GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171 F 843.766.1178

www.gel.com

July 28, 2009

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

Re: Tronox Henderson
Work Order: 232528

Dear Mr. Hagar:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on July 02, 2009, June 27, 2009 and June 30, 2009. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4453.

Sincerely,

Heather Shaffer

for Edith Kent
Project Manager

Chain of Custody: 2027.001.00145, 2027.001.00161, 2027.001.00164 and 2027.001.00179
Enclosures

Tronox LLC
Tronox Henderson
SDG:232528

Table of Contents

Case Narrative **1**

Chain of Custody and Supporting Documentation **4**

Laboratory Certifications **16**

Radiological Analysis **18**
- Sample Data Summary 33
- Quality Control Data 55
- Raw Data 59
  - Uranium 60
  - Thorium 87
  - Radium 228 114
  - Radium 226 124
- Method Calibration Data 130
  - Gas Flow Proportional Counters 131
  - Lucas Cell Counters 215
    - *Lucas 1* *216*
    - *Lucas 2* *239*
    - *Lucas 3* *259*
    - *Lucas 4* *279*
    - *Lucas 5* *294*
    - *Lucas 7* *315*
  - Alpha Spectroscopy.pdf 331
- Background and Efficiency Data 562
- Runlogs 751

Case Narrative

CASE NARRATIVE
for
Tronox LLC
Tronox Henderson
SDG:232528

July 28, 2009

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample receipt
The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on July 02, 2009, June 27, 2009 and June 30, 2009 for analysis. Shipping container temperatures were checked, documented, and within specifications. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. The last sample of this SDG was received on July 2, 2009 at which time the SDG was closed. The client was notified through receipt of login review checklist and in the weekly status reports.

Items of Note
For Ra-228, the following samples exceeded the Tronox QA program sample result uncertainty limit of 30% with an activity between 2 and 5 times the MDA with samples counting for the maximum time:232528001, 232528002, 232528003, 232528005,232528007, 232528008, 232528010, 232528012, 232528013,232528014, 232528015,232528016, 232528017, 232528020 and the lab duplicate sample. For Ra-228, the following samples exceeded the Tronox QA program sample result uncertainty limit of 30% with an activity greater than 5 times the MDA with samples counting the maximum count time: 232528018. For Alpha Spec Thorium the following samples exceeded the Tronox QA program sample result uncertainty limit of 30% with an activity between 2 and 5 times the MDA with samples counting for the maximum time: 232528009 and 232528013. For Alpha Spec Uranium the following samples exceeded the Tronox QA program sample result uncertainty limit of 30% with an activity between 2 and 5 times the MDA with samples counting for the maximum time: 232528003, 232528004, 232528006, 232528007, 232528010, 232528015, 232528016, 232528017. For Alpha Spec Uranium, the following samples exceeded the Tronox QA program sample result uncertainty limit of 30% with an activity greater than 5 times the MDA with samples counting the maximum count time: 232528001, 232528008, 232528019, 232528020. For Ra-226, the following samples exceeded the Tronox QA program sample result uncertainty limit of 30% with an activity between 2 and 5 times the MDA with samples counting for the maximum time:232528001, 232528003, 232528004, 232528009, 232528010, 232528013, 232528015, 232528016, 232528017,232528018,232528019 and the lab duplicate sample. For Ra-226, the following samples exceeded the Tronox QA program sample result uncertainty limit of 30% with an activity greater than 5 times the MDA with samples counting the maximum count time:232528002, 232528005, 232528006, 232528007,232528008, 232528011, 232528014, 232528020.

Sample Identification
The laboratory received the following samples:

Laboratory ID	Client ID
232528001	RSAI2-10B
232528002	RSAI2009-10B
232528003	RSAI2-20B

232528004	RSAI2-31B
232528005	RSAJ2-10B
232528006	RSAJ2-20B
232528007	RSAJ2-33B
232528008	RSAJ2009-33B
232528009	SA187-0.5B
232528010	SA45-0.5B
232528011	SA45009-0.5B
232528012	SA153-0.5B
232528013	SA186-0.5B
232528014	SA185-0.5B
232528015	RSAO5-0.5B
232528016	SA152-10B
232528017	SA152-20B
232528018	SA152-34B
232528019	SA82-0.5B
232528020	SA82-10B

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.

Heather Shaffer

for Edith Kent

Project Manager

Chain of Custody and Supporting Documentation

2325287

northgate
environmental management, inc.

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. 2027.001.00145
Page: 1 of 1
Cooler # 1 of 1

Required Ship to Lab:		Required Project Information:		Required Invoice Information:			
Lab Name:	GEL Laboratories, LLC	Site ID #:	TRONOX LLC. HENDERSON	Send Invoice to:	Susan Crowley Tronox LLC	TAT: Standard 30 day	X
Address:	2040 Savage Road	Project #	2027.001	Address:	PO Box 55	If Rush, Date due	
Charleston, SC 29407		Site Address	560 W. Lake Mead Drive	City/State	Henderson, NV 89009	Phone #:	(949)260-9293
Lab PM:	Edith M. Kent	City	Henderson	State	NV	Reimbursement project?	X
Phone/Fax:	(843)556-8171	Site PM Name	Derrick Willis	Send EDD to	Frank Hagar Northgate Environmental Management, Inc frank.hagar@ngem.com	MA MCP Cert?	CT RCP Cert?
Lab PM email	emk@gel.com	Phone/Fax:	949-375-7004	CC Hardcopy report to	PDF Electronic Version Only		
Applicable Lab Quote #:		Site PM Email:	derrick.willis@ngem.com	CC Hardcopy report to	see additional comments below		

TAT: Standard 30 day	X	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 One Character per box. (A-Z, 0-9 / ,-) Samples IDs MUST BE UNIQUE	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	SAMPLE DATE	SAMPLE TIME	#OF CONTAINERS	FIELD FILTERED? (Y/N)	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analyses: EPA903.1 Radium-226	EPA904.0 Radium 228	Radionuclides*	Comments/Lab Sample I.D.
1	RSAI2-10B	SO	G	6/26/2009	7:10	1	N	X								X	X	X	250 ml Plastic jar
2	RSAI2009-10B	SO	G	6/26/2009	7:10	1	N	X								X	X	X	250 ml Plastic jar
3	RSAI2-20B	SO	G	6/26/2009	7:39	1	N	X								X	X	X	250 ml Plastic jar
4	RSAI2-31B	SO	G	6/26/2009	8:08	1	N	X								X	X	X	250 ml Plastic jar
8	RSAJ2-10B	SO	G	6/26/2009	11:22	1	N	X								X	X	X	250 ml Plastic jar
9	RSAJ2-20B	SO	G	6/26/2009	11:43	1	N	X								X	X	X	250 ml Plastic jar
10	RSAJ2-33B	SO	G	6/26/2009	12:47	1	N	X								X	X	X	250 ml Plastic jar
11	RSAJ2009-33B	SO	G	6/26/2009	12:47	1	N	X								X	X	X	250 ml Plastic jar
12	LORD 6/26/09																		

Valid Matrix Codes: DRINKING WATER WP; GROUND WATER WG; WASTE WATER WW; FREE PRODUCT LF; SOIL SO; OIL OL; WIPE SW; AMBIENT AIR AA; SVE AIR AE; SOIL GAS GS; WATER W; SURFACE WATER WS; WATER QC WQ; SLUDGE SL; RINSEATE WR; OTHER OT; ANIMAL TISSUE TA

Additional Comments/Special Instructions:

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

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

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[signature]	6/26/09	1700	Mike Fadow GEL	6/27/09	0905

Sample Receipt Conditions

Temp in 0C	Samples on Ice?	Sample intact?	Trip Blank?
23C	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

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

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Doug Davis
SIGNATURE of SAMPLER: [signature]
DATE Signed: 6/26/09 Time: 1700

5

GEL | Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: Kerr/Northgate	**SDG/ARCOC/Work Order:** 232528 70
Received By: MF	**Date Received:** 6-27-09

Suspected Hazard Information	Yes	No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.
COC/Samples marked as radioactive?		✓	Maximum Counts Observed*: Crn 20
Classified Radioactive II or III by RSO?		✓	
COC/Samples marked containing PCBs?		✓	
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		✓	

	Sample Receipt Criteria	Yes	NA	No	**Comments/Qualifiers (Required for Non-Conforming Items)**
1	Shipping containers received intact and sealed?	✓			Circle Applicable: seals broken / damaged container / leaking container / other (describe)
2	Samples requiring cold preservation within 0 ≤ 6 deg. C?		✓		Preservation Method: ice bags / blue ice / dry ice / (none) / other (describe) 23 c
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: seals broken / damaged container / leaking container / other (describe)
5	Samples requiring chemical preservation at proper pH?		✓		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		✓		Sample ID's and containers affected:
7	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	✓			Id's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
12	COC form is properly signed in relinquished/received sections?	✓			

Comments:

FX 7977 1836 7090

PM (or PMA) review: Initials MF Date 6/29/09

2009065145 1

232528

CHAIN-OF-CUSTODY / Analytical Request Document

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

COC No. 2027.001.00161
Page: 1 of 1
Cooler # 1 of 1

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

Required Ship to Lab:		Required Project Information:		Required Invoice Information:			
Lab Name:	GEL Laboratories, LLC	Site ID #:	TRONOX LLC. HENDERSON	Send Invoice to:	Susan Crowley Tronox LLC	TAT: Standard 30 day	X Rush ( ) Mark One
Address:	2040 Savage Road	Project #	2027.001	Address:	PO Box 55	If Rush, Date due	
Chartleston, SC 29407		Site Address	560 W. Lake Mead Drive	City/State	Henderson, NV 89009	Phone #: (949)260-9293	QC level Required: Standard ( ) Special EPA Stage 4 Mark one
Lab PM:	Edith M. Kent	City	Henderson	State	NV	Reimbursement project? X	Non-reimbursement project? ( ) Mark one	NJ Reduced Deliverable Package?	
Phone/Fax:	(843)556-8171	Site PM Name	Derrick Willis	Send EDD to	Frank Hagar Northgate Environmental Management, Inc frank.hagar@ngem.com	MA MCP Cert? ( )	CT RCP Cert? ( ) Mark One
Lab PM email	emk@gel.com	Phone/Fax:	949-375-7004	CC Hardcopy report to	PDF Electronic Version Only	Lab Project ID (lab use)	
Applicable Lab Quote #:		Site PM Email:	derrick.willis@ngem.com	CC Hardcopy report to	see additional comments below		

Valid Matrix Codes

MATRIX		MATRIX	
DRINKING WATER	WP	WATER	W
GROUND WATER	WG	SURFACE WATER	WS
WASTE WATER	WW	WATER QC	WQ
FREE PRODUCT	LF	SLUDGE	SL
SOIL	SO	RINSEATE	WH
OIL	OL	OTHER	OT
WIPE	SW	ANIMAL TISSUE	TA
AMBIENT AIR	AA		
SVE AIR	AE		
SOIL GAS	GS		

ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / ,-) Samples IDs MUST BE UNIQUE	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	SAMPLE DATE	SAMPLE TIME	#OF CONTAINERS	FIELD FILTERED? (Y/N)	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analyses: EPA903.1 Radium-226	EPA904.0 Radium 228	Radionuclides*					Comments/Lab Sample I.D.
1	SA187-0.5B	SO	G	6/29/2009	9:20	1	N	X								X	X	X					250 ml Plastic jar
2	SA45-0.5B	SO	G	6/29/2009	11:15	1	N	X								X	X	X					250 ml Plastic jar
3	SA45009-0.5B	SO	G	6/29/2009	11:15	1	N	X								X	X	X					250 ml Plastic jar
4	SA153-0.5B	SO	G	6/29/2009	13:20	1	N	X								X	X	X					250 ml Plastic jar
5	SA186-0.5B	SO	G	6/29/2009	8:50	1	N	X								X	X	X					250 ml Plastic jar
6	SA185-0.5B	SO	G	6/29/2009	10:30	1	N	X								X	X	X					250 ml Plastic jar
7	RSAO5-0.5B	SO	G	6/29/2009	9:55	1	N	X								X	X	X					250 ml Plastic jar
8																							
9																							
10																							
11																							
12																							

7

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	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
GES	6-29	1500	Gel	6-30-09	0915

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

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Phil Brinkerhoff
SIGNATURE of SAMPLER:
DATE Signed: 6/29/2009 Time: 1500

Sample Receipt Conditions	Temp in OC	Samples on Ice?	Sample intact?	Trip Blank?
	23°C	Y/N	Y/N	Y/N
		Y/N	Y/N	Y/N
		Y/N	Y/N	Y/N
		Y/N	Y/N	Y/N

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: Kerr / Northgate	**SDG/ARCOC/Work Order:** 232528 1.
Received By: MF	**Date Received:** 6-30-09

Suspected Hazard Information	Yes	No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.
COC/Samples marked as radioactive?		✓	Maximum Counts Observed*: Cpm 20
Classified Radioactive II or III by RSO?		✓	
COC/Samples marked containing PCBs?		✓	
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		✓	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: seals broken damaged container leaking container other (describe)
2	Samples requiring cold preservation within 0 ≤ 6 deg. C?		✓		Preservation Method: ice bags blue ice dry ice (none) other (describe) 23c
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: seals broken damaged container leaking container other (describe)
5	Samples requiring chemical preservation at proper pH?		✓		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		✓		Sample ID's and containers affected:
7	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	✓			Id's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
12	COC form is properly signed in relinquished/received sections?	✓			

Comments:

FX - 7977 2268 5300

PM (or PMA) review: Initials MF Date 6/30/09

northgate
environmental management, inc.

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. 2027.001.00164
Page: 1 of 1
Cooler # 1 of 1

Required Ship to Lab:

Lab Name:	GEL Laboratories, LLC
Address:	2040 Savage Road
	Chartleston, SC 29407
Lab PM:	Edith M. Kent
Phone/Fax:	(843)556-8171
Lab PM email	emk@gel.com
Applicable Lab Quote #:	

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?	X
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	X	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)

Valid Matrix Codes: MATRIX — DRINKING WATER WP; GROUND WATER WG; WASTE WATER WW; FREE PRODUCT LF; SOIL SO; OIL OL; WIPE WI; AMBIENT AIR AB; SVE AIR SG; SOIL GAS. MATRIX — WATER W; SURFACE WATER WS; WATER QC WQ; SLUDGE SL; RINSEATE WH; OTHER OT; ANIMAL TISSUE TA

ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / ,-) Samples IDs MUST BE UNIQUE	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	SAMPLE DATE	SAMPLE TIME	#OF CONTAINERS	FIELD FILTERED? (Y/N)	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analyses: EPA903.1 Radium-226	EPA904.0 Radium 228	Radionuclides*				Comments/Lab Sample I.D.
1	SA152-10B	SO	G	6/29/2009	8:53	1	N	X								X	X	X				250 ml Plastic jar
2	SA152-20B	SO	G	6/29/2009	9:33	1	N	X								X	X	X				250 ml Plastic jar
3	SA152-34B	SO	G	6/29/2009	10:11	1	N	X								X	X	X				250 ml Plastic jar
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

Additional Comments/Special Instructions:

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

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

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
	6-29	1430		6-29	1430
	6-29	1700	GEL	6/30/09	0915

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

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Doug Davis
SIGNATURE of SAMPLER:
DATE Signed 6-29
Time: 1430

Sample Receipt Conditions

	Temp in 0C	Samples on Ice?	Sample Intact?	Trip Blank?
		Y/N	Y/N	Y/N
	23°	Y/(N)	(Y)/N	Y/(N)
		Y/N	Y/N	Y/N
		Y/N	Y/N	Y/N

6

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client:	KERR / NORTHGATE	**SDG/ARCOC/Work Order:**	232528 1.
Received By:	MK	**Date Received:**	6-30-09

Suspected Hazard Information	Yes	No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.
COC/Samples marked as radioactive?		✓	Maximum Counts Observed*: cpm 20
Classified Radioactive II or III by RSO?		✓	
COC/Samples marked containing PCBs?		✓	
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		✓	

	Sample Receipt Criteria	Yes	NA	No	**Comments/Qualifiers (Required for Non-Conforming Items)**
1	Shipping containers received intact and sealed?	✓			Circle Applicable: seals broken damaged container leaking container other (describe)
2	Samples requiring cold preservation within 0 ≤ 6 deg. C?		✓		Preservation Method: ice bags blue ice dry ice (none) other (describe) 23 c
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: seals broken damaged container leaking container other (describe)
5	Samples requiring chemical preservation at proper pH?		✓		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		✓		Sample ID's and containers affected:
7	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	✓			Id's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
12	COC form is properly signed in relinquished/received sections?	✓			

Comments:

FX 7967 3550 8909

PM (or PMA) review: Initials MK Date 6/30/09

PD 7/2

232528 1. 232528 1.

northgate
environmental management, inc.

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

CHAIN-OF-CUSTODY / Analytical Request Document

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

COC No. 2027.001.00179
Page: 1 of 1
Cooler # 1 of 1

Required Ship to Lab:

Lab Name:	GEL Laboratories, LLC
Address:	2040 Savage Road
	Chartleston, SC 29407
Lab PM:	Edith M. Kent
Phone/Fax:	(843)556-8171
Lab PM email	emk@gel.com
Applicable Lab Quote #:	

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?	X
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	X	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)

Valid Matrix Codes: MATRIX — DRINKING WATER WP; GROUND WATER WG; WASTE WATER WW; FREE PRODUCT LF; SOIL SO; OIL OL; WIPE WI; AMBIENT AIR AB; SVE AIR SG; SOIL GAS GS; WATER W; SURFACE WATER WS; WATER QC WQ; SLUDGE SL; RINSEATE WH; OTHER OT; ANIMAL TISSUE TA

ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / ,-) Samples IDs MUST BE UNIQUE	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	SAMPLE DATE	SAMPLE TIME	#OF CONTAINERS	FIELD FILTERED? (Y/N)	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analyses: EPA903.1 Radium-226	EPA904.0 Radium 228	Radionuclides*	Comments/Lab Sample I.D.
1	SA82-0.5B	SO	G	7/1/2009	7:00	1	N	X								X	X	X	250 ml Plastic jar
2	SA82-0.5BMS	SO	G	7/1/2009	7:00	1	N	X								X	X	X	250 ml Plastic jar
3	SA82-0.5BMSD	SO	G	7/1/2009	7:00	1	N	X								X	X	X	250 ml Plastic jar
4	SA82-10B	SO	G	7/1/2009	7:56	1	N	X								X	X	X	250 ml Plastic jar
5	SA82-29B	SO	G	7/1/2009	9:36	1	N	X								X	X	X	250 ml Plastic jar
6	RSAL3-10B	SO	G	7/1/2009	11:03	1	N	X								X	X	X	250 ml Plastic jar
7	RSAL3-30B	SO	G	7/1/2009	12:02	1	N	X								X	X	X	250 ml Plastic jar
8																			
9																			
10																			
11																			
12																			

Additional Comments/Special Instructions:

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

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

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
	7-1-09	1430		7-1-09	1450
	7-1-09	1700	Gel	7-2-09	0840

Sample Receipt Conditions

	Temp in 0C	Samples on Ice?	Sample intact?	Trip Blank?
		Y/N	Y/N	Y/N
	23°	Y/N	Y/N	Y/N
		Y/N	Y/N	Y/N
		Y/N	Y/N	Y/N

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

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Doug Davis

SIGNATURE of SAMPLER:

DATE Signed: 7-1-09 Time: 1430

11

2009065145l

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: Kerr/Northgate	**SDG/ARCOC/Work Order:** 232528
Received By: MF	**Date Received:** 7-2-09

Suspected Hazard Information	Yes	No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.
COC/Samples marked as radioactive?		✓	Maximum Counts Observed*: Cpm 200
Classified Radioactive II or III by RSO?		✓	
COC/Samples marked containing PCBs?		✓	
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		✓	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: seals broken damaged container leaking container other (describe)
2	Samples requiring cold preservation within 0 ≤ 6 deg. C?		✓		Preservation Method: ice bags blue ice dry ice (none) other (describe) 23°
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: seals broken damaged container leaking container other (describe)
5	Samples requiring chemical preservation at proper pH?		✓		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		✓		Sample ID's and containers affected:
7	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	✓			Id's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
12	COC form is properly signed in relinquished/received sections?	✓			

Comments:

FX 7967 4394 9805

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

Subject: Soil SDG 232528 and Water SDG 232135 to be closed
From: Heather Shaffer <Heather.Shaffer@gel.com>
Date: Thu, 02 Jul 2009 11:32:58 -0400
To: Frank Hagar <Frank.Hagar@ngem.com>, Cindy Arnold <Cindy.Arnold@ngem.com>, Derrick Willis <Derrick.Willis@ngem.com>
CC: Edie Kent <emk@gel.com>, Mercedes Simmons <mer01583@gel.com>

The SDG 232528 for soils and 232135 for the waters was closed as of today, July 2nd. As soon as the chains have been reviewed you will receive a final LRR and scanned chains of custody.

We have one outstanding request for a revised COC for work order 232135. We have not yet received the revised chain for 2027.001.00109. There was no time of collection listed on the chain.

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

Subject: Correction: SDG 232528 QC Issues -Ra226, Ra228, Alpha spec Th and Alpha spec U
From: Heather Shaffer <Heather.Shaffer@gel.com>
Date: Tue, 28 Jul 2009 15:15:56 -0400
To: Cindy Arnold <Cindy.Arnold@ngem.com>
CC: Edie Kent <emk@gel.com>

Cindy,
I was just double checking my samples, and I have a revision to the Uranium Issues (please disregard samples listed in my first e-mail) These are the correct samples:

URANIUM ISSUES: correction
The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with results between 2 and 5 times the MDA for U235: RSAI2-20B (232528003), RSAI2-31B(232528004), RSAJ2-20B(232528006), RSAJ2-33B(232528007), SA45-0.5B(232528010), RSAO5-0.5B(232528015), SA152-10B(232528016), SA152-20B(232528017).
The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with results greater than 5 times the MDA for U235: RSAI2-10B(232528001), RSAJ2009-33B(232528008), SA82-0.5B(232528019), SA82-10B(232528020).

Thank you,
Heather
Heather Shaffer wrote:

> The following are the QC issues regarding this SDG for Ra-226, Ra-228, Alpha Spec Th, and Alpha Spec U:
>
> **RA 228 ISSUES:**
> The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with results between 2 and 5 times the MDA for Ra 228: RSAI2-10B(232528001), RSAI2009-10B (232528002), RSAI2-20B (232528003), RSAJ2-10B(232528005), RSAJU2-33B(232528007), RSAJ2009-33B(232528008), SA45-0.5B(232528010), SA153-0.5B(232528012), SA186-0.5B (232528013), SA185-0.5B (232528014), RSAO5-0.5B(232528015), SA152-10B(232528016), SA152-20B(232528017), SA82-10B(232528020) and the lab duplicate sample.
> The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with results greater than 5 times the MDA for Ra228: SA152-34B (232528018)
> **RA 226 ISSUES:**
> The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with results between 2 and 5 times the MDA for Ra 226: RSAI2-10B(232528001), RSAI2-20B(232528003), RSAI2-31B(232528004), SA187-0.5B(232528009), SA45-0.5B(232528010),SA186-0.5B (232528013), RSAO5-0.5B (232528015), SA152-10B(232528016), SA152-20B(232528017), SA152-34B (232528018), SA82-0.5B (232528019) and the lab duplicate sample.
> The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with results greater than 5 times the MDA for Ra226: RSAI2009-10B(232528002), RSAJ2-10B (232528005), RSAJ2-20B(232528006), RSAJ2-33B(232528007), RSAJ2009-33B(232528008), SA45009-0.5B(232528011), SA185-0.5B(232528014), SA82-10B(232528020).
> **THORIUM ISSUES:**
> The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with results between 2 and 5 times the MDA for Th: SA187-0.5B(232528009), SA186-0.5B(232528013)
> **URANIUM ISSUES:**
> The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with results between 2 and 5 times the MDA for U235: RSAI2-10B(232528001), RSAJ2009-33B(232528008), SA82-0.5B(232528019), SA82-10B(232528020)
> The following samples do not meet the Tronox QA program sample result uncertainty limit of <30% with results greater than 5 times the MDA for U235: RSAI2009-10B(232528002), RSAJ2-10B (232528005), RSAJ2-20B(232528006), RSAJ2-33B(232528007), RSAJ2009-33B(232528008), SA45009-0.5B(232528011), SA185-0.5B(232528014), SA82-10B(232528020).
>
> The lab has noted that an increased aliquot size might be helpful in improving the counting uncertainty. However, to do so would result in U-234 tailing into the U-235 region of interest and possibly lower the tracer recoveries. For these samples, the lab did originally prep with a larger aliquot which did result in lower tracer yields and so the aliquots had to

be reduced by half in order to produce acceptable tracer yields.
GEL has counted each sample being reported for the maximum possible count time.

This will be noted in the case narrative.

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

--
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

Laboratory Certifications

List of current GEL Certifications as of 28 July 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 232528

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:	886907
Prep Batch Number:	882179

Sample ID	Client ID
232528001	RSAI2-10B
232528002	RSAI2009-10B
232528003	RSAI2-20B
232528004	RSAI2-31B
232528005	RSAJ2-10B
232528006	RSAJ2-20B
232528007	RSAJ2-33B
232528008	RSAJ2009-33B
232528009	SA187-0.5B
232528010	SA45-0.5B
232528011	SA45009-0.5B
232528012	SA153-0.5B
232528013	SA186-0.5B
232528014	SA185-0.5B
232528015	RSAO5-0.5B
232528016	SA152-10B
232528017	SA152-20B
232528018	SA152-34B
232528019	SA82-0.5B
232528020	SA82-10B
1201885296	Method Blank (MB)
1201885297	232528019(SA82-0.5B) Sample Duplicate (DUP)
1201885298	232528019(SA82-0.5B) Matrix Spike (MS)
1201885299	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: 232528019 (SA82-0.5B).

QC Information
All of the QC samples met the required acceptance limits.

Technical Information:

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

Sample Re-prep/Re-analysis
Samples were recounted due to a suspected blank false positive. Samples were reprepped due to low tracer yield recovery.

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 715194 was generated due to Other. 1. Sample 232528013 has uncertainty greater than thirty percent of the sample activity for Th230 and the Th230 result is between two and five times the MDA. Sample was counted one thousand minutes to achieve best possible uncertainties. 1. Project manager notified, reporting results.

Manual Integration
No manual integrations were performed on data in this batch.

Additional Comments
The blank, 1201885296 (MB), did not meet the detection limit due to keeping the blank volume

consistent with the other sample aliquots. All other samples met the detection limits. The sample and the duplicate, 1201885297 (SA82-0.5B) and 232528019 (SA82-0.5B), did not meet the relative percent difference requirement for Th-228, however they do meet the relative error ratio requirement with a value of 1.94.

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:	883496
Prep Batch Number:	882179

Sample ID	Client ID
232528001	RSAI2-10B
232528002	RSAI2009-10B
232528003	RSAI2-20B
232528004	RSAI2-31B
232528005	RSAJ2-10B
232528006	RSAJ2-20B
232528007	RSAJ2-33B
232528008	RSAJ2009-33B
232528009	SA187-0.5B
232528010	SA45-0.5B
232528011	SA45009-0.5B
232528012	SA153-0.5B
232528013	SA186-0.5B
232528014	SA185-0.5B
232528015	RSAO5-0.5B
232528016	SA152-10B
232528017	SA152-20B
232528018	SA152-34B
232528019	SA82-0.5B
232528020	SA82-10B
1201876826	Method Blank (MB)
1201876827	232528019(SA82-0.5B) Sample Duplicate (DUP)
1201876828	232528019(SA82-0.5B) Matrix Spike (MS)
1201876829	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 volumes in this batch.

Designated QC
The following sample was used for QC: 232528019 (SA82-0.5B).

QC Information
Refer to Non-Conformance Report.

Technical Information:

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

Sample Re-prep/Re-analysis
Samples 1201876826 (MB), 232528001 (RSAI2-10B), 232528002 (RSAI2009-10B), 232528003 (RSAI2-20B), 232528004 (RSAI2-31B), 232528006 (RSAJ2-20B), 232528007 (RSAJ2-33B), 232528008 (RSAJ2009-33B), 232528009 (SA187-0.5B), 232528010 (SA45-0.5B), 232528012 (SA153-0.5B), 232528014 (SA185-0.5B), 232528015 (RSAO5-0.5B), 232528016 (SA152-10B), 232528017 (SA152-20B), 232528019 (SA82-0.5B) and 232528020 (SA82-10B) were recounted for the maximum count time to reduce uncertainty.

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 714397 was generated due to Other. 1. The uncertainty is greater than 30% of the U235 result and activity is greater than five times the MDA for sample 232528001. Uncertainty is greater than 30% of the U235 result and activity is between two times the MDA and five times the MDA for

samples 232528003, 232528004, 232528006, 232528007, 232528010, 232528015, 232528016 and 232528017. Samples meet the client's tracer yield requirements and required detection limits. Samples counted for the maximum count time to reduce uncertainty. 1. Project manager was notified. Reporting results.

Manual Integration
No manual integrations were performed on data in this batch.

Additional Comments
The sample and the duplicate, 1201876827 (SA82-0.5B) and 232528019 (SA82-0.5B), did not meet the relative percent difference requirement for U235, however they do meet the relative error ratio requirement with a value of 2.34.

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:	882961
Prep Batch Number:	882179

Sample ID	Client ID
232528001	RSAI2-10B
232528002	RSAI2009-10B
232528003	RSAI2-20B
232528004	RSAI2-31B
232528005	RSAJ2-10B
232528006	RSAJ2-20B
232528007	RSAJ2-33B
232528008	RSAJ2009-33B
232528009	SA187-0.5B
232528010	SA45-0.5B
232528011	SA45009-0.5B
232528012	SA153-0.5B
232528013	SA186-0.5B
232528014	SA185-0.5B
232528015	RSAO5-0.5B
232528016	SA152-10B
232528017	SA152-20B
232528018	SA152-34B
232528019	SA82-0.5B
232528020	SA82-10B
1201875401	Method Blank (MB)
1201875402	232528019(SA82-0.5B) Sample Duplicate (DUP)
1201875403	232528019(SA82-0.5B) Matrix Spike (MS)
1201875404	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: 232528019 (SA82-0.5B).

QC Information
Refer to Non-Conformance Report.

Technical Information:

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

Sample Re-prep/Re-analysis
Sample 1201875404 (LCS) was recounted due to low recovery. Samples 1201875402 (SA82-0.5B), 232528001 (RSAI2-10B), 232528002 (RSAI2009-10B), 232528003 (RSAI2-20B), 232528005 (RSAJ2-10B), 232528007 (RSAJ2-33B), 232528008 (RSAJ2009-33B), 232528010 (SA45-0.5B), 232528012 (SA153-0.5B), 232528013 (SA186-0.5B), 232528014 (SA185-0.5B), 232528015 (RSAO5-0.5B), 232528016 (SA152-10B), 232528017 (SA152-20B), 232528018 (SA152-34B) and 232528020 (SA82-10B) were recounted due to uncertainty requirements and activity being between two and five times the MDA. Samples 232528002 (RSAI2009-10B) and 232528010 (SA45-0.5B) were re-eluted due to high MDAs.

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

Miscellaneous Information:

NCR Documentation
Nonconformance reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following NCR was generated for this SDG:
NCR 715738 was generated due to Other. 1. Sample 232528013 has Ra-228 activity between two and five times the MDC and the Uncertainty is greater than 30 percent. Sample was recounted maximum count time. 1. Project manager notified. Reporting results.

Additional Comments
Additional comments were not required for this sample set.

Qualifier information

Manual qualifiers were not required.

Method/Analysis Information

Product:	**Lucas Cell, Ra226, solid**
Analytical Method:	EPA 903.1 Modified
Prep Method:	Dry Soil Prep
Analytical Batch Number:	883001
Prep Batch Number:	882179

Sample ID	Client ID
232528001	RSAI2-10B
232528002	RSAI2009-10B
232528003	RSAI2-20B
232528004	RSAI2-31B
232528005	RSAJ2-10B
232528006	RSAJ2-20B
232528007	RSAJ2-33B
232528008	RSAJ2009-33B
232528009	SA187-0.5B
232528010	SA45-0.5B
232528011	SA45009-0.5B
232528012	SA153-0.5B
232528013	SA186-0.5B
232528014	SA185-0.5B
232528015	RSAO5-0.5B
232528016	SA152-10B
232528017	SA152-20B
232528018	SA152-34B
232528019	SA82-0.5B
232528020	SA82-10B
1201875537	Method Blank (MB)
1201875538	232528019(SA82-0.5B) Sample Duplicate (DUP)
1201875539	232528019(SA82-0.5B) Matrix Spike (MS)
1201875540	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: 232528019 (SA82-0.5B).

QC Information
All of the QC samples met the required acceptance limits.

Technical Information:

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

Sample Re-prep/Re-analysis
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 715239 was generated due to Other. 1. The following samples have activity between 2 and 5x the MDC, Uncertainty is greater than 30 percent and counted the maximum count time: 232528001, 232528009, 232528013, 232528015, 232528018, 232528019, and 1201875538. 2. The following have activity above 5 times the MDC and Uncertainty is greater than 30 percent: 232528011 and 232528020. 1. Reporting results. 2. Reporting results.

Additional Comments
Additional comments were not required for this sample set.

Qualifier information

Manual qualifiers were not required.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Review Validation:

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

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

Reviewer/Date: 7/28/09

COMPANY - WIDE NONCONFORMANCE REPORT

Mo.Day Yr.	Division:	Quality Criteria:	Type:
23-JUL-09	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
ALPHA SPECTROMETER	DOE EML HASL-300, U-02-RC Modified	Solid	KERR
Batch ID:	**Sample Numbers:**		
883496	See below		

Potentially affected work order(s)(SDG): 232528

Application Issues:

Other

Specification and Requirements Nonconformance Description:	NRG Disposition:
1. The uncertainty is greater than 30% of the U235 result and activity is greater than five times the MDA for sample 232528001. Uncertainty is greater than 30% of the U235 result and activity is between two times the MDA and five times the MDA for samples 232528003, 232528004, 232528006, 232528007, 232528010, 232528015, 232528016 and 232528017. Samples meet the client's tracer yield requirements and required detection limits. Samples counted for the maximum count time to reduce uncertainty.	1. Project manager was notified. Reporting results.

Originator's Name:

Joseph Moulden 28-JUL-09

Data Validator/Group Leader:

Joseph Moulden

COMPANY - WIDE NONCONFORMANCE REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
26-JUL-09	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
ALPHA SPECTROMETER	DOE EML HASL-300, Th-01-RC Modified	Solid	KERR
Batch ID:	**Sample Numbers:**		
886907	See Below		

Potentially affected work order(s)(SDG): 232528

Application Issues:

Other

Specification and Requirements Nonconformance Description:	**NRG Disposition:**
1. Sample 232528013 has uncertainty greater than thirty percent of the sample activity for Th230 and the Th230 result is between two and five times the MDA. Sample was counted one thousand minutes to achieve best possible uncertainties.	1. Project manager notified, reporting results.

Originator's Name:

Eric Brimstin 26-JUL-09

Data Validator/Group Leader:

Joseph Moulden 28-JUL-09

COMPANY - WIDE NONCONFORMANCE REPORT

Mo.Day Yr.	Division:	Quality Criteria:	Type:
27-JUL-09	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
LUCAS CELL DETECTOR	EPA 903.1 Modified	Solid	KERR
Batch ID:	**Sample Numbers:**		
883001	232528001, 232528002, 232528003, 232528004, 232528005, 232528006, 232528007, 232528008, 232528009, 232528010, 232528011, 232528012, 232528013, 232528014, 232528015, 232528016, 232528017, 232528018, 232528019, 232528020, 1201875538		

Potentially affected work order(s)(SDG): 232528

Application Issues:

Other

Specification and Requirements Nonconformance Description:	NRG Disposition:
1. The following samples have activity between 2 and 5x the MDC, Uncertainty is greater than 30 percent and counted the maximum count time: 232528001, 232528009, 232528013, 232528015, 232528018, 232528019, and 1201875538. 2. The following have activity above 5 times the MDC and Uncertainty is greater than 30 percent: 232528011 and 232528020.	1. Reporting results. 2. Reporting results.

Originator's Name:

Lesley Anderson 27-JUL-09

Data Validator/Group Leader:

Theresa Austin 28-JUL-09

COMPANY - WIDE NONCONFORMANCE REPORT

Mo.Day Yr.	**Division:**	**Quality Criteria:**	**Type:**
28-JUL-09	Radiochemistry	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
GFPC	EPA 904.0/SW846 9320 Modified	Solid	KERR
Batch ID:	**Sample Numbers:**		
882961	232528013		

Potentially affected work order(s)(SDG): 232528

Application Issues:

Other

Specification and Requirements Nonconformance Description:	**NRG Disposition:**
1. Sample 232528013 has Ra-228 activity between two and five times the MDC and the Uncertainty is greater than 30 percent. Sample was recounted maximum count time.	1. Project manager notified. Reporting results.

Originator's Name:

Theresa Austin 28-JUL-09

Data Validator/Group Leader:

Angela Johnson 28-JUL-09

SAMPLE DATA SUMMARY

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

Certificate of Analysis Report
for

KERR003 Tronox LLC

Client SDG: 232528 GEL Work Order: 232528

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.

7/27/09

Reviewed by

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: RSAI2-10B
Sample ID: 232528001
Matrix: SO
Collect Date: 26-JUN-09 07:10
Receive Date: 27-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		1.47	+/-0.315	0.323	0.050	pCi/g		HAKB	07/24/09	0726	886907	1
Thorium-230		1.40	+/-0.266	0.138	0.050	pCi/g						
Thorium-232		1.60	+/-0.281	0.120	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		1.30	+/-0.0928	0.0274	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0545	+/-0.0209	0.00629	0.040	pCi/g						
Uranium-238		1.15	+/-0.0872	0.0209	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		1.72	+/-0.250	0.282	0.500	pCi/g		JXC5	07/15/09	2027	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		0.902	+/-0.290	0.288	0.500	pCi/g		KSD1	07/25/09	0855	883001	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	07/02/09	1608	882179

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"			89.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			96.5	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			99.5	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: RSAI2009-10B
Sample ID: 232528002
Matrix: SO
Collect Date: 26-JUN-09 07:10
Receive Date: 27-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		2.05	+/-0.425	0.438	0.050	pCi/g		HAKB	07/24/09	0726	886907	1
Thorium-230		1.42	+/-0.299	0.123	0.050	pCi/g						
Thorium-232		2.01	+/-0.361	0.178	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		1.35	+/-0.0967	0.0322	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0454	+/-0.0236	0.029	0.040	pCi/g						
Uranium-238		1.14	+/-0.0886	0.0283	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		1.41	+/-0.256	0.342	0.500	pCi/g		JXC5	07/21/09	1555	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		0.804	+/-0.216	0.135	0.500	pCi/g		KSD1	07/25/09	0855	883001	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	07/02/09	1608	882179

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			88.4	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			101	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			76.0	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: RSAI2-20B
Sample ID: 232528003
Matrix: SO
Collect Date: 26-JUN-09 07:39
Receive Date: 27-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		1.36	+/-0.283	0.246	0.050	pCi/g		HAKB	07/24/09	0726	886907	1
Thorium-230		1.35	+/-0.263	0.153	0.050	pCi/g						
Thorium-232		1.58	+/-0.278	0.119	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		1.78	+/-0.108	0.0226	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0895	+/-0.0286	0.023	0.040	pCi/g						
Uranium-238		1.67	+/-0.104	0.0161	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		0.905	+/-0.369	0.589	0.500	pCi/g		JXC5	07/15/09	2027	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		1.27	+/-0.317	0.266	0.500	pCi/g		KSD1	07/25/09	0855	883001	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	07/02/09	1608	882179

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"			90.0	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			104	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			94.6	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: RSAI2-31B
Sample ID: 232528004
Matrix: SO
Collect Date: 26-JUN-09 08:08
Receive Date: 27-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		0.934	+/-0.270	0.217	0.050	pCi/g		HAKB	07/24/09	0726	886907	1
Thorium-230		2.57	+/-0.422	0.168	0.050	pCi/g						
Thorium-232		1.02	+/-0.262	0.0527	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		2.14	+/-0.125	0.027	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0927	+/-0.0301	0.0222	0.040	pCi/g						
Uranium-238		2.21	+/-0.126	0.018	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		0.667	+/-0.283	0.361	0.500	pCi/g		JXC5	07/15/09	1530	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		1.40	+/-0.376	0.342	0.500	pCi/g		KSD1	07/25/09	0855	883001	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	07/02/09	1608	882179

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			84.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			91.1	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			84.3	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: RSAJ2-10B
Sample ID: 232528005
Matrix: SO
Collect Date: 26-JUN-09 11:22
Receive Date: 27-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		2.65	+/-0.444	0.180	0.050	pCi/g		HAKB	07/24/09	1316	886907	1
Thorium-230		1.76	+/-0.356	0.0563	0.050	pCi/g						
Thorium-232		1.80	+/-0.364	0.144	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		1.78	+/-0.229	0.0466	0.040	pCi/g		HAKB	07/15/09	1351	883496	2
Uranium-235/236		0.0471	+/-0.0413	0.0283	0.040	pCi/g						
Uranium-238		1.57	+/-0.215	0.0422	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		1.11	+/-0.281	0.414	0.500	pCi/g		JXC5	07/15/09	2025	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		1.24	+/-0.296	0.137	0.500	pCi/g		KSD1	07/25/09	0855	883001	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	07/02/09	1608	882179

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"			86.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			94.0	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			101	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: RSAJ2-20B
Sample ID: 232528006
Matrix: SO
Collect Date: 26-JUN-09 11:43
Receive Date: 27-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		1.61	+/-0.311	0.164	0.050	pCi/g		HAKB	07/24/09	0726	886907	1
Thorium-230		1.79	+/-0.323	0.141	0.050	pCi/g						
Thorium-232		1.46	+/-0.293	0.141	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		1.81	+/-0.114	0.0179	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0854	+/-0.029	0.0221	0.040	pCi/g						
Uranium-238		1.76	+/-0.112	0.0143	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		0.591	+/-0.264	0.400	0.500	pCi/g		JXC5	07/15/09	1530	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		1.02	+/-0.262	0.158	0.500	pCi/g		KSD1	07/25/09	0855	883001	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	07/02/09	1608	882179

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"			93.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			97.8	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			93.8	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: RSAJ2-33B
Sample ID: 232528007
Matrix: SO
Collect Date: 26-JUN-09 12:47
Receive Date: 27-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		1.56	+/-0.382	0.412	0.050	pCi/g		HAKB	07/24/09	0726	886907	1
Thorium-230		1.71	+/-0.345	0.222	0.050	pCi/g						
Thorium-232		1.54	+/-0.320	0.159	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		2.40	+/-0.131	0.0282	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0935	+/-0.030	0.0218	0.040	pCi/g						
Uranium-238		2.22	+/-0.125	0.00553	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		1.24	+/-0.261	0.361	0.500	pCi/g		JXC5	07/15/09	2025	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		1.55	+/-0.361	0.298	0.500	pCi/g		KSD1	07/25/09	0925	883001	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	07/02/09	1608	882179

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			75.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			98.7	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			98.9	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: RSAJ2009-33B
Sample ID: 232528008
Matrix: SO
Collect Date: 26-JUN-09 12:47
Receive Date: 27-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		1.69	+/-0.390	0.263	0.050	pCi/g		HAKB	07/24/09	1316	886907	1
Thorium-230		2.23	+/-0.431	0.163	0.050	pCi/g						
Thorium-232		1.13	+/-0.309	0.163	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		2.22	+/-0.127	0.0206	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.115	+/-0.032	0.00692	0.040	pCi/g						
Uranium-238		2.17	+/-0.125	0.0056	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		0.963	+/-0.242	0.343	0.500	pCi/g		JXC5	07/15/09	2025	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		1.41	+/-0.305	0.229	0.500	pCi/g		KSD1	07/25/09	0925	883001	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	07/02/09	1608	882179

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"			82.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			97.4	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			97.2	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: SA187-0.5B
Sample ID: 232528009
Matrix: SO
Collect Date: 29-JUN-09 09:20
Receive Date: 30-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		0.735	+/-0.186	0.0368	0.050	pCi/g		HAKB	07/24/09	0718	886907	1
Thorium-230		0.586	+/-0.166	0.0367	0.050	pCi/g						
Thorium-232		0.208	+/-0.115	0.135	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		0.437	+/-0.064	0.00732	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0271	+/-0.0196	0.0231	0.040	pCi/g						
Uranium-238		0.459	+/-0.0656	0.00732	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		0.633	+/-0.282	0.395	0.500	pCi/g		JXC5	07/15/09	1530	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		0.635	+/-0.217	0.208	0.500	pCi/g		KSD1	07/25/09	0925	883001	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	07/02/09	1608	882179

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"			90.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			73.9	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			105	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: SA45-0.5B
Sample ID: 232528010
Matrix: SO
Collect Date: 29-JUN-09 11:15
Receive Date: 30-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		2.37	+/-0.349	0.0401	0.050	pCi/g		HAKB	07/24/09	0718	886907	1
Thorium-230		1.27	+/-0.255	0.040	0.050	pCi/g						
Thorium-232		1.88	+/-0.310	0.040	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		0.942	+/-0.0814	0.0222	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0468	+/-0.0209	0.017	0.040	pCi/g						
Uranium-238		0.834	+/-0.0766	0.0222	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		0.809	+/-0.165	0.212	0.500	pCi/g		JXC5	07/21/09	1555	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		0.974	+/-0.272	0.254	0.500	pCi/g		KSD1	07/25/09	0925	883001	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	07/02/09	1608	882179

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"			78.7	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			96.5	(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: July 27, 2009

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

Client Sample ID: SA45009-0.5B
Sample ID: 232528011
Matrix: SO
Collect Date: 29-JUN-09 11:15
Receive Date: 30-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		2.08	+/-0.361	0.306	0.050	pCi/g		HAKB	07/24/09	0726	886907	1
Thorium-230		1.01	+/-0.245	0.201	0.050	pCi/g						
Thorium-232		1.71	+/-0.304	0.176	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		0.820	+/-0.154	0.0454	0.040	pCi/g		HAKB	07/15/09	1500	883496	2
Uranium-235/236		0.0368	+/-0.036	0.0276	0.040	pCi/g						
Uranium-238		0.815	+/-0.153	0.0412	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		0.567	+/-0.230	0.289	0.500	pCi/g		JXC5	07/15/09	1530	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		0.602	+/-0.186	0.110	0.500	pCi/g		KSD1	07/25/09	0925	883001	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	07/02/09	1608	882179

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			84.2	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			97.9	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			102	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: SA153-0.5B
Sample ID: 232528012
Matrix: SO
Collect Date: 29-JUN-09 13:20
Receive Date: 30-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		2.10	+/-0.357	0.221	0.050	pCi/g		HAKB	07/24/09	0726	886907	1
Thorium-230		1.14	+/-0.266	0.193	0.050	pCi/g						
Thorium-232		1.72	+/-0.311	0.110	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		0.978	+/-0.0781	0.0334	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0325	+/-0.0172	0.0183	0.040	pCi/g						
Uranium-238		0.921	+/-0.0744	0.019	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		0.919	+/-0.215	0.301	0.500	pCi/g		JXC5	07/15/09	2026	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226	U	0.271	+/-0.190	0.276	0.500	pCi/g		KSD1	07/25/09	0925	883001	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	07/02/09	1608	882179

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			85.9	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			110	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			109	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: SA186-0.5B
Sample ID: 232528013
Matrix: SO
Collect Date: 29-JUN-09 08:50
Receive Date: 30-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		2.47	+/-0.419	0.363	0.050	pCi/g		HAKB	07/24/09	0726	886907	1
Thorium-230		0.803	+/-0.244	0.247	0.050	pCi/g						
Thorium-232		1.75	+/-0.326	0.196	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		0.992	+/-0.170	0.0495	0.040	pCi/g		HAKB	07/15/09	1500	883496	2
Uranium-235/236		0.0557	+/-0.0446	0.0279	0.040	pCi/g						
Uranium-238		0.937	+/-0.165	0.036	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		1.12	+/-0.357	0.558	0.500	pCi/g		JXC5	07/15/09	2026	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		1.01	+/-0.345	0.364	0.500	pCi/g		KSD1	07/25/09	1000	883001	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	07/02/09	1608	882179

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"			82.5	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			99.9	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			96.6	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: SA185-0.5B
Sample ID: 232528014
Matrix: SO
Collect Date: 29-JUN-09 10:30
Receive Date: 30-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		2.37	+/-0.346	0.0992	0.050	pCi/g		HAKB	07/24/09	0718	886907	1
Thorium-230		1.31	+/-0.255	0.0388	0.050	pCi/g						
Thorium-232		1.54	+/-0.276	0.0388	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		0.951	+/-0.0798	0.0211	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0297	+/-0.0177	0.0203	0.040	pCi/g						
Uranium-238		0.950	+/-0.0797	0.0211	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		1.63	+/-0.357	0.521	0.500	pCi/g		JXC5	07/15/09	2026	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		0.654	+/-0.195	0.111	0.500	pCi/g		KSD1	07/25/09	1000	883001	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	07/02/09	1608	882179

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			87.4	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			104	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			87.3	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: RSAO5-0.5B
Sample ID: 232528015
Matrix: SO
Collect Date: 29-JUN-09 09:55
Receive Date: 30-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		2.66	+/-0.365	0.0392	0.050	pCi/g		HAKB	07/24/09	0726	886907	1
Thorium-230		1.00	+/-0.227	0.0998	0.050	pCi/g						
Thorium-232		2.03	+/-0.321	0.0998	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		1.00	+/-0.0857	0.0269	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0485	+/-0.0217	0.0177	0.040	pCi/g						
Uranium-238		0.975	+/-0.0838	0.0143	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		0.847	+/-0.203	0.278	0.500	pCi/g		JXC5	07/15/09	2026	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		0.605	+/-0.206	0.132	0.500	pCi/g		KSD1	07/25/09	1000	883001	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	07/02/09	1608	882179

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"			93.6	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			95.9	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			104	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: SA152-10B
Sample ID: 232528016
Matrix: SO
Collect Date: 29-JUN-09 08:53
Receive Date: 30-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		1.89	+/-0.304	0.0382	0.050	pCi/g		HAKB	07/24/09	0718	886907	1
Thorium-230		0.940	+/-0.214	0.0381	0.050	pCi/g						
Thorium-232		1.36	+/-0.258	0.0381	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		1.17	+/-0.085	0.0214	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0512	+/-0.0211	0.0189	0.040	pCi/g						
Uranium-238		1.03	+/-0.0797	0.0122	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		1.04	+/-0.229	0.307	0.500	pCi/g		JXC5	07/15/09	2026	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		1.17	+/-0.319	0.295	0.500	pCi/g		KSD1	07/25/09	1000	883001	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	07/02/09	1608	882179

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			84.1	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			109	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			95.8	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: SA152-20B
Sample ID: 232528017
Matrix: SO
Collect Date: 29-JUN-09 09:33
Receive Date: 30-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		2.43	+/-0.402	0.184	0.050	pCi/g		HAKB	07/24/09	0726	886907	1
Thorium-230		2.32	+/-0.393	0.184	0.050	pCi/g						
Thorium-232		1.63	+/-0.332	0.184	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		1.72	+/-0.112	0.0365	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0685	+/-0.029	0.0329	0.040	pCi/g						
Uranium-238		1.59	+/-0.106	0.0204	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		0.923	+/-0.222	0.304	0.500	pCi/g		JXC5	07/15/09	2026	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		1.15	+/-0.293	0.256	0.500	pCi/g		KSD1	07/25/09	1000	883001	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	07/02/09	1608	882179

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			81.3	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			98.2	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			94.5	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: SA152-34B
Sample ID: 232528018
Matrix: SO
Collect Date: 29-JUN-09 10:11
Receive Date: 30-JUN-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		1.84	+/-0.328	0.141	0.050	pCi/g		HAKB	07/24/09	0726	886907	1
Thorium-230		1.79	+/-0.326	0.162	0.050	pCi/g						
Thorium-232		1.47	+/-0.291	0.112	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		1.52	+/-0.216	0.0522	0.040	pCi/g		HAKB	07/15/09	1501	883496	2
Uranium-235/236		0.0857	+/-0.0577	0.0469	0.040	pCi/g						
Uranium-238		1.82	+/-0.235	0.0237	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		1.55	+/-0.242	0.294	0.500	pCi/g		JXC5	07/15/09	2026	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		0.768	+/-0.232	0.193	0.500	pCi/g		KSD1	07/25/09	1000	883001	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	07/02/09	1608	882179

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			84.2	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			96.3	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			103	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: SA82-0.5B
Sample ID: 232528019
Matrix: SO
Collect Date: 01-JUL-09 07:00
Receive Date: 02-JUL-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		2.84	+/-0.510	0.368	0.050	pCi/g		HAKB	07/24/09	1316	886907	1
Thorium-230		1.41	+/-0.358	0.277	0.050	pCi/g						
Thorium-232		1.99	+/-0.406	0.198	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		0.915	+/-0.0642	0.0176	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0712	+/-0.0205	0.0136	0.040	pCi/g						
Uranium-238		0.928	+/-0.0641	0.00346	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		1.66	+/-0.357	0.337	0.500	pCi/g		JXC5	07/15/09	1526	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		0.770	+/-0.252	0.259	0.500	pCi/g		KSD1	07/25/09	1030	883001	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	07/02/09	1608	882179

The following Analytical Methods were performed

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

Surrogate/Tracer recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Actinium-227 Tracer	Alphaspec Th, Solid "Dry Weight Corrected"			84.5	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			106	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			97.3	(25%-125%)

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

Certificate of Analysis

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

Report Date: July 27, 2009

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

Client Sample ID: SA82-10B
Sample ID: 232528020
Matrix: SO
Collect Date: 01-JUL-09 07:56
Receive Date: 02-JUL-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												
Alphaspec Th, Solid "Dry Weight Corrected"												
Thorium-228		2.08	+/-0.335	0.0421	0.050	pCi/g		HAKB	07/24/09	0718	886907	1
Thorium-230		1.33	+/-0.273	0.134	0.050	pCi/g						
Thorium-232		1.97	+/-0.326	0.042	0.100	pCi/g						
Alphaspec U, Solid "Dry Weight Corrected"												
Uranium-233/234		1.25	+/-0.0764	0.0134	0.040	pCi/g		HAKB	07/21/09	2029	883496	2
Uranium-235/236		0.0779	+/-0.0216	0.0115	0.040	pCi/g						
Uranium-238		1.13	+/-0.0727	0.0134	0.040	pCi/g						
Rad Gas Flow Proportional Counting												
Gas Flow Radium 228 "Dry Weight Corrected"												
Radium-228		0.963	+/-0.224	0.311	0.500	pCi/g		JXC5	07/15/09	2028	882961	3
Rad Radium-226												
Lucas Cell, Ra226, solid "Dry Weight Corrected"												
Radium-226		0.630	+/-0.193	0.112	0.500	pCi/g		KSD1	07/25/09	1030	883001	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	07/02/09	1608	882179

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"			82.8	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"			101	(15%-125%)
Barium-133 Tracer	Gas Flow Radium 228 "Dry Weight Corrected"			101	(25%-125%)

QUALITY CONTROL DATA

QC Summary

Report Date: July 27, 2009

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

Contact: **Mr. Frank Hagar**

Workorder: **232528**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 883496										
QC1201876827 232528019 DUP										
Uranium-233/234		0.915 +/-0.0642		0.882 +/-0.155	pCi/g	3.67		(0% - 20%)	HAKB	07/15/09 15:01
Uranium-235/236		0.0712 +/-0.0205		0.0263 +/-0.0297	pCi/g	92.1		(0% - 100%)		
Uranium-238		0.928 +/-0.0641		1.05 +/-0.169	pCi/g	12.3		(0% - 20%)		
QC1201876829 LCS										
Uranium-233/234				2.22 +/-0.237	pCi/g					07/15/09 15:01
Uranium-235/236				0.104 +/-0.0576	pCi/g					
Uranium-238	2.33			2.24 +/-0.239	pCi/g		96.1	(75%-125%)		
QC1201876826 MB										
Uranium-233/234			U	-0.00556 +/-0.00898	pCi/g					07/21/09 20:29
Uranium-235/236			U	0.00 +/-0.00539	pCi/g					
Uranium-238			U	0.00667 +/-0.00689	pCi/g					
QC1201876828 232528019 MS										
Uranium-233/234		0.915 +/-0.0642		3.01 +/-0.283	pCi/g					07/15/09 15:01
Uranium-235/236		0.0712 +/-0.0205		0.131 +/-0.0664	pCi/g					
Uranium-238	2.50	0.928 +/-0.0641		3.28 +/-0.294	pCi/g		94.1	(75%-125%)		
Batch 886907										
QC1201885297 232528019 DUP										
Thorium-228		2.84 +/-0.510		2.10 +/-0.436	pCi/g	30.0*		(0% - 20%)	HAKB	07/24/09 13:17
Thorium-230		1.41 +/-0.358		1.37 +/-0.349	pCi/g	2.88		(0% - 20%)		
Thorium-232		1.99 +/-0.406		2.11 +/-0.410	pCi/g	5.85		(0% - 20%)		
QC1201885299 LCS										
Thorium-228			U	0.098 +/-0.143	pCi/g					07/24/09 13:17
Thorium-230	16.9			18.3 +/-1.07	pCi/g		108	(75%-125%)		
Thorium-232			U	-0.0163	pCi/g			(75%-125%)		

QC Summary

Workorder: 232528

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Rad Alpha Spec										
Batch 886907										
				+/-0.0553						
QC1201885296 MB										
Thorium-228			U	0.118	pCi/g				HAKB	07/24/09 13:16
				+/-0.166						
Thorium-230			U	0.00	pCi/g					
				+/-0.066						
Thorium-232			U	-0.0337	pCi/g					
				+/-0.0572						
QC1201885298 232528019 MS										
Thorium-228		2.84		2.01	pCi/g					07/24/09 13:17
		+/-0.510		+/-0.455						
Thorium-230	20.6	1.41		24.3	pCi/g		111	(75%-125%)		
		+/-0.358		+/-1.42						
Thorium-232		1.99		1.64	pCi/g			(75%-125%)		
		+/-0.406		+/-0.371						
Rad Gas Flow										
Batch 882961										
QC1201875402 232528019 DUP										
Radium-228		1.66		1.70	pCi/g	2.50		(0% - 100%)	JXC5	07/15/09 20:27
		+/-0.357		+/-0.243						
QC1201875404 LCS										
Radium-228	8.01			6.01	pCi/g		75	(75%-125%)		07/15/09 20:27
				+/-0.833						
QC1201875401 MB										
Radium-228			U	0.0487	pCi/g					07/15/09 15:26
				+/-0.193						
QC1201875403 232528019 MS										
Radium-228	79.8	1.66		64.5	pCi/g		78.7	(75%-125%)		07/15/09 15:26
		+/-0.357		+/-7.18						
Rad Ra-226										
Batch 883001										
QC1201875538 232528019 DUP										
Radium-226		0.770		0.585	pCi/g	27.4		(0% - 100%)	KSD1	07/25/09 10:30
		+/-0.252		+/-0.234						
QC1201875540 LCS										
Radium-226	11.0			8.66	pCi/g		78.8	(75%-125%)		07/25/09 10:30
				+/-0.696						
QC1201875537 MB										
Radium-226			U	0.106	pCi/g					07/25/09 10:30
				+/-0.162						
QC1201875539 232528019 MS										
Radium-226	11.6	0.770		11.6	pCi/g		93	(75%-125%)		07/25/09 10:30
		+/-0.252		+/-0.859						

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

QC Summary

Workorder: **232528**

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

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

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
***** Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

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

RAW DATA

URANIUM

Radiochemistry Batch Checklist, Rev 9

Batch# 883496 Product: U Date: 7/23/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to100 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.	✓		Case narrative
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.	✓		
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Sample was correctly preserved if required.	✓		
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 statused.	✓		
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 714397
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCR 714397
Aliquot Correction completed if required.			N/A
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC

revised 8/1/08

Primary Review Performed By: [signature] 7/23/09

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

7/19 7/30

KERR

Uranium Que Sheet

08-JUL-09

Batch #: 883496 **Analyst:** HAKB **First Client Due Date:** 30-JUL-09 **Internal Due Date:** 19-JUL-09

Tracer Isotope: U-232/U-236 **Tracer Code:** 1283-B **Expiration Date:** 12/16/09 **Vol:** 0.1

LCS Isotope: U-238 **LCS Code:** 1163-6 **Expiration Date:** 4/16/10 **Vol:** 0.1

Spike Isotope: U-238 **Spike Code:** 1163-6 **Expiration Date:** 4/16/10 **Vol:** 0.1

Prep Date: 7/9/09 **Initials:** HAKB **Pipet ID:** 2971058 **Balance ID:** 50410272 **Witness:** MDA 7/9/09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g/l/f)	U Det #
232528001-1	RSAI2-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	26-JUN-09	1	1	1.079	113 137
232528002-1	RSAI2009-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	26-JUN-09	2	2	1.001	114 138
232528003-1	RSAI2-20B	SAMPLE		.04 pCi/g	SOIL	KERR003	26-JUN-09	3	3	1.028	115 139
232528004-1	RSAI2-31B	SAMPLE		.04 pCi/g	SOIL	KERR003	26-JUN-09	4	4	1.034	116 140
232528005-1	RSAJ2-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	26-JUN-09	5	5	1.033	117 117
232528006-1	RSAJ2-20B	SAMPLE		.04 pCi/g	SOIL	KERR003	26-JUN-09	6	6	1.008	118 147
232528007-1	RSAJ2-33B	SAMPLE		.04 pCi/g	SOIL	KERR003	26-JUN-09	7	7	1.008	121 148
232528008-1	RSAJ2009-33B	SAMPLE		.04 pCi/g	SOIL	KERR003	26-JUN-09	8	8	1.008	122 149
232528009-1	SA187-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	29-JUN-09	9	9	1.004	123 150
232528010-1	SA45-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	29-JUN-09	10	10	1.010	124 155
232528011-1	SA45009-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	29-JUN-09	11	11	1.001	125
232528012-1	SA153-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	29-JUN-09	12	12	1.075	156 ~~126~~ *
232528013-1	SA186-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	29-JUN-09	13	13	1.010	127
232528014-1	SA185-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	29-JUN-09	14	14	1.014	157 129
232528015-1	RSAO5-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	29-JUN-09	15	15	1.012	158 130
232528016-1	SA152-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	29-JUN-09	16	16	1.025	159 131
232528017-1	SA152-20B	SAMPLE		.04 pCi/g	SOIL	KERR003	29-JUN-09	17	17	1.006	160 132 *
232528018-1	SA152-34B	SAMPLE		.04 pCi/g	SOIL	KERR003	29-JUN-09	18	18	1.004	133
232528019-1	SA82-0.5B	SAMPLE		.04 pCi/g	SOIL	KERR003	01-JUL-09	19	19	1.003	161 134
232528020-1	SA82-10B	SAMPLE		.04 pCi/g	SOIL	KERR003	01-JUL-09	20	20	1.000	162 135
1201876826-1	MB for batch 883496	MB		.04 pCi/g	SOIL	QC ACCOUNT		21	21	1.079	163 136 *
1201876827-1	SA82-0.5B(232528019DUP)	DUP		.04 pCi/g	SOIL	QC ACCOUNT	01-JUL-09	22	22	1.000	137
1201876828-1	SA82-0.5B(232528019MS)	MS		.04 pCi/g	SOIL	QC ACCOUNT	01-JUL-09	23	23	1.008	138
1201876829-1	LCS for batch 883496	LCS		.04 pCi/g	SOIL	QC ACCOUNT		24	24	1.079	144

62

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: 7/23/09

GEL Laboratories LLC, Radiochemistry Division

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

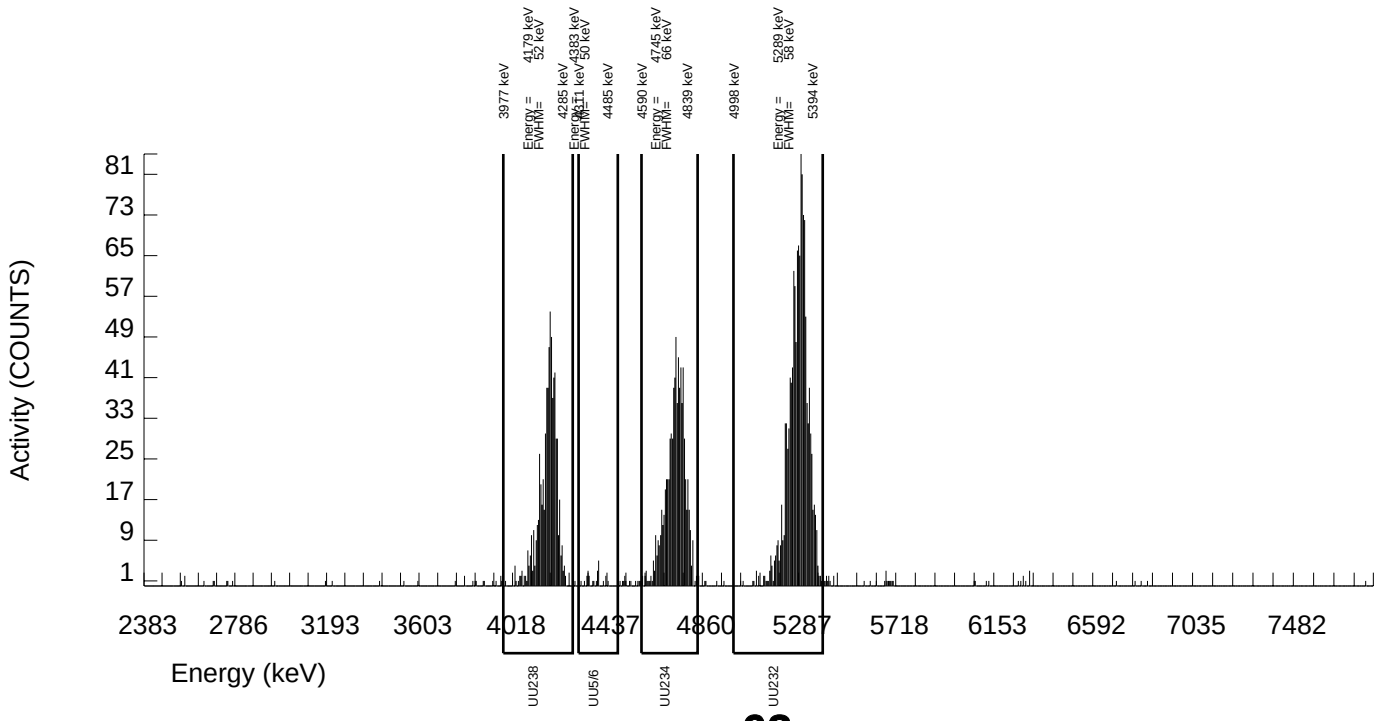
BATCH NUMBER: 883496 SAMPLE DATE : 26-JUN-2009 00:00:00	SAMPLE ID : S0232528001_UU SAMPLE QTY: 1.079 G
DETECTOR NUMBER :64288 AVERAGE %EFFICIENCY :25.5270 % YIELD : 96.451	COUNT DATE:21-JUL-2009 20:29:09 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.334E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.334E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29587 dpm RESULTS : 5.10792 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B137.CNF;330 BKG DATE : 19-JUL-2009 EFF FILE : W137.CNF;90 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	776.000	764.068	8.000	2.8284	100.0000	1.30E+00	1.99E-01	2.74E-02	1.12E-02	9.28E-02
U232	5302.100	1311.000	1303.000	8.000	2.8284	100.0000	2.21E+00	3.24E-01	2.74E-02	1.12E-02	1.21E-01
U-235	4391.000	26.000	26.000	0.000	0.0000	80.90000	5.45E-02	2.22E-02	6.29E-03	0.00E+00	2.09E-02
U-238	4184.730	685.000	681.000	4.000	2.0000	100.0000	1.15E+00	1.80E-01	2.09E-02	7.89E-03	8.72E-02

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



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

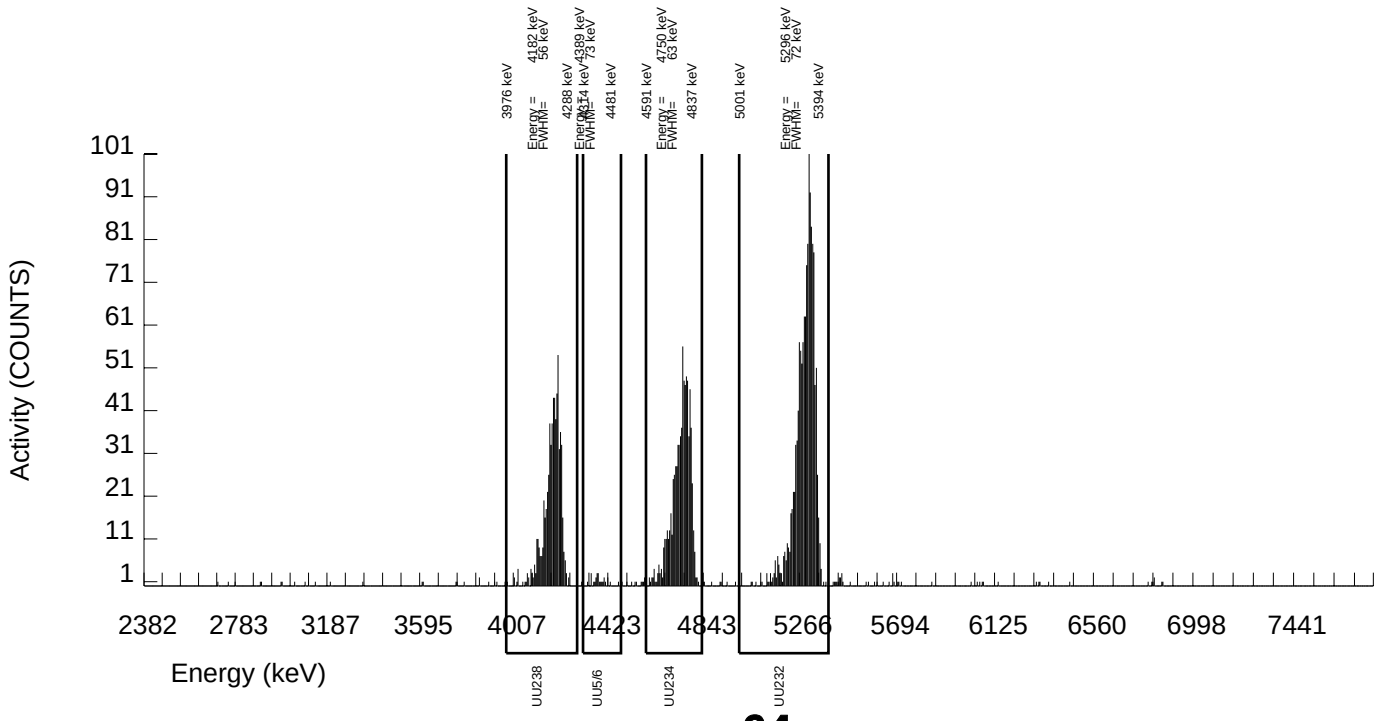
BATCH NUMBER: 883496 SAMPLE DATE : 26-JUN-2009 00:00:00	SAMPLE ID : S0232528002_UU SAMPLE QTY: 1.001 G
DETECTOR NUMBER :65877 AVERAGE %EFFICIENCY :25.4635 % YIELD : 101.070	COUNT DATE:21-JUL-2009 20:29:12 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.516E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.516E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29587 dpm RESULTS : 5.35252 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B138.CNF;335 BKG DATE : 19-JUL-2009 EFF FILE : W138.CNF;90 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	790.000	774.890	11.000	3.3166	100.0000	1.35E+00	2.08E-01	3.22E-02	1.35E-02	9.67E-02
U232	5302.100	1374.000	1362.000	12.000	3.4641	100.0000	2.38E+00	3.47E-01	3.35E-02	1.41E-02	1.28E-01
U-235	4391.000	26.000	21.000	5.000	2.2361	80.90000	4.54E-02	2.44E-02	2.90E-02	1.12E-02	2.36E-02
U-238	4184.730	661.000	653.000	8.000	2.8284	100.0000	1.14E+00	1.78E-01	2.83E-02	1.15E-02	8.86E-02

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



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

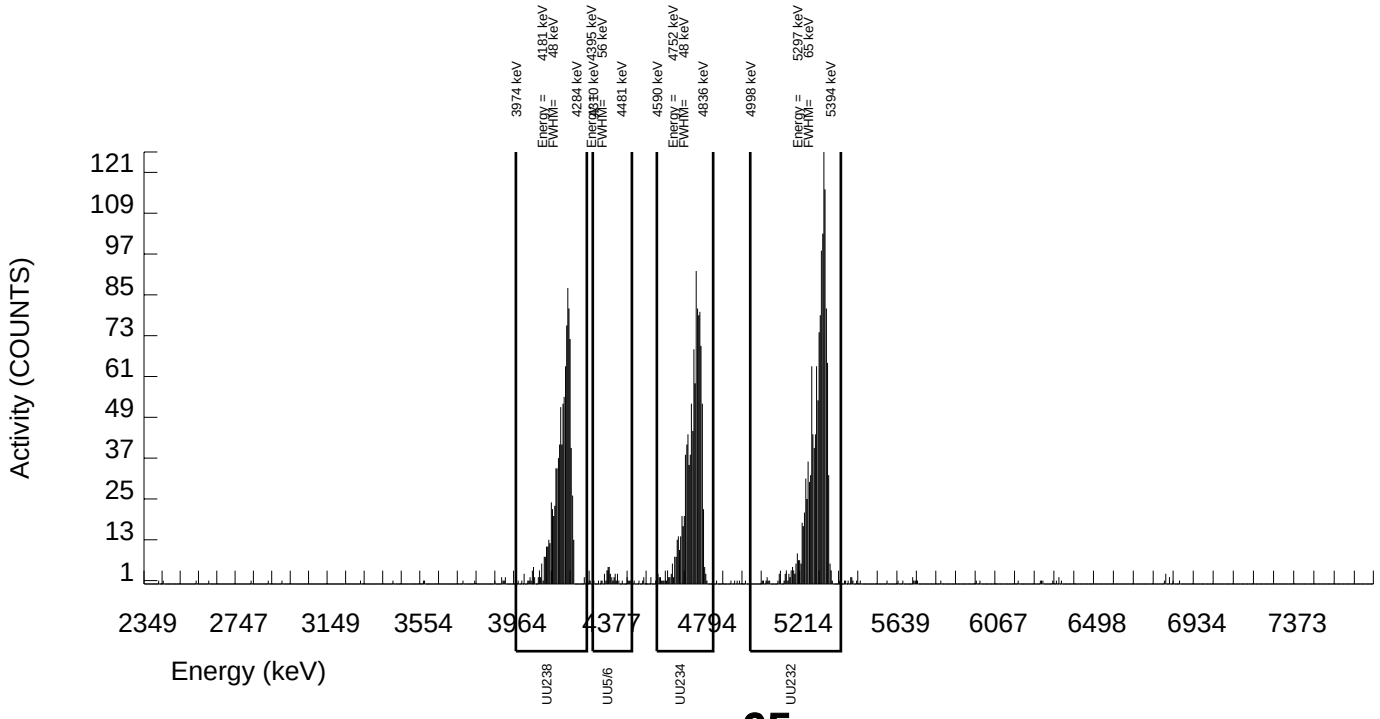
BATCH NUMBER: 883496 SAMPLE DATE : 26-JUN-2009 00:00:00	SAMPLE ID : S0232528003_UU SAMPLE QTY: 1.028 G
DETECTOR NUMBER :76231 AVERAGE %EFFICIENCY :25.0427 % YIELD : 103.900	COUNT DATE:21-JUL-2009 20:29:14 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.450E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.450E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29587 dpm RESULTS : 5.50240 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B139.CNF;332 BKG DATE : 19-JUL-2009 EFF FILE : W139.CNF;90 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	1065.000	1055.844	5.000	2.2361	100.0000	1.78E+00	2.68E-01	2.26E-02	8.76E-03	1.08E-01
U232	5302.100	1384.000	1377.000	7.000	2.6458	100.0000	2.32E+00	3.43E-01	2.58E-02	1.04E-02	1.23E-01
U-235	4391.000	46.000	43.000	3.000	1.7321	80.90000	8.95E-02	3.11E-02	2.30E-02	8.39E-03	2.86E-02
U-238	4184.730	992.000	990.000	2.000	1.4142	100.0000	1.67E+00	2.53E-01	1.61E-02	5.54E-03	1.04E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

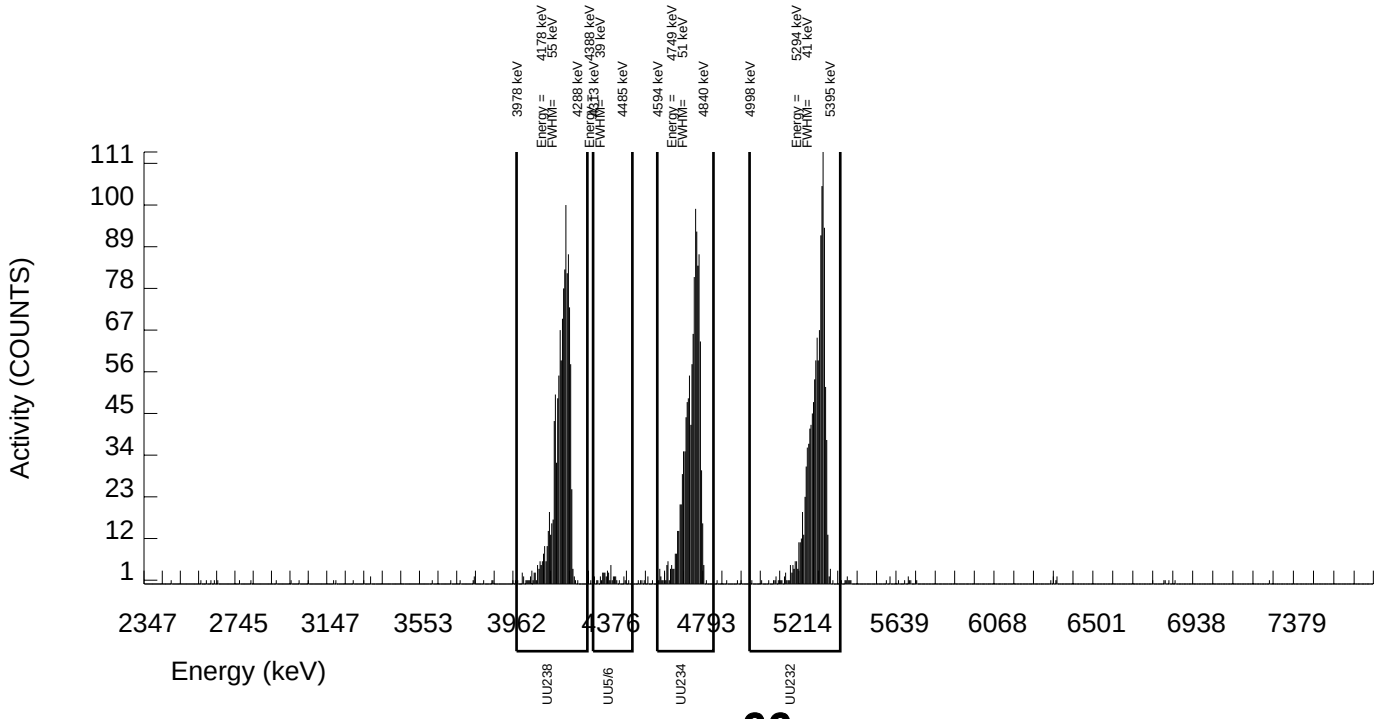
BATCH NUMBER: 883496 SAMPLE DATE : 26-JUN-2009 00:00:00	SAMPLE ID : S0232528004_UU SAMPLE QTY: 1.034 G
DETECTOR NUMBER :78771 AVERAGE %EFFICIENCY :25.5149 % YIELD : 91.091	COUNT DATE:21-JUL-2009 20:29:17 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.436E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.436E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29587 dpm RESULTS : 4.82405 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B140.CNF;332 BKG DATE : 19-JUL-2009 EFF FILE : W140.CNF;95 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	1150.000	1140.288	6.000	2.4495	100.0000	2.14E+00	3.18E-01	2.70E-02	1.07E-02	1.25E-01
U232	5302.100	1241.000	1230.000	11.000	3.3166	100.0000	2.31E+00	3.41E-01	3.46E-02	1.45E-02	1.30E-01
U-235	4391.000	42.000	40.000	2.000	1.4142	80.90000	9.27E-02	3.27E-02	2.22E-02	7.62E-03	3.01E-02
U-238	4184.730	1180.000	1178.000	2.000	1.4142	100.0000	2.21E+00	3.27E-01	1.80E-02	6.17E-03	1.26E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

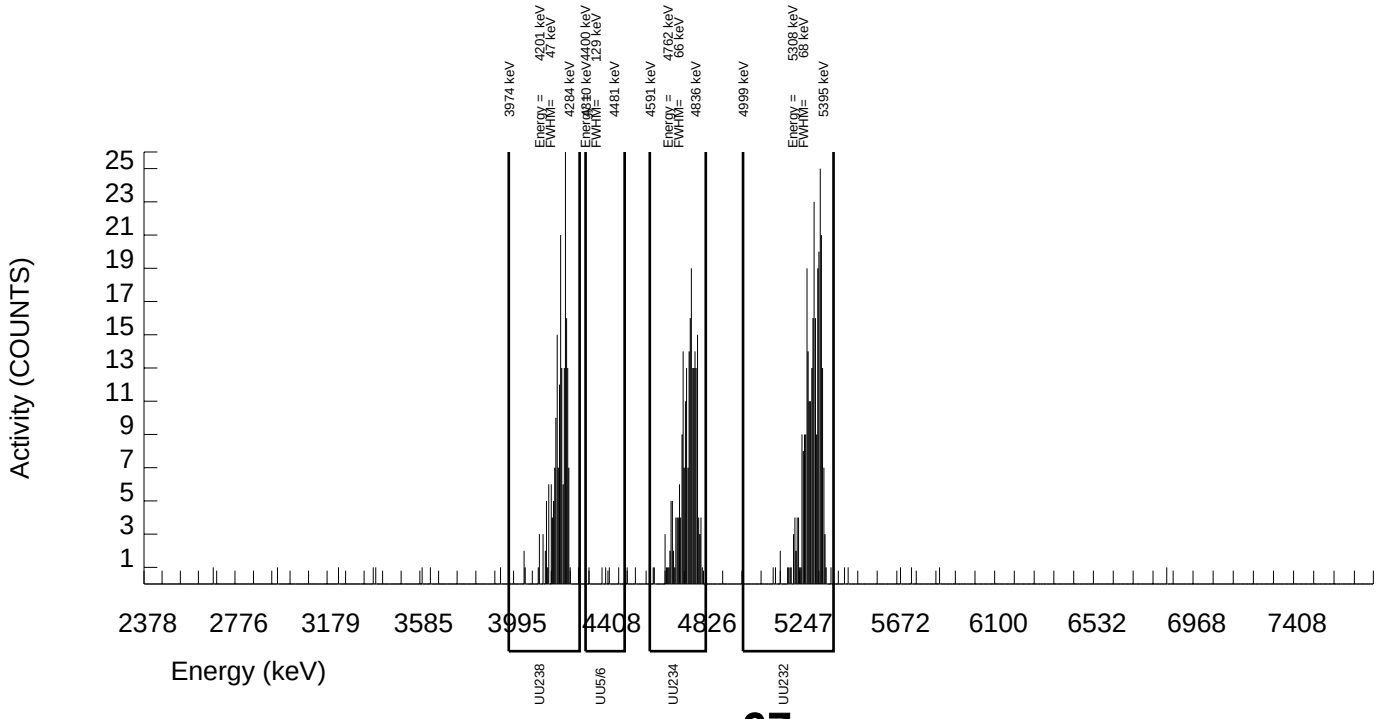
BATCH NUMBER: 883496 SAMPLE DATE : 26-JUN-2009 00:00:00	SAMPLE ID : S0232528005_UU SAMPLE QTY: 1.033 G
DETECTOR NUMBER :33450 AVERAGE %EFFICIENCY :25.3585 % YIELD : 93.996	COUNT DATE:15-JUL-2009 13:51:24 ELAPSED LIVE TIME(SEC): 14400.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.438E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.438E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29589 dpm RESULTS : 4.97790 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B117.CNF;380 BKG DATE : 12-JUL-2009 EFF FILE : W117.CNF;106 CAL DATE : 15-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	235.000	233.366	0.720	0.8485	100.0000	1.78E+00	3.76E-01	4.66E-02	1.18E-02	2.29E-01
U232	5302.100	304.000	302.800	1.200	1.0954	100.0000	2.31E+00	4.67E-01	5.35E-02	1.53E-02	2.61E-01
U-235	4391.000	5.000	5.000	0.000	0.0000	80.90000	4.71E-02	4.20E-02	2.83E-02	0.00E+00	4.13E-02
U-238	4184.730	207.000	206.520	0.480	0.6928	100.0000	1.57E+00	3.41E-01	4.22E-02	9.67E-03	2.15E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

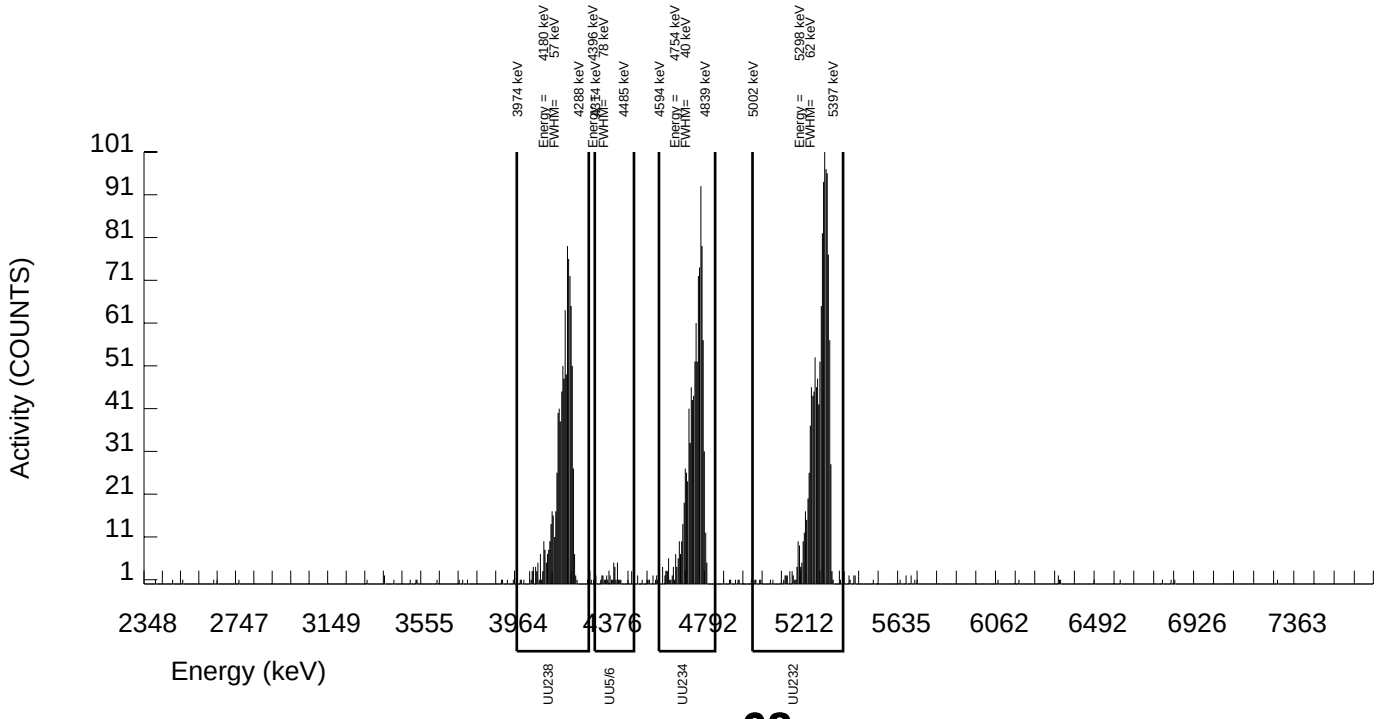
BATCH NUMBER: 883496 SAMPLE DATE : 26-JUN-2009 00:00:00	SAMPLE ID : S0232528006_UU SAMPLE QTY: 1.008 G
DETECTOR NUMBER :75550 AVERAGE %EFFICIENCY :24.4916 % YIELD : 97.751	COUNT DATE:21-JUL-2009 20:29:20 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.499E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.499E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29587 dpm RESULTS : 5.17678 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B147.CNF;334 BKG DATE : 19-JUL-2009 EFF FILE : W147.CNF;100 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	978.000	972.176	2.000	1.4142	100.0000	1.81E+00	2.77E-01	1.79E-02	6.14E-03	1.14E-01
U232	5302.100	1272.000	1267.000	5.000	2.2361	100.0000	2.37E+00	3.54E-01	2.50E-02	9.72E-03	1.31E-01
U-235	4391.000	39.000	37.000	2.000	1.4142	80.90000	8.54E-02	3.13E-02	2.21E-02	7.59E-03	2.90E-02
U-238	4184.730	944.000	943.000	1.000	1.0000	100.0000	1.76E+00	2.69E-01	1.43E-02	4.34E-03	1.12E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

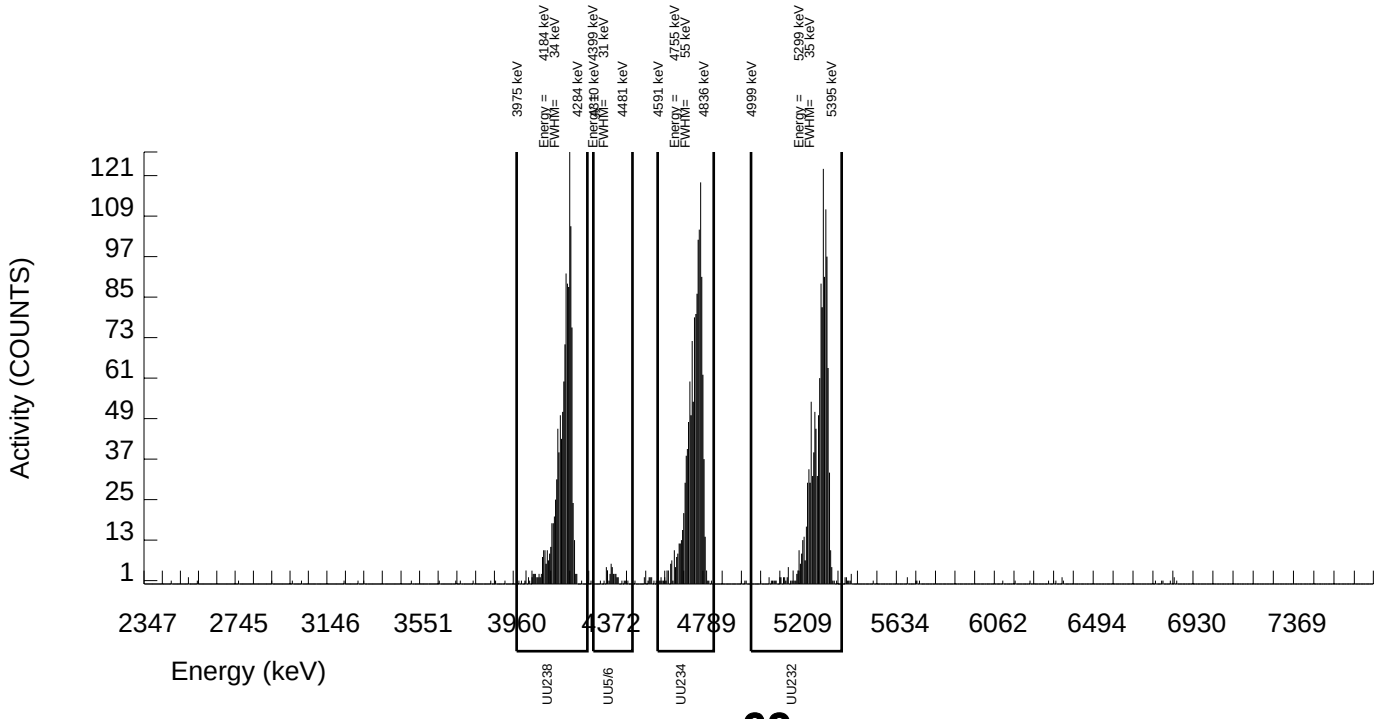
BATCH NUMBER: 883496 SAMPLE DATE : 26-JUN-2009 00:00:00	SAMPLE ID : S0232528007_UU SAMPLE QTY: 1.008 G
DETECTOR NUMBER :74429 AVERAGE %EFFICIENCY :24.5449 % YIELD : 98.694	COUNT DATE:21-JUL-2009 20:29:23 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.499E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.499E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29587 dpm RESULTS : 5.22669 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B148.CNF;333 BKG DATE : 19-JUL-2009 EFF FILE : W148.CNF;115 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	1313.000	1302.131	7.000	2.6458	100.0000	2.40E+00	3.52E-01	2.82E-02	1.14E-02	1.31E-01
U232	5302.100	1283.000	1282.000	1.000	1.0000	100.0000	2.37E+00	3.47E-01	1.41E-02	4.29E-03	1.30E-01
U-235	4391.000	43.000	41.000	2.000	1.4142	80.90000	9.35E-02	3.26E-02	2.18E-02	7.50E-03	3.00E-02
U-238	4184.730	1202.000	1202.000	0.000	0.0000	100.0000	2.22E+00	3.27E-01	5.53E-03	0.00E+00	1.25E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

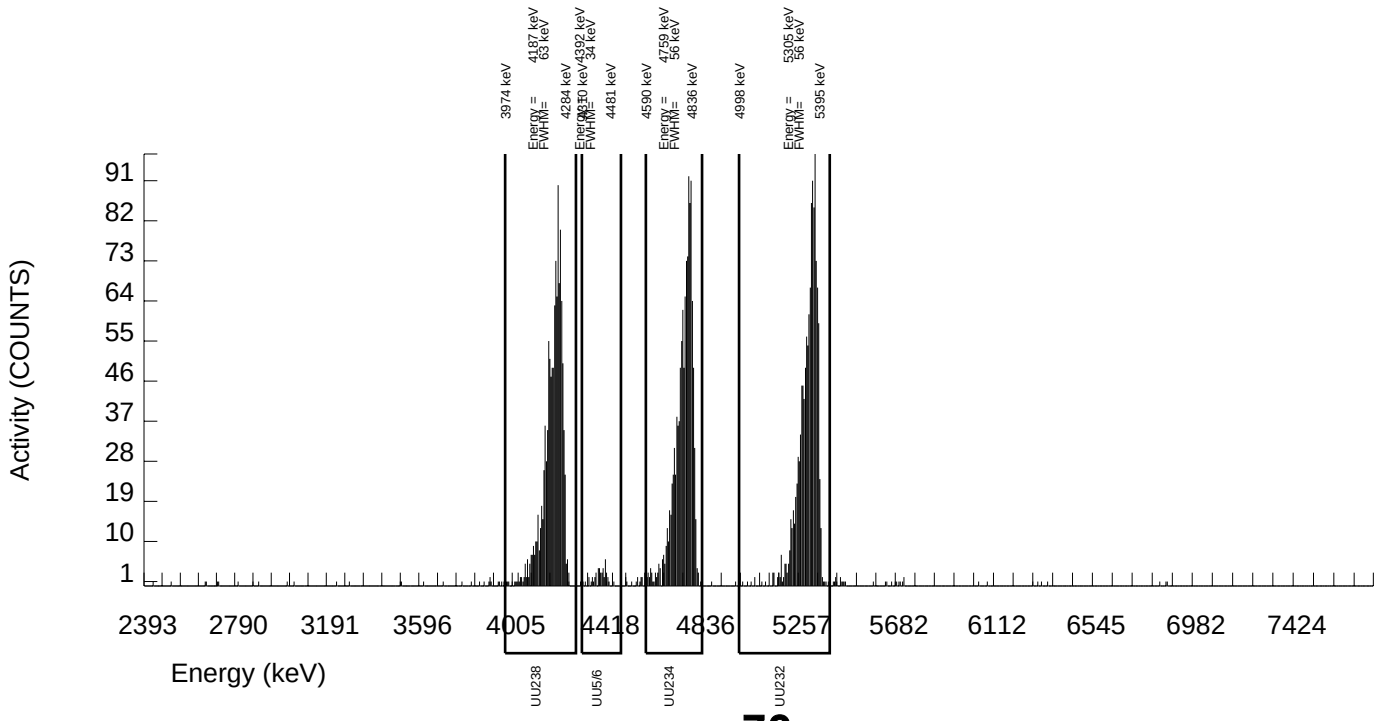
BATCH NUMBER: 883496 SAMPLE DATE : 26-JUN-2009 00:00:00	SAMPLE ID : S0232528008_UU SAMPLE QTY: 1.008 G
DETECTOR NUMBER :33449 AVERAGE %EFFICIENCY :24.5768 % YIELD : 97.412	COUNT DATE:21-JUL-2009 20:29:25 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.499E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.499E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29587 dpm RESULTS : 5.15883 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B149.CNF;337 BKG DATE : 19-JUL-2009 EFF FILE : W149.CNF;100 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	1198.000	1191.176	3.000	1.7321	100.0000	2.22E+00	3.28E-01	2.06E-02	7.52E-03	1.27E-01
U232	5302.100	1272.000	1267.000	5.000	2.2361	100.0000	2.37E+00	3.48E-01	2.50E-02	9.72E-03	1.31E-01
U-235	4391.000	50.000	50.000	0.000	0.0000	80.90000	1.15E-01	3.56E-02	6.92E-03	0.00E+00	3.20E-02
U-238	4184.730	1160.000	1160.000	0.000	0.0000	100.0000	2.17E+00	3.20E-01	5.60E-03	0.00E+00	1.25E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

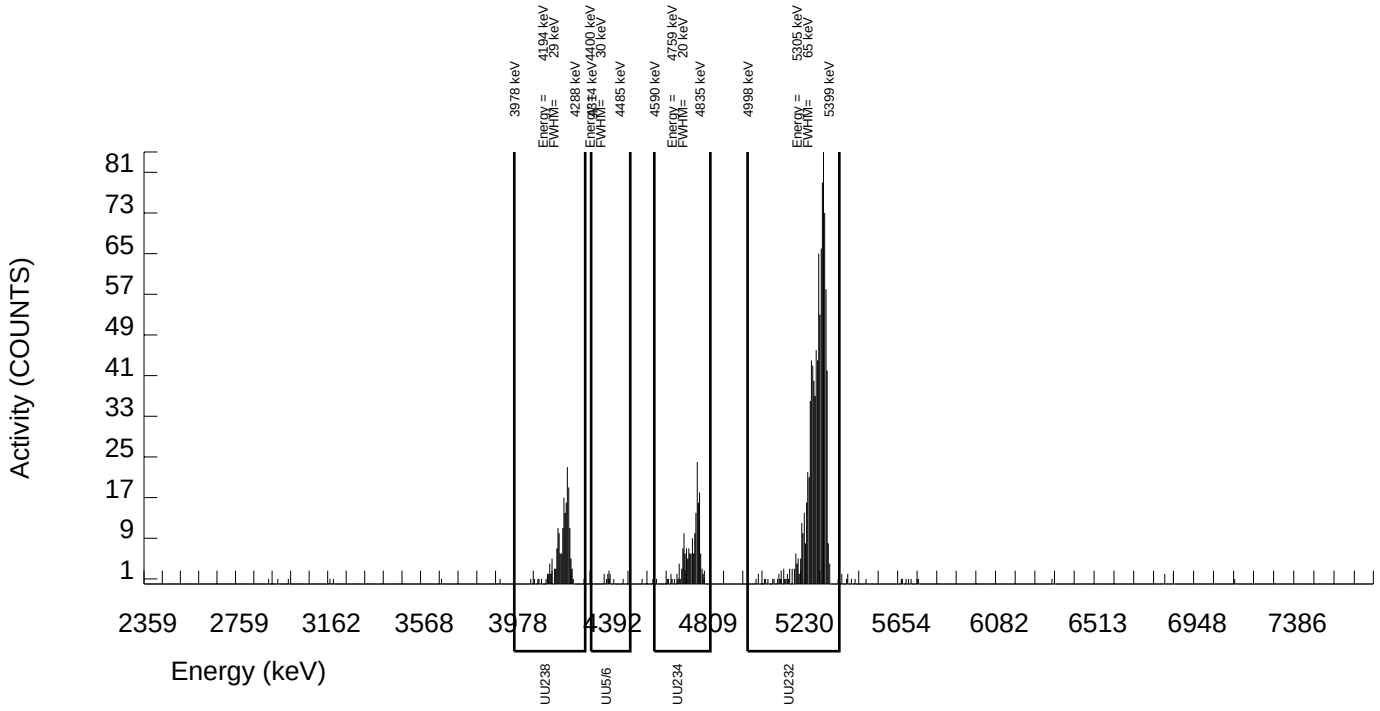
BATCH NUMBER: 883496 SAMPLE DATE : 29-JUN-2009 00:00:00	SAMPLE ID : S0232528009_UU SAMPLE QTY: 1.004 G
DETECTOR NUMBER :75552 AVERAGE %EFFICIENCY :24.8730 % YIELD : 73.917	COUNT DATE:21-JUL-2009 20:29:27 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.509E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.509E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29546 dpm RESULTS : 3.91427 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B150.CNF;338 BKG DATE : 19-JUL-2009 EFF FILE : W150.CNF;108 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	182.000	179.064	0.000	0.0000	100.0000	4.37E-01	8.84E-02	7.32E-03	0.00E+00	6.40E-02
U232	5302.100	979.000	973.000	6.000	2.4495	100.0000	2.38E+00	3.64E-01	3.52E-02	1.39E-02	1.50E-01
U-235	4391.000	10.000	9.000	1.000	1.0000	80.90000	2.71E-02	2.00E-02	2.31E-02	7.02E-03	1.96E-02
U-238	4184.730	188.000	188.000	0.000	0.0000	100.0000	4.59E-01	9.17E-02	7.32E-03	0.00E+00	6.56E-02

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



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

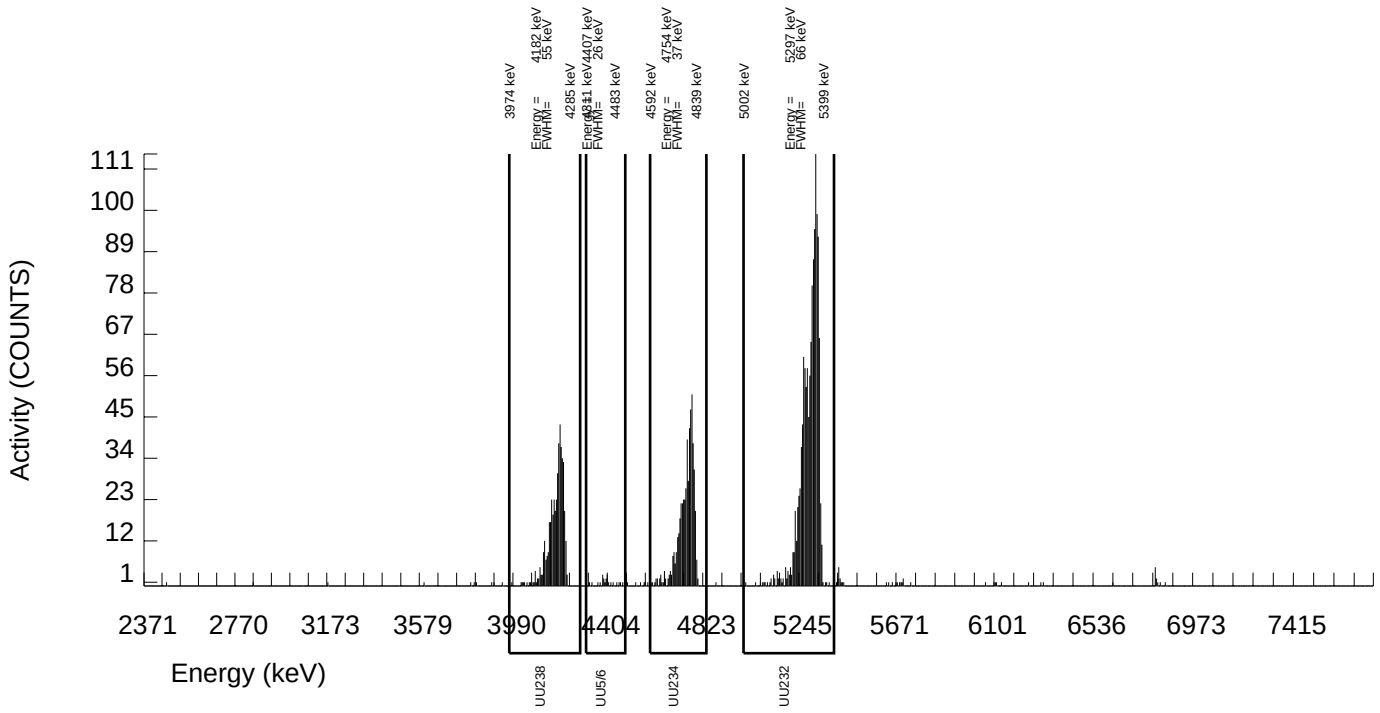
BATCH NUMBER: 883496 SAMPLE DATE : 29-JUN-2009 00:00:00	SAMPLE ID : S0232528010_UU SAMPLE QTY: 1.010 G
DETECTOR NUMBER :75553 AVERAGE %EFFICIENCY :25.6615 % YIELD : 96.461	COUNT DATE:21-JUL-2009 20:29:30 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.494E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.494E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29546 dpm RESULTS : 5.10804 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B155.CNF;334 BKG DATE : 19-JUL-2009 EFF FILE : W155.CNF;103 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	531.000	523.047	4.000	2.0000	100.0000	9.42E-01	1.52E-01	2.22E-02	8.38E-03	8.14E-02
U232	5302.100	1319.000	1310.000	9.000	3.0000	100.0000	2.36E+00	3.46E-01	3.06E-02	1.26E-02	1.29E-01
U-235	4391.000	22.000	21.000	1.000	1.0000	80.90000	4.68E-02	2.19E-02	1.70E-02	5.18E-03	2.09E-02
U-238	4184.730	467.000	463.000	4.000	2.0000	100.0000	8.34E-01	1.37E-01	2.22E-02	8.38E-03	7.66E-02

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



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

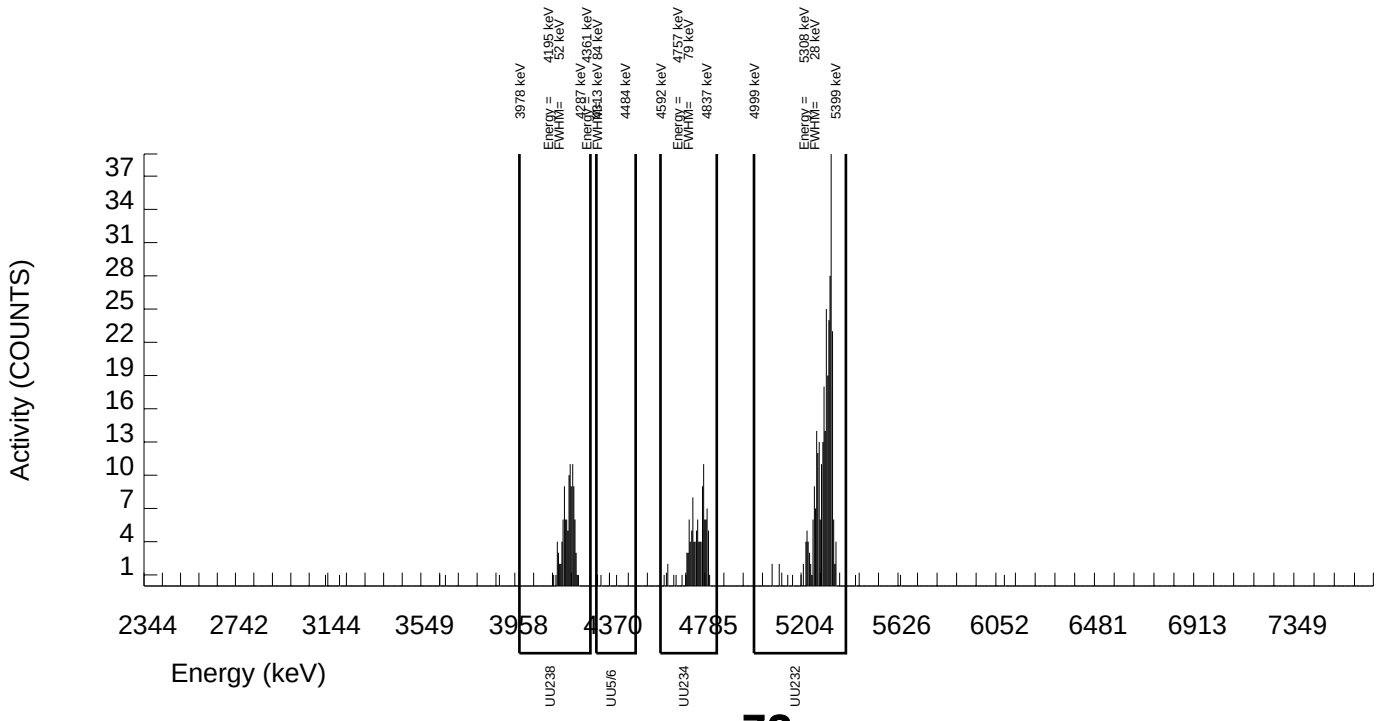
BATCH NUMBER: 883496 SAMPLE DATE : 29-JUN-2009 00:00:00	SAMPLE ID : S0232528011_UU SAMPLE QTY: 1.001 G
DETECTOR NUMBER :75547 AVERAGE %EFFICIENCY :25.7650 % YIELD : 97.853	COUNT DATE:15-JUL-2009 15:00:46 ELAPSED LIVE TIME(SEC): 14400.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.516E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.516E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29547 dpm RESULTS : 5.18180 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B125.CNF;381 BKG DATE : 12-JUL-2009 EFF FILE : W125.CNF;115 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	112.000	110.314	0.720	0.8485	100.0000	8.20E-01	2.05E-01	4.54E-02	1.16E-02	1.54E-01
U232	5302.100	321.000	320.280	0.720	0.8485	100.0000	2.38E+00	4.74E-01	4.54E-02	1.16E-02	2.61E-01
U-235	4391.000	4.000	4.000	0.000	0.0000	80.90000	3.68E-02	3.65E-02	2.76E-02	0.00E+00	3.60E-02
U-238	4184.730	110.000	109.520	0.480	0.6928	100.0000	8.14E-01	2.04E-01	4.12E-02	9.44E-03	1.53E-01

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



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

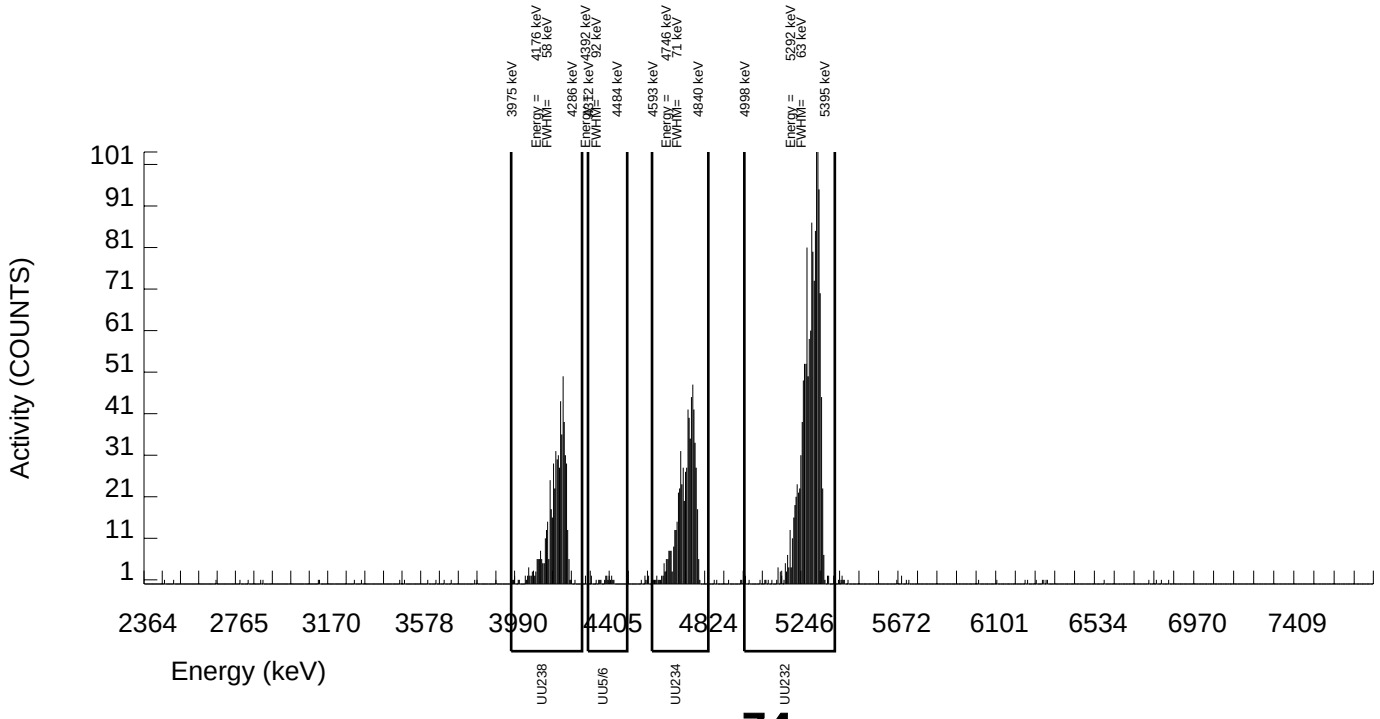
BATCH NUMBER: 883496 SAMPLE DATE : 29-JUN-2009 00:00:00	SAMPLE ID : S0232528012_UU SAMPLE QTY: 1.075 G
DETECTOR NUMBER :75554 AVERAGE %EFFICIENCY :24.7315 % YIELD : 109.638	COUNT DATE:21-JUL-2009 20:29:32 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.343E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.343E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29546 dpm RESULTS : 5.80585 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B156.CNF;335 BKG DATE : 19-JUL-2009 EFF FILE : W156.CNF;107 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	653.000	632.669	16.000	4.0000	100.0000	9.78E-01	1.53E-01	3.34E-02	1.44E-02	7.81E-02
U232	5302.100	1447.000	1435.000	12.000	3.4641	100.0000	2.22E+00	3.21E-01	2.96E-02	1.25E-02	1.16E-01
U-235	4391.000	19.000	17.000	2.000	1.4142	80.90000	3.25E-02	1.77E-02	1.83E-02	6.28E-03	1.72E-02
U-238	4184.730	600.000	596.000	4.000	2.0000	100.0000	9.21E-01	1.45E-01	1.90E-02	7.19E-03	7.44E-02

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

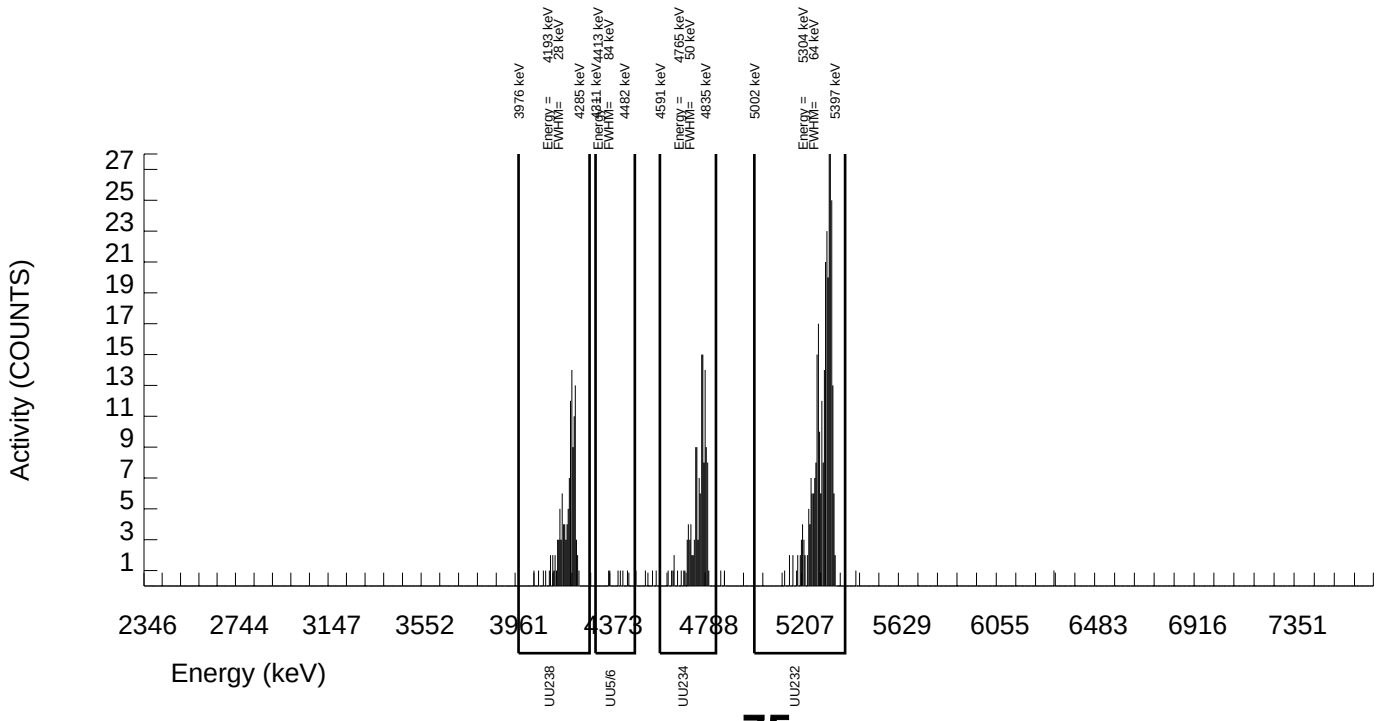
BATCH NUMBER: 883496 SAMPLE DATE : 29-JUN-2009 00:00:00	SAMPLE ID : S0232528013_UU SAMPLE QTY: 1.010 G
DETECTOR NUMBER :78770 AVERAGE %EFFICIENCY :24.7595 % YIELD : 99.920	COUNT DATE:15-JUL-2009 15:00:49 ELAPSED LIVE TIME(SEC): 14400.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.494E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.494E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29547 dpm RESULTS : 5.29122 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B127.CNF;384 BKG DATE : 12-JUL-2009 EFF FILE : W127.CNF;108 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	134.000	132.092	0.960	0.9798	100.0000	9.92E-01	2.37E-01	4.95E-02	1.35E-02	1.70E-01
U232	5302.100	315.000	314.280	0.720	0.8485	100.0000	2.36E+00	4.72E-01	4.59E-02	1.17E-02	2.61E-01
U-235	4391.000	6.000	6.000	0.000	0.0000	80.90000	5.57E-02	4.55E-02	2.79E-02	0.00E+00	4.46E-02
U-238	4184.730	125.000	124.760	0.240	0.4899	100.0000	9.37E-01	2.27E-01	3.60E-02	6.74E-03	1.65E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

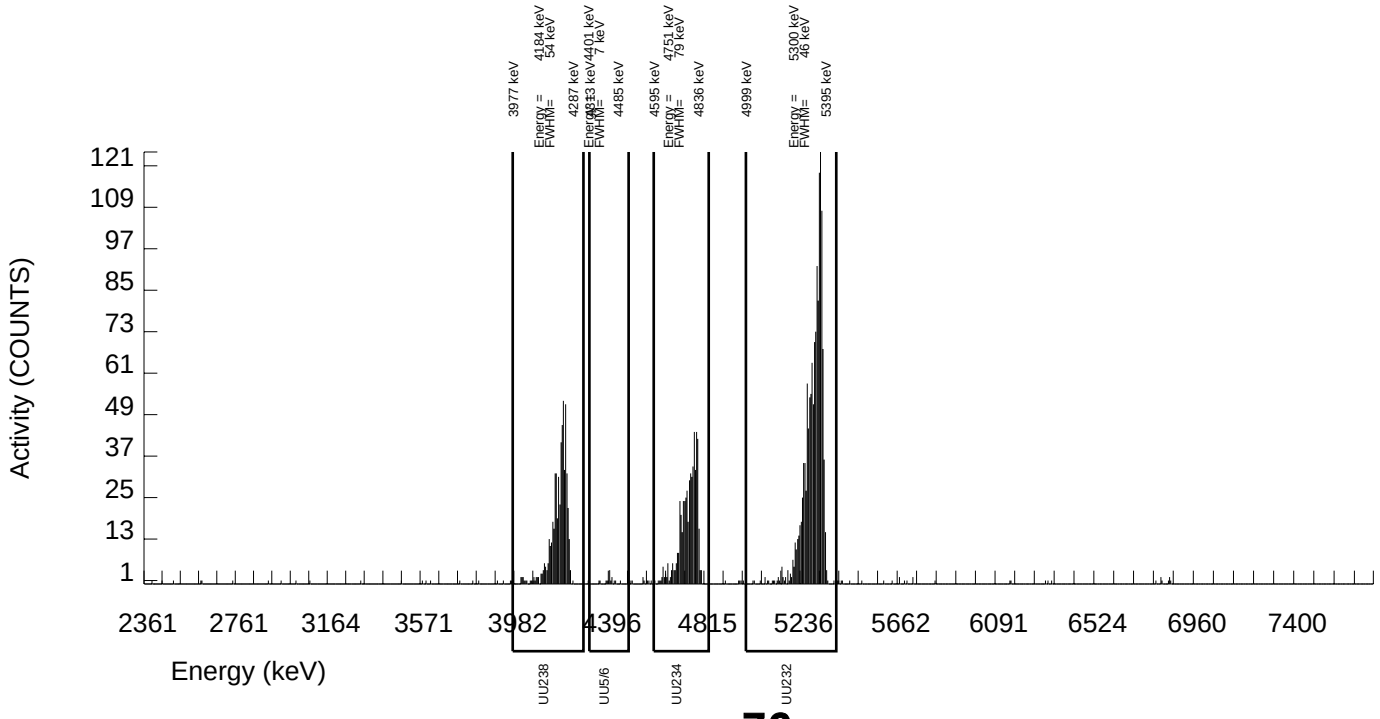
BATCH NUMBER: 883496 SAMPLE DATE : 29-JUN-2009 00:00:00	SAMPLE ID : S0232528014_UU SAMPLE QTY: 1.014 G
DETECTOR NUMBER :75555 AVERAGE %EFFICIENCY :24.7679 % YIELD : 104.442	COUNT DATE:21-JUL-2009 20:29:35 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.484E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.484E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29545 dpm RESULTS : 5.53069 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B157.CNF;335 BKG DATE : 19-JUL-2009 EFF FILE : W157.CNF;97 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	562.000	553.869	4.000	2.0000	100.0000	9.51E-01	1.51E-01	2.11E-02	7.99E-03	7.98E-02
U232	5302.100	1374.000	1369.000	5.000	2.2361	100.0000	2.35E+00	3.42E-01	2.30E-02	8.94E-03	1.25E-01
U-235	4391.000	16.000	14.000	2.000	1.4142	80.90000	2.97E-02	1.81E-02	2.03E-02	6.98E-03	1.77E-02
U-238	4184.730	557.000	553.000	4.000	2.0000	100.0000	9.50E-01	1.51E-01	2.11E-02	7.99E-03	7.97E-02

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

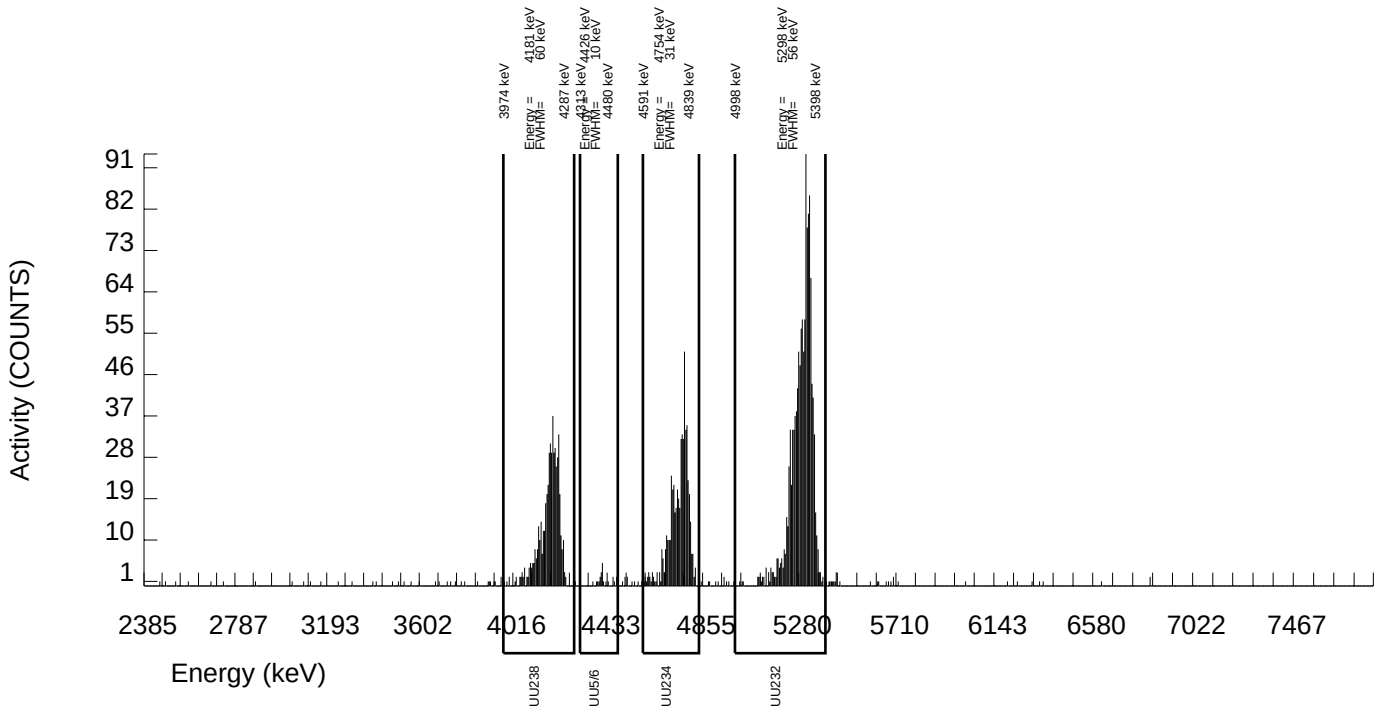
BATCH NUMBER: 883496 SAMPLE DATE : 29-JUN-2009 00:00:00	SAMPLE ID : S0232528015_UU SAMPLE QTY: 1.012 G
DETECTOR NUMBER :33451 AVERAGE %EFFICIENCY :24.8572 % YIELD : 95.857	COUNT DATE:21-JUL-2009 20:29:37 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.489E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.489E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29546 dpm RESULTS : 5.07607 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B158.CNF;336 BKG DATE : 19-JUL-2009 EFF FILE : W158.CNF;100 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	546.000	536.194	6.000	2.4495	100.0000	1.00E+00	1.61E-01	2.69E-02	1.06E-02	8.57E-02
U232	5302.100	1268.000	1261.000	7.000	2.6458	100.0000	2.36E+00	3.47E-01	2.86E-02	1.15E-02	1.31E-01
U-235	4391.000	22.000	21.000	1.000	1.0000	80.90000	4.85E-02	2.27E-02	1.77E-02	5.37E-03	2.17E-02
U-238	4184.730	523.000	522.000	1.000	1.0000	100.0000	9.75E-01	1.57E-01	1.43E-02	4.35E-03	8.38E-02

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

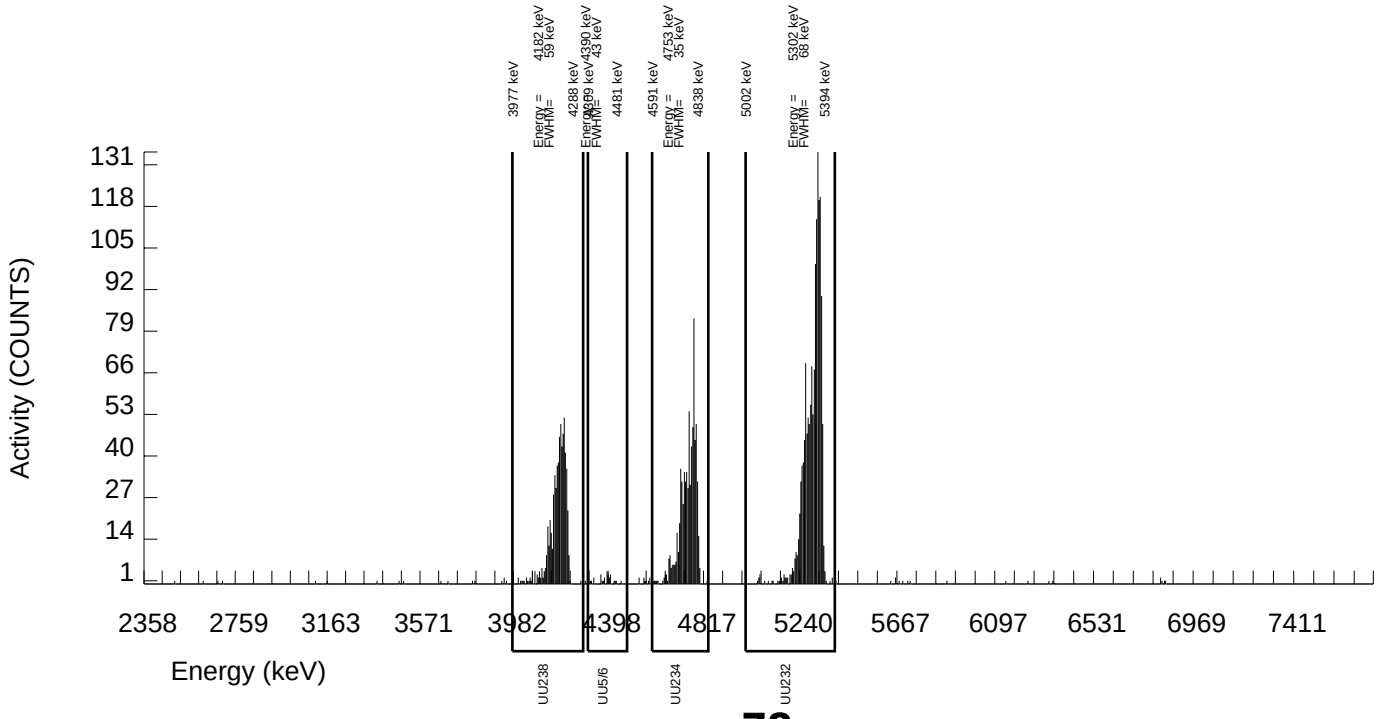
BATCH NUMBER: 883496 SAMPLE DATE : 29-JUN-2009 00:00:00	SAMPLE ID : S0232528016_UU SAMPLE QTY: 1.025 G
DETECTOR NUMBER :76225 AVERAGE %EFFICIENCY :25.3232 % YIELD : 108.942	COUNT DATE:21-JUL-2009 20:29:39 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.457E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.457E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29546 dpm RESULTS : 5.76897 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B159.CNF;309 BKG DATE : 19-JUL-2009 EFF FILE : W159.CNF;92 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	741.000	731.594	5.000	2.2361	100.0000	1.17E+00	1.79E-01	2.14E-02	8.29E-03	8.50E-02
U232	5302.100	1467.000	1460.000	7.000	2.6458	100.0000	2.33E+00	3.36E-01	2.44E-02	9.81E-03	1.20E-01
U-235	4391.000	28.000	26.000	2.000	1.4142	80.90000	5.12E-02	2.22E-02	1.89E-02	6.48E-03	2.11E-02
U-238	4184.730	650.000	649.000	1.000	1.0000	100.0000	1.03E+00	1.61E-01	1.22E-02	3.71E-03	7.97E-02

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

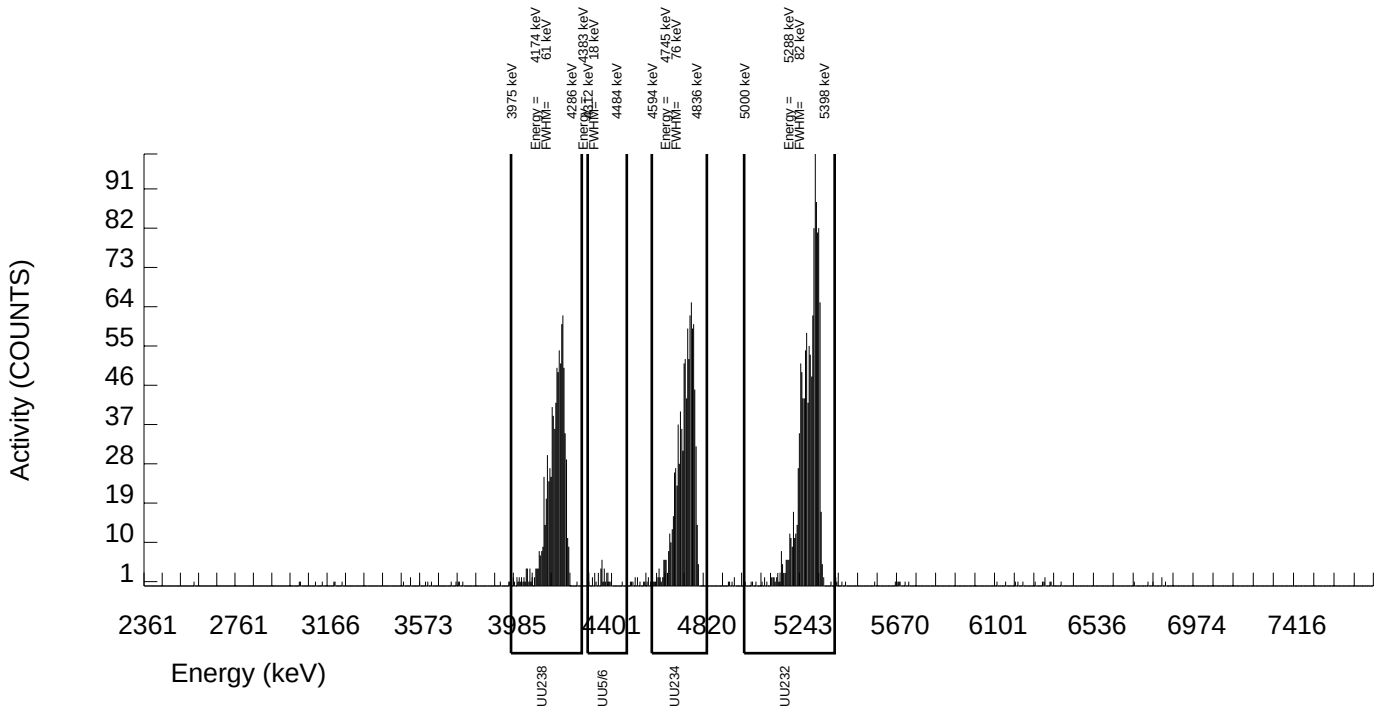
BATCH NUMBER: 883496 SAMPLE DATE : 29-JUN-2009 00:00:00	SAMPLE ID : S0232528017_UU SAMPLE QTY: 1.006 G
DETECTOR NUMBER :76226 AVERAGE %EFFICIENCY :24.6915 % YIELD : 98.184	COUNT DATE:21-JUL-2009 20:29:41 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.504E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.504E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29546 dpm RESULTS : 5.19928 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B160.CNF;311 BKG DATE : 19-JUL-2009 EFF FILE : W160.CNF;100 CAL DATE : 17-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	946.000	929.128	13.000	3.6056	100.0000	1.72E+00	2.59E-01	3.65E-02	1.55E-02	1.12E-01
U232	5302.100	1290.000	1283.000	7.000	2.6458	100.0000	2.37E+00	3.48E-01	2.83E-02	1.14E-02	1.30E-01
U-235	4391.000	36.000	30.000	6.000	2.4495	80.90000	6.85E-02	3.05E-02	3.29E-02	1.30E-02	2.90E-02
U-238	4184.730	862.000	859.000	3.000	1.7321	100.0000	1.59E+00	2.41E-01	2.04E-02	7.44E-03	1.06E-01

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



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

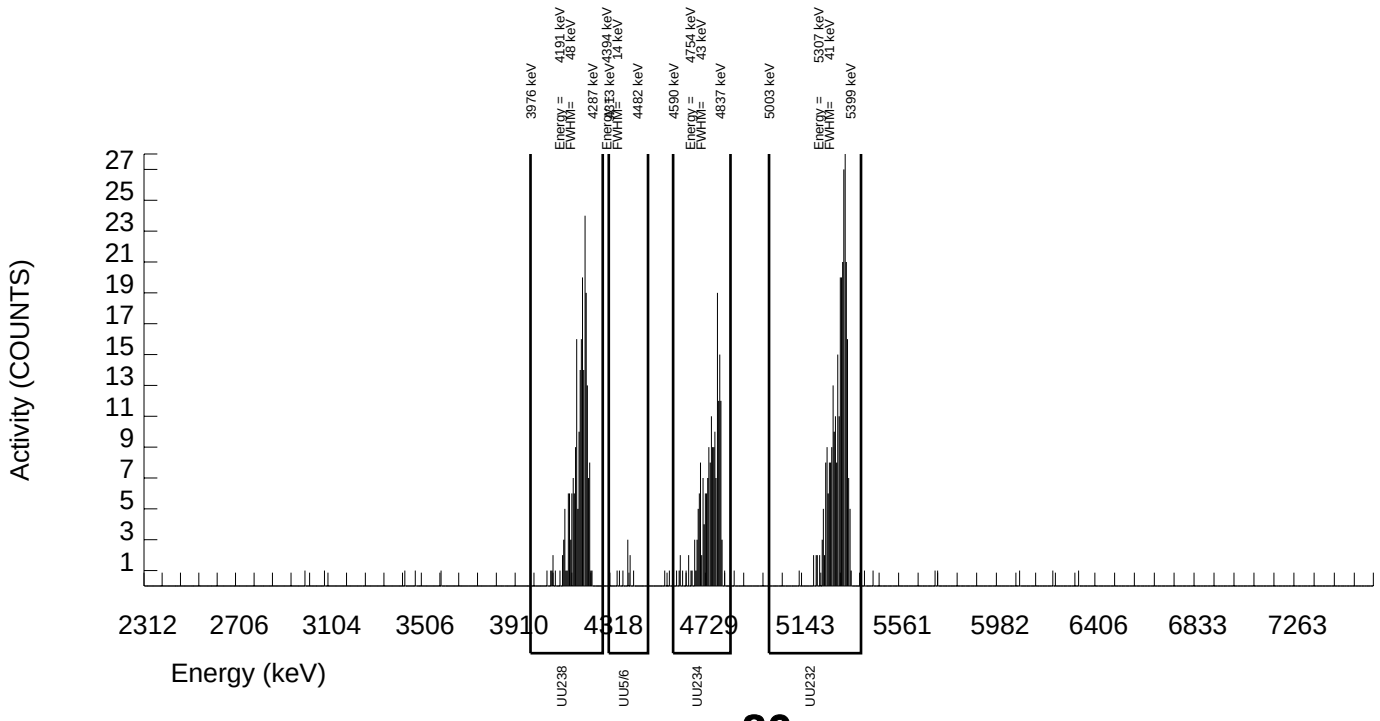
BATCH NUMBER: 883496 SAMPLE DATE : 29-JUN-2009 00:00:00	SAMPLE ID : S0232528018_UU SAMPLE QTY: 1.004 G
DETECTOR NUMBER :76229 AVERAGE %EFFICIENCY :24.5240 % YIELD : 96.308	COUNT DATE:15-JUL-2009 15:01:04 ELAPSED LIVE TIME(SEC): 14400.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.509E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.509E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29547 dpm RESULTS : 5.09997 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B133.CNF;363 BKG DATE : 12-JUL-2009 EFF FILE : W133.CNF;107 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	194.000	192.135	0.960	0.9798	100.0000	1.52E+00	3.35E-01	5.22E-02	1.42E-02	2.16E-01
U232	5302.100	301.000	300.040	0.960	0.9798	100.0000	2.38E+00	4.82E-01	5.22E-02	1.42E-02	2.69E-01
U-235	4391.000	9.000	8.760	0.240	0.4899	80.90000	8.57E-02	5.95E-02	4.69E-02	8.78E-03	5.77E-02
U-238	4184.730	230.000	230.000	0.000	0.0000	100.0000	1.82E+00	3.86E-01	2.37E-02	0.00E+00	2.35E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

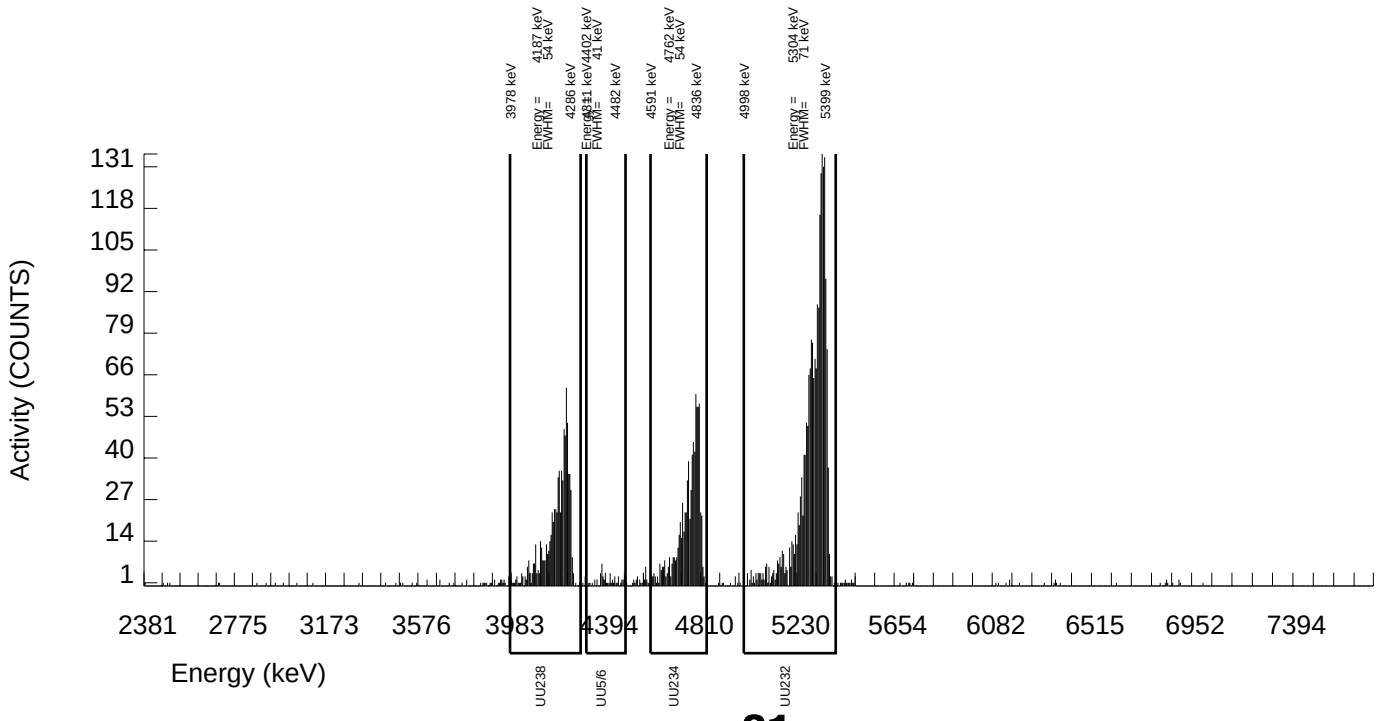
BATCH NUMBER: 883496 SAMPLE DATE : 1-JUL-2009 00:00:00.	SAMPLE ID : S0232528019_UU SAMPLE QTY: 1.003 G
DETECTOR NUMBER :70321 AVERAGE %EFFICIENCY :36.8045 % YIELD : 105.865	COUNT DATE:21-JUL-2009 20:29:44 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.511E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.511E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29518 dpm RESULTS : 5.60572 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B161.CNF;107 BKG DATE : 19-JUL-2009 EFF FILE : W161.CNF;37 CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	807.000	793.777	7.000	2.6458	100.0000	9.15E-01	1.36E-01	1.76E-02	7.09E-03	6.42E-02
U232	5302.100	2071.000	2062.000	9.000	3.0000	100.0000	2.38E+00	3.30E-01	1.96E-02	8.05E-03	1.03E-01
U-235	4391.000	52.000	50.000	2.000	1.4142	80.90000	7.12E-02	2.26E-02	1.36E-02	4.69E-03	2.05E-02
U-238	4184.730	805.000	805.000	0.000	0.0000	100.0000	9.28E-01	1.38E-01	3.46E-03	0.00E+00	6.41E-02

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

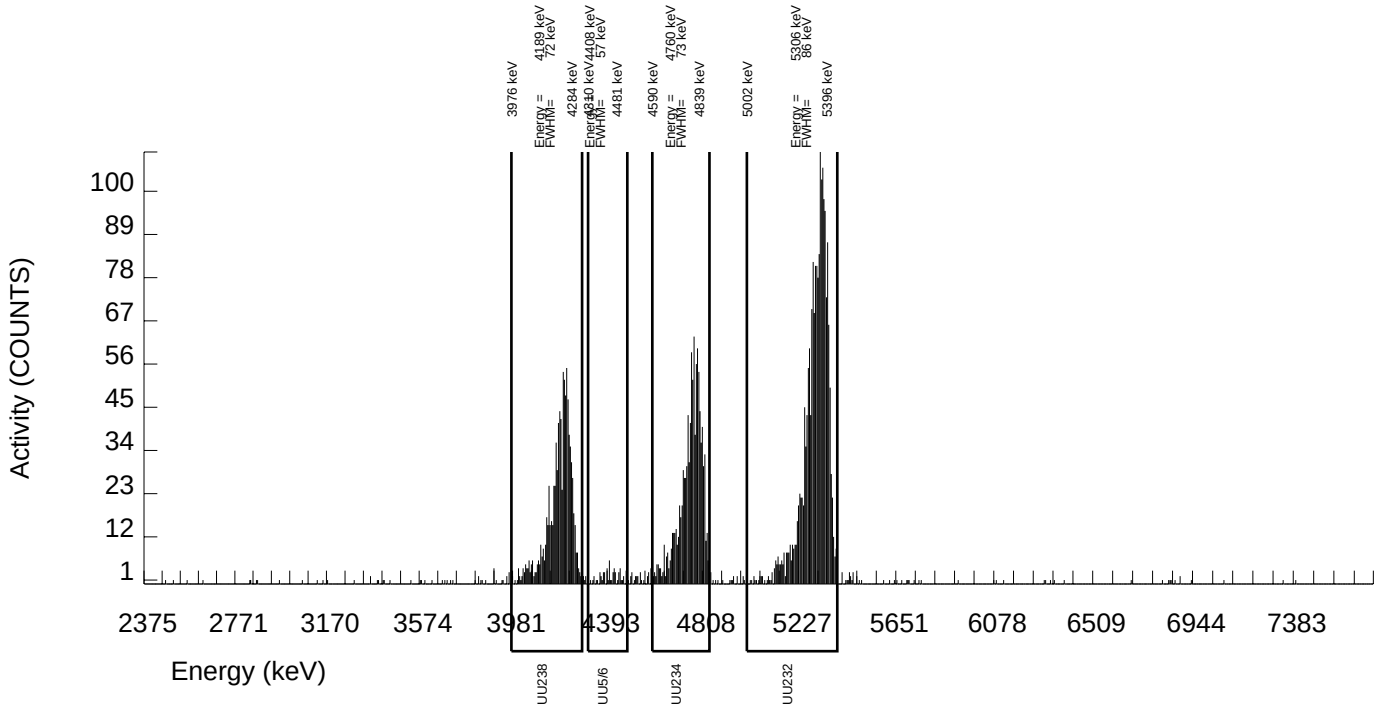
BATCH NUMBER: 883496 SAMPLE DATE : 1-JUL-2009 00:00:00.	SAMPLE ID : S0232528020_UU SAMPLE QTY: 1.000 G
DETECTOR NUMBER :70323 AVERAGE %EFFICIENCY :36.6995 % YIELD : 101.276	COUNT DATE:21-JUL-2009 20:29:46 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.519E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.519E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29517 dpm RESULTS : 5.36273 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B162.CNF;107 BKG DATE : 19-JUL-2009 EFF FILE : W162.CNF;37 CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	1037.000	1028.064	3.000	1.7321	100.0000	1.25E+00	1.81E-01	1.34E-02	4.88E-03	7.64E-02
U232	5302.100	1969.000	1967.000	2.000	1.4142	100.0000	2.39E+00	3.32E-01	1.16E-02	3.99E-03	1.06E-01
U-235	4391.000	53.000	52.000	1.000	1.0000	80.90000	7.79E-02	2.39E-02	1.15E-02	3.49E-03	2.16E-02
U-238	4184.730	933.000	930.000	3.000	1.7321	100.0000	1.13E+00	1.65E-01	1.34E-02	4.88E-03	7.27E-02

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

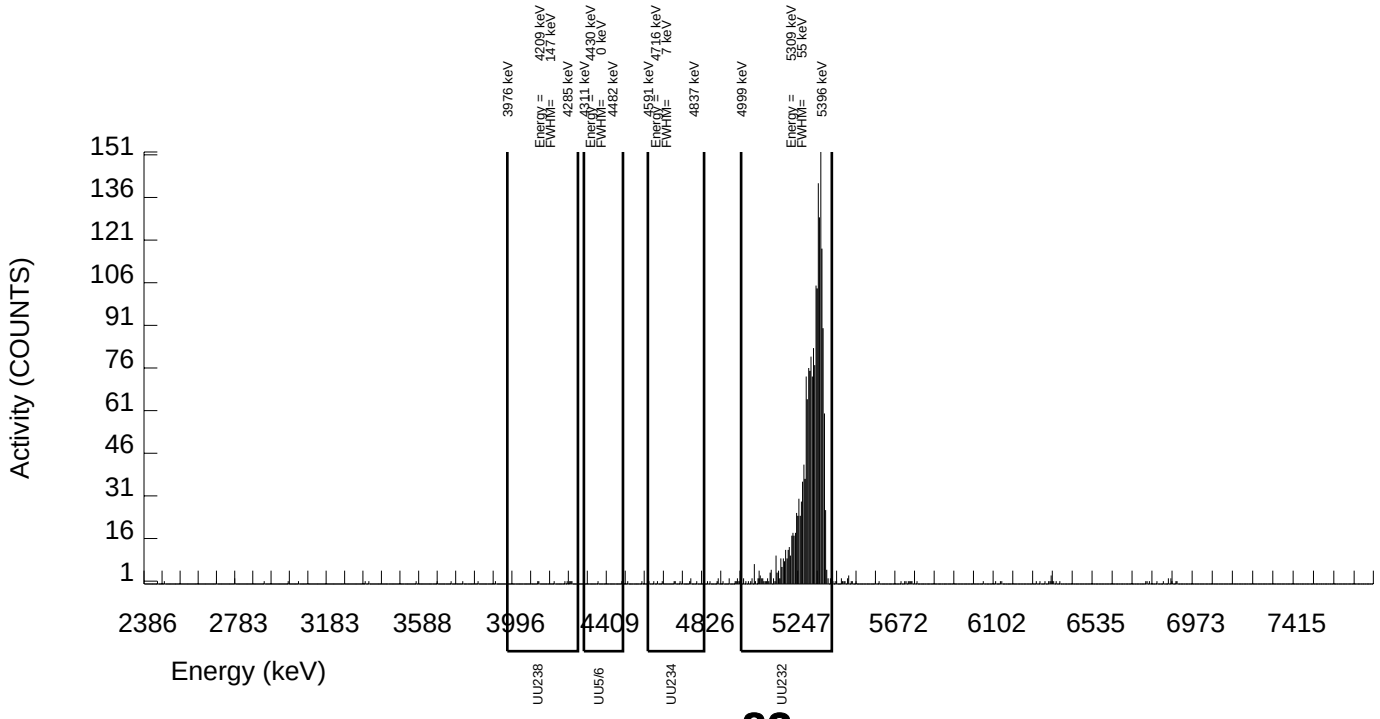
BATCH NUMBER: 883496 SAMPLE DATE : 9-JUL-2009 00:00:00.	SAMPLE ID : S1201876826_UU SAMPLE QTY: 1.079 G
DETECTOR NUMBER :70324 AVERAGE %EFFICIENCY :38.2201 % YIELD : 98.285	COUNT DATE:21-JUL-2009 20:29:49 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.334E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.334E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29405 dpm RESULTS : 5.20325 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B163.CNF;107 BKG DATE : 19-JUL-2009 EFF FILE : W163.CNF;34 CAL DATE : 22-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	12.000	-4.999	11.000	3.3166	100.0000	-5.56E-03	8.98E-03	2.05E-02	8.57E-03	8.98E-03
U232	5302.100	2007.000	1988.000	19.000	4.3589	100.0000	2.21E+00	3.07E-01	2.59E-02	1.13E-02	9.81E-02
U-235	4391.000	2.000	0.000	2.000	1.4142	80.90000	0.00E+00	5.39E-03	1.32E-02	4.52E-03	5.38E-03
U-238	4184.730	8.000	6.000	2.000	1.4142	100.0000	6.67E-03	6.94E-03	1.06E-02	3.66E-03	6.89E-03

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

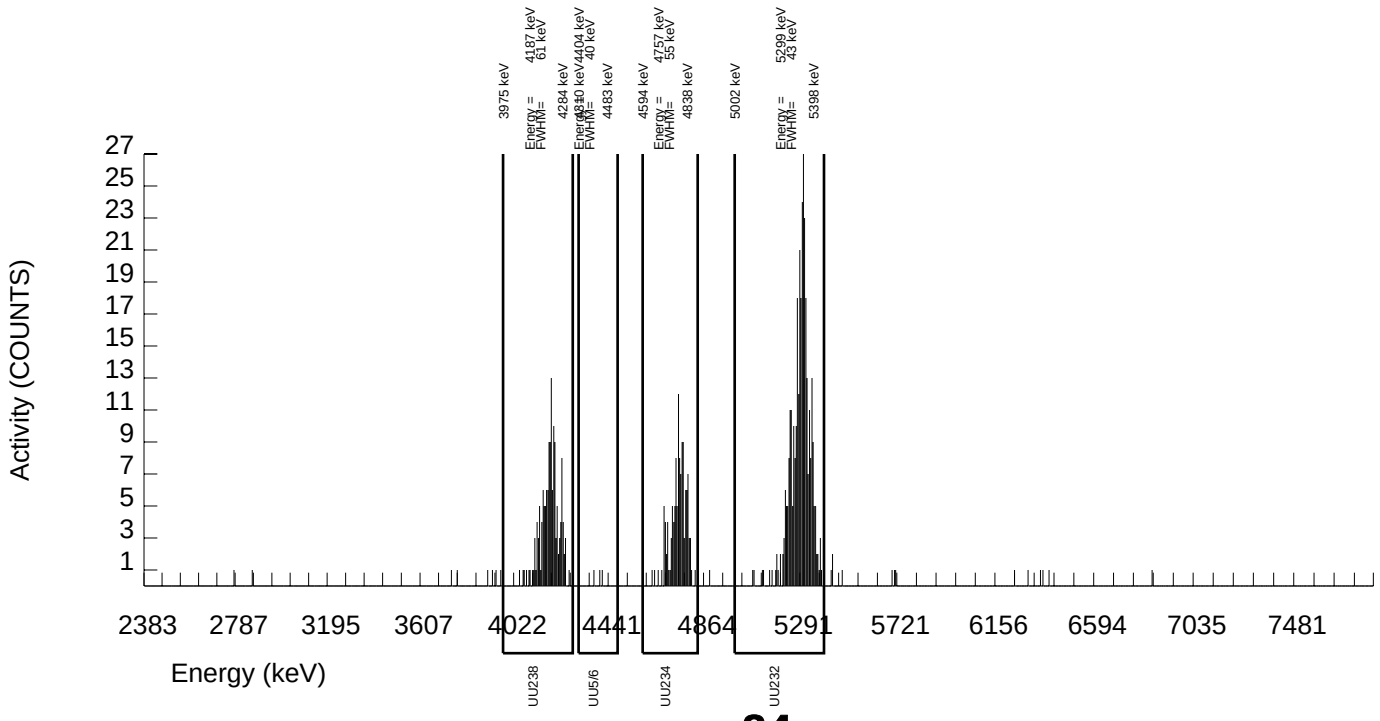
BATCH NUMBER: 883496 SAMPLE DATE : 1-JUL-2009 00:00:00.	SAMPLE ID : S1201876827_UU SAMPLE QTY: 1.000 G
DETECTOR NUMBER :64288 AVERAGE %EFFICIENCY :25.5715 % YIELD : 103.593	COUNT DATE:15-JUL-2009 15:01:15 ELAPSED LIVE TIME(SEC): 14400.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.519E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.519E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29519 dpm RESULTS : 5.48544 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B137.CNF;328 BKG DATE : 12-JUL-2009 EFF FILE : W137.CNF;88 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	126.000	124.505	0.480	0.6928	100.0000	8.82E-01	2.12E-01	3.92E-02	8.99E-03	1.55E-01
U232	5302.100	337.000	336.520	0.480	0.6928	100.0000	2.39E+00	4.67E-01	3.93E-02	9.00E-03	2.55E-01
U-235	4391.000	3.000	3.000	0.000	0.0000	80.90000	2.63E-02	3.00E-02	2.63E-02	0.00E+00	2.97E-02
U-238	4184.730	148.000	147.520	0.480	0.6928	100.0000	1.05E+00	2.41E-01	3.92E-02	8.99E-03	1.69E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

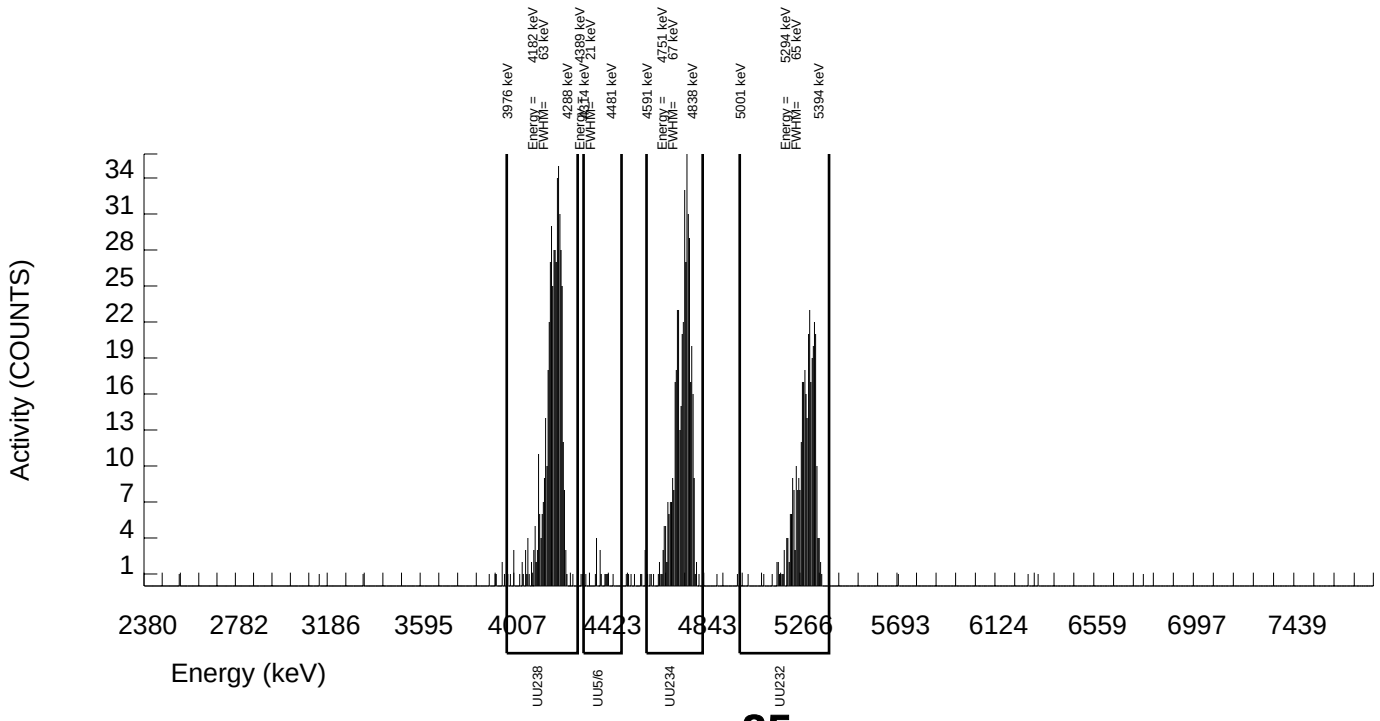
BATCH NUMBER: 883496 SAMPLE DATE : 1-JUL-2009 00:00:00.	SAMPLE ID : S1201876828_UU SAMPLE QTY: 1.008 G
DETECTOR NUMBER :65877 AVERAGE %EFFICIENCY :25.7486 % YIELD : 105.962	COUNT DATE:15-JUL-2009 15:01:18 ELAPSED LIVE TIME(SEC): 14400.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.499E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.499E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29519 dpm RESULTS : 5.61089 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B138.CNF;333 BKG DATE : 12-JUL-2009 EFF FILE : W138.CNF;88 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	447.000	440.434	5.520	2.3495	100.0000	3.01E+00	5.67E-01	7.92E-02	2.94E-02	2.83E-01
U232	5302.100	349.000	346.600	2.400	1.5492	100.0000	2.37E+00	4.60E-01	5.92E-02	1.94E-02	2.50E-01
U-235	4391.000	16.000	15.520	0.480	0.6928	80.90000	1.31E-01	6.97E-02	4.67E-02	1.07E-02	6.64E-02
U-238	4184.730	483.000	481.320	1.680	1.2961	100.0000	3.28E+00	6.12E-01	5.29E-02	1.62E-02	2.94E-01

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



GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

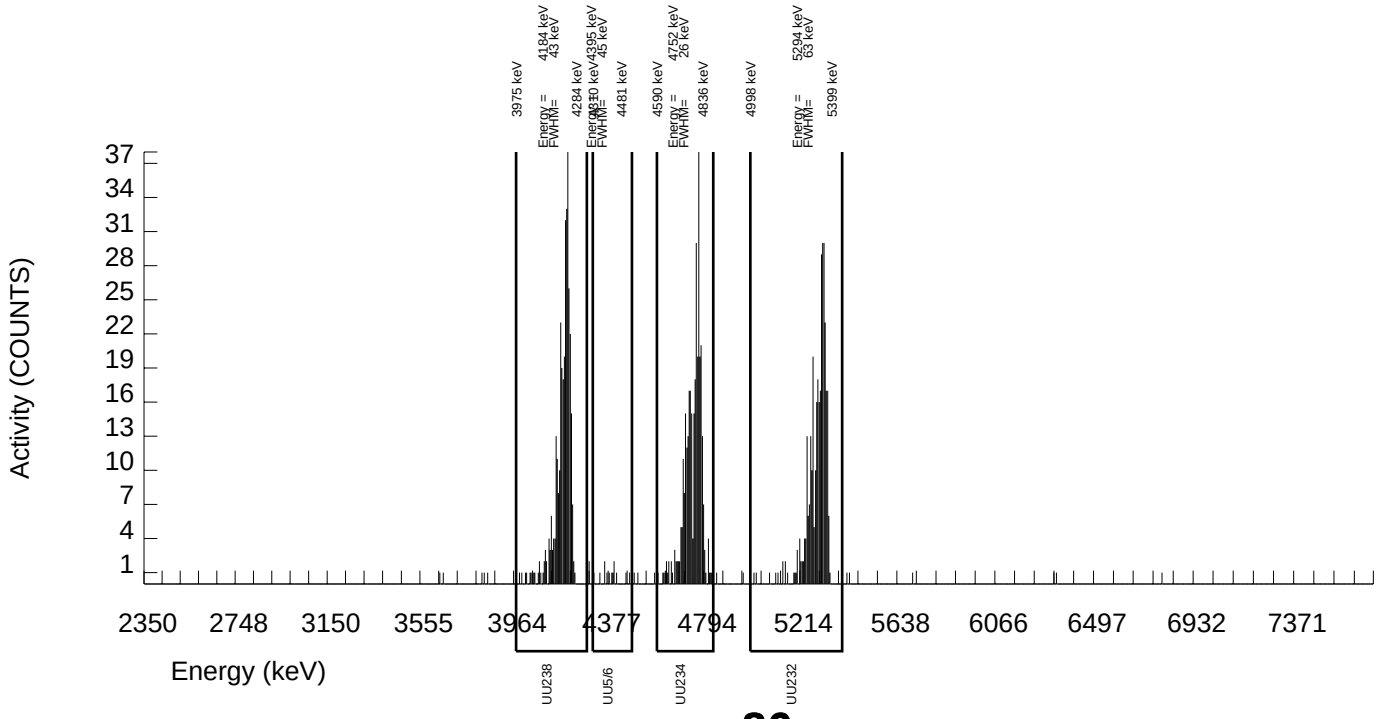
BATCH NUMBER: 883496 SAMPLE DATE : 9-JUL-2009 00:00:00.	SAMPLE ID : S1201876829_UU SAMPLE QTY: 1.079 G
DETECTOR NUMBER :75551 AVERAGE %EFFICIENCY :24.7777 % YIELD : 106.696	COUNT DATE:15-JUL-2009 15:01:20 ELAPSED LIVE TIME(SEC): 14400.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : 1163-G ISOTOPE : U-238 PCI/G : 2.334E+00	ID : 1163-G ISOTOPE : U-238 PCI/G : 2.334E+00	ID : 1283-B ISOTOPE : U232 NOMINAL : 5.29407 dpm RESULTS : 5.64855 dpm	LIB FILE : ENV_ALPHA_UU.N BKG FILE : B144.CNF;329 BKG DATE : 12-JUL-2009 EFF FILE : W144.CNF;92 CAL DATE : 16-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
U-3/4	4763.020	339.000	337.267	0.720	0.8485	100.0000	2.22E+00	4.35E-01	4.02E-02	1.02E-02	2.37E-01
U232	5302.100	338.000	335.840	2.160	1.4697	100.0000	2.21E+00	4.34E-01	5.52E-02	1.77E-02	2.37E-01
U-235	4391.000	13.000	12.760	0.240	0.4899	80.90000	1.04E-01	6.01E-02	3.90E-02	7.30E-03	5.76E-02
U-238	4184.730	342.000	340.320	1.680	1.2961	100.0000	2.24E+00	4.39E-01	5.10E-02	1.56E-02	2.39E-01

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



THORIUM

886907

Radiochemistry Batch Checklist, Rev 9

Batch# ~~886907~~ @ 7/27/09 Product: Th Date: 7/26/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to100 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.	✓		case narrative
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%. Or meets the client's required RER acceptance criteria.	✓		case narrative
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.	✓		
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Sample was correctly preserved if required.	✓		
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 statused.	✓		
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# 715194
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NCR# 715194
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] 7/26/09

Secondary Review Performed By: [signature] 7/27/09

KERR

7/24 - 7/30

Thorium (Ac-227 Tracer) Que Sheet

21-JUL-09

Batch #: 886907 **Analyst:** HAKB **First Client Due Date:** 30-JUL-09 **Internal Due Date** 24-JUL-09

Tracer Isotope: Ac-227 **Tracer Code:** 0387-B-102 **Expiration Date:** 7/31/09 **Vol:** 0.1 **Ac-227 Separation Date/Time:** 7/22/09 @ 0945

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

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

Prep Date: 7/21/09 **Initials:** HAKB **Pipet ID:** 2971058 **Balance ID:** 50410272 **Witness:** KM 7.21.09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g/l/f)	Th Det #
232528001-2	RSAI2-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	26-JUN-09	1	1	0.127	65
232528002-2	RSAI2009-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	26-JUN-09	2	2	0.102	66
232528003-2	RSAI2-20B	SAMPLE		.05 pCi/g	SOIL	KERR003	26-JUN-09	3	3	0.125	67
232528004-2	RSAI2-31B	SAMPLE		.05 pCi/g	SOIL	KERR003	26-JUN-09	4	4	0.100	68
232528005-2	RSAJ2-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	26-JUN-09	5	5	0.108	185 35 BSS 7/26/09
232528006-2	RSAJ2-20B	SAMPLE		.05 pCi/g	SOIL	KERR003	26-JUN-09	6	6	0.103	69
232528007-2	RSAJ2-33B	SAMPLE		.05 pCi/g	SOIL	KERR003	26-JUN-09	7	7	0.102	70
232528008-2	RSAJ2009-33B	SAMPLE		.05 pCi/g	SOIL	KERR003	26-JUN-09	8	8	0.101	186 36 BSS 7/26/09
232528009-2	SA187-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	29-JUN-09	9	9	0.111	209
232528010-2	SA45-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	29-JUN-09	10	10	0.109	210
232528011-2	SA45009-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	29-JUN-09	11	11	0.113	37
232528012-2	SA153-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	29-JUN-09	12	12	0.106	38
232528013-2	SA186-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	29-JUN-09	13	13	0.103	39
232528014-2	SA185-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	29-JUN-09	14	14	0.105	211
232528015-2	RSAO5-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	29-JUN-09	15	15	0.114	40
232528016-2	SA152-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	29-JUN-09	16	16	0.110	212
232528017-2	SA152-20B	SAMPLE		.05 pCi/g	SOIL	KERR003	29-JUN-09	17	17	0.102	41
232528018-2	SA152-34B	SAMPLE		.05 pCi/g	SOIL	KERR003	29-JUN-09	18	18	0.110	42
→ 232528019-2	SA82-0.5B	SAMPLE		.05 pCi/g	SOIL	KERR003	01-JUL-09	19	19	0.103	187 43 BSS 7/26/09
232528020-2	SA82-10B	SAMPLE		.05 pCi/g	SOIL	KERR003	01-JUL-09	20	20	0.101	215
1201885296-1	MB for batch 886907	MB		UCF pCi/g to 1	SOIL	QC ACCOUNT		21	21	0.127	188 BSS 7/26/09
1201885297-2	SA82-0.5B(232528019DUP)	DUP		.05 pCi/g	SOIL	QC ACCOUNT	01-JUL-09	22	22	0.104	189
1201885298-2	SA82-0.5B(232528019MS)	MS		.05 pCi/g	SOIL	QC ACCOUNT	01-JUL-09	23	23	0.104	190 44 BSS 7/26/09
1201885299-1	LCS for batch 886907	LCS		UCF pCi/g to 1	SOIL	QC ACCOUNT		24	24	0.127	191 45

Choose SOP Used: GL-RAD-A-038 ✓

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

Solid Sample Dissolution by: LEACH or DIGESTION (Circle One)

Data Reviewed By: [signature] 7/26/09

GEL Laboratories LLC, Radiochemistry Division

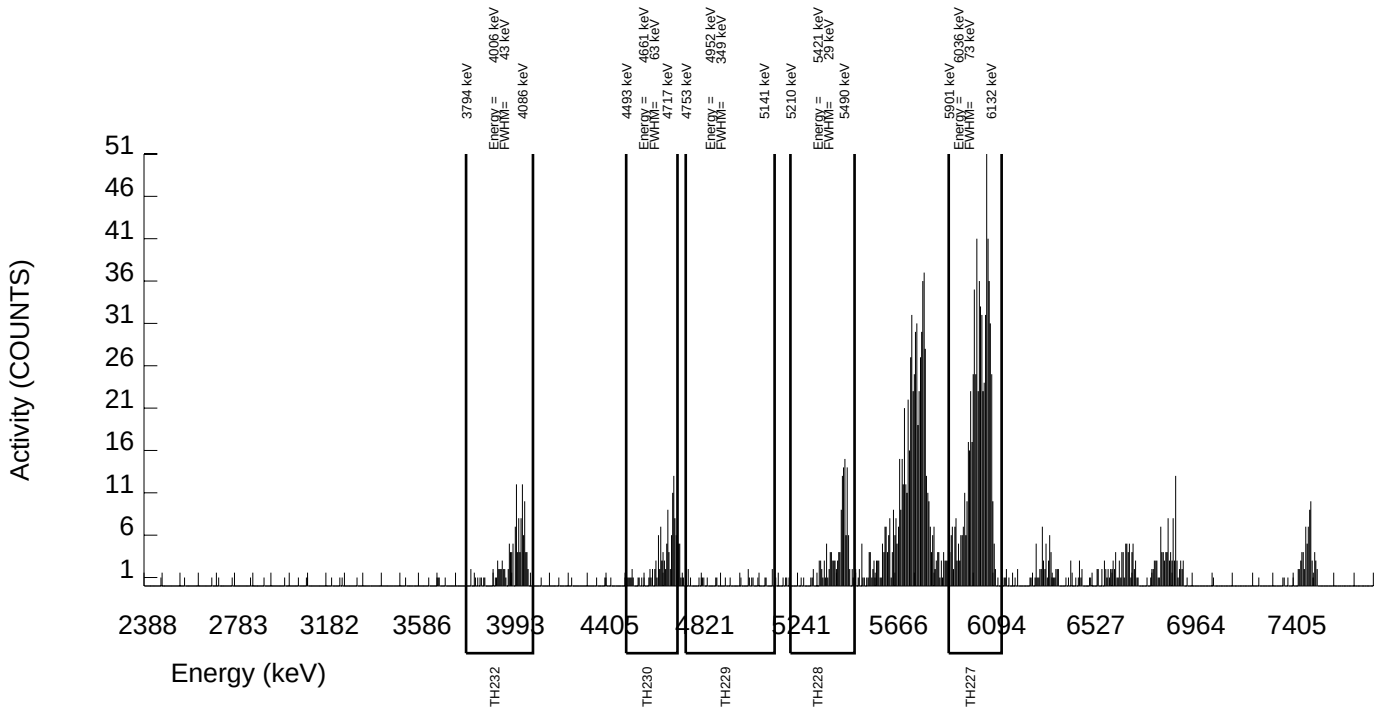
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528001_TH SAMPLE QTY: 0.127 G
DETECTOR NUMBER :68551 AVERAGE %EFFICIENCY :31.6730 % YIELD : 89.620	COUNT DATE:24-JUL-2009 07:26:28 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.685E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.685E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.51727 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B065.CNF;1881 BKG DATE : 19-JUL-2009 EFF FILE : W065.CNF;293 CAL DATE : 9-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	701.000	698.000	3.000	1.7321	68.10000	1.39E+01	1.46E+00	2.21E-01	8.04E-02	1.04E+00
TH-228	5363.000	141.000	117.000	24.000	4.8990	99.94000	1.47E+00	3.33E-01	3.23E-01	1.43E-01	3.15E-01
TH229	4900.000	23.000	13.000	10.000	3.1623	99.52000	1.63E-01	1.42E-01	2.22E-01	9.24E-02	1.41E-01
TH-230	4625.000	115.000	112.000	3.000	1.7321	100.0000	1.40E+00	2.85E-01	1.38E-01	5.03E-02	2.66E-01
TH-232	3972.000	130.000	128.000	2.000	1.4142	100.0000	1.60E+00	3.05E-01	1.20E-01	4.11E-02	2.81E-01



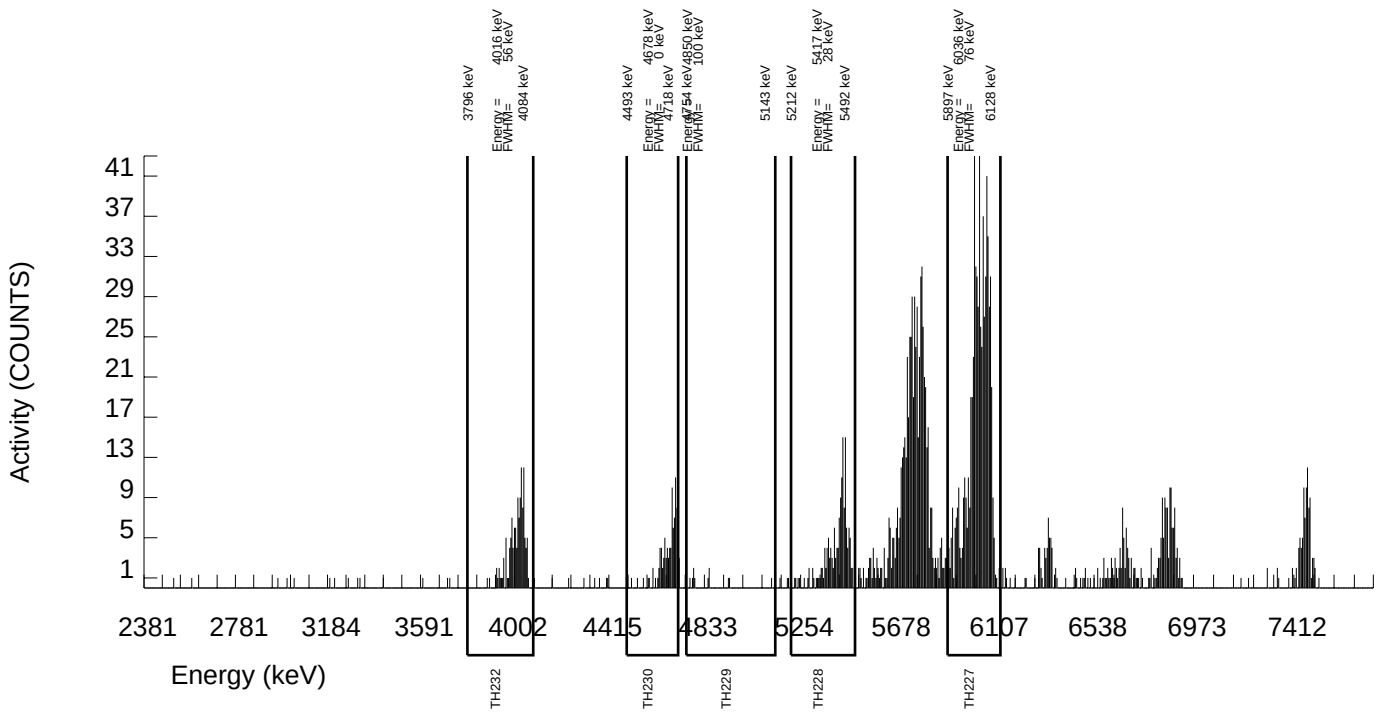
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528002_TH SAMPLE QTY: 0.102 G
DETECTOR NUMBER :46-089C1 AVERAGE %EFFICIENCY :31.0410 % YIELD : 88.431	COUNT DATE:24-JUL-2009 07:26:28 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.098E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.098E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.47062 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B066.CNF;1042 BKG DATE : 19-JUL-2009 EFF FILE : W066.CNF;294 CAL DATE : 9-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	677.000	675.000	2.000	1.4142	68.10000	1.73E+01	1.94E+00	2.46E-01	8.45E-02	1.31E+00
TH-228	5363.000	154.000	127.000	27.000	5.1962	99.94000	2.05E+00	4.58E-01	4.38E-01	1.95E-01	4.25E-01
TH229	4900.000	13.000	7.000	6.000	2.4495	99.52000	1.13E-01	1.38E-01	2.33E-01	9.21E-02	1.38E-01
TH-230	4625.000	89.000	88.000	1.000	1.0000	100.0000	1.42E+00	3.21E-01	1.23E-01	3.74E-02	2.99E-01
TH-232	3972.000	128.000	125.000	3.000	1.7321	100.0000	2.01E+00	3.97E-01	1.78E-01	6.48E-02	3.61E-01



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

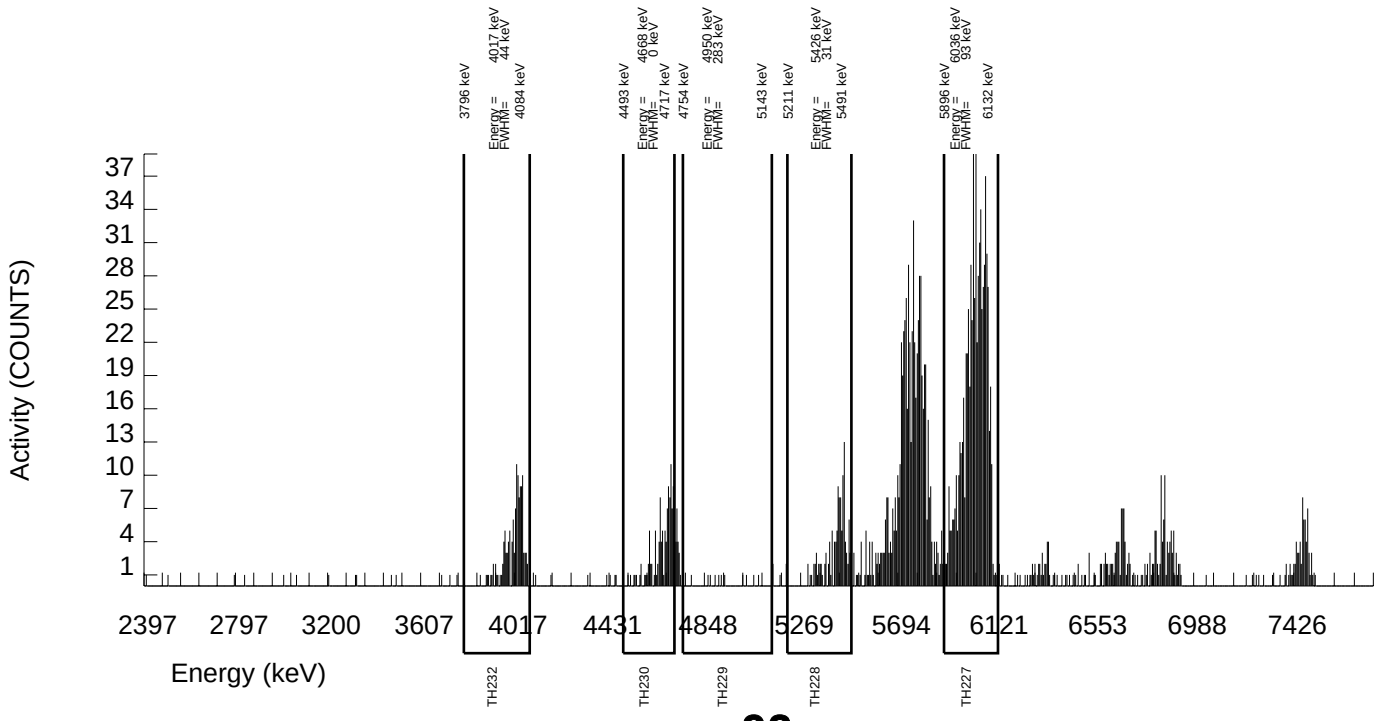
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528003_TH SAMPLE QTY: 0.125 G
DETECTOR NUMBER :46-089B4 AVERAGE %EFFICIENCY :32.2511 % YIELD : 90.031	COUNT DATE:24-JUL-2009 07:26:28 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.712E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.712E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.53340 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B067.CNF;1040 BKG DATE : 19-JUL-2009 EFF FILE : W067.CNF;275 CAL DATE : 9-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	715.000	714.000	1.000	1.0000	68.10000	1.41E+01	1.47E+00	1.52E-01	4.61E-02	1.04E+00
TH-228	5363.000	122.000	109.000	13.000	3.6056	99.94000	1.36E+00	3.01E-01	2.46E-01	1.04E-01	2.83E-01
TH229	4900.000	11.000	5.000	6.000	2.4495	99.52000	6.24E-02	1.01E-01	1.80E-01	7.11E-02	1.01E-01
TH-230	4625.000	113.000	109.000	4.000	2.0000	100.0000	1.35E+00	2.82E-01	1.53E-01	5.77E-02	2.63E-01
TH-232	3972.000	129.000	127.000	2.000	1.4142	100.0000	1.58E+00	3.02E-01	1.19E-01	4.08E-02	2.78E-01



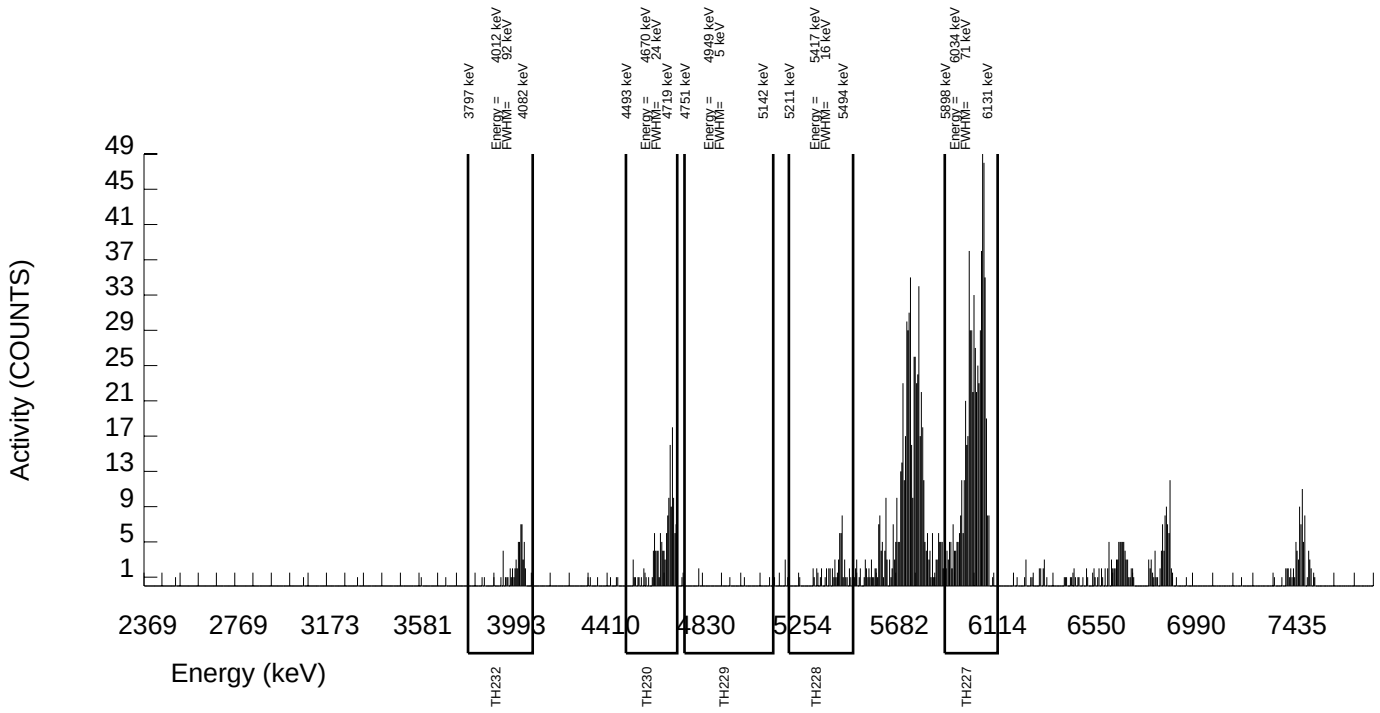
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528004_TH SAMPLE QTY: 0.100 G
DETECTOR NUMBER :78794 AVERAGE %EFFICIENCY :30.1861 % YIELD : 84.874	COUNT DATE:24-JUL-2009 07:26:28 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.140E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.140E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.33099 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B068.CNF;1033 BKG DATE : 19-JUL-2009 EFF FILE : W068.CNF;266 CAL DATE : 9-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	630.000	630.000	0.000	0.0000	68.10000	1.77E+01	1.68E+00	8.42E-02	0.00E+00	1.38E+00
TH-228	5363.000	57.000	53.000	4.000	2.0000	99.94000	9.34E-01	2.75E-01	2.17E-01	8.20E-02	2.70E-01
TH229	4900.000	5.000	2.000	3.000	1.7321	99.52000	3.53E-02	9.80E-02	1.95E-01	7.12E-02	9.79E-02
TH-230	4625.000	148.000	146.000	2.000	1.4142	100.0000	2.57E+00	4.45E-01	1.68E-01	5.78E-02	4.22E-01
TH-232	3972.000	58.000	58.000	0.000	0.0000	100.0000	1.02E+00	2.68E-01	5.27E-02	0.00E+00	2.62E-01



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

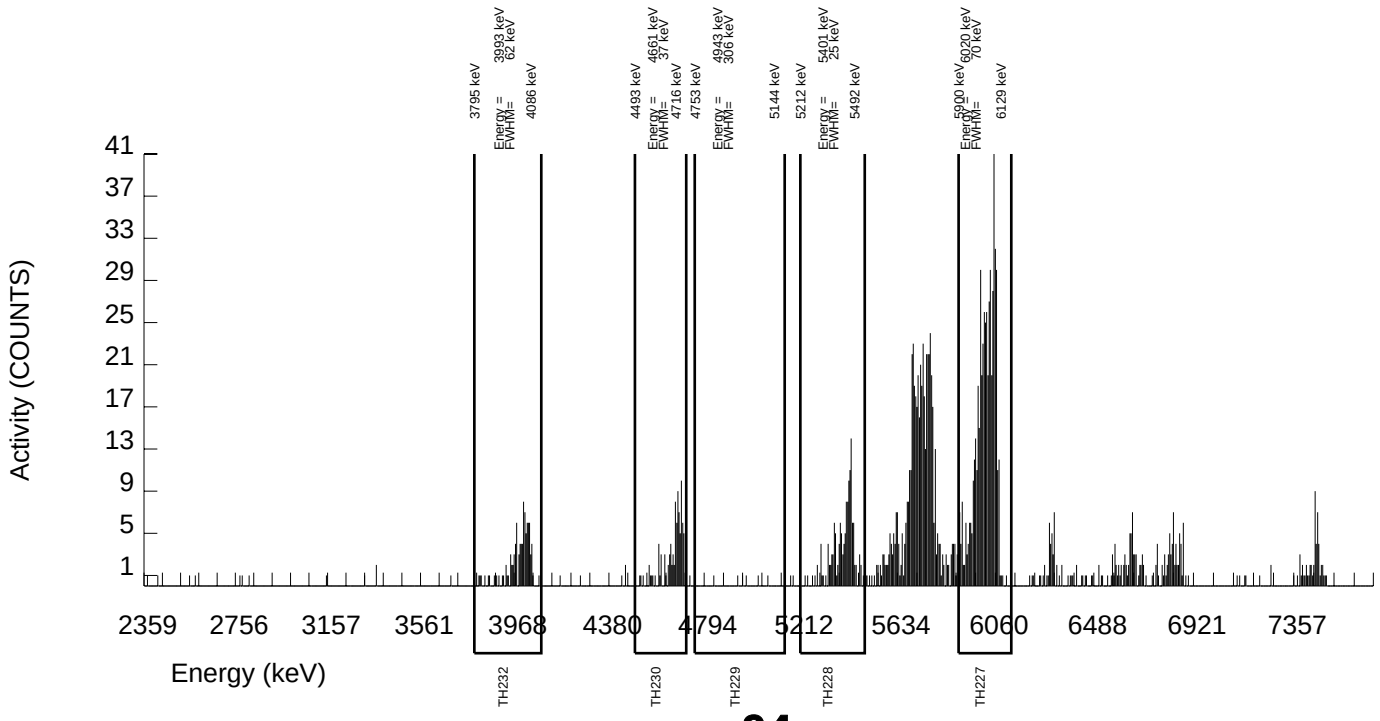
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528005_TH SAMPLE QTY: 0.108 G
DETECTOR NUMBER :68615 AVERAGE %EFFICIENCY :25.6564 % YIELD : 86.687	COUNT DATE:24-JUL-2009 13:16:52 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.982E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.982E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92464 dpm RESULTS : 3.40216 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B185.CNF;91 BKG DATE : 19-JUL-2009 EFF FILE : W185.CNF;35 CAL DATE : 22-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	547.000	542.000	5.000	2.2361	68.10000	1.64E+01	1.91E+00	4.05E-01	1.57E-01	1.39E+00
TH-228	5363.000	143.000	141.000	2.000	1.4142	99.94000	2.65E+00	4.92E-01	1.80E-01	6.19E-02	4.44E-01
TH229	4900.000	7.000	5.000	2.000	1.4142	99.52000	9.42E-02	1.11E-01	1.81E-01	6.20E-02	1.11E-01
TH-230	4625.000	94.000	94.000	0.000	0.0000	100.0000	1.76E+00	3.83E-01	5.63E-02	0.00E+00	3.56E-01
TH-232	3972.000	97.000	96.000	1.000	1.0000	100.0000	1.80E+00	3.91E-01	1.44E-01	4.36E-02	3.64E-01



