

Table of Contents

Case Narrative	1
Chain of Custody and Supporting Documentation	4
Laboratory Certifications	17
Radiological Analysis	19
Sample Data Summary	39
Quality Control Data	59
Raw Data.....	65
Thorium	66
905546.....	67
908246.....	73
Uranium.....	96
905548.....	97
911639.....	103
Radium 228.....	126
905326.....	127
907633.....	134
Radium 226.....	142
904649.....	143
905701.....	148
Method Calibration Data	153
Lucas Cell Counters	154
Lucas 1	155
Lucas 2	176
Lucas 3.....	196
Lucas 4.....	216
Lucas 5.....	231
Lucas 6.....	252
Lucas 7.....	278
Gas Flow Proportional Counters	320
Alpha Spectroscopy	404
Background and Efficiency Data	543
Runlogs	744

Case Narrative

CASE NARRATIVE
for
Tronox LLC
Tronox Henderson
SDG:237343

October 16, 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 17, 2009 and September 18, 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 18, 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: and 237343015. The following samples did not meet the Tronox QA program sample result uncertainty limit of <30% for Alpha Spec Thorium with the results between 2 and 5 times the MDA and were counted for the maximum time: 237343001 and 237343004. The following samples did not meet the Tronox QA program sample tracer yield requirements of 70-120% for Alpha Spec Thorium due to matrix issues: 237343001, 237343004, 237343011, 237343016, 237343017 and 237343018. 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: and 237343014. 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: 237343003, 237343004, 237343005, 237343007, 237343008, 237343009, 237343010, 237343012, 237343013, 237343016, 237343017 and 237343018. The Thorium and Uranium soil method blanks did not meet the Tronox QA program required detection limits due to keeping the blank aliquot consistent with the sample aliquots. The Uranium soil batch did not meet the following Tronox QA program requirements: the lab DUP sample result uncertainty was >30% with activity between 2 and 5 times the MDA and was counted the maximum possible count time; samples 237343002, 237343004, 237343005, 237343007, 237343008, 237343009, 237343010, 237343011, 237343012, 237343013, 237343015, 237343017, the lab DUP and matrix spike did not meet tracer yield requirements of 70-120%; sample 237343017 and the lab DUP did not meet %RPD requirements but met RER requirements; samples 237343002, 237343012, 237343013, 237343017, and the matrix spike did not meet the resolution requirement of FWHM of 100 keV or less. Please see attached e-mail for further details.

Sample Identification

The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
237343001	SA128-0.5B
237343002	SA128-10B
237343003	SA128-29B
237343004	SA65-0.5B
237343005	SA65009-0.5B
237343006	EB091609-SO1
237343007	SA51-10B
237343008	SA51009-10B
237343009	SA51-25B
237343010	SA51-36B
237343011	SA151-0.5B
237343012	SA151-10B
237343013	SA151-25B
237343014	SA151-39B
237343015	SA151009-39B
237343016	SA165-0.5B
237343017	SA165-10B
237343018	SA165-28B

Case Narrative

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

Data Package

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Radiochemistry.

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



Edith Kent

Project Manager

Chain of Custody and Supporting Documentation



SAMPLE RECEIPT & REVIEW FORM

Client: <u>KEER/NORTHEAST</u>		SDG/ARCOC/Work Order: <u>2373431</u>	
Received By: <u>AK</u>		Date Received: <u>9-17-09</u>	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?			<input checked="" type="checkbox"/>
Classified Radioactive II or III by RSO?			<input checked="" type="checkbox"/>
COC/Samples marked containing PCBs?			<input checked="" type="checkbox"/>
Shipped as a DOT Hazardous?			<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>

*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.
 Maximum Counts Observed*: 0-40

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>22°C</u>
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: seals broken damaged container leaking container other (describe)
5	Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7	Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	<input checked="" type="checkbox"/>			Id's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?			<input checked="" type="checkbox"/>	Sample ID's affected: <u>see below</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:

SA 128-29BSPLP - NO TIME ON CONTAINER

FX 7979 3903 3899

PM (or PMA) review: Initials ea Date 9/17/09



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. 2027.001.00790
Page: 1 of 1
Cooler # 1 of 1
Collection Area: II

Required Ship to Lab:
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

Required Project Information:
Site ID #: TRONOX LLC, HENDERSON
Project #: 2027.001
Site Address: 560 W. Lake Mead Drive
City: Henderson
State: NV
Site PM Name: Derrick Willis
Phone/Fax: 949-375-7004
Site PM Email: derrick.willis@ngem.com

Required Invoice Information:
Send Invoice to: Susan Crowley
Tronox LLC
Address: PO Box 55
City/State: Henderson, NV 89009
Phone #: (949) 260-9293
Reimbursement project? Non-reimbursement project? Mark one
Send EDD to: Frank Hagar Northgate Environmental Management, Inc
frank.hagar@ngem.com
CC Hardcopy report to: PDF Electronic Version Only
CC Hardcopy report to: see additional comments below

TAT: Standard 30 day Rush Mark One
If Rush, Date due
QC level Required: Standard Special EPA Stage 4 Mark one
NJ Reduced Deliverable Package?
MA MCP Cert? CT RCP Cert? Mark One
Lab Project ID (lab use)

ITEM #	SAMPLE ID	Character per box. (A-Z, 0-9 / ,) Samples IDs MUST BE UNIQUE	VALID MATRIX CODES MATRIX DRINKING WATER GROUND WATER SURFACE WATER FREE PRODUCT SOIL WASTE AMBIENT AIR SOIL GAS	MATRIX CODE	SAMPLE TYPE G-GRAB C-COMP	SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	FIELD FILTERED? (Y/N)	PRESERVATIVES Unpreserved H2SO4 HNO3 HCl NaOH Na2S2O3 Methanol Other	Requested Analyses	Comments/Lab Sample I.D.
1	EB091609-SO1			W	G	9/16/2009	8:46	1	N	X	X	2 L Poly Clear
2	EB091609-SO1			W	G	9/16/2009	8:46	1	N	X	X	2 L Poly Clear
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

RELINQUISHED BY / AFFILIATION
Patricia Ferringer
GES
9-16-09

DATE 9-16-09
TIME 1:00
ACCEPTED BY / AFFILIATION
mike kushner
BEL
9-17-09
DATE 9-17-09
TIME 0900

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

SHIPPING METHOD: (mark as appropriate)
UPS COURIER USPS MAIL
SAMPLER NAME AND SIGNATURE: Patricia Ferringer
PRINT NAME OF SAMPLER: Patricia Ferringer
SIGNATURE OF SAMPLER: Patricia Ferringer
DATE SIGNED: 9-16-09
TIME: 5:30

Additional Comments/Special Instructions:
Equipment Blank is associated with SA51-36B.
FULL DIGESTION SPECIFICATION
EMSL HASL 300* - DOE EMSL HASL 300 modified (alpha spectroscopy) Thorium (isotopic) and Uranium (isotopic)

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



SAMPLE RECEIPT & REVIEW FORM

Client: <u>Kepp / Northgate</u>	SDG/ARCOC/Work Order: <u>237343.1</u>
Received By: <u>MIL</u>	Date Received: <u>9-17-09</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 type="checkbox"/> Yes <input checked="" type="checkbox"/> No Maximum Counts Observed*: <u>Open 20</u>
Classified Radioactive II or III by RSO?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
COC/Samples marked containing PCBs?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Shipped as a DOT Hazardous?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: seals broken damaged container leaking container other (describe)
2 Samples requiring cold preservation within 0 ≤ 6 deg. C?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ice bags blue ice dry ice <u>none</u> other (describe) <u>24c</u>
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: seals broken damaged container leaking container other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input 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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
7 Are Encore containers present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Id's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sample ID's affected:
12 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments:

FX 7979 3903 3914

PM (or PMA) review: Initials EM Date 9/17/09

2009 09 24 280

2373432



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. 2027.001.00773
Page: 1 of 1
Cooler # 1 of 1
Collection Area: II

Required Ship to Lab:		Required Project Information:		Required Invoice Information:														
Lab Name:	GEL Laboratories, LLC	Site ID #:	TRONOX LLC, HENDERSON	Send Invoice to:	Susan Crowley Tronox LLC													
Address:	2040 Savage Road Charleston, SC 29407	Project #:	2027.001	Address:	PO Box 55 Henderson, NV 89009													
Lab PM:	Edith M. Kent	Site Address:	560 W. Lake Mead Drive Henderson, NV	City/State:	Henderson, NV 89009													
Phone/Fax:	(843) 556-8171	City:	Henderson	Reimbursement project?	<input checked="" type="checkbox"/> Non-reimbursement project?													
Lab PM email:	emk@gel.com	Site PM Name:	Derrick Willis	Send EDD to:	Frank Hagar Northgate Environmental Management, Inc. frank.hagar@ngem.com													
Applicable Lab Quote #:		Phone/Fax:	(849) 375-7004	CC Hardcopy report to:	PDF Electronic Version Only													
		Site PM Email:	derrick.willis@ngem.com	CC Hardcopy report to:	see additional comments below													
ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / -) Samples IDs MUST BE UNIQUE	MATRIX	MATRIX CODE	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	#OF CONTAINERS	FIELD FILTERED? (Y/N)	Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analyses	Comments/Lab Sample I.D.
1	SA51-10B	DRINKING WATER	SO	G	9/17/2009	12:47	1	N	X								ETAP03, Radium-226 Radionuclides	250 ml Plastic jar
2	SA51009-10B	GROUNDWATER	SO	G	9/17/2009	12:47	1	N	X								ETAP03, Radium-226 Radionuclides	250 ml Plastic jar
3	SA51-25B	FREE PRODUCT	SO	G	9/17/2009	13:04	1	N	X								ETAP03, Radium-226 Radionuclides	250 ml Plastic jar
4	SA51-36B	WASTE WATER	SO	G	9/17/2009	13:49	1	N	X								ETAP03, Radium-226 Radionuclides	250 ml Plastic jar
5																		
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.arnold@ngem.com & frank.hagar@ngem.com

RELINQUISHED BY / AFFILIATION: *Patrick Ferringer*
 DATE: 9-17-09
 TIME: 15:30
 ACCEPTED BY / AFFILIATION: *Patrick Ferringer*
 DATE: 9-17-09
 TIME: 15:30

SHIPPING METHOD: (mark as appropriate)
 UPS COURIER USPS
 SIGNATURE OF SAMPLER: *Patrick Ferringer*
 DATE SHIPPED: 9-17-09
 TIME: 15:30



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

CHAIN-OF-CUSTODY / Analytical Request Document

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

COC No. 2027.001.00771

Page: 1 of 1

Cooler # 1 of 1

Collection Area: II

Required Ship to Lab:		Required Project Information:		Required Invoice Information:										
Lab Name:	GEL Laboratories, LLC	Site ID #:	TRONOX LLC, HENDERSON	Send Invoice to:	Susan Crowley Tronox LLC									
Address:	2040 Savage Road	Project #:	2027.001	Address:	PO Box 55									
City:	Charleston, SC 29407	Site Address:	560 W. Lake Mead Drive	City/State:	Henderson, NV 89009									
Lab PVI:	Edith M. Kent	City:	Henderson	Reimbursement project?	<input checked="" type="checkbox"/> Non-reimbursement project?									
Phone/Fax:	(843) 558-8171	State:	NV	Send EDD to:	Frank Hagar Northgate Environmental Management, Inc frank.hagar@ngem.com									
Lab PM email:	emk@gel.com	Site PM Name:	Derrick Willis	CC Hardcopy report to:	PDF Electronic Version Only									
Applicable Lab Quote #:		Phone/Fax:	(949) 375-7004	CC Hardcopy report to:	derrick.willis@ngem.com									
#	ITEM	VALID MATRIX CODES		SAMPLE DATE	SAMPLE TIME	# OF CONTAINERS	FIELD FILTERED? (Y/N)	PRESERVATIVES					Requested Analyses	Comments/Lab Sample I.D.
		DRINKING WATER	WATER					W	UNPRESERVED	H2SO4	HNO3	HCl		
1	SA151-0.5B	WATER	W	9/17/2009	9:45	1	N							250 ml Plastic jar
2	SA151-10B	WATER	W	9/17/2009	10:10	1	N							250 ml Plastic jar
3	SA151-25B	WATER	W	9/17/2009	10:44	1	N							250 ml Plastic jar
4	SA151-39B	WATER	W	9/17/2009	11:14	1	N							250 ml Plastic jar
5	SA151009-39B	WATER	W	9/17/2009	11:14	1	N							250 ml Plastic jar
6														
7														
8														
9														
10														
11														
12														
13														

RELIQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE RECEIPT CONDITIONS
<i>Patrick Ferring</i>	9-17-09	1700	<i>Patrick Ferring</i>	9-18-09	0920	dd Y/N/N
						Y/N
						Y/N
						Y/N
						Y/N
						Y/N

SHIPPING METHOD: (mark as appropriate)	SAMPLER NAME AND SIGNATURE
UPS COURIER FEDEx	<i>Patrick Ferring</i>
PRINT NAME OF SAMPLER:	
SIGNATURE OF SAMPLER:	
US MAIL	
DATE SIGNED	9/17 Time: 1530

Additional Comments/Special Instructions:

FULL DIGESTION SPECIFICATION
Radionuclides* includes Thorium (isotopic) and Uranium (isotopic)
by EML HASL 300 modified(alpha spectroscopy)

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



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. 2027-001-00807

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 Savage Road Charleston, SC 29407	Project #:	2027-001	Address:	PO Box 55	QC level Required:	Standard	Special	EPA Stage	Mark One												
Lab PM:	Edith M. Kent	Site Address:	560 W. Lake Mead Drive Charleston, SC 29407	City/State:	Henderson, NV 89009	Phone #:	(949)260-9293															
Phone/Fax:	(843)556-8171	City:	Henderson	State:	NV	Reimbursement project?	<input checked="" type="checkbox"/>	Non-reimbursement project?														
Lab PM email:	emk@gel.com	Site PM Name:	Derrick Willis	Send EDD to:	frank.hagar@ngem.com	CC Hardcopy report to:	PDF Electronic Version Only															
Applicable Lab Quote #:		Phone/Fax:	949-375-7004	Site PM Email:	derrick.willis@ngem.com	CC Hardcopy report to:	see additional comments below															
ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / - /) Samples IDs MUST BE UNIQUE	MATRIX	METHANOL	PRESERVATIVES	FIELD FILTERED? (Y/N)	# OF CONTAINERS	SAMPLE TIME	SAMPLE DATE	MATRIX CODE	SAMPLE TYPE	G-RAB O-COMP	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Sample Receipt Conditions	Temp in OC	Samples on Ice?	Sample Intact?	Trip Blank?	
																						UNPRESERVED
1	SA165-0.5B	DRINKING WATER	W			1	7:54	9/17/2009	SO	G												
2	SA165-10B	GROUNDWATER	WG			1	8:19	9/17/2009	SO	G												
3	SA165-10BMS	SLUDGE	S			1	8:19	9/17/2009	SO	G												
4	SA165-10BMSD	SLUDGE	S			1	8:19	9/17/2009	SO	G												
5	SA165-28B	SLUDGE	S			1	8:51	9/17/2009	SO	G												
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.amolc@ngem.com
 frank.hagar@ngem.com

RELINQUISHED BY / AFFILIATION
 P. Ferringer / GEL
 DATE: 9-17-09
 TIME: 7:17 PM
 ACCEPTED BY / AFFILIATION
 Mike Kunkler / GEL
 DATE: 9-17-09
 TIME: 9:30 AM

SHIPPING METHOD: (mark as appropriate)
 UPS COURIER **FEDEX**
 SIGNATURE OF SAMPLER: Patrick Ferringer
 DATE SIGNED: 9-17
 TIME: 1530



Client: <u>Kerr/Northgate</u>		SDG/ARCO/Work Order: <u>2373431</u>	
Received By:		Date Received: <u>9-18-09</u>	
Suspected Hazard Information		Yes	No
COC/Samples marked as radioactive?			<input checked="" type="checkbox"/>
Classified Radioactive II or III by RSO?			<input checked="" type="checkbox"/>
COC/Samples marked containing PCBs?			<input checked="" type="checkbox"/>
Shipped as a DOT Hazardous?			<input checked="" type="checkbox"/>
Samples identified as Foreign Soil?			<input checked="" type="checkbox"/>

*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.
 Maximum Counts Observed*: CPN 20
 Hazard Class Shipped: _____ UN#: _____

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

Comments:

Fx 7969 5546 5016

PM (or PMA) review: Initials EM Date 9/18/09

Subject: GEL Closed SDGs 237343

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

Date: Fri, 18 Sep 2009 16:49:14 -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 237343. 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
Web: www.gel.com

237343.xls	Content-Type: application/msexcel Content-Encoding: base64
-------------------	-----------------------------------------------------------------------------

Subject: SDG 237343 QC Issues - Alpha Spec Th, Alpha Spec U, Ra-226

From: Edie Kent <emk@gel.com>

Date: Fri, 16 Oct 2009 16:28:45 -0400

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

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

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

Soil Ra 226 Issues:

The following samples did 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: 237343015.

Soil Thorium Issues:

The method blank did not meet the Tronox QA program detection limit requirements for Th-228 and Th-230 due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

The following samples did not meet the Tronox QA program tracer yield requirement of 70-120%: 237343001, 237343004, 237343011, 237343016, 237343017, 237343018. The samples met GEL's standard tracer yield requirements. The blank and LCS met the contract tracer yield requirements.

Sample 237343001 did not meet the Tronox QA program sample result uncertainty limit of <30% for Th-228 and Th-232 with activity between 2 and 5 times the MDA and was counted the maximum possible count time.

Samples 237343001 and 237343004 did not meet the Tronox QA program sample result uncertainty limit of <30% for Th-230 with activity between 2 and 5 times the MDA and were counted the maximum possible count time.

Soil Uranium Issues:

The following samples did not meet the Tronox QA program required detection limit for U235/236 due to limited aliquot size: 237343003, 237343004, 237343005, 237343007, 237343008, 237343009, 237343010, 237343012, 237343013, 237343016, 237343017, 237343018. The sample size is restricted in the attempt to assure achieved yield recoveries meet the program yield requirements and to reduce the chance of tailing from U-233/234 activity into the U-235/236 region of interest. A 0.5 g aliquot was prepped for each sample. The samples met the program yield requirements and were counted the maximum possible count time in order to achieve the lowest possible MDA. The method blank does not meet the U-233/234 and U-238 detection limits due to keeping the blank aliquot consistent with the other sample aliquots.

The following samples did not meet the Tronox QA program sample result uncertainty limit of <30% for U-235/236 with activity greater than 5 times the MDA and were counted the maximum possible count time: 237343014.

The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% for U-235/236 with activity between 2 and 5 times the MDA and were counted the maximum possible count time: the lab DUP.

The following samples did not meet the Tronox QA program tracer yield requirement of 70-120%: 237343002, 237343004, 237343005, 237343007, 237343008, 237343009, 237343010, 237343011, 237343012, 237343013, 237343015, 237343017, the lab DUP, and the matrix spike. The samples met GEL's standard tracer yield requirements. The blank and LCS met the contract tracer yield requirements.

Sample 237343017 and the lab DUP did not meet the Tronox QA program %RPD requirements for U235/236 or U238. However, the relative error ratio requirements were met with values of 2.23 and 1.33 respectively.

Samples 237343002, 237343012, 237343013, 237343017, and the matrix spike did not meet the resolution requirement of having a full width half maximum of 100 keV or less. The samples met GEL's tracer yield requirement and counts are within the U232 region of interest.

This will be noted in the case narrative.

Edie

--

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

Laboratory Certifications

List of current GEL Certifications as of 16 October 2009

State	Certification
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 237343**

Method/Analysis Information

Product: Alphaspec Th, Liquid
Analytical Method: DOE EML HASL-300, Th-01-RC Modified
Analytical Batch Number: 905546

Sample ID	Client ID
237343006	EB091609-SO1
1201930820	Method Blank (MB)
1201930821	Laboratory Control Sample (LCS)
1201930822	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 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. 1201930821 (LCS) and

1201930822 (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

Samples 1201930820 (MB) and 237343006 (EB091609-SO1) were recounted due to high MDAs.

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

The Th-228 blank result is greater than the MDA but less than the RDL.

Qualifier information

Manual qualifiers were not required.

Method/Analysis Information

Product:	Alphaspec Th, Solid
Analytical Method:	DOE EML HASL-300, Th-01-RC Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	908246
Prep Batch Number:	904626

Sample ID	Client ID
237343001	SA128-0.5B
237343002	SA128-10B
237343003	SA128-29B
237343004	SA65-0.5B
237343005	SA65009-0.5B
237343007	SA51-10B
237343008	SA51009-10B
237343009	SA51-25B
237343010	SA51-36B
237343011	SA151-0.5B
237343012	SA151-10B
237343013	SA151-25B
237343014	SA151-39B
237343015	SA151009-39B
237343016	SA165-0.5B
237343017	SA165-10B
237343018	SA165-28B
1201937429	Method Blank (MB)
1201937430	237343017(SA165-10B) Sample Duplicate (DUP)
1201937431	237343017(SA165-10B) Matrix Spike (MS)
1201937432	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: 237343017 (SA165-10B).

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 1201937429 (MB) was recounted due to a suspected blank false positive. Sample 1201937429 (MB) was recounted due to a negative result greater than three times the error.

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 746532 was generated due to Failed Recovery for Surrogate or Tracer and Other. 1. Samples 2237343001, 237343004, 237343011, 237343016, 237343017 and 237343018 do not meet the client's tracer yield requirement of 70 - 120%. 2. Sample 237343001 has Thorium-228 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity. Samples 237343001 and 237343004 have Thorium-230 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity. Sample 237343001 has Thorium-232 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity. 1. All samples do meet GEL standard tracer requirements and the blank and LCS both meet the client's tracer yield requirements. PM notified, reporting results. 2. Samples were all counted the maximum count time of 1000 minutes to achieve the best possible uncertainties. PM notified, reporting results.

Manual Integration

No manual integrations were performed on data in this batch.

Additional Comments

The blank, 1201937429 (MB), did not meet the detection limit for Th228 or Th230 due to keeping the blank volume consistent with the other sample aliquots. All other samples met the detection limits.

Qualifier information

Manual qualifiers were not required.

Method/Analysis Information

Product:	Alphaspec U, Liquid
Analytical Method:	DOE EML HASL-300, U-02-RC Modified
Analytical Batch Number:	905548

Sample ID	Client ID
237343006	EB091609-SO1
1201930842	Method Blank (MB)
1201930843	Laboratory Control Sample (LCS)
1201930844	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 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. 1201930843 (LCS) and 1201930844 (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.

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

Product:	Alphaspec U, Solid
Analytical Method:	DOE EML HASL-300, U-02-RC Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	911639
Prep Batch Number:	904626

Sample ID	Client ID
237343001	SA128-0.5B
237343002	SA128-10B
237343003	SA128-29B
237343004	SA65-0.5B
237343005	SA65009-0.5B
237343007	SA51-10B
237343008	SA51009-10B
237343009	SA51-25B
237343010	SA51-36B
237343011	SA151-0.5B
237343012	SA151-10B
237343013	SA151-25B
237343014	SA151-39B
237343015	SA151009-39B
237343016	SA165-0.5B
237343017	SA165-10B
237343018	SA165-28B
1201945570	Method Blank (MB)
1201945571	237343017(SA165-10B) Sample Duplicate (DUP)
1201945572	237343017(SA165-10B) Matrix Spike (MS)
1201945573	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: 237343017 (SA165-10B).

QC Information

Refer to Non-Conformance Report.

Technical Information:

Holding Time

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

Sample Re-prep/Re-analysis

Samples were reprepared due to 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 746914 was generated due to RDL less than MDA, Failed Recovery for Surrogate or Tracer and Other. 1. Samples 237343002, 237343004, 237343005, 237343008, 237343009, 237343010, 237343011, 237343012, 237343013, 237343015, 237343017, the duplicate sample, 1201945571 and the matrix spike, 1201945572 do not meet the client's tracer yield requirements of 70 to 120% due to the matrix of the sample. 2. Samples 237343003, 237343004, 237343005, 237343007, 237343008, 237343009, 237343010, 237343012, 237343013, 237343016, 237343017 and 237343018 do not meet the required detection limit for U235/236. The blank, 1201945570, does not meet the required detection limits for U233/234 or U238. 3. Sample 237343014 has Uranium-235/236 activity greater

than five times the MDA and uncertainty greater than 30% of that activity. Samples 1201945571 has Uranium-235/236 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity. 4. Samples 237343002, 237343012, 237343013, 237343017 and the matrix spike, 1201945572, do not meet the resolution requirement of having a full width half maximum of 100 keV or less. 1. With tracer yields of 23.5 - 49.0%, the samples do meet the GEL standard tracer yield requirements of 15 to 125%. The blank and LCS do meet the client tracer yield acceptance criteria. PM notified, reporting results. 2. The blank, 1201945570, did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. The samples were analyzed with an appropriate aliquot for the method and matrix. Additionally, the samples were counted the maximum count time of 1000 minutes to achieve the lowest possible MDA's. PM notified, reporting results. 3. Samples were all counted the maximum count time of 1000 minutes to achieve the best possible uncertainties. PM notified, reporting results. 4. Samples do meet the GEL tracer yield requirement and counts are within the U232 region of interest.

Manual Integration

No manual integrations were performed on data in this batch.

Additional Comments

The sample and the duplicate, 1201945571 (SA165-10B) and 237343017 (SA165-10B), did not meet the relative percent difference requirement for U235/236 or U238, however they do meet the relative error ratio requirement with values of 2.23 and 1.33.

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: 905326

Sample ID	Client ID
237343006	EB091609-SO1
1201930326	Method Blank (MB)
1201930327	Laboratory Control Sample (LCS)
1201930328	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. 1201930327 (LCS) and 1201930328 (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

Sample 1201930326 (MB) was recounted due to a suspected blank false positive.

Chemical Recoveries

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

Miscellaneous Information:

NCR Documentation

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

Additional Comments

Additional comments were not required for this sample set.

Qualifier information

Manual qualifiers were not required.

Method/Analysis Information

Product: Gas Flow Radium 228
Analytical Method: EPA 904.0/SW846 9320 Modified
Prep Method: Dry Soil Prep
Analytical Batch Number: 907633
Prep Batch Number: 904626

Sample ID	Client ID
237343001	SA128-0.5B
237343002	SA128-10B
237343003	SA128-29B
237343004	SA65-0.5B
237343005	SA65009-0.5B
237343007	SA51-10B
237343008	SA51009-10B
237343009	SA51-25B
237343010	SA51-36B
237343011	SA151-0.5B
237343012	SA151-10B
237343013	SA151-25B
237343014	SA151-39B
237343015	SA151009-39B
237343016	SA165-0.5B
237343017	SA165-10B
237343018	SA165-28B
1201935774	Method Blank (MB)
1201935775	237343017(SA165-10B) Sample Duplicate (DUP)
1201935776	237343017(SA165-10B) Matrix Spike (MS)
1201935777	Laboratory Control Sample (LCS)

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

SOP Reference

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

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

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

Sample Geometry

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

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

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

Designated QC

The following sample was used for QC: 237343017 (SA165-10B).

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 1201935775 (SA165-10B), 237343003 (SA128-29B), 237343008 (SA51009-10B), 237343009 (SA51-25B), 237343011 (SA151-0.5B), 237343012 (SA151-10B), 237343014 (SA151-39B) and 237343015 (SA151009-39B) were recounted to meet client uncertainty requirements.

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.

Qualifier information

Manual qualifiers were not required.

Method/Analysis Information

Product:	Lucas Cell, Ra226, liquid
Analytical Method:	EPA 903.1 Modified
Analytical Batch Number:	904649

Sample ID	Client ID
237343006	EB091609-SO1
1201928562	Method Blank (MB)
1201928563	Laboratory Control Sample (LCS)
1201928564	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-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

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. 1201928563 (LCS) and 1201928564 (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.

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 738448 was generated due to Other. 1. Sample, 236077019, has activity between 2 and 5 times the MDA and uncertainty is greater than 30 percent. Samples counted the maximum count time. 1. Reporting results

Additional Comments

The laboratory control sample and the laboratory control sample duplicate, 1201928563 (LCS) and 1201928564 (LCSD), did not meet the relative percent difference requirement, however they do meet the relative error ratio requirement with value of 1.5683.

Qualifier information

Manual qualifiers were not required.

Method/Analysis Information

Product:	Lucas Cell, Ra226, solid
Analytical Method:	EPA 903.1 Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	905701
Prep Batch Number:	904626

Sample ID	Client ID
237343001	SA128-0.5B
237343002	SA128-10B
237343003	SA128-29B
237343004	SA65-0.5B
237343005	SA65009-0.5B
237343007	SA51-10B
237343008	SA51009-10B
237343009	SA51-25B
237343010	SA51-36B
237343011	SA151-0.5B
237343012	SA151-10B
237343013	SA151-25B
237343014	SA151-39B
237343015	SA151009-39B
237343016	SA165-0.5B
237343017	SA165-10B
237343018	SA165-28B
1201931192	Method Blank (MB)
1201931193	237343017(SA165-10B) Sample Duplicate (DUP)
1201931194	237343017(SA165-10B) Matrix Spike (MS)
1201931195	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: 237343017 (SA165-10B).

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 1201931195 (LCS) was recounted due to low recovery. The method blank 1201931192 (MB) was recounted due to a result greater than the MDA. Second count being reported.

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 745799 was generated due to Other. 1. Sample 237343015 has 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

Additional comments were not required for this sample set.

COMPANY - WIDE NONCONFORMANCE REPORT

Mo.Day Yr. 25-SEP-09	Division: Radiochemistry	Quality Criteria: Specifications	Type: Process
Instrument Type: LUCAS CELL DETECTOR	Test / Method: EPA 903.1 Modified	Matrix Type: Liquid	Client Code: KERR
Batch ID: 904649	Sample Numbers: See Below		
Potentially affected work order(s)(SDG): 236077,236699,236817,236938,237010,237170,237343			
Application Issues: Other			
Specification and Requirements		NRG Disposition:	
Nonconformance Description: 1. Sample, 236077019, has activity between 2 and 5 times the MDA and uncertainty is greater than 30 percent. Samples counted the maximum count time.		1. Reporting results	

Originator's Name:
Takesha Mungo 25-SEP-09

Data Validator/Group Leader:
Layota Yom 25-SEP-09

COMPANY - WIDE NONCONFORMANCE REPORT

Mo.Day Yr. 14-OCT-09	Division: Radiochemistry	Quality Criteria: Specifications	Type: Process
Instrument Type: LUCAS CELL DETECTOR	Test / Method: EPA 903.1 Modified	Matrix Type: Solid	Client Code: KERR
Batch ID: 905701	Sample Numbers: See below		
Potentially affected work order(s)(SDG): 237343			
Application Issues: Other			
Specification and Requirements Nonconformance Description:		NRG Disposition:	
<p>1. Sample 237343015 has 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.</p>		<p>1. PM notified, reporting results.</p>	

Originator's Name:

Lyndsey Pace 14-OCT-09

Data Validator/Group Leader:

Lesley Anderson 14-OCT-09

COMPANY - WIDE NONCONFORMANCE REPORT

Mo.Day Yr. 15-OCT-09	Division: Radiochemistry	Quality Criteria: Specifications	Type: Process
Instrument Type: ALPHA SPECTROMETER	Test / Method: DOE EML HASL-300, Th-01-RC Modified	Matrix Type: Solid	Client Code: KERR
Batch ID: 908246	Sample Numbers: See below		
Potentially affected work order(s)(SDG): 237343			
Application Issues: Failed Recovery for Surrogate or Tracer Other			
Specification and Requirements Nonconformance Description:		NRG Disposition:	
<p>1. Samples 2237343001, 237343004, 237343011, 237343016, 237343017 and 237343018 do not meet the client's tracer yield requirement of 70 - 120%.</p> <p>2. Sample 237343001 has Thorium-228 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity. Samples 237343001 and 237343004 have Thorium-230 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity. Sample 237343001 has Thorium-232 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity.</p>		<p>1. All samples do meet GEL standard tracer requirements and the blank and LCS both meet the client's tracer yield requirements. PM notified, reporting results.</p> <p>2. Samples were all counted the maximum count time of 1000 minutes to achieve the best possible uncertainties. PM notified, reporting results.</p>	

Originator's Name:

Joseph Moulden 15-OCT-09

Data Validator/Group Leader:

Joseph Moulden

COMPANY - WIDE NONCONFORMANCE REPORT

Mo.Day Yr. 16-OCT-09	Division: Radiochemistry	Quality Criteria: Specifications	Type: Process
Instrument Type: ALPHA SPECTROMETER	Test / Method: DOE EML HASL-300, U-02-RC Modified	Matrix Type: Solid	Client Code: KERR
Batch ID: 911639	Sample Numbers: See Below		

Potentially affected work order(s)(SDG): 237343

Application Issues:

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

Specification and Requirements Nonconformance Description:	NRG Disposition:
<p>1. Samples 237343002, 237343004, 237343005, 237343008, 237343009, 237343010, 237343011, 237343012, 237343013, 237343015, 237343017, the duplicate sample, 1201945571 and the matrix spike, 1201945572 do not meet the client's tracer yield requirements of 70 to 120% due to the matrix of the sample.</p> <p>2. Samples 237343003, 237343004, 237343005, 237343007, 237343008, 237343009, 237343010, 237343012, 237343013, 237343016, 237343017 and 237343018 do not meet the required detection limit for U235/236. The blank, 1201945570, does not meet the required detection limits for U233/234 or U238.</p> <p>3. Sample 237343014 has Uranium-235/236 activity greater than five times the MDA and uncertainty greater than 30% of that activity. Samples 1201945571 has Uranium-235/236 activity between two and five times the MDA and uncertainty greater than 30% of that respective activity.</p> <p>4. Samples 237343002, 237343012, 237343013, 237343017 and the matrix spike, 1201945572, do not meet the resolution requirement of having a full width half maximum of 100 keV or less.</p>	<p>1. With tracer yields of 23.5 - 49.0%, the samples do meet the GEL standard tracer yield requirements of 15 to 125%. The blank and LCS do meet the client tracer yield acceptance criteria. PM notified, reporting results.</p> <p>2. The blank, 1201945570, did not meet the detection limit due to keeping the blank volume consistent with the other sample aliquots. The samples were analyzed with an appropriate aliquot for the method and matrix. Additionally, the samples were counted the maximum count time of 1000 minutes to achieve the lowest possible MDA's. PM notified, reporting results.</p> <p>3. Samples were all counted the maximum count time of 1000 minutes to achieve the best possible uncertainties. PM notified, reporting results.</p> <p>4. Samples do meet the GEL tracer yield requirement and counts are within the U232 region of interest.</p>

Originator's Name:
Joseph Moulden 16-OCT-09

Data Validator/Group Leader:
Jessica Downey 16-OCT-09

SAMPLE DATA SUMMARY

GEL LABORATORIES LLC

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

Certificate of Analysis Report for

KERR003 Tronox LLC

Client SDG: 237343 GEL Work Order: 237343

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.

Heather J. McCarty

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 16, 2009

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

Client Sample ID:	SA128-0.5B	Project:	KERRHenderson
Sample ID:	237343001	Client ID:	KERR003
Matrix:	SO		
Collect Date:	16-SEP-09 13:55		
Receive Date:	17-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		0.959	+/-0.296	0.309	0.050	pCi/g		JXD2	10/10/09	1522	908246	1
Thorium-230		0.748	+/-0.240	0.209	0.050	pCi/g						
Thorium-232		0.714	+/-0.226	0.163	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		2.18	+/-0.186	0.0124	0.040	pCi/g		JXD2	10/15/09	1424	911639	2
Uranium-235/236		0.0769	+/-0.0438	0.0491	0.040	pCi/g						
Uranium-238		1.61	+/-0.160	0.0124	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.918	+/-0.364	0.485	0.500	pCi/g		MXS2	10/15/09	1832	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.854	+/-0.256	0.251	0.500	pCi/g		KSD1	10/13/09	1300	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

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"			40.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			86.4	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			78.2	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID:	SA128-10B	Project:	KERRHenderson
Sample ID:	237343002	Client ID:	KERR003
Matrix:	SO		
Collect Date:	16-SEP-09 09:58		
Receive Date:	17-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.41	+/-0.227	0.163	0.050	pCi/g		JXD2	10/10/09	1522	908246	1
Thorium-230		3.30	+/-0.320	0.0613	0.050	pCi/g						
Thorium-232		1.06	+/-0.182	0.0613	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		3.43	+/-0.346	0.0692	0.040	pCi/g		JXD2	10/15/09	1424	911639	2
Uranium-235/236		0.168	+/-0.0955	0.107	0.040	pCi/g						
Uranium-238		3.33	+/-0.341	0.0692	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.71	+/-0.378	0.367	0.500	pCi/g		MXS2	10/15/09	1832	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.72	+/-0.314	0.215	0.500	pCi/g		KSD1	10/13/09	1300	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

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"			86.0	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			38.9	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			92.4	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID:	SA128-29B	Project:	KERRHenderson
Sample ID:	237343003	Client ID:	KERR003
Matrix:	SO		
Collect Date:	16-SEP-09 10:28		
Receive Date:	17-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		0.832	+/-0.177	0.141	0.050	pCi/g		JXD2	10/10/09	1522	908246	1
Thorium-230		1.73	+/-0.233	0.062	0.050	pCi/g						
Thorium-232		0.924	+/-0.173	0.0777	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.80	+/-0.166	0.0305	0.040	pCi/g		JXD2	10/15/09	1424	911639	2
Uranium-235/236	U	0.0148	+/-0.0289	0.0544	0.040	pCi/g						
Uranium-238		1.59	+/-0.156	0.0305	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.13	+/-0.244	0.328	0.500	pCi/g		MXS2	10/15/09	2344	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.40	+/-0.303	0.217	0.500	pCi/g		KSD1	10/13/09	1300	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			87.0	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			87.4	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			84.1	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID:	SA65-0.5B	Project:	KERRHenderson
Sample ID:	237343004	Client ID:	KERR003
Matrix:	SO		
Collect Date:	16-SEP-09 07:49		
Receive Date:	17-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.55	+/-0.333	0.268	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		0.754	+/-0.228	0.189	0.050	pCi/g						
Thorium-232		1.45	+/-0.295	0.118	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.822	+/-0.191	0.129	0.040	pCi/g		JXD2	10/15/09	1424	911639	2
Uranium-235/236	U	0.0259	+/-0.0507	0.099	0.040	pCi/g						
Uranium-238		0.848	+/-0.187	0.0801	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.30	+/-0.350	0.384	0.500	pCi/g		MXS2	10/15/09	1832	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.60	+/-0.305	0.217	0.500	pCi/g		KSD1	10/13/09	1300	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			45.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			31.6	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			89.9	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID:	SA65009-0.5B	Project:	KERRHenderson
Sample ID:	237343005	Client ID:	KERR003
Matrix:	SO		
Collect Date:	16-SEP-09 07:49		
Receive Date:	17-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.78	+/-0.251	0.154	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		0.806	+/-0.162	0.078	0.050	pCi/g						
Thorium-232		1.55	+/-0.220	0.0244	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.771	+/-0.160	0.079	0.040	pCi/g		JXD2	10/15/09	1424	911639	2
Uranium-235/236	U	0.0408	+/-0.0692	0.125	0.040	pCi/g						
Uranium-238		0.899	+/-0.173	0.0912	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.689	+/-0.426	0.668	0.500	pCi/g		MXS2	10/15/09	1832	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.848	+/-0.243	0.224	0.500	pCi/g		KSD1	10/13/09	1300	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

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"			82.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			42.5	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			80.5	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID:	EB091609-SO1	Project:	KERRHenderson
Sample ID:	237343006	Client ID:	KERR003
Matrix:	W		
Collect Date:	16-SEP-09 08:46		
Receive Date:	17-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Rad Alpha Spec Analysis											
<i>Alphaspec Th, Liquid "As Received"</i>											
Thorium-228		0.0302	+/-0.0176	0.0178	0.030	pCi/L		AXD2 10/05/09 2051	905546	1	
Thorium-230	U	0.00	+/-0.00446	0.00683	0.030	pCi/L					
Thorium-232	U	0.00	+/-0.00631	0.0174	0.030	pCi/L					
<i>Alphaspec U, Liquid "As Received"</i>											
Uranium-233/234	U	0.0114	+/-0.013	0.0215	0.030	pCi/L		AXD2 10/02/09 2026	905548	2	
Uranium-235/236	U	0.00396	+/-0.011	0.0219	0.030	pCi/L					
Uranium-238	U	0.0032	+/-0.00992	0.0197	0.030	pCi/L					
Rad Gas Flow Proportional Counting											
<i>GFPC, Ra228, Liquid "As Received"</i>											
Radium-228	U	1.99	+/-1.39	2.14	3.00	pCi/L		MXS2 09/28/09 1942	905326	3	
Rad Radium-226											
<i>Lucas Cell, Ra226, liquid "As Received"</i>											
Radium-226	U	0.0674	+/-0.280	0.545	1.00	pCi/L		KSD1 09/25/09 1110	904649	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"			92.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Liquid "As Received"			95.4	(15%-125%)
Barium-133 Tracer	GFPC, Ra228, Liquid "As Received"			94.7	(15%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID: SA51-10B
Sample ID: 237343007
Matrix: SO
Collect Date: 17-SEP-09 12:47
Receive Date: 18-SEP-09
Collector: Client

Project: KERRHenderson
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.50	+/-0.215	0.102	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		1.19	+/-0.187	0.071	0.050	pCi/g						
Thorium-232		1.27	+/-0.192	0.071	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.08	+/-0.138	0.0351	0.040	pCi/g		JXD2	10/15/09	1424	911639	2
Uranium-235/236	U	0.0227	+/-0.0351	0.0627	0.040	pCi/g						
Uranium-238		0.876	+/-0.125	0.0351	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.877	+/-0.377	0.547	0.500	pCi/g		MXS2	10/15/09	1832	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.01	+/-0.256	0.217	0.500	pCi/g		KSD1	10/13/09	1300	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

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"			93.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			76.4	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			90.1	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID:	SA51009-10B	Project:	KERRHenderson
Sample ID:	237343008	Client ID:	KERR003
Matrix:	SO		
Collect Date:	17-SEP-09 12:47		
Receive Date:	18-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.45	+/-0.233	0.158	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		0.973	+/-0.180	0.0803	0.050	pCi/g						
Thorium-232		1.44	+/-0.216	0.0252	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.37	+/-0.250	0.125	0.040	pCi/g		JXD2	10/15/09	1429	911639	2
Uranium-235/236	U	0.0279	+/-0.0773	0.154	0.040	pCi/g						
Uranium-238		1.38	+/-0.244	0.0339	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.863	+/-0.220	0.307	0.500	pCi/g		MXS2	10/15/09	2344	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.799	+/-0.226	0.179	0.500	pCi/g		KSD1	10/13/09	1300	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

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"			78.4	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			31.7	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			90.7	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID: SA51-25B
Sample ID: 237343009
Matrix: SO
Collect Date: 17-SEP-09 13:04
Receive Date: 18-SEP-09
Collector: Client

Project: KERRHenderson
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.76	+/-0.224	0.107	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		1.62	+/-0.206	0.0205	0.050	pCi/g						
Thorium-232		1.66	+/-0.212	0.0757	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.71	+/-0.246	0.125	0.040	pCi/g		JXD2	10/15/09	1429	911639	2
Uranium-235/236	U	0.0644	+/-0.0665	0.103	0.040	pCi/g						
Uranium-238		1.70	+/-0.241	0.0832	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.50	+/-0.323	0.469	0.500	pCi/g		MXS2	10/15/09	2346	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.03	+/-0.268	0.222	0.500	pCi/g		KSD1	10/13/09	1330	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

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"			106	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			42.6	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			93.7	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID: SA51-36B
Sample ID: 237343010
Matrix: SO
Collect Date: 17-SEP-09 13:49
Receive Date: 18-SEP-09
Collector: Client

Project: KERRHenderson
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.09	+/-0.180	0.130	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		1.50	+/-0.195	0.0199	0.050	pCi/g						
Thorium-232		0.907	+/-0.153	0.0507	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		2.22	+/-0.371	0.150	0.040	pCi/g		JXD2	10/15/09	1429	911639	2
Uranium-235/236	U	0.0775	+/-0.107	0.186	0.040	pCi/g						
Uranium-238		2.04	+/-0.356	0.150	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.742	+/-0.355	0.518	0.500	pCi/g		MXS2	10/15/09	1832	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.17	+/-0.270	0.222	0.500	pCi/g		KSD1	10/13/09	1330	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

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"			23.5	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			88.5	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID:	SA151-0.5B	Project:	KERRHenderson
Sample ID:	237343011	Client ID:	KERR003
Matrix:	SO		
Collect Date:	17-SEP-09 09:45		
Receive Date:	18-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.61	+/-0.353	0.278	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		1.06	+/-0.265	0.128	0.050	pCi/g						
Thorium-232		1.58	+/-0.319	0.0503	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.920	+/-0.192	0.0953	0.040	pCi/g		JXD2	10/15/09	1429	911639	2
Uranium-235/236		0.0369	+/-0.0417	0.0369	0.040	pCi/g						
Uranium-238		0.935	+/-0.193	0.0953	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.38	+/-0.284	0.389	0.500	pCi/g		MXS2	10/15/09	2346	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.782	+/-0.229	0.198	0.500	pCi/g		KSD1	10/13/09	1330	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			41.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			36.6	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			87.7	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID:	SA151-10B	Project:	KERRHenderson
Sample ID:	237343012	Client ID:	KERR003
Matrix:	SO		
Collect Date:	17-SEP-09 10:10		
Receive Date:	18-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.39	+/-0.226	0.155	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		0.813	+/-0.163	0.0787	0.050	pCi/g						
Thorium-232		1.46	+/-0.217	0.0787	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		0.965	+/-0.171	0.109	0.040	pCi/g		JXD2	10/15/09	1429	911639	2
Uranium-235/236	U	0.0352	+/-0.0488	0.0844	0.040	pCi/g						
Uranium-238		0.934	+/-0.164	0.0788	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.958	+/-0.247	0.355	0.500	pCi/g		MXS2	10/15/09	2346	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.07	+/-0.279	0.220	0.500	pCi/g		KSD1	10/13/09	1330	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

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"			82.0	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			49.0	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			91.8	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID:	SA151-25B	Project:	KERRHenderson
Sample ID:	237343013	Client ID:	KERR003
Matrix:	SO		
Collect Date:	17-SEP-09 10:44		
Receive Date:	18-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.76	+/-0.253	0.166	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		1.89	+/-0.246	0.0785	0.050	pCi/g						
Thorium-232		1.41	+/-0.213	0.0785	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.64	+/-0.244	0.101	0.040	pCi/g		JXD2	10/15/09	1429	911639	2
Uranium-235/236	U	0.0675	+/-0.0623	0.0861	0.040	pCi/g						
Uranium-238		1.77	+/-0.250	0.0696	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.892	+/-0.386	0.558	0.500	pCi/g		MXS2	10/15/09	1847	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.75	+/-0.376	0.268	0.500	pCi/g		KSD1	10/13/09	1330	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			85.1	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			37.7	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			91.5	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID:	SA151-39B	Project:	KERRHenderson
Sample ID:	237343014	Client ID:	KERR003
Matrix:	SO		
Collect Date:	17-SEP-09 11:14		
Receive Date:	18-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.27	+/-0.234	0.173	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		1.56	+/-0.242	0.0911	0.050	pCi/g						
Thorium-232		1.39	+/-0.227	0.0728	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.73	+/-0.172	0.0687	0.040	pCi/g		JXD2	10/15/09	1429	911639	2
Uranium-235/236		0.0946	+/-0.0437	0.0158	0.040	pCi/g						
Uranium-238		1.67	+/-0.165	0.0325	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.63	+/-0.426	0.650	0.500	pCi/g		MXS2	10/15/09	2346	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.11	+/-0.254	0.208	0.500	pCi/g		KSD1	10/13/09	1330	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

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"			72.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			80.8	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			79.8	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID:	SA151009-39B	Project:	KERRHenderson
Sample ID:	237343015	Client ID:	KERR003
Matrix:	SO		
Collect Date:	17-SEP-09 11:14		
Receive Date:	18-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.31	+/-0.223	0.158	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		1.22	+/-0.198	0.0251	0.050	pCi/g						
Thorium-232		1.02	+/-0.186	0.0927	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.42	+/-0.222	0.160	0.040	pCi/g		JXD2	10/15/09	1429	911639	2
Uranium-235/236		0.0775	+/-0.0601	0.0742	0.040	pCi/g						
Uranium-238		1.45	+/-0.215	0.105	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.753	+/-0.220	0.315	0.500	pCi/g		MXS2	10/15/09	2346	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.730	+/-0.224	0.222	0.500	pCi/g		KSD1	10/13/09	1330	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			85.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			46.0	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			91.0	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID: SA165-0.5B
Sample ID: 237343016
Matrix: SO
Collect Date: 17-SEP-09 07:54
Receive Date: 18-SEP-09
Collector: Client

Project: KERRHenderson
Client ID: KERR003

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.13	+/-0.280	0.280	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		0.767	+/-0.205	0.144	0.050	pCi/g						
Thorium-232		1.23	+/-0.248	0.039	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.63	+/-0.172	0.0821	0.040	pCi/g		JXD2	10/15/09	1429	911639	2
Uranium-235/236	U	0.0386	+/-0.0389	0.0609	0.040	pCi/g						
Uranium-238		1.33	+/-0.156	0.0821	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.36	+/-0.351	0.345	0.500	pCi/g		MXS2	10/15/09	1847	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		0.939	+/-0.276	0.266	0.500	pCi/g		KSD1	10/13/09	1405	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

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"			54.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			81.4	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			87.6	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID:	SA165-10B	Project:	KERRHenderson
Sample ID:	237343017	Client ID:	KERR003
Matrix:	SO		
Collect Date:	17-SEP-09 08:19		
Receive Date:	18-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.76	+/-0.278	0.168	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		2.06	+/-0.287	0.0974	0.050	pCi/g						
Thorium-232		1.50	+/-0.246	0.0974	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		2.17	+/-0.327	0.182	0.040	pCi/g		JXD2	10/15/09	1429	911639	2
Uranium-235/236	U	0.0294	+/-0.0408	0.0441	0.040	pCi/g						
Uranium-238		2.07	+/-0.313	0.132	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		0.841	+/-0.437	0.669	0.500	pCi/g		MXS2	10/15/09	1848	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.36	+/-0.283	0.214	0.500	pCi/g		KSD1	10/13/09	1405	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			68.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			29.2	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			89.3	(25%-125%)

GEL LABORATORIES LLC

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

Certificate of Analysis

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

Report Date: October 16, 2009

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

Client Sample ID:	SA165-28B	Project:	KERRHenderson
Sample ID:	237343018	Client ID:	KERR003
Matrix:	SO		
Collect Date:	17-SEP-09 08:51		
Receive Date:	18-SEP-09		
Collector:	Client		

Parameter	Qualifier	Result	Uncertainty	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Rad Alpha Spec Analysis												
<i>Alphaspec Th, Solid "Dry Weight Corrected"</i>												
Thorium-228		1.71	+/-0.274	0.181	0.050	pCi/g		JXD2	10/10/09	1523	908246	1
Thorium-230		1.19	+/-0.215	0.0763	0.050	pCi/g						
Thorium-232		1.37	+/-0.231	0.0763	0.100	pCi/g						
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>												
Uranium-233/234		1.15	+/-0.136	0.0689	0.040	pCi/g		JXD2	10/15/09	1430	911639	2
Uranium-235/236	U	0.024	+/-0.0365	0.0645	0.040	pCi/g						
Uranium-238		1.28	+/-0.139	0.0373	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
<i>Gas Flow Radium 228 "Dry Weight Corrected"</i>												
Radium-228		1.28	+/-0.350	0.379	0.500	pCi/g		MXS2	10/15/09	1848	907633	3
Rad Radium-226												
<i>Lucas Cell, Ra226, solid "Dry Weight Corrected"</i>												
Radium-226		1.44	+/-0.335	0.275	0.500	pCi/g		KSD1	10/13/09	1405	905701	4

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	09/22/09	1212	904626

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			68.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			92.1	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			89.6	(25%-125%)

QUALITY CONTROL DATA

GEL LABORATORIES LLC

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

QC Summary

Report Date: October 16, 2009

Page 1 of 5

Northgate Environmental Management, Inc.

1100 Quail St., Suite 102
Newport Beach, California

Contact: Mr. Frank Hagar

Workorder: 237343

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	905546										
QC1201930821	LCS										
Thorium-228			U	0.0205	pCi/L				AXD2	10/02/09	09:19
				+/-0.0205							
Thorium-230	2.68			2.39	pCi/L		89.2	(75%-125%)			
				+/-0.137							
Thorium-232				0.0143	pCi/L			(75%-125%)			
				+/-0.0106							
QC1201930822	LCSD										
Thorium-228			U	0.00931	pCi/L	75.0				10/02/09	09:19
				+/-0.019							
Thorium-230	2.68			2.67	pCi/L	11.2	99.6	(0%-20%)			
				+/-0.138							
Thorium-232			U	0.00927	pCi/L	42.5*		(0%-20%)			
				+/-0.0109							
QC1201930820	MB										
Thorium-228				0.0287	pCi/L					10/05/09	20:51
				+/-0.0168							
Thorium-230			U	0.00439	pCi/L						
				+/-0.0086							
Thorium-232			U	0.00	pCi/L						
				+/-0.0043							
Batch	905548										
QC1201930843	LCS										
Uranium-233/234				2.89	pCi/L				AXD2	10/02/09	13:49
				+/-0.144							
Uranium-235/236				0.153	pCi/L						
				+/-0.0398							
Uranium-238	3.15			3.16	pCi/L		100	(75%-125%)			
				+/-0.151							
QC1201930844	LCSD										
Uranium-233/234				3.08	pCi/L	6.43				10/02/09	13:49
				+/-0.151							
Uranium-235/236				0.167	pCi/L	8.77					
				+/-0.0388							
Uranium-238	3.15			3.29	pCi/L	3.97	104	(0%-20%)			
				+/-0.156							
QC1201930842	MB										
Uranium-233/234			U	0.00785	pCi/L					10/02/09	13:49
				+/-0.0134							
Uranium-235/236			U	0.00669	pCi/L						
				+/-0.00978							
Uranium-238			U	0.0162	pCi/L						

GEL LABORATORIES LLC

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

QC Summary

Workorder: 237343

Page 2 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch	905548										
Batch	908246										
QC1201937430	237343017		DUP								
Thorium-228		1.76		1.64	pCi/g	7.29		(0% - 20%)	JXD2	10/10/09	15:23
		+/-0.278		+/-0.232							
Thorium-230		2.06		2.04	pCi/g	1.03		(0% - 20%)			
		+/-0.287		+/-0.249							
Thorium-232		1.50		1.29	pCi/g	15.4		(0% - 20%)			
		+/-0.246		+/-0.197							
QC1201937432	LCS										
Thorium-228			U	0.00668	pCi/g					10/10/09	15:23
				+/-0.0628							
Thorium-230	8.30			7.56	pCi/g		91.2	(75%-125%)			
				+/-0.443							
Thorium-232			U	-0.0132	pCi/g			(75%-125%)			
				+/-0.041							
QC1201937429	MB										
Thorium-228			U	-0.0357	pCi/g					10/14/09	12:56
				+/-0.069							
Thorium-230			U	-0.00722	pCi/g						
				+/-0.0245							
Thorium-232			U	0.00722	pCi/g						
				+/-0.0142							
QC1201937431	237343017		MS								
Thorium-228		1.76		1.71	pCi/g					10/10/09	15:23
		+/-0.278		+/-0.232							
Thorium-230	8.53	2.06		8.67	pCi/g		77.5	(75%-125%)			
		+/-0.287		+/-0.492							
Thorium-232		1.50		1.43	pCi/g			(75%-125%)			
		+/-0.246		+/-0.201							
Batch	911639										
QC1201945571	237343017		DUP								
Uranium-233/234		2.17		2.05	pCi/g	5.69		(0% - 20%)	JXD2	10/15/09	14:29
		+/-0.327		+/-0.261							
Uranium-235/236		U	0.0294	0.125	pCi/g	124*		(0% - 100%)			
		+/-0.0408		+/-0.0707							
Uranium-238		2.07		1.68	pCi/g	20.8*		(0% - 20%)			
		+/-0.313		+/-0.237							
QC1201945573	LCS										
Uranium-233/234				3.94	pCi/g					10/15/09	14:29
				+/-0.220							
Uranium-235/236				0.251	pCi/g						
				+/-0.0615							
Uranium-238	4.85			4.07	pCi/g		83.9	(75%-125%)			
				+/-0.223							

GEL LABORATORIES LLC

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

QC Summary

Workorder: 237343

Page 3 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Alpha Spec											
Batch		911639									
QC1201945570		MB									
Uranium-233/234			U	-0.0512 +/-0.0348	pCi/g				JXD2	10/15/09	14:24
Uranium-235/236			U	-0.0048 +/-0.0133	pCi/g						
Uranium-238			U	-0.0194 +/-0.0253	pCi/g						
QC1201945572		237343017	MS								
Uranium-233/234				2.17 +/-0.327	pCi/g					10/15/09	14:29
Uranium-235/236		U		0.0294 +/-0.0408	pCi/g						
Uranium-238	5.01			2.07 +/-0.313	pCi/g		95.8	(75%-125%)			
Rad Gas Flow											
Batch		905326									
QC1201930327		LCS									
Radium-228	40.0			44.0 +/-4.24	pCi/L		110	(75%-125%)	MXS2	09/28/09	19:41
QC1201930328		LCSD									
Radium-228	40.0			38.2 +/-4.13	pCi/L	14.1	95.7	(0%-20%)		09/28/09	19:41
QC1201930326		MB									
Radium-228			U	2.76 +/-1.83	pCi/L					09/28/09	20:55
Batch		907633									
QC1201935775		237343017	DUP								
Radium-228				0.841 +/-0.437	pCi/g	90.5		(0% - 100%)	MXS2	10/15/09	23:44
QC1201935777		LCS									
Radium-228	7.81			7.52 +/-0.806	pCi/g		96.3	(75%-125%)		10/15/09	18:58
QC1201935774		MB									
Radium-228			U	0.195 +/-0.218	pCi/g					10/15/09	18:47
QC1201935776		237343017	MS								
Radium-228	80.1			0.841 +/-0.437	pCi/g		97	(75%-125%)		10/15/09	18:58
Rad Ra-226											
Batch		904649									
QC1201928563		LCS									
Radium-226	24.2			20.4 +/-1.75	pCi/L		84.3	(75%-125%)	KSD1	09/25/09	10:40
QC1201928564		LCSD									
Radium-226	24.2			30.1 +/-2.30	pCi/L	38.5*	124	(0%-20%)		09/25/09	10:40
QC1201928562		MB									

GEL LABORATORIES LLC

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

QC Summary

Workorder: 237343

Page 4 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Ra-226											
Batch		904649									
Radium-226			U	0.419	pCi/L					09/25/09	10:40
				+/-0.325							
Batch		905701									
QC1201931193		237343017									
DUP											
Radium-226				1.36	1.31	pCi/g	3.86	(0% - 20%)	KSD1	10/13/09	14:05
				+/-0.283	+/-0.298						
QC1201931195		LCS									
Radium-226	11.2			8.46	pCi/g		75.5	(75%-125%)		10/13/09	15:10
				+/-0.671							
QC1201931192		MB									
Radium-226			U	0.058	pCi/g					10/13/09	15:10
				+/-0.106							
QC1201931194		237343017									
MS											
Radium-226	12.0			1.36	12.1	pCi/g	90.1	(75%-125%)		10/13/09	14:05
				+/-0.283	+/-0.809						

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
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound

GEL LABORATORIES LLC

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

QC Summary

Workorder: 237343

Page 5 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
^	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# 908846 Product: Th Date: 10/7/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required)			NA
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	/		
Instrument source check is within limits.	/		
Instrument bkg check is within limits.	/		
Method RDL/ LLD has been met.	/		
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	/		
Or meets the client's required RER acceptance criteria.	/		
Tracer yield is 15-125% . Carrier yield 25-125%.	/		
Or meets the client's contract acceptance criteria.	/		
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	/		CASE NARRATIVE
Sample was run within hold time.	/		
Sample was correctly preserved if required.	/		
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	/		
No blank spaces on data forms.	/		
All line outs initialed and dated.	/		
No transcription errors are apparent.	/		
Aux data is correct.			NA
Client Special requirements page has been checked.	/		
Raw Data and/ or spectrum are included and properly 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.	/		NCH# 742701
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCH# 742701
Aliquot Correction completed if required.			NA
Review sample historical results if available (If REMF, results above MDC have been verified by historical results, recount or re-analysis.)	/		

GEL Laboratories, LLC

revised 8/1/08

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

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

9/27 (10/8)
KERR

Thorium (Ac-227 Tracer) Que Sheet

23-SEP-09

Batch #: 905546

Analyst: AXD2

First Client Due Date: 08-OCT-09

Internal Due Date: 27-SEP-09

Tracer Isotope: Ac-227

Tracer Code: 887B-102

Expiration Date: 7/23/10

Vol: 0.1

LCS Isotope: Th-230

LCS Code: 12796-J

Expiration Date: 4/13/10

Vol: 0.1

Spike Isotope: Th-230

Spike Code: ---

Expiration Date: ---

Vol: ---

Prep Date: 9/29/09

Initials: AW

Pipet ID: 297058

Balance ID: 16750207

Witness: AW 9/25/09

Wet Dry

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Aliquot (g) (1 f)	Th Det #
236699016-1	EB090309-SO2	SAMPLE		.03 pCi/L	WATER	KERR003	03-SEP-09	1	1	0.800	25 197
236817014-1	EB090809-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	08-SEP-09	2	2	0.800	26 198
236938020-1	EB091009-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	10-SEP-09	3	3	0.800	27 199
237010013-1	EB091009-SO2	SAMPLE		.03 pCi/L	WATER	KERR003	10-SEP-09	4	4	0.800	28 200
237170005-1	EB091409-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	14-SEP-09	5	5	0.800	29 201
237170020-1	EB091509-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	15-SEP-09	6	6	0.800	30 201
237343006-1	EB091609-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	16-SEP-09	7	7	0.800	31 202
237521010-1	EB091809-SO1	SAMPLE		.03 pCi/L	WATER	KERR003	18-SEP-09	8	8	0.800	32 203
1201930820-1	MB for batch 905546	MB		.03 pCi/L	WATER	QC ACCOUNT	03-SEP-09	9	9	0.800	39 205
1201930821-1	LCS for batch 905546	LCS		.03 pCi/L	WATER	QC ACCOUNT	03-SEP-09	10	10	0.800	40
1201930822-1	LCS for batch 905546	LCS		.03 pCi/L	WATER	QC ACCOUNT	03-SEP-09	11	11	0.800	41

AW 9/25/09

Data Reviewed By: AW 9/25/09

Solid Sample Dissolution by: LEACH or DIGESTION

Choose SOP Used: GL-RAD-A-038

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

GEL Laboratories LLC, Radiochemistry Division

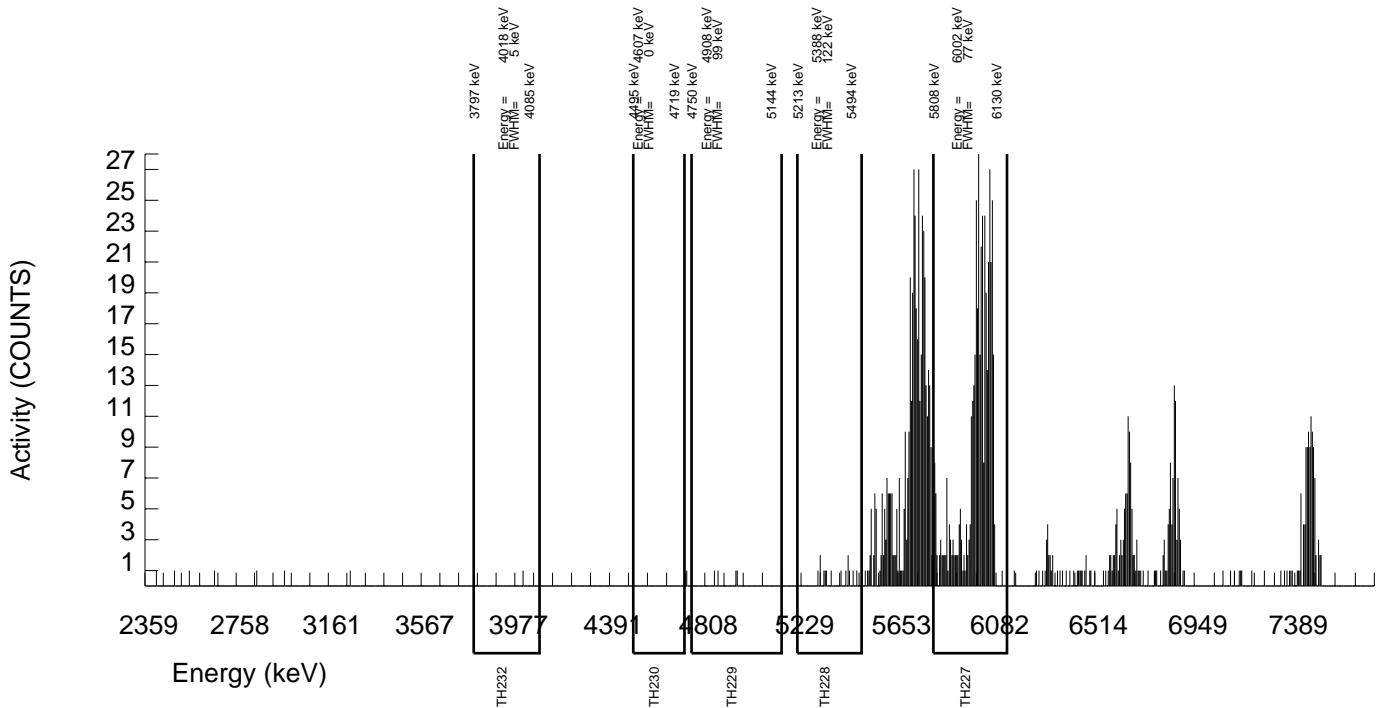
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905546 SAMPLE DATE : 16-SEP-2009 00:00:00 AC-227 SEPARATION : 30-SEP-2009 11:15:00		SAMPLE ID : S0237343006_TH SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :78903 AVERAGE %EFFICIENCY :26.6527 % YIELD : 92.809		COUNT DATE: 5-OCT-2009 20:51:35 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :AXD2	
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 : AC-227 NOMINAL : 3.90075 dpm RESULTS : 3.62023 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B202.CNF;60 BKG DATE : 4-OCT-2009 EFF FILE : W202.CNF;38 CAL DATE : 21-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	5994.040	455.000	448.000	7.000	2.6458	57.44000	2.20E+00	2.38E-01	7.51E-02	3.02E-02	2.07E-01
TH-228	5363.000	14.000	13.000	1.000	1.0000	99.94000	3.02E-02	1.77E-02	1.78E-02	5.41E-03	1.76E-02
TH229	4900.000	4.000	4.000	0.000	0.0000	99.52000	9.15E-03	8.98E-03	6.86E-03	0.00E+00	8.97E-03
TH-230	4625.000	0.000	0.000	0.000	0.0000	100.0000	0.00E+00	4.46E-03	6.83E-03	0.00E+00	4.46E-03
TH-232	3972.000	1.000	0.000	1.000	1.0000	100.0000	0.00E+00	6.31E-03	1.74E-02	5.30E-03	6.31E-03

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



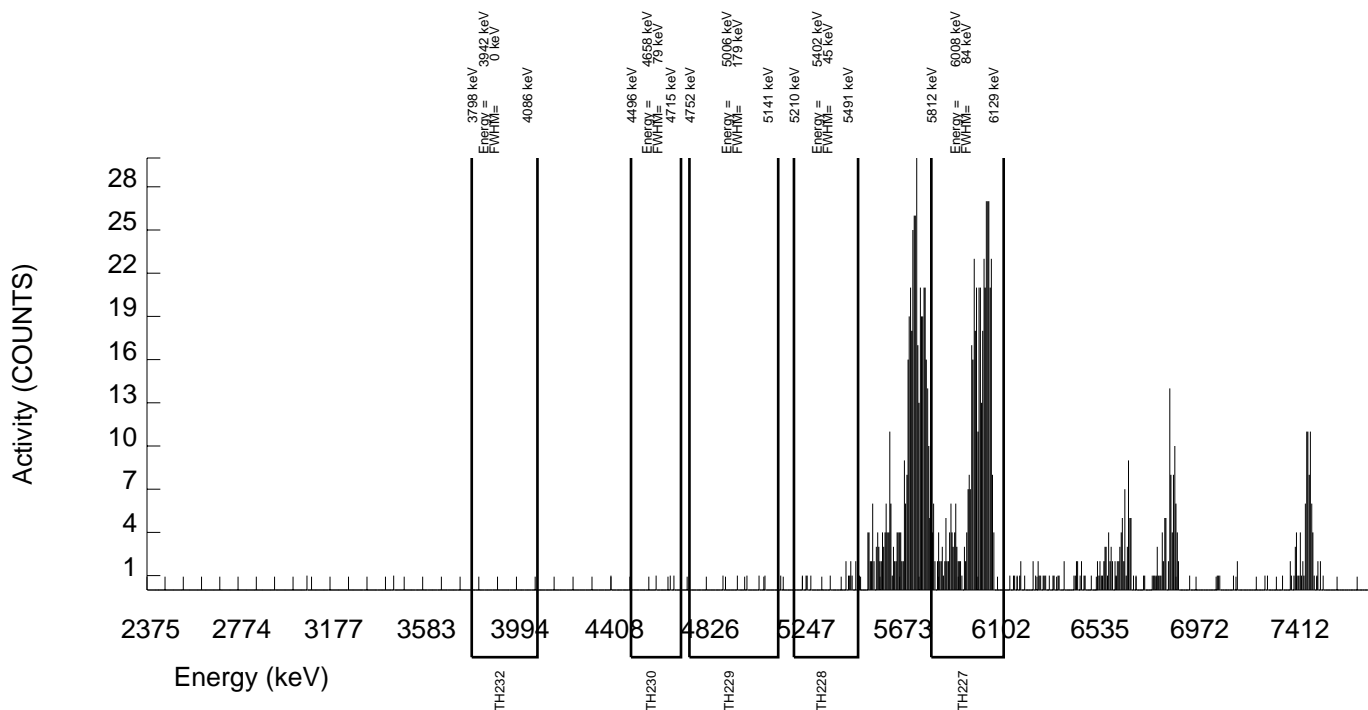
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905546 SAMPLE DATE : 29-SEP-2009 00:00:00 AC-227 SEPARATION : 30-SEP-2009 11:15:00		SAMPLE ID : S1201930820_TH SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :78908 AVERAGE %EFFICIENCY :25.4940 % YIELD : 100.709		COUNT DATE: 5-OCT-2009 20:51:40 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :AXD2	
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 : AC-227 NOMINAL : 3.90075 dpm RESULTS : 3.92840 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B205.CNF;60 BKG DATE : 4-OCT-2009 EFF FILE : W205.CNF;38 CAL DATE : 21-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	5994.040	476.000	465.000	11.000	3.3166	57.44000	2.20E+00	2.36E-01	8.71E-02	3.64E-02	2.04E-01
TH-228	5363.000	14.000	13.000	1.000	1.0000	99.94000	2.87E-02	1.68E-02	1.69E-02	5.14E-03	1.68E-02
TH229	4900.000	5.000	3.000	2.000	1.4142	99.52000	6.61E-03	1.14E-02	2.11E-02	7.25E-03	1.14E-02
TH-230	4625.000	3.000	2.000	1.000	1.0000	100.0000	4.39E-03	8.60E-03	1.68E-02	5.10E-03	8.60E-03
TH-232	3972.000	0.000	0.000	0.000	0.0000	100.0000	0.00E+00	4.30E-03	6.58E-03	0.00E+00	4.30E-03

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



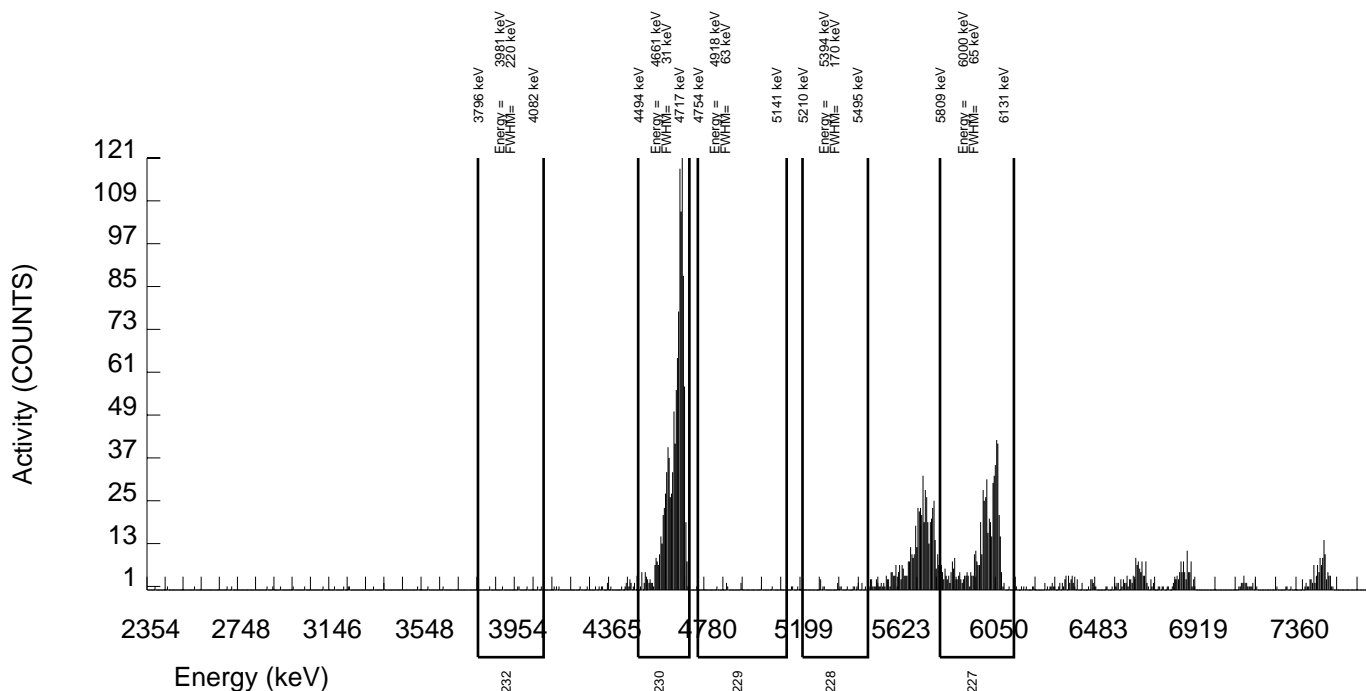
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905546 SAMPLE DATE : 29-SEP-2009 00:00:00 AC-227 SEPARATION : 30-SEP-2009 11:15:00		SAMPLE ID : S1201930821_TH SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :78773 AVERAGE %EFFICIENCY :32.0737 % YIELD : 86.108		COUNT DATE: 2-OCT-2009 09:19:40 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :AXD2	
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 : 3.90075 dpm RESULTS : 3.35887 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/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
AC-227	5994.040	607.000	569.000	38.000	6.1644	57.44000	2.20E+00	2.26E-01	1.22E-01	5.54E-02	1.92E-01
TH-228	5363.000	18.000	10.000	8.000	2.8284	99.94000	2.05E-02	2.05E-02	3.31E-02	1.35E-02	2.05E-02
TH229	4900.000	9.000	4.000	5.000	2.2361	99.52000	8.19E-03	1.50E-02	2.75E-02	1.07E-02	1.50E-02
TH-230	4625.000	1174.000	1171.000	3.000	1.7321	100.0000	2.39E+00	1.88E-01	2.25E-02	8.21E-03	1.37E-01
TH-232	3972.000	7.000	7.000	0.000	0.0000	100.0000	1.43E-02	1.06E-02	6.12E-03	0.00E+00	1.06E-02

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



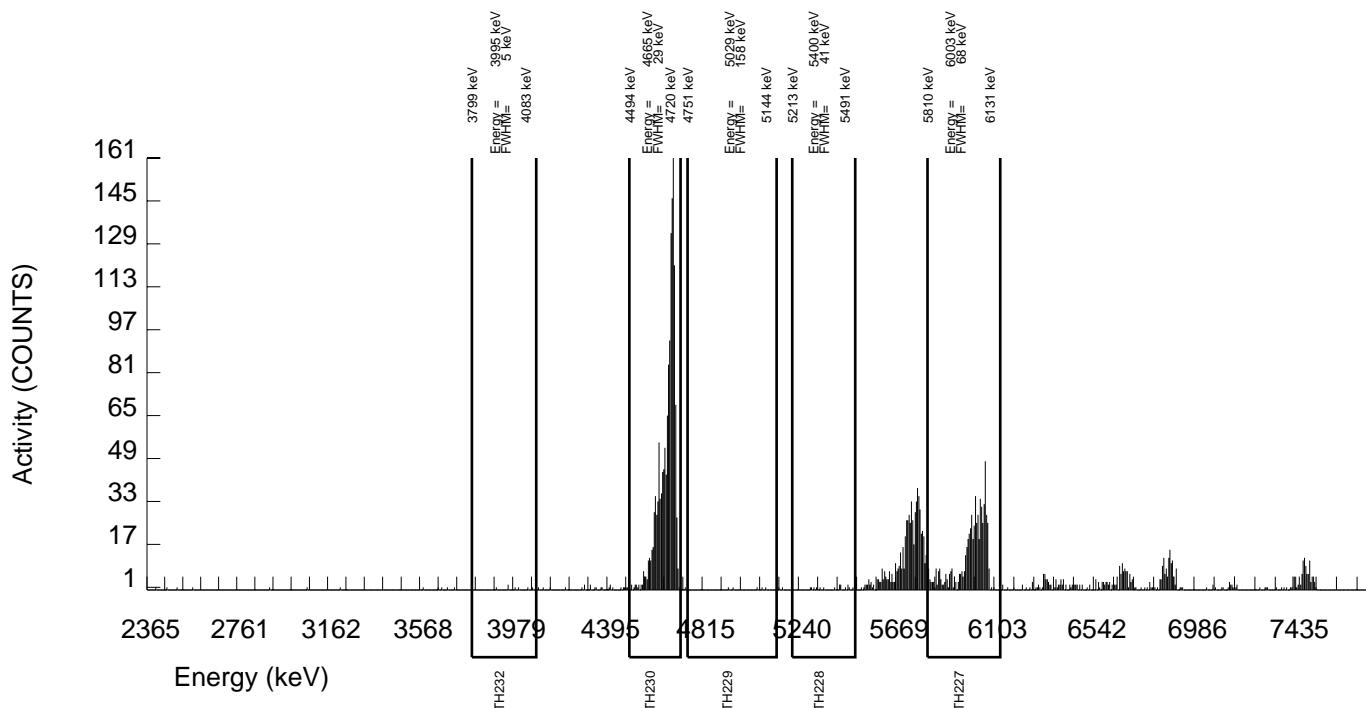
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905546 SAMPLE DATE : 29-SEP-2009 00:00:00 AC-227 SEPARATION : 30-SEP-2009 11:15:00		SAMPLE ID : S1201930822_TH SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :78205 AVERAGE %EFFICIENCY :32.9883 % YIELD : 92.108		COUNT DATE: 2-OCT-2009 09:19:40 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :AXD2	
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 : 3.90075 dpm RESULTS : 3.59290 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/L	TPU 1.96-SIGMA	MDA pCi/L	Lc pCi/L	UNC pCi/L
AC-227	5994.040	660.000	626.000	34.000	5.8310	57.44000	2.20E+00	2.17E-01	1.06E-01	4.76E-02	1.81E-01
TH-228	5363.000	16.000	5.000	11.000	3.3166	99.94000	9.31E-03	1.90E-02	3.43E-02	1.44E-02	1.90E-02
TH229	4900.000	5.000	-4.000	9.000	3.0000	99.52000	-7.45E-03	1.37E-02	3.16E-02	1.30E-02	1.37E-02
TH-230	4625.000	1447.000	1441.000	6.000	2.4495	100.0000	2.67E+00	2.00E-01	2.67E-02	1.06E-02	1.38E-01
TH-232	3972.000	7.000	5.000	2.000	1.4142	100.0000	9.27E-03	1.09E-02	1.78E-02	6.10E-03	1.09E-02

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



Radiochemistry Batch Checklist, Rev 9

Batch# 908246 Product: Th Date: 10/15/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NIA
Samples have been blank corrected (if required)			NIA
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.	✓		Case narrative
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	✓		
Or meets the client's required RER acceptance criteria.			
Tracer yield is 15-125% . Carrier yield 25-125%.		✓	NCR 746532
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.			NIA
Smears Taken for Radioactive batches.			NIA
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.			NIA
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)			NIA
Batch entered into Case Narrative.	✓		
Batch non-conformances completed, if applicable.	✓		NCR 746532
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCR 746532
Aliquot Correction completed if required.			NIA
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: Jep LML - 10/15/09

Secondary Review Performed By: [Signature] 10/15/09

10/5 10/16

KERR

P ✓

Thorium (Ac-227 Tracer) Que Sheet

01-OCT-09

Batch #: 908246 Analyst: JXD2 First Client Due Date: 16-OCT-09 Internal Due Date: 05-OCT-09
 Tracer Isotope: Ac-227 Tracer Code: 0387-β-102 Expiration Date: 07/23/10 Vol: 0.1 Ac-227 Separation Date/Time: 10/07/09 1535
 LCS Isotope: Th-230 LCS Code: A2276-J Expiration Date: 04/12/10 Vol: 0.1
 Spike Isotope: Th-230 Spike Code: A2276-J Expiration Date: 04/12/10 Vol: 0.1
 Prep Date: 10/02/09 Initials: JED Pipet ID: 227058 Balance ID: 5040272
 Witness: 10/2/09 CMW

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g/l/f)	Th Det #
237343001-1	SA128-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	16-SEP-09	1	1	0.251	173
237343002-1	SA128-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	16-SEP-09	2	2	0.258	174
237343003-1	SA128-29B	SAMPLE		.05 pCi/g	SOIL	KERR003	16-SEP-09	3	3	0.251	175
237343004-1	SA65-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	16-SEP-09	4	4	0.252	176
237343005-1	SA65009-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	16-SEP-09	5	5	0.253	177
237343007-1	SA51-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	17-SEP-09	6	6	0.251	178
237343008-1	SA51009-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	17-SEP-09	7	7	0.258	179
237343009-1	SA51-25B	SAMPLE		.05 pCi/g	SOIL	KERR003	17-SEP-09	8	8	0.250	180
237343010-1	SA51-36B	SAMPLE		.05 pCi/g	SOIL	KERR003	17-SEP-09	9	9	0.257	181
237343011-1	SA151-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	17-SEP-09	10	10	0.252	182
237343012-1	SA151-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	17-SEP-09	11	11	0.256	183
237343013-1	SA151-25B	SAMPLE		.05 pCi/g	SOIL	KERR003	17-SEP-09	12	12	0.250	184
237343014-1	SA151-39B	SAMPLE		.05 pCi/g	SOIL	KERR003	17-SEP-09	13	13	0.254	185
237343015-1	SA151009-39B	SAMPLE		.05 pCi/g	SOIL	KERR003	17-SEP-09	14	14	0.252	186
237343016-1	SA165-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	17-SEP-09	15	15	0.254	187
237343017-1	SA165-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	17-SEP-09	16	16	0.252	188
237343018-1	SA165-28B	SAMPLE		.05 pCi/g	SOIL	KERR003	17-SEP-09	17	17	0.251	189
1201937429-1	MB for batch 908246	MB		.05 pCi/g	SOIL	QC ACCOUNT		18	18	0.258	188
1201937430-1	SA165-10B(237343017DUP)	DUP		.05 pCi/g	SOIL	QC ACCOUNT	17-SEP-09	19	19	0.258	191
1201937431-1	SA165-10B(237343017MS)	MS		.05 pCi/g	SOIL	QC ACCOUNT	17-SEP-09	20	20	0.251	191
1201937432-1	LCS for batch 908246	LCS		.05 pCi/g	SOIL	QC ACCOUNT		21	21	0.258	193

177
10/15/09

Choose SOP Used: GL-RAD-A-038 ✓
 GL-RAD-A-045
 GL-RAD-A-043
 GL-RAD-A-032

Solid Sample Dissolution by: LEACH of DIGESTION
 Circle One

Data Reviewed By: Suppl-10/15/09

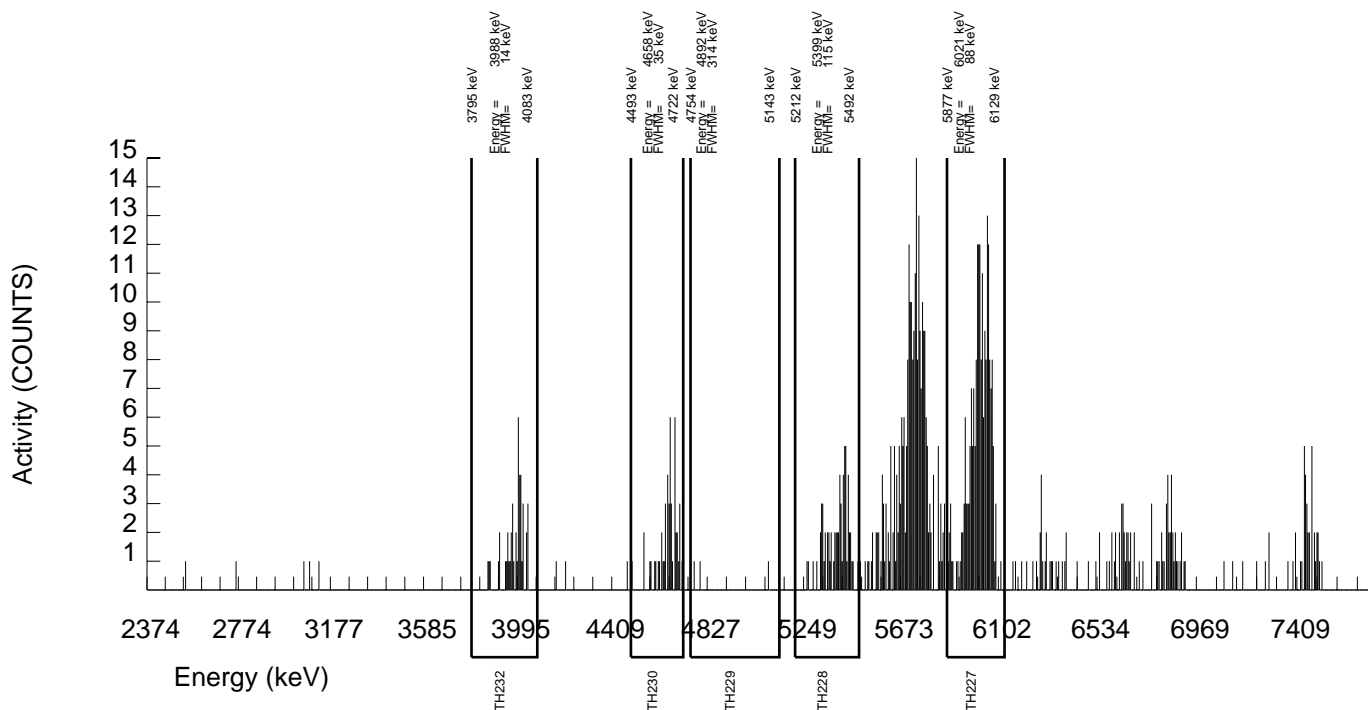
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 16-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343001_TH SAMPLE QTY: 0.251 G	
DETECTOR NUMBER :74431 AVERAGE %EFFICIENCY :26.0299 % YIELD : 40.575		COUNT DATE:10-OCT-2009 15:22:52 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 1.58175 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B173.CNF;132 BKG DATE : 4-OCT-2009 EFF FILE : W173.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	209.000	209.000	0.000	0.0000	57.44000	7.00E+00	1.04E+00	1.00E-01	0.00E+00	9.48E-01
TH-228	5363.000	65.000	55.000	10.000	3.1623	99.94000	9.59E-01	3.01E-01	3.09E-01	1.28E-01	2.96E-01
TH229	4900.000	3.000	-1.000	4.000	2.0000	99.52000	-1.71E-02	8.85E-02	2.10E-01	7.94E-02	8.85E-02
TH-230	4625.000	48.000	44.000	4.000	2.0000	100.0000	7.48E-01	2.44E-01	2.09E-01	7.91E-02	2.40E-01
TH-232	3972.000	44.000	42.000	2.000	1.4142	100.0000	7.14E-01	2.30E-01	1.63E-01	5.59E-02	2.26E-01

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



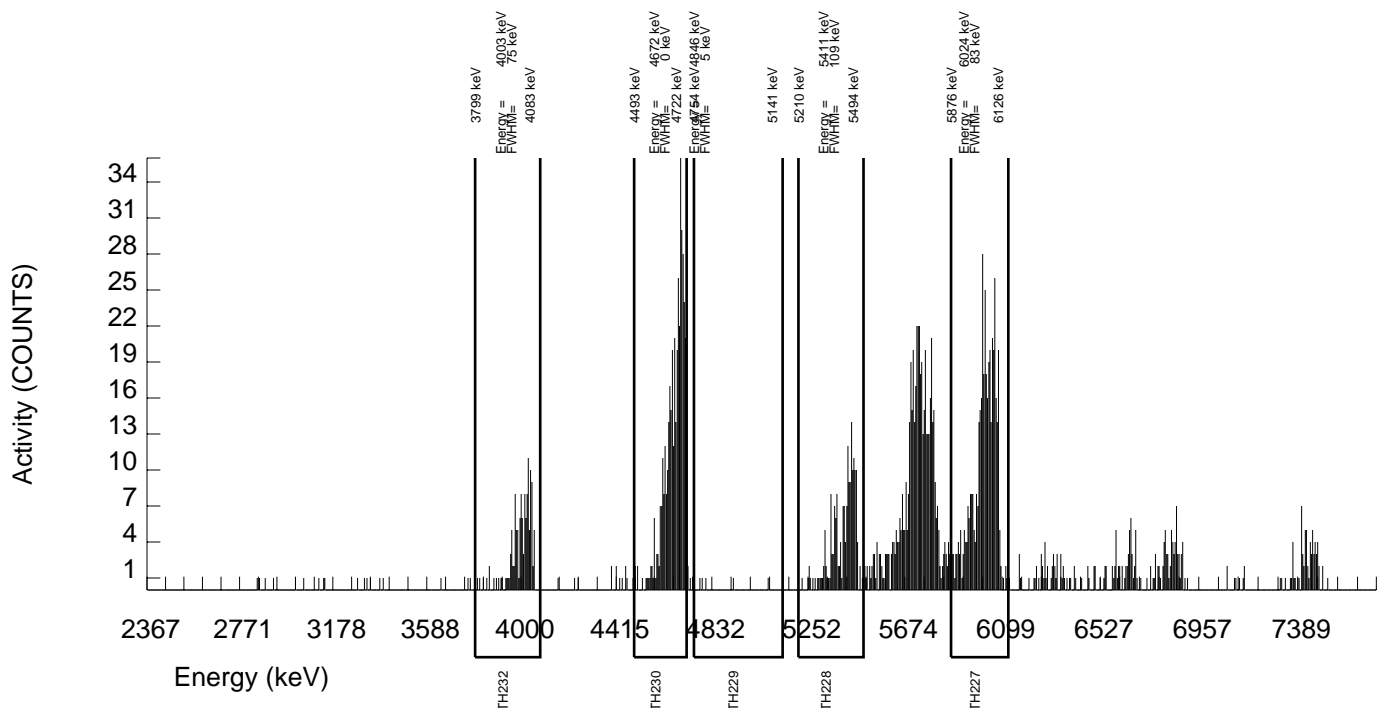
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 16-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343002_TH SAMPLE QTY: 0.258 G	
DETECTOR NUMBER :74432 AVERAGE %EFFICIENCY :25.3327 % YIELD : 85.977		COUNT DATE:10-OCT-2009 15:22:55 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 3.35166 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B174.CNF;132 BKG DATE : 4-OCT-2009 EFF FILE : W174.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	439.000	431.000	8.000	2.8284	57.44000	6.81E+00	7.69E-01	2.55E-01	1.04E-01	6.54E-01
TH-228	5363.000	185.000	172.000	13.000	3.6056	99.94000	1.41E+00	2.42E-01	1.63E-01	6.90E-02	2.27E-01
TH229	4900.000	7.000	4.000	3.000	1.7321	99.52000	3.22E-02	5.00E-02	8.91E-02	3.25E-02	4.99E-02
TH-230	4625.000	413.000	412.000	1.000	1.0000	100.0000	3.30E+00	3.75E-01	6.13E-02	1.86E-02	3.20E-01
TH-232	3972.000	133.000	132.000	1.000	1.0000	100.0000	1.06E+00	1.92E-01	6.13E-02	1.86E-02	1.82E-01

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



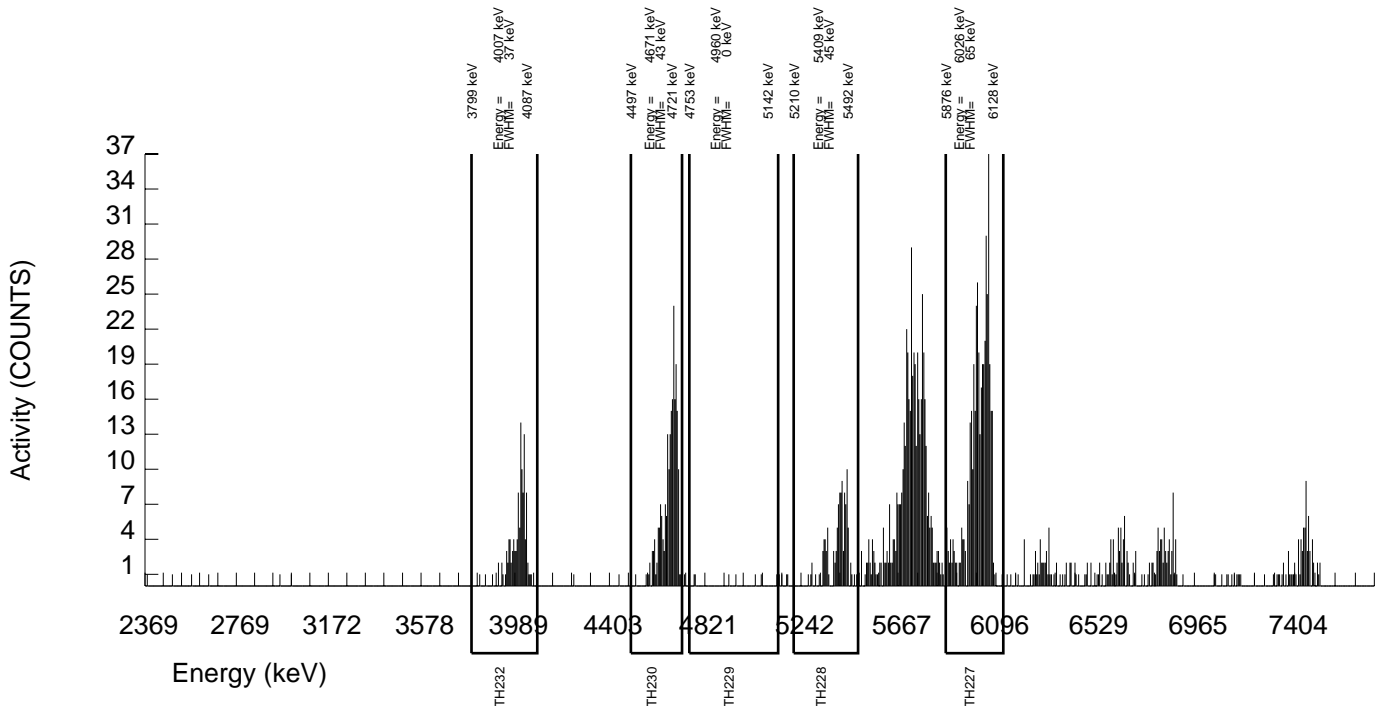
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 16-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343003_TH SAMPLE QTY: 0.251 G	
DETECTOR NUMBER :74433 AVERAGE %EFFICIENCY :25.4394 % YIELD : 87.007		COUNT DATE:10-OCT-2009 15:22:58 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 3.39181 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B175.CNF;132 BKG DATE : 4-OCT-2009 EFF FILE : W175.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	442.000	438.000	4.000	2.0000	57.44000	7.00E+00	7.82E-01	1.97E-01	7.43E-02	6.61E-01
TH-228	5363.000	109.000	100.000	9.000	3.0000	99.94000	8.32E-01	1.84E-01	1.41E-01	5.80E-02	1.77E-01
TH229	4900.000	7.000	5.000	2.000	1.4142	99.52000	4.07E-02	4.80E-02	7.80E-02	2.68E-02	4.79E-02
TH-230	4625.000	214.000	213.000	1.000	1.0000	100.0000	1.73E+00	2.55E-01	6.20E-02	1.89E-02	2.33E-01
TH-232	3972.000	116.000	114.000	2.000	1.4142	100.0000	9.24E-01	1.81E-01	7.77E-02	2.67E-02	1.73E-01

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



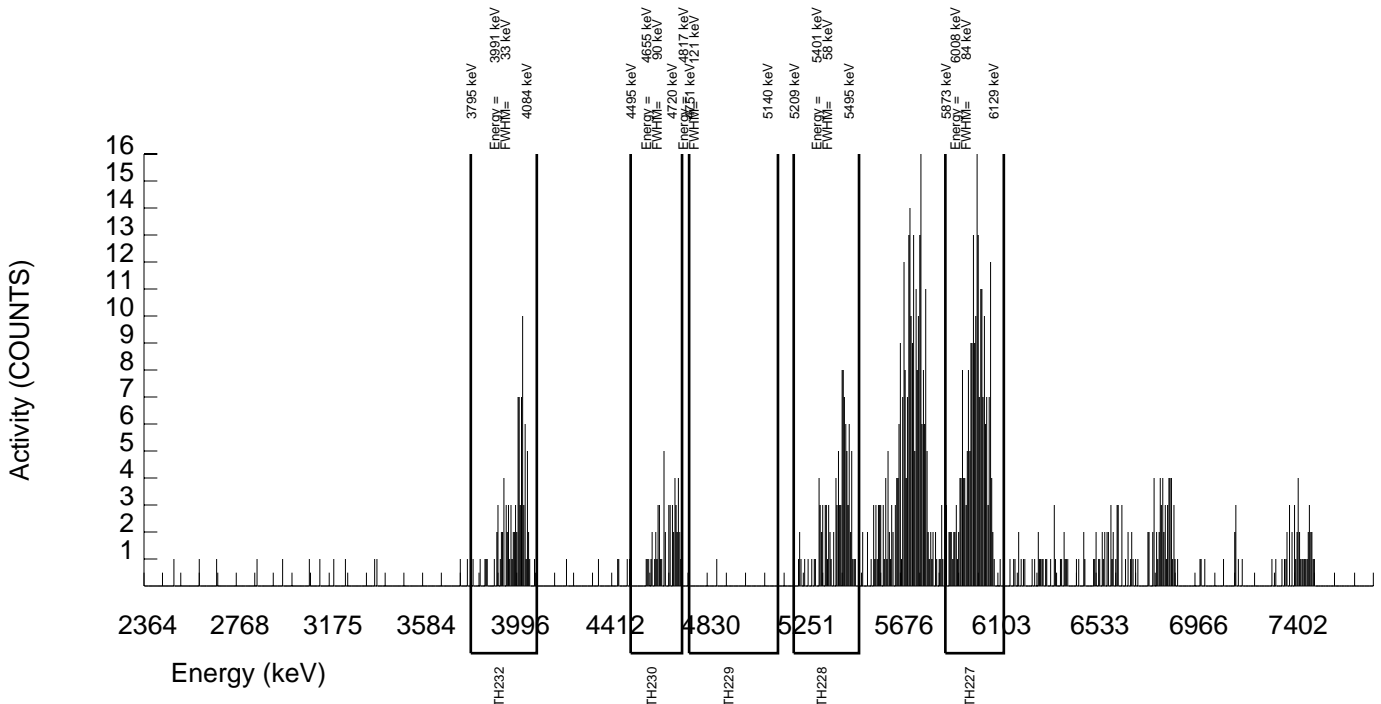
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 16-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343004_TH SAMPLE QTY: 0.252 G	
DETECTOR NUMBER :74434 AVERAGE %EFFICIENCY :25.4776 % YIELD : 45.620		COUNT DATE:10-OCT-2009 15:23:01 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 1.77842 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B176.CNF;132 BKG DATE : 4-OCT-2009 EFF FILE : W176.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	235.000	230.000	5.000	2.2361	57.44000	6.97E+00	1.01E+00	4.06E-01	1.58E-01	9.20E-01
TH-228	5363.000	107.000	98.000	9.000	3.0000	99.94000	1.55E+00	3.45E-01	2.68E-01	1.10E-01	3.33E-01
TH229	4900.000	2.000	-4.000	6.000	2.4495	99.52000	-6.18E-02	8.57E-02	2.22E-01	8.81E-02	8.57E-02
TH-230	4625.000	53.000	49.000	4.000	2.0000	100.0000	7.54E-01	2.32E-01	1.89E-01	7.16E-02	2.28E-01
TH-232	3972.000	95.000	94.000	1.000	1.0000	100.0000	1.45E+00	3.08E-01	1.18E-01	3.58E-02	2.95E-01

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



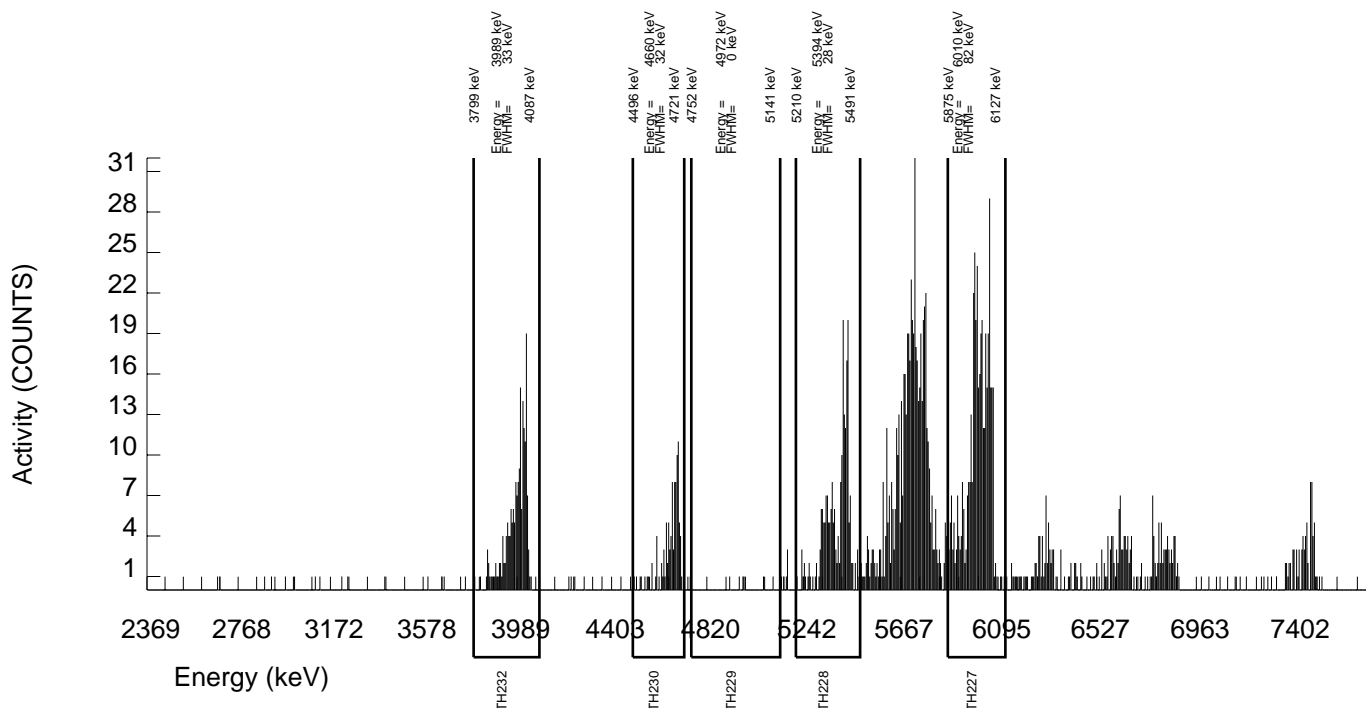
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 16-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343005_TH SAMPLE QTY: 0.253 G	
DETECTOR NUMBER :74435 AVERAGE %EFFICIENCY :26.5975 % YIELD : 82.269		COUNT DATE:10-OCT-2009 15:23:04 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 3.20710 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B177.CNF;132 BKG DATE : 4-OCT-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	435.000	433.000	2.000	1.4142	57.44000	6.94E+00	7.76E-01	1.54E-01	5.27E-02	6.57E-01
TH-228	5363.000	224.000	213.000	11.000	3.3166	99.94000	1.78E+00	2.72E-01	1.54E-01	6.44E-02	2.51E-01
TH229	4900.000	7.000	1.000	6.000	2.4495	99.52000	8.18E-03	5.78E-02	1.18E-01	4.66E-02	5.78E-02
TH-230	4625.000	101.000	99.000	2.000	1.4142	100.0000	8.06E-01	1.69E-01	7.79E-02	2.68E-02	1.62E-01
TH-232	3972.000	190.000	190.000	0.000	0.0000	100.0000	1.55E+00	2.38E-01	2.44E-02	0.00E+00	2.20E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.	SAMPLE ID : S0237343007_TH SAMPLE QTY: 0.251 G
--------------------------------------------------------------------------------------------------------	---------------------------------------------------

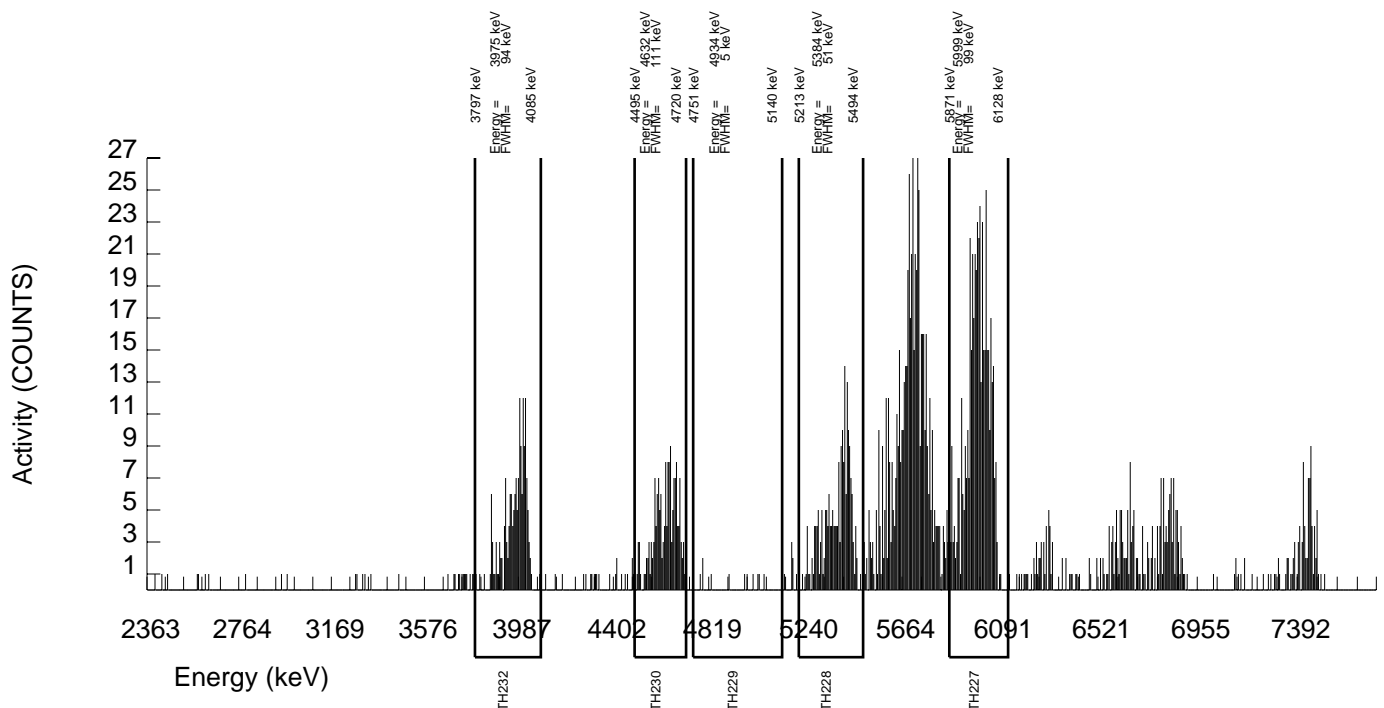
DETECTOR NUMBER :74436 AVERAGE %EFFICIENCY :25.8470 % YIELD : 93.652	COUNT DATE:10-OCT-2009 15:23:06 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2
----------------------------------------------------------------------------	--------------------------------------------------------------------------------------

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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 3.65083 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B178.CNF;132 BKG DATE : 4-OCT-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	480.000	479.000	1.000	1.0000	57.44000	7.00E+00	7.54E-01	1.12E-01	3.40E-02	6.28E-01
TH-228	5363.000	203.000	198.000	5.000	2.2361	99.94000	1.50E+00	2.33E-01	1.02E-01	3.95E-02	2.15E-01
TH229	4900.000	11.000	7.000	4.000	2.0000	99.52000	5.21E-02	5.66E-02	9.17E-02	3.47E-02	5.66E-02
TH-230	4625.000	163.000	161.000	2.000	1.4142	100.0000	1.19E+00	2.00E-01	7.10E-02	2.44E-02	1.87E-01
TH-232	3972.000	173.000	171.000	2.000	1.4142	100.0000	1.27E+00	2.07E-01	7.10E-02	2.44E-02	1.92E-01

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



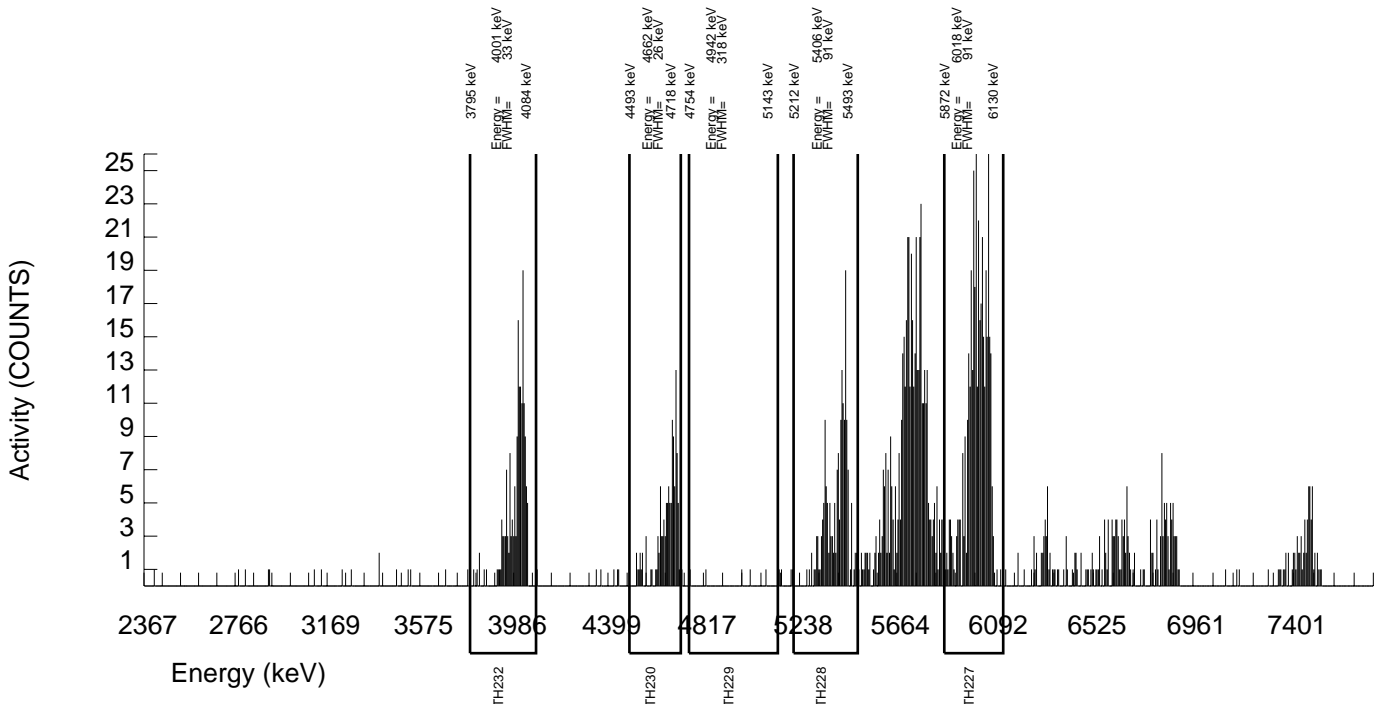
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343008_TH SAMPLE QTY: 0.258 G	
DETECTOR NUMBER :74437 AVERAGE %EFFICIENCY :26.5666 % YIELD : 78.370		COUNT DATE:10-OCT-2009 15:23:09 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 3.05512 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B179.CNF;132 BKG DATE : 4-OCT-2009 EFF FILE : W179.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	415.000	412.000	3.000	1.7321	57.44000	6.81E+00	7.75E-01	1.83E-01	6.66E-02	6.62E-01
TH-228	5363.000	180.000	169.000	11.000	3.3166	99.94000	1.45E+00	2.48E-01	1.58E-01	6.63E-02	2.33E-01
TH229	4900.000	5.000	1.000	4.000	2.0000	99.52000	8.43E-03	4.95E-02	1.04E-01	3.92E-02	4.95E-02
TH-230	4625.000	118.000	116.000	2.000	1.4142	100.0000	9.73E-01	1.89E-01	8.03E-02	2.76E-02	1.80E-01
TH-232	3972.000	172.000	172.000	0.000	0.0000	100.0000	1.44E+00	2.32E-01	2.52E-02	0.00E+00	2.16E-01

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



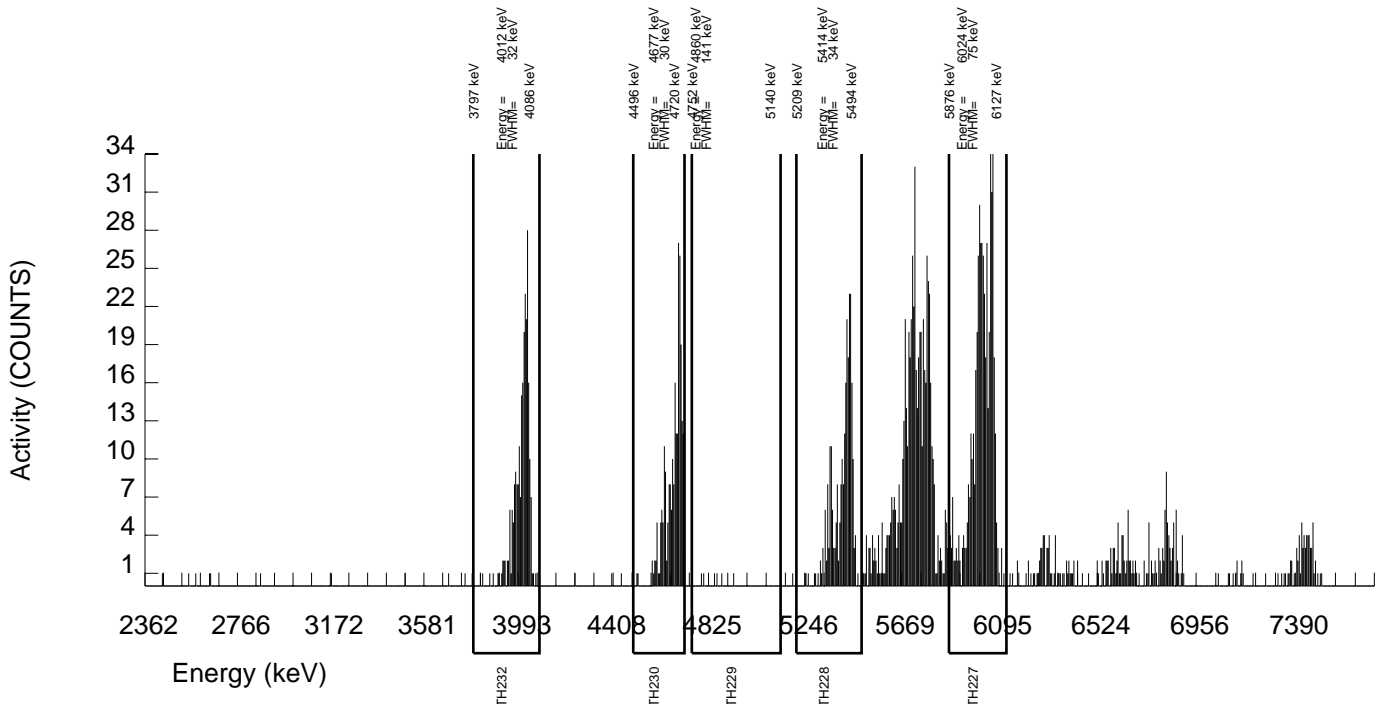
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343009_TH SAMPLE QTY: 0.250 G	
DETECTOR NUMBER :74438 AVERAGE %EFFICIENCY :24.8204 % YIELD : 106.077		COUNT DATE:10-OCT-2009 15:23:11 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 4.13519 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B180.CNF;134 BKG DATE : 4-OCT-2009 EFF FILE : W180.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	526.000	521.000	5.000	2.2361	57.44000	7.02E+00	7.39E-01	1.81E-01	7.01E-02	6.09E-01
TH-228	5363.000	258.000	251.000	7.000	2.6458	99.94000	1.76E+00	2.47E-01	1.07E-01	4.32E-02	2.24E-01
TH229	4900.000	6.000	-3.000	9.000	3.0000	99.52000	-2.06E-02	5.22E-02	1.17E-01	4.80E-02	5.22E-02
TH-230	4625.000	236.000	236.000	0.000	0.0000	100.0000	1.62E+00	2.27E-01	2.05E-02	0.00E+00	2.06E-01
TH-232	3972.000	246.000	243.000	3.000	1.7321	100.0000	1.66E+00	2.34E-01	7.57E-02	2.76E-02	2.12E-01

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



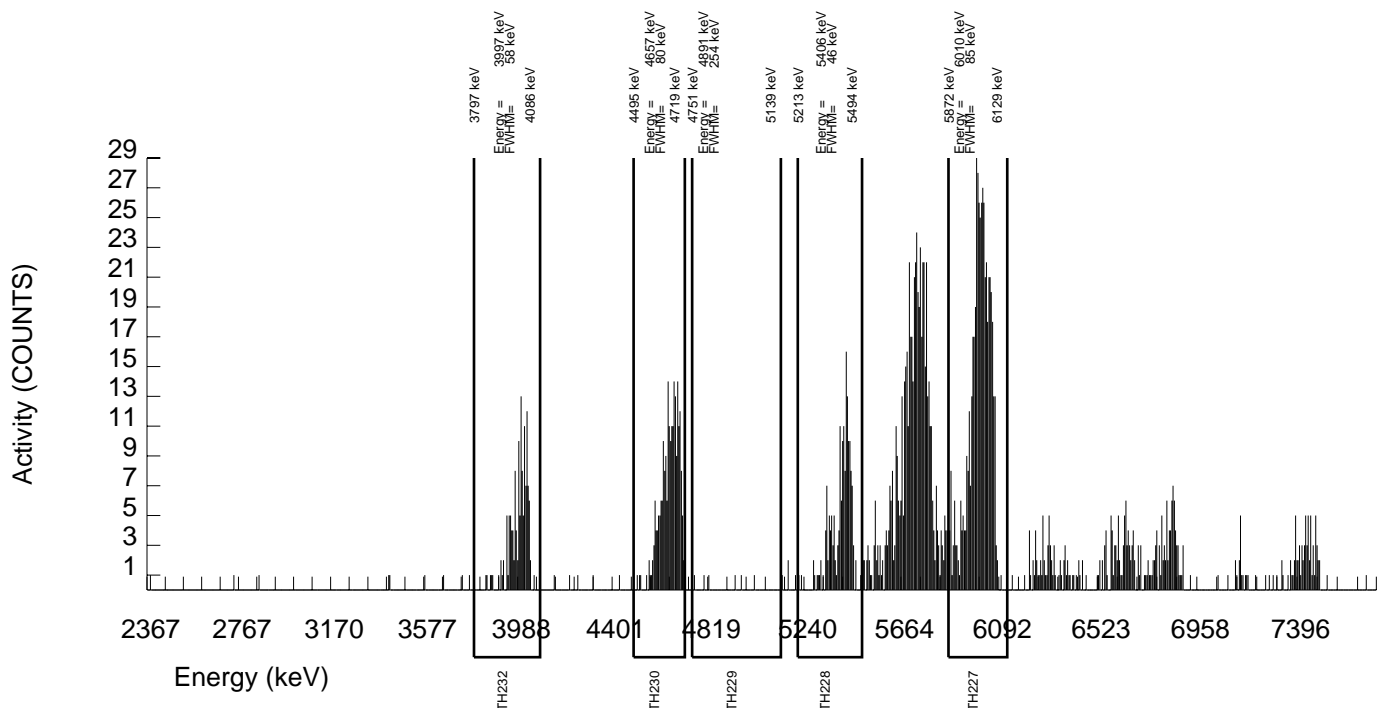
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343010_TH SAMPLE QTY: 0.257 G	
DETECTOR NUMBER :74439 AVERAGE %EFFICIENCY :25.6899 % YIELD : 103.076		COUNT DATE:10-OCT-2009 15:23:14 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.328E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.328E+00	TRACER ID : 0387-B-102 ISOTOPE : AC-227 NOMINAL : 3.89831 dpm RESULTS : 4.01824 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B181.CNF;132 BKG DATE : 4-OCT-2009 EFF FILE : W181.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	526.000	524.000	2.000	1.4142	57.44000	6.83E+00	7.14E-01	1.25E-01	4.29E-02	5.87E-01
TH-228	5363.000	172.000	160.000	12.000	3.4641	99.94000	1.09E+00	1.91E-01	1.30E-01	5.47E-02	1.80E-01
TH229	4900.000	6.000	4.000	2.000	1.4142	99.52000	2.66E-02	3.69E-02	6.37E-02	2.19E-02	3.69E-02
TH-230	4625.000	227.000	227.000	0.000	0.0000	100.0000	1.50E+00	2.15E-01	1.99E-02	0.00E+00	1.95E-01
TH-232	3972.000	138.000	137.000	1.000	1.0000	100.0000	9.07E-01	1.62E-01	5.07E-02	1.54E-02	1.53E-01

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



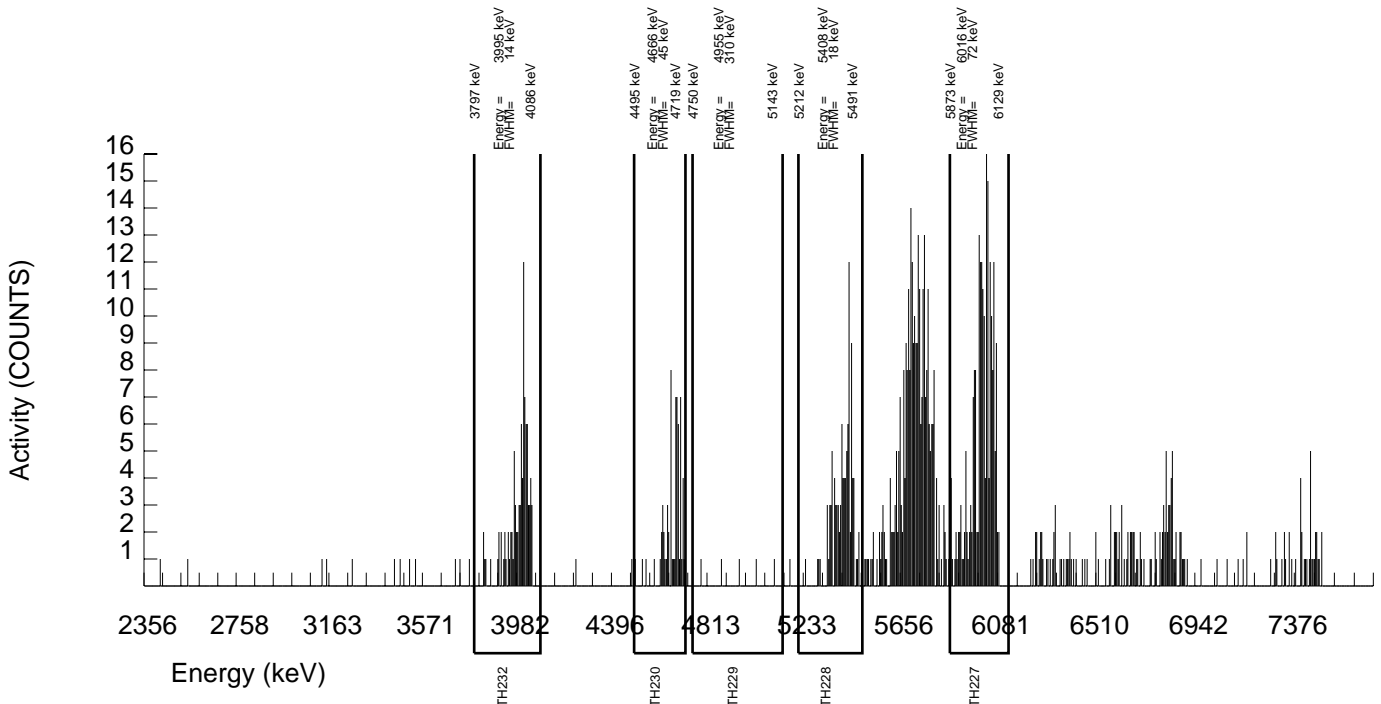
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343011_TH SAMPLE QTY: 0.252 G	
DETECTOR NUMBER :74440 AVERAGE %EFFICIENCY :25.5522 % YIELD : 41.730		COUNT DATE:10-OCT-2009 15:23:17 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 1.62676 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B182.CNF;132 BKG DATE : 4-OCT-2009 EFF FILE : W182.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	222.000	211.000	11.000	3.3166	57.44000	6.97E+00	1.07E+00	6.09E-01	2.55E-01	9.88E-01
TH-228	5363.000	102.000	94.000	8.000	2.8284	99.94000	1.61E+00	3.66E-01	2.78E-01	1.13E-01	3.53E-01
TH229	4900.000	5.000	2.000	3.000	1.7321	99.52000	3.37E-02	9.34E-02	1.86E-01	6.79E-02	9.34E-02
TH-230	4625.000	64.000	63.000	1.000	1.0000	100.0000	1.06E+00	2.72E-01	1.28E-01	3.90E-02	2.65E-01
TH-232	3972.000	94.000	94.000	0.000	0.0000	100.0000	1.58E+00	3.32E-01	5.03E-02	0.00E+00	3.19E-01

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



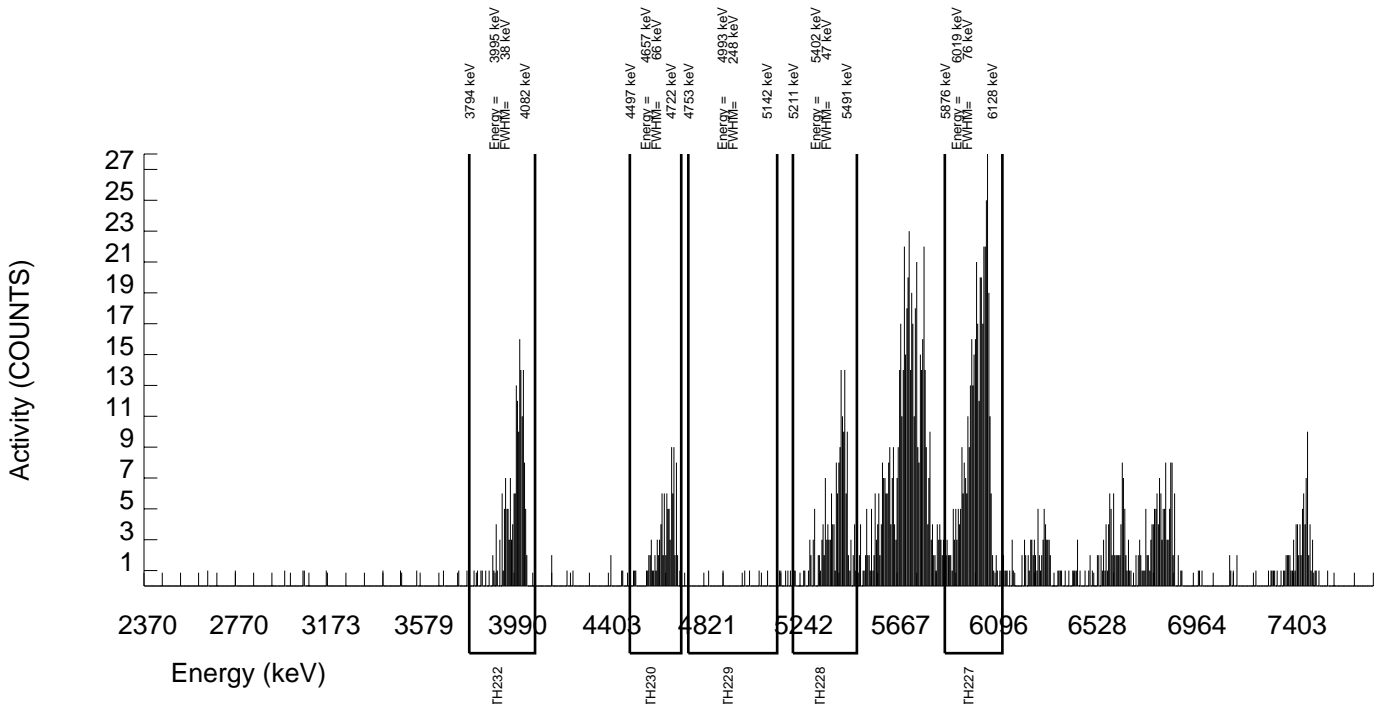
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343012_TH SAMPLE QTY: 0.256 G	
DETECTOR NUMBER :74441 AVERAGE %EFFICIENCY :26.1199 % YIELD : 82.033		COUNT DATE:10-OCT-2009 15:23:21 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.360E+00	LCS/LCSD ID : A2796-J ISOTOPE : TH-230 PCI/G : 8.360E+00	TRACER ID : 0387-B-102 ISOTOPE : AC-227 NOMINAL : 3.89831 dpm RESULTS : 3.19789 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B183.CNF;132 BKG DATE : 4-OCT-2009 EFF FILE : W183.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	426.000	424.000	2.000	1.4142	57.44000	6.86E+00	7.72E-01	1.55E-01	5.32E-02	6.56E-01
TH-228	5363.000	176.000	165.000	11.000	3.3166	99.94000	1.39E+00	2.40E-01	1.55E-01	6.49E-02	2.26E-01
TH229	4900.000	6.000	0.000	6.000	2.4495	99.52000	0.00E+00	5.60E-02	1.19E-01	4.70E-02	5.60E-02
TH-230	4625.000	101.000	99.000	2.000	1.4142	100.0000	8.13E-01	1.70E-01	7.87E-02	2.70E-02	1.63E-01
TH-232	3972.000	180.000	178.000	2.000	1.4142	100.0000	1.46E+00	2.34E-01	7.87E-02	2.70E-02	2.17E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.	SAMPLE ID : S0237343013_TH SAMPLE QTY: 0.250 G
--------------------------------------------------------------------------------------------------------	---------------------------------------------------

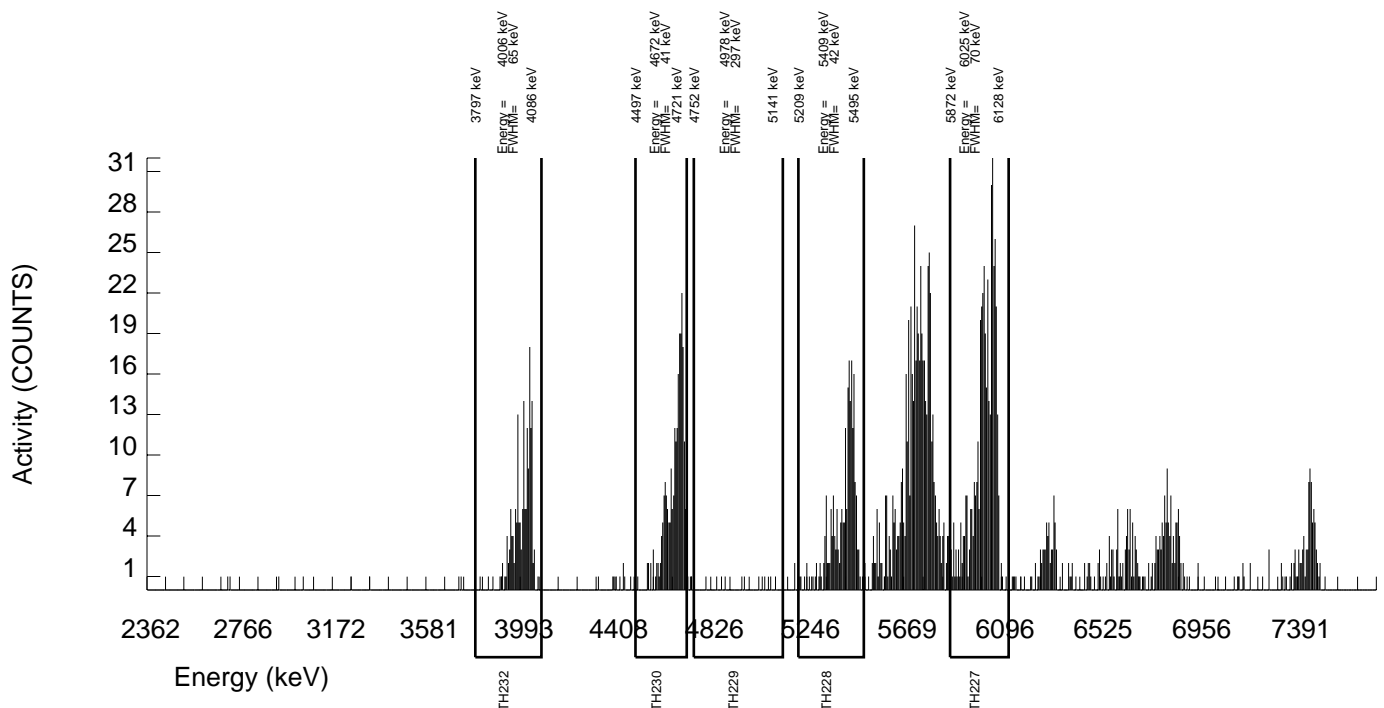
DETECTOR NUMBER :74442 AVERAGE %EFFICIENCY :25.8458 % YIELD : 85.053	COUNT DATE:10-OCT-2009 15:23:23 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2
----------------------------------------------------------------------------	--------------------------------------------------------------------------------------

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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 3.31565 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B184.CNF;134 BKG DATE : 4-OCT-2009 EFF FILE : W184.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	441.000	435.000	6.000	2.4495	57.44000	7.02E+00	7.89E-01	2.32E-01	9.20E-02	6.69E-01
TH-228	5363.000	223.000	210.000	13.000	3.6056	99.94000	1.76E+00	2.74E-01	1.66E-01	7.04E-02	2.53E-01
TH229	4900.000	11.000	5.000	6.000	2.4495	99.52000	4.12E-02	6.66E-02	1.19E-01	4.69E-02	6.66E-02
TH-230	4625.000	233.000	231.000	2.000	1.4142	100.0000	1.89E+00	2.71E-01	7.85E-02	2.70E-02	2.46E-01
TH-232	3972.000	174.000	172.000	2.000	1.4142	100.0000	1.41E+00	2.29E-01	7.85E-02	2.70E-02	2.13E-01

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



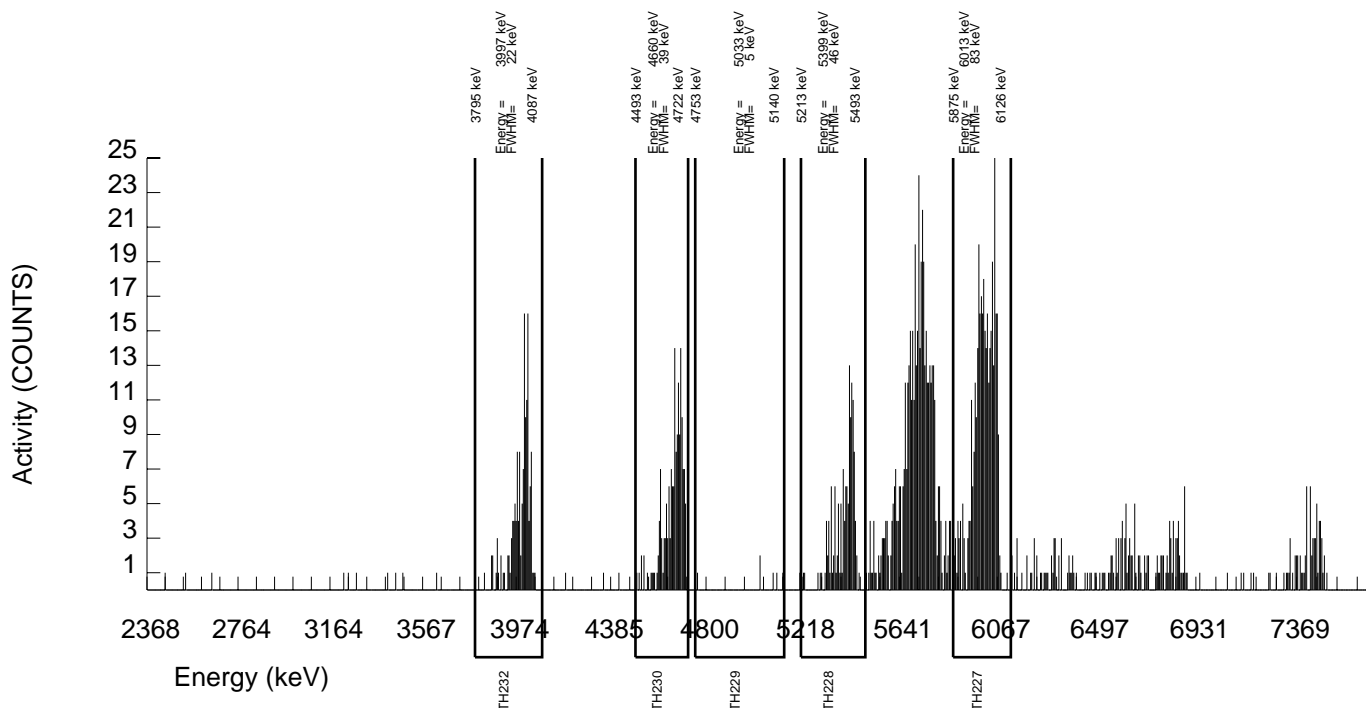
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343014_TH SAMPLE QTY: 0.254 G	
DETECTOR NUMBER :68615 AVERAGE %EFFICIENCY :25.7805 % YIELD : 72.332		COUNT DATE:10-OCT-2009 15:23:26 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 2.81972 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B185.CNF;114 BKG DATE : 4-OCT-2009 EFF FILE : W185.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	374.000	369.000	5.000	2.2361	57.44000	6.91E+00	8.25E-01	2.51E-01	9.75E-02	7.15E-01
TH-228	5363.000	140.000	130.000	10.000	3.1623	99.94000	1.27E+00	2.46E-01	1.73E-01	7.17E-02	2.34E-01
TH229	4900.000	6.000	2.000	4.000	2.0000	99.52000	1.91E-02	5.92E-02	1.18E-01	4.45E-02	5.92E-02
TH-230	4625.000	166.000	164.000	2.000	1.4142	100.0000	1.56E+00	2.59E-01	9.11E-02	3.13E-02	2.42E-01
TH-232	3972.000	147.000	146.000	1.000	1.0000	100.0000	1.39E+00	2.41E-01	7.28E-02	2.21E-02	2.27E-01

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



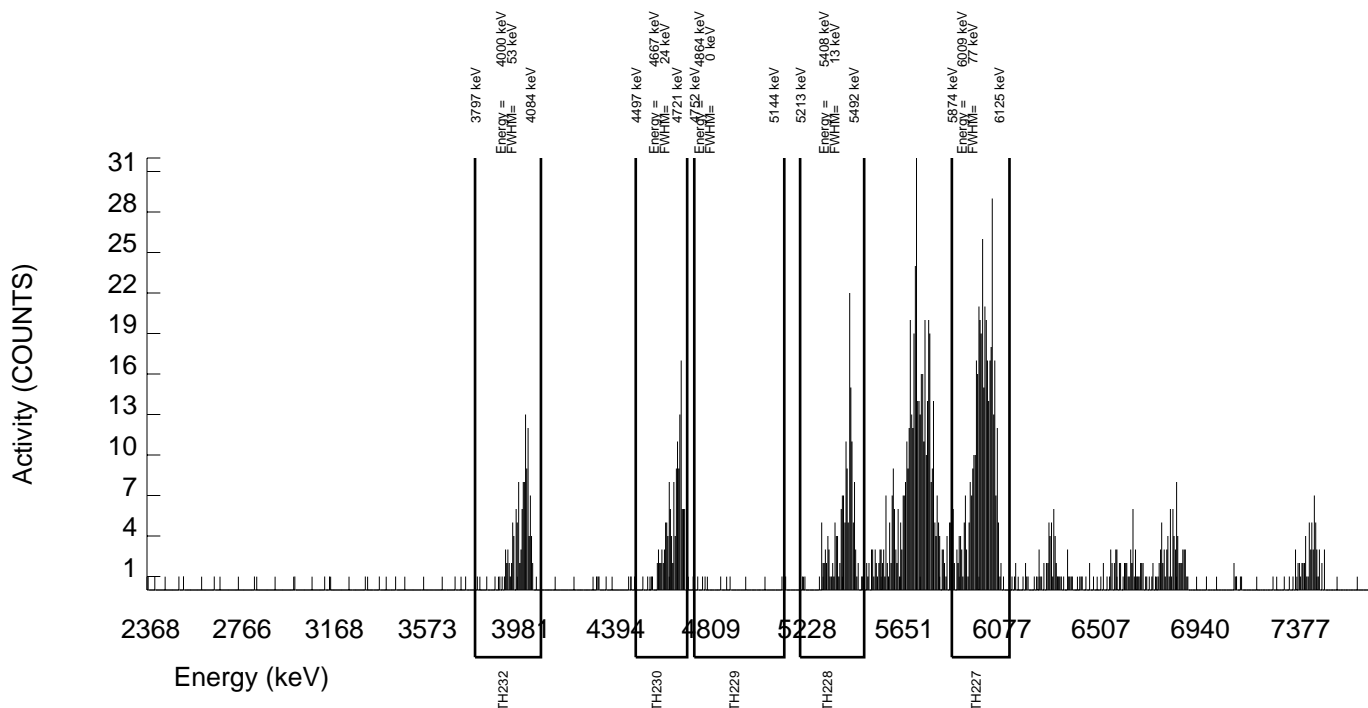
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343015_TH SAMPLE QTY: 0.252 G	
DETECTOR NUMBER :68616 AVERAGE %EFFICIENCY :24.8843 % YIELD : 85.700		COUNT DATE:10-OCT-2009 15:23:29 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 3.34085 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B186.CNF;114 BKG DATE : 4-OCT-2009 EFF FILE : W186.CNF;42 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	427.000	422.000	5.000	2.2361	57.44000	6.97E+00	7.91E-01	2.21E-01	8.59E-02	6.73E-01
TH-228	5363.000	164.000	153.000	11.000	3.3166	99.94000	1.31E+00	2.36E-01	1.58E-01	6.63E-02	2.23E-01
TH229	4900.000	7.000	6.000	1.000	1.0000	99.52000	5.05E-02	4.68E-02	6.45E-02	1.96E-02	4.67E-02
TH-230	4625.000	145.000	145.000	0.000	0.0000	100.0000	1.22E+00	2.11E-01	2.51E-02	0.00E+00	1.98E-01
TH-232	3972.000	125.000	122.000	3.000	1.7321	100.0000	1.02E+00	1.96E-01	9.27E-02	3.38E-02	1.86E-01

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



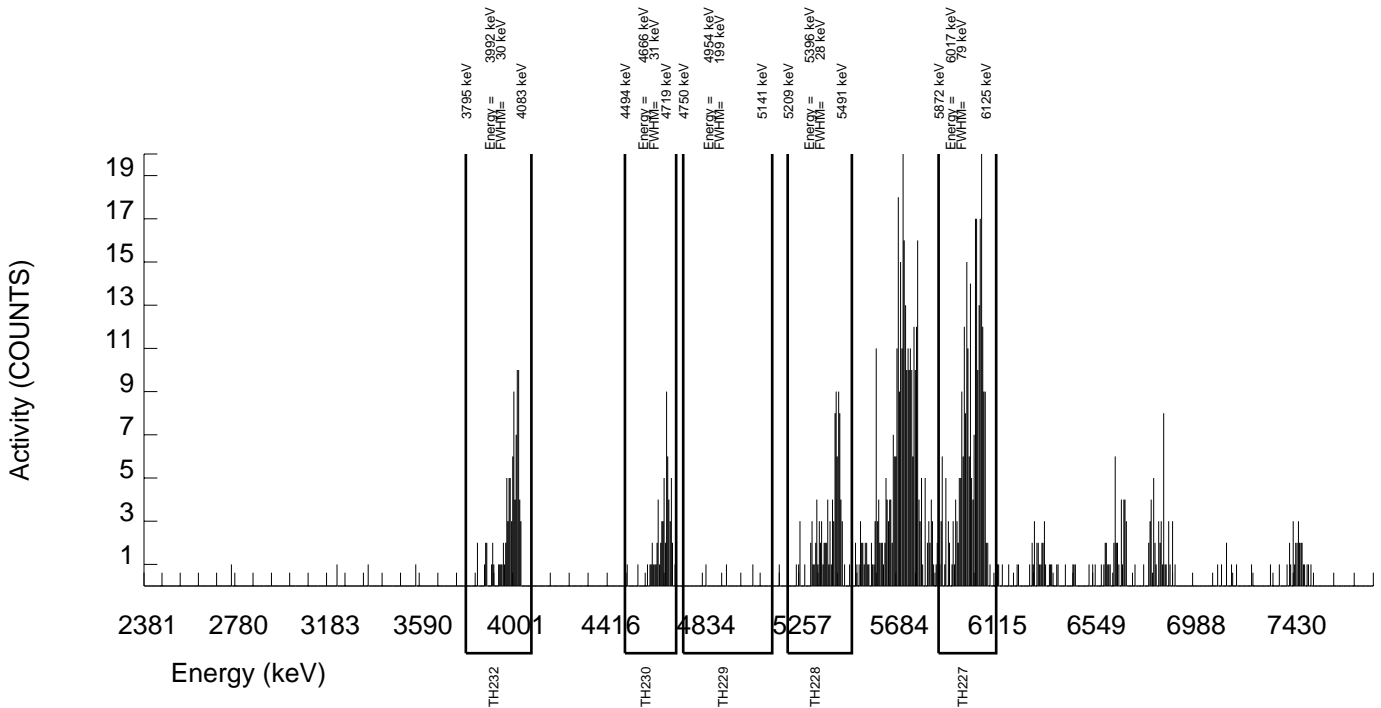
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343016_TH SAMPLE QTY: 0.254 G	
DETECTOR NUMBER :68620 AVERAGE %EFFICIENCY :25.0014 % YIELD : 54.575		COUNT DATE:10-OCT-2009 15:23:32 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 2.12751 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B187.CNF;114 BKG DATE : 4-OCT-2009 EFF FILE : W187.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	275.000	270.000	5.000	2.2361	57.44000	6.91E+00	9.45E-01	3.43E-01	1.33E-01	8.40E-01
TH-228	5363.000	100.000	85.000	15.000	3.8730	99.94000	1.13E+00	2.89E-01	2.80E-01	1.20E-01	2.80E-01
TH229	4900.000	3.000	-3.000	6.000	2.4495	99.52000	-3.92E-02	7.68E-02	1.88E-01	7.44E-02	7.68E-02
TH-230	4625.000	62.000	59.000	3.000	1.7321	100.0000	7.67E-01	2.11E-01	1.44E-01	5.24E-02	2.05E-01
TH-232	3972.000	95.000	95.000	0.000	0.0000	100.0000	1.23E+00	2.60E-01	3.90E-02	0.00E+00	2.48E-01

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



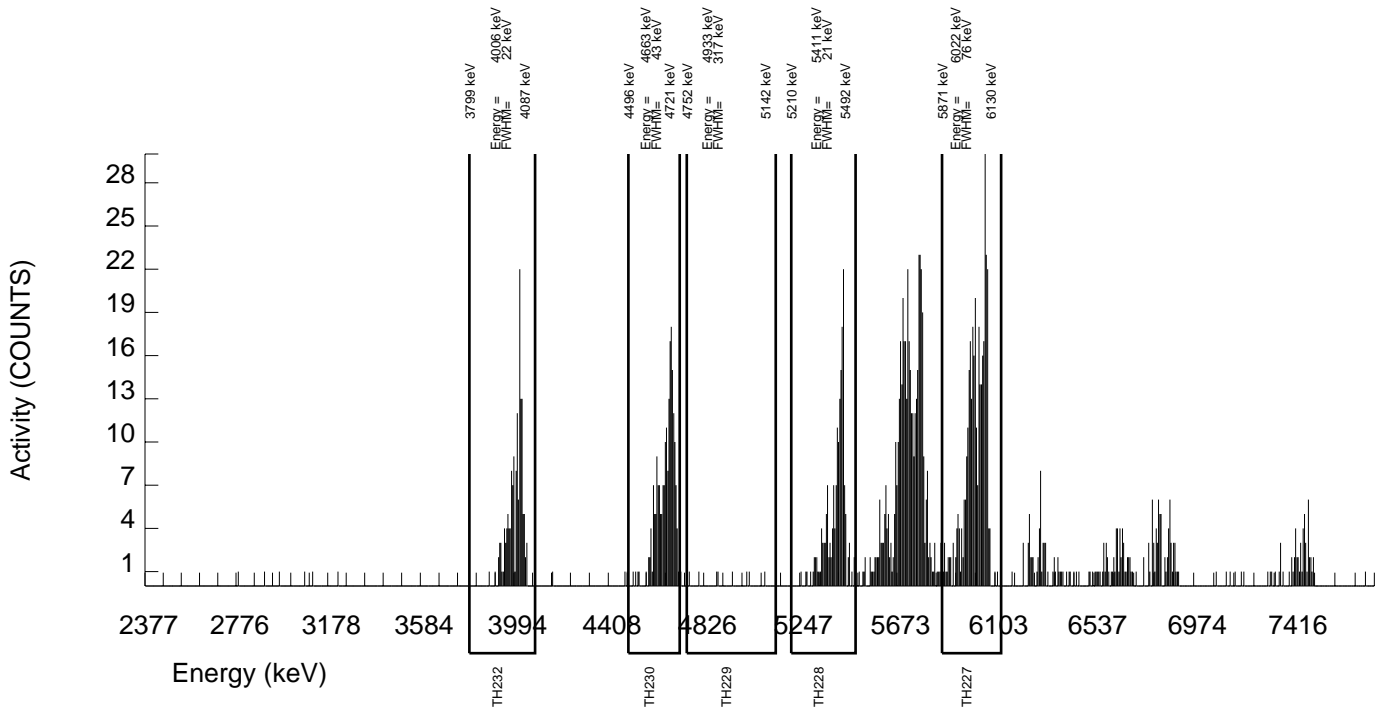
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343017_TH SAMPLE QTY: 0.252 G	
DETECTOR NUMBER :68621 AVERAGE %EFFICIENCY :25.7368 % YIELD : 68.331		COUNT DATE:10-OCT-2009 15:23:35 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 2.66377 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B188.CNF;114 BKG DATE : 4-OCT-2009 EFF FILE : W188.CNF;43 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	356.000	348.000	8.000	2.8284	57.44000	6.97E+00	8.56E-01	3.24E-01	1.32E-01	7.49E-01
TH-228	5363.000	177.000	169.000	8.000	2.8284	99.94000	1.76E+00	2.97E-01	1.68E-01	6.85E-02	2.78E-01
TH229	4900.000	8.000	5.000	3.000	1.7321	99.52000	5.11E-02	6.65E-02	1.13E-01	4.12E-02	6.64E-02
TH-230	4625.000	205.000	203.000	2.000	1.4142	100.0000	2.06E+00	3.12E-01	9.74E-02	3.34E-02	2.87E-01
TH-232	3972.000	150.000	148.000	2.000	1.4142	100.0000	1.50E+00	2.61E-01	9.74E-02	3.34E-02	2.46E-01

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



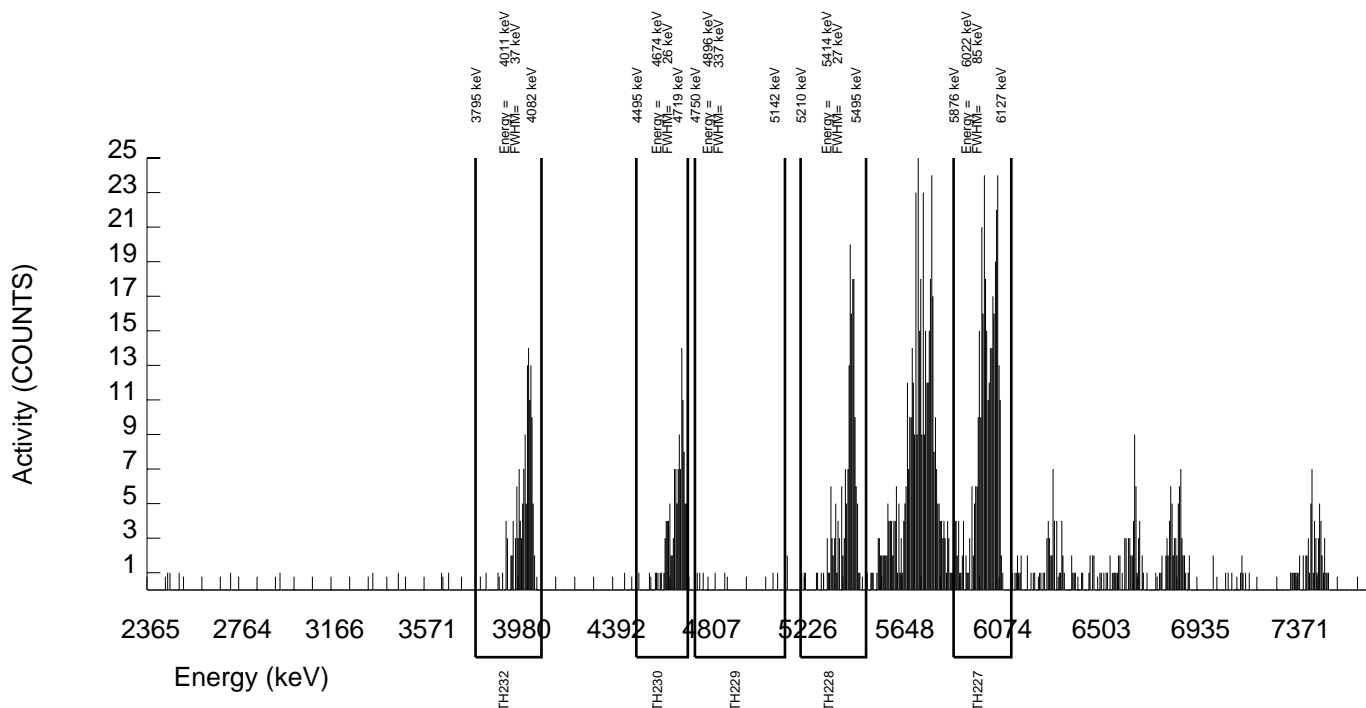
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S0237343018_TH SAMPLE QTY: 0.251 G	
DETECTOR NUMBER :68622 AVERAGE %EFFICIENCY :26.1313 % YIELD : 68.847		COUNT DATE:10-OCT-2009 15:23:38 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 2.68387 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B189.CNF;114 BKG DATE : 4-OCT-2009 EFF FILE : W189.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	362.000	356.000	6.000	2.4495	57.44000	7.00E+00	8.60E-01	2.83E-01	1.12E-01	7.39E-01
TH-228	5363.000	177.000	167.000	10.000	3.1623	99.94000	1.71E+00	2.94E-01	1.81E-01	7.52E-02	2.74E-01
TH229	4900.000	7.000	1.000	6.000	2.4495	99.52000	1.00E-02	7.08E-02	1.44E-01	5.71E-02	7.08E-02
TH-230	4625.000	120.000	119.000	1.000	1.0000	100.0000	1.19E+00	2.28E-01	7.63E-02	2.32E-02	2.15E-01
TH-232	3972.000	138.000	137.000	1.000	1.0000	100.0000	1.37E+00	2.46E-01	7.63E-02	2.32E-02	2.31E-01

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



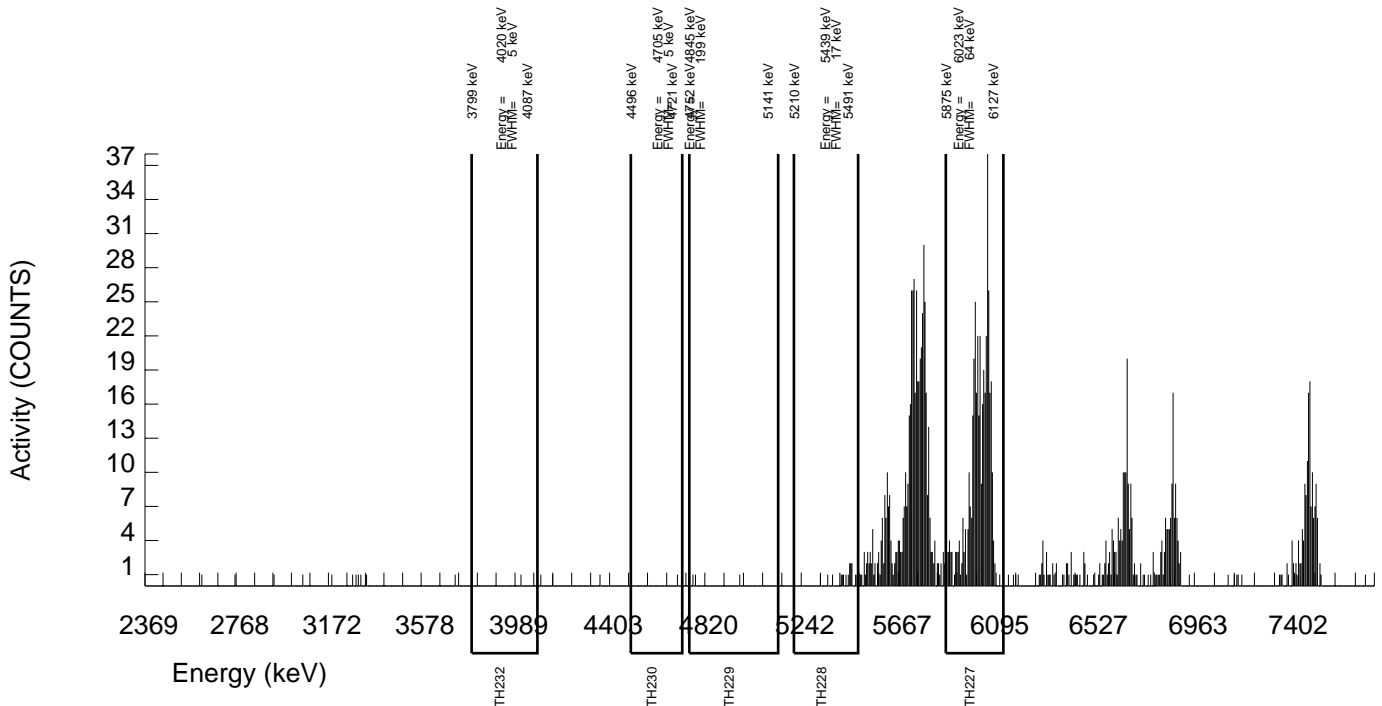
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 2-OCT-2009 00:00:00. AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S1201937429_TH SAMPLE QTY: 0.258 G	
DETECTOR NUMBER :74435 AVERAGE %EFFICIENCY :26.5975 % YIELD : 90.874		COUNT DATE:14-OCT-2009 12:56:58 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 3.54256 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B177.CNF;134 BKG DATE : 11-OCT-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	418.000	414.000	4.000	2.0000	57.44000	6.81E+00	7.75E-01	2.02E-01	7.65E-02	6.62E-01
TH-228	5363.000	16.000	-4.876	14.000	3.7417	99.94000	-3.57E-02	6.90E-02	1.49E-01	6.37E-02	6.90E-02
TH229	4900.000	3.000	0.000	3.000	1.7321	99.52000	0.00E+00	3.48E-02	8.03E-02	2.92E-02	3.48E-02
TH-230	4625.000	1.000	-1.000	2.000	1.4142	100.0000	-7.22E-03	2.45E-02	6.92E-02	2.38E-02	2.45E-02
TH-232	3972.000	1.000	1.000	0.000	0.0000	100.0000	7.22E-03	1.42E-02	2.17E-02	0.00E+00	1.42E-02

NOTE: Ac-227 results decay corrected to separation date/time.
NOTE: Corrections made to Th-228 net area due to Ra-223 ingrowth from tracer.



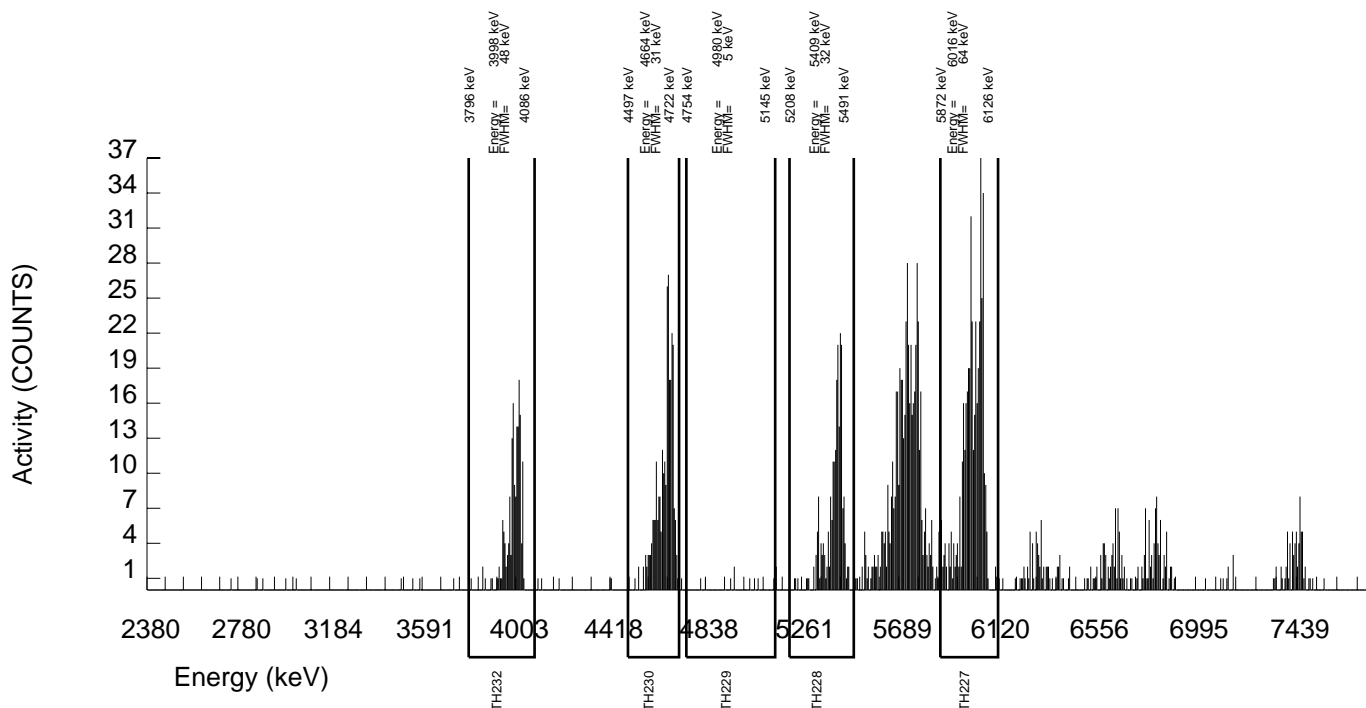
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S1201937430_TH SAMPLE QTY: 0.258 G	
DETECTOR NUMBER :68624 AVERAGE %EFFICIENCY :26.2560 % YIELD : 86.612		COUNT DATE:10-OCT-2009 15:23:44 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 3.37642 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B191.CNF;116 BKG DATE : 4-OCT-2009 EFF FILE : W191.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	456.000	450.000	6.000	2.4495	57.44000	6.81E+00	7.66E-01	2.18E-01	8.62E-02	6.37E-01
TH-228	5363.000	217.000	208.000	9.000	3.0000	99.94000	1.64E+00	2.53E-01	1.33E-01	5.49E-02	2.32E-01
TH229	4900.000	10.000	8.000	2.000	1.4142	99.52000	6.17E-02	5.25E-02	7.39E-02	2.54E-02	5.24E-02
TH-230	4625.000	270.000	266.000	4.000	2.0000	100.0000	2.04E+00	2.80E-01	9.45E-02	3.57E-02	2.49E-01
TH-232	3972.000	170.000	168.000	2.000	1.4142	100.0000	1.29E+00	2.13E-01	7.36E-02	2.53E-02	1.97E-01

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



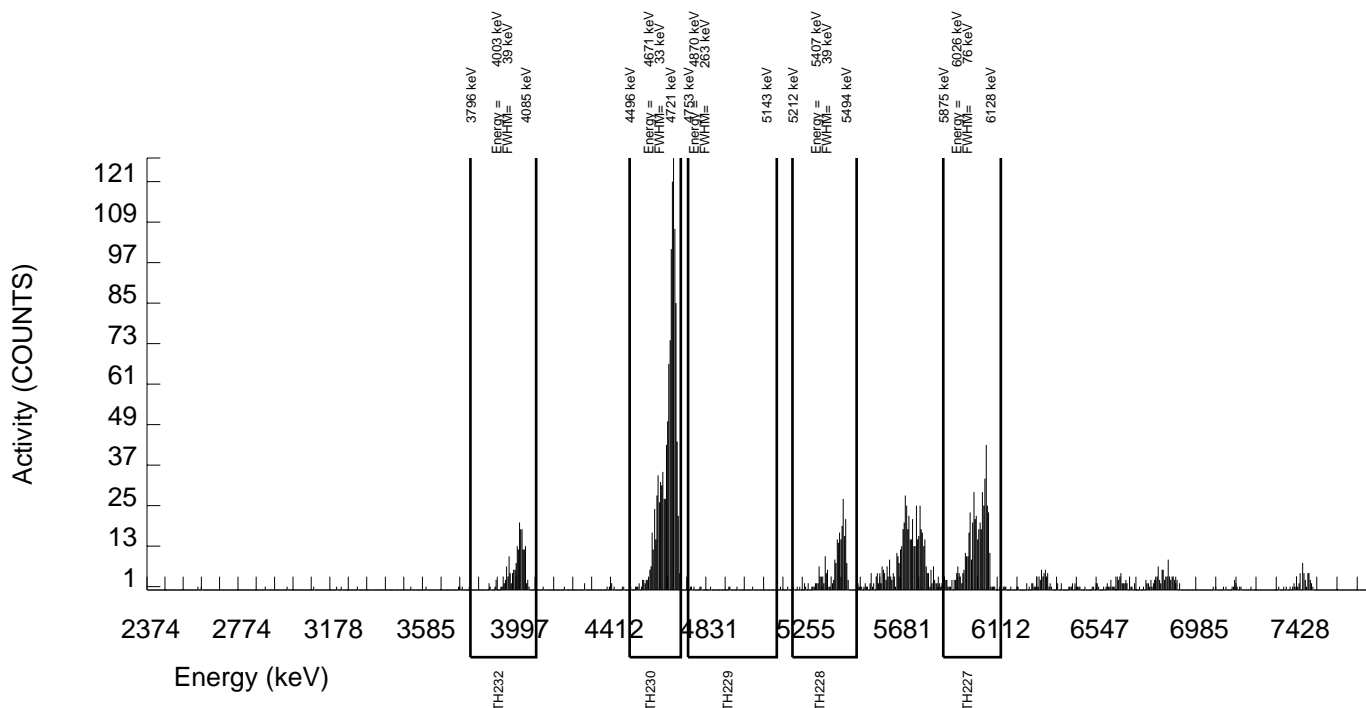
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 17-SEP-2009 00:00:00 AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S1201937431_TH SAMPLE QTY: 0.251 G	
DETECTOR NUMBER :74430 AVERAGE %EFFICIENCY :25.4458 % YIELD : 96.917		COUNT DATE:10-OCT-2009 15:23:46 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 3.77814 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B192.CNF;114 BKG DATE : 4-OCT-2009 EFF FILE : W192.CNF;48 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	497.000	488.000	9.000	3.0000	57.44000	7.00E+00	7.58E-01	2.43E-01	1.00E-01	6.32E-01
TH-228	5363.000	240.000	229.000	11.000	3.3166	99.94000	1.71E+00	2.53E-01	1.37E-01	5.75E-02	2.32E-01
TH229	4900.000	10.000	3.000	7.000	2.6458	99.52000	2.19E-02	5.91E-02	1.12E-01	4.50E-02	5.91E-02
TH-230	4625.000	1192.000	1192.000	0.000	0.0000	100.0000	8.67E+00	7.15E-01	2.18E-02	0.00E+00	4.92E-01
TH-232	3972.000	197.000	196.000	1.000	1.0000	100.0000	1.43E+00	2.18E-01	5.57E-02	1.69E-02	2.01E-01

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



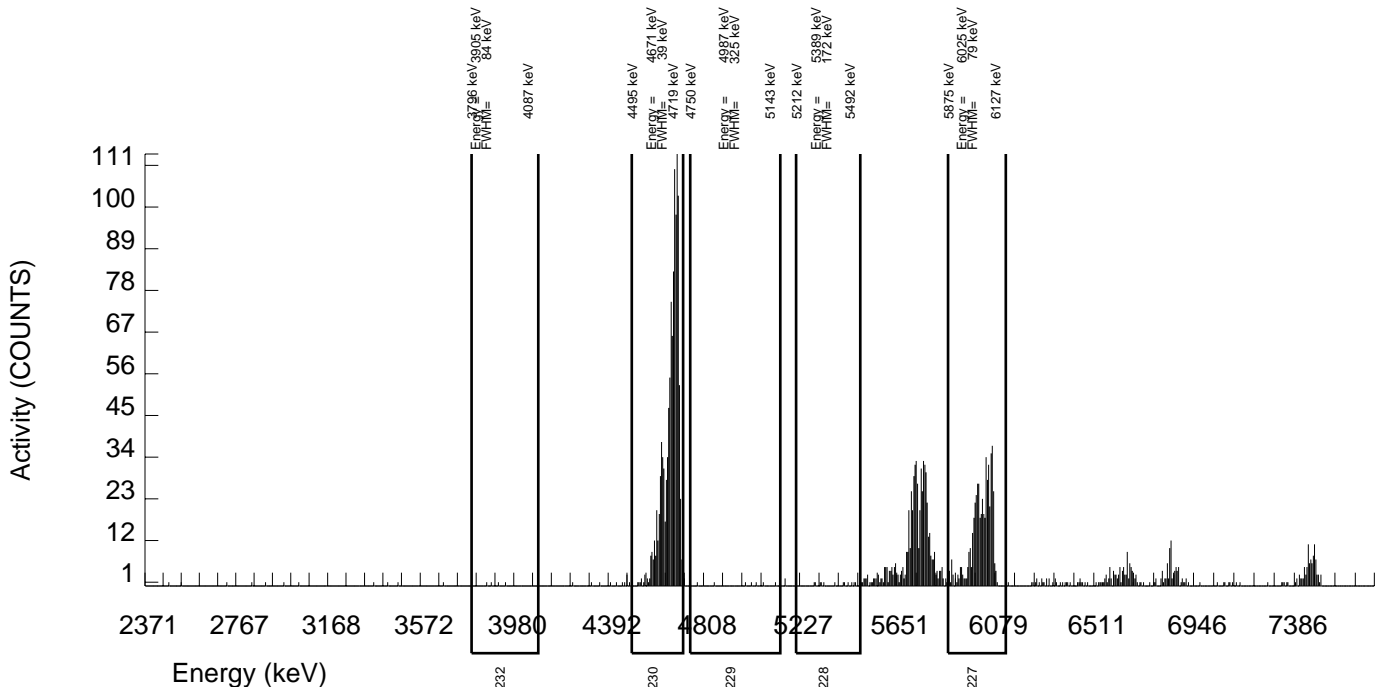
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 908246 SAMPLE DATE : 2-OCT-2009 00:00:00. AC-227 SEPARATION : 7-OCT-2009 15:35:00.		SAMPLE ID : S1201937432_TH SAMPLE QTY: 0.258 G	
DETECTOR NUMBER :68627 AVERAGE %EFFICIENCY :26.1520 % YIELD : 100.870		COUNT DATE:10-OCT-2009 15:23:49 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 : AC-227 NOMINAL : 3.89831 dpm RESULTS : 3.93224 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B193.CNF;116 BKG DATE : 4-OCT-2009 EFF FILE : W193.CNF;40 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	525.000	522.000	3.000	1.7321	57.44000	6.81E+00	7.25E-01	1.44E-01	5.25E-02	5.87E-01
TH-228	5363.000	12.000	1.000	11.000	3.3166	99.94000	6.68E-03	6.28E-02	1.23E-01	5.16E-02	6.28E-02
TH229	4900.000	7.000	-12.000	19.000	4.3589	99.52000	-7.98E-02	6.65E-02	1.55E-01	6.74E-02	6.65E-02
TH-230	4625.000	1155.000	1143.000	12.000	3.4641	100.0000	7.56E+00	6.48E-01	1.27E-01	5.33E-02	4.43E-01
TH-232	3972.000	4.000	-2.000	6.000	2.4495	100.0000	-1.32E-02	4.10E-02	9.53E-02	3.77E-02	4.10E-02

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



URANIUM

Radiochemistry Batch Checklist, Rev 9

Batch# 908848 Product: 4 Date: 10/7/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required)			NA
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	/		
Instrument source check is within limits.	/		
Instrument bkg check is within limits.	/		
Method RDL/ LLD has been met.	/		
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	/		
Or meets the client's required RER acceptance criteria.			
Tracer yield is 15-125% . Carrier yield 25-125%.		/	NCH# 742719
Or meets the client's contract acceptance criteria.			
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	/		
	/		
Sample was run within hold time.	/		
Sample was correctly preserved if required.	/		
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	/		
No blank spaces on data forms.	/		
All line outs initialed and dated.	/		
No transcription errors are apparent.			
Aux data is correct.			NA
Client Special requirements page has been checked.	/		
Raw Data and/ or spectrum are included and properly stasured.	/		
QC data entered into QC database and batch is in REVW	/		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	/		
Batch non-conformances completed, if applicable.	/		NCH# 742719
Batch non-conformances second reviewed and disposition verified to be completed.			NCH# 742719
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: [Signature] 10/7/09

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

9/22 (10/8)
KEROL

Uranium Que Sheet

23-SEP-09

Batch #: 905548 Analyst: AXD2 First Client Due Date: 08-OCT-09 Internal Due Date: 27-SEP-09

Tracer Isotope: U-232U-236 Tracer Code: 1283-E Expiration Date: 1/15/10 Vol: 0.1
 LCS Isotope: U-238 LCS Code: 1163-G Expiration Date: 4/10/10 Vol: 0.1
 Spike Isotope: U-238 Spike Code: Expiration Date: Vol:
 Prep Date: 9/29/09 Initials: APW Pipet ID: 2971058 Balance ID: 16750207

Witness: MARK B 9/29/09

Sample ID	Client Description	Hazard Code	Type	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g/Df)	Det #
236699016-1	EB090309-SO2		SAMPLE	.03 pCi/L	WATER	KERR003	03-SEP-09	1	1	0.800	114
236817014-1	EB090809-SO1		SAMPLE	.03 pCi/L	WATER	KERR003	08-SEP-09	2	2	0.800	113
236938020-1	EB091009-SO1		SAMPLE	.03 pCi/L	WATER	KERR003	10-SEP-09	3	3	0.800	145
237010013-1	EB091009-SO2		SAMPLE	.03 pCi/L	WATER	KERR003	10-SEP-09	4	4	0.800	146
237170005-1	EB091409-SO1		SAMPLE	.03 pCi/L	WATER	KERR003	14-SEP-09	5	5	0.800	13a
237170020-1	EB091509-SO1		SAMPLE	.03 pCi/L	WATER	KERR003	15-SEP-09	6	6	0.800	135
237343006-1	EB091609-SO1		SAMPLE	.03 pCi/L	WATER	KERR003	16-SEP-09	7	7	0.800	161
237521010-1	EB091809-SO1		SAMPLE	.03 pCi/L	WATER	KERR003	18-SEP-09	8	8	0.800	162
1201930842-1	MB for batch 905548		MB	.03 pCi/L	WATER	QC ACCOUNT	03-SEP-09	9	9	0.800	22
1201930843-1	LCS for batch 905548		LCS	.03 pCi/L	WATER	QC ACCOUNT	03-SEP-09	10	10	0.800	23
1201930844-1	LCS for batch 905548		LCS	.03 pCi/L	WATER	QC ACCOUNT	03-SEP-09	11	11	0.800	24

APW 9/29/09

Data Reviewed By:

Solid Sample Dissolution by: LEACH or DIGESTION
 Circle One

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

GEL Laboratories LLC, Radiochemistry Division

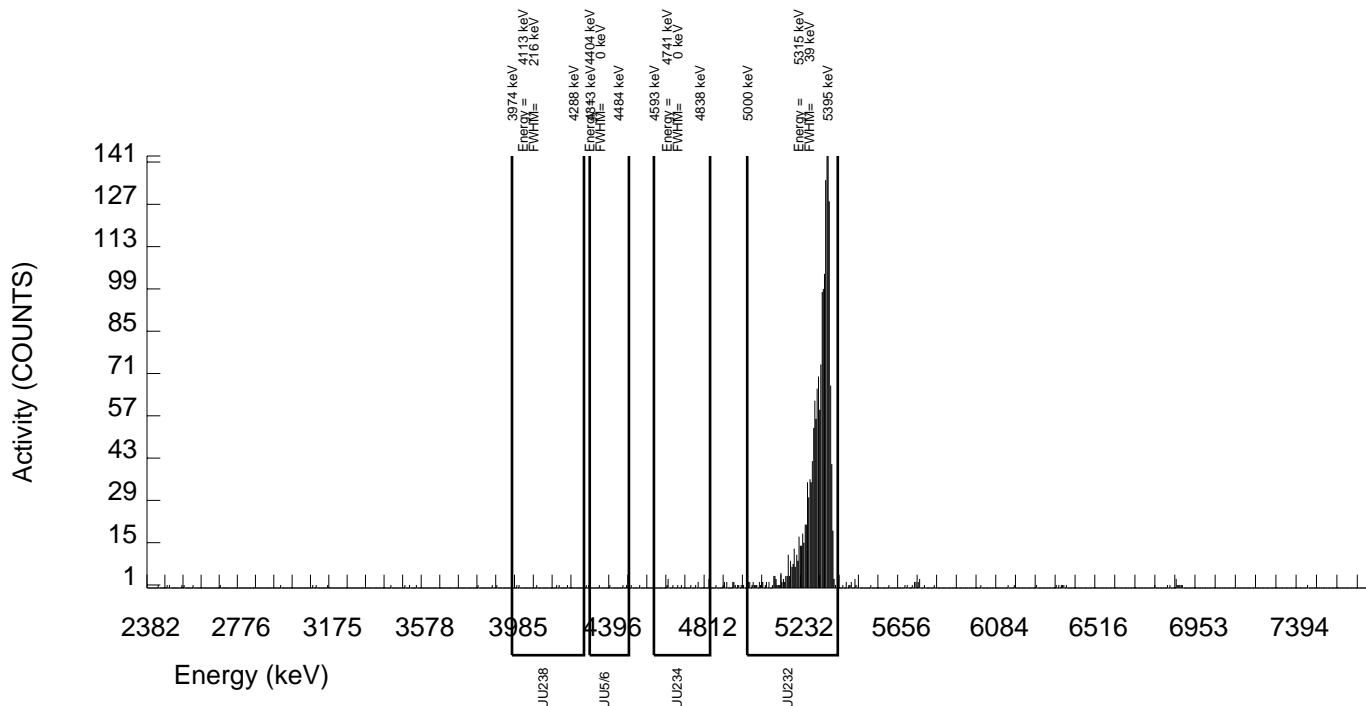
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905548 SAMPLE DATE : 16-SEP-2009 00:00:00		SAMPLE ID : S0237343006_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :70321 AVERAGE %EFFICIENCY :36.8913 % YIELD : 95.374		COUNT DATE: 2-OCT-2009 20:26:01 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :AXD2	
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 : 5.25748 dpm RESULTS : 5.01430 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B161.CNF;128 BKG DATE : 27-SEP-2009 EFF FILE : W161.CNF;46 CAL DATE : 21-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	14.000	7.136	5.000	2.2361	100.0000	1.14E-02	1.31E-02	2.15E-02	8.32E-03	1.30E-02
U232	5302.100	1856.000	1849.000	7.000	2.6458	100.0000	2.96E+00	4.14E-01	2.45E-02	9.85E-03	1.35E-01
U-235	4391.000	5.000	2.000	3.000	1.7321	80.90000	3.96E-03	1.10E-02	2.19E-02	7.97E-03	1.10E-02
U-238	4184.730	6.000	2.000	4.000	2.0000	100.0000	3.20E-03	9.93E-03	1.97E-02	7.45E-03	9.92E-03

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



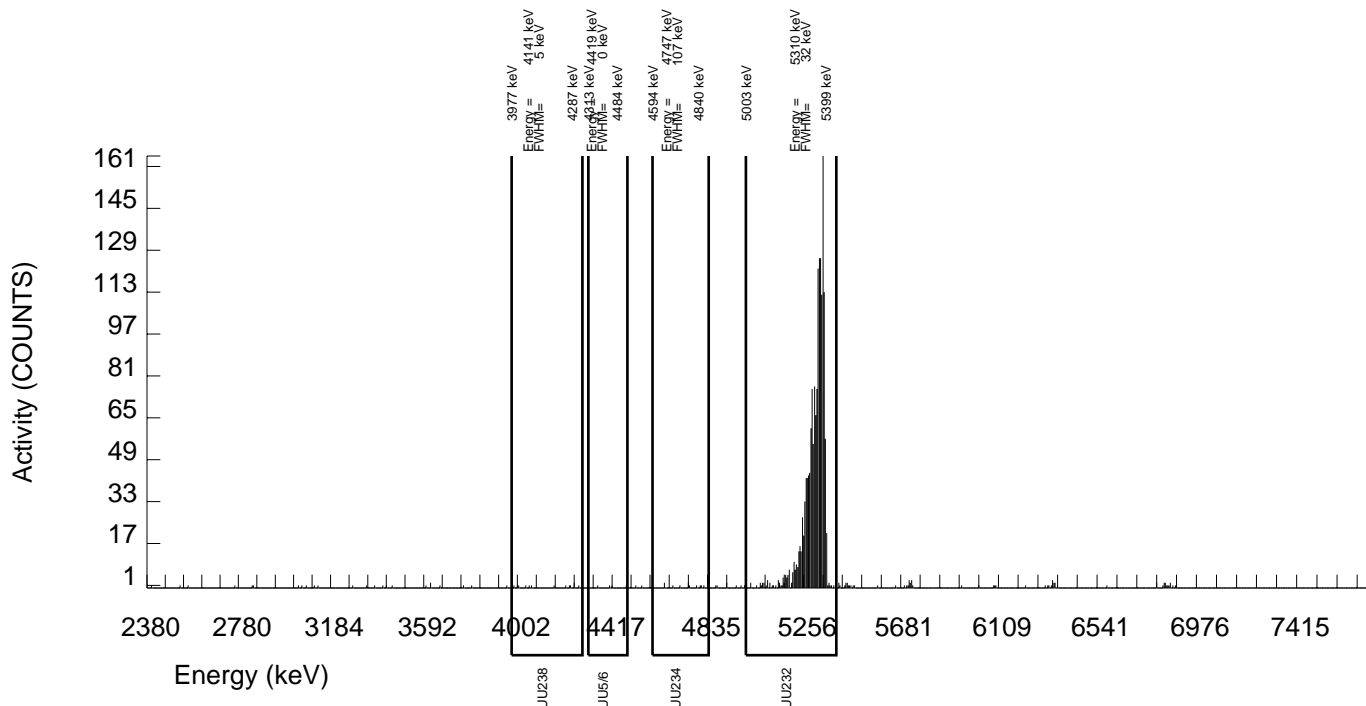
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905548 SAMPLE DATE : 29-SEP-2009 00:00:00		SAMPLE ID : S1201930842_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :72530 AVERAGE %EFFICIENCY :31.6755 % YIELD : 98.463		COUNT DATE: 2-OCT-2009 13:49:11 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :AXD2	
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 : 5.25568 dpm RESULTS : 5.17488 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B022.CNF;1063 BKG DATE : 27-SEP-2009 EFF FILE : W022.CNF;304 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	11.000	4.348	5.000	2.2361	100.0000	7.85E-03	1.34E-02	2.42E-02	9.39E-03	1.34E-02
U232	5302.100	1651.000	1639.000	12.000	3.4641	100.0000	2.96E+00	4.21E-01	3.45E-02	1.46E-02	1.44E-01
U-235	4391.000	4.000	3.000	1.000	1.0000	80.90000	6.69E-03	9.82E-03	1.71E-02	5.19E-03	9.78E-03
U-238	4184.730	13.000	9.000	4.000	2.0000	100.0000	1.62E-02	1.47E-02	2.22E-02	8.40E-03	1.46E-02

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



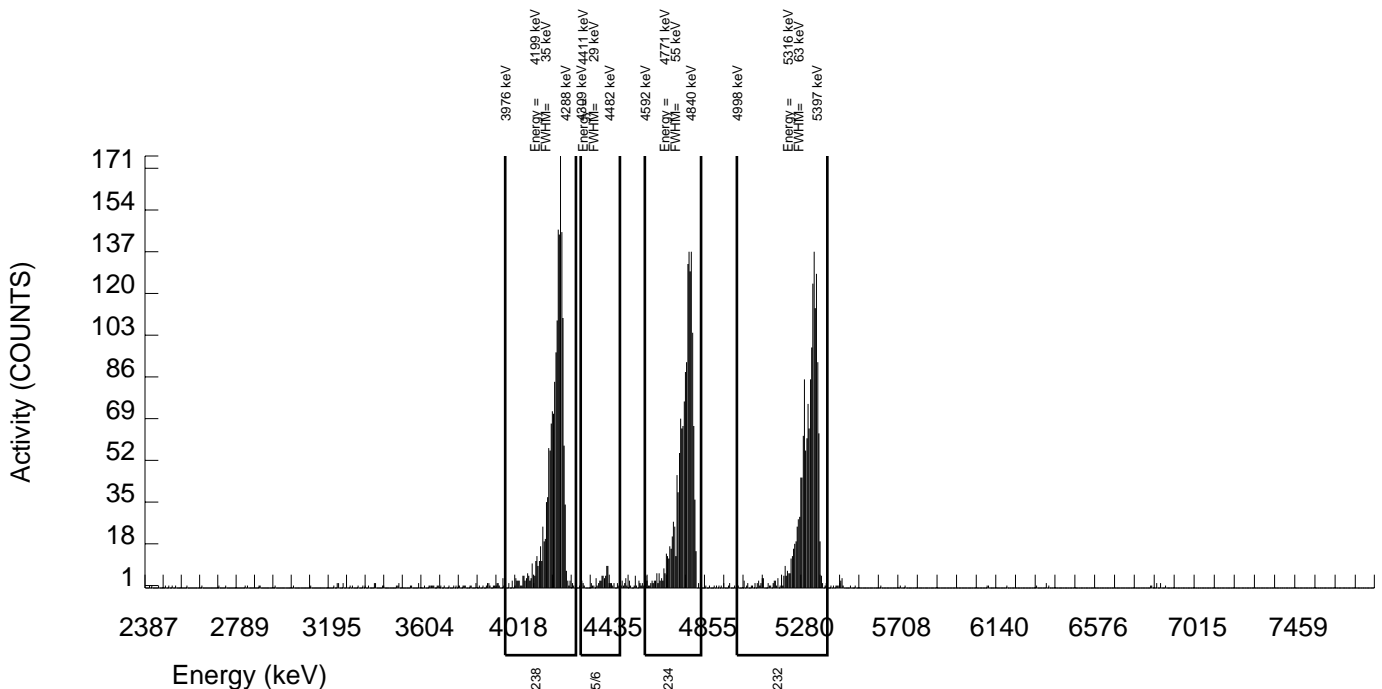
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905548 SAMPLE DATE : 29-SEP-2009 00:00:00		SAMPLE ID : S1201930843_UU SAMPLE QTY: 0.800 L	
DETECTOR NUMBER :78264 AVERAGE %EFFICIENCY :33.1983 % YIELD : 91.825		COUNT DATE: 2-OCT-2009 13:49:11 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :AXD2	
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 : 5.25568 dpm RESULTS : 4.82605 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B023.CNF;1065 BKG DATE : 27-SEP-2009 EFF FILE : W023.CNF;290 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	1577.000	1565.385	10.000	3.1623	100.0000	2.89E+00	4.12E-01	3.27E-02	1.36E-02	1.44E-01
U232	5302.100	1612.000	1602.000	10.000	3.1623	100.0000	2.96E+00	4.21E-01	3.27E-02	1.36E-02	1.46E-01
U-235	4391.000	73.000	67.000	6.000	2.4495	80.90000	1.53E-01	4.47E-02	3.29E-02	1.30E-02	3.98E-02
U-238	4184.730	1726.000	1712.000	14.000	3.7417	100.0000	3.16E+00	4.49E-01	3.77E-02	1.61E-02	1.51E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 905548
SAMPLE DATE : 29-SEP-2009 00:00:00

SAMPLE ID : S1201930844_UU
SAMPLE QTY: 0.800 L

DETECTOR NUMBER :76542
AVERAGE %EFFICIENCY :32.8288
% YIELD : 90.135

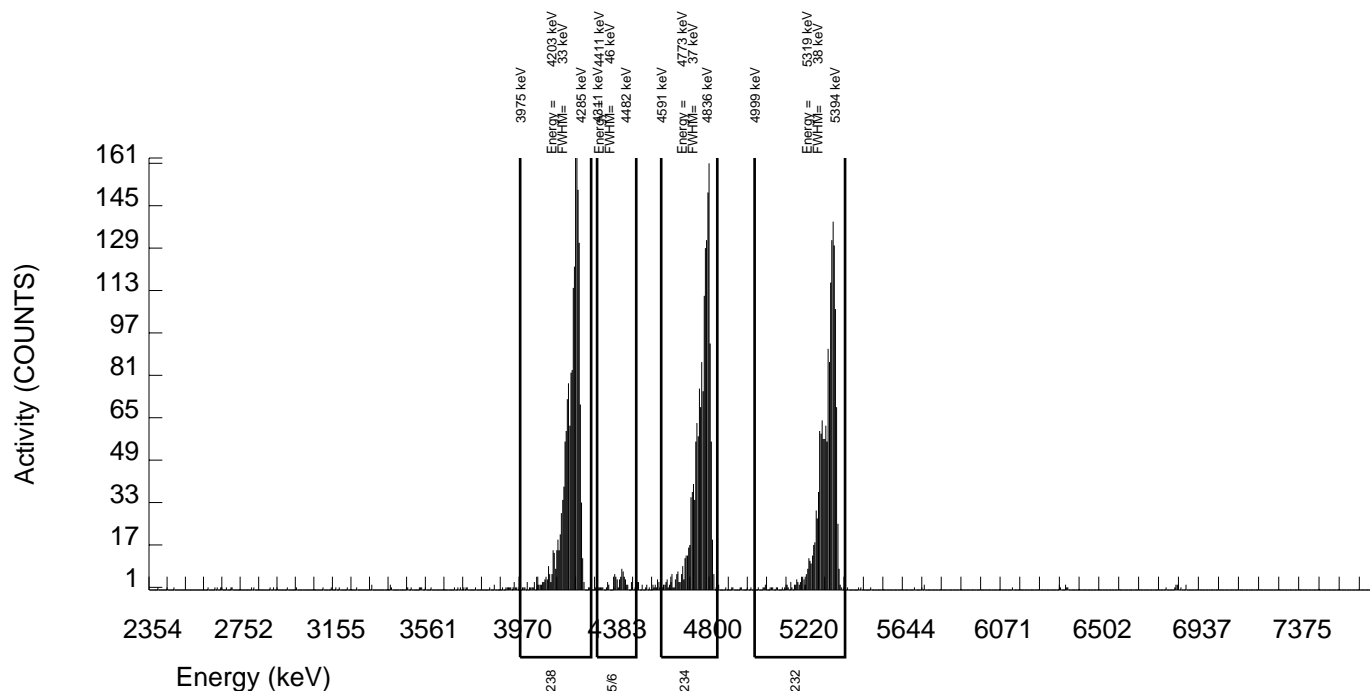
COUNT DATE: 2-OCT-2009 13:49:11
ELAPSED LIVE TIME(SEC): 59999.99
ANALYST :AXD2

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 : 5.25568 dpm RESULTS : 4.73719 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B024.CNF;1058 BKG DATE : 27-SEP-2009 EFF FILE : W024.CNF;289 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	1629.000	1620.433	7.000	2.6458	100.0000	3.08E+00	4.40E-01	2.91E-02	1.17E-02	1.51E-01
U232	5302.100	1563.000	1555.000	8.000	2.8284	100.0000	2.96E+00	4.23E-01	3.08E-02	1.25E-02	1.48E-01
U-235	4391.000	71.000	71.000	0.000	0.0000	80.90000	1.67E-01	4.48E-02	7.06E-03	0.00E+00	3.88E-02
U-238	4184.730	1737.000	1729.000	8.000	2.8284	100.0000	3.29E+00	4.67E-01	3.08E-02	1.25E-02	1.56E-01

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



Radiochemistry Batch Checklist, Rev 9

Batch# 911639 Product: U Date: 10/16/09

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 746914
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	✓		Case narrative
Or meets the client's required RER acceptance criteria.			
Tracer yield is 15-125% . Carrier yield 25-125%.		✓	NCR 746914
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.	✓		NCR 746914
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCR 746914
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: JopLMT - 10/16/09

Secondary Review Performed By: [Signature] 10/16/09

10/10 10/16
VSR

Uranium Que Sheet

13-OCT-09

Batch #: 911639 Analyst: JXD2 First Client Due Date: 16-OCT-09 Internal Due Date: 10-OCT-09
 Tracer Isotope: U-232 U-236 Tracer Code: 1283-E Expiration Date: 01/15/10 Vol: 0.1
 LCS Isotope: U-238 LCS Code: 1163-G Expiration Date: 04/14/10 Vol: 0.1
 Spike Isotope: U-238 Spike Code: 1163-G Expiration Date: 04/14/10 Vol: 0.1
 Prep Date: 10/13/09 Initials: gvd Pipet ID: 2771558 Balance ID: 50410272

Witness: ML 10/13/09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	U	
										Wet	Dry
237343001-2	SA128-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	16-SEP-09	1	1	0.504	113
237343002-2	SA128-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	16-SEP-09	2	2	0.502	114
237343003-2	SA128-29B	SAMPLE		.04 pCi/g	SOIL	KERR003	16-SEP-09	3	3	0.501	115
237343004-2	SA65-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	16-SEP-09	4	4	0.515	116
237343005-2	SA65009-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	16-SEP-09	5	5	0.506	117
237343007-2	SA51-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	17-SEP-09	6	6	0.502	118
237343008-2	SA51009-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	17-SEP-09	7	7	0.504	119
237343009-2	SA51-25B	SAMPLE		.04 pCi/g	SOIL	KERR003	17-SEP-09	8	8	0.501	144
237343010-2	SA51-36B	SAMPLE		.04 pCi/g	SOIL	KERR003	17-SEP-09	9	9	0.500	151
237343011-2	SA151-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	17-SEP-09	10	10	0.502	152
237343012-2	SA151-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	17-SEP-09	11	11	0.510	153
237343013-2	SA151-25B	SAMPLE		.04 pCi/g	SOIL	KERR003	17-SEP-09	12	12	0.512	154
237343014-2	SA151-39B	SAMPLE		.04 pCi/g	SOIL	KERR003	17-SEP-09	13	13	0.507	155
237343015-2	SA151009-39B	SAMPLE		.04 pCi/g	SOIL	KERR003	17-SEP-09	14	14	0.508	156
237343016-2	SA165-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	17-SEP-09	15	15	0.502	157
237343017-2	SA165-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	17-SEP-09	16	16	0.519	158
237343018-2	SA165-28B	SAMPLE		.04 pCi/g	SOIL	KERR003	17-SEP-09	17	17	0.501	159
1201945570-1	MB for batch 911639	MB		UCF pCi/g to pCi	SOIL	QC ACCOUNT	17-SEP-09	18	18	0.519	136
1201945571-2	SA165-10B(237343017DUP)	DUP		.04 pCi/g	SOIL	QC ACCOUNT	17-SEP-09	19	19	0.509	137
1201945572-2	SA165-10B(237343017MS)	MS		.04 pCi/g	SOIL	QC ACCOUNT	17-SEP-09	20	20	0.503	138
1201945573-1	LCS for batch 911639	LCS		UCF pCi/g to pCi	SOIL	QC ACCOUNT	17-SEP-09	21	21	0.519	139

104

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

Solid Sample Dissolution by: LEACH or DIGESTION
 Circle One

Data Reviewed By: J. L. ML-10/16/09

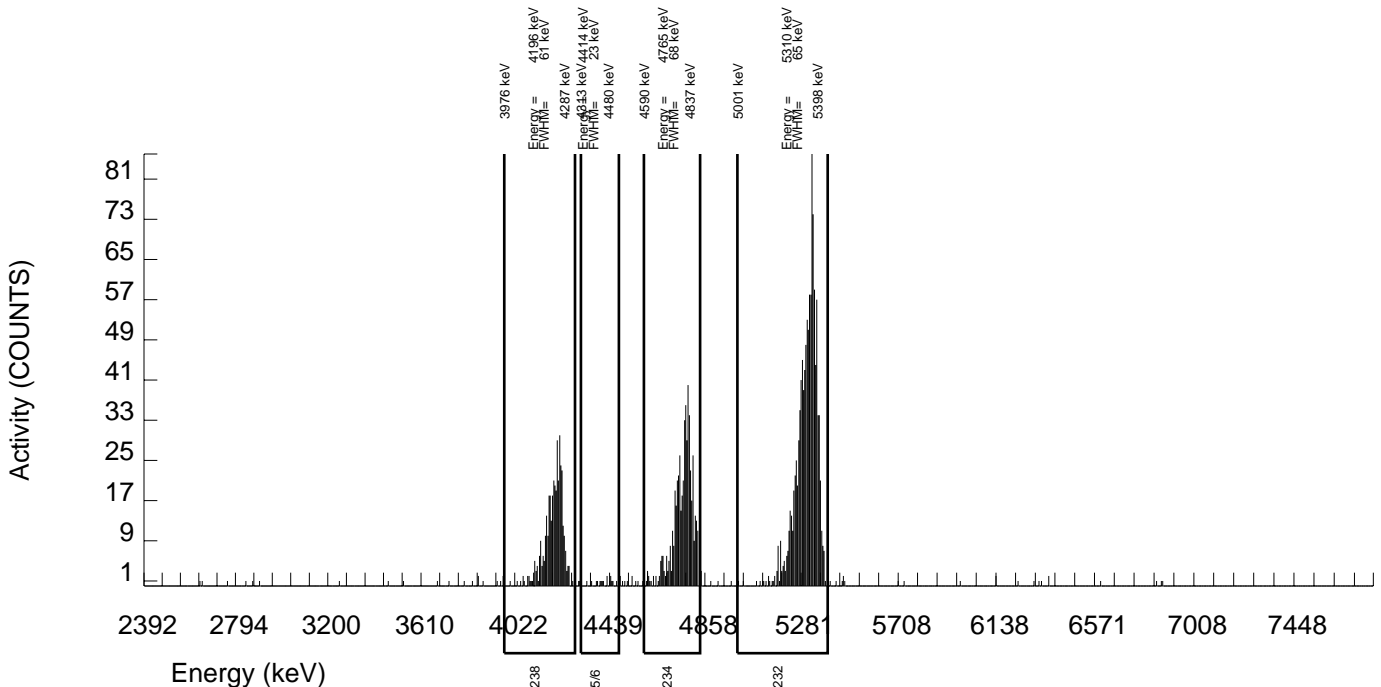
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 16-SEP-2009 00:00:00		SAMPLE ID : S0237343001_UU SAMPLE QTY: 0.504 G	
DETECTOR NUMBER :45-111B4 AVERAGE %EFFICIENCY :24.9366 % YIELD : 86.412		COUNT DATE:15-OCT-2009 14:24:00 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 : 5.25748 dpm RESULTS : 4.54309 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B113.CNF;402 BKG DATE : 11-OCT-2009 EFF FILE : W113.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	527.000	525.859	0.000	0.0000	100.0000	2.18E+00	3.54E-01	1.24E-02	0.00E+00	1.86E-01
U232	5302.100	1136.000	1132.000	4.000	2.0000	100.0000	4.70E+00	7.04E-01	5.11E-02	1.93E-02	2.75E-01
U-235	4391.000	17.000	15.000	2.000	1.4142	80.90000	7.69E-02	4.51E-02	4.91E-02	1.69E-02	4.38E-02
U-238	4184.730	387.000	387.000	0.000	0.0000	100.0000	1.61E+00	2.73E-01	1.24E-02	0.00E+00	1.60E-01

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



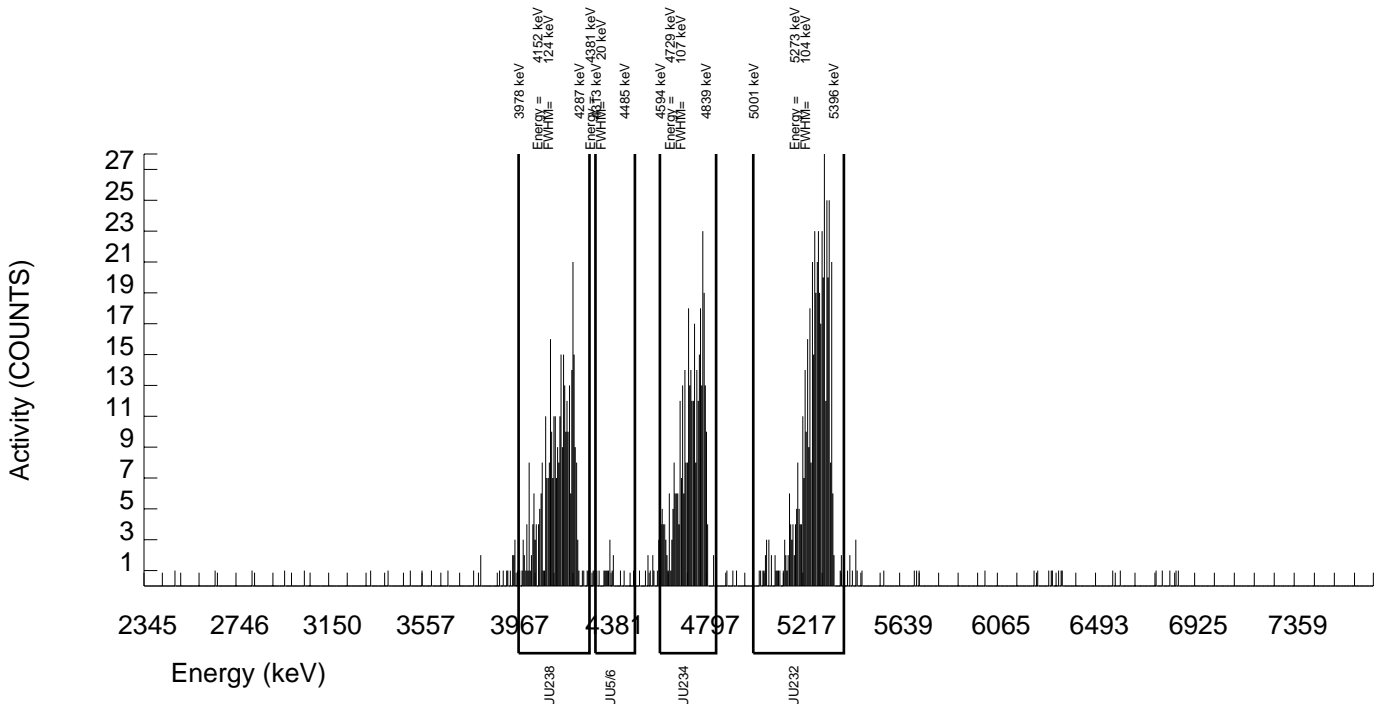
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 16-SEP-2009 00:00:00		SAMPLE ID : S0237343002_UU SAMPLE QTY: 0.502 G	
DETECTOR NUMBER :78258 AVERAGE %EFFICIENCY :25.4913 % YIELD : 38.905		COUNT DATE:15-OCT-2009 14:24:01 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 : 5.25748 dpm RESULTS : 2.04545 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B114.CNF;403 BKG DATE : 11-OCT-2009 EFF FILE : W114.CNF;110 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	381.000	379.475	1.000	1.0000	100.0000	3.43E+00	6.25E-01	6.92E-02	2.10E-02	3.46E-01
U232	5302.100	522.000	521.000	1.000	1.0000	100.0000	4.72E+00	8.23E-01	6.93E-02	2.11E-02	4.06E-01
U-235	4391.000	17.000	15.000	2.000	1.4142	80.90000	1.68E-01	9.89E-02	1.07E-01	3.68E-02	9.55E-02
U-238	4184.730	369.000	368.000	1.000	1.0000	100.0000	3.33E+00	6.09E-01	6.92E-02	2.10E-02	3.41E-01

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



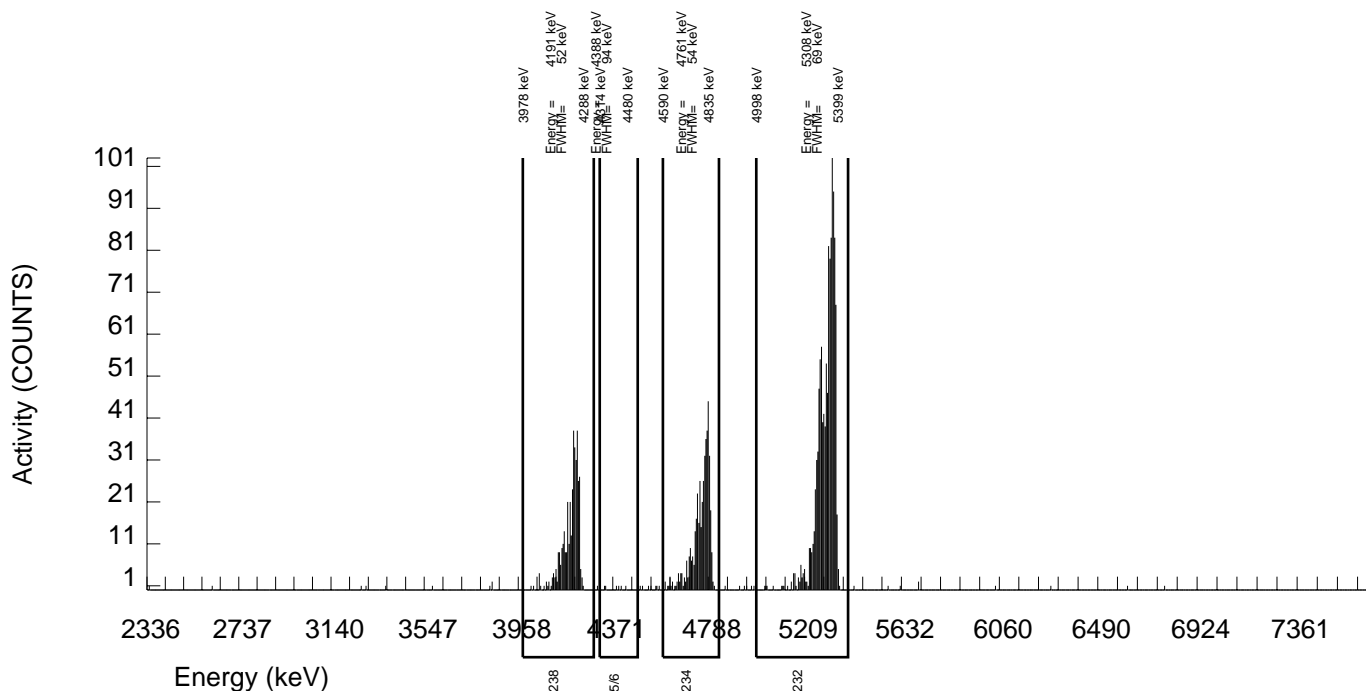
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 16-SEP-2009 00:00:00		SAMPLE ID : S0237343003_UU SAMPLE QTY: 0.501 G	
DETECTOR NUMBER :79995 AVERAGE %EFFICIENCY :25.8668 % YIELD : 87.352		COUNT DATE:15-OCT-2009 14:24:04 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 : 5.25748 dpm RESULTS : 4.59252 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B115.CNF;410 BKG DATE : 11-OCT-2009 EFF FILE : W115.CNF;138 CAL DATE : 14-OCT-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	455.000	452.803	1.000	1.0000	100.0000	1.80E+00	2.98E-01	3.05E-02	9.26E-03	1.66E-01
U232	5302.100	1191.000	1187.000	4.000	2.0000	100.0000	4.73E+00	7.03E-01	4.90E-02	1.85E-02	2.70E-01
U-235	4391.000	6.000	3.000	3.000	1.7321	80.90000	1.48E-02	2.90E-02	5.44E-02	1.98E-02	2.89E-02
U-238	4184.730	401.000	400.000	1.000	1.0000	100.0000	1.59E+00	2.69E-01	3.05E-02	9.26E-03	1.56E-01

