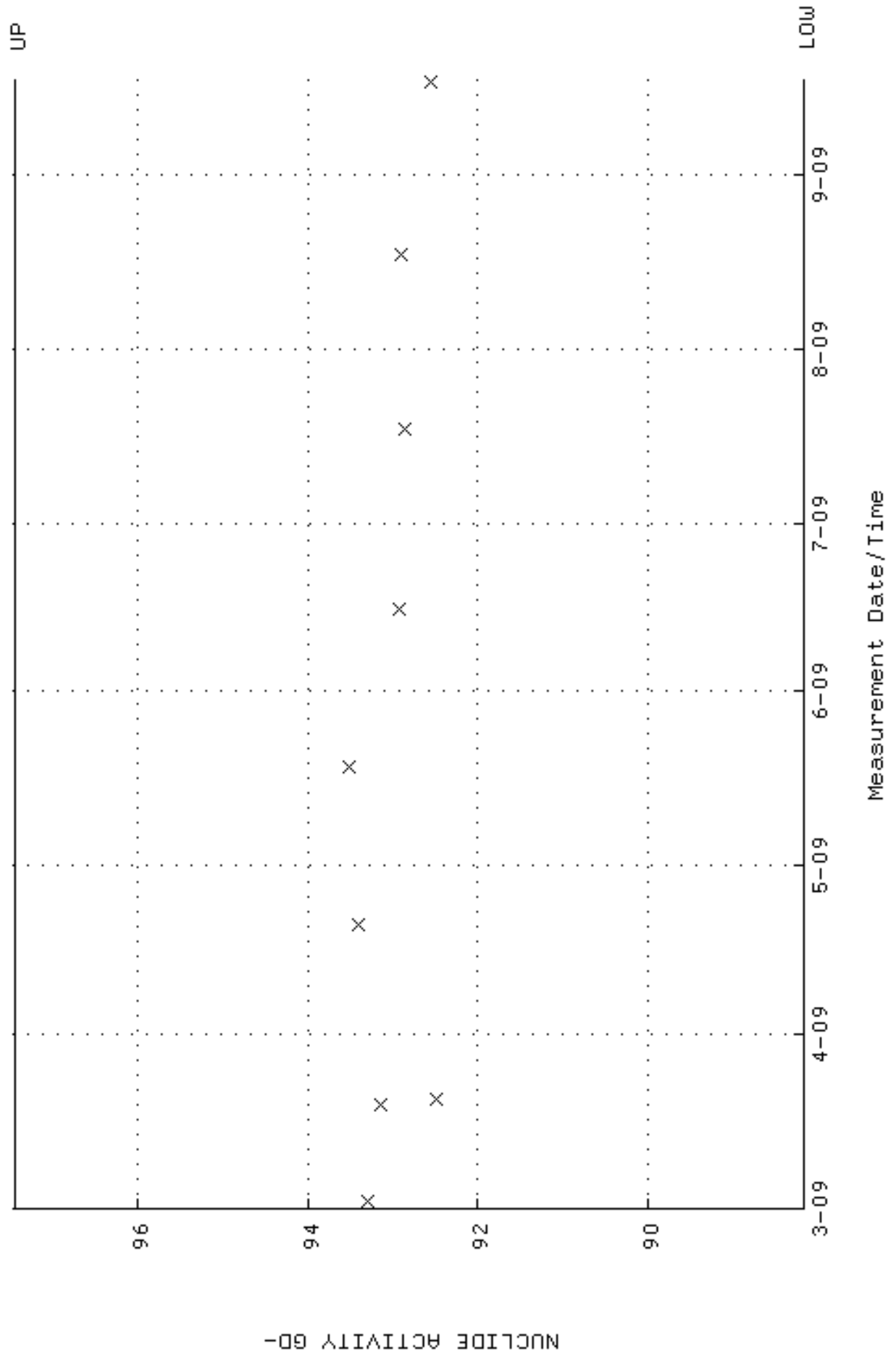
QA filename : DKA100:[ENV\_ALPHA.QA.B]B129.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:18:55 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



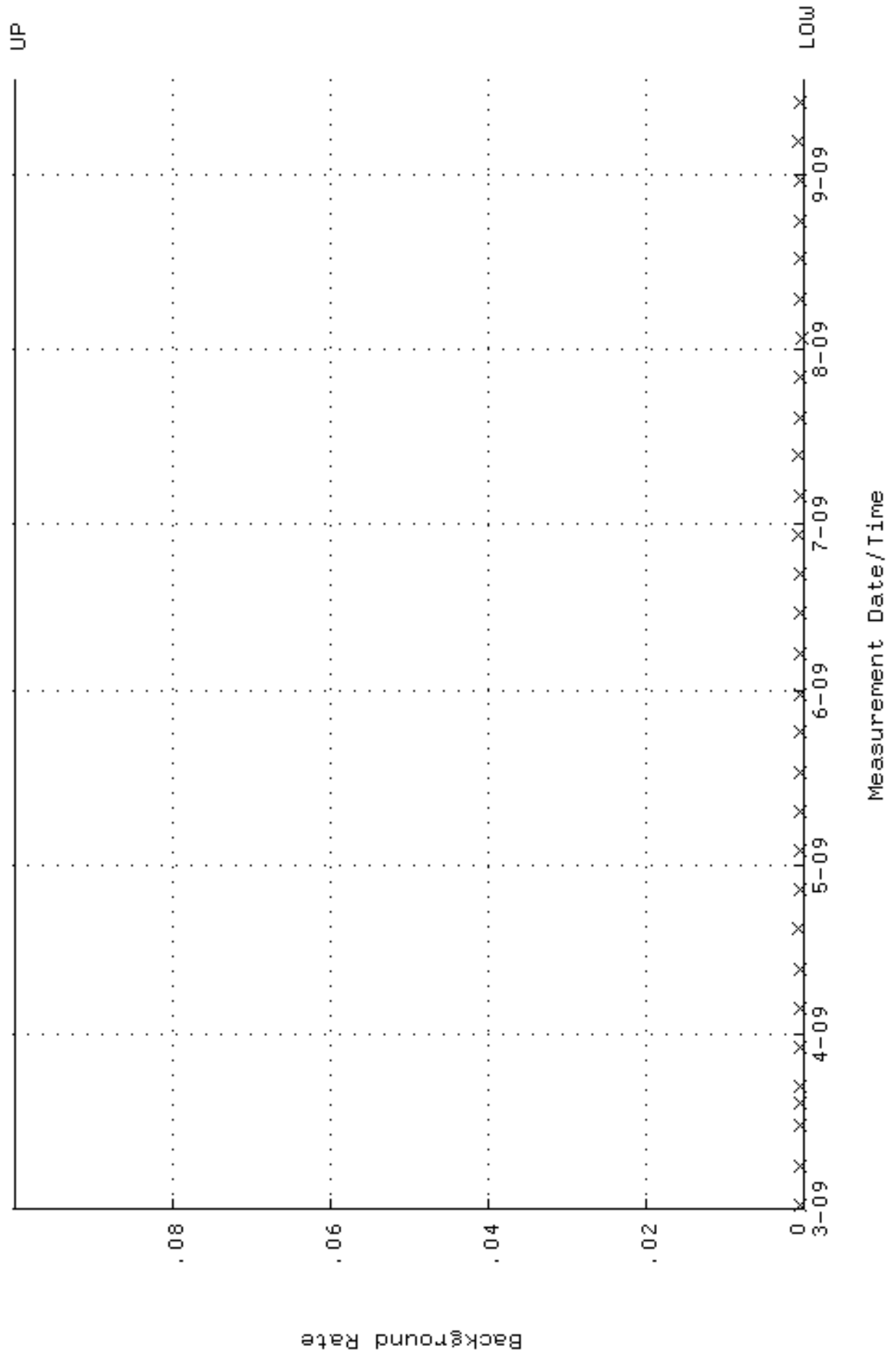
QA filename : DKA100:[ENV\_ALPHA.QA.W]W130.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:09:26 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.239131 through 0.259131



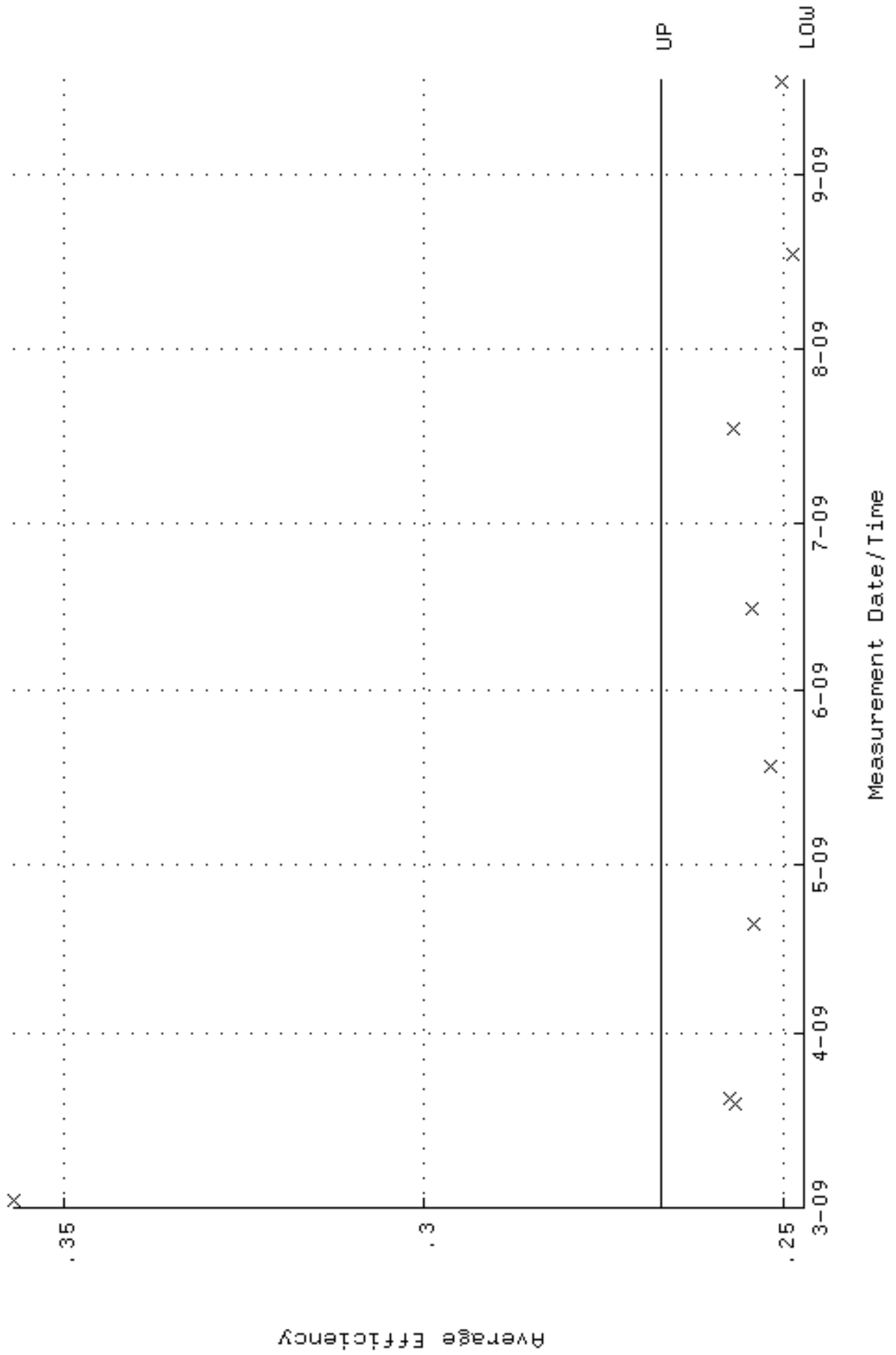
QA filename : DKA100:[ENV\_ALPHA.QA.W]W130.QAF;1  
 Parameter Name : NACTIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:09:26 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 88.1614 through 97.4416



QA filename : DKA100:[ENV\_ALPHA.QA.B]B130.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:00 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



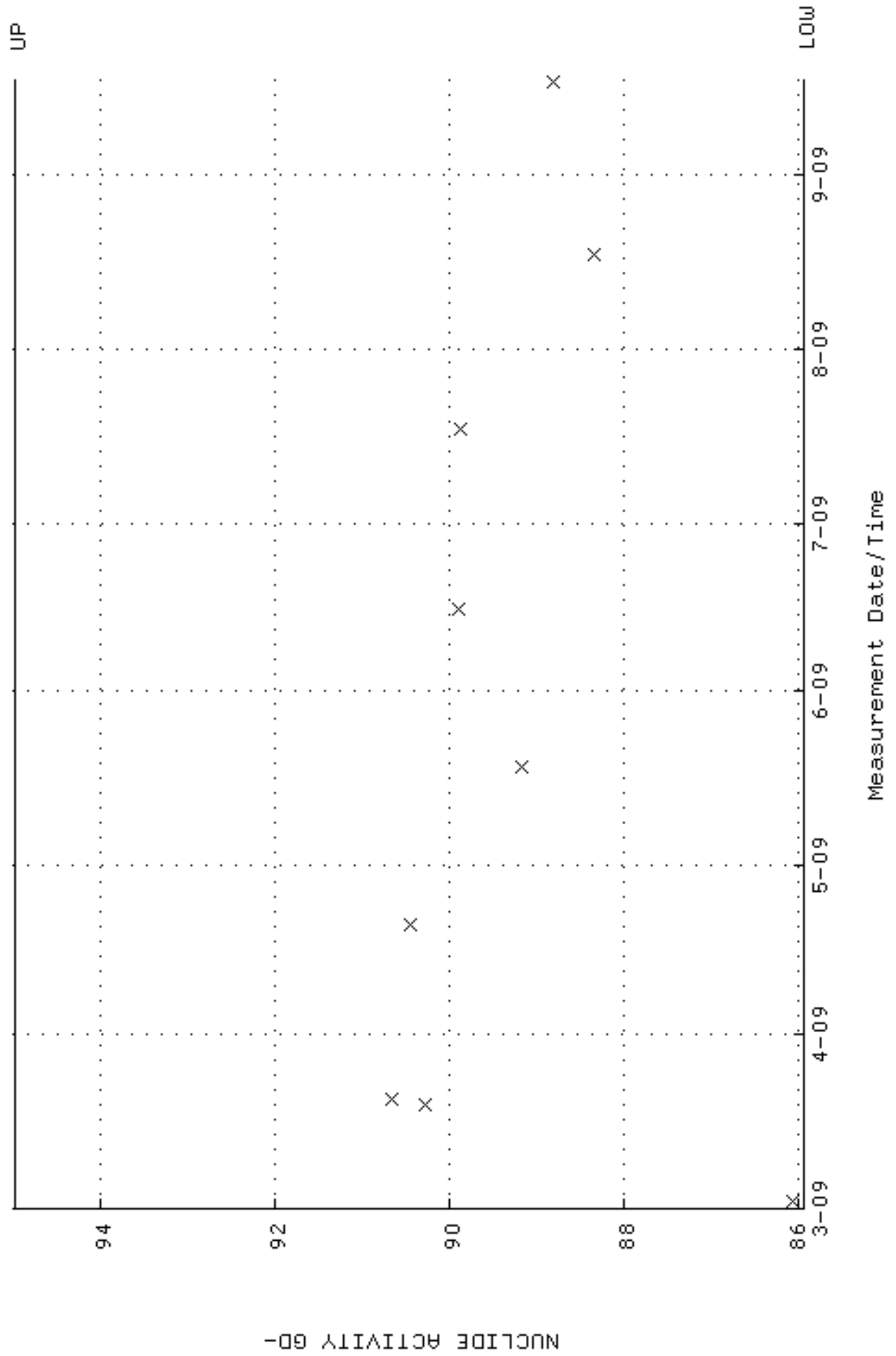
QA filename : DKA100:[ENV\_ALPHA.QA.W]W131.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:09:33 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.247185 through 0.267185



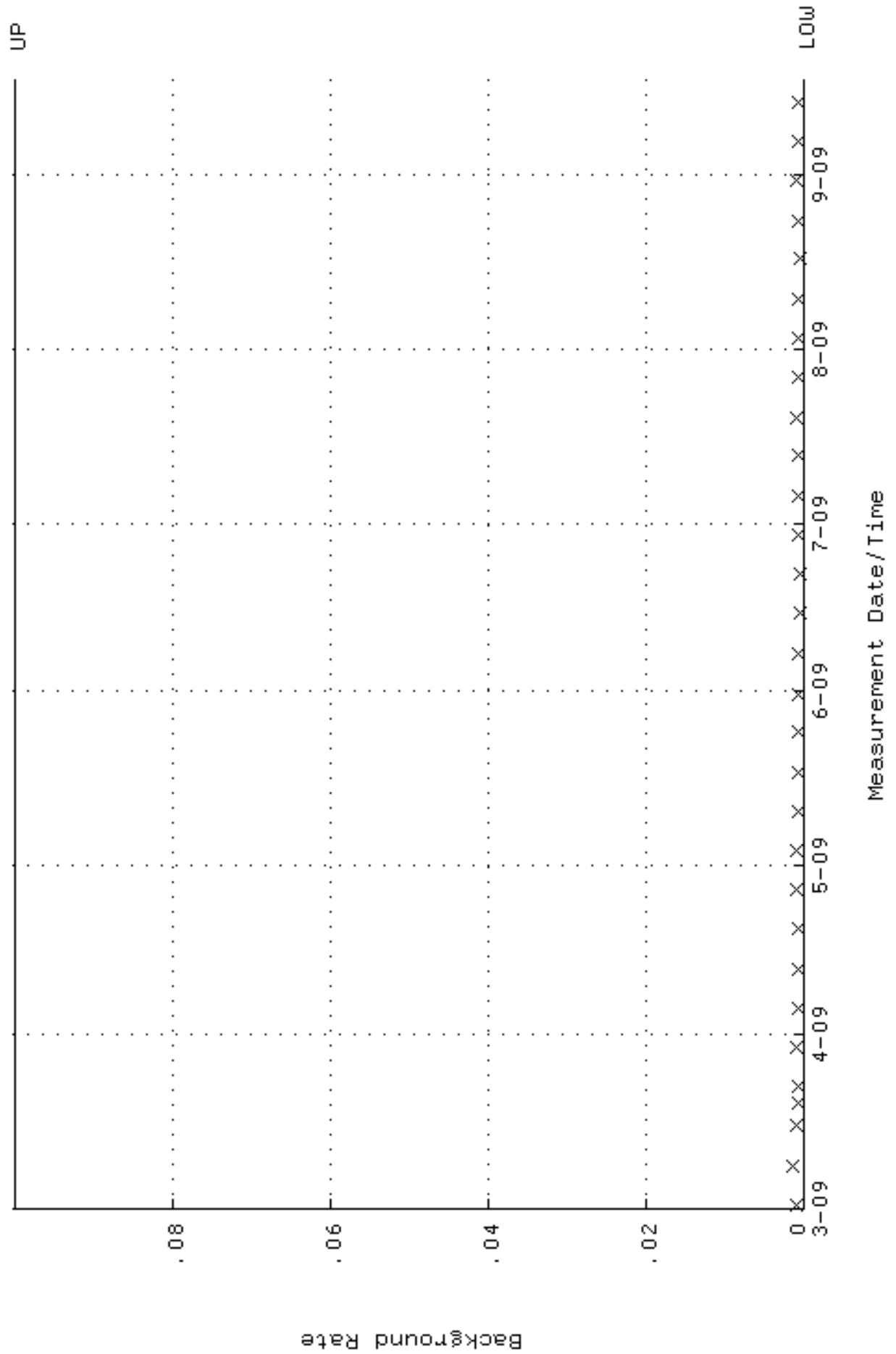
Average Efficiency

Measurement Date/Time

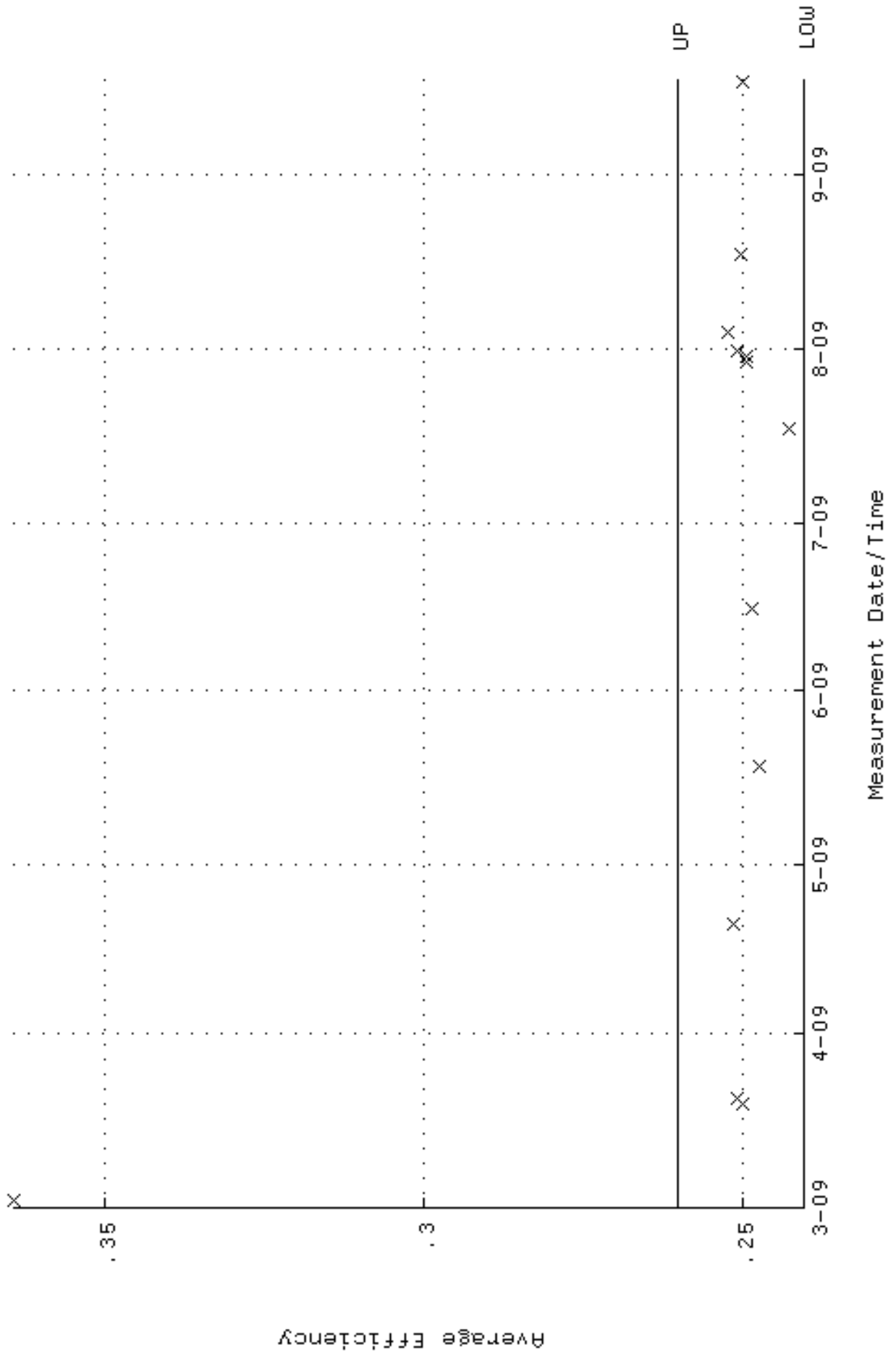
QA filename : DKA100:[ENV\_ALPHA.QA.W]W131.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:09:33 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 85.9407 through 94.9871



QA filename : DKA100:[ENV\_ALPHA.QA.B]B131.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:04 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

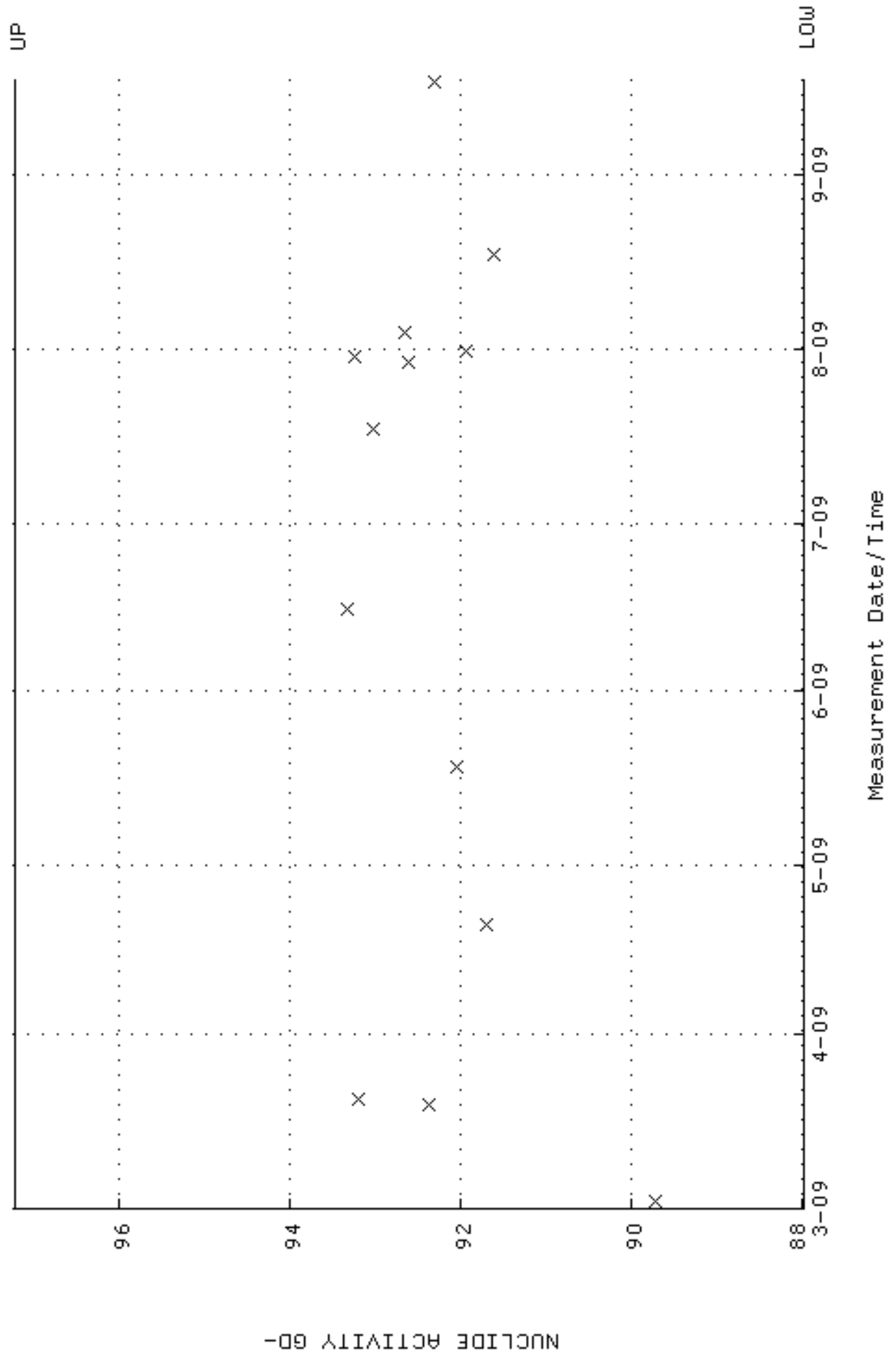


QA filename : DKA100:[ENV\_ALPHA.QA.W]W132.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:09:38 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.240573 through 0.260573

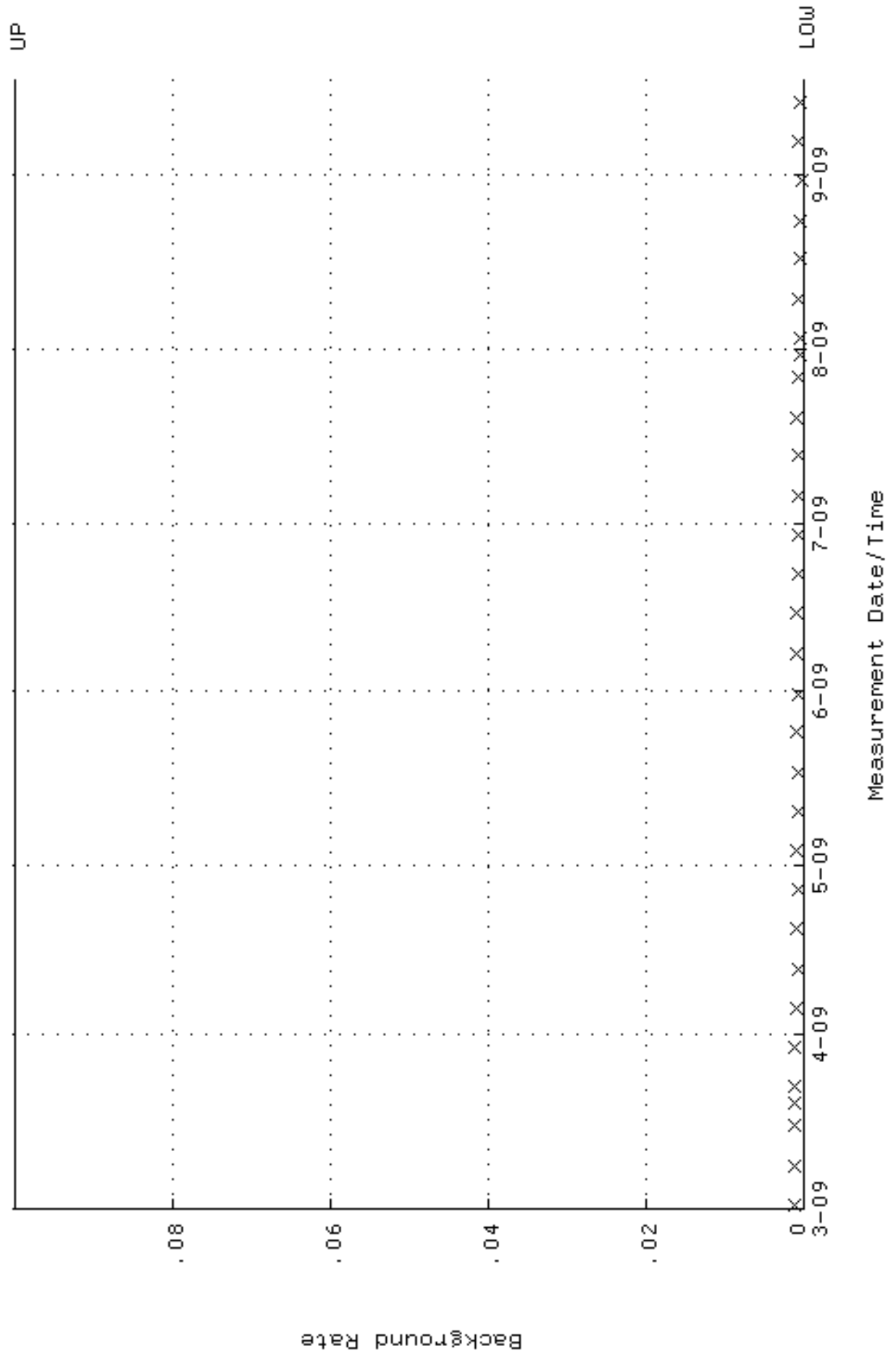




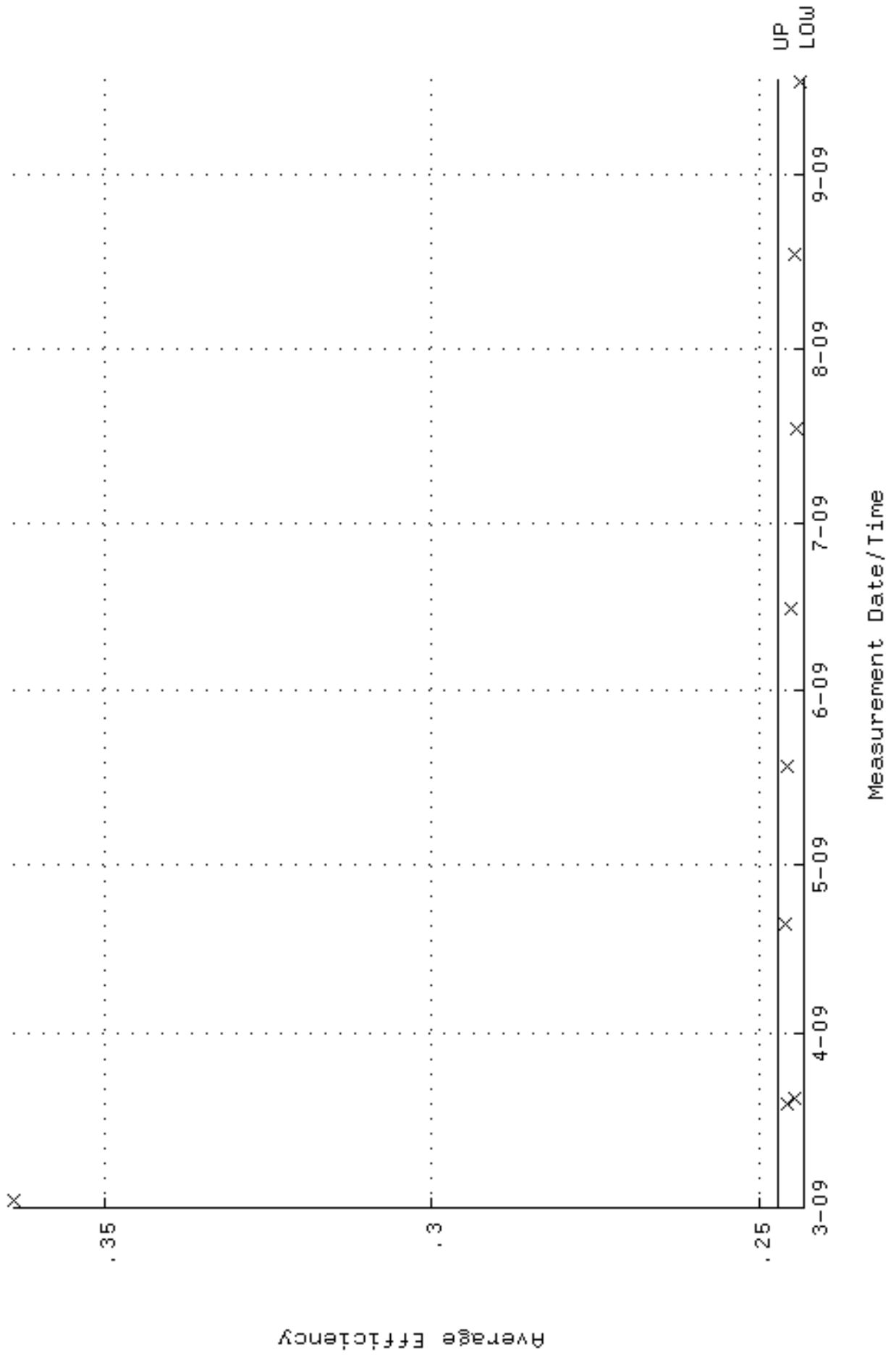
QA filename : DKA100:[ENV\_ALPHA.QA.W]W132.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:09:38 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 87.9674 through 97.2272