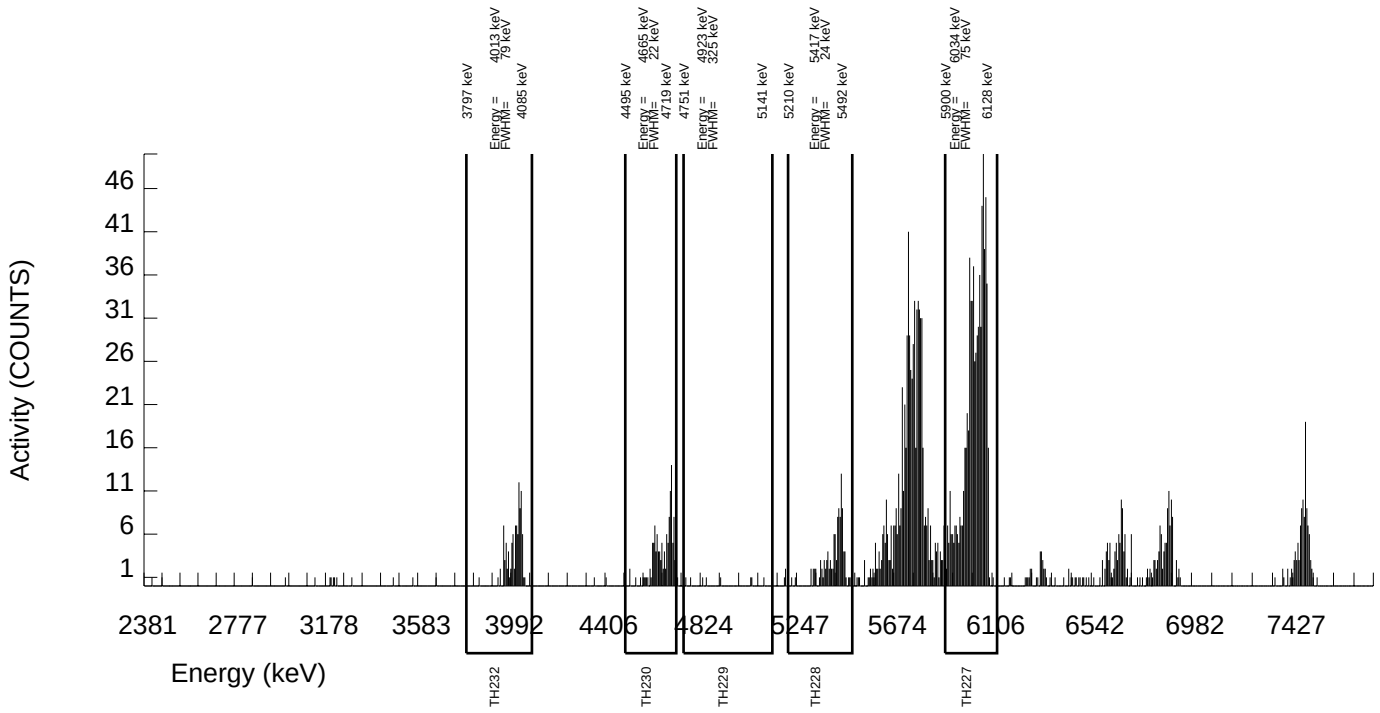
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528006_TH SAMPLE QTY: 0.103 G
DETECTOR NUMBER :78795 AVERAGE %EFFICIENCY :31.5901 % YIELD : 93.846	COUNT DATE:24-JUL-2009 07:26:28 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.078E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.078E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.68312 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B069.CNF;1035 BKG DATE : 19-JUL-2009 EFF FILE : W069.CNF;273 CAL DATE : 9-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	729.000	729.000	0.000	0.0000	68.10000	1.72E+01	1.88E+00	7.06E-02	0.00E+00	1.25E+00
TH-228	5363.000	112.000	109.000	3.000	1.7321	99.94000	1.61E+00	3.38E-01	1.64E-01	5.96E-02	3.11E-01
TH229	4900.000	8.000	4.000	4.000	2.0000	99.52000	5.93E-02	1.01E-01	1.82E-01	6.90E-02	1.01E-01
TH-230	4625.000	123.000	121.000	2.000	1.4142	100.0000	1.78E+00	3.55E-01	1.41E-01	4.85E-02	3.23E-01
TH-232	3972.000	101.000	99.000	2.000	1.4142	100.0000	1.46E+00	3.17E-01	1.41E-01	4.85E-02	2.93E-01



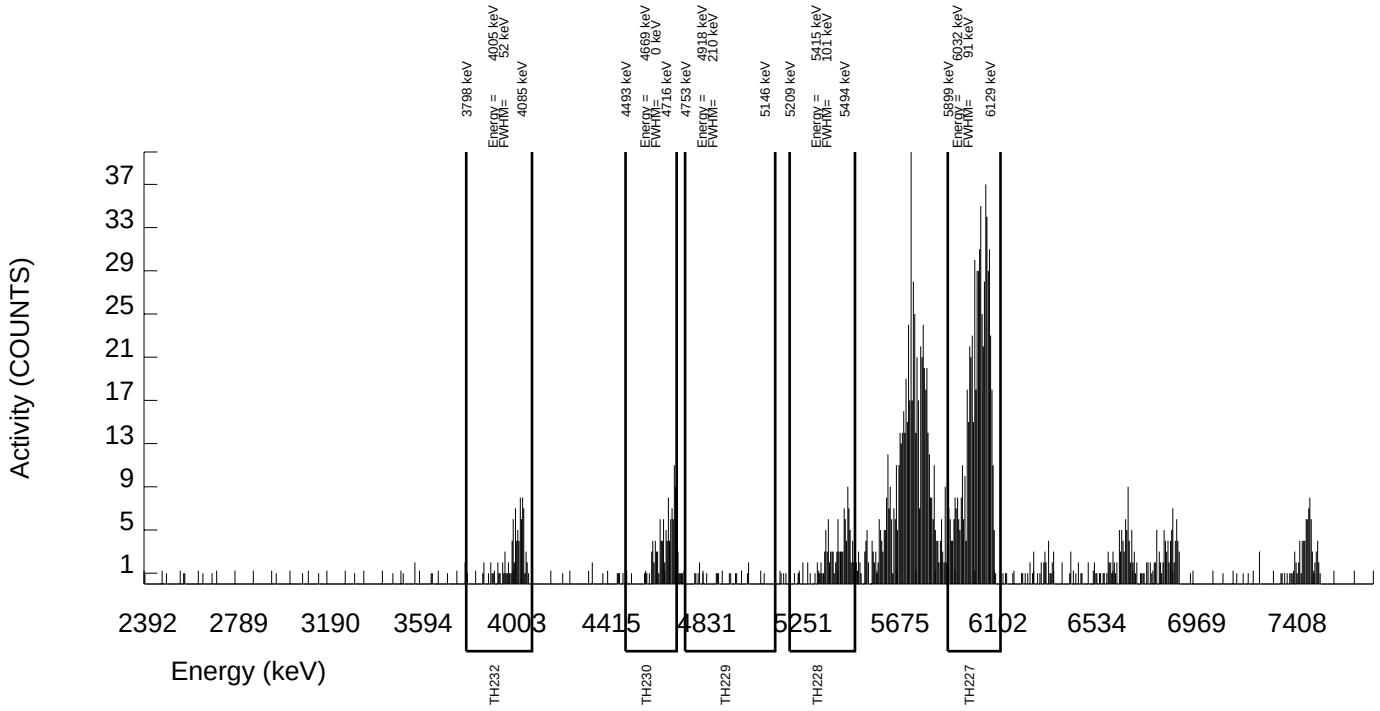
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528007_TH SAMPLE QTY: 0.102 G
DETECTOR NUMBER :46-089B2 AVERAGE %EFFICIENCY :35.2079 % YIELD : 75.771	COUNT DATE:24-JUL-2009 07:26:28 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.098E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.098E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 2.97374 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B070.CNF;1045 BKG DATE : 19-JUL-2009 EFF FILE : W070.CNF;278 CAL DATE : 9-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	658.000	656.000	2.000	1.4142	68.10000	1.73E+01	1.95E+00	2.53E-01	8.69E-02	1.33E+00
TH-228	5363.000	116.000	94.000	22.000	4.6904	99.94000	1.56E+00	4.03E-01	4.12E-01	1.81E-01	3.82E-01
TH229	4900.000	18.000	1.000	17.000	4.1231	99.52000	1.66E-02	1.93E-01	3.69E-01	1.60E-01	1.93E-01
TH-230	4625.000	108.000	103.000	5.000	2.2361	100.0000	1.71E+00	3.72E-01	2.22E-01	8.61E-02	3.45E-01
TH-232	3972.000	95.000	93.000	2.000	1.4142	100.0000	1.54E+00	3.44E-01	1.59E-01	5.45E-02	3.20E-01



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

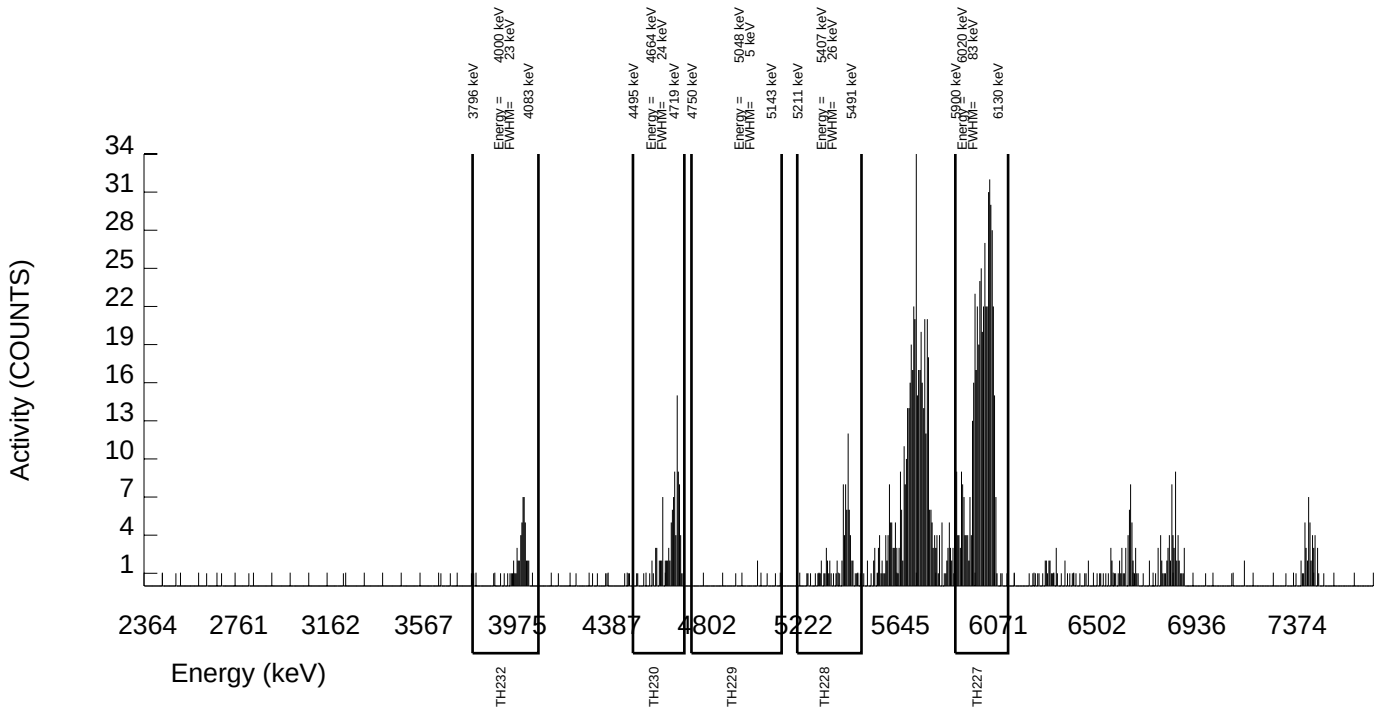
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528008_TH SAMPLE QTY: 0.101 G
DETECTOR NUMBER :68616 AVERAGE %EFFICIENCY :25.3097 % YIELD : 82.848	COUNT DATE:24-JUL-2009 13:16:54 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.119E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.119E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.25151 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B186.CNF;91 BKG DATE : 19-JUL-2009 EFF FILE : W186.CNF;36 CAL DATE : 22-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	513.000	511.000	2.000	1.4142	68.10000	1.75E+01	2.10E+00	3.28E-01	1.13E-01	1.52E+00
TH-228	5363.000	83.000	79.000	4.000	2.0000	99.94000	1.69E+00	4.14E-01	2.63E-01	9.93E-02	3.90E-01
TH229	4900.000	5.000	5.000	0.000	0.0000	99.52000	1.07E-01	9.41E-02	6.41E-02	0.00E+00	9.37E-02
TH-230	4625.000	106.000	105.000	1.000	1.0000	100.0000	2.23E+00	4.69E-01	1.63E-01	4.95E-02	4.31E-01
TH-232	3972.000	54.000	53.000	1.000	1.0000	100.0000	1.13E+00	3.23E-01	1.63E-01	4.95E-02	3.09E-01



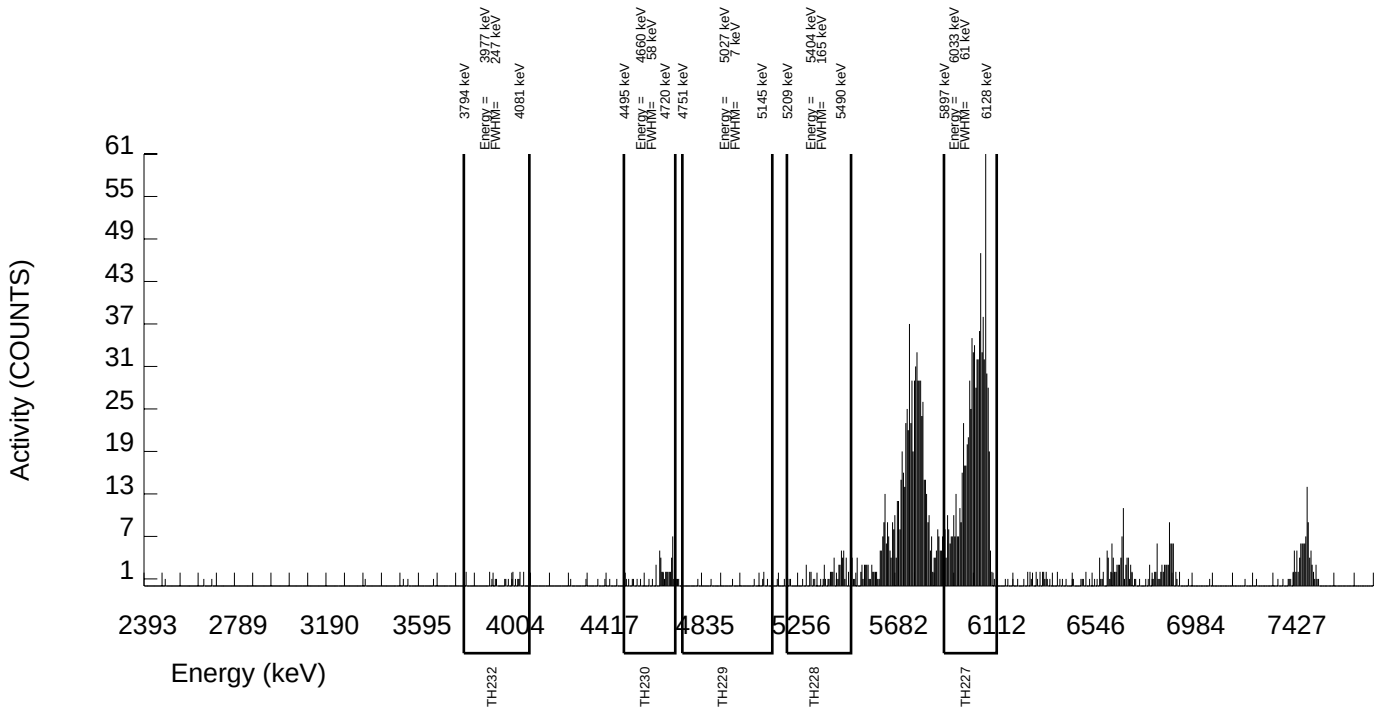
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528009_TH SAMPLE QTY: 0.111 G
DETECTOR NUMBER :79188 AVERAGE %EFFICIENCY :36.7711 % YIELD : 90.337	COUNT DATE:24-JUL-2009 07:18:27 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.928E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.928E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.54540 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B209.CNF;18 BKG DATE : 19-JUL-2009 EFF FILE : W209.CNF;8 CAL DATE : 30-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	817.000	817.000	0.000	0.0000	68.10000	1.59E+01	1.66E+00	5.85E-02	0.00E+00	1.09E+00
TH-228	5363.000	60.000	60.000	0.000	0.0000	99.94000	7.35E-01	1.95E-01	3.68E-02	0.00E+00	1.86E-01
TH229	4900.000	8.000	6.000	2.000	1.4142	99.52000	7.37E-02	7.63E-02	1.18E-01	4.04E-02	7.61E-02
TH-230	4625.000	48.000	48.000	0.000	0.0000	100.0000	5.86E-01	1.72E-01	3.66E-02	0.00E+00	1.66E-01
TH-232	3972.000	20.000	17.000	3.000	1.7321	100.0000	2.08E-01	1.16E-01	1.35E-01	4.92E-02	1.15E-01



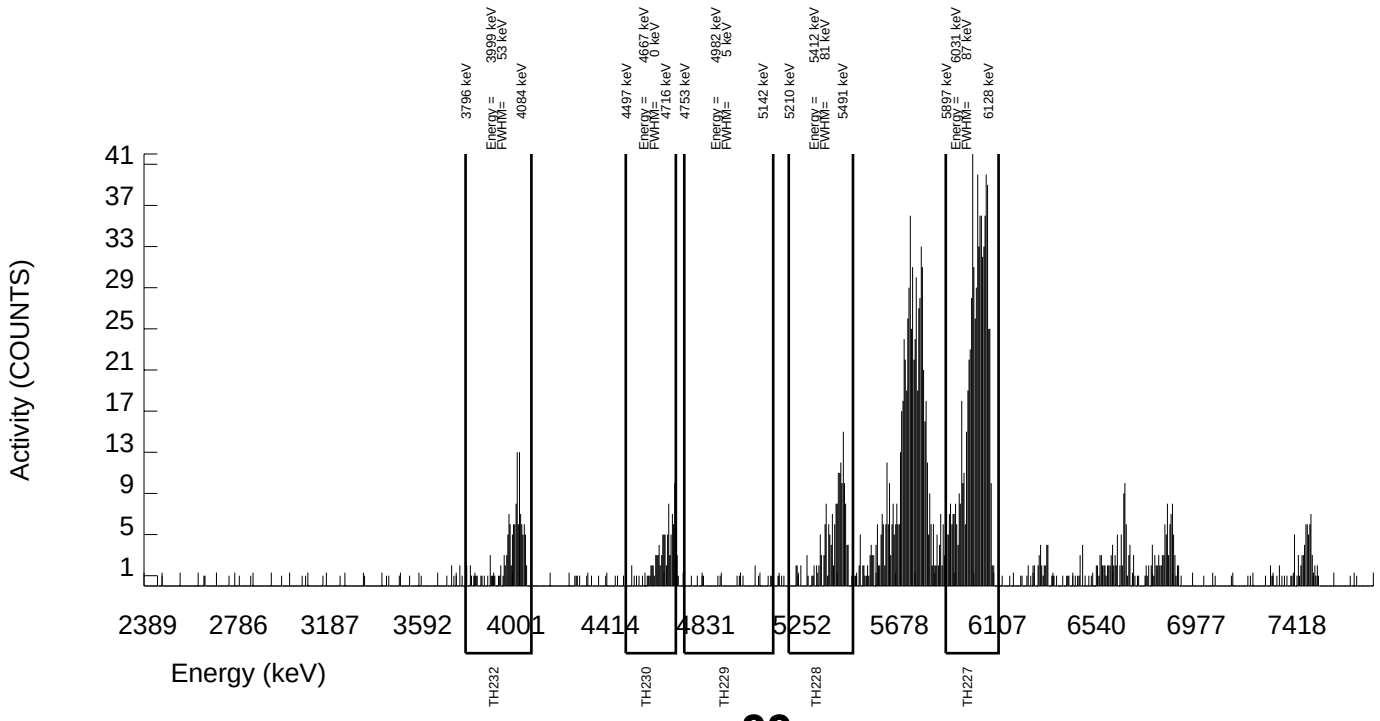
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528010_TH SAMPLE QTY: 0.109 G
DETECTOR NUMBER :79189 AVERAGE %EFFICIENCY :39.3895 % YIELD : 78.654	COUNT DATE:24-JUL-2009 07:18:29 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.964E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.964E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.08691 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B210.CNF;17 BKG DATE : 19-JUL-2009 EFF FILE : W210.CNF;8 CAL DATE : 30-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	763.000	762.000	1.000	1.0000	68.10000	1.62E+01	1.72E+00	1.63E-01	4.95E-02	1.15E+00
TH-228	5363.000	177.000	177.000	0.000	0.0000	99.94000	2.37E+00	3.96E-01	4.01E-02	0.00E+00	3.49E-01
TH229	4900.000	15.000	15.000	0.000	0.0000	99.52000	2.01E-01	1.03E-01	4.02E-02	0.00E+00	1.02E-01
TH-230	4625.000	95.000	95.000	0.000	0.0000	100.0000	1.27E+00	2.74E-01	4.00E-02	0.00E+00	2.55E-01
TH-232	3972.000	141.000	141.000	0.000	0.0000	100.0000	1.88E+00	3.44E-01	4.00E-02	0.00E+00	3.10E-01



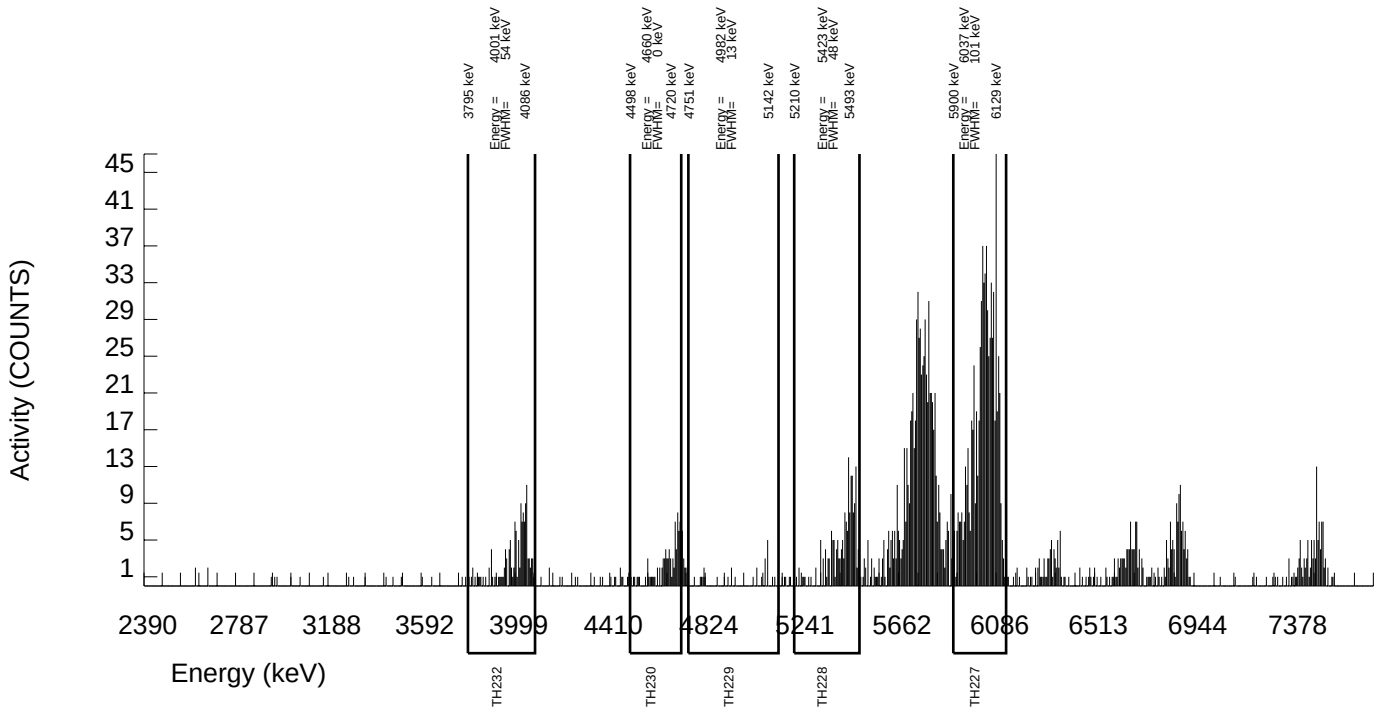
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528011_TH SAMPLE QTY: 0.113 G
DETECTOR NUMBER :45-149BB5 AVERAGE %EFFICIENCY :36.0936 % YIELD : 84.164	COUNT DATE:24-JUL-2009 07:26:27 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.894E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.894E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.30316 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B037.CNF;1050 BKG DATE : 19-JUL-2009 EFF FILE : W037.CNF;292 CAL DATE : 6-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	749.000	747.000	2.000	1.4142	68.10000	1.56E+01	1.66E+00	2.01E-01	6.89E-02	1.12E+00
TH-228	5363.000	177.000	158.000	19.000	4.3589	99.94000	2.08E+00	3.96E-01	3.06E-01	1.33E-01	3.61E-01
TH229	4900.000	27.000	10.000	17.000	4.1231	99.52000	1.32E-01	1.72E-01	2.93E-01	1.26E-01	1.71E-01
TH-230	4625.000	84.000	77.000	7.000	2.6458	100.0000	1.01E+00	2.58E-01	2.01E-01	8.08E-02	2.45E-01
TH-232	3972.000	135.000	130.000	5.000	2.2361	100.0000	1.71E+00	3.32E-01	1.76E-01	6.83E-02	3.04E-01



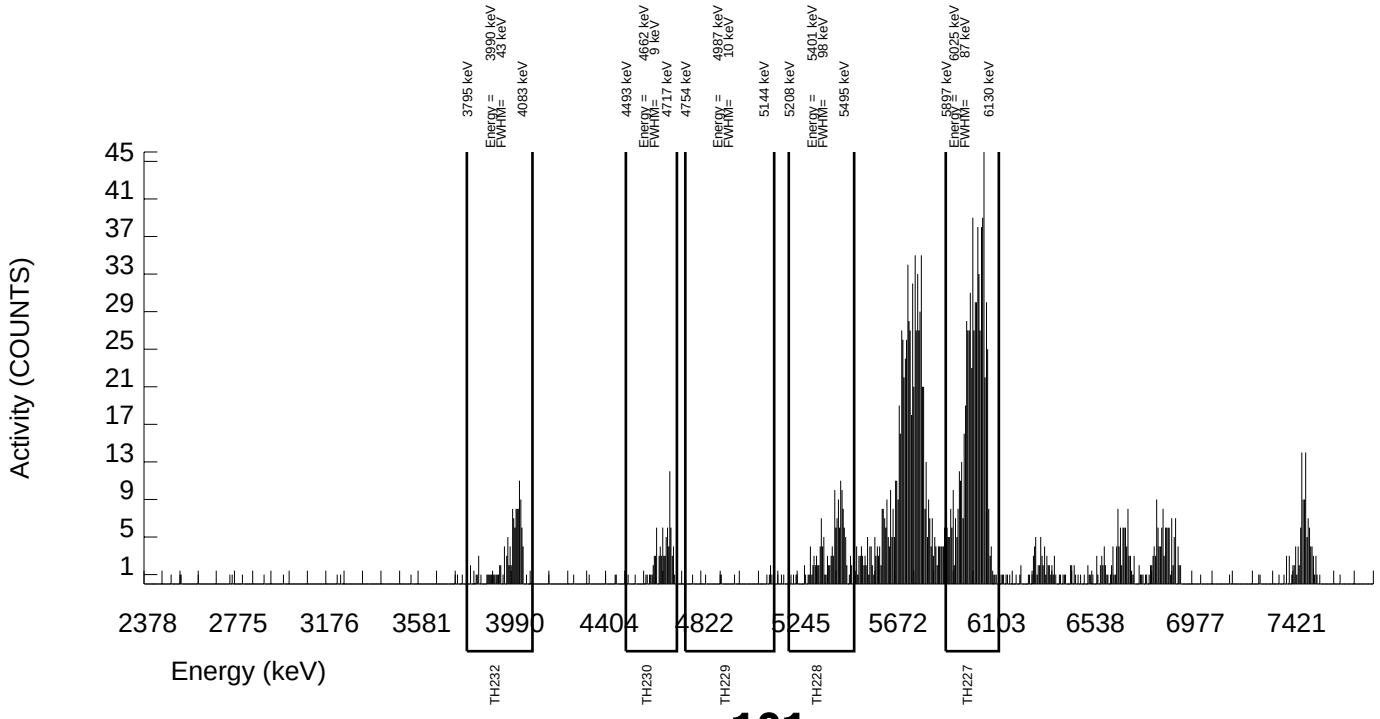
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528012_TH SAMPLE QTY: 0.106 G
DETECTOR NUMBER :72532 AVERAGE %EFFICIENCY :34.4017 % YIELD : 85.939	COUNT DATE:24-JUL-2009 07:26:27 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.019E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.019E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.37281 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B038.CNF;1047 BKG DATE : 19-JUL-2009 EFF FILE : W038.CNF;306 CAL DATE : 8-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	727.000	727.000	0.000	0.0000	68.10000	1.67E+01	1.81E+00	6.88E-02	0.00E+00	1.21E+00
TH-228	5363.000	153.000	146.000	7.000	2.6458	99.94000	2.10E+00	3.95E-01	2.21E-01	8.87E-02	3.57E-01
TH229	4900.000	11.000	0.000	11.000	3.3166	99.52000	0.00E+00	1.33E-01	2.66E-01	1.11E-01	1.33E-01
TH-230	4625.000	84.000	79.000	5.000	2.2361	100.0000	1.14E+00	2.81E-01	1.93E-01	7.48E-02	2.66E-01
TH-232	3972.000	121.000	120.000	1.000	1.0000	100.0000	1.72E+00	3.41E-01	1.10E-01	3.34E-02	3.11E-01



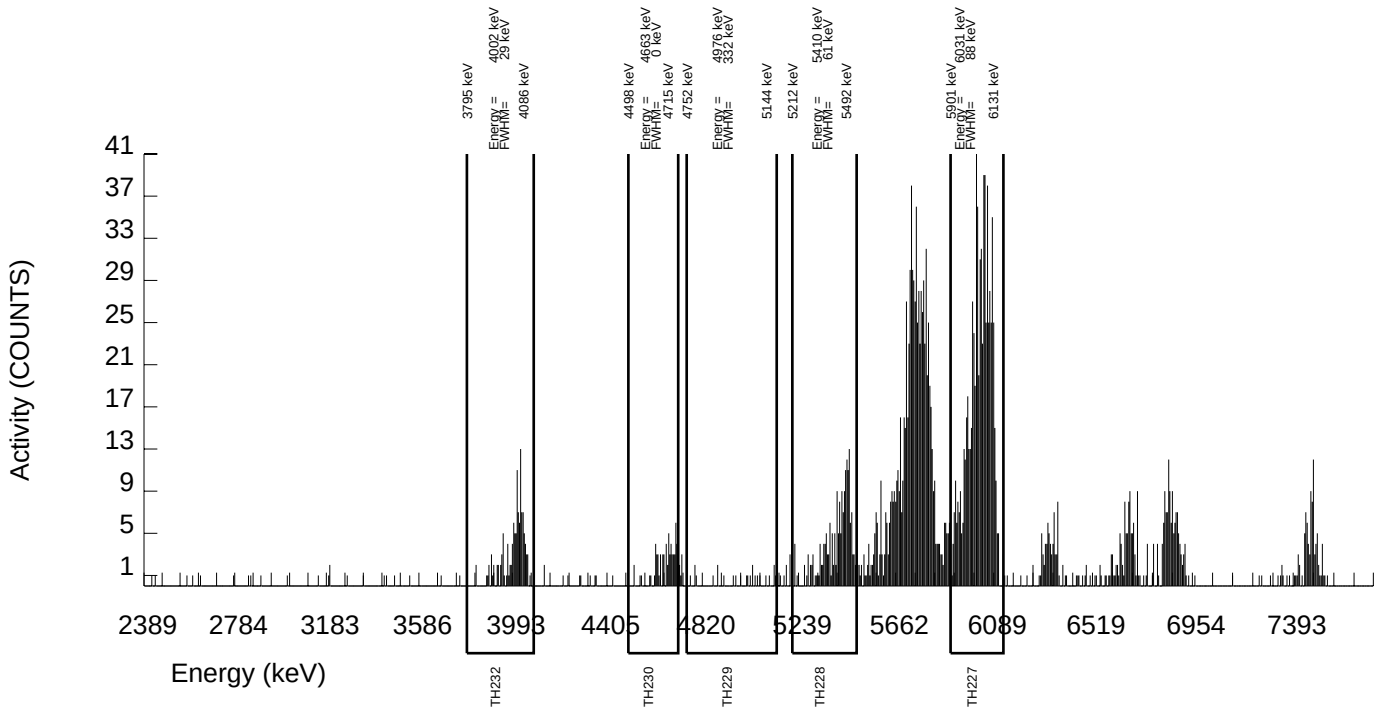
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528013_TH SAMPLE QTY: 0.103 G
DETECTOR NUMBER :45-149BB2 AVERAGE %EFFICIENCY :36.3356 % YIELD : 82.485	COUNT DATE:24-JUL-2009 07:26:27 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.078E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.078E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.23723 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B039.CNF;1047 BKG DATE : 19-JUL-2009 EFF FILE : W039.CNF;283 CAL DATE : 6-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	739.000	737.000	2.000	1.4142	68.10000	1.72E+01	1.87E+00	2.23E-01	7.66E-02	1.24E+00
TH-228	5363.000	191.000	169.000	22.000	4.6904	99.94000	2.47E+00	4.65E-01	3.63E-01	1.60E-01	4.19E-01
TH229	4900.000	25.000	17.000	8.000	2.8284	99.52000	2.49E-01	1.66E-01	2.37E-01	9.65E-02	1.65E-01
TH-230	4625.000	64.000	55.000	9.000	3.0000	100.0000	8.03E-01	2.53E-01	2.47E-01	1.02E-01	2.44E-01
TH-232	3972.000	125.000	120.000	5.000	2.2361	100.0000	1.75E+00	3.56E-01	1.96E-01	7.59E-02	3.26E-01



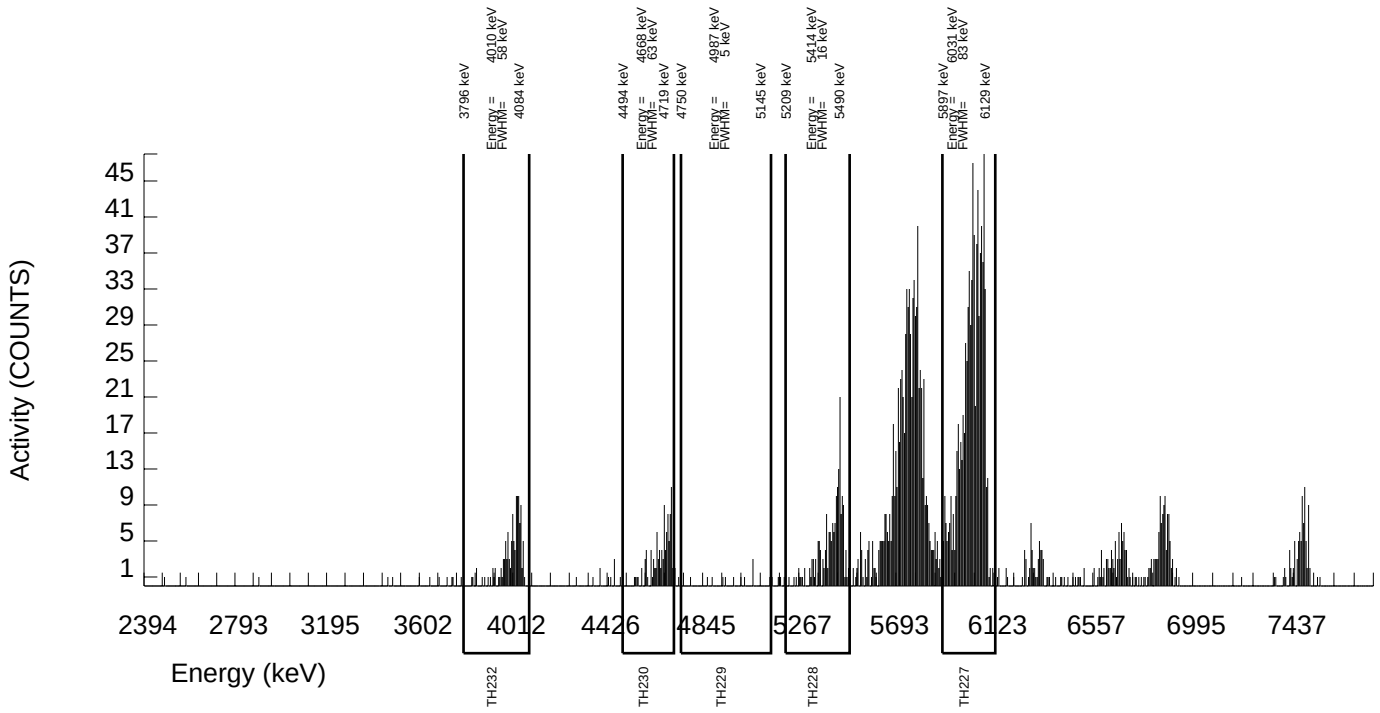
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528014_TH SAMPLE QTY: 0.105 G
DETECTOR NUMBER :79190 AVERAGE %EFFICIENCY :37.9778 % YIELD : 87.359	COUNT DATE:24-JUL-2009 07:18:32 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.038E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.038E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.42855 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B211.CNF;17 BKG DATE : 19-JUL-2009 EFF FILE : W211.CNF;8 CAL DATE : 30-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	816.000	816.000	0.000	0.0000	68.10000	1.68E+01	1.78E+00	6.19E-02	0.00E+00	1.16E+00
TH-228	5363.000	184.000	183.000	1.000	1.0000	99.94000	2.37E+00	3.95E-01	9.92E-02	3.02E-02	3.46E-01
TH229	4900.000	12.000	11.000	1.000	1.0000	99.52000	1.43E-01	9.25E-02	9.94E-02	3.02E-02	9.18E-02
TH-230	4625.000	101.000	101.000	0.000	0.0000	100.0000	1.31E+00	2.76E-01	3.88E-02	0.00E+00	2.55E-01
TH-232	3972.000	119.000	119.000	0.000	0.0000	100.0000	1.54E+00	3.03E-01	3.88E-02	0.00E+00	2.76E-01



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

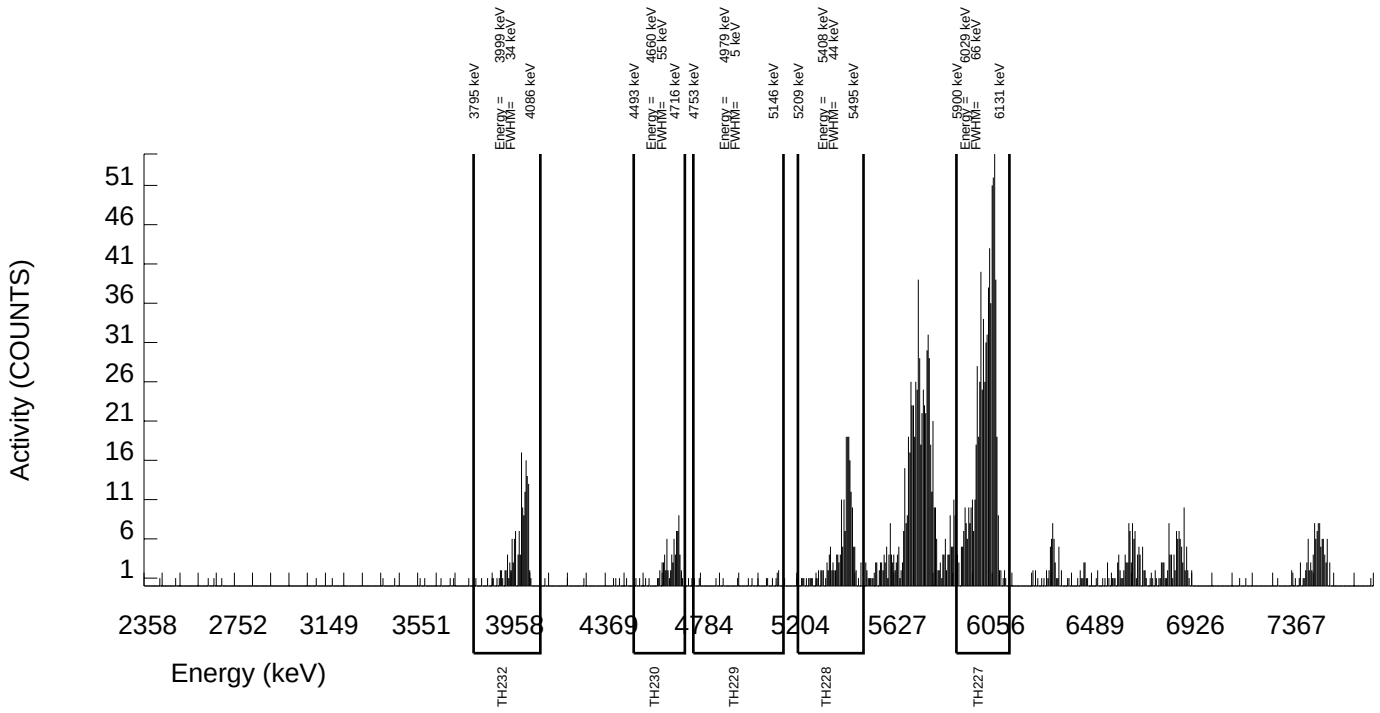
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528015_TH SAMPLE QTY: 0.114 G
DETECTOR NUMBER :78773 AVERAGE %EFFICIENCY :32.3636 % YIELD : 93.613	COUNT DATE:24-JUL-2009 07:26:27 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.877E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.877E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.67399 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B040.CNF;1050 BKG DATE : 19-JUL-2009 EFF FILE : W040.CNF;302 CAL DATE : 6-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	745.000	745.000	0.000	0.0000	68.10000	1.55E+01	1.64E+00	6.24E-02	0.00E+00	1.11E+00
TH-228	5363.000	203.000	203.000	0.000	0.0000	99.94000	2.66E+00	4.19E-01	3.92E-02	0.00E+00	3.65E-01
TH229	4900.000	15.000	13.000	2.000	1.4142	99.52000	1.70E-01	1.07E-01	1.26E-01	4.31E-02	1.06E-01
TH-230	4625.000	78.000	77.000	1.000	1.0000	100.0000	1.00E+00	2.40E-01	9.98E-02	3.03E-02	2.27E-01
TH-232	3972.000	157.000	156.000	1.000	1.0000	100.0000	2.03E+00	3.58E-01	9.98E-02	3.03E-02	3.21E-01



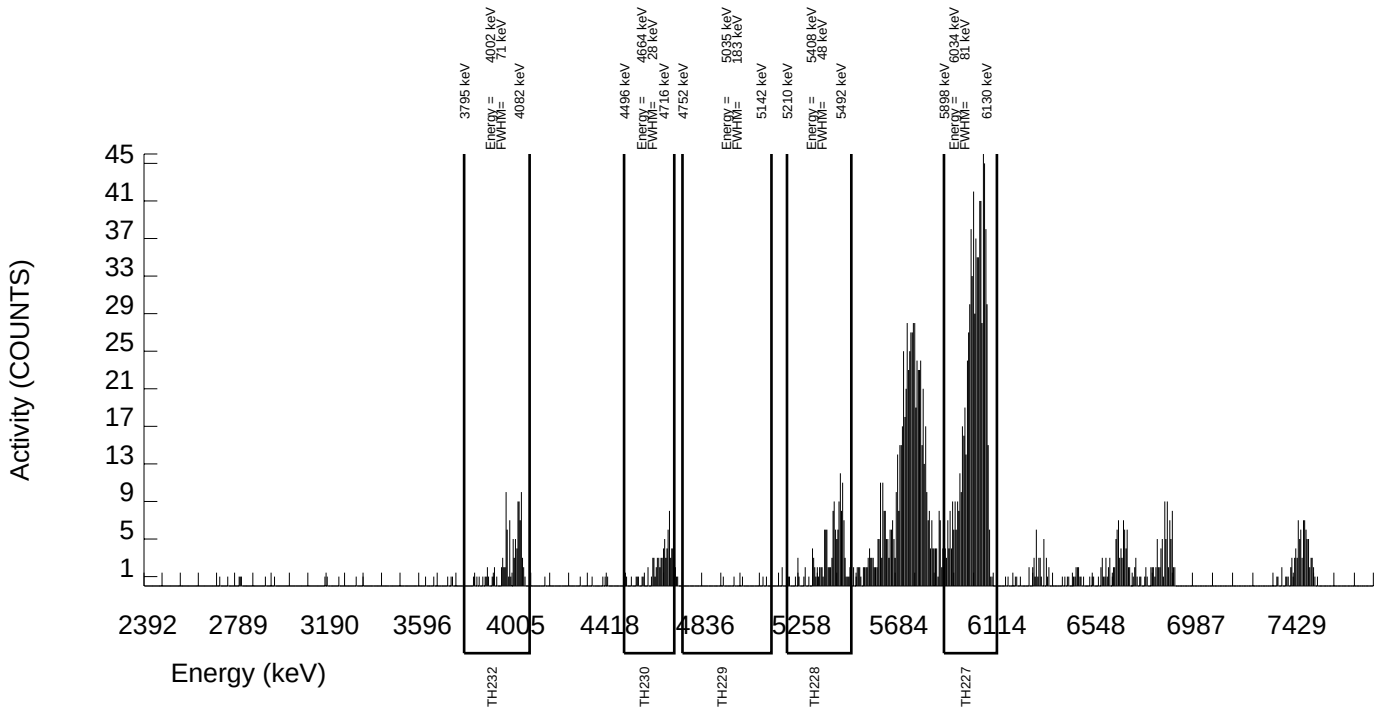
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528016_TH SAMPLE QTY: 0.110 G
DETECTOR NUMBER :79191 AVERAGE %EFFICIENCY :38.3493 % YIELD : 84.075	COUNT DATE:24-JUL-2009 07:18:35 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.946E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.946E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.29964 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B212.CNF;17 BKG DATE : 19-JUL-2009 EFF FILE : W212.CNF;8 CAL DATE : 30-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	793.000	793.000	0.000	0.0000	68.10000	1.61E+01	1.69E+00	6.08E-02	0.00E+00	1.12E+00
TH-228	5363.000	148.000	148.000	0.000	0.0000	99.94000	1.89E+00	3.38E-01	3.82E-02	0.00E+00	3.04E-01
TH229	4900.000	5.000	5.000	0.000	0.0000	99.52000	6.38E-02	5.62E-02	3.83E-02	0.00E+00	5.59E-02
TH-230	4625.000	74.000	74.000	0.000	0.0000	100.0000	9.40E-01	2.27E-01	3.81E-02	0.00E+00	2.14E-01
TH-232	3972.000	107.000	107.000	0.000	0.0000	100.0000	1.36E+00	2.79E-01	3.81E-02	0.00E+00	2.58E-01



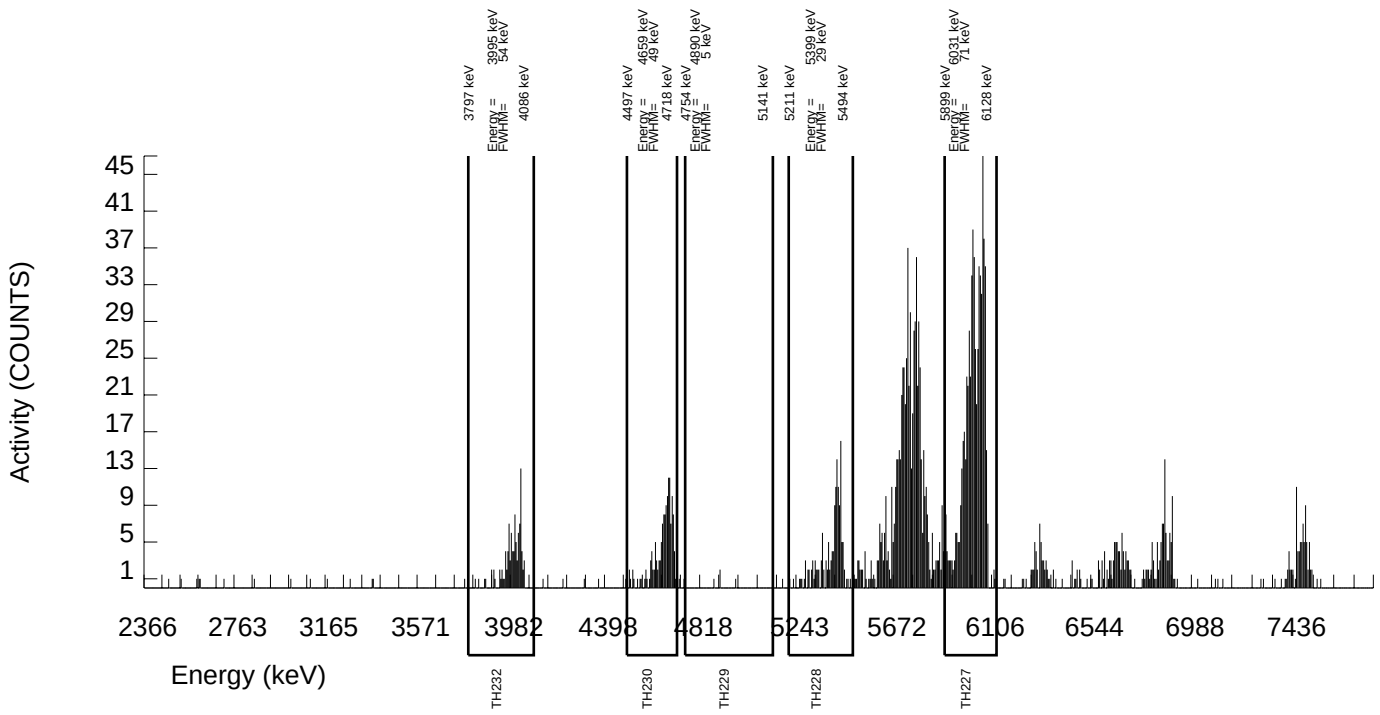
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528017_TH SAMPLE QTY: 0.102 G
DETECTOR NUMBER :78205 AVERAGE %EFFICIENCY :32.7176 % YIELD : 81.289	COUNT DATE:24-JUL-2009 07:26:27 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.098E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.098E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.19032 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B041.CNF;1043 BKG DATE : 19-JUL-2009 EFF FILE : W041.CNF;306 CAL DATE : 6-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	654.000	654.000	0.000	0.0000	68.10000	1.73E+01	1.95E+00	7.95E-02	0.00E+00	1.33E+00
TH-228	5363.000	149.000	146.000	3.000	1.7321	99.94000	2.43E+00	4.49E-01	1.84E-01	6.71E-02	4.02E-01
TH229	4900.000	5.000	0.000	5.000	2.2361	99.52000	0.00E+00	1.03E-01	2.24E-01	8.68E-02	1.03E-01
TH-230	4625.000	143.000	140.000	3.000	1.7321	100.0000	2.32E+00	4.37E-01	1.84E-01	6.69E-02	3.93E-01
TH-232	3972.000	101.000	98.000	3.000	1.7321	100.0000	1.63E+00	3.58E-01	1.84E-01	6.69E-02	3.32E-01



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

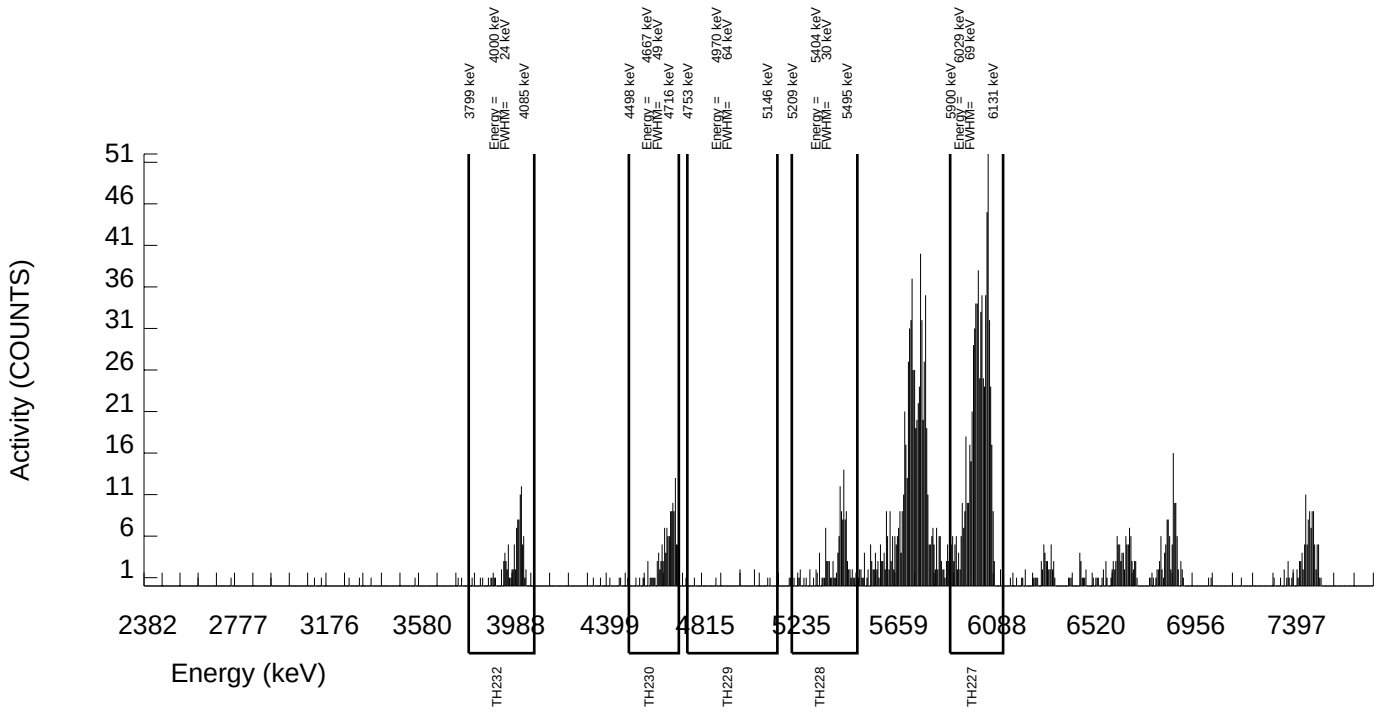
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528018_TH SAMPLE QTY: 0.110 G
DETECTOR NUMBER :78793 AVERAGE %EFFICIENCY :33.1201 % YIELD : 84.231	COUNT DATE:24-JUL-2009 07:26:27 ELAPSED LIVE TIME(SEC): 59999.99 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.946E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.946E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.30576 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B042.CNF;1042 BKG DATE : 19-JUL-2009 EFF FILE : W042.CNF;279 CAL DATE : 6-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	689.000	686.000	3.000	1.7321	68.10000	1.61E+01	1.75E+00	2.59E-01	9.44E-02	1.21E+00
TH-228	5363.000	127.000	125.000	2.000	1.4142	99.94000	1.84E+00	3.58E-01	1.41E-01	4.84E-02	3.28E-01
TH229	4900.000	9.000	6.000	3.000	1.7321	99.52000	8.85E-02	1.00E-01	1.63E-01	5.94E-02	1.00E-01
TH-230	4625.000	125.000	122.000	3.000	1.7321	100.0000	1.79E+00	3.55E-01	1.62E-01	5.91E-02	3.26E-01
TH-232	3972.000	101.000	100.000	1.000	1.0000	100.0000	1.47E+00	3.13E-01	1.12E-01	3.41E-02	2.91E-01



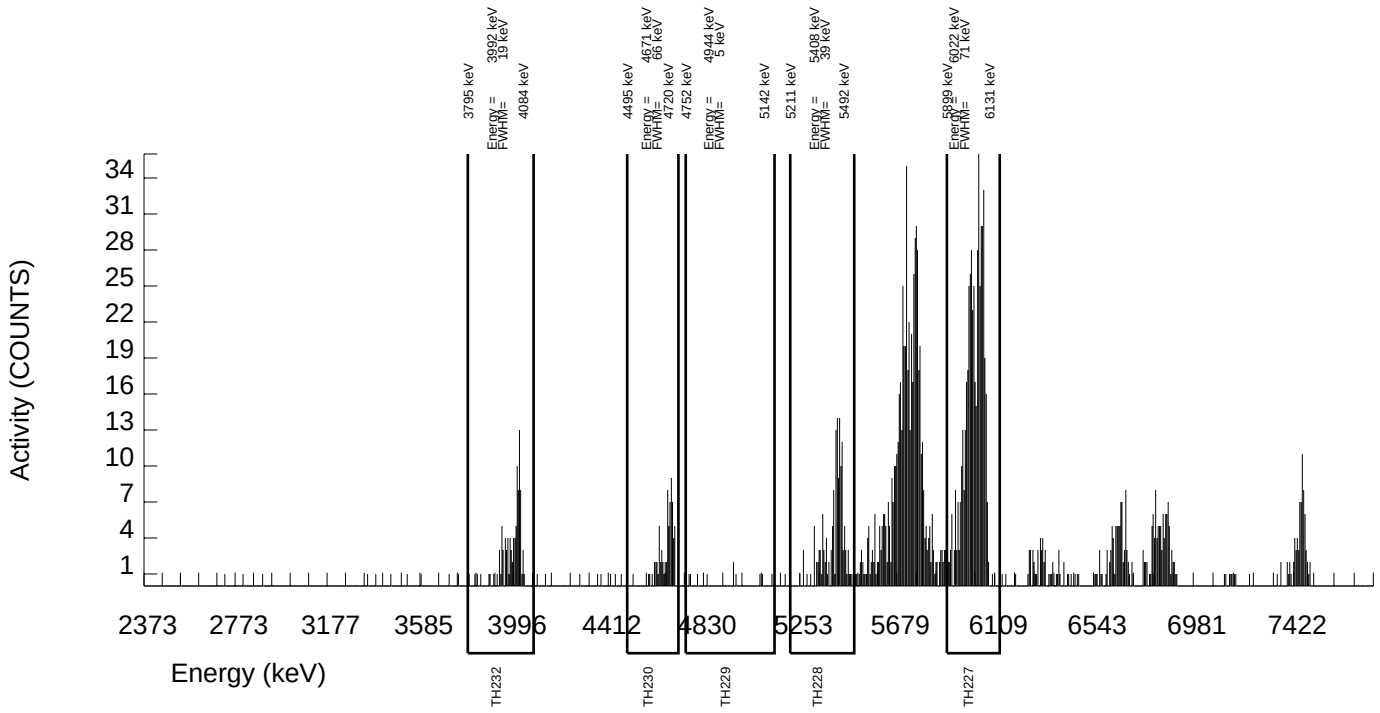
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528019_TH SAMPLE QTY: 0.103 G
DETECTOR NUMBER :68620 AVERAGE %EFFICIENCY :25.0189 % YIELD : 84.468	COUNT DATE:24-JUL-2009 13:16:56 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.078E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.078E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92464 dpm RESULTS : 3.31506 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B187.CNF;91 BKG DATE : 19-JUL-2009 EFF FILE : W187.CNF;35 CAL DATE : 22-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	517.000	515.000	2.000	1.4142	68.10000	1.72E+01	2.07E+00	3.19E-01	1.10E-01	1.49E+00
TH-228	5363.000	147.000	137.000	10.000	3.1623	99.94000	2.84E+00	5.63E-01	3.68E-01	1.53E-01	5.10E-01
TH229	4900.000	10.000	3.000	7.000	2.6458	99.52000	6.24E-02	1.68E-01	3.18E-01	1.28E-01	1.68E-01
TH-230	4625.000	73.000	68.000	5.000	2.2361	100.0000	1.41E+00	3.77E-01	2.77E-01	1.08E-01	3.58E-01
TH-232	3972.000	98.000	96.000	2.000	1.4142	100.0000	1.99E+00	4.39E-01	1.98E-01	6.81E-02	4.06E-01



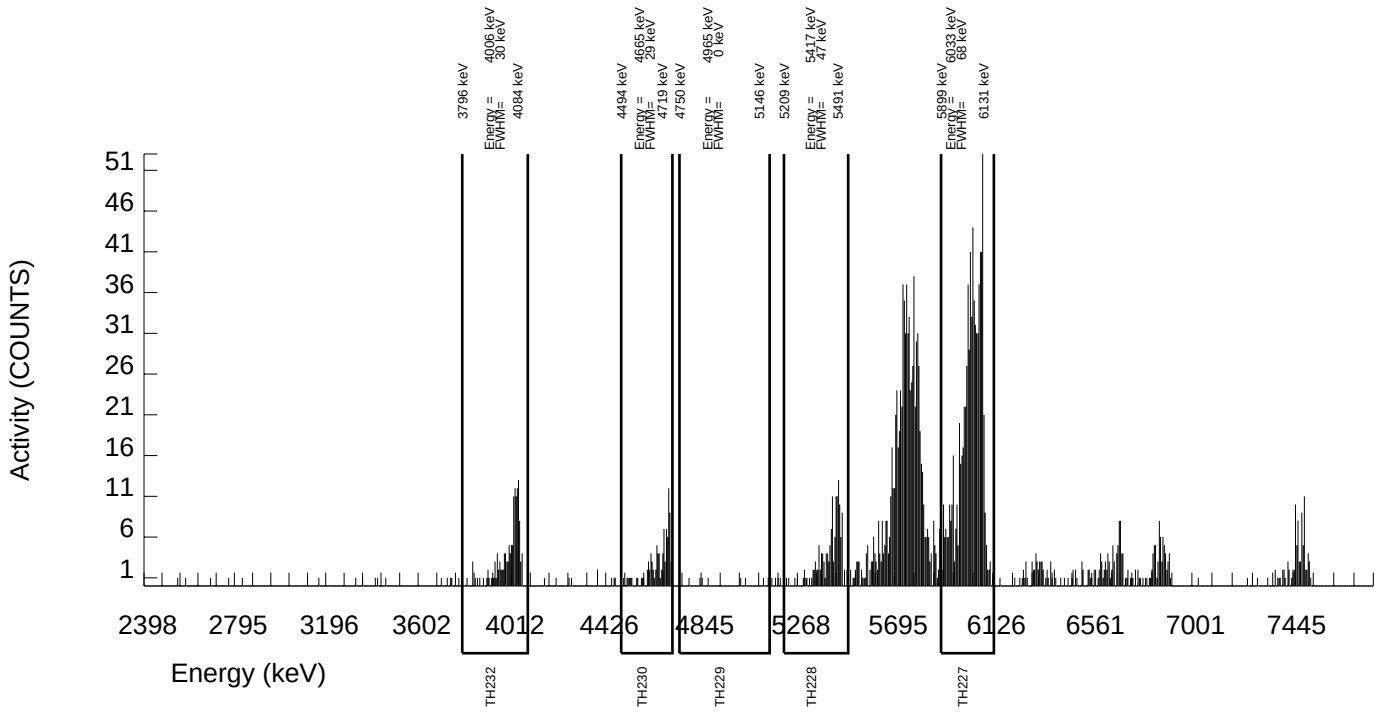
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S0232528020_TH SAMPLE QTY: 0.101 G
DETECTOR NUMBER :79194 AVERAGE %EFFICIENCY :38.5024 % YIELD : 82.790	COUNT DATE:24-JUL-2009 07:18:38 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.119E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.119E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.24923 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B215.CNF;17 BKG DATE : 19-JUL-2009 EFF FILE : W215.CNF;8 CAL DATE : 30-JUN-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	784.000	784.000	0.000	0.0000	68.10000	1.75E+01	1.89E+00	6.70E-02	0.00E+00	1.23E+00
TH-228	5363.000	148.000	148.000	0.000	0.0000	99.94000	2.08E+00	3.76E-01	4.21E-02	0.00E+00	3.35E-01
TH229	4900.000	8.000	7.000	1.000	1.0000	99.52000	9.84E-02	8.31E-02	1.08E-01	3.27E-02	8.27E-02
TH-230	4625.000	97.000	95.000	2.000	1.4142	100.0000	1.33E+00	2.94E-01	1.34E-01	4.60E-02	2.73E-01
TH-232	3972.000	141.000	141.000	0.000	0.0000	100.0000	1.97E+00	3.64E-01	4.20E-02	0.00E+00	3.26E-01



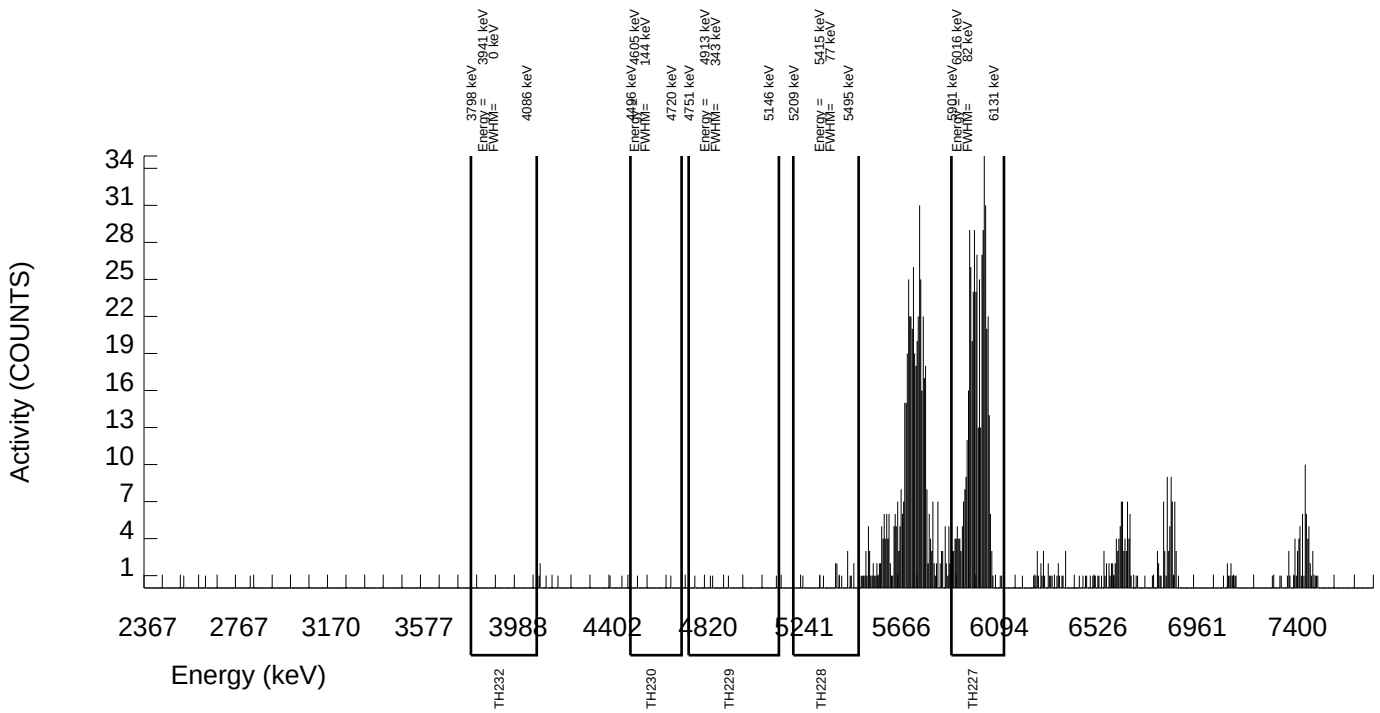
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S1201885296_TH SAMPLE QTY: 0.127 G
DETECTOR NUMBER :68621 AVERAGE %EFFICIENCY :26.0109 % YIELD : 80.931	COUNT DATE:24-JUL-2009 13:16:58 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.685E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.685E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92464 dpm RESULTS : 3.17625 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B188.CNF;91 BKG DATE : 19-JUL-2009 EFF FILE : W188.CNF;36 CAL DATE : 22-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	514.000	513.000	1.000	1.0000	68.10000	1.39E+01	1.58E+00	2.08E-01	6.31E-02	1.21E+00
TH-228	5363.000	16.000	7.000	9.000	3.0000	99.94000	1.18E-01	1.66E-01	2.87E-01	1.18E-01	1.66E-01
TH229	4900.000	5.000	1.000	4.000	2.0000	99.52000	1.69E-02	9.96E-02	2.08E-01	7.88E-02	9.95E-02
TH-230	4625.000	2.000	0.000	2.000	1.4142	100.0000	0.00E+00	6.61E-02	1.61E-01	5.54E-02	6.60E-02
TH-232	3972.000	0.000	-2.000	2.000	1.4142	100.0000	-3.37E-02	5.72E-02	1.61E-01	5.54E-02	5.72E-02



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

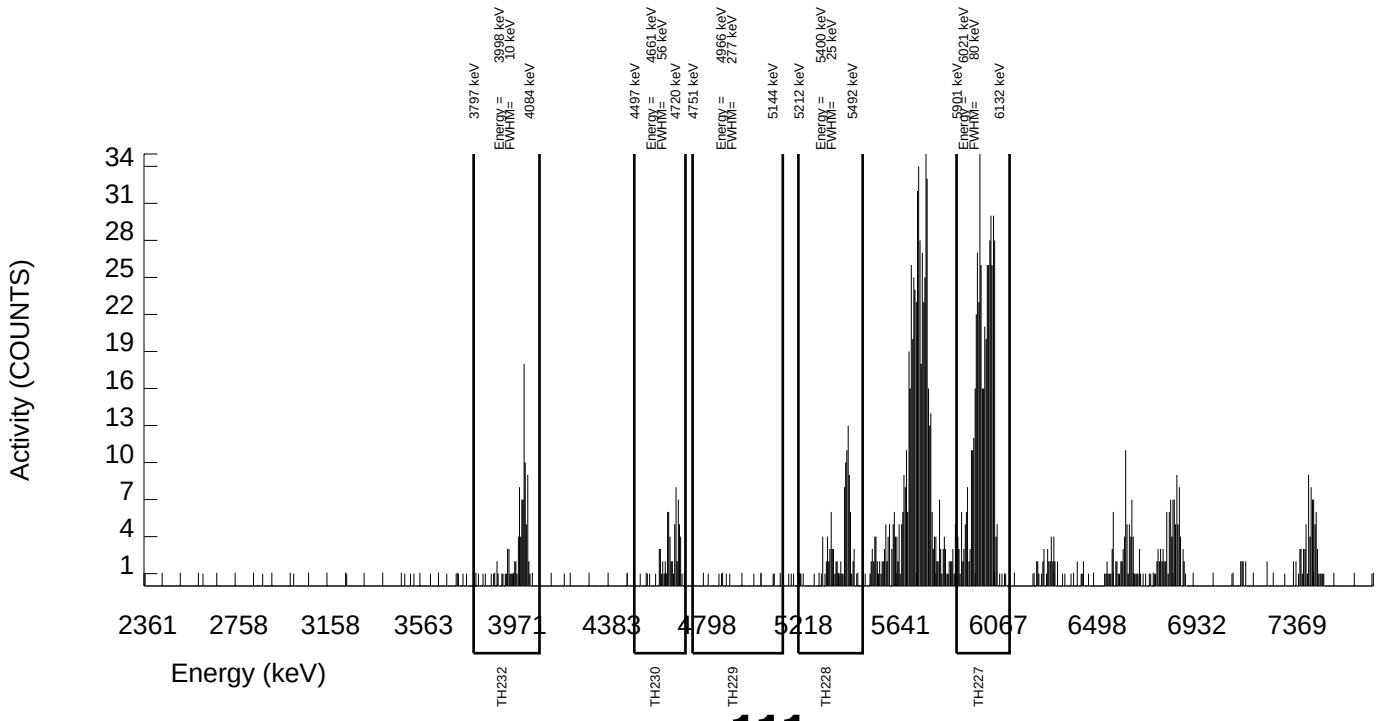
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S1201885297_TH SAMPLE QTY: 0.104 G
DETECTOR NUMBER :68622 AVERAGE %EFFICIENCY :25.9042 % YIELD : 80.789	COUNT DATE:24-JUL-2009 13:17:02 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.058E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.058E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92464 dpm RESULTS : 3.17069 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B189.CNF;91 BKG DATE : 19-JUL-2009 EFF FILE : W189.CNF;35 CAL DATE : 22-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	512.000	510.000	2.000	1.4142	68.10000	1.70E+01	2.05E+00	3.19E-01	1.10E-01	1.48E+00
TH-228	5363.000	108.000	101.000	7.000	2.6458	99.94000	2.10E+00	4.70E-01	3.18E-01	1.28E-01	4.36E-01
TH229	4900.000	9.000	7.000	2.000	1.4142	99.52000	1.46E-01	1.36E-01	1.99E-01	6.84E-02	1.35E-01
TH-230	4625.000	70.000	66.000	4.000	2.0000	100.0000	1.37E+00	3.67E-01	2.55E-01	9.63E-02	3.49E-01
TH-232	3972.000	102.000	102.000	0.000	0.0000	100.0000	2.11E+00	4.46E-01	6.21E-02	0.00E+00	4.10E-01



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

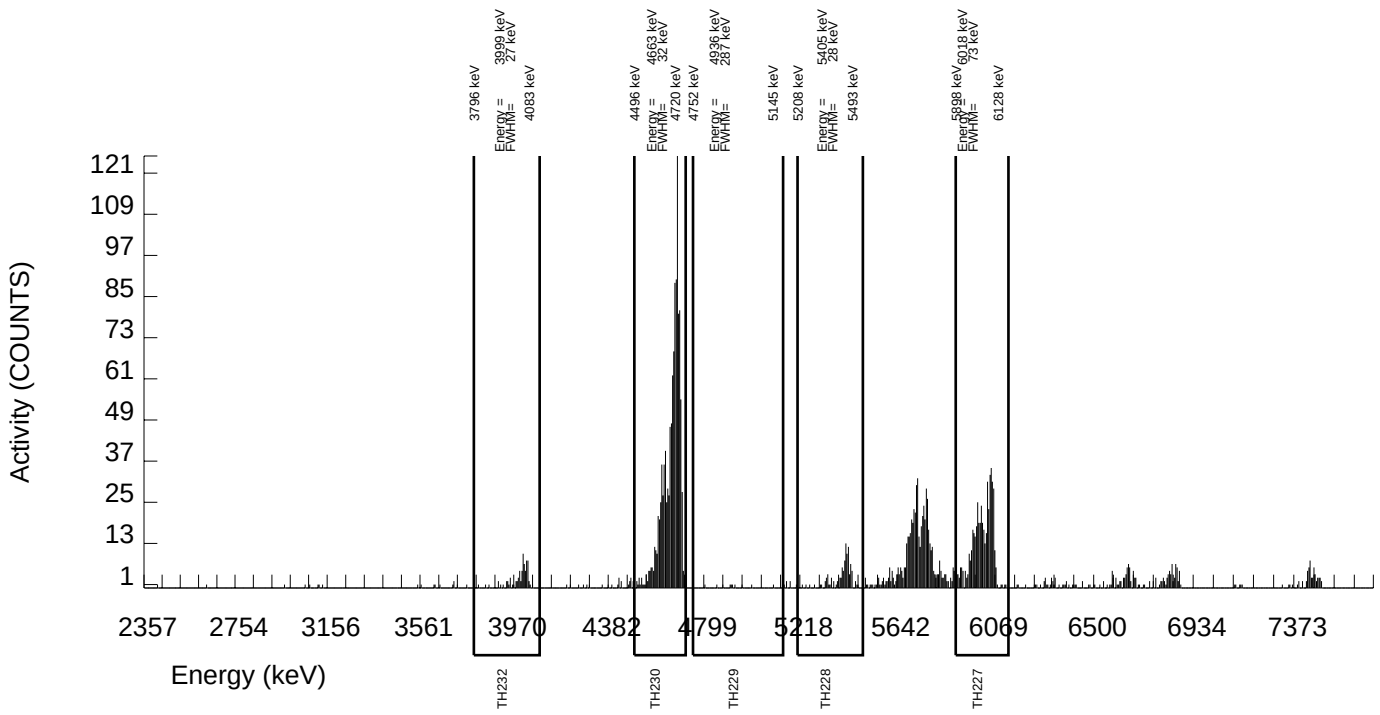
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S1201885298_TH SAMPLE QTY: 0.104 G
DETECTOR NUMBER :68623 AVERAGE %EFFICIENCY :26.0642 % YIELD : 77.932	COUNT DATE:24-JUL-2009 13:17:04 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.058E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 2.058E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92464 dpm RESULTS : 3.05855 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B190.CNF;91 BKG DATE : 19-JUL-2009 EFF FILE : W190.CNF;36 CAL DATE : 22-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	499.000	495.000	4.000	2.0000	68.10000	1.70E+01	2.05E+00	4.23E-01	1.60E-01	1.51E+00
TH-228	5363.000	106.000	94.000	12.000	3.4641	99.94000	2.01E+00	4.84E-01	4.09E-01	1.72E-01	4.55E-01
TH229	4900.000	10.000	-12.000	22.000	4.6904	99.52000	-2.57E-01	2.38E-01	5.32E-01	2.34E-01	2.38E-01
TH-230	4625.000	1149.000	1140.000	9.000	3.0000	100.0000	2.43E+01	2.44E+00	3.62E-01	1.49E-01	1.42E+00
TH-232	3972.000	78.000	77.000	1.000	1.0000	100.0000	1.64E+00	3.95E-01	1.63E-01	4.96E-02	3.71E-01



Alpha Spectroscopy Software Version 2.0
effective date: 09-Mar-1997

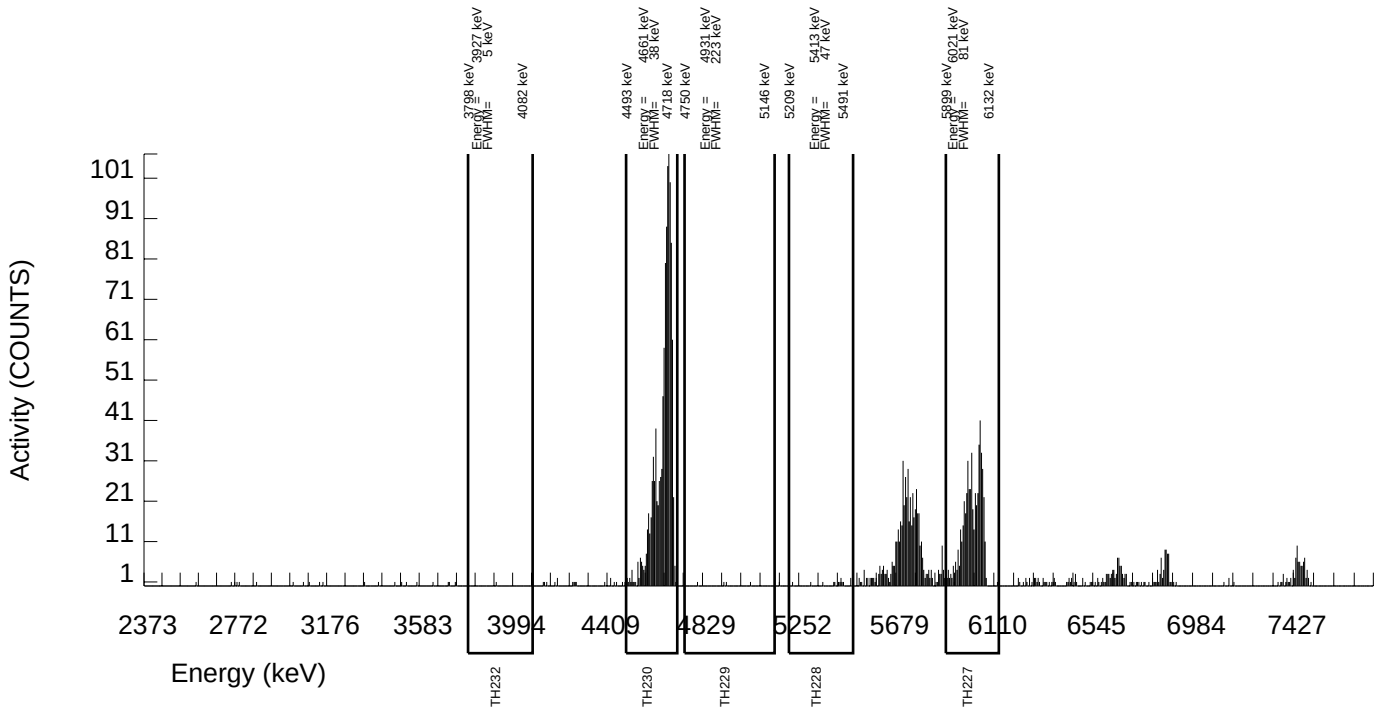
GEL Laboratories LLC
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER: 886907 SAMPLE DATE : 22-JUL-2009 09:45:00	SAMPLE ID : S1201885299_TH SAMPLE QTY: 0.127 G
DETECTOR NUMBER :68624 AVERAGE %EFFICIENCY :26.2116 % YIELD : 83.129	COUNT DATE:24-JUL-2009 13:17:06 ELAPSED LIVE TIME(SEC): 60000.00 ANALYST :HAKB

MS/MSD	LCS/LCSD	TRACER	
ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.685E+01	ID : A2796-J ISOTOPE : TH-230 PCI/G : 1.685E+01	ID : 0387-B-102 ISOTOPE : AC227 NOMINAL : 3.92465 dpm RESULTS : 3.26254 dpm	LIB FILE : ENV_ALPHA_TH.N BKG FILE : B191.CNF;93 BKG DATE : 19-JUL-2009 EFF FILE : W191.CNF;35 CAL DATE : 22-JUL-2009

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	ENERGY	GROSS AREA	NET AREA	BKG AREA	BKG Sg	%ABUN	ACTIVITY pCi/G	TPU 1.96-SIGMA	MDA pCi/G	Lc pCi/G	UNC pCi/G
AC-227	6038.010	533.000	531.000	2.000	1.4142	68.10000	1.39E+01	1.59E+00	2.51E-01	8.62E-02	1.19E+00
TH-228	5363.000	13.000	6.000	7.000	2.6458	99.94000	9.80E-02	1.43E-01	2.50E-01	1.00E-01	1.43E-01
TH229	4900.000	4.000	3.000	1.000	1.0000	99.52000	4.91E-02	7.18E-02	1.25E-01	3.81E-02	7.17E-02
TH-230	4625.000	1127.000	1127.000	0.000	0.0000	100.0000	1.83E+01	1.76E+00	4.88E-02	0.00E+00	1.07E+00
TH-232	3972.000	1.000	-1.000	2.000	1.4142	100.0000	-1.63E-02	5.53E-02	1.56E-01	5.36E-02	5.53E-02



RADIUM 228

Radiochemistry Batch Checklist, Rev 9

Batch# 882961 Product: Radium 228 Date: 7/22/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to100 mg for GAB.			NA
Samples have been blank corrected (if required)			NA
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits. Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.	✓		
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%. Or meets the client's required RER acceptance criteria.	✓		
Tracer yield is 15-125% . Carrier yield 25-125%. Or meets the client's contract acceptance criteria.	✓		
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Sample was correctly preserved if required.	✓		
Smears Taken for Radioactive batches.	✓		
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent.	✓		
Aux data is correct.			NA
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly statused.	✓		
QC data entered into QC database and batch is in REVW	✓		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	✓		
Batch non-conformances completed, if applicable.	✓		NA TNA 7/28/2009 715738
Batch non-conformances second reviewed and disposition verified to be completed.	✓		NA
Aliquot Correction completed if required.			NA
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC

revised 8/1/08

LCORTR

Primary Review Performed By: [signature] 7/22/09

Secondary Review Performed By: Lasote Yon 7/22/09

Radium-228 Que Sheet

General Engineering Laboratories, Radiochemistry Division
07/07/2009

Batch #: 882961 **Analyst:** JXC5 **First Client Due Date:** 07/30/2009 **Internal Due Date:** 07/19/2009

Spike Isotope: Radium-228 **Spike Code:** 0503-B **Expiration Date:** 9-13-09 **Vol:** 0.1 mL **Ac-228 Ingrow:** 7-13-09 11:25

LCS Isotope: Radium-228 **LCS Code:** 0503-B **Expiration Date:** 9-13-09 **Vol:** 0.1 mL

Tracer Isotope: Barium-133 **Tracer Code:** 0112J **Expiration Date:** 2-12-10 **Vol:** 0.1 mL **Ac-228 Separation Date/Time:** 7-15-09 / 1355

Prep Date: 7-7-09 **Initials:** MS **Pipet ID:** 27669953 **Balance ID:** 178 55160 **Witness:** DJM 7-7-09

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collect Date & Time	Pos. #	Vol (mL)	Det #	Ba Yield (%)	Gamma Det. #
232528001-1	RSAI2-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	26-JUN-09 07:10 AM	1	1.012	1A 2C	99.50	
232528002-1	RSAI2009-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	26-JUN-09 07:10 AM	2	1.004	1D	88.61	
232528003-1	RSAI2-20B	SAMPLE		.5 pCi/g	SOIL	KERR003	26-JUN-09 07:39 AM	3	1.024	2A 8D	94.64	
232528004-1	RSAI2-31B	SAMPLE		.5 pCi/g	SOIL	KERR003	26-JUN-09 08:08 AM	4	1.017	2D	84.34	
232528005-1	RSAJ2-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	26-JUN-09 11:22 AM	5	1.011	3A 11B	101.23	
232528006-1	RSAJ2-20B	SAMPLE		.5 pCi/g	SOIL	KERR003	26-JUN-09 11:43 AM	6	1.017	4D	93.78	
232528007-1	RSAJ2-33B	SAMPLE		.5 pCi/g	SOIL	KERR003	26-JUN-09 12:47 PM	7	1.002	5B 12B	98.91	
232528008-1	RSAJ2009-33B	SAMPLE		.5 pCi/g	SOIL	KERR003	26-JUN-09 12:47 PM	8	1.013	5D 12C	97.19	
232528009-1	SA187-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	29-JUN-09 09:20 AM	9	1.007	6B	104.77	
232528010-1	SA45-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	29-JUN-09 11:15 AM	10	1.012	7A 12D	99.64	2C
232528011-1	SA45009-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	29-JUN-09 11:15 AM	11	1.018	7B	102.41	
232528012-1	SA153-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	29-JUN-09 01:20 PM	12	1.020	7C 13A	108.62	
232528013-1	SA186-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	29-JUN-09 08:50 AM	13	1.006	8A 13B	96.60	
232528014-1	SA185-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	29-JUN-09 10:30 AM	14	1.018	8C 13D	97.34	
232528015-1	RSAO5-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	29-JUN-09 09:55 AM	15	1.006	9C 14A	104.27	
232528016-1	SA152-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	29-JUN-09 08:53 AM	16	1.009	10A 14B	95.82	
232528017-1	SA152-20B	SAMPLE		.5 pCi/g	SOIL	KERR003	29-JUN-09 09:33 AM	17	1.001	10C 14C	94.46	
232528018-1	SA152-34B	SAMPLE		.5 pCi/g	SOIL	KERR003	29-JUN-09 10:11 AM	18	1.015	10D 14D	103.27	
232528019-1	SA82-0.5B	SAMPLE		.5 pCi/g	SOIL	KERR003	01-JUL-09 07:00 AM	19	1.001	11C 11C	97.28	
232528020-1	SA82-10B	SAMPLE		.5 pCi/g	SOIL	KERR003	01-JUL-09 07:56 AM	20	1.004	11D 9A	101.27	
1201875401-1	MB for batch 882961	MB		.5 pCi/g	SOIL	QC ACCOUNT		21	1.024	12B	91.92	
1201875402-1	SA82-0.5B(232528019DUP)	DUP		.5 pCi/g	SOIL	QC ACCOUNT	01-JUL-09 07:00 AM	22	1.003	12C 9C	103.04	
1201875403-1	SA82-0.5B(232528019MS)	MS		.5 pCi/g	SOIL	QC ACCOUNT	01-JUL-09 07:00 AM	23	0.103	12D	92.10	
1201875404-1	LCS for batch 882961	LCS		.5 pCi/g	SOIL	QC ACCOUNT		24	1.024	13A 7C	94.64	

116

NL 7/22/09

NL 7/22/09

NL 7/22/09

*MB 7/20/09 daily

Comments:

Data Reviewed By: Mary Mizzell 7/20/09

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

7/30

Radium 228 Re-Elute / Reprecipitate

Batch # 882961
Ra 228 Spike Code 0503B
LCS Code 0503B
Ba-133 Tracer Code 0112-J

Prep Date 7-7-09
Spike Vol (mls) 0.1mL
LCS Vol (mls) 0.1mL
Tracer Vol (mls) 0.1m

Initials JLC

Ingrow Start Time: 7-15-09 / 1355
Seperation Time: 7-21-09 / 1250

Sample ID	Bkr #	Vol. (mls)	Det #	% Yield	Gamma Det #
2325280 (4 7hr 1/2)	2	1.004	1D	76.03	
2325280 10	10	1.012	2C	91.53	
1201875401	21	1.024	11B	82.91	
1201875404	24	1.024	14B	82.31	

Radium-228 Solid

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

Batch : 882961
Analyst : JXC5
Prep Date : 7/7/2009

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

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

Spike S/N : 0503-B
Spike Exp Date : 9/13/2009
Spike Activity (dpm/ml): 182.06
Spike Volume Added: 0.10

LCS S/N : 0503-B
LCS Exp Date : 9/13/2009
LCS Activity (dpm/ml): 182.06
LCS Volume Added: 0.10

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 :	GFC28RAS	
Parmname :	Radium-228	
Required MDA :	0.5	pCi/G
Halflife of Ra-228 :	5.75	years
Halflife of Ac-228 :	6.13	hours
Batch counted on :	PIC	
BKG Count time :	500	min

Sample Characteristics					**Tracer Calculations**					
Pos.	Sample ID	Sample Aliquot G	Sample Aliquot StDev. G	Sample Date/Time	Tracer Concentration (cpm) (Ba-133 Ref.)	Tracer Ref. Count Uncertainty (cpm)	Tracer Concentration (cpm) (Ba-133 Samp.)	Tracer Samp. Count Uncertainty (cpm)	Tracer Aliquot (mL)	Tracer Aliquot StDev. (mL)
1	232528001.1	1.0120	3.3246E-03	6/26/2009 7:10	220.3	4.22%	219.2	4.24%	0.1	0.000701
2	232528002.1	1.0040	3.3238E-03	6/26/2009 7:10	200.7	4.46%	152.6	5.24%	0.1	0.000701
3	232528003.1	1.0240	3.3258E-03	6/26/2009 7:39	220.3	4.22%	208.5	4.36%	0.1	0.000701
4	232528004.1	1.0170	3.3251E-03	6/26/2009 8:08	220.3	4.22%	185.8	4.66%	0.1	0.000701
5	232528005.1	1.0110	3.3245E-03	6/26/2009 11:22	220.3	4.22%	223.0	4.20%	0.1	0.000701
6	232528006.1	1.0170	3.3251E-03	6/26/2009 11:43	220.3	4.22%	206.6	4.38%	0.1	0.000701
7	232528007.1	1.0020	3.3235E-03	6/26/2009 12:47	220.3	4.22%	217.9	4.25%	0.1	0.000701
8	232528008.1	1.0130	3.3247E-03	6/26/2009 12:47	220.3	4.22%	214.1	4.29%	0.1	0.000701
9	232528009.1	1.0070	3.3241E-03	6/29/2009 9:20	220.3	4.22%	230.8	4.11%	0.1	0.000701
10	232528010.1	1.0120	3.3246E-03	6/29/2009 11:15	200.7	4.46%	183.7	4.70%	0.1	0.000701
11	232528011.1	1.0180	3.3252E-03	6/29/2009 11:15	220.3	4.22%	225.6	4.17%	0.1	0.000701
12	232528012.1	1.0200	3.3254E-03	6/29/2009 13:20	220.3	4.22%	239.3	4.03%	0.1	0.000701
13	232528013.1	1.0060	3.3240E-03	6/29/2009 8:50	220.3	4.22%	212.8	4.31%	0.1	0.000701
14	232528014.1	1.0180	3.3252E-03	6/29/2009 10:30	220.3	4.22%	192.4	4.57%	0.1	0.000701
15	232528015.1	1.0060	3.3240E-03	6/29/2009 9:55	220.3	4.22%	229.7	4.12%	0.1	0.000701
16	232528016.1	1.0090	3.3243E-03	6/29/2009 8:53	220.3	4.22%	211.1	4.33%	0.1	0.000701
17	232528017.1	1.0010	3.3234E-03	6/29/2009 9:33	220.3	4.22%	208.1	4.37%	0.1	0.000701
18	232528018.1	1.0150	3.3249E-03	6/29/2009 10:11	220.3	4.22%	227.5	4.15%	0.1	0.000701
19	232528019.1	1.0010	3.3234E-03	7/1/2009 7:00	220.3	4.22%	214.3	4.29%	0.1	0.000701
20	232528020.1	1.0040	3.3238E-03	7/1/2009 7:56	220.3	4.22%	223.1	4.19%	0.1	0.000701
21	1201875401.1	1.0240	3.3258E-03	7/7/2009 0:00	220.3	4.22%	202.5	4.44%	0.1	0.000701
22	1201875402.1	1.0030	3.3237E-03	7/1/2009 7:00	220.3	4.22%	227.0	4.15%	0.1	0.000701
23	1201875403.1	0.1030	3.2298E-03	7/1/2009 7:00	220.3	4.22%	202.9	4.43%	0.1	0.000701
24	1201875404.1	1.0240	3.3258E-03	7/7/2009 0:00	220.3	4.22%	208.5	4.36%	0.1	0.000701

Count raw Data

Pos.	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Beta cpm	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Weekly Bkg cpm	Weekly Bkg Count Time (min.)	Separation Date/Time	Count Start Date/Time	Ra-228 Decay	Ac-228 Decay	Ac-228 Count Correction	Calculated Sample Recovery %	Sample Recovery Error %
1	2C	390	37	411	1.054	0.5969	0.00575	0.284	500	7/15/2009 13:55	7/15/2009 20:27	0.994	0.477	1.412	99.50%	3.15%
2	1D	380	41	485	1.276	0.6043	0.00511	0.556	500	7/21/2009 12:50	7/21/2009 15:55	0.992	0.705	1.400	76.03%	3.58%
3	8D	390	153	692	1.774	0.6281	0.00816	1.364	500	7/15/2009 13:55	7/15/2009 20:27	0.994	0.477	1.412	94.64%	3.19%
4	2D	60	13	60	1.000	0.6119	0.00479	0.390	500	7/15/2009 13:55	7/15/2009 15:30	0.994	0.836	1.058	84.34%	3.30%
5	11B	390	145	510	1.308	0.6372	0.00816	0.764	500	7/15/2009 13:55	7/15/2009 20:25	0.994	0.479	1.412	101.23%	3.14%
6	4D	120	30	193	1.608	0.5873	0.00816	1.062	500	7/15/2009 13:55	7/15/2009 15:30	0.994	0.836	1.117	93.78%	3.20%
7	12B	390	24	436	1.118	0.6352	0.00816	0.532	500	7/15/2009 13:55	7/15/2009 20:25	0.994	0.479	1.412	98.91%	3.15%
8	12C	390	37	356	0.913	0.6304	0.00816	0.466	500	7/15/2009 13:55	7/15/2009 20:25	0.994	0.479	1.412	97.19%	3.17%
9	6B	60	13	90	1.500	0.6163	0.00816	0.782	500	7/15/2009 13:55	7/15/2009 15:30	0.995	0.835	1.058	104.77%	3.11%
10	2C	390	27	308	0.790	0.5969	0.00575	0.298	500	7/21/2009 12:50	7/21/2009 15:55	0.993	0.705	1.412	91.53%	3.39%
11	7B	60	9	62	1.033	0.6280	0.00816	0.386	500	7/15/2009 13:55	7/15/2009 15:30	0.995	0.835	1.058	102.41%	3.13%
12	13A	390	14	373	0.956	0.6410	0.00816	0.468	500	7/15/2009 13:55	7/15/2009 20:26	0.995	0.479	1.412	108.62%	3.08%
13	13B	390	41	730	1.872	0.6526	0.00816	1.340	500	7/15/2009 13:55	7/15/2009 20:26	0.995	0.479	1.412	96.60%	3.17%
14	13D	390	35	629	1.613	0.6377	0.00816	0.920	500	7/15/2009 13:55	7/15/2009 20:26	0.995	0.478	1.412	87.34%	3.26%
15	14A	390	30	303	0.777	0.6393	0.00816	0.352	500	7/15/2009 13:55	7/15/2009 20:26	0.995	0.478	1.412	104.27%	3.11%
16	14B	390	23	320	0.821	0.6266	0.00816	0.350	500	7/15/2009 13:55	7/15/2009 20:26	0.995	0.478	1.412	95.82%	3.18%
17	14C	390	78	294	0.754	0.6375	0.00816	0.338	500	7/15/2009 13:55	7/15/2009 20:26	0.995	0.478	1.412	94.46%	3.20%
18	14D	390	16	451	1.156	0.6326	0.00816	0.386	500	7/15/2009 13:55	7/15/2009 20:26	0.995	0.478	1.412	103.27%	3.12%
19	11C	60	18	138	2.300	0.6352	0.00816	0.496	500	7/15/2009 13:55	7/15/2009 15:26	0.995	0.842	1.058	97.28%	3.17%
20	9A	390	20	352	0.903	0.6496	0.00816	0.428	500	7/15/2009 13:55	7/15/2009 20:28	0.995	0.477	1.412	101.27%	3.13%
21	12B	60	6	35	0.583	0.6352	0.00816	0.532	500	7/15/2009 13:55	7/15/2009 15:26	0.997	0.842	1.058	91.92%	3.22%
22	9C	390	14	449	1.151	0.6273	0.00816	0.328	500	7/15/2009 13:55	7/15/2009 20:27	0.995	0.477	1.412	103.04%	3.12%
23	12D	60	10	523	8.717	0.6320	0.00816	1.922	500	7/15/2009 13:55	7/15/2009 15:26	0.995	0.842	1.058	92.10%	3.22%
24	7C	60	12	231	3.850	0.6178	0.00816	0.254	500	7/15/2009 13:55	7/15/2009 20:27	0.997	0.477	1.058	94.64%	3.19%

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

Results

Pos.	Decision Level pCi/G	Critical Level pCi/G	Required MDA pCi/G	MDA pCi/G	Sample Act. Conc. pCi/G	Sample Act. Error pCi/G	Net Count Rate CPM	Net Count Rate Error CPM	**2 SIGMA** Counting Uncertainty pCi/G	**2 SIGMA** Total Prop. Uncertainty pCi/G	Sample QC	Sample Type	RPD	RER	Nominal pCi/G	Recovery
1	0.1873	0.1322	0.5	0.2816	**1.7187**	0.0810	0.7698	0.0572	0.2502	0.2727		SAMPLE				
2	0.2314	0.1634	0.5	0.3422	**1.4098**	0.0997	0.7203	0.0669	0.2565	0.2754		SAMPLE				
3	0.4054	0.2862	0.5	0.5894	**0.9049**	0.2105	0.4104	0.0853	0.3687	0.3733		SAMPLE				
4	0.2173	0.1534	0.5	0.3614	**0.6666**	0.2191	0.6100	0.1321	0.2829	0.2863		SAMPLE				
5	0.2820	0.1991	0.5	0.4140	**1.1144**	0.1326	0.5437	0.0699	0.2807	0.2896		SAMPLE				
6	0.2641	0.1865	0.5	0.4000	**0.5912**	0.2305	0.5463	0.1246	0.2643	0.2671		SAMPLE				
7	0.2438	0.1721	0.5	0.3606	**1.2442**	0.1119	0.5859	0.0627	0.2609	0.2729		SAMPLE				
8	0.2315	0.1634	0.5	0.3434	**0.9626**	0.1322	0.4468	0.0572	0.2416	0.2494		SAMPLE				
9	0.2482	0.1753	0.5	0.3946	**0.6332**	0.2293	0.7180	0.1630	0.2817	0.2845		SAMPLE				
10	0.1414	0.0998	0.5	0.2122	**0.8089**	0.1097	0.4917	0.0512	0.1651	0.1739		SAMPLE				
11	0.1733	0.1224	0.5	0.2885	**0.5672**	0.2098	0.6473	0.1341	0.2304	0.2332		SAMPLE				
12	0.2026	0.1431	0.5	0.3006	**0.9190**	0.1234	0.4884	0.0582	0.2147	0.2223		SAMPLE				
13	0.3840	0.2711	0.5	0.5584	**1.1207**	0.1659	0.5318	0.0865	0.3572	0.3645		SAMPLE				
14	0.3560	0.2513	0.5	0.5208	**1.6334**	0.1166	0.6928	0.0773	0.3572	0.3732		SAMPLE				
15	0.1862	0.1315	0.5	0.2783	**0.8472**	0.1264	0.4249	0.0519	0.2029	0.2099		SAMPLE				
16	0.2055	0.1451	0.5	0.3072	**1.0385**	0.1173	0.4705	0.0530	0.2291	0.2387		SAMPLE				
17	0.2030	0.1433	0.5	0.3037	**0.9226**	0.1272	0.4158	0.0511	0.2221	0.2300		SAMPLE				
18	0.1973	0.1393	0.5	0.2941	**1.5541**	0.0857	0.7704	0.0611	0.2417	0.2611		SAMPLE				
19	0.2061	0.1455	0.5	0.3370	**1.6583**	0.1147	1.8040	0.1983	0.3573	0.3729		SAMPLE				
20	0.2090	0.1476	0.5	0.3107	**0.9631**	0.1230	0.4746	0.0563	0.2240	0.2322		SAMPLE				
21	0.2204	0.1556	0.5	0.3587	**0.0487**	2.0235	0.0513	0.1039	0.1932	0.1933		MB				
22	0.1862	0.1314	0.5	0.2788	**1.7003**	0.0798	0.8233	0.0601	0.2431	0.2661	232528019.1	DUP	2.5%			
23	4.1863	2.9555	0.5	6.3853	**64.4507**	0.0729	6.7947	0.3862	7.1794	9.2086	232528019.1	MS			79.7694	78.7%
24	0.2681	0.1893	0.5	0.4622	**6.0097**	0.0781	3.5960	0.2543	0.8330	0.9198		LCS			8.0086	75.0%

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine
232528001	2C	390	37	411	7/15/2009 20:27	7/16/2009 2:57	Protean
232528002	1D	380	41	485	7/21/2009 15:55	7/21/2009 22:15	Protean
232528003	8D	390	153	692	7/15/2009 20:27	7/16/2009 2:57	Protean
232528004	2D	60	13	60	7/15/2009 15:30	7/15/2009 16:30	Protean
232528005	11B	390	145	510	7/15/2009 20:25	7/16/2009 2:55	Protean
232528006	4D	120	30	193	7/15/2009 15:30	7/15/2009 17:30	Protean
232528007	12B	390	24	436	7/15/2009 20:25	7/16/2009 2:55	Protean
232528008	12C	390	37	356	7/15/2009 20:25	7/16/2009 2:55	Protean
232528009	6B	60	13	90	7/15/2009 15:30	7/15/2009 16:30	Protean
232528010	2C	390	27	308	7/21/2009 15:55	7/21/2009 22:25	Protean
232528011	7B	60	9	62	7/15/2009 15:30	7/15/2009 16:30	Protean
232528012	13A	390	14	373	7/15/2009 20:26	7/16/2009 2:56	Protean
232528013	13B	390	41	730	7/15/2009 20:26	7/16/2009 2:56	Protean
232528014	13D	390	35	629	7/15/2009 20:26	7/16/2009 2:56	Protean
232528015	14A	390	30	303	7/15/2009 20:26	7/16/2009 2:56	Protean
232528016	14B	390	23	320	7/15/2009 20:26	7/16/2009 2:56	Protean
232528017	14C	390	78	294	7/15/2009 20:26	7/16/2009 2:56	Protean
232528018	14D	390	16	451	7/15/2009 20:26	7/16/2009 2:56	Protean
232528019	11C	60	18	138	7/15/2009 15:26	7/15/2009 16:26	Protean
232528020	9A	390	20	352	7/15/2009 20:28	7/16/2009 2:58	Protean
1201875401	12B	60	6	35	7/15/2009 15:26	7/15/2009 16:26	Protean
1201875402	9C	390	14	449	7/15/2009 20:27	7/16/2009 2:57	Protean
1201875403	12D	60	10	523	7/15/2009 15:26	7/15/2009 16:26	Protean
1201875404	7C	60	12	231	7/15/2009 20:27	7/15/2009 21:27	Protean

ASSAY 13-Jul-09 12:49:57

Protocol	id	9	228_REC2
Time	limit	180	
Count	limit	50000	
Isotope	Ba-133		
Protocol	date	9-Apr-07	10:02:22
Run	id.	57	

inc 7/22/09

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	87	1	180	752	220.3	4.22		12:50:05
2	87	2	180	749	219.2	4.24	99.50	12:53:16
~~3~~	~~87~~	~~3~~	~~180~~	~~677~~	~~195.2~~	~~4.53~~	~~88.61~~	~~12:56:27~~
4	87	4	180	717	208.5	4.36	94.64	12:59:39
5	87	5	180	649	185.8	4.66	84.34	13:02:50
6	74	6	180	760	223	4.2	101.23	13:06:15
7	74	7	180	711	206.6	4.38	93.78	13:09:26
8	74	8	180	745	217.9	4.25	98.91	13:12:38
9	74	9	180	734	214.1	4.29	97.19	13:15:49
10	74	10	180	784	230.8	4.11	104.77	13:19:01
~~11~~	~~92~~	~~11~~	~~180~~	~~750~~	~~219.5~~	~~4.23~~	~~99.64~~	~~13:22:30~~
12	92	12	180	768	225.6	4.17	102.41	13:25:42
13	92	13	180	809	239.3	4.03	108.62	13:28:53
14	92	14	180	730	212.8	4.31	96.60	13:32:04
15	92	15	180	668	192.4	4.57	87.34	13:35:16
16	91	16	180	780	229.7	4.12	104.27	13:38:35
17	91	17	180	724	211.1	4.33	95.82	13:41:46
18	91	18	180	715	208.1	4.37	94.46	13:44:57
19	91	19	180	774	227.5	4.15	103.27	13:48:09
20	91	20	180	734	214.3	4.29	97.28	13:51:20
21	99	21	180	761	223.1	4.19	101.27	13:54:45
22	99	22	180	699	202.5	4.44	91.92	13:57:56
23	99	23	180	772	227	4.15	103.04	14:01:07
24	99	24	180	700	202.9	4.43	92.10	14:04:19
25	99	25	180	716	208.5	4.36	94.64	14:07:30

END OF ASSAY

ASSAY 21-Jul-09 10:00:51

Protocol	id	9	228_REC2
Time	limit	180	
Count	limit	50000	
Isotope	Ba-133		
Protocol	date	9-Apr-07	10:02:22
Run	id.	86	

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	87	1	180	693	200.7	4.46		10:00:54
2	87	2	180	549	152.6	5.24	76.03	10:04:05
3	87	3	180	642	183.7	4.7	91.53	10:07:16
4	87	4	180	591	166.4	4.98	82.91	10:10:28
5	87	5	180	587	165.2	5	82.31	10:13:39

END OF ASSAY

RADIUM 226

Radiochemistry Batch Checklist, Rev 9

Batch# 463001 Product: Ra-226 Date: 7/25/09

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to100 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 statused.	✓		
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.	✓	7/27/09	N/A NCR 715239
Batch non-conformances second reviewed and disposition verified to be completed.	✓		N/A NCR 715239
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: Margaret Hunt

Secondary Review Performed By: [signature] 7/27/09

KERR 7/30/09

Radium-226 Que Sheet

07/07/2009 *General Engineering Laboratories, Radiochemistry Division*

Batch #: 883001 **Analyst:**KSD1 **First Client Due Date:**07/30/2009 **Internal Due Date:**07/19/2009

Spike Isotope: Radium-226 **Spike Code:** 063584 **Expiration Date:** 7/23/09 **Vol:** 0.1 **Nom Conc:** 11.5264

LCS Isotope: Radium-226 **LCS Code:** 063584 **Expiration Date:** 7/23/09 **Vol:** 0.1 **Nom Conc:** 10.9947

Prep Date: 7/16/09 **Pipet ID:** 1421303 **Initials:** KD **Witness:** KD 7/16/09 **Sample Count Time:** 30 (Min)

KD 7/16/09 **Bkg Count Time:** 30 (Min)

Sample I	Client Description	Type	Hazard Code	Matrix	Min CRDL	Client		Vol g (mL)	End Init Degas Date/Tin	End LN De-em Date/Time	Start Count Date/Time	Cell #	Det #	Bkg counts	Total Counts
232528001-1	RSAI2-10B	SAMPLE		SOIL.	.5 pCi/g	KERR003	1	1.095	7/20/09 1600	7/24/09 1355	7-25-09 0855	112	1	7	55
232528002-1	RSAI2009-10B	SAMPLE		SOIL	.5 pCi/g	KERR003	2	1.071	7/20/09 1600	7/24/09 1355	7-25-09 0855	210	2	2	59
232528003-1	RSAI2-20B	SAMPLE		SOIL	.5 pCi/g	KERR003	3	1.016	7/20/09 1600	7/24/09 1355	7-25-09 0855	311	3	7	80
232528004-1	RSAI2-31B	SAMPLE		SOIL	.5 pCi/g	KERR003	4	1.099	7/20/09 1600	7/24/09 1355	7-25-09 0855	403	4	8	74
232528005-1	RSAJ2-10B	SAMPLE		SOIL	.5 pCi/g	KERR003	5	1.011	7/20/09 1600	7/24/09 1355	7-25-09 0855	501	5	1	70
232528006-1	RSAJ2-20B	SAMPLE		SOIL	.5 pCi/g	KERR003	6	1.070	7/20/09 1600	7/24/09 1355	7-25-09 0855	707	7	2	64
232528007-1	RSAJ2-33B	SAMPLE		SOIL	.5 pCi/g	KERR003	7	1.001	7/20/09 1600	7/24/09 1420	7-25-09 0925	108	1	8	92
232528008-1	RSAJ2009-33B	SAMPLE		SOIL	.5 pCi/g	KERR003	8	1.004	7/20/09 1600	7/24/09 1420	7-25-09 0925	206	2	7	101
232528009-1	SA187-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	9	1.066	7/20/09 1600	7/24/09 1420	7-25-09 0925	305	3	5	46
232528010-1	SA45-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	10	1.095	7/20/09 1600	7/24/09 1420	7-25-09 0925	412	4	8	70
232528011-1	SA45009-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	11	1.016	7/20/09 1600	7/24/09 1420	7-25-09 0925	505	5	1	43
232528012-1	SA153-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	12	1.037	7/20/09 1600	7/24/09 1420	7-25-09 0925	701	7	7	22
232528013-1	SA186-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	13	1.012	7/20/09 1600	7/24/09 1445	7-25-09 1000	106	1	8	53
232528014-1	SA185-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	14	1.014	7/20/09 1600	7/24/09 1445	7-25-09 1000	211	2	1	46
232528015-1	RSAO5-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	15	1.004	7/20/09 1600	7/24/09 1445	7-25-09 1000	312	3	1	36
232528016-1	SA152-10B	SAMPLE		SOIL	.5 pCi/g	KERR003	16	1.020	7/20/09 1600	7/24/09 1445	7-25-09 1000	411	4	8	72
232528017-1	SA152-20B	SAMPLE		SOIL	.5 pCi/g	KERR003	17	1.027	7/20/09 1600	7/24/09 1445	7-25-09 1000	511	5	8	81
232528018-1	SA152-34B	SAMPLE		SOIL	.5 pCi/g	KERR003	18	1.021	7/20/09 1600	7/24/09 1445	7-25-09 1000	707	7	4	53
232528019-1	SA82-0.5B	SAMPLE		SOIL	.5 pCi/g	KERR003	19	1.067	7/20/09 1600	7/24/09 1515	7-25-09 1030	104	1	8	56
232528020-1	SA82-10B	SAMPLE		SOIL	.5 pCi/g	KERR003	20	1.051	7/20/09 1600	7/24/09 1515	7-25-09 1030	204	2	1	44
1201875537-1	MB for batch 883001	MB		SOIL	.5 pCi/g	QC ACCOUNT	21	1.059	7/20/09 1600	7/24/09 1515	7-25-09 1030	306	3	8	14
1201875538-1	SA82-0.5B(232528019DUP)	DUP		SOIL	.5 pCi/g	QC ACCOUNT	22	1.047	7/20/09 1600	7/24/09 1515	7-25-09 1030	404	4	8	13
1201875539-1	SA82-0.5B(232528019MS)	MS		SOIL	.5 pCi/g	QC ACCOUNT	23	1.042	7/20/09 1600	7/24/09 1515	7-25-09 1030	511	5	2	700
1201875540-1	LCS for batch 883001	LCS		SOIL	.5 pCi/g	QC ACCOUNT	24	1.099	7/20/09 1600	7/24/09 1515	7-25-09 1030	706	7	1	598

126

Comments:

Instrument ID's:

LUCAS1:90988, LUCAS2:136917, LUCAS3:90989, LUCAS4:102753, LUC5:132286, LUC6:170055

Data Reviewed By Diana Marie Hunt

Radium-226 Solid

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

Batch : 883001
Analyst : KSD1
Prep Date : 7/16/2009
Ra-226 Abundance : 1
Ra-226 Method Uncertainty : 0.1153

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

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

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

Procedure Code : LUC26RAS
Parmname : Radium-226
Required MDA : 0.5 pCi/G
Halflife of Ra-226 : 1600 years
Halflife of Rn-222: 3.823 days
Batch counted on : LUCAS CELL DETECTOR
BKG Count time : 30 min

Sample Characteristics					Count Raw Data				Weekly Background			
Pos.	Sample ID	Sample Aliquot G	Sample Aliquot StDev. G	Sample Date/Time	Cell Number	Counting Time (min.)	Gross Counts	Gross CPM	Counts	CPM	Count Time (min.)	Detector Efficiency (cpm/dpm)
1	232528001.1	1.0990	3.3336E-03	6/26/2009 7:10	112	30	55	1.833	7	0.233	30	1.6480
2	232528002.1	1.0710	3.3307E-03	6/26/2009 7:10	210	30	59	1.967	2	0.067	30	2.2530
3	232528003.1	1.0160	3.3250E-03	6/26/2009 7:39	307	30	80	2.667	7	0.233	30	1.9310
4	232528004.1	1.0990	3.3336E-03	6/26/2009 8:08	403	30	74	2.467	8	0.267	30	1.4630
5	232528005.1	1.0110	3.3245E-03	6/26/2009 11:22	502	30	70	2.333	1	0.033	30	1.8780
6	232528006.1	1.0700	3.3306E-03	6/26/2009 11:43	702	30	64	2.133	2	0.067	30	1.9320
7	232528007.1	1.0010	3.3234E-03	6/26/2009 12:47	108	30	92	3.067	8	0.267	30	1.8400
8	232528008.1	1.0040	3.3238E-03	6/26/2009 12:47	206	30	101	3.367	7	0.233	30	2.2590
9	232528009.1	1.0660	3.3302E-03	6/29/2009 9:20	305	30	46	1.533	5	0.167	30	2.0570
10	232528010.1	1.0990	3.3336E-03	6/29/2009 11:15	412	30	70	2.333	8	0.267	30	1.9670
11	232528011.1	1.0160	3.3250E-03	6/29/2009 11:15	505	30	43	1.433	1	0.033	30	2.3310
12	232528012.1	1.0370	3.3272E-03	6/29/2009 13:20	701	30	22	0.733	7	0.233	30	1.8150
13	232528013.1	1.0120	3.3246E-03	6/29/2009 8:50	106	30	53	1.767	8	0.267	30	1.4860
14	232528014.1	1.0740	3.3310E-03	6/29/2009 10:30	211	30	46	1.533	1	0.033	30	2.1710
15	232528015.1	1.0090	3.3243E-03	6/29/2009 9:55	312	30	36	1.200	1	0.033	30	1.9440
16	232528016.1	1.0200	3.3254E-03	6/29/2009 8:53	411	30	72	2.400	8	0.267	30	1.8240
17	232528017.1	1.0270	3.3261E-03	6/29/2009 9:33	501	30	81	2.700	8	0.267	30	2.0870
18	232528018.1	1.0210	3.3255E-03	6/29/2009 10:11	707	30	53	1.767	4	0.133	30	2.1190
19	232528019.1	1.0670	3.3303E-03	7/1/2009 7:00	104	30	56	1.867	8	0.267	30	1.9730
20	232528020.1	1.0510	3.3286E-03	7/1/2009 7:56	204	30	44	1.467	1	0.033	30	2.1930
21	1201875537.1	1.0990	3.3336E-03	7/16/2009 0:00	306	30	14	0.467	8	0.267	30	1.7470
22	1201875538.1	1.0470	3.3282E-03	7/1/2009 7:00	404	30	43	1.433	8	0.267	30	1.9310
23	1201875539.1	1.0420	3.3277E-03	7/1/2009 7:00	511	30	700	23.333	2	0.067	30	1.9590
24	1201875540.1	1.0990	3.3336E-03	7/16/2009 0:00	706	30	598	19.933	1	0.033	30	2.1180

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	Rn-222 Corrections			
						De-Gas to Ingrowth	Ingrowth to Count	During Count	Ra-226 Decay
0.09580	8/29/2008	8/29/2009	7/20/2009 16:00	7/24/2009 13:55	7/25/2009 8:55	0.508	0.866	1.002	1.000
0.07722	12/19/2008	12/19/2009	7/20/2009 16:00	7/24/2009 13:55	7/25/2009 8:55	0.508	0.866	1.002	1.000
0.06082	2/4/2009	2/4/2010	7/20/2009 16:00	7/24/2009 13:55	7/25/2009 8:55	0.508	0.866	1.002	1.000
0.12371	3/2/2009	3/2/2010	7/20/2009 16:00	7/24/2009 13:55	7/25/2009 8:55	0.508	0.866	1.002	1.000
0.14377	3/25/2009	3/25/2010	7/20/2009 16:00	7/24/2009 13:55	7/25/2009 8:55	0.508	0.866	1.002	1.000
0.08547	11/21/2008	11/21/2009	7/20/2009 16:00	7/24/2009 13:55	7/25/2009 8:55	0.508	0.866	1.002	1.000
0.09580	8/29/2008	8/29/2009	7/20/2009 16:00	7/24/2009 14:20	7/25/2009 9:25	0.510	0.866	1.002	1.000
0.07722	12/19/2008	12/19/2009	7/20/2009 16:00	7/24/2009 14:20	7/25/2009 9:25	0.510	0.866	1.002	1.000
0.06082	2/4/2009	2/4/2010	7/20/2009 16:00	7/24/2009 14:20	7/25/2009 9:25	0.510	0.866	1.002	1.000
0.12371	3/2/2009	3/2/2010	7/20/2009 16:00	7/24/2009 14:20	7/25/2009 9:25	0.510	0.866	1.002	1.000
0.14377	3/25/2009	3/25/2010	7/20/2009 16:00	7/24/2009 14:20	7/25/2009 9:25	0.510	0.866	1.002	1.000
0.08547	11/21/2008	11/21/2009	7/20/2009 16:00	7/24/2009 14:20	7/25/2009 9:25	0.510	0.866	1.002	1.000
0.09580	8/29/2008	8/29/2009	7/20/2009 16:00	7/24/2009 14:45	7/25/2009 10:00	0.511	0.865	1.002	1.000
0.07722	12/19/2008	12/19/2009	7/20/2009 16:00	7/24/2009 14:45	7/25/2009 10:00	0.511	0.865	1.002	1.000
0.06082	2/4/2009	2/4/2010	7/20/2009 16:00	7/24/2009 14:45	7/25/2009 10:00	0.511	0.865	1.002	1.000
0.12371	3/2/2009	3/2/2010	7/20/2009 16:00	7/24/2009 14:45	7/25/2009 10:00	0.511	0.865	1.002	1.000
0.14377	3/25/2009	3/25/2010	7/20/2009 16:00	7/24/2009 14:45	7/25/2009 10:00	0.511	0.865	1.002	1.000
0.08547	11/21/2008	11/21/2009	7/20/2009 16:00	7/24/2009 14:45	7/25/2009 10:00	0.511	0.865	1.002	1.000
0.09580	8/29/2008	8/29/2009	7/20/2009 16:00	7/24/2009 15:15	7/25/2009 10:30	0.513	0.865	1.002	1.000
0.07722	12/19/2008	12/19/2009	7/20/2009 16:00	7/24/2009 15:15	7/25/2009 10:30	0.513	0.865	1.002	1.000
0.06082	2/4/2009	2/4/2010	7/20/2009 16:00	7/24/2009 15:15	7/25/2009 10:30	0.513	0.865	1.002	1.000
0.12371	3/2/2009	3/2/2010	7/20/2009 16:00	7/24/2009 15:15	7/25/2009 10:30	0.513	0.865	1.002	1.000
0.14377	3/25/2009	3/25/2010	7/20/2009 16:00	7/24/2009 15:15	7/25/2009 10:30	0.513	0.865	1.002	1.000
0.08547	11/21/2008	11/21/2009	7/20/2009 16:00	7/24/2009 15:15	7/25/2009 10:30	0.513	0.865	1.002	1.000

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

Results

Pos.	Decision Level pCi/G	Critical Level pCi/G	Required MDA pCi/G	MDA pCi/G	Sample Act. Conc. pCi/G	Sample Act. Error pCi/G	Net Count Rate CPM	Net Count Rate Error CPM	**2 SIGMA** Counting Uncertainty pCi/G	**2 SIGMA** Total Prop. Uncertainty pCi/G	Sample QC	Sample Type	RPD	RER	Nominal pCi/G	Recovery
1	0.1639	0.1157	0.5	0.2878	**0.9024**	0.1900	1.6000	0.2625	0.2901	0.3931		SAMPLE				
2	0.0658	0.0464	0.5	0.1352	**0.8043**	0.1573	1.9000	0.2603	0.2160	0.3075		SAMPLE				
3	0.1513	0.1068	0.5	0.2657	**1.2669**	0.1415	2.4333	0.3109	0.3173	0.4533		SAMPLE				
4	0.1974	0.1393	0.5	0.3422	**1.3977**	0.1848	2.2000	0.3018	0.3759	0.5966		SAMPLE				
5	0.0591	0.0417	0.5	0.1372	**1.2374**	0.1887	2.3000	0.2809	0.2962	0.5362		SAMPLE				
6	0.0768	0.0542	0.5	0.1578	**1.0212**	0.1565	2.0667	0.2708	0.2623	0.3890		SAMPLE				
7	0.1719	0.1213	0.5	0.2980	**1.5491**	0.1528	2.8000	0.3333	0.3615	0.5813		SAMPLE				
8	0.1306	0.0922	0.5	0.2293	**1.4078**	0.1349	3.1333	0.3464	0.3050	0.4896		SAMPLE				
9	0.1141	0.0806	0.5	0.2076	**0.6351**	0.1845	1.3667	0.2380	0.2168	0.2708		SAMPLE				
10	0.1464	0.1034	0.5	0.2539	**0.9742**	0.1887	2.0667	0.2944	0.2720	0.4222		SAMPLE				
11	0.0473	0.0334	0.5	0.1098	**0.6024**	0.2136	1.4000	0.2211	0.1865	0.2866		SAMPLE				
12	0.1573	0.1111	0.5	0.2763	**0.2707**	0.3691	0.5000	0.1795	0.1905	0.2051		SAMPLE				
13	0.2101	0.1484	0.5	0.3644	**1.0146**	0.1983	1.5000	0.2603	0.3451	0.4561		SAMPLE				
14	0.0479	0.0338	0.5	0.1113	**0.6544**	0.1708	1.5000	0.2285	0.1954	0.2643		SAMPLE				
15	0.0570	0.0402	0.5	0.1323	**0.6050**	0.1842	1.1667	0.2028	0.2061	0.2576		SAMPLE				
16	0.1699	0.1199	0.5	0.2945	**1.1664**	0.1867	2.1333	0.2981	0.3195	0.5016		SAMPLE				
17	0.1474	0.1041	0.5	0.2556	**1.1548**	0.1933	2.4333	0.3145	0.2925	0.5095		SAMPLE				
18	0.1033	0.0729	0.5	0.1929	**0.7679**	0.1762	1.6333	0.2517	0.2319	0.3170		SAMPLE				
19	0.1496	0.1056	0.5	0.2593	**0.7703**	0.1923	1.6000	0.2667	0.2516	0.3385		SAMPLE				
20	0.0483	0.0341	0.5	0.1122	**0.6303**	0.1741	1.4333	0.2236	0.1927	0.2580		SAMPLE				
21	0.1640	0.1158	0.5	0.2844	**0.1056**	0.7841	0.2000	0.1563	0.1618	0.1640		MB				
22	0.1557	0.1100	0.5	0.2700	**0.5849**	0.2386	1.1667	0.2380	0.2339	0.3038	232528019.1	DUP	27.4%			
23	0.0771	0.0545	0.5	0.1586	**11.5525**	0.1487	23.2667	0.8832	0.8595	4.2611	232528019.1	MS			11.5964	93.0%
24	0.0478	0.0338	0.5	0.1111	**8.6649**	0.0948	19.9000	0.8158	0.6962	2.5356		LCS			10.9947	78.8%

METHOD CALIBRATION DATA

GAS FLOW PROPORTIONAL COUNTERS

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

Gas Flow Proportional Counter Calibration Package

Method: Ra-228 (PIC)

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

Prepared By: _____ Date: 7/2/09

Reviewed By: _____ Date: 7/2/09

Effective Date: 7/2/09

Ra-228 Calibration PROTEAN Detectors

Detector #	Source #	Seperation date	Count date	Ac-228 decay (dec)	Spike Vol. Ra-228 (mL)	Seperation time Decay Corrected Std. Act. Ra-228 dpm/mL	Volume corrected Standard Nominal dpm	raw beta counts	ct. time (min)	Beta cpm	corrected* cpm	Ra-228 eff (cpm/dpm)	
1A	1	7/1/09 10:45	7/1/2009 13:36	0.7249	1.5	6363.2	9544.8	13564	3	4521.3	6237.434348	0.6535	
1A	2	7/1/09 10:45	7/1/2009 13:52	0.7032	1.5	6363.2	9544.8	12775	3	4258.3	6055.521583	0.6344	
1A	3	7/1/09 10:45	7/1/2009 13:48	0.7083	1.5	6363.2	9544.8	12750	3	4250.0	6000.085083	0.6286	Average EFF
1A	4	7/1/09 10:45	7/1/2009 13:41	0.7170	1.5	6363.2	9544.8	12410	3	4136.7	5769.693602	0.6045	0.6303
1B	1	7/1/09 10:45	7/1/2009 13:41	0.7174	1.5	6363.2	9544.8	13292	3	4430.7	6176.07771	0.6471	
1B	2	7/1/09 10:45	7/1/2009 13:36	0.7246	1.5	6363.2	9544.8	13274	3	4424.7	6106.181463	0.6397	
1B	3	7/1/09 10:45	7/1/2009 13:52	0.7031	1.5	6363.2	9544.8	12699	3	4233.0	6020.43969	0.6308	Average EFF
1B	4	7/1/09 10:45	7/1/2009 13:48	0.7082	1.5	6363.2	9544.8	12072	3	4024.0	5682.267909	0.5953	0.6282
1C	1	7/1/09 10:45	7/1/2009 13:48	0.7085	1.5	6363.2	9544.8	12813	3	4271.0	6028.410186	0.6316	
1C	2	7/1/09 10:45	7/1/2009 13:41	0.7172	1.5	6363.2	9544.8	12979	3	4326.3	6032.15531	0.6320	
1C	3	7/1/09 10:45	7/1/2009 13:36	0.7245	1.5	6363.2	9544.8	12755	3	4251.7	5868.722998	0.6149	Average EFF
1C	4	7/1/09 10:45	7/1/2009 13:52	0.7030	1.5	6363.2	9544.8	11917	3	3972.3	5650.765354	0.5920	0.6176
1D	1	7/1/09 10:45	7/1/2009 13:52	0.7033	1.5	6363.2	9544.8	12473	3	4157.7	5911.258105	0.6193	
1D	2	7/1/09 10:45	7/1/2009 13:48	0.7084	1.5	6363.2	9544.8	12484	3	4161.3	5874.170562	0.6154	
1D	3	7/1/09 10:45	7/1/2009 13:41	0.7171	1.5	6363.2	9544.8	12289	3	4096.3	5712.363902	0.5985	Average EFF
1D	4	7/1/09 10:45	7/1/2009 13:36	0.7243	1.5	6363.2	9544.8	12115	3	4038.3	5575.47435	0.5841	0.6043
2A	1	7/1/09 10:45	7/1/2009 13:57	0.6960	1.5	6363.2	9544.8	12499	3	4166.3	5986.085459	0.6272	
2A	2	7/1/09 10:45	7/1/2009 14:15	0.6728	1.5	6363.2	9544.8	12103	3	4034.3	5996.6905	0.6283	
2A	3	7/1/09 10:45	7/1/2009 14:09	0.6815	1.5	6363.2	9544.8	11968	3	3989.3	5854.110901	0.6133	Average EFF
2A	4	7/1/09 10:45	7/1/2009 14:02	0.6899	1.5	6363.2	9544.8	11855	3	3951.7	5728.227222	0.6001	0.6172
2B	1	7/1/09 10:45	7/1/2009 14:02	0.6903	1.5	6363.2	9544.8	12471	3	4157.0	6022.286434	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	5604.156523	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 14:35	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 14:30	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	5868.56525	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	5790.010642	0.6066	Average EFF
4C	4	7/1/09 10:45	7/1/2009 15:00	0.6185	1.5	6363.2	9544.8	13733	4	3433.3	5550.795964	0.5816	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	5666.467573	0.5937	
4D	3	7/1/09 10:45	7/1/2009 14:48	0.6326	1.5	6363.2	9544.8	14131	4	3532.8	5584.07765	0.5850	Average EFF
4D	4	7/1/09 10:45	7/1/2009 14:41	0.6413	1.5	6363.2	9544.8	13978	4	3494.5	5449.182717	0.5709	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

7/2/09

5C	4	7/1/09 10:45	7/1/2009 15:21	0.5941	1.5	6363.2	9544.8	13831	4	3457.8	5819.905873	0.6097	0.6368
5D	1	7/1/09 10:45	7/1/2009 15:21	0.5943	1.5	6363.2	9544.8	14321	4	3580.3	6024.014899	0.6311	
5D	2	7/1/09 10:45	7/1/2009 15:17	0.5993	1.5	6363.2	9544.8	14642	4	3660.5	6107.538025	0.6399	
5D	3	7/1/09 10:45	7/1/2009 15:12	0.6048	1.5	6363.2	9544.8	14443	4	3610.8	5970.409434	0.6255	Average EFF
5D	4	7/1/09 10:45	7/1/2009 15:07	0.6107	1.5	6363.2	9544.8	13954	4	3488.5	5711.973074	0.5984	0.6237
6A	1	7/1/09 10:45	7/1/2009 15:27	0.5885	1.5	6363.2	9544.8	14018	4	3504.5	5955.42076	0.6239	
6A	2	7/1/09 10:45	7/1/2009 15:40	0.5735	1.5	6363.2	9544.8	12283	3.5	3509.4	6118.819734	0.6411	
6A	3	7/1/09 10:45	7/1/2009 15:36	0.5779	1.5	6363.2	9544.8	12111	3.5	3460.3	5987.187856	0.6273	Average EFF
6A	4	7/1/09 10:45	7/1/2009 15:32	0.5826	1.5	6363.2	9544.8	11598	3.5	3313.7	5687.952648	0.5959	0.6221
6B	1	7/1/09 10:45	7/1/2009 15:32	0.5824	1.5	6363.2	9544.8	12151	3.5	3471.7	5961.398905	0.6246	
6B	2	7/1/09 10:45	7/1/2009 15:27	0.5885	1.5	6363.2	9544.8	14371	4	3592.8	6105.389624	0.6397	
6B	3	7/1/09 10:45	7/1/2009 15:40	0.5734	1.5	6363.2	9544.8	11705	3.5	3344.3	5831.983307	0.6110	Average EFF
6B	4	7/1/09 10:45	7/1/2009 15:36	0.5779	1.5	6363.2	9544.8	11388	3.5	3253.7	5630.295163	0.5899	0.6163
6C	1	7/1/09 10:45	7/1/2009 15:36	0.5778	1.5	6363.2	9544.8	12161	3.5	3474.6	6013.224586	0.6300	
6C	2	7/1/09 10:45	7/1/2009 15:32	0.5821	1.5	6363.2	9544.8	12083	3.5	3452.3	5930.638446	0.6213	
6C	3	7/1/09 10:45	7/1/2009 15:27	0.5883	1.5	6363.2	9544.8	13638	4	3409.5	5795.433731	0.6072	Average EFF
6C	4	7/1/09 10:45	7/1/2009 15:40	0.5733	1.5	6363.2	9544.8	11218	3.5	3205.1	5590.212659	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	5533.699914	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	6047.285606	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	5646.694018	0.5916	0.6180
7B	1	7/1/09 10:45	7/1/2009 15:51	0.5622	1.5	6363.2	9544.8	11968	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	11605	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	6133.762218	0.6426	
8C	2	7/1/09 10:45	7/1/2009 16:10	0.5422	1.5	6363.2	9544.8	11774	3.5	3364.0	6204.011354	0.6500	
8C	3	7/1/09 10:45	7/1/2009 16:06	0.5465	1.5	6363.2	9544.8	11611	3.5	3317.4	6070.574762	0.6360	Average EFF
8C	4	7/1/09 10:45	7/1/2009 16:19	0.5331	1.5	6363.2	9544.8	10809	3.5	3088.3	5793.080291	0.6069	0.6339
8D	1	7/1/09 10:45	7/1/2009 16:19	0.5330	1.5	6363.2	9544.8	11301	3.5	3228.9	6057.336905	0.6346	
8D	2	7/1/09 10:45	7/1/2009 16:15	0.5374	1.5	6363.2	9544.8	11412	3.5	3260.6	6067.58377	0.6357	
8D	3	7/1/09 10:45	7/1/2009 16:10	0.5421	1.5	6363.2	9544.8	11660	3.5	3331.4	6145.674775	0.6439	Average EFF
8D	4	7/1/09 10:45	7/1/2009 16:06	0.5464	1.5	6363.2	9544.8	10918	3.5	3119.4	5709.327085	0.5982	0.6281
9A	1	7/1/09 10:45	7/1/2009 16:24	0.5280	1.5	6363.2	9544.8	11605	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	6085.406603	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	6160.125852	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	6276.391381	0.6578	
9D	3	7/1/09 10:45	7/1/2009 16:29	0.5234	1.5	6363.2	9544.8	11340	3.5	3240.0	6190.682442	0.6486	Average EFF
9D	4	7/1/09 10:45	7/1/2009 16:24	0.5278	1.5	6363.2	9544.8	10912	3.5	3117.7	5907.401951	0.6189	0.6433
10A	1	7/1/09 10:45	7/1/2009 16:47	0.5057	1.5	6363.2	9544.8	10991	3.5	3140.3	6209.984837	0.6506	
10A	2	7/1/09 10:45	7/1/2009 17:12	0.4824	1.5	6363.2	9544.8	11959	4	2989.8	6198.168046	0.6494	
10A	3	7/1/09 10:45	7/1/2009 16:58	0.4958	1.5	6363.2	9544.8	10553	3.5	3015.1	6081.381423	0.6371	Average EFF
10A	4	7/1/09 10:45	7/1/2009 16:53	0.5003	1.5	6363.2	9544.8	10338	3.5	2953.7	5903.409852	0.6185	0.6389
10B	1	7/1/09 10:45	7/1/2009 17:03	0.4910	1.5	6363.2	9544.8	11110	4	2777.5	5656.748417	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	7/1/2009 16:53	0.5001	1.5	6363.2	9544.8	10535	3.5	3010.0	6018.73284	0.6306	
10C	3	7/1/09 10:45	7/1/2009 16:47	0.5054	1.5	6363.2	9544.8	10723	3.5	3063.7	6061.601256	0.6351	Average EFF
10C	4	7/1/09 10:45	7/1/2009 17:13	0.4820	1.5	6363.2	9544.8	11066	4	2766.5	5739.114805	0.6013	0.6250
10D	1	7/1/09 10:45	7/1/2009 17:13	0.4819	1.5	6363.2	9544.8	12021	4	3005.3	6236.356344	0.6534	
10D	2	7/1/09 10:45	7/1/2009 16:58	0.4955	1.5	6363.2	9544.8	10614	3.5	3032.6	6119.984615	0.6412	

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	5306.3	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	6174.136045	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	6182.998937	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	6140.635636	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	5756.75774	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	0.8092	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	6213.261445	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

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
File type : Excel
Version # : 1.2.3

Batch : 595514
Analyst : AF1
Prep Date : 7/1/2009

Ra-228 Abundance : 1
Ra-228 Method Uncertainty : 0.0784

Calibration Date : 6/2/2008
Calibration Due Date : 6/30/2009

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

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

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

Sample Characteristics					Count raw Data																	Results
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Sample Date/Time	Pos.	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Beta cpm	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Weekly Bkg cpm	Count Time (min.)	Separation Date/Time	Count Start Date/Time	Ra-228 Decay	Ac-228 Decay	Ac-228 Count Correction	Calculated Sample Recovery %	Sample Recovery Error %	Pos.
1	1201245712.1	1.0000	2.0399E-05	7/1/2009 0:00	1	1A	15	36	1980	132.000	0.6303	0.00600	0.312	500	7/2/2009 5:40	7/2/2009 8:39	1.000	0.713	1.014	100.83%	1.00%	1 *
2	1201245713.1	1.0000	2.0399E-05	7/1/2009 0:00	2	1B	15	27	1959	130.600	0.6282	0.00409	0.342	500	7/2/2009 5:40	7/2/2009 8:40	1.000	0.712	1.014	108.20%	1.00%	2 *
3	1201245714.1	1.0000	2.0399E-05	7/1/2009 0:00	3	1C	15	44	2108	140.533	0.6176	0.00344	0.716	500	7/2/2009 5:40	7/2/2009 8:40	1.000	0.712	1.014	114.22%	1.00%	3 *
4	1201245715.1	1.0000	2.0399E-05	7/1/2009 0:00	4	1D	15	108	2265	151.000	0.6043	0.00511	0.524	500	7/2/2009 5:40	7/2/2009 8:40	1.000	0.712	1.014	120.58%	1.00%	4 *
5	1201245716.1	1.0000	2.0399E-05	7/1/2009 0:00	5	2A	15	69	1838	122.533	0.6172	0.00349	0.450	500	7/2/2009 5:40	7/2/2009 8:40	1.000	0.712	1.014	105.84%	1.00%	5 *
6	1201245717.1	1.0000	2.0399E-05	7/1/2009 0:00	6	2B	15	8	2053	136.867	0.6167	0.00383	1.428	500	7/2/2009 5:40	7/2/2009 8:40	1.000	0.712	1.014	102.70%	1.00%	6 *
7	1201245718.1	1.0000	2.0399E-05	7/1/2009 0:00	7	2C	15	96	1982	132.133	0.5969	0.00575	0.334	500	7/2/2009 5:40	7/2/2009 8:40	1.000	0.711	1.014	112.82%	1.00%	7 *
8	1201245719.1	1.0000	2.0399E-05	7/1/2009 0:00	8	2D	15	93	1984	132.267	0.6119	0.00479	0.378	500	7/2/2009 5:40	7/2/2009 9:08	1.000	0.676	1.014	111.91%	1.00%	8 *
9	1201245720.1	1.0000	2.0399E-05	7/1/2009 0:00	9	3A	15	233	1645	109.667	0.5682	0.00943	0.762	500	7/2/2009 5:40	7/2/2009 9:08	1.000	0.675	1.014	100.83%	1.00%	9 *
10	1201245721.1	1.0000	2.0399E-05	7/1/2009 0:00	10	3B	15	99	1821	121.400	0.5980	0.00655	1.710	500	7/2/2009 5:40	7/2/2009 9:08	1.000	0.675	1.014	108.20%	1.00%	10 *
11	1201245722.1	1.0000	2.0399E-05	7/1/2009 0:00	11	3C	15	96	1942	129.467	0.6164	0.00535	0.822	500	7/2/2009 5:40	7/2/2009 9:08	1.000	0.675	1.014	114.22%	1.00%	11 *
12	1201245723.1	1.0000	2.0399E-05	7/1/2009 0:00	12	3D	15	90	2076	138.400	0.5994	0.00464	0.630	500	7/2/2009 5:40	7/2/2009 9:08	1.000	0.675	1.014	120.58%	1.00%	12 *
13	1201245724.1	1.0000	2.0399E-05	7/1/2009 0:00	13	4A	15	79	1877	125.133	0.6208	0.00744	0.890	500	7/2/2009 5:40	7/2/2009 9:08	1.000	0.675	1.014	105.84%	1.00%	13 *
14	1201245725.1	1.0000	2.0399E-05	7/1/2009 0:00	14	4B	15	13	1909	127.267	0.6205	0.00196	1.838	500	7/2/2009 5:40	7/2/2009 9:08	1.000	0.675	1.014	102.70%	1.00%	14 *
15	1201245726.1	1.0000	2.0399E-05	7/1/2009 0:00	15	4C	15	97	1974	131.600	0.6052	0.00426	1.260	500	7/2/2009 5:40	7/2/2009 9:09	1.000	0.674	1.014	112.82%	1.00%	15 *
16	1201245727.1	1.0000	2.0399E-05	7/1/2009 0:00	16	4D	15	181	1880	125.333	0.5873	0.00816	1.070	500	7/2/2009 5:40	7/2/2009 9:25	1.000	0.654	1.014	111.91%	1.00%	16 *
17	1201245728.1	1.0000	2.0399E-05	7/1/2009 0:00	17	5A	15	53	1818	121.200	0.6258	0.00816	0.496	500	7/2/2009 5:40	7/2/2009 9:26	1.000	0.653	1.014	100.83%	1.00%	17 *
18	1201245729.1	1.0000	2.0399E-05	7/1/2009 0:00	18	5B	15	59	1785	119.000	0.6280	0.00816	1.050	500	7/2/2009 5:40	7/2/2009 9:26	1.000	0.653	1.014	108.20%	1.00%	18 *
19	1201245730.1	1.0000	2.0399E-05	7/1/2009 0:00	19	5C	15	43	2009	133.933	0.6368	0.00816	0.946	500	7/2/2009 5:40	7/2/2009 9:26	1.000	0.653	1.014	114.22%	1.00%	19 *
20	1201245731.1	1.0000	2.0399E-05	7/1/2009 0:00	20	5D	15	59	2107	140.467	0.6237	0.00816	1.248	500	7/2/2009 5:40	7/2/2009 9:26	1.000	0.652	1.014	120.58%	1.00%	20 *
21	1201245732.1	1.0000	2.0399E-05	7/1/2009 0:00	21	6A	15	35	1800	120.000	0.6221	0.00816	1.004	500	7/2/2009 5:40	7/2/2009 9:27	1.000	0.652	1.014	105.84%	1.00%	21 *
22	1201245733.1	1.0000	2.0399E-05	7/1/2009 0:00	22	6B	15	71	1816	121.067	0.6163	0.00816	0.764	500	7/2/2009 5:40	7/2/2009 9:27	1.000	0.651	1.014	102.70%	1.00%	22 *
23	1201245734.1	1.0000	2.0399E-05	7/1/2009 0:00	23	6C	15	81	1933	128.867	0.6111	0.00816	1.836	500	7/2/2009 5:40	7/2/2009 9:27	1.000	0.651	1.014	112.82%	1.00%	23 *
24	1201245735.1	1.0000	2.0399E-05	7/1/2009 0:00	24	6D	15	81	1826	121.733	0.6120	0.00816	0.362	500	7/2/2009 5:40	7/2/2009 9:47	1.000	0.627	1.014	111.91%	1.00%	24 *
25	1201245736.1	1.0000	2.0399E-05	7/1/2009 0:00	25	7A	15	75	1711	114.067	0.6180	0.00816	0.344	500	7/2/2009 5:40	7/2/2009 9:48	1.000	0.627	1.014	100.83%	1.00%	25 *
26	1201245737.1	1.0000	2.0399E-05	7/1/2009 0:00	26	7B	15	59	1783	118.867	0.6280	0.00816	0.378	500	7/2/2009 5:40	7/2/2009 9:48	1.000	0.627	1.014	108.20%	1.00%	26 *
27	1201245738.1	1.0000	2.0399E-05	7/1/2009 0:00	27	7C	15	74	1934	128.933	0.6178	0.00816	0.302	500	7/2/2009 5:40	7/2/2009 9:48	1.000	0.627	1.014	114.22%	1.00%	27 *
28	1201245739.1	1.0000	2.0399E-05	7/1/2009 0:00	28	7D	15	83	1963	130.867	0.6257	0.00816	0.396	500	7/2/2009 5:40	7/2/2009 9:48	1.000	0.627	1.014	120.58%	1.00%	28 *
29	1201245740.1	1.0000	2.0399E-05	7/1/2009 0:00	29	8A	15	49	1653	110.200	0.6247	0.00816	0.788	500	7/2/2009 5:40	7/2/2009 9:48	1.000	0.626	1.014	105.84%	1.00%	29 *
30	1201245741.1	1.0000	2.0399E-05	7/1/2009 0:00	30	8B	15	20	1788	119.200	0.6332	0.00816	1.946	500	7/2/2009 5:40	7/2/2009 9:48	1.000	0.626	1.014	102.70%	1.00%	30 *
31	1201245742.1	1.0000	2.0399E-05	7/1/2009 0:00	31	8C	15	34	1920	128.000	0.6339	0.00816	0.676	500	7/2/2009 5:40	7/2/2009 9:48	1.000	0.626	1.014	112.82%	1.00%	31 *
32	1201245743.1	1.0000	2.0399E-05	7/1/2009 0:00	32	8D	15	45	1782	118.800	0.6281	0.00816	1.312	500	7/2/2009 5:40	7/2/2009 10:07	1.000	0.604	1.014	111.91%	1.00%	32 *
33	1201490021.1	1.0000	2.0399E-05	7/1/2009 0:00	33	9A	15	17	1689	112.600	0.6496	0.00816	0.380	500	7/2/2009 5:40	7/2/2009 10:06	1.000	0.605	1.014	100.83%	1.00%	33 *
34	1201490022.1	1.0000	2.0399E-05	7/1/2009 0:00	34	9B	15	13	1706	113.733	0.6356	0.00816	1.206	500	7/2/2009 5:40	7/2/2009 10:06	1.000	0.605	1.014	108.20%	1.00%	34 *
35	1201490023.1	1.0000	2.0399E-05	7/1/2009 0:00	35	9C	15	13	1802	120.133	0.6273	0.00816	0.370	500	7/2/2009 5:40	7/2/2009 10:06	1.000	0.605	1.014	114.22%	1.00%	35 *
36	1201490024.1	1.0000	2.0399E-05	7/1/2009 0:00	36	9D	15	15	1945	129.667	0.6433	0.00816	1.292	500	7/2/2009 5:40	7/2/2009 10:06	1.000	0.605	1.014	120.58%	1.00%	36 *
37	1201490025.1	1.0000	2.0399E-05	7/1/2009 0:00	37	10A	15	10	1708	113.867	0.6389	0.00816	0.316	500	7/2/2009 5:40	7/2/2009 10:07	1.000	0.604	1.014	105.84%	1.00%	37 *
38	1201490026.1	1.0000	2.0399E-05	7/1/2009 0:00	38	10B	15	19	1743	116.200	0.6137	0.00816	6.596	500	7/2/2009 5:40	7/2/2009 10:07	1.000	0.604	1.014	102.70%	1.00%	38 *
39	1201490027.1	1.0000	2.0399E-05	7/1/2009 0:00	39	10C	15	15	1826	121.733	0.6250	0.00816	0.324	500	7/2/2009 5:40	7/2/2009 10:07	1.000	0.604	1.014	112.82%	1.00%	39 *
40	1201490028.1	1.0000	2.0399E-05	7/1/2009 0:00	40	10D	15	14	1769	117.933	0.6320	0.00816	0.348	500	7/2/2009 5:40	7/2/2009 10:22	1.000	0.587	1.014	111.91%	1.00%	40 *
41	1201245736.1	1.0000	2.0399E-05	7/1/2009 0:00	41	11A	15	19	2125	141.667	0.5825	0.00816	0.344	500	7/2/2009 5:40	7/2/2009 7:26	1.000	0.819	1.014	100.83%	1.00%	41 *
42	1201245737.1	1.0000	2.0399E-05	7/1/2009 0:00	42	11B	15	22	2260	150.667	0.6372	0.00816	0.378	500	7/2/2009 5:40	7/2/2009 7:26	1.000	0.819	1.014	108.20%	1.00%	42 *
43	1201245738.1	1.0000	2.0399E-05	7/1/2009 0:00	43	11C	15	13	2544	169.600	0.6352	0.00816	0.302	500	7/2/2009 5:40	7/2/2009 7:26	1.000	0.819	1.014	114.22%	1.00%	43 *
44	1201245739.1	1.0000	2.0399E-05	7/1/2009 0:00	44	11D	15	14	2596	173.067	0.6348	0.00816	0.396	500	7/2/2009 5:40	7/2/2009 7:26	1.000	0.819	1.014	120.58%	1.00%	44 *
45	1201245740.1	1.0000	2.0399E-05	7/1/2009 0:00	45	12A	15	17	2235	149.000	0.6286	0.00816	0.788	500	7/2/2009 5:40	7/2/2009 7:26	1.000	0.818	1.014	105.84%	1.00%	45 *
46	1201245741.1	1.0000	2.0399E-05	7/1/2009 0:00	46	12B	15	10	2330	155.333	0.6352	0.00816	1.946	500	7/2/2009 5:40	7/2/2009 7:26	1.000	0.818	1.014	102.70%	1.00%	46 *
47	1201245742.1	1.0000	2.0399E-05	7/1/2009 0:00	47	12C	15	16	2530	168.667	0.6304	0.00816	0.676	500	7/2/2009 5:40	7/2/2009 7:26	1.000	0.818	1.014	112.82%	1.00%	47 *
48	1201245743.1	1.0000	2.0399E-05	7/1/2009 0:00	48	12D	15	10	2463	164.200	0.6320	0.00816	1.312	500	7/2/2009 5:40	7/2/2009 7:26	1.000	0.818	1.014	111.91%	1.00%	48 *
49	1201490021.1	1.0000	2.0399E-05	7/1/2009 0:00	49	13A	15	11	2231	148.733	0.6410	0.00816	0.380	500	7/2/2009 5:40	7/2/2009 7:49	1.000	0.783	1.014	100.83%	1.00%	49 *
50	1201490022.1	1.0000	2.0399E-05	7/1/2009 0:00	50	13B	15	13	2190	146.000	0.6526	0.00816	1.206	500	7/2/2009 5:40	7/2/2009 7:49	1.000	0.783	1.014	108.20%	1.00%	50 *
51	1201490023.1	1.0000	2.0399E-05	7/1/2009 0:00	51	13C	15	11	2458	163.867	0.6538	0.00816	0.370	500	7/2/2009 5:40	7/2/2009 7:49	1.000	0.783	1.014	114.22%	1.00%	51 *
52	1201490024.1	1.0000	2.0399E-05	7/1/2009 0:00	52	13D	15	12	2635	175.667	0.6377	0.00816	1.292	500	7/2/2009 5:40	7/2/2009 7:50	1.000	0.783	1.014	120.58%	1.00%	52 *
53	1201490025.1	1.0000	2.0399E-05	7/1/2009 0:00	53	14A	15	11	2173	144.867	0.6393	0.00816	0.316	500	7/2/2009 5:40	7/2/2009 7:50	1.000	0.783	1.014	105.84%	1.00%	53 *
54	1201490026.1	1.0000	2.0399E-05	7/1/2009 0:00	54	14B	15	11	2281	152.067	0.6266	0.00816	6.596	500	7/2/2009 5:40	7/2/2009 7:50	1.000	0.782	1.014	102.70%	1.00%	54 *
55	1201490027.1	1.0000	2.0399E-05	7/1/2009 0:00	55	14C	15	14	2323	154.867	0.6375	0.00816	0.324	500	7/2/2009 5:40	7/2/2009 7:50	1.000	0.782	1.014	112.82%	1.00%	55 *
56	1201490028.1	1.0000	2.0399E-05	7/1/2009 0:00	56	14D	15	14	2388	159.200	0.6326	0.00816	0.348	500	7/2/2009 5:40	7/2/2009 7:50	1.000	0.782	1.014	111.91%	1.00%	56 *

141

7/2/09

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

* indicates results calculated at 100% recovery

s Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act Error pCi/L	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA Counting Uncertainty pCi/L	2 SIGMA Total Prop. Uncertainty pCi/L	Sample Type	Nominal pCi/L	Recovery
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%
0.5369	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	0.8753	**159.8328**	0.0239	150.4760	3.1730	6.6057	25.6756	LCS	164.3409	97.3%
0.4261	0.3008	1	0.8097	**127.0000**	0.0257	122.0833	2.8583	5.8279	20.5368	LCS	164.3409	77.3%
0.7599	0.5365	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	0.2930	1	0.8072	**145.8192**	0.0251	131.8887	2.9696	6.4352	23.5274	LCS	164.3409	88.7%
0.6347	0.4481	1	1.1343	**129.6854**	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	2.8886	6.1761	21.9739	LCS	164.3409	82.5%
0.9036	0.6379	1	1.4942	**136.9155**	0.0254	125.4287	2.9134	6.2333	22.1127	LCS	164.3409	83.3%
0.7676	0.5419	1	1.3079	**145.9626**	0.0252	130.3400	2.9624	6.5032	23.5621	LCS	164.3409	88.8%
0.7520	0.5309	1	1.3000	**147.9661**	0.0266	124.2633	2.8910	6.7471	24.0105	LCS	164.3409	90.0%
0.4809	0.3395	1	0.9027	**134.9911**	0.0269	120.7040	2.8427	6.2312	21.9265	LCS	164.3409	82.1%
0.6974	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	2.9884	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	**134.1883**	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**	0.0268	121.3713	2.8489	6.6518	23.4785	LCS	164.3409	88.0%
0.4227	0.2984	1	0.8330	**134.2390**	0.0275	113.7227	2.7577	6.3803	21.8573	LCS	164.3409	81.7%
0.4360	0.3079	1	0.8480	**137.6373**	0.0270	118.4887	2.8152	6.4094	22.3723	LCS	164.3409	83.8%
0.3962	0.2797	1	0.7956	**151.8935**	0.0262	128.6313	2.9319	6.7858	24.6088	LCS	164.3409	92.4%
0.4480	0.3163	1	0.8657	**152.1131**	0.0261	130.4707	2.9539	6.7499	24.6318	LCS	164.3409	92.6%
0.6332	0.4470	1	1.1278	**127.8251**	0.0279	109.4120	2.7108	6.2072	20.8518	LCS	164.3409	77.8%
0.9817	0.6931	1	1.6167	**135.1471**	0.0273	117.2540	2.8197	6.3699	21.9896	LCS	164.3409	82.2%
0.5779	0.4080	1	1.0463	**146.5864**	0.0263	127.3240	2.9214	6.5922	23.7610	LCS	164.3409	89.2%
0.8422	0.5946	1	1.4301	**141.4935**	0.0272	117.4880	2.8147	6.6441	23.0149	LCS	164.3409	86.1%
0.4379	0.3091	1	0.8509	**130.5505**	0.0276	112.2200	2.7400	6.2476	21.2692	LCS	164.3409	79.4%
0.7972	0.5629	1	1.3635	**133.7974**	0.0277	112.5273	2.7540	6.4182	21.8026	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**	0.0275	113.5507	2.7553	6.3927	21.8871	LCS	164.3409	81.8%
1.9322	1.3641	1	2.9747	**135.0540**	0.0285	109.6040	2.7857	6.7277	22.0820	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	0.3132	1	0.8728	**144.8386**	0.0271	117.5853	2.8041	6.7699	23.5500	LCS	164.3409	88.1%
0.3432	0.2423	1	0.6763	**135.4549**	0.0253	141.3227	3.0733	5.7736	21.8705	LCS	164.3409	82.4%
0.3289	0.2322	1	0.6397	**131.6931**	0.0247	150.2887	3.1694	5.4434	21.2189	LCS	164.3409	80.1%
0.2949	0.2082	1	0.5922	**148.8038**	0.0237	169.2980	3.3626	5.7929	23.8866	LCS	164.3409	90.5%
0.3379	0.2385	1	0.6530	**151.8473**	0.0235	172.6707	3.3968	5.8549	24.3615	LCS	164.3409	92.4%
0.4816	0.3400	1	0.8577	**131.6889**	0.0249	148.2120	3.1520	5.4891	21.2301	LCS	164.3409	80.1%
0.7488	0.5287	1	1.2332	**134.8566**	0.0246	153.3873	3.2186	5.5463	21.7215	LCS	164.3409	82.1%
0.4447	0.3140	1	0.8052	**148.8317**	0.0238	167.9907	3.3535	5.8232	23.8982	LCS	164.3409	90.6%
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	0.6660	**135.0873**	0.0248	148.3533	3.1490	5.6202	21.7752	LCS	164.3409	82.2%
0.5997	0.4234	1	1.0256	**129.5009**	0.0251	144.7940	3.1202	5.4697	20.8960	LCS	164.3409	78.8%
0.3316	0.2341	1	0.6469	**146.0021**	0.0240	163.4967	3.3053	5.7852	23.4616	LCS	164.3409	88.8%
0.6355	0.4487	1	1.0805	**159.6717**	0.0235	174.3747	3.4225	6.1425	25.6134	LCS	164.3409	97.2%
0.3136	0.2214	1	0.6255	**132.0625**	0.0251	144.5507	3.1078	5.5650	21.3060	LCS	164.3409	80.4%
1.4618	1.0321	1	2.2506	**135.6135**	0.0254	145.4707	3.1861	5.8215	21.9070	LCS	164.3409	82.5%
0.3185	0.2249	1	0.6330	**141.6298**	0.0245	154.5427	3.2133	5.7718	22.7990	LCS	164.3409	86.2%
0.3327	0.2349	1	0.6546	**146.7439**	0.0242	158.8520	3.2579	5.8988	23.6017	LCS	164.3409	89.3%

7/2/09

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

7/21/09

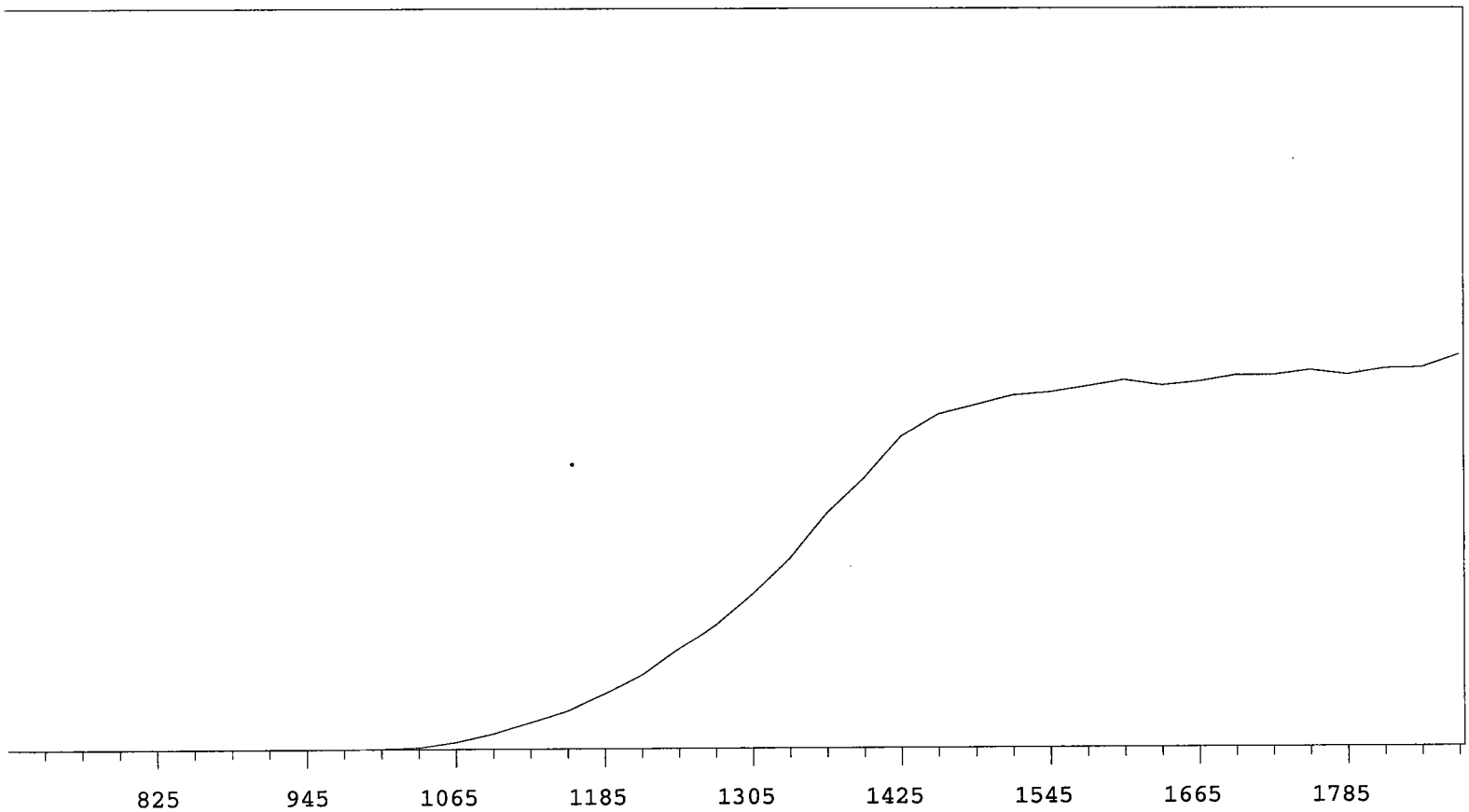
4	13D	15	12	2635	7/2/2009 7:50	7/2/2009 8:05	Protean
5	14A	15	11	2173	7/2/2009 7:50	7/2/2009 8:05	Protean
6	14B	15	11	2281	7/2/2009 7:50	7/2/2009 8:05	Protean
7	14C	15	14	2323	7/2/2009 7:50	7/2/2009 8:05	Protean
8	14D	15	14	2388	7/2/2009 7:50	7/2/2009 8:05	Protean

Ra-228	Cal Date	7/2/2009	Exp Date	7/31/2009	
Protean	A0	A1	A2	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

MPC 9600 Plateau Instrument 1 MPC 9604 Detector A 7/1/2009

Alpha Volts: 1575 Beta Volts: 1575

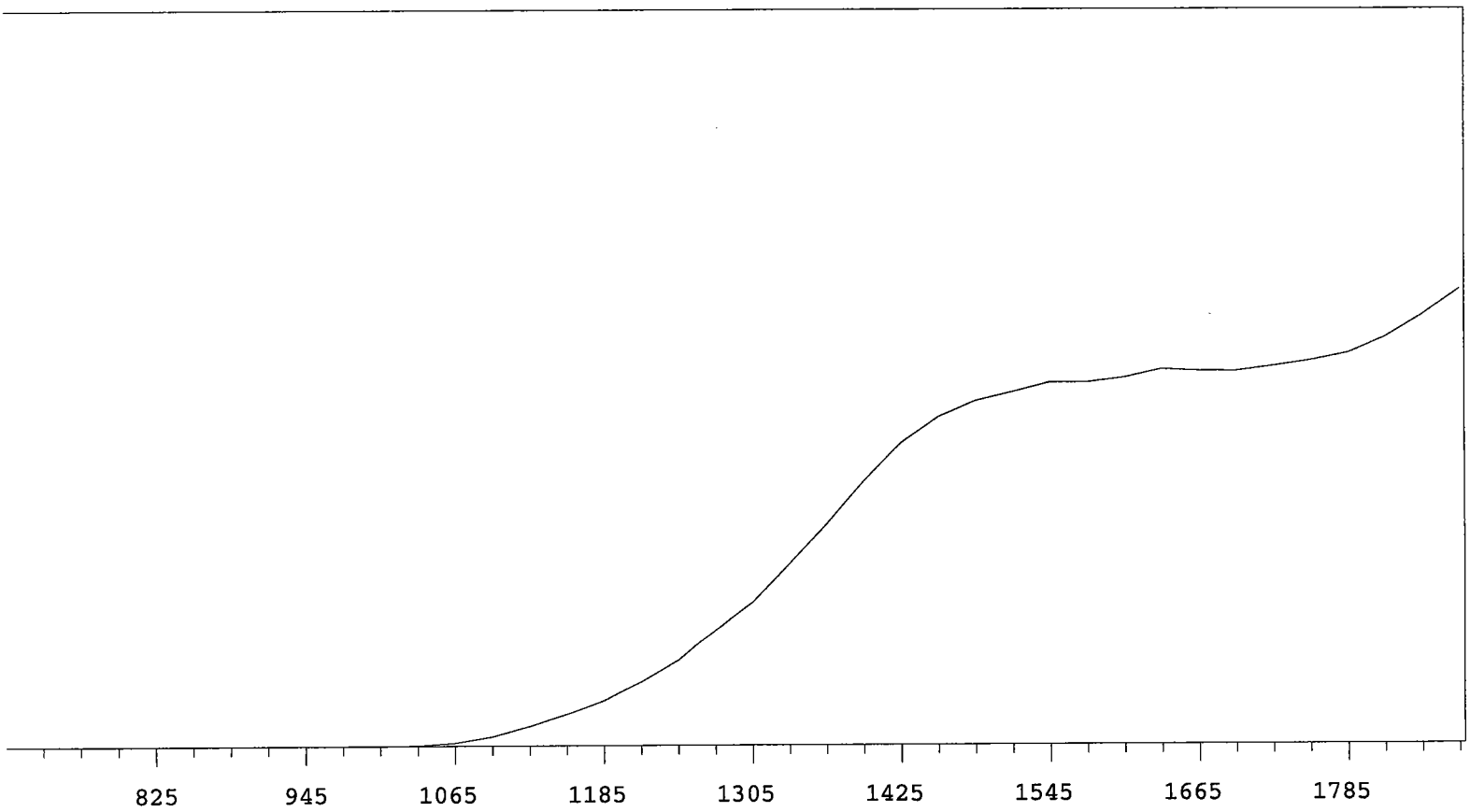


VOLTS	COUNTS	%/100 Volts
705	1	
735	1	
765	0	
795	0	+0.00
825	0	>100
855	1	>100
885	0	+55.56
915	2	+66.67
945	0	>100
975	2	>100
1005	42	>100
1035	145	>100
1065	544	>100
1095	1136	>100
1125	1967	>100
1155	2845	>100
1185	4078	>100
1215	5483	+93.18
1245	7400	+83.35
1275	9328	+75.40

VOLTS	COUNTS	%/100 Volts
1305	11640	+69.78
1335	14241	+62.88
1365	17534	+55.91
1395	20127	+45.04
1425	23254	+31.29
1455	24902	+20.41
1485	25605	+10.49
1515	26310	+6.44
1545	26535	+5.31
1575	26953	+2.79
1605	27399	+1.83
1635	27000	+1.71
1665	27255	+1.62
1695	27723	+3.14
1725	27705	+1.56
1755	28072	+1.15
1785	27729	+1.43
1815	28194	+3.24
1845	28243	
1875	29191	

MPC 9600 Plateau Instrument 1 MPC 9604 Detector B 7/1/2009

Alpha Volts: 1575 Beta Volts: 1575

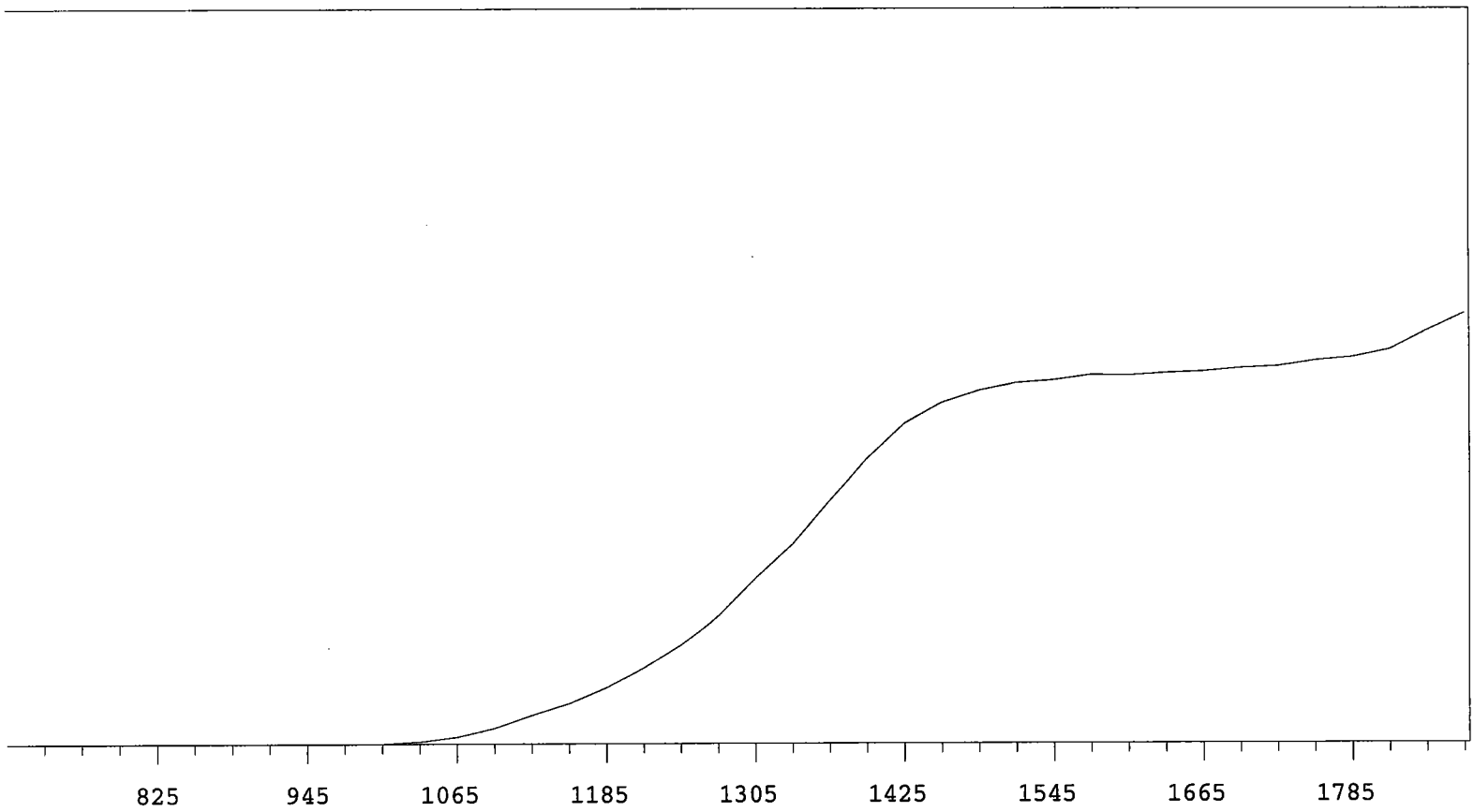


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	+55.56
795	1	+83.33
825	1	+55.56
855	0	>100
885	1	+0.00
915	0	+0.00
945	1	>100
975	0	>100
1005	4	>100
1035	56	>100
1065	292	>100
1095	890	>100
1125	1841	>100
1155	2936	>100
1185	4179	>100
1215	5837	>100
1245	7821	+91.28
1275	10638	+83.88

VOLTS	COUNTS	%/100 Volts
1305	13188	+75.92
1335	16818	+67.60
1365	20420	+59.86
1395	24341	+47.85
1425	27854	+35.51
1455	30288	+23.26
1485	31798	+14.54
1515	32622	+8.32
1545	33496	+5.11
1575	33475	+4.43
1605	33903	+3.09
1635	34654	+2.46
1665	34485	+1.74
1695	34445	+1.84
1725	34908	+3.91
1755	35401	+6.80
1785	36062	+10.27
1815	37505	+14.30
1845	39508	
1875	41843	

MPC 9600 Plateau Instrument 1 MPC 9604 Detector C 7/1/2009

Alpha Volts: 1575 Beta Volts: 1575

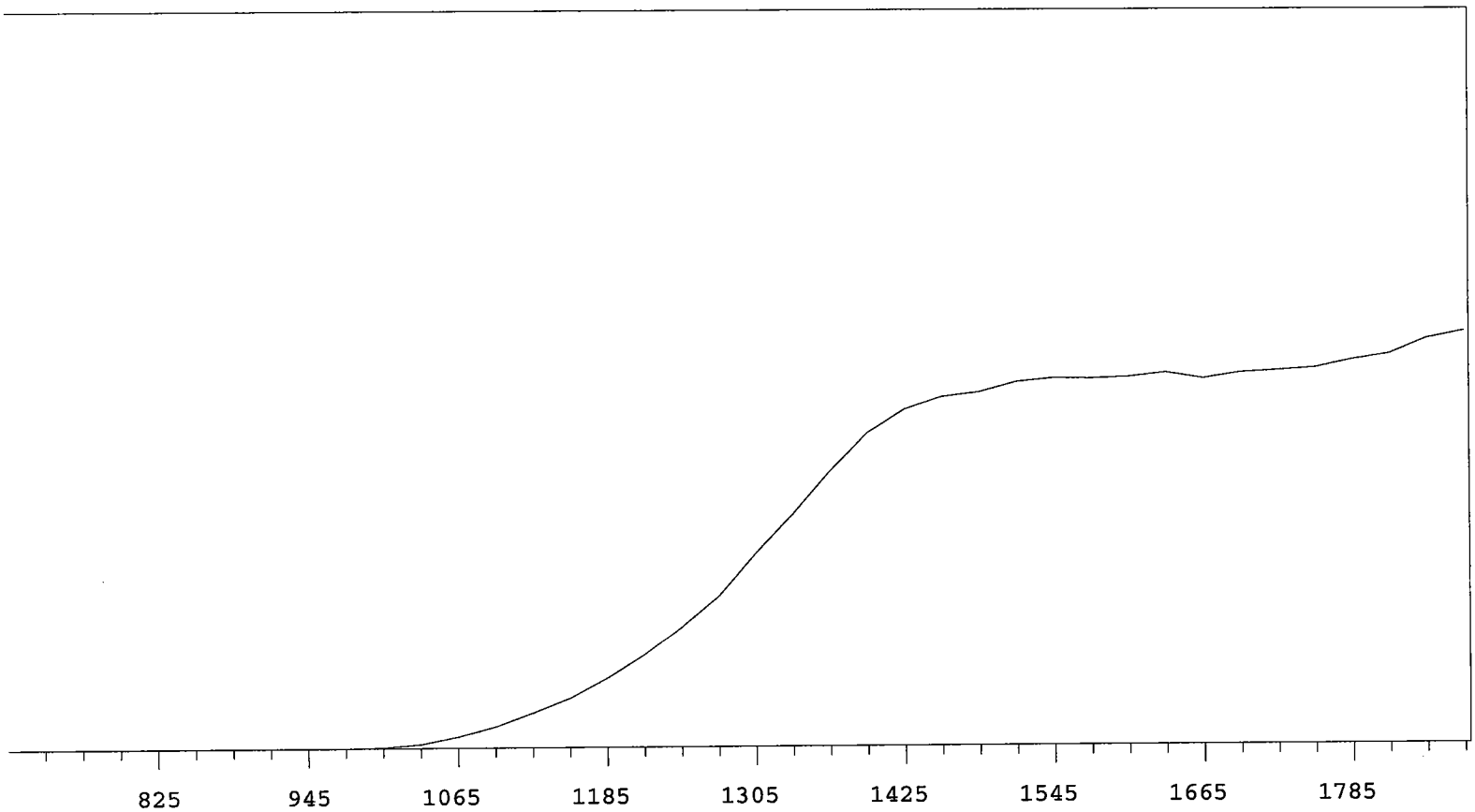


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	1	+0.00
795	0	>100
825	1	-55.56
855	1	+55.56
885	0	>100
915	1	>100
945	0	>100
975	4	>100
1005	32	>100
1035	206	>100
1065	639	>100
1095	1416	>100
1125	2551	>100
1155	3619	>100
1185	5037	+98.68
1215	6875	+91.19
1245	8915	+85.53
1275	11519	+77.28

VOLTS	COUNTS	%/100 Volts
1305	14817	+71.06
1335	17823	+63.34
1365	21704	+53.63
1395	25422	+42.55
1425	28424	+29.21
1455	30244	+18.11
1485	31305	+10.10
1515	31989	+6.07
1545	32223	+3.43
1575	32671	+2.15
1605	32621	+1.68
1635	32837	+1.52
1665	32961	+2.01
1695	33249	+2.64
1725	33409	+3.21
1755	33931	+4.07
1785	34234	+7.20
1815	34909	+10.28
1845	36660	
1875	38205	

MPC 9600 Plateau Instrument 1 MPC 9604 Detector D 7/1/2009

Alpha Volts: 1575 Beta Volts: 1575

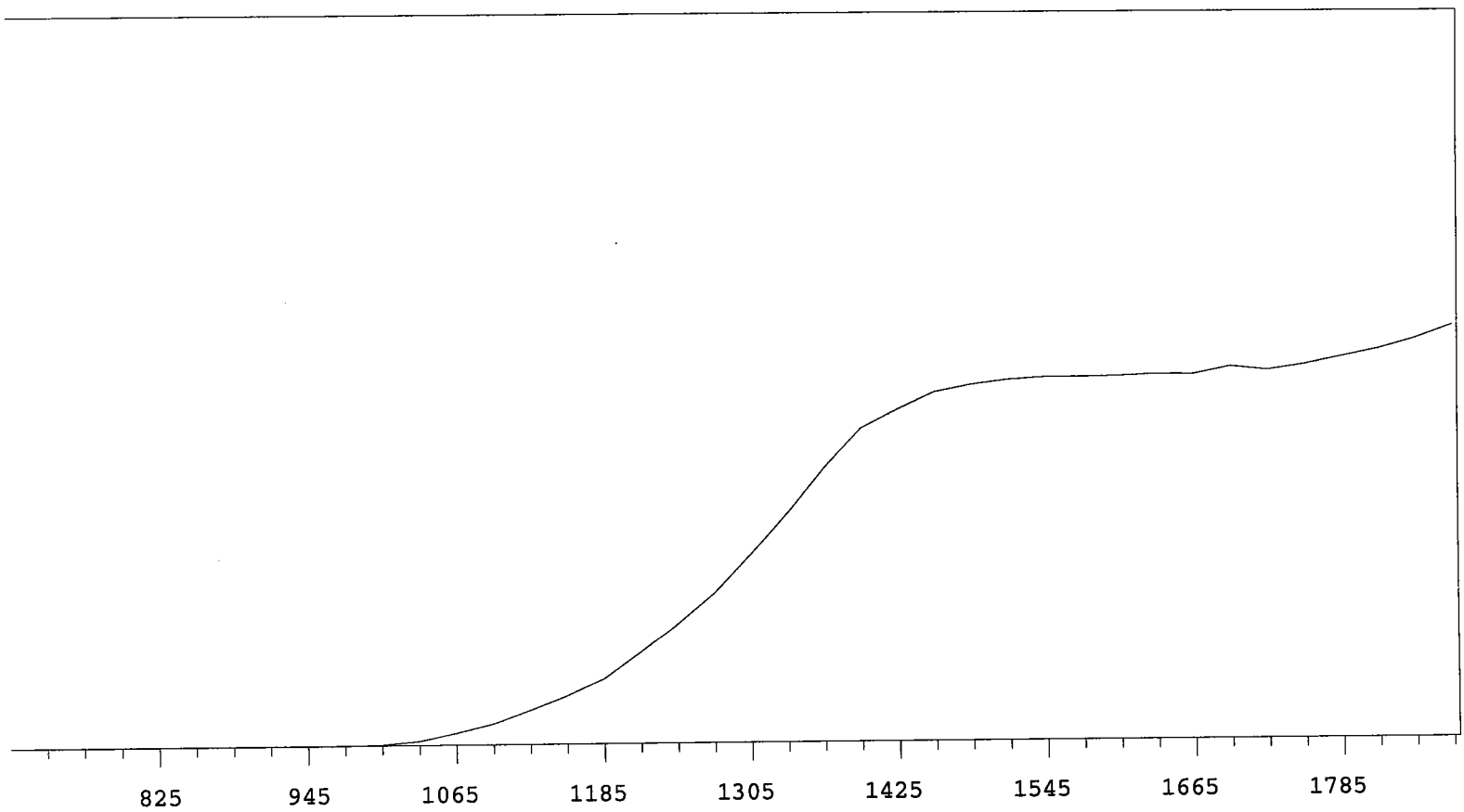


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+0.00
795	1	+0.00
825	0	+0.00
855	1	>100
885	0	>100
915	0	>100
945	0	>100
975	8	>100
1005	75	>100
1035	303	>100
1065	872	>100
1095	1656	>100
1125	2729	>100
1155	3862	>100
1185	5425	+98.19
1215	7256	+88.82
1245	9510	+81.89
1275	11944	+74.07

VOLTS	COUNTS	%/100 Volts
1305	15202	+66.36
1335	18216	+57.86
1365	21597	+45.58
1395	24648	+32.96
1425	26505	+19.92
1455	27475	+11.42
1485	27836	+7.08
1515	28609	+4.51
1545	28896	+2.93
1575	28862	+1.66
1605	28969	+0.36
1635	29292	+0.80
1665	28836	+1.06
1695	29279	+1.48
1725	29439	+3.59
1755	29642	+4.07
1785	30243	+6.51
1815	30699	+7.79
1845	31876	
1875	32444	

MPC 9600 Plateau Instrument 2 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

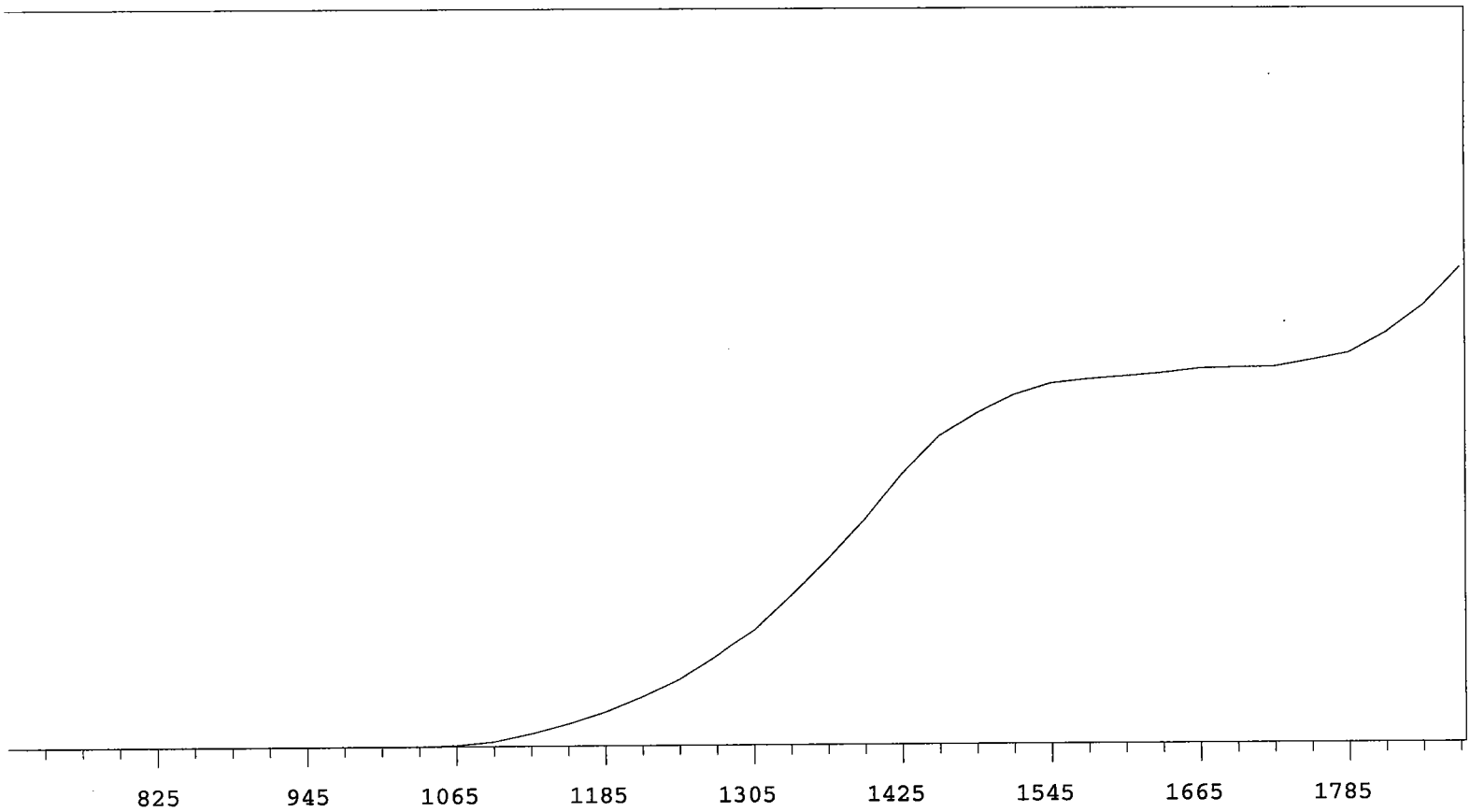


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+83.33
795	0	-83.33
825	1	>100
855	0	>100
885	1	+100.00
915	1	>100
945	2	>100
975	12	>100
1005	91	>100
1035	421	>100
1065	1239	>100
1095	2155	>100
1125	3527	>100
1155	4974	>100
1185	6647	+97.44
1215	9250	+89.00
1245	12041	+82.15
1275	15094	+73.81

VOLTS	COUNTS	%/100 Volts
1305	19017	+67.45
1335	23157	+59.23
1365	27625	+45.78
1395	31465	+32.72
1425	33352	+20.41
1455	35084	+11.74
1485	35819	+7.11
1515	36292	+3.35
1545	36527	+1.63
1575	36540	+0.87
1605	36585	+0.48
1635	36742	+1.76
1665	36691	+1.53
1695	37461	+1.89
1725	37073	+3.07
1755	37603	+4.02
1785	38346	+6.58
1815	39111	+7.95
1845	40115	
1875	41409	

MPC 9600 Plateau Instrument 2 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