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



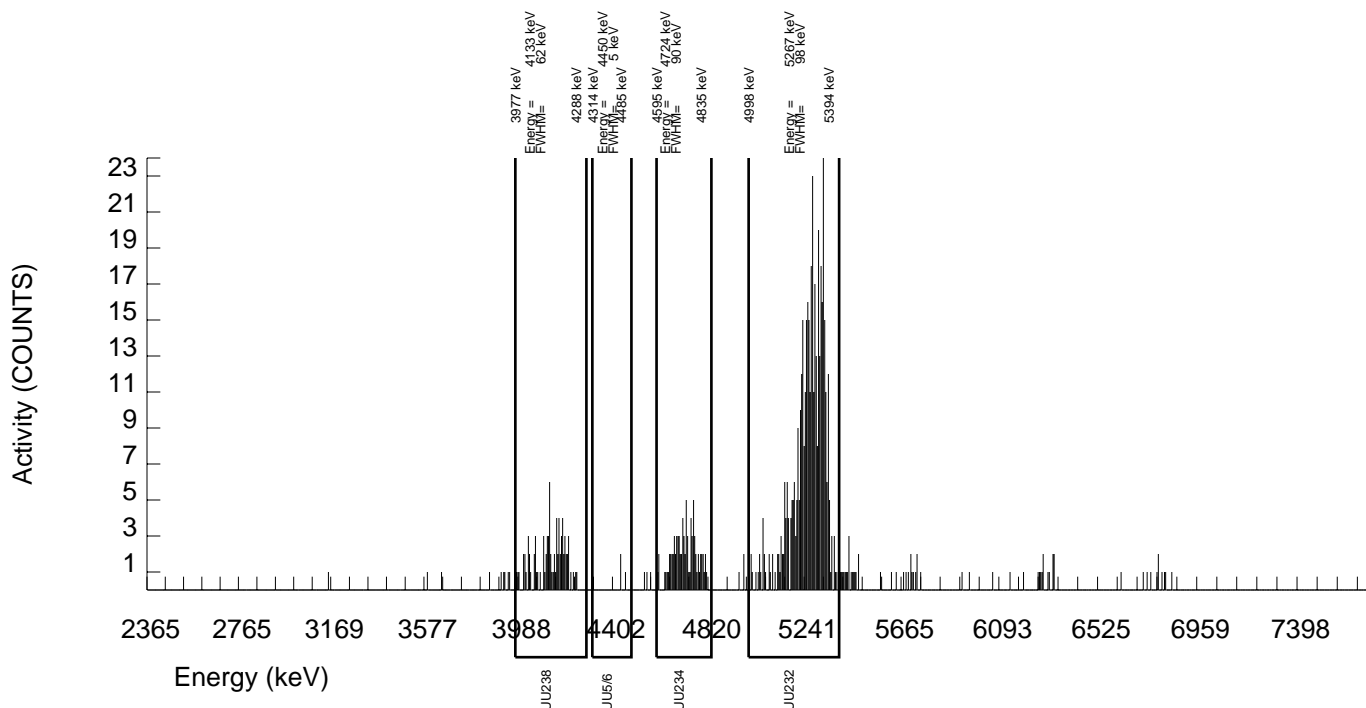
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 16-SEP-2009 00:00:00		SAMPLE ID : S0237343004_UU SAMPLE QTY: 0.515 G	
DETECTOR NUMBER :45-132FF2 AVERAGE %EFFICIENCY :26.4221 % YIELD : 31.627		COUNT DATE:15-OCT-2009 14:24:08 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.891E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.891E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25748 dpm RESULTS : 1.66280 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B116.CNF;397 BKG DATE : 11-OCT-2009 EFF FILE : W116.CNF;98 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	78.557	4.000	2.0000	100.0000	8.22E-01	2.30E-01	1.29E-01	4.87E-02	1.91E-01
U232	5302.100	447.000	439.000	8.000	2.8284	100.0000	4.60E+00	8.44E-01	1.69E-01	6.89E-02	4.38E-01
U-235	4391.000	3.000	2.000	1.000	1.0000	80.90000	2.59E-02	5.09E-02	9.90E-02	3.01E-02	5.07E-02
U-238	4184.730	82.000	81.000	1.000	1.0000	100.0000	8.48E-01	2.29E-01	8.01E-02	2.43E-02	1.87E-01

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



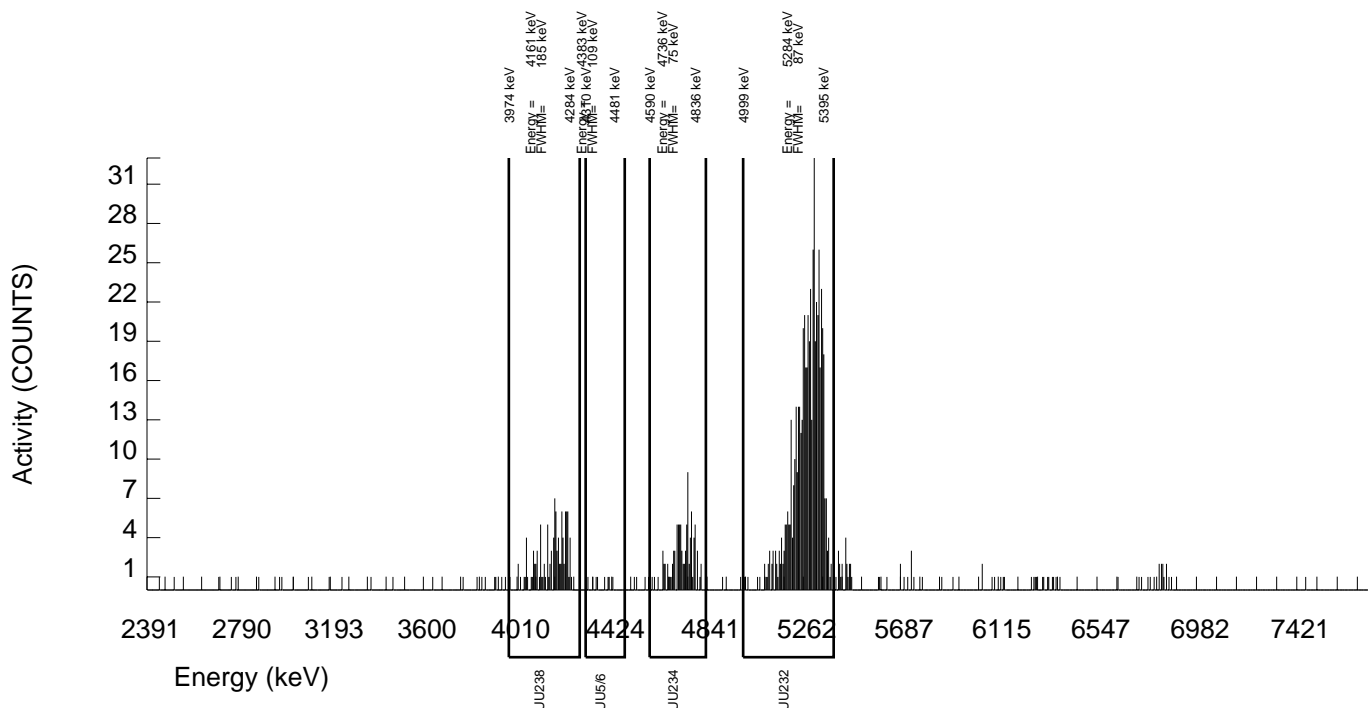
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 16-SEP-2009 00:00:00		SAMPLE ID : S0237343005_UU SAMPLE QTY: 0.506 G	
DETECTOR NUMBER :33450 AVERAGE %EFFICIENCY :25.3933 % YIELD : 42.504		COUNT DATE:15-OCT-2009 14:24:10 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 : 5.25748 dpm RESULTS : 2.23464 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B117.CNF;407 BKG DATE : 11-OCT-2009 EFF FILE : W117.CNF;110 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	96.000	93.428	2.000	1.4142	100.0000	7.71E-01	1.97E-01	7.90E-02	2.71E-02	1.60E-01
U232	5302.100	576.000	567.000	9.000	3.0000	100.0000	4.68E+00	8.05E-01	1.40E-01	5.76E-02	3.91E-01
U-235	4391.000	8.000	4.000	4.000	2.0000	80.90000	4.08E-02	6.95E-02	1.25E-01	4.74E-02	6.92E-02
U-238	4184.730	112.000	109.000	3.000	1.7321	100.0000	8.99E-01	2.20E-01	9.12E-02	3.32E-02	1.73E-01

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



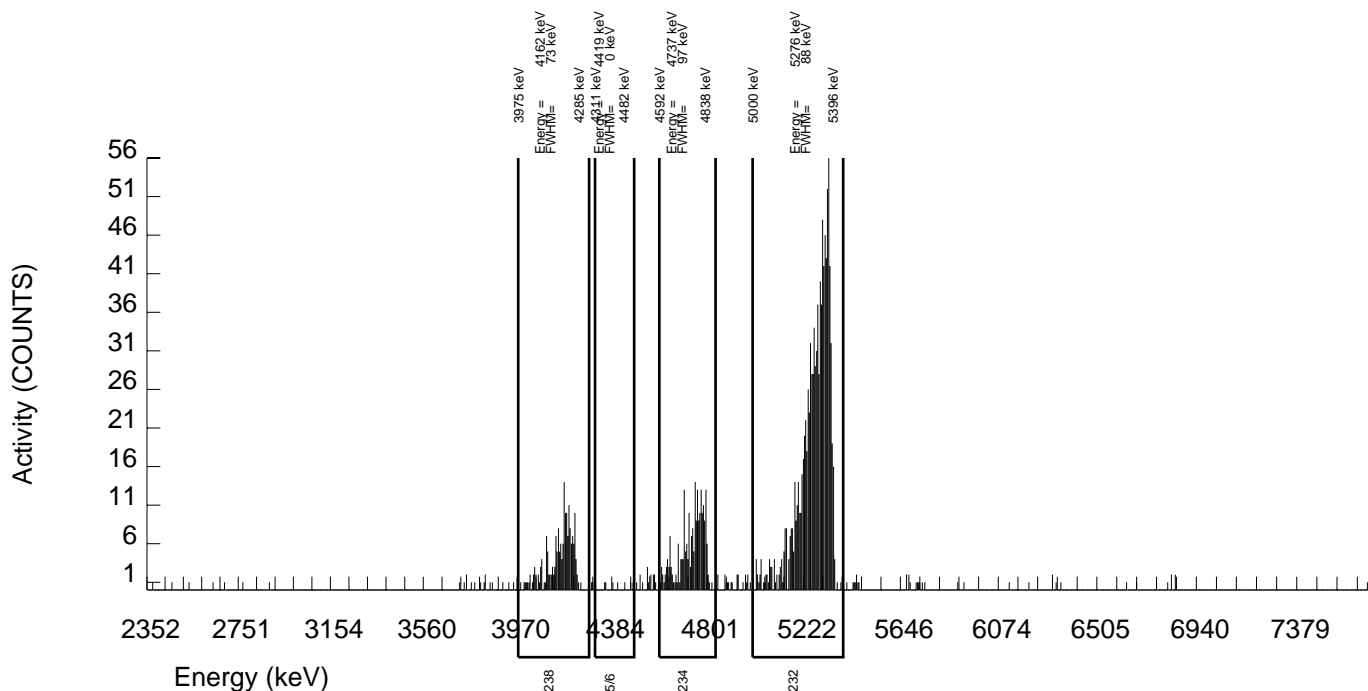
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S0237343007_UU SAMPLE QTY: 0.502 G	
DETECTOR NUMBER :75544 AVERAGE %EFFICIENCY :25.6202 % YIELD : 76.380		COUNT DATE:15-OCT-2009 14:24:12 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 : 5.25734 dpm RESULTS : 4.01553 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B118.CNF;406 BKG DATE : 11-OCT-2009 EFF FILE : W118.CNF;107 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	237.000	234.964	1.000	1.0000	100.0000	1.08E+00	2.04E-01	3.51E-02	1.07E-02	1.38E-01
U232	5302.100	1035.000	1028.000	7.000	2.6458	100.0000	4.72E+00	7.18E-01	7.03E-02	2.82E-02	2.90E-01
U-235	4391.000	7.000	4.000	3.000	1.7321	80.90000	2.27E-02	3.53E-02	6.27E-02	2.28E-02	3.51E-02
U-238	4184.730	192.000	191.000	1.000	1.0000	100.0000	8.76E-01	1.75E-01	3.51E-02	1.07E-02	1.25E-01

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



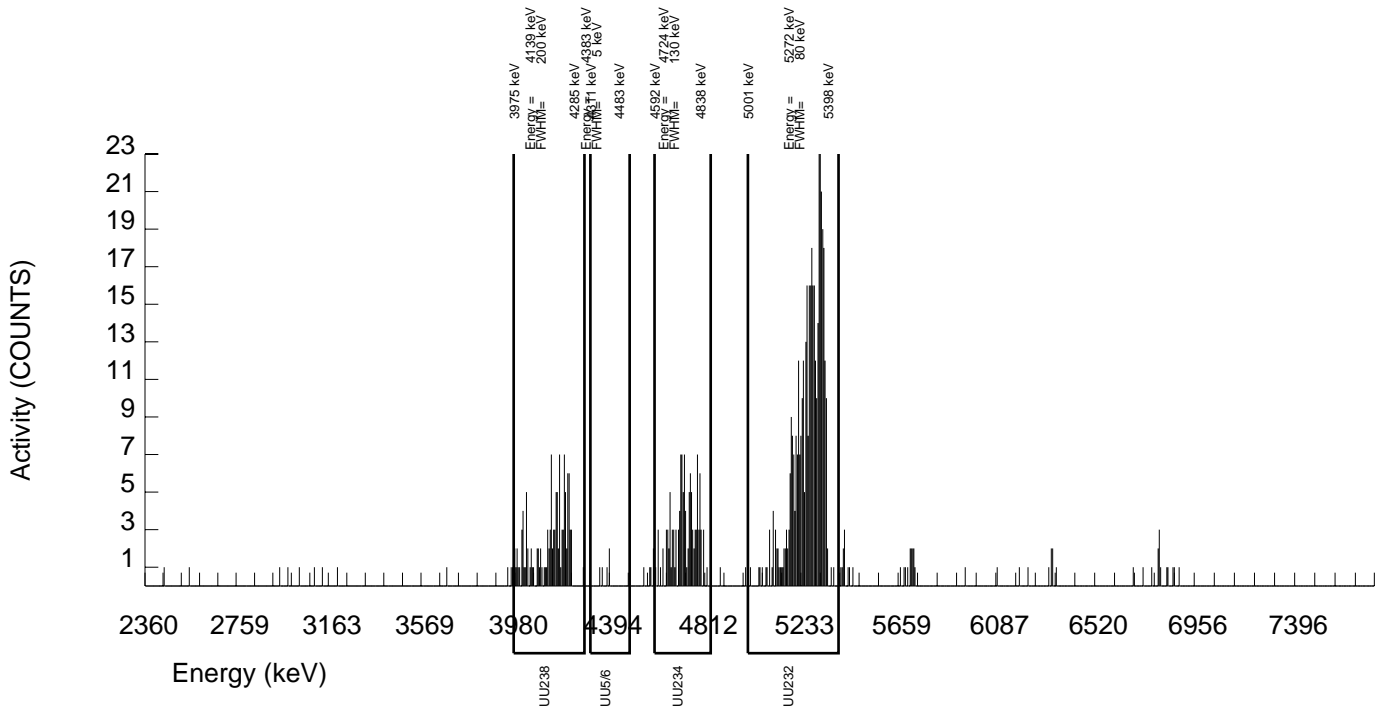
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S0237343008_UU SAMPLE QTY: 0.504 G	
DETECTOR NUMBER :72526 AVERAGE %EFFICIENCY :24.9491 % YIELD : 31.740		COUNT DATE:15-OCT-2009 14:29:26 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 : 5.25734 dpm RESULTS : 1.66867 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B145.CNF;354 BKG DATE : 11-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	125.000	121.581	3.000	1.7321	100.0000	1.37E+00	3.34E-01	1.25E-01	4.55E-02	2.50E-01
U232	5302.100	425.000	416.000	9.000	3.0000	100.0000	4.70E+00	8.87E-01	1.92E-01	7.88E-02	4.61E-01
U-235	4391.000	5.000	2.000	3.000	1.7321	80.90000	2.79E-02	7.75E-02	1.54E-01	5.62E-02	7.73E-02
U-238	4184.730	122.000	122.000	0.000	0.0000	100.0000	1.38E+00	3.30E-01	3.39E-02	0.00E+00	2.44E-01

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



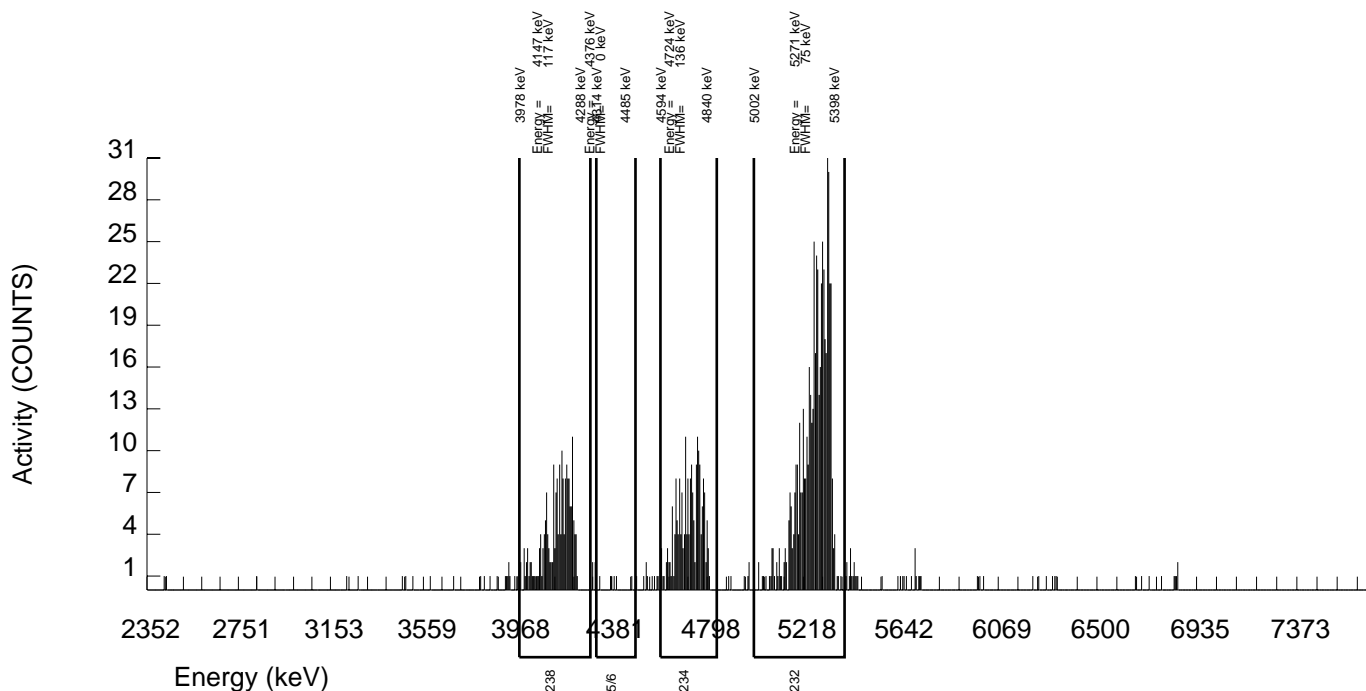
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S0237343009_UU SAMPLE QTY: 0.501 G	
DETECTOR NUMBER :75551 AVERAGE %EFFICIENCY :24.3208 % YIELD : 42.578		COUNT DATE:15-OCT-2009 14:29:23 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 : 5.25734 dpm RESULTS : 2.23848 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B144.CNF;356 BKG DATE : 11-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	203.000	196.452	6.000	2.4495	100.0000	1.71E+00	3.57E-01	1.25E-01	4.95E-02	2.46E-01
U232	5302.100	560.000	544.000	16.000	4.0000	100.0000	4.73E+00	8.27E-01	1.88E-01	8.09E-02	4.09E-01
U-235	4391.000	8.000	6.000	2.000	1.4142	80.90000	6.44E-02	6.72E-02	1.03E-01	3.53E-02	6.65E-02
U-238	4184.730	198.000	196.000	2.000	1.4142	100.0000	1.70E+00	3.53E-01	8.32E-02	2.86E-02	2.41E-01

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



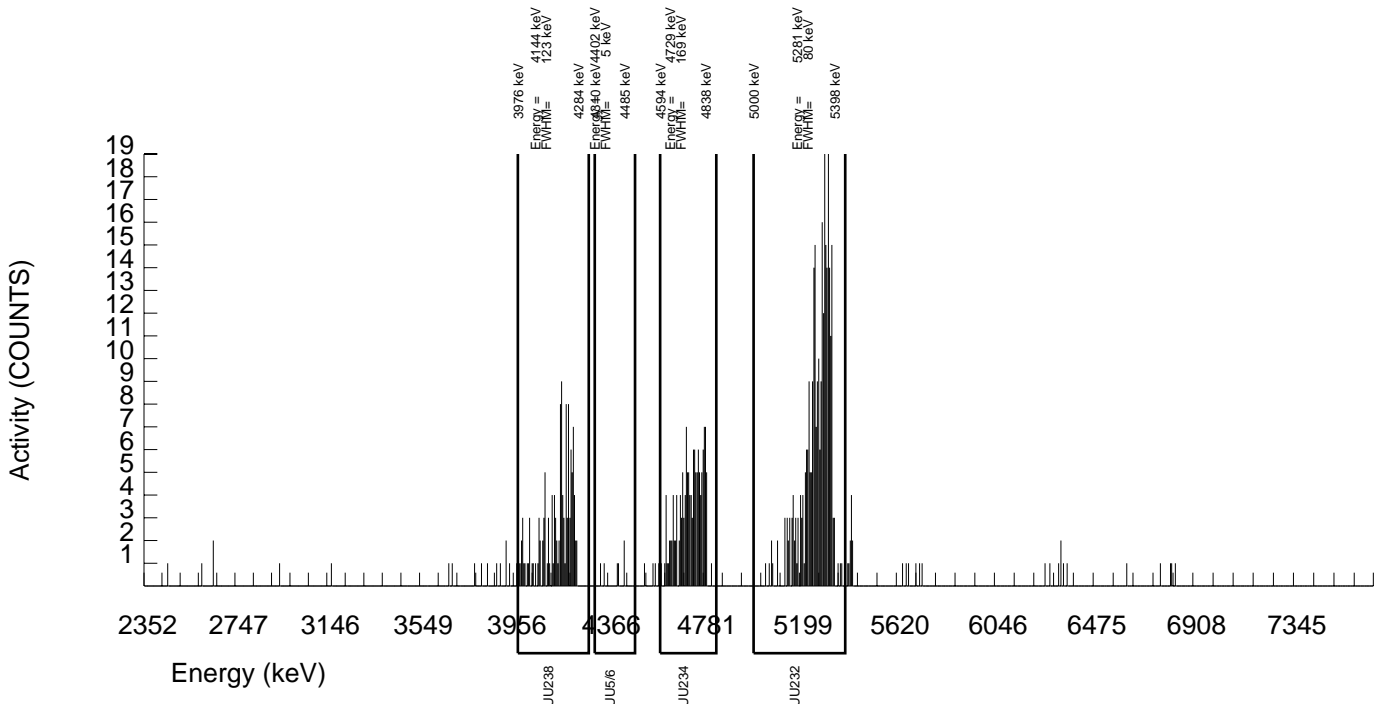
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S0237343010_UU SAMPLE QTY: 0.500 G	
DETECTOR NUMBER :75556 AVERAGE %EFFICIENCY :24.4597 % YIELD : 23.503		COUNT DATE:15-OCT-2009 14:29:40 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.038E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 5.038E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25734 dpm RESULTS : 1.23562 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B151.CNF;358 BKG DATE : 11-OCT-2009 EFF FILE : W151.CNF;110 CAL DATE : 15-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	144.000	141.696	2.000	1.4142	100.0000	2.22E+00	5.28E-01	1.50E-01	5.16E-02	3.71E-01
U232	5302.100	305.000	302.000	3.000	1.7321	100.0000	4.74E+00	9.66E-01	1.73E-01	6.32E-02	5.39E-01
U-235	4391.000	6.000	4.000	2.000	1.4142	80.90000	7.75E-02	1.08E-01	1.86E-01	6.37E-02	1.07E-01
U-238	4184.730	132.000	130.000	2.000	1.4142	100.0000	2.04E+00	4.95E-01	1.50E-01	5.16E-02	3.56E-01

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



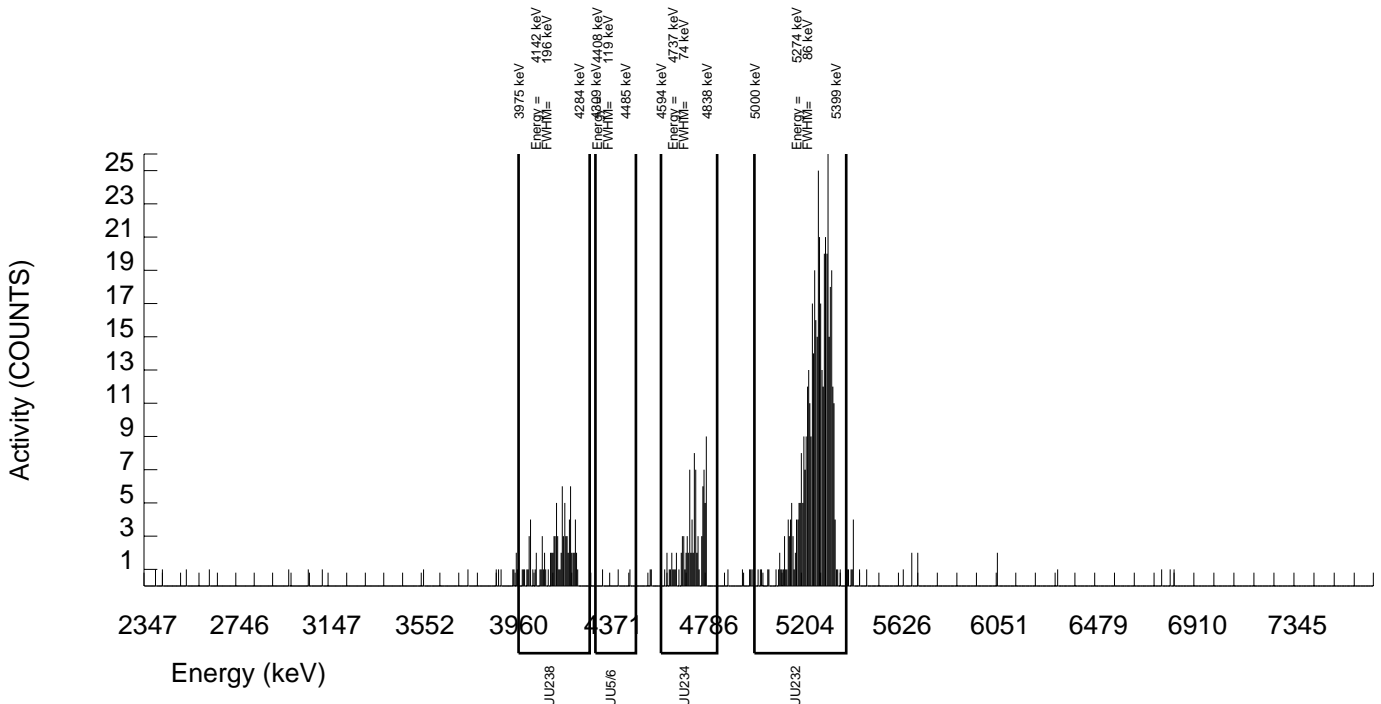
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S0237343011_UU SAMPLE QTY: 0.502 G	
DETECTOR NUMBER :76222 AVERAGE %EFFICIENCY :24.6765 % YIELD : 36.565		COUNT DATE:15-OCT-2009 14:29:42 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 : 5.25734 dpm RESULTS : 1.92232 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B152.CNF;355 BKG DATE : 11-OCT-2009 EFF FILE : W152.CNF;97 CAL DATE : 15-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	95.000	92.522	2.000	1.4142	100.0000	9.20E-01	2.39E-01	9.53E-02	3.27E-02	1.91E-01
U232	5302.100	479.000	474.000	5.000	2.2361	100.0000	4.72E+00	8.46E-01	1.33E-01	5.18E-02	4.29E-01
U-235	4391.000	3.000	3.000	0.000	0.0000	80.90000	3.69E-02	4.21E-02	3.69E-02	0.00E+00	4.17E-02
U-238	4184.730	96.000	94.000	2.000	1.4142	100.0000	9.35E-01	2.41E-01	9.53E-02	3.27E-02	1.93E-01

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



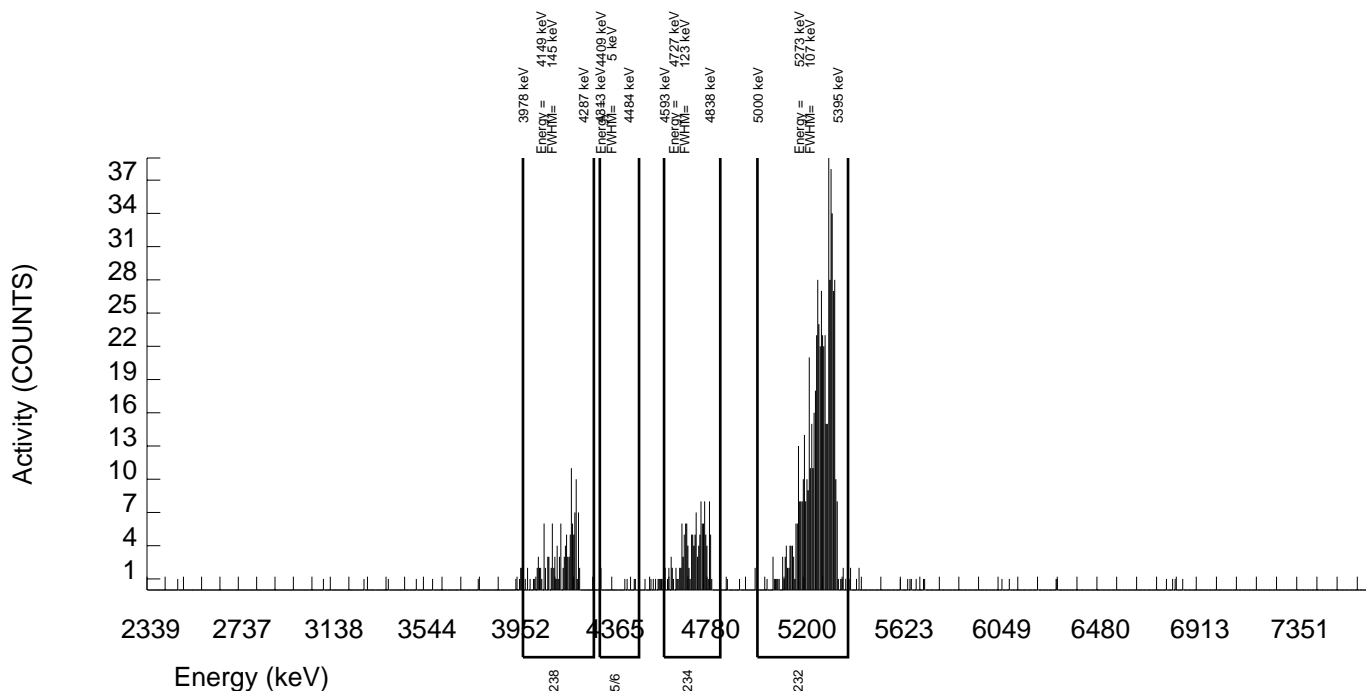
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S0237343012_UU SAMPLE QTY: 0.510 G	
DETECTOR NUMBER :76223 AVERAGE %EFFICIENCY :25.3061 % YIELD : 48.969		COUNT DATE:15-OCT-2009 14:29:45 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.939E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.939E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25734 dpm RESULTS : 2.57446 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B153.CNF;350 BKG DATE : 11-OCT-2009 EFF FILE : W153.CNF;100 CAL DATE : 15-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	143.000	135.344	7.000	2.6458	100.0000	9.65E-01	2.23E-01	1.09E-01	4.39E-02	1.71E-01
U232	5302.100	672.000	651.000	21.000	4.5826	100.0000	4.64E+00	7.80E-01	1.73E-01	7.60E-02	3.68E-01
U-235	4391.000	6.000	4.000	2.000	1.4142	80.90000	3.52E-02	4.91E-02	8.44E-02	2.90E-02	4.88E-02
U-238	4184.730	134.000	131.000	3.000	1.7321	100.0000	9.34E-01	2.14E-01	7.88E-02	2.87E-02	1.64E-01

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



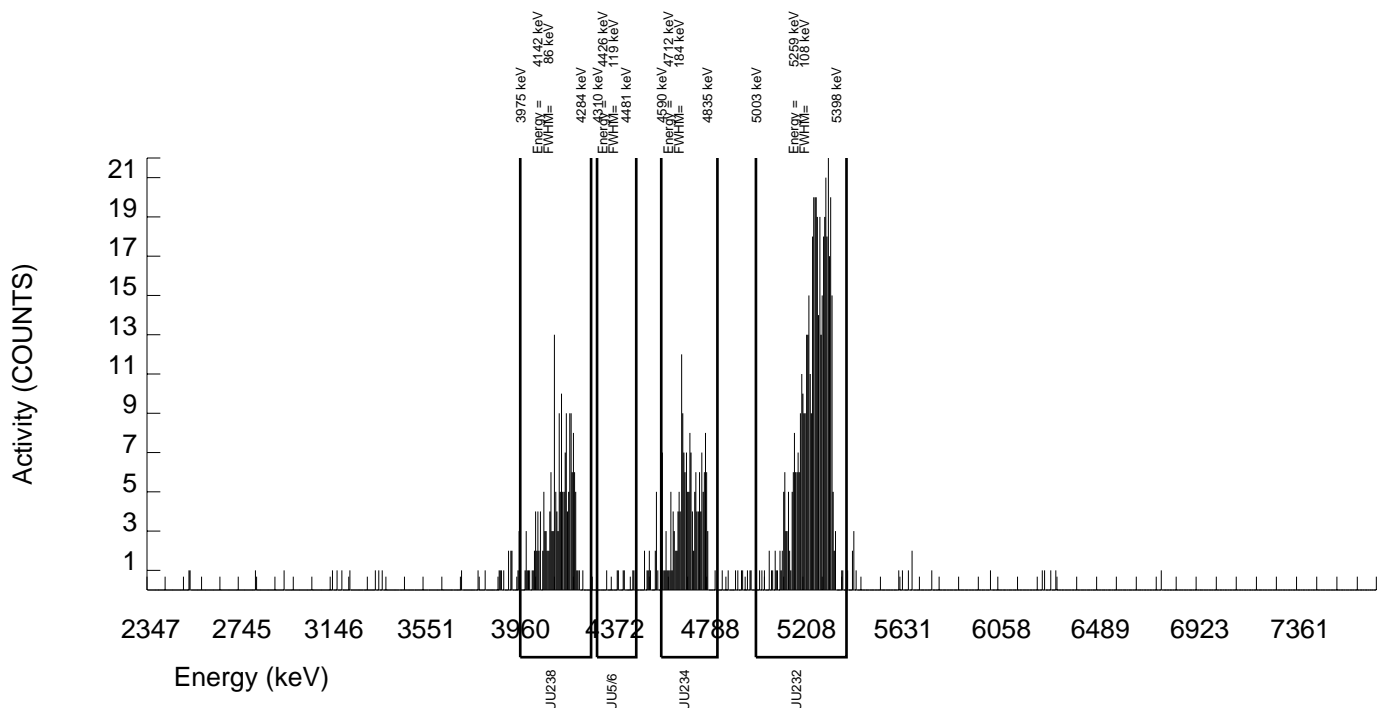
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S0237343013_UU SAMPLE QTY: 0.512 G	
DETECTOR NUMBER :76224 AVERAGE %EFFICIENCY :25.6606 % YIELD : 37.684		COUNT DATE:15-OCT-2009 14:29:48 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.920E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.920E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25734 dpm RESULTS : 1.98120 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B154.CNF;352 BKG DATE : 11-OCT-2009 EFF FILE : W154.CNF;98 CAL DATE : 15-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	184.000	180.488	3.000	1.7321	100.0000	1.64E+00	3.50E-01	1.01E-01	3.67E-02	2.44E-01
U232	5302.100	515.000	508.000	7.000	2.6458	100.0000	4.63E+00	8.17E-01	1.39E-01	5.60E-02	4.08E-01
U-235	4391.000	7.000	6.000	1.000	1.0000	80.90000	6.75E-02	6.32E-02	8.61E-02	2.62E-02	6.23E-02
U-238	4184.730	195.000	194.000	1.000	1.0000	100.0000	1.77E+00	3.68E-01	6.96E-02	2.12E-02	2.50E-01

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



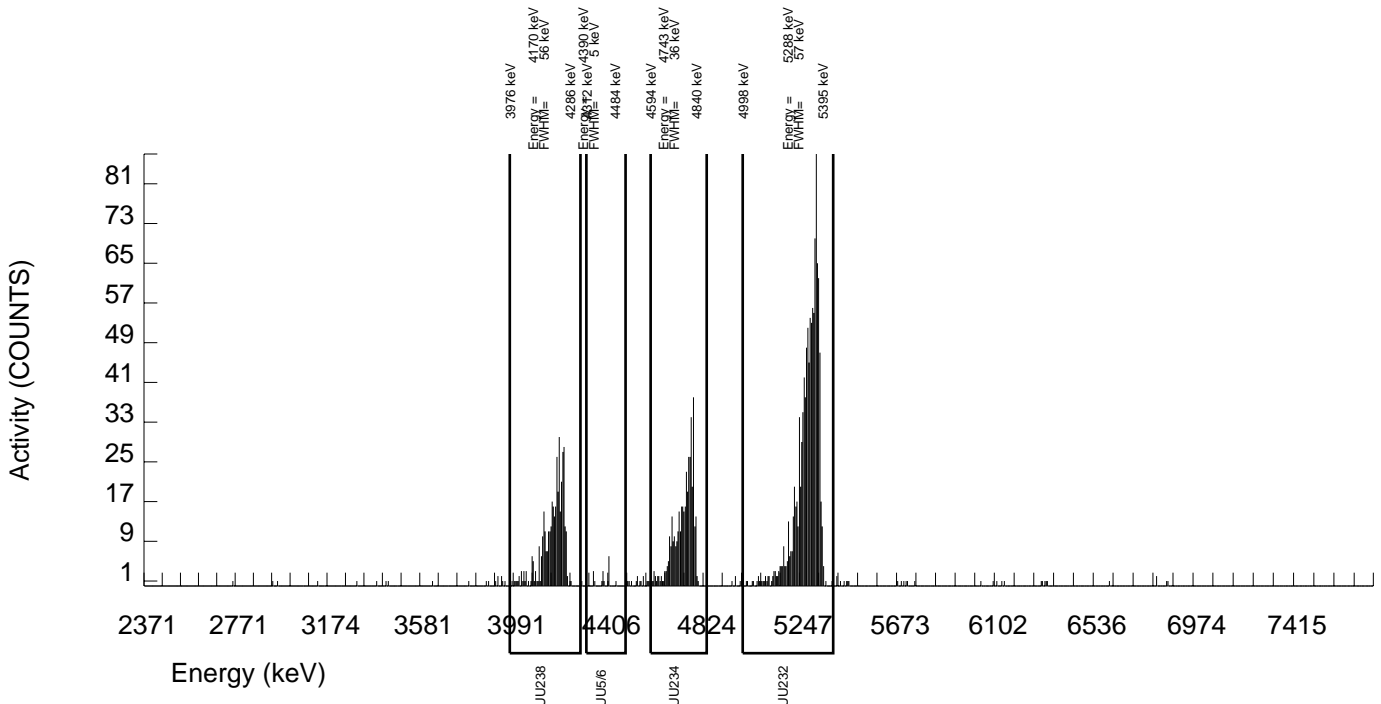
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S0237343014_UU SAMPLE QTY: 0.507 G	
DETECTOR NUMBER :75553 AVERAGE %EFFICIENCY :25.8645 % YIELD : 80.810		COUNT DATE:15-OCT-2009 14:29:50 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.968E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.968E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25734 dpm RESULTS : 4.24845 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B155.CNF;359 BKG DATE : 11-OCT-2009 EFF FILE : W155.CNF;107 CAL DATE : 15-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	417.000	407.893	8.000	2.8284	100.0000	1.73E+00	2.95E-01	6.87E-02	2.80E-02	1.72E-01
U232	5302.100	1107.000	1098.000	9.000	3.0000	100.0000	4.67E+00	7.04E-01	7.21E-02	2.97E-02	2.79E-01
U-235	4391.000	18.000	18.000	0.000	0.0000	80.90000	9.46E-02	4.56E-02	1.58E-02	0.00E+00	4.37E-02
U-238	4184.730	393.000	392.000	1.000	1.0000	100.0000	1.67E+00	2.84E-01	3.25E-02	9.89E-03	1.65E-01

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



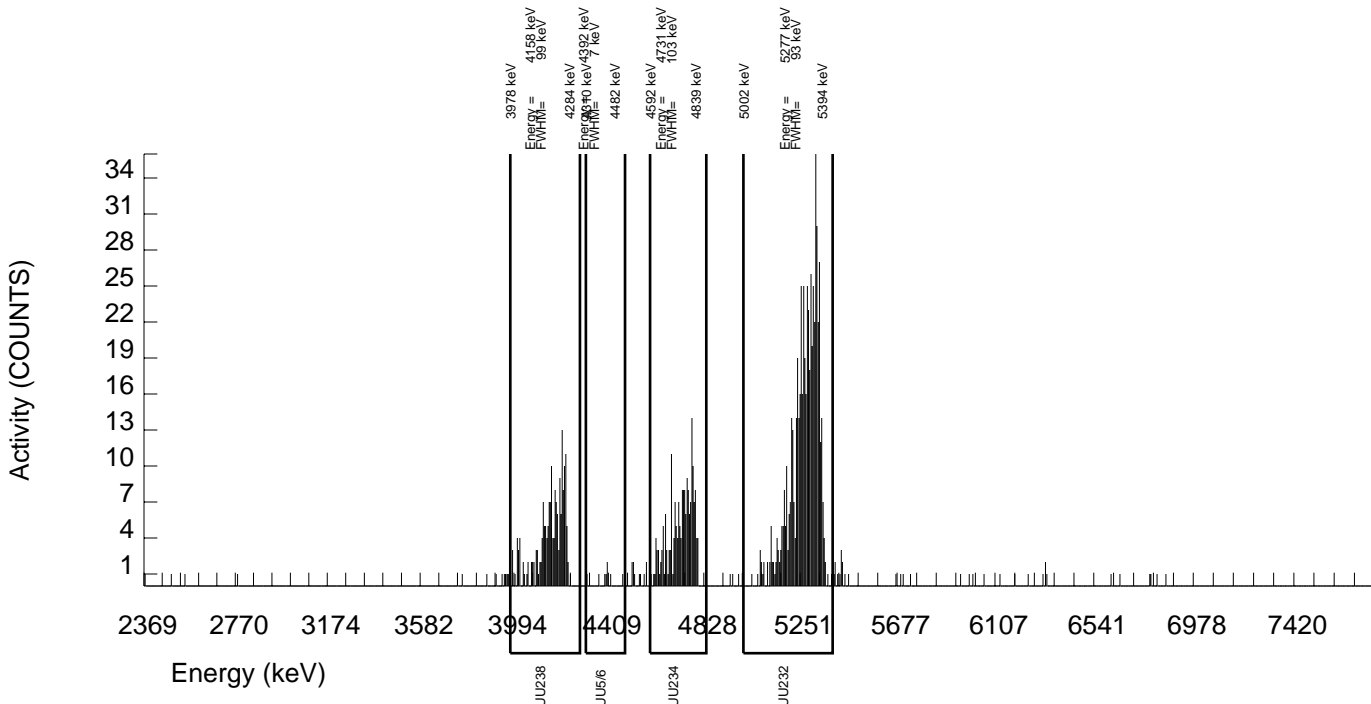
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S0237343015_UU SAMPLE QTY: 0.508 G	
DETECTOR NUMBER :75554 AVERAGE %EFFICIENCY :24.5835 % YIELD : 45.995		COUNT DATE:15-OCT-2009 14:29:53 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.958E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.958E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25734 dpm RESULTS : 2.41810 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B156.CNF;360 BKG DATE : 11-OCT-2009 EFF FILE : W156.CNF;111 CAL DATE : 15-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	196.000	181.401	14.000	3.7417	100.0000	1.42E+00	3.08E-01	1.60E-01	6.83E-02	2.22E-01
U232	5302.100	604.000	594.000	10.000	3.1623	100.0000	4.66E+00	7.94E-01	1.39E-01	5.77E-02	3.81E-01
U-235	4391.000	9.000	8.000	1.000	1.0000	80.90000	7.75E-02	6.12E-02	7.42E-02	2.26E-02	6.01E-02
U-238	4184.730	190.000	185.000	5.000	2.2361	100.0000	1.45E+00	3.05E-01	1.05E-01	4.08E-02	2.15E-01

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



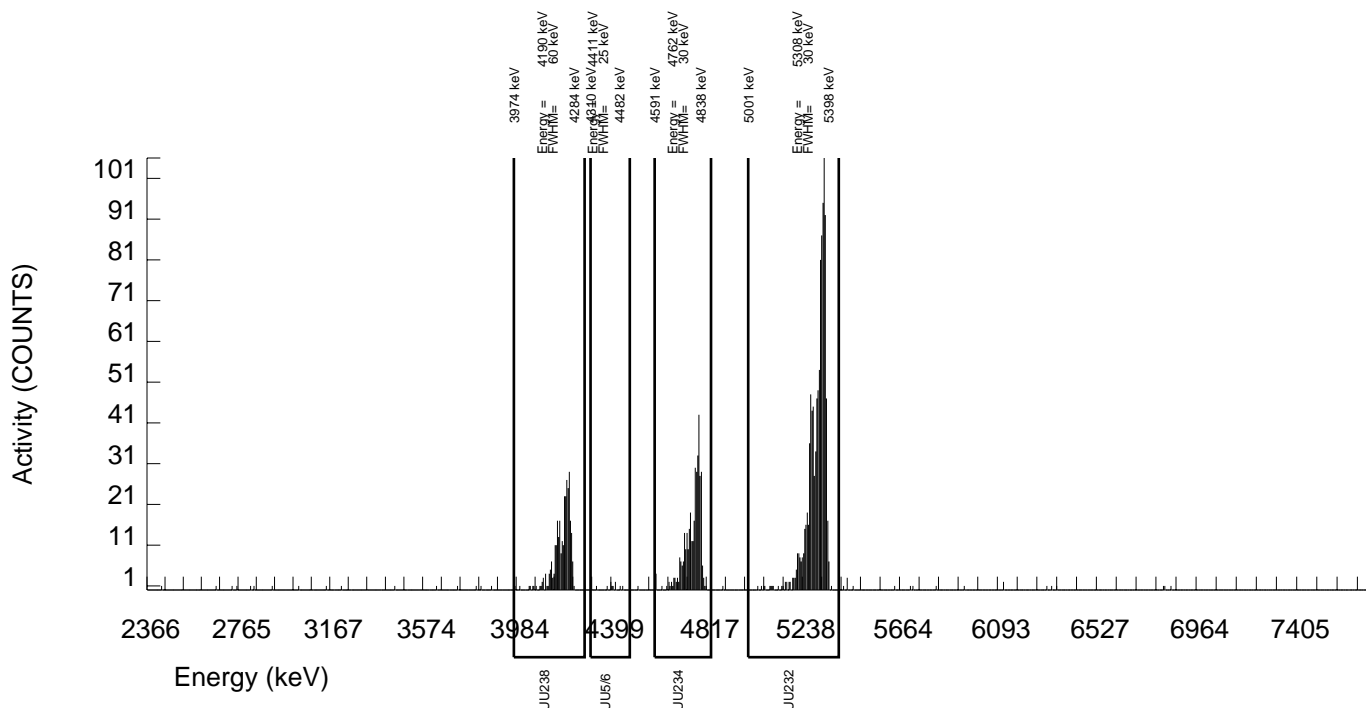
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S0237343016_UU SAMPLE QTY: 0.502 G	
DETECTOR NUMBER :75555 AVERAGE %EFFICIENCY :24.7420 % YIELD : 81.398		COUNT DATE:15-OCT-2009 14:29:55 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 : 5.25734 dpm RESULTS : 4.27939 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B157.CNF;360 BKG DATE : 11-OCT-2009 EFF FILE : W157.CNF;101 CAL DATE : 15-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	379.000	366.933	11.000	3.3166	100.0000	1.63E+00	2.85E-01	8.21E-02	3.44E-02	1.72E-01
U232	5302.100	1067.000	1058.000	9.000	3.0000	100.0000	4.72E+00	7.16E-01	7.56E-02	3.11E-02	2.87E-01
U-235	4391.000	10.000	7.000	3.000	1.7321	80.90000	3.86E-02	3.93E-02	6.09E-02	2.22E-02	3.89E-02
U-238	4184.730	310.000	299.000	11.000	3.3166	100.0000	1.33E+00	2.42E-01	8.21E-02	3.44E-02	1.56E-01

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



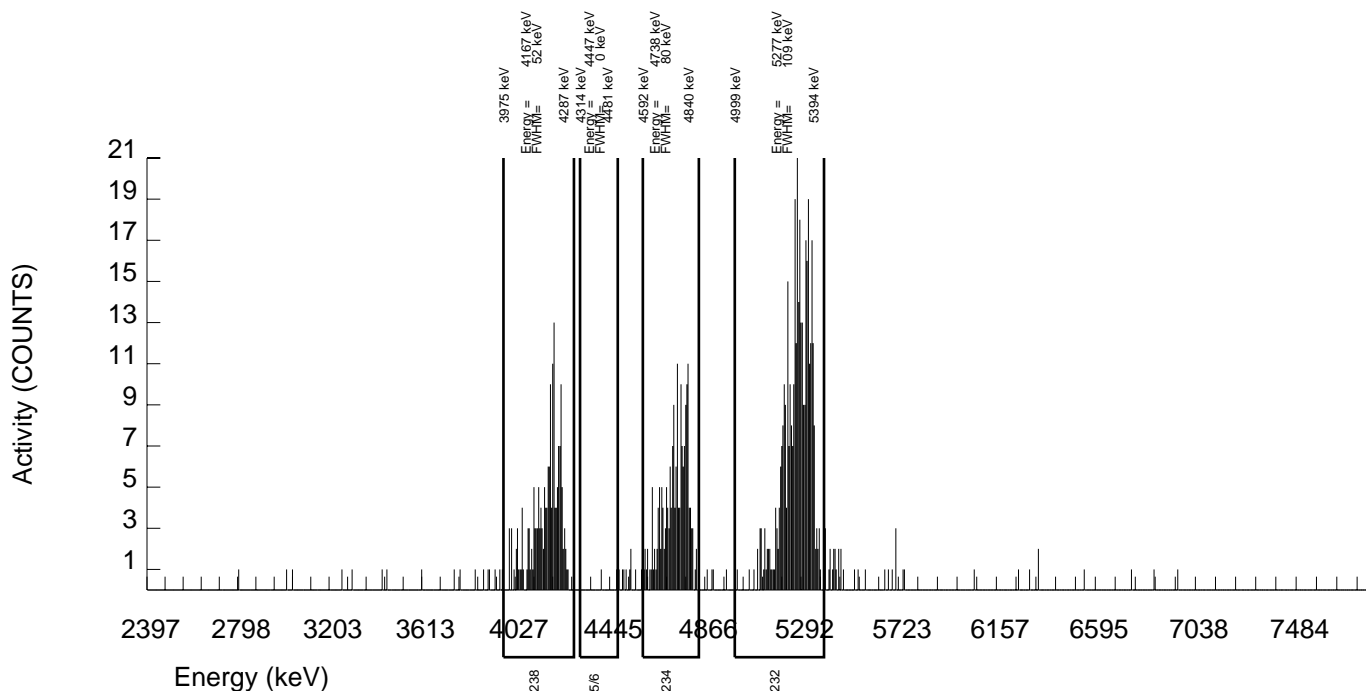
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S0237343017_UU SAMPLE QTY: 0.519 G	
DETECTOR NUMBER :33451 AVERAGE %EFFICIENCY :24.9380 % YIELD : 29.235		COUNT DATE:15-OCT-2009 14:29:58 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.853E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.853E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25734 dpm RESULTS : 1.53698 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B158.CNF;361 BKG DATE : 11-OCT-2009 EFF FILE : W158.CNF;104 CAL DATE : 15-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	190.000	182.614	7.000	2.6458	100.0000	2.17E+00	4.80E-01	1.82E-01	7.33E-02	3.27E-01
U232	5302.100	392.000	383.000	9.000	3.0000	100.0000	4.56E+00	8.73E-01	2.02E-01	8.31E-02	4.68E-01
U-235	4391.000	2.000	2.000	0.000	0.0000	80.90000	2.94E-02	4.11E-02	4.41E-02	0.00E+00	4.08E-02
U-238	4184.730	177.000	174.000	3.000	1.7321	100.0000	2.07E+00	4.58E-01	1.32E-01	4.80E-02	3.13E-01

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



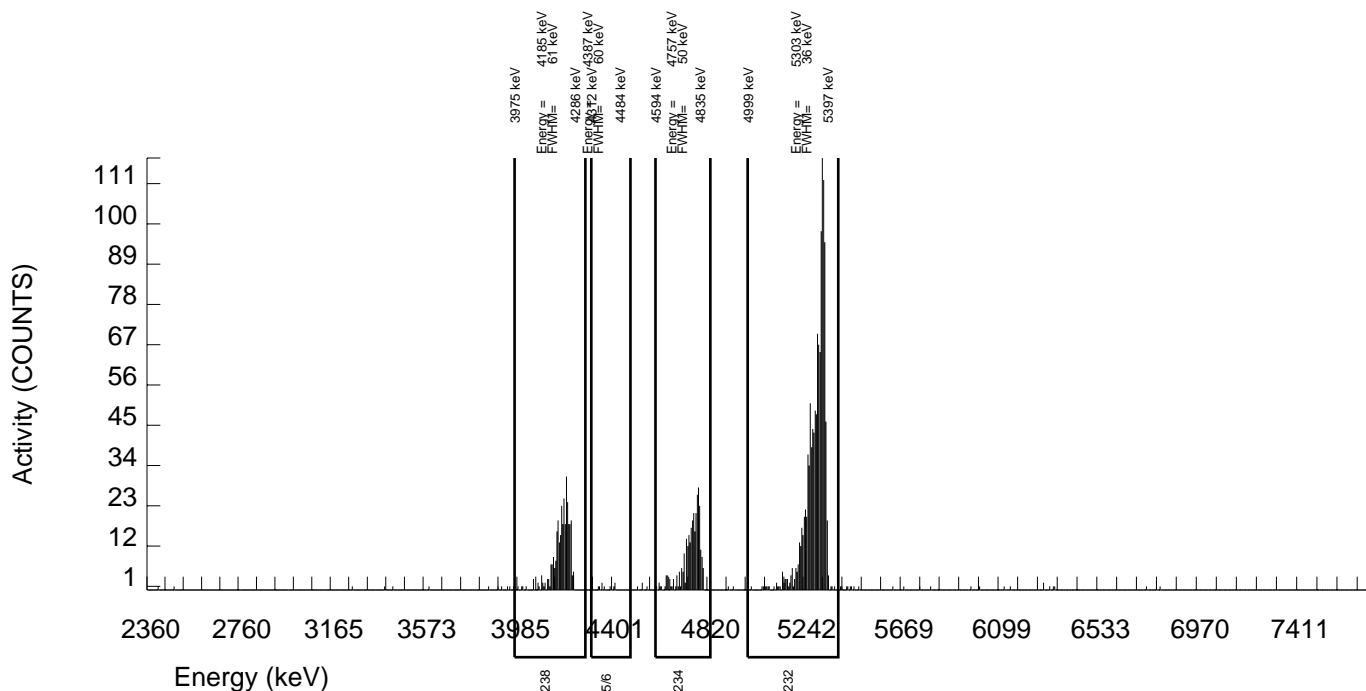
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S0237343018_UU SAMPLE QTY: 0.501 G	
DETECTOR NUMBER :76225 AVERAGE %EFFICIENCY :25.0830 % YIELD : 92.131		COUNT DATE:15-OCT-2009 14:30:00 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 : 5.25734 dpm RESULTS : 4.84362 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B159.CNF;334 BKG DATE : 11-OCT-2009 EFF FILE : W159.CNF;96 CAL DATE : 15-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	308.000	296.776	10.000	3.1623	100.0000	1.15E+00	2.09E-01	6.89E-02	2.86E-02	1.36E-01
U232	5302.100	1226.000	1214.000	12.000	3.4641	100.0000	4.73E+00	7.03E-01	7.44E-02	3.14E-02	2.69E-01
U-235	4391.000	10.000	5.000	5.000	2.2361	80.90000	2.40E-02	3.67E-02	6.45E-02	2.50E-02	3.65E-02
U-238	4184.730	330.000	328.000	2.000	1.4142	100.0000	1.28E+00	2.24E-01	3.73E-02	1.28E-02	1.39E-01

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



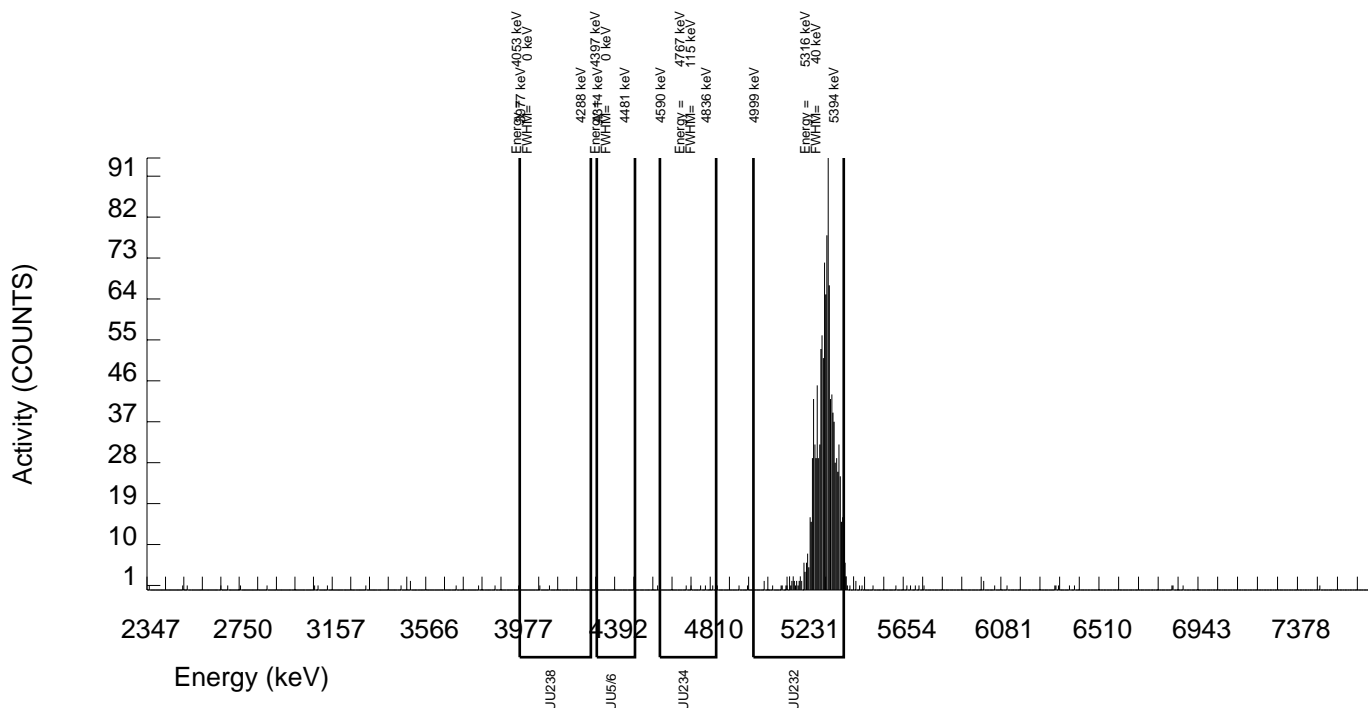
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 13-OCT-2009 00:00:00		SAMPLE ID : S1201945570_UU SAMPLE QTY: 0.519 G	
DETECTOR NUMBER :68549 AVERAGE %EFFICIENCY :24.8579 % YIELD : 89.825		COUNT DATE:15-OCT-2009 14:24:56 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.853E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.853E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25374 dpm RESULTS : 4.71918 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B136.CNF;400 BKG DATE : 11-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	5.000	-13.183	17.000	4.1231	100.0000	-5.12E-02	3.48E-02	8.62E-02	3.73E-02	3.48E-02
U232	5302.100	1196.000	1173.000	23.000	4.7958	100.0000	4.56E+00	6.82E-01	9.84E-02	4.34E-02	2.66E-01
U-235	4391.000	0.000	-1.000	1.000	1.0000	80.90000	-4.80E-03	1.33E-02	3.68E-02	1.12E-02	1.33E-02
U-238	4184.730	3.000	-5.000	8.000	2.8284	100.0000	-1.94E-02	2.53E-02	6.28E-02	2.56E-02	2.53E-02

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



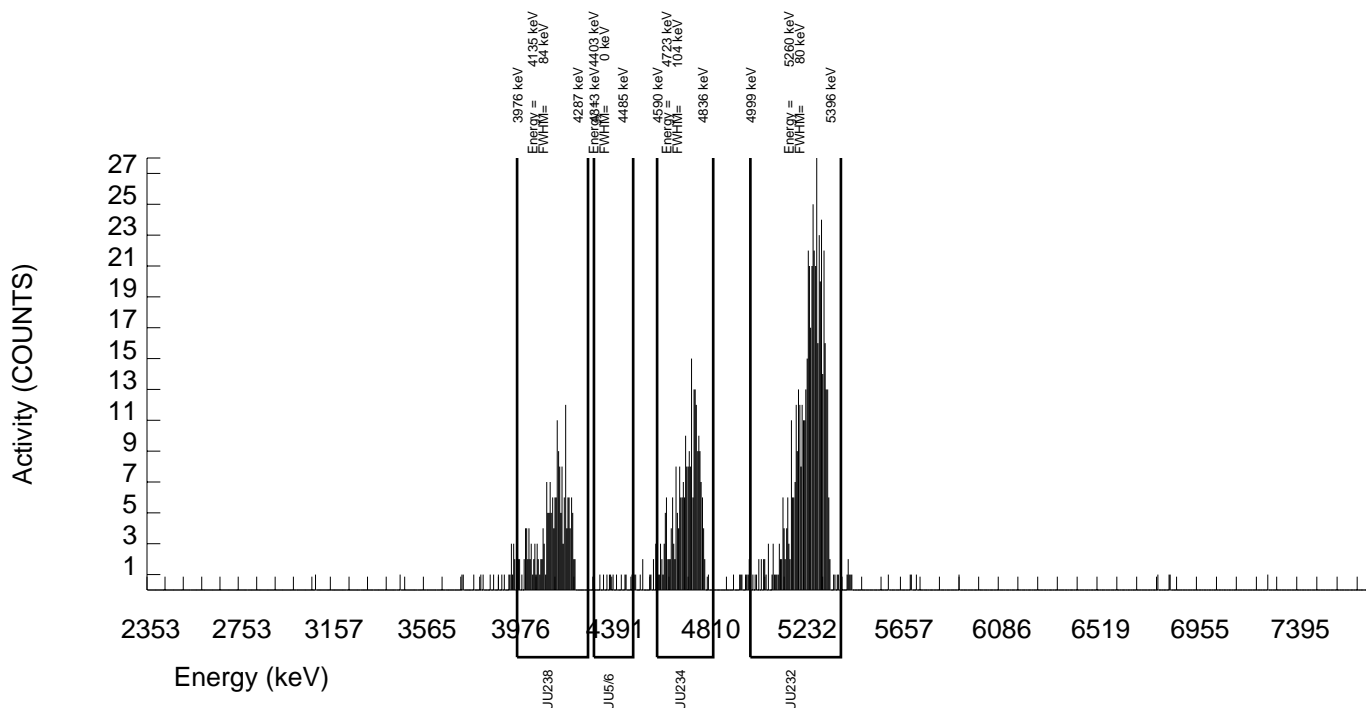
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S1201945571_UU SAMPLE QTY: 0.509 G	
DETECTOR NUMBER :79467 AVERAGE %EFFICIENCY :25.0900 % YIELD : 41.880		COUNT DATE:15-OCT-2009 14:29:07 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :JXD2	
MS/MSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.949E+00	LCS/LCSD ID : 1163-G ISOTOPE : U-238 PCI/G : 4.949E+00	TRACER ID : 1283-E ISOTOPE : U232 NOMINAL : 5.25734 dpm RESULTS : 2.20176 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B137.CNF;355 BKG DATE : 11-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	247.000	243.443	3.000	1.7321	100.0000	2.05E+00	4.04E-01	9.31E-02	3.39E-02	2.61E-01
U232	5302.100	556.000	552.000	4.000	2.0000	100.0000	4.65E+00	8.02E-01	1.04E-01	3.92E-02	3.91E-01
U-235	4391.000	12.000	12.000	0.000	0.0000	80.90000	1.25E-01	7.31E-02	3.12E-02	0.00E+00	7.07E-02
U-238	4184.730	203.000	200.000	3.000	1.7321	100.0000	1.68E+00	3.47E-01	9.31E-02	3.39E-02	2.37E-01

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



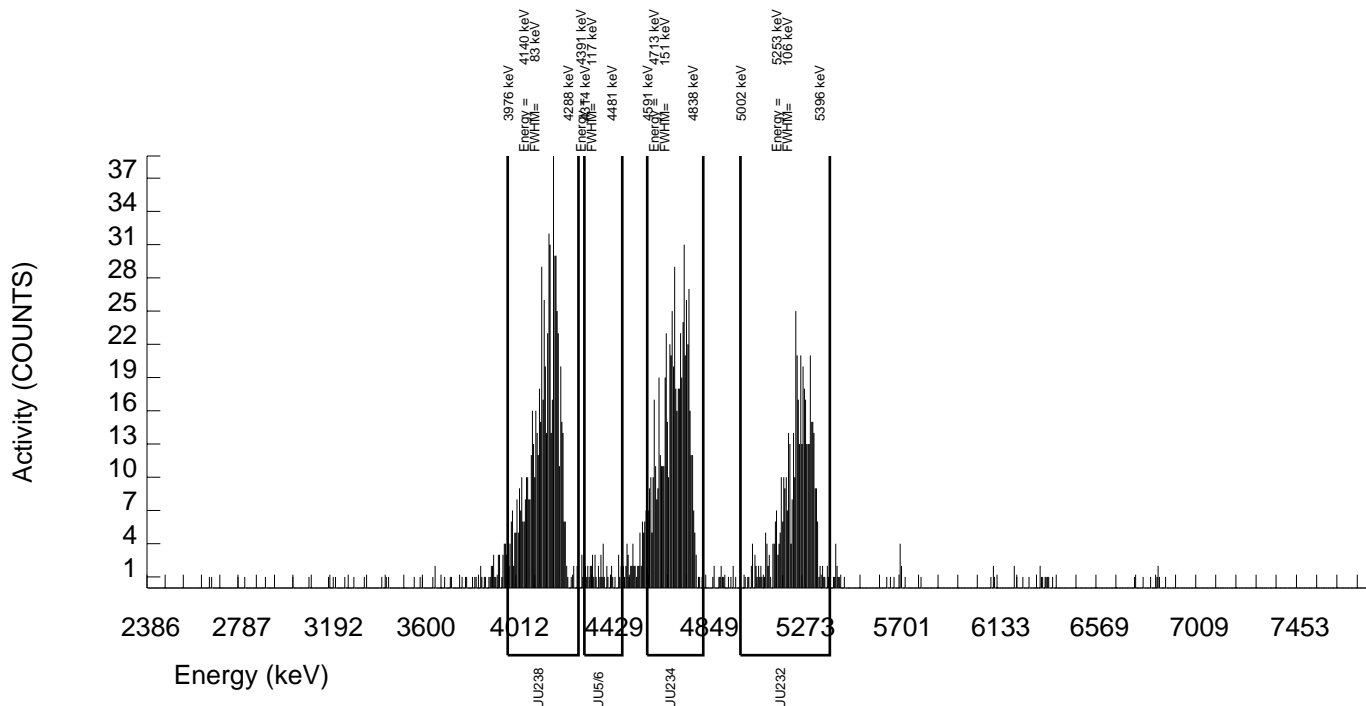
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639 SAMPLE DATE : 17-SEP-2009 00:00:00		SAMPLE ID : S1201945572_UU SAMPLE QTY: 0.503 G	
DETECTOR NUMBER :65877 AVERAGE %EFFICIENCY :25.6005 % YIELD : 35.617		COUNT DATE:15-OCT-2009 14:29:08 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 : 5.25734 dpm RESULTS : 1.87249 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B138.CNF;360 BKG DATE : 11-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	669.000	656.517	12.000	3.4641	100.0000	6.45E+00	1.12E+00	1.88E-01	7.91E-02	5.02E-01
U232	5302.100	488.000	479.000	9.000	3.0000	100.0000	4.71E+00	8.46E-01	1.67E-01	6.86E-02	4.29E-01
U-235	4391.000	46.000	44.000	2.000	1.4142	80.90000	5.34E-01	1.84E-01	1.16E-01	3.99E-02	1.65E-01
U-238	4184.730	709.000	699.000	10.000	3.1623	100.0000	6.87E+00	1.18E+00	1.74E-01	7.23E-02	5.16E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 911639
SAMPLE DATE : 13-OCT-2009 00:00:00

SAMPLE ID : S1201945573_UU
SAMPLE QTY: 0.519 G

DETECTOR NUMBER :76231
AVERAGE %EFFICIENCY :24.9287
% YIELD : 109.805

COUNT DATE:15-OCT-2009 14:29:11
ELAPSED LIVE TIME(SEC): 60000.00
ANALYST :JXD2

MS/MSD
ID : 1163-G
ISOTOPE : U-238
PCI/G : 4.853E+00

LCS/LCSD
ID : 1163-G
ISOTOPE : U-238
PCI/G : 4.853E+00

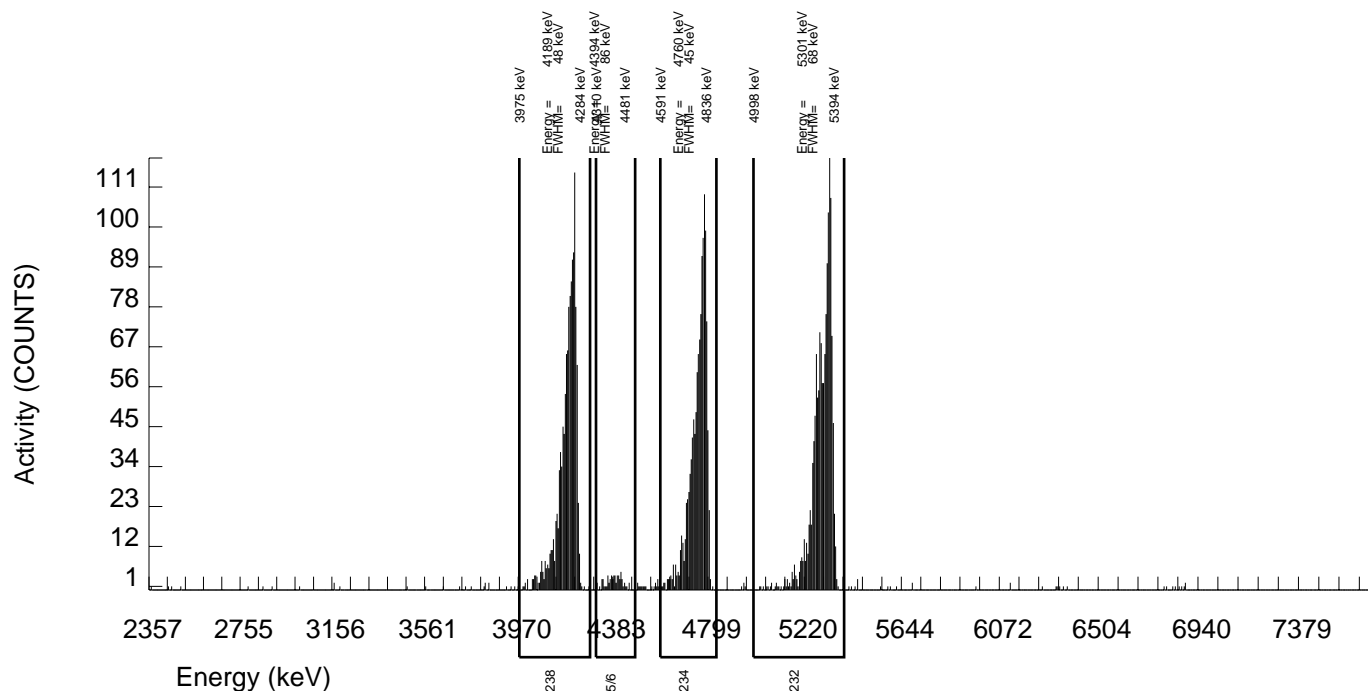
TRACER
ID : 1283-E
ISOTOPE : U232
NOMINAL : 5.25374 dpm
RESULTS : 5.76890 dpm

LIB FILE : ENV_ALPHA_UU.N
BKG FILE : B139.CNF;357
BKG DATE : 11-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	1249.000	1241.550	6.000	2.4495	100.0000	3.94E+00	5.87E-01	4.56E-02	1.81E-02	2.20E-01
U232	5302.100	1447.000	1438.000	9.000	3.0000	100.0000	4.56E+00	6.73E-01	5.38E-02	2.21E-02	2.37E-01
U-235	4391.000	64.000	64.000	0.000	0.0000	80.90000	2.51E-01	7.05E-02	1.18E-02	0.00E+00	6.15E-02
U-238	4184.730	1286.000	1283.000	3.000	1.7321	100.0000	4.07E+00	6.05E-01	3.51E-02	1.28E-02	2.23E-01

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



RADIUM 228

Radiochemistry Batch Checklist, Rev 9

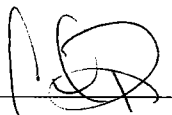
Batch# 905324 Product: RA 22B Date: 9/29/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			N/A
Samples have been blank corrected (if required)			N/A
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.	✓		
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	✓		
Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%.	✓		
Or meets the client's contract acceptance criteria.	✓		
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)	✓		
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: _____

 . 9/29/09

Secondary Review Performed By: _____



11008 10/19


Radium-228 Que Sheet

General Engineering Laboratories, Radiochemistry Division
09/23/2009

Batch #: 905326 Analyst: MXS2 First Client Due Date: 10/09/2009 Internal Due Date: 09/28/2009 Ac-228 Ingrow: 92409/1030
 Spike Isotope: Radium-228 Spike Code: _____ Expiration Date: _____
 LCS Isotope: Radium-228 LCS Code: 0503-0 Expiration Date: 9-11-10 Vol: 0.1 mL
 Tracer Isotope: Barium-133 Tracer Code: 0112-5 Expiration Date: 2-17-10 Vol: 0.1 mL
 Prep Date: 9-23-09 Initials: HS Pipet ID: 2766953 Balance ID: 17955160 Witness: JLP 9-23-09 Ac-228 Separation Date/Time: 9-28-09 1700

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Pos. #	Vol (mL)	Det #	Ba Yield (%)	Gamma Det. #
236938020-1	EB091009-SO1	SAMPLE		3 pCi/L	WATER	KERR003	10-SEP-09 10:37 AM	1	200	1A	99.70	
237010013-1	EB091009-SO2	SAMPLE		3 pCi/L	WATER	KERR003	10-SEP-09 11:53 AM	2	200	1B	91.92	
237170005-1	EB091409-SO1	SAMPLE		3 pCi/L	WATER	KERR003	14-SEP-09 09:54 AM	3	200	1C	102.05	
237170020-1	EB091509-SO1	SAMPLE		3 pCi/L	WATER	KERR003	15-SEP-09 10:16 AM	4	200	1D	92.75	
237343006-1	EB091609-SO1	SAMPLE		3 pCi/L	WATER	KERR003	16-SEP-09 08:46 AM	5	200	2A	94.70	
237521010-1	EB091809-SO1	SAMPLE		3 pCi/L	WATER	KERR003	18-SEP-09 01:12 PM	6	200	2C	97.75	
1201930326-1	MB for batch 905326	MB		3 pCi/L	WATER	QC ACCOUNT	10-SEP-09 10:37 AM	7	200	2B 3A	98.11	
1201930327-1	LCS for batch 905326	LCS		3 pCi/L	WATER	QC ACCOUNT	10-SEP-09 10:37 AM	8	200	3A	103.98	
1201930328-1	LCS for batch 905326	LCS		3 pCi/L	WATER	QC ACCOUNT	10-SEP-09 10:37 AM	9	200	3D	93.70	

10/6/09
CP

Data Reviewed By:  9/29/09

Comments:

Instrument Used: (Circle One) PIC SN: 10751-4

Radium-228 Liquid

Filename : RA228.XLS
 File type : Excel
 Version # : 1.2.5
 Batch : 905326
 Analyst : MXS2
 Prep Date : 9/23/2009

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

LCS S/N : 0503-B
 LCS Exp Date : 9/11/2010
 LCS Activity (dpm/ml) : 177.43
 LCS Volume Added : 0.10

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

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

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

Geometry: CeF on 25mm Filter

Sample Characteristics			Tracer Calculations			Tracer Samp.			Tracer			
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Tracer Concentration (cpm) (Ba-133 Ref.)	Tracer Ref. Count Uncertainty (cpm)	Tracer Concentration (cpm) (Ba-133 Samp.)	Tracer Count Uncertainty (cpm)	Tracer Aliquot (mL)	Tracer Aliquot StDev. (mL)	Tracer Count Uncertainty (cpm)	Tracer Aliquot (mL)	Tracer Aliquot StDev. (mL)
1	236938020.1	0.2000	1.6007E-05	301.8	3.53%	300.9	3.54%	0.1	0.000701	300.9	0.1	0.000701
2	237010013.1	0.2000	1.6007E-05	301.8	3.53%	274.7	3.73%	0.1	0.000701	274.7	0.1	0.000701
3	237170005.1	0.2000	1.6007E-05	301.8	3.53%	308.0	3.49%	0.1	0.000701	308.0	0.1	0.000701
4	237170020.1	0.2000	1.6007E-05	301.8	3.53%	278.4	3.70%	0.1	0.000701	278.4	0.1	0.000701
5	237343006.1	0.2000	1.6007E-05	301.8	3.53%	285.8	3.64%	0.1	0.000701	285.8	0.1	0.000701
6	237521010.1	0.2000	1.6007E-05	301.8	3.53%	295.0	3.58%	0.1	0.000701	295.0	0.1	0.000701
7	1201930326.1	0.2000	1.6007E-05	301.8	3.53%	296.1	3.57%	0.1	0.000701	296.1	0.1	0.000701
8	1201930327.1	0.2000	1.6007E-05	301.8	3.53%	313.8	3.46%	0.1	0.000701	313.8	0.1	0.000701
9	1201930328.1	0.2000	1.6007E-05	301.8	3.53%	282.8	3.67%	0.1	0.000701	282.8	0.1	0.000701

Count raw Data										Calibration Data									
Pos.	Detector ID	Counting Time (min.)	Gross Alpha	Gross Beta	Beta cpm	Count Start Date/Time	Separation Date/Time	Ra-228 Decay	Ac-228 Decay	Ac-228 Count Correction	Calculated Sample Recovery %	Sample Recovery Error %	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Weekly Bkg Count	Weekly Bkg Time (min.)
1	1A	60	2	49	0.817	9/28/2009 19:42	9/28/2009 17:00	0.994	0.737	1.058	98.70%	2.69%	PIC	7/2/2009	7/31/2010	0.6303	0.00600	0.410	500
2	1B	60	0	32	0.533	9/28/2009 19:42	9/28/2009 17:00	0.994	0.737	1.058	91.02%	2.75%	PIC	7/2/2009	7/31/2010	0.6282	0.00409	0.306	500
3	1C	60	6	77	1.283	9/28/2009 19:42	9/28/2009 17:00	0.995	0.737	1.058	102.05%	2.67%	PIC	7/2/2009	7/31/2010	0.6176	0.00344	0.870	500
4	1D	60	9	57	0.950	9/28/2009 19:42	9/28/2009 17:00	0.996	0.737	1.058	92.25%	2.74%	PIC	7/2/2009	7/31/2010	0.6043	0.00511	0.530	500
5	2A	60	6	55	0.917	9/28/2009 19:42	9/28/2009 17:00	0.996	0.737	1.058	94.70%	2.72%	PIC	7/2/2009	7/31/2010	0.6172	0.00349	0.558	500
6	2C	60	10	28	0.467	9/28/2009 19:42	9/28/2009 17:00	0.997	0.737	1.058	97.75%	2.70%	PIC	7/2/2009	7/31/2010	0.5969	0.00575	0.340	500
7	3A	100	20	158	1.580	9/28/2009 20:55	9/28/2009 17:00	0.998	0.642	1.097	98.11%	2.70%	PIC	7/2/2009	7/31/2010	0.5882	0.00943	1.182	500
8	3A	60	69	553	9.217	9/28/2009 19:41	9/28/2009 17:00	0.998	0.737	1.058	103.96%	2.66%	PIC	7/2/2009	7/31/2010	0.5882	0.00943	1.182	500
9	3D	60	29	471	7.850	9/28/2009 19:41	9/28/2009 17:00	0.998	0.737	1.058	93.70%	2.73%	PIC	7/2/2009	7/31/2010	0.5994	0.00464	1.218	500

- Notes:
 1 - Results are decay corrected to Sample Date/Time
 2 - Reference date for Spike Activity (dpm/mi) 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	RER	RPD	Nominal pCi/L	Recovery
									Counting Uncertainty pCi/L	Total Prop. Uncertainty pCi/L						
1	1.0549	0.7448	3	1.7484	2.1047	0.2967	0.4067	0.1201	1.2186	1.3310		SAMPLE				
2	1.0015	0.7071	3	1.6986	1.2930	0.4297	0.2273	0.0975	1.0866	1.1353		SAMPLE				
3	1.5302	1.0803	3	2.4184	2.1301	0.3689	0.4133	0.1521	1.5362	1.6287		SAMPLE				
4	1.3500	0.9531	3	2.1975	2.4466	0.3107	0.4200	0.1300	1.4840	1.6093		SAMPLE				
5	1.3209	0.9326	3	2.1429	1.9923	0.3580	0.3587	0.1280	1.3940	1.4832		SAMPLE				
6	1.0323	0.7288	3	1.7356	0.7044	0.7266	0.1267	0.0920	1.0024	1.0183		SAMPLE				
7	1.9211	1.3563	3	2.9203	2.7554	0.3398	0.3980	0.1348	1.8288	1.9589		MB			39.9618	110.2%
8	1.8967	1.3391	3	2.9522	44.0329	0.0567	8.0347	0.3949	4.2422	11.9874		LCS			39.9618	95.7%
9	2.0255	1.4300	3	3.1483	38.2352	0.0616	6.6320	0.3651	4.1252	10.5654		LCSD	14.1%			

905326

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine
236938020	1A	60	2	49	9/28/2009 19:42	9/28/2009 20:42	PIC
237010013	1B	60	0	32	9/28/2009 19:42	9/28/2009 20:42	PIC
237170005	1C	60	6	77	9/28/2009 19:42	9/28/2009 20:42	PIC
237170020	1D	60	9	57	9/28/2009 19:42	9/28/2009 20:42	PIC
237343006	2A	60	6	55	9/28/2009 19:42	9/28/2009 20:42	PIC
237521010	2C	60	10	28	9/28/2009 19:42	9/28/2009 20:42	PIC
1201930326	3A	100	20	158	9/28/2009 20:55	9/28/2009 22:35	PIC
1201930327	3A	60	69	553	9/28/2009 19:41	9/28/2009 20:41	PIC
1201930328	3D	60	29	471	9/28/2009 19:41	9/28/2009 20:41	PIC

ASSAY 24-Sep-09 9:41:50

Protocol id 8 228_REC
Time limit 180
Count limit 50000
Isotope Ba-133
Protocol date 9-Apr-07 10:03:07
Run id. 5

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	98	1	180	997	301.8	3.53		09:41:57
2	98	2	180	994	300.9	3.54	99.70	09:45:09
3	98	3	180	915	274.7	3.73	91.02	09:48:20
4	98	4	180	1015	308	3.49	102.05	09:51:31
5	98	5	180	926	278.4	3.7	92.25	09:54:43
6	60	6	180	949	285.8	3.64	94.70	09:58:08
7	60	7	180	976	295	3.58	97.75	10:01:19
8	60	8	180	979	296.1	3.57	98.11	10:04:31
9	60	9	180	1032	313.8	3.46	103.98	10:07:42
10	60	10	180	940	282.8	3.67	93.70	10:10:53

END OF ASSAY

Radiochemistry Batch Checklist, Rev 9

Batch# 907633 Product: Radium 228 Date: 10/16/09

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.			N/A
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 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 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: V. Calpeppan 10/16/09

Secondary Review Performed By: [Signature]

KERR
10/16

Radium-228 Que Sheet

09/30/2009

Batch #: 907633
 Analyst: MXS2
 First Client Due Date: 10/16/2009
 Internal Due Date: 05/20/2009
 Spike Isotope: Radium-228
 Spike Code: 0503-β
 Expiration Date: 9-11-10
 LCS Isotope: Radium-228
 LCS Code: 0503-β
 Expiration Date: 9-11-10
 Tracer Isotope: Barium-133
 Tracer Code: 0117-γ
 Expiration Date: 2-17-10
 Prep Date: 10/2/09
 Initials: MS
 Pipet ID: 2766953
 Balance ID: 50410272
 Ac-228 Separation Date/Time: 10/2/09 10:15
 Witness: MEB b-k-y
 Ac-228 Ingrow: 10-8-09 1145

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Pos. #	Vol (mL)	Ba Yield (%)	Gamma Det. #
237343001-1	SA128-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	16-SEP-09 01:55 PM	1	1.002	92.21	3C
237343002-1	SA128-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	16-SEP-09 09:58 AM	2	1.003	102.92	3D
237343003-1	SA128-29B	SAMPLE		.5 pCi/g	SOIL	KERR003	16-SEP-09 10:28 AM	3	1.015	92.11	4P
237343004-1	SA65-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	16-SEP-09 07:49 AM	4	1.002	101.86	4C
237343005-1	SA65009-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	16-SEP-09 07:49 AM	5	1.003	85.61	6A
237343007-1	SA51-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	17-SEP-09 12:47 PM	6	1.019	93.77	6B
237343008-1	SA51009-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	17-SEP-09 12:47 PM	7	1.007	101.23	6D
237343009-1	SA51-25B	SAMPLE		.5 pCi/g	SOIL	KERR003	17-SEP-09 01:04 PM	8	1.001	94.90	8A
237343010-1	SA51-36B	SAMPLE		.5 pCi/g	SOIL	KERR003	17-SEP-09 01:49 PM	9	1.001	97.02	8C
237343011-1	SA151-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	17-SEP-09 09:45 AM	10	1.002	94.40	9A
237343012-1	SA151-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	17-SEP-09 10:10 AM	11	1.010	100.13	10A
237343013-1	SA151-25B	SAMPLE		.5 pCi/g	SOIL	KERR003	17-SEP-09 10:44 AM	12	1.019	100.43	10B
237343014-1	SA151-39B	SAMPLE		.5 pCi/g	SOIL	KERR003	17-SEP-09 11:14 AM	13	1.004	99.07	10B
237343015-1	SA151009-39B	SAMPLE		.5 pCi/g	SOIL	KERR003	17-SEP-09 11:14 AM	14	1.001	97.64	7C
237343016-1	SA165-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	17-SEP-09 07:54 AM	15	1.001	95.43	8B
237343017-1	SA165-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	17-SEP-09 08:19 AM	16	1.009	97.35	10C
237343018-1	SA165-28B	SAMPLE		.5 pCi/g	SOIL	KERR003	17-SEP-09 08:51 AM	17	1.006	95.72	13A
1201935774-1	MB for batch 907633	MB		.5 pCi/g	SOIL	QC ACCOUNT		18	1.019	70.80	13B
1201935775-1	SA165-10B(237343017DUP)	DUP		.5 pCi/g	SOIL	QC ACCOUNT	17-SEP-09 08:19 AM	19	1.020	98.91	13C
1201935776-1	SA165-10B(237343017MS)	MS		.5 pCi/g	SOIL	QC ACCOUNT	17-SEP-09 08:19 AM	20	0.100	98.81	13D
1201935777-1	LCS for batch 907633	LCS		.5 pCi/g	SOIL	QC ACCOUNT		21	1.019	87.84	9C

ML 10/16/09

W A VC 10/16/09

135

Data Reviewed By: V. Calappa 10/16/09

Radium 228 Re-Elute / Reprecipitate

Batch # 907633
 Ra 228 Spike Code 0503-B
 LCS Code 0503-B
 Ba-133 Tracer Code 0112-J

Prep Date 10-2-09 Initials MS
 Spike Vol (mls) 0.1
 LCS Vol (mls) 0.1 Ingrow Start Time: 10-14-09/1300
 Tracer Vol (mls) 0.1 Separation Time: 10-15-09/1700

Sample ID	Bkr #	Vol. (mls)	Det #	% Yield	Gamma Det #
237343001	1	1.002	11D	78.15	
237343002	2	1.003	12B	92.41	
237343003	3	1.015 *	12C 1A	84.12	
237343004	4	1.002	13A	89.85	
237343005	5	1.003	13B	80.52	
237343007	6	1.019	13C	90.11	
237343008	7	1.007 *	14A 1B	90.70	
237343009	8	1.001 *	14C 1C	93.68	
237343010	9	1.001	14D	88.46	
237343011	10	1.002 *	20 1D	87.68	
237343012	11	1.010 *	5B 2A	91.80	
237343013	12	1.019	6A	91.54	
237343014	13	1.004 *	6B 2B	79.81	
237343015	14	1.001 *	6C 2C	91.02	
237343016	15	1.001	7D	87.62	
237343017	16	1.009	8B	89.34	
237343018	17	1.006	8C	89.63	
1201935774	18 ^{1.020}	1.019 *	9A	83.37	
1201935775	19 ^{1.020}	1.020 *	9C 4A	79.29	
1201935776	20	0.100	5A	93.58	
1201935777	21 ^{1.020}	1.019 *	5D	84.31	

* VC 10/16/09

Radium-228 Solid

Filename : RA228.XLS
 File type : Excel
 Version # : 1.2.5
 Batch : 907633
 Analyst : MXS2
 Prep Date : 10/2/2009

Spike S/N : 0503-B
 Spike Exp Date : 9/11/2010
 Spike Activity (dpm/ml) : 176.90
 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

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

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

Geometry: CeF on 25mm Filter

LCS S/N : 0503-B
 LCS Exp Date : 9/11/2010
 LCS Activity (dpm/ml) : 176.90
 LCS Volume Added : 0.10

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 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.)					
1	237343001.1	1.0020	3.3235E-03	9/16/2009 13:55	308.5	3.49%	241.1	4.01%	0.1	0.000701
2	237343002.1	1.0030	3.3237E-03	9/16/2009 9:58	308.5	3.49%	285.1	3.65%	0.1	0.000701
3	237343003.1	1.0150	3.3249E-03	9/16/2009 10:28	308.5	3.49%	259.5	3.85%	0.1	0.000701
4	237343004.1	1.0020	3.3235E-03	9/16/2009 7:49	308.5	3.49%	277.2	3.71%	0.1	0.000701
5	237343005.1	1.0030	3.3237E-03	9/16/2009 7:49	308.5	3.49%	248.4	3.94%	0.1	0.000701
6	237343007.1	1.0190	3.3253E-03	9/17/2009 12:47	308.5	3.49%	278.0	3.70%	0.1	0.000701
7	237343008.1	1.0070	3.3241E-03	9/17/2009 12:47	308.5	3.49%	279.8	3.69%	0.1	0.000701
8	237343009.1	1.0010	3.3234E-03	9/17/2009 13:04	308.5	3.49%	289.0	3.62%	0.1	0.000701
9	237343010.1	1.0010	3.3234E-03	9/17/2009 13:49	308.5	3.49%	272.9	3.74%	0.1	0.000701
10	237343011.1	1.0020	3.3235E-03	9/17/2009 9:45	308.5	3.49%	270.5	3.76%	0.1	0.000701
11	237343012.1	1.0100	3.3244E-03	9/17/2009 10:10	308.5	3.49%	283.2	3.66%	0.1	0.000701
12	237343013.1	1.0190	3.3253E-03	9/17/2009 10:44	308.5	3.49%	282.4	3.67%	0.1	0.000701
13	237343014.1	1.0040	3.3238E-03	9/17/2009 11:14	308.5	3.49%	246.2	3.96%	0.1	0.000701
14	237343015.1	1.0010	3.3234E-03	9/17/2009 11:14	308.5	3.49%	280.8	3.68%	0.1	0.000701
15	237343016.1	1.0010	3.3234E-03	9/17/2009 7:54	308.5	3.49%	270.3	3.76%	0.1	0.000701
16	237343017.1	1.0090	3.3243E-03	9/17/2009 8:51	308.5	3.49%	275.6	3.72%	0.1	0.000701
17	237343018.1	1.0060	3.3240E-03	9/17/2009 8:19	308.5	3.49%	276.5	3.71%	0.1	0.000701
18	1201935774.1	1.0200	3.3254E-03	10/2/2009 0:00	308.5	3.49%	257.2	3.87%	0.1	0.000701
19	1201935775.1	1.0200	3.3254E-03	9/17/2009 8:19	308.5	3.49%	244.6	3.98%	0.1	0.000701
20	1201935776.1	0.1000	4.3713E-04	9/17/2009 8:19	308.5	3.49%	286.7	3.62%	0.1	0.000701
21	1201935777.1	1.0200	3.3254E-03	10/2/2009 0:00	308.5	3.49%	260.1	3.84%	0.1	0.000701

Count raw Data		Counting										Calibration Data										Sample Recovery		Calculated	
Pos.	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Beta cpm	Count Start Date/Time	Separation Date/Time	Pa-228 Decay	Ac-228 Decay	Ac-228 Correction	Count	Sample Recovery %	Recovery Error %	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Weekly Bkg Count Time (min.)	Weekly Bkg cpm					
1	11D	60	13	91	1.517	10/15/2009 18:32	10/15/2009 17:00	0.990	0.839	1.058	1.058	78.15%	2.84%	PIC	7/2/2009	7/31/2010	0.6348	0.00816	1000	0.720					
2	12B	60	9	139	2.317	10/15/2009 18:32	10/15/2009 17:00	0.990	0.839	1.058	1.058	92.41%	2.71%	PIC	7/2/2009	7/31/2010	0.6348	0.00816	1000	0.560					
3	1A	460	22	367	0.798	10/15/2009 23:44	10/15/2009 17:00	0.990	0.467	1.495	1.495	84.12%	2.78%	PIC	7/2/2009	7/31/2010	0.6303	0.00600	1000	0.382					
4	13A	60	9	114	1.900	10/15/2009 18:32	10/15/2009 17:00	0.990	0.839	1.058	1.058	89.85%	2.79%	PIC	7/2/2009	7/31/2010	0.6410	0.00816	1000	0.591					
5	13B	60	11	138	2.300	10/15/2009 18:32	10/15/2009 17:00	0.990	0.839	1.058	1.058	80.52%	2.81%	PIC	7/2/2009	7/31/2010	0.6526	0.00816	1000	1.666					
6	13C	60	3	141	2.350	10/15/2009 18:32	10/15/2009 17:00	0.991	0.839	1.058	1.058	90.11%	2.73%	PIC	7/2/2009	7/31/2010	0.6538	0.00816	1000	1.431					
7	1B	460	37	331	0.720	10/15/2009 23:44	10/15/2009 17:00	0.991	0.466	1.495	1.495	90.70%	2.79%	PIC	7/2/2009	7/31/2010	0.6282	0.00409	1000	0.380					
8	1C	460	43	703	1.528	10/15/2009 23:46	10/15/2009 17:00	0.991	0.465	1.495	1.495	93.68%	2.70%	PIC	7/2/2009	7/31/2010	0.6176	0.00344	1000	0.935					
9	14D	60	17	109	1.817	10/15/2009 18:32	10/15/2009 17:00	0.991	0.839	1.058	1.058	88.46%	2.74%	PIC	7/2/2009	7/31/2010	0.6326	0.00816	1000	1.091					
10	1D	460	45	474	1.030	10/15/2009 23:46	10/15/2009 17:00	0.991	0.465	1.495	1.495	87.66%	2.75%	PIC	7/2/2009	7/31/2010	0.6043	-0.00511	1000	0.529					
11	2A	460	38	407	0.885	10/15/2009 23:46	10/15/2009 17:00	0.991	0.465	1.495	1.495	91.80%	2.72%	PIC	7/2/2009	7/31/2010	0.6172	0.00349	1000	0.510					
12	6A	60	6	131	2.183	10/15/2009 18:47	10/15/2009 17:00	0.991	0.817	1.058	1.058	79.81%	2.82%	PIC	7/2/2009	7/31/2010	0.6221	0.00816	1000	1.304					
13	2B	460	61	861	1.872	10/15/2009 23:46	10/15/2009 17:00	0.991	0.465	1.495	1.495	91.54%	2.72%	PIC	7/2/2009	7/31/2010	0.5969	0.00383	1000	1.320					
14	2C	460	49	292	0.635	10/15/2009 18:47	10/15/2009 17:00	0.991	0.465	1.495	1.495	87.62%	2.75%	PIC	7/2/2009	7/31/2010	0.6167	0.00575	1000	0.355					
15	7D	60	10	99	1.650	10/15/2009 23:46	10/15/2009 17:00	0.991	0.816	1.058	1.058	89.34%	2.74%	PIC	7/2/2009	7/31/2010	0.6257	0.00816	1000	0.384					
16	8B	60	6	161	2.683	10/15/2009 18:48	10/15/2009 17:00	0.991	0.816	1.058	1.058	89.63%	2.79%	PIC	7/2/2009	7/31/2010	0.6332	0.00816	1000	1.869					
17	8C	60	10	106	1.767	10/15/2009 18:48	10/15/2009 17:00	0.991	0.816	1.058	1.058	83.37%	2.79%	PIC	7/2/2009	7/31/2010	0.6339	0.00816	1000	0.527					
18	9A	60	10	38	0.633	10/15/2009 18:47	10/15/2009 17:00	0.995	0.817	1.058	1.058	83.37%	2.83%	PIC	7/2/2009	7/31/2010	0.6496	0.00816	1000	0.449					
19	4A	460	128	769	1.672	10/15/2009 23:44	10/15/2009 17:00	0.991	0.467	1.495	1.495	79.29%	2.83%	PIC	7/2/2009	7/31/2010	0.6208	0.00744	1000	0.903					
20	5A	60	20	488	8.133	10/15/2009 18:58	10/15/2009 17:00	0.991	0.799	1.058	1.058	93.59%	2.70%	PIC	7/2/2009	7/31/2010	0.6258	0.00816	1000	0.486					
21	5D	60	16	484	8.067	10/15/2009 18:58	10/15/2009 17:00	0.995	0.799	1.058	1.058	84.31%	2.78%	PIC	7/2/2009	7/31/2010	0.6237	0.00816	1000	1.326					

- 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 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		Sample QC	Sample Type	RPD	RER	Nominal pCi/G	Recovery
	pCi/G	pCi/G								pCi/G	pCi/G						
1	0.3029	0.2139	0.2139	0.5	0.4854	0.9184	0.2046	0.7967	0.1612	0.3643	0.3682		SAMPLE				
2	0.2256	0.1593	0.1593	0.5	0.3672	1.7089	0.1162	1.7567	0.1979	0.3776	0.3895		SAMPLE				
3	0.2198	0.1552	0.1552	0.5	0.3280	1.1265	0.1143	0.4158	0.0460	0.2443	0.2523		SAMPLE				
4	0.2364	0.1669	0.1669	0.5	0.3835	1.3000	0.1402	1.3090	0.1796	0.3496	0.3572		SAMPLE				
5	0.4346	0.3069	0.3069	0.5	0.6681	0.6894	0.3168	0.6340	0.2000	0.4262	0.4281		SAMPLE				
6	0.3535	0.2496	0.2496	0.5	0.5469	0.8769	0.2211	0.9190	0.2015	0.3768	0.3800		SAMPLE				
7	0.2056	0.1451	0.1451	0.5	0.3068	0.8626	0.1328	0.3396	0.0441	0.2196	0.2245		SAMPLE				
8	0.3203	0.2262	0.2262	0.5	0.4688	1.4972	0.1134	0.5933	0.0652	0.3227	0.3326		SAMPLE				
9	0.3308	0.2335	0.2335	0.5	0.5182	0.7420	0.1087	0.7257	0.1771	0.3550	0.3574		SAMPLE				
10	0.2829	0.1856	0.1856	0.5	0.3692	1.3807	0.1087	0.5014	0.0526	0.2840	0.2940		SAMPLE				
11	0.2397	0.1692	0.1692	0.5	0.3551	0.9581	0.1345	0.3748	0.0493	0.2472	0.2526		SAMPLE				
12	0.3589	0.2594	0.2594	0.5	0.5575	0.8924	0.2226	0.8793	0.1941	0.3862	0.3894		SAMPLE				
13	0.4466	0.3153	0.3153	0.5	0.6500	1.6340	0.1361	0.5517	0.0734	0.4261	0.4359		SAMPLE				
14	0.2105	0.1486	0.1486	0.5	0.3148	0.7530	0.1515	0.2798	0.0417	0.2197	0.2236		SAMPLE				
15	0.2061	0.1455	0.1455	0.5	0.3447	1.3596	0.1350	1.2660	0.1670	0.3515	0.3598		SAMPLE				
16	0.4373	0.3087	0.3087	0.5	0.6691	0.8411	0.2666	0.8143	0.2158	0.4370	0.4395		SAMPLE				
17	0.2319	0.1637	0.1637	0.5	0.3790	1.2787	0.1426	1.2397	0.1731	0.3500	0.3573		SAMPLE				
18	0.2200	0.1553	0.1553	0.5	0.3637	0.1954	0.5698	0.1843	0.1049	0.2180	0.2183		SAMPLE				
19	0.3620	0.2556	0.2556	0.5	0.5301	2.2312	0.0924	0.7687	0.0674	0.3832	0.4042		SAMPLE				
20	2.2175	1.5656	1.5656	0.5	3.6448	78.5474	0.0561	7.6473	0.3688	7.4253	8.6300	237343017.1	MB	90.5%		80.0729	97.0%
21	0.3980	0.2810	0.2810	0.5	0.6178	7.5231	0.0619	6.7407	0.3685	0.8060	0.9133	237343017.1	LCS			7.8124	96.3%

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	907633	Count Start Time	Count End Time	Machine
237343001	11D	60	13	91		10/15/2009 18:32	10/15/2009 19:32	PIC
237343002	12B	60	9	139		10/15/2009 18:32	10/15/2009 19:32	PIC
237343003	1A	460	22	367		10/15/2009 23:44	10/16/2009 7:24	PIC
237343004	13A	60	9	114		10/15/2009 18:32	10/15/2009 19:32	PIC
237343005	13B	60	11	138		10/15/2009 18:32	10/15/2009 19:32	PIC
237343007	13C	60	3	141		10/15/2009 18:32	10/15/2009 19:32	PIC
237343008	1B	460	37	331		10/15/2009 23:44	10/16/2009 7:24	PIC
237343009	1C	460	43	703		10/15/2009 23:46	10/16/2009 7:26	PIC
237343010	14D	60	17	109		10/15/2009 18:32	10/15/2009 19:32	PIC
237343011	1D	460	45	474		10/15/2009 23:46	10/16/2009 7:26	PIC
237343012	2A	460	38	407		10/15/2009 23:46	10/16/2009 7:26	PIC
237343013	6A	60	6	131		10/15/2009 18:47	10/15/2009 19:47	PIC
237343014	2B	460	61	861		10/15/2009 23:46	10/16/2009 7:26	PIC
237343015	2C	460	49	292		10/15/2009 23:46	10/16/2009 7:26	PIC
237343016	7D	60	10	99		10/15/2009 18:47	10/15/2009 19:47	PIC
237343017	8B	60	6	161		10/15/2009 18:48	10/15/2009 19:48	PIC
237343018	8C	60	10	106		10/15/2009 18:48	10/15/2009 19:48	PIC
1201935774	9A	60	10	38		10/15/2009 18:47	10/15/2009 19:47	PIC
1201935775	4A	460	128	769		10/15/2009 23:44	10/16/2009 7:24	PIC
1201935776	5A	60	20	488		10/15/2009 18:58	10/15/2009 19:58	PIC
1201935777	5D	60	16	484		10/15/2009 18:58	10/15/2009 19:58	PIC

ASSAY 14-Oct-09 14:54:40

Protocol id 9 228_REC2
Time limit 180
Count limit 50000
Isotope Ba-133
Protocol date 9-Apr-07 10:02:22
Run id. 41

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	72	1	180	1017	308.5	3.49		14:54:47
2	72	2	180	814	241.1	4.01	78.15	14:57:58
3	72	3	180	946	285.1	3.65	92.41	15:01:10
4	72	4	180	870	259.5	3.85	84.12	15:04:21
5	72	5	180	923	277.2	3.71	89.85	15:07:32
6	77	6	180	836	248.4	3.94	80.52	15:10:57
7	77	7	180	925	278	3.7	90.11	15:14:08
8	77	8	180	931	279.8	3.69	90.70	15:17:20
9	77	9	180	958	289	3.62	93.68	15:20:31
10	77	10	180	910	272.9	3.74	88.46	15:23:43
11	73	11	180	903	270.5	3.76	87.68	15:27:13
12	73	12	180	941	283.2	3.66	91.80	15:30:24
13	73	13	180	938	282.4	3.67	91.54	15:33:35
14	73	14	180	830	246.2	3.96	79.81	15:36:47
15	73	15	180	934	280.8	3.68	91.02	15:39:58
16	60	16	180	902	270.3	3.76	87.62	15:43:17
17	60	17	180	918	275.6	3.72	89.34	15:46:28
18	60	18	180	921	276.5	3.71	89.63	15:49:39
19	60	19	180	863	257.2	3.87	83.37	15:52:51
20	60	20	180	825	244.6	3.98	79.29	15:56:02
21	72	21	180	957	288.7	3.62	93.58	15:59:27
22	72	22	180	871	260.1	3.84	84.31	16:02:38

END OF ASSAY

RADIUM 226

Radiochemistry Batch Checklist, Rev 9

Batch# 904649 Product: Radium 226 Date: 9-25-09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required)			NA
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.			
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.			
Or meets the client's required REF acceptance criteria.		✓	See case narrative
Tracer yield is 15-125% . Carrier yield 25-125%.			
Or meets the client's contract acceptance criteria.			NA
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Sample was correctly preserved if required.			NA
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent.	✓		
Aux data is correct.			NA
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly stasured.	✓		
QC data entered into QC database and batch is in REVW	✓		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	✓		
Batch non-conformances completed, if applicable.	✓		NCR 738448
Batch non-conformances second reviewed and disposition verified to be completed.	✓		GEL 738448
Aliquot Correction completed if required.			NA
Review sample historical results if available (If REMF, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC

revised 8/1/08

Primary Review Performed By: [Signature]

Secondary Review Performed By: [Signature] 9/25/09

KERR 9-30-09

Radium-226 Que Sheet

21-SEP-09

GEL Laboratories, Radiochemistry Division

Batch #: 904649 Analyst: KSDI First Client Due Date: 09/30/2009 Internal Due Date: 09/19/2009
 Spike Isotope: Radium-226 Spike Code: 0028-H Expiration Date: 7/11/10 Vol: 1
 LCS Isotope: Radium-226 LCS Code: 0028-H Expiration Date: 7/11/10 Vol: 1
 Bkg Count Time: 30 (Min) Sample Count Time: 30 (Min) Start Count Date: 9/25/09
 Pipet ID: 142303 Balance ID: 5124802 Initials: KD Witness: MS 9-22-09

012209 1100

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
236077013-1	EB082709-SO1	SAMPLE		WATER	1 pCi/L	KERR003	1	500	0605	930	505	5	8	13
236077019-1	EB083109-SO1	SAMPLE		WATER	1 pCi/L	KERR003	2	500	0605	930	605	6	8	53
236077021-1	EB090109-SO1	SAMPLE		WATER	1 pCi/L	KERR003	3	500	0630	1005	107	1	8	21
236699016-1	EB090309-SO2	SAMPLE		WATER	1 pCi/L	KERR003	4	500	0630	1030	207	2	8	17
236817014-1	EB090809-SO1	SAMPLE		WATER	1 pCi/L	KERR003	5	500	0630	1005	305	3	8	20
236938020-1	EB091009-SO1	SAMPLE		WATER	1 pCi/L	KERR003	6	500	0630	1005 240	411	4	8	21
237010013-1	EB091009-SO2	SAMPLE		WATER	1 pCi/L	KERR003	7	500	0630	1005	506	5	8	23
237170005-1	EB091409-SO1	SAMPLE		WATER	1 pCi/L	KERR003	8	500	0630	1005	601	6	8	17
237170020-1	EB091509-SO1	SAMPLE		WATER	1 pCi/L	KERR003	9	500	0650	1040	112	1	8	27
237343006-1	EB091609-SO1	SAMPLE		WATER	1 pCi/L	KERR003	10	500	0650	1040 110	209	2	8	10
1201928562-1	MB for batch 904649	MB		WATER	1 pCi/L	QC ACCOUNT	11	500	0650	1040	301	3	4	15
1201928563-1	LCS for batch 904649	LCS		WATER	1 pCi/L	QC ACCOUNT	12	500	0650	1040	409	4	8	547
1201928564-1	LCS for batch 904649	LCS		WATER	1 pCi/L	QC ACCOUNT	13	500	0650	1040	507	5	4	669

daillies ✓

144

Comments: _____
 Data Reviewed By: JAN 9-25-09 Page 1 of 1

Radium-226 Liquid

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

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

Batch : 904649

Analyst : KSD1
 Prep Date : 9/22/2009

Ra-226 Abundance : 1

Ra-226 Method Uncertainty : 0.0918

Procedure Code : LUC26RAL

Parname : 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

Sample Characteristics			Count Raw Data				Weekly Background					
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot StdDev. L	Sample Date/Time	Cell Number	Counting Time (min.)	Gross Counts	Gross CPM	Counts	CPM	Count Time (min.)	Detector Efficiency (cpm/dpm)
1	236077013.1	0.5000	2.0256E-05	8/27/2009 10:00	505	30	13	0.433	8	0.267	30	2.3310
2	236077019.1	0.5000	2.0256E-05	8/31/2009 10:00	605	30	53	1.767	8	0.267	30	2.1490
3	236077021.1	0.5000	2.0256E-05	9/1/2009 12:50	107	30	21	0.700	8	0.267	30	1.9810
4	236699016.1	0.5000	2.0256E-05	9/3/2009 13:50	207	30	17	0.567	8	0.267	30	2.1460
5	236817014.1	0.5000	2.0256E-05	9/8/2009 12:02	305	30	20	0.667	6	0.200	30	2.0570
6	236939020.1	0.5000	2.0256E-05	9/10/2009 10:37	411	30	21	0.700	8	0.267	30	1.8240
7	237010013.1	0.5000	2.0256E-05	9/10/2009 11:53	506	30	23	0.767	8	0.267	30	2.0040
8	237170005.1	0.5000	2.0256E-05	9/14/2009 9:54	601	30	17	0.567	8	0.267	30	2.1810
9	237170020.1	0.5000	2.0256E-05	9/15/2009 10:16	112	30	27	0.900	8	0.267	30	1.9310
10	237343006.1	0.5000	2.0256E-05	9/16/2009 8:46	209	30	10	0.333	8	0.267	30	2.2910
11	1201928562.1	0.5000	2.0256E-05	9/22/2009 0:00	301	30	15	0.500	4	0.133	30	2.0210
12	1201928563.1	0.5000	2.0256E-05	9/22/2009 0:00	409	30	547	18.233	8	0.267	30	2.0360
13	1201928564.1	0.5000	2.0256E-05	9/22/2009 0:00	507	30	669	22.300	4	0.133	30	1.7010

Detector Efficiency Error (cpm/dpm)	Cell Calibration Date	Cell Calibration Due Date	De-Gas Date/Time	Rn-222 Ingrowth		Count Start Date/Time	Rn-222 Corrections		Ra-226 Decay
				End Date/Time	De-Gas to Ingrowth		Ingrowth to Count	During Count	
0.14377	3/25/2009	3/25/2010	9/22/2009 11:00	9/25/2009 6:05	9/25/2009 9:30	0.398	0.975	1.002	1.000
0.06605	8/4/2009	8/4/2010	9/22/2009 11:00	9/25/2009 6:05	9/25/2009 9:30	0.398	0.975	1.002	1.000
0.05303	8/31/2009	8/31/2010	9/22/2009 11:00	9/25/2009 6:30	9/25/2009 10:05	0.399	0.973	1.002	1.000
0.07722	12/19/2008	12/19/2009	9/22/2009 11:00	9/25/2009 6:30	9/25/2009 10:30	0.399	0.970	1.002	1.000
0.06082	2/4/2009	2/4/2010	9/22/2009 11:00	9/25/2009 6:30	9/25/2009 10:05	0.399	0.973	1.002	1.000
0.12371	3/2/2009	3/2/2010	9/22/2009 11:00	9/25/2009 6:30	9/25/2009 12:40	0.399	0.954	1.002	1.000
0.14377	3/25/2009	3/25/2010	9/22/2009 11:00	9/25/2009 6:30	9/25/2009 10:05	0.399	0.973	1.002	1.000
0.06605	8/4/2009	8/4/2010	9/22/2009 11:00	9/25/2009 6:30	9/25/2009 10:05	0.399	0.973	1.002	1.000
0.05303	8/31/2009	8/31/2010	9/22/2009 11:00	9/25/2009 6:50	9/25/2009 10:40	0.401	0.971	1.002	1.000
0.07722	12/19/2008	12/19/2009	9/22/2009 11:00	9/25/2009 6:50	9/25/2009 11:10	0.401	0.968	1.002	1.000
0.06082	2/4/2009	2/4/2010	9/22/2009 11:00	9/25/2009 6:50	9/25/2009 10:40	0.401	0.971	1.002	1.000
0.12371	3/2/2009	3/2/2010	9/22/2009 11:00	9/25/2009 6:50	9/25/2009 10:40	0.401	0.971	1.002	1.000
0.14377	3/25/2009	3/25/2010	9/22/2009 11:00	9/25/2009 6:50	9/25/2009 10:40	0.401	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 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	0.3093	0.2184	1	0.5363	0.1659	0.9277	0.1667	0.1528	0.2981	0.3032		SAMPLE				
2	0.3355	0.2369	1	0.5818	1.6200	0.1857	1.5000	0.2603	0.5511	0.6578		SAMPLE				
3	0.3627	0.2561	1	0.6289	0.5059	0.4176	0.4333	0.1795	0.4108	0.4240		SAMPLE				
4	0.3359	0.2371	1	0.5824	0.3243	0.5609	0.3000	0.1667	0.3532	0.3613		SAMPLE				
5	0.3025	0.2136	1	0.5396	0.5247	0.3693	0.4667	0.1700	0.3746	0.3913		SAMPLE				
6	0.4017	0.2836	1	0.6965	0.5603	0.4323	0.4333	0.1795	0.4549	0.4853		SAMPLE				
7	0.3585	0.2531	1	0.6217	0.5771	0.3981	0.5000	0.1856	0.4198	0.4620		SAMPLE				
8	0.3294	0.2326	1	0.5712	0.3181	0.5595	0.3000	0.1667	0.3464	0.3535		SAMPLE				
9	0.3714	0.2622	1	0.6440	0.7571	0.3159	0.6333	0.1972	0.4621	0.4881		SAMPLE				
10	0.3142	0.2218	1	0.5448	0.0674	2.1227	0.0667	0.1414	0.2804	0.2808		SAMPLE				
11	0.2509	0.1771	1	0.4685	0.4188	0.4009	0.3667	0.1453	0.3253	0.3376		MB			24.1645	84.3%
12	0.3522	0.2487	1	0.6107	20.3707	0.1312	17.9667	0.7853	1.7451	6.3933		LCS		1.5683	24.1645	124.5%
13	0.2981	0.2105	1	0.5567	30.0824	0.1490	22.1667	0.8647	2.3001	10.3172		LCSD	38.5%			

Radiochemistry Batch Checklist, Rev 9

Batch# 905701 Product: Ta-226 Date: 10/14/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required)			NA
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.	✓		
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	✓		
Or meets the client's required RER acceptance criteria.			
Tracer yield is 15-125% . Carrier yield 25-125%.			NA
Or meets the client's contract acceptance criteria.			
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Sample was correctly preserved if required.			NA
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms.	✓		
All line outs initialed and dated.	✓		
No transcription errors are apparent.			
Aux data is correct.			NA
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly stused.	✓		
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.	✓		NOT 745799
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NRK 745799
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:

Symonee Pace

Secondary Review Performed By:

Lynch 10/14/09

KETEK 10/16/09

Radium-226 Que Sheet

24-SEP-09

GEL Laboratories, Radiochemistry Division

Batch #: 905701

Analyst: KSD1

First Client Due Date: 10/16/2009

Internal Due Date: 10/05/2009

Spike Isotope: Radium-226

Spike Code: 0030-4

Expiration Date: 7/7/10

Vol: 0.1

End Initial/Degas Date/Time: 10/11/09 1400

LCS Isotope: Radium-226

LCS Code: 0030-4

Expiration Date: 7/7/10

Vol: 0.1

End LN De-em Date: 10/13/09

Bkg Count Time: 30 (Min)

Sample Count Time: 30 (Min)

Start Count Date: 10/13/09

Prep Date: 10/12/09

Pipet ID: 1424223

Balance ID: 5040272

Initials: KD

Witness: WES 10-6-09

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
237343001-1	SA128-0.5B	SAMPLE	SOIL	.5 pCi/g	KERR003	1	1.009	MSS	1300	101	1	8	63
237343002-1	SA128-10B	SAMPLE	SOIL	.5 pCi/g	KERR003	2	1.004	MSS	1300	204	2	8	137
237343003-1	SA128-29B	SAMPLE	SOIL	.5 pCi/g	KERR003	3	1.005	MSS	1300	301	3	8	99
237343004-1	SA65-0.5B	SAMPLE	SOIL	.5 pCi/g	KERR003	4	1.079	MSS	1300	401	4	8	127
237343005-1	SA65009-0.5B	SAMPLE	SOIL	.5 pCi/g	KERR003	5	1.004	MSS	1300	501	5	7	65
237343007-1	SA51-10B	SAMPLE	SOIL	.5 pCi/g	KERR003	6	1.007	MSS	1300	605	4	7	78
237343008-1	SA51009-10B	SAMPLE	SOIL	.5 pCi/g	KERR003	7	1.001	MSS	1300	701	7	4	59
237343009-1	SA51-25B	SAMPLE	SOIL	.5 pCi/g	KERR003	8	1.008	D15	1330	104	1	6	73
237343010-1	SA51-36B	SAMPLE	SOIL	.5 pCi/g	KERR003	9	1.018	D15	1330	204	2	8	93
237343011-1	SA151-0.5B	SAMPLE	SOIL	.5 pCi/g	KERR003	10	1.009	D15	1330	205	2	5	58
237343012-1	SA151-10B	SAMPLE	SOIL	.5 pCi/g	KERR003	11	1.041	D15	1330	411	4	5	70
237343013-1	SA151-25B	SAMPLE	SOIL	.5 pCi/g	KERR003	12	1.037	D15	1330	503	5	6	100
237343014-1	SA151-39B	SAMPLE	SOIL	.5 pCi/g	KERR003	13	1.014	D15	1330	606	6	8	94
237343015-1	SA151009-39B	SAMPLE	SOIL	.5 pCi/g	KERR003	14	1.001	D15	1330	703	7	8	61
237343016-1	SA165-0.5B	SAMPLE	SOIL	.5 pCi/g	KERR003	15	1.009	D45	1405	100	1	8	65
237343017-1	SA165-10B	SAMPLE	SOIL	.5 pCi/g	KERR003	16	1.030	D45	1405	200	2	8	11
237343018-1	SA165-28B	SAMPLE	SOIL	.5 pCi/g	KERR003	17	1.028	D45	1405	200	3	8	93
1201931192-1	MB for batch 905701	MB	SOIL	.5 pCi/g	QC ACCOUNT	18	1.079	D45	*1405 1510	411	4	5	*269
1201931193-1	SA165-10B(237343017DUP)	DUP	SOIL	.5 pCi/g	QC ACCOUNT	19	1.031	D45	1405	506	5	8	*96
1201931194-1	SA165-10B(237343017MS)	MS	SOIL	.5 pCi/g	QC ACCOUNT	20	1.010	D45	1405	601	6	6	883
1201931195-1	LCS for batch 905701	LCS	SOIL	.5 pCi/g	QC ACCOUNT	21	1.079	D45	*1405 1510	705	7	8	*101633

*24.10/1469

Comments:

Data Reviewed By: Sydney Pace 10/13/09

Radium-226 Solid

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

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

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

Batch : 905701

Analyst : KSD1
 Prep Date : 10/6/2009

Ra-226 Abundance : 1

Ra-226 Method Uncertainty : 0.1153

Procedure Code : LUC26RAS
 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

Sample Characteristics			Sample			Sample			Count Raw Data			Weekly Background		
Pos.	Sample ID	Sample Aliquot G	Sample Aliquot G	Sample Aliquot StDev.	Sample Date/Time	Cell Number	Counting Time (min.)	Gross Counts	Gross CPM	Counts	CPM	Count Time (min.)	Detector Efficiency (cpm/dpm)	
1	237343001.1	1.0090	3.3243E-03	9/16/2009 13:55	101	30	63	2.100	8	0.267	30	1.9560		
2	237343002.1	1.0040	3.3238E-03	9/16/2009 9:58	209	30	137	4.567	8	0.267	30	2.2910		
3	237343003.1	1.0050	3.3239E-03	9/16/2009 10:28	301	30	99	3.300	6	0.200	30	2.0210		
4	237343004.1	1.0790	3.3316E-03	9/16/2009 7:49	402	30	127	4.233	8	0.267	30	2.1180		
5	237343005.1	1.0040	3.3238E-03	9/16/2009 7:49	501	30	65	2.167	7	0.233	30	2.0870		
6	237343007.1	1.0070	3.3241E-03	9/17/2009 12:47	605	30	78	2.600	7	0.233	30	2.1490		
7	237343008.1	1.0010	3.3234E-03	9/17/2009 12:47	701	30	59	1.967	4	0.133	30	2.1070		
8	237343009.1	1.0080	3.3242E-03	9/17/2009 13:04	104	30	73	2.433	6	0.200	30	1.9720		
9	237343010.1	1.0180	3.3252E-03	9/17/2009 13:49	204	30	93	3.100	8	0.267	30	2.1930		
10	237343011.1	1.0090	3.3243E-03	9/17/2009 9:45	305	30	58	1.933	5	0.167	30	2.0570		
11	237343012.1	1.0210	3.3255E-03	9/17/2009 10:10	411	30	70	2.333	5	0.167	30	1.8240		
12	237343013.1	1.0270	3.3261E-03	9/17/2009 10:44	503	30	100	3.333	6	0.200	30	1.6010		
13	237343014.1	1.0140	3.3248E-03	9/17/2009 11:14	606	30	94	3.133	8	0.267	30	2.3480		
14	237343015.1	1.0010	3.3234E-03	9/17/2009 11:14	703	30	61	2.033	8	0.267	30	2.2210		
15	237343016.1	1.0090	3.3243E-03	9/17/2009 7:54	106	30	65	2.167	8	0.267	30	1.8360		
16	237343017.1	1.0200	3.3254E-03	9/17/2009 8:19	206	30	111	3.700	8	0.267	30	2.2590		
17	237343018.1	1.0280	3.3263E-03	9/17/2009 8:51	306	30	93	3.100	8	0.267	30	1.7470		
18	1201931192.1	1.0790	3.3316E-03	10/6/2009 0:00	412	30	9	0.300	5	0.167	30	1.9670		
19	1201931193.1	1.0210	3.3255E-03	9/17/2009 8:19	506	30	96	3.200	8	0.267	30	2.0040		
20	1201931194.1	1.0100	3.3244E-03	9/17/2009 8:19	601	30	883	29.433	6	0.200	30	2.1810		
21	1201931195.1	1.0790	3.3316E-03	10/6/2009 0:00	705	30	633	21.100	8	0.267	30	2.1070		

Detector Efficiency Error (cpm/dpm)	Cell Calibration Date	Cell Calibration Due Date	De-Gas Date/Time	Rn-222 Ingrow		Count Start Date/Time	De-Gas to Ingrowth	Rn-222 Corrections		Ra-226 Decay
				End Date/Time	Count			Ingrowth to Count	During Count	
0.05303	8/31/2009	8/31/2010	10/9/2009 14:00	10/13/2009 9:55	10/13/2009 13:00	0.501	0.977	1.002	1.000	
0.07722	12/19/2008	12/19/2009	10/9/2009 14:00	10/13/2009 9:55	10/13/2009 13:00	0.501	0.977	1.002	1.000	
0.06082	2/4/2009	2/4/2010	10/9/2009 14:00	10/13/2009 9:55	10/13/2009 13:00	0.501	0.977	1.002	1.000	
0.12371	3/2/2009	3/2/2010	10/9/2009 14:00	10/13/2009 9:55	10/13/2009 13:00	0.501	0.977	1.002	1.000	
0.14377	3/25/2009	3/25/2010	10/9/2009 14:00	10/13/2009 9:55	10/13/2009 13:00	0.501	0.977	1.002	1.000	
0.06605	8/4/2009	8/4/2010	10/9/2009 14:00	10/13/2009 9:55	10/13/2009 13:00	0.501	0.977	1.002	1.000	
0.06519	9/30/2009	9/30/2010	10/9/2009 14:00	10/13/2009 9:55	10/13/2009 13:00	0.501	0.977	1.002	1.000	
0.05303	8/31/2009	8/31/2010	10/9/2009 14:00	10/13/2009 9:55	10/13/2009 13:00	0.502	0.976	1.002	1.000	
0.07722	12/19/2008	12/19/2009	10/9/2009 14:00	10/13/2009 10:15	10/13/2009 13:30	0.502	0.976	1.002	1.000	
0.06082	2/4/2009	2/4/2010	10/9/2009 14:00	10/13/2009 10:15	10/13/2009 13:30	0.502	0.976	1.002	1.000	
0.12371	3/2/2009	3/2/2010	10/9/2009 14:00	10/13/2009 10:15	10/13/2009 13:30	0.502	0.976	1.002	1.000	
0.14377	3/25/2009	3/25/2010	10/9/2009 14:00	10/13/2009 10:15	10/13/2009 13:30	0.502	0.976	1.002	1.000	
0.06605	8/4/2009	8/4/2010	10/9/2009 14:00	10/13/2009 10:15	10/13/2009 13:30	0.502	0.976	1.002	1.000	
0.06519	9/30/2009	9/30/2010	10/9/2009 14:00	10/13/2009 10:15	10/13/2009 13:30	0.502	0.976	1.002	1.000	
0.05303	8/31/2009	8/31/2010	10/9/2009 14:00	10/13/2009 10:15	10/13/2009 13:30	0.504	0.975	1.002	1.000	
0.07722	12/19/2008	12/19/2009	10/9/2009 14:00	10/13/2009 10:45	10/13/2009 14:05	0.504	0.975	1.002	1.000	
0.06082	2/4/2009	2/4/2010	10/9/2009 14:00	10/13/2009 10:45	10/13/2009 14:05	0.504	0.975	1.002	1.000	
0.12371	3/2/2009	3/2/2010	10/9/2009 14:00	10/13/2009 10:45	10/13/2009 15:10	0.504	0.967	1.002	1.000	
0.14377	3/25/2009	3/25/2010	10/9/2009 14:00	10/13/2009 10:45	10/13/2009 14:05	0.504	0.975	1.002	1.000	
0.06605	8/4/2009	8/4/2010	10/9/2009 14:00	10/13/2009 10:45	10/13/2009 14:05	0.504	0.975	1.002	1.000	
0.06519	9/30/2009	9/30/2010	10/9/2009 14:00	10/13/2009 10:45	10/13/2009 15:10	0.504	0.967	1.002	1.000	

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

Pos.	Decision Level pCi/G	Critical Level pCi/G	Required MDA pCi/G	MDA pCi/G	Sample Act. Conc. pCi/G	Sample Act. Error pCi/G	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA Counting Uncertainty pCi/G	2 SIGMA Total Prop. Uncertainty pCi/G	Sample QC	Sample Type	RPD	RER	Nominal pCi/G	Recovery
1	0.1447	0.1022	0.5	0.2509	0.8539	0.1622	1.8333	0.2809	0.2564	0.3330		SAMPLE				
2	0.1242	0.0877	0.5	0.2153	1.7185	0.1212	4.3000	0.4014	0.3144	0.5634		SAMPLE				
3	0.1218	0.0860	0.5	0.2172	1.4031	0.1259	3.1000	0.3416	0.3030	0.4695		SAMPLE				
4	0.1250	0.0882	0.5	0.2167	1.5956	0.1576	3.9667	0.3873	0.3054	0.6108		SAMPLE				
5	0.1275	0.0900	0.5	0.2239	0.9482	0.2051	1.9333	0.2828	0.2432	0.3912		SAMPLE				
6	0.1234	0.0872	0.5	0.2168	1.0053	0.1457	2.3667	0.3073	0.2559	0.3662		SAMPLE				
7	0.0957	0.0676	0.5	0.1788	0.7991	0.1584	1.8333	0.2646	0.2260	0.3068		SAMPLE				
8	0.1243	0.0877	0.5	0.2217	1.0315	0.1429	2.2333	0.2963	0.2682	0.3712		SAMPLE				
9	0.1278	0.0902	0.5	0.2215	1.1652	0.1413	2.8333	0.3350	0.2700	0.4164		SAMPLE				
10	0.1086	0.0767	0.5	0.1976	0.7815	0.1617	1.7667	0.2646	0.2294	0.3042		SAMPLE				
11	0.1211	0.0855	0.5	0.2203	1.0682	0.1818	2.1667	0.2887	0.2789	0.4508		SAMPLE				
12	0.1502	0.1061	0.5	0.2680	1.7496	0.1808	3.1333	0.3432	0.3756	0.7353		SAMPLE				
13	0.1198	0.0846	0.5	0.2077	1.1055	0.1348	2.8667	0.3367	0.2545	0.3843		SAMPLE				
14	0.1283	0.0906	0.5	0.2225	0.7296	0.1698	1.7667	0.2769	0.2241	0.2935		SAMPLE				
15	0.1535	0.1084	0.5	0.2661	0.9387	0.1590	1.9000	0.2848	0.2758	0.3614		SAMPLE				
16	0.1234	0.0871	0.5	0.2140	1.3638	0.1311	3.4333	0.3636	0.2831	0.4667		SAMPLE				
17	0.1583	0.1118	0.5	0.2745	1.4440	0.1330	2.8333	0.3350	0.3346	0.4982		SAMPLE				
18	0.1068	0.0754	0.5	0.1943	0.0580	0.9436	0.1333	0.1247	0.1063	0.1080		MB				
19	0.1390	0.0981	0.5	0.2410	1.3122	0.1847	2.9333	0.3399	0.2980	0.5600	237343017.1	DUP	3.9%		11.9627	90.1%
20	0.1118	0.0789	0.5	0.1994	12.1466	0.0744	29.2333	0.9939	0.8094	3.2663	237343017.1	DUP			11.1974	75.5%
21	0.1261	0.0890	0.5	0.2186	8.4561	0.0768	20.8333	0.8439	0.6714	2.2962		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 secondard 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 S. Dume

Date: 8/31/09

Reviewed By: Angela G. H.

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) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from 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	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	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	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	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	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	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	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	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	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	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	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	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

$\frac{2945}{8/13/09} = 900$
 $\frac{2659}{8/13/09}$
 $\frac{2858}{8/13/09}$
 Voltage $\frac{1.10}{8/13/09} = 900$
 * 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	3142 4050
Cal 2	500	8/18/09 1340	8/21/09 0950	1500 1425 8/21/09 1305	102	1	2778
Cal 3	500	8/18/09 1340	8/21/09 1010	1550 8/21/09 1445	104	1	2182 259
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							

$\frac{2945}{8/13/09}$
 $\frac{2659}{8/13/09}$
 $\frac{2858}{8/13/09}$

WSP/BSM

8/13/09

8/28/09

Voltage - 0.9

Ra-226 Calibration Sheet

Standard ID: D494-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 1110	8/27/09 1000	8/27/09 1455	106	1	2940
Cal 3	500	8/24/09 1125	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	4623
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

W/CP/10/1

8/28/09

16/8/2010

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 0799-4 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-1MHC1 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				
	100502105				

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

eev

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

Approved
Signature

Date of issue

17th 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

W. Spina

Voltage Curve Ludlum #1

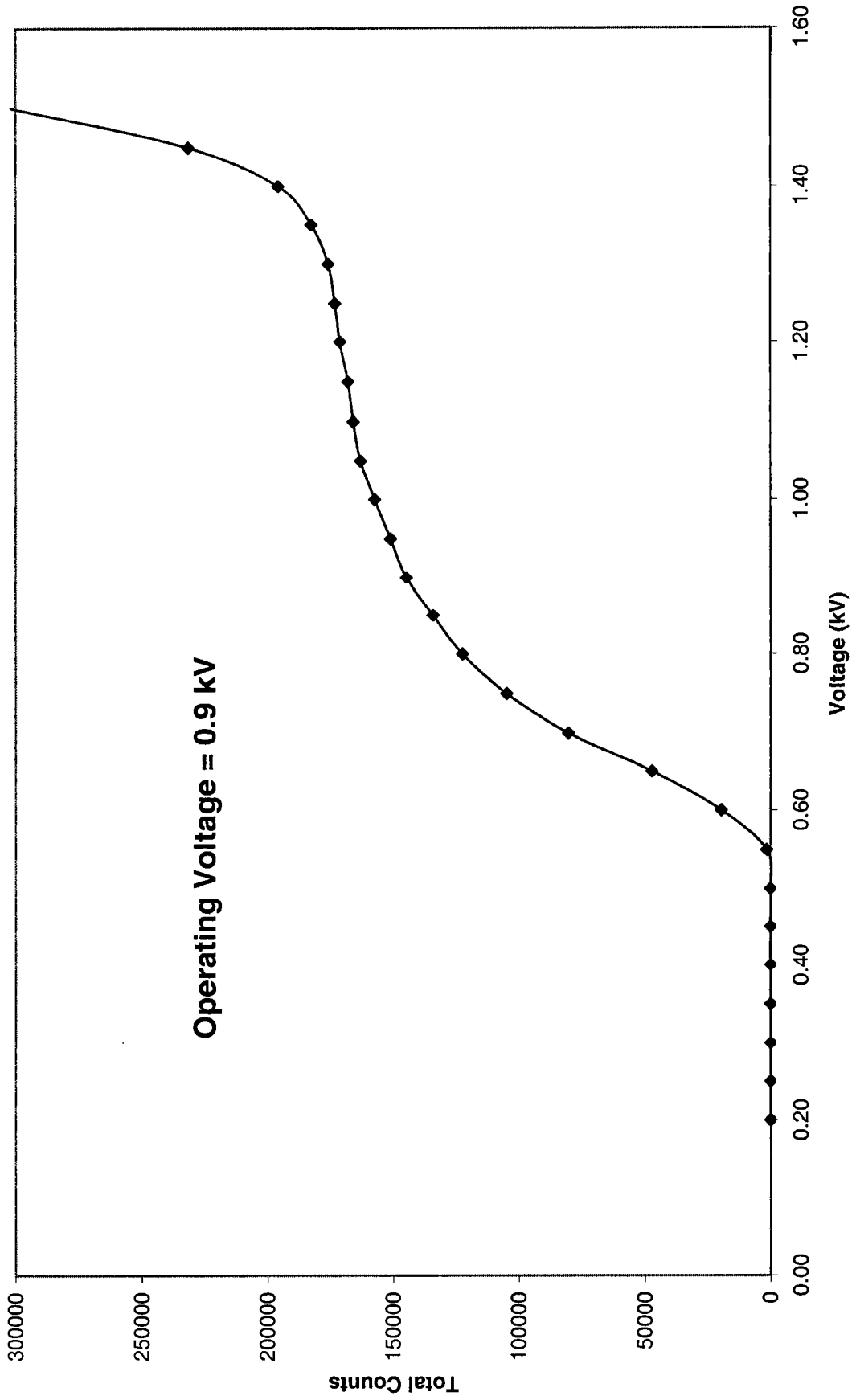
Voltage (kV)	Count Time (min)	Counts	Date/Time
0.20	1.00	0	8/21/09 13:20
0.25	1.00	0	8/21/09 13:21
0.30	1.00	0	8/21/09 13:22
0.35	1.00	0	8/21/09 13:23
0.40	1.00	0	8/21/09 13:24
0.45	1.00	0	8/21/09 13:25
0.50	1.00	0	8/21/09 13:26
0.55	1.00	1534	8/21/09 13:27
0.60	1.00	19637	8/21/09 13:28
0.65	1.00	47206	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: 8/31/09

Ludlum Detector Voltage Curve

—◆— Voltage Curve Ludlum #1



8/13/09

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

	Eff	Cal Date
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

Lucas	Ra-226	
Oldest Cal	01/23/2008	
Detector	Eff Error	Cal Date
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

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 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: 11/11/10

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	8/28/09 1600	8/28/09 0655	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	107	1	8	629
VEN 8	500	8/28/09 1600	8/28/09 1305	8/28/09 1820	108	1	8	736
VEN 2	500	8/28/09 1020	8/28/09 1110	8/28/09 1435	101	1	8	689
VEN 3	500	8/28/09 1040	8/28/09 1130	8/28/09 1505	102	1	4	697
VEN 4	500	8/28/09 1050	8/28/09 1155	8/28/09 1540	106	1	8	638
VEN 5	500	8/28/09 1120	8/28/09 1215	8/28/09 1615	108	1	8	693

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

W 9/1/09

W 8/31/09

W 8/31/09
170

W 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: γ -impurities (other than decay products) <0.1%

5.01065 grams 0.1M HCl solution with 50 μ g/g Ba carrier.

P O NUMBER 3231RD, Item 5

SOURCE PREPARED BY:

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

Q A APPROVED:

ACUM 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

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

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

$$(4.8398 \text{ g}) * (23530 \text{ dps}) * (60 \text{ dpm/dps}) * (5.01065 \text{ g} * 100 \text{ mL}) = 13636.6133 \text{ dpm/mL}$$

$$(4.8398 \text{ g}) * (23530 \text{ dps}) * (60 \text{ dpm/dps}) / (1.0266 \text{ g/mL}) / (5.01065 \text{ g} * 100 \text{ mL}) = 13282.9676 \text{ dpm/g}$$

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

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
Mean Value (Counting) =	12.106	100.13	Pass
Stdev =	0.260353631		Rule 3 (Pass/Fail)
Target =	12.09		
Lower Limit =	11.5848594		
Upper Limit =	12.62627393		
Rule 1 Pass/Fail	Pass		
Two sigma =	0.520707263		
10 % of Mean =	1.210556667		
Rule 2 (Pass/Fail)	Pass		

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

General Engineering Laboratories

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

Lucas Cell Calibration Package

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

Prepared By: Kelli Donnell

Date: 12/19/08

Reviewed By: Mark G. Adams

Date: 12/19/08

Effective Date: 12/19/08

NU 12/19/08

Ra-226 Cell Constants

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

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	bkg cpm	total counts	count time min	cpm	Known activity dpm	11 (days) end-degas to flush	12 (days) end-flush to count	13 (days) Std Ref Date to count	Decay from Std Ref Date to count
201	2.021	Average	9/15/2008 15:45	9/15/2008 9:05	9/12/2008 13:20	0.267	5596	30	186.53	243.02	2.82292	0.27778	3198	0.9962
201	2.043	Stdv	9/18/2008 13:00	9/18/2008 8:10	9/15/2008 9:05	0.267	5949	30	198.30	243.02	2.96181	0.20139	3201	0.9962
201	1.915		9/25/2008 19:35	9/25/2008 9:15	9/22/2008 10:00	0.267	5361	30	178.70	243.02	2.96975	0.49056	3208	0.9962
202	2.436	Average	9/15/2008 16:20	9/15/2008 9:35	9/12/2008 13:20	0.267	6779	30	225.97	243.02	2.84375	0.28125	3198	0.9962
202	2.209	Stdv	9/18/2008 13:50	9/18/2008 8:45	9/15/2008 9:35	0.267	6425	30	214.17	243.02	2.96528	0.21181	3201	0.9962
202	2.137		10/21/2008 13:50	10/20/2008 13:45	10/13/2008 16:00	0.267	9248	30	308.27	243.02	6.90625	1.00347	3234	0.9962
203	2.255	Average	9/15/2008 16:50	9/15/2008 10:00	9/12/2008 13:20	0.267	6300	30	210.00	243.02	2.86111	0.28472	3198	0.9962
203	2.273	Stdv	9/18/2008 14:25	9/18/2008 9:15	9/15/2008 10:00	0.267	6613	30	220.43	243.02	2.96875	0.21528	3201	0.9962
203	2.234		9/25/2008 21:00	9/25/2008 10:15	9/22/2008 10:00	0.267	6298	30	209.93	243.02	3.01042	0.44782	3208	0.9962
204	2.184	Average	9/15/2008 17:25	9/15/2008 10:30	9/12/2008 13:20	0.267	6132	30	204.40	243.02	2.88194	0.28819	3198	0.9962
204	2.300	Stdv	9/18/2008 14:55	9/18/2008 9:35	9/15/2008 10:30	0.267	6671	30	222.37	243.02	2.96181	0.22222	3201	0.9962
204	2.096		9/30/2008 14:05	9/30/2008 9:10	9/28/2008 9:45	0.133	7535	30	251.17	243.02	3.97569	0.20486	3213	0.9962
205	1.677	Average	10/21/2008 8:30	10/20/2008 14:05	10/13/2008 16:00	0.267	7584	30	252.80	243.02	6.32014	0.76736	3233	0.9962
205	1.730	Stdv	9/18/2008 16:00	9/18/2008 10:05	9/15/2008 10:55	0.167	4989	30	166.63	243.02	2.96528	0.24653	3201	0.9962
205	1.990		9/30/2008 14:45	9/30/2008 9:40	9/28/2008 9:45	0.187	7170	30	239.00	243.02	3.89653	0.21181	3213	0.9962
206	2.240	Average	9/15/2008 21:10	9/15/2008 11:25	9/12/2008 13:20	0.233	6216	30	207.20	243.02	2.32014	0.40825	3198	0.9962
206	2.293	Stdv	9/18/2008 16:35	9/18/2008 10:25	9/15/2008 11:25	0.267	6604	30	220.13	243.02	2.95833	0.25694	3201	0.9962
206	2.245		9/30/2008 15:20	9/30/2008 10:15	9/28/2008 9:45	0.267	8125	30	270.83	243.02	4.02083	0.21181	3213	0.9962
207	2.187	Average	9/15/2008 21:40	9/15/2008 11:50	9/12/2008 13:20	0.267	6084	30	203.13	243.02	2.33750	0.40972	3198	0.9962
207	2.141	Stdv	9/18/2008 17:55	9/18/2008 10:40	9/15/2008 11:50	0.267	6105	30	203.50	243.02	2.95139	0.30208	3201	0.9962
207	2.110		9/30/2008 16:00	9/30/2008 10:45	9/28/2008 9:45	0.233	7856	30	255.20	243.02	4.04167	0.21875	3213	0.9962
208	2.239	Average	9/15/2008 22:15	9/15/2008 12:15	9/12/2008 13:20	0.267	6288	30	208.60	243.02	2.85486	0.41667	3198	0.9962
208	2.243	Stdv	9/18/2008 19:30	9/18/2008 11:00	9/15/2008 12:15	0.133	6374	30	212.47	243.02	2.94788	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	6928	30	230.87	243.02	3.06250	0.39583	3198	0.9962
212	2.315	Stdv	9/18/2008 22:55	9/18/2008 12:50	9/15/2008 14:50	0.267	6405	30	213.50	243.02	2.91667	0.42014	3201	0.9962
212	2.244		9/30/2008 19:50	9/30/2008 14:00	9/28/2008 9:45	0.267	8287	30	276.23	243.02	4.17708	0.24306	3213	0.9962

NU 12/19/08

NU 12/19/08

NU 12/19/08

Verification for Ra-226 Standard 0299-G

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

Mean Value (Counting) = 2558.093715
 Stdev = 10.63610098

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

Verification Rules

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

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

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

where:

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

BAD.SOP.M-001

Net 121.9 (28)
 4/17/10/08
 Nancy E. Johnson 4/19/08
 Daniel Dwyer 4/10/08



Standard Traceability Log Rad

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

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

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

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

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

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

Secondary Standards

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

GEL Laboratories LLC
Version 1.0 9/18/2000

all the 12/19/08
len 12/19/08

General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number <u>GLRAD A-008</u>	Isotope <u>Ra-226</u>
Date Standards Prepared <u>4/5/08</u>	Cocktail Type Used <u>NA</u>
Standard ID <u>0299-G</u>	Matrix of Vial/Planchett <u>NA</u> <u>NA</u> <u>NA</u>
Amount Used (g or ml) <u>0.1</u>	Type of Scintillation Vial <u>NA</u>
Standard Activity (DPM/g or ml) <u>2446.347</u>	Pipette ID Used <u>1429303</u>
Reference Date <u>12/15/99</u>	Balance ID Used <u>36040216</u>
Expiration Date <u>4/2/09</u>	Quenching Agent <u>NA</u>
Residue/Carrier Agent <u>0.5 M HCl</u>	

	Standard Number	Quenching Vol (uL) Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
14	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: Kelli S. Deroso Date: 12/19/08
 Reviewed By: M. G. Johnson Date: 12/19/08

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	0.500	30	593	208	2.283	0.267	0.5132	16.9552	1.4723	11/20/2008 16:40
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
KSD

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

W
12/18/08

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

W
12/18/08

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

Verification for Ra-226 Standard 0638-F

D Roy
12/27/2007

Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass. Used (mL)	Source DPM/mL
0638-F N1	1239.9000	31.5000	1208.4000	4.624018	261.3311626
0638-F N2	1222.8000	31.5000	1191.3000	4.624018	257.6330801
0638-F N3	1219.4000	31.5000	1187.9000	4.624018	256.8977889
					Average = 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:

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

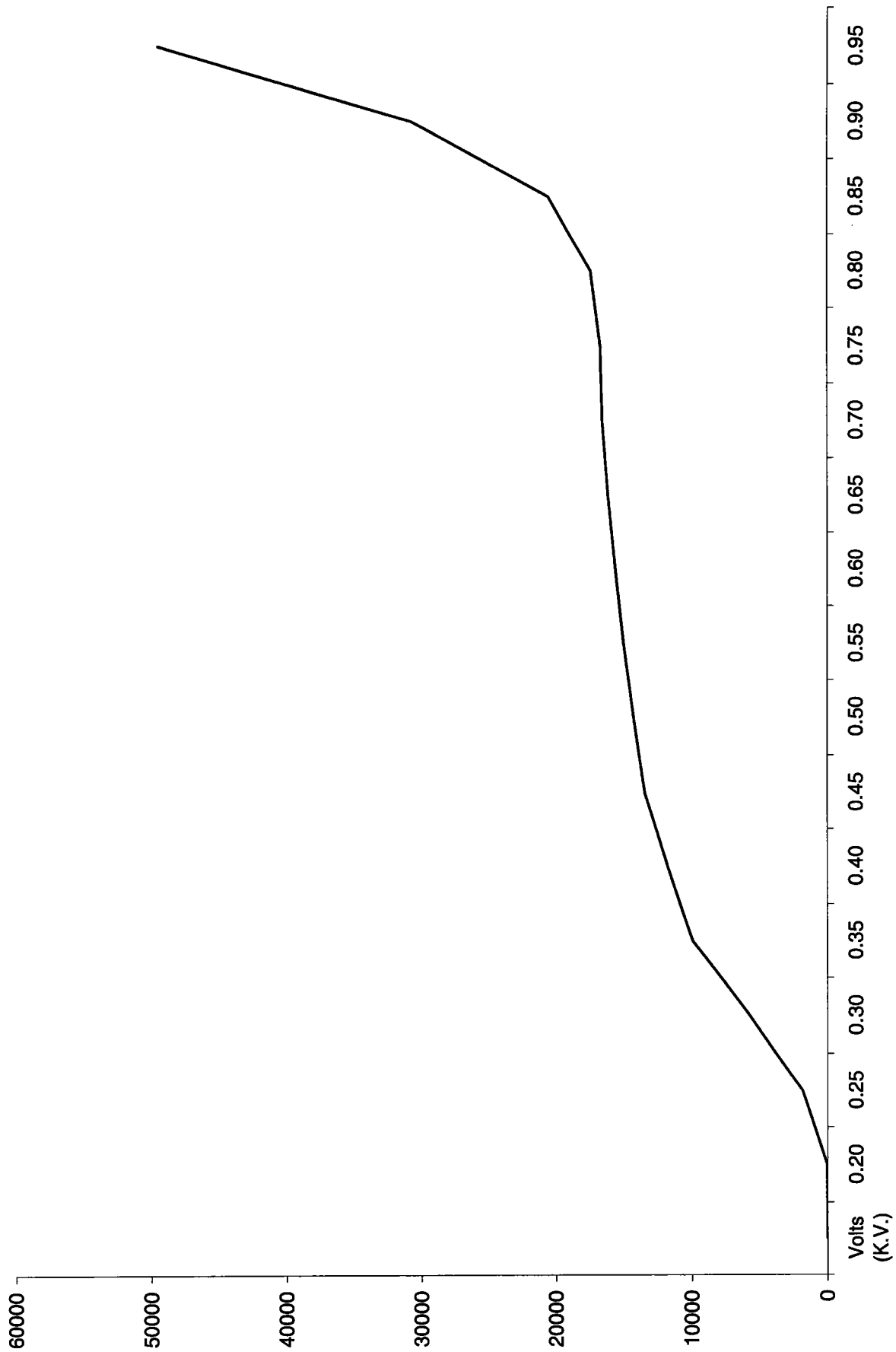
where:

- 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. Feher 1/4/07



mut 12/19/08
VW 12/19/08

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

Next
12/19/08

General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414

(843)556-8171

Lucas Cell Calibration Package

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

Prepared By: Kellipanel

Date: 2/3/09

Reviewed By: W. G. Hens

Date: 2/4/09

Effective Date: 2/4/09

Ra-226 Cell Constants

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

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	bkg cpm	total counts	count time min	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count
301	1.867	Average	1/20/2009 11:05	1/19/2009 10:10	1/19/2009 15:45	0.267	9355	30	311.83	9.76736	1.03819	3324	0.9961
301	2.184	Stdev	1/29/2009 11:50	1/29/2009 8:50	1/28/2009 13:00	0.267	6239	30	207.97	2.82639	0.12500	3333	0.9961
301	2.011		1/26/2009 14:35	1/26/2009 9:25	1/22/2009 9:10	0.267	7282	30	242.73	4.01042	0.21528	3331	0.9961
302	2.082	Average	1/30/2009 11:30	1/30/2009 8:30	1/28/2009 13:00	0.267	7401	30	246.70	3.81250	0.12500	3334	0.9961
302	2.225	Stdev	1/29/2009 13:30	1/29/2009 9:20	1/28/2009 13:00	0.233	6335	30	211.17	2.84722	0.17361	3334	0.9961
302	2.086		1/26/2009 15:30	1/26/2009 9:55	1/22/2009 9:10	0.267	7555	30	251.83	4.03125	0.23264	3331	0.9961
303	1.958	Average	1/20/2009 13:40	1/19/2009 11:00	1/19/2009 15:45	0.267	9695	30	323.17	9.80208	1.11111	3325	0.9961
303	2.218	Stdev	1/22/2009 20:35	1/22/2009 10:05	1/19/2009 15:00	0.267	5938	30	197.93	2.79514	0.43750	3327	0.9961
303	2.231		1/26/2009 17:20	1/26/2009 10:25	1/22/2009 9:10	0.267	8028	30	267.60	4.05208	0.28819	3331	0.9961

305	1.897	Average	1/20/2009 14:50	1/19/2009 11:35	1/19/2009 15:45	0.200	9357	30	311.90	9.82639	1.13542	3325	0.9961
305	2.191	Stdev	1/22/2009 21:50	1/22/2009 11:05	1/19/2009 15:00	0.267	5921	30	197.37	2.83681	0.44792	3327	0.9961
305	2.083		1/26/2009 23:00	1/26/2009 11:20	1/22/2009 9:10	0.267	7280	30	242.67	4.09028	0.48611	3331	0.9961
306	1.730	Average	1/20/2009 15:20	1/19/2009 11:50	1/19/2009 15:45	0.167	8521	30	284.03	9.83681	1.14593	3325	0.9961
306	1.891	Stdev	1/29/2009 14:30	1/29/2009 10:20	1/28/2009 13:00	0.233	4869	30	162.30	2.88889	0.17361	3334	0.9961
306	1.821		1/26/2009 23:30	1/26/2009 11:50	1/22/2009 9:10	0.267	6387	30	212.90	4.11111	0.48611	3331	0.9961
307	1.818	Average	1/20/2009 15:50	1/19/2009 12:05	1/19/2009 15:45	0.267	8944	30	298.13	9.84722	1.15625	3325	0.9961
307	2.095	Stdev	1/30/2009 12:55	1/30/2009 9:10	1/28/2009 13:00	0.267	7442	30	248.07	3.84028	0.15625	3335	0.9961
307	1.881		1/27/2009 0:05	1/26/2009 12:10	1/22/2009 9:10	0.267	6598	30	219.93	4.12500	0.49653	3331	0.9961
308	2.129	Average	1/29/2009 15:50	1/29/2009 11:05	1/28/2009 13:00	0.133	6149	30	204.97	2.92014	0.19792	3334	0.9961
308	1.858	Stdev	1/23/2009 9:35	1/22/2009 13:45	1/19/2009 15:00	0.267	4829	30	160.97	2.94792	0.82639	3327	0.9961
308	1.862		1/27/2009 8:30	1/26/2009 13:15	1/22/2009 9:10	0.267	6226	30	207.53	4.17014	0.80208	3331	0.9961
309	1.857	Average	1/20/2009 17:20	1/19/2009 13:35	1/19/2009 15:45	0.033	9149	30	304.97	9.90972	1.15625	3325	0.9961
309	1.964	Stdev	1/23/2009 10:30	1/22/2009 14:05	1/19/2009 15:00	0.267	5100	30	170.00	2.96181	0.85069	3327	0.9961
309	1.810		1/27/2009 9:05	1/26/2009 13:30	1/22/2009 9:10	0.267	6046	30	201.53	4.18056	0.81597	3331	0.9961

311	2.140	Average	1/29/2009 16:40	1/29/2009 11:20	1/28/2009 13:00	0.267	6176	30	205.87	2.93056	0.22222	3334	0.9961
311	2.212	Stdev	1/23/2009 12:20	1/22/2009 14:25	1/19/2009 15:00	0.267	5698	30	189.93	2.97569	0.91319	3328	0.9961
311	1.988		1/27/2009 10:15	1/26/2009 13:45	1/22/2009 9:10	0.267	6607	30	220.23	4.19097	0.85417	3331	0.9961
312	1.871	Average	1/20/2009 19:16	1/19/2009 14:10	1/19/2009 15:45	0.100	9135	30	304.50	9.93403	1.21250	3325	0.9961
312	2.014	Stdev	1/29/2009 17:10	1/29/2009 11:35	1/28/2009 13:00	0.167	5814	30	193.80	2.94097	0.23264	3334	0.9961
312	1.946		1/27/2009 11:10	1/26/2009 14:00	1/22/2009 9:10	0.267	6446	30	214.87	4.20139	0.88194	3331	0.9961

K0 2/3/09

Verification for Ra-226 Standard 0299-G

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

Mean Value (Counting) = 2558.093715
 Stdev = 10.63610098

Certificate Value = 2437.6 dpm/mL
 Lower Limit = 2536.821513 dpm/mL
 Upper Limit = 2579.365917 dpm/mL

Rule 1 Pass/Fail **Fail**
 Two sigma = 21.27220197 dpm/mL
 10 % of Mean = 255.8093715 dpm/mL

Rule 2 (Pass/Fail) **Pass**

104.944421 **Pass**
 0.00415782 **Rule 3 (Pass/Fail)**

*exception taken due to full recovery of standard

Verification Rules

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

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

Rule 3 = The determined mean value shall be within 10% of the certificate value.

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

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

IRAD-SOP-M-001

Handwritten notes:
 5/10/08
 M. N. 2310
 1.5 ml water for 30 sec



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

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

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

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

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

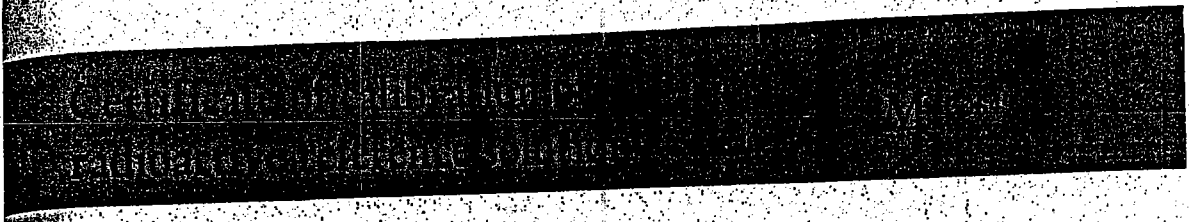
Secondary Standards

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

0299



UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

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

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

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

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

- Combined Type A uncertainty: $\pm 0.2\%$
- Combined Type B uncertainty: $\pm 1.3\%$

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

Chemical form: Carrier free in 0.5M HCL

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

1 year = 365.25 days

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

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

Ra-226 WATER

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

Procedure Code : LUC26RAL
 Parmname : Radium-226

MDA : 1 pCi/L

Instrument Used : LUCAS CELL DETECTOR

Bkg Count Time: 30 min

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

601112
 CW

Handwritten signature

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

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

5/11/12
 071
 LEWA 2141.04

Ra-226 Verification Sheet

#3

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VER 1	500	1126109 1605	1126109 1040	1126109 1505	301	3	8	656
VER 2	500	1126109 1605	1126109 1105	1126109 1540	303	3	8	914
VER 3	500	1126109 1605	1126109 1130	1130109 1705	305	3	8	791
VER 4	500	1126109 1605	1126109 1145	1130109 1737 1.31.09 1737	306	3	8	768
VER 5	500	1126109 1605	1126109 1200	1130109 1905 1.31.09 1905	308	3	8	730
VER 6	500	1126109 1605	1126109 1305	1.31.09 1020	309	3	8	764
VER 7	500	1126109 1605	1126109 1320	131.09 1720	311	3	8	594
VER 8	500	1126109 1605	1126109 1340	1126109 0845	312	3	8	542
VER 9	500	1126109 1605						
VER 10	500	1126109 1605						
VER 11	500	1126109 1605						
VER 12	500	1126109 1605						

VER 9
2/3/09

1126109

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VUN 1	500	11/20/09 1000	2/2/09 0915	2/1/09 1340	304	3	8	655
VUN 2	500	11/20/09 1000	2/2/09 0940	2/2/09 1415	307	3	8	120
VUN 3	500	11/20/09 1000	2/2/09 1115	2/2/09 1450	309	3	8	754

LN 213109

LN 213109

LN 213109

Verification for Ra-226 Standard 0638-F

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

- 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 ^{2/11/09} 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} 2/1/09 Quenching Agent N/A
 Residue/Carrier Agent 0.1 ml H₂O

	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

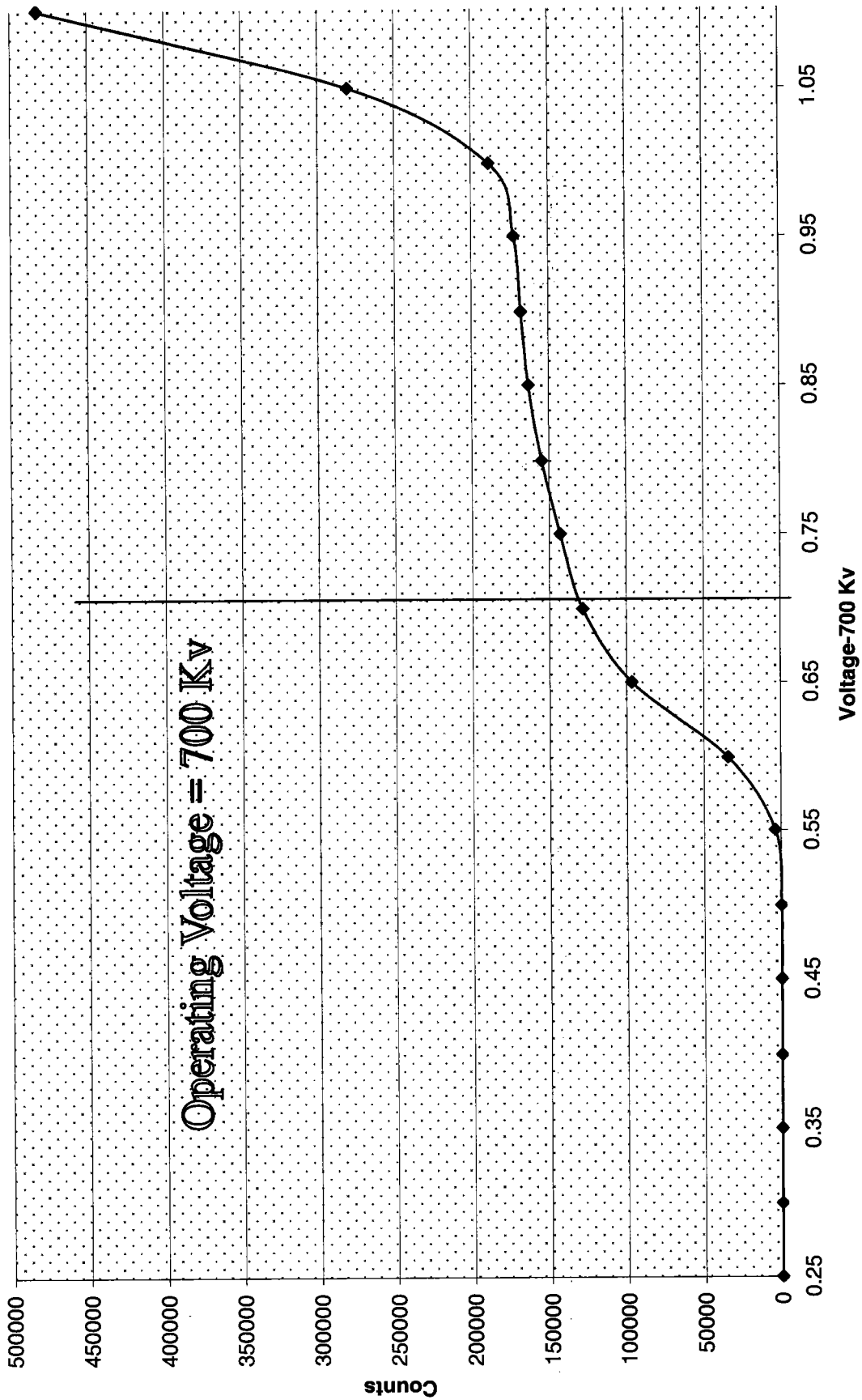
Prepared By: Kelli B. Nevel Date 2/13/09
 Reviewed By: [Signature] Date 2/14/09

Voltage Curve 1-09

Voltage Curve Ludlum # 3				
Volts	Counts	Date	Time	Detector
0.00	0	1/20/2009	13:45	3
0.05	0	1/20/2009	13:46	3
0.10	0	1/20/2009	13:47	3
0.15	0	1/20/2009	13:48	3
0.20	0	1/20/2009	13:49	3
0.25	0	1/20/2009	14:00	3
0.30	0	1/20/2009	14:01	3
0.35	0	1/20/2009	14:02	3
0.40	0	1/20/2009	14:03	3
0.45	0	1/20/2009	14:04	3
0.50	0	1/20/2009	14:05	3
0.55	3914	1/20/2009	14:06	3
0.60	34392	1/20/2009	14:07	3
0.65	96643	1/20/2009	14:08	3
0.70	128361	1/20/2009	14:09	3
0.75	142888	1/20/2009	14:10	3
0.80	154583	1/20/2009	14:11	3
0.85	163087	1/20/2009	14:12	3
0.90	167801	1/20/2009	14:13	3
0.95	172317	1/20/2009	14:14	3
1.00	188508	1/20/2009	14:15	3

KLA 2/4/09
 LW
 2/3/09

Ludlum 3 Voltage Curve



2/12/72
MCA

KO 213109

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

RE UT
2/4/09

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

General Engineering Laboratories

2040 Savage Road, Charleston, SC 29414

(843)556-8171

Lucas Cell Calibration Package

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

Prepared By: Kelli Dorrel

Date: 2/28/09

Reviewed By: Angela Johnson

Date: 3/2/09

Effective Date: 3/2/09

Ra-226 Cell Constants

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

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

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

Angela J. Johnson 3/2/09
 Mike Dorell 3/2/09

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

General Engineering Laboratories Verification Source Preparation Sheet

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

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

W 3/2/09

Prepared By: Kell Deneo Date: 3/2/09
 Reviewed By: Angie J. Ghera Date: 3/2/09


Rev 1 RLM 9/10/97

General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number GL-PAD-008 Isotope RA-226
 Date Standards Prepared 4/15/09 Cocktail Type Used NA
 Standard ID 0299G Matrix of Vial/Planchett NA
 Amount Used (g or ml) 0.103109 0.1 Matrix of Vial/Planchett NA
 Standard Activity (DPM/g or mL) 2.446.347 Type of Scintillation Vial NA
 Reference Date 12/15/99 Pipette ID Used 1429305
 Expiration Date 4/12/09 Balance ID Used 3604026
 Residue/Carrier Agent 0.5M HCl Quenching Agent NA

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

Prepared By: Valli Perese Date 3/2/09
 Reviewed By: Ayle Agha 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

221

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

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

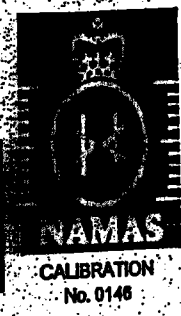
Secondary Standards

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

CEL Laboratories LLC
Version 1.0 9/18/2000

8-21-00
Nycomed Amersham plc
Amersham Laboratories

0299



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

ISSUED
FOR:

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

ion Principal radionuclide: Radium-226

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

ment Reference time: 1200 GMT on 15 December 1999

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

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

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

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

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

ved
ory

Date of
issue 222 17th December 1999

Nycomed
Amersham
Via 31/10/99

Verification for Ra-226 Standard 0299-G

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

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

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

Verification Rules

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

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

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

where:

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

RAD.SOP.M-001

Henry St. Johnson 4/19/08
David Dwyer 4/10/08
WMS

Ra-226 Verification Sheet

Cal #4

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 3	500	2/20/09 1725	2/23/09 1030	2/23/09 1615	401	4	0	4580
43	500	2/20/09 1725	2/23/09 1105	2/23/09 1655	402	4	0	5877 4877
7	500	2/20/09 1725	2/23/09 1130	2.23.09 1930	403	4	0	4011
42	500	2/20/09 1725	2/23/09 1310	2.23.09 1908	404	4	0	5005
13	500	2/20/09 1725	2/23/09 1340	2.23.09 1955	405	4	0	4224
3A	500	2/20/09 1725	2/23/09 1405	2.23.09 2250	406	4		2355
44	500	2/20/09 1725	2/23/09 1435	2.23.09 2330	407	4		2359
1A	500	2/20/09 1725	2/23/09 1455	2.24.09 00:00	408	4		2598
30	500	2/20/09 1725	2/23/09 1540	2.24.09 00:30	409	4	8	5887 5887
48	500	2/20/09 1725	2/23/09 1540	2/24/09 0800 2/24/09 0800	410	4	8	4840
30	500	2/20/09 1725	2/23/09 1555	2/24/09 0840	411	4	8	4829
35	500	2/20/09 1725	2/23/09 1610	2/24/09 0900	412	4	8	4878

K40 2/23/09
 K40 2/18/09
 140 2/22/09
 2/28/09-140
 K40 2/28/09
 K40 2/24/09
 K40 2/23/09
 K40 2/23/09
 K40 2/23/09

Re-226 Verification Sheet

#4

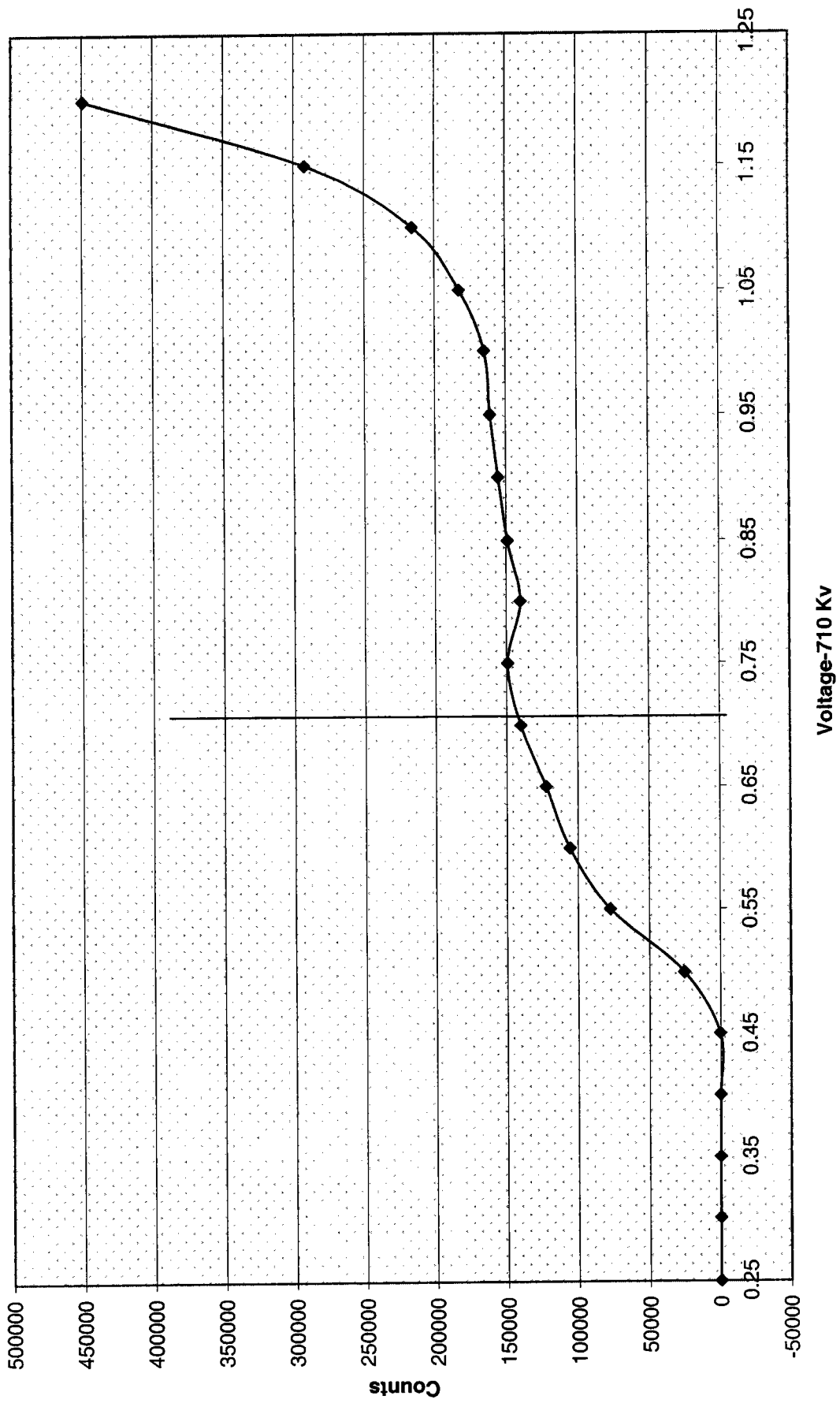
Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 28	500	2/20/09 1725	2/25/09 0755	2/25/09 1440	401	4	8	5677
15	500	2/20/09 1725	2/25/09 0815	2/25/09 1525	402	4	8	8017
14	500	2/20/09 1725	2/25/09 0835	2/25/09 1555	403	4	8	5562
40	500	2/20/09 1725	2/25/09 0855	2.25.09 20:20	404	4	8	7075
47	500	2/20/09 1725	2/25/09 1010	2.25.09 20:55	405	4	8	6721
10	500	2/20/09 1725	2/25/09 1040	2.26.09 20:22 2.25.09 20:55 2.26.09 20:22	406	4	8	7091
25	500	2/20/09 1725	2/25/09 1110	2.25.09 22:05	407	4	8	2827
23	500	2/20/09 1725	2/25/09 1145	2.25.09 22:45 2.25.09 22:55	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

Handwritten notes: #9 3/2/09, #10 3/2/09, #11 3/2/09, #12 3/2/09, #13 3/2/09, #14 3/2/09, #15 3/2/09, #16 3/2/09, #17 3/2/09, #18 3/2/09, #19 3/2/09, #20 3/2/09, #21 3/2/09, #22 3/2/09, #23 3/2/09, #24 3/2/09, #25 3/2/09, #26 3/2/09, #27 3/2/09, #28 3/2/09, #29 3/2/09, #30 3/2/09, #31 3/2/09, #32 3/2/09, #33 3/2/09, #34 3/2/09, #35 3/2/09, #36 3/2/09, #37 3/2/09, #38 3/2/09, #39 3/2/09, #40 3/2/09, #41 3/2/09, #42 3/2/09, #43 3/2/09, #44 3/2/09, #45 3/2/09, #46 3/2/09, #47 3/2/09, #48 3/2/09, #49 3/2/09, #50 3/2/09, #51 3/2/09, #52 3/2/09, #53 3/2/09, #54 3/2/09, #55 3/2/09, #56 3/2/09, #57 3/2/09, #58 3/2/09, #59 3/2/09, #60 3/2/09, #61 3/2/09, #62 3/2/09, #63 3/2/09, #64 3/2/09, #65 3/2/09, #66 3/2/09, #67 3/2/09, #68 3/2/09, #69 3/2/09, #70 3/2/09, #71 3/2/09, #72 3/2/09, #73 3/2/09, #74 3/2/09, #75 3/2/09, #76 3/2/09, #77 3/2/09, #78 3/2/09, #79 3/2/09, #80 3/2/09, #81 3/2/09, #82 3/2/09, #83 3/2/09, #84 3/2/09, #85 3/2/09, #86 3/2/09, #87 3/2/09, #88 3/2/09, #89 3/2/09, #90 3/2/09, #91 3/2/09, #92 3/2/09, #93 3/2/09, #94 3/2/09, #95 3/2/09, #96 3/2/09, #97 3/2/09, #98 3/2/09, #99 3/2/09, #100 3/2/09

Handwritten notes: #9 3/2/09, #10 3/2/09

Handwritten notes: #10 3/2/09, #11 3/2/09

Ludlum 4 Voltage Curve



10/3/04

General Engineering Laboratories

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

Lucas Cell Calibration Package (501-512)

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

Prepared By: Kelli S. Dancer

Date: 3/24/09

Reviewed By: Angela Johnson

Date: 3/25/09

Effective Date: 3/25/09

Ra-226 Cell Constants

standard ID: 0299-E
Volume added (mL): 0.1
Standard Reference Activity (DPM/mL): 2434.34

Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/time flushed to cell	Date/time end of degas	total counts	count time min	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count	
501	1.927	15	3/6/2009 7:50	3/3/2009 8:15	2/25/2009 14:00	5281	30	176.03	243.03	5.76042	2.98264	3369	0.9960
501	2.086	9	3/11/2009 10:40	3/10/2009 12:50	3/5/2009 14:00	7611	30	253.70	243.03	4.95139	0.90972	3374	0.9960
501	2.247	42	3/12/2009 13:30	3/12/2009 9:10	3/6/2009 15:25	10210	30	340.33	243.03	5.73958	0.18056	3376	0.9960
502	1.772	16	3/18/2009 8:25	3/17/2009 12:50	3/10/2009 14:00	7951	30	265.03	243.03	6.95739	0.81597	3381	0.9960
502	2.045	14	3/11/2009 11:15	3/10/2009 13:20	3/5/2009 14:00	7474	30	249.13	243.03	4.97222	0.91319	3374	0.9960
502	1.816	19	3/12/2009 14:20	3/12/2009 9:35	3/6/2009 15:25	8243	30	274.77	243.03	5.75694	0.19792	3376	0.9960
503	1.581	46	3/6/2009 9:20	3/5/2009 9:20	2/25/2009 14:00	7250	30	241.67	243.03	7.80556	1.00000	3369	0.9960
503	1.633	42	3/19/2009 20:15	3/19/2009 15:15	3/12/2009 12:10	8282	30	276.07	243.03	7.12847	0.20833	3383	0.9960
503	1.588	44	3/12/2009 14:50	3/12/2009 10:00	3/6/2009 15:25	7214	30	240.47	243.03	5.77431	0.20139	3376	0.9960
504	1.592	47	3/6/2009 10:30	3/5/2009 9:40	2/25/2009 14:00	7262	30	242.07	243.03	7.81944	1.03472	3369	0.9960
504	1.611	34	3/11/2009 12:30	3/10/2009 14:05	3/5/2009 14:00	5889	30	196.30	243.03	5.00347	0.93403	3375	0.9960
504	1.641	19	3/19/2009 20:50	3/19/2009 15:30	3/12/2009 12:10	8310	30	277.00	243.03	7.13889	0.22222	3383	0.9960
505	2.364	16	3/6/2009 12:40	3/5/2009 10:05	2/25/2009 14:00	10654	30	355.13	243.03	7.83681	1.10764	3370	0.9960
505	2.438	23	3/11/2009 13:00	3/10/2009 14:30	3/5/2009 14:00	8924	30	297.47	243.03	5.02083	0.93750	3375	0.9960
505	2.190	7	3/12/2009 17:01	3/12/2009 10:50	3/6/2009 15:25	9884	30	329.47	243.03	5.80903	0.25764	3376	0.9960
506	1.902	25	3/6/2009 13:10	3/5/2009 10:30	2/25/2009 14:00	8576	30	285.87	243.03	7.85417	1.11111	3370	0.9960
506	2.124	47	3/11/2009 13:30	3/10/2009 15:05	3/5/2009 14:00	7804	30	260.13	243.03	5.04514	0.93403	3375	0.9960
506	1.965	13	3/12/2009 17:40	3/12/2009 11:15	3/6/2009 15:25	8954	30	298.47	243.03	5.82639	0.26736	3376	0.9960
507	1.708	23	3/6/2009 13:45	3/5/2009 10:55	2/25/2009 14:00	7695	30	256.50	243.03	7.87153	1.11806	3370	0.9960
507	1.722	25	3/11/2009 14:20	3/10/2009 15:27	3/5/2009 14:00	6315	30	210.50	243.03	5.06042	0.95347	3375	0.9960
507	1.674	43	3/12/2009 18:30	3/12/2009 11:35	3/6/2009 15:25	7535	30	251.17	243.03	5.84028	0.28819	3376	0.9960
508	1.605	39	3/6/2009 14:20	3/5/2009 11:25	2/25/2009 14:00	7236	30	241.20	243.03	7.89236	1.12153	3370	0.9960
508	1.497	44	3/19/2009 21:30	3/19/2009 15:45	3/12/2009 12:10	7581	30	252.03	243.03	7.14931	0.23958	3383	0.9960
508	1.499	3	3/12/2009 20:45	3/12/2009 12:10	3/6/2009 15:25	6680	30	222.67	243.03	5.86458	0.35764	3376	0.9960
509	1.730	28	3/6/2009 14:50	3/5/2009 11:45	2/25/2009 14:00	7795	30	259.83	243.03	7.90625	1.12847	3370	0.9960
509	1.857	39	3/11/2009 15:25	3/10/2009 16:05	3/5/2009 14:00	6810	30	227.00	243.03	5.08681	0.97222	3375	0.9960
509	1.806	36	3/12/2009 21:20	3/12/2009 12:35	3/6/2009 15:25	8049	30	268.30	243.03	5.88194	0.36458	3376	0.9960
510	1.460	9	3/6/2009 15:25	3/5/2009 12:10	2/25/2009 14:00	6578	30	219.27	243.03	7.92361	1.13542	3370	0.9960
510	1.433	28	3/11/2009 16:05	3/10/2009 16:20	3/5/2009 14:00	5246	30	174.87	243.03	5.09722	0.98958	3375	0.9960
510	1.481	35	3/12/2009 21:55	3/12/2009 12:50	3/6/2009 15:25	6589	30	219.63	243.03	5.89236	0.37847	3376	0.9960
511	1.839	34	3/6/2009 16:30	3/5/2009 13:20	2/25/2009 14:00	8316	30	277.20	243.03	7.97222	1.13194	3370	0.9960
511	1.995	46	3/12/2009 16:50	3/10/2009 16:35	3/5/2009 14:00	7283	30	242.77	243.03	5.10764	1.01042	3375	0.9960
511	2.041	37	3/12/2009 22:40	3/12/2009 13:10	3/6/2009 15:25	9088	30	302.27	243.03	5.90625	0.39583	3376	0.9960
512	1.796	48	3/11/2009 17:35	3/10/2009 16:50	3/5/2009 14:00	6542	30	218.07	243.03	5.11806	1.03125	3375	0.9960
512	2.100	38	3/12/2009 23:15	3/12/2009 13:30	3/6/2009 15:25	9322	30	310.73	243.03	5.92014	0.40625	3376	0.9960
512	1.972	48	3/18/2009 13:00	3/17/2009 14:00	3/10/2009 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).