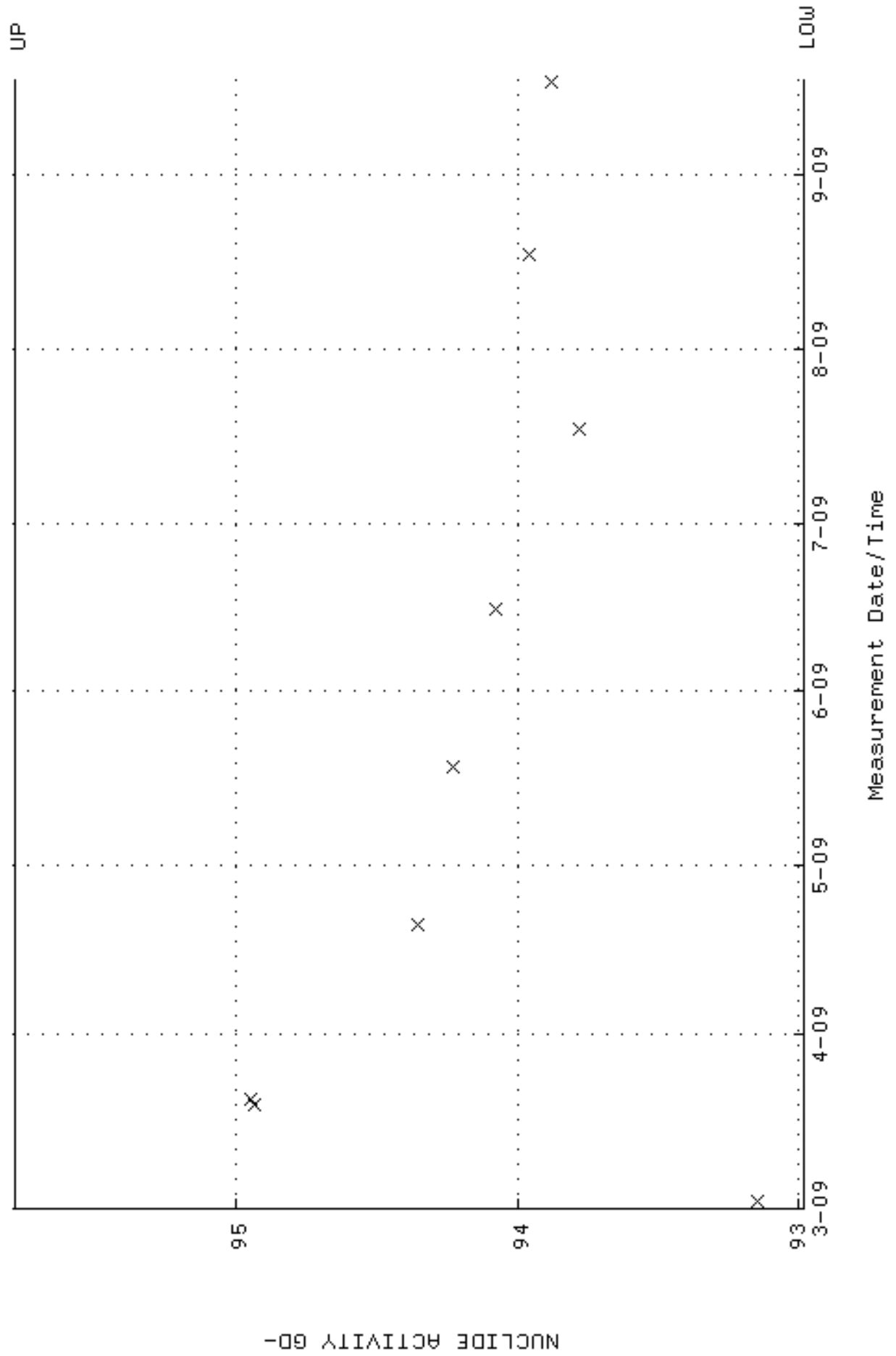
QA filename : DKA100:[ENV\_ALPHA.QA.B]B132.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:08 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



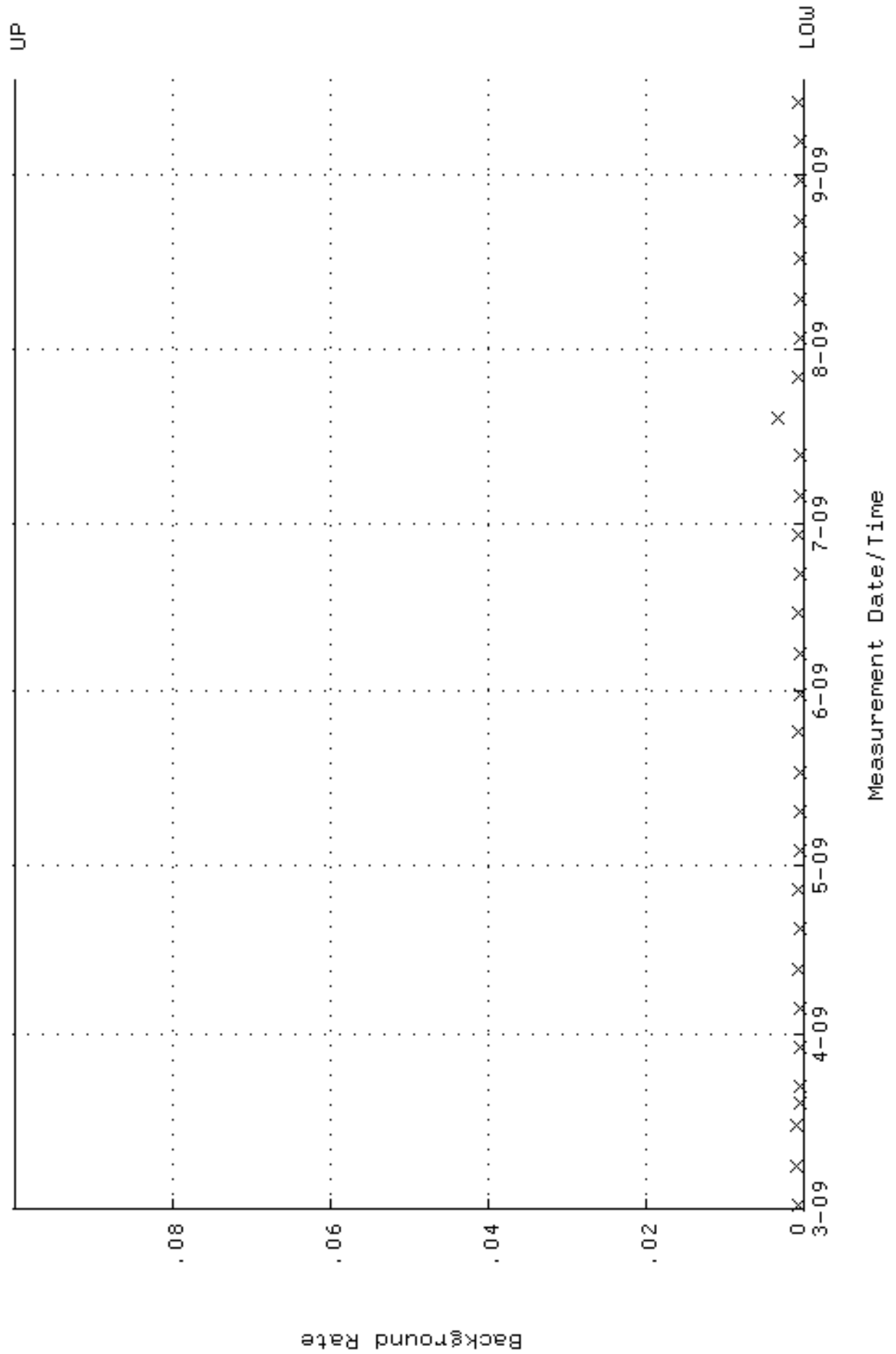
QA filename : DKA100:[ENV\_ALPHA.QA.W]W133.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:09:43 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.243148 through 0.247324



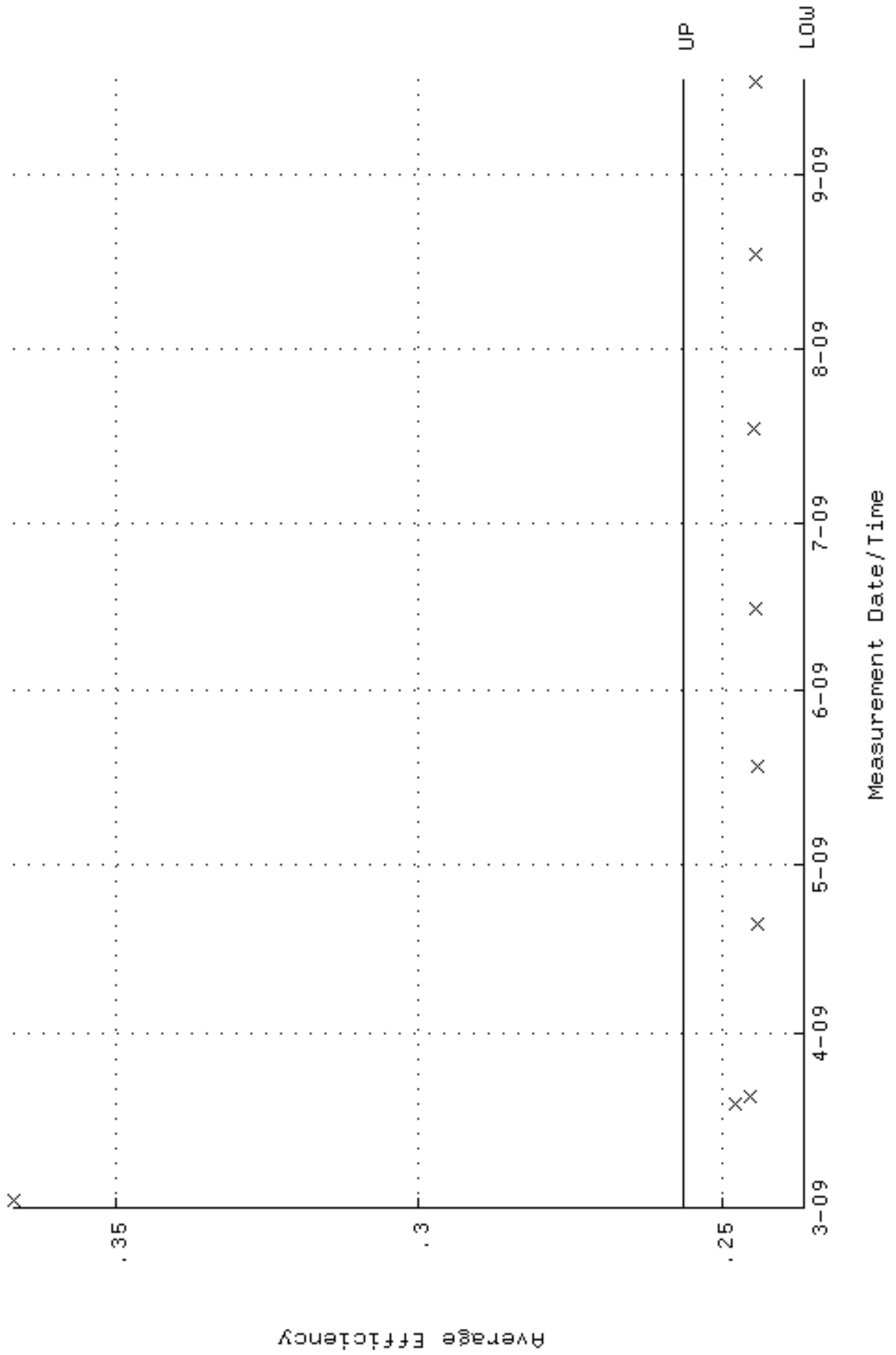
QA filename : DKA100:[ENV\_ALPHA.QA.W]W133.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:09:43 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 92.9792 through 95.7898



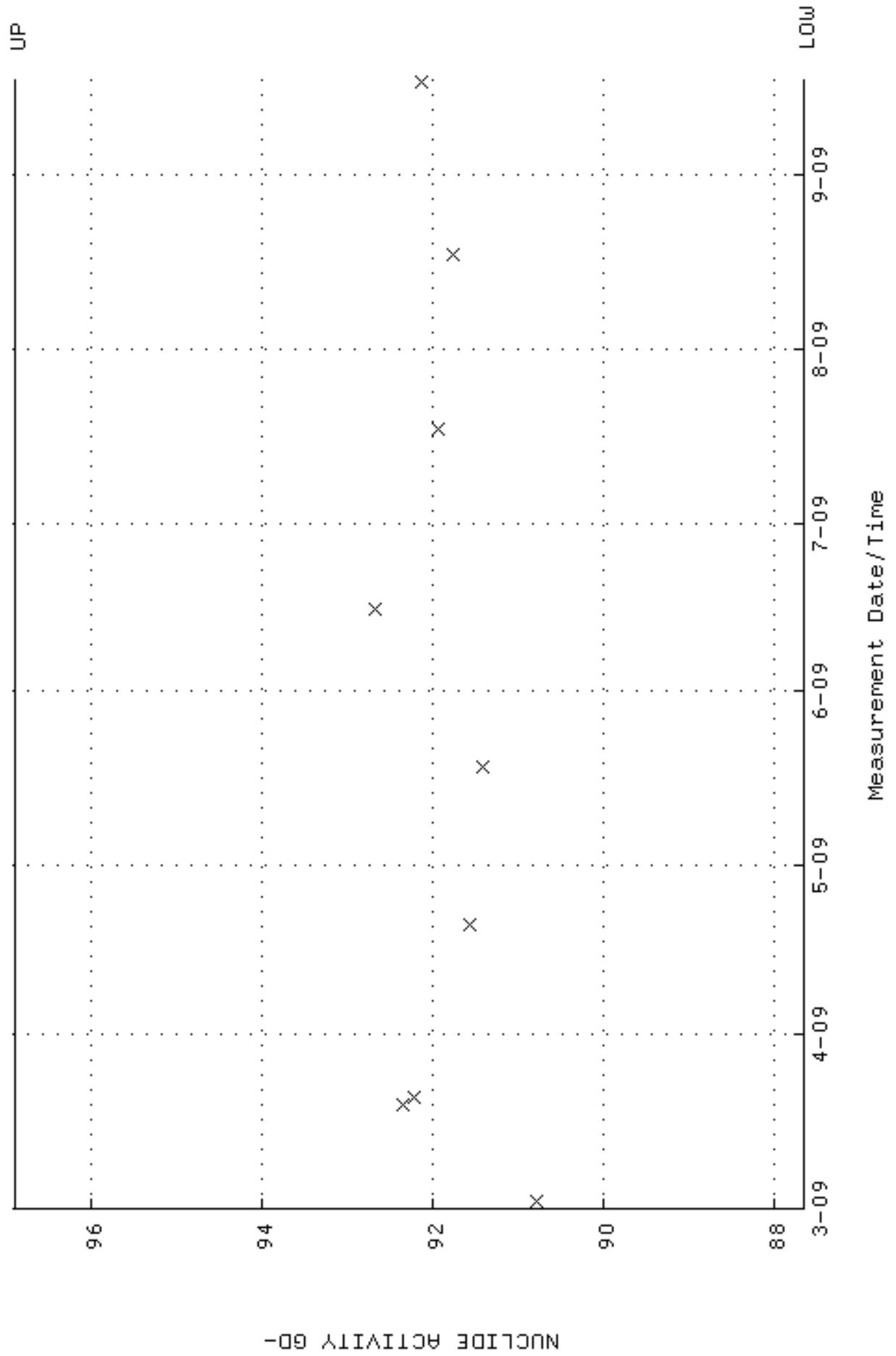
QA filename : DKA100:[ENV\_ALPHA.QA.B]B133.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:12 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



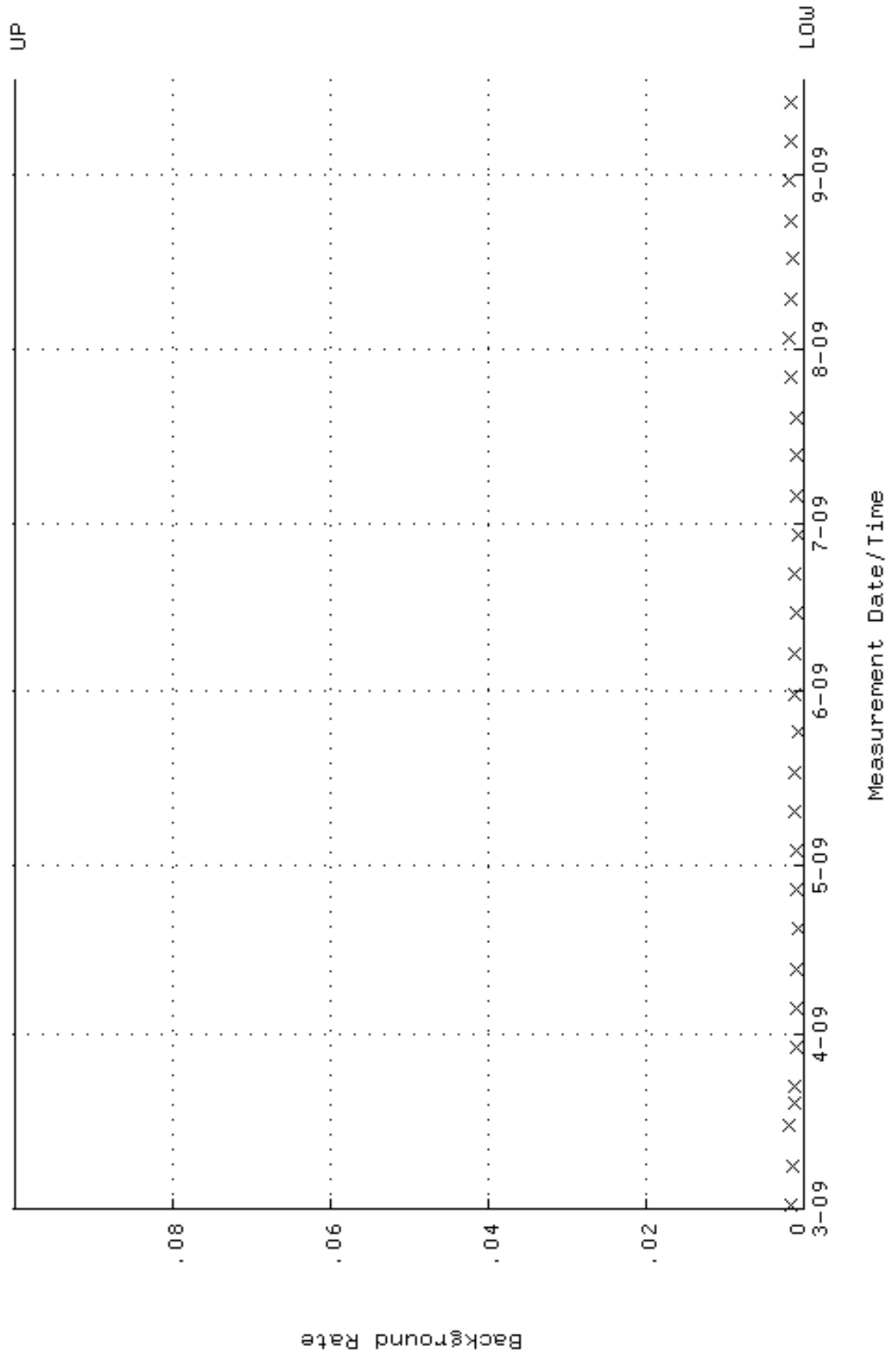
QA filename : DKA100:[ENV\_ALPHA.QA.W]W134.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:09:48 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.236455 through 0.256455



QA filename : DKA100:[ENV\_ALPHA.QA.W]W134.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:09:48 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 87.6576 through 96.8848

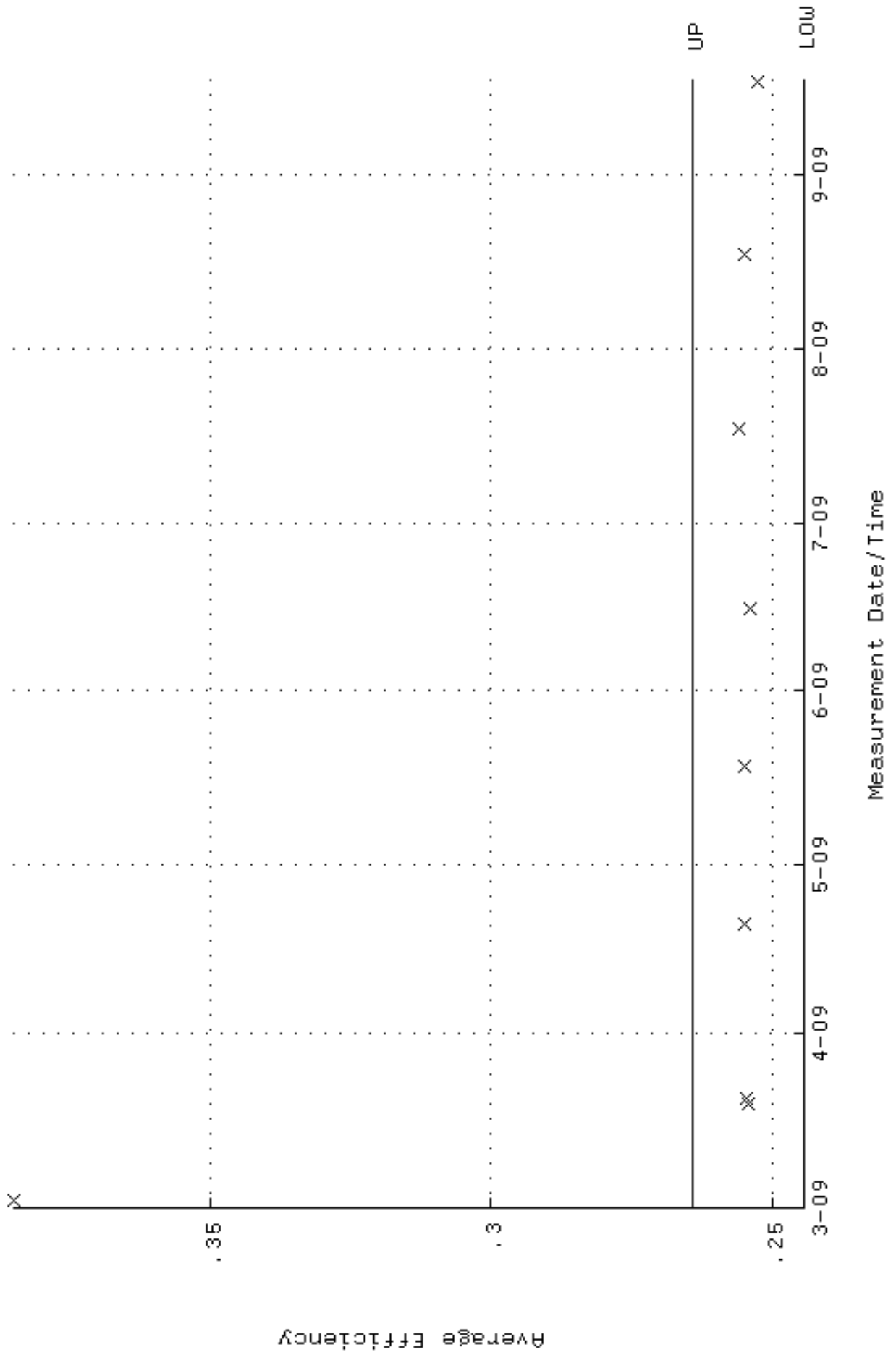


QA filename : DKA100:[ENV\_ALPHA.QA.B]B134.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:16 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

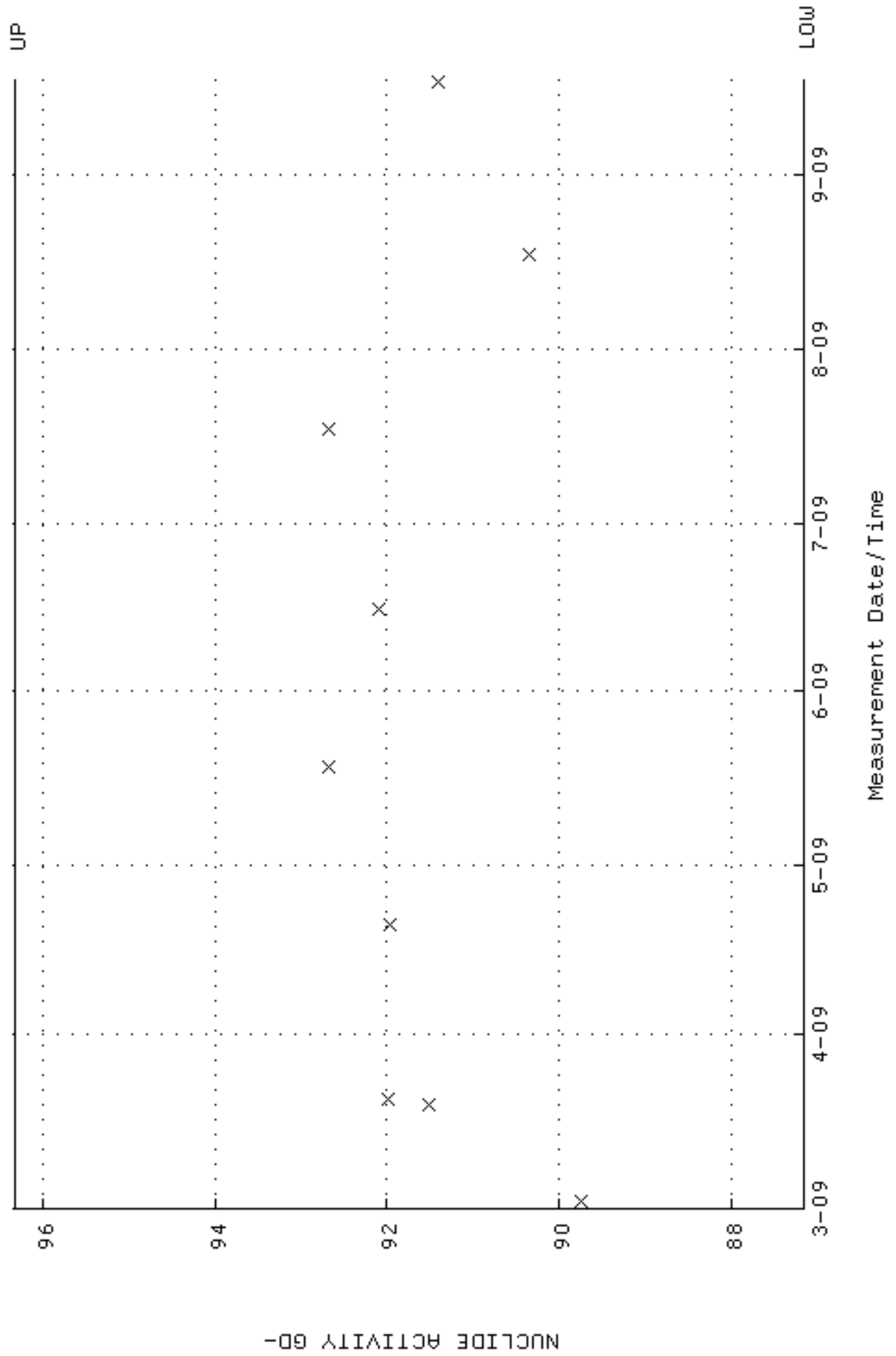




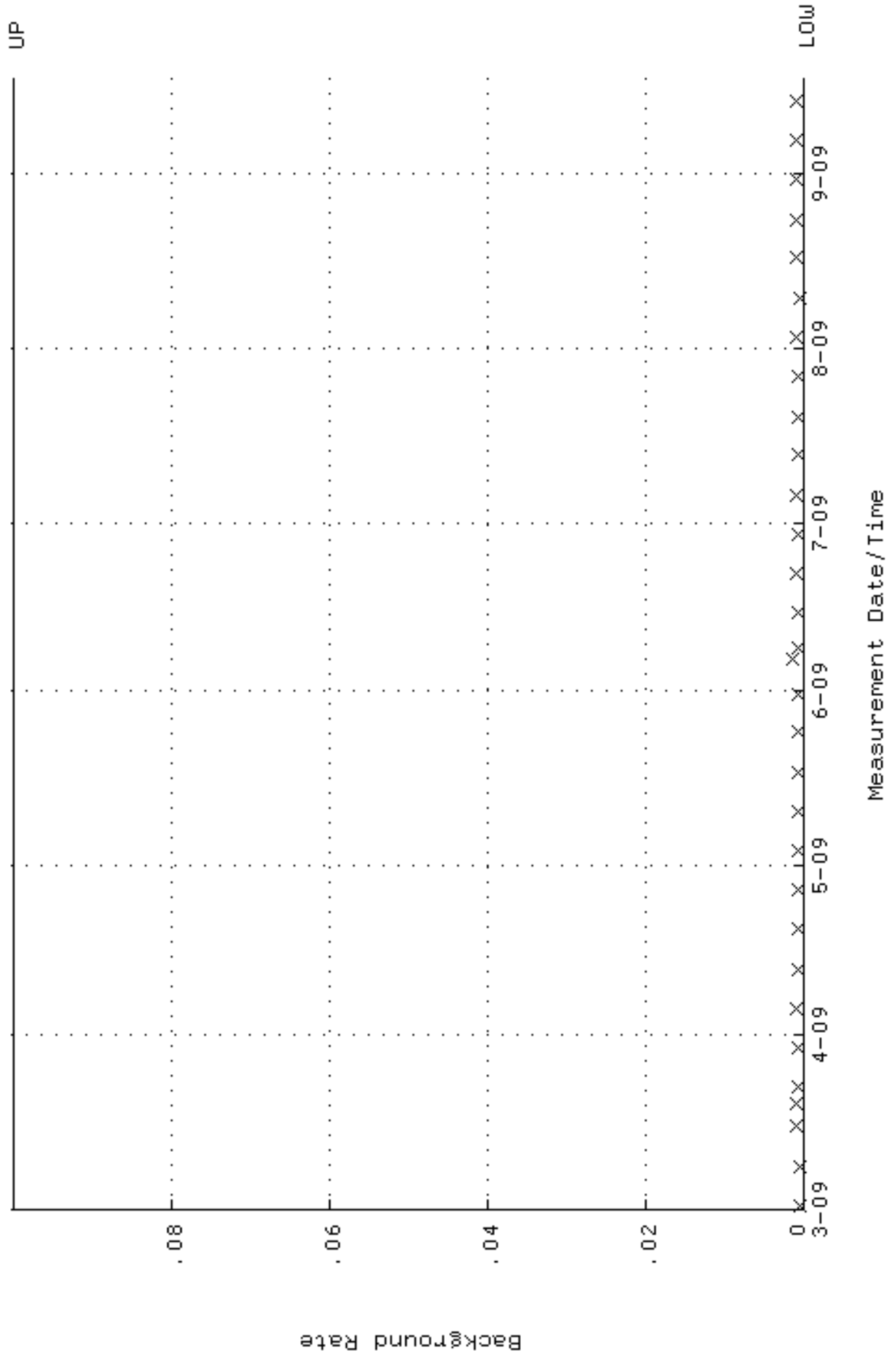
QA filename : DKA100:[ENV\_ALPHA.QA.W]W135.QAF;2  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:09:53 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.244305 through 0.264305



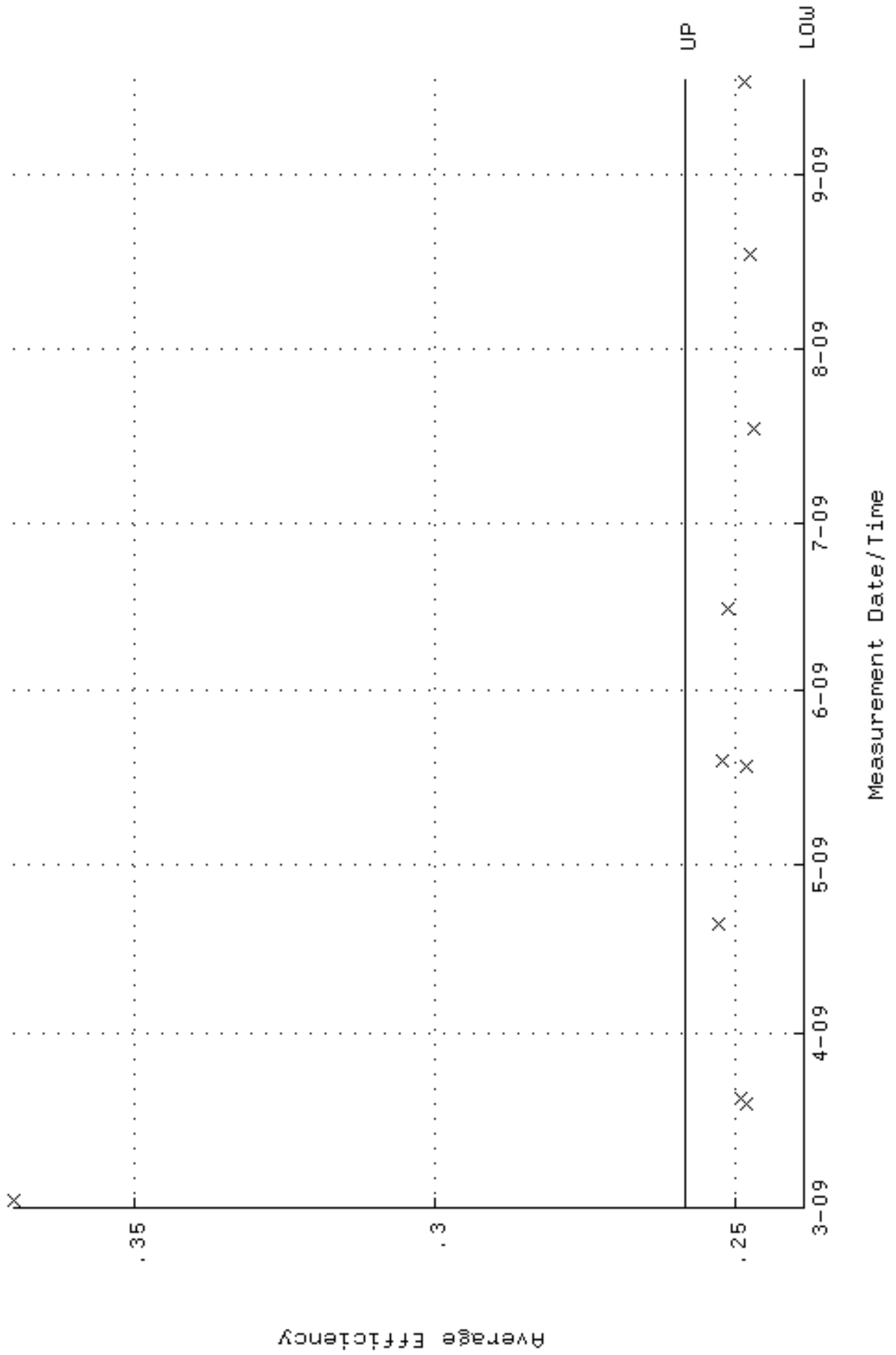
QA filename : DKA100:[ENV\_ALPHA.QA.W]W135.QAF;2  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:09:53 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 87.1482 through 96.3217



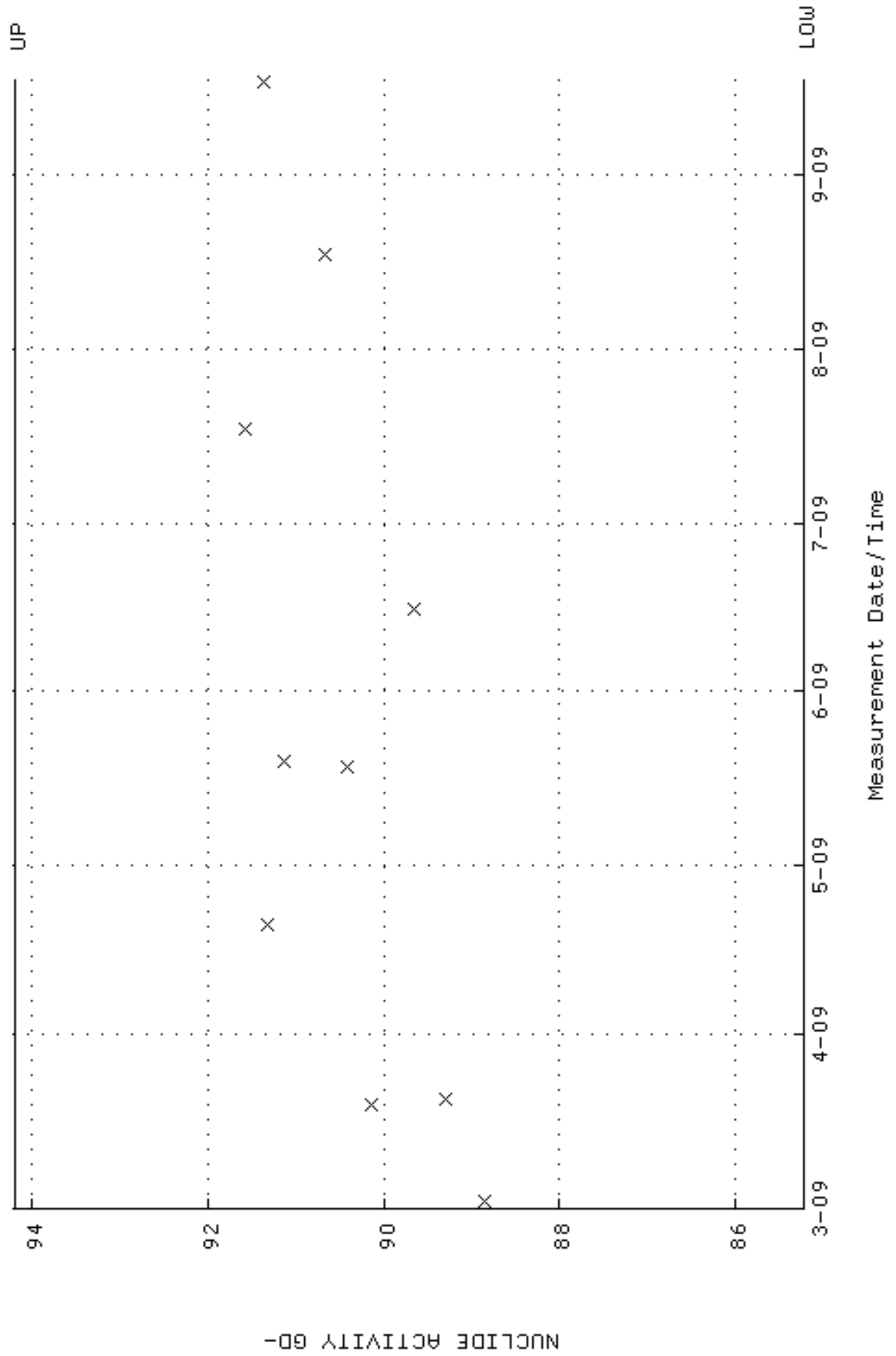
QA filename : DKA100:[ENV\_ALPHA.QA.B]B135.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:21 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