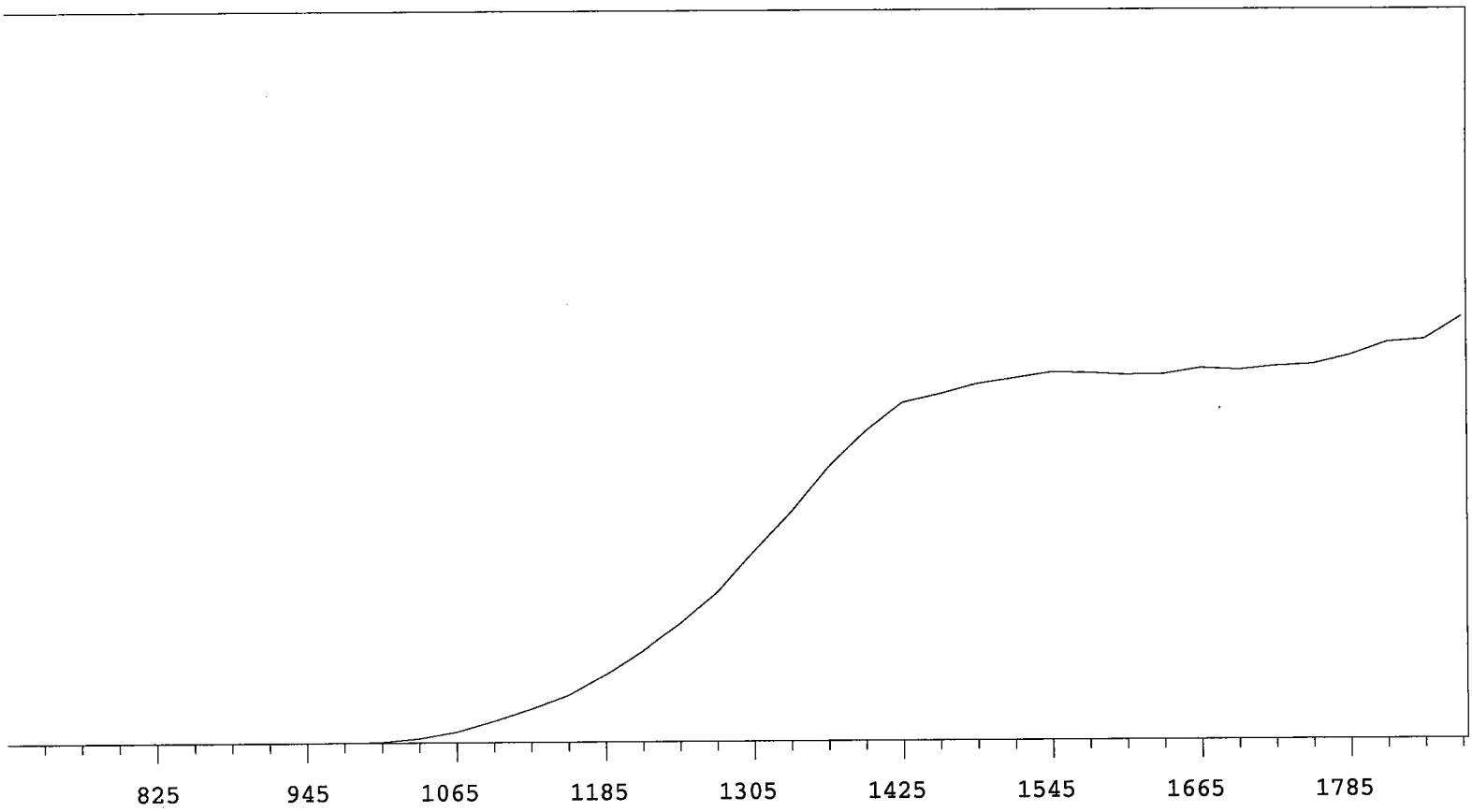


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	>100
975	2	>100
1005	3	>100
1035	14	>100
1065	127	>100
1095	500	>100
1125	1332	>100
1155	2373	>100
1185	3614	>100
1215	5227	>100
1245	7060	+97.33
1275	9574	+90.30

VOLTS	COUNTS	%/100 Volts
1305	12541	+83.18
1335	16192	+74.48
1365	20083	+67.17
1395	24273	+58.43
1425	29090	+46.86
1455	33223	+34.56
1485	35608	+22.67
1515	37581	+13.63
1545	38762	+8.18
1575	39185	+4.42
1605	39484	+3.06
1635	39806	+2.61
1665	40264	+2.03
1695	40353	+2.32
1725	40431	+3.28
1755	41127	+7.09
1785	41882	+12.40
1815	44049	+18.52
1845	46950	
1875	51097	

MPC 9600 Plateau Instrument 2 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

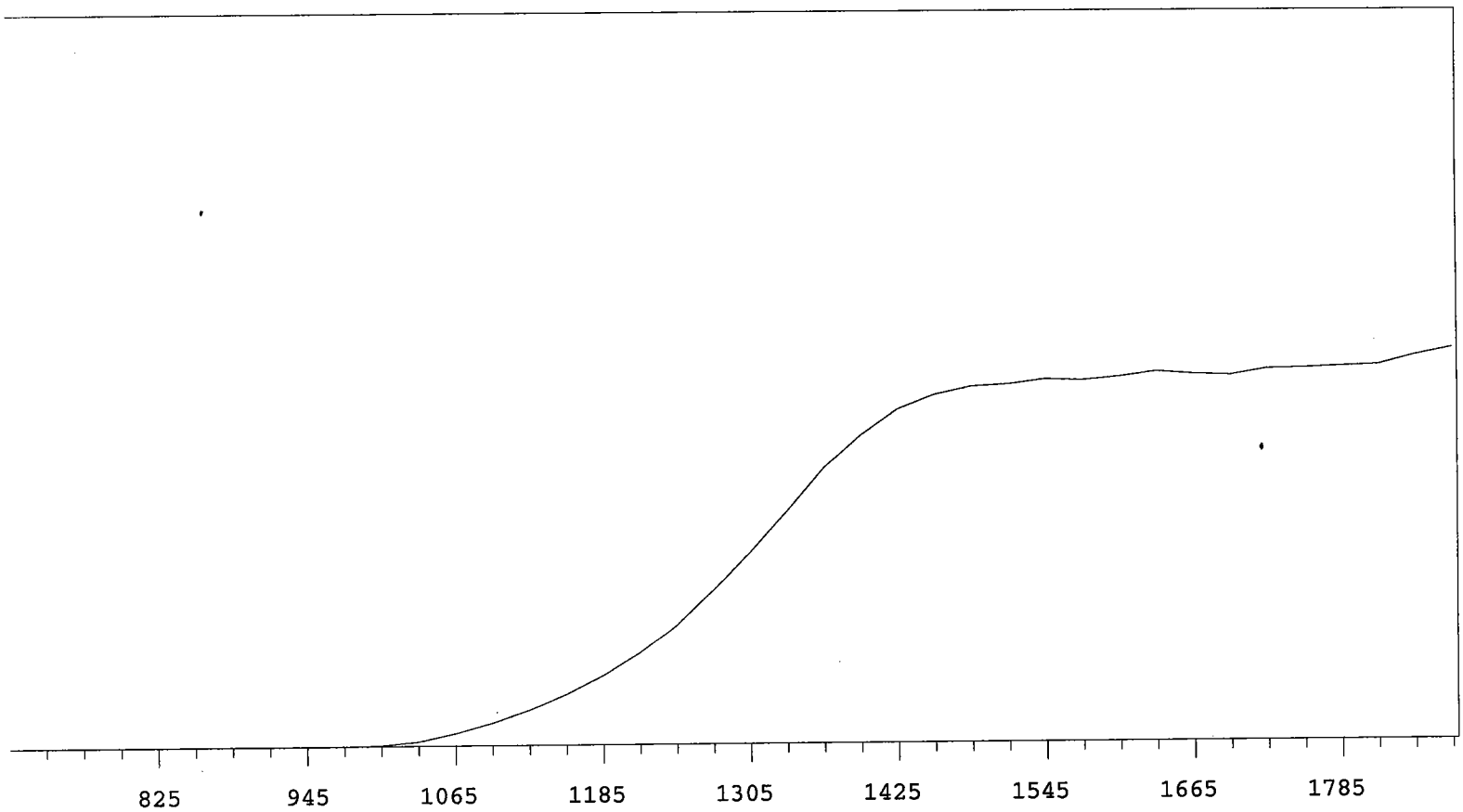


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	17	>100
1005	87	>100
1035	438	>100
1065	1055	>100
1095	2114	>100
1125	3282	>100
1155	4625	>100
1185	6554	+97.66
1215	8743	+88.09
1245	11345	+81.31
1275	14261	+74.60

VOLTS	COUNTS	%/100 Volts
1305	18216	+67.74
1335	21995	+58.11
1365	26173	+46.11
1395	29479	+32.75
1425	32186	+20.62
1455	33022	+12.13
1485	33981	+7.22
1515	34520	+4.95
1545	35095	+2.07
1575	35014	+0.38
1605	34812	+0.55
1635	34859	+1.11
1665	35460	+1.94
1695	35273	+1.95
1725	35629	+2.73
1755	35811	+5.77
1785	36656	+6.44
1815	37896	+9.21
1845	38145	
1875	40283	

MPC 9600 Plateau Instrument 2 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

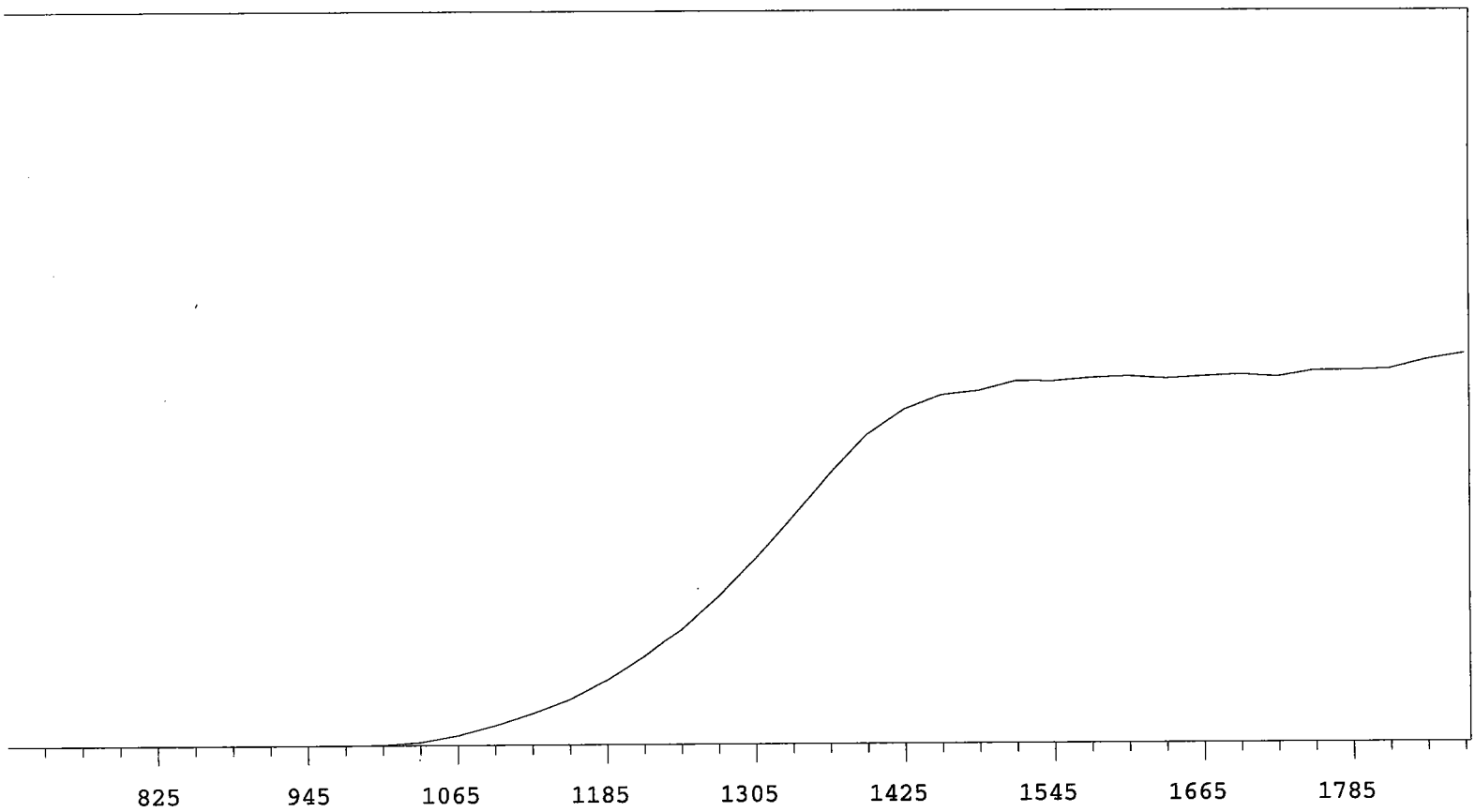


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	+83.33
795	2	+55.56
825	1	>100
855	0	>100
885	0	>100
915	0	>100
945	2	>100
975	9	>100
1005	89	>100
1035	439	>100
1065	1198	>100
1095	2164	>100
1125	3436	>100
1155	4917	>100
1185	6762	+96.59
1215	9006	+89.14
1245	11800	+81.34
1275	15132	+73.59

VOLTS	COUNTS	%/100 Volts
1305	18675	+65.94
1335	22620	+55.69
1365	26869	+44.63
1395	29957	+32.08
1425	32494	+20.49
1455	33836	+11.98
1485	34627	+6.45
1515	34849	+3.22
1545	35298	+1.98
1575	35180	+2.37
1605	35503	+1.57
1635	36006	+0.99
1665	35722	+0.89
1695	35597	+0.93
1725	36188	+1.86
1755	36272	+1.90
1785	36389	+2.55
1815	36529	+4.39
1845	37459	
1875	38170	

MPC 9600 Plateau Instrument 3 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

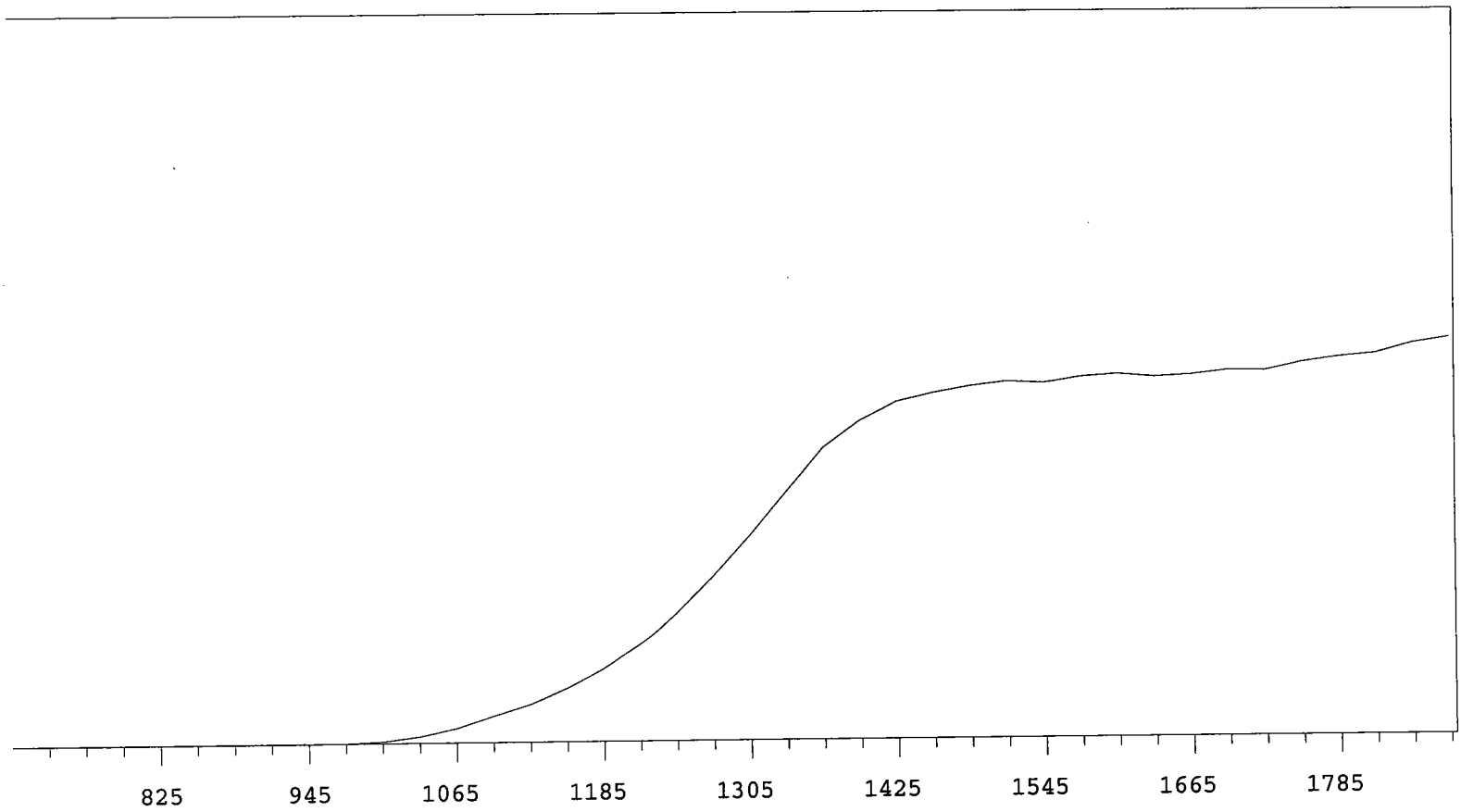


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	+55.56
795	1	>100
825	1	+0.00
855	1	>100
885	0	>100
915	0	>100
945	0	>100
975	9	>100
1005	53	>100
1035	302	>100
1065	878	>100
1095	1805	>100
1125	2887	>100
1155	4163	>100
1185	5842	+99.81
1215	7959	+90.90
1245	10323	+83.03
1275	13250	+75.91

VOLTS	COUNTS	%/100 Volts
1305	16654	+68.57
1335	20416	+59.26
1365	24191	+47.28
1395	27643	+34.04
1425	29891	+21.08
1455	31183	+12.30
1485	31558	+6.67
1515	32444	+4.05
1545	32413	+2.90
1575	32704	+0.81
1605	32837	+0.71
1635	32629	+0.49
1665	32797	+0.16
1695	32964	+1.32
1725	32746	+1.40
1755	33308	+1.56
1785	33318	+3.21
1815	33456	+3.92
1845	34283	
1875	34815	

MPC 9600 Plateau Instrument 3 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

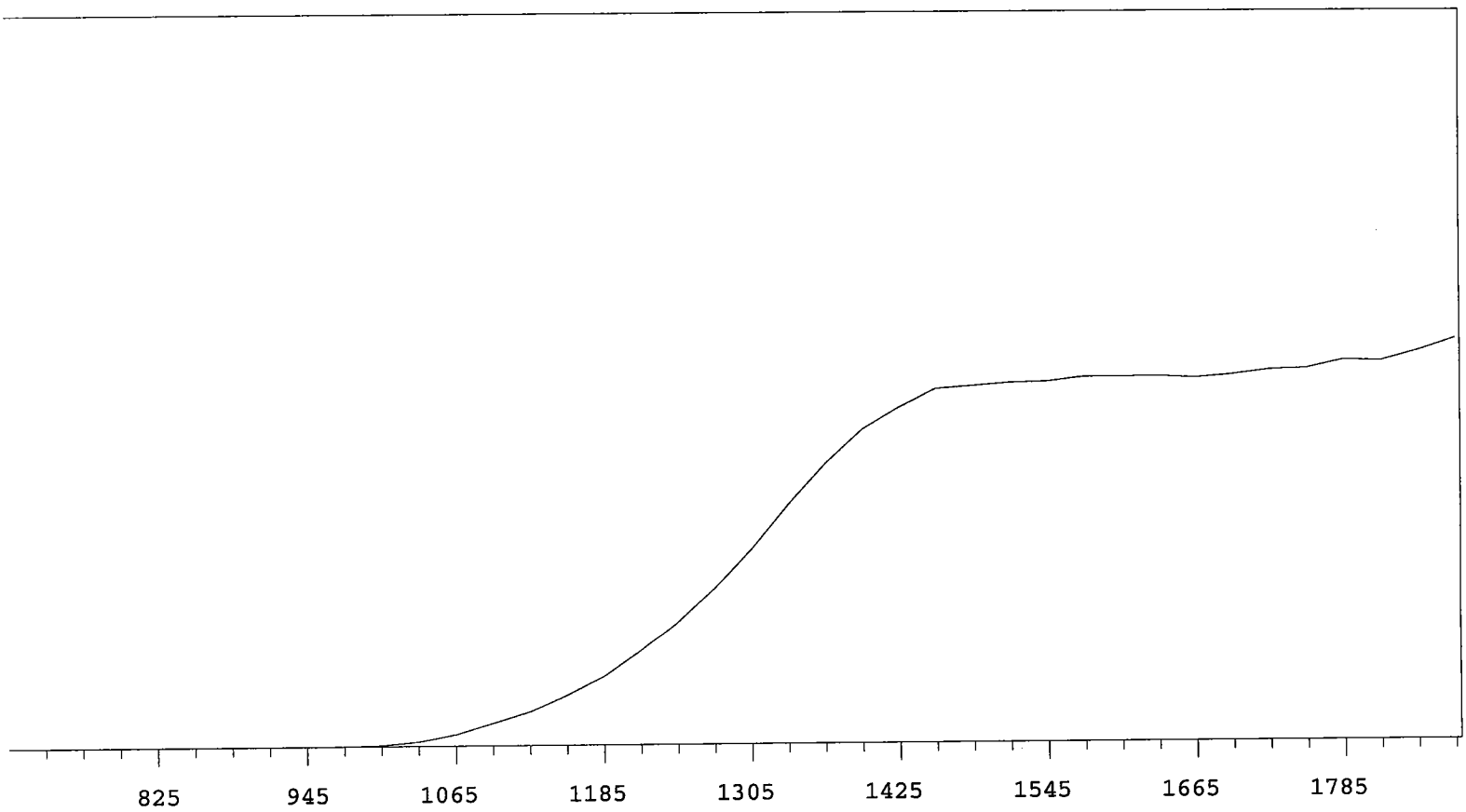


VOLTS	COUNTS	%/100 Volts
705	1	
735	1	
765	0	-55.56
795	0	>100
825	1	>100
855	3	+33.33
885	0	+0.00
915	1	>100
945	2	>100
975	29	>100
1005	165	>100
1035	613	>100
1065	1394	>100
1095	2558	>100
1125	3702	>100
1155	5222	>100
1185	7161	+96.06
1215	9507	+89.18
1245	12552	+81.52
1275	16030	+73.64

VOLTS	COUNTS	%/100 Volts
1305	19810	+64.73
1335	23962	+52.62
1365	28091	+39.27
1395	30594	+25.61
1425	32381	+14.86
1455	33206	+8.91
1485	33832	+4.41
1515	34260	+3.01
1545	34071	+2.33
1575	34623	+1.34
1605	34848	+1.22
1635	34564	+0.89
1665	34733	+1.01
1695	35144	+2.76
1725	35084	+3.66
1755	35839	+3.97
1785	36332	+5.39
1815	36654	+5.35
1845	37609	
1875	38164	

MPC 9600 Plateau Instrument 3 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

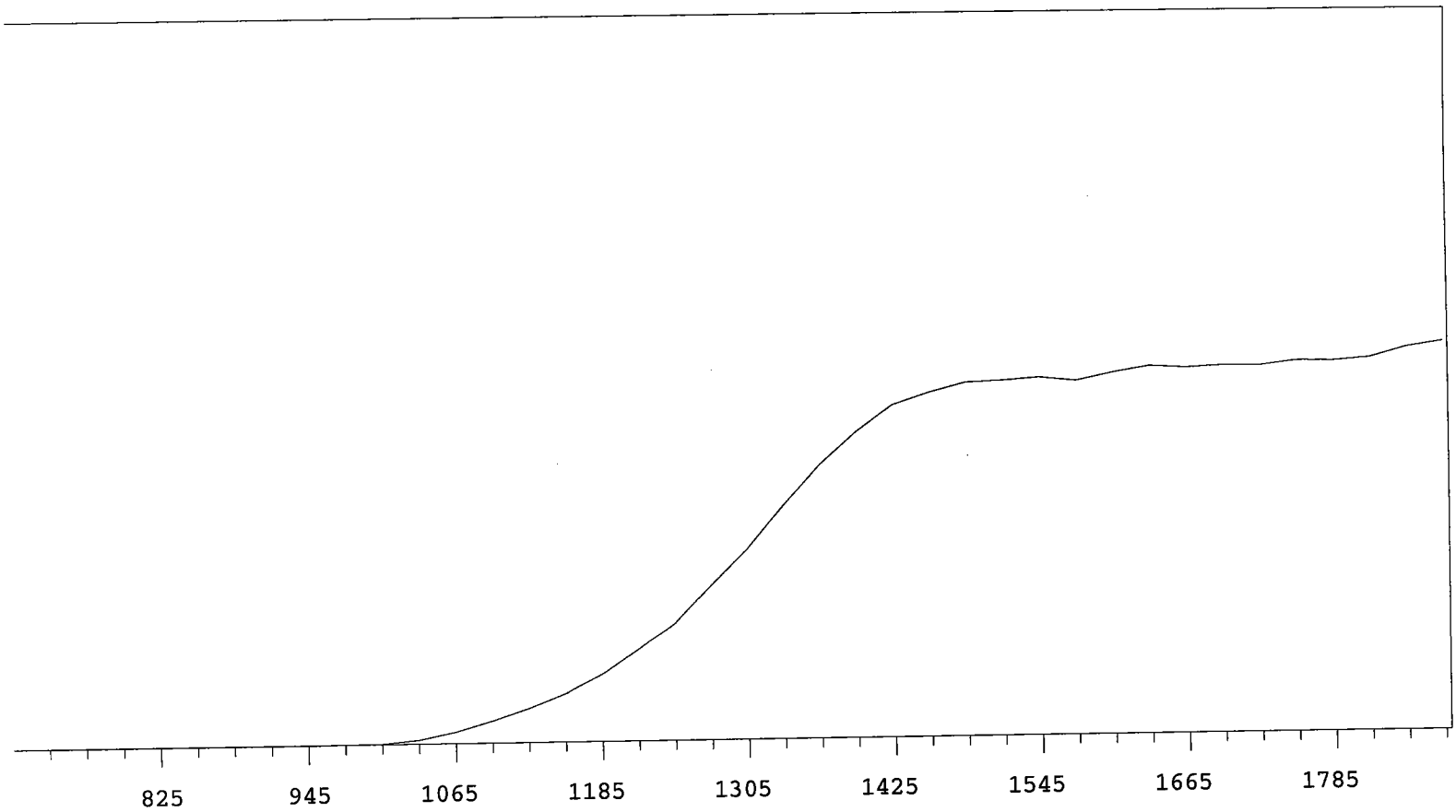


VOLTS	COUNTS	%/100 Volts
705	1	
735	1	
765	1	
795	0	>100
825	0	+0.00
855	0	>100
885	1	>100
915	1	>100
945	1	>100
975	17	>100
1005	122	>100
1035	533	>100
1065	1287	>100
1095	2493	>100
1125	3753	>100
1155	5482	>100
1185	7538	+99.39
1215	10305	+90.31
1245	13415	+82.57
1275	17141	+75.13

VOLTS	COUNTS	%/100 Volts
1305	21412	+66.80
1335	26262	+56.32
1365	30679	+43.71
1395	34466	+31.61
1425	36949	+20.14
1455	38998	+11.16
1485	39313	+5.34
1515	39625	+2.44
1545	39751	+2.04
1575	40227	+1.45
1605	40228	+0.56
1635	40255	+0.13
1665	40075	+1.22
1695	40384	+1.95
1725	40900	+3.50
1755	41028	+3.05
1785	41899	+3.71
1815	41767	+5.64
1845	42852	
1875	44132	

MPC 9600 Plateau Instrument 3 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

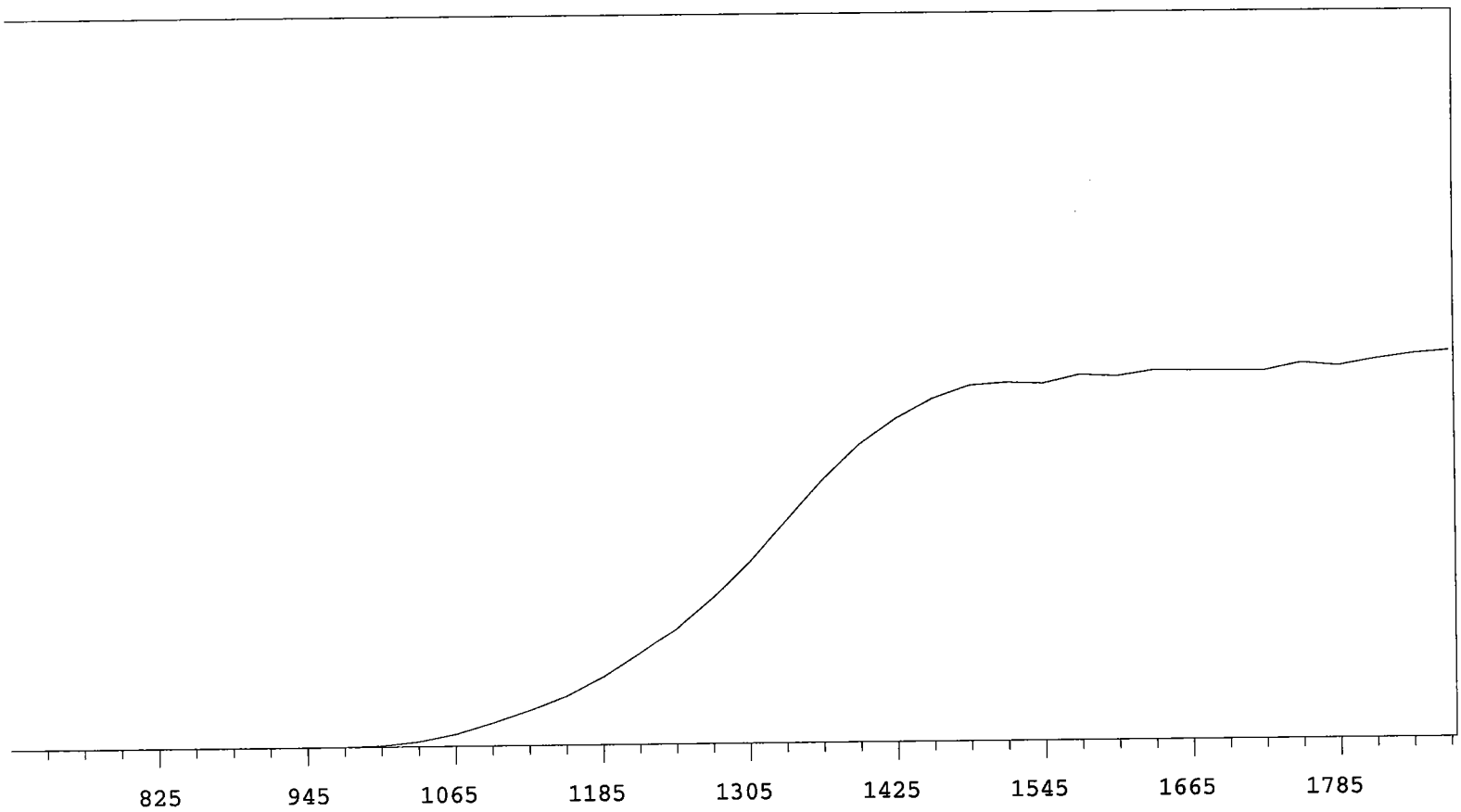


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+0.00
795	1	>100
825	0	+83.33
855	0	-83.33
885	1	>100
915	0	>100
945	1	>100
975	12	>100
1005	51	>100
1035	298	>100
1065	848	>100
1095	1649	>100
1125	2535	>100
1155	3602	>100
1185	5036	+98.31
1215	6880	+91.37
1245	8822	+82.29
1275	11546	+74.61

VOLTS	COUNTS	%/100 Volts
1305	14171	+66.45
1335	17362	+54.90
1365	20310	+43.83
1395	22647	+30.82
1425	24551	+20.19
1455	25440	+11.69
1485	26124	+5.90
1515	26245	+2.21
1545	26428	+1.39
1575	26151	+2.69
1605	26721	+2.72
1635	27168	+2.80
1665	27007	+0.87
1695	27135	+0.70
1725	27089	+1.24
1755	27414	+1.43
1785	27373	+3.21
1815	27581	+4.34
1845	28332	
1875	28750	

MPC 9600 Plateau Instrument 4 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

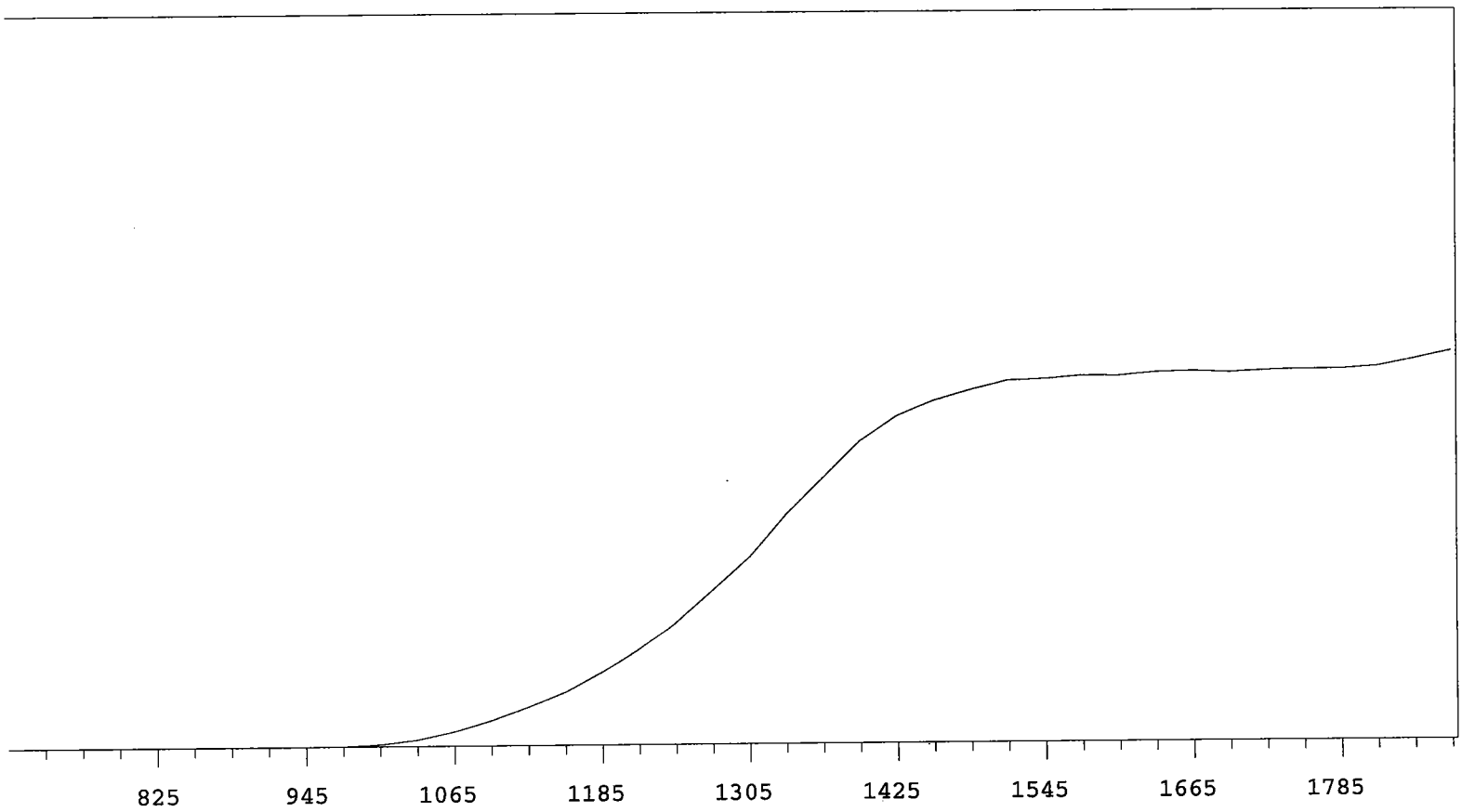


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	2	+55.56
855	1	>100
885	0	-55.56
915	3	>100
945	0	>100
975	16	>100
1005	114	>100
1035	451	>100
1065	1100	>100
1095	2068	>100
1125	3189	>100
1155	4386	>100
1185	6094	+94.81
1215	8184	+87.09
1245	10489	+78.88
1275	13273	+72.66

VOLTS	COUNTS	%/100 Volts
1305	16442	+66.24
1335	20146	+57.40
1365	23769	+46.40
1395	26926	+34.68
1425	29276	+24.40
1455	31037	+15.28
1485	32197	+7.91
1515	32425	+4.33
1545	32314	+2.14
1575	33071	+2.66
1605	32918	+2.52
1635	33435	+1.02
1665	33382	+0.73
1695	33349	+1.07
1725	33324	+1.28
1755	34001	+2.26
1785	33701	+3.08
1815	34304	+2.97
1845	34744	
1875	35012	

MPC 9600 Plateau Instrument 4 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

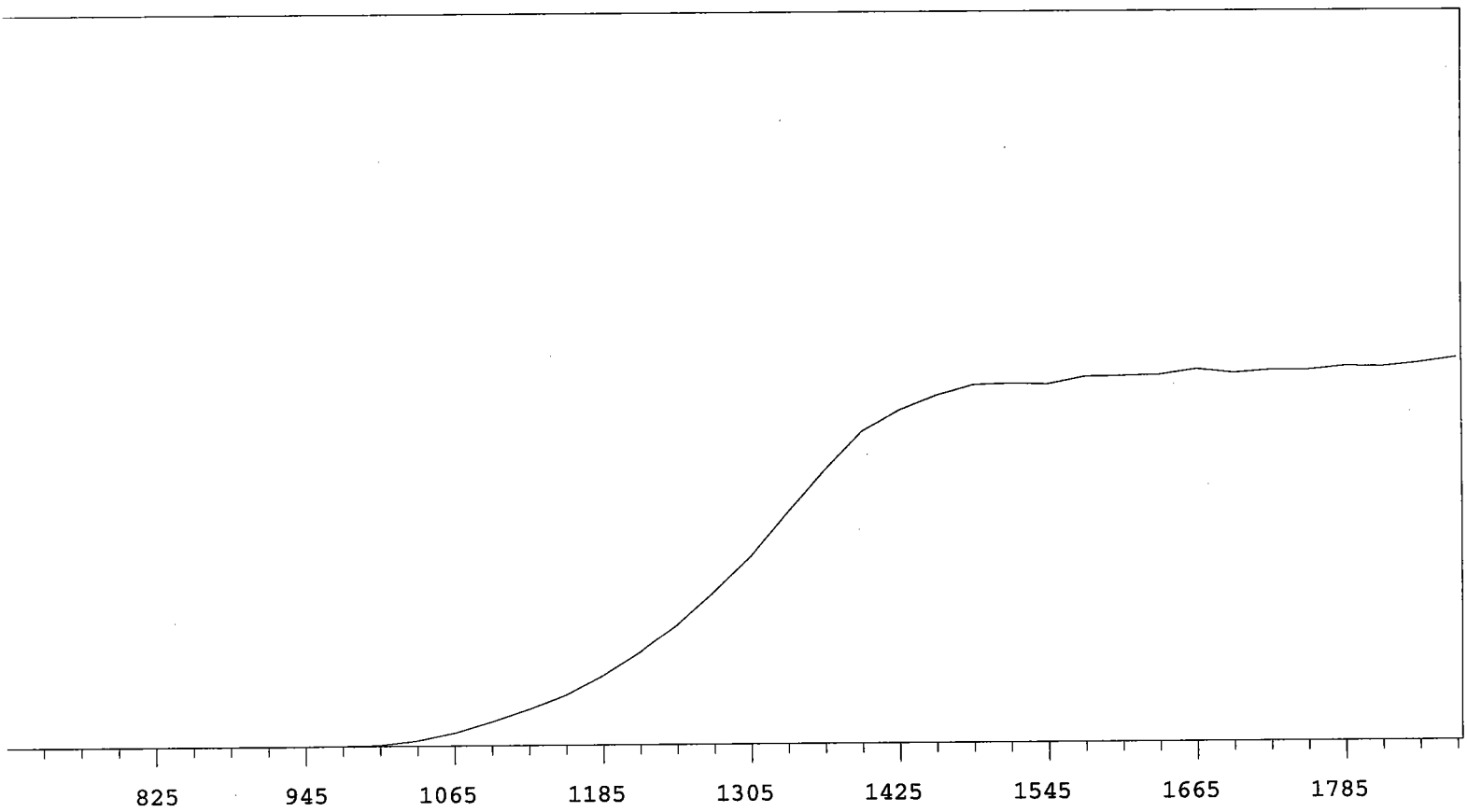


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+0.00
795	1	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	2	>100
975	31	>100
1005	176	>100
1035	550	>100
1065	1218	>100
1095	2114	>100
1125	3212	>100
1155	4416	>100
1185	6066	+92.28
1215	7936	+85.60
1245	10288	+76.79
1275	13020	+70.59

VOLTS	COUNTS	%/100 Volts
1305	15747	+62.38
1335	19230	+54.19
1365	22255	+44.46
1395	25299	+32.45
1425	27370	+22.24
1455	28625	+14.10
1485	29467	+8.56
1515	30213	+5.29
1545	30326	+2.77
1575	30564	+1.57
1605	30548	+1.52
1635	30820	+0.85
1665	30898	+0.79
1695	30779	+0.44
1725	30934	+0.45
1755	31008	+0.96
1785	30991	+2.01
1815	31196	+3.80
1845	31781	
1875	32406	

MPC 9600 Plateau Instrument 4 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

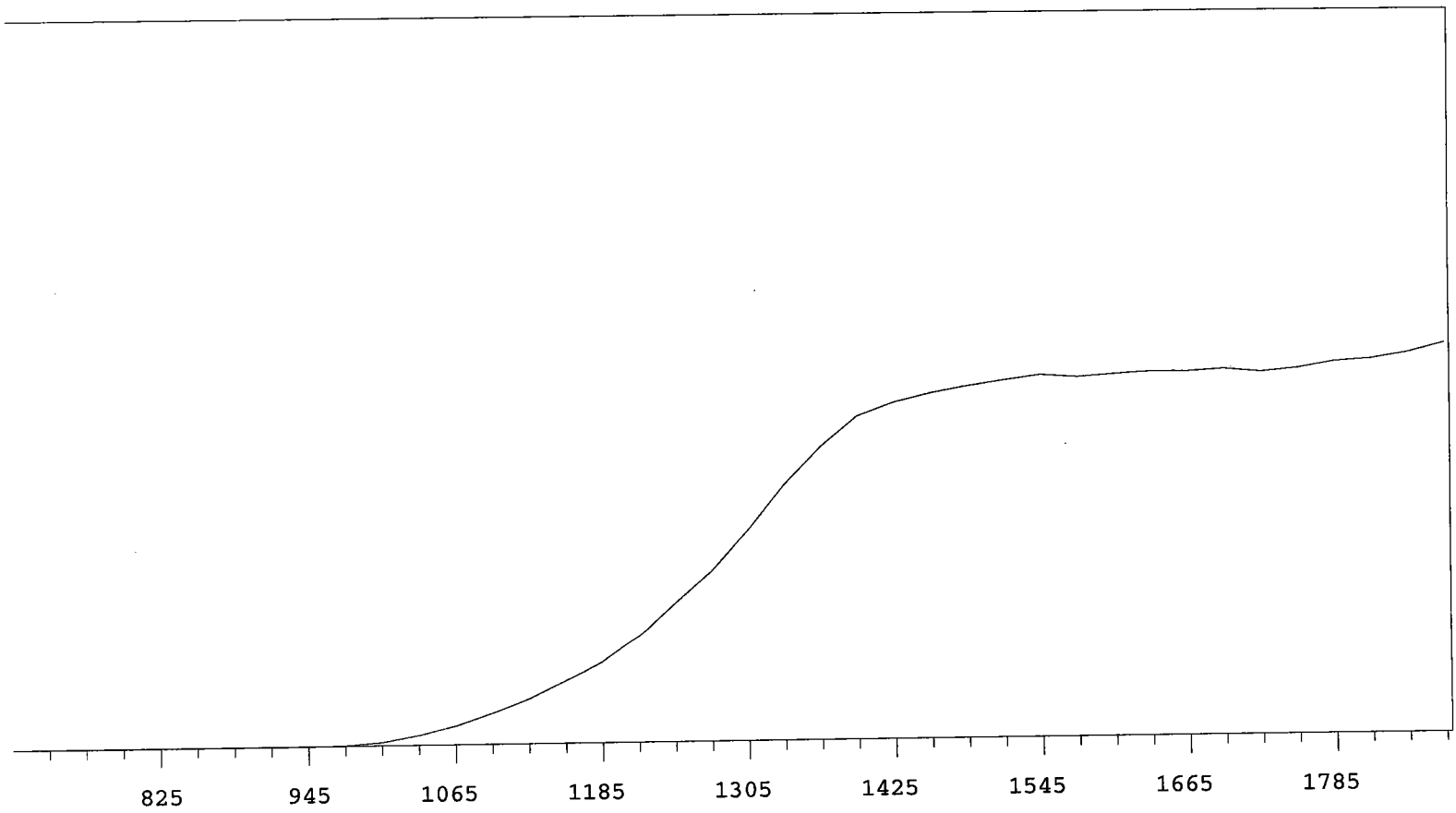


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+55.56
795	2	+0.00
825	0	-55.56
855	1	>100
885	0	>100
915	0	>100
945	2	>100
975	24	>100
1005	134	>100
1035	558	>100
1065	1361	>100
1095	2511	>100
1125	3762	>100
1155	5246	>100
1185	7268	+96.29
1215	9733	+88.98
1245	12701	+79.94
1275	16176	+73.13

VOLTS	COUNTS	%/100 Volts
1305	19796	+65.77
1335	24338	+57.55
1365	28686	+45.86
1395	32750	+32.27
1425	34919	+20.83
1455	36434	+11.45
1485	37487	+5.80
1515	37623	+3.32
1545	37528	+2.07
1575	38277	+2.12
1605	38338	+2.70
1635	38426	+1.12
1665	39007	+1.06
1695	38592	+0.64
1725	38870	+0.63
1755	38868	+1.30
1785	39238	+1.45
1815	39169	+2.34
1845	39570	
1875	40086	

MPC 9600 Plateau Instrument 4 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

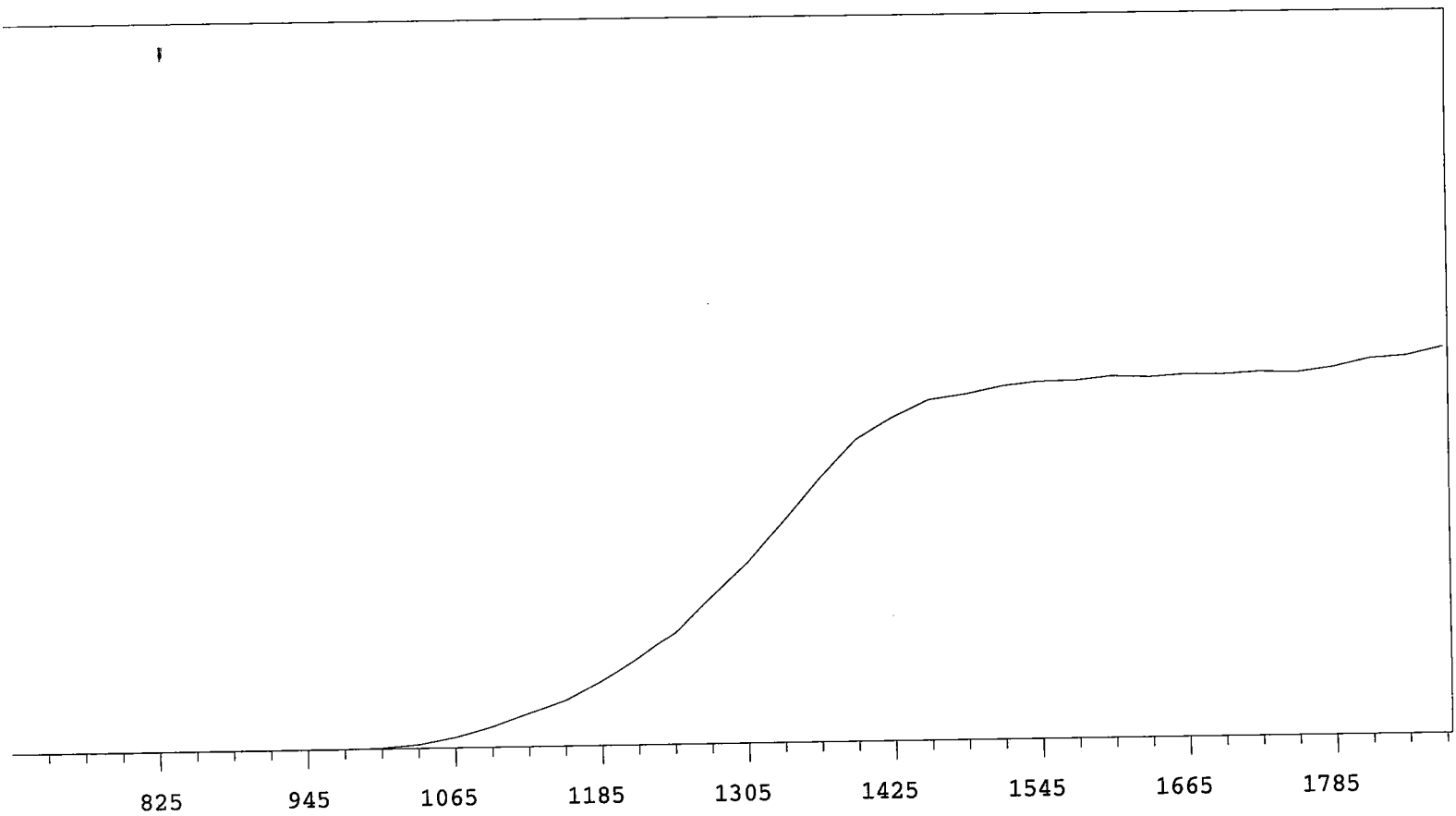


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	+0.00
795	0	>100
825	1	+83.33
855	1	+55.56
885	0	+0.00
915	1	>100
945	1	>100
975	60	>100
1005	297	>100
1035	855	>100
1065	1647	>100
1095	2700	>100
1125	3921	>100
1155	5471	+96.54
1185	7042	+90.21
1215	9405	+82.23
1245	12266	+76.33
1275	14989	+69.38

VOLTS	COUNTS	%/100 Volts
1305	18491	+61.09
1335	22444	+51.56
1365	25756	+37.44
1395	28379	+23.82
1425	29517	+14.00
1455	30309	+8.08
1485	30874	+6.03
1515	31345	+3.66
1545	31782	+2.17
1575	31567	+1.31
1605	31789	+0.78
1635	31963	+1.34
1665	31956	+0.29
1695	32123	+0.20
1725	31850	+1.46
1755	32114	+2.39
1785	32665	+3.95
1815	32876	+4.96
1845	33399	
1875	34206	

MPC 9600 Plateau Instrument 5 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

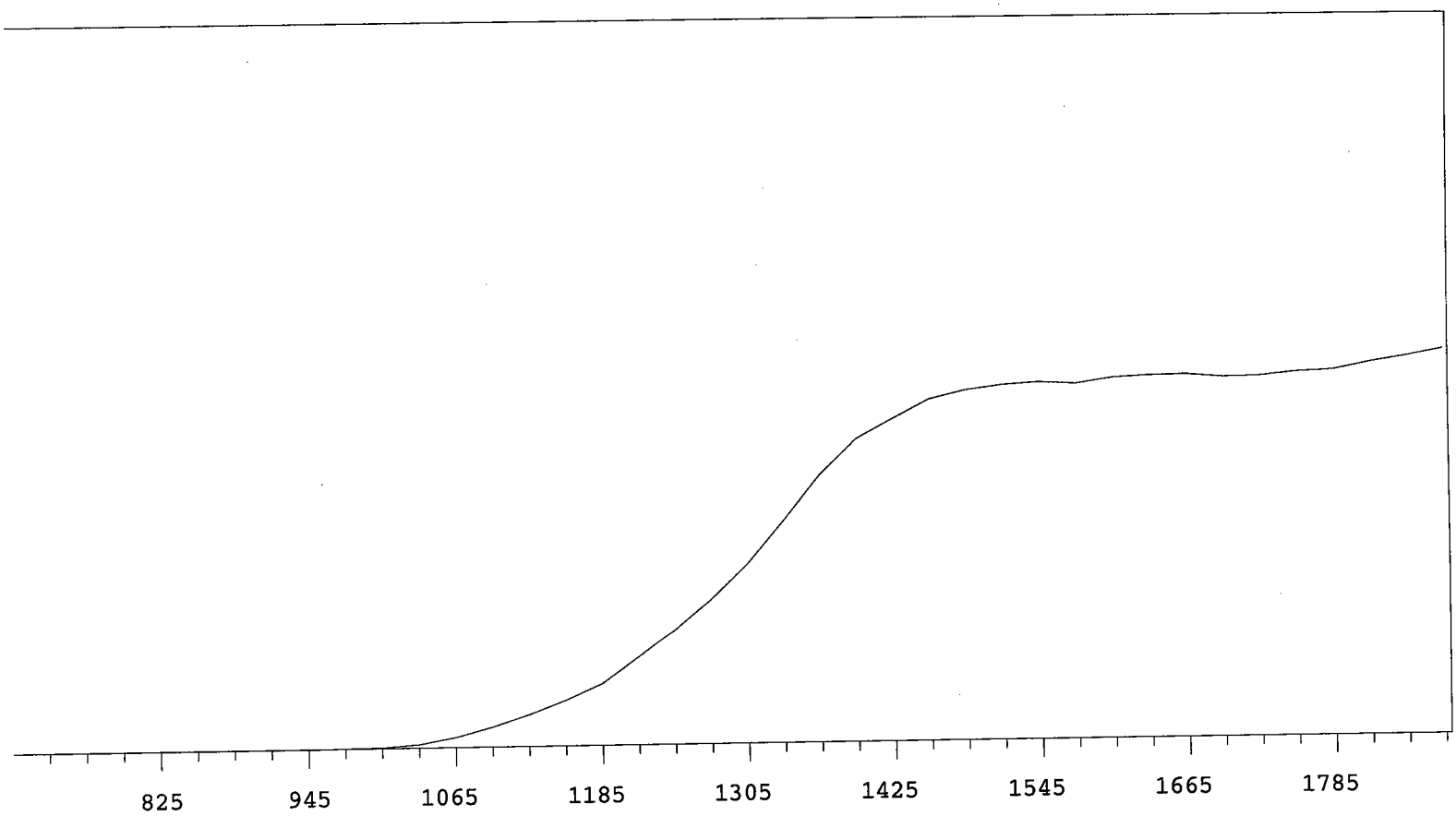


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	
795	1	+83.33
825	1	-83.33
855	1	>100
885	0	-55.56
915	0	>100
945	1	>100
975	9	>100
1005	76	>100
1035	308	>100
1065	814	>100
1095	1600	>100
1125	2598	>100
1155	3596	>100
1185	5065	+96.05
1215	6773	+90.23
1245	8717	+81.43
1275	11391	+74.83

VOLTS	COUNTS	%/100 Volts
1305	13974	+68.00
1335	17170	+58.62
1365	20456	+47.04
1395	23332	+33.83
1425	24996	+21.10
1455	26290	+12.40
1485	26683	+7.74
1515	27270	+4.43
1545	27590	+3.48
1575	27635	+1.71
1605	27932	+1.20
1635	27807	+0.88
1665	28006	+0.62
1695	27964	+0.63
1725	28112	+0.98
1755	28020	+2.84
1785	28392	+3.76
1815	29028	+5.17
1845	29220	
1875	29849	

MPC 9600 Plateau Instrument 5 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

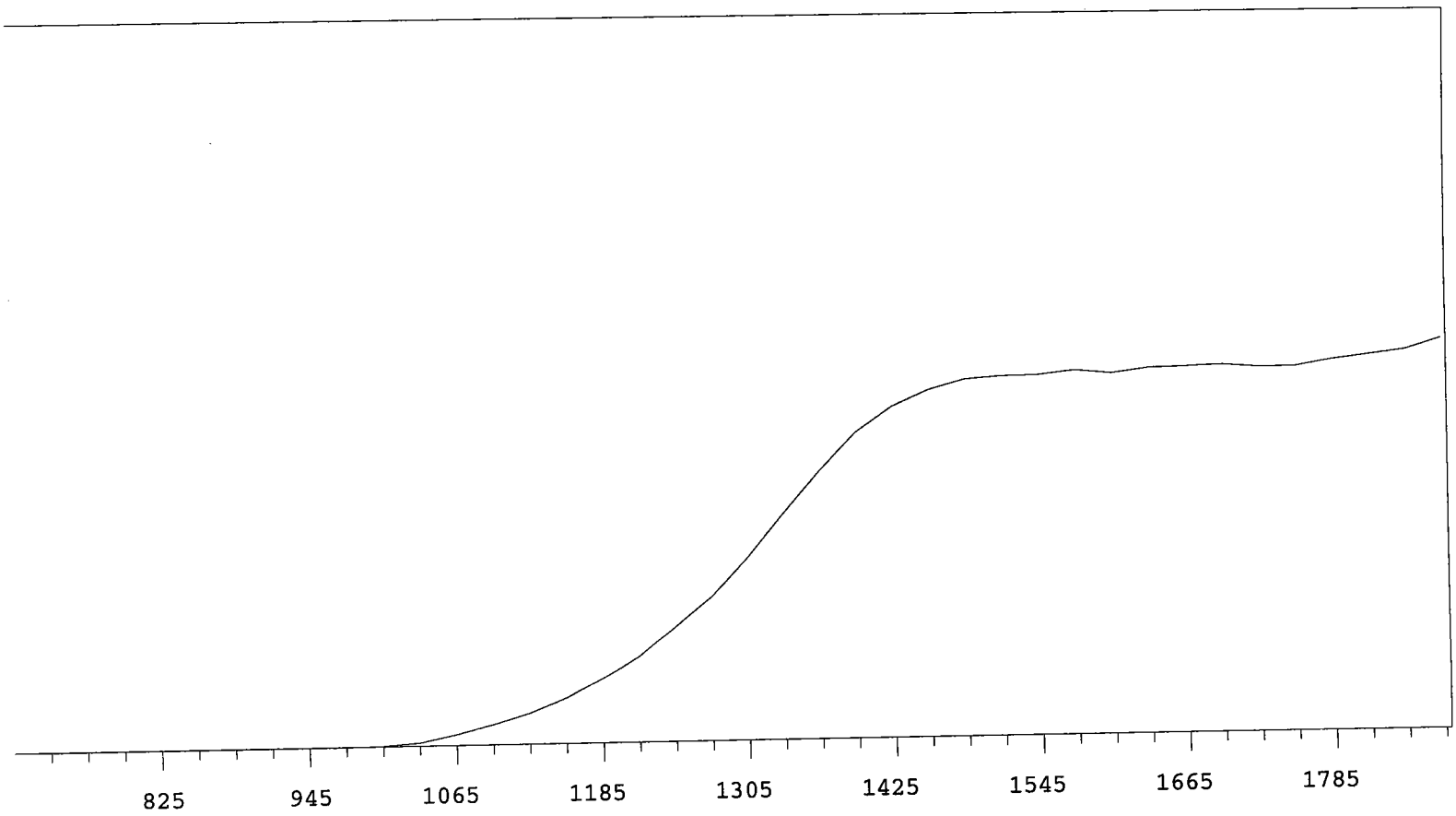


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	1	>100
855	1	+41.67
885	2	-33.33
915	0	>100
945	1	>100
975	17	>100
1005	87	>100
1035	336	>100
1065	1010	>100
1095	1955	>100
1125	3124	>100
1155	4486	>100
1185	6017	>100
1215	8507	+91.20
1245	11148	+82.59
1275	14003	+74.21

VOLTS	COUNTS	%/100 Volts
1305	17414	+68.46
1335	21540	+59.98
1365	25854	+46.75
1395	29222	+33.38
1425	31128	+21.52
1455	32995	+13.26
1485	33846	+8.09
1515	34289	+3.25
1545	34528	+2.00
1575	34311	+1.78
1605	34866	+1.78
1635	35046	+1.14
1665	35087	-0.26
1695	34795	+0.11
1725	34857	+0.93
1755	35220	+2.81
1785	35363	+3.98
1815	36028	+4.79
1845	36577	
1875	37207	

MPC 9600 Plateau Instrument 5 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

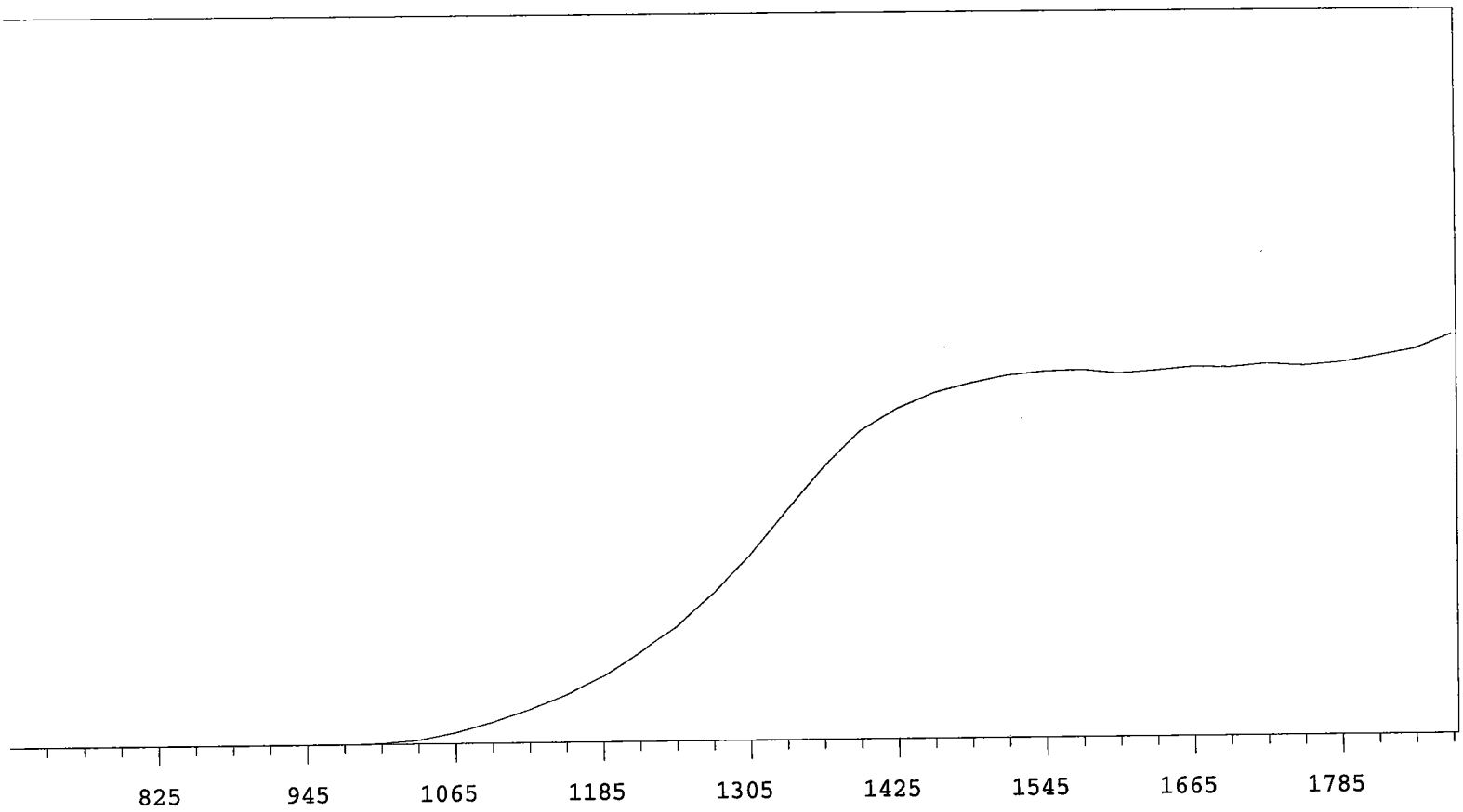


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	1	>100
885	0	>100
915	1	>100
945	2	>100
975	7	>100
1005	56	>100
1035	305	>100
1065	982	>100
1095	1874	>100
1125	2890	>100
1155	4260	>100
1185	6001	>100
1215	8050	+91.54
1245	10895	+82.98
1275	13556	+76.26

VOLTS	COUNTS	%/100 Volts
1305	17085	+68.24
1335	21135	+59.99
1365	25066	+47.39
1395	28530	+33.93
1425	30823	+22.30
1455	32287	+12.93
1485	33217	+6.71
1515	33474	+3.57
1545	33517	+1.17
1575	33921	+1.13
1605	33584	+1.27
1635	34014	+1.12
1665	34116	+0.98
1695	34225	-0.22
1725	33980	+0.58
1755	33971	+1.96
1785	34541	+3.64
1815	34954	+5.38
1845	35375	
1875	36384	

MPC 9600 Plateau Instrument 5 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

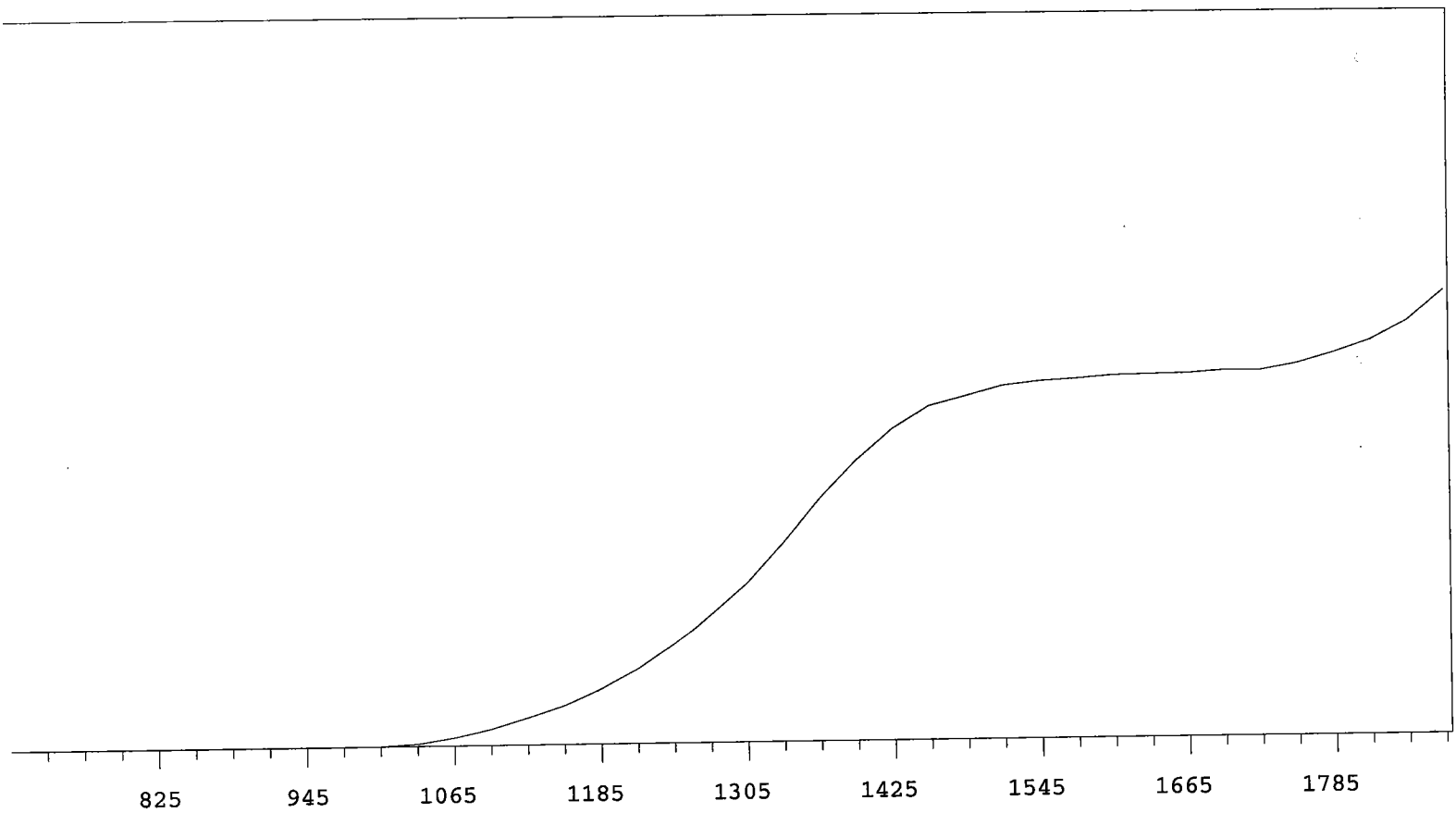


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	6	>100
1005	81	>100
1035	318	>100
1065	897	>100
1095	1710	>100
1125	2714	>100
1155	3925	>100
1185	5395	+97.31
1215	7282	+88.49
1245	9426	+81.36
1275	12007	+75.65

VOLTS	COUNTS	%/100 Volts
1305	15025	+68.87
1335	18640	+58.97
1365	22048	+45.84
1395	24877	+32.08
1425	26653	+20.83
1455	27899	+13.08
1485	28670	+8.43
1515	29257	+5.13
1545	29568	+2.06
1575	29683	+0.52
1605	29362	+0.57
1635	29589	+0.80
1665	29870	+1.82
1695	29783	+0.90
1725	30077	+0.75
1755	29889	+2.02
1785	30152	+3.33
1815	30656	+6.54
1845	31211	
1875	32389	

MPC 9600 Plateau Instrument 6 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

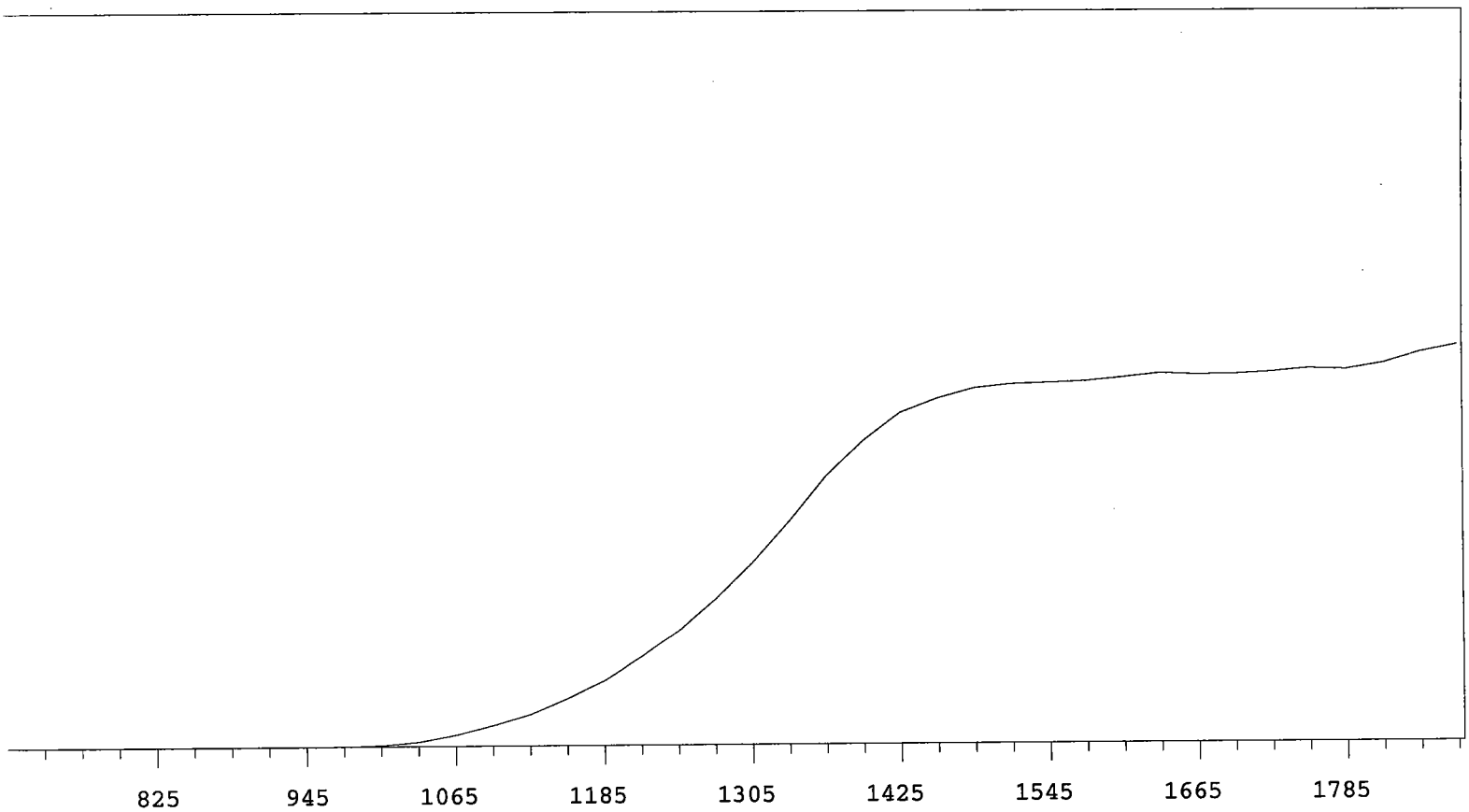


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	7	>100
1005	31	>100
1035	238	>100
1065	810	>100
1095	1637	>100
1125	2743	>100
1155	3932	>100
1185	5579	>100
1215	7602	+94.41
1245	10078	+84.86
1275	13091	+77.67

VOLTS	COUNTS	%/100 Volts
1305	16217	+71.57
1335	20184	+63.76
1365	24605	+53.98
1395	28528	+41.40
1425	31675	+28.02
1455	33899	+17.93
1485	34826	+10.65
1515	35815	+6.13
1545	36225	+4.15
1575	36456	+2.28
1605	36747	+1.47
1635	36801	+1.26
1665	36859	+0.85
1695	37095	+1.85
1725	37072	+4.01
1755	37724	+6.65
1785	38802	+10.33
1815	40036	+14.71
1845	41975	
1875	45123	

MPC 9600 Plateau Instrument 6 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

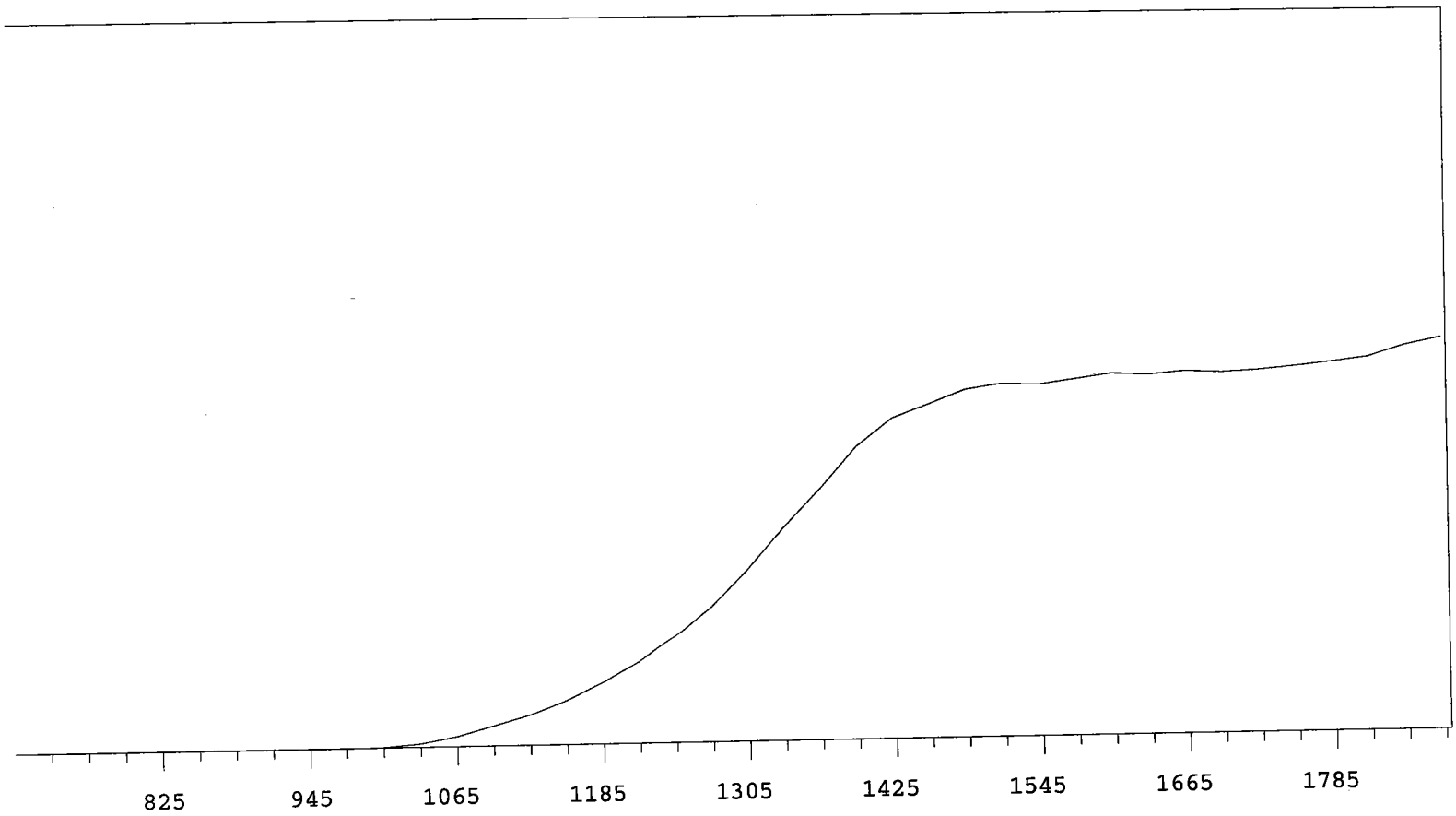


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	1	+83.33
855	1	-83.33
885	0	>100
915	0	>100
945	5	>100
975	18	>100
1005	125	>100
1035	482	>100
1065	1255	>100
1095	2318	>100
1125	3540	>100
1155	5288	>100
1185	7168	+98.51
1215	9760	+88.48
1245	12656	+81.52
1275	16065	+74.58

VOLTS	COUNTS	%/100 Volts
1305	20094	+68.67
1335	24665	+59.40
1365	29591	+47.86
1395	33376	+34.51
1425	36440	+22.50
1455	38024	+13.58
1485	39187	+7.04
1515	39608	+3.63
1545	39722	+2.10
1575	39894	+2.32
1605	40298	+2.09
1635	40711	+1.41
1665	40574	+0.80
1695	40608	+1.02
1725	40839	+1.28
1755	41201	+1.97
1785	41065	+3.74
1815	41711	+5.42
1845	42917	
1875	43699	

MPC 9600 Plateau Instrument 6 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

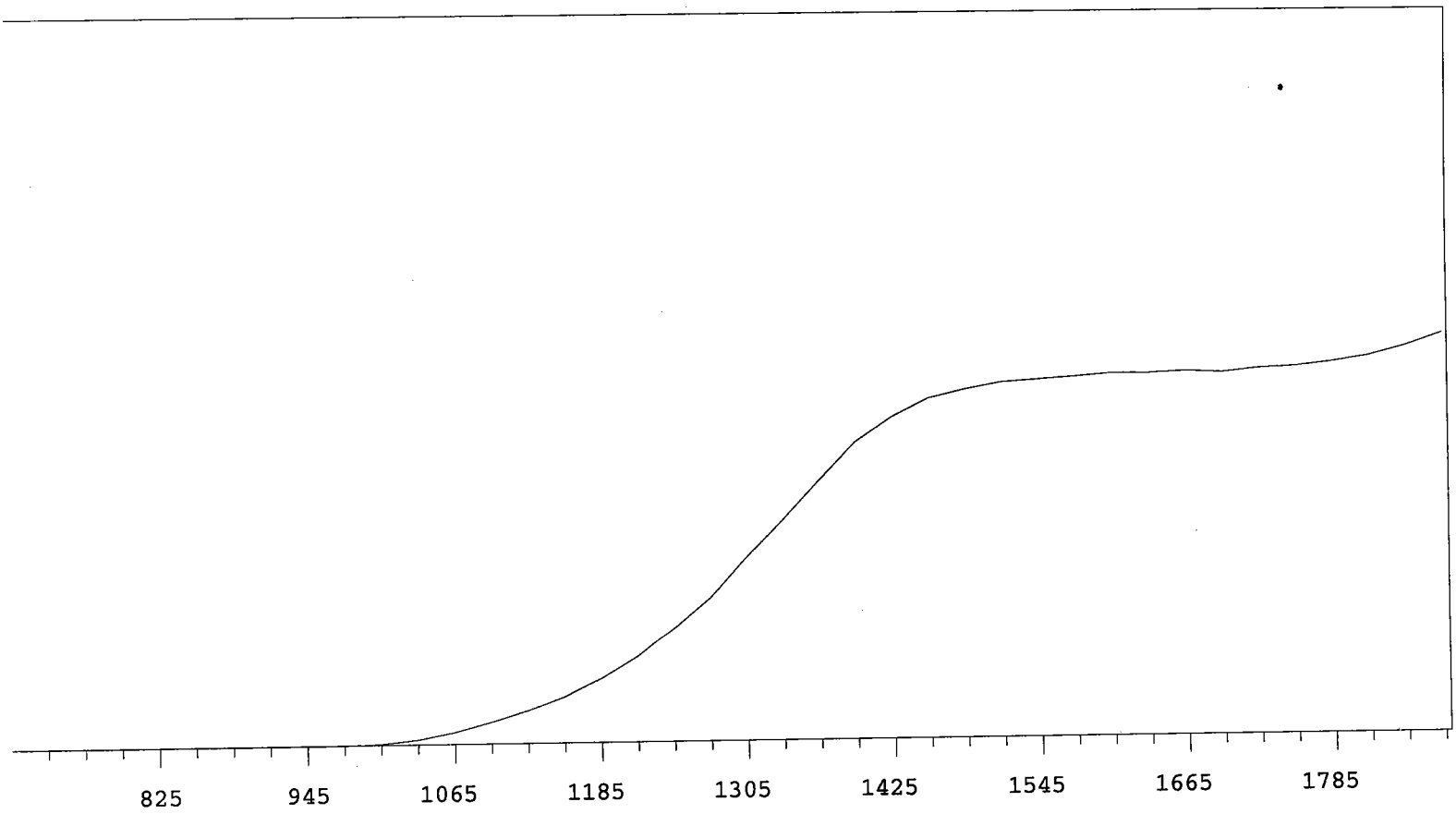


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	+0.00
795	0	>100
825	0	+0.00
855	0	>100
885	1	>100
915	1	>100
945	2	>100
975	8	>100
1005	70	>100
1035	353	>100
1065	990	>100
1095	1956	>100
1125	3024	>100
1155	4400	>100
1185	6173	+99.75
1215	8230	+89.85
1245	10904	+82.36
1275	13747	+76.18

VOLTS	COUNTS	%/100 Volts
1305	17350	+67.80
1335	21371	+60.27
1365	25084	+49.32
1395	29177	+36.15
1425	31927	+24.86
1455	33217	+14.70
1485	34545	+7.74
1515	35097	+4.64
1545	34927	+2.96
1575	35439	+2.21
1605	35939	+2.41
1635	35763	+0.94
1665	36053	+0.35
1695	35886	+1.15
1725	36066	+1.77
1755	36379	+3.03
1785	36768	+4.80
1815	37193	+6.14
1845	38320	
1875	39061	

MPC 9600 Plateau Instrument 6 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

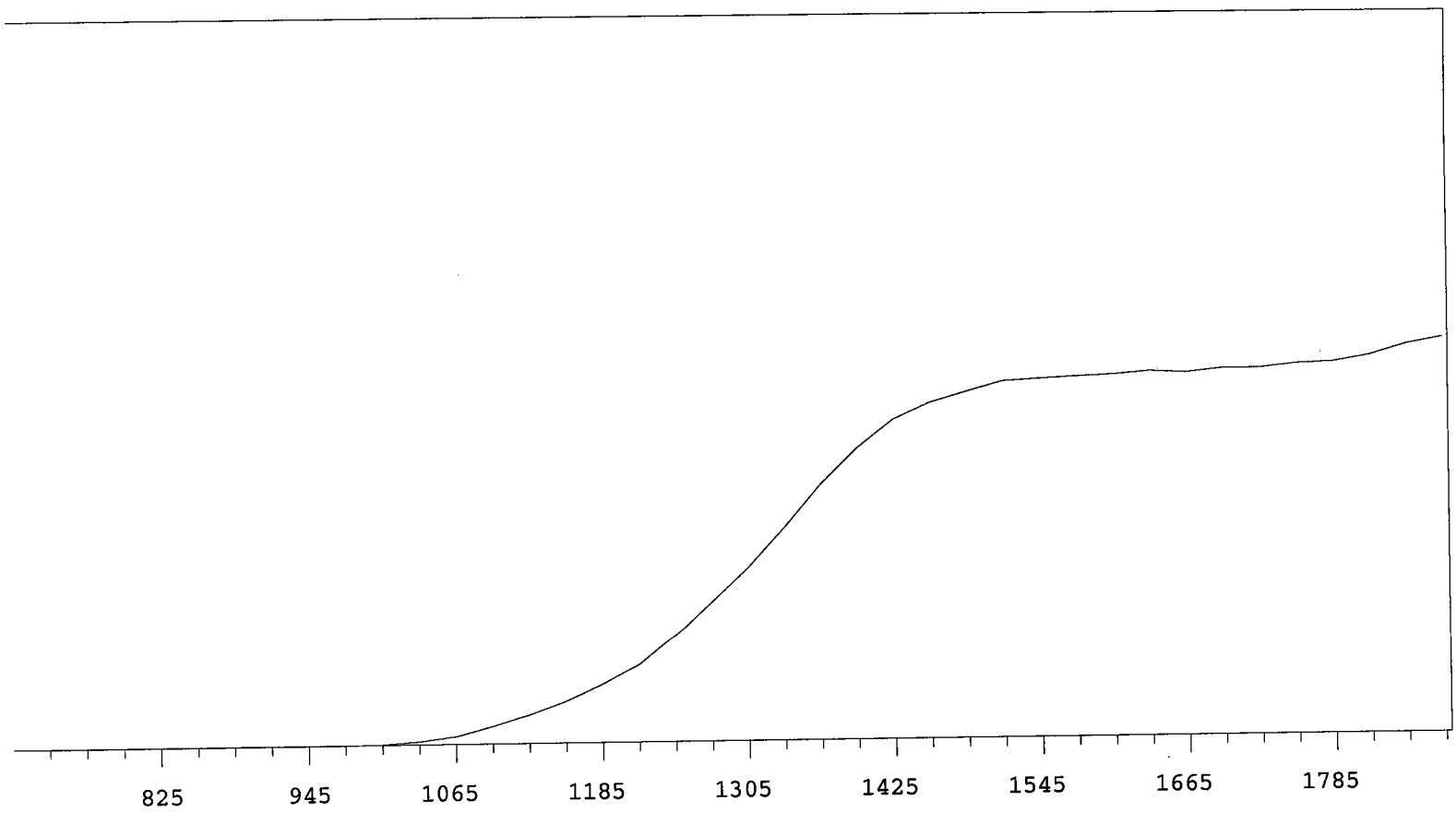


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	1	+0.00
825	0	>100
855	0	+0.00
885	0	>100
915	1	>100
945	0	>100
975	14	>100
1005	109	>100
1035	481	>100
1065	1177	>100
1095	2133	>100
1125	3243	>100
1155	4554	>100
1185	6285	+98.38
1215	8468	+89.75
1245	11266	+83.13
1275	14088	+74.43

VOLTS	COUNTS	%/100 Volts
1305	17954	+65.82
1335	21482	+57.64
1365	25373	+45.78
1395	29042	+34.80
1425	31373	+23.29
1455	33143	+14.25
1485	34006	+8.49
1515	34662	+4.71
1545	34892	+3.14
1575	35129	+1.86
1605	35411	+1.49
1635	35380	+0.62
1665	35554	+0.65
1695	35385	+1.18
1725	35755	+1.89
1755	35907	+3.26
1785	36305	+4.62
1815	36870	+6.98
1845	37807	
1875	39047	

MPC 9600 Plateau Instrument 7 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

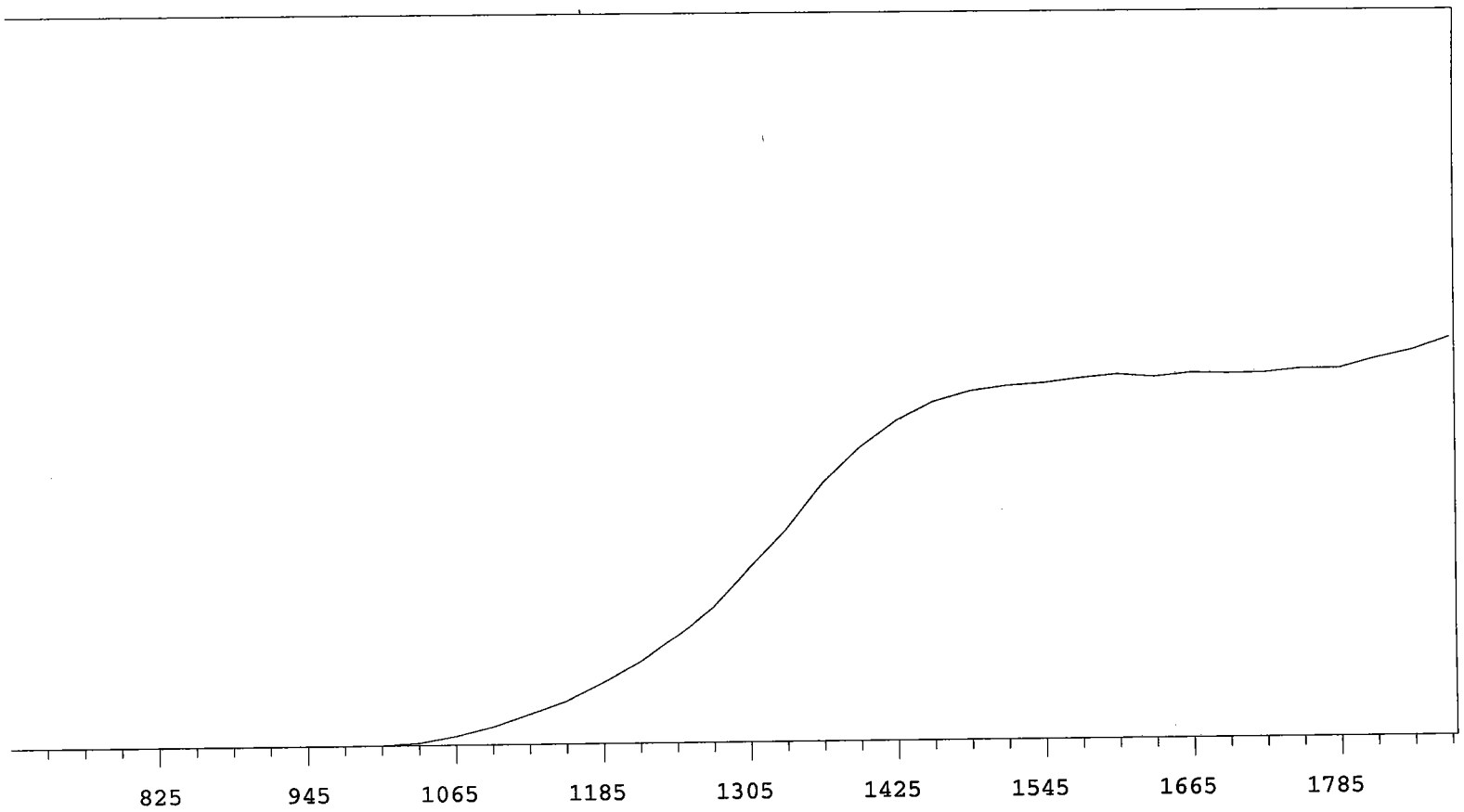


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	1	+83.33
855	1	-83.33
885	0	-55.56
915	0	>100
945	1	>100
975	3	>100
1005	42	>100
1035	242	>100
1065	613	>100
1095	1353	>100
1125	2213	>100
1155	3256	>100
1185	4474	>100
1215	5932	+94.10
1245	8072	+87.32
1275	10579	+79.61

VOLTS	COUNTS	%/100 Volts
1305	13228	+70.36
1335	16271	+60.12
1365	19506	+49.19
1395	22188	+36.46
1425	24373	+24.43
1455	25649	+15.99
1485	26433	+9.58
1515	27195	+5.74
1545	27367	+3.24
1575	27490	+1.86
1605	27608	+1.22
1635	27841	+1.33
1665	27695	+1.11
1695	27999	+1.42
1725	27992	+2.04
1755	28289	+2.52
1785	28408	+4.56
1815	28863	+5.70
1845	29664	
1875	30148	

MPC 9600 Plateau Instrument 7 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

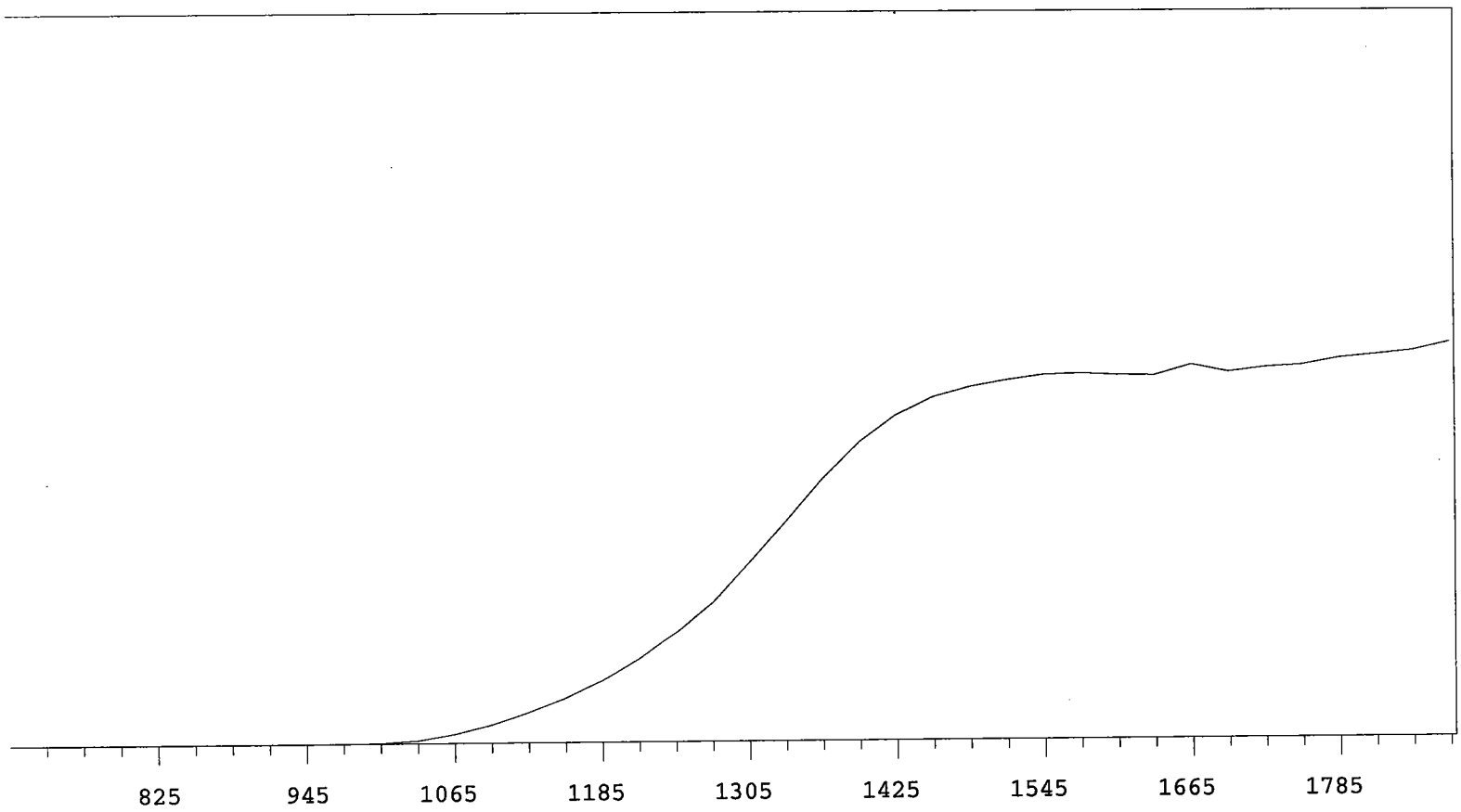


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	1	>100
975	3	>100
1005	34	>100
1035	221	>100
1065	825	>100
1095	1709	>100
1125	2873	>100
1155	4078	>100
1185	5858	>100
1215	7809	+91.82
1245	10336	+85.02
1275	13215	+77.79

VOLTS	COUNTS	%/100 Volts
1305	16978	+70.97
1335	20569	+61.39
1365	24989	+48.97
1395	28389	+36.69
1425	30977	+24.05
1455	32727	+14.93
1485	33697	+8.42
1515	34195	+4.89
1545	34437	+3.49
1575	34850	+2.11
1605	35174	+1.62
1635	34923	+0.68
1665	35250	+0.35
1695	35171	+1.24
1725	35237	+1.02
1755	35584	+2.79
1785	35587	+4.59
1815	36485	+6.74
1845	37270	
1875	38453	

MPC 9600 Plateau Instrument 7 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

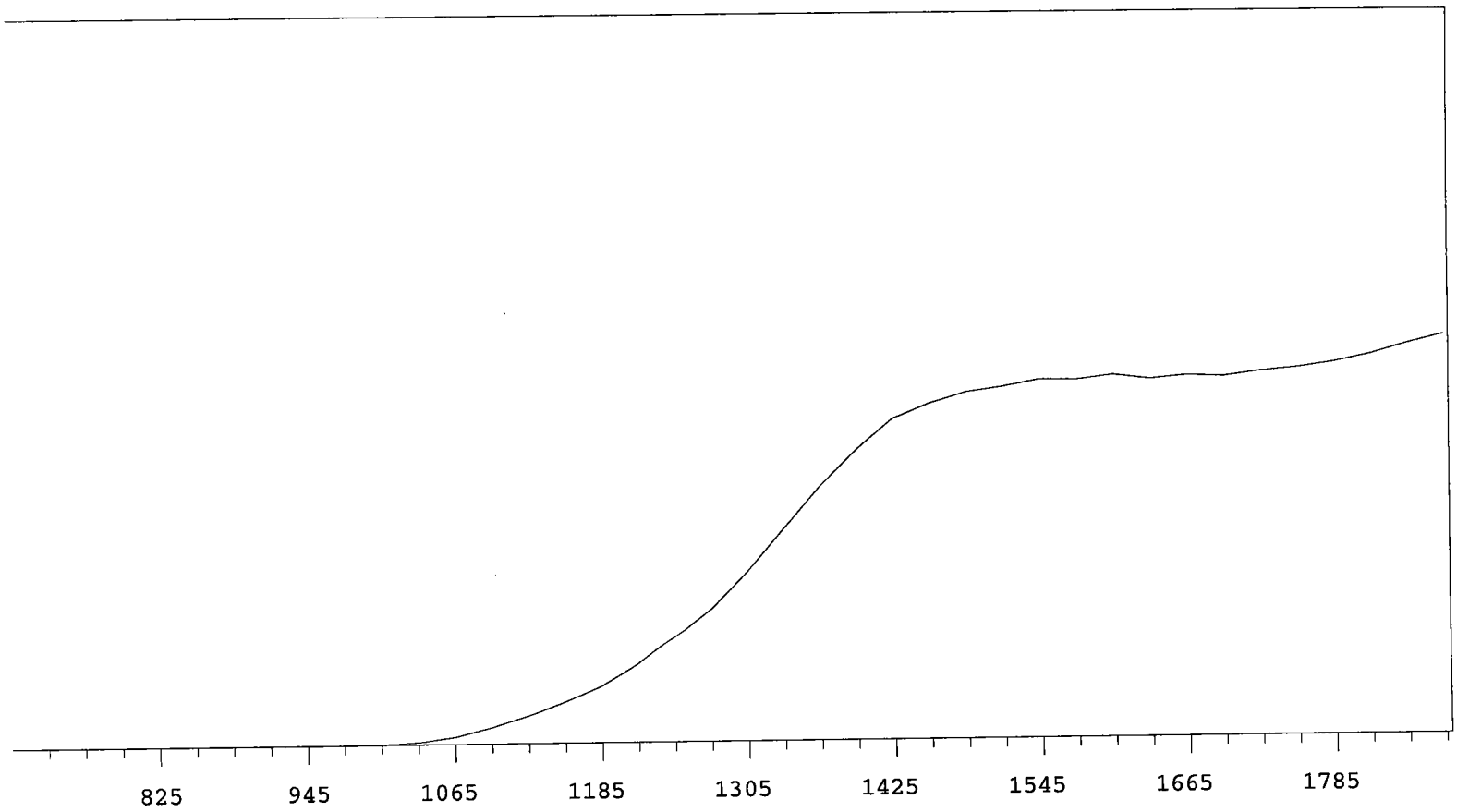


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	4	>100
1005	57	>100
1035	277	>100
1065	817	>100
1095	1666	>100
1125	2766	>100
1155	4077	>100
1185	5667	>100
1215	7694	+91.50
1245	10209	+84.83
1275	12950	+77.50

VOLTS	COUNTS	%/100 Volts
1305	16543	+70.03
1335	20257	+60.71
1365	24245	+48.17
1395	27602	+35.50
1425	30019	+23.48
1455	31614	+14.53
1485	32522	+8.91
1515	33103	+5.28
1545	33572	+2.60
1575	33695	+0.70
1605	33525	+1.48
1635	33477	+0.99
1665	34432	+1.49
1695	33745	+1.43
1725	34149	+1.60
1755	34350	+3.69
1785	34955	+3.62
1815	35251	+4.44
1845	35592	
1875	36382	

MPC 9600 Plateau Instrument 7 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

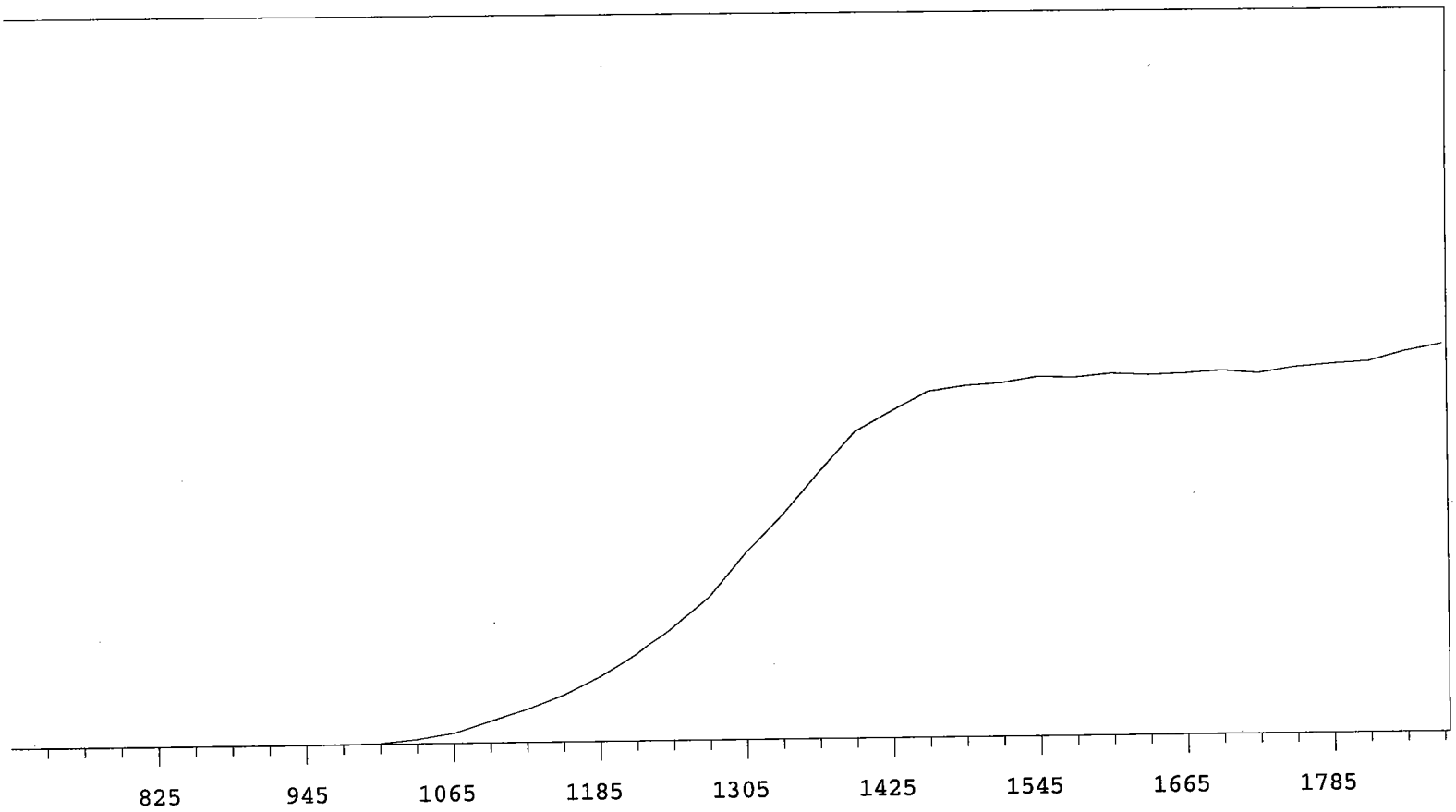


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	5	>100
1005	29	>100
1035	204	>100
1065	609	>100
1095	1354	>100
1125	2316	>100
1155	3418	>100
1185	4654	>100
1215	6455	+92.99
1245	8669	+86.45
1275	10931	+79.15

VOLTS	COUNTS	%/100 Volts
1305	14016	+71.42
1335	17436	+62.21
1365	20814	+50.32
1395	23760	+36.91
1425	26302	+24.91
1455	27519	+15.17
1485	28410	+8.91
1515	28843	+5.41
1545	29396	+3.58
1575	29357	+1.54
1605	29719	+0.51
1635	29358	+0.23
1665	29623	+0.57
1695	29509	+2.12
1725	29896	+2.84
1755	30165	+4.42
1785	30570	+5.65
1815	31180	+6.95
1845	31995	
1875	32717	

MPC 9600 Plateau Instrument 8 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

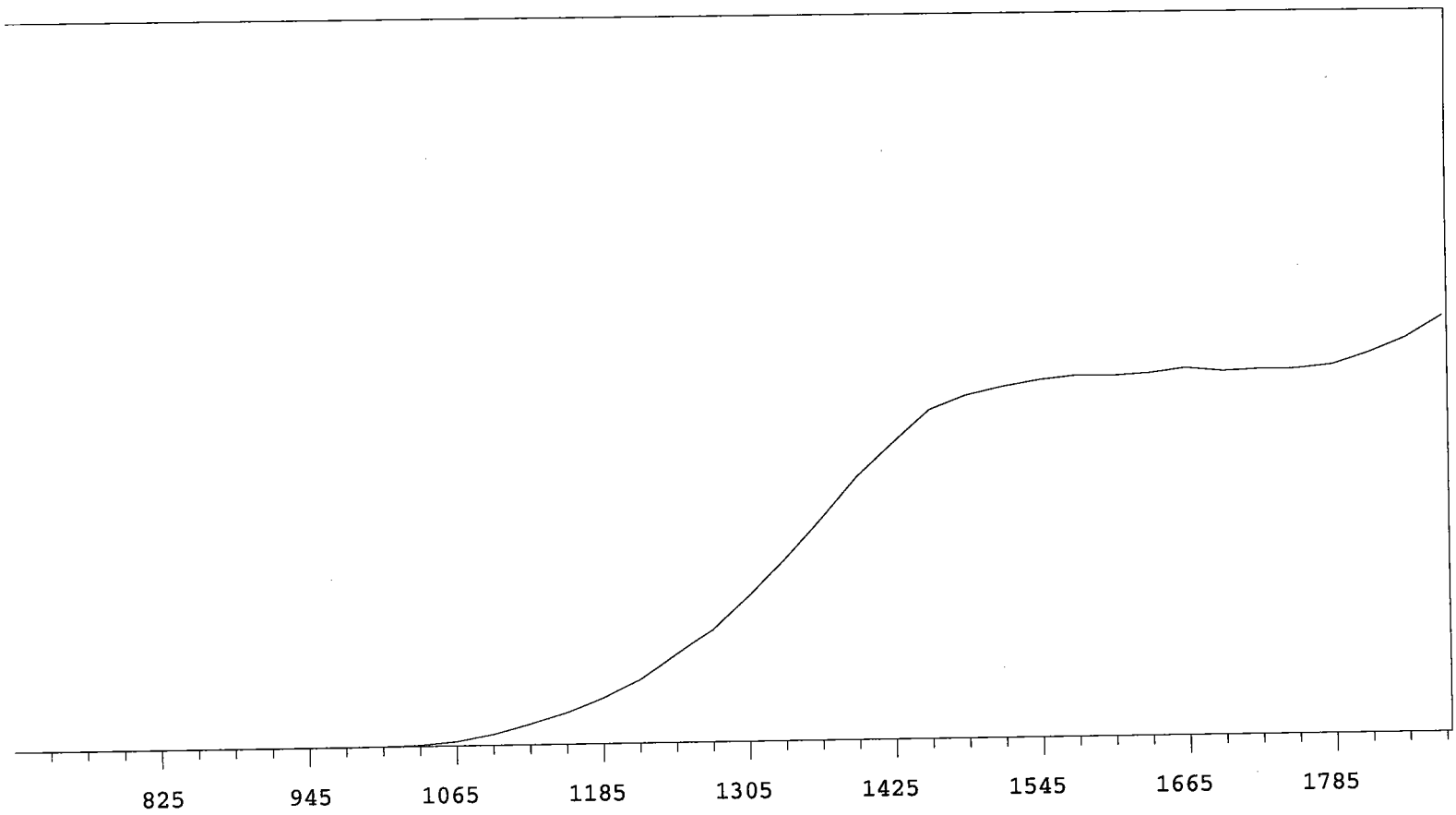


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	>100
975	9	>100
1005	96	>100
1035	468	>100
1065	1084	>100
1095	2286	>100
1125	3479	>100
1155	4912	>100
1185	6819	+98.23
1215	9153	+89.05
1245	12105	+83.21
1275	15122	+75.24

VOLTS	COUNTS	%/100 Volts
1305	19482	+67.45
1335	23344	+59.35
1365	27793	+45.86
1395	31916	+34.29
1425	33979	+21.61
1455	35993	+11.71
1485	36530	+7.04
1515	36796	+3.11
1545	37393	+2.44
1575	37279	+1.41
1605	37650	+0.49
1635	37458	+0.91
1665	37579	+0.12
1695	37828	+1.10
1725	37535	+1.72
1755	38104	+2.18
1785	38416	+4.12
1815	38633	+4.92
1845	39649	
1875	40366	

MPC 9600 Plateau Instrument 8 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

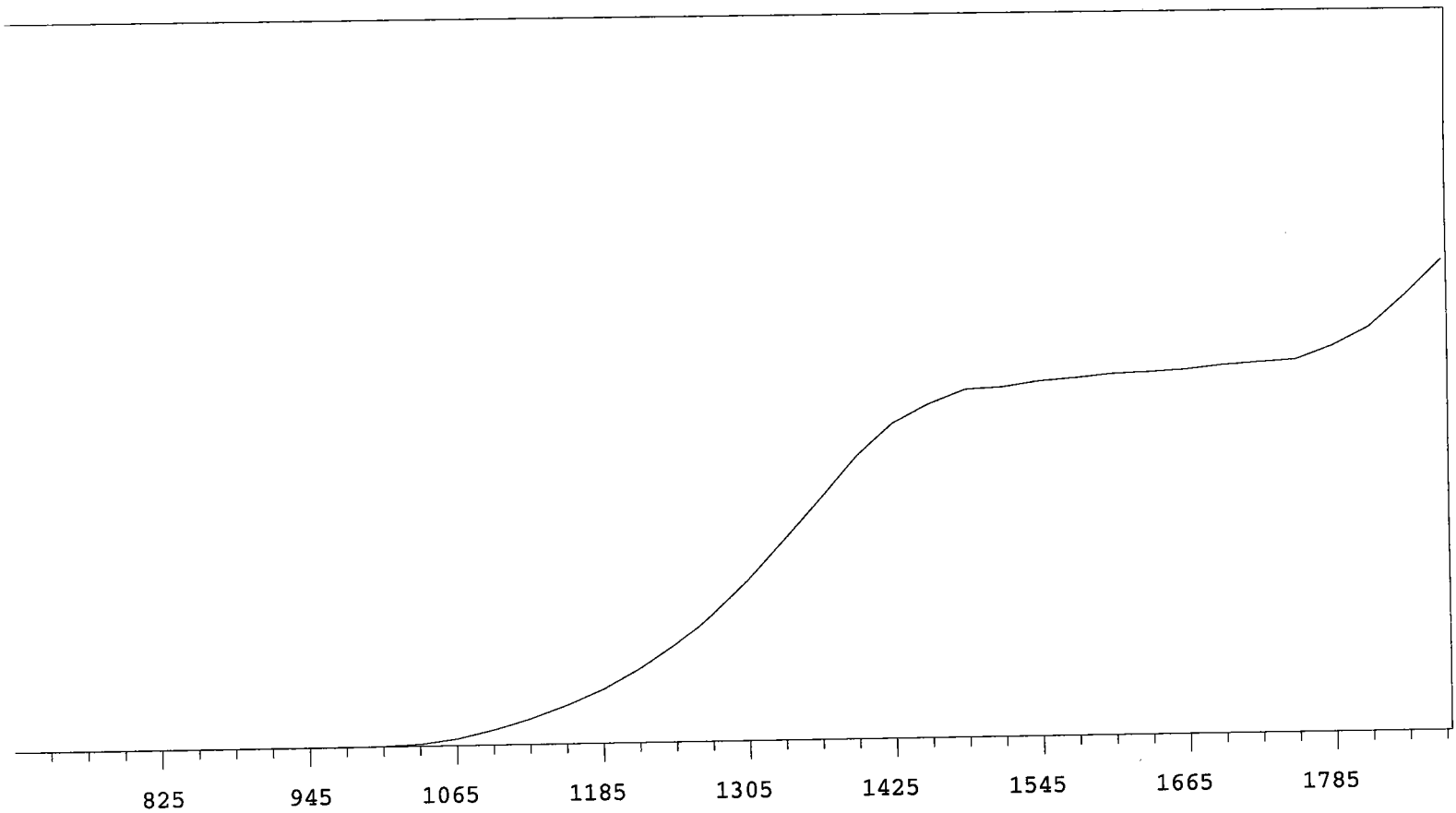


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	0	>100
1005	20	>100
1035	122	>100
1065	511	>100
1095	1263	>100
1125	2390	>100
1155	3641	>100
1185	5246	>100
1215	7212	+98.32
1245	9897	+89.80
1275	12742	+82.40

VOLTS	COUNTS	%/100 Volts
1305	16337	+74.91
1335	20471	+68.07
1365	25012	+57.86
1395	29694	+47.48
1425	33409	+35.17
1455	37013	+23.27
1485	38629	+14.35
1515	39529	+7.69
1545	40284	+4.34
1575	40711	+2.52
1605	40642	+1.97
1635	40879	+1.11
1665	41405	+0.98
1695	41011	+0.30
1725	41182	+0.41
1755	41178	+3.28
1785	41573	+6.47
1815	42858	+10.82
1845	44440	
1875	46780	

MPC 9600 Plateau Instrument 8 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

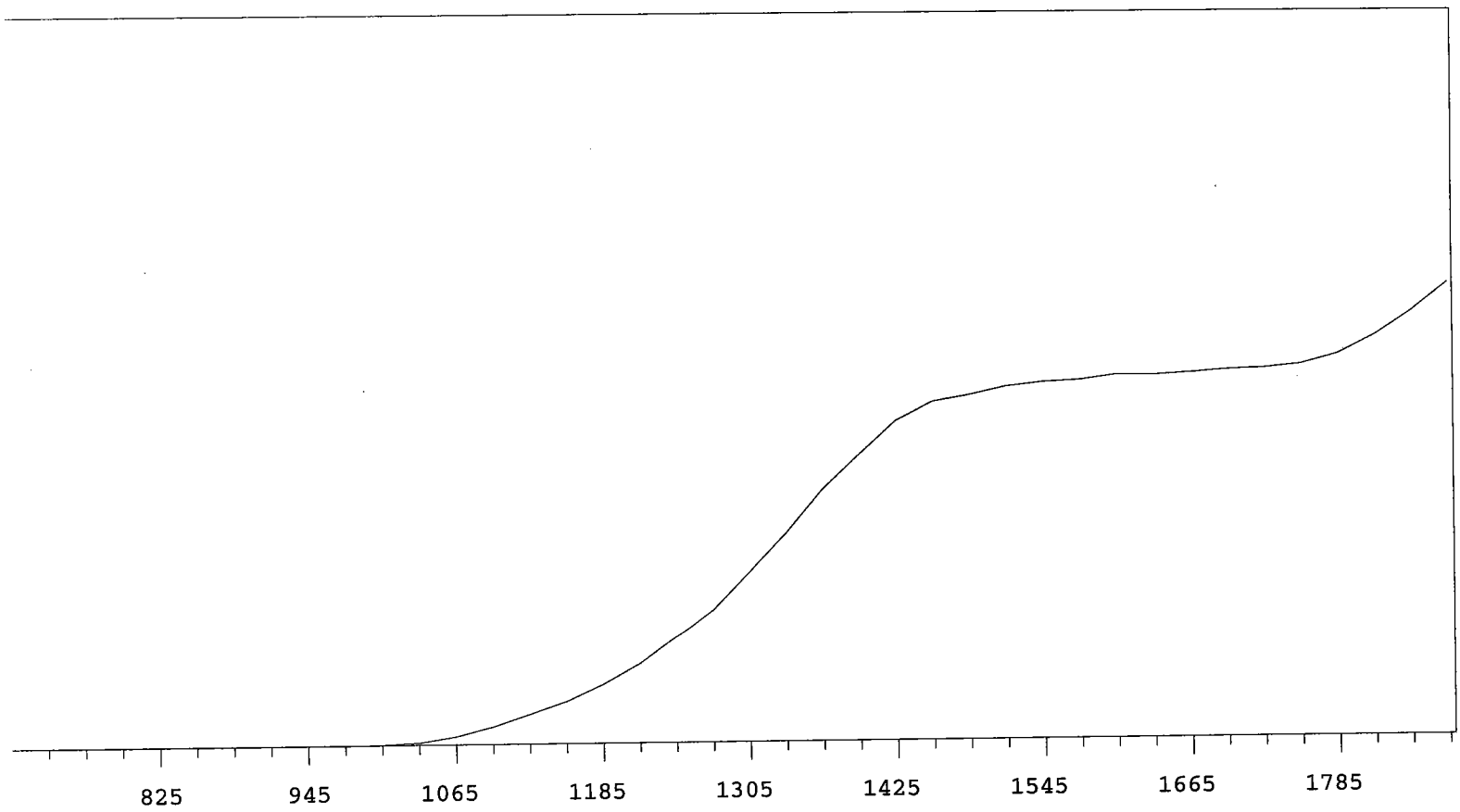


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	4	>100
1005	46	>100
1035	202	>100
1065	697	>100
1095	1532	>100
1125	2614	>100
1155	3953	>100
1185	5474	>100
1215	7466	+93.09
1245	9842	+86.73
1275	12814	+80.29

VOLTS	COUNTS	%/100 Volts
1305	16303	+72.82
1335	20309	+64.32
1365	24364	+53.82
1395	28527	+40.95
1425	31774	+28.74
1455	33631	+16.87
1485	35030	+9.25
1515	35208	+5.21
1545	35741	+3.27
1575	36019	+2.95
1605	36373	+2.21
1635	36484	+2.27
1665	36713	+2.28
1695	37093	+2.46
1725	37325	+4.17
1755	37543	+7.52
1785	38833	+13.43
1815	40656	+19.49
1845	43753	
1875	47246	

MPC 9600 Plateau Instrument 8 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1575

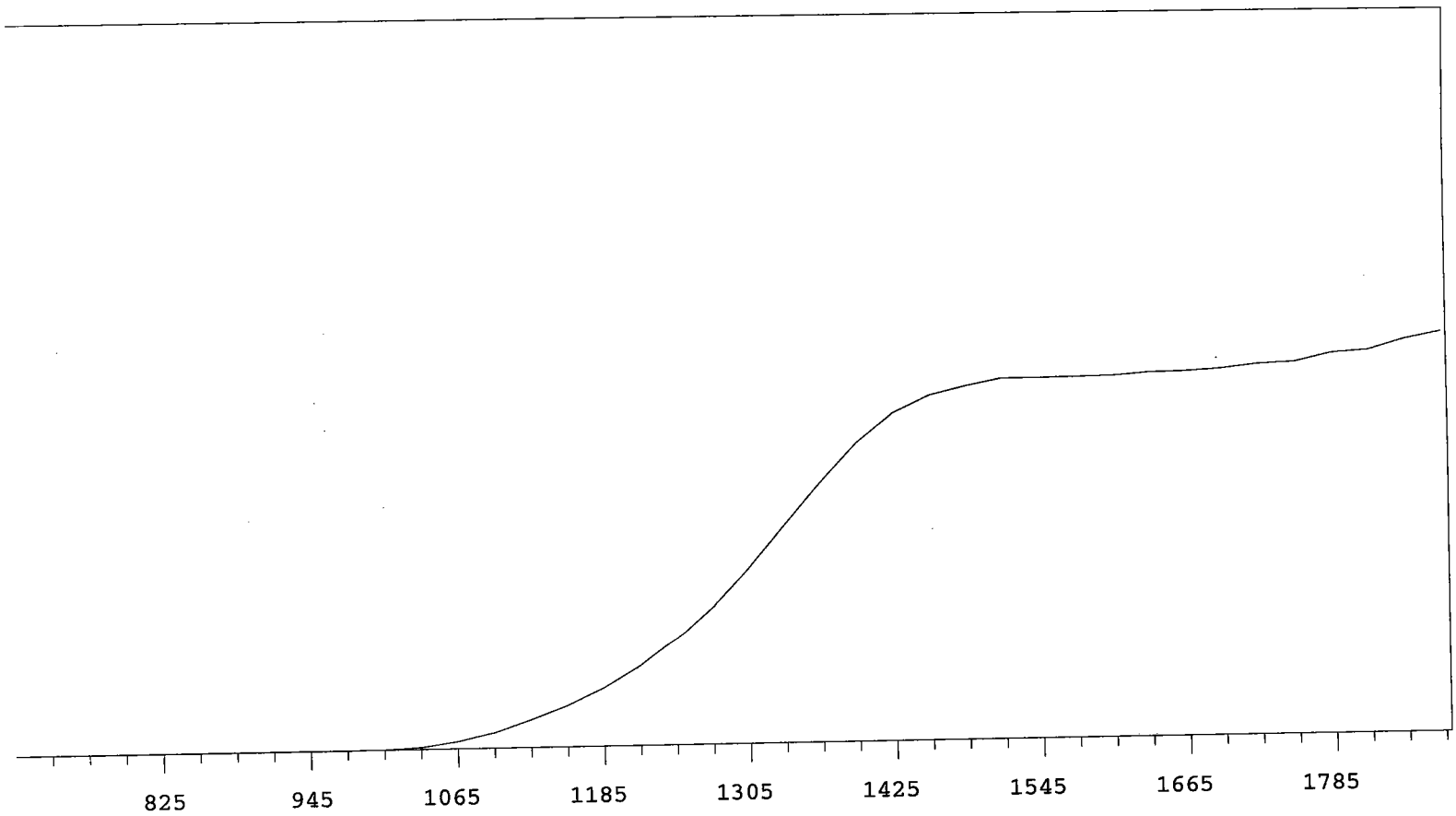


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	+0.00
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	5	>100
1005	47	>100
1035	243	>100
1065	792	>100
1095	1744	>100
1125	2933	>100
1155	4123	>100
1185	5780	>100
1215	7791	+91.58
1245	10478	+84.93
1275	13118	+77.50

VOLTS	COUNTS	%/100 Volts
1305	16889	+70.18
1335	20600	+61.29
1365	24824	+50.40
1395	28208	+38.85
1425	31539	+25.79
1455	33391	+16.06
1485	33991	+8.60
1515	34782	+5.01
1545	35201	+4.10
1575	35380	+2.50
1605	35849	+1.87
1635	35784	+1.79
1665	36000	+1.43
1695	36269	+2.10
1725	36381	+3.46
1755	36733	+6.86
1785	37669	+11.78
1815	39465	+16.64
1845	41803	
1875	44665	

MPC 9600 Plateau Instrument 9 MPC 9604 Detector A 7/1/2009

Alpha Volts: 870 Beta Volts: 1530

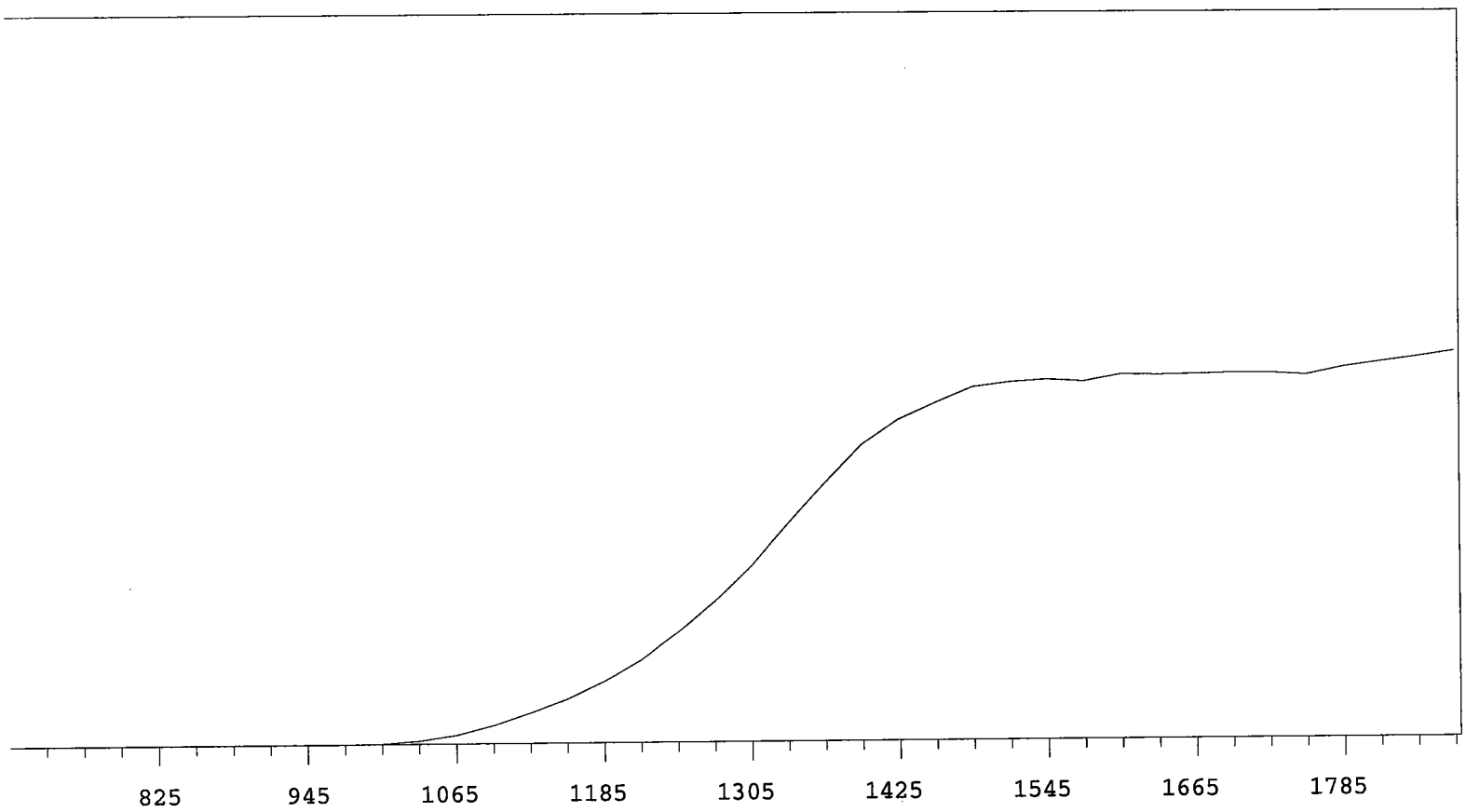


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	1	+0.00
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	2	>100
1005	33	>100
1035	203	>100
1065	668	>100
1095	1403	>100
1125	2545	>100
1155	3800	>100
1185	5363	>100
1215	7355	+95.00
1245	9807	+87.69
1275	12700	+80.28

VOLTS	COUNTS	%/100 Volts
1305	16226	+71.71
1335	20083	+61.95
1365	23913	+49.99
1395	27526	+36.97
1425	30193	+24.54
1455	31747	+14.71
1485	32544	+7.71
1515	33198	+3.66
1545	33188	+1.51
1575	33227	+0.73
1605	33278	+1.04
1635	33518	+1.38
1665	33565	+1.95
1695	33774	+1.99
1725	34135	+3.30
1755	34244	+3.67
1785	35022	+4.84
1815	35229	+5.93
1845	36179	
1875	36821	

MPC 9600 Plateau Instrument 9 MPC 9604 Detector B 7/1/2009

Alpha Volts: 870 Beta Volts: 1530

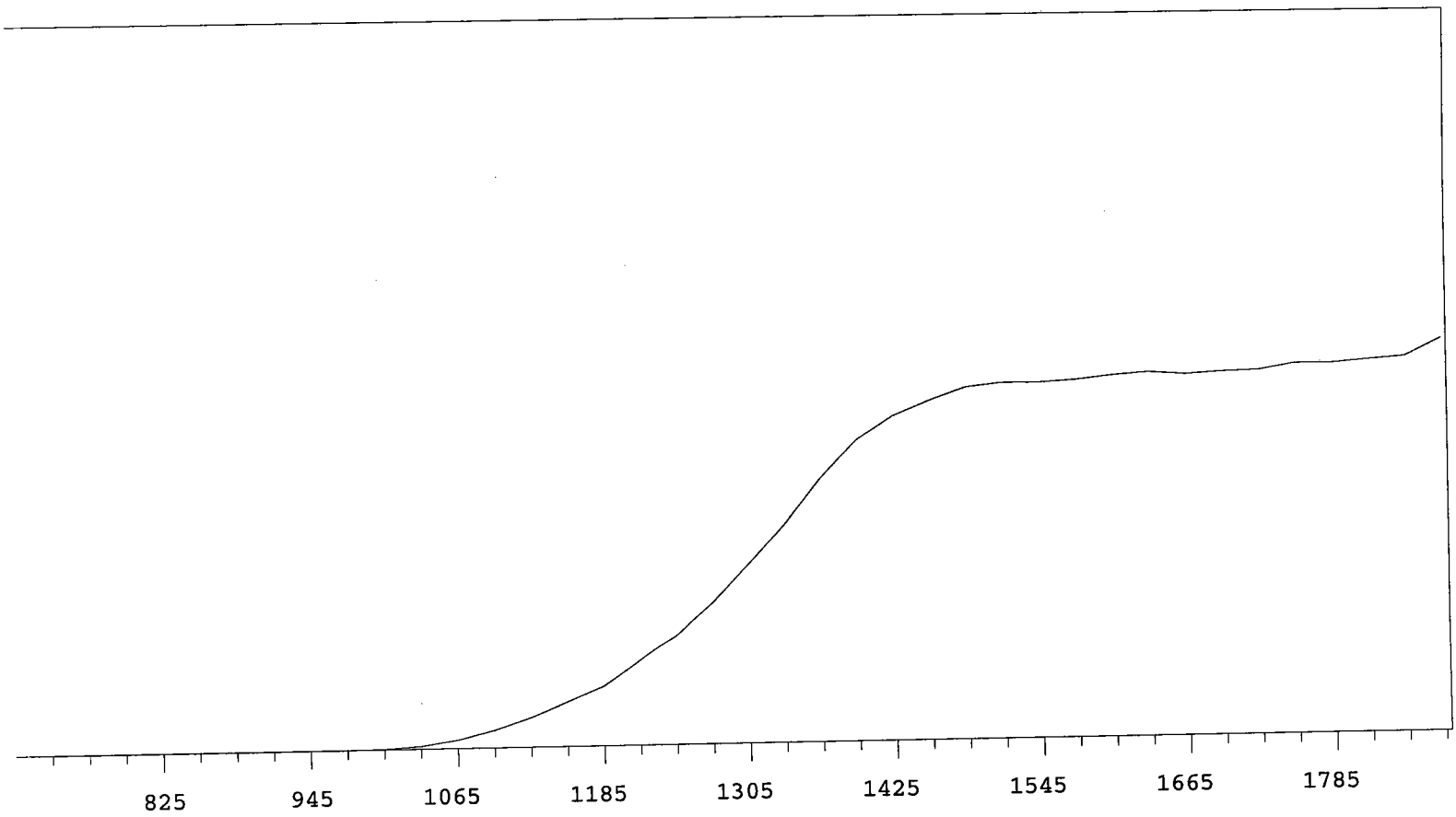


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	4	>100
1005	45	>100
1035	300	>100
1065	836	>100
1095	1742	>100
1125	2896	>100
1155	4198	>100
1185	5849	>100
1215	7887	+92.20
1245	10561	+83.55
1275	13442	+76.62

VOLTS	COUNTS	%/100 Volts
1305	16723	+68.78
1335	20749	+60.55
1365	24686	+48.78
1395	28343	+35.24
1425	30657	+24.31
1455	32208	+15.22
1485	33662	+9.32
1515	34098	+4.47
1545	34326	+2.17
1575	34133	+1.60
1605	34758	+1.41
1635	34706	+1.35
1665	34769	+0.30
1695	34830	-0.10
1725	34850	+0.90
1755	34613	+2.41
1785	35351	+3.87
1815	35849	+4.97
1845	36285	
1875	36814	

MPC 9600 Plateau Instrument 9 MPC 9604 Detector C 7/1/2009

Alpha Volts: 870 Beta Volts: 1530

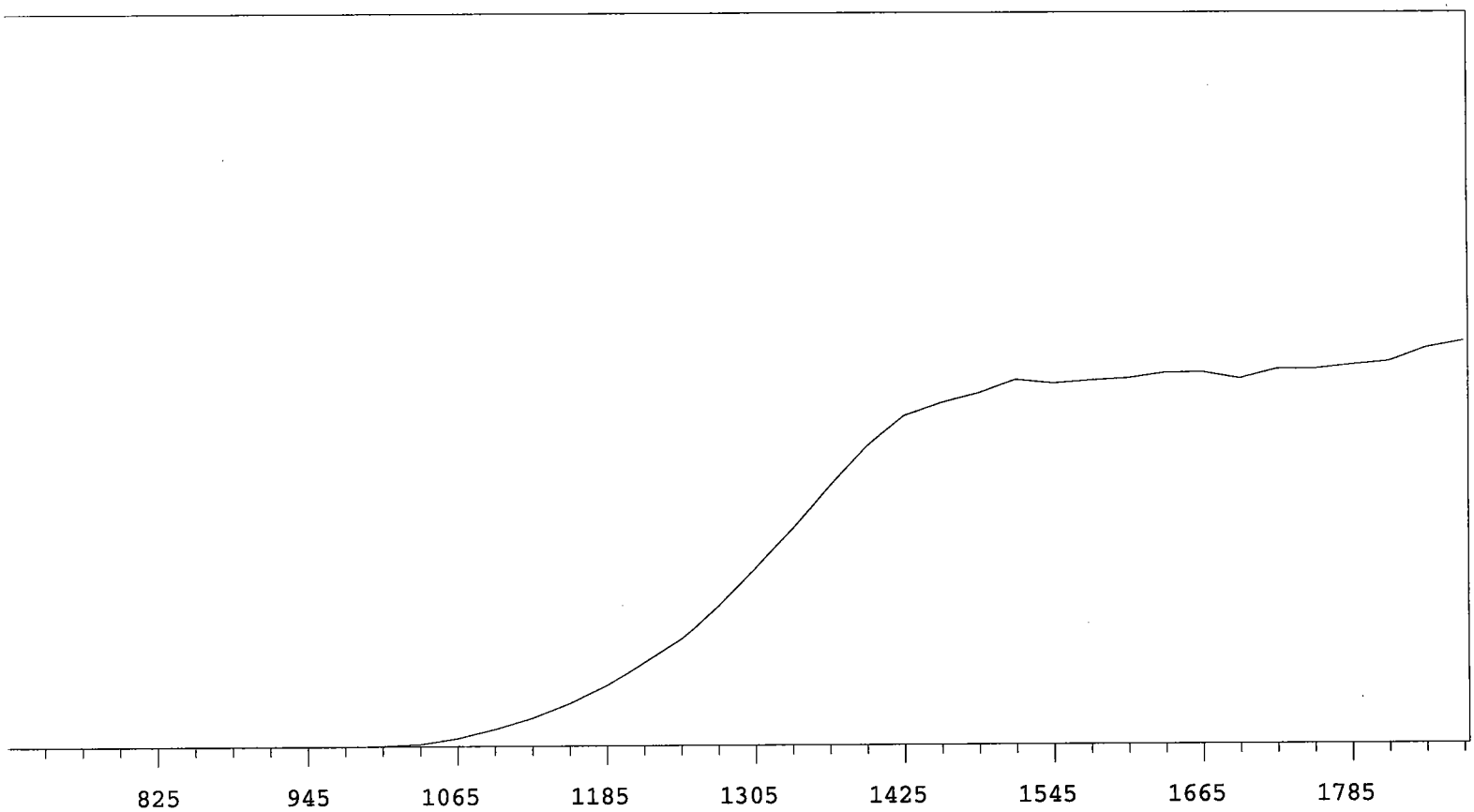


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	>100
915	1	>100
945	2	>100
975	3	>100
1005	64	>100
1035	349	>100
1065	970	>100
1095	1982	>100
1125	3328	>100
1155	5012	>100
1185	6669	>100
1215	9448	+92.67
1245	12293	+86.58
1275	15917	+76.99

VOLTS	COUNTS	%/100 Volts
1305	20192	+70.39
1335	24524	+60.97
1365	29650	+48.44
1395	33904	+35.09
1425	36549	+22.73
1455	38217	+13.58
1485	39628	+7.51
1515	40035	+3.73
1545	40020	+1.92
1575	40236	+2.06
1605	40680	+1.62
1635	40953	+1.03
1665	40643	+0.43
1695	40882	+1.41
1725	40979	+2.18
1755	41654	+2.20
1785	41602	+2.27
1815	41935	+4.50
1845	42259	
1875	44183	

MPC 9600 Plateau Instrument 9 MPC 9604 Detector D 7/1/2009

Alpha Volts: 870 Beta Volts: 1530

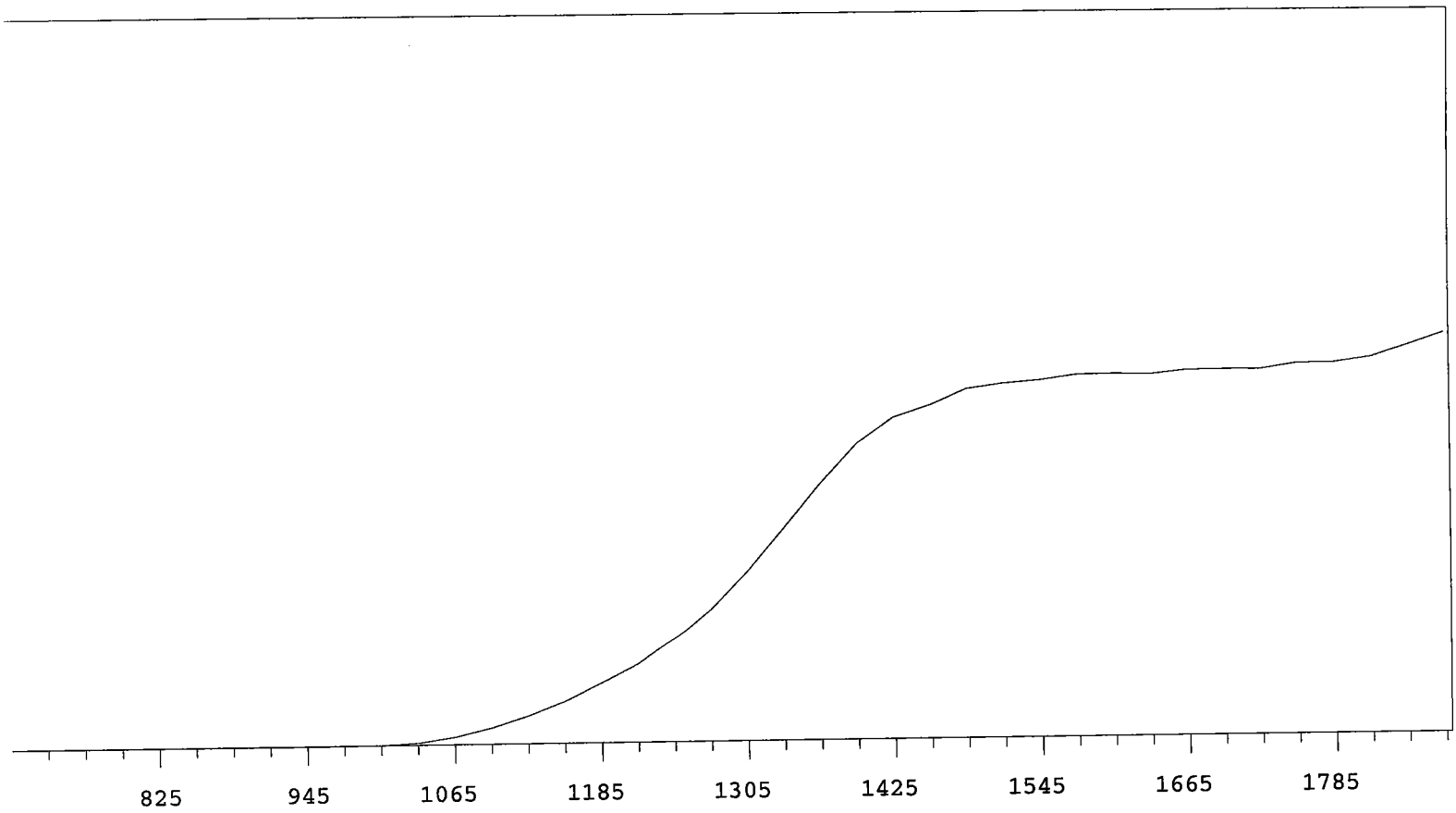


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	5	>100
1005	35	>100
1035	186	>100
1065	618	>100
1095	1280	>100
1125	2141	>100
1155	3268	>100
1185	4659	>100
1215	6343	+90.68
1245	8064	+83.46
1275	10497	+77.03

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

MPC 9600 Plateau Instrument 10 MPC 9604 Detector A 7/1/2009

Alpha Volts: 870 Beta Volts: 1552

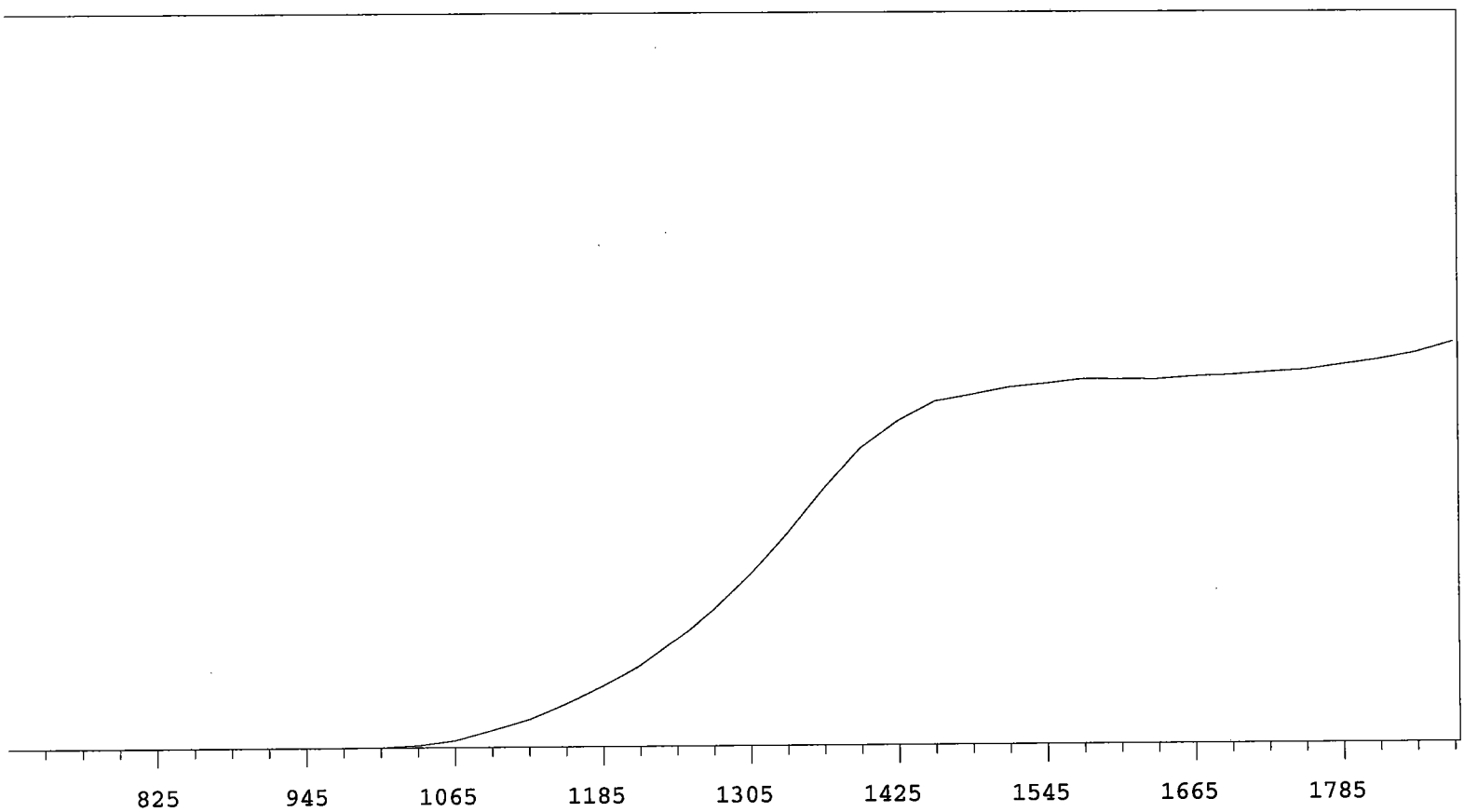


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	1	>100
1005	37	>100
1035	198	>100
1065	687	>100
1095	1491	>100
1125	2580	>100
1155	3920	>100
1185	5588	>100
1215	7384	+91.32
1245	9794	+84.81
1275	12572	+79.73

VOLTS	COUNTS	%/100 Volts
1305	16076	+72.76
1335	19985	+63.85
1365	24102	+50.95
1395	27819	+36.01
1425	30228	+23.86
1455	31343	+14.40
1485	32811	+8.77
1515	33243	+6.10
1545	33518	+3.25
1575	34010	+1.98
1605	34061	+1.59
1635	33973	+0.97
1665	34346	+0.93
1695	34366	+1.72
1725	34341	+1.54
1755	34860	+2.47
1785	34897	+4.50
1815	35377	+6.60
1845	36458	
1875	37630	

MPC 9600 Plateau Instrument 10 MPC 9604 Detector B 7/1/2009

Alpha Volts: 870 Beta Volts: 1552

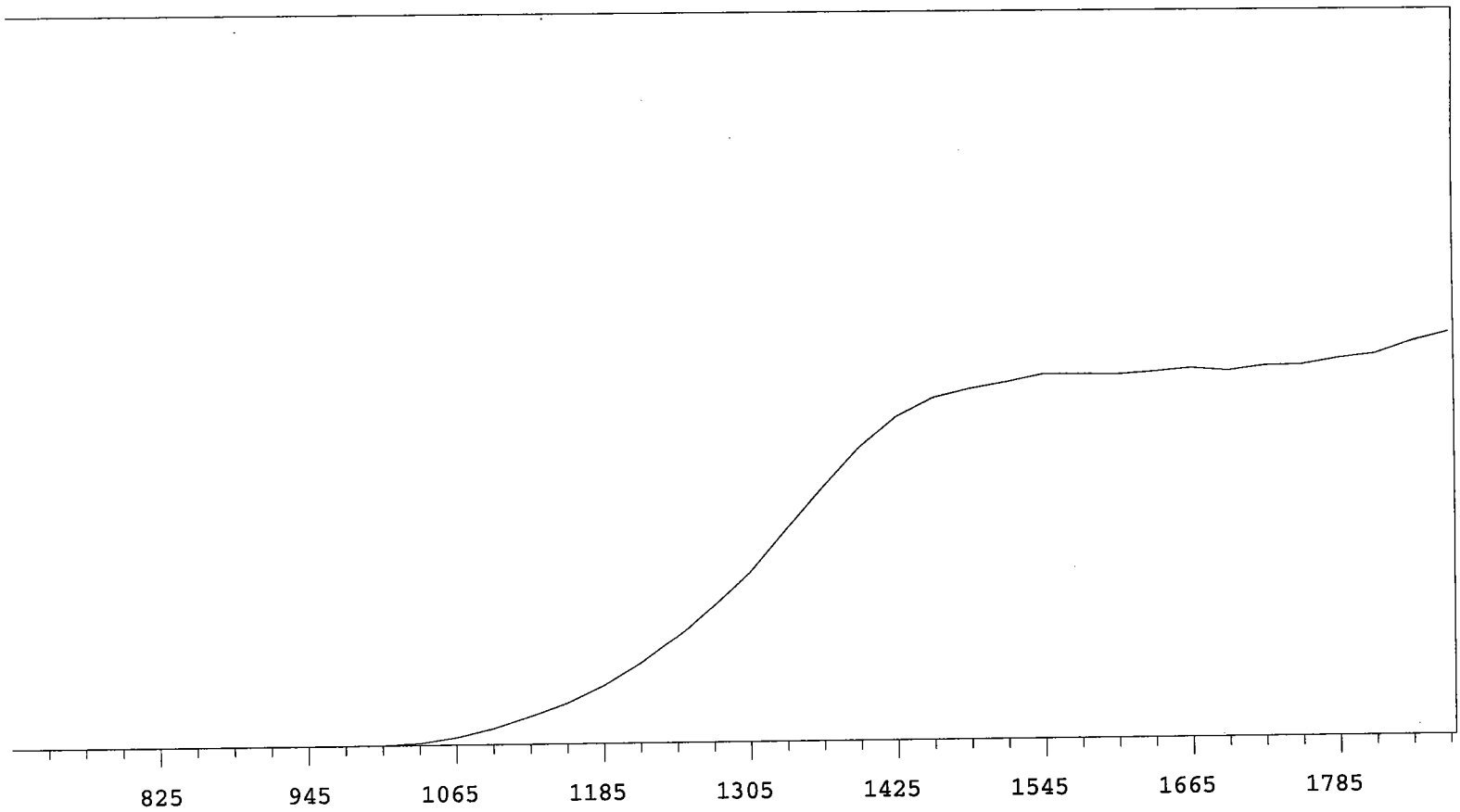


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	>100
975	7	>100
1005	28	>100
1035	190	>100
1065	597	>100
1095	1474	>100
1125	2383	>100
1155	3680	>100
1185	5131	>100
1215	6808	+89.95
1245	8990	+83.03
1275	11493	+77.30

VOLTS	COUNTS	%/100 Volts
1305	14469	+71.08
1335	17904	+63.07
1365	21677	+51.20
1395	25027	+38.06
1425	27237	+24.55
1455	28914	+14.61
1485	29480	+8.48
1515	30075	+5.06
1545	30374	+3.42
1575	30738	+1.68
1605	30703	+1.08
1635	30679	+0.77
1665	30902	+1.46
1695	30992	+1.89
1725	31224	+2.40
1755	31397	+3.27
1785	31826	+4.13
1815	32236	+5.59
1845	32782	
1875	33632	

MPC 9600 Plateau Instrument 10 MPC 9604 Detector C 7/1/2009

Alpha Volts: 870 Beta Volts: 1552

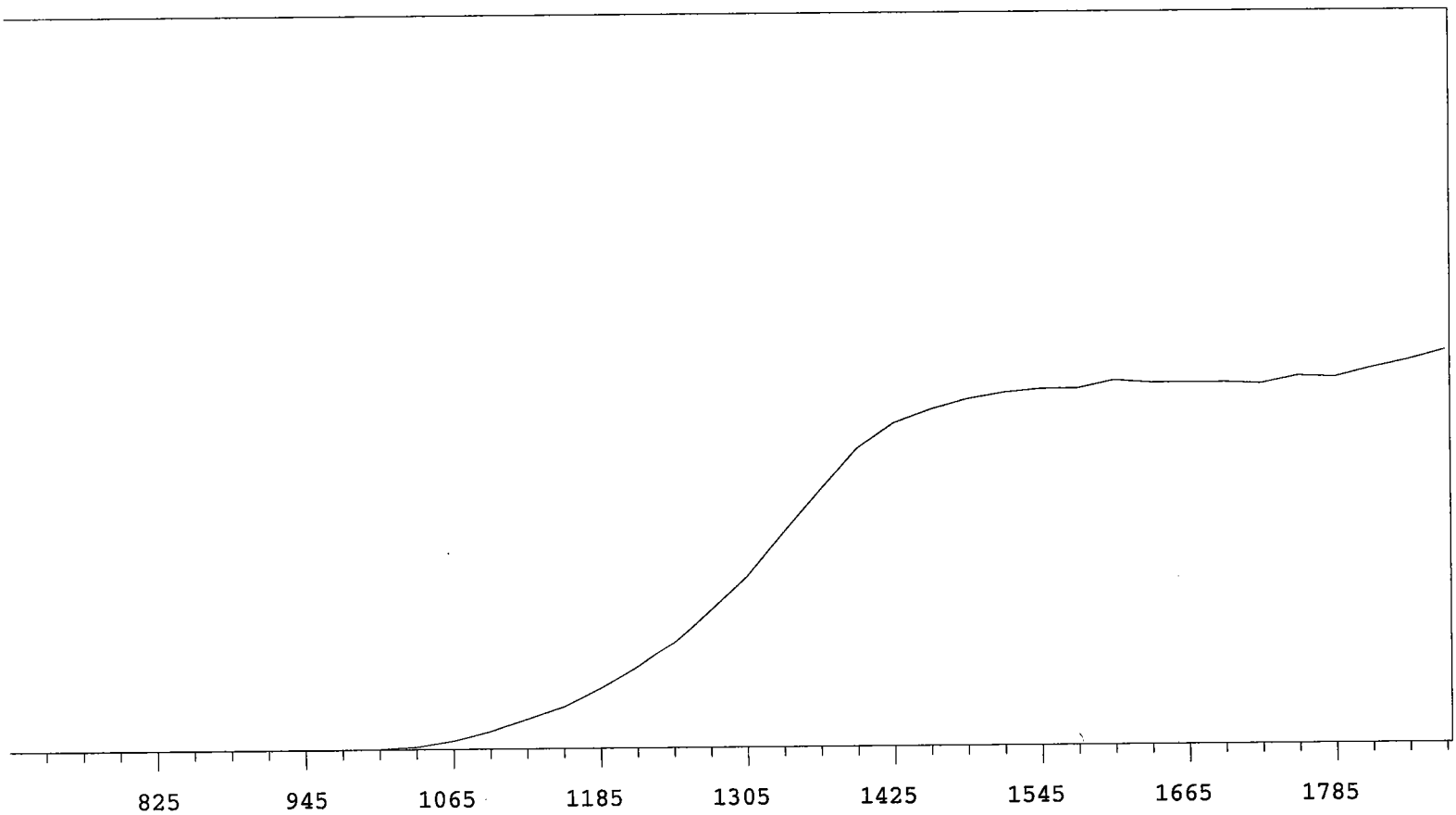


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	>100
915	0	>100
945	2	>100
975	2	>100
1005	36	>100
1035	220	>100
1065	780	>100
1095	1712	>100
1125	2926	>100
1155	4297	>100
1185	6097	>100
1215	8397	+95.11
1245	11155	+85.84
1275	14430	+78.79

VOLTS	COUNTS	%/100 Volts
1305	18051	+71.16
1335	22586	+62.34
1365	26973	+51.47
1395	31137	+38.24
1425	34321	+25.70
1455	36267	+15.37
1485	37197	+9.21
1515	37851	+5.38
1545	38622	+3.00
1575	38600	+1.55
1605	38538	+1.03
1635	38786	+0.91
1665	39129	+1.38
1695	38832	+1.20
1725	39323	+2.00
1755	39390	+3.35
1785	40031	+4.86
1815	40466	+6.64
1845	41713	
1875	42620	

MPC 9600 Plateau Instrument 10 MPC 9604 Detector D 7/1/2009

Alpha Volts: 870 Beta Volts: 1552

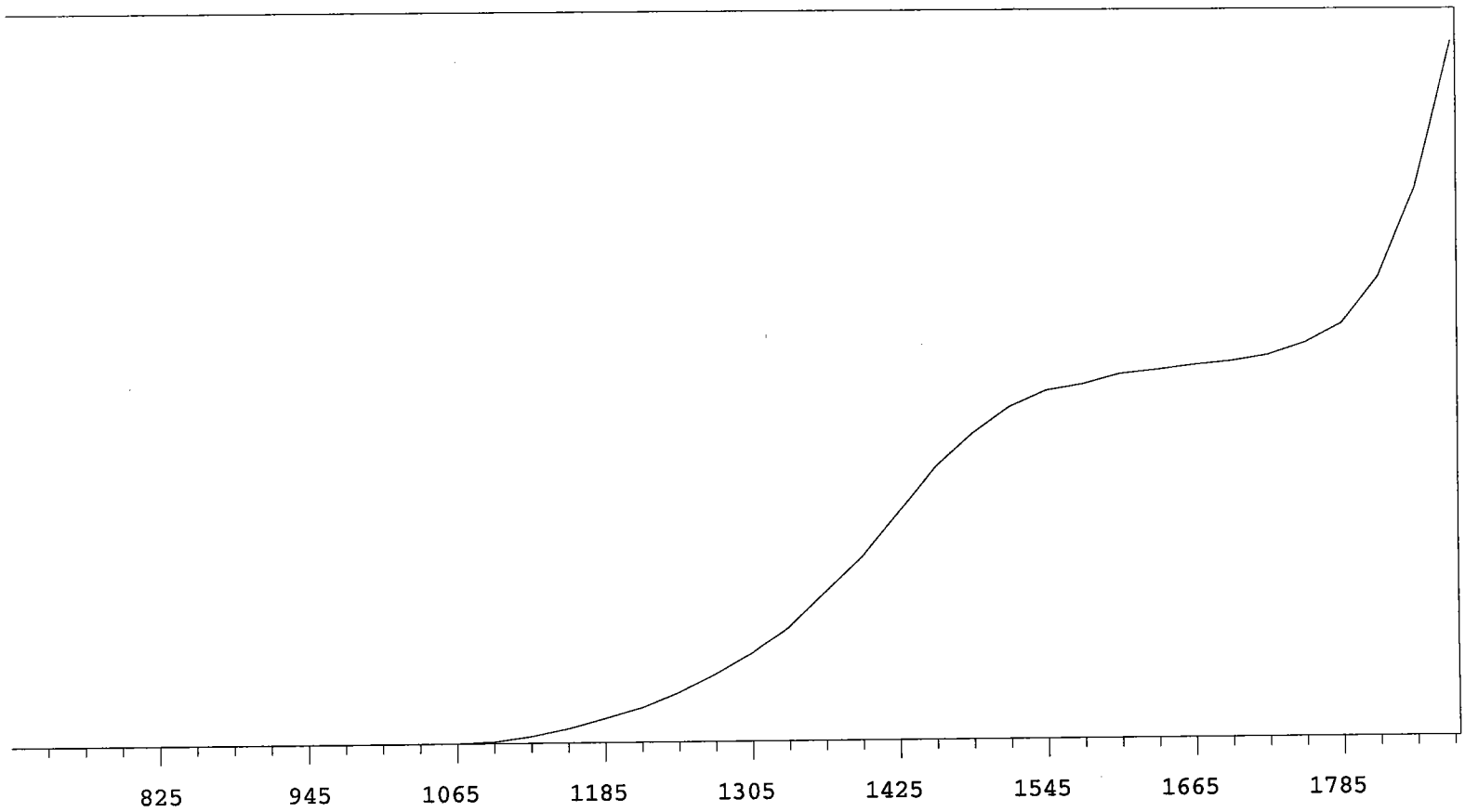


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	3	>100
1005	49	>100
1035	244	>100
1065	764	>100
1095	1584	>100
1125	2677	>100
1155	3763	>100
1185	5395	>100
1215	7350	+93.71
1245	9655	+83.52
1275	12504	+76.82

VOLTS	COUNTS	%/100 Volts
1305	15430	+69.87
1335	19258	+61.49
1365	23018	+50.06
1395	26562	+35.34
1425	28750	+22.67
1455	29911	+13.20
1485	30798	+8.01
1515	31375	+4.83
1545	31684	+3.74
1575	31721	+2.38
1605	32398	+1.44
1635	32154	+0.64
1665	32157	-0.77
1695	32152	+0.99
1725	32029	+1.41
1755	32699	+3.00
1785	32566	+4.71
1815	33351	+5.92
1845	34031	
1875	34941	

Plateau 7/1/09 Instrument 11 MPC 9604 Detector A 7/1/2009

Alpha Volts: 1515 Beta Volts: 1515

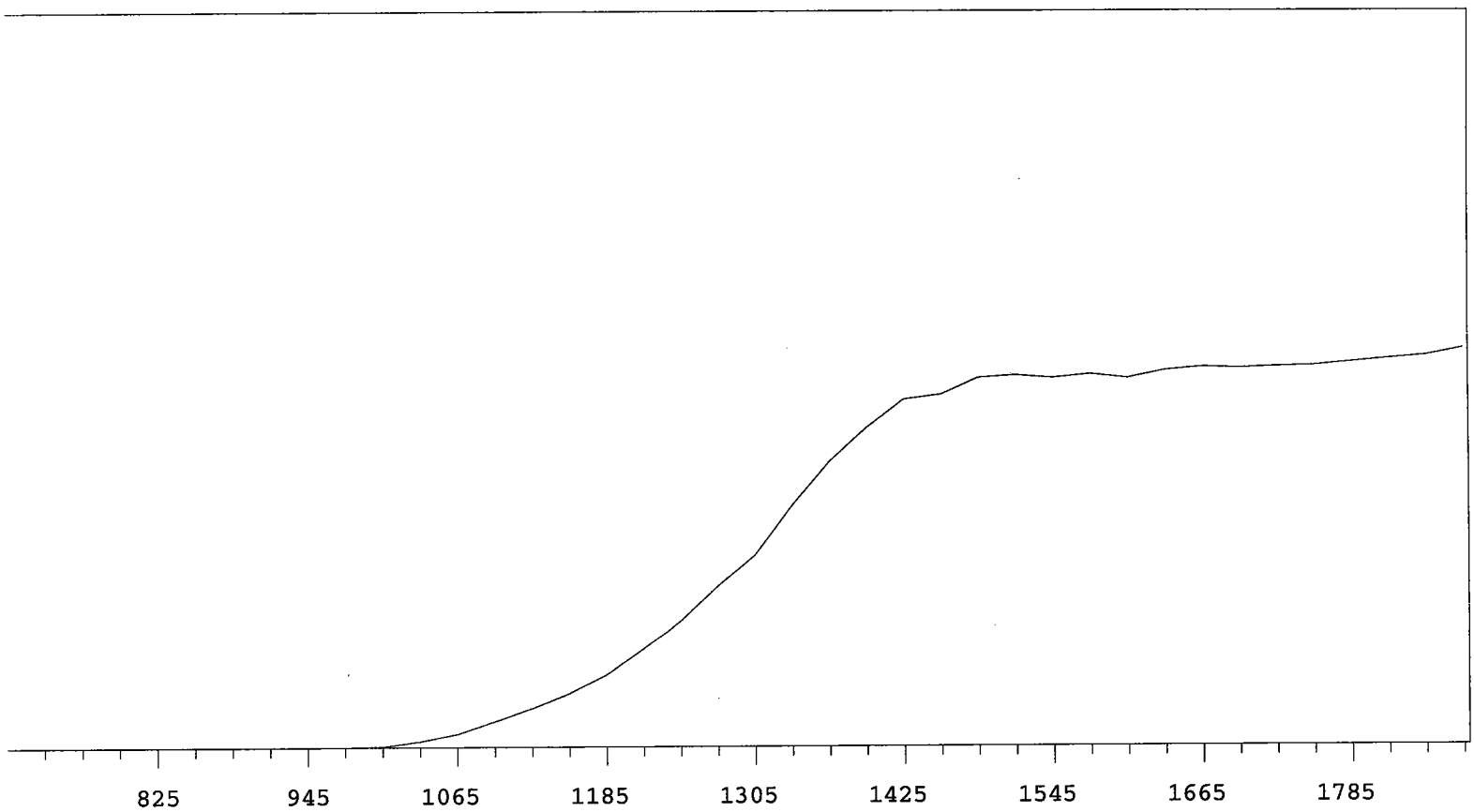


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	+0.00
975	0	>100
1005	0	>100
1035	2	>100
1065	9	>100
1095	61	>100
1125	248	>100
1155	528	>100
1185	882	>100
1215	1270	>100
1245	1786	>100
1275	2478	+93.67

VOLTS	COUNTS	%/100 Volts
1305	3225	+87.64
1335	4189	+80.15
1365	5428	+75.12
1395	6662	+68.60
1425	8241	+58.14
1455	9857	+46.65
1485	11018	+33.24
1515	11953	+21.01
1545	12538	+13.57
1575	12760	+8.35
1605	13114	+5.84
1635	13258	+4.78
1665	13430	+3.99
1695	13551	+5.46
1725	13771	+8.65
1755	14204	+16.44
1785	14916	+30.03
1815	16579	+48.74
1845	19717	
1875	25029	

Plateau 7/1/09 Instrument 11 MPC 9604 Detector B 7/1/2009

Alpha Volts: 1515 Beta Volts: 1515

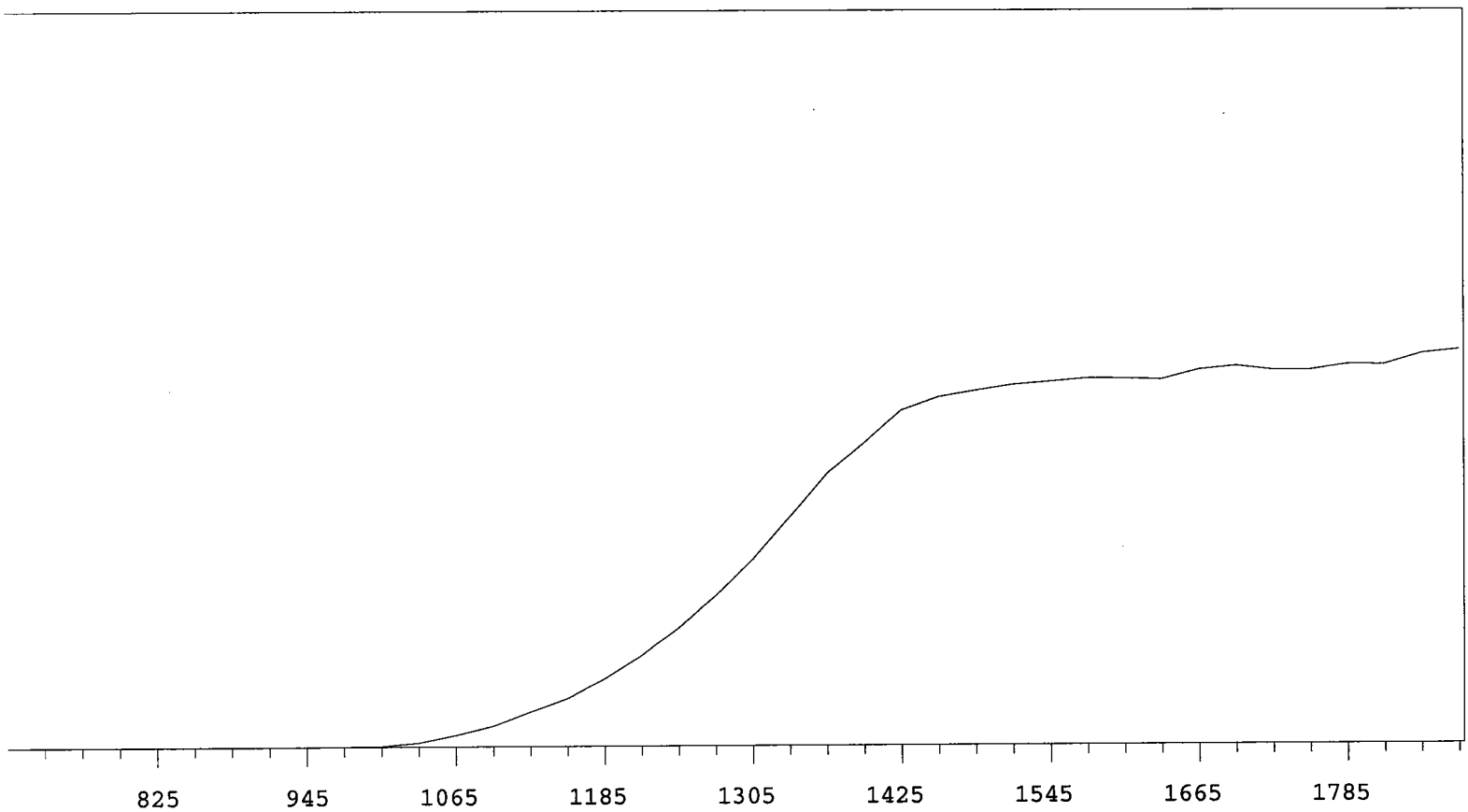


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	11	>100
1005	47	>100
1035	280	>100
1065	610	>100
1095	1192	>100
1125	1789	>100
1155	2466	>100
1185	3337	+94.91
1215	4526	+88.85
1245	5885	+78.40
1275	7518	+72.09

VOLTS	COUNTS	%/100 Volts
1305	8947	+65.63
1335	11238	+56.58
1365	13246	+46.66
1395	14838	+30.69
1425	16166	+20.11
1455	16396	+11.95
1485	17161	+5.61
1515	17274	+3.59
1545	17144	-0.00
1575	17323	+0.80
1605	17136	+2.21
1635	17484	+1.94
1665	17638	+2.16
1695	17580	+0.85
1725	17655	+1.05
1755	17700	+1.98
1785	17857	+2.38
1815	18006	+3.36
1845	18140	
1875	18468	

Plateau 7/1/09 Instrument 11 MPC 9604 Detector C 7/1/2009

Alpha Volts: 1515 Beta Volts: 1515

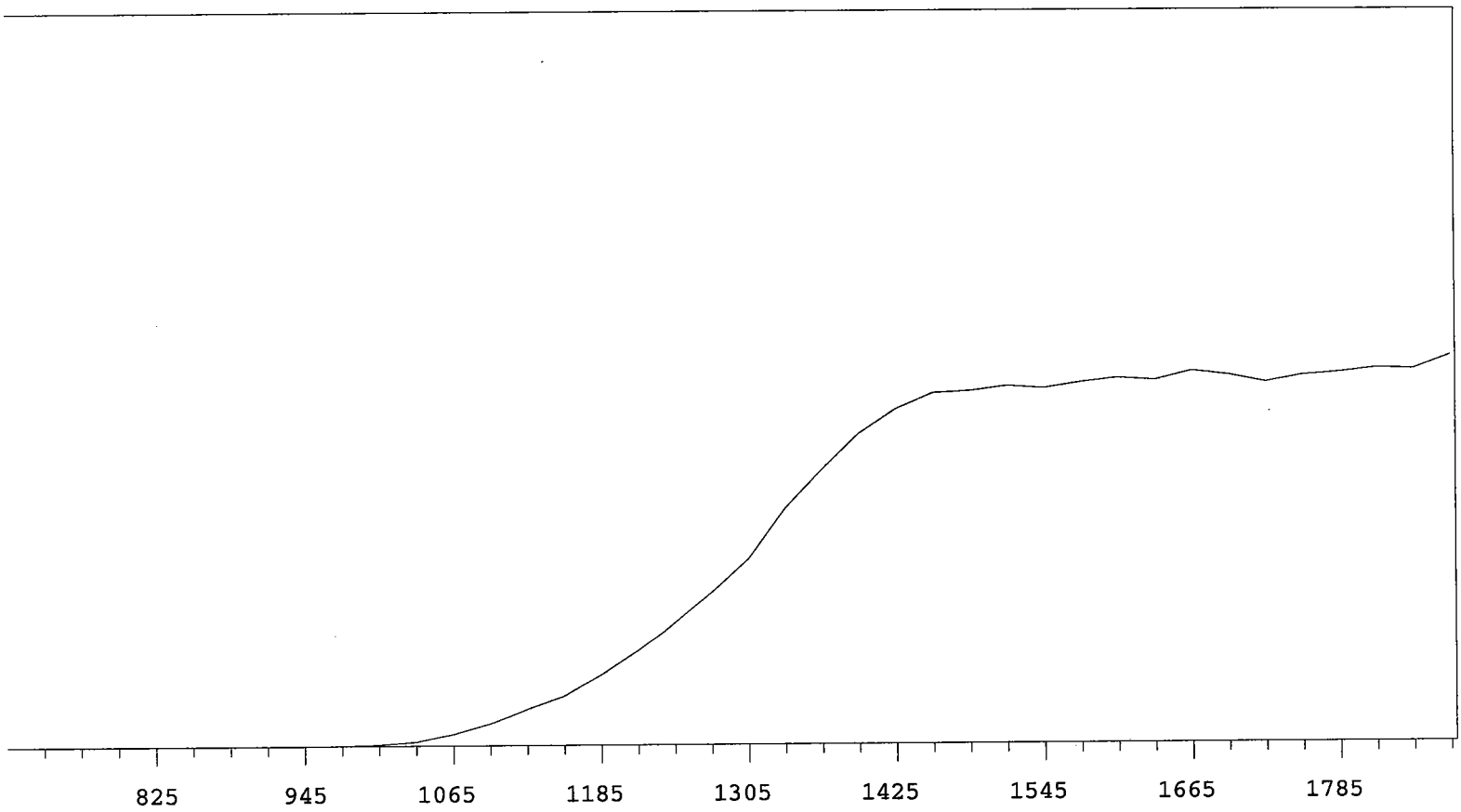


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	+0.00
795	0	>100
825	1	+0.00
855	0	>100
885	0	+0.00
915	0	>100
945	1	>100
975	7	>100
1005	46	>100
1035	191	>100
1065	540	>100
1095	957	>100
1125	1597	>100
1155	2217	>100
1185	3154	+98.74
1215	4239	+89.75
1245	5550	+79.98
1275	6980	+73.12

VOLTS	COUNTS	%/100 Volts
1305	8636	+66.44
1335	10593	+56.56
1365	12582	+46.23
1395	13957	+33.45
1425	15443	+21.49
1455	16048	+13.14
1485	16331	+6.45
1515	16603	+4.19
1545	16736	+2.73
1575	16884	+1.11
1605	16875	+1.91
1635	16813	+2.86
1665	17257	+2.60
1695	17425	+1.58
1725	17238	+0.49
1755	17230	+0.63
1785	17482	+3.27
1815	17468	+4.46
1845	17977	
1875	18163	

Plateau 7/1/09 Instrument 11 MPC 9604 Detector D 7/1/2009

Alpha Volts: 1515 Beta Volts: 1515

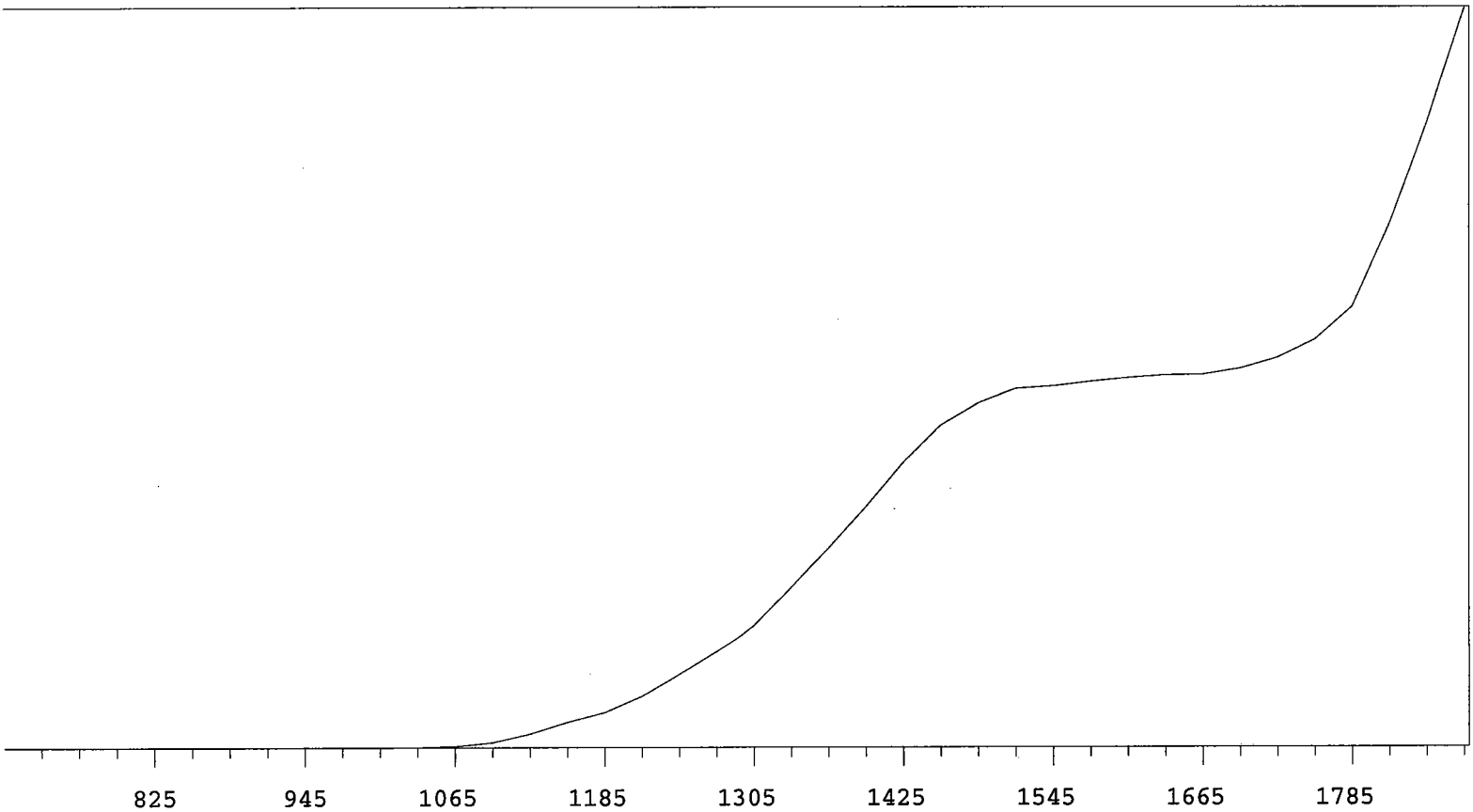


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	1	+83.33
885	1	+55.56
915	0	>100
945	1	>100
975	9	>100
1005	60	>100
1035	173	>100
1065	480	>100
1095	911	>100
1125	1508	>100
1155	2024	>100
1185	2872	+97.38
1215	3858	+89.30
1245	5070	+78.02
1275	6322	+73.30

VOLTS	COUNTS	%/100 Volts
1305	7679	+65.97
1335	9737	+57.57
1365	11301	+45.87
1395	12767	+31.71
1425	13767	+19.90
1455	14399	+10.72
1485	14467	+4.38
1515	14671	+2.12
1545	14576	+2.61
1575	14808	+1.80
1605	14974	+3.15
1635	14872	+1.76
1665	15248	-0.41
1695	15067	-0.27
1725	14784	-0.43
1755	15044	+2.01
1785	15163	+2.82
1815	15333	+3.61
1845	15278	
1875	15817	

Plateau 7/1/09 Instrument 12 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

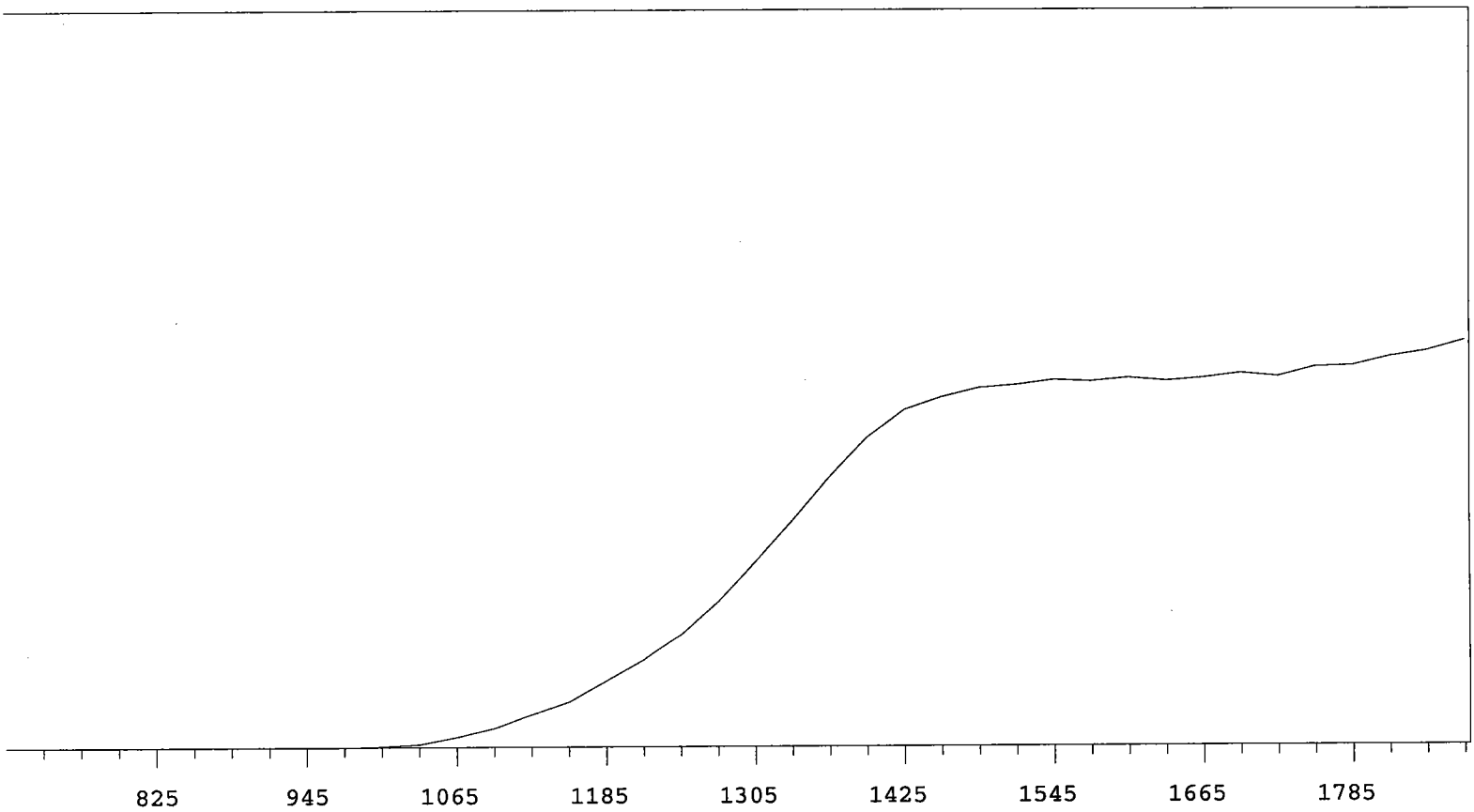


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	1	>100
1005	3	>100
1035	17	>100
1065	84	>100
1095	267	>100
1125	709	>100
1155	1299	>100
1185	1813	>100
1215	2638	>100
1245	3777	+96.47
1275	4915	+87.98

VOLTS	COUNTS	%/100 Volts
1305	6302	+80.03
1335	8191	+73.78
1365	10140	+66.18
1395	12247	+55.83
1425	14468	+43.92
1455	16303	+31.28
1485	17411	+18.64
1515	18150	+9.87
1545	18275	+5.30
1575	18496	+3.16
1605	18685	+2.66
1635	18820	+2.63
1665	18855	+4.16
1695	19152	+7.70
1725	19706	+13.90
1755	20640	+26.51
1785	22308	+40.92
1815	26460	+51.46
1845	31616	
1875	37348	

Plateau 7/1/09 Instrument 12 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

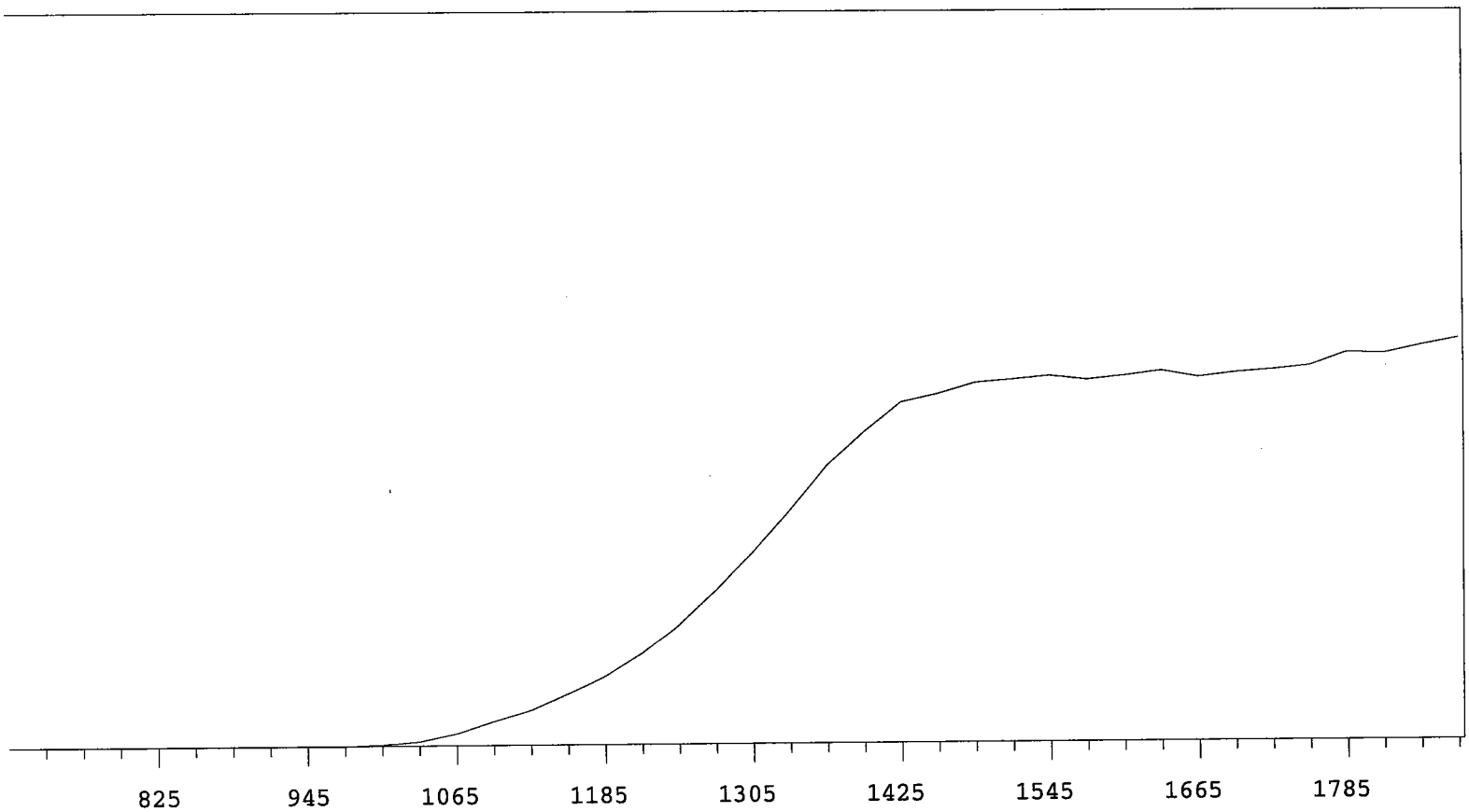


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	1	+83.33
885	1	-83.33
915	0	-55.56
945	0	>100
975	1	>100
1005	43	>100
1035	165	>100
1065	557	>100
1095	1055	>100
1125	1775	>100
1155	2470	>100
1185	3617	+98.46
1215	4757	+90.95
1245	6186	+83.59
1275	8021	+77.85

VOLTS	COUNTS	%/100 Volts
1305	10207	+70.42
1335	12473	+60.75
1365	14900	+48.87
1395	17101	+35.36
1425	18643	+22.53
1455	19350	+12.34
1485	19848	+6.68
1515	20014	+3.51
1545	20278	+2.03
1575	20186	+0.80
1605	20375	+0.32
1635	20209	+1.36
1665	20364	+0.83
1695	20607	+2.43
1725	20429	+2.51
1755	20924	+3.64
1785	20984	+5.11
1815	21470	+5.63
1845	21773	
1875	22346	

Plateau 7/1/09 Instrument 12 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

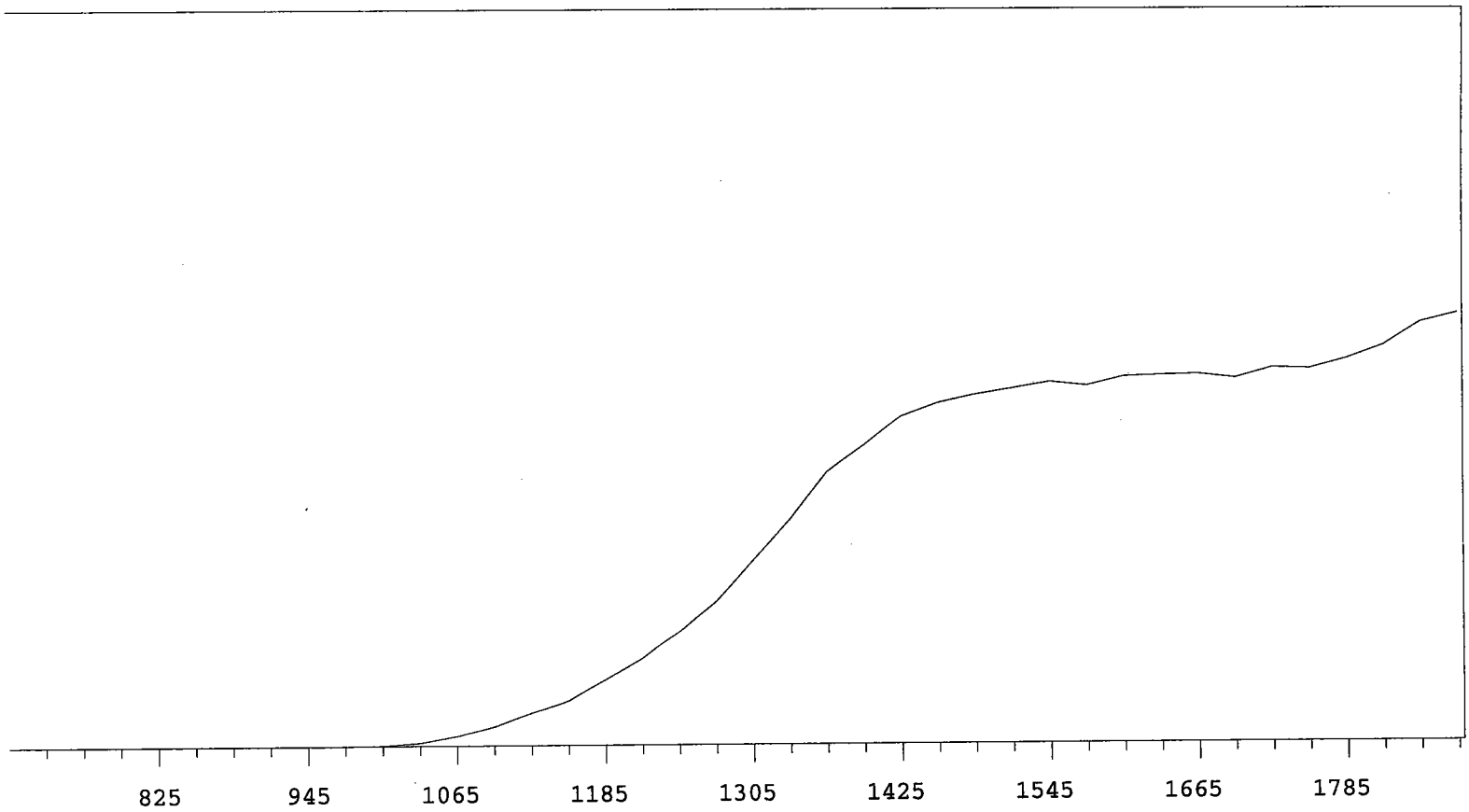


VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	+0.00
915	0	>100
945	0	>100
975	7	>100
1005	52	>100
1035	214	>100
1065	590	>100
1095	1201	>100
1125	1759	>100
1155	2569	>100
1185	3440	+95.13
1215	4583	+87.74
1245	5985	+81.67
1275	7682	+74.54