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

Calibration
Ra-226 Verification-Sheet
3/16/09

Cal # 5

no 3124109
3/19/09

3/19/09

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 15	500	2/25/09 1400	3/3/09 0815	3/6/09 0750	501	5	8	5281
Cal 14	500	2/25/09 1400	2/25/09 0845	3/6/09 0840	502	5	1	4200
		2/25/09 1400	3/3/09		503	5	100 3/3/09	6800
Cal 46	500	2/25/09 1400	3/5/09 0920	3/6/09 0900	503	5	3	7250
Cal 47	500	2/25/09 1400	3/5/09 0940	3/6/09 1030	504	5	1	7262
Cal 48	500	2/25/09 1400	3/5/09 1005	3/6/09 1040	505	5	3	10654
Cal 45	500	2/25/09 1400	3/5/09 1030	3/6/09 1016	506	5	8	8576
Cal 23	500	2/25/09 1400	3/5/09 1055	3/6/09 1345	507	5	4	7695
Cal 39	500	2/25/09 1400	3/5/09 1125	3/6/09 1420	508	5	1	7236
Cal 28	500	2/25/09 1400	3/5/09 1145	3/6/09 1450	509	5	8	7795
Cal 9	500	2/25/09 1400	3/5/09 1210	3/6/09 1525	510	5	2	6578
Cal 34	500	2/25/09 1400	3/5/09 1220	3/6/09 1630	511	5	6	8316

Calibration

Ra-226 Verification Sheet

219 3116109

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 9	500	3/5/09 1400	3/10/09 1250	3/11/09 1040	501	5	8	7611
Cal 14	500	3/5/09 1400	3/10/09 1370	3/11/09 1115	502	5	5	7474
Cal 15	500	3/5/09 1400	3/10/09 1345	3/11/09 1155	503	5	8	7352
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
Cal 18	500	3/5/09 1400	3/10/09 1527	3/11/09 1410	507	5	4	6315
Cal 19	500	3/5/09 1400	3/10/09 1550	3/11/09 1455	508	5	4	6443
Cal 29	500	3/5/09 1400	3/10/09 1605	3/11/09 1525	509	5	8	6810
Cal 28	500	3/5/09 1400	3/10/09 1620	3/11/09 1610	510	5	3	5246
Cal 44	500	3/5/09 1400	3/10/09 1635	3/11/09 1650	511	5	8	7283
Cal 48	500	3/5/09 1400	3/10/09 1650	3/11/09 1735	512	5	8	6542

219 3124109

219 3124109

219 3124109

219 3116109

Calibration

Ra-226 Verification Sheet

3/19/09

140 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
Cal 40	500	3/6/09 1525	3/12/09 1035	3/11/09 1535	504	5	0	4202
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 140 3/12/09	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
3/25/09

Cal #5's

✓
3/24/09
✓
3/24/09

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
Cal 119	500	3/10/09 1400	3/17/09 1325	3/18/09 0855	503	5		6855
Cal 128	500	3/10/09 1400	3/17/09 1345	3/18/09 1005	504	5		6804
Cal 140	500	3/10/09 1400	3/17/09 1400	3/18/09 1300	512	5	8	8053
Cal 125	500	3/15/09 1400	3/10/09 1527	3/11/09 1420	507	5	4	6315

3/24/09

Ra-226 Calibration Sheet

Standard ID: 01470
 Volume Added (mL): 1.1
 Expiration Date: 4/12/09

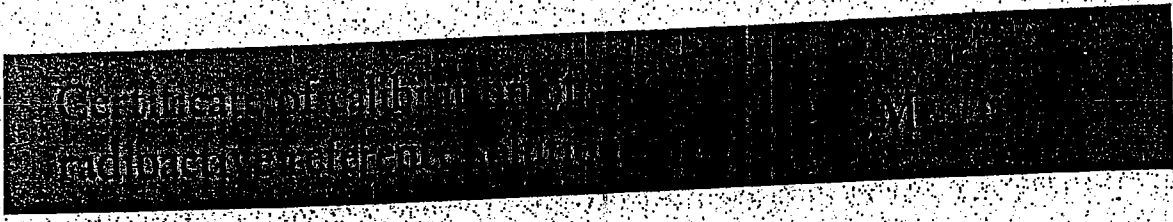
Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 42	500	3/12/09 1210	3/12/09 1515	3/19/09 2015	503	85	8282
Cal 19	500	3/12/09 1210	3/12/09 1530	3/19/09 2050	504	5	8310
Cal 44	500	3/12/09 1210	3/12/09 1545	3/19/09 2130	508	5	7561
Cal 30	500	3/12/09 1210	3/12/09 1600	3/19/09 2200	509	5	7442

3/25/09

8-21-00

Nycomed Amersham plc
Amersham Laboratories

0299



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

ISSUED
FOR:

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

ion Principal radionuclide: Radium-226

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

ment Reference time: 1200 GMT on 15 December 1999

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

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

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

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

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

ved

Date of 238 17th December 1999



Standard Traceability Log Rad

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

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

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

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

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

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

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

Secondary Standards

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

GEL Laboratories LLC
Version 1.0 9/18/2000

Kelli Sporell

Verification for Ra-226 Standard 0299-G

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

Mean Value (Counting) = 2558.093715
 Stdev = 10.63610098

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

Verification Rules

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

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

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

where:

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

BAD.SOP.M-001

Handwritten notes:
 New Source 3/24/09
 4/19/08
 David Dwyer 4/10/08

General Engineering Laboratories
Verification Source Preparation Sheet
Calibration

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

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

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 4/15/09 Cocktail Type Used NA
 Standard ID 02946 Matrix of Vial/Planchett NA
 Amount Used (g or ml) 0.1 Type of Scintillation Vial NA
 Standard Activity (DPM/g or mL) 2446.347 Pipette ID Used 1429303
 Reference Date 12/15/99 Balance ID Used 3604026
 Expiration Date 4/21/09 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 3/25/09

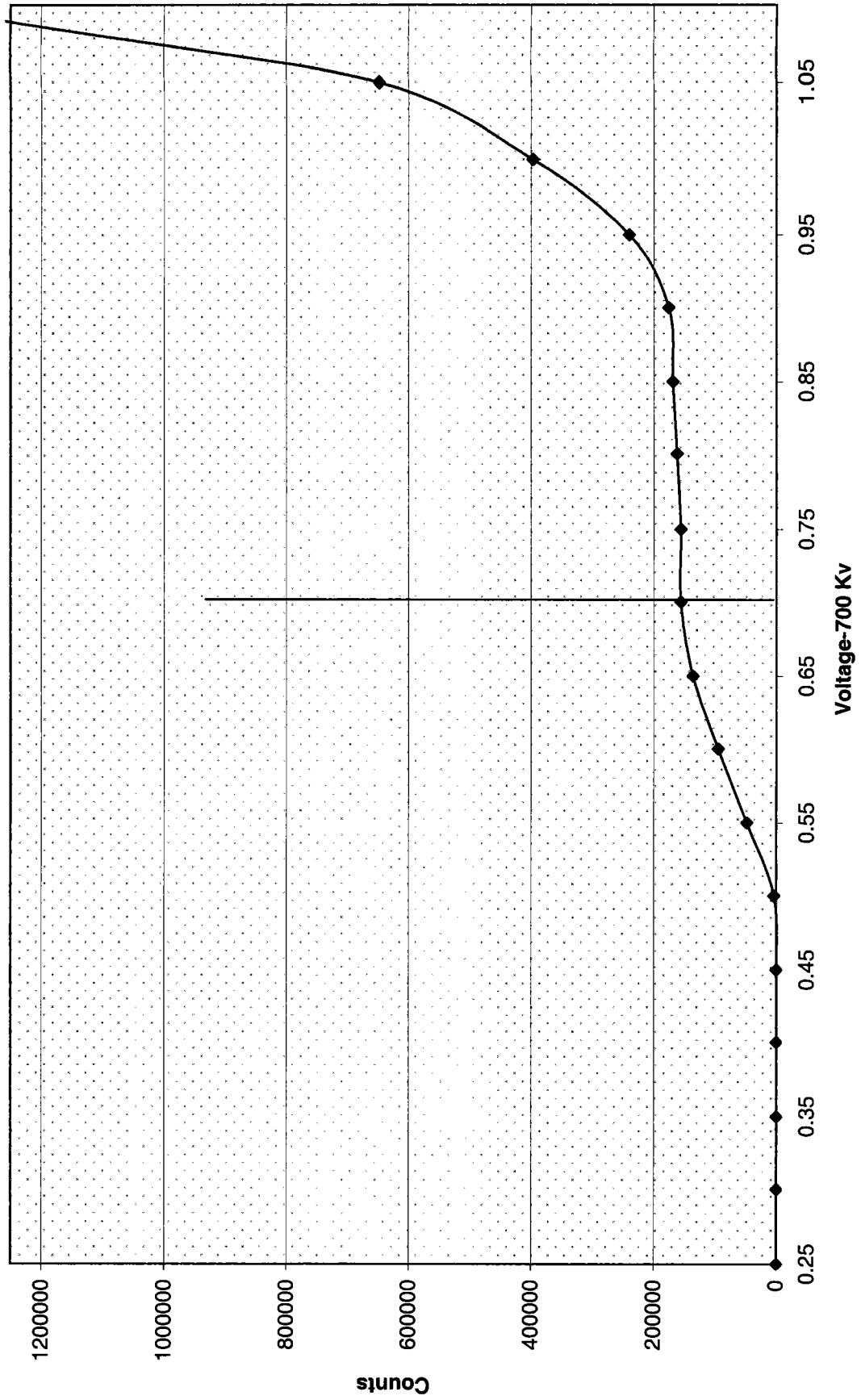
Prepared By: Kelli Ducee Date 3/24/09
 Reviewed By: _____ Date _____

Voltage

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

UD 3/25/09

Ludlum 5 Voltage Curve



KAP 3/24/09

Ra-226 WATER

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

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

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

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

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

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

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VUX 1	500	3/16/09 1530	3/16/09 0945	3/16/09 1510 3/16/09 1510 SEE 3/16/09	501	5	8	766
VUX 2	500	3/13/09 1530	3/16/09 1010	3/16/09 1925	502	5	85 140 3/12/09	537
VUX 3	500	3/13/09 1530	3/16/09 1030	3/16/09 2020	503	5	8	518
VUX 4	500	3/13/09 1530	3/16/09 1100	3/16/09 2115	504	5	8	577
VUX 5	500	3/13/09 1530	3/16/09 1125	3/16/09 2200	505	5	8 140 3/12/09	680
VUX 6	500	3/13/09 1530	3/16/09 1155	3/16/09 2230	506	5	8	707
VUX 7	500	3/13/09 1530	3/16/09 1320	3/16/09 2300	507	5	8	488
VUX 8	500	3/13/09 1530	3/16/09 1350	3/16/09 2330	508	5	8 140 3/12/09	544
VUX 9	500	3/13/09 1530	3/16/09 1410	3/17/09 0445 0345 0345	509	5	8	640
VUX 10	500	3/13/09 1530	3/16/09 1415	3/17/09 0500 0500	510	5	8 140 3/12/09	432
VUX 11	500	3/13/09 1530	3/16/09 1445	3/17/09 0535	511	5	8	577
VUX 12	500	3/13/09 1530	3/16/09 1500	3/17/09 0610	512	5	8	723

140
3/24/09

140
3/24/09

140
3/24/09

3/25/09
3/25/09

3/17/09
140

Ra-226 Verification Sheet

Standard ID: 0638F

Volume Added (mL): 0.1

Expiration Date: 12/10

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

60172126

AV 3124109

KNO 3124105

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

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 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: KDD [Signature]

Date: 8/4/09

Reviewed By: [Signature]

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

Lucas	Ra-226	
Oldest Cal	01/23/2008	
Detector	Eff Error	Cal Date
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

Ra-226 Calibration Sheet

Standard ID: ~~0299-G~~ 0299-G
 Volume Added (mL): 0.1 JAG 8/4/09

Expiration Date: ~~4/11/10~~ JAG 8/4/09

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 5	500	5/22/09 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 12:00	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 17:20	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	

W 8/16/09
 JAG
 8/4/09

Ra-226 Calibration Sheet

Standard ID: ~~0299-6~~ 0299-6
 Volume Added (mL): 0.1 ~~1126110~~ 1126110
 Expiration Date: ~~5/19/09~~ 5/19/09

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
Cal 2	500	5/19/09 1400	5/22/09 0945	5/22/09 1325	602	6	6358
Cal 3	500	5/19/09 1400	5/22/09 1010	5/22/09 1420	604	6	4600
Cal 4	500	5/19/09 1400	5/22/09 1045	5/22/09 1625	605	6	6318
Cal 5	500	5/19/09 1400	5/22/09 1115	5/22/09 1700	606	6	6494
Cal 6	500	5/19/09 1400	5/22/09 1140	5/22/09 1735	607	6	6428
Cal 7	500	5/19/09 1400	5/22/09 1200	5/22/09 1920	609	6	6473
Cal 8	500	5/19/09 1400	5/22/09 1250	5/22/09 2035	611	6	6455
Cal 9							
Cal 10							
Cal 11							
Cal 12							

100 814109
 100 814109
 100 814109
 100 814109
 6162-100 814109

11/19/09

249
 814109
 100 816109

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

17th December 1999

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
Mean Value (Counting) =	240.057	98.52	Pass
Stdev =	18.30744475		Rule 3 (Pass/Fail)
Target =	243.67		
Lower Limit =	203.4417772		
Upper Limit =	276.6715562		
Rule 1 Pass/Fail	Pass		
Two sigma =	36.6148895		
10 % of Mean =	24.00566667		
Rule 2 (Pass/Fail)	Fail	*exception taken due to full recovery of standard	

- 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 241.730
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

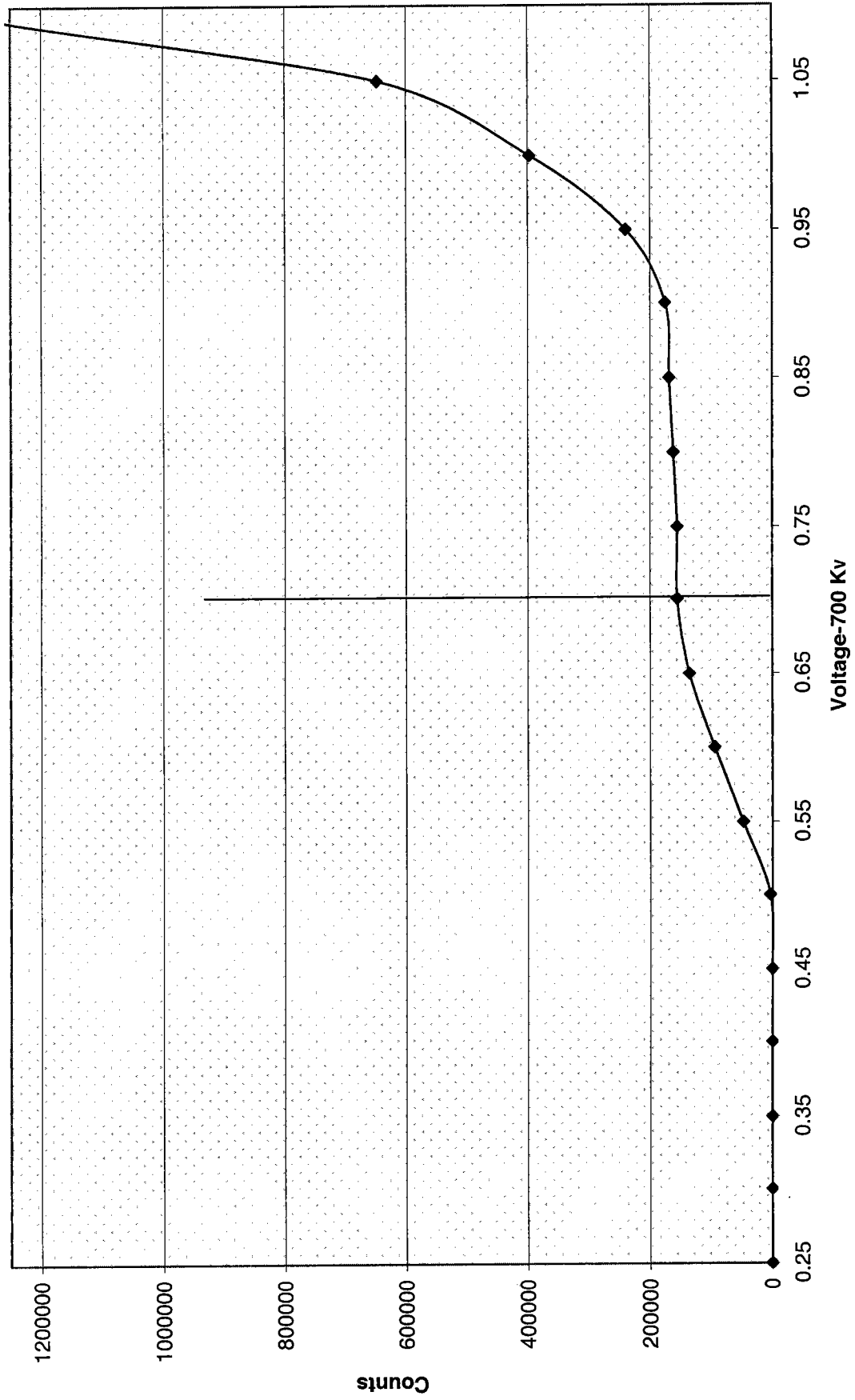
Lucas cell #	Cell constant	Standard Source	Date/Time of count	Date/Time flushed to cell	Date/Time end of degas	bkg cpm	total counts	count time min	cpm	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count
301	2.021	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 3_08

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

M 8/4/09

Ludlum 6 Voltage Curve



WGS

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: 8/6/09 and 8/16/09

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
 11/18/10/09

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: γ -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

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

GEL Laboratories LLC
Version 1.0 9/18/2000

W084116

Verification for Ra-226 Standard 0638-F

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

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

Analyst: KSDI

First Client Due Date:

Internal Due Date: 02/07/2009

Batch #: 838839

Spike Isotope: Radium-226 Spike Code: 003-P

Expiration Date: 12/27/08

Nom Conc:

LCS Isotope: Radium-226 LCS Code: 003-P

Expiration Date: 12/27/08

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	5.0	1/26/09 10:05	1/26/09 11:30	1/26/09 13:10	1/26/09 17:05	305	3	9	741
1201770522-1	LCS for batch 838839	LCS	GROUND	WAJ 1	1 pCi/L	QC ACCOUNT	5.0	1/26/09 10:05	1/26/09 11:45	1/26/09 13:10	1/26/09 17:57	304	3	9	748
1201770523-1	LCS for batch 838839	LCS	GROUND	WAJ 1	1 pCi/L	QC ACCOUNT	5.0	1/26/09 10:05	1/26/09 12:00	1/26/09 13:10	1/26/09 19:05	305	3	9	743

VO 81615

Comments: _____ Data Reviewed By: _____

Instrument ID: _____

LUCAS-5028, LUCAS-13617, LUCAS-90899, LUCAS-162753, LUCAS-132286, LUC-6-17055

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

Parname : 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

Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	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.)
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:
 UNSM105
 1/26/09

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
[Handwritten signature]

- 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 Decision Level pCi/L	Critical Level 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						
0.2932	0.2070	0.5083	24.6287	0.0707	26.1000	0.9422	1.7426	5.5940		LCS			24.0486	102.4%
0.2997	0.2116	0.5196	24.4384	0.0710	25.3333	0.9286	1.7557	5.5591		LCS			24.0486	101.6%
0.2942	0.2077	0.5101	22.7906	0.0715	24.0667	0.9055	1.6808	5.1982		LCS			24.0486	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		2998	15	195.87	243.02	3.02083	0.20625	3572	0.9958	

EffEr 0.065186 <- Put in Machines.xls (Lucas Cell Tab)

A19
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	500	9/11/09 10:30	9/15/09 15:15	9/15/09 19:00	704	7	6039
Cal 5	500	9/11/09 10:30	9/15/09 15:40	9/15/09 19:15	705	7	5579
Cal 6	500	9/11/09 10:30	9/15/09 16:05	9/15/09 19:45	706	7	5347
Cal 7	500	9/11/09 10:30	9/15/09 16:30	9/15/09 2:00	707	7	5376
Cal 8	500	9/11/09 10:30	9/15/09 16:45	9/15/09 2:30	708	7	6203
Cal 9	500	9/11/09 10:30	9/15/09 17:05	9/15/09 2:11	709	7	6458
Cal 10	500	9/11/09 10:30	9/15/09 17:20	9/15/09 2:55	710	7	5935
Cal 11	500	9/11/09 10:30	9/15/09 17:35	9/15/09 2:25	712	7	6263

9/13/09

9/13/09

9/13/09

9/13/09

9/13/09

9/13/09

9/13/09

9/13/09

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	9/15/09 9/15/09	9/18/09 1320	9/18/09 1815	101	7	3219
Cal 2	500	9/15/09 1000	9/18/09 1425	9/18/09 1835	102	7	3420
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 1630 1630	9/18/09 2015	107	7	3406
Cal 8	500	9/15/09 1000	9/18/09 1650 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 2137 2137	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
Cal 5	500	9/18/09 1700	9/21/09 1005	9/21/09 2112	708	7	7155
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

W/10/09/10

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Total Counts
Cal 1	500	01/21/09 1700	01/21/09 1730	01/24/09 1745	701	7	3125
Cal 2	500	01/21/09 1700	01/24/09 1705	01/24/09 1805	702	7	3014
Cal 3	500	01/21/09 1700	01/24/09 1735	01/24/09 1825	703	7	3292
Cal 4	500	01/21/09 1700	01/24/09 1900	01/24/09 1845	704	7	3274
Cal 5	500	01/21/09 1700	01/24/09 1525	01/24/09 1905	705	7	3050
Cal 6	500	01/21/09 1700	01/24/09 1945	01/24/09 1925	706	7	3089
Cal 7	500	01/21/09 1700	01/24/09 1605	01/24/09 1945	707	7	3506
Cal 8	500	01/21/09 1700	01/24/09 1630	01/24/09 2000	708	7	3330
Cal 9	500	01/21/09 1700	01/24/09 1645	01/24/09 2020	709	7	3554
Cal 10	500	01/21/09 1700	01/24/09 1700	01/24/09 2050	710	7	3611
Cal 11	500	01/21/09 1700	01/24/09 1715	01/24/09 2205	711	7	3395
Cal 12	500	01/21/09 1700	01/24/09 1730	01/24/09 2227	712	7	2938

W/11/20/09

01/30/09

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 $\nu_{eff} = \infty$ 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
286

17th December 1999

WD91280109

Nycomed

GEL Standard Traceability Log Rad

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

Calculations Converting parent activity to dpm/mL/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

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
Mean Value (Counting) =	113.048	101.49	Pass
Stdev =	2.496414563		Rule 3 (Pass/Fail)
Target =	111.39		
Lower Limit =	108.0550709		
Upper Limit =	118.0407291		
Rule 1 Pass/Fail	Pass		
Two sigma =	4.992829126		
10 % of Mean =	11.30479		
Rule 2 (Pass/Fail)	Pass		

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 Exp Date : 8/7/2010
 Spike Activity (dpm/ml) : 2472.85
 Spike Volume Added : 0.10

Spike S/N : N/A
 Spike Exp Date : N/A
 Spike Activity (dpm/ml) : N/A
 Spike Volume Added : N/A
 Spike Date/Time : 8/7/2009 14:00

Procedure Code : LSC222RNL
 Parname : Radon-222
 Required MDA : 200 pCi/L
 Half-life of Radon-222 : 3.823 days

Batch : 891920
 Analyst : MLA
 Prep Date : 8/7/2009

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					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	Count Start Date/Time	Sample Decay
1	1201897268.1	1.0000	2.0399E-05	8-2	15	43.3	517.53	15	8/12/2009 7:48	8/12/2009 7:48	0.380
2	1201897269.1	1.0000	2.0399E-05	8-3	15	44.6	538.8	15	8/12/2009 8:04	8/12/2009 8:04	0.380
3	1201897270.1	1.0000	2.0399E-05	8-4	15	45	520.6	15	8/12/2009 8:20	8/12/2009 8:20	0.379

0.379

Calibration Data				Detector				Backgrounds			Correction Factors			Net Sample	
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					
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					
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					

6/24/09
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 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	592.17	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	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	5.9390	2.5407	24.5345		LCS			111.3896	100.4%

Handwritten initials/signature

12 AUG 2009 07:48

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

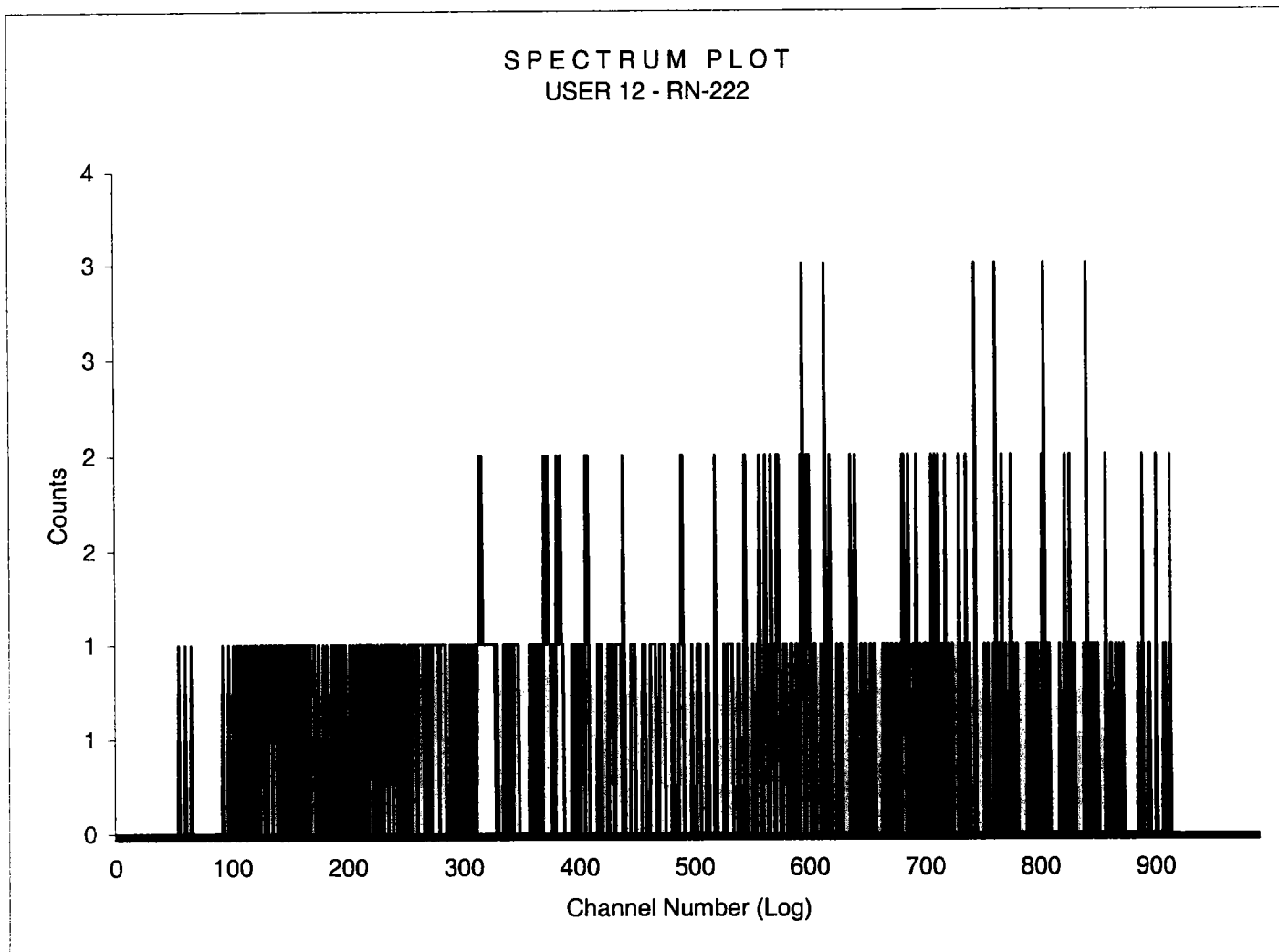
CHAN: 600.0 - 975.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0
 CHAN: 0.0 - 900.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

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

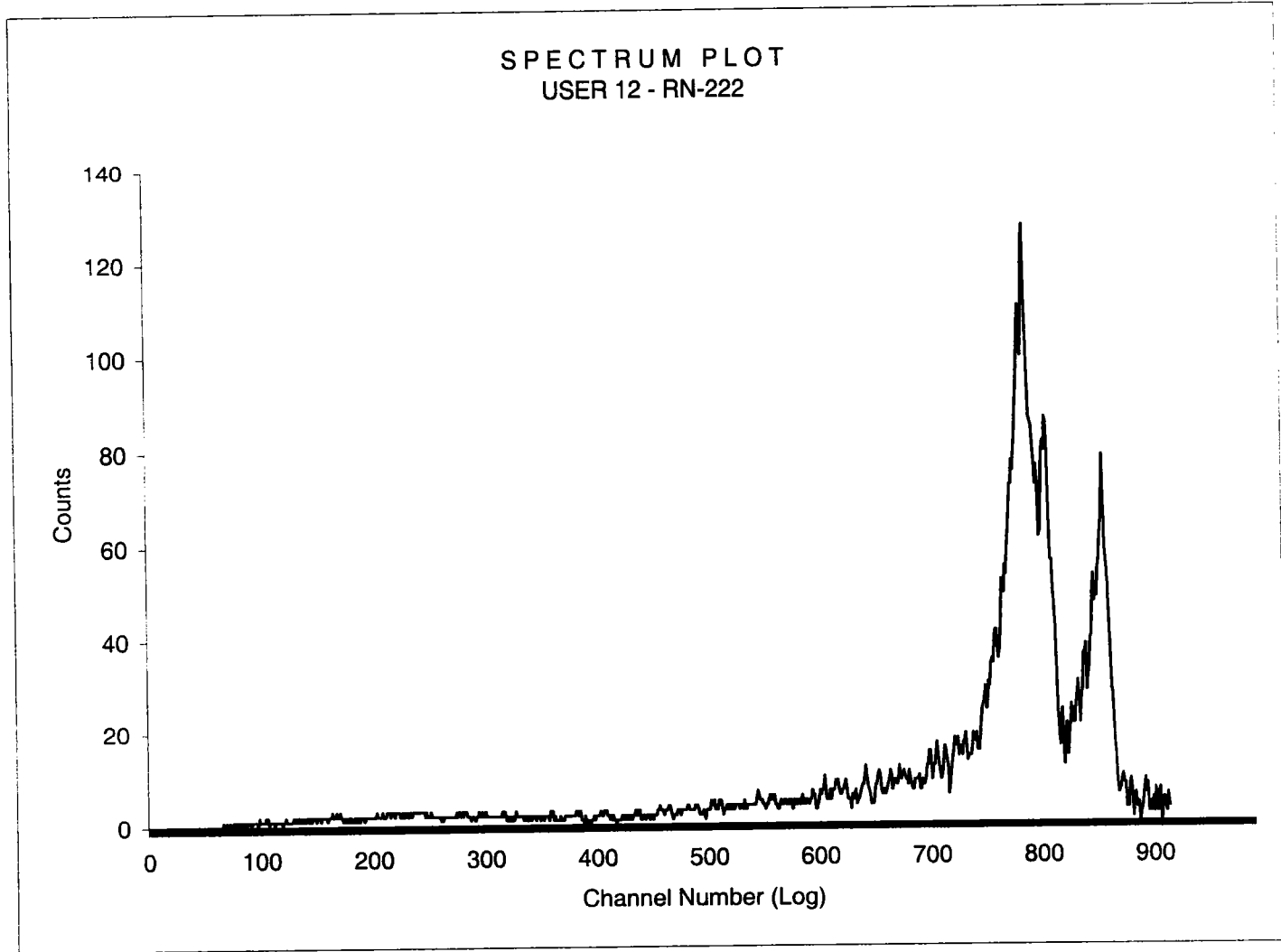
COX team

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



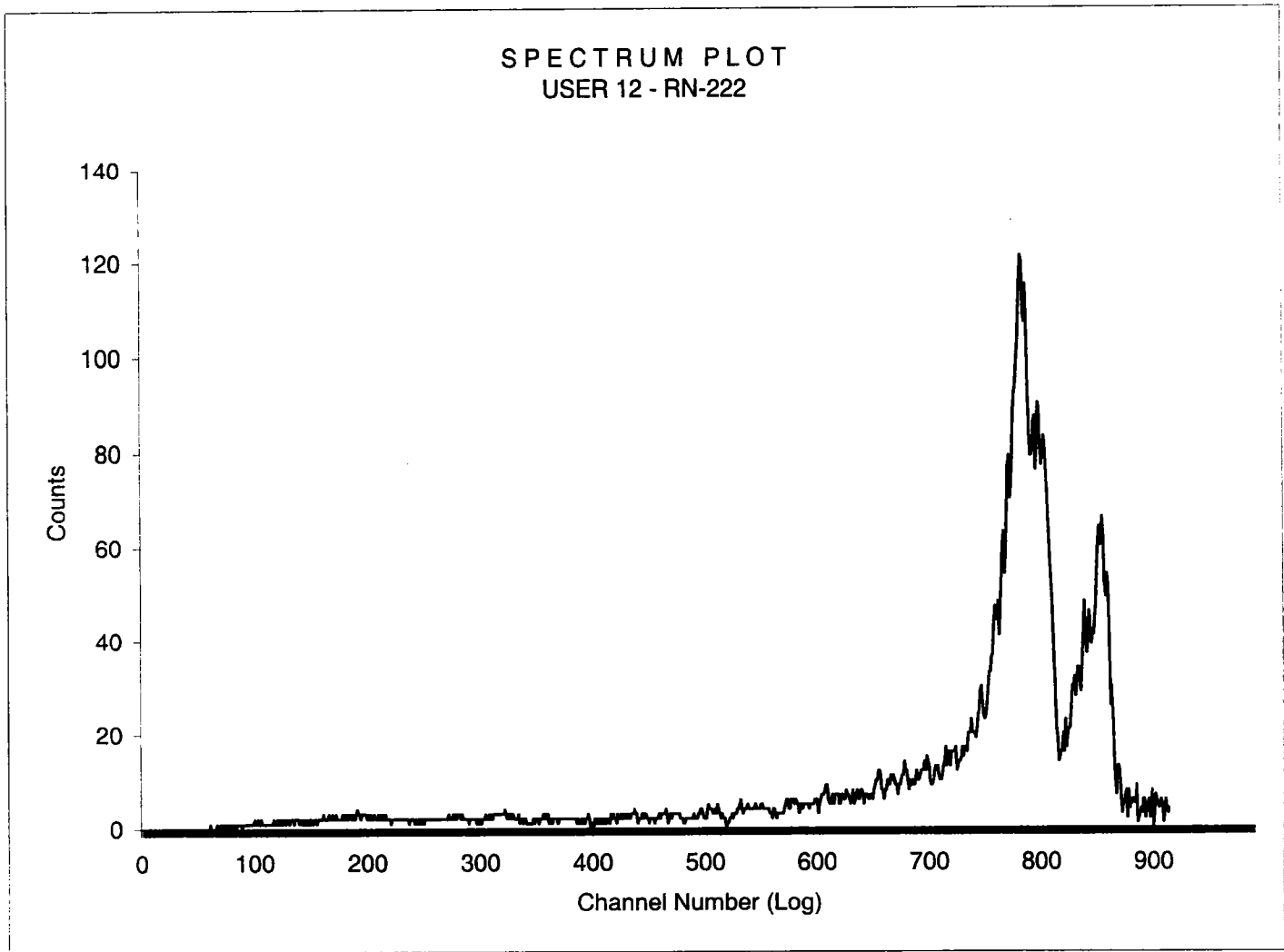
Handwritten: 07/5
31:3109

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

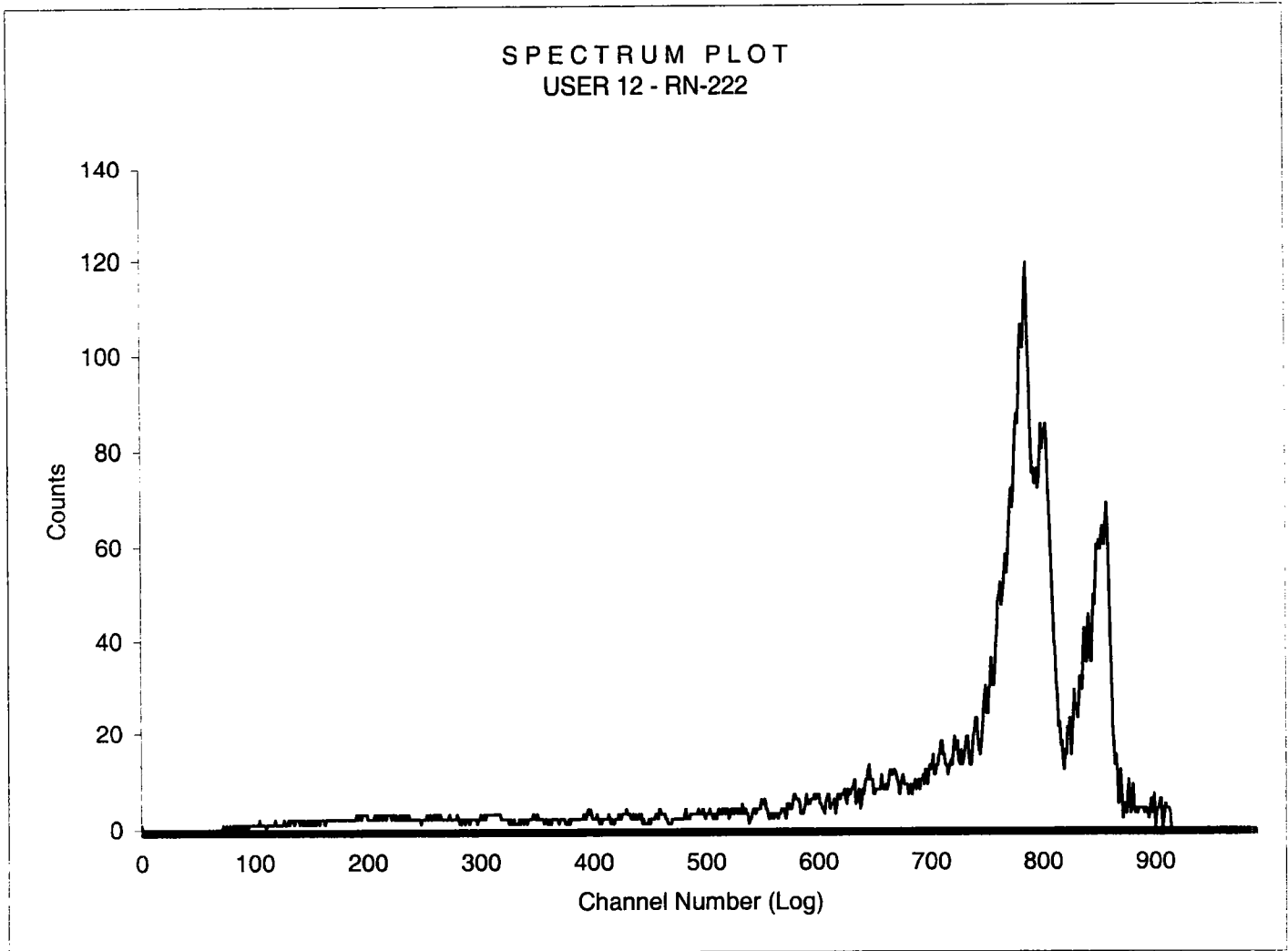


Handwritten notes:
3/13/07

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}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



Handwritten notes:
C12-4
3/12/09

Radon 222 Que Sheet

08/07/2009

Batch #: 891920 Analyst: MLA First Client Due Date: 08/17/2009
 Spike Isotope: Radium-226 Spike Code: 0299-A Expiration Date: 02/29/10 Vol: 1
 LCS Isotope: Radium-226 LCS Code: 0299-A Expiration Date: 02/29/10 Vol: 1
 Prep Date: 07/21/09 Pipet ID: 270968 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 #:

Data Reviewed By:

Comments:

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

08/11/09

Voltage Curve Ludlum #7

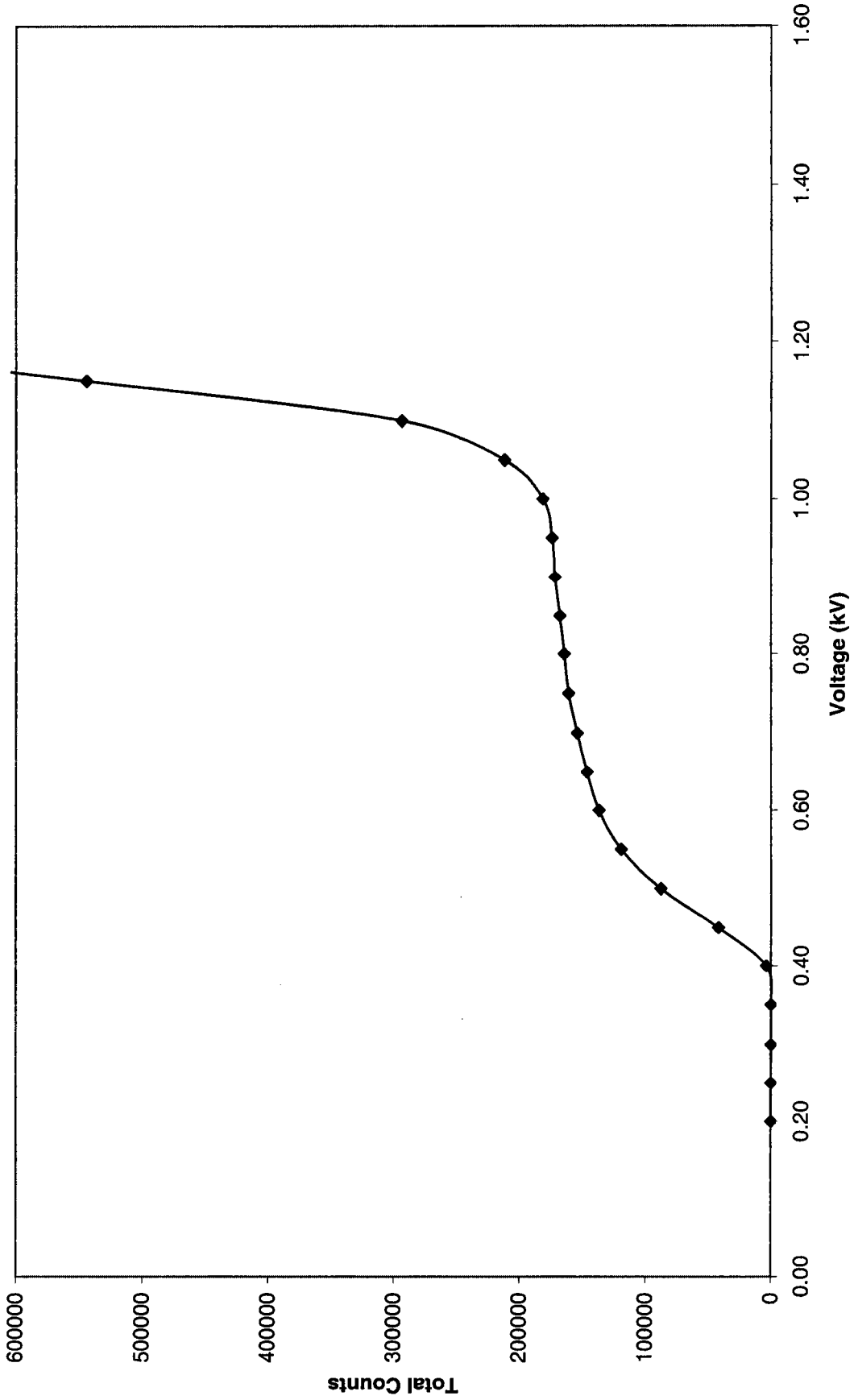
Voltage (kV)	Count Time (min)	Counts	Date/Time
0.20	1.00	0	9/15/09 12:13
0.25	1.00	0	9/15/09 12:14
0.30	1.00	0	9/15/09 12:15
0.35	1.00	0	9/15/09 12:16
0.40	1.00	3788	9/15/09 12:17
0.45	1.00	41827	9/15/09 12:18
0.50	1.00	87578	9/15/09 12:19
0.55	1.00	119153	9/15/09 12:20
0.60	1.00	136757	9/15/09 12:21
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

Ludlum Detector Voltage Curve

—◆— Voltage Curve Ludlum #7



JKG
9/30/09

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
UPPER	160934
LOWER	140489

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	0.7498	0.9751	42.1333	0.7318
9/22/2009 14:30	9/29/2009 10:00	163.50	6.17	0.7090	0.9545	41.4000	0.6774
9/22/2009 14:30	9/29/2009 10:15	163.75	6.50	0.7095	0.9521	41.4000	0.6762
9/22/2009 14:30	9/29/2009 10:30	164.00	6.75	0.7101	0.9503	38.8667	0.6755
9/22/2009 14:30	9/29/2009 10:50	164.33	7.00	0.7108	0.9485	33.8000	0.6749
9/22/2009 14:30	9/29/2009 11:15	164.75	7.17	0.7117	0.9473	38.4000	0.6749
9/22/2009 14:30	9/29/2009 12:45	166.25	5.92	0.7150	0.9563	35.6663	0.6844
9/22/2009 14:30	9/29/2009 13:10	166.67	5.83	0.7159	0.9569	34.7333	0.6857
9/22/2009 14:30	9/29/2009 13:35	167.08	6.08	0.7168	0.9551	37.0000	0.6852
9/22/2009 14:30	9/30/2009 6:30	184.00	3.33	0.7507	0.9751	46.0000	0.7328
9/22/2009 14:30	9/29/2009 14:20	167.83	6.00	0.7184	0.9557	35.5333	0.6872
9/22/2009 14:30	9/29/2009 14:40	168.17	6.50	0.7191	0.9521	36.5333	0.6853

Handwritten signature and date: 9/30/09

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
VEN1	500	9/29/09 1430	9/29/09 1040	9/29/09 1535	701	7	8	488
VEN 2	500	9/29/09 1430	9/29/09 1000	9/29/09 1610	702	7	8	685
VEN 3	500	9/29/09 1430	9/29/09 1015	9/29/09 1645	703	7	1	625
VEN 4	500	9/29/09 1430	9/29/09 1030	9/29/09 1715	704	7	3	587
VEN 5	500	9/29/09 1430	9/29/09 1050	9/29/09 1750	705	7	1	511
VEN 6	500	9/29/09 1430	9/29/09 1115	9/29/09 1825	706	7	6	580
VEN 7	500	9/29/09 1430	9/29/09 1145	9/29/09 1840	707	7	1	539
VEN 8	500	9/29/09 1430	9/29/09 1310	9/29/09 1900	708	7	6	525
VEN 9	500	9/29/09 1430	9/29/09 1335	9/29/09 1940	709	7	5	559
VEN 10	500	9/29/09 1430	9/29/09 1400	9/29/09 2000	710	7	4	322
VEN 11	500	9/29/09 1430	9/29/09 1420	9/29/09 2020	711	7	7	537
VEN 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
Empty								

JHQ 9/30/09

JHQ 9/30/09

General Engineering Laboratories Verification Source Preparation Sheet

Applicable SOP Number <u>GL RAD-A-008</u>	Isotope <u>RA 226</u>
Date Standards Prepared <u>11/3/09</u>	Cocktail Type Used <u>NA</u>
Standard ID <u>DL2814</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>268,8845</u>	Type of Scintillation Vial <u>NA</u>
Reference Date <u>11/23/04</u>	Pipette ID Used <u>1429303</u>
Expiration Date <u>1/17/10</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	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				

Handwritten note: 11/23/09

Prepared By: <u>Kelli & Deuce</u>	Date: <u>9/30/09</u>
Reviewed By: <u>Agile & Jk</u>	Date: <u>9/30/09</u>

Rev 1 RLM 9/10/97

ANALYTICS

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

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: γ -impurities (other than decay products) <0.1%

5.01065 grams 0.1M HCl solution with 50 μ 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		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:	04/09/2009
Ampoule Mass (g):	5.01065 g	Expiration Date:	04/09/2010
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	04/09/2009	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	Isotope 0638-H 0638-H 0638-H	Value 12.025 10.739 12.348	Uncertainty 1.2237 1.1752 1.2298
Mean Value (Counting) =	11.704	96.86	Pass
Stdev =	0.85081728		Rule 3 (Pass/Fail)
Target =	12.08		
Lower Limit =	10.00223211		
Upper Limit =	13.40550123		
Rule 1 Pass/Fail	Pass		
Two sigma =	1.701634559		
10 % of Mean =	1.170386667		
Rule 2 (Pass/Fail)	Fail		*Exception taken due to full recovery of standard

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

Batch : 886194
 Analyst : MLA
 Prep Date : 7/17/2009

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

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				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)	Backgrounds Count Start Date/Time	Rack Position #	Spike Date/Time	Rn-222 Ingrowth	Rn-222 Count Correction
1	LSCGREEN	3/25/2009	3/31/2010	3.4365	0.00792	7/20/2009 11:36	22-1	7/17/2009 15:00	0.406	0.406
2	LSCGREEN	3/25/2009	3/31/2010	3.4365	0.00792	7/20/2009 11:36	22-1	7/17/2009 15:00	0.408	0.408
3	LSCGREEN	3/25/2009	3/31/2010	3.4365	0.00792	7/20/2009 11:36	22-1	7/17/2009 15:00	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		Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
									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		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		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		LCS			12.0832	102.2%

Radon 222 Que Sheet

07/17/2009

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

314

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

ID: RIV-222

20 JUL 2009 11:46

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	

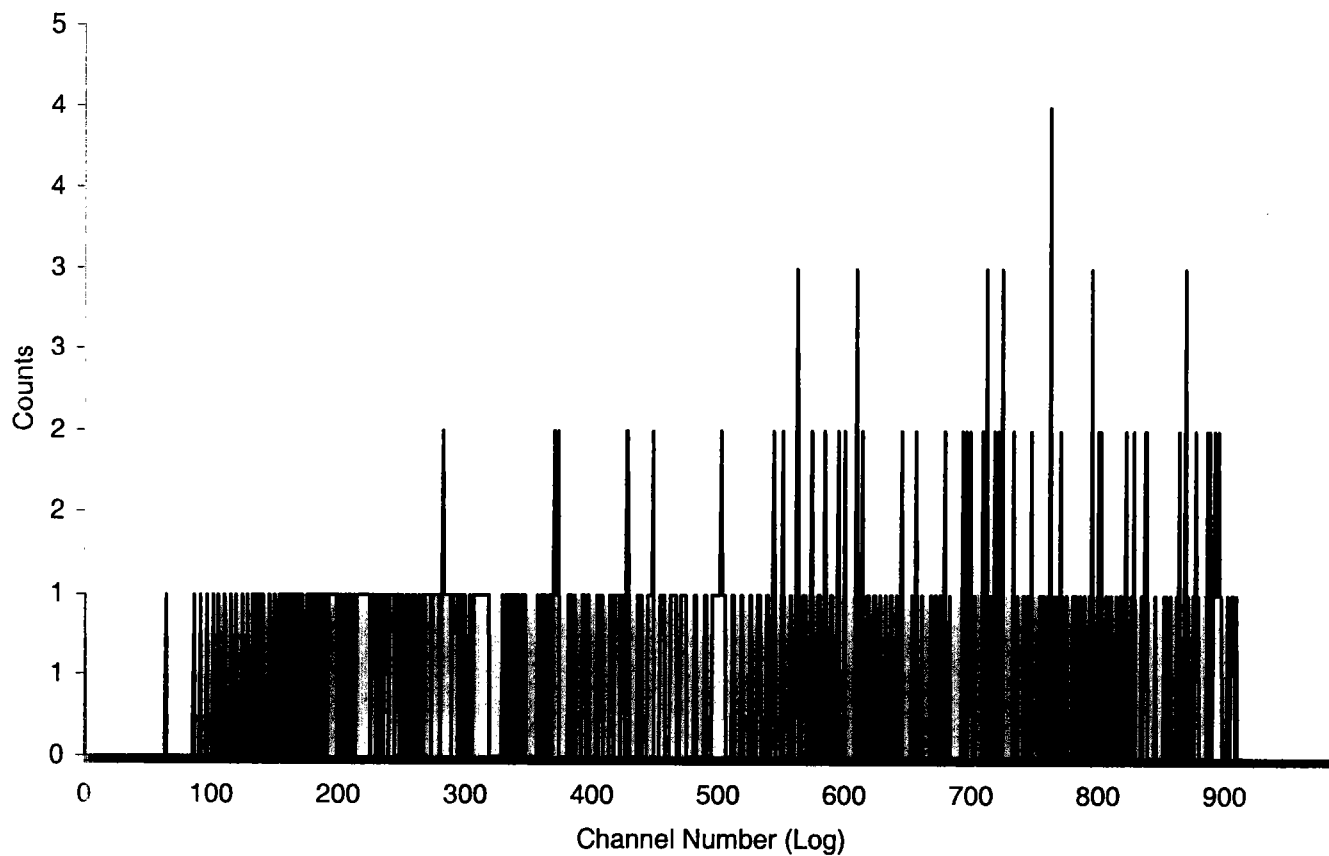
CHAN:	600.0 - 875.0	%ERROR:	2.00	FACTOR:	1.000000	BKG. SUB:	0
CHAN:	300.0 - 900.0	%ERROR:	2.00	FACTOR:	1.000000	BKG. SUB:	0

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

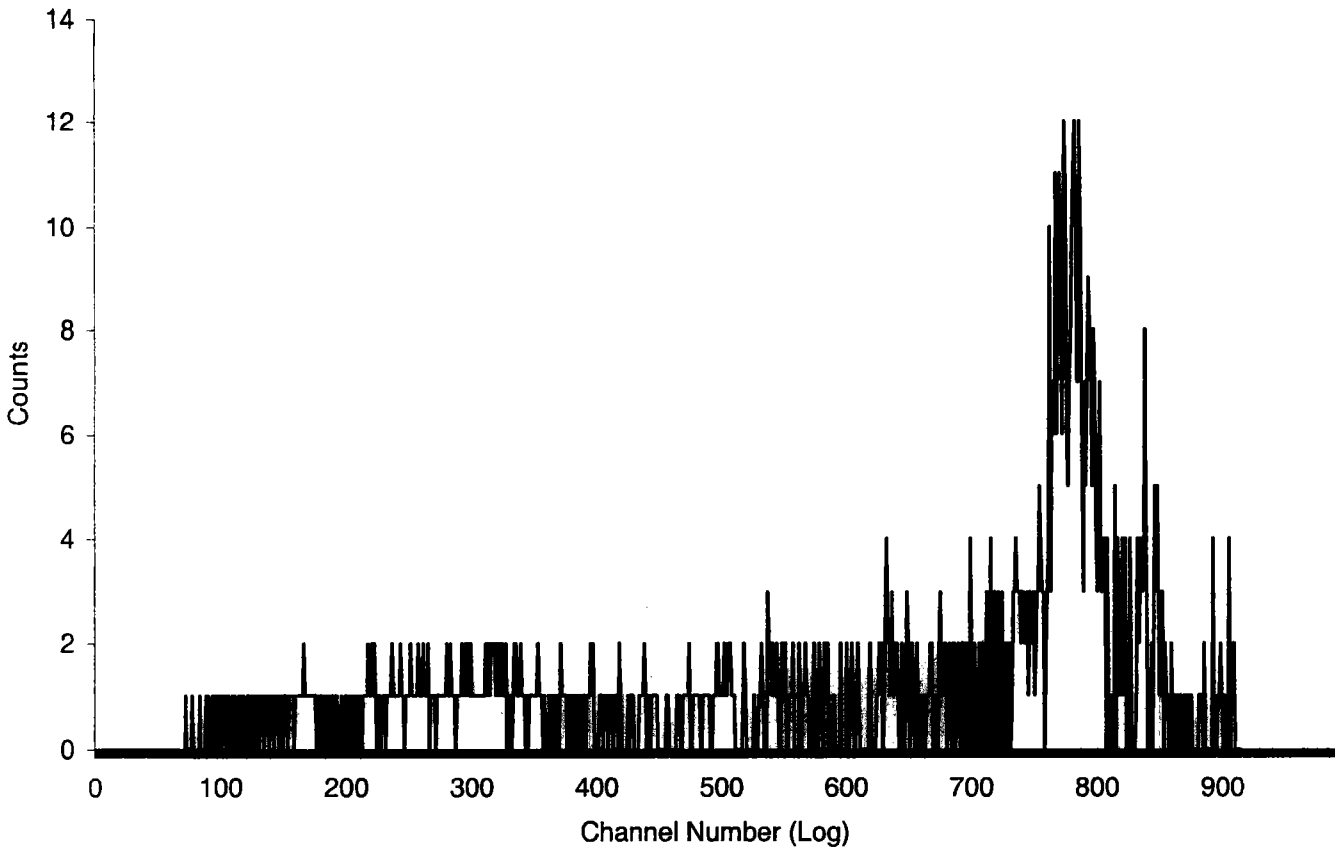
Sample Count Start Time:	20 Jul 2009 11:36:58		
Data Capture Date	20 Jul 2009 11:52:21		
User Filename	S16072022-1B.XLS		
	U16072022-1B.XLS		
Spectrum Type	Log Counts		
User Number	16		
User Id	RN-222		
User Comment	GREEN		
Isotope Name	14C		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	1	22-1	15.00
H#, Total Counts:	47.9	412	
Start, End, X-Axis:	0	990	Channel Number

SPECTRUM PLOT
USER 16 - RN-222



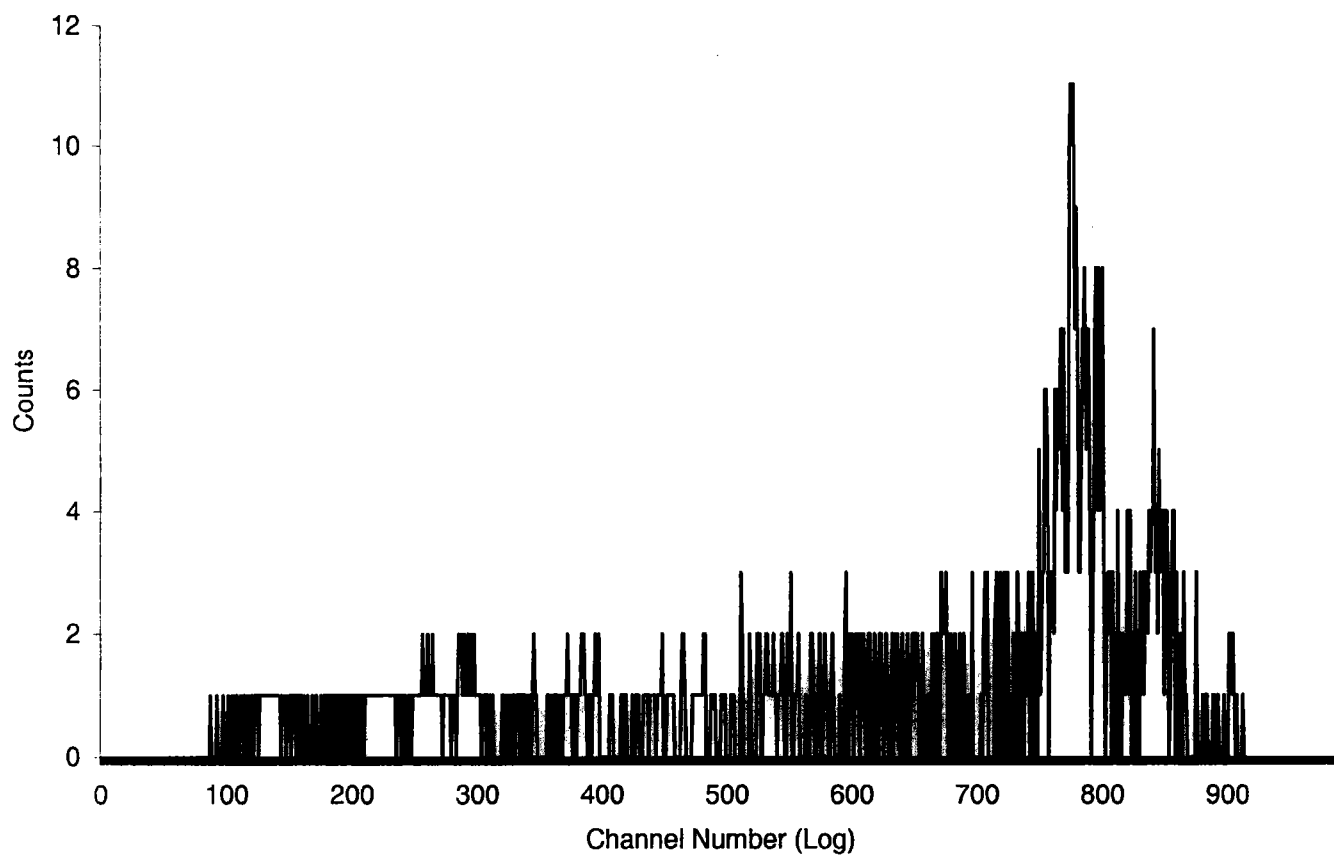
Sample Count Start Time: 20 Jul 2009 11:53:20
Data Capture Date: 20 Jul 2009 12:08:43
User Filename: S16072022-2B.XLS
U16072022-1B.XLS
Spectrum Type: Log Counts
User Number: 16
User Id: RN-222
User Comment: GREEN
Isotope Name: 14C
Scintillator: LIQUID
Sample, Rack-Pos, Time: 2 22-2 15.00
H#, Total Counts: 50.3 1100
Start, End, X-Axis: 0 990 Channel Number

SPECTRUM PLOT
USER 16 - RN-222



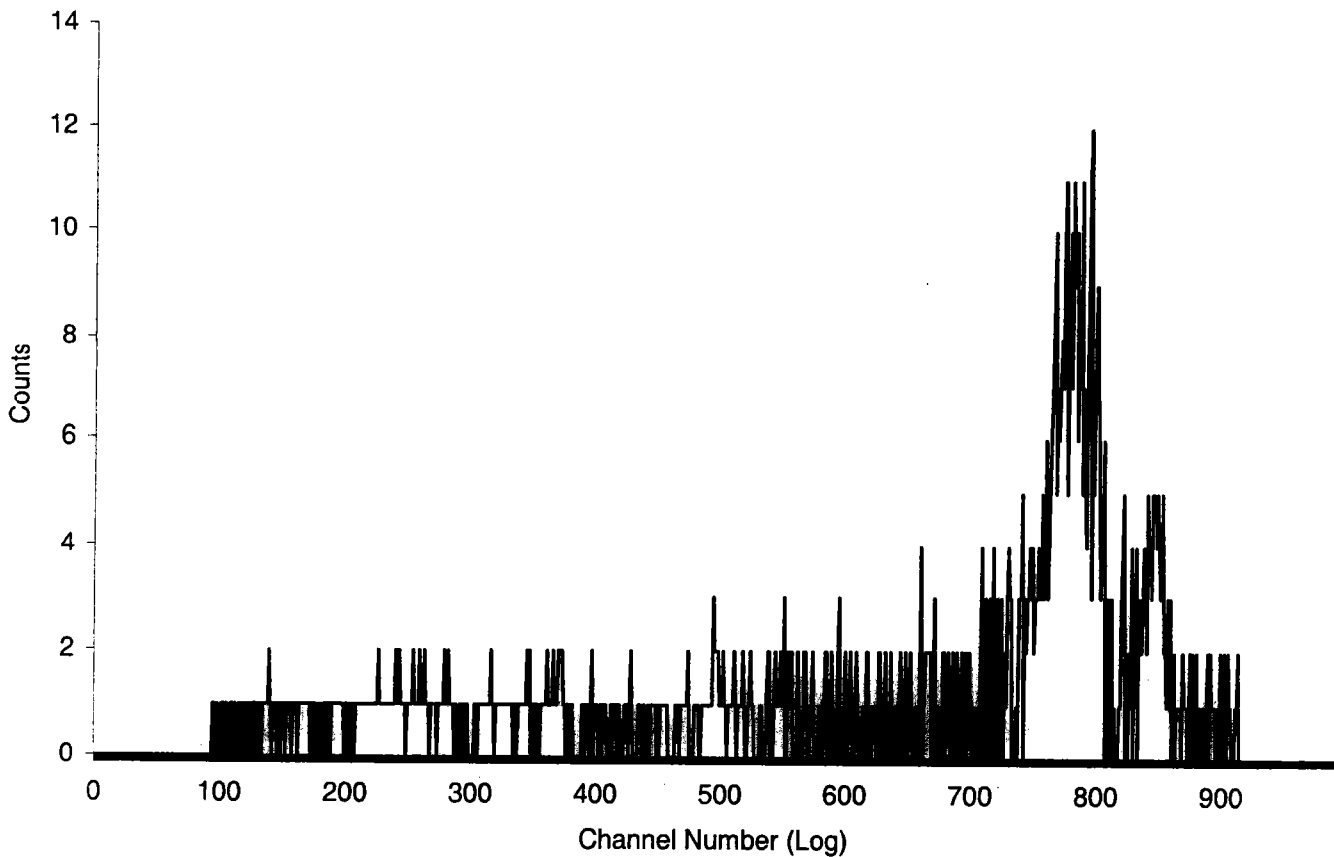
Sample Count Start Time: 20 Jul 2009 12:09:43
Data Capture Date: 20 Jul 2009 12:25:05
User Filename: S16072022-3B.XLS
U16072022-1B.XLS
Spectrum Type: Log Counts
User Number: 16
User Id: RN-222
User Comment: GREEN
Isotope Name: ^{14}C
Scintillator: LIQUID
Sample, Rack-Pos, Time: 3 22-3 15.00
H#, Total 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

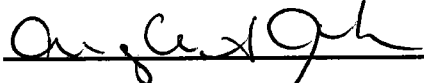
Gas Flow Proportional Counter Calibration Package

Method: Ra-228 (AC)

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

Prepared By: 

Date: 7/2/09

Reviewed By: 

Date: 7/2/09

Effective Date: 7/2/09

Ra-228 Calibration PROTEAN Detectors

Detector #	Source #	Separation date	Count date	Ac-228 decay (dec)	Spike Vol. Ra-228 (mL)	Std. Act. Ra-228 dpm/mL	Standard Nominal dpm	raw beta counts	ct. time (min)	Beta cpm	corrected* cpm	Ra-228 eff (cpm/dpm)	Separation time	
													Decay Corrected	Volume corrected
1A	1	7/1/09 10:45	7/1/2009 13:36	0.7249	1.5	6363.2	9544.8	13564	3	4521.3	6237.434348	0.6535		
1A	2	7/1/09 10:45	7/1/2009 13:52	0.7032	1.5	6363.2	9544.8	12775	3	4258.3	6055.521583	0.6344		
1A	3	7/1/09 10:45	7/1/2009 13:48	0.7083	1.5	6363.2	9544.8	12750	3	4250.0	6000.085083	0.6286	Average EFF	
1A	4	7/1/09 10:45	7/1/2009 13:41	0.7170	1.5	6363.2	9544.8	12410	3	4136.7	5769.683602	0.6045	0.6303	
1B	1	7/1/09 10:45	7/1/2009 13:41	0.7174	1.5	6363.2	9544.8	13292	3	4430.7	6176.07771	0.6471		
1B	2	7/1/09 10:45	7/1/2009 13:36	0.7246	1.5	6363.2	9544.8	13274	3	4424.7	6106.181463	0.6397		
1B	3	7/1/09 10:45	7/1/2009 13:52	0.7031	1.5	6363.2	9544.8	12699	3	4233.0	6020.43969	0.6308	Average EFF	
1B	4	7/1/09 10:45	7/1/2009 13:48	0.7082	1.5	6363.2	9544.8	12072	3	4024.0	5682.267909	0.5953	0.6282	
1C	1	7/1/09 10:45	7/1/2009 13:48	0.7085	1.5	6363.2	9544.8	12813	3	4271.0	6028.410186	0.6316		
1C	2	7/1/09 10:45	7/1/2009 13:41	0.7172	1.5	6363.2	9544.8	12979	3	4326.3	6032.15531	0.6320		
1C	3	7/1/09 10:45	7/1/2009 13:36	0.7245	1.5	6363.2	9544.8	12755	3	4251.7	5868.722998	0.6149	Average EFF	
1C	4	7/1/09 10:45	7/1/2009 13:52	0.7030	1.5	6363.2	9544.8	11917	3	3972.3	5650.765354	0.5920	0.6176	
1D	1	7/1/09 10:45	7/1/2009 13:52	0.7033	1.5	6363.2	9544.8	12473	3	4157.7	5911.258105	0.6193		
1D	2	7/1/09 10:45	7/1/2009 13:48	0.7084	1.5	6363.2	9544.8	12484	3	4161.3	5874.170562	0.6154		
1D	3	7/1/09 10:45	7/1/2009 13:41	0.7171	1.5	6363.2	9544.8	12289	3	4096.3	5712.363902	0.5985	Average EFF	
1D	4	7/1/09 10:45	7/1/2009 13:36	0.7243	1.5	6363.2	9544.8	12115	3	4038.3	5575.47435	0.5841	0.6043	
2A	1	7/1/09 10:45	7/1/2009 13:57	0.6960	1.5	6363.2	9544.8	12499	3	4166.3	5986.085459	0.6272		
2A	2	7/1/09 10:45	7/1/2009 14:15	0.6728	1.5	6363.2	9544.8	12103	3	4034.3	5996.6905	0.6283		
2A	3	7/1/09 10:45	7/1/2009 14:09	0.6815	1.5	6363.2	9544.8	11968	3	3989.3	5854.110901	0.6133	Average EFF	
2A	4	7/1/09 10:45	7/1/2009 14:02	0.6899	1.5	6363.2	9544.8	11855	3	3951.7	5728.227222	0.6001	0.6172	
2B	1	7/1/09 10:45	7/1/2009 14:02	0.6903	1.5	6363.2	9544.8	12471	3	4157.0	6022.266434	0.6309		
2B	2	7/1/09 10:45	7/1/2009 13:57	0.6958	1.5	6363.2	9544.8	12492	3	4164.0	5984.232843	0.6270		
2B	3	7/1/09 10:45	7/1/2009 14:15	0.6727	1.5	6363.2	9544.8	11892	3	3964.0	5892.884561	0.6174	Average EFF	
2B	4	7/1/09 10:45	7/1/2009 14:09	0.6814	1.5	6363.2	9544.8	11539	3	3846.3	5644.974311	0.5914	0.6167	
2C	1	7/1/09 10:45	7/1/2009 14:08	0.6817	1.5	6363.2	9544.8	12050	3	4016.7	5892.005142	0.6173		
2C	2	7/1/09 10:45	7/1/2009 14:02	0.6901	1.5	6363.2	9544.8	11914	3	3971.3	5754.571355	0.6029		
2C	3	7/1/09 10:45	7/1/2009 13:58	0.6957	1.5	6363.2	9544.8	11994	3	3998.0	5746.92868	0.6021	Average EFF	
2C	4	7/1/09 10:45	7/1/2009 14:15	0.6726	1.5	6363.2	9544.8	10889	3	3629.7	5396.37168	0.5654	0.5969	
2D	1	7/1/09 10:45	7/1/2009 14:15	0.6729	1.5	6363.2	9544.8	12010	3	4003.3	5949.493049	0.6233		
2D	2	7/1/09 10:45	7/1/2009 14:08	0.6816	1.5	6363.2	9544.8	12124	3	4041.3	5929.303014	0.6212		
2D	3	7/1/09 10:45	7/1/2009 14:02	0.6900	1.5	6363.2	9544.8	12168	3	4056.0	5878.360714	0.6159	Average EFF	
2D	4	7/1/09 10:45	7/1/2009 13:58	0.6954	1.5	6363.2	9544.8	11692	3	3897.3	5604.158523	0.5871	0.6119	
3A	1	7/1/09 10:45	7/1/2009 14:19	0.6675	1.5	6363.2	9544.8	11194	3	3731.3	5589.748519	0.5856		
3A	2	7/1/09 10:45	7/1/2009 14:30	0.6482	1.5	6363.2	9544.8	14227	4	3556.8	5486.792678	0.5748		
3A	3	7/1/09 10:45	7/1/2009 14:35	0.6548	1.5	6363.2	9544.8	14180	4	3545.0	5414.108112	0.5672	Average EFF	
3A	4	7/1/09 10:45	7/1/2009 14:25	0.6608	1.5	6363.2	9544.8	13754	4	3438.5	5203.464549	0.5452	0.5682	
3B	1	7/1/09 10:45	7/1/2009 14:25	0.6612	1.5	6363.2	9544.8	15370	4	3842.5	5811.010789	0.6088		
3B	2	7/1/09 10:45	7/1/2009 14:20	0.6673	1.5	6363.2	9544.8	11695	3	3898.3	5842.303251	0.6121		
3B	3	7/1/09 10:45	7/1/2009 14:35	0.6481	1.5	6363.2	9544.8	14905	4	3726.3	5749.171166	0.6023	Average EFF	
3B	4	7/1/09 10:45	7/1/2009 14:30	0.6547	1.5	6363.2	9544.8	14220	4	3555.0	5430.231301	0.5689	0.5980	
3C	1	7/1/09 10:45	7/1/2009 14:29	0.6552	1.5	6363.2	9544.8	15644	4	3911.0	5969.527404	0.6254		
3C	2	7/1/09 10:45	7/1/2009 14:25	0.6611	1.5	6363.2	9544.8	15964	4	3991.0	6036.911214	0.6325		
3C	3	7/1/09 10:45	7/1/2009 14:20	0.6672	1.5	6363.2	9544.8	11701	3	3900.3	5846.033242	0.6125	Average EFF	
3C	4	7/1/09 10:45	7/1/2009 14:35	0.6480	1.5	6363.2	9544.8	14729	4	3682.3	5682.352456	0.5953	0.6164	
3D	1	7/1/09 10:45	7/1/2009 14:35	0.6484	1.5	6363.2	9544.8	15152	4	3788.0	5842.430209	0.6121		
3D	2	7/1/09 10:45	7/1/2009 14:30	0.6550	1.5	6363.2	9544.8	15168	4	3792.0	5789.343603	0.6065		
3D	3	7/1/09 10:45	7/1/2009 14:25	0.6610	1.5	6363.2	9544.8	15295	4	3823.8	5785.011122	0.6061	Average EFF	
3D	4	7/1/09 10:45	7/1/2009 14:20	0.6670	1.5	6363.2	9544.8	10942	3	3647.3	5468.022172	0.5729	0.5994	
4A	1	7/1/09 10:45	7/1/2009 14:40	0.6418	1.5	6363.2	9544.8	15298	4	3824.5	5959.288371	0.6243		
4A	2	7/1/09 10:45	7/1/2009 15:00	0.6187	1.5	6363.2	9544.8	14897	4	3724.3	6019.957238	0.6307		
4A	3	7/1/09 10:45	7/1/2009 14:53	0.6266	1.5	6363.2	9544.8	15050	4	3762.5	6005.095127	0.6291	Average EFF	
4A	4	7/1/09 10:45	7/1/2009 14:48	0.6325	1.5	6363.2	9544.8	14462	4	3615.5	5715.951787	0.5989	0.6208	
4B	1	7/1/09 10:45	7/1/2009 14:48	0.6329	1.5	6363.2	9544.8	15335	4	3833.8	6057.768128	0.6347		
4B	2	7/1/09 10:45	7/1/2009 14:41	0.6416	1.5	6363.2	9544.8	15513	4	3878.3	6044.745331	0.6333		
4B	3	7/1/09 10:45	7/1/2009 15:00	0.6186	1.5	6363.2	9544.8	14521	4	3630.3	5868.58525	0.6148	Average EFF	
4B	4	7/1/09 10:45	7/1/2009 14:53	0.6265	1.5	6363.2	9544.8	14328	4	3582.0	5717.547589	0.5990	0.6205	
4C	1	7/1/09 10:45	7/1/2009 14:53	0.6268	1.5	6363.2	9544.8	14733	4	3683.3	5876.583259	0.6157		
4C	2	7/1/09 10:45	7/1/2009 14:48	0.6327	1.5	6363.2	9544.8	14902	4	3725.5	5888.011911	0.6169		
4C	3	7/1/09 10:45	7/1/2009 14:41	0.6414	1.5	6363.2	9544.8	14856	4	3714.0	5790.010842	0.6066	Average EFF	
4C	4	7/1/09 10:45	7/1/2009 15:00	0.6185	1.5	6363.2	9544.8	13733	4	3433.3	5550.795964	0.5816	0.6052	
4D	1	7/1/09 10:45	7/1/2009 15:00	0.6188	1.5	6363.2	9544.8	14167	4	3541.8	5723.884149	0.5997		
4D	2	7/1/09 10:45	7/1/2009 14:53	0.6267	1.5	6363.2	9544.8	14204	4	3551.0	5866.467573	0.5937		
4D	3	7/1/09 10:45	7/1/2009 14:48	0.6326	1.5	6363.2	9544.8	14131	4	3532.8	5584.07765	0.5850	Average EFF	
4D	4	7/1/09 10:45	7/1/2009 14:41	0.6413	1.5	6363.2	9544.8	13978	4	3494.5	5449.182717	0.5709	0.5873	
5A	1	7/1/09 10:45	7/1/2009 15:06	0.6112	1.5	6363.2	9544.8	14870	4	3717.5	6082.165089	0.6372		
5A	2	7/1/09 10:45	7/1/2009 15:21	0.5943	1.5	6363.2	9544.8	14487	4	3621.8	6094.223373	0.6385		
5A	3	7/1/09 10:45	7/1/2009 15:17	0.5996	1.5	6363.2	9544.8	14259	4	3564.8	5945.170793	0.6229	Average EFF	
5A	4	7/1/09 10:45	7/1/2009 15:12	0.6047	1.5	6363.2	9544.8	13957	4	3489.3	5770.592799	0.6046	0.6258	
5B	1	7/1/09 10:45	7/1/2009 15:12	0.6050	1.5	6363.2	9544.8	14869	4	3717.3	6144.005028	0.6437		
5B	2	7/1/09 10:45	7/1/2009 15:06	0.6111	1.5	6363.2	9544.8	14821	4	3705.3	6063.072791	0.6352		
5B	3	7/1/09 10:45	7/1/2009 15:21	0.5942	1.5	6363.2	9544.8	14289	4	3572.3	6011.872812	0.6299	Average EFF	
5B	4	7/1/09 10:45	7/1/2009 15:17	0.5995	1.5	6363.2	9544.8	13809	4	3452.3	5758.629577	0.6033	0.6280	
5C	1	7/1/09 10:45	7/1/2009 15:17	0.5994	1.5	6363.2	9544.8	14676	4	3669.0	6120.953053	0.6413		
5C	2	7/1/09 10:45	7/1/2009 15:12	0.6049	1.5	6363.2	9544.8	15122	4	3780.5	6249.917577	0.6548		
5C	3	7/1/09 10:45	7/1/2009 15:07	0.6108	1.5	6363.2	9544.8	14958	4	3739.5	6121.8025	0.6414	Average EFF	

7/21/09

5C	4	7/1/09 10:45	7/1/2009 15:21	0.5941	1.5	6363.2	9544.8	13831	4	3457.8	5819.905873	0.6097	0.6368
5D	1	7/1/09 10:45	7/1/2009 15:21	0.5943	1.5	6363.2	9544.8	14321	4	3580.3	6024.014899	0.6311	
5D	2	7/1/09 10:45	7/1/2009 15:17	0.5993	1.5	6363.2	9544.8	14642	4	3680.5	6107.538025	0.6399	
5D	3	7/1/09 10:45	7/1/2009 15:12	0.6048	1.5	6363.2	9544.8	14443	4	3610.8	5970.409434	0.6255	Average EFF
5D	4	7/1/09 10:45	7/1/2009 15:07	0.6107	1.5	6363.2	9544.8	13954	4	3488.5	5711.973074	0.5984	0.6237
6A	1	7/1/09 10:45	7/1/2009 15:27	0.5885	1.5	6363.2	9544.8	14018	4	3504.5	5955.42076	0.6239	
6A	2	7/1/09 10:45	7/1/2009 15:40	0.5735	1.5	6363.2	9544.8	12283	3.5	3509.4	6118.819734	0.6411	
6A	3	7/1/09 10:45	7/1/2009 15:36	0.5779	1.5	6363.2	9544.8	12111	3.5	3460.3	5987.187856	0.6273	Average EFF
6A	4	7/1/09 10:45	7/1/2009 15:32	0.5826	1.5	6363.2	9544.8	11598	3.5	3313.7	5687.952648	0.5959	0.6221
6B	1	7/1/09 10:45	7/1/2009 15:32	0.5824	1.5	6363.2	9544.8	12151	3.5	3471.7	5961.398905	0.6246	
6B	2	7/1/09 10:45	7/1/2009 15:27	0.5885	1.5	6363.2	9544.8	14371	4	3592.8	6105.389624	0.6397	
6B	3	7/1/09 10:45	7/1/2009 15:40	0.5734	1.5	6363.2	9544.8	11705	3.5	3344.3	5831.983307	0.6110	Average EFF
6B	4	7/1/09 10:45	7/1/2009 15:36	0.5779	1.5	6363.2	9544.8	11388	3.5	3253.7	5630.295163	0.5899	0.6163
6C	1	7/1/09 10:45	7/1/2009 15:36	0.5778	1.5	6363.2	9544.8	12161	3.5	3474.6	6013.224586	0.6300	
6C	2	7/1/09 10:45	7/1/2009 15:32	0.5821	1.5	6363.2	9544.8	12083	3.5	3452.3	5930.638446	0.6213	
6C	3	7/1/09 10:45	7/1/2009 15:27	0.5883	1.5	6363.2	9544.8	13638	4	3409.5	5795.433731	0.6072	Average EFF
6C	4	7/1/09 10:45	7/1/2009 15:40	0.5733	1.5	6363.2	9544.8	11218	3.5	3205.1	5590.212659	0.5857	0.6111
6D	1	7/1/09 10:45	7/1/2009 15:40	0.5732	1.5	6363.2	9544.8	11987	3.5	3424.9	5974.547886	0.6259	
6D	2	7/1/09 10:45	7/1/2009 15:36	0.5777	1.5	6363.2	9544.8	12183	3.5	3480.9	6025.235519	0.6313	
6D	3	7/1/09 10:45	7/1/2009 15:32	0.5819	1.5	6363.2	9544.8	11882	3.5	3394.9	5833.810262	0.6112	Average EFF
6D	4	7/1/09 10:45	7/1/2009 15:27	0.5881	1.5	6363.2	9544.8	13018	4	3254.5	5533.899914	0.5798	0.6120
7A	1	7/1/09 10:45	7/1/2009 15:46	0.5673	1.5	6363.2	9544.8	12007	3.5	3430.6	6047.285806	0.6336	
7A	2	7/1/09 10:45	7/1/2009 16:00	0.5525	1.5	6363.2	9544.8	11655	3.5	3330.0	6027.30696	0.6315	
7A	3	7/1/09 10:45	7/1/2009 15:56	0.5569	1.5	6363.2	9544.8	11445	3.5	3270.0	5871.972756	0.6152	Average EFF
7A	4	7/1/09 10:45	7/1/2009 15:50	0.5627	1.5	6363.2	9544.8	11121	3.5	3177.4	5846.694018	0.5916	0.6180
7B	1	7/1/09 10:45	7/1/2009 15:51	0.5622	1.5	6363.2	9544.8	11988	3.5	3419.4	6082.664171	0.6373	
7B	2	7/1/09 10:45	7/1/2009 15:46	0.5673	1.5	6363.2	9544.8	12050	3.5	3442.9	6069.322745	0.6359	
7B	3	7/1/09 10:45	7/1/2009 16:00	0.5524	1.5	6363.2	9544.8	11675	3.5	3335.7	6038.785014	0.6327	Average EFF
7B	4	7/1/09 10:45	7/1/2009 15:56	0.5567	1.5	6363.2	9544.8	11271	3.5	3220.3	5784.331251	0.6060	0.6280
7C	1	7/1/09 10:45	7/1/2009 15:56	0.5566	1.5	6363.2	9544.8	11781	3.5	3366.0	6047.202464	0.6336	
7C	2	7/1/09 10:45	7/1/2009 15:51	0.5621	1.5	6363.2	9544.8	11760	3.5	3360.0	5978.073192	0.6263	
7C	3	7/1/09 10:45	7/1/2009 15:46	0.5670	1.5	6363.2	9544.8	11766	3.5	3361.7	5928.878357	0.6212	Average EFF
7C	4	7/1/09 10:45	7/1/2009 16:00	0.5523	1.5	6363.2	9544.8	10888	3.5	3110.9	5632.598965	0.5901	0.6178
7D	1	7/1/09 10:45	7/1/2009 16:00	0.5522	1.5	6363.2	9544.8	11805	3.5	3315.7	6004.271132	0.6291	
7D	2	7/1/09 10:45	7/1/2009 15:56	0.5565	1.5	6363.2	9544.8	11920	3.5	3405.7	6119.509991	0.6411	
7D	3	7/1/09 10:45	7/1/2009 15:51	0.5619	1.5	6363.2	9544.8	11933	3.5	3409.4	6067.346561	0.6357	Average EFF
7D	4	7/1/09 10:45	7/1/2009 15:46	0.5668	1.5	6363.2	9544.8	11305	3.5	3230.0	5698.36602	0.5970	0.6257
8A	1	7/1/09 10:45	7/1/2009 16:06	0.5466	1.5	6363.2	9544.8	11673	3.5	3335.1	6101.651756	0.6393	
8A	2	7/1/09 10:45	7/1/2009 16:19	0.5333	1.5	6363.2	9544.8	11172	3.5	3192.0	5985.379105	0.6271	
8A	3	7/1/09 10:45	7/1/2009 16:15	0.5377	1.5	6363.2	9544.8	11258	3.5	3216.6	5982.329368	0.6268	Average EFF
8A	4	7/1/09 10:45	7/1/2009 16:10	0.5424	1.5	6363.2	9544.8	10977	3.5	3136.3	5782.059146	0.6058	0.6247
8B	1	7/1/09 10:45	7/1/2009 16:10	0.5423	1.5	6363.2	9544.8	11583	3.5	3309.4	6102.412618	0.6393	
8B	2	7/1/09 10:45	7/1/2009 16:06	0.5466	1.5	6363.2	9544.8	11758	3.5	3359.4	6146.082528	0.6439	
8B	3	7/1/09 10:45	7/1/2009 16:19	0.5332	1.5	6363.2	9544.8	11499	3.5	3285.4	6161.727069	0.6456	Average EFF
8B	4	7/1/09 10:45	7/1/2009 16:15	0.5376	1.5	6363.2	9544.8	10844	3.5	3098.3	5763.600098	0.6038	0.6332
8C	1	7/1/09 10:45	7/1/2009 16:15	0.5375	1.5	6363.2	9544.8	11539	3.5	3296.9	6133.782218	0.6426	
8C	2	7/1/09 10:45	7/1/2009 16:10	0.5422	1.5	6363.2	9544.8	11774	3.5	3364.0	6204.011354	0.6500	
8C	3	7/1/09 10:45	7/1/2009 16:06	0.5465	1.5	6363.2	9544.8	11611	3.5	3317.4	6070.574762	0.6380	Average EFF
8C	4	7/1/09 10:45	7/1/2009 16:19	0.5331	1.5	6363.2	9544.8	10809	3.5	3088.3	5793.080291	0.6069	0.6339
8D	1	7/1/09 10:45	7/1/2009 16:19	0.5330	1.5	6363.2	9544.8	11301	3.5	3228.9	6057.336905	0.6346	
8D	2	7/1/09 10:45	7/1/2009 16:15	0.5374	1.5	6363.2	9544.8	11412	3.5	3260.6	6067.58377	0.6357	
8D	3	7/1/09 10:45	7/1/2009 16:10	0.5421	1.5	6363.2	9544.8	11660	3.5	3331.4	6145.874775	0.6439	Average EFF
8D	4	7/1/09 10:45	7/1/2009 16:06	0.5464	1.5	6363.2	9544.8	10918	3.5	3119.4	5709.327085	0.5982	0.6281
9A	1	7/1/09 10:45	7/1/2009 16:24	0.5280	1.5	6363.2	9544.8	11805	3.5	3315.7	6280.207813	0.6580	
9A	2	7/1/09 10:45	7/1/2009 16:42	0.5106	1.5	6363.2	9544.8	11281	3.5	3223.1	6313.016372	0.6614	
9A	3	7/1/09 10:45	7/1/2009 16:33	0.5196	1.5	6363.2	9544.8	11301	3.5	3228.9	6214.402502	0.6511	Average EFF
9A	4	7/1/09 10:45	7/1/2009 16:29	0.5236	1.5	6363.2	9544.8	10987	3.5	3139.1	5995.155865	0.6281	0.6496
9B	1	7/1/09 10:45	7/1/2009 16:29	0.5235	1.5	6363.2	9544.8	11151	3.5	3186.0	6085.406803	0.6376	
9B	2	7/1/09 10:45	7/1/2009 16:24	0.5280	1.5	6363.2	9544.8	11462	3.5	3274.9	6202.821366	0.6499	
9B	3	7/1/09 10:45	7/1/2009 16:42	0.5104	1.5	6363.2	9544.8	11004	3.5	3144.0	6180.125852	0.6454	Average EFF
9B	4	7/1/09 10:45	7/1/2009 16:33	0.5195	1.5	6363.2	9544.8	10581	3.5	3023.1	5819.569586	0.6097	0.6356
9C	1	7/1/09 10:45	7/1/2009 16:33	0.5194	1.5	6363.2	9544.8	11026	3.5	3150.3	6064.890483	0.6354	
9C	2	7/1/09 10:45	7/1/2009 16:29	0.5235	1.5	6363.2	9544.8	11281	3.5	3223.1	6157.122814	0.6451	
9C	3	7/1/09 10:45	7/1/2009 16:24	0.5279	1.5	6363.2	9544.8	11016	3.5	3147.4	5962.583098	0.6247	Average EFF
9C	4	7/1/09 10:45	7/1/2009 16:42	0.5103	1.5	6363.2	9544.8	10297	3.5	2942.0	5765.244836	0.6040	0.6273
9D	1	7/1/09 10:45	7/1/2009 16:38	0.5146	1.5	6363.2	9544.8	11135	3.5	3181.4	6182.4976	0.6477	
9D	2	7/1/09 10:45	7/1/2009 16:33	0.5193	1.5	6363.2	9544.8	11412	3.5	3260.6	6278.391381	0.6578	
9D	3	7/1/09 10:45	7/1/2009 16:29	0.5234	1.5	6363.2	9544.8	11340	3.5	3240.0	6190.682442	0.6486	Average EFF
9D	4	7/1/09 10:45	7/1/2009 16:24	0.5278	1.5	6363.2	9544.8	10912	3.5	3117.7	5907.401951	0.6189	0.6433
10A	1	7/1/09 10:45	7/1/2009 16:47	0.5057	1.5	6363.2	9544.8	10991	3.5	3140.3	6209.984837	0.6506	
10A	2	7/1/09 10:45	7/1/2009 17:12	0.4824	1.5	6363.2	9544.8	11959	4	2889.8	6198.168046	0.6494	
10A	3	7/1/09 10:45	7/1/2009 16:58	0.4958	1.5	6363.2	9544.8	10553	3.5	3015.1	6081.381423	0.6371	Average EFF
10A	4	7/1/09 10:45	7/1/2009 16:53	0.5003	1.5	6363.2	9544.8	10338	3.5	2953.7	5903.409852	0.6185	0.6389
10B	1	7/1/09 10:45	7/1/2009 17:03	0.4910	1.5	6363.2	9544.8	11110	4	2777.5	5856.748417	0.5927	
10B	2	7/1/09 10:45	7/1/2009 16:47	0.5057	1.5	6363.2	9544.8	10812	3.5	3089.1	6109.231533	0.6401	
10B	3	7/1/09 10:45	7/1/2009 17:12	0.4822	1.5	6363.2	9544.8	11422	4	2855.5	5921.333197	0.6204	Average EFF
10B	4	7/1/09 10:45	7/1/2009 16:58	0.4957	1.5	6363.2	9544.8	9967	3.5	2847.7	5744.946895	0.6019	0.6137
10C	1	7/1/09 10:45	7/1/2009 16:58	0.4956	1.5	6363.2	9544.8	10482	3.5	2994.9	6042.548531	0.6331	
10C	2	7/1/09 10:45	7/1										

10D	3	7/1/09 10:45	7/1/2009 16:53	0.5000	1.5	6363.2	9544.8	10643	3.5	3040.9	6081.577364	0.6372	Average EFF
10D	4	7/1/09 10:45	7/1/2009 16:48	0.5053	1.5	6363.2	9544.8	10064	3.5	2875.4	5690.501596	0.5962	0.6320
11A	1	7/1/09 10:45	7/1/2009 11:56	0.8745	1.5	6363.2	9544.8	14773	3	4924.3	5631.22443	0.5900	
11A	2	7/1/09 10:45	7/1/2009 12:08	0.8547	1.5	6363.2	9544.8	14429	3	4809.7	5627.17636	0.5896	
11A	3	7/1/09 10:45	7/1/2009 12:04	0.8607	1.5	6363.2	9544.8	14454	3	4818.0	5597.851728	0.5865	Average EFF
11A	4	7/1/09 10:45	7/1/2009 12:00	0.8677	1.5	6363.2	9544.8	14013	3	4671.0	5383.193838	0.5640	0.5825
11B	1	7/1/09 10:45	7/1/2009 12:00	0.8681	1.5	6363.2	9544.8	16203	3	5401.0	6221.768068	0.6518	
11B	2	7/1/09 10:45	7/1/2009 11:56	0.8742	1.5	6363.2	9544.8	16106	3	5368.7	6141.073627	0.6434	
11B	3	7/1/09 10:45	7/1/2009 12:08	0.8545	1.5	6363.2	9544.8	15643	3	5214.3	6102.154531	0.6393	Average EFF
11B	4	7/1/09 10:45	7/1/2009 12:04	0.8606	1.5	6363.2	9544.8	15133	3	5044.3	5861.738123	0.6141	0.6372
11C	1	7/1/09 10:45	7/1/2009 12:04	0.8609	1.5	6363.2	9544.8	15637	3	5212.3	6054.305139	0.6343	
11C	2	7/1/09 10:45	7/1/2009 12:00	0.8680	1.5	6363.2	9544.8	15919	3	5308.3	6113.481467	0.6405	
11C	3	7/1/09 10:45	7/1/2009 11:56	0.8740	1.5	6363.2	9544.8	16452	3	5484.0	6274.376359	0.6574	Average EFF
11C	4	7/1/09 10:45	7/1/2009 12:08	0.8544	1.5	6363.2	9544.8	14887	3	4962.3	5808.157492	0.6085	0.6352
11D	1	7/1/09 10:45	7/1/2009 12:08	0.8548	1.5	6363.2	9544.8	15607	3	5202.3	6085.822645	0.6376	
11D	2	7/1/09 10:45	7/1/2009 12:04	0.8608	1.5	6363.2	9544.8	15944	3	5314.7	6174.138045	0.6469	
11D	3	7/1/09 10:45	7/1/2009 12:00	0.8679	1.5	6363.2	9544.8	16098	3	5366.0	6182.989937	0.6478	Average EFF
11D	4	7/1/09 10:45	7/1/2009 11:56	0.8738	1.5	6363.2	9544.8	15191	3	5063.7	5794.733717	0.6071	0.6348
12A	1	7/1/09 10:45	7/1/2009 12:15	0.8437	1.5	6363.2	9544.8	15450	3	5150.0	6104.026984	0.6395	
12A	2	7/1/09 10:45	7/1/2009 12:28	0.8234	1.5	6363.2	9544.8	15016	3	5005.3	6078.958269	0.6369	
12A	3	7/1/09 10:45	7/1/2009 12:24	0.8296	1.5	6363.2	9544.8	14984	3	4994.7	6020.558384	0.6308	Average EFF
12A	4	7/1/09 10:45	7/1/2009 12:20	0.8358	1.5	6363.2	9544.8	14530	3	4843.3	5794.58497	0.6071	0.6286
12B	1	7/1/09 10:45	7/1/2009 12:20	0.8362	1.5	6363.2	9544.8	15404	3	5134.7	6140.835636	0.6433	
12B	2	7/1/09 10:45	7/1/2009 12:15	0.8437	1.5	6363.2	9544.8	15607	3	5202.3	6166.05496	0.6460	
12B	3	7/1/09 10:45	7/1/2009 12:28	0.8232	1.5	6363.2	9544.8	15060	3	5020.0	6097.91718	0.6389	Average EFF
12B	4	7/1/09 10:45	7/1/2009 12:24	0.8295	1.5	6363.2	9544.8	14553	3	4851.0	5848.11587	0.6127	0.6352
12C	1	7/1/09 10:45	7/1/2009 12:24	0.8300	1.5	6363.2	9544.8	15183	3	5061.0	6097.649845	0.6388	
12C	2	7/1/09 10:45	7/1/2009 12:20	0.8361	1.5	6363.2	9544.8	15651	3	5217.0	6239.881493	0.6537	
12C	3	7/1/09 10:45	7/1/2009 12:15	0.8436	1.5	6363.2	9544.8	15216	3	5072.0	6012.519531	0.6299	Average EFF
12C	4	7/1/09 10:45	7/1/2009 12:28	0.8231	1.5	6363.2	9544.8	14117	3	4705.7	5716.805229	0.5989	0.6304
12D	1	7/1/09 10:45	7/1/2009 12:28	0.8235	1.5	6363.2	9544.8	15174	3	5058.0	6141.959419	0.6435	
12D	2	7/1/09 10:45	7/1/2009 12:24	0.8298	1.5	6363.2	9544.8	15137	3	5045.7	6080.699807	0.6371	
12D	3	7/1/09 10:45	7/1/2009 12:20	0.8359	1.5	6363.2	9544.8	15418	3	5139.3	6148.142699	0.6441	Average EFF
12D	4	7/1/09 10:45	7/1/2009 12:15	0.8434	1.5	6363.2	9544.8	14566	3	4855.3	5758.75774	0.6031	0.6320
13A	1	7/1/09 10:45	7/1/2009 12:33	0.8153	1.5	6363.2	9544.8	15230	3	5076.7	6226.552932	0.6524	
13A	2	7/1/09 10:45	7/1/2009 12:50	0.7902	1.5	6363.2	9544.8	14784	3	4928.0	6236.596242	0.6534	
13A	3	7/1/09 10:45	7/1/2009 12:41	0.8031	1.5	6363.2	9544.8	14851	3	4950.3	6164.384216	0.6458	Average EFF
13A	4	7/1/09 10:45	7/1/2009 12:37	0.8090	1.5	6363.2	9544.8	14183	3	4727.7	5843.553624	0.6122	0.6410
13B	1	7/1/09 10:45	7/1/2009 12:37	0.8094	1.5	6363.2	9544.8	15625	3	5208.3	6434.850276	0.6742	
13B	2	7/1/09 10:45	7/1/2009 12:33	0.8153	1.5	6363.2	9544.8	15450	3	5150.0	6316.496573	0.6618	
13B	3	7/1/09 10:45	7/1/2009 12:50	0.7901	1.5	6363.2	9544.8	14689	3	4896.3	6197.297391	0.6493	Average EFF
13B	4	7/1/09 10:45	7/1/2009 12:41	0.8029	1.5	6363.2	9544.8	14377	3	4792.3	5968.757323	0.6253	0.6526
13C	1	7/1/09 10:45	7/1/2009 12:41	0.8033	1.5	6363.2	9544.8	15426	3	5142.0	6401.251014	0.6707	
13C	2	7/1/09 10:45	7/1/2009 12:37	0.8093	1.5	6363.2	9544.8	15315	3	5105.0	6307.973396	0.6609	
13C	3	7/1/09 10:45	7/1/2009 12:33	0.8152	1.5	6363.2	9544.8	15288	3	5096.0	6251.048762	0.6549	Average EFF
13C	4	7/1/09 10:45	7/1/2009 12:50	0.7900	1.5	6363.2	9544.8	14222	3	4740.7	6001.209943	0.6287	0.6538
13D	1	7/1/09 10:45	7/1/2009 12:50	0.7903	1.5	6363.2	9544.8	14492	3	4830.7	6112.65055	0.6404	
13D	2	7/1/09 10:45	7/1/2009 12:46	0.7958	1.5	6363.2	9544.8	14858	3	4952.7	6223.19528	0.6520	
13D	3	7/1/09 10:45	7/1/2009 12:37	0.8082	1.5	6363.2	9544.8	14873	3	4957.7	6126.881339	0.6419	Average EFF
13D	4	7/1/09 10:45	7/1/2009 12:33	0.8151	1.5	6363.2	9544.8	14389	3	4796.3	5884.197712	0.6165	0.6377
14A	1	7/1/09 10:45	7/1/2009 12:54	0.7834	1.5	6363.2	9544.8	14463	3	4821.0	6153.596507	0.6447	
14A	2	7/1/09 10:45	7/1/2009 13:17	0.7507	1.5	6363.2	9544.8	14137	3	4712.3	6277.53373	0.6577	
14A	3	7/1/09 10:45	7/1/2009 13:13	0.7571	1.5	6363.2	9544.8	14022	3	4674.0	6173.627369	0.6468	Average EFF
14A	4	7/1/09 10:45	7/1/2009 13:02	0.7727	1.5	6363.2	9544.8	13451	3	4483.7	5802.830587	0.6080	0.6393
14B	1	7/1/09 10:45	7/1/2009 13:01	0.7730	1.5	6363.2	9544.8	14039	3	4679.7	6054.030301	0.6343	
14B	2	7/1/09 10:45	7/1/2009 12:54	0.7834	1.5	6363.2	9544.8	14398	3	4799.3	6126.324754	0.6418	
14B	3	7/1/09 10:45	7/1/2009 13:17	0.7505	1.5	6363.2	9544.8	13475	3	4491.7	5984.510182	0.6270	Average EFF
14B	4	7/1/09 10:45	7/1/2009 13:13	0.7569	1.5	6363.2	9544.8	13077	3	4359.0	5758.643863	0.6033	0.6266
14C	1	7/1/09 10:45	7/1/2009 13:12	0.7573	1.5	6363.2	9544.8	14116	3	4705.3	6213.281445	0.6510	
14C	2	7/1/09 10:45	7/1/2009 13:02	0.7729	1.5	6363.2	9544.8	14187	3	4729.0	6118.427365	0.6410	
14C	3	7/1/09 10:45	7/1/2009 12:55	0.7832	1.5	6363.2	9544.8	14409	3	4803.0	6132.734423	0.6425	Average EFF
14C	4	7/1/09 10:45	7/1/2009 13:17	0.7505	1.5	6363.2	9544.8	13229	3	4409.7	5875.993199	0.6156	0.6375
14D	1	7/1/09 10:45	7/1/2009 13:17	0.7508	1.5	6363.2	9544.8	13927	3	4642.3	6183.314452	0.6478	
14D	2	7/1/09 10:45	7/1/2009 13:12	0.7572	1.5	6363.2	9544.8	14089	3	4696.3	6202.348821	0.6498	
14D	3	7/1/09 10:45	7/1/2009 13:02	0.7728	1.5	6363.2	9544.8	13912	3	4637.3	6000.768164	0.6287	Average EFF
14D	4	7/1/09 10:45	7/1/2009 12:55	0.7830	1.5	6363.2	9544.8	13545	3	4515.0	5766.084113	0.6041	0.6326

*Background is considered negligible

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

419
7/2/09

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

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

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

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

Radium-228 Liquid

Filename : RA228.XLS
Spike S/N : N/A
Spike Exp Date : N/A
Spike Activity (dpm/ml) : N/A
Spike Volume Added: N/A

Batch : 595514
LCS Exp Date : 9/13/2009
LCS Volume Added: 2.00
Tracer S/N : 0112-J
Tracer Exp Date : 2/17/2010
Tracer 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 : GFC90SRL
Pararmete : 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

Table with columns: Pos., Sample Characteristics, Counting Data, Detector ID, Counting Time, Gross Counts, Beta, Detector Efficiency, Weekly Bkg Count, Separation Date, Count Start Date, Ra-228 Decay, Ac-228 Correction, Calculated Sample Recovery, Sample Recovery Error, Results. It contains 56 rows of data.

Handwritten number: 21971219

Notes:

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

* indicates results calculated at 100% recovery

Decision Level	Critical Level	Required MDA	MDA	Sample Act. Conc.		Sample Error	Net Count Rate	Net Count Rate	Net Count Rate	2 SIGMA Counting		Total Prop. Uncertainty	Sample Type	Nominal pCi/L	Recovery
				pCi/L	Conc.					CPM	CPM				
0.3471	0.2451	1	0.6937	134.0279	0.0254	131.6880	2.9666	5.9178	21.6466	LCS	164.3409	81.6%			
0.3647	0.2575	1	0.7192	133.0399	0.0251	130.2580	2.9508	5.9071	21.4655	LCS	164.3409	81.0%			
0.5889	0.3790	1	0.9659	145.2921	0.0243	139.8173	3.0611	6.2347	23.3752	LCS	164.3409	88.4%			
0.4695	0.3314	1	0.8755	159.8828	0.0239	150.4760	3.1730	6.6057	25.6756	LCS	164.3409	97.3%			
0.4261	0.3008	1	0.8097	127.0000	0.0257	122.0633	2.8583	5.8279	20.5368	LCS	164.3409	77.3%			
0.7599	0.5395	1	1.2813	141.0616	0.0247	135.4387	3.0211	6.1673	22.7300	LCS	164.3409	85.8%			
0.3798	0.2681	1	0.7515	141.8559	0.0253	131.7993	2.9681	6.2613	22.9053	LCS	164.3409	86.3%			
0.4150	0.2830	1	0.8072	145.8182	0.0251	131.8887	2.9696	6.4352	23.5274	LCS	164.3409	88.7%			
0.6347	0.4481	1	1.1343	129.9854	0.0284	108.9047	2.7042	6.3116	21.1935	LCS	164.3409	78.9%			
0.9035	0.6379	1	1.5022	135.4510	0.0266	119.6900	2.8455	6.3115	21.9803	LCS	164.3409	82.4%			
0.6078	0.4291	1	1.0779	141.2594	0.0255	128.6447	2.9382	6.3235	22.8259	LCS	164.3409	86.0%			
0.5473	0.3864	1	0.9987	155.5960	0.0247	137.7700	3.0378	6.7244	25.0636	LCS	164.3409	94.7%			
0.6283	0.4436	1	1.1054	135.5336	0.0264	124.2433	2.8986	6.1761	21.9739	LCS	164.3409	83.3%			
0.9036	0.6379	1	1.4942	136.9155	0.0254	125.4287	2.9134	6.2333	22.1127	LCS	164.3409	88.8%			
0.7676	0.5419	1	1.3079	145.9826	0.0252	130.3400	2.9624	6.5032	23.5621	LCS	164.3409	90.0%			
0.4809	0.3395	1	0.9027	134.9611	0.0269	120.7040	2.8427	6.2312	21.9265	LCS	164.3409	82.1%			
0.8974	0.4924	1	1.2076	131.4742	0.0271	117.9500	2.8170	6.1544	21.3797	LCS	164.3409	80.0%			
0.6530	0.4610	1	1.1419	148.2299	0.0259	132.9873	2.9894	6.4406	23.6659	LCS	164.3409	89.0%			
0.7661	0.5409	1	1.3064	156.3706	0.0255	139.2187	3.0605	6.7377	25.2668	LCS	164.3409	95.2%			
0.6899	0.4871	1	1.1997	134.1863	0.0270	118.9960	2.8288	6.2523	21.8127	LCS	164.3409	81.7%			
0.6079	0.4292	1	1.0862	137.0396	0.0269	120.3027	2.8412	6.3436	22.2643	LCS	164.3409	83.4%			
0.9509	0.6713	1	1.5725	146.0056	0.0264	127.0307	2.9317	6.6044	23.6775	LCS	164.3409	88.8%			
0.4376	0.3090	1	0.8562	144.5849	0.0276	113.7227	2.7577	6.3903	21.8573	LCS	164.3409	88.0%			
0.4227	0.2984	1	0.8330	134.2390	0.0275	118.4887	2.8152	6.4094	22.3723	LCS	164.3409	92.4%			
0.4360	0.3079	1	0.8480	137.6373	0.0270	118.4887	2.8152	6.7858	24.6088	LCS	164.3409	92.6%			
0.3962	0.2797	1	0.7956	151.8935	0.0262	128.6313	2.9319	6.6518	23.4785	LCS	164.3409	77.8%			
0.4480	0.3091	1	0.8657	152.1131	0.0261	130.4707	2.9539	6.7489	24.6318	LCS	164.3409	82.2%			
0.8917	0.6931	1	1.1278	127.8251	0.0279	109.4120	2.7108	6.2072	20.8618	LCS	164.3409	89.2%			
0.6179	0.4080	1	1.1617	135.1471	0.0273	117.2540	2.8197	6.3699	21.9896	LCS	164.3409	86.1%			
0.5779	0.3896	1	1.0463	146.5864	0.0263	127.3240	2.8214	6.5922	23.7610	LCS	164.3409	86.1%			
0.8422	0.5946	1	1.4301	141.4935	0.0272	117.4880	2.8147	6.6441	23.0149	LCS	164.3409	79.4%			
0.4379	0.3091	1	0.8509	130.5505	0.0276	112.2200	2.7400	6.2478	21.2682	LCS	164.3409	81.4%			
0.7972	0.5629	1	1.3635	133.7974	0.0277	112.5273	2.7540	6.4182	21.9026	LCS	164.3409	81.4%			
0.4475	0.3159	1	0.8728	144.2924	0.0269	119.7633	2.8301	6.6832	23.4437	LCS	164.3409	87.8%			
0.8154	0.5757	1	1.3863	150.8313	0.0263	128.3747	2.9406	6.7718	24.4459	LCS	164.3409	91.8%			
0.4063	0.2868	1	0.8104	134.4151	0.0285	118.5507	2.7553	6.3927	21.8871	LCS	164.3409	82.2%			
0.4205	0.2969	1	0.8358	146.9063	0.0268	121.4093	2.8489	6.7565	23.8548	LCS	164.3409	89.4%			
0.4437	0.3182	1	0.8728	144.8386	0.0271	117.5853	2.8041	6.7699	23.5500	LCS	164.3409	86.1%			
0.3432	0.2423	1	0.6763	135.4546	0.0253	141.3227	3.0733	5.7736	21.8705	LCS	164.3409	82.4%			
0.3289	0.2322	1	0.6397	131.8931	0.0247	150.2887	3.1684	5.4434	21.2189	LCS	164.3409	80.1%			
0.2949	0.2082	1	0.5922	148.3038	0.0237	169.2980	3.3626	5.7929	23.8966	LCS	164.3409	90.5%			
0.3379	0.2385	1	0.6530	151.8473	0.0235	172.6707	3.3968	6.8549	24.3615	LCS	164.3409	92.4%			
0.4616	0.3400	1	0.8577	131.6889	0.0249	148.2120	3.2186	5.4891	21.2301	LCS	164.3409	80.1%			
0.7498	0.5287	1	1.2332	134.8966	0.0246	153.3873	3.3053	5.8483	21.7215	LCS	164.3409	82.1%			
0.4447	0.3140	1	0.8052	148.8317	0.0238	162.8880	3.3090	5.8232	23.8982	LCS	164.3409	90.8%			
0.6180	0.4363	1	1.0494	143.9479	0.0241	162.8880	3.3090	5.7315	23.1384	LCS	164.3409	87.6%			
0.3427	0.2420	1	0.6680	135.0873	0.0248	148.3533	3.1490	5.6202	21.7752	LCS	164.3409	82.2%			
0.5997	0.4234	1	1.0256	129.5009	0.0251	144.7940	3.1202	5.4687	20.8960	LCS	164.3409	78.9%			
0.6469	0.4600	1	1.0649	146.0021	0.0240	163.4967	3.3053	5.7852	23.4616	LCS	164.3409	88.8%			
0.3316	0.2341	1	0.6469	146.0021	0.0235	174.3747	3.4225	6.1425	25.6134	LCS	164.3409	97.2%			
0.6355	0.4487	1	1.0805	159.6717	0.0251	144.5507	3.1078	5.5650	21.3060	LCS	164.3409	80.4%			
0.3136	0.2214	1	0.6255	132.0625	0.0254	145.4707	3.1861	5.8215	21.9790	LCS	164.3409	82.5%			
1.4618	1.0321	1	2.2506	135.6135	0.0254	154.5427	3.2193	5.7718	22.7000	LCS	164.3409	86.2%			
0.3185	0.2249	1	0.6330	141.6298	0.0245	158.8520	3.2579	5.8988	23.6017	LCS	164.3409	89.3%			
0.3327	0.2349	1	0.6546	146.7439	0.0242	158.8520	3.2579	5.8988	23.6017	LCS	164.3409	89.3%			

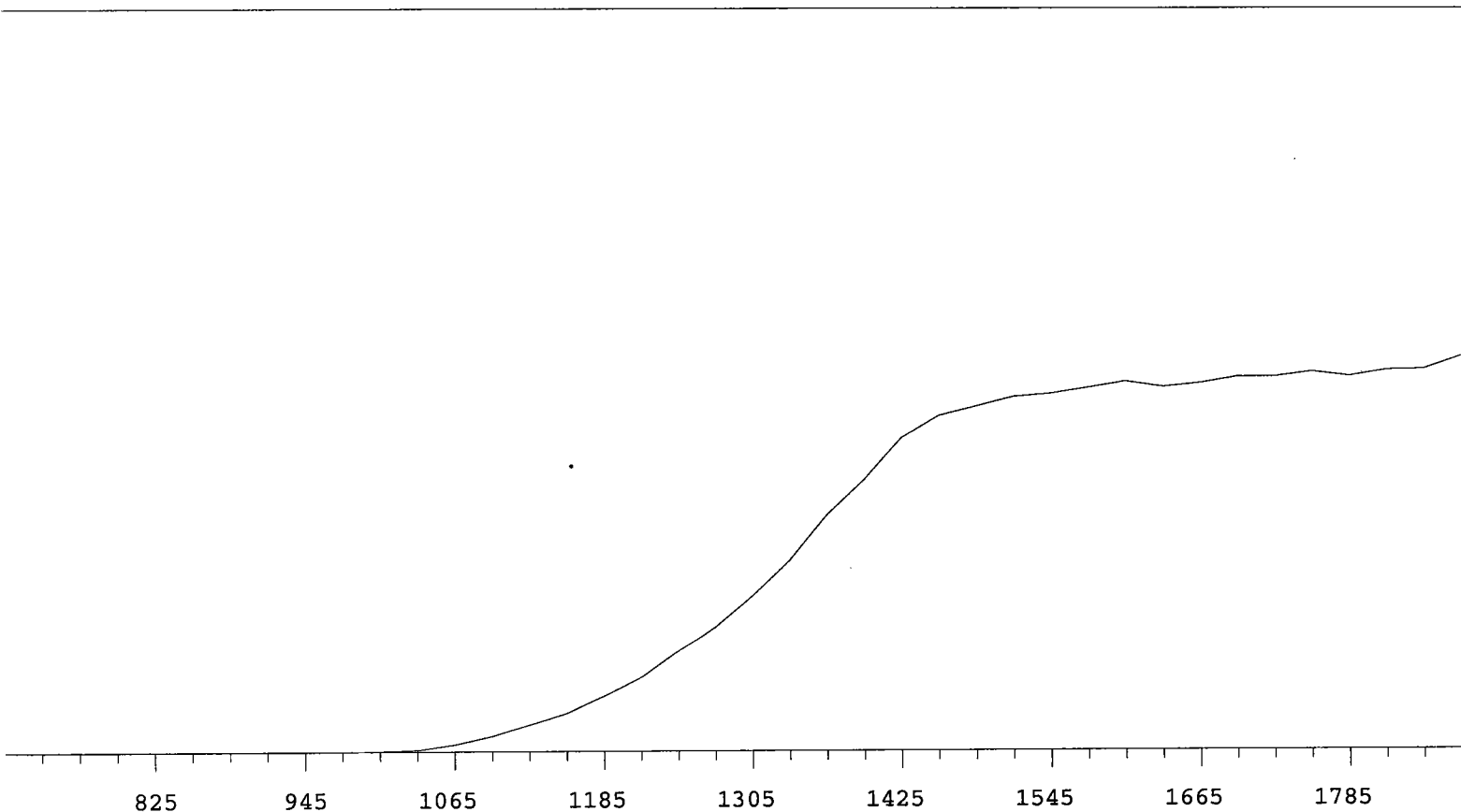
SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine
1	1A	15	36	1980	7/2/2009 8:39	7/2/2009 8:54	Protean
2	1B	15	27	1959	7/2/2009 8:40	7/2/2009 8:55	Protean
3	1C	15	44	2108	7/2/2009 8:40	7/2/2009 8:55	Protean
4	1D	15	108	2265	7/2/2009 8:40	7/2/2009 8:55	Protean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

219
7/2/09

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

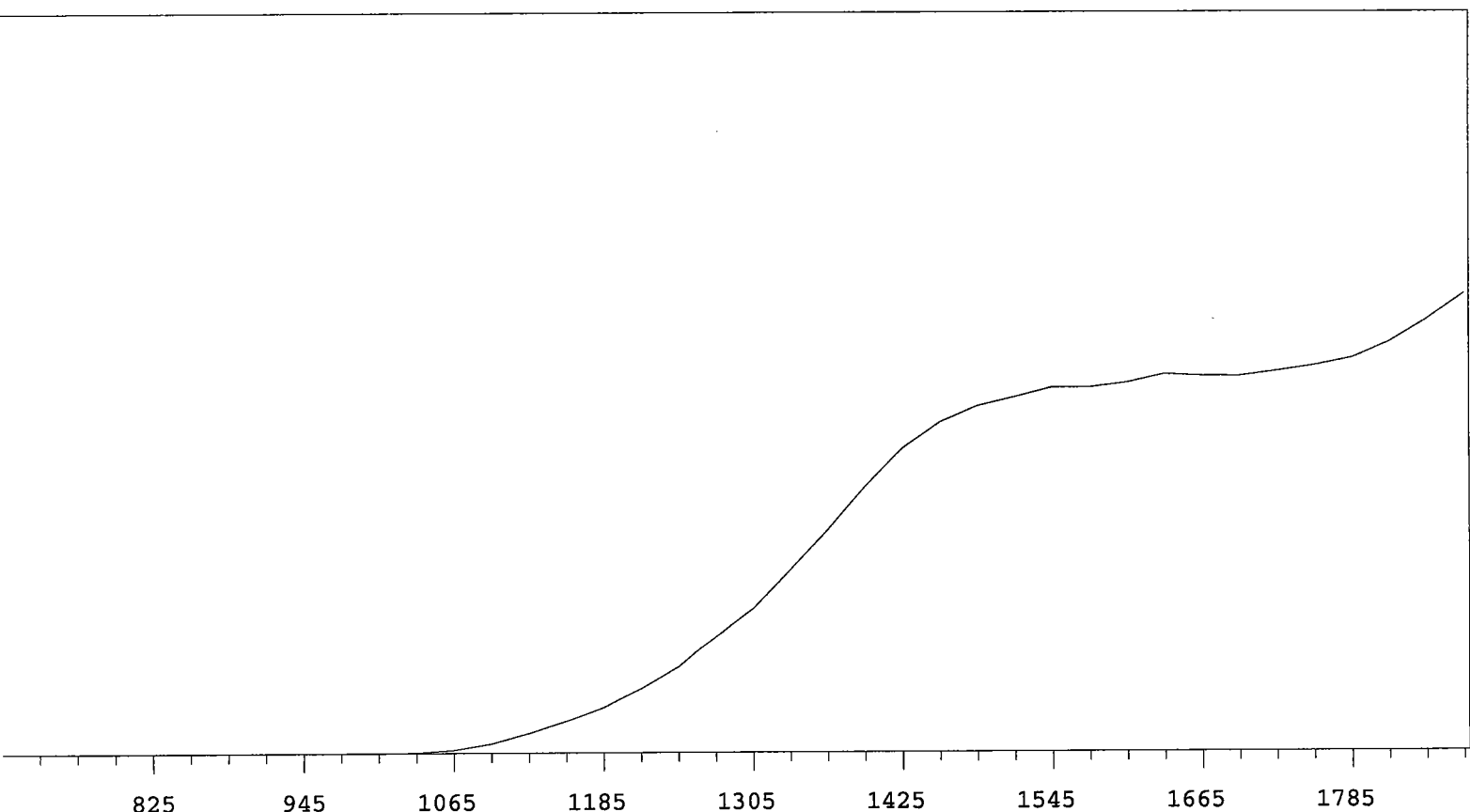
Ra-228 Protean	Cal Date A0	7/2/2009 A1	Exp Date A2	7/31/2009 A3	A4
1A	6.30258E-01				
1B	6.28221E-01				
1C	6.17615E-01				
1D	6.04341E-01				
2A	6.17224E-01				
2B	6.16681E-01				
2C	5.96919E-01				
2D	6.11886E-01				
3A	5.68218E-01				
3B	5.98041E-01				
3C	6.16431E-01				
3D	5.99405E-01				
4A	6.20765E-01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

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



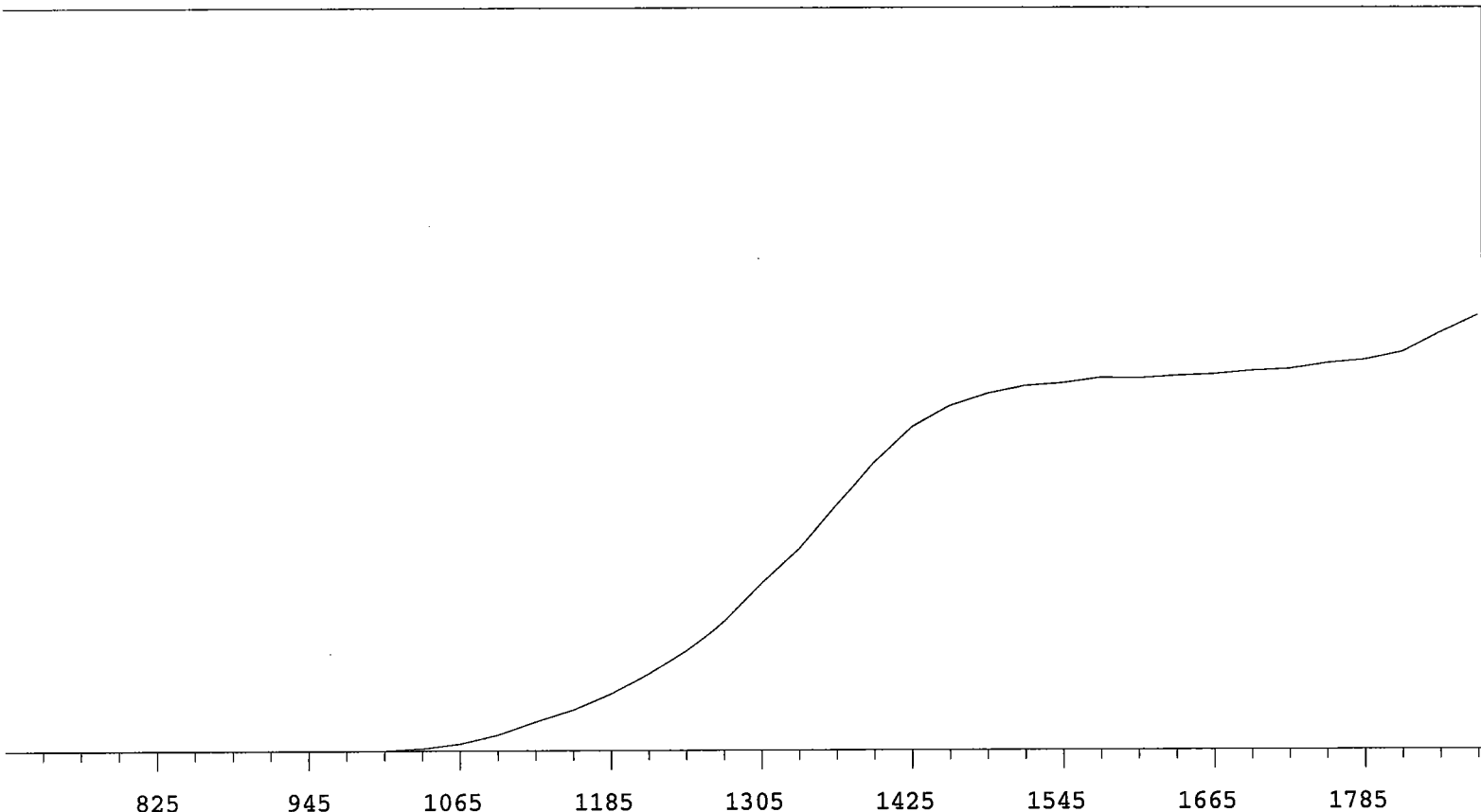
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	11640	+69.78
735	1		1335	14241	+62.88
765	0		1365	17534	+55.91
795	0	+0.00	1395	20127	+45.04
825	0	>100	1425	23254	+31.29
855	1	>100	1455	24902	+20.41
885	0	+55.56	1485	25605	+10.49
915	2	+66.67	1515	26310	+6.44
945	0	>100	1545	26535	+5.31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

Alpha Volts: 1575 Beta Volts: 1575

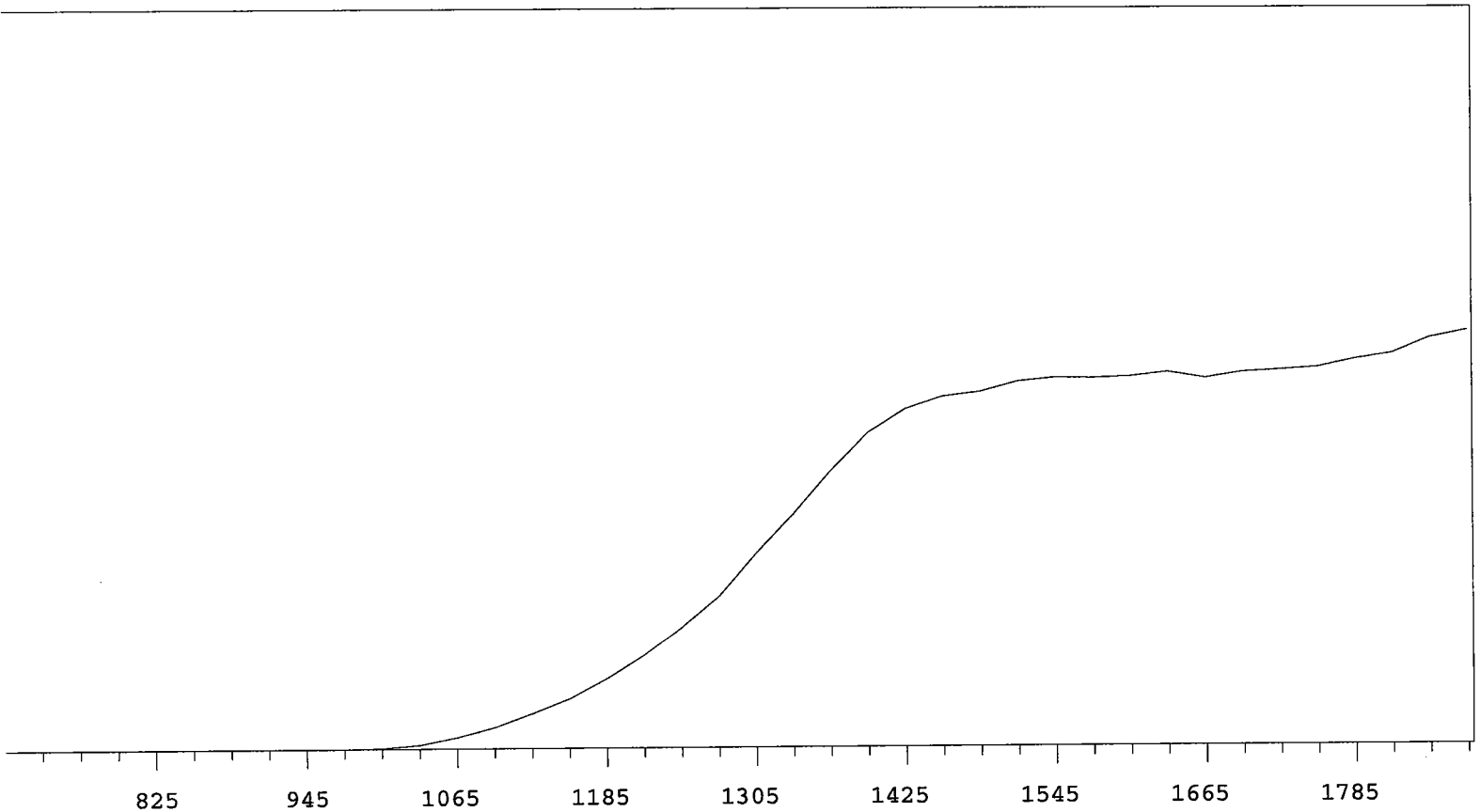


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	13188	+75.92
735	0		1335	16818	+67.60
765	0	+55.56	1365	20420	+59.86
795	1	+83.33	1395	24341	+47.85
825	1	+55.56	1425	27854	+35.51
855	0	>100	1455	30288	+23.26
885	1	+0.00	1485	31798	+14.54
915	0	+0.00	1515	32622	+8.32
945	1	>100	1545	33496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

Alpha Volts: 1575 Beta Volts: 1575



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

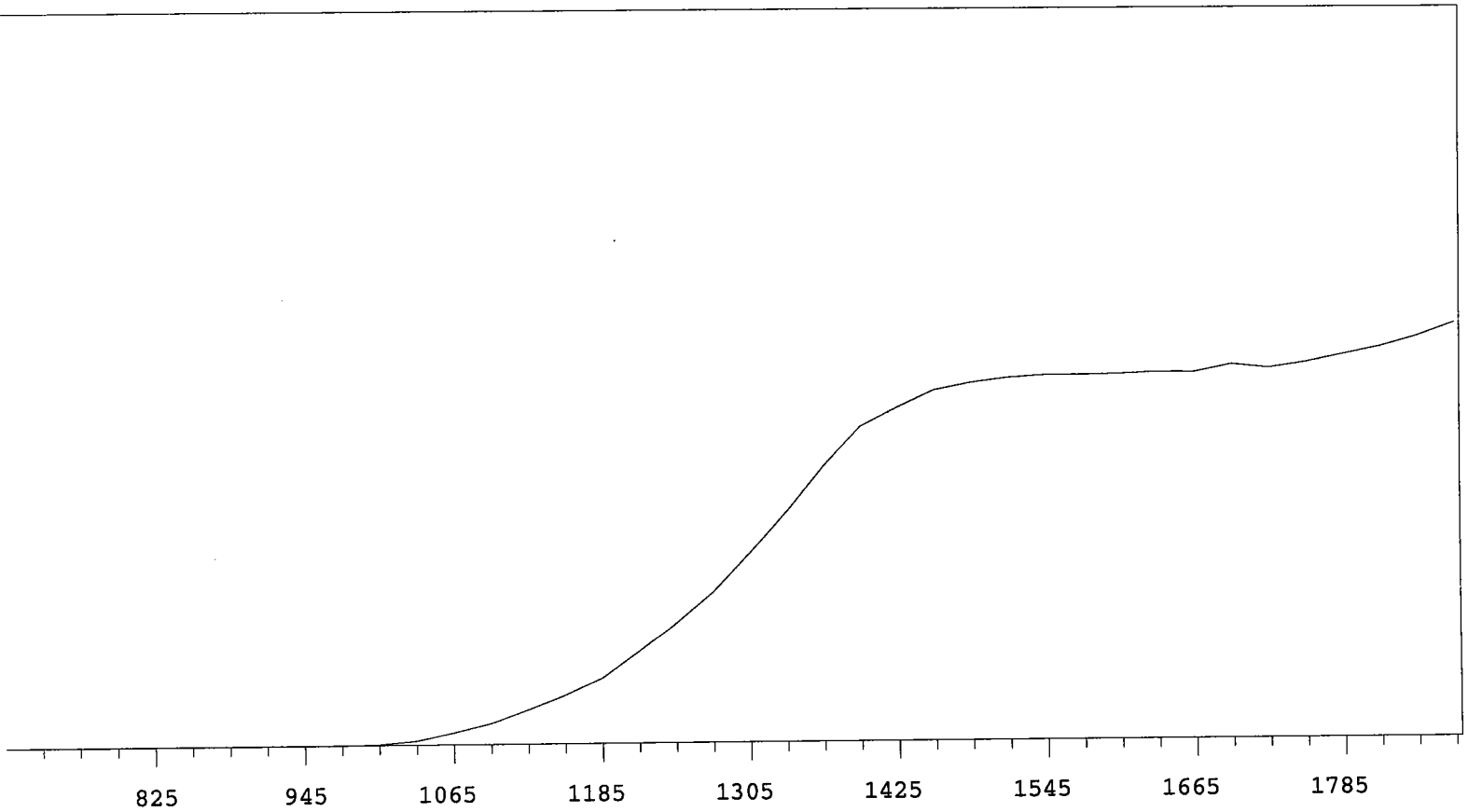


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15202	+66.36
735	1		1335	18216	+57.86
765	0	+0.00	1365	21597	+45.58
795	1	+0.00	1395	24648	+32.96
825	0	+0.00	1425	26505	+19.92
855	1	>100	1455	27475	+11.42
885	0	>100	1485	27836	+7.08
915	0	>100	1515	28609	+4.51
945	0	>100	1545	28896	+2.93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

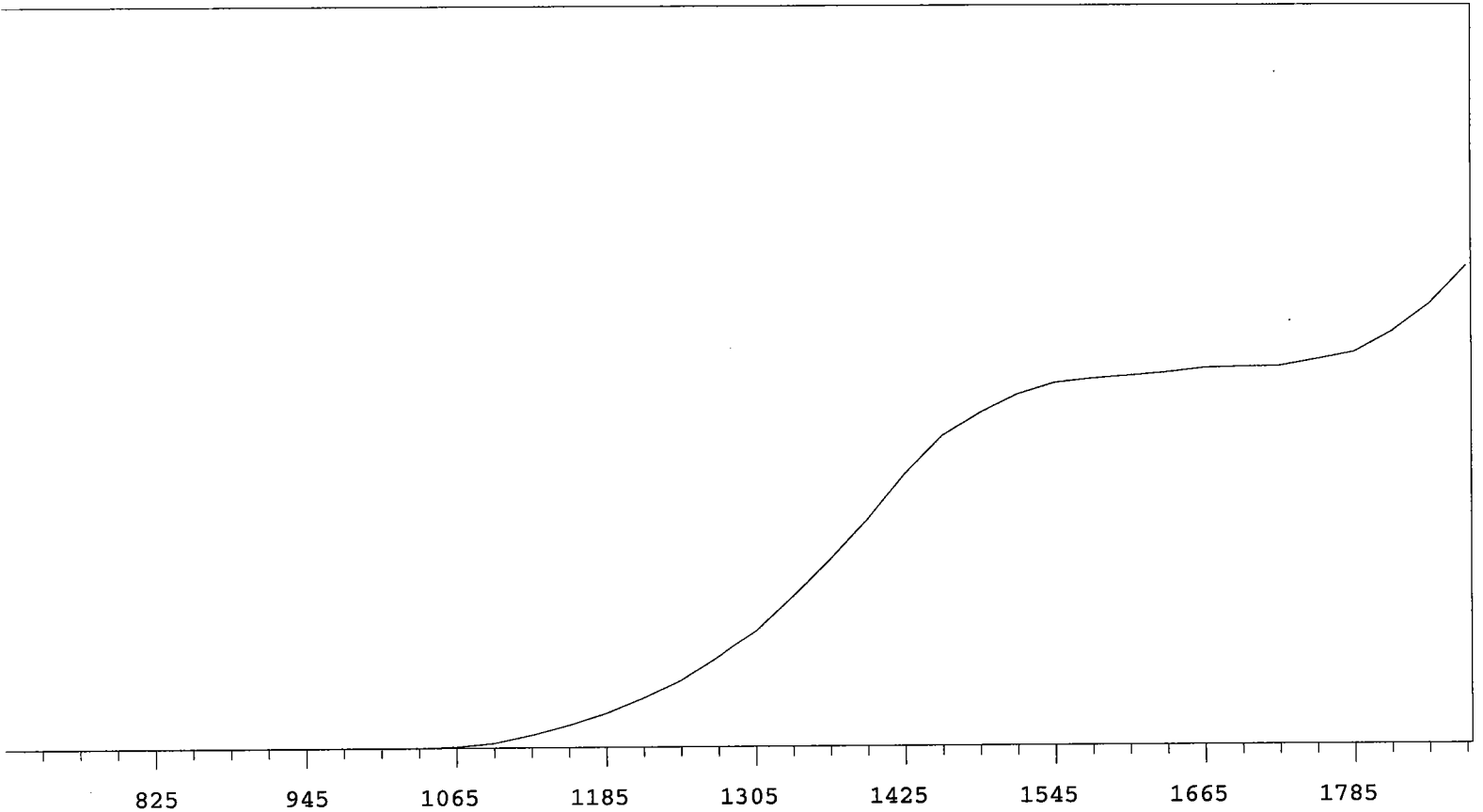
MPC 9600 Plateau
 Alpha Volts: 705

Instrument 2 MPC 9604 Detector A
 Beta Volts: 1575

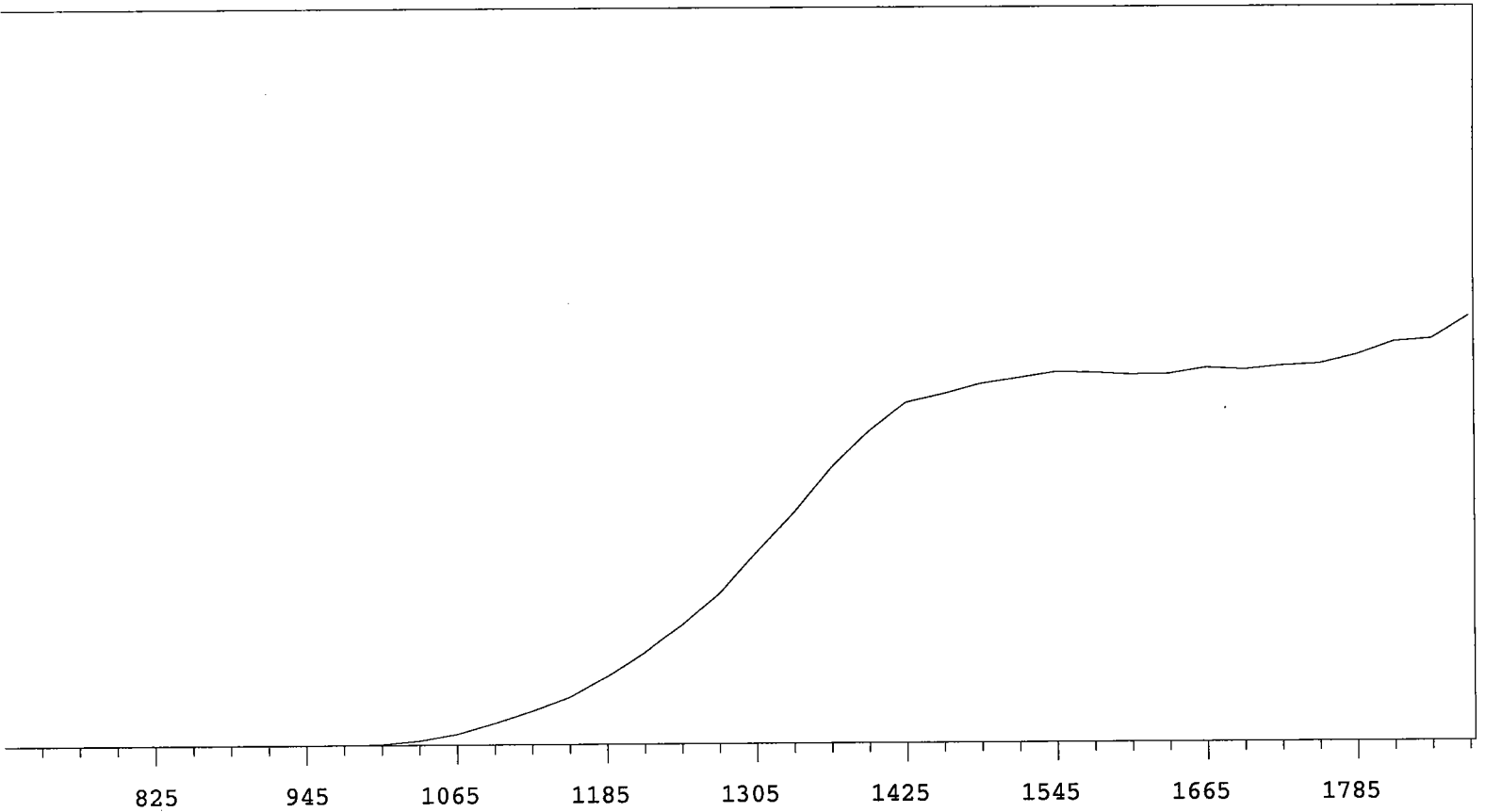
7/1/2009



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19017	+67.45
735	1		1335	23157	+59.23
765	0	+83.33	1365	27625	+45.78
795	0	-83.33	1395	31465	+32.72
825	1	>100	1425	33352	+20.41
855	0	>100	1455	35084	+11.74
885	1	+100.00	1485	35819	+7.11
915	1	>100	1515	36292	+3.35
945	2	>100	1545	36527	+1.63
975	12	>100	1575	36540	+0.87
1005	91	>100	1605	36585	+0.48
1035	421	>100	1635	36742	+1.76
1065	1239	>100	1665	36691	+1.53
1095	2155	>100	1695	37461	+1.89
1125	3527	>100	1725	37073	+3.07
1155	4974	>100	1755	37603	+4.02
1185	6647	+97.44	1785	38346	+6.58
1215	9250	+89.00	1815	39111	+7.95
1245	12041	+82.15	1845	40115	
1275	15094	+73.81	1875	41409	



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

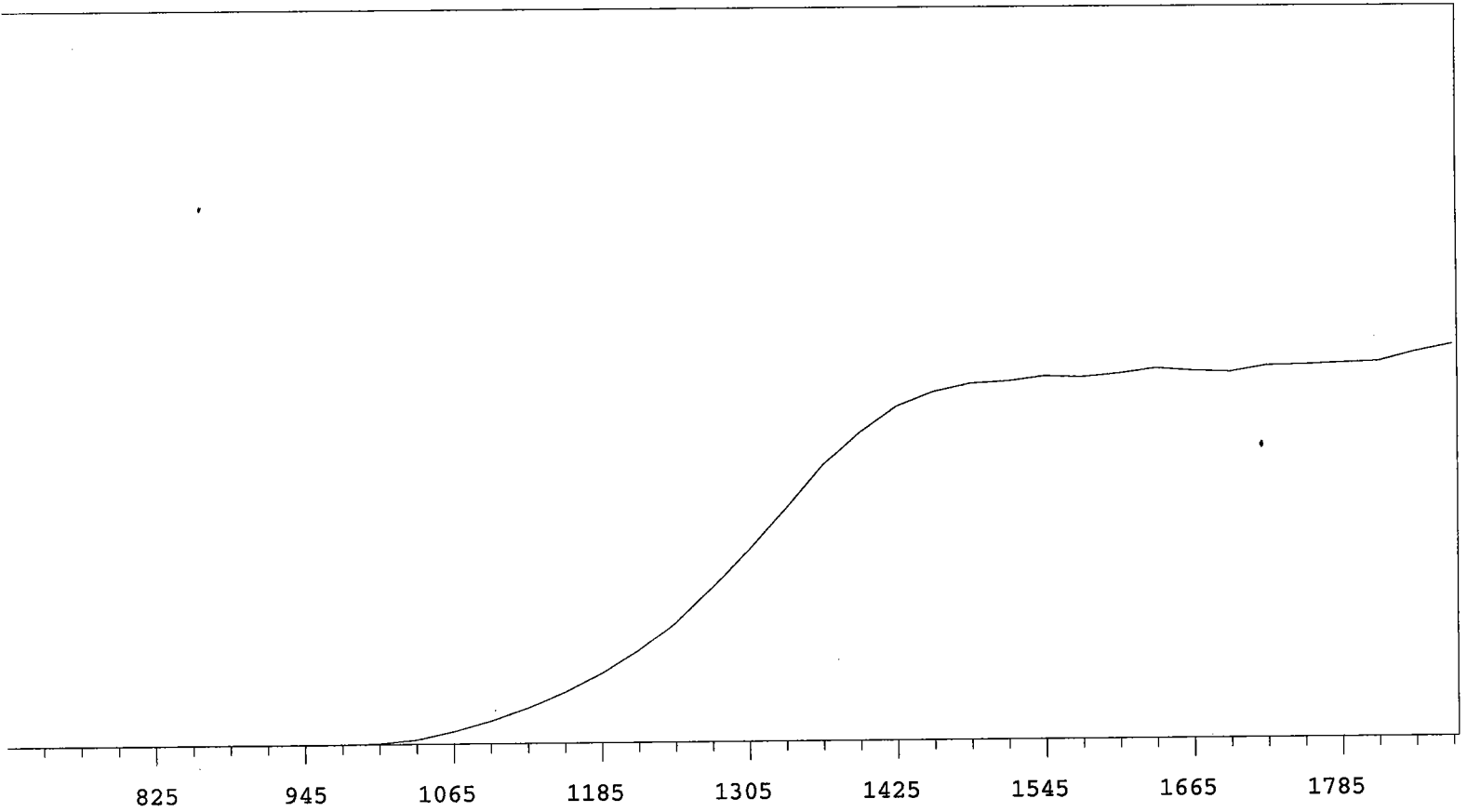


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18216	+67.74
735	0		1335	21995	+58.11
765	0		1365	26173	+46.11
795	0	>100	1395	29479	+32.75
825	0	>100	1425	32186	+20.62
855	0	>100	1455	33022	+12.13
885	0	>100	1485	33981	+7.22
915	1	>100	1515	34520	+4.95
945	0	>100	1545	35095	+2.07
975	17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

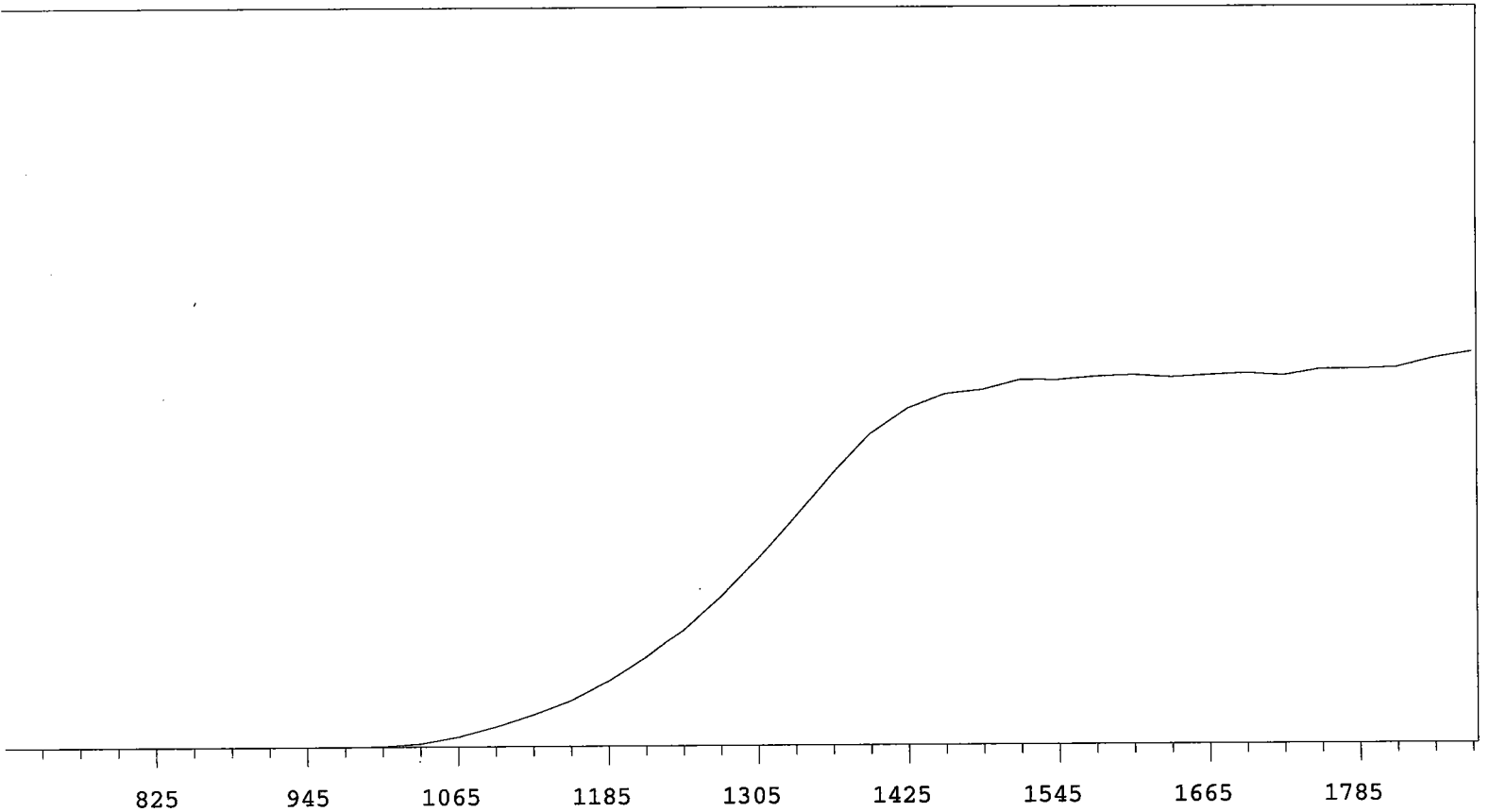
MPC 9600 Plateau
Alpha Volts: 705

Instrument 2 MPC 9604 Detector D
Beta Volts: 1575

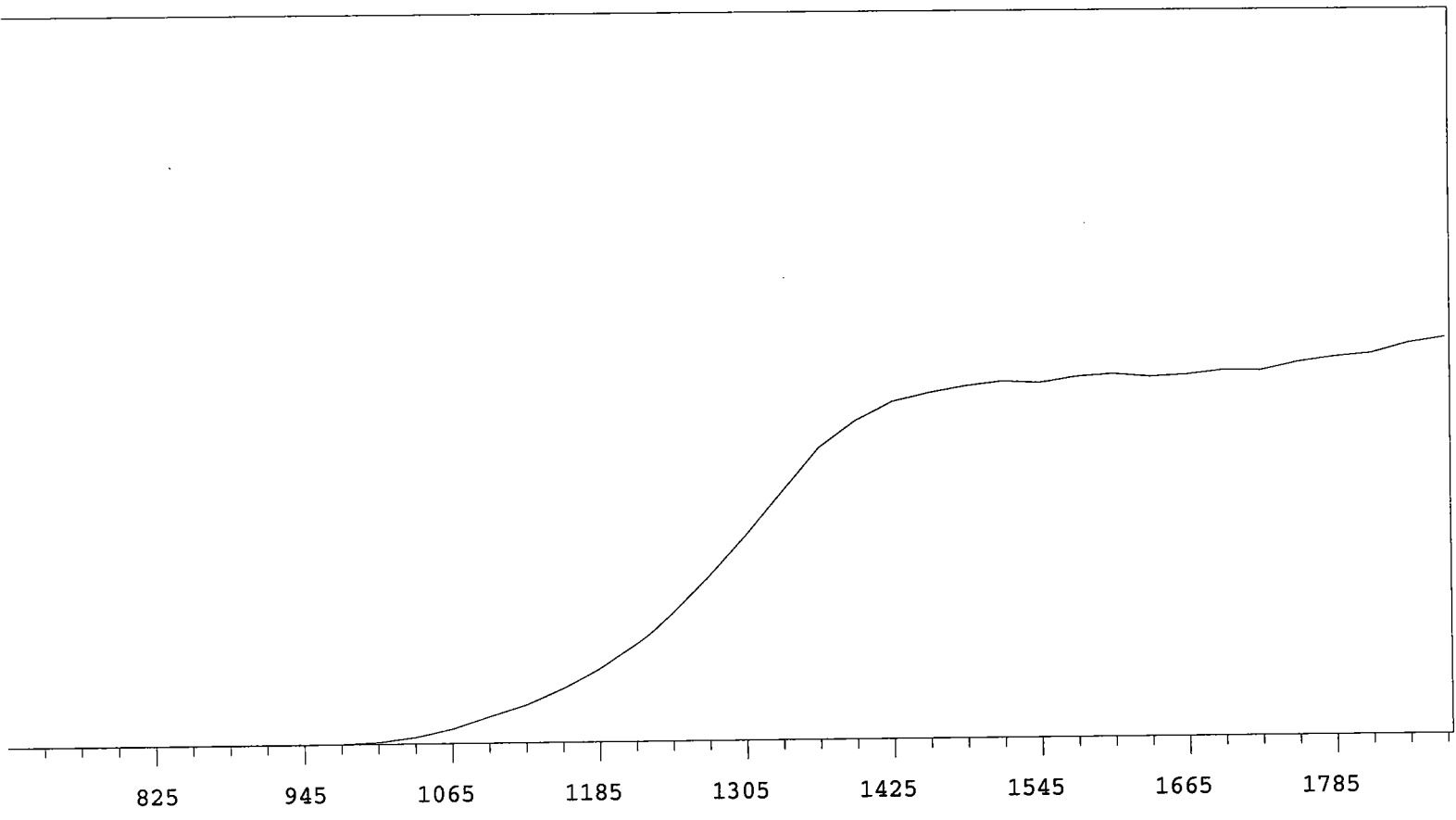
7/1/2009



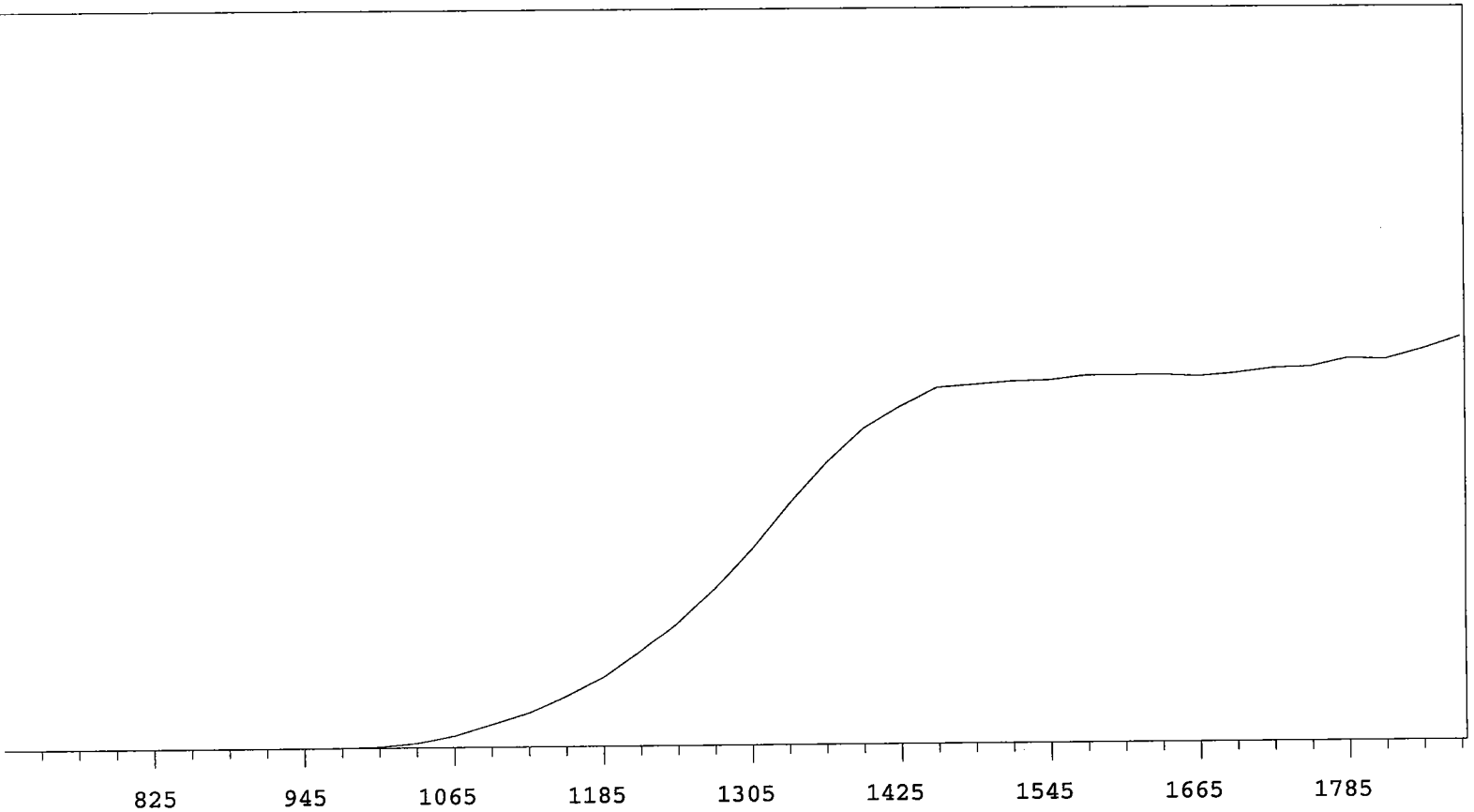
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18675	+65.94
735	0		1335	22620	+55.69
765	0	+83.33	1365	26869	+44.63
795	2	+55.56	1395	29957	+32.08
825	1	>100	1425	32494	+20.49
855	0	>100	1455	33836	+11.98
885	0	>100	1485	34627	+6.45
915	0	>100	1515	34849	+3.22
945	2	>100	1545	35298	+1.98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



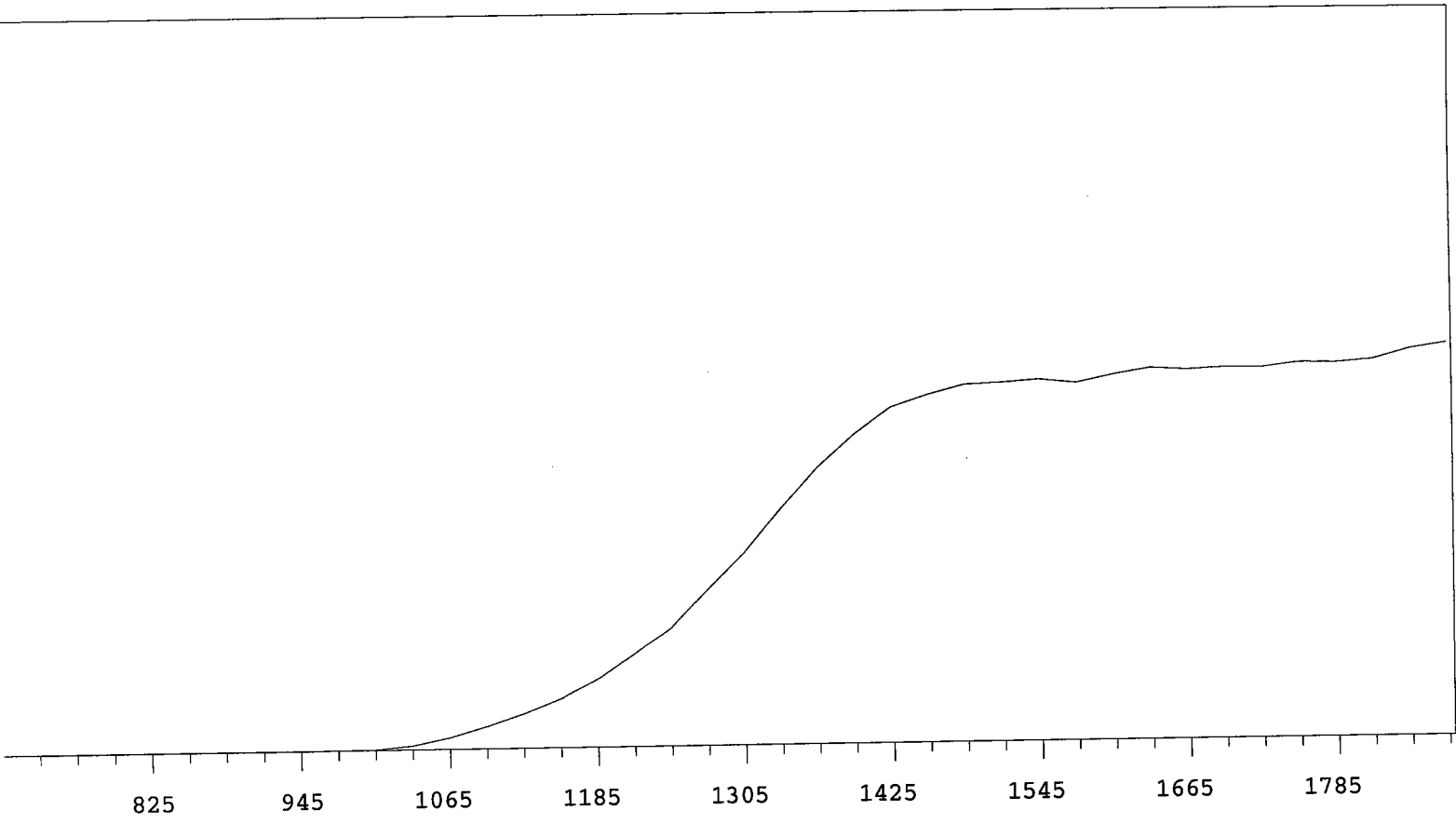
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	16654	+68.57
735	0		1335	20416	+59.26
765	0	+55.56	1365	24191	+47.28
795	1	>100	1395	27643	+34.04
825	1	+0.00	1425	29891	+21.08
855	1	>100	1455	31183	+12.30
885	0	>100	1485	31558	+6.67
915	0	>100	1515	32444	+4.05
945	0	>100	1545	32413	+2.90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



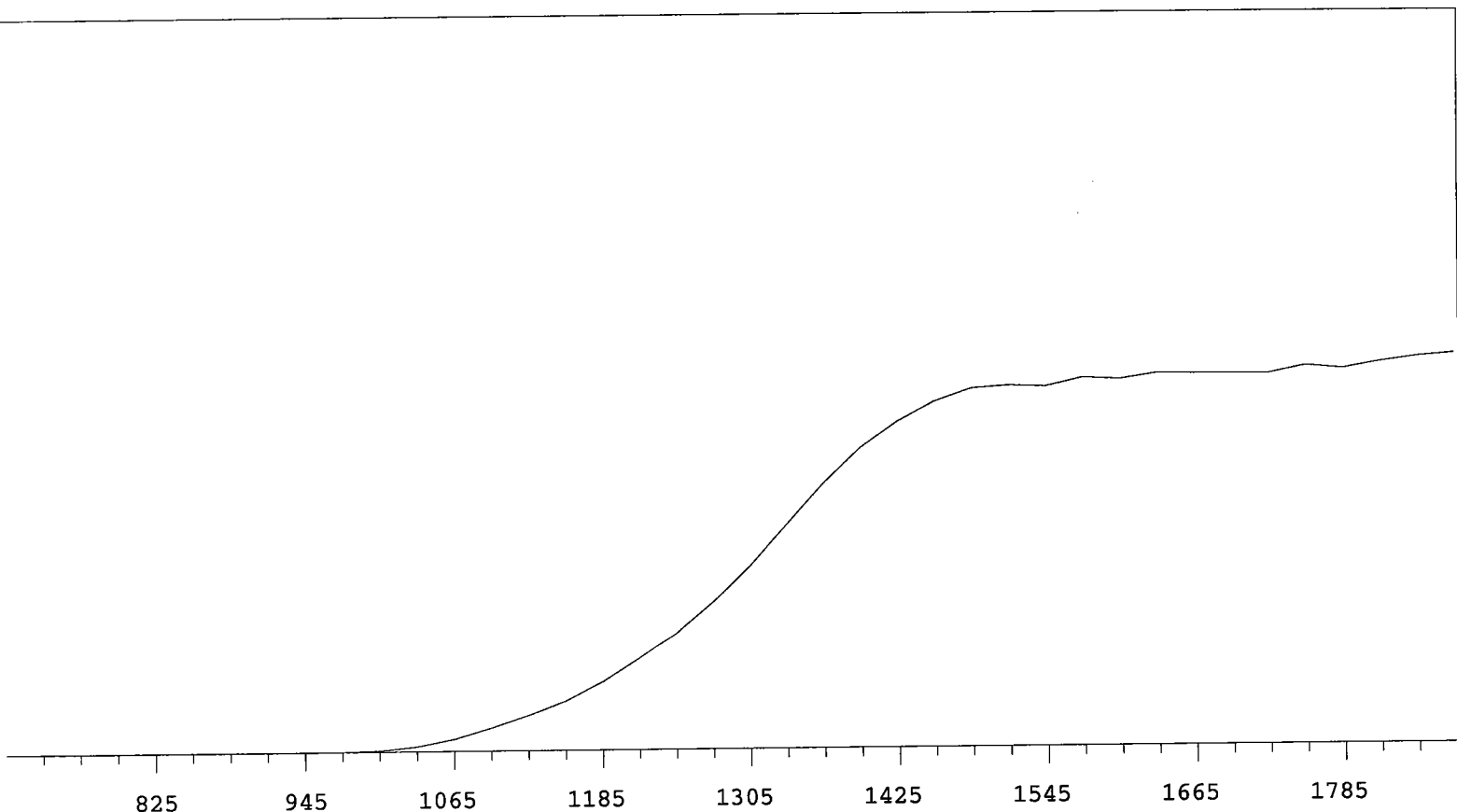
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	19810	+64.73
735	1		1335	23962	+52.62
765	0	-55.56	1365	28091	+39.27
795	0	>100	1395	30594	+25.61
825	1	>100	1425	32381	+14.86
855	3	+33.33	1455	33206	+8.91
885	0	+0.00	1485	33832	+4.41
915	1	>100	1515	34260	+3.01
945	2	>100	1545	34071	+2.33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



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



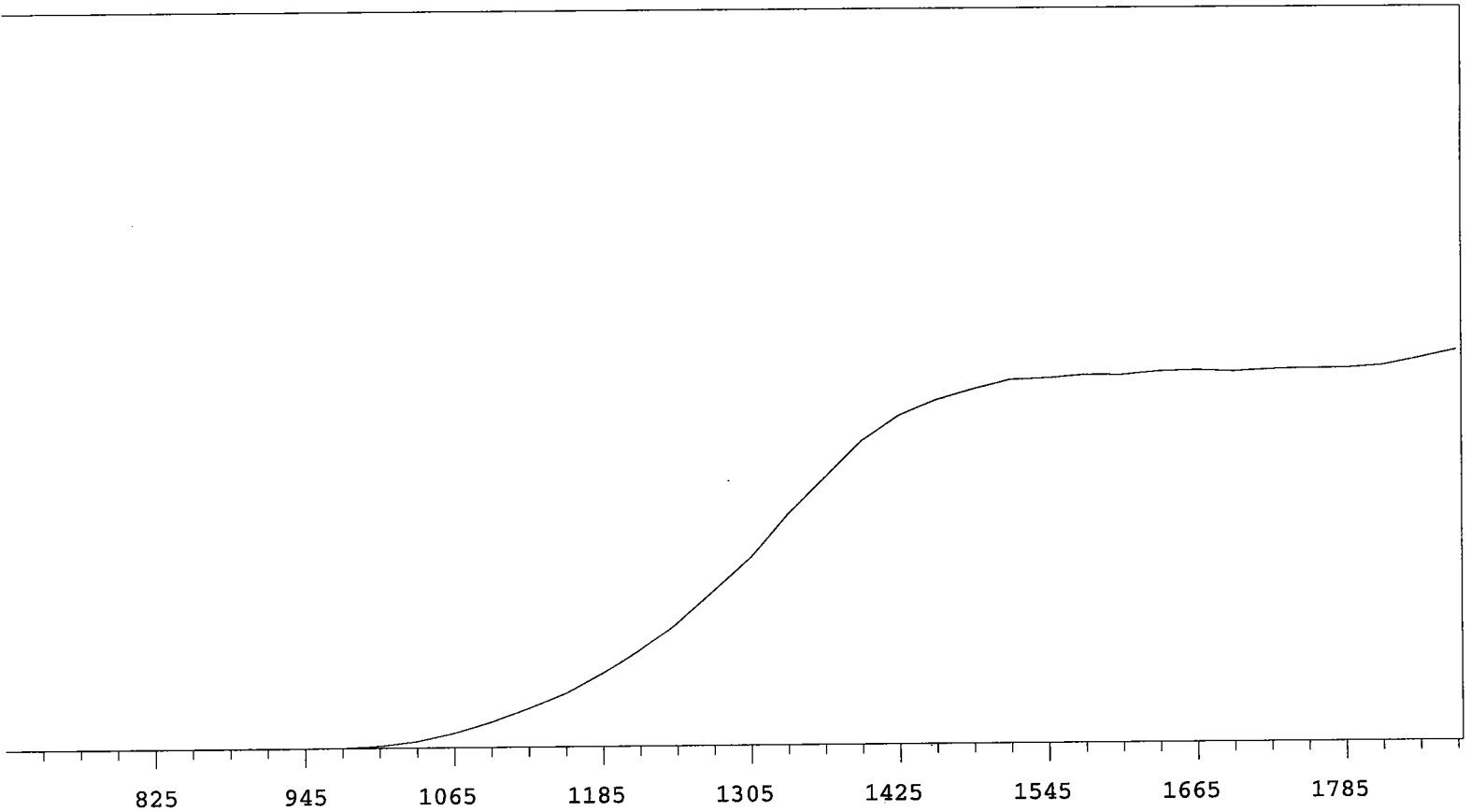
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14171	+66.45
735	1		1335	17362	+54.90
765	0	+0.00	1365	20310	+43.83
795	1	>100	1395	22647	+30.82
825	0	+83.33	1425	24551	+20.19
855	0	-83.33	1455	25440	+11.69
885	1	>100	1485	26124	+5.90
915	0	>100	1515	26245	+2.21
945	1	>100	1545	26428	+1.39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



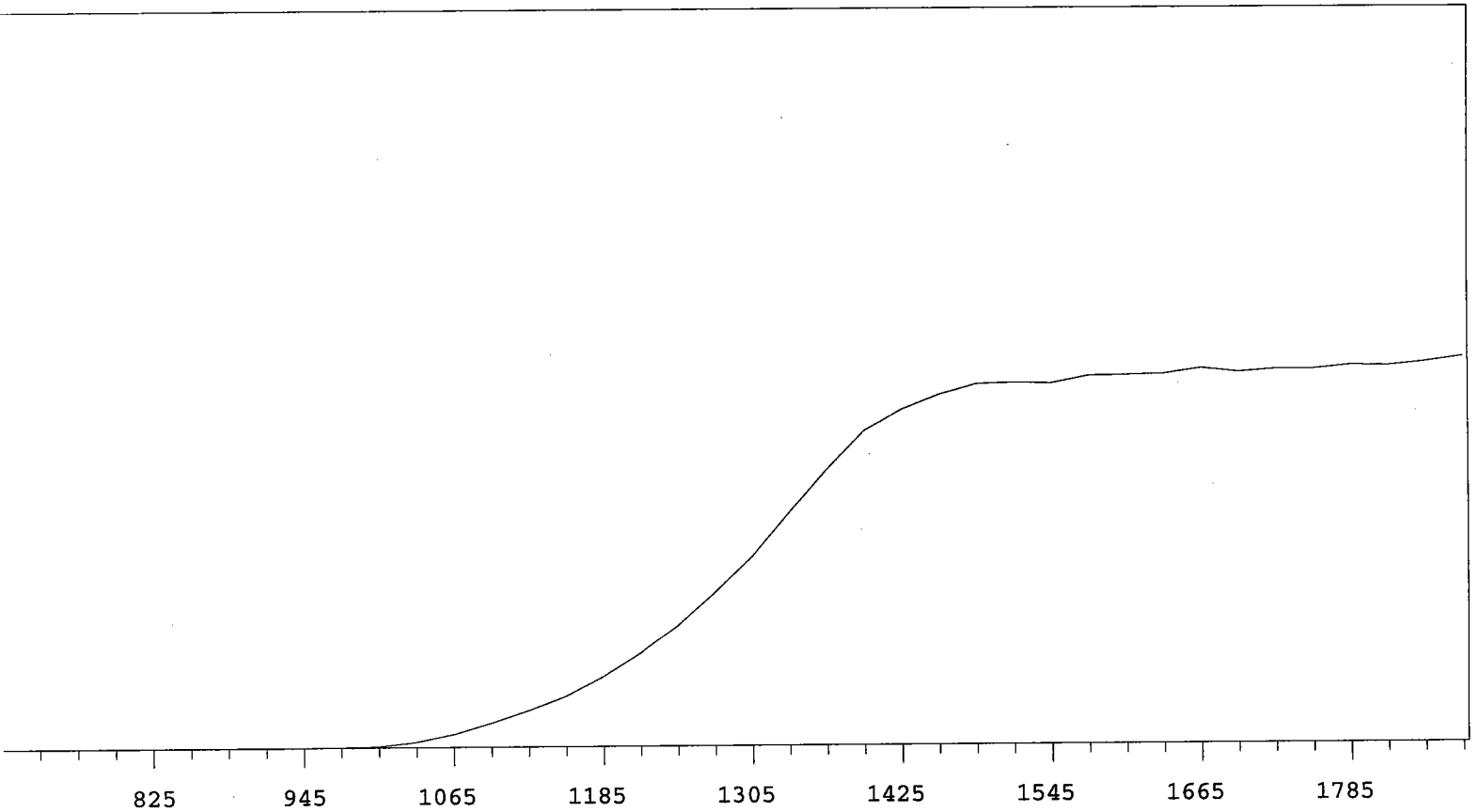
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16442	+66.24
735	0		1335	20146	+57.40
765	0		1365	23769	+46.40
795	0	>100	1395	26926	+34.68
825	2	+55.56	1425	29276	+24.40
855	1	>100	1455	31037	+15.28
885	0	-55.56	1485	32197	+7.91
915	3	>100	1515	32425	+4.33
945	0	>100	1545	32314	+2.14
975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

MPC 9600 Plateau
Alpha Volts: 705

Instrument 4 MPC 9604 Detector B 7/1/2009
Beta Volts: 1575



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

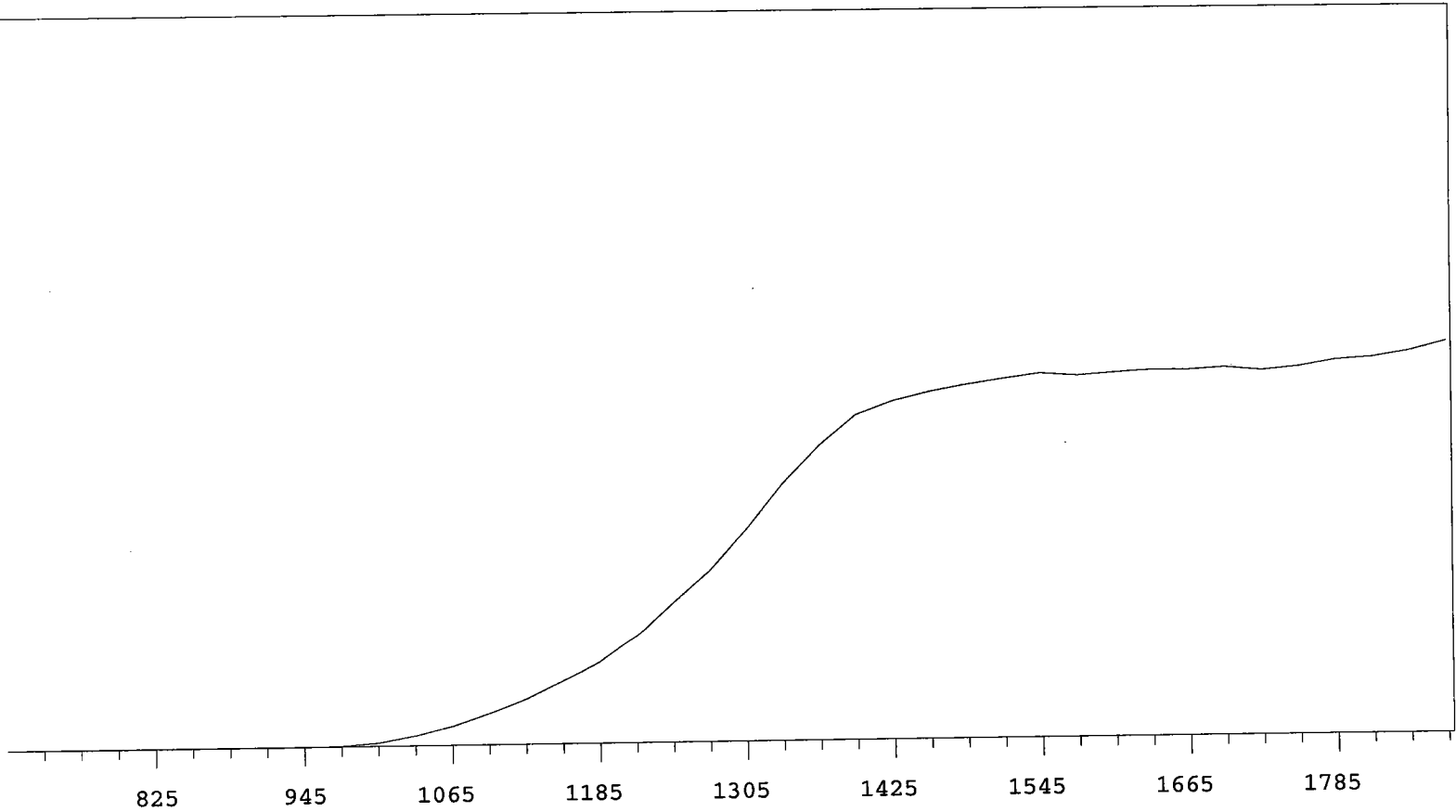


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19796	+65.77
735	1		1335	24338	+57.55
765	0	+55.56	1365	28686	+45.86
795	2	+0.00	1395	32750	+32.27
825	0	-55.56	1425	34919	+20.83
855	1	>100	1455	36434	+11.45
885	0	>100	1485	37487	+5.80
915	0	>100	1515	37623	+3.32
945	2	>100	1545	37528	+2.07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

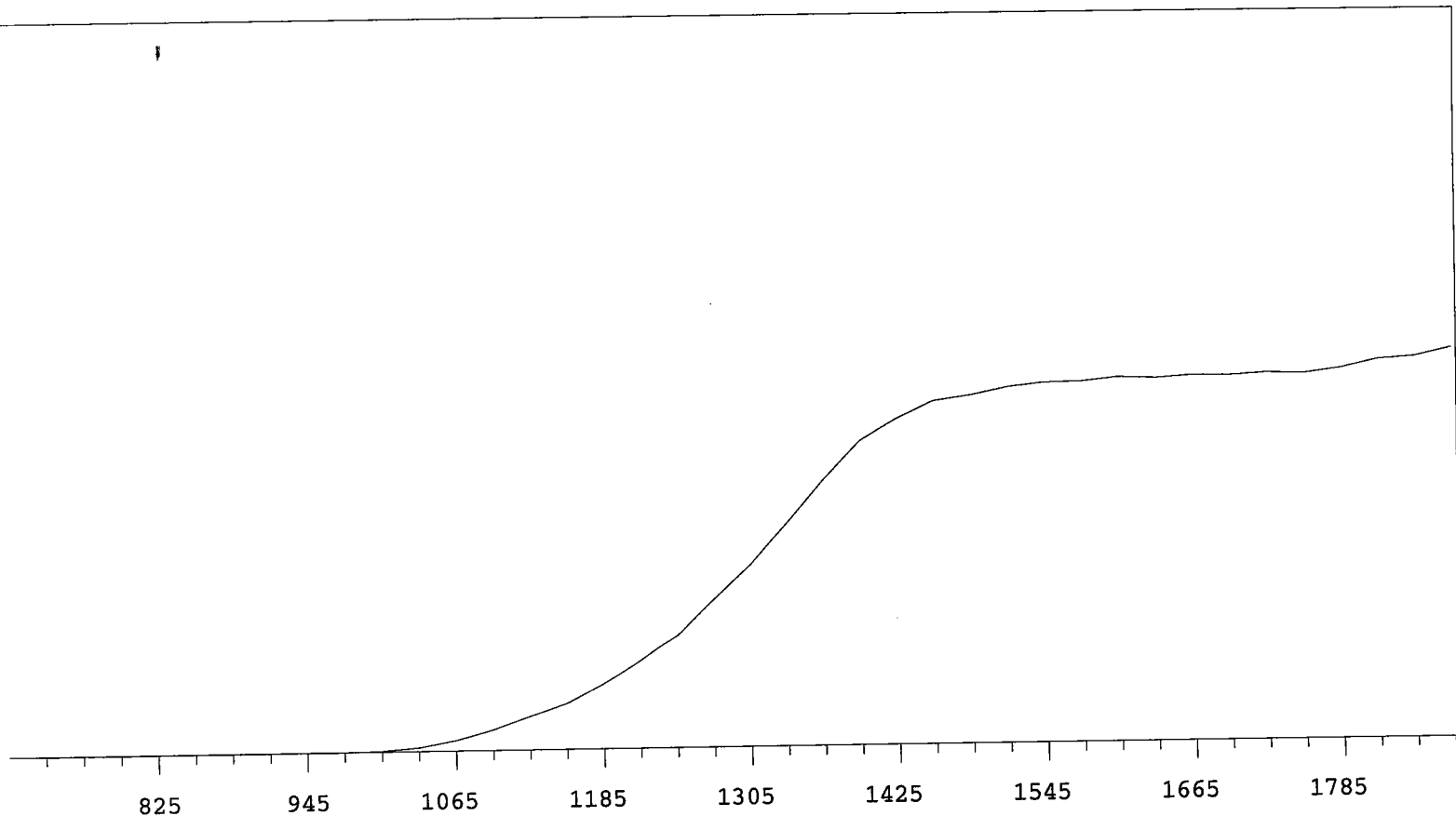
MPC 9600 Plateau
Alpha Volts: 705

Instrument 4 MPC 9604 Detector D
Beta Volts: 1575

7/1/2009



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

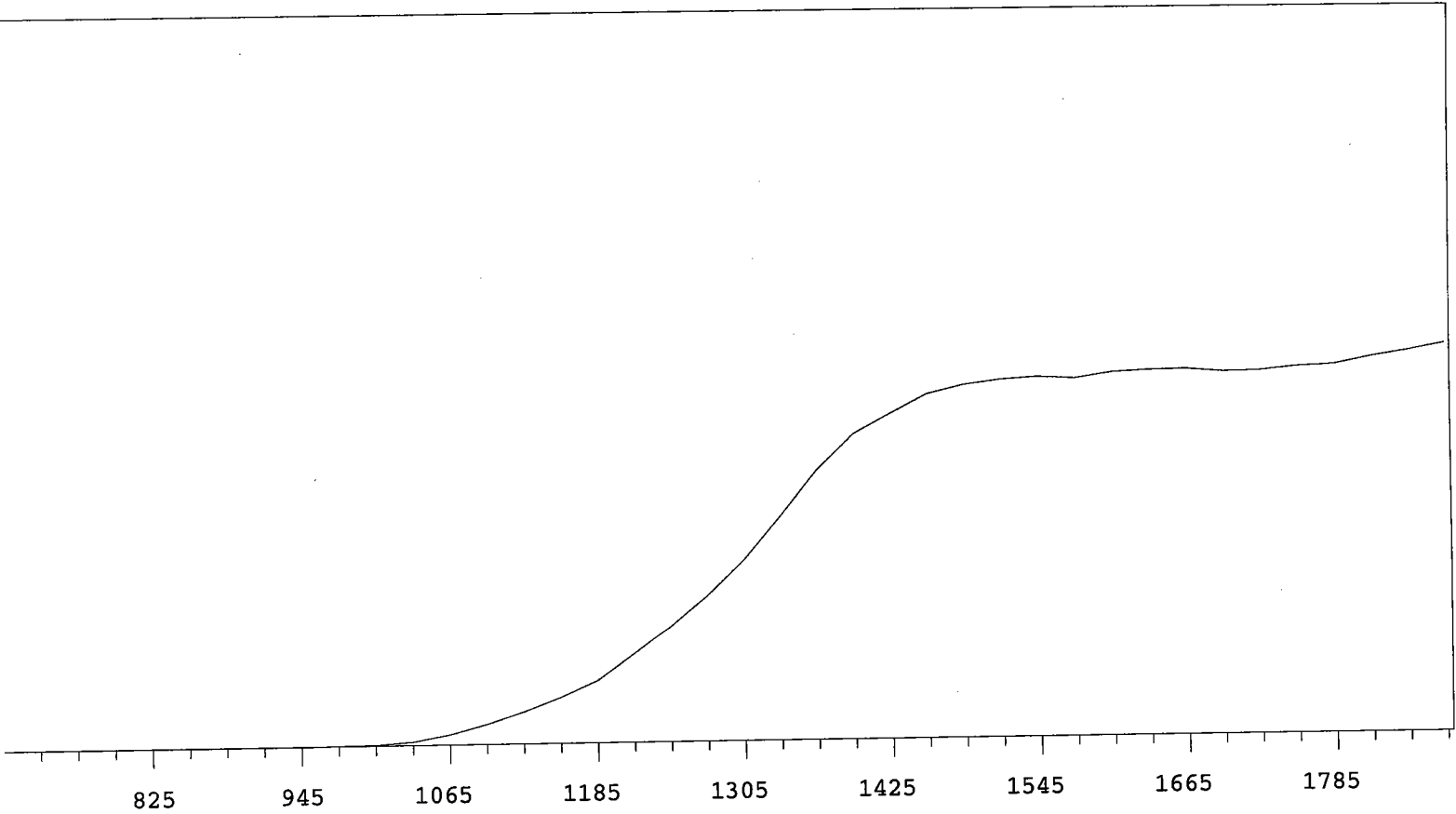


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13974	+68.00
735	0		1335	17170	+58.62
765	1		1365	20456	+47.04
795	1	+83.33	1395	23332	+33.83
825	1	-83.33	1425	24996	+21.10
855	1	>100	1455	26290	+12.40
885	0	-55.56	1485	26683	+7.74
915	0	>100	1515	27270	+4.43
945	1	>100	1545	27590	+3.48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

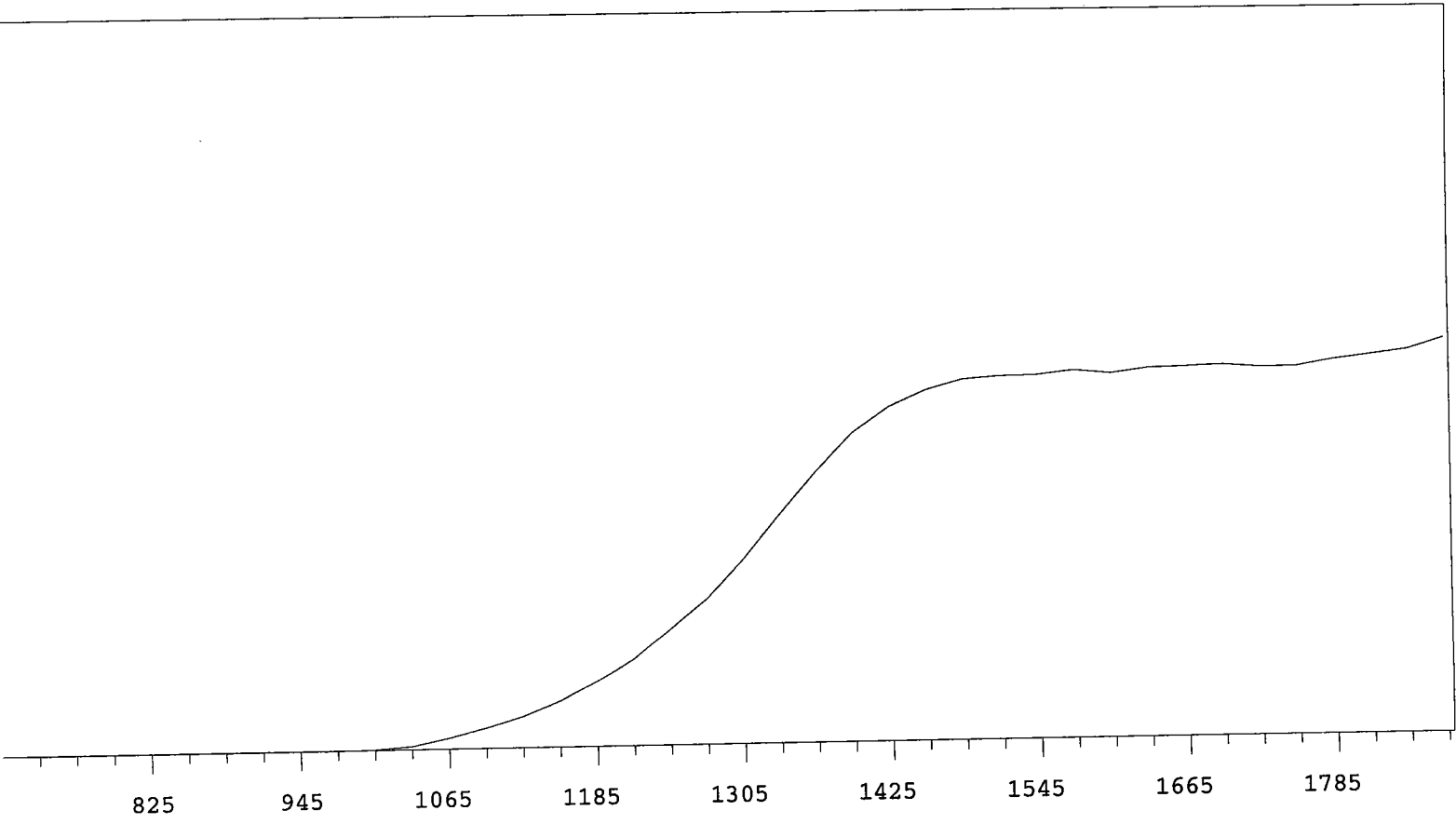
MPC 9600 Plateau
Alpha Volts: 705

Instrument 5 MPC 9604 Detector B
Beta Volts: 1575

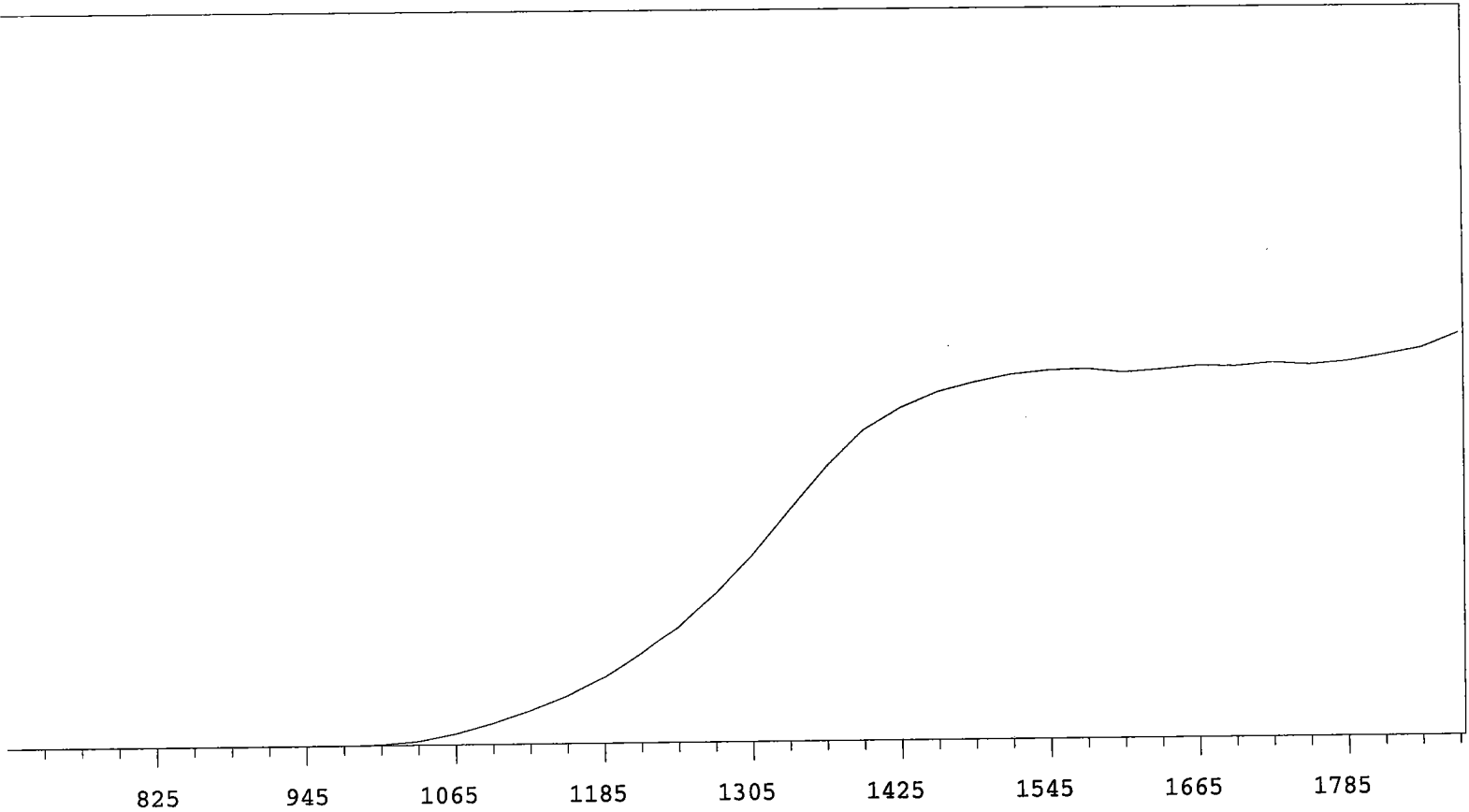
7/1/2009



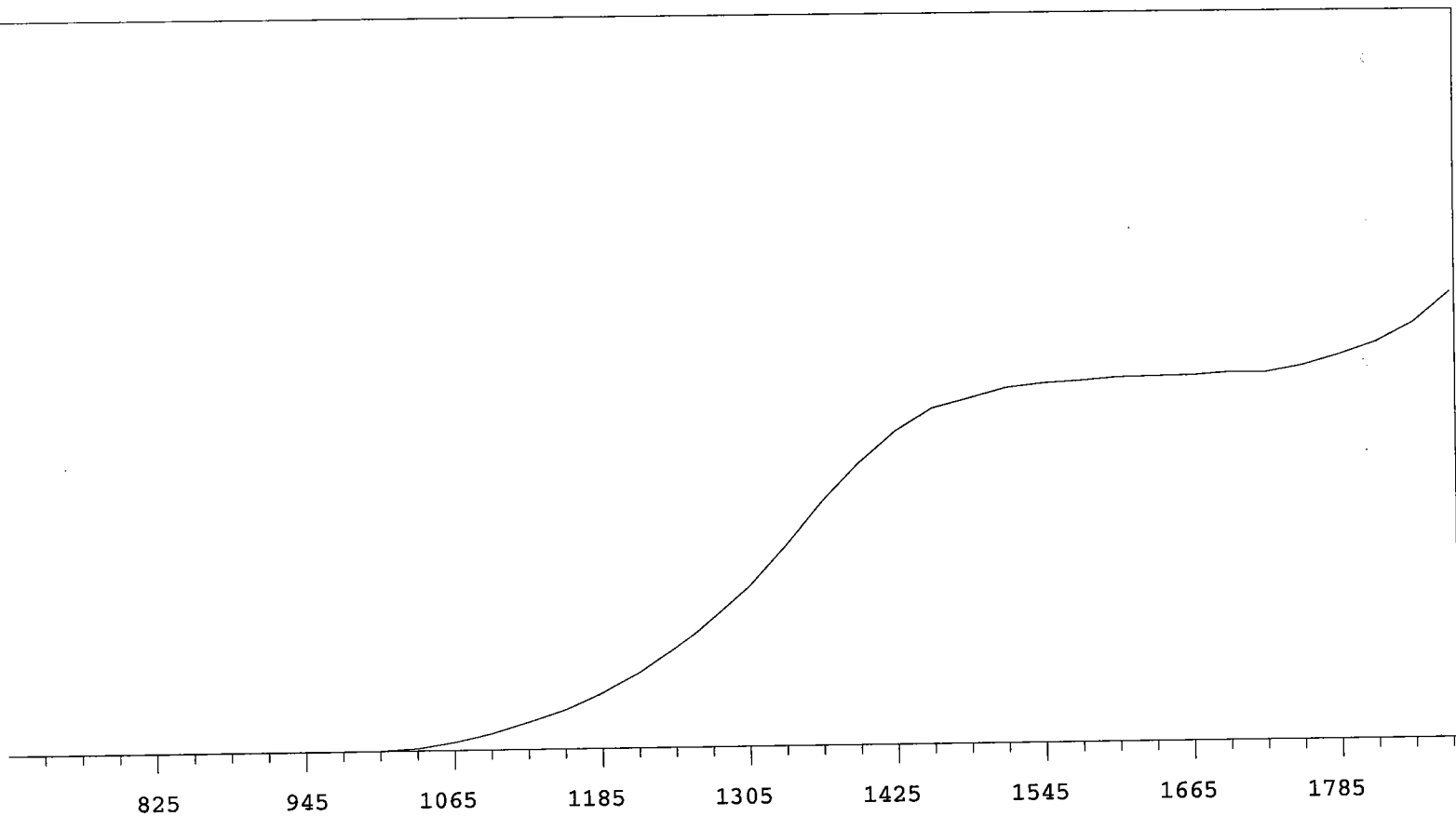
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17414	+68.46
735	0		1335	21540	+59.98
765	0		1365	25854	+46.75
795	0	>100	1395	29222	+33.38
825	1	>100	1425	31128	+21.52
855	1	+41.67	1455	32995	+13.26
885	2	-33.33	1485	33846	+8.09
915	0	>100	1515	34289	+3.25
945	1	>100	1545	34528	+2.00
975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



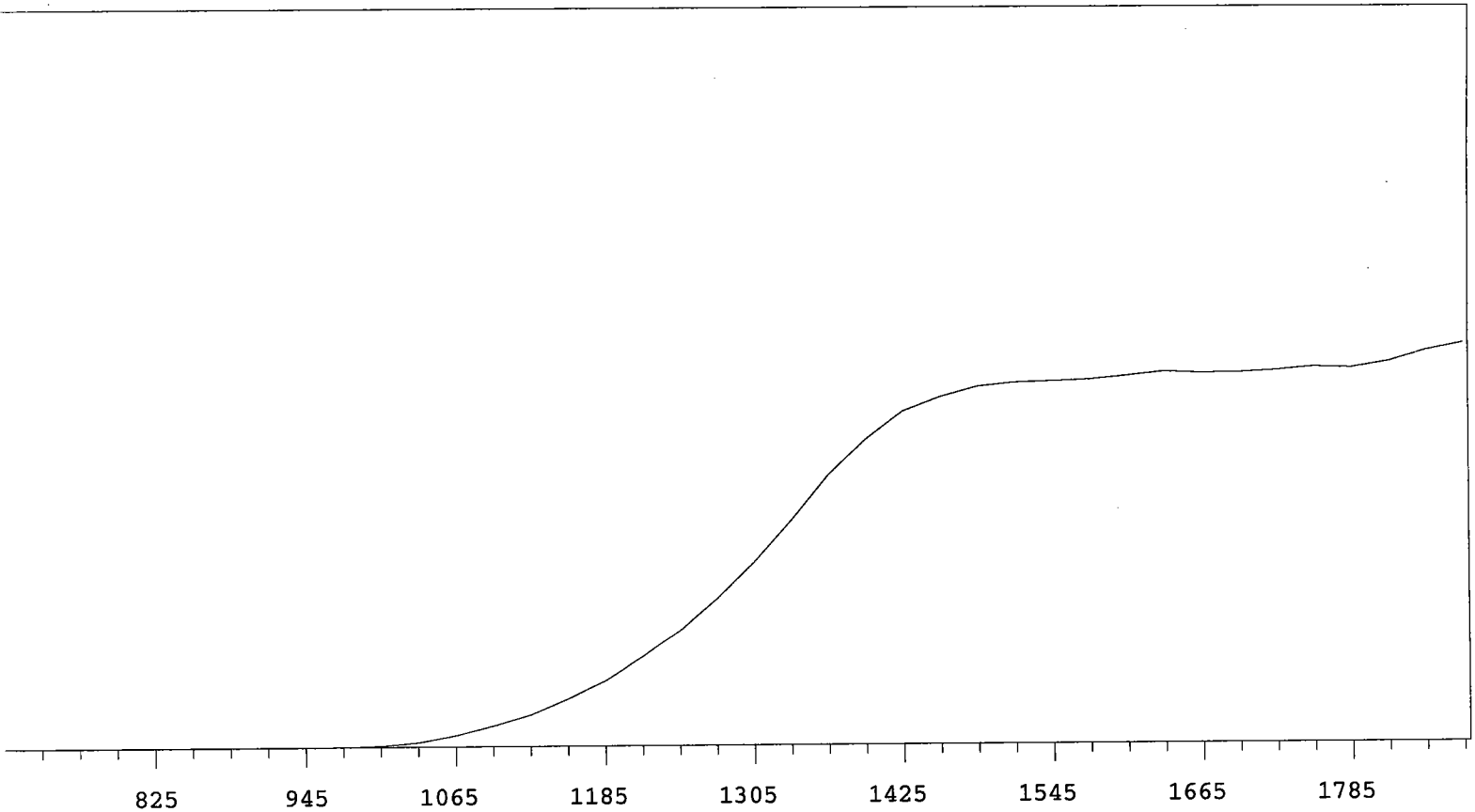
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17085	+68.24
735	0		1335	21135	+59.99
765	0		1365	25066	+47.39
795	0	>100	1395	28530	+33.93
825	0	>100	1425	30823	+22.30
855	1	>100	1455	32287	+12.93
885	0	>100	1485	33217	+6.71
915	1	>100	1515	33474	+3.57
945	2	>100	1545	33517	+1.17
975	7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



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



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

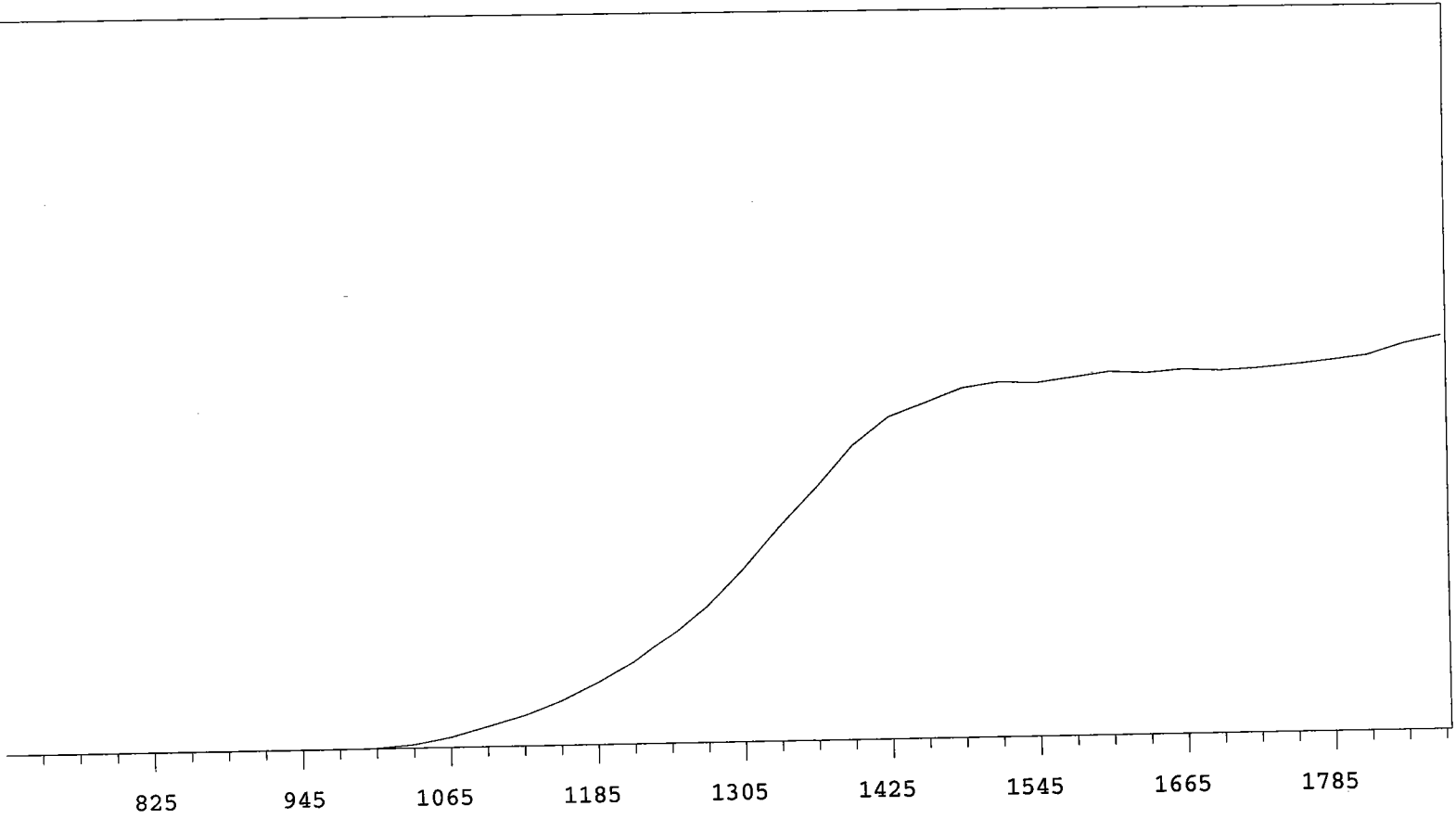


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	20094	+68.67
735	0		1335	24665	+59.40
765	0		1365	29591	+47.86
795	0	>100	1395	33376	+34.51
825	1	+83.33	1425	36440	+22.50
855	1	-83.33	1455	38024	+13.58
885	0	>100	1485	39187	+7.04
915	0	>100	1515	39608	+3.63
945	5	>100	1545	39722	+2.10
975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

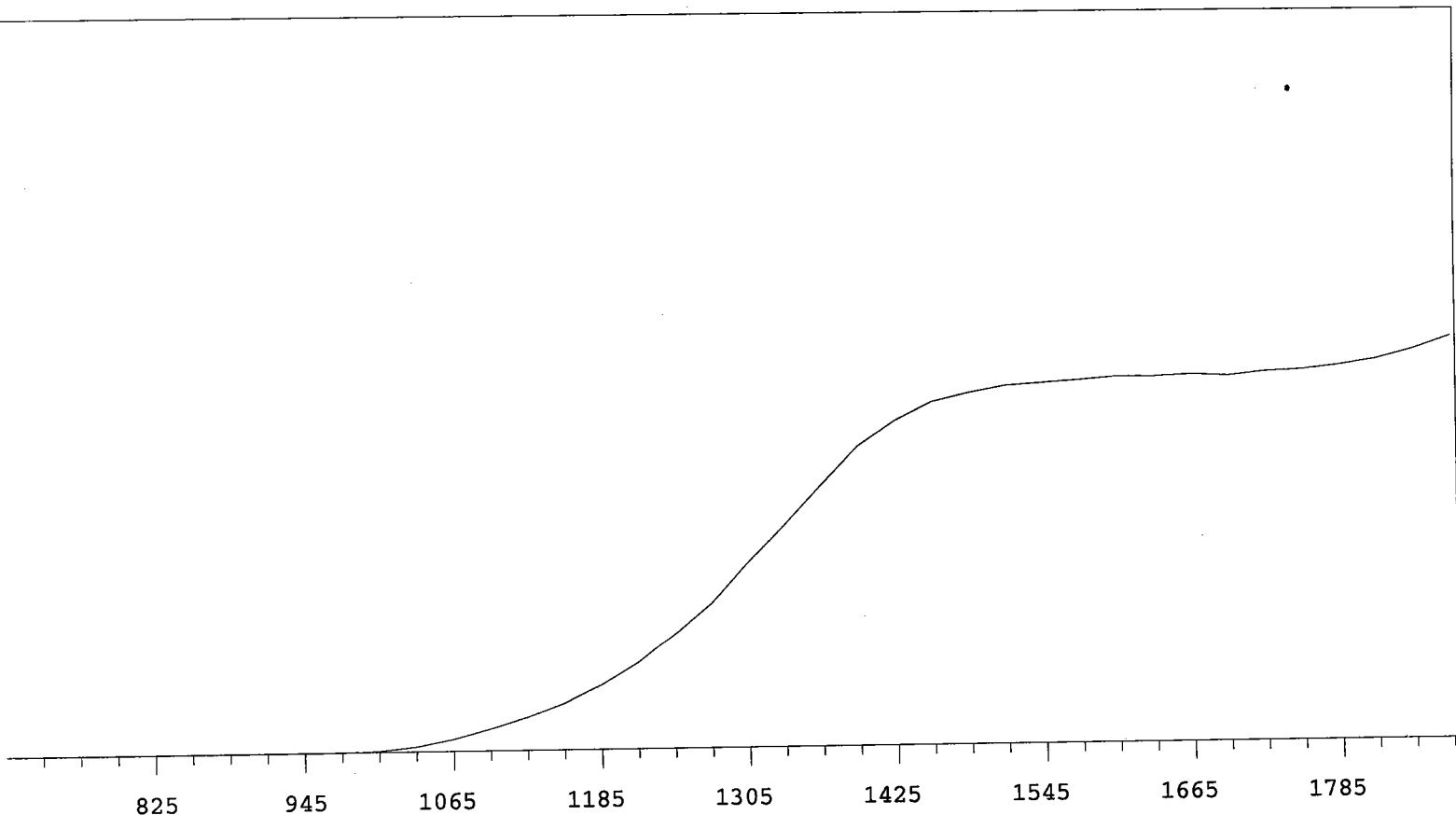
MPC 9600 Plateau
Alpha Volts: 705

Instrument 6 MPC 9604 Detector C
Beta Volts: 1575

7/1/2009



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

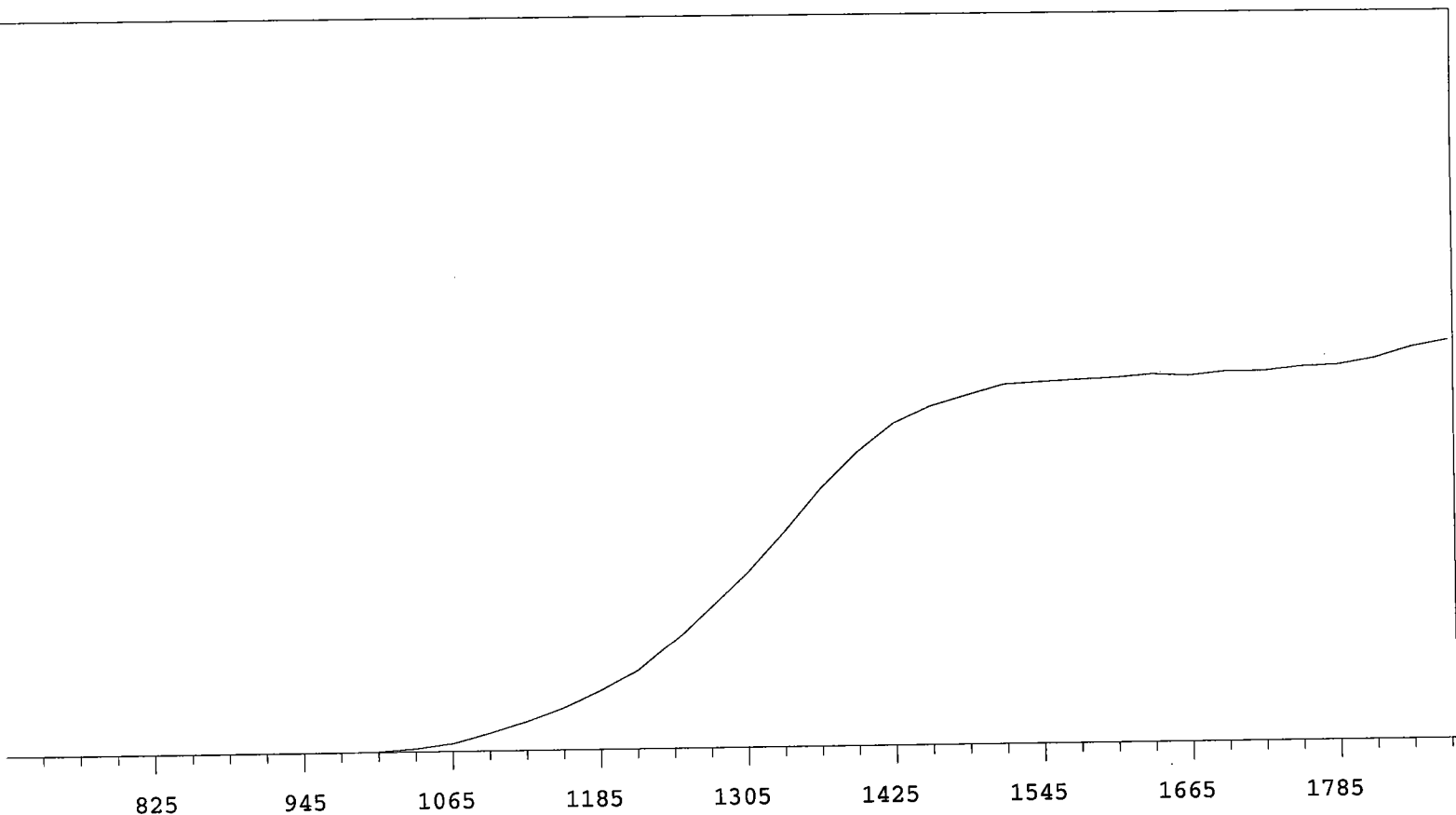


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17954	+65.82
735	0		1335	21482	+57.64
765	0		1365	25373	+45.78
795	1	+0.00	1395	29042	+34.80
825	0	>100	1425	31373	+23.29
855	0	+0.00	1455	33143	+14.25
885	0	>100	1485	34006	+8.49
915	1	>100	1515	34662	+4.71
945	0	>100	1545	34892	+3.14
975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

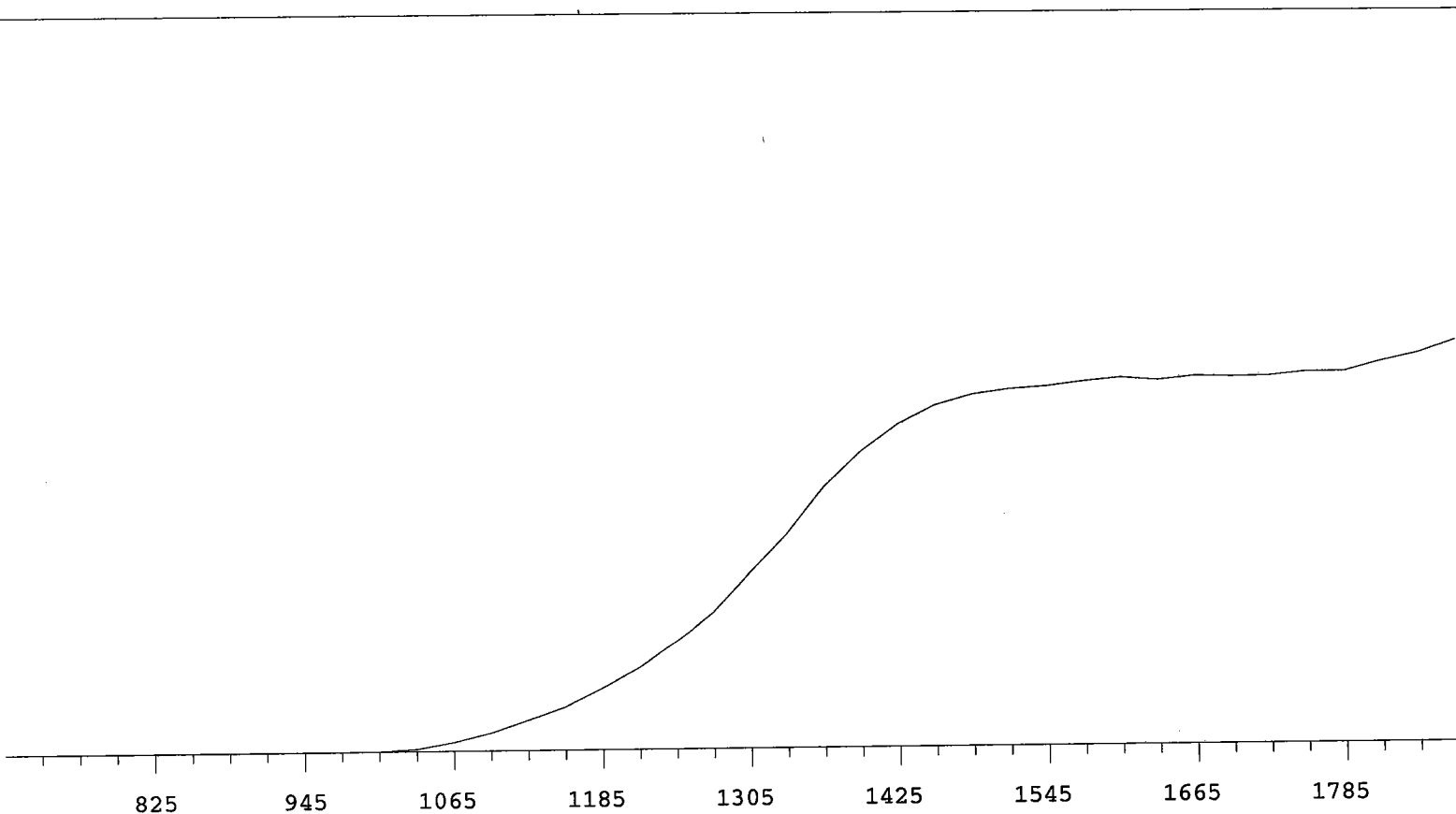
MPC 9600 Plateau
 Alpha Volts: 705

Instrument 7 MPC 9604 Detector A
 Beta Volts: 1575

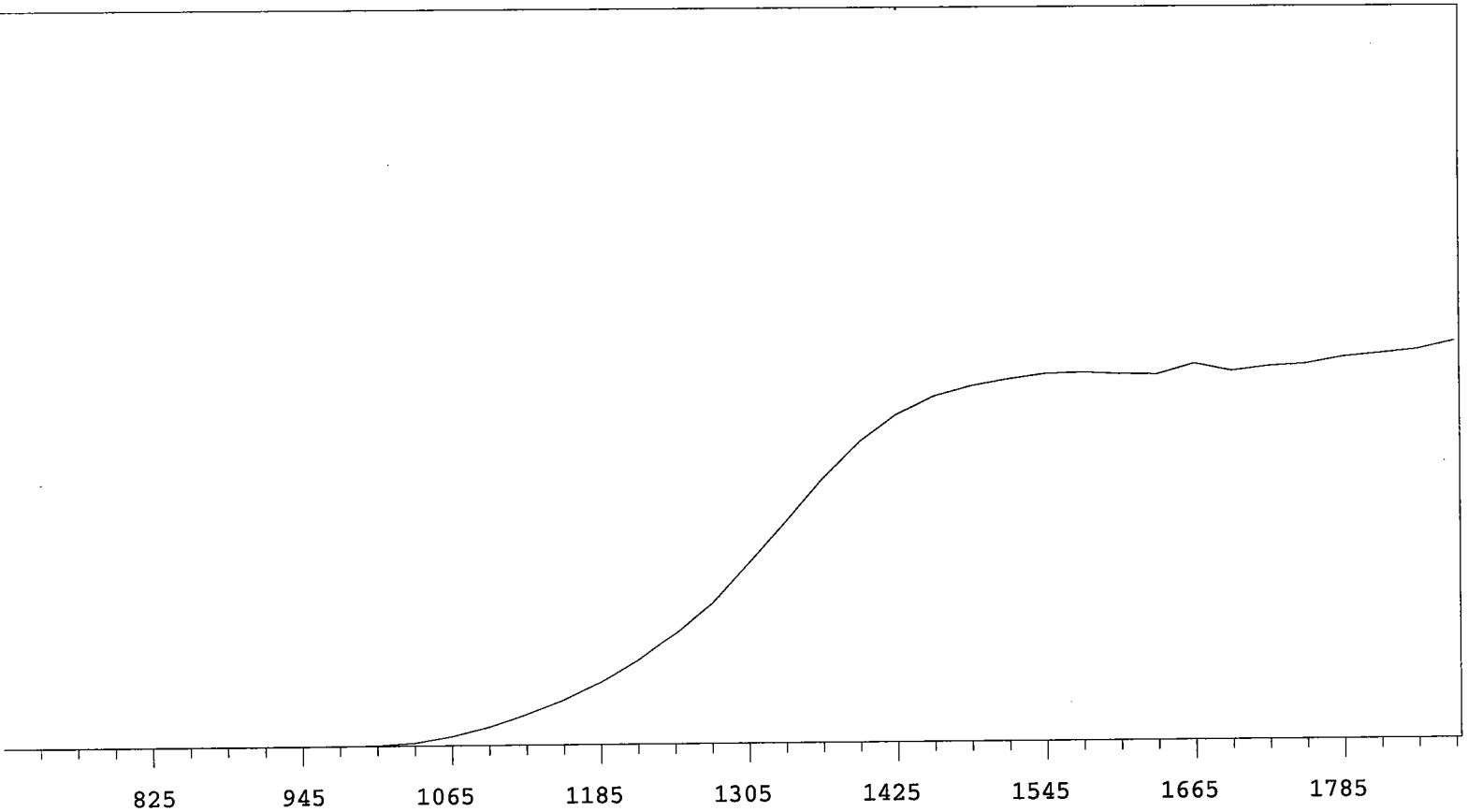
7/1/2009



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



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

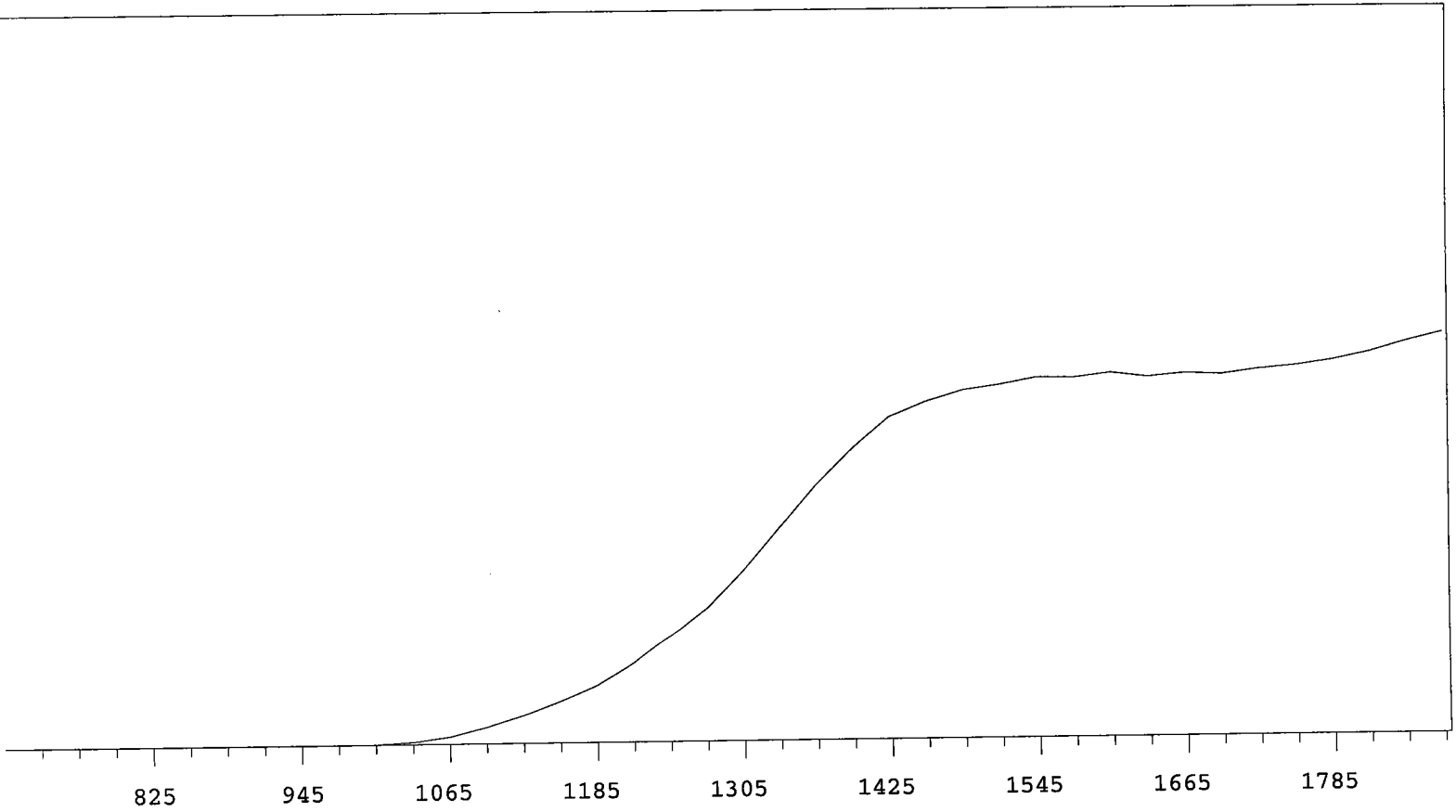


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16543	+70.03
735	0		1335	20257	+60.71
765	0		1365	24245	+48.17
795	0	>100	1395	27602	+35.50
825	0	>100	1425	30019	+23.48
855	0	>100	1455	31614	+14.53
885	0	>100	1485	32522	+8.91
915	0	>100	1515	33103	+5.28
945	0	>100	1545	33572	+2.60
975	4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

MPC 9600 Plateau
 Alpha Volts: 705

Instrument 7 MPC 9604 Detector D
 Beta Volts: 1575

7/1/2009

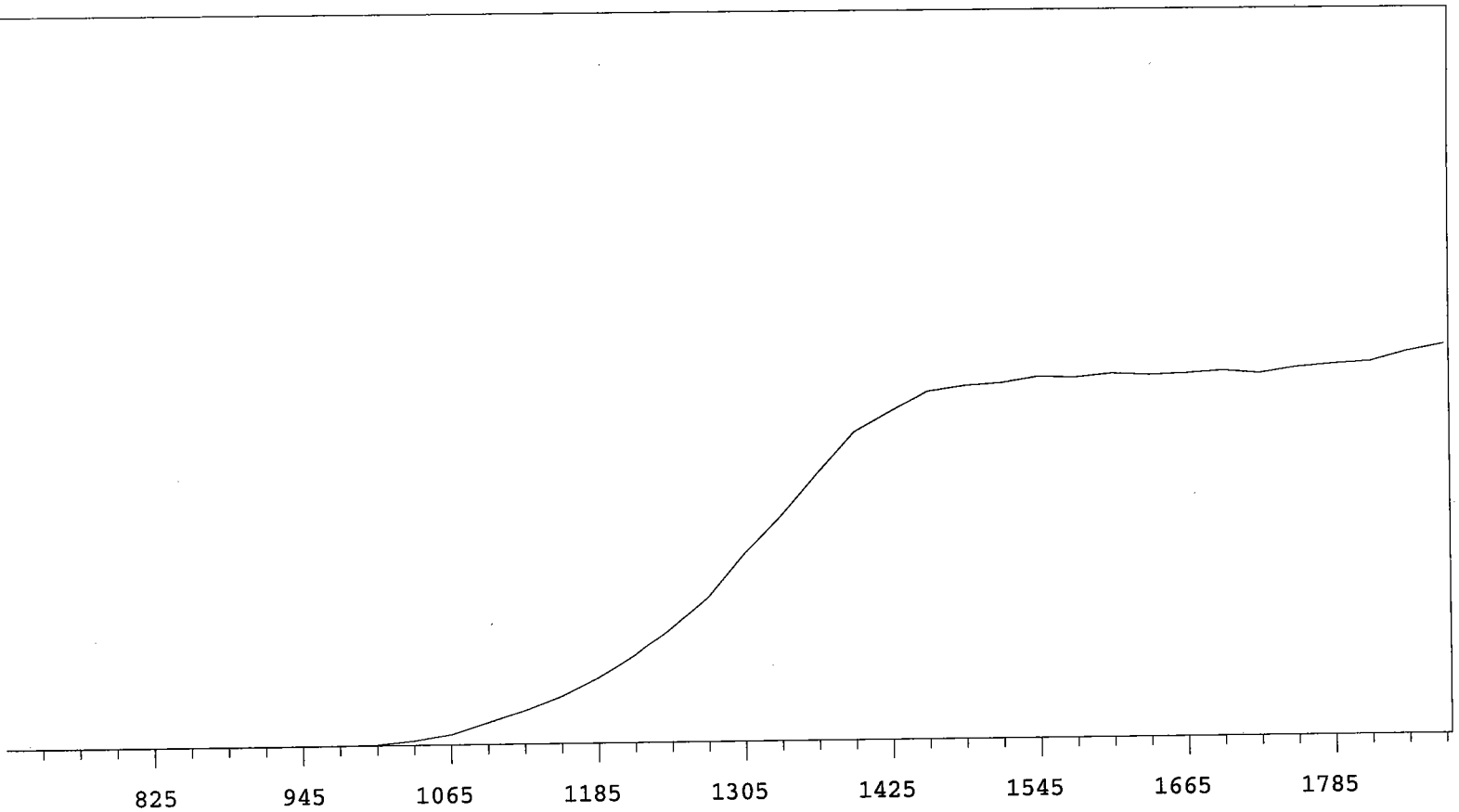


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14016	+71.42
735	0		1335	17436	+62.21
765	0		1365	20814	+50.32
795	0	>100	1395	23760	+36.91
825	0	>100	1425	26302	+24.91
855	0	>100	1455	27519	+15.17
885	0	>100	1485	28410	+8.91
915	0	>100	1515	28843	+5.41
945	0	>100	1545	29396	+3.58
975	5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

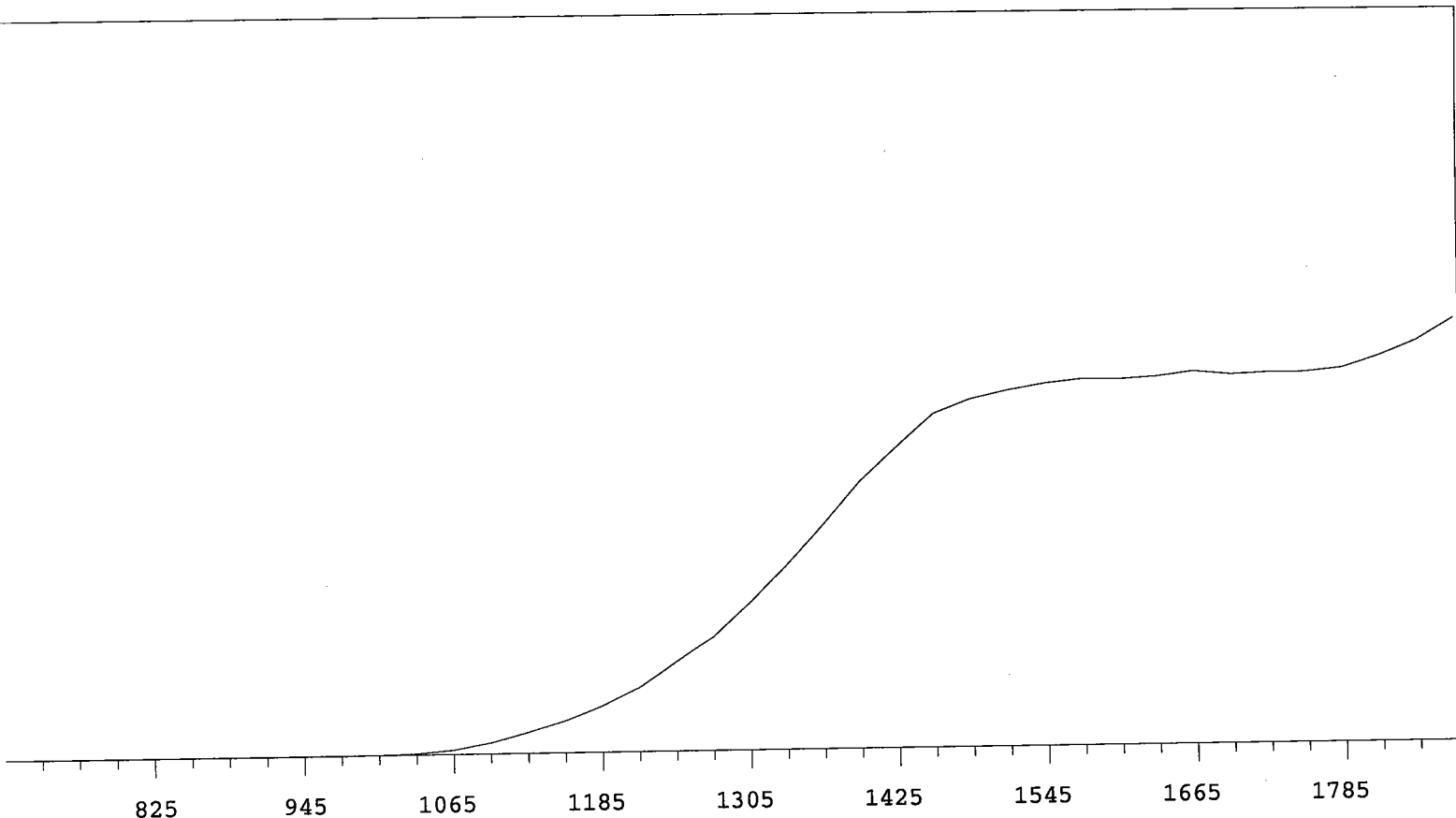
MPC 9600 Plateau
Alpha Volts: 705

Instrument 8 MPC 9604 Detector A
Beta Volts: 1575

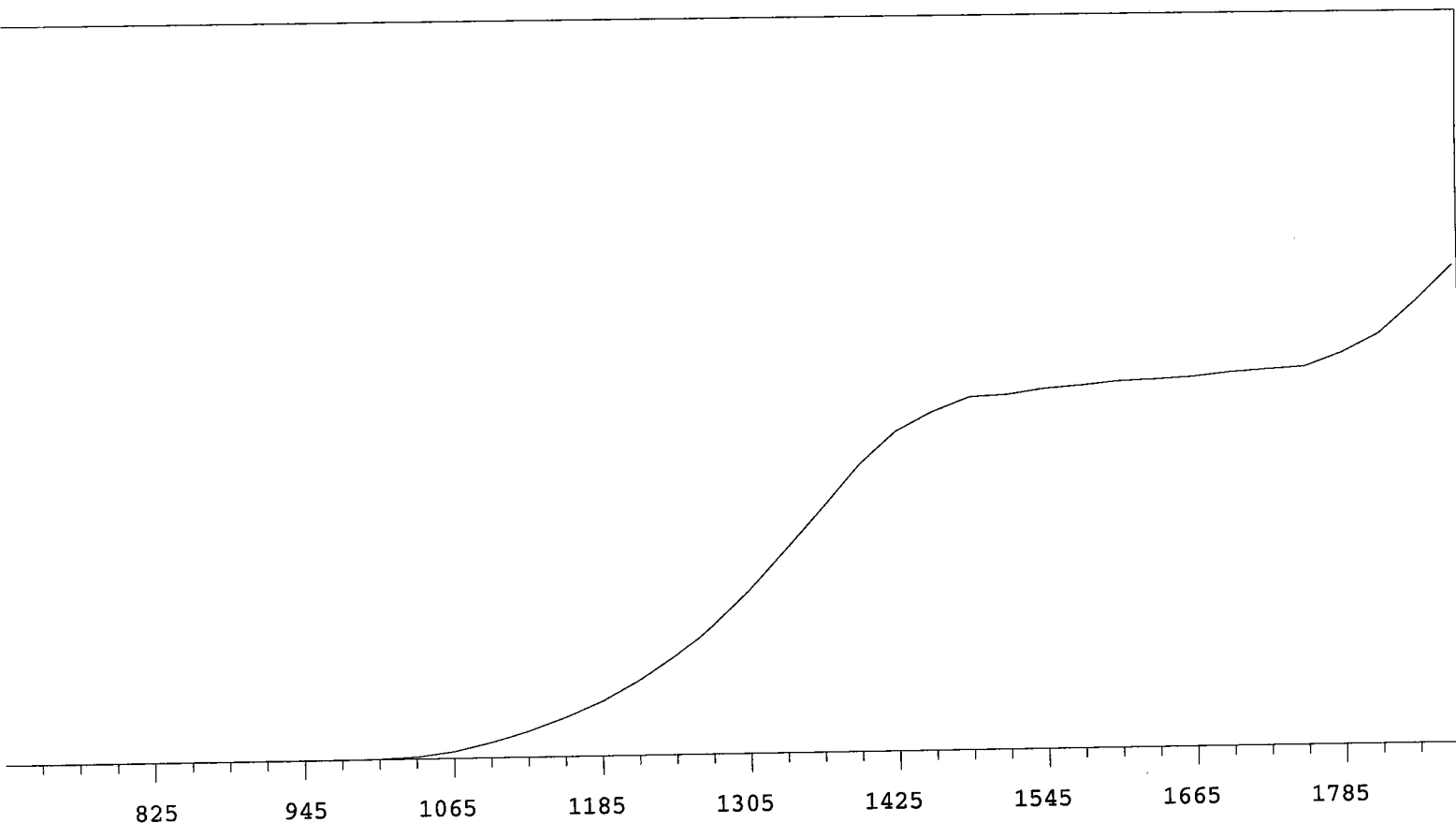
7/1/2009



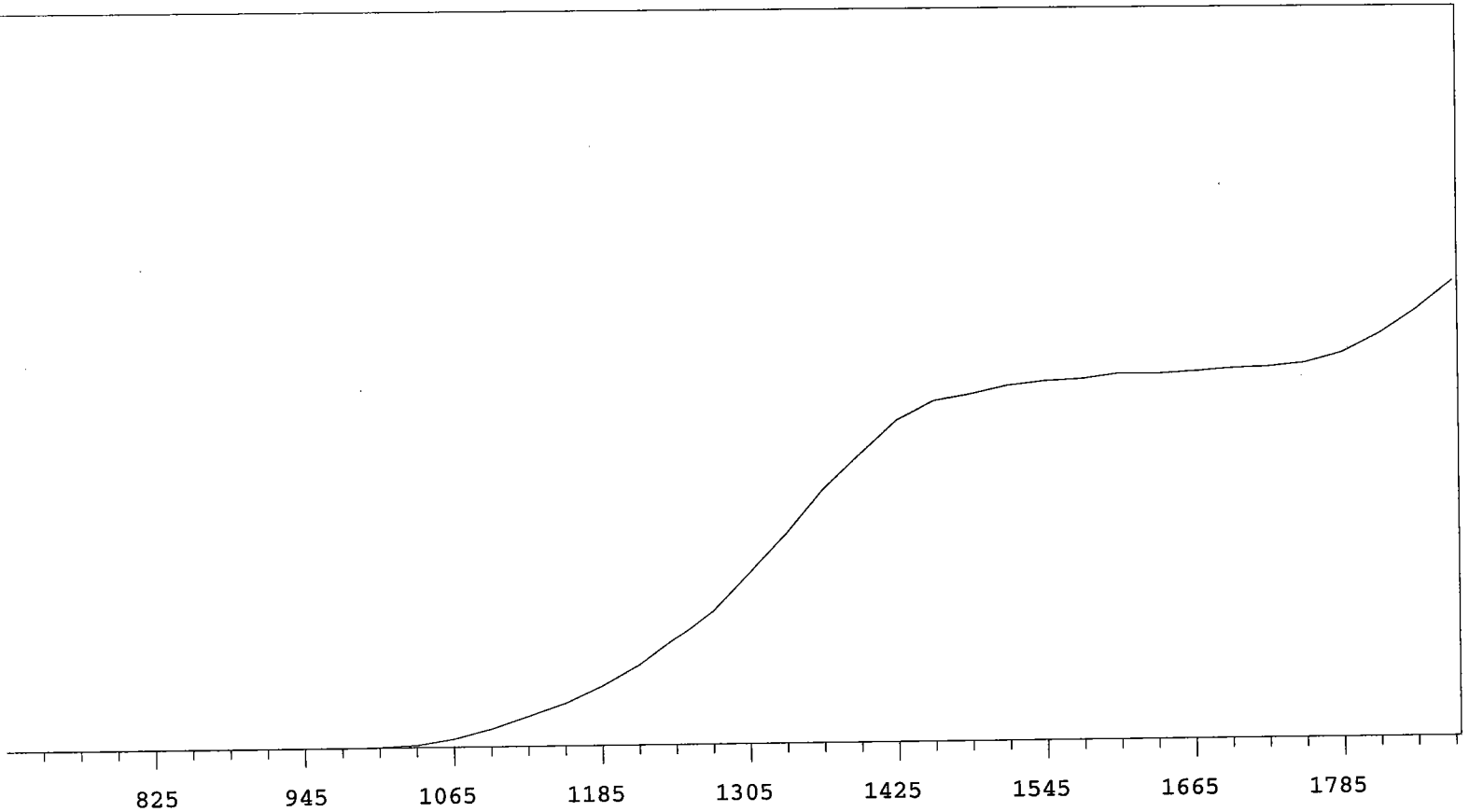
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19482	+67.45
735	0		1335	23344	+59.35
765	0		1365	27793	+45.86
795	0	>100	1395	31916	+34.29
825	0	>100	1425	33979	+21.61
855	0	>100	1455	35993	+11.71
885	0	>100	1485	36530	+7.04
915	0	>100	1515	36796	+3.11
945	1	>100	1545	37393	+2.44
975	9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