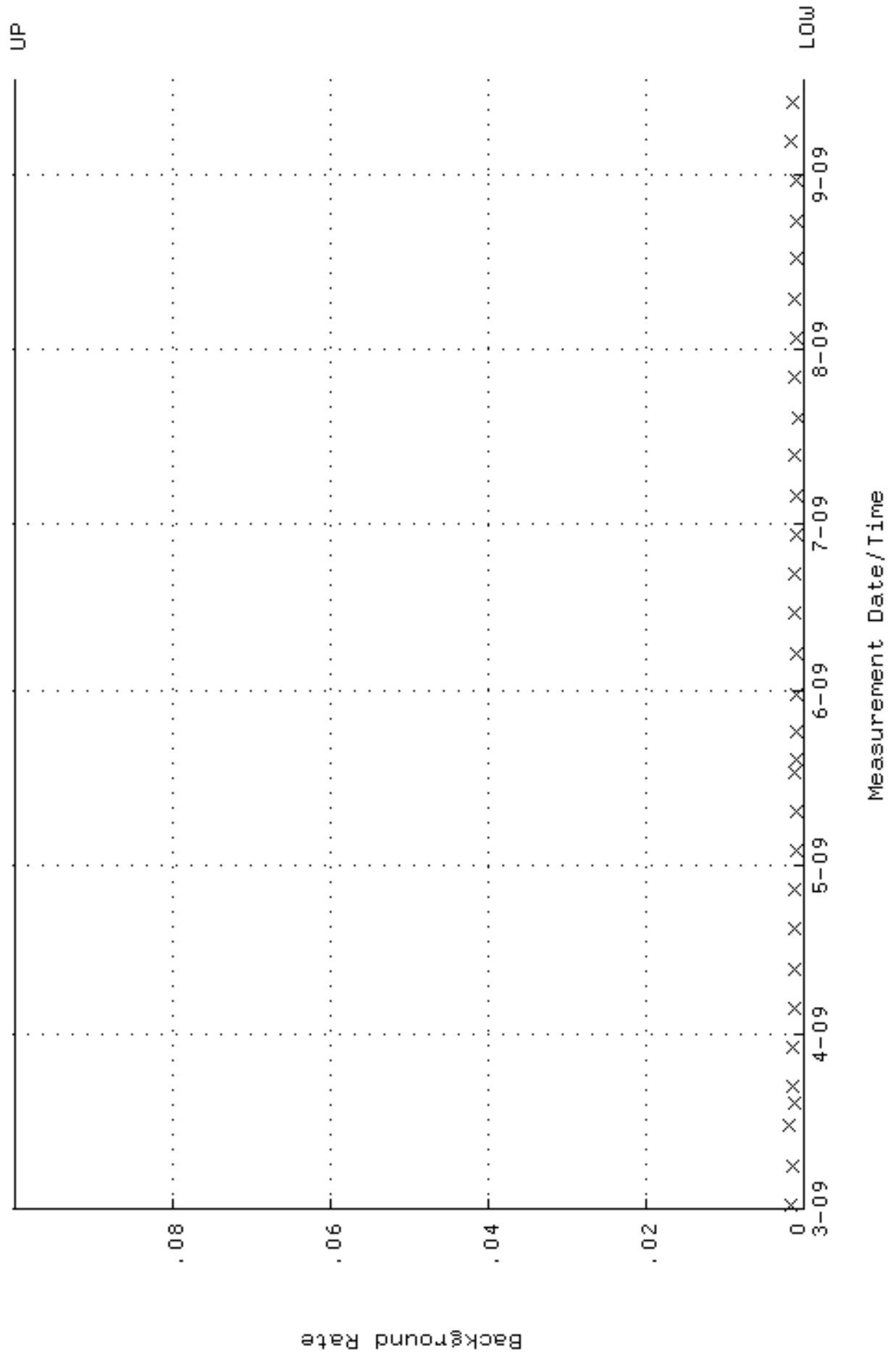
QA filename : DKA100:[ENV\_ALPHA.QA.W]W136.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:09:58 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.238568 through 0.258568



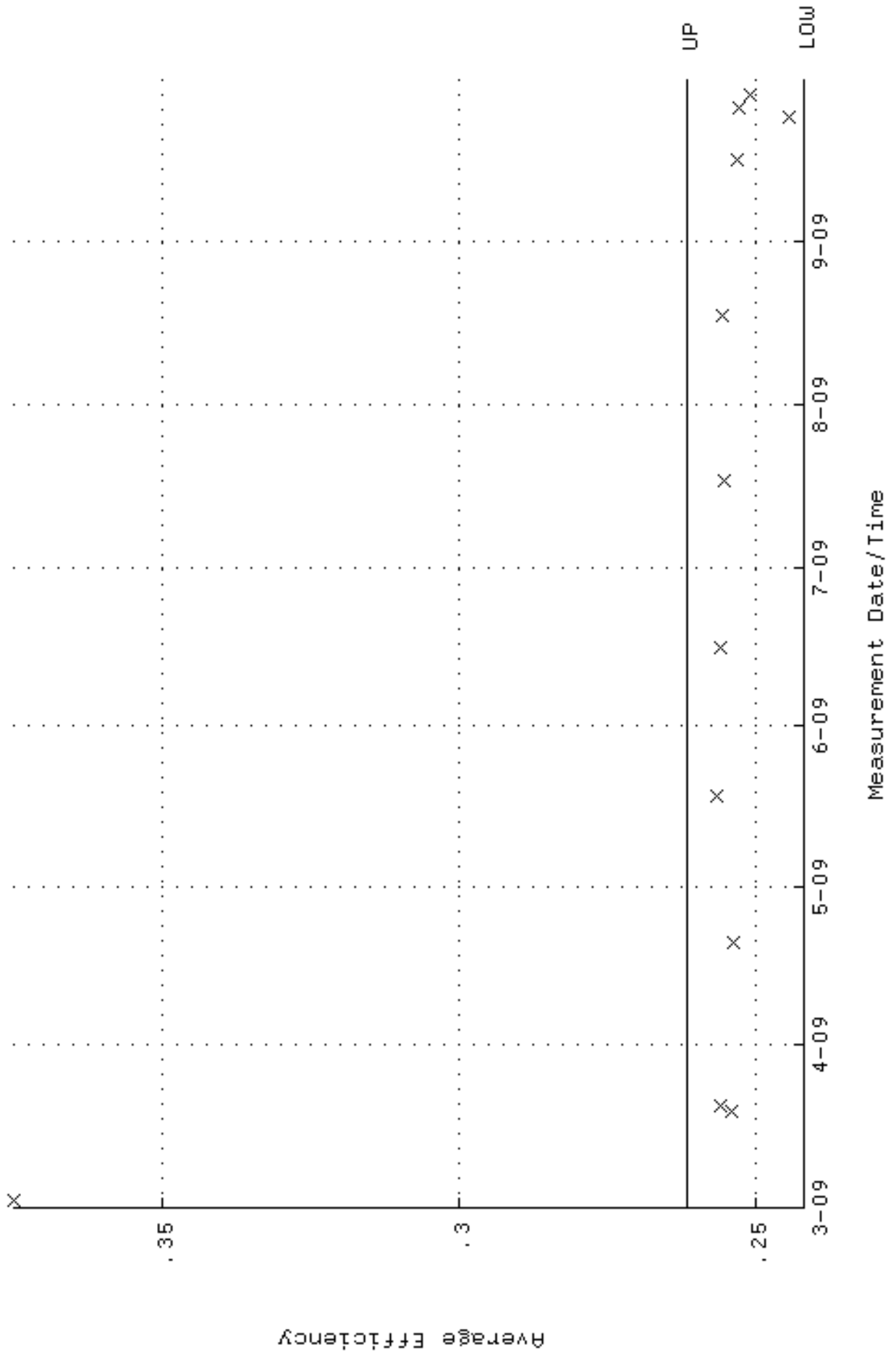
QA filename : DKA100:[ENV\_ALPHA.QA.W]W136.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:09:58 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 85.2214 through 94.1920



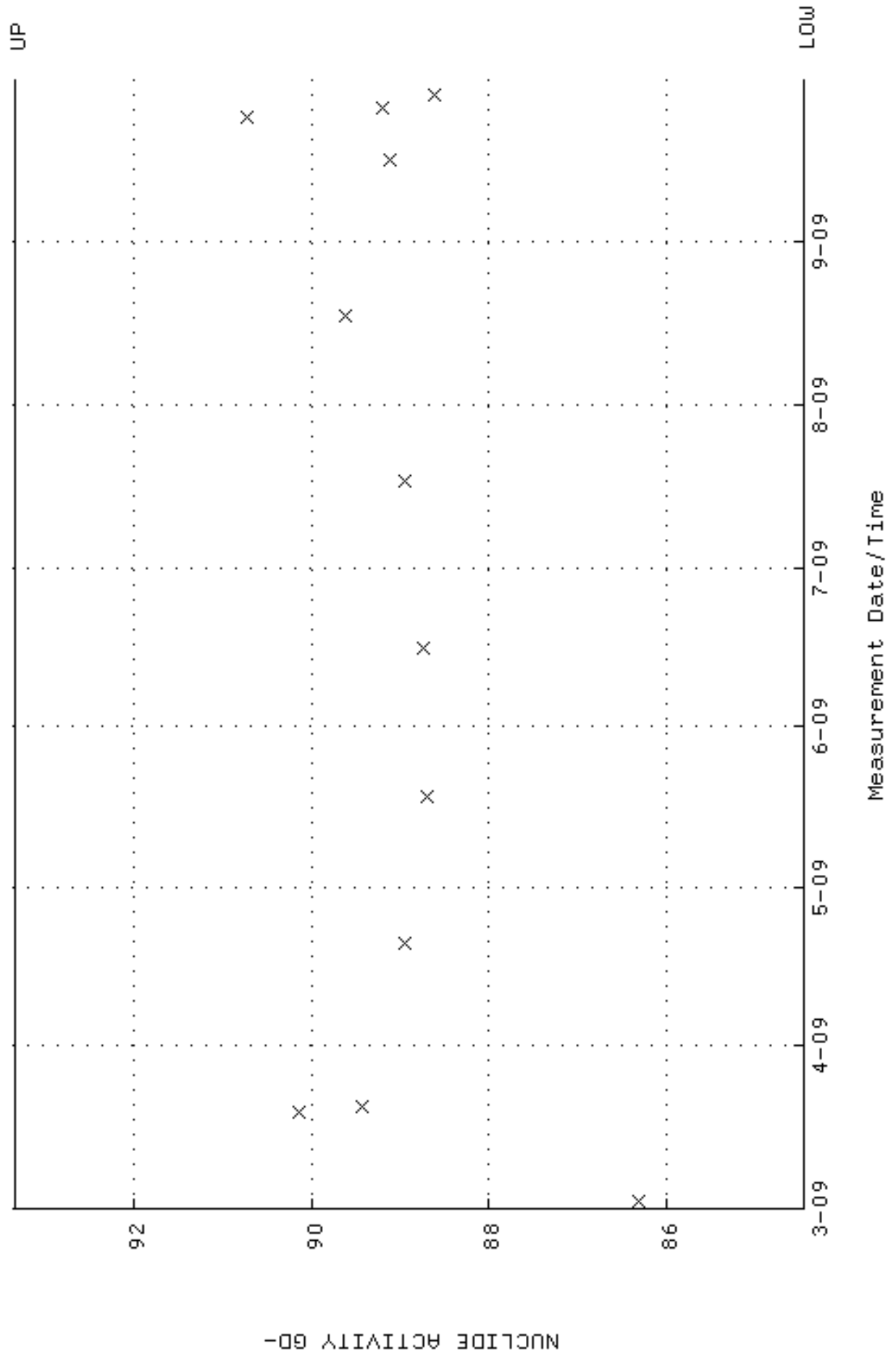
QA filename : DKA100:[ENV\_ALPHA.QA.B]B136.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:24 through 17-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W137.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:10:03 through 1-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.241744 through 0.261744

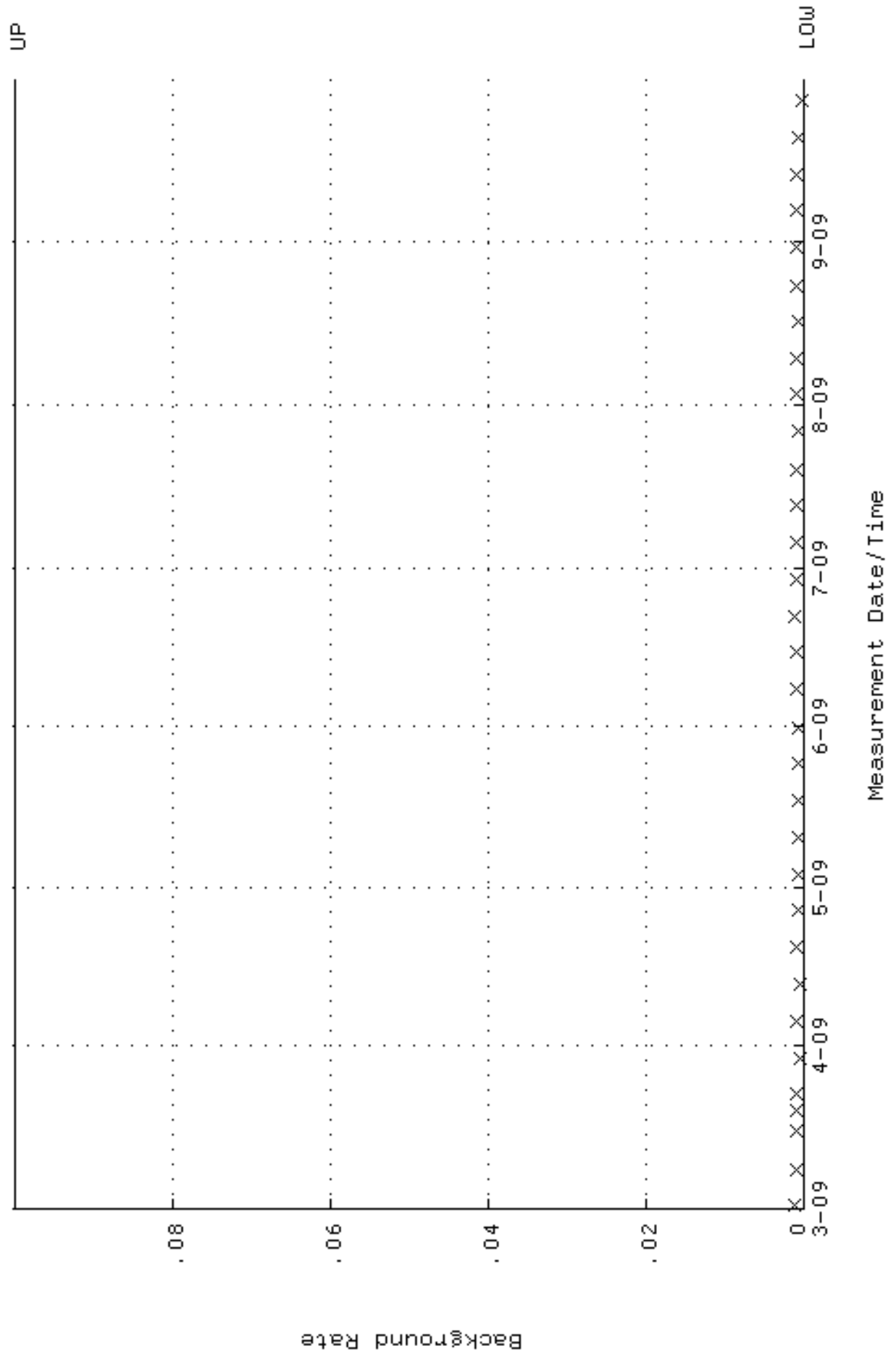


QA filename : DKA100:[ENV\_ALPHA.QA.W]W137.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:10:03 through 1-OCT-2009 12:00:00  
 Lower/Upper Lmts: 84.4530 through 93.3428

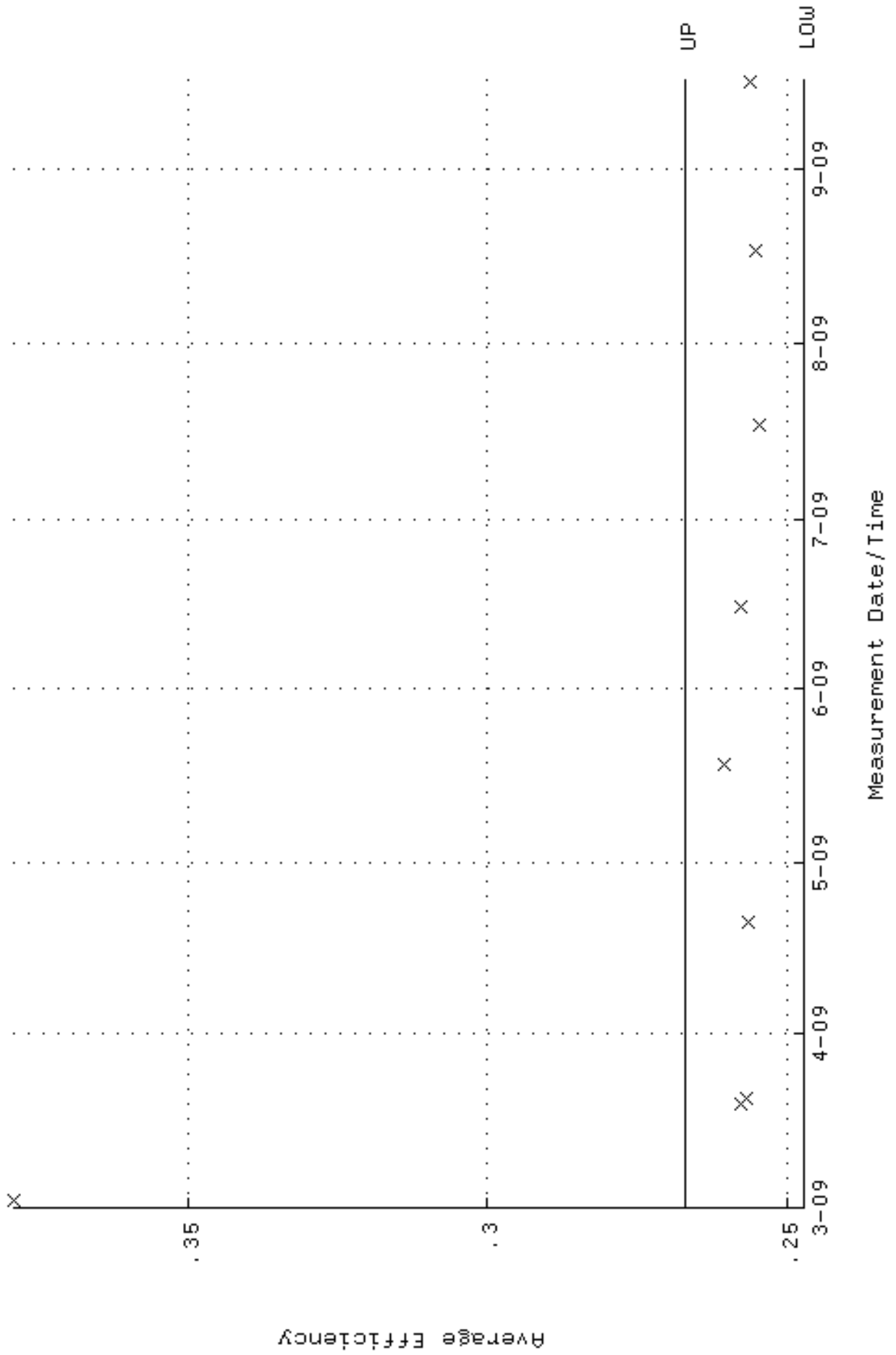




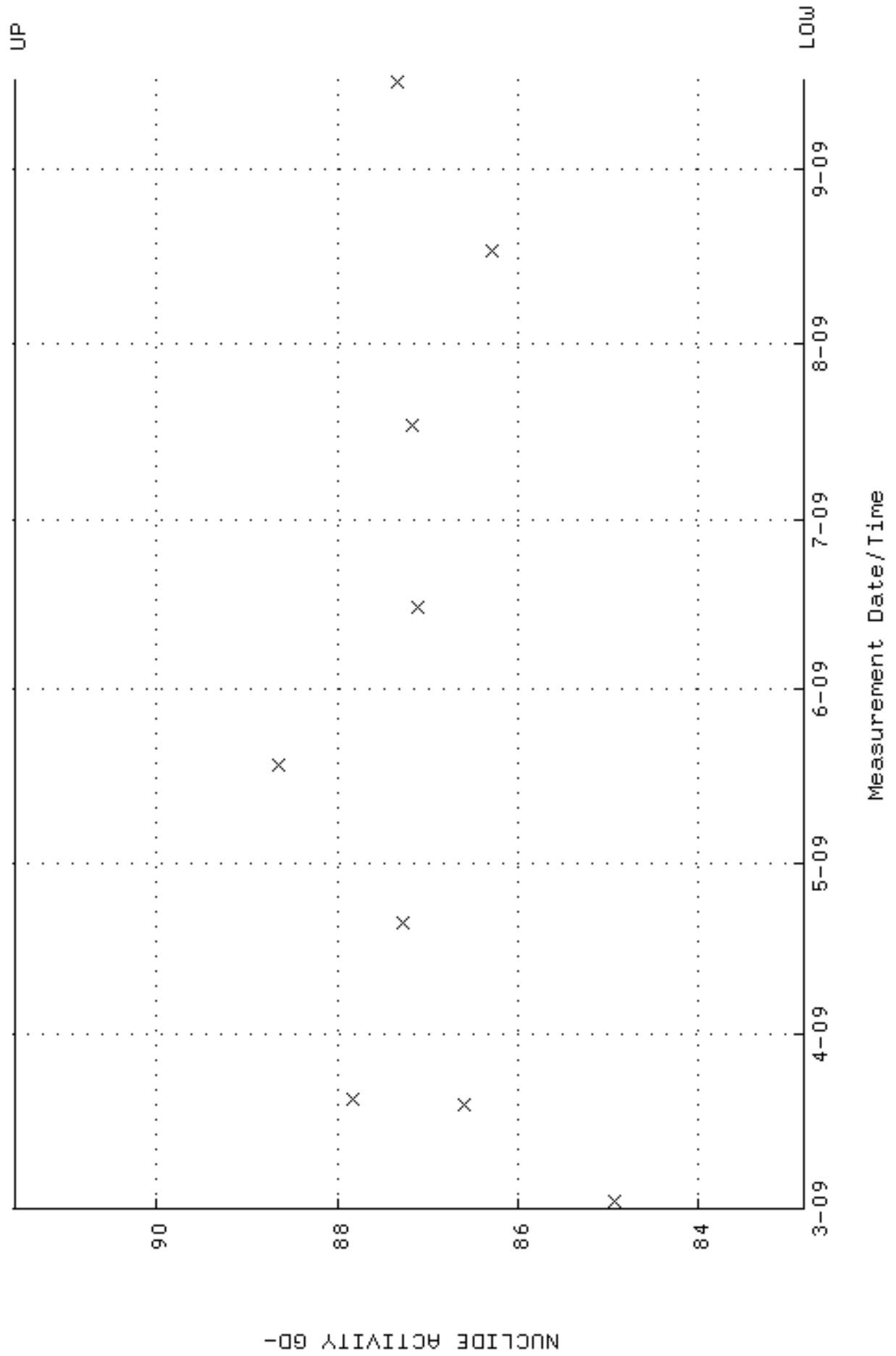
QA filename : DKA100:[ENV\_ALPHA.QA.B]B137.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:28 through 1-OCT-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



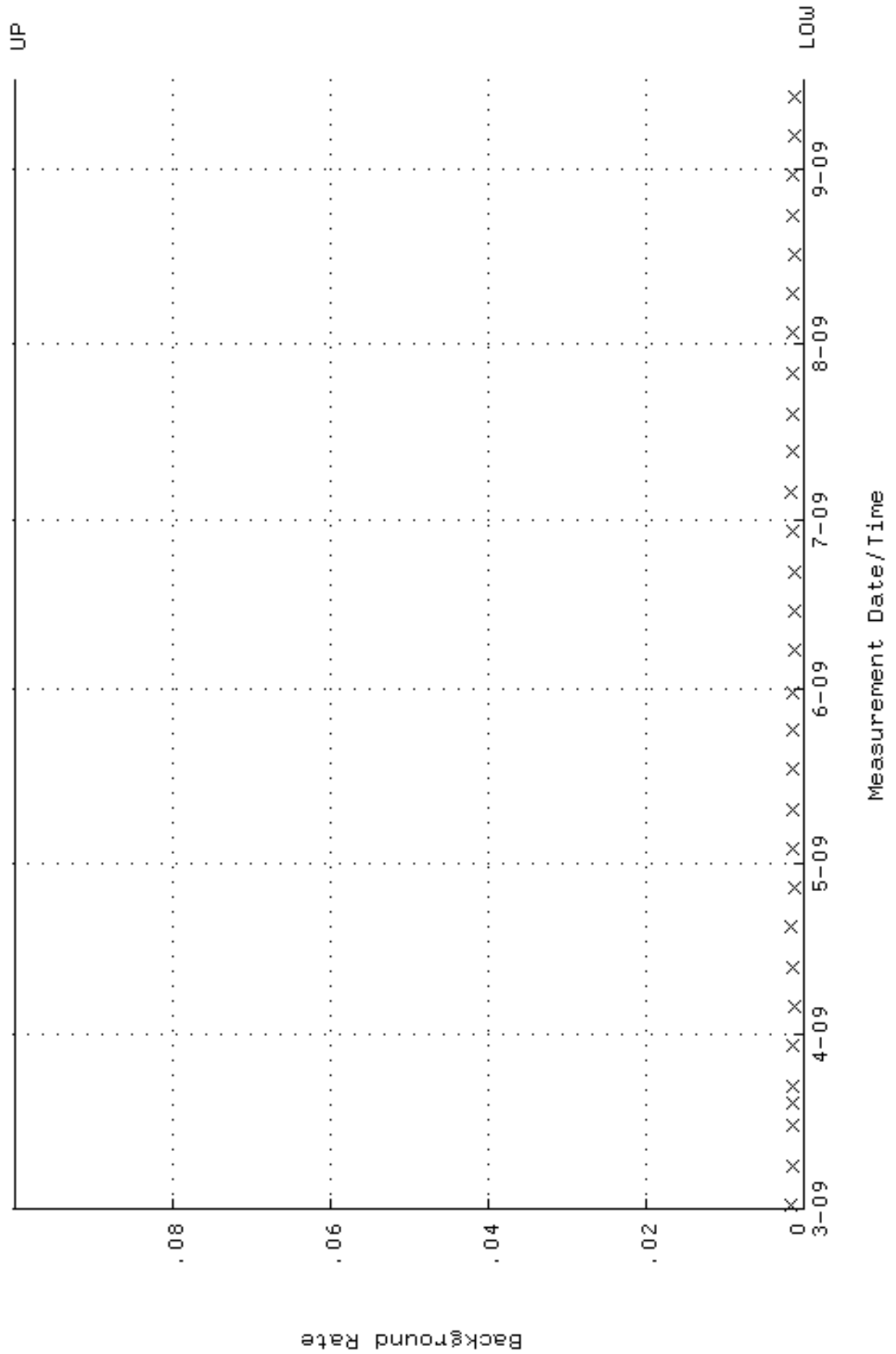
QA filename : DKA100:[ENV\_ALPHA.QA.W]W138.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:10:08 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.247085 through 0.267085



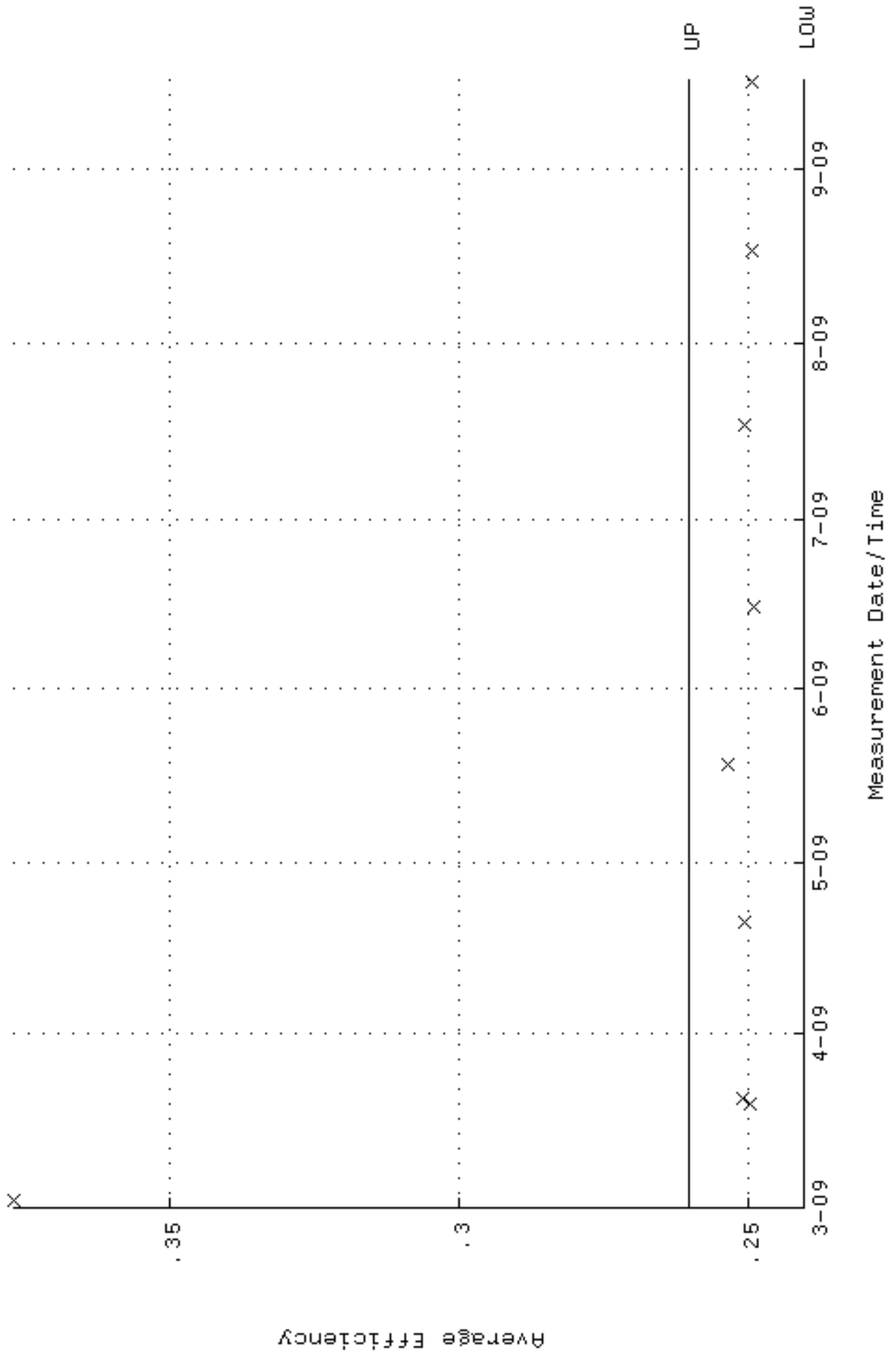
QA filename : DKA100:[ENV\_ALPHA.QA.W]W138.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:10:08 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 82.8399 through 91.5599



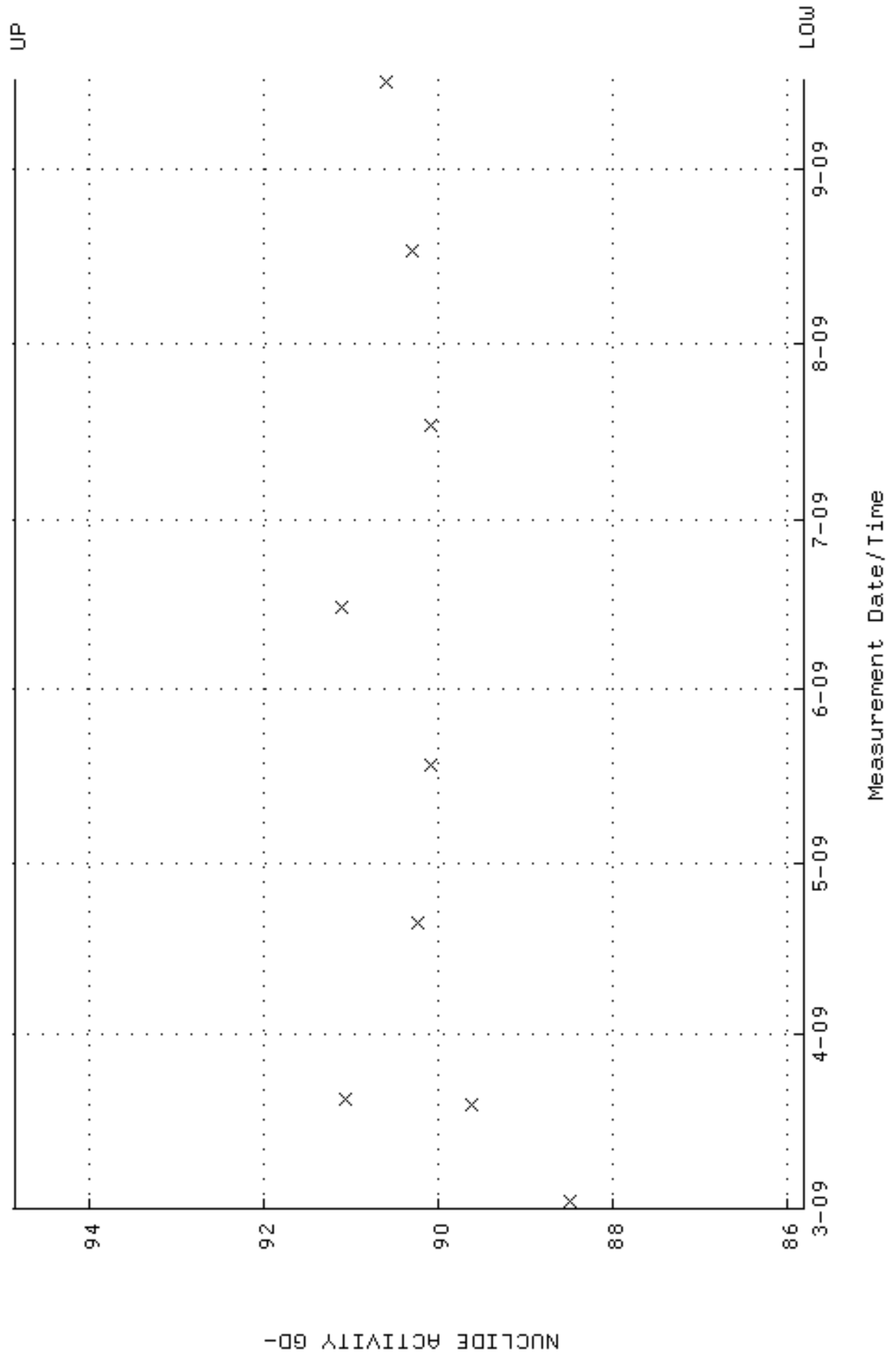
QA filename : DKA100:[ENV\_ALPHA.QA.B]B138.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:32 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