VOLTS	COUNTS	%/100 Volts
1305	9543	+67.01
1335	11617	+56.47
1365	13791	+45.47
1395	15387	+31.66
1425	16819	+20.02
1455	17210	+11.63
1485	17742	+6.05
1515	17892	+3.04
1545	18070	+1.09
1575	17856	+1.43
1605	18054	+0.42
1635	18287	+1.06
1665	17969	+0.78
1695	18187	+1.48
1725	18317	+4.89
1755	18518	+4.76
1785	19156	+5.18
1815	19100	+5.18
1845	19496	
1875	19842	

Plateau 7/1/09 Instrument 12 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

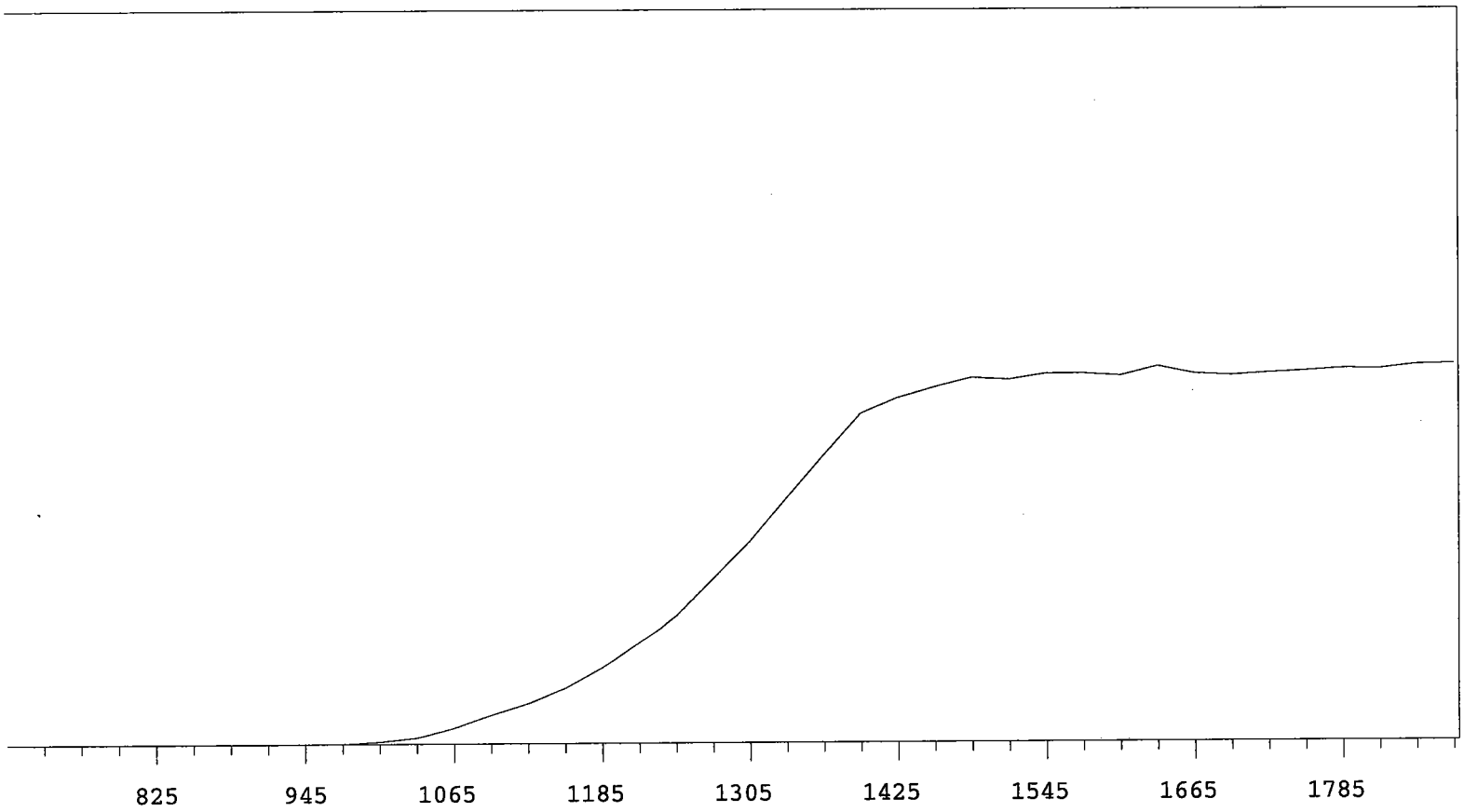


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	4	>100
1005	26	>100
1035	169	>100
1065	483	>100
1095	955	>100
1125	1639	>100
1155	2233	>100
1185	3262	+98.61
1215	4306	+89.77
1245	5662	+82.36
1275	7113	+76.36

VOLTS	COUNTS	%/100 Volts
1305	9144	+69.92
1335	11120	+58.43
1365	13399	+45.40
1395	14711	+32.57
1425	16134	+20.69
1455	16805	+13.46
1485	17209	+7.90
1515	17500	+4.31
1545	17812	+3.48
1575	17629	+2.80
1605	18066	+2.23
1635	18122	+1.44
1665	18166	+1.20
1695	17967	+1.60
1725	18469	+3.41
1755	18409	+6.35
1785	18884	+9.47
1815	19535	+11.98
1845	20630	
1875	21076	

Plateau 7/1/09 Instrument 13 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

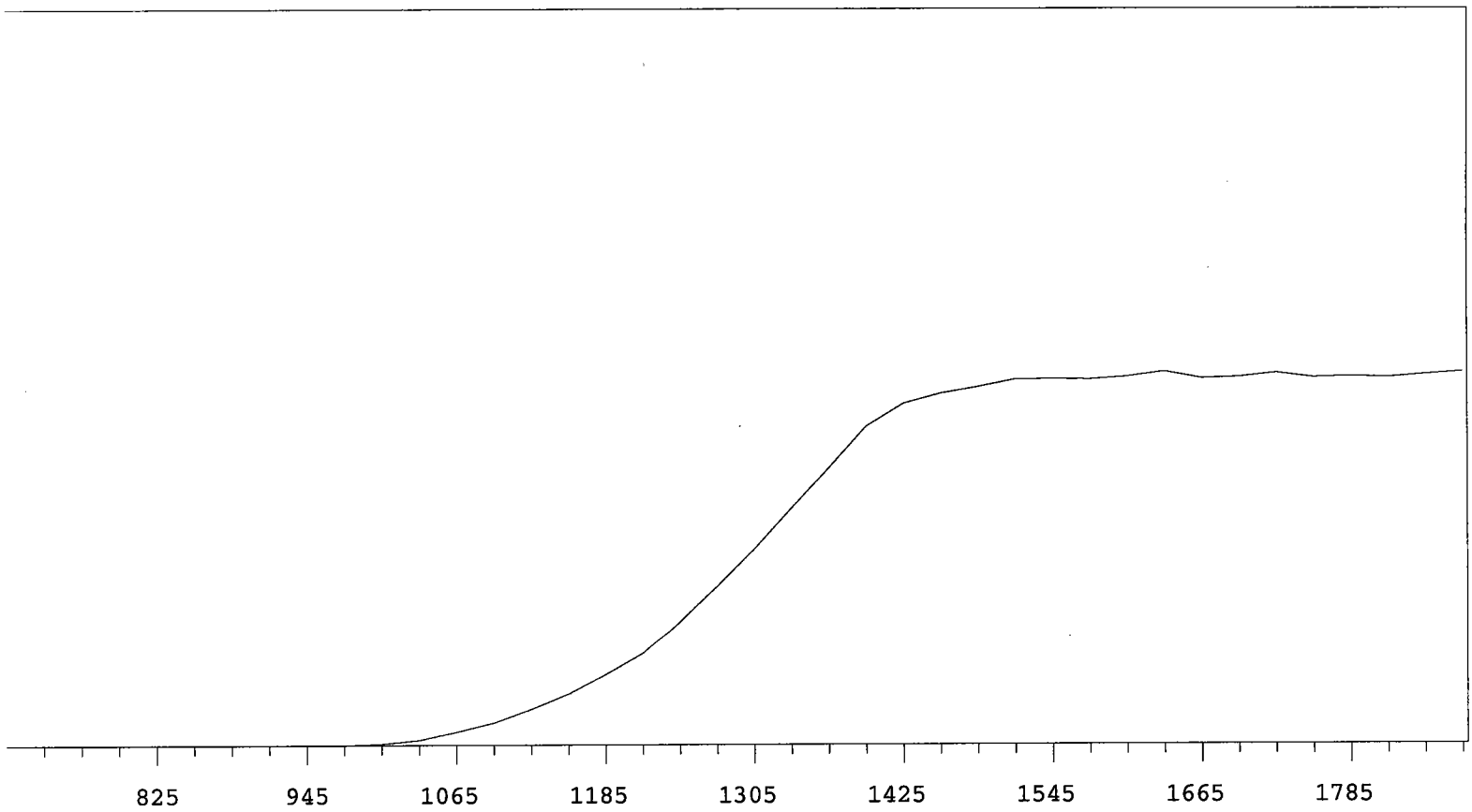


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+55.56
795	2	>100
825	0	+0.00
855	0	>100
885	1	>100
915	0	>100
945	1	>100
975	14	>100
1005	104	>100
1035	281	>100
1065	720	>100
1095	1302	>100
1125	1834	>100
1155	2544	>100
1185	3485	+92.28
1215	4624	+85.50
1245	5878	+77.82
1275	7515	+71.49

VOLTS	COUNTS	%/100 Volts
1305	9209	+64.55
1335	11200	+55.94
1365	13123	+43.27
1395	14957	+29.04
1425	15658	+17.41
1455	16123	+8.01
1485	16530	+4.92
1515	16437	+2.71
1545	16704	+0.83
1575	16707	+2.14
1605	16602	+0.55
1635	17024	-0.28
1665	16684	-0.42
1695	16597	-0.85
1725	16711	+1.27
1755	16796	+1.51
1785	16903	+1.57
1815	16880	+1.46
1845	17066	
1875	17085	

Plateau 7/1/09 Instrument 13 MPC 9604 Detector B 7/1/2009

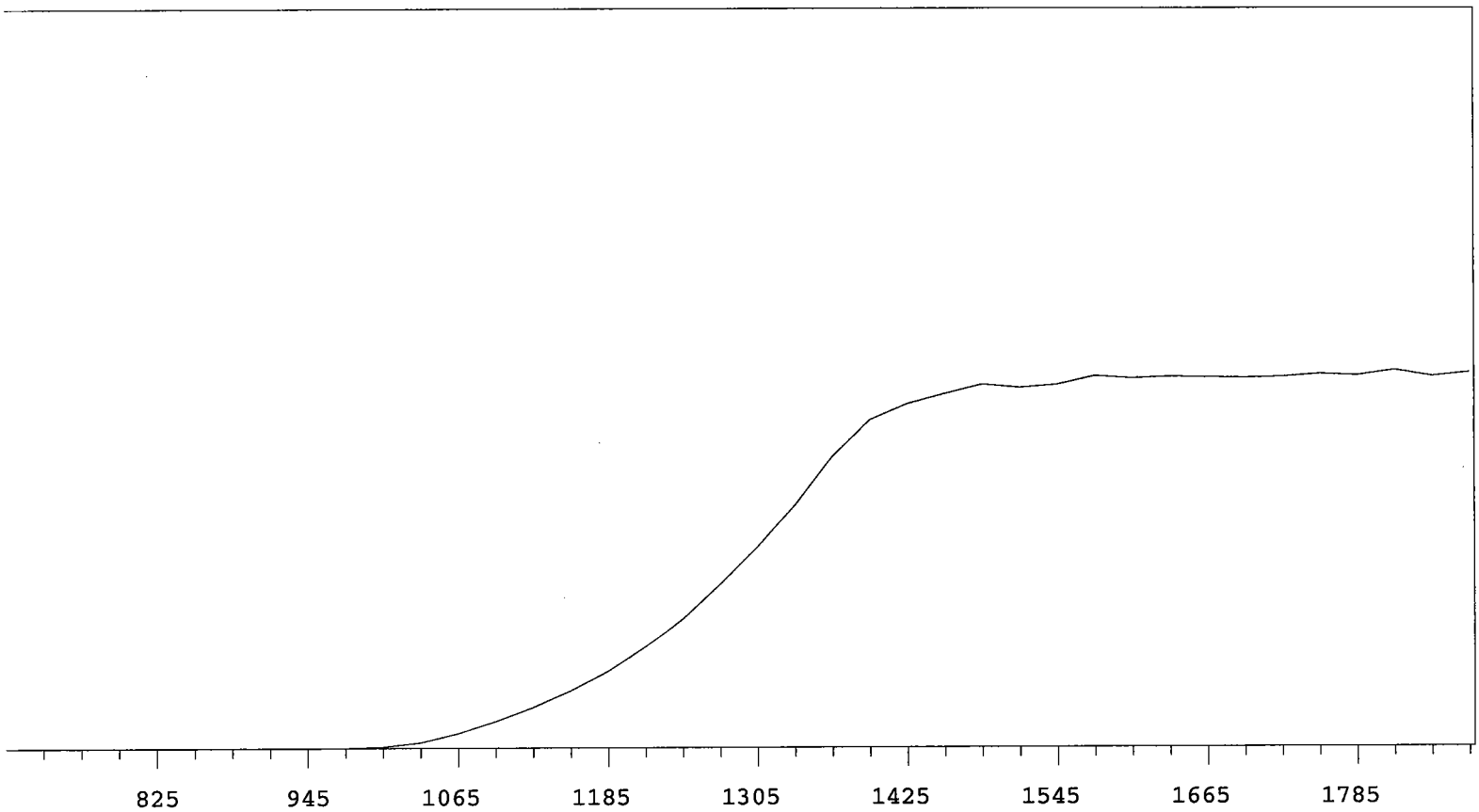
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	4	>100
1005	70	>100
1035	257	>100
1065	648	>100
1095	1116	>100
1125	1784	>100
1155	2560	>100
1185	3531	+96.11
1215	4568	+89.22
1245	6137	+81.65
1275	7855	+74.42

VOLTS	COUNTS	%/100 Volts
1305	9666	+64.39
1335	11722	+55.91
1365	13680	+44.91
1395	15677	+31.56
1425	16786	+19.46
1455	17283	+10.57
1485	17608	+5.95
1515	17972	+3.32
1545	18006	+1.84
1575	17970	+1.58
1605	18104	+0.74
1635	18351	+0.24
1665	18016	+0.16
1695	18080	-0.63
1725	18283	+0.29
1755	18047	-0.47
1785	18110	-0.32
1815	18040	+1.17
1845	18200	
1875	18320	

Plateau 7/1/09 Instrument 13 MPC 9604 Detector C 7/1/2009
Alpha Volts: 705 Beta Volts: 1515

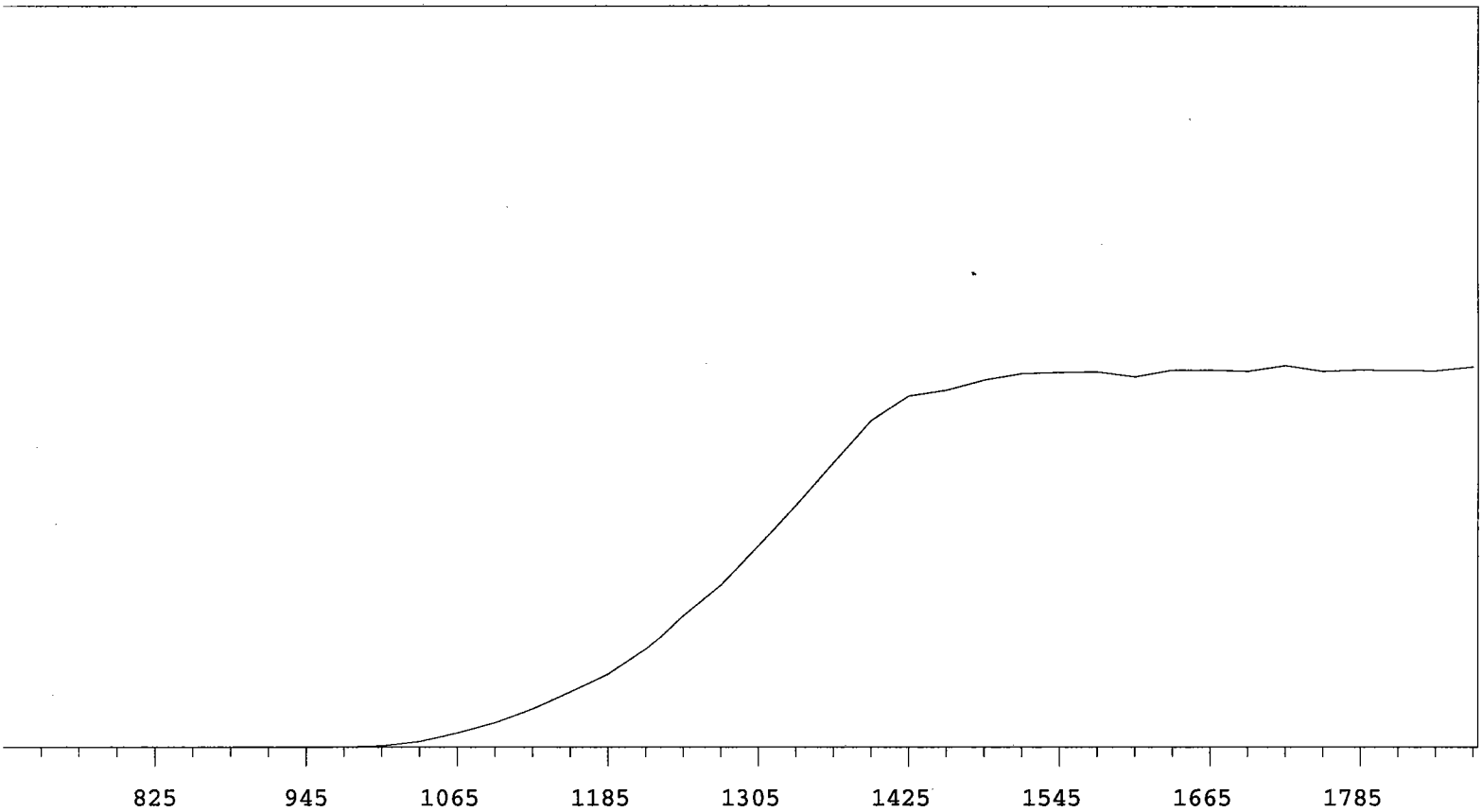


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	9	>100
1005	93	>100
1035	325	>100
1065	834	>100
1095	1525	>100
1125	2318	>100
1155	3233	>100
1185	4357	+92.07
1215	5755	+85.64
1245	7438	+78.35
1275	9463	+70.89

VOLTS	COUNTS	%/100 Volts
1305	11573	+64.95
1335	13929	+56.47
1365	16726	+43.82
1395	18834	+29.38
1425	19743	+16.84
1455	20314	+7.95
1485	20860	+4.16
1515	20670	+3.23
1545	20844	+2.09
1575	21330	+2.48
1605	21188	+1.16
1635	21280	-0.32
1665	21237	+0.08
1695	21202	+0.42
1725	21254	+0.60
1755	21406	+1.41
1785	21326	+0.42
1815	21619	+0.16
1845	21282	
1875	21478	

Plateau 7/1/09 Instrument 13 MPC 9604 Detector D 7/1/2009

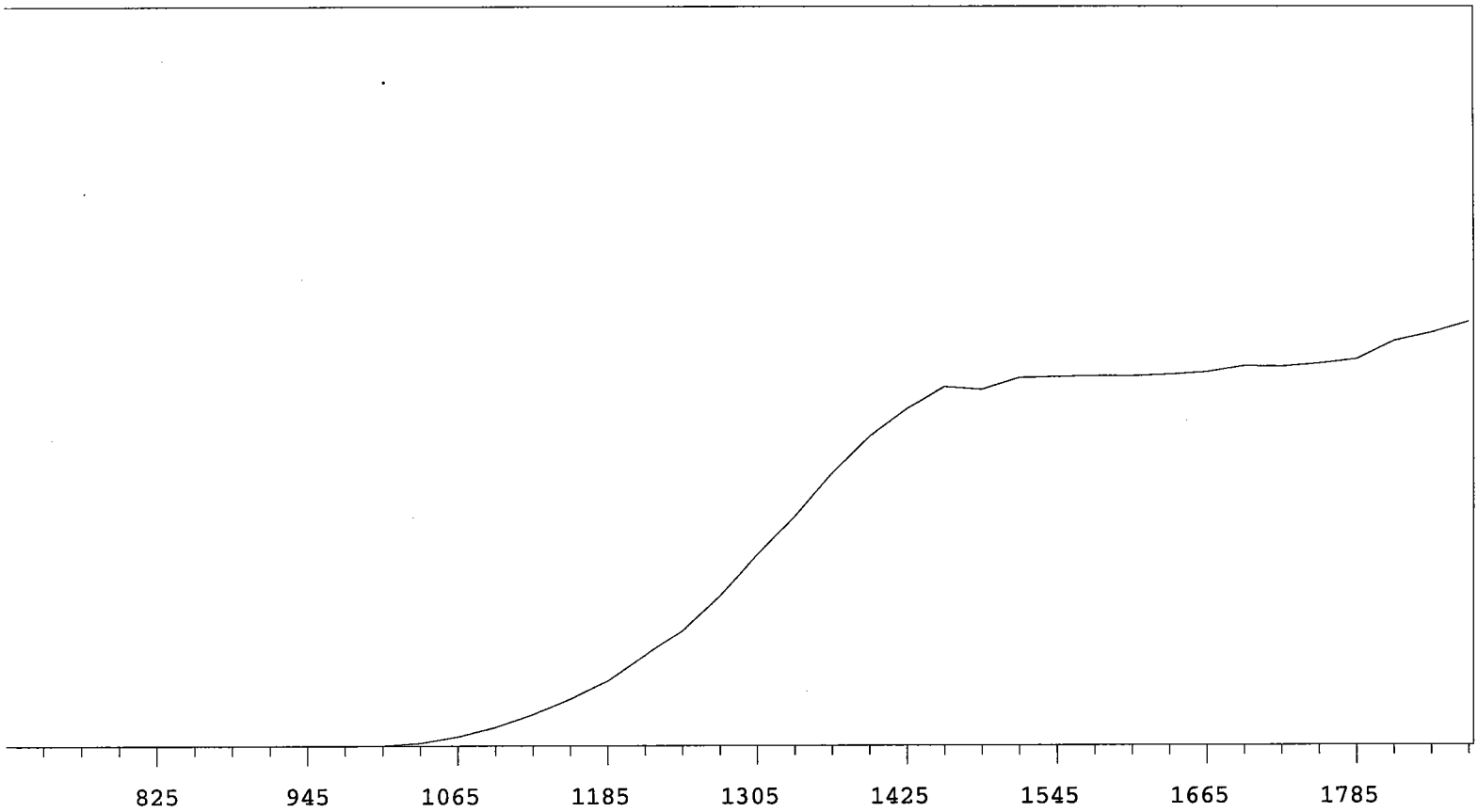
Alpha Volts: 705 Beta Volts: 1515



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	

Plateau 7/1/09 Instrument 14 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

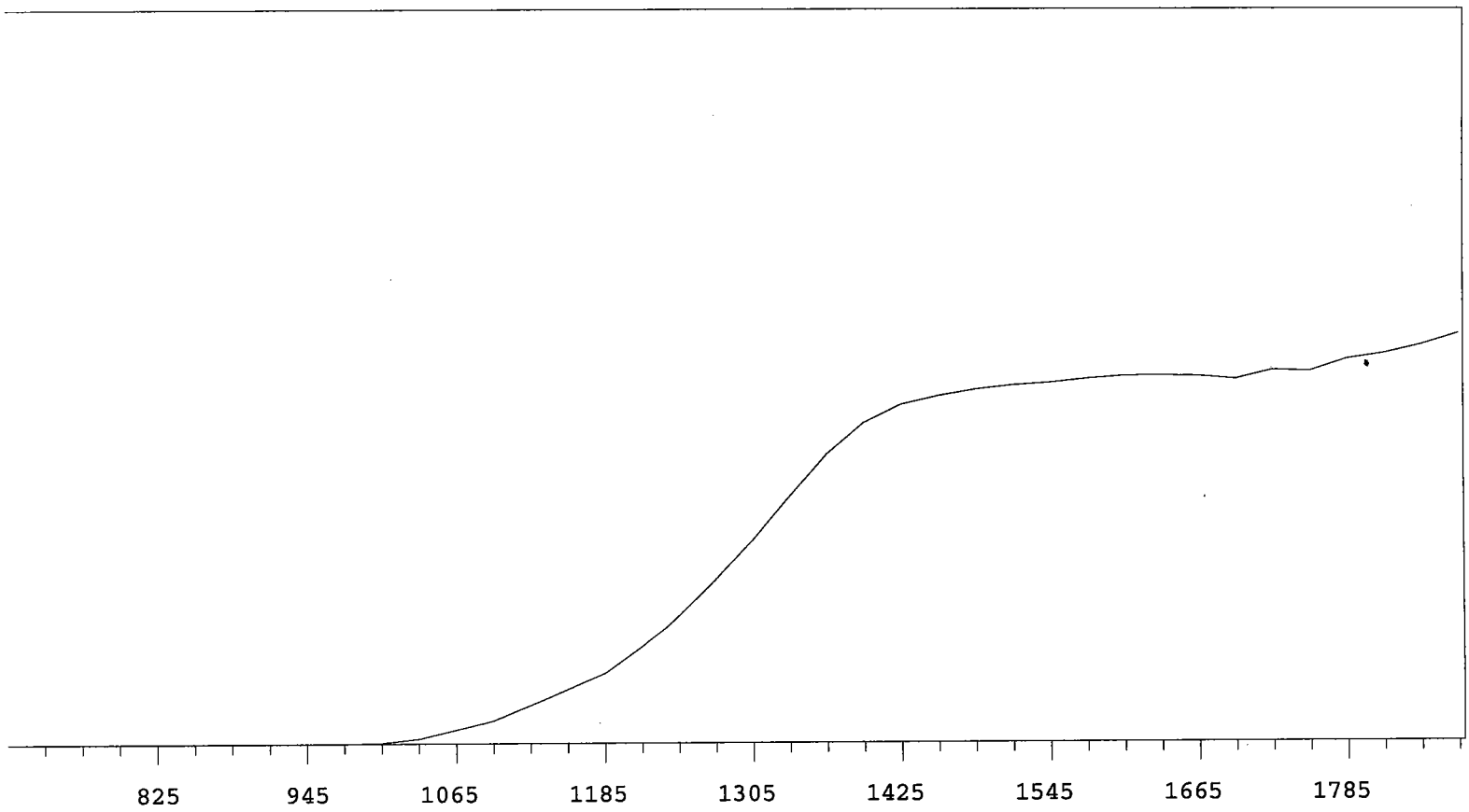


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	+0.00
915	0	>100
945	0	>100
975	0	>100
1005	18	>100
1035	137	>100
1065	430	>100
1095	865	>100
1125	1444	>100
1155	2151	>100
1185	2981	>100
1215	4168	+92.14
1245	5377	+84.73
1275	6924	+74.92

VOLTS	COUNTS	%/100 Volts
1305	8778	+67.49
1335	10502	+57.68
1365	12516	+46.36
1395	14215	+35.88
1425	15472	+22.01
1455	16469	+12.99
1485	16342	+6.70
1515	16874	+3.07
1545	16918	+2.53
1575	16950	+0.58
1605	16943	+0.95
1635	17008	+2.13
1665	17130	+2.45
1695	17403	+2.43
1725	17377	+2.43
1755	17515	+4.88
1785	17710	+7.54
1815	18533	+9.04
1845	18905	
1875	19415	

Plateau 7/1/09 Instrument 14 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

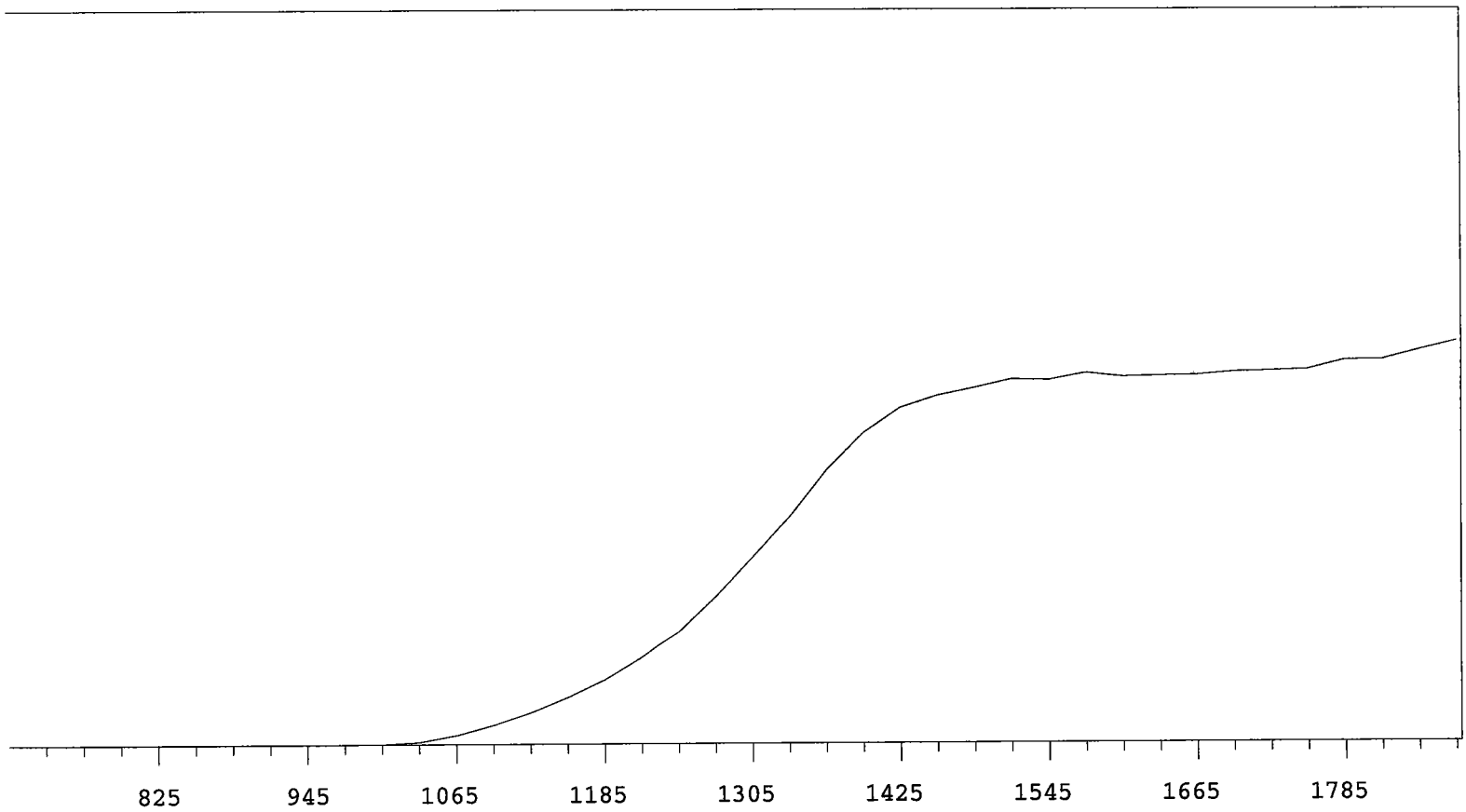


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	1	+0.00
885	0	>100
915	0	>100
945	0	>100
975	3	>100
1005	40	>100
1035	210	>100
1065	590	>100
1095	983	>100
1125	1645	>100
1155	2342	>100
1185	3045	+96.43
1215	4201	+90.42
1245	5579	+83.64
1275	7121	+74.44

VOLTS	COUNTS	%/100 Volts
1305	8797	+65.44
1335	10726	+54.47
1365	12570	+41.11
1395	13917	+26.79
1425	14687	+15.44
1455	15048	+8.47
1485	15318	+5.00
1515	15494	+3.76
1545	15606	+3.04
1575	15776	+2.35
1605	15889	+1.44
1635	15907	-0.16
1665	15881	+0.64
1695	15741	+1.21
1725	16124	+3.63
1755	16076	+5.41
1785	16588	+5.79
1815	16830	+7.53
1845	17185	
1875	17682	

Plateau 7/1/09 Instrument 14 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

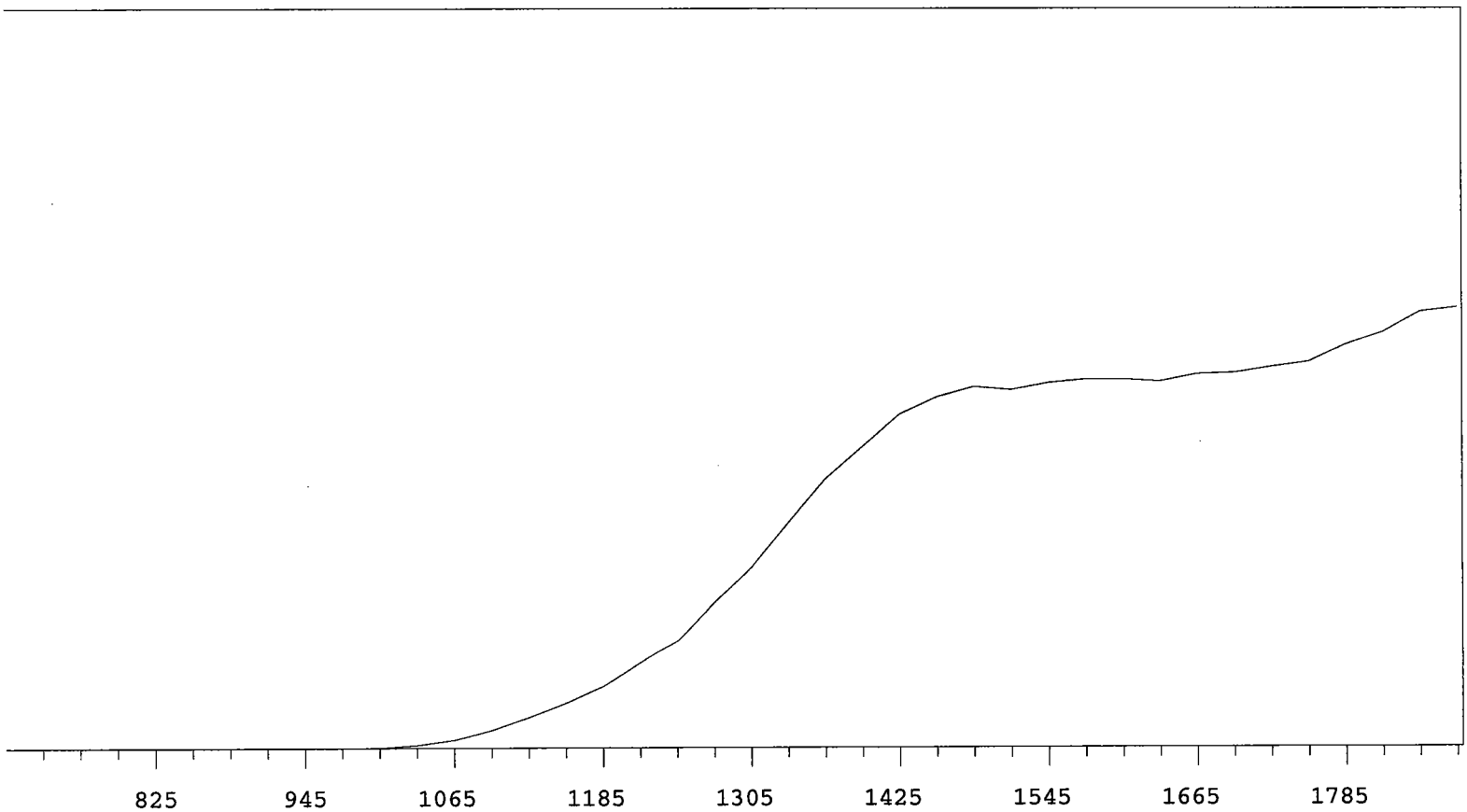


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	+0.00
915	0	>100
945	0	>100
975	2	>100
1005	21	>100
1035	132	>100
1065	491	>100
1095	1036	>100
1125	1698	>100
1155	2517	>100
1185	3468	>100
1215	4721	+91.83
1245	6175	+85.13
1275	8025	+76.82

VOLTS	COUNTS	%/100 Volts
1305	10118	+69.76
1335	12269	+59.65
1365	14810	+47.35
1395	16773	+33.46
1425	18104	+20.13
1455	18720	+11.98
1485	19122	+6.50
1515	19580	+4.77
1545	19527	+2.48
1575	19902	+0.81
1605	19690	+0.53
1635	19739	+0.23
1665	19765	+1.29
1695	19932	+1.40
1725	19976	+2.72
1755	20051	+2.92
1785	20523	+4.26
1815	20542	+5.57
1845	21035	
1875	21528	

Plateau 7/1/09 Instrument 14 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	1	>100
1005	14	>100
1035	130	>100
1065	363	>100
1095	785	>100
1125	1357	>100
1155	1996	>100
1185	2735	+99.45
1215	3785	+94.20
1245	4857	+86.43
1275	6571	+78.80

VOLTS	COUNTS	%/100 Volts
1305	8095	+71.16
1335	10052	+58.38
1365	11990	+47.92
1395	13400	+35.01
1425	14808	+23.58
1455	15554	+13.45
1485	15987	+6.39
1515	15861	+3.45
1545	16156	+2.18
1575	16297	+1.72
1605	16297	+1.33
1635	16208	+1.62
1665	16526	+2.92
1695	16581	+3.94
1725	16832	+5.91
1755	17039	+8.68
1785	17800	+11.53
1815	18351	+11.46
1845	19265	
1875	19468	

0553

ANALYTICS

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

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

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 µg/g Ba carrier.

P O NUMBER 3219 RD, Item 1

SOURCE PREPARED BY: M Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED: M. Monty 4-23-03

Standard Traceability Log Rad

Source Material Info	
Parent Code:	0553-A
Prepared By:	Lonnie Morris
Carrier Conc:	0.5M HCl
Reference Date:	04/23/2003
Ampoule Mass (g):	5.0235 g
Uncertainty:	+/-
LogBook No:	RC-S-035-068

A Solution Material Info	
Isotope:	Radium-228 SPIKE
Prepared By:	Lonnie Morris
Prep Date:	04/25/2003
Verification Date:	04/27/2005
Expiration Date:	04/27/2006
Primary Code:	0553-B
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

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

0503

ANALYTICS

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

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

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 µg/g Ba carrier.

P O NUMBER 3208RD, Item 2

SOURCE PREPARED BY: M Taskaeva
M. Taskaeva, Radiochemist

Q A APPROVED: M. Mtg 10-2-02

RC-S-035-018a

Standard Traceability Log Rad

Source Material Info	
Parent Code:	0503
Prepared By:	Angela Johnson
Carrier Conc:	0.1 M HCL
Reference Date:	10/01/2002
Ampoule Mass (g):	5.02617 g
Uncertainty:	+/- 3.6 %
LogBook No:	RC S 035 018

A Solution Material Info	
Isotope:	Radium-228
Prepared By:	Angela Johnson
Prep Date:	02/20/2003
Verification Date:	04/09/2004
Expiration Date:	04/09/2005
Primary Code:	0503-A
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

(Mass of parent(g)) * (Parm Activity (dps)) * (conversion dpm to dps) / (Ampoule Mass(g) *(Dilution Vol)) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (dps)) * (conversion dpm to dps) / Density / (Ampoule Mass (g) * (Dilution Vol)) = Parent Activity (dpm/g)
(4.4737 g) * (19390 dps) * (60 dpm/dps) / (5.02617 g * 100 mL) = 10355.2060 dpm/mL
(4.4737 g) * (19390 dps) * (60 dpm/dps) / (0.9992 g/mL)/ (5.02617 g * 100 mL) = 10363.0820 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	Standard Mass. Used (mL)	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
							206.3740189

Mean Value (Counting) =	206.3740189	dpm/mL	**102.880426**	**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:

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 9/16/08

Douglas A Johnson 9/17/08

ID: TOTAL ACTIVITY 16 SEP 2008 16:24

USER:11 COMMENT:GOLD

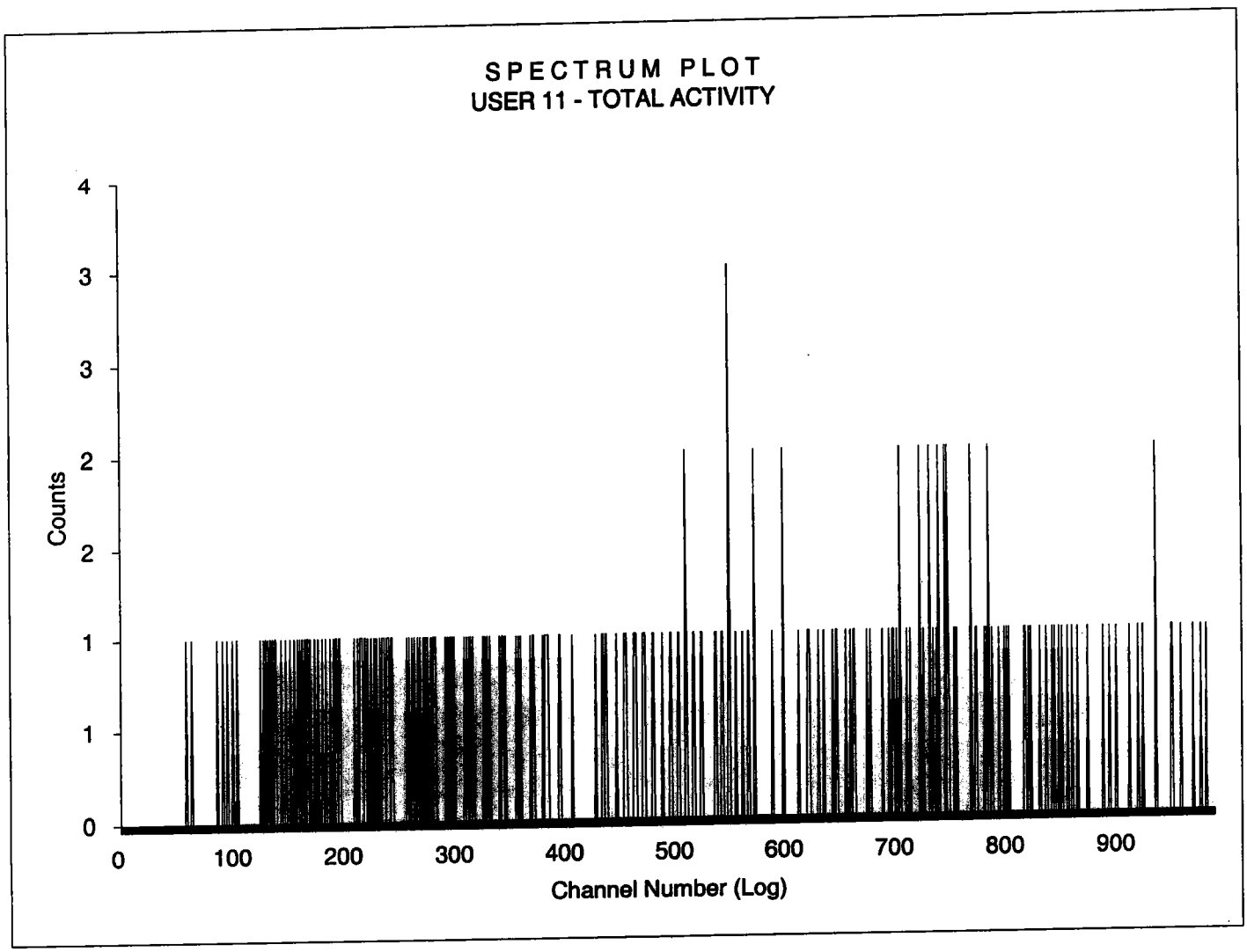
PRESET TIME :	5.00						
DATA CALC :	CPM	H#	:YES	SAMPLE REPEATS:	1	PRINTER	: STD
COUNT BLANK :	NO	IC#	: NO	REPLICATES :	1	RS232	:EDIT
TWO PHASE :	NO	AQC	: NO	CYCLE REPEATS :	1	DISK	: OFF
SCINTILLATOR:	LIQUID	LUMEX	:YES	LOW SAMPLE REJ:	0		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:				none	

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

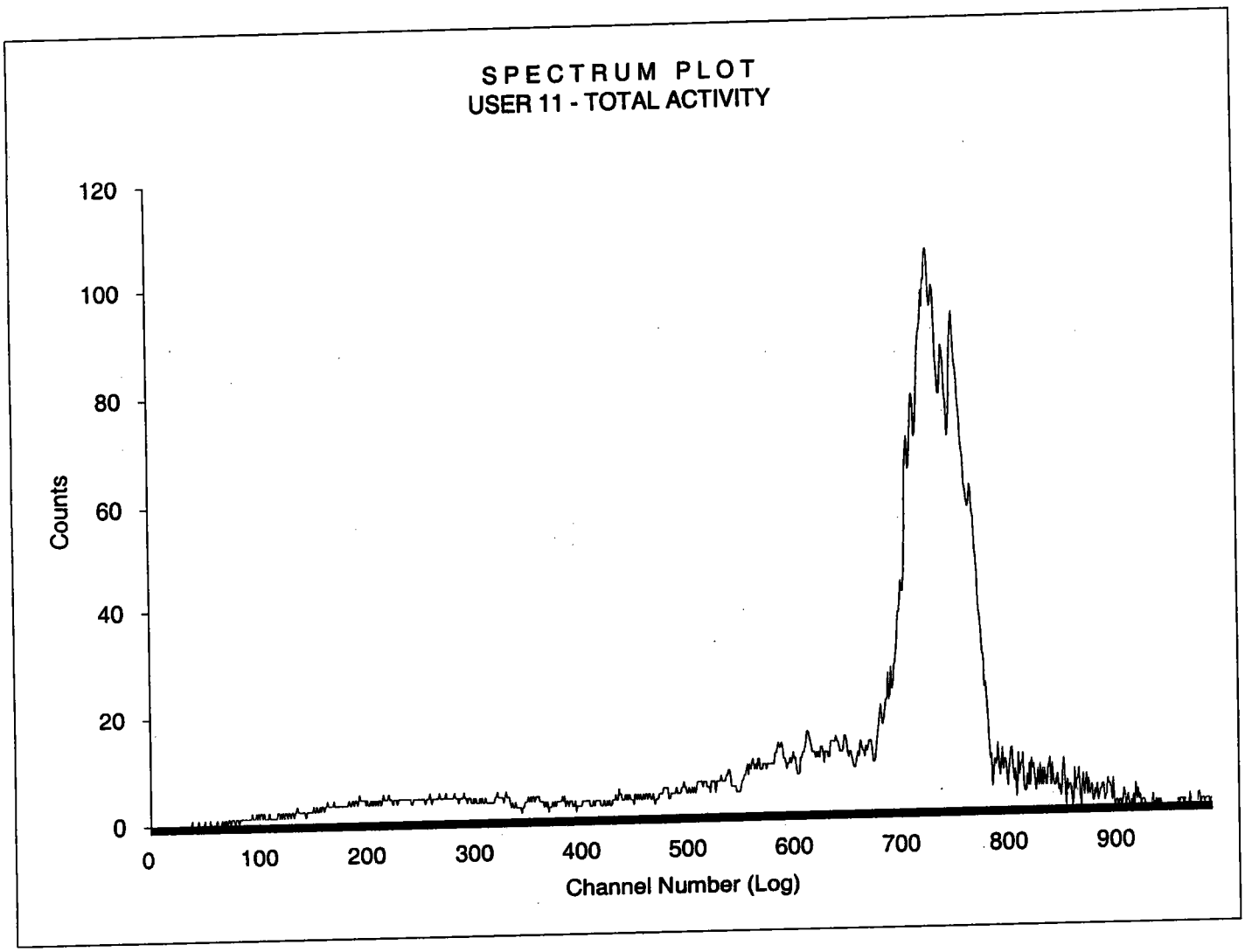
SAM NO	POS	TIME MIN	H#	WIND1 CPM	WIND1 %ERROR	WIND2 CPM	WIND2 %ERROR	LUMEX %	ELAPSED TIME
1	11-1	5.00	98.2	50.40	12.60	54.00	12.17	0.41	5.55
2	11-2	1.30	99.3	7802.31	1.99	7803.08	1.99	0.00	7.81
3	11-3	1.30	100.4	7782.31	1.99	7786.15	1.99	0.00	10.14
4	11-4	1.35	99.2	7581.48	1.98	7585.19	1.98	0.01	12.51
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

8/19/16
VB

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

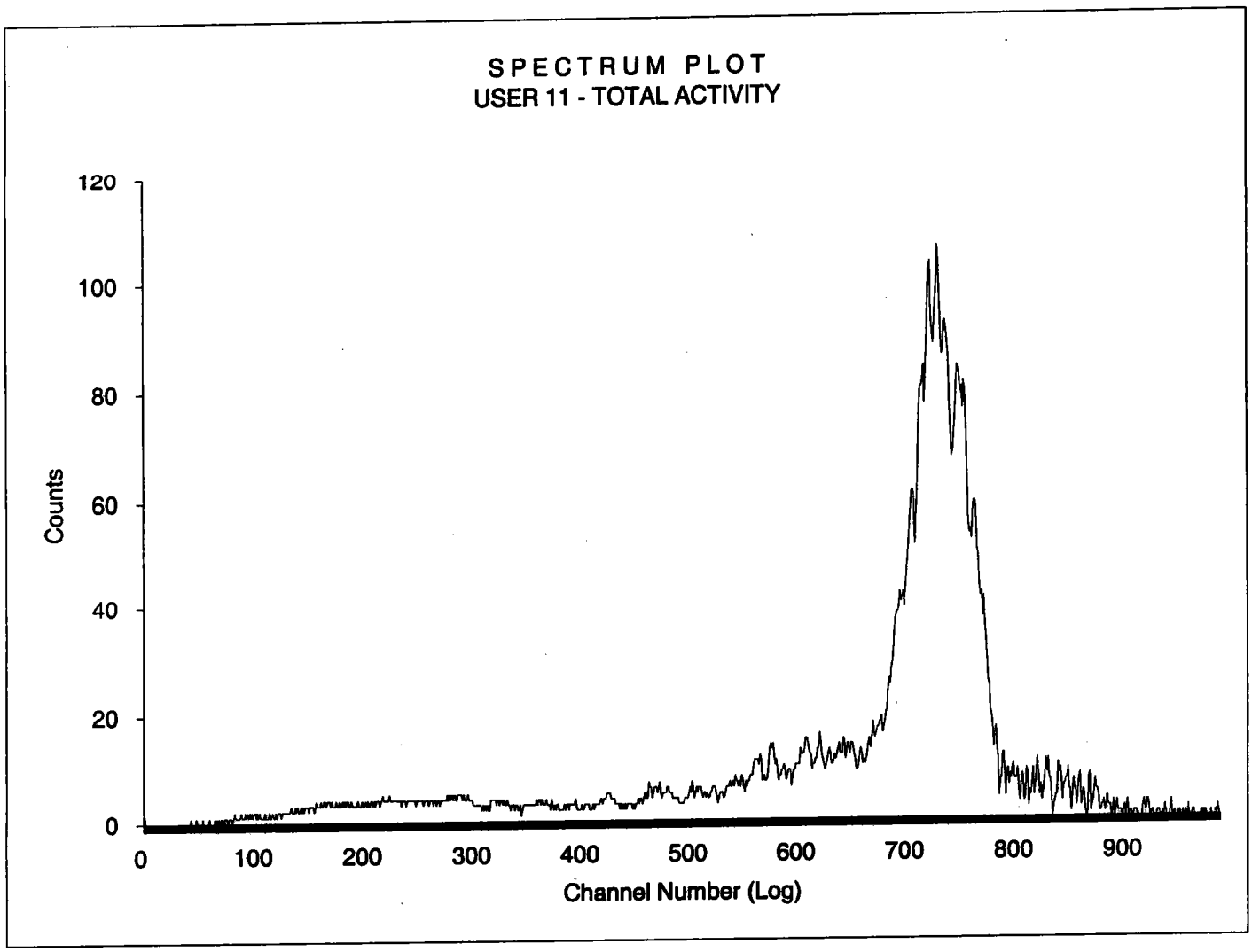


Sample Count Start Time:	16 Sep 2008 16:53:01		
Data Capture Date:	9/16/2008 16:58:06		
User Filename:	S11091611-6A.WK1		
	U11091611-1A.WK1		
Spectrum Type	Log Counts		
User Number:	11		
User Id:	TOTAL ACTIVITY		
User Comment:	GOLD		
Isotope Name:	14C		
Scintillator:	LIQUID		
Sample, Rack-Pos, Time: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



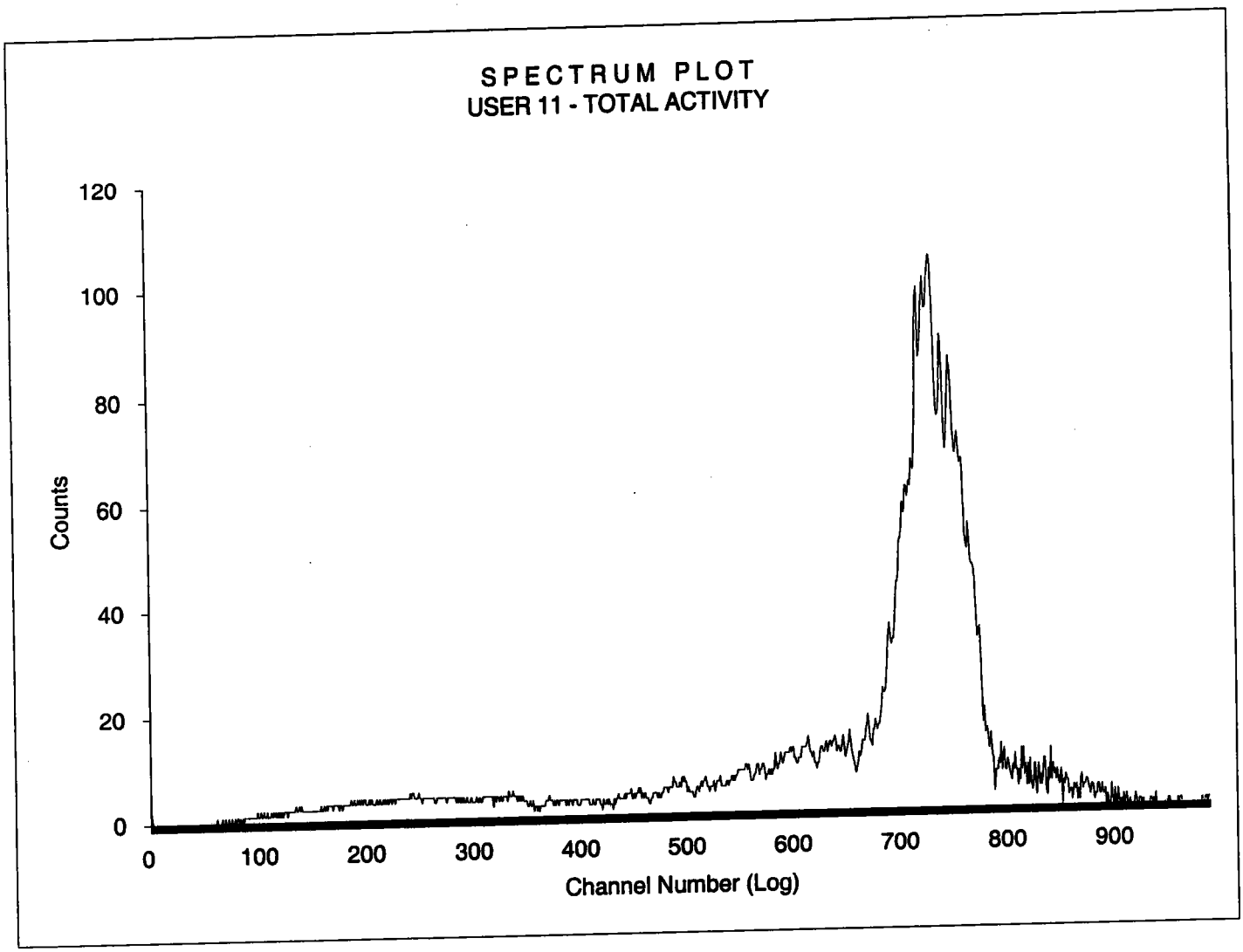
8/9/16

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



8/9/16

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

JRS 6/30/09

Batch #: 881540 **Analyst:DXM2** **First Client Due Date:** **Internal Due Date** 07/03/2009 **Ac-228 Ingrow:** 2025 6/30/09

Spike Isotope: Radium-228 **Spike Code:** 0 NA **Expiration Date:** NA **Vol:** NA

LCS Isotope: Radium-228 **LCS Code:** 0503-B **Expiration Date:** 9/13/09 **Vol:** 2 **Ac-228 Separation Date/Time:** 7-2-09 0540

Tracer Isotope: Barium-133 **Tracer Code:** 0112-J **Expiration Date:** 2/17/10 **Vol:** 0.1

Prep Date: 6/30/09 **Initials:** JRS **Pipet ID:** 1734218 **Balance ID:** NA **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	W2ALL
1201872116-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	5	20		105.84	
1201872117-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	6	20		102.70	
1201872118-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	7	20		112.82	
1201872119-1	LCS for batch 881540	LCS		3 pCi/L	GROUND WATI	QC ACCOUNT	16-JUN-09 03:56 PM	8	20		111.91	↓

SR 7/2/09

213

Comments: _____

Data Reviewed By: SR 7/2/09

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

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

7/2/09

LUCAS CELL COUNTERS

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

Lucas Cell Calibration Package

		YES	NO	Comments
1)	Is all calibration standard information enclosed for:			
	the primary standard certificate?	✓		
	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 Denese Date: 8/29/08

Reviewed By: Mary L. Adams Date: 8/29/08

Effective Date: 8/29/08

Ra-226 Cell Constants

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

Lucas cell #	Cell constant			Standard Source	Date/Time of count	Date/time flushed to cell	Date/time end of degas	Bkg Counts	bkg cpm	total counts	count time min	cpm	Known activity dpm	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	1.796	Average	1.751	17	6/11/2008 22:40	6/11/2008 14:55	6/5/2008 14:10	8	0.267	8239	30	274.63	244.63	6.03125	0.32292	3102	0.9963
101	1.729	Stdev	0.039	15	8/15/2008 12:50	8/15/2008 9:25	8/12/2008 16:10	8	0.267	4800	30	160.00	244.63	2.71875	0.14236	3167	0.9962
101	1.728			14	7/31/2008 15:35	7/31/2008 8:55	7/28/2008 10:55	8	0.267	4938	30	164.60	244.63	2.91667	0.27778	3152	0.9963
102	1.677	Average	1.647	41	6/11/2008 23:15	6/11/2008 15:20	6/5/2008 14:10	8	0.267	7698	30	256.60	244.63	6.04861	0.32986	3102	0.9963
102	1.632	Stdev	0.026	44	8/4/2008 16:35	8/4/2008 9:45	8/1/2008 13:30	8	0.267	4570	30	152.33	244.63	2.84375	0.28472	3156	0.9963
102	1.632			44	7/31/2008 16:10	7/31/2008 9:20	7/28/2008 10:55	8	0.267	4680	30	156.00	244.63	2.93403	0.28472	3152	0.9963
103	1.864	Average	1.752	47	6/11/2008 13:40	6/11/2008 9:40	6/5/2008 14:10	8	0.267	8620	30	287.33	244.63	5.81250	0.16667	3102	0.9963
103	1.687	Stdev	0.098	36	7/31/2008 16:40	7/31/2008 9:50	7/28/2008 10:55	7	0.233	4862	30	162.07	244.63	2.95486	0.28472	3152	0.9963
103	1.704			36	8/4/2008 17:10	8/4/2008 10:15	8/1/2008 13:30	7	0.233	4796	30	159.87	244.63	2.86458	0.28819	3156	0.9963
104	1.937	Average	1.973	3	6/11/2008 14:10	6/11/2008 10:00	6/5/2008 14:10	6	0.200	8955	30	298.50	244.63	5.82639	0.17361	3102	0.9963
104	1.917	Stdev	0.080	21	6/24/2008 17:20	6/24/2008 14:10	6/20/2008 9:50	8	0.267	7275	30	242.50	244.63	4.18056	0.13194	3115	0.9963
104	2.064			19	7/31/2008 17:20	7/31/2008 10:15	7/28/2008 10:55	8	0.267	5964	30	198.80	244.63	2.97222	0.29514	3152	0.9963
105	1.916	Average	1.749	37	8/15/2008 13:55	8/15/2008 9:55	8/12/2008 16:10	8	0.267	5327	30	177.57	244.63	2.73958	0.16667	3167	0.9962
105	1.700	Stdev	0.149	30	7/31/2008 17:55	7/31/2008 10:45	7/28/2008 10:55	4	0.133	4933	30	164.43	244.63	2.99306	0.29861	3152	0.9963
105	1.631			30	8/4/2008 18:35	8/4/2008 11:05	8/1/2008 13:30	1	0.033	4605	30	153.50	244.63	2.89931	0.31250	3156	0.9963
106	1.594	Average	1.486	43	8/15/2008 14:30	8/15/2008 10:15	8/12/2008 16:10	8	0.267	4441	30	148.03	244.63	2.75347	0.17708	3167	0.9962
106	1.441	Stdev	0.094	46	7/31/2008 18:25	7/31/2008 11:15	7/28/2008 10:55	8	0.267	4208	30	140.27	244.63	3.01389	0.29861	3152	0.9963
106	1.422			15	8/19/2008 8:00	8/18/2008 16:00	8/15/2008 9:25	8	0.267	4132	30	137.73	244.63	3.27431	0.66667	3170	0.9962
107	1.779	Average	1.773	25	6/11/2008 15:50	6/11/2008 11:10	6/5/2008 14:10	8	0.267	8232	30	274.40	244.63	5.87500	0.19444	3102	0.9963
107	1.751	Stdev	0.020	13	7/31/2008 19:05	7/31/2008 11:40	7/28/2008 10:55	7	0.233	5121	30	170.70	244.63	3.03125	0.30903	3152	0.9963
107	1.790			13	8/4/2008 19:40	8/4/2008 12:00	8/1/2008 13:30	8	0.267	5105	30	170.17	244.63	2.93750	0.31944	3156	0.9963
108	1.755	Average	1.840	36	6/11/2008 17:00	6/11/2008 11:30	6/5/2008 14:10	7	0.233	8081	30	269.37	244.63	5.88889	0.22917	3102	0.9963
108	1.937	Stdev	0.092	47	6/25/2008 20:00	6/25/2008 15:40	6/20/2008 9:50	8	0.267	8413	30	280.43	244.63	5.24306	0.18056	3116	0.9963
108	1.827			46	8/15/2008 15:00	8/15/2008 10:15	8/12/2008 16:10	8	0.267	5071	30	169.03	244.63	2.75347	0.19792	3167	0.9962
109	1.646	Average	1.512	21	6/11/2008 17:35	6/11/2008 11:45	6/5/2008 14:10	8	0.267	7570	30	252.33	244.63	5.89931	0.24306	3102	0.9963
109	1.441	Stdev	0.117	42	8/1/2008 8:55	7/31/2008 13:05	7/28/2008 10:55	6	0.200	3894	30	129.80	244.63	3.09028	0.82639	3152	0.9963
109	1.448			42	8/4/2008 20:40	8/4/2008 13:40	8/1/2008 13:30	8	0.267	4226	30	140.87	244.63	3.00694	0.29167	3156	0.9963
110	1.664	Average	1.544	36	6/24/2008 21:15	6/24/2008 15:05	6/20/2008 9:50	8	0.267	6214	30	207.13	244.63	4.21875	0.25694	3115	0.9963
110	1.566	Stdev	0.133	13	8/15/2008 15:35	8/15/2008 10:50	8/12/2008 16:10	8	0.267	4377	30	145.90	244.63	2.77778	0.19792	3167	0.9962
110	1.401			15	8/4/2008 21:10	8/4/2008 14:05	8/1/2008 13:30	8	0.267	4103	30	136.77	244.63	3.02431	0.29514	3156	0.9963
111	1.632	Average	1.575	37	6/24/2008 22:30	6/24/2008 15:30	6/20/2008 9:50	7	0.233	6071	30	202.37	244.63	4.23611	0.29167	3115	0.9963
111	1.517	Stdev	0.057	43	8/1/2008 10:30	7/31/2008 14:00	7/28/2008 10:55	8	0.267	4120	30	137.33	244.63	3.12847	0.85417	3152	0.9963
111	1.576			43	8/4/2008 21:35	8/4/2008 14:30	8/1/2008 13:30	7	0.233	4636	30	154.53	244.63	3.04167	0.29514	3156	0.9963
112	1.797	Average	1.648	43	6/11/2008 22:10	6/11/2008 14:30	6/5/2008 14:10	8	0.267	8239	30	274.63	244.63	6.01389	0.31944	3102	0.9963
112	1.588	Stdev	0.130	37	8/1/2008 11:00	7/31/2008 14:00	7/28/2008 10:55	8	0.267	4294	30	143.13	244.63	3.12847	0.87500	3152	0.9963
112	1.559			37	8/4/2008 22:00	8/4/2008 14:50	8/1/2008 13:30	8	0.267	4599	30	153.30	244.63	3.05556	0.29861	3156	0.9963

KP 8/29/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 19	500	6/5/08 1410						
Cal 13	500	6/5/08 1410						
Cal 10	500	6/5/08 1410						
Cal 14	500	6/5/08 1410						
Cal 34	500	6/5/08 1410						
Cal 21	500	6/20/08 0950	6/24/08 1410	6/24/08 1720	104	1	8	7275
~~Cal 40~~	~~500~~	~~6/20/08 0950~~	~~6/24/08 1430~~	6.24.08 1820	107	1	8	~~18~~ KD 8/30/08
~~Cal 25~~	~~500~~	~~6/20/08 0950~~	~~6/24/08 1450~~	6.24.08 1921	108	1	8	~~7547~~
Cal 36	500	6/20/08 0950	6/24/08 1505	6.24.08 2115	110	1	8	6214
Cal 37	500	6/20/08 0950	6/24/08 1530	6.24.08 2230	111	1	7	6071
~~Cal 11~~	500	6/20/08 0950	6/24/08 1545	6.24.08 2305	112	1	8	5592
~~Cal 3~~	~~500~~	6/20/08 0950	6/25/08 1405	6.25.08 1705	102	1	8	8275
~~Cal 32~~	~~500~~	6/20/08 0950	6/25/08 1420	6.25.08 1740	101	1	8	~~3362~~ KD 8/29/08
~~Cal 41~~	500	6/20/08 0950	6/25/08 1445	6.25.08 1820	103	1	8	~~8405~~
~~Cal 39~~	500	6/20/08 0950	6/25/08 1510	6.25.08 1851	105	1	8	9300
~~Cal 43~~	500	6/20/08 0950	6/25/08 1525	6.25.08 1933	109	1	8	~~8121~~
Cal 47	500	6/20/08 0950	6/25/08 1540	6.25.08 2000	109	1	8	8413
								KD 8/29/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 47	500	6/5/08 1410	6/11/08 0940	6/11/08 1340	103	1	8	8620
Cal 3	500	6/5/08 1410	6/11/08 1000	6/11/08 1410	104	1	6	8955
~~Cal 37~~	~~500~~	~~6/5/08 1410~~	6/11/08 1015	~~6/11/08 1440~~	~~105~~	~~1~~	~~4~~	~~9629~~
~~Cal 40~~	~~500~~	~~6/5/08 1410~~	~~6/11/08 1045~~	6/11/08 1510	106	1	8	3534
Cal 25	500	6/5/08 1410	6/11/08 1110	6/11/08 1550	107	1	8	8232
Cal 36	500	6/5/08 1410	6/11/08 1130	6/11/08 1700	108	1	7	8081
Cal 21	500	6/5/08 1410	6/11/08 1145	6/11/08 1735	109	1	8	7570
~~Cal 32~~	~~500~~	~~6/5/08 1410~~	~~6/11/08 1350~~	~~6/11/08 2040~~	~~110~~	~~1~~	~~8~~	~~4366~~
~~Cal 34~~	~~500~~	~~6/5/08 1410~~	~~6/11/08 1415~~	6/11/08 2115	111	1	6	6792
Cal 43	500	6/5/08 1410	6/11/08 1430	6/11/08 2210	111	1	8	5867
Cal 17	500	6/5/08 1410	6/11/08 1455	6/11/08 2240	101	1	8	8239
Cal 41	500	6/5/08 1410	6/11/08 1520	6/11/08 2315	101	1	8	7698
Cal 11	500	6/5/08 1410						
Cal 30	500	6/5/08 1410						
Cal 7	500	6/5/08 1410						
Cal 9	500	6/5/08 1410						
Cal 6	500	6/5/08 1410						
Cal 8	500	6/5/08 1410						
Cal 35	500	6/5/08 1410						

219

1 of 10
8/29/08

Ra-226 Verification Sheet rig 1

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 14	500	7/28/08 1055	7/31/08 0855	7/31/08 1535	101	1	8	4938
Cal 44	500	7/28/08 1055	7/31/08 0920	7/31/08 1610	102	1	8	4680
Cal 36	500	7/28/08 1055	7/31/08 0950	7/31/08 1640	103	1	7	4862
Cal 19	500	7/28/08 1055	7/31/08 1015	7/31/08 1720	104	1	8	5964
Cal 30	500	7/28/08 1055	7/31/08 1045	7/31/08 1755	105	1	4	4933
Cal 46	500	7/28/08 1055	7/31/08 1115	7/31/08 1825	106	1	8	4208
Cal 13	500	7/28/08 1055	7/31/08 1140	7/31/08 1905	107	1	7	5121
~~Cal 25~~	~~500~~	~~7/28/08 1055~~	~~7/31/08 1205~~	8/1/08 0815	108	1	8	3159
Cal 42	500	7/28/08 1055	7/31/08 1305	8/1/08 0855	109	1	6	3894
~~Cal 15~~	~~500~~	~~7/28/08 1055~~	~~7/31/08 1330~~	~~8/1/08 0930~~	110	1	6	~~3185~~
Cal 43	500	7/28/08 1055	7/31/08 1400	8/1/08 1050	111	1	8	4120
Cal 37	500	7/28/08 1055	7/31/08 (x) 7/31/08 1415	8/1/08 1100	112	1	8	4294

220

VD 8/29/08

Ra-226 Verification Sheet

Rig 1

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
~~Cal 14~~	500	8/1/08 1330	8/4/08 0915	8/4/08 1550	101	1	8	3638
44	500	8/1/08 1330	8/4/08 0945	8.4.08 1635	102	1	8	4570
36	500	8/1/08 1337	8/4/08 1015	8.4.08 1710	103	1	7	4796
~~19~~	500	~~8/1/08 1330~~	~~8/4/08 1035~~	8.4.08 1745	104	1	6	~~4733~~
30	500	8/1/08 1330	8/4/08 1105	8.4.08 1835	105	1	1	4605
~~46~~	500	~~8/1/08 1330~~	~~8/4/08 1130~~	8.4.08 1910	106	1	6	~~3725~~
13	500	8/1/08 1330	8/4/08 1200	8.4.08 1940	107	1	8	5105
~~25~~	~~500~~	~~8/1/08 1330~~	~~8/4/08 1310~~	8.4.08 2010	108	1	8	~~4575~~
42	500	8/1/08 1330	8/4/08 1340	8.4.08 2040	109	1	8	4226
15	500	8/1/08 1330	8/4/08 1405	8.4.08 2110	110	1	8	4103
43	500	8/1/08 1330	8/4/08 1430	8.4.08 2135	111	1	7	4636
37	500	8/1/08 1330	8/4/08 1450	8.4.08 2200	112	1	8	4599

KD 8/29/08

KD 8/29/08

Ra-226 Verification Sheet

Rig 1

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
		~~8/4/08 1305~~						
Cal 15		8/12/08 1610	8/15/08 0925	8/15/08 1250	101	1	8	4900
Cal 37		8/12/08 1610	8/15/08 0955	8/15/08 1335	105	1	8	5327
Cal 43		8/12/08 1610	8/15/08 1015	8/15/08 1430	106	1	8	4411
Cal 46		8/12/08 1610	8/15/08 1030	8/15/08 1500	108	1	8	5071
Cal 13		8/12/08 1610	8/15/08 1050	8/15/08 1535	110	1	8	4377
~~Cal 15~~	~~500~~	~~8/15/08 0925~~	~~8/18/08 1000~~	~~8-18-08 1720~~	~~106~~	~~1~~	~~4132~~	~~462~~
CAL-15	500	8/15/08 0925	8/18/08 1600	8/19/08 0900	106	1	8	4132

222

LLA 8/19/08

LLD 8/29/08

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		**104.944421**	**Pass**			
Stdev =	10.63610098		0.00415782	**Rule 3 (Pass/Fail)**			

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

Verification Rules

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

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

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

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

Source dpm/g = (A - B)/(C)(D)

where:

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

RAD SOP M-001

KD 8/29/08

4/9/08

David Roy 4/10/08

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

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

8/28/08

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: N/A

Standard ID: D299-6

Matrix of Vial/Planchett: N/A / N/A / N/A

Amount Used (g or (ml)): 0.1

Standard Activity (DPM/g or (mL)): 2446.347

Type of Scintillation Vial: N/A

Reference Date: 12/15/99

Pipette ID Used: 1429303

Expiration Date: 4/12/09

Balance ID Used: 3/6040216

Residue/Carrier Agent: 0.5M HCl

Quenching Agent: N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	CAL 1				
2	CAL 2				
3	CAL 3				
4	CAL 4				
5	CAL 5				
6	CAL 6				
7	CAL 7				
8	CAL 8				
9	CAL 9				
10	CAL 10				
11	CAL 11				
12	CAL 12				
13	CAL 13				
14	CAL 14				
15	CAL 15				

N.W. 8/29/05

Prepared By: [signature] Date: 8/29/05

Reviewed By: [signature] Date: 8/29/05

Rev 1 RLM 9/10/97

General Engineering Laboratories
Verification Source Preparation Sheet

Applicable SOP Number: GL-RAD-A-008

Isotope: Ra-226

Date Standards Prepared: 4/15/05

Cocktail Type Used: N/A

Standard ID: D2991-6

Matrix of Vial/Planchett: N/A / N/A / N/A

Amount Used (g or (ml)): 0.1

Standard Activity (DPM/g or (mL)): 2446.347

Type of Scintillation Vial: N/A

Reference Date: 12/15/99

Pipette ID Used: 1429303

Expiration Date: 4/12/09

Balance ID Used: 3600402162

Residue/Carrier Agent: 0.5M HCl

Quenching Agent: N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
16	CAL 16				
17	CAL 17				
18	CAL 18				
19	CAL 19				
20	CAL 20				
21	CAL 21				
22	CAL 22				
23	CAL 23				
24	CAL 24				
25	CAL 25				
26	CAL 26				
27	CAL 27				
28	CAL 28				
29	CAL 29				
30	CAL 30				

Net Wt. 8/28/08

Prepared By: Kelli Powell Date: 8/28/08

Reviewed By: Jeffrey K. Isbell Date: 8/28/08

Rev 1 RLM 9/10/97

General Engineering Laboratories
Verification Source Preparation Sheet

Applicable SOP Number: GL-RAD-A-008

Isotope: Ra-226

Date Standards Prepared: 4/5/05

Cocktail Type Used: N/A

Standard ID: D2961-6

Matrix of Vial/Planchett: N/A

N/A

N/A

Amount Used (g or (ml)): 0.1

Standard Activity (DPM/g or (mL)): 2446.347

Type of Scintillation Vial: N/A

Reference Date: 12/15/99

Pipette ID Used: 14229303

Expiration Date: 4/12/09

Balance ID Used: 360402162

Residue/Carrier Agent: 0.5M HCl

Quenching Agent: N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
31	CAL31				
32	CAL 32				
33	CAL33				
34	CAL34				
35	CAL35				
36	CAL36				
37	CAL37				
38	CAL38				
39	CAL 39				
40	CAL 40				
41	CAL 41				
42	CAL 42				
43	CAL43				
44	CAL 44				
45	CAL 45				

8/25/05

Prepared By: [signature] Date: 8/25/05

Reviewed By: [signature] Date: 8/28/05

Rev 1 RLM 9/10/97

General Engineering Laboratories
Verification Source Preparation Sheet

Applicable SOP Number: GL-RAD-A-003

Isotope: Ra-226

Date Standards Prepared: 4/5/05

Cocktail Type Used: N/A

Standard ID: 0799-G

Matrix of Vial/Planchett: N/A / N/A / N/A

Amount Used (g or ml): 0.1

Standard Activity (DPM/g or mL): 2446.347

Type of Scintillation Vial: N/A

Reference Date: 12/15/99

Pipette ID Used: 1429303

Expiration Date: 4/12/09

Balance ID Used: 36040216

Residue/Carrier Agent: 0.5M HCl

Quenching Agent: N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (g)
46	CAL 46				
47	CAL 47				
48	CAL 48				

Prepared By: [signature] Date: 8/25/05

Reviewed By: [signature] Date: 8/28/05

Rev 1 RLM 9/10/97

! 8-21-00

Nycomed Amersham plc
Amersham Laboratories

0299

NAMAS
CALIBRATION
No. 0146

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 17th December 1999

229

Nycomed Amersham

Ra-226 WATER

Batch : LCSVER
Date : 8/20/2008
Analyst : KSD1
Bkg Count Time: 30 min

Procedure Code : LUC26RAL
Parmname : Radium-226
MDA : 1 pCi/L
Instrument Used : LUCAS CELL DETECTOR

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG	BKG cpm	Ra-226 MDA pCi/L	**Ra-226 RESULT pCi/L**	Ra-226 ERROR pCi/L	COUNT DATE/TIME
Ver 1	0.500	30	738	**101**	1.751	8	0.267	0.4737	**21.7600**	1.5957	8/26/2008 16:10
Ver 2	0.500	30	770	**102**	1.647	8	0.267	0.5038	**24.1604**	1.7334	8/26/2008 17:05
Ver 3	0.500	30	716	**103**	1.752	8	0.267	0.4735	**21.0967**	1.5715	8/26/2008 17:45
Ver 4	0.500	30	820	**104**	1.973	6	0.200	0.3728	**21.4823**	1.4866	8/26/2008 18:15
Ver 5	0.500	30	656	**106**	1.486	8	0.267	0.5576	**22.7382**	1.7722	8/26/2008 19:00
Ver 6	0.500	30	860	**107**	1.773	8	0.267	0.4674	**25.0613**	1.6986	8/26/2008 19:35
Ver 7	0.500	30	867	**108**	1.840	8	0.267	0.4505	**24.3515**	1.6436	8/26/2008 20:10
Ver 8	0.500	30	756	**110**	1.544	8	0.267	0.5372	**25.2853**	1.8313	8/26/2008 20:40
Ver 9	0.500	30	827	**111**	1.575	4	0.133	0.3989	**27.2897**	1.8735	8/26/2008 21:10
VER 10	0.500	30	851	**112**	1.648	8	0.267	0.5042	**26.7480**	1.8227	8/26/2008 21:45

KD 8/25/08

Sample ID	Sample Dup	Det #	Run Date	Sample Type	Standard ID	NC	NC units	Recovery/RPD
Ver 1		1	8/26/2008 13:00	LCS	0638-F	24.10	pCi/L	**90%**
Ver 2		1	8/26/2008 13:30	LCS	0638-F	24.10	pCi/L	**100%**
Ver 3		1	8/26/2008 13:55	LCS	0638-F	24.10	pCi/L	**88%**
Ver 4		1	8/26/2008 14:25	LCS	0638-F	24.10	pCi/L	**89%**
Ver 5		1	8/26/2008 14:45	LCS	0638-F	24.10	pCi/L	**94%**
Ver 6		1	8/26/2008 15:05	LCS	0638-F	24.10	pCi/L	**104%**
Ver 7		1	8/26/2008 15:25	LCS	0638-F	24.10	pCi/L	**101%**
Ver 8		1	8/26/2008 15:40	LCS	0638-F	24.10	pCi/L	**105%**
Ver 9		1	8/26/2008 15:55	LCS	0638-F	24.10	pCi/L	**113%**
Ver 10		1	8/26/2008 16:10	LCS	0638-F	24.10	pCi/L	**111%**

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM cpm	Ingrowth constant
8/21/2008 15:30	8/26/2008 13:00	117.50	3.17	0.5882	0.9764	1.0019	24.3333	0.5754
8/21/2008 15:30	8/26/2008 13:30	118.00	3.58	0.5897	0.9733	1.0019	25.4000	0.5751
8/21/2008 15:30	8/26/2008 13:55	118.42	3.83	0.5910	0.9715	1.0019	23.6000	0.5752
8/21/2008 15:30	8/26/2008 14:25	118.92	3.83	0.5925	0.9715	1.0019	27.1333	0.5767
8/21/2008 15:30	8/26/2008 14:45	119.25	4.25	0.5936	0.9684	1.0019	21.6000	0.5759
8/21/2008 15:30	8/26/2008 15:05	119.58	4.50	0.5946	0.9666	1.0019	28.4000	0.5758
8/21/2008 15:30	8/26/2008 15:25	119.92	4.75	0.5956	0.9648	1.0019	28.6333	0.5757
8/21/2008 15:30	8/26/2008 15:40	120.17	5.00	0.5964	0.9630	1.0019	24.9333	0.5754
8/21/2008 15:30	8/26/2008 15:55	120.42	5.25	0.5971	0.9611	1.0019	27.4333	0.5750
8/21/2008 15:30	8/26/2008 16:10	120.67	5.58	0.5979	0.9587	1.0019	28.1000	0.5743

KB 8/29/08

Ra-226 Verification Sheet

Rig 1

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	8/21/08 1530	8/26/08 1300	8/26/08 1610	101	1	8	738
Ver 2	500	8/21/08 1530	8/26/08 1330	8/26/08 1705	102	1	8	770
Ver 3	500	8/21/08 1530	8/26/08 1355	8.26.08 1745	103	1	8	716
Ver 4	500	8/21/08 1530	8/26/08 1425	8.26.08 1815	104	1	8	820
Ver 5	500	8/21/08 1530	8/26/08 1445	8.26.08 1900	106	1	8	656
Ver 6	500	8/21/08 1530	8/26/08 1505	8.26.08 1935	107	1	8	860
Ver 7	500	8/21/08 1530	8/26/08 1525	8.26.08 2010	108	1	8	867
Ver 8	500	8/21/08 1530	8/26/08 1540	8.26.08 2040	110	1	8	756
Ver 9	500	8/21/08 1530	8/26/08 1555	8.26.08 2110	111	1	4	827
Ver 10	500	8/21/08 1530	8/26/08 1610	8.26.08 2145	112	1	8	851
Ver 11	500	8/21/08 1530						
Ver 12	500	8/21/08 1530						

KD 8/27/08

Verification for Ra-226 Standard 0638-F

D Roy
12/27/2007

	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard Mass. Used (mL)	Source DPM/mL
	0638-F N1	1239.9000	31.5000	1208.4000	4.624018	1.0000	261.3311626
	0638-F N2	1222.8000	31.5000	1191.3000	4.624018	1.0000	257.6330801
	0638-F N3	1219.4000	31.5000	1187.9000	4.624018	1.0000	256.8977889
						Average =	258.6206772
Mean Value (Counting) =	258.6206772		**96.8384646**	**Pass**			
Stdev =	2.375965421		0.00918707	**Rule 3 (Pass/Fail)**			
Certificate Value =	267.1						
Lower Limit =	253.8687464						
Upper Limit =	263.3726081						
Rule 1 Pass/Fail	**Fail**	*exception taken due to full recovery of standard					
Two sigma =	4.751930843						
10 % of Mean =	25.86206772						
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 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:

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

KD 8/22/08

Amanda L. Tech 1/4/07

Amanda L. Tech 1/4 107

General Engineering Laboratories
Verification Source Preparation Sheet

Applicable SOP Number: GL-RAD-A-008

Isotope: Ra-226

Date Standards Prepared: 12/18/07

Cocktail Type Used: N/A

Standard ID: 0638-F

Matrix of Vial/Planchett: N/A

N/A

Amount Used (g or (ml)): 0.1

N/A

Standard Activity (DPM/g or mL): 267.519

Type of Scintillation Vial: N/A

Reference Date: 1/23/04

Pipette ID Used: 1429303

Expiration Date: 12/20/08

Balance ID Used: 3604046

Residue/Carrier Agent: 0.1M HCl

Quenching Agent: N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	Ver 1				
2	Ver 2				
3	ver 3				
4	ver 4				
5	Ver 5				
6	Ver 6				
7	Ver 7				
8	Ver 8				
9	ver 9				
10	Ver 10				
11	Ver 11				
12	Ver 12				
13	Ver 13				
14	Ver 14				
15	Ver 15				

Prepared By: Kelli Pierce Date: 8/29/08

Reviewed By: Mary L. Johnson Date: 8/29/08

Rev 1 RLM 9/10/97

General Engineering Laboratories
Verification Source Preparation Sheet

Applicable SOP Number: GL-RAD. A-008

Isotope: Ra-226

Date Standards Prepared: 12/18/07

Cocktail Type Used: N/A

Standard ID: 0638-F

Matrix of Vial/Planchett: N/A / N/A / N/A

Amount Used (g or (ml)): 10.1

Standard Activity (DPM/g or (mL)): 267-519

Type of Scintillation Vial: N/A

Reference Date: 1/23/04

Pipette ID Used: 1429303

Expiration Date: 12/20/08

Balance ID Used: 3604046

Residue/Carrier Agent: 0.1M HCl

Quenching Agent: N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
16	Ver 16				
17	Ver 17				
18	Ver 18				
19	Ver 19				
20	Ver 20				
21	Ver 21				
22	Ver 22				
23	Ver 23				
24	Ver 24				

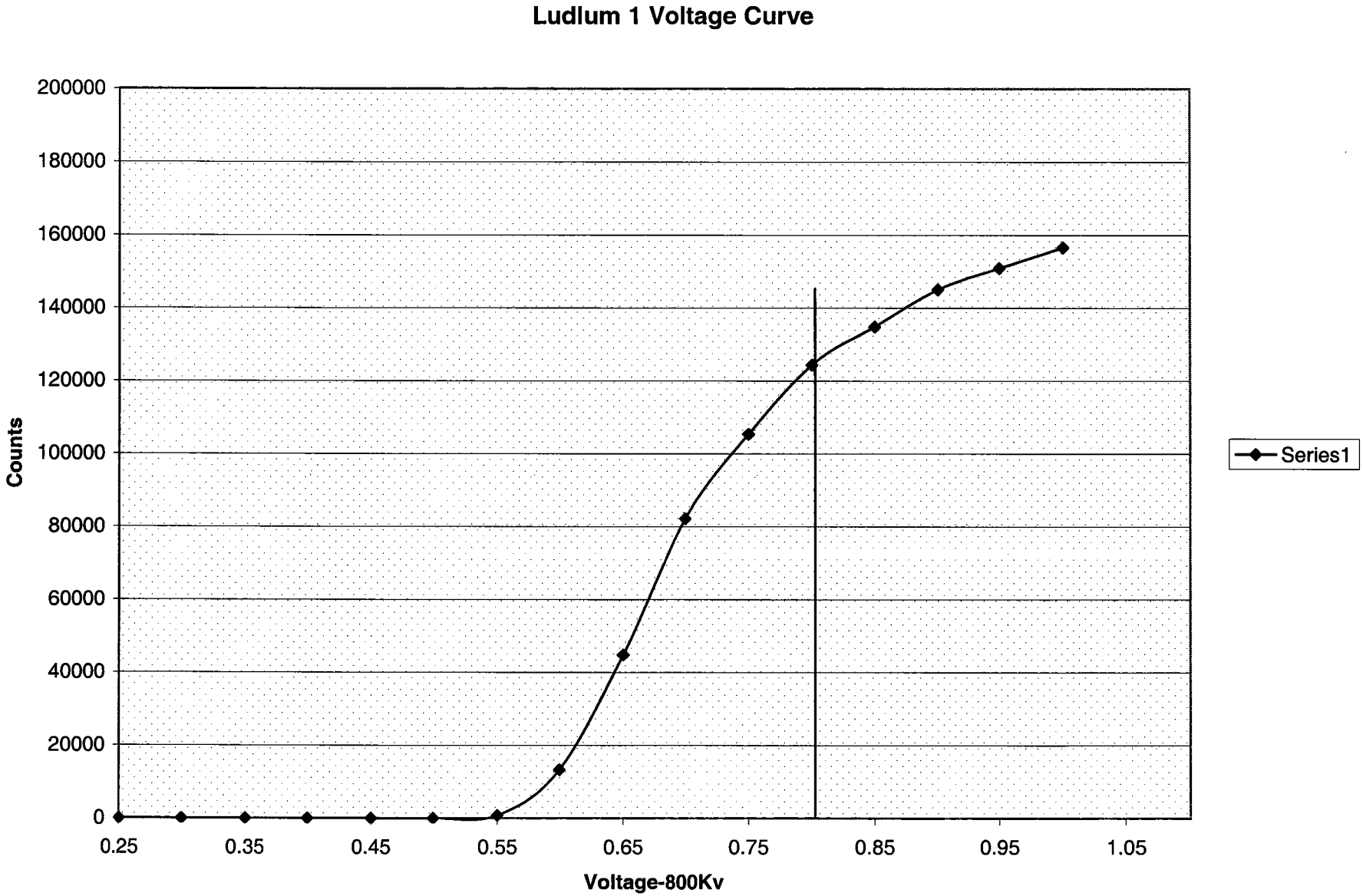
N/A 8/29/08

Prepared By: Kelly Powell Date: 8/29/08

Reviewed By: [signature] Date: 8/29/08

Rev 1 RLM 9/10/97

Voltage Curve Ludlum # 1				
Volts	**Counts**	**Date**	**Time**	**Detector**
0.00	0	8/19/2008	11:00	1
0.05	0	8/19/2008	11:00	1
0.10	0	8/19/2008	11:00	1
0.15	0	8/19/2008	11:00	1
0.20	0	8/19/2008	11:00	1
0.25	0	8/19/2008	11:00	1
0.30	0	8/19/2008	11:00	1
0.35	0	8/19/2008	11:00	1
0.40	0	8/19/2008	11:00	1
0.45	0	8/19/2008	11:00	1
0.50	0	8/19/2008	11:00	1
0.55	813	8/19/2008	11:00	1
0.60	13369	8/19/2008	11:00	1
0.65	44807	8/19/2008	11:00	1
0.70	82131	8/19/2008	11:00	1
0.75	105365	8/19/2008	11:00	1
0.80	124405	8/19/2008	11:00	1
0.85	134938	8/19/2008	11:00	1
0.90	145048	8/19/2008	11:00	1
0.95	150949	8/19/2008	11:00	1
1.00	156594	8/19/2008	11:00	1


Ludlum 1 Voltage Curve
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
Counts
0.25
0.35
0.45
0.55
0.65
0.75
0.85
0.95
1.05
Voltage-800Kv
Series1

KO 8/29/08

101	1.751	8/29/2008
102	1.647	8/29/2008
103	1.752	8/29/2008
104	1.973	8/29/2008
105	1.749	8/29/2008
106	1.486	8/29/2008
107	1.773	8/29/2008
108	1.840	8/29/2008
109	1.512	8/29/2008
110	1.544	8/29/2008
111	1.575	8/29/2008
112	1.648	8/29/2008

KD 8/29/08

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

Lucas Cell Calibration Package

	YES	NO	Comments
1) Is all calibration standard information enclosed for:			
the primary standard certificate?	✓	✓	
the 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 Darnell Date: 12/19/08

Reviewed By: [signature] Date: 12/19/08

Effective Date: 12/19/08

Ra-226 Cell Constants

NLD 12/19/08

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
201	2.021	Average	1.993	Cal 14	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	Stdev	0.068	Cal 14	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			Cal 14	9/25/2008 19:35	9/25/2008 9:15	9/22/2008 10:00	0.267	5361	30	178.70	243.02	2.96875	0.43056	3208	0.9962
202	2.436	Average	2.261	Cal 13	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	Stdev	0.156	Cal 13	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			Cal 14	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	2.254	Cal 43	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	Stdev	0.019	Cal 43	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			Cal 43	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	0.44792	3208	0.9962
204	2.184	Average	2.193	Cal 15	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	Stdev	0.102	Cal 15	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			Cal 15	9/30/2008 14:05	9/30/2008 9:10	9/26/2008 9:45	0.133	7535	30	251.17	243.02	3.97569	0.20486	3213	0.9962
205	1.677	Average	1.799	Cal 13	10/21/2008 8:30	10/20/2008 14:05	10/13/2008 16:00	0.267	7584	30	252.80	243.02	6.92014	0.76736	3233	0.9962
205	1.730	Stdev	0.167	Cal 44	9/18/2008 16:00	9/18/2008 10:05	9/15/2008 10:55	0.167	4999	30	166.63	243.02	2.96528	0.24653	3201	0.9962
205	1.990			Cal 44	9/30/2008 14:45	9/30/2008 9:40	9/26/2008 9:45	0.167	7170	30	239.00	243.02	3.99653	0.21181	3213	0.9962
206	2.240	Average	2.259	Cal 46	9/15/2008 21:10	9/15/2008 11:25	9/12/2008 13:20	0.233	6216	30	207.20	243.02	2.92014	0.40625	3198	0.9962
206	2.293	Stdev	0.030	Cal 46	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			Cal 46	9/30/2008 15:20	9/30/2008 10:15	9/26/2008 9:45	0.267	8125	30	270.83	243.02	4.02083	0.21181	3213	0.9962
207	2.187	Average	2.146	Cal 36	9/15/2008 21:40	9/15/2008 11:50	9/12/2008 13:20	0.267	6094	30	203.13	243.02	2.93750	0.40972	3198	0.9962
207	2.141	Stdev	0.038	Cal 36	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			Cal 36	9/30/2008 16:00	9/30/2008 10:45	9/26/2008 9:45	0.233	7656	30	255.20	243.02	4.04167	0.21875	3213	0.9962
~~208~~	~~2.239~~	~~Average~~	~~2.283~~	~~Cal 30~~	~~9/15/2008 22:15~~	~~9/15/2008 12:15~~	~~9/12/2008 13:20~~	~~0.267~~	~~6258~~	~~30~~	~~208.60~~	~~243.02~~	~~3.95486~~	~~0.41667~~	~~3198~~	~~0.9962~~
~~208~~	~~2.243~~	~~Stdev~~	~~0.135~~	~~Cal 30~~	~~9/18/2008 18:30~~	~~9/18/2008 11:00~~	~~9/15/2008 12:15~~	~~0.133~~	~~6374~~	~~30~~	~~212.47~~	~~243.02~~	~~2.94792~~	~~0.61250~~	~~3201~~	~~0.9962~~
~~208~~	~~2.116~~			~~Cal 30~~	~~9/30/2008 18:35~~	~~9/30/2008 11:10~~	~~9/26/2008 9:45~~	~~0.333~~	~~7681~~	~~30~~	~~256.03~~	~~243.02~~	~~4.05990~~	~~0.99560~~	~~3213~~	~~0.9962~~
209	2.471	Average	2.291	Cal 19	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	Stdev	0.137	Cal 19	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			Cal 19	9/30/2008 17:25	9/30/2008 11:40	9/26/2008 9:45	0.100	8795	30	293.17	243.02	4.07986	0.23958	3213	0.9962
210	2.320	Average	2.253	Cal 47	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	Stdev	0.059	Cal 47	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			Cal 47	9/30/2008 18:00	9/30/2008 12:05	9/26/2008 9:45	0.033	8116	30	270.53	243.02	4.09722	0.24653	3213	0.9962
211	2.140	Average	2.171	Cal 37	9/15/2008 23:50	9/15/2008 14:30	9/12/2008 13:20	0.033	6150	30	205.00	243.02	3.04861	0.38889	3198	0.9962
211	2.238	Stdev	0.057	Cal 37	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			Cal 37	9/30/2008 18:30	9/30/2008 13:35	9/26/2008 9:45	0.100	7917	30	263.90	243.02	4.15972	0.20486	3213	0.9962
212	2.405	Average	2.322	Cal 42	9/16/2008 0:20	9/15/2008 14:50	9/12/2008 13:20	0.033	6926	30	230.87	243.02	3.06250	0.39583	3198	0.9962
212	2.315	Stdev	0.081	Cal 42	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			Cal 42	9/30/2008 19:50	9/30/2008 14:00	9/26/2008 9:45	0.267	8287	30	276.23	243.02	4.17708	0.24306	3213	0.9962

240

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 14	500	9/22/08 1000	9/25/08 0015	9/25/08 1935	201	2	0	5361
~~Cal 13~~	500	~~9/22/08 1000~~	~~9/25/08 0150~~	~~9/25/08 2010~~	202	2	0	5845
Cal 43	500	9/22/08 1000	9/25/08 1015	9/25/08 2100	203	2	0	6298
Cal 15	500	9/22/08 1000						
Cal 44	500	9/22/08 1000						
Cal 46	500	9/22/08 1000						
Cal 36	500	9/22/08 1000						
Cal 30	500	9/22/08 1000						
Cal 19	500	9/22/08 1000						
Cal 47	500	9/22/08 1000						
Cal 37	500	9/22/08 1000						
Cal 42	500	9/22/08 1000						

KW 12/18/08

KW 12/18/08

KW 12/18/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 14	500	9/12/08 1320	9/15/08 0905	9/15/08 1545	201	2	8	5596
Cal 13	500	9/12/08 1320	9/15/08 0935	9/15/08 1620	202	2	8	6779
Cal 43	500	9/12/08 1320	9/15/08 1000	9.15.08 1650	203	2	8	6300
Cal 15	500	9/12/08 1320	9/15/08 1030	9.15.08 1725	204	2	8	6132
~~Cal 44~~	~~500~~	~~9/12/08 1320~~	9/15/08 1055	9.15.08 1805	~~205~~	~~2~~	5	~~6132~~
Cal 46	500	9/12/08 1320	9/15/08 1125	9.15.09 2110	206	2	7	6216
Cal 36	500	9/12/08 1320	9/15/08 1150	9.15.08 2140	207	2	8	6094
~~Cal 30~~	500	9/12/08 1320	9/15/08 1215	9.15.08 2215	~~208~~	~~2~~	8	~~6258~~
Cal 19	500	9/12/08 1320	9/15/08 1350	9.15.08 2245	209	2	1	7073
Cal 47	500	9/12/08 1320	9/15/08 1415	9.15.08 2315	210	2	1	6665
Cal 37	500	9/12/08 1320	9/15/08 1430	9.15.08 2350	211	2	1	6150
Cal 42	500	9/12/08 1320	9/15/08 1450	9.16.08 0020	212	2	1	6926

KD 12/18/08

KD 12/19/08

KD 12/18/08

KD 12/19/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
15	500	9/26/08 0945	9/30/08 0910	9/30/08 1405	204	2	4	7535
44	500	9/26/08 0945	9/30/08 0940	9/30/08 1445	205	2	5	7170
46	500	9/26/08 0945	9/30/08 1015	9/30/08 1520	206	2	8	8125
36	500	9/26/08 0945	9/30/08 1015	9/30/08 1600	207	2	7	7656
~~30~~	~~500~~	~~9/26/08 0945~~	~~9/30/08 1110~~	~~9/30/08 1635~~	~~208~~	~~2~~	~~1~~	~~7681~~
19	500	9/26/08 0945	9/30/08 1140	9.30.08 1725	209	2	3	8795
47	500	9/26/08 0945	9/30/08 1205	9.30.08 1800	210	2	1	8116
37	500	9/26/08 0945	9/30/08 1335	9.30.08 1830	211	2	3	7917
42	500	9/26/08 0945	9/30/08 1400	9.30.08 1950	212	2	8	8287

KD 12/19/08

KD 12/18/08

WWK 12/19/08

KD 12/19/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 14	500	9/15/08 0905	9/18/08 0810	9/18/08 1300	201	2	8	5949
cal 13	500	9/15/08 0935	9/18/08 0845	9/18/08 1350	202	2	8	6425
Cal 43	500	9/15/08 1000	9/18/08 0915	9/18/08 1425	203	2	8	6413
cal 15	500	9/15/08 1030	9/18/08 0935	9/18/08 1455	204	2	8	6671
cal 44	500	9/15/08 1055	9/18/08 1005	9/18/08 1600	205	2	5	4999
Cal 46	500	9/15/08 1125	9/18/08 1025	9/18/08 1635	206	2	8	6604
Cal 36	500	9/15/08 1150	9/18/08 1040	9/18/08 1755	207	2	8	6105
~~Cal 30~~	~~500~~	9/15/08 1215	9/18/08 1100	9/18/08 1830	208	2	4	6374
Cal 19	500	9/15/08 1350	9/18/08 1115	9/18/08 1915	209	2	2	6170
Cal 47	500	9/15/08 1415	9/18/08 1130	9/18/08 1945	210	2	3	6142
Cal 37	500	9/15/08 1430	9/18/08 1235	9/18/08 2220	211	2	4	6207
Cal 42	500	9/15/08 1450	9/18/08 1250	9/18/08 2255	212	2	8	6405

244

KW 12/19/08

KW 12/18/08

KW 12/19/08

KW 12/19/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 14	500	10/13/08 1600	10/20/08 1345	~~10/20/08~~ 10.21.08 13:50	202	2	8	9248
13	500	10/13/08 1600	10/20/08 1405	10/21/08 0830	205	2	8	1584
43								
44								
15								
36								
46								
30								
19								
47								
37				LCO 12/18/08				
42								

LCO 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		**104.944421**	**Pass**			
Stdev =	10.63610098		0.00415782	**Rule 3 (Pass/Fail)**			

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

Verification Rules

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

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

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

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

Source dpm/g = (A - B)/(C)(D)

where:

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

RAD SOP M-001

4/10/08

4/9/08

4/10/08

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

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

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: 0299-G

Matrix of Vial/Planchett: NA / NA / NA

Amount Used (g or (ml)): 0.1

Standard Activity (DPM/g or (mL)): 1446.347

Type of Scintillation Vial: NA

Reference Date: 4/15/99

Pipette ID Used: 1429303

Expiration Date: 4/2/09

Balance ID Used: 36040216

Residue/Carrier Agent: 0.5 M HCl

Quenching Agent: NA

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
14	Cal14				
13	Cal13				
43	Cal43				
15	Cal15				
44	Cal44				
46	Cal46				
36	Cal36				
19	Cal19				
47	Cal47				
37	Cal37				
42	Cal42				

Prepared By: Kelli S Dermody Date: 12/19/08

Reviewed By: [signature] Date: 12/19/08

Rev 1 RLM 9/10/97

0299

[redacted]

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

ement	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.

acy Expanded uncertainty in the radioactive concentration quoted above: ± 2.5 %

Combined Type A uncertainty: ± 0.2 %
Combined Type B uncertainty: ± 1.3 %

onuclidic 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.

tical position Carrier free in 0.5M HCl

arks 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.

MCR 12/19/98
KD 12/19/98

ver 11-08

Ra-226 WATER

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

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	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~~	~~533~~	~~**208**~~	~~**2.283**~~	~~0.267~~	~~0.5132~~	~~**16.9552**~~	~~1.4723~~	~~11/20/2008 16:40~~ KD
VER 9	0.500	30	630	**209**	**2.291**	0.133	0.4042	**21.0513**	1.6596	10/30/2008 23:40 12/19/08
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

250

LL LA 12/19/08
KD 12/19/08

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

KD 12/18/08

DEGASSING DATE/TIME	DE-EMAN. DATE/TIME	DEGASS-DE-EM	dE-EM-COUNT	constant	constant	constant	Net CPM 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~~	~~0.9636~~	~~1.0019~~	~~17.5000~~	~~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

KD 12/18/08

251

NCA 12/19/08
KD 12/18/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VER 1	500	~~11/10/08 1535~~ ~~10/30/08 1430~~ 11/10/08	11/17/08 1020	11/17/08 1510	201	2	8	1014
2	500	11/10/08 1535	11/17/08 1045	11/17/08 1545	202	2	8	1056
3	500	11/10/08 1535	11/17/08 1110	11/17/08 1620	205	2	8	937
4	500	11/10/08 1535	11/17/08 1135	~~11.17.08 2050~~	~~208~~	~~2~~	~~8~~	~~786~~
5	500	11/10/08 1535	11/17/08 1150	11.17.08 2120	209	2	8	1200
6	500	11/10/08 1535	11/17/08 1220	11.17.08 2155	211	2	8	1067
7	~~500~~	~~11/10/08 1535~~	~~11/17/08 0845~~	~~11/17/08 1330~~	~~202~~	~~1~~	~~8~~	~~982~~
8	500	11/10/08 1535	11/17/08 0900	~~11/17/08 1405~~	~~208~~	~~1~~	~~8~~	~~1164~~
9	500	~~11/10/08 1535~~	11/17/08 0930	11/17/08 1435	205	1	8	1122
10								
11								
12								
~~VER 3~~	500	~~11/17/08 1110~~	~~11/20/08 1145~~	~~11/20/08 1640~~	~~208~~	~~2~~	~~8~~	~~533~~

252

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
~~VW 1~~	~~500~~	~~10/27/08 1420~~	~~10/30/08 0945~~	10/30/08 1500	201	~~2~~	~~4~~	~~452~~
~~VW 2~~	~~500~~	~~10/27/08 1420~~	10/30/08 1005	10/30/08 1535	202	2	~~6~~	~~789~~
VW 3	500	10/27/08 1420	10/30/08 1105	10/30/08 1605	~~203~~ 204	2	8	726
VW 4	500	10/27/08 1420	10/30/08 1230	10/30/08 1820	~~204~~ 205	2	8	737
~~VW 5~~	~~500~~	~~10/27/08 1420~~	~~10/30/08 1250~~	10/30/08 1900	205	2	6	663
VW 6	500	10/27/08 1420	10/30/08 1310	10/30/08 2020	206	2	8	780
VW 7	500	10/27/08 1420	10/30/08 1425	10/30/08 2200	207	2	8	711
~~VW 8~~	~~500~~	10/27/08 1420	10/30/08 1345	10/30/08 2300	208	2	4	497
VW 9	500	10/27/08 1420	10/30/08 1405	10/30/08 2340	209	2	4	630
VW 10	500	10/27/08 1420	10/30/08 1425	10/31/08 0115	210	2	1	691
~~VW 11~~	~~500~~	10/27/08 1420	10/30/08 1440	10/31/08 0835	211	2	3	~~423~~
VW 12	500	10/27/08 1420	10/30/08 1455	10/31/08 0915	212	2	4	648

KD 12/18/08

KD 12/18/08

KD 12/18/08

KD 12/18/08

KD 12/18/08

KD 12/19/08

KD 12/19/08

Verification for Ra-226 Standard 0638-F

D Roy
12/27/2007

	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard Mass. Used (mL)	Source DPM/mL
	0638-F N1	1239.9000	31.5000	1208.4000	4.624018	1.0000	261.3311626
	0638-F N2	1222.8000	31.5000	1191.3000	4.624018	1.0000	257.6330801
	0638-F N3	1219.4000	31.5000	1187.9000	4.624018	1.0000	256.8977889
						Average =	258.6206772
Mean Value (Counting) =	258.6206772		**96.8384646**	**Pass**			
Stdev =	2.375965421		0.00918707	**Rule 3 (Pass/Fail)**			
Certificate Value =	267.1						
Lower Limit =	253.8687464						
Upper Limit =	263.3726081						
Rule 1 Pass/Fail	**Fail**	'exception taken due to full recovery of standard					
Two sigma =	4.751930843						
10 % of Mean =	25.86206772						
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 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:

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

LW 12/19/08

1/4/07

Amanda L. Tech 1/4/07

General Engineering Laboratories
Verification Source Preparation Sheet

Applicable SOP Number: GL-RAD-A-008

Isotope: RA-226

Date Standards Prepared: 12/18/07

Cocktail Type Used: NA

Standard ID: 0638-F

Matrix of Vial/Planchett: NA / NA / NA

Amount Used (g or ml): 0.1

Standard Activity (DPM/g or mL): 167.519

Type of Scintillation Vial: NA

Reference Date: 1/23/04

Pipette ID Used: 1425303

Expiration Date: 12/2008

Balance ID Used: 3604046

Residue/Carrier Agent: 0.1M HCl

Quenching Agent: NA

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

12/19/08

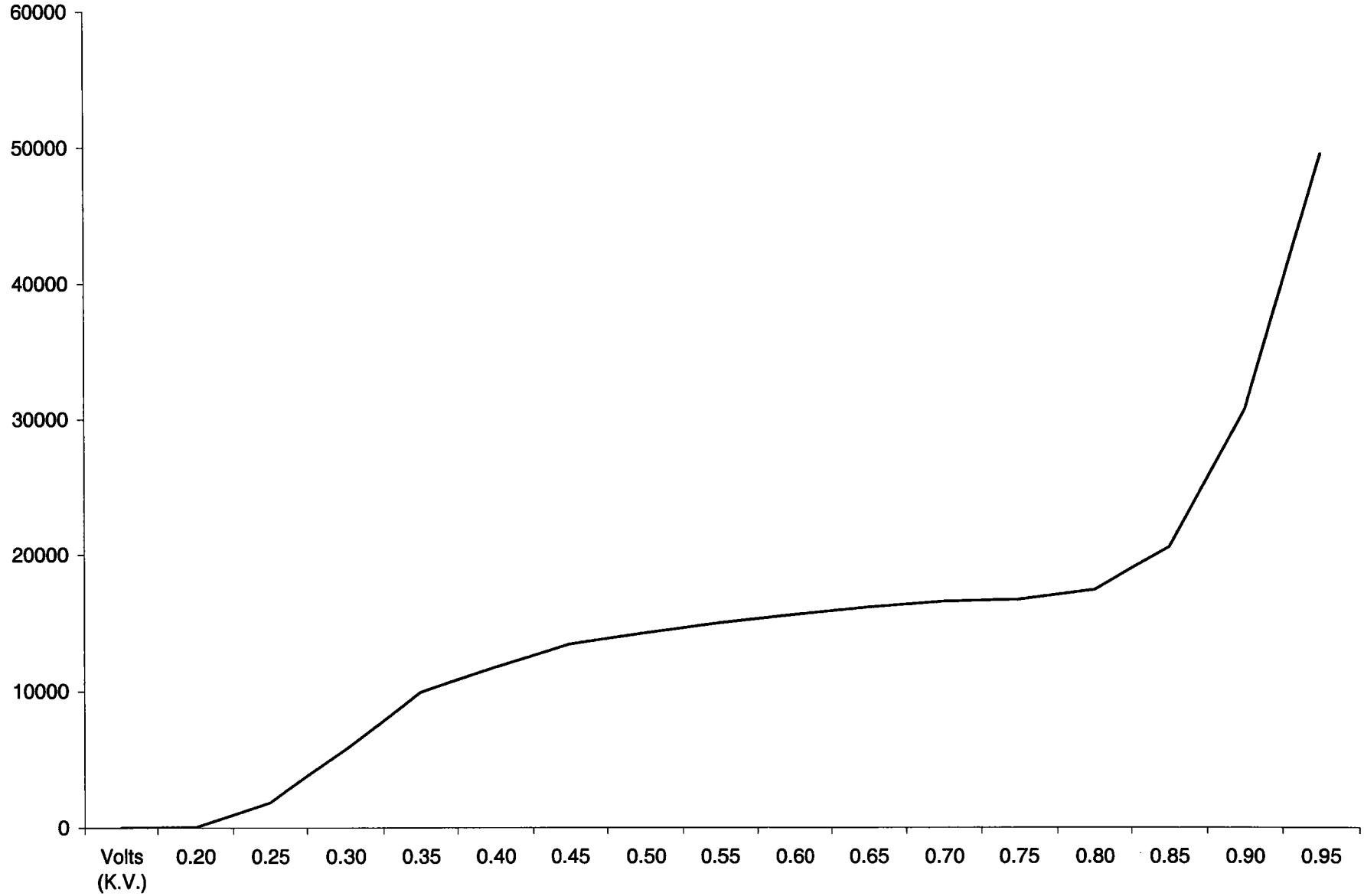
Prepared By: Kelli Dienel Date: 12/19/08

Reviewed By: [signature] Date: 12/19/08

Rev 1 RLM 9/10/97

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

12/19/08
12/19/08



12/19/08
12/19/08

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

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 Darnell Date: 2/3/09

Reviewed By: Lucy G. Hens Date: 2/4/09

Effective Date: 2/4/09

Ra-226 Cell Constants

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

Lucas cell #	Cell constant			Standard Source	Date/Time of count	Date/time flushed to cell	Date/time end of degas	bkg cpm	total counts	count time min	cpm	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count
301	1.867	Average	2.021	43	1/20/2009 11:05	1/19/2009 10:10	1/9/2009 15:45	0.267	9355	30	311.83	243.67	9.76736	1.03819	3324	0.9961
301	2.184	Stdev	0.159	43	1/29/2009 11:50	1/29/2009 8:50	1/26/2009 13:00	0.267	6239	30	207.97	243.67	2.82639	0.12500	3333	0.9961
301	2.011			43	1/26/2009 14:35	1/26/2009 9:25	1/22/2009 9:10	0.267	7282	30	242.73	243.67	4.01042	0.21528	3331	0.9961
302	2.082	Average	2.131	13	1/30/2009 11:30	1/30/2009 8:30	1/26/2009 13:00	0.267	7401	30	246.70	243.67	3.81250	0.12500	3334	0.9961
302	2.225	Stdev	0.082	47	1/29/2009 13:30	1/29/2009 9:20	1/26/2009 13:00	0.233	6335	30	211.17	243.67	2.84722	0.17361	3334	0.9961
302	2.086			47	1/26/2009 15:30	1/26/2009 9:55	1/22/2009 9:10	0.267	7555	30	251.83	243.67	4.03125	0.23264	3331	0.9961
303	1.958	Average	2.136	19	1/20/2009 13:40	1/19/2009 11:00	1/9/2009 15:45	0.267	9695	30	323.17	243.67	9.80208	1.11111	3325	0.9961
303	2.218	Stdev	0.154	19	1/22/2009 20:35	1/22/2009 10:05	1/19/2009 15:00	0.267	5938	30	197.93	243.67	2.79514	0.43750	3327	0.9961
303	2.231			19	1/26/2009 17:20	1/26/2009 10:25	1/22/2009 9:10	0.267	8028	30	267.60	243.67	4.05208	0.28819	3331	0.9961
305	1.897	Average	2.057	42	1/20/2009 14:50	1/19/2009 11:35	1/9/2009 15:45	0.200	9357	30	311.90	243.67	9.82639	1.13542	3325	0.9961
305	2.191	Stdev	0.149	42	1/22/2009 21:50	1/22/2009 11:05	1/19/2009 15:00	0.267	5921	30	197.37	243.67	2.83681	0.44792	3327	0.9961
305	2.083			42	1/26/2009 23:00	1/26/2009 11:20	1/22/2009 9:10	0.267	7280	30	242.67	243.67	4.09028	0.48611	3331	0.9961
306	1.730	Average	1.747	44	1/20/2009 15:20	1/19/2009 11:50	1/9/2009 15:45	0.167	8521	30	284.03	243.67	9.83681	1.14583	3325	0.9961
306	1.691	Stdev	0.067	30	1/29/2009 14:30	1/29/2009 10:20	1/26/2009 13:00	0.233	4869	30	162.30	243.67	2.88889	0.17361	3334	0.9961
306	1.821			44	1/26/2009 23:30	1/26/2009 11:50	1/22/2009 9:10	0.267	6387	30	212.90	243.67	4.11111	0.48611	3331	0.9961
307	1.818	Average	1.931	15	1/20/2009 15:50	1/19/2009 12:05	1/9/2009 15:45	0.267	8944	30	298.13	243.67	9.84722	1.15625	3325	0.9961
307	2.095	Stdev	0.145	36	1/30/2009 12:55	1/30/2009 9:10	1/26/2009 13:00	0.267	7442	30	248.07	243.67	3.84028	0.15625	3335	0.9961
307	1.881			15	1/27/2009 0:05	1/26/2009 12:10	1/22/2009 9:10	0.267	6598	30	219.93	243.67	4.12500	0.49653	3331	0.9961
308	2.129	Average	1.950	44	1/29/2009 15:50	1/29/2009 11:05	1/26/2009 13:00	0.133	6149	30	204.97	243.67	2.92014	0.19792	3334	0.9961
308	1.858	Stdev	0.155	14	1/23/2009 9:35	1/22/2009 13:45	1/19/2009 15:00	0.267	4829	30	160.97	243.67	2.94792	0.82639	3327	0.9961
308	1.862			14	1/27/2009 8:30	1/26/2009 13:15	1/22/2009 9:10	0.267	6226	30	207.53	243.67	4.17014	0.80208	3331	0.9961
309	1.857	Average	1.877	13	1/20/2009 17:20	1/19/2009 13:35	1/9/2009 15:45	0.033	9149	30	304.97	243.67	9.90972	1.15625	3325	0.9961
309	1.964	Stdev	0.079	13	1/23/2009 10:30	1/22/2009 14:05	1/19/2009 15:00	0.267	5100	30	170.00	243.67	2.96181	0.85069	3327	0.9961
309	1.810			13	1/27/2009 9:05	1/26/2009 13:30	1/22/2009 9:10	0.267	6046	30	201.53	243.67	4.18056	0.81597	3331	0.9961
311	2.140	Average	2.114	15	1/29/2009 16:40	1/29/2009 11:20	1/26/2009 13:00	0.267	6176	30	205.87	243.67	2.93056	0.22222	3334	0.9961
311	2.212	Stdev	0.114	28	1/23/2009 12:20	1/22/2009 14:25	1/19/2009 15:00	0.267	5698	30	189.93	243.67	2.97569	0.91319	3328	0.9961
311	1.988			28	1/27/2009 10:15	1/26/2009 13:45	1/22/2009 9:10	0.267	6607	30	220.23	243.67	4.19097	0.85417	3331	0.9961
312	1.871	Average	1.944	36	1/20/2009 19:16	1/19/2009 14:10	1/9/2009 15:45	0.100	9135	30	304.50	243.67	9.93403	1.21250	3325	0.9961
312	2.014	Stdev	0.071	14	1/29/2009 17:10	1/29/2009 11:35	1/26/2009 13:00	0.167	5814	30	193.80	243.67	2.94097	0.23264	3334	0.9961
312	1.946			36	1/27/2009 11:10	1/26/2009 14:00	1/22/2009 9:10	0.267	6446	30	214.87	243.67	4.20139	0.88194	3331	0.9961

KD 2/3/09

Ra-226 Verification Sheet

#3

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 13	500	11/26/09 1300	11/30/09 0830	11/30/09 1130	302	3	8	7401
~~Cal 28~~	~~500~~	~~11/26/09 1300~~	~~11/30/09 0855~~	~~11/30/09 1200~~	~~304~~	~~3~~	~~8~~	~~7101~~
Cal 36	500	11/26/09 1300	11/30/09 0910	11/30/09 1255	307	3	8	7442

KD 2/3/09

1/3/09

261

KD 2/3/09

MCA 2/4/09

KD 2/3/09

Ra-226 Verification Sheet

#3

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 43	500	1/26/09 1300	1/29/09 0850	1/29/09 1150	301	3	8	6239
Cal 47	500	1/26/09 1300	1/29/09 0920	1/29/09 1330	302	3	7	6335
~~Cal 49~~	~~500~~	~~1/26/09 1300~~	~~1/29/09 0950~~	~~1/29/09 1400~~	~~304~~	~~3~~	~~2~~	~~6472~~
Cal 130	500	1/26/09 1300	1/29/09 1020	1/29/09 1430	306	3	7	4869
~~Cal 42~~	~~500~~	~~1/26/09 1300~~	~~1/29/09 1045~~	~~1/29/09 1515~~	~~307~~	~~3~~	~~3~~	~~6668~~
Cal 144	500	1/26/09 1300	1/29/09 1105	1/29/09 1550	308	3	4	6149
Cal 15	500	1/26/09 1300	1/29/09 1120	1/29/09 1640	311	3	8	6176
Cal 14	500	1/26/09 1300	1/29/09 1135	1/29/09 1710	312	3	5	5814
Cal 13	500	1/26/09 1300						
Cal 28	500	1/26/09 1300						
Cal 36	500	1/26/09 1300						
Cal 37	500	1/26/09 1300						

262

KW 2/3/09

~~1/29/09 1400~~ KW 2/3/09

~~1/29/09 1515~~ KW 2/3/09

KW 2/3/09

M.A 2/4/09

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts	
Cal 43	500	1/9/09 1545	1/19/09 1010	1/20/09 1105	301	3	8	9355	
~~Cal 47~~	~~500~~	~~1/9/09 1545~~	~~1/19/09 1040~~	~~1/20/09 1150~~	~~302~~	~~3~~	~~8~~	~~8933~~	KD 2/3/09
Cal 19	500	1/9/09 1545	1/19/09 1100	1/20/09 1340	303	3	8	9695	
~~Cal 30~~	~~500~~	~~1/9/09 1545~~	~~1/19/09 1120~~	~~1/20/09 1420~~	~~304~~	~~3~~	~~8~~	~~9630~~	KD 2/3/09
Cal 42	500	1/9/09 1545	1/19/09 1135	1/20/09 1450	305	3	5	9357	
Cal 44	500	1/9/09 1545	1/19/09 1150	1/20/09 ~~1520~~ 1520 KD 1/20/09	306	3	7	8521	
Cal 15	500	1/9/09 1545	1/19/09 1205	1/20/09 1550	307	3	8	8944	
~~Cal 14~~	~~500~~	~~1/9/09 1545~~	~~1/19/09 1315~~	~~1/20/09 1645~~	~~308~~	~~3~~	~~3~~	~~6938~~	KD 2/3/09
Cal 13	500	1/9/09 1545	1/19/09 1335	1/20/09 1720	309	3	1	9149	
~~Cal 28~~	~~500~~	~~1/9/09 1545~~	~~1/19/09 1355~~	~~1/20/09 1840~~	~~311~~	~~3~~	~~8~~	~~8648~~	KD 2/3/09
Cal 36	500	1/9/09 1545	1/19/09 1410	1/20/09 1916	312	3	1	9135	
~~Cal 37~~	500	1/9/09 1545							
								KD 2/3/09	KD 2/3/09 Rec'd 2/11/09

Ra-226 Verification Sheet

Cal for #3

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts	
~~Cal 43~~	~~500~~	~~11/19/09 1500~~	~~11/22/09 0910~~	~~11/23/09 1525~~	~~301~~	~~3~~	~~8~~	~~6408~~	KD 2/3/09
~~Cal 44~~	~~500~~	~~11/19/09 1500~~	~~11/22/09 0935~~	11/22/09 1605	302	3	~~8~~	6493	KD 2/3/09
Cal 29	500	11/19/09 1500	11/22/09 1005	1.22.09 2035	303	3	8	5938	
Cal 30	500	11/19/09 1500	11/22/09 1035	1.22.09 2120	~~304~~	~~3~~	~~8~~	~~5240~~	KD 2/3/09
Cal 42	500	11/19/09 1500	11/22/09 1105	11/22/09 2150	305	3	8	5921	
~~Cal 44~~	500	~~11/19/09 1500~~	~~11/22/09 1135~~	~~11/23/09 0830~~	~~306~~	~~3~~	~~8~~	~~5393~~	KD 2/3/09
~~Cal 15~~	500	~~11/19/09 1500~~	~~11/22/09 1320~~	11/23/09 0950	~~307~~	~~3~~	~~8~~	~~5870~~	KD 2/3/09
Cal 14	500	11/19/09 1500	11/22/09 1345	11/23/09 0935	308	3	8	4826	
Cal 13	500	11/19/09 1500	11/22/09 1405	11/23/09 1030	309	3	8	5100	
Cal 28	500	11/19/09 1500	11/22/09 1425	11/23/09 1220	311	3	8	5698	
~~Cal 36~~	500	~~11/19/09 1500~~	~~11/22/09 1440~~	~~11/23/09 1315~~	~~312~~	~~3~~	~~8~~	~~5881~~	KD 2/3/09
Cal 27	500	11/19/09 1500	11/22/09						
					KD 2/3/09				KD 2/3/09 RLA 2/4/09

Ra-226 Verification Sheet

Cal for #3

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 43	500	11/22/09 0910	11/26/09 0925	11/26/09 1435	301	3	8	7282
Cal 47	500	11/22/09 0910	11/26/09 0955	11/26/09 1530	302	3	8	1555
Cal 19	500	11/22/09 0910	11/26/09 1025	11/26/09 1610 1720	303	3	8	8028
~~Cal 30~~	~~500~~	~~11/22/09 0910~~	11/26/09 1050	~~1.26.09 1645~~	~~304~~	~~3~~		5162
Cal 42	500	11/22/09 0910	11/26/09 1120	1.26.09 2300	305	3	8	7280
Cal 44	500	11/22/09 0910	11/26/09 1150	1.26.09 2330	306	3	8	6387
Cal 15	500	11/22/09 0910	11/26/09 1210	1.27.09 0005	307	3	8	6598
Cal 14	500	11/22/09 0910	11/26/09 1315	11/27/09 0830	308	3	8	6726
Cal 13	500	11/22/09 0910	11/26/09 1330	11/27/09 0905	309	3	8	6046
Cal 28	500	11/22/09 0910	11/26/09 1345	11/27/09 1015	311	3	8	6607
Cal 36	500	11/22/09 1910	11/26/09 1400	11/27/09 1110	312	3	8	6446
~~Cal 37~~								

KD 2/3/09

KD 2/3/09

KD 2/3/09

ALM 2/4/09

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		**104.944421**	**Pass**
Stdev =	10.63610098		0.00415782	**Rule 3 (Pass/Fail)**
Certificate Value =	2437.6	dpm/mL		
Lower Limit =	2536.821513	dpm/mL		
Upper Limit =	2579.365917	dpm/mL		
Rule 1 Pass/Fail	**Fail**	***exception taken due to full recovery of standard**		
Two sigma =	21.27220197	dpm/mL		
10 % of Mean =	255.8093715	dpm/mL		
Rule 2 (Pass/Fail)	**Pass**			

Verification Rules

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

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

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

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

Source dpm/g = (A - B)/(C)(D)

where:

A = Ver. source cpm,

B = BKG cpm,

C = System efficiency, (cpm/dpm), and

D = mass used for standard verification.

RAD SOP M-001

JLO 2/3/09
μ-ut 2/4/09

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

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

KD 2/3/09
ALLA 2/4/09

General Engineering Laboratories
Verification Source Preparation Sheet

Applicable SOP Number: GL-RAD-A-008

Isotope: RA-226

Date Standards Prepared: 4/5/09

Cocktail Type Used: NA

Standard ID: 02996

Matrix of Vial/Planchett: NA / NA / NA

Amount Used (g or ml): 0.1

Standard Activity (DPM/g or mL): 246.347

Type of Scintillation Vial: NA

Reference Date: 12/15/99

Pipette ID Used: 1429303

Expiration Date: 4/2/09

Balance ID Used: 36040216

Residue/Carrier Agent: 0.5 M HCl

Quenching Agent: NA

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

LVD 2/31/09

Prepared By: Kelli S Power Date: 2/3/09

Reviewed By: [signature] Date: 2/4/09

Rev 1 RLM 9/10/97

0299

Certificate of Calibration for Radium-226 Solution

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

ement	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.

acy Expanded uncertainty in the radioactive concentration quoted above: ± 2.5 %

Combined Type A uncertainty: ± 0.2 %
Combined Type B uncertainty: ± 1.3 %

onuclidic 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.

nical Carrier free in 0.5M HCl
position

arks 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 2/3/09
2/11/09

Ra-226 WATER

Batch : LCSVER
Date : 1/2/2009
Analyst : KSD1
Bkg Count Time: 30 min

Procedure Code : LUC26RAL
Parmname : Radium-226
MDA : 1 pCi/L
Instrument Used : LUCAS CELL DETECTOR

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	**Ra-226 RESULT pCi/L**	Ra-226 ERROR pCi/L	COUNT DATE/TIME
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

270

2/4/09

2/4/09

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%**
						24.10		
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%**
						24.10		
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	constant	Net CPM cpm	Ingrowth constant
1/26/2009 16:05	1/30/2009 10:40	90.58	4.42	0.4954	0.9672	1.0019	21.6000	0.4800
1/30/2009 10:00	2/2/2009 9:15	71.25	4.42	0.4160	0.9672	1.0019	21.5667	0.4032
1/26/2009 16:05	1/30/2009 11:05	91.00	4.58	0.4969	0.9660	1.0019	30.1997	0.4809
1/26/2009 16:05	1/30/2009 11:30	91.42	5.58	0.4985	0.9587	1.0019	26.1000	0.4788
1/26/2009 16:05	1/30/2009 11:45	91.67	5.87	0.4995	0.9567	1.0019	25.3330	0.4787
1/30/2009 10:00	2/2/2009 9:40	71.67	4.58	0.4179	0.9660	1.0019	23.7330	0.4044
1/26/2009 16:05	1/30/2009 12:00	91.92	7.08	0.5004	0.9479	1.0019	24.0667	0.4753
1/26/2009 16:05	1/30/2009 13:05	93.00	21.25	0.5045	0.8518	1.0019	25.1997	0.4305
1/26/2009 16:05	1/30/2009 13:20	93.25	28.00	0.5054	0.8095	1.0019	19.5330	0.4099
1/26/2009 16:05	1/30/2009 13:40	93.58	66.75	0.5067	0.6041	1.0019	17.7997	0.3067

271

LCWA 2141.9

#3

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Ver 1	500	11/26/09 1605	11/30/09 1040	11/30/09 1505	301	3	8	656
Ver 2	500	11/26/09 1605	11/30/09 1105	11/30/09 1510	303	3	8	914
Ver 3	500	11/26/09 1605	11/30/09 1130	11/30/09 1705	305	3	8	791
Ver 4	500	11/26/09 1605	11/30/09 1145	~~11/30/09~~ 1.30.09 1737	306	3	8	768
Ver 5	500	11/26/09 1605	11/30/09 1200	~~11/30/09~~ 1.30.09 1905	308	3	8	730
Ver 6	500	11/26/09 1605	11/30/09 1305	1.31.09 1020	309	3	8	764
Ver 7	500	11/26/09 1605	11/30/09 1320	1.31.09 1720	311	3	8	594
Ver 8	500	11/26/09 1605	11/30/09 1340	2/1/09 0825	312	3	8	542
~~Ver 9~~ 272	500	11/26/09 1605						
Ver 10	500	11/26/09 1605						
Ver 11	500	11/26/09 1605						
Ver 12	500	11/26/09 1605						

KD 2/3/09

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
VW 1	500	11/30/09 1000	12/1/09 0915	12/1/09 1340	307	3	8	655
VW 2	500	11/30/09 1000	12/1/09 0940	12/1/09 1415	307	3	8	720
~~VW 3~~	~~500~~	~~11/30/09 1000~~	~~12/1/09 1115~~	12/1/09 1450	~~309~~	3	8	~~754~~

KD 2/3/09

KD 2/3/09

KD 2/3/09

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.

LO 2/4/09

2/2/09

2/4/09

General Engineering Laboratories
Verification Source Preparation Sheet

Applicable SOP Number: GL-RAD-008

Isotope: Ra-226

Date Standards Prepared: 12/15/2007 (Ra-226 2/14/09)

Cocktail Type Used: N/A

Standard ID: 0635-F

Matrix of Vial/Planchett: N/A / N/A / N/A

Amount Used (g or ml): 0.1 ml

Standard Activity (DPM/g or mL): 267.5 dpm/ml

Type of Scintillation Vial: N/A

Reference Date: 1/23/2004

Pipette ID Used: 147, 9303

Expiration Date: 2/4/09 (2 µL A 2/14/09)

Balance ID Used: N/A

Residue/Carrier Agent: 0.1 ml HCl

Quenching Agent: N/A

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

Prepared By: Kelli Bonnell Date: 2/3/09

Reviewed By: [signature] Date: 2/4/09

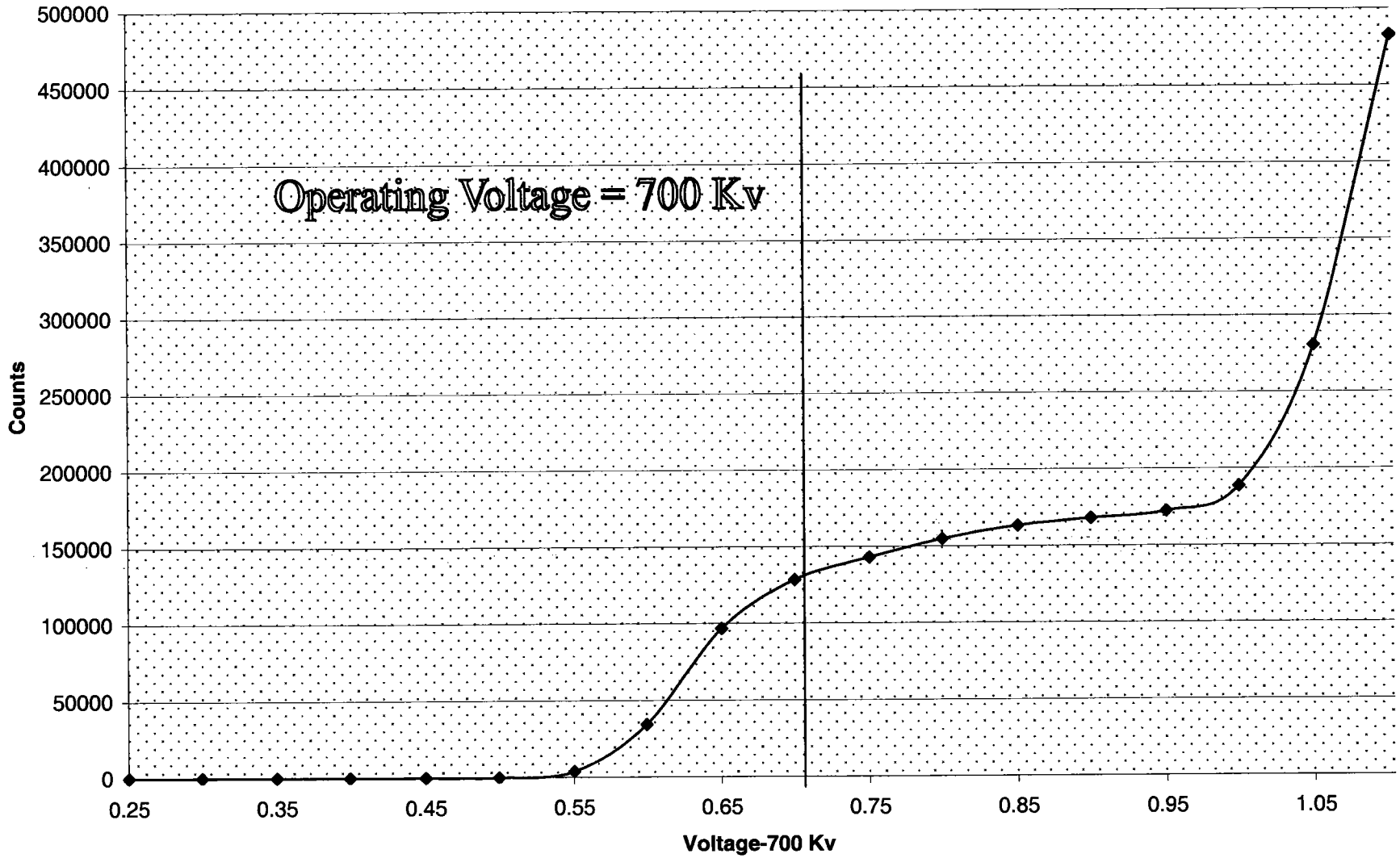
Rev 1 RLM 9/10/97

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

LLA 2/4/09
KM 2/3/09

277

Ludlum 3 Voltage Curve



KO 2/3/09

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

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 Worrell Date: 2/28/09

Reviewed By: [signature] 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 #	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
401	1.689	Average	1.574	3	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	0.121	3	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			38	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	2.118	43	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	0.064	43	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			15	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	1.463	7	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	0.039	7	2/27/2009 14:50	2/27/2009 10:00	2/23/2009 16:05	0.267	5182	30	172.73	243.66	3.74653	0.20139	3363	0.9960
403	1.419			14	2/25/2009 15:55	2/25/2009 8:35	2/20/2009 17:25	0.267	5562	30	185.40	243.66	4.63194	0.30556	3361	0.9960
404	1.792	Average	1.931	42	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	0.186	42	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			46	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	1.903	38	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	0.161	13	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			47	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	2.036	30	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	0.200	44	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			44	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	1.886	28	2/26/2009 8:50	2/25/2009 13:05	2/20/2009 17:25	0.267	6838	30	227.93	243.66	4.81944	0.82292	3361	0.9960
410	1.965	Stdev	0.072	15	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	0.70833	3339	0.9960
410	1.824			48	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	1.824	36	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	1.811	Stdev	0.013	30	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			9	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	1.967	34	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	0.156	48	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			35	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)

3/2/09

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: GL-RAD-A-008

Isotope: Ra-226

Date Standards Prepared: 4/15/05

Cocktail Type Used: NA

Standard ID: D2996

Matrix of Vial/Planchett: NA / NA / NA

Amount Used (g or (ml)): 0.1

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: 3604021C

Residue/Carrier Agent: 0.5M HCl

Quenching Agent: NA

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
3	Cal 3				
43	Cal 43				
7	Cal 7				
42	Cal 42				
13	Cal 43				
44	Cal 44				
30	Cal 30				
48	Cal 48				
36	Cal 36				
35	Cal 35				
38	Cal 38				
15	Cal 15				
14	Cal 14				
46	Cal 46				
47	Cal 47				

3/2/09

Prepared By: Kelli Dowdle Date: 3/2/09

Reviewed By: Angela Johnson Date: 3/2/09

Rev 1 RLM 9/10/97

General Engineering Laboratories
Verification Source Preparation Sheet

Applicable SOP Number: GL-RAD-A-008

Isotope: Ra-226

Date Standards Prepared: 4/5/05

Cocktail Type Used: N/A

Standard ID: 02A9G

Matrix of Vial/Planchett: NA / NA / NA

Amount Used (g or ml): 0.1 ml 3/2/09

Type of Scintillation Vial: NA

Standard Activity (DPM/g or mL): 2,446.347

Pipette ID Used: 1429303

Reference Date: 12/15/99

Balance ID Used: 36040216

Expiration Date: 4/2/09

Quenching Agent: NA

Residue/Carrier Agent: 0.5M HCl

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

KD 3/2/09

Prepared By: Kellie Derrick Date: 3/2/09

Reviewed By: Angela Date: 3/2/09

Rev 1 RLM 9/10/97

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:	

284

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

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

Secondary Standards

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

! 8-21-00

Nycomed Amersham plc
Amersham Laboratories

0299

[redacted]

NAMAS
CALIBRATION
No. 0146

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: 17th December 1999

285

Nycomed Amersham

Verification for Ra-226 Standard 0299-G

4/2/2008	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard Mass. Used (G)	Source DPM/G
D. Roy	0299-G N1	2536.9600	52.4000	2484.5600	1.917186	0.5057	2562.667649
	0299-G N2	2520.2500	52.4000	2467.8500	1.917186	0.5056	2545.935781
	0299-G N3	2532.5000	52.4000	2480.1000	1.917186	0.5042	2565.677715
						Average =	2558.093715
Mean Value (Counting) =	2558.093715		**104.944421**	**Pass**			
Stdev =	10.63610098		0.00415782	**Rule 3 (Pass/Fail)**			

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

Verification Rules

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

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

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

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

Source dpm/g = (A - B)/(C)(D)

where:

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

RAD SOP M-001

Mary Sr. Adam 4/9/08

David Roy 4/10/08

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~~		~~11/30/09 1050~~	~~2/3/09 1335~~	~~2.3.09 1710~~	~~401~~	~~4~~	~~8~~	~~6763~~	
41		11/30/09 1050	2/3/09 1310	2.3.09 1800	402	4	8	9067	LW 3/2/09
~~19~~		~~11/30/09 1050~~	2/3/09 1335	2.3.09 1840	~~403~~	4	8	~~7092~~	
~~30~~		11/30/09 1050	2/3/09 1400	2.3.09 1915	~~404~~	4	8	7877	LW 3/2/09
~~42~~		11/30/09 ~~1050~~	~~2/3/09 1435~~	2.3.09 2035	405	4	8	8700	LW 3/2/09
44		11/30/09 1050	2/3/09 1500	2.3.09 2110	409	4	8	7949	
15		11/30/09 1050	2/3/09 1530	~~2/4/09~~ 2/4/09 0830	410	4	8	4108	
~~14~~		~~11/30/09 1050~~	~~2/3/09 1545~~	~~2/4/09 1015~~ 2/4/09 1015	~~411~~	4	8	~~7562~~	LW 3/2/09
~~13~~		11/30/09 1050	2/3/09 1600	2/4/09 1100	412	4	8	~~9523~~	LW 3/2/09
~~38~~									
36									
				LW 2/26/09					LW 3/2/09
									LW 3/2/09

287

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	8	4580	
43	500	2/20/09 1725	2/23/09 1105	2/23/09 1655	402	4	8	~~4817~~ 5017	KD 2/23/09
7	500	2/20/09 1725	2/23/09 1130	2.23.09 1930	403	4	8	4011	
42	500	2/20/09 1725	2/23/09 1310	2.23.09 1905	404	4	8	5005	
~~13~~	~~500~~	2/20/09 1725	2/23/09 1340	2.23.09 1955	405	4	8	~~4224~~	KD 2/28/09
~~34~~	~~500~~	2/20/09 1725	~~2/23/09~~ 1405	2.23.09 2250	406	4		~~2355~~	KD 2/28/09
44	500	~~2/20/09 1725~~	~~2/23/09 1435~~	2.23.09 2330	407	4		2359	2/28/09 KD
~~14~~	500	2/20/09 1725	2/23/09 1455	2.24.09 00:00	408	4		~~2598~~	KD 2/28/09
30	500	2/20/09 1725	2/23/09 1520	2.24.09 00:30	409	4	8	~~5035~~ 5029	KD 2/24/09
48	500	2/20/09 1725	2/23/09 1540	~~2/24/09 0850~~ 2/24/09 0800	40	4	8	4840	
36	500	2/20/09 1725	2/23/09 1555	2/24/09 0840	411	4	8	4839	
35	500	2/20/09 1725	2/23/09 1610	2/24/09 0940	412	4	8	4818	
				KD 2/28/09					

KD 3/2/09

KD 3/2/09

Ra-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
46	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 2055	405	4	8	6721
~~16~~	~~500~~	~~2/20/09 1725~~	~~2/25/09 1040~~	~~2.26.09 00:22~~ ~~2.25.09 2317~~ ~~Sec 2.25.09~~	~~406~~	~~4~~	~~8~~	~~2084~~
~~25~~	~~500~~	~~2/20/09 1725~~	~~2/25/09 1110~~	~~2.25.09 2205~~	~~407~~	~~4~~	~~8~~	~~2827~~
~~23~~	~~500~~	~~2/20/09 1725~~	~~2/25/09 1145~~	~~2.25.09 22:45~~ ~~Sec 2253~~	~~408~~	~~4~~	~~8~~	~~3137~~
~~39~~	500	2/20/09 1725	2/25/09 1210	2/26/09 0810	409	4	8	5169
28	500	2/20/09 1725	2/25/09 1305	2/26/09 0850	410	4	8	6838
9	500	2/20/09 1725	2/25/09 1340	2/26/09 0930	411	4	8	6734
34	500	2/20/09 1725	2/25/09 1405	2/26/09 1015	412	4	8	7137

289

KLO 3/2/09

KLO 3/2/09

KLO 3/2/09

KLO 3/2/09

KLO 3/2/09

KLO 3/2/09

Ra-226 Verification Sheet

Cal #4

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
~~Cal 5~~ Cal 3	500	2/23/09 1605	2/27/09 0900	2/27/09 0915	401	4	8	5474
Cal 43	500	2/23/09 1605	2/27/09 0930	2/27/09 1416	402	4	8	7507
Cal 7	500	2/23/09 1605	2/27/09 1000	2/27/09 1450	403	4	8	5182
Cal 42	500	2/23/09 1605	2/27/09 1030	2/27/09 1525	404	4	8	7443
Cal 13	500	2/23/09 1605	2/27/09 1055	2/27/09 1600	405	4	8	6612
Cal 44	500	2/23/09 1605	2/27/09 1130	2/27/09 16:35	409	4	8	7516
~~Cal 9~~	~~500~~	~~2/23/09 1605~~	~~2/27/09 1150~~	~~2/27/09 17:15~~	~~410~~	~~4~~	~~8~~	~~7850~~
Cal 30	500	2/23/09 1605	2/27/09 1220	2/27/09 17:45	411	4	8	~~2357~~ 6357
Cal 48	500	2/23/09 1605	2/27/09 1245	2/27/09 18:20	412	4	8	7495

LCD 3/2/09

LCD 2/28/09

LCD 2/28/09

LCD 3/2/09

Ra-226 Verification Sheet Cal #4

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 38	500	2/25/09 1450	3/2/09 1030	3/2/09 1340	405	4	8	8602

KH 3/2/09

MB 3/2/09

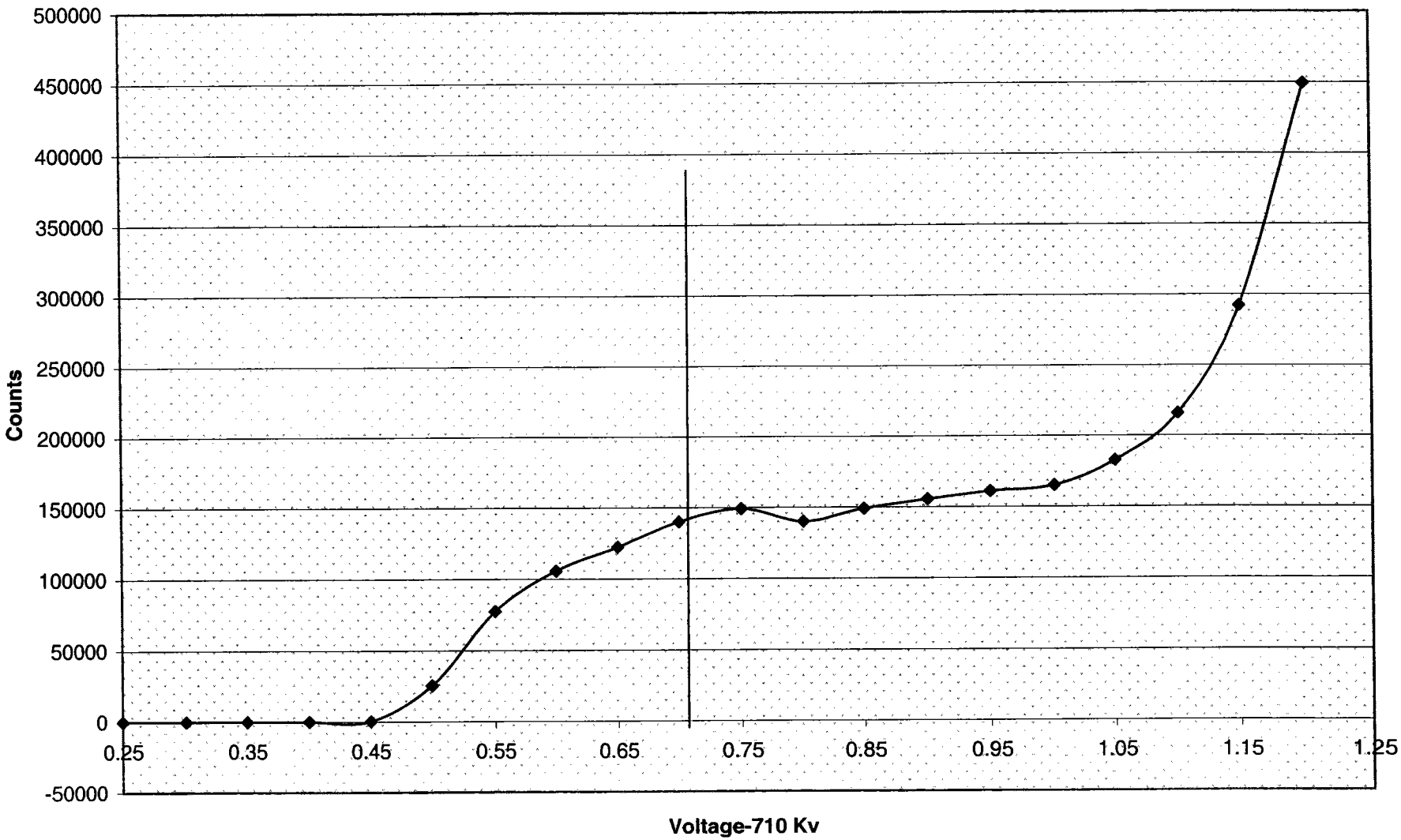
LKS 3/2/09

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

3/2/09

3/2/09

Ludlum 4 Voltage Curve



WD 3/1/09

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 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 Spencer Date: 3/24/09

Reviewed By: Angela Quinn Date: 3/25/09

Effective Date: 3/25/09

Ra-226 Cell Constants

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

Lucas cell #	Cell constant			Standard Source	Date/Time of count	Date/time flushed to cell	Date/time end of degas	total counts	count time min	cpm	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count
501	1.927	Average	2.087	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	Stdev	0.160	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	Average	1.878	16	3/18/2009 8:25	3/17/2009 12:50	3/10/2009 14:00	7951	30	265.03	243.03	6.95139	0.81597	3381	0.9960
502	2.045	Stdev	0.146	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	Average	1.601	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	Stdev	0.028	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	Average	1.615	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	Stdev	0.025	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	Average	2.331	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	Stdev	0.127	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	Average	2.004	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	Stdev	0.112	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	1.985			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	Average	1.701	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	Stdev	0.024	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	Average	1.534	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	Stdev	0.062	44	3/19/2009 21:30	3/19/2009 15:45	3/12/2009 12:10	7561	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	Average	1.798	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	Stdev	0.064	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	Average	1.458	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	Stdev	0.024	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	Average	1.959	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	Stdev	0.106	46	3/11/2009 16:50	3/10/2009 16:35	3/5/2009 14:00	7283	30	242.77	243.03	5.10764	1.01042	3375	0.9960
511	2.041			37	3/12/2009 22:40	3/12/2009 13:10	3/6/2009 15:25	9068	30	302.27	243.03	5.90625	0.39583	3376	0.9960
512	1.796	Average	1.956	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	Stdev	0.152	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

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

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

Cal #5

Calibration

Ra-226 ~~Verification~~ Sheet JH 3/16/09

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~~	~~3/3/09 0845~~	~~3/6/09 0840~~	502	5	1	~~4308~~
		~~2/25/09 1400~~	3/3/09		~~503~~	5	~~No~~ 3/3/09	~~6860~~
Cal 46	500	2/25/09 1400	3/5/09 0920	3/6/09 0920	503	5	3	7250
Cal 47	500	2/25/09 1400	3/5/09 0940	3/6/09 1030	504	5	1	7262
Cal 16	500	2/25/09 1400	3/5/09 1005	3/6/09 1240	505	5	3	10654
Cal 25	500	2/25/09 1400	3/5/09 1030	3/6/09 1310	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	502	2/25/09 1400	3/5/09 1320	3/6/09 1630	511	5	6	8316

~~No~~ 3/24/09 JH 3/19/09

JH 3/16/09

Calibration

Ra-226 ~~Verification~~ Sheet

JAS 3/16/09

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts	
Cal 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 1320	3/11/09 1115	502	5	5	7414	
~~Cal 15~~	~~500~~	~~3/5/09 1400~~	~~3/10/09 1345~~	~~3/11/09 1155~~	503	5	8	7352	KB 3/24/09
Cal 34	500	3/5/09 1400	3/10/09 1405	3/11/09 1230	504	5	4	5889	
Cal 23	500	3/5/09 1400	3/10/09 1430	3/11/09 1300	505	5	2	8924	
Cal 47	500	3/5/09 1400	3/10/09 1505	3/11/09 1330	506	5	8	7804	
~~Cal 45~~	~~500~~	~~3/5/09 1400~~	3/10/09 1527	3/11/09 1420	~~507~~	~~5~~	~~4~~	~~6315~~	KB 3/24/09
~~Cal 16~~	~~500~~	~~3/5/09 1400~~	3/10/09 1550	3/11/09 1455	~~508~~	~~5~~	~~4~~	~~6443~~	KB 3/24/09
Cal 39	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	7246	
Cal 46	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	

JAS 3/16/09

Calibration

Ra-226 ~~Verification~~ Sheet

JH 8/11/09

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 42	500	3/6/09 1525	3/12/09 0910	3/12/09 1330	501	5	8	10210
Cal 19	500	3/6/09 1525	3/12/09 ~~0940~~ 0935 ~~to 3/11/09~~	3/12/09 1420	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 1025	3/11/09 1525	~~504~~	~~5~~	~~0~~	~~420~~
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	8954
Cal 43	500	3/6/09 1525	3/12/09 1135	3/12/09 18:30	507	5	6	7535
Cal 3	500	~~3/10~~ 3/6/09 1525 ~~to 3/12/09~~	3/12/09 1210	3/12/09 20:45	508	5	0	6640
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

LCD 3/24/09

JH 8/11/09

Calibration

Ra-226 ~~Verification~~ Sheet

JH 3/25/09 Cal #5's

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 16	500	3/10/09 1400	3/17/09 1250	3/18/09 0825	502	5	5	7951
~~Cal 39~~	~~500~~	~~3/10/09 1400~~	~~3/17/09 1325~~	~~3/18/09 0855~~	~~503~~	5		6855
~~Cal 28~~	~~500~~	~~3/10/09 1400~~	~~3/17/09 1345~~	~~3/18/09 1025~~	~~504~~	5		6804
Cal 40	500	3/10/09 1400	3/17/09 1400	3/18/09 1300	512	5	8	8653
Cal 25	500	3/5/09 1400	3/10/09 1527	3/11/09 1420	507	5	4	6315

KD 3/24/09

KD 3/24/09

KD 3/24/09

JH 3/25/09

Ra-226 Calibration Sheet

Standard ID: 0249-G
Volume Added (mL): 0.1
Expiration Date: 4/2/09

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det # VW 3/24/09	Total Counts
Cal 42	500	3/12/09 1210	3/19/09 1515	3/19/09 2015	503	5	8282
Cal 19	500	3/12/09 1210	3/19/09 1530	3/19/09 2030	504	5	8310
Cal 44	500	3/12/09 1210	3/19/09 1545	3/19/09 2130	508	5	7561
~~Cal 30~~	~~500~~	~~3/12/09 1210~~	~~3/19/09 1600~~	3/19/09 2200	509	5	9942

VW 3/24/09

VW 3/24/09

300

VW 3/25/09

8-21-00

Nycomed Amersham plc
Amersham Laboratories

0299

Certificate of calibration of radionuclide activity

NAMAS
CALIBRATION
No. 0146

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

301

Date of 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

(Mass of parent(g)) * (Parm Activity (kBq/g)) * (conversion dpm to kBq) / (Dilution Vol) = Parent Activity (dpm/mL)
(Mass of parent(g)) * (Parm Activity (kBq/g)) * (conversion dpm to kBq) / Density (g/mL)/ (Dilution Vol) = Parent Activity (dpm/g)
(4.6634 g) * (43.75 kBq/g) * (60000 dpm/kBq) / (100 mL) = 122414.2500 dpm/mL
(4.6634 g) * (43.75 kBq/g) * (60000 dpm/kBq) / (1.0012 g/mL) / (100 mL) = 122273.3377 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 Darnell

Verification for Ra-226 Standard 0299-G

4/2/2008	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard Mass. Used (G)	Source DPM/G
D. Roy	0299-G N1	2536.9600	52.4000	2484.5600	1.917186	0.5057	2562.667649
	0299-G N2	2520.2500	52.4000	2467.8500	1.917186	0.5056	2545.935781
	0299-G N3	2532.5000	52.4000	2480.1000	1.917186	0.5042	2565.677715
						Average =	2558.093715
Mean Value (Counting) =	2558.093715		**104.944421**	**Pass**			
Stdev =	10.63610098		0.00415782	**Rule 3 (Pass/Fail)**			

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

Verification Rules

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

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

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

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

Source dpm/g = (A - B)/(C)(D)

where:

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

RAD SOP M-001

3/24/08 4/9/08

4/10/08

General Engineering Laboratories

~~Verification~~ Source Preparation Sheet

3/25/09 Calibration

Applicable SOP Number: GL-RAD-A-008

Date Standards Prepared: 4/15/05

Standard ID: 0249-G

Amount Used (g or ml): 0.1

Standard Activity (DPM/g or mL): 12446.347

Reference Date: 12/15/99

Expiration Date: 4/2/09

Residue/Carrier Agent: 0.5M HCl

Isotope: RA-226

Cocktail Type Used: NA

Matrix of Vial/Planchett: NA

NA

NA

Type of Scintillation Vial: NA

Pipette ID Used: 1425303

Balance ID Used: 3600402216

Quenching Agent: NA

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
15	Cal 15				
46	Cal 46				
47	Cal 47				
16	Cal 16				
25	Cal 25				
23	Cal 23				
39	Cal 39				
28	Cal 28				
9	Cal 9				
34	Cal 34				
42	Cal 42				
19	Cal 19				
44	Cal 44				
7	Cal 7				
13	Cal 13				

VP 3/24/09

Prepared By: Kelli Dixon Date: 3/24/09

Reviewed By: _____ Date: _____

Rev 1 RLM 9/10/97

General Engineering Laboratories

~~Verification~~ Source Preparation Sheet

3/25/09 Calibration

Applicable SOP Number GL-RAD-A-008

Date Standards Prepared 4/5/09

Standard ID 12946

Amount Used (g or ml) 0.1

Standard Activity (DPM/g or mL) 2146.347

Reference Date 12/15/99

Expiration Date 4/2/09

Residue/Carrier Agent 0.5M HCl

Isotope Ra-226

Cocktail Type Used NA

Matrix of Vial/Planchett NA / NA / NA

Type of Scintillation Vial NA

Pipette ID Used 1429303

Balance ID Used 36040216

Quenching Agent NA

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
43	Cal 43				
3	Cal 3				
36	Cal 36				
35	Cal 35				
37	Cal 37				
38	Cal 38				

3/24/09

Prepared By: Kelli Davee Date 3/24/09

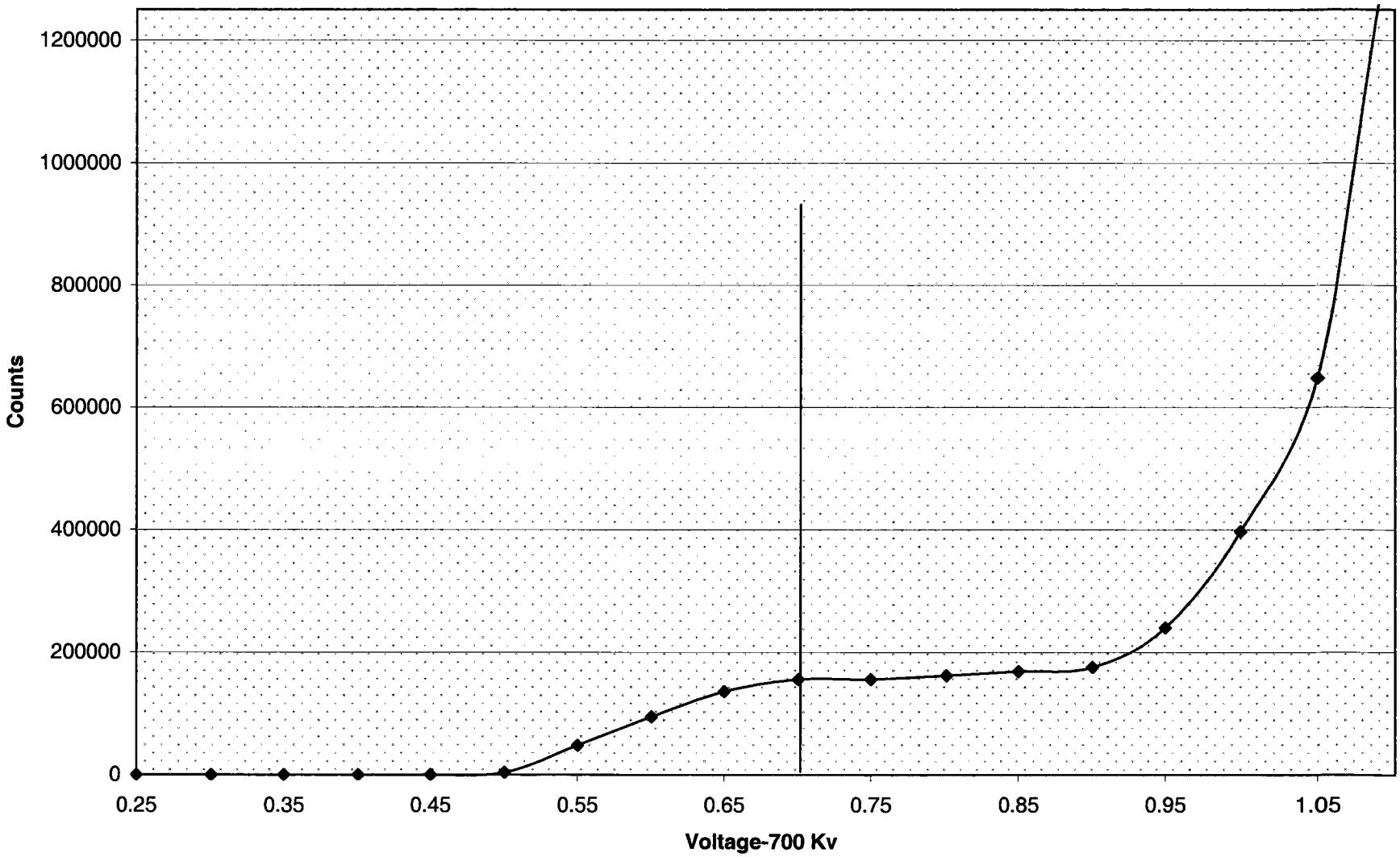
Reviewed By: _____ Date _____

Rev 1 RLM 9/10/97

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

VD 3/24/09

Ludlum 5 Voltage Curve



KAP 3/24/09

Ra-226 WATER

Batch : LCSVER
Date : 2/20/2008
Analyst : DXM2
Bkg Count Time: 30 min

Procedure Code : LUC26RAL
Parmname : Radium-226
MDA : 1 pCi/L
Instrument Used : LUCAS CELL DETECTOR

Sample ID	Sample Vol L	Count Time min	Gross counts cts	Cell # num	Cell Const. num	BKG cpm	Ra-226 MDA pCi/L	**Ra-226 RESULT pCi/L**	Ra-226 ERROR pCi/L	COUNT DATE/TIME
Ver 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 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

309

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
VER 1	500	3/13/09 1530	3/16/09 0945	~~3/16/09 1510~~ 3.16.09 1510 ->SEA 3.17.09	501	5	8	766
VER 2	500	3/13/09 1530	3/16/09 1010	3.16.09 1925	502	5	~~8~~ 5 KD 3/25/09	537
VER 3	500	3/13/09 1530	3/16/09 1030	3/16/09 2020	503	5	8	518
~~VER 4~~	~~500~~	~~3/13/09 1530~~	~~3/16/09~~ 1100	~~3.16.09 2115~~	504	5	8	~~577~~ KD 3/24/09
VER 5	500	3/13/09 1530	3/16/09 1125	3.16.09 2200	505	5	~~8~~ 1 KD 3/25/09	680
~~VER 6~~	~~500~~	3/13/09 1530	3/16/09 1155	3.16.09 2230	506	5	8	~~707~~ KD 3/24/09
VER 7	500	3/13/09 1530	3/16/09 1320	3.16.09 2300	507	5	8	488
VER 8	500	3/13/09 1530	3/16/09 1350	3.16.09 2330	508	5	~~8~~ 1 KD 3/25/09	544
310 ~~VER 9~~	~~500~~	~~3/13/09 1530~~	~~3/16/09 1410~~	~~3/17/09 0315~~ 0415 SB 3/17/09	509	5	8	640 → KD 3/24/09
VER 10	500	3/13/09 1530	3/16/09 1425	3/17/09 0500	510	5	~~8~~ 1 KD 3/25/09	432
VER 11	500	3/13/09 1530	3/16/09 1445	3/17/09 0535	511	5	8	577
VER 12	500	3/13/09 1530	3/16/09 1500	3/17/09 0610	512	5	8	723
				KD 3/24/09				

KD 3/25/09

Ra-226 Verification Sheet

Standard ID: 0638F
Volume Added (mL): D.I
Expiration Date: 2/2/10

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

KW 3/24/09

KW 3/24/09

KW 3/24/09

311

General Engineering Laboratories
Verification Source Preparation Sheet

Applicable SOP Number: GL-RAD-A-008

Date Standards Prepared: 11/16/09

Standard ID: 0638-F

Amount Used (g or ml): 0.1

Standard Activity (DPM/g or mL): 267.519

Reference Date: 1123104

Expiration Date: 2/2/10

Residue/Carrier Agent: NA

Isotope: RA-226

Cocktail Type Used: NA

Matrix of Vial/Planchett: NA / NA / NA

Type of Scintillation Vial: NA

Pipette ID Used: 1429303

Balance ID Used: 3808 0004

Quenching Agent: NA

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
1	Ver 1				
2	ver 2				
3	Ver 3				
4	Ver 4				
5	Ver 5				
6	Ver 6				
7	Ver 7				
8	Ver 8				
9	Ver 9		LD 3/25/09		
10	Ver 10				
11	Ver 11				
12	Ver 12				

Prepared By: Kelli Diesel Date: 3/24/09

Reviewed By: Angela A Quinn Date: 3/25/09

Rev 1 RLM 9/10/97

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:	03/04/2007
Expiration Date:	03/04/2008
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

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

LW 3/24/09

2/2/09

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 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 Powell Date: 11/21/08

Reviewed By: Angela D Johnson Date: 11/21/08

Effective Date: 11/21/08

Ra-226 Cell Constants

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

Lucas cell #	Cell constant			Standard Source	Date/Time of count	Date/time flushed to cell	Date/time end of degas	bkg cpm	total counts	count time min	cpm	Known activity dpm	t1 (days) end-degas to flush	t2 (days) end-flush to count	t3 (days) Std Ref Date to count	Decay from Std Ref Date to count
701	1.996	Average	1.815	cal 43	11/20/2008 16:40	11/20/2008 12:00	11/13/2008 12:20	0.267	10056	30	335.20	243.02	6.98611	0.19444	3264	0.9961
701	1.720	Stdev	0.157	cal 28	10/15/2008 14:35	10/15/2008 10:40	10/10/2008 14:20	0.267	7095	30	236.50	243.02	4.84722	0.16319	3228	0.9962
701	1.728			cal 14	10/13/2008 16:15	10/13/2008 9:35	10/10/2008 14:20	0.267	4760	30	158.67	243.02	2.80208	0.27778	3226	0.9962
702	1.820	Average	1.932	cal 9	10/20/2008 15:45	10/20/2008 9:40	10/15/2008 14:10	0.233	7352	30	245.07	243.02	4.81250	0.25347	3233	0.9962
702	2.014	Stdev	0.101	cal 9	10/15/2008 15:20	10/15/2008 10:55	10/10/2008 14:20	0.100	8282	30	276.07	243.02	4.85764	0.18403	3228	0.9962
702	1.963			cal 13	10/13/2008 20:25	10/13/2008 10:10	10/10/2008 14:20	0.267	5296	30	176.53	243.02	2.82639	0.42708	3226	0.9962
703	1.899	Average	2.083	cal 43	11/13/2008 15:20	11/13/2008 12:20	11/10/2008 16:15	0.267	5428	30	180.93	243.02	2.83681	0.12500	3257	0.9961
703	2.126	Stdev	0.166	cal 7	10/15/2008 15:55	10/15/2008 11:10	10/10/2008 14:20	0.267	8738	30	291.27	243.02	4.86806	0.19792	3228	0.9962
703	2.222			cal 43	10/13/2008 20:55	10/13/2008 10:35	10/10/2008 14:20	0.267	6019	30	200.63	243.02	2.84375	0.43056	3226	0.9962
704	2.116	Average	2.248	cal 23	10/20/2008 17:00	10/20/2008 10:30	10/15/2008 14:10	0.233	8560	30	285.33	243.02	4.84722	0.27083	3233	0.9962
704	2.390	Stdev	0.137	cal 23	10/15/2008 17:00	10/15/2008 12:30	10/10/2008 14:20	0.267	9909	30	330.30	243.02	4.92361	0.18750	3228	0.9962
704	2.239			cal 44	10/13/2008 21:30	10/13/2008 11:00	10/10/2008 14:20	0.267	6084	30	202.80	243.02	2.86111	0.43750	3226	0.9962
705	2.199	Average	2.160	cal 48	10/20/2008 17:35	10/20/2008 10:55	10/15/2008 14:10	0.233	8905	30	296.83	243.02	4.86458	0.27778	3233	0.9962
705	2.050	Stdev	0.097	cal 48	10/15/2008 17:30	10/15/2008 12:45	10/10/2008 14:20	0.267	8495	30	283.17	243.02	4.93403	0.19792	3228	0.9962
705	2.232			cal 15	10/13/2008 22:00	10/13/2008 11:20	10/10/2008 14:20	0.267	6081	30	202.70	243.02	2.87500	0.44444	3226	0.9962
706	2.099	Average	2.118	cal 35	10/20/2008 18:05	10/20/2008 11:15	10/15/2008 14:10	0.233	8504	30	283.47	243.02	4.87847	0.28472	3233	0.9962
706	2.040	Stdev	0.088	cal 35	10/15/2008 18:00	10/15/2008 13:00	10/10/2008 14:20	0.267	8452	30	281.73	243.02	4.94444	0.20833	3228	0.9962
706	2.213			cal 36	10/13/2008 22:30	10/13/2008 11:40	10/10/2008 14:20	0.267	6044	30	201.47	243.02	2.88889	0.45139	3226	0.9962
707	2.069	Average	2.119	cal 34	10/20/2008 18:35	10/20/2008 11:30	10/15/2008 14:10	0.233	8378	30	279.27	243.02	4.88889	0.29514	3233	0.9962
707	2.057	Stdev	0.097	cal 34	10/15/2008 18:35	10/15/2008 13:25	10/10/2008 14:20	0.267	8527	30	284.23	243.02	4.96181	0.21528	3228	0.9962
707	2.230			cal 46	10/13/2008 23:00	10/13/2008 13:20	10/10/2008 14:20	0.267	6255	30	208.50	243.02	2.95833	0.40278	3226	0.9962
708	1.652	Average	1.869	cal 38	10/20/2008 22:00	10/20/2008 12:50	10/15/2008 14:10	0.233	6632	30	221.07	243.02	4.94444	0.38194	3233	0.9962
708	1.772	Stdev	0.163	cal 38	10/15/2008 19:20	10/15/2008 13:40	10/10/2008 14:20	0.267	7329	30	244.30	243.02	4.97222	0.23611	3228	0.9962
708	1.954			cal 14	11/13/2008 15:50	11/13/2008 12:50	11/10/2008 16:15	0.267	5614	30	187.13	243.02	2.85764	0.12500	3257	0.9961
709	1.890	Average	1.960	CAL 25	10/20/2008 22:35	10/20/2008 13:05	10/15/2008 14:10	0.233	7578	30	252.60	243.02	4.95486	0.39583	3233	0.9962
709	1.817	Stdev	0.162	cal 25	10/15/2008 20:35	10/15/2008 13:55	10/10/2008 14:20	0.267	7469	30	248.97	243.02	4.98264	0.27778	3228	0.9962
709	2.127			cal 47	10/14/2008 9:00	10/13/2008 14:05	10/10/2008 14:20	0.267	5608	30	186.93	243.02	2.98958	0.78819	3226	0.9962
710	1.965	Average	2.042	CAL 3	10/20/2008 23:05	10/20/2008 13:25	10/15/2008 14:10	0.233	7882	30	262.73	243.02	4.96875	0.40278	3233	0.9962
710	2.009	Stdev	0.098	cal 3	10/15/2008 21:40	10/15/2008 14:15	10/10/2008 14:20	0.267	8224	30	274.13	243.02	4.99653	0.30903	3228	0.9962
710	2.152			cal 19	10/14/2008 10:00	10/13/2008 14:25	10/10/2008 14:20	0.267	5666	30	188.87	243.02	3.00347	0.81597	3226	0.9962
711	2.283	Average	2.204	CAL 16	10/20/2008 23:55	10/20/2008 13:45	10/15/2008 14:10	0.233	9136	30	304.53	243.02	4.98264	0.42361	3233	0.9962
711	2.208	Stdev	0.081	cal 16	10/16/2008 8:30	10/15/2008 14:30	10/10/2008 14:20	0.267	8357	30	278.57	243.02	5.00694	0.75000	3228	0.9962
711	2.122			cal 37	10/14/2008 10:55	10/13/2008 14:45	10/10/2008 14:20	0.267	5581	30	186.03	243.02	3.01736	0.84028	3226	0.9962
712	2.049	Average	2.132	cal 39	10/21/2008 1:00	10/20/2008 14:05	10/15/2008 14:10	0.233	8170	30	272.33	243.02	4.99653	0.45486	3233	0.9962
712	2.174	Stdev	0.072	cal 39	10/16/2008 19:15	10/15/2008 14:50	10/10/2008 14:20	0.267	7618	30	253.93	243.02	5.02083	1.18403	3229	0.9962
712	2.174			cal 42	10/14/2008 11:25	10/13/2008 16:15	10/10/2008 14:20	0.267	5852	30	195.07	243.02	3.07986	0.79861	3226	0.9962

Kelli Newell 11/21/08

Angela Johnson 11/21/08

General Engineering Laboratories
Verification Source Preparation Sheet

Applicable SOP Number: GL-RAD-A008

Isotope: Ra-226

Date Standards Prepared: 4.15.05

Cocktail Type Used: NA

Standard ID: 0299-G

Matrix of Vial/Planchett: NA / NA / NA

ED 7/12/08

Amount Used (g or ml): 0.1

Standard Activity (DPM/g or mL): 2446.347

Type of Scintillation Vial: NA

Reference Date: 12/15/99

Pipette ID Used: 1429303

Expiration Date: 4/12/05

Balance ID Used: 360401216

Residue/Carrier Agent: 0.5 M HCl

Quenching Agent: NA

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
Cal48	Cal48				
Cal35	Cal35				
Cal34	Cal34				
Cal38	Cal38				
Cal25	Cal25				
Cal3	Cal3				
Cal16	Cal16				
Cal39	Cal39				

LD 11/21/08

Prepared By: Kelli Dorrer Date: 10/27/08

Reviewed By: Angela Johnson Date: 11/21/08

Rev 1 RLM 9/10/97

General Engineering Laboratories
Verification Source Preparation Sheet

Applicable SOP Number: GL-RAD-A-008

Isotope: Ra 226

Date Standards Prepared: 4/15/05

Cocktail Type Used: NA

Standard ID: 0299-G

Matrix of Vial/Planchett: NA / NA / NA

Amount Used (g or ml): 0.1

Standard Activity (DPM/g or mL): 2446.347

Type of Scintillation Vial: NA

Reference Date: 12/15/99

Pipette ID Used: 1429303

Expiration Date: 4/12/09

Balance ID Used: 3604021G

Residue/Carrier Agent: 0.5 M HCl

Quenching Agent: N/A

	Standard Number	Quenching Vol (uL)/ Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
Cal 14	Cal 14				
Cal 13	Cal 13				
Cal 43	Cal 43				
Cal 44	Cal 44				
Cal 15	Cal 15				
Cal 36	Cal 36				
Cal 46	Cal 46				
Cal 47	Cal 47				
Cal 19	Cal 19				
Cal 37	Cal 37				
Cal 42	Cal 42				
Cal 28	Cal 28				
Cal 9	Cal 9				
Cal 7	Cal M				
Cal 23	Cal 23				

Prepared By: Kelli Dowell Date: 11/21/08

Reviewed By: Angela J Johnson Date: 11/21/08

Rev 1 RLM 9/10/97

! 8-21-00

Nycomed Amersham plc
Amersham Laboratories

0299

[redacted]

NAMAS
CALIBRATION
No. 0146

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 inties 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

ved
ory

Date of issue 319 17th December 1999

Nycomed Amersham

0299

[redacted]

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

ement	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.

acy Expanded uncertainty in the radioactive concentration quoted above: ± 2.5 %

Combined Type A uncertainty: ± 0.2 %
Combined Type B uncertainty: ± 1.3 %

nuclidic 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.

mical Carrier free in 0.5M HCl
position

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

1 year = 365.25 days

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

Standard Traceability Log Rad

Source Material Info	
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

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

LW 11/21/08

Verification for Ra-226 Standard 0299-G

4/2/2008	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff	Standard Mass. Used (G)	Source DPM/G
D. Roy	0299-G N1	2536.9600	52.4000	2484.5600	1.917186	0.5057	2562.667649
	0299-G N2	2520.2500	52.4000	2467.8500	1.917186	0.5056	2545.935781
	0299-G N3	2532.5000	52.4000	2480.1000	1.917186	0.5042	2565.677715
						Average =	2558.093715
Mean Value (Counting) =	2558.093715		**104.944421**	**Pass**			
Stdev =	10.63610098		0.00415782	**Rule 3 (Pass/Fail)**			

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

Verification Rules

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

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

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

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

Source dpm/g = (A - B)/(C)(D)

where:

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

RAD SOP M-001

Mary Jo Adams 4/9/08

David Roy 4/10/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
14	500	~~10/10/08 1440~~ 10/10/08 1420	~~10/13/08 0935~~ 10/13/08 0935	10/13/08 1615	101	7	8	4760
13	500	10/10/08 1420	10/13/08 1010	10.13.08 2025	102	7	8	5296
43	500	10/10/08 1420	10/13/08 1035	10.13.08 2055	103	7	8	6019
44	500	10/10/08 1420	10/13/08 1100	10.13.08 2130	104	7	8	6084
15	500	10/10/08 1420	10/13/08 1120	10.13.08 2200	105	7	8	6081
~~46~~ 36	500	10/10/08 1420	10/13/08 1140	10.13.08 2230	106	7	8	6044
KD 10/13/08 ~~36~~ 46	500	10/10/08 1420	10/13/08 1320	10.13.08 2300	107	7	8	6255
~~36~~	~~500~~	~~10/10/08 1420~~	~~10/13/08 1345~~	~~10.13.08 2330~~	108	7		~~6081~~
323 47	500	10/10/08 1420	10/13/08 1405	10.14.08 0900	109	7	8	5608
19	500	10/10/08 1420	10/13/08 1425	10/14/08 1000	110	7	8	5666
31	500	10/10/08 1420	10/13/08 1445	10/14/08 1055	111	7	8	5581
42	500	10/10/08 1420	10/13/08 1615	10/14/08 1125	112	7	8	5852

KD 11/21/08

KD 11/21/08

11/21/08

Kelli Bennett 11/21/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
Cal 28	500	10/10/08 1420	10/15/08 1040	10/15/08 1435	701	7	8	7095
Cal 9	500	10/10/08 1420	10/15/08 1055	10/15/08 1520	702	7	3	8282
Cal 7	500	10/10/08 1420	10/15/08 1110	10/15/08 1555	703	7	8	8738
Cal 23	500	10/10/08 1420	10/15/08 1230	10.15.08 1700	704	7	8	9909
Cal 48	500	10/10/08 1420	10/15/08 1245	10.15.08 1730	705	7	8	8495
Cal 35	500	10/10/08 1420	10/15/08 1300	10.15.08 1800	706	7	8	8452
Cal 34	500	10/10/08 1420	10/15/08 1325	10.15.08 1835	707	7	8	8527
Cal 38	500	10/10/08 1420	10/15/08 1340	10/15/08 1920	708	7	8	7329
Cal 25	500	10/10/08 1420	10/15/08 1355	10/15/08 2035	709	7	8	7469
Cal 3	500	10/10/08 1420	10/15/08 1415	10/15/08 2140	710	7	8	8224
Cal 16	500	10/10/08 1420	10/15/08 1430	10/16/08 0830	711	7	8	8357
Cal 39	500	10/10/08 1420	10/15/08 1450	10/16/08 1915	712	7	8	7618
			11/4/08					

11/21/08

11/21/08

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
~~Cal 28~~	~~500~~	~~10/15/08 1410~~	~~10/20/08 0910~~	~~10/20/08 1450~~	~~701~~	~~7~~		~~8593~~
Cal 9	500	10/15/08 1410	10/20/08 0940	10/20/08 1545	702	7	7=0.233	7352
~~Cal 7~~	~~500~~	~~10/15/08 1410~~	~~10/20/08 1005~~	~~10/20/08 1625~~	~~703~~	~~7~~		~~7555~~
Cal 23	500	10/15/08 1410	10/20/08 1030	10.20.08 1700	704	7	7=0.237	8560
Cal 48	500	10/15/08 1410	10/20/08 1055	10.20.08 1735	705	7	7=0.233	8905
Cal 35	500	10/15/08 1410	10/20/08 1115	10.20.08 1805	706	7	7=0.233	8504
Cal 34	500	10/15/08 1410	10/20/08 1130	10.20.08 1835	707	7	7=0.233	8378
Cal 38	500	10/15/08 1410	10/20/08 1250	10.20.08 2200	708	7	7=0.233	6632
Cal 25	500	10/15/08 1410	10/20/08 1305	10.20.08 2235	709	7	7=0.233	7578
Cal 3	500	10/15/08 1410	10/20/08 1325	10.20.08 2305	710	7	7=0.233	7882
Cal 16	500	10/15/08 1410	10/20/08 1345	10.20.08 2355	711	7	7=0.233	9136
Cal 39	500	10/15/08 1410	10/20/08 1405	10.21.08 ~~0130~~ 0100	712	7	7=0.233	8170

KP 11/2/08

KP 11/2/08

KP 11/2/08

KP 11/2/08

325

Ra-226 Verification Sheet

Sample ID	Volume (mL)	End Degas Date/Time	End De-em Date/Time	Start Count Date/Time	Cell #	Det #	Background CPM	Total Counts
~~Cal 13~~ KW 11/24/08	~~500~~	~~11/10/08 1615~~	11/13/08 1055	11/13/08 1435	701	1	8	~~4318~~
Cal 43	500	11/10/08 1615	11/13/08 1220	11/13/08 1520	703	1	8	5428
Cal 14	500	11/10/08 1615	11/13/08 1250	11/13/08 1550	708	1	8	5614
~~Cal 15~~	~~500~~	11/10/08 1615	~~11/13/08 1220~~	~~11/13/08 1520~~	205	2	8	~~7013~~
~~Cal 44~~ KW 11/24/08	~~500~~							KW 11/20/08
Cal 43	500	11/13/08 1220	11/20/08 1200	11/20/08 1640	701	1	8	10056

KW 11/21/08

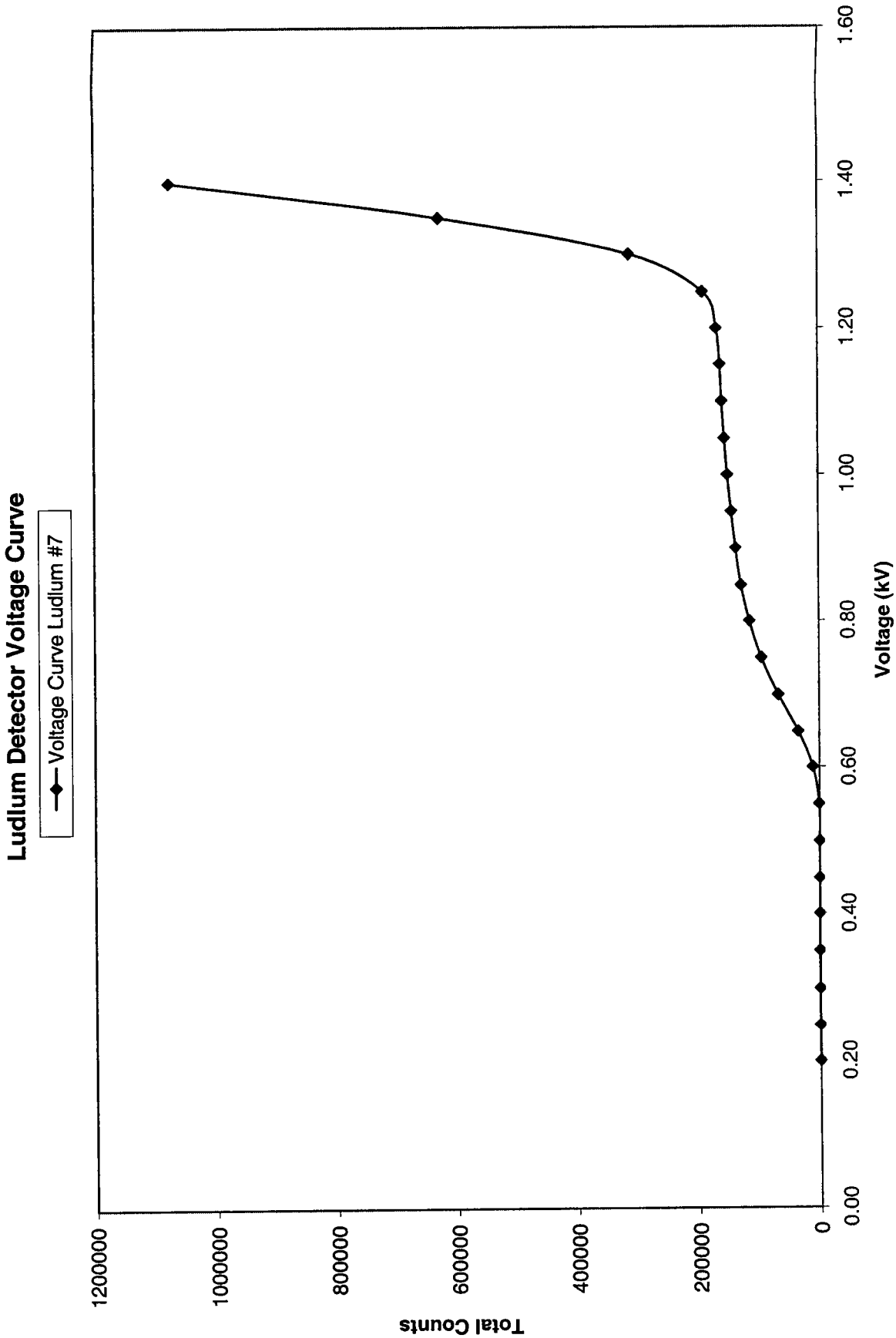
KW 11/21/08

Voltage Curve Ludlum #7

Voltage (kV)	Count Time (min)	Counts	Date/Time
0.20	1.00	0	11/21/08 11:20
0.25	1.00	0	11/21/08 11:22
0.30	1.00	0	11/21/08 11:24
0.35	1.00	0	11/21/08 11:26
0.40	1.00	0	11/21/08 11:29
0.45	1.00	0	11/21/08 11:31
0.50	1.00	1	11/21/08 11:33
0.55	1.00	781	11/21/08 11:36
0.60	1.00	10872	11/21/08 11:38
0.65	1.00	34947	11/21/08 11:40
0.70	1.00	67984	11/21/08 11:43
0.75	1.00	95541	11/21/08 11:45
0.80	1.00	114849	11/21/08 11:47
0.85	1.00	128116	11/21/08 11:49
0.90	1.00	136852	11/21/08 11:52
0.95	1.00	143914	11/21/08 11:54
1.00	1.00	149894	11/21/08 11:56
1.05	1.00	154762	11/21/08 11:59
1.10	1.00	158921	11/21/08 12:01
1.15	1.00	161613	11/21/08 12:03
1.20	1.00	167982	11/21/08 12:06
1.25	1.00	190502	11/21/08 12:08
1.30	1.00	311908	11/21/08 12:10
1.35	1.00	627837	11/21/08 12:13
1.40	1.00	1075213	11/21/08 12:15
1.45	1.00	1601419	11/21/08 12:17

*Highlighted areas indicate points with percent slope below 5%. No slope will appear at points where no counts detected.

Detector set to operate at 0.85 kV (850 volts)


Ludlum Detector Voltage Curve
Voltage Curve Ludlum #7
Total Counts
0
200000
400000
600000
800000
1000000
1200000
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
Voltage (kV)

DAILY CALIBRATION RANGE

Trial	Counts	Date	Time	Detector
1	138657	10/13/2008	16:00	7
2	139338	10/16/2008	14:20	7
3	137849	10/20/2008	9:50	7
4	138518	10/29/2008	15:35	7
5	139828	11/12/2008	13:40	7
6	138146	11/21/2008	14:10	7
7	138219	11/21/2008	12:15	7
8	138822	11/21/2008	12:16	7
9	137486	11/21/2008	12:20	7
10	137365	11/21/2008	12:30	7
11	135262	11/21/2008	13:00	7
12	133624	11/21/2008	13:02	7
13	132633	11/21/2008	13:04	7
14	133126	11/21/2008	13:06	7
15	133343	11/21/2008	13:09	7
16	132096	11/21/2008	13:11	7
17	133801	11/21/2008	13:13	7
18	133895	11/21/2008	13:16	7
19	138993	11/21/2008	13:18	7
20	139729	11/21/2008	13:20	7

STATISTICS	
Average	136536.50
St. Dev.	2701.27
+ 3 S.D.	144640.30
+ 2 S.D.	141939.03
Average	136536.50
- 2 S.D.	131133.97
- 3 S.D.	128432.70
UPPER	**144640**
LOWER	**128433**

701	1.815	11/21/2008
702	1.932	11/21/2008
703	2.083	11/21/2008
704	2.248	11/21/2008
705	2.16	11/21/2008
706	2.118	11/21/2008
707	2.119	11/21/2008
708	1.869	11/21/2008
709	1.96	11/21/2008
710	2.042	11/21/2008
711	2.204	11/21/2008
712	2.132	11/21/2008

11/21/08

Alpha Spectroscopy Calibration Sources

The following is a summary of the procedure performed for preparing mixed alpha calibration standards:

A calibration stock solution was prepared by combining the following in a volumetric flask and diluting to 50 ml (51.4561 grams). These individual standards were first verified by direct precipitation of small aliquots of each standard (as described in Attachment I).