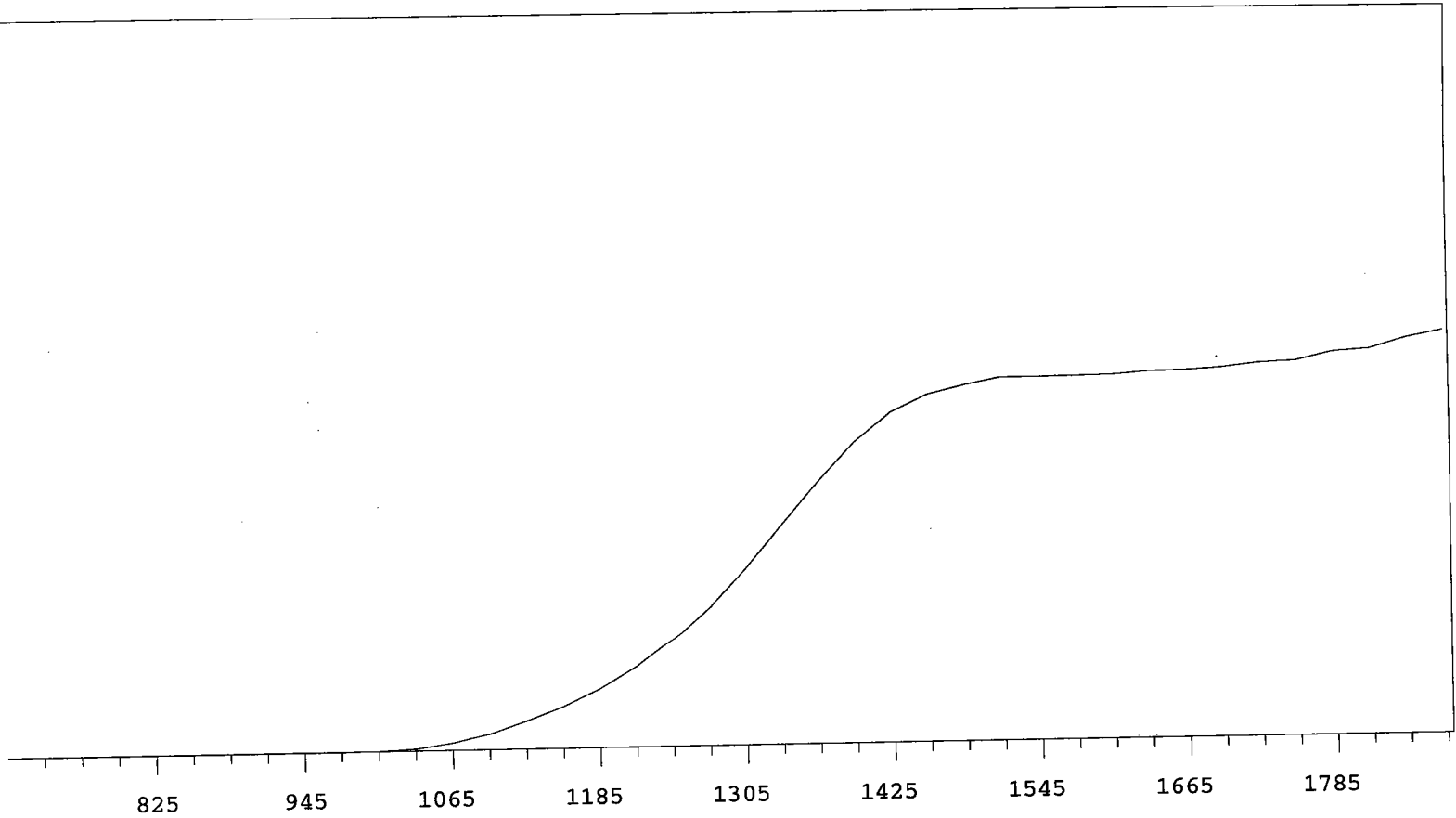
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16337	+74.91
735	0		1335	20471	+68.07
765	0		1365	25012	+57.86
795	0	>100	1395	29694	+47.48
825	0	>100	1425	33409	+35.17
855	0	>100	1455	37013	+23.27
885	0	>100	1485	38629	+14.35
915	0	>100	1515	39529	+7.69
945	0	>100	1545	40284	+4.34
975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



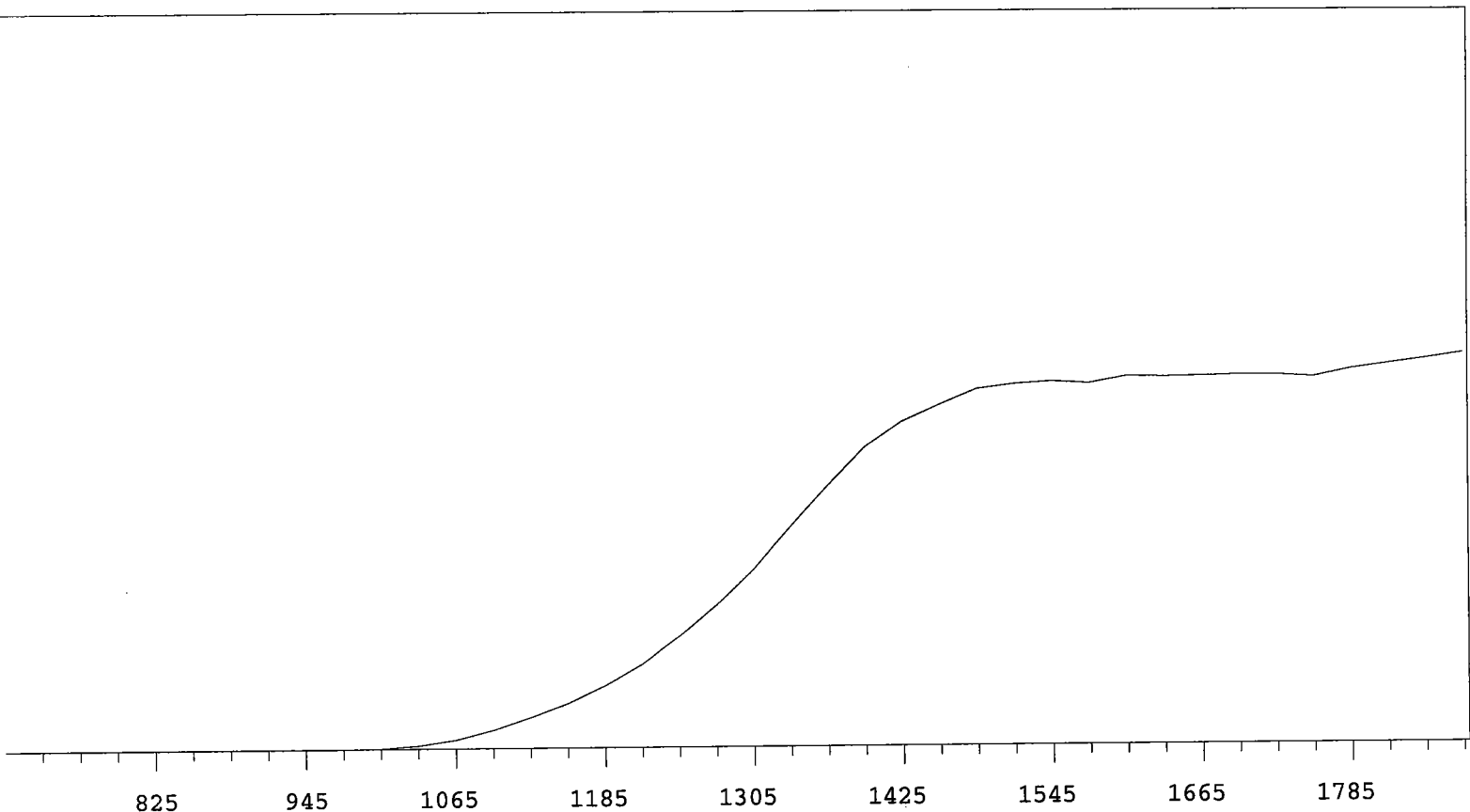
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16303	+72.82
735	0		1335	20309	+64.32
765	0		1365	24364	+53.82
795	0	>100	1395	28527	+40.95
825	0	>100	1425	31774	+28.74
855	0	>100	1455	33631	+16.87
885	0	>100	1485	35030	+9.25
915	0	>100	1515	35208	+5.21
945	0	>100	1545	35741	+3.27
975	4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



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



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

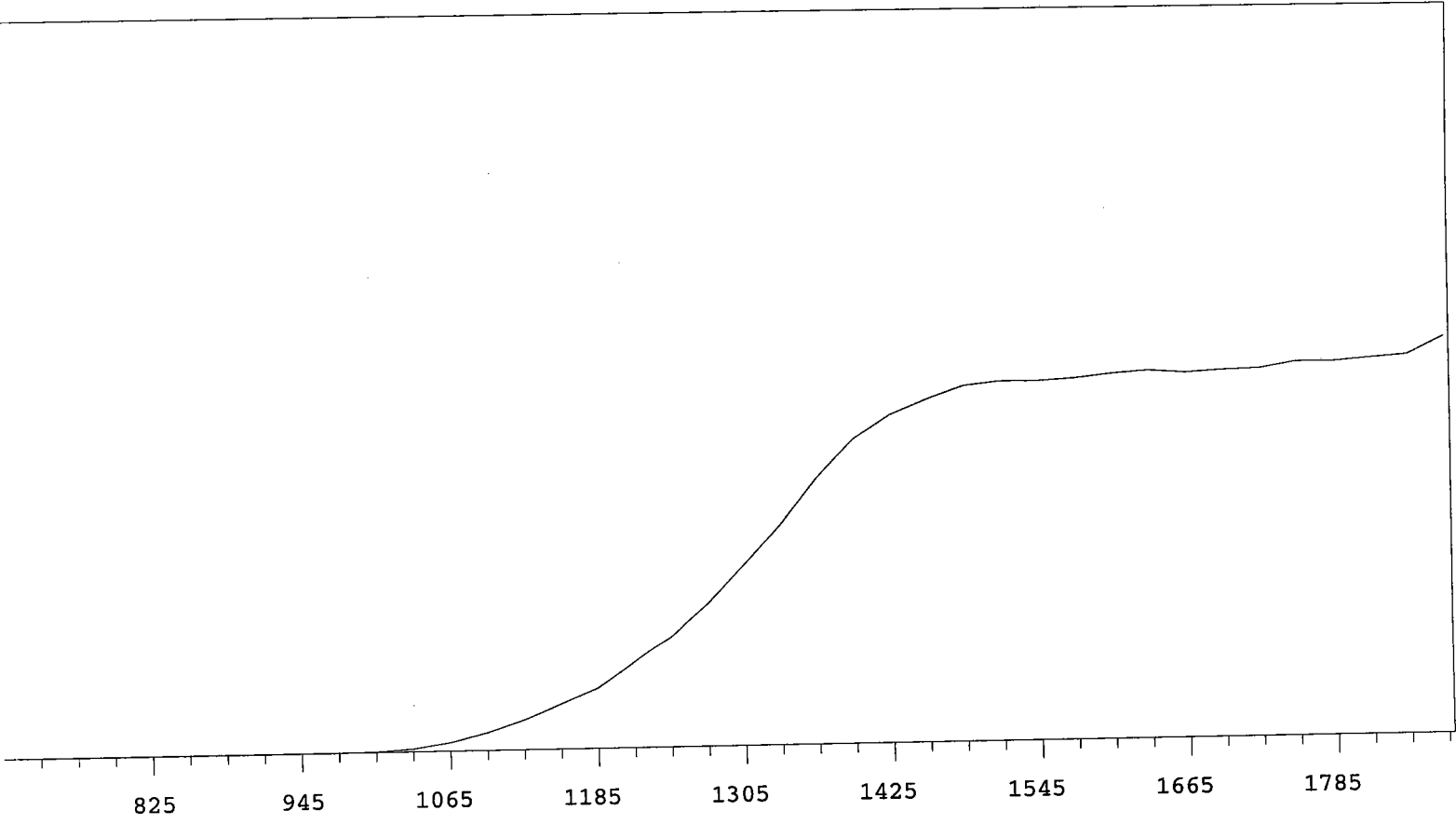


VOLTS COUNTS %/100 Volts

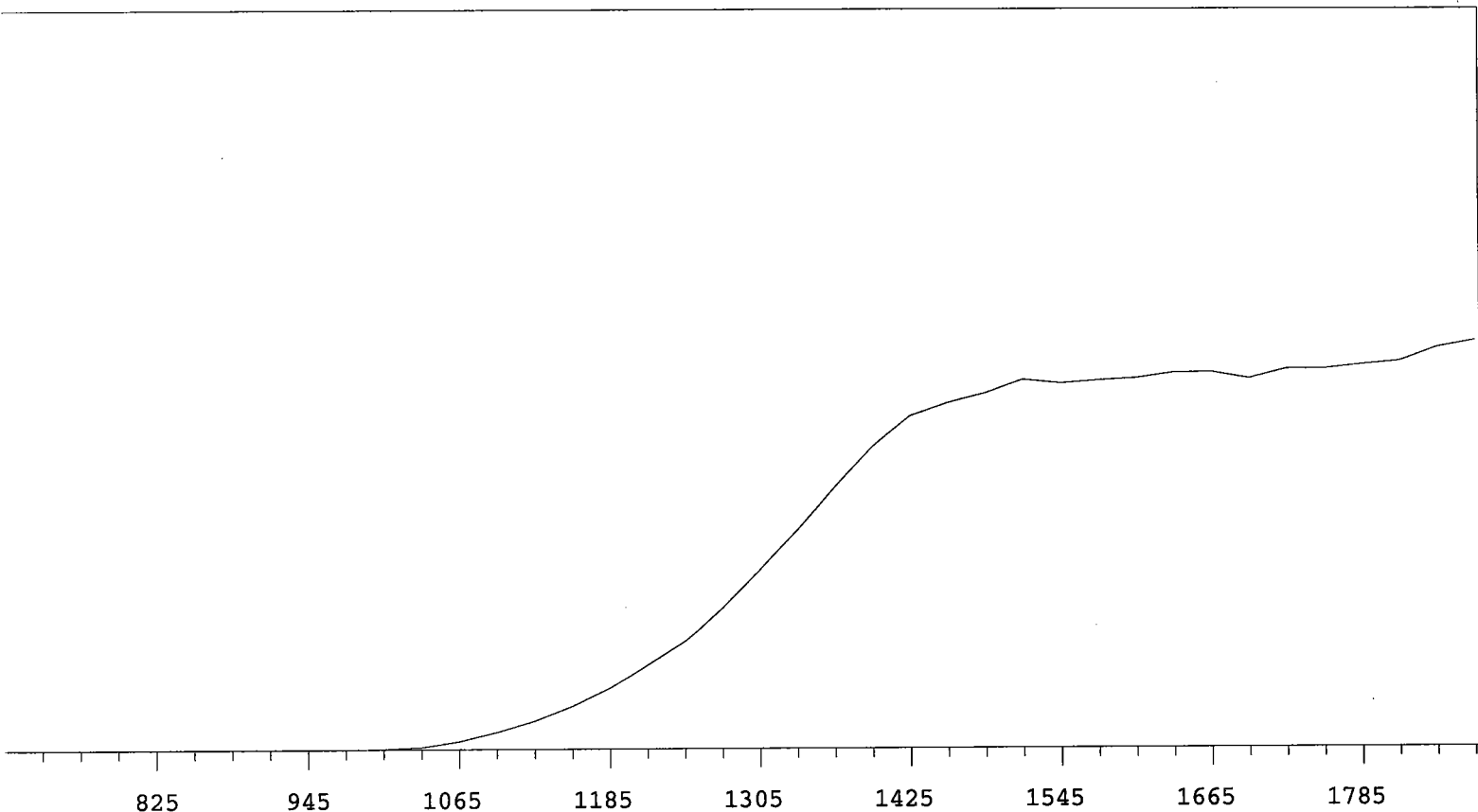
VOLTS COUNTS %/100 Volts

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

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



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

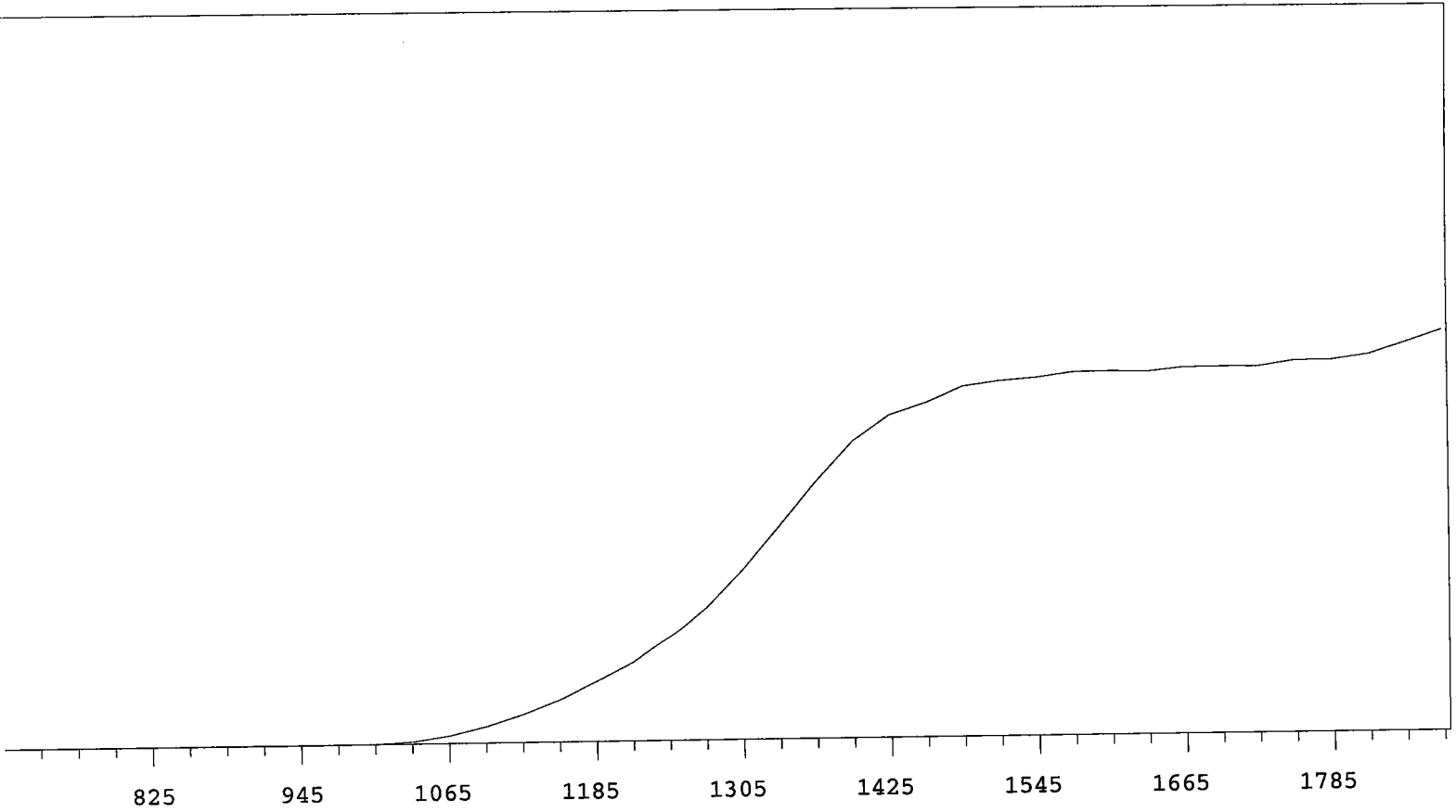


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13319	+70.94
735	0		1335	16319	+61.35
765	0		1365	19577	+50.27
795	0	>100	1395	22498	+36.85
825	0	>100	1425	24782	+23.90
855	0	>100	1455	25761	+15.37
885	0	>100	1485	26486	+8.38
915	1	>100	1515	27503	+5.11
945	0	>100	1545	27223	+2.67
975	5	>100	1575	27453	+1.71
1005	35	>100	1605	27604	+2.70
1035	186	>100	1635	28021	+0.78
1065	618	>100	1665	28059	+1.05
1095	1280	>100	1695	27548	+0.90
1125	2141	>100	1725	28280	+2.16
1155	3268	>100	1755	28290	+3.51
1185	4659	>100	1785	28600	+4.46
1215	6343	+90.68	1815	28879	+6.35
1245	8064	+83.46	1845	29913	
1275	10497	+77.03	1875	30417	

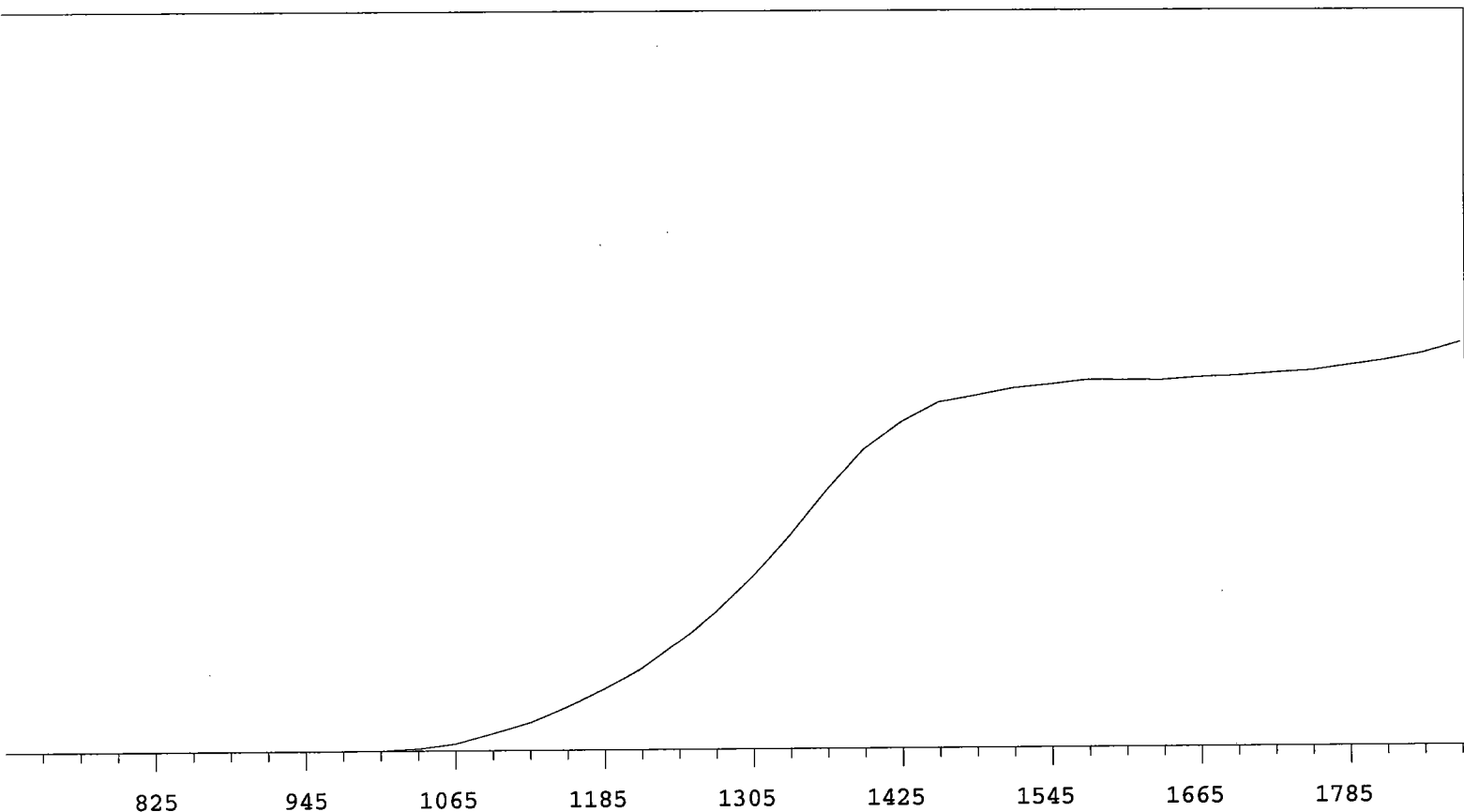
MPC 9600 Plateau
Alpha Volts: 870

Instrument 10 MPC 9604 Detector A
Beta Volts: 1552

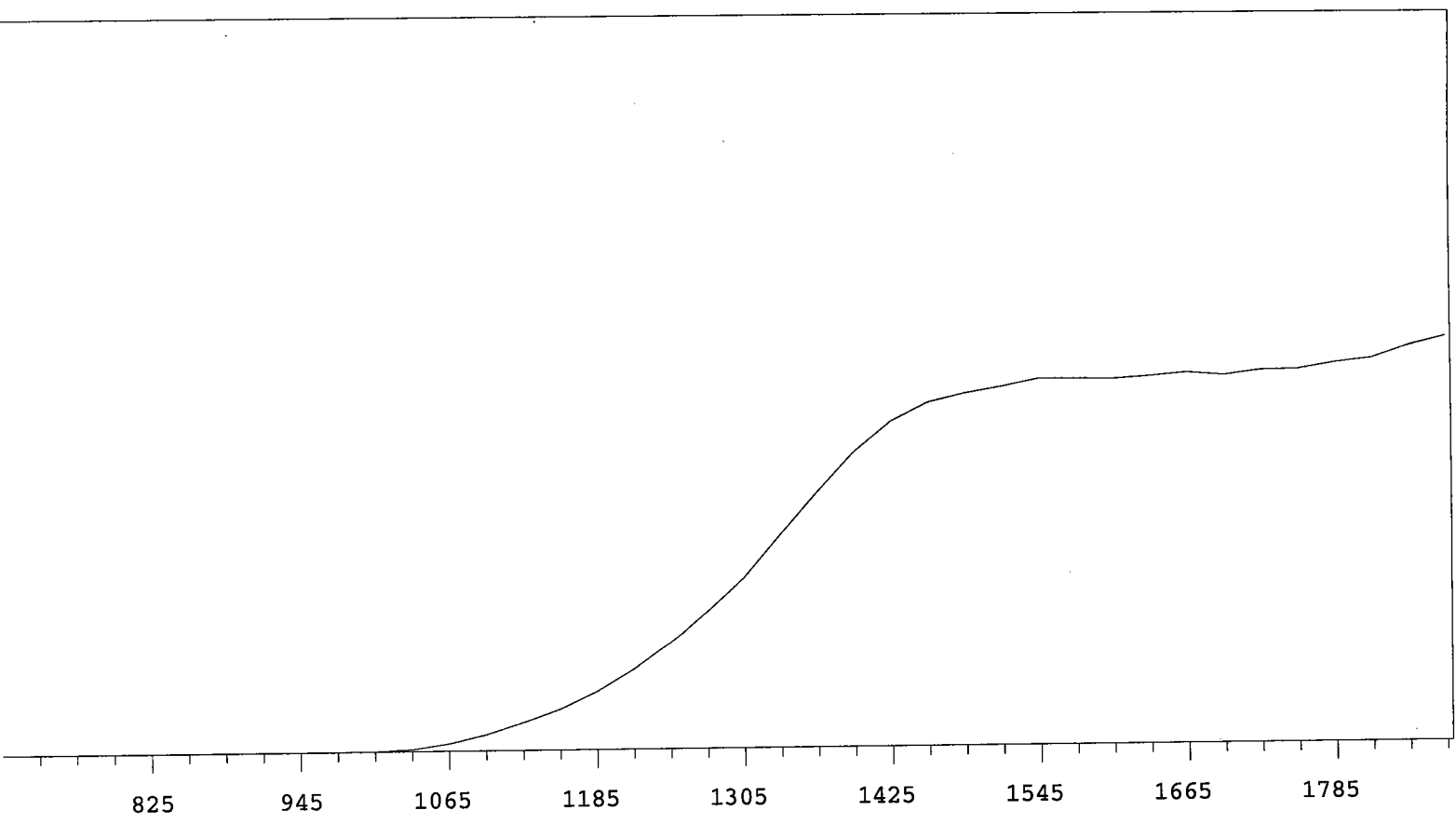
7/1/2009



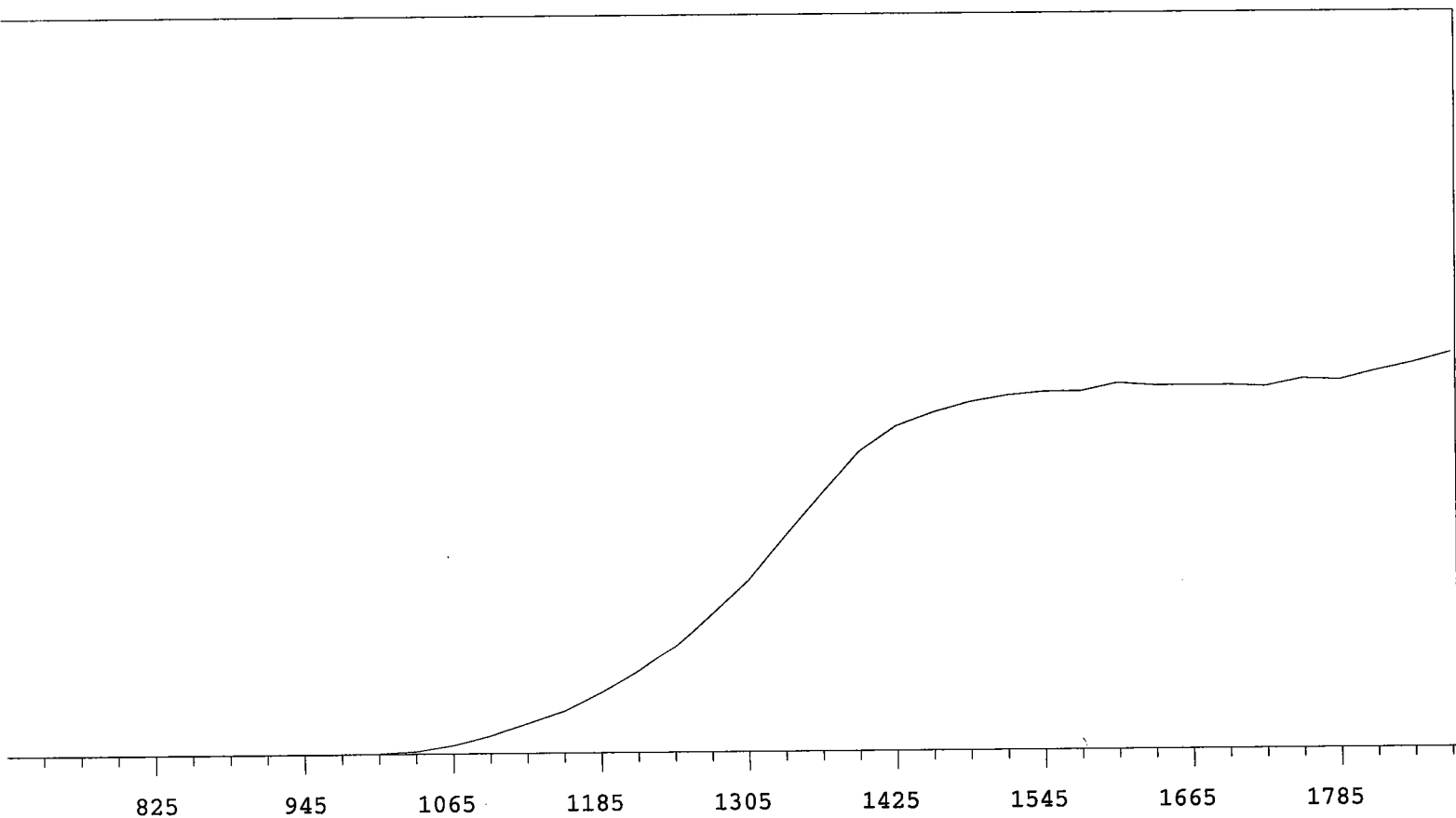
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16076	+72.76
735	1		1335	19985	+63.85
765	0		1365	24102	+50.95
795	0	>100	1395	27819	+36.01
825	0	>100	1425	30228	+23.86
855	0	>100	1455	31343	+14.40
885	0	>100	1485	32811	+8.77
915	0	>100	1515	33243	+6.10
945	0	>100	1545	33518	+3.25
975	1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



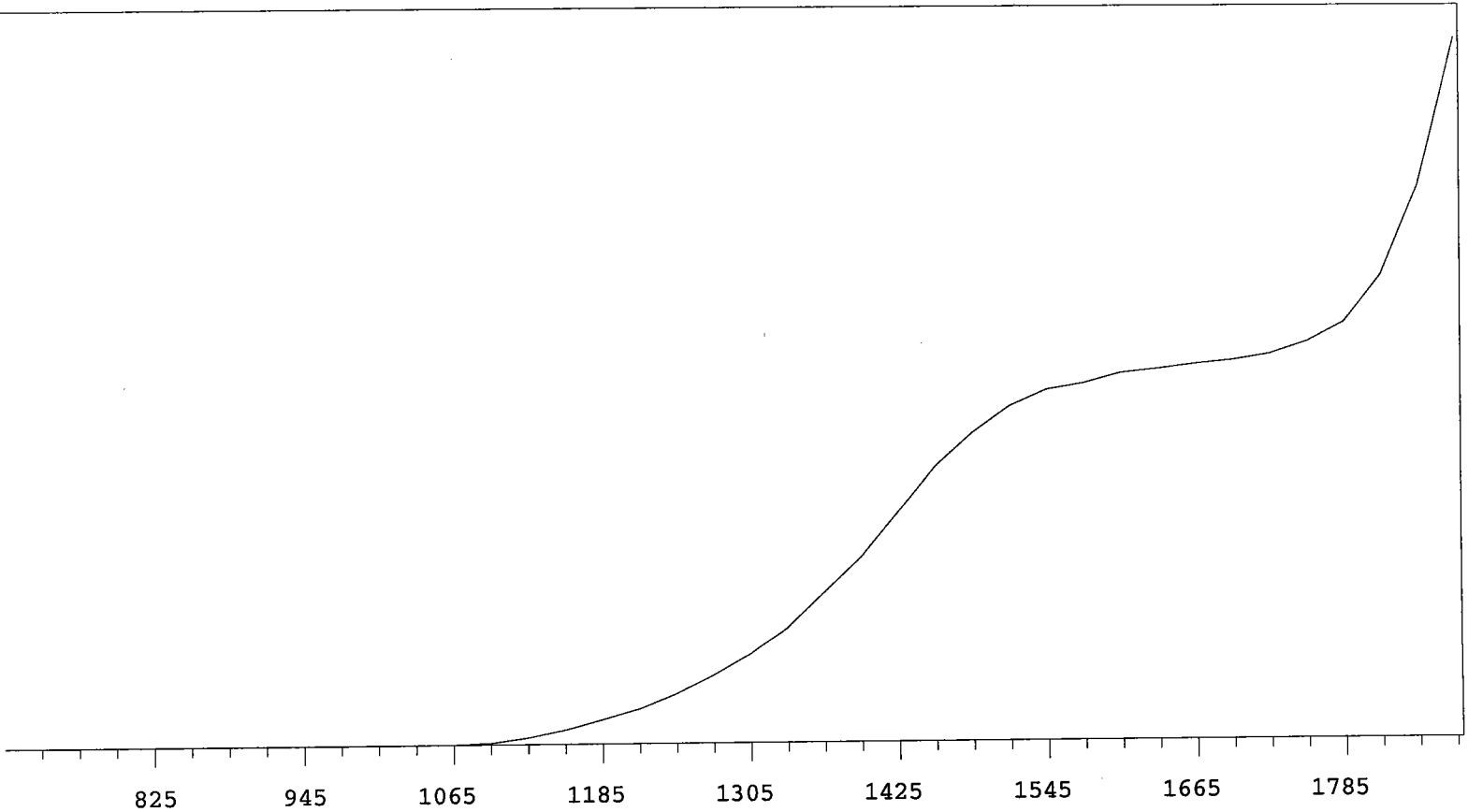
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14469	+71.08
735	0		1335	17904	+63.07
765	0		1365	21677	+51.20
795	0	>100	1395	25027	+38.06
825	0	>100	1425	27237	+24.55
855	0	>100	1455	28914	+14.61
885	0	>100	1485	29480	+8.48
915	0	>100	1515	30075	+5.06
945	1	>100	1545	30374	+3.42
975	7	>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	



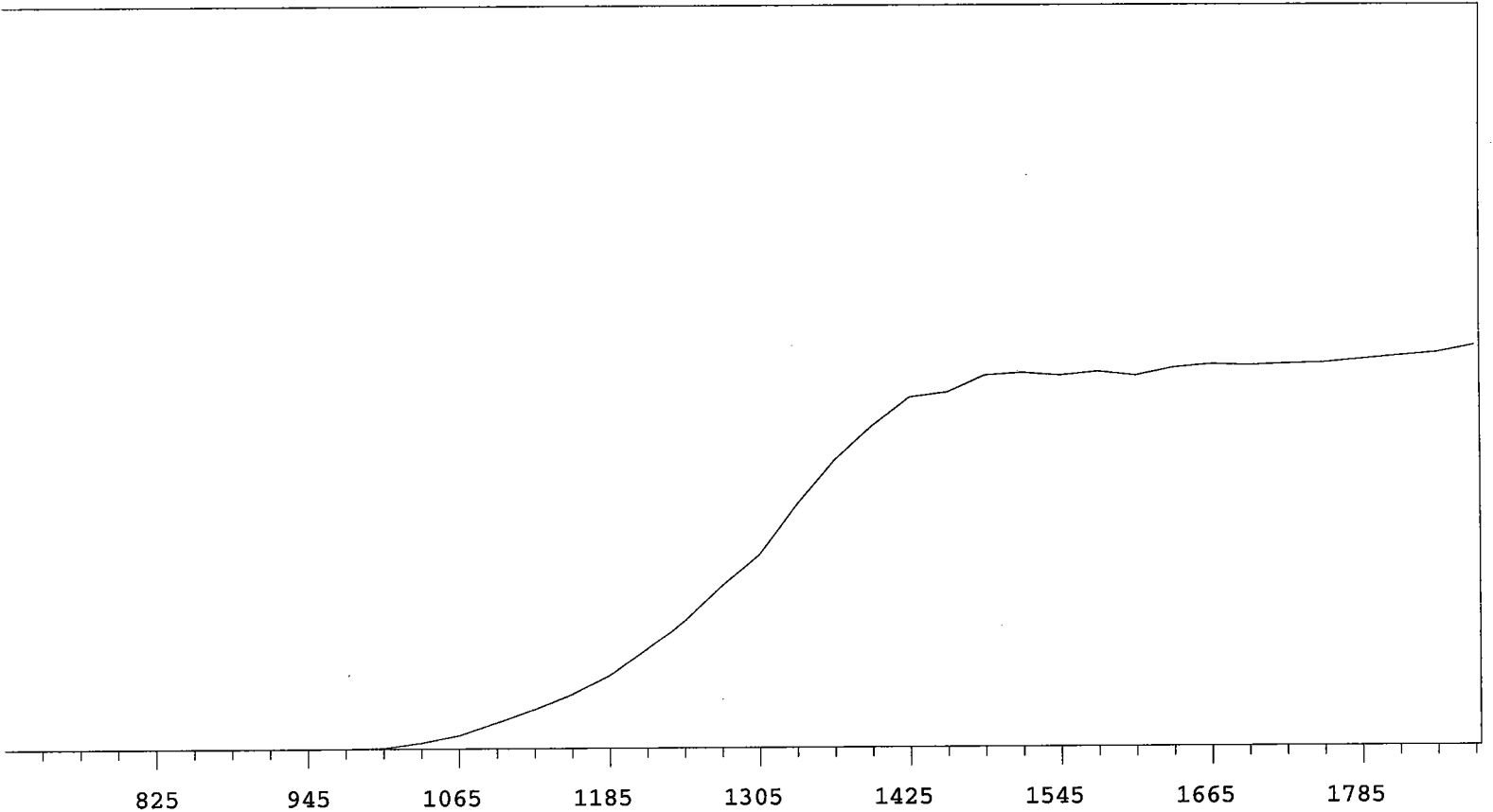
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18051	+71.16
735	0		1335	22586	+62.34
765	0		1365	26973	+51.47
795	0	>100	1395	31137	+38.24
825	0	>100	1425	34321	+25.70
855	0	>100	1455	36267	+15.37
885	1	>100	1485	37197	+9.21
915	0	>100	1515	37851	+5.38
945	2	>100	1545	38622	+3.00
975	2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



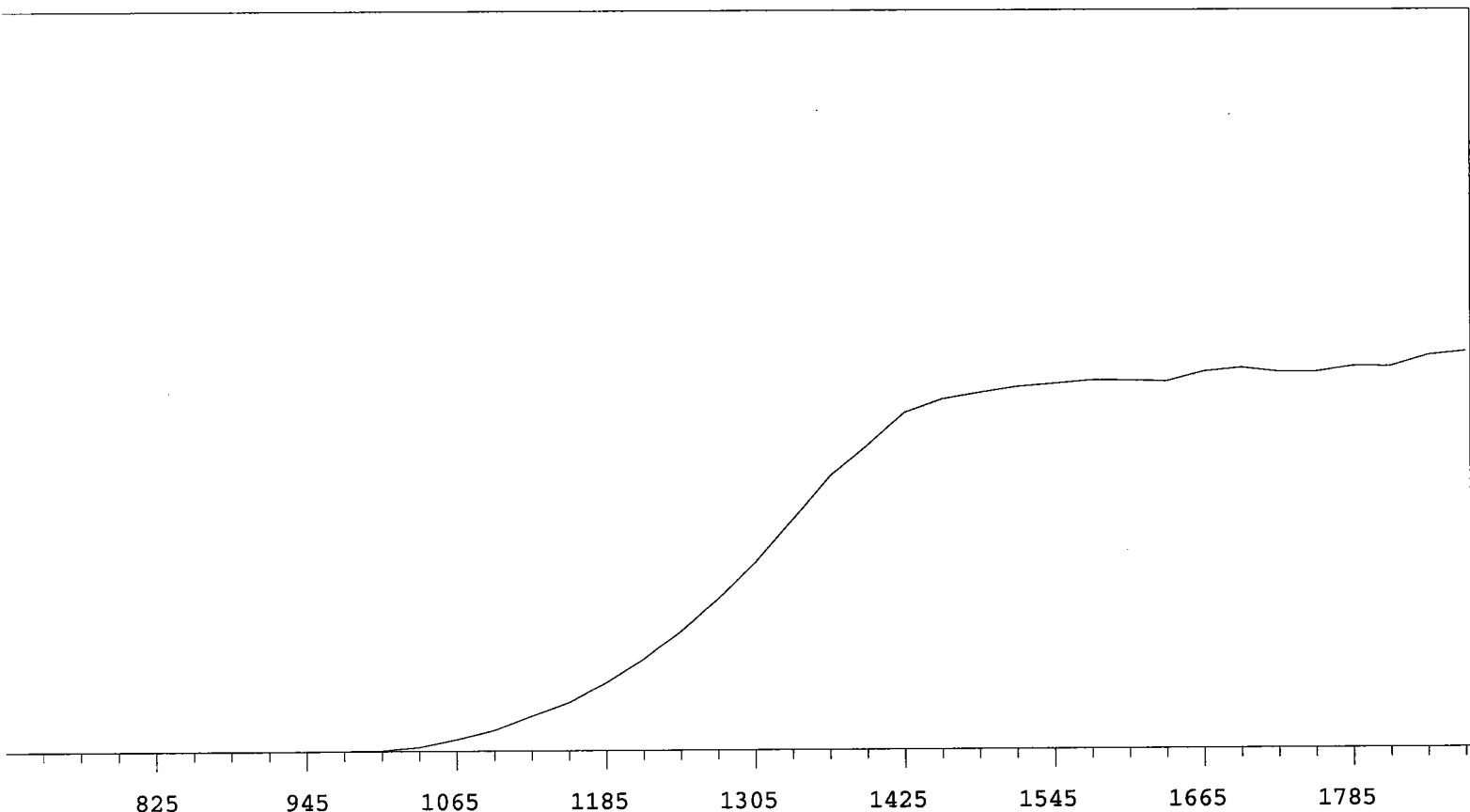
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15430	+69.87
735	0		1335	19258	+61.49
765	0		1365	23018	+50.06
795	0	>100	1395	26562	+35.34
825	0	>100	1425	28750	+22.67
855	0	>100	1455	29911	+13.20
885	0	>100	1485	30798	+8.01
915	0	>100	1515	31375	+4.83
945	0	>100	1545	31684	+3.74
975	3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



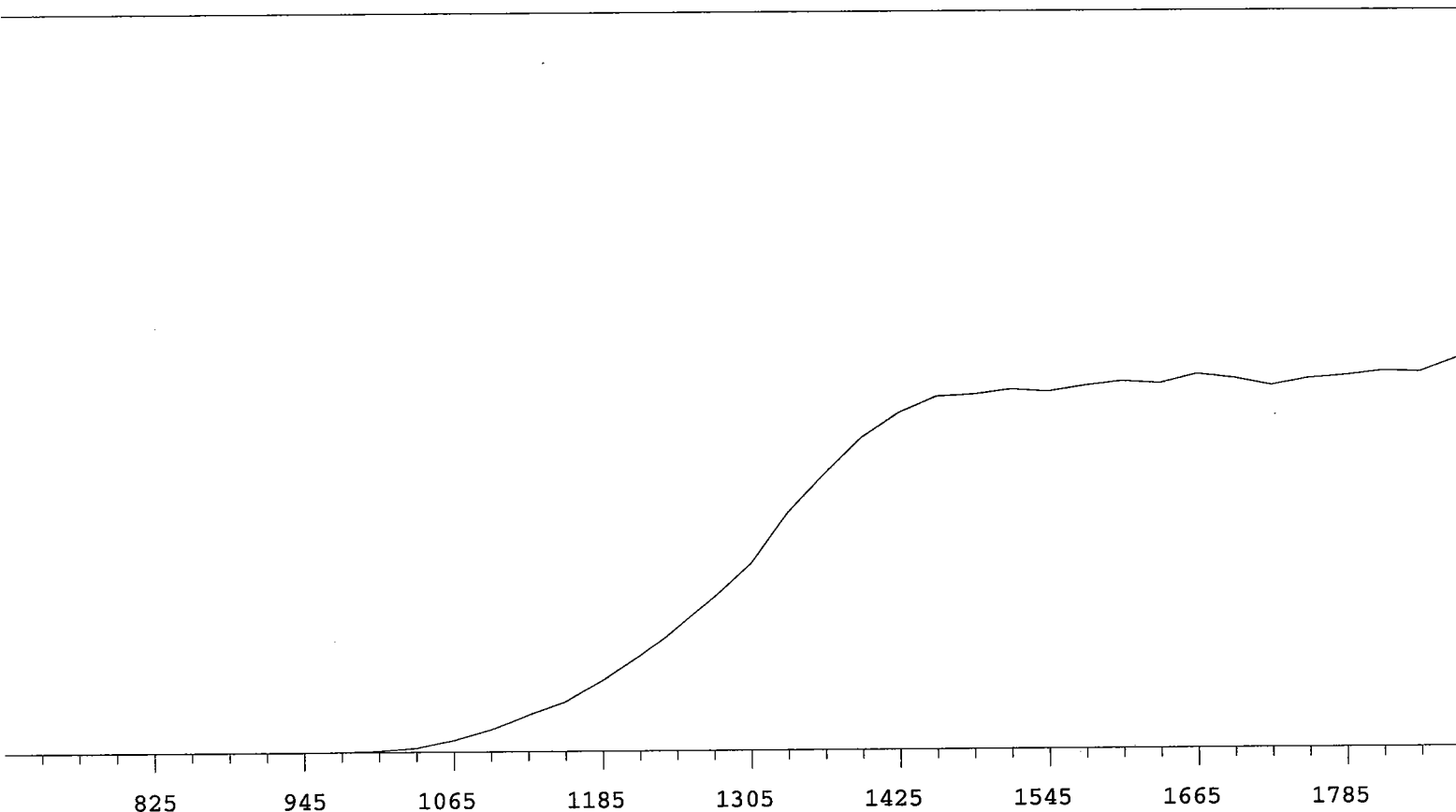
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	3225	+87.64
735	1		1335	4189	+80.15
765	0		1365	5428	+75.12
795	0	>100	1395	6662	+68.60
825	0	>100	1425	8241	+58.14
855	0	>100	1455	9857	+46.65
885	0	>100	1485	11018	+33.24
915	0	>100	1515	11953	+21.01
945	1	+0.00	1545	12538	+13.57
975	0	>100	1575	12760	+8.35
1005	0	>100	1605	13114	+5.84
1035	2	>100	1635	13258	+4.78
1065	9	>100	1665	13430	+3.99
1095	61	>100	1695	13551	+5.46
1125	248	>100	1725	13771	+8.65
1155	528	>100	1755	14204	+16.44
1185	882	>100	1785	14916	+30.03
1215	1270	>100	1815	16579	+48.74
1245	1786	>100	1845	19717	
1275	2478	+93.67	1875	25029	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8947	+65.63
735	0		1335	11238	+56.58
765	0		1365	13246	+46.66
795	0	>100	1395	14838	+30.69
825	0	>100	1425	16166	+20.11
855	0	>100	1455	16396	+11.95
885	0	>100	1485	17161	+5.61
915	1	>100	1515	17274	+3.59
945	0	>100	1545	17144	-0.00
975	11	>100	1575	17323	+0.80
1005	47	>100	1605	17136	+2.21
1035	280	>100	1635	17484	+1.94
1065	610	>100	1665	17638	+2.16
1095	1192	>100	1695	17580	+0.85
1125	1789	>100	1725	17655	+1.05
1155	2466	>100	1755	17700	+1.98
1185	3337	+94.91	1785	17857	+2.38
1215	4526	+88.85	1815	18006	+3.36
1245	5885	+78.40	1845	18140	
1275	7518	+72.09	1875	18468	



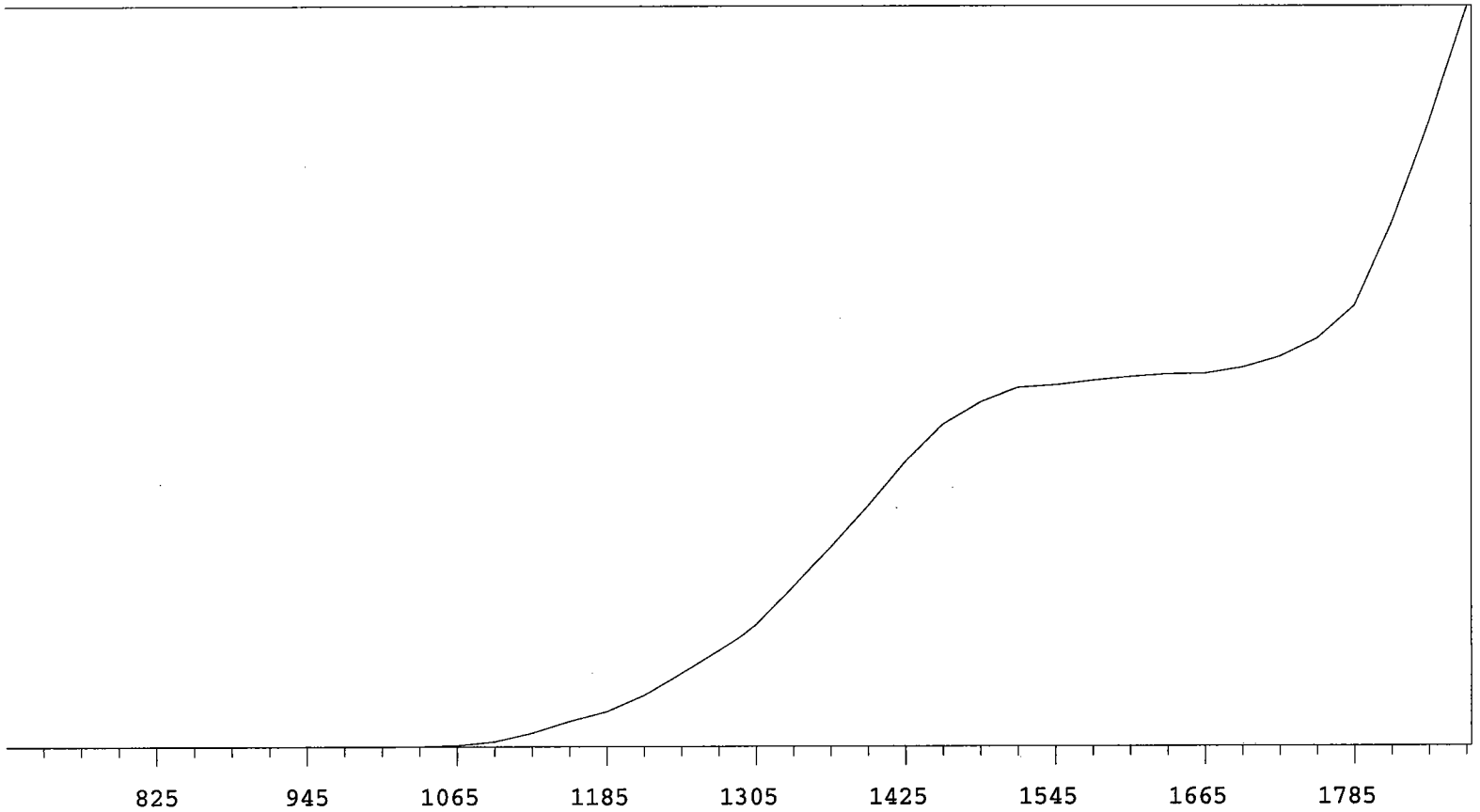
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	8636	+66.44
735	0		1335	10593	+56.56
765	0	+0.00	1365	12582	+46.23
795	0	>100	1395	13957	+33.45
825	1	+0.00	1425	15443	+21.49
855	0	>100	1455	16048	+13.14
885	0	+0.00	1485	16331	+6.45
915	0	>100	1515	16603	+4.19
945	1	>100	1545	16736	+2.73
975	7	>100	1575	16884	+1.11
1005	46	>100	1605	16875	+1.91
1035	191	>100	1635	16813	+2.86
1065	540	>100	1665	17257	+2.60
1095	957	>100	1695	17425	+1.58
1125	1597	>100	1725	17238	+0.49
1155	2217	>100	1755	17230	+0.63
1185	3154	+98.74	1785	17482	+3.27
1215	4239	+89.75	1815	17468	+4.46
1245	5550	+79.98	1845	17977	
1275	6980	+73.12	1875	18163	



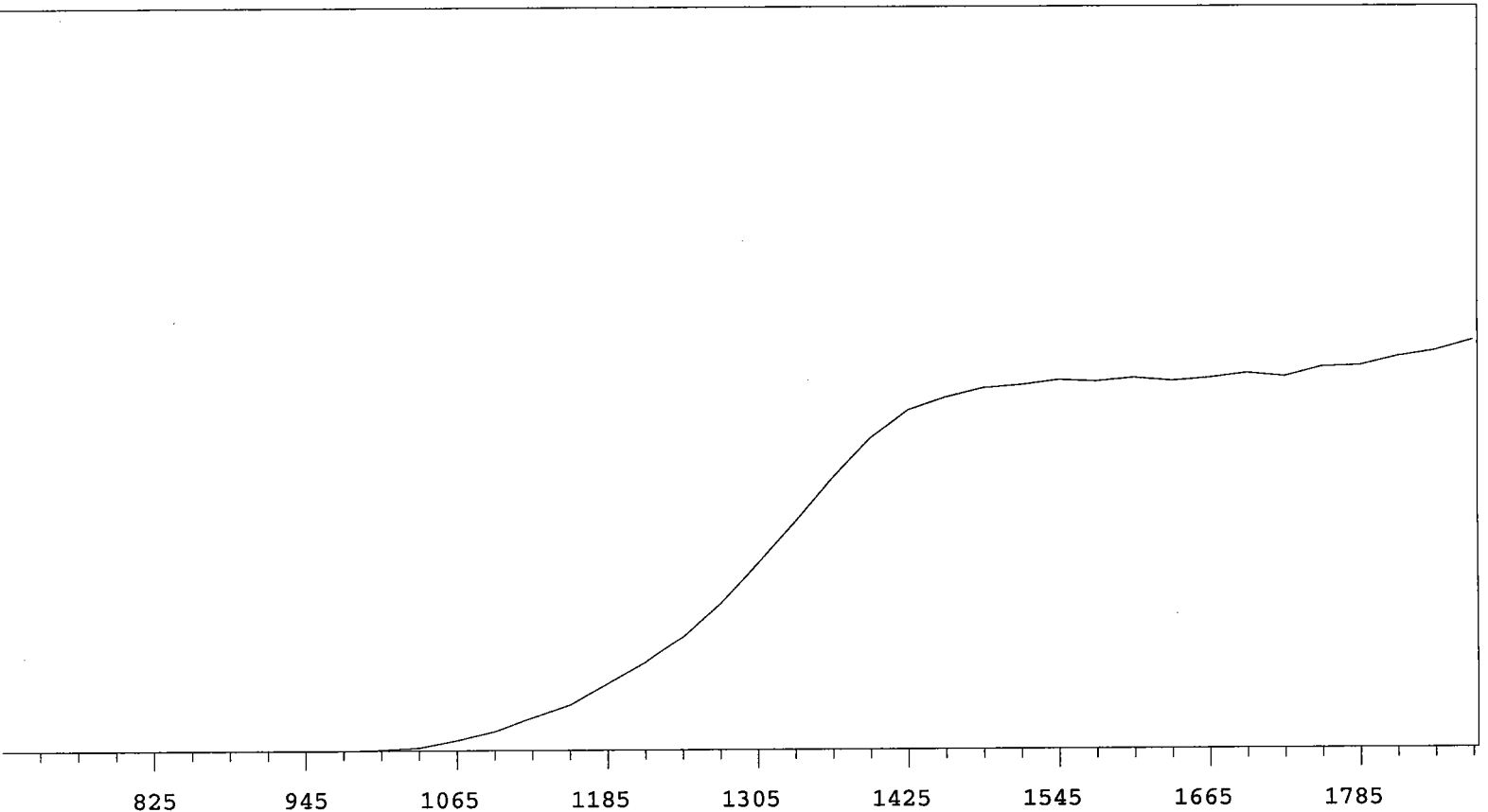
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	7679	+65.97
735	0		1335	9737	+57.57
765	0		1365	11301	+45.87
795	0	>100	1395	12767	+31.71
825	0	>100	1425	13767	+19.90
855	1	+83.33	1455	14399	+10.72
885	1	+55.56	1485	14467	+4.38
915	0	>100	1515	14671	+2.12
945	1	>100	1545	14576	+2.61
975	9	>100	1575	14808	+1.80
1005	60	>100	1605	14974	+3.15
1035	173	>100	1635	14872	+1.76
1065	480	>100	1665	15248	-0.41
1095	911	>100	1695	15067	-0.27
1125	1508	>100	1725	14784	-0.43
1155	2024	>100	1755	15044	+2.01
1185	2872	+97.38	1785	15163	+2.82
1215	3858	+89.30	1815	15333	+3.61
1245	5070	+78.02	1845	15278	
1275	6322	+73.30	1875	15817	

Alpha Volts: 705

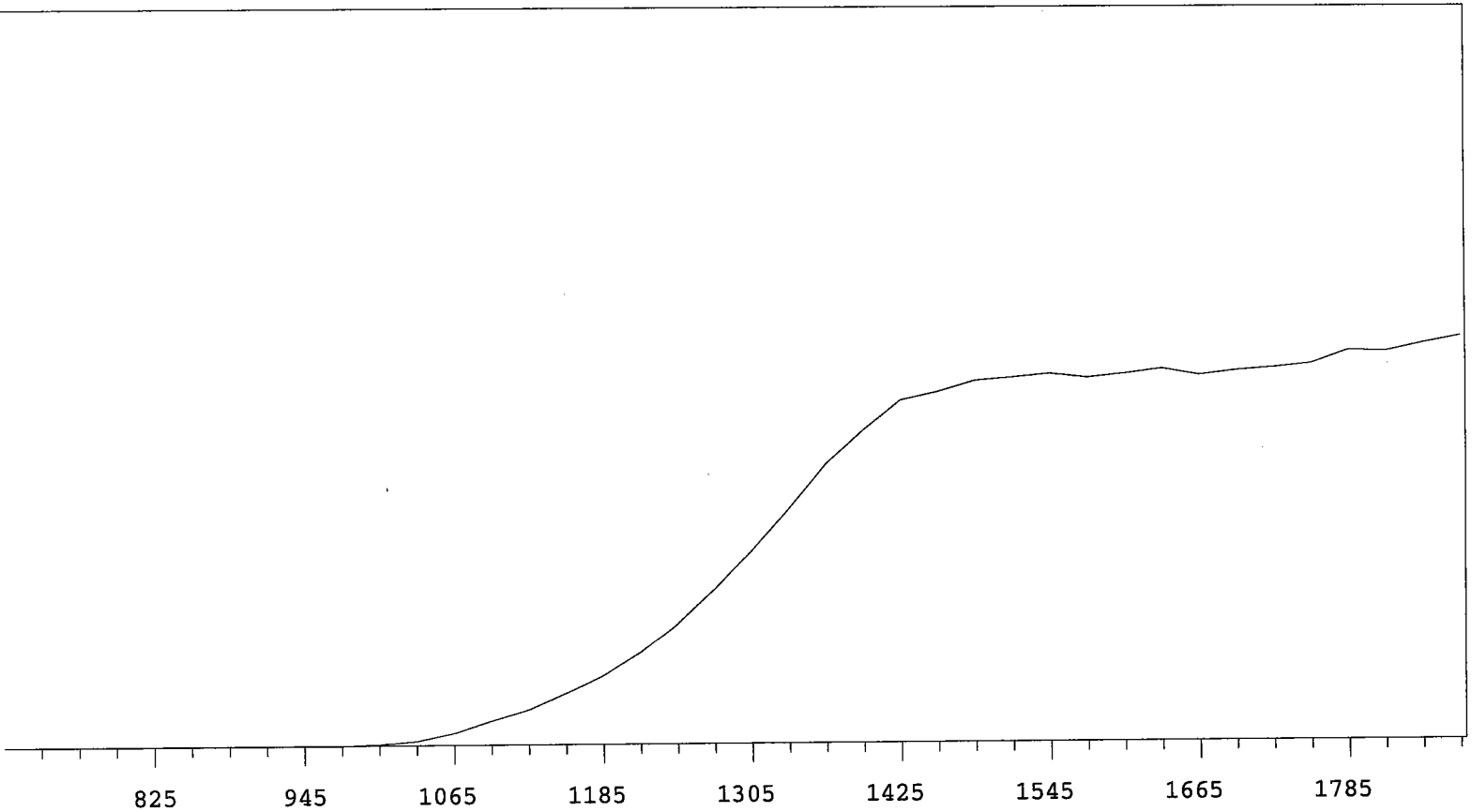
Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	6302	+80.03
735	1		1335	8191	+73.78
765	0		1365	10140	+66.18
795	0	>100	1395	12247	+55.83
825	0	>100	1425	14468	+43.92
855	0	>100	1455	16303	+31.28
885	0	>100	1485	17411	+18.64
915	0	>100	1515	18150	+9.87
945	0	>100	1545	18275	+5.30
975	1	>100	1575	18496	+3.16
1005	3	>100	1605	18685	+2.66
1035	17	>100	1635	18820	+2.63
1065	84	>100	1665	18855	+4.16
1095	267	>100	1695	19152	+7.70
1125	709	>100	1725	19706	+13.90
1155	1299	>100	1755	20640	+26.51
1185	1813	>100	1785	22308	+40.92
1215	2638	>100	1815	26460	+51.46
1245	3777	+96.47	1845	31616	
1275	4915	+87.98	1875	37348	



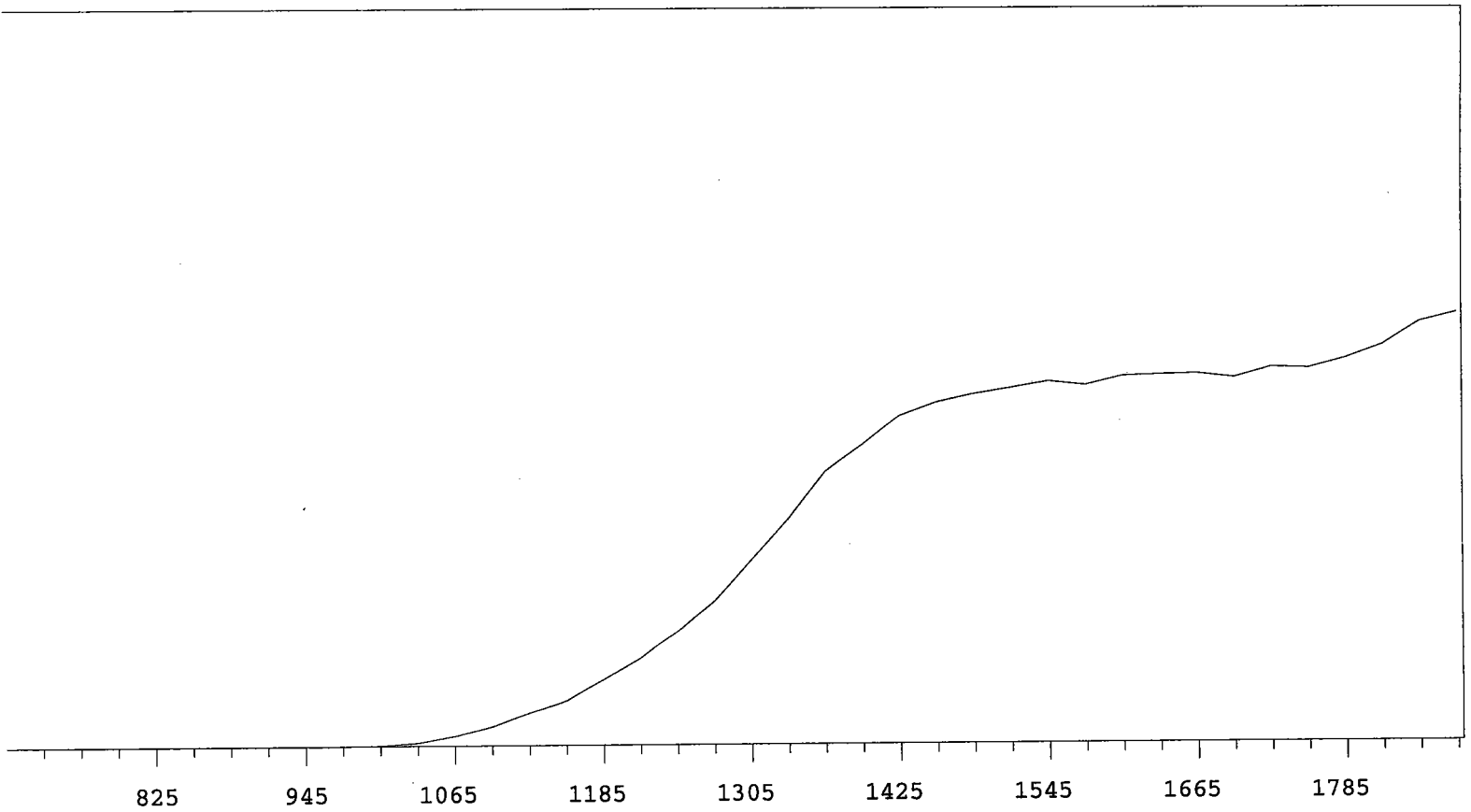
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	10207	+70.42
735	0		1335	12473	+60.75
765	0		1365	14900	+48.87
795	0	>100	1395	17101	+35.36
825	0	>100	1425	18643	+22.53
855	1	+83.33	1455	19350	+12.34
885	1	-83.33	1485	19848	+6.68
915	0	-55.56	1515	20014	+3.51
945	0	>100	1545	20278	+2.03
975	1	>100	1575	20186	+0.80
1005	43	>100	1605	20375	+0.32
1035	165	>100	1635	20209	+1.36
1065	557	>100	1665	20364	+0.83
1095	1055	>100	1695	20607	+2.43
1125	1775	>100	1725	20429	+2.51
1155	2470	>100	1755	20924	+3.64
1185	3617	+98.46	1785	20984	+5.11
1215	4757	+90.95	1815	21470	+5.63
1245	6186	+83.59	1845	21773	
1275	8021	+77.85	1875	22346	



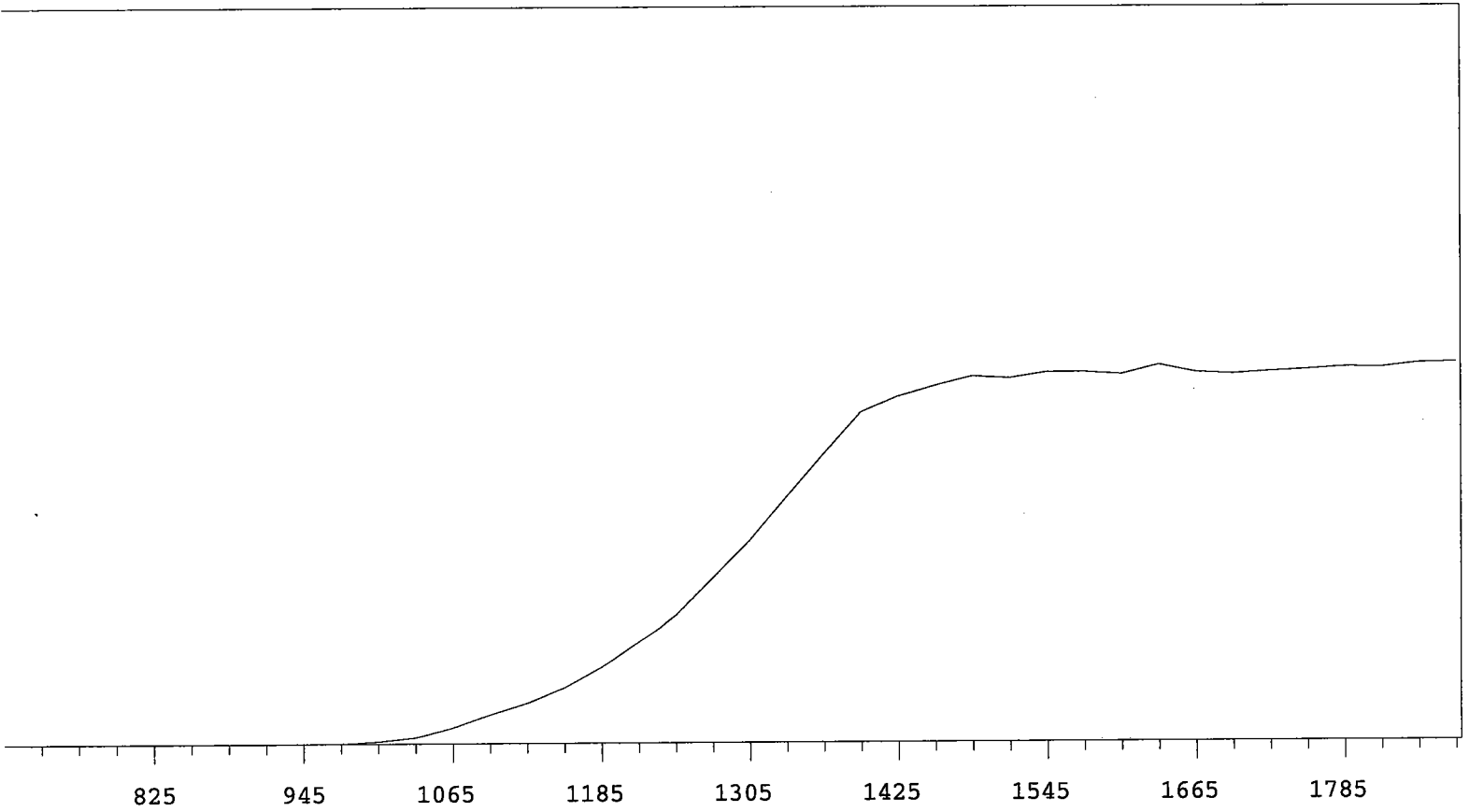
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	9543	+67.01
735	0		1335	11617	+56.47
765	0		1365	13791	+45.47
795	0	>100	1395	15387	+31.66
825	0	>100	1425	16819	+20.02
855	0	>100	1455	17210	+11.63
885	1	+0.00	1485	17742	+6.05
915	0	>100	1515	17892	+3.04
945	0	>100	1545	18070	+1.09
975	7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

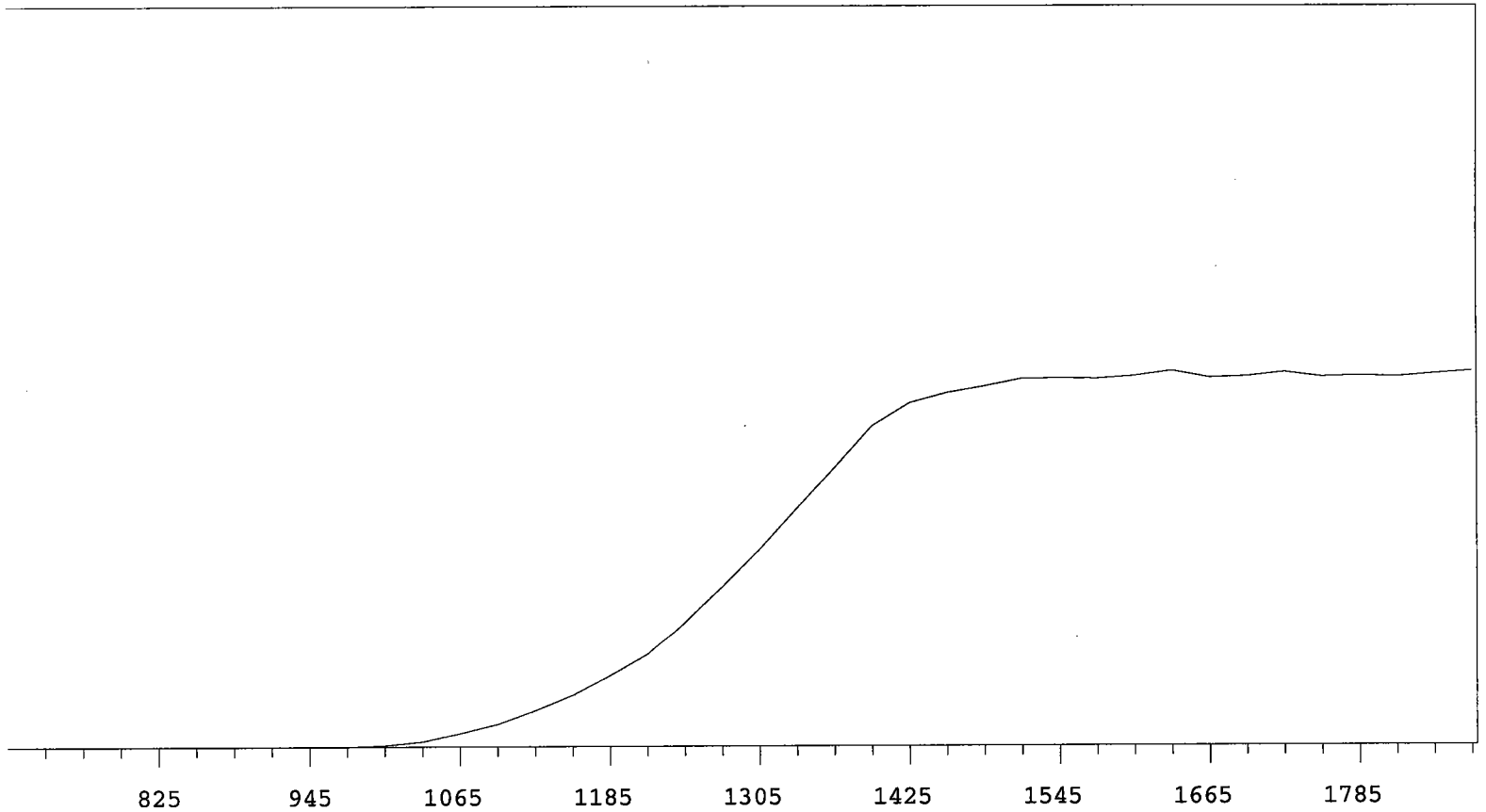
Beta Volts: 1515



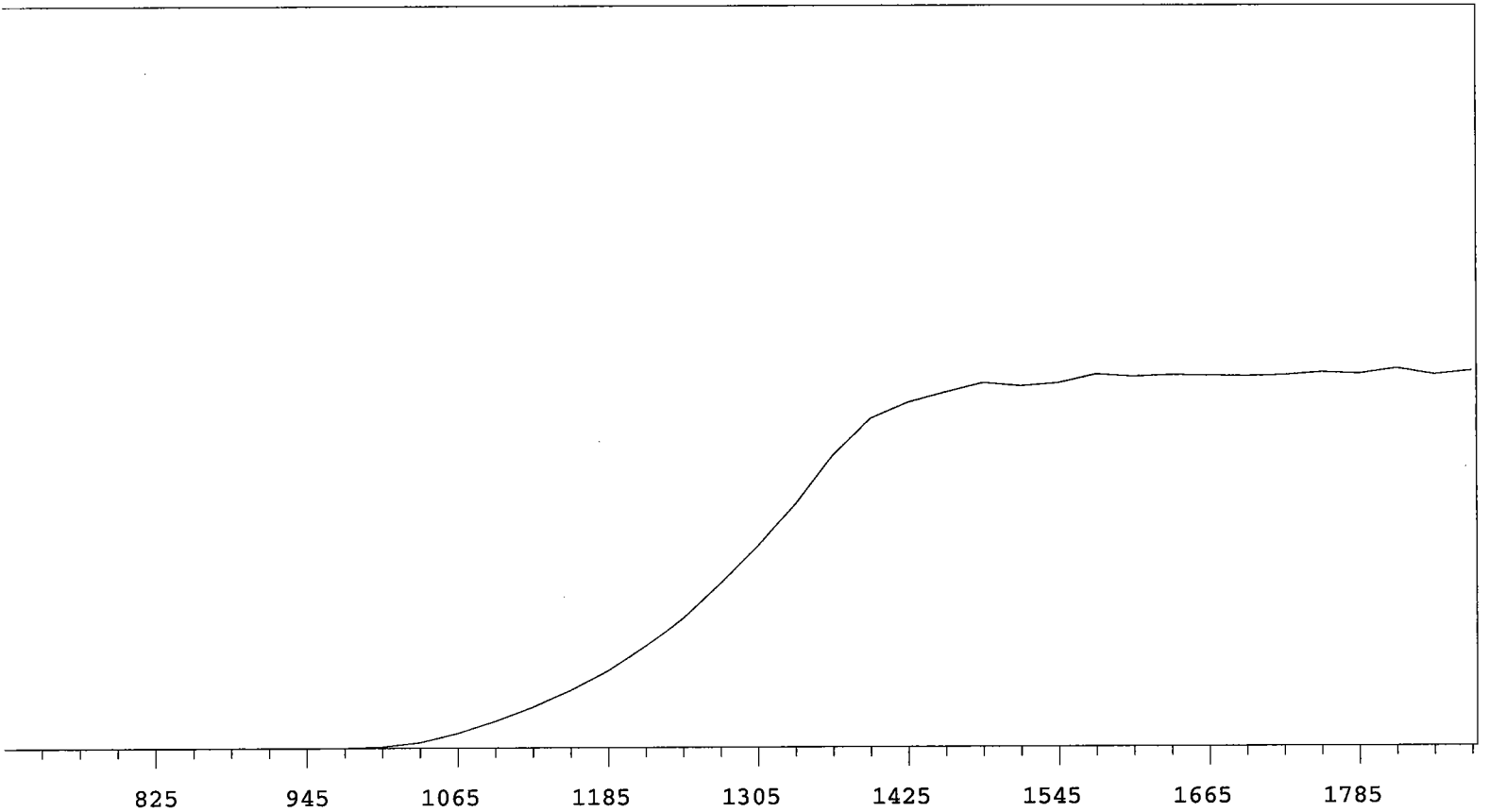
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9144	+69.92
735	0		1335	11120	+58.43
765	0		1365	13399	+45.40
795	0	>100	1395	14711	+32.57
825	0	>100	1425	16134	+20.69
855	0	>100	1455	16805	+13.46
885	0	>100	1485	17209	+7.90
915	0	>100	1515	17500	+4.31
945	0	>100	1545	17812	+3.48
975	4	>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	



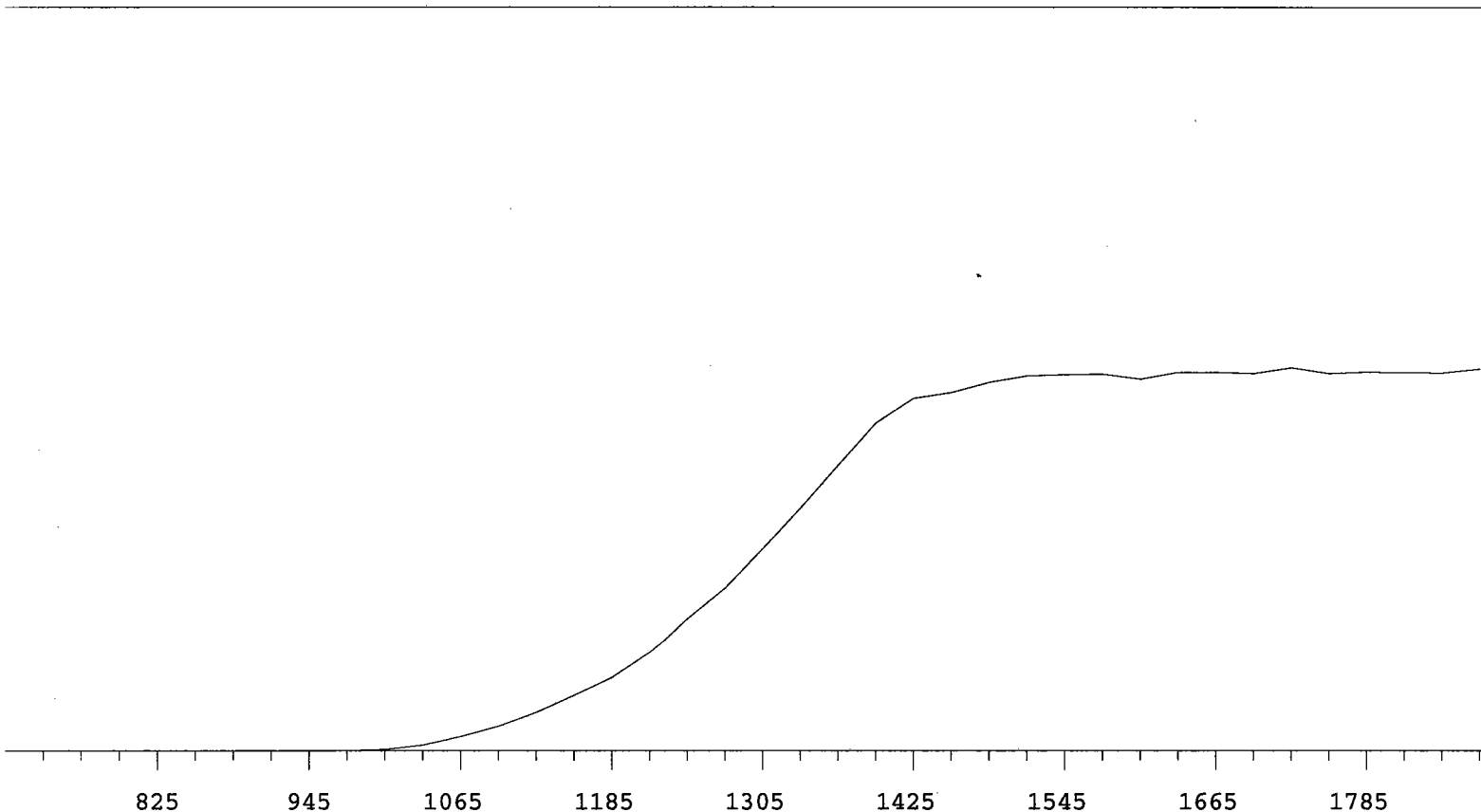
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9666	+64.39
735	0		1335	11722	+55.91
765	0		1365	13680	+44.91
795	0	>100	1395	15677	+31.56
825	0	>100	1425	16786	+19.46
855	0	>100	1455	17283	+10.57
885	0	>100	1485	17608	+5.95
915	1	>100	1515	17972	+3.32
945	0	>100	1545	18006	+1.84
975	4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



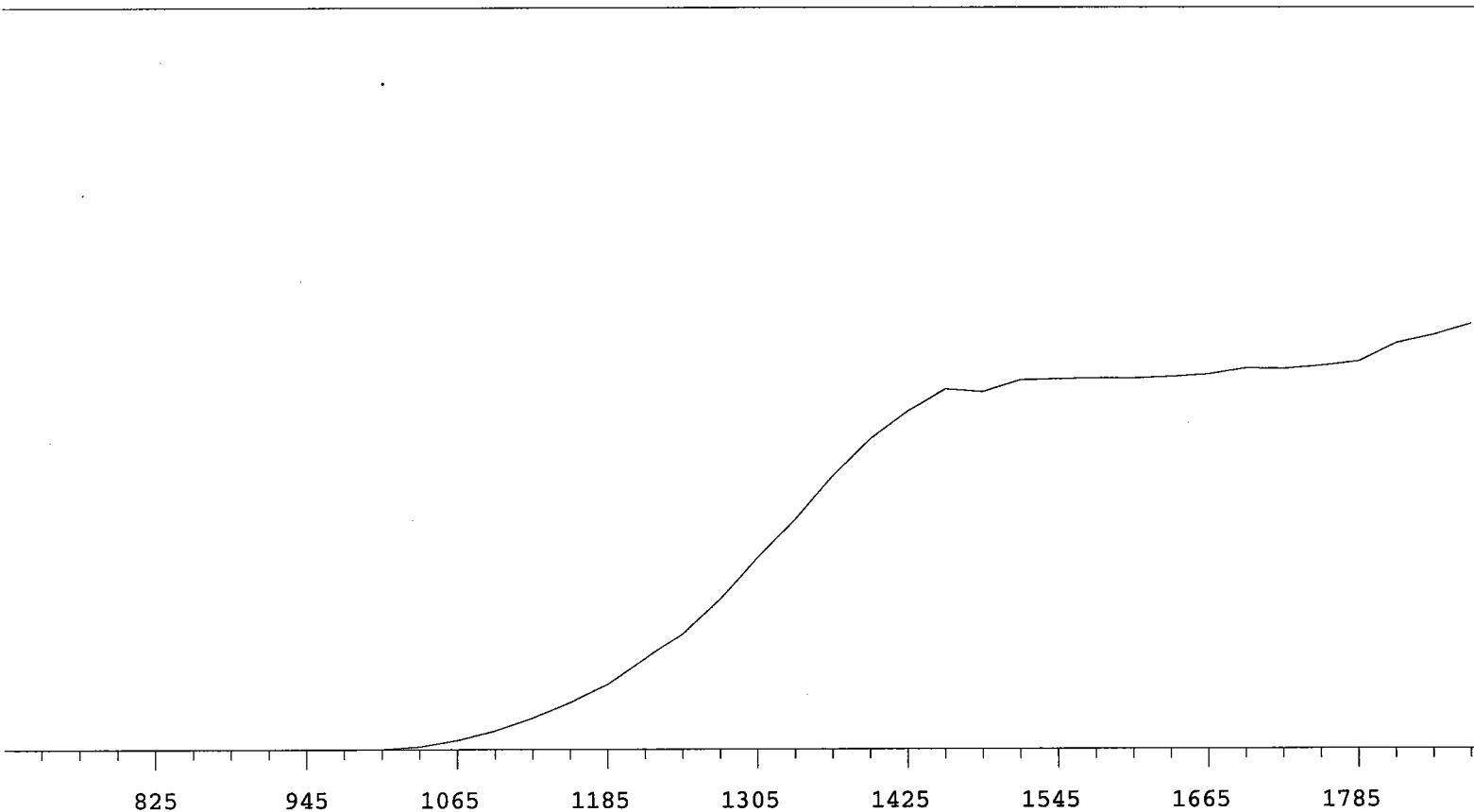
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	11573	+64.95
735	0		1335	13929	+56.47
765	0		1365	16726	+43.82
795	0	>100	1395	18834	+29.38
825	0	>100	1425	19743	+16.84
855	0	>100	1455	20314	+7.95
885	0	>100	1485	20860	+4.16
915	0	>100	1515	20670	+3.23
945	0	>100	1545	20844	+2.09
975	9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



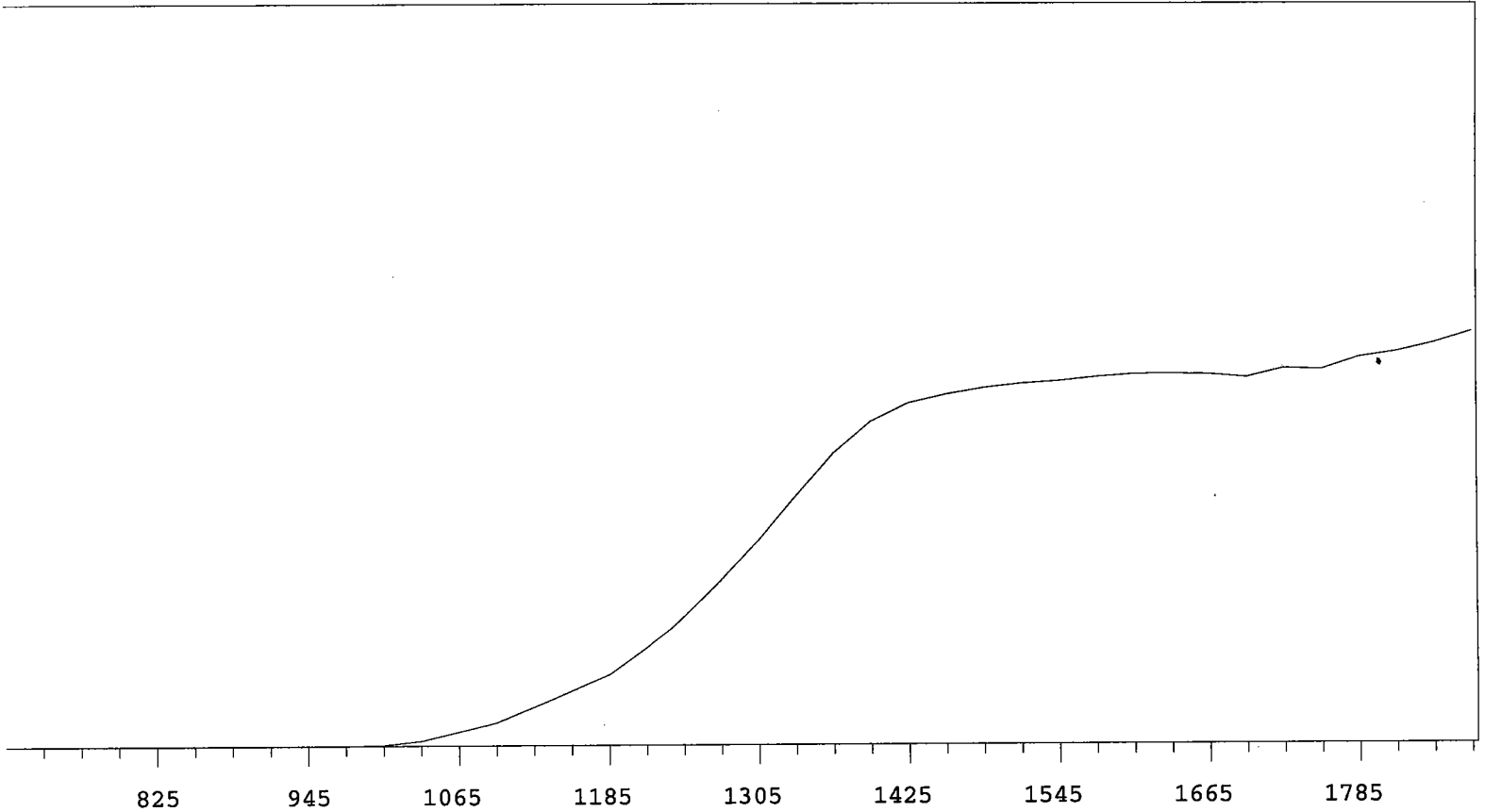
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	7524	+61.93
735	0		1335	9002	+55.36
765	0		1365	10542	+44.70
795	0	>100	1395	12064	+31.21
825	0	>100	1425	12981	+19.20
855	0	>100	1455	13192	+10.41
885	0	>100	1485	13570	+5.93
915	0	>100	1515	13820	+4.08
945	0	>100	1545	13866	+0.75
975	9	>100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



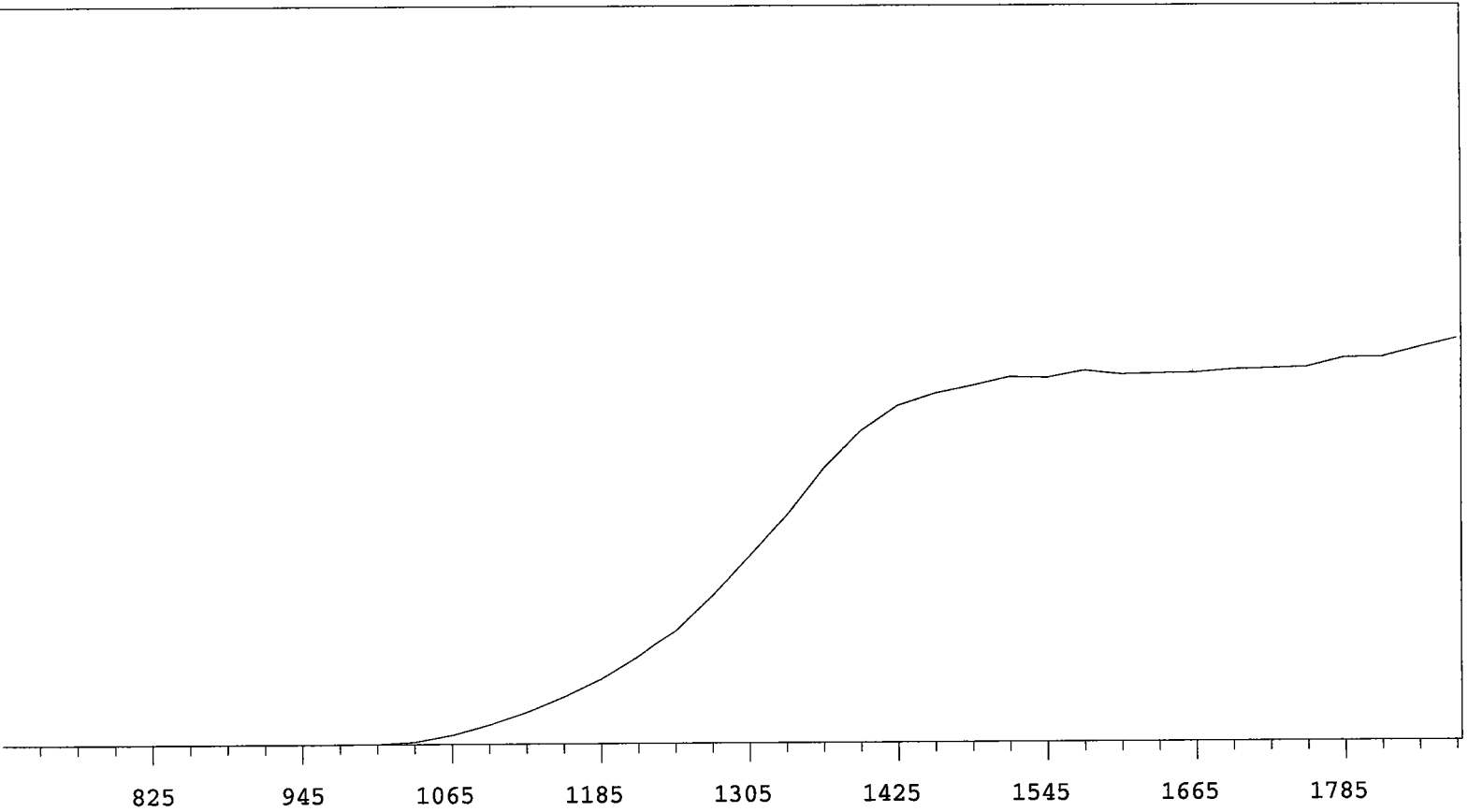
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8778	+67.49
735	0		1335	10502	+57.68
765	0		1365	12516	+46.36
795	0	>100	1395	14215	+35.88
825	0	>100	1425	15472	+22.01
855	0	>100	1455	16469	+12.99
885	1	+0.00	1485	16342	+6.70
915	0	>100	1515	16874	+3.07
945	0	>100	1545	16918	+2.53
975	0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

Alpha Volts: 705

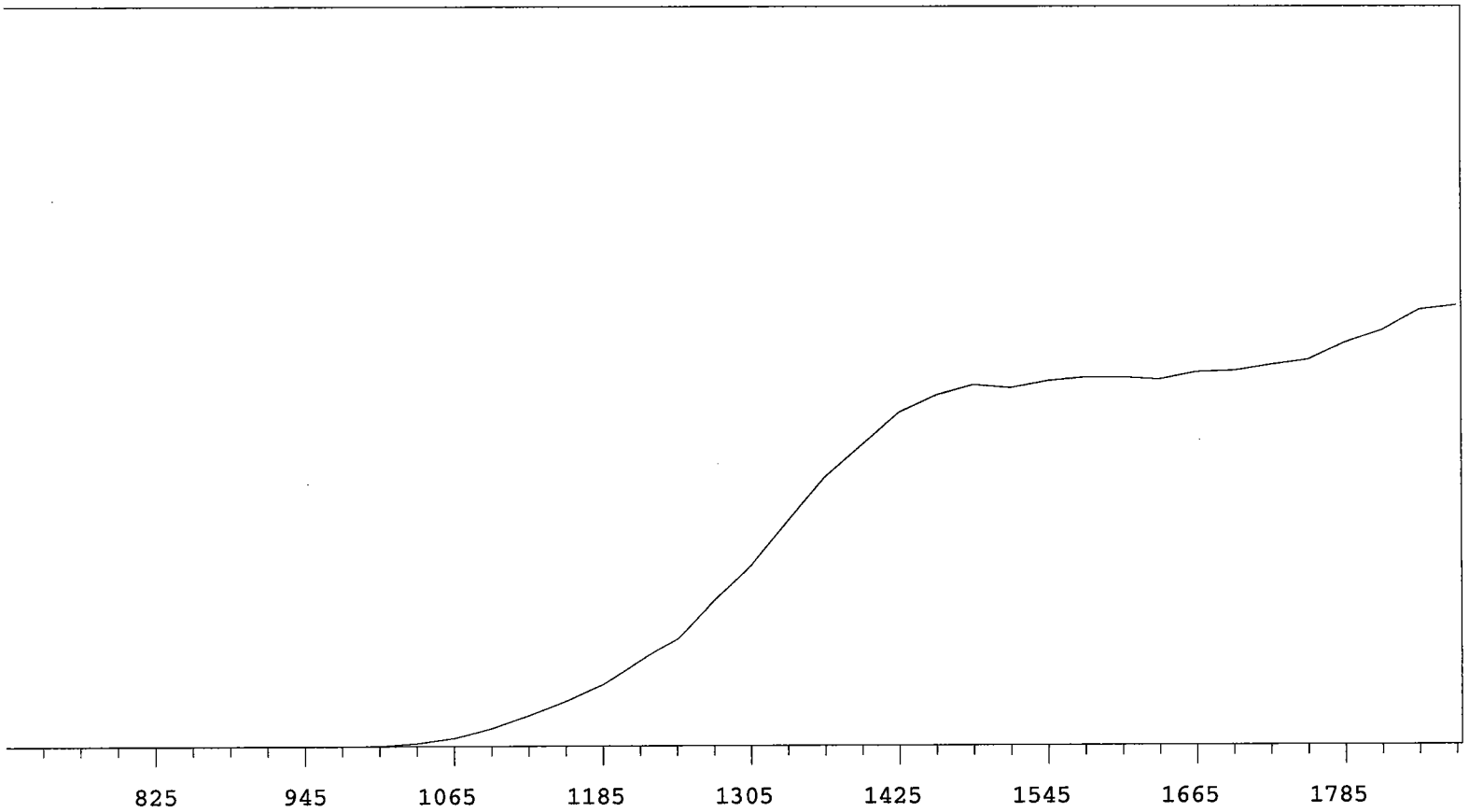
Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8797	+65.44
735	0		1335	10726	+54.47
765	0		1365	12570	+41.11
795	0	>100	1395	13917	+26.79
825	0	>100	1425	14687	+15.44
855	1	+0.00	1455	15048	+8.47
885	0	>100	1485	15318	+5.00
915	0	>100	1515	15494	+3.76
945	0	>100	1545	15606	+3.04
975	3	>100	1575	15776	+2.35
1005	40	>100	1605	15889	+1.44
1035	210	>100	1635	15907	-0.16
1065	590	>100	1665	15881	+0.64
1095	983	>100	1695	15741	+1.21
1125	1645	>100	1725	16124	+3.63
1155	2342	>100	1755	16076	+5.41
1185	3045	+96.43	1785	16588	+5.79
1215	4201	+90.42	1815	16830	+7.53
1245	5579	+83.64	1845	17185	
1275	7121	+74.44	1875	17682	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	10118	+69.76
735	0		1335	12269	+59.65
765	0		1365	14810	+47.35
795	0	>100	1395	16773	+33.46
825	0	>100	1425	18104	+20.13
855	0	>100	1455	18720	+11.98
885	1	+0.00	1485	19122	+6.50
915	0	>100	1515	19580	+4.77
945	0	>100	1545	19527	+2.48
975	2	>100	1575	19902	+0.81
1005	21	>100	1605	19690	+0.53
1035	132	>100	1635	19739	+0.23
1065	491	>100	1665	19765	+1.29
1095	1036	>100	1695	19932	+1.40
1125	1698	>100	1725	19976	+2.72
1155	2517	>100	1755	20051	+2.92
1185	3468	>100	1785	20523	+4.26
1215	4721	+91.83	1815	20542	+5.57
1245	6175	+85.13	1845	21035	
1275	8025	+76.82	1875	21528	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8095	+71.16
735	0		1335	10052	+58.38
765	0		1365	11990	+47.92
795	0	>100	1395	13400	+35.01
825	0	>100	1425	14808	+23.58
855	0	>100	1455	15554	+13.45
885	0	>100	1485	15987	+6.39
915	0	>100	1515	15861	+3.45
945	0	>100	1545	16156	+2.18
975	1	>100	1575	16297	+1.72
1005	14	>100	1605	16297	+1.33
1035	130	>100	1635	16208	+1.62
1065	363	>100	1665	16526	+2.92
1095	785	>100	1695	16581	+3.94
1125	1357	>100	1725	16832	+5.91
1155	1996	>100	1755	17039	+8.68
1185	2735	+99.45	1785	17800	+11.53
1215	3785	+94.20	1815	18351	+11.46
1245	4857	+86.43	1845	19265	
1275	6571	+78.80	1875	19468	

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

66002-278

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Ra-228
ACTIVITY (dps):	2.367 E4
HALF-LIFE:	5.75 years
CALIBRATION DATE:	April 23, 2003 12:00 EST
TOTAL UNCERTAINTY*:	2.4%

*95% Confidence Level

Impurities: γ -impurities (other than decay products) <0.1%,
Ra-226 <0.1%

5.31628 grams 4M HCl solution with 100 μ g/g Ba carrier.

P O NUMBER 3219 RD, Item 1

SOURCE PREPARED BY:

M. Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED:

J.M. Muth 4-23-03



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0553-A	Isotope:	Radium-228 SPIKE
Prepared By:	Lonnie Morris	Prepared By:	Lonnie Morris
Carrier Conc:	0.5M HCl	Prep Date:	04/25/2003
Reference Date:	04/23/2003	Verification Date:	04/27/2005
Ampoule Mass (g):	5.0235 g	Expiration Date:	04/27/2006
Uncertainty:	+/-	Primary Code:	0553-B
LogBook No:	RC-S-035-068	Dilution(mL):	1000 mL
		Mass of Parent(g):	30.535 g
		Density(g/mL):	
		Balance ID:	

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

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

Secondary Standards

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

GEL Laboratories LLC
Version 1.0 9/18/2000

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

64673-278

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Ra-228
ACTIVITY (dps):	1.939 E4
HALF-LIFE:	5.75 years
CALIBRATION DATE:	October 1, 2002 12:00 EST
TOTAL UNCERTAINTY*:	3.6%
SYSTEMATIC:	3.4%
RANDOM:	1.1%

*99% Confidence Level

Impurities: γ -impurities <0.1%

5.02617 grams 0.1M HCl solution with 110 $\mu\text{g/g}$ Ba carrier.

P O NUMBER 3208RD, Item 2

SOURCE PREPARED BY: M. Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED:

M. M. Ty 10202



Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0503	Isotope:	Radium-228
Prepared By:	Angela Johnson	Prepared By:	Angela Johnson
Carrier Conc:	0.1 M HCL	Prep Date:	02/20/2003
Reference Date:	10/01/2002	Verification Date:	04/09/2004
Ampoule Mass (g):	5.02617 g	Expiration Date:	04/09/2005
Uncertainty:	+/- 3.6 %	Primary Code:	0503-A
LogBook No:	RC S 035 018	Dilution(mL):	100 mL
		Mass of Parent(g):	4.4737 g
		Density(g/mL):	0.9992
		Balance ID:	

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

$(\text{Mass of parent(g)}) * (\text{Parent Activity (dps)}) * (\text{conversion dpm to dps}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parent Activity (dps)}) * (\text{conversion dpm to dps}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.4737 \text{ g}) * (19390 \text{ dps}) * (60 \text{ dpm/dps}) / (5.02617 \text{ g} * 100 \text{ mL}) = 10355.2060 \text{ dpm/mL}$
$(4.4737 \text{ g}) * (19390 \text{ dps}) * (60 \text{ dpm/dps}) / (0.9992 \text{ g/mL}) / (5.02617 \text{ g} * 100 \text{ mL}) = 10363.0820 \text{ dpm/g}$

Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
04/02/2003	Lonnie Morris	39.71	1000	0503-B	411.518 dpm/mL	09/13/2008	09/13/2009

GEL Laboratories LLC
Version 1.0 9/18/2000

Verification for Ra-228 Standard 0503-B

D. Roy 9/13/2008	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass. Used (mL)	Standard Source DPM/mL
	0503-B	1962.0000	45.6000	1916.4000	9.263763	1.0000 206.8705773
	0503-B	1983.2000	45.6000	1937.6000	9.263763	1.0000 209.1590642
	0503-B	1927.0000	45.6000	1881.4000	9.263763	1.0000 203.092415

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 S. J. 9/16/08

Angela Johnson 9/17/08

5/19/16
28

16 SEP 2008 16:24

ID: TOTAL ACTIVITY

USER:11 COMMENT:GOLD

PRESET TIME : 5.00

DATA CALC : CPM H# :YES SAMPLE REPEATS: 1 PRINTER : STD

COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 :EDIT

TWO PHASE : NO AQC : NO CYCLE REPEATS : 1 DISK : OFF

SCINTILLATOR: LIQUID LUMEX:YES LOW SAMPLE REJ: 0

LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

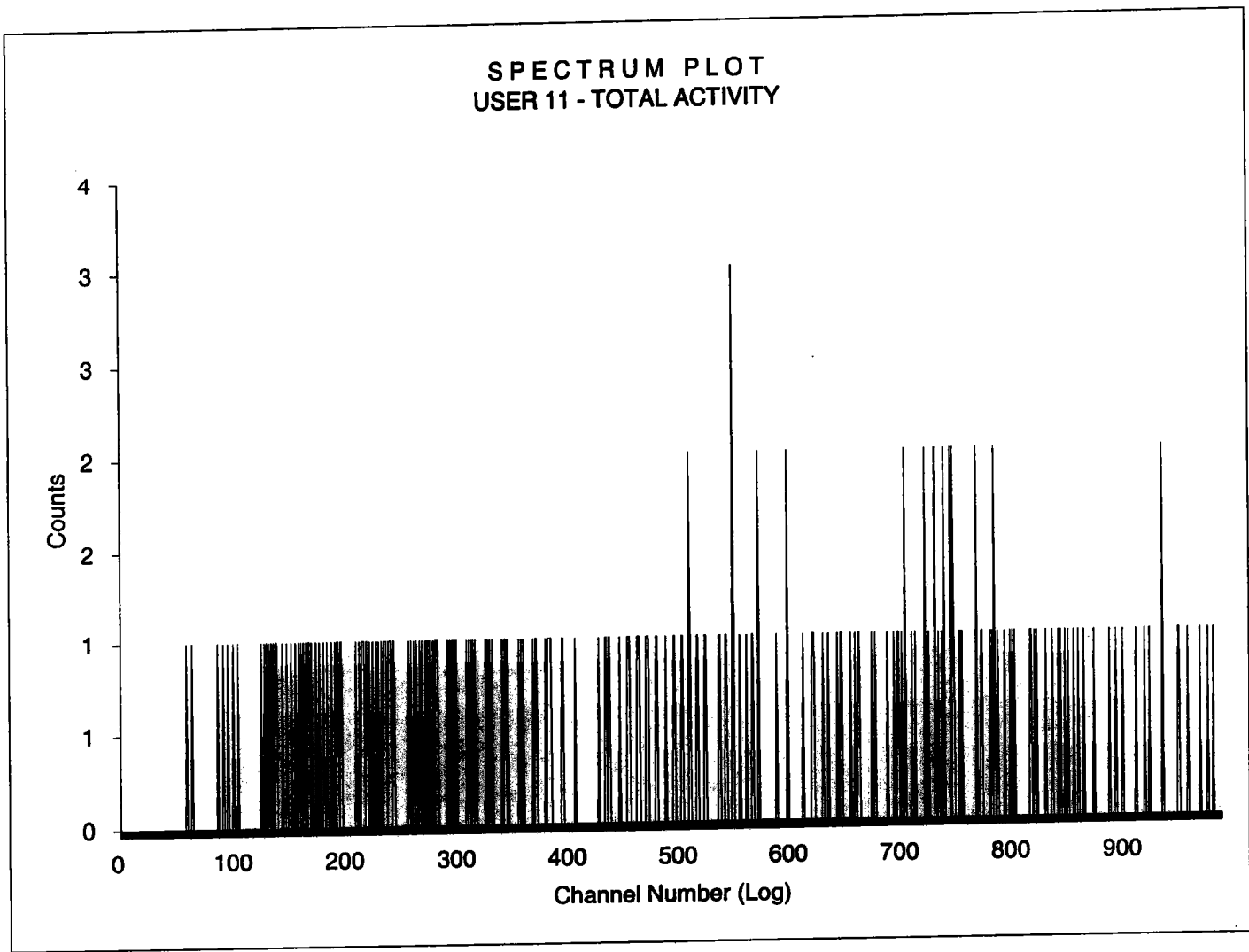
CHAN: 0.0 - 990.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

CHAN: 0.0 - 1000.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

SAM NO	POS	TIME MIN	H#	WIND1		WIND2		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
1	11-1	5.00	98.2	50.40	12.60	54.00	12.17	0.41	5.55
2	11-2	1.30	99.3	7802.31	1.99	7803.08	1.99	0.00	7.81
3	11-3	1.30	100.4	7782.31	1.99	7786.15	1.99	0.00	10.14
4	11-4	1.35	99.2	7581.48	1.98	7585.19	1.98	0.01	12.51
5	11-5	5.00	97.9	45.60	13.25	47.20	13.02	0.43	18.61
6	11-6	5.00	110.7	1962.00	2.02	1964.80	2.02	0.01	24.65
7	11-7	5.00	110.8	1983.20	2.01	1984.80	2.01	0.01	30.75
8	11-8	5.00	110.7	1927.00	2.04	1927.80	2.04	0.02	36.85

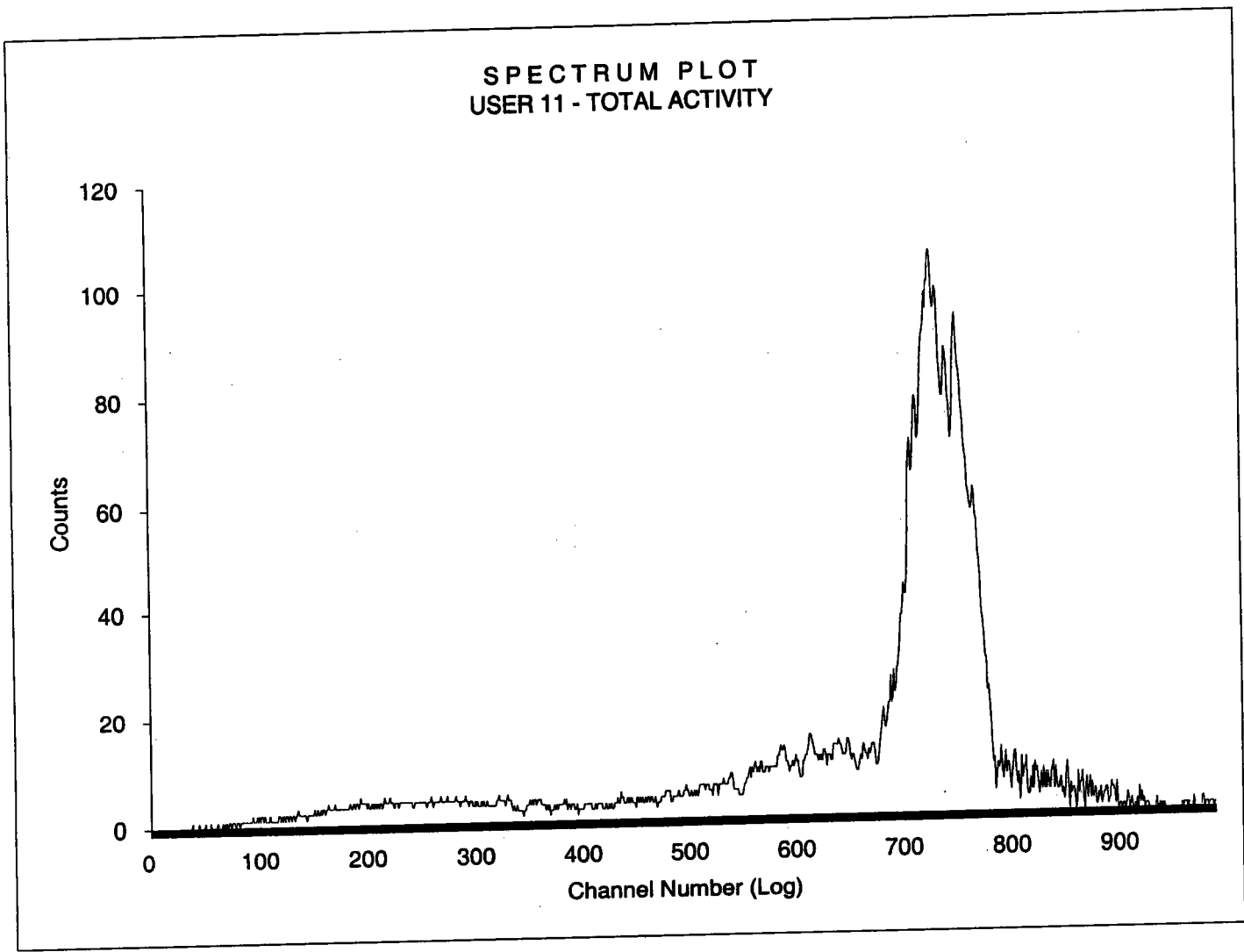
8/16/08
228

Sample Count Start Time: 16 Sep 2008 16:46:59
Data Capture Date: 9/16/2008 16:52:01
User Filename: S11091611-5A.WK1
U11091611-1A.WK1
Spectrum Type: Log Counts
User Number: 11
User Id: TOTAL ACTIVITY
User Comment: GOLD
Isotope Name: 14C
Scintillator: LIQUID
Sample, Rack-Pos, Time: 5 11-5 5.00
H#, Total Counts: 97.9 69
Start, End, X-Axis: 0 990 Channel Number



50/9/16
25

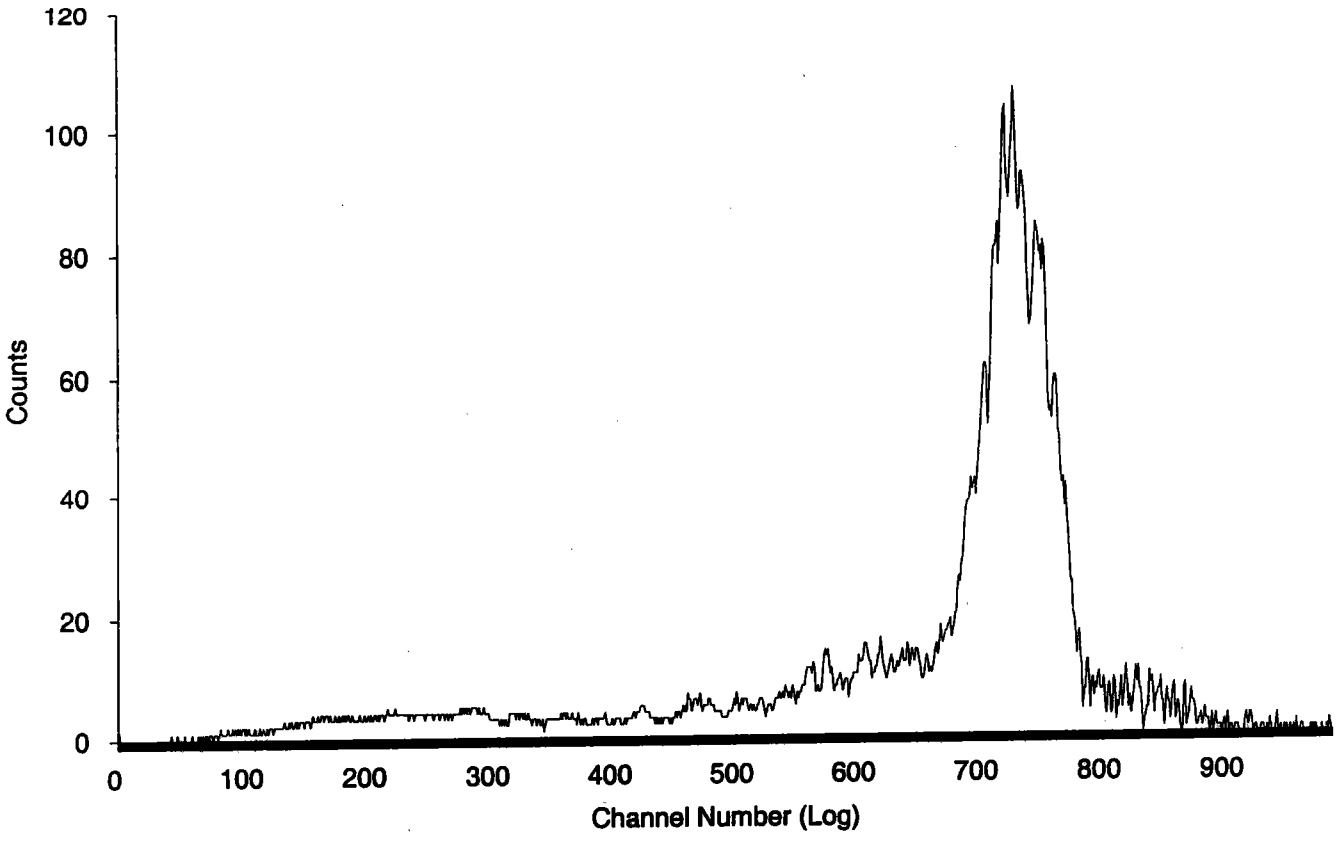
Sample Count Start Time: 16 Sep 2008 16:53:01
Data Capture Date: 9/16/2008 16:58:06
User Filename: S11091611-6A.WK1
U11091611-1A.WK1
Spectrum Type: Log Counts
User Number: 11
User Id: TOTAL ACTIVITY
User Comment: GOLD
Isotope Name: 14C
Scintillator: LIQUID
Sample, Rack-Pos, Time: 6 11-6 5.00
H#, Total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



8/16/08
SLS

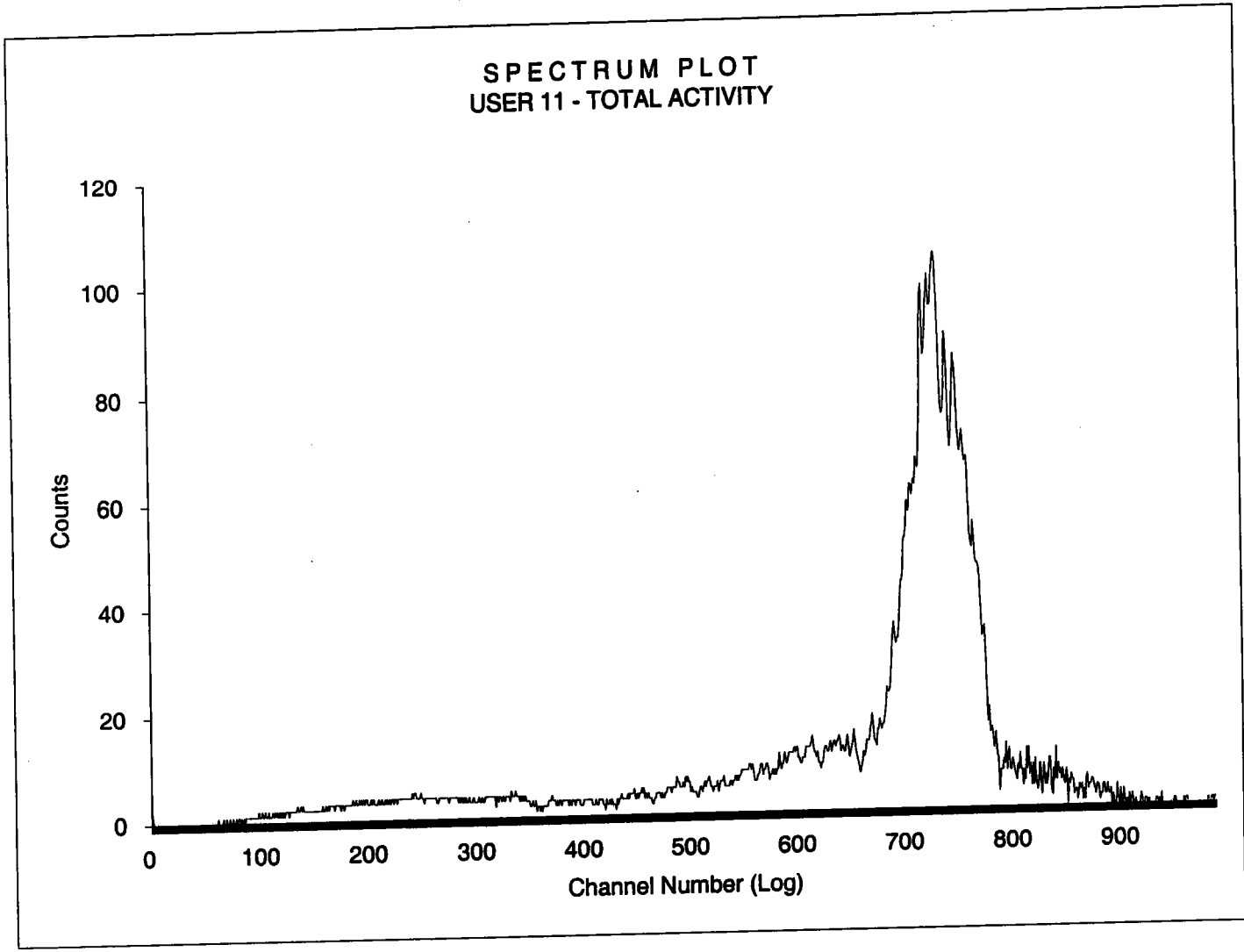
Sample Count Start Time: 16 Sep 2008 16:59:07
Data Capture Date: 9/16/2008 17:04:12
User Filename: S11091611-7A.WK1
U11091611-1A.WK1
Spectrum Type: Log Counts
User Number: 11
User Id: TOTAL ACTIVITY
User Comment: GOLD
Isotope Name: 14C
Scintillator: LIQUID
Sample, Rack-Pos, Time: 7 11-7 5.00
H#, Total Counts: 110.8 7726
Start, End, X-Axis: 0 990 Channel Number

SPECTRUM PLOT
USER 11 - TOTAL ACTIVITY



9/16/08
11-8

Sample Count Start Time: 16 Sep 2008 17:05:13
Data Capture Date: 9/16/2008 17:10:18
User Filename: S11091611-8A.WK1
U11091611-1A.WK1
Spectrum Type: Log Counts
User Number: 11
User Id: TOTAL ACTIVITY
User Comment: GOLD
Isotope Name: 14C
Scintillator: LIQUID
Sample, Rack-Pos, Time: 8 11-8 5.00
H#, Total Counts: 110.7 7557
Start, End, X-Axis: 0 990 Channel Number



Radium-228 Que Sheet

SR 6/30/09

Batch #: 881540 Analyst: DXM2 Internal Due Date: 07/03/2009
 Spike Isotope: Radium-228 Spike Code: NA Ac-228 Ingrow: 2025 6/30/09
 LCS Isotope: Radium-228 LCS Code: 0503-B Expiration Date: 9/13/09
 Tracer Isotope: Barium-133 Tracer Code: 0112-2 Expiration Date: 2/17/10
 Prep Date: 6/30/09 Initials: JRS Pipet ID: 1734212 Balance ID: NA Ac-228 Separation Date/Time: 7-2-09 0540
 Witness: JRS 6/30/09

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		107.70	
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

[Signature] 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. Isteps	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. Isteps	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. Isteps	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	0.000000E+00	0.000000E+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. Isteps	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. Isteps	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. Isteps	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. Isteps	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. Isteps	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. Isteps	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 115		
	Detector	:	45-132FF4		
	Calibration Date/Time	:	14-OCT-2009 12:51:52		
	Calibration Source Id	:	AESS-002		
Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy	
GD-148	6445-278	2/28/10	3183.000	3183.000	
NP-237	4341	2/28/10	4768.800	4768.799	
CM-244	4320A	2/28/10	5795.020	5795.021	

Energy/Channel Equation	:	see above
Energy Calibration Zero	:	2331.366
Energy Calibration Slope	:	4.982347
Energy Calibration Quadratic	:	2.6142588E-04
Energy Calibration Range	:	7707.000

Subsection 2: Background Calibration

Instrument : CHAMBER 115
Detector : 45-132FF4
Background Analysis Date/Time : 11-OCT-2009 12:29:31
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.540	3297.614	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.667	4903.630	4.000000	1.200000	50.00000	95.00000
CM-244	5531.528	5882.965	2.000000	0.6000000	70.71068	95.00000

Subsection 3: Efficiency Calibration

Instrument : CHAMBER 115
Detector : 45-132FF4
Standard ID : AESS-002
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 14-OCT-2009 07:13:39
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 14-OCT-2009 12:51:52
Average Efficiency : 0.2586680
Average Efficiency Error : 7.1179215E-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	2988.540	3297.614	15265.00	0.2581702	1.1094493E-02	48.60556
NP-237	200.4990	28-FEB-2010	4433.667	4903.630	15588.00	0.2591386	1.3122142E-02	59.05742
CM-244	196.5558	28-FEB-2010	5531.528	5882.965	14332.00	0.2588939	1.3124122E-02	55.45720

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

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	22.00000	6.600000	21.32007	95.00000
CM-244	5535.250	5882.471	13.00000	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	14.00000	4.200000	26.72612	95.00000
CM-244	5533.108	5887.023	12.00000	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	10.00000	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	15.00000	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. Isteps	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. Isteps	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. Isteps	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. Isteps	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. Isteps	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. Isteps	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. Isteps	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. Isteps	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. Isteps	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. Isteps	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. Isteps	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. Isteps	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

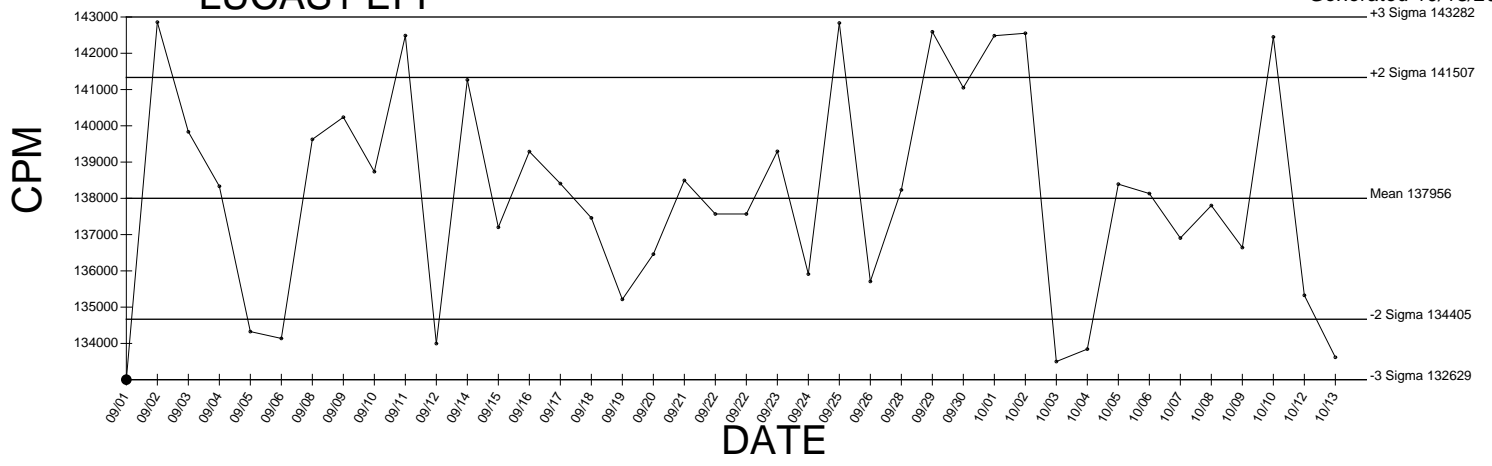
Instrument : CHAMBER 208
 Detector : 78911
 Standard ID : AESS-048
 Standard Reference Date : 19-FEB-2008 00:32:27
 Calibration Analysis Date/Time : 21-SEP-2009 09:33:08
 Calibration Count Time : 300.0000
 Efficiency Calibration Date/Time : 21-SEP-2009 14:56:00
 Average Efficiency : 0.2510063
 Average 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

BACKGROUND AND EFFICIENCY DATA

LUCAS1 EFF

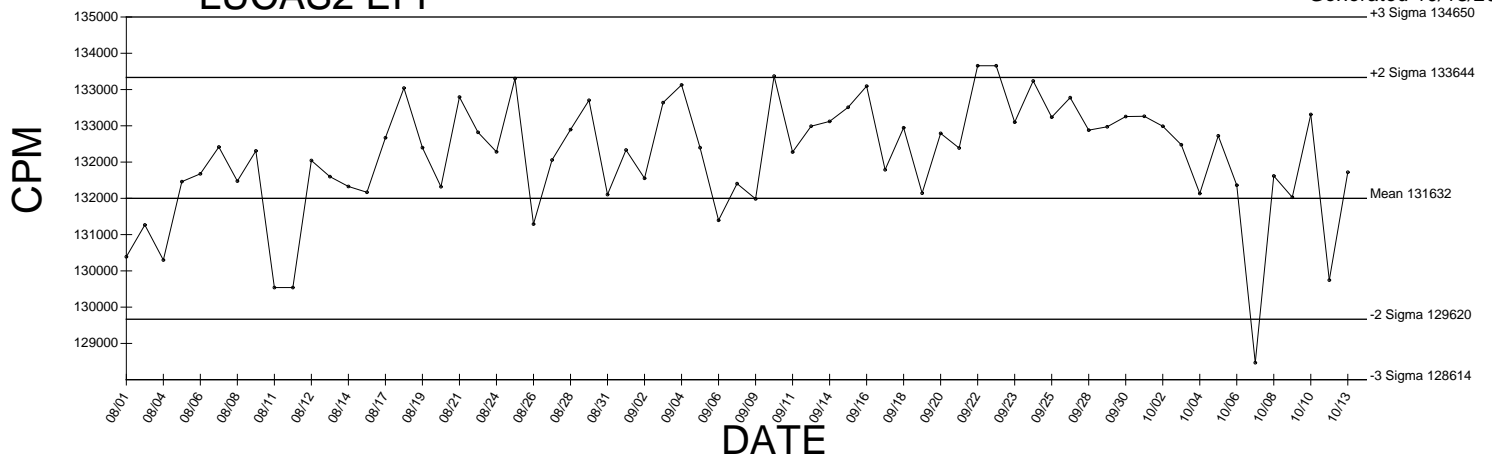
Generated 10/13/2009



● Denotes Outlier

LUCAS2 EFF

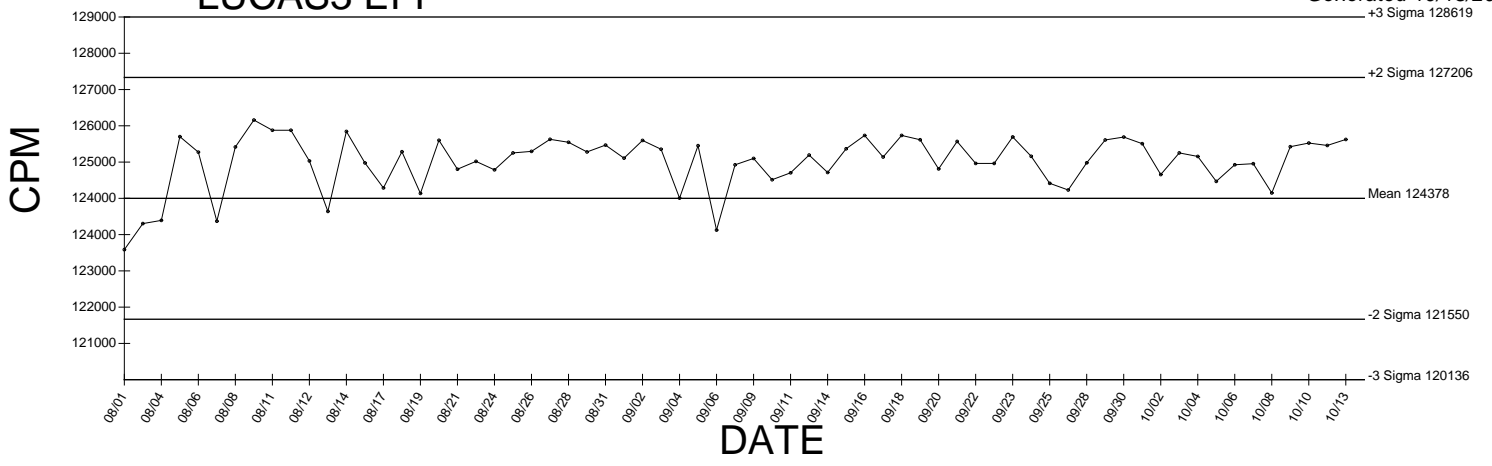
Generated 10/13/2009



● Denotes Outlier

LUCAS3 EFF

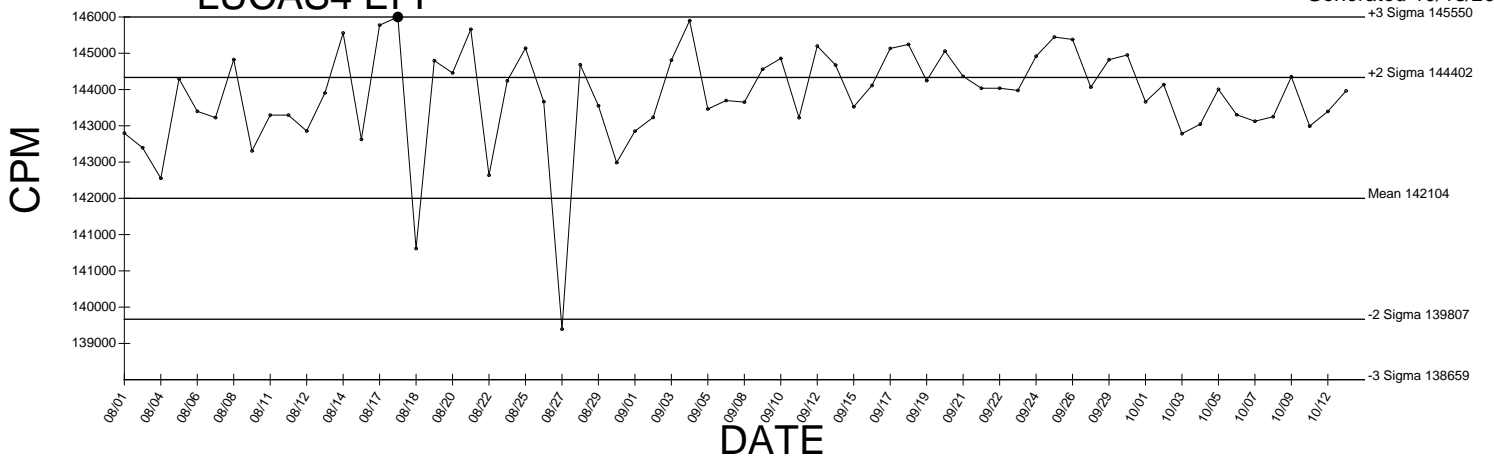
Generated 10/13/2009



● Denotes Outlier

LUCAS4 EFF

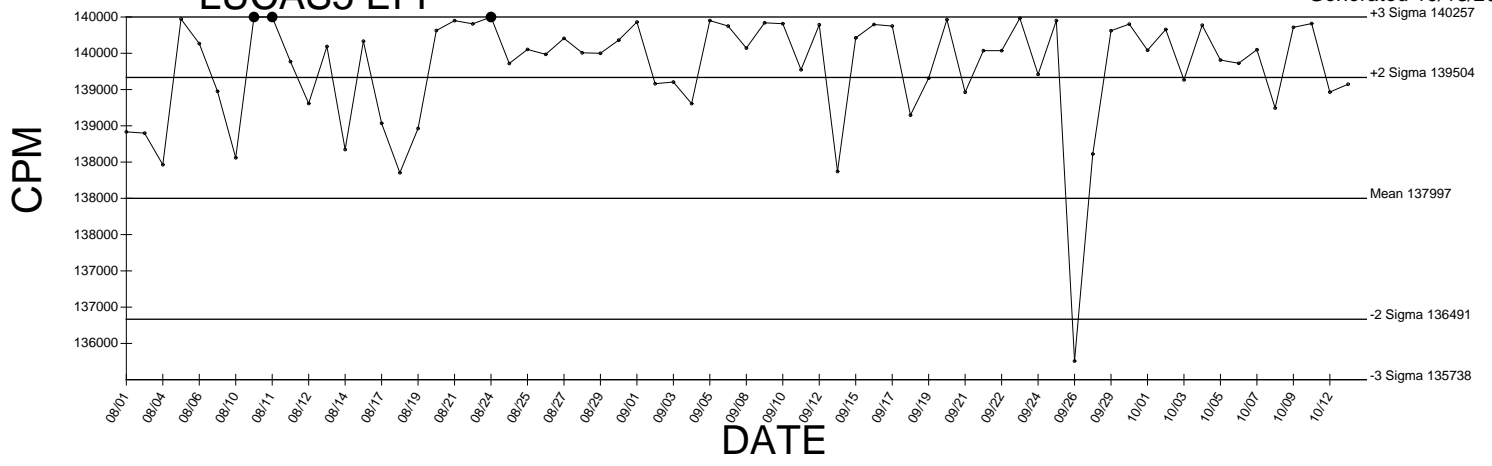
Generated 10/13/2009



● Denotes Outlier

LUCAS5 EFF

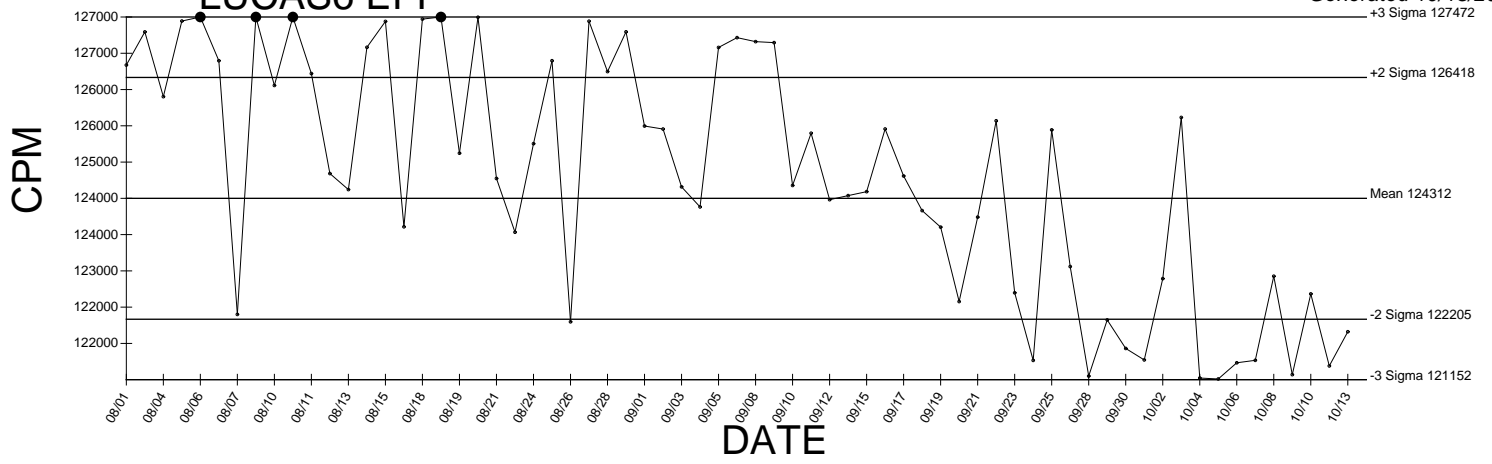
Generated 10/13/2009



● Denotes Outlier

LUCAS6 EFF

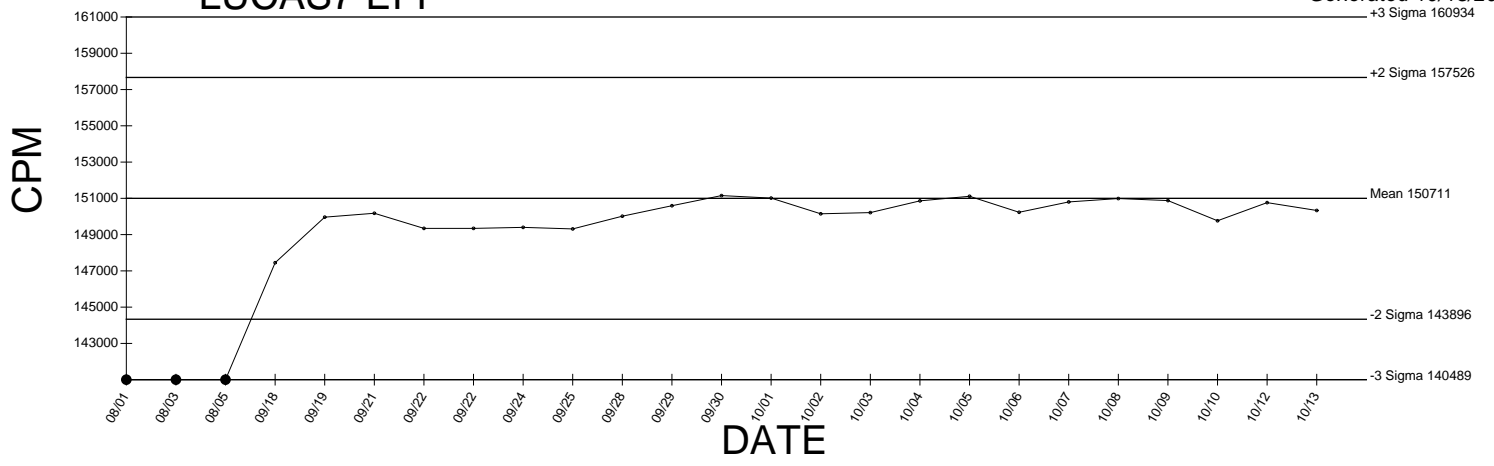
Generated 10/13/2009



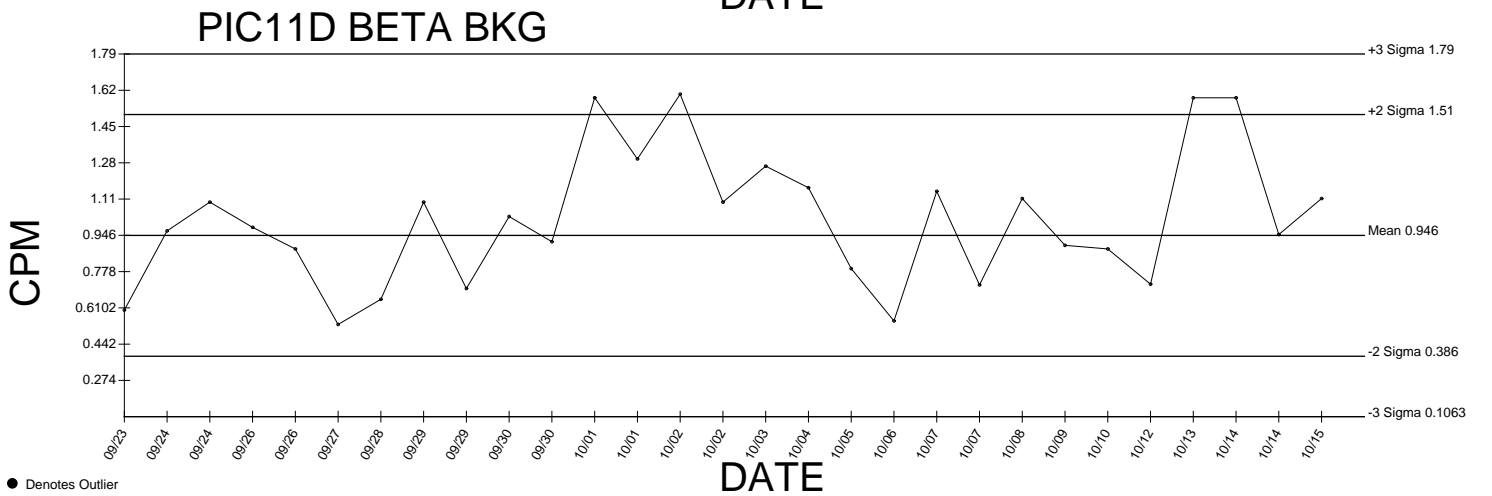
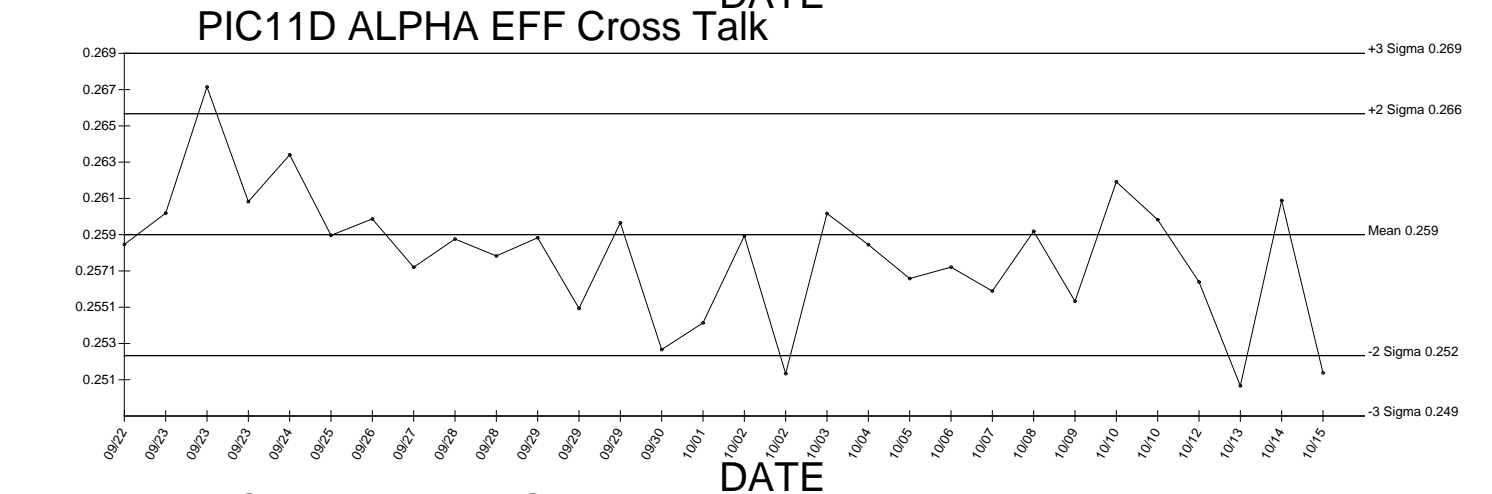
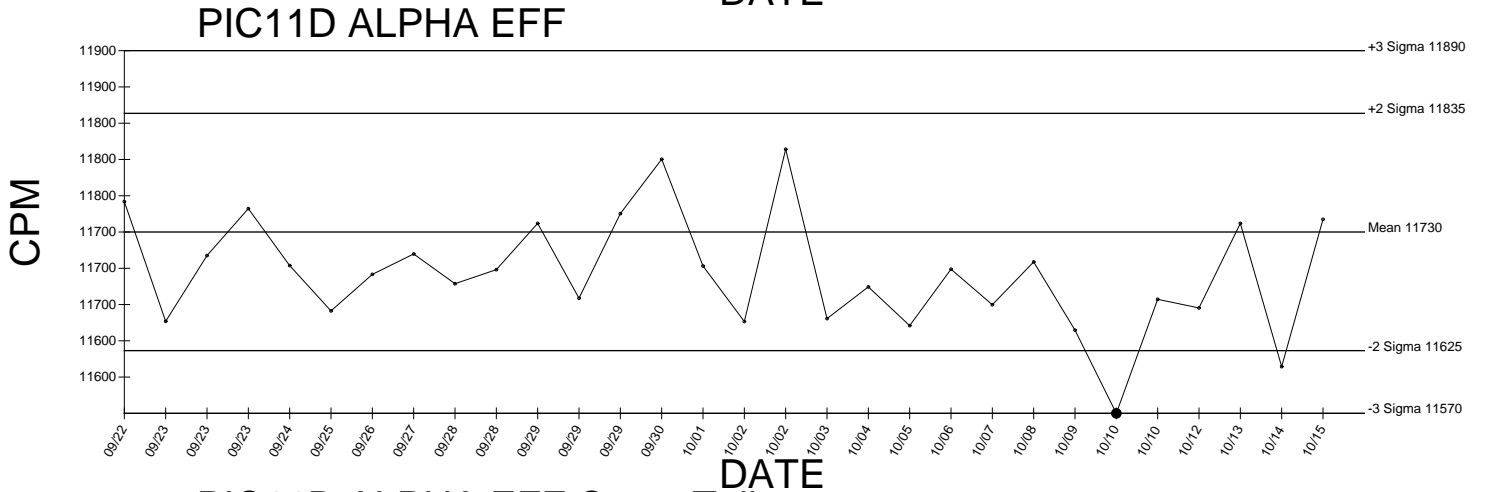
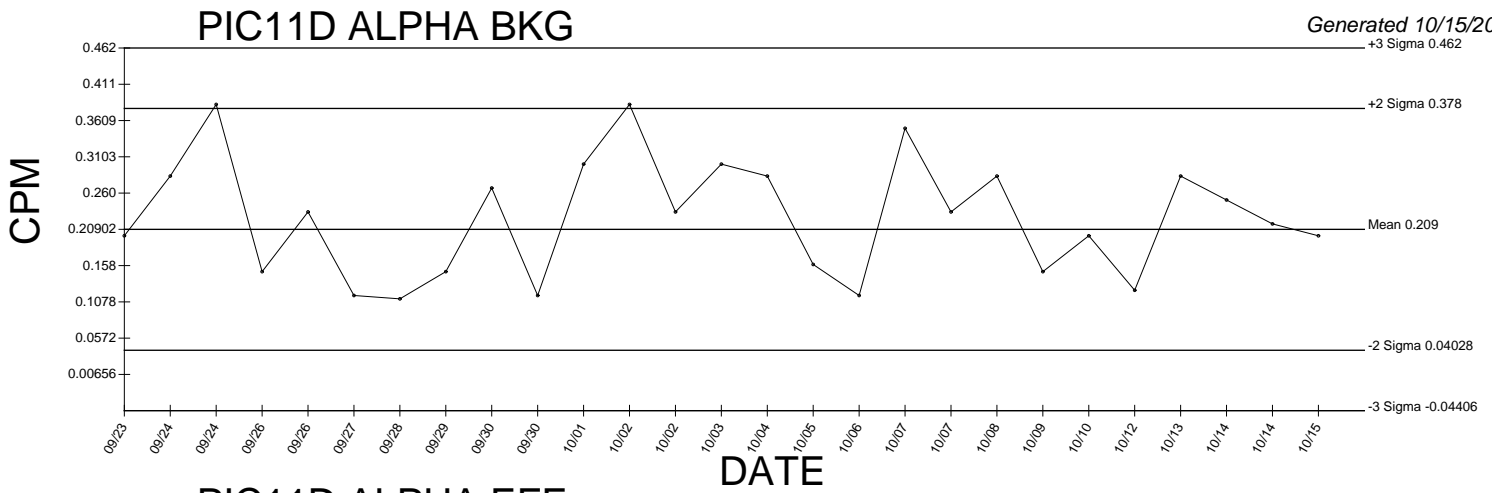
● Denotes Outlier

LUCAS7 EFF

Generated 10/13/2009



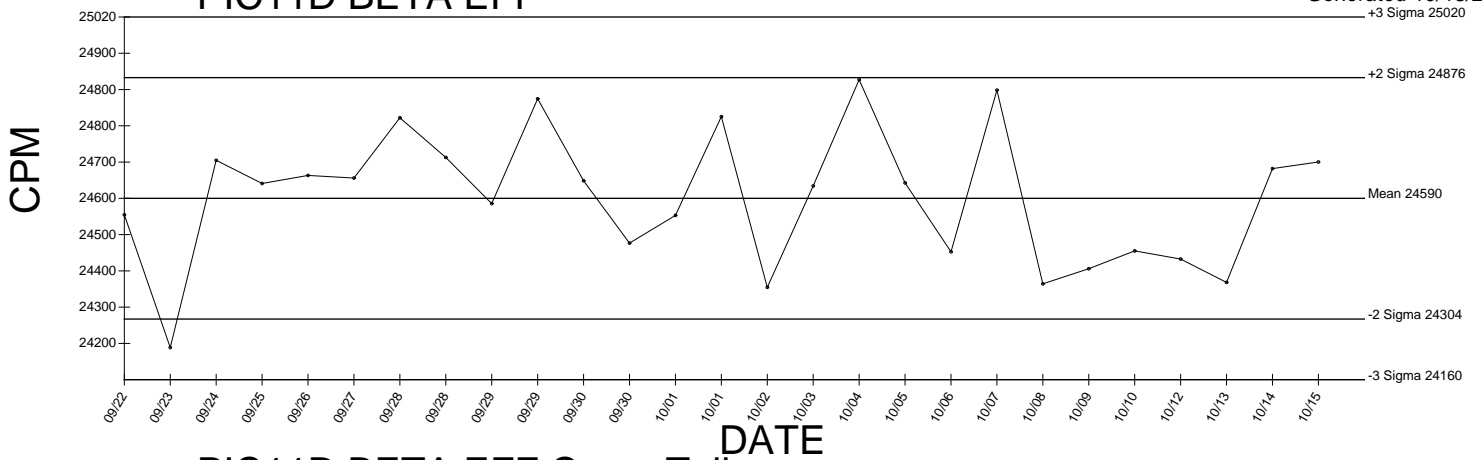
● Denotes Outlier



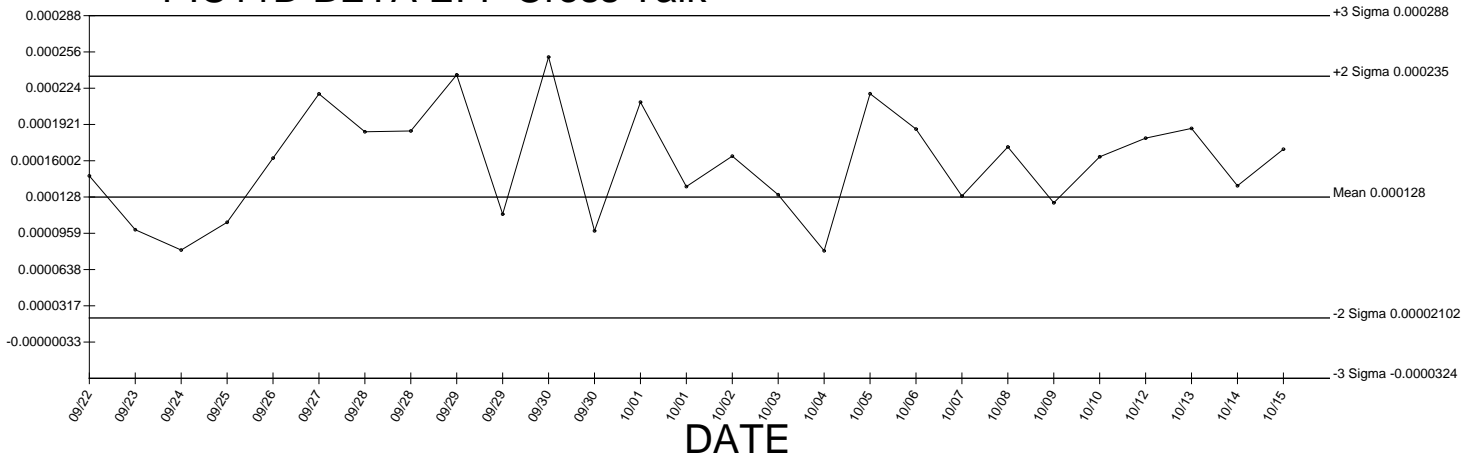
● Denotes Outlier

PIC11D BETA EFF

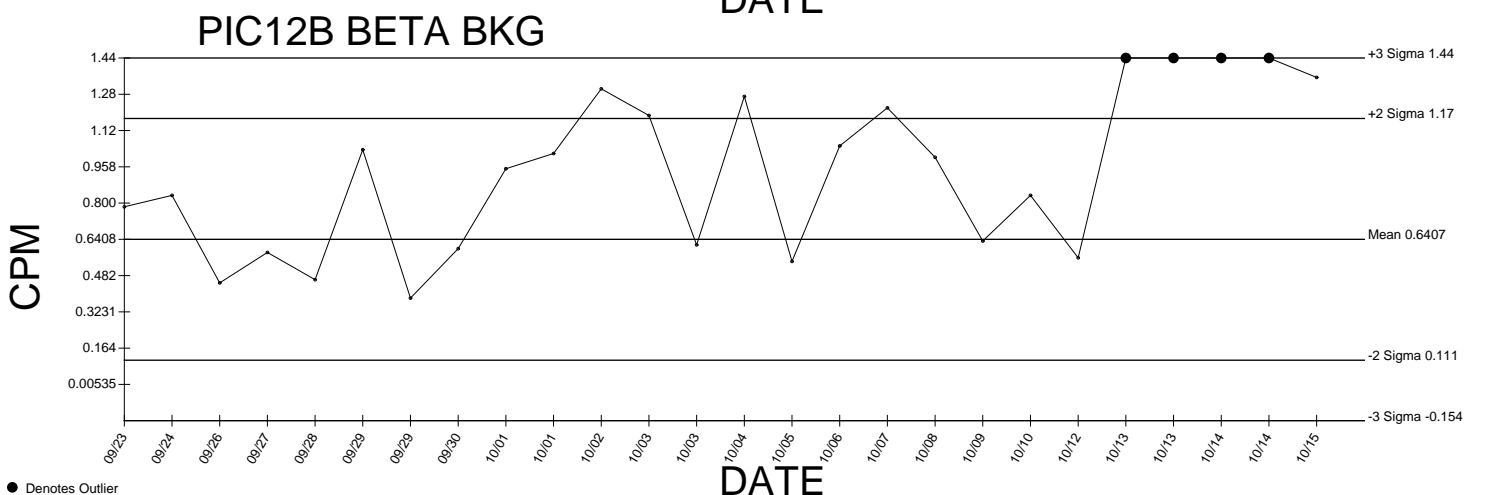
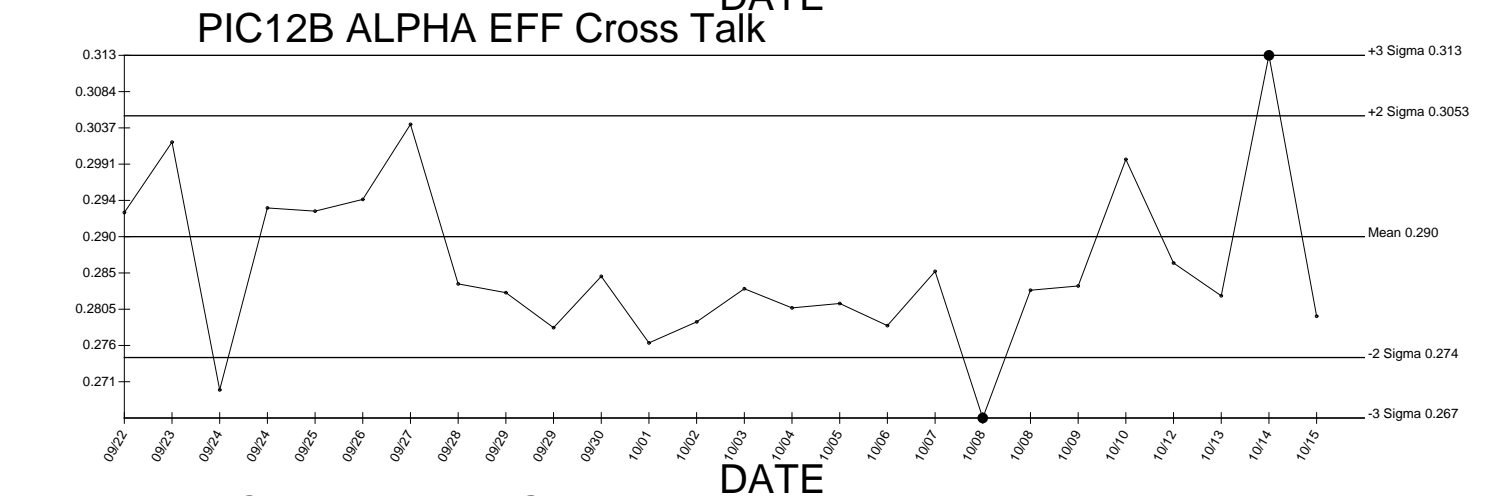
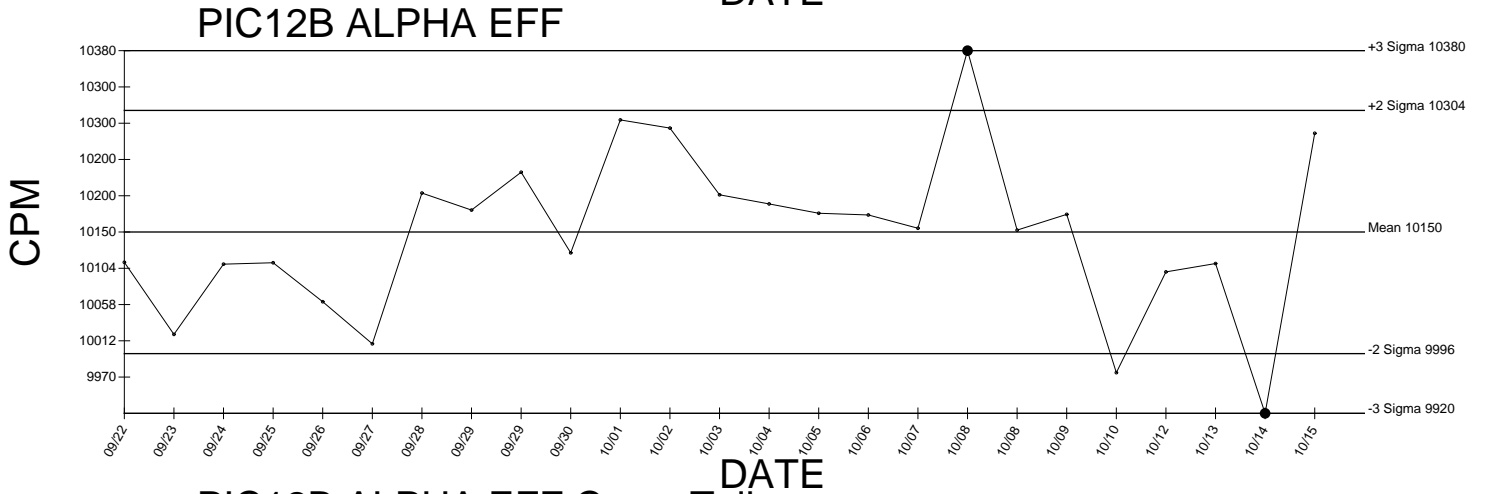
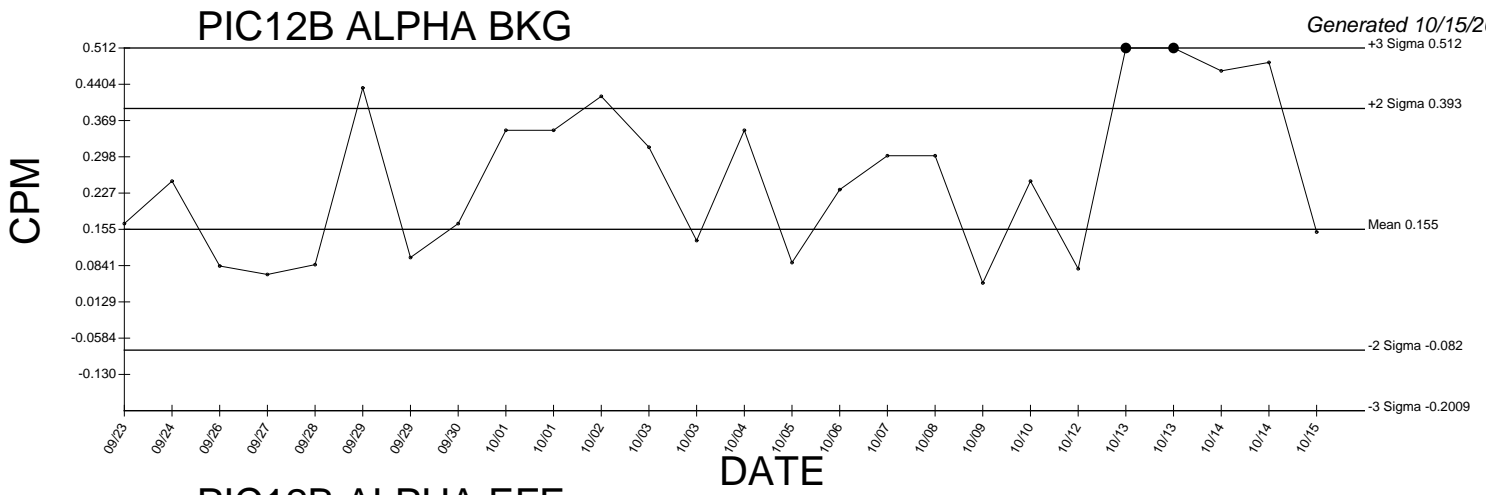
Generated 10/15/2009



PIC11D BETA EFF Cross Talk



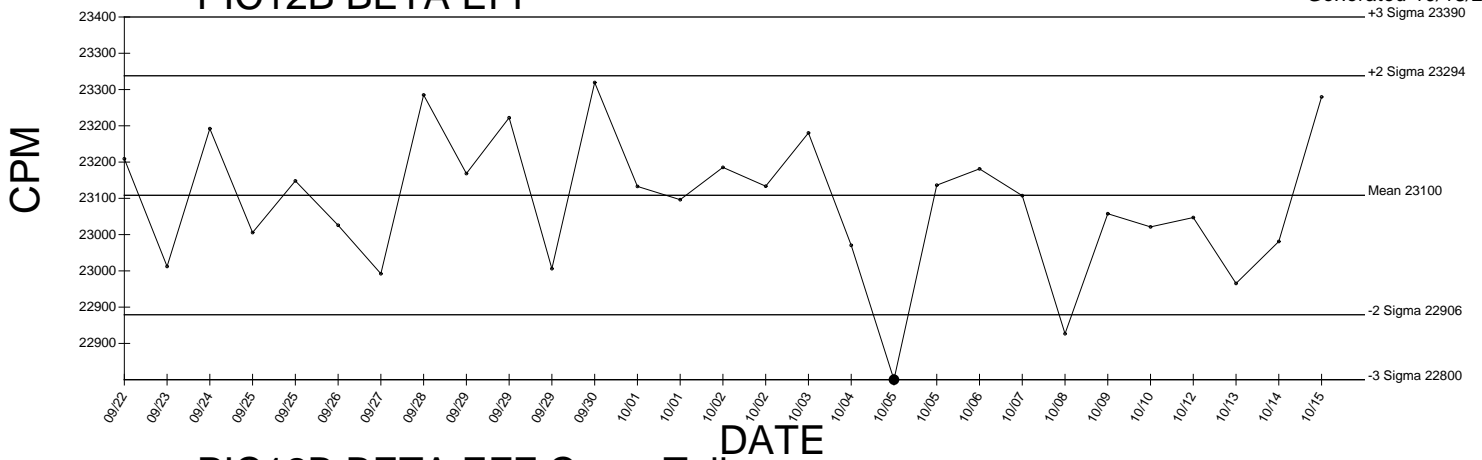
● Denotes Outlier



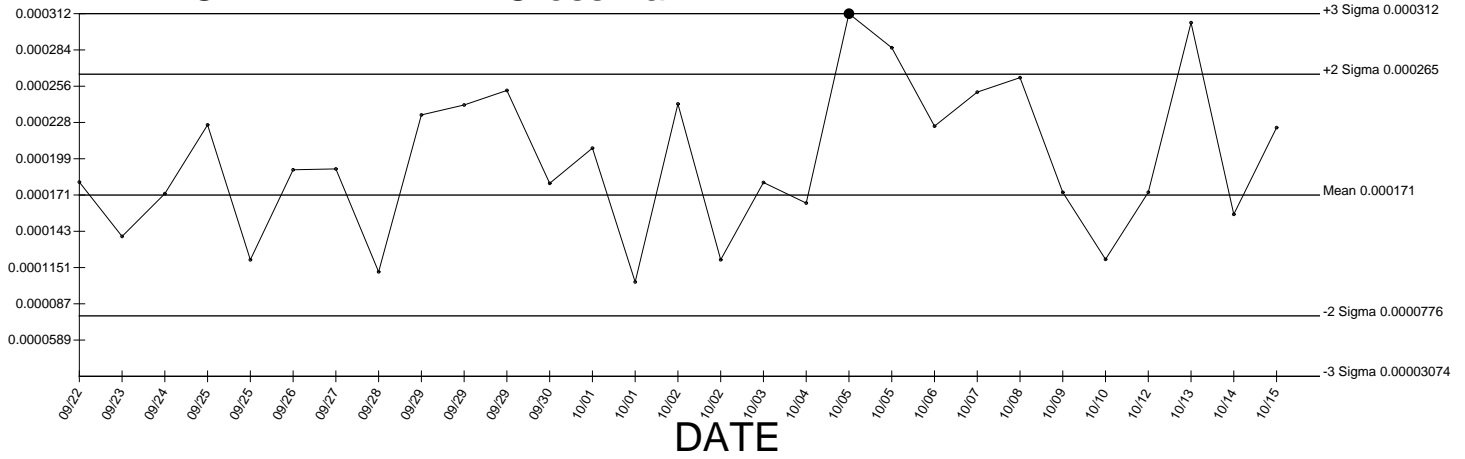
● Denotes Outlier

PIC12B BETA EFF

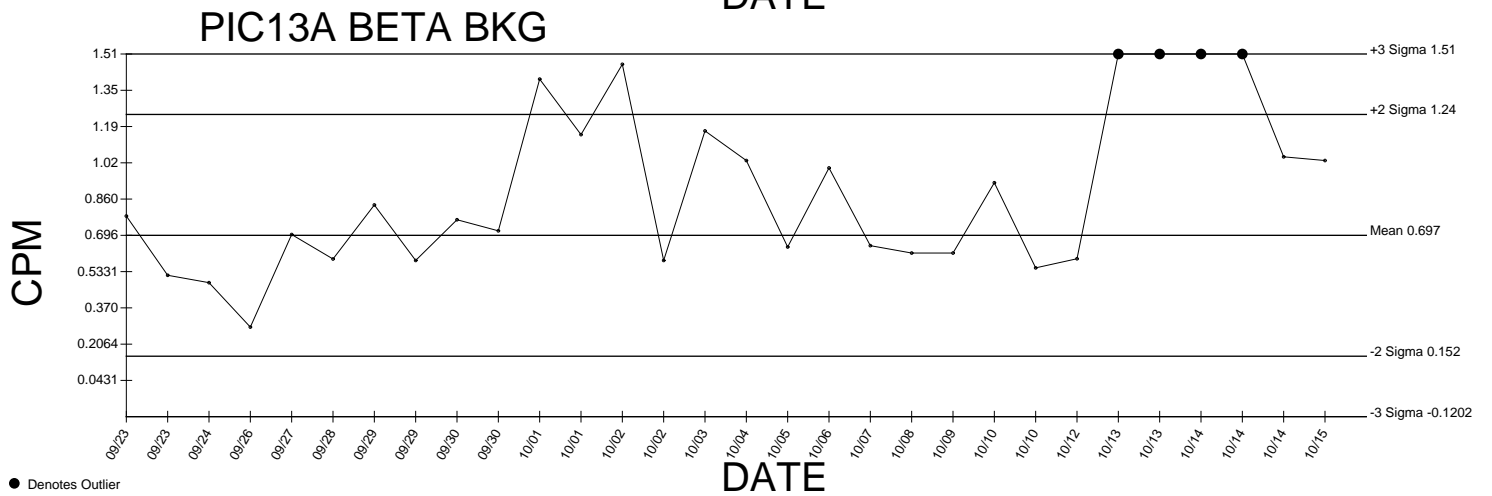
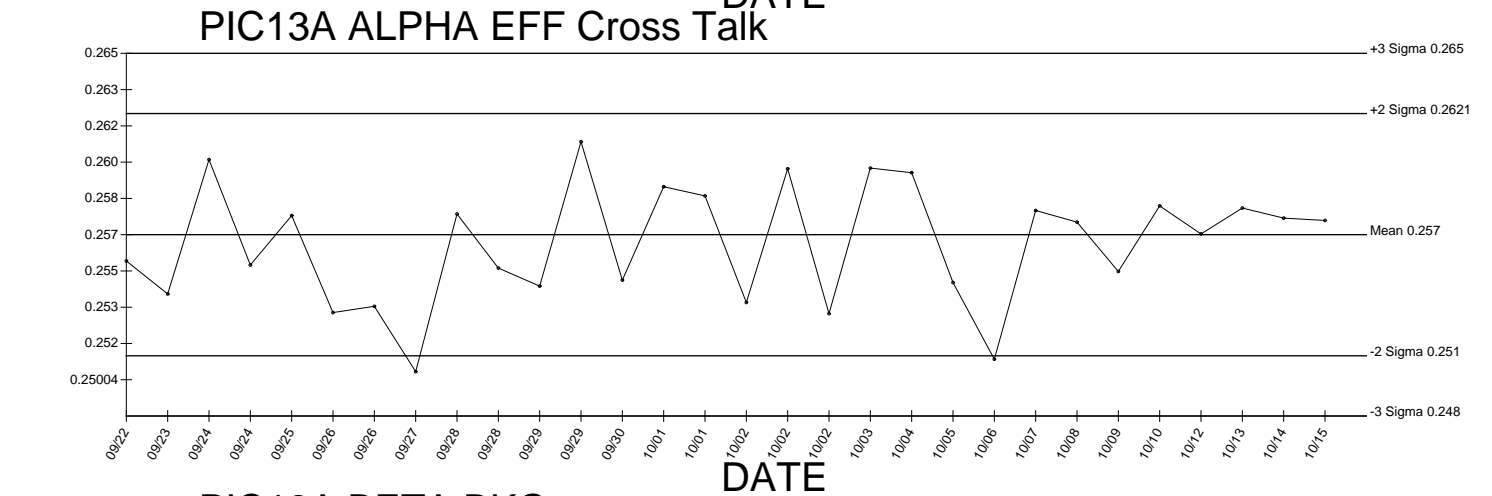
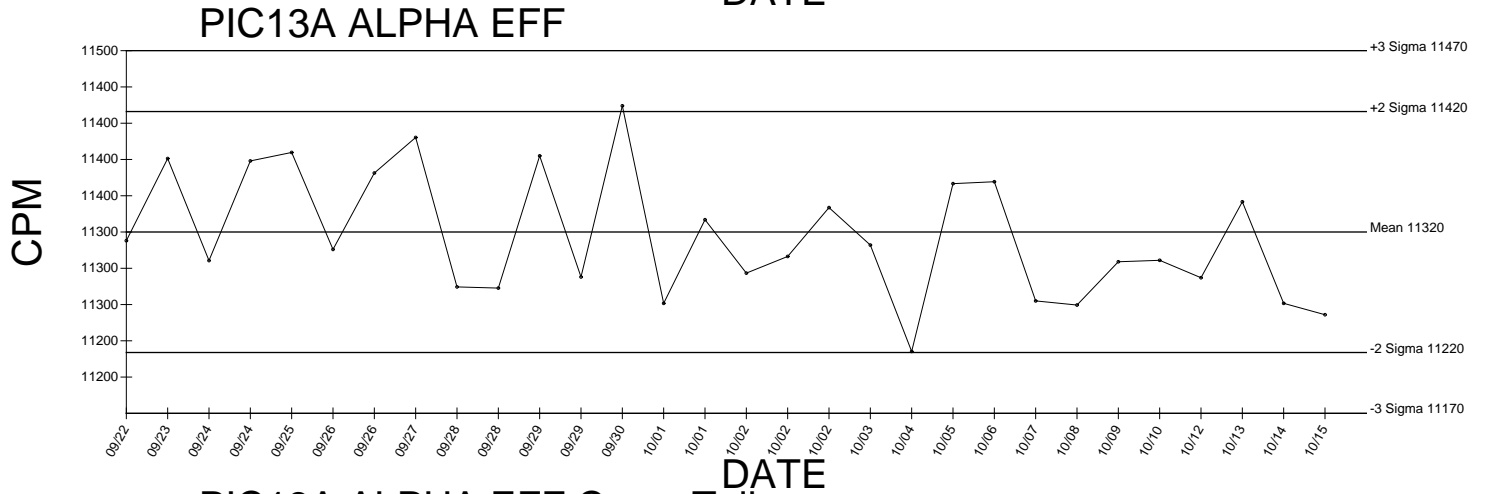
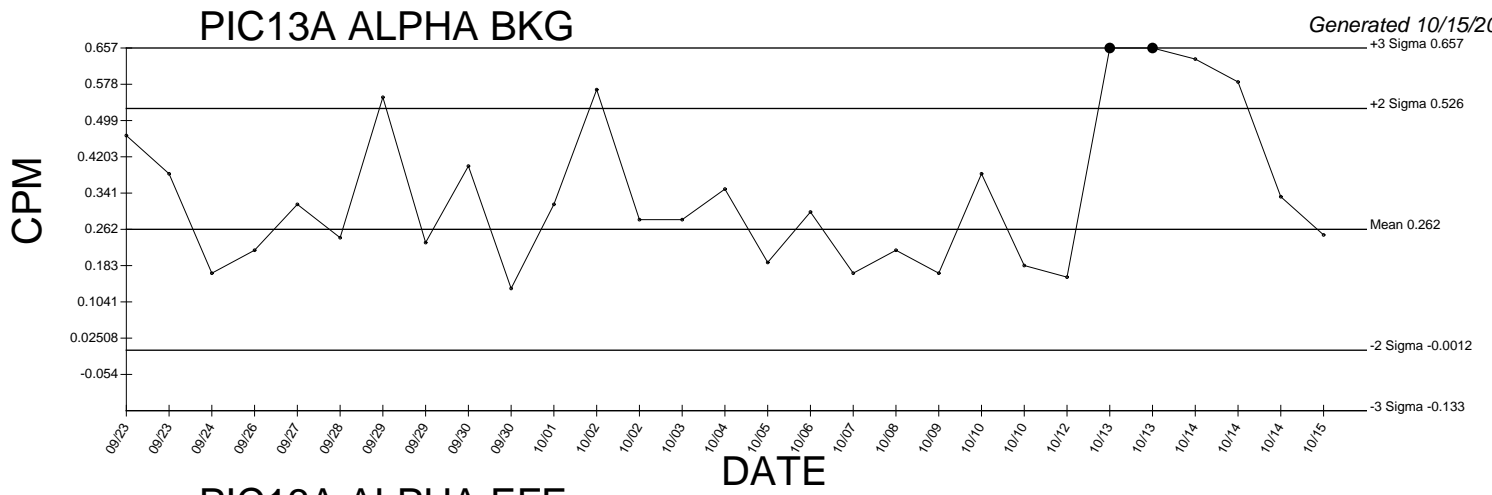
Generated 10/15/2009



PIC12B BETA EFF Cross Talk

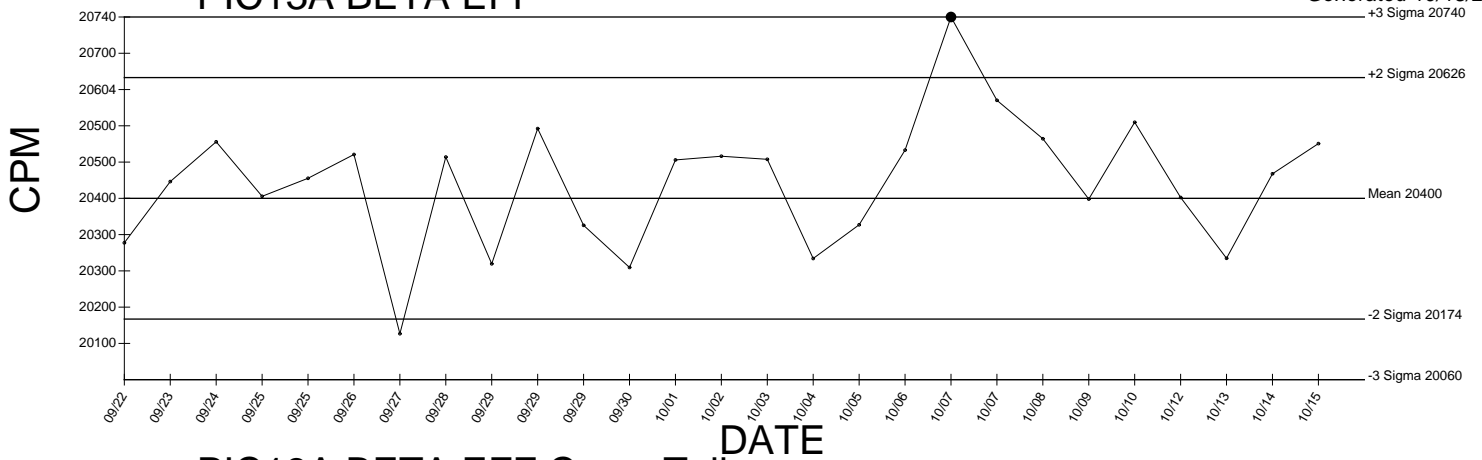


● Denotes Outlier

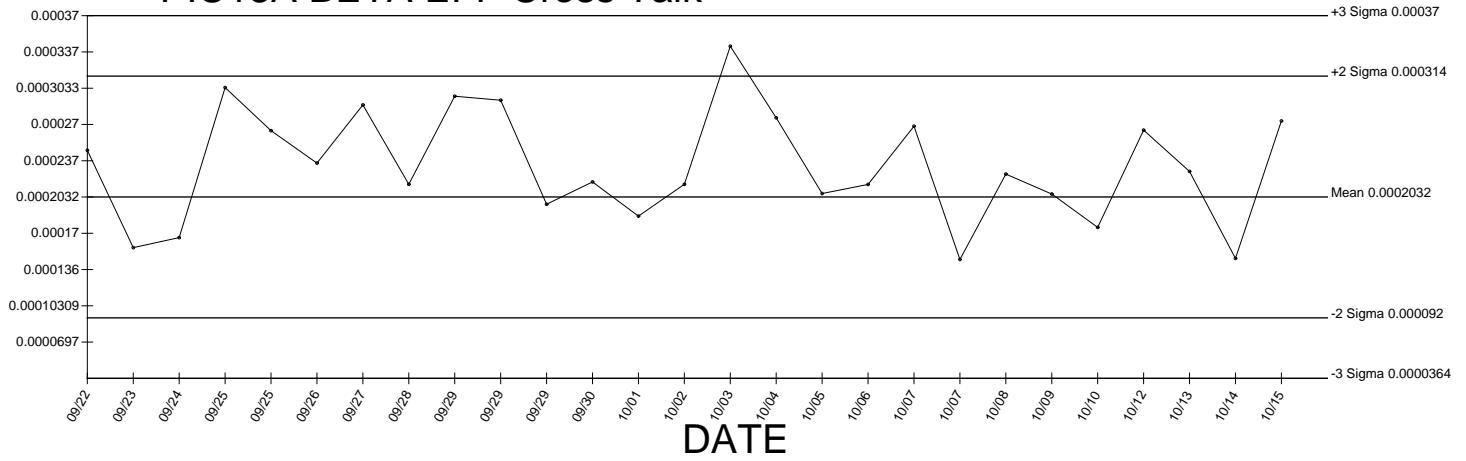


PIC13A BETA EFF

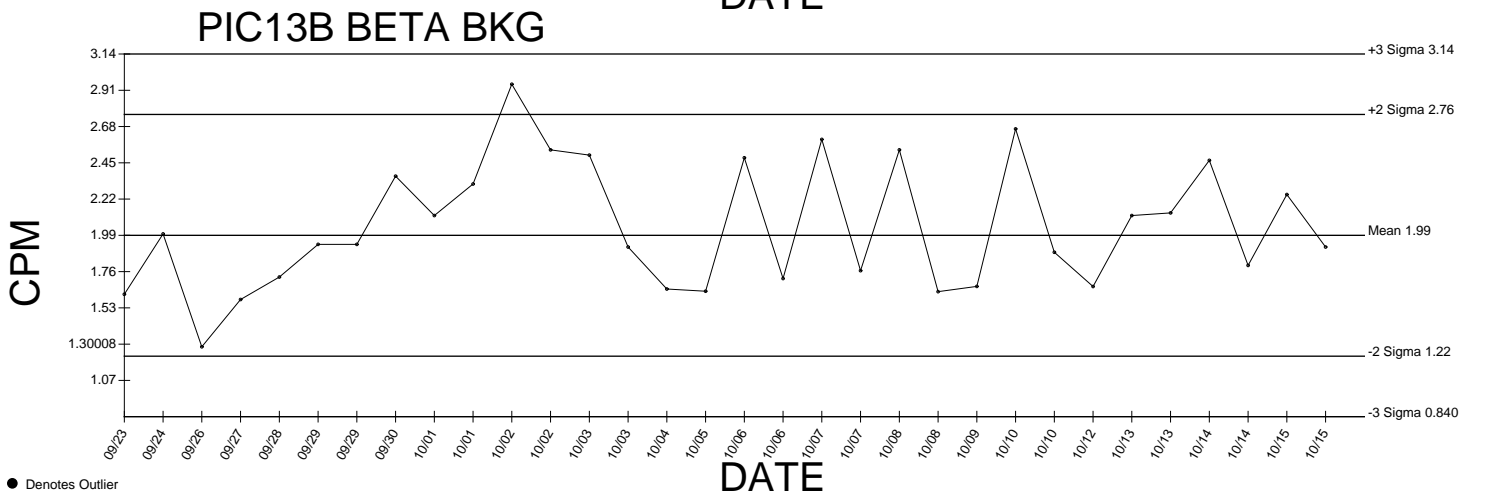
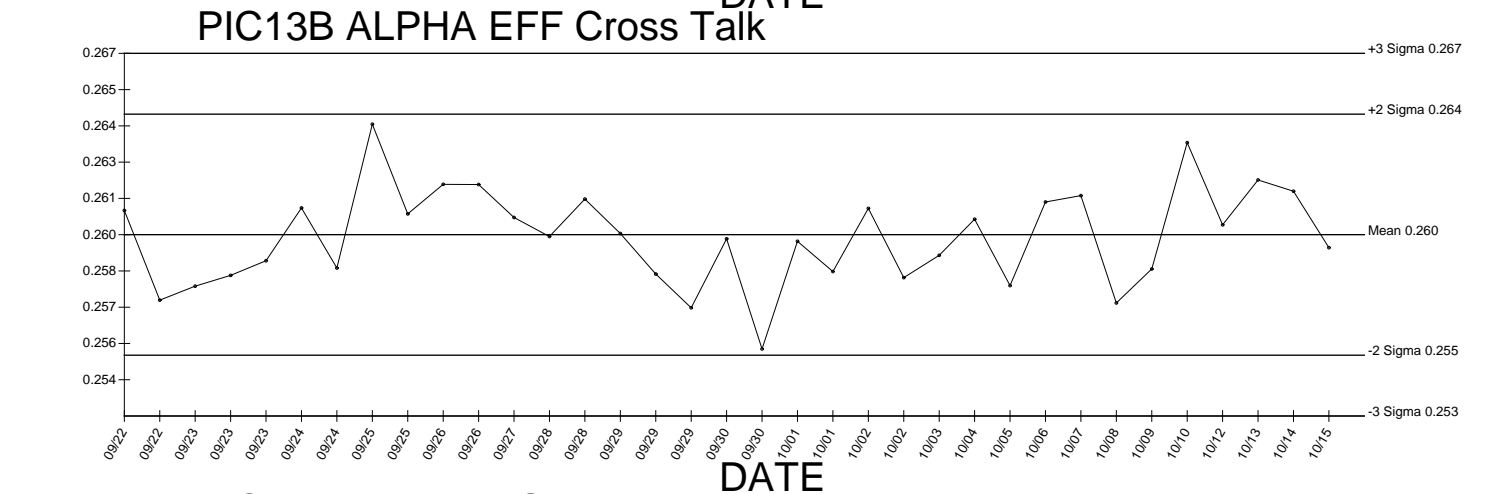
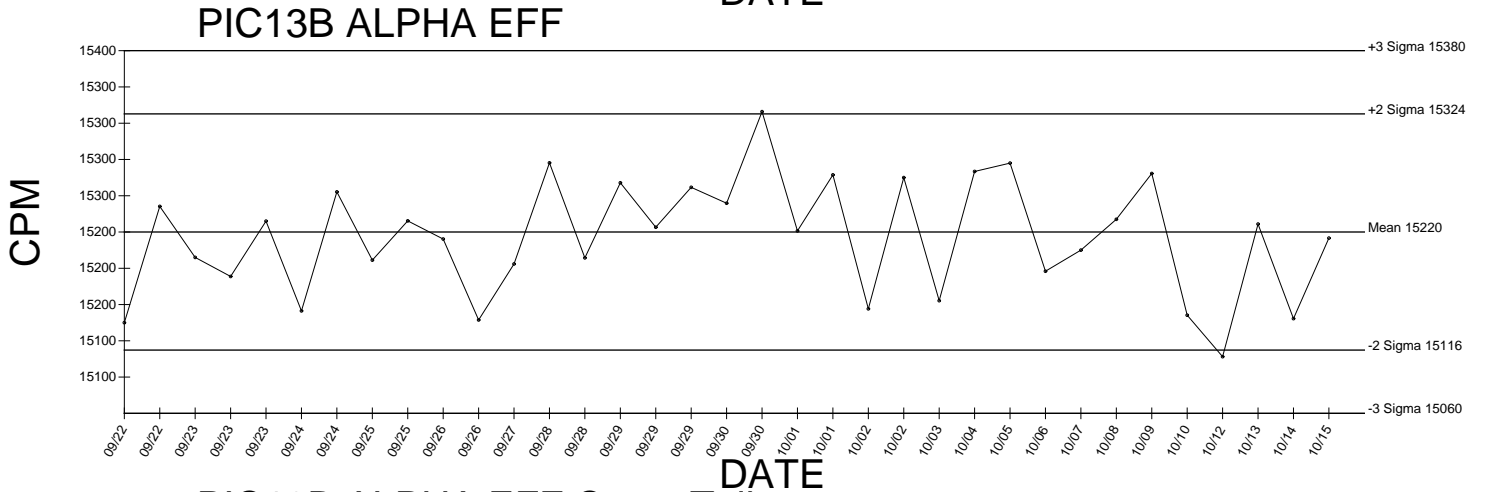
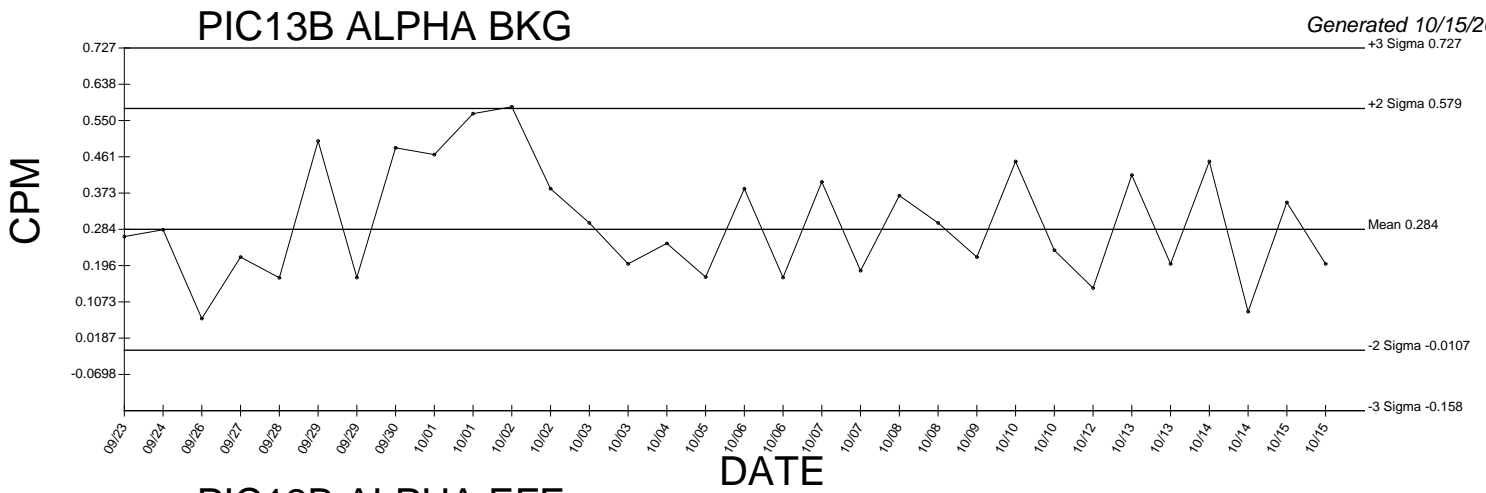
Generated 10/15/2009



PIC13A BETA EFF Cross Talk



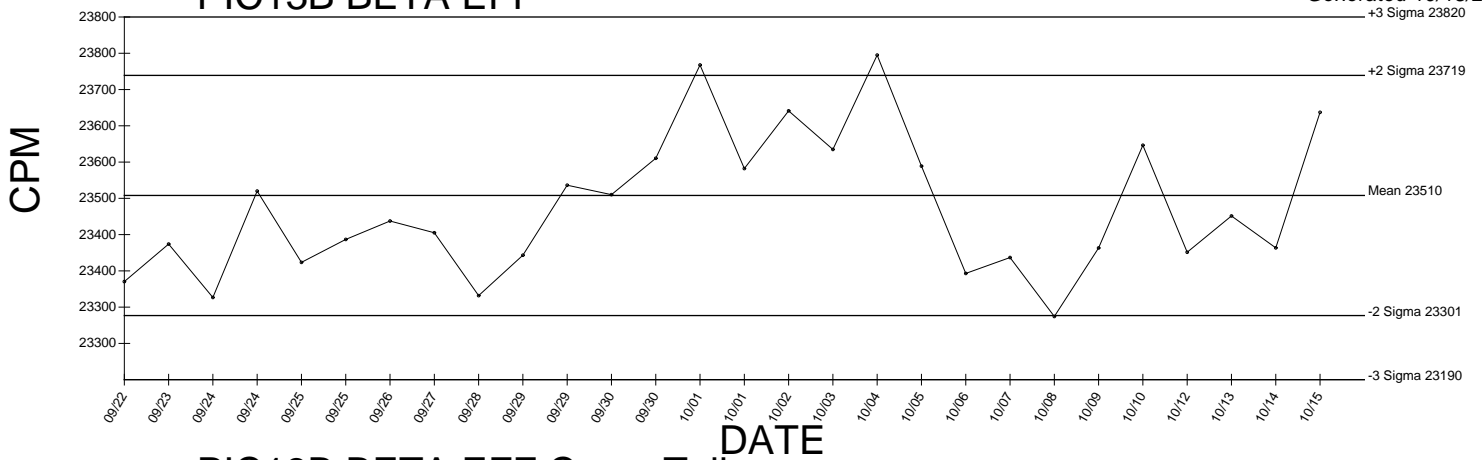
● Denotes Outlier



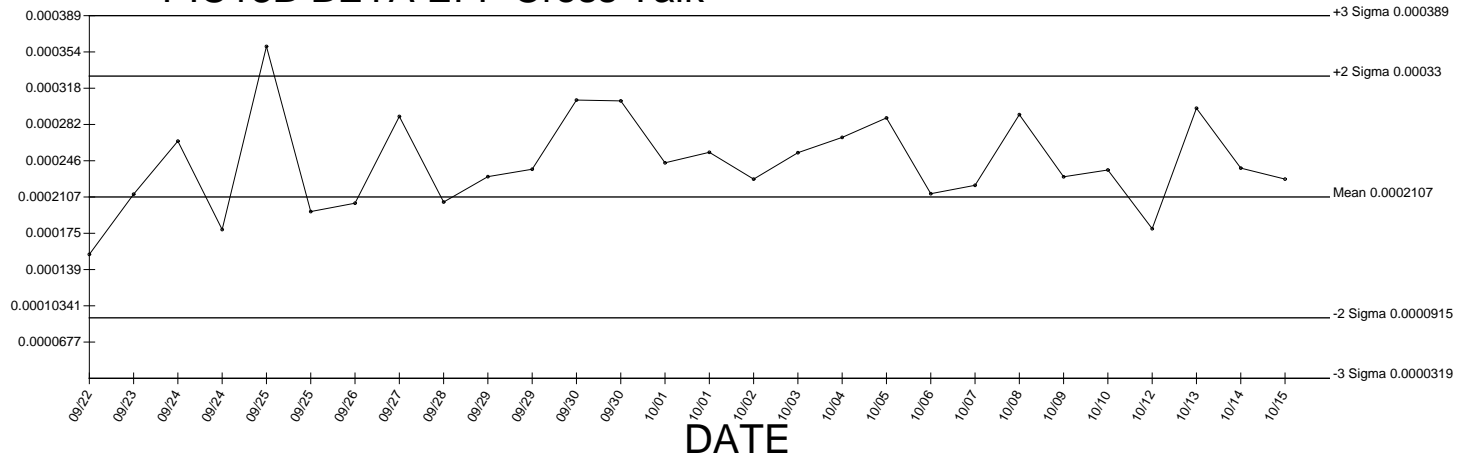
● Denotes Outlier

PIC13B BETA EFF

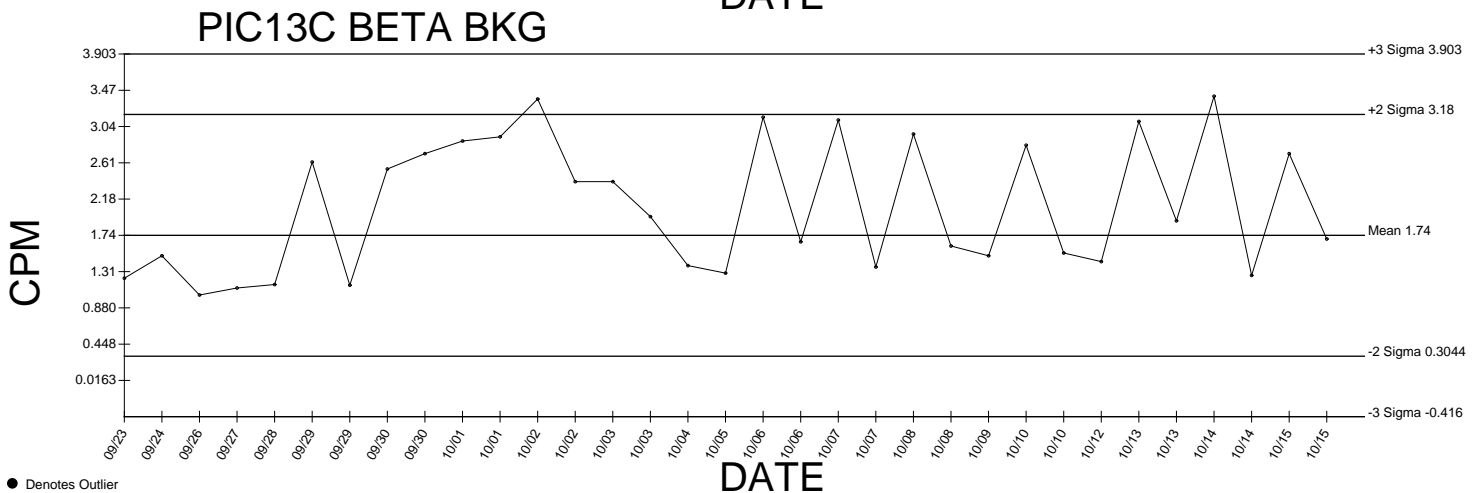
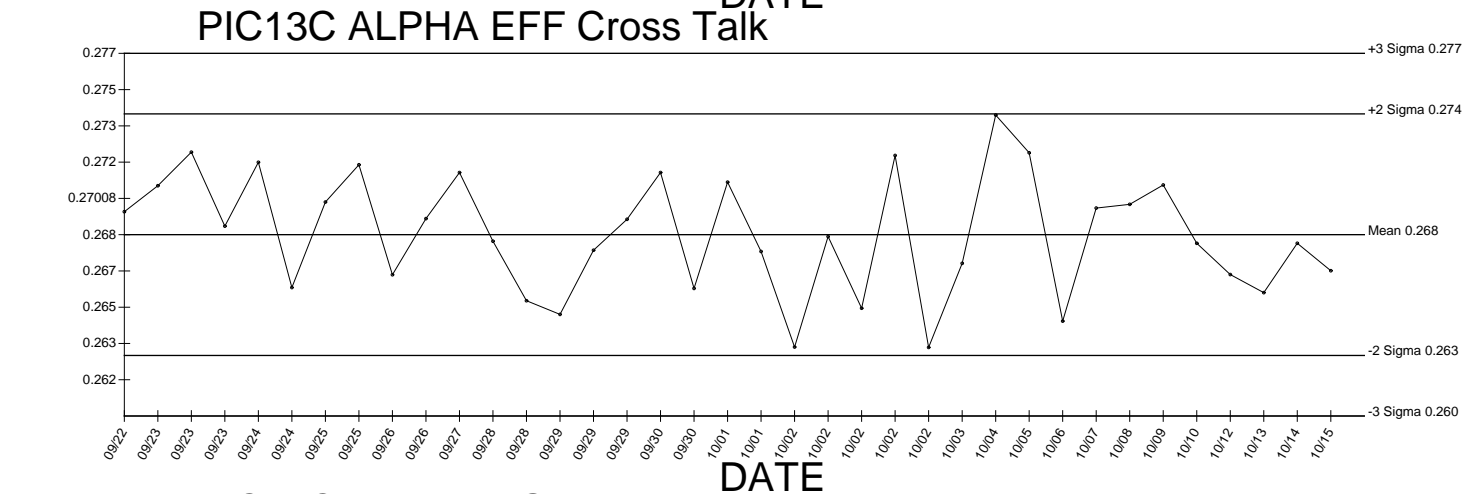
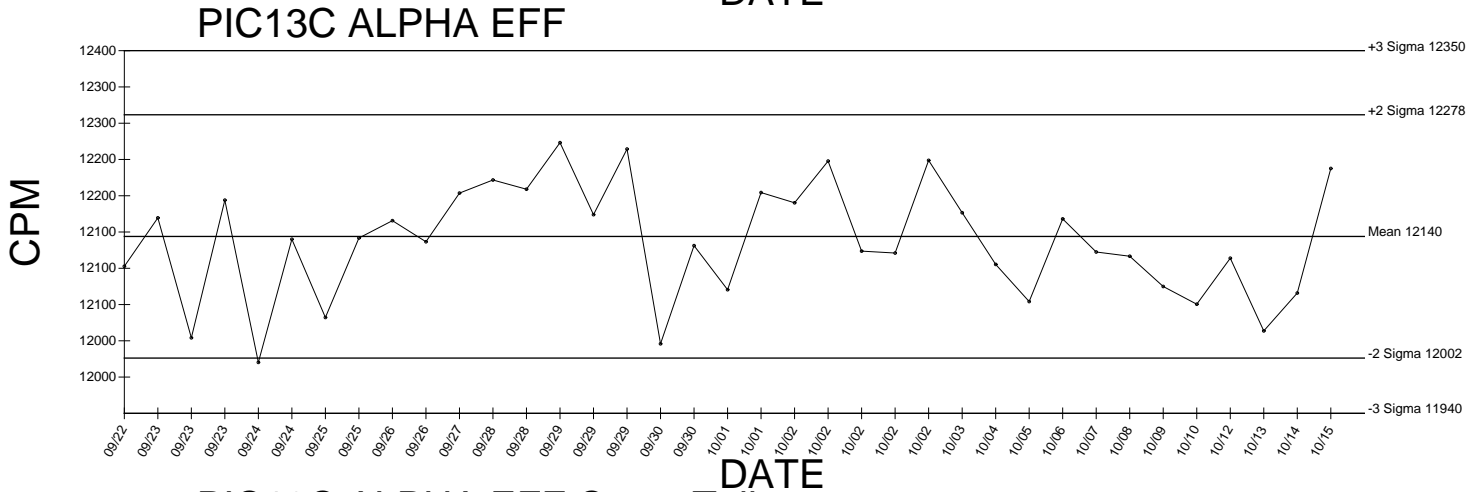
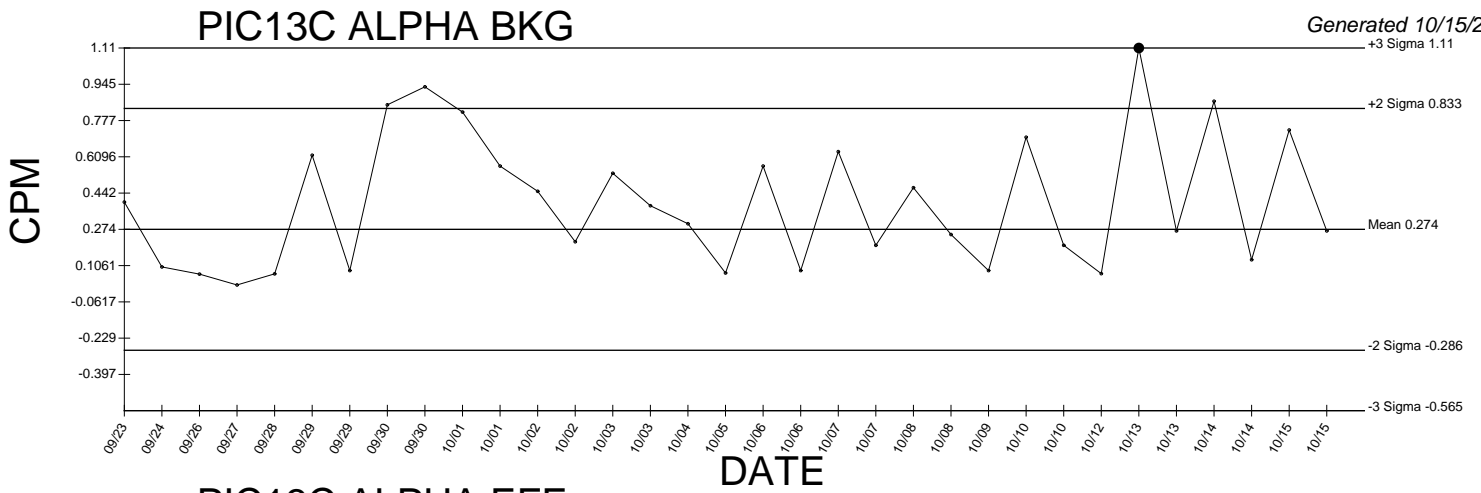
Generated 10/15/2009