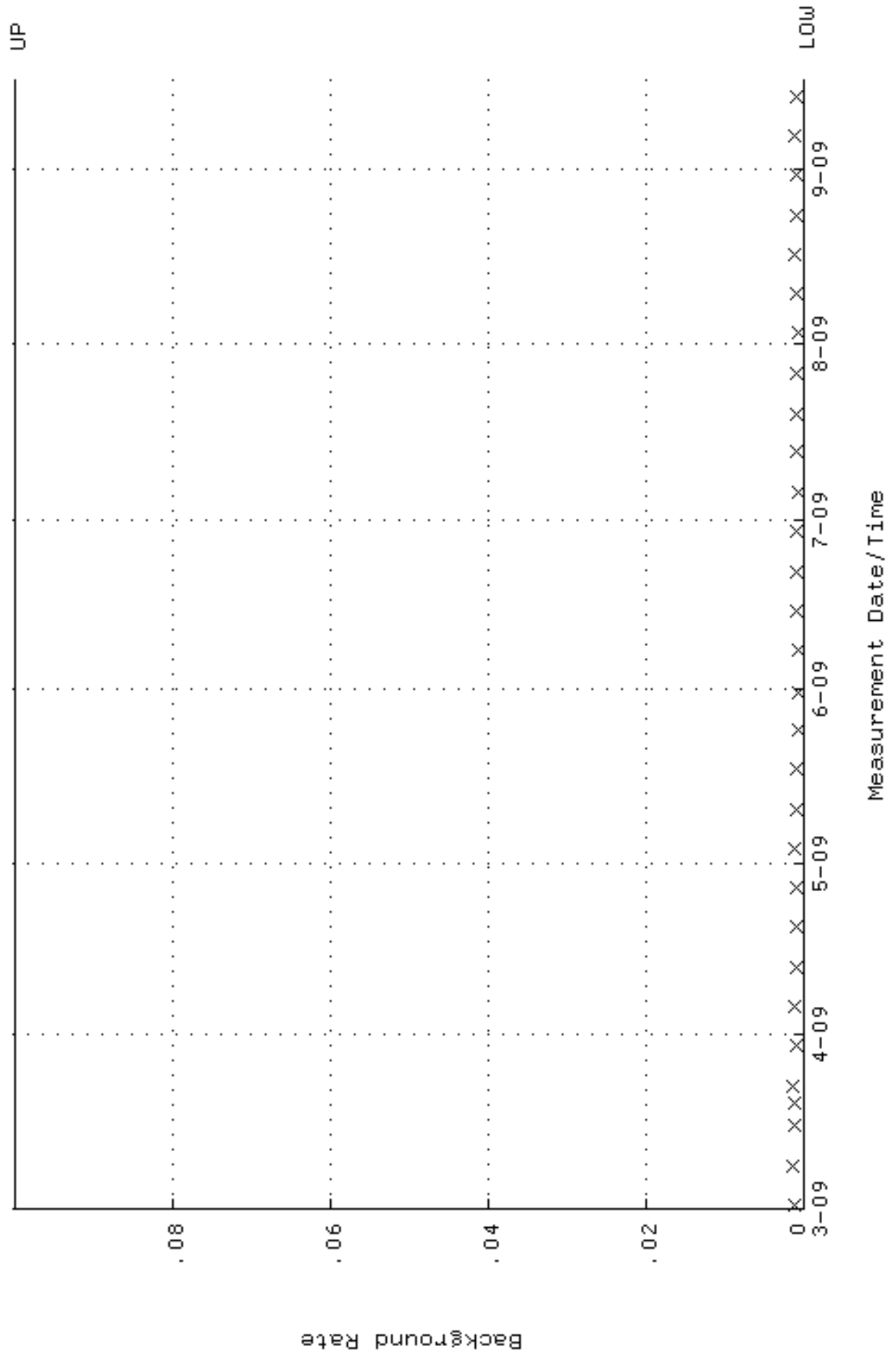
QA filename : DKA100:[ENV\_ALPHA.QA.W]W139.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:10:14 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.240299 through 0.260299



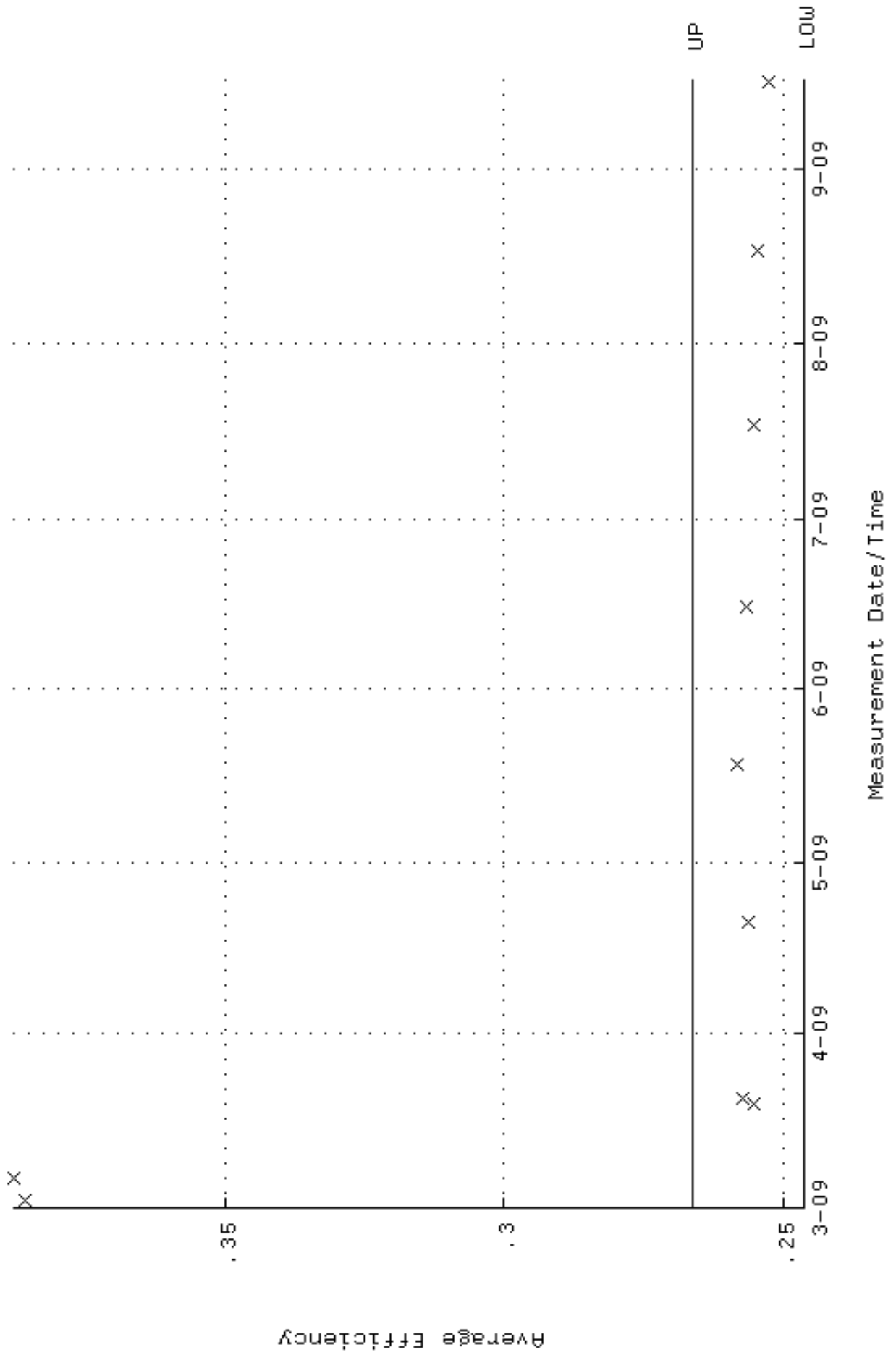
QA filename : DKA100:[ENV\_ALPHA.QA.W]W139.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:10:14 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 85.8145 through 94.8477



QA filename : DKA100:[ENV\_ALPHA.QA.B]B139.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:37 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

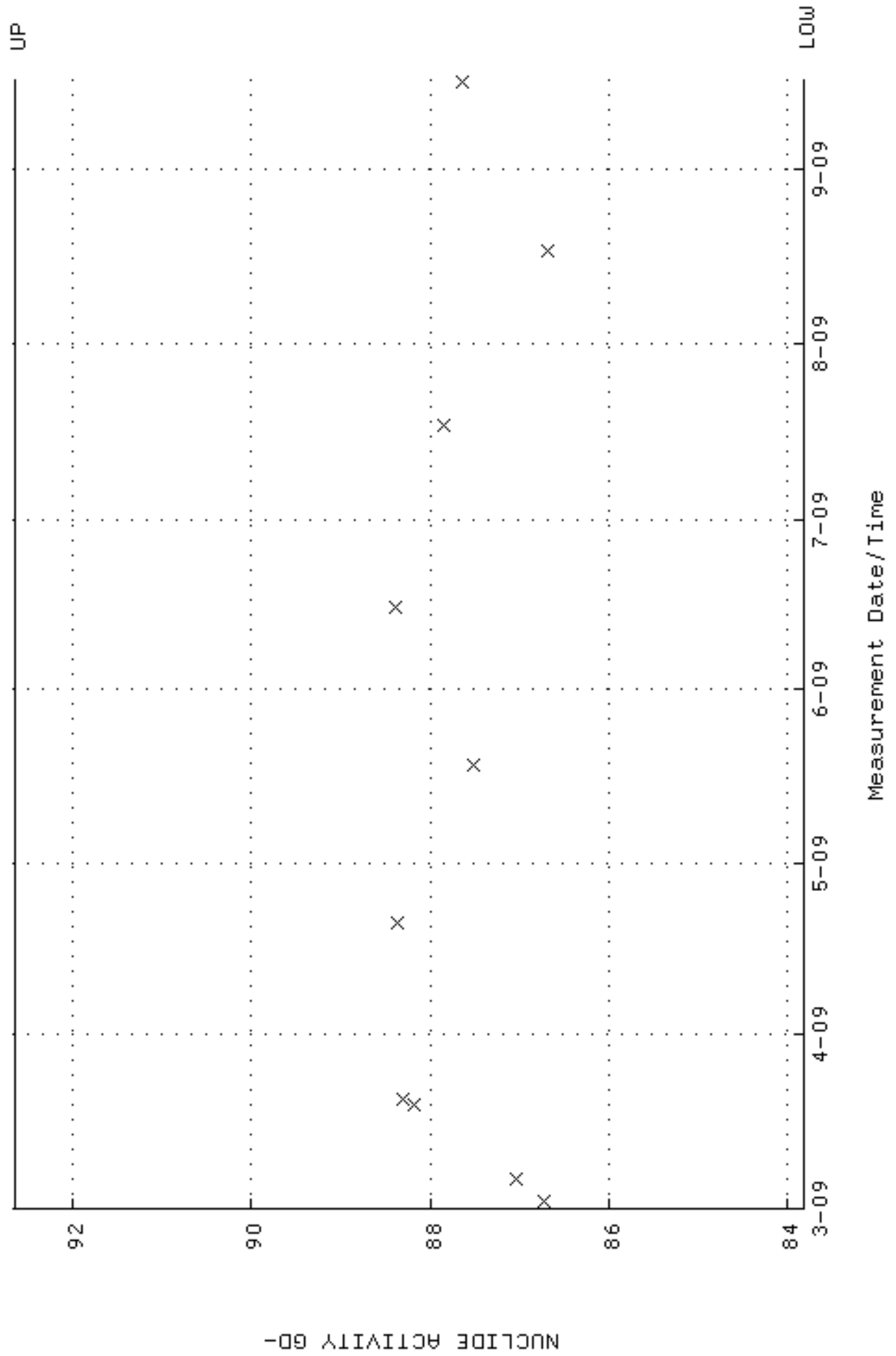


QA filename : DKA100:[ENV\_ALPHA.QA.W]W140.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:10:19 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.246178 through 0.266178

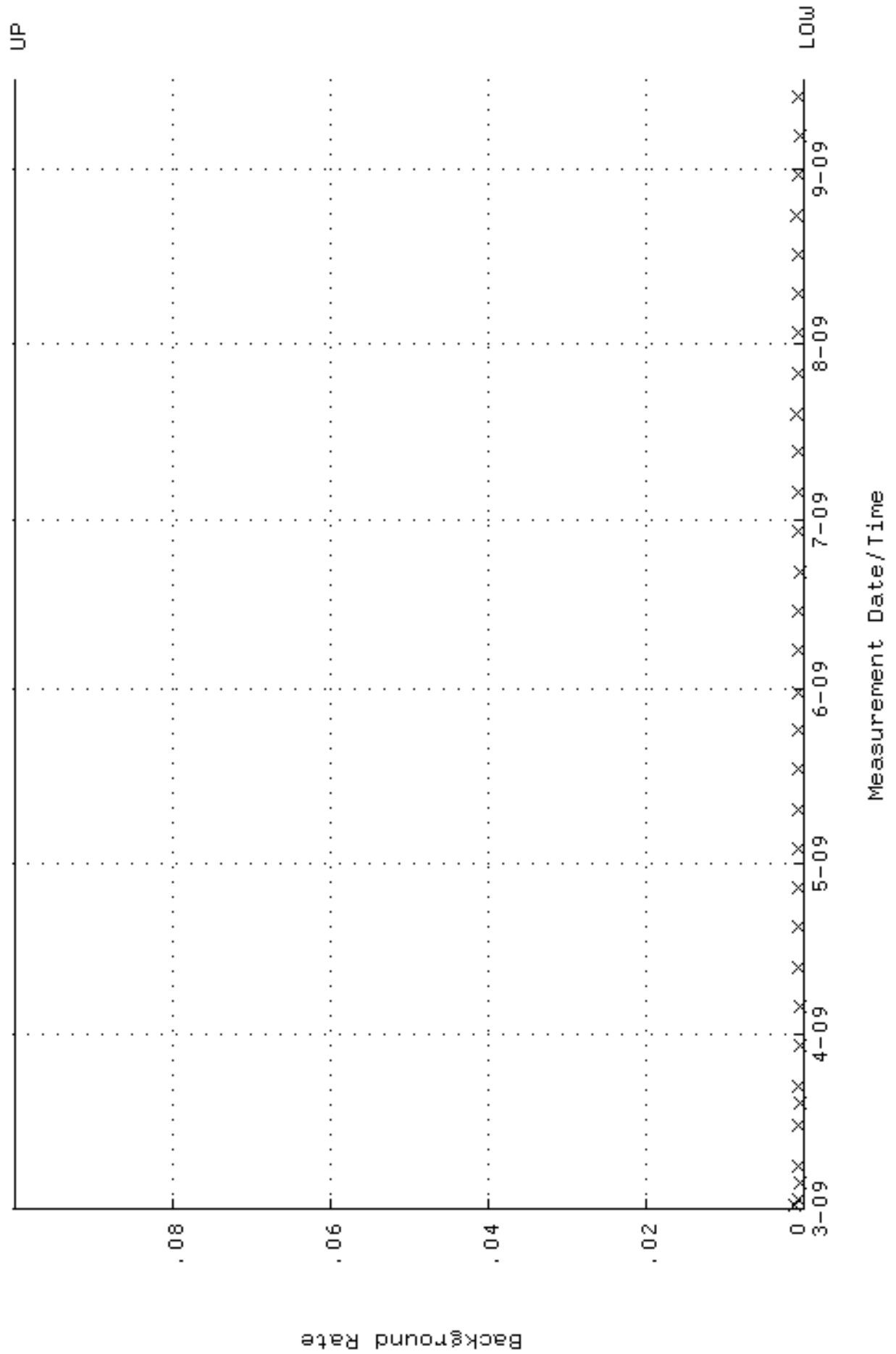




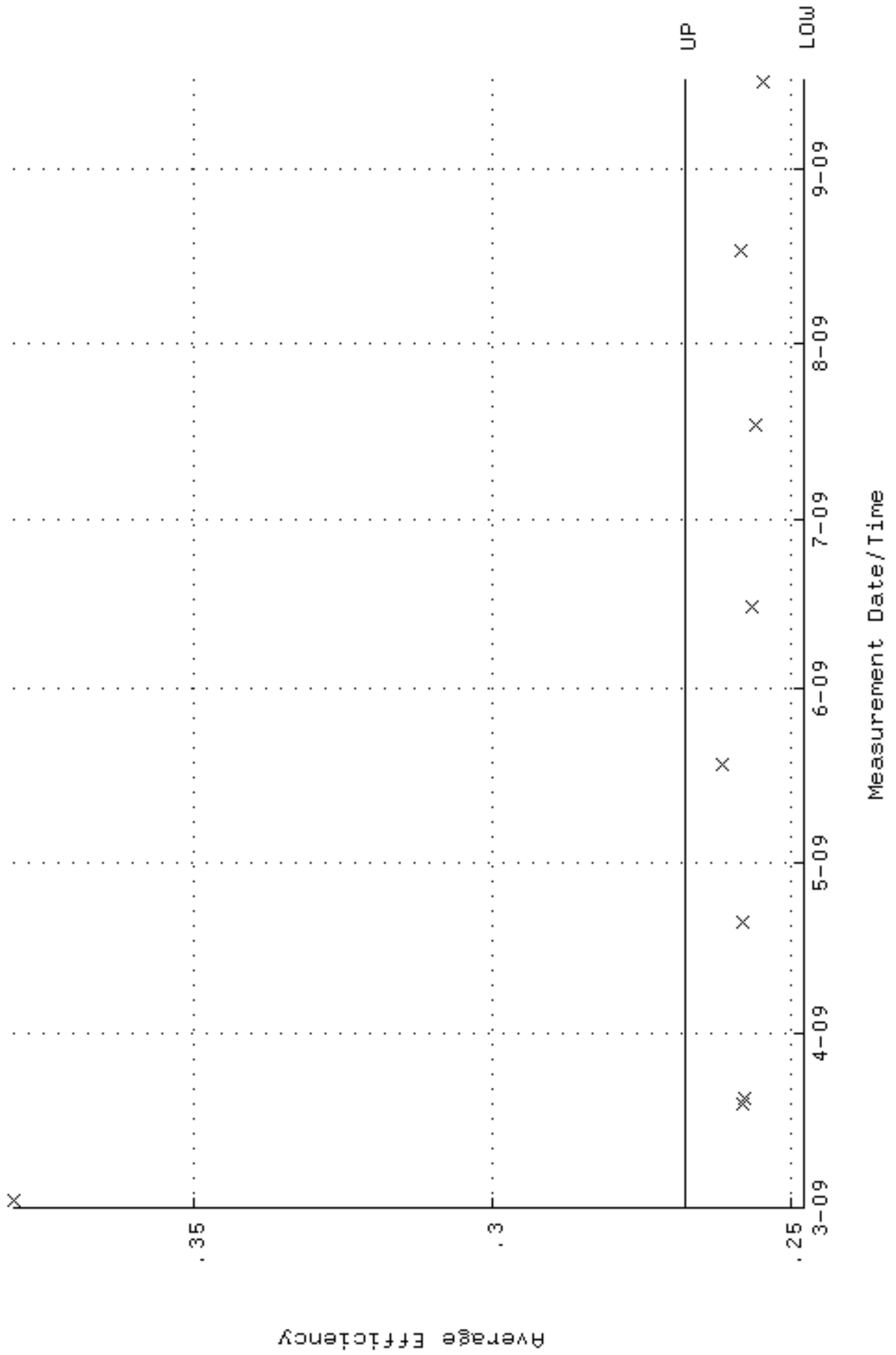
QA filename : DKA100:[ENV\_ALPHA.QA.W]W140.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:10:19 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 83.8171 through 92.6399



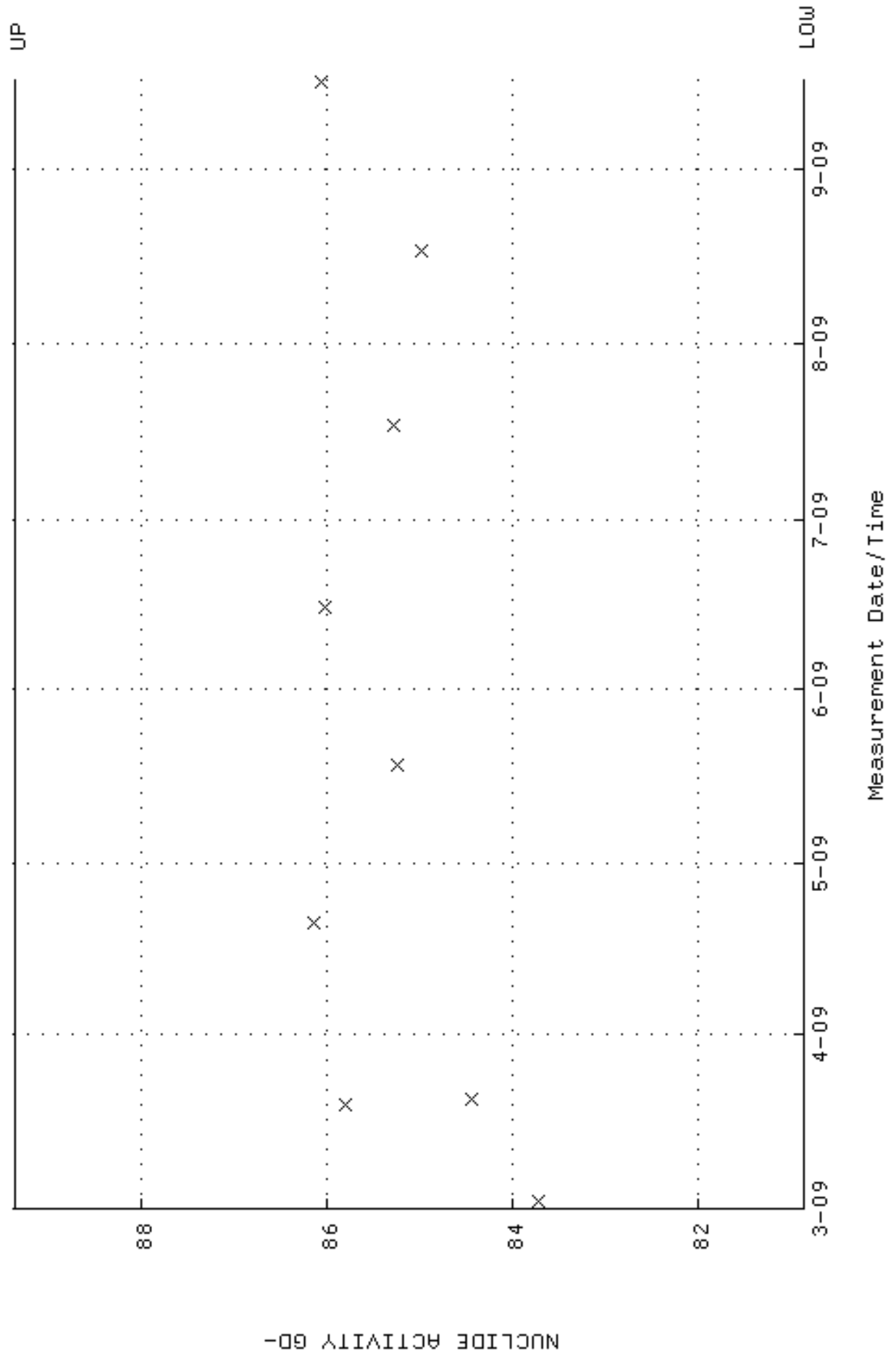
QA filename : DKA100:[ENV\_ALPHA.QA.B]B140.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:41 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



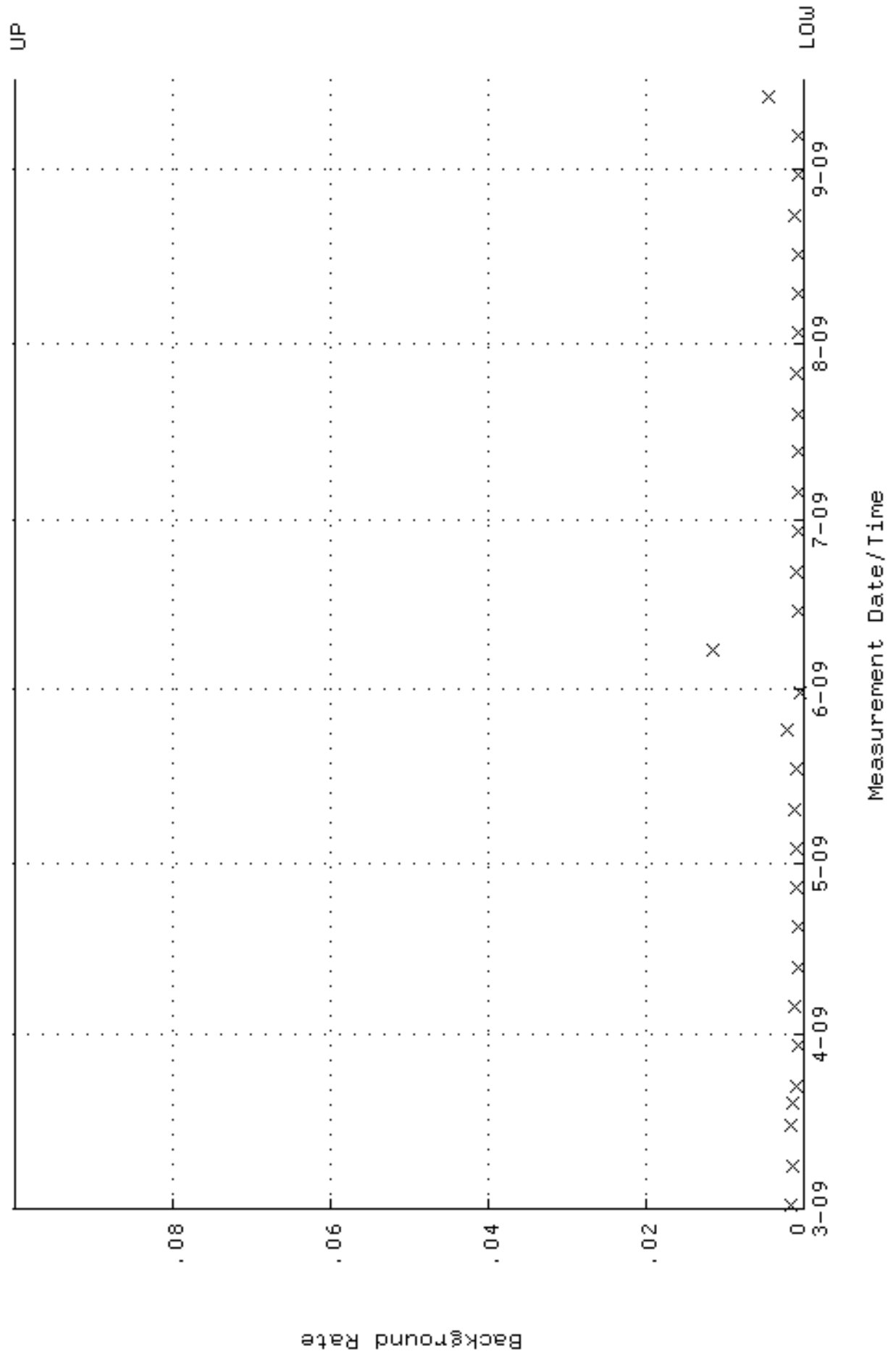
QA filename : DKA100:[ENV\_ALPHA.QA.W]W141.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:10:24 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.247845 through 0.267845



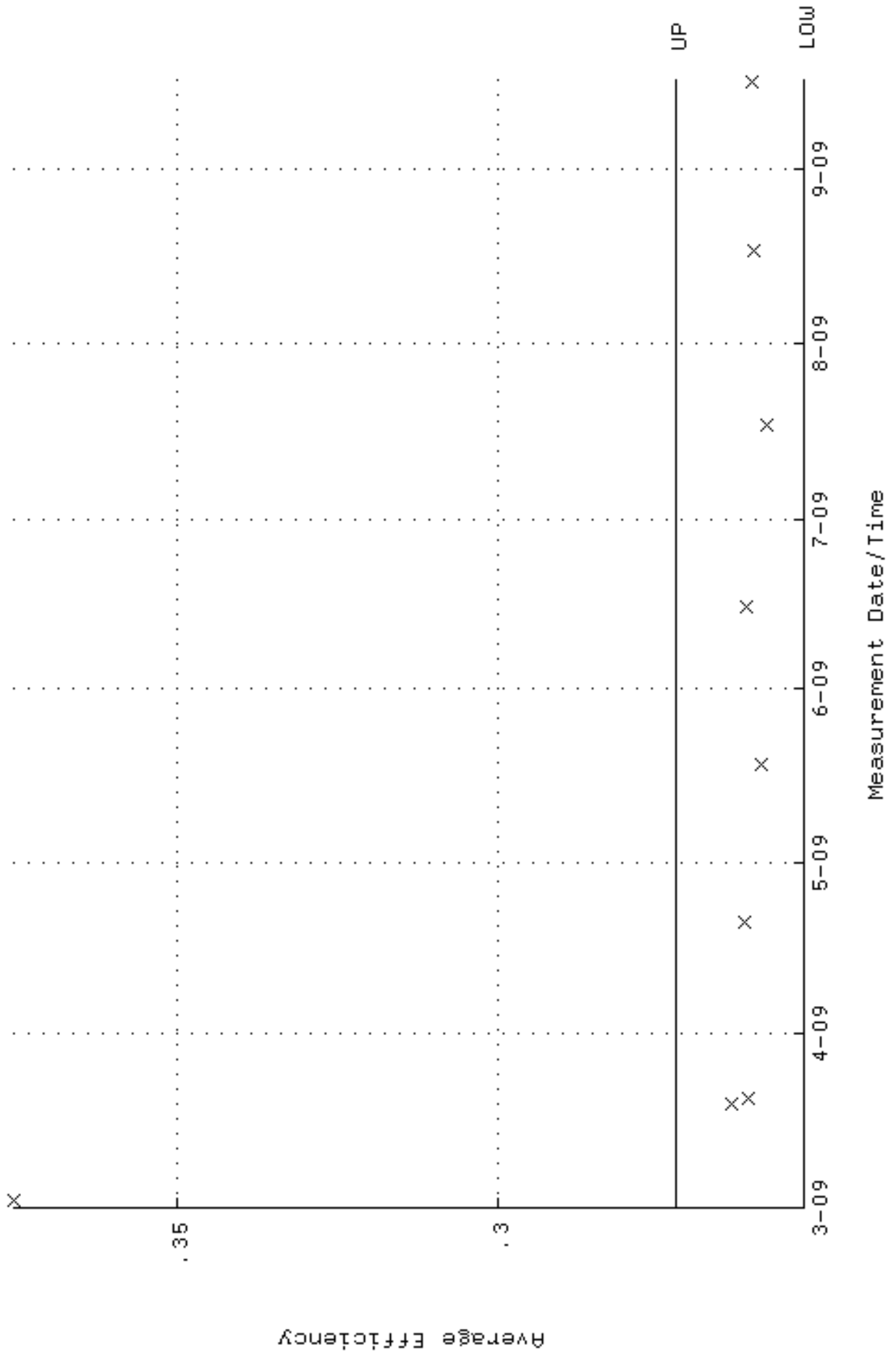
QA filename : DKA100:[ENV\_ALPHA.QA.W]w141.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:10:24 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 80.8595 through 89.3711



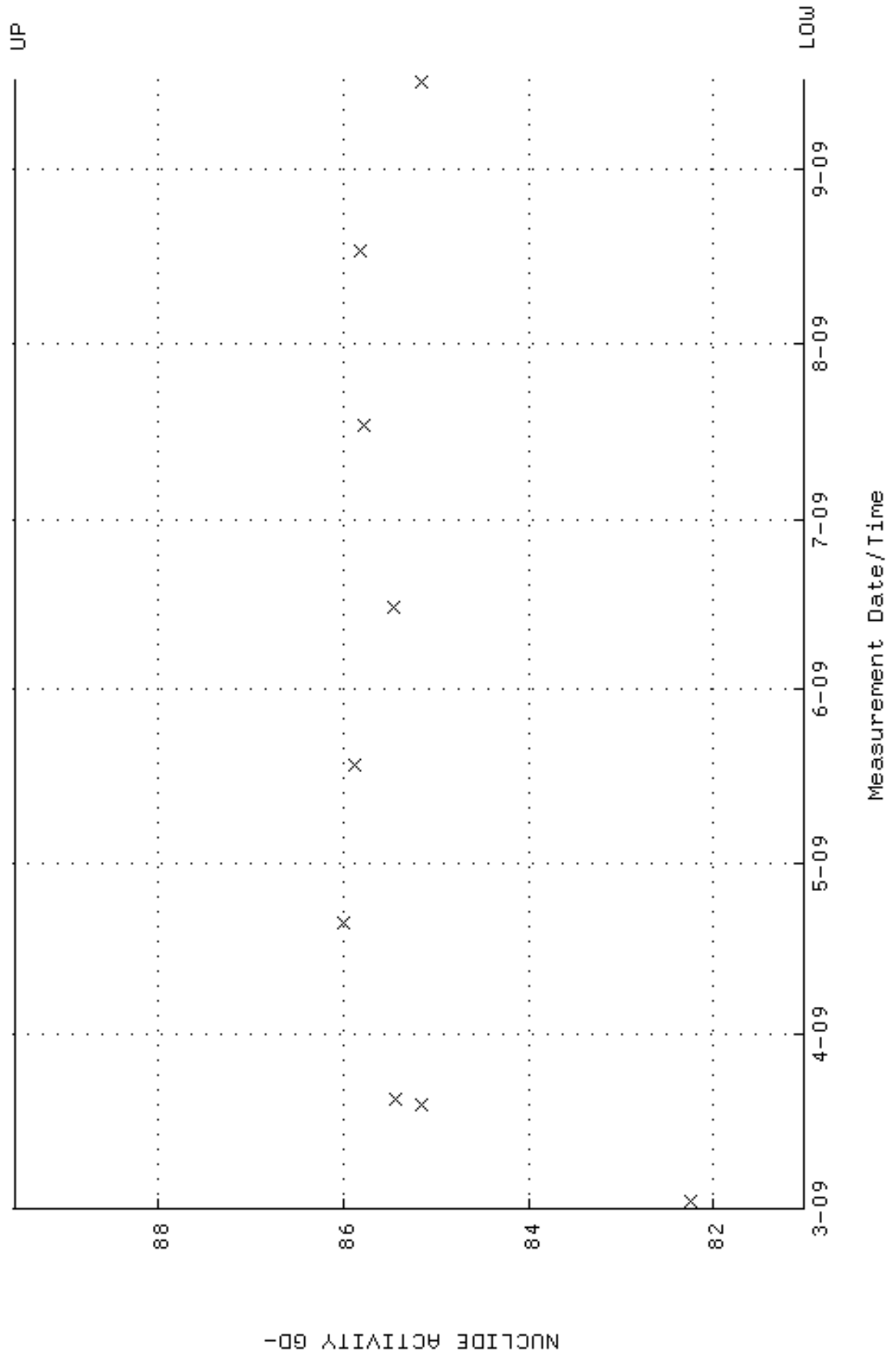
QA filename : DKA100:[ENV\_ALPHA.QA.B]B141.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:45 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



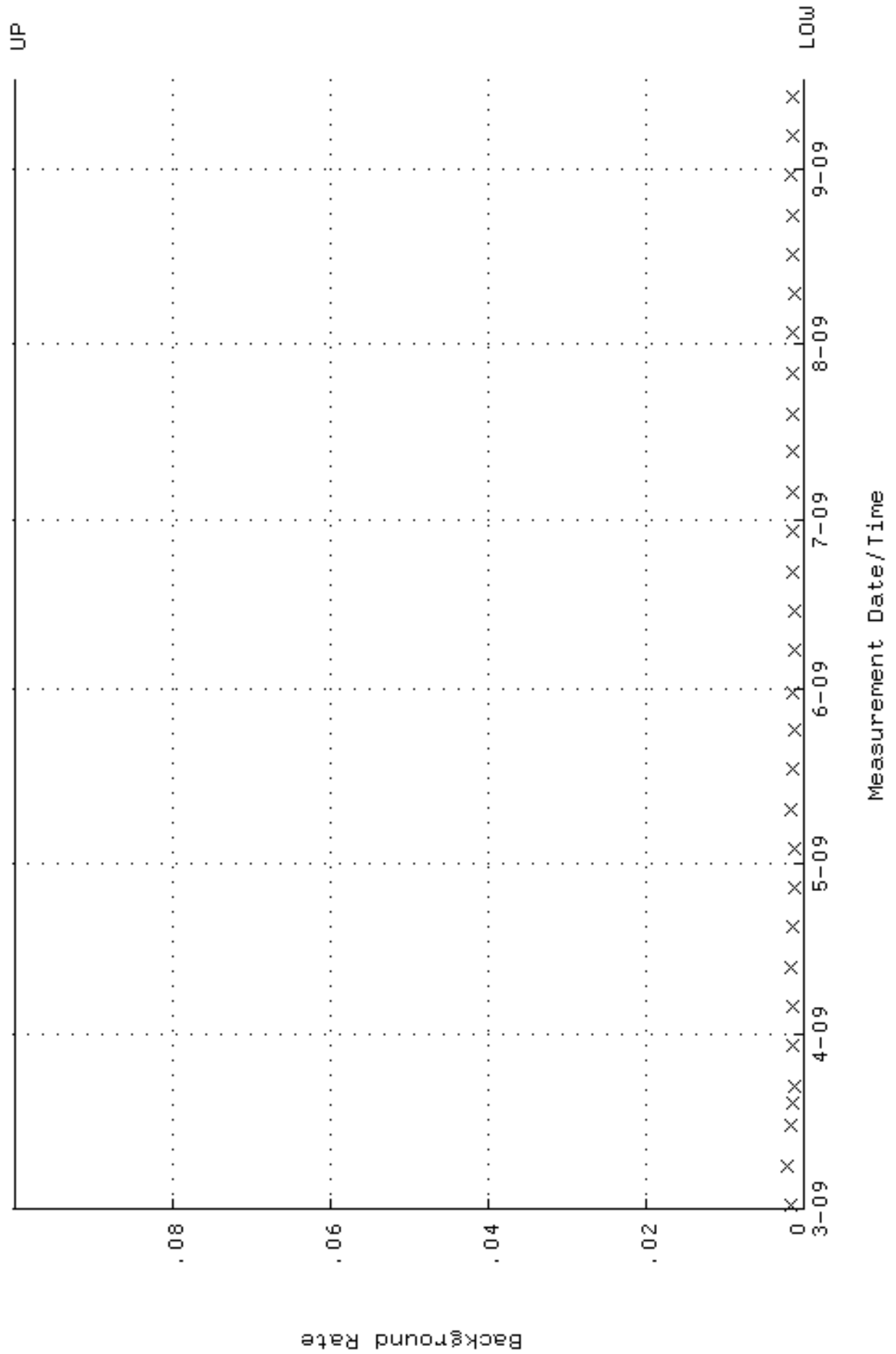
QA filename : DKA100:[ENV\_ALPHA.QA.W]W142.QAF;2  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:10:30 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.252182 through 0.272182