Isotope	Serial #	amount used (g)	dpm (note 1)
Gd-148	64445-278	0.2471	212.159287
Np-237	4341	1.8075	204.438594
Cm-244	4320A	7.2704	240.144737

Note 1: Dpm values are decay corrected to 2/7/2003.

Forty one weighted aliquots were then directly precipitated using Neodymium Flouride /HF system. The sources were then mounted on 0.1Poly-proplyene filters and taped securely to 1 inch stainless steel planchettes for counting in an Alpha Spectroscopy system. The liquid fraction that passes through the filter is collected, traced with Am-241 and prepared for counting using the identical procedure. These samples are counted to ensure there is no more than 1% loss in the filtering processes. All sources pass this requirement. The DPM information for each source is listed in attachment II.

Certificate files were then created on the Alpha system used for acquisition and processing of data. Each source is assigned a name (AESS-001 through AESS-041). The information for the source activities is entered into the certificate files appropriate for the detector being used.
For example: If source AESS-001 is used for calibrating detector 25, the source data is entered into the certificate file name [env_alpha.cer]U025.cer.
The computer software uses these certificate files to calculate an energy calibration and determine the efficiency of the detector after counting the source.

4/1/03

2002 Alpha Eff Source Stock Verification

Curium-244

Isotope	Value pCi/g
SSTOCK2002A2_AM	106.000
SSTOCK2002B2_AM	106.000
SSTOCK2002C2_AM	106.000

Mean Value (Counting) =	106.000	98.04%	
Stdev =	0		
Target =	108.1230	pCi/g	
Lower Limit =	106		
Upper Limit =	106		
Rule 1 Pass/Fail	Pass	Pass	① Pass ~~Fail~~ (as given)
Two sigma =	0		
10 % of Mean =	10.6		
Rule 2 (Pass/Fail)	Pass		

Neptunium-237

Isotope	Value pCi/g
SSTOCK2002A2_AM	90.100
SSTOCK2002B2_AM	87.200
SSTOCK2002C2_AM	93.500

Mean Value (Counting) =	90.267	98.02%		
Stdev =	3.153305144			
Target =	92.0900	pCi/g		
Lower Limit =	83.96005638			
Upper Limit =	96.57327696			
Rule 1 Pass/Fail	Pass	Pass	Pass	
Two sigma =	6.306610289			
10 % of Mean =	9.026666667			
Rule 2 (Pass/Fail)	Pass			

Gadolinium-148

Isotope	Value pCi/g
SSTOCK2002A2_AM	96.080
SSTOCK2002B2_AM	93.750
SSTOCK2002C2_AM	96.560

Mean Value (Counting) =	95.463	99.81%		
Stdev =	1.503074627			
Target =	95.6460	pCi/g		
Lower Limit =	92.45718408			
Upper Limit =	98.46948259			
Rule 1 Pass/Fail	Pass	Pass	Pass	
Two sigma =	3.006149253			
10 % of Mean =	9.546333333			
Rule 2 (Pass/Fail)	Pass			

The analyst prepared three standard verification sources for the mixed alpha stock standard using 0.1030 g for source #1, 0.1035 g for source #2 and 0.1028 g for source #3. Each standard was combined with 1.0 mL of Am-243 standard 0454-A and 0.1 mL of Nd carrier in a disposable centrifuge tube. Four mL of 2 M HCl was added to each standard and then diluted with 4 mL of DI water. 5 mL of ascorbic acid was added to each sample then one mL of 48% HF was added to precipitate Nd(and Curium) fluoride. After 30 minutes, each sample was filtered following routine procedures for alpha spectroscopy source preparation. Each source was counted using routine alpha spec procedures. pCi/L values for the Mixed Alpha Stock were calculated and compared to Am-243 certified values.

① The rule failed because the 3 results from 3 sources were the same. Therefore, the std dev was zero. The intent of this rule is to ensure an appropriate amount of counts are achieved for proper determinations. ~~For~~ For each standard the # of counts achieved was just under 10000 which has a counting error of nearly 1%. Because the standard's bias is < 2% from the known value the standard is acceptable.

Robert Jin 02/26

Attachment II

Mixed alpha	Reference date =	2/7/2003					
Isotope	Source	Stock Dpm/g	Reference date	Half-life (years)	amount used for mixed	Dpm/g mixed	Decay corr dpm/g
Gd-148	64445-278 (0502)	44354.59289	9/5/2002	74.60	0.2471	212.9974853	212.159287
Np-237	Srm 4341 (0493)	5820	3/1/1992	2.14E+06	1.8075	204.4393182	204.438594
Cm-244	SRM 4320a (0490)	2223.6	2/1/1996	18.1	7.2704	314.1796879	240.144737

Source	Amount of standard used	dpm Gd-148	dpm Np-237	dpm Cm-244	dps Gd-148	dps Np-237	dps Cm-244
AESS-001	1.0362	219.839	211.839	248.838	3.664	3.531	4.147
AESS-002	1.0344	219.458	211.471	248.406	3.658	3.525	4.140
AESS-003	1.034	219.373	211.390	248.310	3.656	3.523	4.138
AESS-004	1.0331	219.182	211.206	248.094	3.653	3.520	4.135
AESS-005	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-006	1.0331	219.182	211.206	248.094	3.653	3.520	4.135
AESS-007	1.0348	219.542	211.553	248.502	3.659	3.526	4.142
AESS-008	1.0363	219.861	211.860	248.862	3.664	3.531	4.148
AESS-009	1.0352	219.627	211.635	248.598	3.660	3.527	4.143
AESS-010	1.0346	219.500	211.512	248.454	3.658	3.525	4.141
AESS-011	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-012	1.0367	219.946	211.941	248.958	3.666	3.532	4.149
AESS-013	1.0396	220.561	212.534	249.654	3.676	3.542	4.161
AESS-014	1.0368	219.967	211.962	248.982	3.666	3.533	4.150
AESS-015	1.0363	219.861	211.860	248.862	3.664	3.531	4.148
AESS-016	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-017	1.0356	219.712	211.717	248.694	3.662	3.529	4.145
AESS-018	1.0359	219.776	211.778	248.766	3.663	3.530	4.146
AESS-019	1.0349	219.564	211.574	248.526	3.659	3.526	4.142
AESS-020	1.0361	219.818	211.819	248.814	3.664	3.530	4.147
AESS-021	1.0348	219.542	211.553	248.502	3.659	3.526	4.142
AESS-022	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-023	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-024	1.0343	219.436	211.451	248.382	3.657	3.524	4.140
AESS-025	1.0364	219.882	211.880	248.886	3.665	3.531	4.148
AESS-026	1.0336	219.288	211.308	248.214	3.655	3.522	4.137
AESS-027	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-028	1.0366	219.924	211.921	248.934	3.665	3.532	4.149

AESS-029	1.0355	219.691	211.696	248.670	3.662	3.528	4.144
AESS-030	1.0349	219.564	211.574	248.526	3.659	3.526	4.142
AESS-031	1.0343	219.436	211.451	248.382	3.657	3.524	4.140
AESS-032	1.0326	219.076	211.103	247.973	3.651	3.518	4.133
AESS-033	1.0308	218.694	210.735	247.541	3.645	3.512	4.126
AESS-034	1.0314	218.821	210.858	247.685	3.647	3.514	4.128
AESS-035	1.0303	218.588	210.633	247.421	3.643	3.511	4.124
AESS-036	1.0343	219.436	211.451	248.382	3.657	3.524	4.140
AESS-037	1.0353	219.649	211.655	248.622	3.661	3.528	4.144
AESS-038	1.0373	220.073	212.064	249.102	3.668	3.534	4.152
AESS-039	1.0334	219.245	211.267	248.166	3.654	3.521	4.136
AESS-040	1.0346	219.500	211.512	248.454	3.658	3.525	4.141
AESS-041	1.0352	219.627	211.635	248.598	3.660	3.527	4.143

0490
0491

National Institute of Standards & Technology

Certificate

Standard Reference Material 4320A
Curium-244 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive curium-244 nitrate and nitric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of alpha-particle counting instruments and for the monitoring of radiochemical procedures.

Radiological Hazard

The SRM ampoule contains curium-244 with a total activity of approximately 200 Bq. Curium-244 decays by alpha-particle emission to plutonium-240, which also decays by alpha-particle emission. None of the alpha particles escape from the SRM ampoule. During the decay process X-rays and gamma rays with energies from 40 keV to 1100 keV are also emitted. Most of these photons escape from the SRM ampoule but their intensities are so small that they do not represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains nitric acid (HNO_3) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least February 2006.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
February 1996 (Text only revised November 1997)

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6

Recommended Procedure for Opening the SRM Ampoule

1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the SRM solution.

2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it. Work in a fume hood. In addition to the radioactive material, the solution contains strong acid and is corrosive.

3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.

4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process.

5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.

6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.

7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.

8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle. NEVER PIPETTE BY MOUTH.

9) Seal any unused SRM solution in a flame-sealed glass ampoule, if possible, to minimize the evaporation loss.

See also reference [4]*.

*Notes and references are on pages 5 and 6.

RC-S-035-005

PROPERTIES OF SRM 4320A
(Certified values are shown in bold type)

Source identification number	NIST SRM 4320A		
Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule		
Ampoule specifications	Body outside diameter Wall Thickness Barium content Lead-oxide content Other heavy elements	(16.5 ± 0.5) mm (0.60 ± 0.04) mm Less than 2.5% Less than 0.02% Trace quantities	
Solution density	**(1.030 ± 0.002) $g \cdot mL^{-1}$ at 22.8 °C** [b]*		
Solution mass	Approximately 5.15 g		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration ($mol \cdot L^{-1}$)	Mass Fraction ($g \cdot g^{-1}$)
	H_2O HNO_3 HCl $^{244}Cm^{+3}$	54 1.0 <0.001 5×10^{-11}	0.94 0.06 $<4 \times 10^{-5}$ 1×10^{-11}
Radiological Properties:			
Radionuclide	**Curium-244**		
Reference time	**1200 EST, 1 February 1996** [c]		
Massic activity of the solution [d]	**37.06 $Bq \cdot g^{-1}$** 74.12 Bq·g⁻¹		
Relative expanded uncertainty (k=2)	**0.68%** [e] [f]		
Alpha-particle-emitting daughters Alpha-particle-emitting impurities	Plutonium-240: (0.22 ± 0.11) $Bq \cdot g^{-1}$ [b] [c] Curium-243: (0.005 ± 0.004) $Bq \cdot g^{-1}$ [b] [g]		
Photon-emitting impurities	None detected [h]		
Half lives used in the decay corrections	Curium-244: (18.10 ± 0.02) a [i] Plutonium-240: (6563 ± 7) a [i]		
Calibration method	Two 4πα liquid-scintillation counting systems		

37.06 x 2

2004

6

*Notes and references are on pages 5 and 6.

RC-S-035-005c

[i] The stated uncertainty is the standard uncertainty. See reference [5].

[j] Relative standard uncertainty of the input quantity x_i.

[k] The relative change in the output quantity y divided by the relative change in the input quantity x_i. If $|\partial y/\partial x_i| \cdot (x_i/y) = 1.0$, then a 1% change in x_i results in a 1% change in y. If $|\partial y/\partial x_i| \cdot (x_i/y) = 0.05$, then a 1% change in x_i results in a 0.05% change in y.

[m] Relative component of combined standard uncertainty of output quantity y, rounded to two significant figures or less. The relative component of combined standard uncertainty of y is given by $u_i(y)/y \equiv |\partial y/\partial x_i| \cdot u(x_i)/y = |\partial y/\partial x_i| \cdot (x_i/y) \cdot u(x_i)/x_i$. The numerical values of $u(x_i)/x_i$, $|\partial y/\partial x_i| \cdot (x_i/y)$, and $u_i(y)/y$, all dimensionless quantities, are listed in columns 3, 4, and 5, respectively. Thus, the value in column 5 is equal to the value in column 4 multiplied by the value in column 3. The input quantities are independent, or very nearly so. Hence the covariances are zero or negligible.

[n] The relative standard uncertainty of $\lambda \cdot t$ is determined by the relative standard uncertainty of λ (i.e., of the half life). The relative standard uncertainty of t is negligible.

[p] $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$

[q] The live time is determined by counting the pulses from a gated oscillator.

[r] The standard uncertainty given is for the detected Cm-243 impurity. $|\partial y/\partial x_i| \cdot (x_i/y)$ = {(response per Bq of impurity)/(response per Bq of Cm-244)}·{(Bq of impurity)/(Bq of Cm-244)}.

[s] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e. $u(x_i)/x_i$ = 100%. $|\partial y/\partial x_i| \cdot (x_i/y)$ = {(response per Bq of impurity)/(response per Bq of Cm-244)}·{(Bq of impurity)/(Bq of Cm-244)}. Thus $u_i(y)/y$ is the relative change in y if the impurity were present with a massic activity equal to the estimated limit of detection.

REFERENCES

[1] International Organization for Standardization (ISO), *ISO Standards Handbook - Quantities and Units*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900.

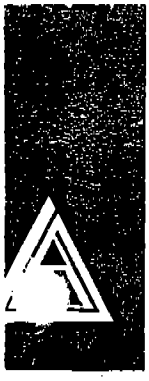
[2] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900. (Listed under ISO miscellaneous publications as "ISO Guide to the Expression 1993".)

[3] B. N. Taylor and C. E. Kuyatt, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20407, U.S.A.

[4] National Council on Radiation Protection and Measurements Report No. 58, *A Handbook of Radioactivity Measurements Procedures*, Second Edition, 1985. Available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Bethesda, MD 20814 U.S.A.

[5] Evaluated Nuclear Structure Data File (ENSDF), February 1996.

RC-5-035-005



ANALYTICS

0502

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

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

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

64445-278

Gd-148 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master liquid radionuclide solution source. The master source was calibrated by liquid scintillation counting.

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

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

ISOTOPE:	Gd-148
ACTIVITY (dps):	3.759 E3
HALF-LIFE:	74.6 years
CALIBRATION DATE:	September 5, 2002 12:00 EST
TOTAL UNCERTAINTY*:	2.7%
SYSTEMATIC:	1.9%
RANDOM:	0.8%

99% confidence level.

5.08493 grams 0.1M HCl solution.

P O NUMBER 3207RD, Item 1

SOURCE PREPARED BY: M.D. Currie

M.D. Currie, Radiochemist

Q A APPROVED: 9-6-02

0493

National Institute of Standards & Technology

Certificate

Standard Reference Material 4341
Radioactivity Standard

Radionuclide	Neptunium-237
Source identification	SRM 4341
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule (1)*
Solution mass	Approximately 5 grams
Solution composition	Neptunium-237 in 2 $mol \cdot L^{-1}$ nitric acid
Reference time	March 1992
Radioactivity concentration	97.0 $Bq \cdot g^{-1}$
Overall uncertainty	1.28 percent (2)
Photon-emitting impurities	None detected (3)
Alpha-particle-emitting impurities	None detected (4)
Half life	$(2.14 \pm 0.11) \times 10^6$ years (5)
Measuring instrument	NIST "$0.8\pi\alpha$ defined-solid-angle counter with scintillation detector

This standard reference material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M. Robin Hutchinson, Acting Group Leader.

Gaithersburg, MD
January 1993

William P. Reed, Chief
Standard Reference Materials Program

*Notes on back

NOTES

(1) Approximately five milliliters of solution. Ampoule specifications:

body diameter	16.5 ± 0.5 mm
wall thickness	0.60 ± 0.04 mm
barium content	less than 2.5 percent
lead oxide content	less than 0.02 percent
other heavy elements	trace quantities

(2) The overall uncertainty was formed by taking three times the quadratic combination of the standard deviations of the mean, or approximations thereof, for the following:

a) alpha-particle-emission-rate measurements	0.34 percent
b) background	0.01 percent
c) livetime	0.10 percent
d) detection efficiency	0.16 percent
e) count-rate-vs-energy extrapolation to zero energy	0.10 percent
f) half life	0.00 percent
g) gravimetric measurements	0.10 percent
h) alpha-emitting impurities	0.10 percent

(3) The protactinium-233 daughter of neptunium-237 is approximately in equilibrium. The limit of detection for photon-emitting impurities is

0.19 $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 30 and 307 keV and
0.01 $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 317 and 1750 keV,

provided that the impurity photons are separated in energy by 5 keV or more from photons emitted in the decay of neptunium-237 and progeny.

(4) The limit of detection for alpha-particle-emitting impurities is

0.10 $\alpha \cdot s^{-1} \cdot g^{-1}$ for energies between 1.0 and 4.3 MeV and
0.05 $\alpha \cdot s^{-1} \cdot g^{-1}$ for energies between 4.9 and 10 MeV.

(5) Evaluated Nuclear Structure Data File (ENSDF), February 1990.

For further information please contact Dr. J.M. Robin Hutchinson at NIST.
Telephone: (301) 975-5532
FAX: (301) 926-7416

Subsection 1: Energy Calibration

The Energy Calibration energy=Cal_Zero+(e1*C)+(e2*C^2)

where : Cal_Zero = Energy Calibration Zero
e1 = Energy Calibration Slope
e2 = Energy Calibration Quadratic
C = Channel

Instrument : CHAMBER 001
Detector : 78788
Calibration Date/Time : 6-JUL-2009 14:30:47
Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.307
NP-237	4341	2/28/10	4768.800	4769.611
CM-244	4320A	2/28/10	5795.020	5795.576

Energy/Channel Equation : see above
Energy Calibration Zero : 2636.547
Energy Calibration Slope : 5.562682
Energy Calibration Quadratic : 4.2404264E-04
Energy Calibration Range : 8777.000

Instrument : CHAMBER 002
Detector : 78266
Calibration Date/Time : 6-JUL-2009 14:31:01
Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.381
NP-237	4341	2/28/10	4768.800	4769.059
CM-244	4320A	2/28/10	5795.020	5795.281

Energy/Channel Equation : see above
Energy Calibration Zero : 2457.268
Energy Calibration Slope : 5.068144
Energy Calibration Quadratic : 3.1073095E-04
Energy Calibration Range : 7973.000

Instrument : CHAMBER 003
Detector : 67617
Calibration Date/Time : 1-JUL-2009 14:34:18
Calibration Source Id : AESS-003

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3256.624
NP-237	4341	2/28/10	4768.800	4498.057
CM-244	4320A	2/28/10	5795.020	5643.440

Energy/Channel Equation : see above
Energy Calibration Zero : 2303.136
Energy Calibration Slope : 5.574179
Energy Calibration Quadratic : -3.1479710E-04
Energy Calibration Range : 7681.000

Instrument : CHAMBER 004
Detector : 64279
Calibration Date/Time : 6-JUL-2009 14:31:14
Calibration Source Id : AESS-004

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.700
NP-237	4341	2/28/10	4768.800	4768.502
CM-244	4320A	2/28/10	5795.020	5794.708

Energy/Channel Equation : see above
Energy Calibration Zero : 2548.030
Energy Calibration Slope : 5.181645
Energy Calibration Quadratic : 3.6983294E-04
Energy Calibration Range : 8242.000

Instrument : CHAMBER 005
Detector : 67612
Calibration Date/Time : 6-JUL-2009 14:31:33
Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3239.511
NP-237	4341	2/28/10	4768.800	4822.857
CM-244	4320A	2/28/10	5795.020	5760.225

Energy/Channel Equation : see above
Energy Calibration Zero : 2540.769
Energy Calibration Slope : 4.586285
Energy Calibration Quadratic : 1.2606301E-03
Energy Calibration Range : 8559.000

Instrument : CHAMBER 006
Detector : 67613
Calibration Date/Time : 6-JUL-2009 14:31:42
Calibration Source Id : AESS-006

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.980
NP-237	4341	2/28/10	4768.800	4771.889
CM-244	4320A	2/28/10	5795.020	5798.332

Energy/Channel Equation : see above
Energy Calibration Zero : 2362.189
Energy Calibration Slope : 4.968290
Energy Calibration Quadratic : 2.9507218E-04
Energy Calibration Range : 7759.000

Instrument : CHAMBER 007
Detector : 67607
Calibration Date/Time : 6-JUL-2009 14:31:52
Calibration Source Id : AESS-007

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.695
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2433.790
Energy Calibration Slope : 5.142394
Energy Calibration Quadratic : 3.0138035E-04
Energy Calibration Range : 8016.000

Instrument : CHAMBER 008
Detector : 78788
Calibration Date/Time : 6-JUL-2009 14:32:01
Calibration Source Id : AESS-008

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.588
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2373.661
Energy Calibration Slope : 4.981515
Energy Calibration Quadratic : 2.9968601E-04
Energy Calibration Range : 7789.000

Instrument : CHAMBER 009
Detector : 72528
Calibration Date/Time : 6-JUL-2009 14:32:10
Calibration Source Id : AESS-009

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.963
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2376.116
Energy Calibration Slope : 4.955449
Energy Calibration Quadratic : 3.2997411E-04
Energy Calibration Range : 7796.000

Instrument : CHAMBER 010
Detector : 72529
Calibration Date/Time : 6-JUL-2009 14:32:19
Calibration Source Id : AESS-010

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.261
NP-237	4341	2/28/10	4768.800	4769.006
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2373.375
Energy Calibration Slope : 4.948005
Energy Calibration Quadratic : 2.8748735E-04
Energy Calibration Range : 7742.000

Instrument : CHAMBER 011
Detector : 72531
Calibration Date/Time : 6-JUL-2009 14:32:29
Calibration Source Id : AESS-011

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.184
NP-237	4341	2/28/10	4768.800	4768.906
CM-244	4320A	2/28/10	5795.020	5795.321

Energy/Channel Equation : see above
Energy Calibration Zero : 2353.106
Energy Calibration Slope : 4.984596
Energy Calibration Quadratic : 3.1995389E-04
Energy Calibration Range : 7793.000

Instrument : CHAMBER 012
Detector : 67594
Calibration Date/Time : 6-JUL-2009 14:32:37
Calibration Source Id : AESS-012

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.008
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above
Energy Calibration Zero : 2380.096
Energy Calibration Slope : 4.961268
Energy Calibration Quadratic : 2.7943935E-04
Energy Calibration Range : 7753.000

Instrument : CHAMBER 013
Detector : 78790
Calibration Date/Time : 6-JUL-2009 14:32:45
Calibration Source Id : AESS-013

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.992
NP-237	4341	2/28/10	4768.800	4768.663
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2357.626
Energy Calibration Slope : 4.921106
Energy Calibration Quadratic : 2.8607668E-04
Energy Calibration Range : 7697.000

Instrument : CHAMBER 014
Detector : 67616
Calibration Date/Time : 6-JUL-2009 14:32:56
Calibration Source Id : AESS-014

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5794.876

Energy/Channel Equation : see above
Energy Calibration Zero : 2354.365
Energy Calibration Slope : 4.948353
Energy Calibration Quadratic : 3.2476214E-04
Energy Calibration Range : 7762.000

Instrument : CHAMBER 015
Detector : 61581
Calibration Date/Time : 6-JUL-2009 14:33:12
Calibration Source Id : AESS-015

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.620
NP-237	4341	2/28/10	4768.800	4768.609
CM-244	4320A	2/28/10	5795.020	5794.858

Energy/Channel Equation : see above
Energy Calibration Zero : 2344.469
Energy Calibration Slope : 4.895294
Energy Calibration Quadratic : 3.0532407E-04
Energy Calibration Range : 7677.000

Instrument : CHAMBER 016
Detector : 78774
Calibration Date/Time : 6-JUL-2009 14:33:38
Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.282
NP-237	4341	2/28/10	4768.800	4769.068
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2356.850
Energy Calibration Slope : 4.876907
Energy Calibration Quadratic : 3.2479633E-04
Energy Calibration Range : 7691.000

Instrument : CHAMBER 017
Detector : 78791
Calibration Date/Time : 6-JUL-2009 14:33:47
Calibration Source Id : AESS-017

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.882
CM-244	4320A	2/28/10	5795.020	5795.156

Energy/Channel Equation : see above
Energy Calibration Zero : 2369.181
Energy Calibration Slope : 4.952589
Energy Calibration Quadratic : 3.2460166E-04
Energy Calibration Range : 7781.000

Instrument : CHAMBER 018
Detector : 21063
Calibration Date/Time : 15-JUL-2009 07:50:05
Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.276
NP-237	4341	2/28/10	4768.800	4768.965
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2350.011
Energy Calibration Slope : 4.971119
Energy Calibration Quadratic : 3.1396872E-04
Energy Calibration Range : 7770.000

Instrument : CHAMBER 019
Detector : 78786
Calibration Date/Time : 6-JUL-2009 14:34:03
Calibration Source Id : AESS-019

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.635
NP-237	4341	2/28/10	4768.800	4769.628
CM-244	4320A	2/28/10	5795.020	5795.798

Energy/Channel Equation : see above
Energy Calibration Zero : 2346.014
Energy Calibration Slope : 5.054453
Energy Calibration Quadratic : 2.2688090E-04
Energy Calibration Range : 7760.000

Instrument : CHAMBER 020
Detector : 78787
Calibration Date/Time : 6-JUL-2009 14:34:12
Calibration Source Id : AESS-020

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2339.467
Energy Calibration Slope : 4.972310
Energy Calibration Quadratic : 3.0532698E-04
Energy Calibration Range : 7751.000

Instrument : CHAMBER 021
Detector : 67047
Calibration Date/Time : 6-JUL-2009 14:34:21
Calibration Source Id : AESS-021

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2271.765
Energy Calibration Slope : 4.961651
Energy Calibration Quadratic : 2.7429842E-04
Energy Calibration Range : 7640.000

Instrument : CHAMBER 022
Detector : 72530
Calibration Date/Time : 6-JUL-2009 14:34:44
Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.024
NP-237	4341	2/28/10	4768.800	4769.027
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2380.245
Energy Calibration Slope : 4.952941
Energy Calibration Quadratic : 3.0796995E-04
Energy Calibration Range : 7775.000

Instrument : CHAMBER 023
Detector : 78264
Calibration Date/Time : 6-JUL-2009 14:34:52
Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.366
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2380.600
Energy Calibration Slope : 5.002743
Energy Calibration Quadratic : 2.8062947E-04
Energy Calibration Range : 7798.000

Instrument : CHAMBER 024
Detector : 76542
Calibration Date/Time : 6-JUL-2009 14:35:01
Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2346.716
Energy Calibration Slope : 4.980215
Energy Calibration Quadratic : 2.5087653E-04
Energy Calibration Range : 7710.000

Instrument : CHAMBER 025
Detector : 45-149AA5
Calibration Date/Time : 6-JUL-2009 14:35:10
Calibration Source Id : AESS-025

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.237
NP-237	4341	2/28/10	4768.800	4769.932
CM-244	4320A	2/28/10	5795.020	5795.518

Energy/Channel Equation : see above
Energy Calibration Zero : 2322.042
Energy Calibration Slope : 4.860308
Energy Calibration Quadratic : 3.0488655E-04
Energy Calibration Range : 7619.000

Instrument : CHAMBER 026
Detector : 78204
Calibration Date/Time : 6-JUL-2009 14:35:19
Calibration Source Id : AESS-026

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.984
NP-237	4341	2/28/10	4768.800	4768.684
CM-244	4320A	2/28/10	5795.020	5794.748

Energy/Channel Equation : see above
Energy Calibration Zero : 2360.724
Energy Calibration Slope : 4.928299
Energy Calibration Quadratic : 3.4985787E-04
Energy Calibration Range : 7774.000

Instrument : CHAMBER 027
Detector : 42484
Calibration Date/Time : 24-JUL-2009 13:43:22
Calibration Source Id : AESS-027

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

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

Instrument : CHAMBER 028
Detector : 78792
Calibration Date/Time : 6-JUL-2009 14:35:37
Calibration Source Id : AESS-028

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2321.462
Energy Calibration Slope : 4.941727
Energy Calibration Quadratic : 3.3650306E-04
Energy Calibration Range : 7735.000

Instrument : CHAMBER 029
Detector : 33454
Calibration Date/Time : 6-JUL-2009 14:35:45
Calibration Source Id : AESS-029

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.895
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2356.431
Energy Calibration Slope : 4.907866
Energy Calibration Quadratic : 3.0104505E-04
Energy Calibration Range : 7698.000

Instrument : CHAMBER 030
Detector : 33447
Calibration Date/Time : 6-JUL-2009 14:35:54
Calibration Source Id : AESS-030

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.338
CM-244	4320A	2/28/10	5795.020	5794.792

Energy/Channel Equation : see above
Energy Calibration Zero : 2374.233
Energy Calibration Slope : 4.948391
Energy Calibration Quadratic : 3.0175908E-04
Energy Calibration Range : 7758.000

Instrument : CHAMBER 031
Detector : 67042
Calibration Date/Time : 15-JUL-2009 07:50:24
Calibration Source Id : AESS-031

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.352
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2369.164
Energy Calibration Slope : 4.941464
Energy Calibration Quadratic : 3.3644502E-04
Energy Calibration Range : 7782.000

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

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.693
NP-237	4341	2/28/10	4768.800	4768.915
CM-244	4320A	2/28/10	5795.020	5795.021

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

Instrument : CHAMBER 033
Detector : 78785
Calibration Date/Time : 6-JUL-2009 14:36:20
Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.822
CM-244	4320A	2/28/10	5795.020	5795.221

Energy/Channel Equation : see above
Energy Calibration Zero : 2378.215
Energy Calibration Slope : 4.936105
Energy Calibration Quadratic : 3.4599172E-04
Energy Calibration Range : 7796.000

Instrument : CHAMBER 034
Detector : 61586
Calibration Date/Time : 15-JUL-2009 07:50:46
Calibration Source Id : AESS-034

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.661
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2338.228
Energy Calibration Slope : 4.969683
Energy Calibration Quadratic : 3.5388564E-04
Energy Calibration Range : 7798.000

Instrument : CHAMBER 035
Detector : 78202
Calibration Date/Time : 6-JUL-2009 14:36:36
Calibration Source Id : AESS-035

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.571
CM-244	4320A	2/28/10	5795.020	5794.874

Energy/Channel Equation : see above
Energy Calibration Zero : 2334.698
Energy Calibration Slope : 4.957491
Energy Calibration Quadratic : 3.3283085E-04
Energy Calibration Range : 7760.000

Instrument : CHAMBER 036
Detector : 78203
Calibration Date/Time : 6-JUL-2009 14:36:45
Calibration Source Id : AESS-036

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.768
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2354.938
Energy Calibration Slope : 4.922945
Energy Calibration Quadratic : 3.4444858E-04
Energy Calibration Range : 7757.000

Instrument : CHAMBER 037
Detector : 45-149BB5
Calibration Date/Time : 6-JUL-2009 14:36:53
Calibration Source Id : AESS-037

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.484
NP-237	4341	2/28/10	4768.800	4769.580
CM-244	4320A	2/28/10	5795.020	5795.541

Energy/Channel Equation : see above
Energy Calibration Zero : 2384.709
Energy Calibration Slope : 4.946308
Energy Calibration Quadratic : 2.5989802E-04
Energy Calibration Range : 7722.000

Instrument : CHAMBER 038
Detector : 72532
Calibration Date/Time : 8-JUL-2009 07:31:06
Calibration Source Id : AESS-038

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.361
NP-237	4341	2/28/10	4768.800	4769.277
CM-244	4320A	2/28/10	5795.020	5795.217

Energy/Channel Equation : see above
Energy Calibration Zero : 2373.087
Energy Calibration Slope : 4.930811
Energy Calibration Quadratic : 3.3542284E-04
Energy Calibration Range : 7774.000

Instrument : CHAMBER 039
Detector : 45-149BB2
Calibration Date/Time : 6-JUL-2009 14:37:12
Calibration Source Id : AESS-039

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.536
NP-237	4341	2/28/10	4768.800	4768.350
CM-244	4320A	2/28/10	5795.020	5794.833

Energy/Channel Equation : see above
Energy Calibration Zero : 2383.948
Energy Calibration Slope : 4.914604
Energy Calibration Quadratic : 3.1003577E-04
Energy Calibration Range : 7742.000

Instrument : CHAMBER 040
Detector : 78773
Calibration Date/Time : 6-JUL-2009 14:37:21
Calibration Source Id : AESS-040

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2353.545
Energy Calibration Slope : 4.888068
Energy Calibration Quadratic : 3.4239746E-04
Energy Calibration Range : 7718.000

Instrument : CHAMBER 041
Detector : 78205
Calibration Date/Time : 6-JUL-2009 14:37:34
Calibration Source Id : AESS-041

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.714
NP-237	4341	2/28/10	4768.800	4768.652
CM-244	4320A	2/28/10	5795.020	5794.887

Energy/Channel Equation : see above
Energy Calibration Zero : 2361.504
Energy Calibration Slope : 4.933050
Energy Calibration Quadratic : 3.6094084E-04
Energy Calibration Range : 7791.000

Instrument : CHAMBER 042
Detector : 78793
Calibration Date/Time : 6-JUL-2009 14:37:44
Calibration Source Id : AESS-042

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2376.865
Energy Calibration Slope : 4.914897
Energy Calibration Quadratic : 3.2152777E-04
Energy Calibration Range : 7747.000

Instrument : CHAMBER 043
Detector : 76543
Calibration Date/Time : 6-JUL-2009 14:37:56
Calibration Source Id : AESS-043

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2368.689
Energy Calibration Slope : 4.938226
Energy Calibration Quadratic : 3.2137471E-04
Energy Calibration Range : 7762.000

Instrument : CHAMBER 044
Detector : 79459
Calibration Date/Time : 7-JUL-2009 13:33:56
Calibration Source Id : AESS-044

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.945
CM-244	4320A	2/28/10	5795.020	5795.104

Energy/Channel Equation : see above
Energy Calibration Zero : 2362.983
Energy Calibration Slope : 4.923144
Energy Calibration Quadratic : 3.4992688E-04
Energy Calibration Range : 7771.000

Instrument : CHAMBER 045
Detector : 67601
Calibration Date/Time : 15-JUL-2009 07:50:59
Calibration Source Id : AESS-045

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2360.907
Energy Calibration Slope : 4.934806
Energy Calibration Quadratic : 3.2861135E-04
Energy Calibration Range : 7759.000

Instrument : CHAMBER 046
Detector : 76544
Calibration Date/Time : 6-JUL-2009 14:38:21
Calibration Source Id : AESS-046

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.832
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2363.131
Energy Calibration Slope : 4.885582
Energy Calibration Quadratic : 3.3954665E-04
Energy Calibration Range : 7722.000

Instrument : CHAMBER 047
Detector : 46-089B1
Calibration Date/Time : 6-JUL-2009 14:38:30
Calibration Source Id : AESS-047

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.917
CM-244	4320A	2/28/10	5795.020	5795.028

Energy/Channel Equation : see above
Energy Calibration Zero : 2358.735
Energy Calibration Slope : 4.953376
Energy Calibration Quadratic : 3.2229861E-04
Energy Calibration Range : 7769.000

Instrument : CHAMBER 048
Detector : 42483
Calibration Date/Time : 6-JUL-2009 14:38:39
Calibration Source Id : AESS-048

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.757
NP-237	4341	2/28/10	4768.800	4768.527
CM-244	4320A	2/28/10	5795.020	5794.876

Energy/Channel Equation : see above
Energy Calibration Zero : 2379.156
Energy Calibration Slope : 4.959531
Energy Calibration Quadratic : 2.8168198E-04
Energy Calibration Range : 7753.000

Instrument : CHAMBER 065
Detector : 68551
Calibration Date/Time : 9-JUL-2009 13:06:51
Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3181.934
NP-237	4341	2/28/10	4768.800	4768.222
CM-244	4320A	2/28/10	5795.020	5794.627

Energy/Channel Equation : see above
Energy Calibration Zero : 2383.031
Energy Calibration Slope : 4.912300
Energy Calibration Quadratic : 3.2574762E-04
Energy Calibration Range : 7755.000

Instrument : CHAMBER 066
Detector : 46-089C1
Calibration Date/Time : 9-JUL-2009 13:07:05
Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.612
NP-237	4341	2/28/10	4768.800	4768.619
CM-244	4320A	2/28/10	5795.020	5794.832

Energy/Channel Equation : see above
Energy Calibration Zero : 2375.985
Energy Calibration Slope : 4.975531
Energy Calibration Quadratic : 2.7539468E-04
Energy Calibration Range : 7760.000

Instrument : CHAMBER 067
Detector : 46-089B4
Calibration Date/Time : 9-JUL-2009 13:07:16
Calibration Source Id : AESS-003

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.025
NP-237	4341	2/28/10	4768.800	4768.287
CM-244	4320A	2/28/10	5795.020	5794.643

Energy/Channel Equation : see above
Energy Calibration Zero : 2392.470
Energy Calibration Slope : 4.972788
Energy Calibration Quadratic : 2.7622253E-04
Energy Calibration Range : 7774.000

Instrument : CHAMBER 068
Detector : 78794
Calibration Date/Time : 9-JUL-2009 13:07:28
Calibration Source Id : AESS-004

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.711
NP-237	4341	2/28/10	4768.800	4768.483
CM-244	4320A	2/28/10	5795.020	5794.734

Energy/Channel Equation : see above
Energy Calibration Zero : 2363.543
Energy Calibration Slope : 4.977541
Energy Calibration Quadratic : 3.1141064E-04
Energy Calibration Range : 7787.000

Instrument : CHAMBER 069
Detector : 78795
Calibration Date/Time : 9-JUL-2009 13:07:42
Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.689
NP-237	4341	2/28/10	4768.800	4768.583
CM-244	4320A	2/28/10	5795.020	5794.896

Energy/Channel Equation : see above
Energy Calibration Zero : 2376.120
Energy Calibration Slope : 4.922992
Energy Calibration Quadratic : 3.4665639E-04
Energy Calibration Range : 7781.000

Instrument : CHAMBER 070
Detector : 46-089B2
Calibration Date/Time : 9-JUL-2009 13:07:53
Calibration Source Id : AESS-006

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.107
NP-237	4341	2/28/10	4768.800	4768.384
CM-244	4320A	2/28/10	5795.020	5794.512

Energy/Channel Equation : see above
Energy Calibration Zero : 2386.604
Energy Calibration Slope : 4.939598
Energy Calibration Quadratic : 2.9686227E-04
Energy Calibration Range : 7756.000

Instrument : CHAMBER 071
Detector : 64259
Calibration Date/Time : 9-JUL-2009 13:08:07
Calibration Source Id : AESS-007

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.519
NP-237	4341	2/28/10	4768.800	4768.421
CM-244	4320A	2/28/10	5795.020	5794.714

Energy/Channel Equation : see above
Energy Calibration Zero : 2381.008
Energy Calibration Slope : 4.974834
Energy Calibration Quadratic : 3.0491504E-04
Energy Calibration Range : 7795.000

Instrument : CHAMBER 072
Detector : 45-149AA3
Calibration Date/Time : 9-JUL-2009 13:08:19
Calibration Source Id : AESS-008

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.621
NP-237	4341	2/28/10	4768.800	4768.489
CM-244	4320A	2/28/10	5795.020	5794.766

Energy/Channel Equation : see above
Energy Calibration Zero : 2365.531
Energy Calibration Slope : 4.947875
Energy Calibration Quadratic : 2.9255319E-04
Energy Calibration Range : 7739.000

Instrument : CHAMBER 073
Detector : 78775
Calibration Date/Time : 9-JUL-2009 13:08:30
Calibration Source Id : AESS-009

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.442
NP-237	4341	2/28/10	4768.800	4768.180
CM-244	4320A	2/28/10	5795.020	5794.629

Energy/Channel Equation : see above
Energy Calibration Zero : 2339.856
Energy Calibration Slope : 4.937759
Energy Calibration Quadratic : 3.0114278E-04
Energy Calibration Range : 7712.000

Instrument : CHAMBER 074
Detector : 78266
Calibration Date/Time : 9-JUL-2009 13:08:42
Calibration Source Id : AESS-010

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.764
NP-237	4341	2/28/10	4768.800	4768.637
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2353.120
Energy Calibration Slope : 4.981784
Energy Calibration Quadratic : 2.9874133E-04
Energy Calibration Range : 7768.000

Instrument : CHAMBER 075
Detector : 68550
Calibration Date/Time : 9-JUL-2009 13:08:53
Calibration Source Id : AESS-011

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.163
NP-237	4341	2/28/10	4768.800	4768.299
CM-244	4320A	2/28/10	5795.020	5794.726

Energy/Channel Equation : see above
Energy Calibration Zero : 2364.223
Energy Calibration Slope : 4.955623
Energy Calibration Quadratic : 3.1275101E-04
Energy Calibration Range : 7767.000

Instrument : CHAMBER 076
Detector : 78779
Calibration Date/Time : 9-JUL-2009 13:09:04
Calibration Source Id : AESS-012

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.983
NP-237	4341	2/28/10	4768.800	4768.736
CM-244	4320A	2/28/10	5795.020	5794.908

Energy/Channel Equation : see above
Energy Calibration Zero : 2353.316
Energy Calibration Slope : 4.951778
Energy Calibration Quadratic : 3.2127454E-04
Energy Calibration Range : 7761.000

Instrument : CHAMBER 077
Detector : 67576
Calibration Date/Time : 9-JUL-2009 13:09:15
Calibration Source Id : AESS-013

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
NP-237	4341	2/28/10	4768.800	4768.613
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2361.225
Energy Calibration Slope : 4.943738
Energy Calibration Quadratic : 2.9529908E-04
Energy Calibration Range : 7733.000

Instrument : CHAMBER 078
Detector : 67577
Calibration Date/Time : 9-JUL-2009 13:09:25
Calibration Source Id : AESS-014

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.605
NP-237	4341	2/28/10	4768.800	4768.392
CM-244	4320A	2/28/10	5795.020	5794.652

Energy/Channel Equation : see above
Energy Calibration Zero : 2395.349
Energy Calibration Slope : 4.935272
Energy Calibration Quadratic : 3.3427982E-04
Energy Calibration Range : 7800.000

Instrument : CHAMBER 079
Detector : 67598
Calibration Date/Time : 9-JUL-2009 13:09:33
Calibration Source Id : AESS-015

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.660
NP-237	4341	2/28/10	4768.800	4768.547
CM-244	4320A	2/28/10	5795.020	5794.894

Energy/Channel Equation : see above
Energy Calibration Zero : 2369.373
Energy Calibration Slope : 4.904424
Energy Calibration Quadratic : 3.2698381E-04
Energy Calibration Range : 7734.000

Instrument : CHAMBER 080
Detector : 78197
Calibration Date/Time : 9-JUL-2009 13:09:43
Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3184.302
NP-237	4341	2/28/10	4768.800	4771.069
CM-244	4320A	2/28/10	5795.020	5795.787

Energy/Channel Equation : see above
Energy Calibration Zero : 2345.798
Energy Calibration Slope : 5.019492
Energy Calibration Quadratic : 2.4690092E-04
Energy Calibration Range : 7745.000

Instrument : CHAMBER 081
Detector : 72533
Calibration Date/Time : 9-JUL-2009 13:09:58
Calibration Source Id : AESS-017

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3128.274
NP-237	4341	2/28/10	4768.800	4679.048
CM-244	4320A	2/28/10	5795.020	5545.961

Energy/Channel Equation : see above
Energy Calibration Zero : 2299.761
Energy Calibration Slope : 8.847325
Energy Calibration Quadratic : -4.6356809E-03
Energy Calibration Range : 6499.000

Instrument : CHAMBER 082
Detector : 64263
Calibration Date/Time : 9-JUL-2009 13:10:11
Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.523
NP-237	4341	2/28/10	4768.800	4768.330
CM-244	4320A	2/28/10	5795.020	5794.746

Energy/Channel Equation : see above
Energy Calibration Zero : 2391.756
Energy Calibration Slope : 4.946808
Energy Calibration Quadratic : 3.5040258E-04
Energy Calibration Range : 7825.000

Instrument : CHAMBER 083
Detector : 64278
Calibration Date/Time : 9-JUL-2009 13:10:22
Calibration Source Id : AESS-019

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4769.394
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above
Energy Calibration Zero : 2373.863
Energy Calibration Slope : 5.042446
Energy Calibration Quadratic : 2.3603256E-04
Energy Calibration Range : 7785.000

Instrument : CHAMBER 084
Detector : 78265
Calibration Date/Time : 9-JUL-2009 13:10:32
Calibration Source Id : AESS-020

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.274

Energy/Channel Equation : see above
Energy Calibration Zero : 2362.172
Energy Calibration Slope : 5.013323
Energy Calibration Quadratic : 2.8020472E-04
Energy Calibration Range : 7790.000

Instrument : CHAMBER 085
Detector : 78776
Calibration Date/Time : 9-JUL-2009 13:10:43
Calibration Source Id : AESS-021

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2367.102
Energy Calibration Slope : 4.983326
Energy Calibration Quadratic : 2.9771921E-04
Energy Calibration Range : 7782.000

Instrument : CHAMBER 086
Detector : 78198
Calibration Date/Time : 9-JUL-2009 13:10:52
Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.643
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2354.748
Energy Calibration Slope : 5.010773
Energy Calibration Quadratic : 2.3814633E-04
Energy Calibration Range : 7735.000

Instrument : CHAMBER 087
Detector : 78199
Calibration Date/Time : 9-JUL-2009 13:11:02
Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2338.424
Energy Calibration Slope : 4.984921
Energy Calibration Quadratic : 2.3201770E-04
Energy Calibration Range : 7686.000

Instrument : CHAMBER 088
Detector : 33452
Calibration Date/Time : 9-JUL-2009 13:11:13
Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
NP-237	4341	2/28/10	4768.800	4768.468
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2351.689
Energy Calibration Slope : 4.964746
Energy Calibration Quadratic : 2.3151403E-04
Energy Calibration Range : 7678.000

Instrument : CHAMBER 089
Detector : 78262
Calibration Date/Time : 9-JUL-2009 13:11:23
Calibration Source Id : AESS-025

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.808
NP-237	4341	2/28/10	4768.800	4768.497
CM-244	4320A	2/28/10	5795.020	5794.868

Energy/Channel Equation : see above
Energy Calibration Zero : 2357.358
Energy Calibration Slope : 4.998539
Energy Calibration Quadratic : 3.0872814E-04
Energy Calibration Range : 7800.000

Instrument : CHAMBER 090
Detector : 78263
Calibration Date/Time : 9-JUL-2009 13:11:39
Calibration Source Id : AESS-026

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.574
NP-237	4341	2/28/10	4768.800	4768.547
CM-244	4320A	2/28/10	5795.020	5794.930

Energy/Channel Equation : see above
Energy Calibration Zero : 2367.561
Energy Calibration Slope : 4.900284
Energy Calibration Quadratic : 3.4428819E-04
Energy Calibration Range : 7746.000

Instrument : CHAMBER 091
Detector : 78259
Calibration Date/Time : 9-JUL-2009 13:11:52
Calibration Source Id : AESS-027

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.675
NP-237	4341	2/28/10	4768.800	4768.729
CM-244	4320A	2/28/10	5795.020	5794.997

Energy/Channel Equation : see above
Energy Calibration Zero : 2370.658
Energy Calibration Slope : 4.954311
Energy Calibration Quadratic : 3.4313111E-04
Energy Calibration Range : 7804.000

Instrument : CHAMBER 092
Detector : 79457
Calibration Date/Time : 10-JUL-2009 08:15:23
Calibration Source Id : AESS-028

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2351.067
Energy Calibration Slope : 4.974295
Energy Calibration Quadratic : 2.6989207E-04
Energy Calibration Range : 7728.000

Instrument : CHAMBER 093
Detector : 33206
Calibration Date/Time : 9-JUL-2009 13:12:10
Calibration Source Id : AESS-029

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.697
NP-237	4341	2/28/10	4768.800	4768.674
CM-244	4320A	2/28/10	5795.020	5794.907

Energy/Channel Equation : see above
Energy Calibration Zero : 2369.563
Energy Calibration Slope : 4.914497
Energy Calibration Quadratic : 3.2562285E-04
Energy Calibration Range : 7743.000

Instrument : CHAMBER 094
Detector : 78267
Calibration Date/Time : 9-JUL-2009 13:12:19
Calibration Source Id : AESS-030

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.761
NP-237	4341	2/28/10	4768.800	4768.682
CM-244	4320A	2/28/10	5795.020	5794.852

Energy/Channel Equation : see above
Energy Calibration Zero : 2363.085
Energy Calibration Slope : 4.944716
Energy Calibration Quadratic : 3.0186711E-04
Energy Calibration Range : 7743.000

Instrument : CHAMBER 095
Detector : 64279
Calibration Date/Time : 9-JUL-2009 13:12:27
Calibration Source Id : AESS-031

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.666
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2355.533
Energy Calibration Slope : 4.950543
Energy Calibration Quadratic : 2.9788527E-04
Energy Calibration Range : 7737.000

Instrument : CHAMBER 096
Detector : 67605
Calibration Date/Time : 9-JUL-2009 13:12:36
Calibration Source Id : AESS-032

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.747
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2347.386
Energy Calibration Slope : 4.941090
Energy Calibration Quadratic : 3.3197468E-04
Energy Calibration Range : 7755.000

Instrument : CHAMBER 097
Detector : 67599
Calibration Date/Time : 9-JUL-2009 13:12:44
Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4769.290
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2363.267
Energy Calibration Slope : 4.928224
Energy Calibration Quadratic : 3.4786455E-04
Energy Calibration Range : 7775.000

Instrument : CHAMBER 098
Detector : 68644
Calibration Date/Time : 9-JUL-2009 13:12:53
Calibration Source Id : AESS-034

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.282
NP-237	4341	2/28/10	4768.800	4768.479
CM-244	4320A	2/28/10	5795.020	5794.637

Energy/Channel Equation : see above
Energy Calibration Zero : 2385.389
Energy Calibration Slope : 4.950438
Energy Calibration Quadratic : 3.5501088E-04
Energy Calibration Range : 7827.000

Instrument : CHAMBER 099
Detector : 70317
Calibration Date/Time : 9-JUL-2009 13:13:03
Calibration Source Id : AESS-035

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.752
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2368.685
Energy Calibration Slope : 4.893388
Energy Calibration Quadratic : 3.5426160E-04
Energy Calibration Range : 7751.000

Instrument : CHAMBER 100
Detector : 79456
Calibration Date/Time : 9-JUL-2009 13:13:12
Calibration Source Id : AESS-046

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.705
CM-244	4320A	2/28/10	5795.020	5794.913

Energy/Channel Equation : see above
Energy Calibration Zero : 2354.623
Energy Calibration Slope : 4.898829
Energy Calibration Quadratic : 3.4345602E-04
Energy Calibration Range : 7731.000

Instrument : CHAMBER 101
Detector : 64253
Calibration Date/Time : 9-JUL-2009 13:13:22
Calibration Source Id : AESS-037

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.469
NP-237	4341	2/28/10	4768.800	4767.637
CM-244	4320A	2/28/10	5795.020	5794.300

Energy/Channel Equation : see above
Energy Calibration Zero : 2410.698
Energy Calibration Slope : 4.933665
Energy Calibration Quadratic : 3.2843428E-04
Energy Calibration Range : 7807.000

Instrument : CHAMBER 102
Detector : 72525
Calibration Date/Time : 9-JUL-2009 13:13:31
Calibration Source Id : AESS-038

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.443
CM-244	4320A	2/28/10	5795.020	5794.909

Energy/Channel Equation : see above
Energy Calibration Zero : 2363.658
Energy Calibration Slope : 4.864605
Energy Calibration Quadratic : 3.5245687E-04
Energy Calibration Range : 7715.000

Instrument : CHAMBER 103
Detector : 79461
Calibration Date/Time : 9-JUL-2009 13:13:40
Calibration Source Id : AESS-039

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.789
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2389.068
Energy Calibration Slope : 4.916300
Energy Calibration Quadratic : 3.4528042E-04
Energy Calibration Range : 7785.000

Instrument : CHAMBER 104
Detector : 72524
Calibration Date/Time : 9-JUL-2009 13:13:48
Calibration Source Id : AESS-040

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5794.853

Energy/Channel Equation : see above
Energy Calibration Zero : 2353.445
Energy Calibration Slope : 4.898041
Energy Calibration Quadratic : 3.2613348E-04
Energy Calibration Range : 7711.000

Instrument : CHAMBER 105
Detector : 78777
Calibration Date/Time : 9-JUL-2009 13:13:56
Calibration Source Id : AESS-041

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.693
NP-237	4341	2/28/10	4768.800	4768.750
CM-244	4320A	2/28/10	5795.020	5794.773

Energy/Channel Equation : see above
Energy Calibration Zero : 2376.710
Energy Calibration Slope : 4.874049
Energy Calibration Quadratic : 3.5893198E-04
Energy Calibration Range : 7744.000

Instrument : CHAMBER 106
Detector : 64274
Calibration Date/Time : 9-JUL-2009 13:14:04
Calibration Source Id : AESS-042

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2388.689
Energy Calibration Slope : 4.927028
Energy Calibration Quadratic : 3.4706845E-04
Energy Calibration Range : 7798.000

Instrument : CHAMBER 107
Detector : 67578
Calibration Date/Time : 9-JUL-2009 13:14:15
Calibration Source Id : AESS-043

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.693
NP-237	4341	2/28/10	4768.800	4768.881
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2362.860
Energy Calibration Slope : 4.955241
Energy Calibration Quadratic : 3.3647806E-04
Energy Calibration Range : 7790.000

Instrument : CHAMBER 108
Detector : 78778
Calibration Date/Time : 10-JUL-2009 08:15:33
Calibration Source Id : AESS-044

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2360.573
Energy Calibration Slope : 4.897293
Energy Calibration Quadratic : 3.3521929E-04
Energy Calibration Range : 7727.000

Instrument : CHAMBER 109
Detector : 79463
Calibration Date/Time : 9-JUL-2009 13:14:36
Calibration Source Id : AESS-045

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2361.218
Energy Calibration Slope : 4.898855
Energy Calibration Quadratic : 3.6102085E-04
Energy Calibration Range : 7756.000

Instrument : CHAMBER 110
Detector : 67602
Calibration Date/Time : 9-JUL-2009 13:15:06
Calibration Source Id : AESS-046

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3151.318
NP-237	4341	2/28/10	4768.800	4743.843
CM-244	4320A	2/28/10	5795.020	5748.494

Energy/Channel Equation : see above
Energy Calibration Zero : 2393.627
Energy Calibration Slope : 5.263870
Energy Calibration Quadratic : 7.2507857E-05
Energy Calibration Range : 7860.000

Instrument : CHAMBER 111
Detector : 79462
Calibration Date/Time : 9-JUL-2009 13:15:22
Calibration Source Id : AESS-047

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2359.279
Energy Calibration Slope : 4.970932
Energy Calibration Quadratic : 3.2777866E-04
Energy Calibration Range : 7793.000

Instrument : CHAMBER 112
Detector : 78261
Calibration Date/Time : 9-JUL-2009 13:15:42
Calibration Source Id : AESS-048

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4769.029
CM-244	4320A	2/28/10	5795.020	5795.070

Energy/Channel Equation : see above
Energy Calibration Zero : 2372.776
Energy Calibration Slope : 4.930915
Energy Calibration Quadratic : 3.0952421E-04
Energy Calibration Range : 7747.000

Instrument : CHAMBER 113
Detector : 45-111B4
Calibration Date/Time : 15-JUL-2009 13:43:32
Calibration Source Id : AESS-001

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.143
NP-237	4341	2/28/10	4768.800	4769.352
CM-244	4320A	2/28/10	5795.020	5795.169

Energy/Channel Equation : see above
Energy Calibration Zero : 2384.808
Energy Calibration Slope : 5.000635
Energy Calibration Quadratic : 2.7049560E-04
Energy Calibration Range : 7789.000

Instrument : CHAMBER 114
Detector : 78258
Calibration Date/Time : 15-JUL-2009 13:43:44
Calibration Source Id : AESS-007

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.317
NP-237	4341	2/28/10	4768.800	4768.936
CM-244	4320A	2/28/10	5795.020	5795.187

Energy/Channel Equation : see above
Energy Calibration Zero : 2334.310
Energy Calibration Slope : 4.976188
Energy Calibration Quadratic : 2.4765823E-04
Energy Calibration Range : 7690.000

Instrument : CHAMBER 115
Detector : 45-132FF4
Calibration Date/Time : 15-JUL-2009 13:43:54
Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.299
NP-237	4341	2/28/10	4768.800	4768.906
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2362.743
Energy Calibration Slope : 4.999947
Energy Calibration Quadratic : 2.6256693E-04
Energy Calibration Range : 7758.000

Instrument : CHAMBER 116
Detector : 45-132FF2
Calibration Date/Time : 15-JUL-2009 13:44:05
Calibration Source Id : AESS-008

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2361.201
Energy Calibration Slope : 4.980864
Energy Calibration Quadratic : 2.6853522E-04
Energy Calibration Range : 7743.000

Instrument : CHAMBER 117
Detector : 33450
Calibration Date/Time : 15-JUL-2009 13:44:15
Calibration Source Id : AESS-003

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.341
NP-237	4341	2/28/10	4768.800	4769.249
CM-244	4320A	2/28/10	5795.020	5795.149

Energy/Channel Equation : see above
Energy Calibration Zero : 2372.642
Energy Calibration Slope : 4.960156
Energy Calibration Quadratic : 2.9082331E-04
Energy Calibration Range : 7757.000

Instrument : CHAMBER 118
Detector : 75544
Calibration Date/Time : 15-JUL-2009 13:44:26
Calibration Source Id : AESS-009

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.240
NP-237	4341	2/28/10	4768.800	4768.906
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2335.434
Energy Calibration Slope : 4.978148
Energy Calibration Quadratic : 2.6964993E-04
Energy Calibration Range : 7716.000

Instrument : CHAMBER 119
Detector : 74429
Calibration Date/Time : 2-FEB-2009 15:15:38
Calibration Source Id : AESS-004

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3069.001
NP-237	4341	2/28/10	4768.800	4669.281
CM-244	4320A	2/28/10	5795.020	5706.875

Energy/Channel Equation : see above
Energy Calibration Zero : 2437.949
Energy Calibration Slope : 5.036866
Energy Calibration Quadratic :
Energy Calibration Range : 7596.000

Instrument : CHAMBER 120
Detector : 74430
Calibration Date/Time : 16-JUL-2009 09:29:36
Calibration Source Id : AESS-010

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

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

Instrument : CHAMBER 121
Detector : 75545
Calibration Date/Time : 15-JUL-2009 13:44:36
Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.188

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

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

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

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

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

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

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

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

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

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

Instrument : CHAMBER 125
Detector : 75547
Calibration Date/Time : 17-JUL-2009 14:23:54
Calibration Source Id : AESS-013

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.386
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.165

Energy/Channel Equation : see above
Energy Calibration Zero : 2338.781
Energy Calibration Slope : 4.955306
Energy Calibration Quadratic : 2.6291917E-04
Energy Calibration Range : 7689.000

Instrument : CHAMBER 126
Detector : 75548
Calibration Date/Time : 17-JUL-2009 14:24:06
Calibration Source Id : AESS-019

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above
Energy Calibration Zero : 2345.216
Energy Calibration Slope : 5.042264
Energy Calibration Quadratic : 1.8960494E-04
Energy Calibration Range : 7707.000

Instrument : CHAMBER 127
Detector : 78770
Calibration Date/Time : 17-JUL-2009 14:24:19
Calibration Source Id : AESS-014

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.168
NP-237	4341	2/28/10	4768.800	4769.036
CM-244	4320A	2/28/10	5795.020	5795.095

Energy/Channel Equation : see above
Energy Calibration Zero : 2333.395
Energy Calibration Slope : 4.961254
Energy Calibration Quadratic : 2.6867207E-04
Energy Calibration Range : 7695.000

Instrument : CHAMBER 128
Detector : 75549
Calibration Date/Time : 17-JUL-2009 14:24:31
Calibration Source Id : AESS-020

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.449
NP-237	4341	2/28/10	4768.800	4769.095
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2323.424
Energy Calibration Slope : 5.017115
Energy Calibration Quadratic : 2.1570176E-04
Energy Calibration Range : 7687.000

Instrument : CHAMBER 129
Detector : 76227
Calibration Date/Time : 17-JUL-2009 14:24:41
Calibration Source Id : AESS-015

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.112
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2343.567
Energy Calibration Slope : 4.949915
Energy Calibration Quadratic : 2.7041257E-04
Energy Calibration Range : 7696.000

Instrument : CHAMBER 130
Detector : 76228
Calibration Date/Time : 17-JUL-2009 14:24:51
Calibration Source Id : AESS-021

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.758
NP-237	4341	2/28/10	4768.800	4768.607
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2336.361
Energy Calibration Slope : 4.980415
Energy Calibration Quadratic : 2.3134552E-04
Energy Calibration Range : 7679.000

Instrument : CHAMBER 131
Detector : 33448
Calibration Date/Time : 17-JUL-2009 14:25:01
Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.605
NP-237	4341	2/28/10	4768.800	4768.573
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2388.756
Energy Calibration Slope : 4.931267
Energy Calibration Quadratic : 3.1428930E-04
Energy Calibration Range : 7768.000

Instrument : CHAMBER 132
Detector : 67579
Calibration Date/Time : 17-JUL-2009 14:25:11
Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3181.074
NP-237	4341	2/28/10	4768.800	4765.688
CM-244	4320A	2/28/10	5795.020	5788.063

Energy/Channel Equation : see above
Energy Calibration Zero : 2375.917
Energy Calibration Slope : 5.056964
Energy Calibration Quadratic : 2.6723032E-04
Energy Calibration Range : 7834.000

Instrument : CHAMBER 133
Detector : 76229
Calibration Date/Time : 17-JUL-2009 14:25:22
Calibration Source Id : AESS-017

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.235
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2304.280
Energy Calibration Slope : 4.909981
Energy Calibration Quadratic : 2.5969208E-04
Energy Calibration Range : 7604.000

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

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2323.771
Energy Calibration Slope : 4.983015
Energy Calibration Quadratic : 2.2696581E-04
Energy Calibration Range : 7664.000

Instrument : CHAMBER 135
Detector : 64270
Calibration Date/Time : 17-JUL-2009 14:25:42
Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.580
NP-237	4341	2/28/10	4768.800	4768.589
CM-244	4320A	2/28/10	5795.020	5794.911

Energy/Channel Equation : see above
Energy Calibration Zero : 2342.408
Energy Calibration Slope : 4.931945
Energy Calibration Quadratic : 2.7902660E-04
Energy Calibration Range : 7685.000

Instrument : CHAMBER 136
Detector : 68549
Calibration Date/Time : 17-JUL-2009 14:25:52
Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3181.940
NP-237	4341	2/28/10	4768.800	4766.491
CM-244	4320A	2/28/10	5795.020	5789.976

Energy/Channel Equation : see above
Energy Calibration Zero : 2353.642
Energy Calibration Slope : 5.024161
Energy Calibration Quadratic : 2.3099547E-04
Energy Calibration Range : 7741.000

Instrument : CHAMBER 137
Detector : 64288
Calibration Date/Time : 17-JUL-2009 14:26:02
Calibration Source Id : AESS-025

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4769.015
CM-244	4320A	2/28/10	5795.020	5795.229

Energy/Channel Equation : see above
Energy Calibration Zero : 2378.044
Energy Calibration Slope : 5.009023
Energy Calibration Quadratic : 3.1443321E-04
Energy Calibration Range : 7837.000

Instrument : CHAMBER 138
Detector : 65877
Calibration Date/Time : 17-JUL-2009 14:26:11
Calibration Source Id : AESS-031

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2377.362
Energy Calibration Slope : 4.981610
Energy Calibration Quadratic : 2.9931843E-04
Energy Calibration Range : 7792.000

Instrument : CHAMBER 139
Detector : 76231
Calibration Date/Time : 17-JUL-2009 14:26:21
Calibration Source Id : AESS-026

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.896
CM-244	4320A	2/28/10	5795.020	5795.211

Energy/Channel Equation : see above
Energy Calibration Zero : 2343.572
Energy Calibration Slope : 4.954267
Energy Calibration Quadratic : 2.9043874E-04
Energy Calibration Range : 7721.000

Instrument : CHAMBER 140
Detector : 78771
Calibration Date/Time : 17-JUL-2009 14:26:31
Calibration Source Id : AESS-032

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.831
CM-244	4320A	2/28/10	5795.020	5795.069

Energy/Channel Equation : see above
Energy Calibration Zero : 2342.367
Energy Calibration Slope : 4.948852
Energy Calibration Quadratic : 3.0391497E-04
Energy Calibration Range : 7729.000

Instrument : CHAMBER 141
Detector : 76232
Calibration Date/Time : 17-JUL-2009 14:26:40
Calibration Source Id : AESS-027

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.179
NP-237	4341	2/28/10	4768.800	4768.885
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2351.966
Energy Calibration Slope : 4.956621
Energy Calibration Quadratic : 2.8871323E-04
Energy Calibration Range : 7730.000

Instrument : CHAMBER 142
Detector : 64261
Calibration Date/Time : 17-JUL-2009 14:26:50
Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.815
NP-237	4341	2/28/10	4768.800	4768.706
CM-244	4320A	2/28/10	5795.020	5794.924

Energy/Channel Equation : see above
Energy Calibration Zero : 2381.651
Energy Calibration Slope : 4.957265
Energy Calibration Quadratic : 2.9752569E-04
Energy Calibration Range : 7770.000

Instrument : CHAMBER 143
Detector : 65882
Calibration Date/Time : 17-JUL-2009 14:27:11
Calibration Source Id : AESS-028

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3198.011
NP-237	4341	2/28/10	4768.800	4793.655
CM-244	4320A	2/28/10	5795.020	5843.728

Energy/Channel Equation : see above
Energy Calibration Zero : 2400.594
Energy Calibration Slope : 4.866200
Energy Calibration Quadratic : 5.6703738E-04
Energy Calibration Range : 7978.000

Instrument : CHAMBER 144
Detector : 75551
Calibration Date/Time : 17-JUL-2009 14:27:26
Calibration Source Id : AESS-034

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.828
NP-237	4341	2/28/10	4768.800	4768.697
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2348.318
Energy Calibration Slope : 4.957791
Energy Calibration Quadratic : 2.7922410E-04
Energy Calibration Range : 7718.000

Instrument : CHAMBER 145
Detector : 72526
Calibration Date/Time : 17-JUL-2009 14:27:37
Calibration Source Id : AESS-029

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.094
NP-237	4341	2/28/10	4768.800	4768.886
CM-244	4320A	2/28/10	5795.020	5795.045

Energy/Channel Equation : see above
Energy Calibration Zero : 2353.360
Energy Calibration Slope : 4.971958
Energy Calibration Quadratic : 2.8320373E-04
Energy Calibration Range : 7742.000

Instrument : CHAMBER 146
Detector : 72527
Calibration Date/Time : 17-JUL-2009 14:27:48
Calibration Source Id : AESS-035

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.175
NP-237	4341	2/28/10	4768.800	4768.922
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2350.571
Energy Calibration Slope : 4.930733
Energy Calibration Quadratic : 2.9194859E-04
Energy Calibration Range : 7706.000

Instrument : CHAMBER 147
Detector : 75550
Calibration Date/Time : 17-JUL-2009 14:27:59
Calibration Source Id : AESS-030

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.209
NP-237	4341	2/28/10	4768.800	4769.018
CM-244	4320A	2/28/10	5795.020	5795.333

Energy/Channel Equation : see above
Energy Calibration Zero : 2343.476
Energy Calibration Slope : 4.959011
Energy Calibration Quadratic : 2.7492910E-04
Energy Calibration Range : 7710.000

Instrument : CHAMBER 148
Detector : 74429
Calibration Date/Time : 17-JUL-2009 14:28:08
Calibration Source Id : AESS-036

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.165
NP-237	4341	2/28/10	4768.800	4768.865
CM-244	4320A	2/28/10	5795.020	5795.167

Energy/Channel Equation : see above
Energy Calibration Zero : 2342.407
Energy Calibration Slope : 4.941724
Energy Calibration Quadratic : 3.0098064E-04
Energy Calibration Range : 7718.000

Instrument : CHAMBER 149
Detector : 33449
Calibration Date/Time : 17-JUL-2009 14:28:21
Calibration Source Id : AESS-037

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2388.292
Energy Calibration Slope : 4.935481
Energy Calibration Quadratic : 3.1694383E-04
Energy Calibration Range : 7775.000

Instrument : CHAMBER 150
Detector : 75552
Calibration Date/Time : 17-JUL-2009 14:28:35
Calibration Source Id : AESS-043

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.748
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2354.055
Energy Calibration Slope : 4.971218
Energy Calibration Quadratic : 2.7575236E-04
Energy Calibration Range : 7734.000

Instrument : CHAMBER 151
Detector : 75556
Calibration Date/Time : 17-JUL-2009 14:28:46
Calibration Source Id : AESS-038

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.936
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2341.373
Energy Calibration Slope : 4.941175
Energy Calibration Quadratic : 2.6452926E-04
Energy Calibration Range : 7679.000

Instrument : CHAMBER 152
Detector : 76222
Calibration Date/Time : 17-JUL-2009 14:28:57
Calibration Source Id : AESS-044

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.140
NP-237	4341	2/28/10	4768.800	4768.855
CM-244	4320A	2/28/10	5795.020	5795.046

Energy/Channel Equation : see above
Energy Calibration Zero : 2338.705
Energy Calibration Slope : 4.955201
Energy Calibration Quadratic : 2.6211896E-04
Energy Calibration Range : 7688.000

Instrument : CHAMBER 153
Detector : 76223
Calibration Date/Time : 17-JUL-2009 14:29:06
Calibration Source Id : AESS-039

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.045

Energy/Channel Equation : see above
Energy Calibration Zero : 2333.099
Energy Calibration Slope : 4.935291
Energy Calibration Quadratic : 2.9876101E-04
Energy Calibration Range : 7700.000

Instrument : CHAMBER 154
Detector : 76224
Calibration Date/Time : 17-JUL-2009 14:29:15
Calibration Source Id : AESS-045

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.651
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2341.465
Energy Calibration Slope : 4.948726
Energy Calibration Quadratic : 2.8072123E-04
Energy Calibration Range : 7703.000

Instrument : CHAMBER 155
Detector : 75553
Calibration Date/Time : 17-JUL-2009 14:29:25
Calibration Source Id : AESS-040

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.160
NP-237	4341	2/28/10	4768.800	4768.857
CM-244	4320A	2/28/10	5795.020	5795.116

Energy/Channel Equation : see above
Energy Calibration Zero : 2365.986
Energy Calibration Slope : 4.960846
Energy Calibration Quadratic : 3.0533157E-04
Energy Calibration Range : 7766.000

Instrument : CHAMBER 156
Detector : 75554
Calibration Date/Time : 17-JUL-2009 14:29:35
Calibration Source Id : AESS-046

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.180
NP-237	4341	2/28/10	4768.800	4768.829
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2358.748
Energy Calibration Slope : 4.995668
Energy Calibration Quadratic : 2.7021556E-04
Energy Calibration Range : 7758.000

Instrument : CHAMBER 157
Detector : 75555
Calibration Date/Time : 17-JUL-2009 14:29:49
Calibration Source Id : AESS-041

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.132
NP-237	4341	2/28/10	4768.800	4768.802
CM-244	4320A	2/28/10	5795.020	5795.161

Energy/Channel Equation : see above
Energy Calibration Zero : 2355.714
Energy Calibration Slope : 4.974587
Energy Calibration Quadratic : 2.8556405E-04
Energy Calibration Range : 7749.000

Instrument : CHAMBER 158
Detector : 33451
Calibration Date/Time : 17-JUL-2009 14:30:01
Calibration Source Id : AESS-047

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.110
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2380.269
Energy Calibration Slope : 4.995139
Energy Calibration Quadratic : 3.1028705E-04
Energy Calibration Range : 7821.000

Instrument : CHAMBER 159
Detector : 76225
Calibration Date/Time : 17-JUL-2009 14:30:14
Calibration Source Id : AESS-042

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.190
NP-237	4341	2/28/10	4768.800	4768.913
CM-244	4320A	2/28/10	5795.020	5795.044

Energy/Channel Equation : see above
Energy Calibration Zero : 2353.142
Energy Calibration Slope : 4.981561
Energy Calibration Quadratic : 2.9250194E-04
Energy Calibration Range : 7761.000

Instrument : CHAMBER 160
Detector : 76226
Calibration Date/Time : 17-JUL-2009 14:30:32
Calibration Source Id : AESS-048

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.999
NP-237	4341	2/28/10	4768.800	4768.958
CM-244	4320A	2/28/10	5795.020	5795.070

Energy/Channel Equation : see above
Energy Calibration Zero : 2355.931
Energy Calibration Slope : 4.980661
Energy Calibration Quadratic : 2.9644801E-04
Energy Calibration Range : 7767.000

Instrument : CHAMBER 161
Detector : 70321
Calibration Date/Time : 23-JUL-2009 13:58:35
Calibration Source Id : AESS-001

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2371.155
Energy Calibration Slope : 4.901179
Energy Calibration Quadratic : 3.3258999E-04
Energy Calibration Range : 7739.000

Instrument : CHAMBER 162
Detector : 70323
Calibration Date/Time : 23-JUL-2009 13:58:45
Calibration Source Id : AESS-007

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.999
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above
Energy Calibration Zero : 2365.388
Energy Calibration Slope : 4.934335
Energy Calibration Quadratic : 2.9240557E-04
Energy Calibration Range : 7725.000

Instrument : CHAMBER 163
Detector : 70324
Calibration Date/Time : 23-JUL-2009 13:58:54
Calibration Source Id : AESS-002

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2378.440
Energy Calibration Slope : 4.923447
Energy Calibration Quadratic : 3.2373652E-04
Energy Calibration Range : 7760.000

Instrument : CHAMBER 164
Detector : 70325
Calibration Date/Time : 23-JUL-2009 13:59:02
Calibration Source Id : AESS-008

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2380.008
Energy Calibration Slope : 4.927452
Energy Calibration Quadratic : 3.2609751E-04
Energy Calibration Range : 7768.000

Instrument : CHAMBER 165
Detector : 72544
Calibration Date/Time : 23-JUL-2009 13:59:11
Calibration Source Id : AESS-003

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2387.218
Energy Calibration Slope : 4.942940
Energy Calibration Quadratic : 3.0943105E-04
Energy Calibration Range : 7773.000

Instrument : CHAMBER 166
Detector : 74545
Calibration Date/Time : 23-JUL-2009 13:59:23
Calibration Source Id : AESS-009

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2373.718
Energy Calibration Slope : 4.929422
Energy Calibration Quadratic : 3.2212323E-04
Energy Calibration Range : 7759.000

Instrument : CHAMBER 167
Detector : 72546
Calibration Date/Time : 23-JUL-2009 13:59:32
Calibration Source Id : AESS-004

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2375.899
Energy Calibration Slope : 4.924172
Energy Calibration Quadratic : 3.2251154E-04
Energy Calibration Range : 7756.000

Instrument : CHAMBER 168
Detector : 72547
Calibration Date/Time : 23-JUL-2009 13:59:40
Calibration Source Id : AESS-010

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2378.301
Energy Calibration Slope : 4.935927
Energy Calibration Quadratic : 3.1537362E-04
Energy Calibration Range : 7763.000

Instrument : CHAMBER 169
Detector : 72548
Calibration Date/Time : 23-JUL-2009 13:59:49
Calibration Source Id : AESS-005

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2382.046
Energy Calibration Slope : 4.917411
Energy Calibration Quadratic : 3.3011474E-04
Energy Calibration Range : 7764.000

Instrument : CHAMBER 170
Detector : 72549
Calibration Date/Time : 23-JUL-2009 13:59:58
Calibration Source Id : AESS-011

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2381.389
Energy Calibration Slope : 4.912318
Energy Calibration Quadratic : 3.5837301E-04
Energy Calibration Range : 7787.000

Instrument : CHAMBER 171
Detector : 78260
Calibration Date/Time : 23-JUL-2009 14:00:07
Calibration Source Id : AESS-006

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2368.307
Energy Calibration Slope : 4.932293
Energy Calibration Quadratic : 3.2247280E-04
Energy Calibration Range : 7757.000

Instrument : CHAMBER 172
Detector : 78772
Calibration Date/Time : 23-JUL-2009 14:00:15
Calibration Source Id : AESS-012

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2365.785
Energy Calibration Slope : 4.920015
Energy Calibration Quadratic : 3.3008555E-04
Energy Calibration Range : 7750.000

Instrument : CHAMBER 173
Detector : 74431
Calibration Date/Time : 22-JUL-2009 14:12:56
Calibration Source Id : AESS-013

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.926
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2364.405
Energy Calibration Slope : 4.981549
Energy Calibration Quadratic : 2.6860670E-04
Energy Calibration Range : 7747.000

Instrument : CHAMBER 174
Detector : 74432
Calibration Date/Time : 22-JUL-2009 14:13:10
Calibration Source Id : AESS-019

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2358.379
Energy Calibration Slope : 5.035265
Energy Calibration Quadratic : 2.0271989E-04
Energy Calibration Range : 7727.000

Instrument : CHAMBER 175
Detector : 74433
Calibration Date/Time : 22-JUL-2009 14:13:33
Calibration Source Id : AESS-014

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.817
NP-237	4341	2/28/10	4768.800	4768.732
CM-244	4320A	2/28/10	5795.020	5794.897

Energy/Channel Equation : see above
Energy Calibration Zero : 2361.060
Energy Calibration Slope : 4.980610
Energy Calibration Quadratic : 2.6701824E-04
Energy Calibration Range : 7741.000

Instrument : CHAMBER 176
Detector : 74434
Calibration Date/Time : 22-JUL-2009 14:13:51
Calibration Source Id : AESS-020

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.546
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2357.097
Energy Calibration Slope : 5.018647
Energy Calibration Quadratic : 2.3654266E-04
Energy Calibration Range : 7744.000

Instrument : CHAMBER 177
Detector : 74435
Calibration Date/Time : 22-JUL-2009 14:14:02
Calibration Source Id : AESS-015

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2358.948
Energy Calibration Slope : 4.983318
Energy Calibration Quadratic : 2.6383059E-04
Energy Calibration Range : 7739.000

Instrument : CHAMBER 178
Detector : 74436
Calibration Date/Time : 22-JUL-2009 14:14:14
Calibration Source Id : AESS-021

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2354.644
Energy Calibration Slope : 4.987851
Energy Calibration Quadratic : 2.6228666E-04
Energy Calibration Range : 7737.000

Instrument : CHAMBER 179
Detector : 74437
Calibration Date/Time : 22-JUL-2009 14:14:24
Calibration Source Id : AESS-016

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.260
NP-237	4341	2/28/10	4768.800	4768.966
CM-244	4320A	2/28/10	5795.020	5795.056

Energy/Channel Equation : see above
Energy Calibration Zero : 2353.987
Energy Calibration Slope : 4.982908
Energy Calibration Quadratic : 2.6569929E-04
Energy Calibration Range : 7735.000

Instrument : CHAMBER 180
Detector : 74438
Calibration Date/Time : 22-JUL-2009 14:14:36
Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.167

Energy/Channel Equation : see above
Energy Calibration Zero : 2352.144
Energy Calibration Slope : 5.023554
Energy Calibration Quadratic : 2.2043443E-04
Energy Calibration Range : 7727.000

Instrument : CHAMBER 181
Detector : 74439
Calibration Date/Time : 22-JUL-2009 14:14:47
Calibration Source Id : AESS-017

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2357.233
Energy Calibration Slope : 4.973598
Energy Calibration Quadratic : 2.7286567E-04
Energy Calibration Range : 7736.000

Instrument : CHAMBER 182
Detector : 74440
Calibration Date/Time : 22-JUL-2009 14:14:57
Calibration Source Id : AESS-023

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.653
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2348.571
Energy Calibration Slope : 4.995710
Energy Calibration Quadratic : 2.4269641E-04
Energy Calibration Range : 7719.000

Instrument : CHAMBER 183
Detector : 74441
Calibration Date/Time : 22-JUL-2009 14:15:07
Calibration Source Id : AESS-018

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2357.181
Energy Calibration Slope : 4.984746
Energy Calibration Quadratic : 2.6386807E-04
Energy Calibration Range : 7738.000

Instrument : CHAMBER 184
Detector : 74442
Calibration Date/Time : 22-JUL-2009 14:15:18
Calibration Source Id : AESS-024

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2352.411
Energy Calibration Slope : 5.026765
Energy Calibration Quadratic : 2.1738216E-04
Energy Calibration Range : 7728.000

Instrument : CHAMBER 185
Detector : 68615
Calibration Date/Time : 22-JUL-2009 14:15:30
Calibration Source Id : AESS-025

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.262
NP-237	4341	2/28/10	4768.800	4769.011
CM-244	4320A	2/28/10	5795.020	5795.113

Energy/Channel Equation : see above
Energy Calibration Zero : 2354.510
Energy Calibration Slope : 4.938845
Energy Calibration Quadratic : 2.7730624E-04
Energy Calibration Range : 7703.000

Instrument : CHAMBER 186
Detector : 68616
Calibration Date/Time : 22-JUL-2009 14:15:43
Calibration Source Id : AESS-031

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.191
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.143

Energy/Channel Equation : see above
Energy Calibration Zero : 2359.547
Energy Calibration Slope : 4.938616
Energy Calibration Quadratic : 2.9074642E-04
Energy Calibration Range : 7722.000

Instrument : CHAMBER 187
Detector : 68620
Calibration Date/Time : 22-JUL-2009 14:15:58
Calibration Source Id : AESS-026

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.775
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2367.921
Energy Calibration Slope : 4.980083
Energy Calibration Quadratic : 2.9012386E-04
Energy Calibration Range : 7772.000

Instrument : CHAMBER 188
Detector : 68621
Calibration Date/Time : 22-JUL-2009 14:16:10
Calibration Source Id : AESS-032

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.008
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.044

Energy/Channel Equation : see above
Energy Calibration Zero : 2361.934
Energy Calibration Slope : 4.976158
Energy Calibration Quadratic : 2.7708741E-04
Energy Calibration Range : 7748.000

Instrument : CHAMBER 189
Detector : 68622
Calibration Date/Time : 22-JUL-2009 14:16:25
Calibration Source Id : AESS-027

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.093

Energy/Channel Equation : see above
Energy Calibration Zero : 2355.697
Energy Calibration Slope : 4.939315
Energy Calibration Quadratic : 2.8903113E-04
Energy Calibration Range : 7717.000

Instrument : CHAMBER 190
Detector : 68623
Calibration Date/Time : 22-JUL-2009 14:16:38
Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.298
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.045

Energy/Channel Equation : see above
Energy Calibration Zero : 2351.739
Energy Calibration Slope : 4.948914
Energy Calibration Quadratic : 2.8685224E-04
Energy Calibration Range : 7720.000

Instrument : CHAMBER 191
Detector : 68624
Calibration Date/Time : 22-JUL-2009 14:17:15
Calibration Source Id : AESS-028

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.925
CM-244	4320A	2/28/10	5795.020	5795.090

Energy/Channel Equation : see above
Energy Calibration Zero : 2367.921
Energy Calibration Slope : 4.966295
Energy Calibration Quadratic : 3.1035815E-04
Energy Calibration Range : 7779.000

Instrument : CHAMBER 192
Detector : 74430
Calibration Date/Time : 22-JUL-2009 14:17:47
Calibration Source Id : AESS-034

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.903
CM-244	4320A	2/28/10	5795.020	5795.089

Energy/Channel Equation : see above
Energy Calibration Zero : 2362.162
Energy Calibration Slope : 4.978550
Energy Calibration Quadratic : 2.9185213E-04
Energy Calibration Range : 7766.000

Instrument : CHAMBER 193
Detector : 68627
Calibration Date/Time : 22-JUL-2009 14:18:09
Calibration Source Id : AESS-029

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3182.786
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.042

Energy/Channel Equation : see above
Energy Calibration Zero : 2363.145
Energy Calibration Slope : 4.920224
Energy Calibration Quadratic : 3.1340783E-04
Energy Calibration Range : 7730.000

Instrument : CHAMBER 194
Detector : 68635
Calibration Date/Time : 22-JUL-2009 14:18:45
Calibration Source Id : AESS-035

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2356.478
Energy Calibration Slope : 4.939730
Energy Calibration Quadratic : 2.9438961E-04
Energy Calibration Range : 7723.000

Instrument : CHAMBER 195
Detector : 68636
Calibration Date/Time : 22-JUL-2009 14:19:31
Calibration Source Id : AESS-030

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.800
CM-244	4320A	2/28/10	5795.020	5795.181

Energy/Channel Equation : see above
Energy Calibration Zero : 2359.634
Energy Calibration Slope : 4.956642
Energy Calibration Quadratic : 2.8082752E-04
Energy Calibration Range : 7730.000

Instrument : CHAMBER 196
Detector : 68637
Calibration Date/Time : 22-JUL-2009 14:19:51
Calibration Source Id : AESS-036

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.156
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above
Energy Calibration Zero : 2357.884
Energy Calibration Slope : 4.943155
Energy Calibration Quadratic : 2.9007217E-04
Energy Calibration Range : 7724.000

Instrument : CHAMBER 197
Detector : 78894
Calibration Date/Time : 23-JUL-2009 14:00:24
Calibration Source Id : AESS-037

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2369.600
Energy Calibration Slope : 4.961125
Energy Calibration Quadratic : 2.9980636E-04
Energy Calibration Range : 7764.000

Instrument : CHAMBER 198
Detector : 78895
Calibration Date/Time : 23-JUL-2009 14:00:36
Calibration Source Id : AESS-043

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2364.985
Energy Calibration Slope : 4.958083
Energy Calibration Quadratic : 2.9077829E-04
Energy Calibration Range : 7747.000

Instrument : CHAMBER 199
Detector : 78896
Calibration Date/Time : 23-JUL-2009 14:00:47
Calibration Source Id : AESS-038

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2363.893
Energy Calibration Slope : 4.975142
Energy Calibration Quadratic : 2.8265564E-04
Energy Calibration Range : 7755.000

Instrument : CHAMBER 200
Detector : 78900
Calibration Date/Time : 23-JUL-2009 14:00:57
Calibration Source Id : AESS-044

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2366.560
Energy Calibration Slope : 4.944607
Energy Calibration Quadratic : 3.1754555E-04
Energy Calibration Range : 7763.000

Instrument : CHAMBER 201
Detector : 78902
Calibration Date/Time : 23-JUL-2009 14:01:05
Calibration Source Id : AESS-039

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2365.274
Energy Calibration Slope : 4.952928
Energy Calibration Quadratic : 3.1035283E-04
Energy Calibration Range : 7763.000

Instrument : CHAMBER 202
Detector : 78903
Calibration Date/Time : 23-JUL-2009 14:01:14
Calibration Source Id : AESS-045

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2355.391
Energy Calibration Slope : 4.951035
Energy Calibration Quadratic : 2.9712555E-04
Energy Calibration Range : 7737.000

Instrument : CHAMBER 203
Detector : 78905
Calibration Date/Time : 23-JUL-2009 14:01:22
Calibration Source Id : AESS-040

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2359.621
Energy Calibration Slope : 4.976038
Energy Calibration Quadratic : 2.7450506E-04
Energy Calibration Range : 7743.000

Instrument : CHAMBER 204
Detector : 78907
Calibration Date/Time : 23-JUL-2009 14:01:31
Calibration Source Id : AESS-046

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2360.966
Energy Calibration Slope : 4.954226
Energy Calibration Quadratic : 2.9946532E-04
Energy Calibration Range : 7748.000

Instrument : CHAMBER 205
Detector : 78908
Calibration Date/Time : 23-JUL-2009 14:01:40
Calibration Source Id : AESS-041

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2367.589
Energy Calibration Slope : 4.954722
Energy Calibration Quadratic : 3.0296977E-04
Energy Calibration Range : 7759.000

Instrument : CHAMBER 206
Detector : 78909
Calibration Date/Time : 23-JUL-2009 14:01:49
Calibration Source Id : AESS-047

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2361.905
Energy Calibration Slope : 4.955875
Energy Calibration Quadratic : 2.9360279E-04
Energy Calibration Range : 7745.000

Instrument : CHAMBER 207
Detector : 78910
Calibration Date/Time : 23-JUL-2009 14:01:57
Calibration Source Id : AESS-042

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2368.030
Energy Calibration Slope : 4.964427
Energy Calibration Quadratic : 2.9426123E-04
Energy Calibration Range : 7760.000

Instrument : CHAMBER 208
Detector : 78911
Calibration Date/Time : 23-JUL-2009 14:02:06
Calibration Source Id : AESS-048

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2364.066
Energy Calibration Slope : 4.968146
Energy Calibration Quadratic : 2.8974371E-04
Energy Calibration Range : 7755.000

Instrument : CHAMBER 209
Detector : 79188
Calibration Date/Time : 30-JUN-2009 13:25:14
Calibration Source Id : AESS-001

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2387.726
Energy Calibration Slope : 4.931397
Energy Calibration Quadratic : 3.2478853E-04
Energy Calibration Range : 7778.000

Instrument : CHAMBER 210
Detector : 79189
Calibration Date/Time : 30-JUN-2009 13:25:32
Calibration Source Id : AESS-002

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2383.637
Energy Calibration Slope : 4.939270
Energy Calibration Quadratic : 3.1113683E-04
Energy Calibration Range : 7768.000

Instrument : CHAMBER 211
Detector : 79190
Calibration Date/Time : 30-JUN-2009 13:25:46
Calibration Source Id : AESS-003

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2389.518
Energy Calibration Slope : 4.955431
Energy Calibration Quadratic : 3.0932875E-04
Energy Calibration Range : 7788.000

Instrument : CHAMBER 212
Detector : 79191
Calibration Date/Time : 30-JUN-2009 13:25:56
Calibration Source Id : AESS-004

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2387.357
Energy Calibration Slope : 4.935492
Energy Calibration Quadratic : 3.2339373E-04
Energy Calibration Range : 7780.000

Instrument : CHAMBER 213
Detector : 79192
Calibration Date/Time : 30-JUN-2009 13:26:06
Calibration Source Id : AESS-005

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2392.713
Energy Calibration Slope : 4.948073
Energy Calibration Quadratic : 3.1151611E-04
Energy Calibration Range : 7786.000

Instrument : CHAMBER 214
Detector : 79193
Calibration Date/Time : 30-JUN-2009 13:26:15
Calibration Source Id : AESS-006

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2381.982
Energy Calibration Slope : 4.949060
Energy Calibration Quadratic : 3.1146532E-04
Energy Calibration Range : 7776.000

Instrument : CHAMBER 215
Detector : 79194
Calibration Date/Time : 30-JUN-2009 13:26:24
Calibration Source Id : AESS-007

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2392.654
Energy Calibration Slope : 4.938601
Energy Calibration Quadratic : 3.3165864E-04
Energy Calibration Range : 7798.000

Instrument : CHAMBER 216
Detector : 79195
Calibration Date/Time : 30-JUN-2009 13:26:33
Calibration Source Id : AESS-008

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2383.258
Energy Calibration Slope : 4.954875
Energy Calibration Quadratic : 3.0062834E-04
Energy Calibration Range : 7772.000

Instrument : CHAMBER 217
Detector : 79410
Calibration Date/Time : 30-JUN-2009 13:26:43
Calibration Source Id : AESS-009

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2389.657
Energy Calibration Slope : 4.940731
Energy Calibration Quadratic : 3.2290843E-04
Energy Calibration Range : 7788.000

Instrument : CHAMBER 218
Detector : 79411
Calibration Date/Time : 30-JUN-2009 13:26:51
Calibration Source Id : AESS-010

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above
Energy Calibration Zero : 2387.484
Energy Calibration Slope : 4.945539
Energy Calibration Quadratic : 3.2147722E-04
Energy Calibration Range : 7789.000

Instrument : CHAMBER 219
Detector : 79412
Calibration Date/Time : 30-JUN-2009 13:27:01
Calibration Source Id : AESS-011

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2385.324
Energy Calibration Slope : 4.953215
Energy Calibration Quadratic : 3.0849627E-04
Energy Calibration Range : 7781.000

Instrument : CHAMBER 220
Detector : 79413
Calibration Date/Time : 30-JUN-2009 13:27:10
Calibration Source Id : AESS-012

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2383.523
Energy Calibration Slope : 4.935628
Energy Calibration Quadratic : 3.2036271E-04
Energy Calibration Range : 7774.000

Instrument : CHAMBER 221
Detector : 79414
Calibration Date/Time : 30-JUN-2009 13:27:19
Calibration Source Id : AESS-013

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2386.554
Energy Calibration Slope : 4.965968
Energy Calibration Quadratic : 3.1077291E-04
Energy Calibration Range : 7798.000

Instrument : CHAMBER 222
Detector : 79415
Calibration Date/Time : 30-JUN-2009 13:27:29
Calibration Source Id : AESS-014

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5794.573

Energy/Channel Equation : see above
Energy Calibration Zero : 2380.427
Energy Calibration Slope : 5.024710
Energy Calibration Quadratic : 2.4253939E-04
Energy Calibration Range : 7780.000

Instrument : CHAMBER 223
Detector : 79416
Calibration Date/Time : 30-JUN-2009 13:27:39
Calibration Source Id : AESS-015

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2391.487
Energy Calibration Slope : 4.944519
Energy Calibration Quadratic : 3.4526619E-04
Energy Calibration Range : 7817.000

Instrument : CHAMBER 224
Detector : 79417
Calibration Date/Time : 30-JUN-2009 13:27:48
Calibration Source Id : AESS-016

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2389.036
Energy Calibration Slope : 4.998024
Energy Calibration Quadratic : 2.7591022E-04
Energy Calibration Range : 7796.000

Instrument : CHAMBER 225
Detector : 79418
Calibration Date/Time : 30-JUN-2009 13:28:00
Calibration Source Id : AESS-017

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2391.820
Energy Calibration Slope : 4.947299
Energy Calibration Quadratic : 3.2222894E-04
Energy Calibration Range : 7796.000

Instrument : CHAMBER 226
Detector : 79419
Calibration Date/Time : 30-JUN-2009 13:28:10
Calibration Source Id : AESS-018

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.001
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2384.017
Energy Calibration Slope : 4.975819
Energy Calibration Quadratic : 2.9400751E-04
Energy Calibration Range : 7788.000

Instrument : CHAMBER 227
Detector : 79420
Calibration Date/Time : 30-JUN-2009 13:28:21
Calibration Source Id : AESS-019

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2390.902
Energy Calibration Slope : 4.944205
Energy Calibration Quadratic : 3.2253028E-04
Energy Calibration Range : 7792.000

Instrument : CHAMBER 228
Detector : 79421
Calibration Date/Time : 30-JUN-2009 13:28:30
Calibration Source Id : AESS-020

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2382.530
Energy Calibration Slope : 4.981592
Energy Calibration Quadratic : 2.8075394E-04
Energy Calibration Range : 7778.000

Instrument : CHAMBER 229
Detector : 79422
Calibration Date/Time : 30-JUN-2009 13:28:39
Calibration Source Id : AESS-021

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2388.282
Energy Calibration Slope : 4.954379
Energy Calibration Quadratic : 3.1871718E-04
Energy Calibration Range : 7796.000

Instrument : CHAMBER 230
Detector : 79423
Calibration Date/Time : 30-JUN-2009 13:28:51
Calibration Source Id : AESS-022

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2384.651
Energy Calibration Slope : 4.970551
Energy Calibration Quadratic : 2.9692691E-04
Energy Calibration Range : 7786.000

Instrument : CHAMBER 231
Detector : 79424
Calibration Date/Time : 30-JUN-2009 13:29:03
Calibration Source Id : AESS-023

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2387.183
Energy Calibration Slope : 4.959881
Energy Calibration Quadratic : 3.0125881E-04
Energy Calibration Range : 7782.000

Instrument : CHAMBER 232
Detector : 79425
Calibration Date/Time : 30-JUN-2009 13:29:13
Calibration Source Id : AESS-024

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2384.233
Energy Calibration Slope : 5.017519
Energy Calibration Quadratic : 2.4404455E-04
Energy Calibration Range : 7778.000

Instrument : CHAMBER 233
Detector : 79426
Calibration Date/Time : 30-JUN-2009 13:29:22
Calibration Source Id : AESS-025

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.801
CM-244	4320A	2/28/10	5795.020	5795.019

Energy/Channel Equation : see above
Energy Calibration Zero : 2383.418
Energy Calibration Slope : 4.917979
Energy Calibration Quadratic : 3.4538476E-04
Energy Calibration Range : 7782.000

Instrument : CHAMBER 234
Detector : 79427
Calibration Date/Time : 30-JUN-2009 13:29:34
Calibration Source Id : AESS-026

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2382.356
Energy Calibration Slope : 4.914772
Energy Calibration Quadratic : 3.4141311E-04
Energy Calibration Range : 7773.000

Instrument : CHAMBER 235
Detector : 79428
Calibration Date/Time : 30-JUN-2009 13:29:43
Calibration Source Id : AESS-027

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2387.058
Energy Calibration Slope : 4.936741
Energy Calibration Quadratic : 3.3184959E-04
Energy Calibration Range : 7790.000

Instrument : CHAMBER 236
Detector : 79429
Calibration Date/Time : 30-JUN-2009 13:29:51
Calibration Source Id : AESS-028

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2387.647
Energy Calibration Slope : 4.918993
Energy Calibration Quadratic : 3.4496849E-04
Energy Calibration Range : 7786.000

Instrument : CHAMBER 237
Detector : 79430
Calibration Date/Time : 30-JUN-2009 13:30:00
Calibration Source Id : AESS-029

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2389.033
Energy Calibration Slope : 4.937141
Energy Calibration Quadratic : 3.3584173E-04
Energy Calibration Range : 7797.000

Instrument : CHAMBER 238
Detector : 79431
Calibration Date/Time : 30-JUN-2009 13:30:09
Calibration Source Id : AESS-030

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2383.856
Energy Calibration Slope : 4.918208
Energy Calibration Quadratic : 3.4156963E-04
Energy Calibration Range : 7778.000

Instrument : CHAMBER 239
Detector : 79432
Calibration Date/Time : 30-JUN-2009 13:30:18
Calibration Source Id : AESS-031

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2389.888
Energy Calibration Slope : 4.920895
Energy Calibration Quadratic : 3.5708703E-04
Energy Calibration Range : 7803.000

Instrument : CHAMBER 240
Detector : 79433
Calibration Date/Time : 30-JUN-2009 13:30:27
Calibration Source Id : AESS-032

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2386.559
Energy Calibration Slope : 4.907694
Energy Calibration Quadratic : 3.6268227E-04
Energy Calibration Range : 7792.000

Instrument : CHAMBER 241
Detector : 79434
Calibration Date/Time : 30-JUN-2009 13:30:36
Calibration Source Id : AESS-033

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2384.510
Energy Calibration Slope : 4.923378
Energy Calibration Quadratic : 3.4127611E-04
Energy Calibration Range : 7784.000

Instrument : CHAMBER 242
Detector : 79435
Calibration Date/Time : 30-JUN-2009 13:30:45
Calibration Source Id : AESS-034

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.798
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2390.047
Energy Calibration Slope : 4.916013
Energy Calibration Quadratic : 3.5139045E-04
Energy Calibration Range : 7793.000

Instrument : CHAMBER 243
Detector : 79436
Calibration Date/Time : 30-JUN-2009 13:30:54
Calibration Source Id : AESS-035

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2388.583
Energy Calibration Slope : 4.932609
Energy Calibration Quadratic : 3.3716374E-04
Energy Calibration Range : 7793.000

Instrument : CHAMBER 244
Detector : 79437
Calibration Date/Time : 30-JUN-2009 13:31:04
Calibration Source Id : AESS-036

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2389.087
Energy Calibration Slope : 4.916673
Energy Calibration Quadratic : 3.5015366E-04
Energy Calibration Range : 7791.000

Instrument : CHAMBER 245
Detector : 79438
Calibration Date/Time : 30-JUN-2009 13:31:18
Calibration Source Id : AESS-037

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4769.036
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2390.120
Energy Calibration Slope : 4.932529
Energy Calibration Quadratic : 3.4877865E-04
Energy Calibration Range : 7807.000

Instrument : CHAMBER 246
Detector : 78912
Calibration Date/Time : 30-JUN-2009 13:31:31
Calibration Source Id : AESS-038

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4769.115
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2391.179
Energy Calibration Slope : 4.943339
Energy Calibration Quadratic : 3.2214838E-04
Energy Calibration Range : 7791.000

Instrument : CHAMBER 247
Detector : 79440
Calibration Date/Time : 30-JUN-2009 13:31:41
Calibration Source Id : AESS-039

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.020

Energy/Channel Equation : see above
Energy Calibration Zero : 2391.692
Energy Calibration Slope : 4.933953
Energy Calibration Quadratic : 3.4777186E-04
Energy Calibration Range : 7809.000

Instrument : CHAMBER 248
Detector : 79441
Calibration Date/Time : 30-JUN-2009 13:31:51
Calibration Source Id : AESS-040

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2387.938
Energy Calibration Slope : 4.919151
Energy Calibration Quadratic : 3.5771105E-04
Energy Calibration Range : 7800.000

Instrument : CHAMBER 249
Detector : 79442
Calibration Date/Time : 30-JUN-2009 13:32:04
Calibration Source Id : AESS-041

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2387.381
Energy Calibration Slope : 4.922509
Energy Calibration Quadratic : 3.6959481E-04
Energy Calibration Range : 7816.000

Instrument : CHAMBER 250
Detector : 79443
Calibration Date/Time : 30-JUN-2009 13:32:16
Calibration Source Id : AESS-042

Cal. Isotopes	Source Id	Expiration Date	Standard Energy	Actual Energy
GD-148	6445-278	2/28/10	3183.000	3183.000
NP-237	4341	2/28/10	4768.800	4768.799
CM-244	4320A	2/28/10	5795.020	5795.021

Energy/Channel Equation : see above
Energy Calibration Zero : 2381.157
Energy Calibration Slope : 4.929844
Energy Calibration Quadratic : 3.4039136E-04
Energy Calibration Range : 7786.000

Instrument : CHAMBER 251
Detector : 79444
Calibration Date/Time : 30-JUN-2009 13:32:48
Calibration Source Id : AESS-043

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2387.225
Energy Calibration Slope : 4.925405
Energy Calibration Quadratic : 3.6185942E-04
Energy Calibration Range : 7810.000

Instrument : CHAMBER 252
Detector : 79445
Calibration Date/Time : 30-JUN-2009 13:33:09
Calibration Source Id : AESS-044

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2382.012
Energy Calibration Slope : 4.929501
Energy Calibration Quadratic : 3.4806953E-04
Energy Calibration Range : 7795.000

Instrument : CHAMBER 253
Detector : 79446
Calibration Date/Time : 30-JUN-2009 13:33:20
Calibration Source Id : AESS-045

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2394.239
Energy Calibration Slope : 4.943881
Energy Calibration Quadratic : 3.5968810E-04
Energy Calibration Range : 7834.000

Instrument : CHAMBER 254
Detector : 79447
Calibration Date/Time : 30-JUN-2009 13:33:32
Calibration Source Id : AESS-046

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2390.188
Energy Calibration Slope : 4.926832
Energy Calibration Quadratic : 3.5614919E-04
Energy Calibration Range : 7809.000

Instrument : CHAMBER 255
Detector : 79448
Calibration Date/Time : 30-JUN-2009 13:33:42
Calibration Source Id : AESS-047

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2390.725
Energy Calibration Slope : 4.926145
Energy Calibration Quadratic : 3.6522237E-04
Energy Calibration Range : 7818.000

Instrument : CHAMBER 256
Detector : 79449
Calibration Date/Time : 30-JUN-2009 13:33:53
Calibration Source Id : AESS-048

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

Energy/Channel Equation : see above
Energy Calibration Zero : 2387.915
Energy Calibration Slope : 4.925013
Energy Calibration Quadratic : 3.5367915E-04
Energy Calibration Range : 7802.000

Subsection 2: Background Calibration

Instrument : CHAMBER 001
Detector : 78788
Background Analysis Date/Time : 5-JUL-2009 15:11:54
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.679	3298.848	2.000000	0.4799997	70.71068	95.00000
NP-237	4436.698	4905.866	9.000000	2.159999	33.33334	95.00000
CM-244	5535.874	5884.629	8.000000	1.919999	35.35534	95.00000

Instrument : CHAMBER 002
Detector : 78266
Background Analysis Date/Time : 5-JUL-2009 15:11:54
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.715	3301.971	9.000000	2.159999	33.33334	95.00000
NP-237	4433.336	4902.576	8.000000	1.919999	35.35534	95.00000
CM-244	5533.904	5882.845	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 003
Detector : 67617
Background Analysis Date/Time : 5-JUL-2009 15:11:54
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.494	3301.750	234063.0	56175.08	0.2066967	95.00000
NP-237	4434.514	4906.213	77237.00	18536.87	0.3598217	95.00000
CM-244	5534.317	5886.218	1459.000	350.1598	2.618016	95.00000

Instrument : CHAMBER 004
Detector : 64279
Background Analysis Date/Time : 5-JUL-2009 15:11:54
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.142	3301.855	1.000000	0.2399998	100.0000	95.00000
NP-237	4434.122	4905.061	9.000000	2.159999	33.33334	95.00000
CM-244	5532.169	5885.896	4.000000	0.9599994	50.00000	95.00000

Instrument : CHAMBER 005
Detector : 67612
Background Analysis Date/Time : 5-JUL-2009 15:11:54
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.844	3301.859	6.000000	1.439999	40.82483	95.00000
NP-237	4432.372	4905.723	7.000000	1.679999	37.79645	95.00000
CM-244	5534.445	5887.312	11.00000	2.639998	30.15113	95.00000

Instrument : CHAMBER 006
Detector : 67613
Background Analysis Date/Time : 5-JUL-2009 15:11:54
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.836	3301.578	1.000000	0.2399998	100.0000	95.00000
NP-237	4433.162	4904.315	5.000000	1.199999	44.72136	95.00000
CM-244	5534.623	5882.438	4.000000	0.9599994	50.00000	95.00000

Instrument : CHAMBER 007
Detector : 67607
Background Analysis Date/Time : 5-JUL-2009 15:11:55
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.476	3300.975	5.000000	1.199999	44.72136	95.00000
NP-237	4436.790	4906.439	13.00000	3.119998	27.73501	95.00000
CM-244	5534.241	5887.079	16.00000	3.839998	25.00000	95.00000

Instrument : CHAMBER 008
Detector : 78788
Background Analysis Date/Time : 5-JUL-2009 15:11:55
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.921	3300.406	4.000000	0.9599994	50.00000	95.00000
NP-237	4435.107	4902.387	10.00000	2.399998	31.62278	95.00000
CM-244	5534.594	5883.502	2.000000	0.4799997	70.71068	95.00000

Instrument : CHAMBER 009
Detector : 72528
Background Analysis Date/Time : 5-JUL-2009 15:11:55
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.628	3299.090	3.000000	0.7199996	57.73503	95.00000
NP-237	4437.197	4904.633	13.00000	3.119998	27.73501	95.00000
CM-244	5532.440	5887.594	10.00000	2.399998	31.62278	95.00000

Instrument : CHAMBER 010
Detector : 72529
Background Analysis Date/Time : 5-JUL-2009 15:11:55
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.348	3298.595	1.000000	0.2399998	100.0000	95.00000
NP-237	4434.835	4903.545	8.000000	1.919999	35.35534	95.00000
CM-244	5530.435	5886.972	9.000000	2.159999	33.33334	95.00000

Instrument : CHAMBER 011
Detector : 72531
Background Analysis Date/Time : 5-JUL-2009 15:11:55
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.311	3301.519	2.000000	0.4799997	70.71068	95.00000
NP-237	4434.837	4904.180	7.000000	1.679999	37.79645	95.00000
CM-244	5534.270	5885.159	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 012
Detector : 67594
Background Analysis Date/Time : 5-JUL-2009 15:11:55
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.530	3302.430	7.000000	1.679999	37.79645	95.00000
NP-237	4435.245	4904.394	9.000000	2.159999	33.33334	95.00000
CM-244	5531.663	5882.971	9.000000	2.159999	33.33334	95.00000

Instrument : CHAMBER 013
Detector : 78790
Background Analysis Date/Time : 5-JUL-2009 15:11:56
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.215	3297.934	1.000000	0.2400001	100.0000	95.00000
NP-237	4433.681	4905.322	9.000000	2.160001	33.33334	95.00000
CM-244	5534.510	5884.075	1.000000	0.2400001	100.0000	95.00000

Instrument : CHAMBER 014
Detector : 67616
Background Analysis Date/Time : 5-JUL-2009 15:11:56
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.044	3301.205	4.000000	0.9600002	50.00000	95.00000
NP-237	4432.568	4904.459	8.000000	1.920000	35.35534	95.00000
CM-244	5531.132	5885.588	19.00000	4.560001	22.94157	95.00000

Instrument : CHAMBER 015
Detector : 61581
Background Analysis Date/Time : 5-JUL-2009 15:11:56
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.992	3300.634	1.000000	0.2400001	100.0000	95.00000
NP-237	4433.750	4904.866	3.000000	0.7200001	57.73503	95.00000
CM-244	5533.850	5883.539	18.00000	4.320001	23.57022	95.00000

Instrument : CHAMBER 016
Detector : 78774
Background Analysis Date/Time : 5-JUL-2009 15:11:56
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.376	3300.188	2.000000	0.4800001	70.71068	95.00000
NP-237	4436.705	4902.519	8.000000	1.920000	35.35534	95.00000
CM-244	5531.791	5887.203	1.000000	0.2400001	100.0000	95.00000

Instrument : CHAMBER 017
Detector : 78791
Background Analysis Date/Time : 5-JUL-2009 15:11:56
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.293	3301.593	4.000000	0.9600002	50.00000	95.00000
NP-237	4433.438	4905.522	3.000000	0.7200001	57.73503	95.00000
CM-244	5532.444	5887.037	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 018
Detector : 21063
Background Analysis Date/Time : 13-JUL-2009 21:54:51
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.459	3300.768	2.000000	0.4800001	70.71068	95.00000
NP-237	4435.720	4903.495	7.000000	1.680000	37.79645	95.00000
CM-244	5531.358	5886.349	4.000000	0.9600002	50.00000	95.00000

Instrument : CHAMBER 019
Detector : 78786
Background Analysis Date/Time : 5-JUL-2009 15:11:57
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.589	3299.131	2.000000	0.4800001	70.71068	95.00000
NP-237	4435.520	4903.560	5.000000	1.200000	44.72136	95.00000
CM-244	5534.981	5882.589	1.000000	0.2400001	100.0000	95.00000

Instrument : CHAMBER 020
Detector : 78787
Background Analysis Date/Time : 5-JUL-2009 15:11:57
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.028	3300.317	3.000000	0.7200001	57.73503	95.00000
NP-237	4434.663	4901.954	7.000000	1.680000	37.79645	95.00000
CM-244	5534.316	5883.376	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 021
Detector : 67047
Background Analysis Date/Time : 5-JUL-2009 15:11:57
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.930	3300.431	3.000000	0.7200001	57.73503	95.00000
NP-237	4435.207	4905.011	8.000000	1.920000	35.35534	95.00000
CM-244	5533.018	5884.673	17.00000	4.080001	24.25356	95.00000

Instrument : CHAMBER 022
Detector : 72530
Background Analysis Date/Time : 5-JUL-2009 15:11:57
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.087	3302.012	33.00000	7.920002	17.40777	95.00000
NP-237	4436.701	4902.154	23.00000	5.520001	20.85144	95.00000
CM-244	5532.124	5885.279	12.00000	2.880001	28.86751	95.00000

Instrument : CHAMBER 023
Detector : 78264
Background Analysis Date/Time : 5-JUL-2009 15:11:57
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.041	3300.395	2.000000	0.4800001	70.71068	95.00000
NP-237	4437.054	4904.602	10.00000	2.400001	31.62278	95.00000
CM-244	5531.351	5885.314	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 024
Detector : 76542
Background Analysis Date/Time : 5-JUL-2009 15:11:57
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.294	3302.013	10.00000	2.400001	31.62278	95.00000
NP-237	4435.963	4904.774	26.00000	6.240001	19.61161	95.00000
CM-244	5530.886	5886.529	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 025
Detector : 45-149AA5
Background Analysis Date/Time : 5-JUL-2009 15:11:58
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.683	3301.317	3.000000	0.7200001	57.73503	95.00000
NP-237	4432.505	4905.964	7.000000	1.680000	37.79645	95.00000
CM-244	5531.275	5884.228	21.00000	5.040001	21.82179	95.00000

Instrument : CHAMBER 026
Detector : 78204
Background Analysis Date/Time : 5-JUL-2009 15:11:58
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.261	3299.610	2.000000	0.4800001	70.71068	95.00000
NP-237	4434.923	4901.784	5.000000	1.200000	44.72136	95.00000
CM-244	5534.672	5884.552	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 027
Detector : 42484
Background Analysis Date/Time : 22-JUL-2009 21:43:06
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.447	3298.118	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.441	4905.996	3.000000	0.7199996	57.73503	95.00000
CM-244	5535.248	5885.925	3.000000	0.7199996	57.73503	95.00000

Instrument : CHAMBER 028
Detector : 78792
Background Analysis Date/Time : 5-JUL-2009 15:11:58
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.695	3297.894	3.000000	0.7200001	57.73503	95.00000
NP-237	4435.454	4902.851	4.000000	0.9600002	50.00000	95.00000
CM-244	5530.764	5886.057	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 029
Detector : 33454
Background Analysis Date/Time : 5-JUL-2009 15:11:58
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.570	3299.793	4.000000	0.9600002	50.00000	95.00000
NP-237	4434.729	4906.466	6.000000	1.440000	40.82483	95.00000
CM-244	5530.876	5886.187	7.000000	1.680000	37.79645	95.00000

Instrument : CHAMBER 030
Detector : 33447
Background Analysis Date/Time : 5-JUL-2009 15:11:58
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.473	3300.013	5.000000	1.200000	44.72136	95.00000
NP-237	4433.021	4902.873	11.00000	2.640000	30.15113	95.00000
CM-244	5531.626	5884.032	17.00000	4.080001	24.25356	95.00000

Instrument : CHAMBER 031
Detector : 67042
Background Analysis Date/Time : 13-JUL-2009 21:54:52
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.104	3299.916	5.000000	1.200000	44.72136	95.00000
NP-237	4436.072	4902.901	16.00000	3.840001	25.00000	95.00000
CM-244	5535.417	5884.932	11.00000	2.640001	30.15113	95.00000

Instrument : CHAMBER 032
Detector : 67041
Background Analysis Date/Time : 13-JUL-2009 21:54:52
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.634	3297.499	1.000000	0.2400001	100.0000	95.00000
NP-237	4437.570	4904.884	14.00000	3.360001	26.72612	95.00000
CM-244	5533.522	5884.215	16.00000	3.840001	25.00000	95.00000

Instrument : CHAMBER 033
Detector : 78785
Background Analysis Date/Time : 5-JUL-2009 15:11:58
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.591	3298.173	1.000000	0.2400000	100.0000	95.00000
NP-237	4434.089	4906.364	9.000000	2.160000	33.33334	95.00000
CM-244	5534.061	5883.941	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 034
Detector : 61586
Background Analysis Date/Time : 13-JUL-2009 21:54:52
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.268	3300.348	1.000000	0.2400001	100.0000	95.00000
NP-237	4435.287	4906.218	9.000000	2.160001	33.33334	95.00000
CM-244	5533.837	5886.701	12.00000	2.880001	28.86751	95.00000

Instrument : CHAMBER 035
Detector : 78202
Background Analysis Date/Time : 5-JUL-2009 15:11:58
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.841	3298.805	1.000000	0.2400000	100.0000	95.00000
NP-237	4433.680	4901.942	20.00000	4.800001	22.36068	95.00000
CM-244	5530.913	5886.751	8.000000	1.920000	35.35534	95.00000

Instrument : CHAMBER 036
Detector : 78203
Background Analysis Date/Time : 5-JUL-2009 15:11:58
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.719	3297.679	1.000000	0.2400000	100.0000	95.00000
NP-237	4436.454	4902.523	2.000000	0.4800001	70.71068	95.00000
CM-244	5534.221	5883.385	6.000000	1.440000	40.82483	95.00000

Instrument : CHAMBER 037
Detector : 45-149BB5
Background Analysis Date/Time : 5-JUL-2009 15:12:00
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.027	3298.587	4.000000	0.9600002	50.00000	95.00000
NP-237	4435.750	4902.017	14.00000	3.360001	26.72612	95.00000
CM-244	5535.521	5884.277	18.00000	4.320001	23.57022	95.00000

Instrument : CHAMBER 038
Detector : 72532
Background Analysis Date/Time : 5-JUL-2009 15:12:00
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.665	3301.822	6.000000	1.440000	40.82483	95.00000
NP-237	4435.489	4906.553	18.00000	4.320001	23.57022	95.00000
CM-244	5532.401	5886.525	16.00000	3.840001	25.00000	95.00000

Instrument : CHAMBER 039
Detector : 45-149BB2
Background Analysis Date/Time : 5-JUL-2009 15:12:00
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.145	3298.732	3.000000	0.7200001	57.73503	95.00000
NP-237	4435.549	4903.088	5.000000	1.200000	44.72136	95.00000
CM-244	5534.287	5885.251	15.00000	3.600001	25.81989	95.00000

Instrument : CHAMBER 040
Detector : 78773
Background Analysis Date/Time : 5-JUL-2009 15:12:00
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.803	3299.657	3.000000	0.7200001	57.73503	95.00000
NP-237	4435.891	4904.106	7.000000	1.680000	37.79645	95.00000
CM-244	5531.706	5883.967	1.000000	0.2400001	100.0000	95.00000

Instrument : CHAMBER 041
Detector : 78205
Background Analysis Date/Time : 5-JUL-2009 15:12:00
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.799	3301.675	4.000000	0.9600002	50.00000	95.00000
NP-237	4434.272	4902.386	12.00000	2.880001	28.86751	95.00000
CM-244	5531.847	5882.877	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 042
Detector : 78793
Background Analysis Date/Time : 5-JUL-2009 15:12:00
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.257	3302.160	1.000000	0.2400001	100.0000	95.00000
NP-237	4435.667	4904.225	11.00000	2.640001	30.15113	95.00000
CM-244	5531.759	5883.730	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 043
Detector : 76543
Background Analysis Date/Time : 5-JUL-2009 15:12:00
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.989	3298.318	1.000000	0.2399998	100.0000	95.00000
NP-237	4436.983	4902.370	4.000000	0.9599994	50.00000	95.00000
CM-244	5532.584	5886.039	3.000000	0.7199996	57.73503	95.00000

Instrument : CHAMBER 044
Detector : 79459
Background Analysis Date/Time : 5-JUL-2009 15:12:00
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.854	3300.902	4.000000	0.9600002	50.00000	95.00000
NP-237	4435.084	4901.492	10.00000	2.400001	31.62278	95.00000
CM-244	5533.776	5883.326	6.000000	1.440000	40.82483	95.00000

Instrument : CHAMBER 045
Detector : 67601
Background Analysis Date/Time : 13-JUL-2009 21:54:53
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.909	3300.265	1.000000	0.2400000	100.0000	95.00000
NP-237	4434.212	4905.200	7.000000	1.680000	37.79645	95.00000
CM-244	5530.781	5884.673	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 046
Detector : 76544
Background Analysis Date/Time : 5-JUL-2009 15:12:00
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.077	3298.635	2.000000	0.4799997	70.71068	95.00000
NP-237	4433.627	4906.487	10.00000	2.399998	31.62278	95.00000
CM-244	5533.329	5885.134	8.000000	1.919999	35.35534	95.00000

Instrument : CHAMBER 047
Detector : 46-089B1
Background Analysis Date/Time : 5-JUL-2009 15:12:00
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.977	3301.361	2.000000	0.4799997	70.71068	95.00000
NP-237	4433.363	4905.447	8.000000	1.919999	35.35534	95.00000
CM-244	5532.313	5886.846	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 048
Detector : 42483
Background Analysis Date/Time : 5-JUL-2009 15:12:00
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.411	3301.246	4.000000	0.9599994	50.00000	95.00000
NP-237	4433.969	4903.143	12.00000	2.879998	28.86751	95.00000
CM-244	5530.501	5887.230	14.00000	3.359998	26.72612	95.00000

Instrument : CHAMBER 065
Detector : 68551
Background Analysis Date/Time : 5-JUL-2009 15:12:01
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.172	3297.923	12.00000	2.879998	28.86751	95.00000
NP-237	4436.297	4904.907	10.00000	2.399998	31.62278	95.00000
CM-244	5532.615	5884.733	17.00000	4.079998	24.25356	95.00000

Instrument : CHAMBER 066
Detector : 46-089C1
Background Analysis Date/Time : 5-JUL-2009 15:12:01
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.142	3300.807	4.000000	0.9599994	50.00000	95.00000
NP-237	4436.247	4906.352	9.000000	2.159999	33.33334	95.00000
CM-244	5534.784	5886.688	18.00000	4.319997	23.57022	95.00000

Instrument : CHAMBER 067
Detector : 46-089B4
Background Analysis Date/Time : 5-JUL-2009 15:12:01
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.144	3301.594	1.000000	0.2399998	100.0000	95.00000
NP-237	4436.169	4905.946	11.00000	2.639998	30.15113	95.00000
CM-244	5533.963	5885.648	7.000000	1.679999	37.79645	95.00000

Instrument : CHAMBER 068
Detector : 78794
Background Analysis Date/Time : 5-JUL-2009 15:12:01
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.601	3300.139	1.000000	0.2399998	100.0000	95.00000
NP-237	4435.756	4903.729	4.000000	0.9599994	50.00000	95.00000
CM-244	5531.794	5886.867	4.000000	0.9599994	50.00000	95.00000

Instrument : CHAMBER 069
Detector : 78795
Background Analysis Date/Time : 5-JUL-2009 15:12:01
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.901	3298.738	5.000000	1.199999	44.72136	95.00000
NP-237	4437.201	4903.207	6.000000	1.439999	40.82483	95.00000
CM-244	5534.874	5884.048	9.000000	2.159999	33.33334	95.00000

Instrument : CHAMBER 070
Detector : 46-089B2
Background Analysis Date/Time : 5-JUL-2009 15:12:01
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.641	3300.492	4.000000	0.9599994	50.00000	95.00000
NP-237	4435.833	4904.443	11.00000	2.639998	30.15113	95.00000
CM-244	5531.433	5882.799	7.000000	1.679999	37.79645	95.00000

Instrument : CHAMBER 071
Detector : 64259
Background Analysis Date/Time : 5-JUL-2009 15:12:02
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.476	3301.614	1.000000	0.2399998	100.0000	95.00000
NP-237	4435.387	4902.436	6.000000	1.439999	40.82483	95.00000
CM-244	5534.462	5883.334	12.00000	2.879998	28.86751	95.00000

Instrument : CHAMBER 072
Detector : 45-149AA3
Background Analysis Date/Time : 5-JUL-2009 15:12:02
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.586	3301.014	2.000000	0.4799997	70.71068	95.00000
NP-237	4432.963	4902.126	5.000000	1.199999	44.72136	95.00000
CM-244	5535.050	5886.750	14.00000	3.359998	26.72612	95.00000

Instrument : CHAMBER 073
Detector : 78775
Background Analysis Date/Time : 5-JUL-2009 15:12:02
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.870	3299.007	2.000000	0.4799997	70.71068	95.00000
NP-237	4435.703	4904.982	6.000000	1.439999	40.82483	95.00000
CM-244	5532.962	5884.931	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 074
Detector : 78266
Background Analysis Date/Time : 5-JUL-2009 15:12:02
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.625	3300.254	2.000000	0.4799997	70.71068	95.00000
NP-237	4435.417	4902.858	9.000000	2.159999	33.33334	95.00000
CM-244	5535.258	5884.259	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 075
Detector : 68550
Background Analysis Date/Time : 5-JUL-2009 15:12:02
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.563	3301.861	2.000000	0.4799997	70.71068	95.00000
NP-237	4432.969	4904.420	19.00000	4.559997	22.94157	95.00000
CM-244	5535.562	5884.044	7.000000	1.679999	37.79645	95.00000

Instrument : CHAMBER 076
Detector : 78779
Background Analysis Date/Time : 5-JUL-2009 15:12:02
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.408	3300.679	2.000000	0.4799997	70.71068	95.00000
NP-237	4437.552	4904.251	7.000000	1.679999	37.79645	95.00000
CM-244	5530.870	5885.252	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 077
Detector : 67576
Background Analysis Date/Time : 5-JUL-2009 15:12:03
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.825	3301.085	2.000000	0.4800001	70.71068	95.00000
NP-237	4432.612	4901.681	5.000000	1.200000	44.72136	95.00000
CM-244	5534.546	5886.248	8.000000	1.920000	35.35534	95.00000

Instrument : CHAMBER 078
Detector : 67577
Background Analysis Date/Time : 5-JUL-2009 15:12:03
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.395	3299.584	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.349	4904.419	5.000000	1.200000	44.72136	95.00000
CM-244	5535.593	5884.350	7.000000	1.680000	37.79645	95.00000

Instrument : CHAMBER 079
Detector : 67598
Background Analysis Date/Time : 5-JUL-2009 15:12:03
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.535	3297.935	1.000000	0.2400000	100.0000	95.00000
NP-237	4435.153	4903.332	3.000000	0.7200001	57.73503	95.00000
CM-244	5530.500	5882.333	4.000000	0.9600002	50.00000	95.00000

Instrument : CHAMBER 080
Detector : 78197
Background Analysis Date/Time : 5-JUL-2009 15:12:03
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.338	3298.189	3.000000	0.7200001	57.73503	95.00000
NP-237	4434.851	4901.472	10.00000	2.400000	31.62278	95.00000
CM-244	5531.493	5883.930	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 081
Detector : 72533
Background Analysis Date/Time : 5-JUL-2009 15:12:03
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2985.980	3302.417	1.000000	0.2400000	100.0000	95.00000
NP-237	4432.287	4905.979	5.000000	1.200000	44.72136	95.00000
CM-244	5534.795	5885.572	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 082
Detector : 64263
Background Analysis Date/Time : 5-JUL-2009 15:12:03
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.419	3298.608	1.000000	0.2400000	100.0000	95.00000
NP-237	4437.000	4905.115	7.000000	1.680000	37.79645	95.00000
CM-244	5534.320	5885.085	9.000000	2.160000	33.33334	95.00000

Instrument : CHAMBER 083
Detector : 64278
Background Analysis Date/Time : 5-JUL-2009 15:12:04
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.455	3299.407	2.000000	0.4800001	70.71068	95.00000
NP-237	4433.838	4906.607	13.00000	3.120001	27.73501	95.00000
CM-244	5532.253	5885.057	13.00000	3.120001	27.73501	95.00000

Instrument : CHAMBER 084
Detector : 78265
Background Analysis Date/Time : 5-JUL-2009 15:12:04
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.133	3299.227	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.289	4901.844	8.000000	1.920000	35.35534	95.00000
CM-244	5535.275	5884.618	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 085
Detector : 78776
Background Analysis Date/Time : 5-JUL-2009 15:12:04
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.612	3299.207	2.000000	0.4800001	70.71068	95.00000
NP-237	4434.183	4901.520	9.000000	2.160001	33.33334	95.00000
CM-244	5533.754	5882.654	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 086
Detector : 78198
Background Analysis Date/Time : 5-JUL-2009 15:12:04
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.886	3300.091	3.000000	0.7200001	57.73503	95.00000
NP-237	4433.582	4903.927	6.000000	1.440000	40.82483	95.00000
CM-244	5531.751	5882.863	5.000000	1.200000	44.72136	95.00000

Instrument : CHAMBER 087
Detector : 78199
Background Analysis Date/Time : 5-JUL-2009 15:12:04
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.385	3299.009	4.000000	0.9600002	50.00000	95.00000
NP-237	4436.772	4904.542	10.00000	2.400001	31.62278	95.00000
CM-244	5534.083	5883.178	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 088
Detector : 33452
Background Analysis Date/Time : 5-JUL-2009 15:12:04
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.970	3298.296	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.463	4902.334	8.000000	1.920000	35.35534	95.00000
CM-244	5534.583	5887.587	9.000000	2.160001	33.33334	95.00000

Instrument : CHAMBER 089
Detector : 78262
Background Analysis Date/Time : 5-JUL-2009 15:12:04
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.075	3297.767	4.000000	0.9599994	50.00000	95.00000
NP-237	4432.406	4901.978	7.000000	1.679999	37.79645	95.00000
CM-244	5532.097	5882.869	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 090
Detector : 78263
Background Analysis Date/Time : 5-JUL-2009 15:12:04
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.462	3300.982	1.000000	0.2399998	100.0000	95.00000
NP-237	4434.552	4903.775	8.000000	1.919999	35.35534	95.00000
CM-244	5532.754	5885.804	3.000000	0.7199996	57.73503	95.00000

Instrument : CHAMBER 091
Detector : 78259
Background Analysis Date/Time : 5-JUL-2009 15:12:04
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.268	3298.949	1.000000	0.2399998	100.0000	95.00000
NP-237	4433.436	4901.824	7.000000	1.679999	37.79645	95.00000
CM-244	5531.214	5887.413	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 092
Detector : 79457
Background Analysis Date/Time : 5-JUL-2009 15:12:04
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.198	3300.849	49.00000	11.75999	14.28572	95.00000
NP-237	4435.896	4905.687	19.00000	4.559997	22.94157	95.00000
CM-244	5533.567	5885.099	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 093
Detector : 33206
Background Analysis Date/Time : 5-JUL-2009 15:12:04
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.963	3299.960	1.000000	0.2399998	100.0000	95.00000
NP-237	4434.063	4902.978	9.000000	2.159999	33.33334	95.00000
CM-244	5531.085	5883.424	2.000000	0.4799997	70.71068	95.00000

Instrument : CHAMBER 094
Detector : 78267
Background Analysis Date/Time : 5-JUL-2009 15:12:04
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.912	3298.303	4.000000	0.9599994	50.00000	95.00000
NP-237	4435.971	4905.664	4.000000	0.9599994	50.00000	95.00000
CM-244	5534.211	5886.502	4.000000	0.9599994	50.00000	95.00000

Instrument : CHAMBER 095
Detector : 64279
Background Analysis Date/Time : 5-JUL-2009 15:12:05
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.056	3301.826	3.000000	0.7199996	57.73503	95.00000
NP-237	4435.330	4905.275	10.00000	2.399998	31.62278	95.00000
CM-244	5534.057	5886.430	24.00000	5.759996	20.41241	95.00000

Instrument : CHAMBER 096
Detector : 67605
Background Analysis Date/Time : 8-JUL-2009 15:03:56
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.311	3298.177	2.000000	0.4799997	70.71068	95.00000
NP-237	4434.251	4906.198	29.00000	6.959996	18.56953	95.00000
CM-244	5533.120	5882.408	2.000000	0.4799997	70.71068	95.00000

Instrument : CHAMBER 097
Detector : 67599
Background Analysis Date/Time : 5-JUL-2009 15:12:05
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.746	3302.068	2.000000	0.4799997	70.71068	95.00000
NP-237	4437.101	4903.794	1.000000	0.2399998	100.0000	95.00000
CM-244	5531.052	5886.116	14.00000	3.359998	26.72612	95.00000

Instrument : CHAMBER 098
Detector : 68644
Background Analysis Date/Time : 5-JUL-2009 15:12:05
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.589	3298.128	1.000000	0.2399998	100.0000	95.00000
NP-237	4432.836	4901.640	12.00000	2.879998	28.86751	95.00000
CM-244	5531.873	5883.257	2.000000	0.4799997	70.71068	95.00000

Instrument : CHAMBER 099
Detector : 70317
Background Analysis Date/Time : 5-JUL-2009 15:12:05
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.876	3301.163	3.000000	0.7199996	57.73503	95.00000
NP-237	4434.526	4903.945	4.000000	0.9599994	50.00000	95.00000
CM-244	5533.432	5886.885	7.000000	1.679999	37.79645	95.00000

Instrument : CHAMBER 100
Detector : 79456
Background Analysis Date/Time : 5-JUL-2009 15:12:05
Background Count Time : 59999.99

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.287	3297.799	2.000000	0.4799997	70.71068	95.00000
NP-237	4436.422	4905.631	13.00000	3.119998	27.73501	95.00000
CM-244	5534.572	5887.590	7.000000	1.679999	37.79645	95.00000

Instrument : CHAMBER 101
Detector : 64253
Background Analysis Date/Time : 5-JUL-2009 15:12:06
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.433	3299.297	2.000000	0.4800001	70.71068	95.00000
NP-237	4436.714	4901.796	4.000000	0.9600002	50.00000	95.00000
CM-244	5531.777	5885.188	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 102
Detector : 72525
Background Analysis Date/Time : 5-JUL-2009 15:12:06
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.102	3300.657	3.000000	0.7200001	57.73503	95.00000
NP-237	4432.858	4904.949	7.000000	1.680000	37.79645	95.00000
CM-244	5531.106	5882.690	2.000000	0.4800001	70.71068	95.00000

Instrument : CHAMBER 103
Detector : 79461
Background Analysis Date/Time : 5-JUL-2009 15:12:06
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.996	3300.314	1.000000	0.2400000	100.0000	95.00000
NP-237	4436.805	4901.981	2.000000	0.4800001	70.71068	95.00000
CM-244	5532.506	5886.425	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 104
Detector : 72524
Background Analysis Date/Time : 5-JUL-2009 15:12:06
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.719	3300.868	1.000000	0.2400000	100.0000	95.00000
NP-237	4437.132	4904.901	12.00000	2.880001	28.86751	95.00000
CM-244	5531.506	5883.017	4.000000	0.9600002	50.00000	95.00000

Instrument : CHAMBER 105
Detector : 78777
Background Analysis Date/Time : 5-JUL-2009 15:12:06
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.574	3300.708	1.000000	0.2400000	100.0000	95.00000
NP-237	4435.406	4903.467	4.000000	0.9600002	50.00000	95.00000
CM-244	5531.275	5883.854	1.000000	0.2400000	100.0000	95.00000

Instrument : CHAMBER 106
Detector : 64274
Background Analysis Date/Time : 5-JUL-2009 15:12:06
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.941	3301.958	4.000000	0.9600002	50.00000	95.00000
NP-237	4435.855	4902.069	6.000000	1.440000	40.82483	95.00000
CM-244	5534.023	5883.359	3.000000	0.7200001	57.73503	95.00000

Instrument : CHAMBER 107
Detector : 67578
Background Analysis Date/Time : 5-JUL-2009 15:12:07
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.523	3301.257	5.000000	1.199999	44.72136	95.00000
NP-237	4435.381	4903.438	5.000000	1.199999	44.72136	95.00000
CM-244	5532.229	5882.600	2.000000	0.4799997	70.71068	95.00000

Instrument : CHAMBER 108
Detector : 78778
Background Analysis Date/Time : 5-JUL-2009 15:12:07
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.937	3298.136	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.160	4903.491	6.000000	1.439999	40.82483	95.00000
CM-244	5531.067	5883.227	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 109
Detector : 79463
Background Analysis Date/Time : 5-JUL-2009 15:12:07
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.195	3299.997	2.000000	0.4799997	70.71068	95.00000
NP-237	4435.631	4906.161	7.000000	1.679999	37.79645	95.00000
CM-244	5531.938	5886.333	2.000000	0.4799997	70.71068	95.00000

Instrument : CHAMBER 110
Detector : 67602
Background Analysis Date/Time : 5-JUL-2009 15:12:07
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.370	3301.157	2.000000	0.4799997	70.71068	95.00000
NP-237	4436.284	4904.992	4.000000	0.9599993	50.00000	95.00000
CM-244	5535.250	5883.287	6.000000	1.439999	40.82483	95.00000

Instrument : CHAMBER 111
Detector : 79462
Background Analysis Date/Time : 5-JUL-2009 15:12:07
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.820	3300.305	5.000000	1.199999	44.72136	95.00000
NP-237	4436.744	4905.500	6.000000	1.439999	40.82483	95.00000
CM-244	5535.002	5885.661	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 112
Detector : 78261
Background Analysis Date/Time : 5-JUL-2009 15:12:07
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.969	3300.635	3.000000	0.7199995	57.73503	95.00000
NP-237	4436.114	4905.135	7.000000	1.679999	37.79645	95.00000
CM-244	5532.983	5884.981	1.000000	0.2399998	100.0000	95.00000

Instrument : CHAMBER 113
Detector : 45-111B4
Background Analysis Date/Time : 12-JUL-2009 18:14:41
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.779	3298.785	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.559	4905.331	6.000000	1.800000	40.82483	95.00000
CM-244	5530.517	5883.481	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 114
Detector : 78258
Background Analysis Date/Time : 12-JUL-2009 18:14:46
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.441	3298.868	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.900	4905.218	5.000000	1.500000	44.72136	95.00000
CM-244	5530.599	5885.790	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 115
Detector : 45-132FF4
Background Analysis Date/Time : 12-JUL-2009 18:14:50
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.839	3301.816	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.001	4902.052	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.697	5884.118	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 116
Detector : 45-132FF2
Background Analysis Date/Time : 12-JUL-2009 18:14:55
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.005	3302.013	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.895	4903.021	6.000000	1.800000	40.82483	95.00000
CM-244	5531.311	5883.052	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 117
Detector : 33450
Background Analysis Date/Time : 12-JUL-2009 18:15:00
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.173	3300.224	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.403	4904.427	5.000000	1.500000	44.72136	95.00000
CM-244	5533.135	5885.381	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 118
Detector : 75544
Background Analysis Date/Time : 12-JUL-2009 18:15:04
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.199	3301.179	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4437.404	4902.417	2.000000	0.6000000	70.71068	95.00000
CM-244	5530.853	5882.689	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 119
Detector : 74429
Background Analysis Date/Time : 12-JUL-2009 18:15:09
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.004	3299.253	3.000000	0.9000000	57.73503	95.00000
NP-237	4432.548	4906.013	1.000000	0.3000000	100.0000	95.00000
CM-244	5530.584	5883.165	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 120
Detector : 74430
Background Analysis Date/Time : 12-JUL-2009 18:15:13
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.522	3298.404	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.328	4903.588	4.000000	1.200000	50.00000	95.00000
CM-244	5534.528	5884.756	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 121
Detector : 75545
Background Analysis Date/Time : 12-JUL-2009 18:15:18
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.023	3300.631	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.658	4901.599	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.997	5885.295	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 122
Detector : 75546
Background Analysis Date/Time : 12-JUL-2009 18:15:22
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.563	3298.589	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.782	4905.890	5.000000	1.500000	44.72136	95.00000
CM-244	5532.955	5884.078	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 123
Detector : 45-142V3
Background Analysis Date/Time : 12-JUL-2009 18:15:27
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.850	3299.223	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4437.241	4905.636	4.000000	1.200000	50.00000	95.00000
CM-244	5531.191	5886.517	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 124
Detector : 45-142V2
Background Analysis Date/Time : 12-JUL-2009 18:15:31
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.169	3298.838	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.514	4905.983	2.000000	0.6000000	70.71068	95.00000
CM-244	5535.498	5887.649	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 125
Detector : 75547
Background Analysis Date/Time : 12-JUL-2009 18:15:35
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.438	3299.892	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.342	4903.042	3.000000	0.9000000	57.73503	95.00000
CM-244	5533.267	5883.118	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 126
Detector : 75548
Background Analysis Date/Time : 12-JUL-2009 18:15:39
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.642	3299.863	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.022	4903.287	10.00000	3.000000	31.62278	95.00000
CM-244	5533.750	5882.833	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 127
Detector : 78770
Background Analysis Date/Time : 12-JUL-2009 18:15:43
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.930	3300.925	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.404	4902.114	4.000000	1.200000	50.00000	95.00000
CM-244	5533.832	5884.575	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 128
Detector : 75549
Background Analysis Date/Time : 12-JUL-2009 18:15:48
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.441	3299.762	3.000000	0.9000000	57.73503	95.00000
NP-237	4437.479	4901.607	5.000000	1.500000	44.72136	95.00000
CM-244	5532.807	5882.614	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 129
Detector : 76227
Background Analysis Date/Time : 12-JUL-2009 18:15:53
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.626	3298.866	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.006	4901.792	4.000000	1.200000	50.00000	95.00000
CM-244	5532.320	5882.430	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 130
Detector : 76228
Background Analysis Date/Time : 12-JUL-2009 18:15:58
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.724	3301.129	4.000000	1.200000	50.00000	95.00000
NP-237	4432.733	4905.256	8.000000	2.400000	35.35534	95.00000
CM-244	5534.221	5882.991	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 131
Detector : 33448
Background Analysis Date/Time : 12-JUL-2009 18:16:03
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.041	3301.703	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.470	4901.500	6.000000	1.800000	40.82483	95.00000
CM-244	5535.040	5887.344	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 132
Detector : 67579
Background Analysis Date/Time : 12-JUL-2009 18:16:07
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.722	3299.982	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.189	4902.037	8.000000	2.400000	35.35534	95.00000
CM-244	5533.193	5884.042	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 133
Detector : 76229
Background Analysis Date/Time : 12-JUL-2009 18:16:11
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.784	3301.677	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.798	4901.797	5.000000	1.500000	44.72136	95.00000
CM-244	5532.072	5884.338	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 134
Detector : 76230
Background Analysis Date/Time : 12-JUL-2009 18:16:16
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.526	3299.017	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.982	4903.287	19.00000	5.700000	22.94157	95.00000
CM-244	5532.080	5886.000	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 135
Detector : 64270
Background Analysis Date/Time : 12-JUL-2009 18:16:20
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.277	3299.628	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.221	4904.200	5.000000	1.500000	44.72136	95.00000
CM-244	5533.869	5883.613	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 136
Detector : 68549
Background Analysis Date/Time : 12-JUL-2009 18:16:24
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.353	3301.238	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.739	4902.455	15.00000	4.500000	25.81989	95.00000
CM-244	5530.869	5887.561	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 137
Detector : 64288
Background Analysis Date/Time : 12-JUL-2009 18:16:27
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.740	3300.102	3.000000	0.9000000	57.73503	95.00000
NP-237	4437.224	4902.644	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.374	5886.101	13.00000	3.900000	27.73501	95.00000

Instrument : CHAMBER 138
Detector : 65877
Background Analysis Date/Time : 12-JUL-2009 18:16:31
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.573	3299.020	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.563	4906.044	32.00000	9.600000	17.67767	95.00000
CM-244	5532.867	5887.098	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 139
Detector : 76231
Background Analysis Date/Time : 12-JUL-2009 18:16:35
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.505	3300.432	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.030	4903.806	6.000000	1.800000	40.82483	95.00000
CM-244	5532.176	5884.231	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 140
Detector : 78771
Background Analysis Date/Time : 12-JUL-2009 18:16:39
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.854	3298.685	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.882	4903.279	10.00000	3.000000	31.62278	95.00000
CM-244	5532.806	5885.667	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 141
Detector : 76232
Background Analysis Date/Time : 12-JUL-2009 18:16:43
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.144	3299.081	4.000000	1.200000	50.00000	95.00000
NP-237	4432.714	4902.455	11.00000	3.300000	30.15113	95.00000
CM-244	5530.738	5882.724	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 142
Detector : 64261
Background Analysis Date/Time : 12-JUL-2009 18:16:47
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.865	3298.794	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.947	4903.147	17.00000	5.100000	24.25356	95.00000
CM-244	5532.255	5884.805	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 143
Detector : 65882
Background Analysis Date/Time : 12-JUL-2009 18:16:51
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.701	3299.952	4.000000	1.200000	50.00000	95.00000
NP-237	4432.480	4904.917	14.00000	4.200000	26.72612	95.00000
CM-244	5535.542	5887.375	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 144
Detector : 75551
Background Analysis Date/Time : 12-JUL-2009 18:16:55
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.490	3300.379	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.137	4902.257	6.000000	1.800000	40.82483	95.00000
CM-244	5534.787	5886.106	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 145
Detector : 72526
Background Analysis Date/Time : 12-JUL-2009 18:16:59
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.366	3298.098	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.265	4904.885	7.000000	2.100000	37.79645	95.00000
CM-244	5534.192	5886.678	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 146
Detector : 72527
Background Analysis Date/Time : 12-JUL-2009 18:17:03
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.494	3297.950	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.761	4904.596	6.000000	1.800000	40.82483	95.00000
CM-244	5530.438	5886.440	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 147
Detector : 75550
Background Analysis Date/Time : 12-JUL-2009 18:17:07
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.763	3300.677	8.000000	2.400000	35.35534	95.00000
NP-237	4433.256	4902.183	15.00000	4.500000	25.81989	95.00000
CM-244	5534.346	5885.412	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 148
Detector : 74429
Background Analysis Date/Time : 12-JUL-2009 18:17:10
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.918	3302.313	6.000000	1.800000	40.82483	95.00000
NP-237	4434.677	4904.245	11.00000	3.300000	30.15113	95.00000
CM-244	5532.604	5884.780	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 149
Detector : 33449
Background Analysis Date/Time : 12-JUL-2009 18:17:14
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.126	3302.099	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.957	4903.766	6.000000	1.800000	40.82483	95.00000
CM-244	5532.840	5885.608	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 150
Detector : 75552
Background Analysis Date/Time : 12-JUL-2009 18:17:18
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.847	3298.390	5.000000	1.500000	44.72136	95.00000
NP-237	4433.411	4903.355	5.000000	1.500000	44.72136	95.00000
CM-244	5531.584	5883.380	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 151
Detector : 75556
Background Analysis Date/Time : 12-JUL-2009 18:17:22
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.196	3299.830	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.520	4904.128	2.000000	0.6000000	70.71068	95.00000
CM-244	5532.939	5887.339	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 152
Detector : 76222
Background Analysis Date/Time : 12-JUL-2009 18:17:26
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.335	3299.767	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.085	4902.709	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.813	5882.589	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 153
Detector : 76223
Background Analysis Date/Time : 12-JUL-2009 18:17:30
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.763	3301.789	7.000000	2.100000	37.79645	95.00000
NP-237	4432.699	4901.612	7.000000	2.100000	37.79645	95.00000
CM-244	5534.359	5886.038	11.00000	3.300000	30.15113	95.00000

Instrument : CHAMBER 154
Detector : 76224
Background Analysis Date/Time : 12-JUL-2009 18:17:34
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.543	3301.969	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.171	4901.699	2.000000	0.6000000	70.71068	95.00000
CM-244	5533.478	5884.401	4.000000	1.200000	50.00000	95.00000

Instrument : CHAMBER 155
Detector : 75553
Background Analysis Date/Time : 12-JUL-2009 18:17:38
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.863	3299.267	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.628	4901.683	4.000000	1.200000	50.00000	95.00000
CM-244	5532.390	5885.923	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 156
Detector : 75554
Background Analysis Date/Time : 12-JUL-2009 18:17:42
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.492	3302.387	4.000000	1.200000	50.00000	95.00000
NP-237	4436.746	4903.077	15.00000	4.500000	25.81989	95.00000
CM-244	5533.286	5886.114	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 157
Detector : 75555
Background Analysis Date/Time : 12-JUL-2009 18:17:46
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.092	3301.029	5.000000	1.500000	44.72136	95.00000
NP-237	4432.881	4903.879	12.00000	3.600000	28.86751	95.00000
CM-244	5533.745	5886.569	13.00000	3.900000	27.73501	95.00000

Instrument : CHAMBER 158
Detector : 33451
Background Analysis Date/Time : 12-JUL-2009 18:17:50
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.224	3299.662	4.000000	1.200000	50.00000	95.00000
NP-237	4433.214	4902.387	14.00000	4.200000	26.72612	95.00000
CM-244	5532.016	5882.536	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 159
Detector : 76225
Background Analysis Date/Time : 12-JUL-2009 18:17:54
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.518	3300.013	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.310	4906.501	6.000000	1.800000	40.82483	95.00000
CM-244	5532.775	5886.617	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 160
Detector : 76226
Background Analysis Date/Time : 12-JUL-2009 18:17:58
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.201	3297.681	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.389	4904.545	8.000000	2.400000	35.35534	95.00000
CM-244	5531.162	5885.243	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 161
Detector : 70321
Background Analysis Date/Time : 19-JUL-2009 13:08:31
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.000	3299.306	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.547	4904.892	11.00000	3.300000	30.15113	95.00000
CM-244	5532.420	5884.522	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 162
Detector : 70323
Background Analysis Date/Time : 19-JUL-2009 13:08:36
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.757	3298.334	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.446	4905.658	4.000000	1.200000	50.00000	95.00000
CM-244	5531.781	5882.612	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 163
Detector : 70324
Background Analysis Date/Time : 19-JUL-2009 13:08:40
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.922	3300.358	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.910	4905.359	19.00000	5.700000	22.94157	95.00000
CM-244	5534.127	5886.809	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 164
Detector : 70325
Background Analysis Date/Time : 19-JUL-2009 13:08:44
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.018	3297.699	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.306	4904.250	9.000000	2.700000	33.33334	95.00000
CM-244	5533.729	5886.834	9.000000	2.700000	33.33334	95.00000

Instrument : CHAMBER 165
Detector : 72544
Background Analysis Date/Time : 19-JUL-2009 13:08:49
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.844	3302.139	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.670	4904.543	11.00000	3.300000	30.15113	95.00000
CM-244	5533.515	5886.135	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 166
Detector : 74545
Background Analysis Date/Time : 19-JUL-2009 13:08:54
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.919	3301.734	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.352	4903.208	6.000000	1.800000	40.82483	95.00000
CM-244	5532.473	5885.411	10.00000	3.000000	31.62278	95.00000

Instrument : CHAMBER 167
Detector : 72546
Background Analysis Date/Time : 19-JUL-2009 13:08:58
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.456	3297.909	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.461	4902.876	7.000000	2.100000	37.79645	95.00000
CM-244	5531.568	5884.192	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 168
Detector : 72547
Background Analysis Date/Time : 19-JUL-2009 13:09:03
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.191	3302.241	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.272	4904.107	10.00000	3.000000	31.62278	95.00000
CM-244	5533.178	5885.925	7.000000	2.100000	37.79645	95.00000

Instrument : CHAMBER 169
Detector : 72548
Background Analysis Date/Time : 19-JUL-2009 13:09:07
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.882	3298.026	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.930	4902.295	20.00000	6.000000	22.36068	95.00000
CM-244	5531.111	5883.897	12.00000	3.600000	28.86751	95.00000

Instrument : CHAMBER 170
Detector : 72549
Background Analysis Date/Time : 19-JUL-2009 13:09:11
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.026	3302.433	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.863	4906.064	7.000000	2.100000	37.79645	95.00000
CM-244	5532.657	5887.477	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 171
Detector : 78260
Background Analysis Date/Time : 19-JUL-2009 13:09:16
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.883	3301.923	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.363	4904.564	11.00000	3.300000	30.15113	95.00000
CM-244	5534.294	5887.494	6.000000	1.800000	40.82483	95.00000

Instrument : CHAMBER 172
Detector : 78772
Background Analysis Date/Time : 19-JUL-2009 13:09:20
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.947	3302.414	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.288	4903.064	6.000000	1.800000	40.82483	95.00000
CM-244	5532.422	5885.508	5.000000	1.500000	44.72136	95.00000

Instrument : CHAMBER 173
Detector : 74431
Background Analysis Date/Time : 19-JUL-2009 13:09:25
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.296	3300.266	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.390	4906.583	5.000000	1.500000	44.72136	95.00000
CM-244	5534.964	5886.757	17.00000	5.100000	24.25356	95.00000

Instrument : CHAMBER 174
Detector : 74432
Background Analysis Date/Time : 19-JUL-2009 13:09:29
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.955	3301.951	3.000000	0.9000000	57.73503	95.00000
NP-237	4436.112	4905.743	7.000000	2.100000	37.79645	95.00000
CM-244	5531.741	5886.720	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 175
Detector : 74433
Background Analysis Date/Time : 19-JUL-2009 13:09:34
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.808	3301.771	2.000000	0.6000000	70.71068	95.00000
NP-237	4437.598	4902.379	3.000000	0.9000000	57.73503	95.00000
CM-244	5530.438	5887.378	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 176
Detector : 74434
Background Analysis Date/Time : 19-JUL-2009 13:09:39
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.124	3298.749	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.658	4904.539	5.000000	1.500000	44.72136	95.00000
CM-244	5533.031	5884.495	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 177
Detector : 74435
Background Analysis Date/Time : 19-JUL-2009 13:09:43
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.035	3300.055	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.061	4906.072	4.000000	1.200000	50.00000	95.00000
CM-244	5534.094	5885.629	20.00000	6.000000	22.36068	95.00000

Instrument : CHAMBER 178
Detector : 74436
Background Analysis Date/Time : 19-JUL-2009 13:09:47
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.331	3301.630	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.348	4903.642	11.00000	3.300000	30.15113	95.00000
CM-244	5531.998	5883.700	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 179
Detector : 74437
Background Analysis Date/Time : 19-JUL-2009 13:09:52
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.102	3300.165	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.443	4906.617	6.000000	1.800000	40.82483	95.00000
CM-244	5534.901	5886.605	25.00000	7.500000	20.00000	95.00000

Instrument : CHAMBER 180
Detector : 74438
Background Analysis Date/Time : 19-JUL-2009 13:09:56
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.611	3299.257	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.245	4903.299	9.000000	2.700000	33.33334	95.00000
CM-244	5535.594	5886.061	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 181
Detector : 74439
Background Analysis Date/Time : 19-JUL-2009 13:10:01
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.239	3301.914	2.000000	0.6000000	70.71068	95.00000
NP-237	4437.080	4901.757	3.000000	0.9000000	57.73503	95.00000
CM-244	5535.131	5886.836	26.00000	7.800000	19.61161	95.00000

Instrument : CHAMBER 182
Detector : 74440
Background Analysis Date/Time : 19-JUL-2009 13:10:05
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.998	3301.429	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.415	4901.861	6.000000	1.800000	40.82483	95.00000
CM-244	5533.907	5884.511	30.00000	9.000000	18.25742	95.00000

Instrument : CHAMBER 183
Detector : 74441
Background Analysis Date/Time : 19-JUL-2009 13:10:09
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.448	3298.556	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.882	4905.025	5.000000	1.500000	44.72136	95.00000
CM-244	5533.221	5884.854	26.00000	7.800000	19.61161	95.00000

Instrument : CHAMBER 184
Detector : 74442
Background Analysis Date/Time : 19-JUL-2009 13:10:15
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.235	3300.018	3.000000	0.9000000	57.73503	95.00000
NP-237	4434.314	4904.409	4.000000	1.200000	50.00000	95.00000
CM-244	5531.386	5887.098	30.00000	9.000000	18.25742	95.00000

Instrument : CHAMBER 185
Detector : 68615
Background Analysis Date/Time : 19-JUL-2009 13:10:19
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.225	3297.857	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.385	4903.692	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.756	5883.696	28.00000	8.400001	18.89822	95.00000

Instrument : CHAMBER 186
Detector : 68616
Background Analysis Date/Time : 19-JUL-2009 13:10:23
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.440	3298.282	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.254	4901.541	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.251	5884.261	30.00000	9.000000	18.25742	95.00000

Instrument : CHAMBER 187
Detector : 68620
Background Analysis Date/Time : 19-JUL-2009 13:10:27
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.912	3299.166	3.000000	0.9000000	57.73503	95.00000
NP-237	4432.442	4904.149	11.00000	3.300000	30.15113	95.00000
CM-244	5535.067	5883.156	22.00000	6.600000	21.32007	95.00000

Instrument : CHAMBER 188
Detector : 68621
Background Analysis Date/Time : 19-JUL-2009 13:10:31
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.283	3302.165	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.129	4903.527	2.000000	0.6000000	70.71068	95.00000
CM-244	5532.390	5884.553	29.00000	8.700001	18.56953	95.00000

Instrument : CHAMBER 189
Detector : 68622
Background Analysis Date/Time : 19-JUL-2009 13:10:35
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.652	3299.552	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.579	4902.841	6.000000	1.800000	40.82483	95.00000
CM-244	5534.475	5885.420	43.00000	12.90000	15.24986	95.00000

Instrument : CHAMBER 190
Detector : 68623
Background Analysis Date/Time : 19-JUL-2009 13:10:39
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.900	3302.388	5.000000	1.500000	44.72136	95.00000
NP-237	4434.198	4903.145	22.00000	6.600000	21.32007	95.00000
CM-244	5535.637	5887.028	30.00000	9.000000	18.25742	95.00000

Instrument : CHAMBER 191
Detector : 68624
Background Analysis Date/Time : 19-JUL-2009 13:10:43
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.514	3302.389	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.396	4902.283	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.230	5883.124	16.00000	4.800000	25.00000	95.00000

Instrument : CHAMBER 192
Detector : 74430
Background Analysis Date/Time : 19-JUL-2009 13:10:47
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.042	3298.270	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.778	4903.324	5.000000	1.500000	44.72136	95.00000
CM-244	5534.357	5882.529	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 193
Detector : 68627
Background Analysis Date/Time : 19-JUL-2009 13:10:51
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.069	3299.225	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.121	4901.609	5.000000	1.500000	44.72136	95.00000
CM-244	5534.158	5885.907	25.00000	7.500000	20.00000	95.00000

Instrument : CHAMBER 194
Detector : 68635
Background Analysis Date/Time : 19-JUL-2009 13:10:55
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.572	3300.603	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.435	4905.175	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.274	5883.671	22.00000	6.600000	21.32007	95.00000

Instrument : CHAMBER 195
Detector : 68636
Background Analysis Date/Time : 19-JUL-2009 13:10:59
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.629	3301.408	5.000000	1.500000	44.72136	95.00000
NP-237	4433.877	4902.925	52.00000	15.60000	13.86751	95.00000
CM-244	5535.397	5886.705	43.00000	12.90000	15.24986	95.00000

Instrument : CHAMBER 196
Detector : 68637
Background Analysis Date/Time : 19-JUL-2009 13:11:03
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.343	3302.501	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.338	4901.979	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.144	5885.395	20.00000	6.000000	22.36068	95.00000

Instrument : CHAMBER 197
Detector : 78894
Background Analysis Date/Time : 19-JUL-2009 13:11:08
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.389	3297.669	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.236	4904.076	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.086	5887.165	19.00000	5.700000	22.94157	95.00000

Instrument : CHAMBER 198
Detector : 78895
Background Analysis Date/Time : 19-JUL-2009 13:11:12
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.288	3302.314	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.287	4906.224	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.818	5887.000	15.00000	4.500000	25.81989	95.00000

Instrument : CHAMBER 199
Detector : 78896
Background Analysis Date/Time : 19-JUL-2009 13:11:16
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.202	3299.048	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.598	4906.357	2.000000	0.6000000	70.71068	95.00000
CM-244	5530.513	5883.049	21.00000	6.300000	21.82179	95.00000

Instrument : CHAMBER 200
Detector : 78900
Background Analysis Date/Time : 19-JUL-2009 13:11:20
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.598	3302.306	3.000000	0.9000000	57.73503	95.00000
NP-237	4436.820	4902.466	15.00000	4.500000	25.81989	95.00000
CM-244	5532.933	5886.480	31.00000	9.300000	17.96053	95.00000

Instrument : CHAMBER 201
Detector : 78902
Background Analysis Date/Time : 19-JUL-2009 13:11:24
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.239	3302.324	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.525	4903.539	4.000000	1.200000	50.00000	95.00000
CM-244	5534.042	5887.523	22.00000	6.600000	21.32007	95.00000

Instrument : CHAMBER 202
Detector : 78903
Background Analysis Date/Time : 19-JUL-2009 13:11:29
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.965	3301.750	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.262	4905.190	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5533.929	5886.269	31.00000	9.300000	17.96053	95.00000

Instrument : CHAMBER 203
Detector : 78905
Background Analysis Date/Time : 19-JUL-2009 13:11:32
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.960	3299.739	5.000000	1.500000	44.72136	95.00000
NP-237	4435.540	4905.766	9.000000	2.700000	33.33334	95.00000
CM-244	5534.337	5886.308	25.00000	7.500000	20.00000	95.00000

Instrument : CHAMBER 204
Detector : 78907
Background Analysis Date/Time : 19-JUL-2009 13:11:37
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.953	3297.878	13.00000	3.900000	27.73501	95.00000
NP-237	4437.339	4902.439	14.00000	4.200000	26.72612	95.00000
CM-244	5531.727	5884.400	31.00000	9.300000	17.96053	95.00000

Instrument : CHAMBER 205
Detector : 78908
Background Analysis Date/Time : 19-JUL-2009 13:11:41
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.664	3299.649	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.348	4904.923	3.000000	0.9000000	57.73503	95.00000
CM-244	5534.662	5887.628	18.00000	5.400000	23.57022	95.00000

Instrument : CHAMBER 206
Detector : 78909
Background Analysis Date/Time : 19-JUL-2009 13:11:45
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.007	3298.921	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.777	4902.746	2.000000	0.6000000	70.71068	95.00000
CM-244	5531.452	5883.730	22.00000	6.600000	21.32007	95.00000

Instrument : CHAMBER 207
Detector : 78910
Background Analysis Date/Time : 19-JUL-2009 13:11:49
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.143	3301.594	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.296	4902.779	2.000000	0.6000000	70.71068	95.00000
CM-244	5532.449	5885.271	25.00000	7.500000	20.00000	95.00000

Instrument : CHAMBER 208
Detector : 78911
Background Analysis Date/Time : 19-JUL-2009 13:11:53
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.612	3298.165	3.000000	0.9000000	57.73503	95.00000
NP-237	4434.097	4904.804	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.389	5887.108	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 209
Detector : 79188
Background Analysis Date/Time : 28-JUN-2009 17:00:00
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.181	3301.049	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.021	4903.097	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5532.718	5885.886	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 210
Detector : 79189
Background Analysis Date/Time : 28-JUN-2009 17:00:05
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.859	3297.943	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.076	4904.812	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5533.646	5886.210	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 211
Detector : 79190
Background Analysis Date/Time : 28-JUN-2009 17:00:09
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.624	3301.653	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.794	4902.468	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.766	5886.120	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 212
Detector : 79191
Background Analysis Date/Time : 28-JUN-2009 17:00:13
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.287	3301.382	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4434.079	4904.410	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.335	5887.654	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 213
Detector : 79192
Background Analysis Date/Time : 28-JUN-2009 17:00:17
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.968	3298.520	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4437.380	4902.572	2.000000	0.6000000	70.71068	95.00000
CM-244	5532.282	5885.336	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 214
Detector : 79193
Background Analysis Date/Time : 28-JUN-2009 17:00:21
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.403	3298.091	1.000000	0.3000000	100.0000	95.00000
NP-237	4437.439	4902.827	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5532.795	5885.993	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 215
Detector : 79194
Background Analysis Date/Time : 28-JUN-2009 17:00:25
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.062	3302.465	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.774	4902.728	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.954	5882.708	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 216
Detector : 79195
Background Analysis Date/Time : 28-JUN-2009 17:00:29
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.227	3300.068	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.095	4904.331	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5533.563	5886.220	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 217
Detector : 79410
Background Analysis Date/Time : 28-JUN-2009 17:00:33
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.213	3299.566	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.215	4903.920	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.328	5882.531	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 218
Detector : 79411
Background Analysis Date/Time : 28-JUN-2009 17:00:38
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.601	3298.221	1.000000	0.3000000	100.0000	95.00000
NP-237	4432.747	4903.769	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5534.561	5882.956	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 219
Detector : 79412
Background Analysis Date/Time : 28-JUN-2009 17:00:42
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.180	3302.094	4.000000	1.200000	50.00000	95.00000
NP-237	4436.774	4902.239	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5532.237	5885.415	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 220
Detector : 79413
Background Analysis Date/Time : 28-JUN-2009 17:00:46
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.438	3302.525	1.000000	0.3000000	100.0000	95.00000
NP-237	4435.000	4905.156	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5534.774	5882.515	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 221
Detector : 79414
Background Analysis Date/Time : 28-JUN-2009 17:00:50
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.987	3300.655	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.096	4905.038	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.434	5885.564	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 222
Detector : 79415
Background Analysis Date/Time : 28-JUN-2009 17:00:54
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.968	3297.845	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.336	4906.032	2.000000	0.6000000	70.71068	95.00000
CM-244	5530.429	5882.613	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 223
Detector : 79416
Background Analysis Date/Time : 28-JUN-2009 17:00:59
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.801	3297.756	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.980	4902.483	1.000000	0.3000000	100.0000	95.00000
CM-244	5530.752	5886.350	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 224
Detector : 79417
Background Analysis Date/Time : 28-JUN-2009 17:01:03
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.708	3297.620	2.000000	0.6000000	70.71068	95.00000
NP-237	4432.391	4904.314	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5535.163	5883.043	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 225
Detector : 79418
Background Analysis Date/Time : 28-JUN-2009 17:01:07
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.136	3297.838	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.708	4903.892	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.915	5883.445	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 226
Detector : 79419
Background Analysis Date/Time : 28-JUN-2009 17:01:11
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.396	3299.355	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4437.021	4903.289	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.002	5887.398	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 227
Detector : 79420
Background Analysis Date/Time : 28-JUN-2009 17:01:15
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.851	3301.430	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.798	4901.523	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5532.218	5885.954	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 228
Detector : 79421
Background Analysis Date/Time : 28-JUN-2009 17:01:19
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.413	3298.479	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.708	4901.434	2.000000	0.6000000	70.71068	95.00000
CM-244	5531.094	5883.745	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 229
Detector : 79422
Background Analysis Date/Time : 28-JUN-2009 17:01:24
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.428	3300.536	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.659	4902.986	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.392	5883.088	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 230
Detector : 79423
Background Analysis Date/Time : 28-JUN-2009 17:01:28
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.435	3299.126	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.006	4902.037	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5532.506	5885.804	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 231
Detector : 79424
Background Analysis Date/Time : 28-JUN-2009 17:01:32
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.739	3299.860	2.000000	0.6000000	70.71068	95.00000
NP-237	4434.942	4905.625	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5535.464	5883.098	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 232
Detector : 79425
Background Analysis Date/Time : 28-JUN-2009 17:01:36
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.849	3300.399	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.500	4901.412	1.000000	0.3000000	100.0000	95.00000
CM-244	5530.414	5887.598	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 233
Detector : 79426
Background Analysis Date/Time : 28-JUN-2009 17:01:40
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.552	3300.019	3.000000	0.9000000	57.73503	95.00000
NP-237	4437.049	4902.445	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5533.265	5887.350	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 234
Detector : 79427
Background Analysis Date/Time : 28-JUN-2009 17:01:43
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.038	3298.233	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.030	4904.076	1.000000	0.3000000	100.0000	95.00000
CM-244	5534.071	5887.649	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 235
Detector : 79428
Background Analysis Date/Time : 28-JUN-2009 17:01:48
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.263	3301.595	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.665	4901.527	1.000000	0.3000000	100.0000	95.00000
CM-244	5532.636	5886.715	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 236
Detector : 79429
Background Analysis Date/Time : 28-JUN-2009 17:01:52
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.896	3299.376	3.000000	0.9000000	57.73503	95.00000
NP-237	4436.423	4901.814	3.000000	0.9000000	57.73503	95.00000
CM-244	5532.618	5886.688	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 237
Detector : 79430
Background Analysis Date/Time : 28-JUN-2009 17:01:56
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.344	3298.717	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.245	4904.669	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5531.003	5885.403	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 238
Detector : 79431
Background Analysis Date/Time : 28-JUN-2009 17:02:00
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.961	3300.370	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.951	4902.062	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5532.406	5886.179	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 239
Detector : 79432
Background Analysis Date/Time : 28-JUN-2009 17:02:04
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.544	3302.370	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4436.212	4902.679	6.000000	1.800000	40.82483	95.00000
CM-244	5535.220	5884.998	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 240
Detector : 79433
Background Analysis Date/Time : 28-JUN-2009 17:02:08
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.696	3301.853	3.000000	0.9000000	57.73503	95.00000
NP-237	4433.664	4904.733	3.000000	0.9000000	57.73503	95.00000
CM-244	5531.260	5886.094	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 241
Detector : 79434
Background Analysis Date/Time : 28-JUN-2009 17:02:12
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.242	3301.966	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.457	4905.204	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5530.782	5884.826	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 242
Detector : 79435
Background Analysis Date/Time : 28-JUN-2009 17:02:17
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.030	3301.446	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.469	4904.310	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5535.605	5884.633	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 243
Detector : 79436
Background Analysis Date/Time : 28-JUN-2009 17:02:21
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2990.365	3297.486	2.000000	0.6000000	70.71068	95.00000
NP-237	4436.388	4902.306	1.000000	0.3000000	100.0000	95.00000
CM-244	5533.622	5882.491	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 244
Detector : 79437
Background Analysis Date/Time : 28-JUN-2009 17:02:26
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.131	3300.564	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4432.574	4903.374	3.000000	0.9000000	57.73503	95.00000
CM-244	5534.584	5883.551	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 245
Detector : 79438
Background Analysis Date/Time : 28-JUN-2009 17:02:30
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.063	3299.394	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.575	4906.628	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5534.102	5883.894	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 246
Detector : 78912
Background Analysis Date/Time : 28-JUN-2009 17:02:34
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.019	3301.538	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.665	4906.544	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.825	5885.470	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 247
Detector : 79440
Background Analysis Date/Time : 28-JUN-2009 17:02:38
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.774	3301.191	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.556	4903.380	3.000000	0.9000000	57.73503	95.00000
CM-244	5530.809	5885.967	2.000000	0.6000000	70.71068	95.00000

Instrument : CHAMBER 248
Detector : 79441
Background Analysis Date/Time : 28-JUN-2009 17:02:43
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.392	3300.122	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4433.659	4905.293	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5532.437	5887.556	8.000000	2.400000	35.35534	95.00000

Instrument : CHAMBER 249
Detector : 79442
Background Analysis Date/Time : 28-JUN-2009 17:02:46
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.416	3300.577	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.398	4904.007	2.000000	0.6000000	70.71068	95.00000
CM-244	5533.011	5883.893	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 250
Detector : 79443
Background Analysis Date/Time : 28-JUN-2009 17:02:50
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.664	3299.772	1.000000	0.3000000	100.0000	95.00000
NP-237	4433.576	4904.834	2.000000	0.6000000	70.71068	95.00000
CM-244	5531.060	5885.456	3.000000	0.9000000	57.73503	95.00000

Instrument : CHAMBER 251
Detector : 79444
Background Analysis Date/Time : 28-JUN-2009 17:02:54
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.497	3300.693	1.000000	0.3000000	100.0000	95.00000
NP-237	4436.150	4903.399	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5531.737	5887.575	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 252
Detector : 79445
Background Analysis Date/Time : 28-JUN-2009 17:02:58
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2988.592	3300.825	3.000000	0.9000000	57.73503	95.00000
NP-237	4435.553	4902.127	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
CM-244	5534.590	5884.216	1.000000	0.3000000	100.0000	95.00000

Instrument : CHAMBER 253
Detector : 79446
Background Analysis Date/Time : 28-JUN-2009 17:03:02
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2987.654	3300.865	1.000000	0.3000000	100.0000	95.00000
NP-237	4434.573	4903.102	2.000000	0.6000000	70.71068	95.00000
CM-244	5533.082	5884.383	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 254
Detector : 79447
Background Analysis Date/Time : 28-JUN-2009 17:03:06
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2991.549	3298.669	2.000000	0.6000000	70.71068	95.00000
NP-237	4433.543	4905.678	6.000000	1.800000	40.82483	95.00000
CM-244	5533.440	5883.478	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 255
Detector : 79448
Background Analysis Date/Time : 28-JUN-2009 17:03:11
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2992.136	3299.381	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000
NP-237	4435.277	4902.796	1.000000	0.3000000	100.0000	95.00000
CM-244	5531.573	5887.697	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Instrument : CHAMBER 256
Detector : 79449
Background Analysis Date/Time : 28-JUN-2009 17:03:15
Background Count Time : 60000.00

Cal. Isotopes	Start Energy	End Energy	Counts in 1000 min	Counts during Cal	% Error	Confidence
GD-148	2989.020	3301.037	2.000000	0.6000000	70.71068	95.00000
NP-237	4435.346	4901.908	2.000000	0.6000000	70.71068	95.00000
CM-244	5534.491	5884.250	0.0000000E+00	0.0000000E+00	0.0000000E+00	95.00000

Subsection 3: Efficiency Calibration

Instrument : CHAMBER 001
Detector : 78788
Standard ID : AESS-001
Standard Reference Date : 20-FEB-2008 09:54:53
Calibration Analysis Date/Time : 6-JUL-2009 09:46:09
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 6-JUL-2009 14:30:47
Average Efficiency : 0.2968604
Average Efficiency Error : 8.1920959E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.6698	28-FEB-2010	2988.679	3298.848	14368.00	0.2905553	1.2499626E-02	54.37264
NP-237	171.0024	28-FEB-2010	4436.698	4905.866	12378.00	0.3015518	1.5319364E-02	65.40276
CM-244	158.1060	28-FEB-2010	5535.874	5884.629	10862.00	0.3016641	1.5358537E-02	54.23344

Instrument : CHAMBER 002
Detector : 78266
Standard ID : AESS-002
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 6-JUL-2009 09:46:09
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 6-JUL-2009 14:31:01
Average Efficiency : 0.3091908
Average Efficiency Error : 8.5140709E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1144	28-FEB-2010	2987.715	3301.971	14528.00	0.3063232	1.3175298E-02	49.84956
NP-237	200.4990	28-FEB-2010	4433.336	4902.576	15147.00	0.3147377	1.5943376E-02	61.42959
CM-244	196.5558	28-FEB-2010	5533.904	5882.845	13779.00	0.3078977	1.5616762E-02	53.40513

Instrument : CHAMBER 003
Detector : 67617
Standard ID : AESS-003
Standard Reference Date : 15-FEB-2008 13:12:27
Calibration Analysis Date/Time : 6-JUL-2009 09:46:09
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 1-JUL-2009 14:34:18
Average Efficiency : 0.3600250
Average Efficiency Error : 1.0207428E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2989.494	3301.750	51088.00	0.5304641	2.2688475E-02	17.25958
NP-237	203.2080	28-FEB-2010	4434.514	4906.213	23507.00	0.2944960	1.5031389E-02	23.33439
CM-244	197.2236	28-FEB-2010	5534.317	5886.218	303.0000	0.3473051	1.7597629E-02	23.27553

Instrument	:	CHAMBER 004
Detector	:	64279
Standard ID	:	AESS-004
Standard Reference Date	:	14-FEB-2008 09:35:18
Calibration Analysis Date/Time	:	6-JUL-2009 09:46:09
Calibration Count Time	:	239.9998
Efficiency Calibration Date/Time	:	6-JUL-2009 14:31:14
Average Efficiency	:	0.3320934
Average Efficiency Error	:	9.1318591E-03
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.1222	28-FEB-2010	2991.142	3301.855	16052.00	0.3286779	1.4111746E-02	51.04387
NP-237	204.2586	28-FEB-2010	4434.122	4905.061	16497.00	0.3364784	1.7026719E-02	57.46174
CM-244	198.8100	28-FEB-2010	5532.169	5885.896	15051.00	0.3326688	1.6853061E-02	54.96896

Instrument	:	CHAMBER 005
Detector	:	67612
Standard ID	:	AESS-005
Standard Reference Date	:	14-FEB-2008 09:35:18
Calibration Analysis Date/Time	:	6-JUL-2009 09:46:09
Calibration Count Time	:	239.9998
Efficiency Calibration Date/Time	:	6-JUL-2009 14:31:33
Average Efficiency	:	6.5707625E-03
Average Efficiency Error	:	3.8320033E-04
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.7452	28-FEB-2010	2987.844	3301.859	3508.000	7.0225731E-03	1.1923207E-03	0.0000000E+00
NP-237	209.5938	28-FEB-2010	4432.372	4905.723	2125.000	4.2211074E-03	1.3009577E-03	0.0000000E+00
CM-244	202.7478	28-FEB-2010	5534.445	5887.312	214.0000	4.5812004E-03	9.9153980E-04	0.0000000E+00

Instrument	:	CHAMBER 006
Detector	:	67613
Standard ID	:	AESS-006
Standard Reference Date	:	14-FEB-2008 09:35:18
Calibration Analysis Date/Time	:	6-JUL-2009 09:46:09
Calibration Count Time	:	239.9998
Efficiency Calibration Date/Time	:	6-JUL-2009 14:31:42
Average Efficiency	:	0.3023717
Average Efficiency Error	:	8.3279395E-03
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2987.836	3301.578	14382.00	0.2979915	1.2819309E-02	52.92189
NP-237	204.7038	28-FEB-2010	4433.162	4904.315	14912.00	0.3035040	1.5377419E-02	64.79807
CM-244	195.0060	28-FEB-2010	5534.623	5882.438	13655.00	0.3076988	1.5608697E-02	55.89266

Instrument : CHAMBER 007
Detector : 67607
Standard ID : AESS-007
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 6-JUL-2009 09:46:11
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 6-JUL-2009 14:31:52
Average Efficiency : 0.2957362
Average Efficiency Error : 8.1475200E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2987.476	3300.975	14142.00	0.2886904	1.2423181E-02	50.35310
NP-237	205.0260	28-FEB-2010	4436.790	4906.439	14907.00	0.3028864	1.5346253E-02	60.44886
CM-244	199.6806	28-FEB-2010	5534.241	5887.079	13602.00	0.2992603	1.5181582E-02	51.78771

Instrument : CHAMBER 008
Detector : 78788
Standard ID : AESS-008
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 6-JUL-2009 09:46:11
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 6-JUL-2009 14:32:01
Average Efficiency : 0.3188090
Average Efficiency Error : 8.7708440E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.0418	28-FEB-2010	2990.921	3300.406	15479.00	0.3170527	1.3621154E-02	48.62412
NP-237	209.2716	28-FEB-2010	4435.107	4902.387	15876.00	0.3160491	1.6000355E-02	65.04717
CM-244	199.6488	28-FEB-2010	5534.594	5883.502	14733.00	0.3242763	1.6432470E-02	50.70723

Instrument : CHAMBER 009
Detector : 72528
Standard ID : AESS-009
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 6-JUL-2009 09:46:11
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 6-JUL-2009 14:32:10
Average Efficiency : 0.3375995
Average Efficiency Error : 9.2831012E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.3736	28-FEB-2010	2990.628	3299.090	15971.00	0.3313866	1.4229259E-02	50.85649
NP-237	204.0192	28-FEB-2010	4437.197	4904.633	16709.00	0.3411832	1.7262230E-02	60.63605
CM-244	197.2128	28-FEB-2010	5532.440	5887.594	15414.00	0.3432376	1.7383220E-02	53.31252

Instrument : CHAMBER 010
Detector : 72529
Standard ID : AESS-010
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 6-JUL-2009 09:46:11
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 6-JUL-2009 14:32:19
Average Efficiency : 0.3172926
Average Efficiency Error : 8.7324297E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.0008	28-FEB-2010	2991.348	3298.595	15125.00	0.3160139	1.3582063E-02	48.55328
NP-237	202.9926	28-FEB-2010	4434.835	4903.545	15667.00	0.3215450	1.6281251E-02	62.71636
CM-244	196.2330	28-FEB-2010	5530.435	5886.972	14067.00	0.3149689	1.5970867E-02	52.28595

Instrument : CHAMBER 011
Detector : 72531
Standard ID : AESS-011
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 6-JUL-2009 09:46:11
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 6-JUL-2009 14:32:29
Average Efficiency : 0.2985433
Average Efficiency Error : 8.2169101E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	212.8284	28-FEB-2010	2991.311	3301.519	14980.00	0.2970565	1.2769507E-02	51.39855
NP-237	214.4868	28-FEB-2010	4434.837	4904.180	15445.00	0.3000057	1.5193330E-02	59.19451
CM-244	208.4184	28-FEB-2010	5534.270	5885.159	14191.00	0.2991836	1.5168598E-02	51.74621

Instrument : CHAMBER 012
Detector : 67594
Standard ID : AESS-012
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 6-JUL-2009 09:46:11
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 6-JUL-2009 14:32:37
Average Efficiency : 0.2994599
Average Efficiency Error : 8.2469108E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.2200	28-FEB-2010	2989.530	3302.430	14453.00	0.2957655	1.2722428E-02	49.93941
NP-237	205.8930	28-FEB-2010	4435.245	4904.394	15165.00	0.3068516	1.5543667E-02	68.21289
CM-244	203.1954	28-FEB-2010	5531.663	5882.971	13767.00	0.2976886	1.5099200E-02	52.18476

Instrument : CHAMBER 013
Detector : 78790
Standard ID : AESS-013
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 6-JUL-2009 09:46:12
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:32:45
Average Efficiency : 0.3386290
Average Efficiency Error : 9.3077216E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2992.215	3297.934	16446.00	0.3408228	1.4627260E-02	48.82562
NP-237	210.2526	28-FEB-2010	4433.681	4905.322	17035.00	0.3375474	1.7074423E-02	66.72312
CM-244	201.9108	28-FEB-2010	5534.510	5884.075	15472.00	0.3367262	1.7052578E-02	51.74340

Instrument : CHAMBER 014
Detector : 67616
Standard ID : AESS-014
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 6-JUL-2009 09:46:12
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:32:56
Average Efficiency : 0.3118280
Average Efficiency Error : 8.5774874E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2988.044	3301.205	15708.00	0.3087174	1.3259654E-02	54.69494
NP-237	211.7160	28-FEB-2010	4432.568	4904.459	16091.00	0.3166406	1.6027654E-02	64.49153
CM-244	207.3882	28-FEB-2010	5531.132	5885.588	14716.00	0.3115681	1.5788864E-02	58.20748

Instrument : CHAMBER 015
Detector : 61581
Standard ID : AESS-015
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 6-JUL-2009 09:46:12
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:33:12
Average Efficiency : 0.3223390
Average Efficiency Error : 8.8713039E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0270	28-FEB-2010	2990.992	3300.634	15182.00	0.3140531	1.3496879E-02	59.83858
NP-237	200.6460	28-FEB-2010	4433.750	4904.866	15926.00	0.3307087	1.6741820E-02	75.43053
CM-244	195.9270	28-FEB-2010	5533.850	5883.539	14567.00	0.3266208	1.6553897E-02	63.39113

Instrument : CHAMBER 016
Detector : 78774
Standard ID : AESS-016
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 6-JUL-2009 09:46:12
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:33:38
Average Efficiency : 0.3364573
Average Efficiency Error : 9.2521459E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2991.376	3300.188	16062.00	0.3322090	1.4263208E-02	47.94983
NP-237	199.3962	28-FEB-2010	4436.705	4902.519	16457.00	0.3438525	1.7400362E-02	59.25246
CM-244	198.6402	28-FEB-2010	5531.791	5887.203	15163.00	0.3354346	1.6991531E-02	53.20901

Instrument : CHAMBER 017
Detector : 78791
Standard ID : AESS-017
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 6-JUL-2009 09:46:12
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:33:47
Average Efficiency : 0.2933579
Average Efficiency Error : 8.0790650E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.0798	28-FEB-2010	2988.293	3301.593	14424.00	0.2897618	1.2464617E-02	48.04712
NP-237	208.5846	28-FEB-2010	4433.438	4905.522	14920.00	0.2980264	1.5099768E-02	63.18722
CM-244	205.5828	28-FEB-2010	5532.444	5887.037	13752.00	0.2939516	1.4909811E-02	52.23705

Instrument : CHAMBER 018
Detector : 21063
Standard ID : AESS-018
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 14-JUL-2009 15:04:40
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 15-JUL-2009 07:50:05
Average Efficiency : 0.3223269
Average Efficiency Error : 8.8674370E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.1856	28-FEB-2010	2991.459	3300.768	15427.00	0.3220896	1.3838380E-02	41.77474
NP-237	208.8990	28-FEB-2010	4435.720	4903.495	16011.00	0.3193196	1.6164232E-02	59.35002
CM-244	198.1458	28-FEB-2010	5531.358	5886.349	14679.00	0.3258023	1.6510617E-02	49.83286

Instrument : CHAMBER 019
Detector : 78786
Standard ID : AESS-019
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 6-JUL-2009 09:46:13
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:34:03
Average Efficiency : 0.2886755
Average Efficiency Error : 7.9575144E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.6468	28-FEB-2010	2991.589	3299.131	13636.00	0.2811793	1.2108484E-02	45.78609
NP-237	202.9140	28-FEB-2010	4435.520	4903.560	14455.00	0.2967967	1.5043795E-02	63.86615
CM-244	199.3140	28-FEB-2010	5534.981	5882.589	13252.00	0.2920234	1.4819912E-02	48.96563

Instrument : CHAMBER 020
Detector : 78787
Standard ID : AESS-020
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 6-JUL-2009 09:46:13
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:34:12
Average Efficiency : 0.3430721
Average Efficiency Error : 9.4324267E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	205.5870	28-FEB-2010	2991.028	3300.317	16260.00	0.3337892	1.4328116E-02	49.41795
NP-237	203.4984	28-FEB-2010	4434.663	4901.954	17092.00	0.3499276	1.7699974E-02	68.09825
CM-244	197.1096	28-FEB-2010	5534.316	5883.376	15719.00	0.3504178	1.7742448E-02	47.75075

Instrument : CHAMBER 021
Detector : 67047
Standard ID : AESS-021
Standard Reference Date : 19-FEB-2008 15:31:52
Calibration Analysis Date/Time : 6-JUL-2009 09:46:13
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:34:21
Average Efficiency : 0.3007418
Average Efficiency Error : 8.2816491E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2991.930	3300.431	14520.00	0.2940652	1.2648145E-02	54.30077
NP-237	210.1548	28-FEB-2010	4435.207	4905.011	15253.00	0.3023781	1.5315918E-02	63.06406
CM-244	200.7390	28-FEB-2010	5533.018	5884.673	14140.00	0.3092899	1.5681855E-02	54.78833

Instrument : CHAMBER 022
Detector : 72530
Standard ID : AESS-022
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 6-JUL-2009 09:46:13
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:34:44
Average Efficiency : 0.3177471
Average Efficiency Error : 8.7433932E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2989.087	3302.012	15372.00	0.3092707	1.3288673E-02	50.08852
NP-237	206.8830	28-FEB-2010	4436.701	4902.154	16304.00	0.3282550	1.6613014E-02	63.36660
CM-244	203.0208	28-FEB-2010	5532.124	5885.279	14804.00	0.3203634	1.6233236E-02	52.02282

Instrument : CHAMBER 023
Detector : 78264
Standard ID : AESS-023
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 6-JUL-2009 09:46:13
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:34:52
Average Efficiency : 0.3327100
Average Efficiency Error : 9.1472948E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	207.4764	28-FEB-2010	2990.041	3300.395	16228.00	0.3301035	1.4170360E-02	46.67713
NP-237	207.4998	28-FEB-2010	4437.054	4904.602	16550.00	0.3322816	1.6813723E-02	63.18299
CM-244	199.8804	28-FEB-2010	5531.351	5885.314	15327.00	0.3369316	1.7065044E-02	50.76911

Instrument : CHAMBER 024
Detector : 76542
Standard ID : AESS-024
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 6-JUL-2009 09:46:13
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:35:01
Average Efficiency : 0.3278600
Average Efficiency Error : 9.0207923E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.5218	28-FEB-2010	2988.294	3302.013	15351.00	0.3182911	1.3676404E-02	53.01509
NP-237	205.6662	28-FEB-2010	4435.963	4904.774	16397.00	0.3320666	1.6804798E-02	66.65491
CM-244	198.3060	28-FEB-2010	5530.886	5886.529	15278.00	0.3385208	1.7146233E-02	56.84327

Instrument : CHAMBER 025
Detector : 45-149AA5
Standard ID : AESS-025
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 6-JUL-2009 09:46:14
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:35:10
Average Efficiency : 0.3244141
Average Efficiency Error : 8.9428928E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2988.683	3301.317	15182.00	0.3276230	1.4080081E-02	58.08860
NP-237	167.9916	28-FEB-2010	4432.505	4905.964	12934.00	0.3207583	1.6284095E-02	71.50992
CM-244	157.2432	28-FEB-2010	5531.275	5884.228	11591.00	0.3237635	1.6465405E-02	65.55542

Instrument : CHAMBER 026
Detector : 78204
Standard ID : AESS-026
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 6-JUL-2009 09:46:14
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:35:19
Average Efficiency : 0.3149063
Average Efficiency Error : 9.2313625E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2992.261	3299.610	15024.00	0.3178152	1.6101750E-02	48.28163
NP-237	168.0294	28-FEB-2010	4434.923	4901.784	12780.00	0.3168793	1.6090054E-02	60.42010
CM-244	160.5822	28-FEB-2010	5534.672	5884.552	11338.00	0.3102135	1.5781984E-02	48.50001

Instrument : CHAMBER 027
Detector : 42484
Standard ID : AESS-027
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 24-JUL-2009 08:07:28
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 24-JUL-2009 13:43:22
Average Efficiency : 0.3412640
Average Efficiency Error : 1.0000055E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2989.447	3298.118	15426.00	0.3367459	1.7055135E-02	44.71416
NP-237	161.6154	28-FEB-2010	4432.441	4905.996	13155.00	0.3391359	1.7212695E-02	71.77612
CM-244	148.1754	28-FEB-2010	5535.248	5885.925	11727.00	0.3483921	1.7714251E-02	48.91441

Instrument : CHAMBER 028
Detector : 78792
Standard ID : AESS-028
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 6-JUL-2009 09:46:14
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:35:37
Average Efficiency : 0.3059801
Average Efficiency Error : 8.9743091E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2989.695	3297.894	14335.00	0.3030114	1.5361304E-02	46.74673
NP-237	168.1992	28-FEB-2010	4435.454	4902.851	12365.00	0.3062848	1.5560016E-02	61.29473
CM-244	156.7614	28-FEB-2010	5530.764	5886.057	11017.00	0.3087767	1.5716689E-02	48.99289

Instrument : CHAMBER 029
Detector : 33454
Standard ID : AESS-029
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 6-JUL-2009 09:46:14
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:35:45
Average Efficiency : 0.3133109
Average Efficiency Error : 9.1862464E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.5742	28-FEB-2010	2989.570	3299.793	14696.00	0.3076786	1.5592718E-02	62.98538
NP-237	169.7700	28-FEB-2010	4434.729	4906.466	12891.00	0.3163488	1.6061027E-02	66.74791
CM-244	154.8234	28-FEB-2010	5530.876	5886.187	11145.00	0.3162610	1.6094424E-02	59.70258