PIC13B BETA EFF Cross Talk



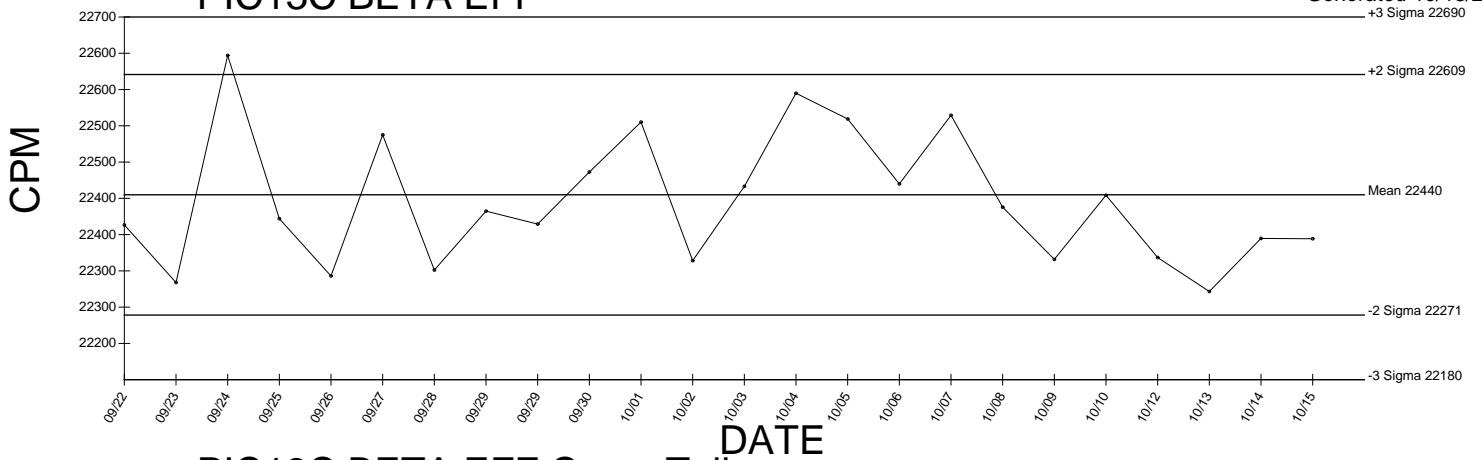
● Denotes Outlier



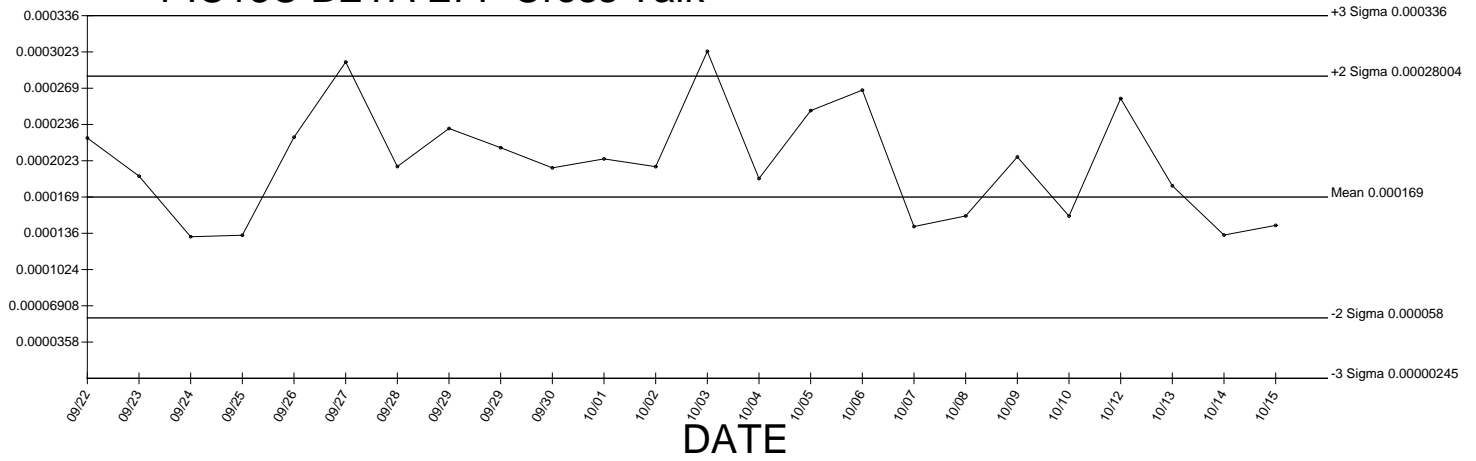
● Denotes Outlier

PIC13C BETA EFF

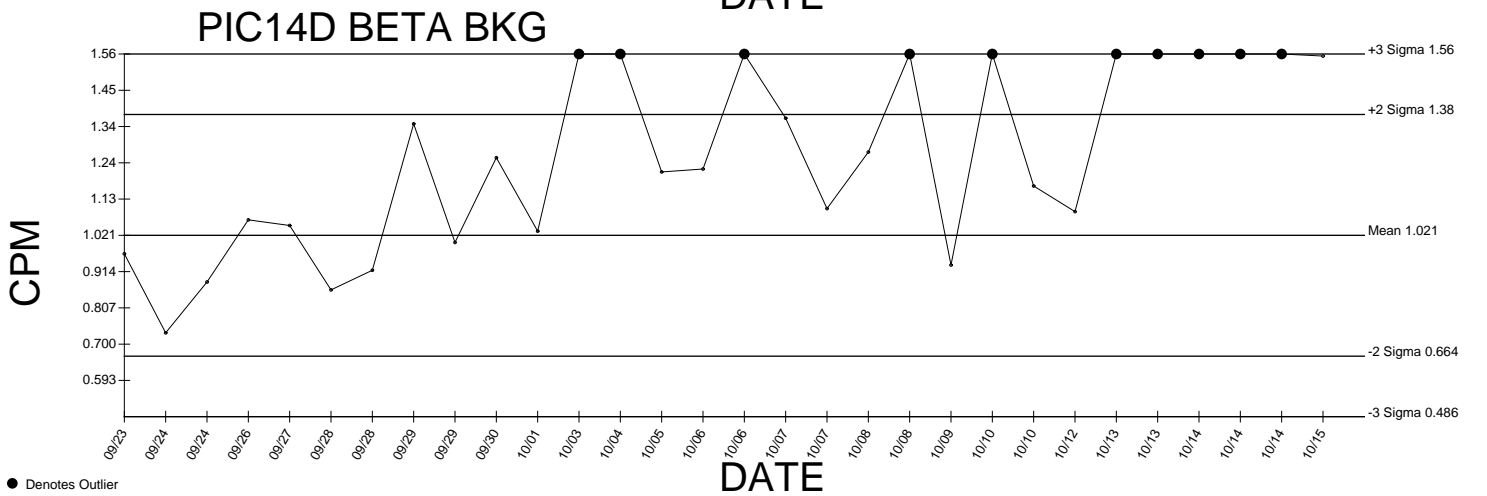
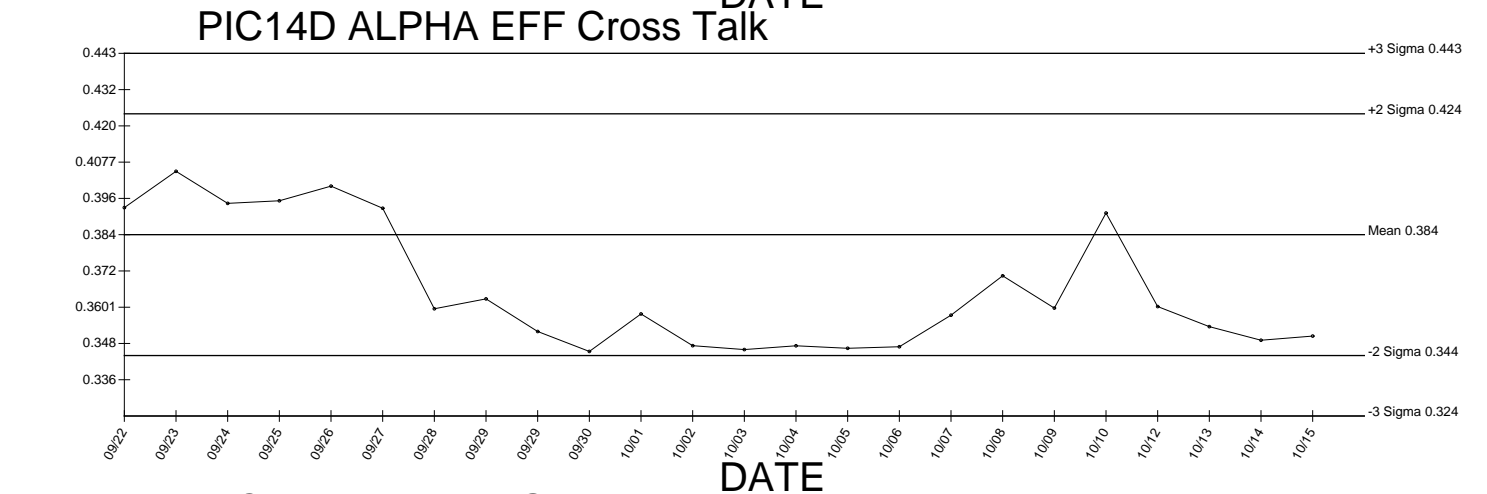
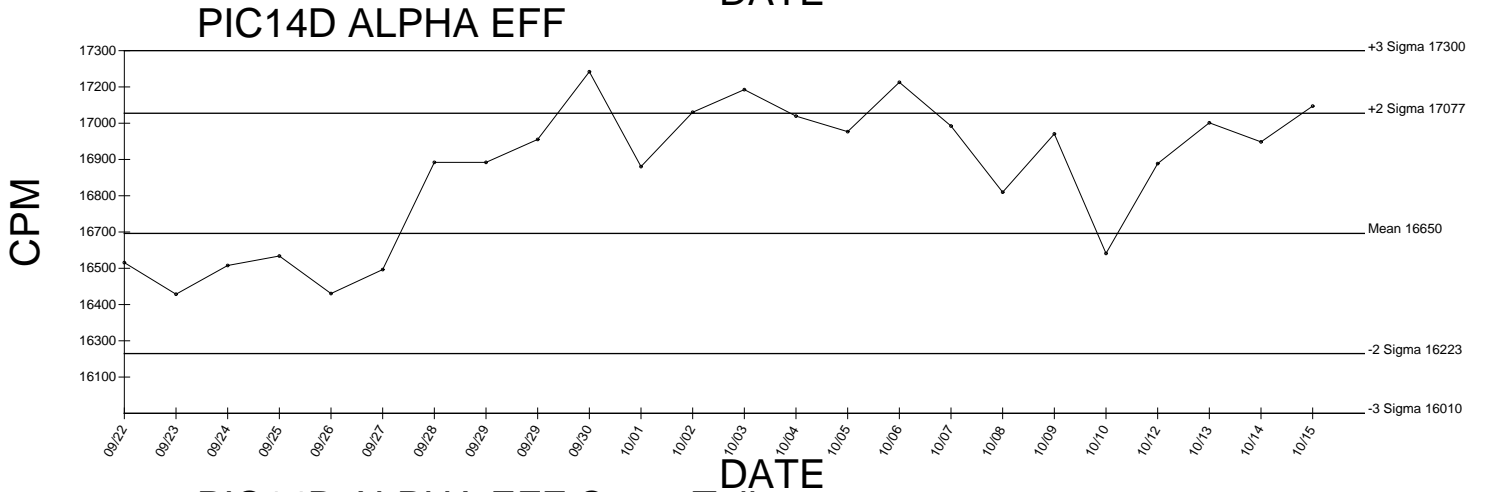
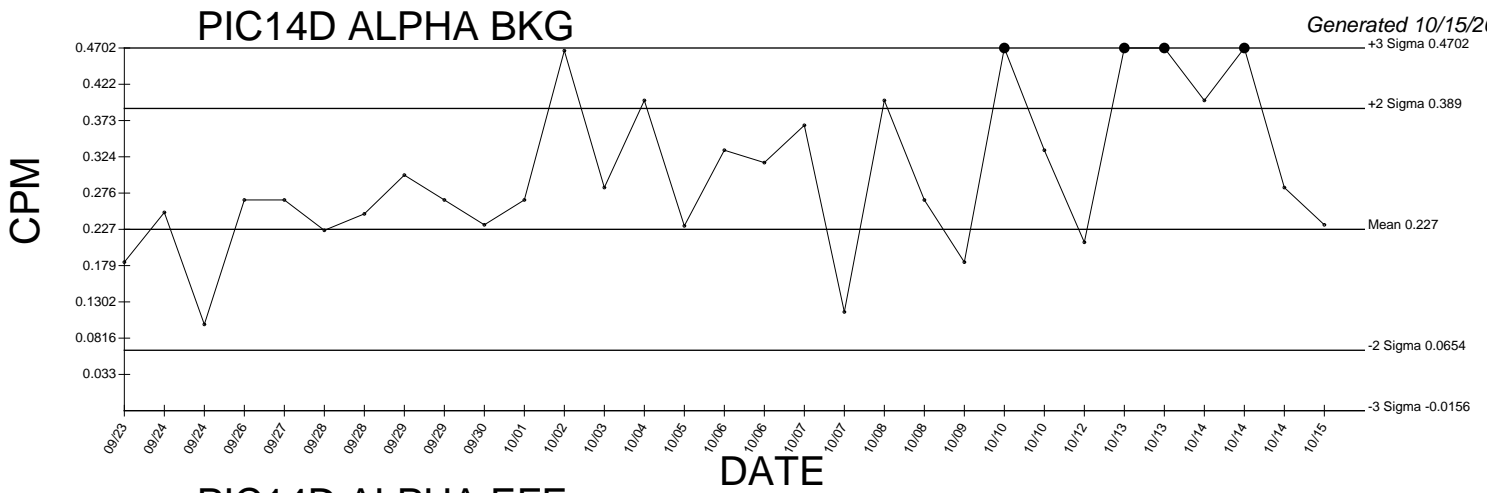
Generated 10/15/2009



PIC13C BETA EFF Cross Talk



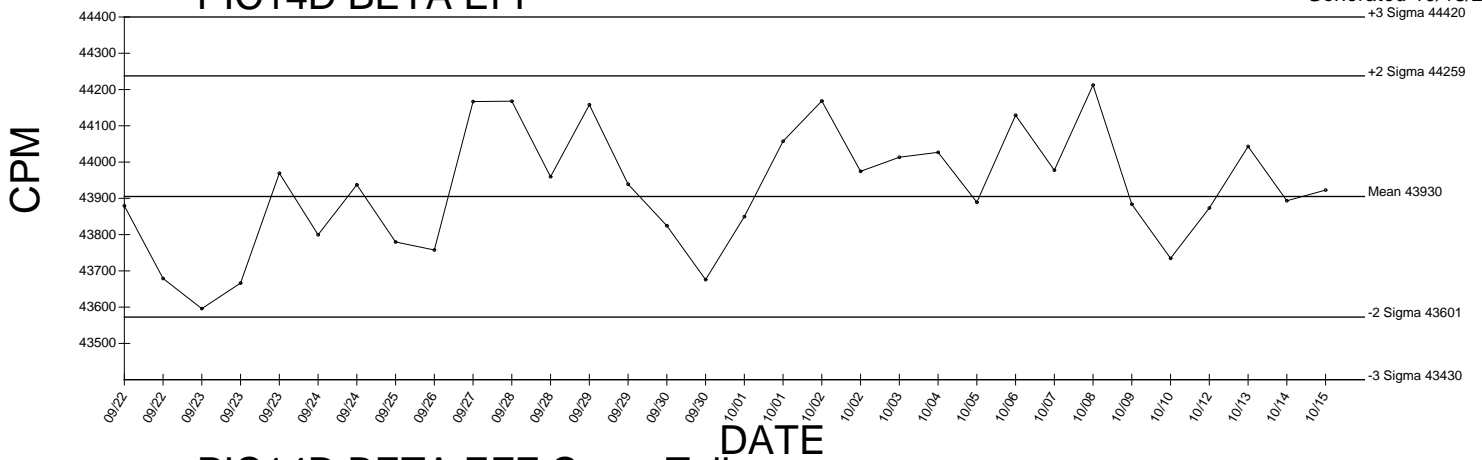
● Denotes Outlier



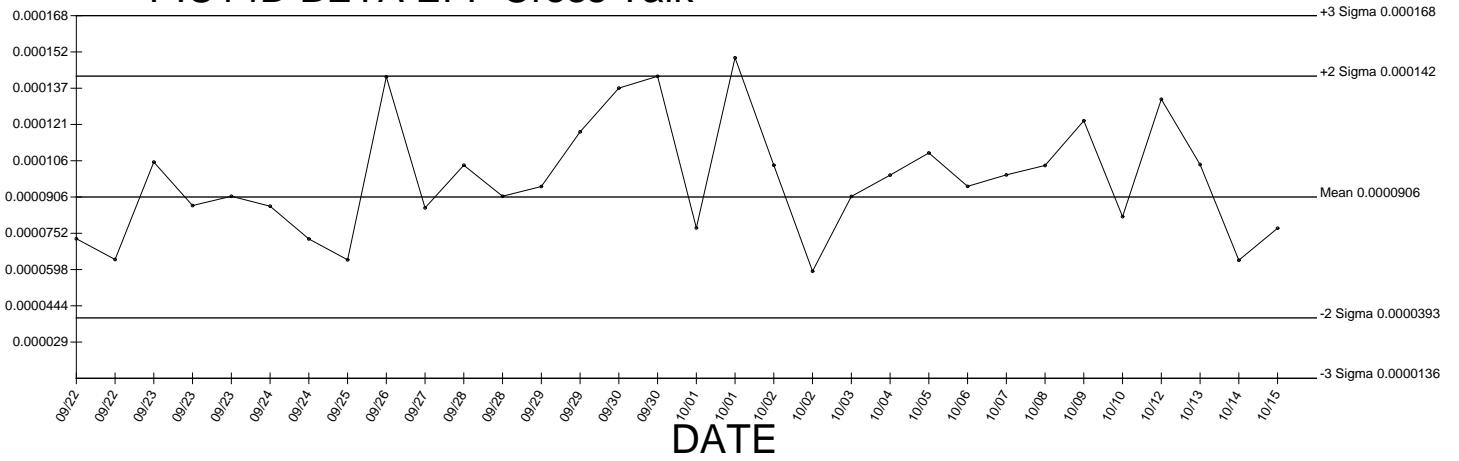
● Denotes Outlier

PIC14D BETA EFF

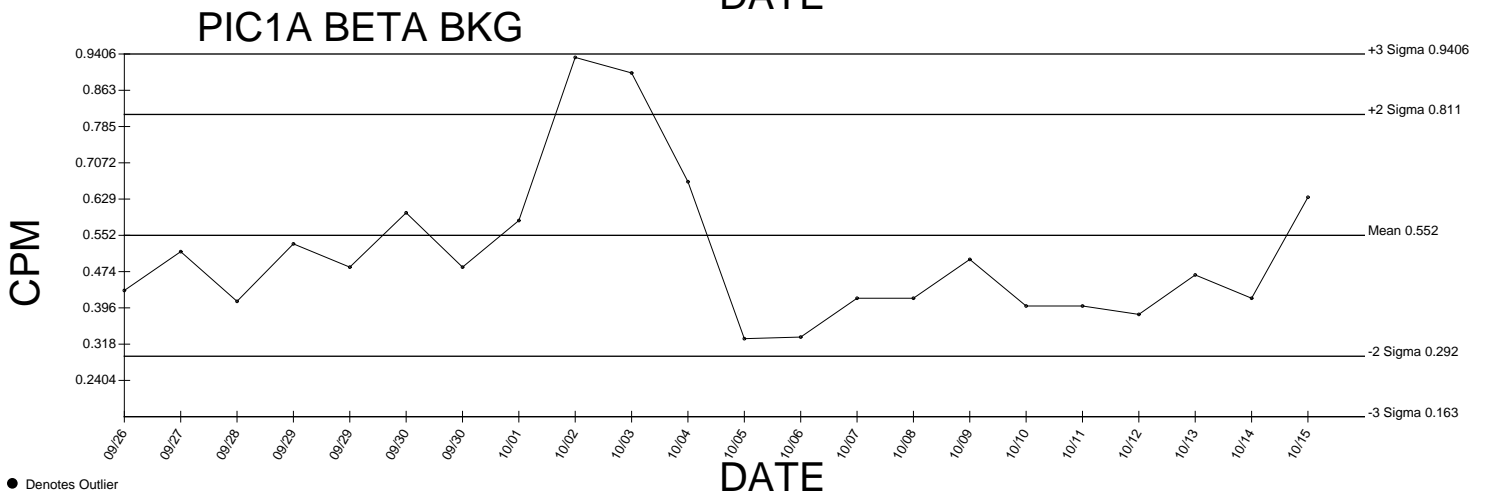
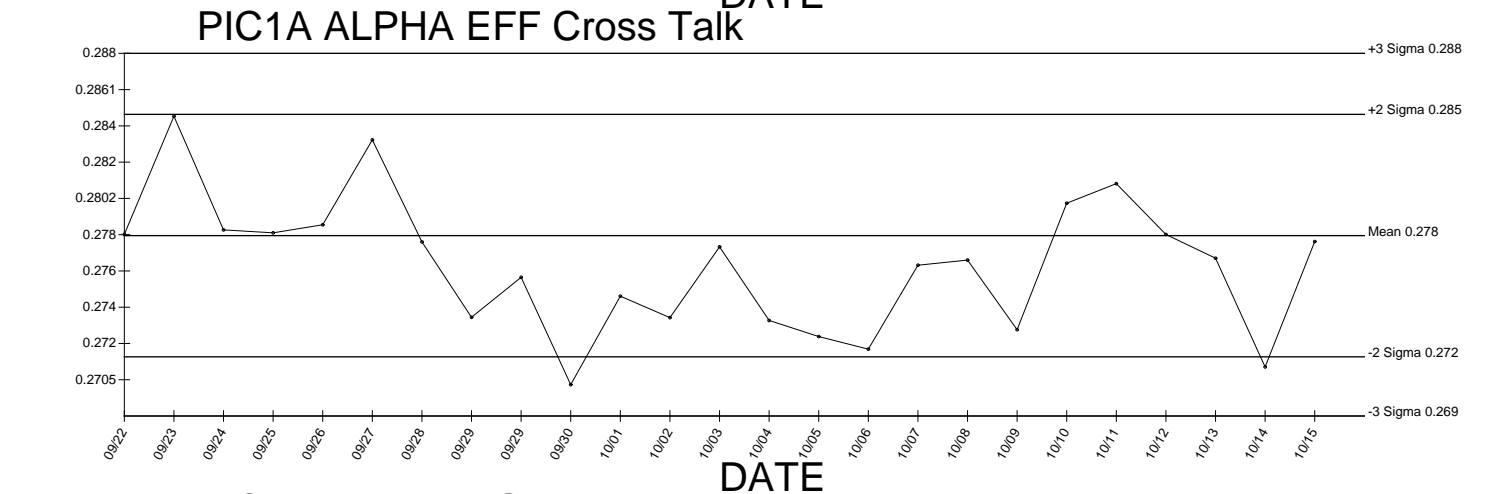
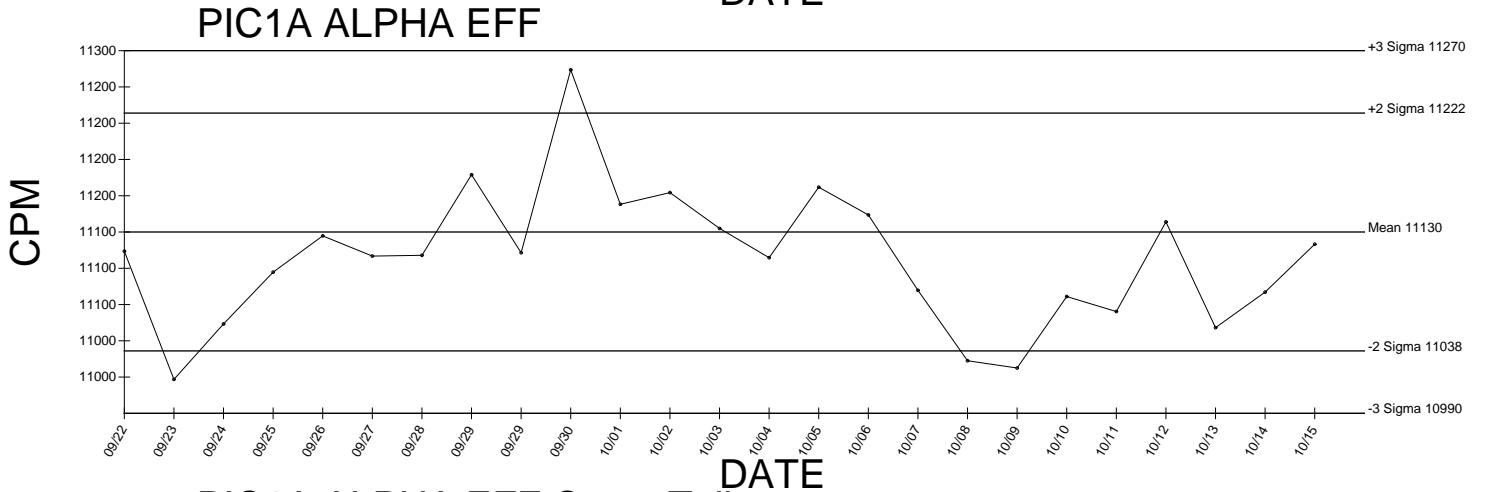
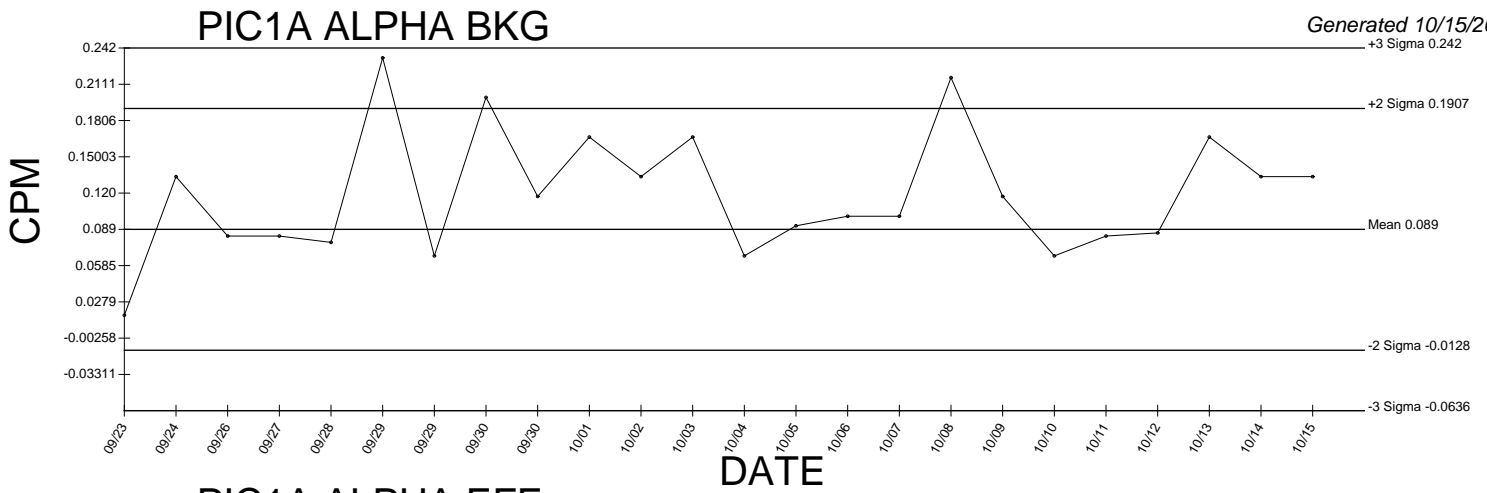
Generated 10/15/2009



PIC14D BETA EFF Cross Talk



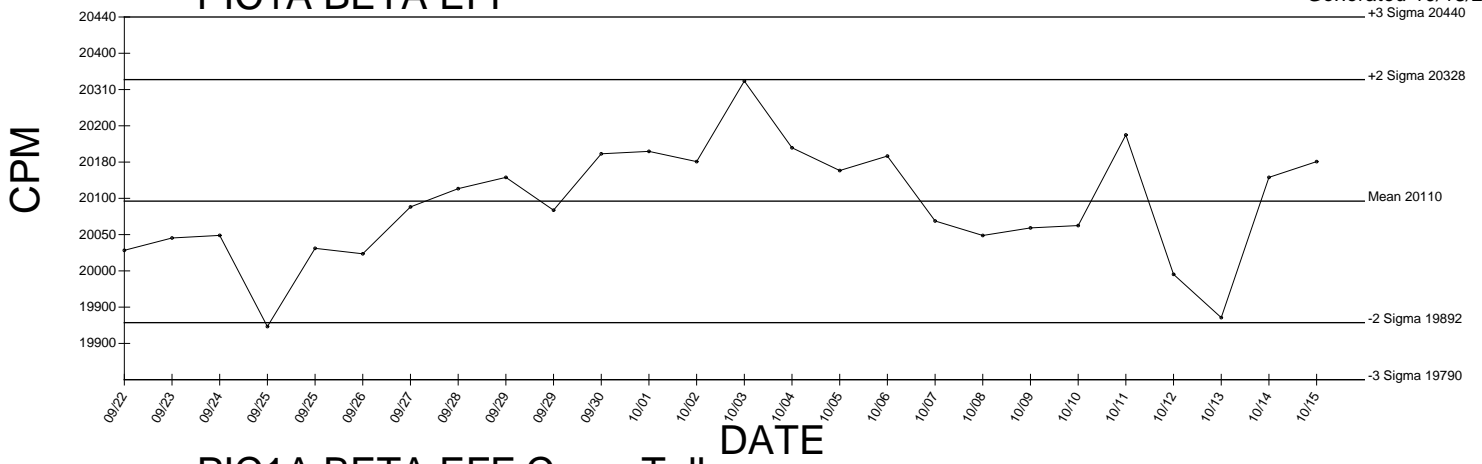
● Denotes Outlier



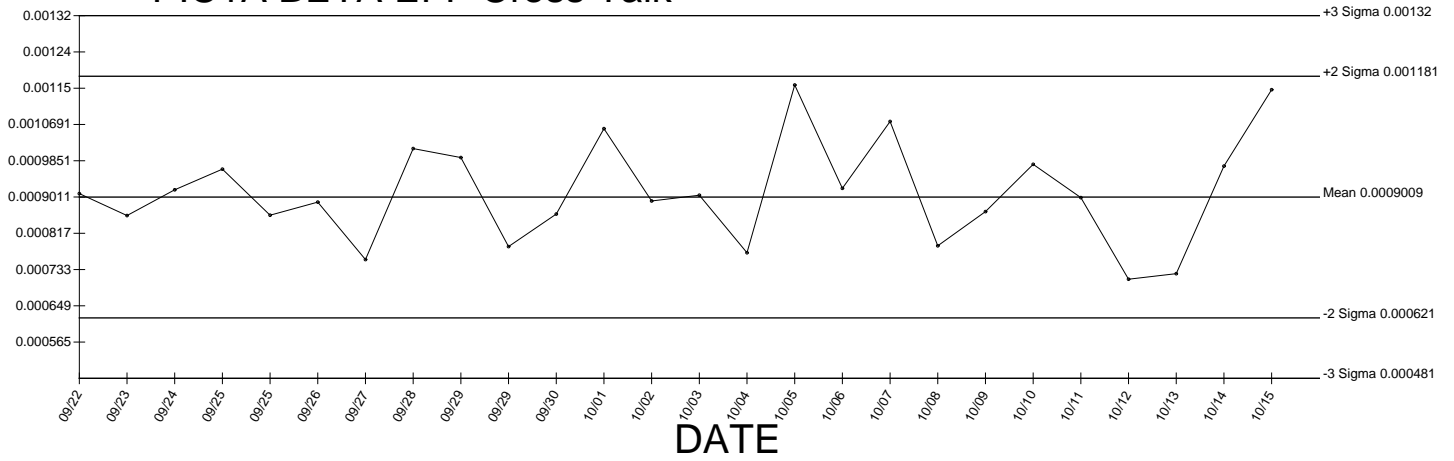
● Denotes Outlier

PIC1A BETA EFF

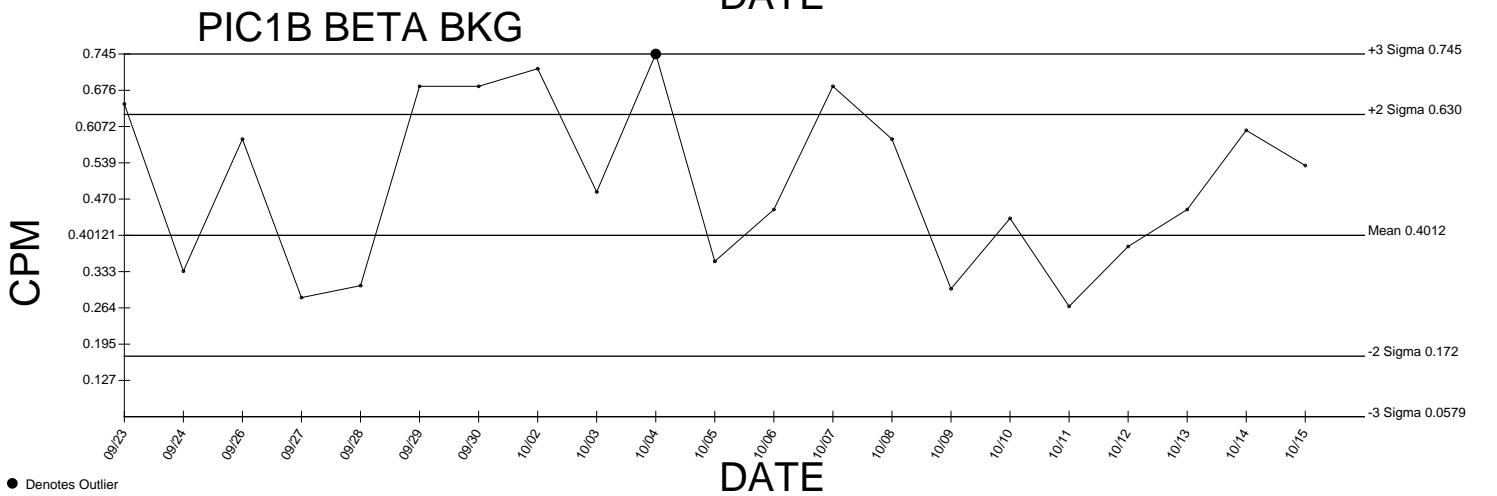
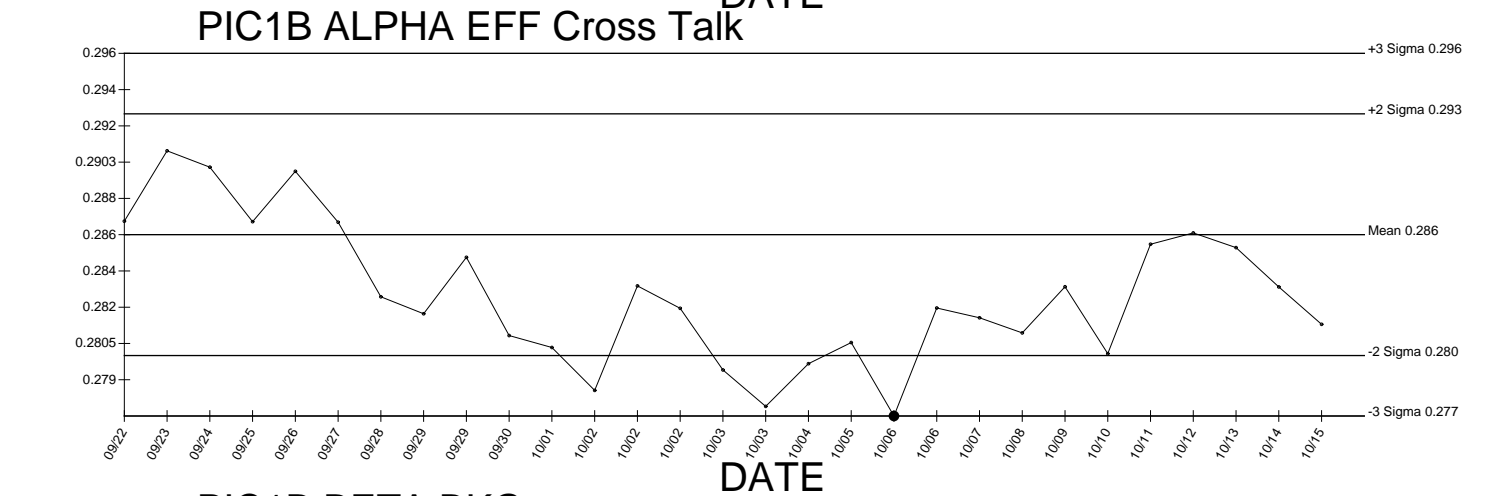
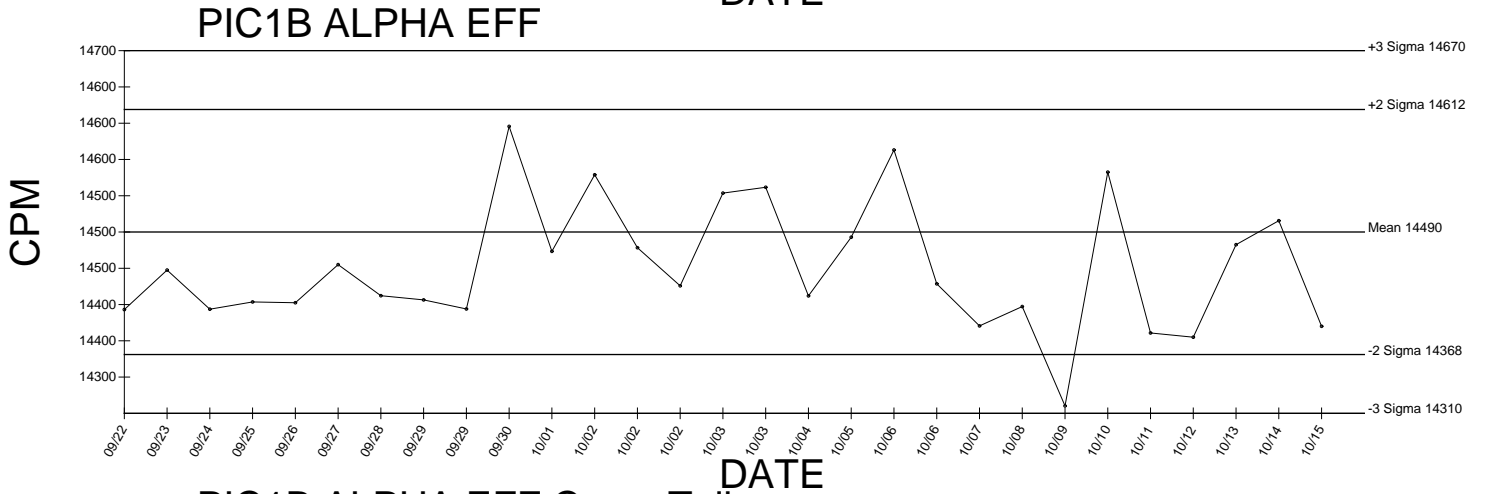
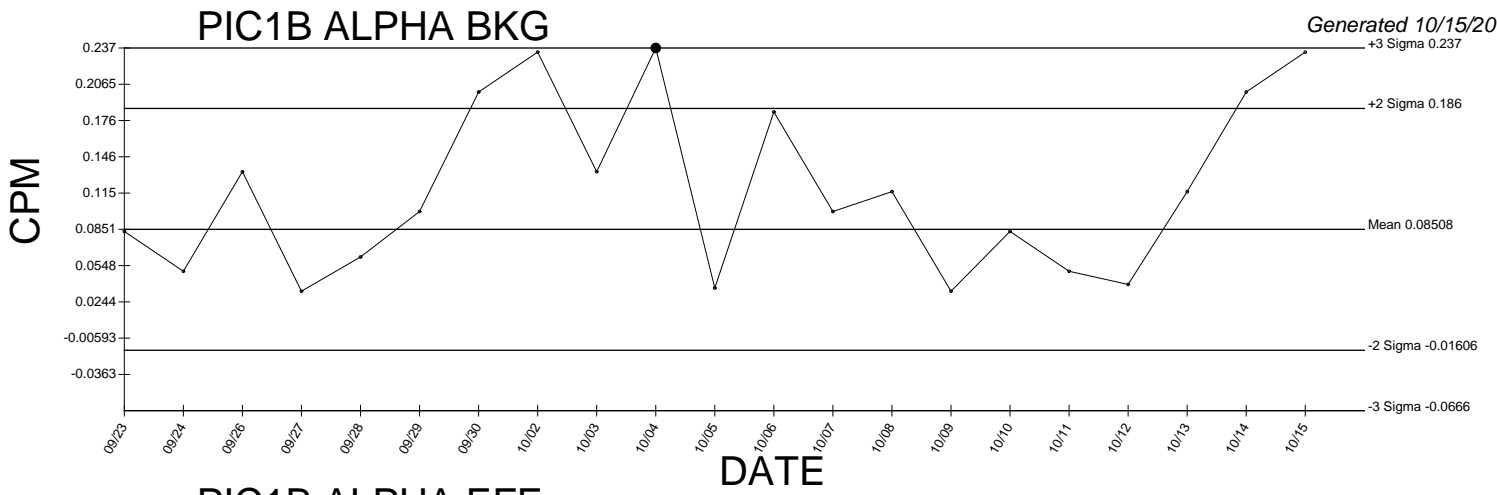
Generated 10/15/2009



PIC1A BETA EFF Cross Talk



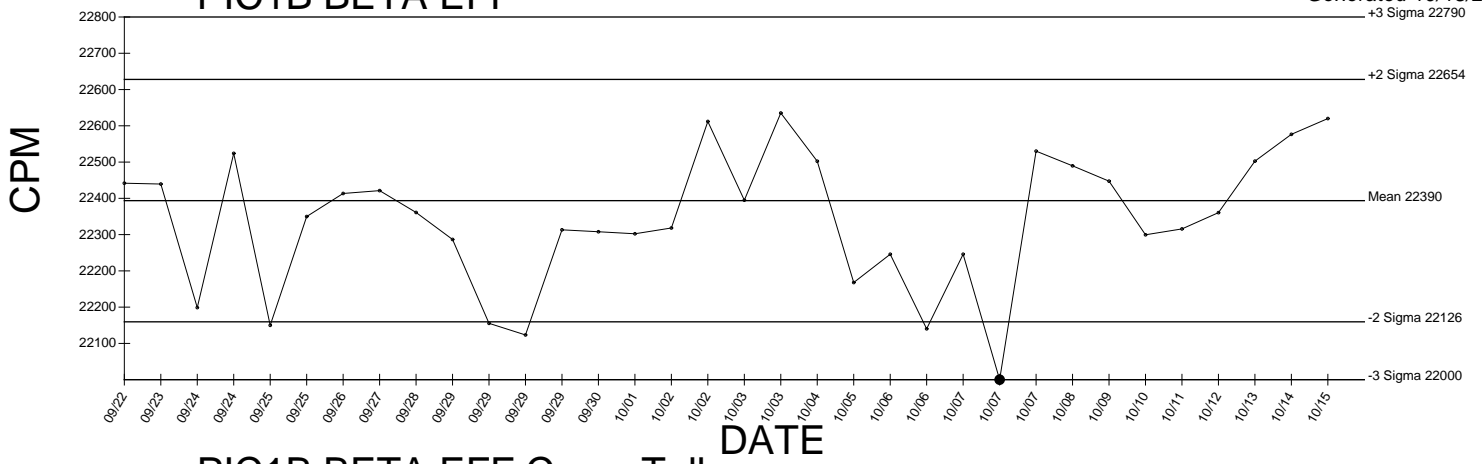
● Denotes Outlier



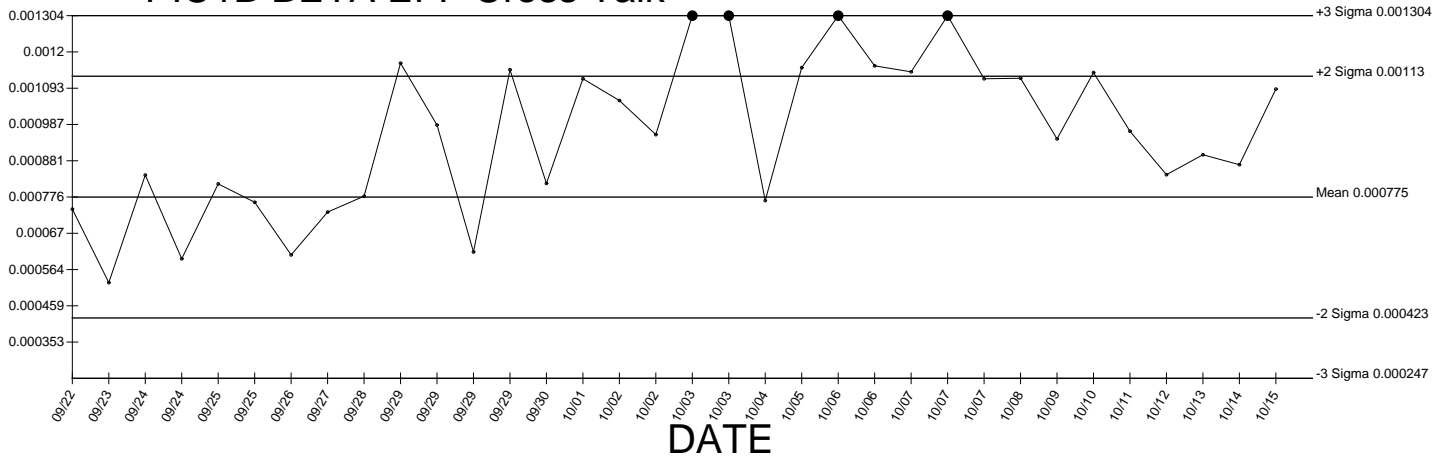
● Denotes Outlier

PIC1B BETA EFF

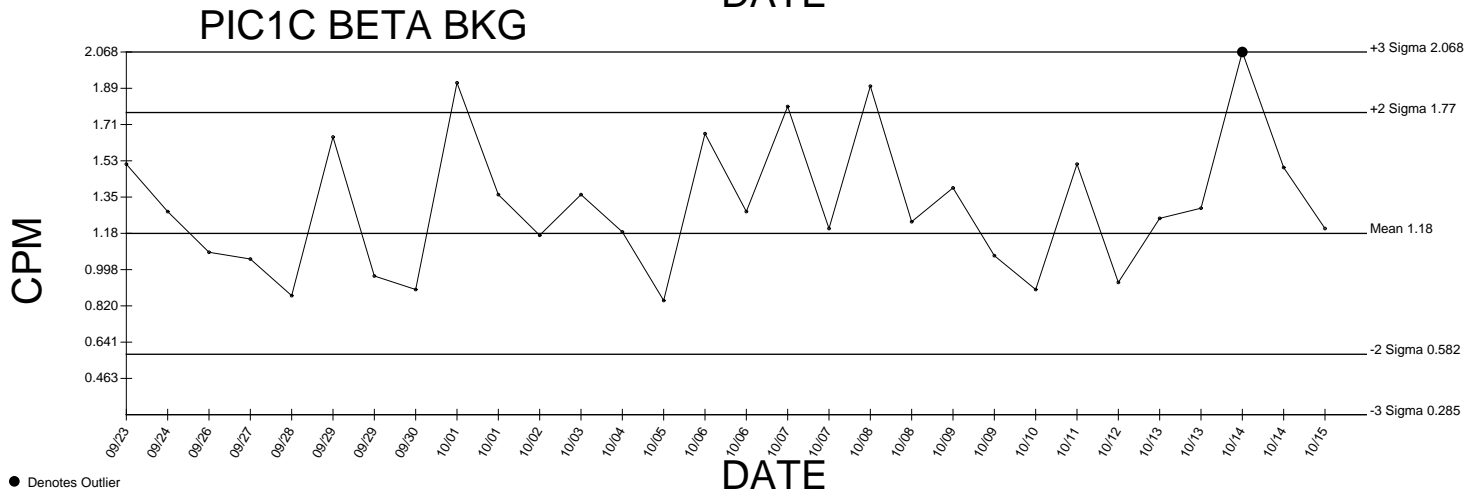
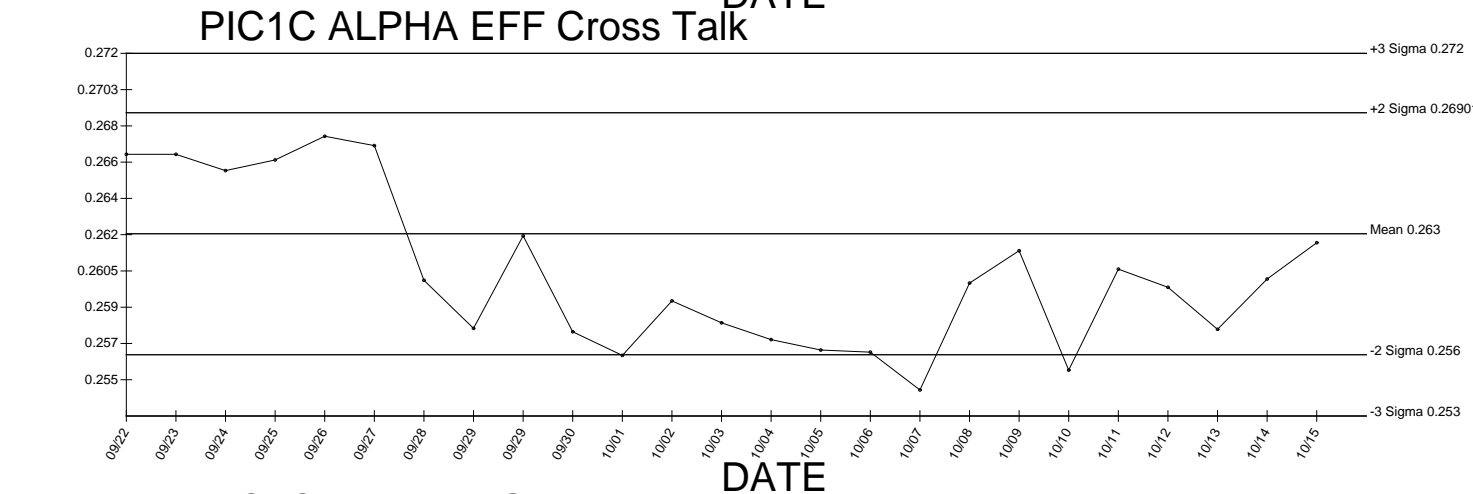
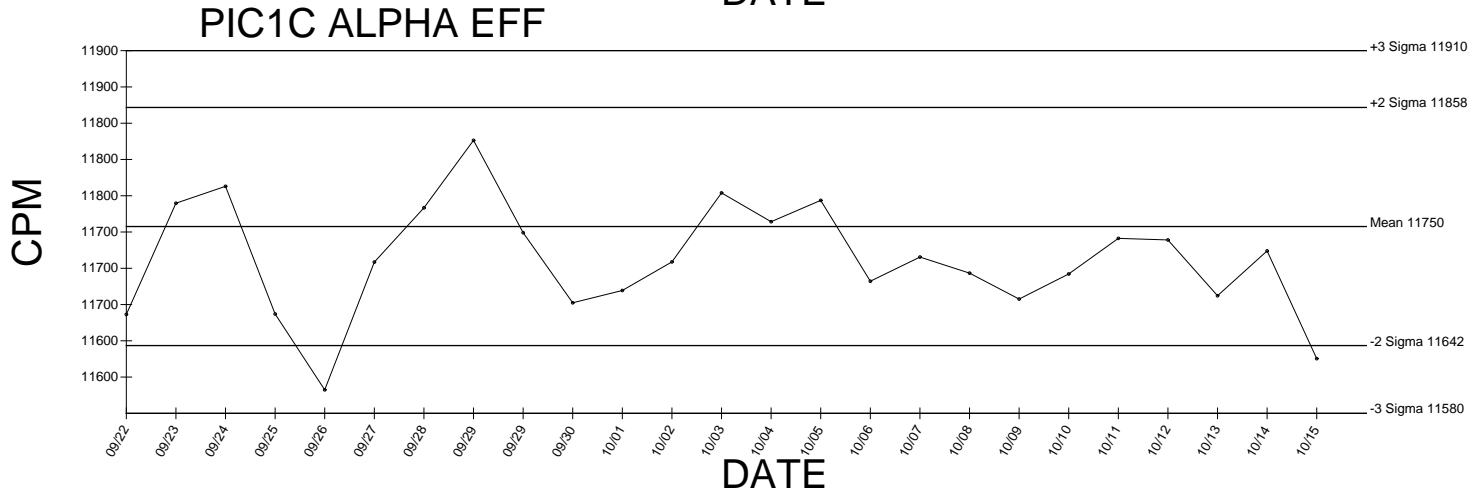
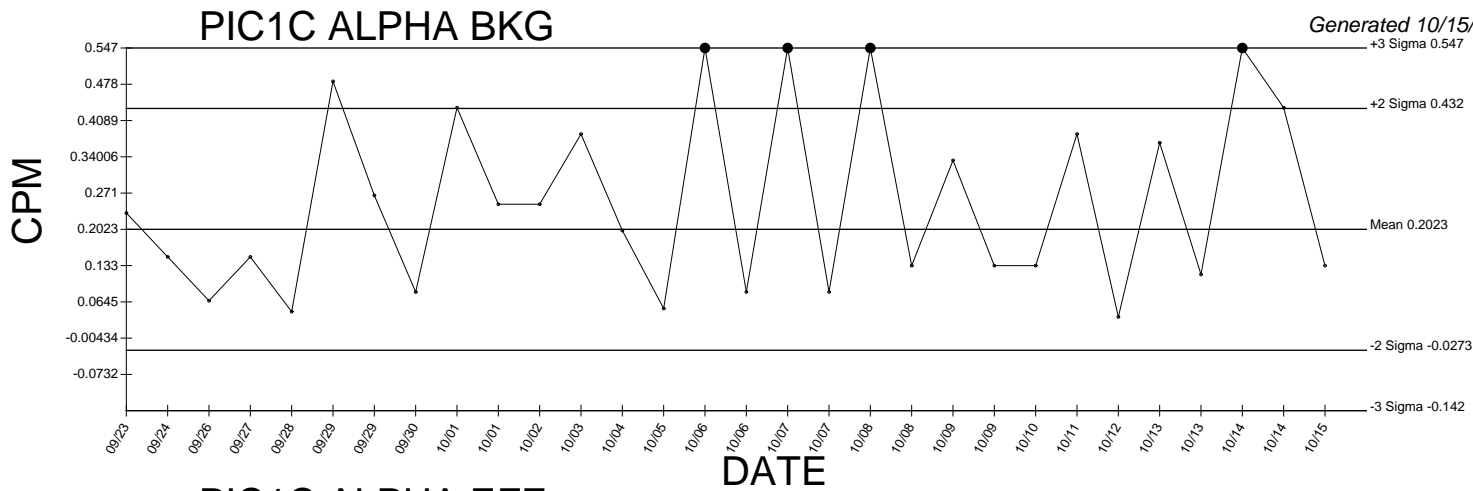
Generated 10/15/2009



PIC1B BETA EFF Cross Talk



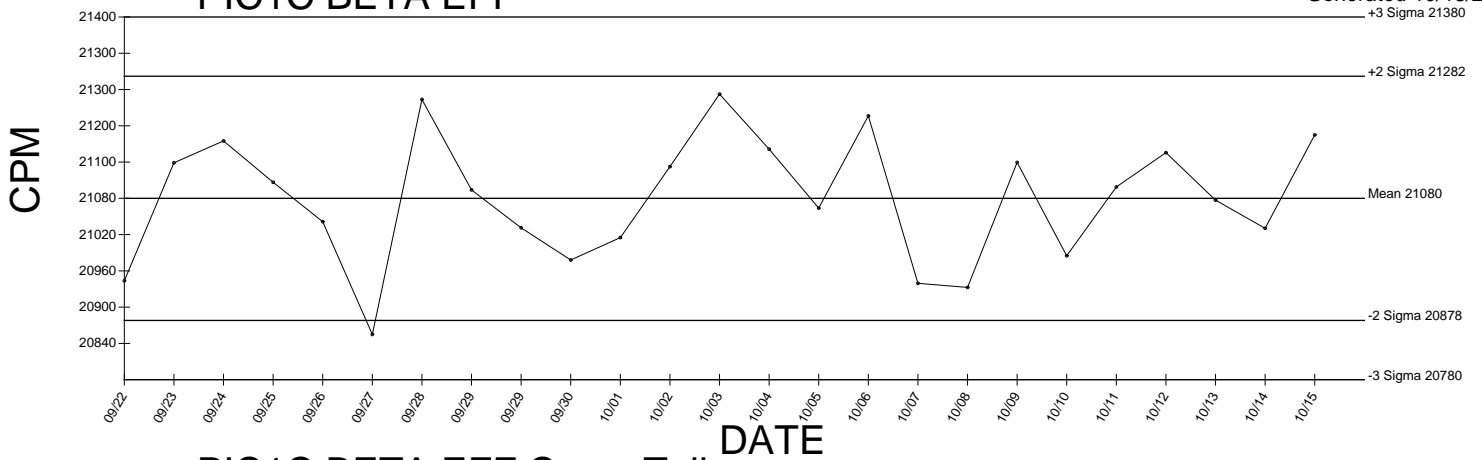
● Denotes Outlier



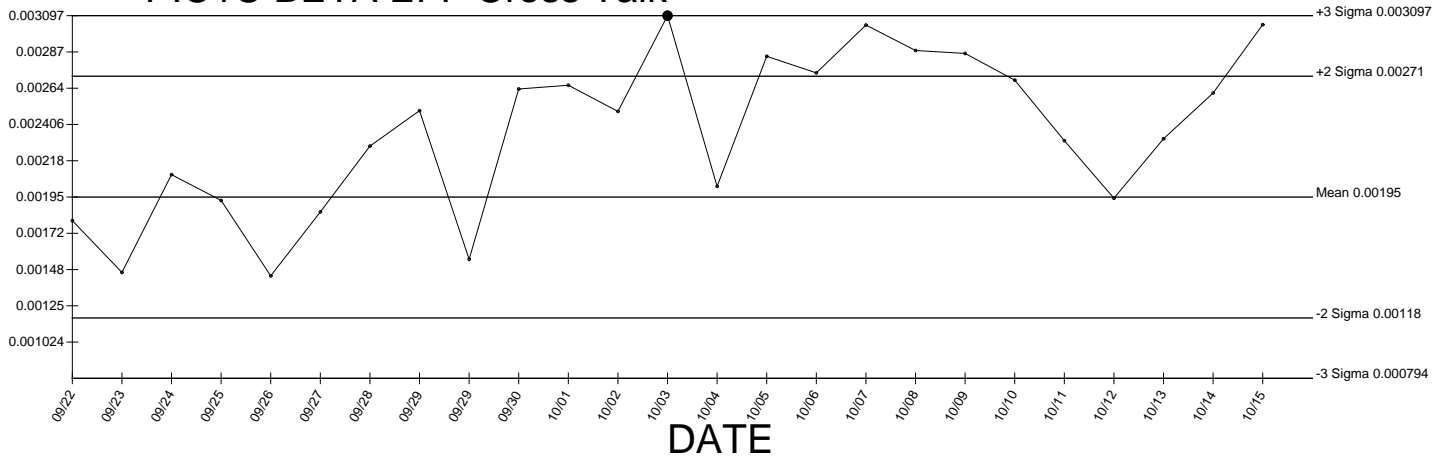
● Denotes Outlier

PIC1C BETA EFF

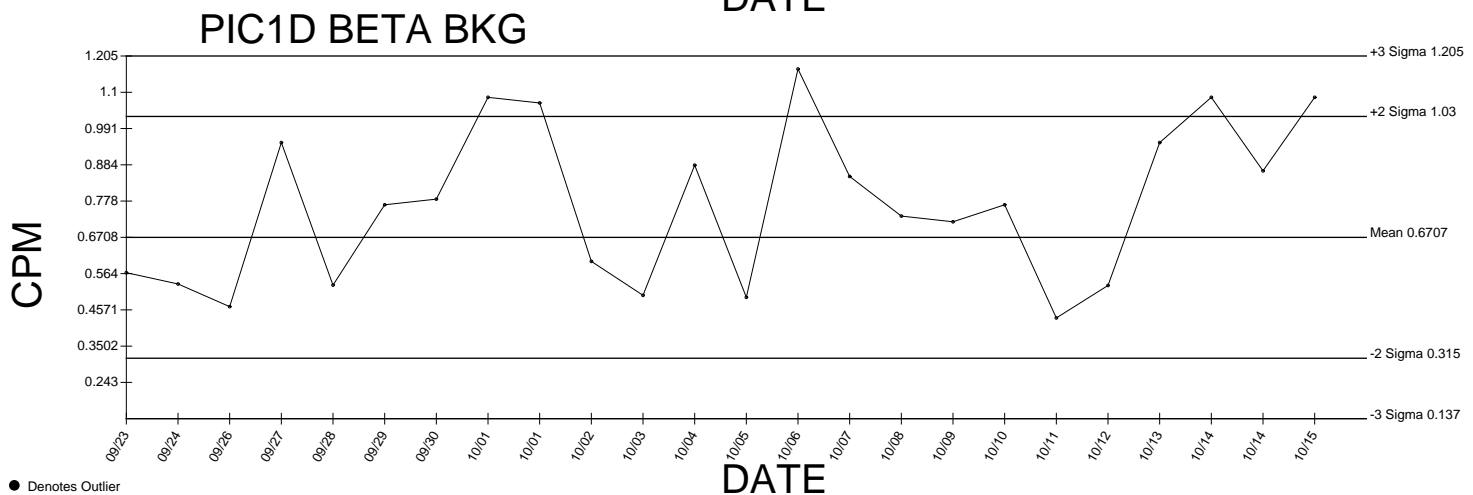
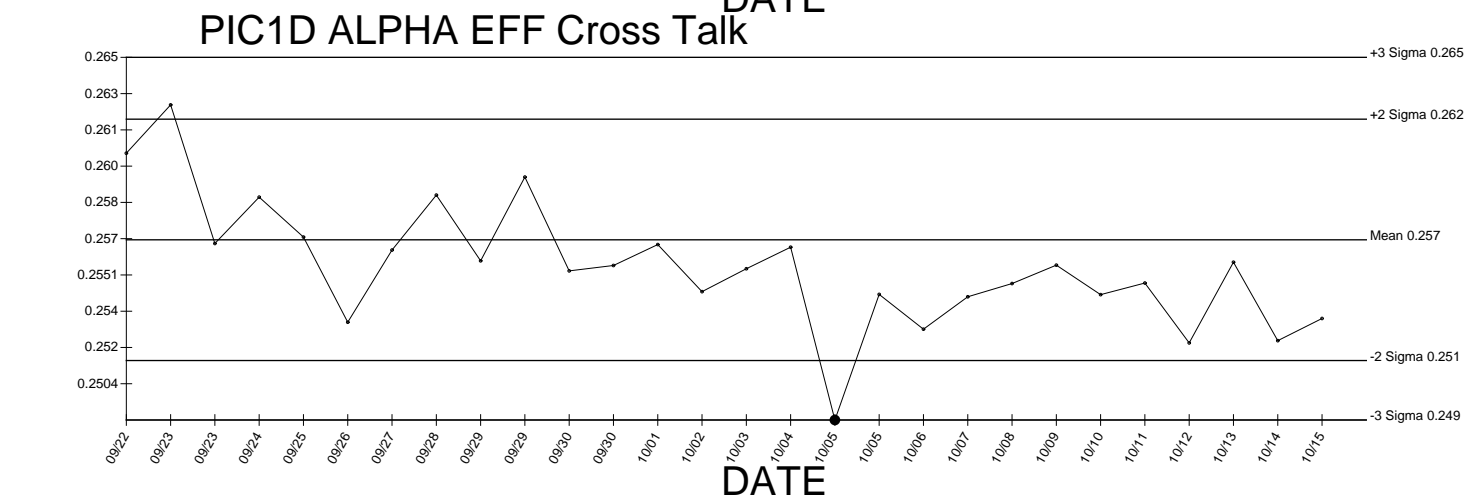
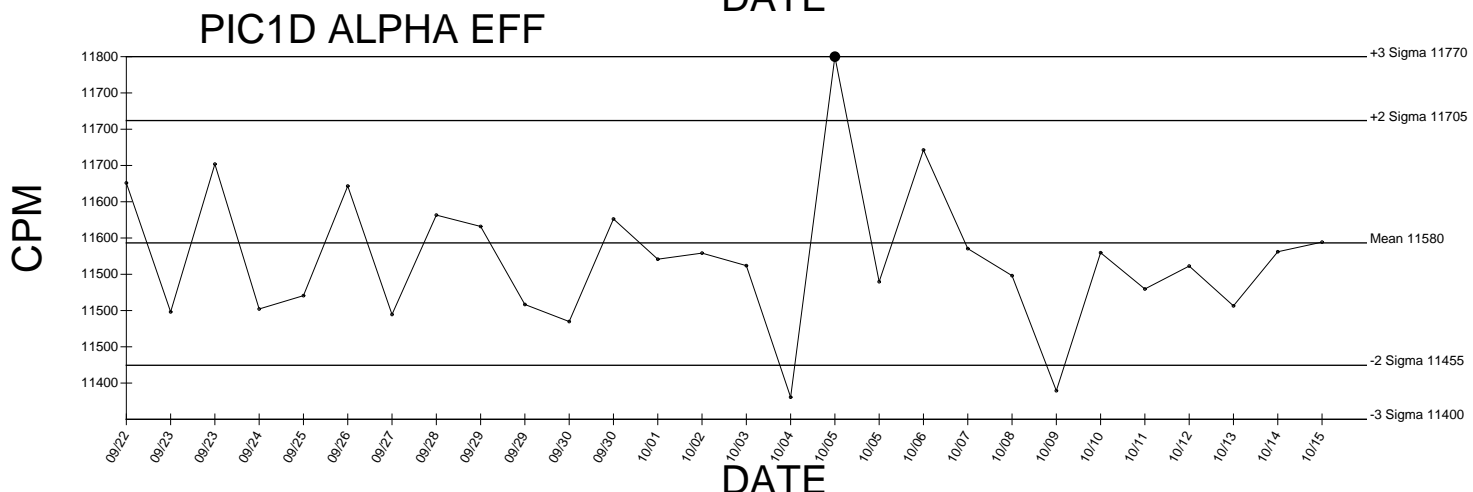
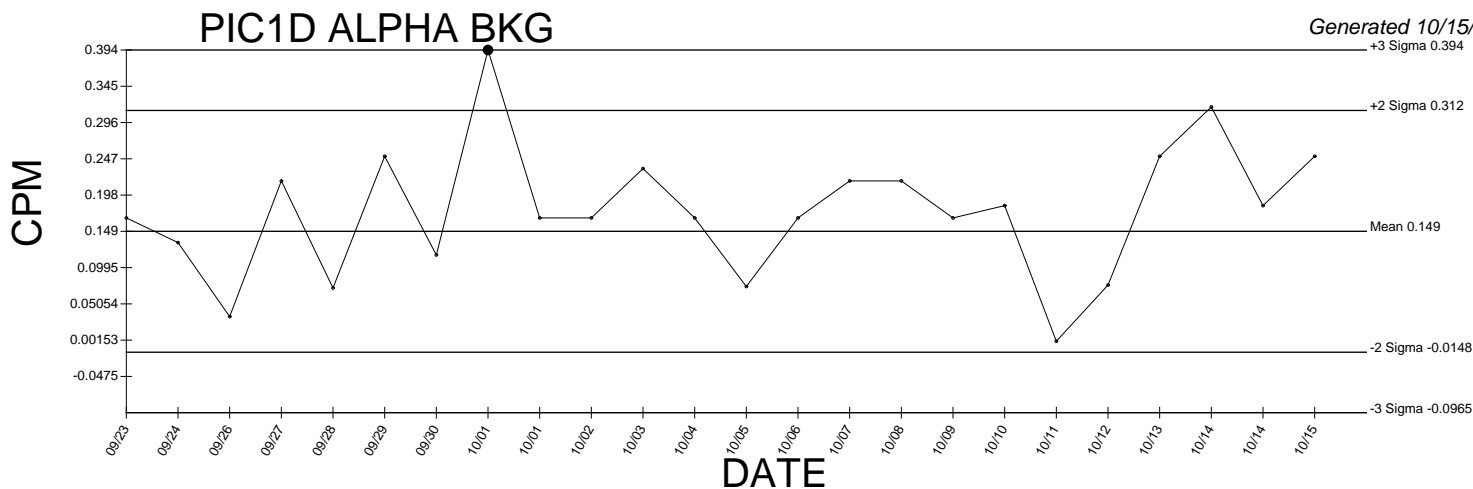
Generated 10/15/2009



PIC1C BETA EFF Cross Talk



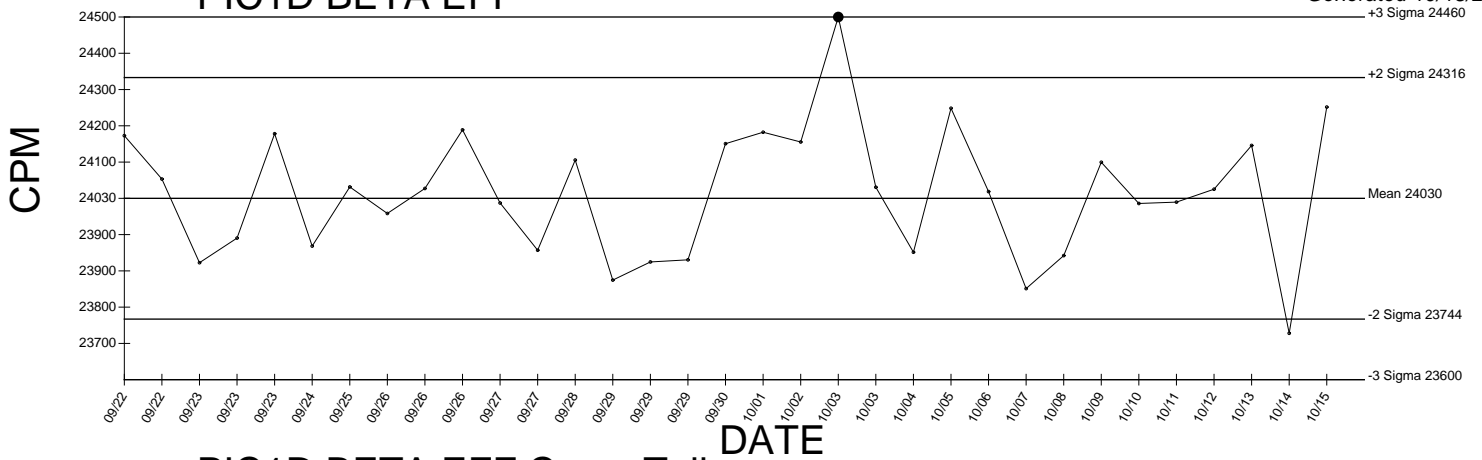
● Denotes Outlier



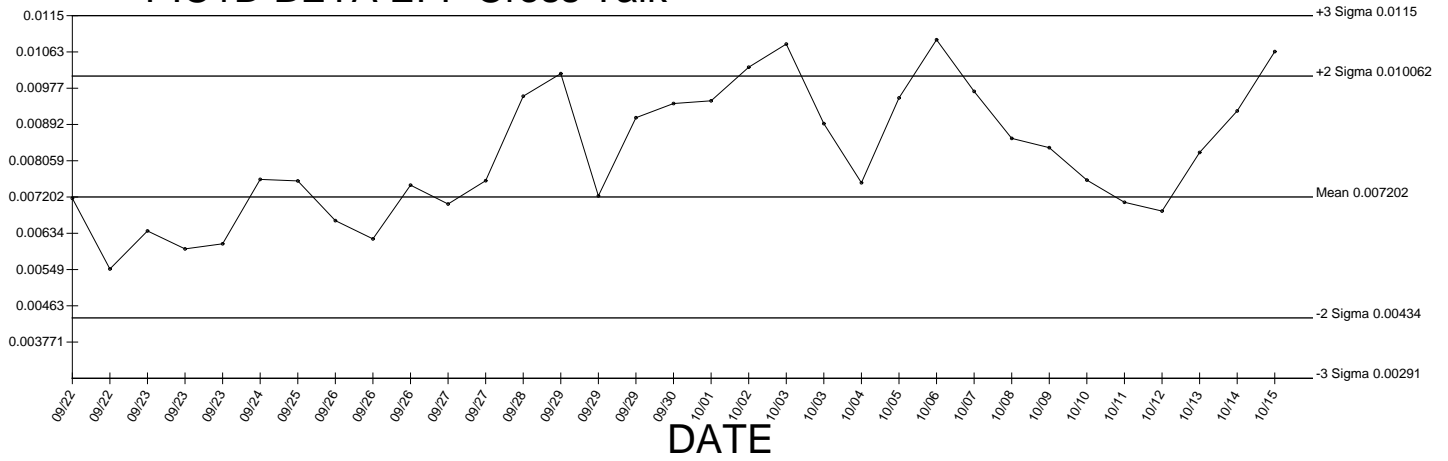
● Denotes Outlier

PIC1D BETA EFF

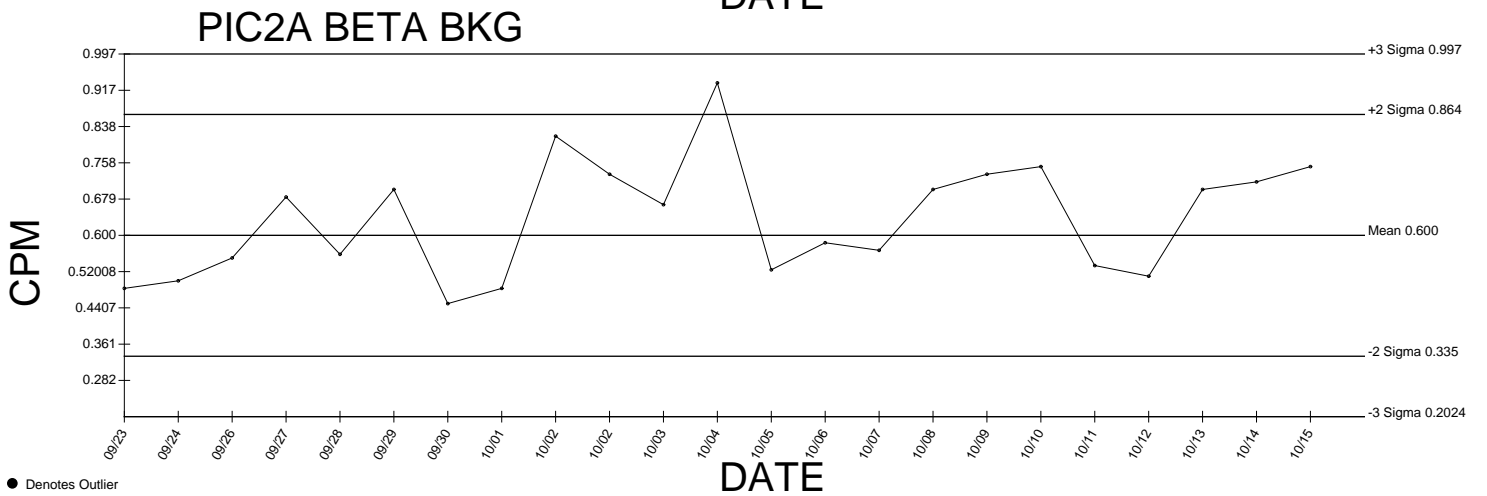
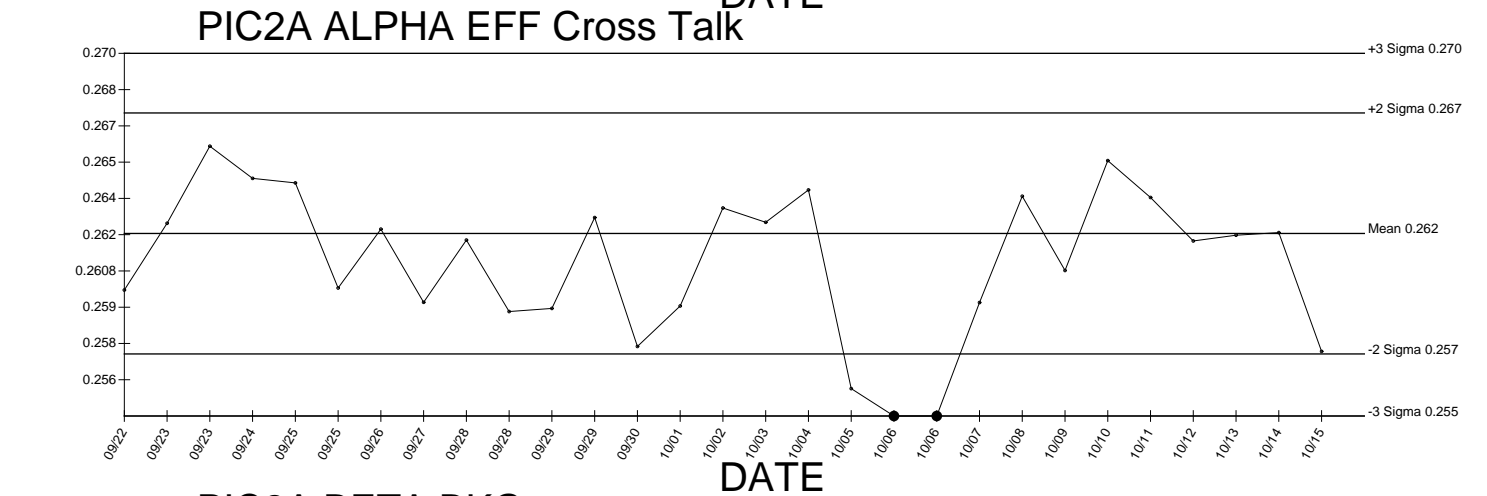
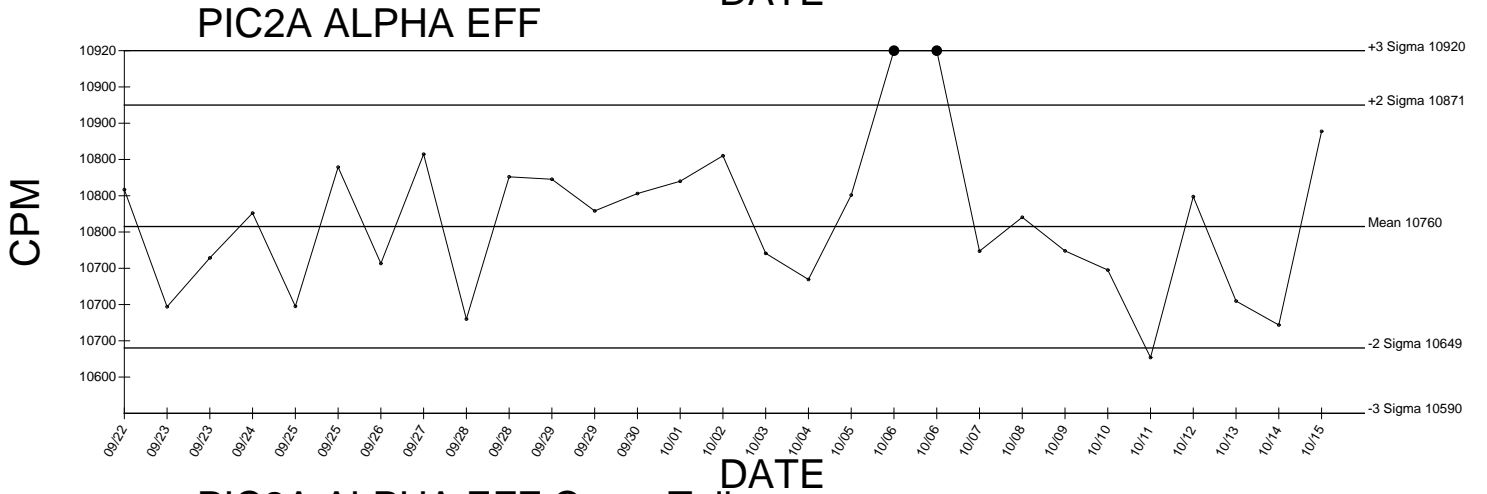
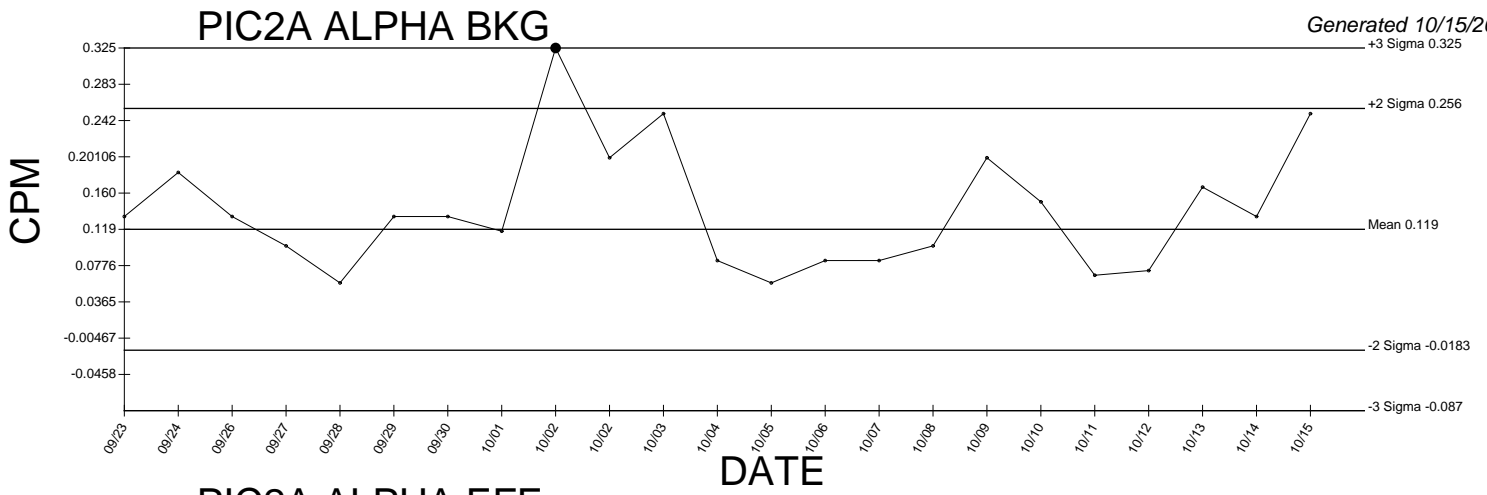
Generated 10/15/2009



PIC1D BETA EFF Cross Talk



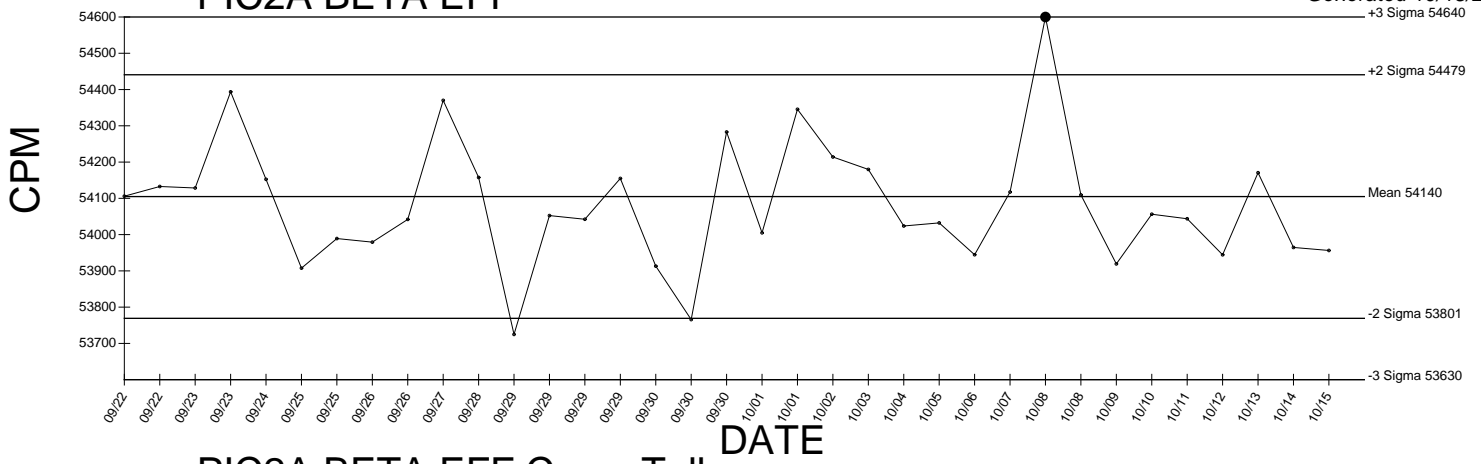
● Denotes Outlier



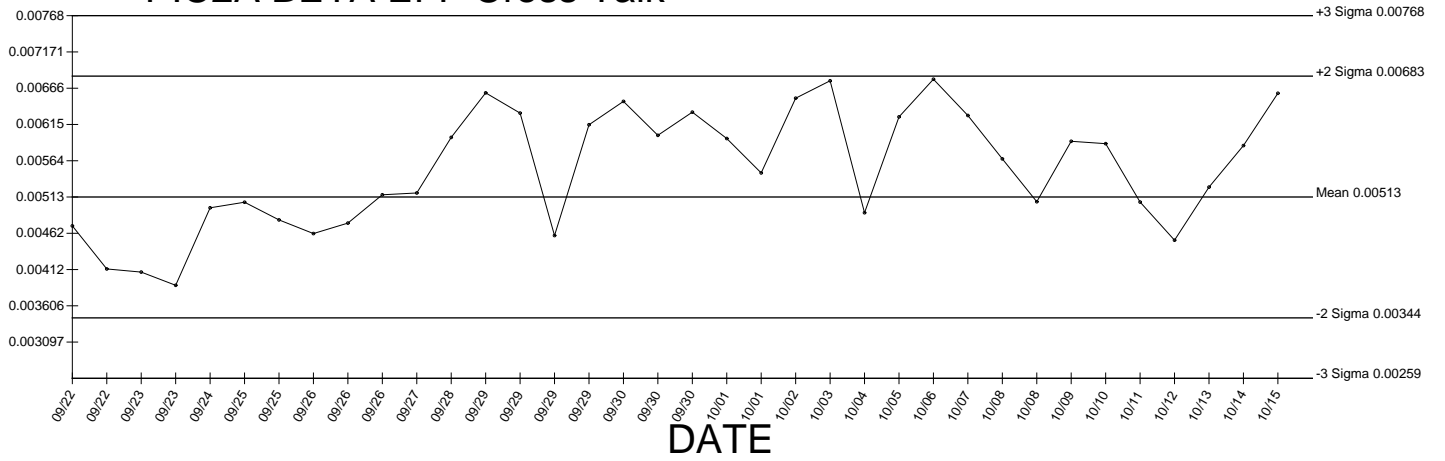
● Denotes Outlier

PIC2A BETA EFF

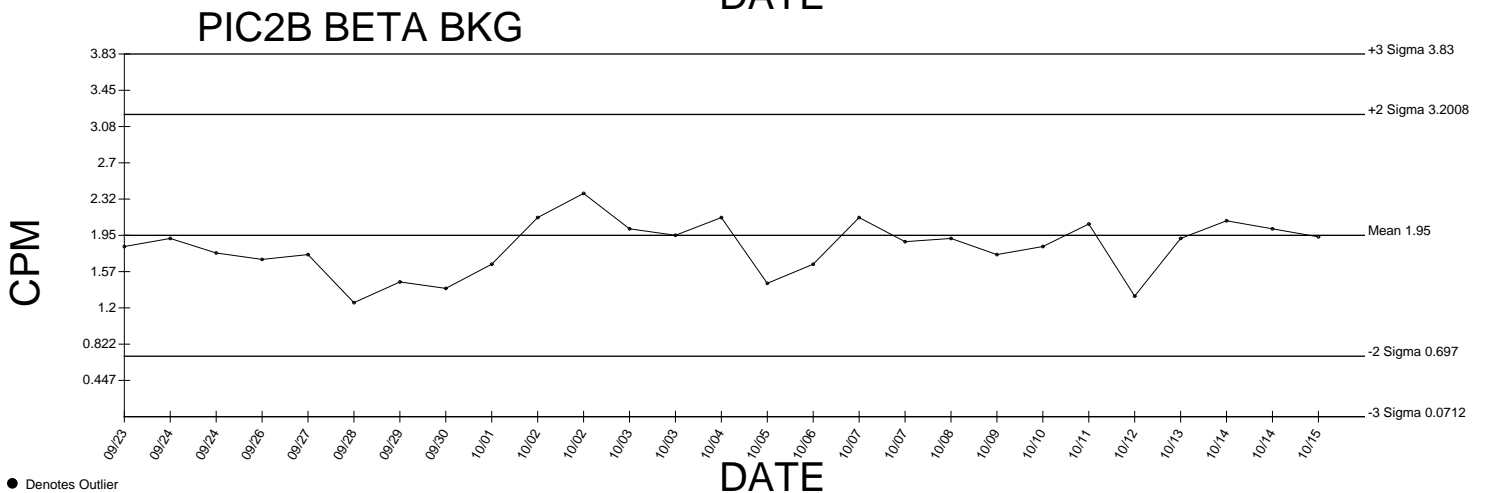
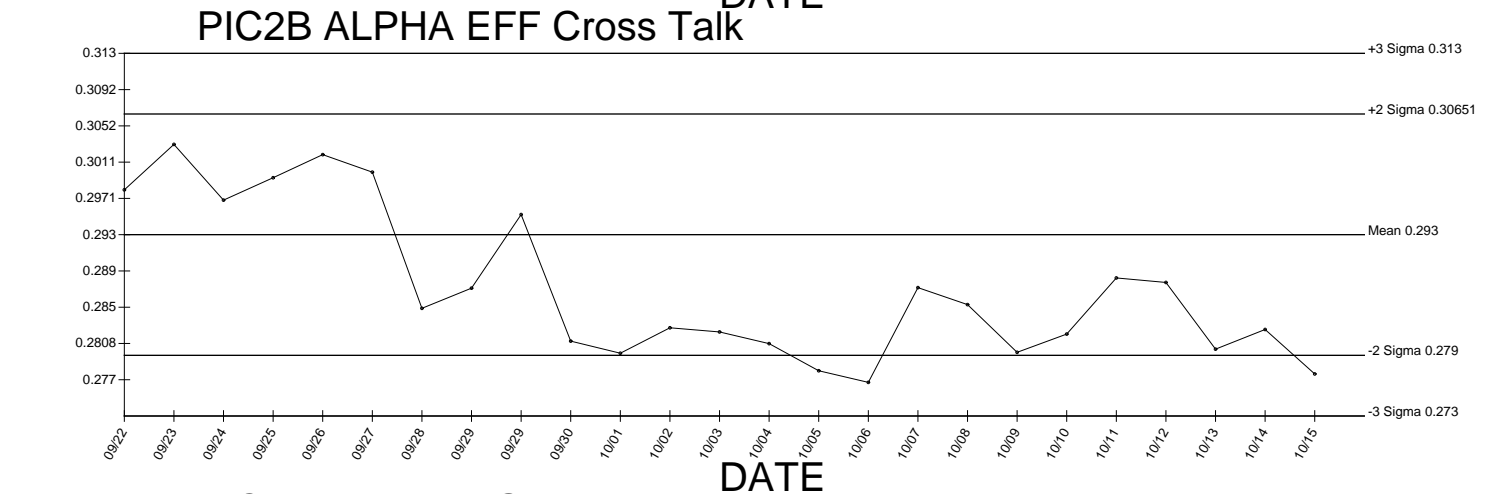
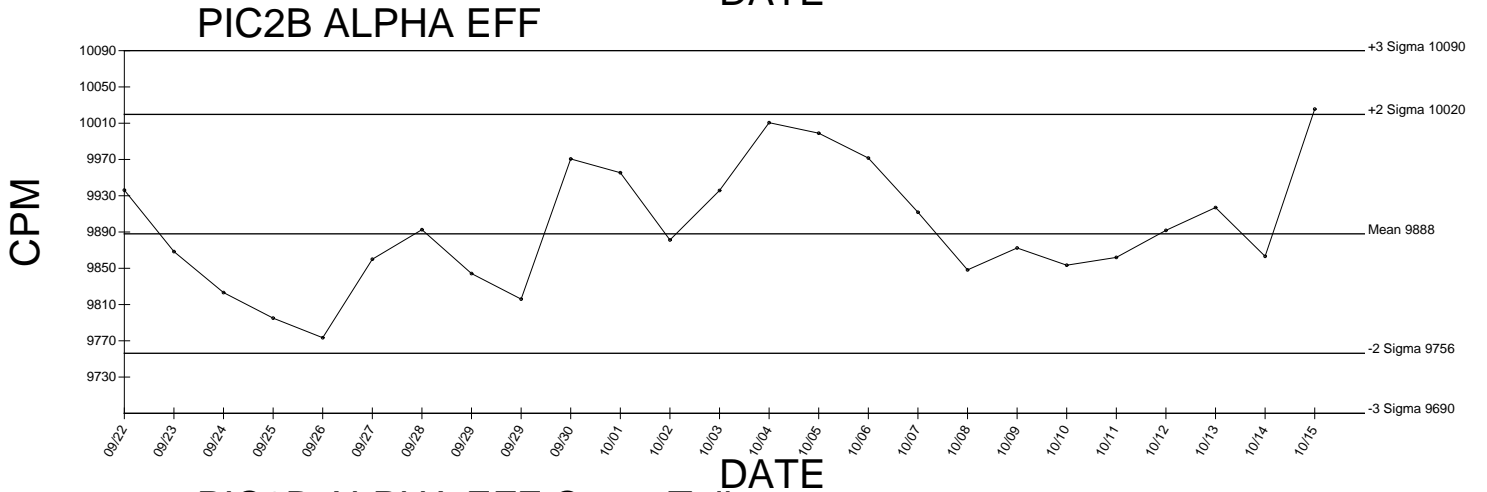
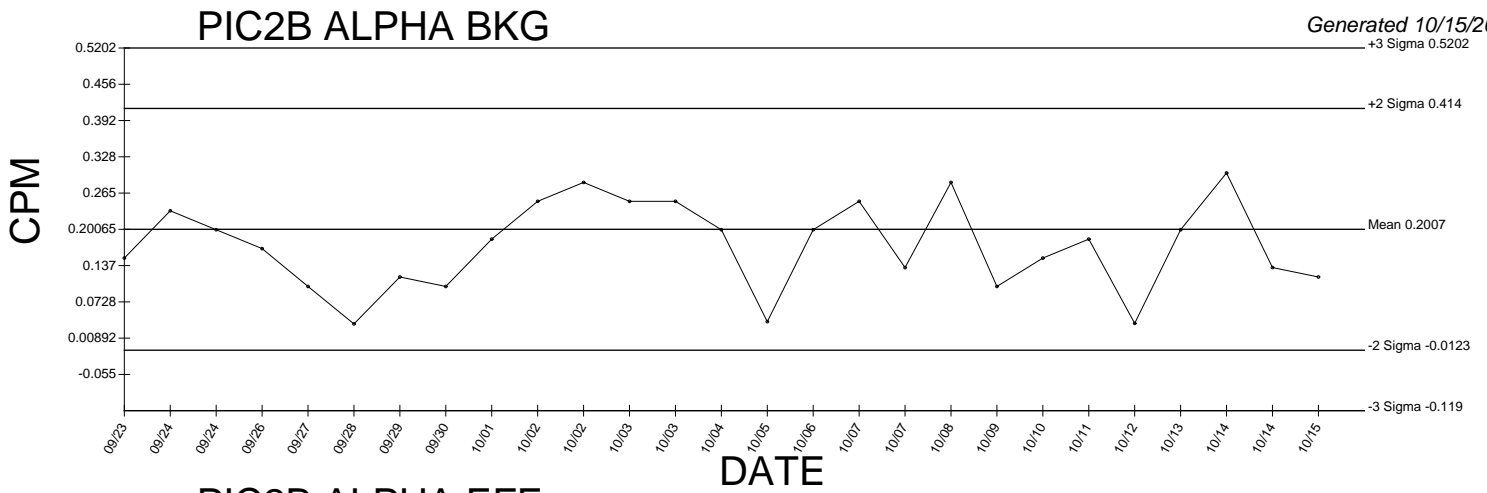
Generated 10/15/2009



PIC2A BETA EFF Cross Talk



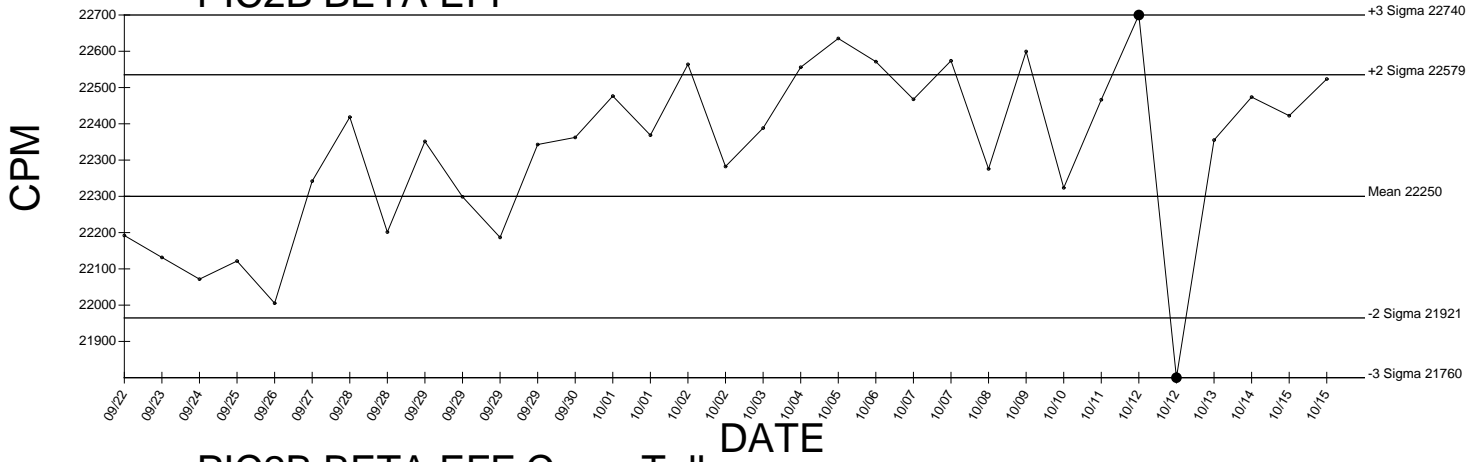
● Denotes Outlier



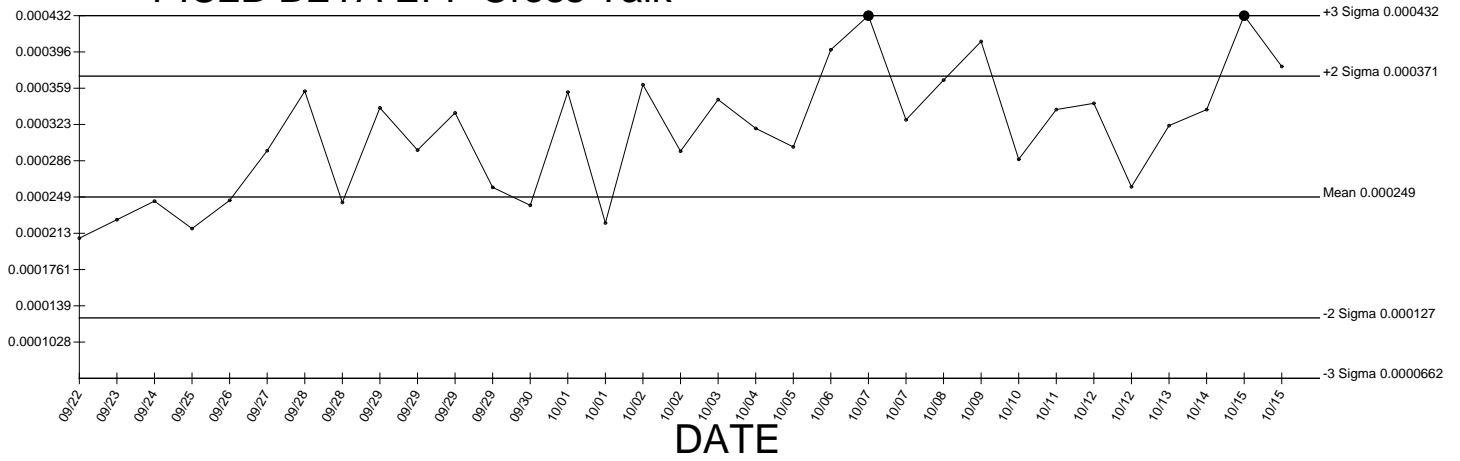
● Denotes Outlier

PIC2B BETA EFF

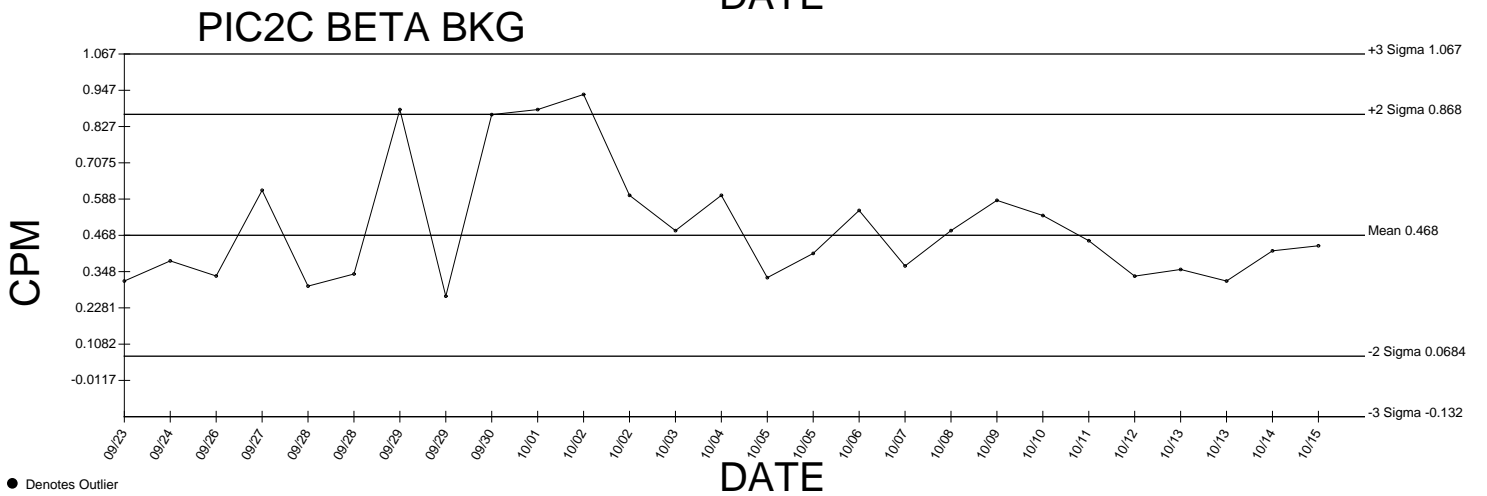
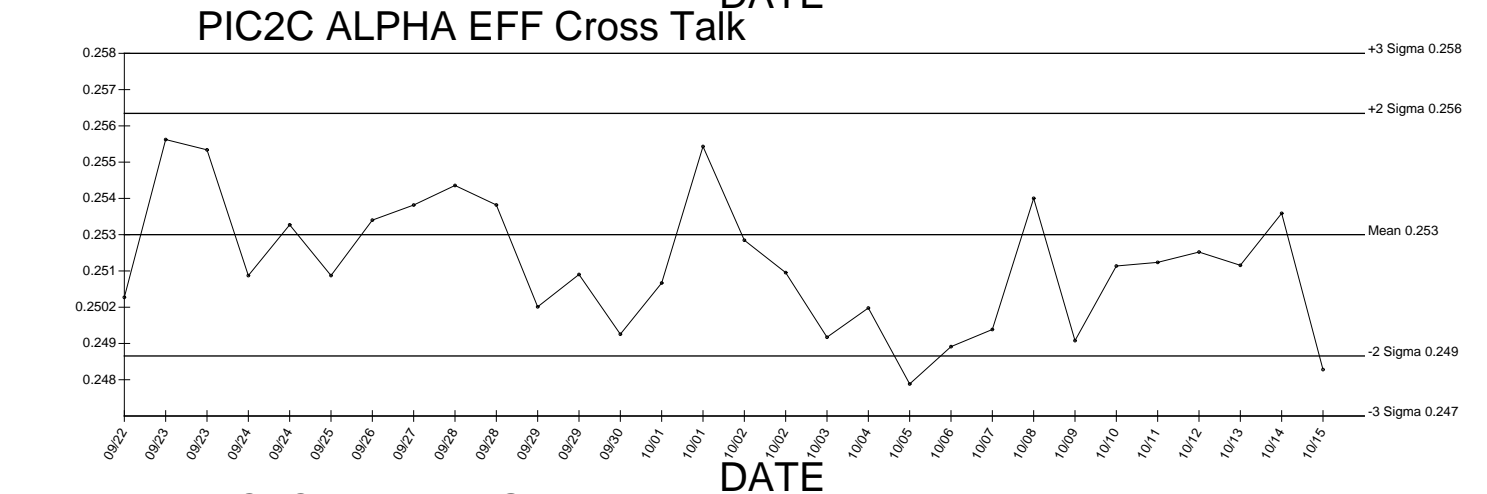
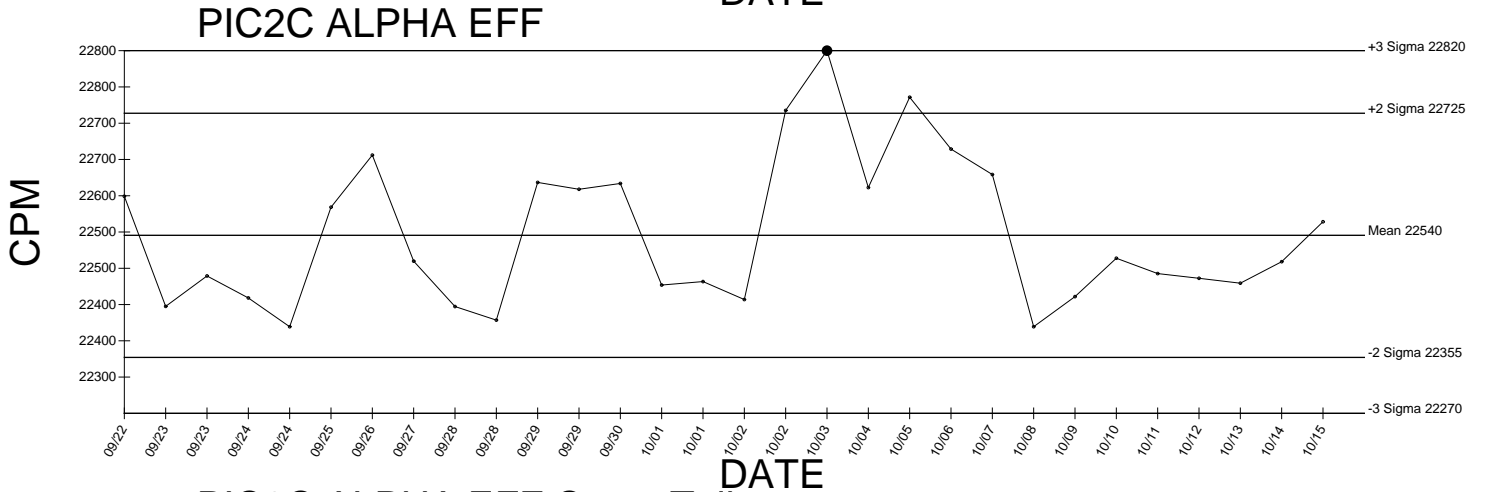
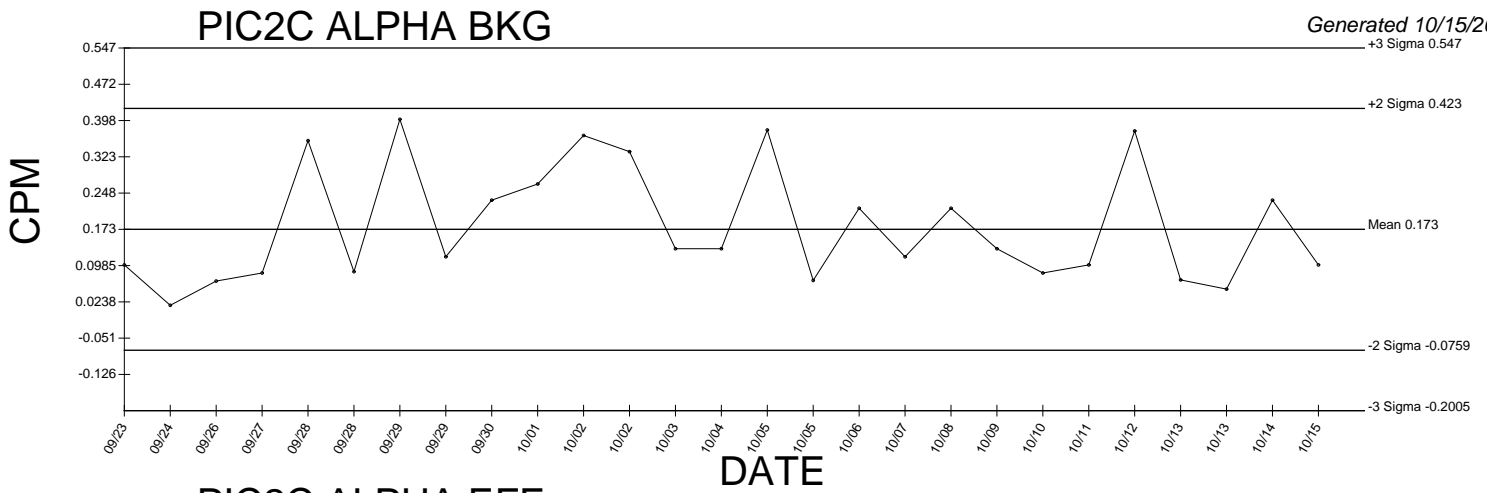
Generated 10/15/2009



PIC2B BETA EFF Cross Talk



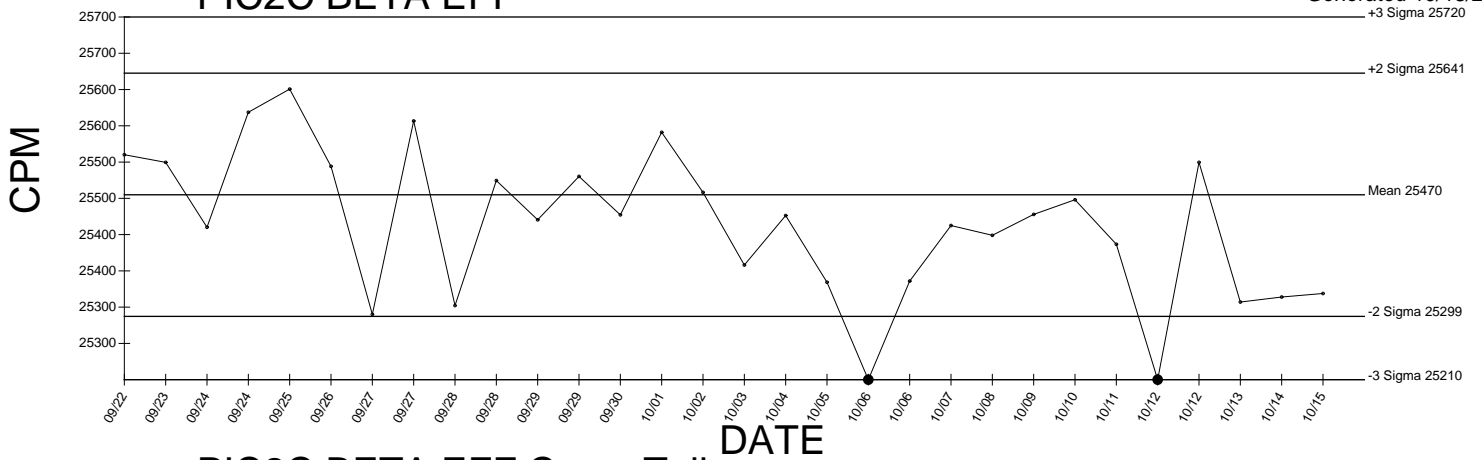
● Denotes Outlier



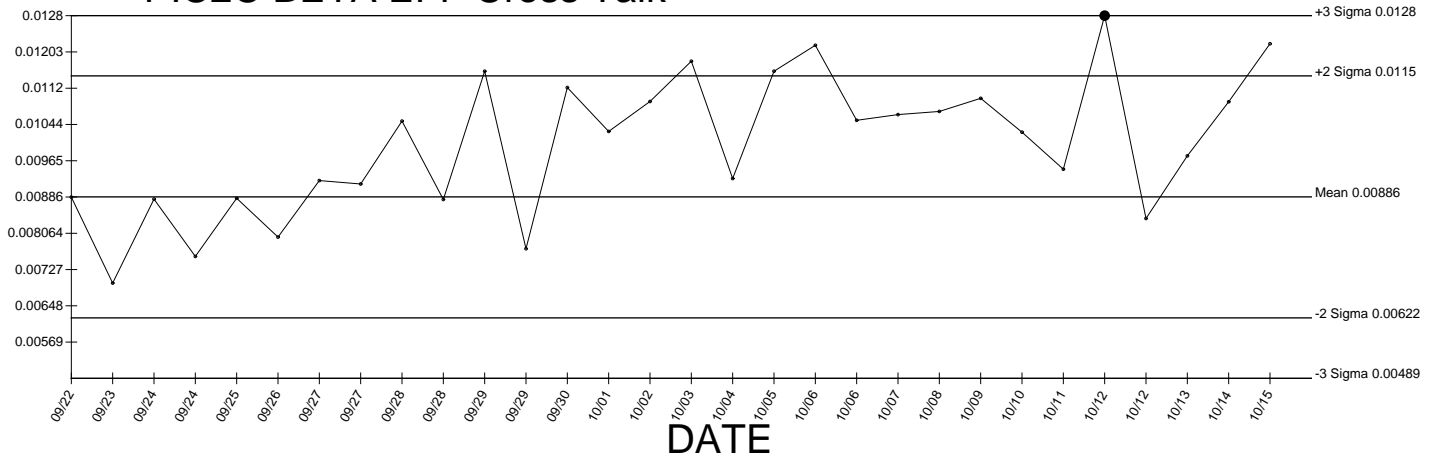
● Denotes Outlier

PIC2C BETA EFF

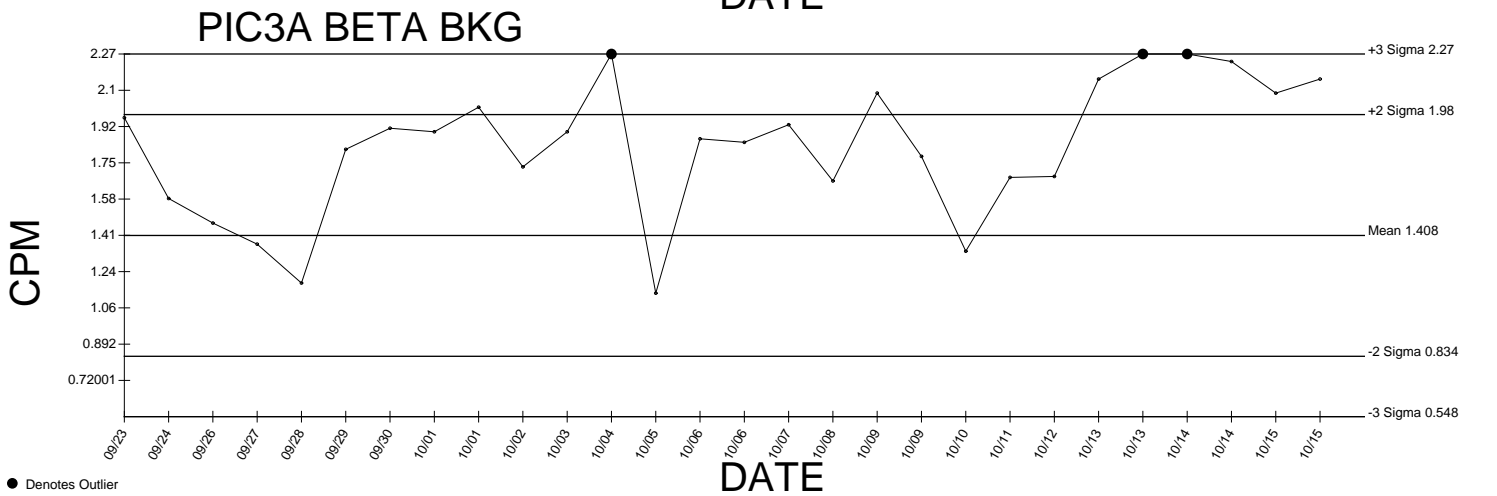
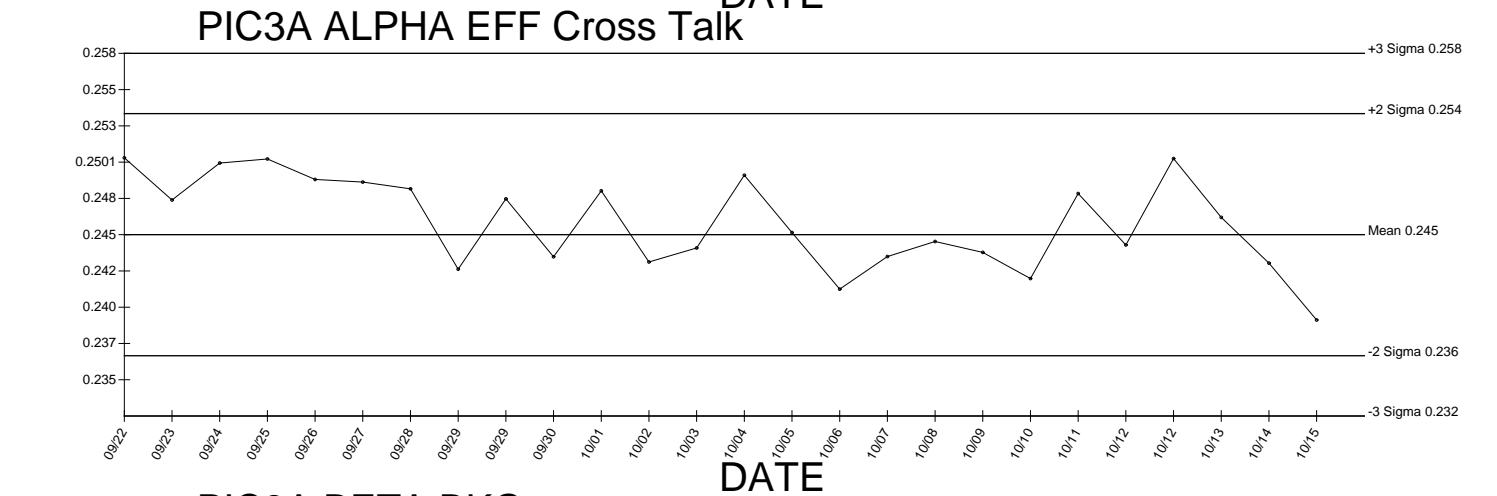
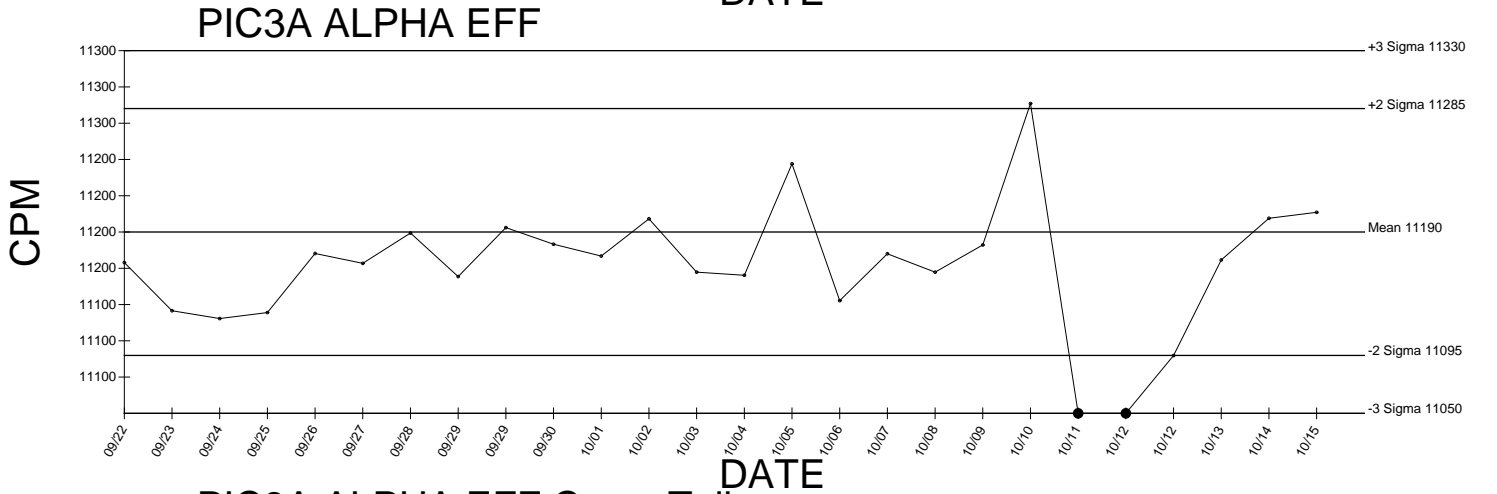
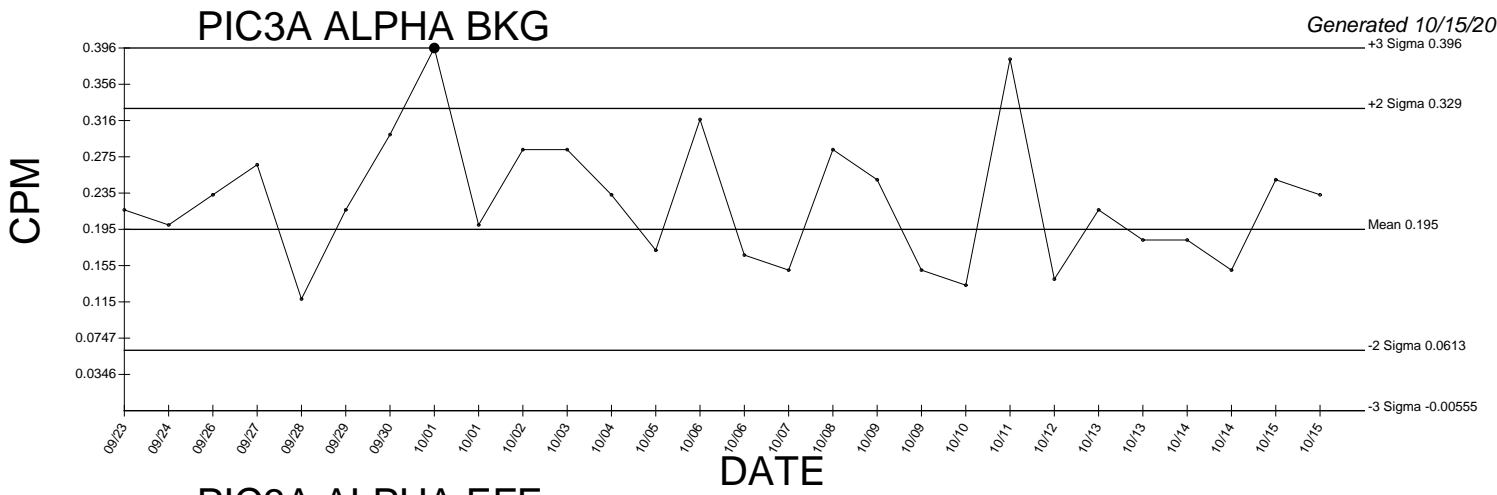
Generated 10/15/2009



PIC2C BETA EFF Cross Talk



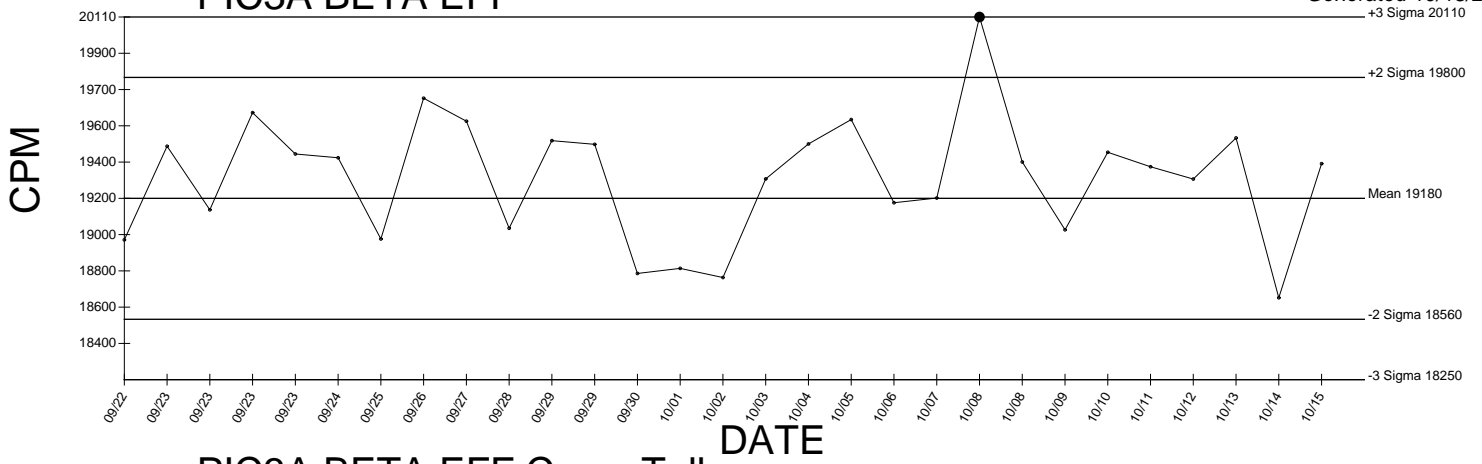
● Denotes Outlier



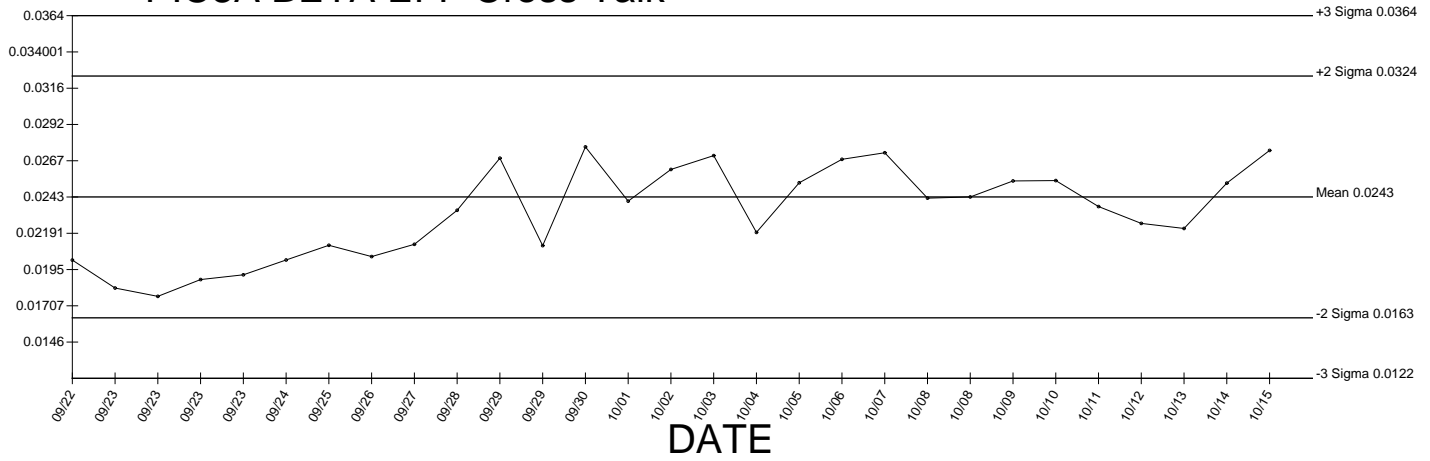
● Denotes Outlier

PIC3A BETA EFF

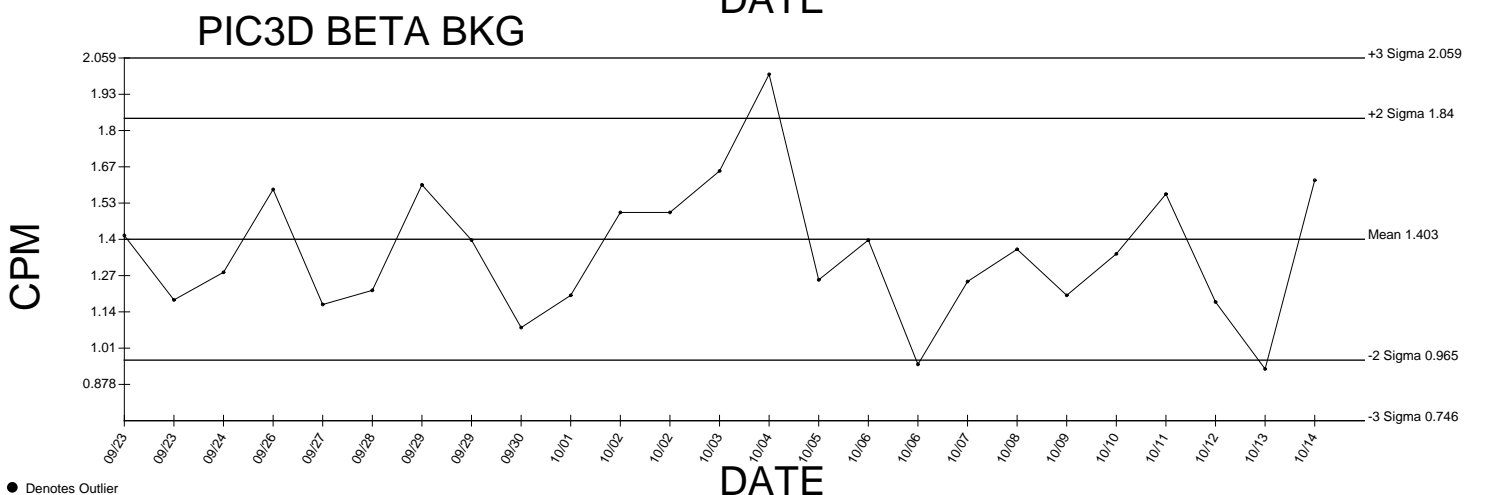
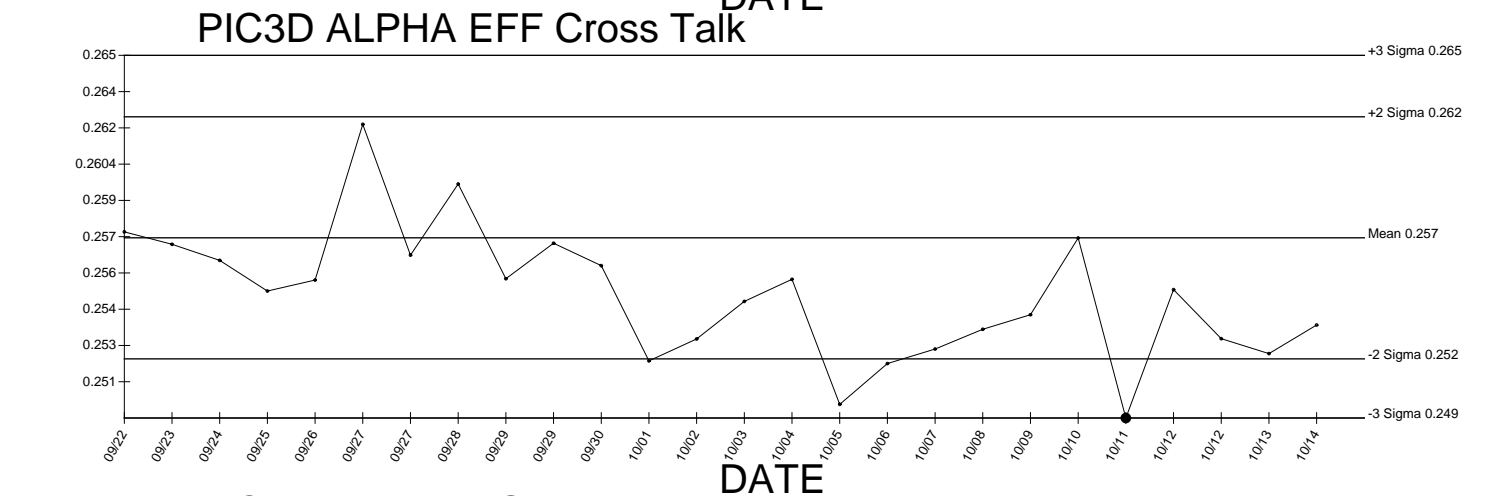
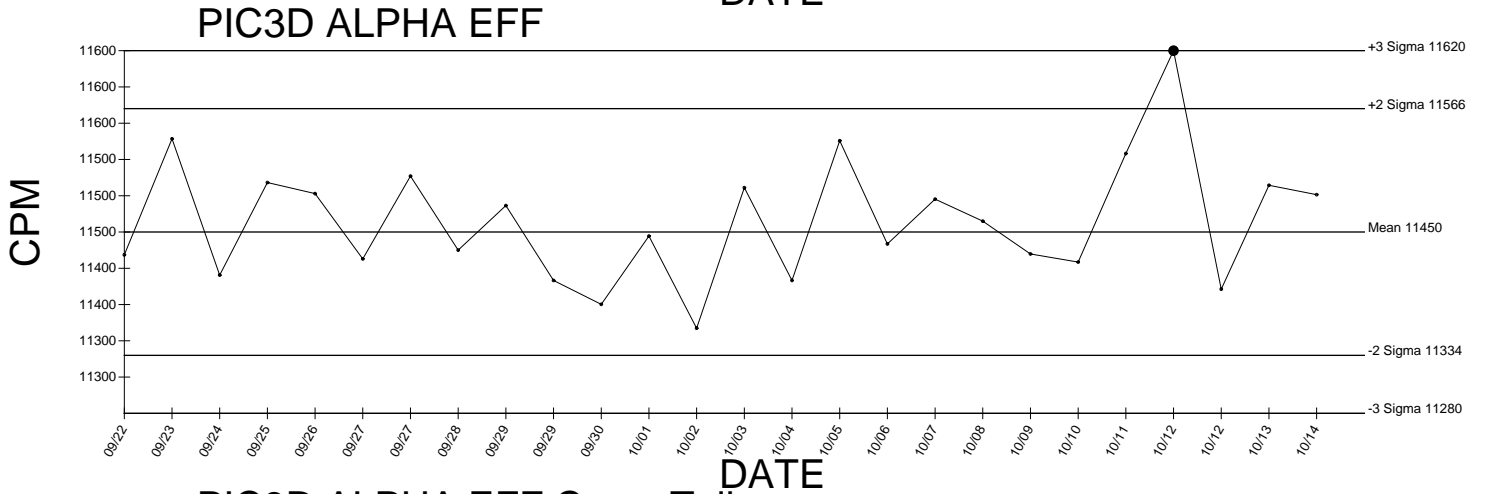
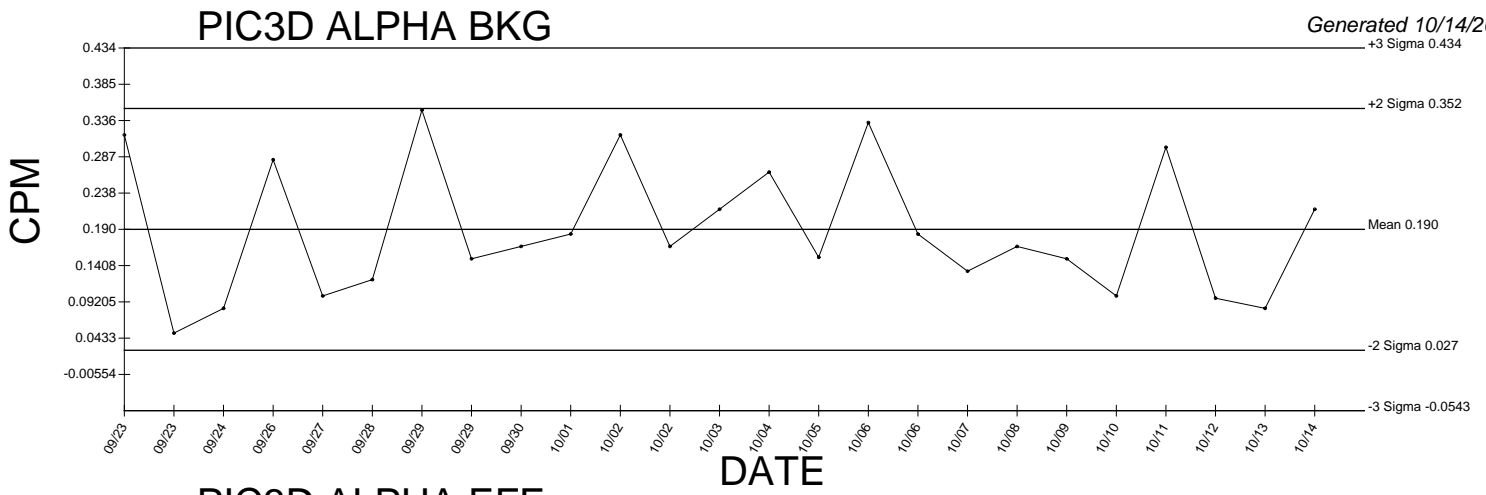
Generated 10/15/2009



PIC3A BETA EFF Cross Talk



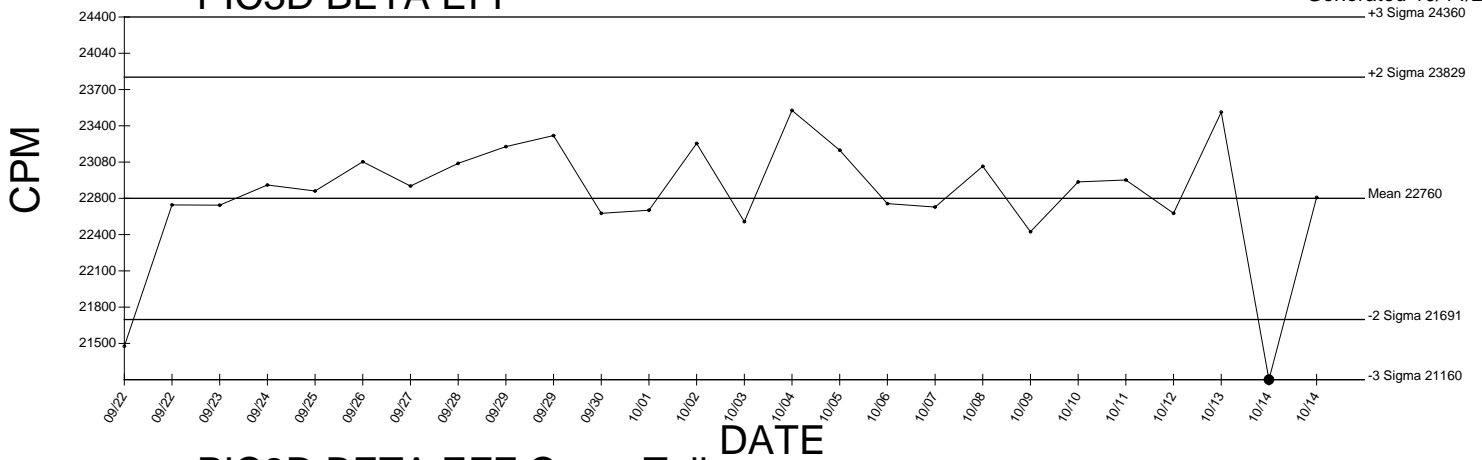
● Denotes Outlier



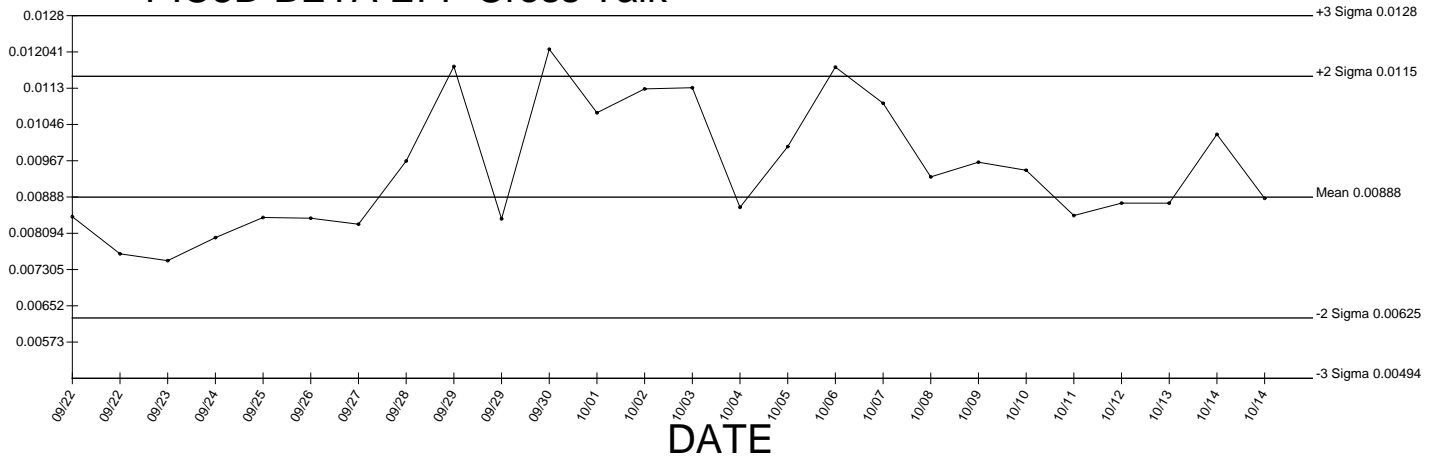
● Denotes Outlier

PIC3D BETA EFF

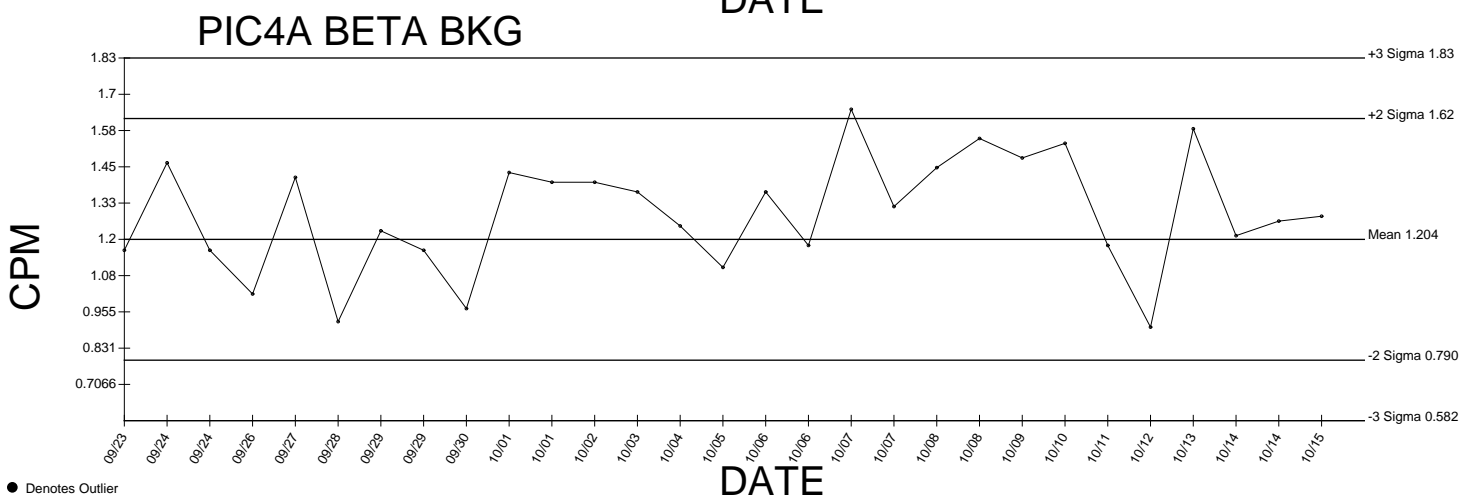
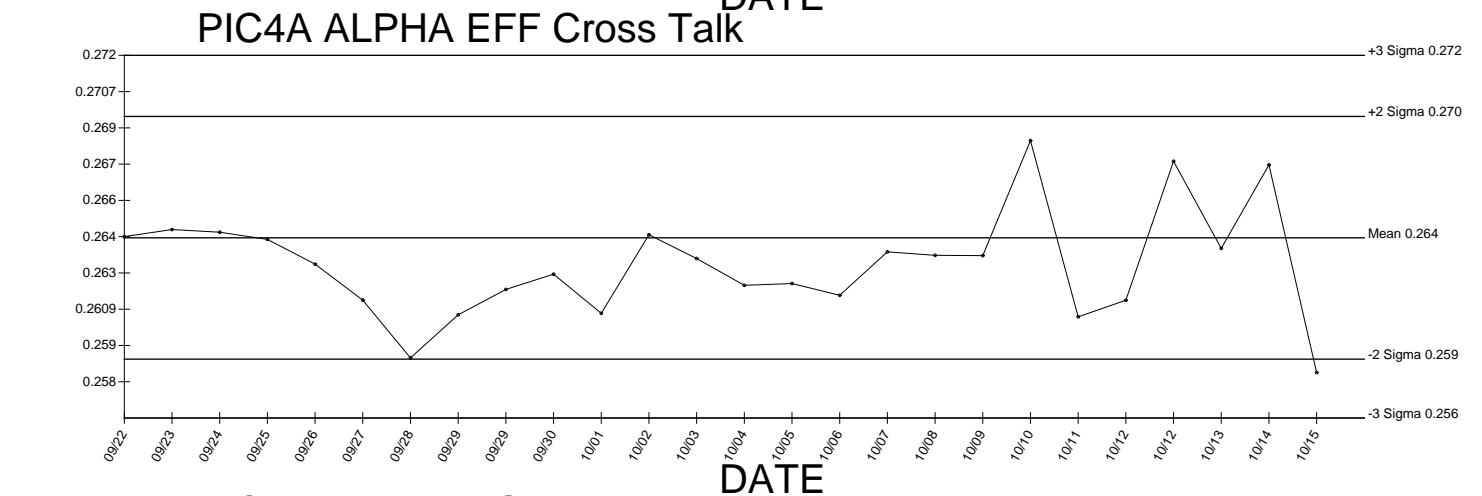
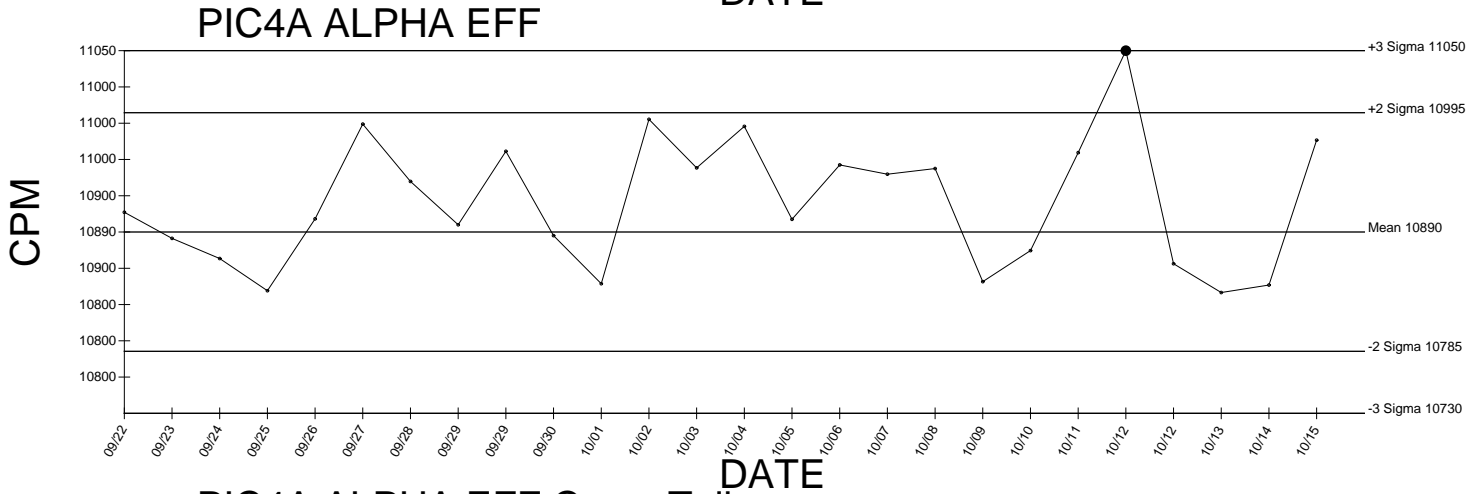
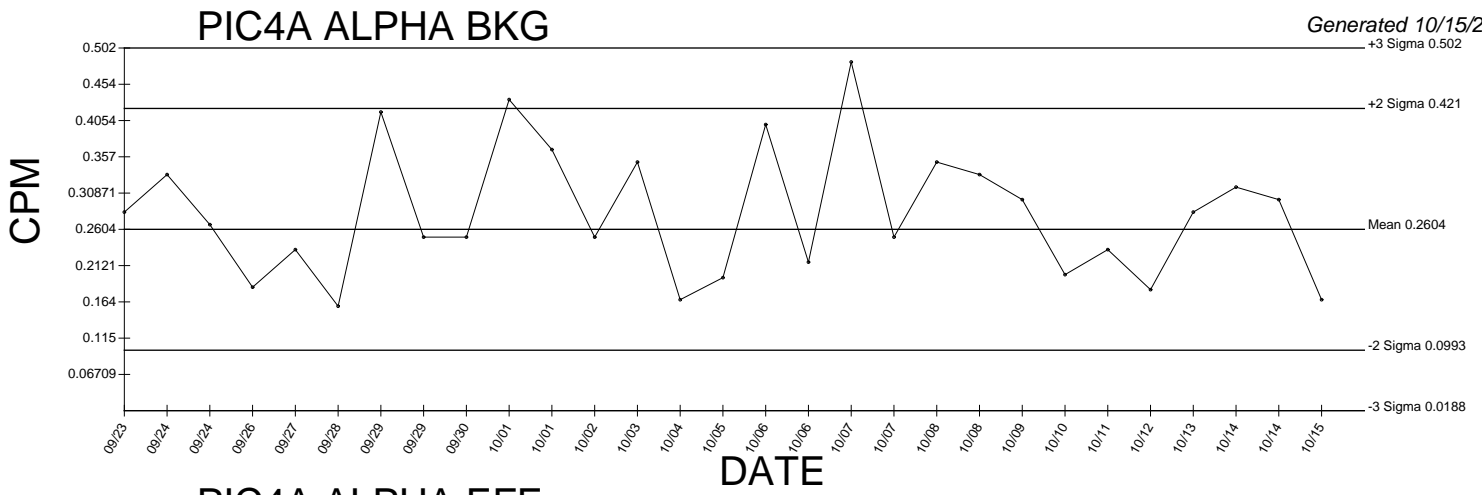
Generated 10/14/2009



PIC3D BETA EFF Cross Talk

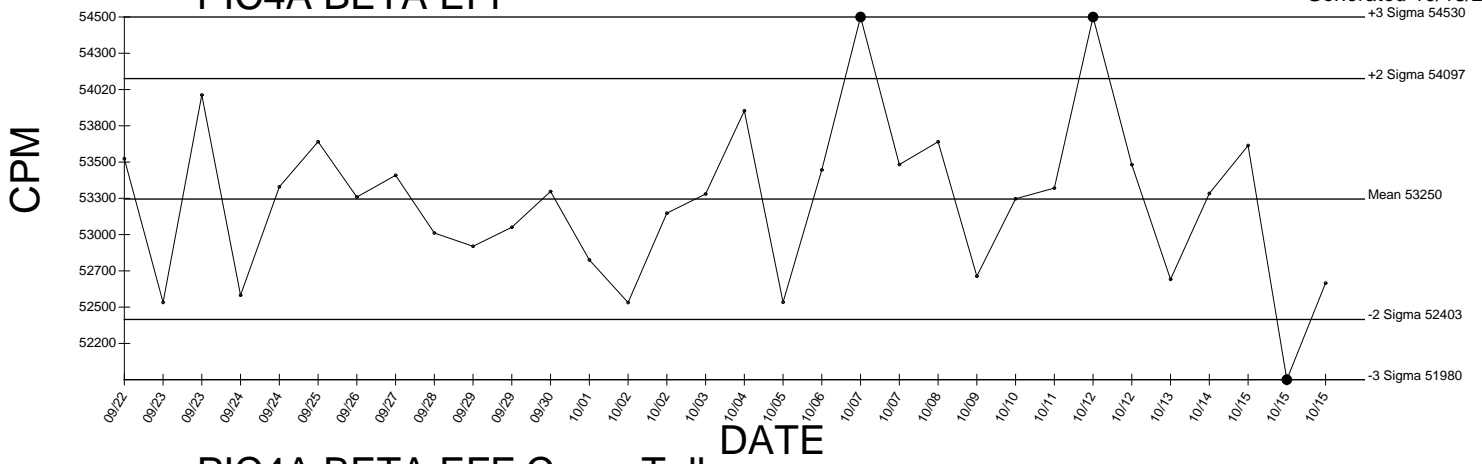


● Denotes Outlier

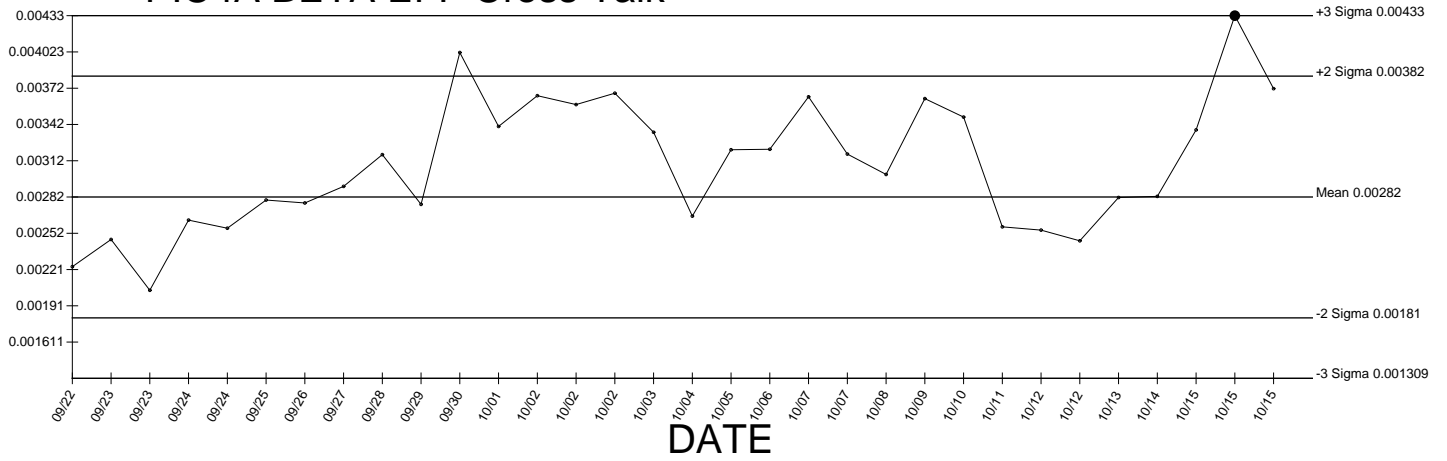


● Denotes Outlier

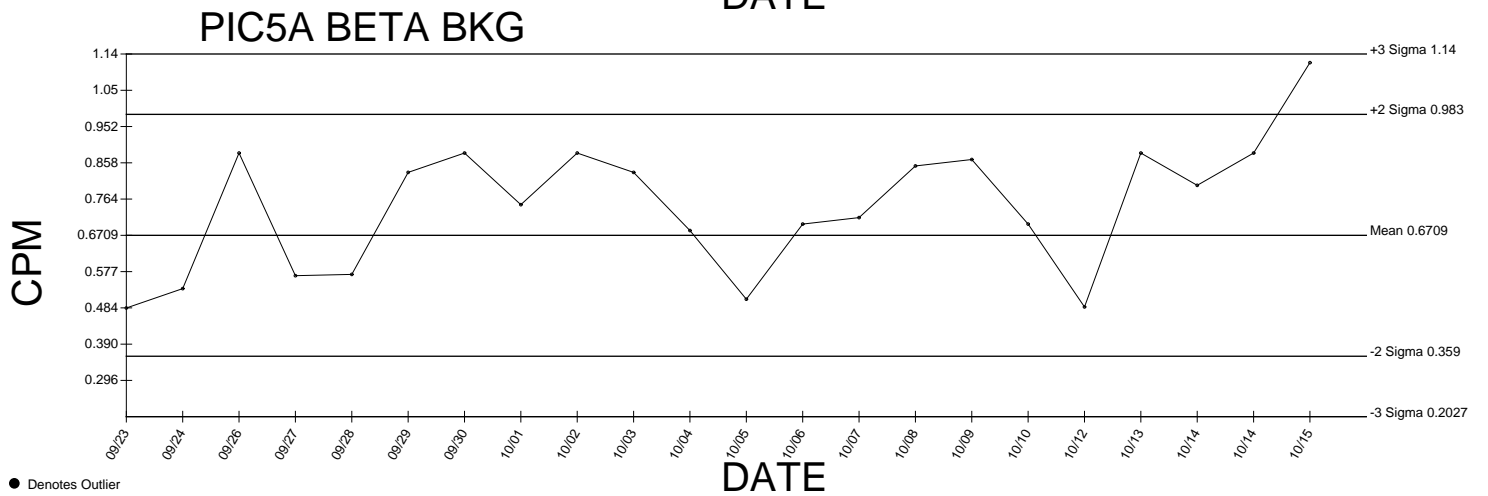
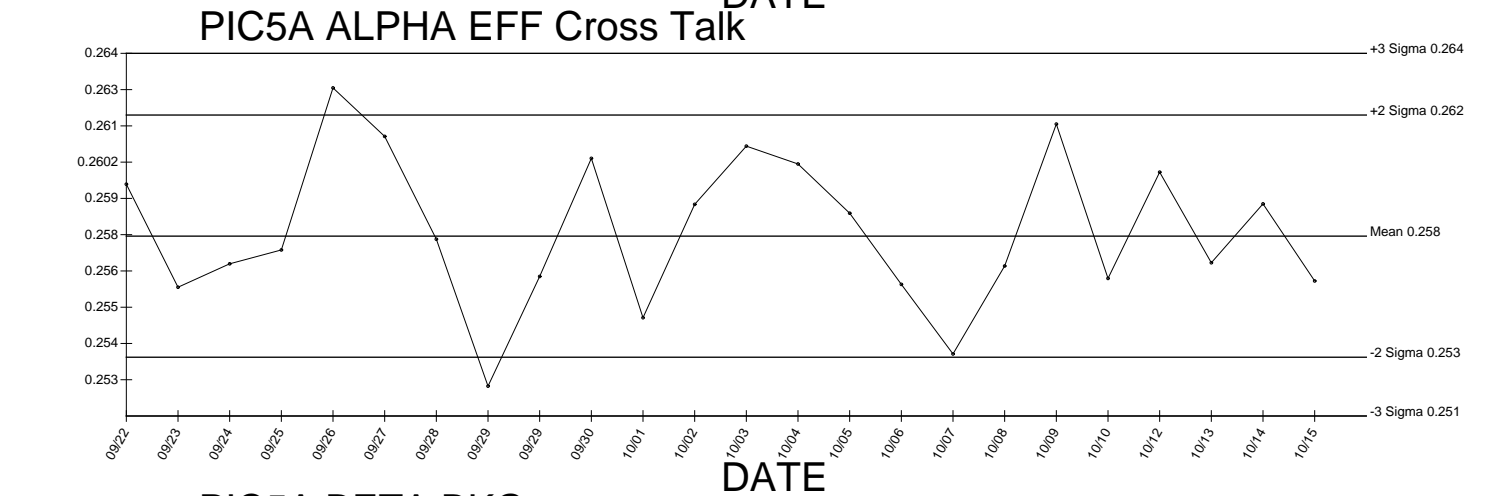
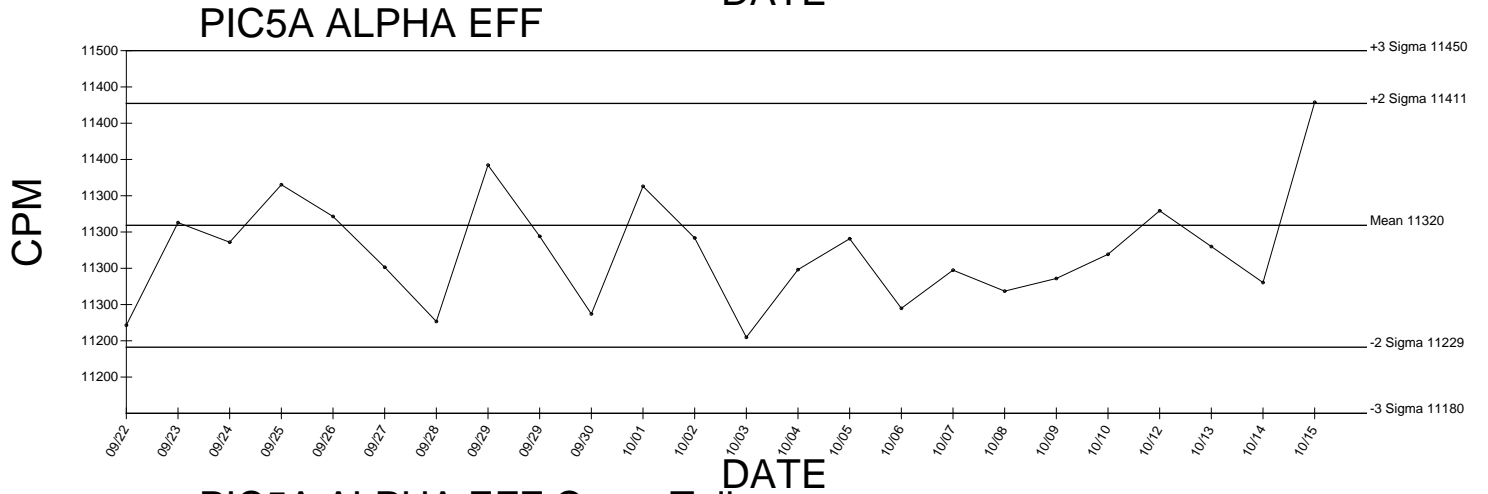
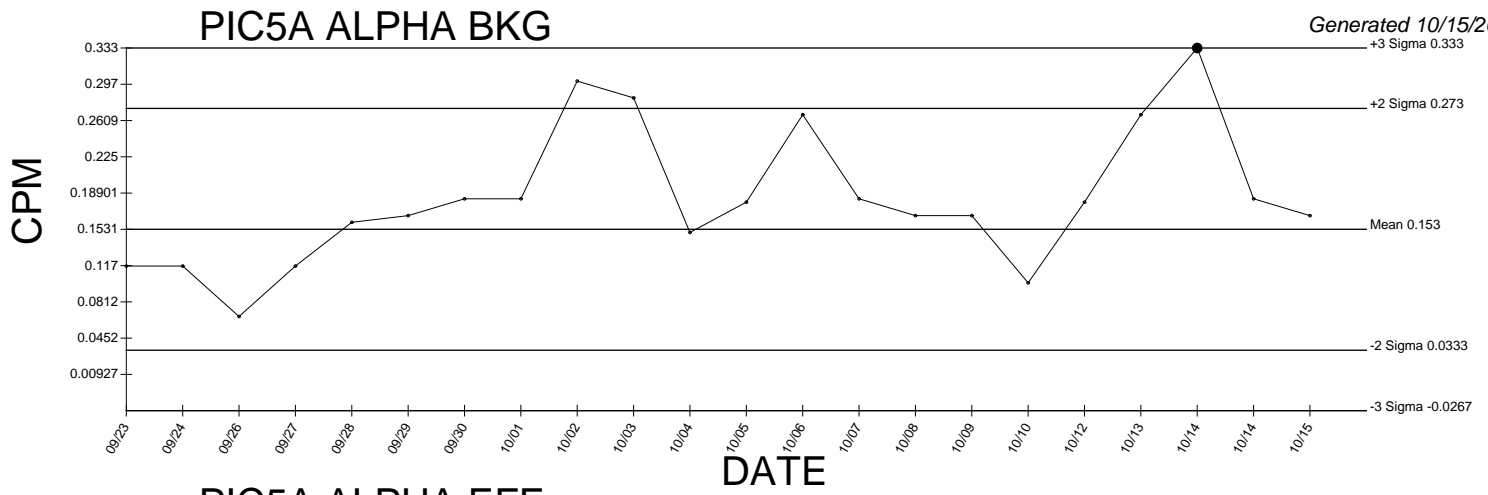
PIC4A BETA EFF



PIC4A BETA EFF Cross Talk



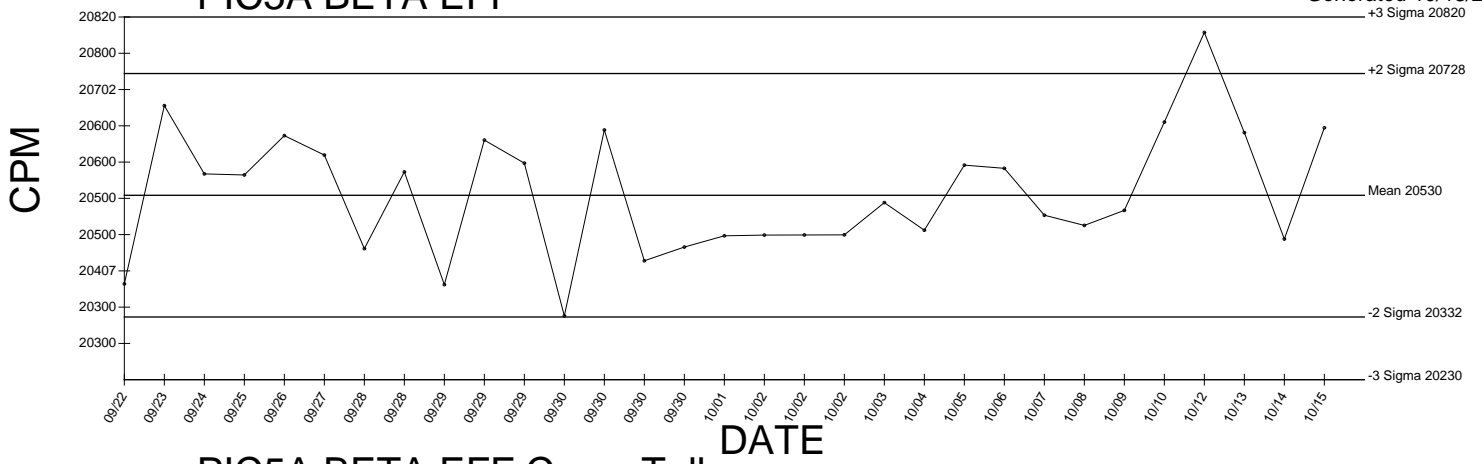
● Denotes Outlier



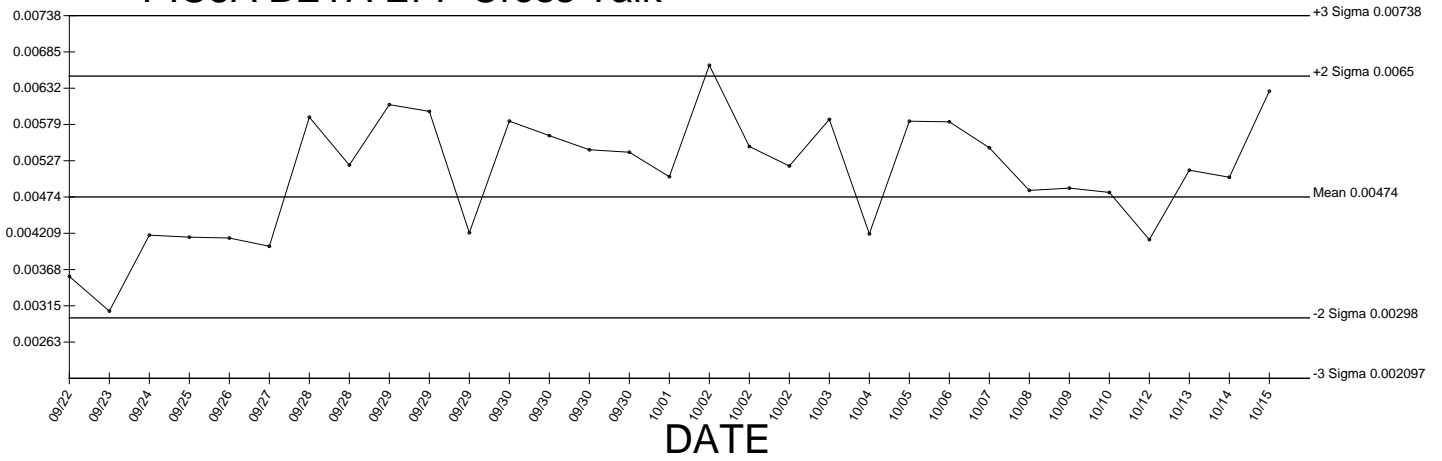
● Denotes Outlier

PIC5A BETA EFF

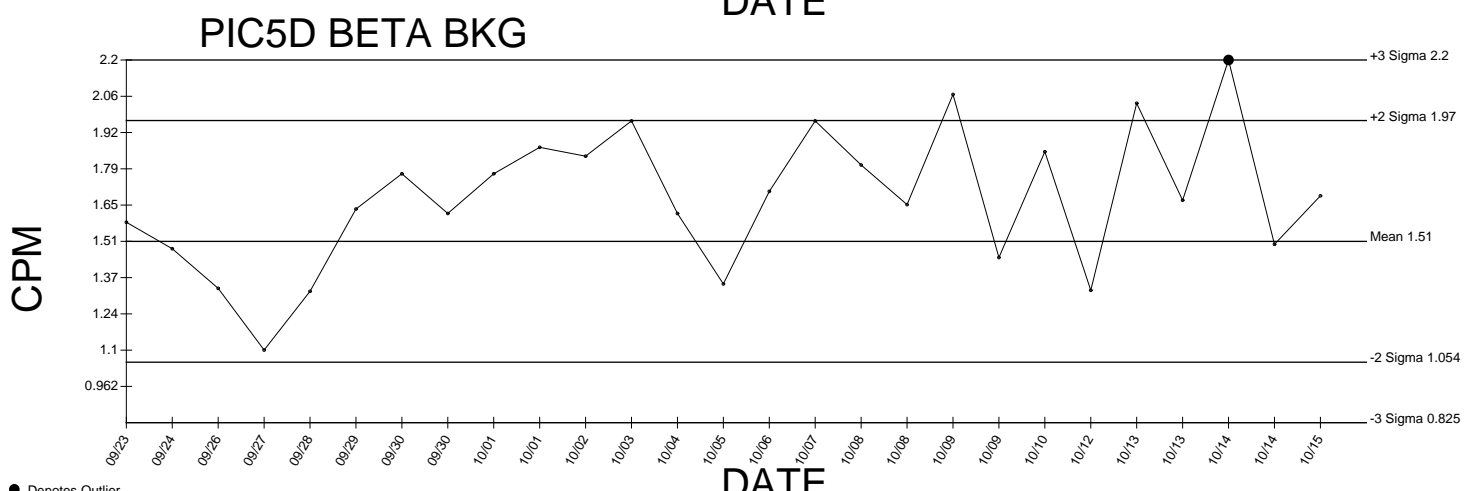
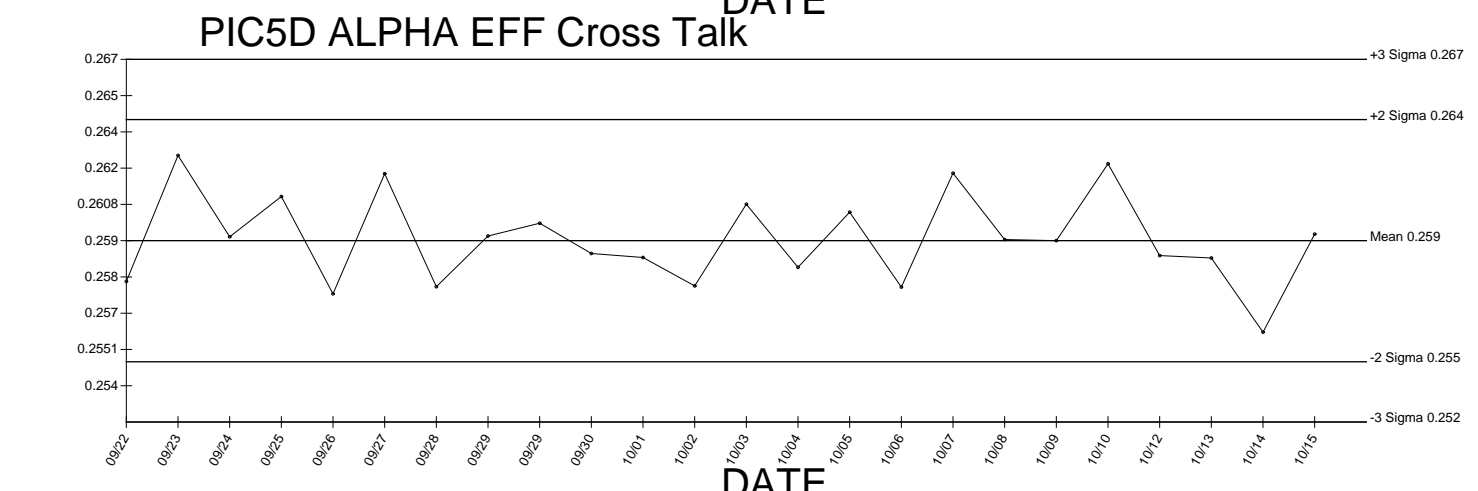
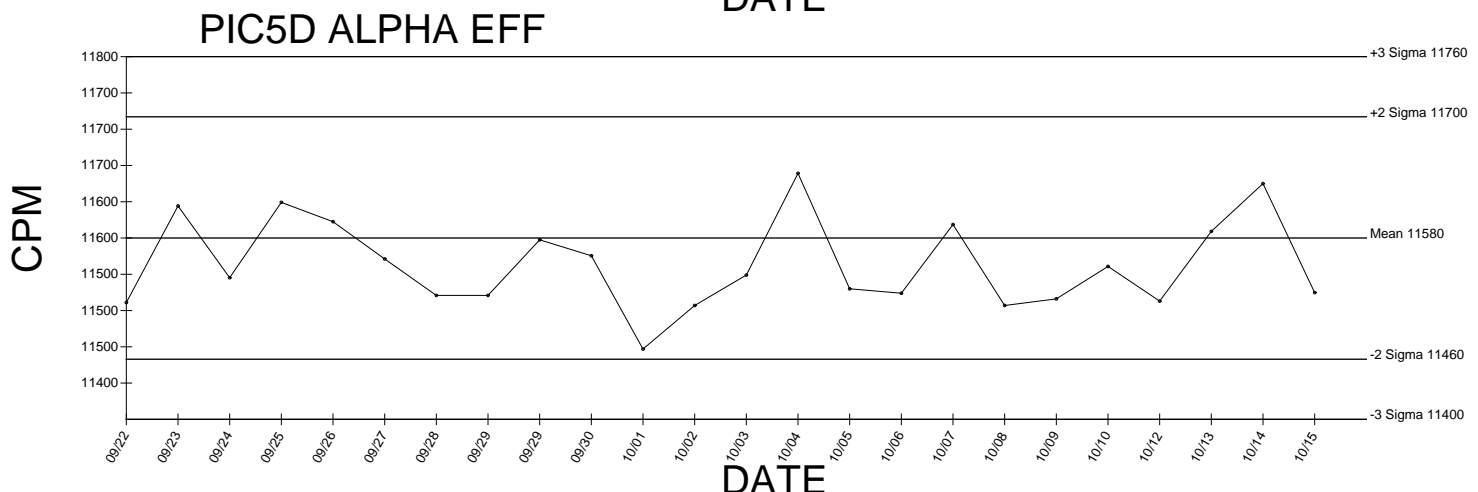
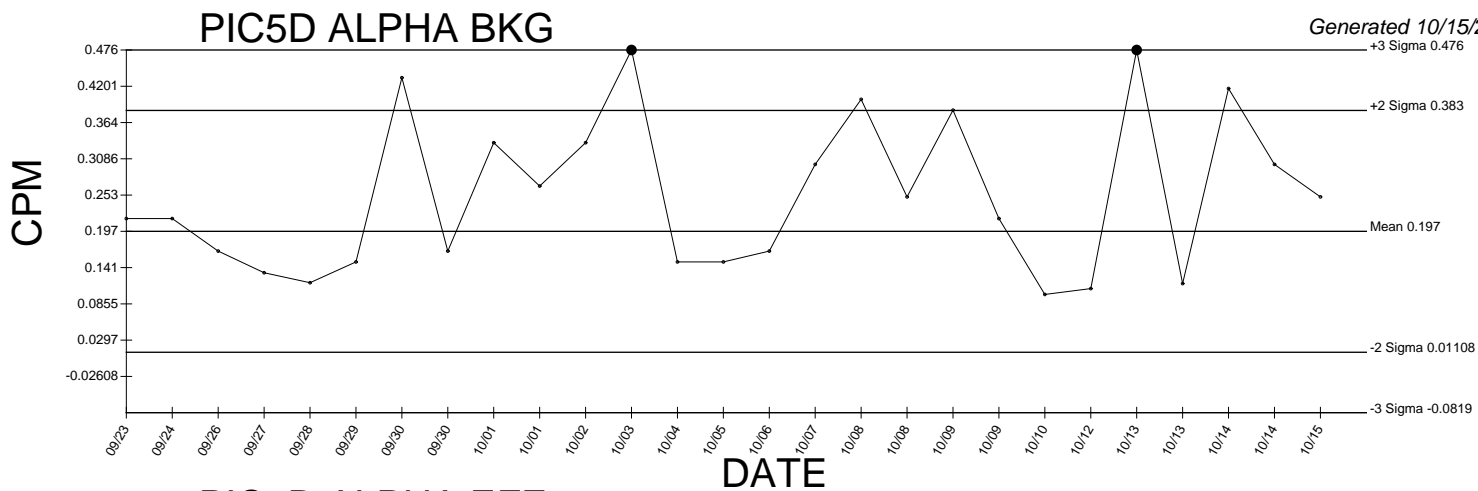
Generated 10/15/2009



PIC5A BETA EFF Cross Talk



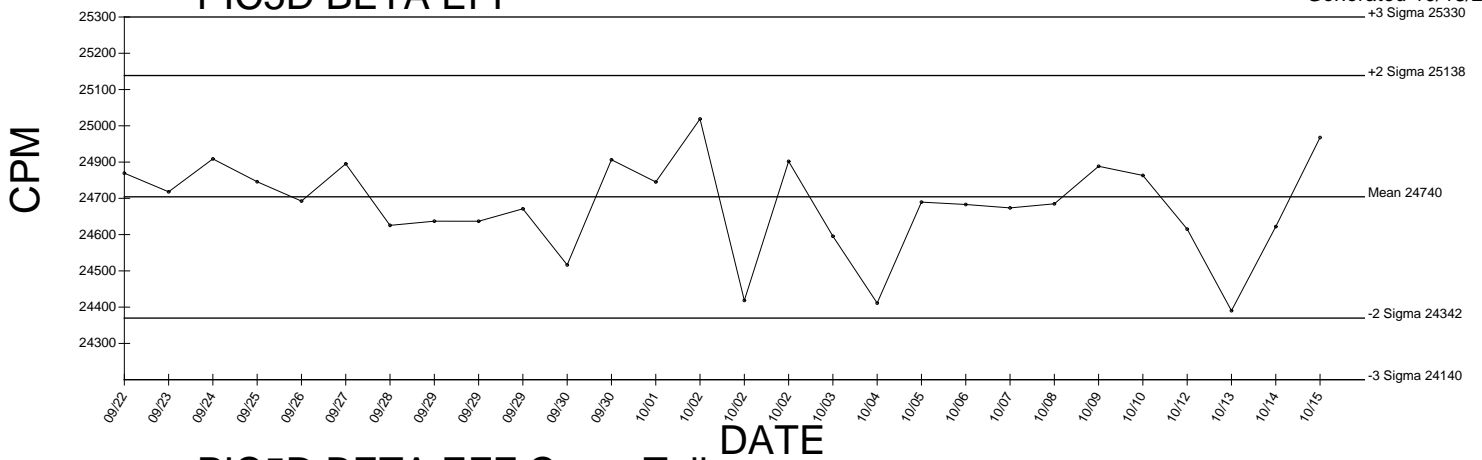
● Denotes Outlier



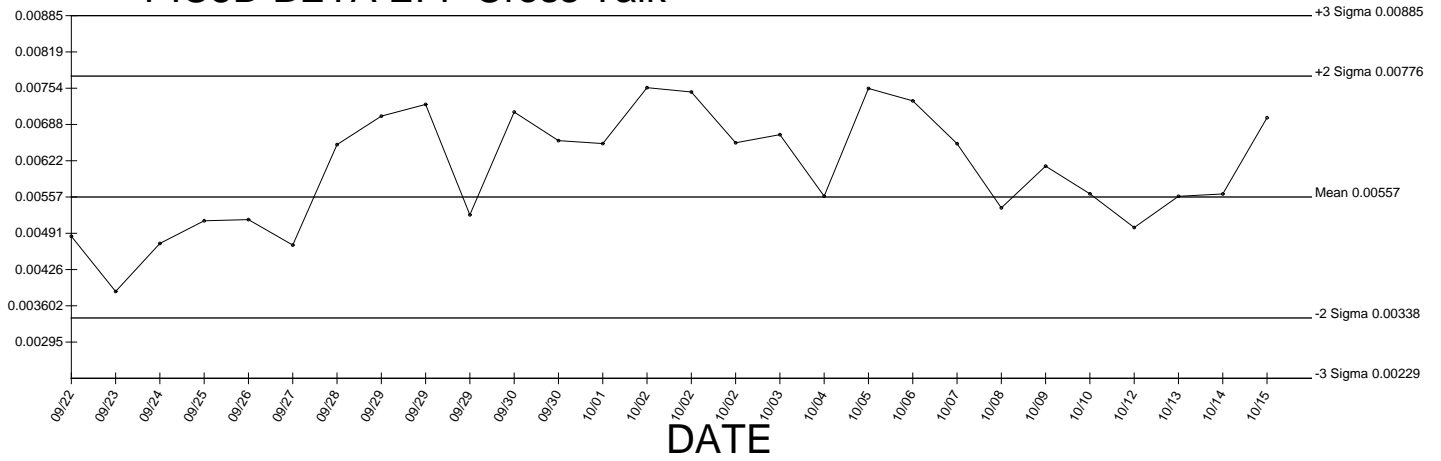
● Denotes Outlier

PIC5D BETA EFF

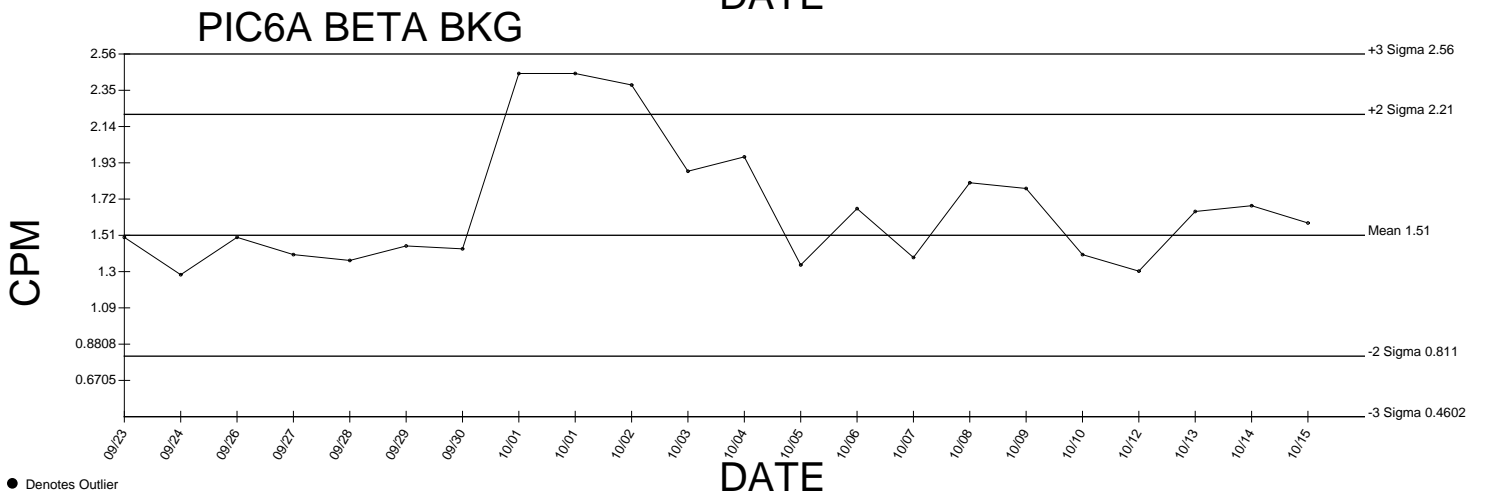
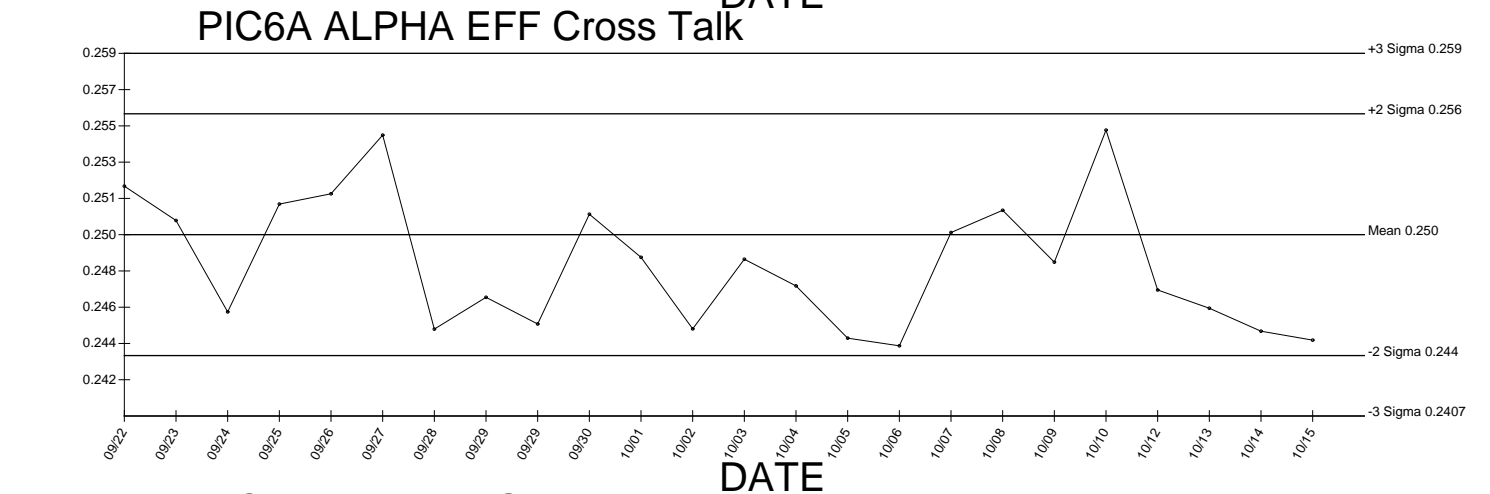
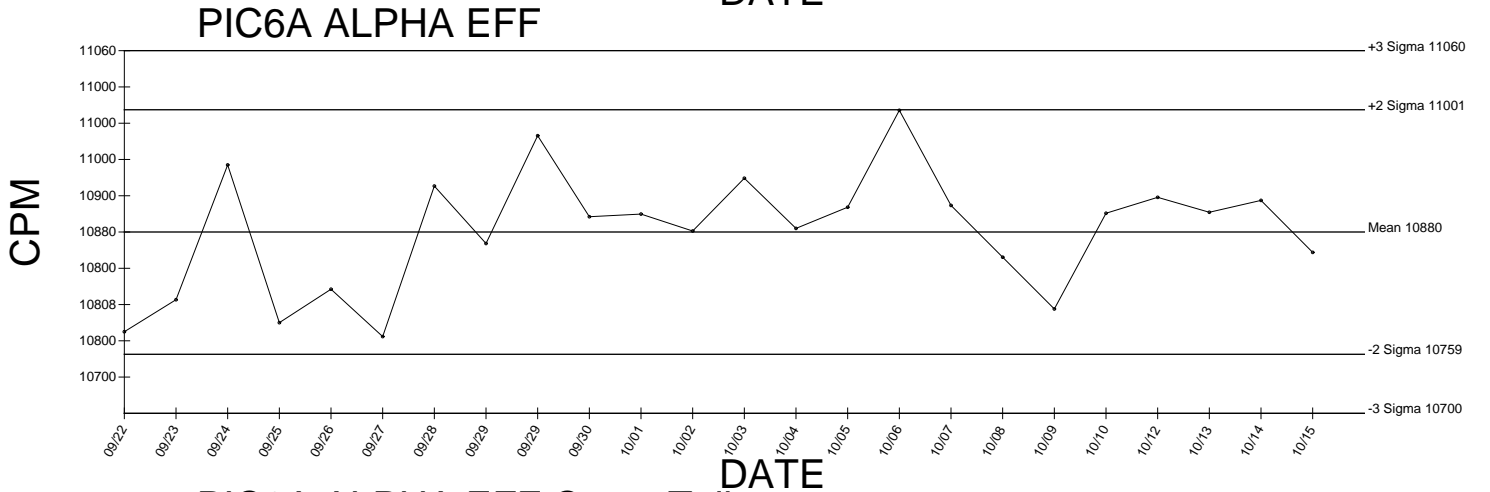
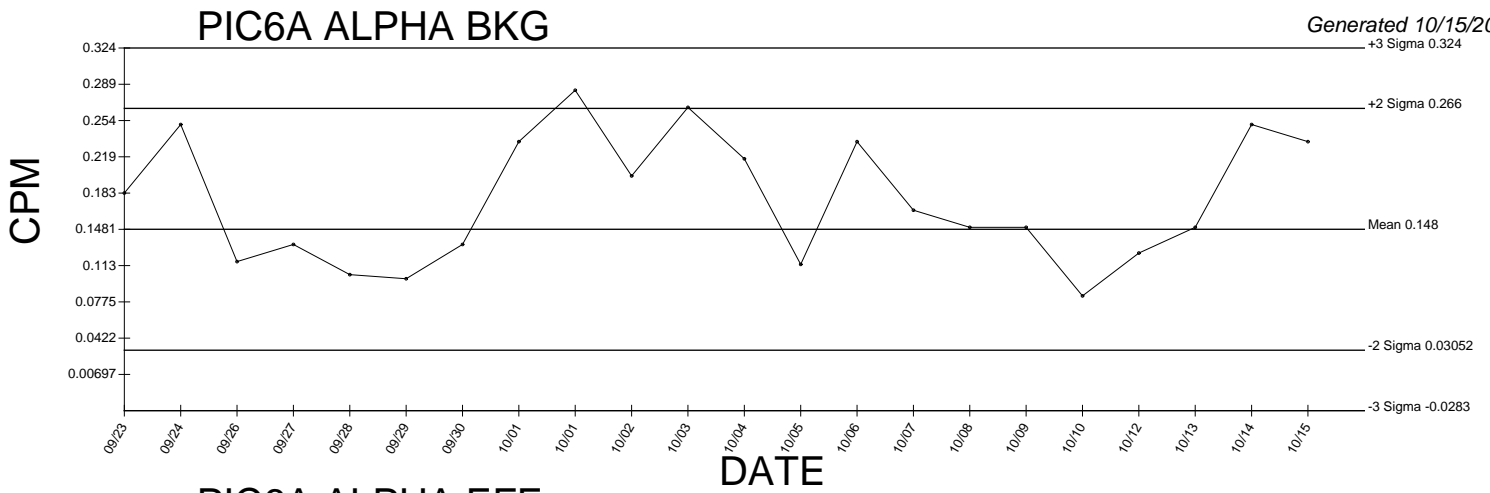
Generated 10/15/2009



PIC5D BETA EFF Cross Talk



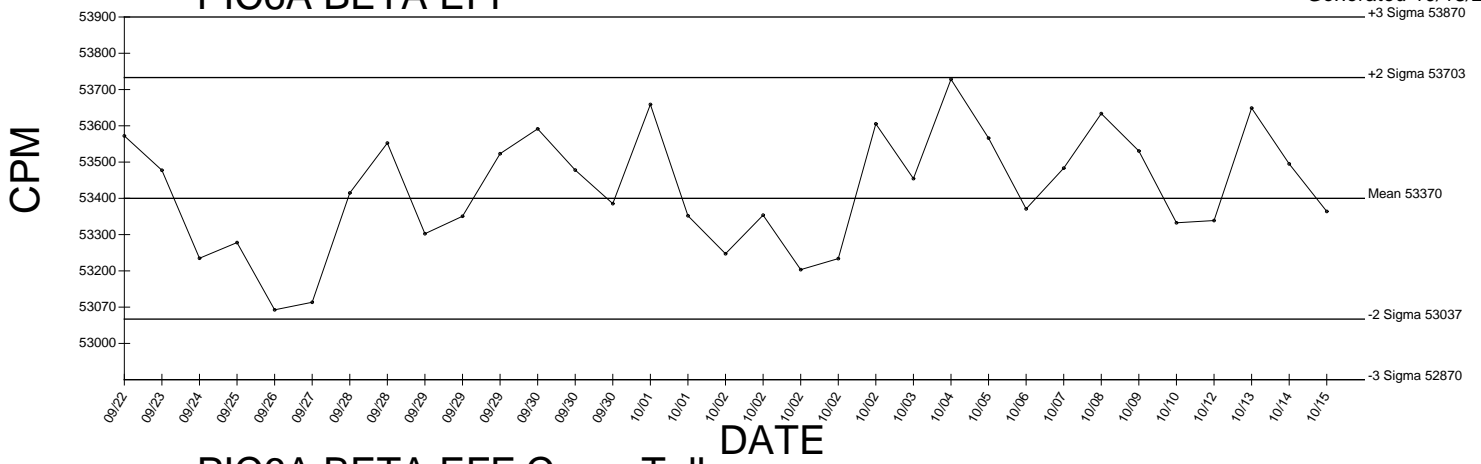
● Denotes Outlier



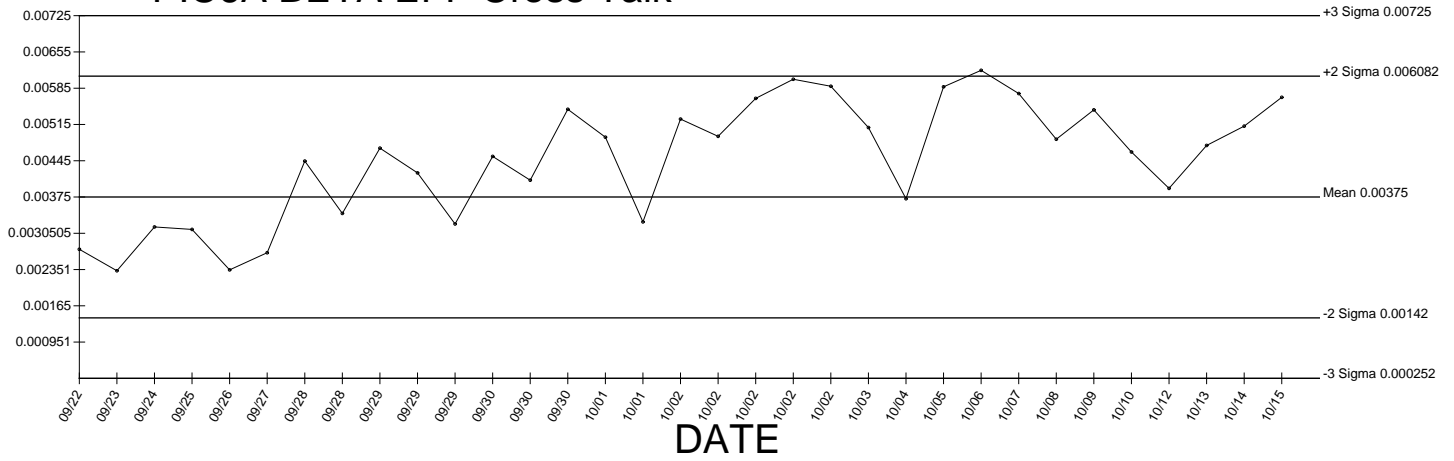
● Denotes Outlier

PIC6A BETA EFF

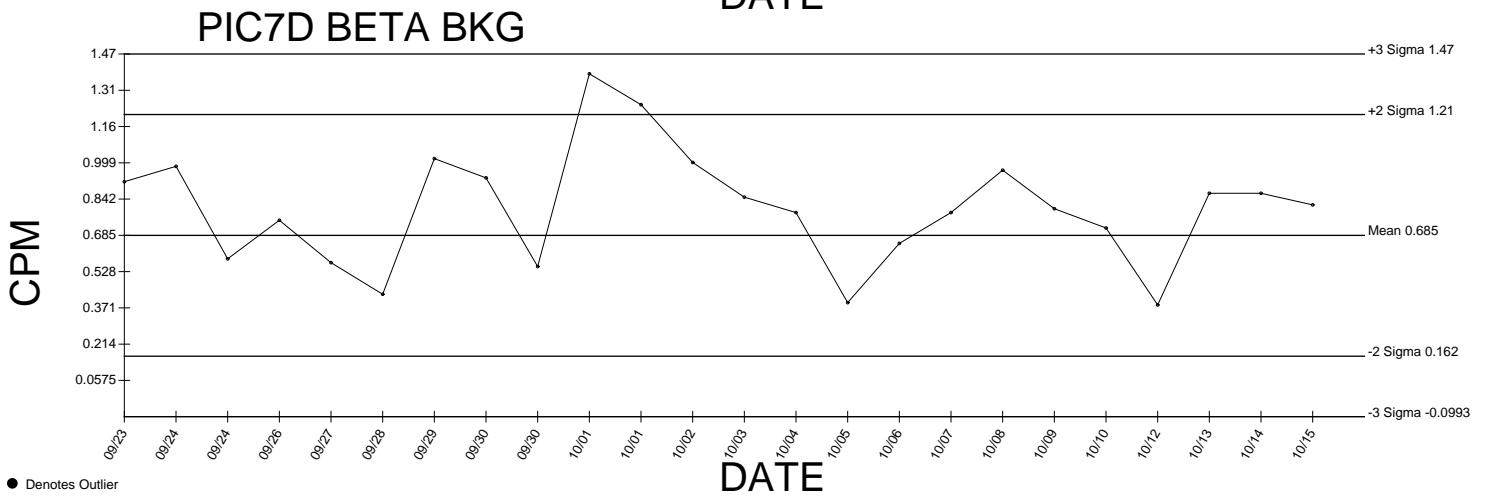
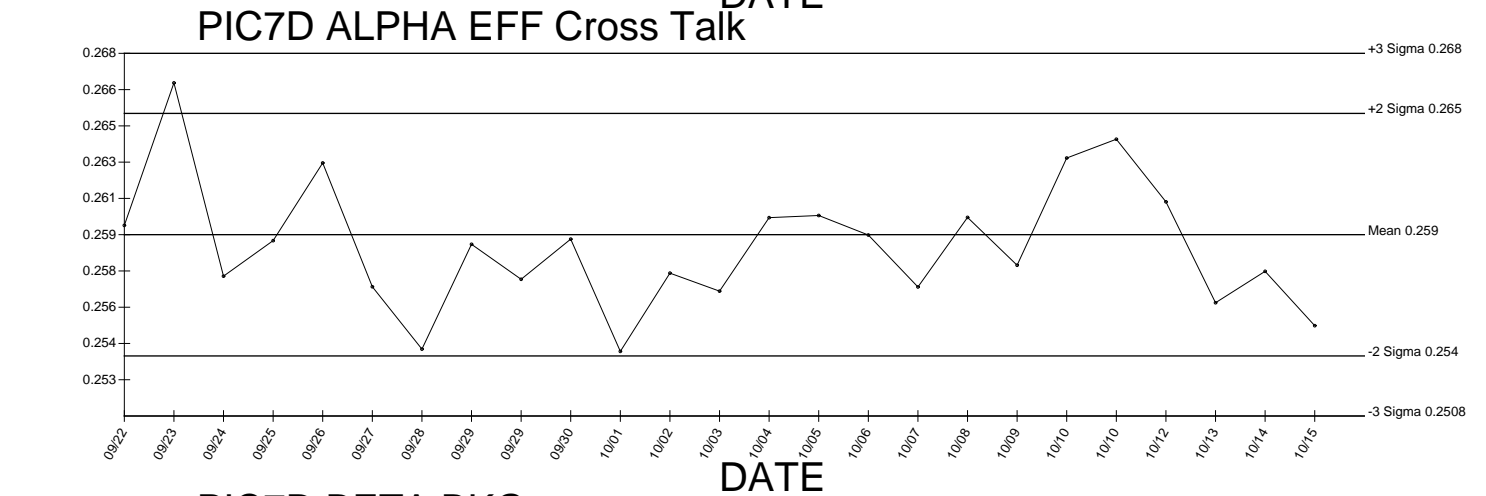
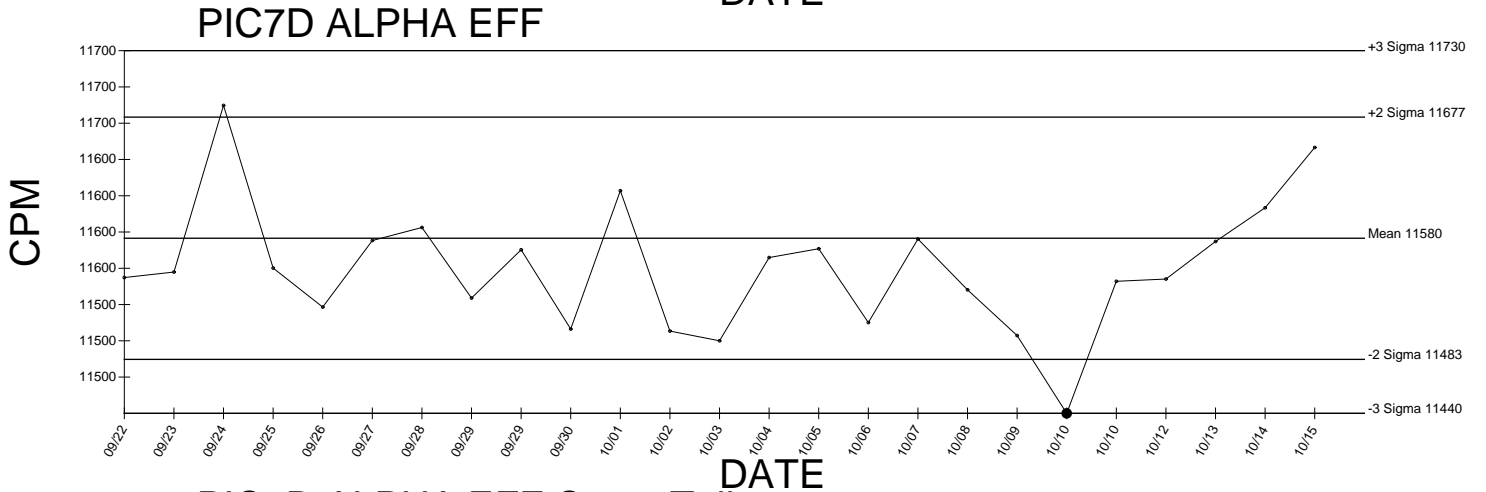
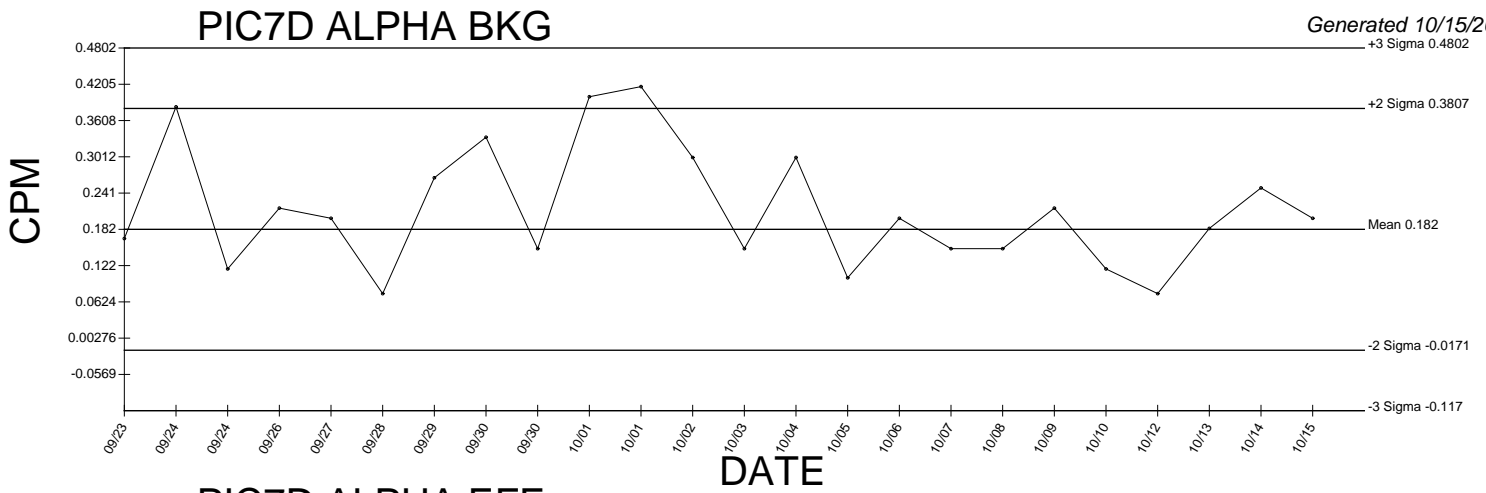
Generated 10/15/2009