QA filename : DKA100:[ENV\_ALPHA.QA.W]W142.QAF;2  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:10:30 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 81.0245 through 89.5533

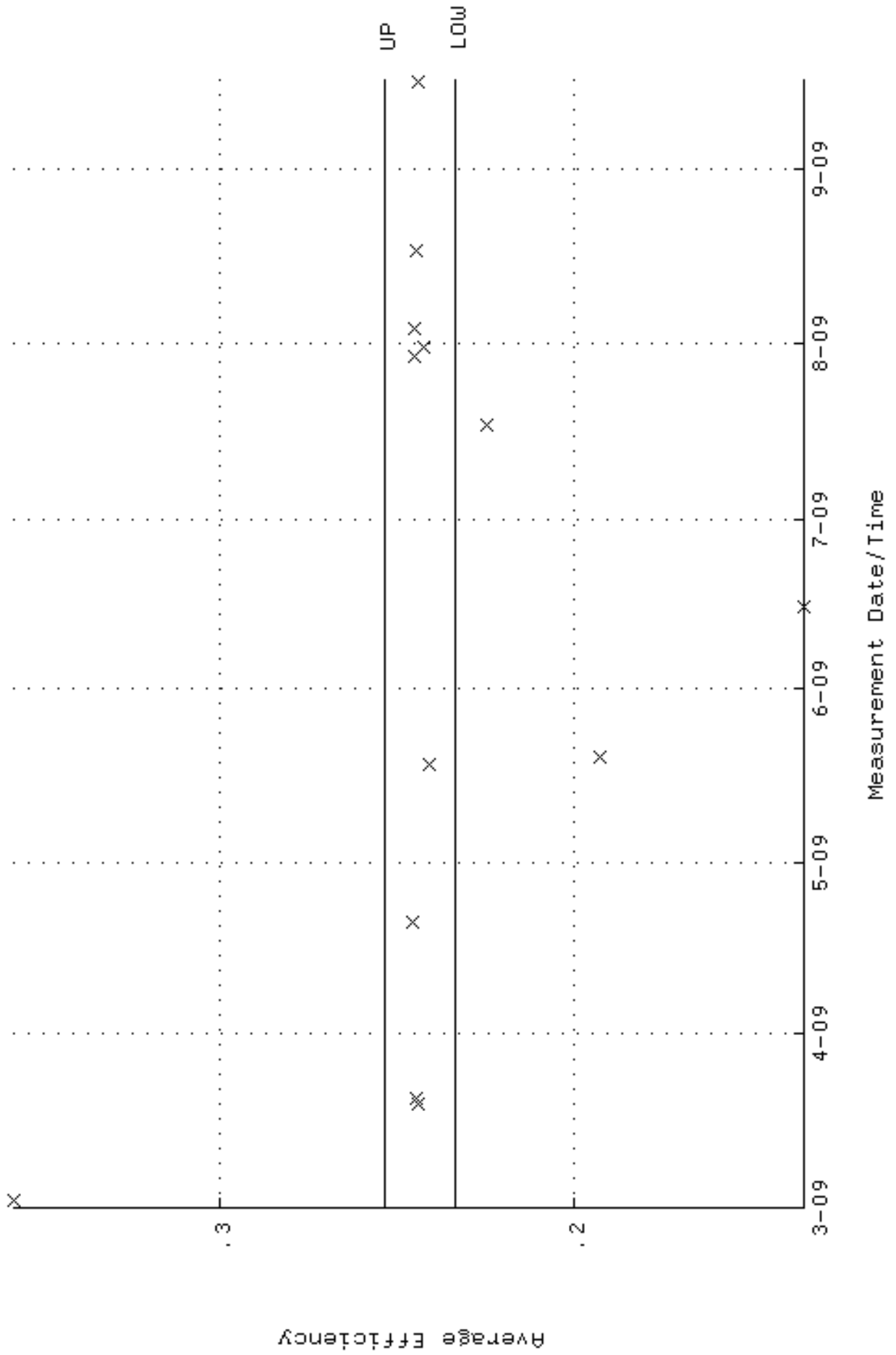


QA filename : DKA100:[ENV\_ALPHA.QA.B]B142.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:49 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

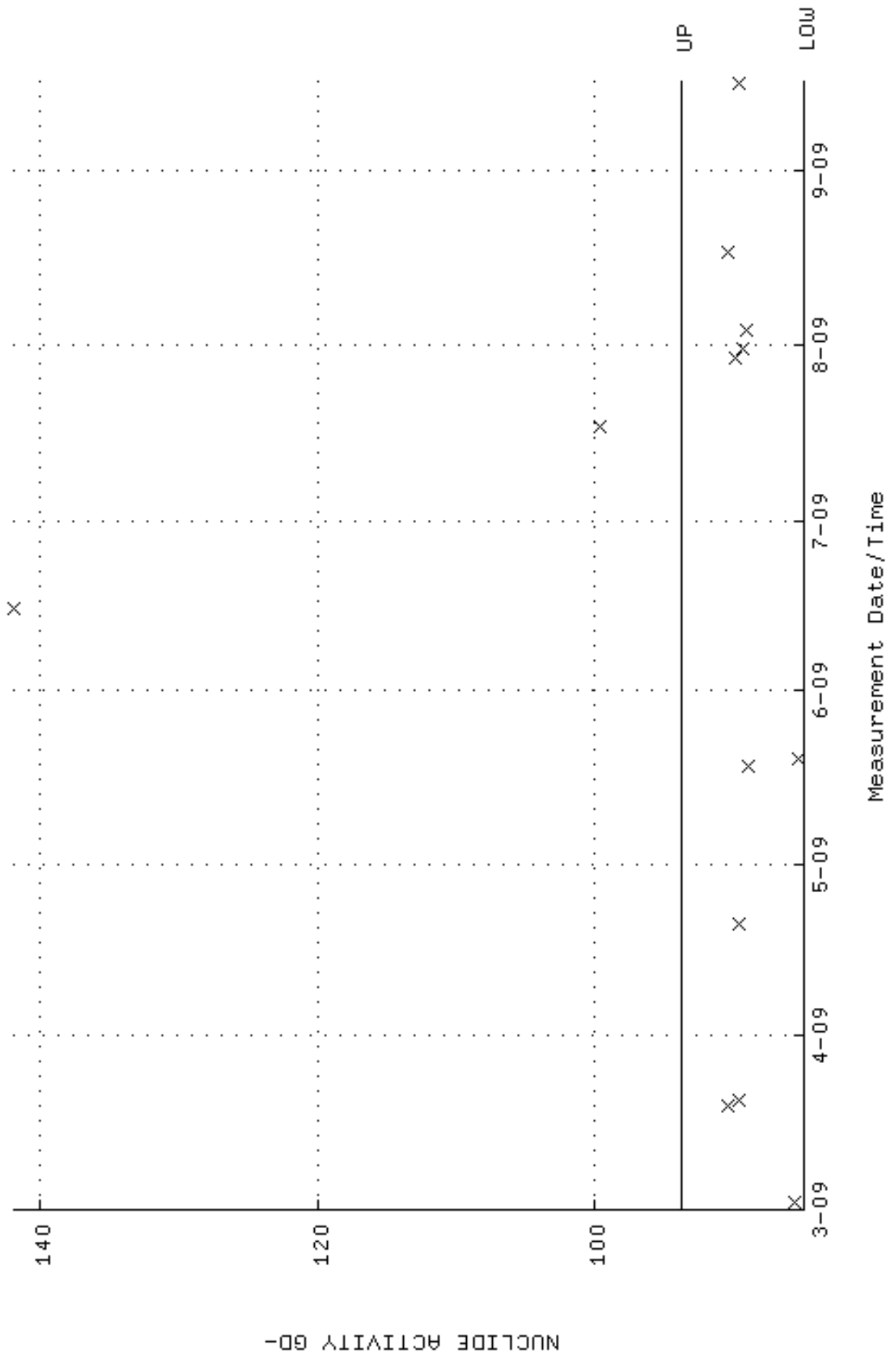




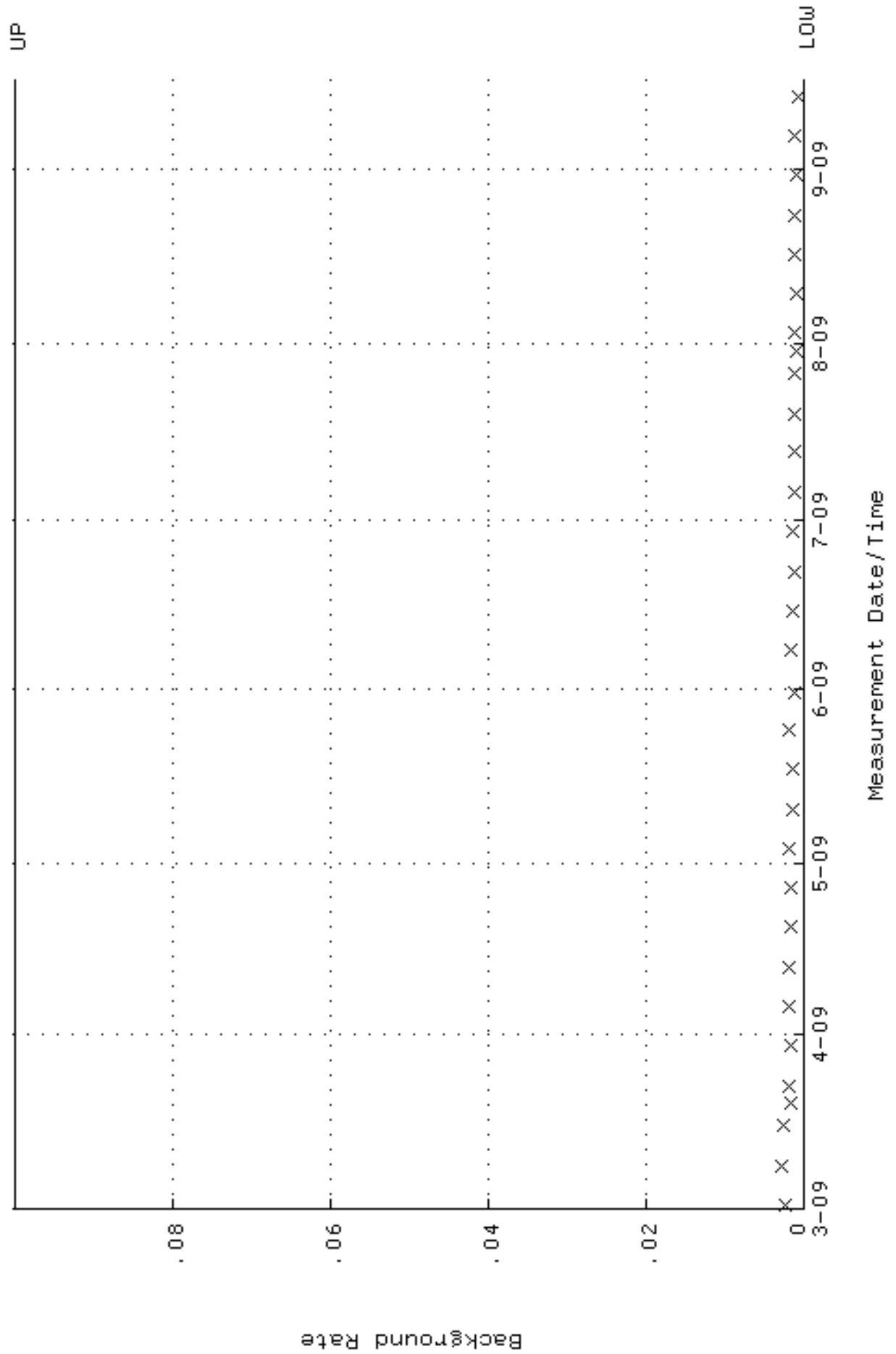
QA filename : DKA100:[ENV\_ALPHA.QA.W]W143.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:10:35 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.233879 through 0.253879



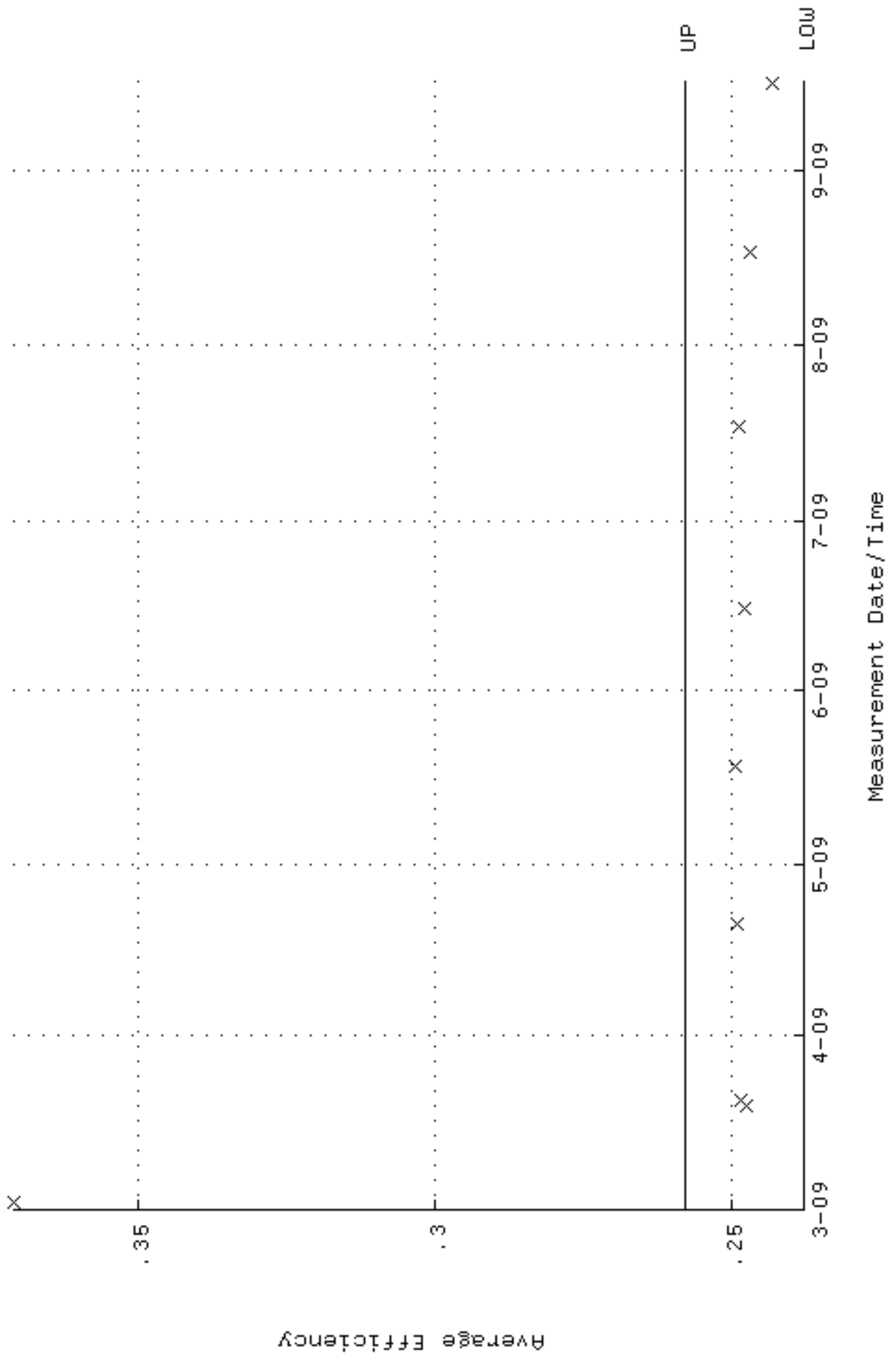
QA filename : DKA100:[ENV\_ALPHA.QA.W]W143.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:10:35 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 84.9200 through 93.8590



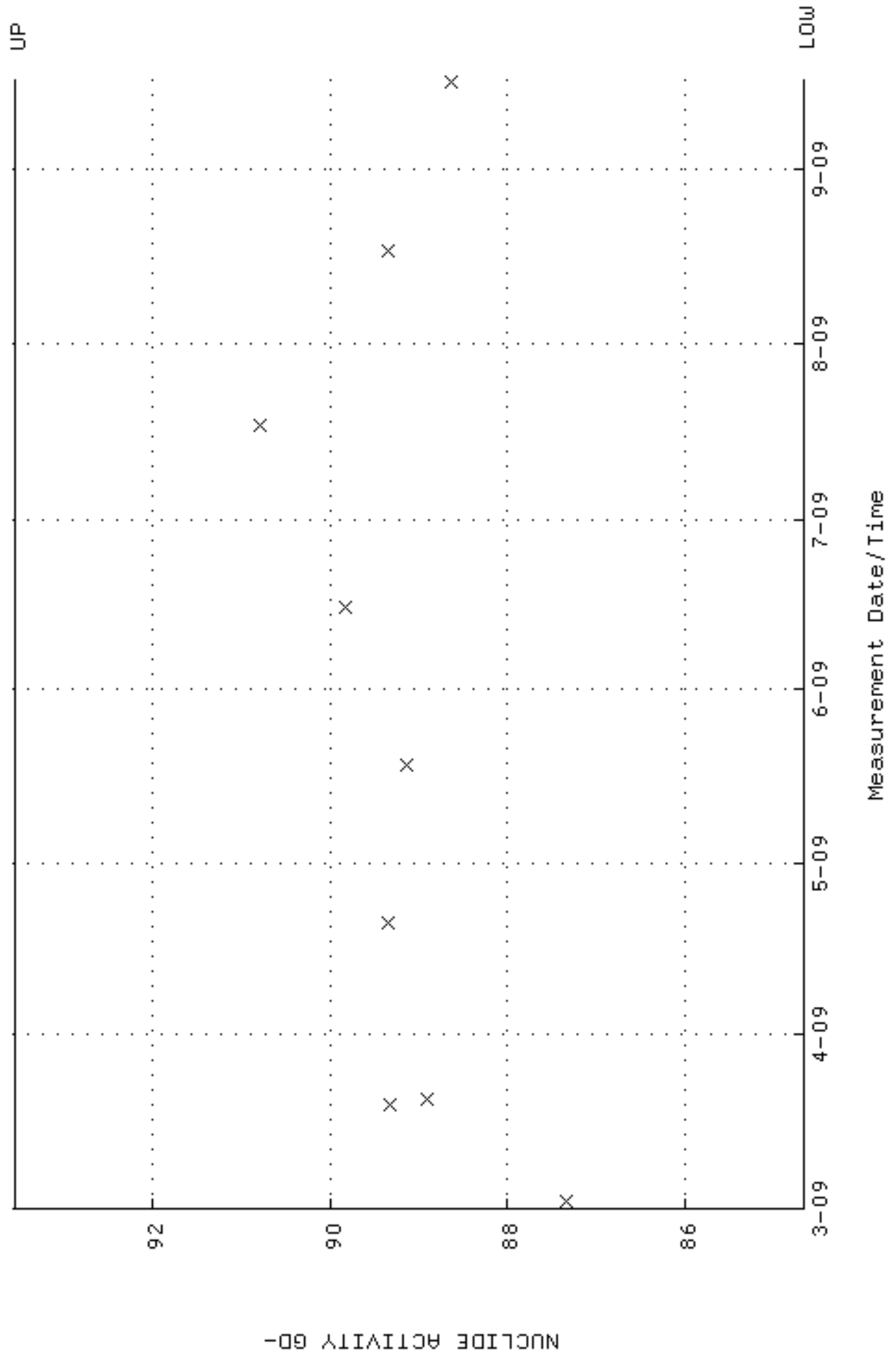
QA filename : DKA100:[ENV\_ALPHA.QA.B]B143.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:53 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



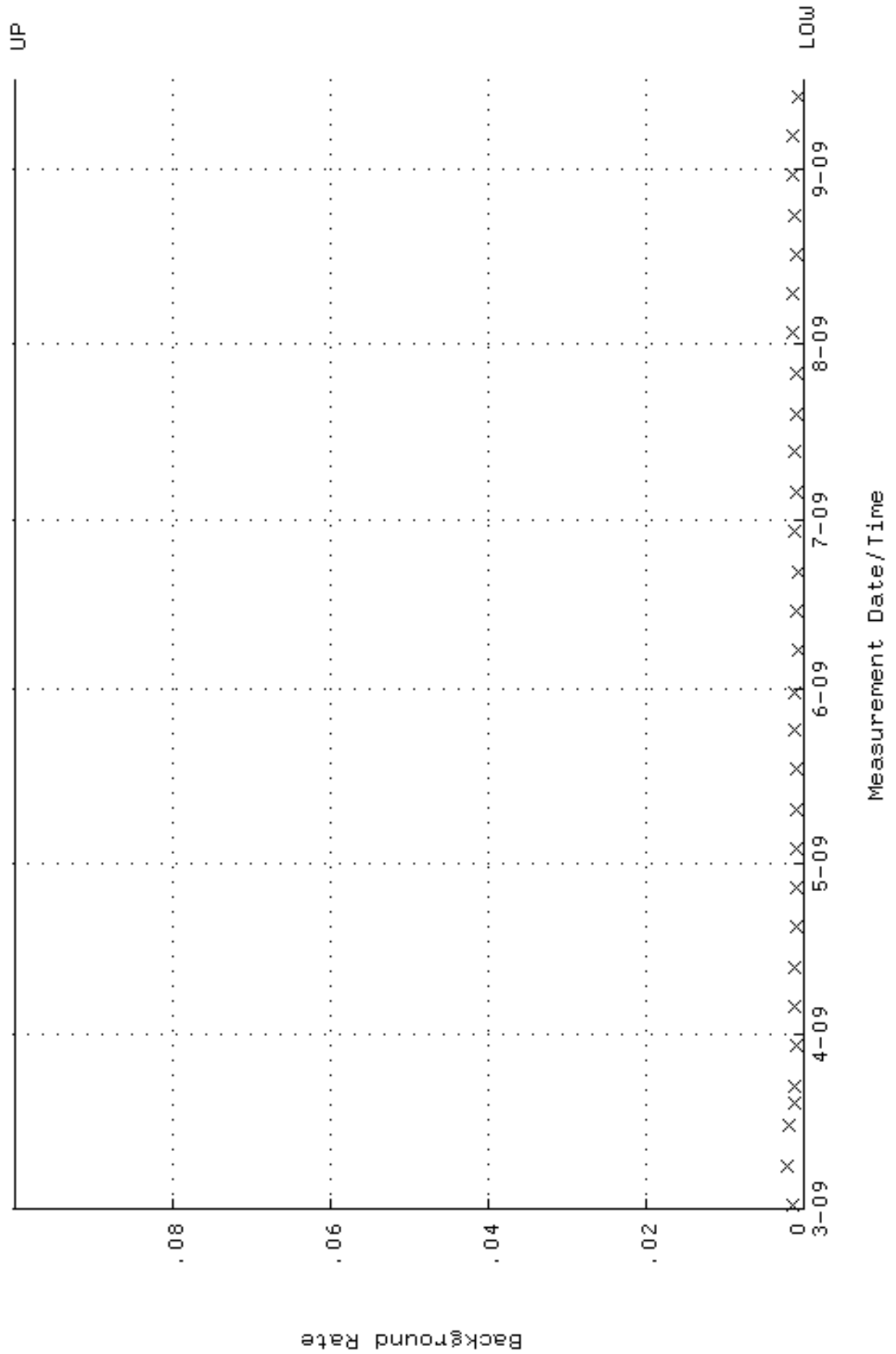
QA filename : DKA100:[ENV\_ALPHA.QA.W]W144.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:10:41 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.237963 through 0.257963



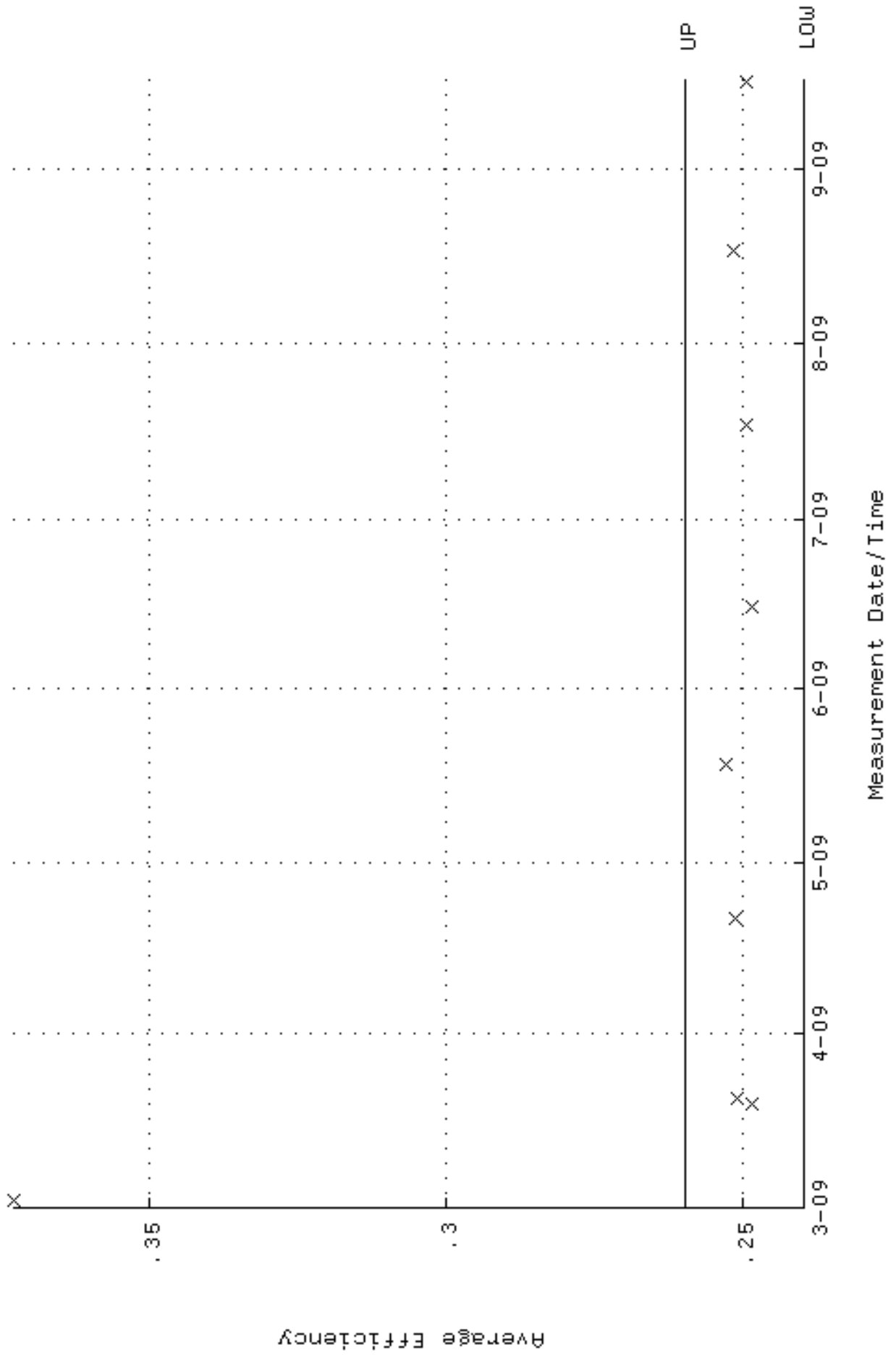
QA filename : DKA100:[ENV\_ALPHA.QA.W]W144.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:10:41 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 84.6507 through 93.5613



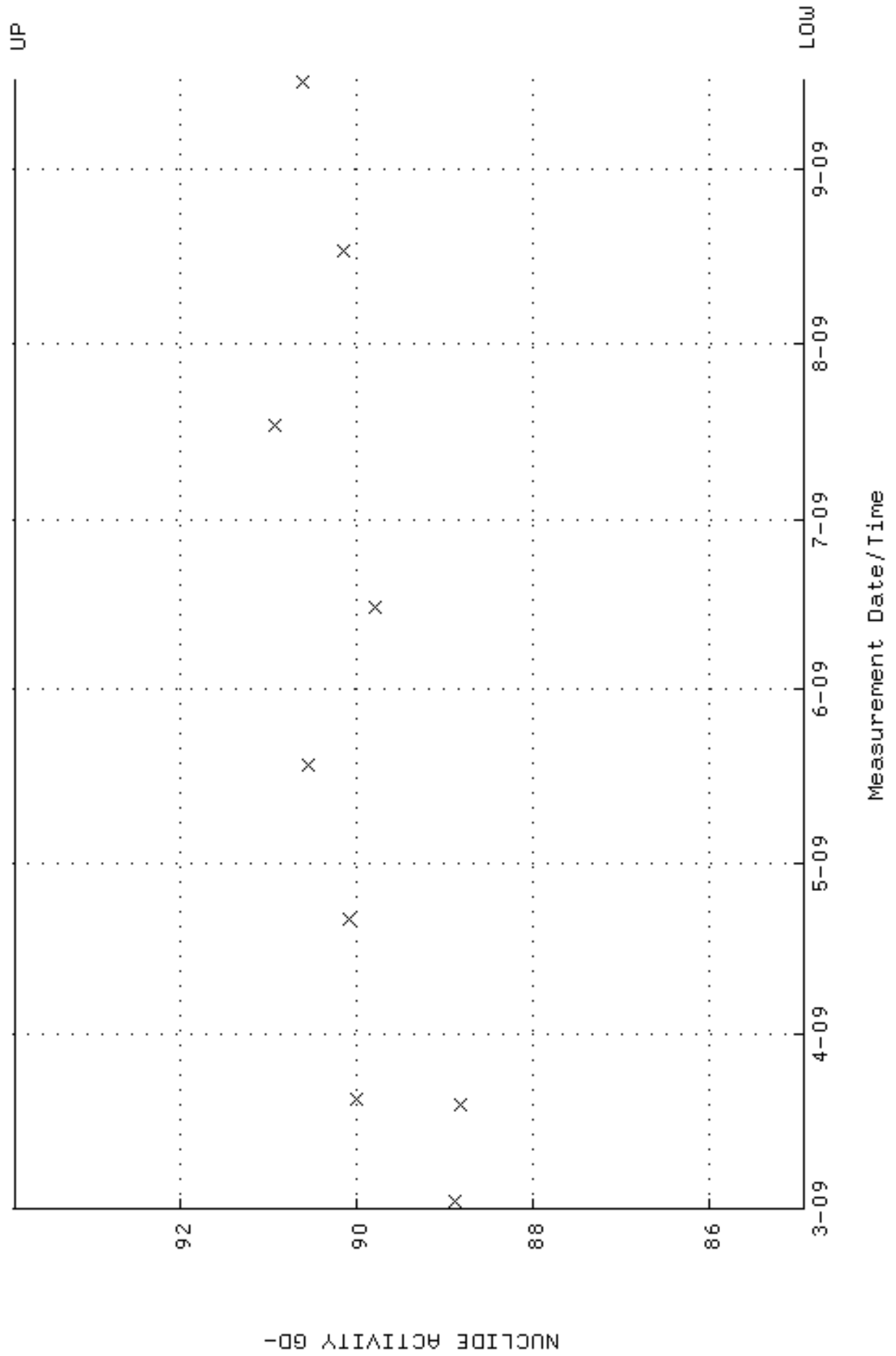
QA filename : DKA100:[ENV\_ALPHA.QA.B]B144.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:19:57 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



QA filename : DKA100:[ENV\_ALPHA.QA.W]W145.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:10:46 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.239850 through 0.259850

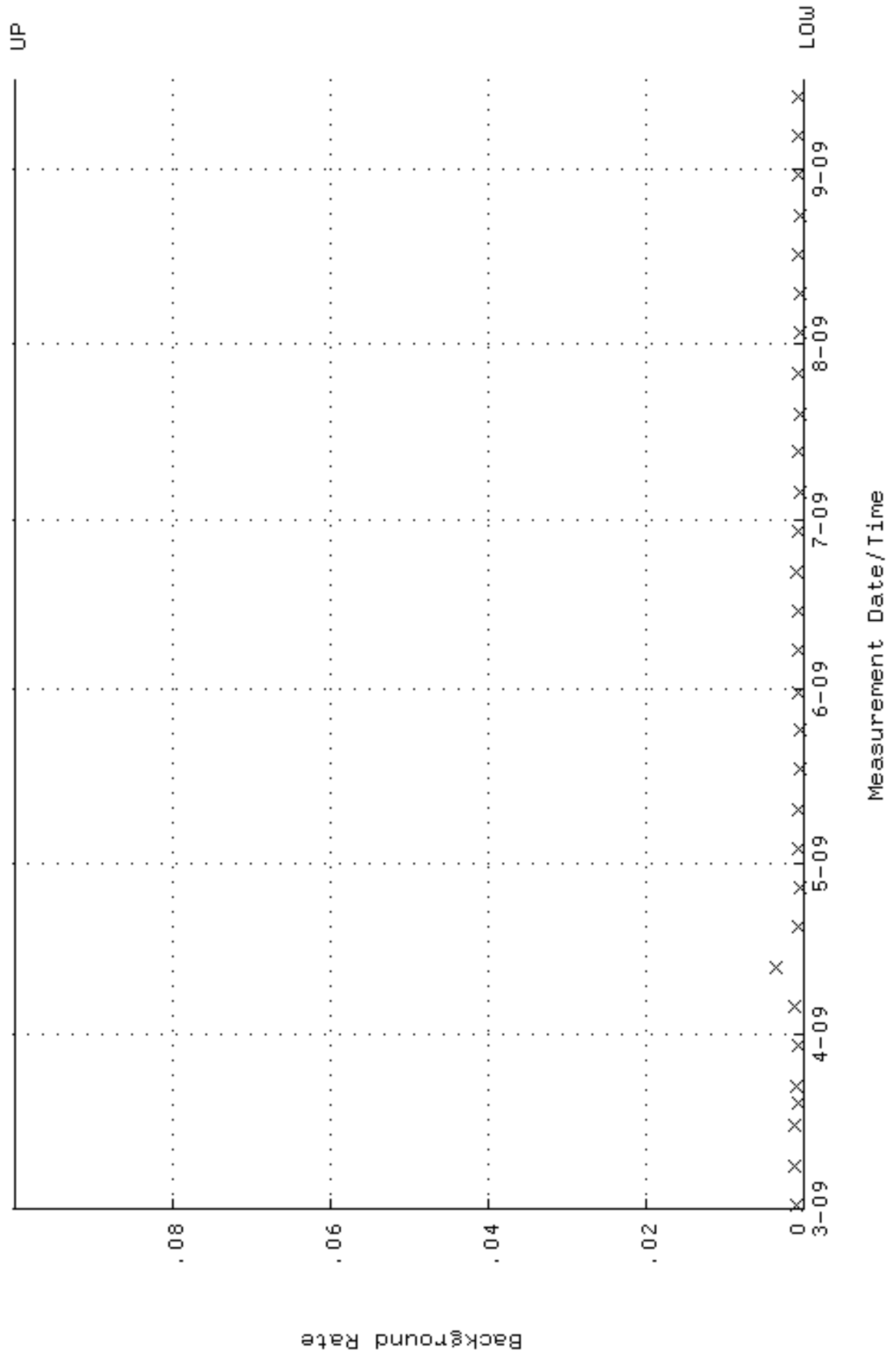


QA filename : DKA100:[ENV\_ALPHA.QA.W]W145.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:10:46 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 84.9354 through 93.8760