Instrument : CHAMBER 030
Detector : 33447
Standard ID : AESS-030
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 6-JUL-2009 09:46:14
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:35:54
Average Efficiency : 0.3190225
Average Efficiency Error : 9.3542365E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.9792	28-FEB-2010	2992.473	3300.013	14522.00	0.3079955	1.5611262E-02	56.22778
NP-237	166.3758	28-FEB-2010	4433.021	4902.873	13108.00	0.3282070	1.6658967E-02	66.10047
CM-244	157.1856	28-FEB-2010	5531.626	5884.032	11533.00	0.3222875	1.6391672E-02	59.45288

Instrument : CHAMBER 031
Detector : 67042
Standard ID : AESS-031
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 14-JUL-2009 15:04:42
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 15-JUL-2009 07:50:24
Average Efficiency : 0.3338314
Average Efficiency Error : 9.2027988E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2992.104	3299.916	15053.00	0.3280614	1.4101115E-02	64.46095
NP-237	162.9186	28-FEB-2010	4436.072	4902.901	13435.00	0.3435040	1.7429167E-02	93.20530
CM-244	153.1968	28-FEB-2010	5535.417	5884.932	11607.00	0.3330215	1.6935715E-02	63.05283

Instrument : CHAMBER 032
Detector : 67041
Standard ID : AESS-032
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 14-JUL-2009 15:04:42
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 15-JUL-2009 07:50:35
Average Efficiency : 0.3120490
Average Efficiency Error : 8.6091449E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2990.634	3297.499	14436.00	0.3121021	1.3425405E-02	53.99254
NP-237	165.9822	28-FEB-2010	4437.570	4904.884	12360.00	0.3101901	1.5758617E-02	64.26519
CM-244	153.7938	28-FEB-2010	5533.522	5884.215	10984.00	0.3138851	1.5977694E-02	52.03965

Instrument : CHAMBER 033
Detector : 78785
Standard ID : AESS-033
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 6-JUL-2009 09:46:15
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:36:20
Average Efficiency : 0.3132727
Average Efficiency Error : 8.6470284E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.4158	28-FEB-2010	2990.591	3298.173	14059.00	0.3083428	1.3270319E-02	45.02124
NP-237	161.7816	28-FEB-2010	4434.089	4906.364	12264.00	0.3158025	1.6045660E-02	60.74144
CM-244	147.2670	28-FEB-2010	5534.061	5883.941	10663.00	0.3180395	1.6197534E-02	44.95700

Instrument : CHAMBER 034
Detector : 61586
Standard ID : AESS-034
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 14-JUL-2009 15:04:42
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 15-JUL-2009 07:50:46
Average Efficiency : 0.3171561
Average Efficiency Error : 8.7465709E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2990.268	3300.348	14798.00	0.3114539	1.3391386E-02	50.21013
NP-237	167.2962	28-FEB-2010	4435.287	4906.218	12784.00	0.3183437	1.6164379E-02	67.44197
CM-244	154.4388	28-FEB-2010	5533.837	5886.701	11405.00	0.3245862	1.6511625E-02	55.32959

Instrument : CHAMBER 035
Detector : 78202
Standard ID : AESS-035
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 6-JUL-2009 09:46:15
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:36:36
Average Efficiency : 0.3039385
Average Efficiency Error : 8.3862301E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2989.841	3298.805	14385.00	0.3055661	1.3145097E-02	44.60017
NP-237	168.2934	28-FEB-2010	4433.680	4901.942	12309.00	0.3046319	1.5477315E-02	57.84991
CM-244	158.8128	28-FEB-2010	5530.913	5886.751	10886.00	0.3010460	1.5326467E-02	49.59610

Instrument : CHAMBER 036
Detector : 78203
Standard ID : AESS-036
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 6-JUL-2009 09:46:15
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:36:45
Average Efficiency : 0.3217056
Average Efficiency Error : 8.8684531E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.3204	28-FEB-2010	2990.719	3297.679	15140.00	0.3173648	1.3639865E-02	54.98193
NP-237	167.4312	28-FEB-2010	4436.454	4902.523	13140.00	0.3269882	1.6596414E-02	66.33447
CM-244	156.4188	28-FEB-2010	5534.221	5883.385	11497.00	0.3228255	1.6419753E-02	57.03784

Instrument : CHAMBER 037
Detector : 45-149BB5
Standard ID : AESS-037
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 6-JUL-2009 09:46:16
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:36:53
Average Efficiency : 0.3609357
Average Efficiency Error : 9.9339429E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7372	28-FEB-2010	2992.027	3298.587	16638.00	0.3550694	1.5235793E-02	70.66451
NP-237	167.1294	28-FEB-2010	4435.750	4902.017	14747.00	0.3675707	1.8626243E-02	87.35378
CM-244	154.7664	28-FEB-2010	5535.521	5884.277	12795.00	0.3630245	1.8432988E-02	72.91970

Instrument : CHAMBER 038
Detector : 72532
Standard ID : AESS-038
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 7-JUL-2009 20:14:26
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 8-JUL-2009 07:31:06
Average Efficiency : 0.3440174
Average Efficiency Error : 9.4721830E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1408	28-FEB-2010	2989.665	3301.822	16315.00	0.3439969	1.4765469E-02	56.35861
NP-237	170.0886	28-FEB-2010	4435.489	4906.553	14189.00	0.3474887	1.7617788E-02	67.43947
CM-244	157.7460	28-FEB-2010	5532.401	5886.525	12237.00	0.3406941	1.7311083E-02	58.94252

Instrument : CHAMBER 039
Detector : 45-149BB2
Standard ID : AESS-039
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 6-JUL-2009 09:46:16
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:37:12
Average Efficiency : 0.3633558
Average Efficiency Error : 1.0003410E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2988.145	3298.732	16409.00	0.3601976	1.5459352E-02	56.41948
NP-237	159.1506	28-FEB-2010	4435.549	4903.088	13988.00	0.3661838	1.8569179E-02	74.12836
CM-244	151.7142	28-FEB-2010	5534.287	5885.251	12613.00	0.3650793	1.8541345E-02	65.99350

Instrument : CHAMBER 040
Detector : 78773
Standard ID : AESS-040
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 6-JUL-2009 09:46:16
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:37:21
Average Efficiency : 0.3236358
Average Efficiency Error : 8.9229112E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4828	28-FEB-2010	2989.803	3299.657	15035.00	0.3262324	1.4022750E-02	46.94137
NP-237	166.8174	28-FEB-2010	4435.891	4904.106	12881.00	0.3216923	1.6332518E-02	63.17031
CM-244	155.0100	28-FEB-2010	5531.706	5883.967	11365.00	0.3220472	1.6383301E-02	50.43327

Instrument : CHAMBER 041
Detector : 78205
Standard ID : AESS-041
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 6-JUL-2009 09:46:16
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:37:34
Average Efficiency : 0.3271760
Average Efficiency Error : 9.0137199E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.9034	28-FEB-2010	2988.799	3301.675	15672.00	0.3243389	1.3931162E-02	49.27284
NP-237	171.2268	28-FEB-2010	4434.272	4902.386	13569.00	0.3301208	1.6747680E-02	61.97926
CM-244	159.5796	28-FEB-2010	5531.847	5882.877	11929.00	0.3283235	1.6689207E-02	48.64401

Instrument : CHAMBER 042
Detector : 78793
Standard ID : AESS-042
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 6-JUL-2009 09:46:16
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 6-JUL-2009 14:37:44
Average Efficiency : 0.3312008
Average Efficiency Error : 9.1335429E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	188.7090	28-FEB-2010	2991.257	3302.160	14934.00	0.3339659	1.4356897E-02	46.01327
NP-237	159.6558	28-FEB-2010	4435.667	4904.225	12775.00	0.3333308	1.6925573E-02	66.93758
CM-244	150.5208	28-FEB-2010	5531.759	5883.730	11154.00	0.3254806	1.6563315E-02	47.72076

Instrument : CHAMBER 043
Detector : 76543
Standard ID : AESS-043
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 6-JUL-2009 09:46:17
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 6-JUL-2009 14:37:56
Average Efficiency : 0.3406220
Average Efficiency Error : 9.3815317E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7708	28-FEB-2010	2990.989	3298.318	15838.00	0.3379508	1.4513168E-02	53.32027
NP-237	168.7422	28-FEB-2010	4436.983	4902.370	13848.00	0.3419185	1.7341113E-02	70.53008
CM-244	156.3252	28-FEB-2010	5532.584	5886.039	12214.00	0.3431670	1.7437097E-02	50.59512

Instrument : CHAMBER 044
Detector : 79459
Standard ID : AESS-044
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 7-JUL-2009 08:06:38
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 7-JUL-2009 13:33:56
Average Efficiency : 0.3539364
Average Efficiency Error : 9.7440388E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2988.854	3300.902	16237.00	0.3523722	1.5126155E-02	49.91737
NP-237	166.6248	28-FEB-2010	4435.084	4901.492	14193.00	0.3548543	1.7991094E-02	62.49409
CM-244	155.8290	28-FEB-2010	5533.776	5883.326	12603.00	0.3552387	1.8041683E-02	52.59266

Instrument : CHAMBER 045
Detector : 67601
Standard ID : AESS-045
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 14-JUL-2009 15:04:44
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 15-JUL-2009 07:50:59
Average Efficiency : 0.3430506
Average Efficiency Error : 9.4568562E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	186.9936	28-FEB-2010	2987.909	3300.265	15299.00	0.3453356	1.4839282E-02	39.68650
NP-237	160.8066	28-FEB-2010	4434.212	4905.200	12955.00	0.3356342	1.7038893E-02	56.79002
CM-244	145.8384	28-FEB-2010	5530.781	5884.673	11538.00	0.3477968	1.7688734E-02	40.32752

Instrument : CHAMBER 046
Detector : 76544
Standard ID : AESS-046
Standard Reference Date : 19-FEB-2008 19:35:48
Calibration Analysis Date/Time : 6-JUL-2009 09:46:17
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 6-JUL-2009 14:38:21
Average Efficiency : 0.3406382
Average Efficiency Error : 9.3857087E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2989.077	3298.635	15535.00	0.3366195	1.4460829E-02	49.62128
NP-237	164.6658	28-FEB-2010	4433.627	4906.487	13519.00	0.3420215	1.7352322E-02	69.09070
CM-244	151.3824	28-FEB-2010	5533.329	5885.134	11898.00	0.3451394	1.7544771E-02	55.17302

Instrument : CHAMBER 047
Detector : 46-089B1
Standard ID : AESS-047
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 6-JUL-2009 09:46:17
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 6-JUL-2009 14:38:30
Average Efficiency : 0.3442340
Average Efficiency Error : 9.4810873E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2987.977	3301.361	15865.00	0.3390196	1.4558652E-02	55.57606
NP-237	168.3948	28-FEB-2010	4433.363	4905.447	13899.00	0.3438680	1.7439116E-02	74.62081
CM-244	154.6032	28-FEB-2010	5532.313	5886.846	12409.00	0.3525089	1.7907353E-02	58.04284

Instrument : CHAMBER 048
Detector : 42483
Standard ID : AESS-048
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 6-JUL-2009 09:46:17
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 6-JUL-2009 14:38:39
Average Efficiency : 0.3178092
Average Efficiency Error : 8.7683024E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2988.411	3301.246	14378.00	0.3162740	1.3605888E-02	55.68159
NP-237	161.5530	28-FEB-2010	4433.969	4903.143	12372.00	0.3190103	1.6206456E-02	67.40500
CM-244	151.1856	28-FEB-2010	5530.501	5887.230	10976.00	0.3187887	1.6227484E-02	60.96161

Instrument : CHAMBER 065
Detector : 68551
Standard ID : AESS-001
Standard Reference Date : 20-FEB-2008 09:54:53
Calibration Analysis Date/Time : 9-JUL-2009 08:08:10
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:06:51
Average Efficiency : 0.3167298
Average Efficiency Error : 8.7357797E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.6698	28-FEB-2010	2992.172	3297.923	15001.00	0.3033305	1.3038947E-02	62.70693
NP-237	171.0024	28-FEB-2010	4436.297	4904.907	13337.00	0.3249072	1.6487280E-02	73.64597
CM-244	158.1060	28-FEB-2010	5532.615	5884.733	11898.00	0.3304830	1.6799837E-02	62.05407

Instrument : CHAMBER 066
Detector : 46-089C1
Standard ID : AESS-002
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 9-JUL-2009 08:08:10
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:07:05
Average Efficiency : 0.3104099
Average Efficiency Error : 8.5468190E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1144	28-FEB-2010	2992.142	3300.807	14611.00	0.3081217	1.3251217E-02	57.90394
NP-237	200.4990	28-FEB-2010	4436.247	4906.352	15119.00	0.3141508	1.5914036E-02	71.36474
CM-244	196.5558	28-FEB-2010	5534.784	5886.688	13872.00	0.3099799	1.5721031E-02	60.13244

Instrument : CHAMBER 067
Detector : 46-089B4
Standard ID : AESS-003
Standard Reference Date : 15-FEB-2008 13:12:27
Calibration Analysis Date/Time : 9-JUL-2009 08:08:10
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:07:16
Average Efficiency : 0.3225107
Average Efficiency Error : 8.8746333E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2988.144	3301.594	15198.00	0.3160322	1.3581690E-02	73.87538
NP-237	203.2080	28-FEB-2010	4436.169	4905.946	16027.00	0.3285710	1.6632373E-02	84.27850
CM-244	197.2236	28-FEB-2010	5533.963	5885.648	14635.00	0.3261202	1.6527411E-02	74.53841

Instrument : CHAMBER 068
Detector : 78794
Standard ID : AESS-004
Standard Reference Date : 14-FEB-2008 09:35:18
Calibration Analysis Date/Time : 9-JUL-2009 08:08:10
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:07:28
Average Efficiency : 0.3018608
Average Efficiency Error : 8.3120642E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.1222	28-FEB-2010	2990.601	3300.139	14643.00	0.2998493	1.2894920E-02	46.91775
NP-237	204.2586	28-FEB-2010	4435.756	4903.729	14909.00	0.3041092	1.5408116E-02	62.03638
CM-244	198.8100	28-FEB-2010	5531.794	5886.867	13681.00	0.3024790	1.5343496E-02	51.78417

Instrument : CHAMBER 069
Detector : 78795
Standard ID : AESS-005
Standard Reference Date : 14-FEB-2008 09:35:18
Calibration Analysis Date/Time : 9-JUL-2009 08:08:10
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:07:42
Average Efficiency : 0.3159011
Average Efficiency Error : 8.6903321E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.7452	28-FEB-2010	2991.901	3298.738	15562.00	0.3116586	1.3388185E-02	51.55959
NP-237	209.5938	28-FEB-2010	4437.201	4903.207	15965.00	0.3173516	1.6065169E-02	63.95503
CM-244	202.7478	28-FEB-2010	5534.874	5884.048	14792.00	0.3206663	1.6248737E-02	52.59375

Instrument : CHAMBER 070
Detector : 46-089B2
Standard ID : AESS-006
Standard Reference Date : 14-FEB-2008 09:35:18
Calibration Analysis Date/Time : 9-JUL-2009 08:08:10
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:07:53
Average Efficiency : 0.3520789
Average Efficiency Error : 9.6757710E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2988.641	3300.492	16713.00	0.3463008	1.4858479E-02	61.95700
NP-237	204.7038	28-FEB-2010	4435.833	4904.443	17344.00	0.3529772	1.7851282E-02	74.78303
CM-244	195.0060	28-FEB-2010	5531.433	5882.799	15964.00	0.3598273	1.8215435E-02	68.73500

Instrument : CHAMBER 071
Detector : 64259
Standard ID : AESS-007
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 9-JUL-2009 08:08:11
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:08:07
Average Efficiency : 0.3163752
Average Efficiency Error : 8.7076994E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2992.476	3301.614	15079.00	0.3078622	1.3232440E-02	56.06450
NP-237	205.0260	28-FEB-2010	4435.387	4902.436	15763.00	0.3203167	1.6217813E-02	68.61439
CM-244	199.6806	28-FEB-2010	5534.462	5883.334	14790.00	0.3255263	1.6495051E-02	58.90277

Instrument : CHAMBER 072
Detector : 45-149AA3
Standard ID : AESS-008
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 9-JUL-2009 08:08:11
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:08:19
Average Efficiency : 0.3234064
Average Efficiency Error : 8.8950237E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.0418	28-FEB-2010	2988.586	3301.014	15743.00	0.3224942	1.3850860E-02	54.24233
NP-237	209.2716	28-FEB-2010	4432.963	4902.126	16207.00	0.3226633	1.6331071E-02	69.06731
CM-244	199.6488	28-FEB-2010	5535.050	5886.750	14785.00	0.3254575	1.6491652E-02	56.72540

Instrument : CHAMBER 073
Detector : 78775
Standard ID : AESS-009
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 9-JUL-2009 08:08:11
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:08:30
Average Efficiency : 0.3320738
Average Efficiency Error : 9.1329338E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.3736	28-FEB-2010	2991.870	3299.007	15813.00	0.3281374	1.4092137E-02	50.25317
NP-237	204.0192	28-FEB-2010	4435.703	4904.982	16193.00	0.3306793	1.6736971E-02	68.87427
CM-244	197.2128	28-FEB-2010	5532.962	5884.931	15235.00	0.3394034	1.7191524E-02	49.27633

Instrument : CHAMBER 074
Detector : 78266
Standard ID : AESS-010
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 9-JUL-2009 08:08:11
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:08:42
Average Efficiency : 0.3124804
Average Efficiency Error : 8.6027775E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.0008	28-FEB-2010	2990.625	3300.254	14705.00	0.3072563	1.3212435E-02	51.15489
NP-237	202.9926	28-FEB-2010	4435.417	4902.858	15345.00	0.3149306	1.5950510E-02	57.41002
CM-244	196.2330	28-FEB-2010	5535.258	5884.259	14186.00	0.3177475	1.6109865E-02	49.01177

Instrument : CHAMBER 075
Detector : 68550
Standard ID : AESS-011
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 9-JUL-2009 08:08:11
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:08:53
Average Efficiency : 0.2973897
Average Efficiency Error : 8.1859389E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	212.8284	28-FEB-2010	2988.563	3301.861	14863.00	0.2947582	1.2672522E-02	56.94482
NP-237	214.4868	28-FEB-2010	4432.969	4904.420	15483.00	0.3006926	1.5227719E-02	69.06491
CM-244	208.4184	28-FEB-2010	5535.562	5884.044	14125.00	0.2978785	1.5103404E-02	58.86678

Instrument : CHAMBER 076
Detector : 78779
Standard ID : AESS-012
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 9-JUL-2009 08:08:11
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:09:04
Average Efficiency : 0.3059446
Average Efficiency Error : 8.4217470E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.2200	28-FEB-2010	2992.408	3300.679	14839.00	0.3037126	1.3057882E-02	46.65081
NP-237	205.8930	28-FEB-2010	4437.552	4904.251	15221.00	0.3079897	1.5600574E-02	59.39308
CM-244	203.1954	28-FEB-2010	5530.870	5885.252	14195.00	0.3070807	1.5568880E-02	50.95067

Instrument : CHAMBER 077
Detector : 67576
Standard ID : AESS-013
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 9-JUL-2009 08:08:11
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:09:15
Average Efficiency : 0.3220192
Average Efficiency Error : 8.8578872E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2988.825	3301.085	15444.00	0.3200761	1.3751586E-02	52.27526
NP-237	210.2526	28-FEB-2010	4432.612	4901.681	16184.00	0.3207017	1.6232070E-02	64.77522
CM-244	201.9108	28-FEB-2010	5534.546	5886.248	14985.00	0.3261909	1.6525861E-02	54.87537

Instrument : CHAMBER 078
Detector : 67577
Standard ID : AESS-014
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 9-JUL-2009 08:08:11
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:09:25
Average Efficiency : 0.3269402
Average Efficiency Error : 8.9888843E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2992.395	3299.584	16294.00	0.3202777	1.3747618E-02	52.02948
NP-237	211.7160	28-FEB-2010	4433.349	4904.419	17152.00	0.3375357	1.7072473E-02	63.87207
CM-244	207.3882	28-FEB-2010	5535.593	5884.350	15420.00	0.3266392	1.6542494E-02	56.64688

Instrument : CHAMBER 079
Detector : 67598
Standard ID : AESS-015
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 9-JUL-2009 08:08:11
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:09:33
Average Efficiency : 0.3269641
Average Efficiency Error : 8.9949844E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0270	28-FEB-2010	2987.535	3297.935	15565.00	0.3219998	1.3832338E-02	51.91238
NP-237	200.6460	28-FEB-2010	4435.153	4903.332	15964.00	0.3314978	1.6781278E-02	65.57870
CM-244	195.9270	28-FEB-2010	5530.500	5882.333	14697.00	0.3297131	1.6708534E-02	52.00982

Instrument : CHAMBER 080
Detector : 78197
Standard ID : AESS-016
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 9-JUL-2009 08:08:11
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:09:43
Average Efficiency : 0.3342651
Average Efficiency Error : 9.1930544E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2992.338	3298.189	15890.00	0.3286708	1.4113899E-02	49.39791
NP-237	199.3962	28-FEB-2010	4434.851	4901.472	16357.00	0.3417528	1.7295377E-02	67.37957
CM-244	198.6402	28-FEB-2010	5531.493	5883.930	15145.00	0.3351447	1.6977096E-02	53.36457

Instrument : CHAMBER 081
Detector : 72533
Standard ID : AESS-017
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 9-JUL-2009 08:08:11
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:09:58
Average Efficiency : 1.0059110E-03
Average Efficiency Error : 1.4002950E-04
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.0798	28-FEB-2010	2985.980	3302.417	45.00000	8.9930405E-04	1.4010404E-04	0.0000000E+00
NP-237	208.5846	28-FEB-2010	4432.287	4905.979	16296.00	0.3255036	1.6473748E-02	140.8390
CM-244	205.5828	28-FEB-2010	5534.795	5885.572	3965.000	8.4768414E-02	1.4471347E-03	0.0000000E+00

Instrument : CHAMBER 082
Detector : 64263
Standard ID : AESS-018
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 9-JUL-2009 08:08:11
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:10:11
Average Efficiency : 0.3262649
Average Efficiency Error : 8.9742821E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.1856	28-FEB-2010	2990.419	3298.608	15507.00	0.3237216	1.3907208E-02	58.84102
NP-237	208.8990	28-FEB-2010	4437.000	4905.115	16371.00	0.3264953	1.6523048E-02	77.98001
CM-244	198.1458	28-FEB-2010	5534.320	5885.085	14864.00	0.3296992	1.6705383E-02	70.67408

Instrument : CHAMBER 083
Detector : 64278
Standard ID : AESS-019
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 9-JUL-2009 08:08:12
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:10:22
Average Efficiency : 0.3331127
Average Efficiency Error : 9.1688316E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.6468	28-FEB-2010	2987.455	3299.407	15432.00	0.3182384	1.3672802E-02	55.81121
NP-237	202.9140	28-FEB-2010	4433.838	4906.607	17206.00	0.3532467	1.7866544E-02	69.77620
CM-244	199.3140	28-FEB-2010	5532.253	5885.057	15334.00	0.3379439	1.7116275E-02	60.81681

Instrument : CHAMBER 084
Detector : 78265
Standard ID : AESS-020
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 9-JUL-2009 08:08:12
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:10:32
Average Efficiency : 0.3434564
Average Efficiency Error : 9.4431741E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	205.5870	28-FEB-2010	2988.133	3299.227	16254.00	0.3337056	1.4324601E-02	49.70576
NP-237	203.4984	28-FEB-2010	4433.289	4901.844	17176.00	0.3516426	1.7785732E-02	63.55498
CM-244	197.1096	28-FEB-2010	5535.275	5884.618	15707.00	0.3502632	1.7734783E-02	51.80883

Instrument : CHAMBER 085
Detector : 78776
Standard ID : AESS-021
Standard Reference Date : 19-FEB-2008 15:31:52
Calibration Analysis Date/Time : 9-JUL-2009 08:08:12
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:10:43
Average Efficiency : 0.3254945
Average Efficiency Error : 8.9515289E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2989.612	3299.207	15817.00	0.3203625	1.3758179E-02	45.89981
NP-237	210.1548	28-FEB-2010	4434.183	4901.520	16560.00	0.3282868	1.6611453E-02	60.08111
CM-244	200.7390	28-FEB-2010	5533.754	5882.654	15090.00	0.3302506	1.6729988E-02	50.06017

Instrument : CHAMBER 086
Detector : 78198
Standard ID : AESS-022
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 9-JUL-2009 08:08:12
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:10:52
Average Efficiency : 0.2987570
Average Efficiency Error : 8.2268827E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2989.886	3300.091	14561.00	0.2931078	1.2606329E-02	46.08396
NP-237	206.8830	28-FEB-2010	4433.582	4903.927	15096.00	0.3040077	1.5400495E-02	61.33533
CM-244	203.0208	28-FEB-2010	5531.751	5882.863	13945.00	0.3018999	1.5310007E-02	49.24375

Instrument : CHAMBER 087
Detector : 78199
Standard ID : AESS-023
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 9-JUL-2009 08:08:12
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:11:02
Average Efficiency : 0.3162691
Average Efficiency Error : 8.7025622E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	207.4764	28-FEB-2010	2990.385	3299.009	15285.00	0.3109341	1.3361266E-02	44.58315
NP-237	207.4998	28-FEB-2010	4436.772	4904.542	15818.00	0.3175828	1.6078727E-02	57.63754
CM-244	199.8804	28-FEB-2010	5534.083	5883.178	14684.00	0.3229105	1.6363984E-02	49.88237

Instrument : CHAMBER 088
Detector : 33452
Standard ID : AESS-024
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 9-JUL-2009 08:08:12
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:11:13
Average Efficiency : 0.2998269
Average Efficiency Error : 8.2606915E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.5218	28-FEB-2010	2990.970	3298.296	14025.00	0.2908646	1.2518696E-02	52.96125
NP-237	205.6662	28-FEB-2010	4436.463	4902.334	15055.00	0.3049660	1.5449598E-02	63.94186
CM-244	198.3060	28-FEB-2010	5534.583	5887.587	13923.00	0.3085581	1.5648056E-02	61.30964

Instrument : CHAMBER 089
Detector : 78262
Standard ID : AESS-025
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 9-JUL-2009 08:08:13
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:11:23
Average Efficiency : 0.2963288
Average Efficiency Error : 8.1822695E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2992.075	3297.767	13916.00	0.3003191	1.2927603E-02	50.98783
NP-237	167.9916	28-FEB-2010	4432.406	4901.978	12013.00	0.2979151	1.5141796E-02	61.57396
CM-244	157.2432	28-FEB-2010	5532.097	5882.869	10361.00	0.2896218	1.4757983E-02	57.67693

Instrument : CHAMBER 090
Detector : 78263
Standard ID : AESS-026
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 9-JUL-2009 08:08:13
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:11:39
Average Efficiency : 0.3241549
Average Efficiency Error : 9.4982684E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2990.462	3300.982	15417.00	0.3261584	1.6518990E-02	52.53284
NP-237	168.0294	28-FEB-2010	4434.552	4903.775	13172.00	0.3265822	1.6575273E-02	66.40552
CM-244	160.5822	28-FEB-2010	5532.754	5885.804	11687.00	0.3198750	1.6265199E-02	57.74523

Instrument : CHAMBER 091
Detector : 78259
Standard ID : AESS-027
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 9-JUL-2009 08:08:13
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:11:52
Average Efficiency : 0.3403451
Average Efficiency Error : 9.9735688E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2990.268	3298.949	15270.00	0.3332087	1.6878121E-02	49.79137
NP-237	161.6154	28-FEB-2010	4433.436	4901.824	13289.00	0.3425658	1.7384235E-02	66.53712
CM-244	148.1754	28-FEB-2010	5531.214	5887.413	11658.00	0.3458194	1.7585119E-02	55.76472

Instrument : CHAMBER 092
Detector : 79457
Standard ID : AESS-028
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 9-JUL-2009 08:08:13
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 10-JUL-2009 08:15:23
Average Efficiency : 0.3244753
Average Efficiency Error : 9.5090605E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2992.198	3300.849	15511.00	0.3276620	1.6594216E-02	50.13194
NP-237	168.1992	28-FEB-2010	4435.896	4905.687	13201.00	0.3269055	1.6591255E-02	61.53701
CM-244	156.7614	28-FEB-2010	5533.567	5885.099	11382.00	0.3190994	1.6232992E-02	50.67320

Instrument : CHAMBER 093
Detector : 33206
Standard ID : AESS-029
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 9-JUL-2009 08:08:13
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:12:10
Average Efficiency : 0.3253579
Average Efficiency Error : 9.5347259E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.5742	28-FEB-2010	2988.963	3299.960	15194.00	0.3181445	1.6116098E-02	50.56812
NP-237	169.7700	28-FEB-2010	4434.063	4902.978	13286.00	0.3260259	1.6544953E-02	75.56580
CM-244	154.8234	28-FEB-2010	5531.085	5883.424	11716.00	0.3326032	1.6911702E-02	57.95201

Instrument : CHAMBER 094
Detector : 78267
Standard ID : AESS-030
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 9-JUL-2009 08:08:13
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:12:19
Average Efficiency : 0.3085452
Average Efficiency Error : 9.0499781E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.9792	28-FEB-2010	2990.912	3298.303	14487.00	0.3072813	1.5575566E-02	44.68866
NP-237	166.3758	28-FEB-2010	4435.971	4905.664	12598.00	0.3154770	1.6022354E-02	64.16422
CM-244	157.1856	28-FEB-2010	5534.211	5886.502	10849.00	0.3033472	1.5444501E-02	48.21400

Instrument : CHAMBER 095
Detector : 64279
Standard ID : AESS-031
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 9-JUL-2009 08:08:14
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:12:27
Average Efficiency : 0.3068112
Average Efficiency Error : 8.4704254E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2989.056	3301.826	13965.00	0.3043179	1.3098821E-02	55.82520
NP-237	162.9186	28-FEB-2010	4435.330	4905.275	12386.00	0.3167128	1.6089419E-02	68.30973
CM-244	153.1968	28-FEB-2010	5534.057	5886.430	10508.00	0.3012262	1.5345651E-02	56.59253

Instrument : CHAMBER 096
Detector : 67605
Standard ID : AESS-032
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 9-JUL-2009 08:08:14
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:12:36
Average Efficiency : 0.3103104
Average Efficiency Error : 8.5620275E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2990.311	3298.177	14291.00	0.3089209	1.3291076E-02	50.28194
NP-237	165.9822	28-FEB-2010	4434.251	4906.198	12426.00	0.3117568	1.5837051E-02	61.11779
CM-244	153.7938	28-FEB-2010	5533.120	5882.408	10880.00	0.3108360	1.5824955E-02	51.23636

Instrument : CHAMBER 097
Detector : 67599
Standard ID : AESS-033
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 9-JUL-2009 08:08:14
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:12:44
Average Efficiency : 0.3440487
Average Efficiency Error : 9.4836140E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.4158	28-FEB-2010	2989.746	3302.068	15243.00	0.3343306	1.4367314E-02	49.90135
NP-237	161.7816	28-FEB-2010	4437.101	4903.794	13519.00	0.3481746	1.7664408E-02	69.66666
CM-244	147.2670	28-FEB-2010	5531.052	5886.116	11904.00	0.3550793	1.8049983E-02	57.03643

Instrument : CHAMBER 098
Detector : 68644
Standard ID : AESS-034
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 9-JUL-2009 08:08:14
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:12:53
Average Efficiency : 0.3341772
Average Efficiency Error : 9.2099942E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2989.589	3298.128	15405.00	0.3241865	1.3928778E-02	51.17890
NP-237	167.2962	28-FEB-2010	4432.836	4901.640	13623.00	0.3392162	1.7208137E-02	68.23425
CM-244	154.4388	28-FEB-2010	5531.873	5883.257	12118.00	0.3447607	1.7520264E-02	52.08022

Instrument : CHAMBER 099
Detector : 70317
Standard ID : AESS-035
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 9-JUL-2009 08:08:14
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:13:03
Average Efficiency : 0.3431231
Average Efficiency Error : 9.4483467E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2990.876	3301.163	16106.00	0.3421397	1.4688905E-02	50.68632
NP-237	168.2934	28-FEB-2010	4434.526	4903.945	13954.00	0.3454547	1.7518591E-02	61.64373
CM-244	158.8128	28-FEB-2010	5533.432	5886.885	12370.00	0.3422045	1.7384758E-02	52.31840

Instrument : CHAMBER 100
Detector : 79456
Standard ID : AESS-046
Standard Reference Date : 19-FEB-2008 19:35:48
Calibration Analysis Date/Time : 9-JUL-2009 08:08:14
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:13:12
Average Efficiency : 0.3427027
Average Efficiency Error : 9.4427206E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2992.287	3297.799	15520.00	0.3363194	1.4448194E-02	50.00877
NP-237	164.6658	28-FEB-2010	4436.422	4905.631	13582.00	0.3435974	1.7431144E-02	61.98585
CM-244	151.3824	28-FEB-2010	5534.572	5887.590	12114.00	0.3515212	1.7863980E-02	52.94975

Instrument : CHAMBER 101
Detector : 64253
Standard ID : AESS-037
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 9-JUL-2009 08:08:15
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:13:22
Average Efficiency : 0.3390052
Average Efficiency Error : 9.3409885E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7372	28-FEB-2010	2992.433	3299.297	15460.00	0.3299631	1.4176095E-02	61.39046
NP-237	167.1294	28-FEB-2010	4436.714	4901.796	13907.00	0.3466887	1.7581994E-02	74.45712
CM-244	154.7664	28-FEB-2010	5531.777	5885.188	12159.00	0.3452022	1.7541731E-02	61.78313

Instrument : CHAMBER 102
Detector : 72525
Standard ID : AESS-038
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 9-JUL-2009 08:08:15
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:13:31
Average Efficiency : 0.3328035
Average Efficiency Error : 9.1680549E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1408	28-FEB-2010	2992.102	3300.657	15781.00	0.3327644	1.4291358E-02	57.28693
NP-237	170.0886	28-FEB-2010	4432.858	4904.949	13683.00	0.3351520	1.7000843E-02	70.05949
CM-244	157.7460	28-FEB-2010	5531.106	5882.690	11868.00	0.3305628	1.6804401E-02	60.52639

Instrument : CHAMBER 103
Detector : 79461
Standard ID : AESS-039
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 9-JUL-2009 08:08:15
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:13:40
Average Efficiency : 0.3354990
Average Efficiency Error : 9.2500327E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2988.996	3300.314	15148.00	0.3325511	1.4292428E-02	46.53494
NP-237	159.1506	28-FEB-2010	4436.805	4901.981	13231.00	0.3463839	1.7579062E-02	65.39693
CM-244	151.7142	28-FEB-2010	5532.506	5886.425	11383.00	0.3296518	1.6769741E-02	53.08098

Instrument : CHAMBER 104
Detector : 72524
Standard ID : AESS-040
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 9-JUL-2009 08:08:15
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:13:48
Average Efficiency : 0.3172685
Average Efficiency Error : 8.7505886E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4828	28-FEB-2010	2990.719	3300.868	14808.00	0.3213409	1.3816299E-02	52.43279
NP-237	166.8174	28-FEB-2010	4437.132	4904.901	12602.00	0.3146936	1.5982572E-02	60.08082
CM-244	155.0100	28-FEB-2010	5531.506	5883.017	11092.00	0.3143873	1.6000355E-02	48.93826

Instrument : CHAMBER 105
Detector : 78777
Standard ID : AESS-041
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 9-JUL-2009 08:08:15
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:13:56
Average Efficiency : 0.3238136
Average Efficiency Error : 8.9225518E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.9034	28-FEB-2010	2991.574	3300.708	15632.00	0.3235499	1.3897874E-02	47.98710
NP-237	171.2268	28-FEB-2010	4435.406	4903.467	13447.00	0.3271988	1.6601518E-02	65.57580
CM-244	159.5796	28-FEB-2010	5531.275	5883.854	11655.00	0.3209064	1.6318357E-02	49.59695

Instrument : CHAMBER 106
Detector : 64274
Standard ID : AESS-042
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 9-JUL-2009 08:08:15
Calibration Count Time : 240.0000
Efficiency Calibration Date/Time : 9-JUL-2009 13:14:04
Average Efficiency : 0.3300298
Average Efficiency Error : 9.1015678E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	188.7090	28-FEB-2010	2989.941	3301.958	14641.00	0.3274217	1.4080711E-02	51.04536
NP-237	159.6558	28-FEB-2010	4435.855	4902.069	12766.00	0.3331273	1.6915364E-02	68.33770
CM-244	150.5208	28-FEB-2010	5534.023	5883.359	11329.00	0.3306891	1.6823869E-02	57.44720

Instrument	:	CHAMBER 107
Detector	:	67578
Standard ID	:	AESS-043
Standard Reference Date	:	19-FEB-2008 00:32:27
Calibration Analysis Date/Time	:	9-JUL-2009 08:08:16
Calibration Count Time	:	239.9998
Efficiency Calibration Date/Time	:	9-JUL-2009 13:14:15
Average Efficiency	:	0.3045647
Average Efficiency Error	:	8.4048761E-03
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7708	28-FEB-2010	2987.523	3301.257	14050.00	0.2997997	1.2902850E-02	50.05696
NP-237	168.7422	28-FEB-2010	4435.381	4903.438	12388.00	0.3058615	1.5538067E-02	64.39712
CM-244	156.3252	28-FEB-2010	5532.229	5882.600	11043.00	0.3103665	1.5796915E-02	54.52126

Instrument	:	CHAMBER 108
Detector	:	78778
Standard ID	:	AESS-044
Standard Reference Date	:	19-FEB-2008 00:32:27
Calibration Analysis Date/Time	:	9-JUL-2009 08:08:16
Calibration Count Time	:	239.9998
Efficiency Calibration Date/Time	:	10-JUL-2009 08:15:33
Average Efficiency	:	0.3360237
Average Efficiency Error	:	9.2592761E-03
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2987.937	3298.136	15260.00	0.3312062	1.4232747E-02	47.91920
NP-237	166.6248	28-FEB-2010	4435.160	4903.491	13641.00	0.3410752	1.7302046E-02	70.19518
CM-244	155.8290	28-FEB-2010	5531.067	5883.227	11990.00	0.3380632	1.7182823E-02	49.11132

Instrument	:	CHAMBER 109
Detector	:	79463
Standard ID	:	AESS-045
Standard Reference Date	:	19-FEB-2008 00:32:27
Calibration Analysis Date/Time	:	9-JUL-2009 08:08:16
Calibration Count Time	:	239.9998
Efficiency Calibration Date/Time	:	9-JUL-2009 13:14:36
Average Efficiency	:	0.3557599
Average Efficiency Error	:	9.8008178E-03
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	186.9936	28-FEB-2010	2989.195	3299.997	15695.00	0.3542219	1.5214318E-02	44.90919
NP-237	160.8066	28-FEB-2010	4435.631	4906.161	13634.00	0.3532281	1.7918682E-02	60.71558
CM-244	145.8384	28-FEB-2010	5531.938	5886.333	11971.00	0.3606424	1.8330947E-02	47.40115

Instrument : CHAMBER 110
Detector : 67602
Standard ID : AESS-046
Standard Reference Date : 8-JAN-2007 09:29:00
Calibration Analysis Date/Time : 9-JUL-2009 08:08:16
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:15:06
Average Efficiency : 0.3174780
Average Efficiency Error : 8.7590944E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.6531	28-FEB-2010	2989.370	3301.157	14395.00	0.3105389	1.3360999E-02	53.22070
NP-237	164.3834	28-FEB-2010	4436.284	4904.992	12802.00	0.3244717	1.6475134E-02	64.57879
CM-244	159.4253	28-FEB-2010	5535.250	5883.287	11162.00	0.3209743	1.6333863E-02	56.77616

Instrument : CHAMBER 111
Detector : 79462
Standard ID : AESS-047
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 9-JUL-2009 08:08:16
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:15:22
Average Efficiency : 0.3410317
Average Efficiency Error : 9.3937013E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2990.820	3300.305	15891.00	0.3395850	1.4582562E-02	46.16263
NP-237	168.3948	28-FEB-2010	4436.744	4905.500	13621.00	0.3369952	1.7095437E-02	61.95173
CM-244	154.6032	28-FEB-2010	5535.002	5885.661	12226.00	0.3474574	1.7654790E-02	55.37262

Instrument : CHAMBER 112
Detector : 78261
Standard ID : AESS-048
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 9-JUL-2009 08:08:16
Calibration Count Time : 239.9998
Efficiency Calibration Date/Time : 9-JUL-2009 13:15:42
Average Efficiency : 0.3101838
Average Efficiency Error : 8.5619837E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2988.969	3300.635	14006.00	0.3081187	1.3261668E-02	44.59222
NP-237	161.5530	28-FEB-2010	4436.114	4905.135	12212.00	0.3149208	1.6001921E-02	60.98758
CM-244	151.1856	28-FEB-2010	5532.983	5884.981	10616.00	0.3085150	1.5713703E-02	48.71024

Instrument : CHAMBER 113
Detector : 45-111B4
Standard ID : AESS-001
Standard Reference Date : 20-FEB-2008 09:54:53
Calibration Analysis Date/Time : 15-JUL-2009 08:37:50
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 15-JUL-2009 13:43:32
Average Efficiency : 0.2519916
Average Efficiency Error : 6.9467155E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.6698	28-FEB-2010	2988.779	3298.785	15298.00	0.2475491	1.0637350E-02	69.86681
NP-237	171.0024	28-FEB-2010	4433.559	4905.331	12963.00	0.2526515	1.2826058E-02	72.30716
CM-244	158.1060	28-FEB-2010	5530.517	5883.481	11603.00	0.2580627	1.3123710E-02	68.28992

Instrument : CHAMBER 114
Detector : 78258
Standard ID : AESS-007
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 15-JUL-2009 08:37:55
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 15-JUL-2009 13:43:44
Average Efficiency : 0.2556549
Average Efficiency Error : 7.0340075E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2990.441	3298.868	15389.00	0.2513953	1.0801502E-02	44.39313
NP-237	205.0260	28-FEB-2010	4436.900	4905.218	15927.00	0.2589234	1.3107756E-02	58.50210
CM-244	199.6806	28-FEB-2010	5530.599	5885.790	14679.00	0.2586593	1.3108032E-02	49.91982

Instrument : CHAMBER 115
Detector : 45-132FF4
Standard ID : AESS-002
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 15-JUL-2009 08:37:59
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 15-JUL-2009 13:43:54
Average Efficiency : 0.2654886
Average Efficiency Error : 7.3024337E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1144	28-FEB-2010	2991.839	3301.816	15791.00	0.2664527	1.1443332E-02	55.36104
NP-237	200.4990	28-FEB-2010	4436.001	4902.052	15786.00	0.2624403	1.3287230E-02	64.95200
CM-244	196.5558	28-FEB-2010	5531.697	5884.118	14942.00	0.2673051	1.3543067E-02	65.53946

Instrument : CHAMBER 116
Detector : 45-132FF2
Standard ID : AESS-008
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 15-JUL-2009 08:38:03
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 15-JUL-2009 13:44:05
Average Efficiency : 0.2629267
Average Efficiency Error : 7.2302124E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.0418	28-FEB-2010	2988.005	3302.013	16058.00	0.2632007	1.1300448E-02	59.26229
NP-237	209.2716	28-FEB-2010	4432.895	4903.021	16270.00	0.2591243	1.3114552E-02	68.78876
CM-244	199.6488	28-FEB-2010	5531.311	5883.052	15125.00	0.2665666	1.3503457E-02	63.98270

Instrument : CHAMBER 117
Detector : 33450
Standard ID : AESS-003
Standard Reference Date : 15-FEB-2008 13:12:27
Calibration Analysis Date/Time : 15-JUL-2009 08:38:07
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 15-JUL-2009 13:44:15
Average Efficiency : 0.2535850
Average Efficiency Error : 6.9797374E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2992.173	3300.224	14948.00	0.2486987	1.0691201E-02	65.60831
NP-237	203.2080	28-FEB-2010	4434.403	4904.427	15595.00	0.2557888	1.2952457E-02	67.83129
CM-244	197.2236	28-FEB-2010	5533.135	5885.381	14502.00	0.2586756	1.3111014E-02	62.53085

Instrument : CHAMBER 118
Detector : 75544
Standard ID : AESS-009
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 15-JUL-2009 08:38:11
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 15-JUL-2009 13:44:26
Average Efficiency : 0.2598683
Average Efficiency Error : 7.1489667E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.3736	28-FEB-2010	2992.199	3301.179	15535.00	0.2579420	1.1080938E-02	44.86411
NP-237	204.0192	28-FEB-2010	4437.404	4902.417	15842.00	0.2588220	1.3103474E-02	58.11101
CM-244	197.2128	28-FEB-2010	5530.853	5882.689	14791.00	0.2637591	1.3365132E-02	41.32130

Instrument : CHAMBER 119
Detector : 74429
Standard ID : AESS-004
Standard Reference Date : 14-FEB-2008 09:35:18
Calibration Analysis Date/Time : 15-JUL-2009 08:38:16
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 2-FEB-2009 15:15:38
Average Efficiency : 0.2936279
Average Efficiency Error : 1.2630888E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.1222	28-FEB-2010	2992.004	3299.253	9998.000	0.2936279	1.2630888E-02	0.0000000E+00
NP-237	204.2586	28-FEB-2010	4432.548	4906.013	0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
CM-244	198.8100	28-FEB-2010	5530.584	5883.165	0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Instrument : CHAMBER 120
Detector : 74430
Standard ID : AESS-010
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 15-JUL-2009 08:38:20
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 16-JUL-2009 09:29:36
Average Efficiency : 0.2329810
Average Efficiency Error : 6.4206291E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.0008	28-FEB-2010	2990.522	3298.404	13848.00	0.2315074	9.9664843E-03	47.05631
NP-237	202.9926	28-FEB-2010	4435.328	4903.588	14182.00	0.2328624	1.1806204E-02	59.86080
CM-244	196.2330	28-FEB-2010	5534.528	5884.756	13118.00	0.2352170	1.1938849E-02	50.37906

Instrument : CHAMBER 121
Detector : 75545
Standard ID : AESS-005
Standard Reference Date : 14-FEB-2008 09:35:18
Calibration Analysis Date/Time : 15-JUL-2009 08:38:24
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 15-JUL-2009 13:44:36
Average Efficiency : 0.2481502
Average Efficiency Error : 6.8278033E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.7452	28-FEB-2010	2988.023	3300.631	15450.00	0.2475892	1.0637230E-02	49.92188
NP-237	209.5938	28-FEB-2010	4432.658	4901.599	15670.00	0.2492075	1.2618415E-02	57.40462
CM-244	202.7478	28-FEB-2010	5533.997	5885.295	14284.00	0.2478847	1.2566634E-02	53.21548

Instrument	:	CHAMBER 122
Detector	:	75546
Standard ID	:	AESS-011
Standard Reference Date	:	14-FEB-2008 13:39:25
Calibration Analysis Date/Time	:	15-JUL-2009 08:38:29
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	15-JUL-2009 13:44:46
Average Efficiency	:	0.2535488
Average Efficiency Error	:	6.9723255E-03
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	212.8284	28-FEB-2010	2990.563	3298.589	16028.00	0.2543318	1.0920011E-02	51.38880
NP-237	214.4868	28-FEB-2010	4436.782	4905.890	16182.00	0.2514608	1.2727518E-02	56.55112
CM-244	208.4184	28-FEB-2010	5532.955	5884.078	15083.00	0.2546007	1.2897825E-02	50.53276

Instrument	:	CHAMBER 123
Detector	:	45-142V3
Standard ID	:	AESS-006
Standard Reference Date	:	14-FEB-2008 09:35:18
Calibration Analysis Date/Time	:	15-JUL-2009 08:38:33
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	15-JUL-2009 13:44:55
Average Efficiency	:	0.2599957
Average Efficiency Error	:	7.1522635E-03
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2990.850	3299.223	15663.00	0.2596899	1.1154454E-02	71.05709
NP-237	204.7038	28-FEB-2010	4437.241	4905.636	15899.00	0.2588749	1.3105587E-02	67.04378
CM-244	195.0060	28-FEB-2010	5531.191	5886.517	14497.00	0.2615748	1.3257999E-02	62.26140

Instrument	:	CHAMBER 124
Detector	:	45-142V2
Standard ID	:	AESS-012
Standard Reference Date	:	14-FEB-2008 13:39:25
Calibration Analysis Date/Time	:	15-JUL-2009 08:38:38
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	15-JUL-2009 13:45:05
Average Efficiency	:	0.2587920
Average Efficiency Error	:	7.1179173E-03
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.2200	28-FEB-2010	2988.169	3298.838	15692.00	0.2569794	1.1037684E-02	70.68444
NP-237	205.8930	28-FEB-2010	4434.514	4905.983	16135.00	0.2612102	1.3221423E-02	71.87656
CM-244	203.1954	28-FEB-2010	5535.498	5887.649	14956.00	0.2589717	1.3120654E-02	72.67943

Instrument : CHAMBER 125
Detector : 75547
Standard ID : AESS-013
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 17-JUL-2009 09:11:36
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:23:54
Average Efficiency : 0.2576947
Average Efficiency Error : 7.0884591E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2992.438	3299.892	15734.00	0.2609255	1.1206666E-02	46.30545
NP-237	210.2526	28-FEB-2010	4435.342	4903.042	16013.00	0.2538552	1.2850333E-02	59.85715
CM-244	201.9108	28-FEB-2010	5533.267	5883.118	14760.00	0.2572743	1.3036882E-02	47.93466

Instrument : CHAMBER 126
Detector : 75548
Standard ID : AESS-019
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 17-JUL-2009 09:11:44
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:24:06
Average Efficiency : 0.2541045
Average Efficiency Error : 6.9944067E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.6468	28-FEB-2010	2988.642	3299.863	14987.00	0.2472976	1.0630463E-02	48.38591
NP-237	202.9140	28-FEB-2010	4434.022	4903.287	15977.00	0.2624101	1.3283804E-02	54.76476
CM-244	199.3140	28-FEB-2010	5533.750	5882.833	14524.00	0.2563267	1.2991657E-02	55.65510

Instrument : CHAMBER 127
Detector : 78770
Standard ID : AESS-014
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 17-JUL-2009 09:11:52
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:24:19
Average Efficiency : 0.2465067
Average Efficiency Error : 6.7814202E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2987.930	3300.925	15708.00	0.2470578	1.0611333E-02	45.78584
NP-237	211.7160	28-FEB-2010	4433.404	4902.114	15685.00	0.2469317	1.2503051E-02	55.80547
CM-244	207.3882	28-FEB-2010	5533.832	5884.575	14464.00	0.2453295	1.2434963E-02	52.15766

Instrument : CHAMBER 128
Detector : 75549
Standard ID : AESS-020
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 17-JUL-2009 09:11:58
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:24:31
Average Efficiency : 0.2568552
Average Efficiency Error : 7.0680329E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	205.5870	28-FEB-2010	2989.441	3299.762	15295.00	0.2512498	1.0796450E-02	45.99468
NP-237	203.4984	28-FEB-2010	4437.479	4901.607	16011.00	0.2622381	1.3274715E-02	55.45222
CM-244	197.1096	28-FEB-2010	5532.807	5882.614	14556.00	0.2598990	1.3172311E-02	50.77409

Instrument : CHAMBER 129
Detector : 76227
Standard ID : AESS-015
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 17-JUL-2009 09:12:03
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:24:41
Average Efficiency : 0.2644528
Average Efficiency Error : 7.2740684E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0270	28-FEB-2010	2991.626	3298.866	15762.00	0.2609125	1.1205764E-02	46.80607
NP-237	200.6460	28-FEB-2010	4434.006	4901.792	16185.00	0.2688618	1.3608224E-02	54.56116
CM-244	195.9270	28-FEB-2010	5532.320	5882.430	14766.00	0.2652449	1.3440695E-02	49.47559

Instrument : CHAMBER 130
Detector : 76228
Standard ID : AESS-021
Standard Reference Date : 19-FEB-2008 15:31:52
Calibration Analysis Date/Time : 17-JUL-2009 09:12:07
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:24:51
Average Efficiency : 0.2468057
Average Efficiency Error : 6.7924876E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2987.724	3301.129	15063.00	0.2441104	1.0492519E-02	52.03590
NP-237	210.1548	28-FEB-2010	4432.733	4905.256	15645.00	0.2481126	1.2563273E-02	57.61189
CM-244	200.7390	28-FEB-2010	5534.221	5882.991	14232.00	0.2493957	1.2643824E-02	52.52812

Instrument : CHAMBER 131
Detector : 33448
Standard ID : AESS-016
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 17-JUL-2009 09:12:11
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:25:01
Average Efficiency : 0.2570197
Average Efficiency Error : 7.0734182E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2990.041	3301.703	15183.00	0.2512954	1.0799803E-02	73.19037
NP-237	199.3962	28-FEB-2010	4437.470	4901.500	15793.00	0.2639839	1.3365344E-02	77.05526
CM-244	198.6402	28-FEB-2010	5535.040	5887.344	14606.00	0.2587552	1.3113786E-02	69.05248

Instrument : CHAMBER 132
Detector : 67579
Standard ID : AESS-022
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 17-JUL-2009 09:12:16
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:25:11
Average Efficiency : 0.2430298
Average Efficiency Error : 6.6918936E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2991.722	3299.982	14858.00	0.2393249	1.0289361E-02	82.35345
NP-237	206.8830	28-FEB-2010	4436.189	4902.037	15718.00	0.2532126	1.2820771E-02	110.8838
CM-244	203.0208	28-FEB-2010	5533.193	5884.042	13792.00	0.2390666	1.2125478E-02	95.32550

Instrument : CHAMBER 133
Detector : 76229
Standard ID : AESS-017
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 17-JUL-2009 09:12:20
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:25:22
Average Efficiency : 0.2443746
Average Efficiency Error : 6.7256871E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.0798	28-FEB-2010	2991.784	3301.677	15064.00	0.2421688	1.0409047E-02	50.61230
NP-237	208.5846	28-FEB-2010	4432.798	4901.797	15477.00	0.2473098	1.2524300E-02	59.86257
CM-244	205.5828	28-FEB-2010	5532.072	5884.338	14290.00	0.2446276	1.2401419E-02	51.55180

Instrument : CHAMBER 134
Detector : 76230
Standard ID : AESS-023
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 17-JUL-2009 09:12:25
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:25:32
Average Efficiency : 0.2446093
Average Efficiency Error : 6.7343172E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	207.4764	28-FEB-2010	2990.526	3299.017	14780.00	0.2405785	1.0344269E-02	47.58438
NP-237	207.4998	28-FEB-2010	4435.982	4903.287	15238.00	0.2446961	1.2394482E-02	57.76377
CM-244	199.8804	28-FEB-2010	5532.080	5886.000	14233.00	0.2505983	1.2704798E-02	45.62634

Instrument : CHAMBER 135
Detector : 64270
Standard ID : AESS-018
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 17-JUL-2009 09:12:30
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:25:42
Average Efficiency : 0.2559817
Average Efficiency Error : 7.0438967E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.1856	28-FEB-2010	2988.277	3299.628	15593.00	0.2604657	1.1188660E-02	51.52015
NP-237	208.8990	28-FEB-2010	4437.221	4904.200	15580.00	0.2485812	1.2587634E-02	59.07031
CM-244	198.1458	28-FEB-2010	5533.869	5883.613	14517.00	0.2578413	1.3068504E-02	58.17161

Instrument : CHAMBER 136
Detector : 68549
Standard ID : AESS-024
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 17-JUL-2009 09:12:34
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:25:52
Average Efficiency : 0.2467655
Average Efficiency Error : 6.7935060E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.5218	28-FEB-2010	2990.353	3301.238	14853.00	0.2464695	1.0596607E-02	65.72455
NP-237	205.6662	28-FEB-2010	4436.739	4902.455	15465.00	0.2505761	1.2689904E-02	90.78280
CM-244	198.3060	28-FEB-2010	5530.869	5887.561	13725.00	0.2435561	1.2354044E-02	84.13201

Instrument : CHAMBER 137
Detector : 64288
Standard ID : AESS-025
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 17-JUL-2009 09:12:39
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:26:02
Average Efficiency : 0.2552701
Average Efficiency Error : 7.0390012E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2988.740	3300.102	14923.00	0.2576955	1.1078311E-02	64.99760
NP-237	167.9916	28-FEB-2010	4437.224	4902.644	12892.00	0.2557947	1.2986653E-02	75.28851
CM-244	157.2432	28-FEB-2010	5534.374	5886.101	11242.00	0.2515239	1.2798158E-02	68.25955

Instrument : CHAMBER 138
Detector : 65877
Standard ID : AESS-031
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 17-JUL-2009 09:12:44
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:26:11
Average Efficiency : 0.2546351
Average Efficiency Error : 7.0242025E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2989.573	3299.020	14588.00	0.2543695	1.0939864E-02	53.70593
NP-237	162.9186	28-FEB-2010	4433.563	4906.044	12608.00	0.2577648	1.3091444E-02	63.94941
CM-244	153.1968	28-FEB-2010	5532.867	5887.098	10976.00	0.2519955	1.2827461E-02	58.23169

Instrument : CHAMBER 139
Detector : 76231
Standard ID : AESS-026
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 17-JUL-2009 09:12:48
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:26:21
Average Efficiency : 0.2504273
Average Efficiency Error : 7.3419176E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2987.505	3300.432	14828.00	0.2510030	1.2718994E-02	48.79321
NP-237	168.0294	28-FEB-2010	4434.030	4903.806	12788.00	0.2536503	1.2879401E-02	56.03834
CM-244	160.5822	28-FEB-2010	5532.176	5884.231	11264.00	0.2468024	1.2557442E-02	47.42265

Instrument : CHAMBER 140
Detector : 78771
Standard ID : AESS-032
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 17-JUL-2009 09:12:53
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:26:31
Average Efficiency : 0.2551487
Average Efficiency Error : 7.0366412E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2990.854	3298.685	14731.00	0.2547957	1.0956220E-02	48.77175
NP-237	165.9822	28-FEB-2010	4432.882	4903.279	12676.00	0.2545053	1.2924591E-02	56.74310
CM-244	153.7938	28-FEB-2010	5532.806	5885.667	11205.00	0.2563040	1.3041983E-02	50.50342

Instrument : CHAMBER 141
Detector : 76232
Standard ID : AESS-027
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 17-JUL-2009 09:12:58
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:26:40
Average Efficiency : 0.2558747
Average Efficiency Error : 7.5053386E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2991.144	3299.081	14344.00	0.2504358	1.2695894E-02	52.97828
NP-237	161.6154	28-FEB-2010	4432.714	4902.455	12501.00	0.2577664	1.3093018E-02	59.69727
CM-244	148.1754	28-FEB-2010	5530.738	5882.724	10942.00	0.2598479	1.3227826E-02	52.14254

Instrument : CHAMBER 142
Detector : 64261
Standard ID : AESS-033
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 17-JUL-2009 09:13:03
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:26:50
Average Efficiency : 0.2578609
Average Efficiency Error : 7.1141319E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.4158	28-FEB-2010	2990.865	3298.794	14538.00	0.2551434	1.0973847E-02	59.26533
NP-237	161.7816	28-FEB-2010	4432.947	4903.147	12416.00	0.2557132	1.2990172E-02	60.24754
CM-244	147.2670	28-FEB-2010	5532.255	5884.805	11064.00	0.2642446	1.3449099E-02	59.08084

Instrument : CHAMBER 143
Detector : 65882
Standard ID : AESS-028
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 17-JUL-2009 09:13:09
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:27:11
Average Efficiency : 0.2247539
Average Efficiency Error : 6.6391113E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2987.701	3299.952	14717.00	0.2489303	1.2615234E-02	59.75106
NP-237	168.1992	28-FEB-2010	4432.480	4904.917	12257.00	0.2428234	1.2337844E-02	78.49762
CM-244	156.7614	28-FEB-2010	5535.542	5887.375	8790.000	0.1972357	1.0083942E-02	0.0000000E+00

Instrument : CHAMBER 144
Detector : 75551
Standard ID : AESS-034
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 17-JUL-2009 09:13:14
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:27:26
Average Efficiency : 0.2489190
Average Efficiency Error : 6.8659927E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2987.490	3300.379	14854.00	0.2501176	1.0753425E-02	46.53134
NP-237	167.2962	28-FEB-2010	4433.137	4902.257	12414.00	0.2473100	1.2563203E-02	59.28743
CM-244	154.4388	28-FEB-2010	5534.787	5886.106	10929.00	0.2488915	1.2670427E-02	55.09279

Instrument : CHAMBER 145
Detector : 72526
Standard ID : AESS-029
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 17-JUL-2009 09:13:19
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:27:37
Average Efficiency : 0.2495571
Average Efficiency Error : 7.3171528E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.5742	28-FEB-2010	2989.366	3298.098	14915.00	0.2498968	1.2661957E-02	51.73314
NP-237	169.7700	28-FEB-2010	4434.265	4904.885	12751.00	0.2503173	1.2710736E-02	57.53227
CM-244	154.8234	28-FEB-2010	5534.192	5886.678	10933.00	0.2484652	1.2648602E-02	48.31667

Instrument : CHAMBER 146
Detector : 72527
Standard ID : AESS-035
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 17-JUL-2009 09:13:24
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:27:48
Average Efficiency : 0.2495693
Average Efficiency Error : 6.8829530E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2991.494	3297.950	14697.00	0.2498184	1.0742654E-02	54.01461
NP-237	168.2934	28-FEB-2010	4436.761	4904.596	12650.00	0.2505190	1.2722510E-02	56.99129
CM-244	158.8128	28-FEB-2010	5530.438	5886.440	11210.00	0.2482881	1.2634057E-02	52.12059

Instrument : CHAMBER 147
Detector : 75550
Standard ID : AESS-030
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 17-JUL-2009 09:13:29
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:27:59
Average Efficiency : 0.2449156
Average Efficiency Error : 7.1838433E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.9792	28-FEB-2010	2987.763	3300.677	14416.00	0.2446455	1.2401544E-02	44.93960
NP-237	166.3758	28-FEB-2010	4433.256	4902.183	12106.00	0.2424534	1.2321484E-02	55.16415
CM-244	157.1856	28-FEB-2010	5534.346	5885.412	11068.00	0.2477740	1.2610656E-02	48.98204

Instrument : CHAMBER 148
Detector : 74429
Standard ID : AESS-036
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 17-JUL-2009 09:13:34
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:28:08
Average Efficiency : 0.2454490
Average Efficiency Error : 6.7716590E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.3204	28-FEB-2010	2989.918	3302.313	14456.00	0.2424625	1.0429571E-02	47.34021
NP-237	167.4312	28-FEB-2010	4434.677	4904.245	12395.00	0.2467024	1.2532696E-02	55.78803
CM-244	156.4188	28-FEB-2010	5532.604	5884.780	11054.00	0.2485659	1.2651297E-02	54.50585

Instrument	:	CHAMBER 149
Detector	:	33449
Standard ID	:	AESS-037
Standard Reference Date	:	18-FEB-2008 15:31:47
Calibration Analysis Date/Time	:	17-JUL-2009 09:13:39
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	17-JUL-2009 14:28:21
Average Efficiency	:	0.2457679
Average Efficiency Error	:	6.7815189E-03
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7372	28-FEB-2010	2990.126	3302.099	14274.00	0.2437622	1.0487950E-02	64.38747
NP-237	167.1294	28-FEB-2010	4433.957	4903.766	12301.00	0.2453031	1.2463043E-02	67.00629
CM-244	154.7664	28-FEB-2010	5532.840	5885.608	10964.00	0.2491831	1.2684503E-02	59.86861

Instrument	:	CHAMBER 150
Detector	:	75552
Standard ID	:	AESS-043
Standard Reference Date	:	19-FEB-2008 00:32:27
Calibration Analysis Date/Time	:	17-JUL-2009 09:13:44
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	17-JUL-2009 14:28:35
Average Efficiency	:	0.2487296
Average Efficiency Error	:	6.8612574E-03
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7708	28-FEB-2010	2989.847	3298.390	14400.00	0.2458598	1.0576462E-02	51.08628
NP-237	168.7422	28-FEB-2010	4433.411	4903.355	12733.00	0.2514980	1.2770942E-02	58.74739
CM-244	156.3252	28-FEB-2010	5531.584	5883.380	11116.00	0.2501363	1.2729902E-02	54.38089

Instrument	:	CHAMBER 151
Detector	:	75556
Standard ID	:	AESS-038
Standard Reference Date	:	18-FEB-2008 15:31:47
Calibration Analysis Date/Time	:	17-JUL-2009 09:13:48
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	17-JUL-2009 14:28:46
Average Efficiency	:	0.2462034
Average Efficiency Error	:	6.7912084E-03
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1408	28-FEB-2010	2988.196	3299.830	14661.00	0.2473749	1.0638047E-02	50.47650
NP-237	170.0886	28-FEB-2010	4437.520	4904.128	12488.00	0.2447234	1.2430614E-02	54.82476
CM-244	157.7460	28-FEB-2010	5532.939	5887.339	11036.00	0.2460822	1.2525211E-02	55.11473

Instrument : CHAMBER 152
Detector : 76222
Standard ID : AESS-044
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 17-JUL-2009 09:13:54
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:28:57
Average Efficiency : 0.2424625
Average Efficiency Error : 6.6924468E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2992.335	3299.767	14031.00	0.2436645	1.0487170E-02	49.42483
NP-237	166.6248	28-FEB-2010	4435.085	4902.709	12138.00	0.2428150	1.2339183E-02	57.89848
CM-244	155.8290	28-FEB-2010	5532.813	5882.589	10654.00	0.2404757	1.2247530E-02	56.10107

Instrument : CHAMBER 153
Detector : 76223
Standard ID : AESS-039
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 17-JUL-2009 09:13:59
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:29:06
Average Efficiency : 0.2537628
Average Efficiency Error : 7.0021353E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2989.763	3301.789	14281.00	0.2508323	1.0792080E-02	43.74009
NP-237	159.1506	28-FEB-2010	4432.699	4901.612	12218.00	0.2558562	1.3000614E-02	52.94971
CM-244	151.7142	28-FEB-2010	5534.359	5886.038	11040.00	0.2559308	1.3026465E-02	50.96056

Instrument : CHAMBER 154
Detector : 76224
Standard ID : AESS-045
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 17-JUL-2009 09:14:04
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:29:15
Average Efficiency : 0.2562141
Average Efficiency Error : 7.0709228E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	186.9936	28-FEB-2010	2989.543	3301.969	14237.00	0.2571022	1.1062440E-02	44.63987
NP-237	160.8066	28-FEB-2010	4433.171	4901.699	12222.00	0.2533354	1.2872400E-02	53.13824
CM-244	145.8384	28-FEB-2010	5533.478	5884.401	10695.00	0.2579601	1.3137060E-02	43.14489

Instrument : CHAMBER 155
Detector : 75553
Standard ID : AESS-040
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 17-JUL-2009 09:14:09
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:29:25
Average Efficiency : 0.2566149
Average Efficiency Error : 7.0761675E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4828	28-FEB-2010	2990.863	3299.267	14869.00	0.2581782	1.1099775E-02	49.42255
NP-237	166.8174	28-FEB-2010	4435.628	4901.683	12765.00	0.2550453	1.2950568E-02	57.37749
CM-244	155.0100	28-FEB-2010	5532.390	5885.923	11282.00	0.2560498	1.3027489E-02	54.62441

Instrument : CHAMBER 156
Detector : 75554
Standard ID : AESS-046
Standard Reference Date : 19-FEB-2008 19:35:48
Calibration Analysis Date/Time : 17-JUL-2009 09:14:14
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:29:35
Average Efficiency : 0.2473153
Average Efficiency Error : 6.8258164E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2992.492	3302.387	14104.00	0.2445442	1.0524000E-02	51.31209
NP-237	164.6658	28-FEB-2010	4436.746	4903.077	12183.00	0.2465298	1.2527379E-02	60.35096
CM-244	151.3824	28-FEB-2010	5533.286	5886.114	10859.00	0.2522683	1.2843768E-02	55.38654

Instrument : CHAMBER 157
Detector : 75555
Standard ID : AESS-041
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 17-JUL-2009 09:14:19
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:29:49
Average Efficiency : 0.2476787
Average Efficiency Error : 6.8296832E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.9034	28-FEB-2010	2992.092	3301.029	14898.00	0.2467154	1.0606610E-02	50.26978
NP-237	171.2268	28-FEB-2010	4432.881	4903.879	12754.00	0.2482167	1.2604078E-02	60.14729
CM-244	159.5796	28-FEB-2010	5533.745	5886.569	11276.00	0.2485061	1.2643948E-02	50.54896

Instrument : CHAMBER 158
Detector : 33451
Standard ID : AESS-047
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 17-JUL-2009 09:14:24
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:30:01
Average Efficiency : 0.2485719
Average Efficiency Error : 6.8571796E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2989.224	3299.662	14546.00	0.2487231	1.0697613E-02	60.48595
NP-237	168.3948	28-FEB-2010	4433.214	4902.387	12467.00	0.2466980	1.2531369E-02	67.30831
CM-244	154.6032	28-FEB-2010	5532.016	5882.536	11002.00	0.2502942	1.2740301E-02	63.12125

Instrument : CHAMBER 159
Detector : 76225
Standard ID : AESS-042
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 17-JUL-2009 09:14:28
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:30:14
Average Efficiency : 0.2532322
Average Efficiency Error : 6.9885729E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	188.7090	28-FEB-2010	2990.518	3300.013	14150.00	0.2532160	1.0896488E-02	50.25048
NP-237	159.6558	28-FEB-2010	4434.310	4906.501	12068.00	0.2519211	1.2803175E-02	54.85251
CM-244	150.5208	28-FEB-2010	5532.775	5886.617	10895.00	0.2545989	1.2961634E-02	49.59791

Instrument : CHAMBER 160
Detector : 76226
Standard ID : AESS-048
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 17-JUL-2009 09:14:34
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 17-JUL-2009 14:30:32
Average Efficiency : 0.2469152
Average Efficiency Error : 6.8162913E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2988.201	3297.681	13856.00	0.2439119	1.0500359E-02	46.45536
NP-237	161.5530	28-FEB-2010	4437.389	4904.545	12040.00	0.2483725	1.2623324E-02	55.48813
CM-244	151.1856	28-FEB-2010	5531.162	5885.243	10738.00	0.2498441	1.2722801E-02	48.70280

Instrument : CHAMBER 161
Detector : 70321
Standard ID : AESS-001
Standard Reference Date : 20-FEB-2008 09:54:53
Calibration Analysis Date/Time : 23-JUL-2009 08:06:57
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 13:58:35
Average Efficiency : 0.3724494
Average Efficiency Error : 1.0217360E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.6698	28-FEB-2010	2989.000	3299.306	22090.00	0.3575253	1.5279296E-02	62.61223
NP-237	171.0024	28-FEB-2010	4436.547	4904.892	19670.00	0.3833612	1.9362049E-02	79.92251
CM-244	158.1060	28-FEB-2010	5532.420	5884.522	17328.00	0.3856982	1.9506300E-02	61.01914

Instrument : CHAMBER 162
Detector : 70323
Standard ID : AESS-007
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 23-JUL-2009 08:07:02
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 13:58:45
Average Efficiency : 0.3625240
Average Efficiency Error : 9.9324752E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2991.757	3298.334	21624.00	0.3533120	1.5103292E-02	69.51453
NP-237	205.0260	28-FEB-2010	4432.446	4905.658	22738.00	0.3696573	1.8644748E-02	85.73167
CM-244	199.6806	28-FEB-2010	5531.781	5882.612	20947.00	0.3694310	1.8647112E-02	72.91757

Instrument : CHAMBER 163
Detector : 70324
Standard ID : AESS-002
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 23-JUL-2009 08:07:06
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 13:58:54
Average Efficiency : 0.3824499
Average Efficiency Error : 1.0474509E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1144	28-FEB-2010	2988.922	3300.358	22181.00	0.3743604	1.5997946E-02	60.90985
NP-237	200.4990	28-FEB-2010	4435.910	4905.359	23404.00	0.3890015	1.9615676E-02	79.84089
CM-244	196.5558	28-FEB-2010	5534.127	5886.809	21671.00	0.3880399	1.9580306E-02	54.00466

Instrument : CHAMBER 164
Detector : 70325
Standard ID : AESS-008
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 23-JUL-2009 08:07:11
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 13:59:02
Average Efficiency : 0.3871453
Average Efficiency Error : 1.0598736E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.0418	28-FEB-2010	2991.018	3297.699	23119.00	0.3790087	1.6188504E-02	60.82843
NP-237	209.2716	28-FEB-2010	4434.306	4904.250	24656.00	0.3926844	1.9792885E-02	74.00230
CM-244	199.6488	28-FEB-2010	5533.729	5886.834	22328.00	0.3938190	1.9866610E-02	56.32586

Instrument : CHAMBER 165
Detector : 72544
Standard ID : AESS-003
Standard Reference Date : 15-FEB-2008 13:12:27
Calibration Analysis Date/Time : 23-JUL-2009 08:07:15
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 13:59:11
Average Efficiency : 0.3820039
Average Efficiency Error : 1.0462373E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2989.844	3302.139	22390.00	0.3726058	1.5921146E-02	65.20252
NP-237	203.2080	28-FEB-2010	4434.670	4904.543	24014.00	0.3938612	1.9856445E-02	91.19821
CM-244	197.2236	28-FEB-2010	5533.515	5886.135	21543.00	0.3846419	1.9409848E-02	65.46077

Instrument : CHAMBER 166
Detector : 74545
Standard ID : AESS-009
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 23-JUL-2009 08:07:19
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 13:59:23
Average Efficiency : 0.3925092
Average Efficiency Error : 1.0746423E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.3736	28-FEB-2010	2989.919	3301.734	23062.00	0.3829970	1.6359299E-02	52.59587
NP-237	204.0192	28-FEB-2010	4433.352	4903.208	24416.00	0.3988877	2.0107118E-02	75.96468
CM-244	197.2128	28-FEB-2010	5532.473	5885.411	22446.00	0.4005800	2.0206742E-02	58.40631

Instrument : CHAMBER 167
Detector : 72546
Standard ID : AESS-004
Standard Reference Date : 14-FEB-2008 09:35:18
Calibration Analysis Date/Time : 23-JUL-2009 08:07:23
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 13:59:32
Average Efficiency : 0.3888160
Average Efficiency Error : 1.0646137E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.1222	28-FEB-2010	2991.456	3297.909	23075.00	0.3781414	1.6151825E-02	58.07474
NP-237	204.2586	28-FEB-2010	4433.461	4902.876	24396.00	0.3980886	2.0066978E-02	77.66827
CM-244	198.8100	28-FEB-2010	5531.568	5884.192	22354.00	0.3959535	1.9974077E-02	59.99561

Instrument : CHAMBER 168
Detector : 72547
Standard ID : AESS-010
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 23-JUL-2009 08:07:28
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 13:59:40
Average Efficiency : 0.3899174
Average Efficiency Error : 1.0677175E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.0008	28-FEB-2010	2990.191	3302.241	22715.00	0.3798450	1.6227633E-02	58.81176
NP-237	202.9926	28-FEB-2010	4434.272	4904.107	24151.00	0.3965338	1.9990249E-02	77.71660
CM-244	196.2330	28-FEB-2010	5533.178	5885.925	22217.00	0.3986928	2.0113347E-02	60.84048

Instrument : CHAMBER 169
Detector : 72548
Standard ID : AESS-005
Standard Reference Date : 14-FEB-2008 09:35:18
Calibration Analysis Date/Time : 23-JUL-2009 08:07:32
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 13:59:49
Average Efficiency : 0.3738278
Average Efficiency Error : 1.0237770E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.7452	28-FEB-2010	2991.882	3298.026	22677.00	0.3634718	1.5528463E-02	58.22092
NP-237	209.5938	28-FEB-2010	4432.930	4902.295	23781.00	0.3781127	1.9064061E-02	78.18230
CM-244	202.7478	28-FEB-2010	5531.111	5883.897	22203.00	0.3856194	1.9453954E-02	60.54502

Instrument : CHAMBER 170
Detector : 72549
Standard ID : AESS-011
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 23-JUL-2009 08:07:36
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 13:59:58
Average Efficiency : 0.3678014
Average Efficiency Error : 1.0071305E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	212.8284	28-FEB-2010	2991.026	3302.433	22648.00	0.3594523	1.5356976E-02	58.76050
NP-237	214.4868	28-FEB-2010	4434.863	4906.064	24165.00	0.3755153	1.8930556E-02	77.34428
CM-244	208.4184	28-FEB-2010	5532.657	5887.477	22059.00	0.3727079	1.8803651E-02	57.81808

Instrument : CHAMBER 171
Detector : 78260
Standard ID : AESS-006
Standard Reference Date : 14-FEB-2008 09:35:18
Calibration Analysis Date/Time : 23-JUL-2009 08:07:41
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:00:07
Average Efficiency : 0.3837917
Average Efficiency Error : 1.0510301E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2989.883	3301.923	22631.00	0.3752889	1.6033715E-02	57.49370
NP-237	204.7038	28-FEB-2010	4434.363	4904.564	23668.00	0.3853487	1.9429620E-02	72.93391
CM-244	195.0060	28-FEB-2010	5534.294	5887.494	21890.00	0.3953083	1.9945232E-02	55.35253

Instrument : CHAMBER 172
Detector : 78772
Standard ID : AESS-012
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 23-JUL-2009 08:07:46
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:00:15
Average Efficiency : 0.3822835
Average Efficiency Error : 1.0466998E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.2200	28-FEB-2010	2990.947	3302.414	22849.00	0.3742635	1.5988056E-02	52.36660
NP-237	205.8930	28-FEB-2010	4433.288	4903.064	24169.00	0.3912586	1.9724179E-02	72.41768
CM-244	203.1954	28-FEB-2010	5532.422	5885.508	22239.00	0.3854235	1.9443754E-02	56.46907

Instrument : CHAMBER 173
Detector : 74431
Standard ID : AESS-013
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 22-JUL-2009 08:09:49
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:12:56
Average Efficiency : 0.2623188
Average Efficiency Error : 7.2139227E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2991.296	3300.266	16061.00	0.2663769	1.1436811E-02	50.38961
NP-237	210.2526	28-FEB-2010	4436.390	4906.583	16403.00	0.2600285	1.3159030E-02	60.88579
CM-244	201.9108	28-FEB-2010	5534.964	5886.757	14870.00	0.2592480	1.3135729E-02	54.15428

Instrument : CHAMBER 174
Detector : 74432
Standard ID : AESS-019
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 22-JUL-2009 08:09:54
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:13:10
Average Efficiency : 0.2553943
Average Efficiency Error : 7.0305546E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.6468	28-FEB-2010	2990.955	3301.951	14943.00	0.2465975	1.0600956E-02	50.10695
NP-237	202.9140	28-FEB-2010	4436.112	4905.743	16012.00	0.2629998	1.3313278E-02	60.55487
CM-244	199.3140	28-FEB-2010	5531.741	5886.720	14821.00	0.2616092	1.3255978E-02	55.35811

Instrument : CHAMBER 175
Detector : 74433
Standard ID : AESS-014
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 22-JUL-2009 08:09:59
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:13:33
Average Efficiency : 0.2539235
Average Efficiency Error : 6.9827326E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2987.808	3301.771	16022.00	0.2520186	1.0820774E-02	50.17014
NP-237	211.7160	28-FEB-2010	4437.598	4902.379	16148.00	0.2542258	1.2867783E-02	58.39753
CM-244	207.3882	28-FEB-2010	5530.438	5887.378	15110.00	0.2563593	1.2986641E-02	52.37697

Instrument : CHAMBER 176
Detector : 74434
Standard ID : AESS-020
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 22-JUL-2009 08:10:03
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:13:51
Average Efficiency : 0.2596514
Average Efficiency Error : 7.1437038E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	205.5870	28-FEB-2010	2988.124	3298.749	15474.00	0.2542223	1.0921958E-02	48.05445
NP-237	203.4984	28-FEB-2010	4433.658	4904.539	16076.00	0.2633027	1.3327949E-02	56.64418
CM-244	197.1096	28-FEB-2010	5533.031	5884.495	14789.00	0.2641215	1.3383611E-02	51.45706

Instrument : CHAMBER 177
Detector : 74435
Standard ID : AESS-015
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 22-JUL-2009 08:10:07
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:14:02
Average Efficiency : 0.2685861
Average Efficiency Error : 7.3855612E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0270	28-FEB-2010	2991.035	3300.055	16129.00	0.2670162	1.1463443E-02	46.17820
NP-237	200.6460	28-FEB-2010	4436.061	4906.072	16230.00	0.2696093	1.3645601E-02	58.26474
CM-244	195.9270	28-FEB-2010	5534.094	5885.629	15017.00	0.2697915	1.3668223E-02	52.64664

Instrument : CHAMBER 178
Detector : 74436
Standard ID : AESS-021
Standard Reference Date : 19-FEB-2008 15:31:52
Calibration Analysis Date/Time : 22-JUL-2009 08:10:12
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:14:14
Average Efficiency : 0.2563734
Average Efficiency Error : 7.0544411E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2992.331	3301.630	15324.00	0.2483911	1.0673227E-02	46.26046
NP-237	210.1548	28-FEB-2010	4433.348	4903.642	16496.00	0.2615961	1.3237508E-02	57.60064
CM-244	200.7390	28-FEB-2010	5531.998	5883.700	15038.00	0.2635517	1.3351870E-02	53.76401

Instrument : CHAMBER 179
Detector : 74437
Standard ID : AESS-016
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 22-JUL-2009 08:10:16
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:14:24
Average Efficiency : 0.2654315
Average Efficiency Error : 7.3000593E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2991.102	3300.165	15895.00	0.2631131	1.1298665E-02	48.51485
NP-237	199.3962	28-FEB-2010	4436.443	4906.617	16075.00	0.2687030	1.3601316E-02	57.52364
CM-244	198.6402	28-FEB-2010	5534.901	5886.605	14985.00	0.2655179	1.3452120E-02	51.10583

Instrument : CHAMBER 180
Detector : 74438
Standard ID : AESS-022
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 22-JUL-2009 08:10:21
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:14:36
Average Efficiency : 0.2505249
Average Efficiency Error : 6.8937857E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2988.611	3299.257	15266.00	0.2459229	1.0567908E-02	47.44321
NP-237	206.8830	28-FEB-2010	4433.245	4903.299	15791.00	0.2543839	1.2879343E-02	51.57590
CM-244	203.0208	28-FEB-2010	5535.594	5886.061	14621.00	0.2534862	1.2846692E-02	51.76523

Instrument : CHAMBER 181
Detector : 74439
Standard ID : AESS-017
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 22-JUL-2009 08:10:26
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:14:47
Average Efficiency : 0.2548543
Average Efficiency Error : 7.0099598E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.0798	28-FEB-2010	2988.239	3301.914	15878.00	0.2552872	1.0962813E-02	48.35796
NP-237	208.5846	28-FEB-2010	4437.080	4901.757	16198.00	0.2588415	1.3100917E-02	57.35833
CM-244	205.5828	28-FEB-2010	5535.131	5886.836	14634.00	0.2505288	1.2696699E-02	51.18034

Instrument : CHAMBER 182
Detector : 74440
Standard ID : AESS-023
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 22-JUL-2009 08:10:30
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:14:57
Average Efficiency : 0.2578707
Average Efficiency Error : 7.0930445E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	207.4764	28-FEB-2010	2991.998	3301.429	15699.00	0.2555752	1.0977317E-02	46.97070
NP-237	207.4998	28-FEB-2010	4432.415	4901.861	16221.00	0.2605498	1.3187178E-02	56.46945
CM-244	199.8804	28-FEB-2010	5533.907	5884.511	14682.00	0.2584959	1.3099929E-02	47.10158

Instrument : CHAMBER 183
Detector : 74441
Standard ID : AESS-018
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 22-JUL-2009 08:10:35
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:15:07
Average Efficiency : 0.2636590
Average Efficiency Error : 7.2516296E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.1856	28-FEB-2010	2989.448	3298.556	16019.00	0.2676203	1.1490691E-02	47.36681
NP-237	208.8990	28-FEB-2010	4434.882	4905.025	16143.00	0.2575647	1.3036844E-02	61.28753
CM-244	198.1458	28-FEB-2010	5533.221	5884.854	14903.00	0.2647125	1.3412292E-02	54.17869

Instrument : CHAMBER 184
Detector : 74442
Standard ID : AESS-024
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 22-JUL-2009 08:10:39
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:15:18
Average Efficiency : 0.2589915
Average Efficiency Error : 7.1259094E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.5218	28-FEB-2010	2989.235	3300.018	15286.00	0.2536818	1.0901084E-02	45.69374
NP-237	205.6662	28-FEB-2010	4434.314	4904.409	16135.00	0.2614885	1.3235523E-02	58.78146
CM-244	198.3060	28-FEB-2010	5531.386	5887.098	14902.00	0.2644547	1.3399277E-02	53.47013

Instrument : CHAMBER 185
Detector : 68615
Standard ID : AESS-025
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 22-JUL-2009 08:10:43
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:15:30
Average Efficiency : 0.2565642
Average Efficiency Error : 7.0740697E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2991.225	3297.857	15033.00	0.2596380	1.1160337E-02	55.72531
NP-237	167.9916	28-FEB-2010	4436.385	4903.692	12852.00	0.2550071	1.2947261E-02	59.11316
CM-244	157.2432	28-FEB-2010	5533.756	5883.696	11351.00	0.2539946	1.2921941E-02	56.16187

Instrument : CHAMBER 186
Detector : 68616
Standard ID : AESS-031
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 22-JUL-2009 08:10:48
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:15:43
Average Efficiency : 0.2530972
Average Efficiency Error : 6.9825449E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2991.440	3298.282	14435.00	0.2517332	1.0828621E-02	55.45393
NP-237	162.9186	28-FEB-2010	4433.254	4901.541	12537.00	0.2565026	1.3028130E-02	59.45676
CM-244	153.1968	28-FEB-2010	5533.251	5884.261	10964.00	0.2517129	1.2813604E-02	55.46026

Instrument : CHAMBER 187
Detector : 68620
Standard ID : AESS-026
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 22-JUL-2009 08:10:52
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:15:58
Average Efficiency : 0.2501889
Average Efficiency Error : 7.3357723E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2989.912	3299.166	15000.00	0.2539414	1.2865975E-02	52.23053
NP-237	168.0294	28-FEB-2010	4432.442	4904.149	12738.00	0.2526287	1.2828344E-02	58.21870
CM-244	160.5822	28-FEB-2010	5535.067	5883.156	11152.00	0.2443892	1.2436978E-02	54.57392

Instrument : CHAMBER 188
Detector : 68621
Standard ID : AESS-032
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 22-JUL-2009 08:10:57
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:16:10
Average Efficiency : 0.2601093
Average Efficiency Error : 7.1711414E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2988.283	3302.165	15025.00	0.2599137	1.1172294E-02	51.37601
NP-237	165.9822	28-FEB-2010	4433.129	4903.527	12962.00	0.2602972	1.3214173E-02	62.37115
CM-244	153.7938	28-FEB-2010	5532.390	5884.553	11377.00	0.2601953	1.3236898E-02	52.05467

Instrument : CHAMBER 189
Detector : 68622
Standard ID : AESS-027
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 22-JUL-2009 08:11:01
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:16:25
Average Efficiency : 0.2590416
Average Efficiency Error : 7.5966278E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2987.652	3299.552	14591.00	0.2547911	1.2913714E-02	51.68600
NP-237	161.6154	28-FEB-2010	4434.579	4902.841	12573.00	0.2592825	1.3168799E-02	58.17202
CM-244	148.1754	28-FEB-2010	5534.475	5885.420	11096.00	0.2633716	1.3404469E-02	50.36570

Instrument : CHAMBER 190
Detector : 68623
Standard ID : AESS-033
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 22-JUL-2009 08:11:06
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:16:38
Average Efficiency : 0.2606415
Average Efficiency Error : 7.1893386E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.4158	28-FEB-2010	2989.900	3302.388	14653.00	0.2571782	1.1059794E-02	51.45757
NP-237	161.7816	28-FEB-2010	4434.198	4903.145	12826.00	0.2641300	1.3411093E-02	58.05247
CM-244	147.2670	28-FEB-2010	5535.637	5887.028	10980.00	0.2622307	1.3348678E-02	51.95362

Instrument : CHAMBER 191
Detector : 68624
Standard ID : AESS-028
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 22-JUL-2009 08:11:10
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:17:15
Average Efficiency : 0.2621158
Average Efficiency Error : 7.6803956E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2988.514	3302.389	15421.00	0.2608921	1.3213424E-02	48.76201
NP-237	168.1992	28-FEB-2010	4435.396	4902.283	13449.00	0.2665235	1.3522904E-02	61.15327
CM-244	156.7614	28-FEB-2010	5534.230	5883.124	11542.00	0.2591464	1.3180151E-02	50.76146

Instrument : CHAMBER 192
Detector : 74430
Standard ID : AESS-034
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 22-JUL-2009 08:11:15
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:17:47
Average Efficiency : 0.2610474
Average Efficiency Error : 7.1950918E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2989.042	3298.270	15338.00	0.2583001	1.1098851E-02	47.63512
NP-237	167.2962	28-FEB-2010	4436.778	4903.324	13156.00	0.2621002	1.3302793E-02	56.66595
CM-244	154.4388	28-FEB-2010	5534.357	5882.529	11589.00	0.2639953	1.3425920E-02	46.57637

Instrument : CHAMBER 193
Detector : 68627
Standard ID : AESS-029
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 22-JUL-2009 08:11:19
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:18:09
Average Efficiency : 0.2640715
Average Efficiency Error : 7.7369036E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.5742	28-FEB-2010	2988.069	3299.225	15508.00	0.2598549	1.3159974E-02	52.58962
NP-237	169.7700	28-FEB-2010	4433.121	4901.609	13394.00	0.2629541	1.3342631E-02	58.77226
CM-244	154.8234	28-FEB-2010	5534.158	5885.907	11872.00	0.2698340	1.3717437E-02	53.66179

Instrument : CHAMBER 194
Detector : 68635
Standard ID : AESS-035
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 22-JUL-2009 08:11:24
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:18:45
Average Efficiency : 0.2549567
Average Efficiency Error : 7.0293345E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2988.572	3300.603	15135.00	0.2573063	1.1058749E-02	49.25695
NP-237	168.2934	28-FEB-2010	4436.435	4905.175	12918.00	0.2558570	1.2989412E-02	62.01285
CM-244	158.8128	28-FEB-2010	5532.274	5883.671	11329.00	0.2509550	1.2767645E-02	52.44061

Instrument : CHAMBER 195
Detector : 68636
Standard ID : AESS-030
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 22-JUL-2009 08:11:29
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:19:31
Average Efficiency : 0.2573034
Average Efficiency Error : 7.5419121E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.9792	28-FEB-2010	2988.629	3301.408	14891.00	0.2527547	1.2807086E-02	48.20201
NP-237	166.3758	28-FEB-2010	4433.877	4902.925	13025.00	0.2606431	1.3231294E-02	57.67042
CM-244	157.1856	28-FEB-2010	5535.397	5886.705	11566.00	0.2588032	1.3162592E-02	51.27964

Instrument : CHAMBER 196
Detector : 68637
Standard ID : AESS-036
Standard Reference Date : 18-FEB-2008 11:28:15
Calibration Analysis Date/Time : 22-JUL-2009 08:11:34
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 22-JUL-2009 14:19:51
Average Efficiency : 0.2566788
Average Efficiency Error : 7.0757568E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.3204	28-FEB-2010	2990.343	3302.501	15220.00	0.2553304	1.0972751E-02	52.52193
NP-237	167.4312	28-FEB-2010	4433.338	4901.979	12956.00	0.2579251	1.3093841E-02	56.52662
CM-244	156.4188	28-FEB-2010	5534.144	5885.395	11442.00	0.2573523	1.3090876E-02	54.16713

Instrument : CHAMBER 197
Detector : 78894
Standard ID : AESS-037
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 23-JUL-2009 07:57:39
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:00:24
Average Efficiency : 0.2568228
Average Efficiency Error : 7.0815496E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7372	28-FEB-2010	2989.389	3297.669	14834.00	0.2533745	1.0893730E-02	54.12946
NP-237	167.1294	28-FEB-2010	4433.236	4904.076	13081.00	0.2608898	1.3242440E-02	59.82949
CM-244	154.7664	28-FEB-2010	5534.086	5887.165	11341.00	0.2578318	1.3117233E-02	57.39178

Instrument : CHAMBER 198
Detector : 78895
Standard ID : AESS-043
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 23-JUL-2009 07:57:47
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:00:36
Average Efficiency : 0.2554221
Average Efficiency Error : 7.0427968E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7708	28-FEB-2010	2989.288	3302.314	14813.00	0.2529756	1.0876846E-02	54.48853
NP-237	168.7422	28-FEB-2010	4436.287	4906.224	13147.00	0.2597000	1.3181067E-02	56.83169
CM-244	156.3252	28-FEB-2010	5534.818	5887.000	11318.00	0.2547599	1.2961345E-02	56.23568

Instrument : CHAMBER 199
Detector : 78896
Standard ID : AESS-038
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 23-JUL-2009 07:57:56
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:00:47
Average Efficiency : 0.2512973
Average Efficiency Error : 6.9297734E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1408	28-FEB-2010	2990.202	3299.048	14855.00	0.2506810	1.0777651E-02	51.46595
NP-237	170.0886	28-FEB-2010	4435.598	4906.357	12647.00	0.2478395	1.2586436E-02	58.09747
CM-244	157.7460	28-FEB-2010	5530.513	5883.049	11473.00	0.2558941	1.3016121E-02	53.79463

Instrument : CHAMBER 200
Detector : 78900
Standard ID : AESS-044
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 23-JUL-2009 07:58:04
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:00:57
Average Efficiency : 0.2672527
Average Efficiency Error : 7.3646023E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2989.598	3302.306	15546.00	0.2700108	1.1599314E-02	51.74545
NP-237	166.6248	28-FEB-2010	4436.820	4902.466	13287.00	0.2657169	1.3484498E-02	57.34525
CM-244	155.8290	28-FEB-2010	5532.933	5886.480	11743.00	0.2650634	1.3477416E-02	51.61598

Instrument : CHAMBER 201
Detector : 78902
Standard ID : AESS-039
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 23-JUL-2009 07:58:10
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:01:05
Average Efficiency : 0.2606938
Average Efficiency Error : 7.1896687E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2989.239	3302.324	14811.00	0.2602134	1.1188080E-02	47.14003
NP-237	159.1506	28-FEB-2010	4432.525	4903.539	12448.00	0.2606924	1.3242436E-02	55.19216
CM-244	151.7142	28-FEB-2010	5534.042	5887.523	11271.00	0.2613738	1.3298883E-02	50.86152

Instrument : CHAMBER 202
Detector : 78903
Standard ID : AESS-045
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 23-JUL-2009 07:58:17
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:01:14
Average Efficiency : 0.2637661
Average Efficiency Error : 7.2755860E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	186.9936	28-FEB-2010	2988.965	3301.750	14586.00	0.2634446	1.1330210E-02	45.61659
NP-237	160.8066	28-FEB-2010	4435.262	4905.190	12706.00	0.2633806	1.3374711E-02	55.61831
CM-244	145.8384	28-FEB-2010	5533.929	5886.269	10972.00	0.2646115	1.3470060E-02	49.12627

Instrument : CHAMBER 203
Detector : 78905
Standard ID : AESS-040
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 23-JUL-2009 07:58:24
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:01:22
Average Efficiency : 0.2569410
Average Efficiency Error : 7.0852954E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4828	28-FEB-2010	2990.960	3299.739	14972.00	0.2599902	1.1176325E-02	44.74440
NP-237	166.8174	28-FEB-2010	4435.540	4905.766	12710.00	0.2539164	1.2894144E-02	57.74120
CM-244	155.0100	28-FEB-2010	5534.337	5886.308	11275.00	0.2558869	1.3019669E-02	47.66172

Instrument : CHAMBER 204
Detector : 78907
Standard ID : AESS-046
Standard Reference Date : 19-FEB-2008 19:35:48
Calibration Analysis Date/Time : 23-JUL-2009 07:58:28
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:01:31
Average Efficiency : 0.2506487
Average Efficiency Error : 6.9159763E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2989.953	3297.878	14336.00	0.2485577	1.0693511E-02	50.84674
NP-237	164.6658	28-FEB-2010	4437.339	4902.439	12528.00	0.2535195	1.2876903E-02	55.89592
CM-244	151.3824	28-FEB-2010	5531.727	5884.400	10796.00	0.2508073	1.2771029E-02	51.62991

Instrument : CHAMBER 205
Detector : 78908
Standard ID : AESS-041
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 23-JUL-2009 07:58:33
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:01:40
Average Efficiency : 0.2503343
Average Efficiency Error : 6.9021145E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.9034	28-FEB-2010	2991.664	3299.649	14924.00	0.2472031	1.0627222E-02	48.93098
NP-237	171.2268	28-FEB-2010	4434.348	4904.923	13015.00	0.2533501	1.2860725E-02	61.87793
CM-244	159.5796	28-FEB-2010	5534.662	5887.628	11424.00	0.2518927	1.2813480E-02	52.59251

Instrument : CHAMBER 206
Detector : 78909
Standard ID : AESS-047
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 23-JUL-2009 07:58:38
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:01:49
Average Efficiency : 0.2562930
Average Efficiency Error : 7.0664333E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2991.007	3298.921	15006.00	0.2566382	1.1031752E-02	49.35140
NP-237	168.3948	28-FEB-2010	4432.777	4902.746	12926.00	0.2558552	1.2989211E-02	55.62066
CM-244	154.6032	28-FEB-2010	5531.452	5883.730	11261.00	0.2562518	1.3038474E-02	55.87610

Instrument : CHAMBER 207
Detector : 78910
Standard ID : AESS-042
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 23-JUL-2009 07:58:42
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:01:57
Average Efficiency : 0.2558556
Average Efficiency Error : 7.0599136E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	188.7090	28-FEB-2010	2988.143	3301.594	14367.00	0.2571380	1.1062090E-02	47.38946
NP-237	159.6558	28-FEB-2010	4437.296	4902.779	12320.00	0.2572077	1.3067513E-02	57.42012
CM-244	150.5208	28-FEB-2010	5532.449	5885.271	10817.00	0.2528071	1.2872322E-02	52.11042

Instrument : CHAMBER 208
Detector : 78911
Standard ID : AESS-048
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 23-JUL-2009 07:58:46
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 23-JUL-2009 14:02:06
Average Efficiency : 0.2527668
Average Efficiency Error : 6.9748992E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2989.612	3298.165	14243.00	0.2507517	1.0789137E-02	50.79447
NP-237	161.5530	28-FEB-2010	4434.097	4904.804	12430.00	0.2564567	1.3027546E-02	58.53157
CM-244	151.1856	28-FEB-2010	5534.389	5887.108	10827.00	0.2520371	1.2832657E-02	54.35335

Instrument	:	CHAMBER 209
Detector	:	79188
Standard ID	:	AESS-001
Standard Reference Date	:	20-FEB-2008 09:54:53
Calibration Analysis Date/Time	:	29-JUN-2009 11:06:21
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:25:14
Average Efficiency	:	0.3677108
Average Efficiency Error	:	1.0086662E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.6698	28-FEB-2010	2989.181	3301.049	21968.00	0.3553457	1.5187075E-02	65.89574
NP-237	171.0024	28-FEB-2010	4433.021	4903.097	19297.00	0.3761547	1.9001663E-02	90.73633
CM-244	158.1060	28-FEB-2010	5532.718	5885.886	17059.00	0.3788077	1.9161167E-02	62.71068

Instrument	:	CHAMBER 210
Detector	:	79189
Standard ID	:	AESS-002
Standard Reference Date	:	19-FEB-2008 11:05:22
Calibration Analysis Date/Time	:	29-JUN-2009 11:06:26
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:25:32
Average Efficiency	:	0.3938951
Average Efficiency Error	:	1.0783576E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1144	28-FEB-2010	2990.859	3297.943	23047.00	0.3887416	1.6604694E-02	57.83068
NP-237	200.4990	28-FEB-2010	4435.076	4904.812	24104.00	0.4007338	2.0202259E-02	76.70370
CM-244	196.5558	28-FEB-2010	5533.646	5886.210	22093.00	0.3946623	1.9910963E-02	61.67818

Instrument	:	CHAMBER 211
Detector	:	79190
Standard ID	:	AESS-003
Standard Reference Date	:	15-FEB-2008 13:12:27
Calibration Analysis Date/Time	:	29-JUN-2009 11:06:32
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:25:46
Average Efficiency	:	0.3797782
Average Efficiency Error	:	1.0400439E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.9740	28-FEB-2010	2988.624	3301.653	22395.00	0.3724639	1.5914930E-02	64.54439
NP-237	203.2080	28-FEB-2010	4436.794	4902.468	23454.00	0.3847243	1.9399559E-02	74.42917
CM-244	197.2236	28-FEB-2010	5532.766	5886.120	21658.00	0.3857397	1.9464286E-02	63.38742

Instrument : CHAMBER 212
Detector : 79191
Standard ID : AESS-004
Standard Reference Date : 14-FEB-2008 09:35:18
Calibration Analysis Date/Time : 29-JUN-2009 11:06:38
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:25:56
Average Efficiency : 0.3834927
Average Efficiency Error : 1.0500317E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.1222	28-FEB-2010	2989.287	3301.382	22921.00	0.3754007	1.6035914E-02	59.43782
NP-237	204.2586	28-FEB-2010	4434.079	4904.410	23916.00	0.3902802	1.9676529E-02	70.71378
CM-244	198.8100	28-FEB-2010	5534.335	5887.654	22006.00	0.3888572	1.9618779E-02	58.13512

Instrument : CHAMBER 213
Detector : 79192
Standard ID : AESS-005
Standard Reference Date : 14-FEB-2008 09:35:18
Calibration Analysis Date/Time : 29-JUN-2009 11:06:43
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:26:06
Average Efficiency : 0.3631246
Average Efficiency Error : 9.9473838E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.7452	28-FEB-2010	2990.968	3298.520	22030.00	0.3528930	1.5081747E-02	65.96364
NP-237	209.5938	28-FEB-2010	4437.380	4902.572	23193.00	0.3688471	1.8600717E-02	79.66854
CM-244	202.7478	28-FEB-2010	5532.282	5885.336	21539.00	0.3732129	1.8833132E-02	63.84235

Instrument : CHAMBER 214
Detector : 79193
Standard ID : AESS-006
Standard Reference Date : 14-FEB-2008 09:35:18
Calibration Analysis Date/Time : 29-JUN-2009 11:06:48
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:26:15
Average Efficiency : 0.3842220
Average Efficiency Error : 1.0522687E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6952	28-FEB-2010	2990.403	3298.091	22543.00	0.3736039	1.5962366E-02	54.14455
NP-237	204.7038	28-FEB-2010	4437.439	4902.827	23935.00	0.3897505	1.9649688E-02	76.09060
CM-244	195.0060	28-FEB-2010	5532.795	5885.993	21931.00	0.3950915	1.9933926E-02	57.07459

Instrument : CHAMBER 215
Detector : 79194
Standard ID : AESS-007
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 29-JUN-2009 11:06:53
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:26:24
Average Efficiency : 0.3850240
Average Efficiency Error : 1.0540539E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.7342	28-FEB-2010	2990.062	3302.465	23238.00	0.3794642	1.6206851E-02	59.62454
NP-237	205.0260	28-FEB-2010	4436.774	4902.728	24080.00	0.3914905	1.9736437E-02	77.73202
CM-244	199.6806	28-FEB-2010	5533.954	5882.708	21984.00	0.3867625	1.9513281E-02	61.70960

Instrument : CHAMBER 216
Detector : 79195
Standard ID : AESS-008
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 29-JUN-2009 11:06:59
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:26:33
Average Efficiency : 0.3755702
Average Efficiency Error : 1.0284359E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.0418	28-FEB-2010	2992.227	3300.068	22506.00	0.3687362	1.5754715E-02	57.73516
NP-237	209.2716	28-FEB-2010	4434.095	4904.331	23839.00	0.3797142	1.9144330E-02	77.62376
CM-244	199.6488	28-FEB-2010	5533.563	5886.220	21686.00	0.3815858	1.9254461E-02	58.78411

Instrument : CHAMBER 217
Detector : 79410
Standard ID : AESS-009
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 29-JUN-2009 11:07:05
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:26:43
Average Efficiency : 0.3781467
Average Efficiency Error : 1.0355381E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.3736	28-FEB-2010	2992.213	3299.566	22448.00	0.3725700	1.5918989E-02	57.23290
NP-237	204.0192	28-FEB-2010	4433.215	4903.920	23291.00	0.3805314	1.9189263E-02	75.68012
CM-244	197.2128	28-FEB-2010	5534.328	5882.531	21567.00	0.3839772	1.9376099E-02	61.18950

Instrument : CHAMBER 218
Detector : 79411
Standard ID : AESS-010
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 29-JUN-2009 11:07:11
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:26:51
Average Efficiency : 0.3930978
Average Efficiency Error : 1.0763295E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.0008	28-FEB-2010	2990.601	3298.221	22913.00	0.3829195	1.6357172E-02	60.17708
NP-237	202.9926	28-FEB-2010	4432.747	4903.769	24319.00	0.3993416	2.0130621E-02	79.18008
CM-244	196.2330	28-FEB-2010	5534.561	5882.956	22479.00	0.4024245	2.0299474E-02	60.89557

Instrument : CHAMBER 219
Detector : 79412
Standard ID : AESS-011
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 29-JUN-2009 11:07:16
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:27:01
Average Efficiency : 0.3689672
Average Efficiency Error : 1.0101880E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	212.8284	28-FEB-2010	2989.180	3302.094	22853.00	0.3624727	1.5484245E-02	56.52708
NP-237	214.4868	28-FEB-2010	4436.774	4902.239	24088.00	0.3743512	1.8872330E-02	86.37078
CM-244	208.4184	28-FEB-2010	5532.237	5885.415	22142.00	0.3732110	1.8828364E-02	61.88073

Instrument : CHAMBER 220
Detector : 79413
Standard ID : AESS-012
Standard Reference Date : 14-FEB-2008 13:39:25
Calibration Analysis Date/Time : 29-JUN-2009 11:07:21
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:27:10
Average Efficiency : 0.3750438
Average Efficiency Error : 1.0269084E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	206.2200	28-FEB-2010	2990.438	3302.525	22663.00	0.3709926	1.5849777E-02	57.01278
NP-237	205.8930	28-FEB-2010	4435.000	4905.156	23426.00	0.3792588	1.9124148E-02	81.06312
CM-244	203.1954	28-FEB-2010	5534.774	5882.515	21789.00	0.3767064	1.9007433E-02	61.18806

Instrument : CHAMBER 221
Detector : 79414
Standard ID : AESS-013
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 29-JUN-2009 11:07:27
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:27:19
Average Efficiency : 0.3793155
Average Efficiency Error : 1.0384974E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.6544	28-FEB-2010	2991.987	3300.655	22692.00	0.3761454	1.6069671E-02	54.91935
NP-237	210.2526	28-FEB-2010	4433.096	4905.038	23943.00	0.3795863	1.9137202E-02	74.16172
CM-244	201.9108	28-FEB-2010	5531.434	5885.564	22050.00	0.3836373	1.9355079E-02	57.98247

Instrument : CHAMBER 222
Detector : 79415
Standard ID : AESS-014
Standard Reference Date : 19-FEB-2008 11:05:22
Calibration Analysis Date/Time : 29-JUN-2009 11:07:32
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:27:29
Average Efficiency : 0.3503861
Average Efficiency Error : 9.6052606E-03
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	214.7088	28-FEB-2010	2991.968	3297.845	21293.00	0.3347430	1.4312199E-02	57.14749
NP-237	211.7160	28-FEB-2010	4434.336	4906.032	23208.00	0.3653858	1.8426064E-02	76.21756
CM-244	207.3882	28-FEB-2010	5530.429	5882.613	21327.00	0.3610742	1.8222243E-02	61.58858

Instrument : CHAMBER 223
Detector : 79416
Standard ID : AESS-015
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 29-JUN-2009 11:07:37
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:27:39
Average Efficiency : 0.3893896
Average Efficiency Error : 1.0661449E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0270	28-FEB-2010	2989.801	3297.756	23051.00	0.3813936	1.6290823E-02	56.25597
NP-237	200.6460	28-FEB-2010	4434.980	4902.483	23824.00	0.3957835	1.9954618E-02	75.62739
CM-244	195.9270	28-FEB-2010	5530.752	5886.350	22029.00	0.3949774	1.9927377E-02	58.25835

Instrument : CHAMBER 224
Detector : 79417
Standard ID : AESS-016
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 29-JUN-2009 11:07:43
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:27:48
Average Efficiency : 0.3855355
Average Efficiency Error : 1.0559128E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.0534	28-FEB-2010	2987.708	3297.620	22614.00	0.3741145	1.5983578E-02	56.47799
NP-237	199.3962	28-FEB-2010	4432.391	4904.314	23852.00	0.3987372	2.0103335E-02	75.47507
CM-244	198.6402	28-FEB-2010	5535.163	5883.043	22064.00	0.3902014	1.9686140E-02	61.20261

Instrument : CHAMBER 225
Detector : 79418
Standard ID : AESS-017
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 29-JUN-2009 11:07:48
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:28:00
Average Efficiency : 0.3784462
Average Efficiency Error : 1.0361466E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	210.0798	28-FEB-2010	2990.136	3297.838	23025.00	0.3699967	1.5804220E-02	54.96978
NP-237	208.5846	28-FEB-2010	4432.708	4903.892	24244.00	0.3874272	1.9530520E-02	72.92027
CM-244	205.5828	28-FEB-2010	5534.915	5883.445	22371.00	0.3822702	1.9283641E-02	60.31302

Instrument : CHAMBER 226
Detector : 79419
Standard ID : AESS-018
Standard Reference Date : 14-FEB-2008 17:45:04
Calibration Analysis Date/Time : 29-JUN-2009 11:07:53
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:28:10
Average Efficiency : 0.3837910
Average Efficiency Error : 1.0508147E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	202.1856	28-FEB-2010	2990.396	3299.355	22716.00	0.3792837	1.6203530E-02	50.45033
NP-237	208.8990	28-FEB-2010	4437.021	4903.289	23922.00	0.3817108	1.9244449E-02	73.07991
CM-244	198.1458	28-FEB-2010	5534.002	5887.398	22152.00	0.3927352	1.9813271E-02	59.33780

Instrument	:	CHAMBER 227
Detector	:	79420
Standard ID	:	AESS-019
Standard Reference Date	:	19-FEB-2008 11:05:22
Calibration Analysis Date/Time	:	29-JUN-2009 11:07:59
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:28:21
Average Efficiency	:	0.3834471
Average Efficiency Error	:	1.0500080E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	204.6468	28-FEB-2010	2988.851	3301.430	22706.00	0.3745125	1.5999762E-02	61.38483
NP-237	202.9140	28-FEB-2010	4435.798	4901.523	23913.00	0.3928266	1.9804921E-02	69.44127
CM-244	199.3140	28-FEB-2010	5532.218	5885.954	22005.00	0.3876506	1.9557914E-02	59.98711

Instrument	:	CHAMBER 228
Detector	:	79421
Standard ID	:	AESS-020
Standard Reference Date	:	14-FEB-2008 21:55:55
Calibration Analysis Date/Time	:	29-JUN-2009 11:08:06
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:28:30
Average Efficiency	:	0.3812083
Average Efficiency Error	:	1.0441090E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	205.5870	28-FEB-2010	2989.413	3298.479	22499.00	0.3694338	1.5784577E-02	57.02933
NP-237	203.4984	28-FEB-2010	4435.708	4901.434	23757.00	0.3891334	1.9619791E-02	78.34894
CM-244	197.1096	28-FEB-2010	5531.094	5883.745	21974.00	0.3916203	1.9758444E-02	59.88309

Instrument	:	CHAMBER 229
Detector	:	79422
Standard ID	:	AESS-021
Standard Reference Date	:	19-FEB-2008 15:31:52
Calibration Analysis Date/Time	:	29-JUN-2009 11:08:14
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:28:39
Average Efficiency	:	0.3777187
Average Efficiency Error	:	1.0341295E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	208.3608	28-FEB-2010	2992.428	3300.536	22973.00	0.3721605	1.5897052E-02	58.77625
NP-237	210.1548	28-FEB-2010	4436.659	4902.986	23961.00	0.3800487	1.9160392E-02	70.52748
CM-244	200.7390	28-FEB-2010	5534.392	5883.088	21930.00	0.3835794	1.9353105E-02	57.32039

Instrument : CHAMBER 230
Detector : 79423
Standard ID : AESS-022
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 29-JUN-2009 11:08:21
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:28:51
Average Efficiency : 0.3723746
Average Efficiency Error : 1.0199217E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	209.6724	28-FEB-2010	2990.435	3299.126	22423.00	0.3610166	1.5425573E-02	51.30120
NP-237	206.8830	28-FEB-2010	4436.006	4902.037	23676.00	0.3814719	1.9234043E-02	72.62286
CM-244	203.0208	28-FEB-2010	5532.506	5885.804	22015.00	0.3809220	1.9218368E-02	59.56349

Instrument : CHAMBER 231
Detector : 79424
Standard ID : AESS-023
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 29-JUN-2009 11:08:27
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:29:03
Average Efficiency : 0.3858555
Average Efficiency Error : 1.0562916E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	207.4764	28-FEB-2010	2991.739	3299.860	23293.00	0.3789935	1.6186299E-02	57.20384
NP-237	207.4998	28-FEB-2010	4434.942	4905.625	24373.00	0.3915348	1.9736728E-02	74.61633
CM-244	199.8804	28-FEB-2010	5535.464	5883.098	22212.00	0.3903586	1.9692916E-02	65.42931

Instrument : CHAMBER 232
Detector : 79425
Standard ID : AESS-024
Standard Reference Date : 14-FEB-2008 21:55:55
Calibration Analysis Date/Time : 29-JUN-2009 11:08:33
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:29:13
Average Efficiency : 0.3708555
Average Efficiency Error : 1.0160839E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.5218	28-FEB-2010	2989.849	3300.399	21668.00	0.3594086	1.5363393E-02	54.49700
NP-237	205.6662	28-FEB-2010	4435.500	4901.412	23160.00	0.3753609	1.8929429E-02	74.14132
CM-244	198.3060	28-FEB-2010	5530.414	5887.598	21698.00	0.3843684	1.9394770E-02	61.92214

Instrument : CHAMBER 233
Detector : 79426
Standard ID : AESS-025
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 29-JUN-2009 11:08:39
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:29:22
Average Efficiency : 0.3807971
Average Efficiency Error : 1.0442032E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.5670	28-FEB-2010	2988.552	3300.019	21743.00	0.3753024	1.6042113E-02	57.53493
NP-237	167.9916	28-FEB-2010	4437.049	4902.445	19555.00	0.3880157	1.9598201E-02	65.87717
CM-244	157.2432	28-FEB-2010	5533.265	5887.350	17089.00	0.3817507	1.9309653E-02	57.89972

Instrument : CHAMBER 234
Detector : 79427
Standard ID : AESS-026
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 29-JUN-2009 11:08:46
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:29:34
Average Efficiency : 0.3715710
Average Efficiency Error : 1.0840051E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.5072	28-FEB-2010	2992.038	3298.233	21630.00	0.3659885	1.8468786E-02	59.50484
NP-237	168.0294	28-FEB-2010	4434.030	4904.076	19159.00	0.3800664	1.9200675E-02	73.78577
CM-244	160.5822	28-FEB-2010	5534.071	5887.649	16880.00	0.3692411	1.8679539E-02	60.73690

Instrument : CHAMBER 235
Detector : 79428
Standard ID : AESS-027
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 29-JUN-2009 11:08:52
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:29:43
Average Efficiency : 0.3940442
Average Efficiency Error : 1.1499584E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.4238	28-FEB-2010	2989.263	3301.595	21602.00	0.3770158	1.9025473E-02	58.14516
NP-237	161.6154	28-FEB-2010	4435.665	4901.527	19364.00	0.3993784	2.0174121E-02	80.43070
CM-244	148.1754	28-FEB-2010	5532.636	5886.715	17233.00	0.4085333	2.0662384E-02	62.76055

Instrument : CHAMBER 236
Detector : 79429
Standard ID : AESS-028
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 29-JUN-2009 11:08:58
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:29:51
Average Efficiency : 0.3835090
Average Efficiency Error : 1.1186651E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	199.6542	28-FEB-2010	2987.896	3299.376	22084.00	0.3733852	1.8838538E-02	56.68213
NP-237	168.1992	28-FEB-2010	4436.423	4901.814	19840.00	0.3931670	1.9855550E-02	67.99222
CM-244	156.7614	28-FEB-2010	5532.618	5886.688	17183.00	0.3850371	1.9474657E-02	58.26772

Instrument : CHAMBER 237
Detector : 79430
Standard ID : AESS-029
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 29-JUN-2009 11:09:04
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:30:00
Average Efficiency : 0.3829979
Average Efficiency Error : 1.1177646E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.5742	28-FEB-2010	2991.344	3298.717	21746.00	0.3641782	1.8376544E-02	56.31577
NP-237	169.7700	28-FEB-2010	4433.245	4904.669	19754.00	0.3878583	1.9588275E-02	82.97163
CM-244	154.8234	28-FEB-2010	5531.003	5885.403	17660.00	0.4006723	2.0259250E-02	60.27898

Instrument : CHAMBER 238
Detector : 79431
Standard ID : AESS-030
Standard Reference Date : 15-FEB-2008 09:06:52
Calibration Analysis Date/Time : 29-JUN-2009 11:09:12
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:30:09
Average Efficiency : 0.3807547
Average Efficiency Error : 1.1108285E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.9792	28-FEB-2010	2988.961	3300.370	21726.00	0.3685883	1.8599236E-02	56.98843
NP-237	166.3758	28-FEB-2010	4436.951	4902.062	19490.00	0.3904817	1.9723417E-02	79.47810
CM-244	157.1856	28-FEB-2010	5532.406	5886.179	17210.00	0.3846013	1.9452270E-02	57.54609

Instrument	:	CHAMBER 239
Detector	:	79432
Standard ID	:	AESS-031
Standard Reference Date	:	18-FEB-2008 11:28:15
Calibration Analysis Date/Time	:	29-JUN-2009 11:09:18
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:30:18
Average Efficiency	:	0.3896177
Average Efficiency Error	:	1.0683284E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	193.6650	28-FEB-2010	2990.544	3302.370	22065.00	0.3845867	1.6435910E-02	56.06851
NP-237	162.9186	28-FEB-2010	4436.212	4902.679	19357.00	0.3960098	2.0004071E-02	74.77979
CM-244	153.1968	28-FEB-2010	5535.220	5884.998	17043.00	0.3906523	1.9760521E-02	60.01815

Instrument	:	CHAMBER 240
Detector	:	79433
Standard ID	:	AESS-032
Standard Reference Date	:	18-FEB-2008 11:28:15
Calibration Analysis Date/Time	:	29-JUN-2009 11:09:25
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:30:27
Average Efficiency	:	0.3777754
Average Efficiency Error	:	1.0360904E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	195.2364	28-FEB-2010	2990.696	3301.853	21594.00	0.3733324	1.5959276E-02	54.88348
NP-237	165.9822	28-FEB-2010	4433.664	4904.733	18875.00	0.3790388	1.9151727E-02	72.74045
CM-244	153.7938	28-FEB-2010	5531.260	5886.094	16776.00	0.3830326	1.9378640E-02	59.08883

Instrument	:	CHAMBER 241
Detector	:	79434
Standard ID	:	AESS-033
Standard Reference Date	:	18-FEB-2008 11:28:15
Calibration Analysis Date/Time	:	29-JUN-2009 11:09:31
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:30:36
Average Efficiency	:	0.3931700
Average Efficiency Error	:	1.0783223E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.4158	28-FEB-2010	2990.242	3301.966	21884.00	0.3839029	1.6408380E-02	53.49284
NP-237	161.7816	28-FEB-2010	4434.457	4905.204	19269.00	0.3970166	2.0055814E-02	84.30279
CM-244	147.2670	28-FEB-2010	5530.782	5884.826	16923.00	0.4035279	2.0413468E-02	60.66447

Instrument	:	CHAMBER 242
Detector	:	79435
Standard ID	:	AESS-034
Standard Reference Date	:	18-FEB-2008 11:28:15
Calibration Analysis Date/Time	:	29-JUN-2009 11:09:38
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:30:45
Average Efficiency	:	0.3846521
Average Efficiency Error	:	1.0549294E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.5488	28-FEB-2010	2990.030	3301.446	22109.00	0.3721264	1.5903009E-02	60.76245
NP-237	167.2962	28-FEB-2010	4433.469	4904.310	19754.00	0.3935935	1.9877926E-02	76.54881
CM-244	154.4388	28-FEB-2010	5535.605	5884.633	17390.00	0.3954074	1.9996468E-02	61.98755

Instrument	:	CHAMBER 243
Detector	:	79436
Standard ID	:	AESS-035
Standard Reference Date	:	18-FEB-2008 11:28:15
Calibration Analysis Date/Time	:	29-JUN-2009 11:09:44
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:30:54
Average Efficiency	:	0.3685505
Average Efficiency Error	:	1.0109218E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	198.6666	28-FEB-2010	2990.365	3297.486	21347.00	0.3626947	1.5506803E-02	57.87182
NP-237	168.2934	28-FEB-2010	4436.388	4902.306	19057.00	0.3774501	1.9069549E-02	79.79286
CM-244	158.8128	28-FEB-2010	5533.622	5882.491	16666.00	0.3685086	1.8645244E-02	59.82504

Instrument	:	CHAMBER 244
Detector	:	79437
Standard ID	:	AESS-036
Standard Reference Date	:	18-FEB-2008 11:28:15
Calibration Analysis Date/Time	:	29-JUN-2009 11:09:51
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:31:04
Average Efficiency	:	0.3725442
Average Efficiency Error	:	1.0218798E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	201.3204	28-FEB-2010	2989.131	3300.564	21635.00	0.3627526	1.5506621E-02	61.82745
NP-237	167.4312	28-FEB-2010	4432.574	4903.374	19014.00	0.3785259	1.9124355E-02	78.29796
CM-244	156.4188	28-FEB-2010	5534.584	5883.551	16999.00	0.3816244	1.9304425E-02	60.38109

Instrument : CHAMBER 245
Detector : 79438
Standard ID : AESS-037
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 29-JUN-2009 11:09:58
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:31:18
Average Efficiency : 0.3871339
Average Efficiency Error : 1.0614644E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7372	28-FEB-2010	2992.063	3299.394	22212.00	0.3791691	1.6203059E-02	61.13074
NP-237	167.1294	28-FEB-2010	4434.575	4906.628	19802.00	0.3949435	1.9945625E-02	77.95452
CM-244	154.7664	28-FEB-2010	5534.102	5883.894	17248.00	0.3913280	1.9792015E-02	61.02800

Instrument : CHAMBER 246
Detector : 78912
Standard ID : AESS-038
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 29-JUN-2009 11:10:04
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:31:31
Average Efficiency : 0.3734691
Average Efficiency Error : 1.0242580E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	200.1408	28-FEB-2010	2989.019	3301.538	21682.00	0.3656716	1.5630983E-02	62.50508
NP-237	170.0886	28-FEB-2010	4435.665	4906.544	19170.00	0.3756807	1.8979004E-02	73.78893
CM-244	157.7460	28-FEB-2010	5531.825	5885.470	17212.00	0.3831484	1.9378757E-02	60.45332

Instrument : CHAMBER 247
Detector : 79440
Standard ID : AESS-039
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 29-JUN-2009 11:10:09
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:31:41
Average Efficiency : 0.3946936
Average Efficiency Error : 1.0825262E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	192.2418	28-FEB-2010	2988.774	3301.191	21982.00	0.3859695	1.6495787E-02	57.12532
NP-237	159.1506	28-FEB-2010	4436.556	4903.380	19616.00	0.4108289	2.0749848E-02	76.11504
CM-244	151.7142	28-FEB-2010	5530.809	5885.967	16961.00	0.3925581	1.9858034E-02	61.99513

Instrument : CHAMBER 248
Detector : 79441
Standard ID : AESS-040
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 29-JUN-2009 11:10:15
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:31:51
Average Efficiency : 0.3902423
Average Efficiency Error : 1.0700536E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4828	28-FEB-2010	2988.392	3300.122	21933.00	0.3806768	1.6270030E-02	55.85408
NP-237	166.8174	28-FEB-2010	4433.659	4905.293	19807.00	0.3957821	1.9987926E-02	82.39788
CM-244	155.0100	28-FEB-2010	5532.437	5887.556	17631.00	0.3993214	2.0191407E-02	58.45845

Instrument : CHAMBER 249
Detector : 79442
Standard ID : AESS-041
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 29-JUN-2009 11:10:21
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:32:04
Average Efficiency : 0.3691239
Average Efficiency Error : 1.0123477E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	203.9034	28-FEB-2010	2988.416	3300.577	21774.00	0.3604519	1.5407033E-02	52.81279
NP-237	171.2268	28-FEB-2010	4436.398	4904.007	19367.00	0.3770129	1.9044334E-02	66.80524
CM-244	159.5796	28-FEB-2010	5533.011	5883.893	17016.00	0.3744264	1.8940104E-02	54.54869

Instrument : CHAMBER 250
Detector : 79443
Standard ID : AESS-042
Standard Reference Date : 18-FEB-2008 15:31:47
Calibration Analysis Date/Time : 29-JUN-2009 11:10:26
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:32:16
Average Efficiency : 0.4029809
Average Efficiency Error : 1.1048914E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	188.7090	28-FEB-2010	2987.664	3299.772	22102.00	0.3953417	1.6895199E-02	54.69497
NP-237	159.6558	28-FEB-2010	4433.576	4904.834	19622.00	0.4096608	2.0690778E-02	72.59711
CM-244	150.5208	28-FEB-2010	5531.060	5885.456	17478.00	0.4077245	2.0618226E-02	53.57324

Instrument	:	CHAMBER 251
Detector	:	79444
Standard ID	:	AESS-043
Standard Reference Date	:	19-FEB-2008 00:32:27
Calibration Analysis Date/Time	:	29-JUN-2009 11:10:32
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:32:48
Average Efficiency	:	0.3859750
Average Efficiency Error	:	1.0582183E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.7708	28-FEB-2010	2988.497	3300.693	22197.00	0.3788451	1.6189344E-02	55.12341
NP-237	168.7422	28-FEB-2010	4436.150	4903.399	19871.00	0.3925318	1.9823143E-02	75.41560
CM-244	156.3252	28-FEB-2010	5531.737	5887.575	17366.00	0.3900679	1.9726753E-02	56.80479

Instrument	:	CHAMBER 252
Detector	:	79445
Standard ID	:	AESS-044
Standard Reference Date	:	19-FEB-2008 00:32:27
Calibration Analysis Date/Time	:	29-JUN-2009 11:10:38
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:33:09
Average Efficiency	:	0.3764580
Average Efficiency Error	:	1.0325164E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.4510	28-FEB-2010	2988.592	3300.825	21491.00	0.3730471	1.5948050E-02	52.77084
NP-237	166.6248	28-FEB-2010	4435.553	4902.127	19212.00	0.3843369	1.9415863E-02	79.06938
CM-244	155.8290	28-FEB-2010	5534.590	5884.216	16588.00	0.3737789	1.8912956E-02	58.86968

Instrument	:	CHAMBER 253
Detector	:	79446
Standard ID	:	AESS-045
Standard Reference Date	:	19-FEB-2008 00:32:27
Calibration Analysis Date/Time	:	29-JUN-2009 11:10:44
Calibration Count Time	:	300.0000
Efficiency Calibration Date/Time	:	30-JUN-2009 13:33:20
Average Efficiency	:	0.4178050
Average Efficiency Error	:	1.1451593E-02
Confidence	:	95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	186.9936	28-FEB-2010	2987.654	3300.865	23009.00	0.4153371	1.7741047E-02	58.55786
NP-237	160.8066	28-FEB-2010	4434.573	4903.102	19908.00	0.4126572	2.0839127E-02	76.00024
CM-244	145.8384	28-FEB-2010	5533.082	5884.383	17734.00	0.4269842	2.1588651E-02	59.04111

Instrument : CHAMBER 254
Detector : 79447
Standard ID : AESS-046
Standard Reference Date : 19-FEB-2008 19:35:48
Calibration Analysis Date/Time : 29-JUN-2009 11:10:49
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:33:32
Average Efficiency : 0.3998787
Average Efficiency Error : 1.0964696E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	194.7474	28-FEB-2010	2991.549	3298.669	22357.00	0.3874868	1.6557176E-02	61.70351
NP-237	164.6658	28-FEB-2010	4433.543	4905.678	20062.00	0.4060794	2.0505425E-02	75.89950
CM-244	151.3824	28-FEB-2010	5533.440	5883.478	17814.00	0.4131682	2.0889070E-02	60.11974

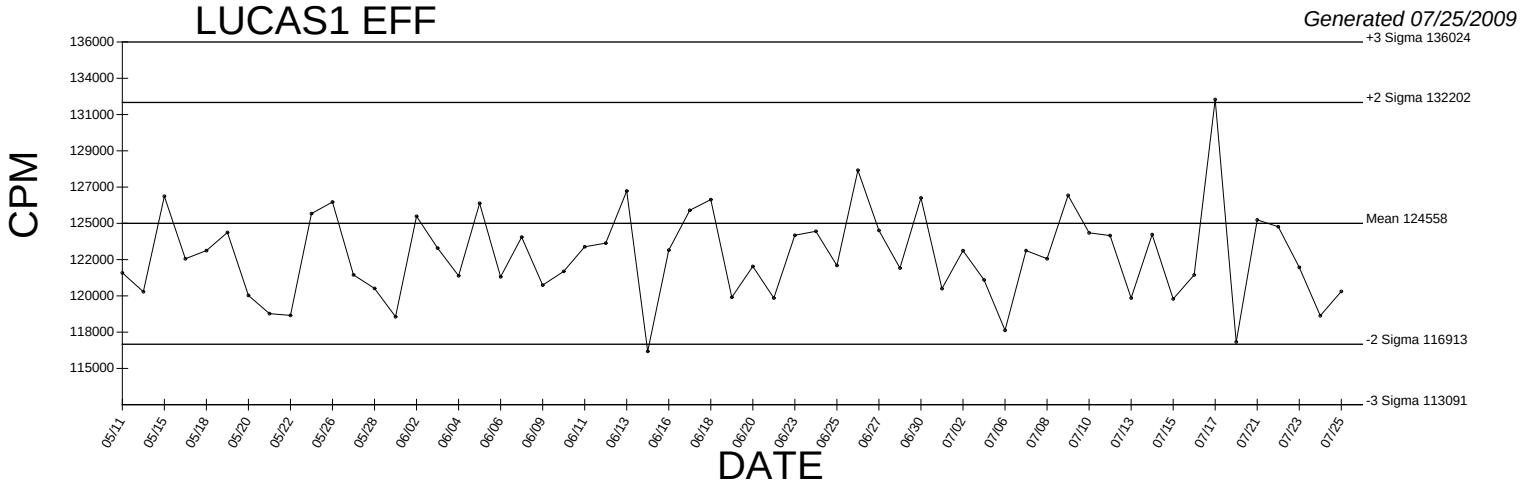
Instrument : CHAMBER 255
Detector : 79448
Standard ID : AESS-047
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 29-JUN-2009 11:10:56
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:33:42
Average Efficiency : 0.3661844
Average Efficiency Error : 1.0047055E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	197.4804	28-FEB-2010	2992.136	3299.381	20925.00	0.3576654	1.5295714E-02	54.59342
NP-237	168.3948	28-FEB-2010	4435.277	4902.796	18729.00	0.3707303	1.8733418E-02	71.29922
CM-244	154.6032	28-FEB-2010	5531.573	5887.697	16494.00	0.3746144	1.8956492E-02	56.20598

Instrument : CHAMBER 256
Detector : 79449
Standard ID : AESS-048
Standard Reference Date : 19-FEB-2008 00:32:27
Calibration Analysis Date/Time : 29-JUN-2009 11:11:01
Calibration Count Time : 300.0000
Efficiency Calibration Date/Time : 30-JUN-2009 13:33:53
Average Efficiency : 0.3793263
Average Efficiency Error : 1.0406218E-02
Confidence : 95.00000

Cal. Istps	DPM	Exp. Date	Start Engy	End Engy	Counts	EFF.	EFF Err	Resolution
GD-148	191.8350	28-FEB-2010	2989.020	3301.037	21283.00	0.3744797	1.6011277E-02	53.36488
NP-237	161.5530	28-FEB-2010	4435.346	4901.908	18858.00	0.3890801	1.9659264E-02	69.14060
CM-244	151.1856	28-FEB-2010	5534.491	5884.250	16233.00	0.3770208	1.9081894E-02	56.15398