PIC6A BETA EFF Cross Talk



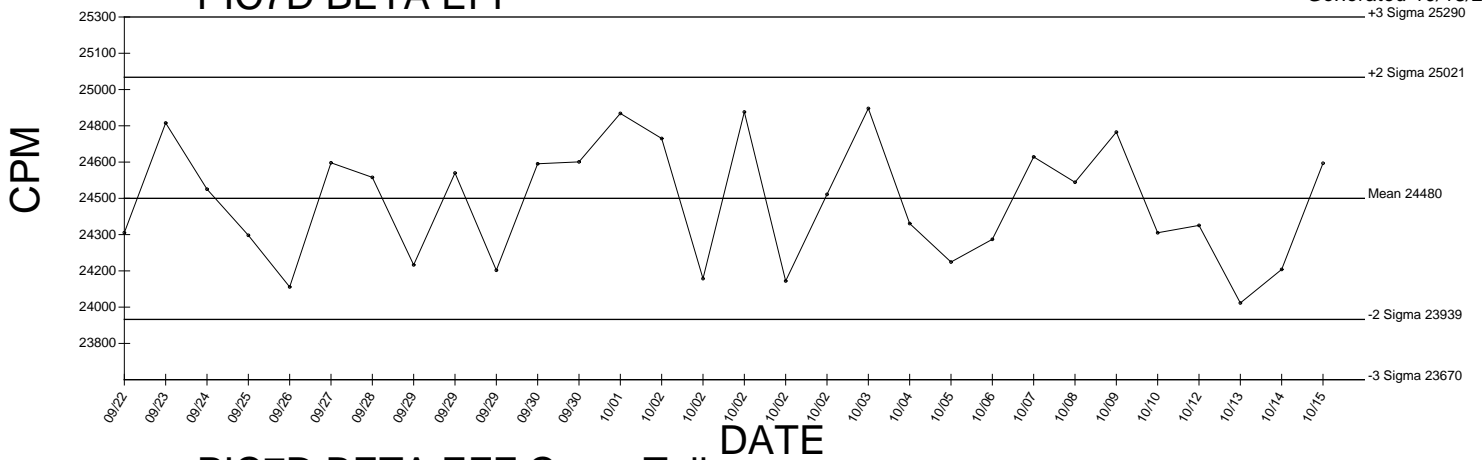
● Denotes Outlier



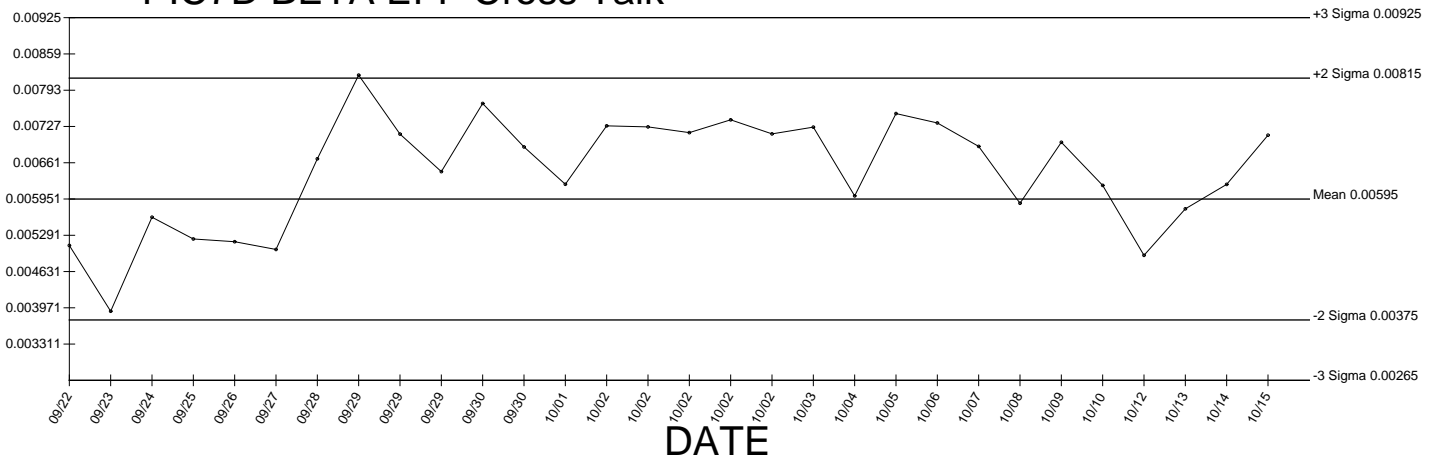
● Denotes Outlier

PIC7D BETA EFF

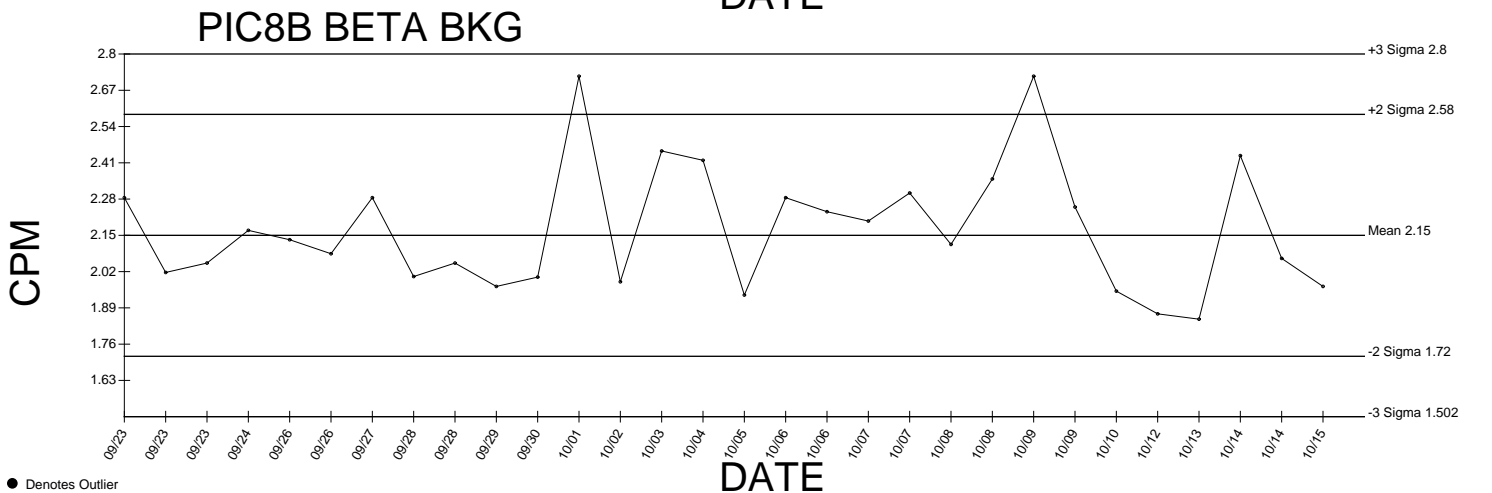
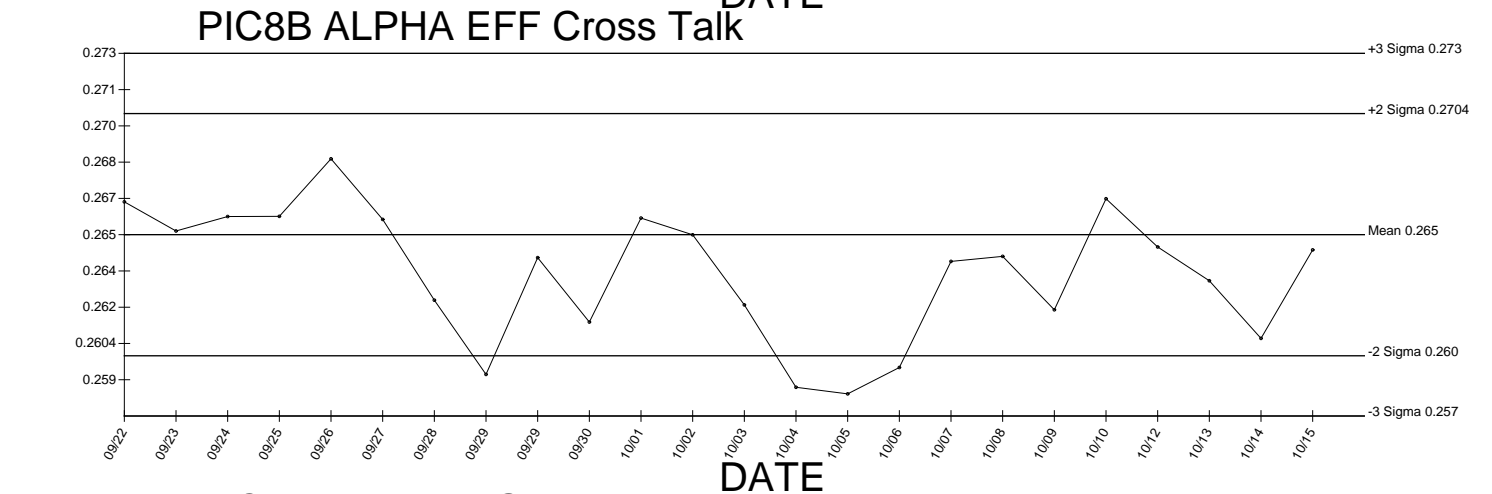
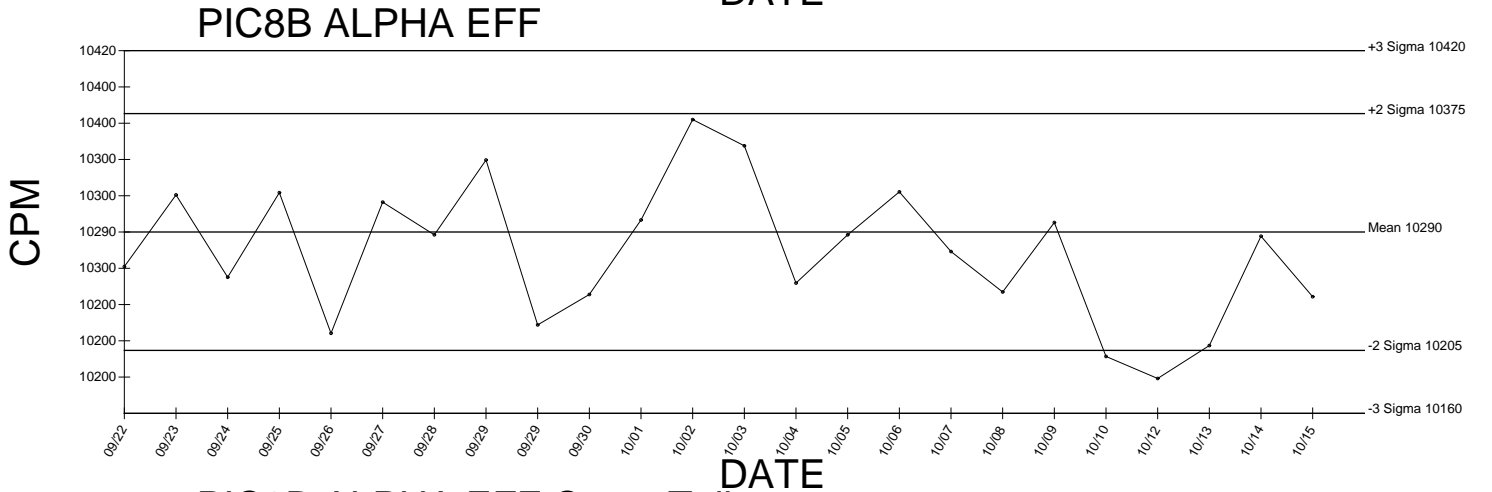
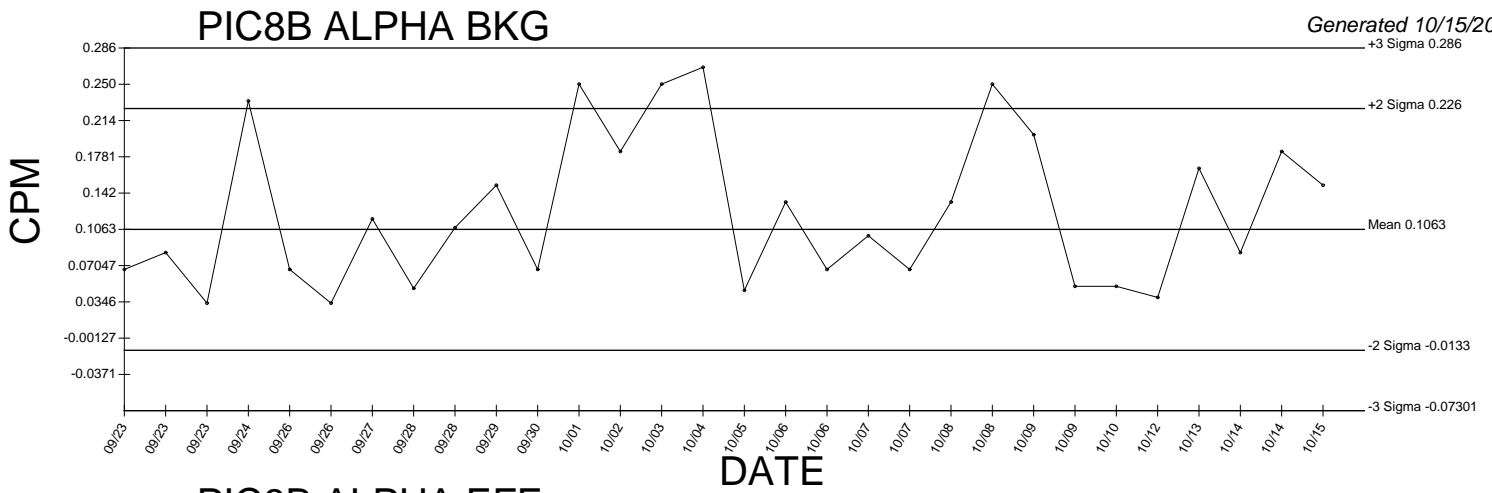
Generated 10/15/2009



PIC7D BETA EFF Cross Talk



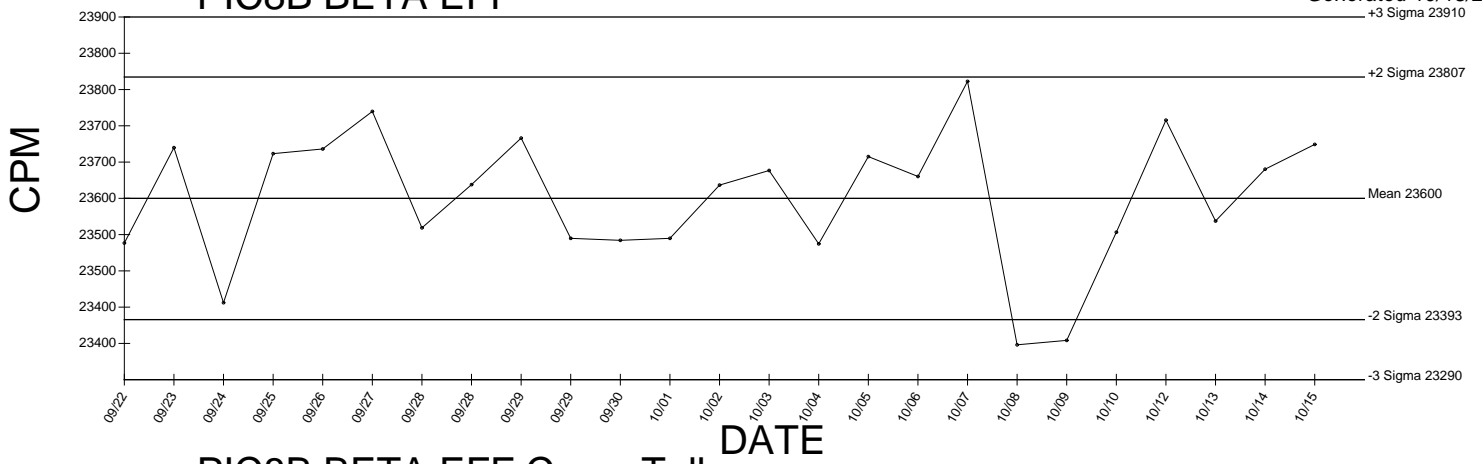
● Denotes Outlier



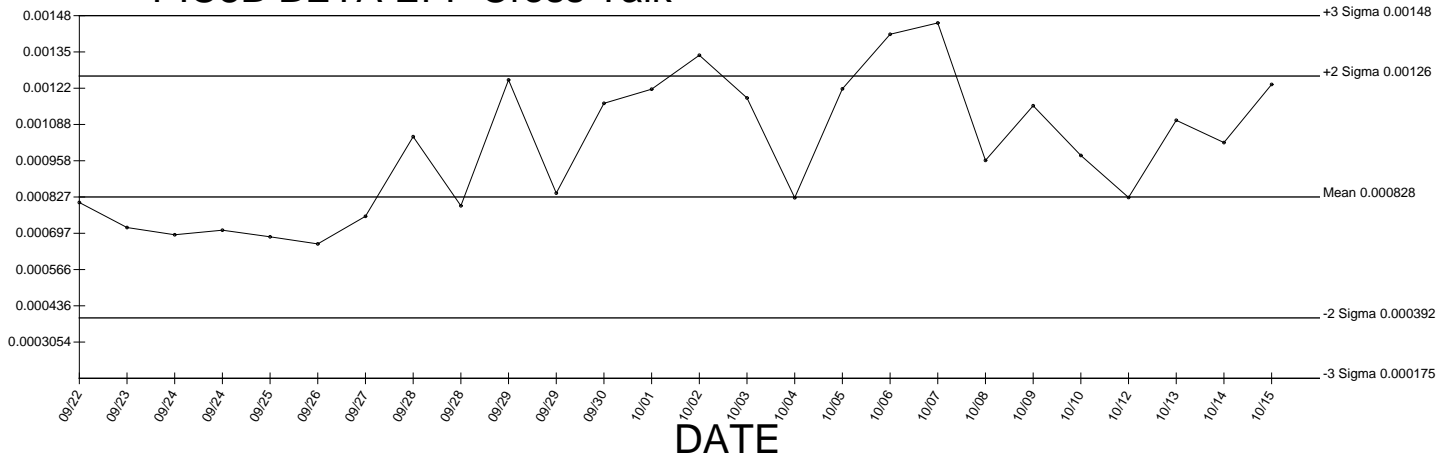
● Denotes Outlier

PIC8B BETA EFF

Generated 10/15/2009

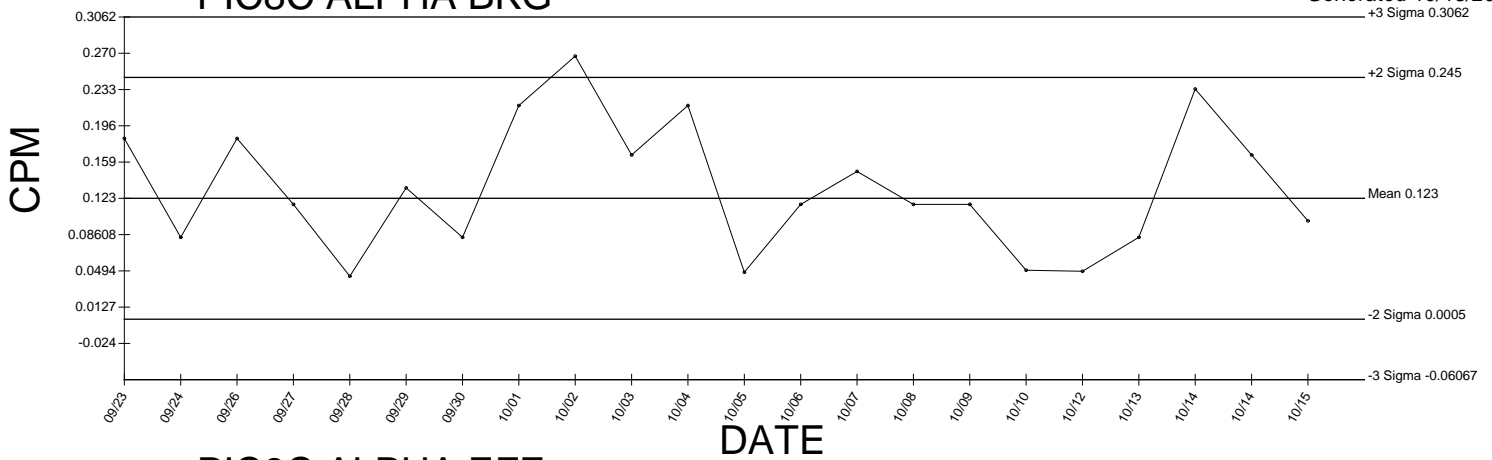


PIC8B BETA EFF Cross Talk

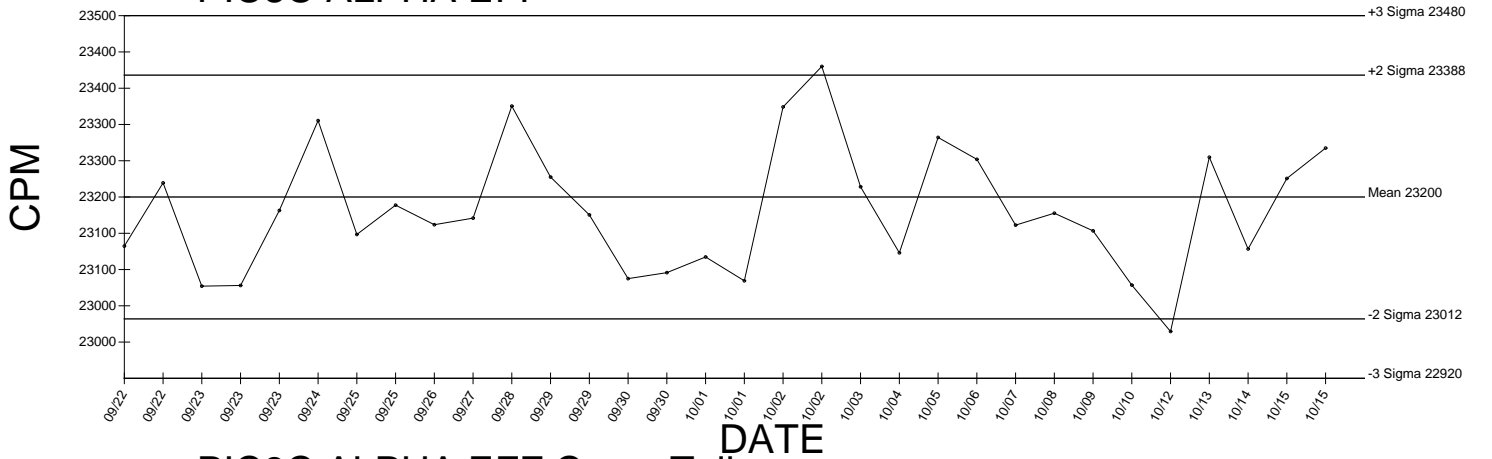


● Denotes Outlier

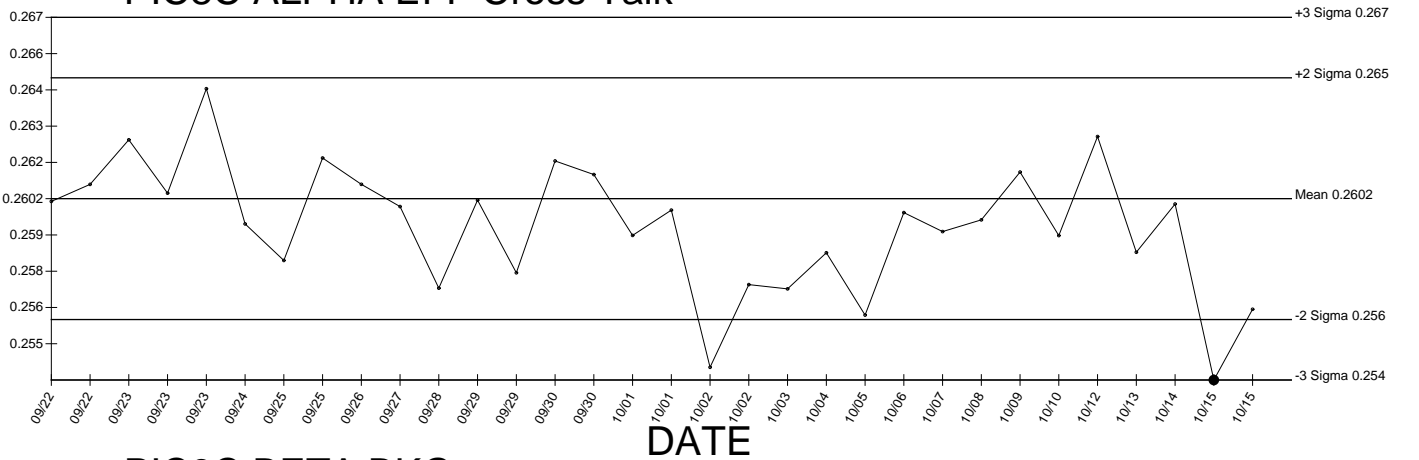
PIC8C ALPHA BKG



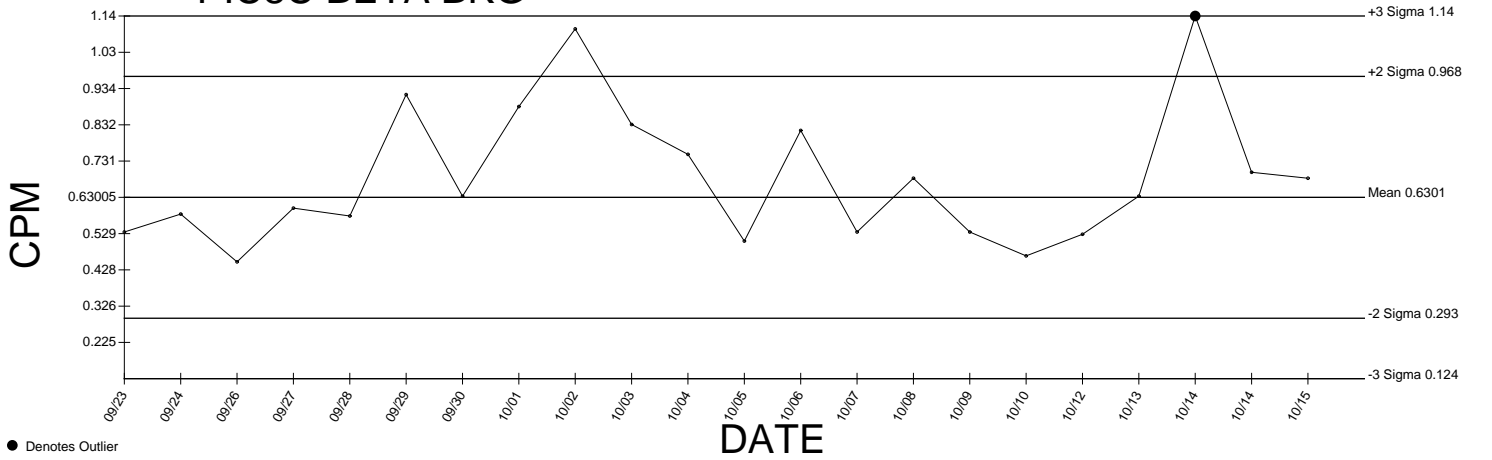
PIC8C ALPHA EFF



PIC8C ALPHA EFF Cross Talk



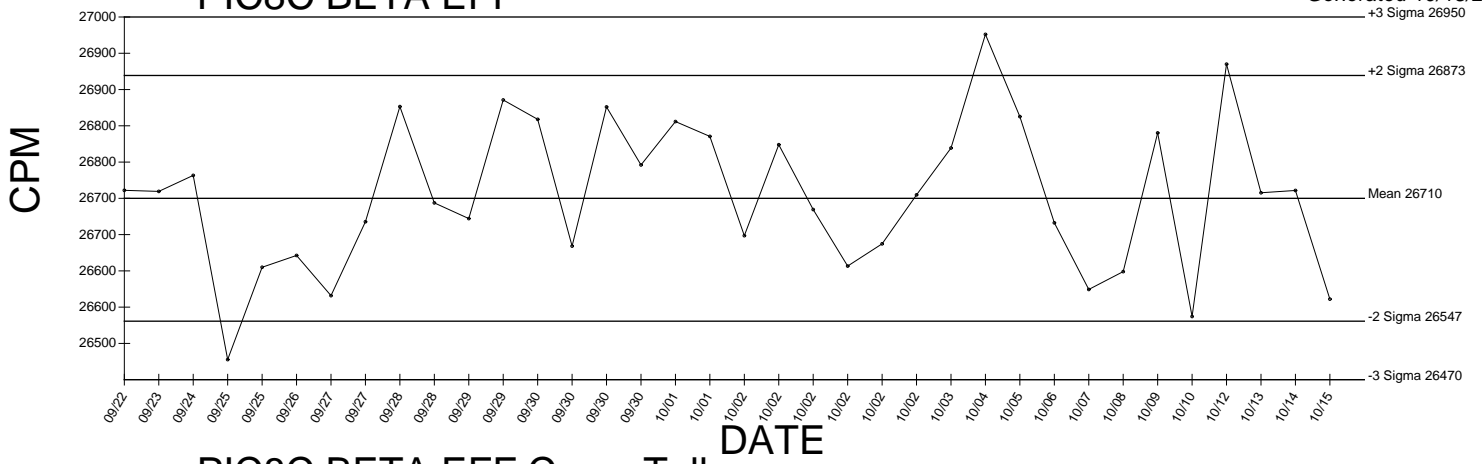
PIC8C BETA BKG



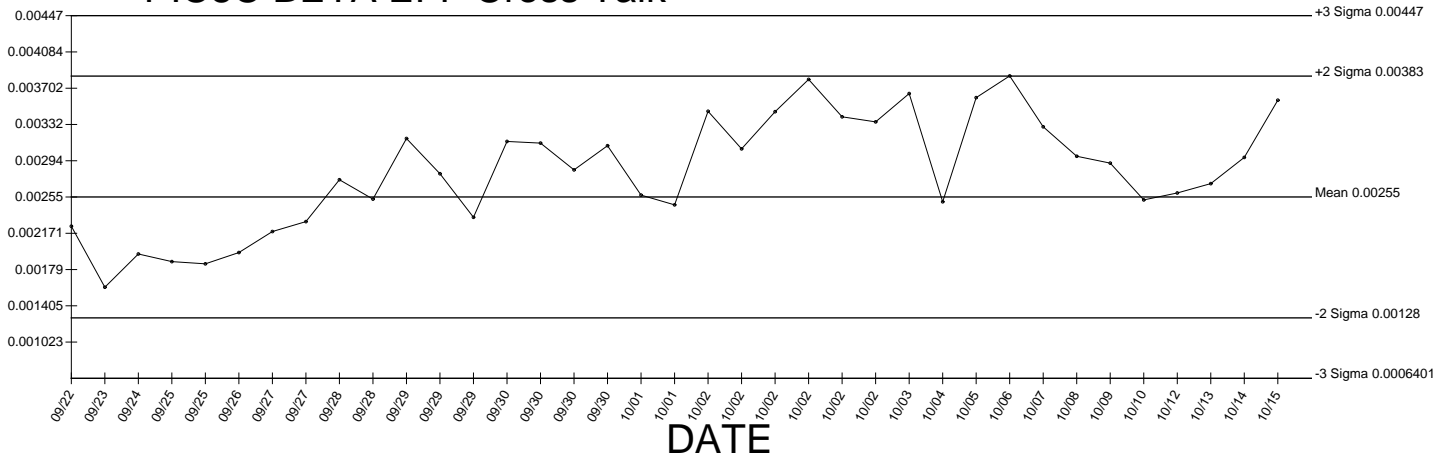
● Denotes Outlier

PIC8C BETA EFF

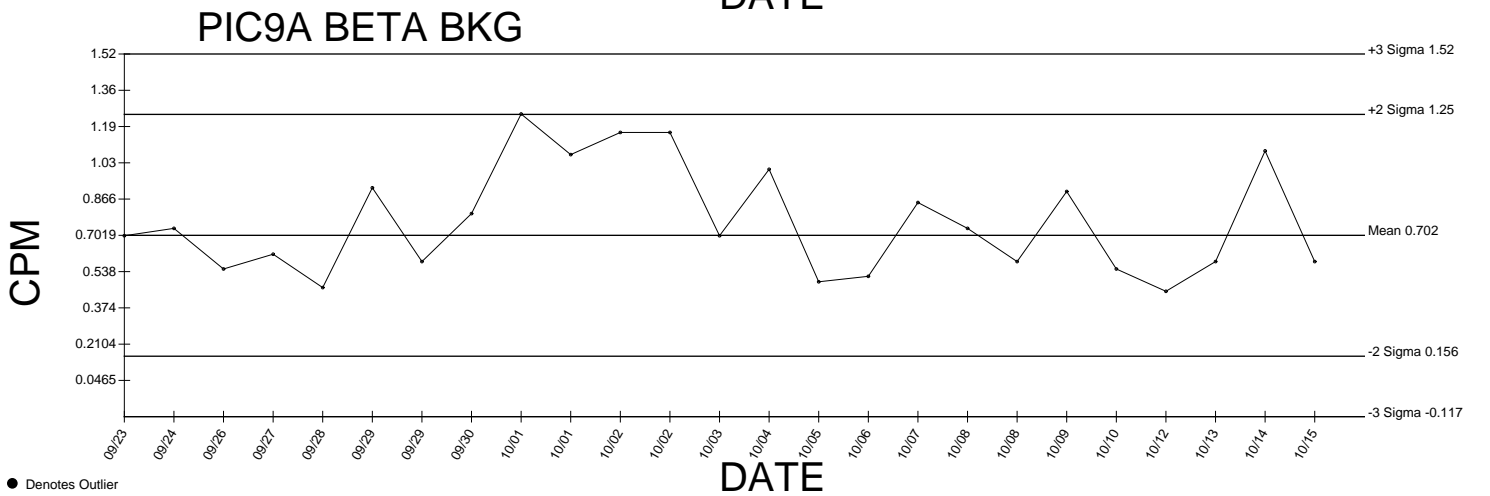
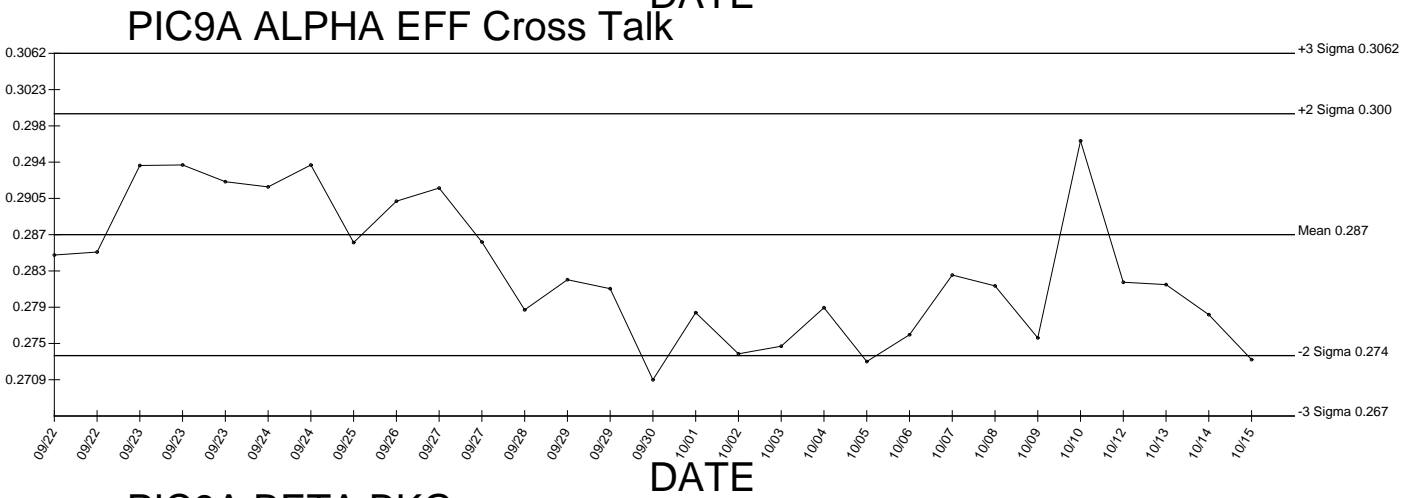
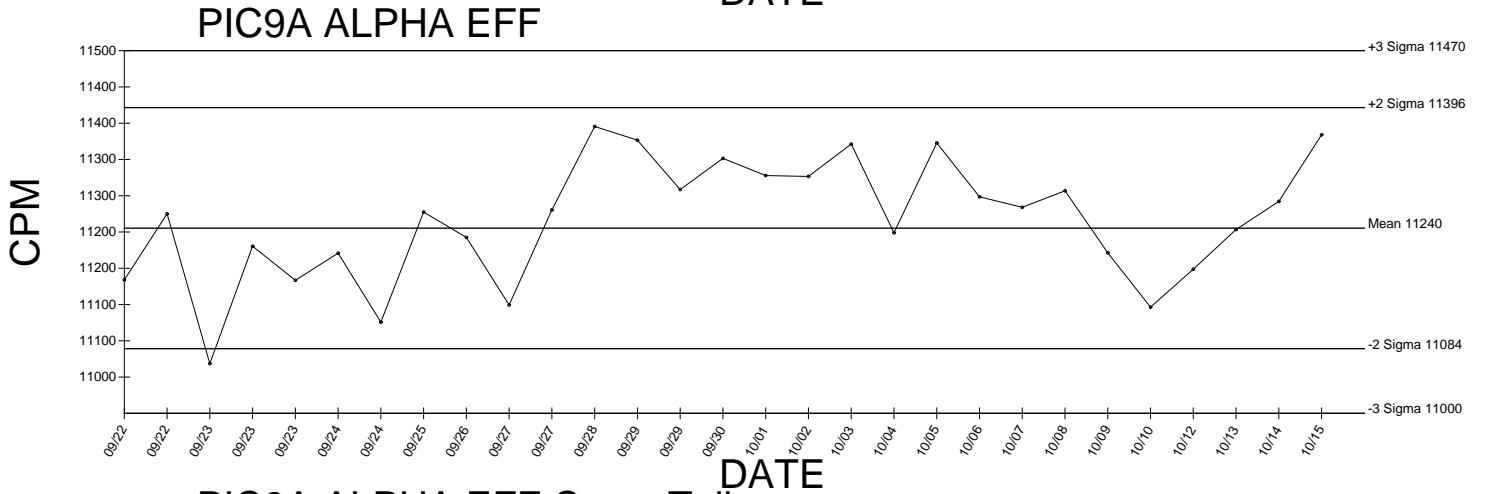
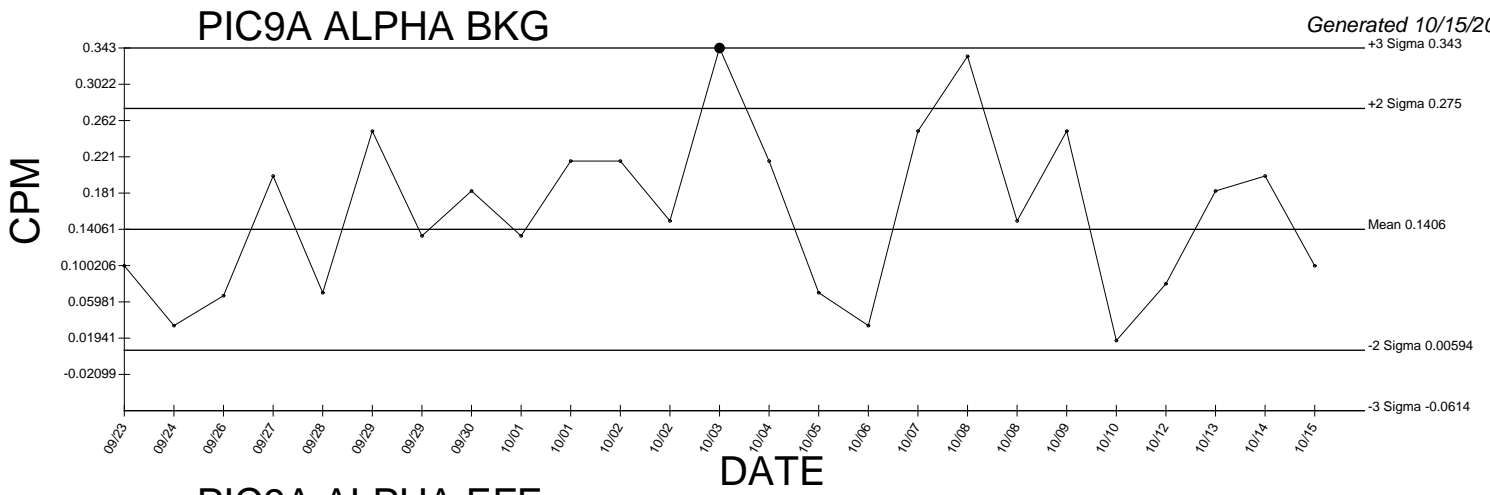
Generated 10/15/2009



PIC8C BETA EFF Cross Talk



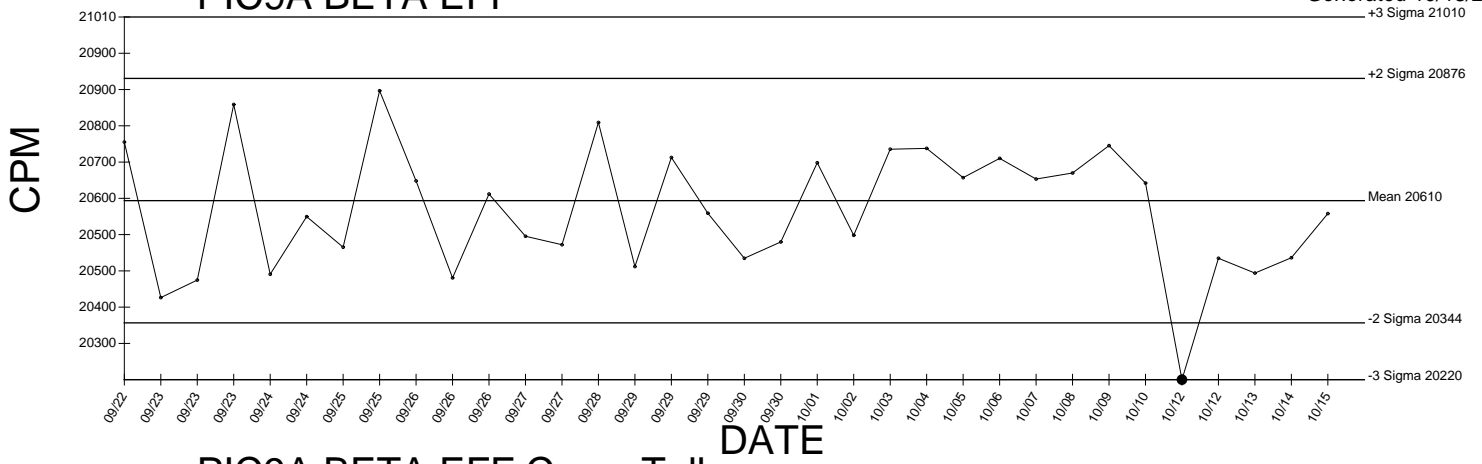
● Denotes Outlier



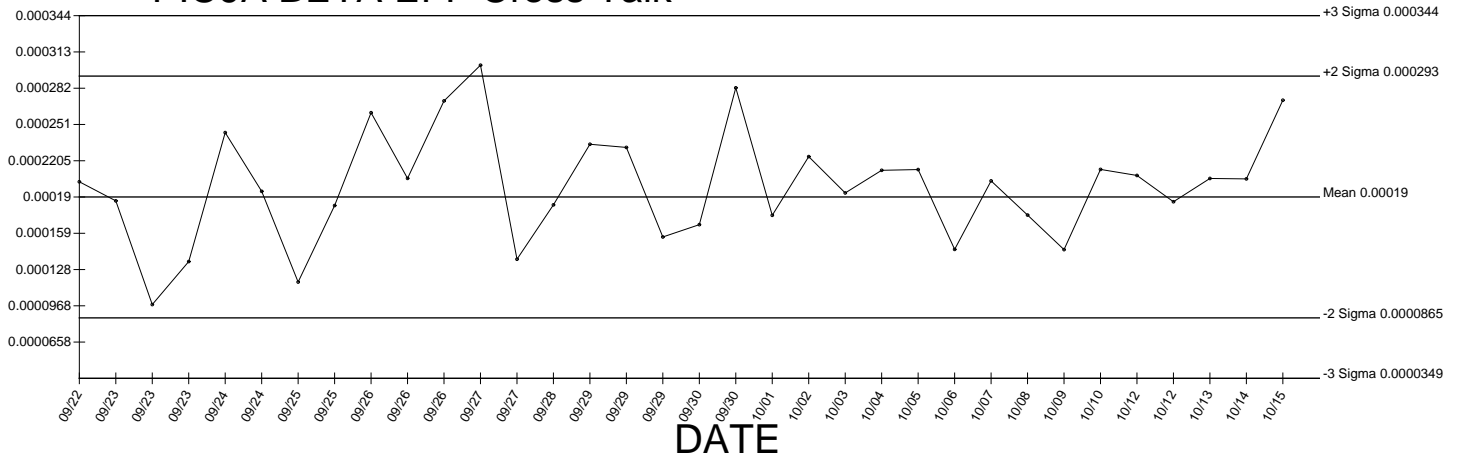
● Denotes Outlier

PIC9A BETA EFF

Generated 10/15/2009

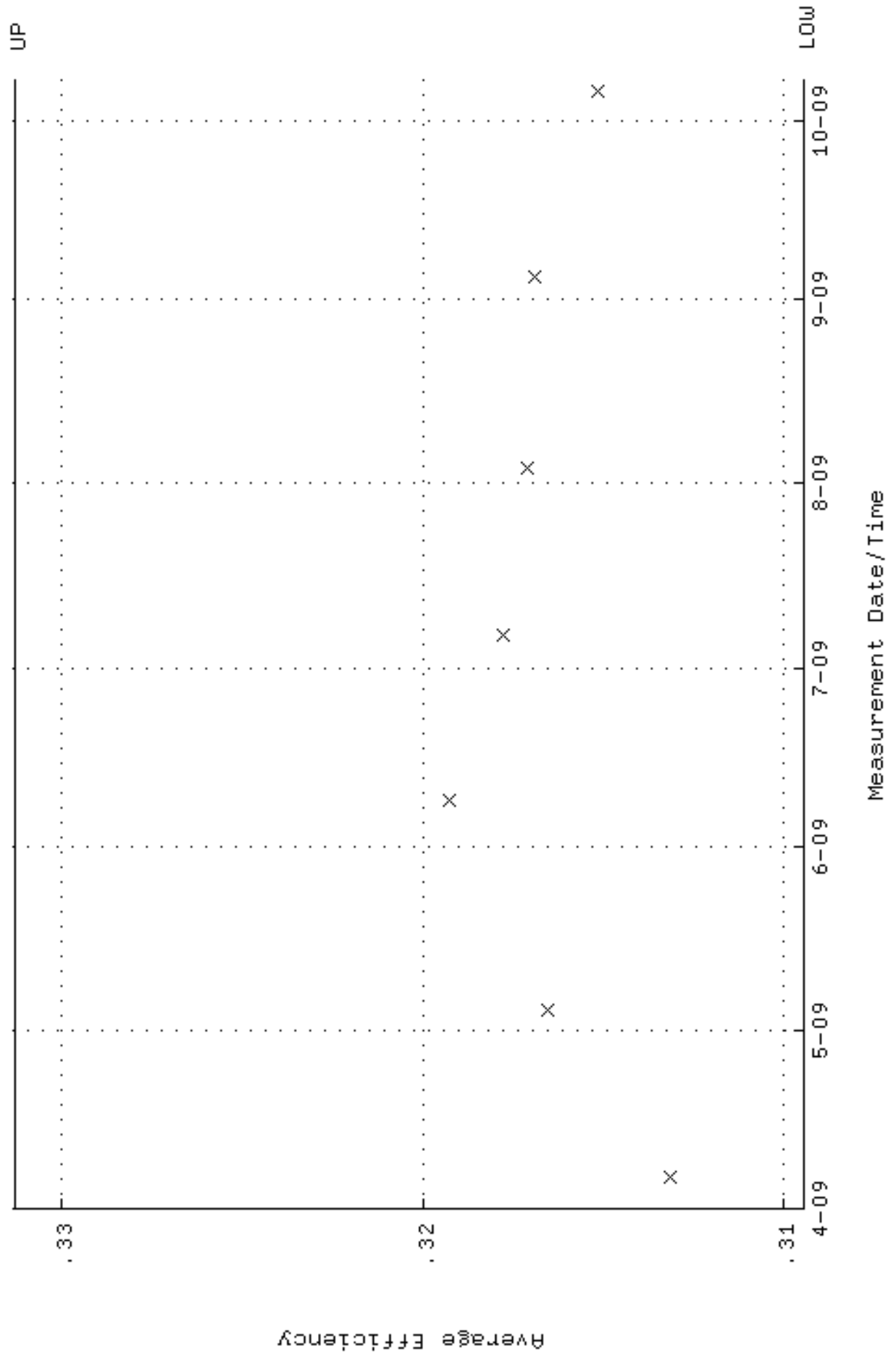


PIC9A BETA EFF Cross Talk

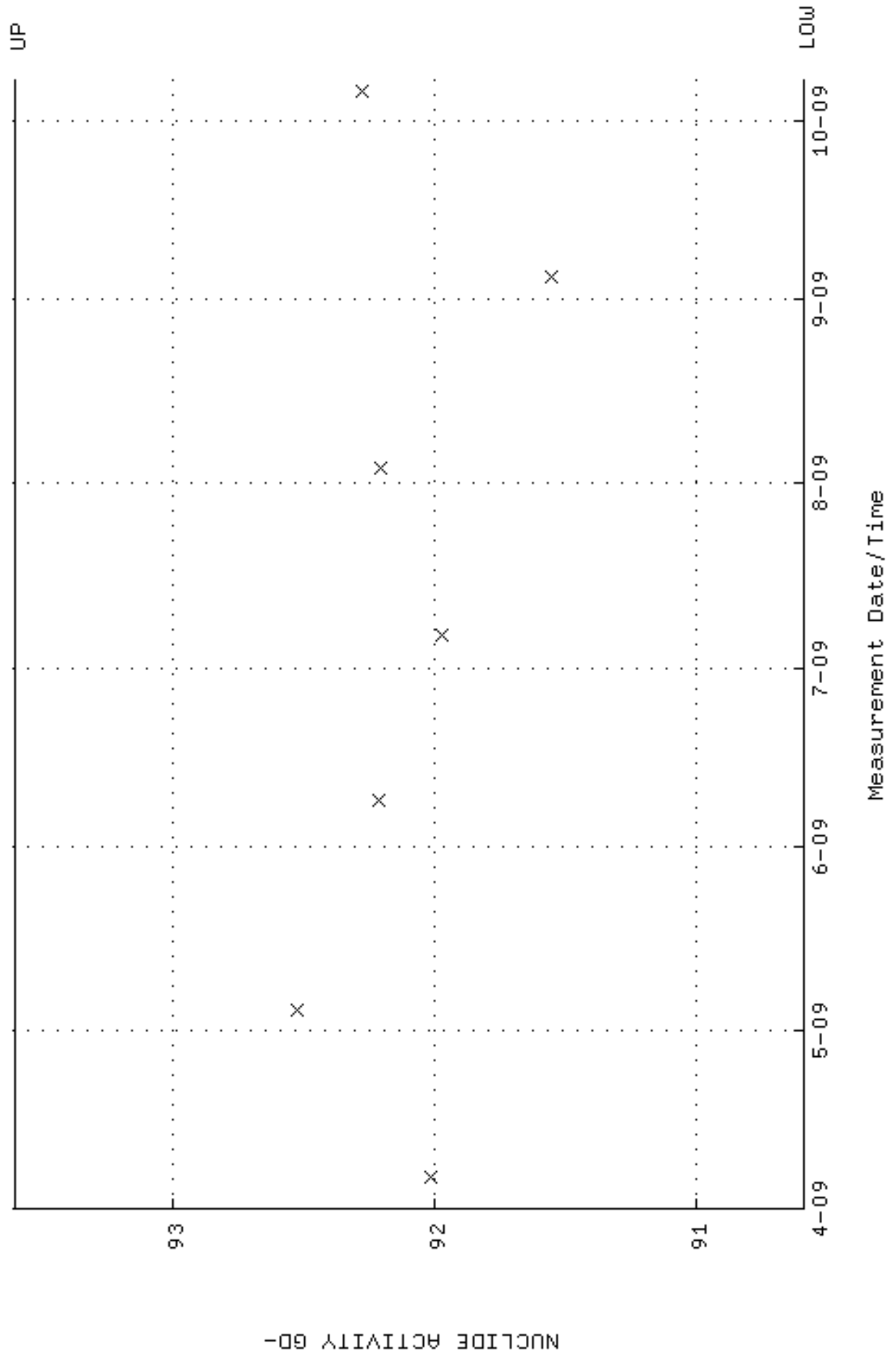


● Denotes Outlier

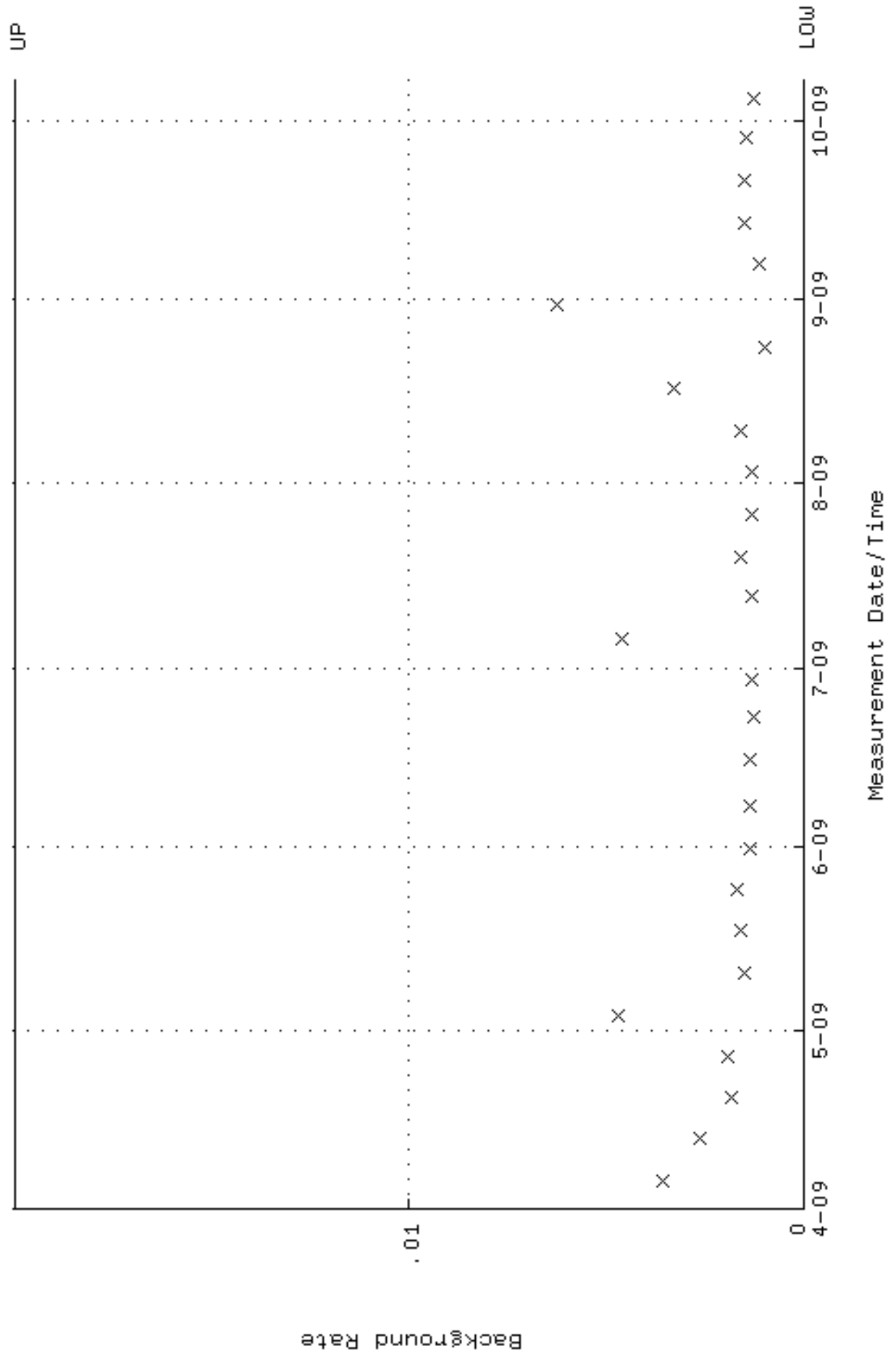
QA filename : DKA100:[ENV_ALPHA.QA.W]W022.QAF;5
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 6-APR-2009 08:44:03 through 7-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.309441 through 0.331295



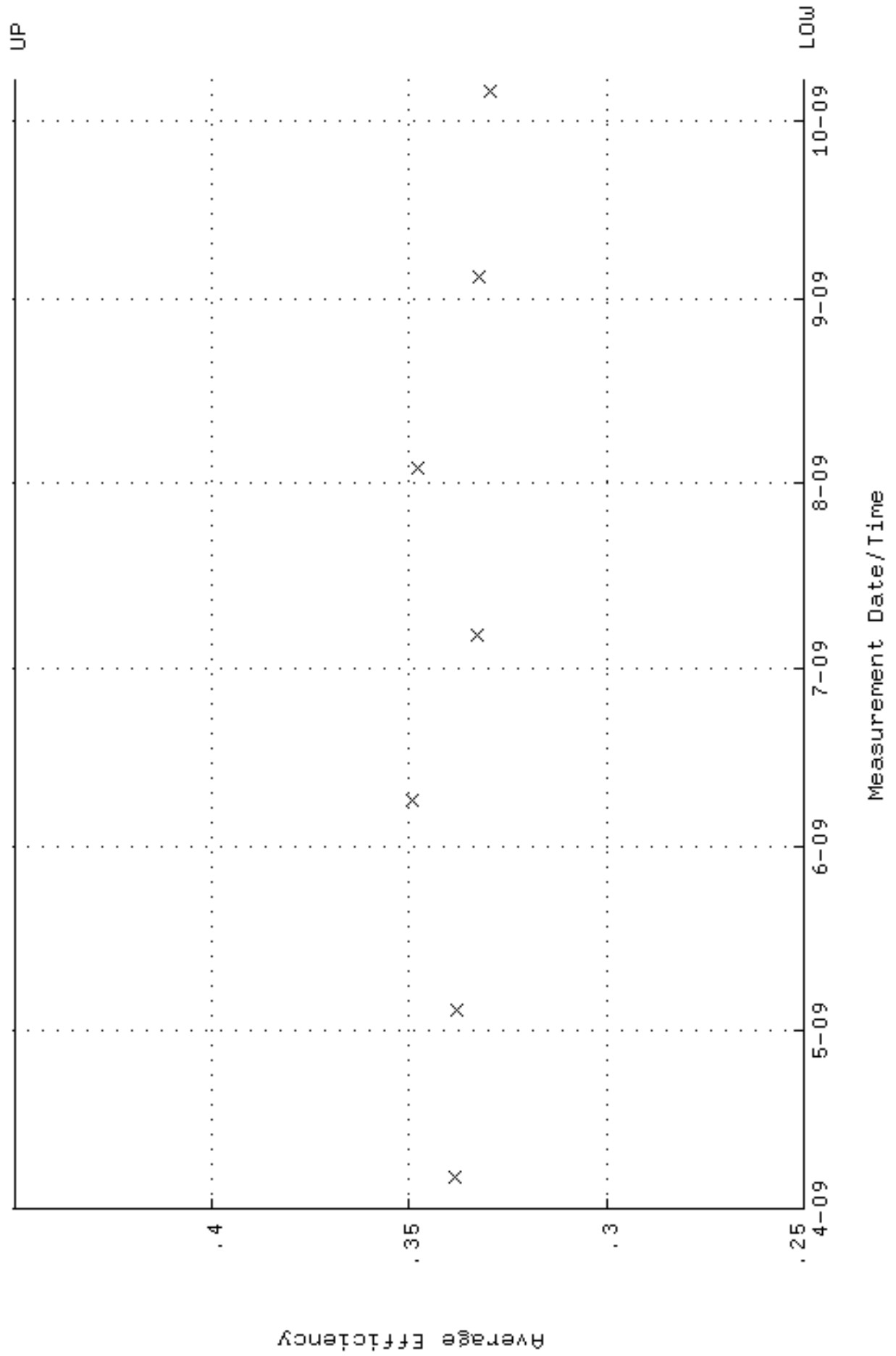
QA filename : DKA100:[ENV_ALPHA.QA.W]w022.QAF;5
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 6-APR-2009 08:44:03 through 7-OCT-2009 12:00:00
 Lower/Upper Lmts: 90.5909 through 93.6045



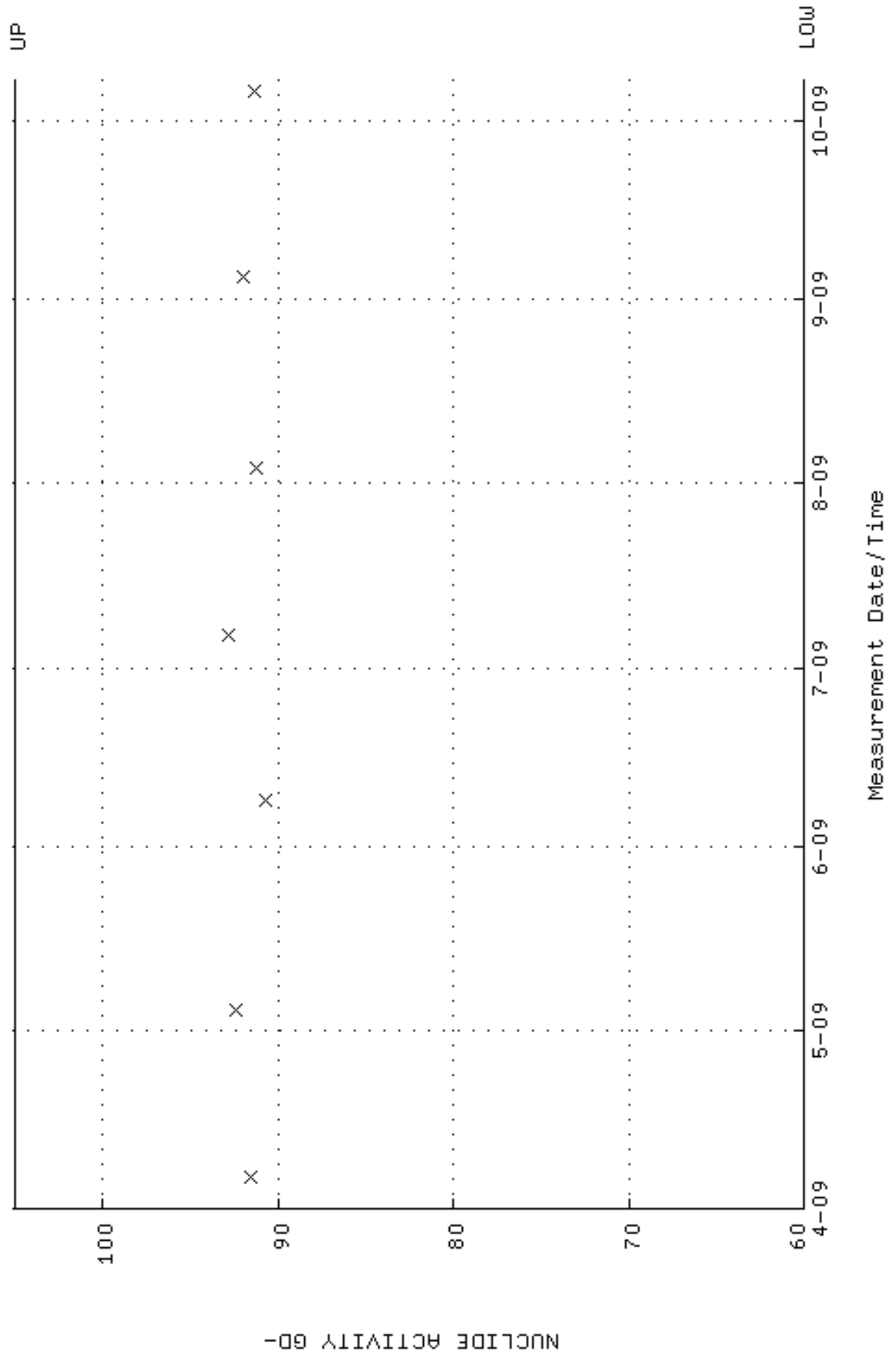
QA filename : DKA100:[ENV_ALPHA.QA.B]B022.QAF;2
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:33:10 through 7-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



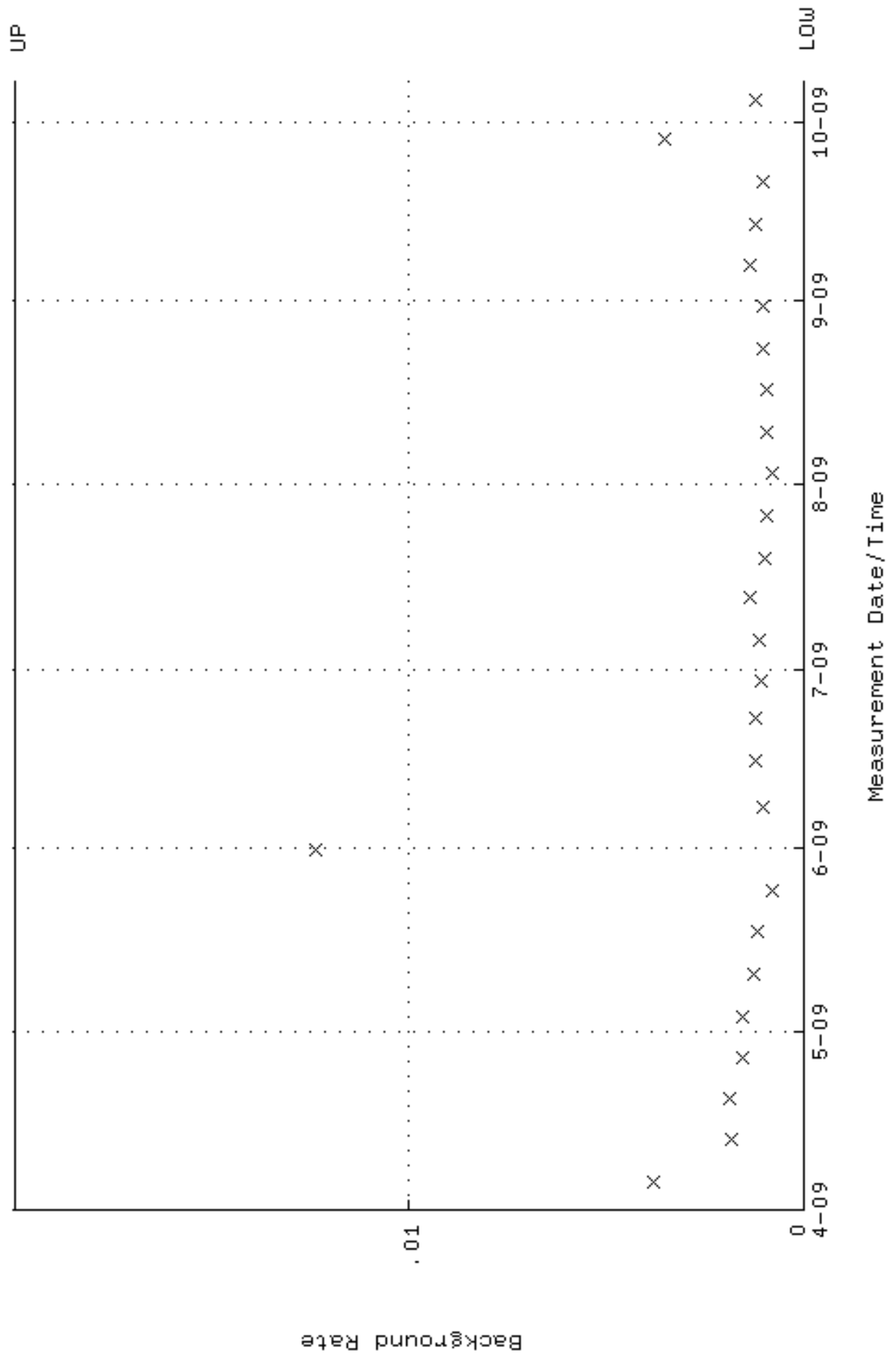
QA filename : DKA100:[ENV_ALPHA.QA.W]W023.QAF;3
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 6-APR-2009 08:44:03 through 7-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.250000 through 0.450000



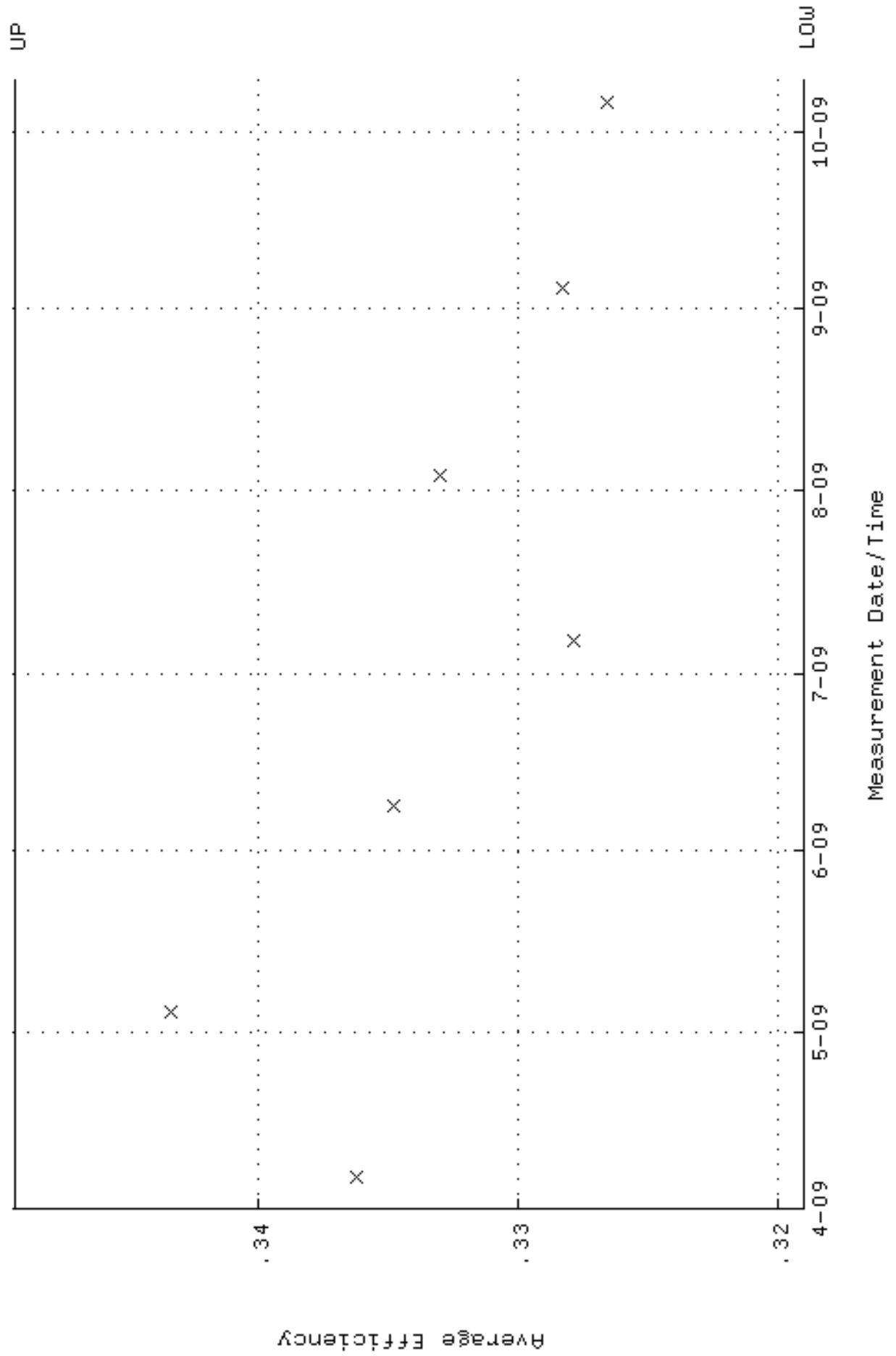
QA filename : DKA100:[ENV_ALPHA.QA.W]W023.QAF;3
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 6-APR-2009 08:44:03 through 7-OCT-2009 12:00:00
 Lower/Upper Lmts: 60.0000 through 105.0000



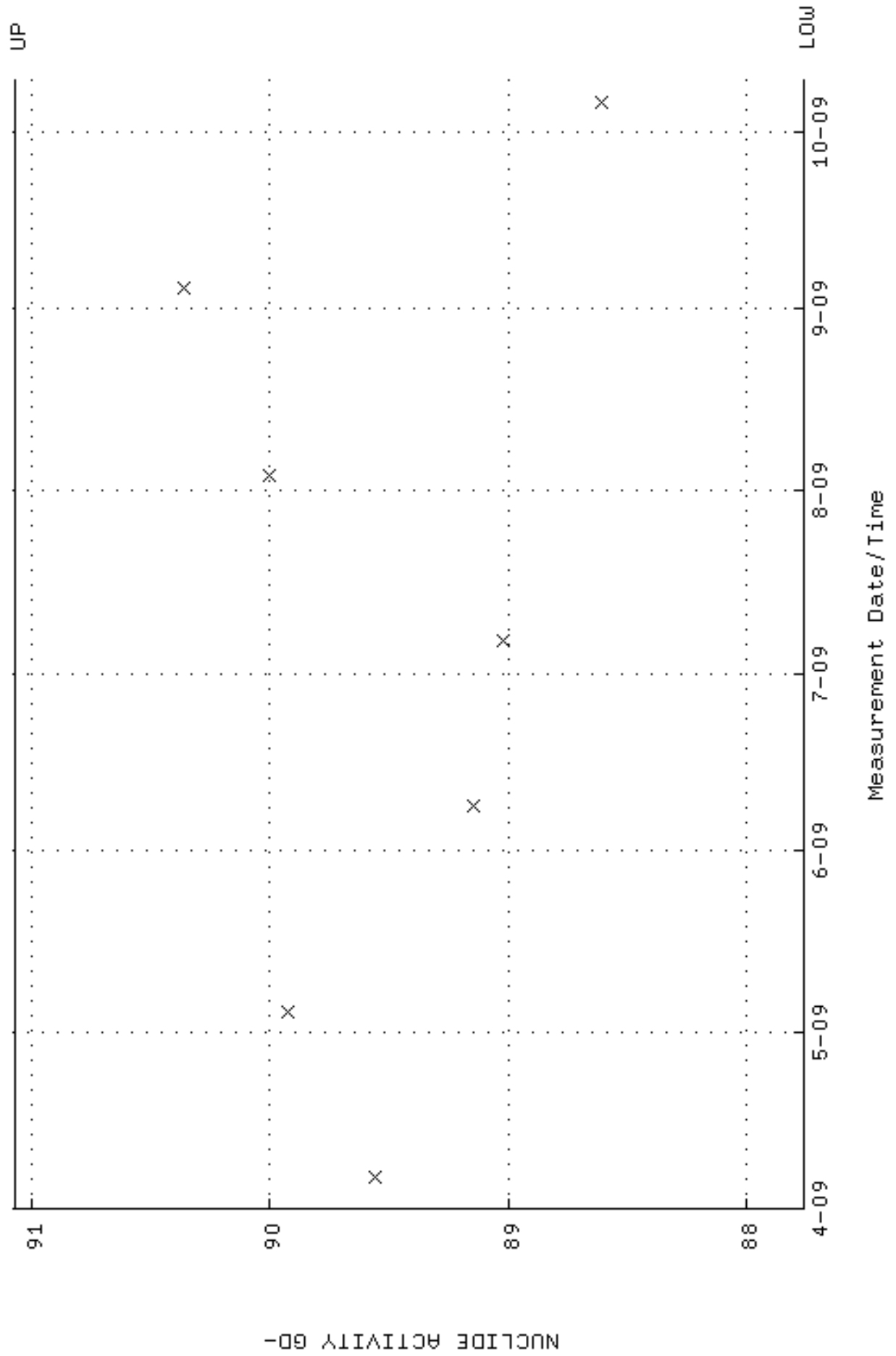
QA filename : DKA100:[ENV_ALPHA.QA.B]B023.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:33:10 through 7-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



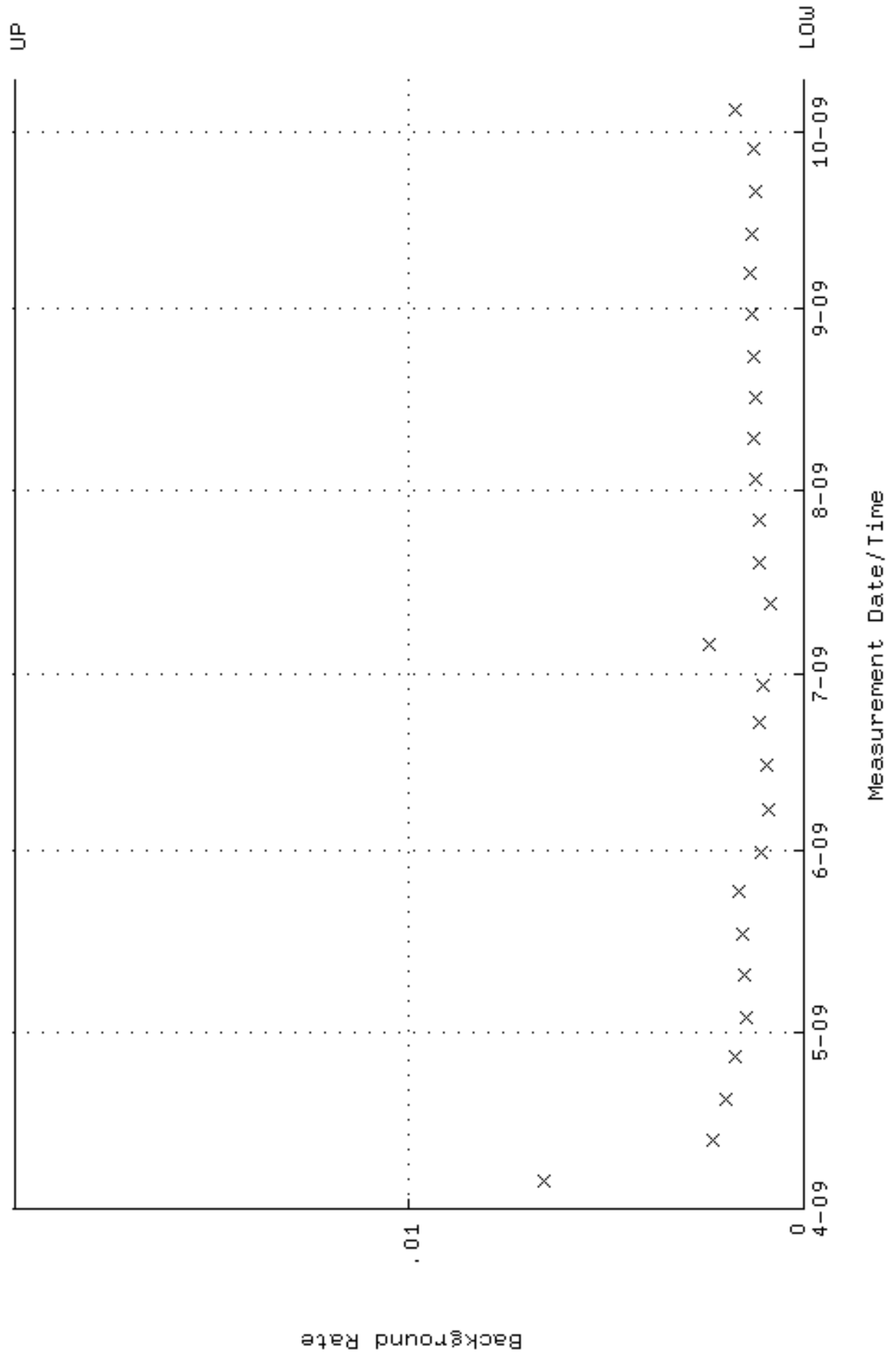
QA filename : DKA100:[ENV_ALPHA.QA.W]W024.QAF;2
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 6-APR-2009 08:44:03 through 9-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.319004 through 0.349372



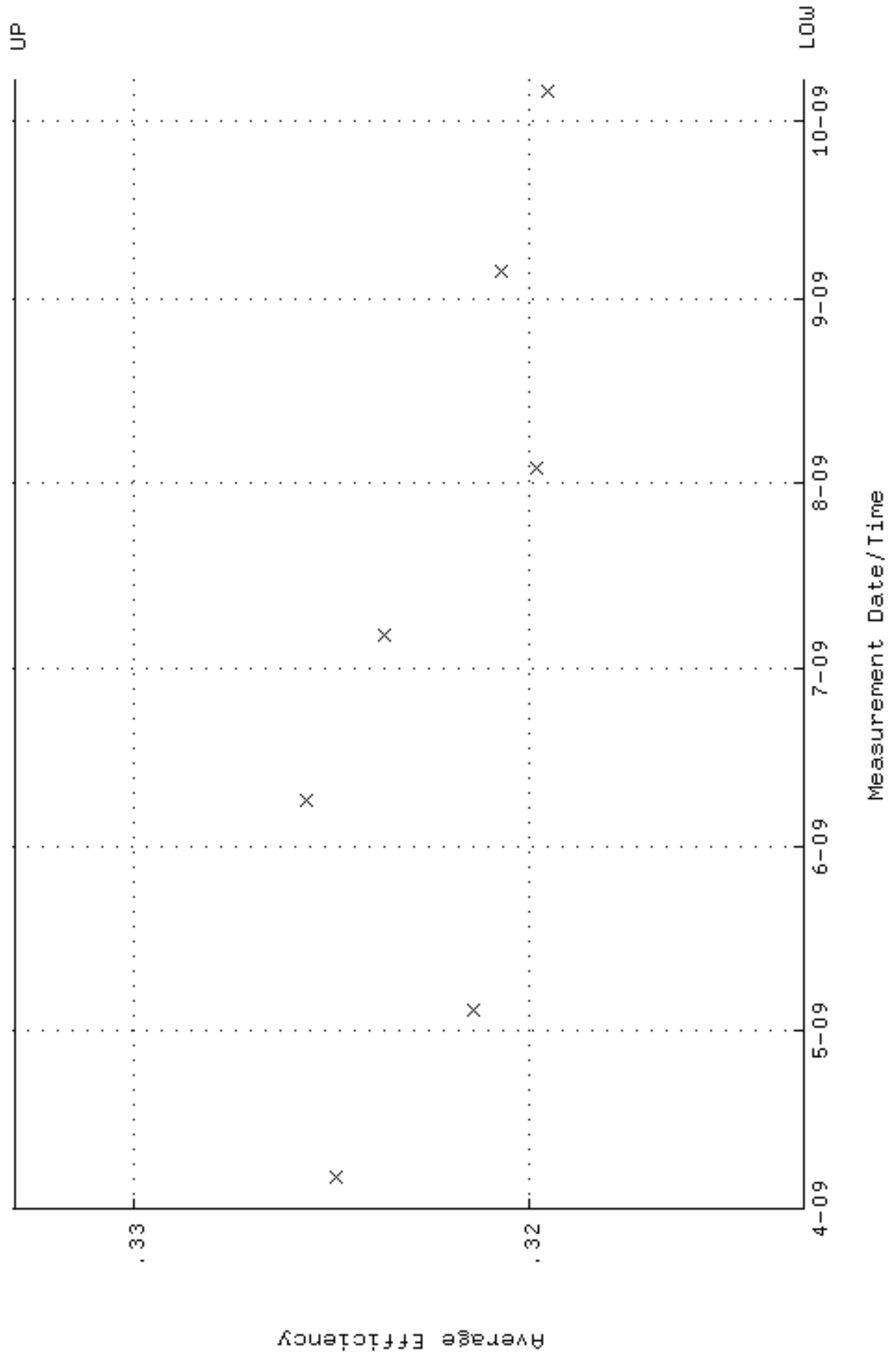
QA filename : DKA100:[ENV_ALPHA.QA.W]W024.QAF;2
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 6-APR-2009 08:44:03 through 9-OCT-2009 12:00:00
 Lower/Upper Lmts: 87.7616 through 91.0672



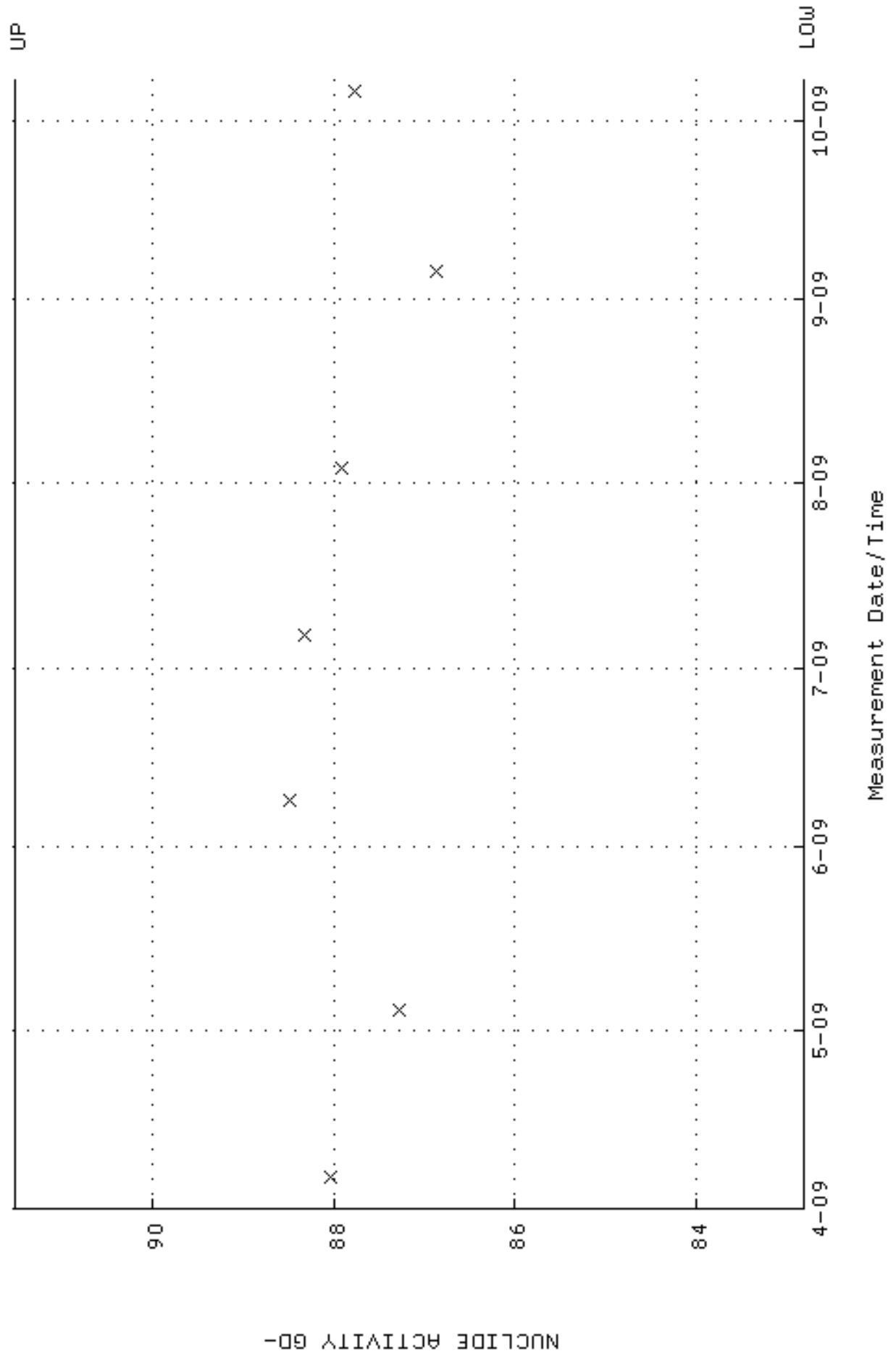
QA filename : DKA100:[ENV_ALPHA.QA.B]B024.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:33:10 through 9-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



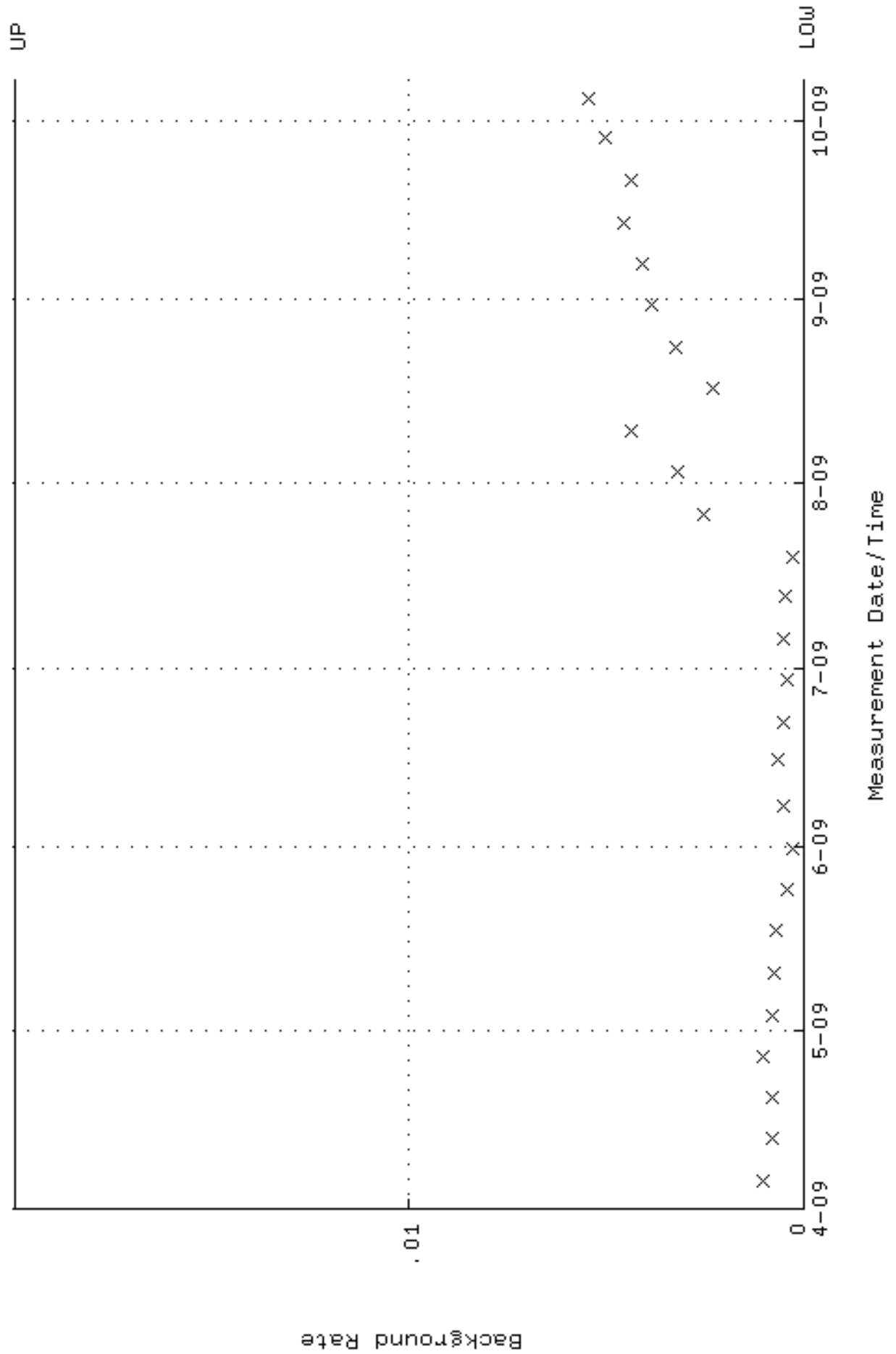
QA filename : DKA100:[ENV_ALPHA.QA.W]W040.QAF;3
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.313016 through 0.333016



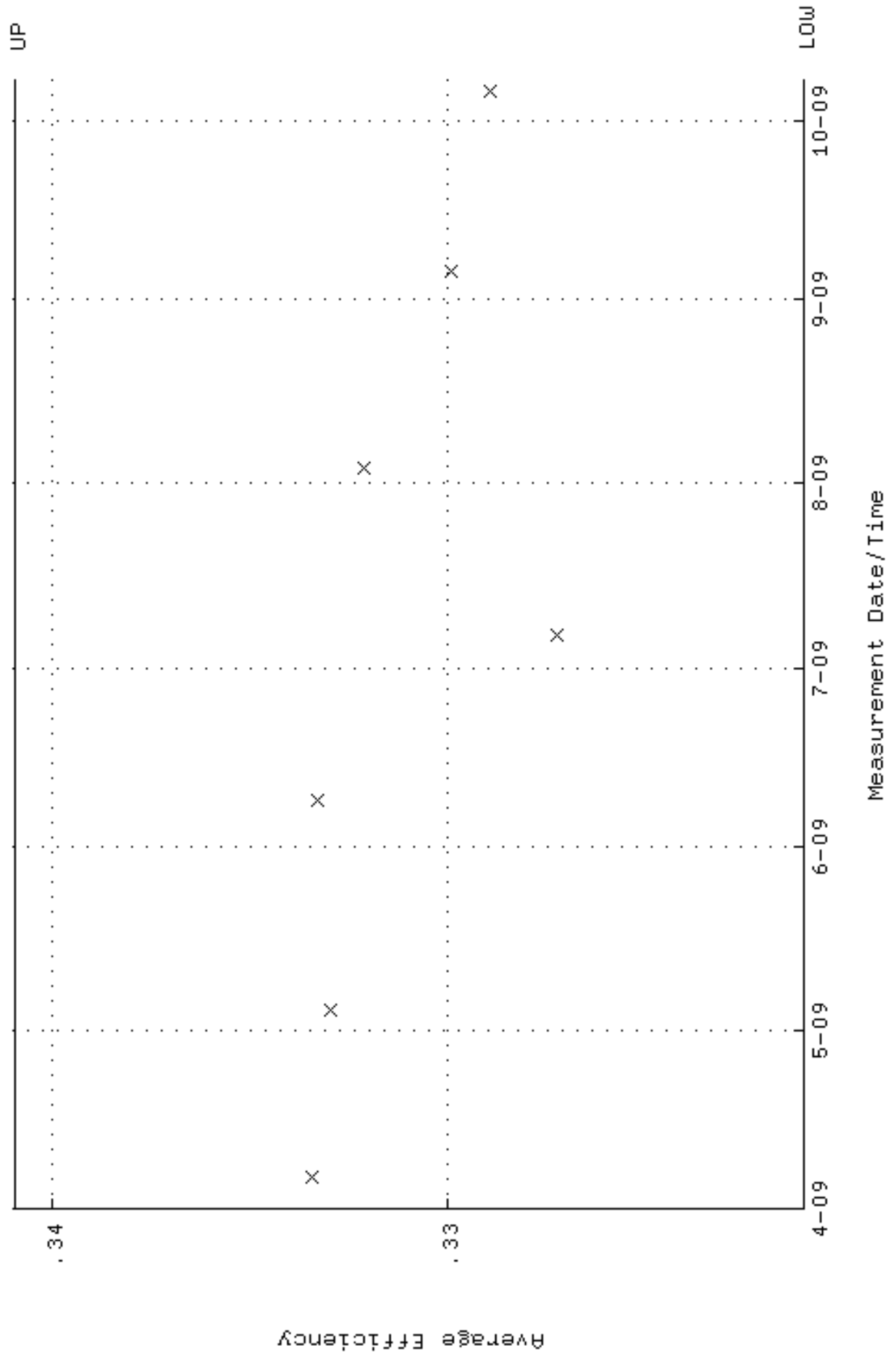
QA filename : DKA100:[ENV_ALPHA.QA.W]W040.QAF;3
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00
 Lower/Upper Lmts: 82.8065 through 91.5229



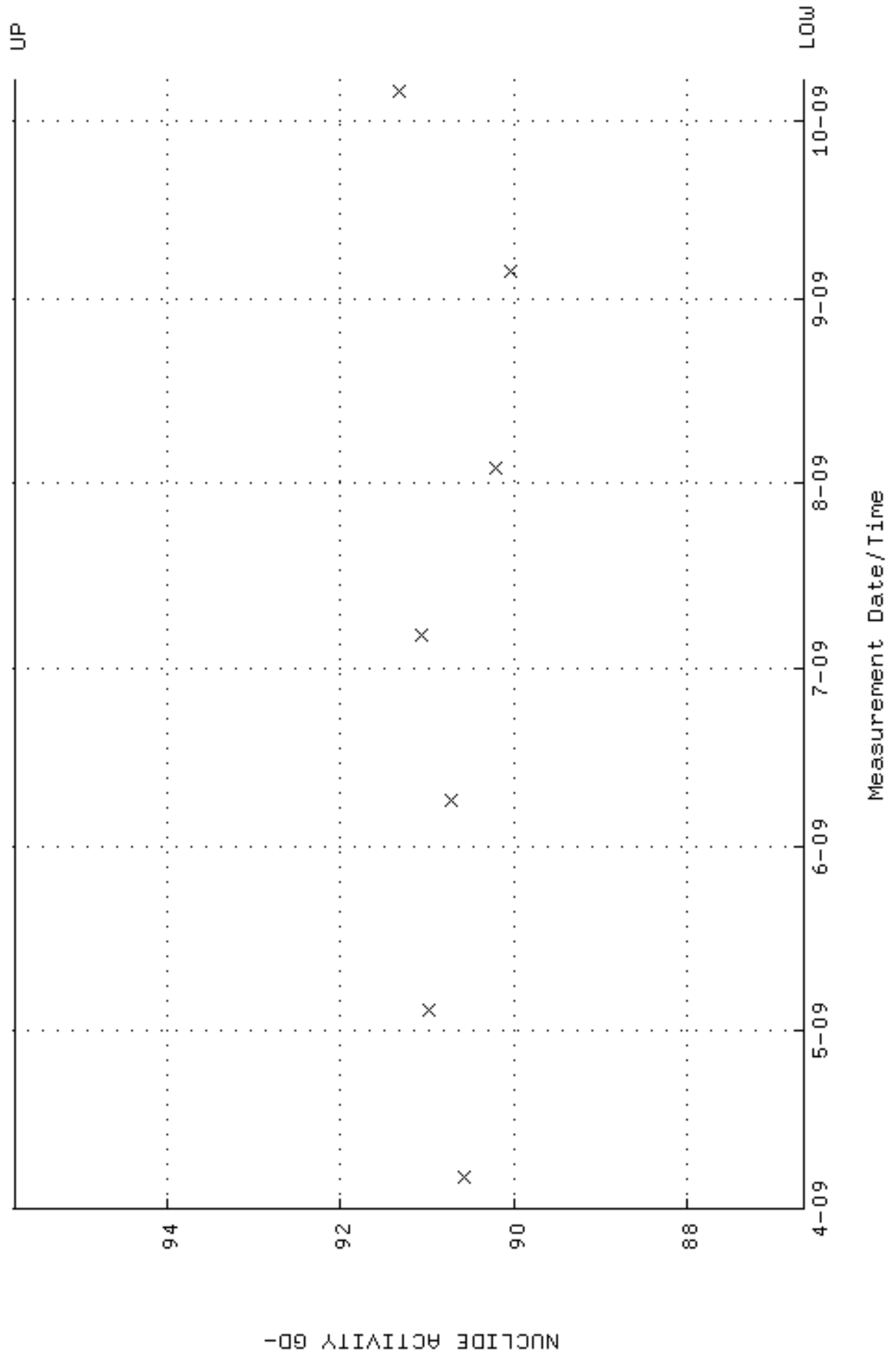
QA filename : DKA100:[ENV_ALPHA.QA.B]B040.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:33:13 through 7-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



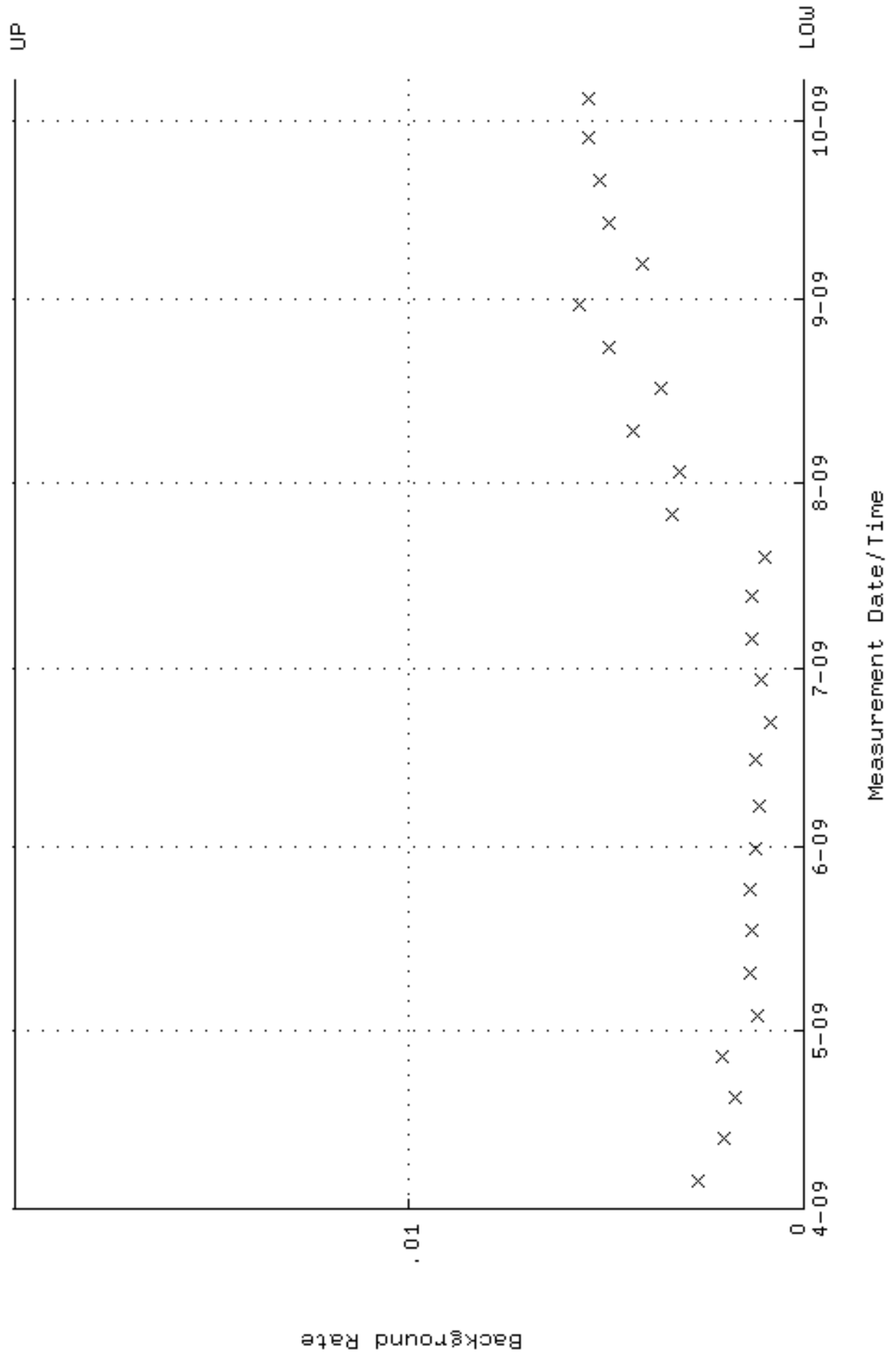
QA filename : DKA100:[ENV_ALPHA.QA.W]W041.QAF;5
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.320943 through 0.340943



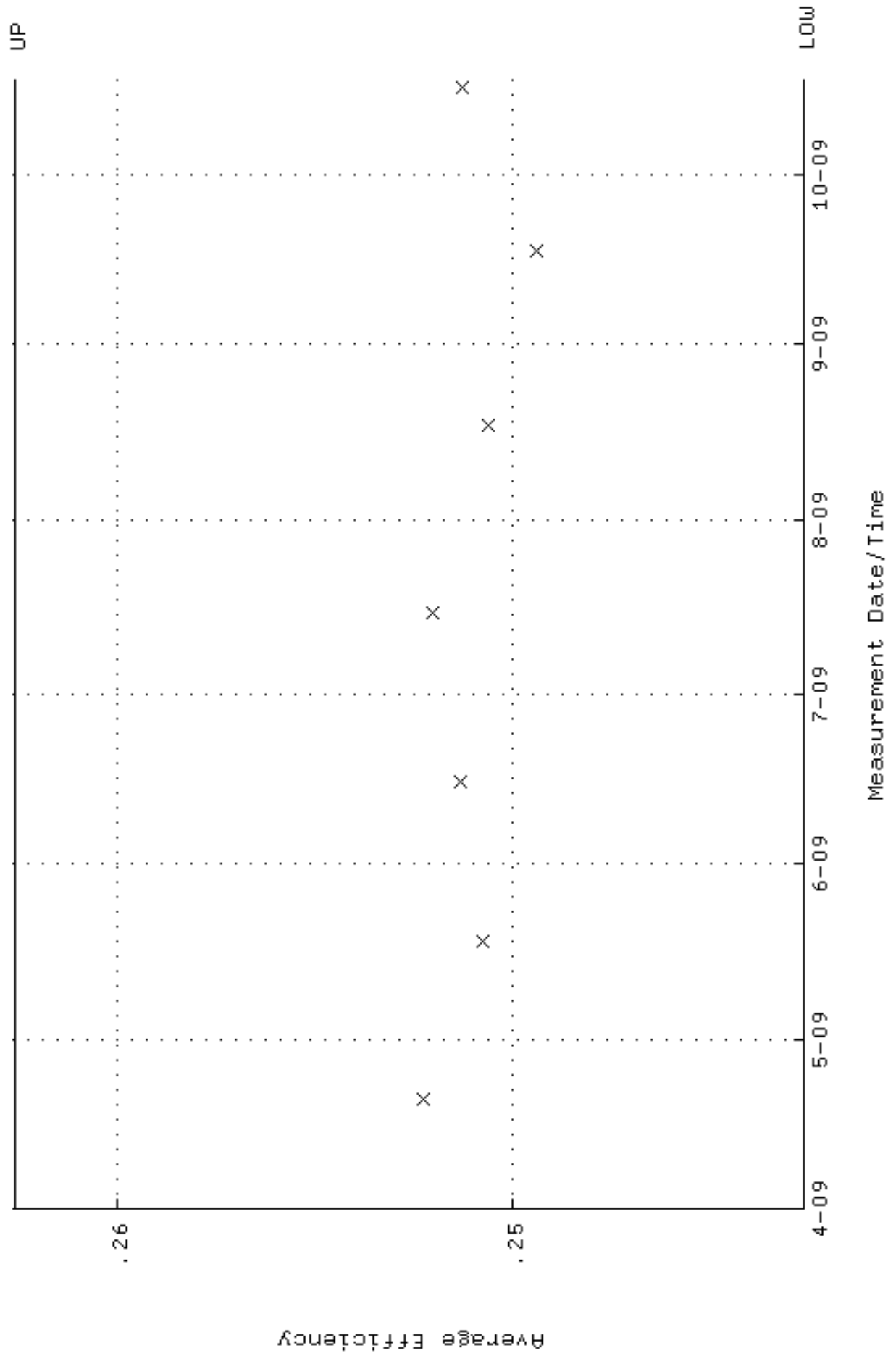
QA filename : DKA100:[ENV_ALPHA.QA.W]w041.QAF;5
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 6-APR-2009 08:44:06 through 7-OCT-2009 12:00:00
 Lower/Upper Lmts: 86.6435 through 95.7639



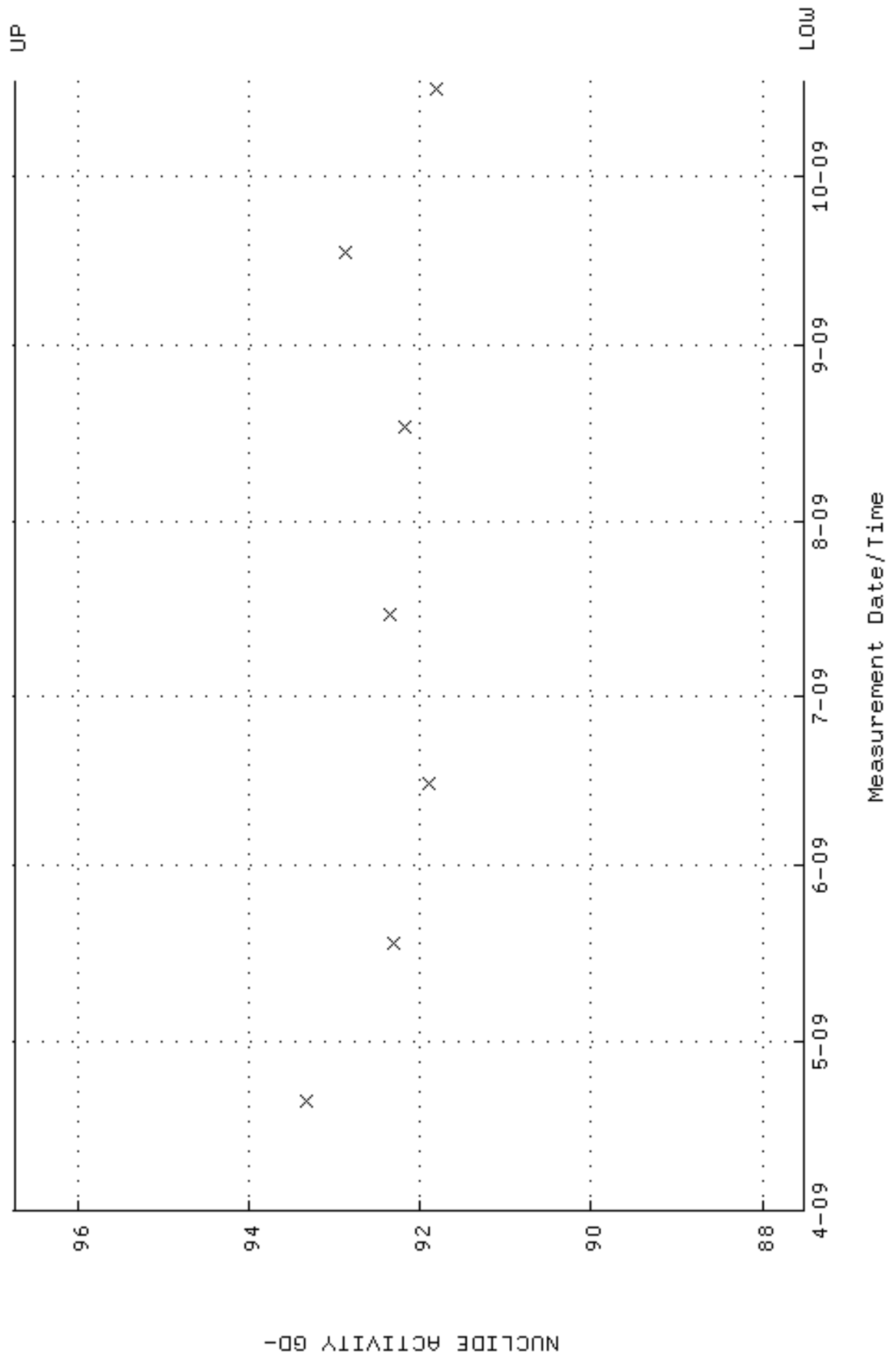
QA filename : DKA100:[ENV_ALPHA.QA.B]B041.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:33:13 through 7-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



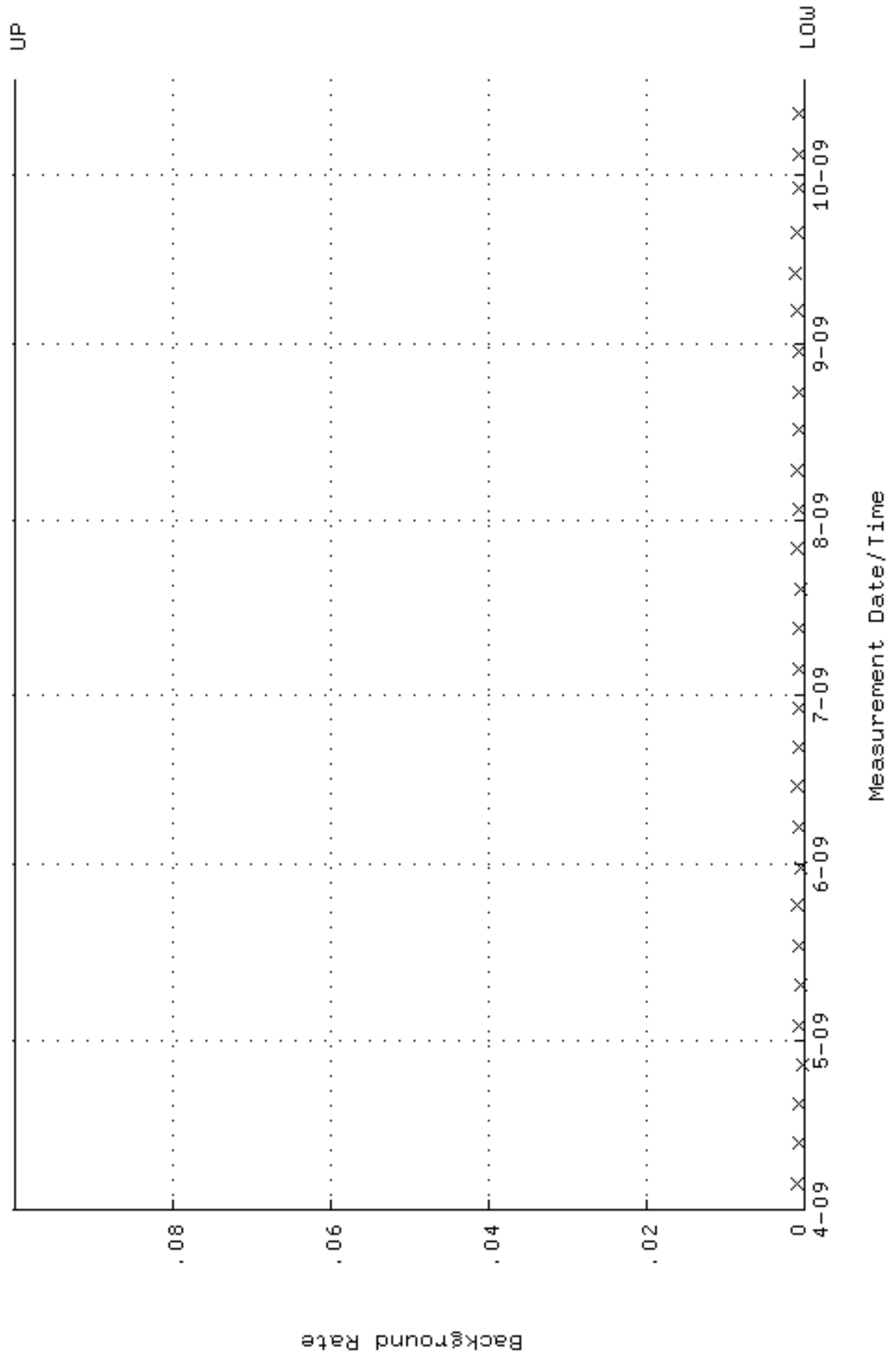
QA filename : DKA100:[ENV_ALPHA.QA.W]W113.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:35:59 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.242598 through 0.262598



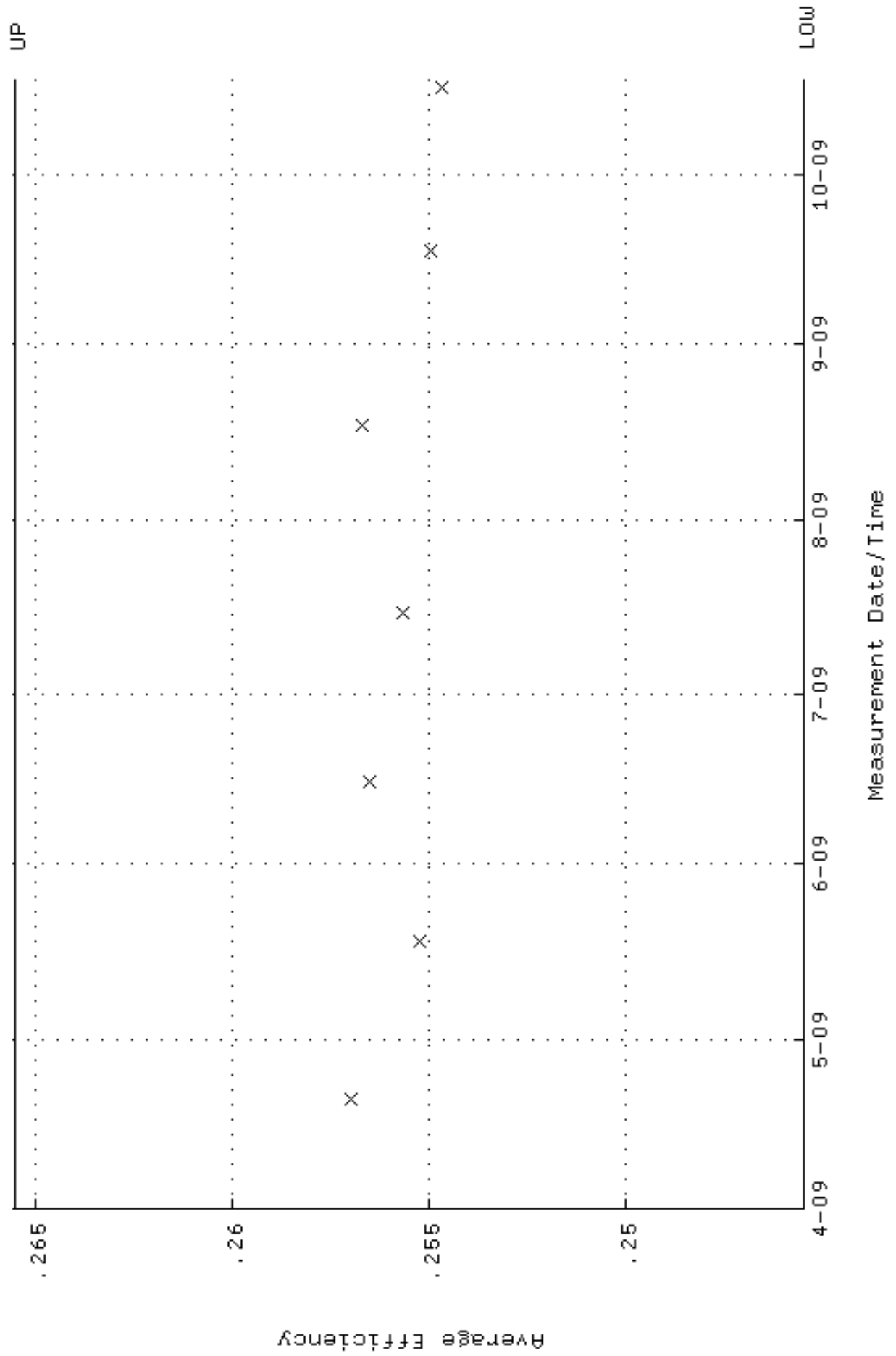
QA filename : DKA100:[ENV_ALPHA.QA.W]w113.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 20-APR-2009 10:35:59 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 87.5172 through 96.7296



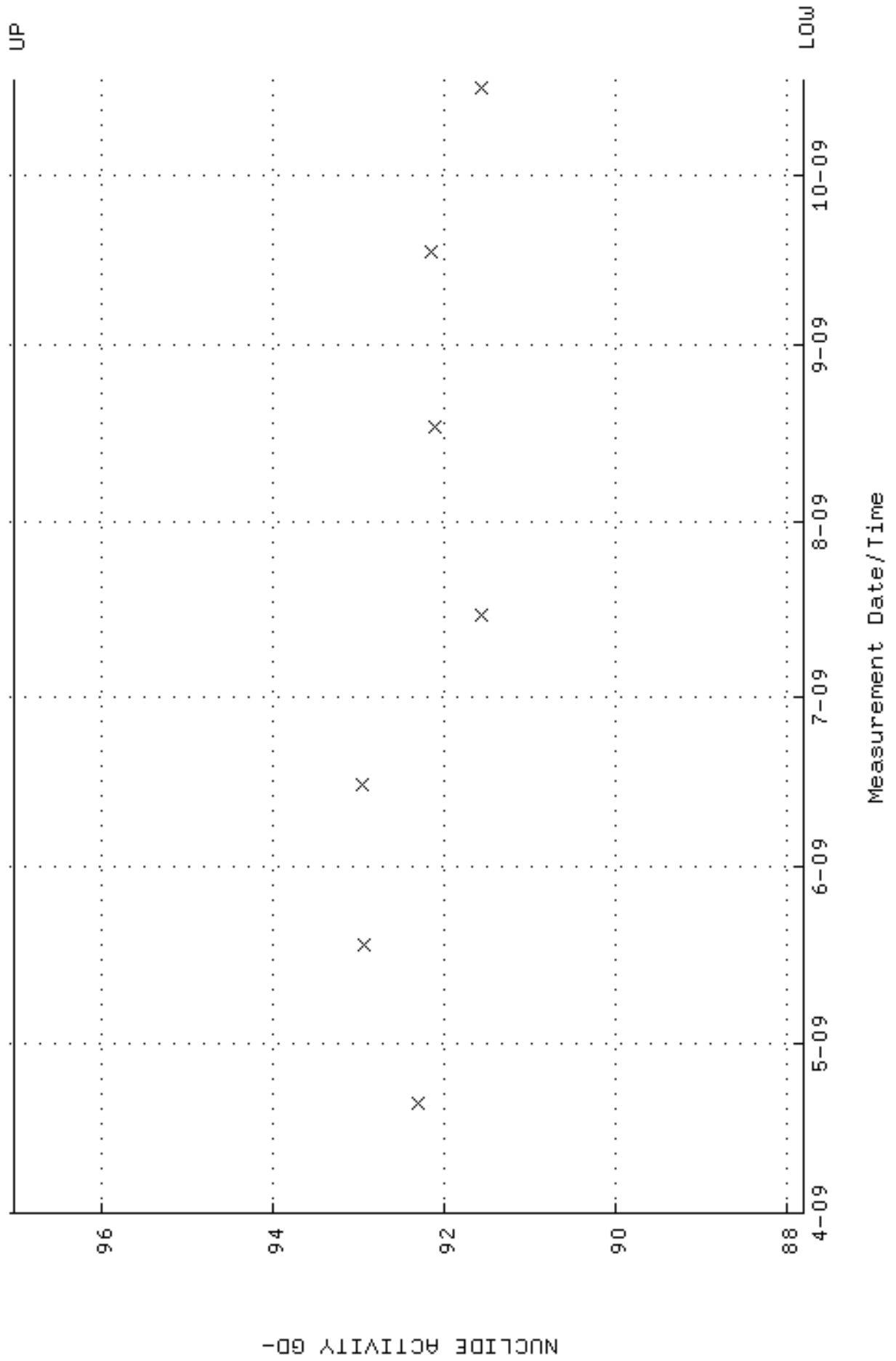
QA filename : DKA100:[ENV_ALPHA.QA.B]B113.QAF;2
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:33:54 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



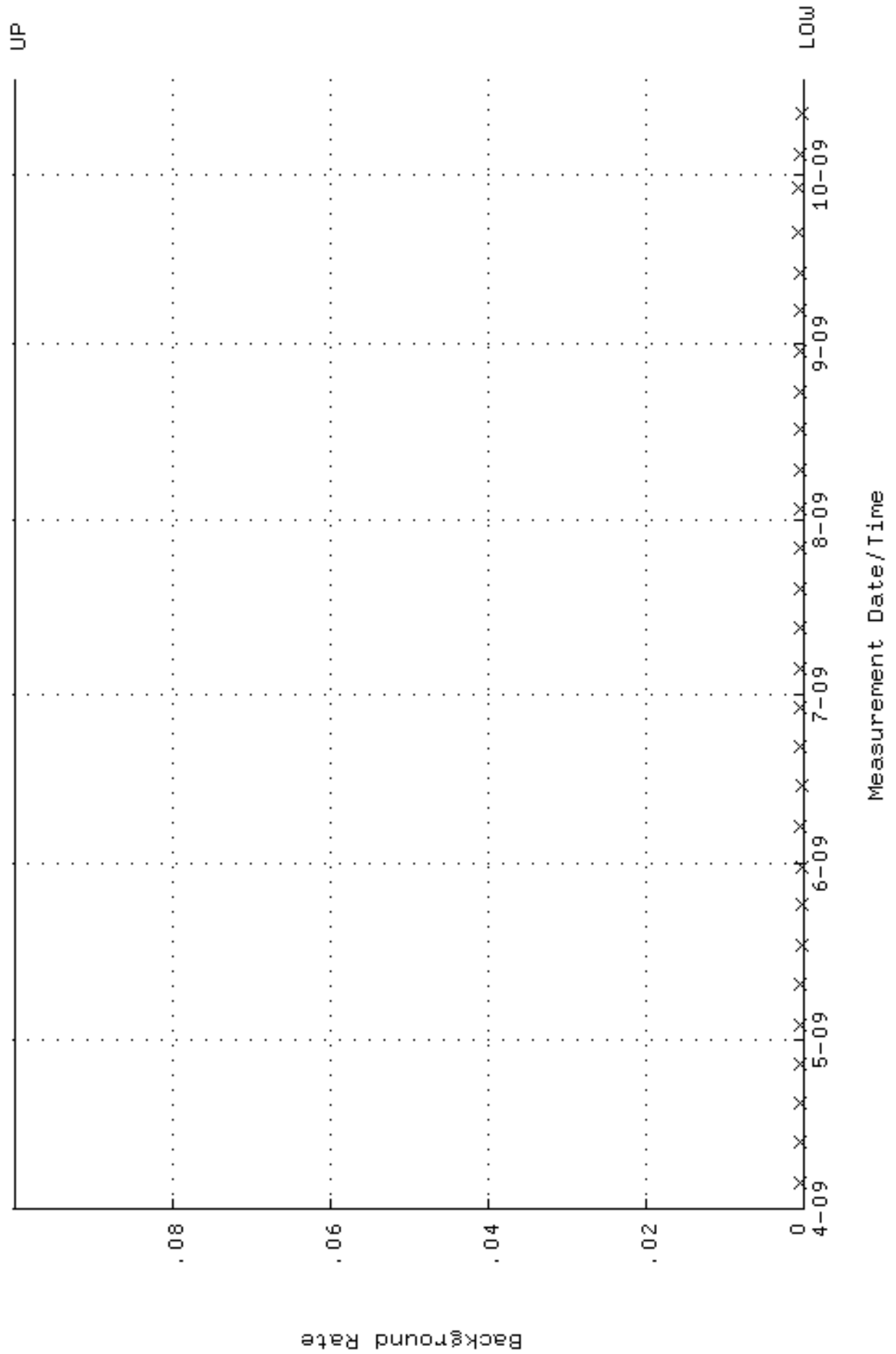
QA filename : DKA100:[ENV_ALPHA.QA.W]W114.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:36:04 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.245499 through 0.265499



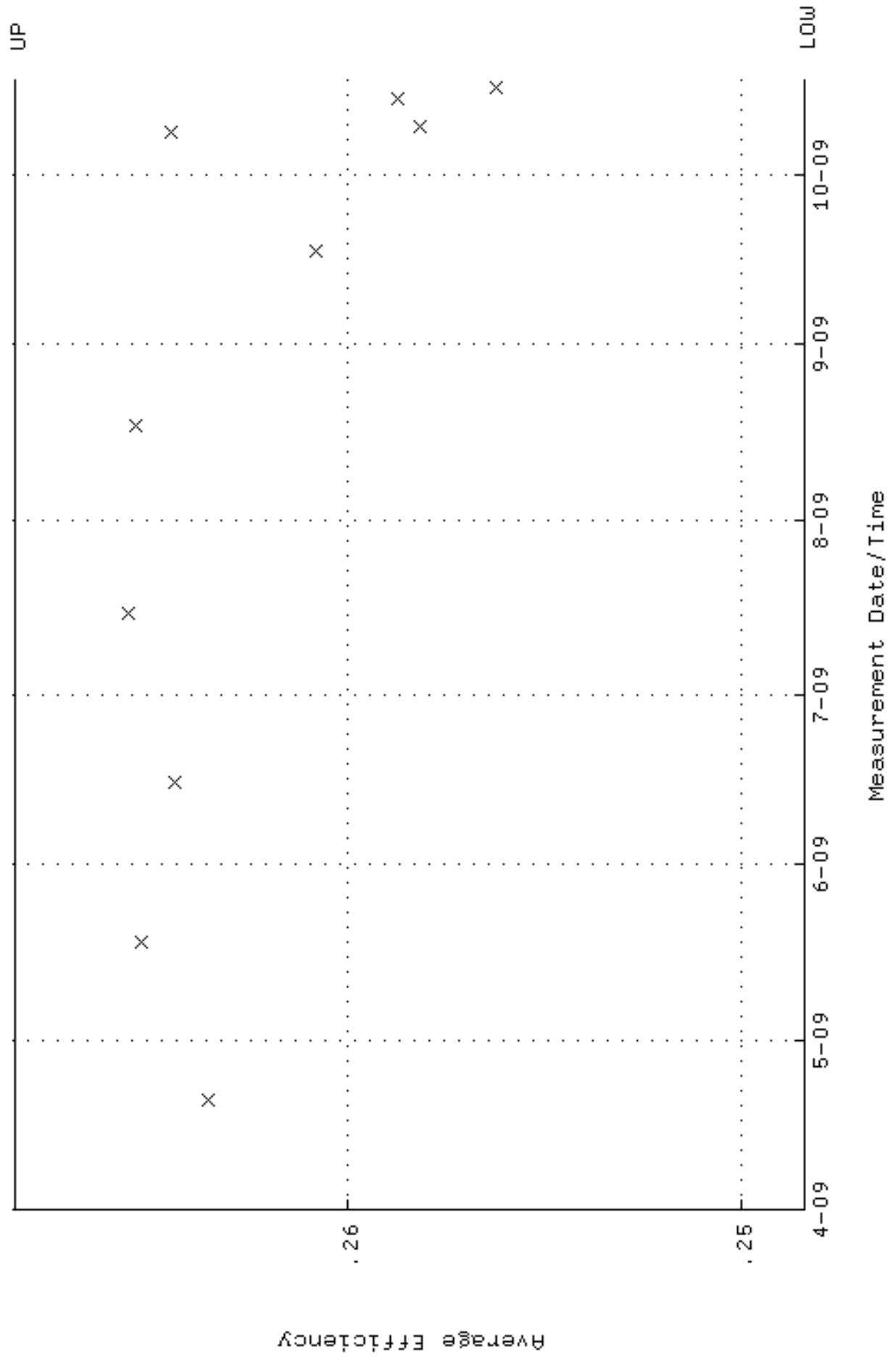
QA filename : DKA100:[ENV_ALPHA.QA.W]w114.QAF;1
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 20-APR-2009 10:36:04 through 17-OCT-2009 12:00:00
Lower/Upper Lmts: 87.8108 through 97.0540



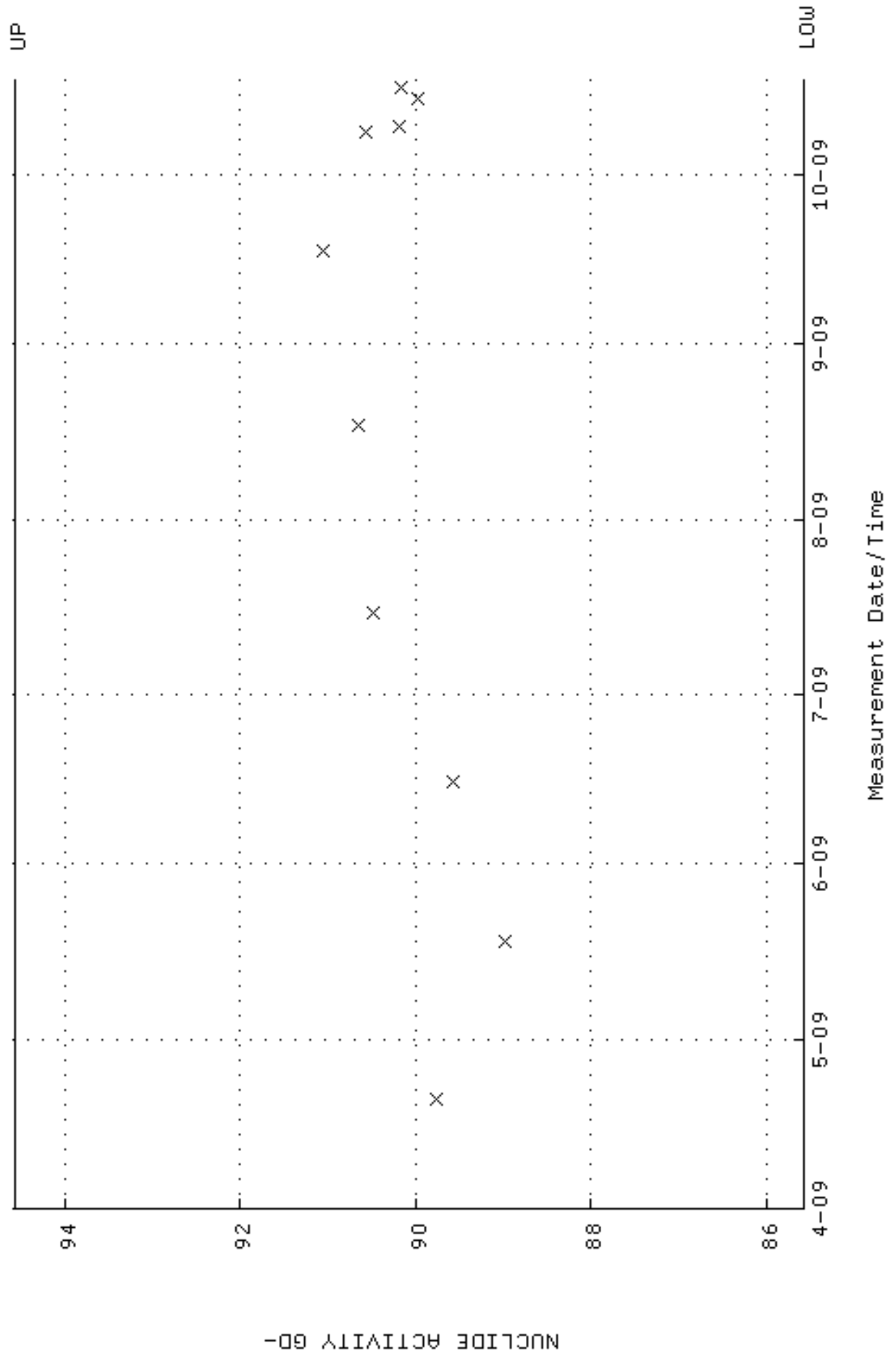
QA filename : DKA100:[ENV_ALPHA.QA.B]B114.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:33:59 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



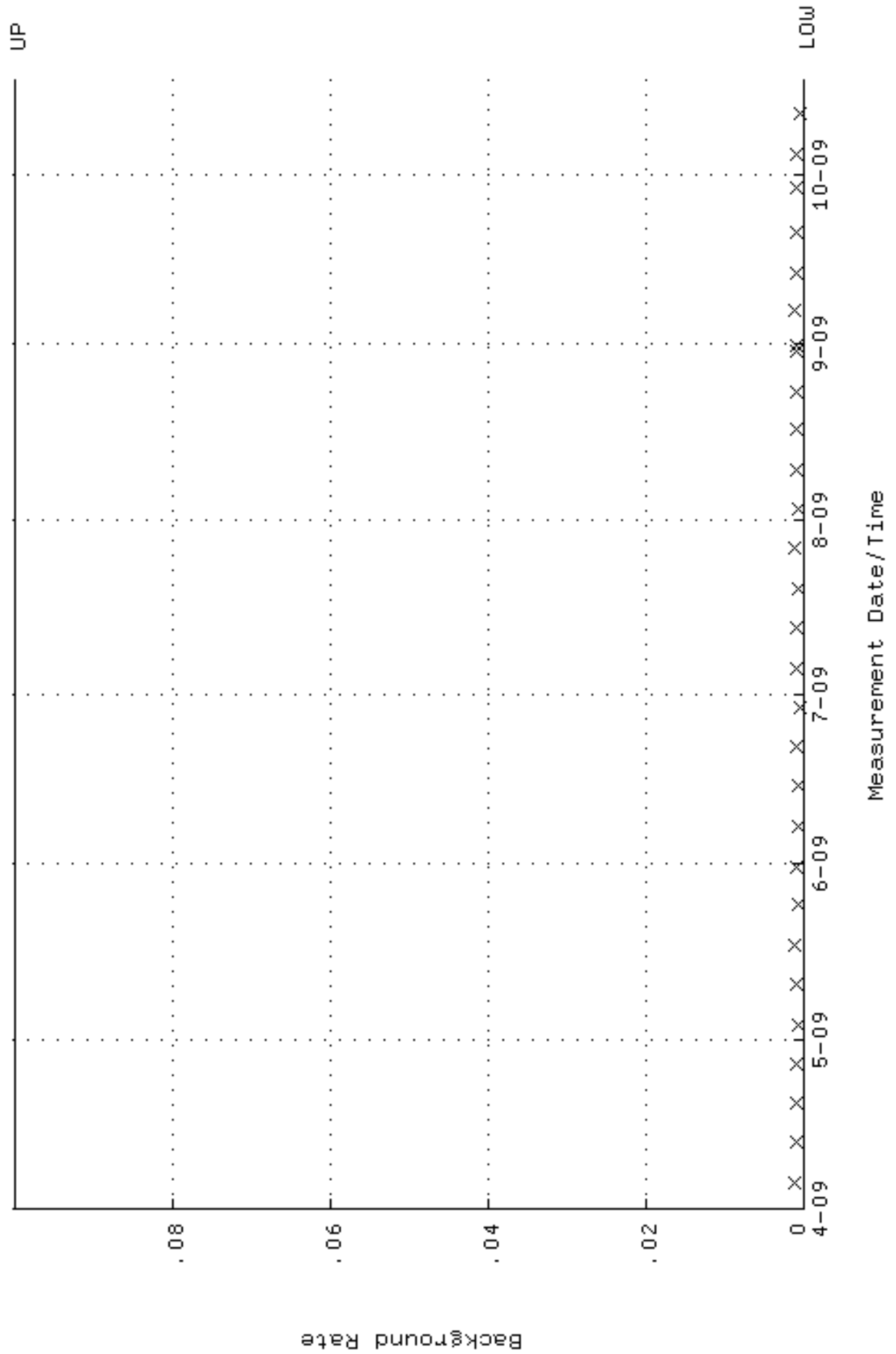
QA filename : DKA100:[ENV_ALPHA.QA.W]W115.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:36:09 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.248404 through 0.268404



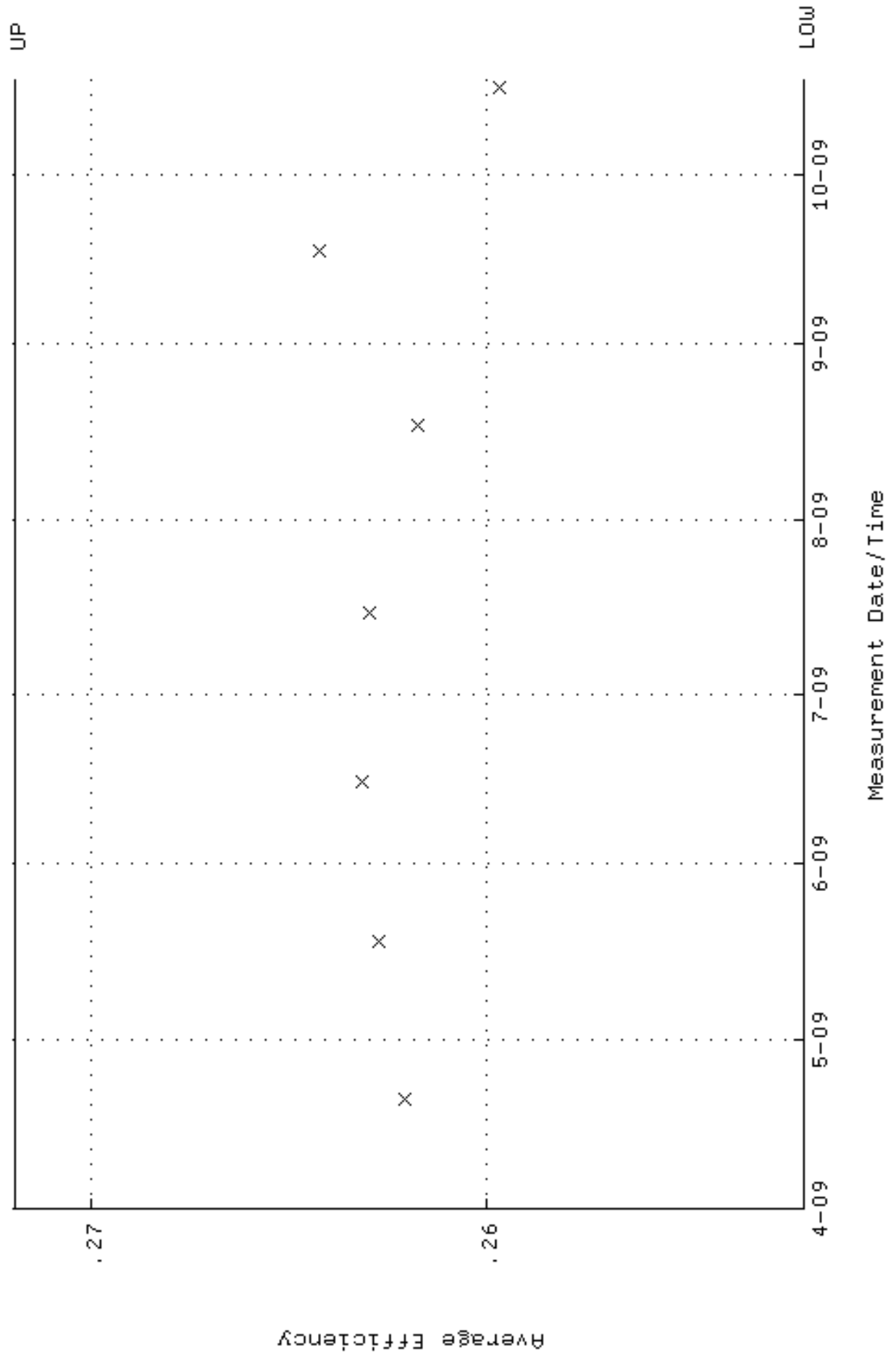
QA filename : DKA100:[ENV_ALPHA.QA.W]w115.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 20-APR-2009 10:36:09 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 85.56661 through 94.5731



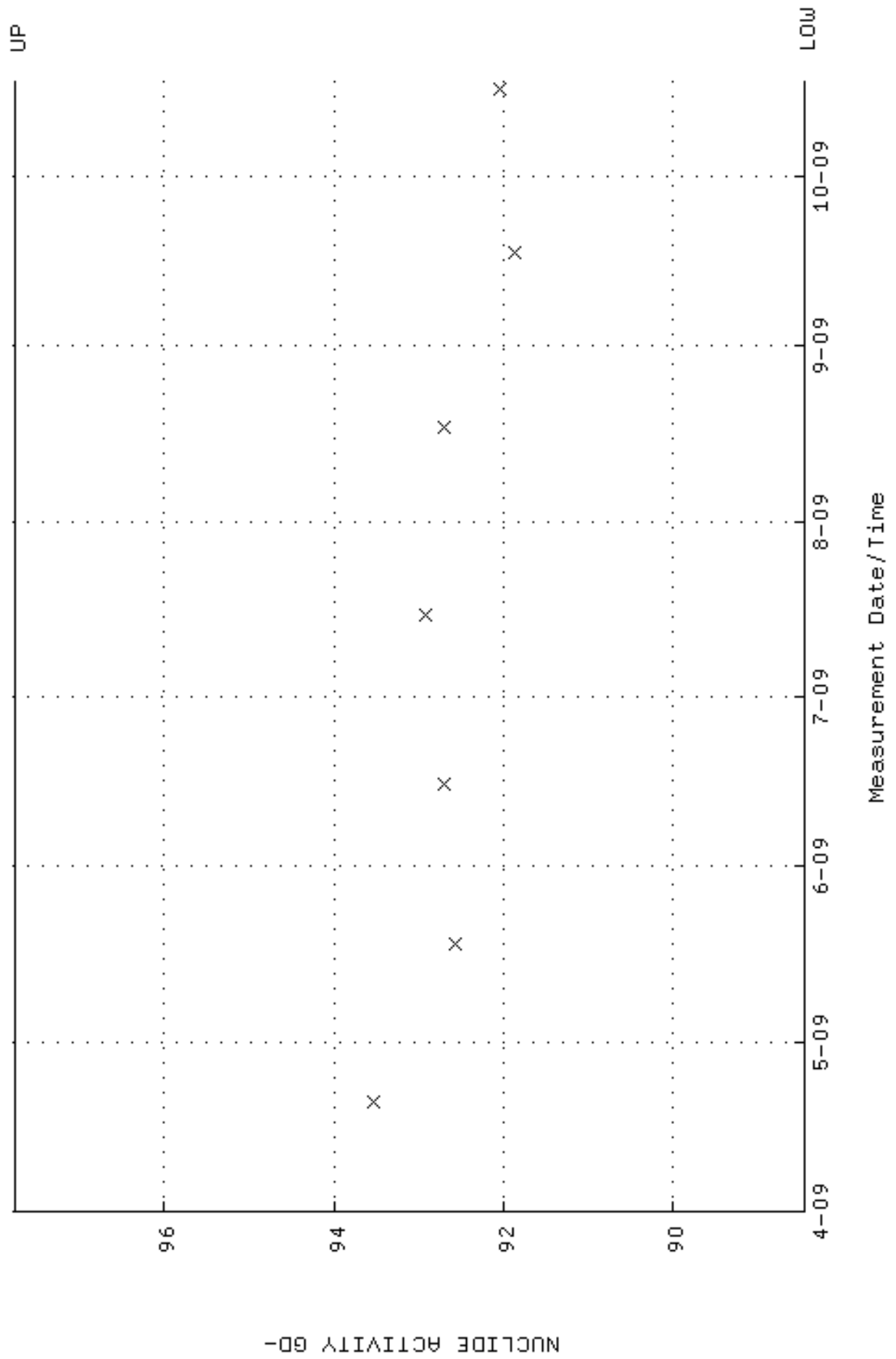
QA filename : DKA100:[ENV_ALPHA.QA.B]B115.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:34:03 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



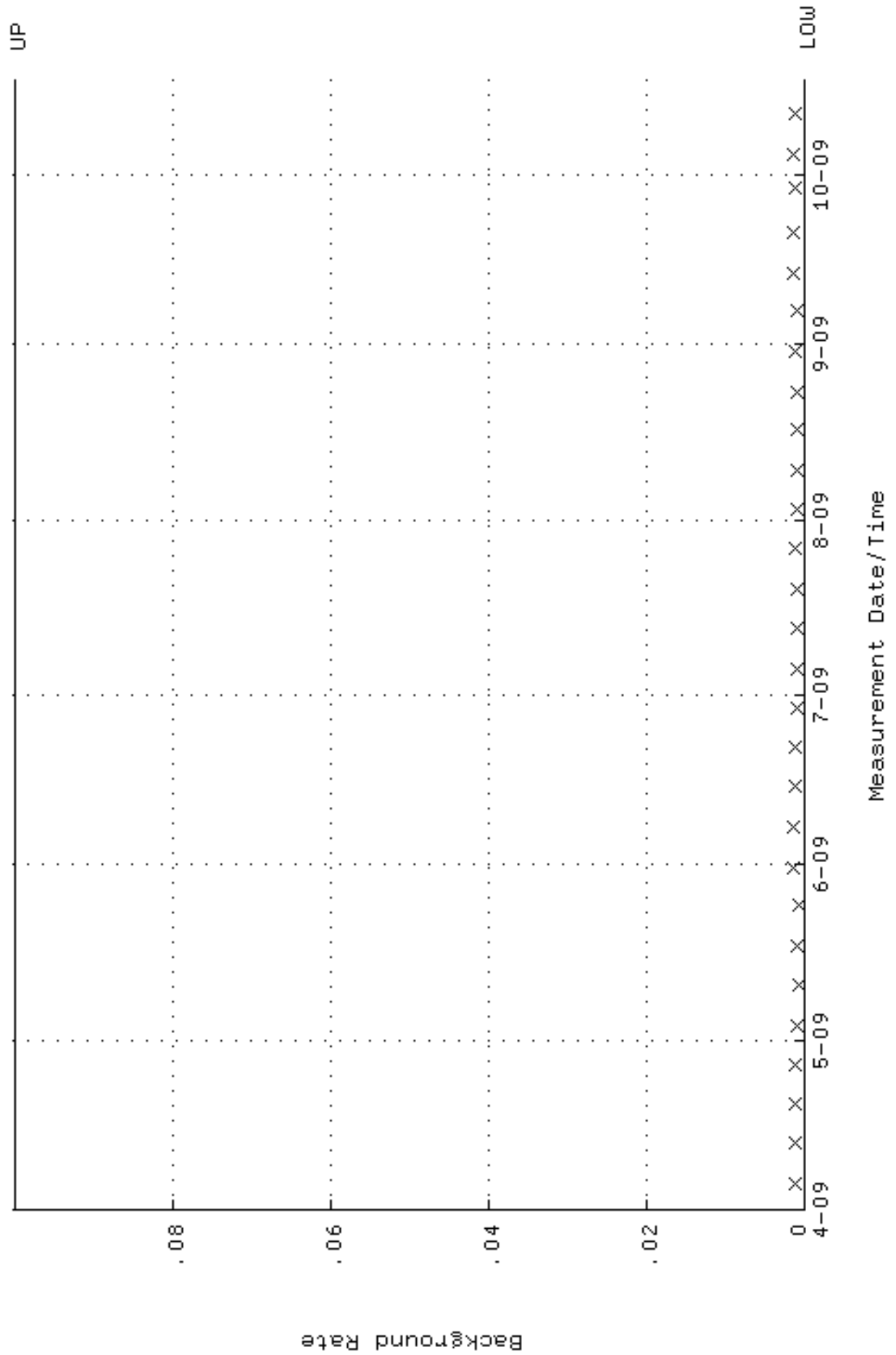
QA filename : DKA100:[ENV_ALPHA.QA.W]W116.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:36:14 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.251950 through 0.271950



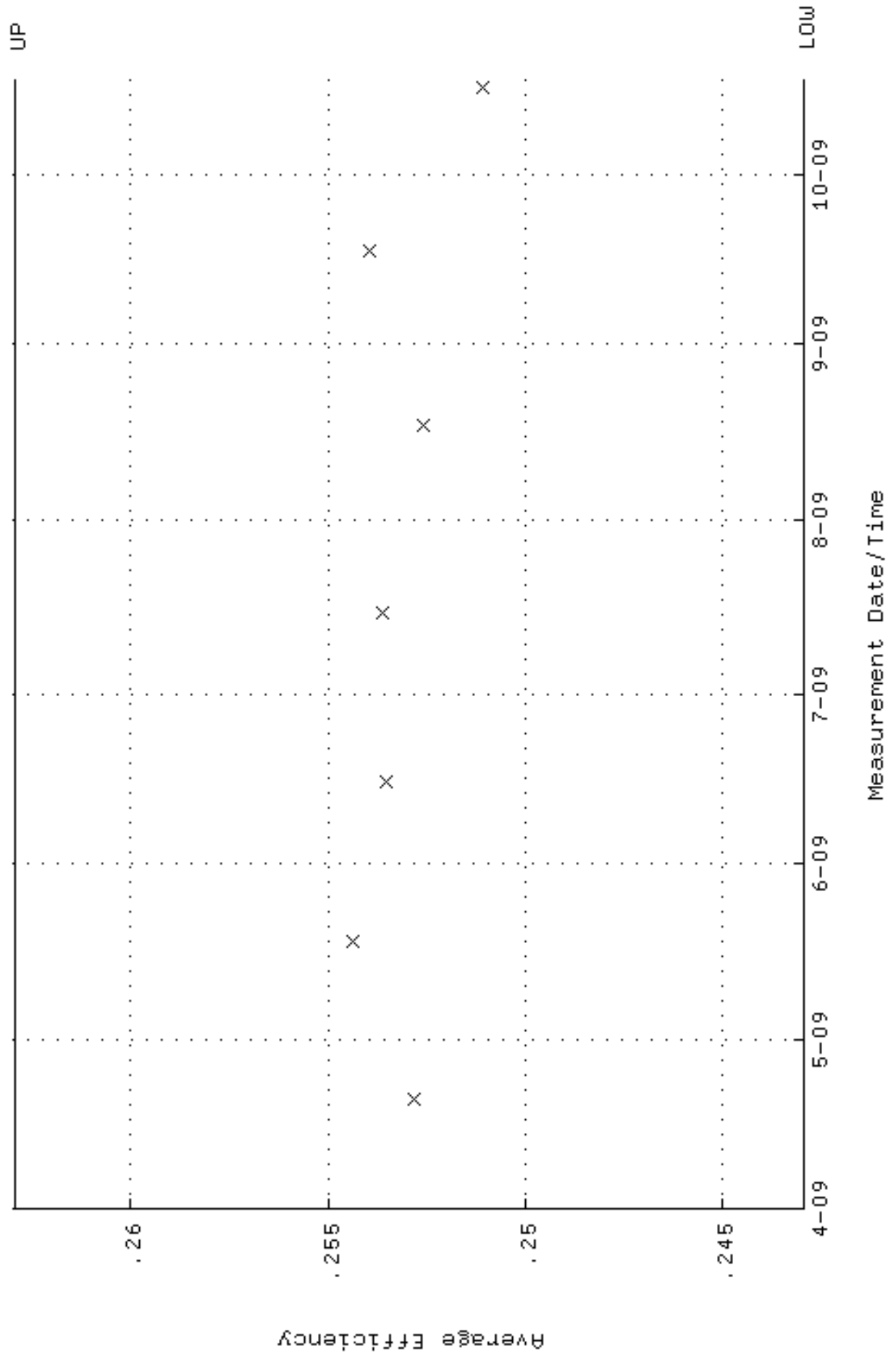
QA filename : DKA100:[ENV_ALPHA.QA.W]w116.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 20-APR-2009 10:36:14 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 88.4515 through 97.7621



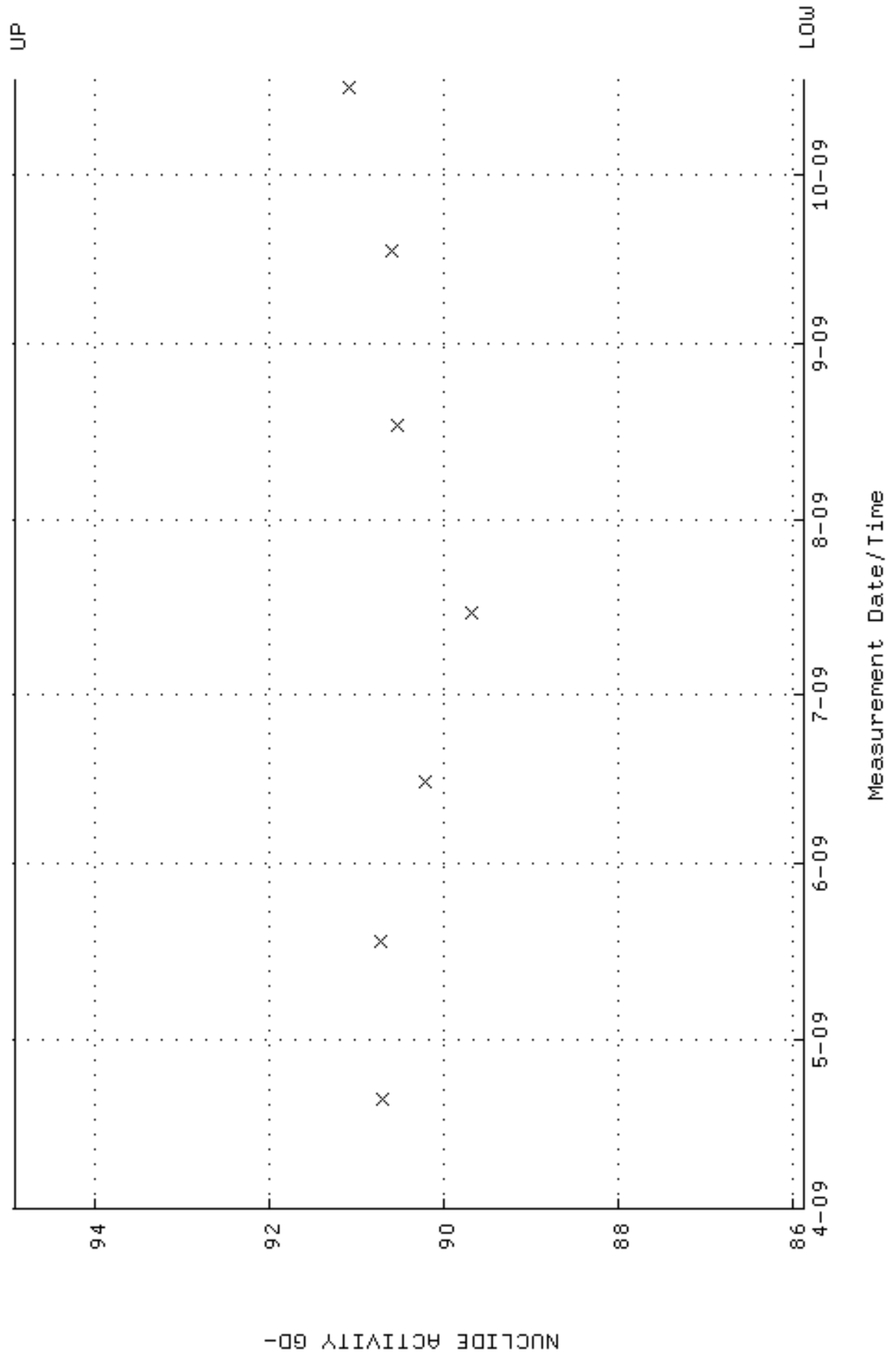
QA filename : DKA100:[ENV_ALPHA.QA.B]B116.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:34:07 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



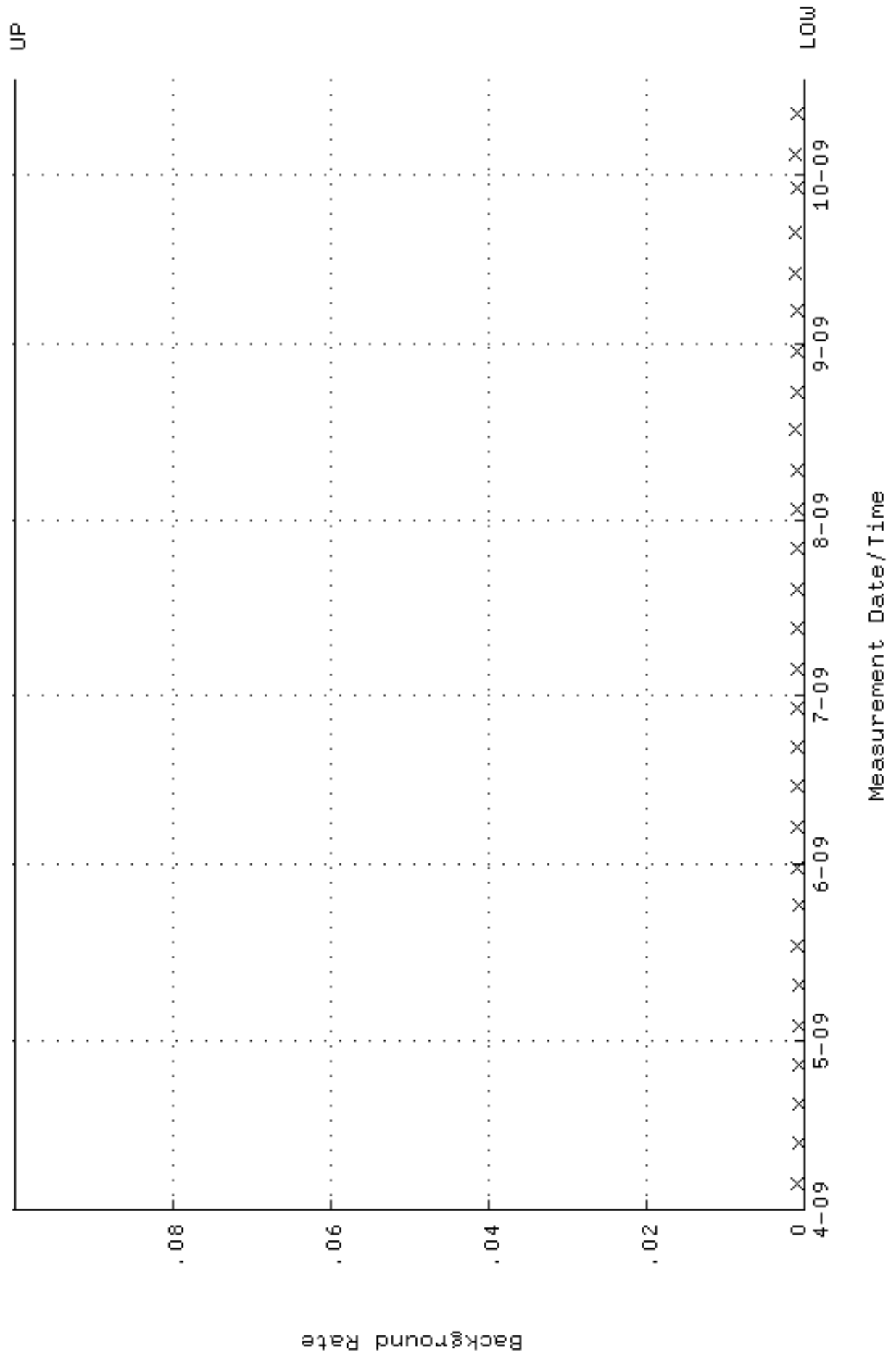
QA filename : DKA100:[ENV_ALPHA.QA.W]W117.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:36:20 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.242940 through 0.262940



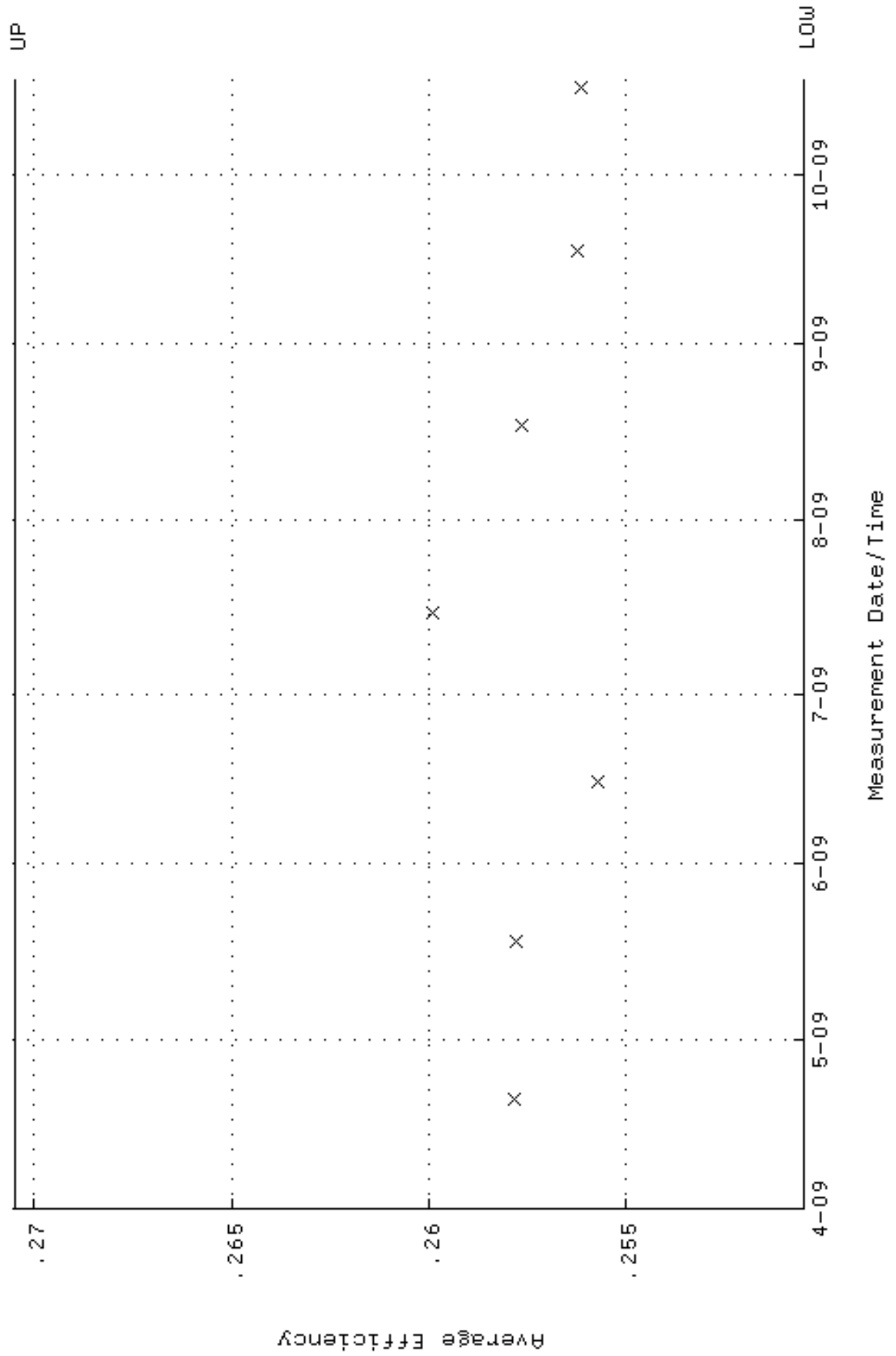
QA filename : DKA100:[ENV_ALPHA.QA.W]w117.QAF;1
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 20-APR-2009 10:36:20 through 17-OCT-2009 12:00:00
Lower/Upper Lmts: 85.8693 through 94.9081



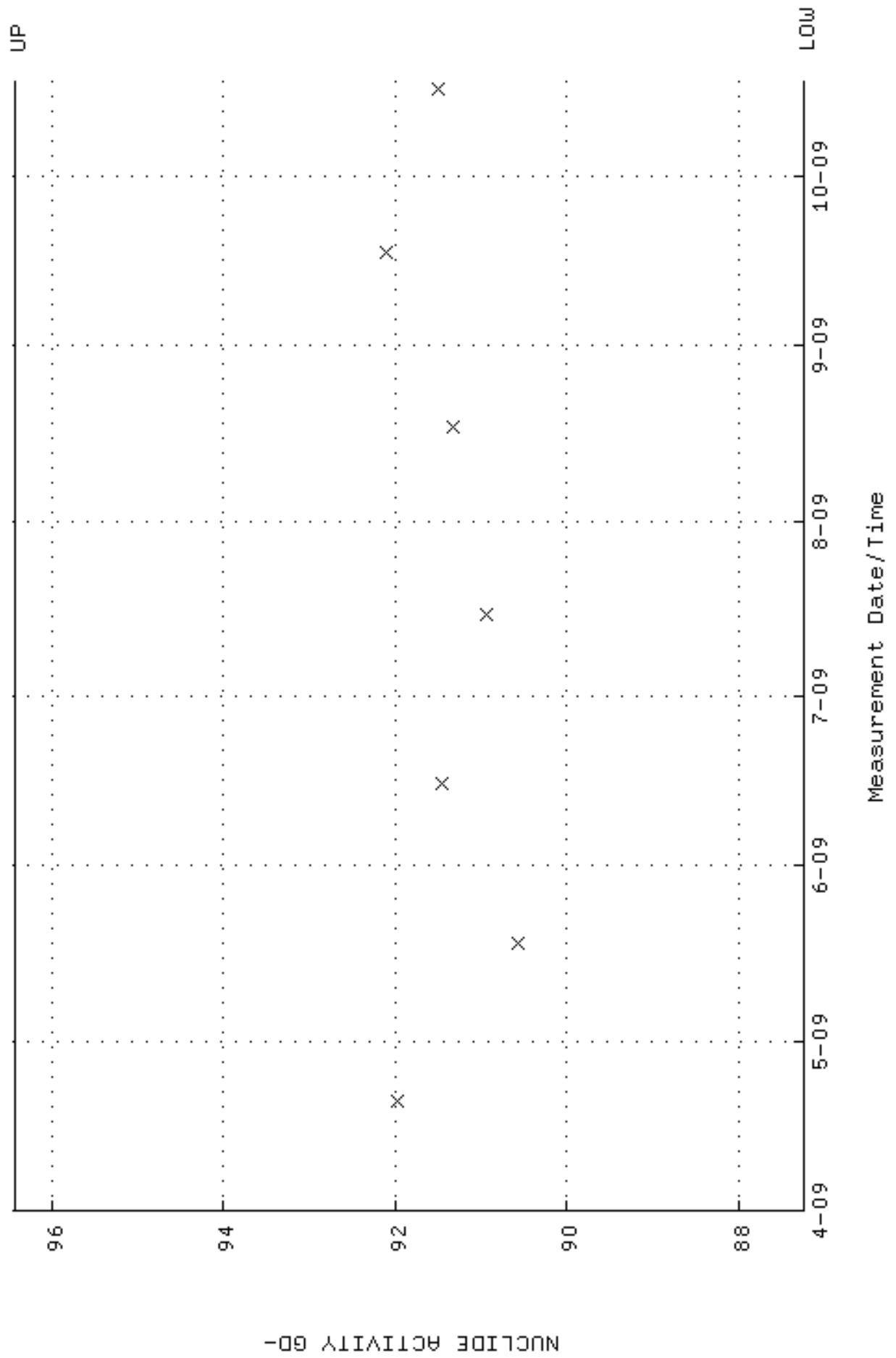
QA filename : DKA100:[ENV_ALPHA.QA.B]B117.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:34:12 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



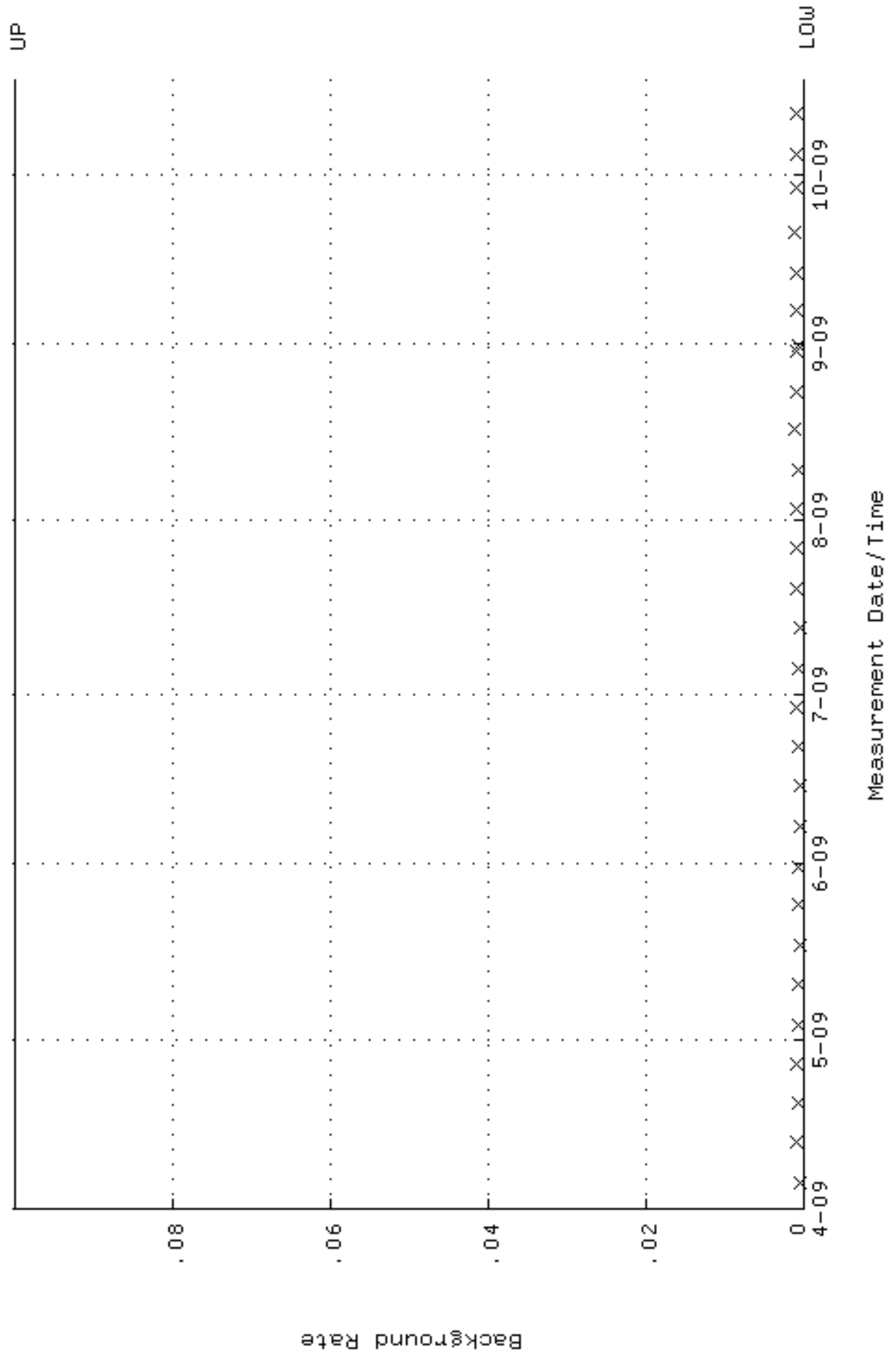
QA filename : DKA100:[ENV_ALPHA.QA.W]W118.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:36:24 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.250490 through 0.270490



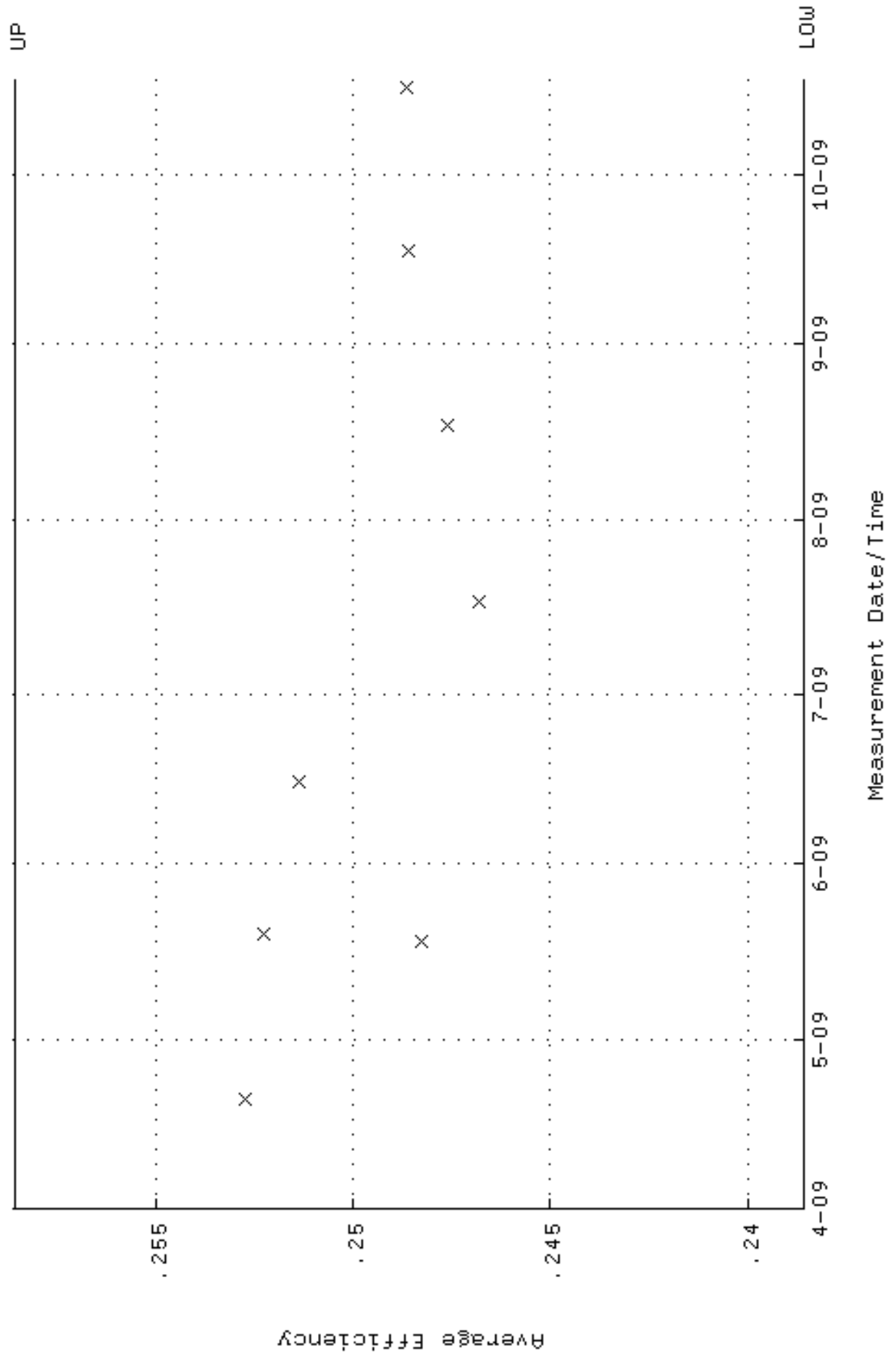
QA filename : DKA100:[ENV_ALPHA.QA.W]w118.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 20-APR-2009 10:36:24 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 87.2440 through 96.4276



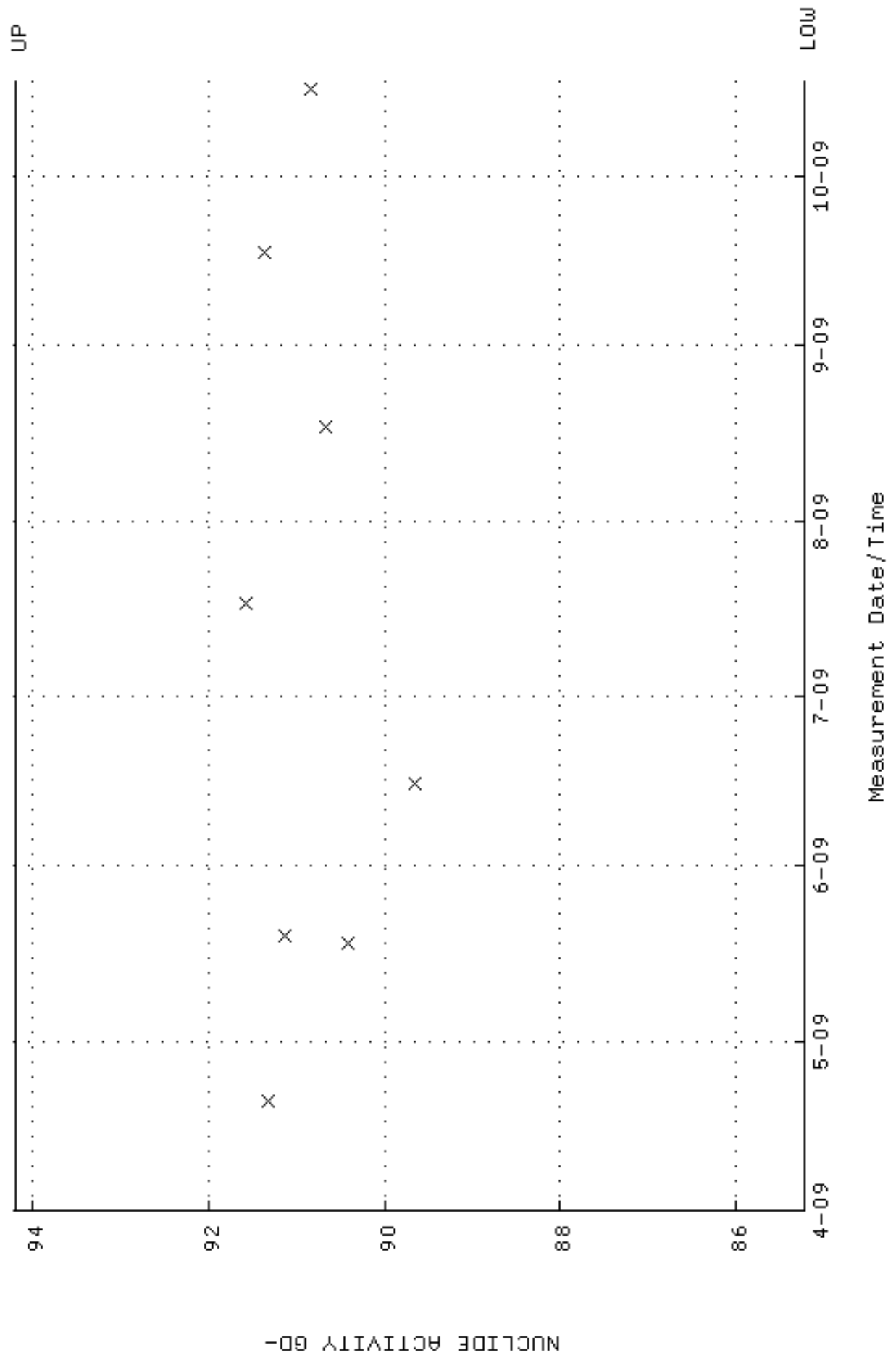
QA filename : DKA100:[ENV_ALPHA.QA.B]B118.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:34:16 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



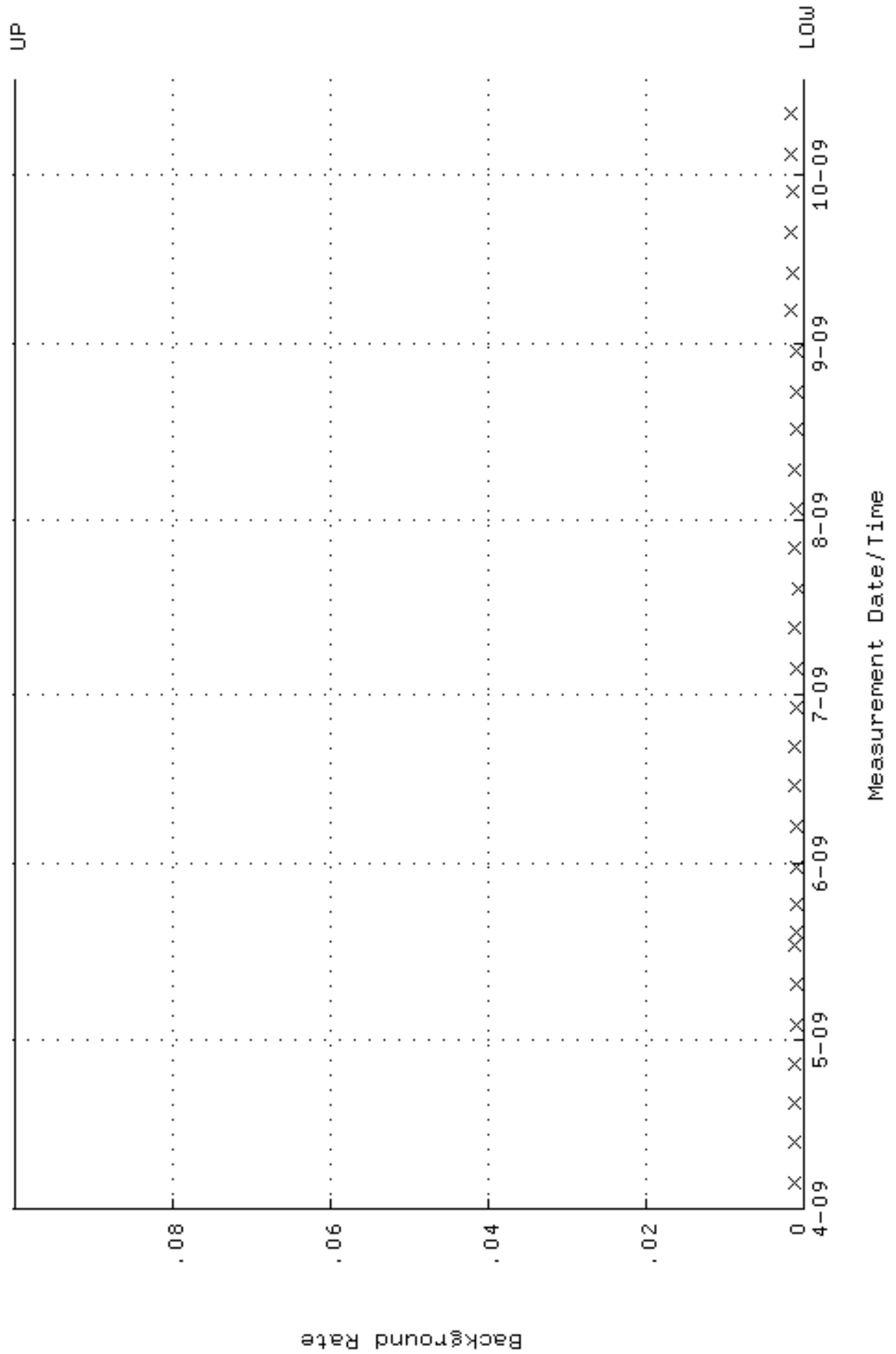
QA filename : DKA100:[ENV_ALPHA.QA.W]W136.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:37:50 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.238568 through 0.258568



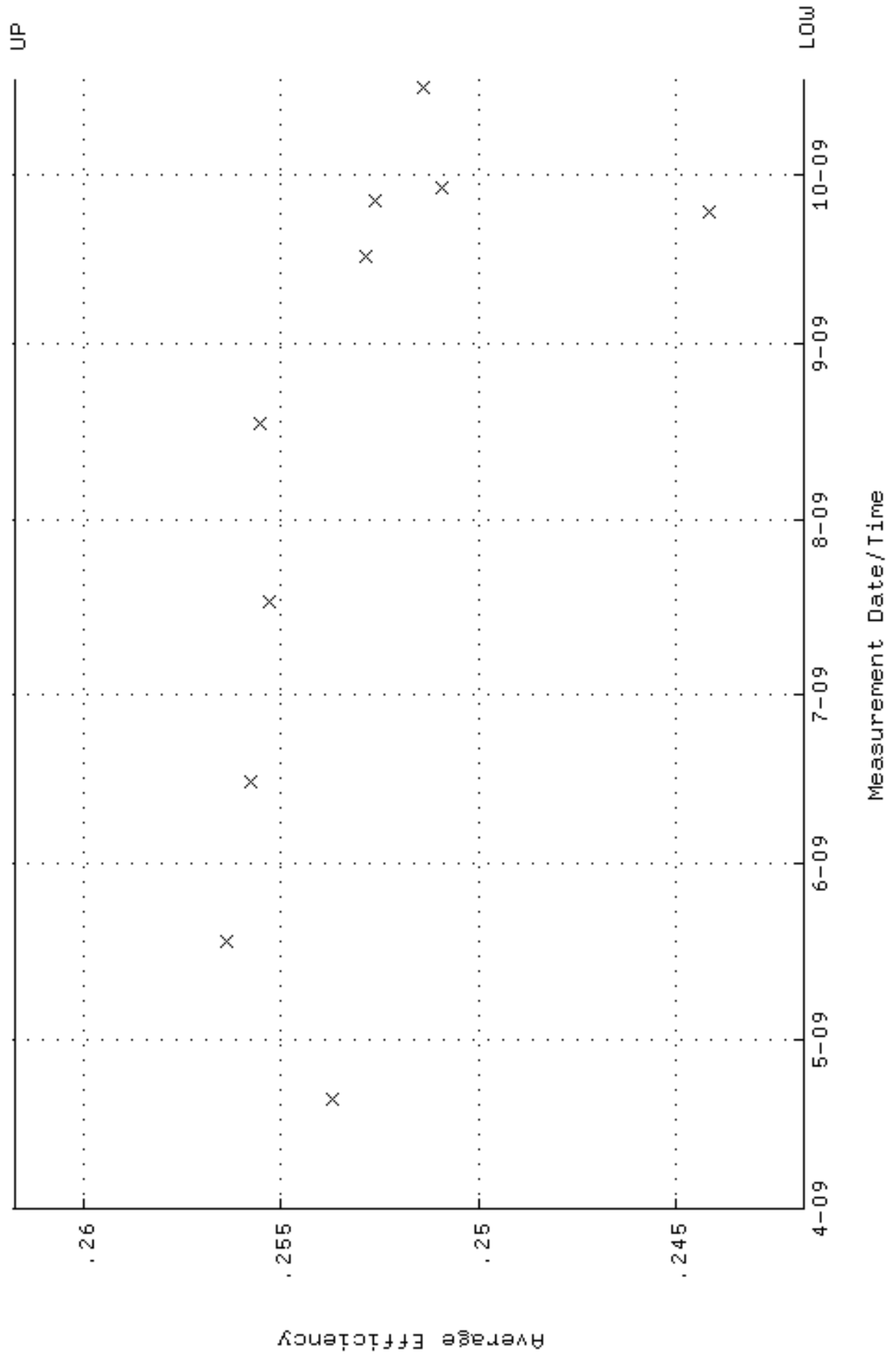
QA filename : DKA100:[ENV_ALPHA.QA.W]w136.QAF;1
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 20-APR-2009 10:37:50 through 17-OCT-2009 12:00:00
Lower/Upper Lmts: 85.2214 through 94.1920



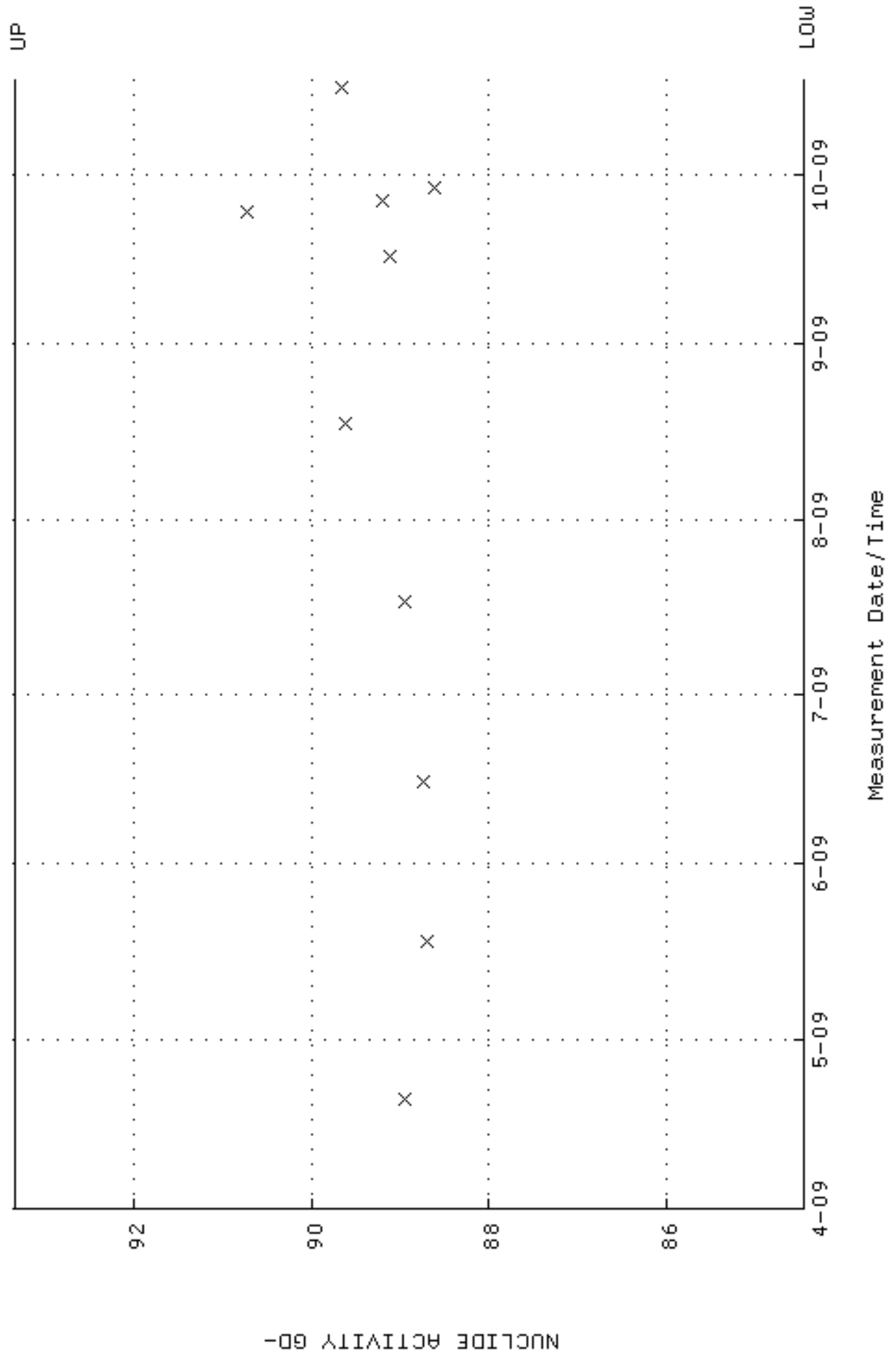
QA filename : DKA100:[ENV_ALPHA.QA.B]B136.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:35:34 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



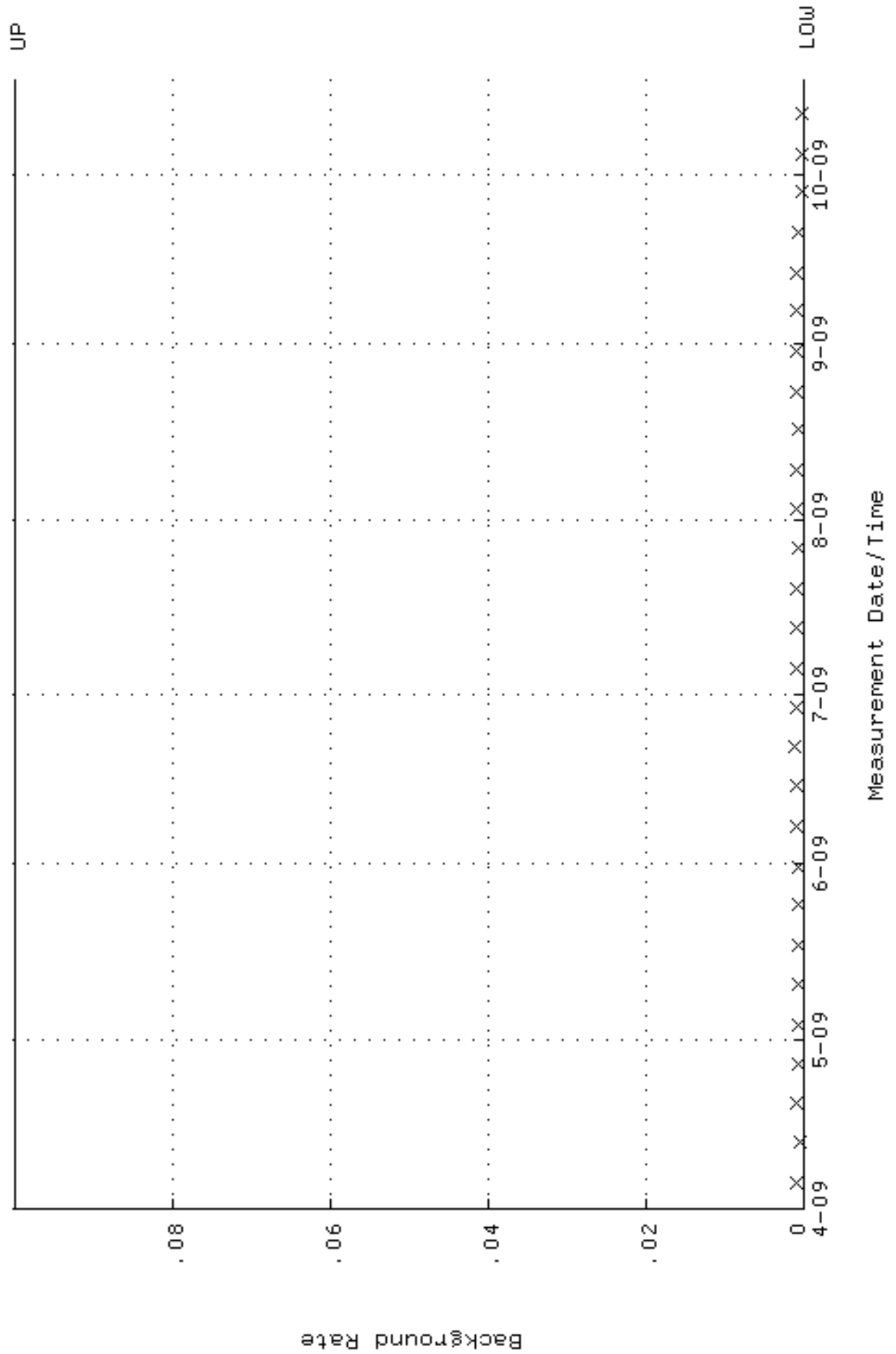
QA filename : DKA100:[ENV_ALPHA.QA.W]W137.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:37:56 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.241744 through 0.261744



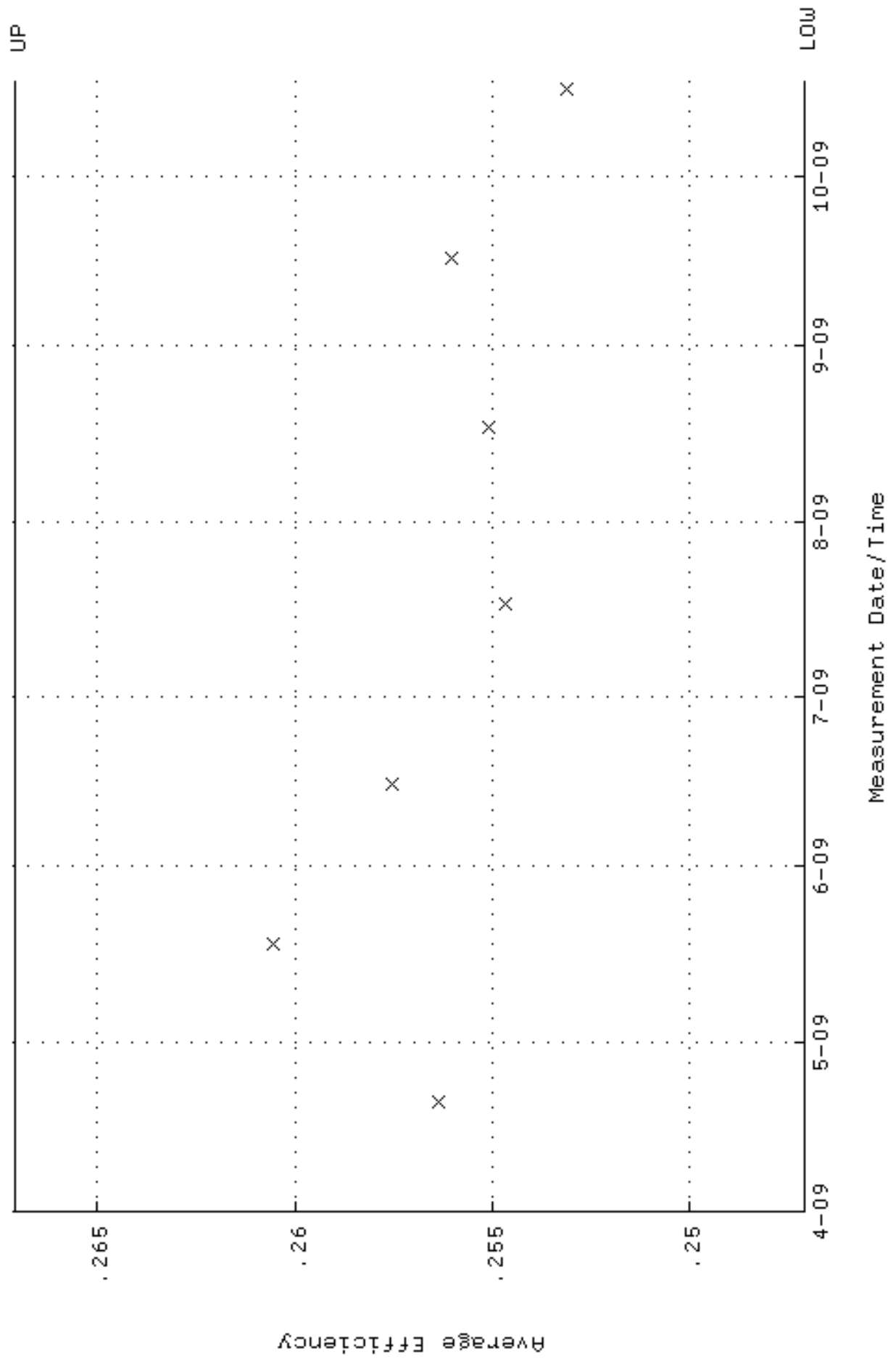
QA filename : DKA100:[ENV_ALPHA.QA.W]w137.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 20-APR-2009 10:37:56 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 84.4530 through 93.3428



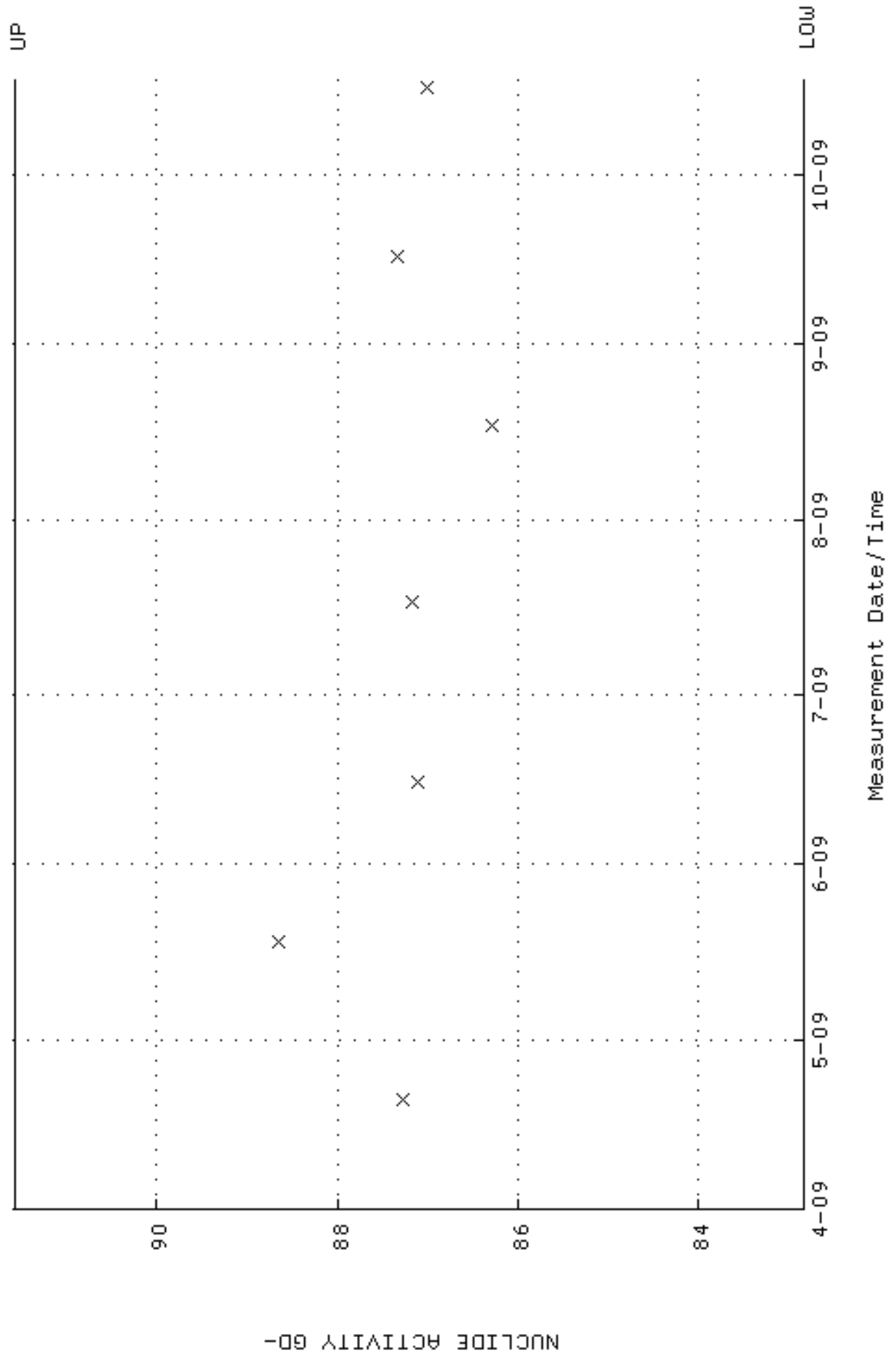
QA filename : DKA100:[ENV_ALPHA.QA.B]B137.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:35:38 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



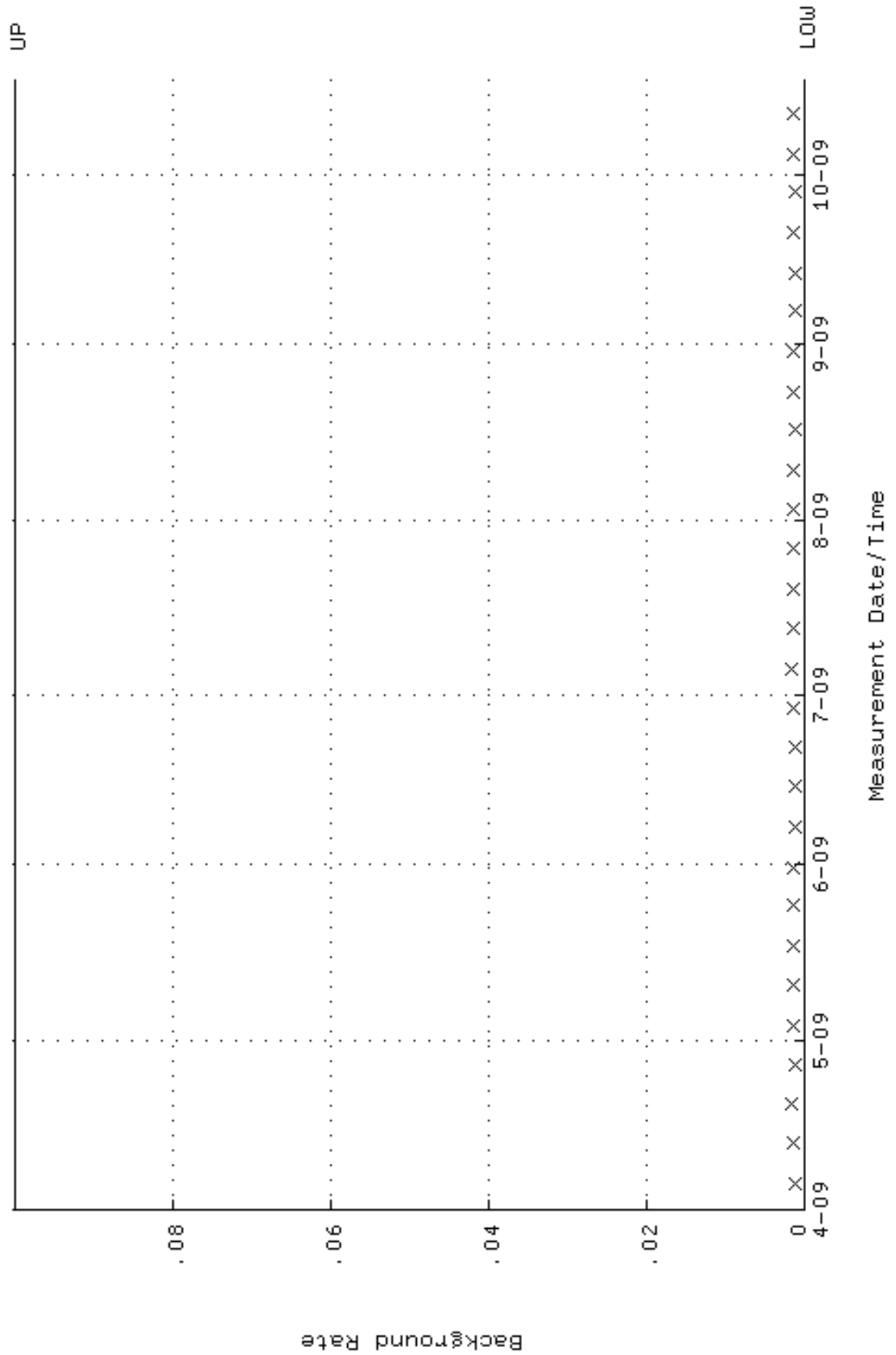
QA filename : DKA100:[ENV_ALPHA.QA.W]W138.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:38:00 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.247085 through 0.267085



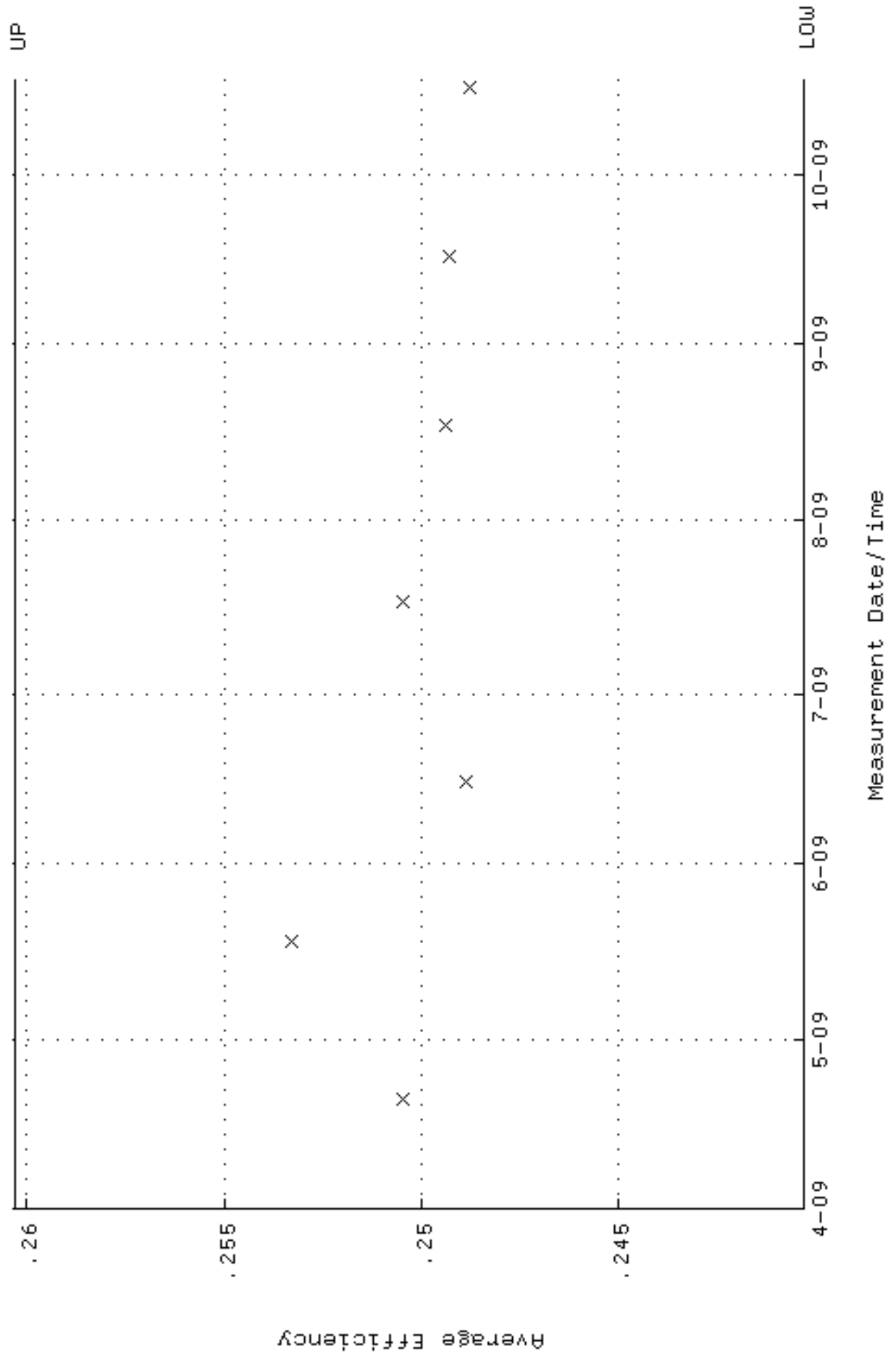
QA filename : DKA100:[ENV_ALPHA.QA.W]w138.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 20-APR-2009 10:38:00 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 82.8399 through 91.5599