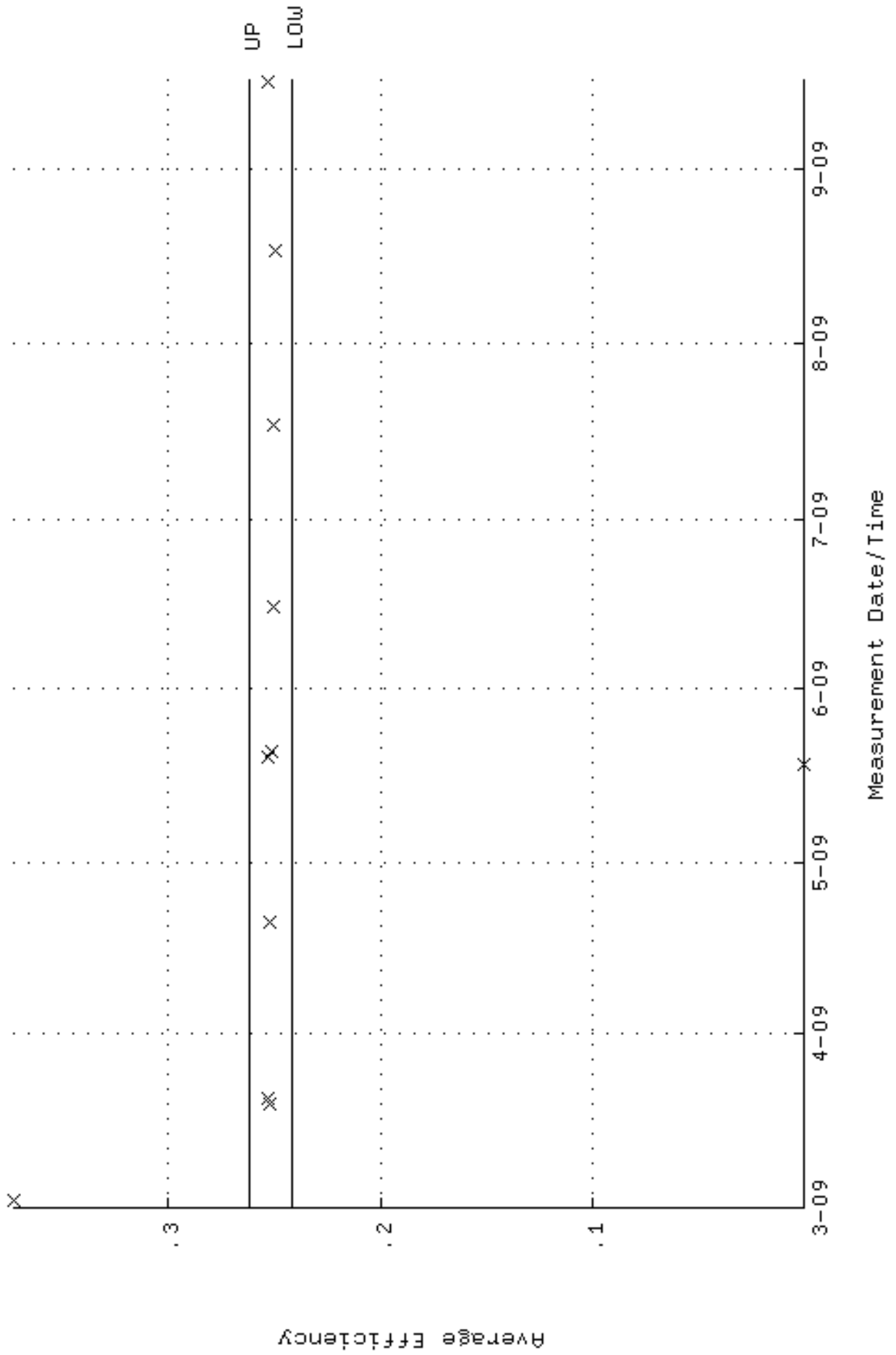




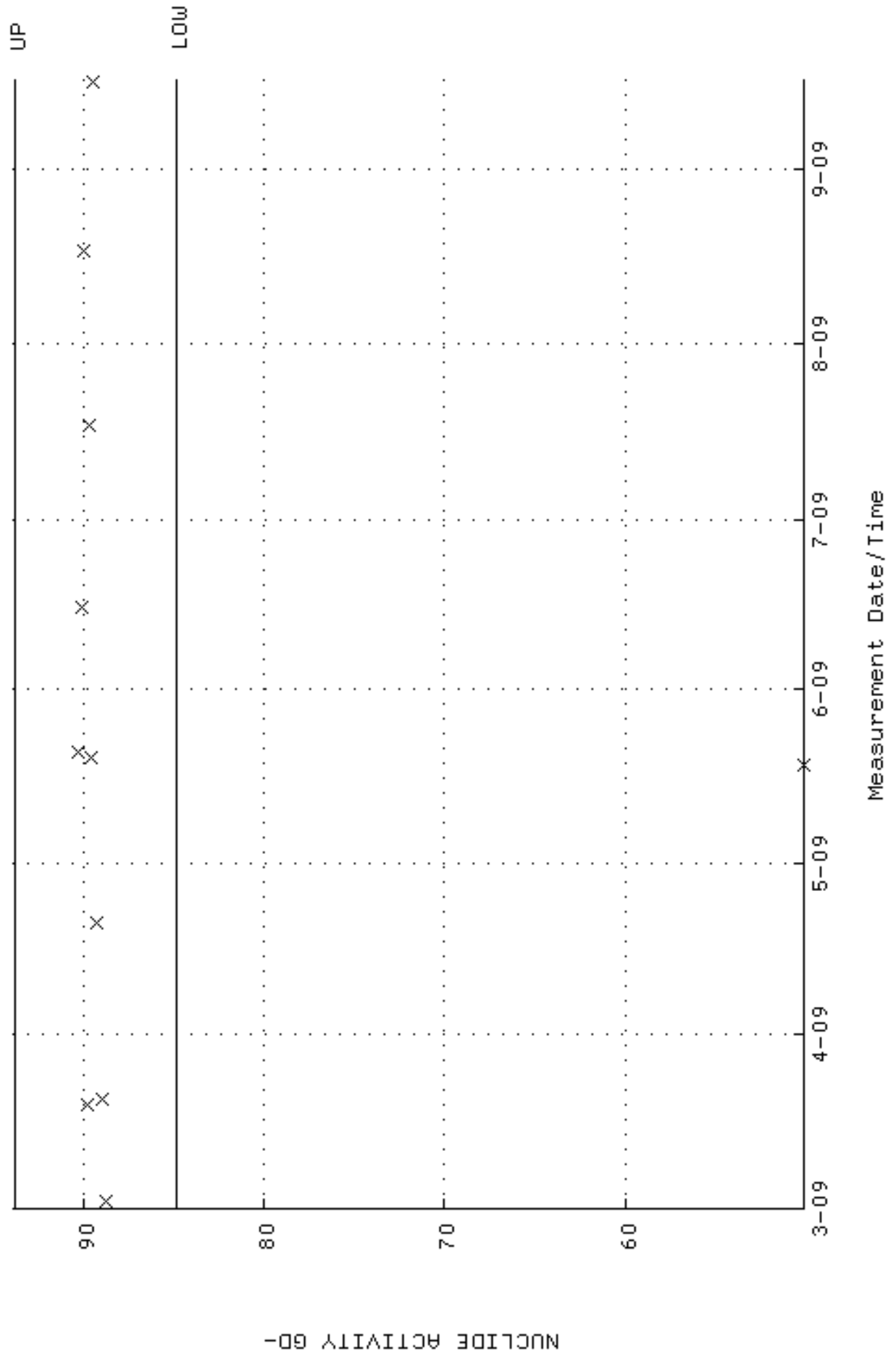
QA filename : DKA100:[ENV\_ALPHA.QA.B]B145.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:20:01 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



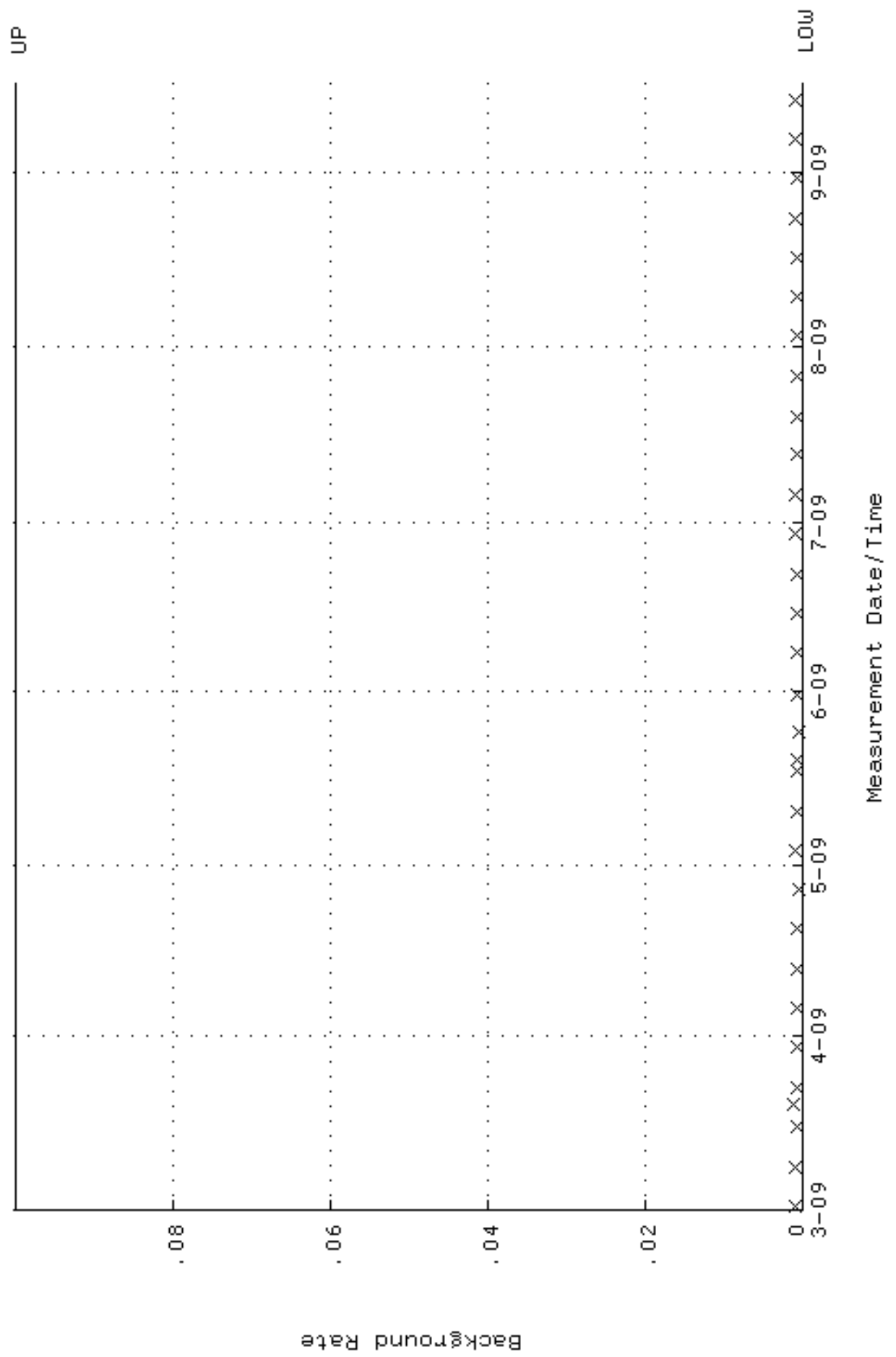
QA filename : DKA100:[ENV\_ALPHA.QA.W]W146.QAF;2  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:10:51 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.241831 through 0.261831



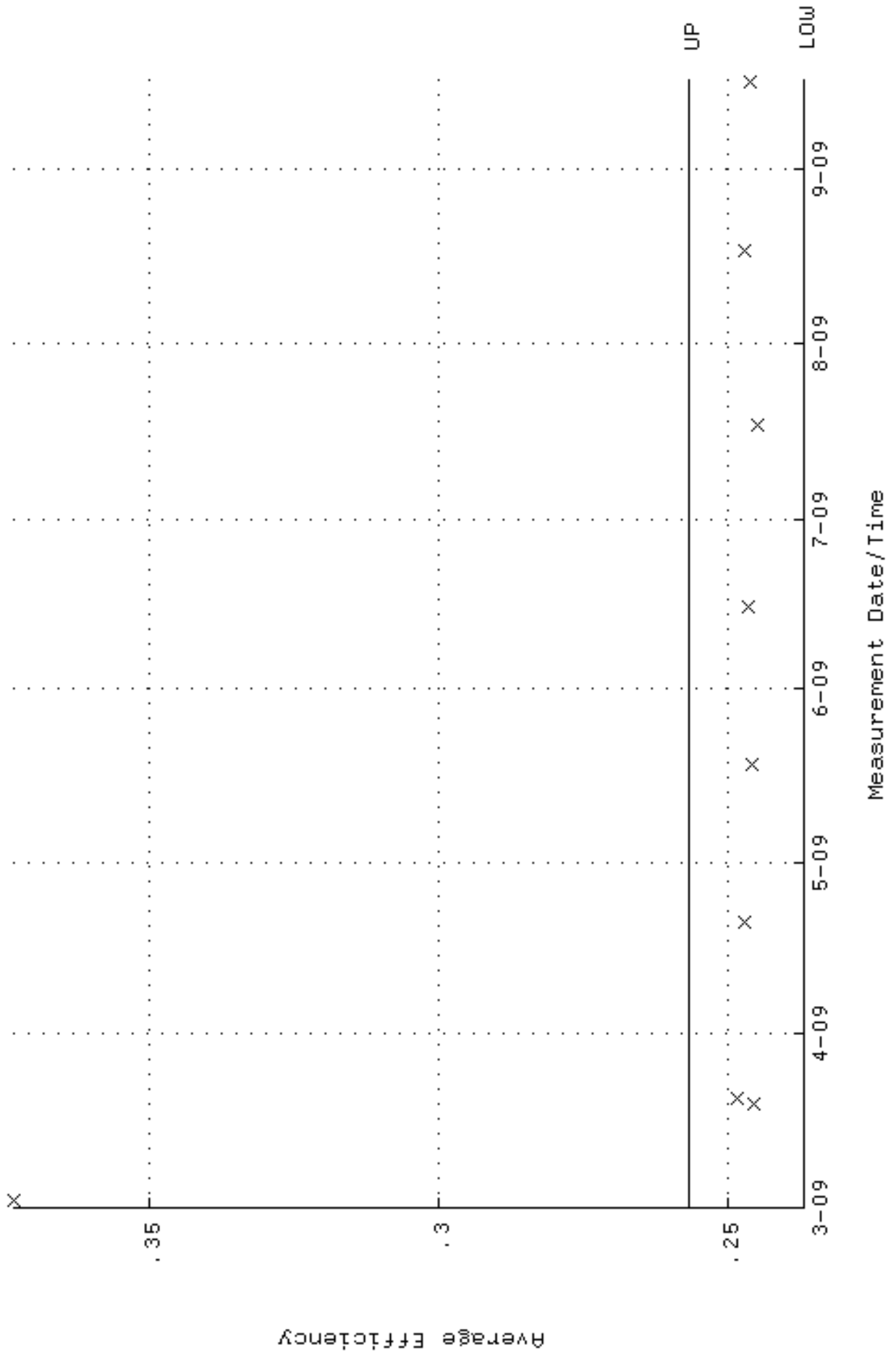
QA filename : DKA100:[ENV\_ALPHA.QA.W]w146.QAF;2  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:10:51 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 84.8578 through 93.7902



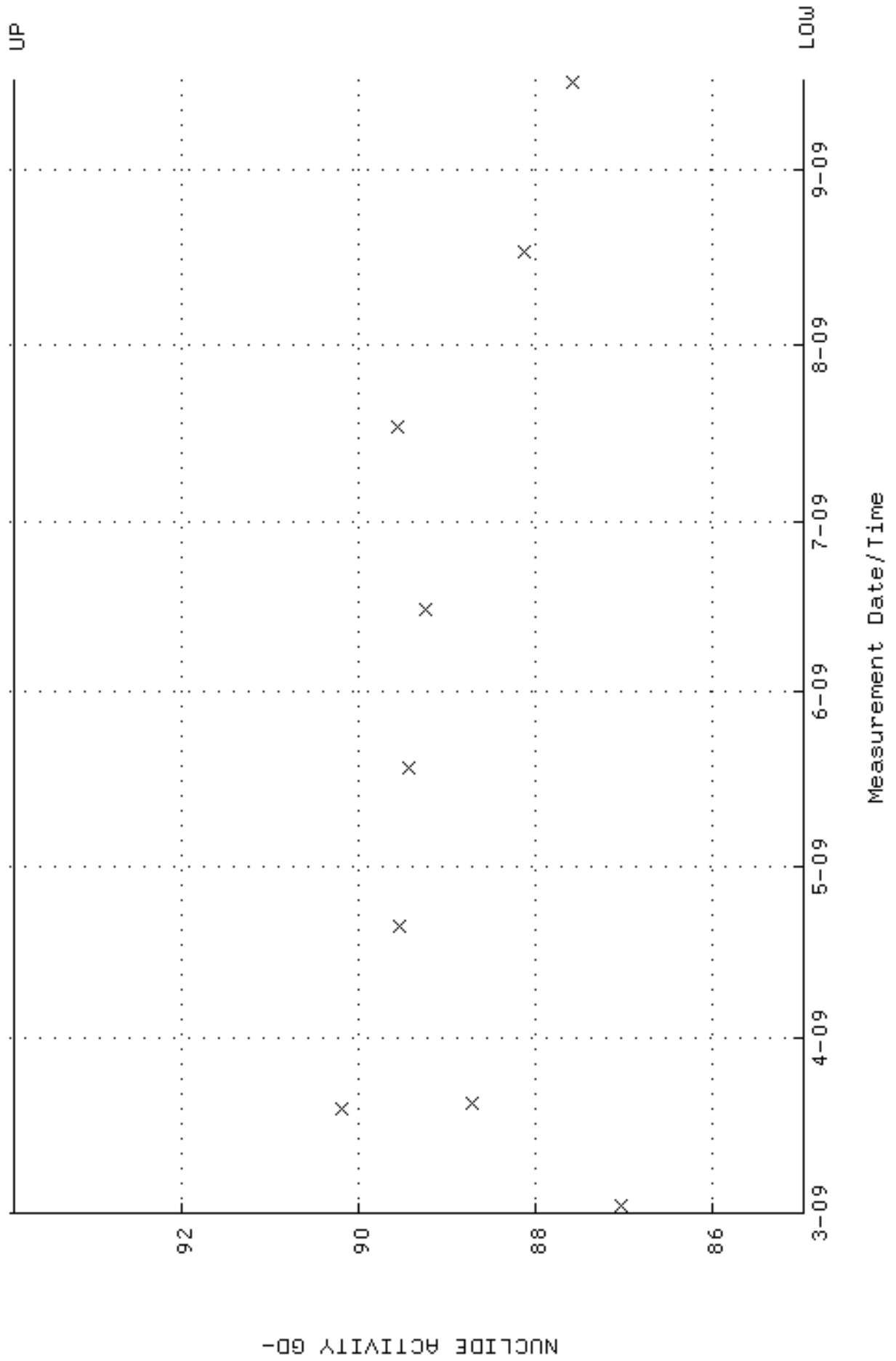
QA filename : DKA100:[ENV\_ALPHA.QA.B]B146.QAF;2  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:20:05 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



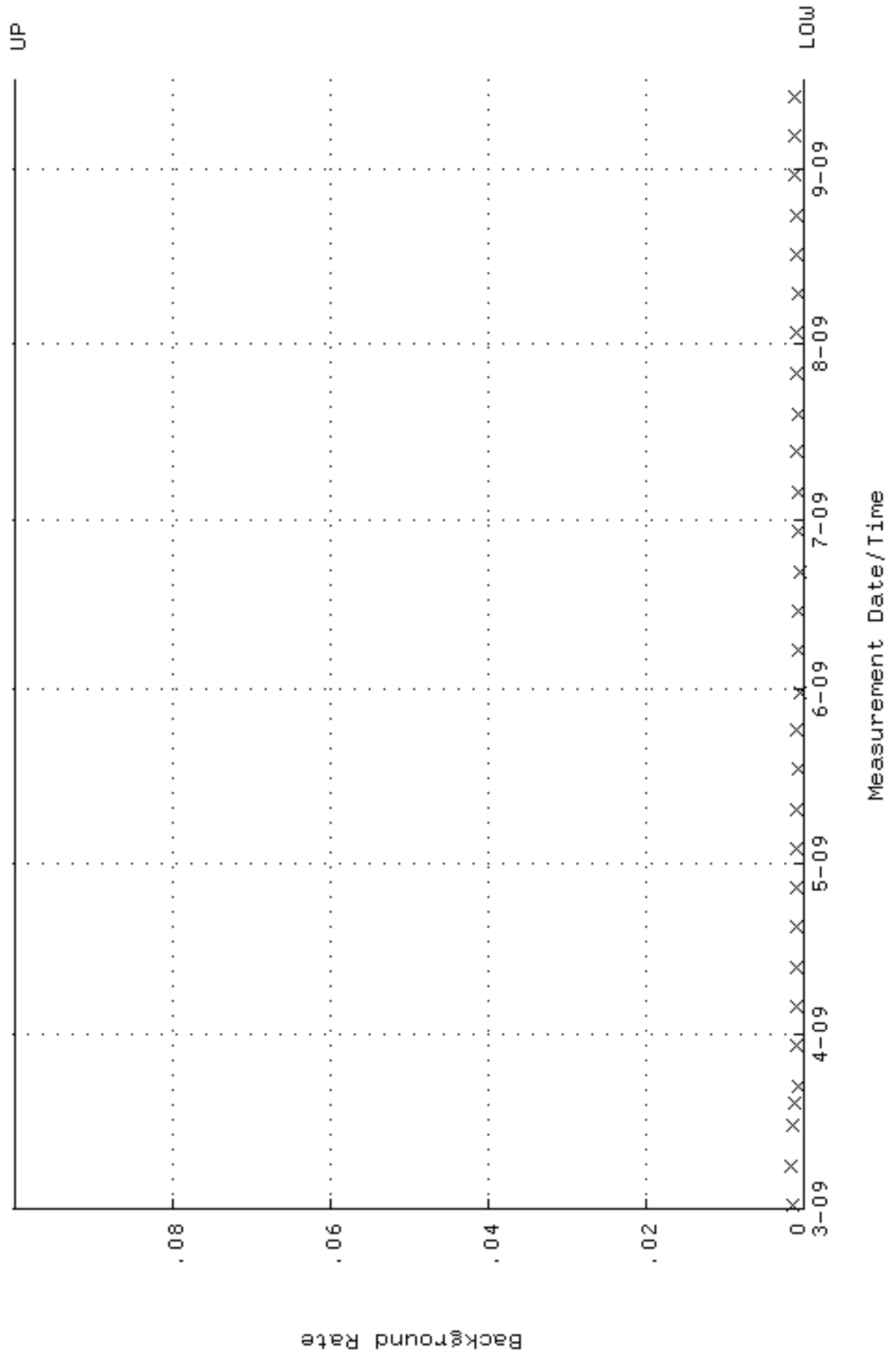
QA filename : DKA100:[ENV\_ALPHA.QA.W]W147.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 2-MAR-2009 11:10:56 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.237046 through 0.257046



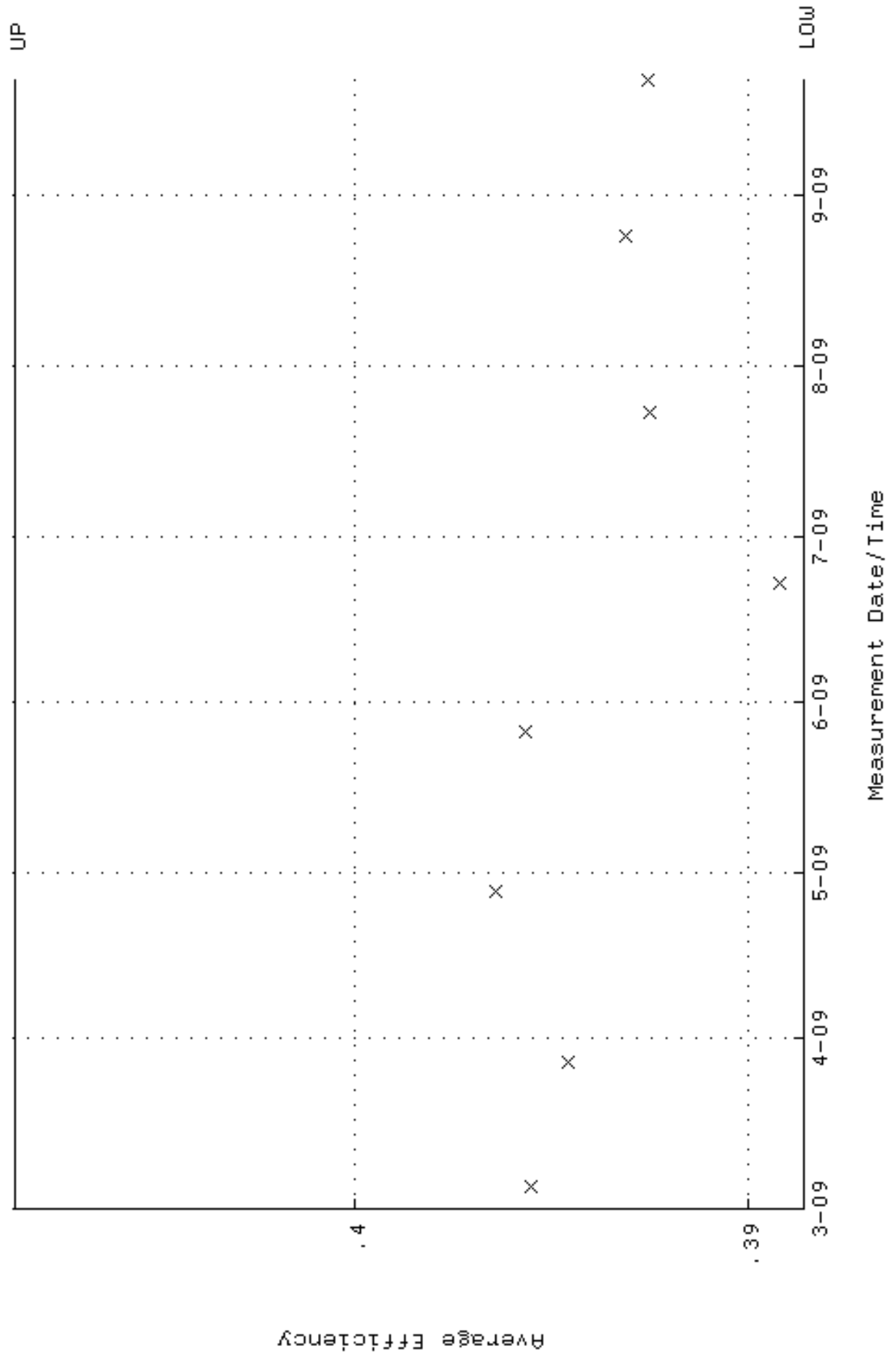
QA filename : DKA100:[ENV\_ALPHA.QA.W]W147.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 2-MAR-2009 11:10:56 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 84.9777 through 93.9227



QA filename : DKA100:[ENV\_ALPHA.QA.B]B147.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:20:09 through 16-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

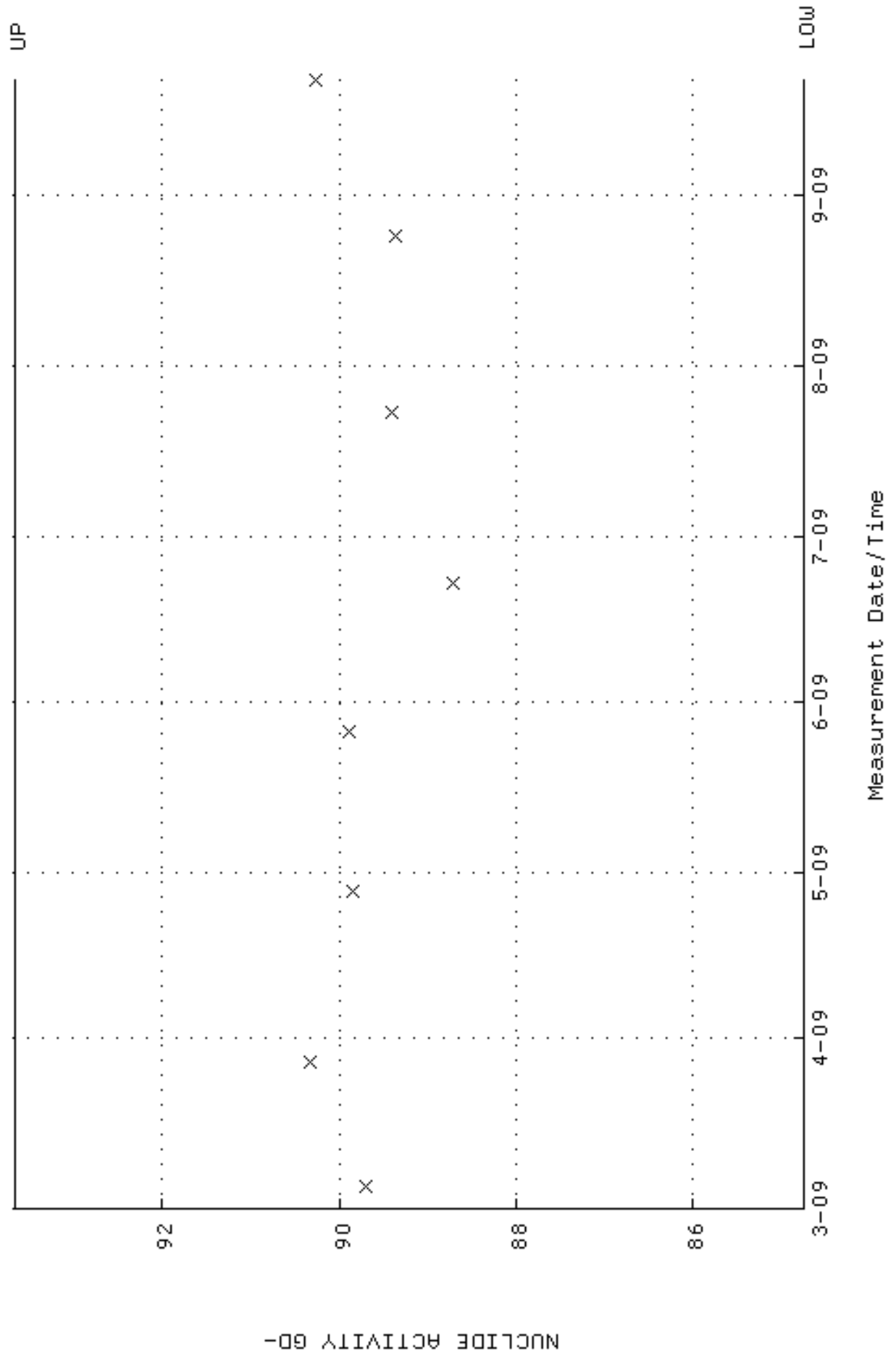


QA filename : DKA100:[ENV\_ALPHA.QA.W]W166.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 4-MAR-2009 22:37:58 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.388604 through 0.408604

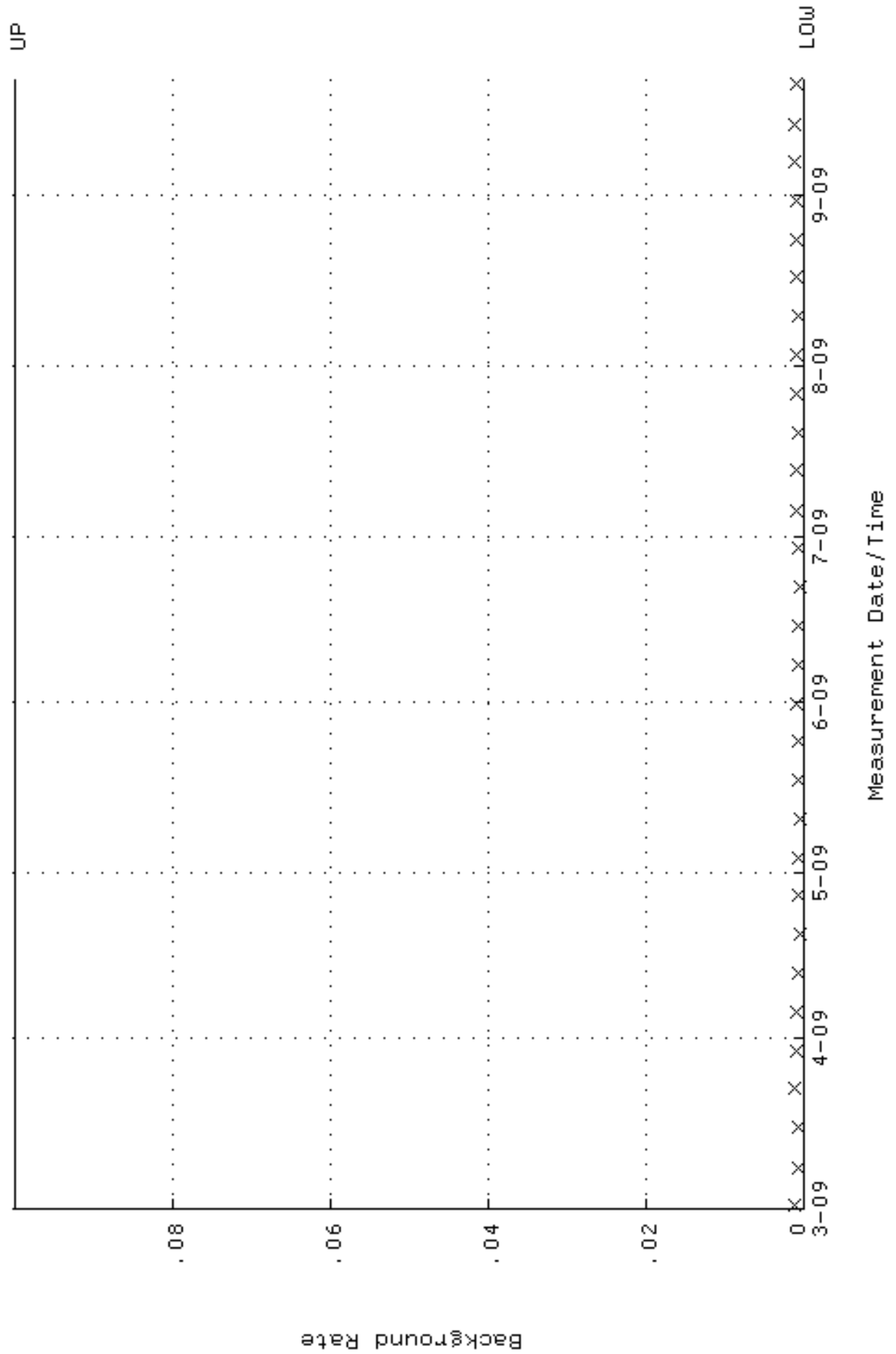




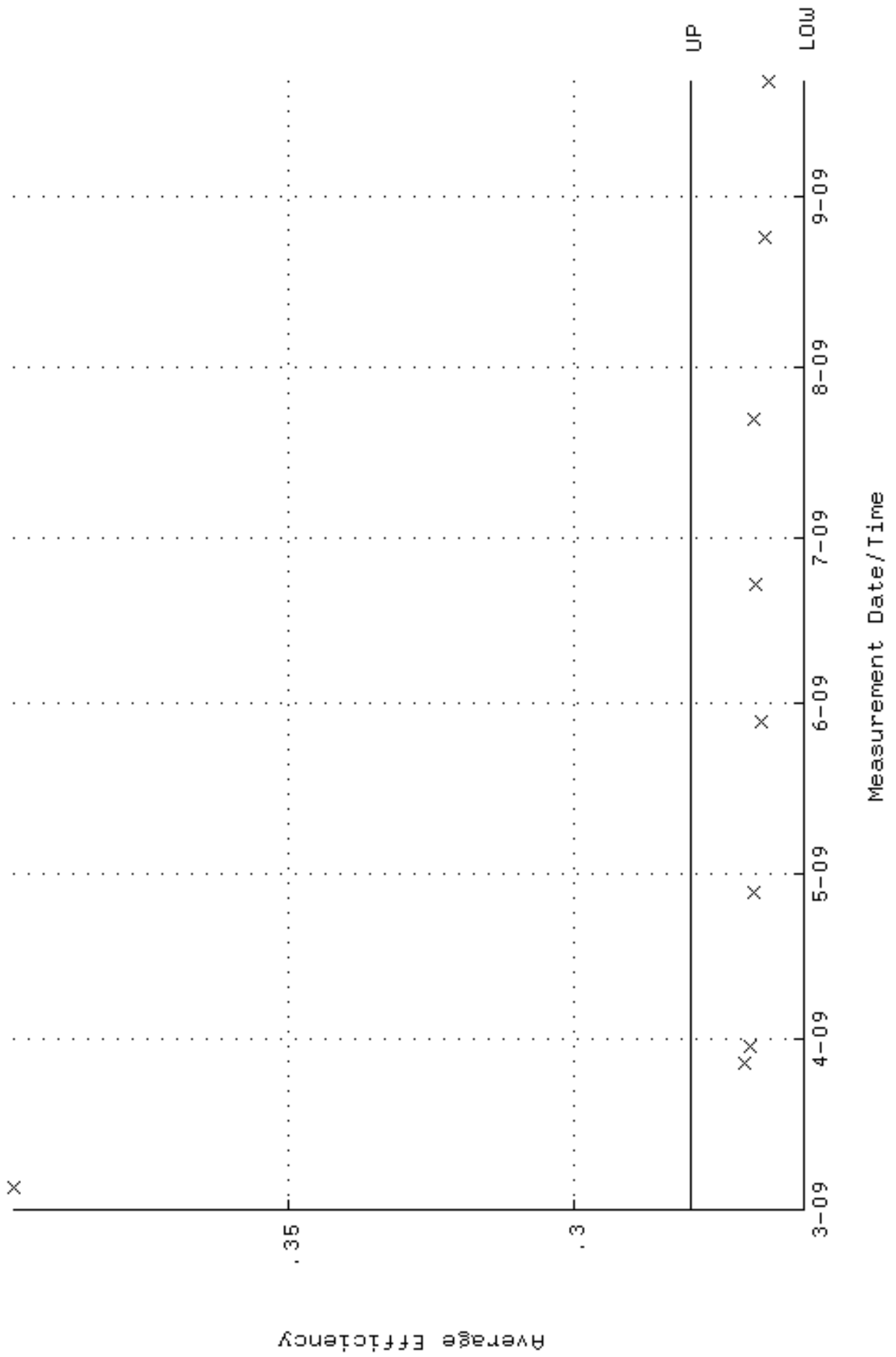
QA filename : DKA100:[ENV\_ALPHA.QA.W]w166.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 4-MAR-2009 22:37:58 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 84.7448 through 93.6654