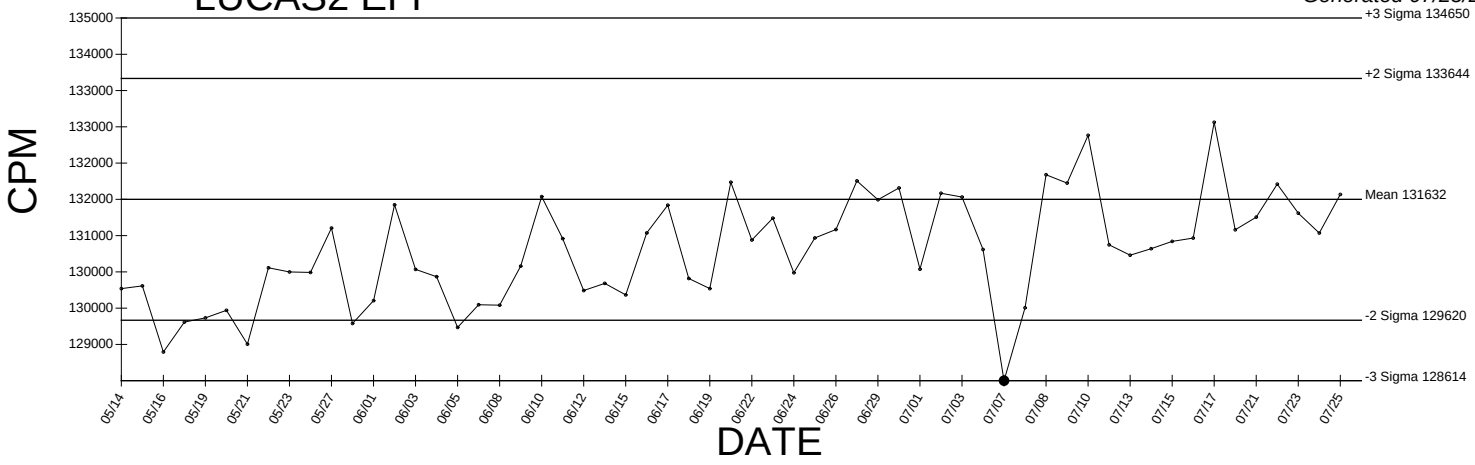
BACKGROUND AND EFFICIENCY DATA



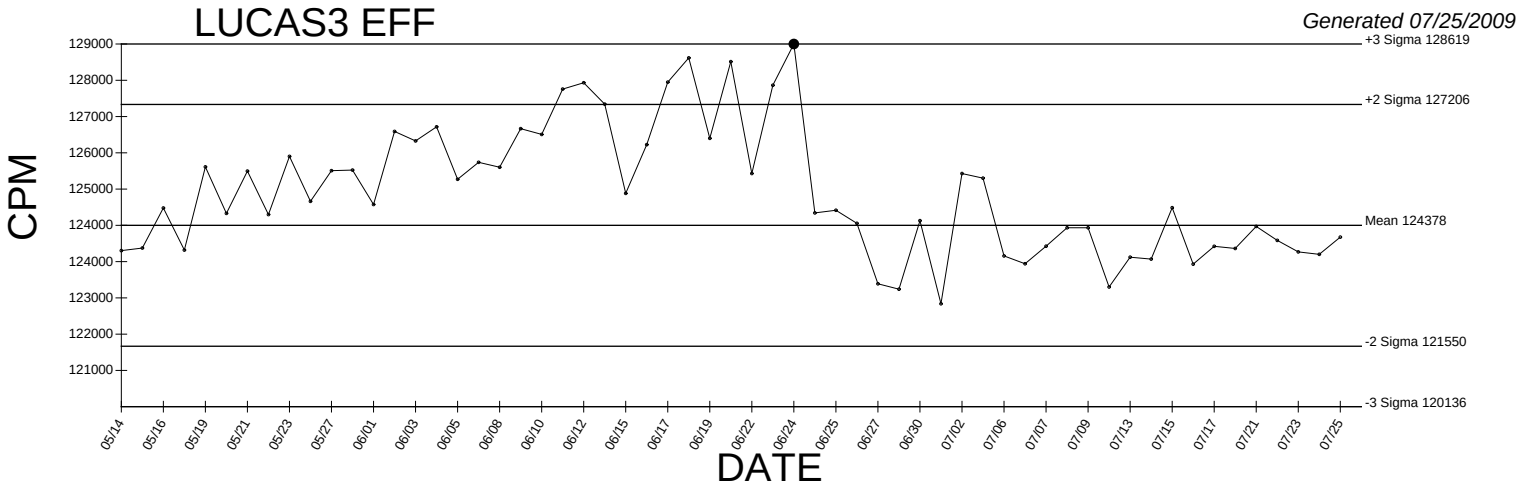
● Denotes Outlier

LUCAS2 EFF

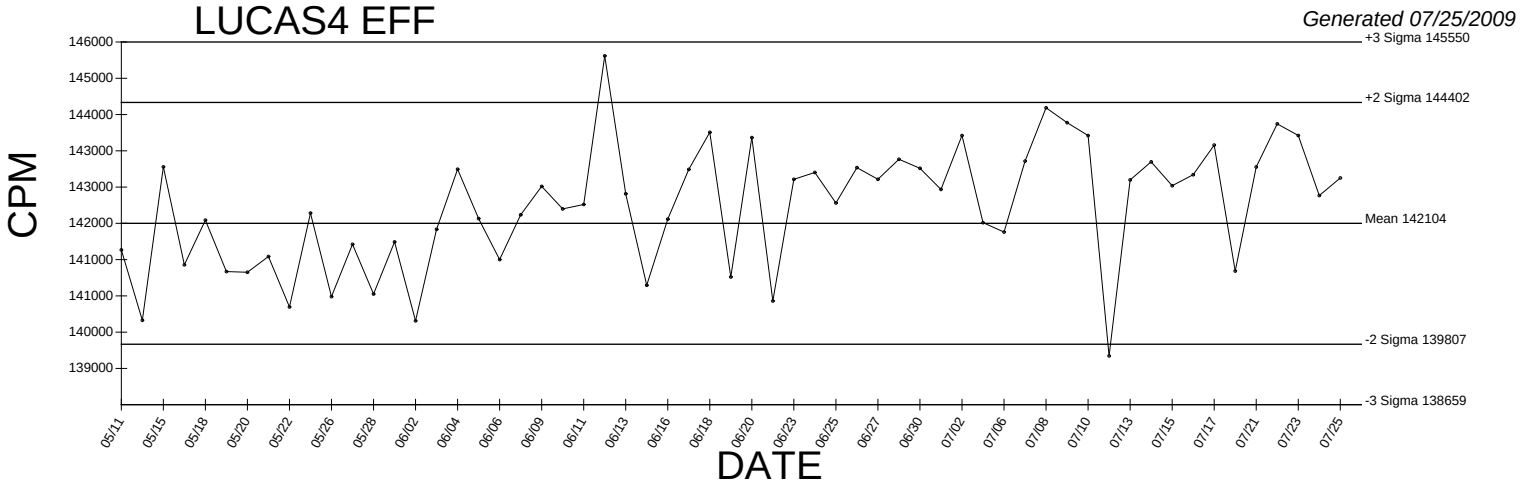
Generated 07/25/2009



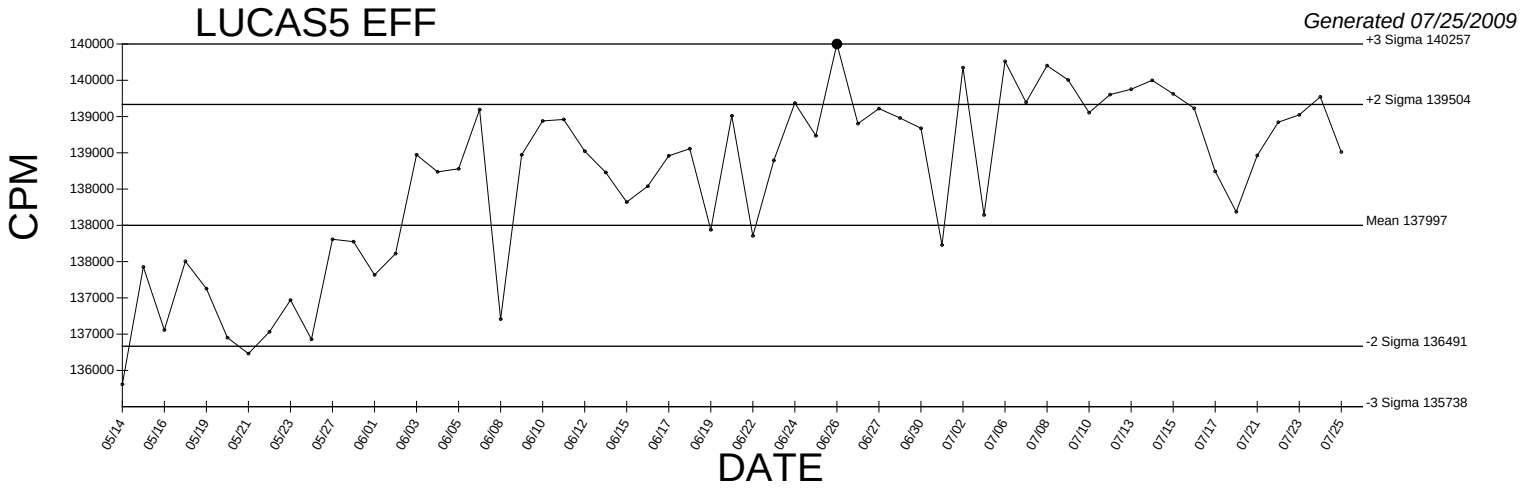
● Denotes Outlier



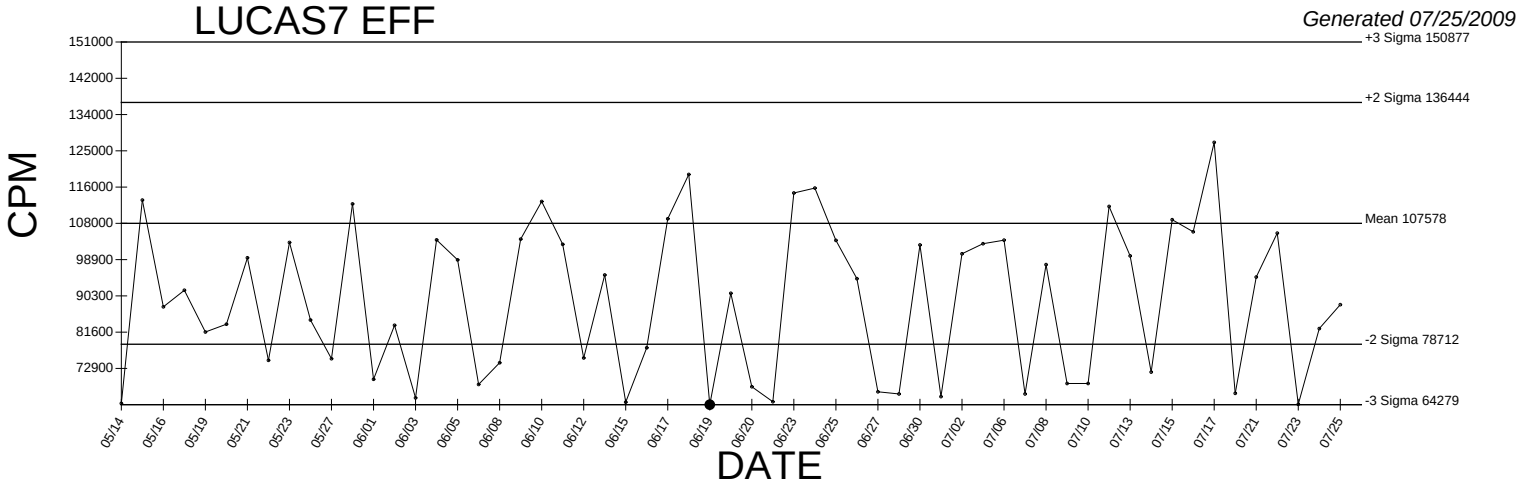
● Denotes Outlier



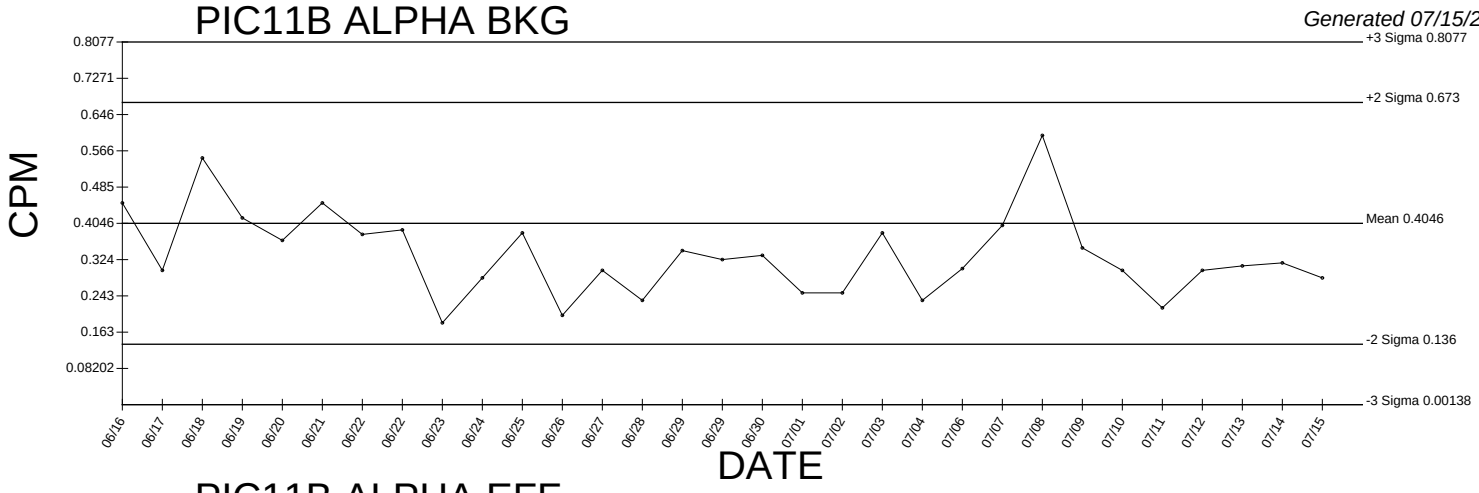
● Denotes Outlier

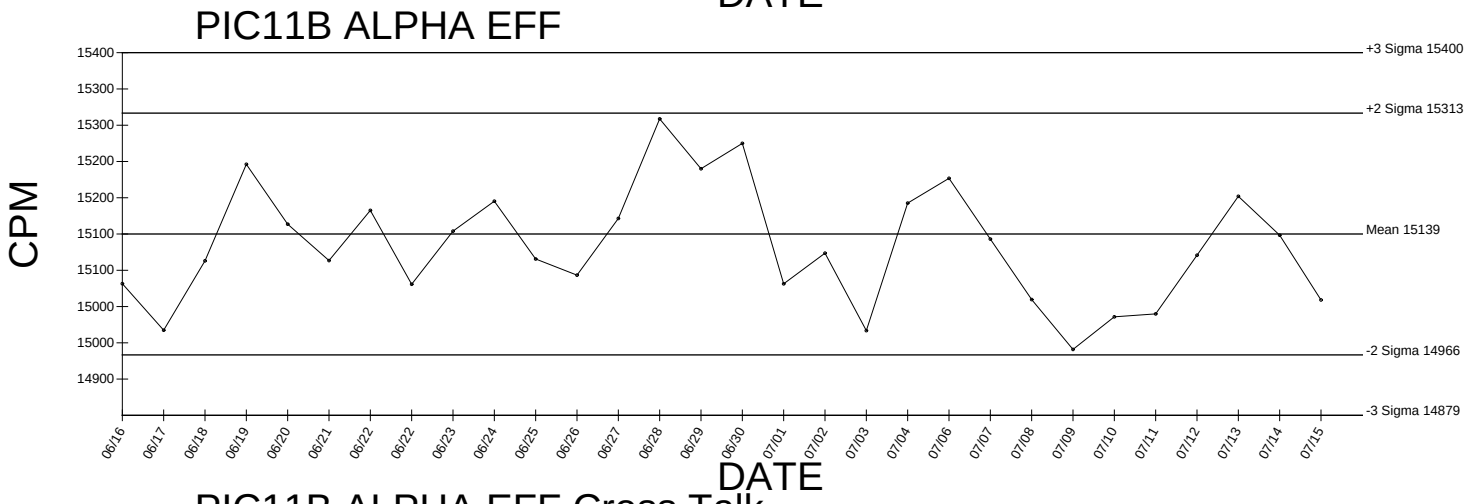


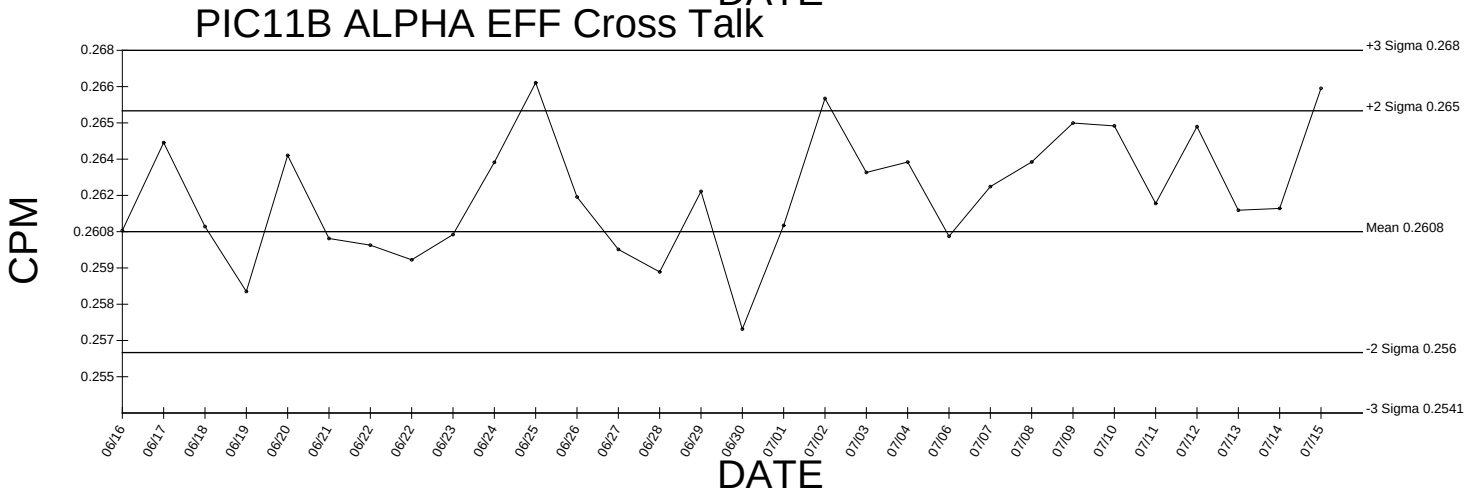
● Denotes Outlier



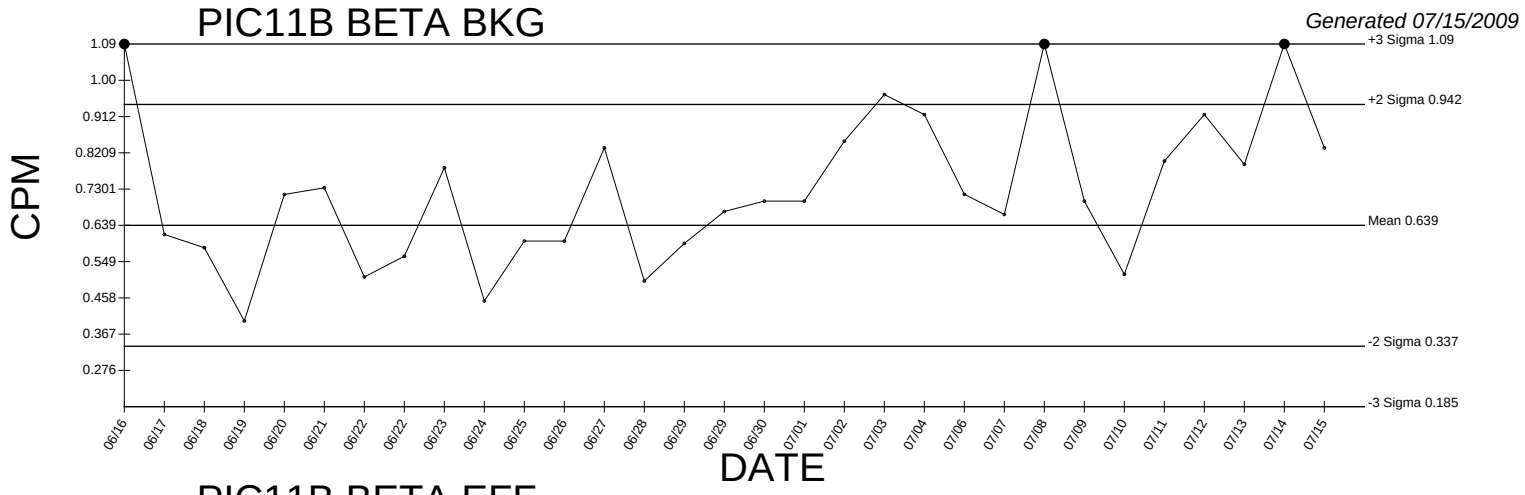
● Denotes Outlier

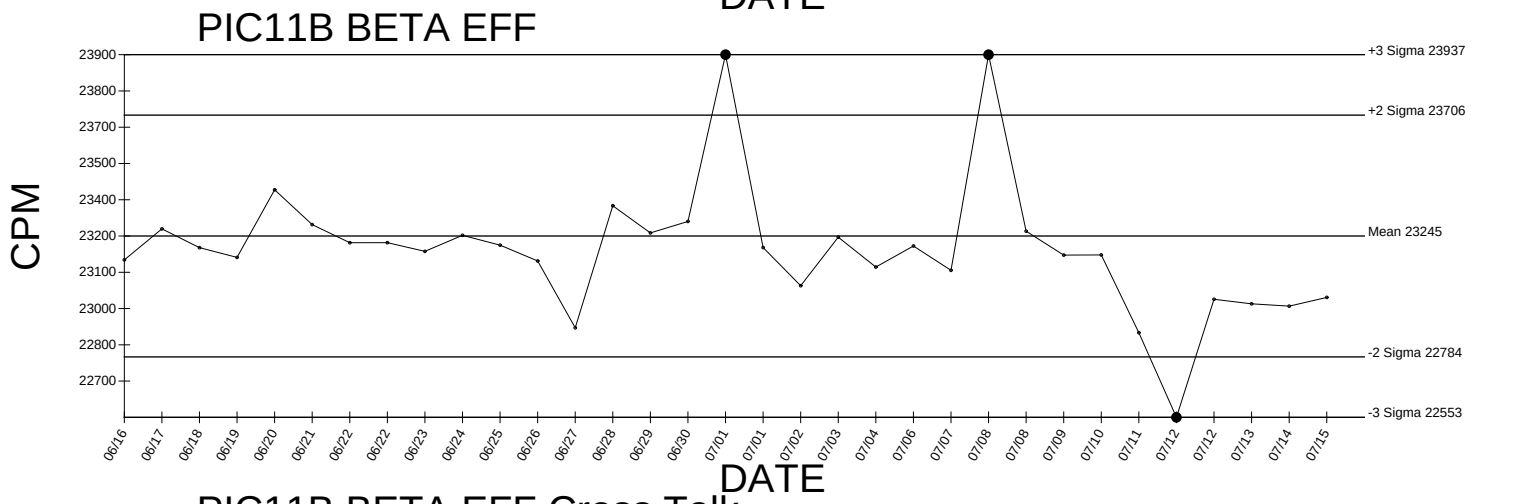


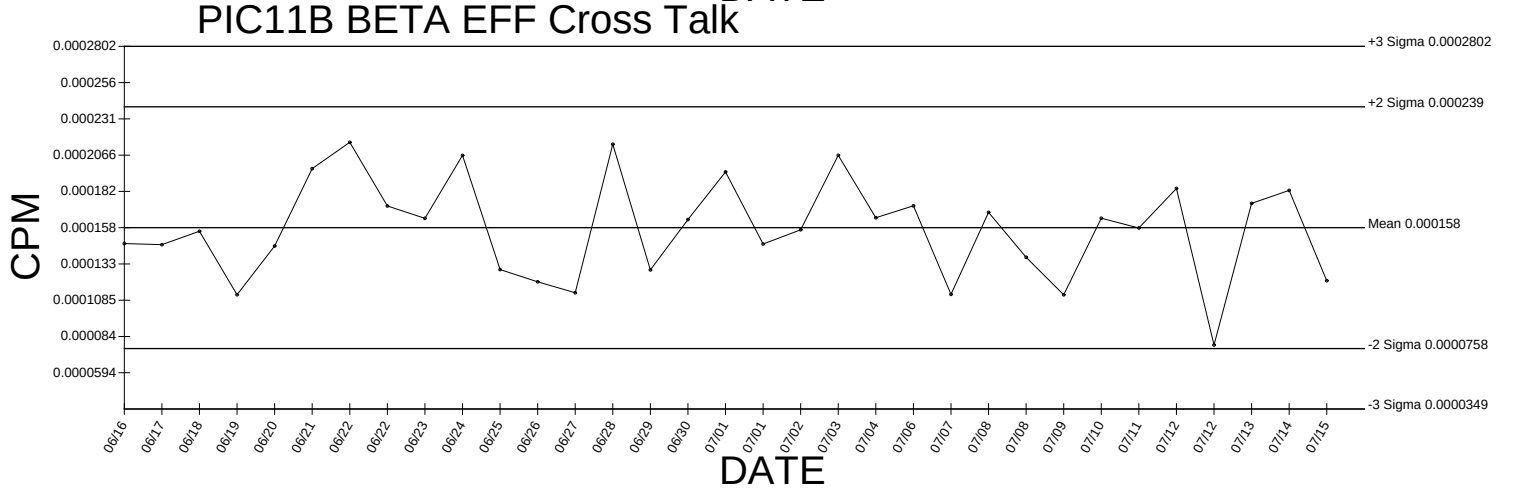




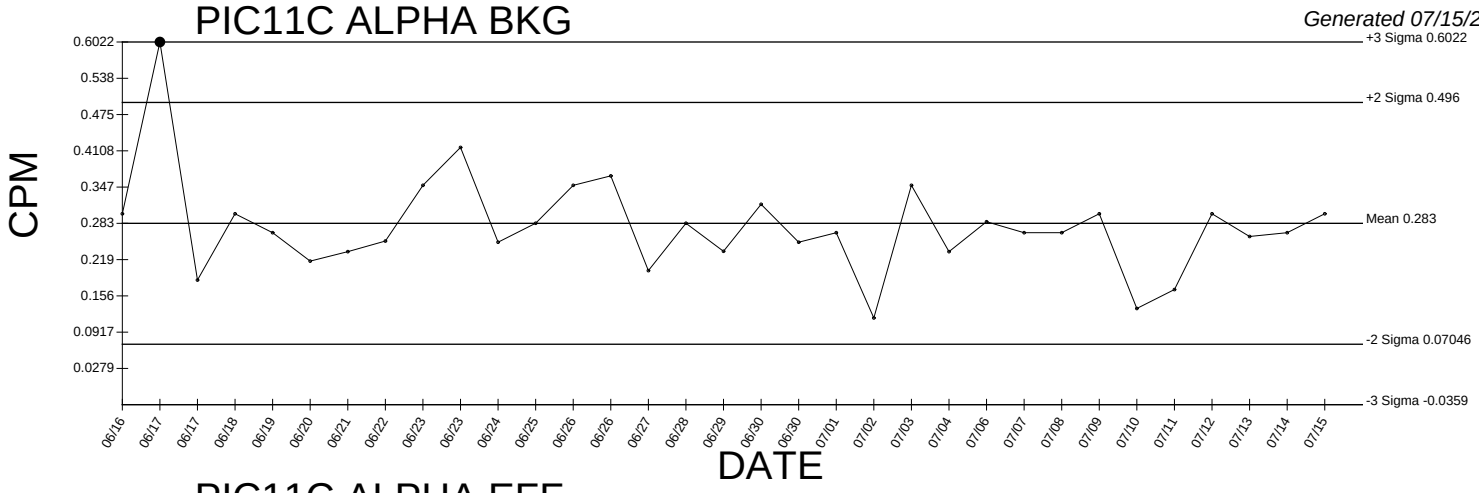
● Denotes Outlier

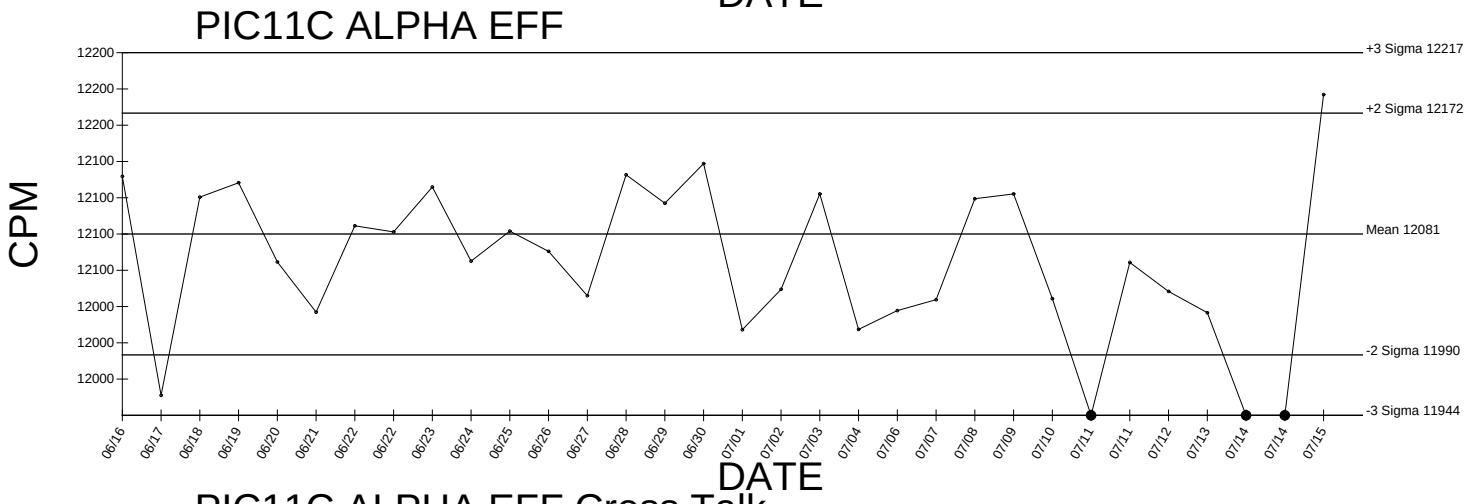


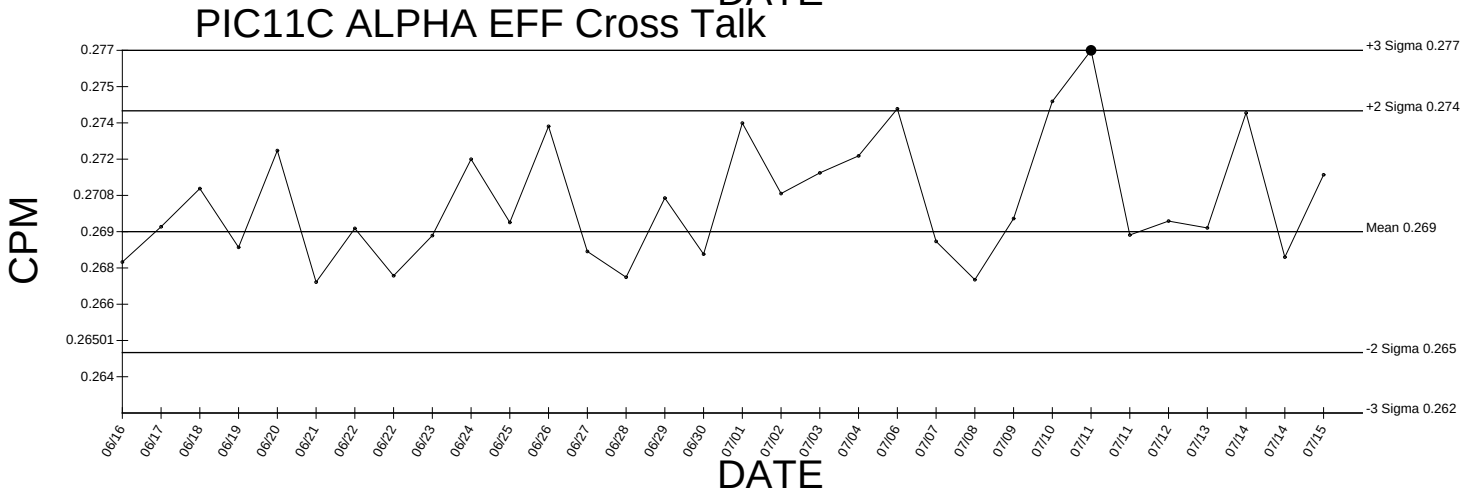




● Denotes Outlier

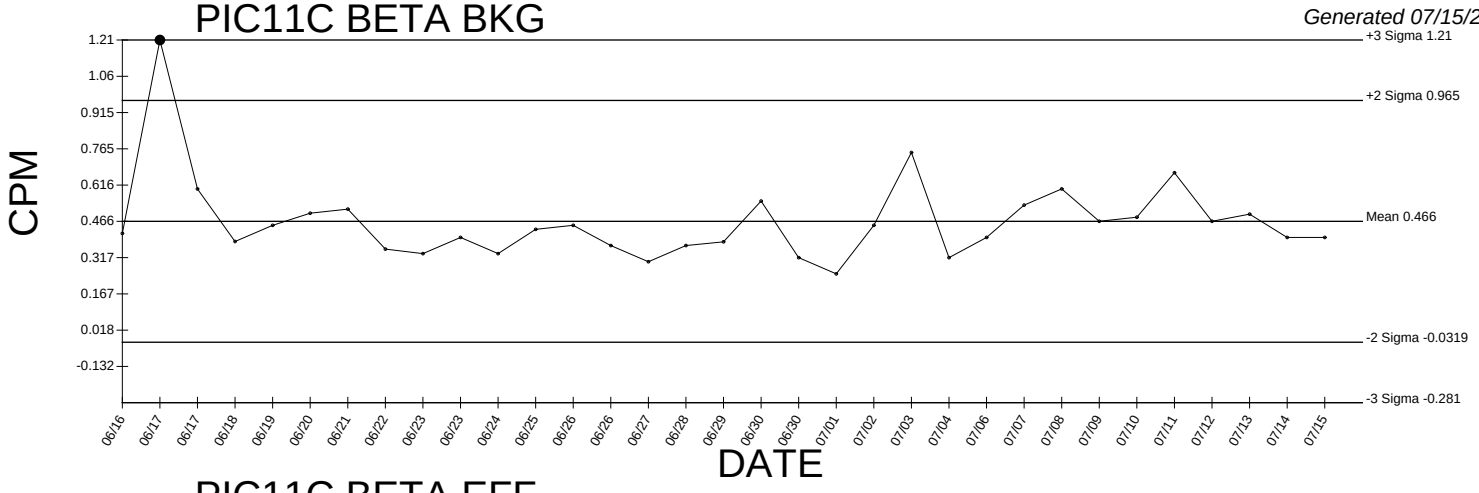




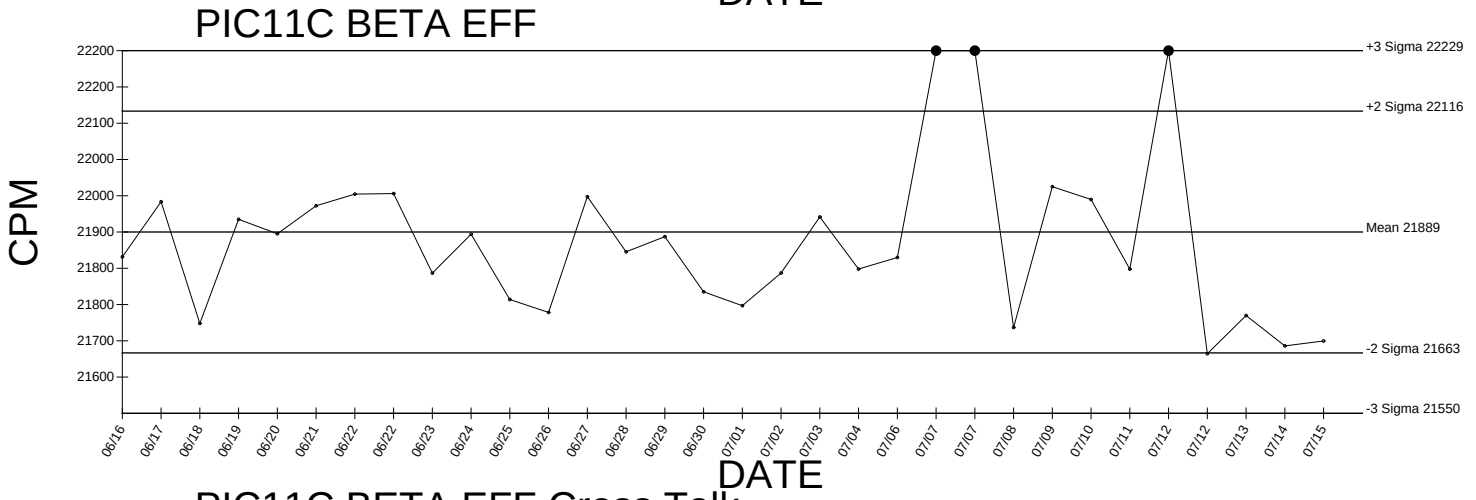


● Denotes Outlier

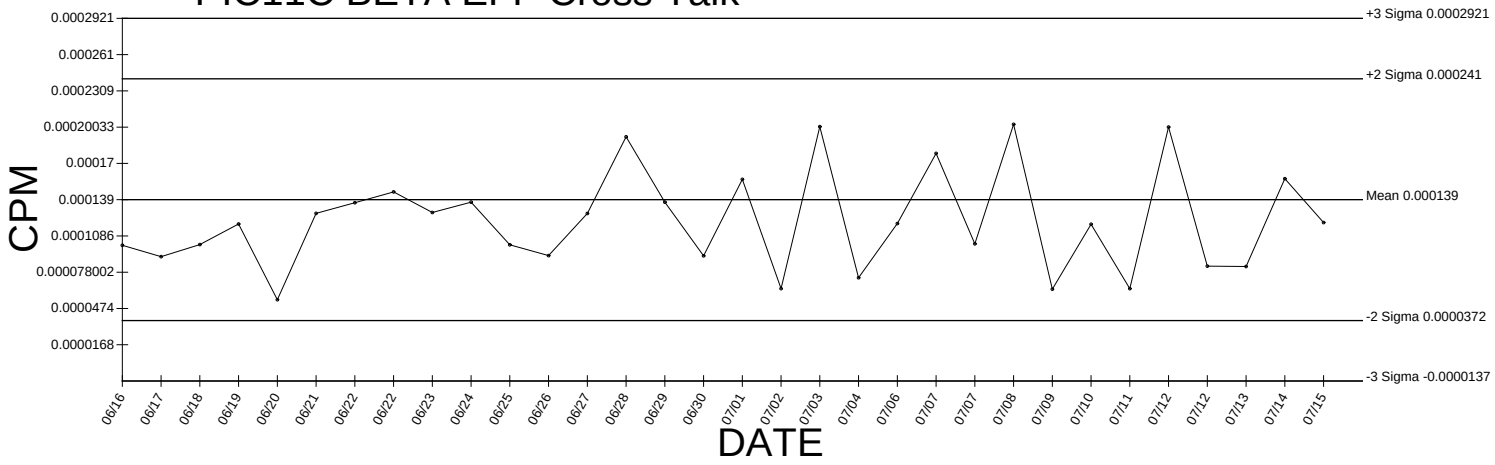
PIC11C BETA BKG



PIC11C BETA EFF

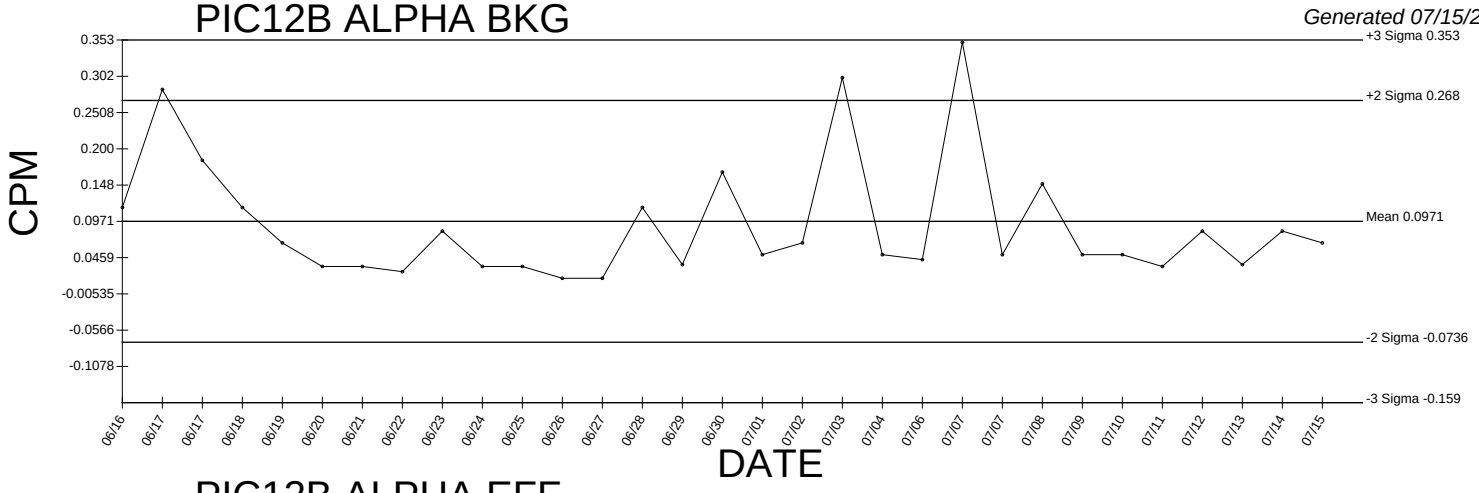


PIC11C BETA EFF Cross Talk

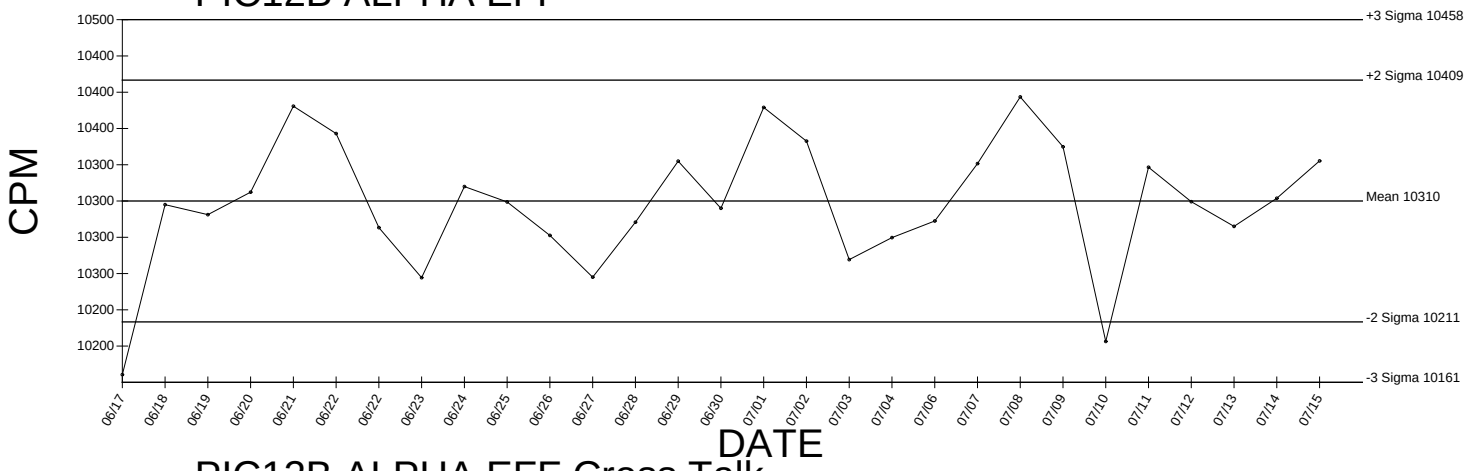


● Denotes Outlier

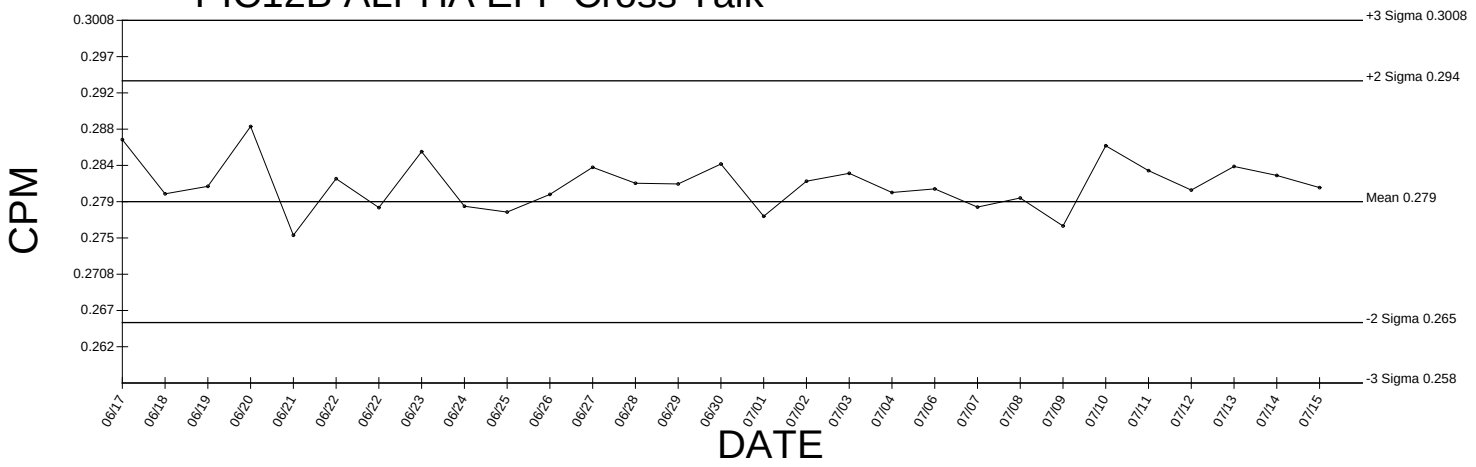
PIC12B ALPHA BKG



PIC12B ALPHA EFF

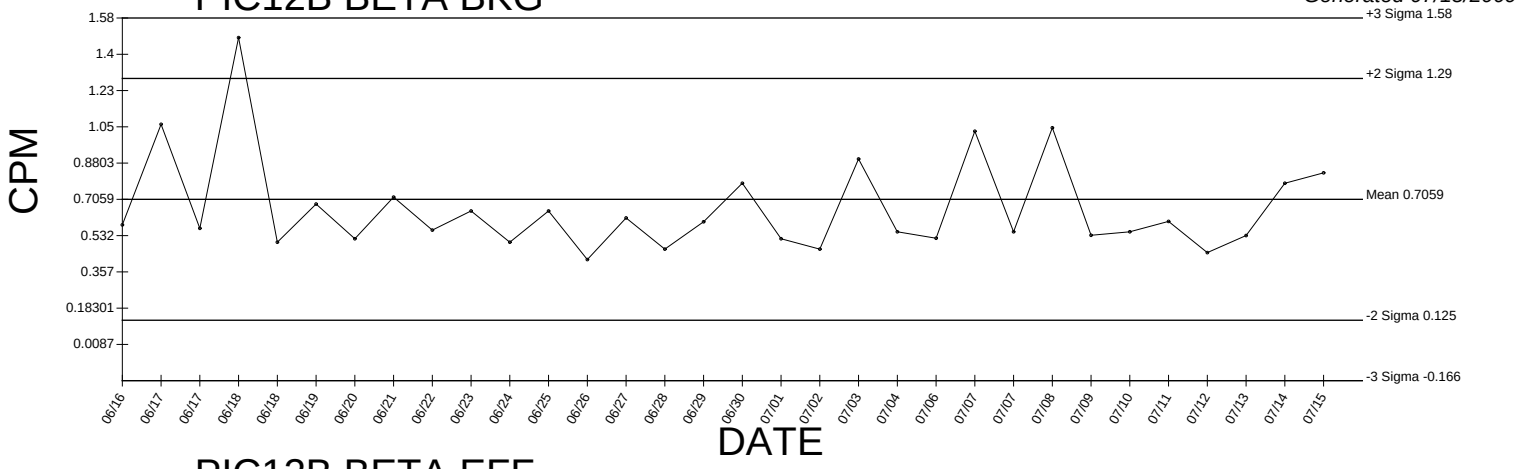


PIC12B ALPHA EFF Cross Talk

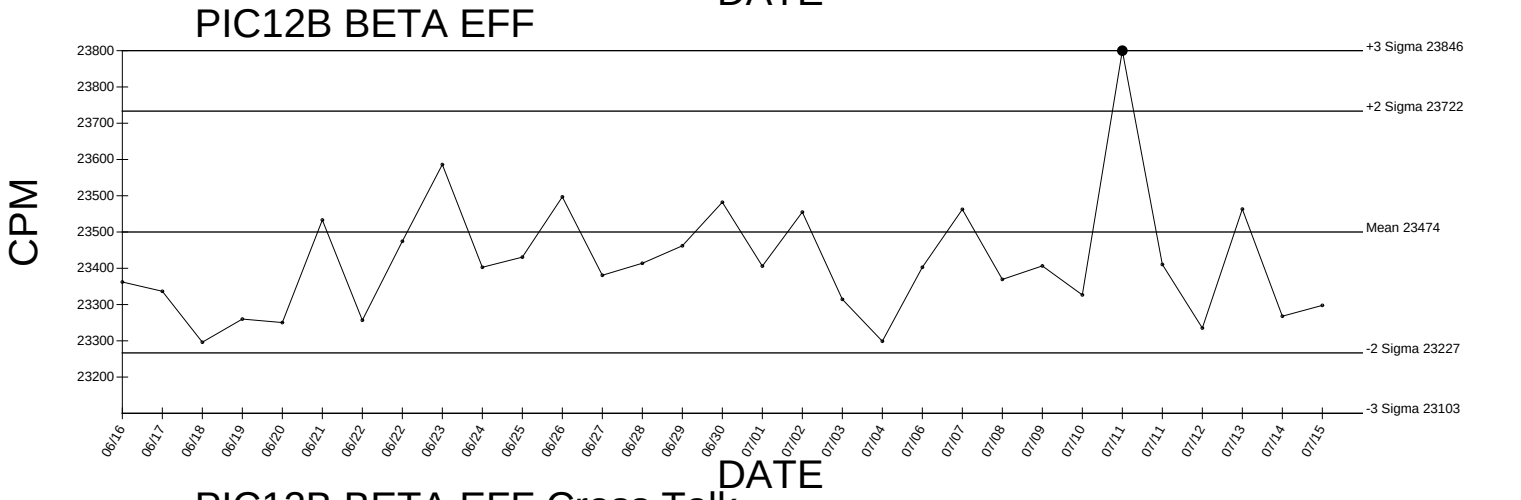


● Denotes Outlier

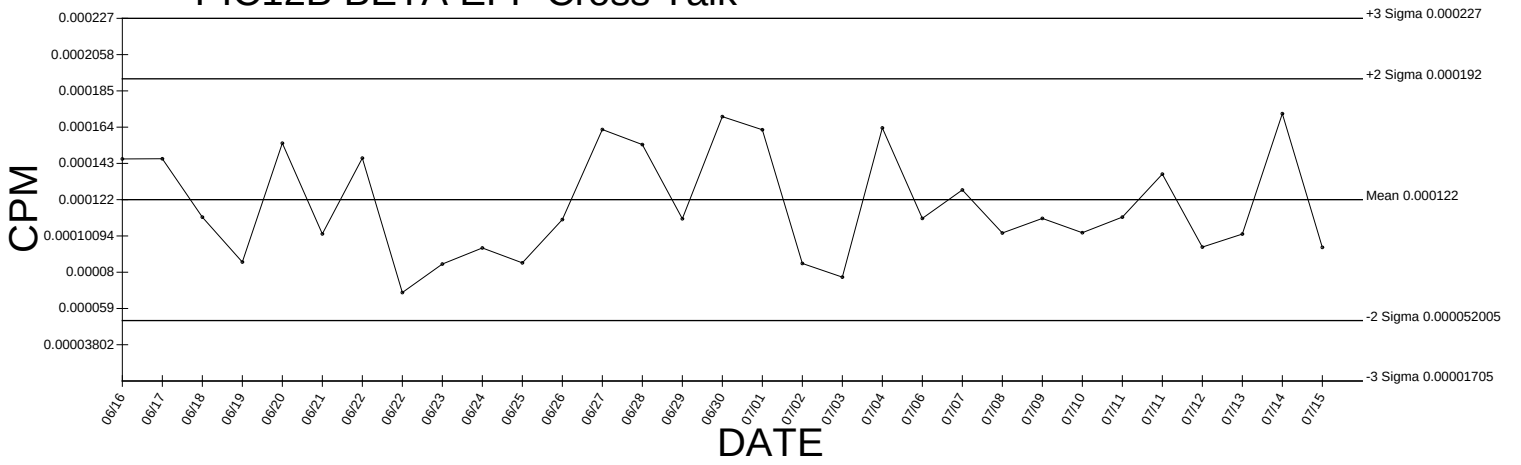
PIC12B BETA BKG



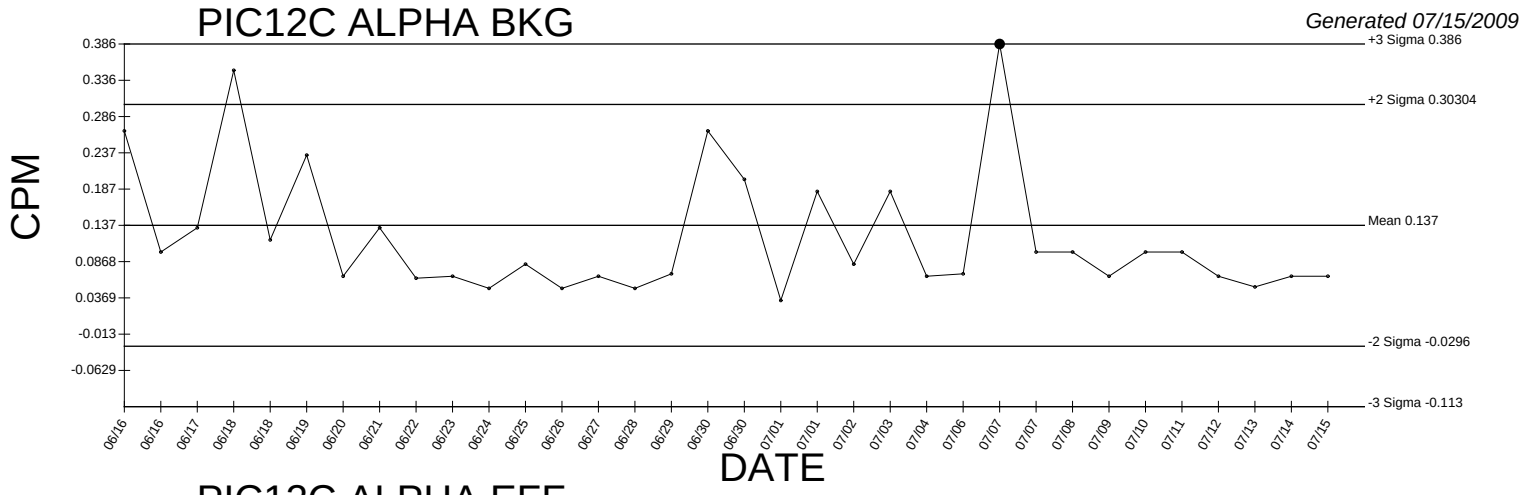
PIC12B BETA EFF

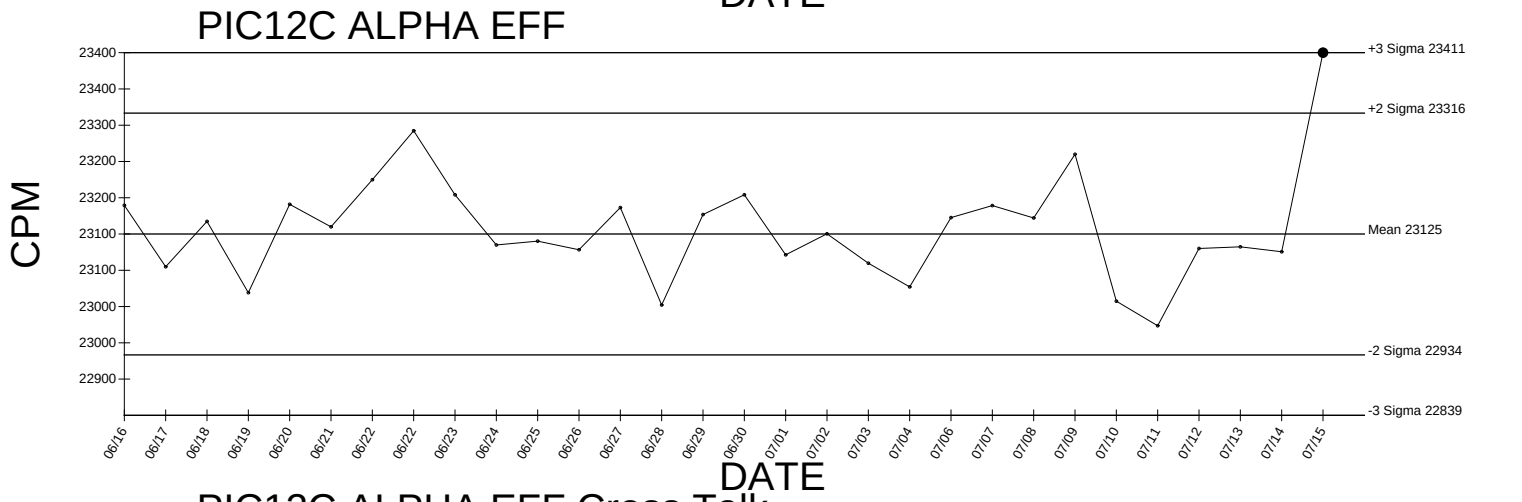


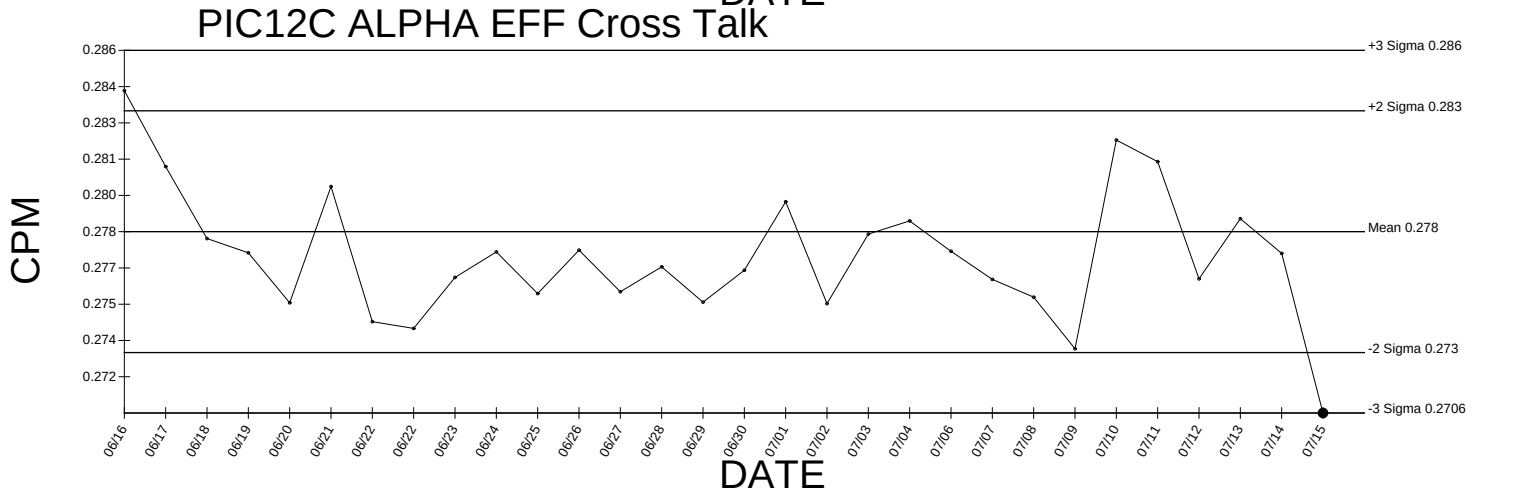
PIC12B BETA EFF Cross Talk



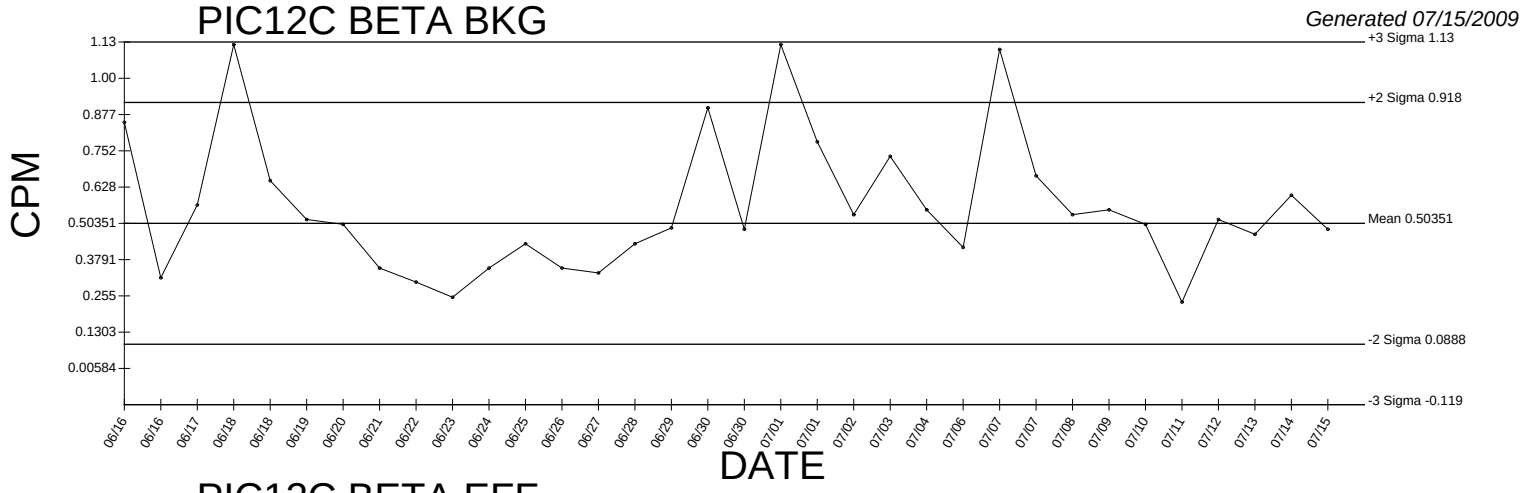
● Denotes Outlier

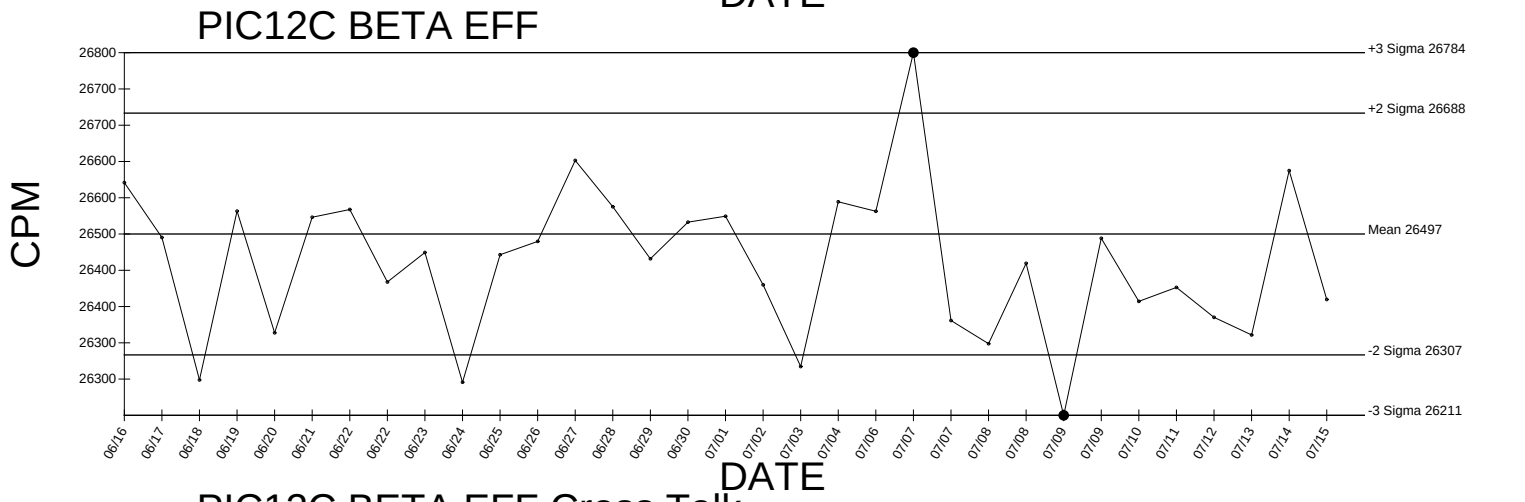


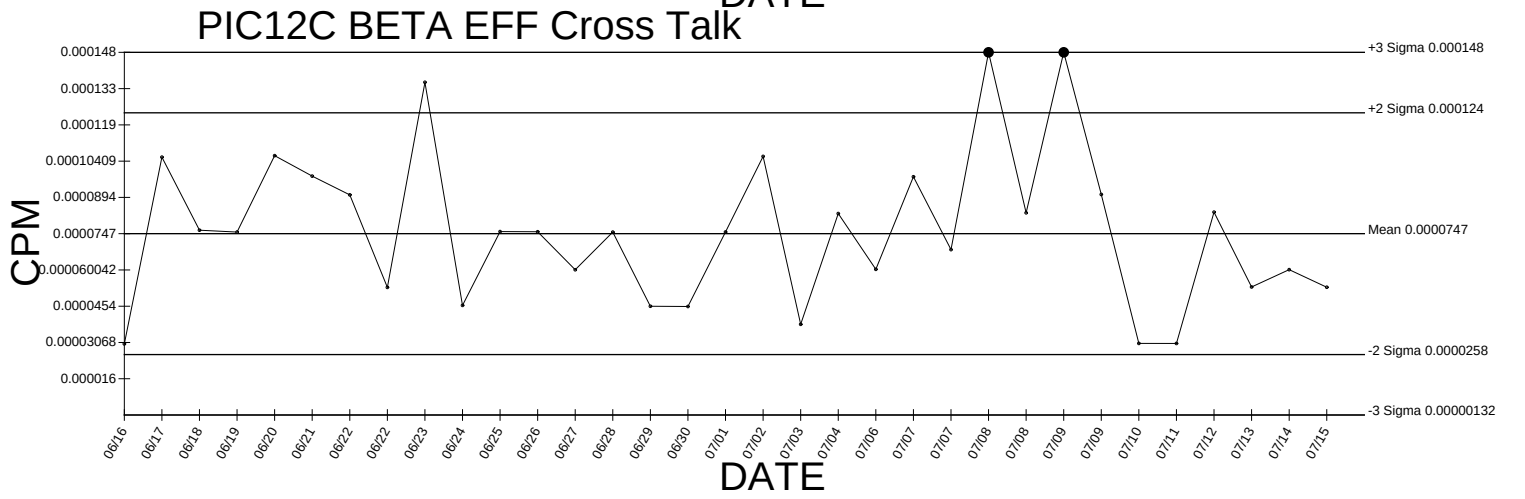




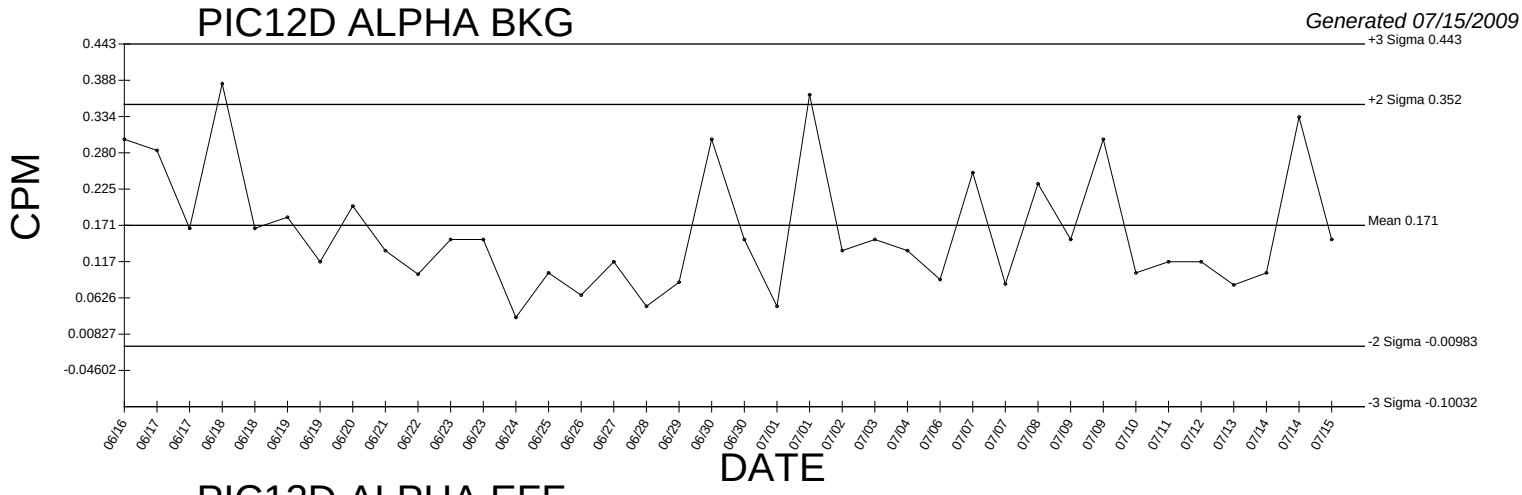
● Denotes Outlier

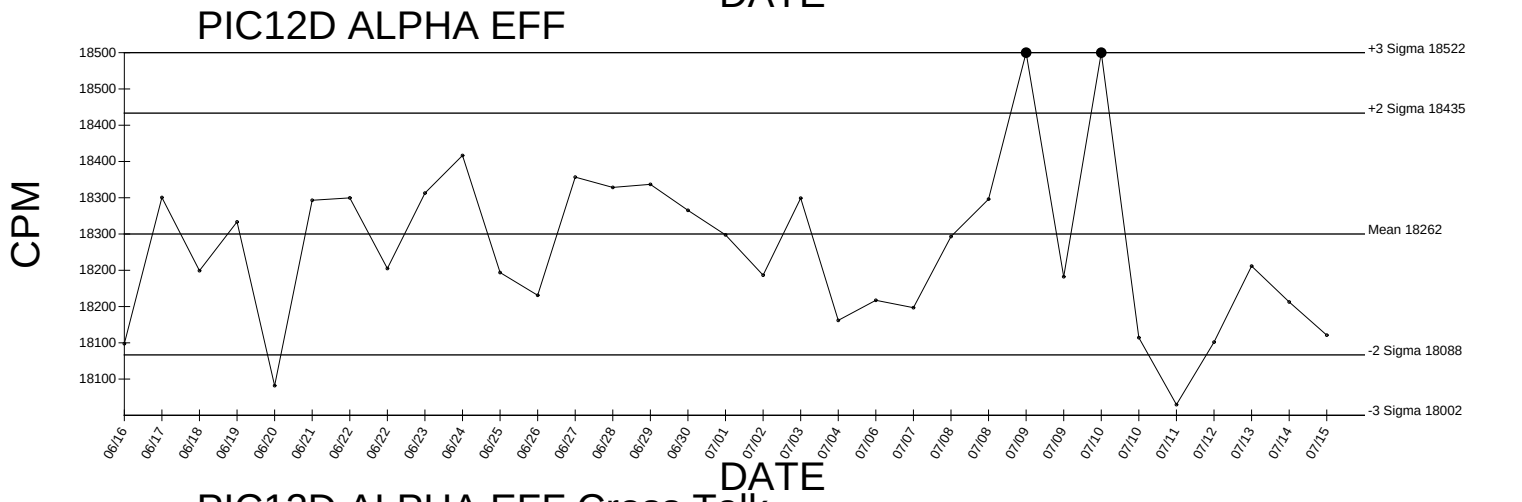


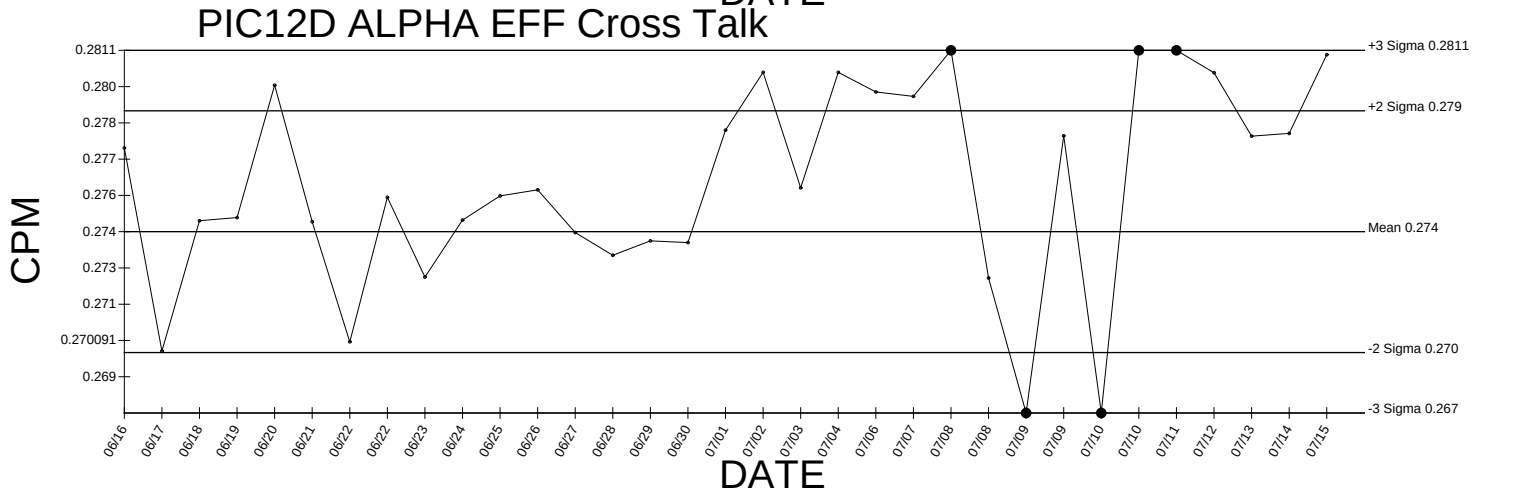




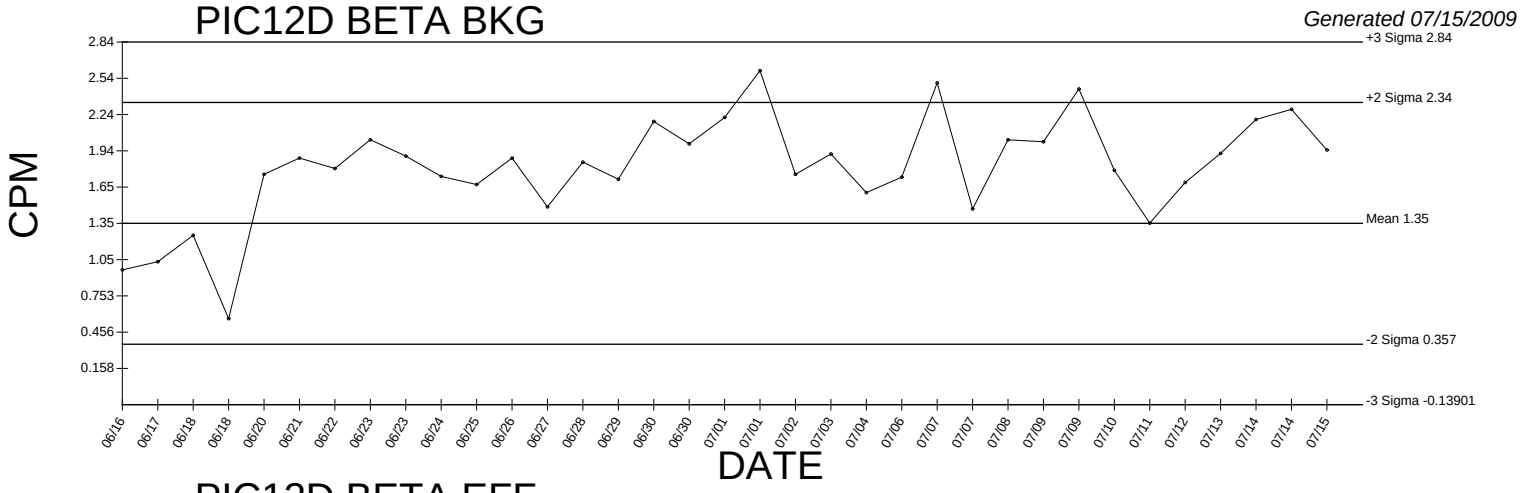
● Denotes Outlier

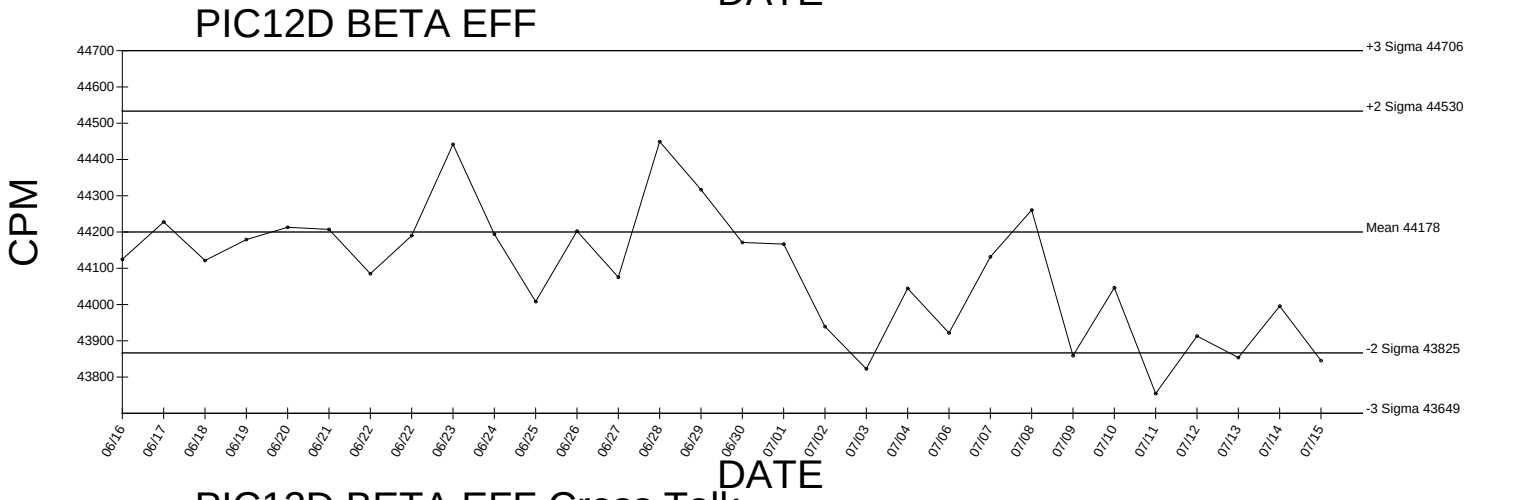


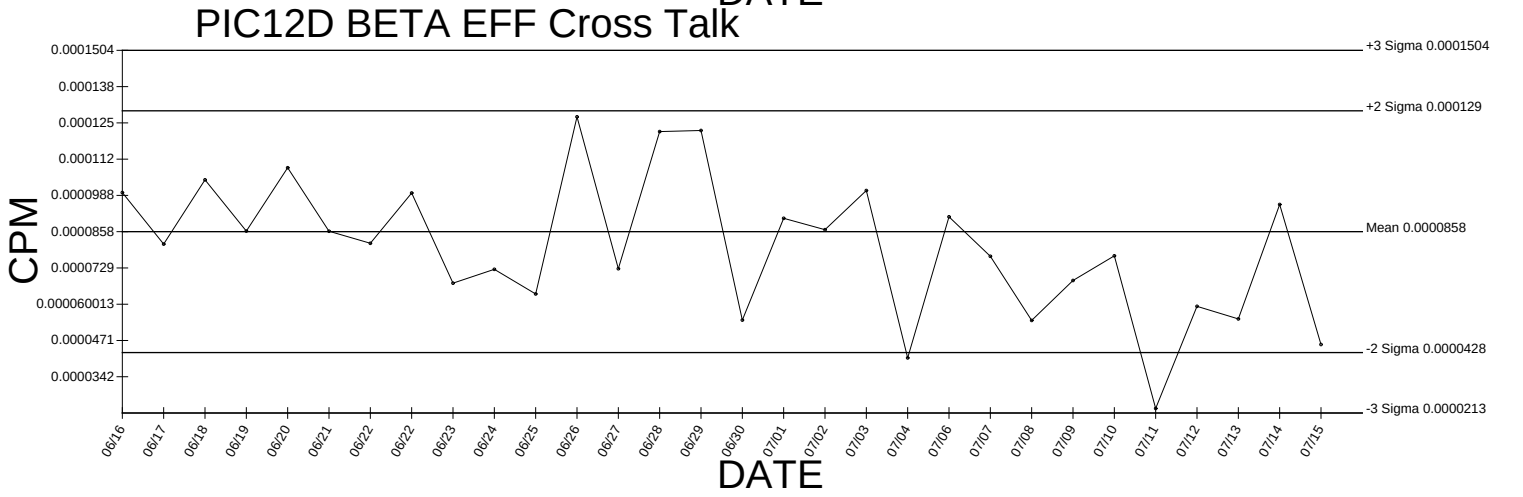




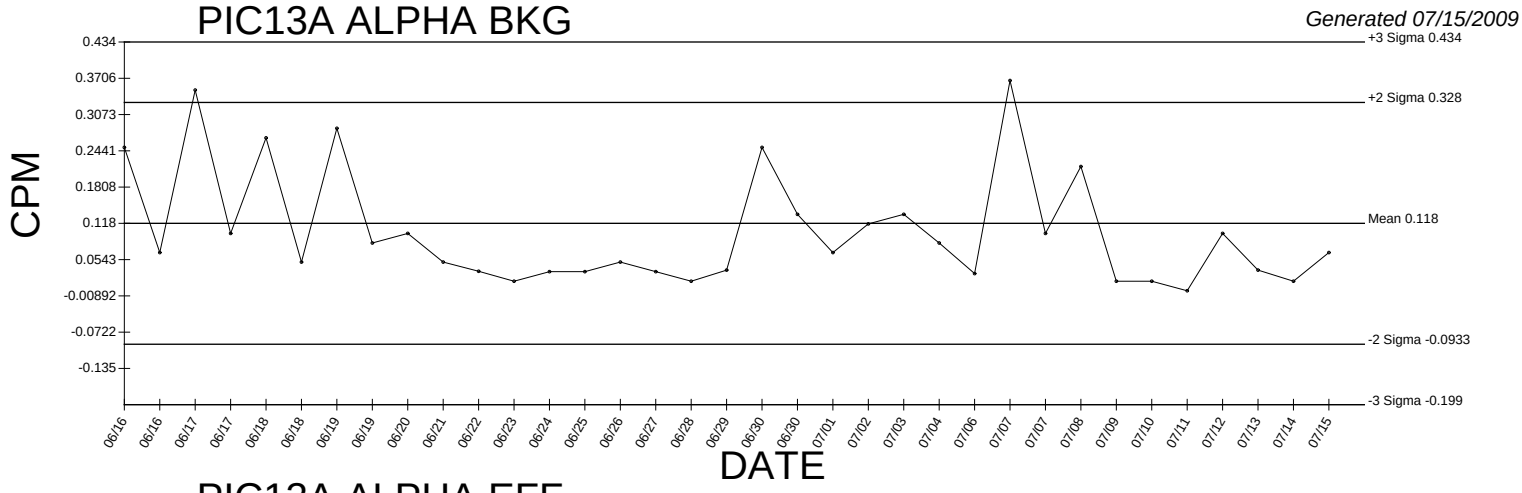
● Denotes Outlier

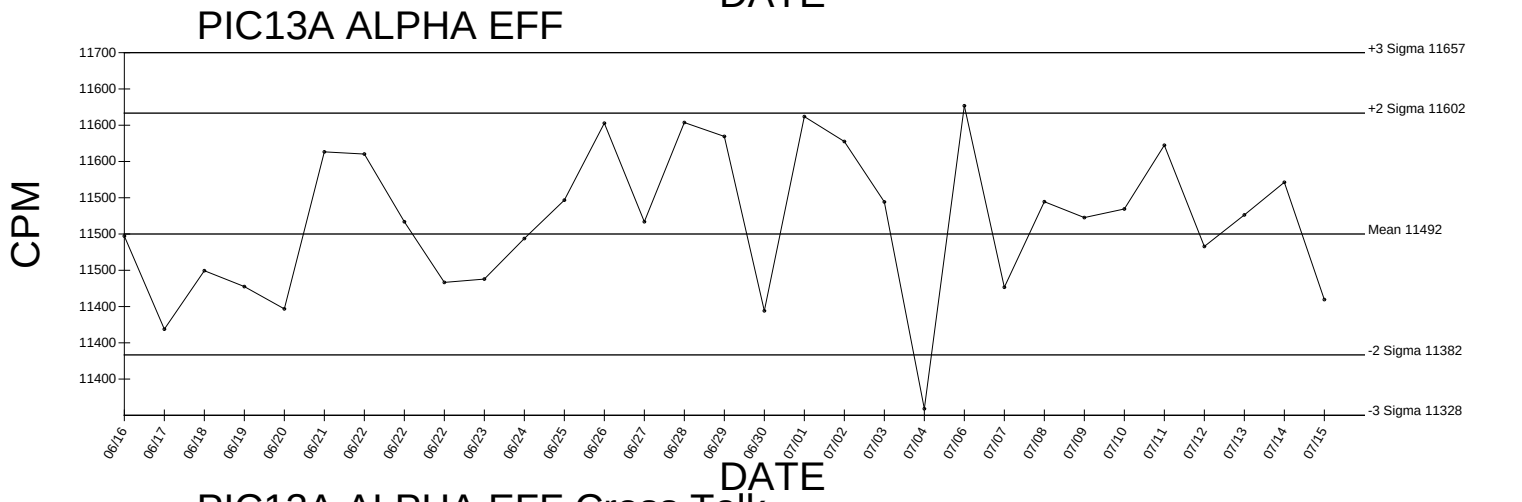


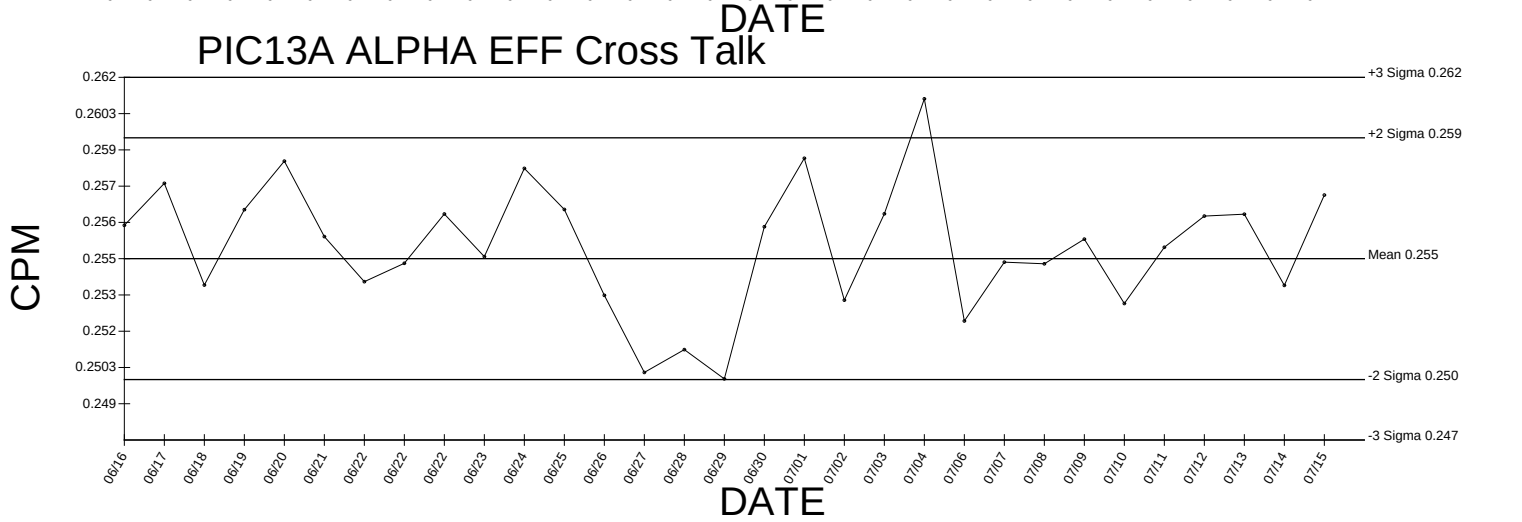




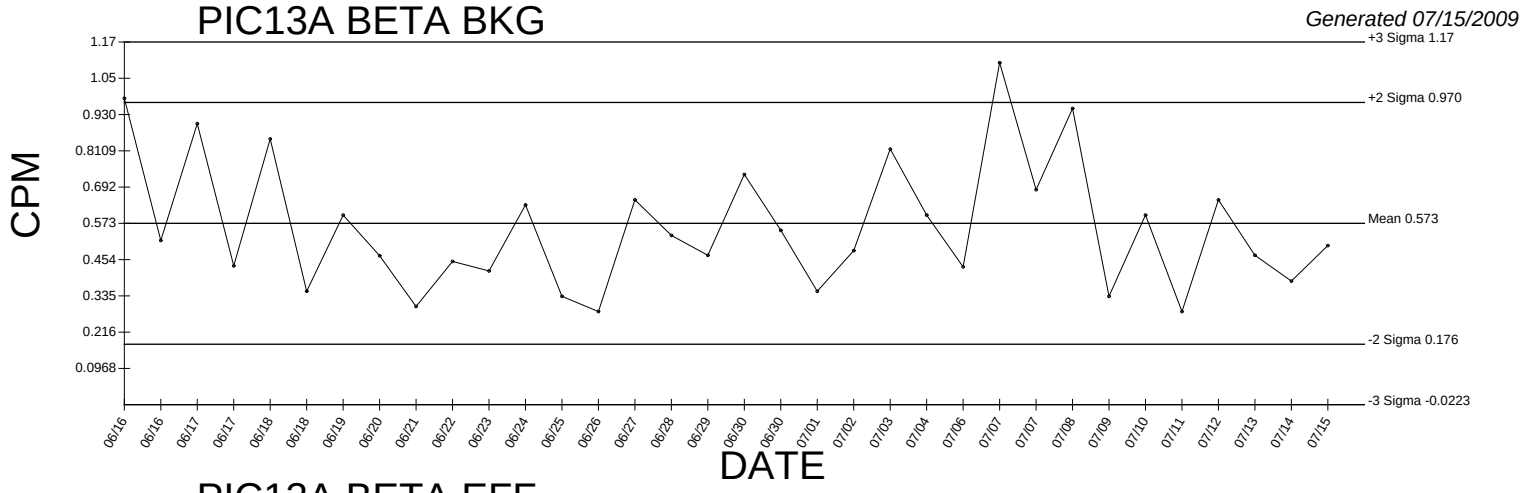
● Denotes Outlier

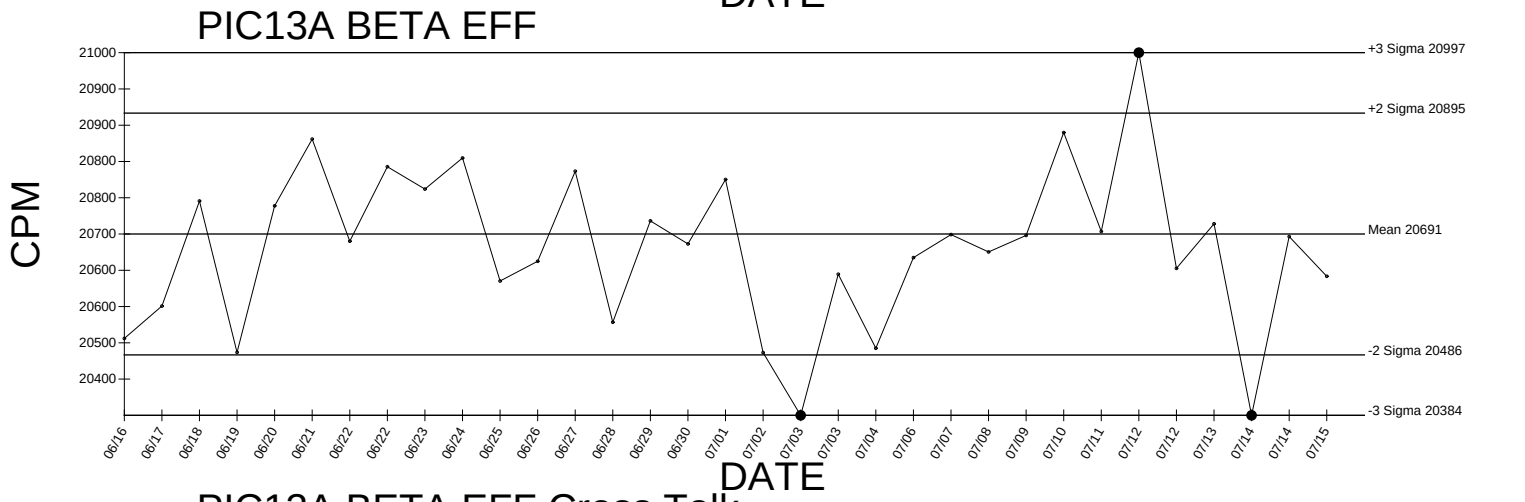


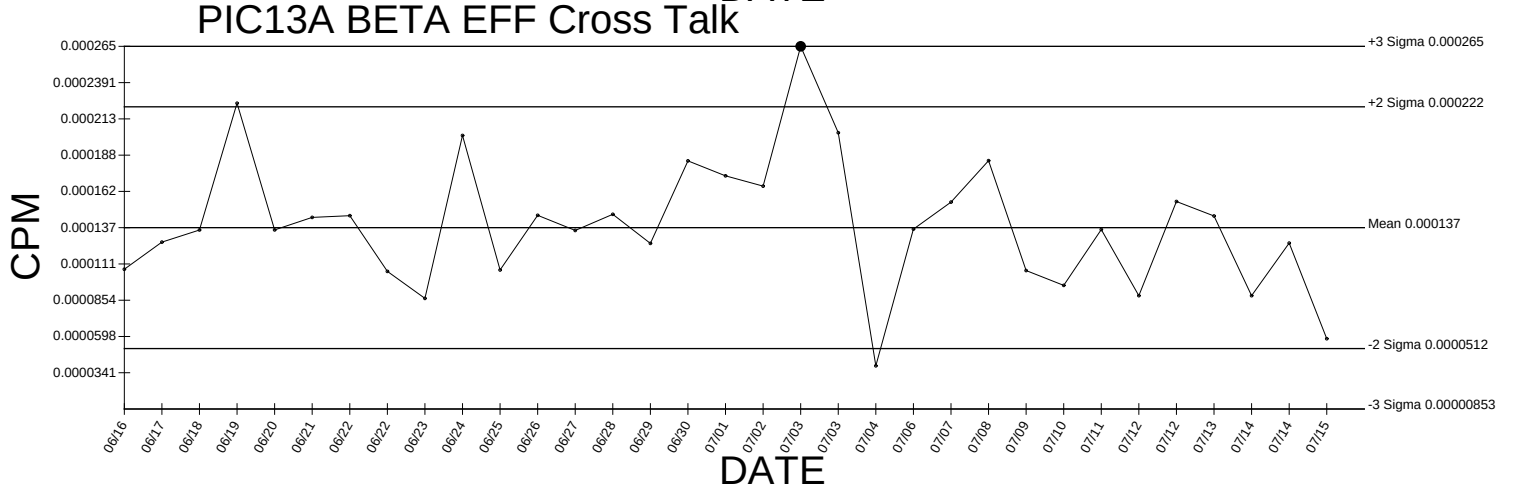




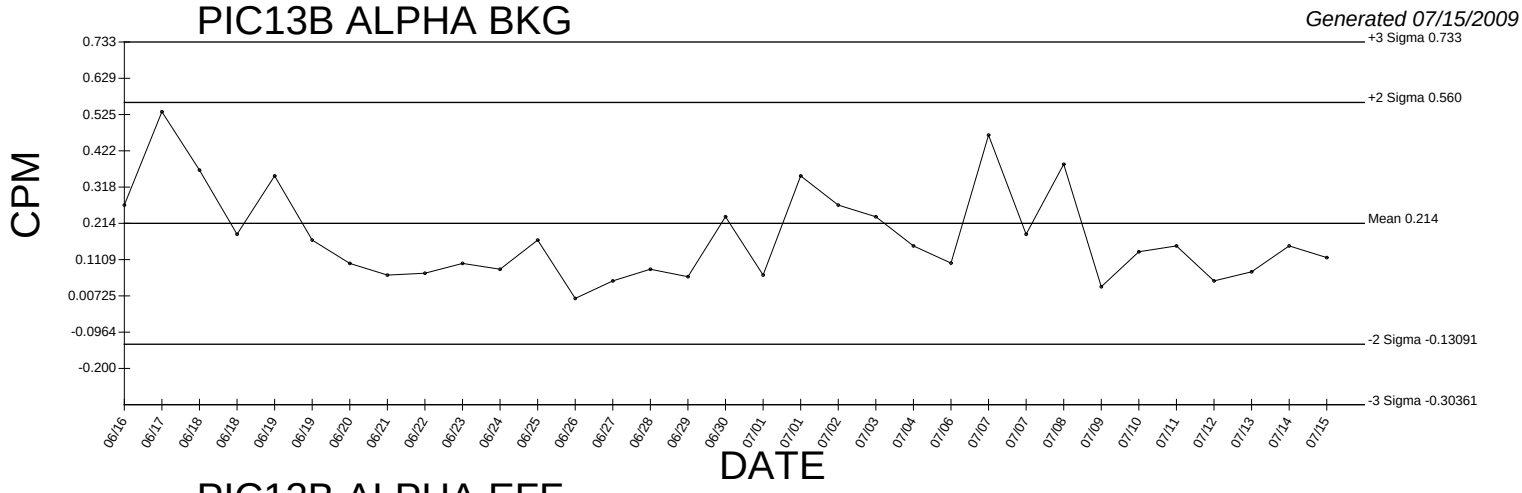
● Denotes Outlier

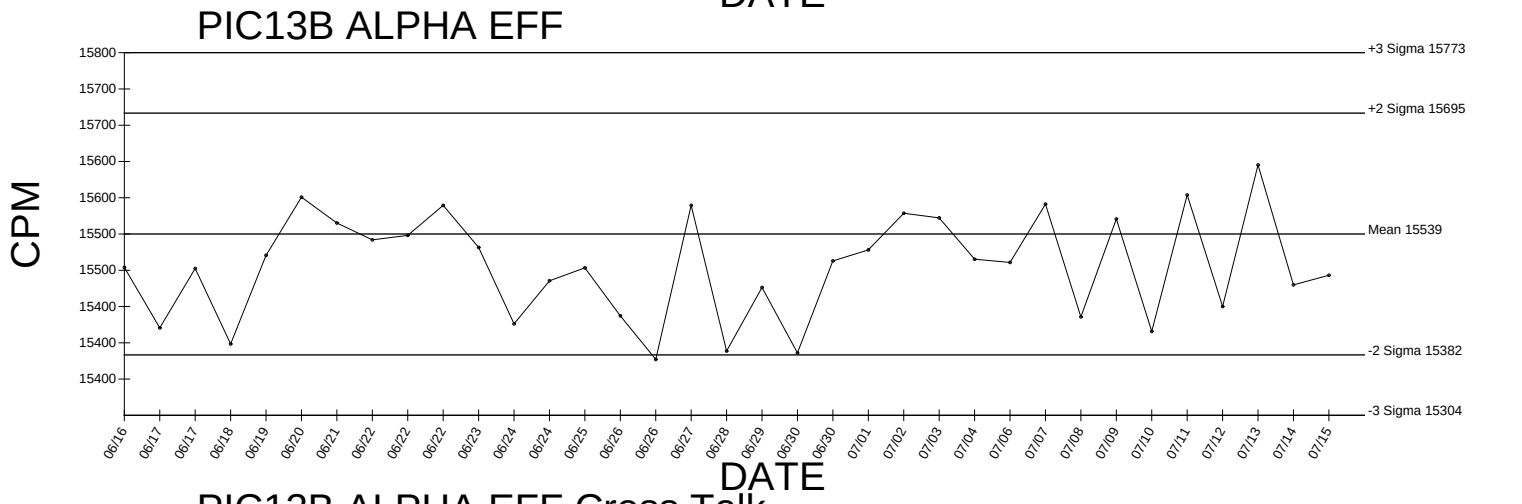


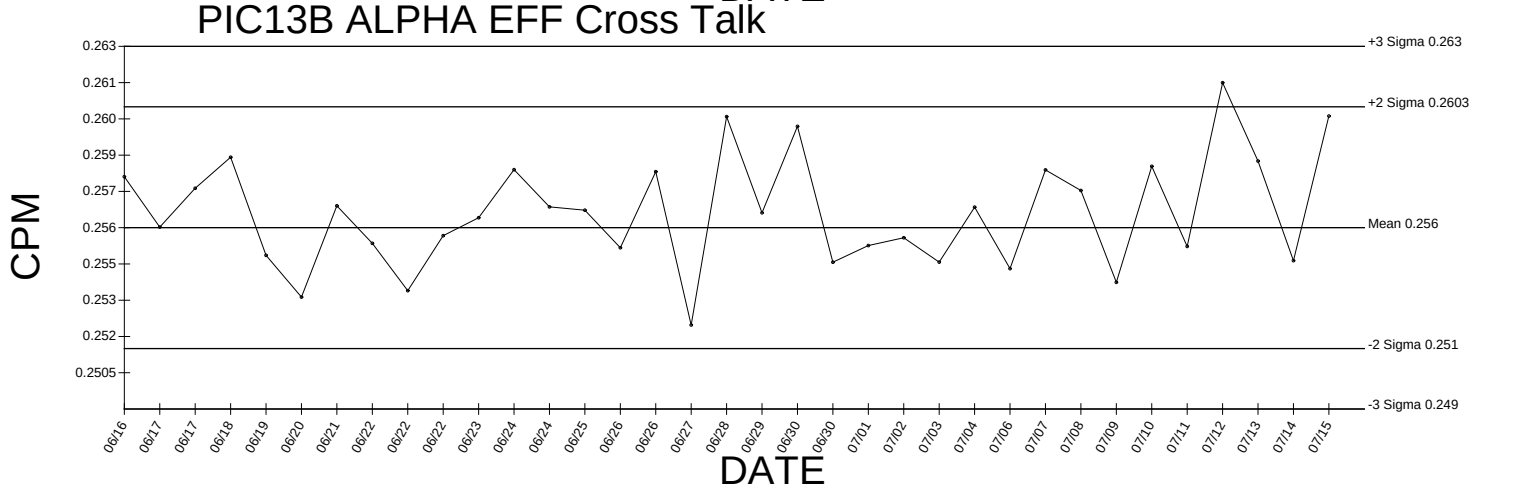




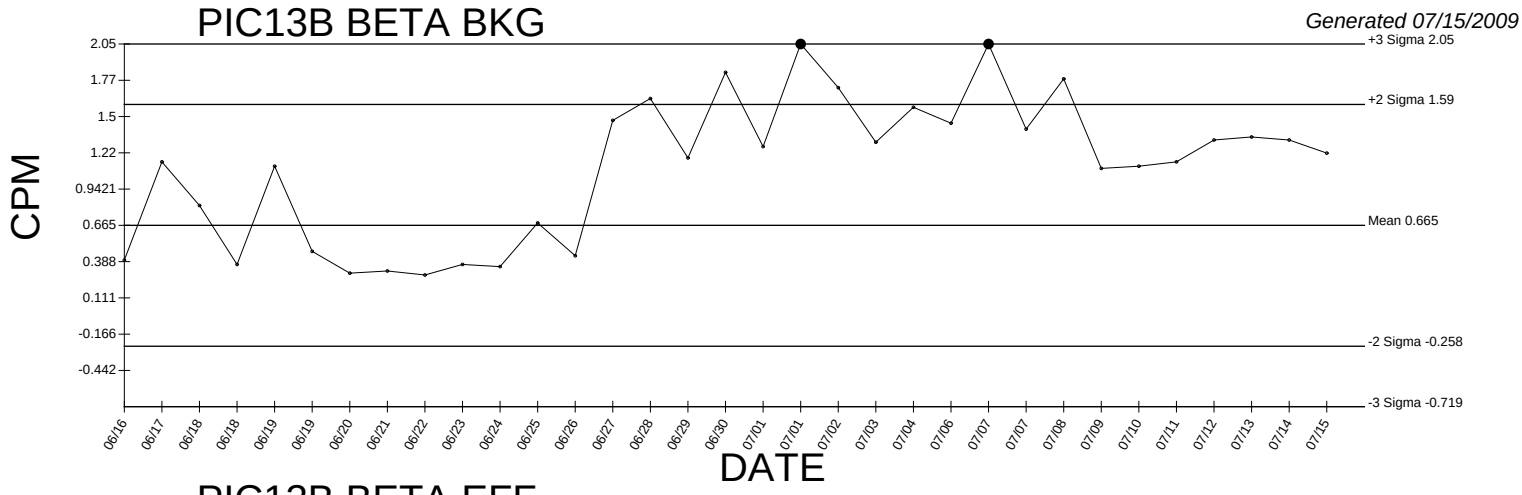
● Denotes Outlier

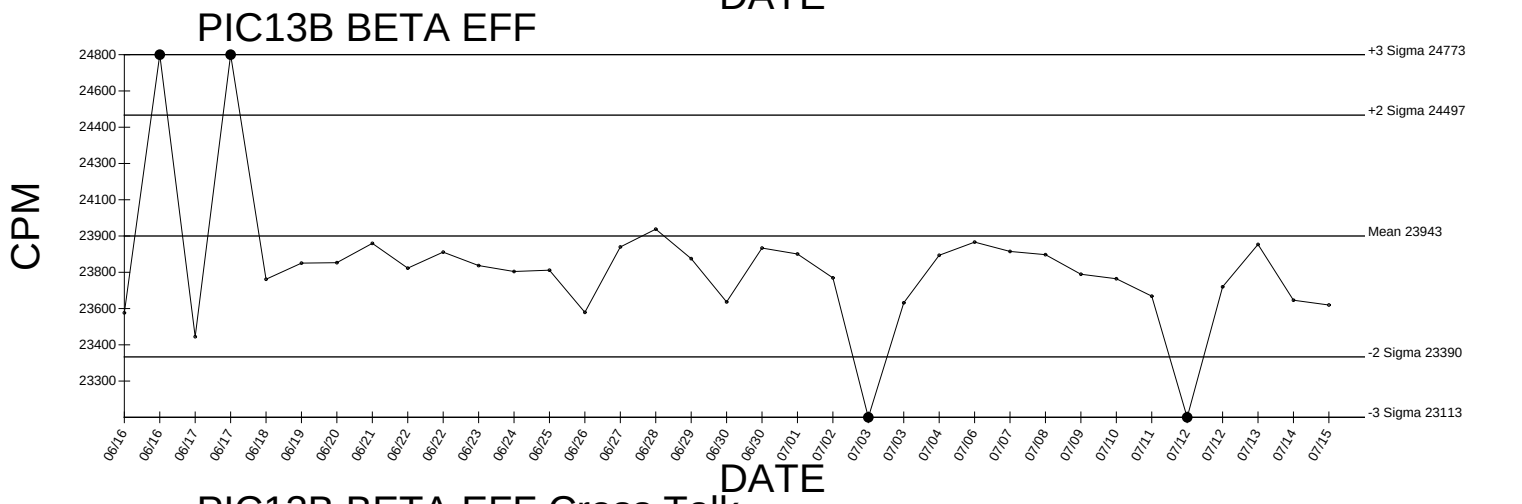


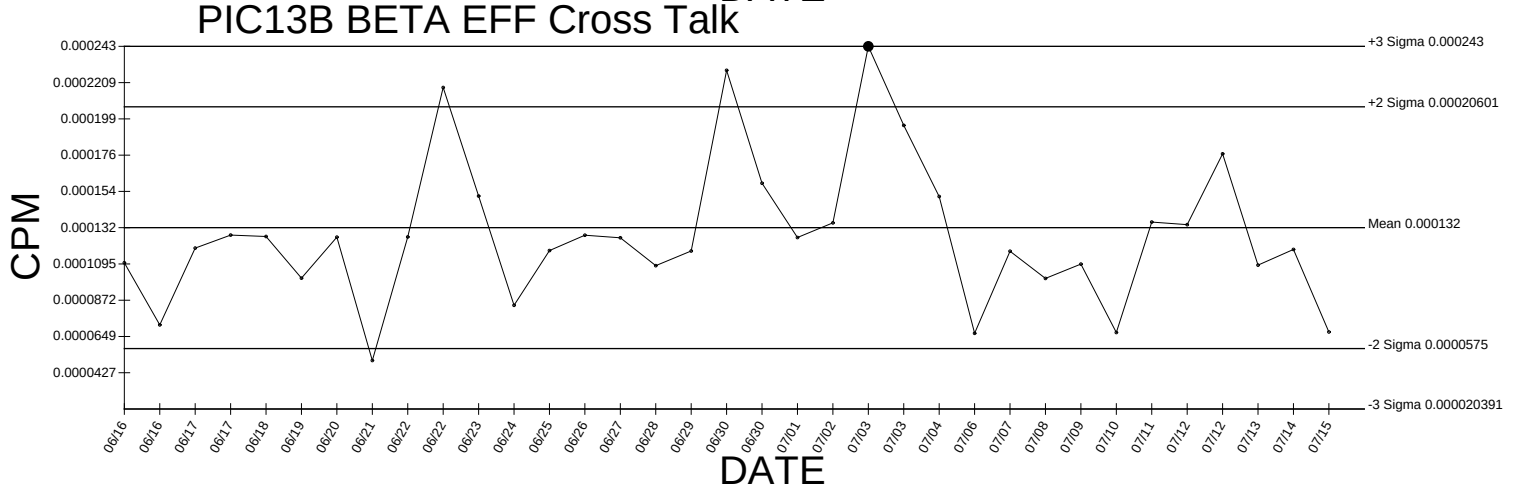




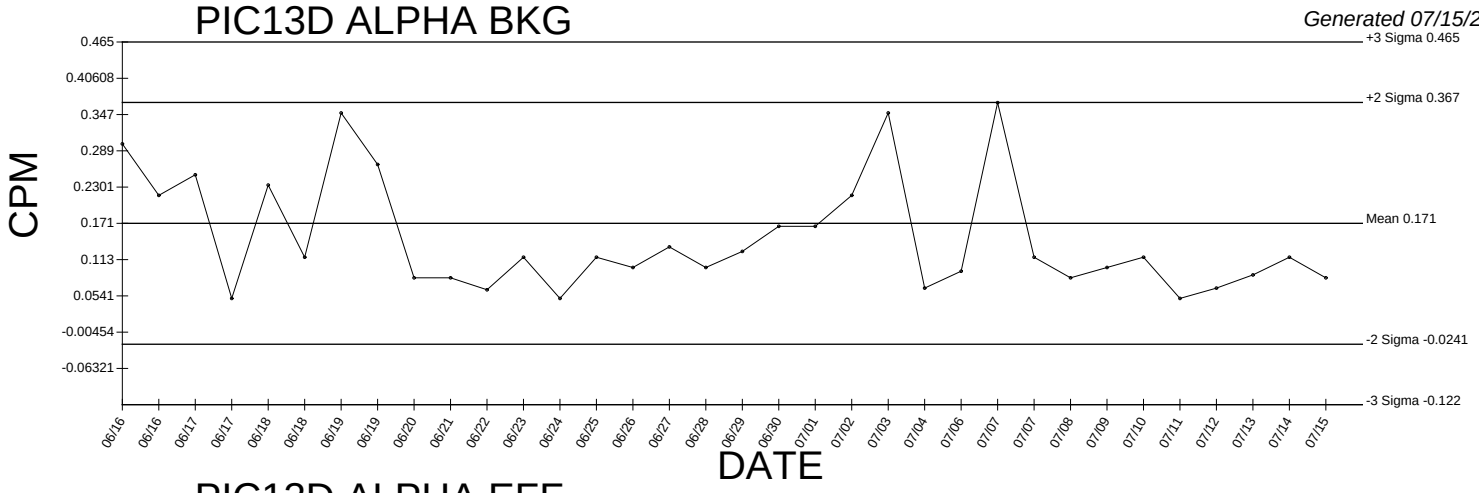
● Denotes Outlier

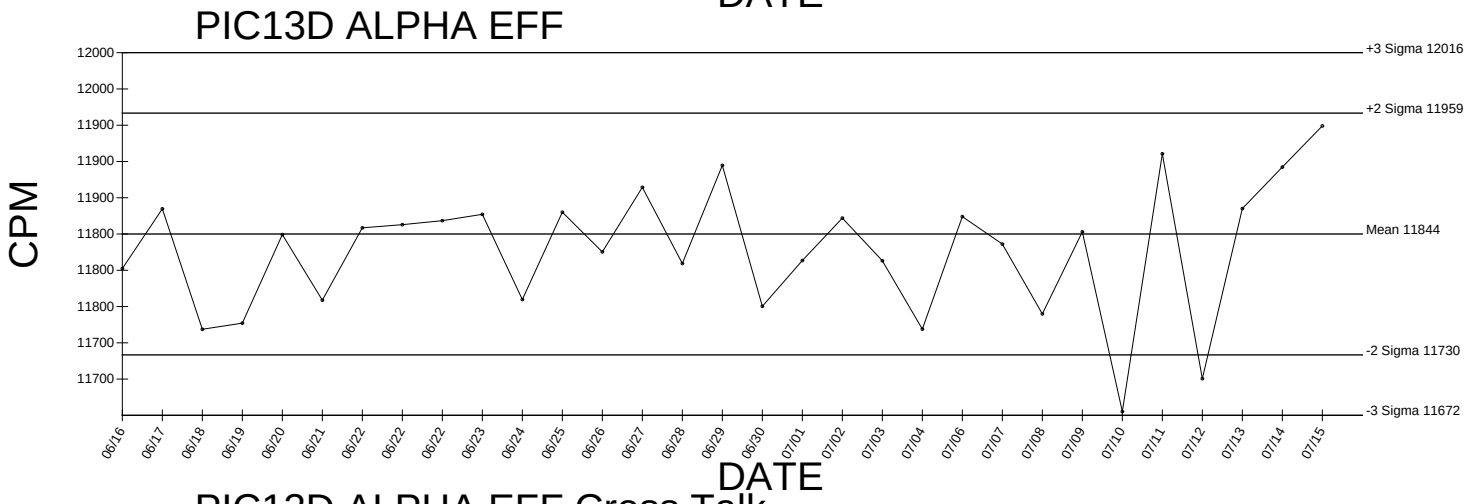


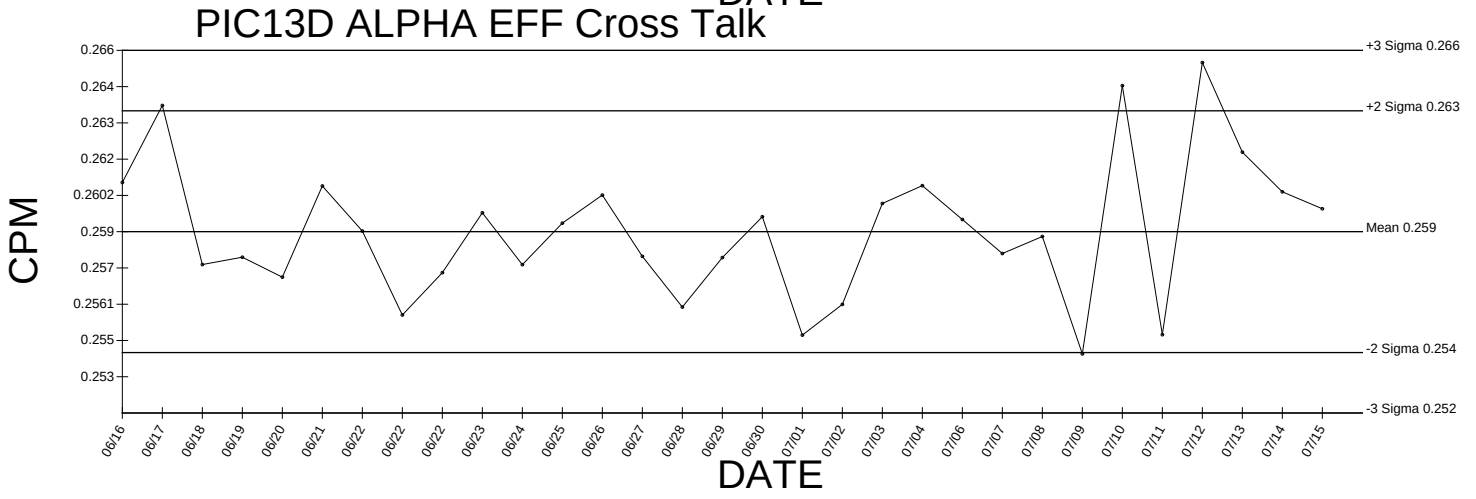




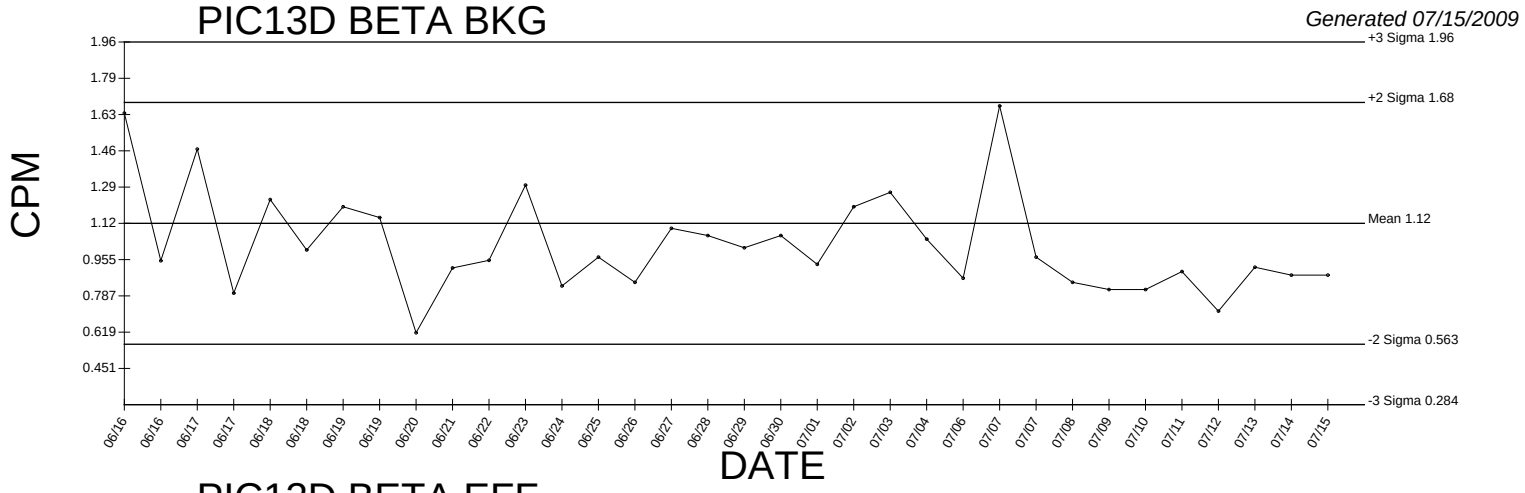
● Denotes Outlier

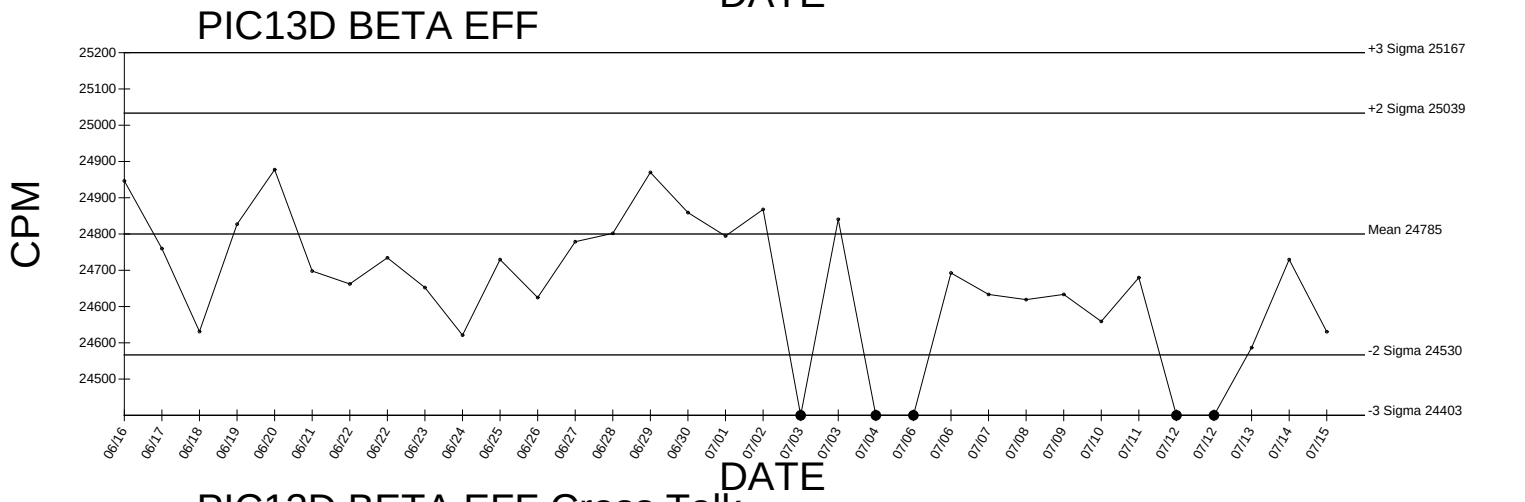


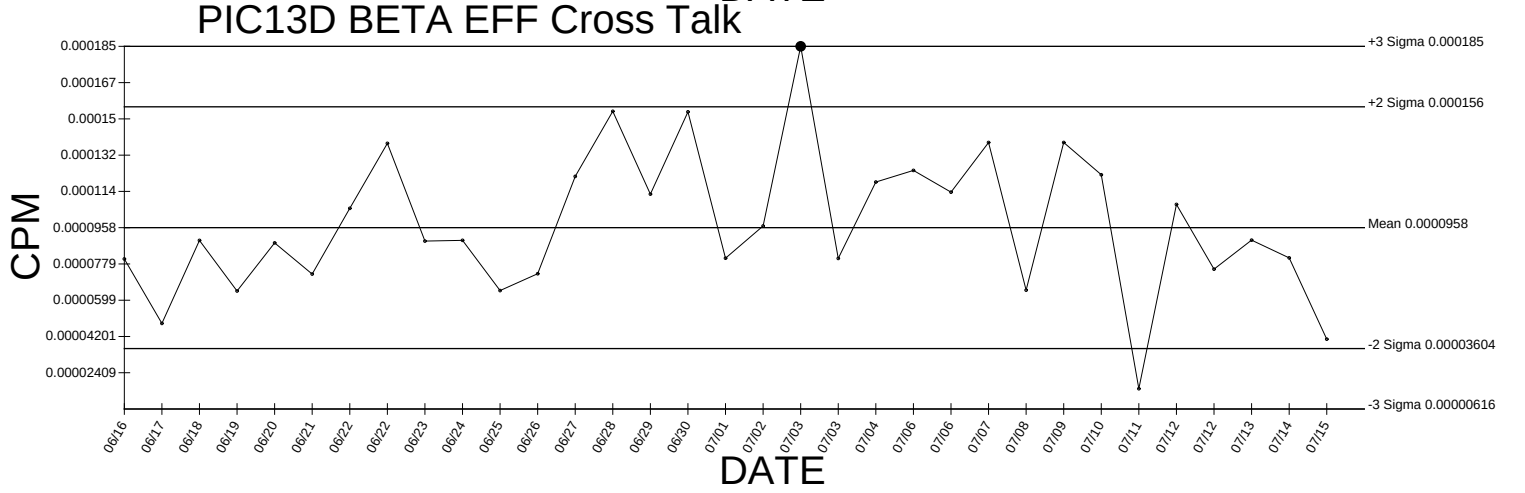




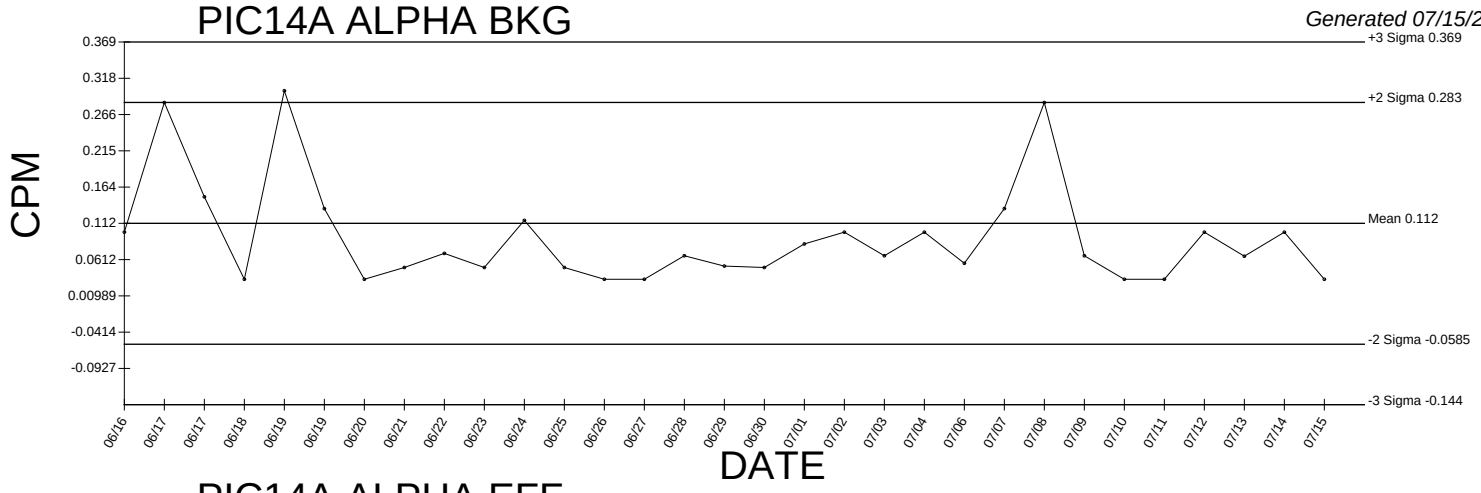
● Denotes Outlier

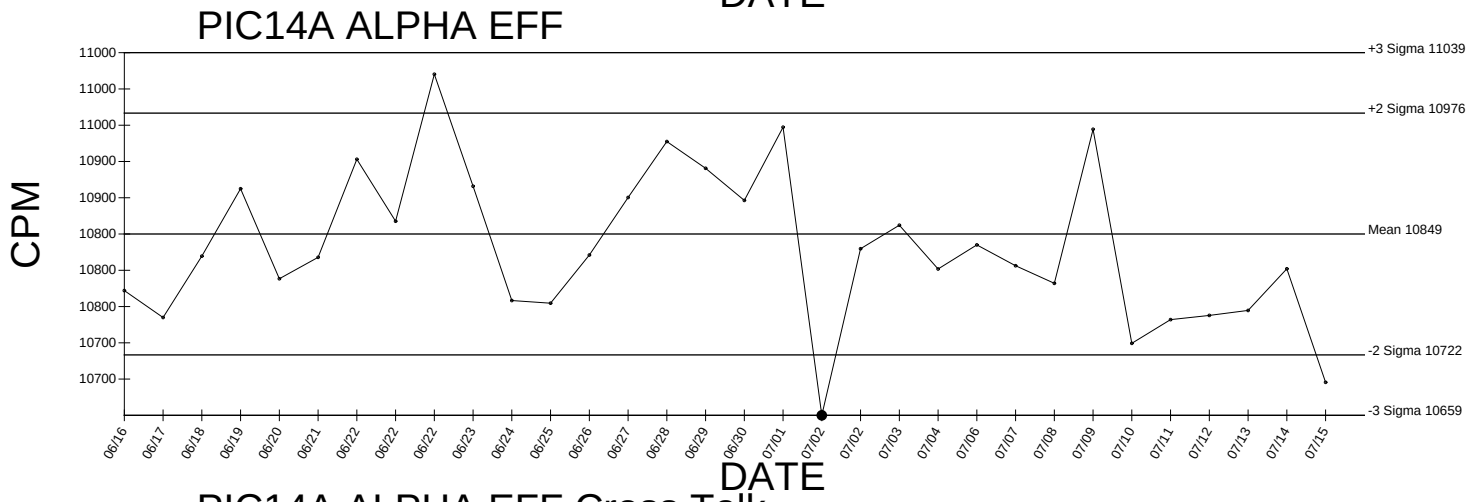


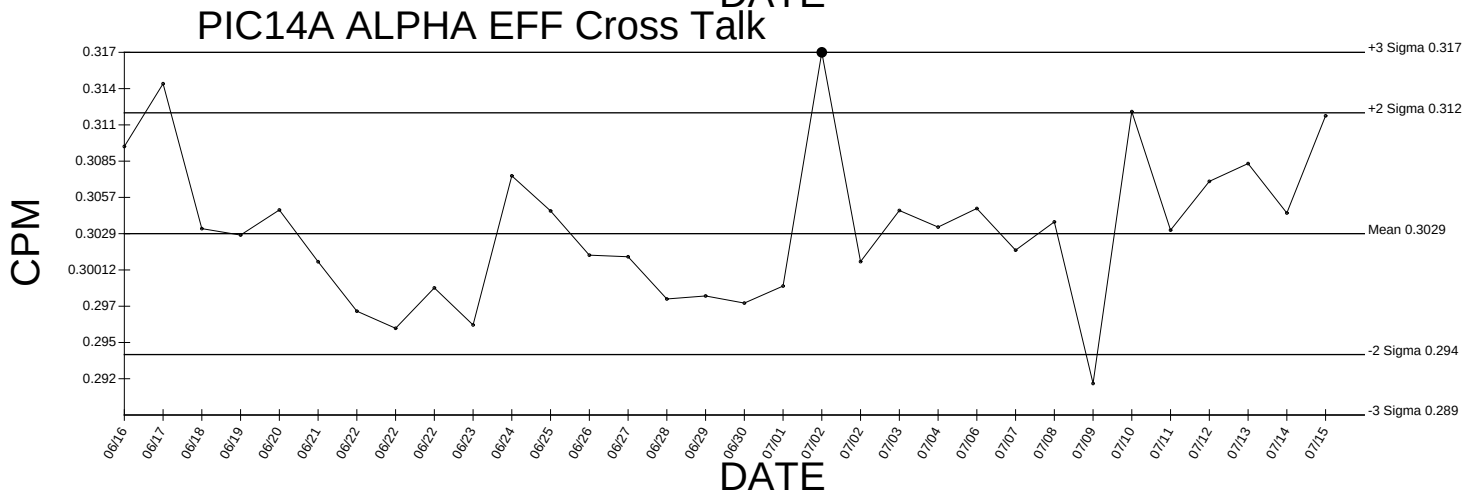




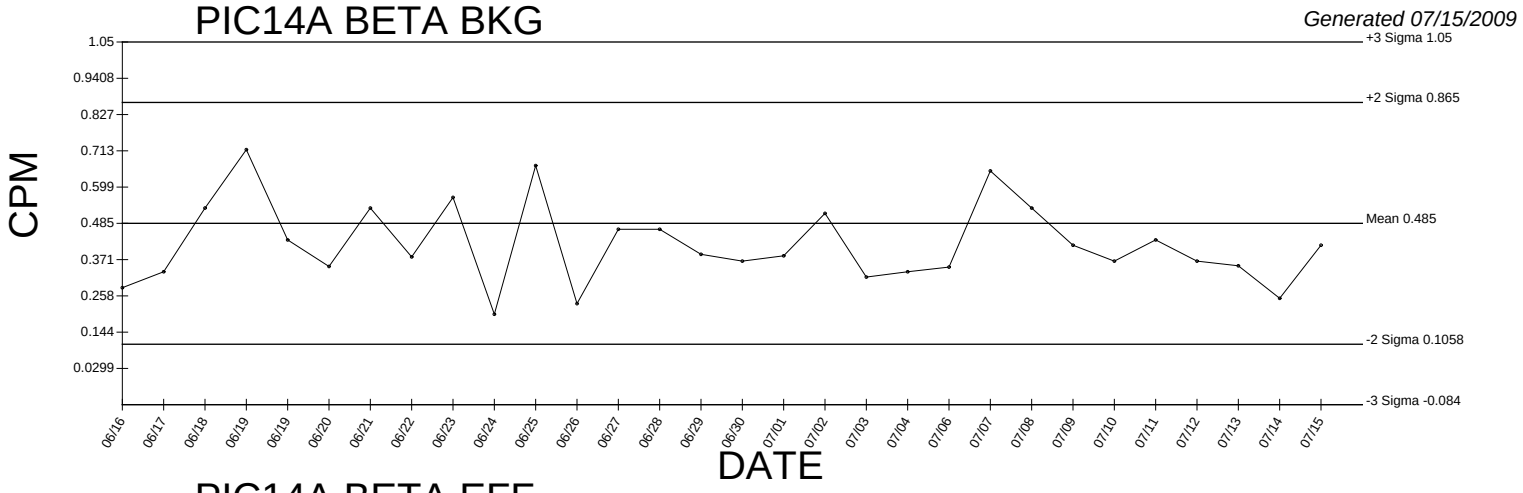
● Denotes Outlier

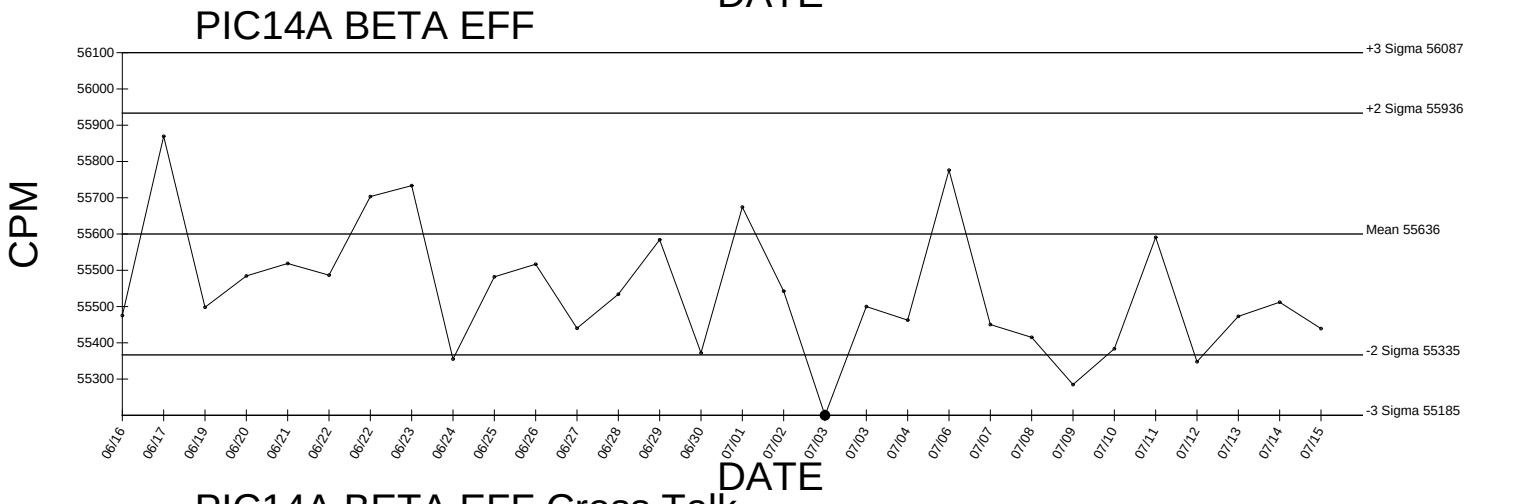


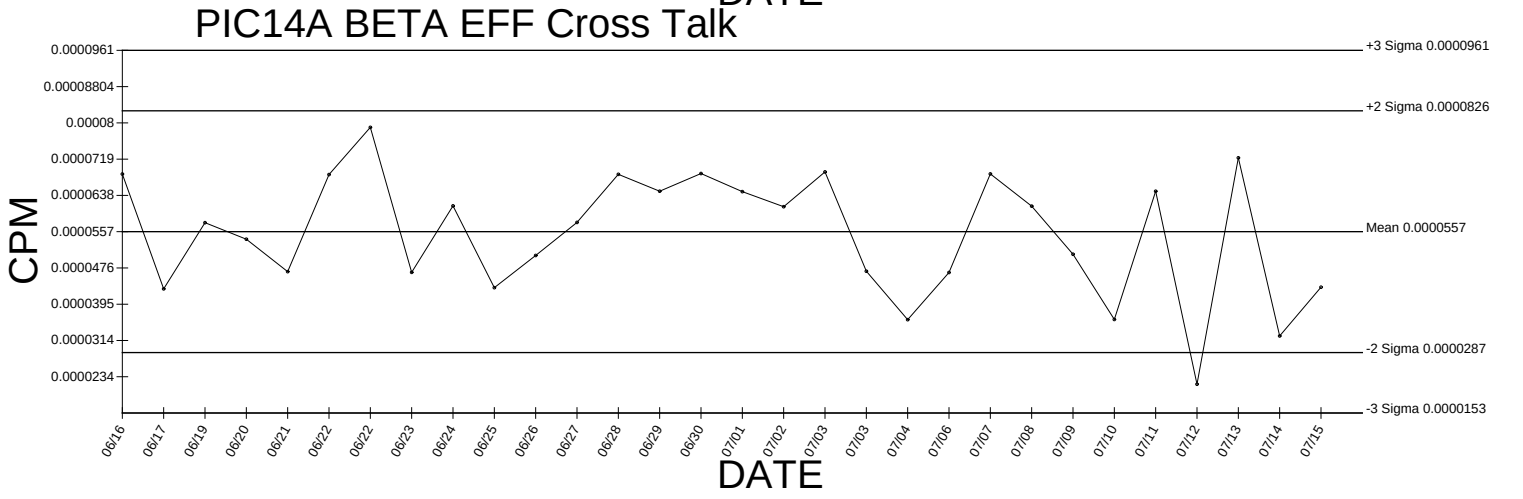




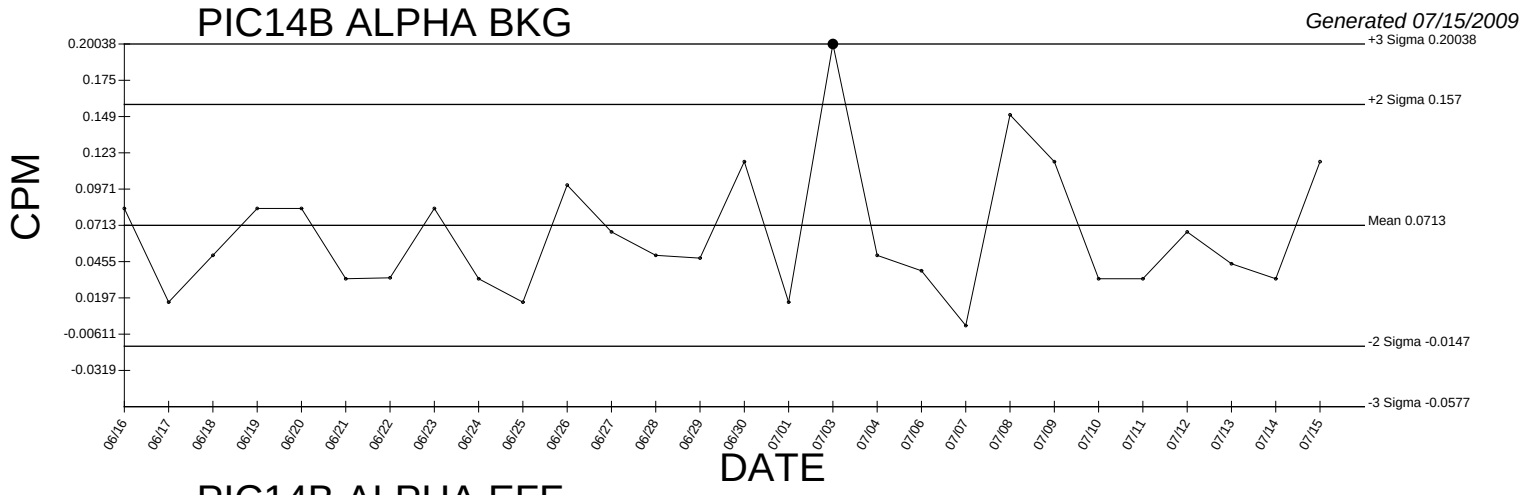
● Denotes Outlier

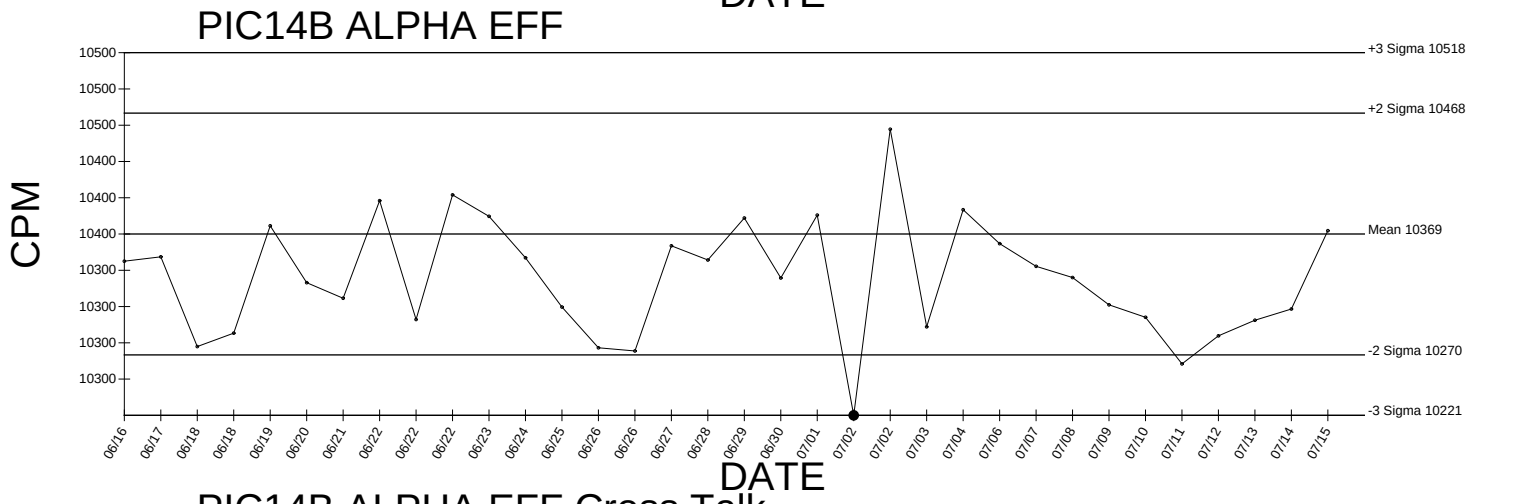


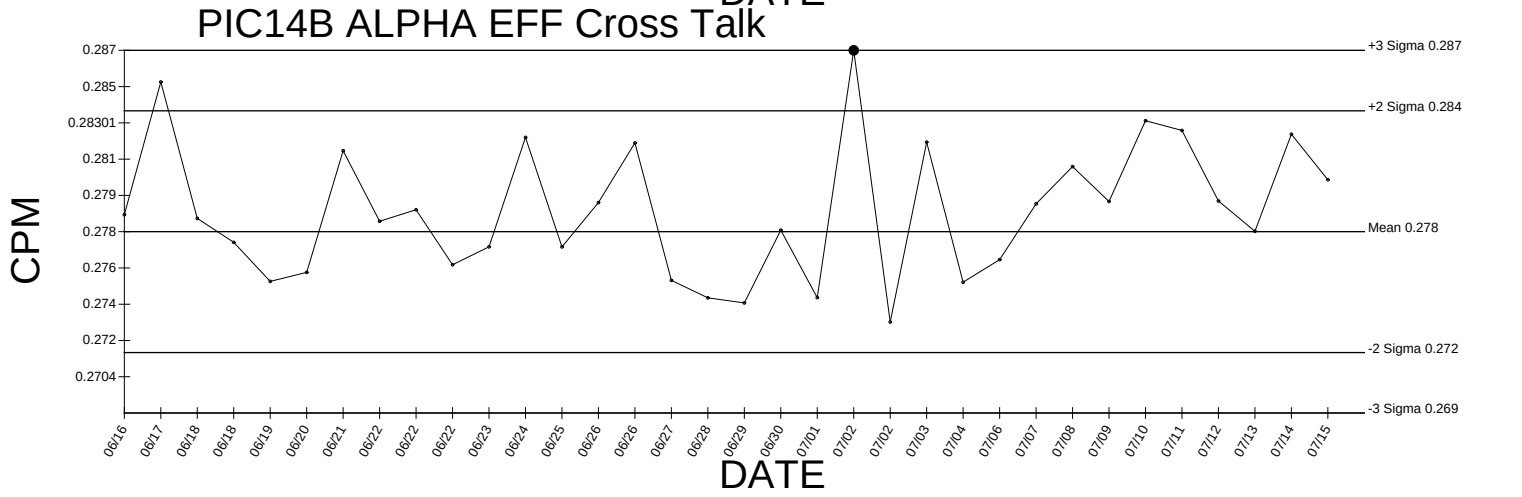




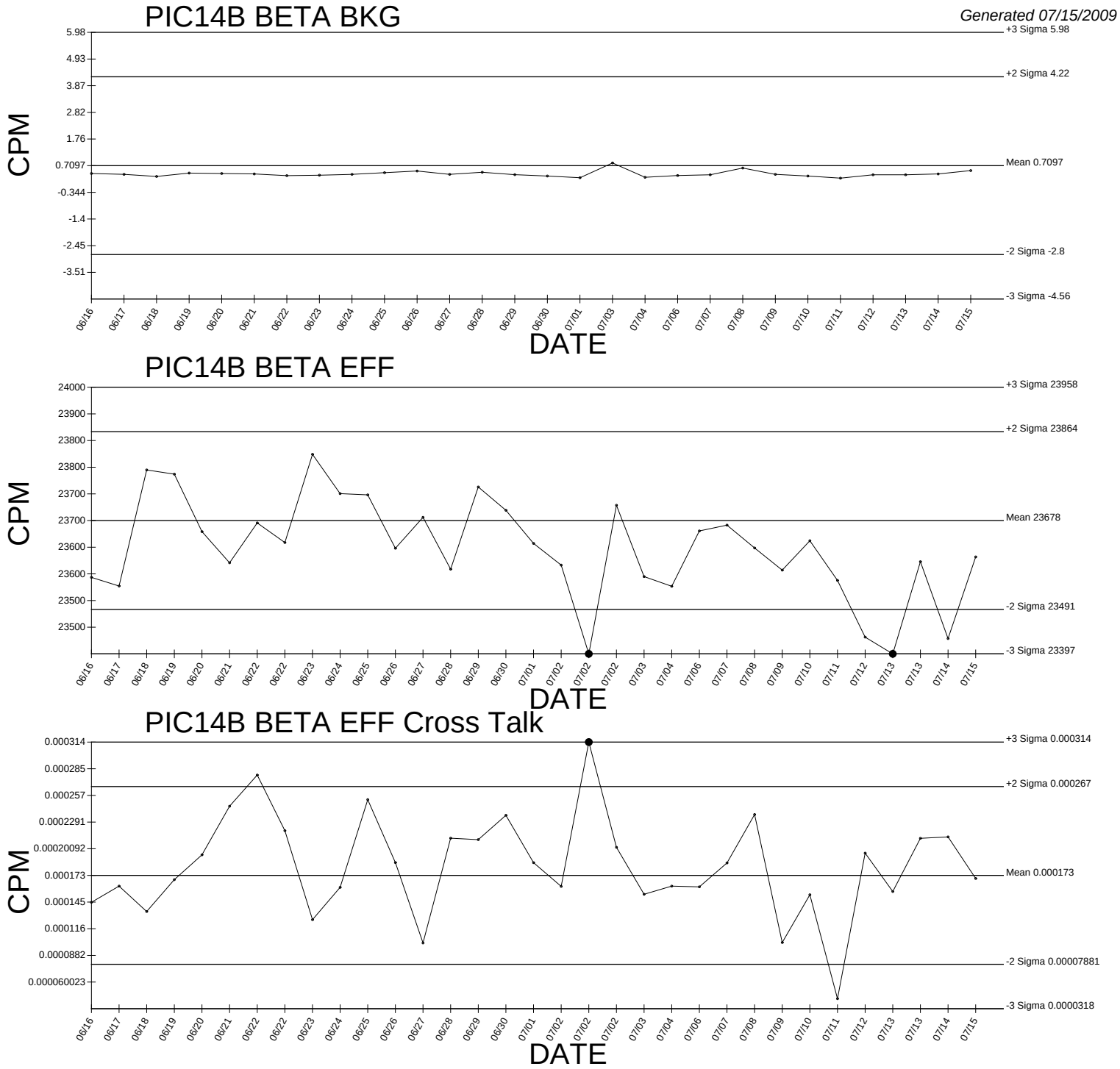
● Denotes Outlier



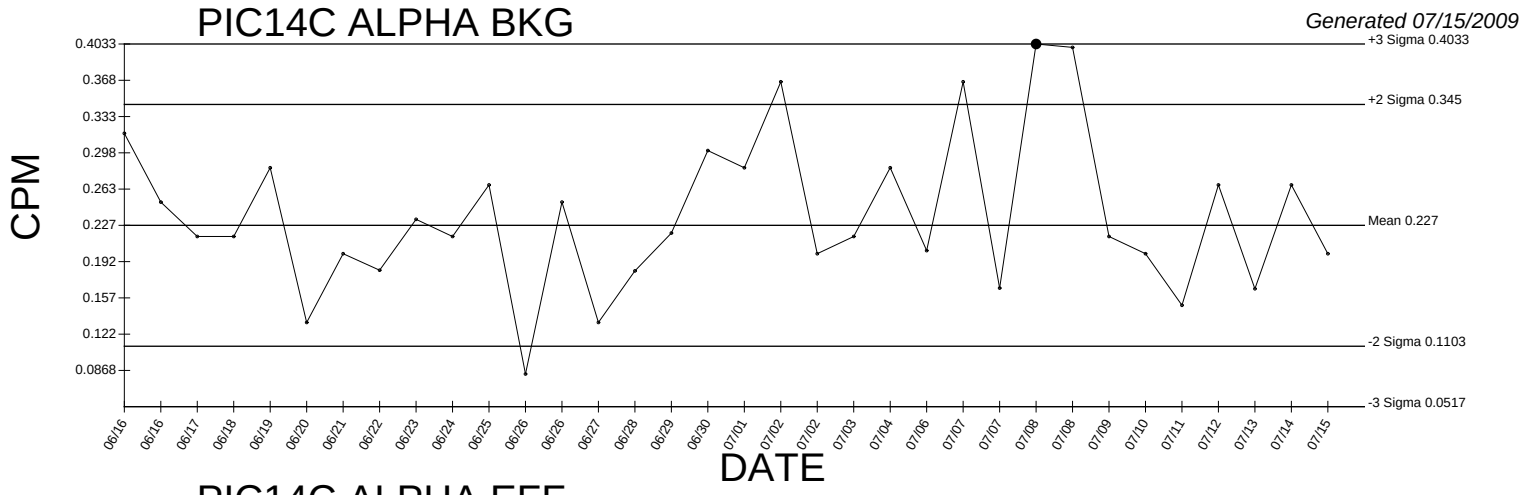


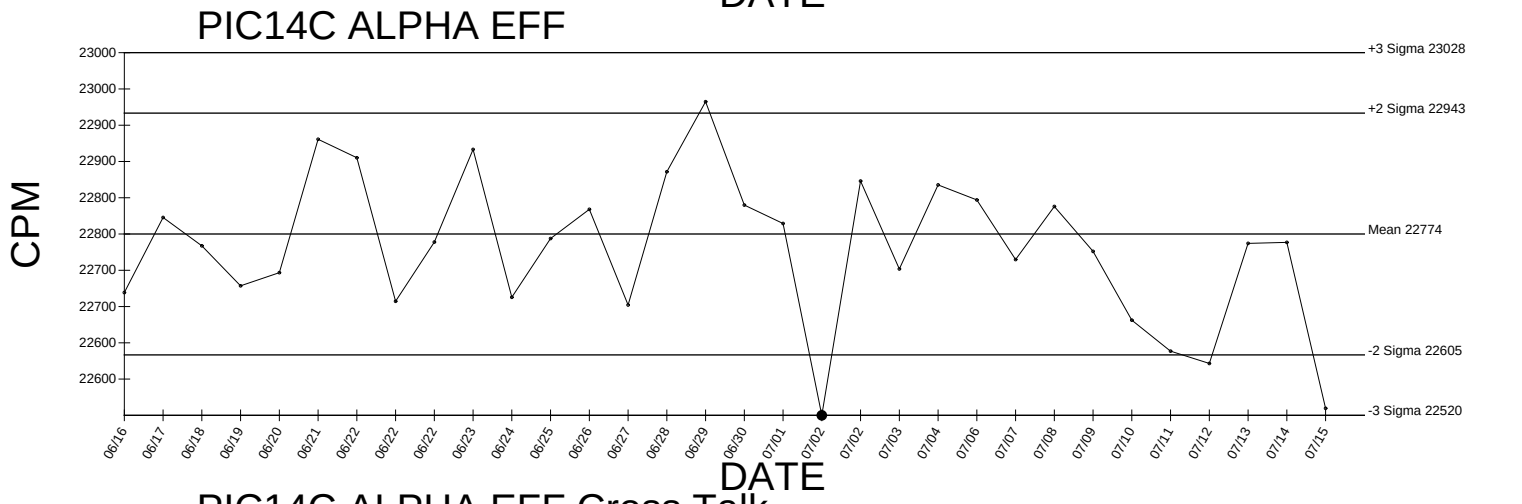


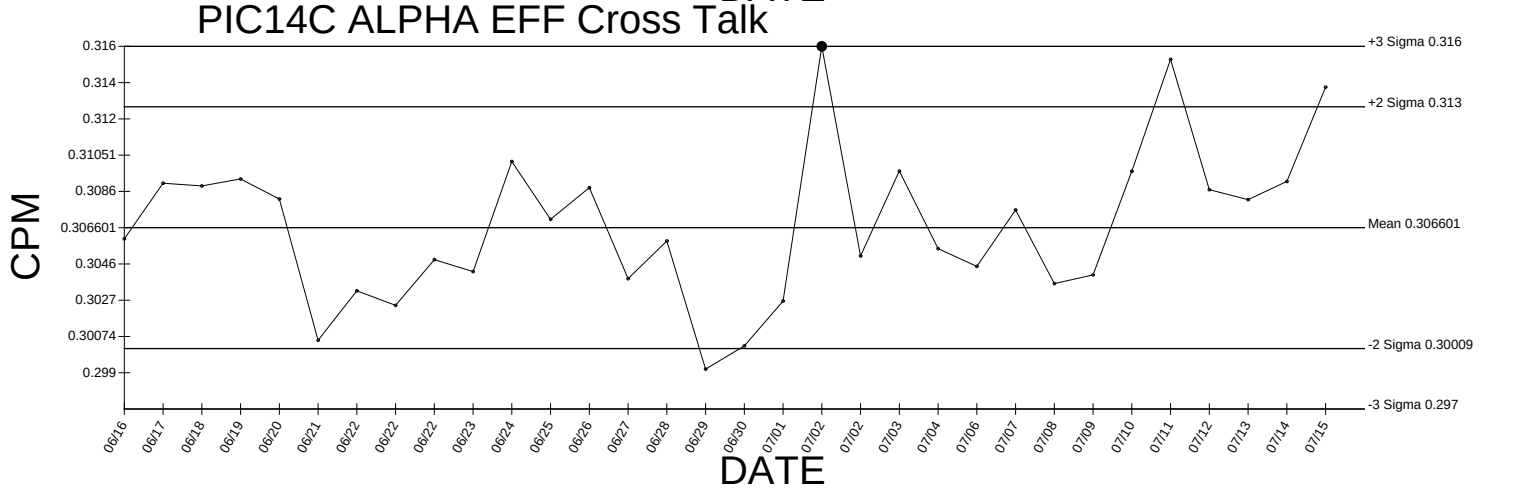
● Denotes Outlier



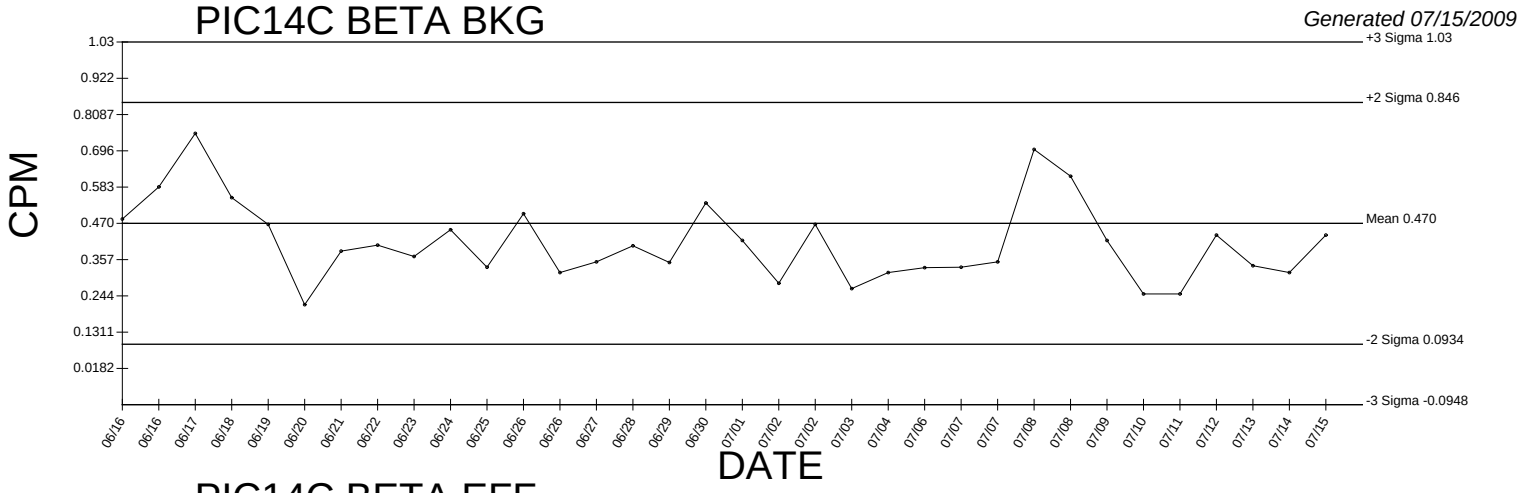
● Denotes Outlier

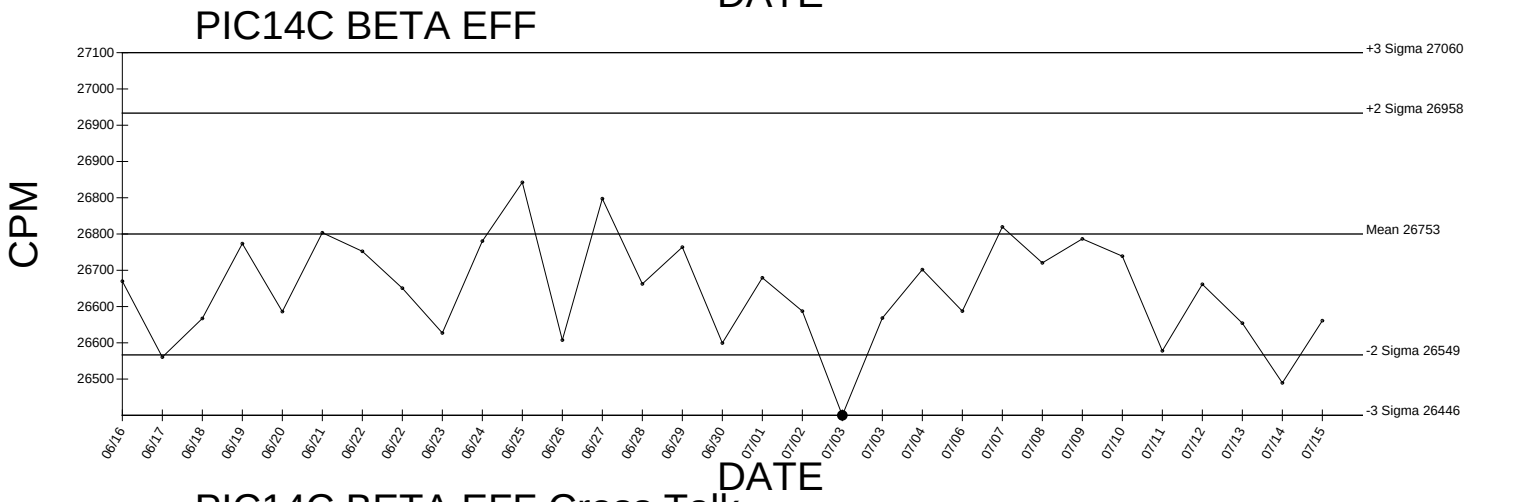


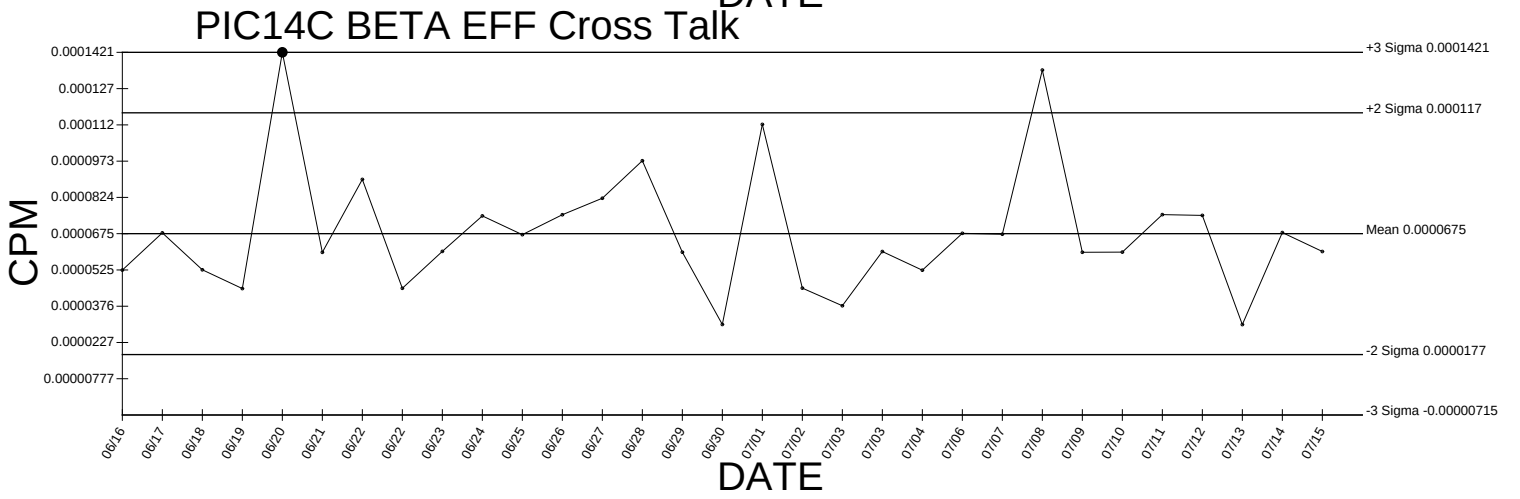




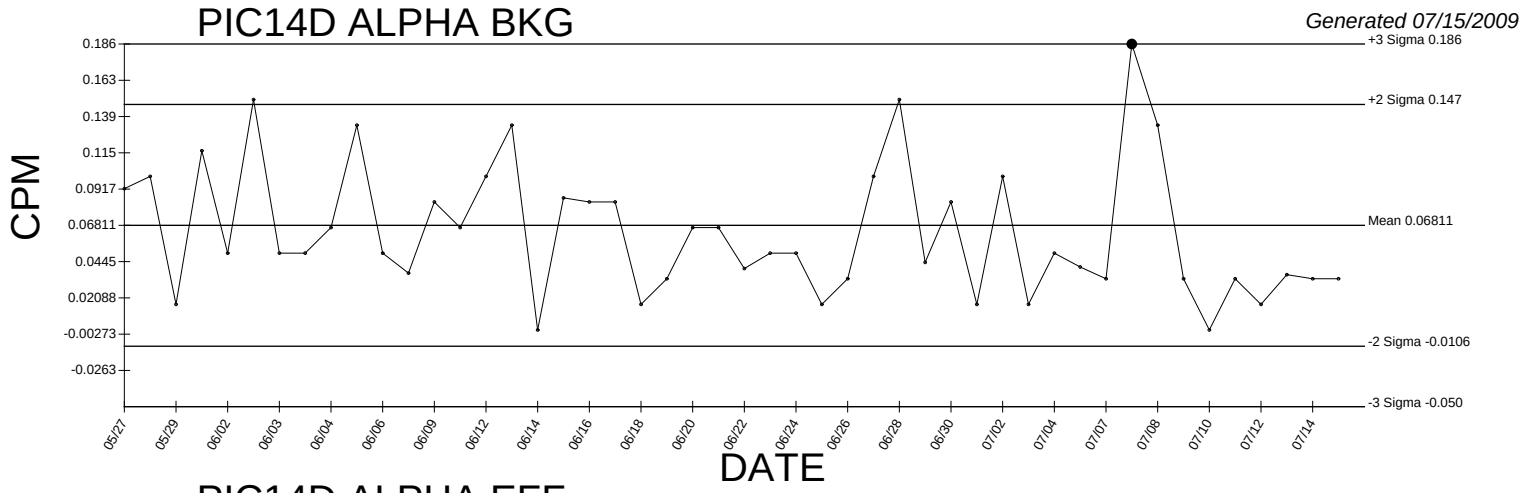
● Denotes Outlier

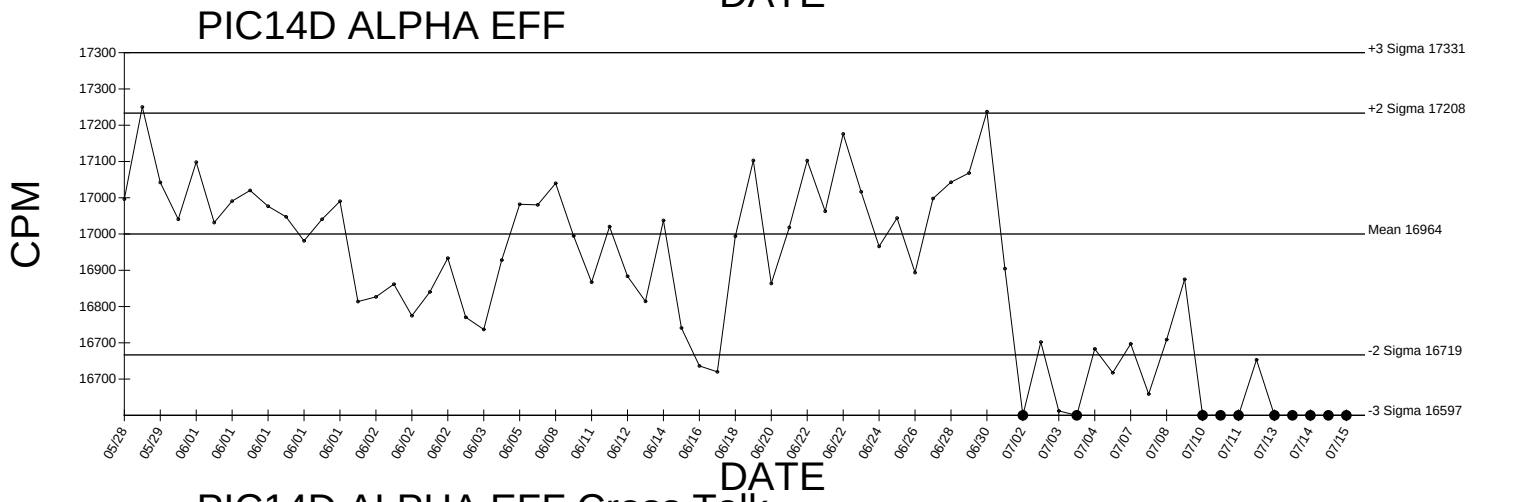


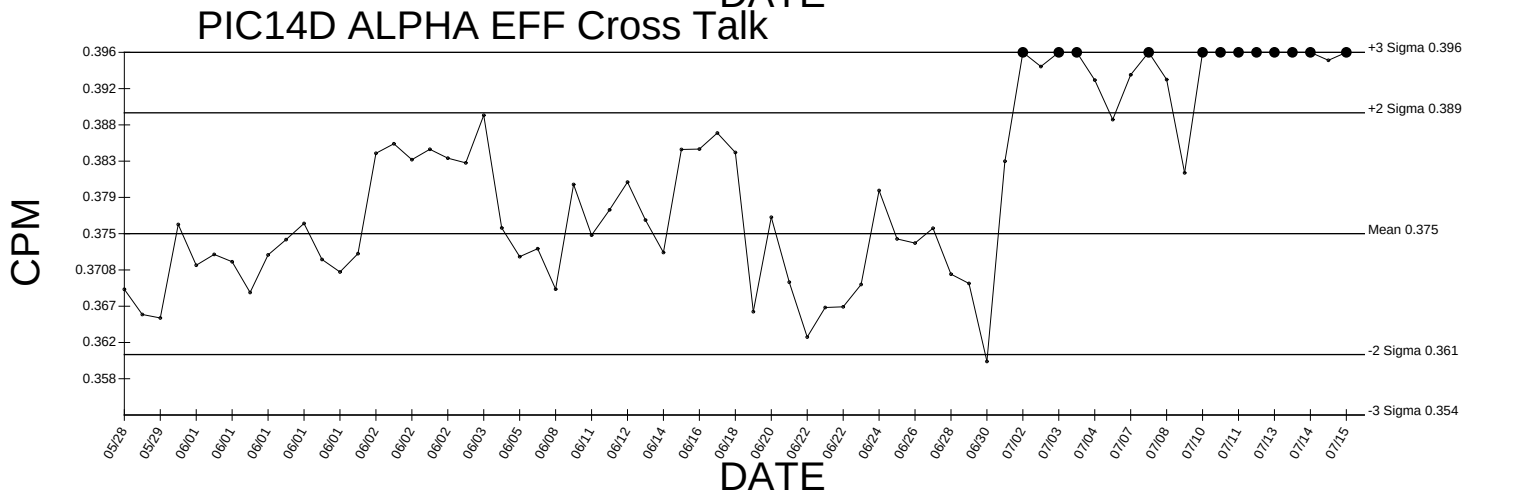




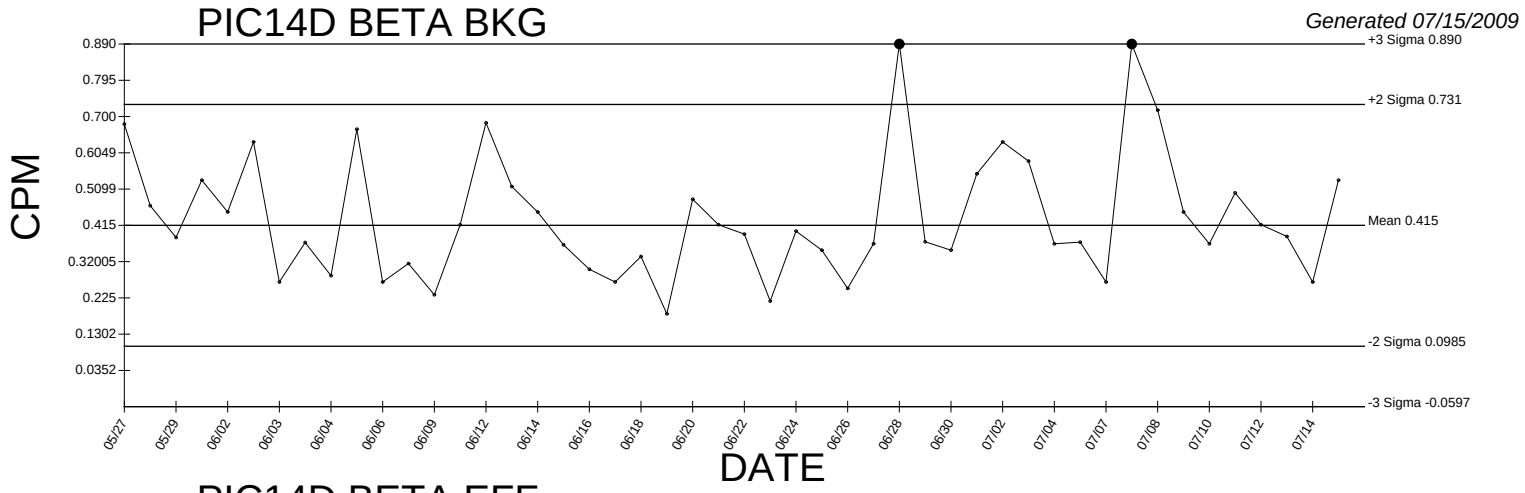
● Denotes Outlier

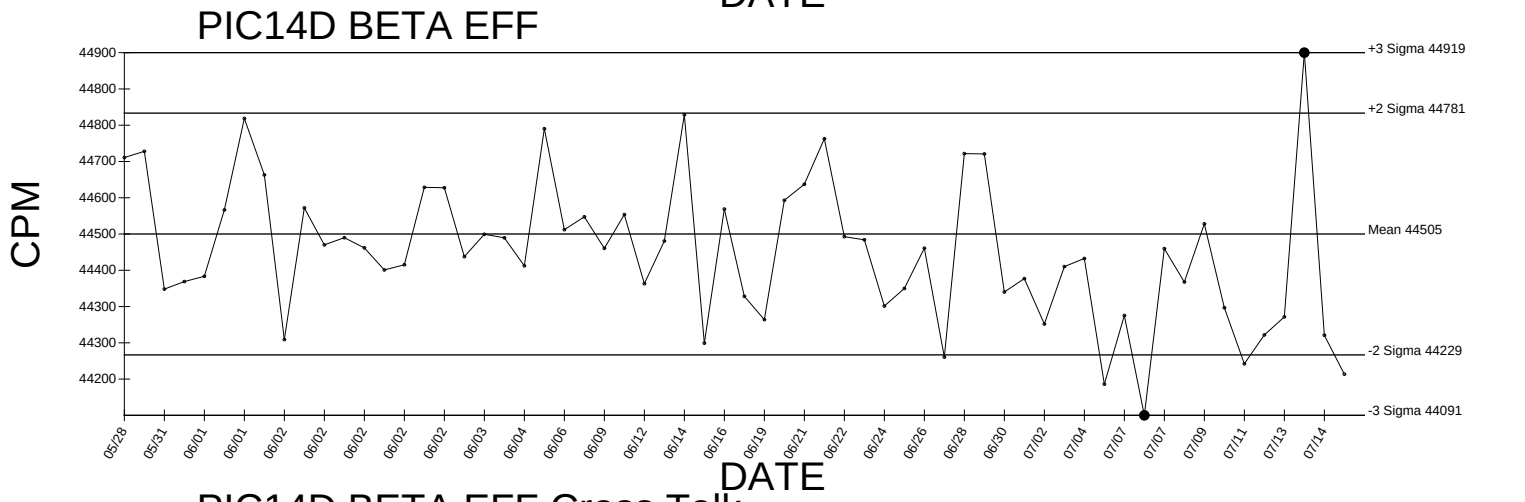


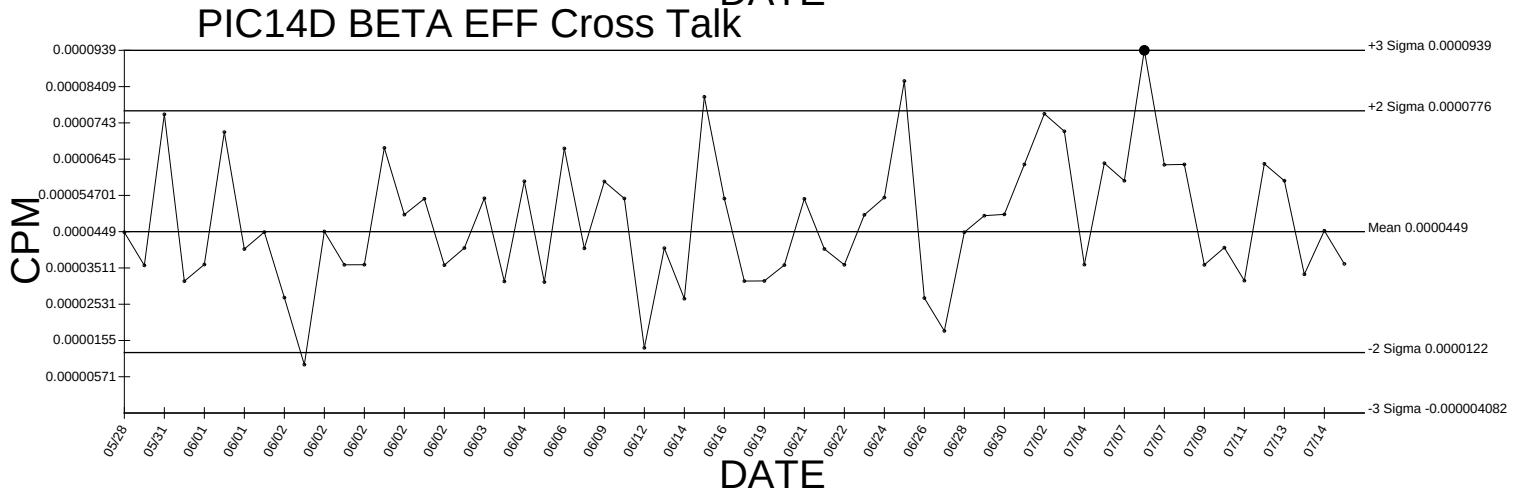




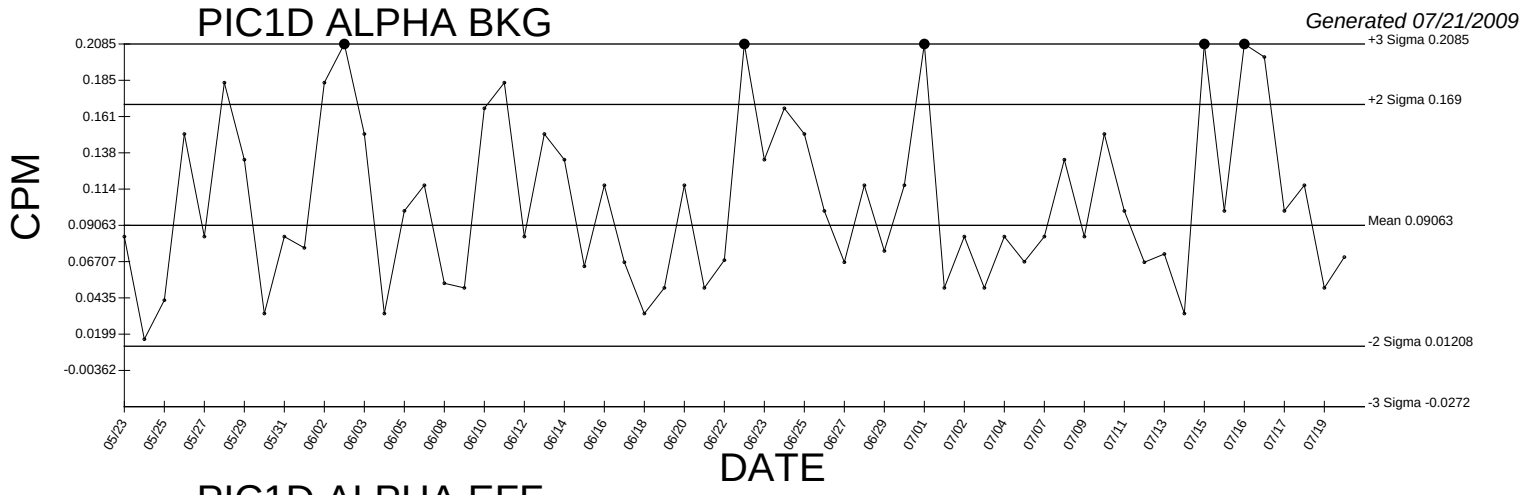
● Denotes Outlier

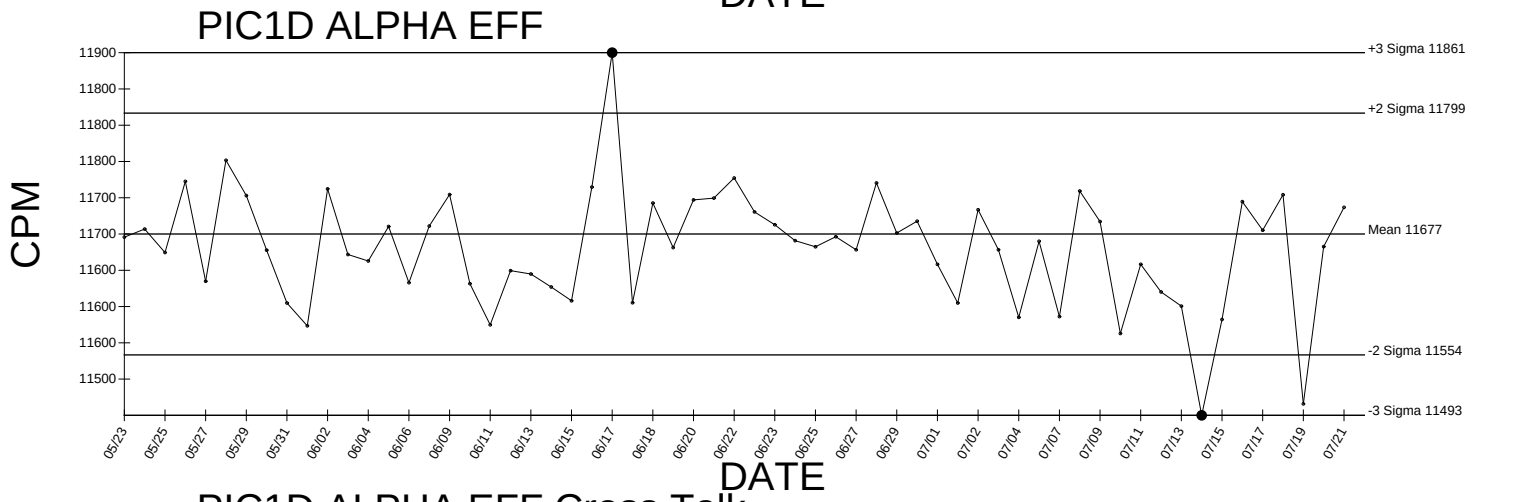


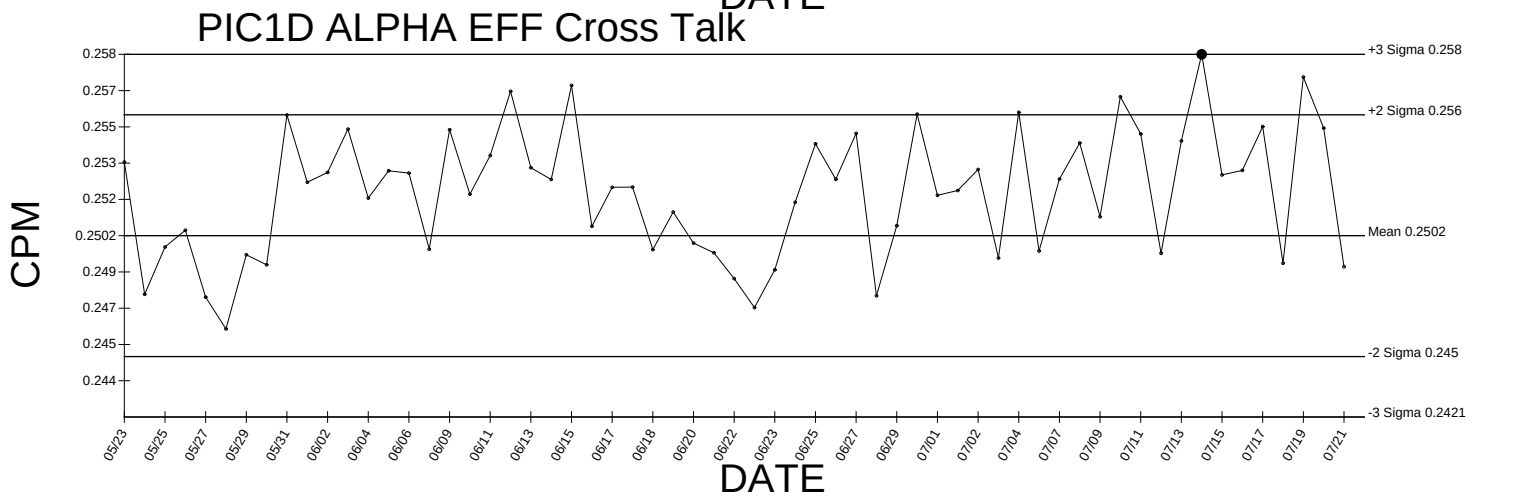




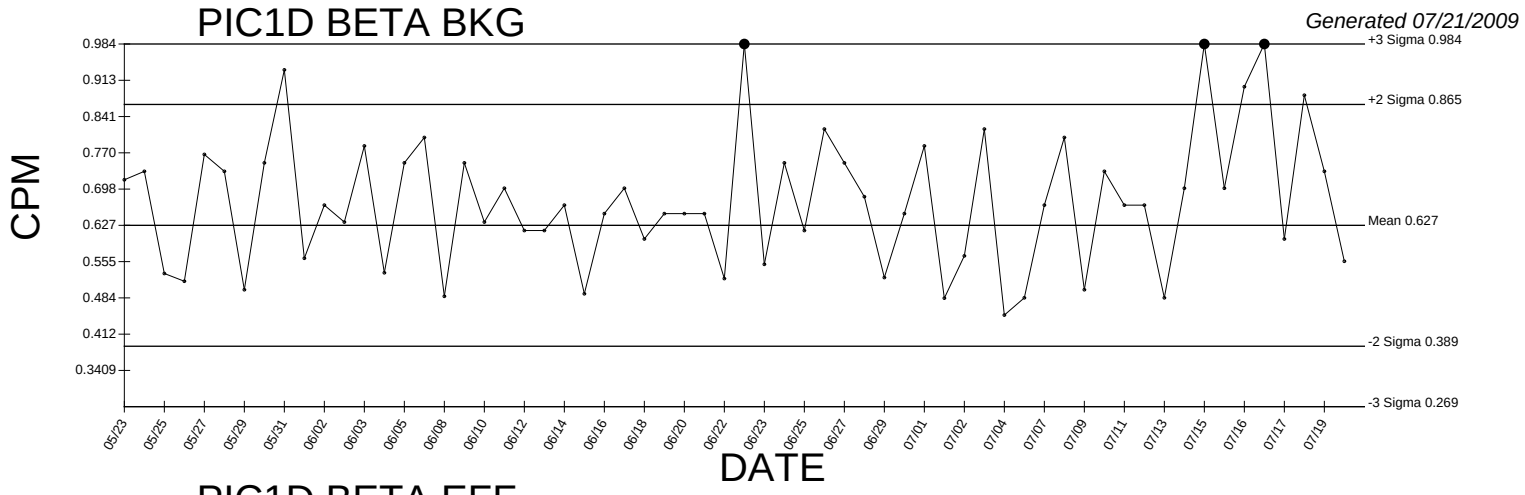
● Denotes Outlier

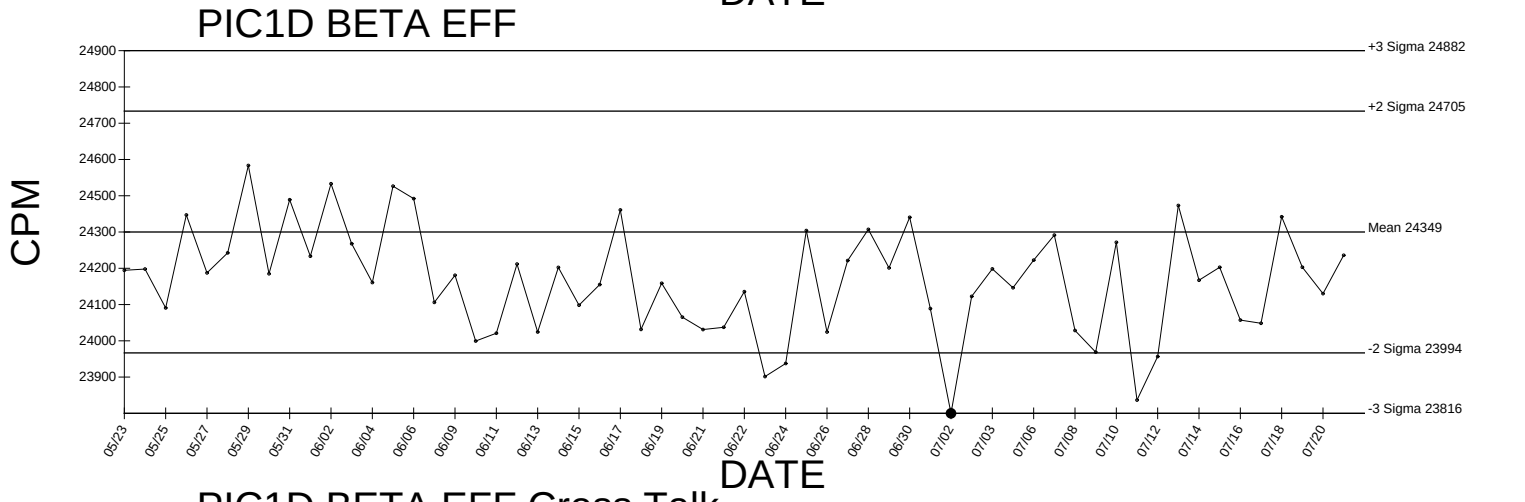


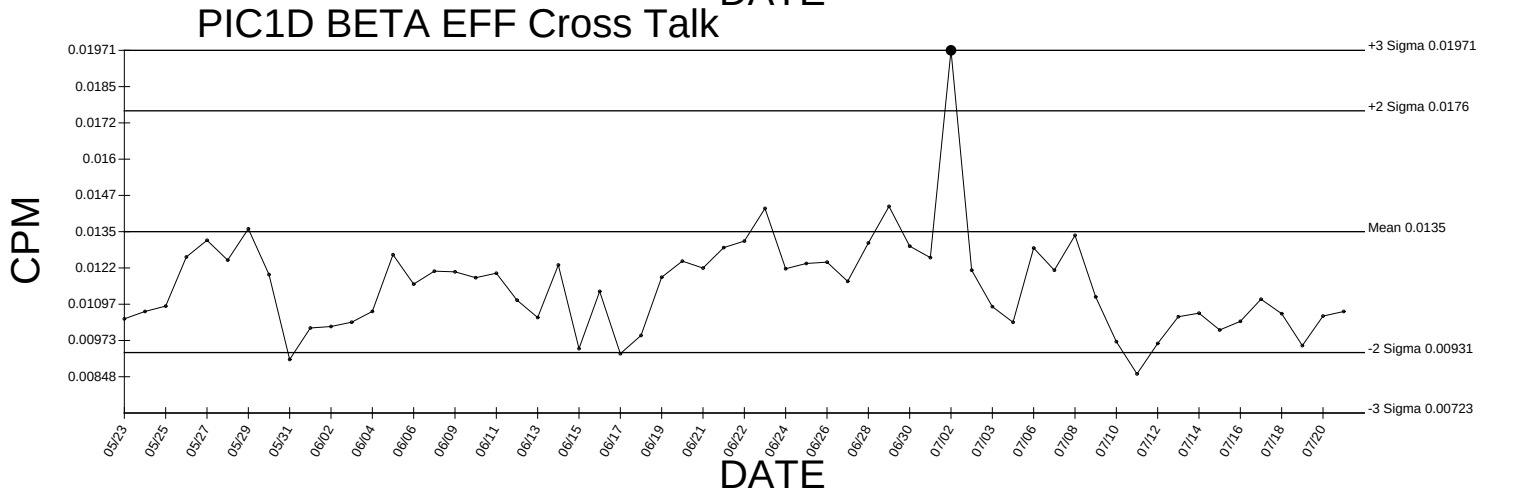




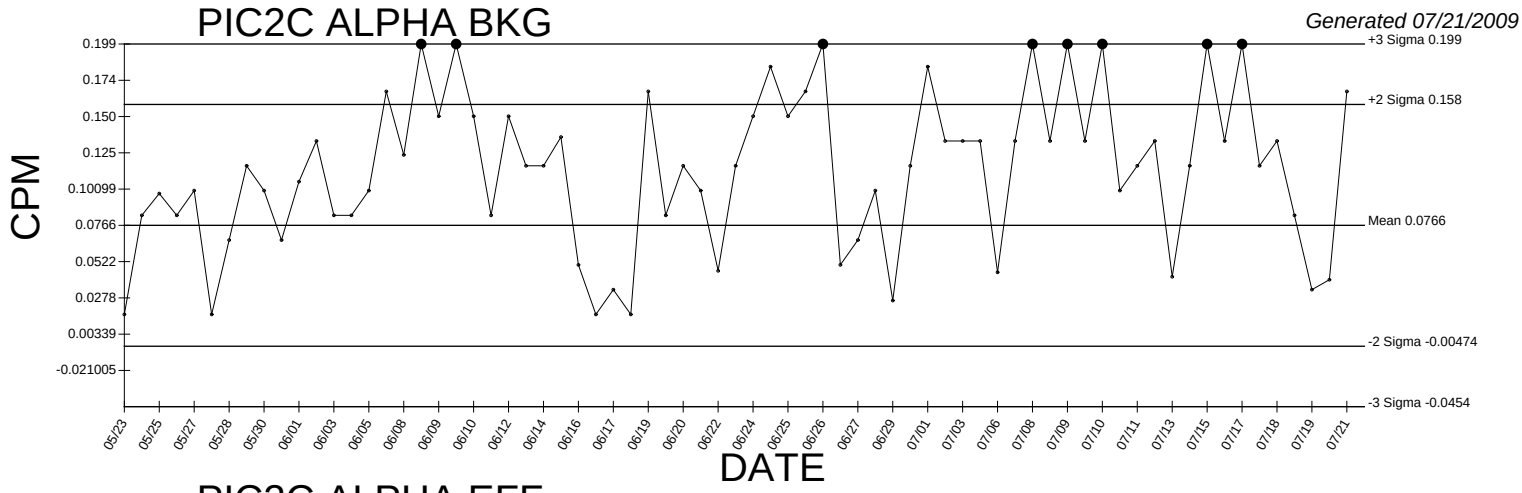
● Denotes Outlier

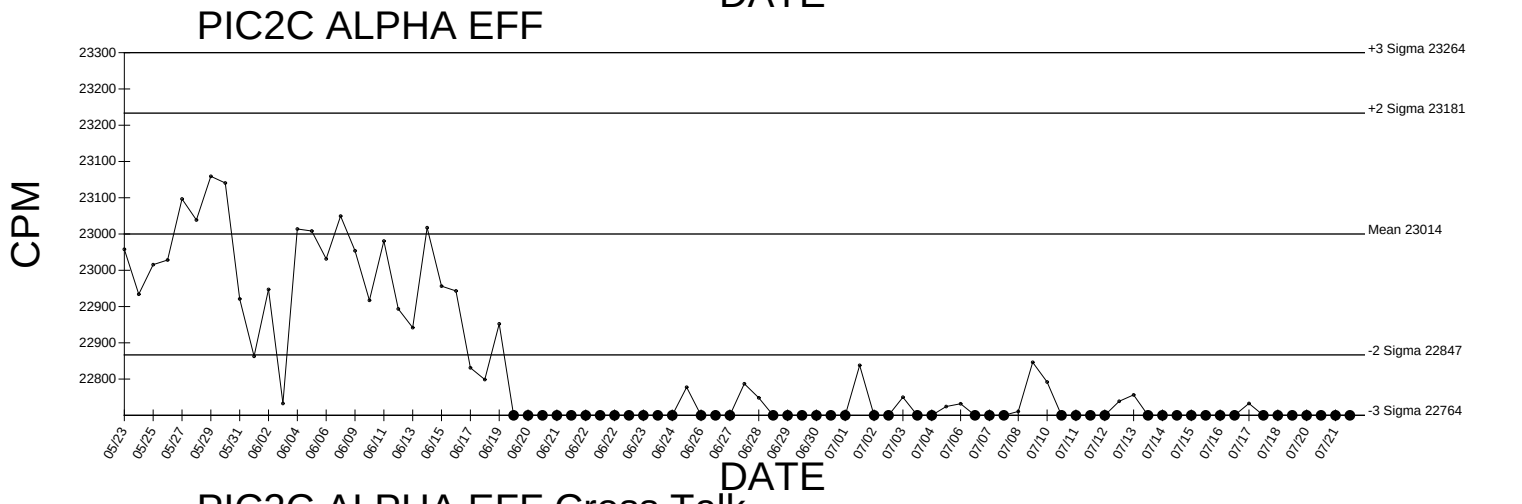


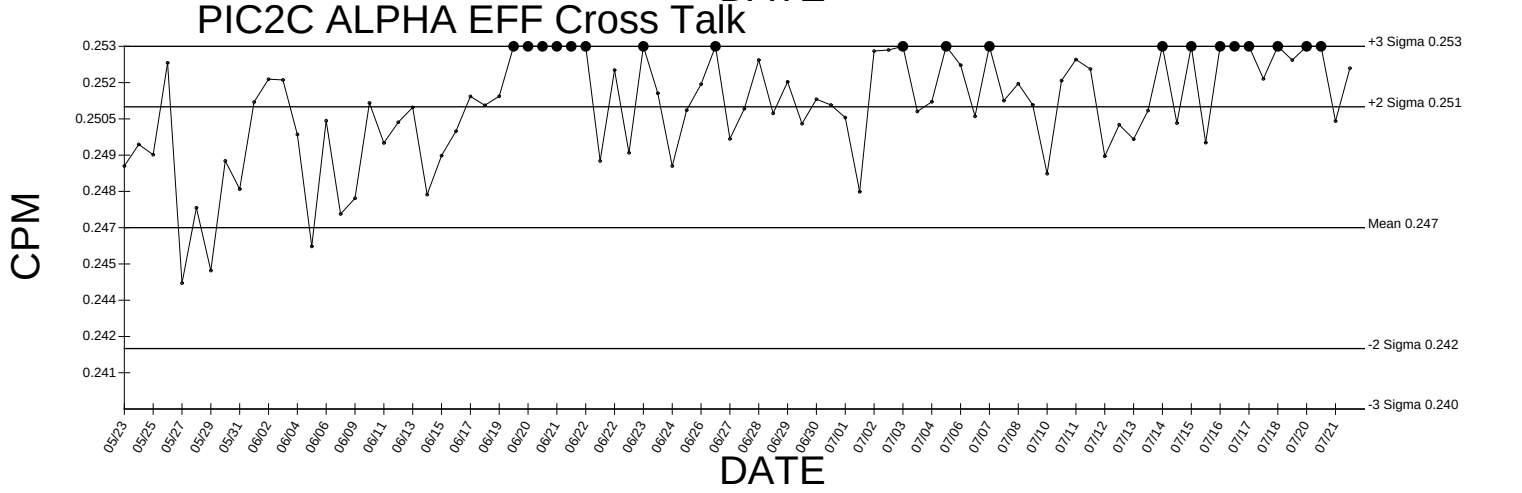




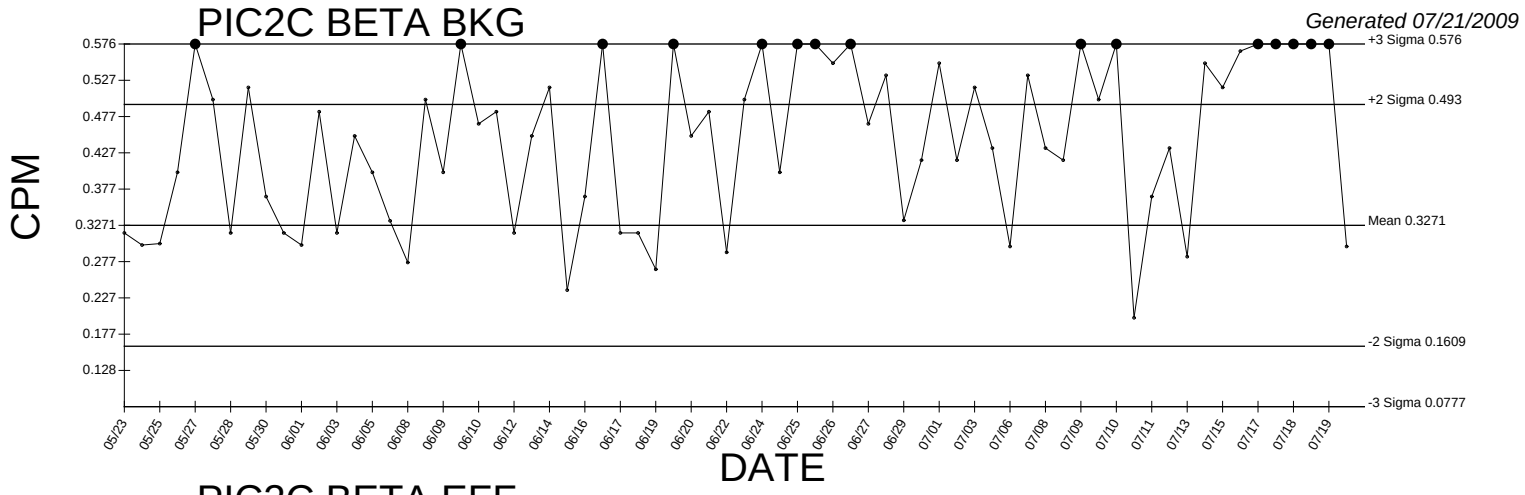
● Denotes Outlier

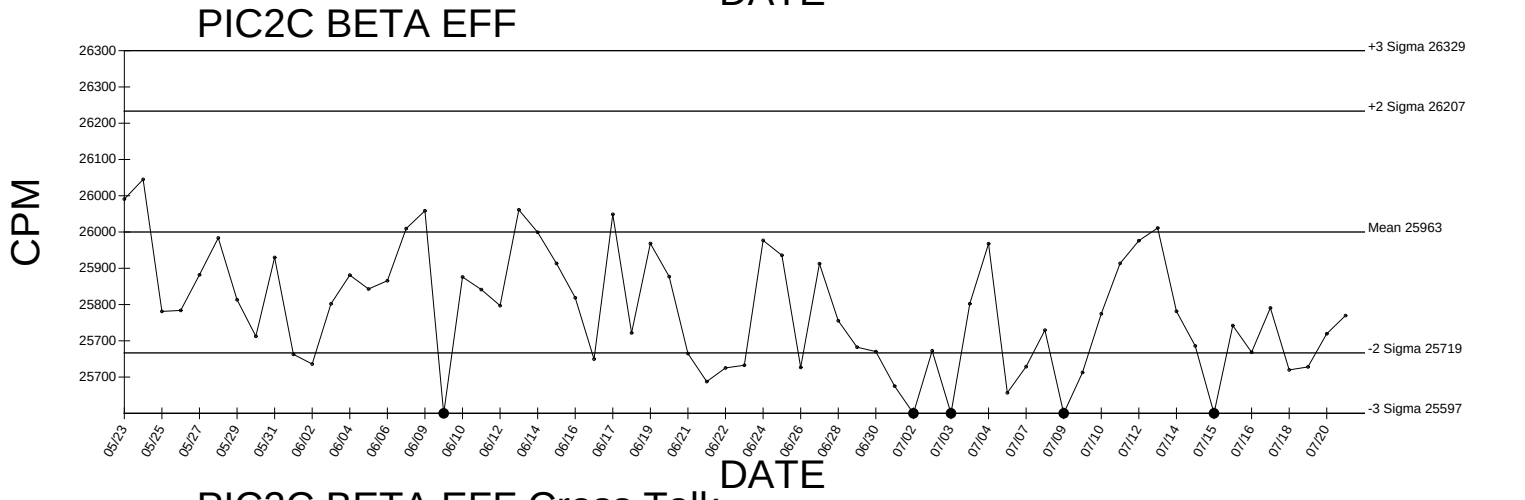


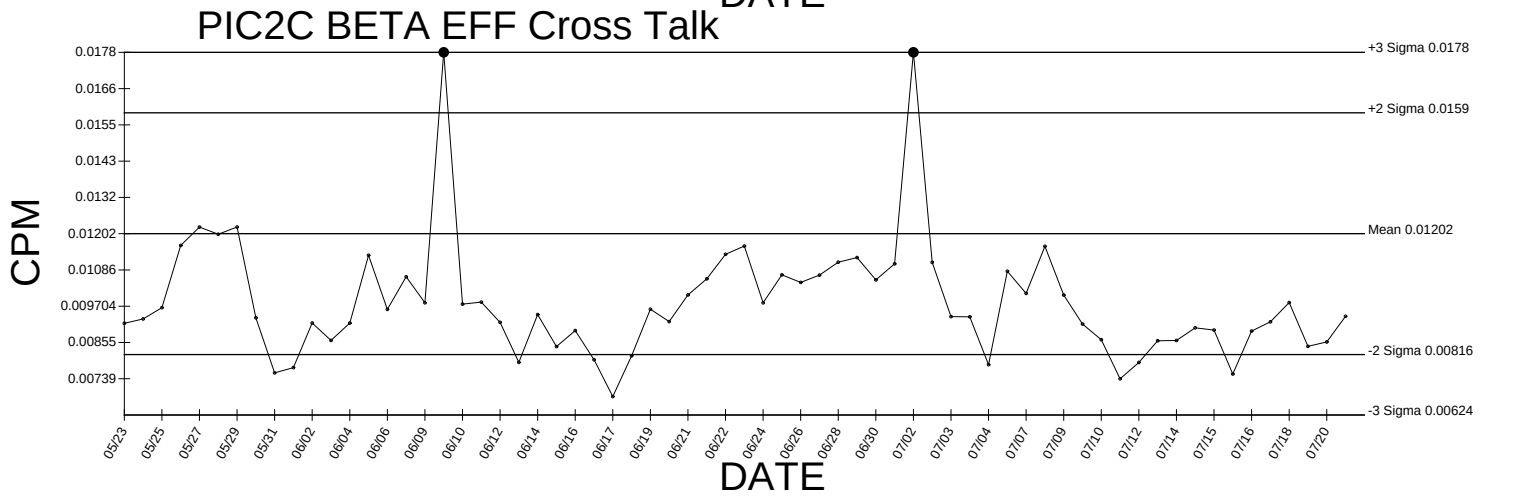




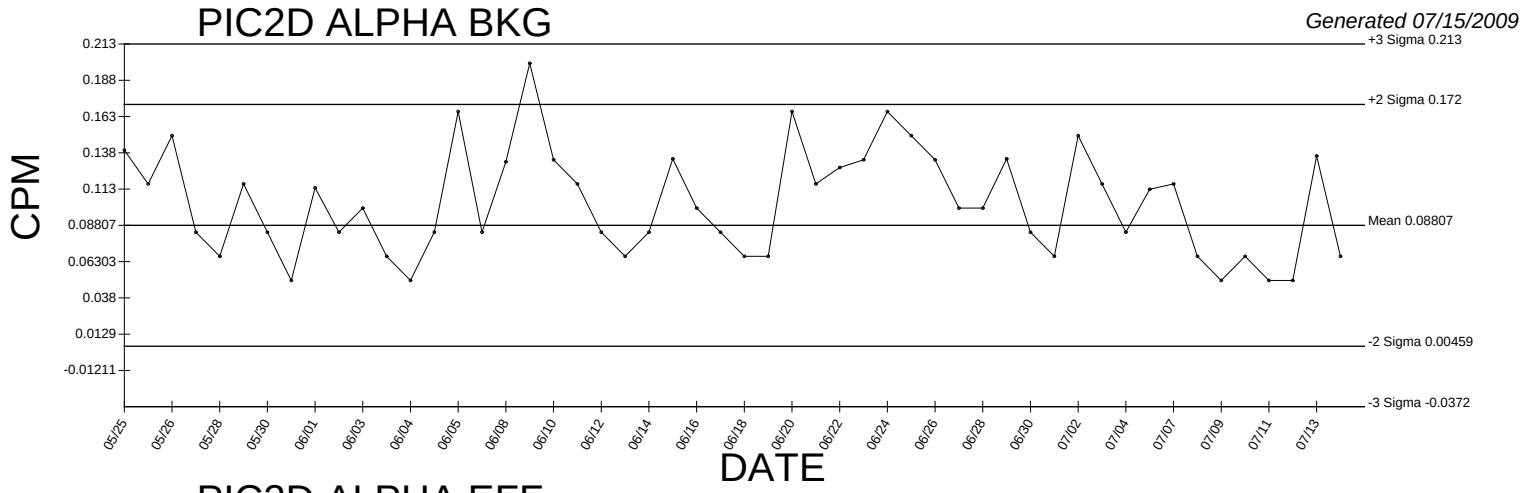
● Denotes Outlier

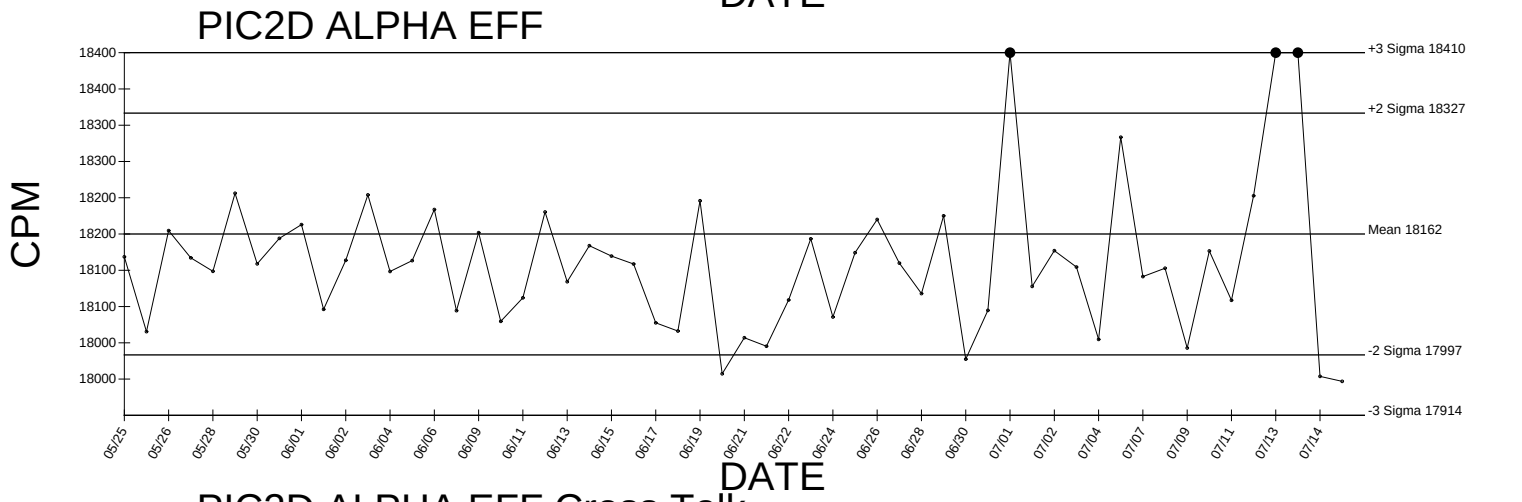


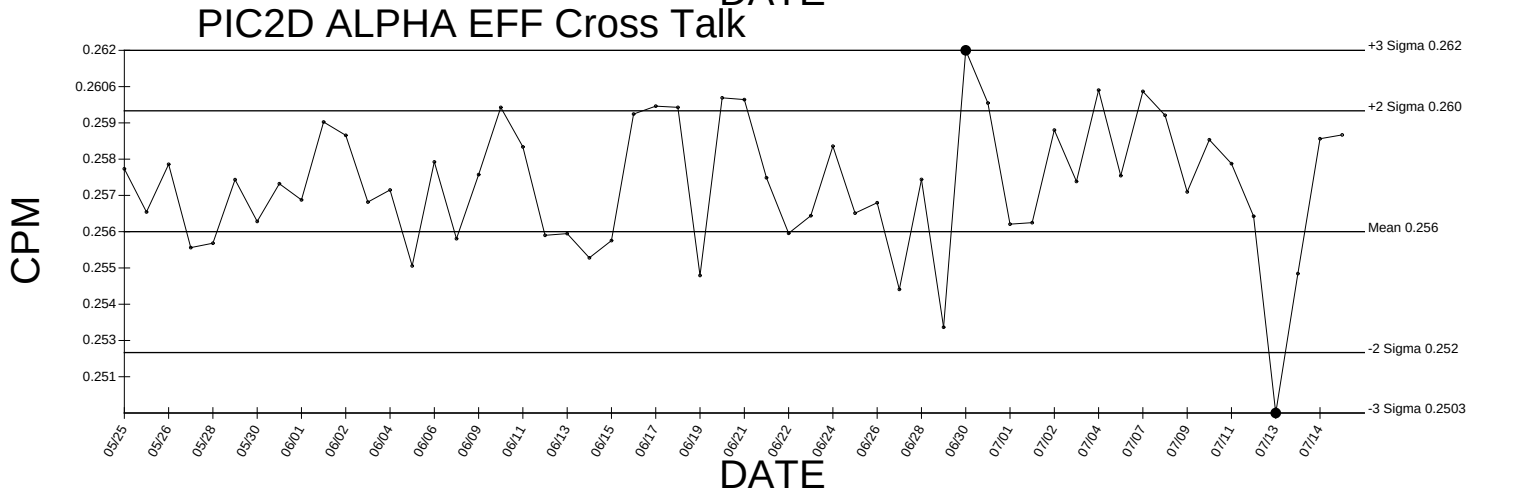




● Denotes Outlier

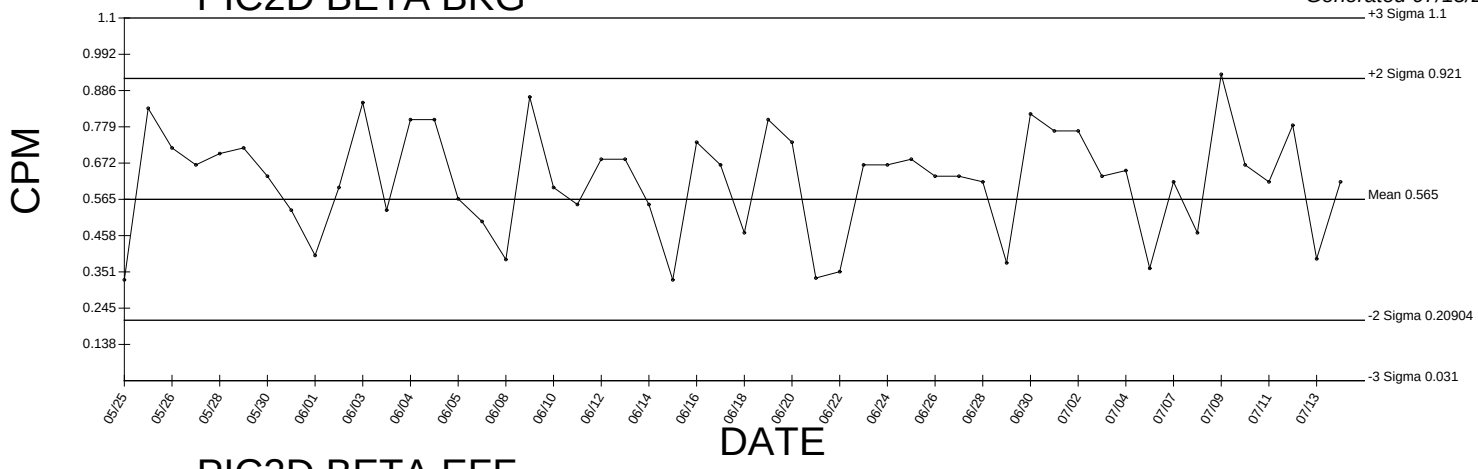




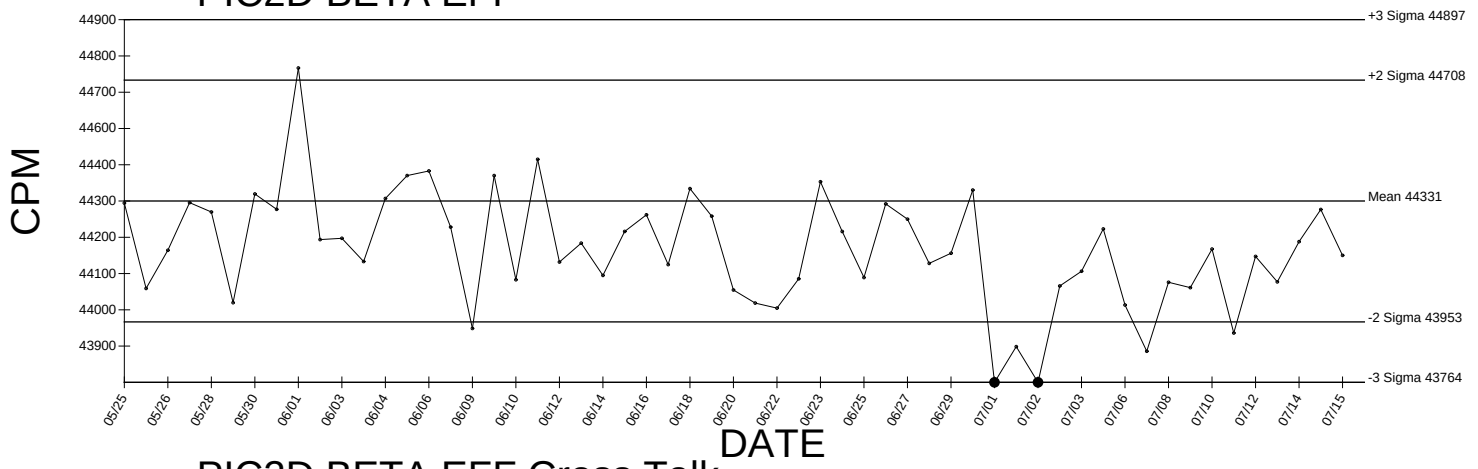


● Denotes Outlier

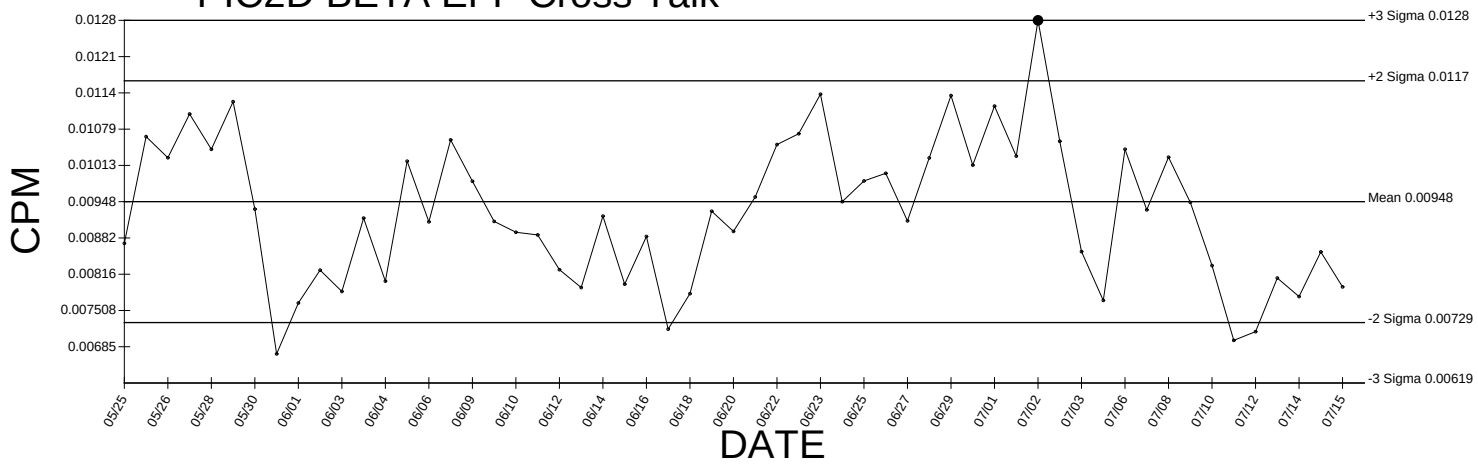
PIC2D BETA BKG



PIC2D BETA EFF

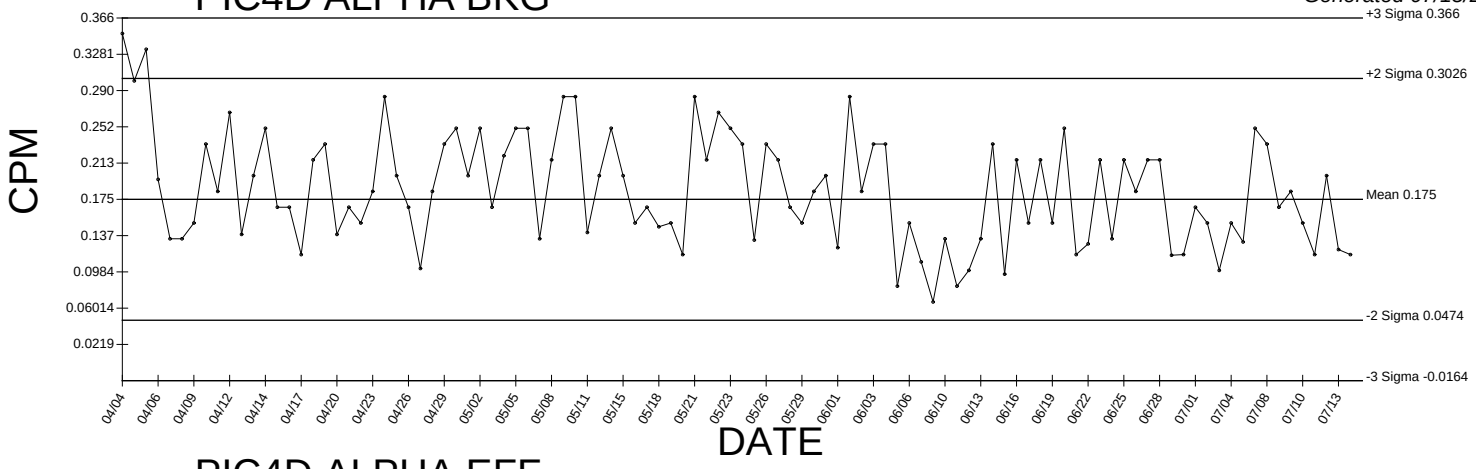


PIC2D BETA EFF Cross Talk

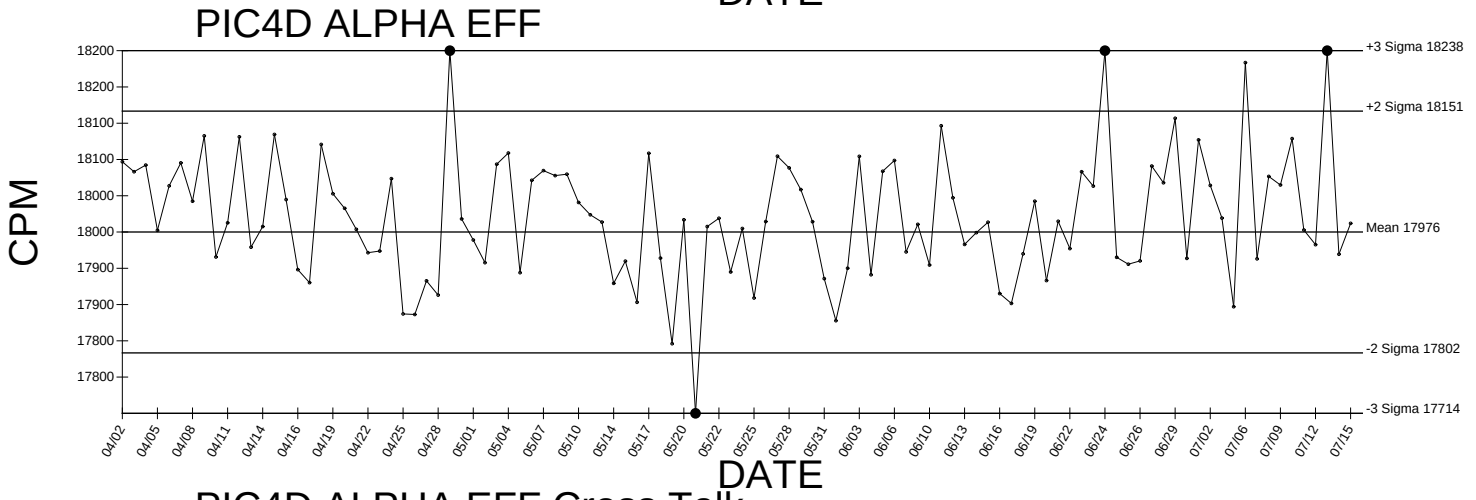


● Denotes Outlier

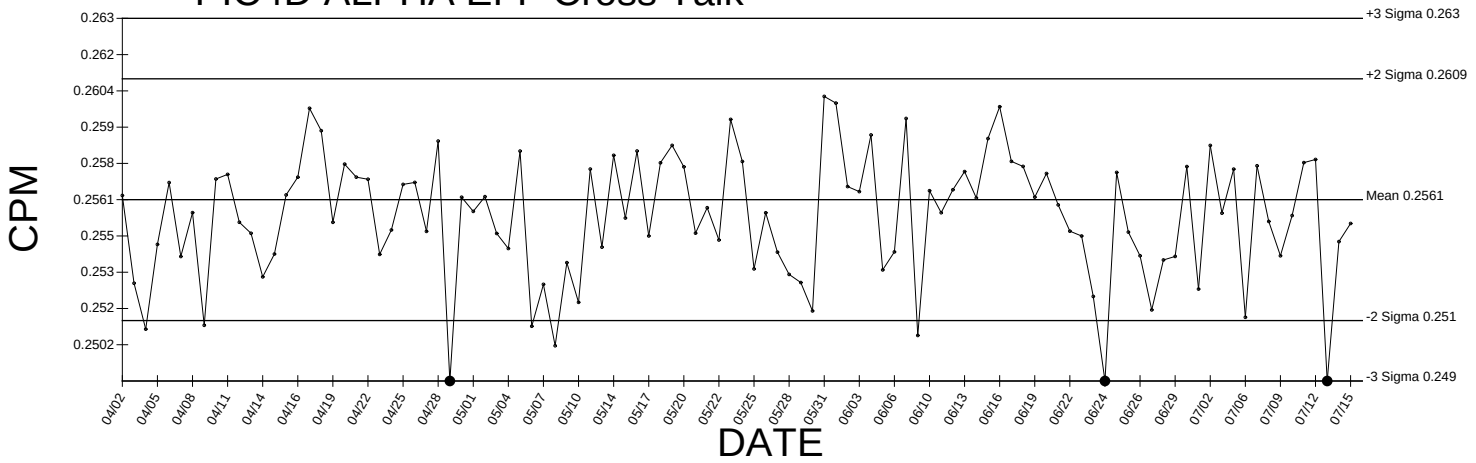
PIC4D ALPHA BKG



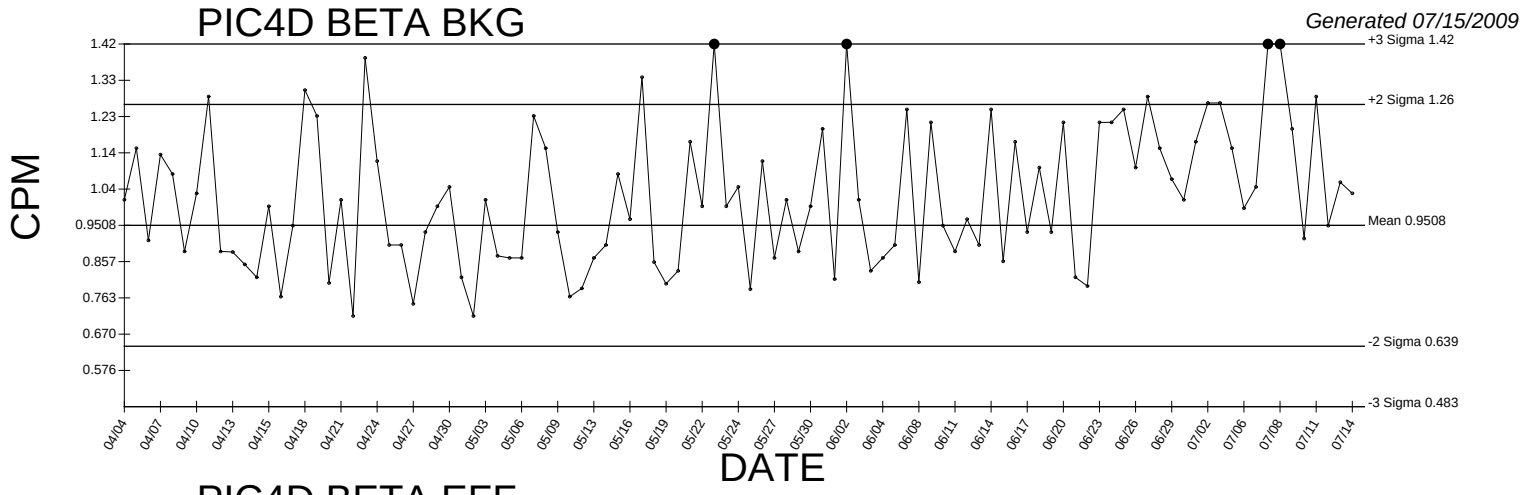
PIC4D ALPHA EFF

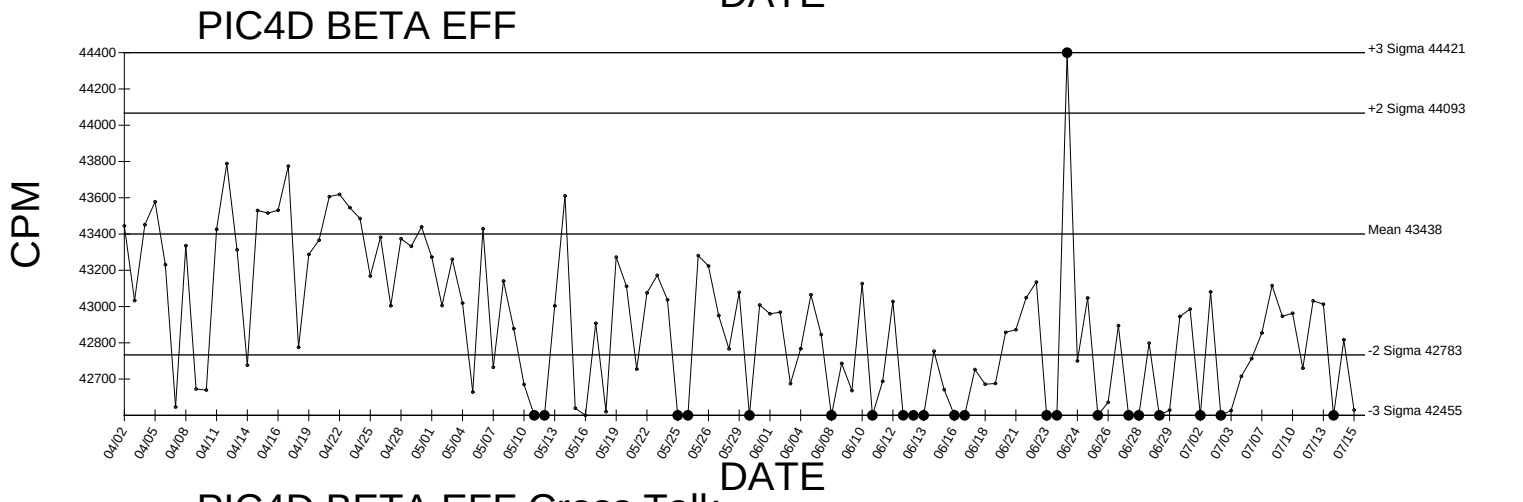


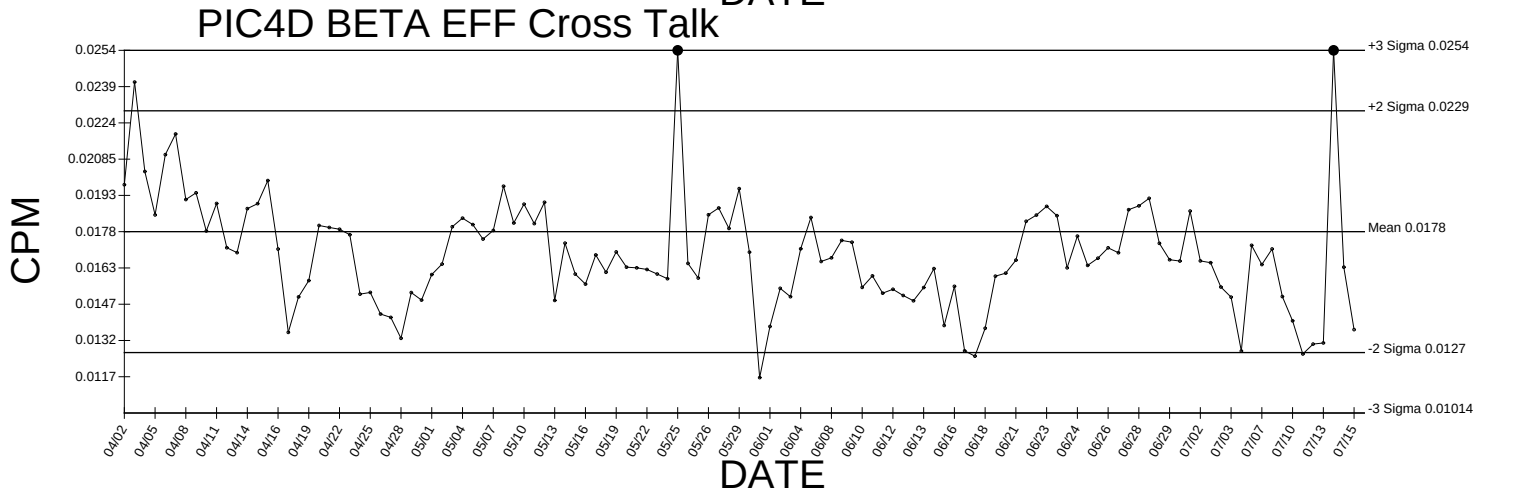
PIC4D ALPHA EFF Cross Talk



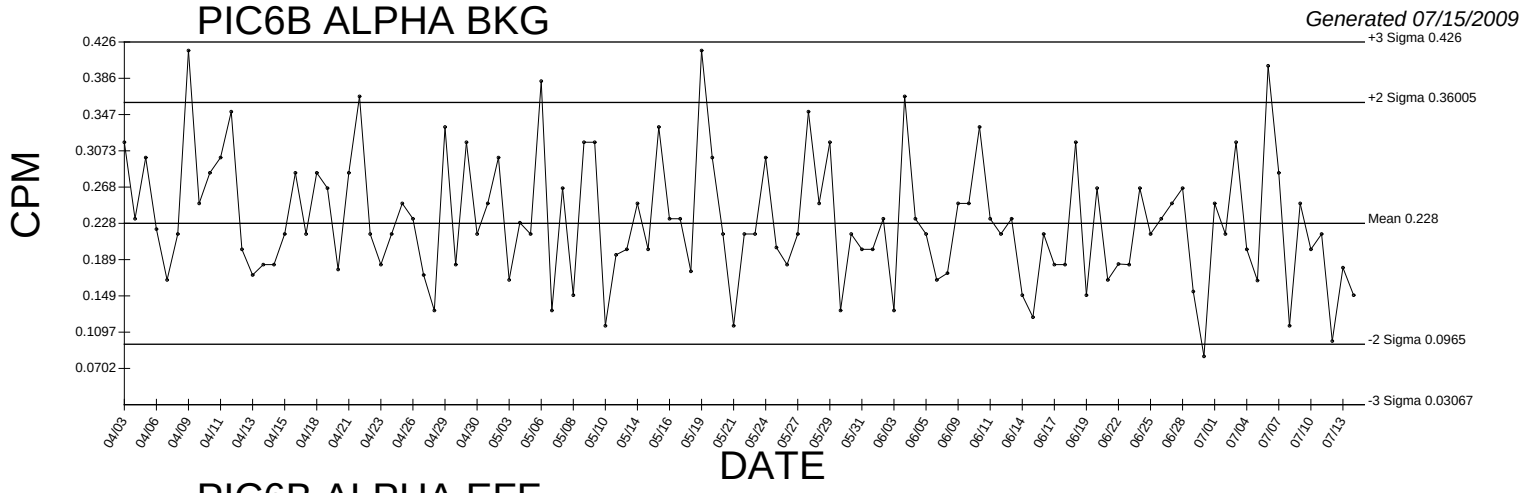
● Denotes Outlier

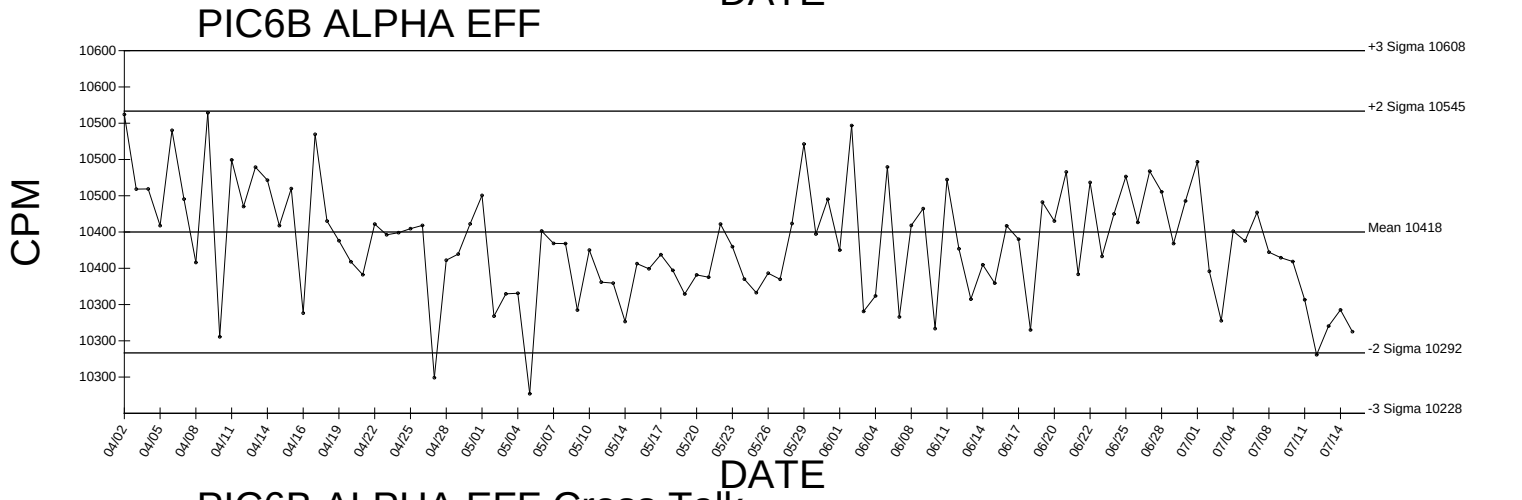


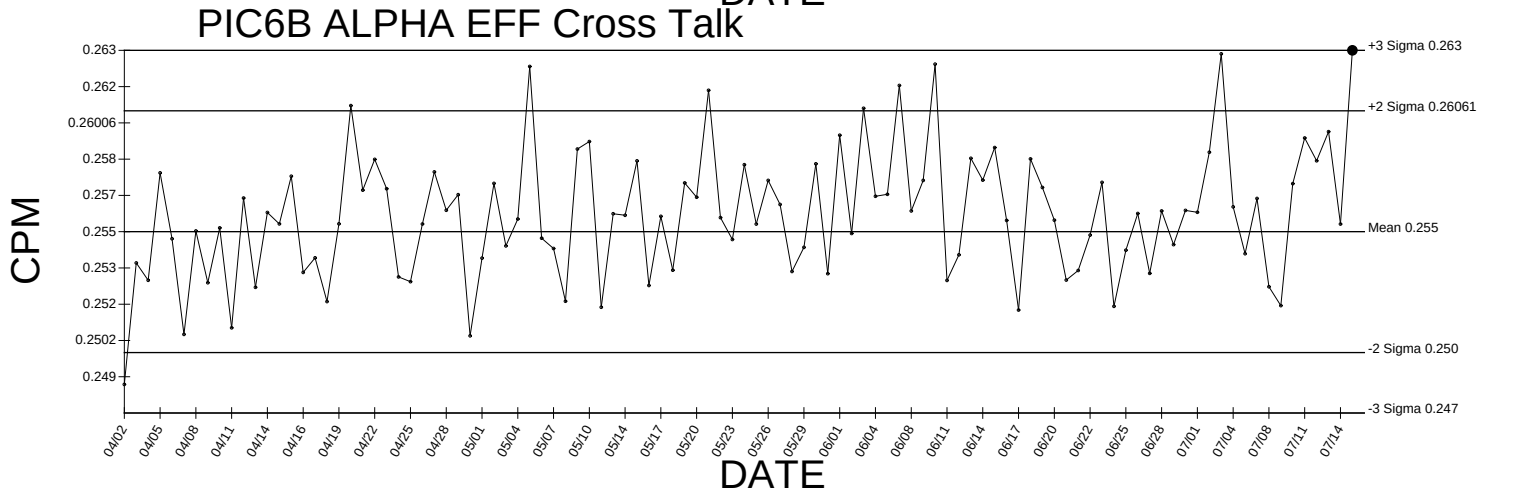




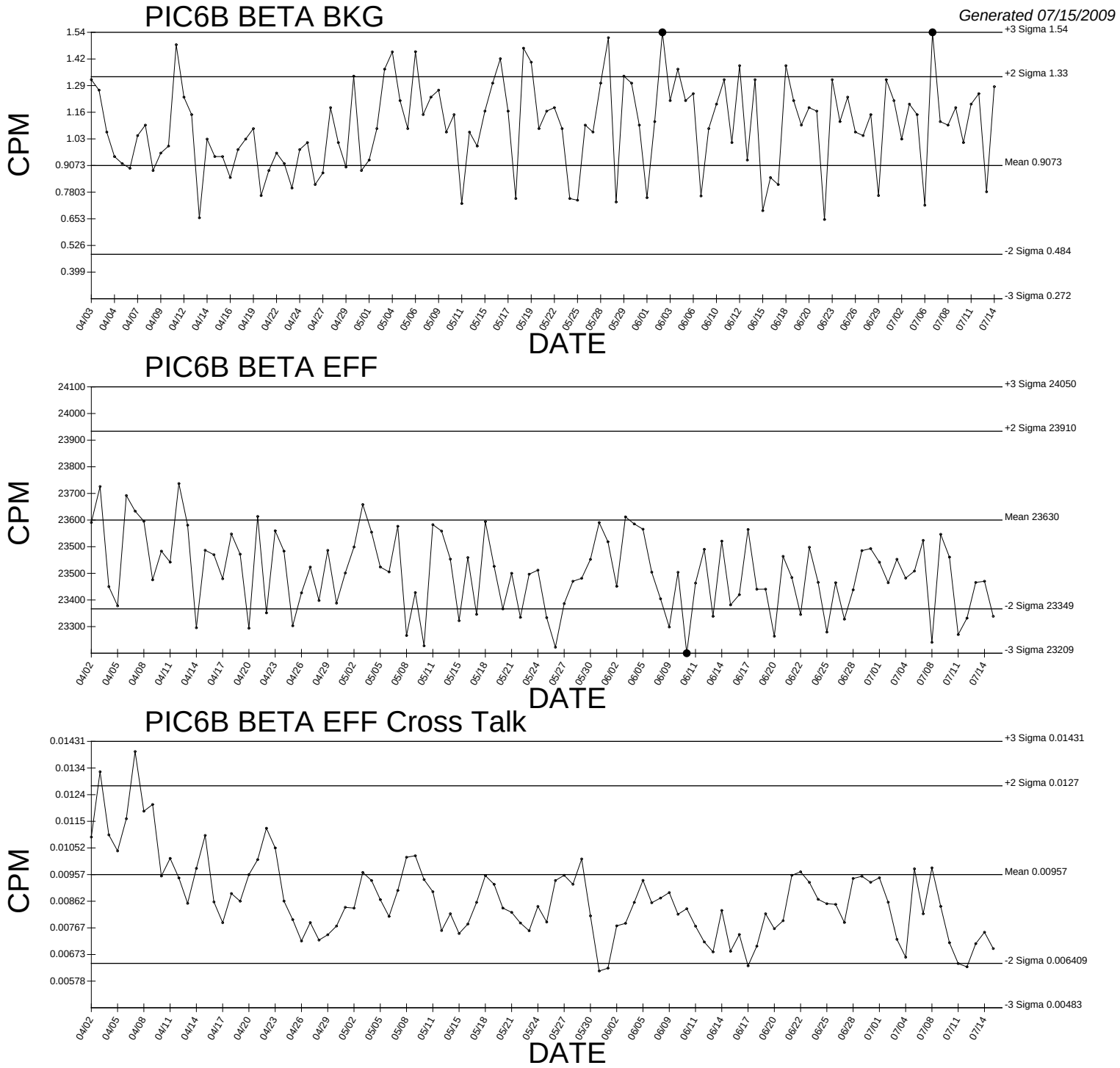
● Denotes Outlier



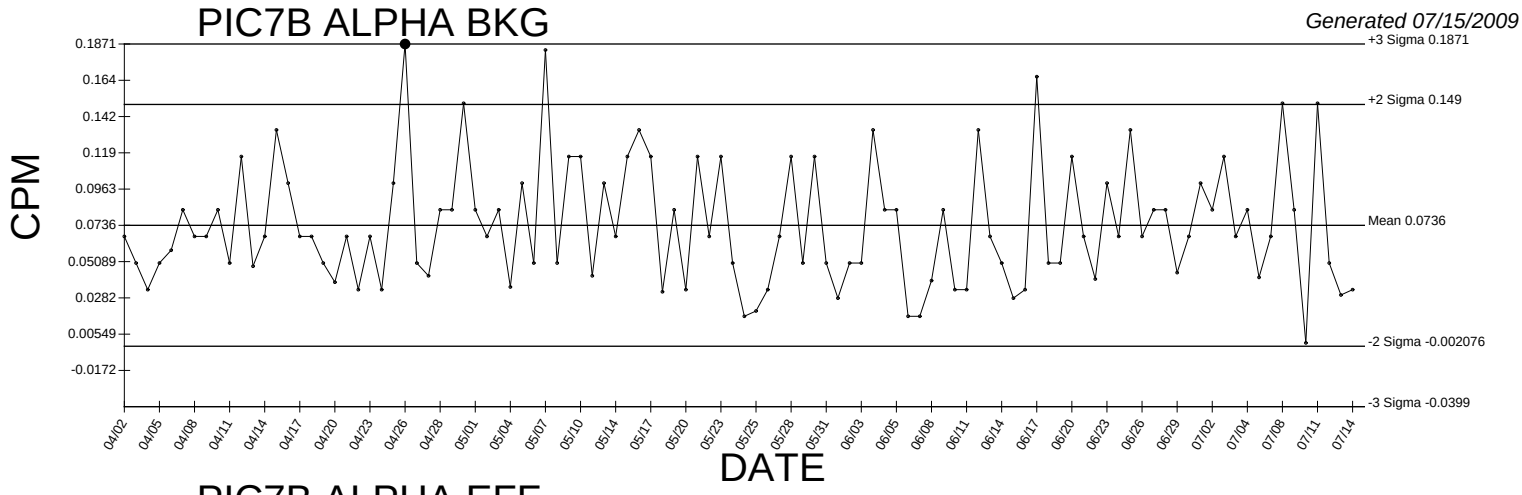


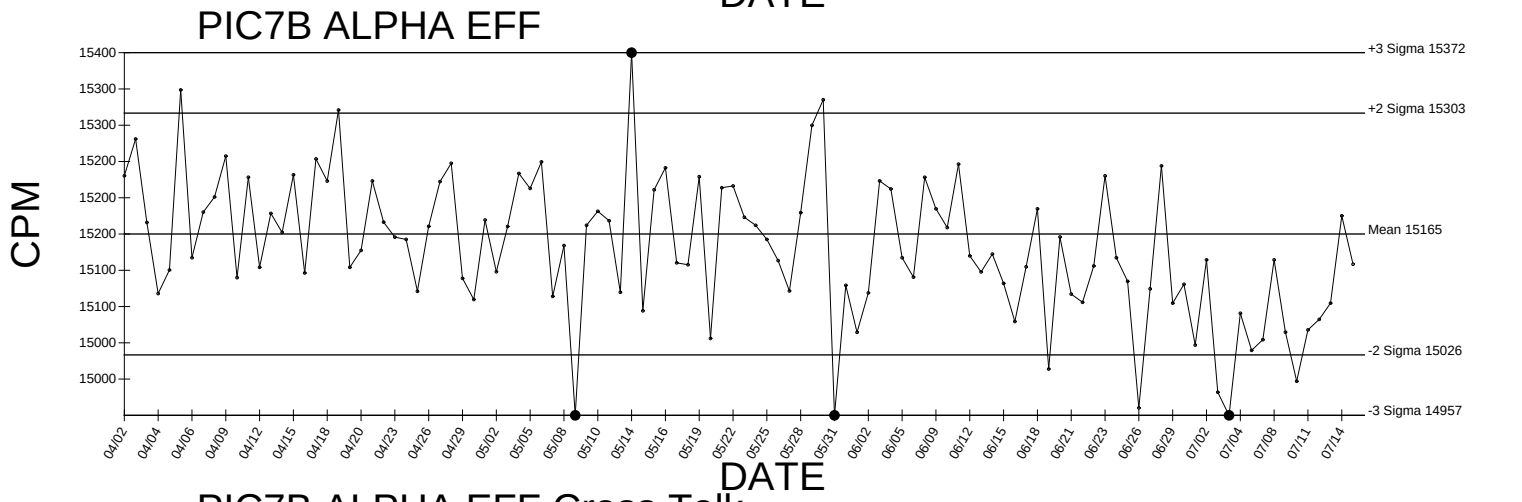


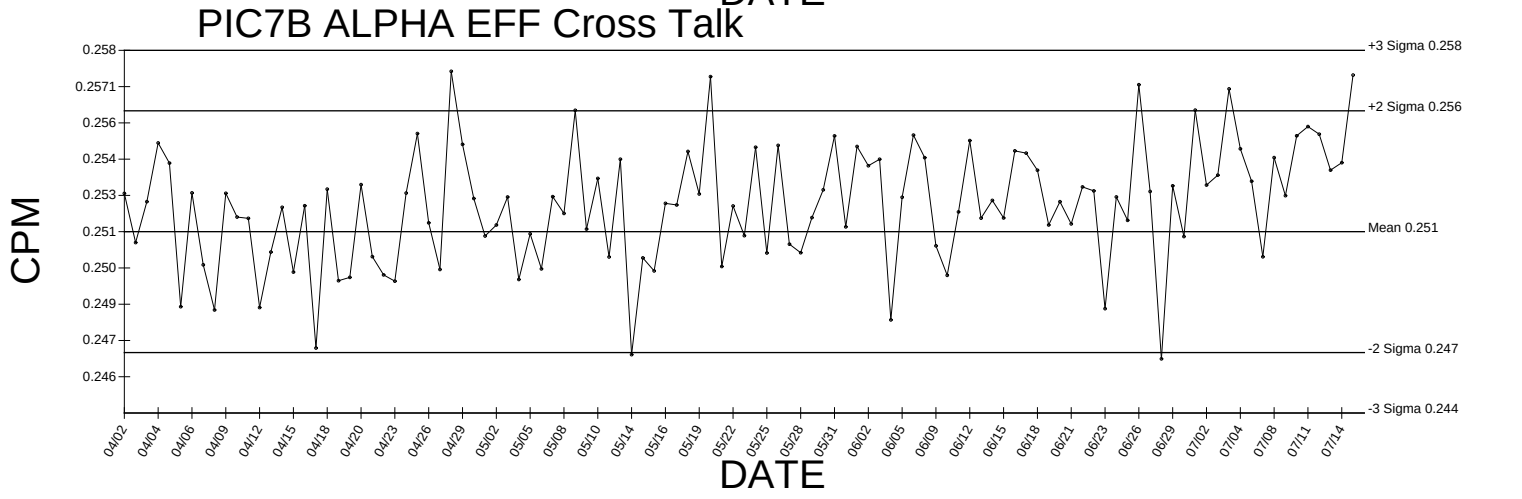
● Denotes Outlier



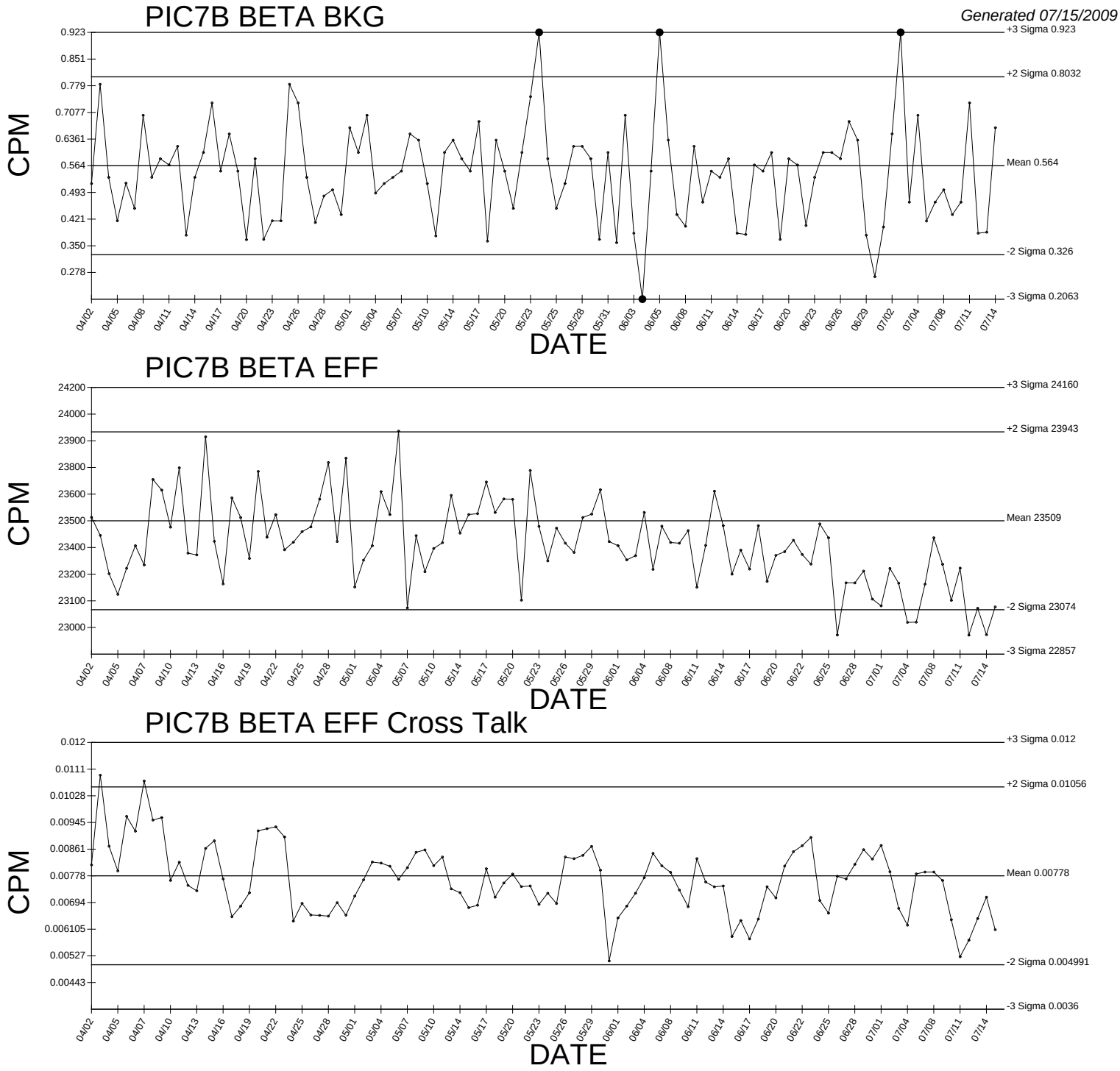
● Denotes Outlier



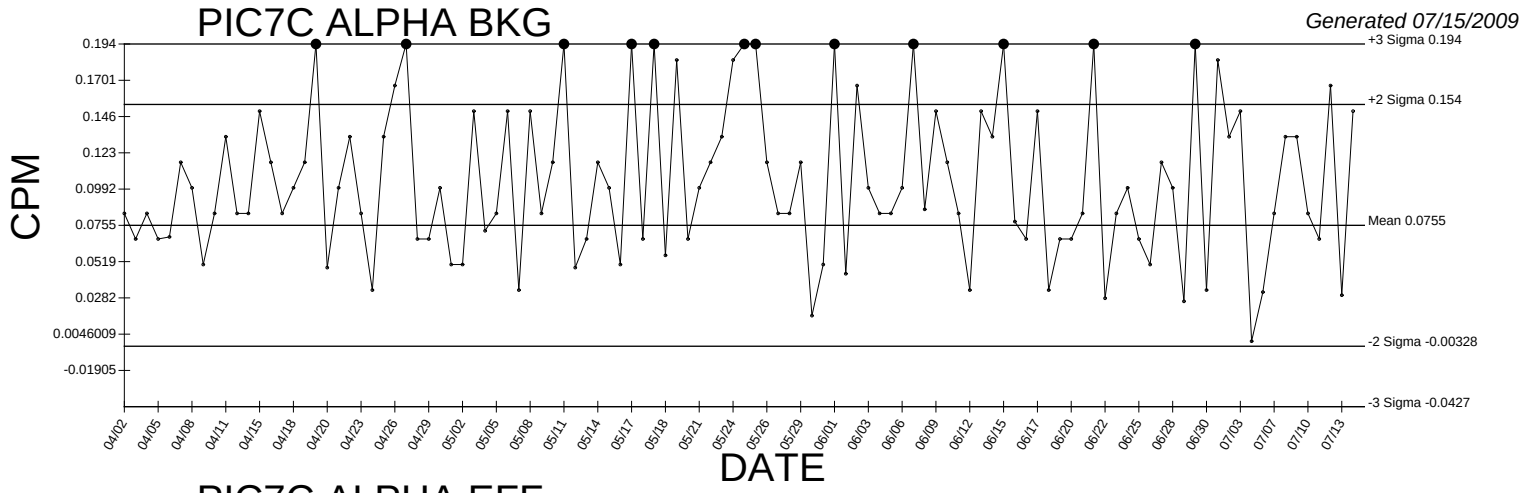


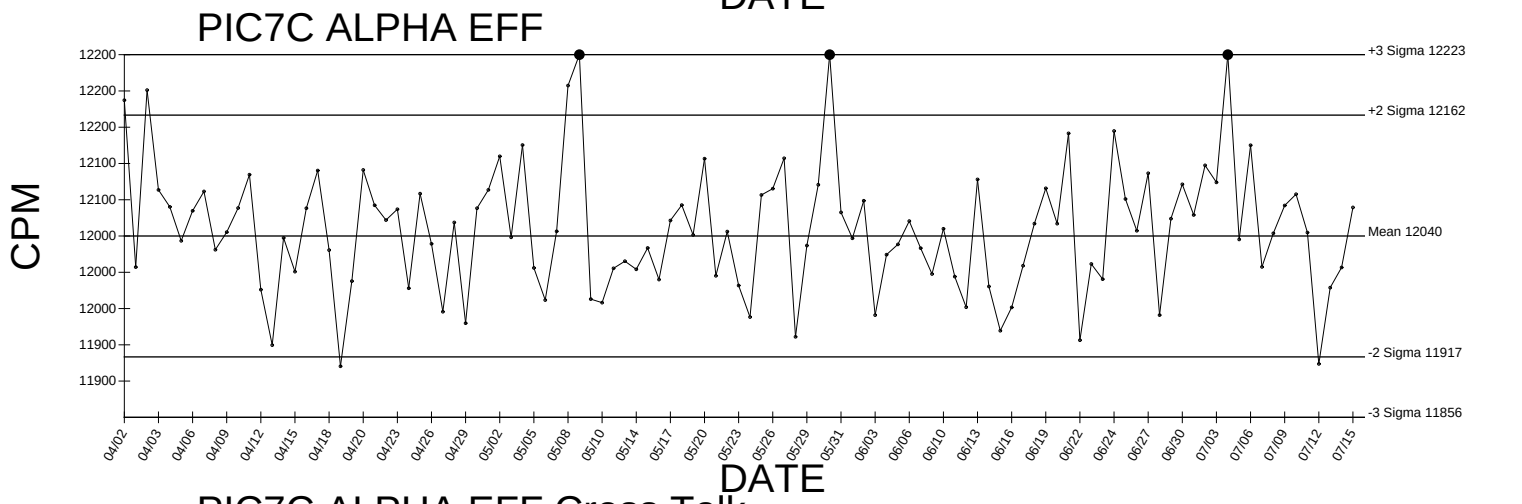


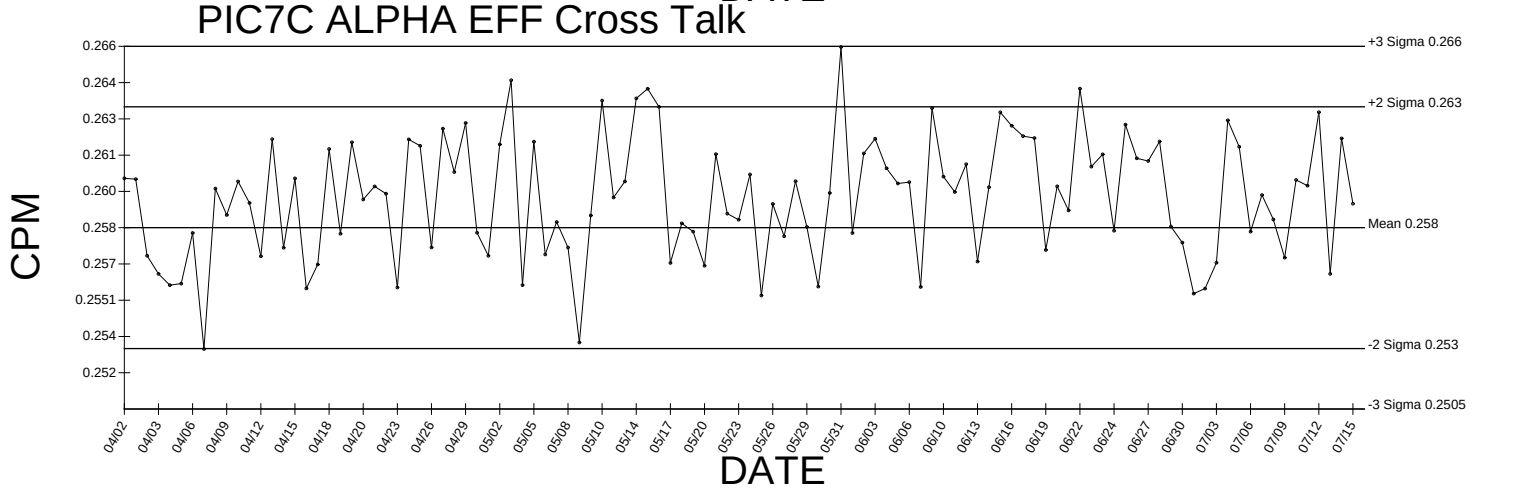
● Denotes Outlier



● Denotes Outlier

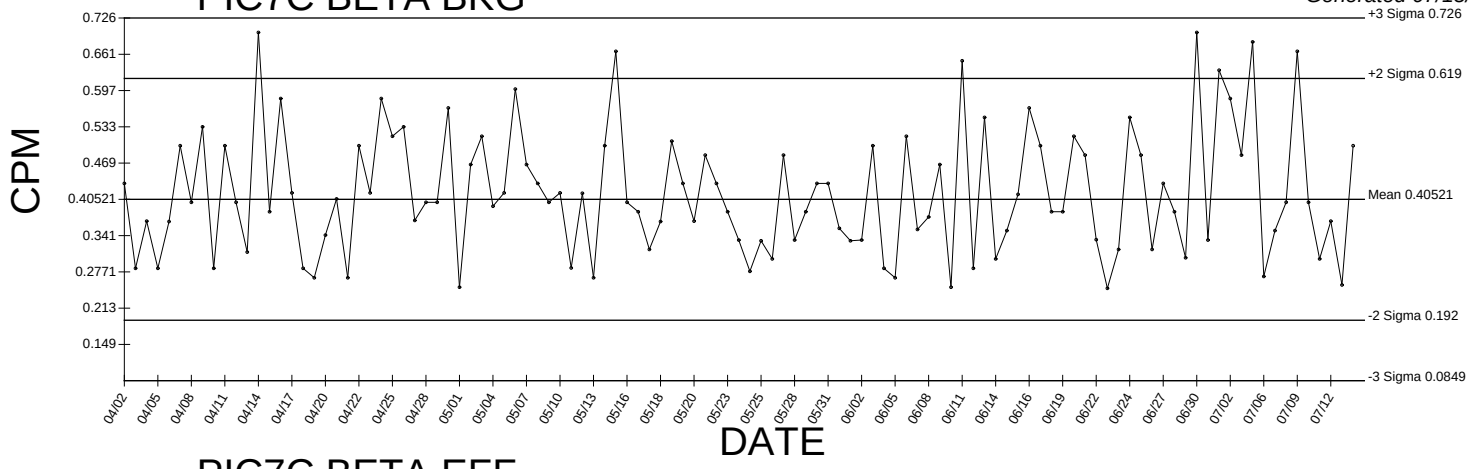




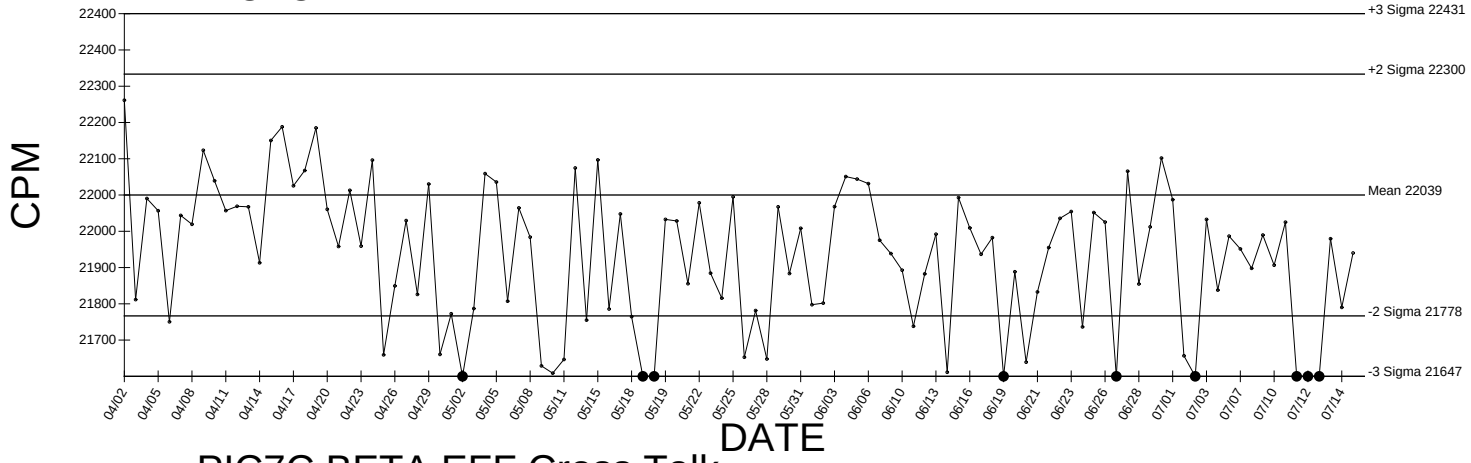


● Denotes Outlier

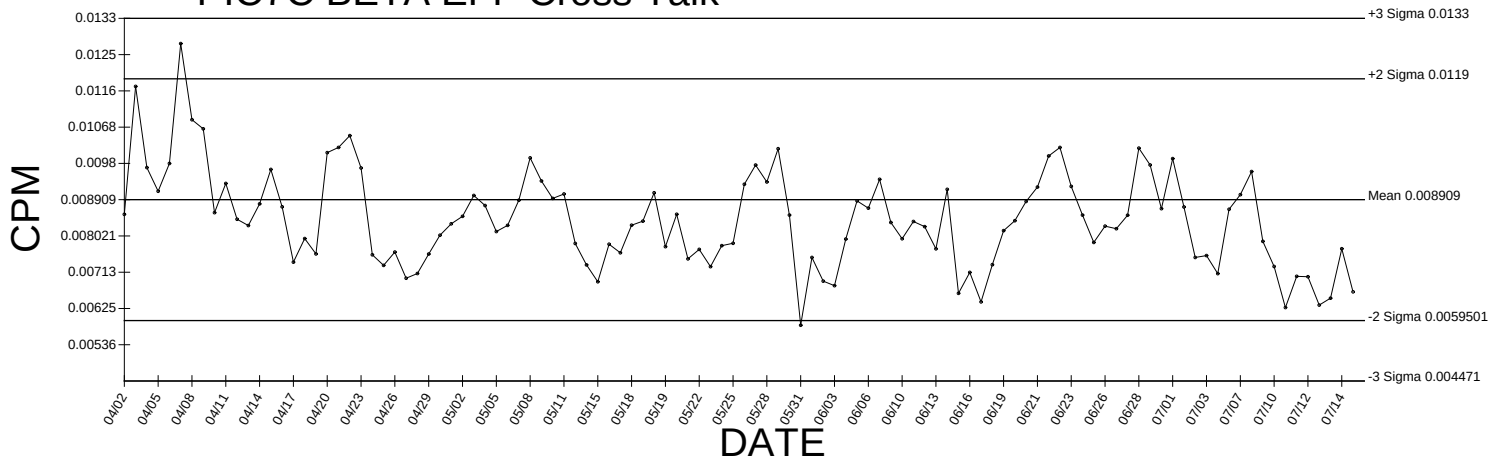
PIC7C BETA BKG



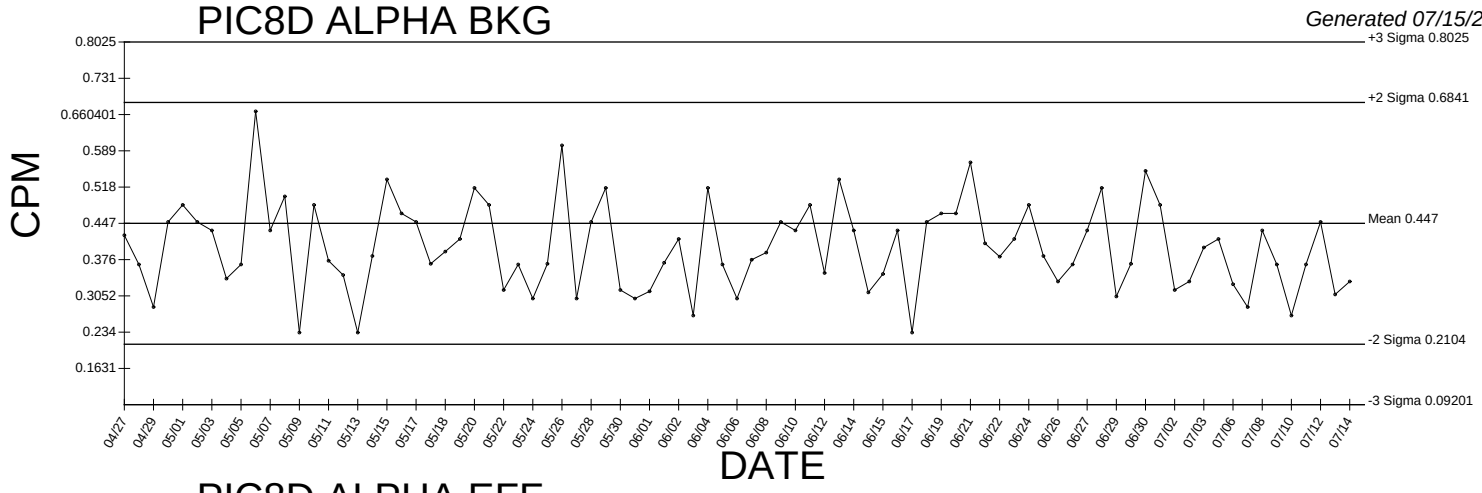
PIC7C BETA EFF

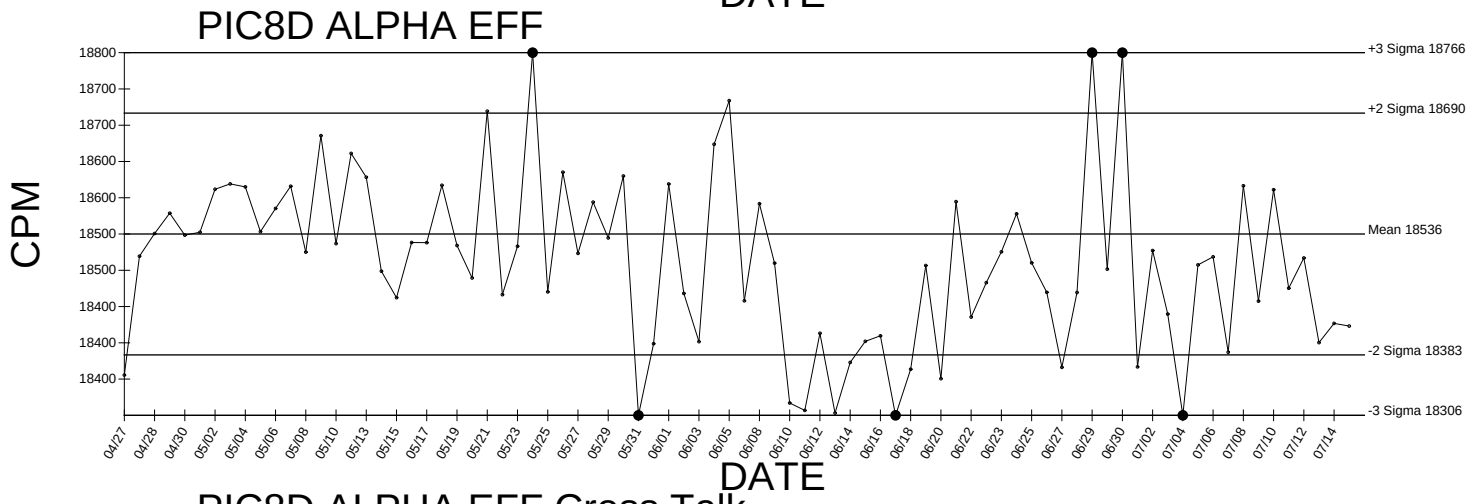


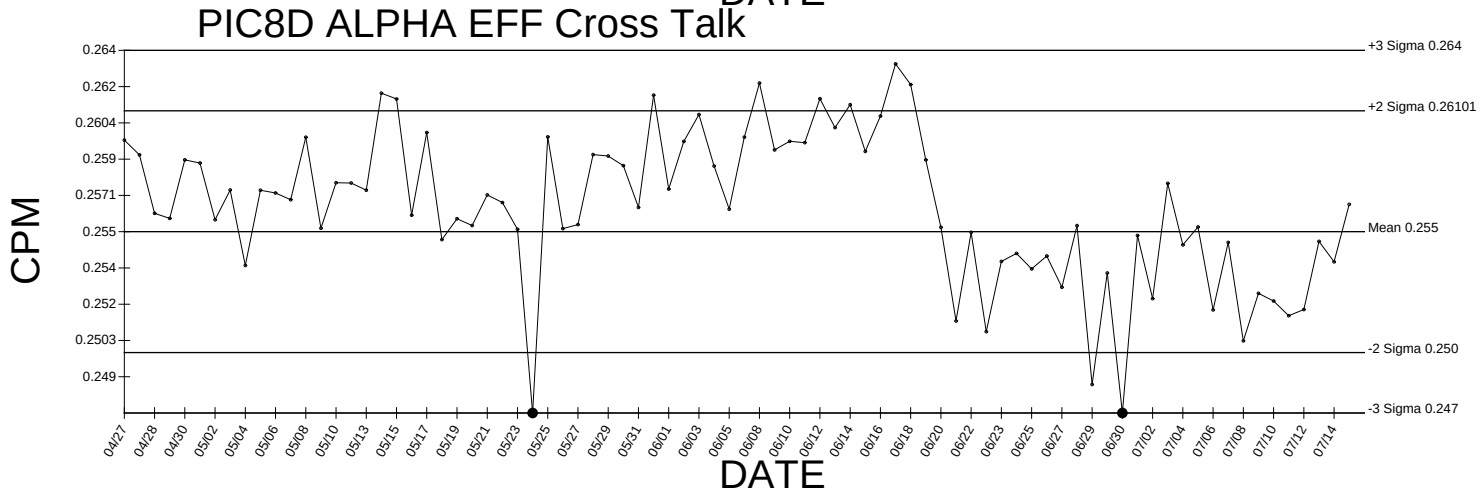
PIC7C BETA EFF Cross Talk



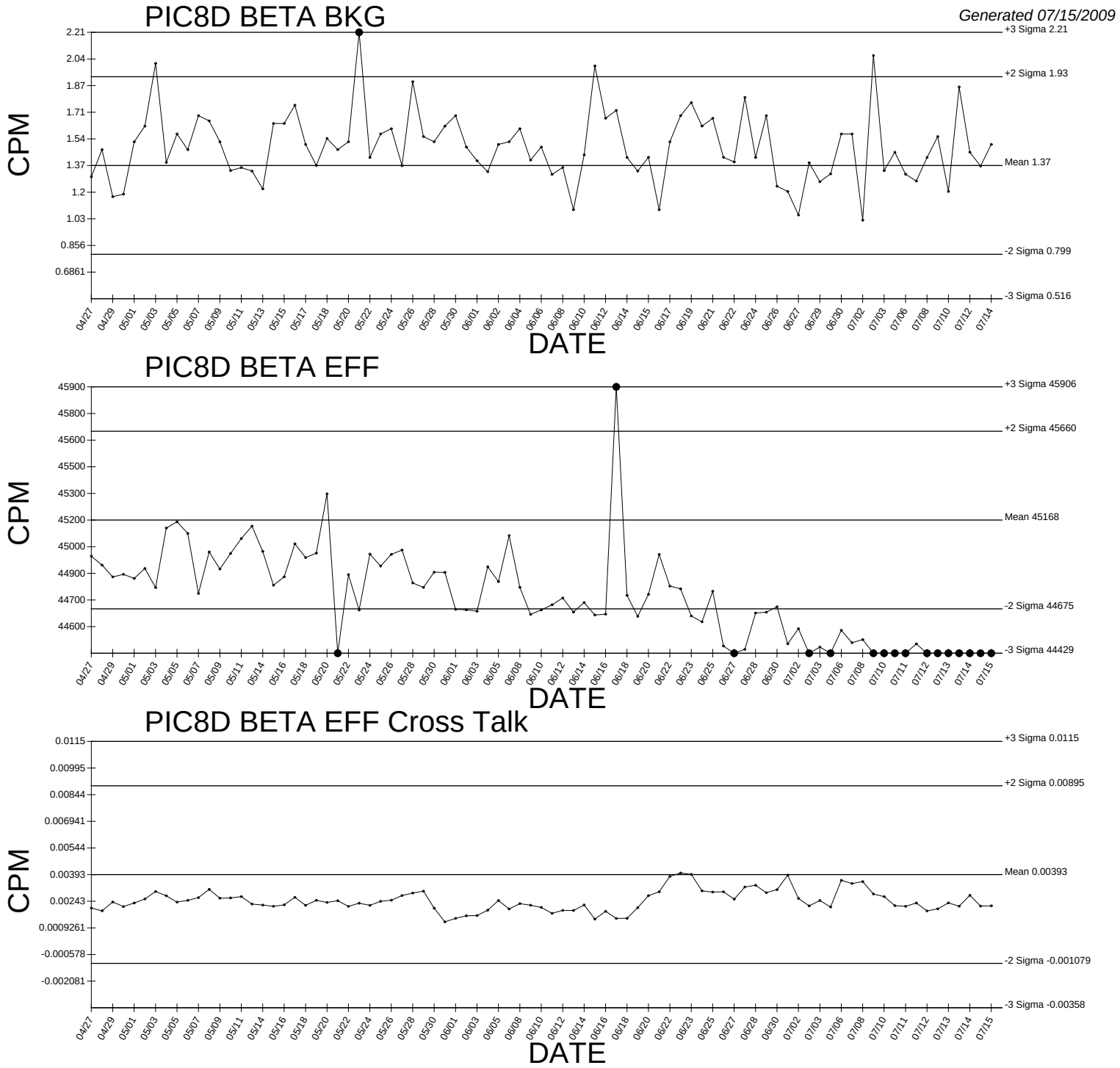
● Denotes Outlier



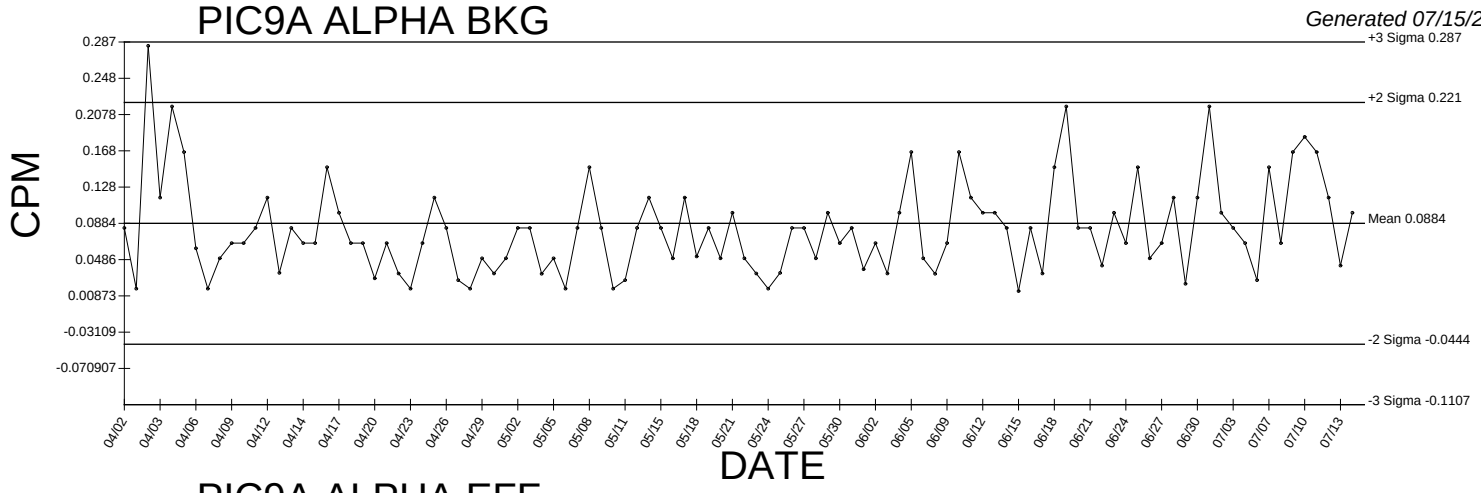


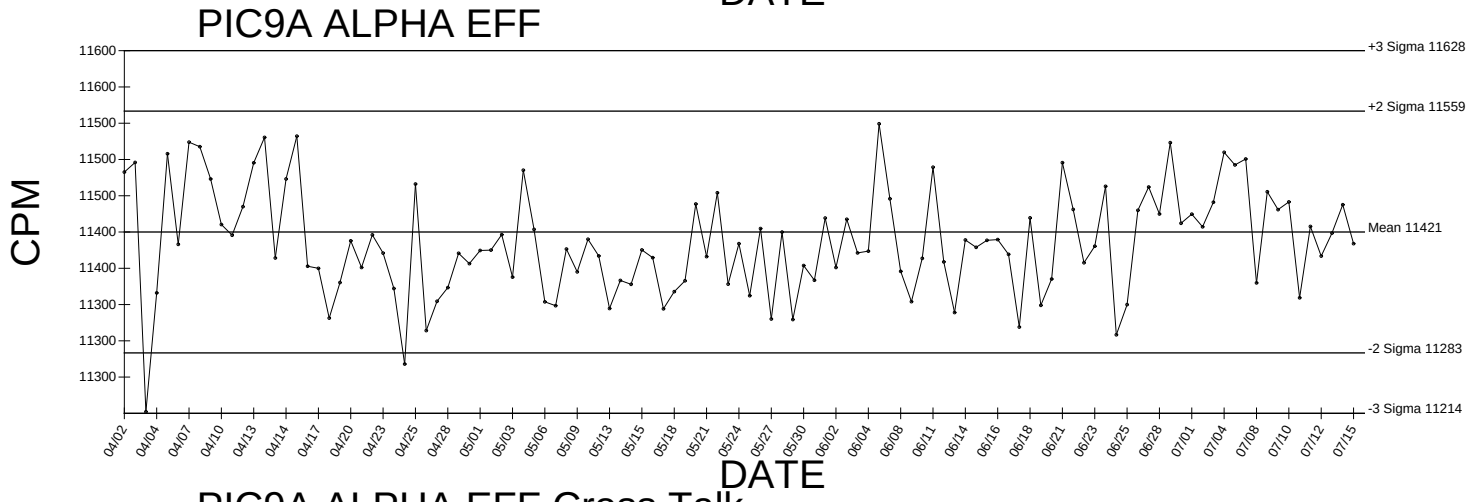


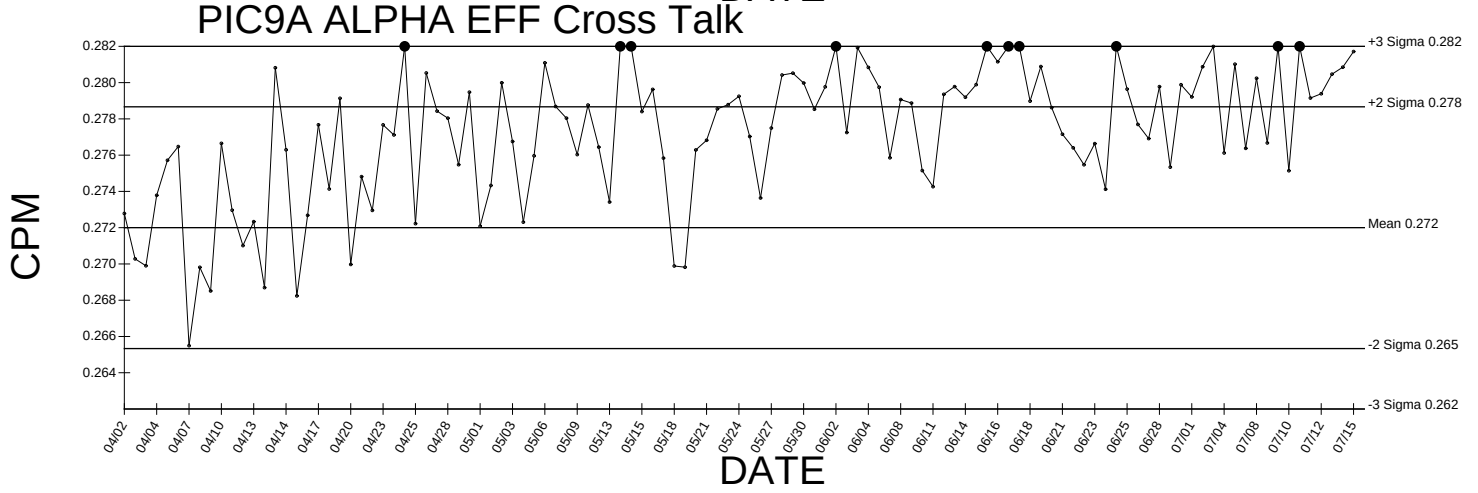
● Denotes Outlier



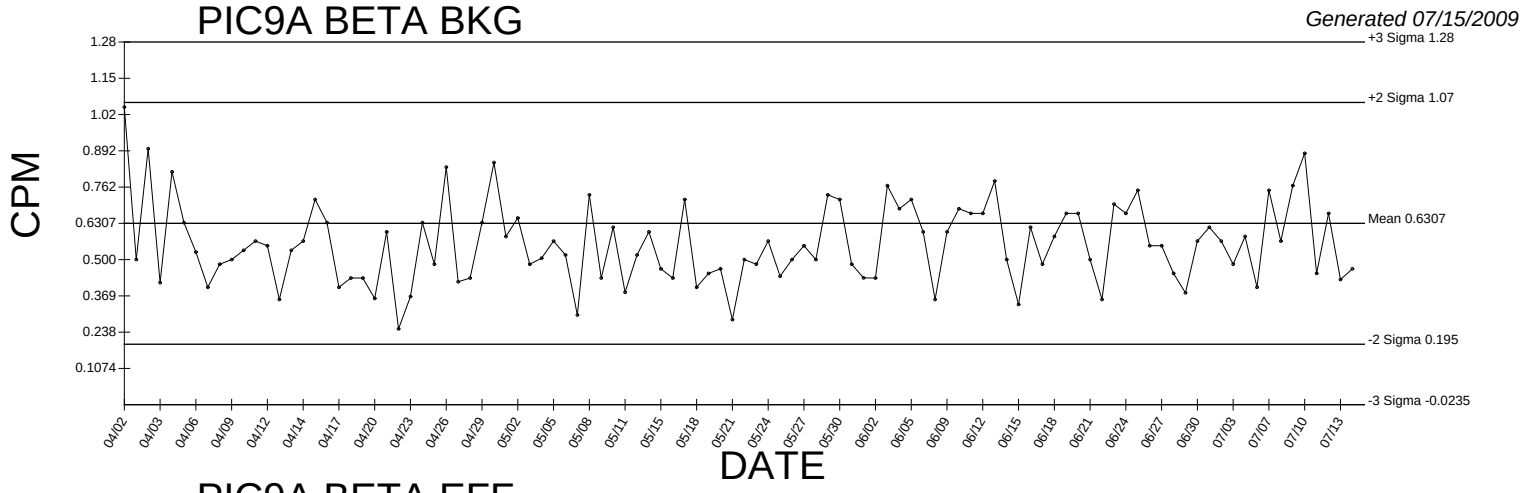
● Denotes Outlier

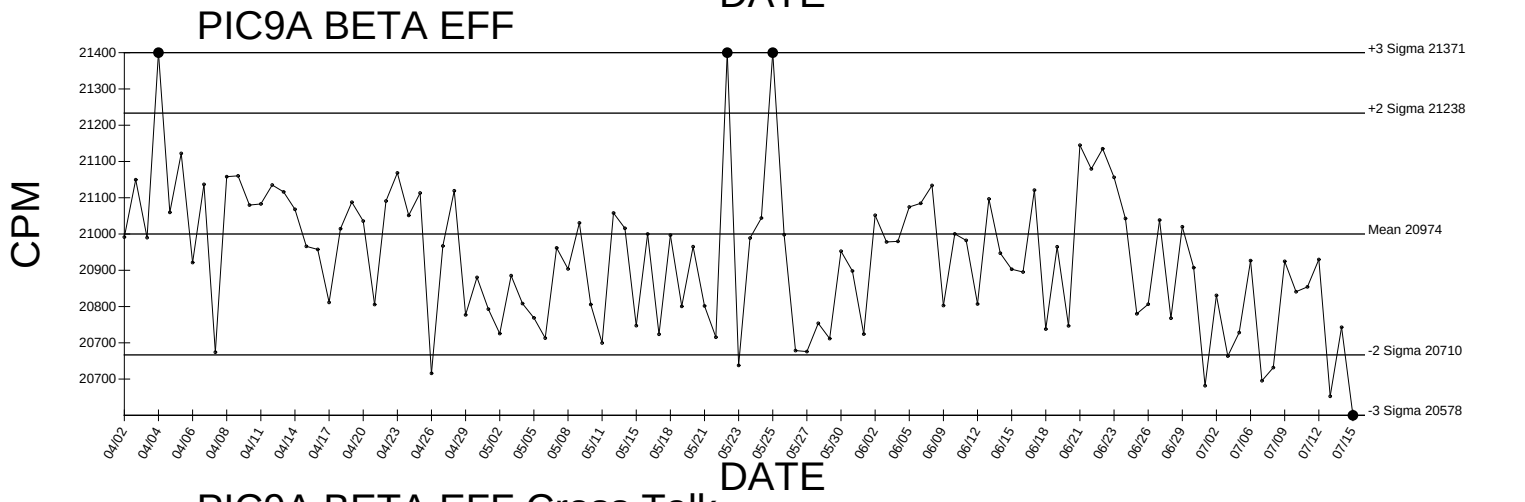


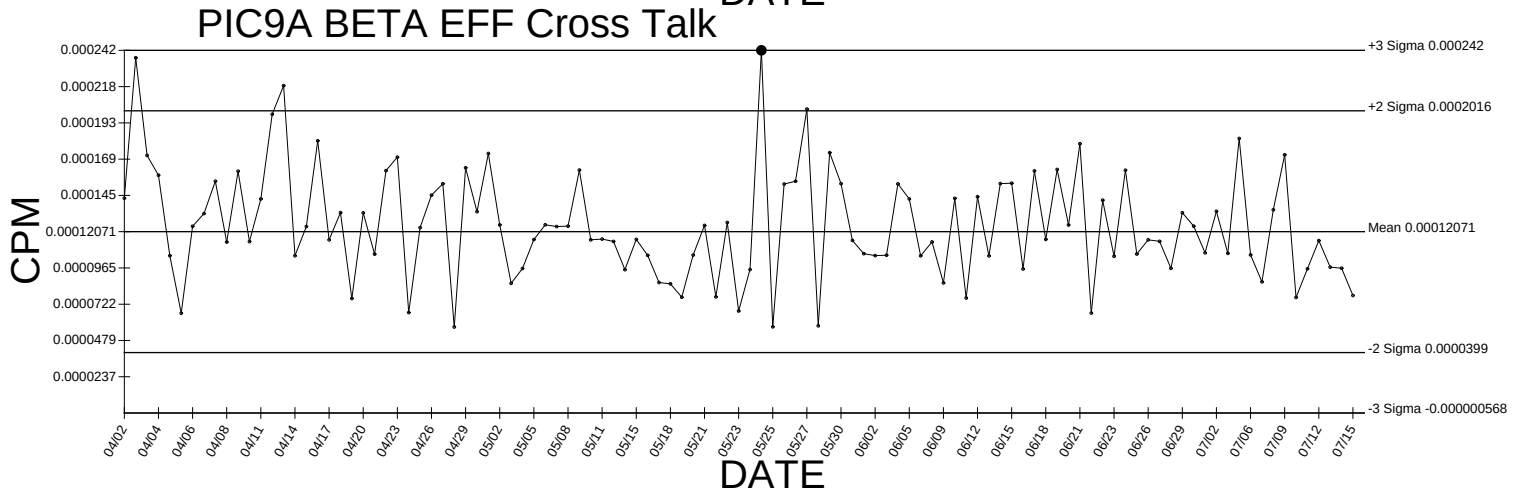




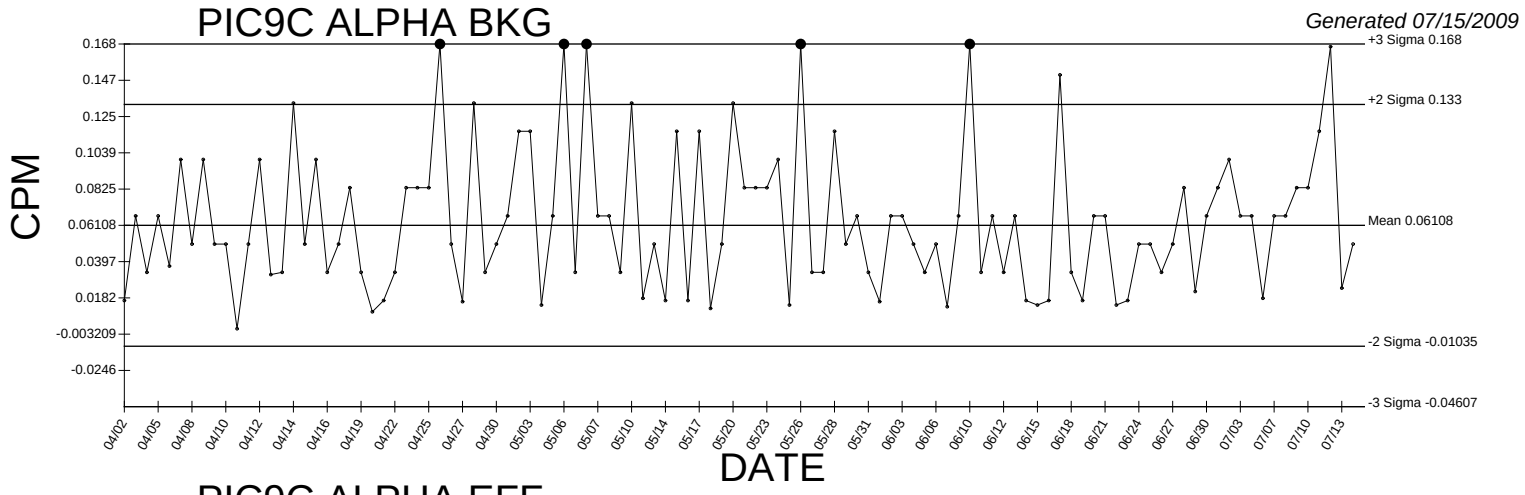
● Denotes Outlier

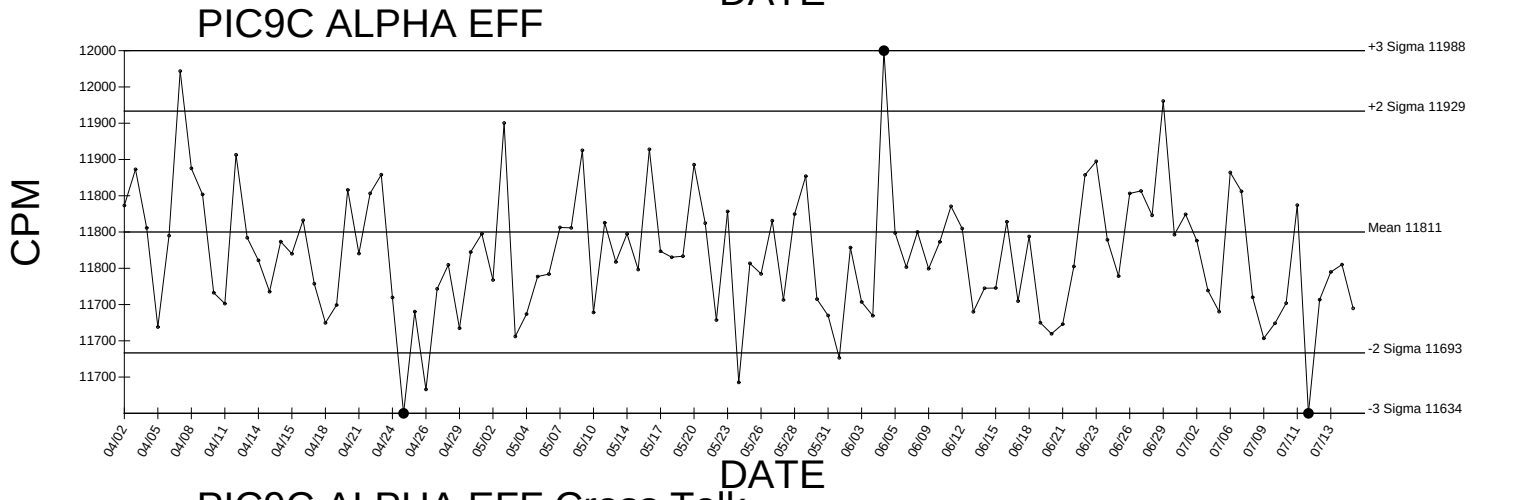


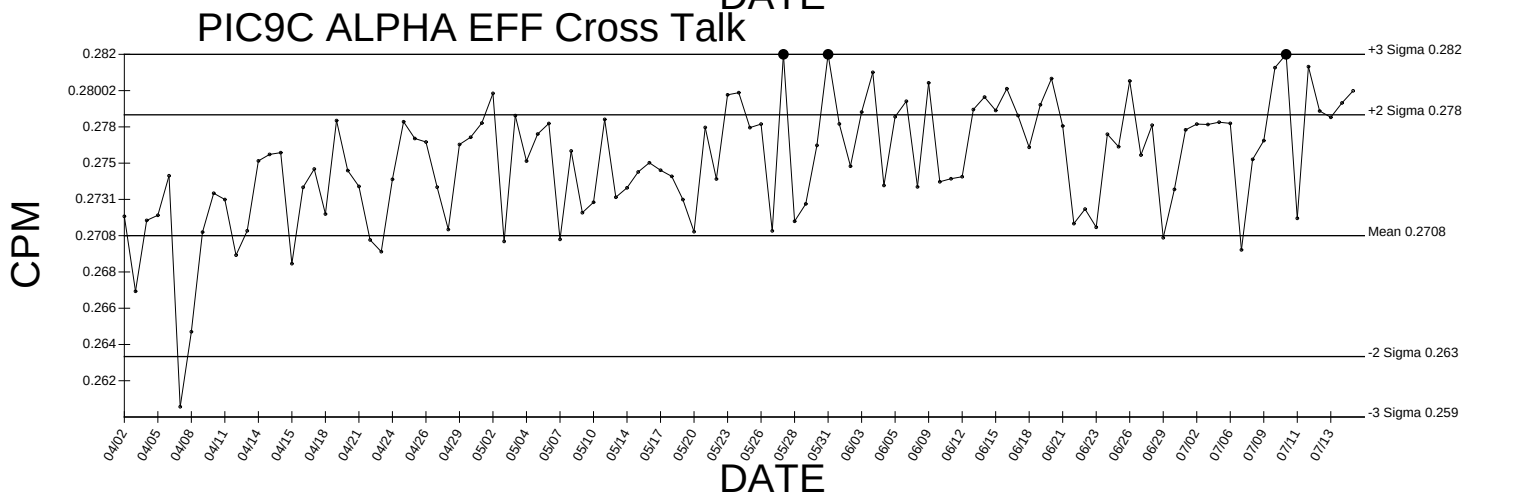




● Denotes Outlier

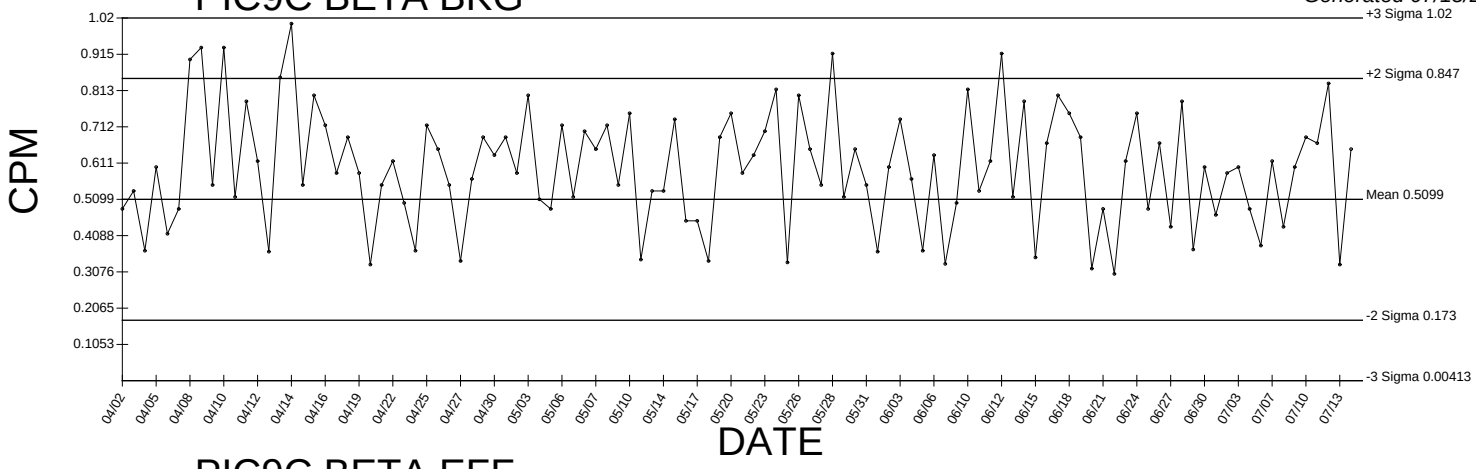




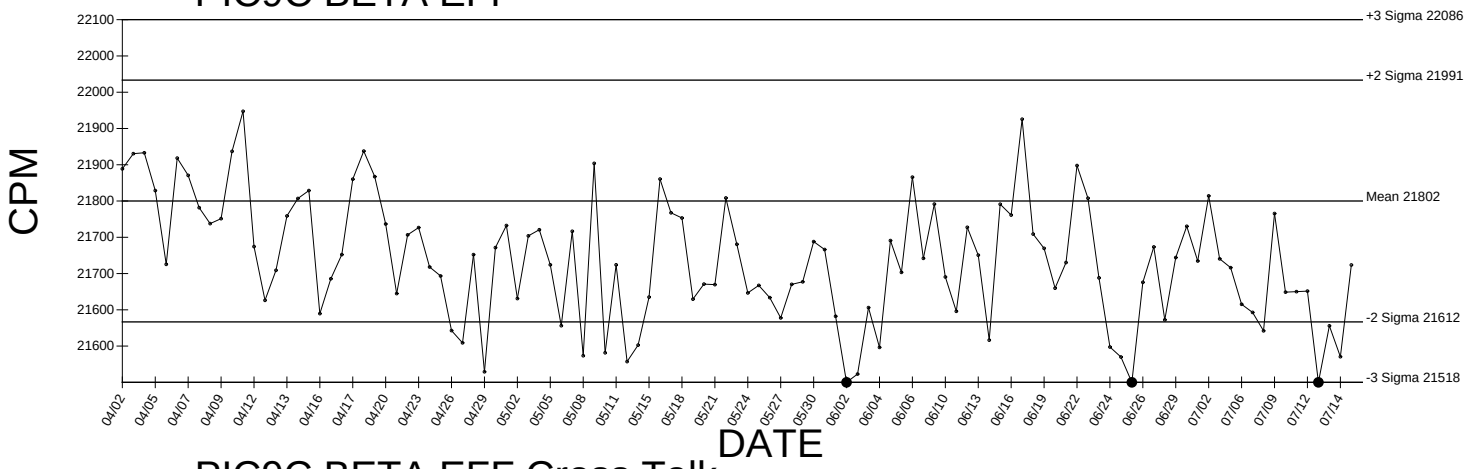


● Denotes Outlier

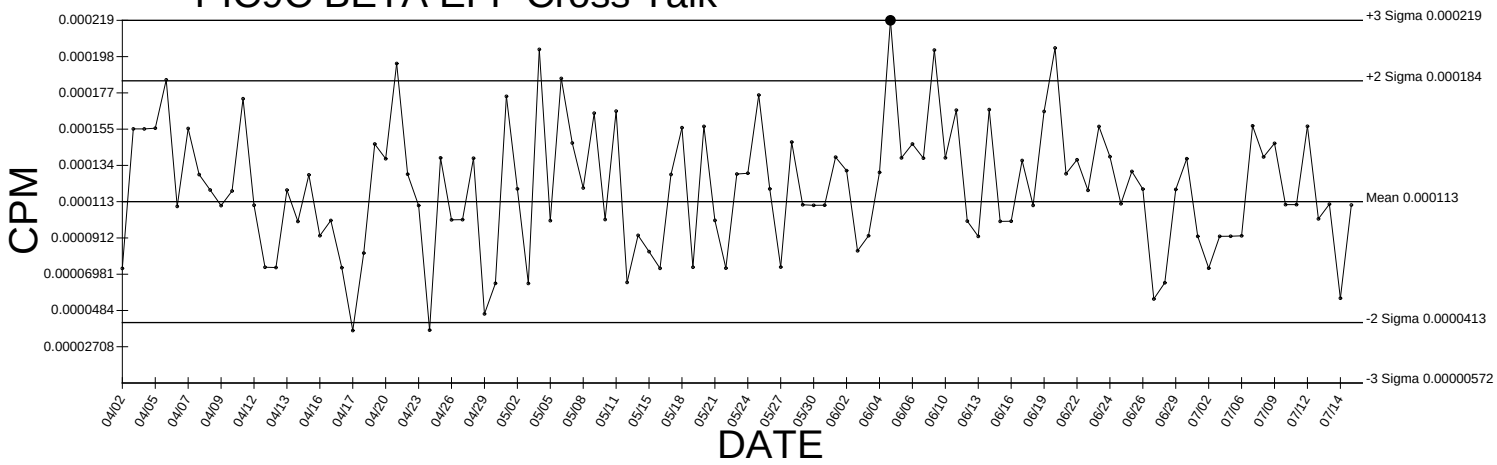
PIC9C BETA BKG



PIC9C BETA EFF

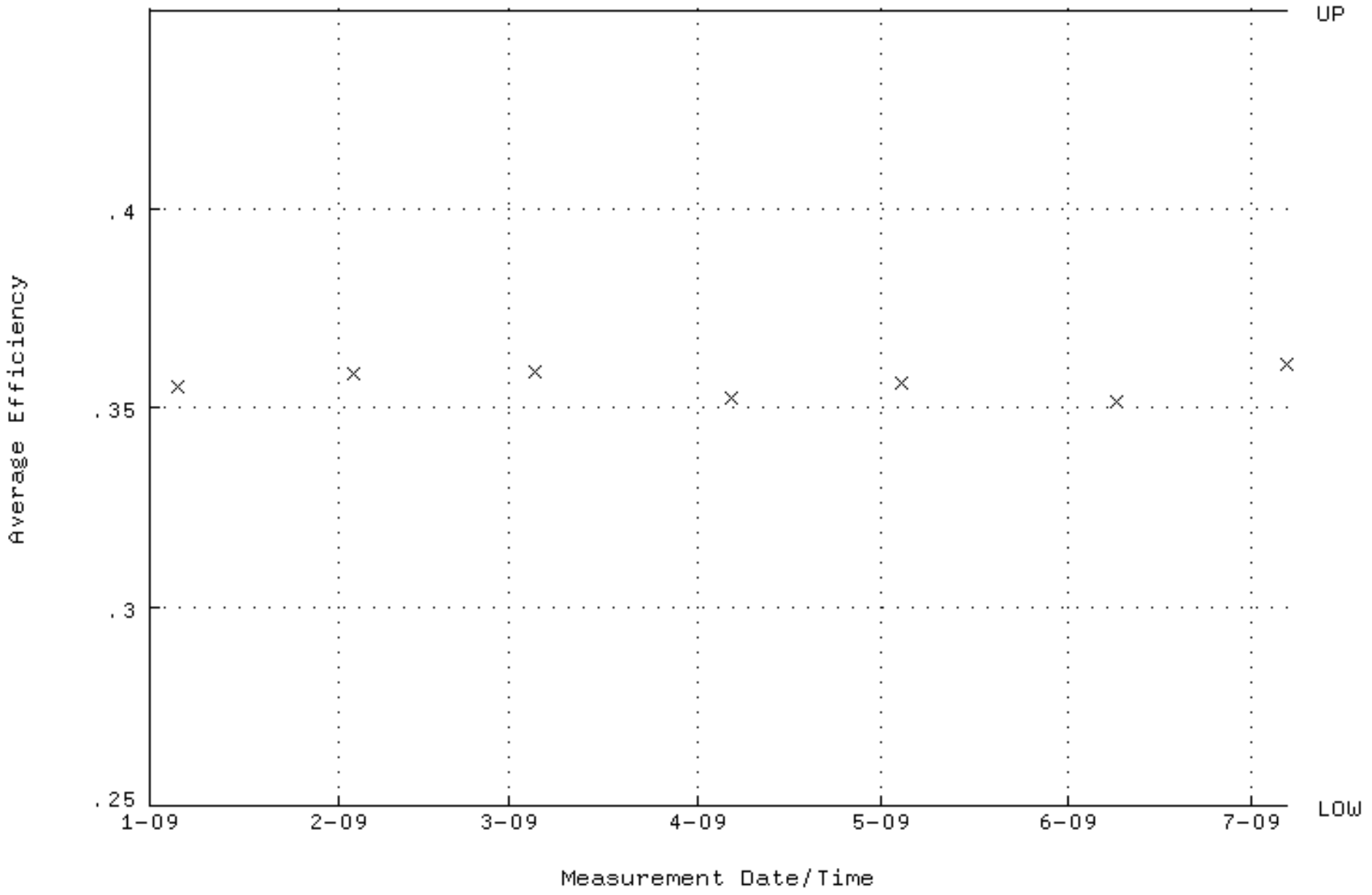


PIC9C BETA EFF Cross Talk

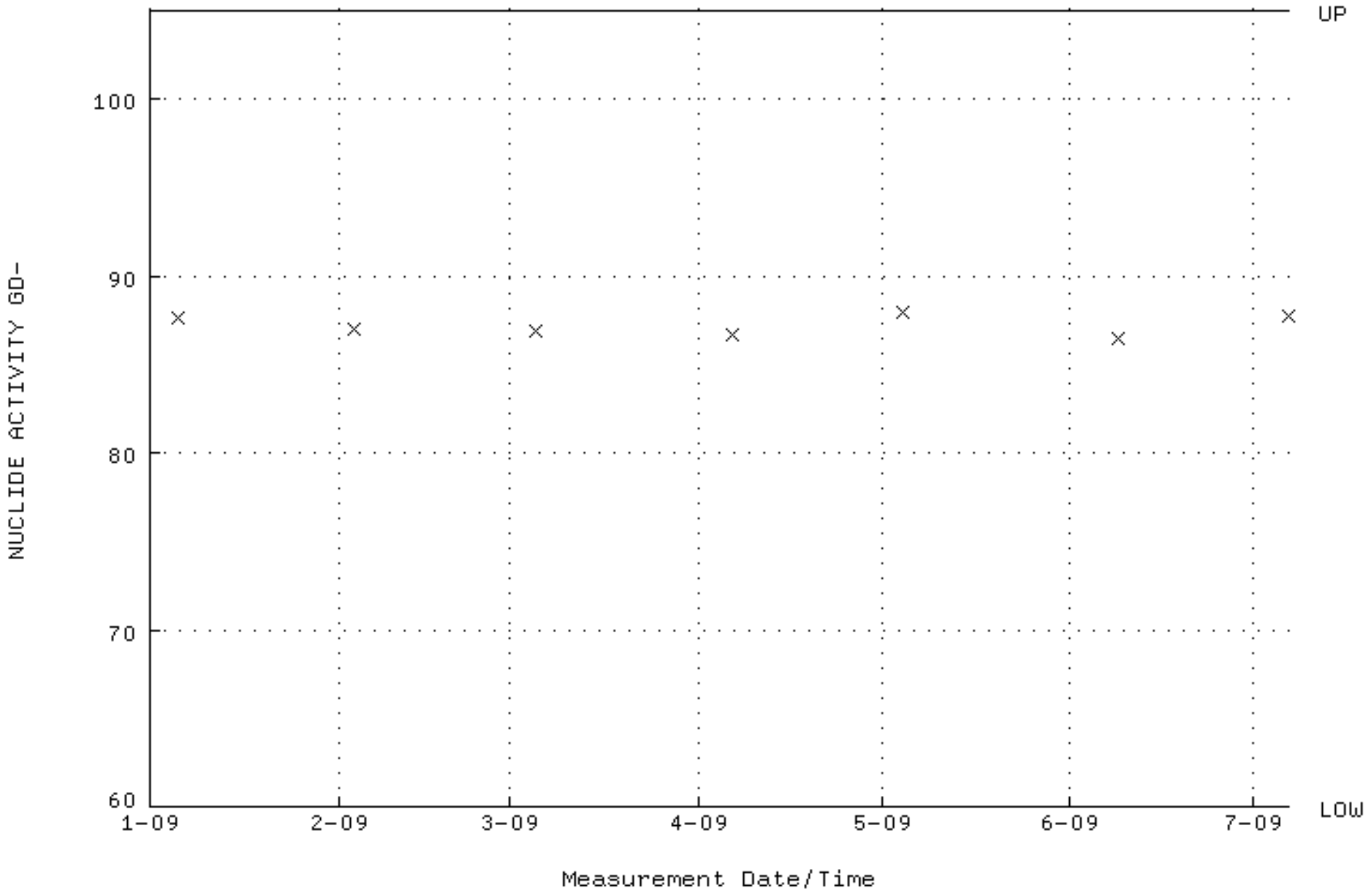


● Denotes Outlier