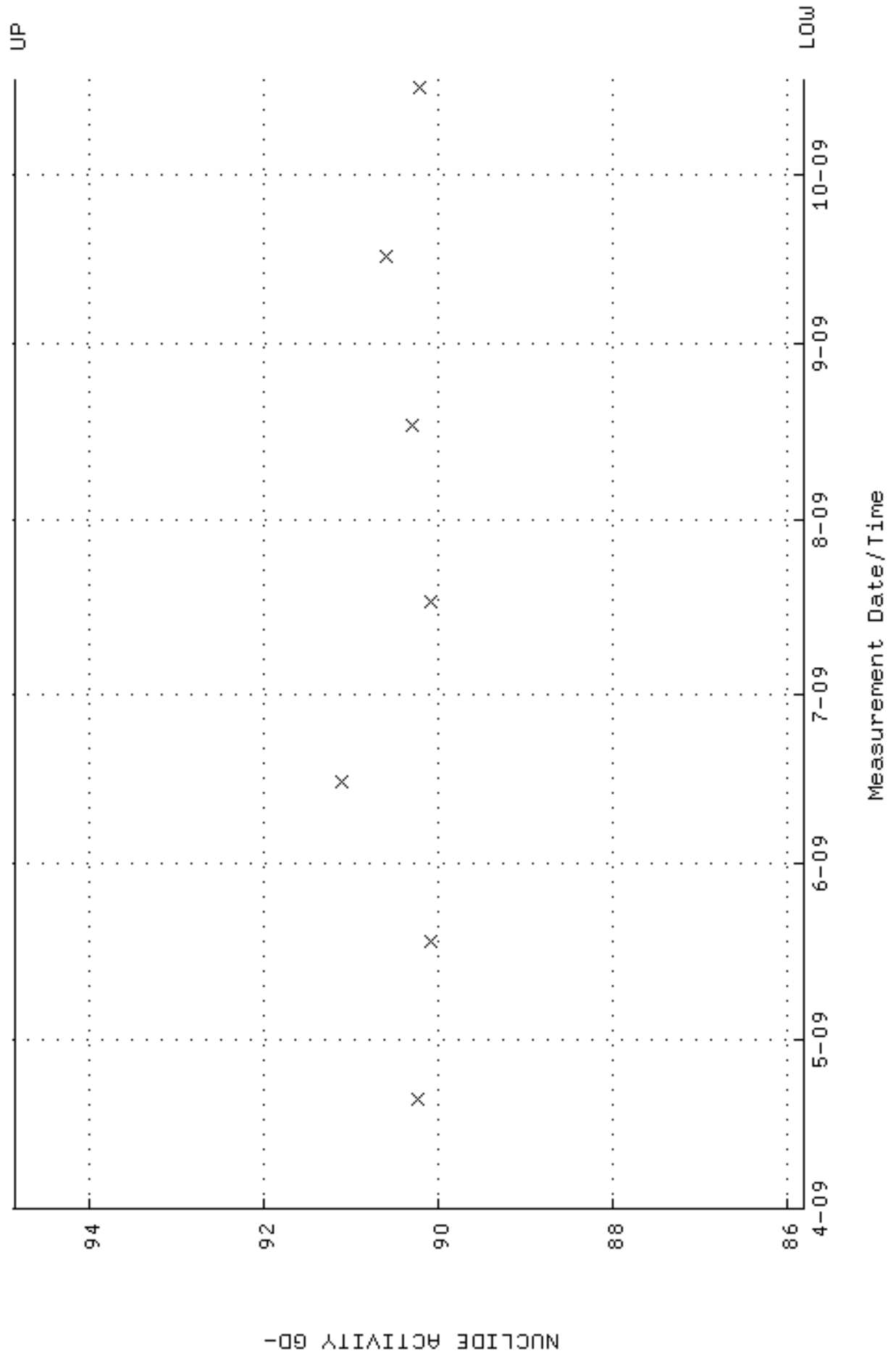
QA filename : DKA100:[ENV_ALPHA.QA.B]B138.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:35:42 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



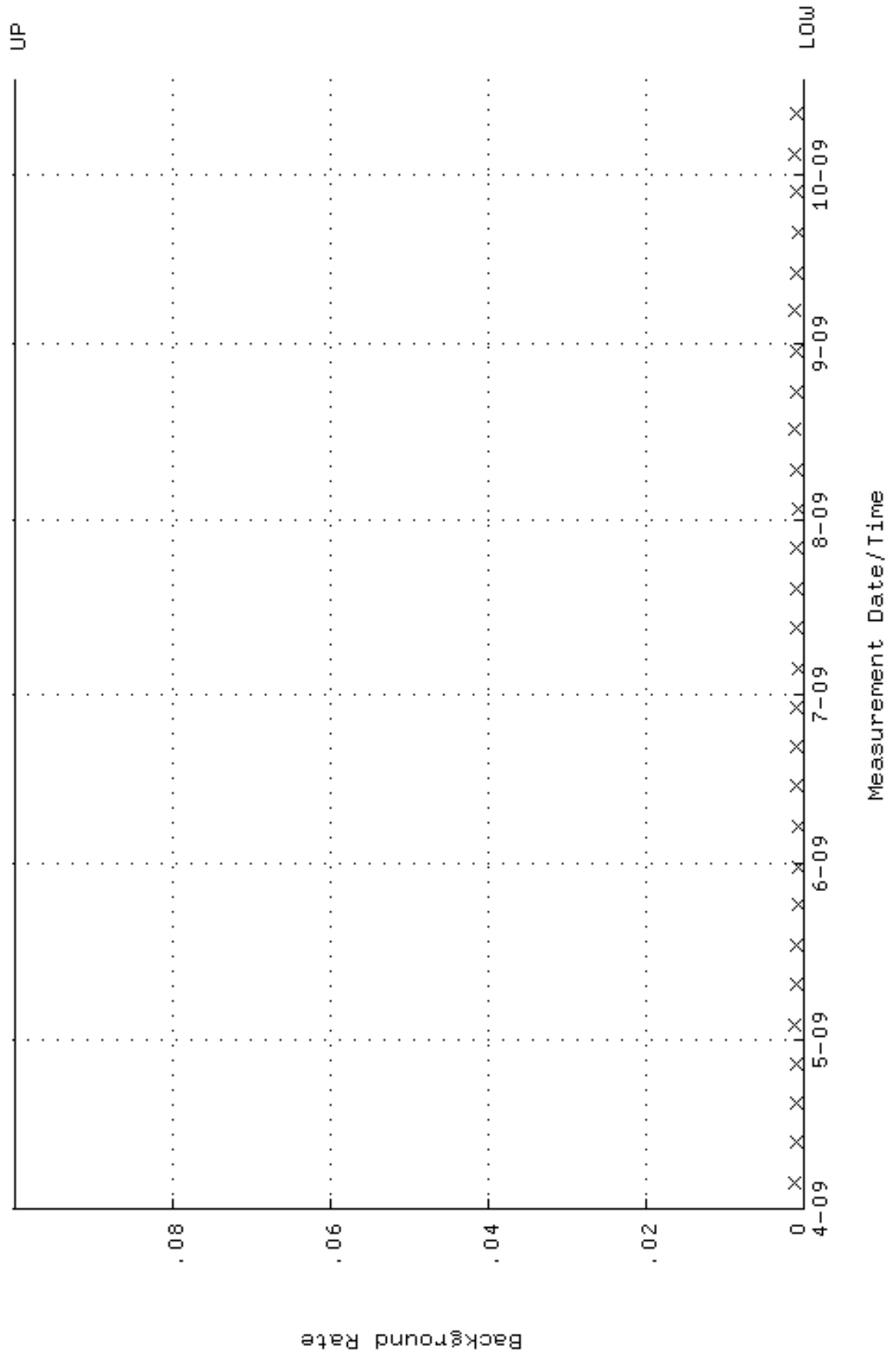
QA filename : DKA100:[ENV_ALPHA.QA.W]W139.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:38:05 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.240299 through 0.260299



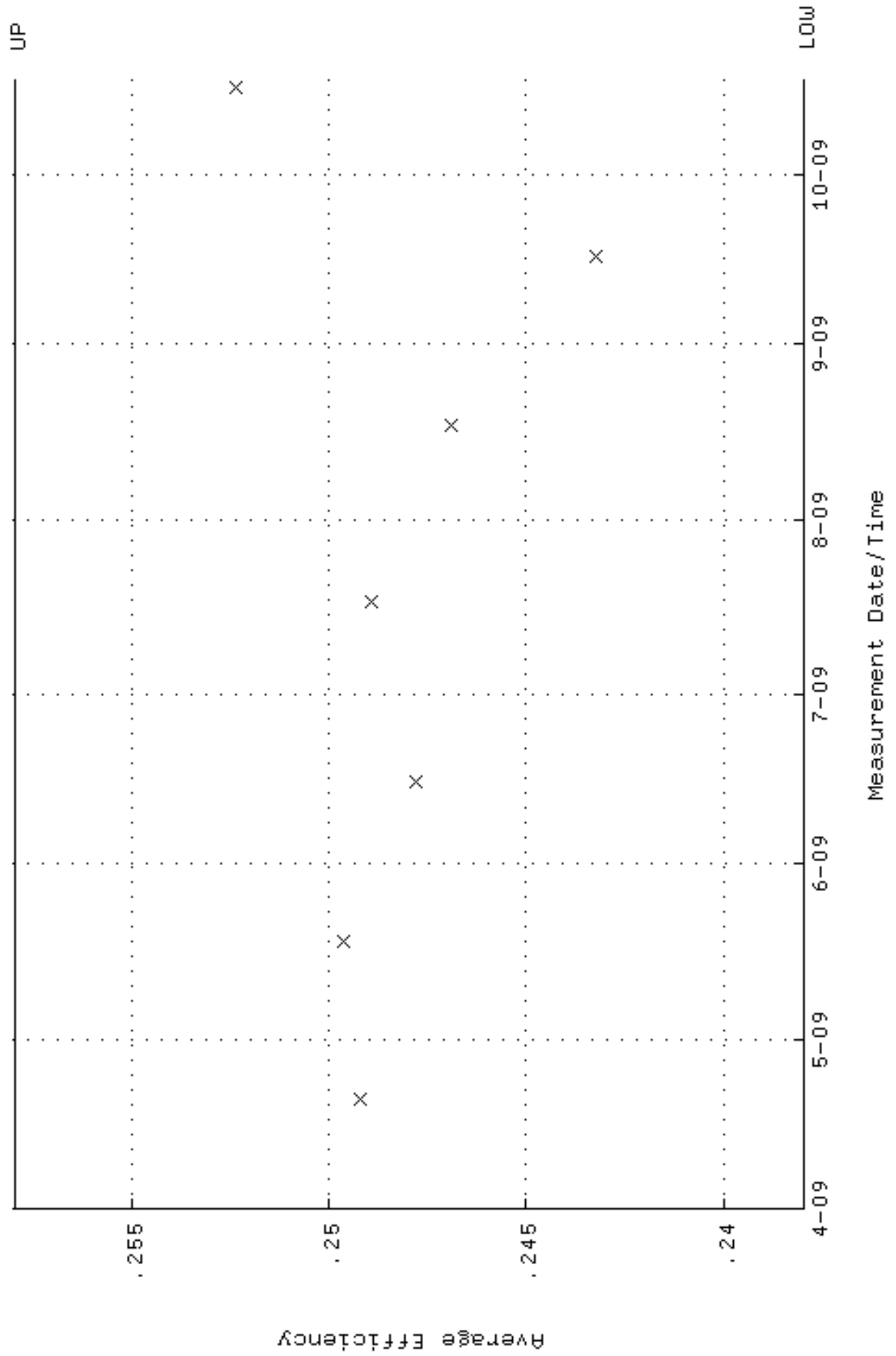
QA filename : DKA100:[ENV_ALPHA.QA.W]w139.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 20-APR-2009 10:38:05 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 85.8145 through 94.8477



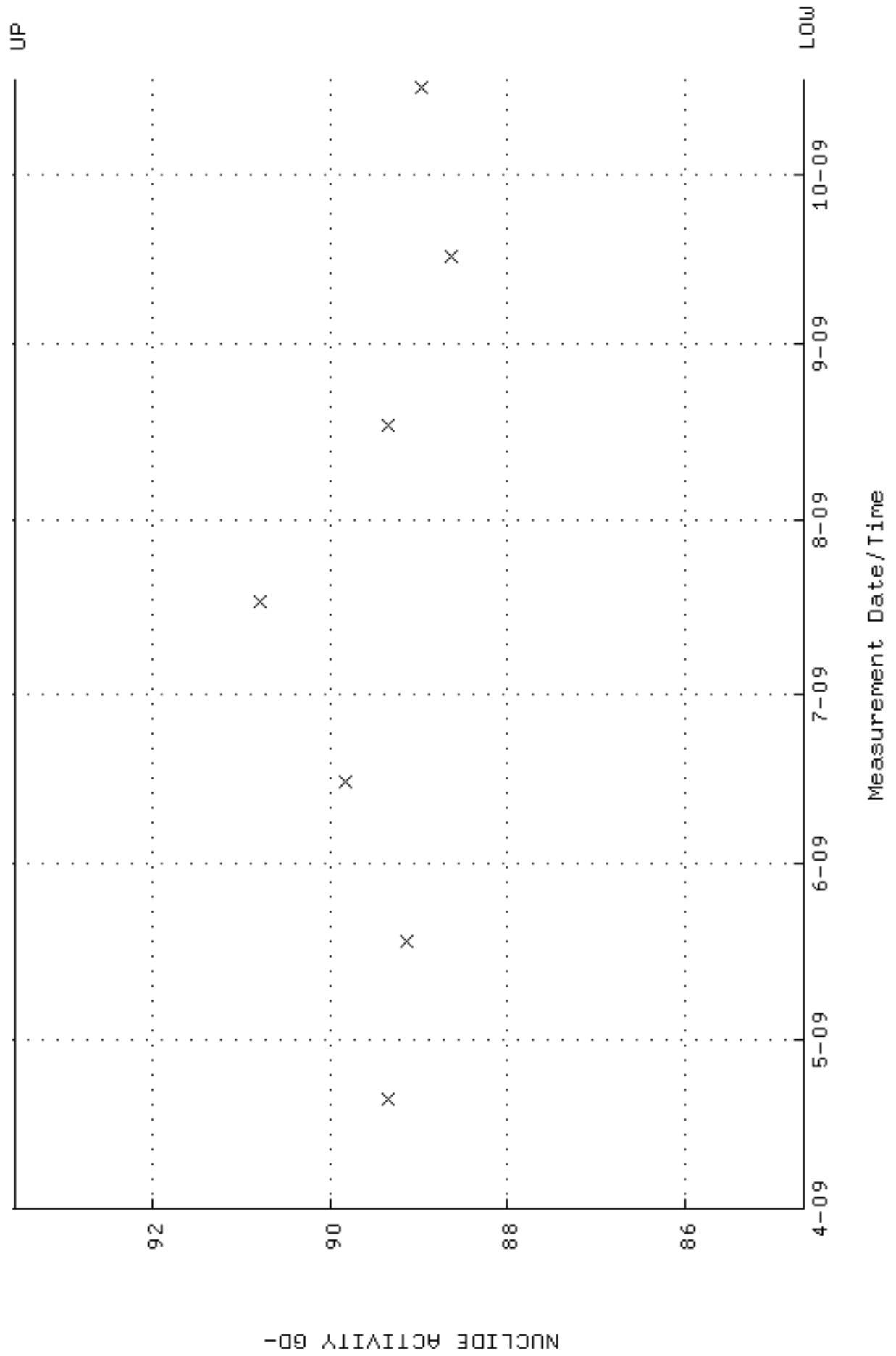
QA filename : DKA100:[ENV_ALPHA.QA.B]B139.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:35:46 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



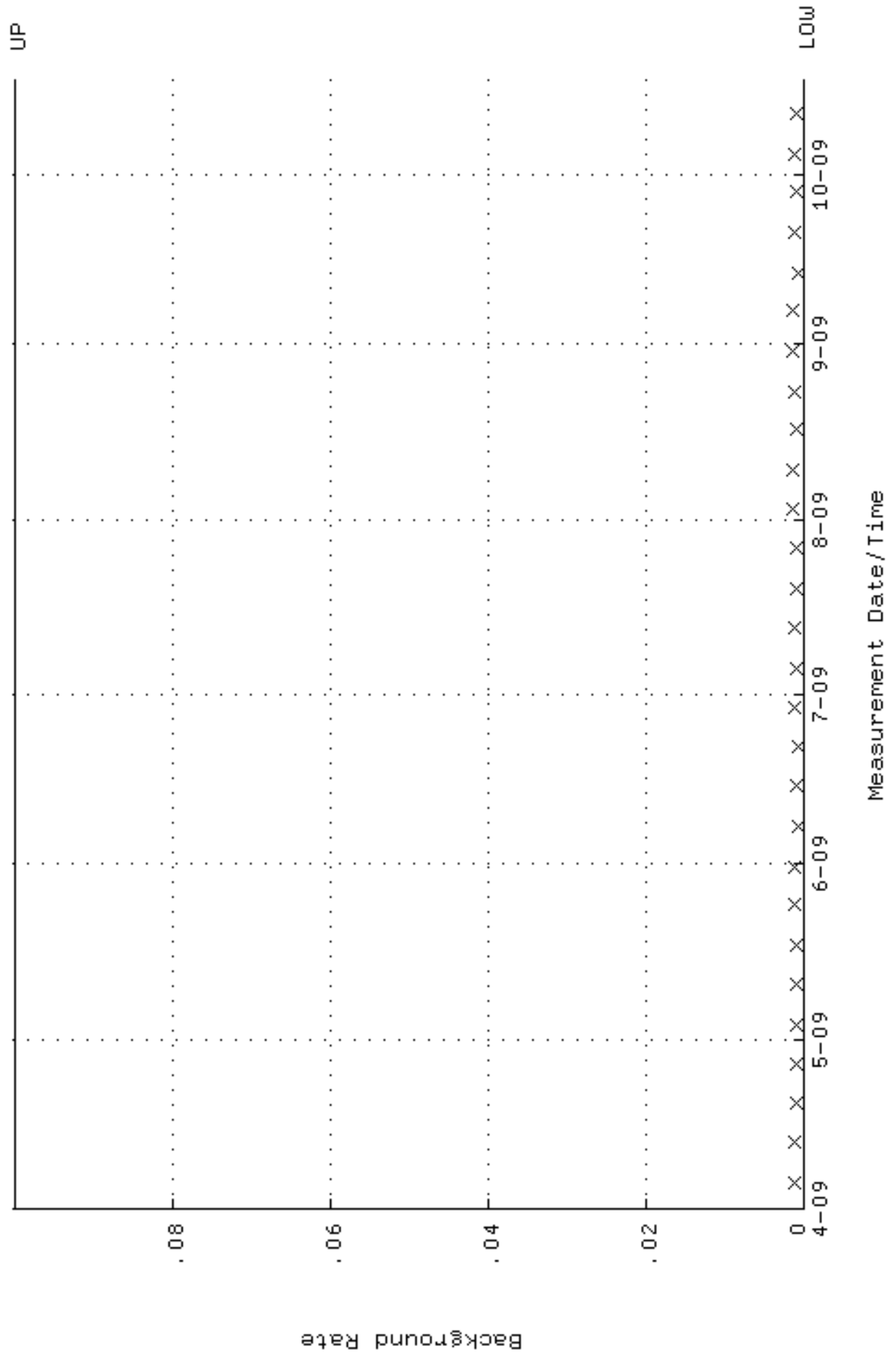
QA filename : DKA100:[ENV_ALPHA.QA.W]W144.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:38:27 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.237963 through 0.257963



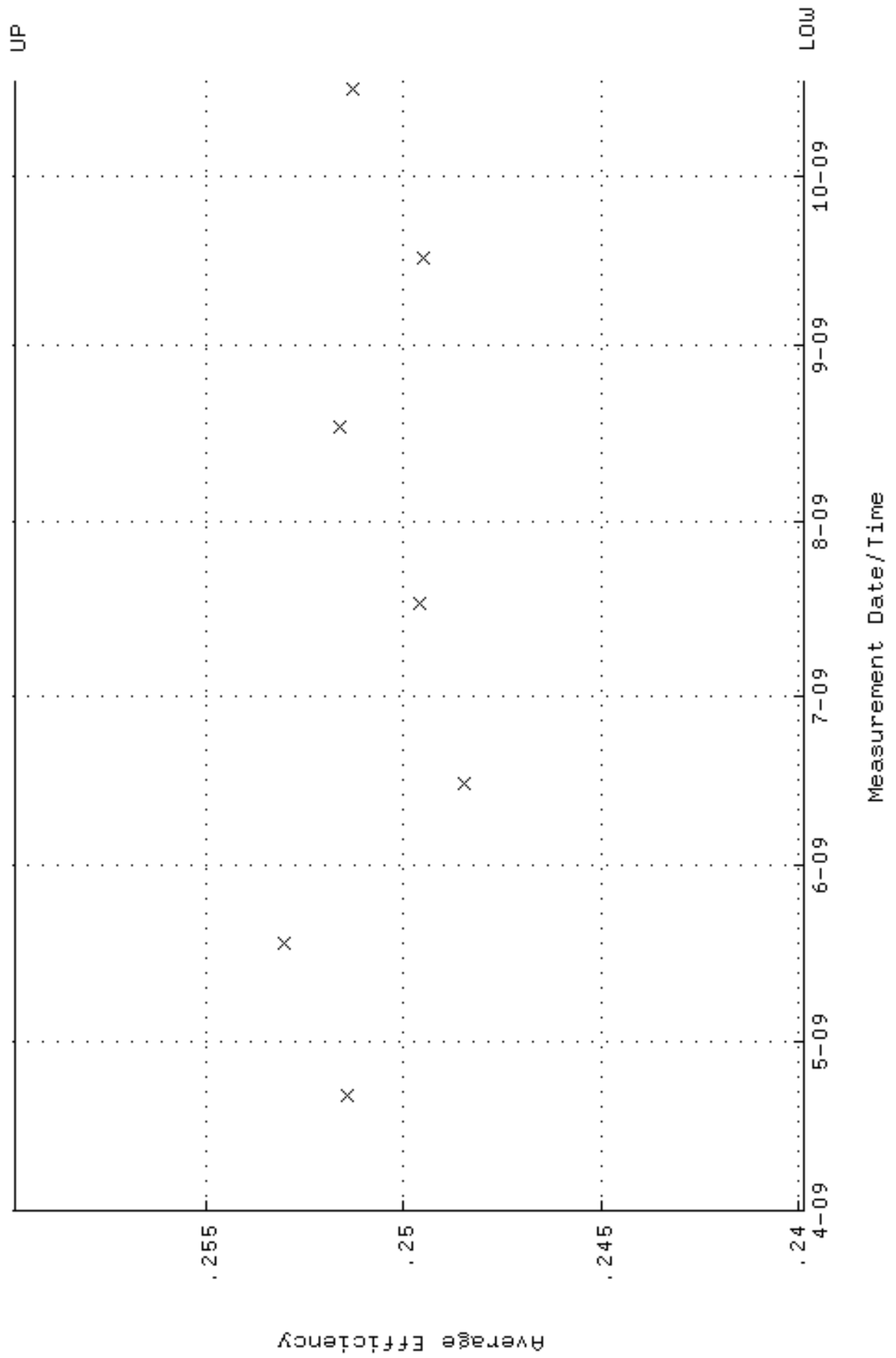
QA filename : DKA100:[ENV_ALPHA.QA.W]W144.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 20-APR-2009 10:38:27 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 84.6507 through 93.5613



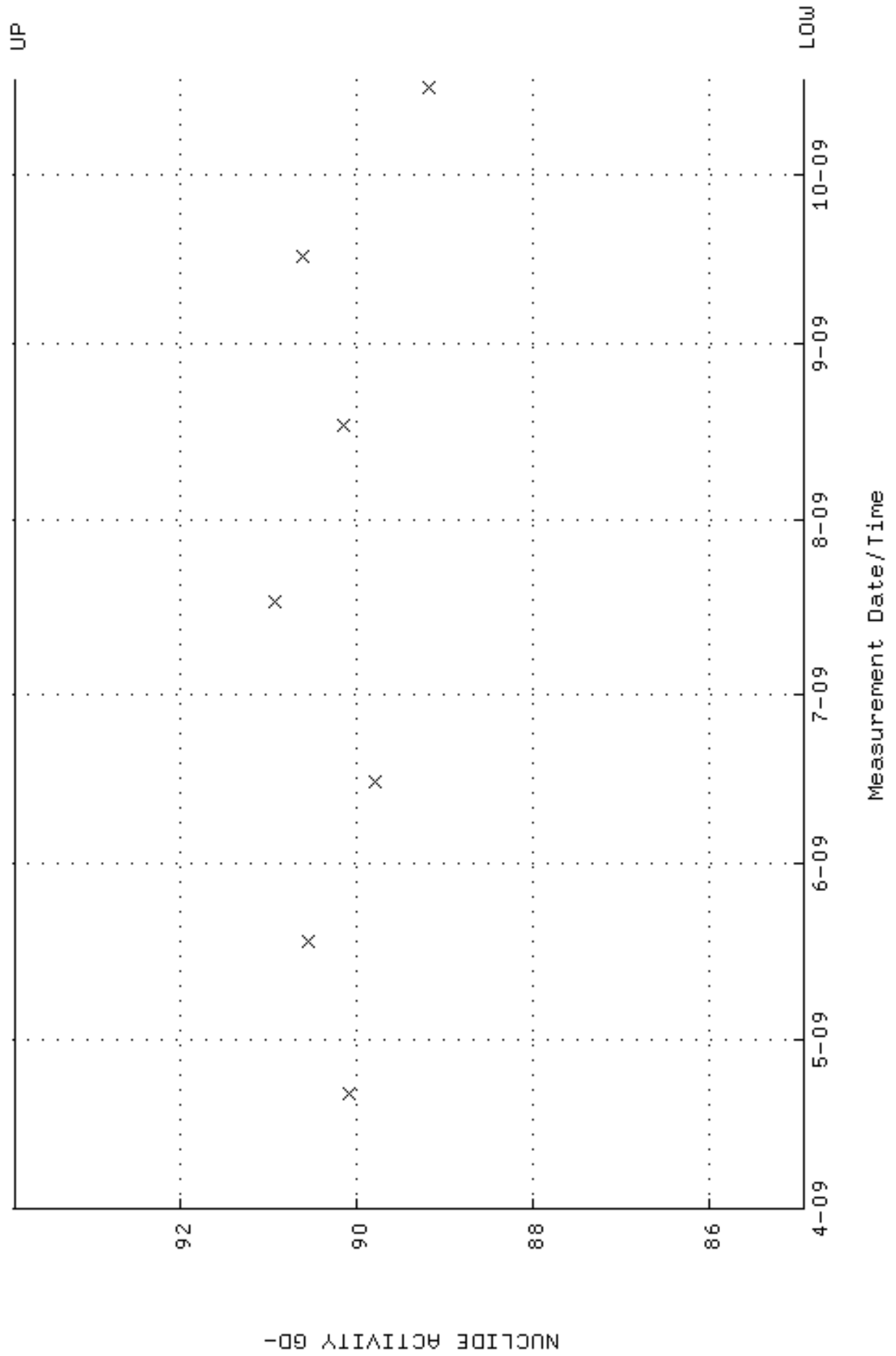
QA filename : DKA100:[ENV_ALPHA.QA.B]B144.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:36:08 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



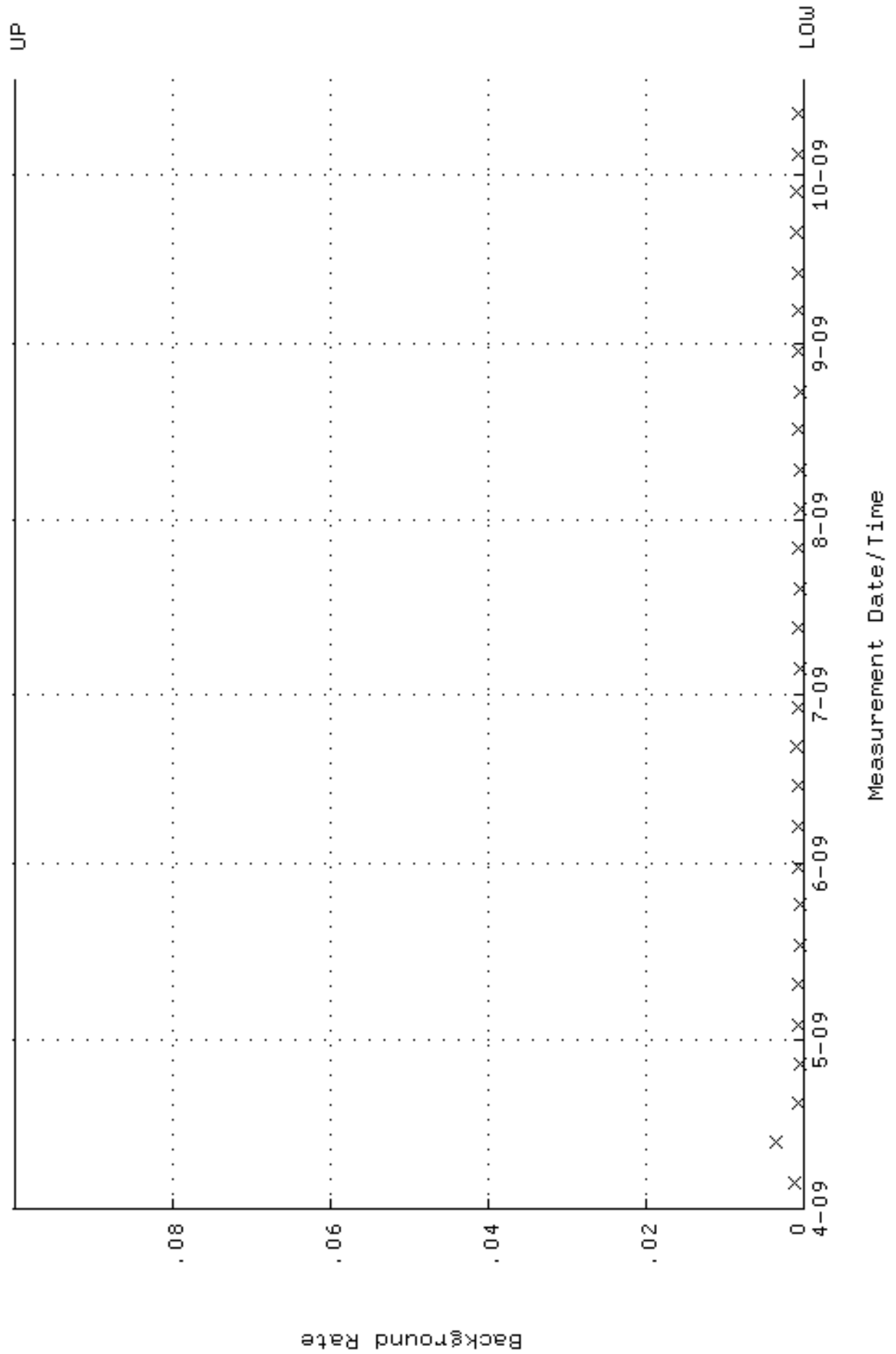
QA filename : DKA100:[ENV_ALPHA.QA.W]W145.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 21-APR-2009 07:23:04 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.239850 through 0.259850



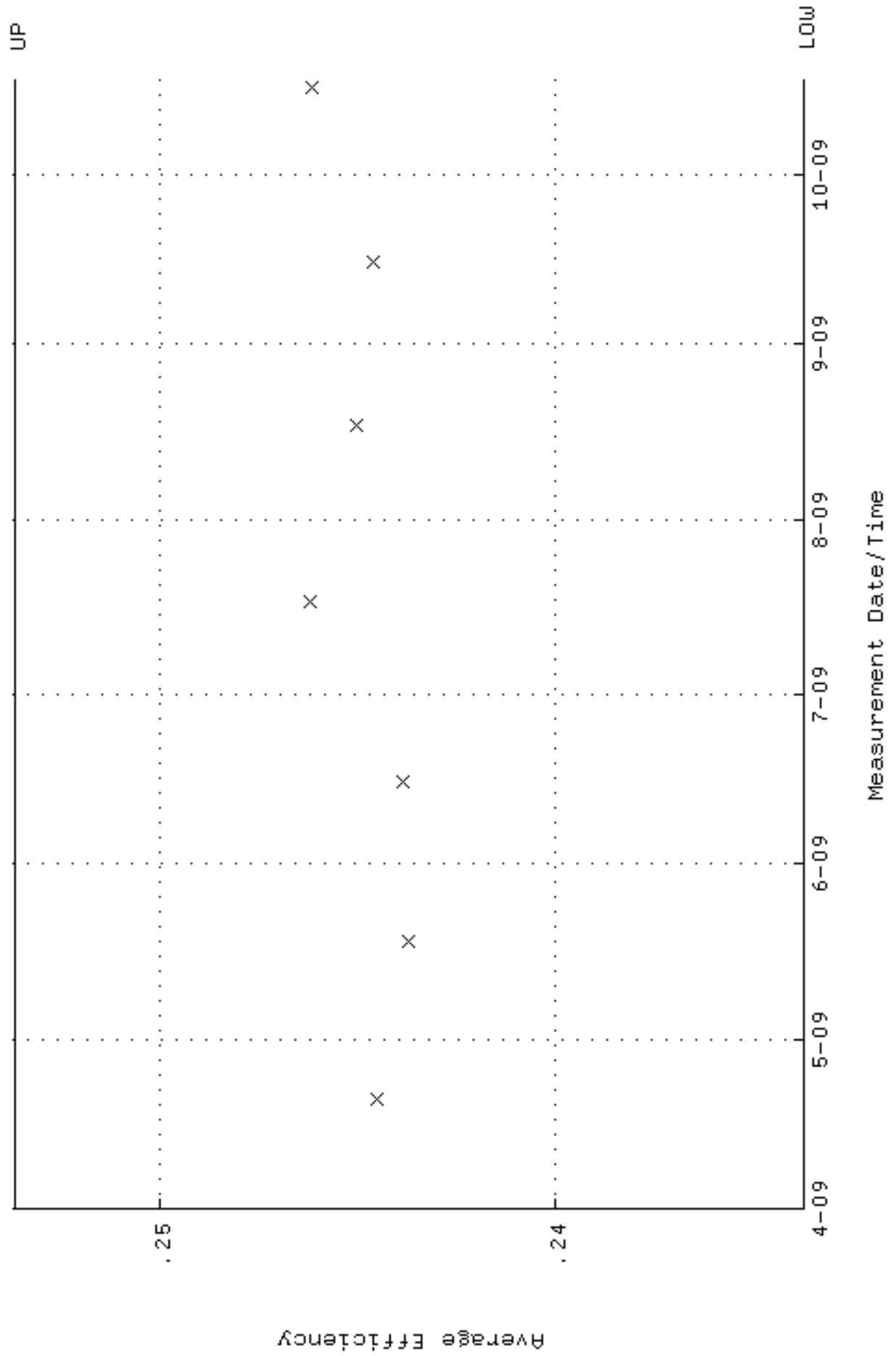
QA filename : DKA100:[ENV_ALPHA.QA.W]W145.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 21-APR-2009 07:23:04 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 84.9354 through 93.8760



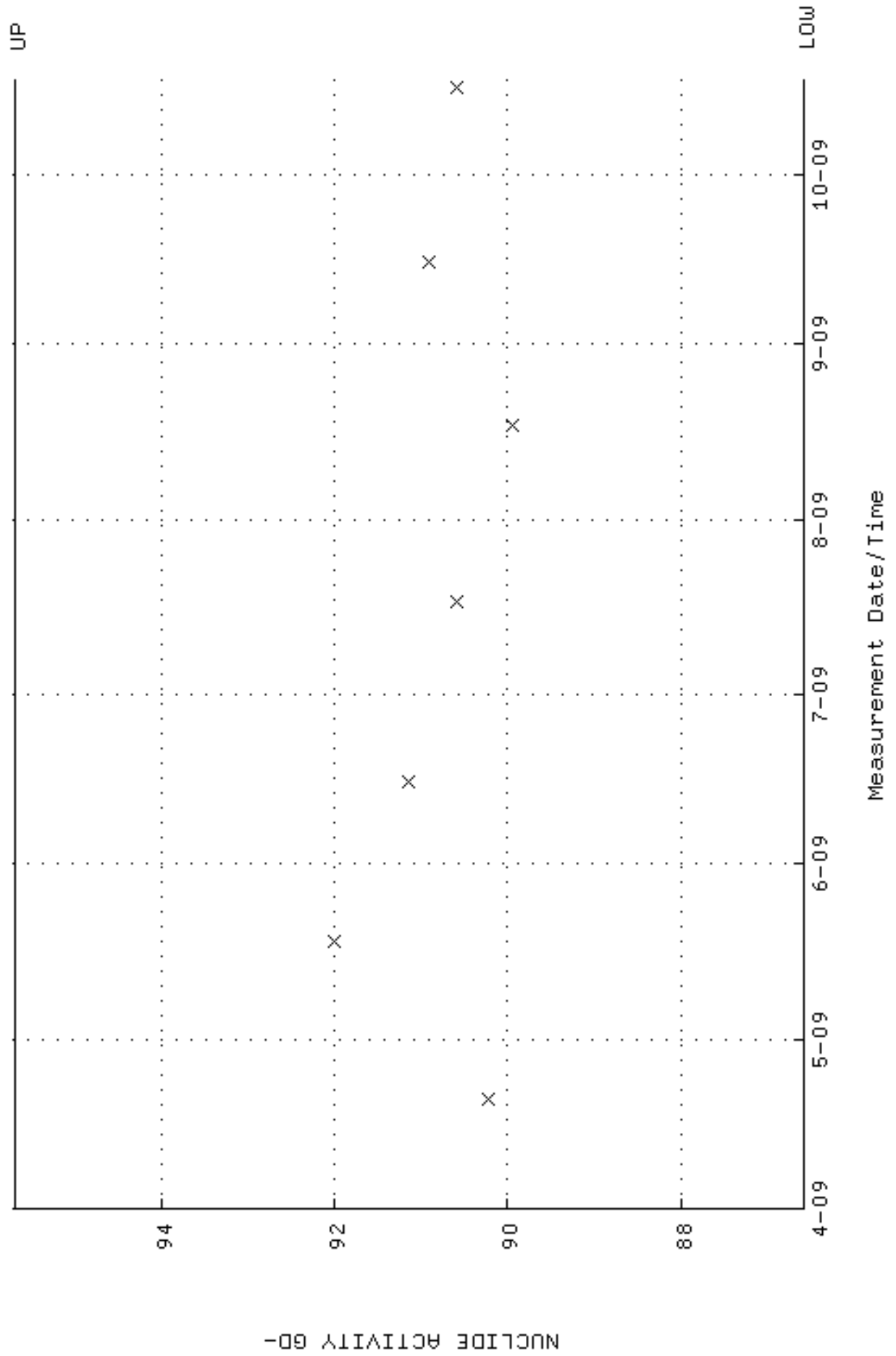
QA filename : DKA100:[ENV_ALPHA.QA.B]B145.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:36:12 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



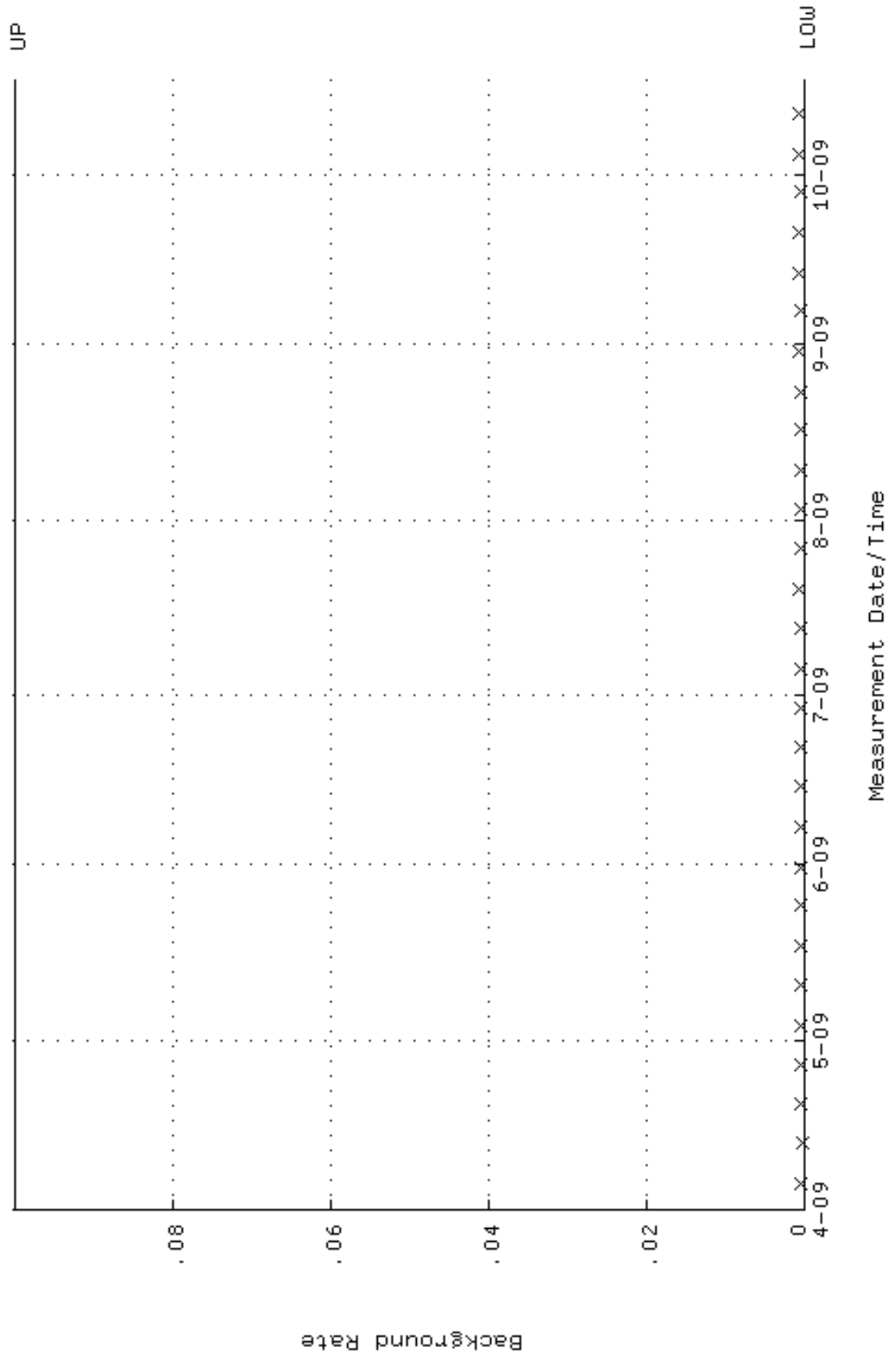
QA filename : DKA100:[ENV_ALPHA.QA.W]W151.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:39:01 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.233693 through 0.253693



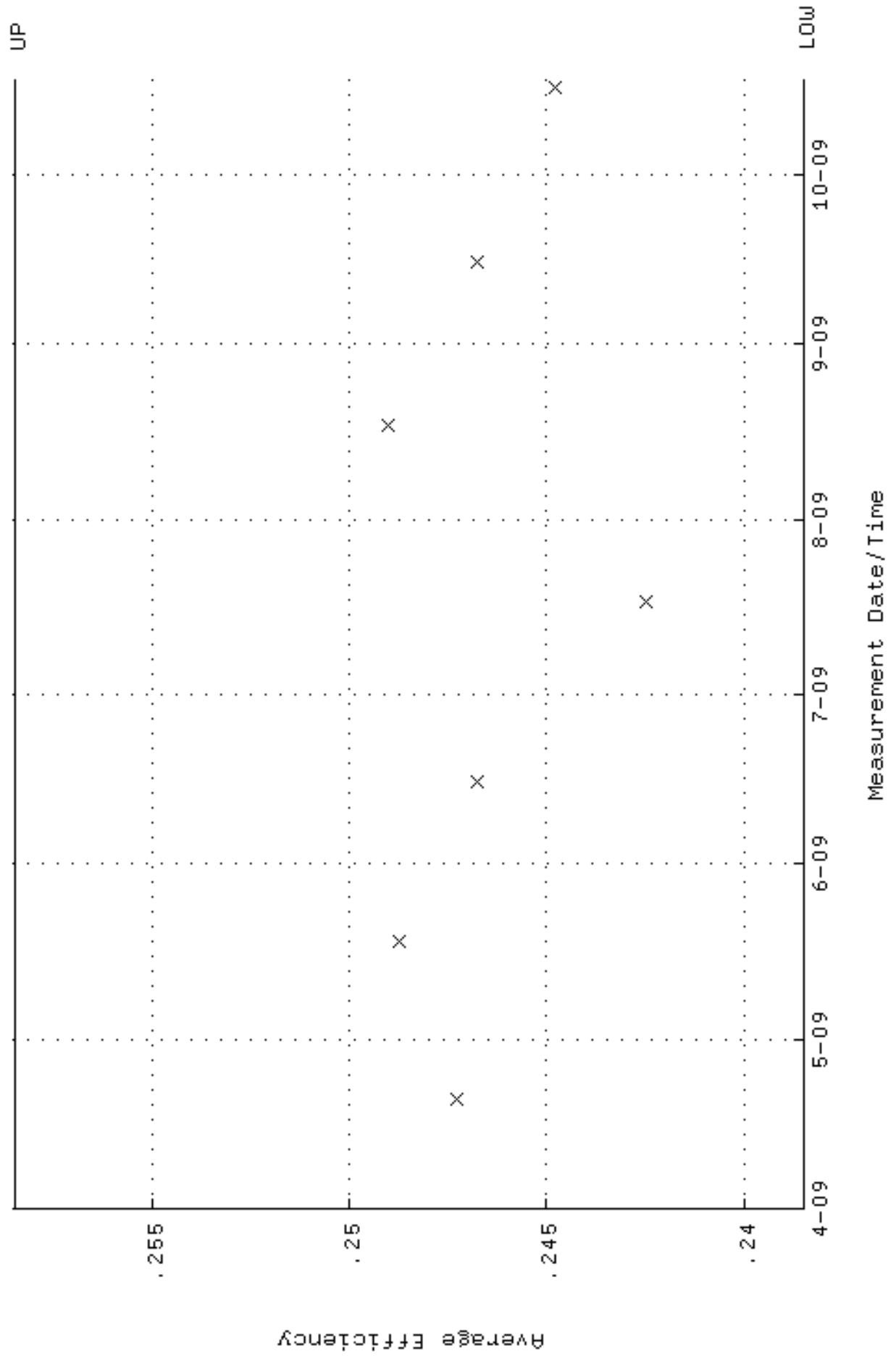
QA filename : DKA100:[ENV_ALPHA.QA.W]w151.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 20-APR-2009 10:39:01 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 86.5749 through 95.6881



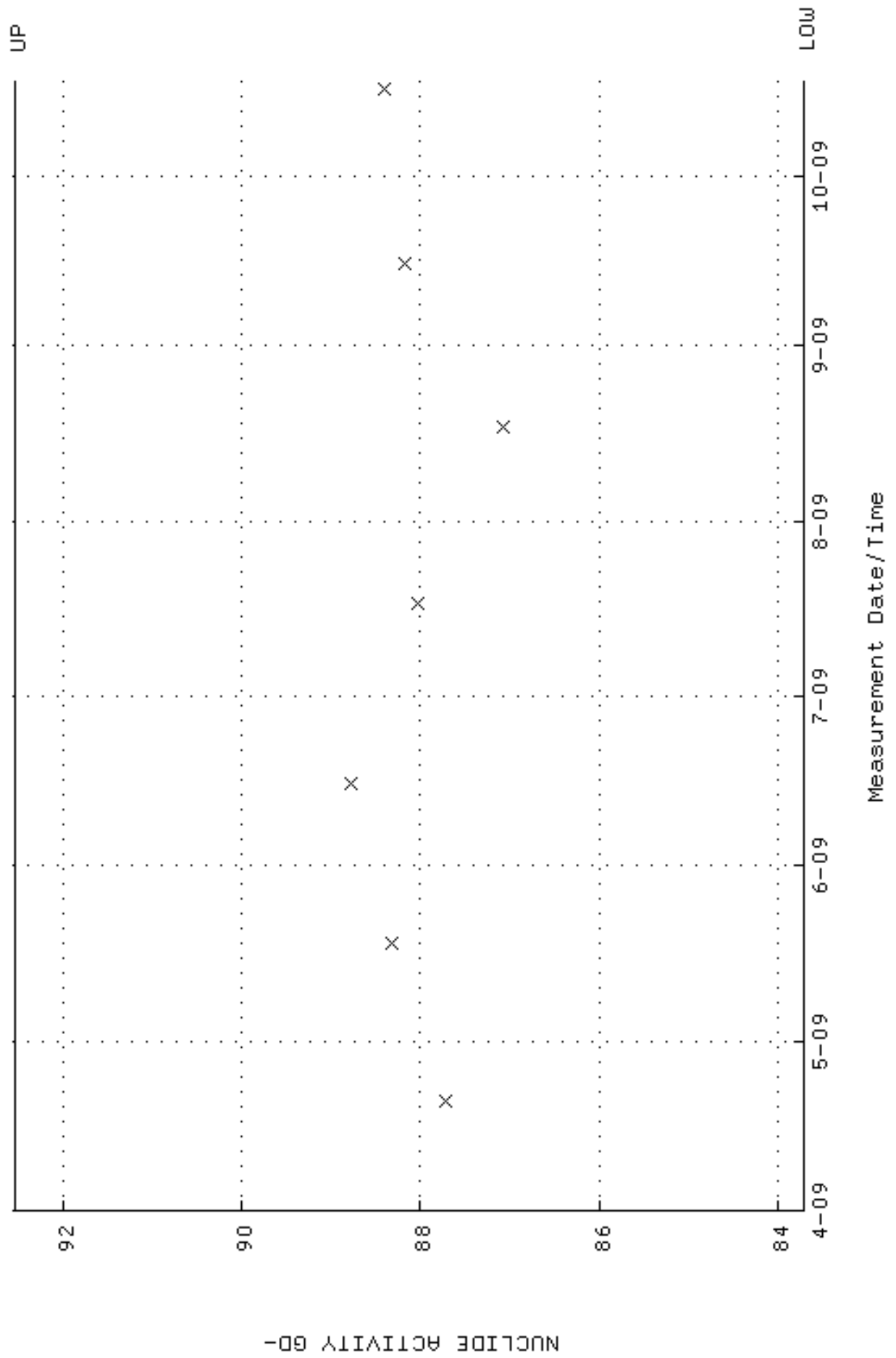
QA filename : DKA100:[ENV_ALPHA.QA.B]B151.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:36:38 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



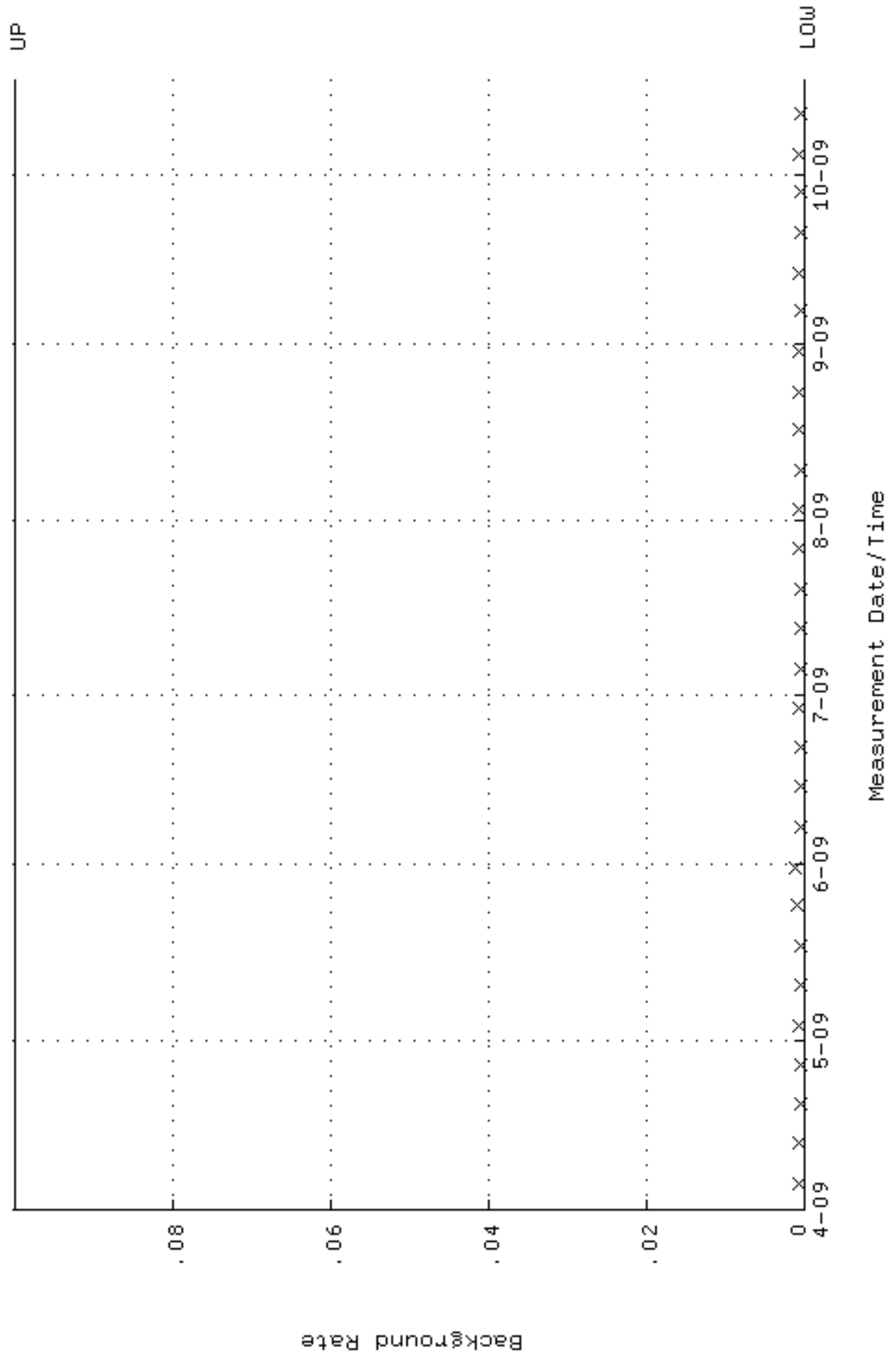
QA filename : DKA100:[ENV_ALPHA.QA.W]W152.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:39:05 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.238479 through 0.258479



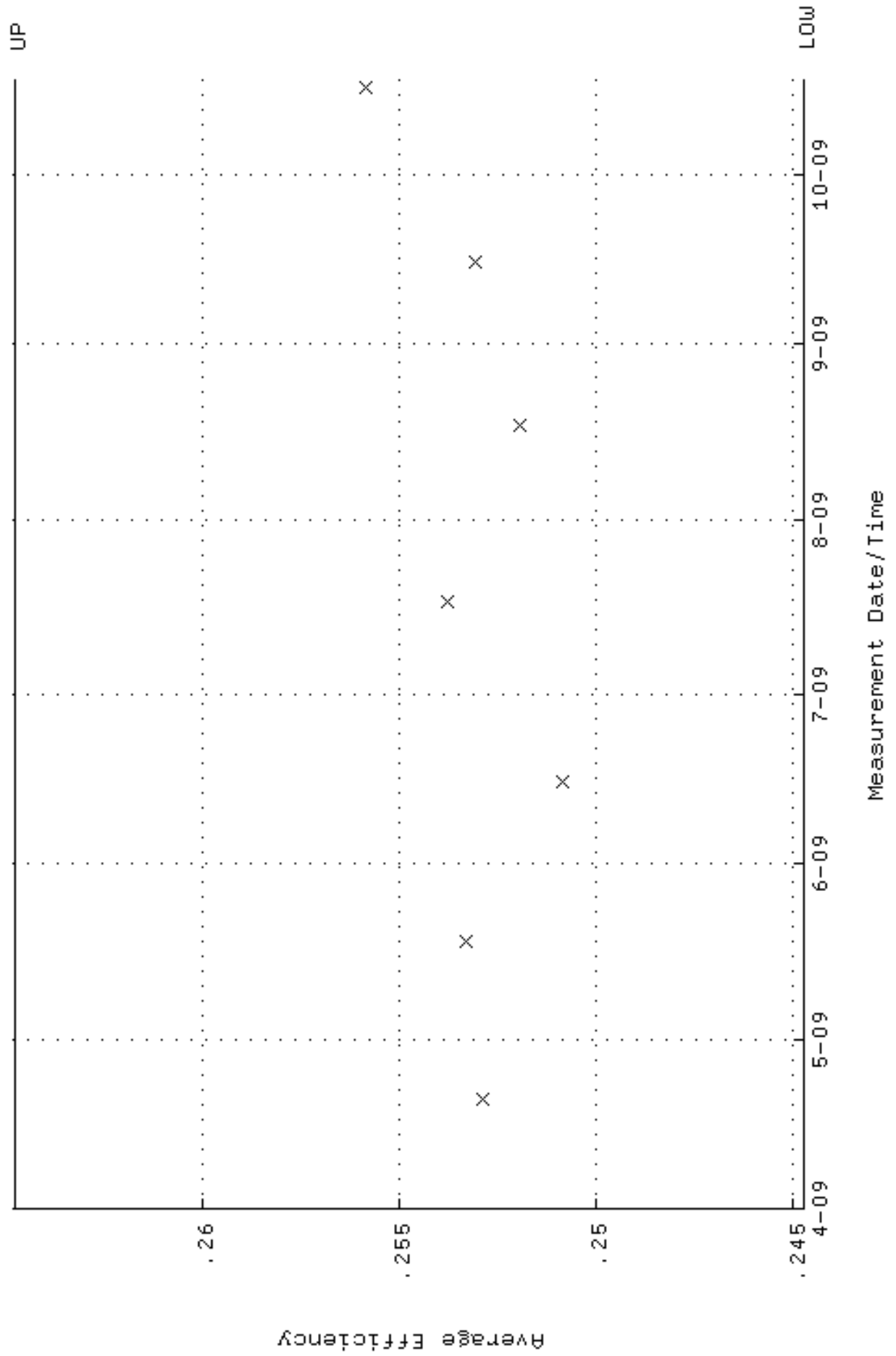
QA filename : DKA100:[ENV_ALPHA.QA.W]w152.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 20-APR-2009 10:39:05 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 83.7180 through 92.5304



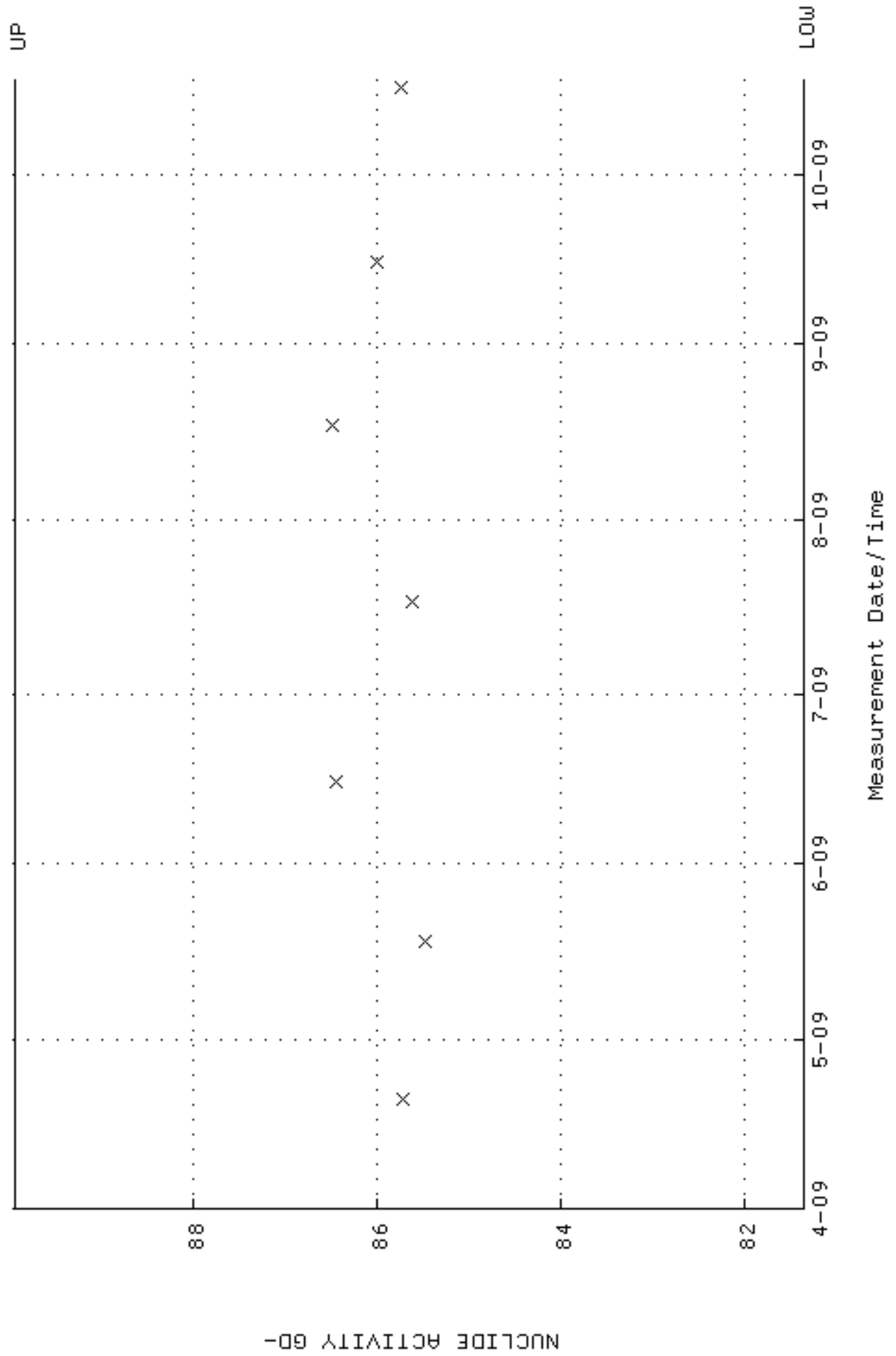
QA filename : DKA100:[ENV_ALPHA.QA.B]B152.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:36:43 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



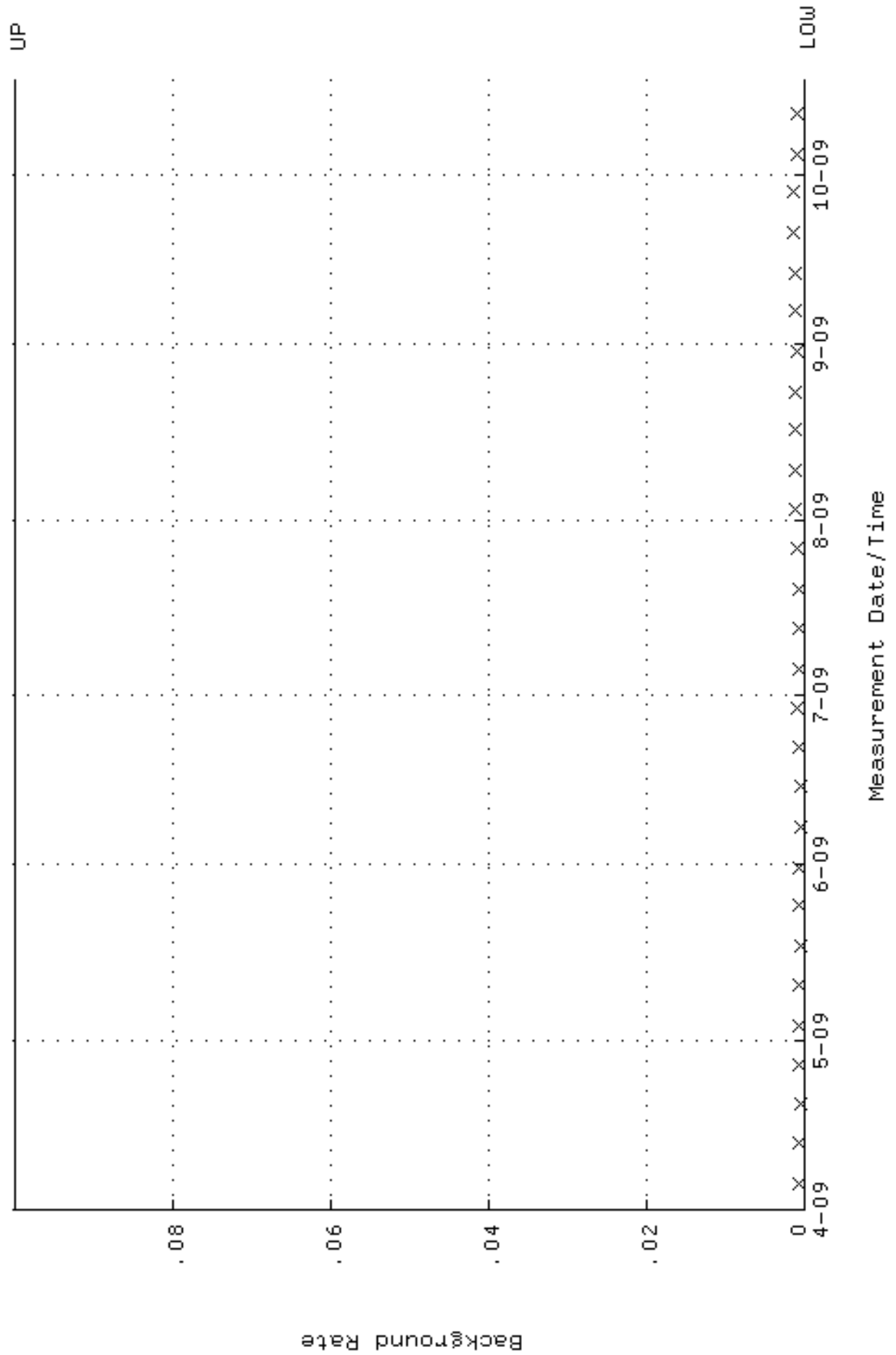
QA filename : DKA100:[ENV_ALPHA.QA.W]W153.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:39:10 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.244738 through 0.264738



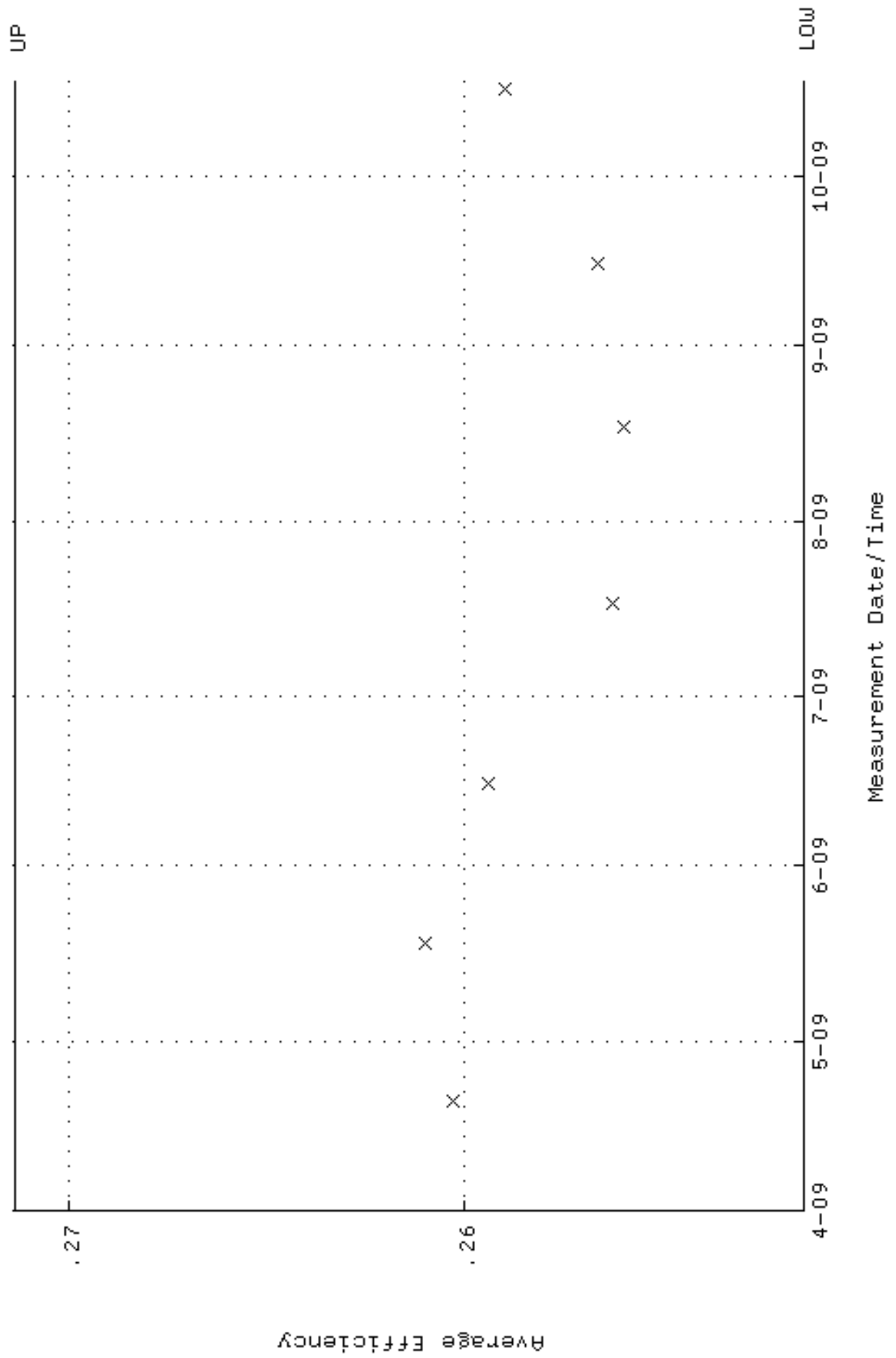
QA filename : DKA100:[ENV_ALPHA.QA.W]w153.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 20-APR-2009 10:39:10 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 81.3634 through 89.9280



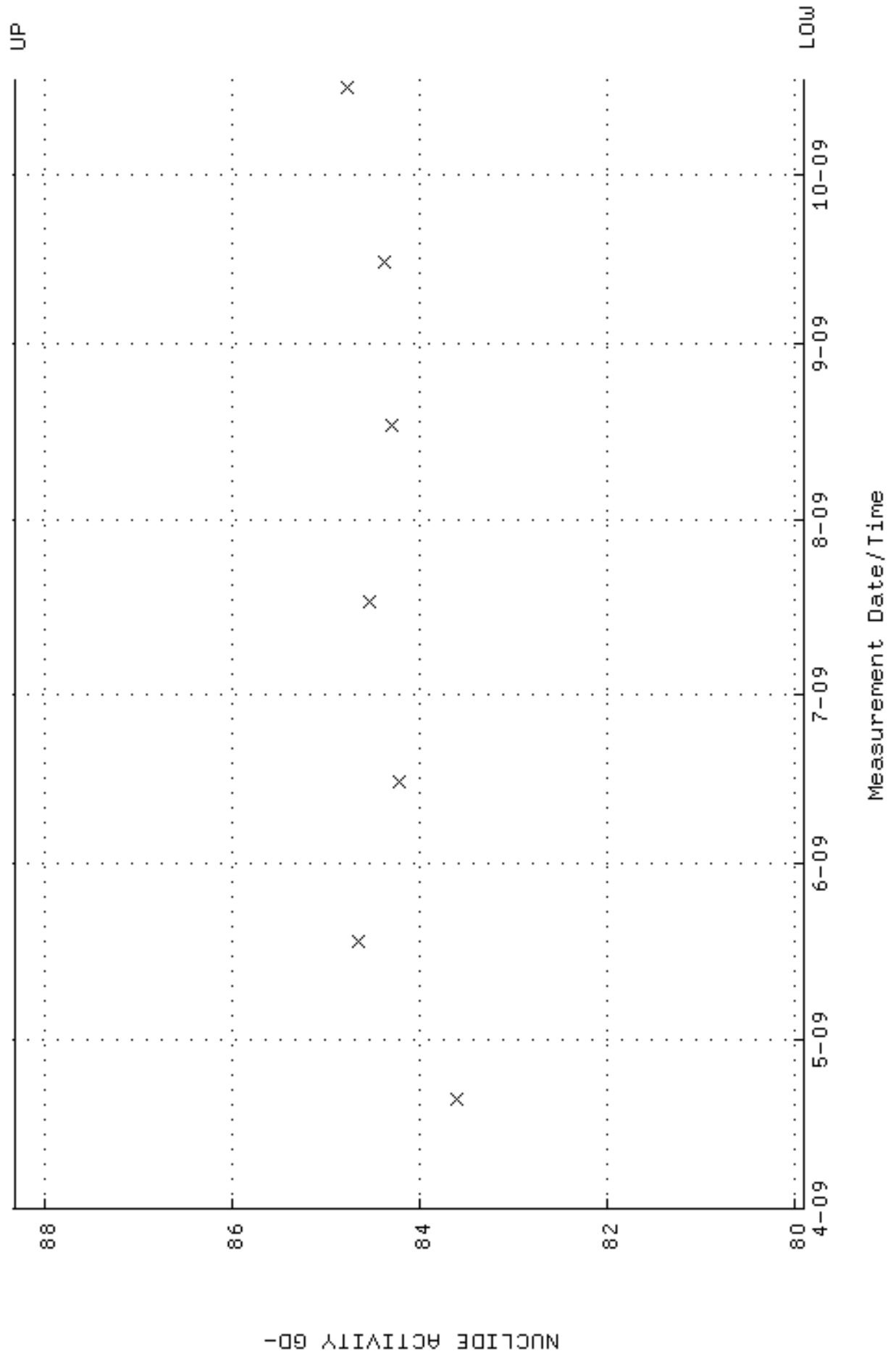
QA filename : DKA100:[ENV_ALPHA.QA.B]B153.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:36:46 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



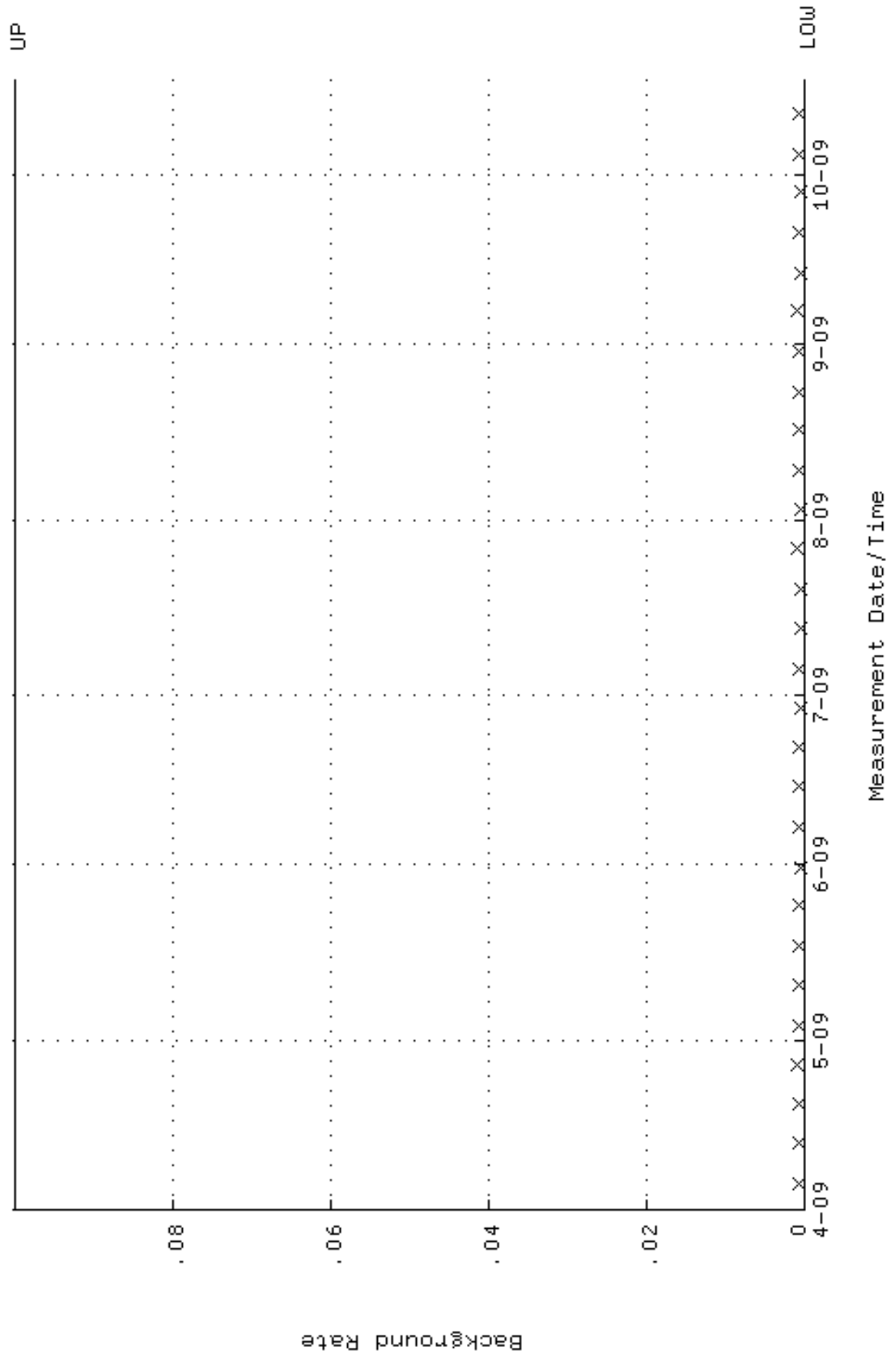
QA filename : DKA100:[ENV_ALPHA.QA.W]W154.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:39:15 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.251386 through 0.271386



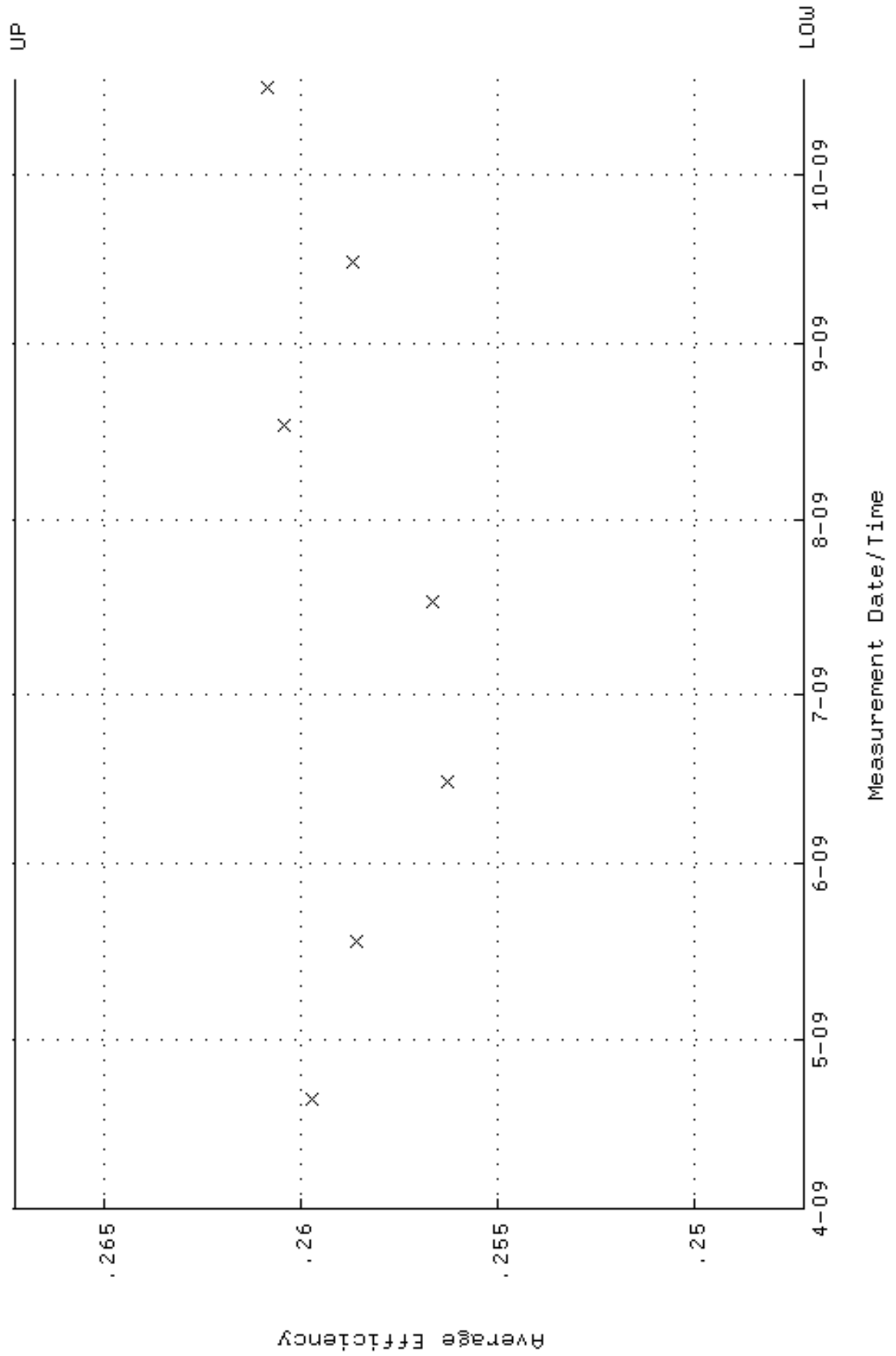
QA filename : DKA100:[ENV_ALPHA.QA.W]w154.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 20-APR-2009 10:39:15 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 79.9003 through 88.3109



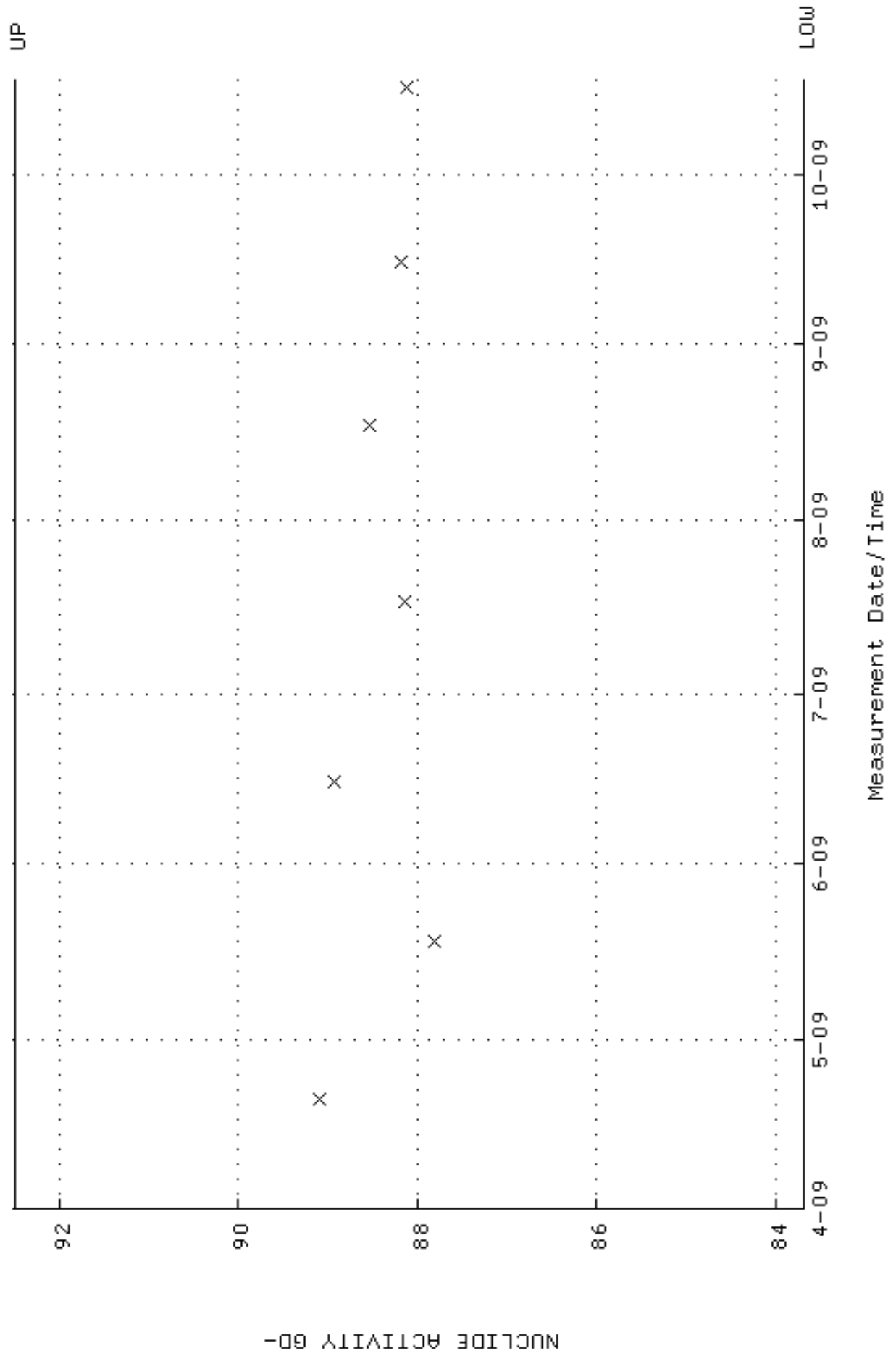
QA filename : DKA100:[ENV_ALPHA.QA.B]B154.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:36:50 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



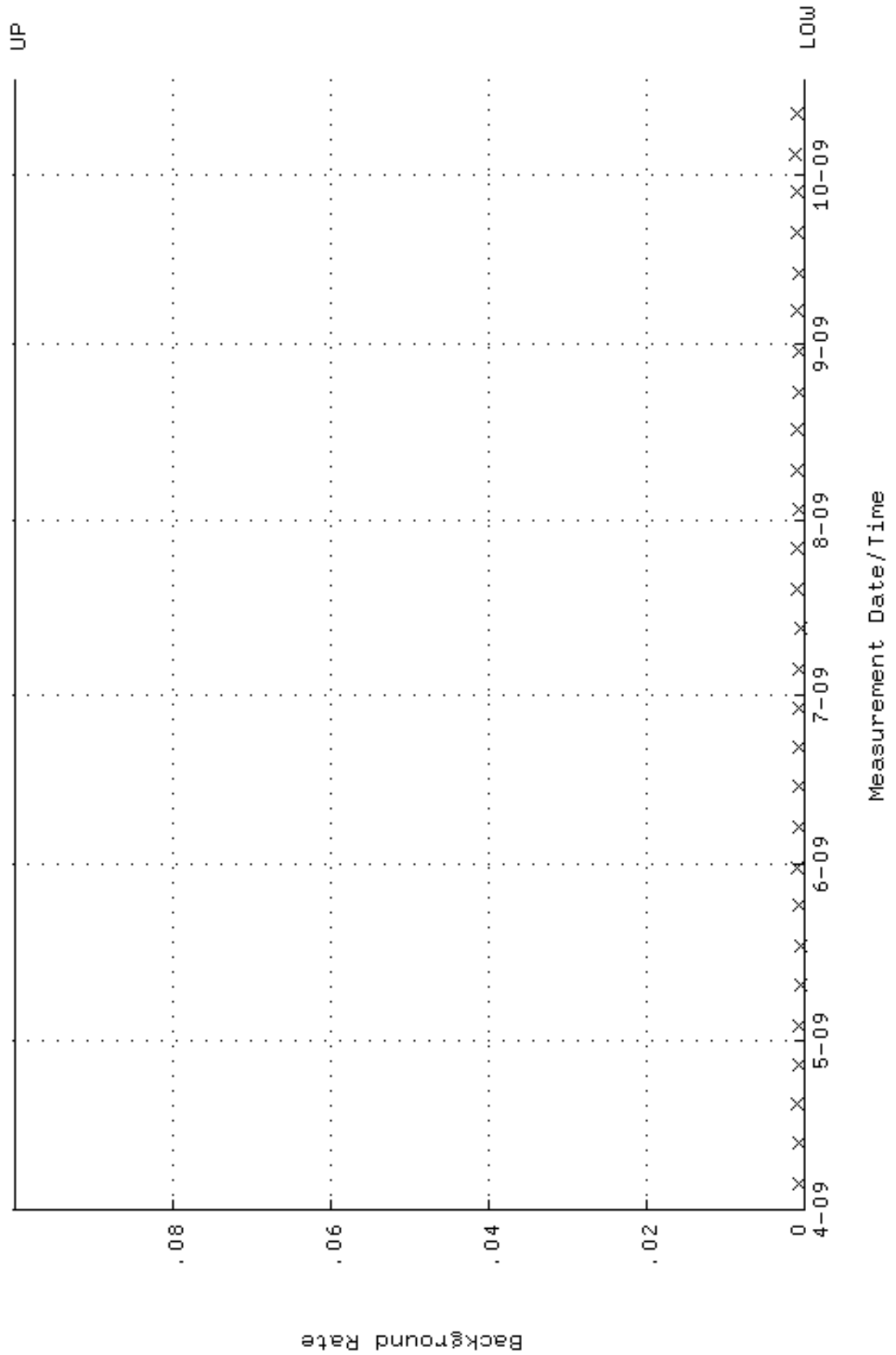
QA filename : DKA100:[ENV_ALPHA.QA.W]W155.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:39:20 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.247241 through 0.267241



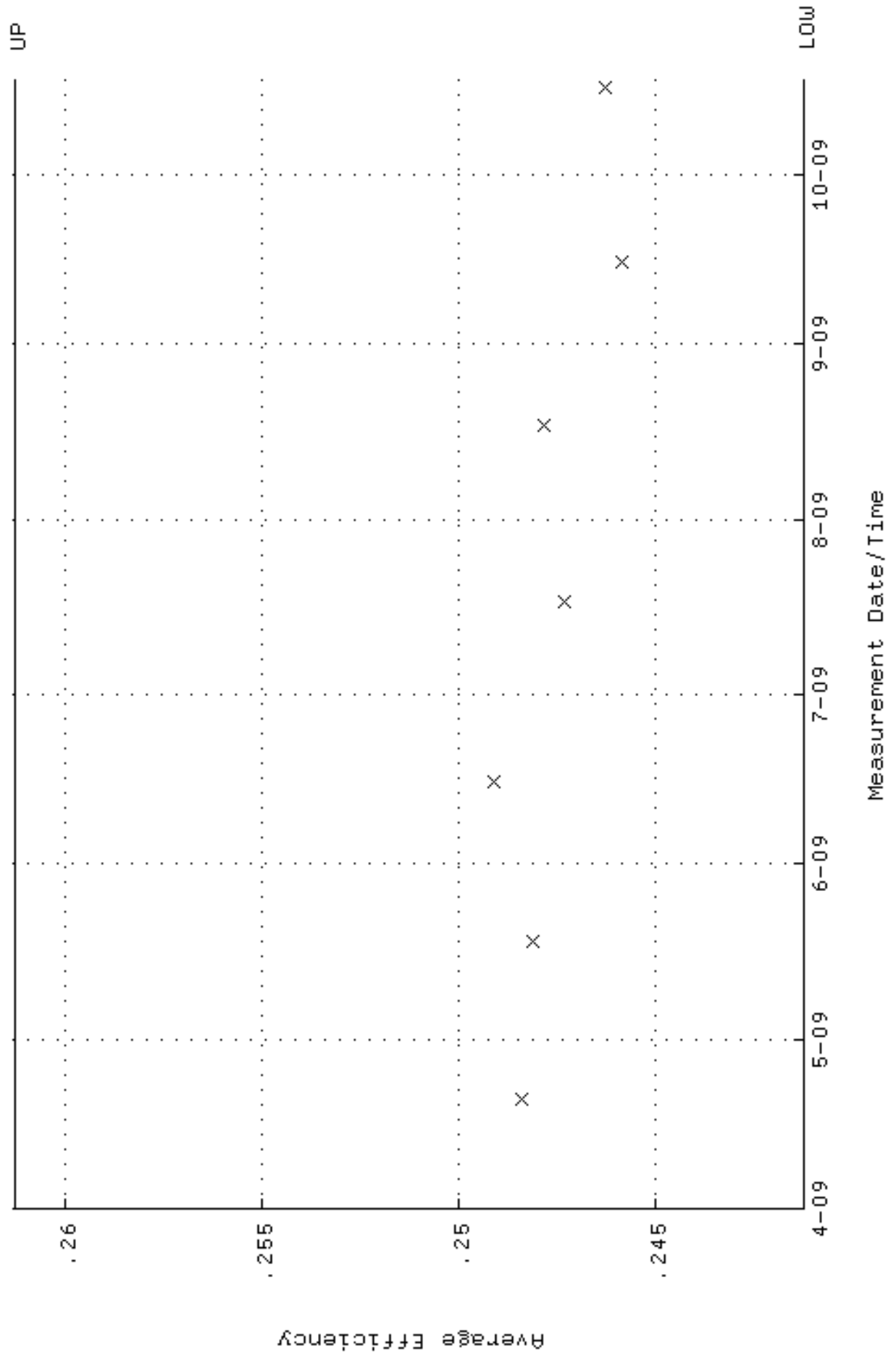
QA filename : DKA100:[ENV_ALPHA.QA.W]w155.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 20-APR-2009 10:39:20 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 83.6873 through 92.4965



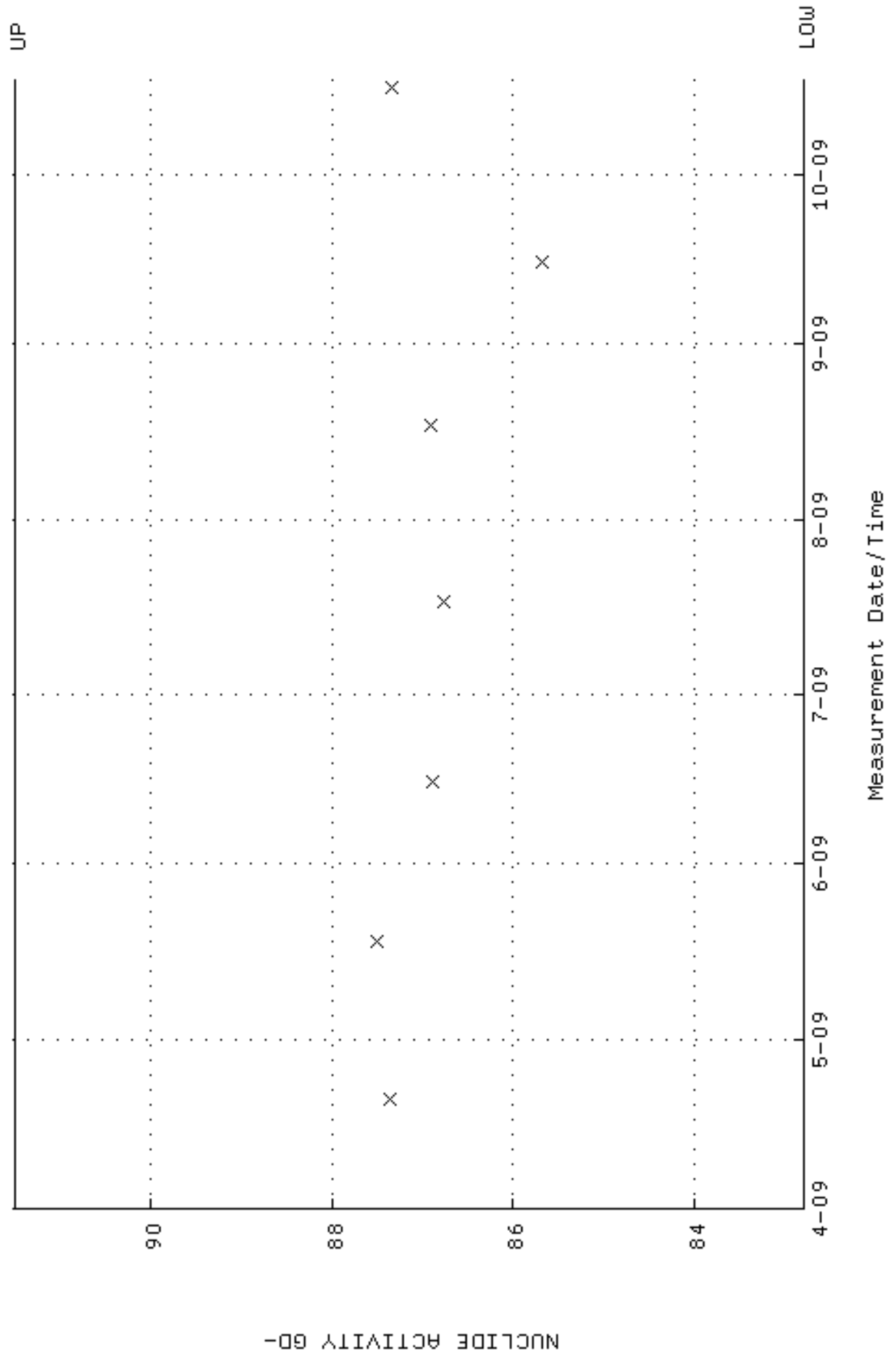
QA filename : DKA100:[ENV_ALPHA.QA.B]B155.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:36:54 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



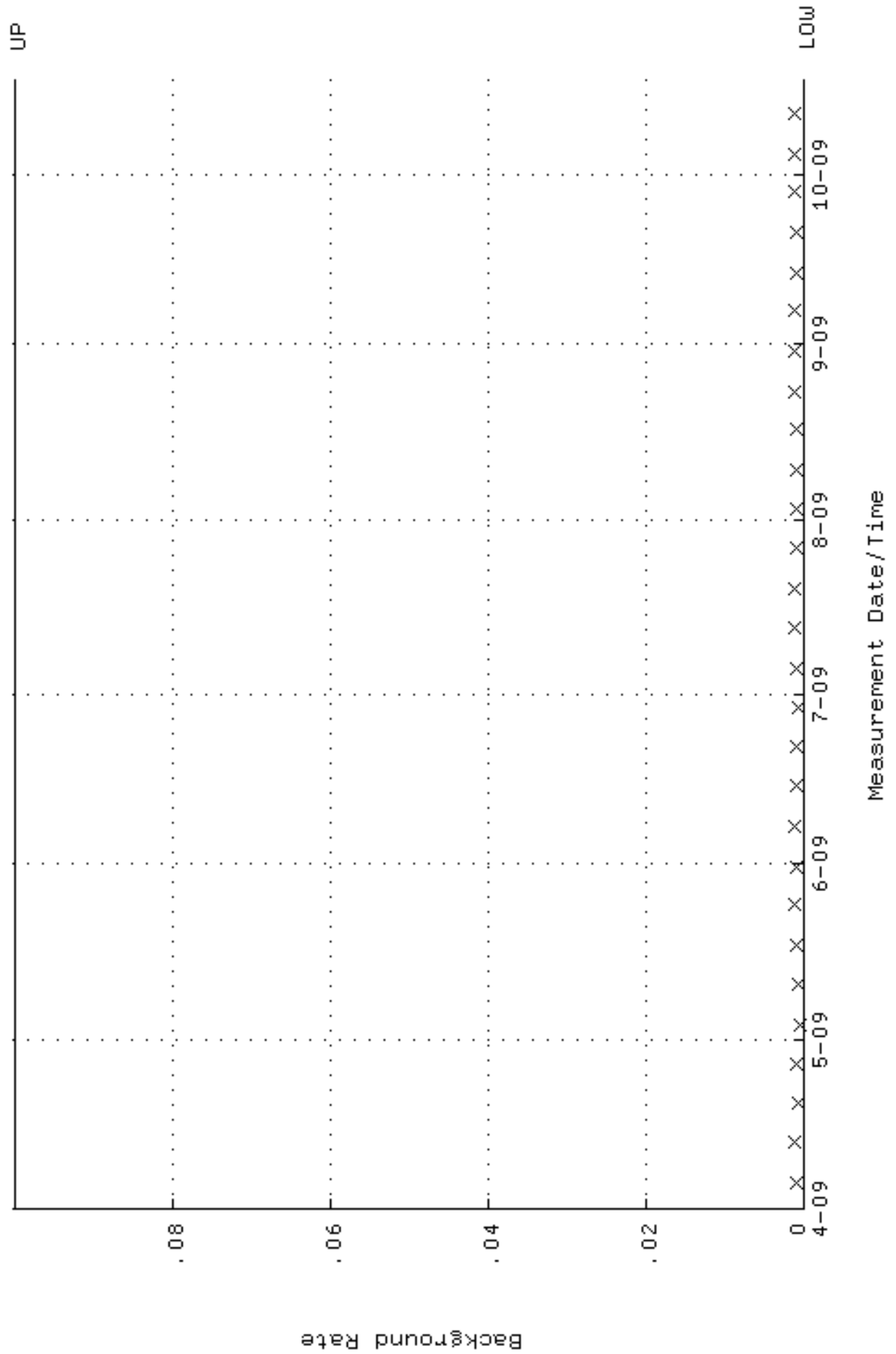
QA filename : DKA100:[ENV_ALPHA.QA.W]W156.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:39:25 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.241250 through 0.261250



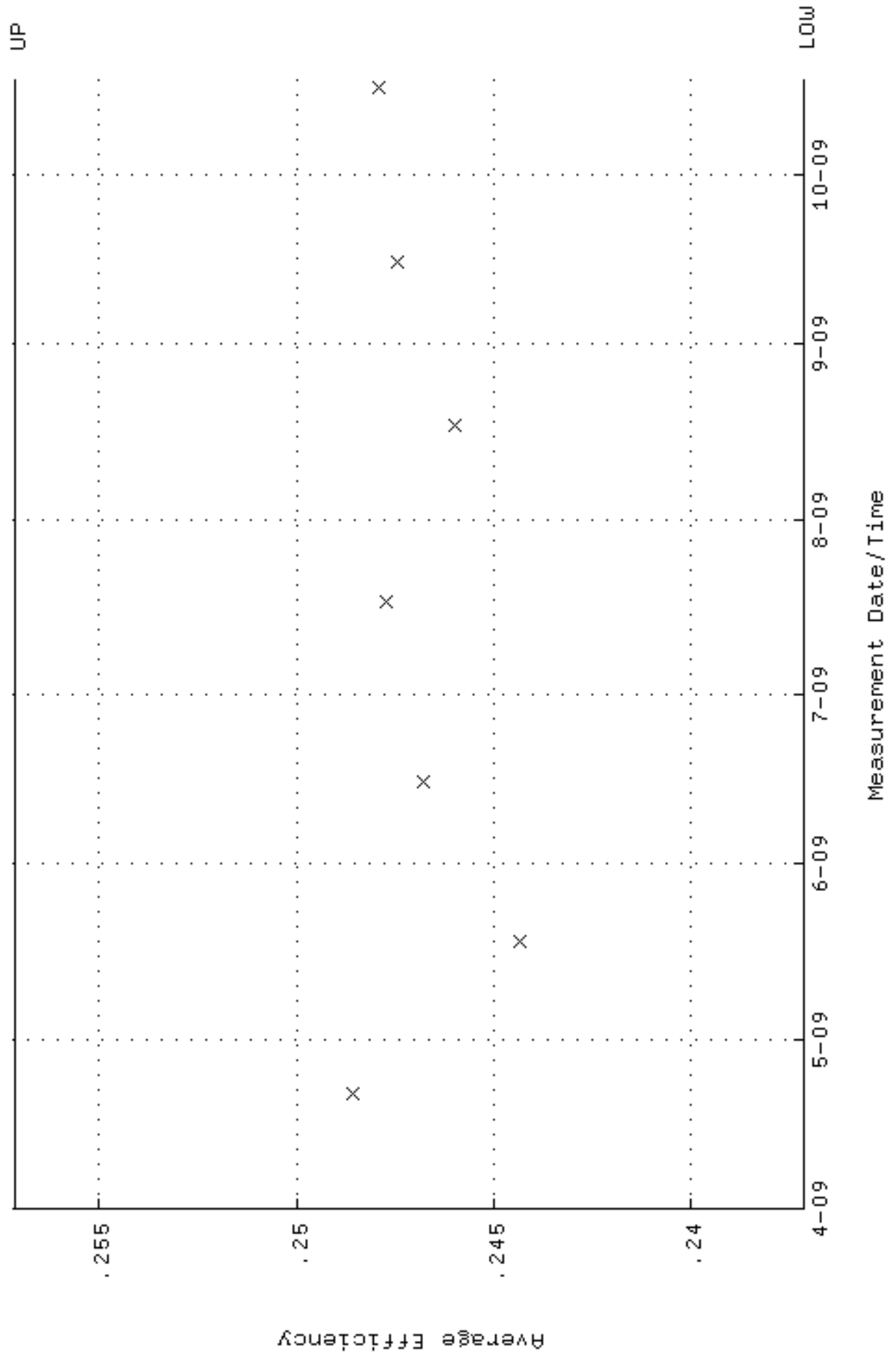
QA filename : DKA100:[ENV_ALPHA.QA.W]w156.QAF;1
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 20-APR-2009 10:39:25 through 17-OCT-2009 12:00:00
Lower/Upper Lmts: 82.7847 through 91.4989



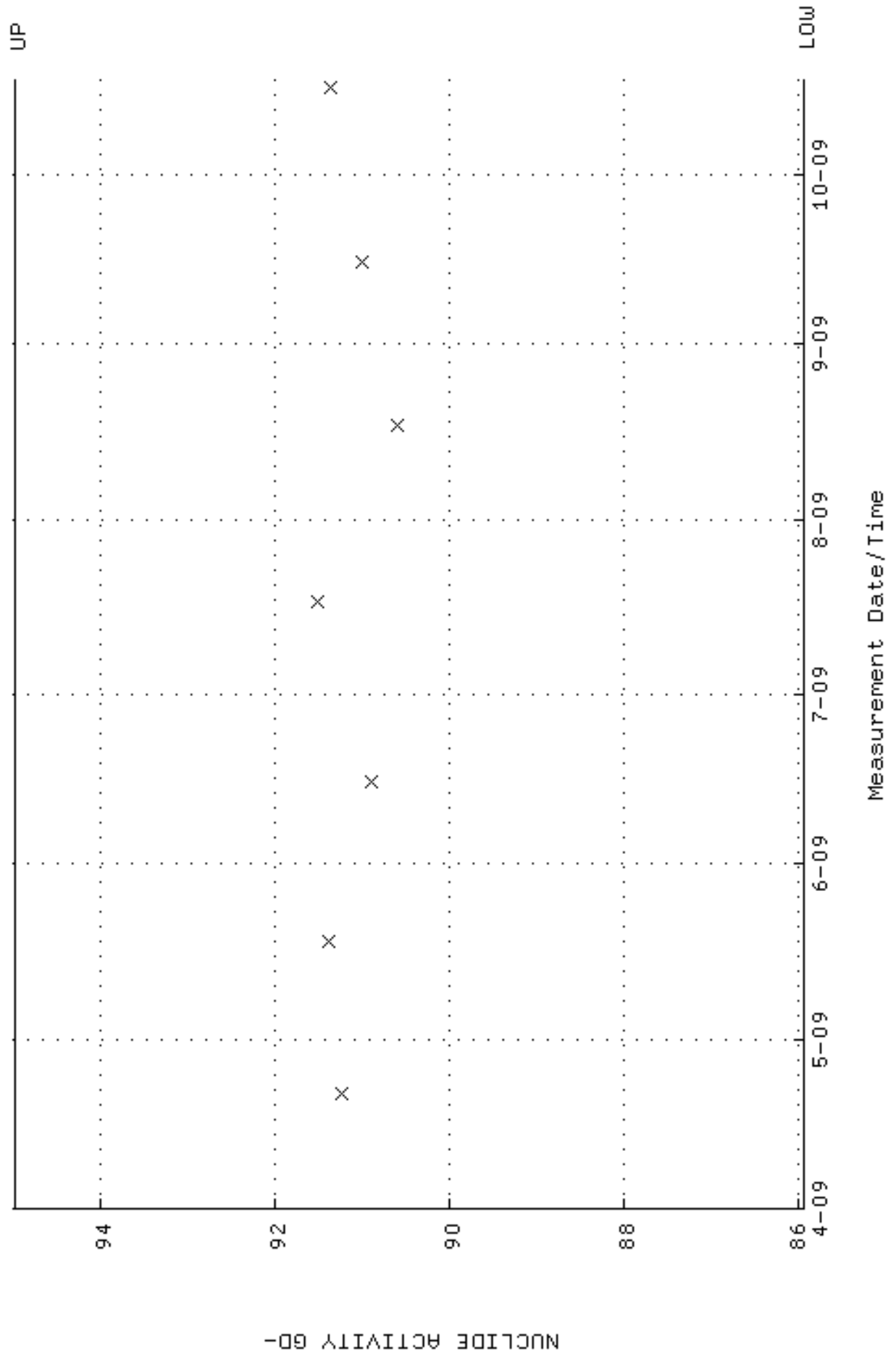
QA filename : DKA100:[ENV_ALPHA.QA.B]B156.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:36:58 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



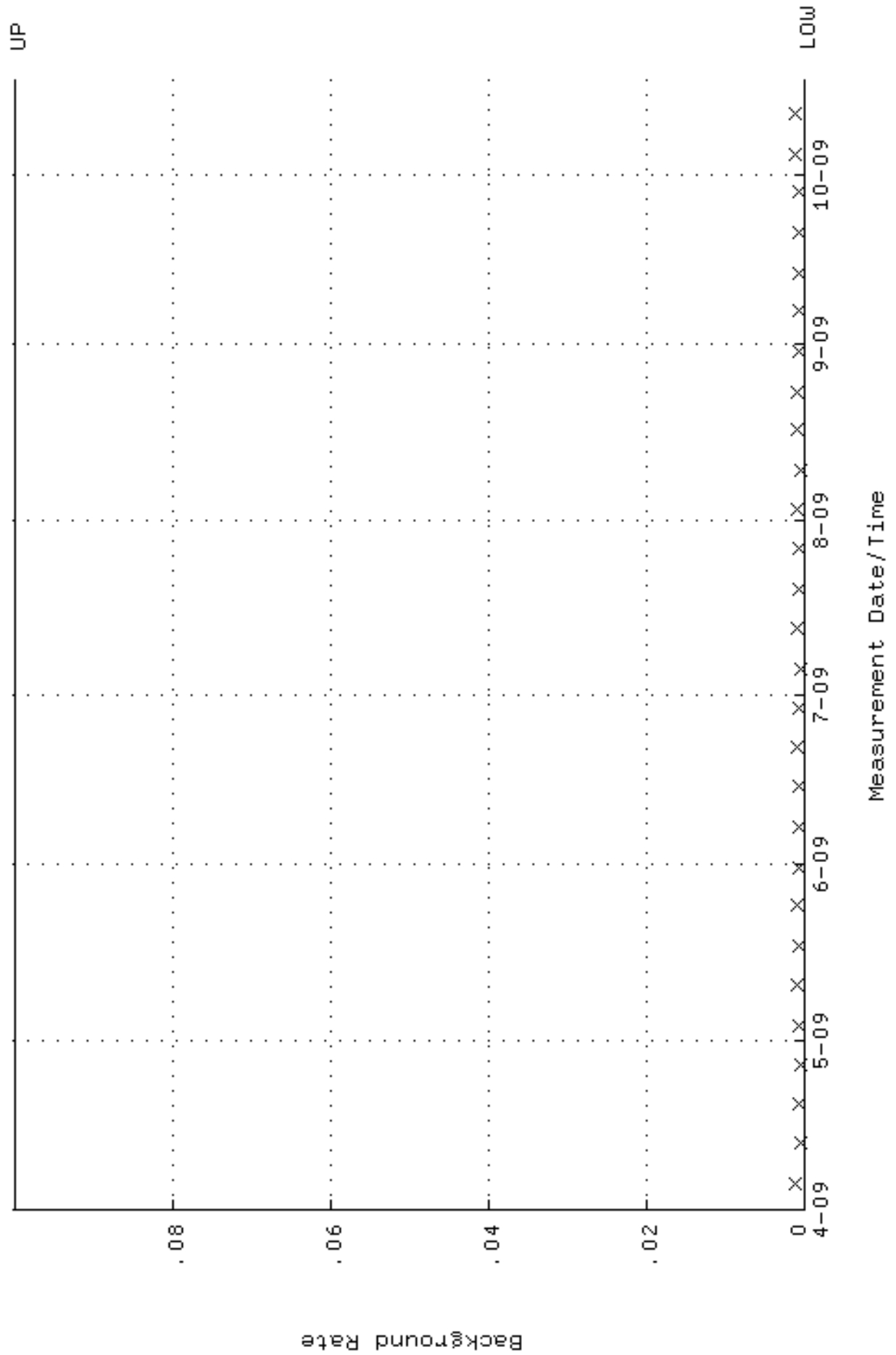
QA filename : DKA100:[ENV_ALPHA.QA.W]w157.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 21-APR-2009 07:23:09 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.237137 through 0.257137



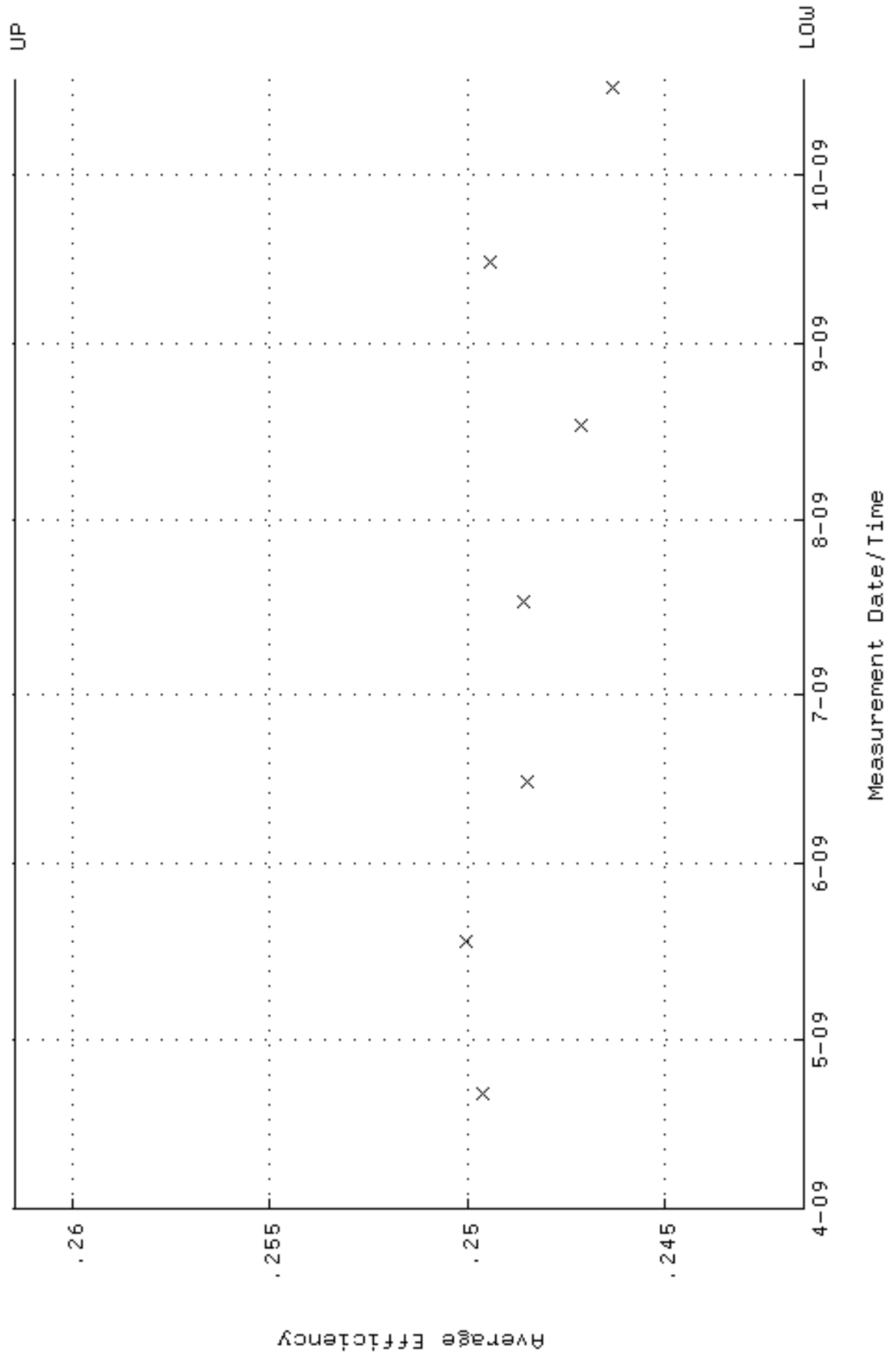
QA filename : DKA100:[ENV_ALPHA.QA.W]w157.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 21-APR-2009 07:23:09 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 85.9292 through 94.9744



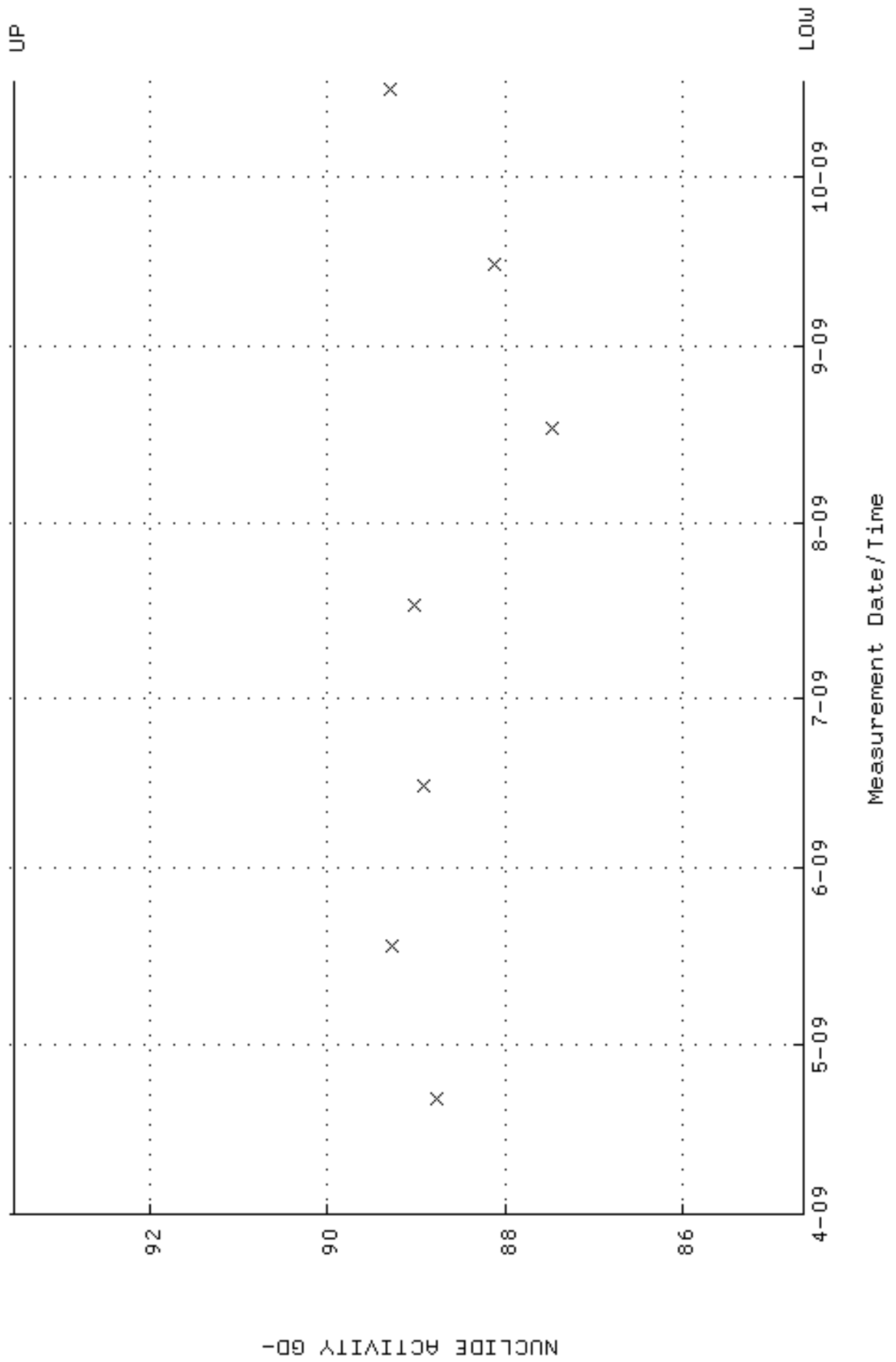
QA filename : DKA100:[ENV_ALPHA.QA.B]B157.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:37:02 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



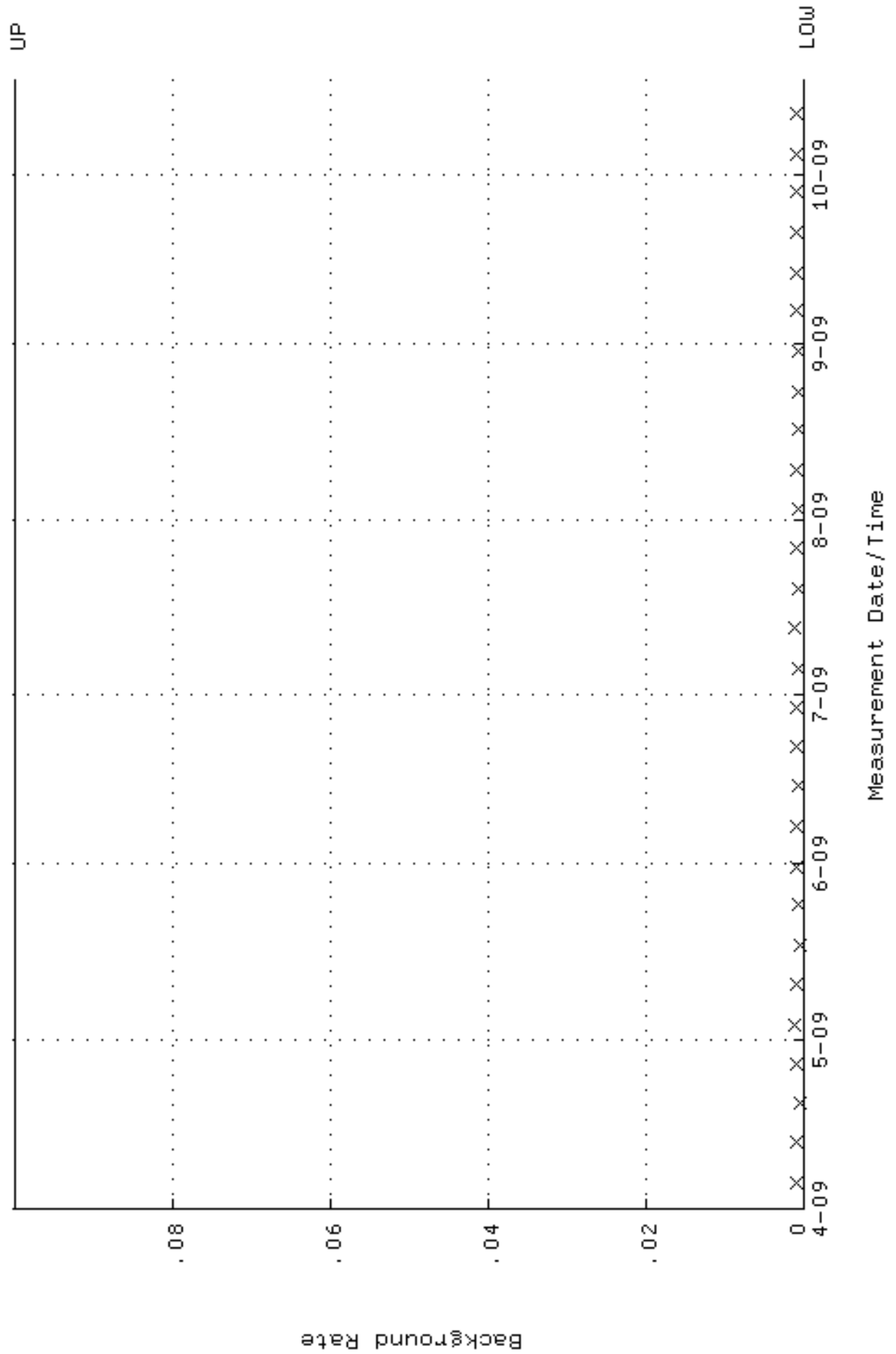
QA filename : DKA100:[ENV_ALPHA.QA.W]w158.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 21-APR-2009 07:23:21 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.241466 through 0.261466



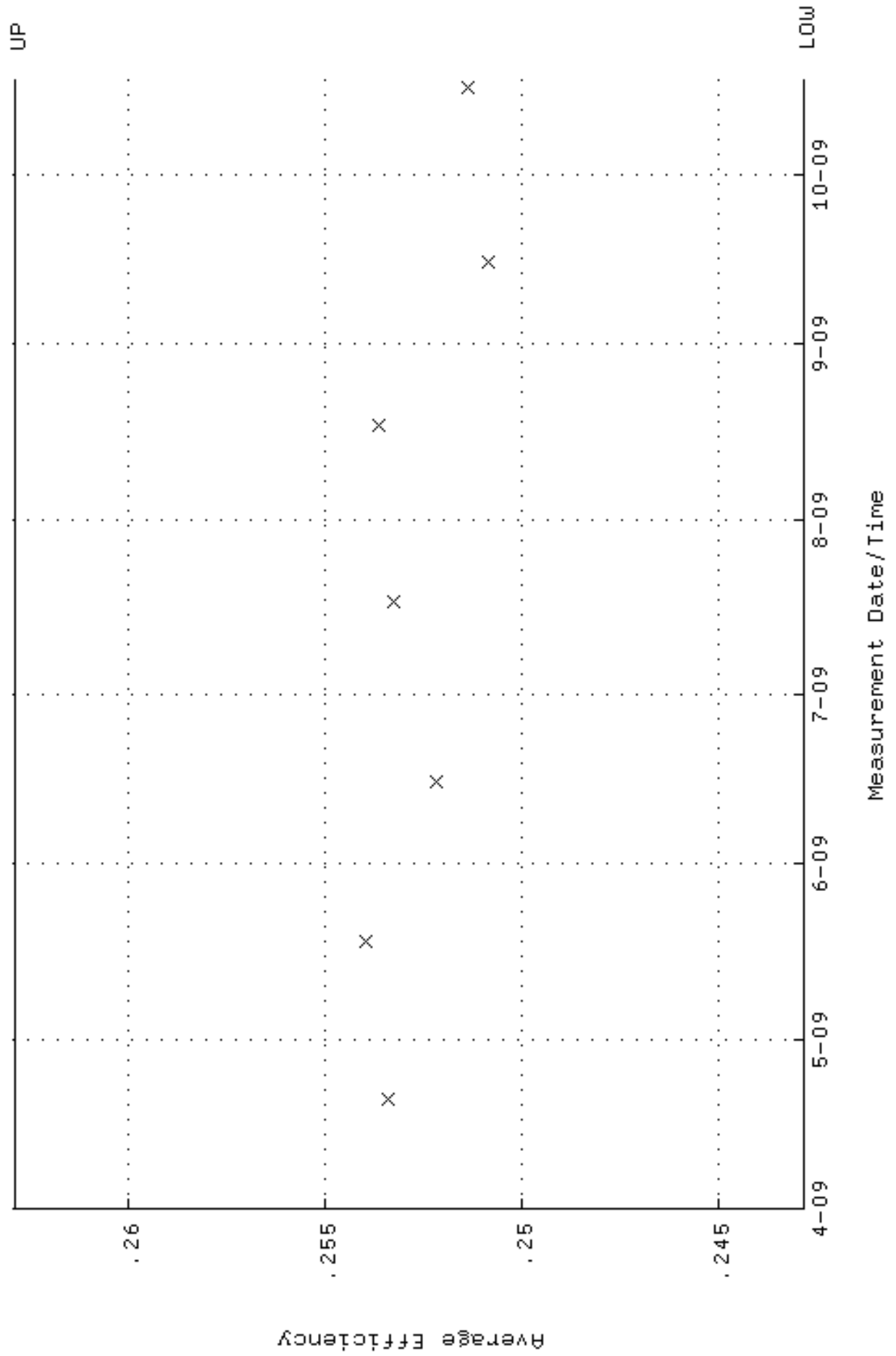
QA filename : DKA100:[ENV_ALPHA.QA.W]w158.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 21-APR-2009 07:23:21 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 84.6414 through 93.5510



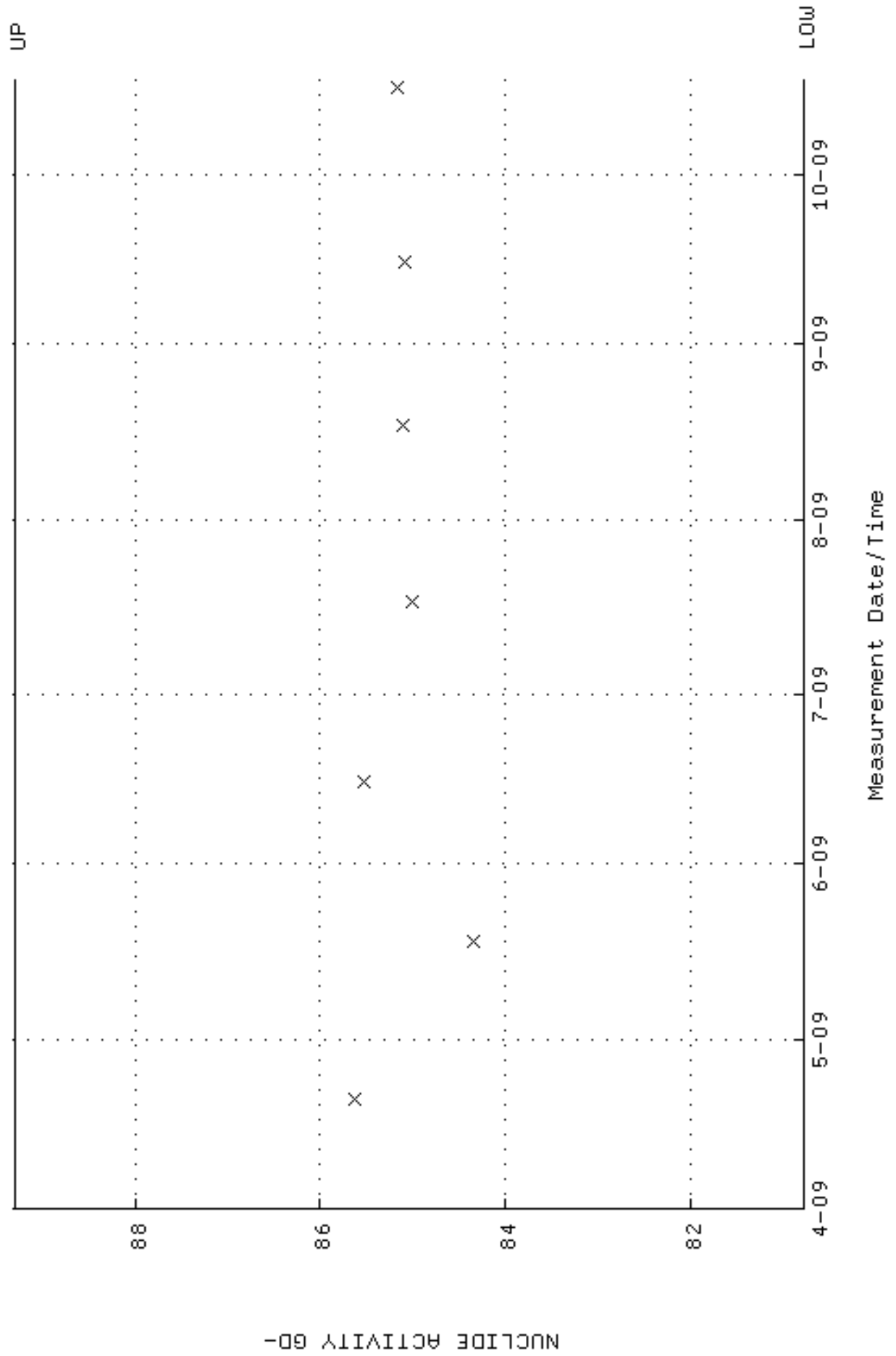
QA filename : DKA100:[ENV_ALPHA.QA.B]B158.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:37:06 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



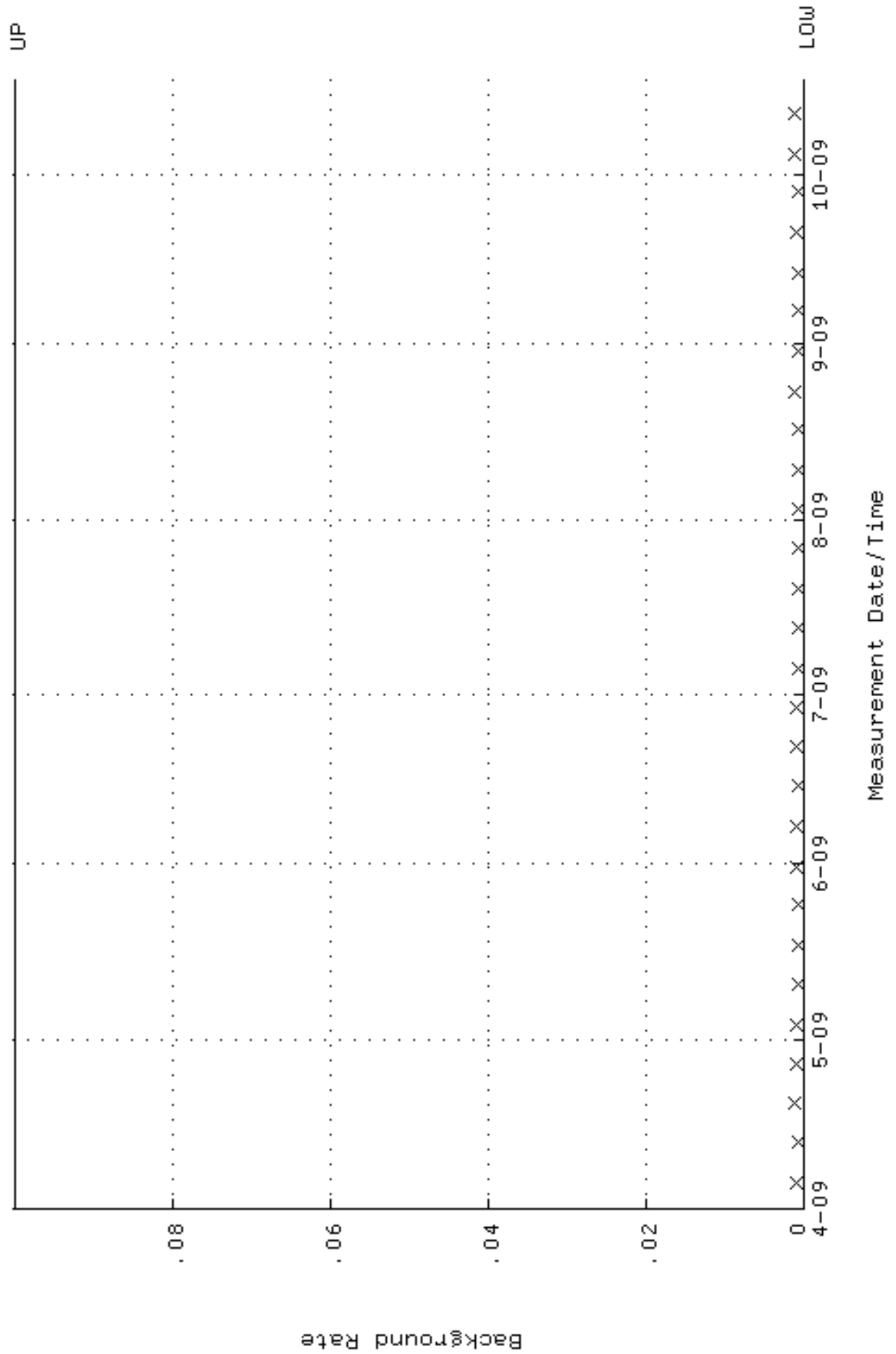
QA filename : DKA100:[ENV_ALPHA.QA.W]W159.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 20-APR-2009 10:39:38 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.242851 through 0.262851



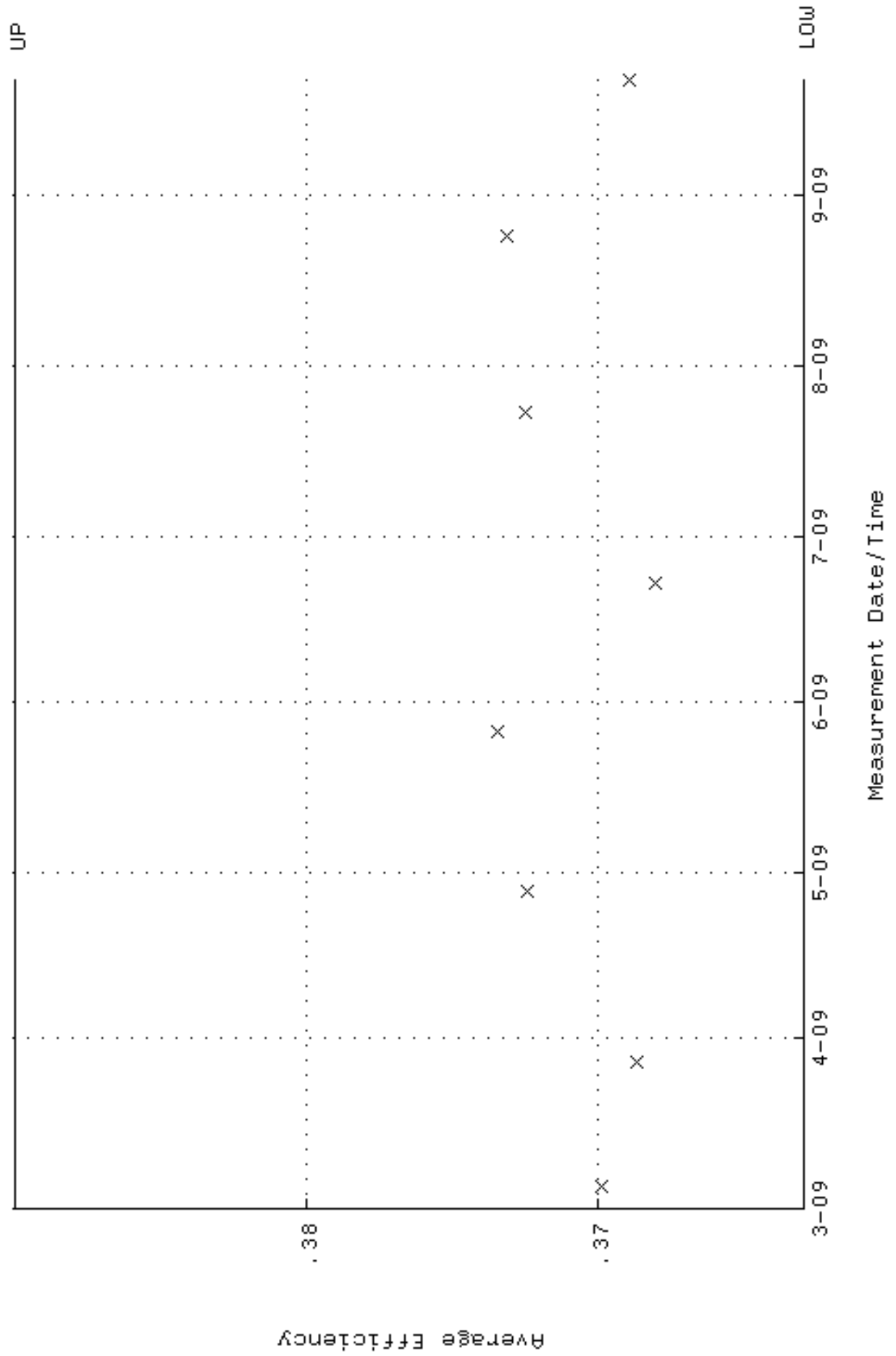
QA filename : DKA100:[ENV_ALPHA.QA.W]w159.QAF;1
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 20-APR-2009 10:39:38 through 17-OCT-2009 12:00:00
Lower/Upper Lmts: 80.7870 through 89.2909



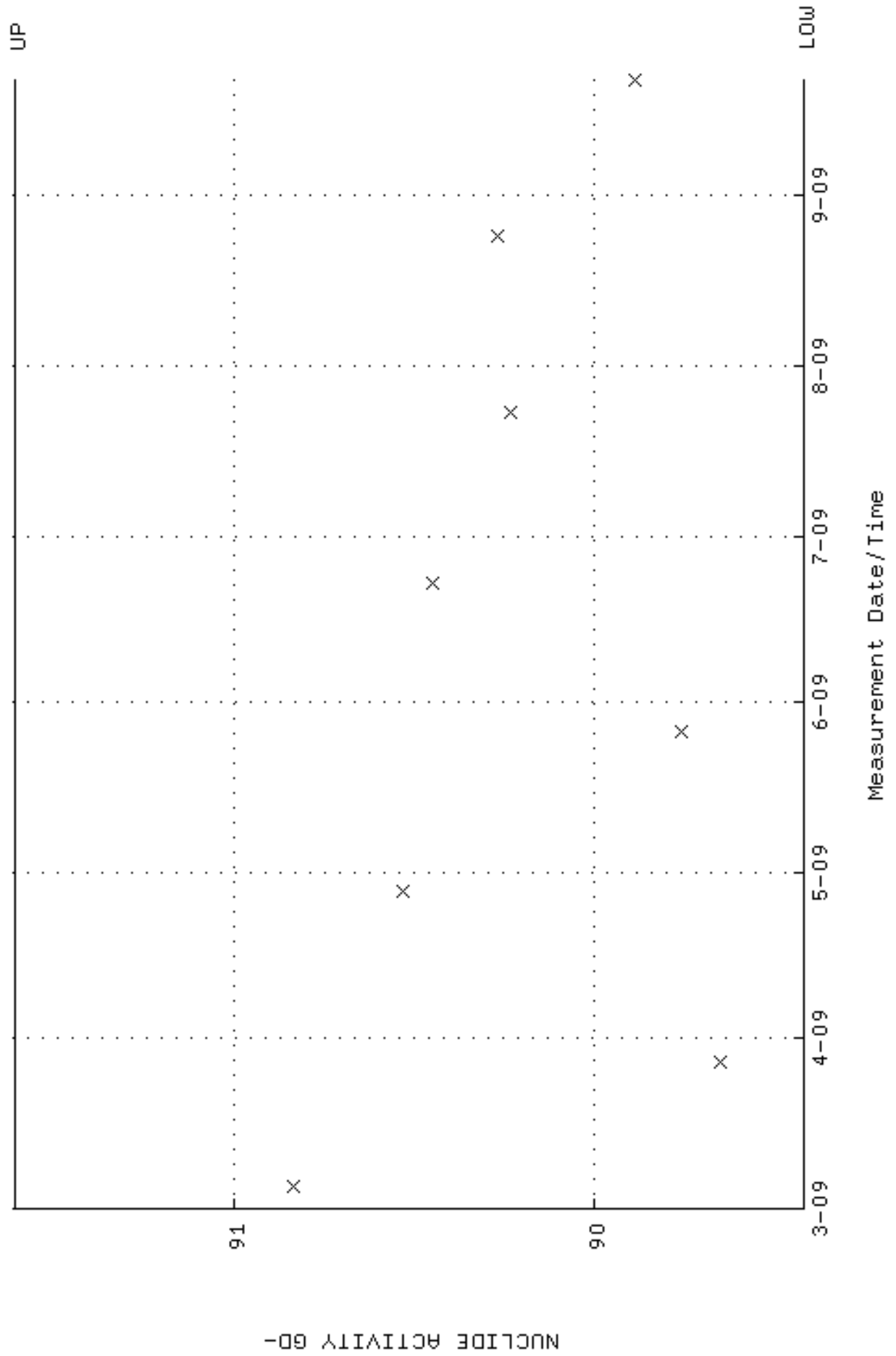
QA filename : DKA100:[ENV_ALPHA.QA.B]B159.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 5-APR-2009 15:37:10 through 17-OCT-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



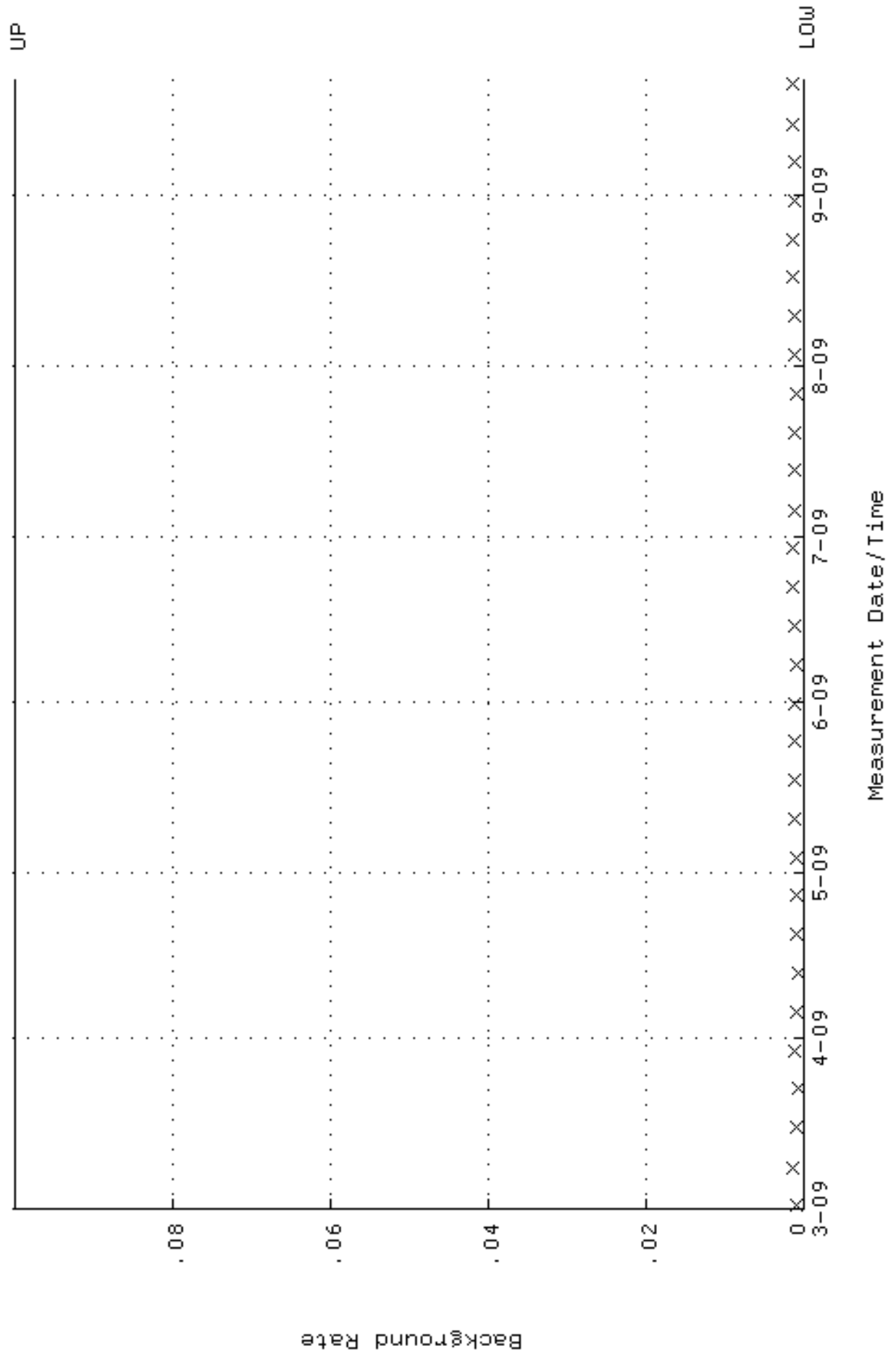
QA filename : DKA100:[ENV_ALPHA.QA.W]W161.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:37:34 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.362982 through 0.389932



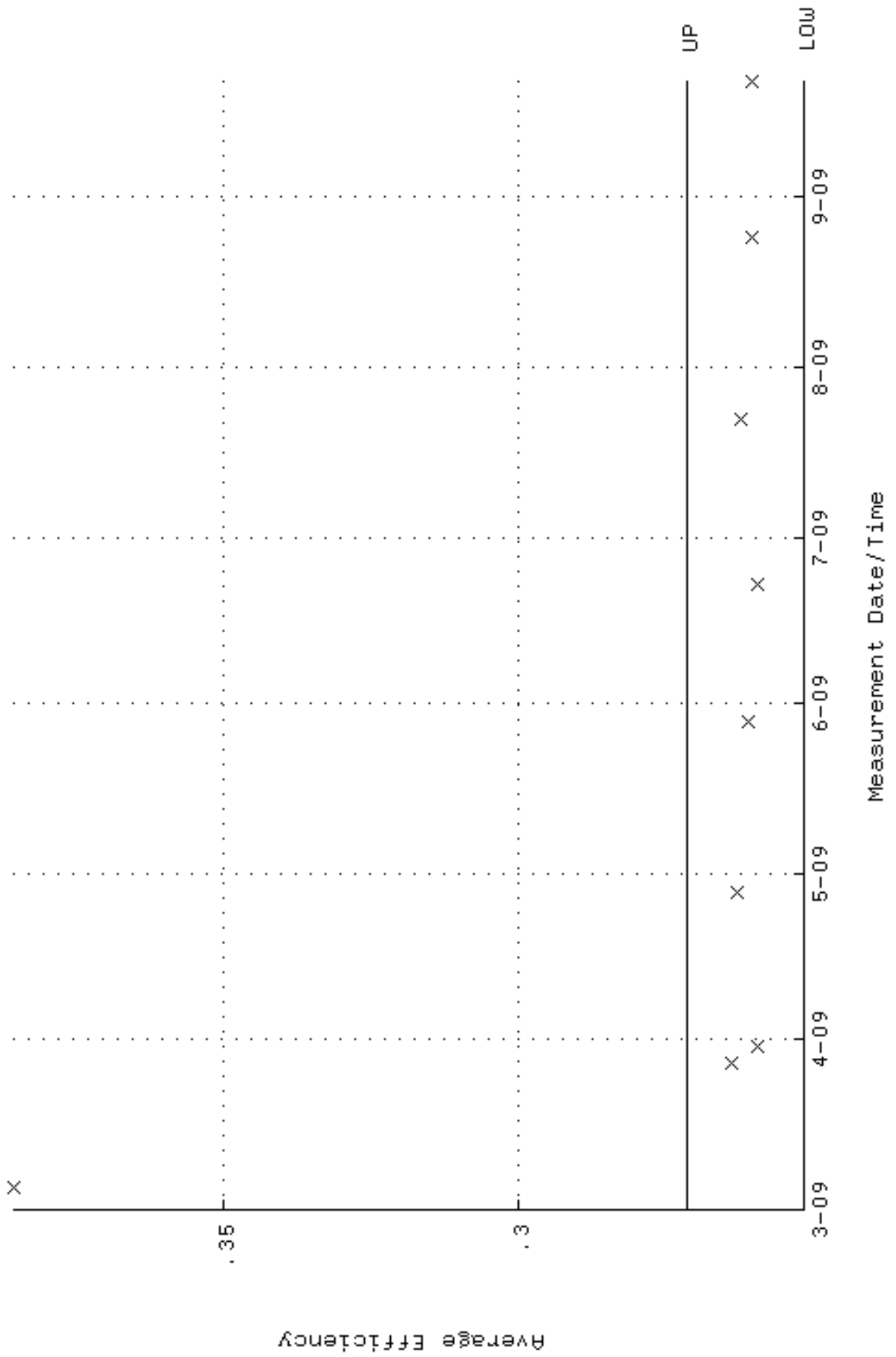
QA filename : DKA100:[ENV_ALPHA.QA.W]w161.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:37:34 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 89.4216 through 91.6054



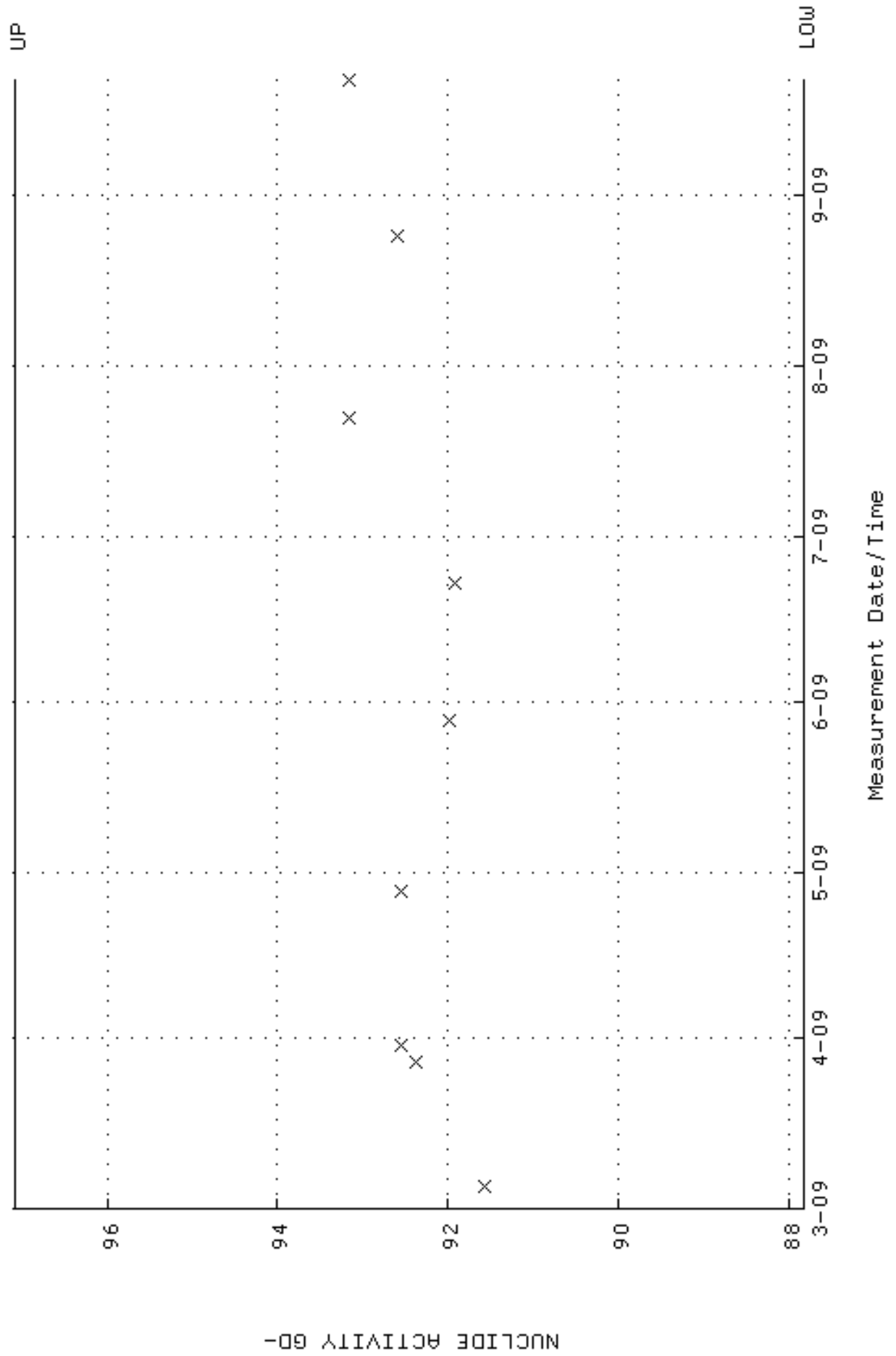
QA filename : DKA100:[ENV_ALPHA.QA.B]B161.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:21:03 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



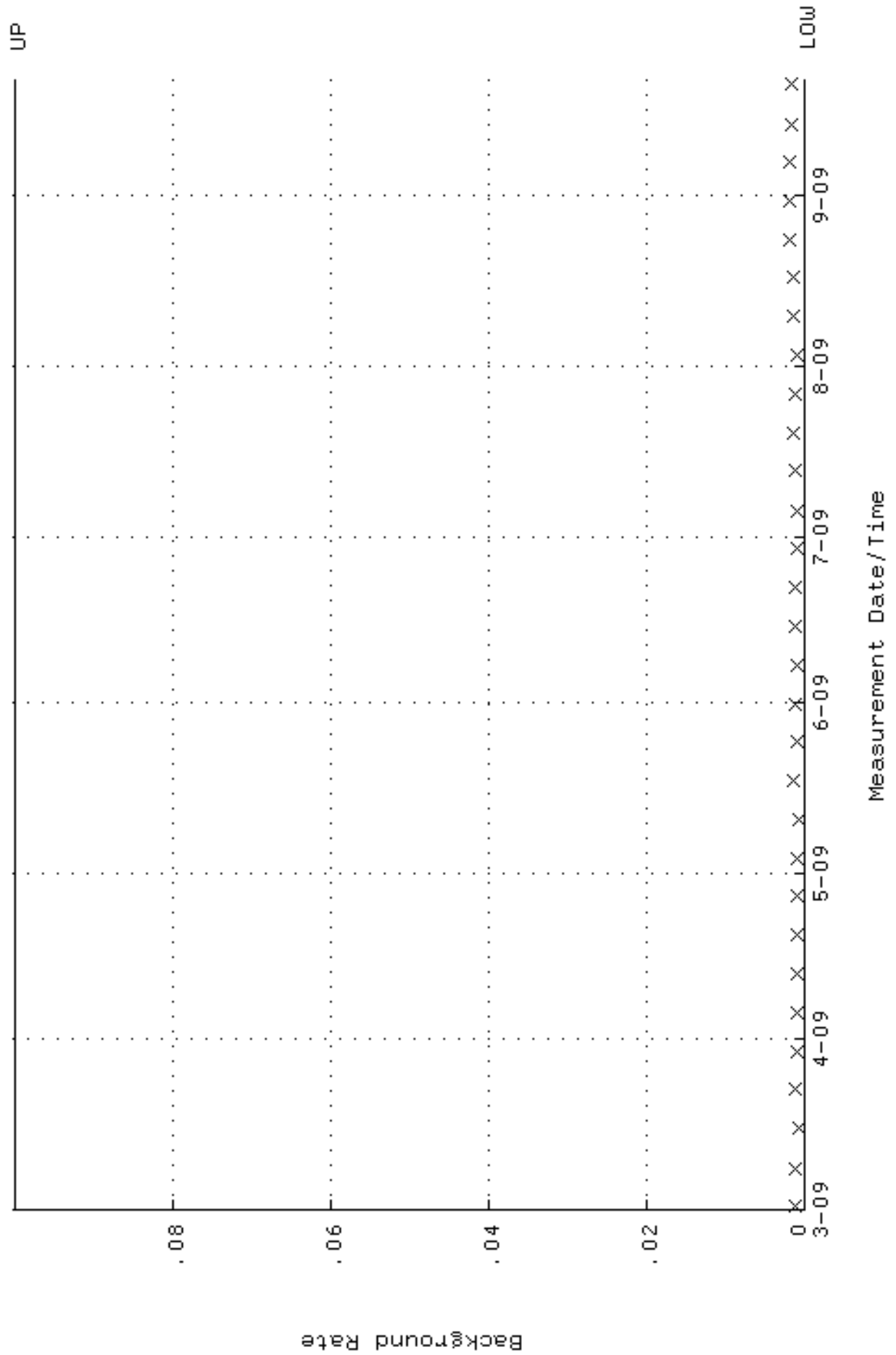
QA filename : DKA100:[ENV_ALPHA.QA.W]W173.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:38:28 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.251498 through 0.271498



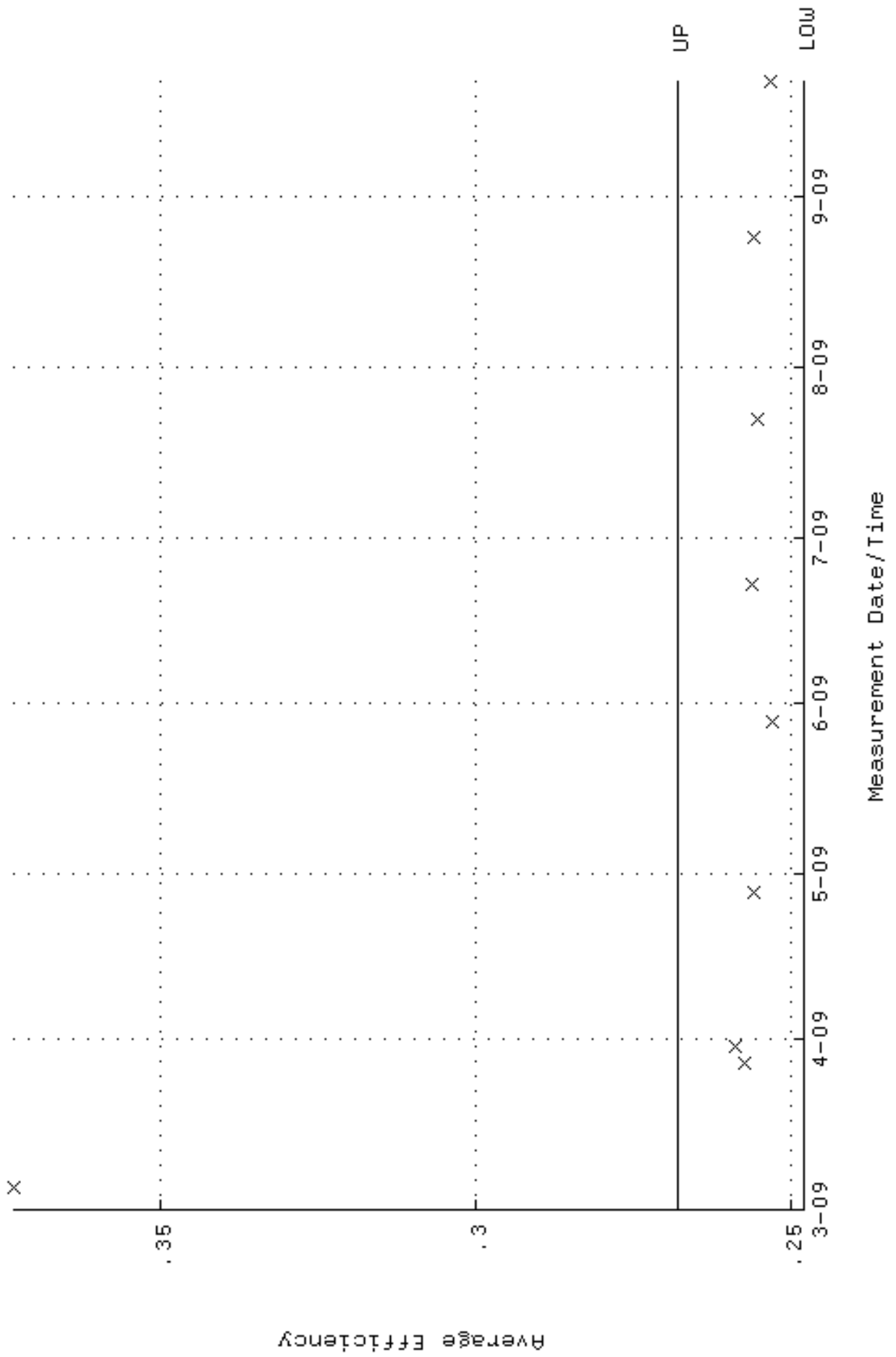
QA filename : DKA100:[ENV_ALPHA.QA.W]w173.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:38:28 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 87.8322 through 97.0776



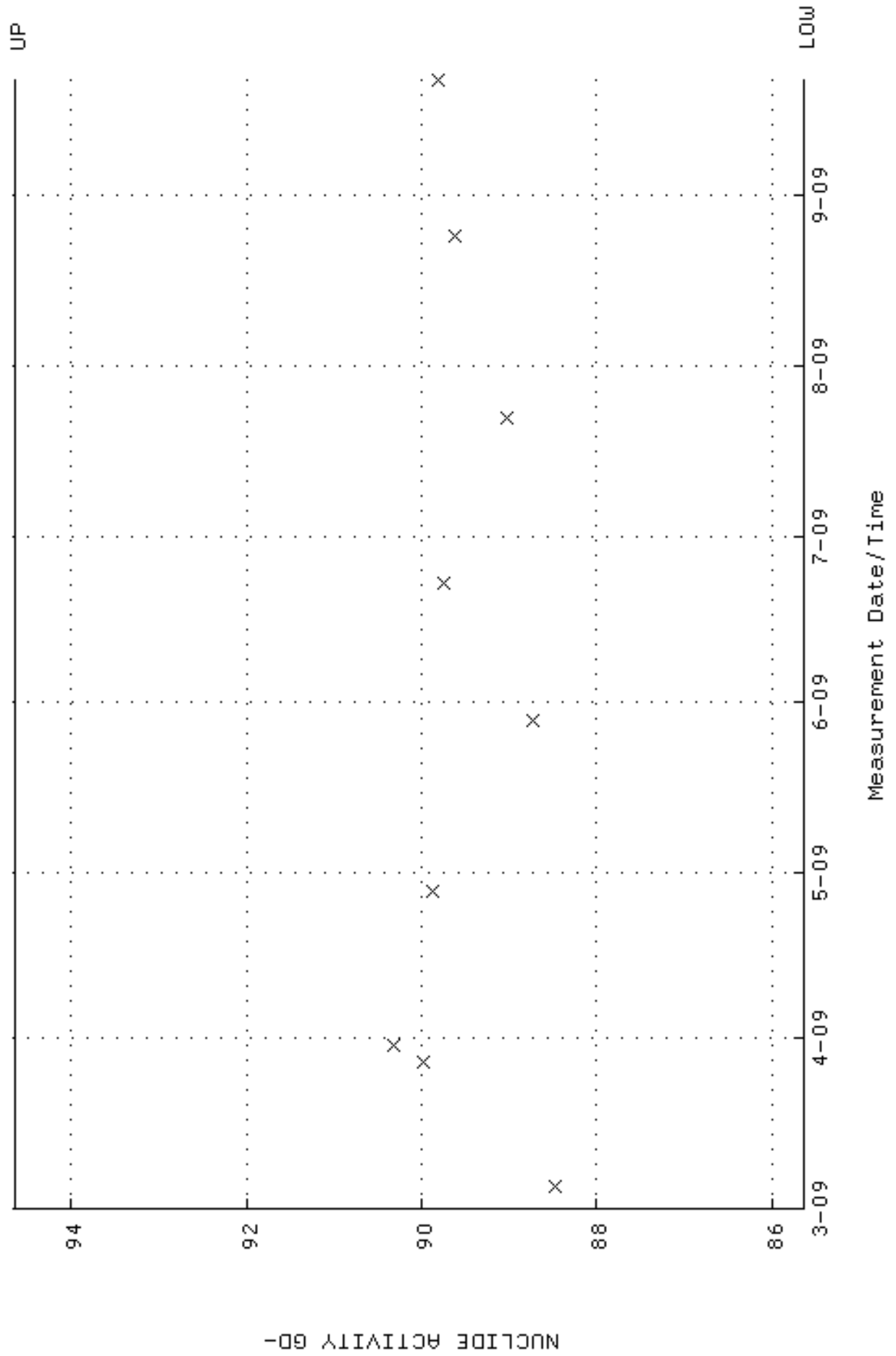
QA filename : DKA100:[ENV_ALPHA.QA.B]B173.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:21:46 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



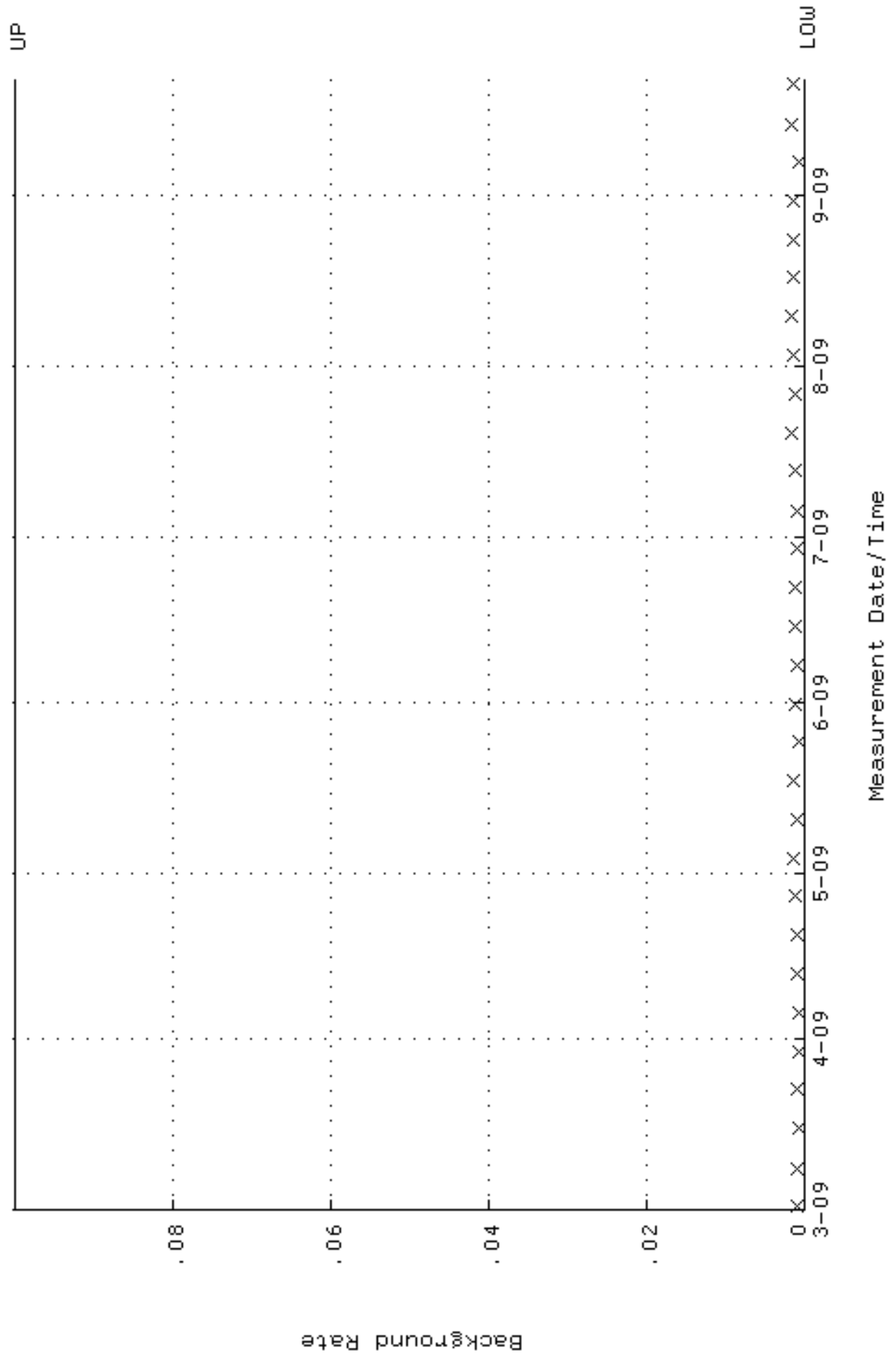
QA filename : DKA100:[ENV_ALPHA.QA.W]W174.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:38:33 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.248038 through 0.268038



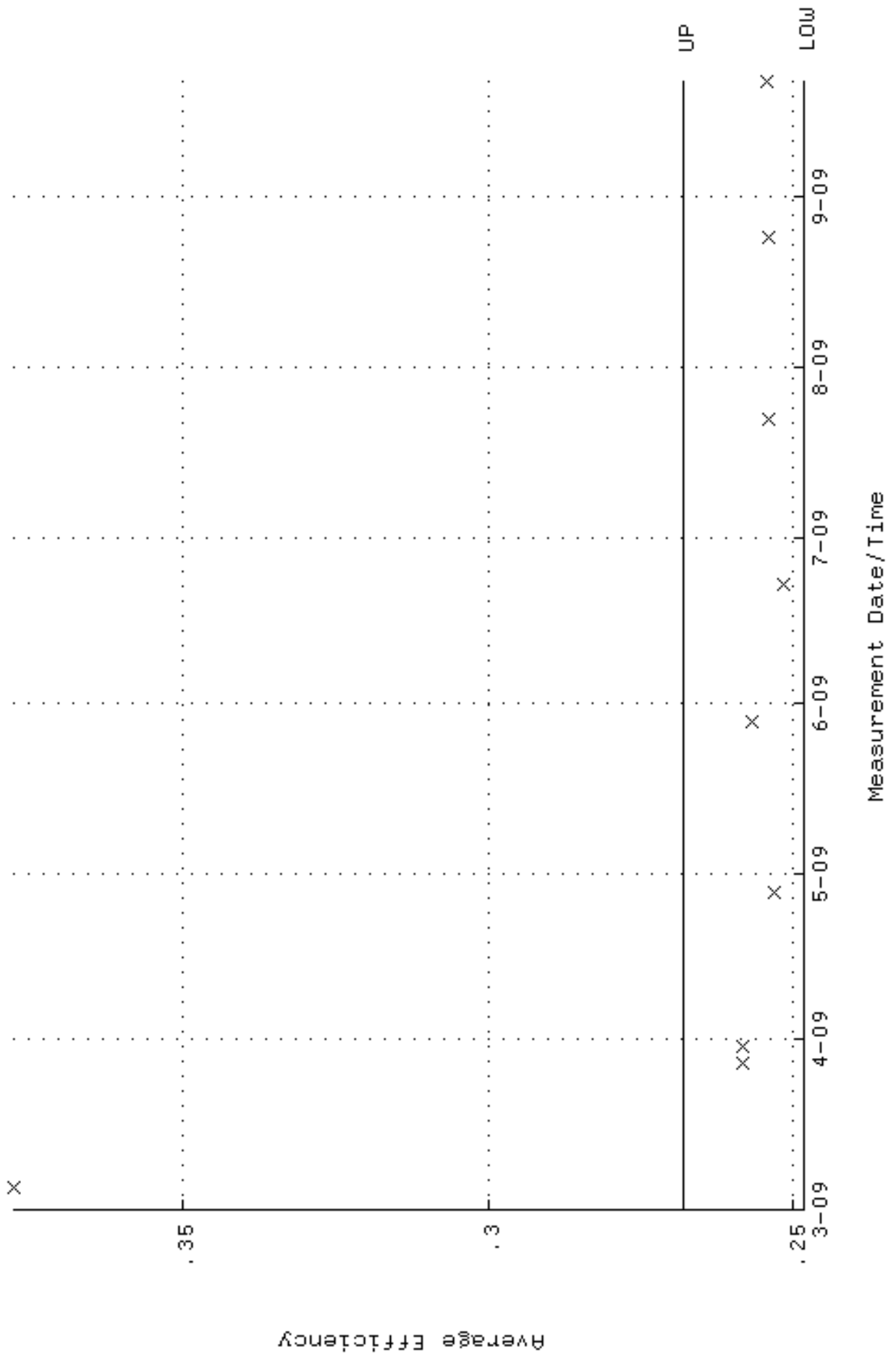
QA filename : DKA100:[ENV_ALPHA.QA.W]W174.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:38:33 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 85.6304 through 94.6442



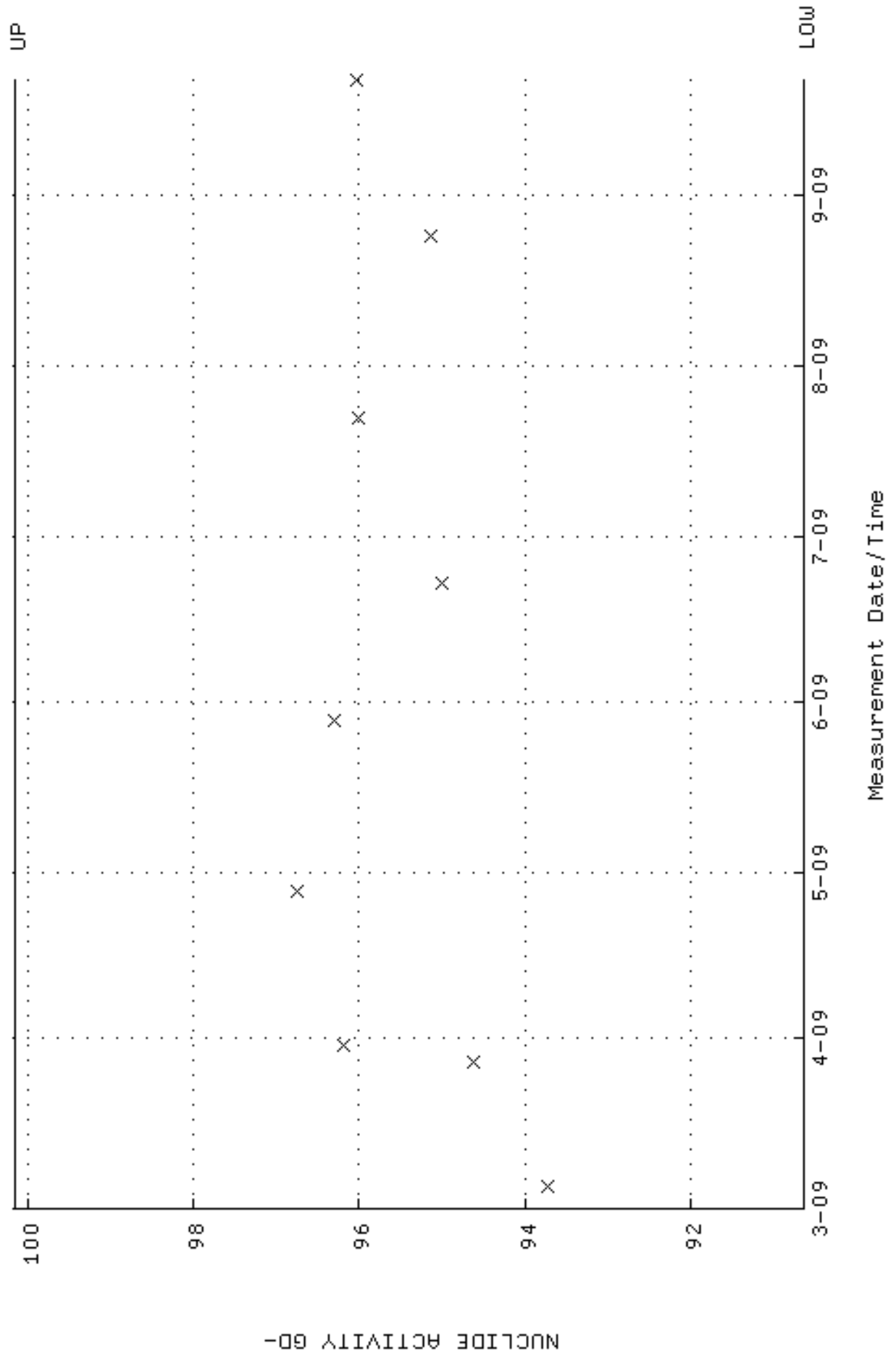
QA filename : DKA100:[ENV_ALPHA.QA.B]B174.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:21:50 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



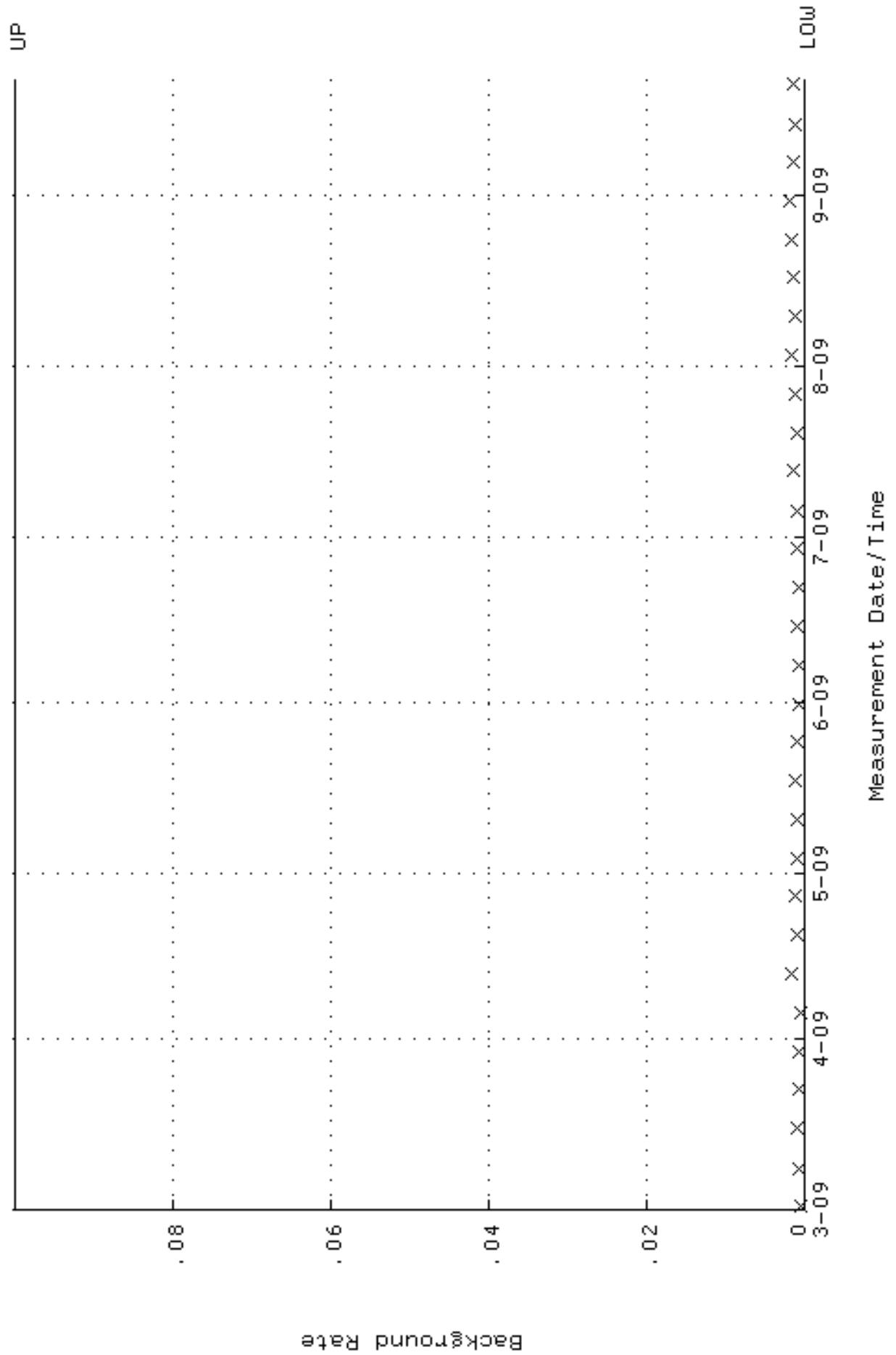
QA filename : DKA100:[ENV_ALPHA.QA.W]W175.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:38:37 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.248296 through 0.268296



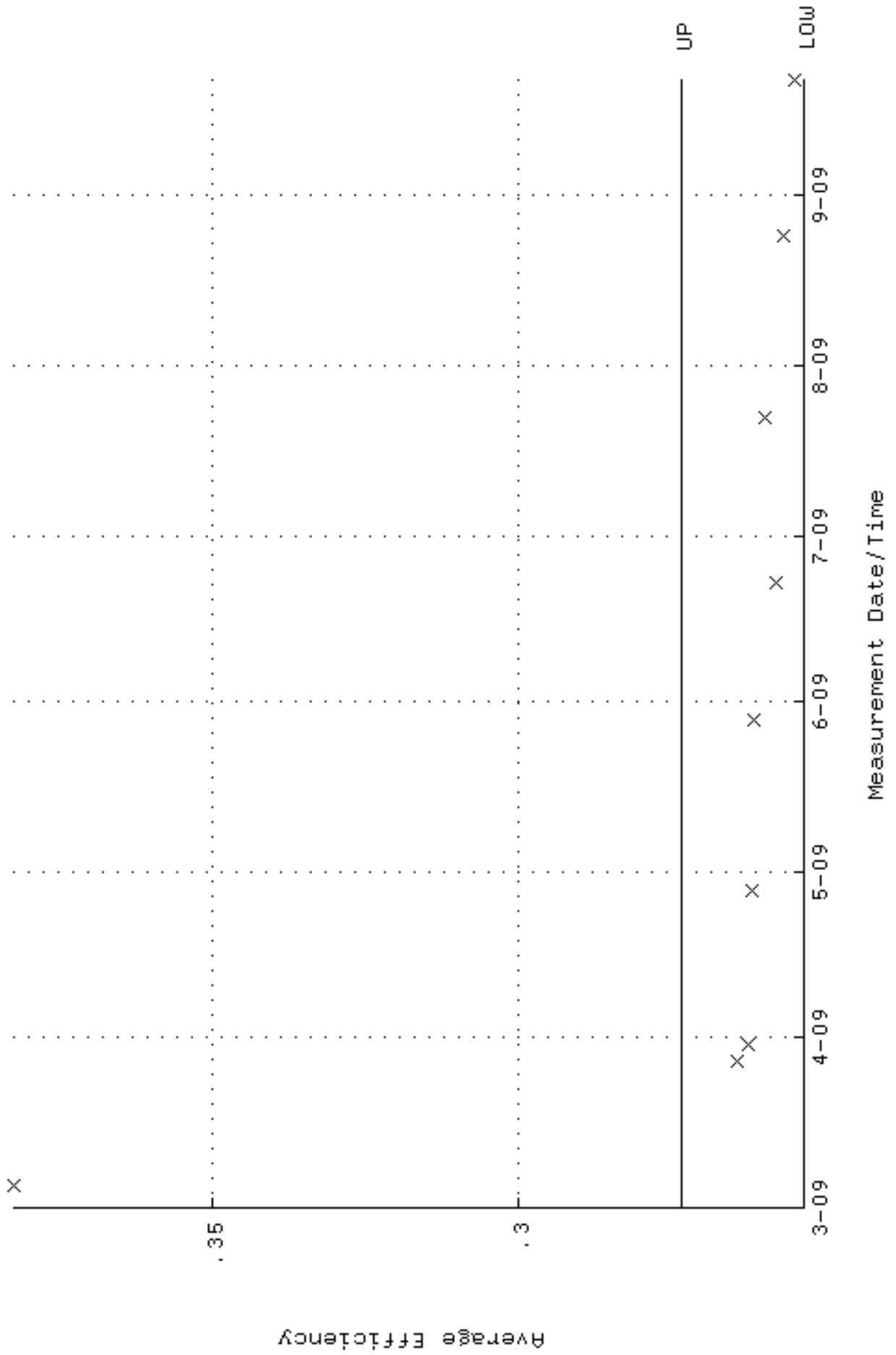
QA filename : DKA100:[ENV_ALPHA.QA.W]W175.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:38:37 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 90.6224 through 100.162



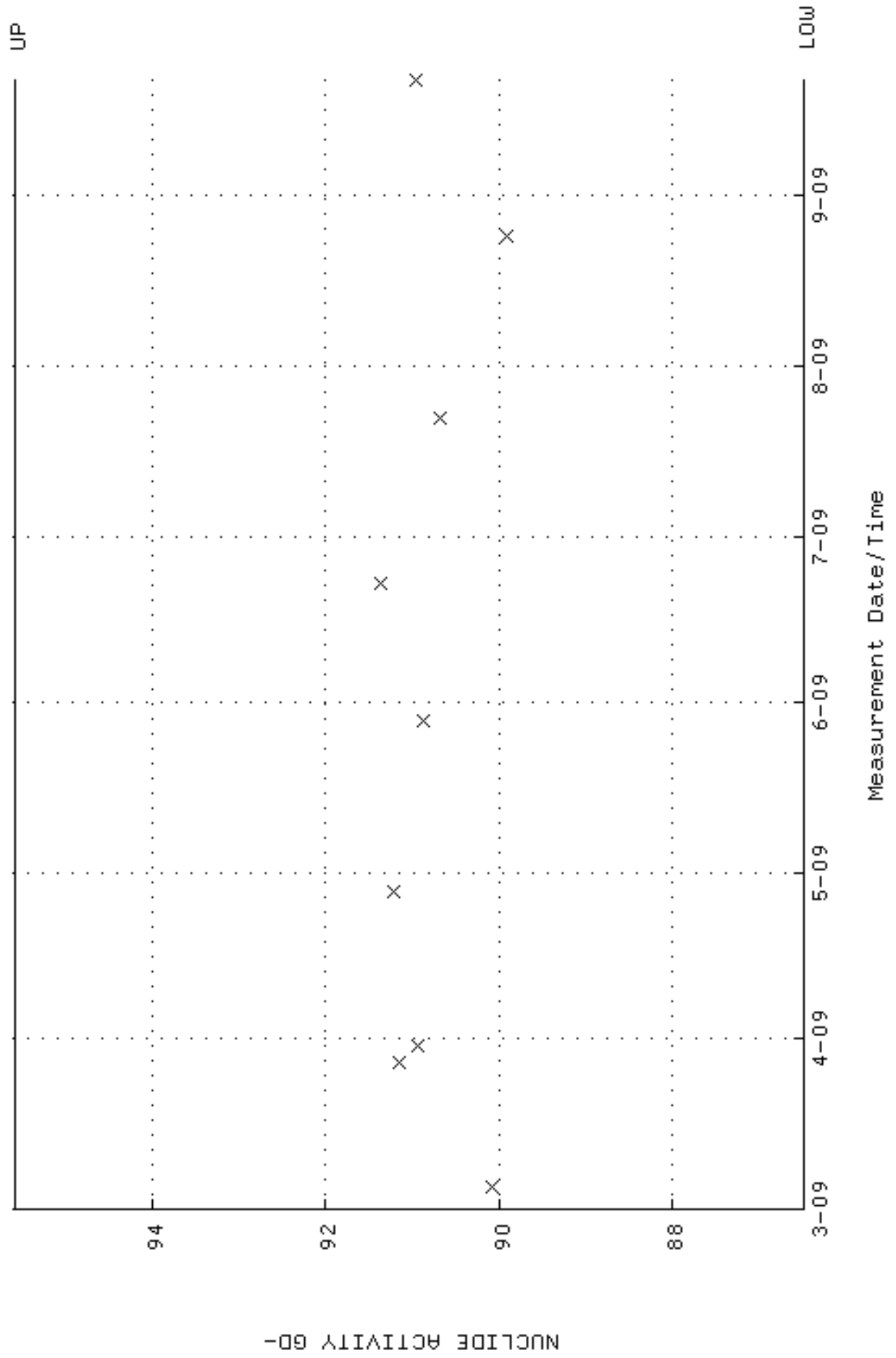
QA filename : DKA100:[ENV_ALPHA.QA.B]B175.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:21:54 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



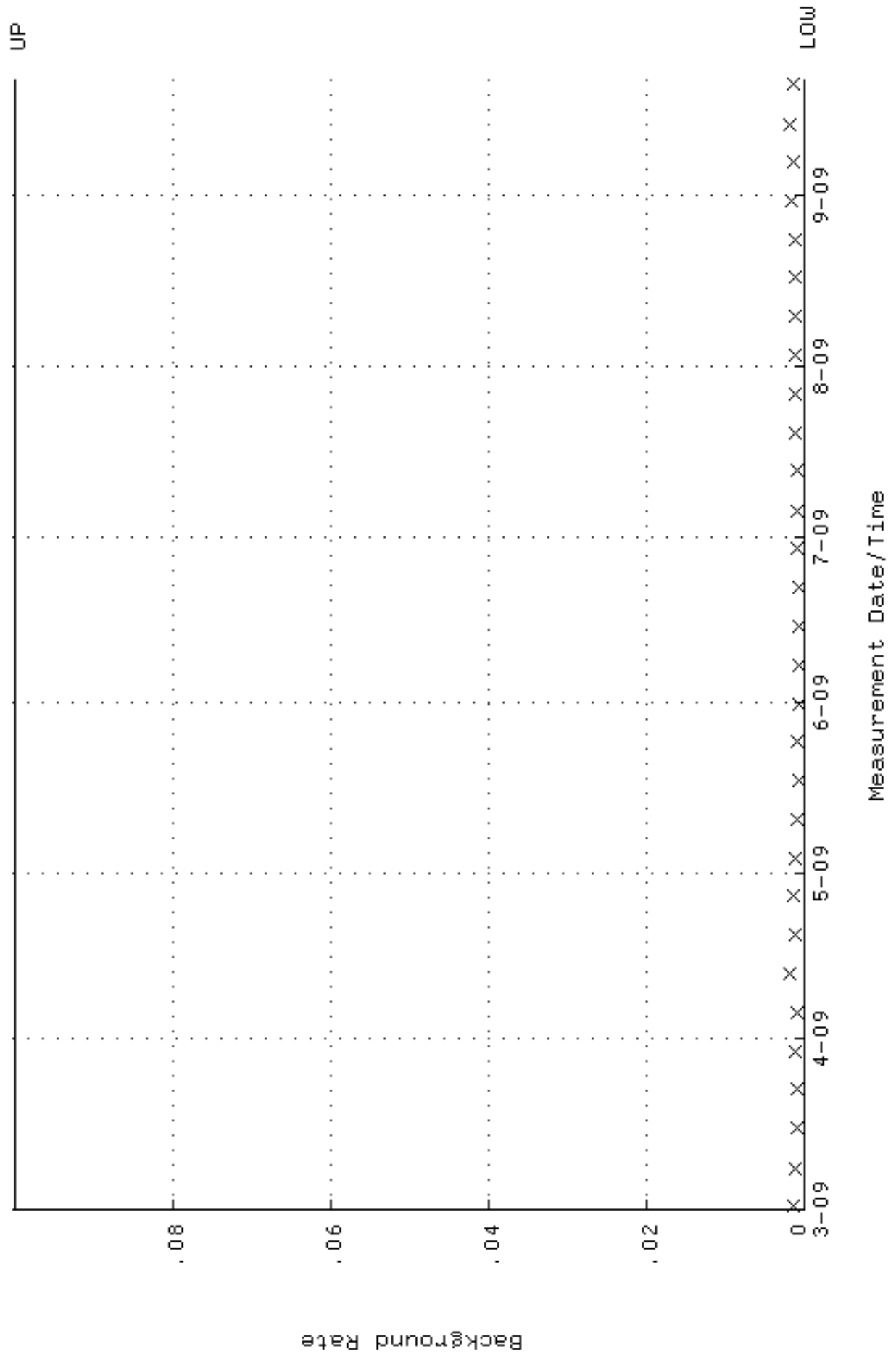
QA filename : DKA100:[ENV_ALPHA.QA.W]W176.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:38:41 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.253285 through 0.273285



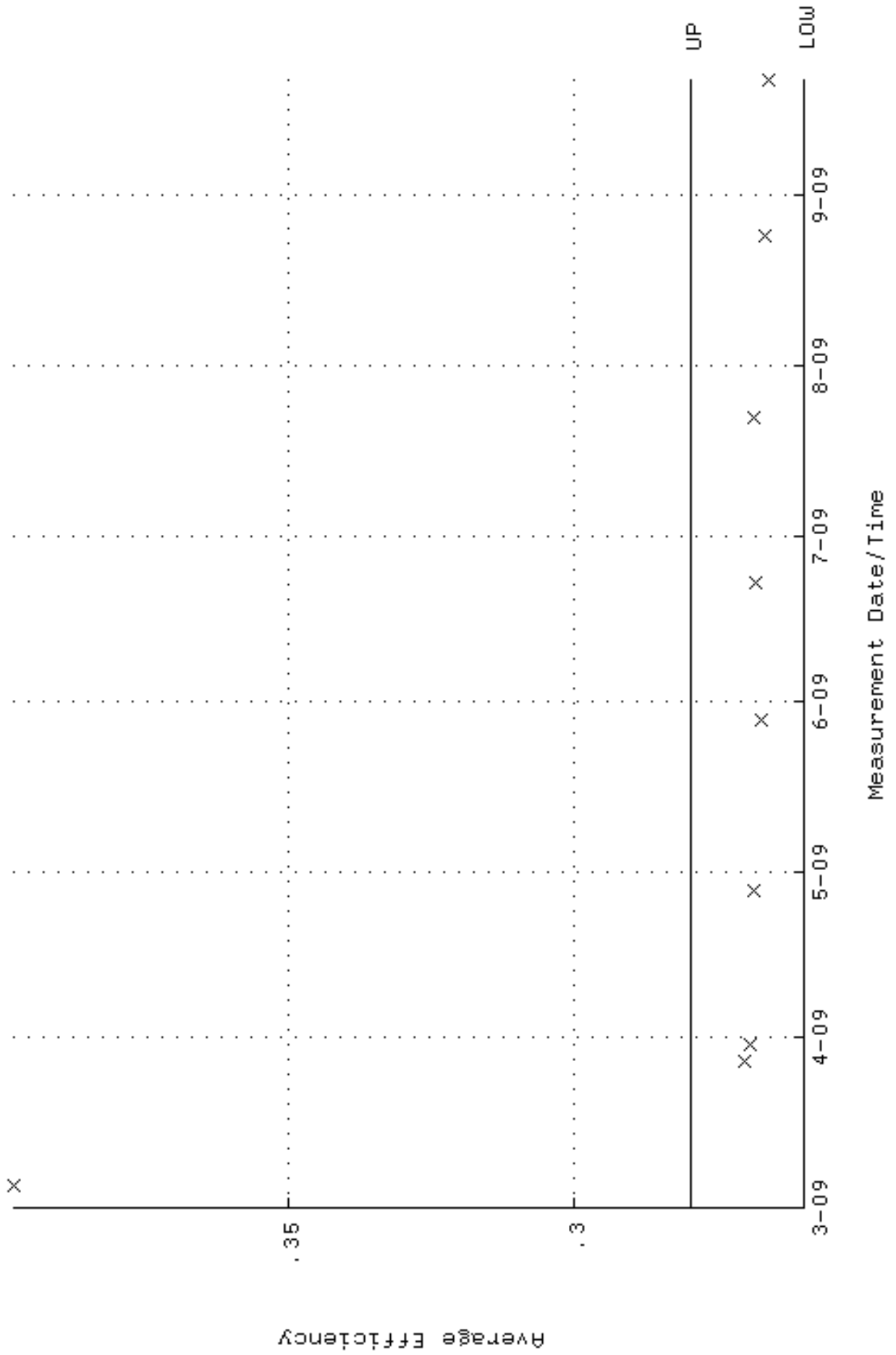
QA filename : DKA100:[ENV_ALPHA.QA.W]w176.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:38:41 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 86.4817 through 95.5851



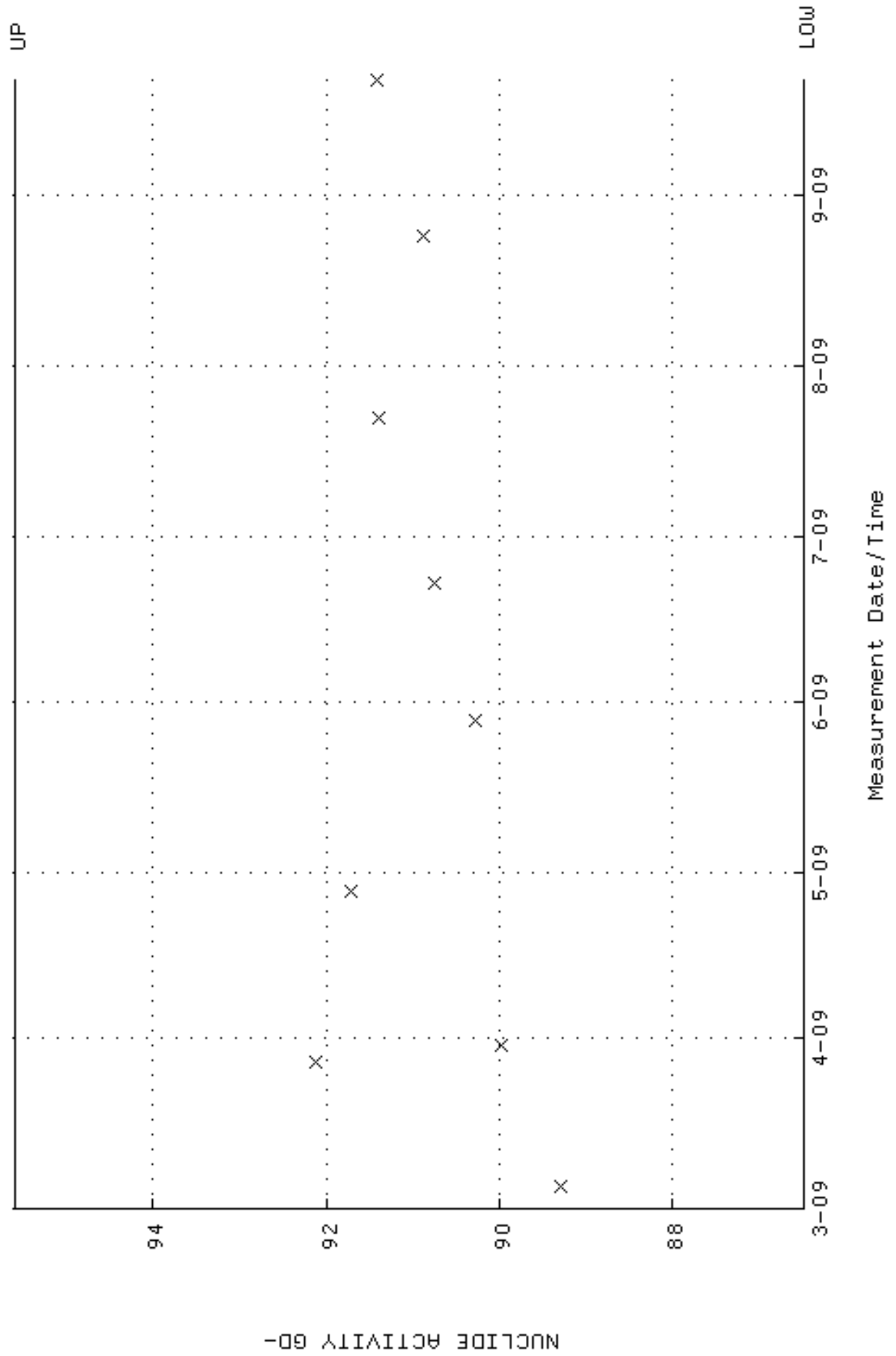
QA filename : DKA100:[ENV_ALPHA.QA.B]B176.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:21:58 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



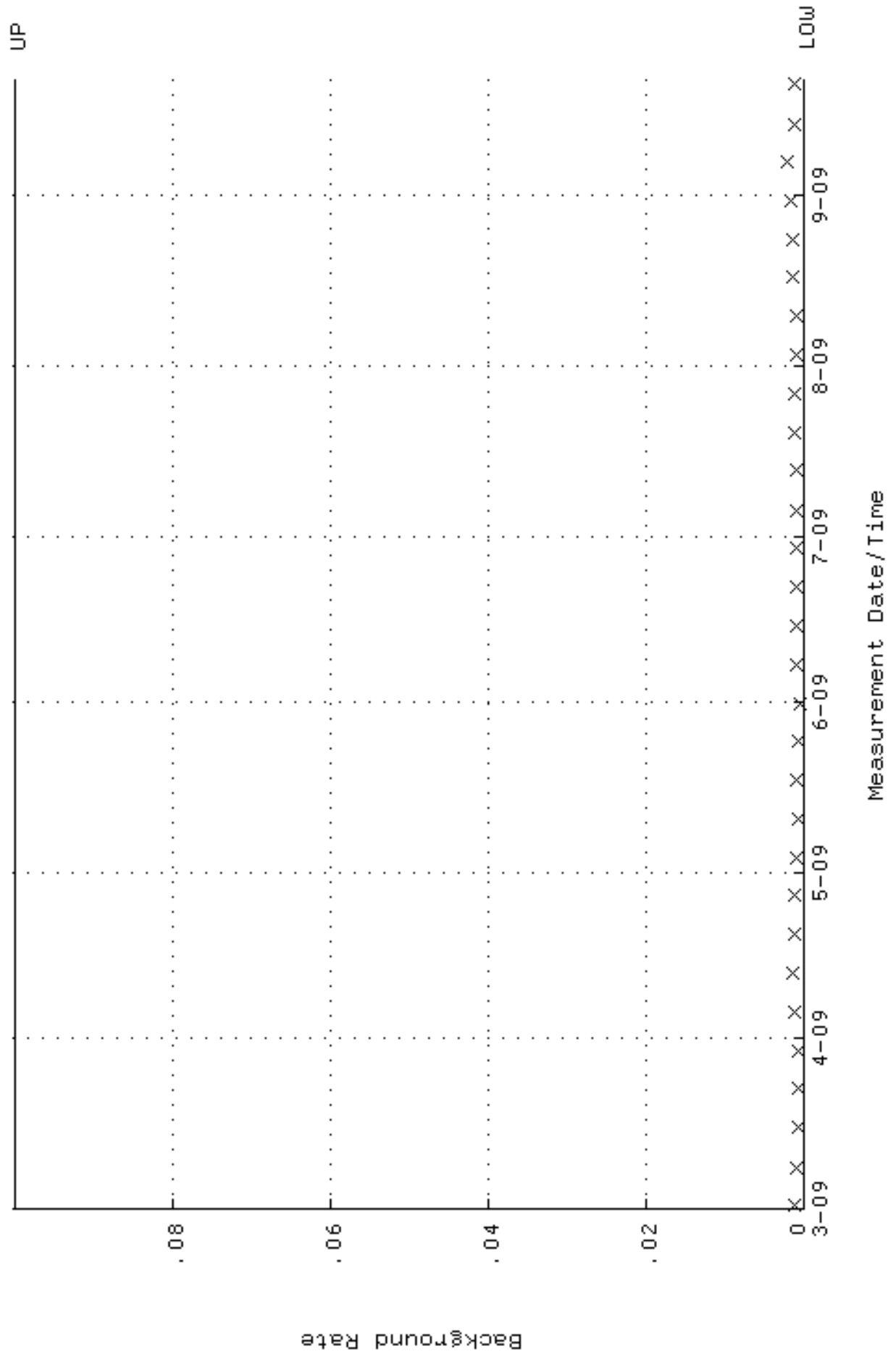
QA filename : DKA100:[ENV_ALPHA.QA.W]W177.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:38:46 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.259935 through 0.279935



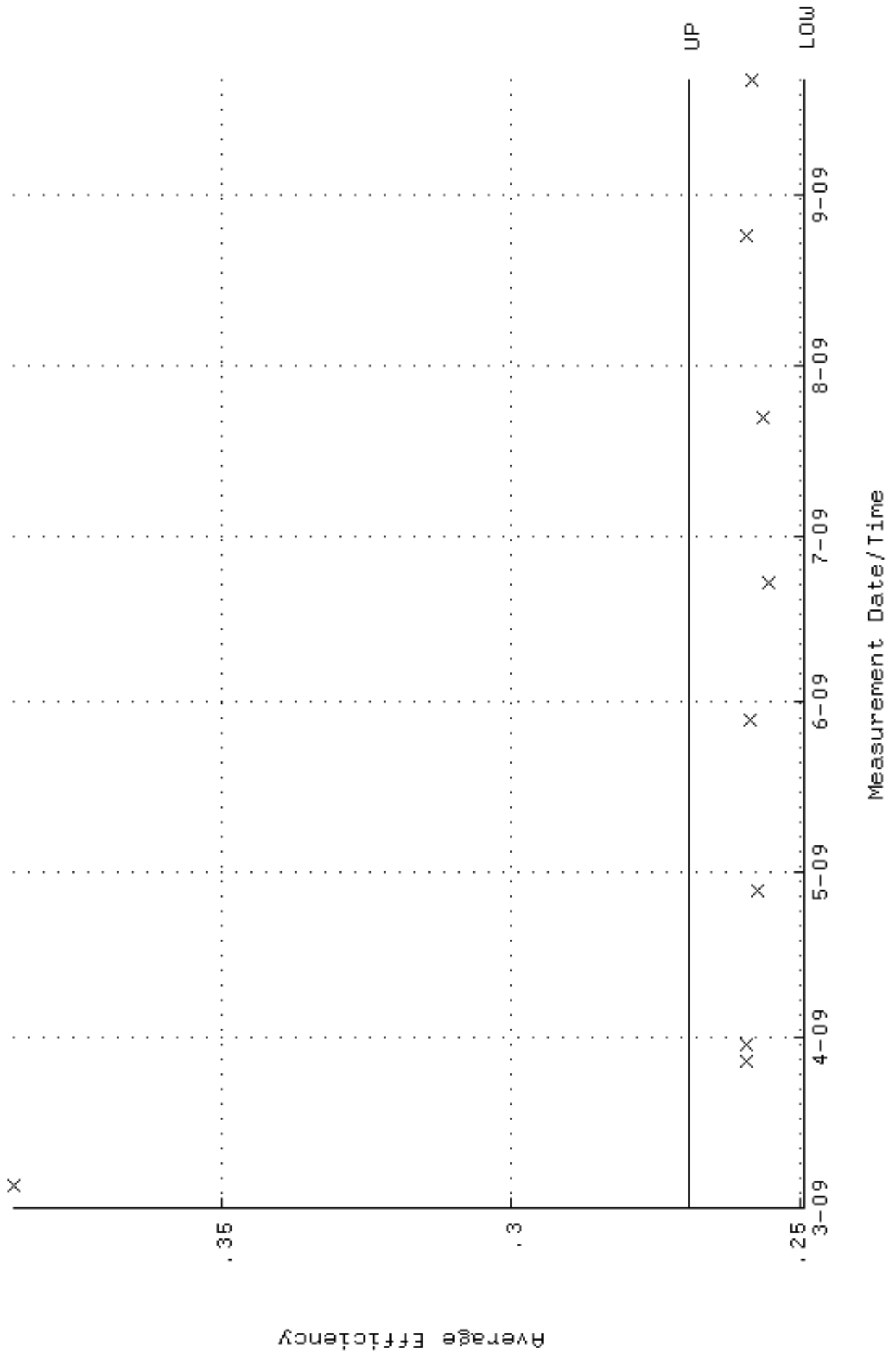
QA filename : DKA100:[ENV_ALPHA.QA.W]w177.QAF;1
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2009 22:38:46 through 21-SEP-2009 12:00:00
Lower/Upper Lmts: 86.4857 through 95.5895