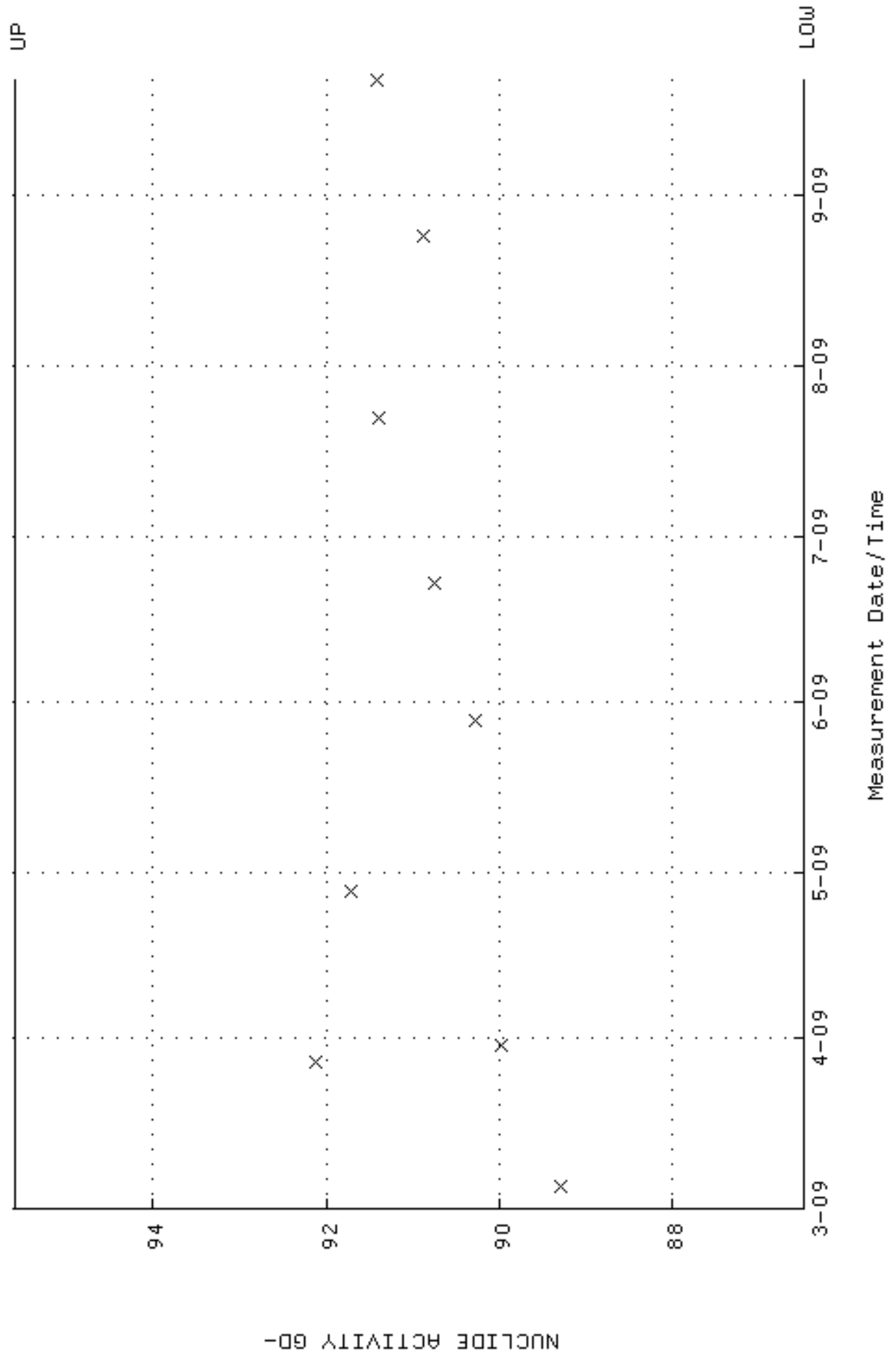
QA filename : DKA100:[ENV\_ALPHA.QA.B]B166.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:21:21 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



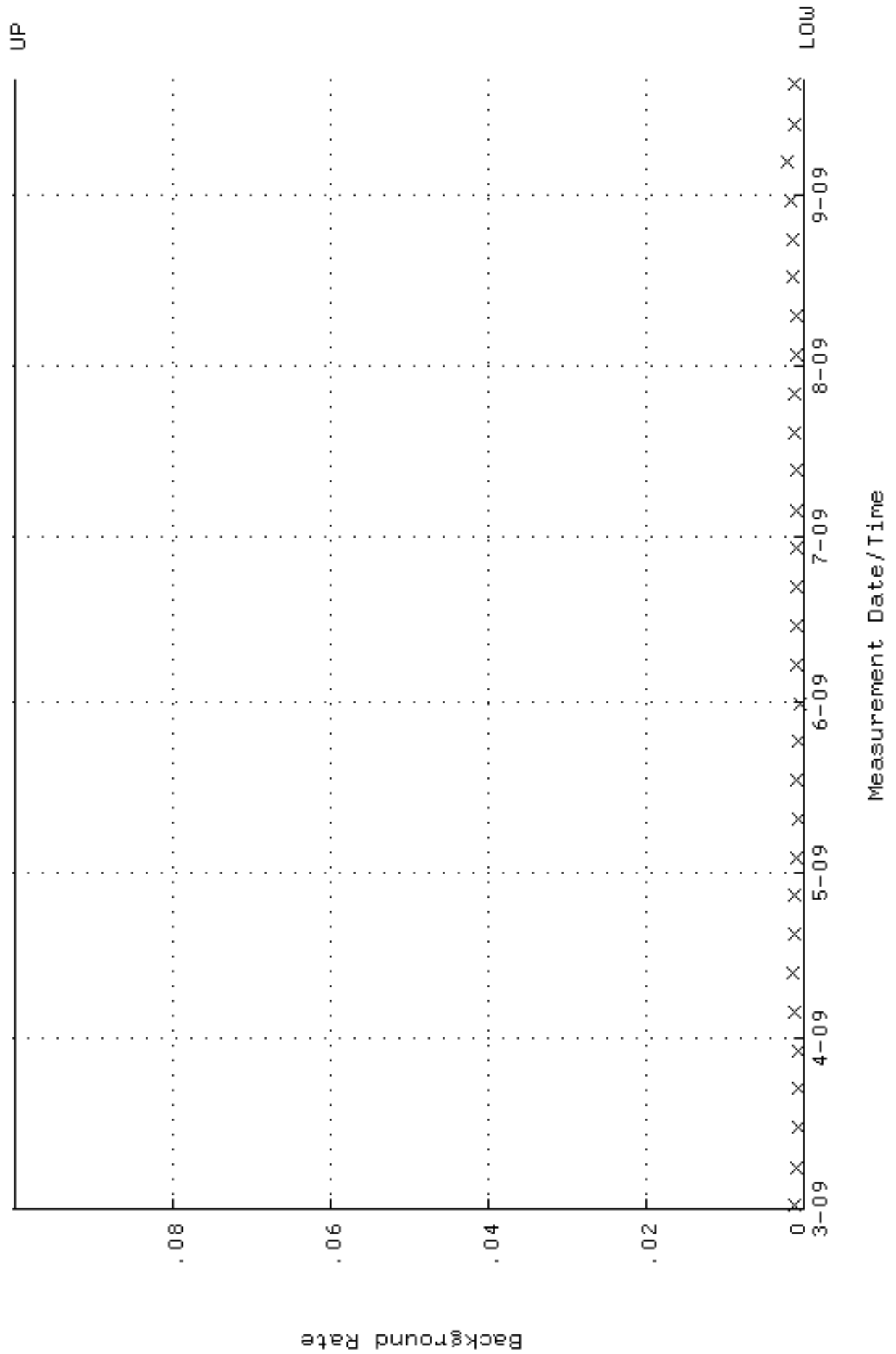
QA filename : DKA100:[ENV\_ALPHA.QA.W]W177.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 4-MAR-2009 22:38:46 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.259935 through 0.279935



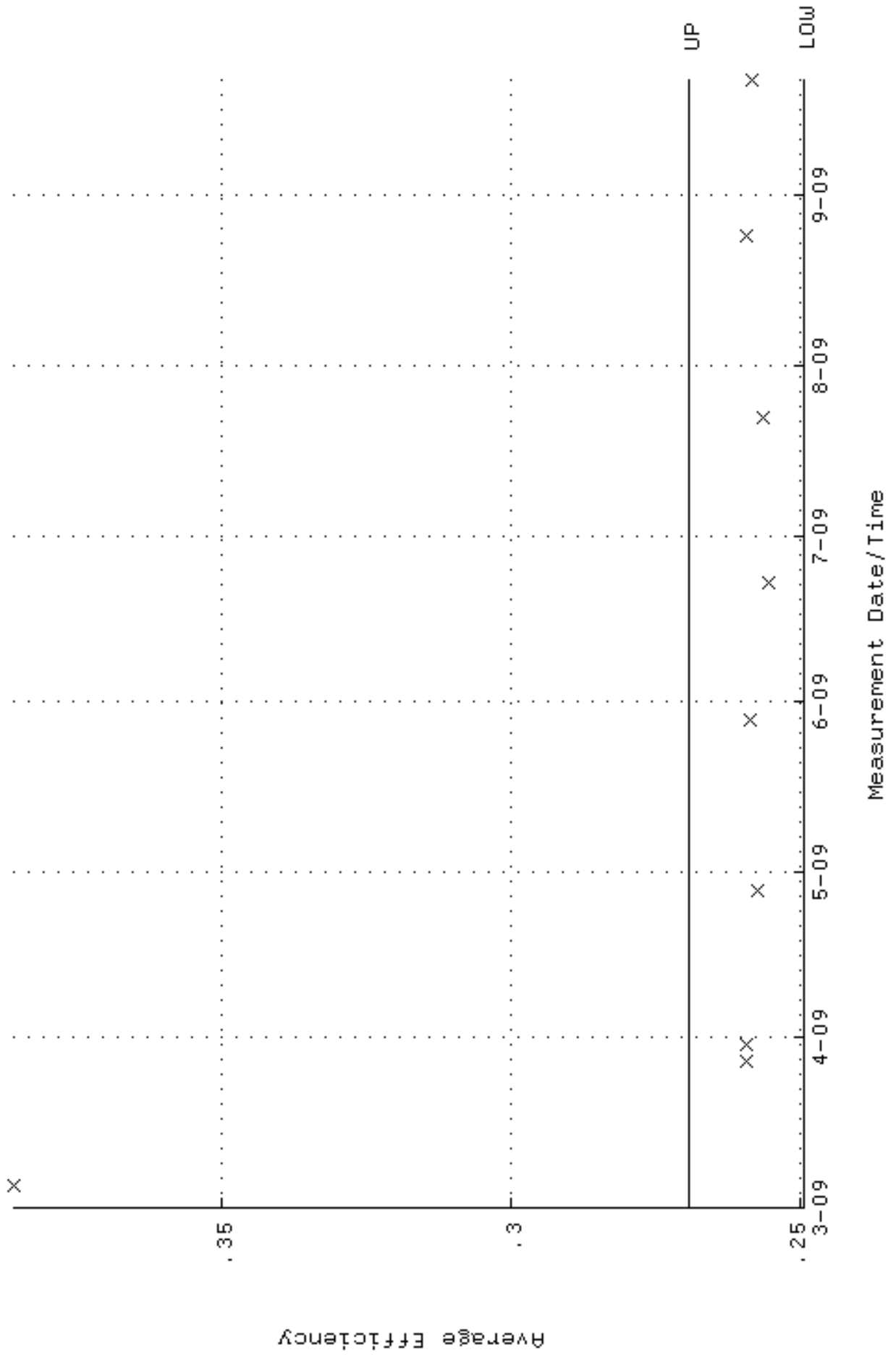
QA filename : DKA100:[ENV\_ALPHA.QA.W]W177.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 4-MAR-2009 22:38:46 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 86.4857 through 95.5895



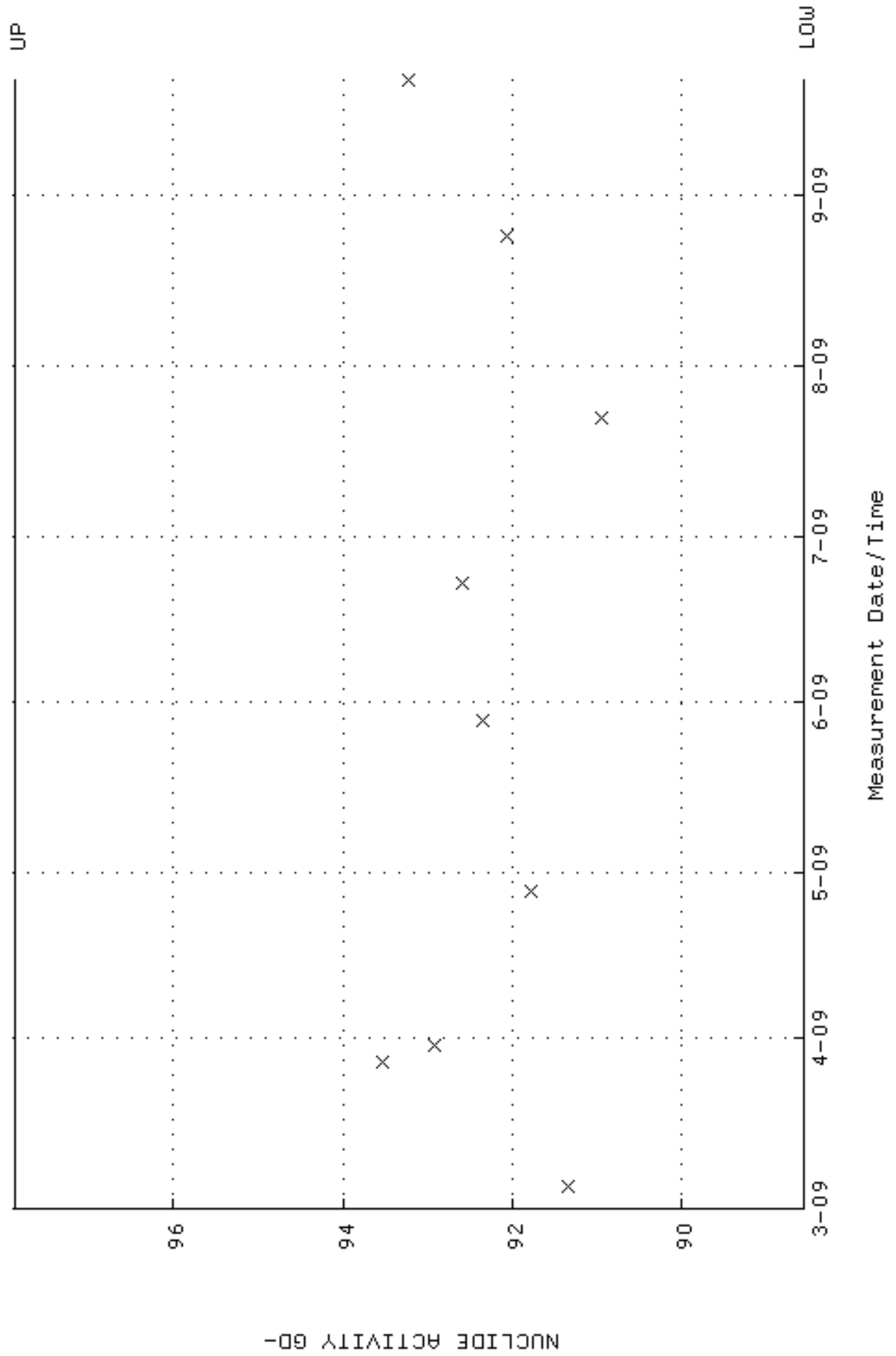
QA filename : DKA100:[ENV\_ALPHA.QA.B]B177.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:22:02 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



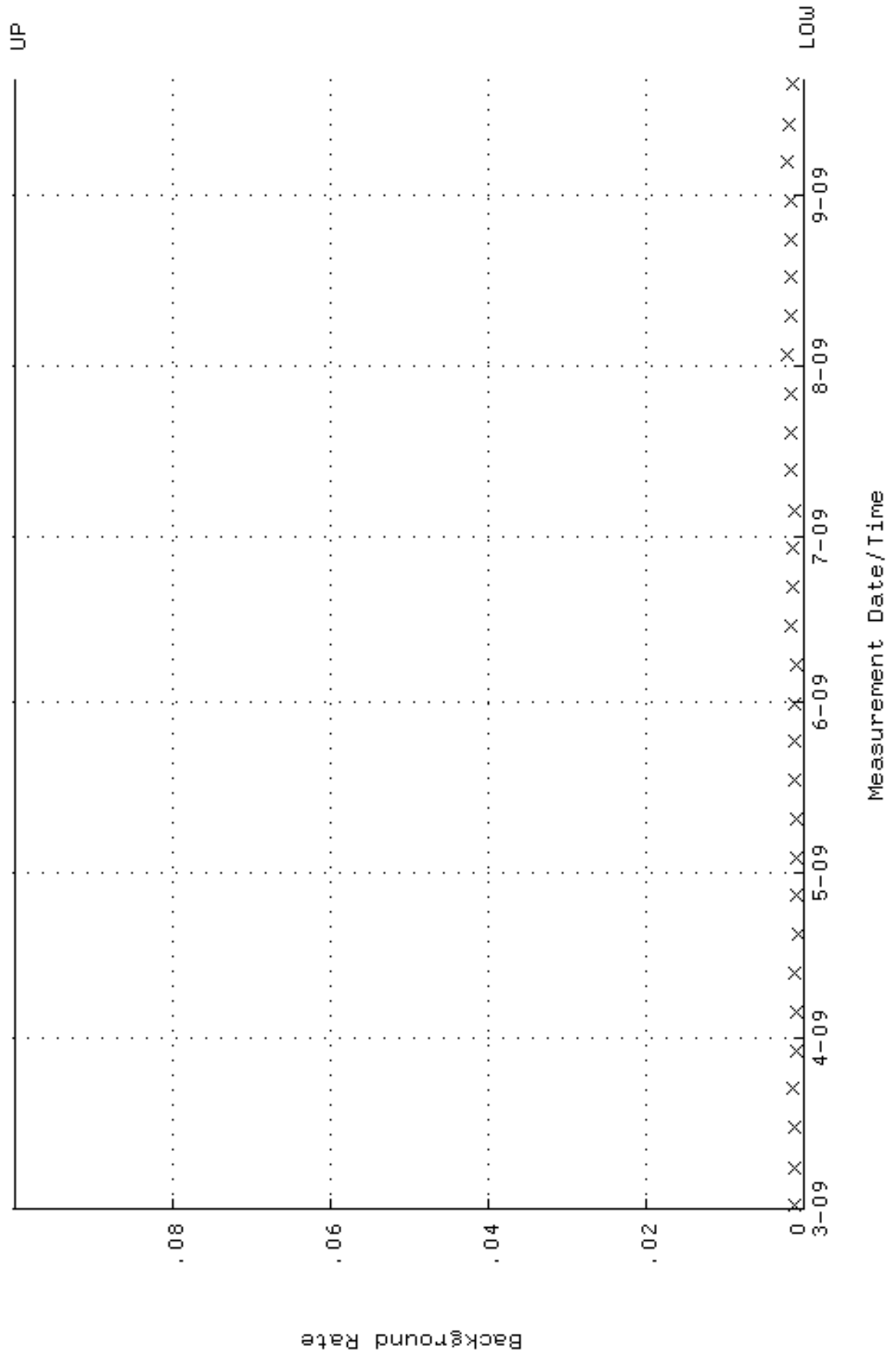
QA filename : DKA100:[ENV\_ALPHA.QA.W]W178.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 4-MAR-2009 22:38:50 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.249490 through 0.269490



QA filename : DKA100:[ENV\_ALPHA.QA.W]W178.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 4-MAR-2009 22:38:50 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 88.5525 through 97.8739

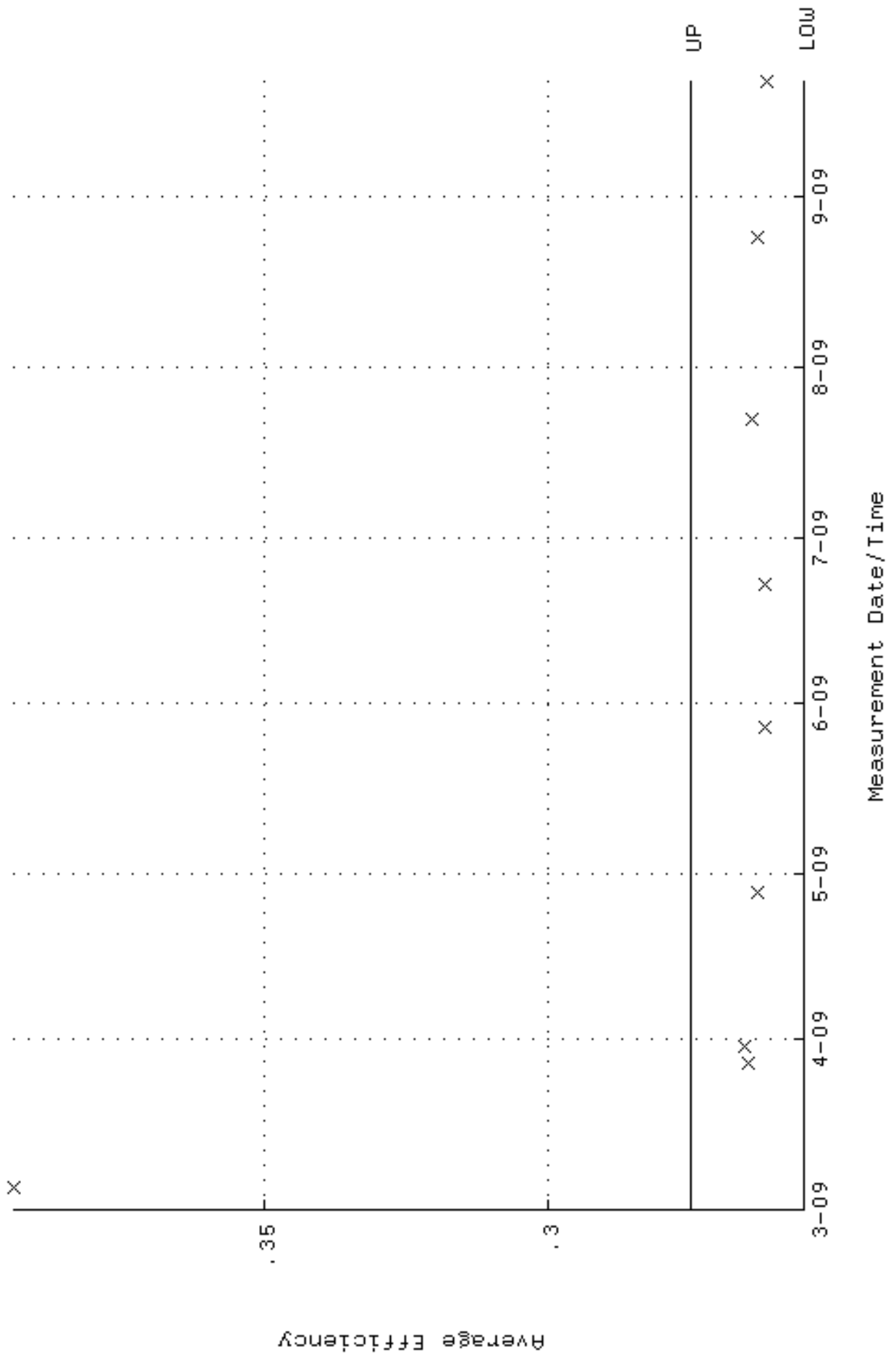


QA filename : DKA100:[ENV\_ALPHA.QA.B]B178.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:22:05 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000

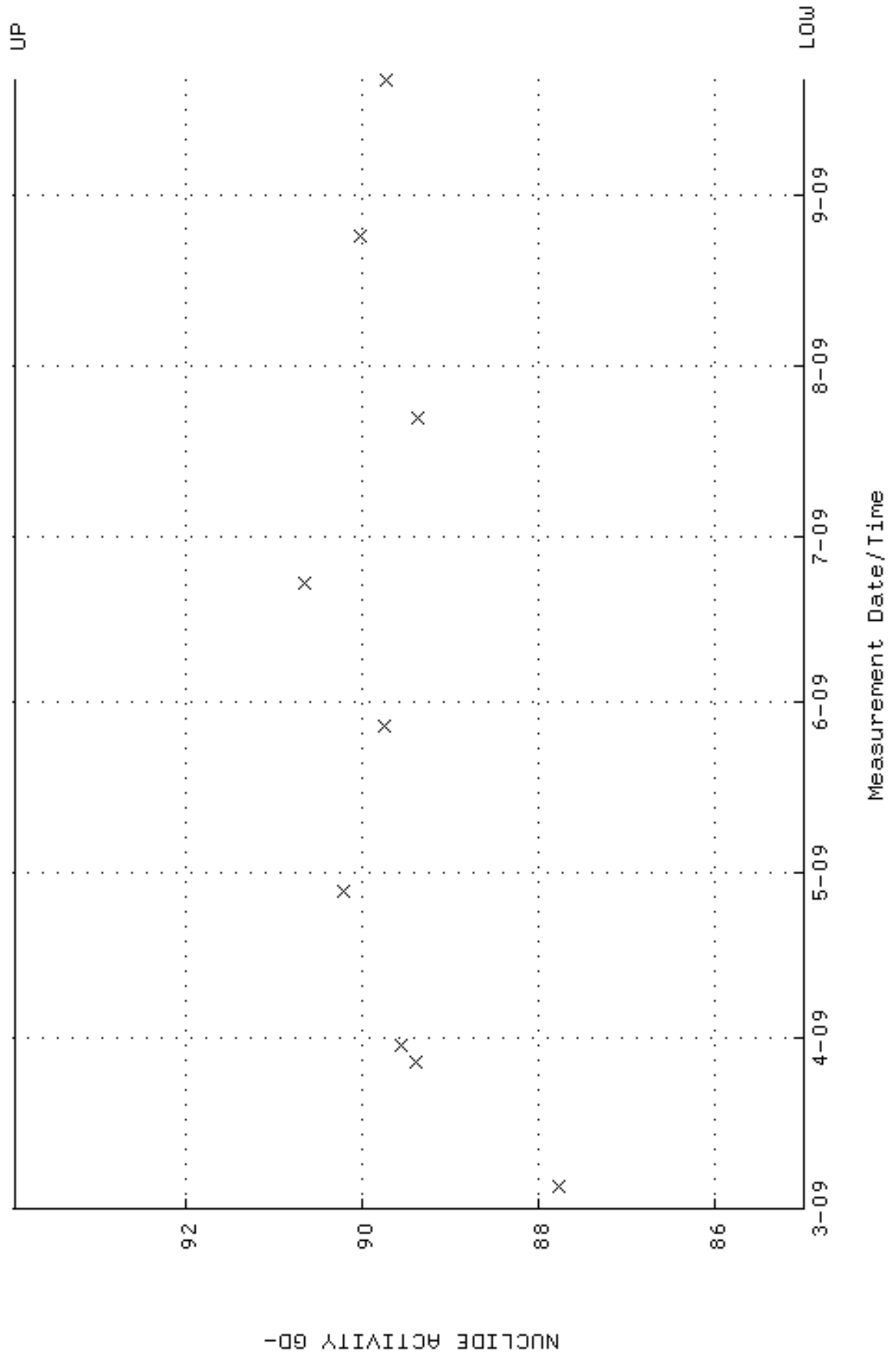




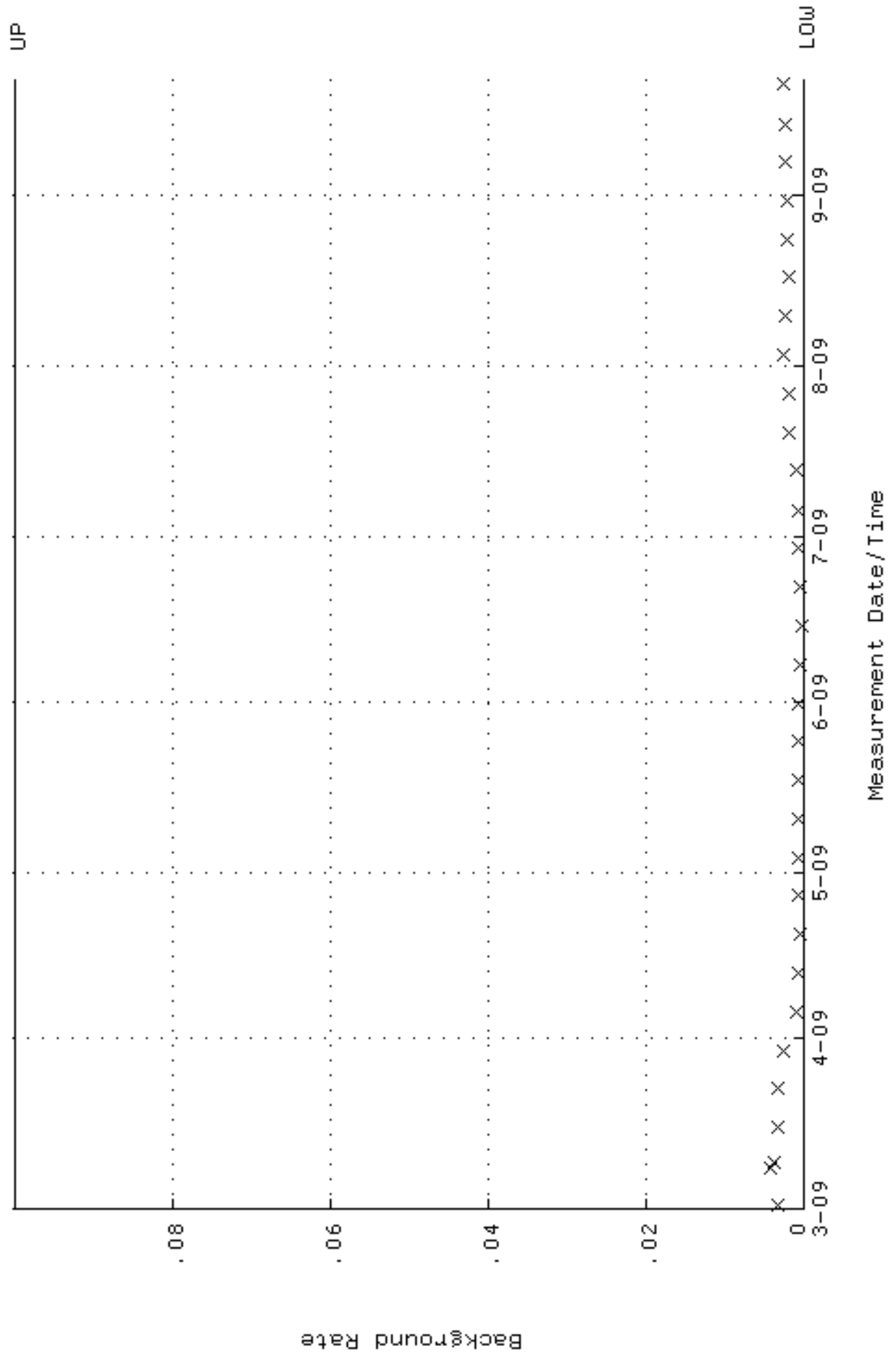
QA filename : DKA100:[ENV\_ALPHA.QA.W]W193.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 4-MAR-2009 22:39:50 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.254861 through 0.274861



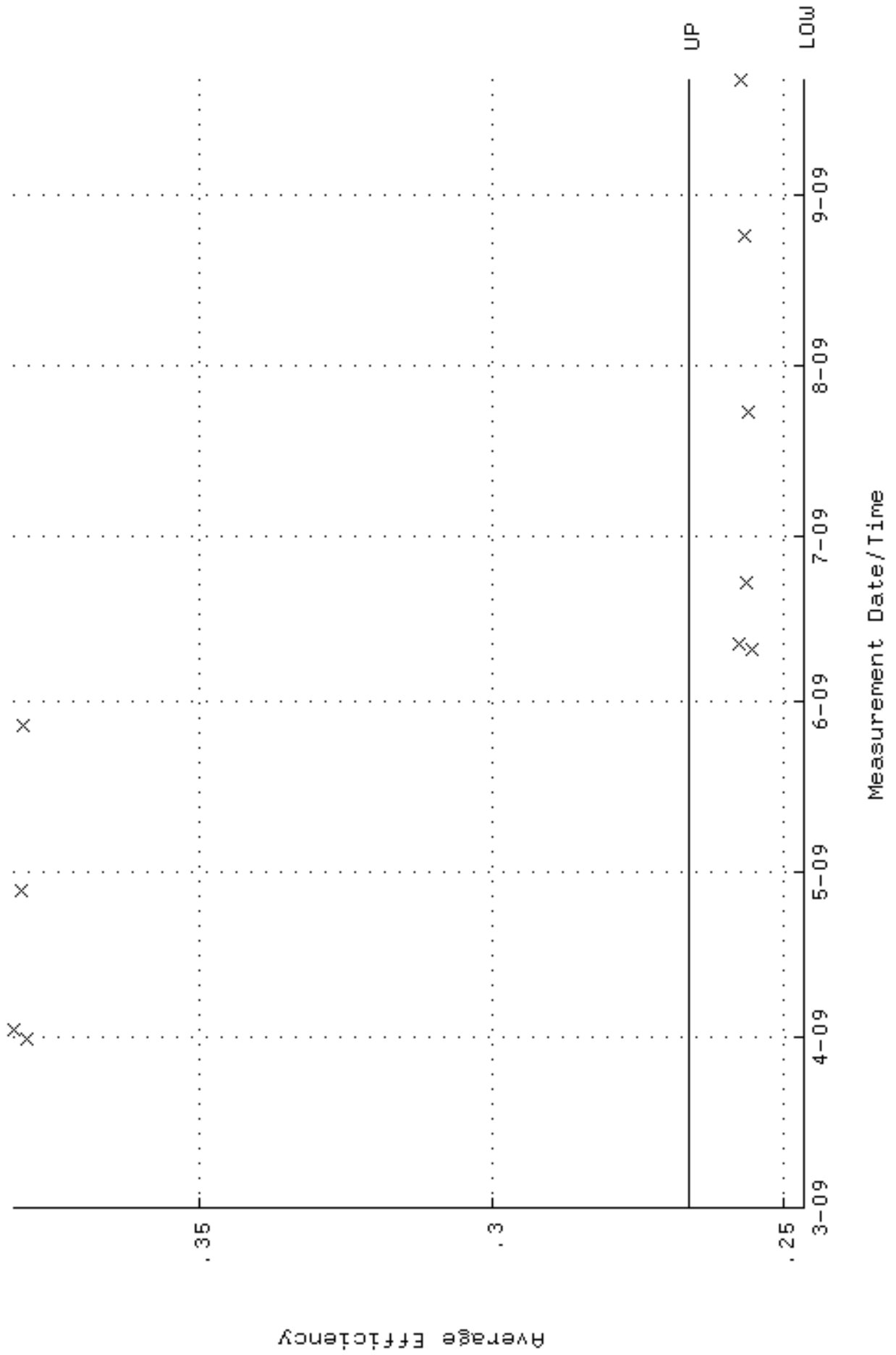
QA filename : DKA100:[ENV\_ALPHA.QA.W]W193.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 4-MAR-2009 22:39:50 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 84.9815 through 93.9269



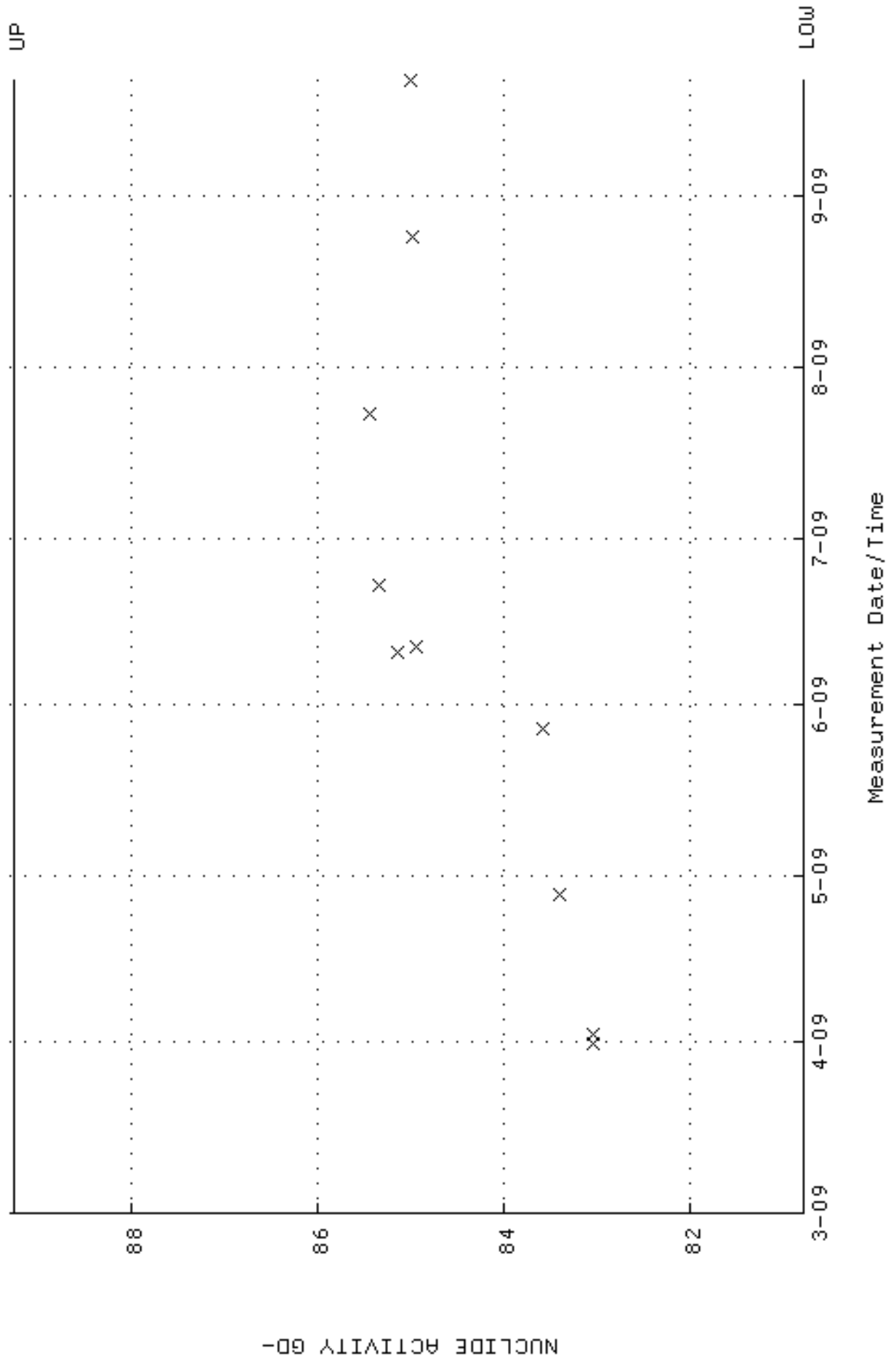
QA filename : DKA100:[ENV\_ALPHA.QA.B]B193.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-MAR-2009 17:23:01 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



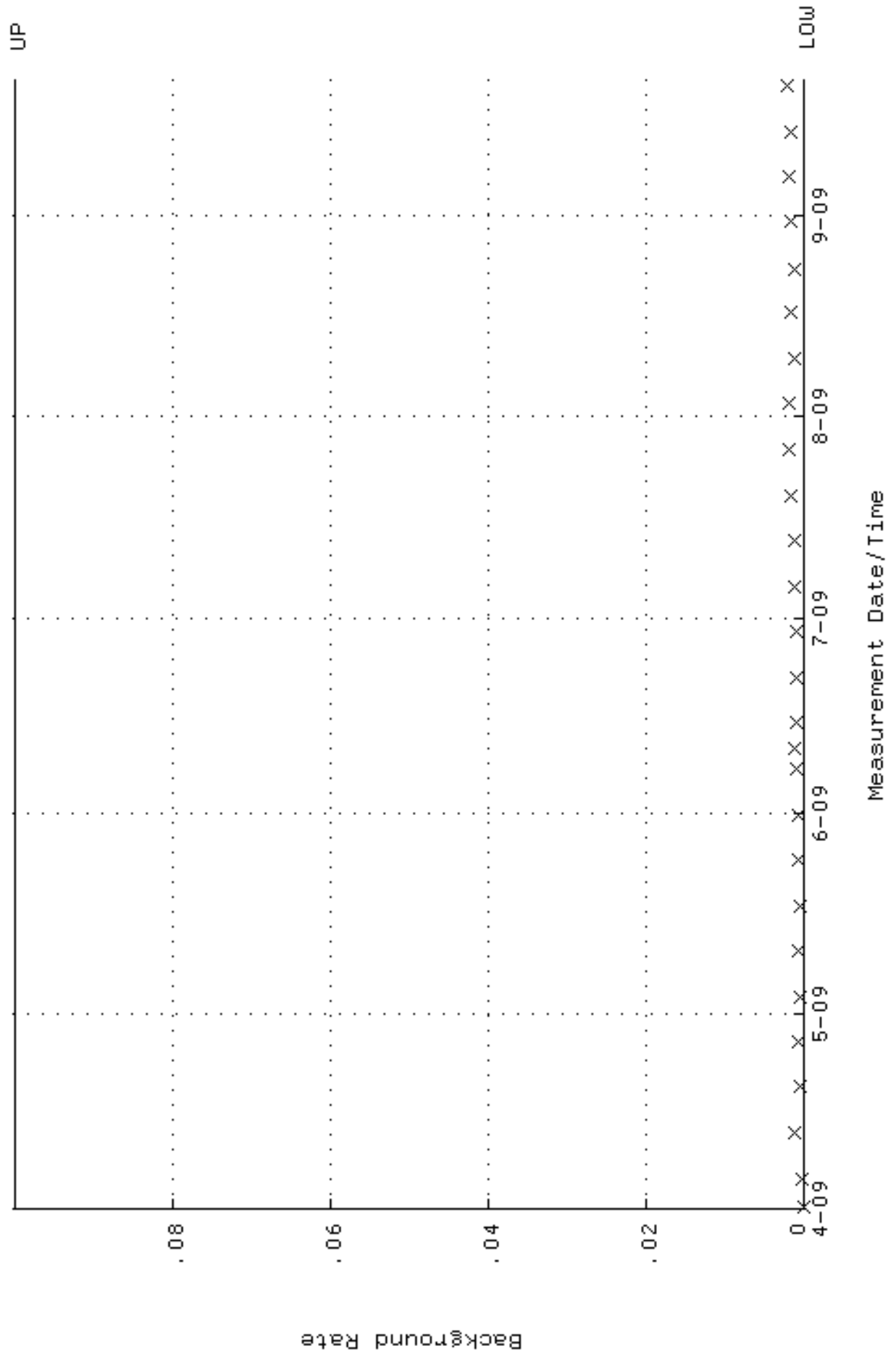
QA filename : DKA100:[ENV\_ALPHA.QA.W]W207.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:38 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.246432 through 0.266432



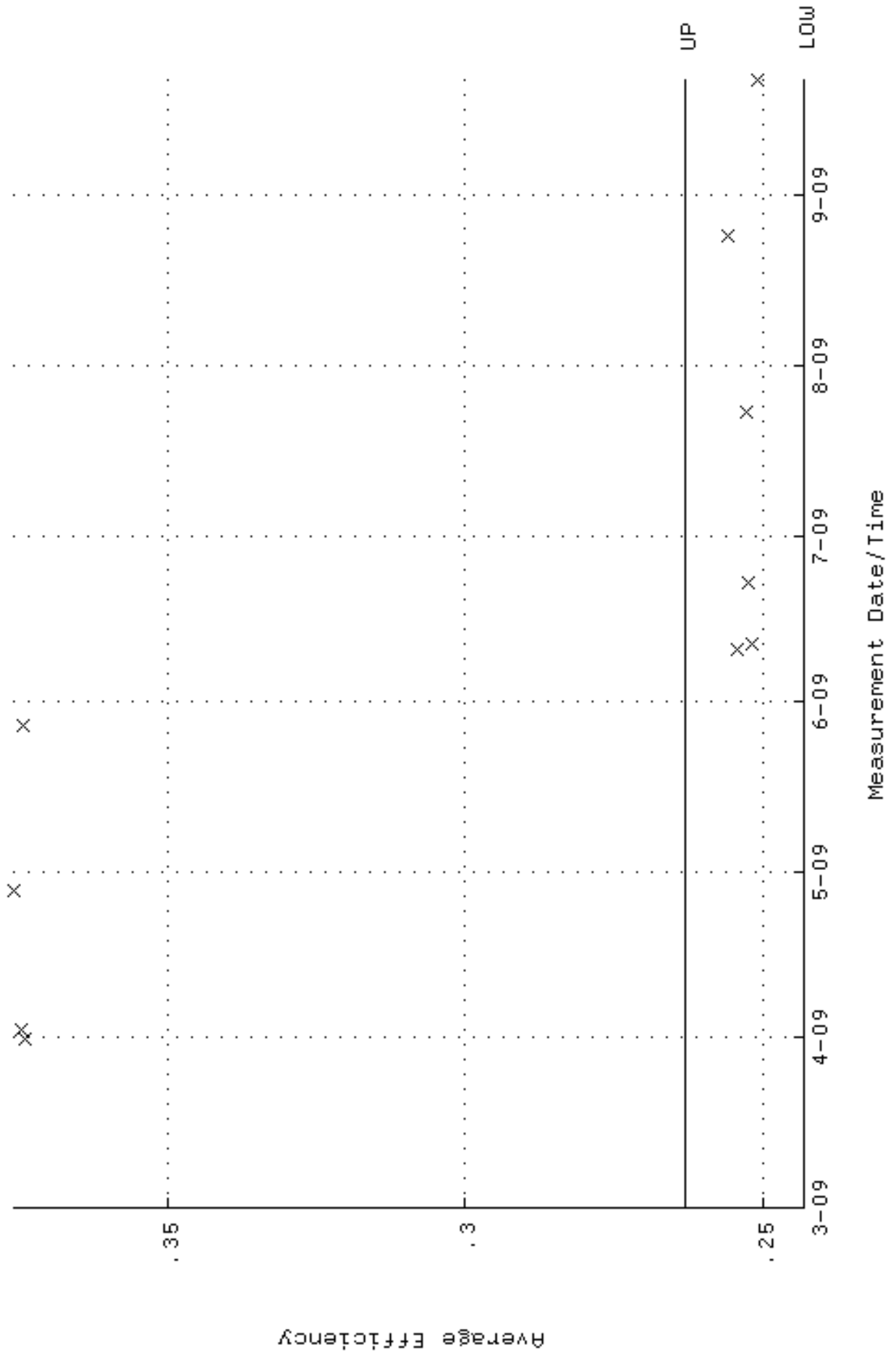
QA filename : DKA100:[ENV\_ALPHA.QA.W]w207.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:38 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 80.7759 through 89.2787



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 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



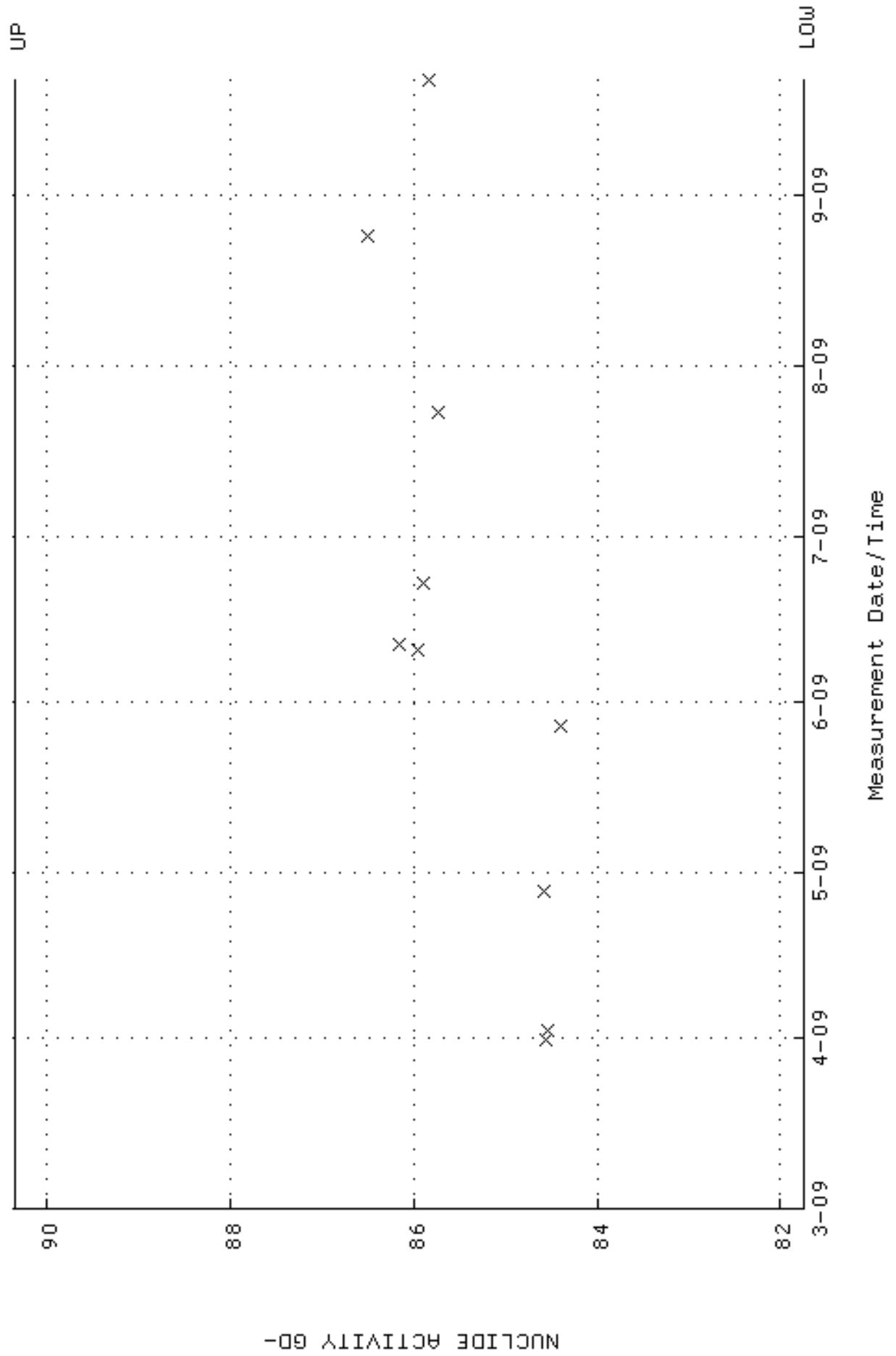
QA filename : DKA100:[ENV\_ALPHA.QA.W]W208.QAF;1  
 Parameter Name : AVRGEFF (Average Efficiency)  
 Start/End Dates : 31-MAR-2009 15:10:40 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.243128 through 0.263128



Average Efficiency

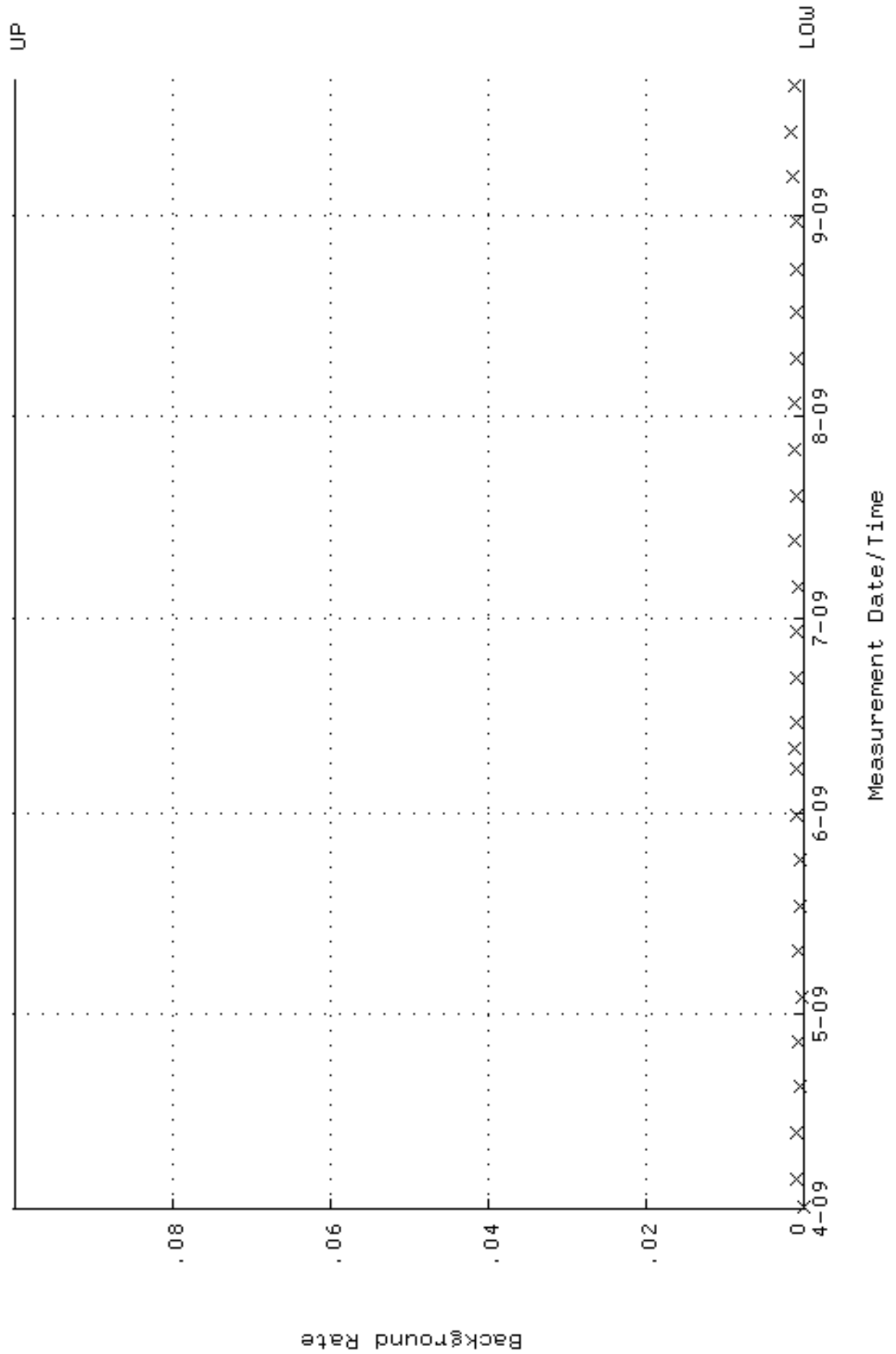
Measurement Date/Time

QA filename : DKA100:[ENV\_ALPHA.QA.W]w208.QAF;1  
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)  
 Start/End Dates : 31-MAR-2009 15:10:40 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 81.7467 through 90.3517





QA filename : DKA100:[ENV\_ALPHA.QA.B]B208.QAF;1  
 Parameter Name : BACKRATE (Background Rate)  
 Start/End Dates : 1-APR-2009 08:03:15 through 21-SEP-2009 12:00:00  
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



# RUNLOGS

# Instrument Run Log

Instrument Type: LUCAS CELL DETECTOR

Batch ID: 900913

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
235816001	SAMPLE	KSD1	LUCAS1	15-SEP-09 07:50	DONE	Lucas Cell	31-AUG-09 00:00
235816003	SAMPLE	KSD1	LUCAS2	15-SEP-09 07:50	DONE	Lucas Cell	19-DEC-08 00:00
235816013	SAMPLE	KSD1	LUCAS5	15-SEP-09 07:50	DONE	Lucas Cell	25-MAR-09 00:00
236435001	SAMPLE	KSD1	LUCAS1	15-SEP-09 08:30	DONE	Lucas Cell	31-AUG-09 00:00
236534011	SAMPLE	KSD1	LUCAS2	15-SEP-09 08:30	DONE	Lucas Cell	19-DEC-08 00:00
235816005	SAMPLE	KSD1	LUCAS3	15-SEP-09 08:30	DONE	Lucas Cell	04-FEB-09 00:00
1201919504	MS	KSD1	LUCAS5	15-SEP-09 08:30	DONE	Lucas Cell	25-MAR-09 00:00
236238008	SAMPLE	KSD1	LUCAS6	15-SEP-09 08:30	DONE	Lucas Cell	04-AUG-09 00:00
1201919502	MB	KSD1	LUCAS3	15-SEP-09 09:10	DONE	Lucas Cell	04-FEB-09 00:00
235816007	SAMPLE	KSD1	LUCAS4	15-SEP-09 11:40	DONE	Lucas Cell	02-MAR-09 00:00
1201919503	DUP	KSD1	LUCAS4	15-SEP-09 12:55	DONE	Lucas Cell	02-MAR-09 00:00
1201919505	LCS	KSD1	LUCAS6	15-SEP-09 12:55	DONE	Lucas Cell	04-AUG-09 00:00

# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 901446

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
235860015	SAMPLE	CXM2	1039	16-SEP-09 17:56	DONE		
236077013	SAMPLE	CXM2	1040	16-SEP-09 17:56	DONE		
236077019	SAMPLE	CXM2	1041	16-SEP-09 17:56	DONE		
236077021	SAMPLE	CXM2	1042	16-SEP-09 17:56	DONE		
236238008	SAMPLE	CXM2	1043	16-SEP-09 17:56	DONE		
236534011	SAMPLE	CXM2	1044	16-SEP-09 17:56	DUSE		
1201920746	MB	CXM2	1045	16-SEP-09 17:56	DONE		
1201920747	LCS	CXM2	1046	16-SEP-09 17:56	DONE		
1201920748	LCSD	CXM2	1047	16-SEP-09 17:56	DONE		
236534011	SAMPLE	CXM2	1193	18-SEP-09 19:36	DONE		

# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 901448

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
236077013	SAMPLE	CXM2	1125	17-SEP-09 19:57	DONE		
236077019	SAMPLE	CXM2	1154	17-SEP-09 19:57	DONE		
236077021	SAMPLE	CXM2	1161	17-SEP-09 19:57	DONE		
236238008	SAMPLE	CXM2	1162	17-SEP-09 19:57	DONE		
236534011	SAMPLE	CXM2	1166	17-SEP-09 19:57	DONE		
1201920750	LCS	CXM2	1013	17-SEP-09 20:03	DONE		
235860015	SAMPLE	CXM2	1014	17-SEP-09 20:03	DONE		
1201920751	LCSD	CXM2	1016	17-SEP-09 20:03	DONE		
1201920749	MB	CXM2	1177	18-SEP-09 08:01	DUSE		
1201920749	MB	CXM2	1121	18-SEP-09 19:36	DONE		

# Instrument Run Log

Instrument Type: GFPC

Batch ID: 902602

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
236077013	SAMPLE	MXS2	PIC5A	18-SEP-09 18:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236077019	SAMPLE	MXS2	PIC5C	18-SEP-09 18:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236077021	SAMPLE	MXS2	PIC5D	18-SEP-09 18:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236238008	SAMPLE	MXS2	PIC6A	18-SEP-09 18:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534011	SAMPLE	MXS2	PIC6B	18-SEP-09 18:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236699016	SAMPLE	MXS2	PIC7A	18-SEP-09 18:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236817014	SAMPLE	MXS2	PIC7B	18-SEP-09 18:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236934020	SAMPLE	MXS2	PIC7C	18-SEP-09 18:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201923559	MB	MXS2	PIC7D	18-SEP-09 18:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201923560	LCS	MXS2	PIC8A	18-SEP-09 18:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201923561	LCSD	MXS2	PIC8B	18-SEP-09 18:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00

# Instrument Run Log

Instrument Type: GFPC

Batch ID: 903231

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
236534001	SAMPLE	JXC5	PIC1A	05-OCT-09 08:14	DUSE	CeF on 25mm Filter	02-JUL-09 00:00
236534002	SAMPLE	JXC5	PIC1B	05-OCT-09 08:14	DUSE	CeF on 25mm Filter	02-JUL-09 00:00
236534003	SAMPLE	JXC5	PIC1C	05-OCT-09 08:14	DUSE	CeF on 25mm Filter	02-JUL-09 00:00
236534005	SAMPLE	JXC5	PIC2A	05-OCT-09 08:14	DUSE	CeF on 25mm Filter	02-JUL-09 00:00
236534017	SAMPLE	JXC5	PIC6D	05-OCT-09 08:16	DUSE	CeF on 25mm Filter	02-JUL-09 00:00
236534020	SAMPLE	JXC5	PIC8A	05-OCT-09 08:17	DUSE	CeF on 25mm Filter	02-JUL-09 00:00
1201925139	MB	JXC5	PIC8B	05-OCT-09 08:17	DUSE	CeF on 25mm Filter	02-JUL-09 00:00
236534002	SAMPLE	JXC5	PIC1B	06-OCT-09 17:52	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534003	SAMPLE	JXC5	PIC1C	06-OCT-09 17:52	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534008	SAMPLE	JXC5	PIC2D	06-OCT-09 17:52	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534010	SAMPLE	JXC5	PIC3C	06-OCT-09 17:52	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534012	SAMPLE	JXC5	PIC3D	06-OCT-09 17:52	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534014	SAMPLE	JXC5	PIC4C	06-OCT-09 17:52	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534016	SAMPLE	JXC5	PIC5A	06-OCT-09 17:52	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534018	SAMPLE	JXC5	PIC5C	06-OCT-09 17:52	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534019	SAMPLE	JXC5	PIC5D	06-OCT-09 17:52	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534020	SAMPLE	JXC5	PIC6A	06-OCT-09 17:53	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201925139	MB	JXC5	PIC6B	06-OCT-09 17:53	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201925141	MS	JXC5	PIC7A	06-OCT-09 17:53	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201925142	LCS	JXC5	PIC4A	06-OCT-09 19:12	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534015	SAMPLE	JXC5	PIC1D	06-OCT-09 19:12	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201925140	DUP	JXC5	PIC6D	06-OCT-09 20:38	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534001	SAMPLE	JXC5	PIC3A	06-OCT-09 20:38	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534004	SAMPLE	JXC5	PIC3C	06-OCT-09 20:38	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534005	SAMPLE	JXC5	PIC3D	06-OCT-09 20:38	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534006	SAMPLE	JXC5	PIC4A	06-OCT-09 20:39	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534007	SAMPLE	JXC5	PIC4C	06-OCT-09 20:39	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534009	SAMPLE	JXC5	PIC4D	06-OCT-09 20:39	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534013	SAMPLE	JXC5	PIC6A	06-OCT-09 20:39	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236534017	SAMPLE	JXC5	PIC6B	06-OCT-09 20:39	DONE	CeF on 25mm Filter	02-JUL-09 00:00

# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 905065

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
236534001	SAMPLE	JXD2	1207	29-SEP-09 19:37	DONE		
236534002	SAMPLE	JXD2	1208	29-SEP-09 19:37	DONE		
236534003	SAMPLE	JXD2	1025	29-SEP-09 19:43	DONE		
236534004	SAMPLE	JXD2	1026	29-SEP-09 19:43	DONE		
236534005	SAMPLE	JXD2	1027	29-SEP-09 19:43	DONE		
236534006	SAMPLE	JXD2	1028	29-SEP-09 19:43	DUSE		
236534007	SAMPLE	JXD2	1029	29-SEP-09 19:43	DONE		
236534008	SAMPLE	JXD2	1030	29-SEP-09 19:43	DONE		
236534009	SAMPLE	JXD2	1031	29-SEP-09 19:43	DONE		
236534010	SAMPLE	JXD2	1033	29-SEP-09 19:43	DONE		
236534012	SAMPLE	JXD2	1035	29-SEP-09 19:43	DONE		
236534013	SAMPLE	JXD2	1036	29-SEP-09 19:43	DONE		
236534014	SAMPLE	JXD2	1037	29-SEP-09 19:43	DONE		
236534015	SAMPLE	JXD2	1038	29-SEP-09 19:43	DONE		
236534016	SAMPLE	JXD2	1039	29-SEP-09 19:43	DONE		
236534017	SAMPLE	JXD2	1040	29-SEP-09 19:43	DONE		
236534018	SAMPLE	JXD2	1041	29-SEP-09 19:43	DONE		
236534019	SAMPLE	JXD2	1042	29-SEP-09 19:43	DONE		
236534020	SAMPLE	JXD2	1043	29-SEP-09 19:43	DONE		
1201929687	MB	JXD2	1044	29-SEP-09 19:43	DUSE		
1201929688	DUP	JXD2	1045	29-SEP-09 19:43	DONE		
1201929689	MS	JXD2	1046	29-SEP-09 19:43	DONE		
1201929690	LCS	JXD2	1047	29-SEP-09 19:43	DONE		
236534006	SAMPLE	JXD2	1177	30-SEP-09 21:50	DONE		
1201929687	MB	JXD2	1178	30-SEP-09 21:50	DONE		



# Instrument Run Log

Instrument Type: LUCAS CELL DETECTOR

Batch ID: 905684

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
236534001	SAMPLE	KSD1	LUCAS6	05-OCT-09 15:35	DONE	Lucas Cell	04-AUG-09 00:00
236534002	SAMPLE	KSD1	LUCAS7	05-OCT-09 15:35	DONE	Lucas Cell	30-SEP-09 00:00
236534003	SAMPLE	KSD1	LUCAS1	05-OCT-09 16:05	DONE	Lucas Cell	31-AUG-09 00:00
236534004	SAMPLE	KSD1	LUCAS2	05-OCT-09 16:05	DONE	Lucas Cell	19-DEC-08 00:00
236534005	SAMPLE	KSD1	LUCAS3	05-OCT-09 16:05	DONE	Lucas Cell	04-FEB-09 00:00
236534006	SAMPLE	KSD1	LUCAS4	05-OCT-09 16:05	DONE	Lucas Cell	02-MAR-09 00:00
236534007	SAMPLE	KSD1	LUCAS5	05-OCT-09 16:05	DONE	Lucas Cell	25-MAR-09 00:00
236534008	SAMPLE	KSD1	LUCAS6	05-OCT-09 16:05	DONE	Lucas Cell	04-AUG-09 00:00
236534009	SAMPLE	KSD1	LUCAS7	05-OCT-09 16:05	DONE	Lucas Cell	30-SEP-09 00:00
236534010	SAMPLE	KSD1	LUCAS1	05-OCT-09 16:40	DONE	Lucas Cell	31-AUG-09 00:00
236534012	SAMPLE	KSD1	LUCAS2	05-OCT-09 16:40	DONE	Lucas Cell	19-DEC-08 00:00
236534013	SAMPLE	KSD1	LUCAS3	05-OCT-09 16:40	DONE	Lucas Cell	04-FEB-09 00:00
236534014	SAMPLE	KSD1	LUCAS4	05-OCT-09 16:40	DONE	Lucas Cell	02-MAR-09 00:00
236534015	SAMPLE	KSD1	LUCAS5	05-OCT-09 16:40	DONE	Lucas Cell	25-MAR-09 00:00
236534016	SAMPLE	KSD1	LUCAS6	05-OCT-09 16:40	DONE	Lucas Cell	04-AUG-09 00:00
236534017	SAMPLE	KSD1	LUCAS7	05-OCT-09 16:40	DONE	Lucas Cell	30-SEP-09 00:00
236534018	SAMPLE	KSD1	LUCAS1	05-OCT-09 17:10	DONE	Lucas Cell	31-AUG-09 00:00
1201931119	MB	KSD1	LUCAS4	05-OCT-09 17:10	DONE	Lucas Cell	02-MAR-09 00:00
1201931121	MS	KSD1	LUCAS6	05-OCT-09 17:10	DONE	Lucas Cell	04-AUG-09 00:00
236534019	SAMPLE	KSD1	LUCAS2	05-OCT-09 17:45	DONE	Lucas Cell	19-DEC-08 00:00
236534020	SAMPLE	KSD1	LUCAS3	05-OCT-09 21:10	DONE	Lucas Cell	04-FEB-09 00:00
1201931120	DUP	KSD1	LUCAS5	05-OCT-09 21:10	DONE	Lucas Cell	25-MAR-09 00:00
1201931122	LCS	KSD1	LUCAS7	05-OCT-09 23:20	DONE	Lucas Cell	30-SEP-09 00:00

# Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 909230

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
236534001	SAMPLE	JXD2	1125	06-OCT-09 23:53	DONE		
236534002	SAMPLE	JXD2	1126	06-OCT-09 23:53	DONE		
236534003	SAMPLE	JXD2	1127	06-OCT-09 23:53	DONE		
236534004	SAMPLE	JXD2	1128	06-OCT-09 23:54	DONE		
236534005	SAMPLE	JXD2	1129	06-OCT-09 23:54	DONE		
236534006	SAMPLE	JXD2	1130	06-OCT-09 23:54	DONE		
236534007	SAMPLE	JXD2	1131	06-OCT-09 23:54	DONE		
236534008	SAMPLE	JXD2	1132	06-OCT-09 23:54	DONE		
236534009	SAMPLE	JXD2	1133	06-OCT-09 23:54	DONE		
236534010	SAMPLE	JXD2	1134	06-OCT-09 23:54	DONE		
236534012	SAMPLE	JXD2	1135	06-OCT-09 23:54	DONE		
236534013	SAMPLE	JXD2	1136	06-OCT-09 23:54	DONE		
236534014	SAMPLE	JXD2	1137	06-OCT-09 23:54	DONE		
236534015	SAMPLE	JXD2	1138	06-OCT-09 23:54	DONE		
236534016	SAMPLE	JXD2	1139	06-OCT-09 23:54	DONE		
236534017	SAMPLE	JXD2	1140	06-OCT-09 23:54	DONE		
236534018	SAMPLE	JXD2	1141	06-OCT-09 23:54	DONE		
236534019	SAMPLE	JXD2	1142	06-OCT-09 23:54	DONE		
236534020	SAMPLE	JXD2	1143	06-OCT-09 23:54	DONE		
1201939900	MB	JXD2	1144	06-OCT-09 23:54	DONE		
1201939901	DUP	JXD2	1145	06-OCT-09 23:54	DONE		
1201939902	MS	JXD2	1146	06-OCT-09 23:54	DONE		
1201939903	LCS	JXD2	1147	06-OCT-09 23:54	DONE		