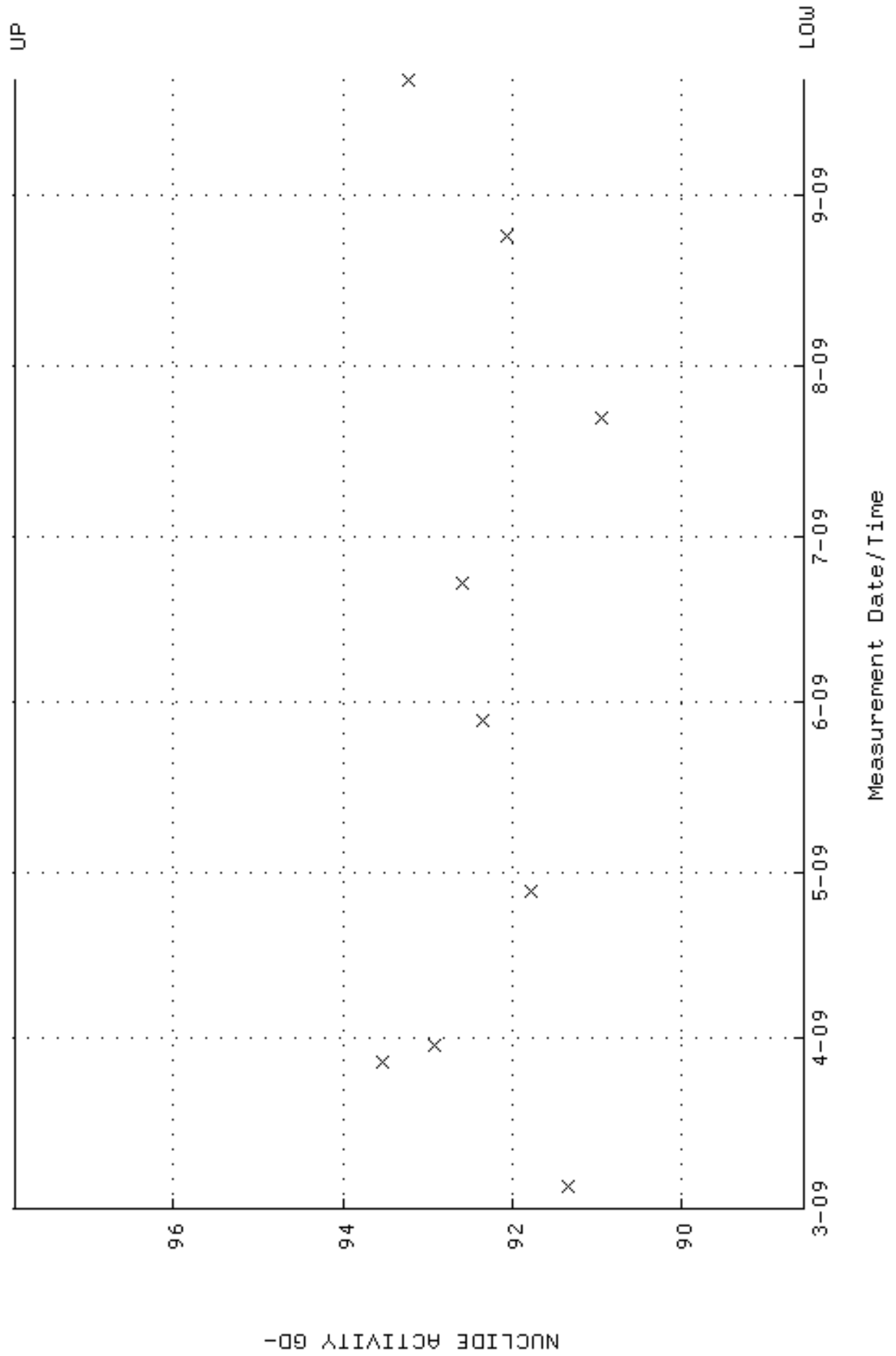
QA filename : DKA100:[ENV_ALPHA.QA.B]B177.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:02 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



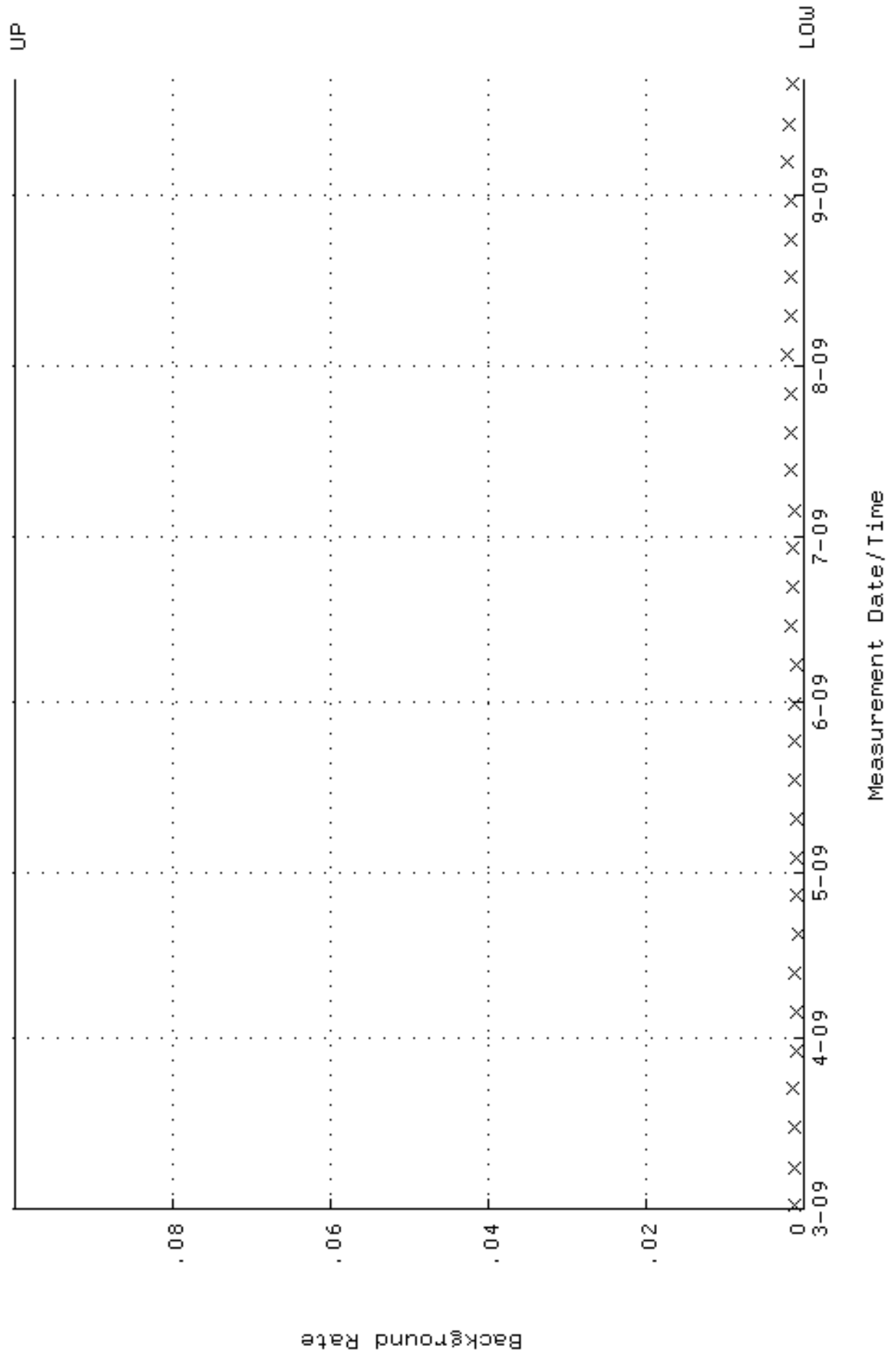
QA filename : DKA100:[ENV_ALPHA.QA.W]W178.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:38:50 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.249490 through 0.269490



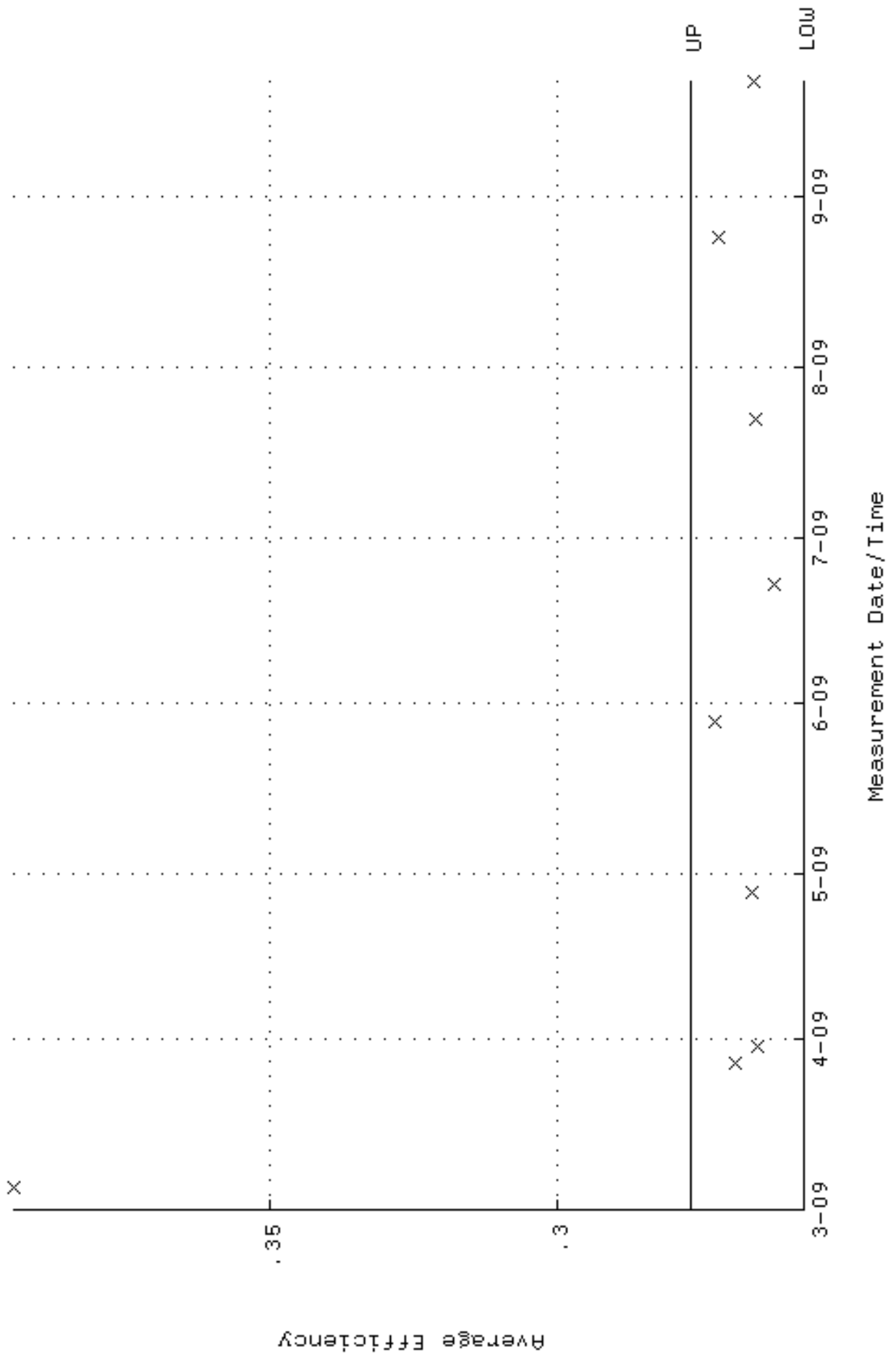
QA filename : DKA100:[ENV_ALPHA.QA.W]w178.QAF;1
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2009 22:38:50 through 21-SEP-2009 12:00:00
Lower/Upper Lmts: 88.5525 through 97.8739



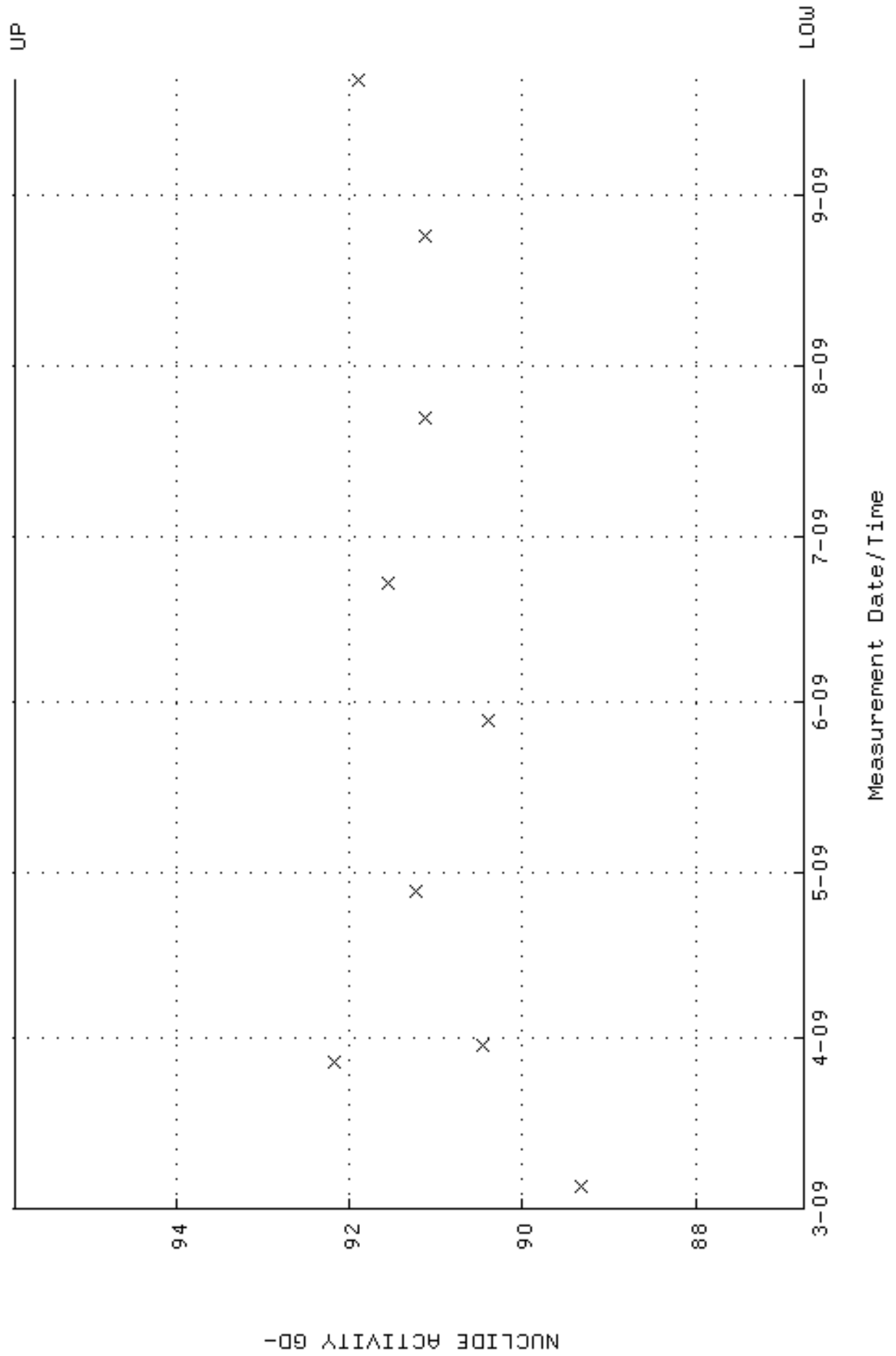
QA filename : DKA100:[ENV_ALPHA.QA.B]B178.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:05 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



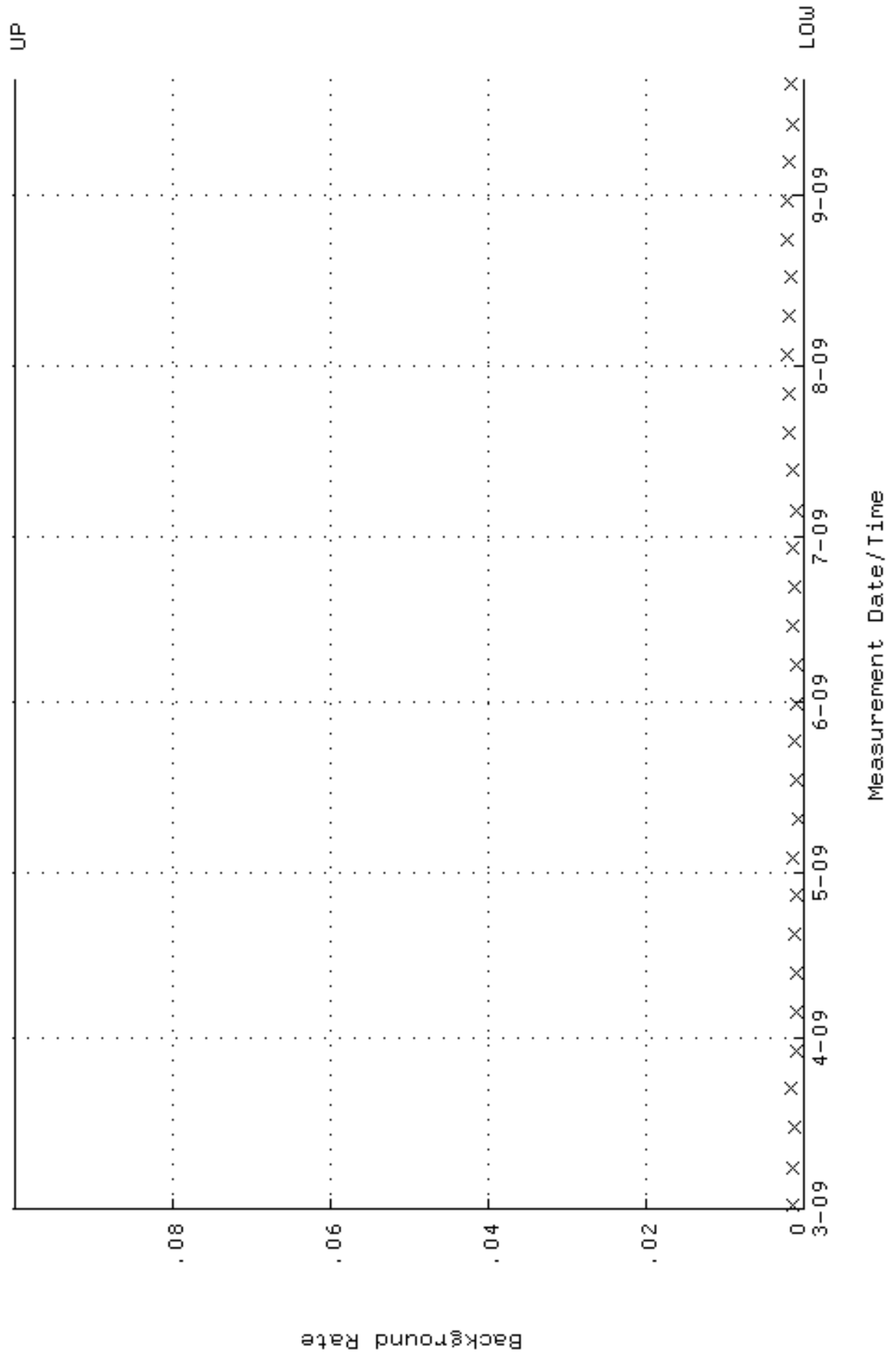
QA filename : DKA100:[ENV_ALPHA.QA.W]W179.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:38:54 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.256911 through 0.276911



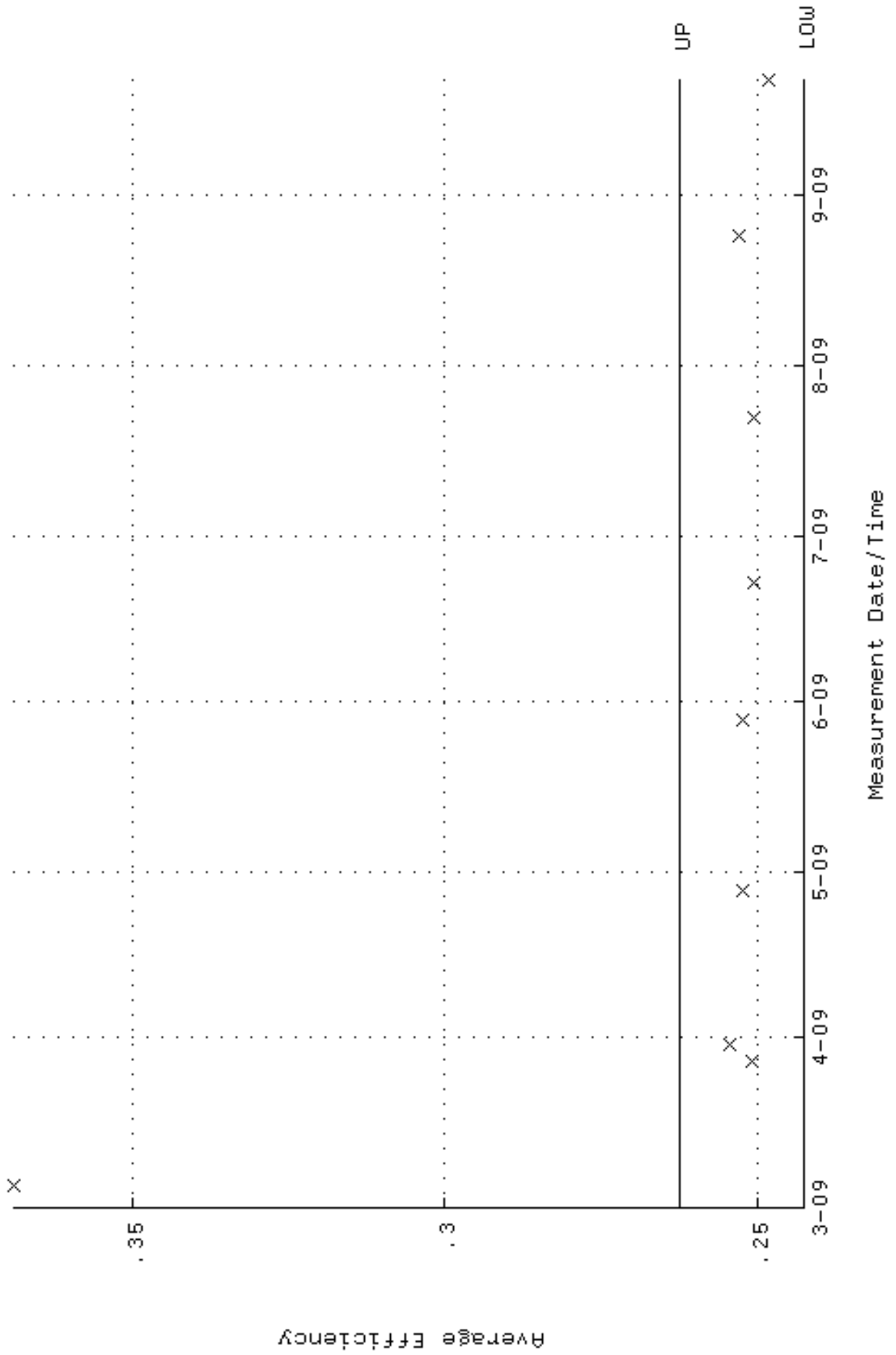
QA filename : DKA100:[ENV_ALPHA.QA.W]w179.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:38:54 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 86.7434 through 95.8742



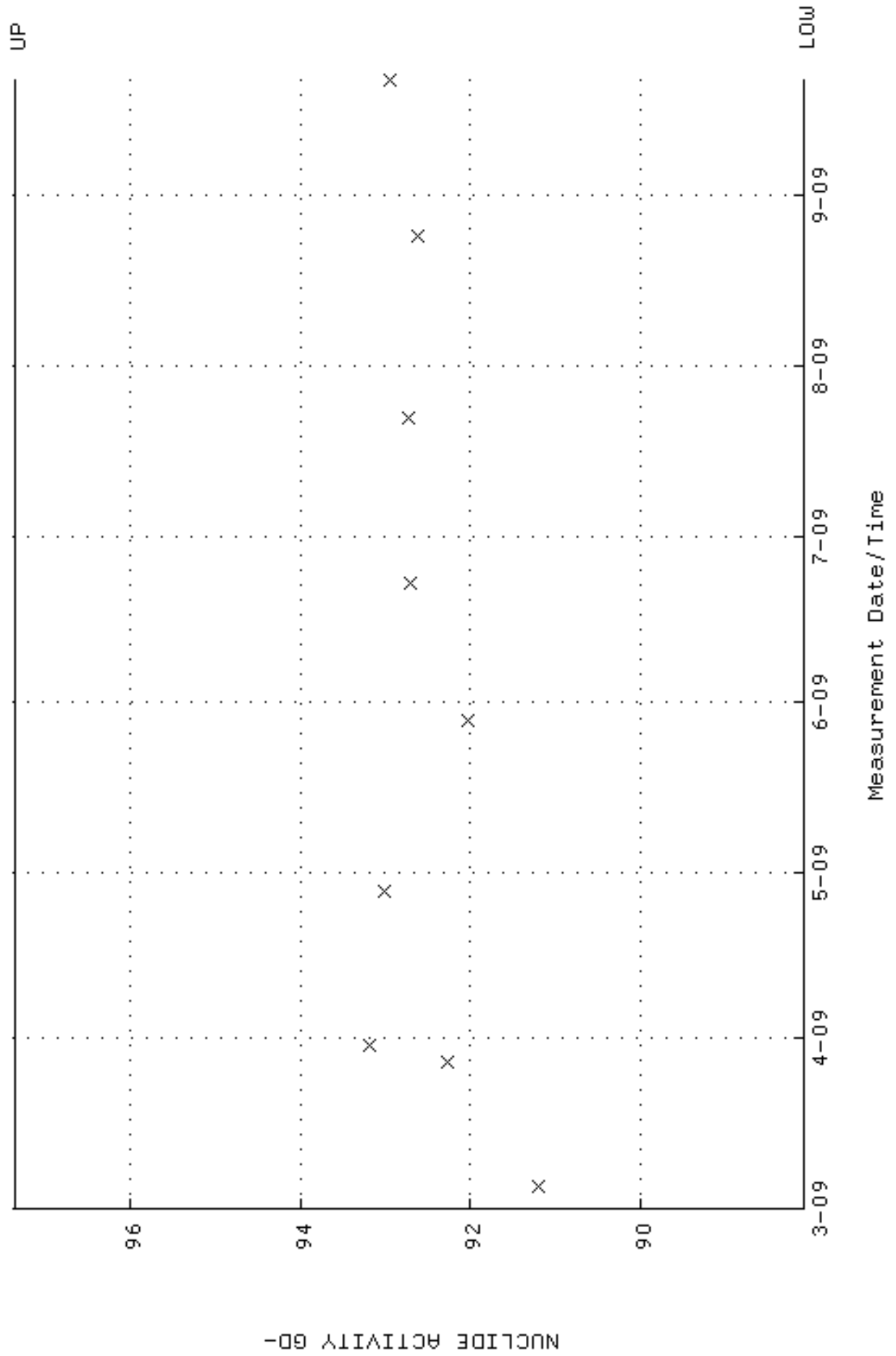
QA filename : DKA100:[ENV_ALPHA.QA.B]B179.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:09 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



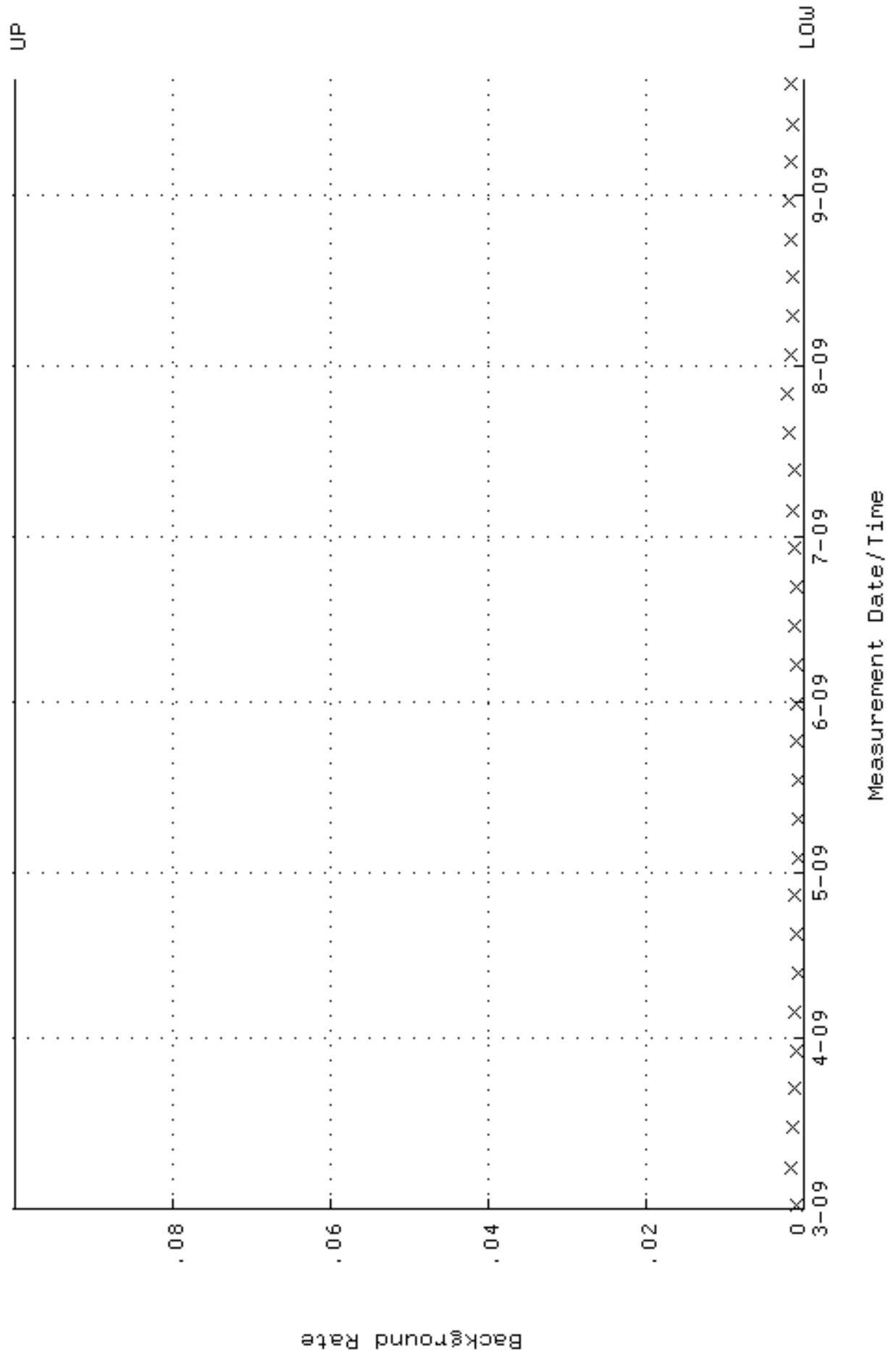
QA filename : DKA100:[ENV_ALPHA.QA.W]W180.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:38:58 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.242633 through 0.262633



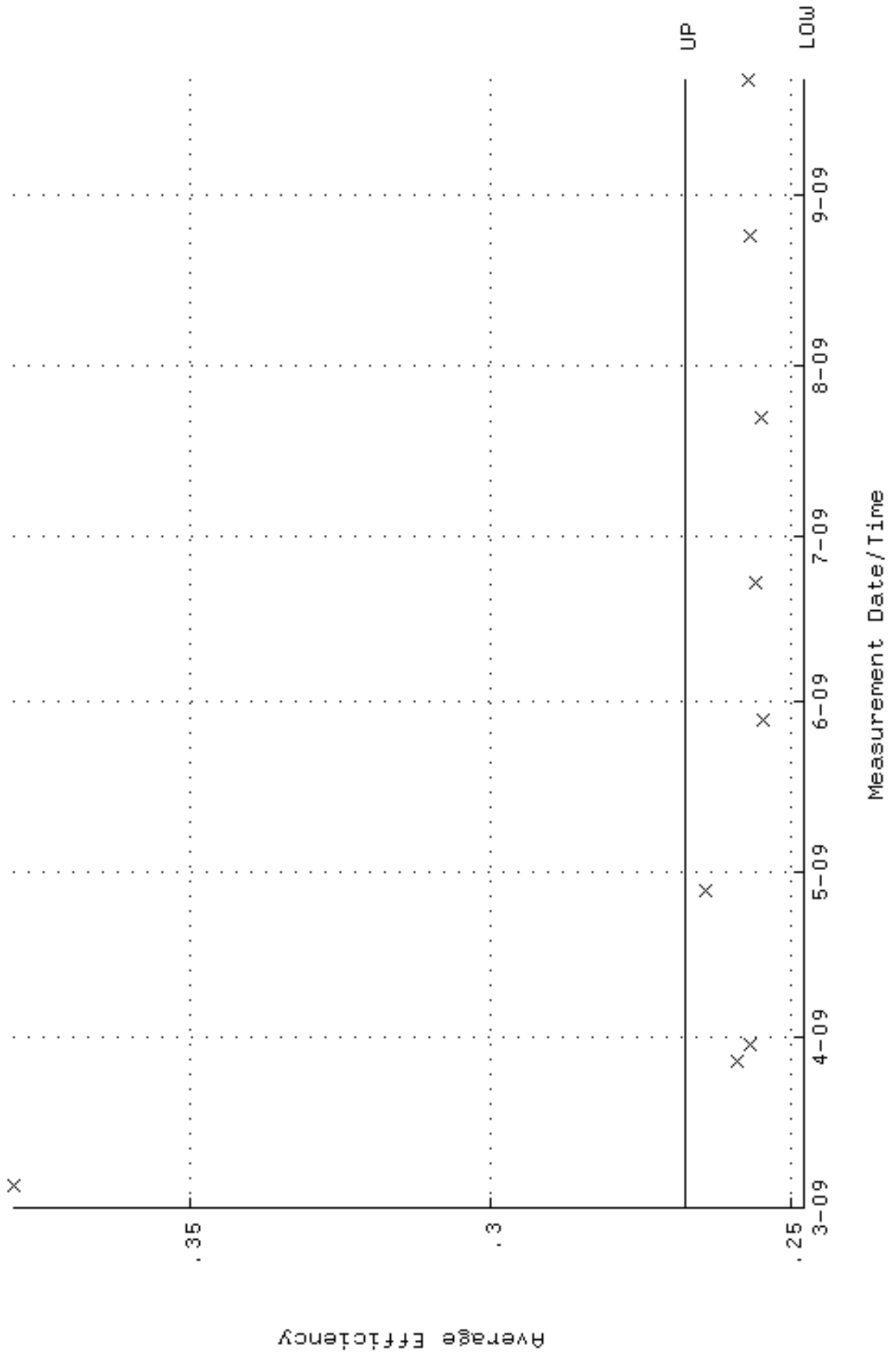
QA filename : DKA100:[ENV_ALPHA.QA.W]W180.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:38:58 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 88.0803 through 97.3519



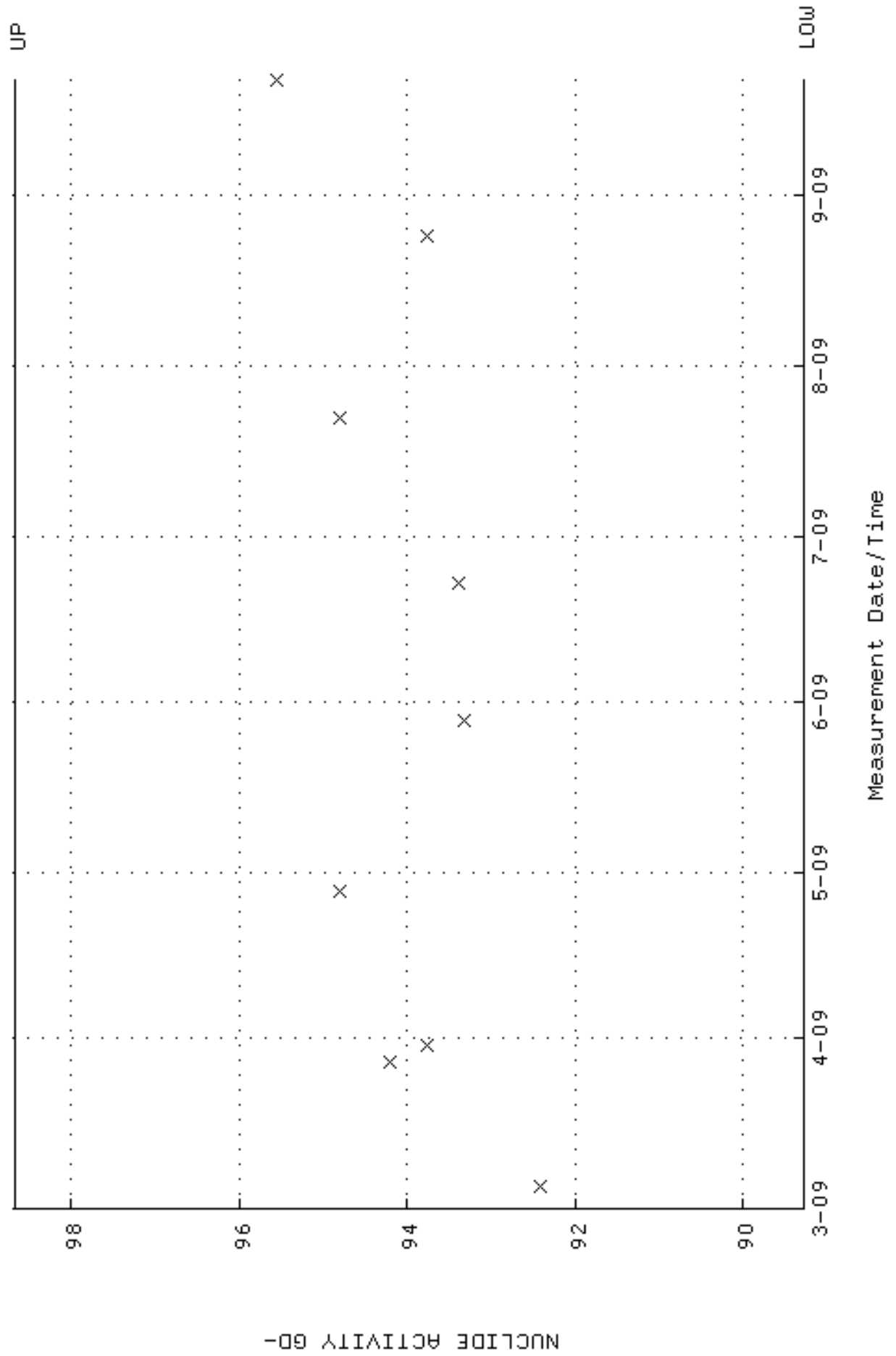
QA filename : DKA100:[ENV_ALPHA.QA.B]B180.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:13 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



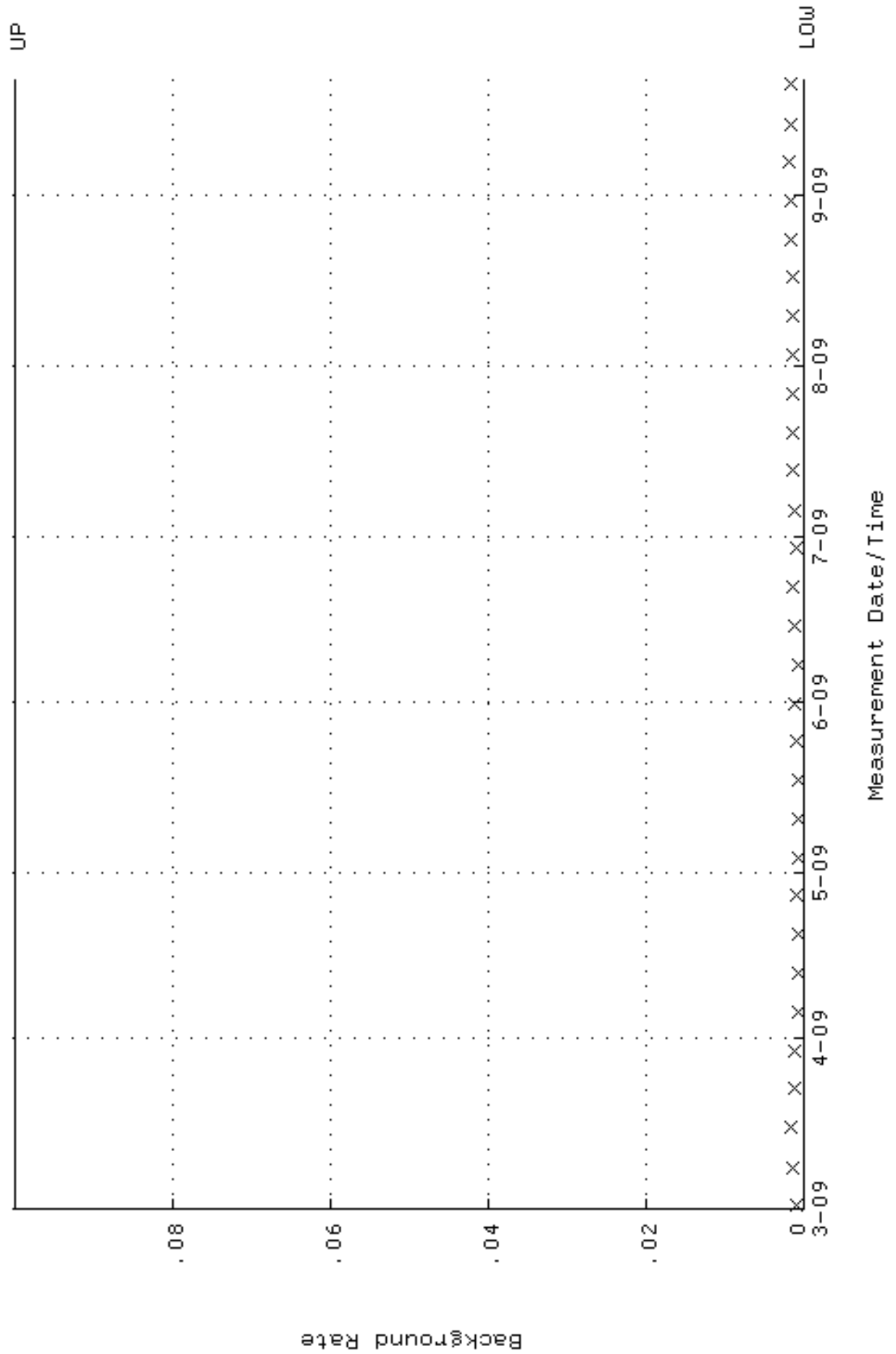
QA filename : DKA100:[ENV_ALPHA.QA.W]W181.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:39:03 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.247722 through 0.267722



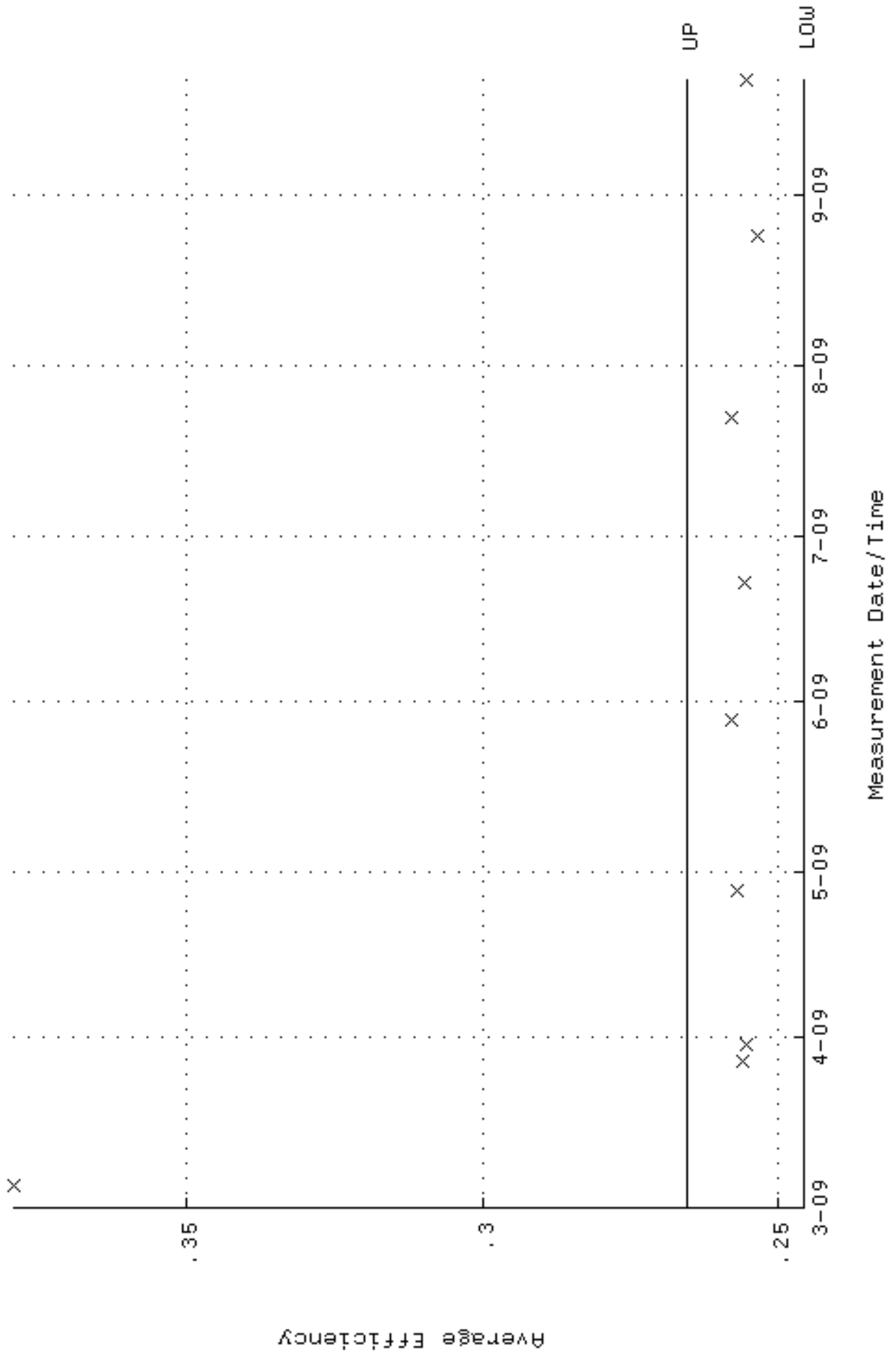
QA filename : DKA100:[ENV_ALPHA.QA.W]w181.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:39:03 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 89.2737 through 98.6709



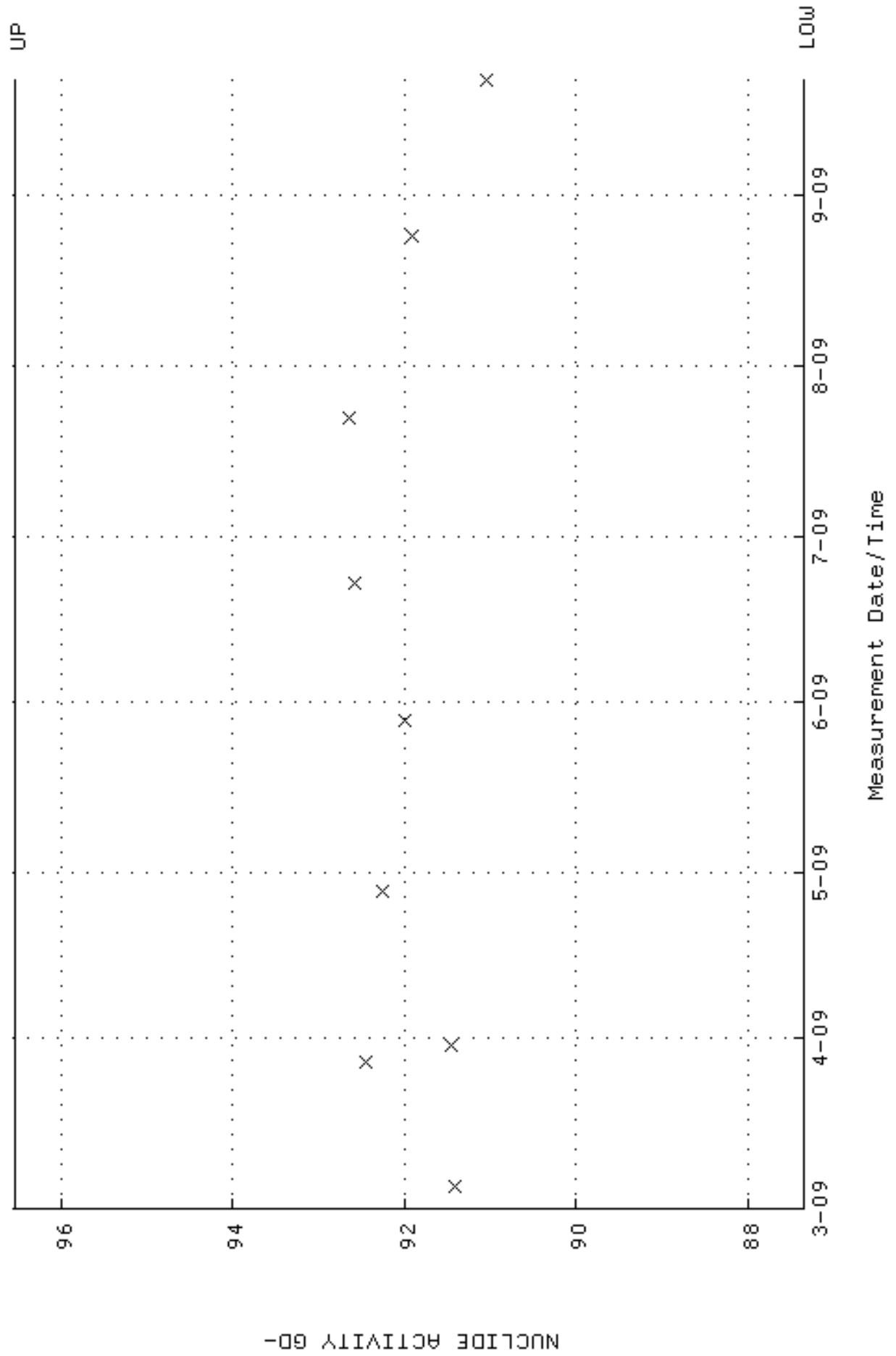
QA filename : DKA100:[ENV_ALPHA.QA.B]B181.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:17 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



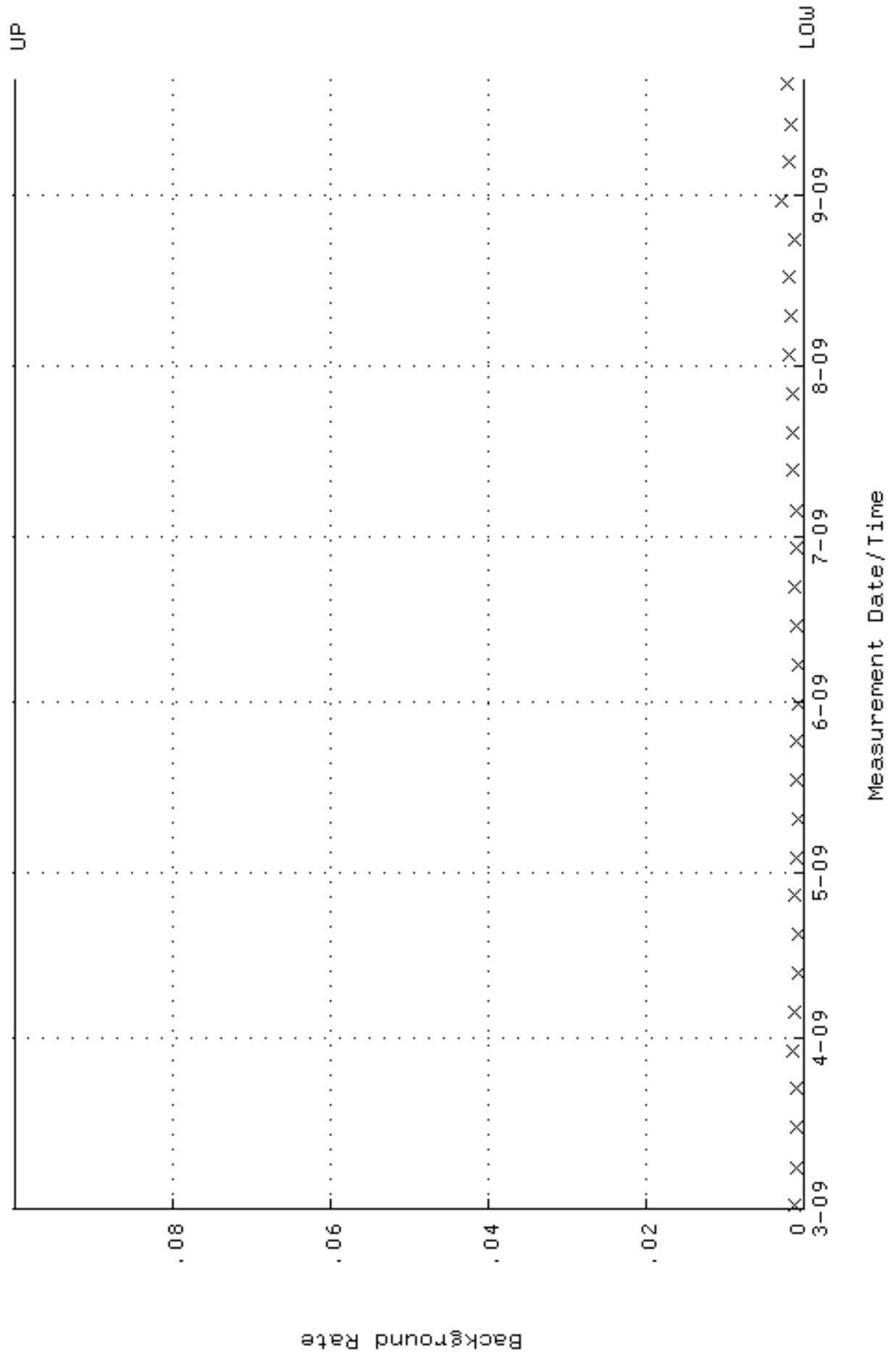
QA filename : DKA100:[ENV_ALPHA.QA.W]W182.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:39:07 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.245707 through 0.265707



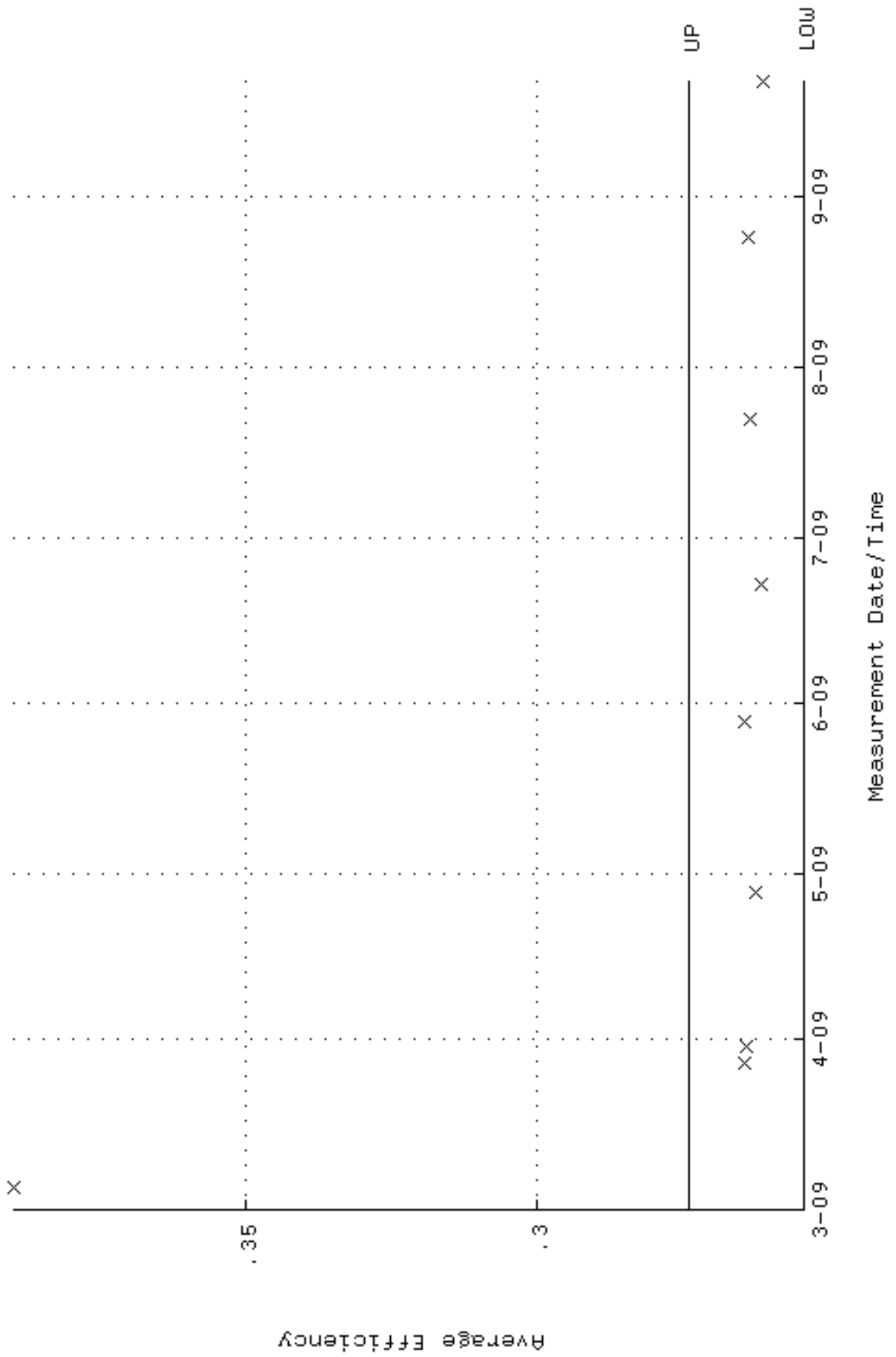
QA filename : DKA100:[ENV_ALPHA.QA.W]w182.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:39:07 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 87.3454 through 96.5396



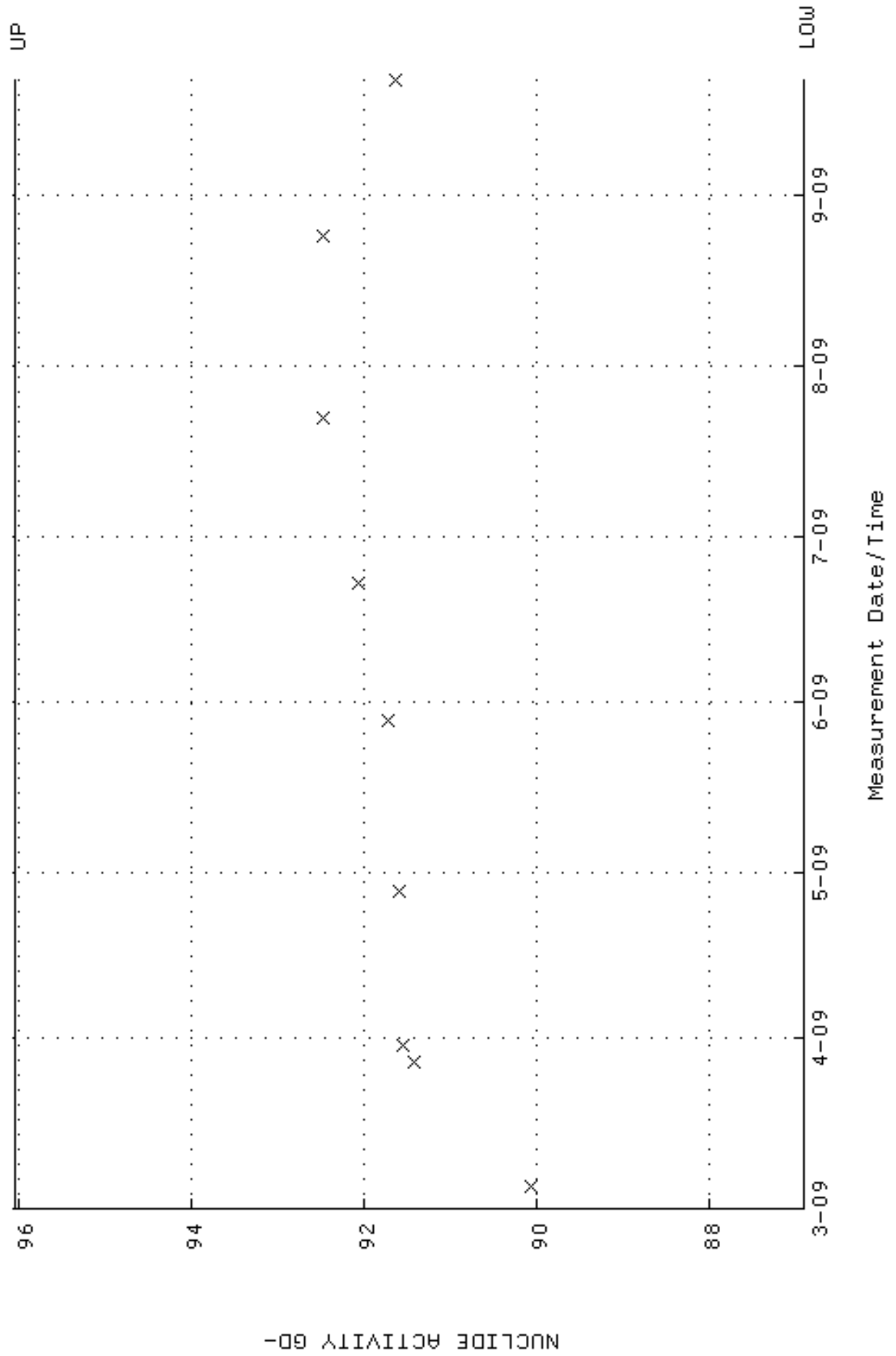
QA filename : DKA100:[ENV_ALPHA.QA.B]B182.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:20 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



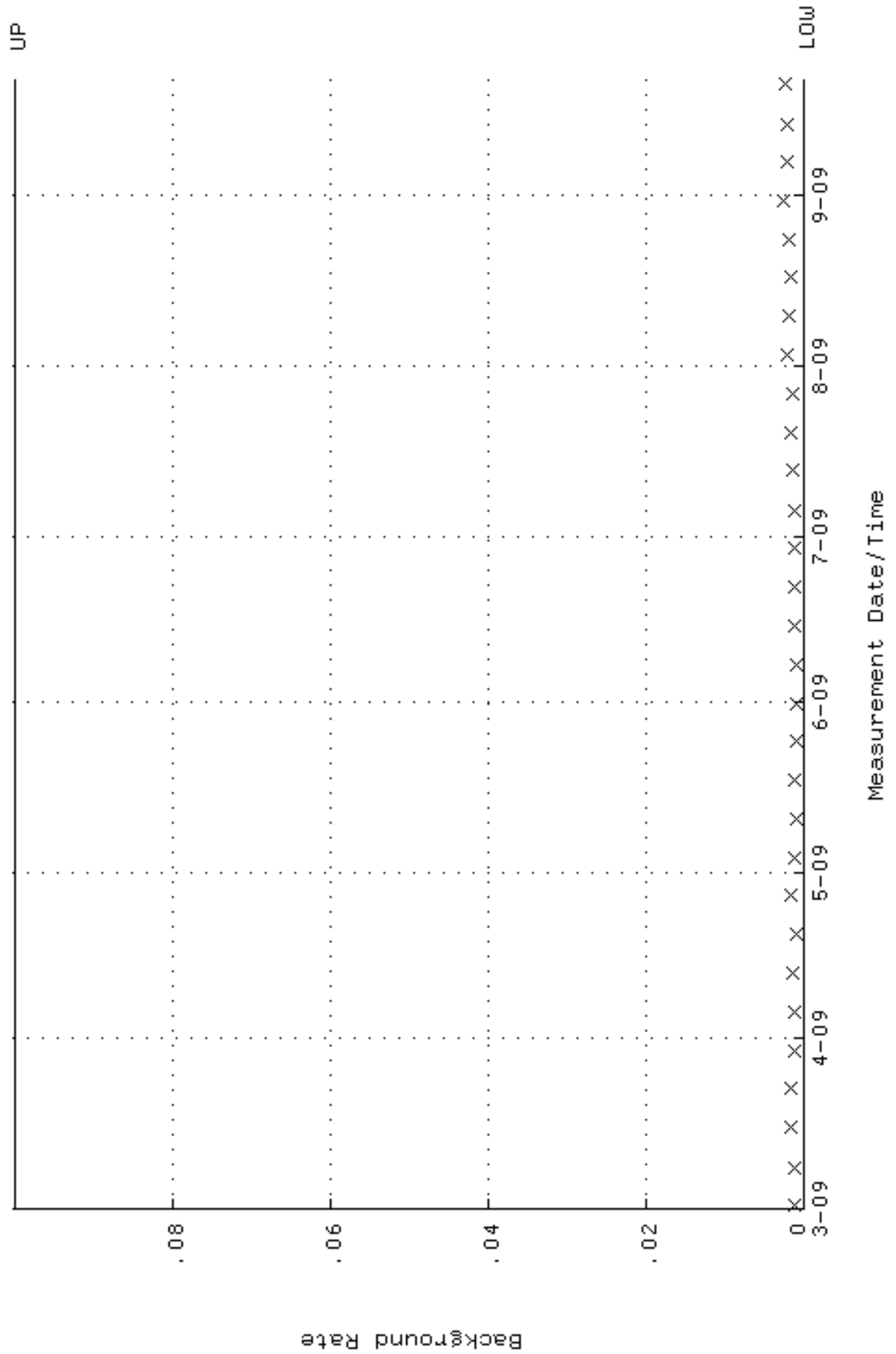
QA filename : DKA100:[ENV_ALPHA.QA.W]W183.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:39:11 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.254364 through 0.274364



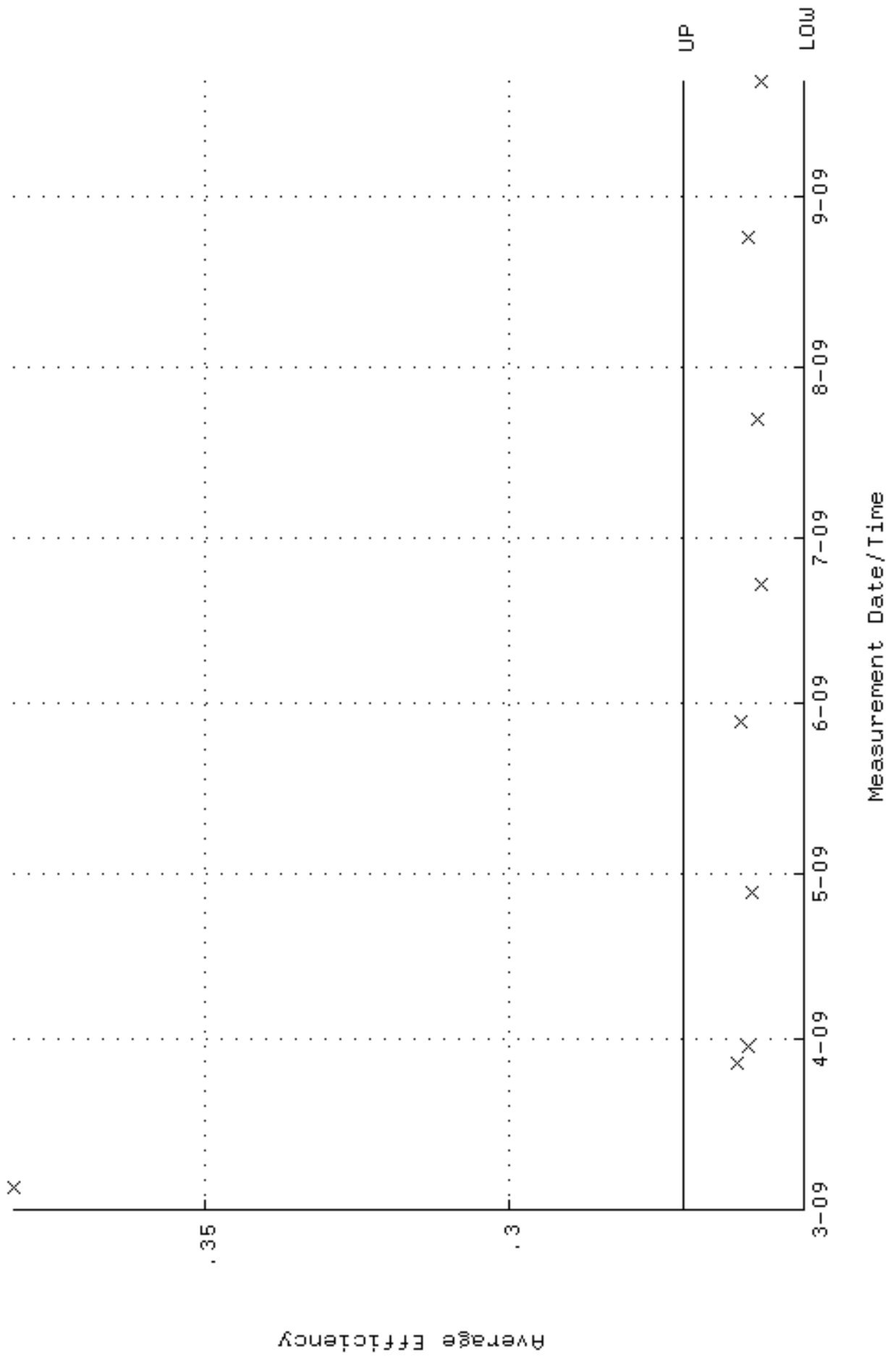
QA filename : DKA100:[ENV_ALPHA.QA.W]w183.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:39:11 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 86.8927 through 96.0393



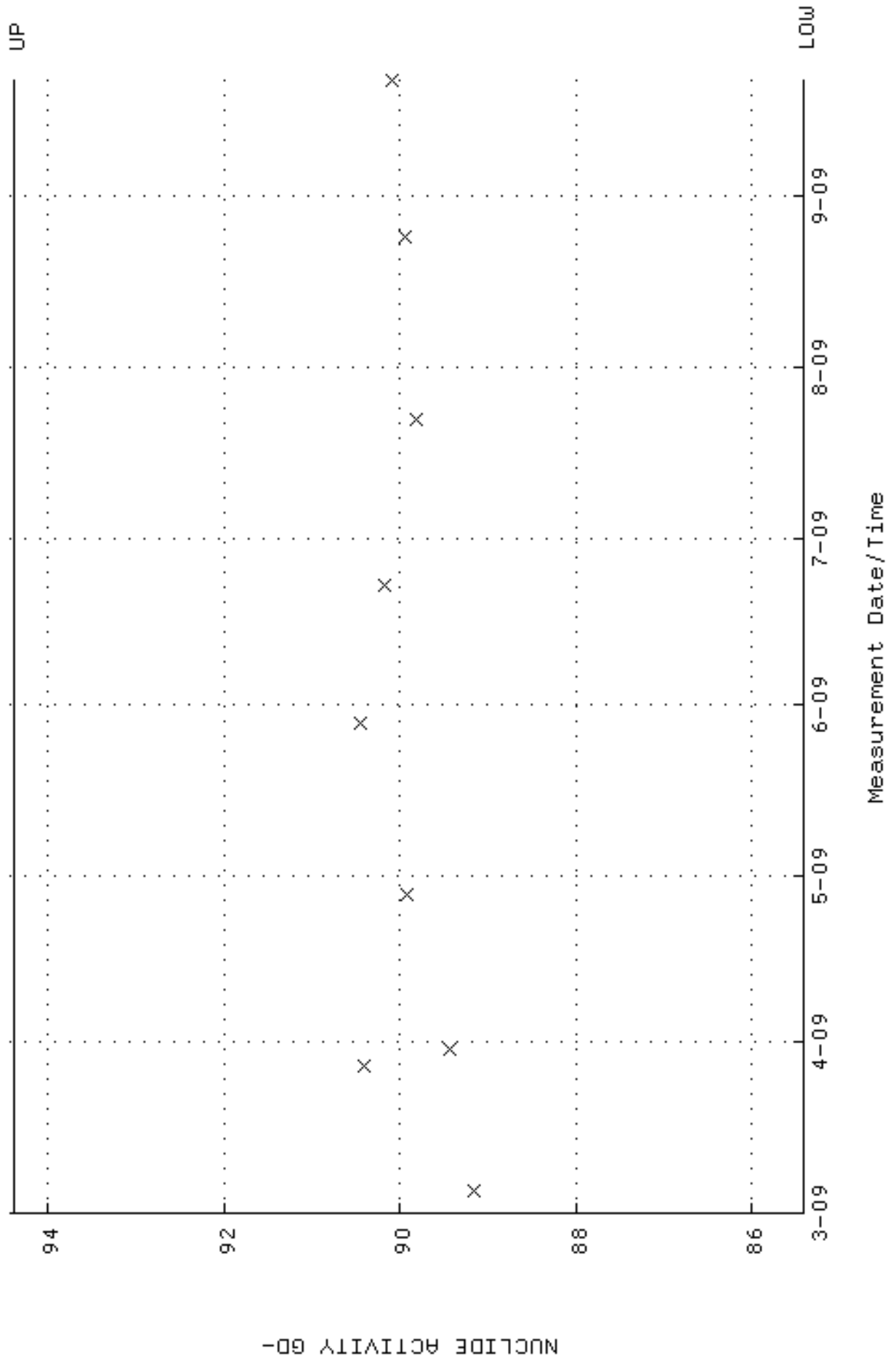
QA filename : DKA100:[ENV_ALPHA.QA.B]B183.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:24 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



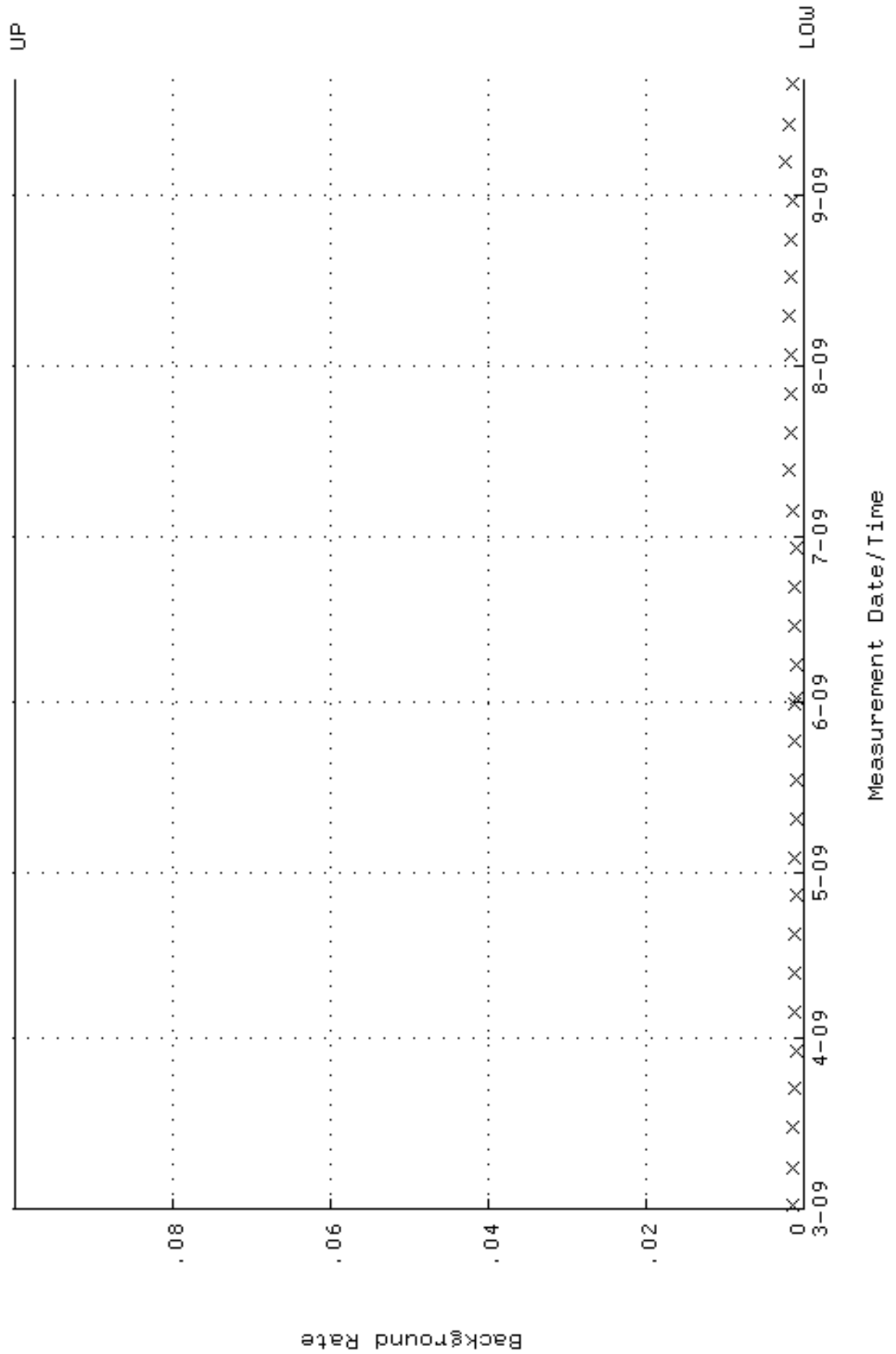
QA filename : DKA100:[ENV_ALPHA.QA.W]W184.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:39:15 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.251367 through 0.271367



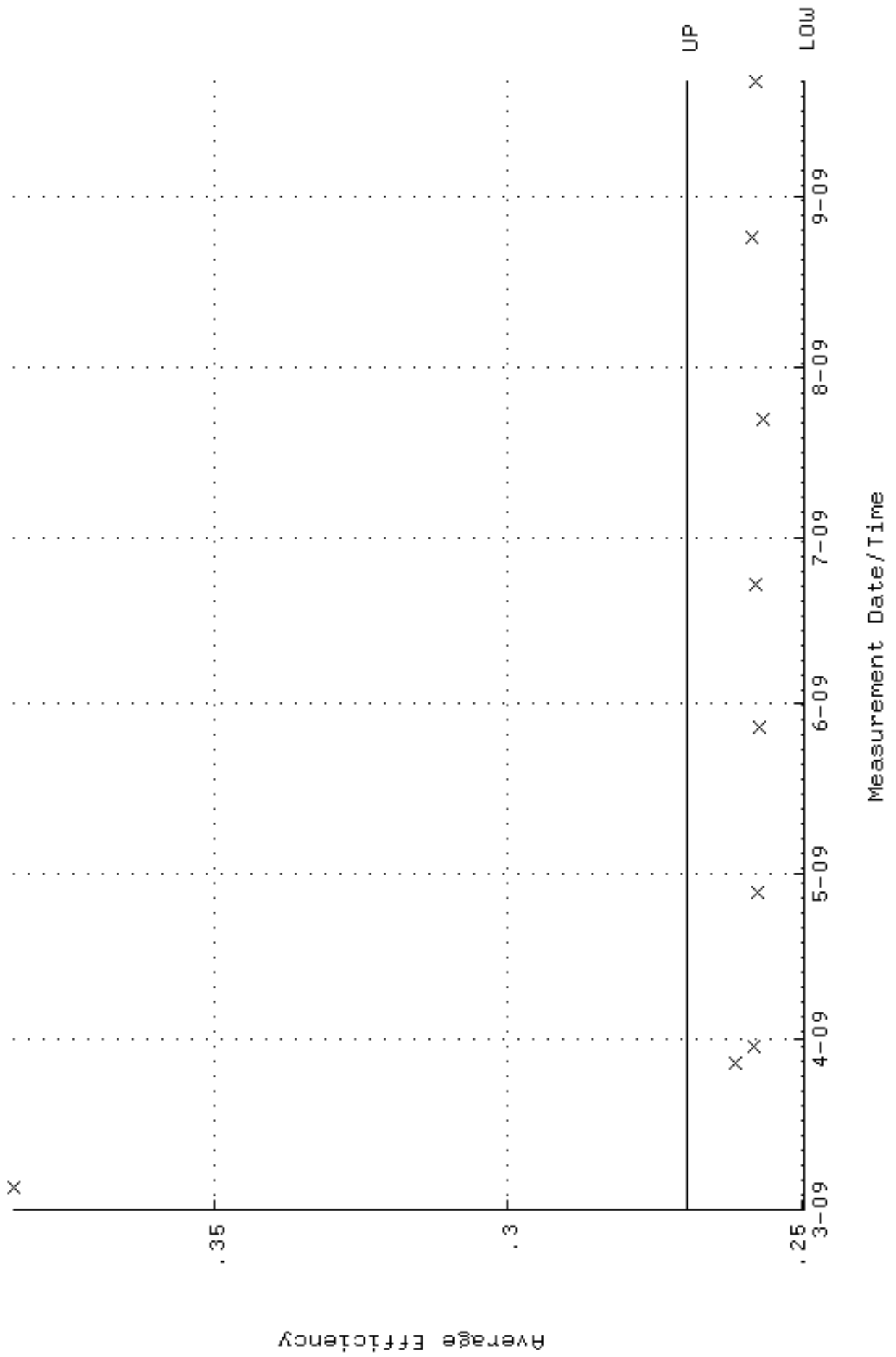
QA filename : DKA100:[ENV_ALPHA.QA.W]w184.QAF;1
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2009 22:39:15 through 21-SEP-2009 12:00:00
Lower/Upper Lmts: 85.4139 through 94.4049



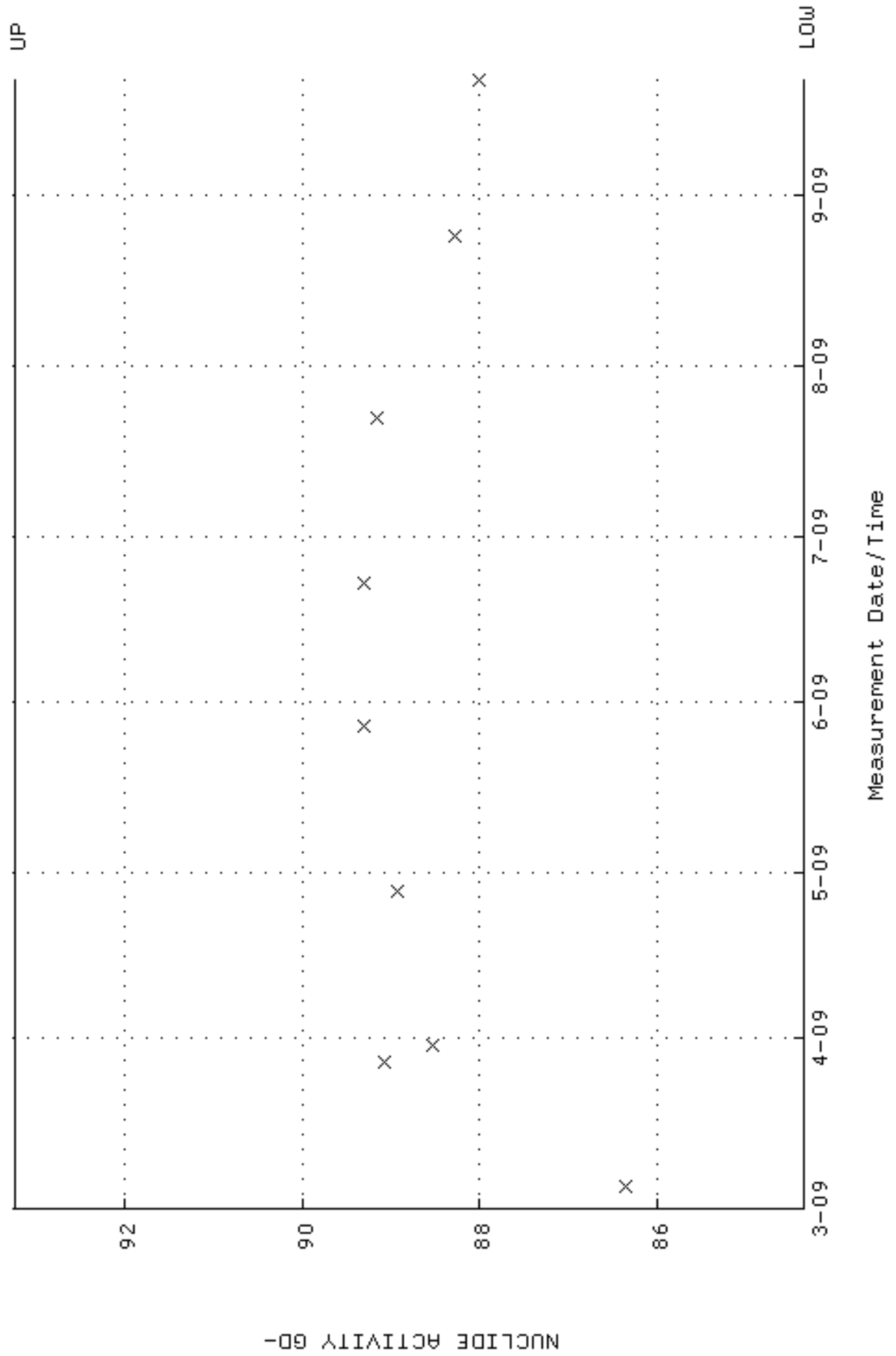
QA filename : DKA100:[ENV_ALPHA.QA.B]B184.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:28 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



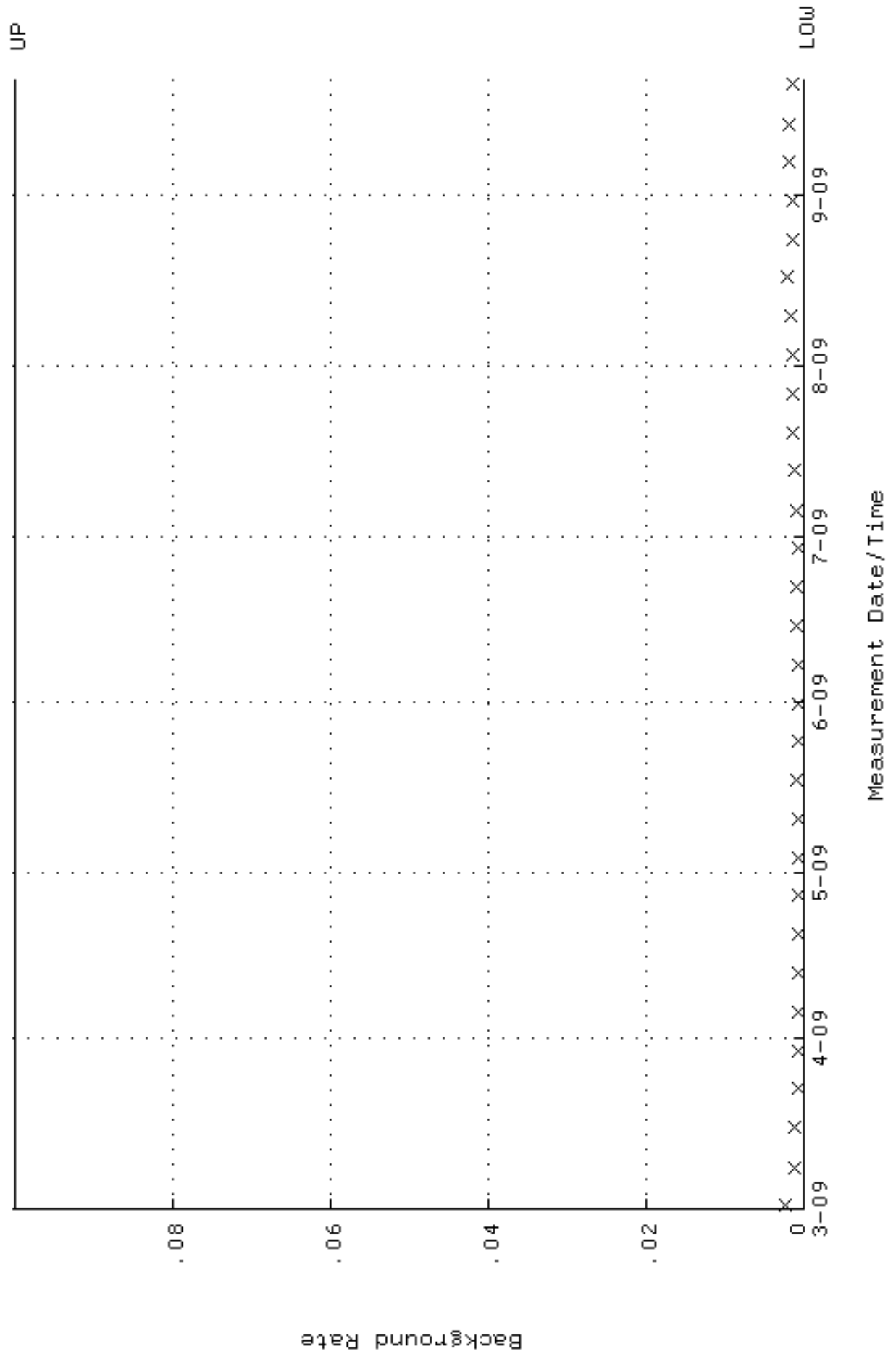
QA filename : DKA100:[ENV_ALPHA.QA.W]W185.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:39:19 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.249628 through 0.269628



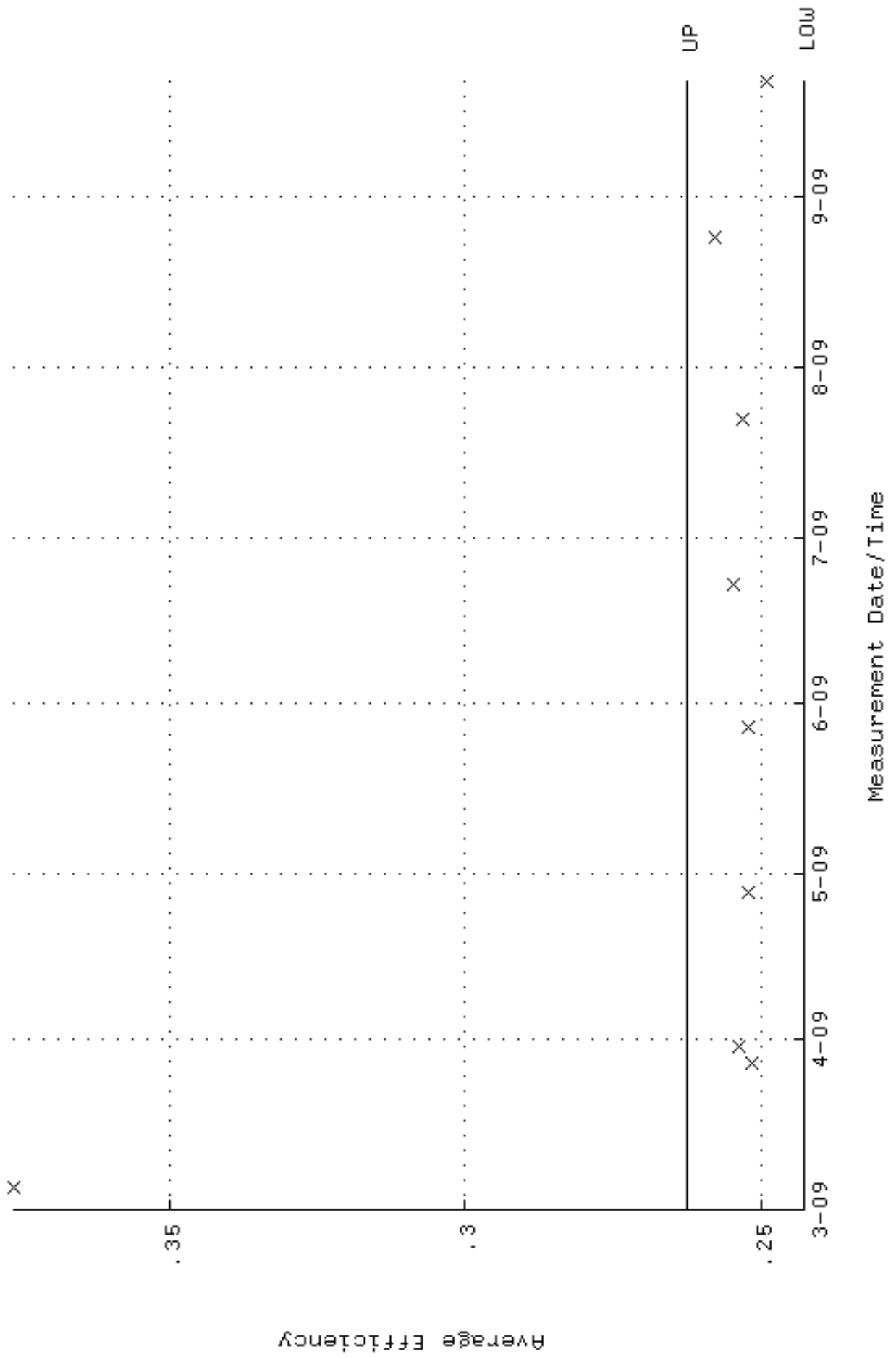
QA filename : DKA100:[ENV_ALPHA.QA.W]w185.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:39:19 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 84.3502 through 93.2292



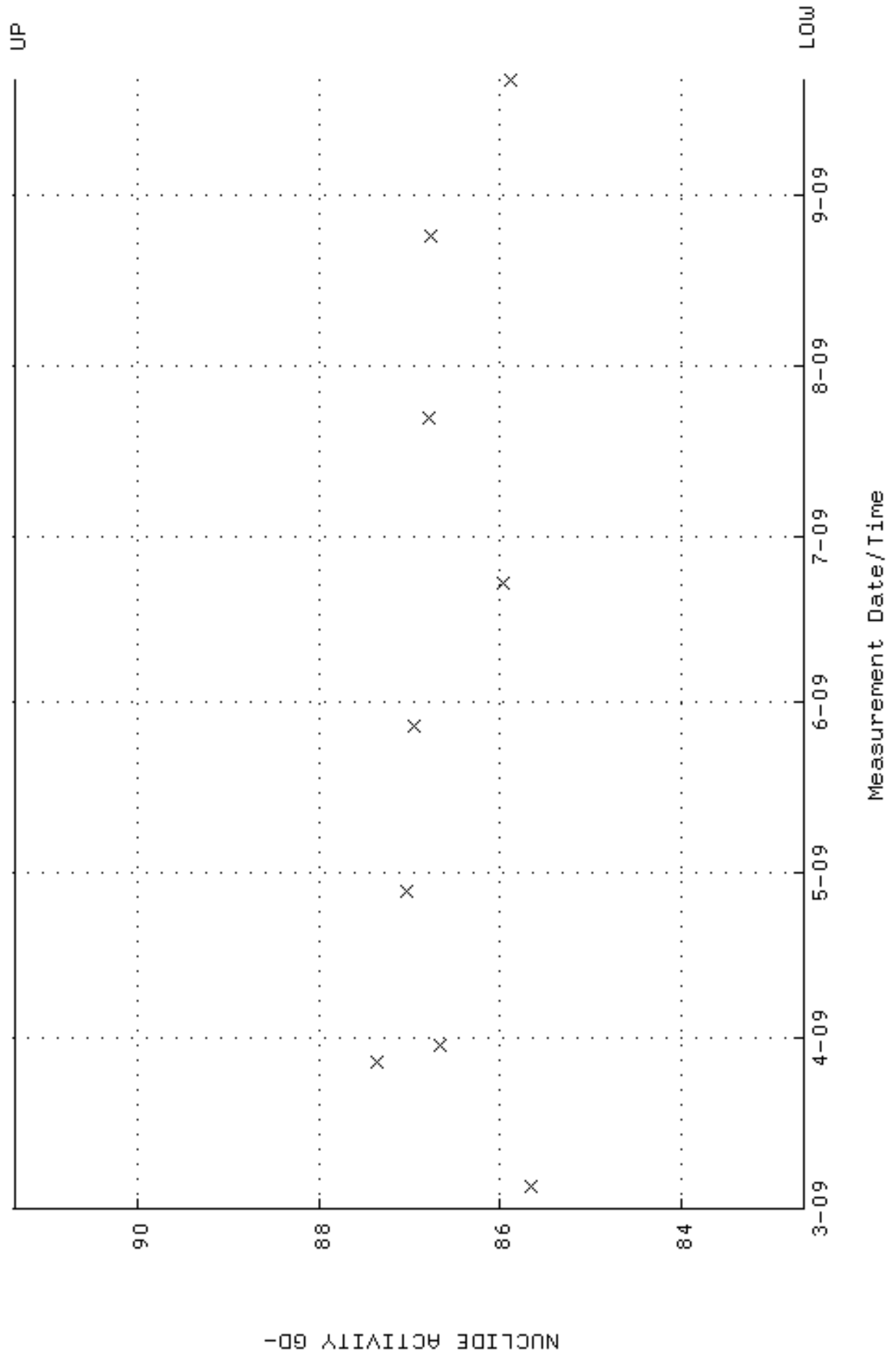
QA filename : DKA100:[ENV_ALPHA.QA.B]B185.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:31 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



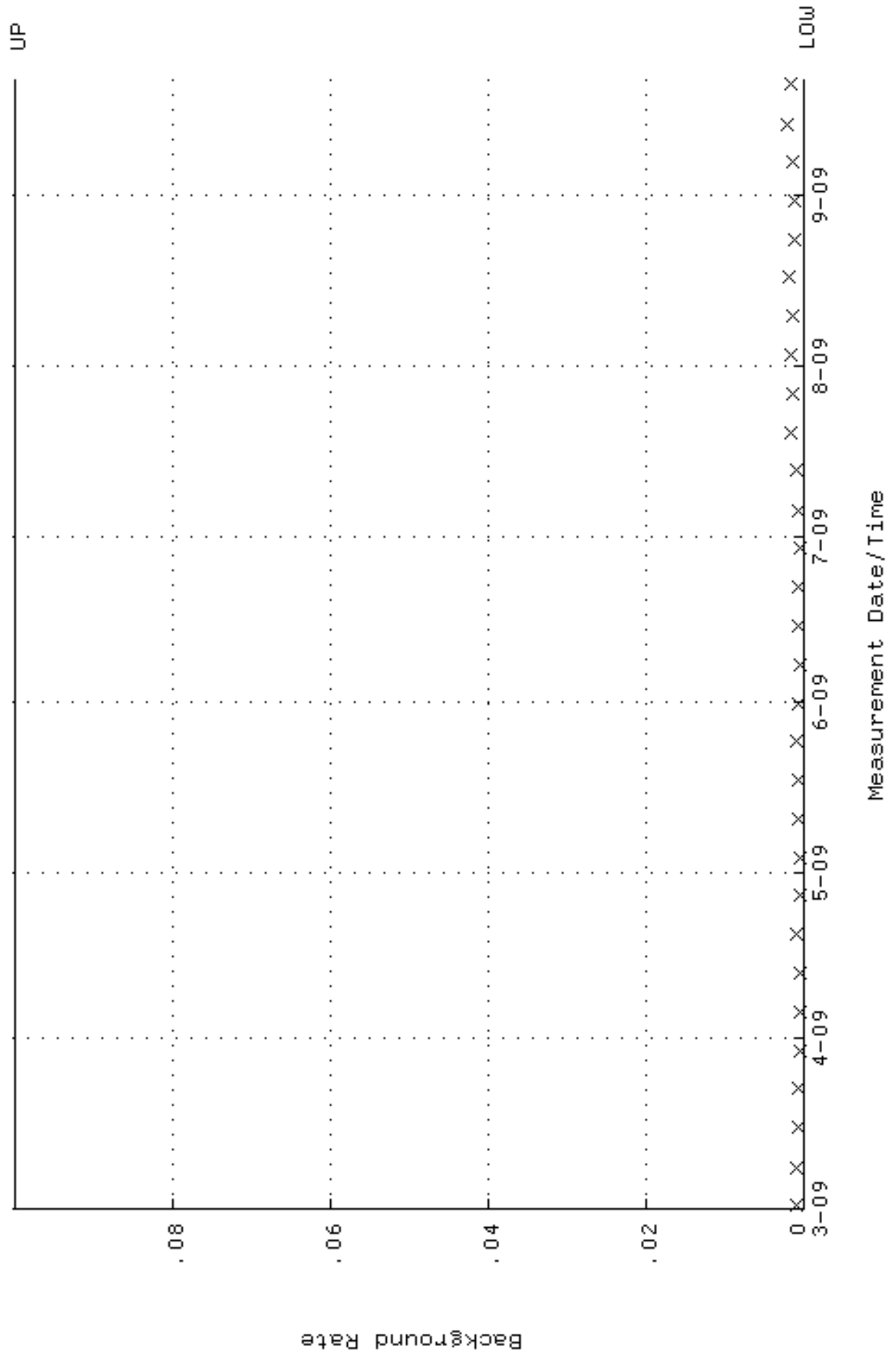
QA filename : DKA100:[ENV_ALPHA.QA.W]W186.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:39:23 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.242649 through 0.262649



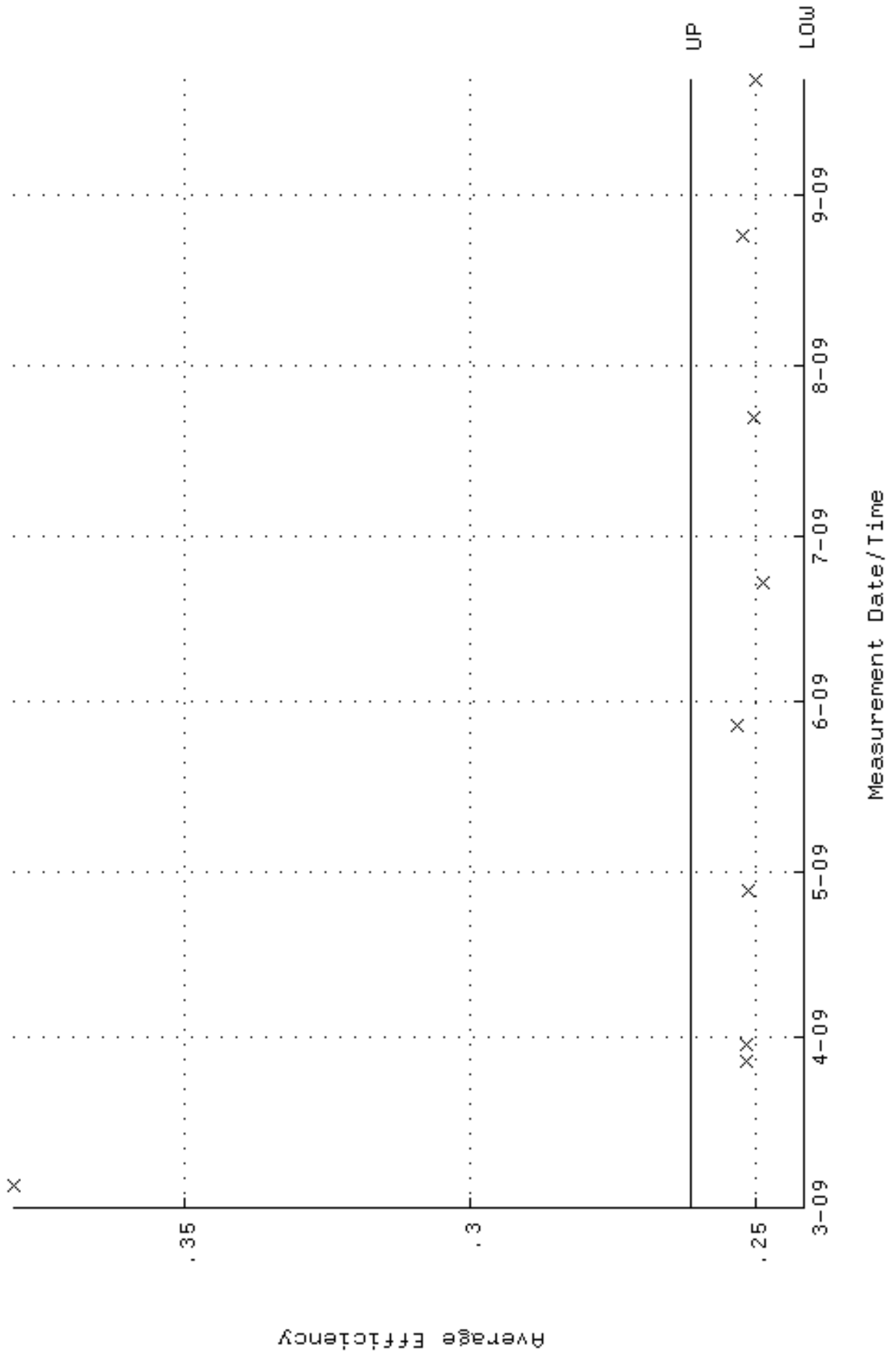
QA filename : DKA100:[ENV_ALPHA.QA.W]W186.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:39:23 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 82.6495 through 91.3495



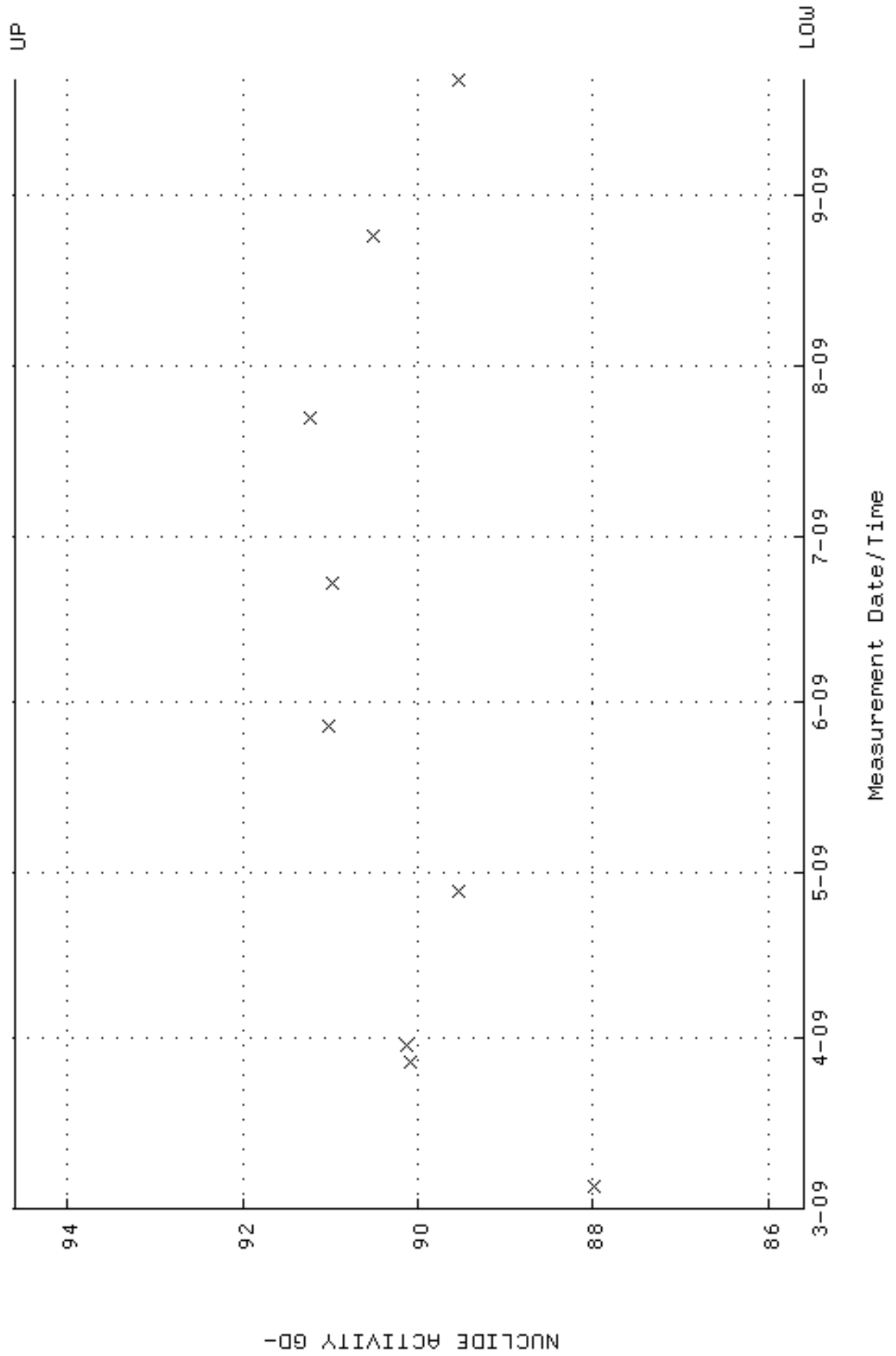
QA filename : DKA100:[ENV_ALPHA.QA.B]B186.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:35 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



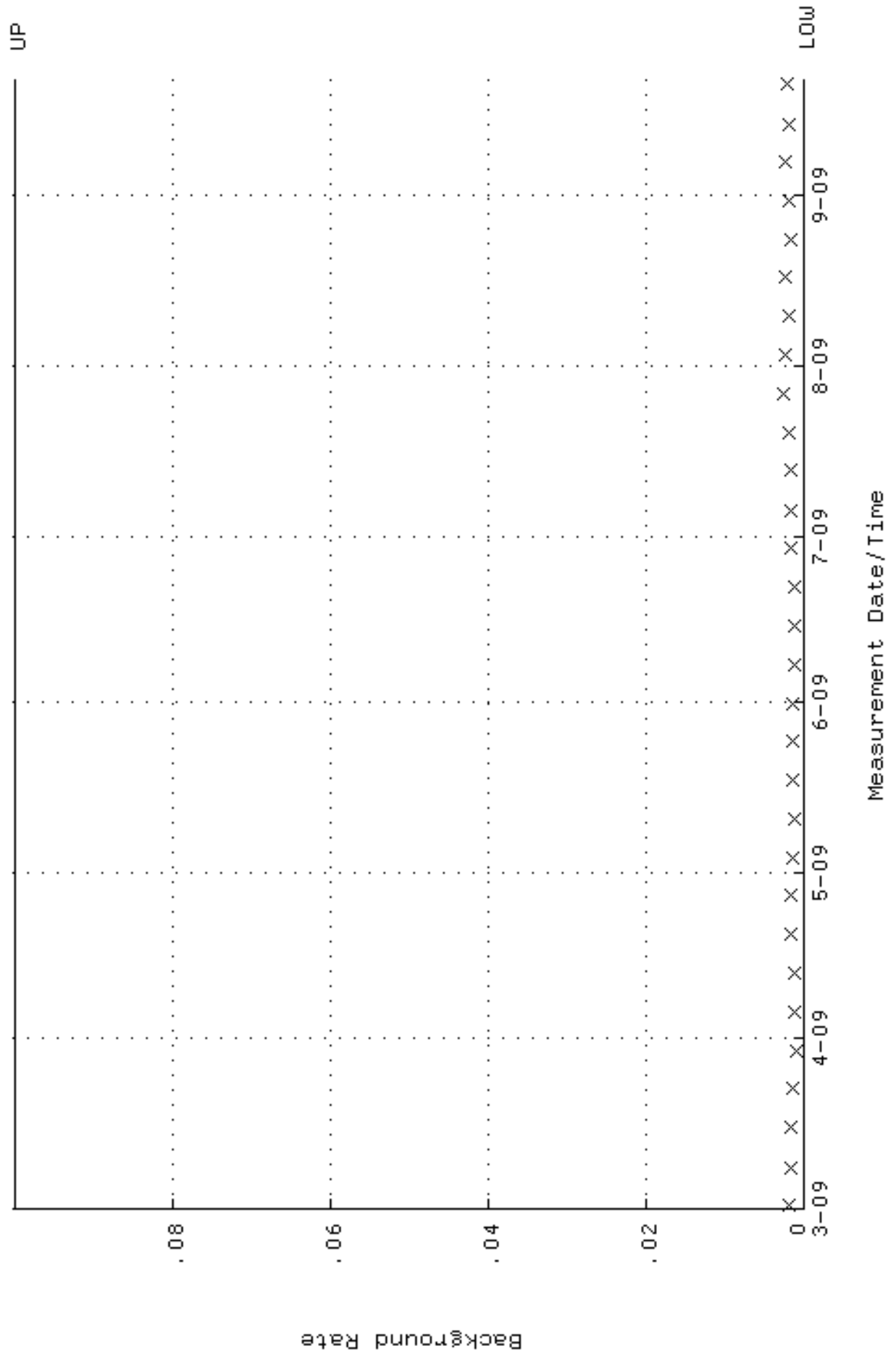
QA filename : DKA100:[ENV_ALPHA.QA.W]W187.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:39:27 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.241464 through 0.261464



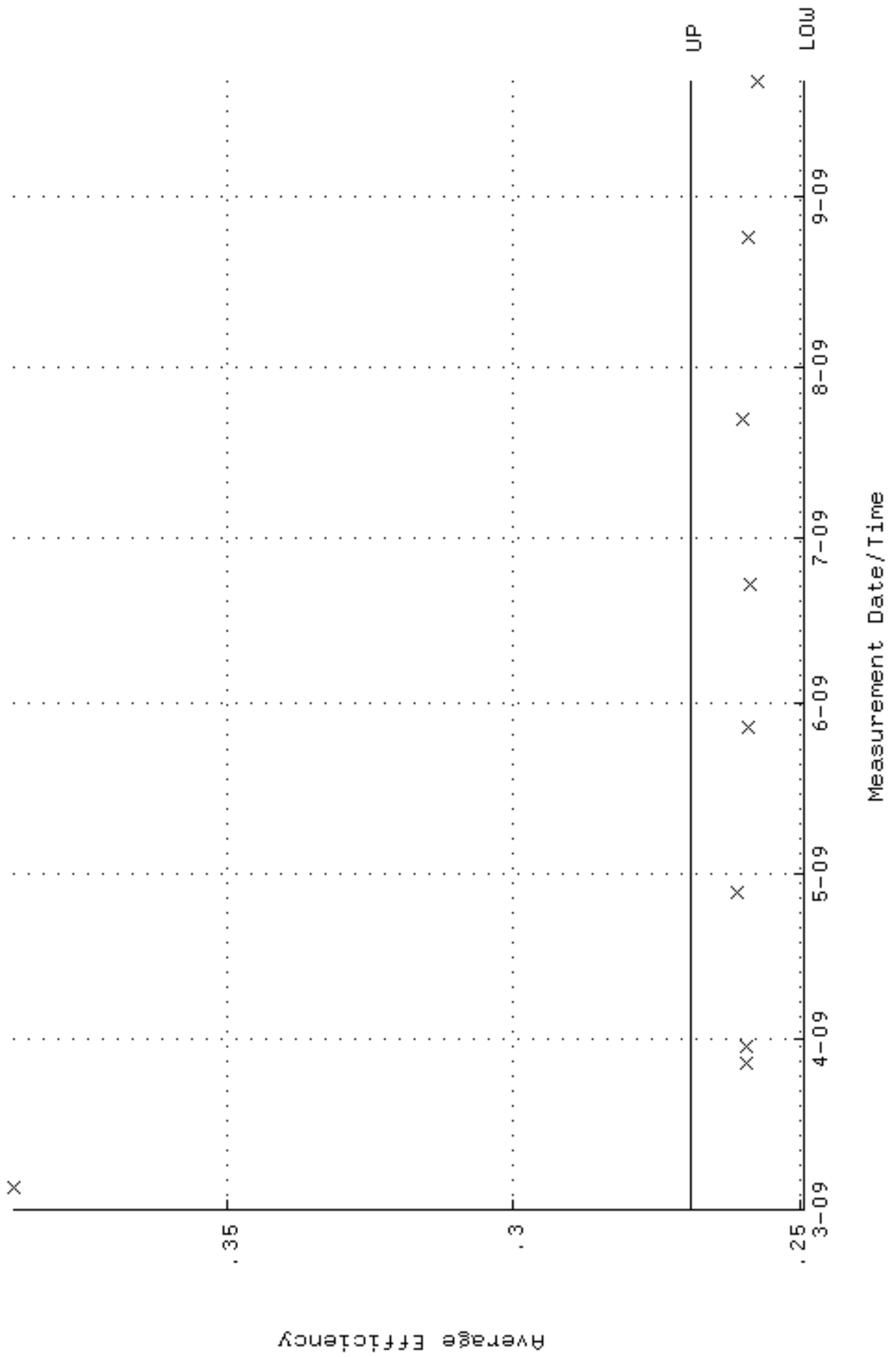
QA filename : DKA100:[ENV_ALPHA.QA.W]w187.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:39:27 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 85.5888 through 94.5982



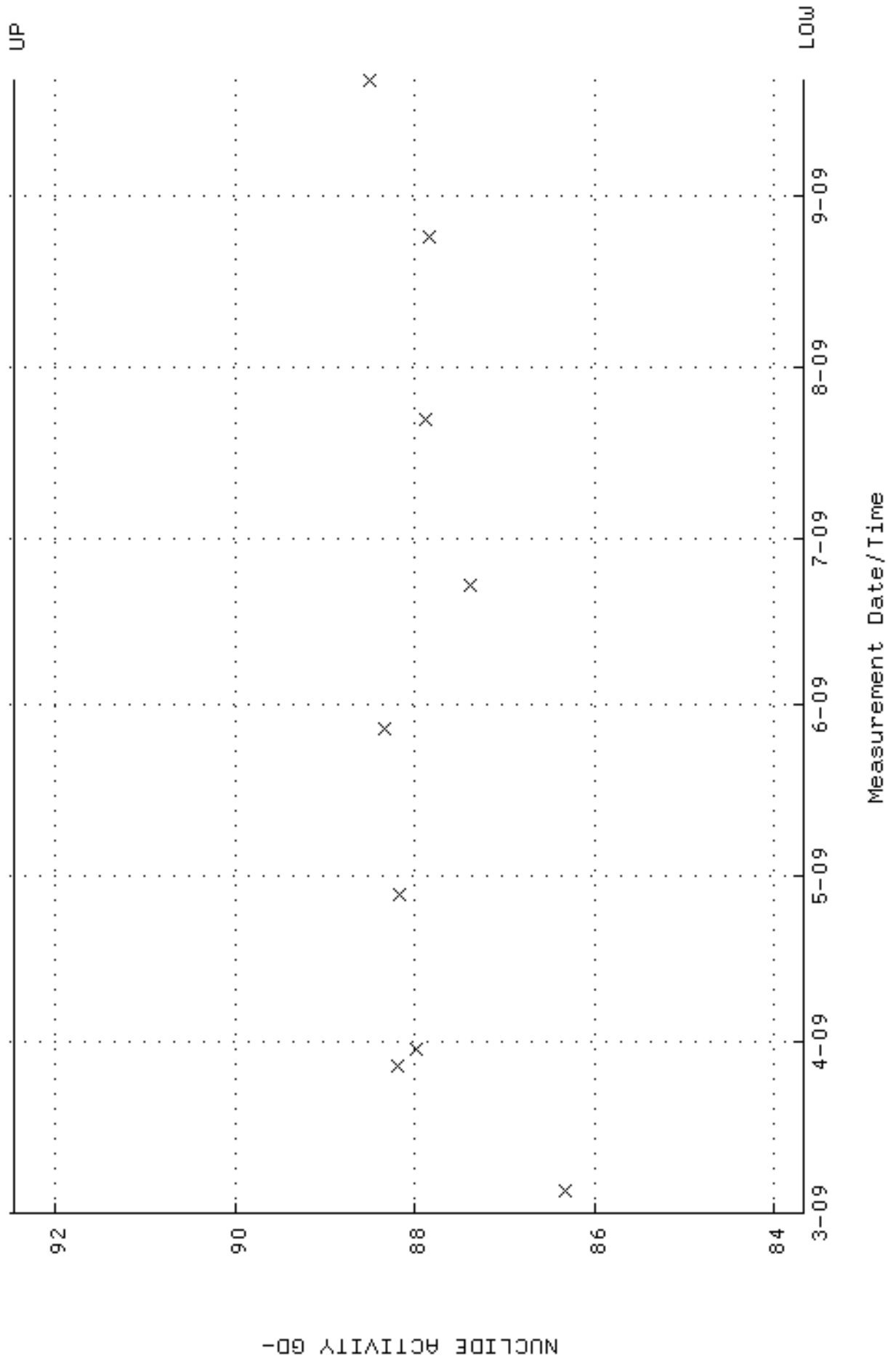
QA filename : DKA100:[ENV_ALPHA.QA.B]B187.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:38 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



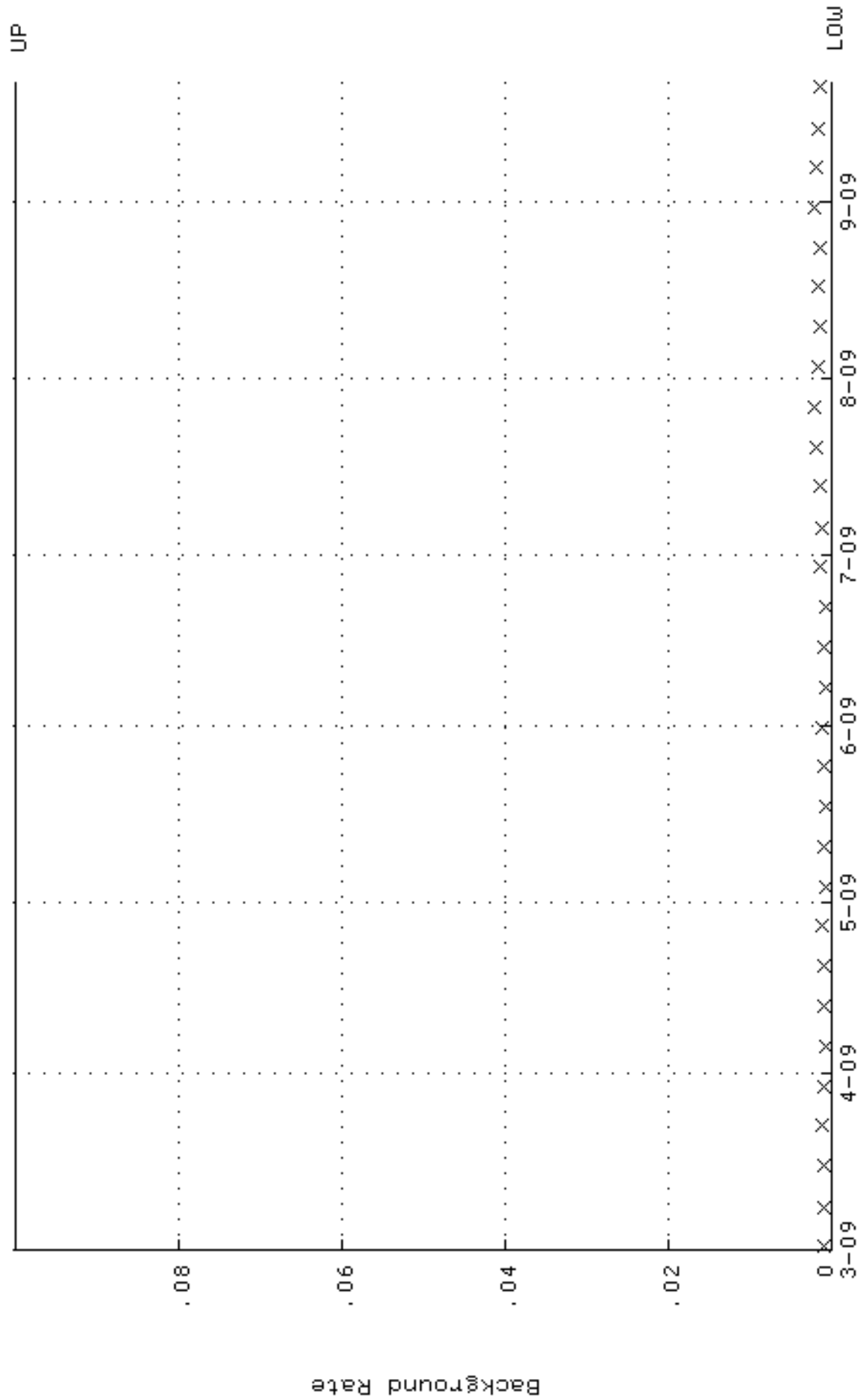
QA filename : DKA100:[ENV_ALPHA.QA.W]W188.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:39:30 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.249341 through 0.269341



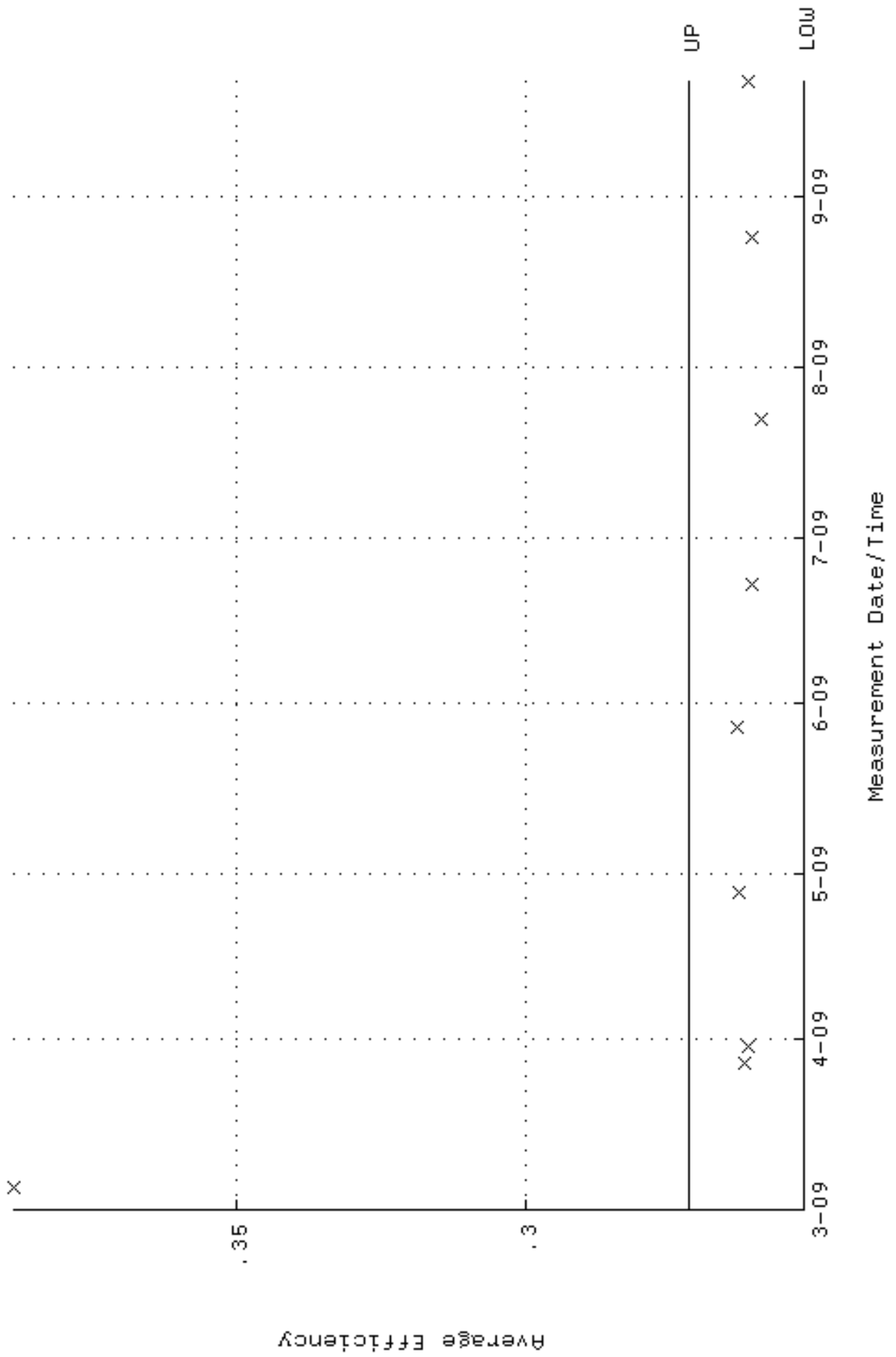
QA filename : DKA100:[ENV_ALPHA.QA.W]w188.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:39:30 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 83.6747 through 92.4825



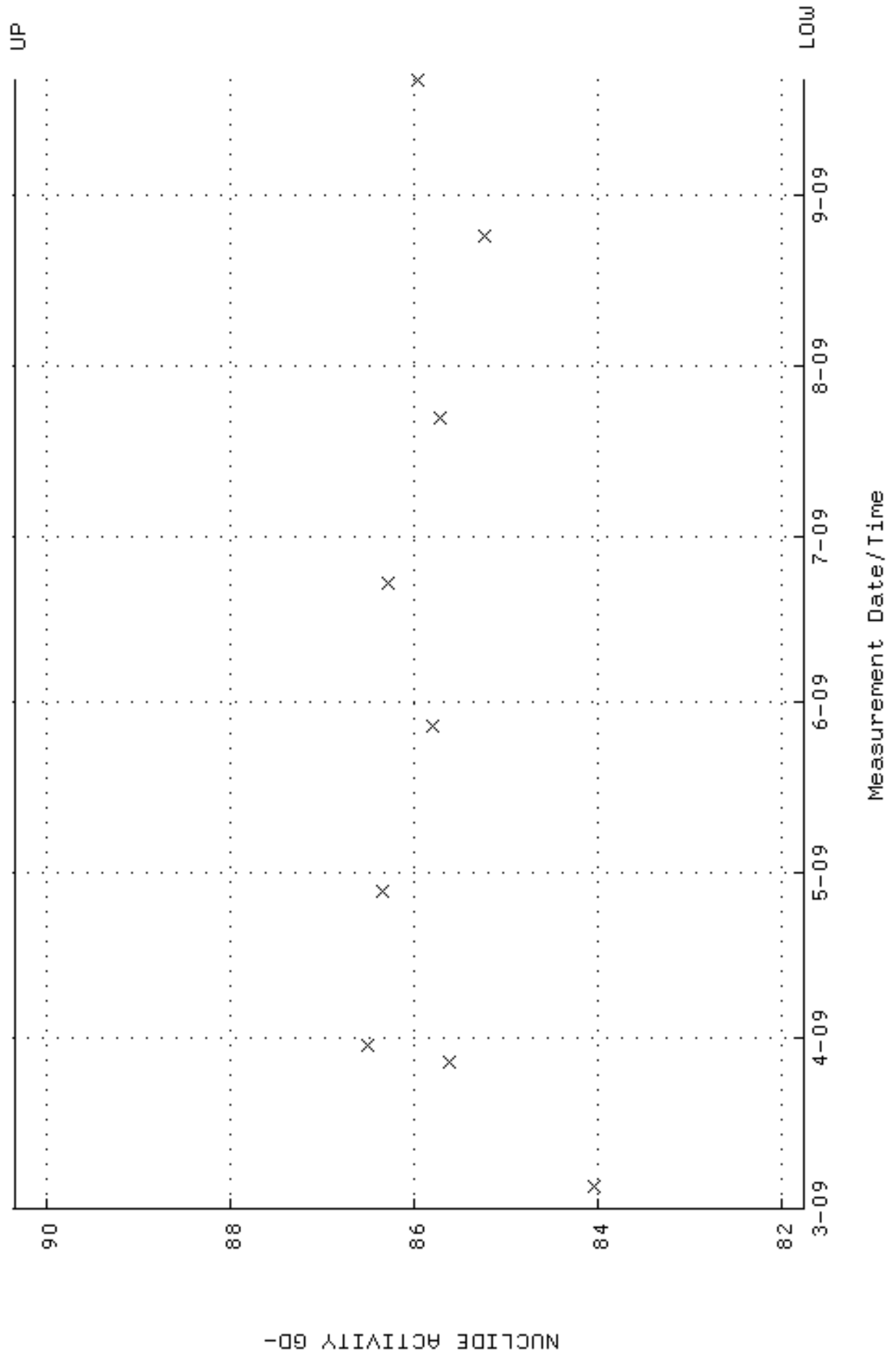
QA filename : DKA100:[ENV_ALPHA.QA.B]B188.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:42 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



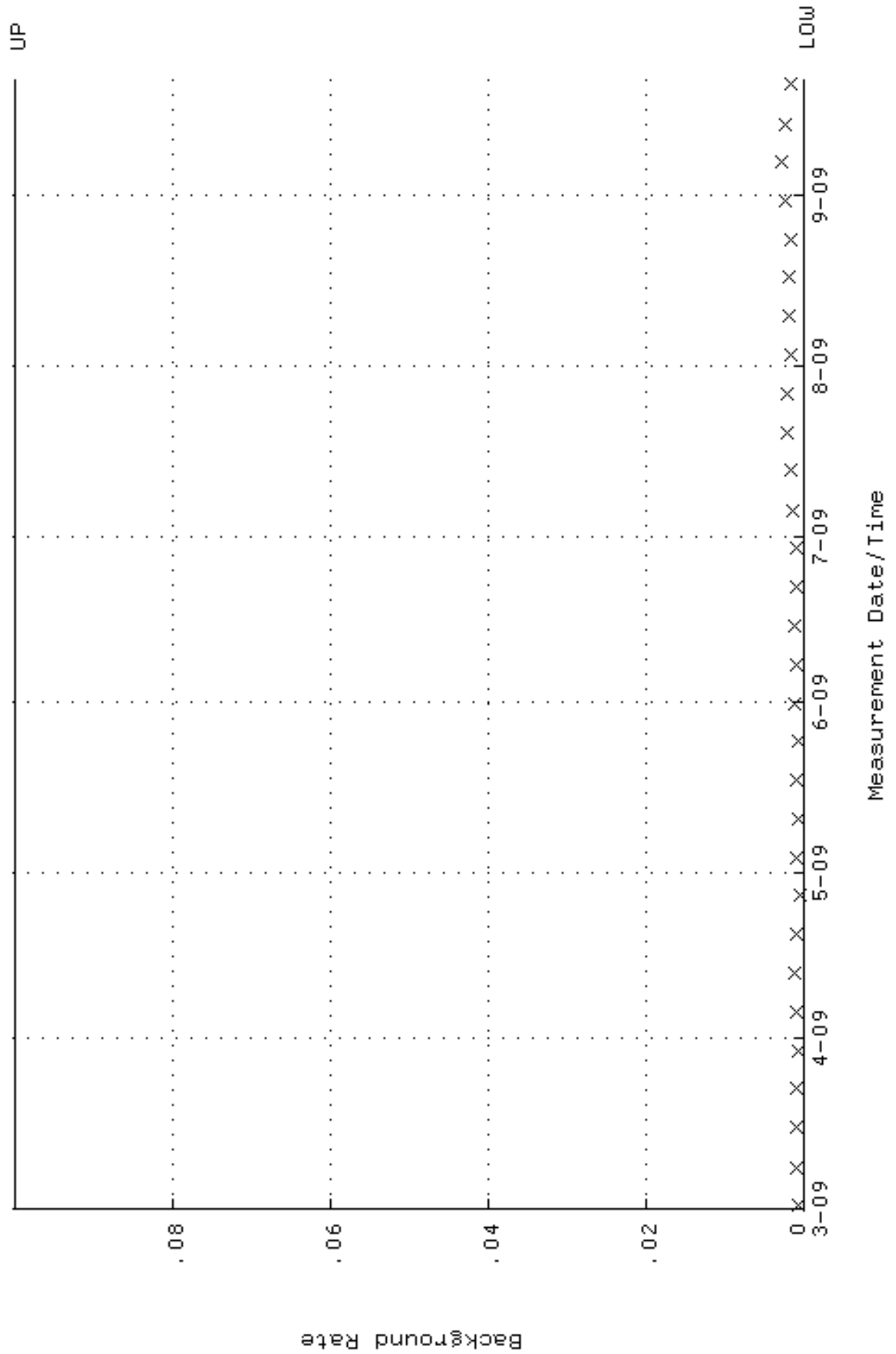
QA filename : DKA100:[ENV_ALPHA.QA.W]W189.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:39:34 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.251590 through 0.271590



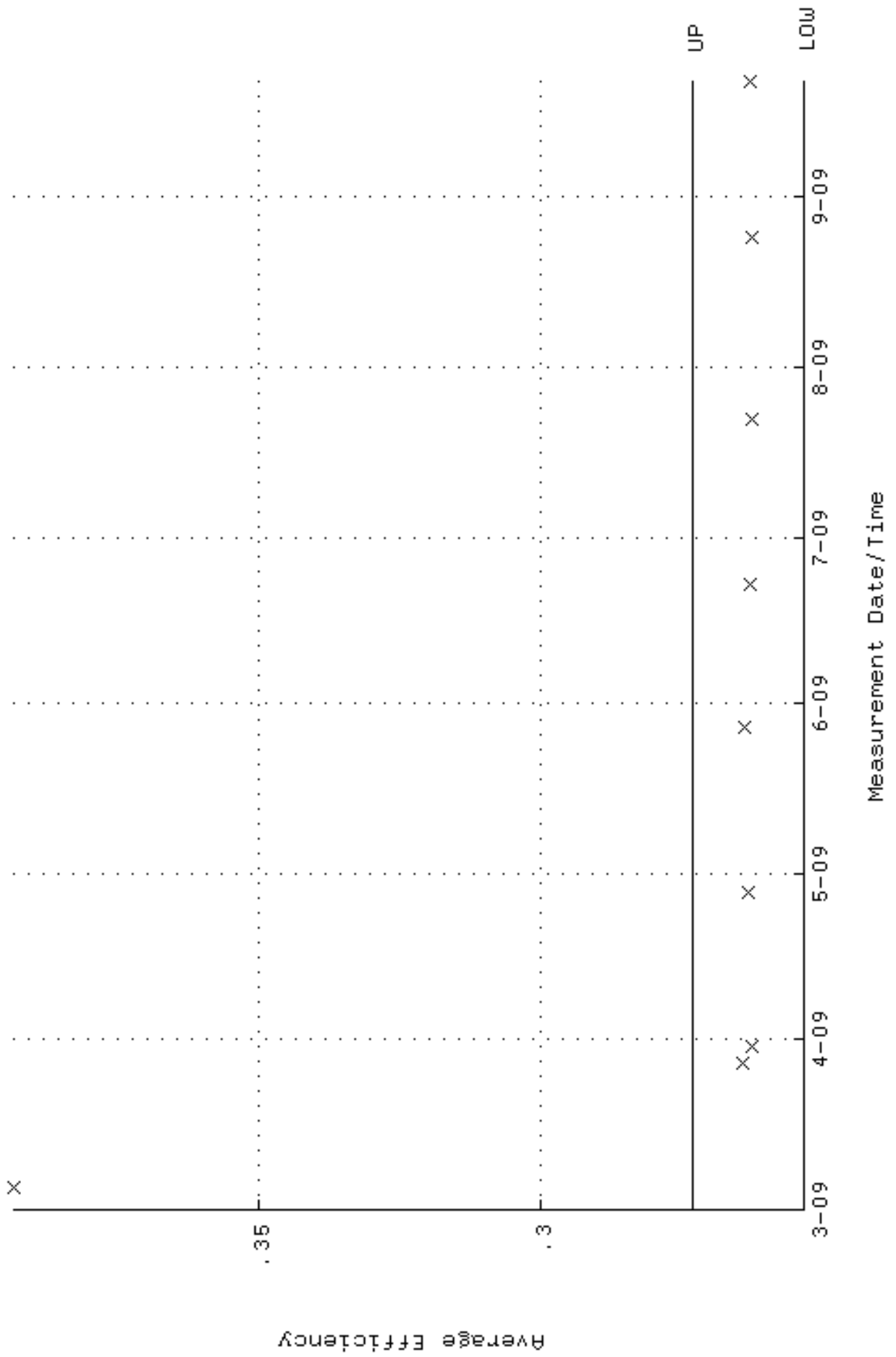
QA filename : DKA100:[ENV_ALPHA.QA.W]w189.QAF;1
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2009 22:39:34 through 21-SEP-2009 12:00:00
Lower/Upper Lmts: 81.7473 through 90.3523



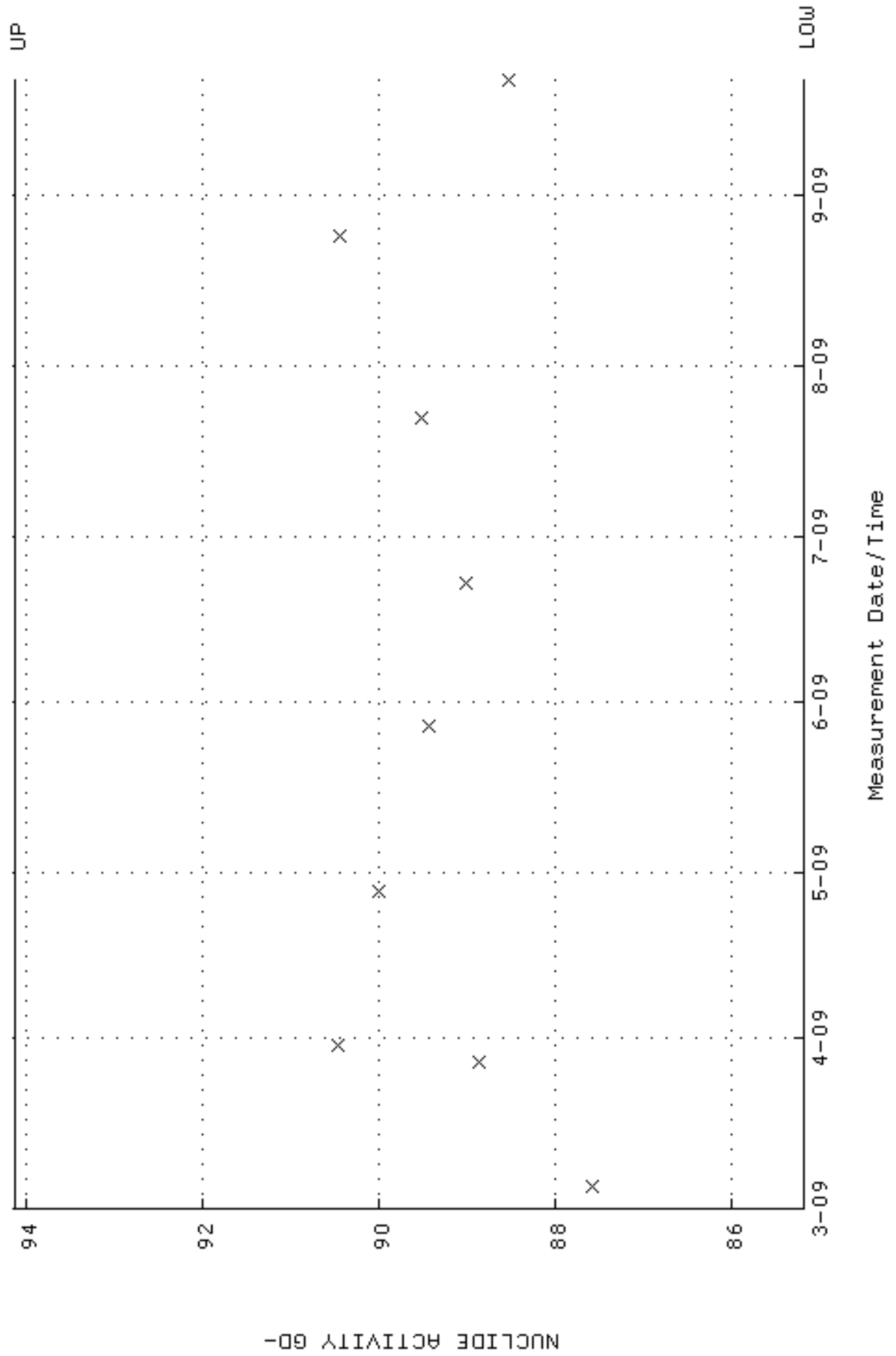
QA filename : DKA100:[ENV_ALPHA.QA.B]B189.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:46 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



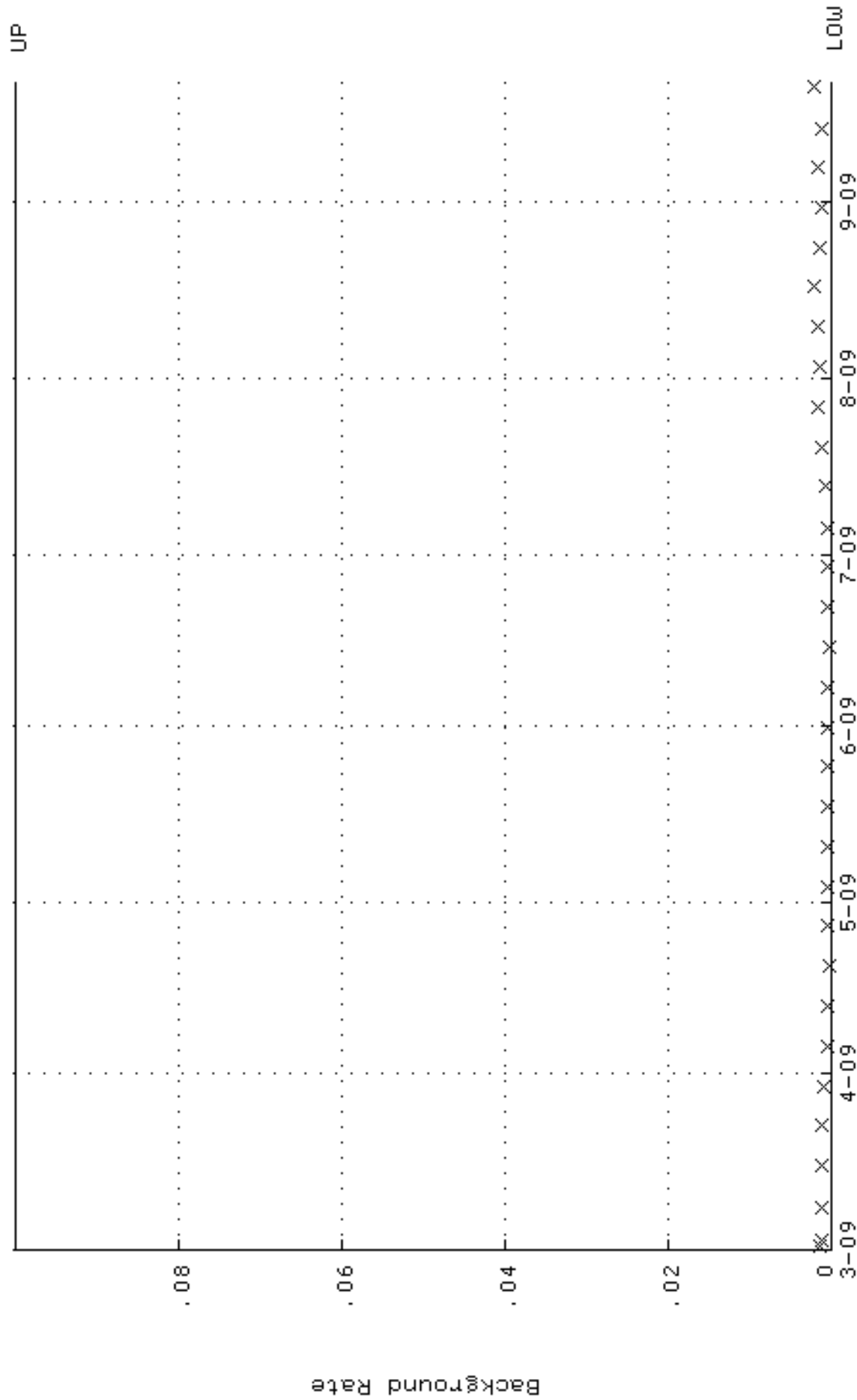
QA filename : DKA100:[ENV_ALPHA.QA.W]W191.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:39:42 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.252993 through 0.272993



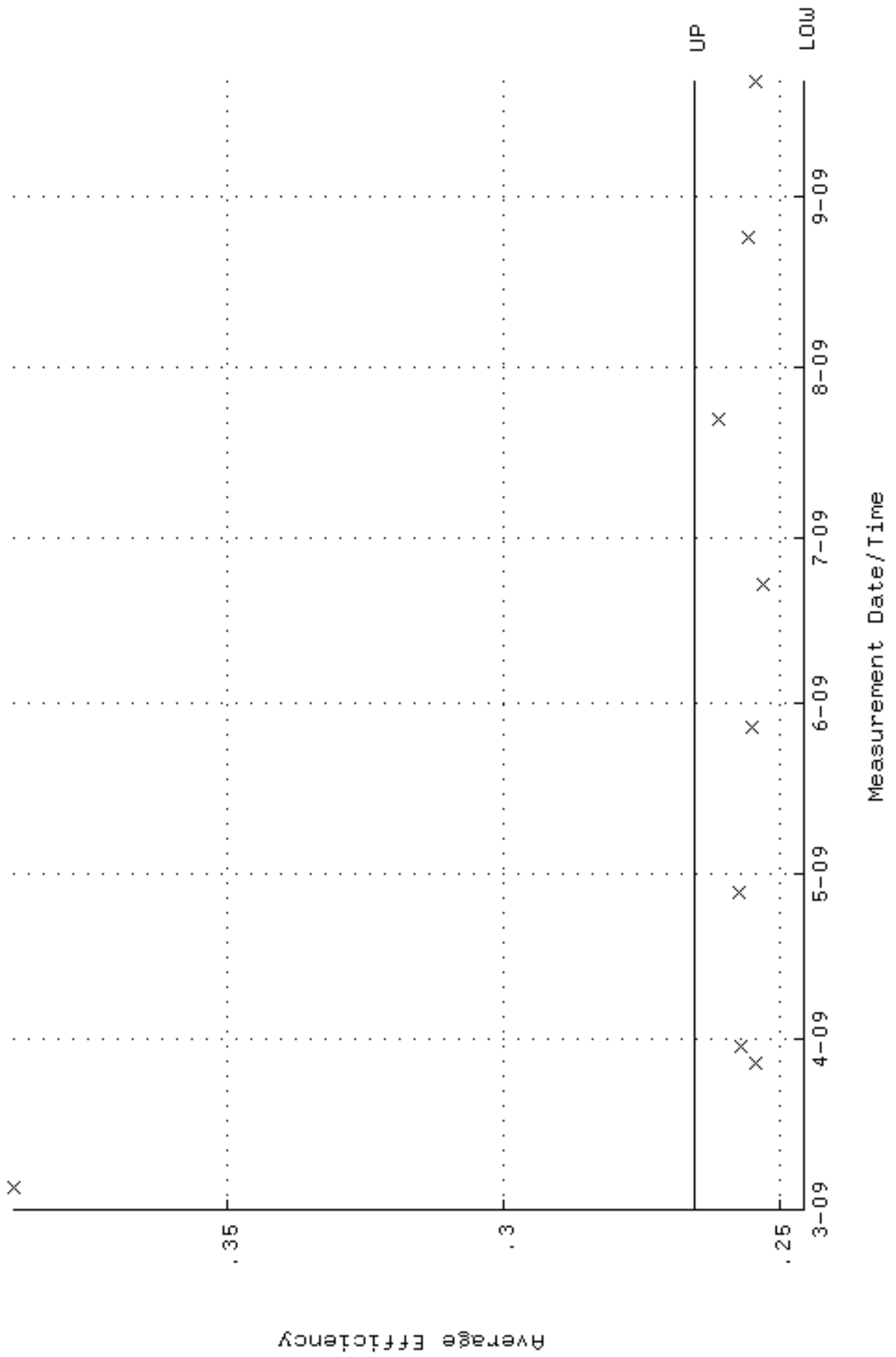
QA filename : DKA100:[ENV_ALPHA.QA.W]w191.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:39:42 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 85.1712 through 94.1366



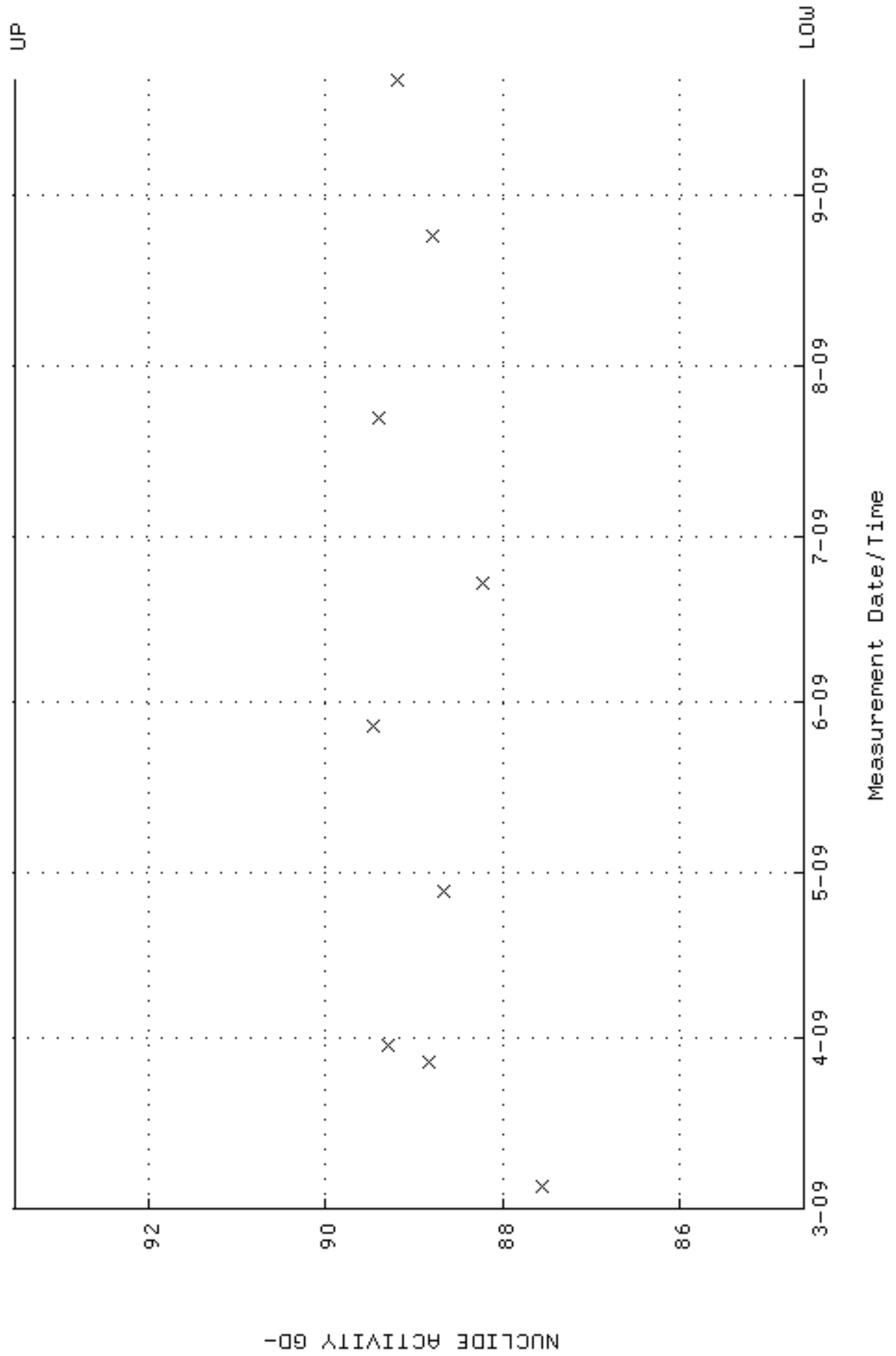
QA filename : DKA100:[ENV_ALPHA.QA.B]B191.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:54 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



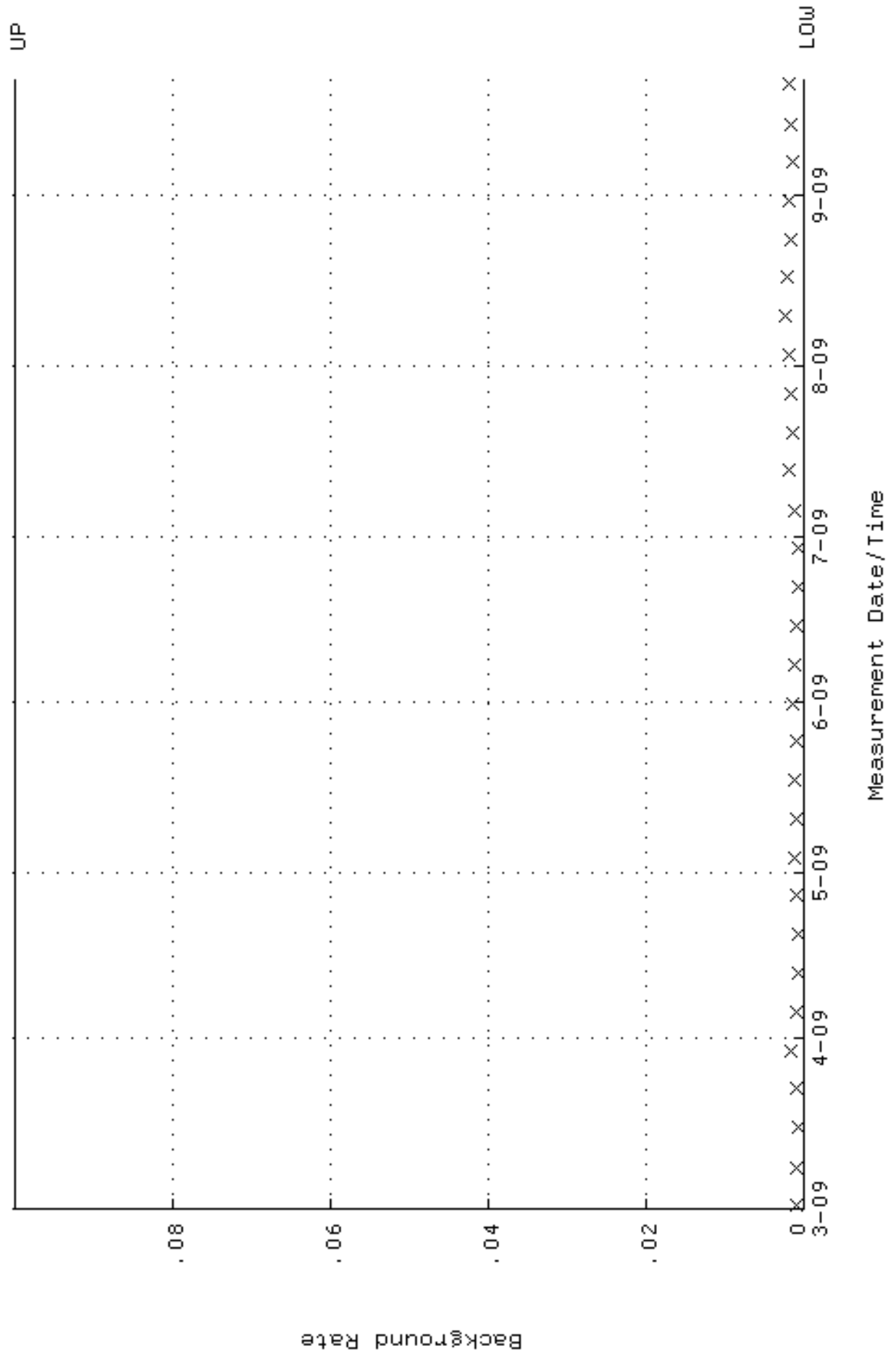
QA filename : DKA100:[ENV_ALPHA.QA.W]W192.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:39:46 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.245663 through 0.265663



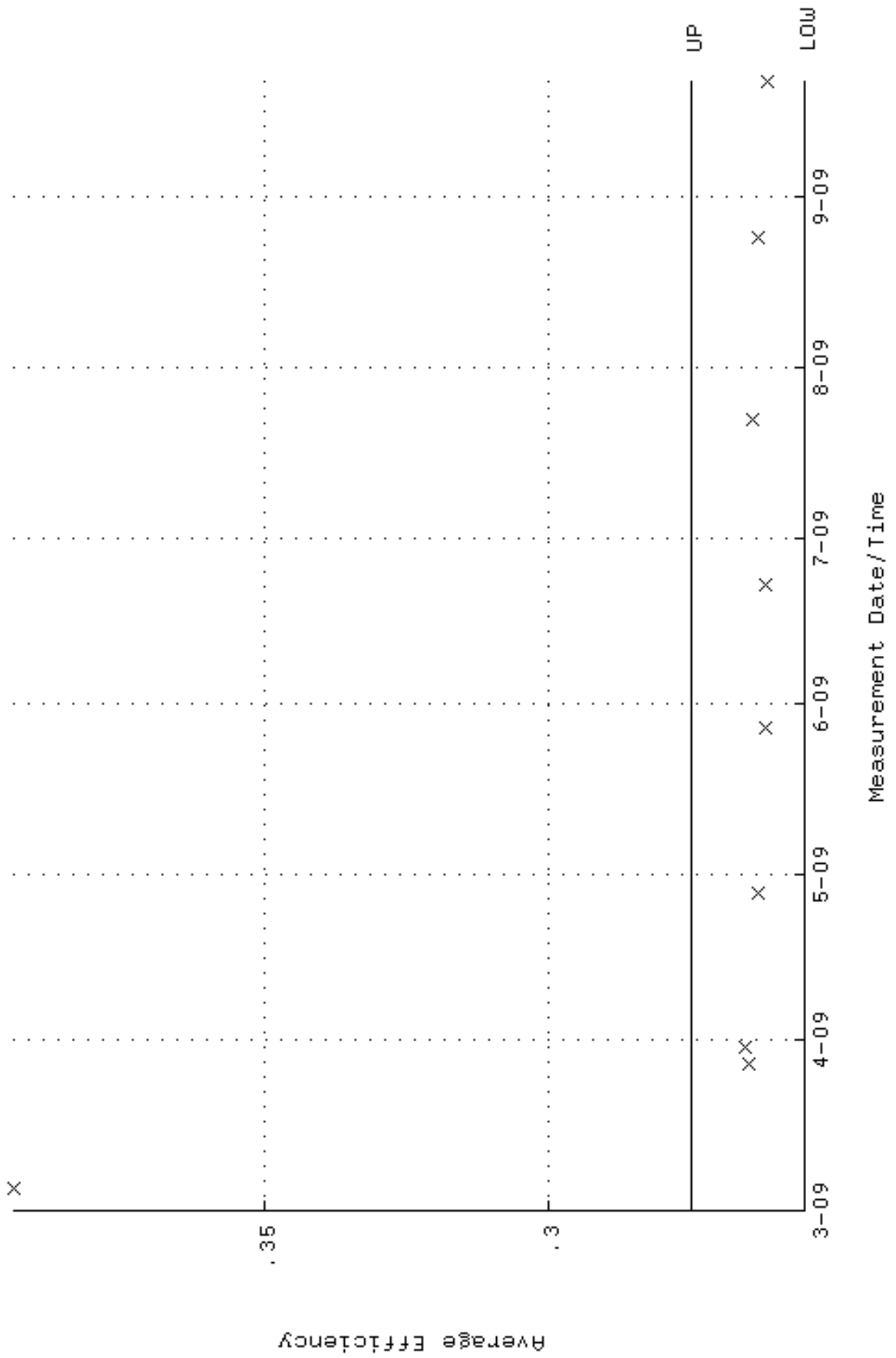
QA filename : DKA100:[ENV_ALPHA.QA.W]W192.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 4-MAR-2009 22:39:46 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 84.6037 through 93.5093



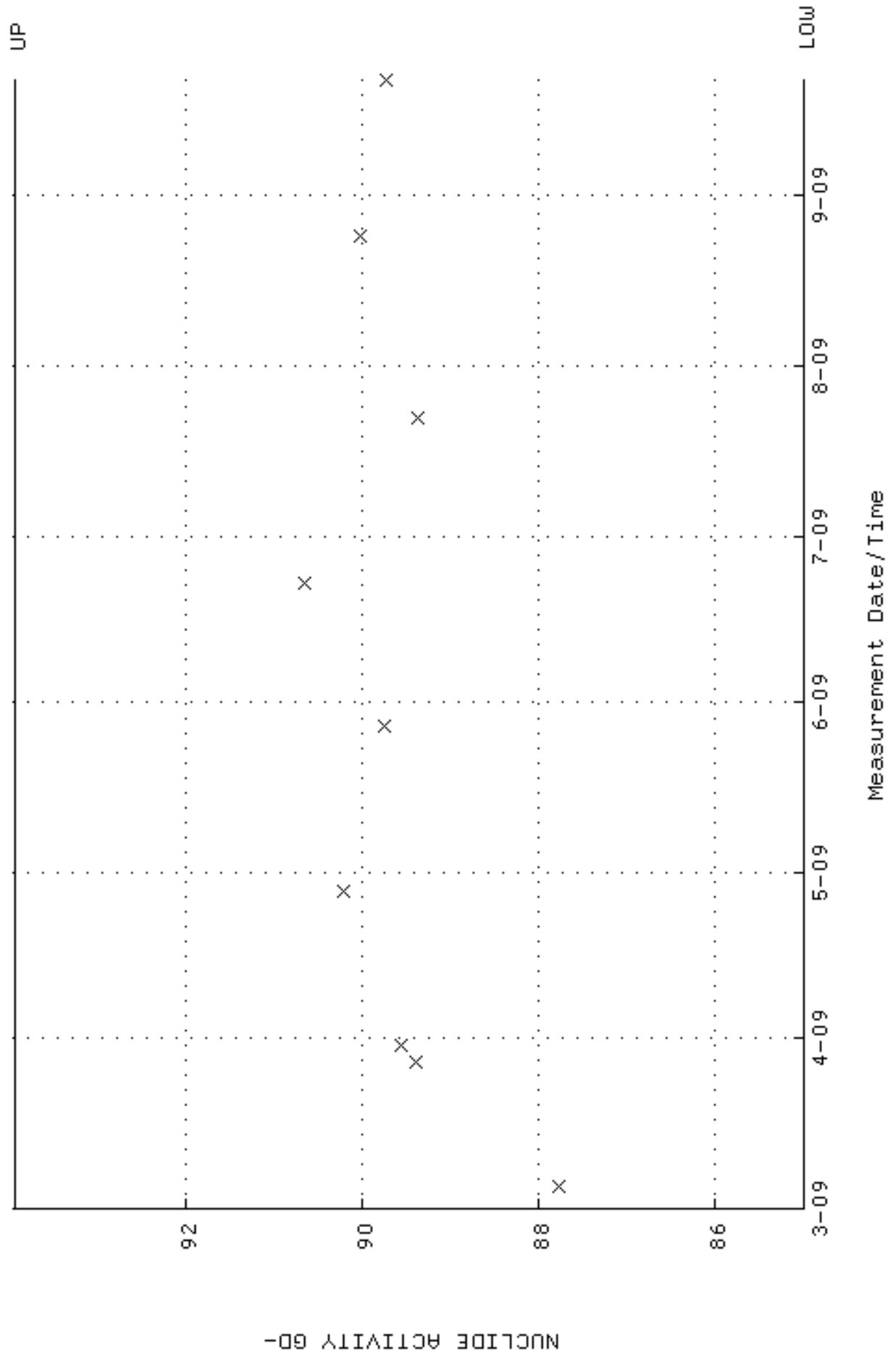
QA filename : DKA100:[ENV_ALPHA.QA.B]B192.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:22:57 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



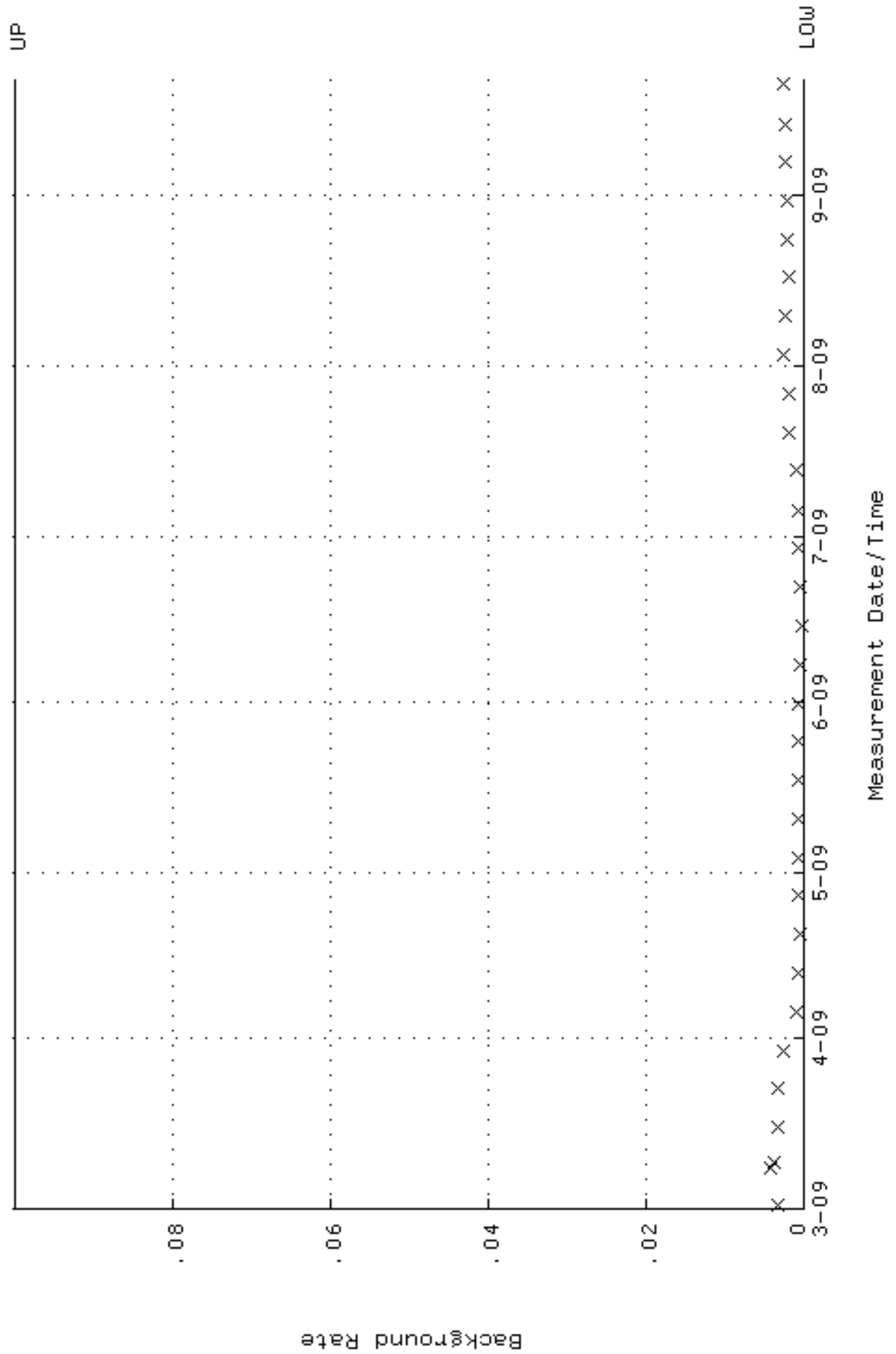
QA filename : DKA100:[ENV_ALPHA.QA.W]W193.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 4-MAR-2009 22:39:50 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.254861 through 0.274861



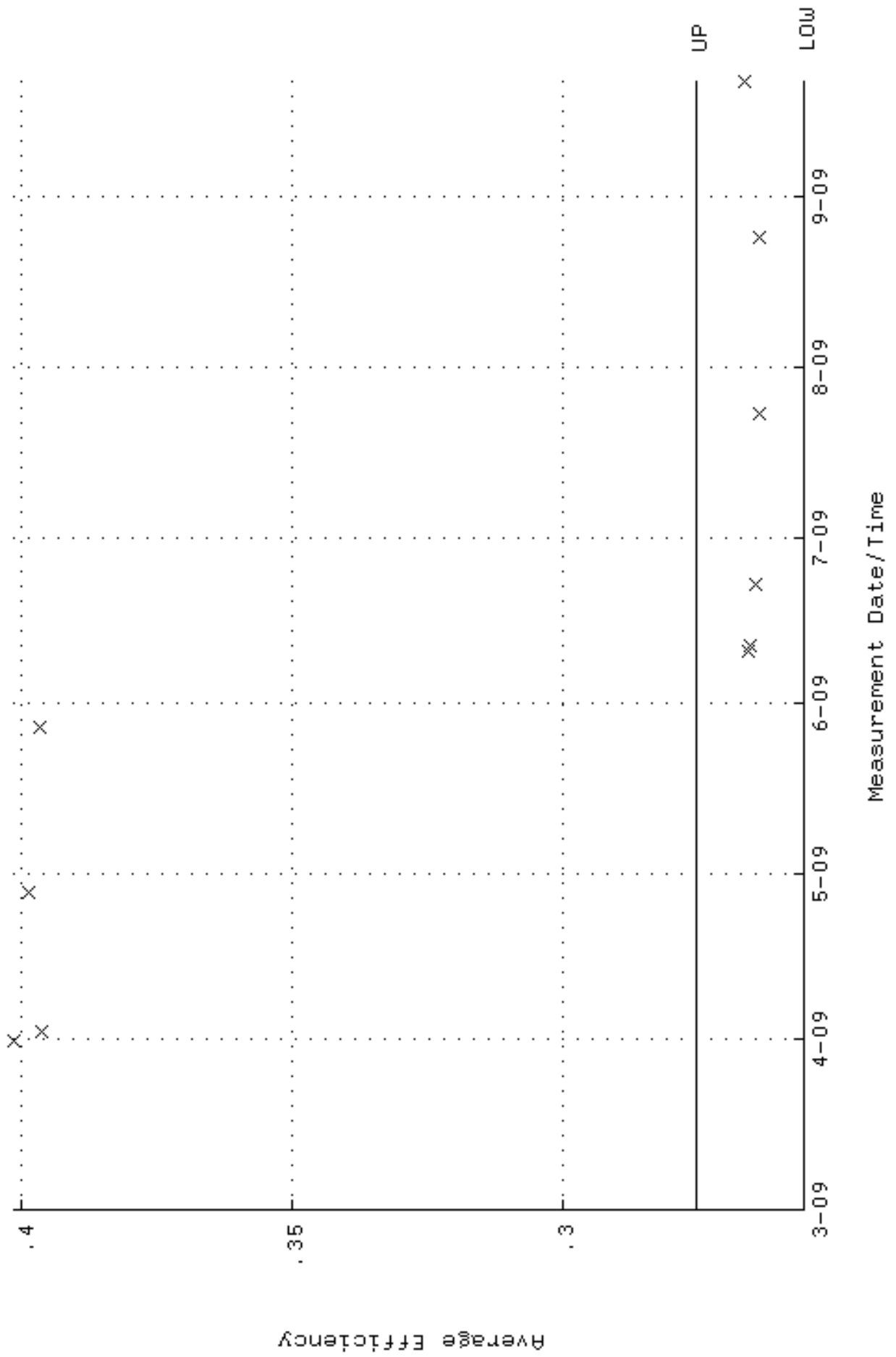
QA filename : DKA100:[ENV_ALPHA.QA.W]W193.QAF;1
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 4-MAR-2009 22:39:50 through 21-SEP-2009 12:00:00
Lower/Upper Lmts: 84.9815 through 93.9269



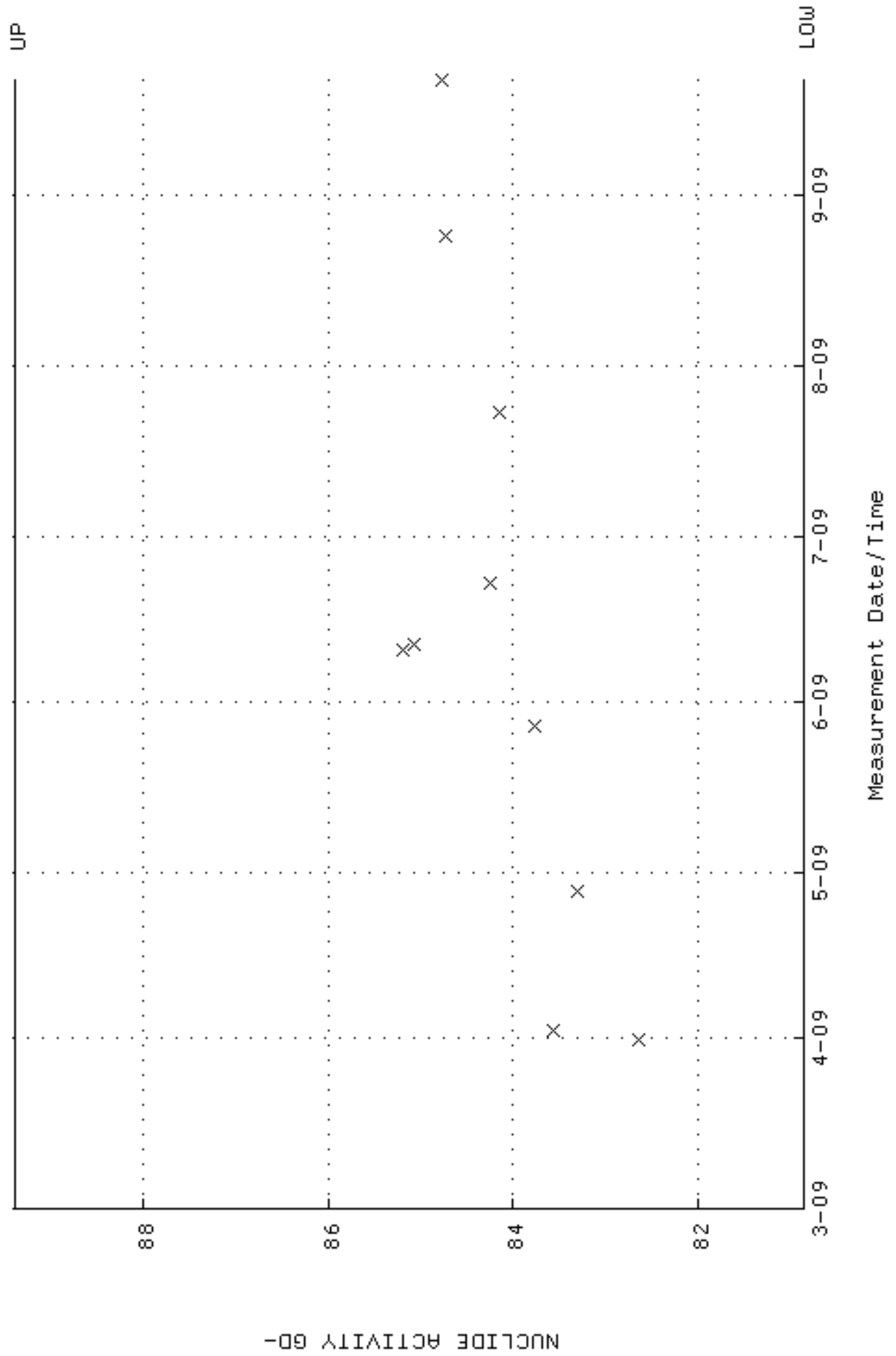
QA filename : DKA100:[ENV_ALPHA.QA.B]B193.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-MAR-2009 17:23:01 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



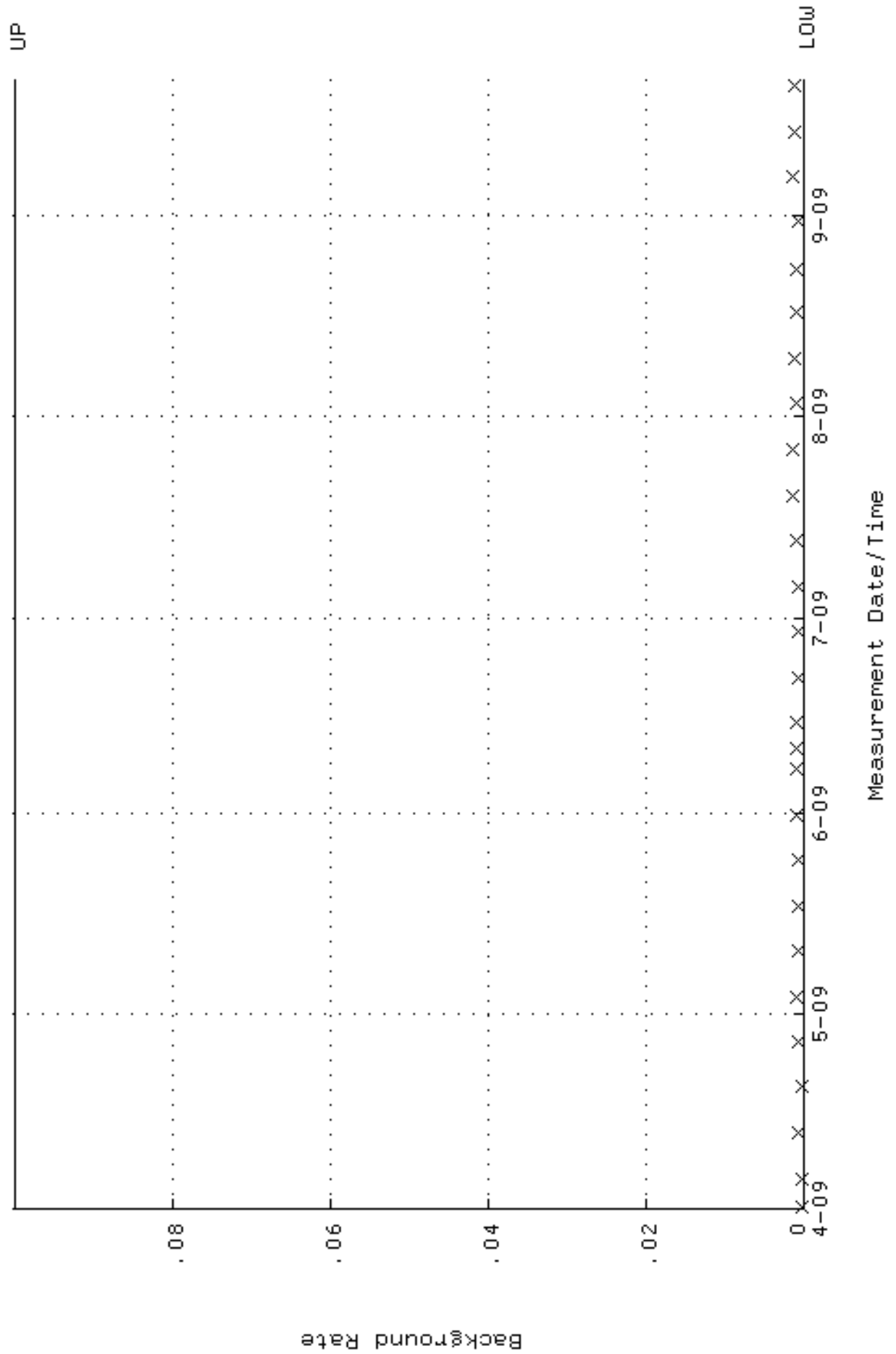
QA filename : DKA100:[ENV_ALPHA.QA.W]W202.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 31-MAR-2009 15:10:28 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.255511 through 0.275511



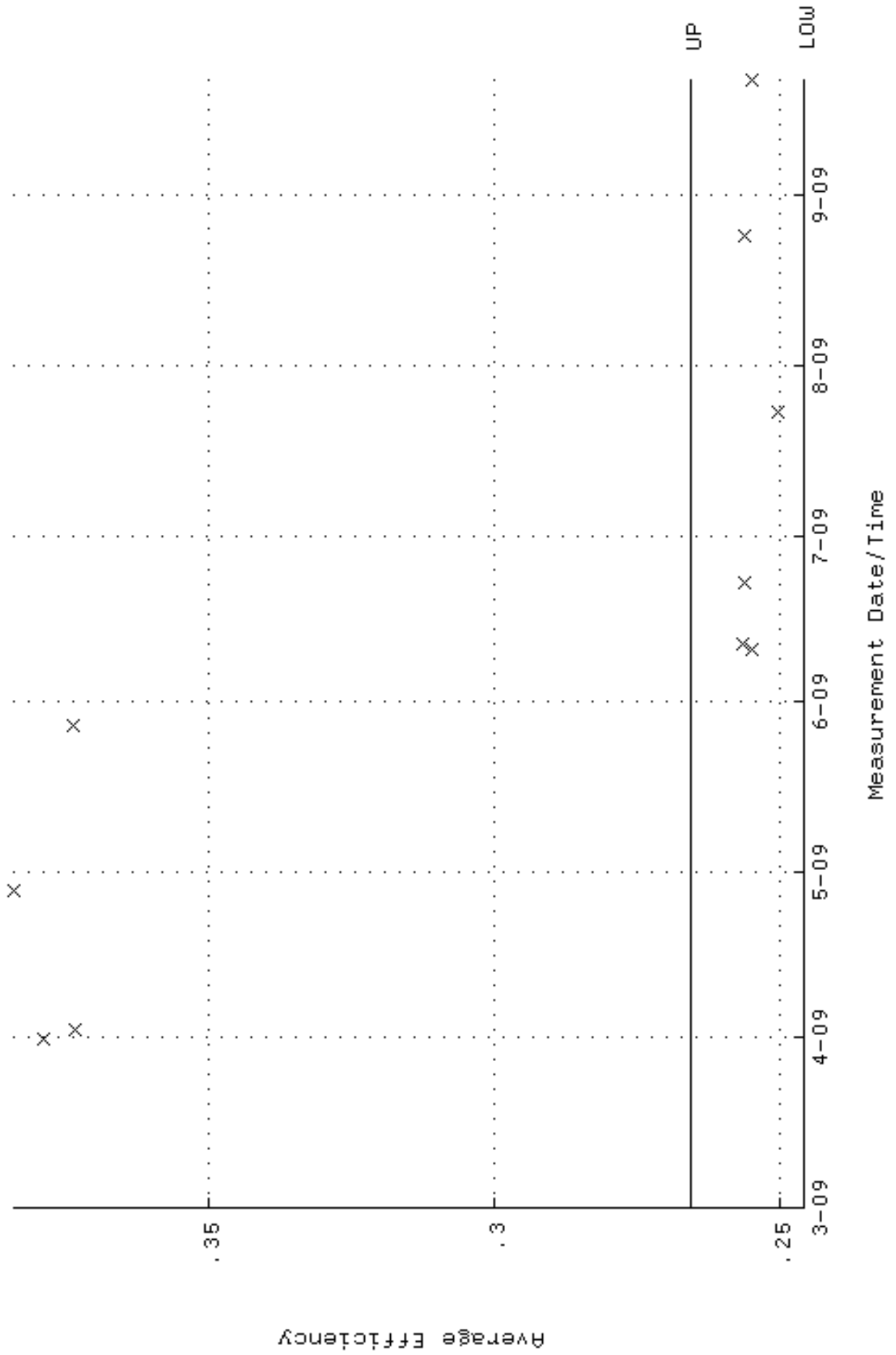
QA filename : DKA100:[ENV_ALPHA.QA.W]w202.QAF;1
Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 31-MAR-2009 15:10:28 through 21-SEP-2009 12:00:00
Lower/Upper Lmts: 80.8649 through 89.3769



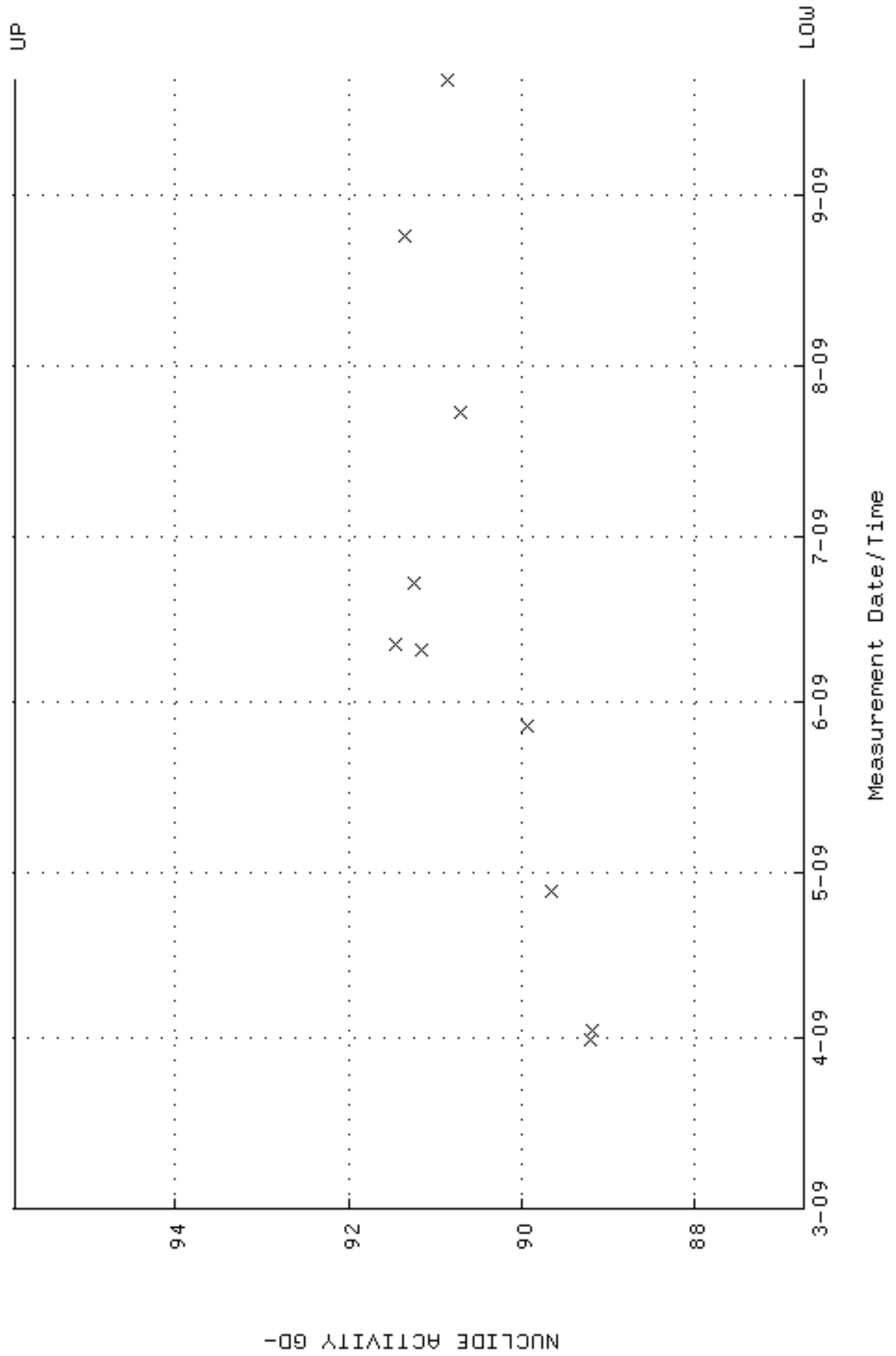
QA filename : DKA100:[ENV_ALPHA.QA.B]B202.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-APR-2009 08:02:44 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.000000E+00 through 0.100000



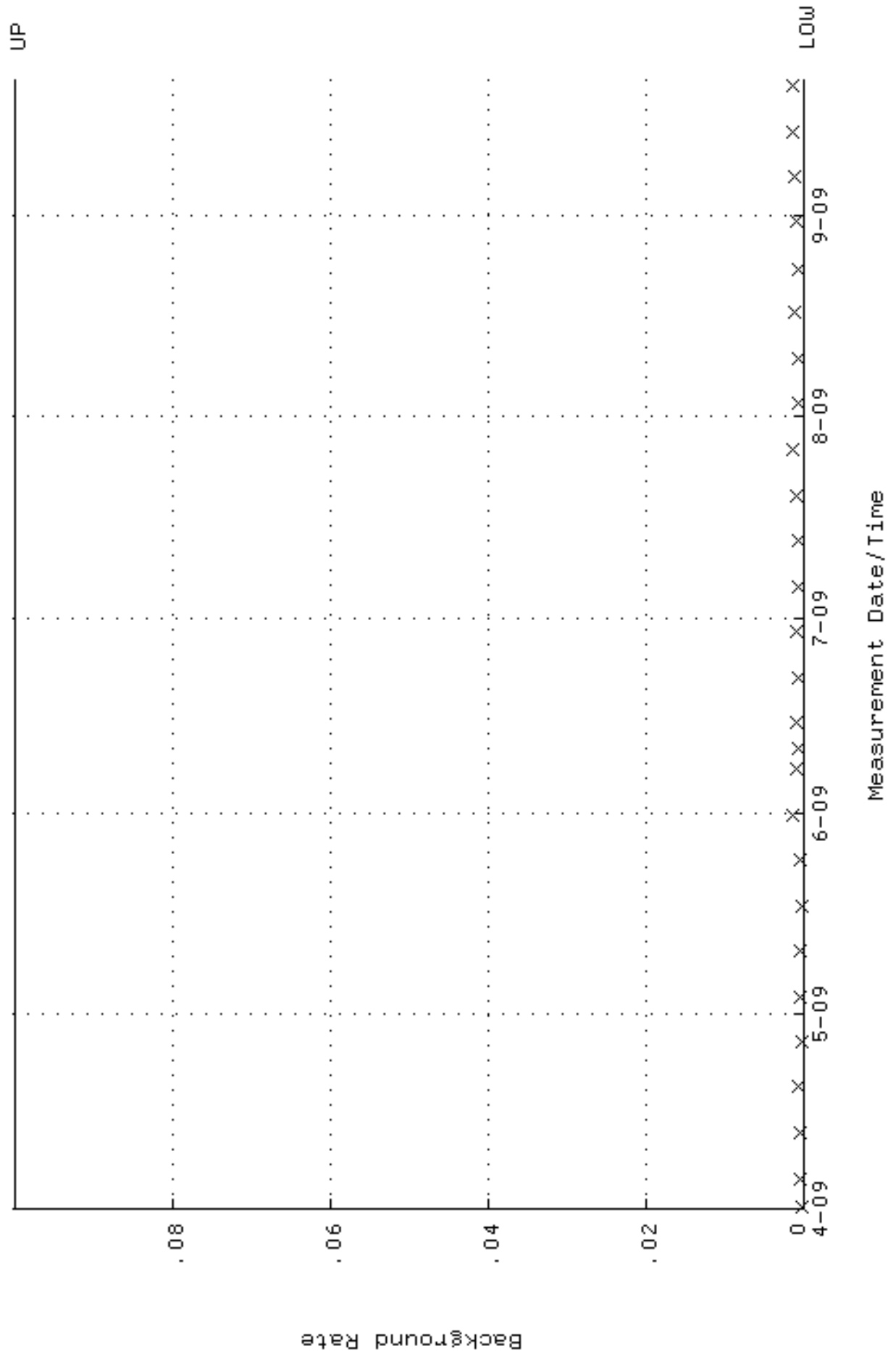
QA filename : DKA100:[ENV_ALPHA.QA.W]W205.QAF;1
 Parameter Name : AVRGEFF (Average Efficiency)
 Start/End Dates : 31-MAR-2009 15:10:33 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 0.245702 through 0.265702



QA filename : DKA100:[ENV_ALPHA.QA.W]w205.QAF;1
 Parameter Name : NLAIVITY-GD148 (NUCLIDE ACTIVITY GD-148)
 Start/End Dates : 31-MAR-2009 15:10:33 through 21-SEP-2009 12:00:00
 Lower/Upper Lmts: 86.7285 through 95.8579



QA filename : DKA100:[ENV_ALPHA.QA.B]B205.QAF;1
 Parameter Name : BACKRATE (Background Rate)
 Start/End Dates : 1-APR-2009 08:03:01 through 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: 904649

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
236077013	SAMPLE	KSD1	LUCAS5	25-SEP-09 09:30	DONE	Lucas Cell	25-MAR-09 00:00
236077019	SAMPLE	KSD1	LUCAS6	25-SEP-09 09:30	DONE	Lucas Cell	04-AUG-09 00:00
236077021	SAMPLE	KSD1	LUCAS1	25-SEP-09 10:05	DONE	Lucas Cell	31-AUG-09 00:00
236817014	SAMPLE	KSD1	LUCAS3	25-SEP-09 10:05	DONE	Lucas Cell	04-FEB-09 00:00
237010013	SAMPLE	KSD1	LUCAS5	25-SEP-09 10:05	DONE	Lucas Cell	25-MAR-09 00:00
237170005	SAMPLE	KSD1	LUCAS6	25-SEP-09 10:05	DONE	Lucas Cell	04-AUG-09 00:00
236699016	SAMPLE	KSD1	LUCAS2	25-SEP-09 10:30	DONE	Lucas Cell	19-DEC-08 00:00
237170020	SAMPLE	KSD1	LUCAS1	25-SEP-09 10:40	DONE	Lucas Cell	31-AUG-09 00:00
1201928562	MB	KSD1	LUCAS3	25-SEP-09 10:40	DONE	Lucas Cell	04-FEB-09 00:00
1201928563	LCS	KSD1	LUCAS4	25-SEP-09 10:40	DONE	Lucas Cell	02-MAR-09 00:00
1201928564	LCSD	KSD1	LUCAS5	25-SEP-09 10:40	DONE	Lucas Cell	25-MAR-09 00:00
237343006	SAMPLE	KSD1	LUCAS2	25-SEP-09 11:10	DONE	Lucas Cell	19-DEC-08 00:00
236938020	SAMPLE	KSD1	LUCAS4	25-SEP-09 12:40	DONE	Lucas Cell	02-MAR-09 00:00

Instrument Run Log

Instrument Type: GFPC

Batch ID: 905326

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
1201930327	LCS	MXS2	PIC3A	28-SEP-09 19:41	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201930328	LCSD	MXS2	PIC3D	28-SEP-09 19:41	DONE	CeF on 25mm Filter	02-JUL-09 00:00
236938020	SAMPLE	MXS2	PIC1A	28-SEP-09 19:42	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237010013	SAMPLE	MXS2	PIC1B	28-SEP-09 19:42	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237170005	SAMPLE	MXS2	PIC1C	28-SEP-09 19:42	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237170020	SAMPLE	MXS2	PIC1D	28-SEP-09 19:42	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343006	SAMPLE	MXS2	PIC2A	28-SEP-09 19:42	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237521010	SAMPLE	MXS2	PIC2C	28-SEP-09 19:42	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201930326	MB	MXS2	PIC3A	28-SEP-09 20:55	DONE	CeF on 25mm Filter	02-JUL-09 00:00

Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 905546

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
236699016	SAMPLE	AXD2	1025	02-OCT-09 09:19	DUSE		
236938020	SAMPLE	AXD2	1027	02-OCT-09 09:19	DONE		
237010013	SAMPLE	AXD2	1028	02-OCT-09 09:19	DONE		
237170005	SAMPLE	AXD2	1029	02-OCT-09 09:19	DUSE		
237170020	SAMPLE	AXD2	1030	02-OCT-09 09:19	DUSE		
237343006	SAMPLE	AXD2	1037	02-OCT-09 09:19	DUSE		
237521010	SAMPLE	AXD2	1038	02-OCT-09 09:19	DUSE		
1201930820	MB	AXD2	1039	02-OCT-09 09:19	DUSE		
1201930821	LCS	AXD2	1040	02-OCT-09 09:19	DONE		
1201930822	LCSD	AXD2	1041	02-OCT-09 09:19	DONE		
236817014	SAMPLE	AXD2	1042	02-OCT-09 09:19	DUSE		
236699016	SAMPLE	AXD2	1197	05-OCT-09 20:51	DONE		
236817014	SAMPLE	AXD2	1198	05-OCT-09 20:51	DONE		
237170005	SAMPLE	AXD2	1199	05-OCT-09 20:51	DONE		
237170020	SAMPLE	AXD2	1201	05-OCT-09 20:51	DONE		
237343006	SAMPLE	AXD2	1202	05-OCT-09 20:51	DONE		
237521010	SAMPLE	AXD2	1203	05-OCT-09 20:51	DONE		
1201930820	MB	AXD2	1205	05-OCT-09 20:51	DONE		

Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 905548

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
1201930842	MB	AXD2	1022	02-OCT-09 13:49	DONE		
1201930843	LCS	AXD2	1023	02-OCT-09 13:49	DONE		
1201930844	LCSD	AXD2	1024	02-OCT-09 13:49	DONE		
236699016	SAMPLE	AXD2	1143	02-OCT-09 20:25	DUSE		
236817014	SAMPLE	AXD2	1144	02-OCT-09 20:25	DUSE		
236938020	SAMPLE	AXD2	1145	02-OCT-09 20:25	DONE		
237010013	SAMPLE	AXD2	1146	02-OCT-09 20:25	DUSE		
237170005	SAMPLE	AXD2	1147	02-OCT-09 20:25	DUSE		
237170020	SAMPLE	AXD2	1148	02-OCT-09 20:25	DUSE		
237343006	SAMPLE	AXD2	1161	02-OCT-09 20:26	DONE		
237521010	SAMPLE	AXD2	1162	02-OCT-09 20:26	DONE		
236817014	SAMPLE	AXD2	1113	05-OCT-09 20:48	DONE		
236699016	SAMPLE	AXD2	1114	05-OCT-09 20:48	DONE		
237010013	SAMPLE	AXD2	1117	05-OCT-09 20:48	DONE		
237170005	SAMPLE	AXD2	1132	05-OCT-09 20:48	DONE		
237170020	SAMPLE	AXD2	1135	05-OCT-09 20:48	DONE		

Instrument Run Log

Instrument Type: LUCAS CELL DETECTOR

Batch ID: 905701

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
237343001	SAMPLE	KSD1	LUCAS1	13-OCT-09 13:00	DONE	Lucas Cell	31-AUG-09 00:00
237343002	SAMPLE	KSD1	LUCAS2	13-OCT-09 13:00	DONE	Lucas Cell	19-DEC-08 00:00
237343003	SAMPLE	KSD1	LUCAS3	13-OCT-09 13:00	DONE	Lucas Cell	04-FEB-09 00:00
237343004	SAMPLE	KSD1	LUCAS4	13-OCT-09 13:00	DONE	Lucas Cell	02-MAR-09 00:00
237343005	SAMPLE	KSD1	LUCAS5	13-OCT-09 13:00	DONE	Lucas Cell	25-MAR-09 00:00
237343007	SAMPLE	KSD1	LUCAS6	13-OCT-09 13:00	DONE	Lucas Cell	04-AUG-09 00:00
237343008	SAMPLE	KSD1	LUCAS7	13-OCT-09 13:00	DONE	Lucas Cell	30-SEP-09 00:00
237343009	SAMPLE	KSD1	LUCAS1	13-OCT-09 13:30	DONE	Lucas Cell	31-AUG-09 00:00
237343010	SAMPLE	KSD1	LUCAS2	13-OCT-09 13:30	DONE	Lucas Cell	19-DEC-08 00:00
237343011	SAMPLE	KSD1	LUCAS3	13-OCT-09 13:30	DONE	Lucas Cell	04-FEB-09 00:00
237343012	SAMPLE	KSD1	LUCAS4	13-OCT-09 13:30	DONE	Lucas Cell	02-MAR-09 00:00
237343013	SAMPLE	KSD1	LUCAS5	13-OCT-09 13:30	DONE	Lucas Cell	25-MAR-09 00:00
237343014	SAMPLE	KSD1	LUCAS6	13-OCT-09 13:30	DONE	Lucas Cell	04-AUG-09 00:00
237343015	SAMPLE	KSD1	LUCAS7	13-OCT-09 13:30	DONE	Lucas Cell	30-SEP-09 00:00
237343016	SAMPLE	KSD1	LUCAS1	13-OCT-09 14:05	DONE	Lucas Cell	31-AUG-09 00:00
237343017	SAMPLE	KSD1	LUCAS2	13-OCT-09 14:05	DONE	Lucas Cell	19-DEC-08 00:00
237343018	SAMPLE	KSD1	LUCAS3	13-OCT-09 14:05	DONE	Lucas Cell	04-FEB-09 00:00
1201931193	DUP	KSD1	LUCAS5	13-OCT-09 14:05	DONE	Lucas Cell	25-MAR-09 00:00
1201931194	MS	KSD1	LUCAS6	13-OCT-09 14:05	DONE	Lucas Cell	04-AUG-09 00:00
1201931192	MB	KSD1	LUCAS4	13-OCT-09 15:10	DONE	Lucas Cell	02-MAR-09 00:00
1201931195	LCS	KSD1	LUCAS7	13-OCT-09 15:10	DONE	Lucas Cell	30-SEP-09 00:00

Instrument Run Log

Instrument Type: GFPC

Batch ID: 907633

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
237343010	SAMPLE	MXS2	PIC14D	15-OCT-09 18:32	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343005	SAMPLE	MXS2	PIC13B	15-OCT-09 18:32	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343007	SAMPLE	MXS2	PIC13C	15-OCT-09 18:32	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343004	SAMPLE	MXS2	PIC13A	15-OCT-09 18:32	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343001	SAMPLE	MXS2	PIC11D	15-OCT-09 18:32	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343002	SAMPLE	MXS2	PIC12B	15-OCT-09 18:32	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201935774	MB	MXS2	PIC9A	15-OCT-09 18:47	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343013	SAMPLE	MXS2	PIC6A	15-OCT-09 18:47	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343016	SAMPLE	MXS2	PIC7D	15-OCT-09 18:47	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343017	SAMPLE	MXS2	PIC8B	15-OCT-09 18:48	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343018	SAMPLE	MXS2	PIC8C	15-OCT-09 18:48	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201935776	MS	MXS2	PIC5A	15-OCT-09 18:58	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201935777	LCS	MXS2	PIC5D	15-OCT-09 18:58	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201935775	DUP	MXS2	PIC4A	15-OCT-09 23:44	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343003	SAMPLE	MXS2	PIC1A	15-OCT-09 23:44	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343008	SAMPLE	MXS2	PIC1B	15-OCT-09 23:44	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343009	SAMPLE	MXS2	PIC1C	15-OCT-09 23:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343011	SAMPLE	MXS2	PIC1D	15-OCT-09 23:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343012	SAMPLE	MXS2	PIC2A	15-OCT-09 23:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343014	SAMPLE	MXS2	PIC2B	15-OCT-09 23:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00
237343015	SAMPLE	MXS2	PIC2C	15-OCT-09 23:46	DONE	CeF on 25mm Filter	02-JUL-09 00:00

Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 908246

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
237343001	SAMPLE	JXD2	1173	10-OCT-09 15:22	DONE		
237343002	SAMPLE	JXD2	1174	10-OCT-09 15:22	DONE		
237343003	SAMPLE	JXD2	1175	10-OCT-09 15:22	DONE		
237343004	SAMPLE	JXD2	1176	10-OCT-09 15:23	DONE		
237343005	SAMPLE	JXD2	1177	10-OCT-09 15:23	DONE		
237343007	SAMPLE	JXD2	1178	10-OCT-09 15:23	DONE		
237343008	SAMPLE	JXD2	1179	10-OCT-09 15:23	DONE		
237343009	SAMPLE	JXD2	1180	10-OCT-09 15:23	DONE		
237343010	SAMPLE	JXD2	1181	10-OCT-09 15:23	DONE		
237343011	SAMPLE	JXD2	1182	10-OCT-09 15:23	DONE		
237343012	SAMPLE	JXD2	1183	10-OCT-09 15:23	DONE		
237343013	SAMPLE	JXD2	1184	10-OCT-09 15:23	DONE		
237343014	SAMPLE	JXD2	1185	10-OCT-09 15:23	DONE		
237343015	SAMPLE	JXD2	1186	10-OCT-09 15:23	DONE		
237343016	SAMPLE	JXD2	1187	10-OCT-09 15:23	DONE		
237343017	SAMPLE	JXD2	1188	10-OCT-09 15:23	DONE		
237343018	SAMPLE	JXD2	1189	10-OCT-09 15:23	DONE		
1201937429	MB	JXD2	1190	10-OCT-09 15:23	DUSE		
1201937430	DUP	JXD2	1191	10-OCT-09 15:23	DONE		
1201937431	MS	JXD2	1192	10-OCT-09 15:23	DONE		
1201937432	LCS	JXD2	1193	10-OCT-09 15:23	DONE		
1201937429	MB	JXD2	1177	14-OCT-09 12:56	DONE		

Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Batch ID: 911639

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
237343001	SAMPLE	JXD2	1113	15-OCT-09 14:24	DONE		
237343002	SAMPLE	JXD2	1114	15-OCT-09 14:24	DONE		
237343003	SAMPLE	JXD2	1115	15-OCT-09 14:24	DONE		
237343004	SAMPLE	JXD2	1116	15-OCT-09 14:24	DONE		
237343005	SAMPLE	JXD2	1117	15-OCT-09 14:24	DONE		
237343007	SAMPLE	JXD2	1118	15-OCT-09 14:24	DONE		
1201945570	MB	JXD2	1136	15-OCT-09 14:24	DONE		
1201945571	DUP	JXD2	1137	15-OCT-09 14:29	DONE		
1201945572	MS	JXD2	1138	15-OCT-09 14:29	DONE		
1201945573	LCS	JXD2	1139	15-OCT-09 14:29	DONE		
237343009	SAMPLE	JXD2	1144	15-OCT-09 14:29	DONE		
237343008	SAMPLE	JXD2	1145	15-OCT-09 14:29	DONE		
237343010	SAMPLE	JXD2	1151	15-OCT-09 14:29	DONE		
237343011	SAMPLE	JXD2	1152	15-OCT-09 14:29	DONE		
237343012	SAMPLE	JXD2	1153	15-OCT-09 14:29	DONE		
237343013	SAMPLE	JXD2	1154	15-OCT-09 14:29	DONE		
237343014	SAMPLE	JXD2	1155	15-OCT-09 14:29	DONE		
237343015	SAMPLE	JXD2	1156	15-OCT-09 14:29	DONE		
237343016	SAMPLE	JXD2	1157	15-OCT-09 14:29	DONE		
237343017	SAMPLE	JXD2	1158	15-OCT-09 14:29	DONE		
237343018	SAMPLE	JXD2	1159	15-OCT-09 14:30	DONE		