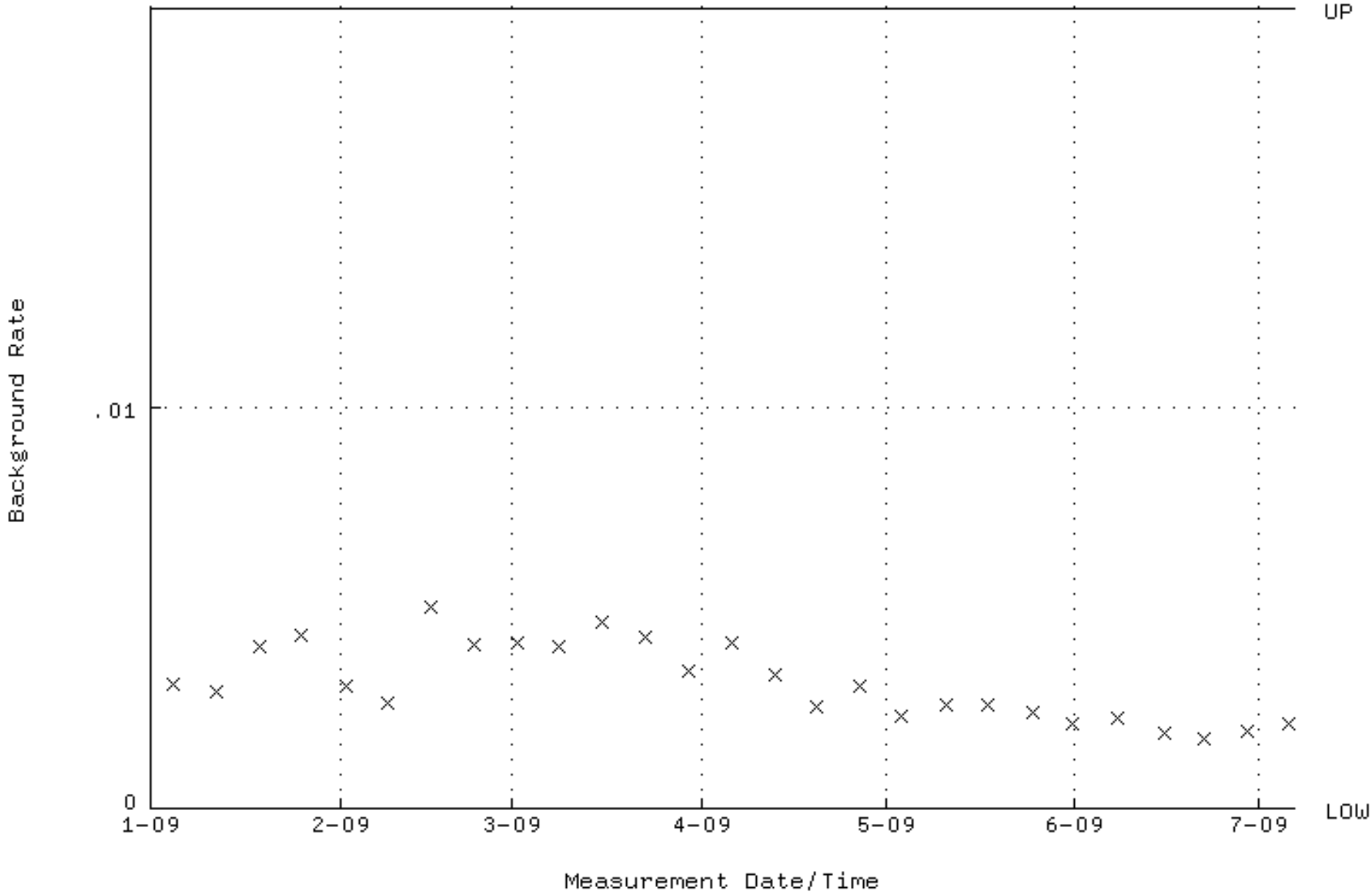
QA filename : DKA100:[ENV_ALPHA.QA.W]W037.QAF;4
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 5-JAN-2009 12:57:01 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 0.250000 through 0.450000



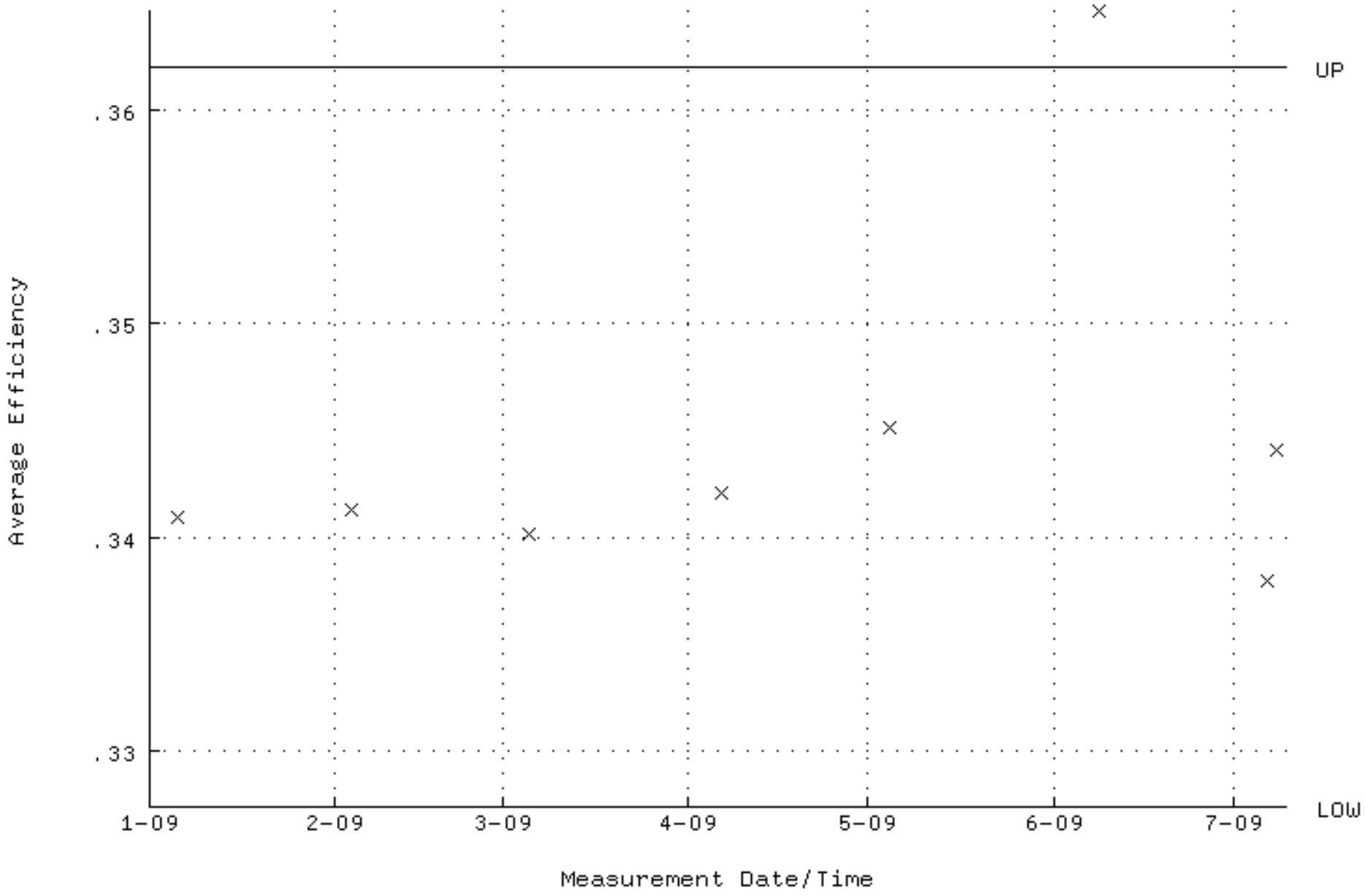
QA filename : DKA100:[ENV_ALPHA.QA.W]W037.QAF;4
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 5-JAN-2009 12:57:01 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 60.0000 through 105.000



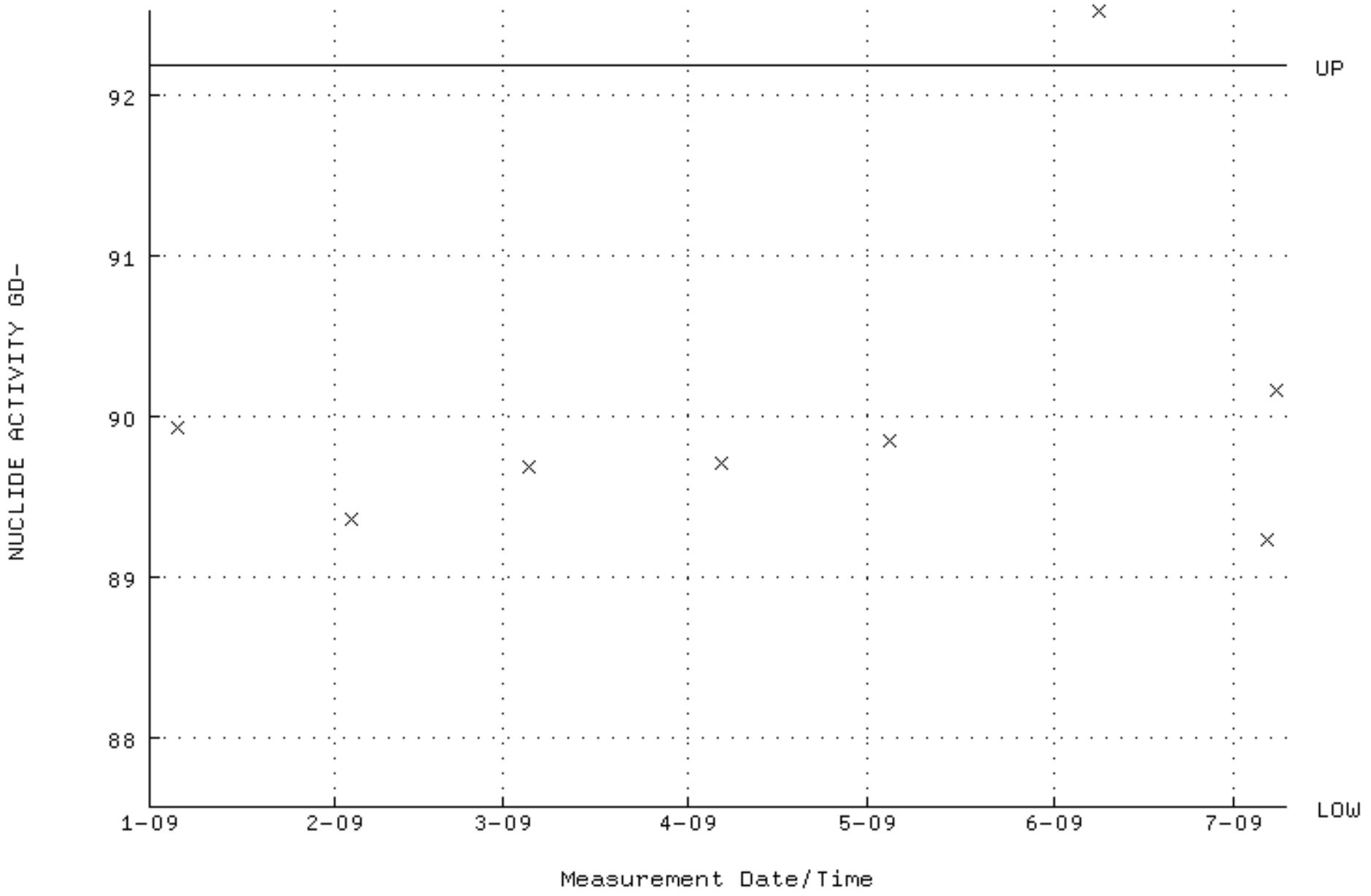
QA filename : DKA100:[ENV_ALPHA.QA.B]B037.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:21:29 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



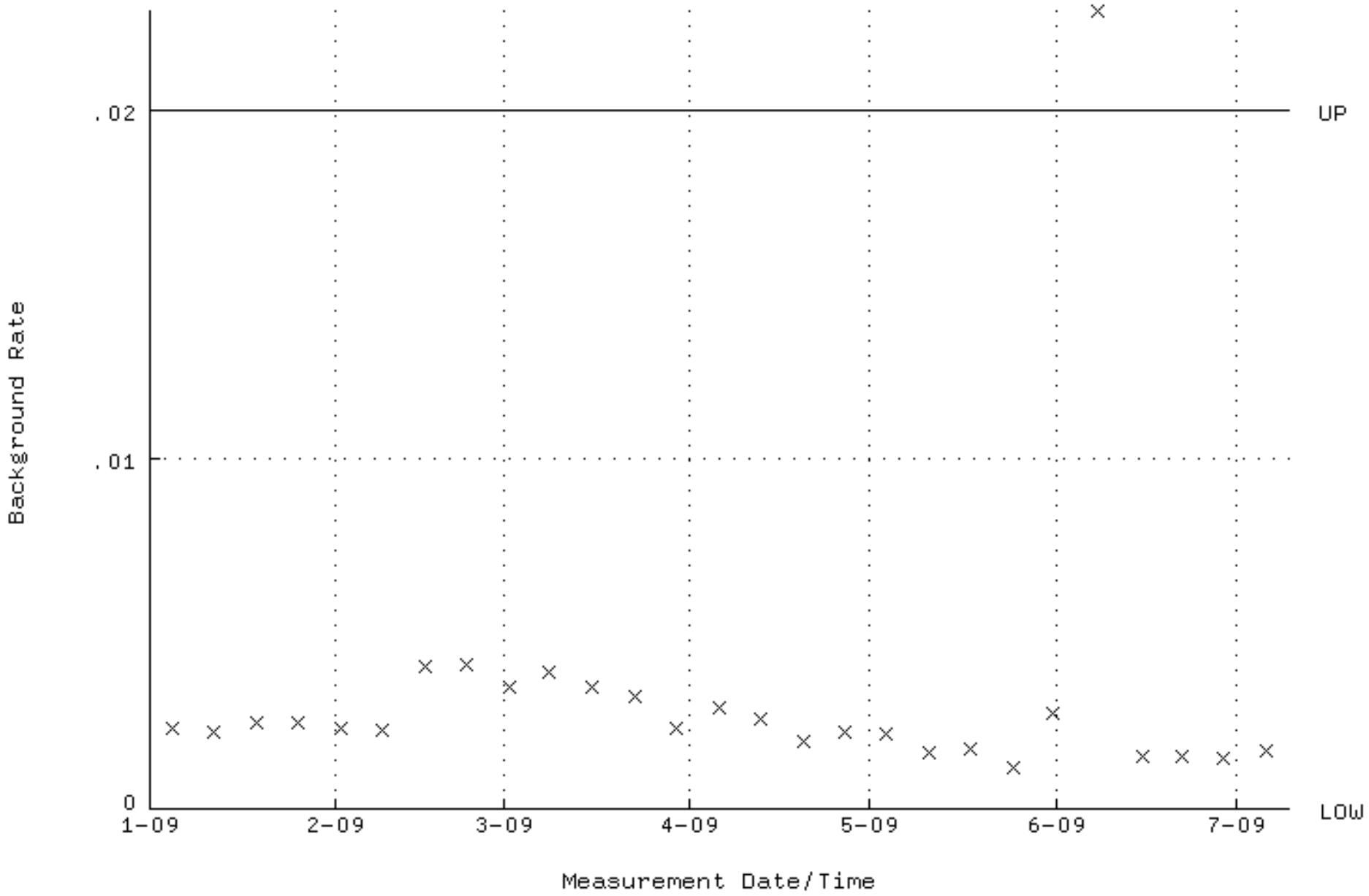
QA filename : DKA100:[ENV_ALPHA.QA.W]W038.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 5-JAN-2009 12:57:01 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.327380 through 0.362086



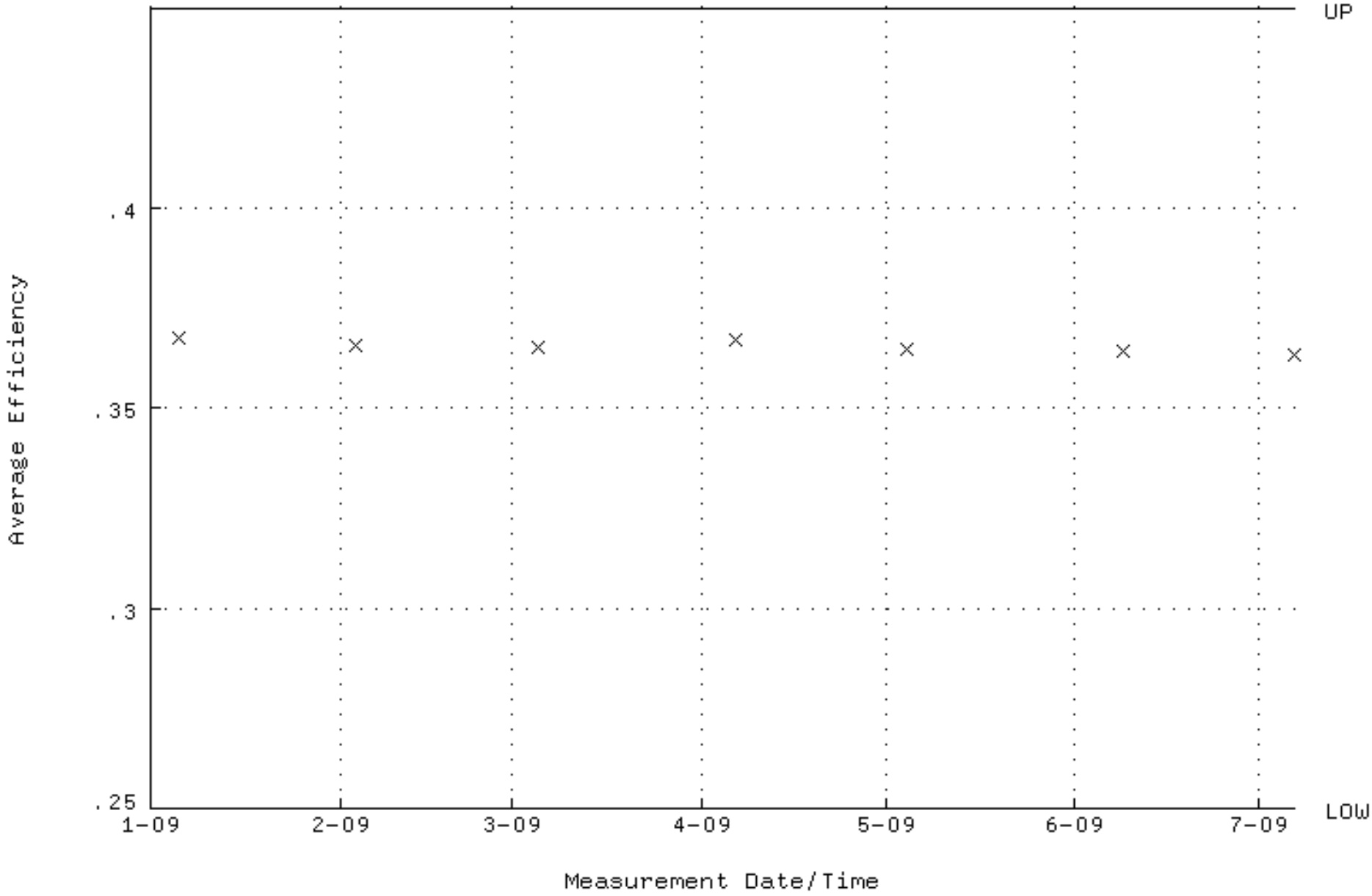
QA filename : DKA100:[ENV_ALPHA.QA.W]W038.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 5-JAN-2009 12:57:01 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 87.5715 through 92.1899



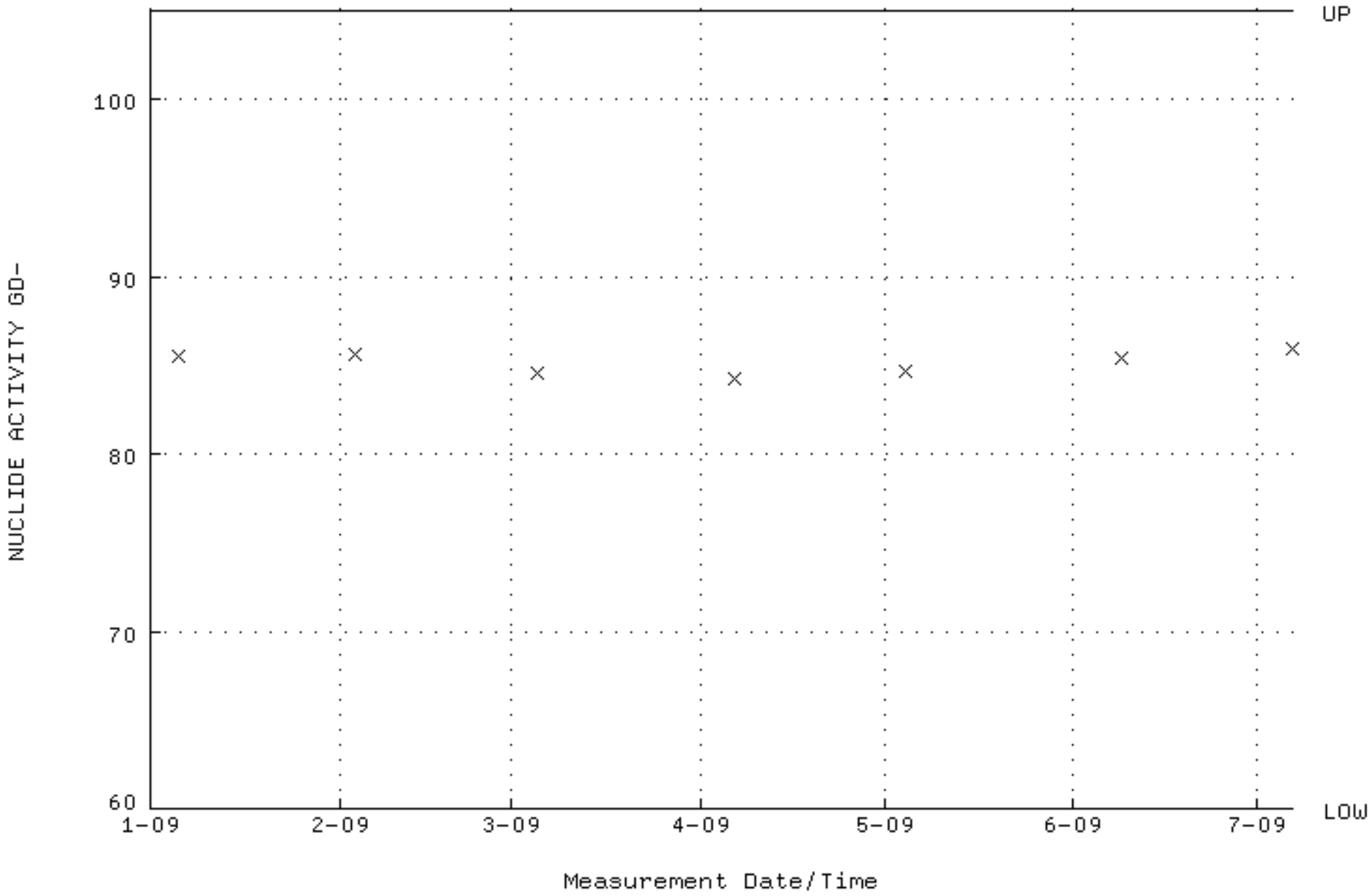
QA filename : DKA100:[ENV_ALPHA.QA.B]B038.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:21:29 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



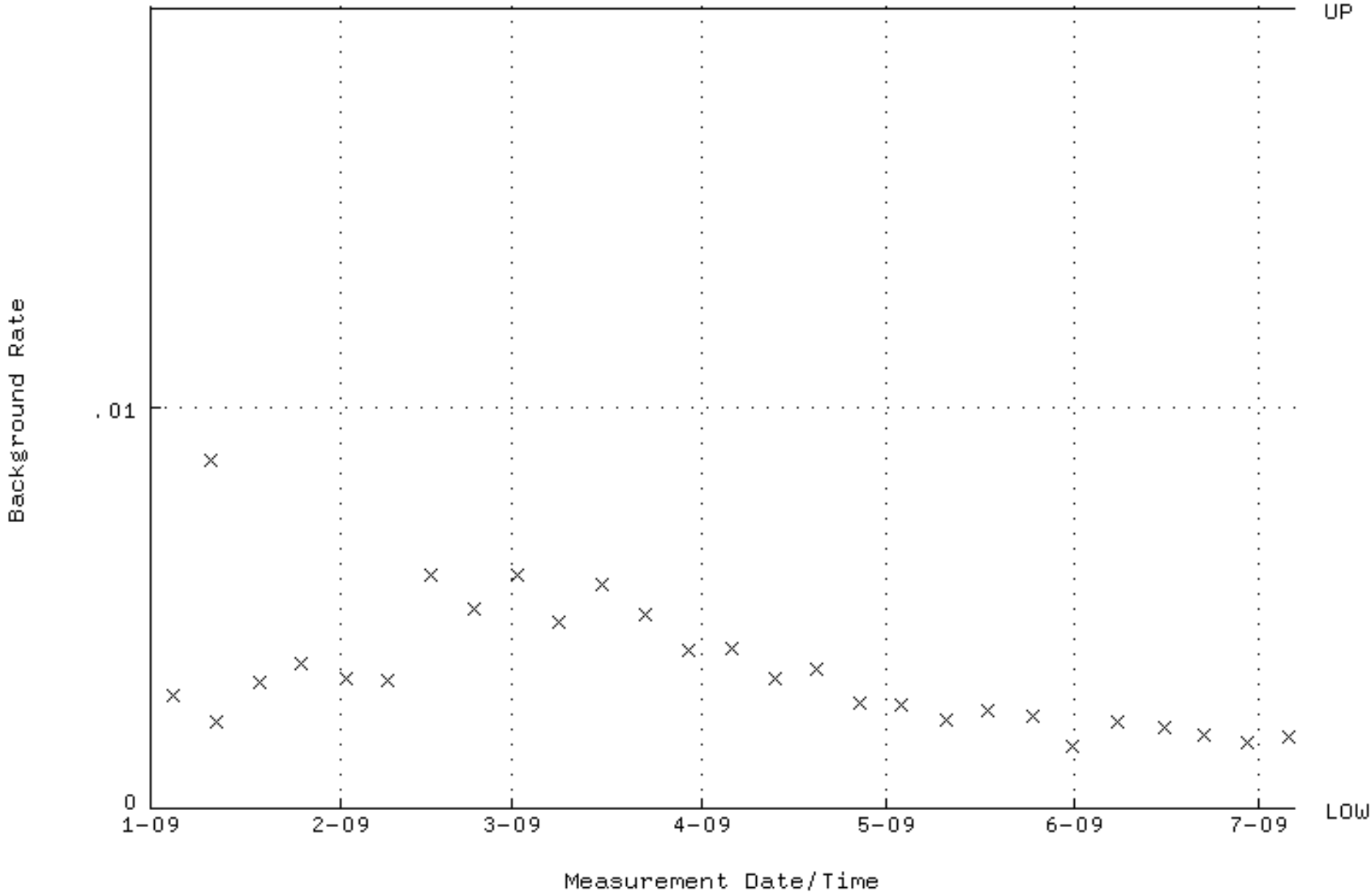
QA filename : DKA100:[ENV_ALPHA.QA.W]W039.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 5-JAN-2009 12:57:01 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 0.250000 through 0.450000



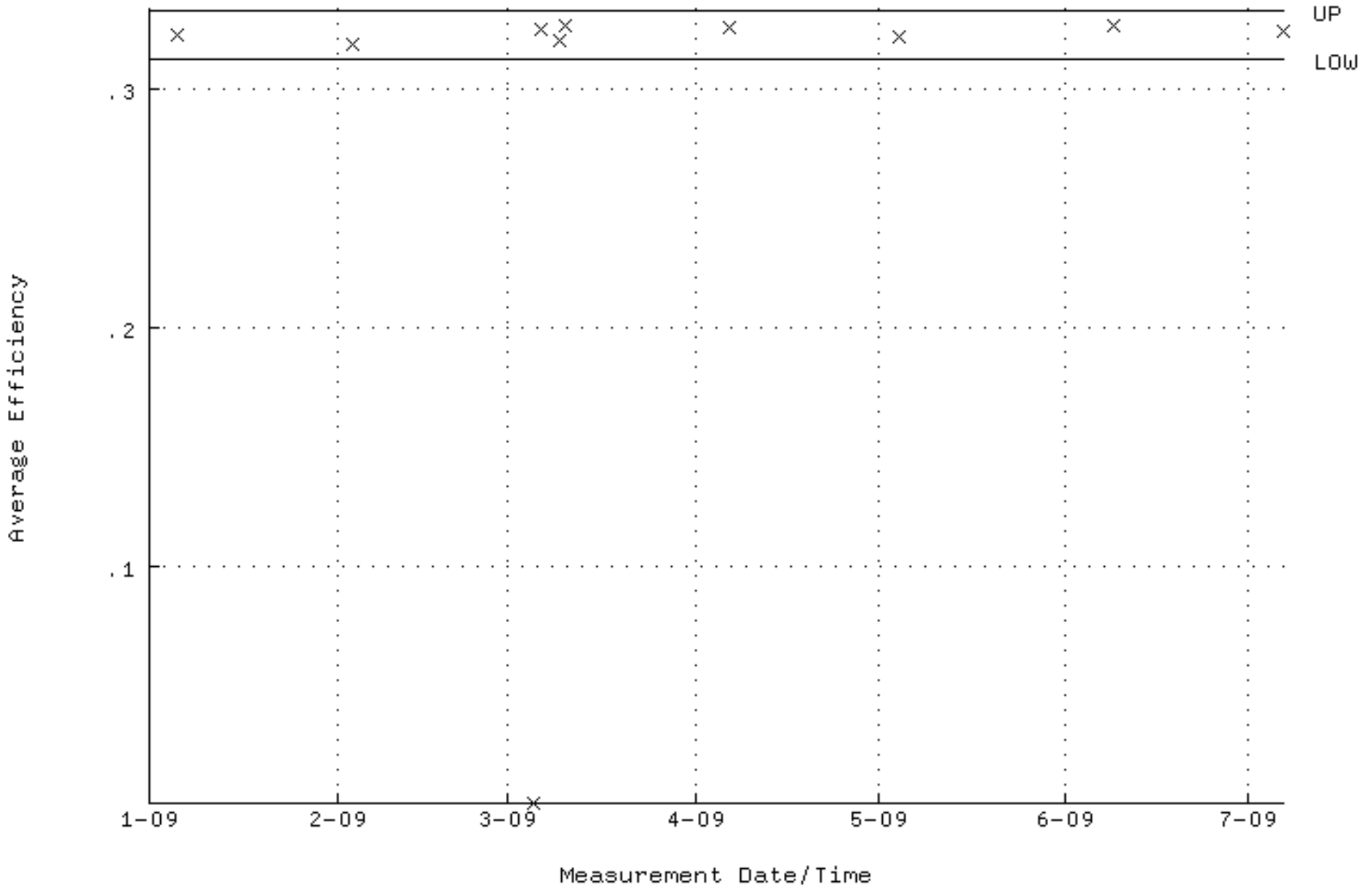
QA filename : DKA100:[ENV_ALPHA.QA.W]W039.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 5-JAN-2009 12:57:01 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 60.0000 through 105.000



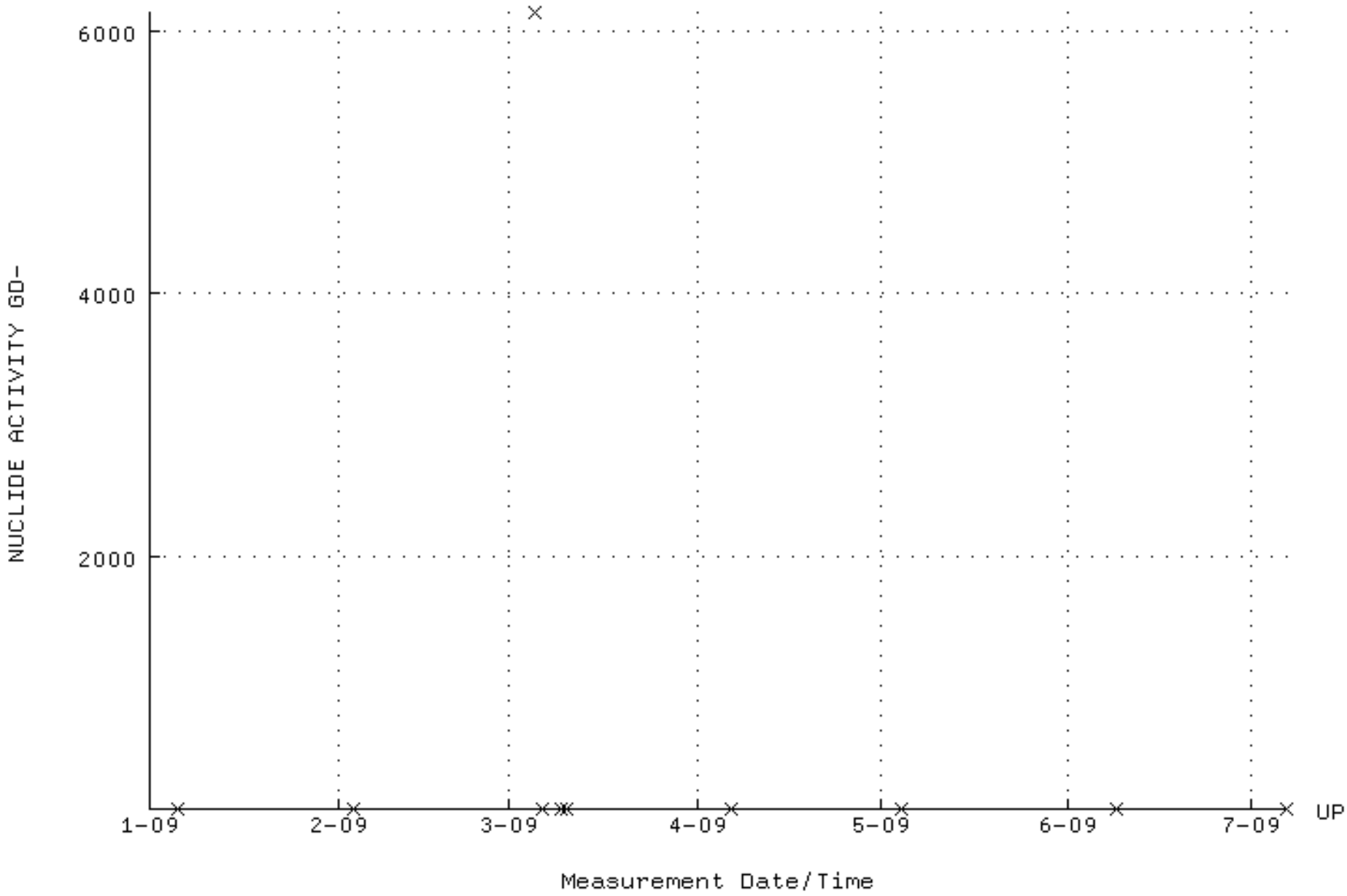
QA filename : DKA100:[ENV_ALPHA.QA.B]B039.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:21:29 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



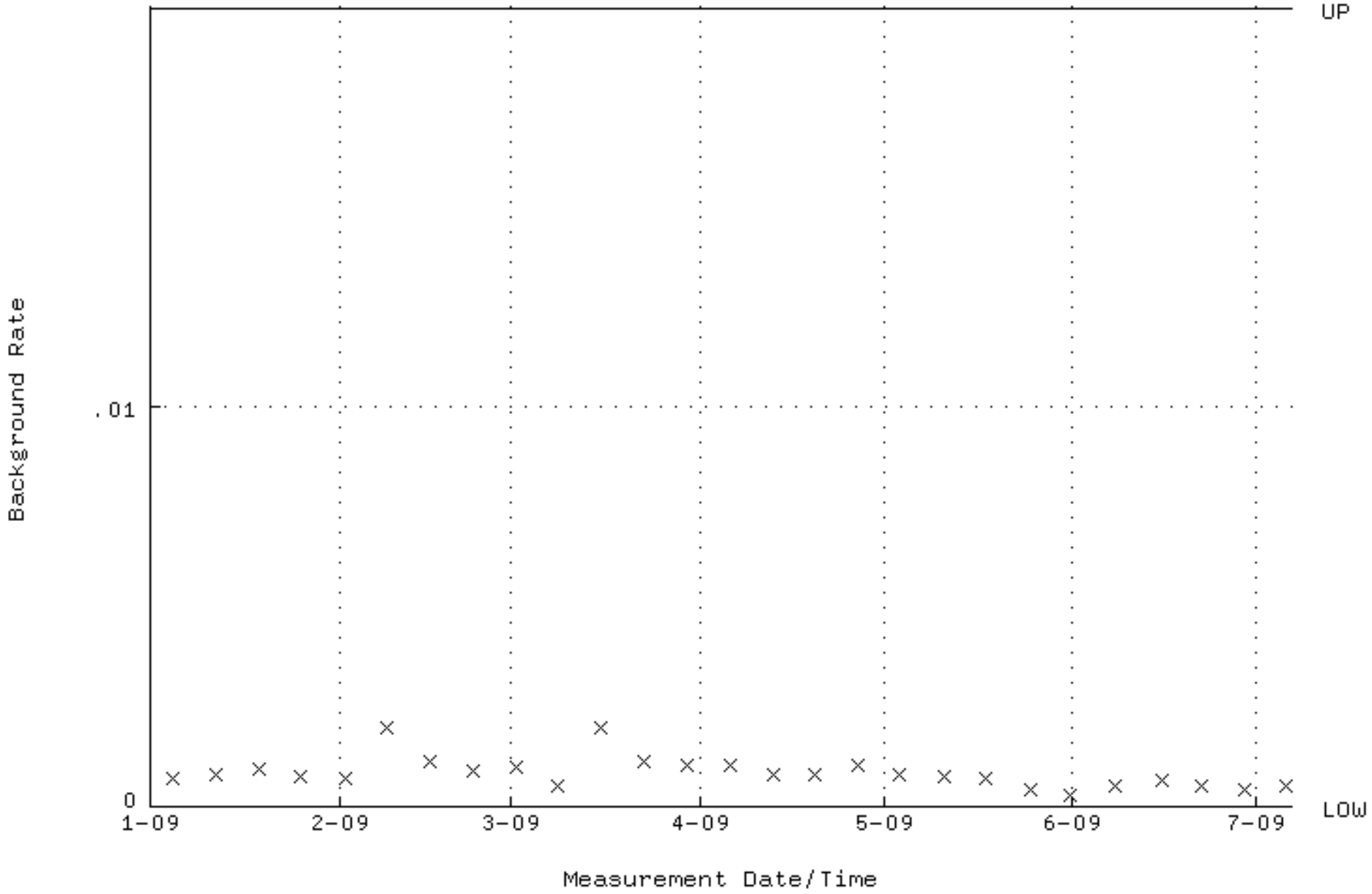
QA filename : DKA100:[ENV_ALPHA.QA.W]W040.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 5-JAN-2009 12:57:01 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 0.313016 through 0.333016



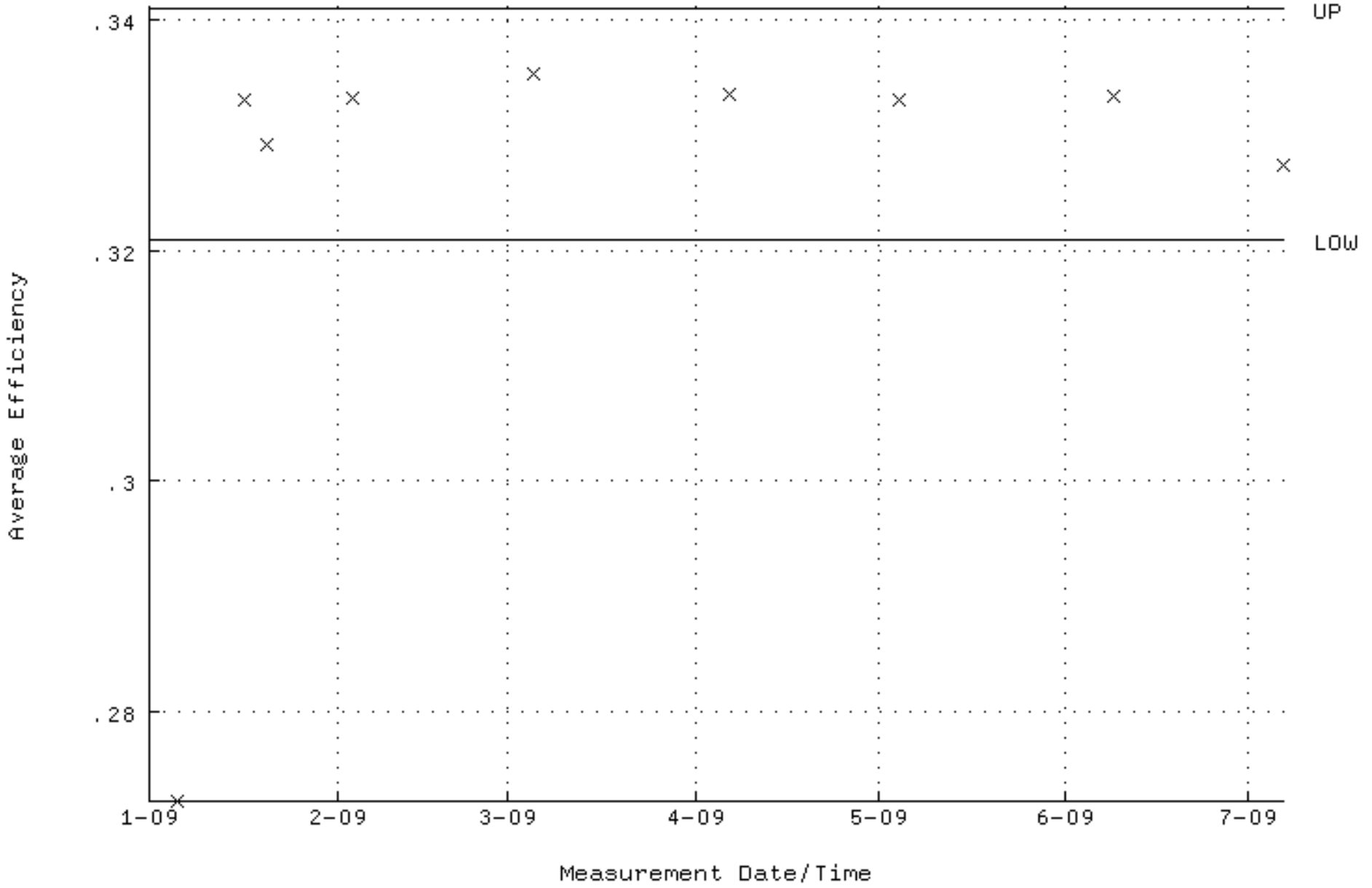
QA filename : DKA100:[ENV_ALPHA.QA.W]W040.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 5-JAN-2009 12:57:01 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 82.8065 through 91.5229



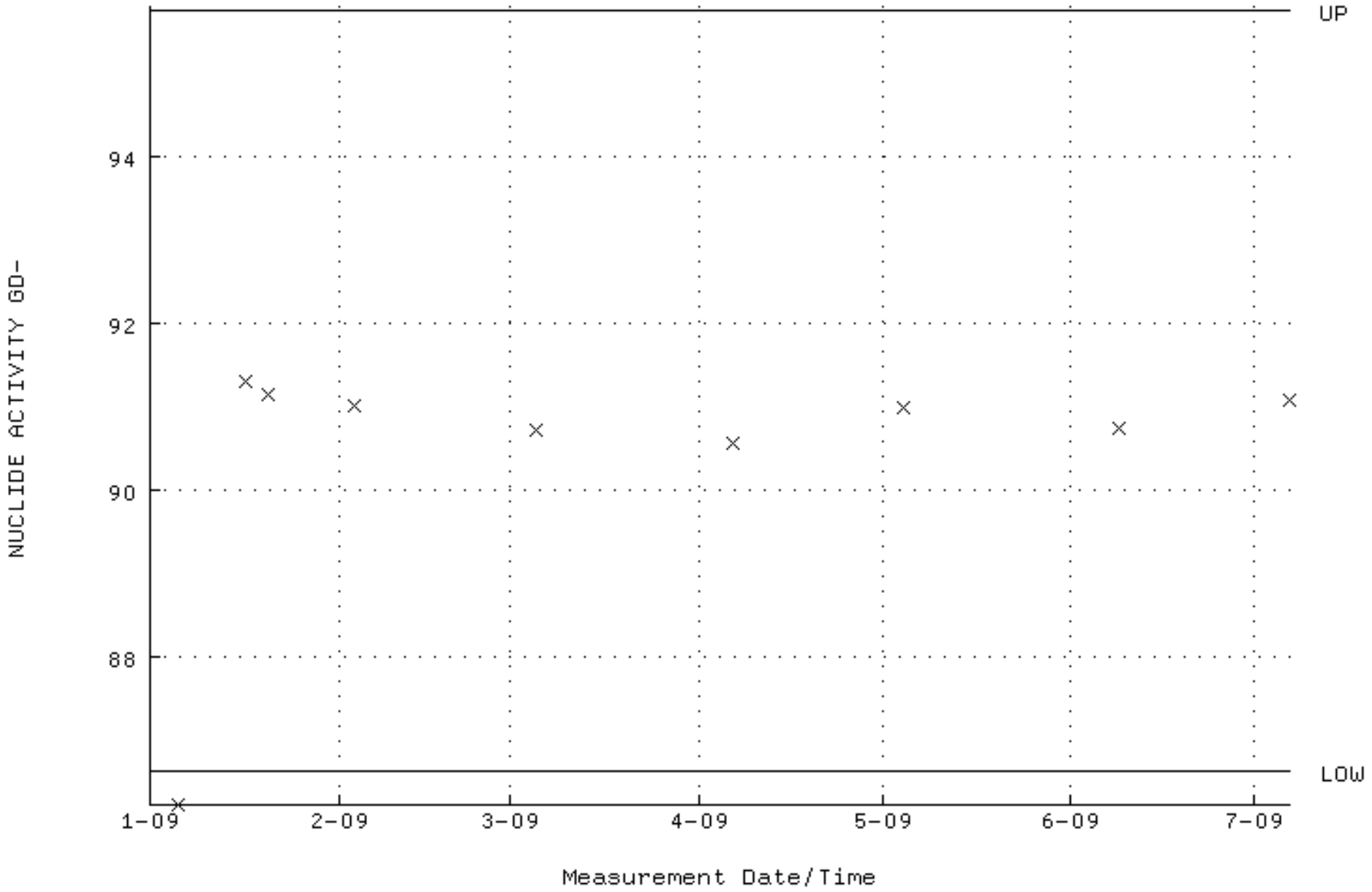
QA filename : DKA100:[ENV_ALPHA.QA.B]B040.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:21:29 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



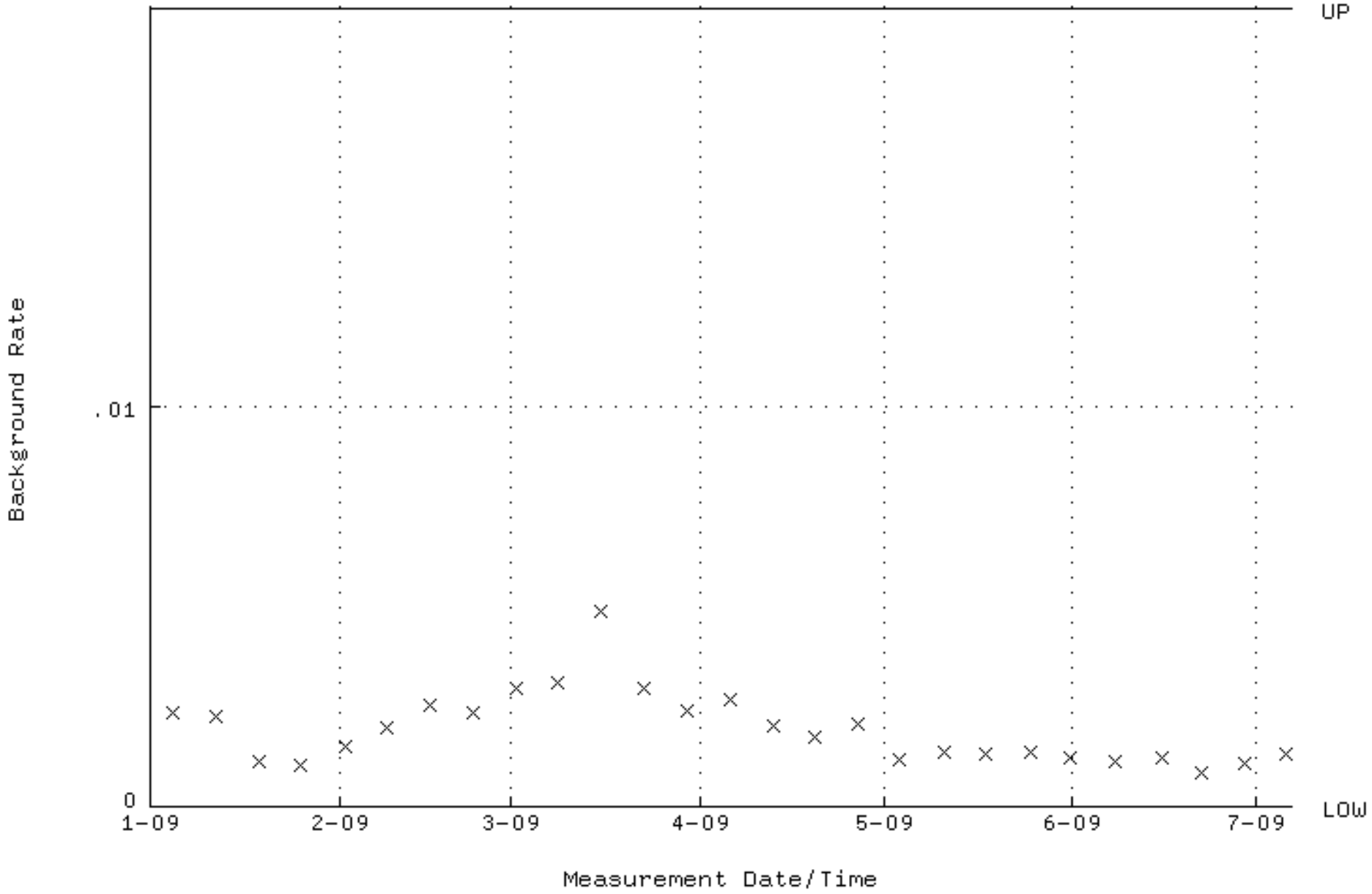
QA filename : DKA100:[ENV_ALPHA.QA.W]W041.QAF;5
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 5-JAN-2009 12:57:01 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 0.320943 through 0.340943



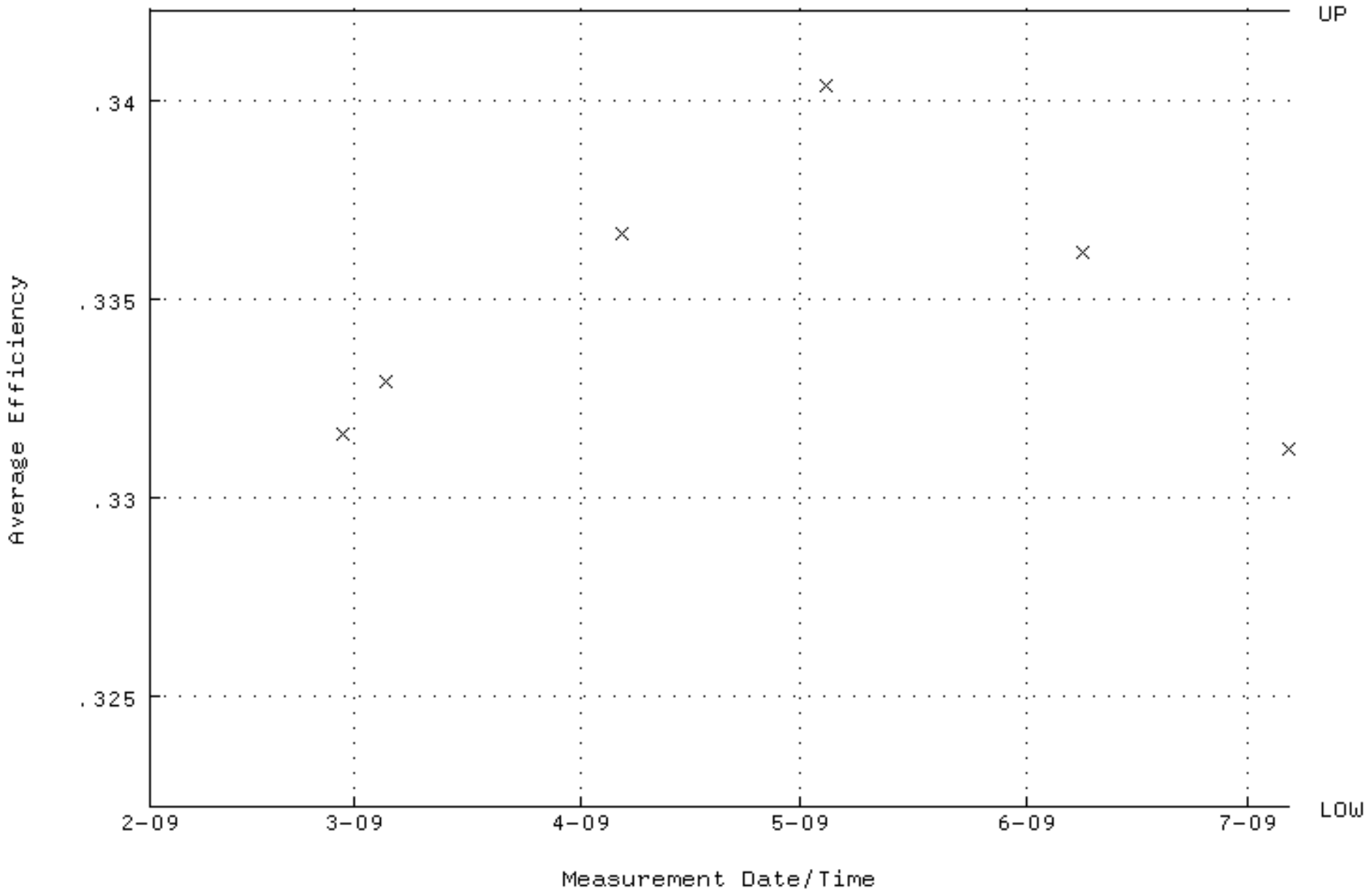
QA filename : DKA100:[ENV_ALPHA.QA.W]W041.QAF;5
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 5-JAN-2009 12:57:01 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 86.6435 through 95.7639



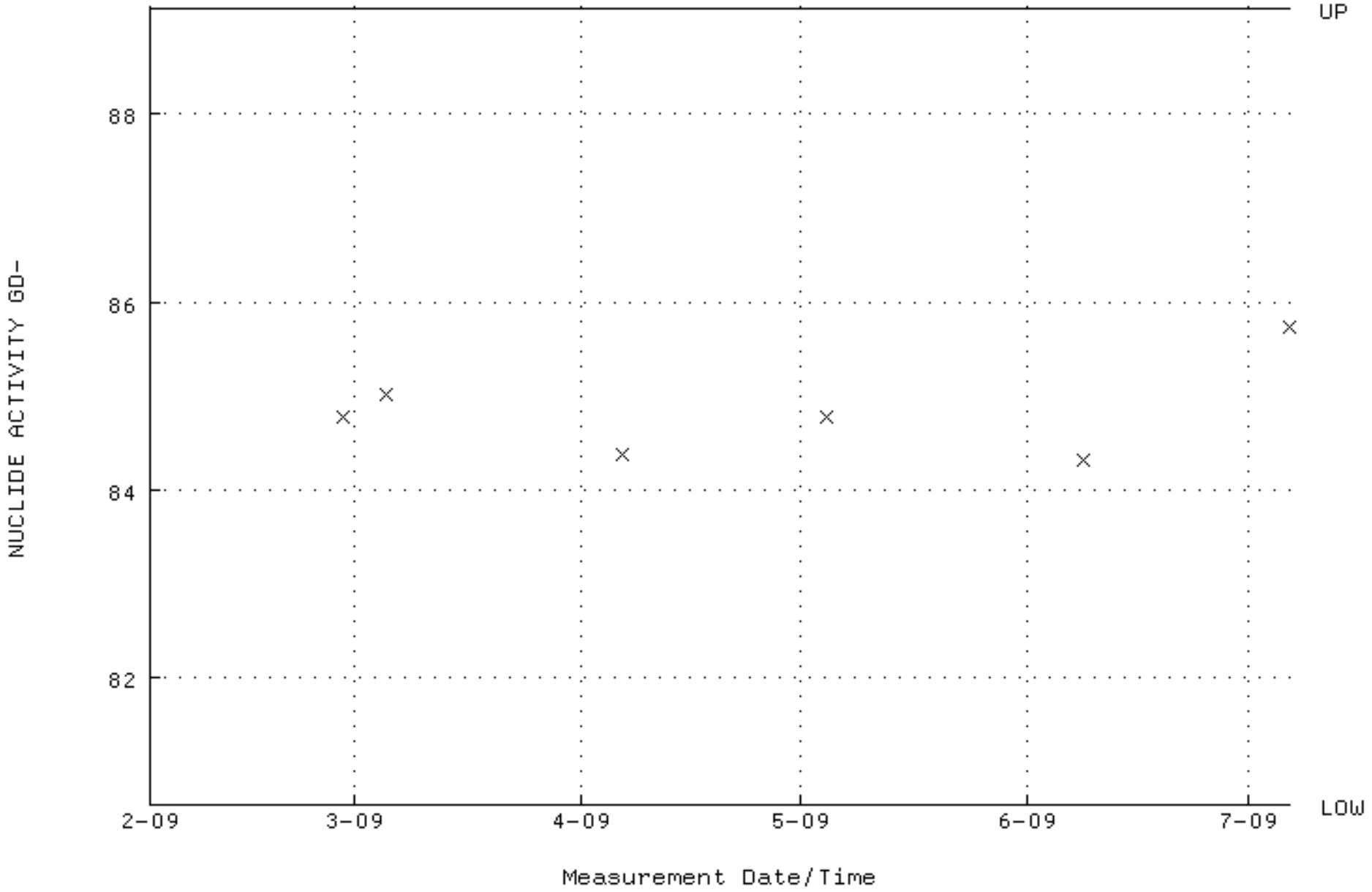
QA filename : DKA100:[ENV_ALPHA.QA.B]B041.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:21:29 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



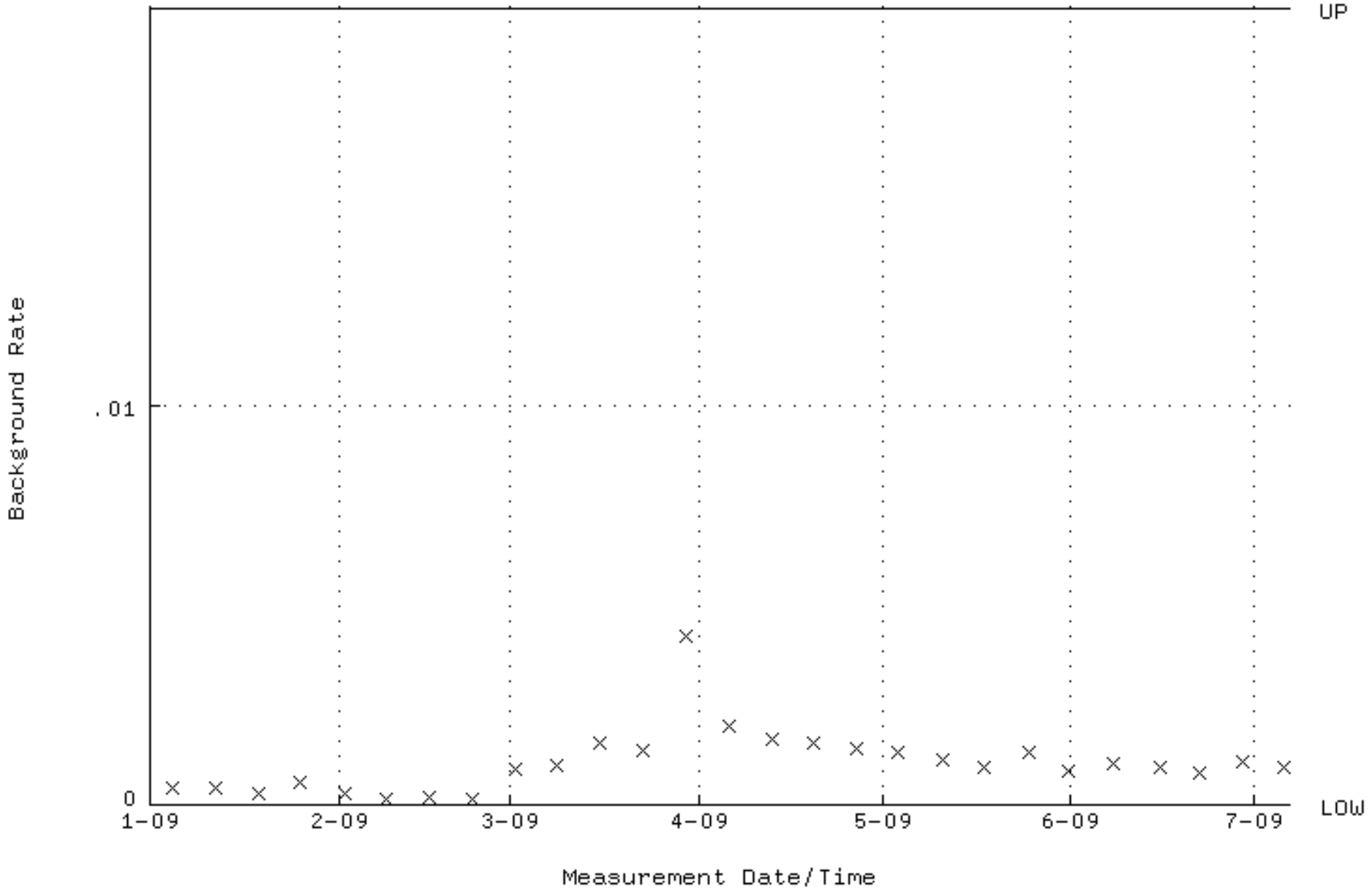
QA filename : DKA100:[ENV_ALPHA.QA.W]W042.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 27-FEB-2009 07:22:38 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 0.322243 through 0.342243



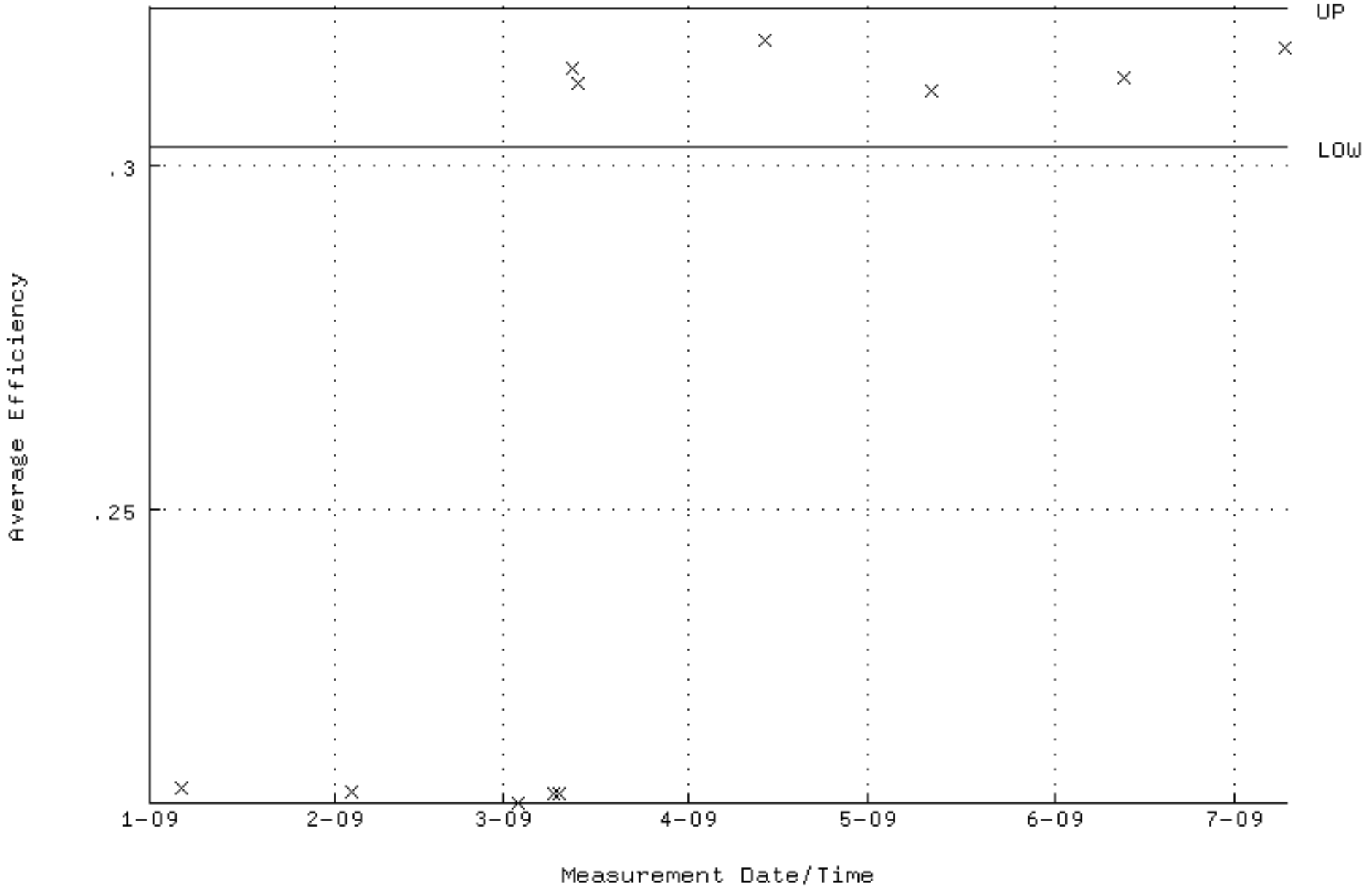
QA filename : DKA100:[ENV_ALPHA.QA.W]W042.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 27-FEB-2009 07:22:38 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 80.6389 through 89.1273



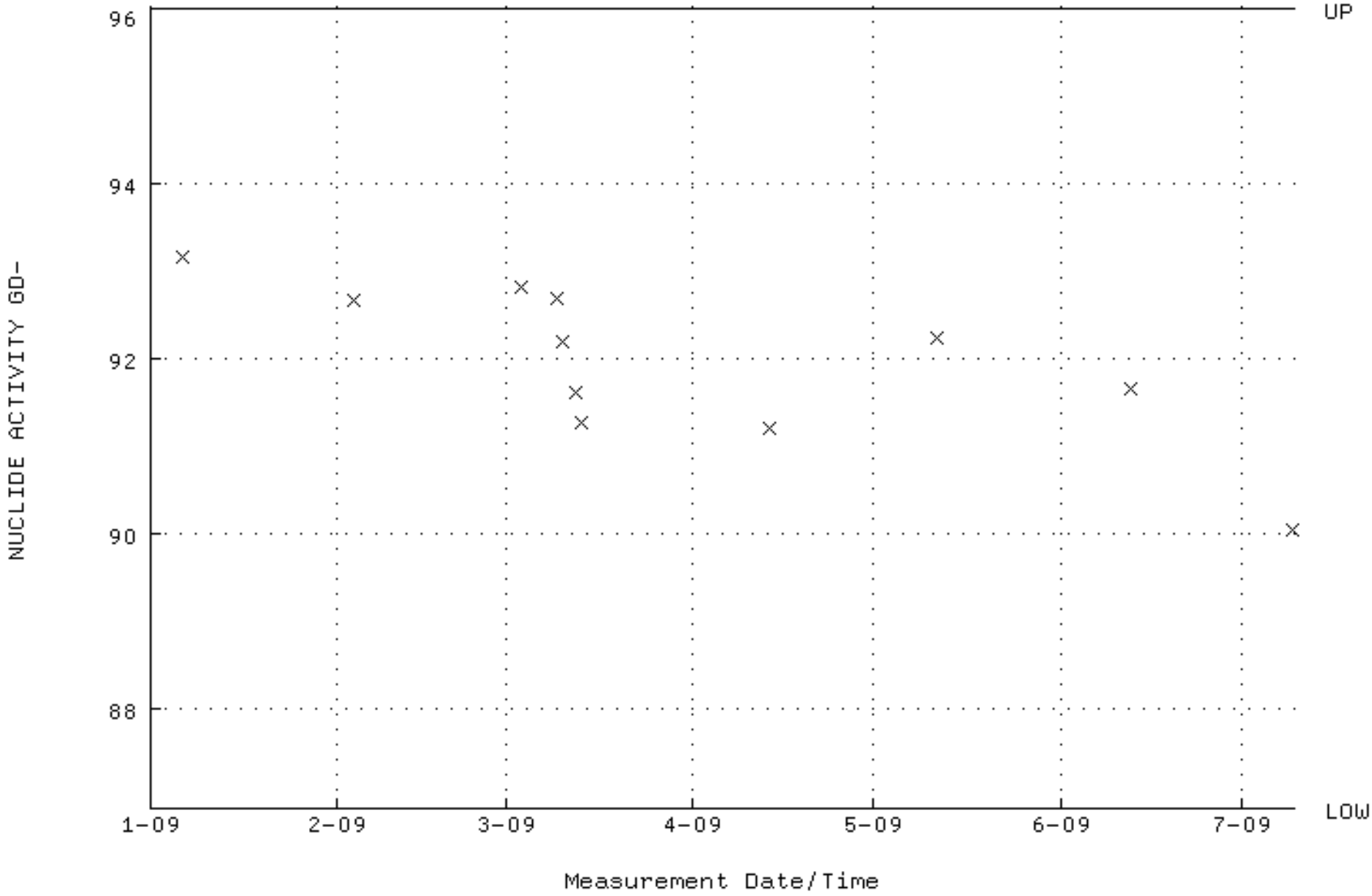
QA filename : DKA100:[ENV_ALPHA.QA.B]B042.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:21:29 through 6-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



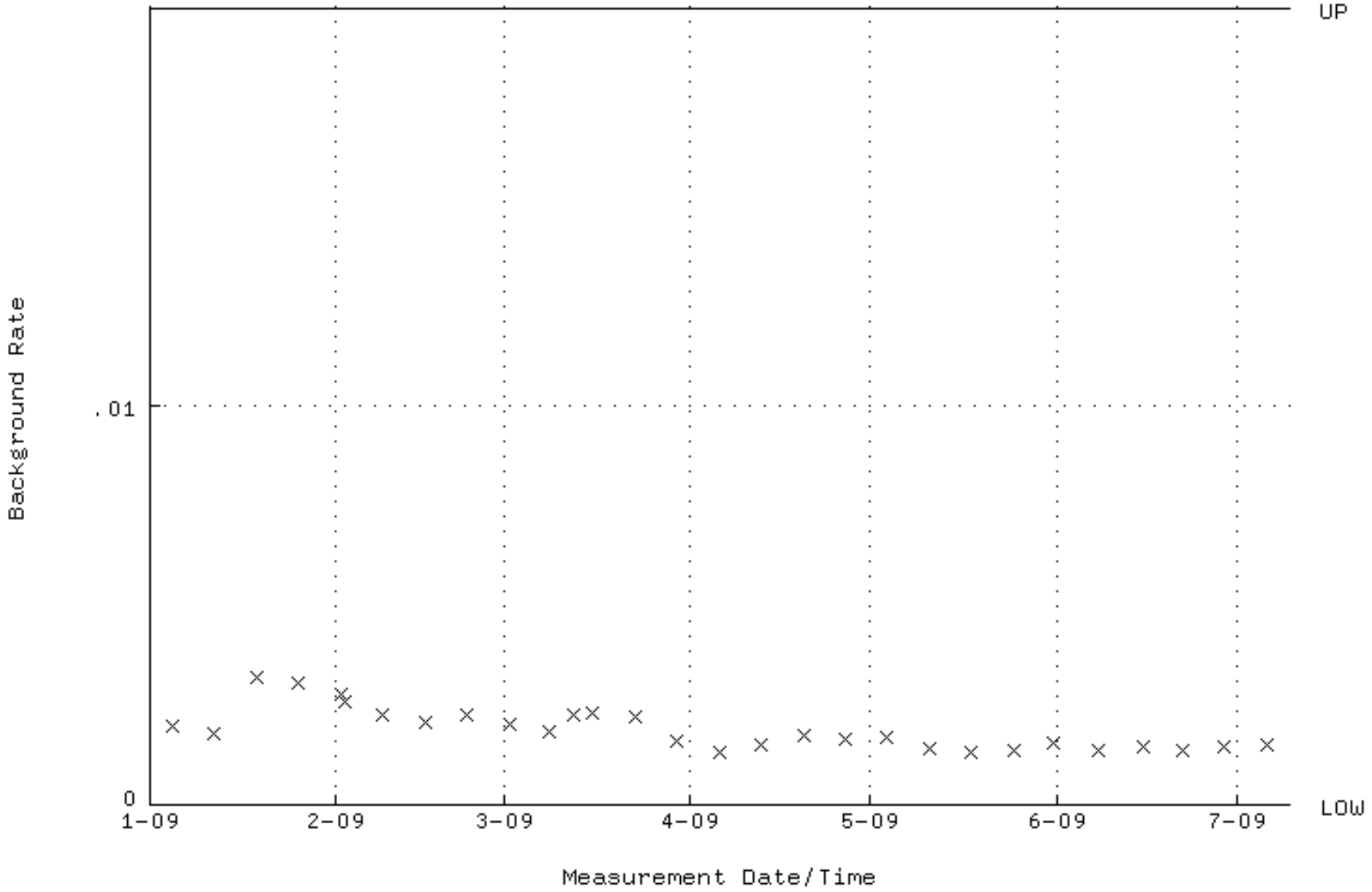
QA filename : DKA100:[ENV_ALPHA.QA.W]W065.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 6-JAN-2009 07:53:20 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.302750 through 0.322750



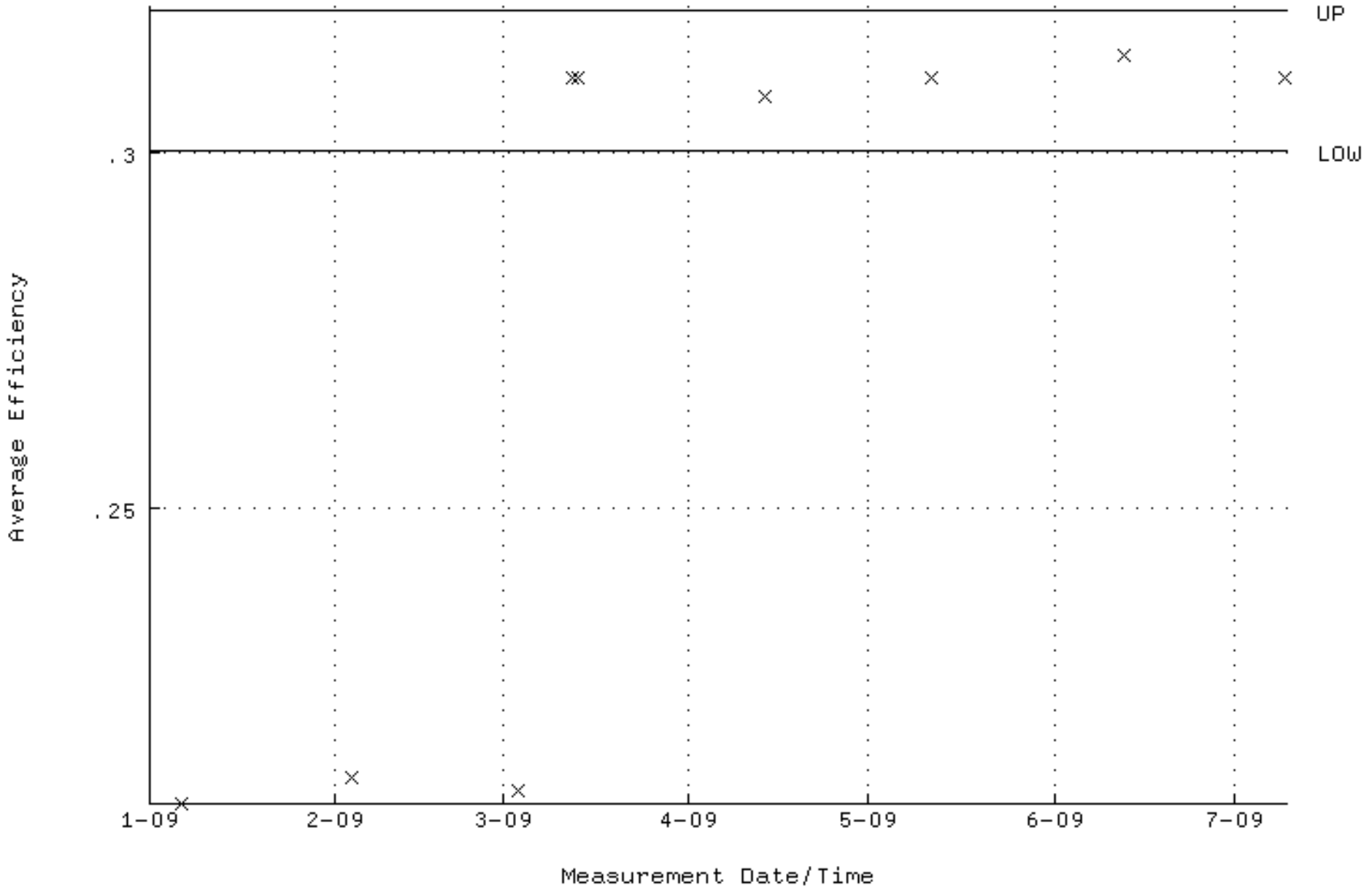
QA filename : DKA100:[ENV_ALPHA.QA.W]W065.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 6-JAN-2009 07:53:20 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 86.8638 through 96.0074



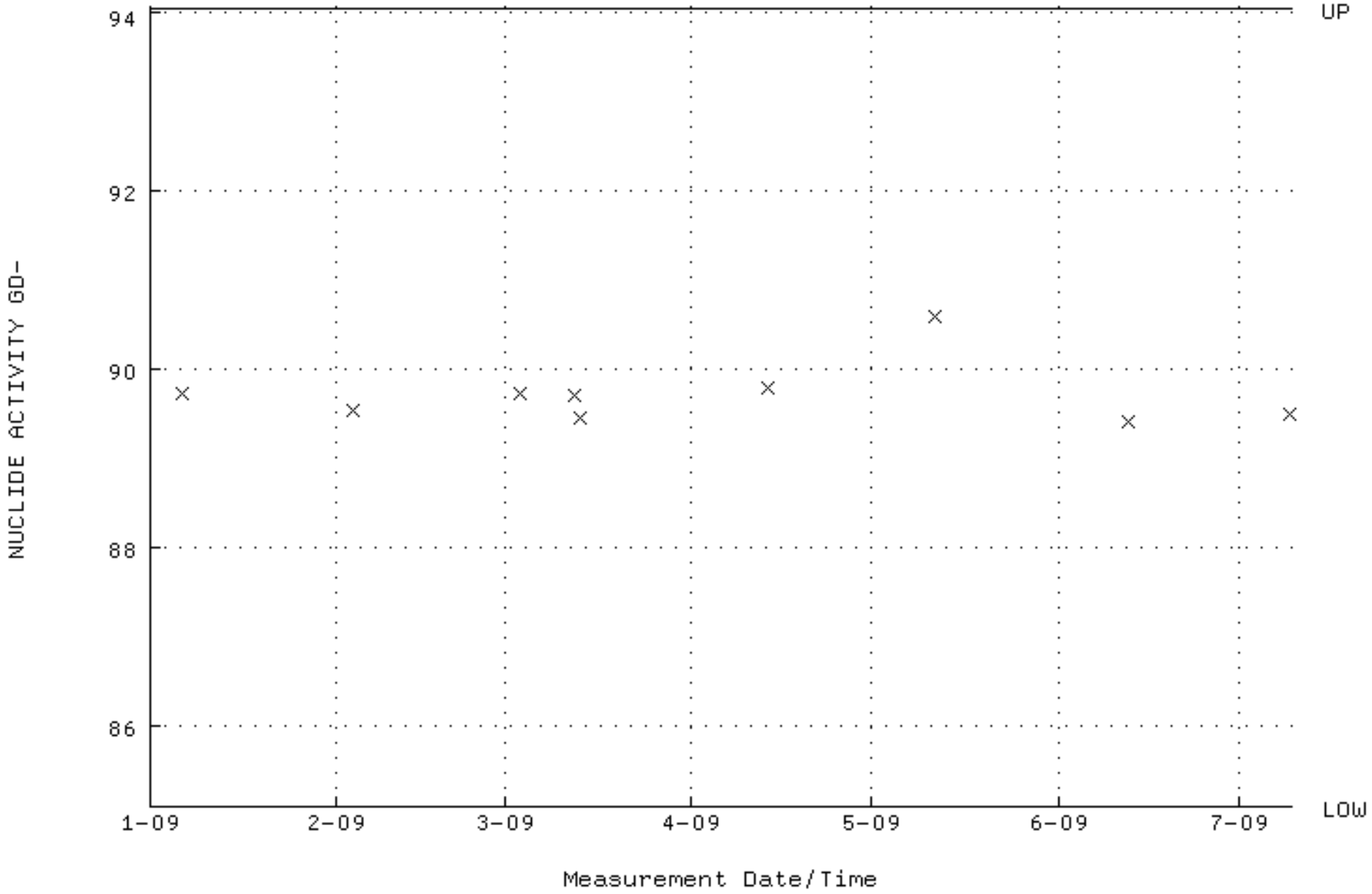
QA filename : DKA100:[ENV_ALPHA.QA.B]B065.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:21:32 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



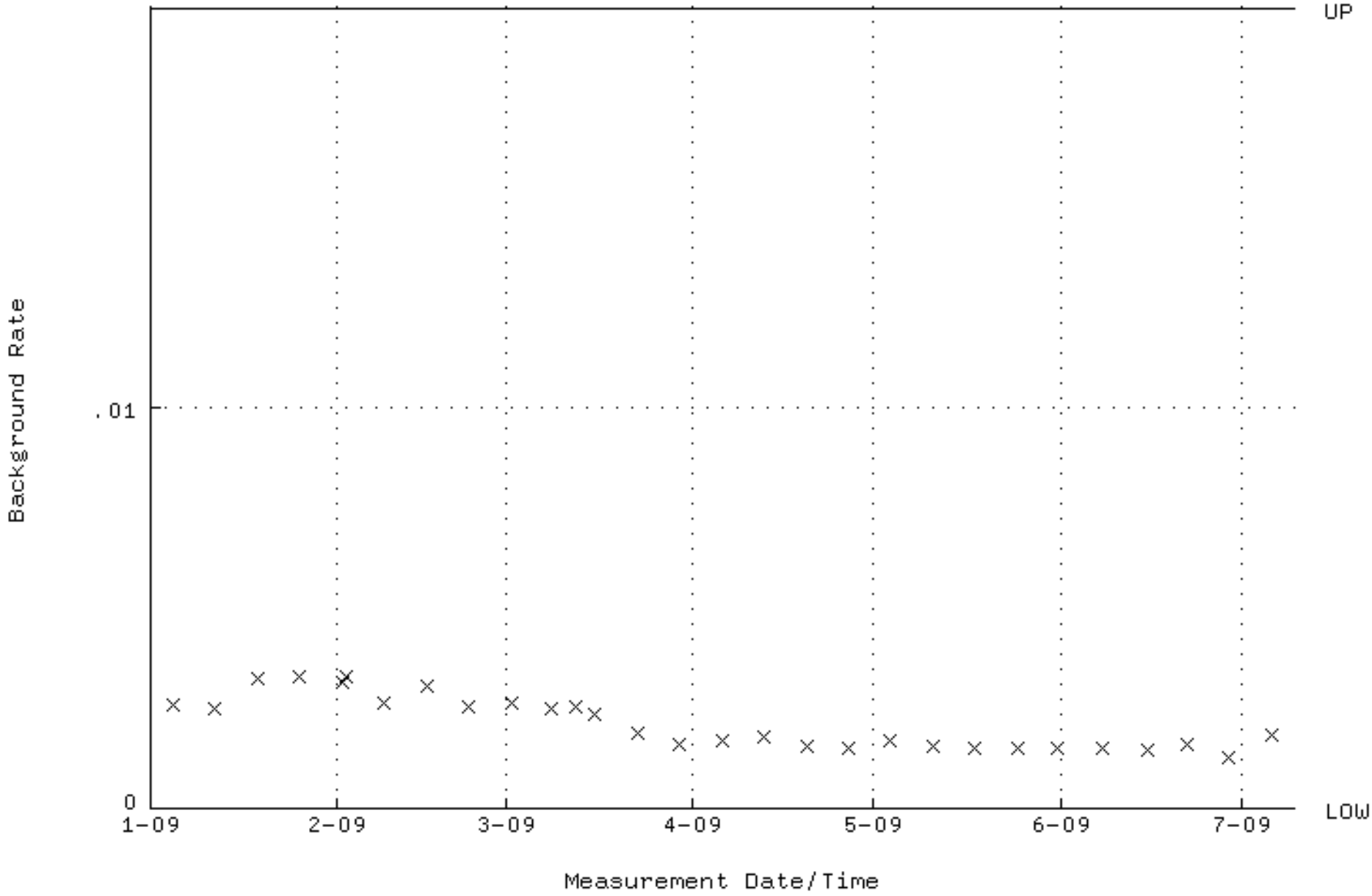
QA filename : DKA100:[ENV_ALPHA.QA.W]W066.QAF;4
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 6-JAN-2009 07:53:20 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.300416 through 0.320416



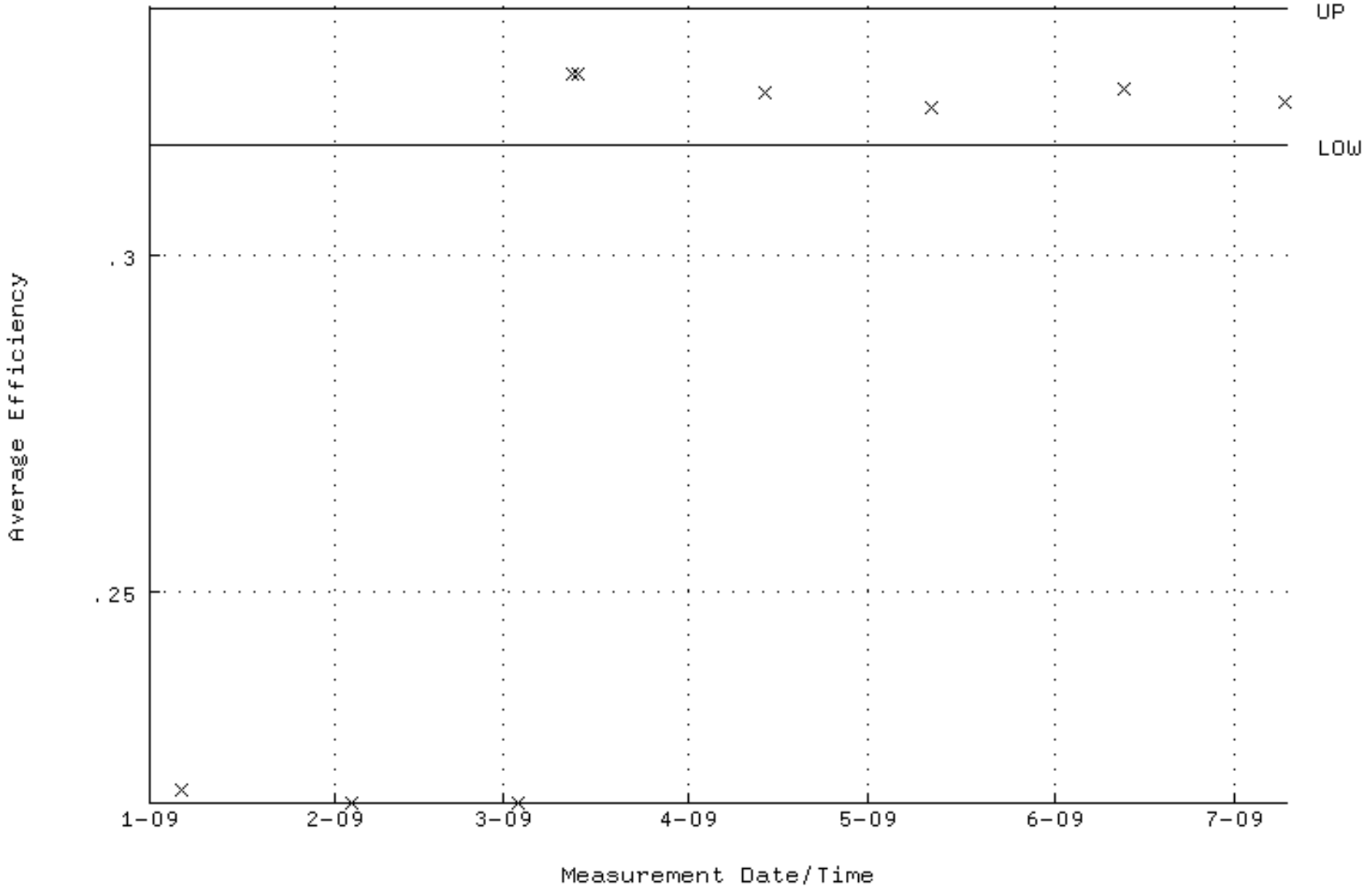
QA filename : DKA100:[ENV_ALPHA.QA.W]W066.QAF;4
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 6-JAN-2009 07:53:20 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 85.0864 through 94.0428



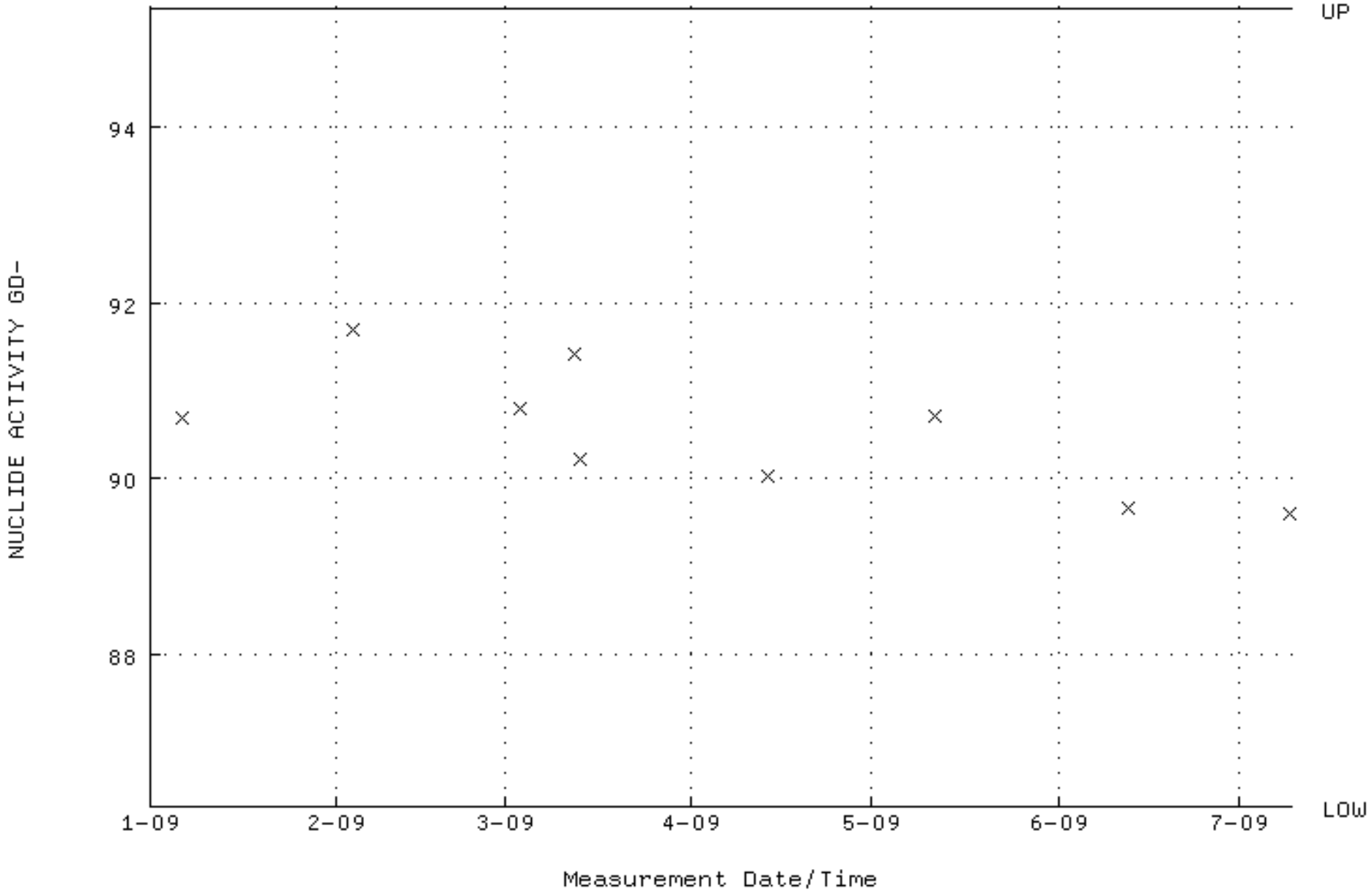
QA filename : DKA100:[ENV_ALPHA.QA.B]B066.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:21:32 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



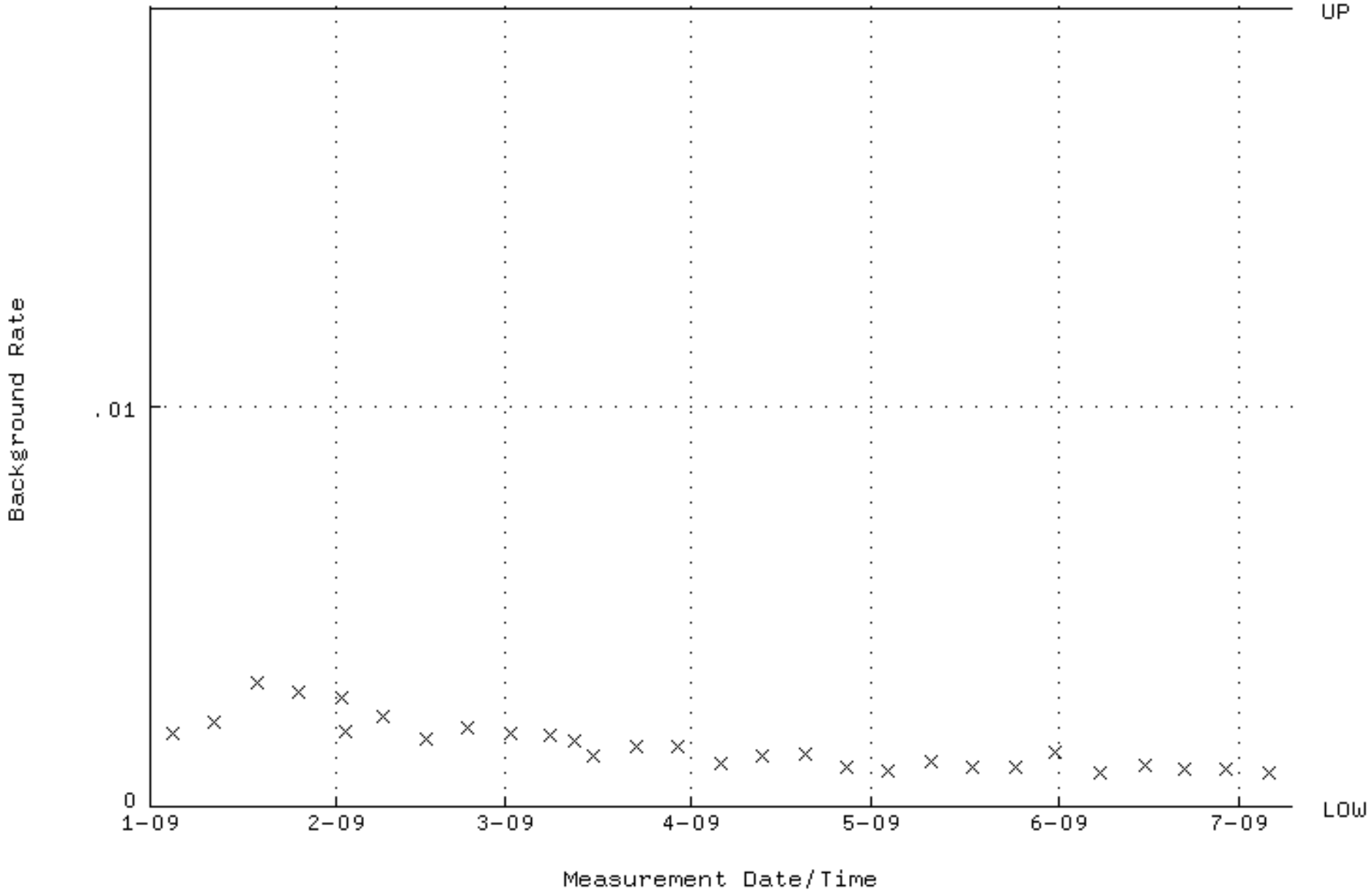
QA filename : DKA100:[ENV_ALPHA.QA.W]W067.QAF;2
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 6-JAN-2009 07:53:20 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.316597 through 0.336597



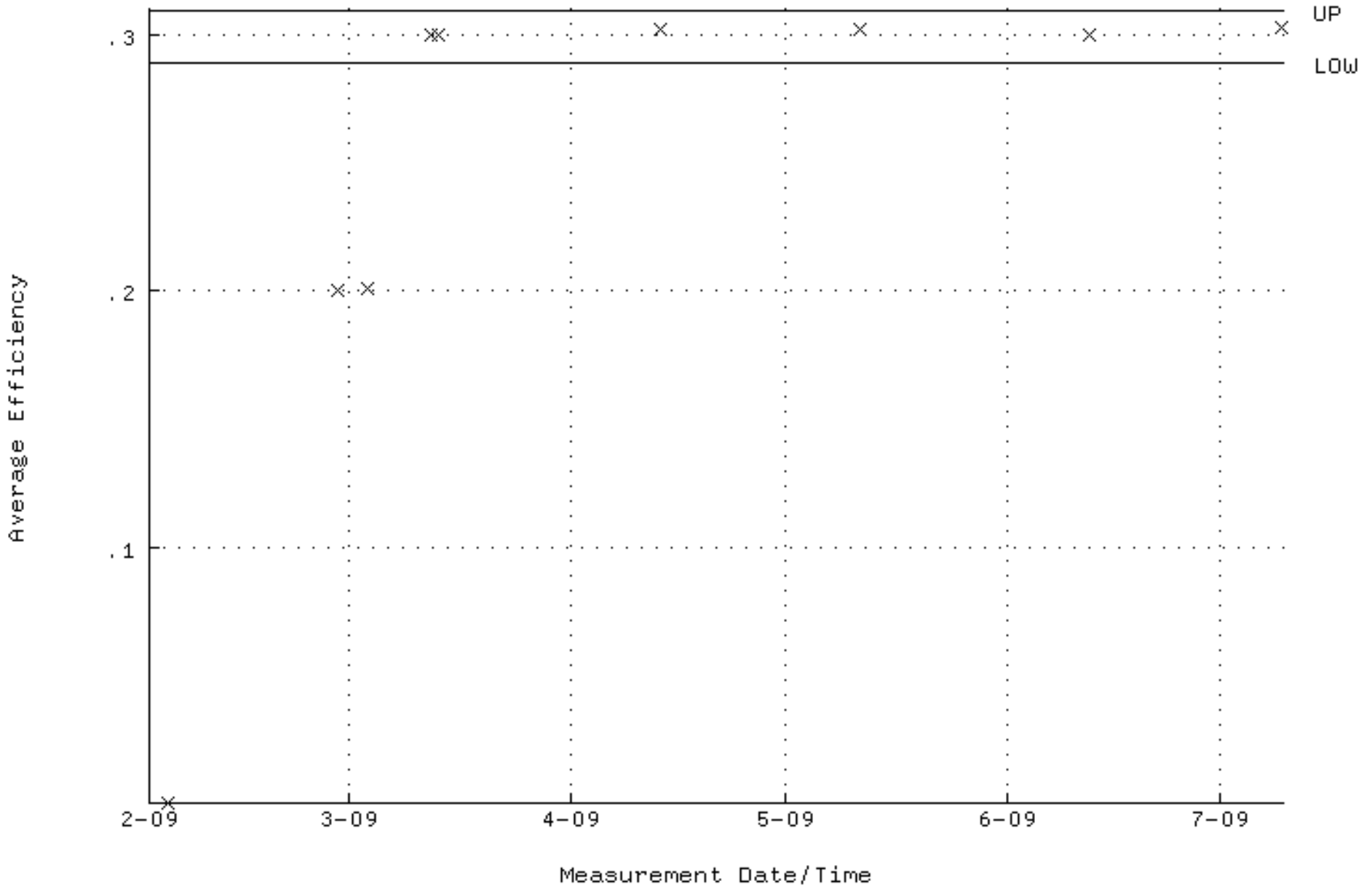
QA filename : DKA100:[ENV_ALPHA.QA.W]W067.QAF;2
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 6-JAN-2009 07:53:20 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 86.2683 through 95.3491



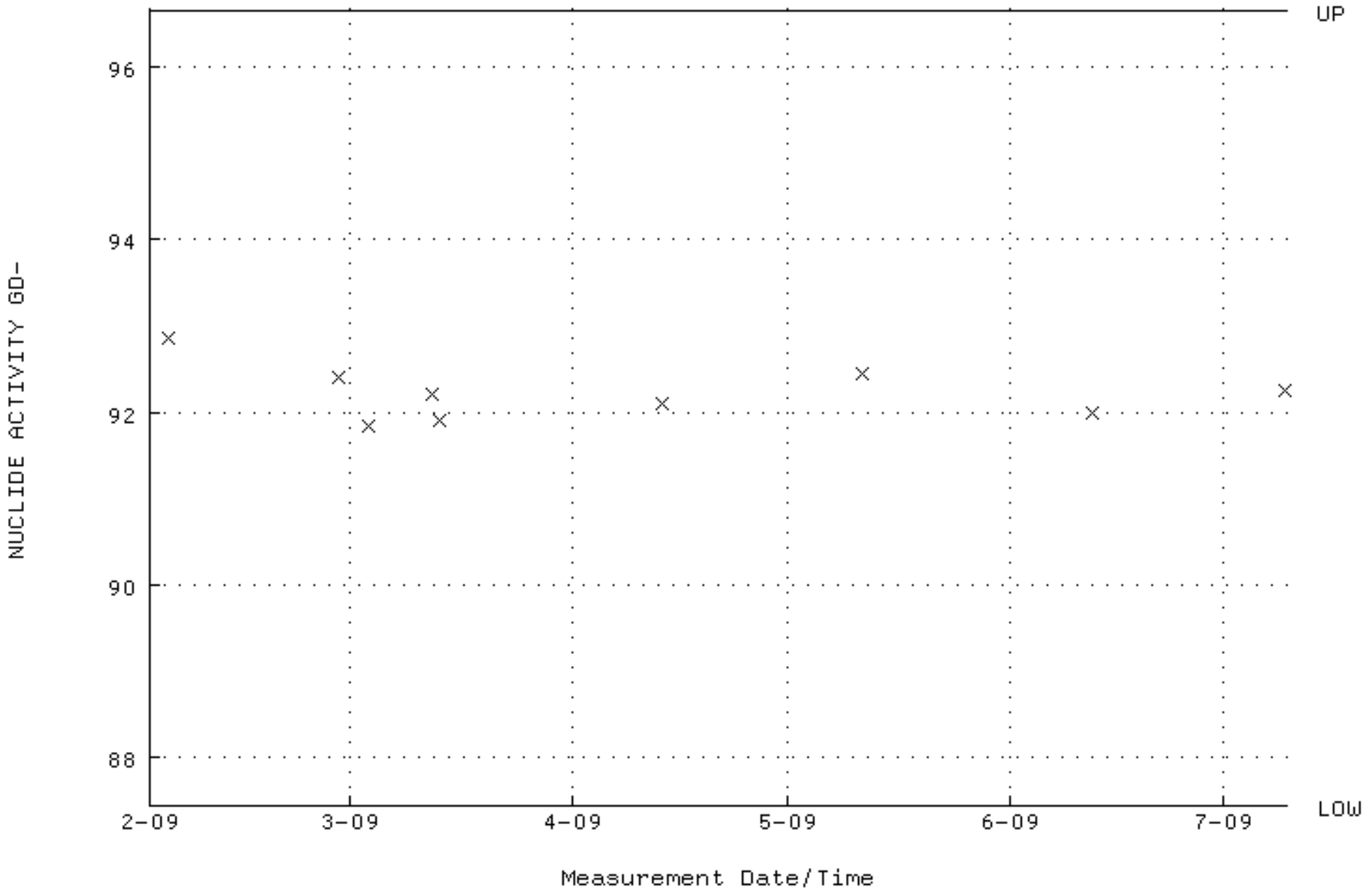
QA filename : DKA100:[ENV_ALPHA.QA.B]B067.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:21:32 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



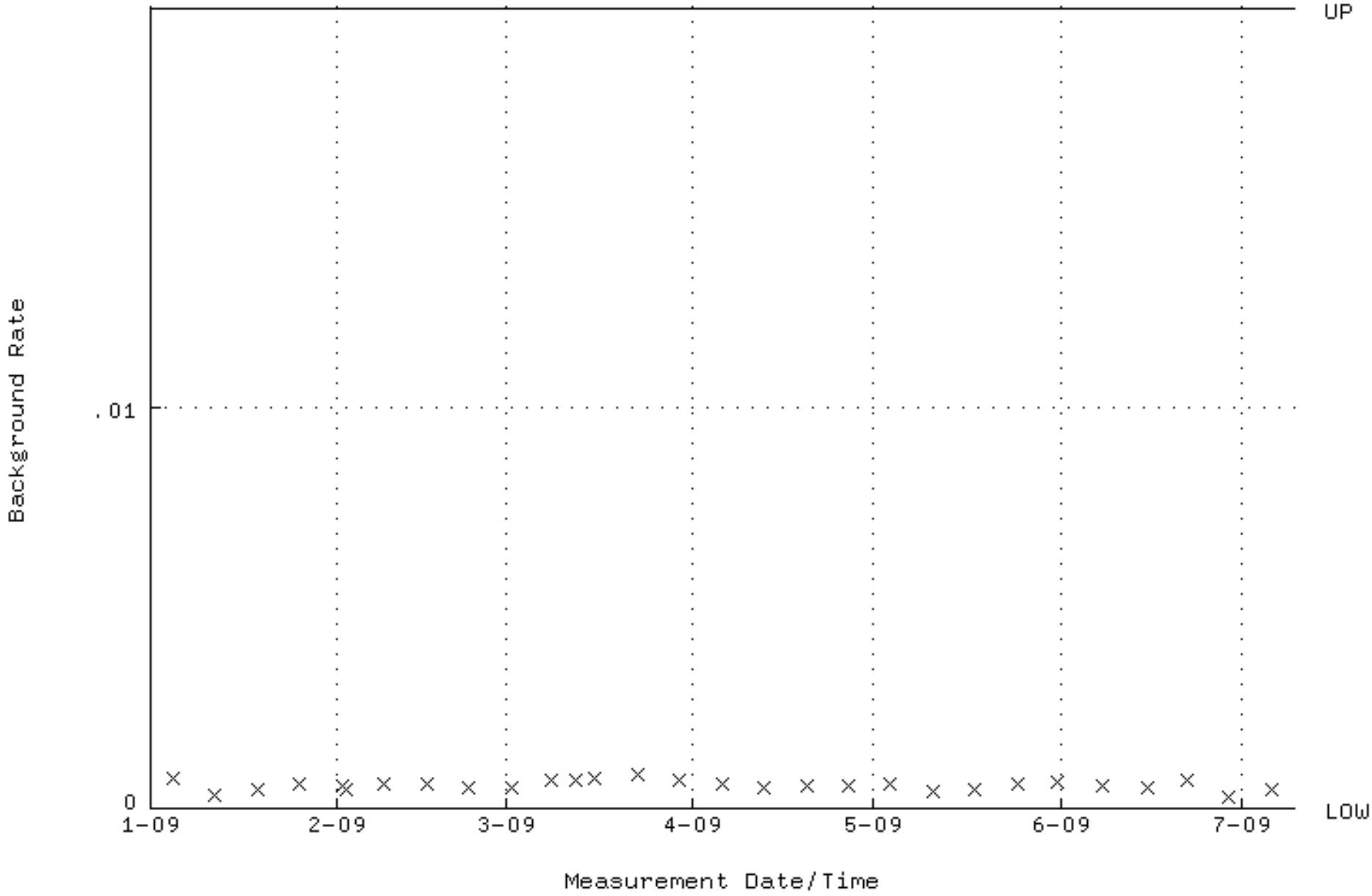
QA filename : DKA100:[ENV_ALPHA.QA.W]W068.QAF;2
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 3-FEB-2009 12:12:09 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.289178 through 0.309178



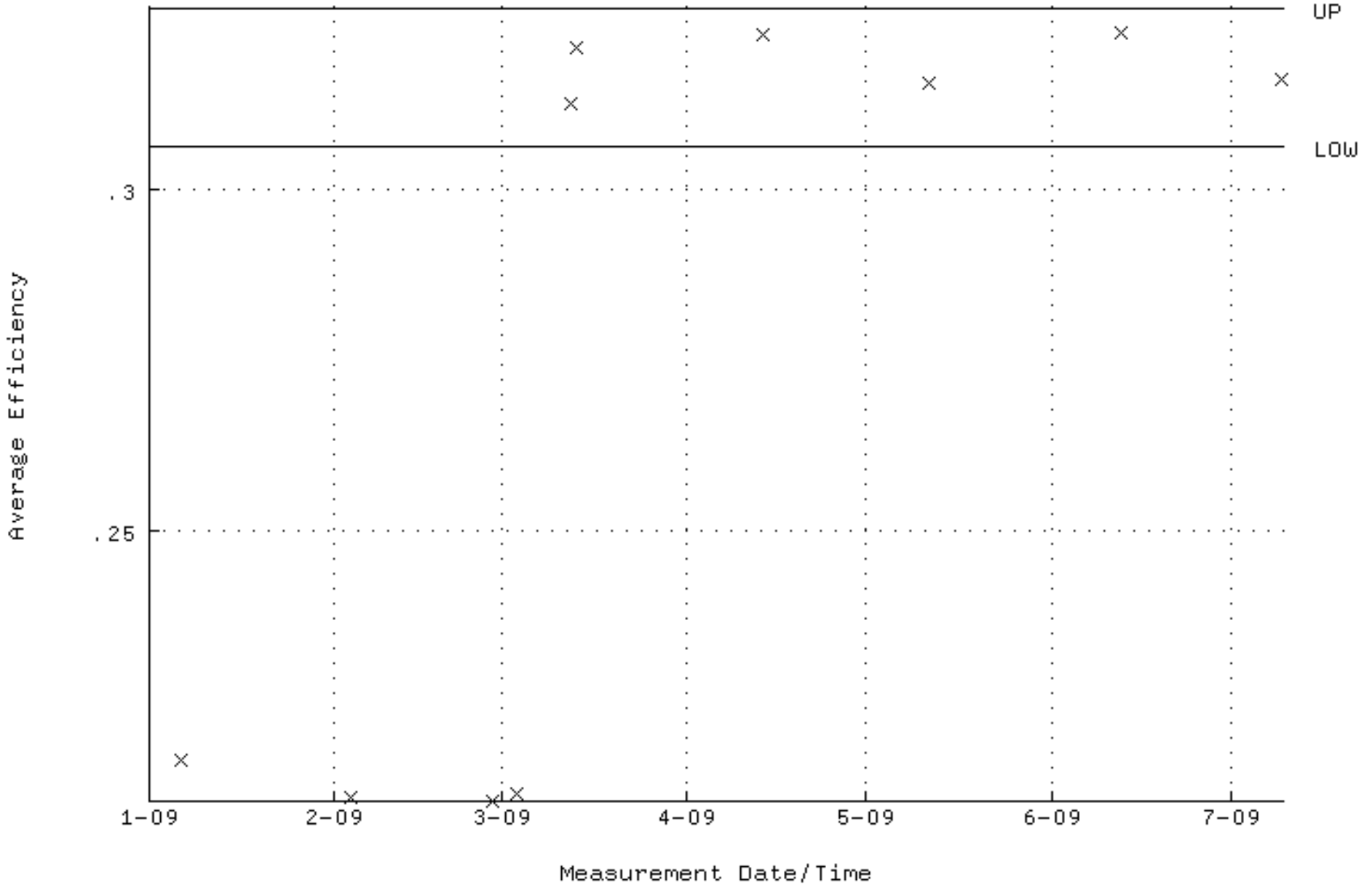
QA filename : DKA100:[ENV_ALPHA.QA.W]W068.QAF;2
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 3-FEB-2009 12:12:09 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 87.4419 through 96.6463



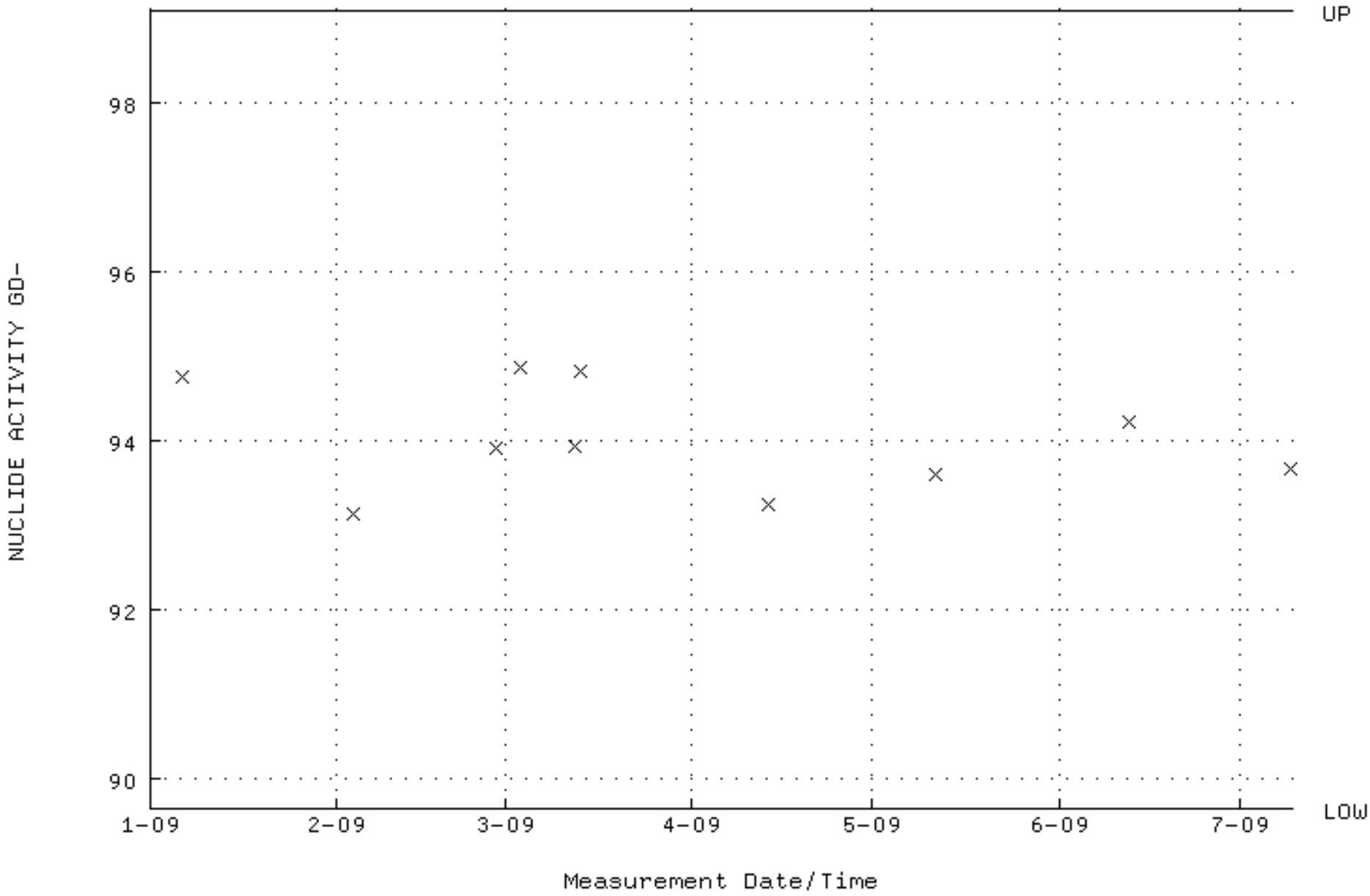
QA filename : DKA100:[ENV_ALPHA.QA.B]B068.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:21:32 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



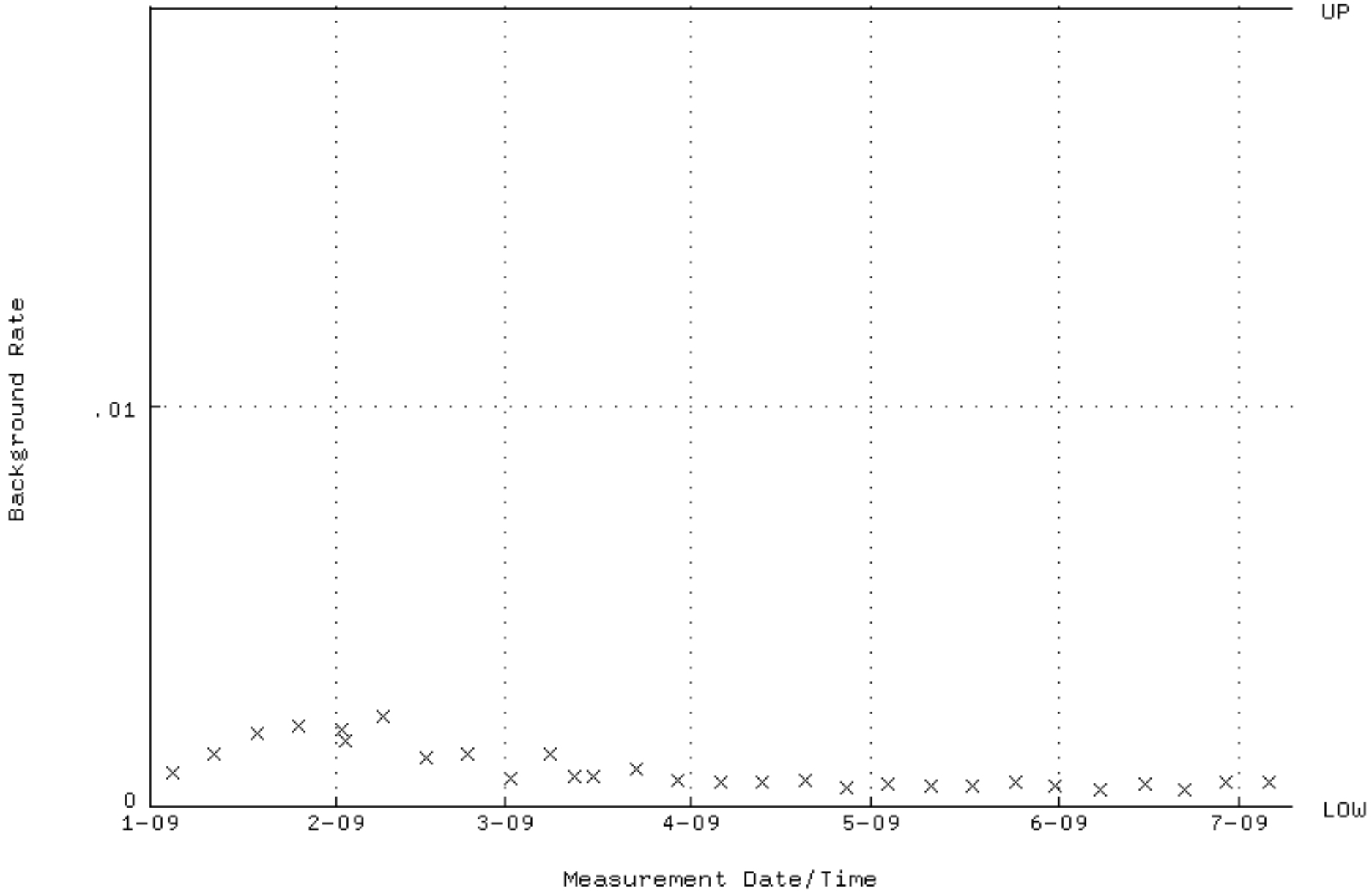
QA filename : DKA100:[ENV_ALPHA.QA.W]W069.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 6-JAN-2009 07:53:20 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.306636 through 0.326636



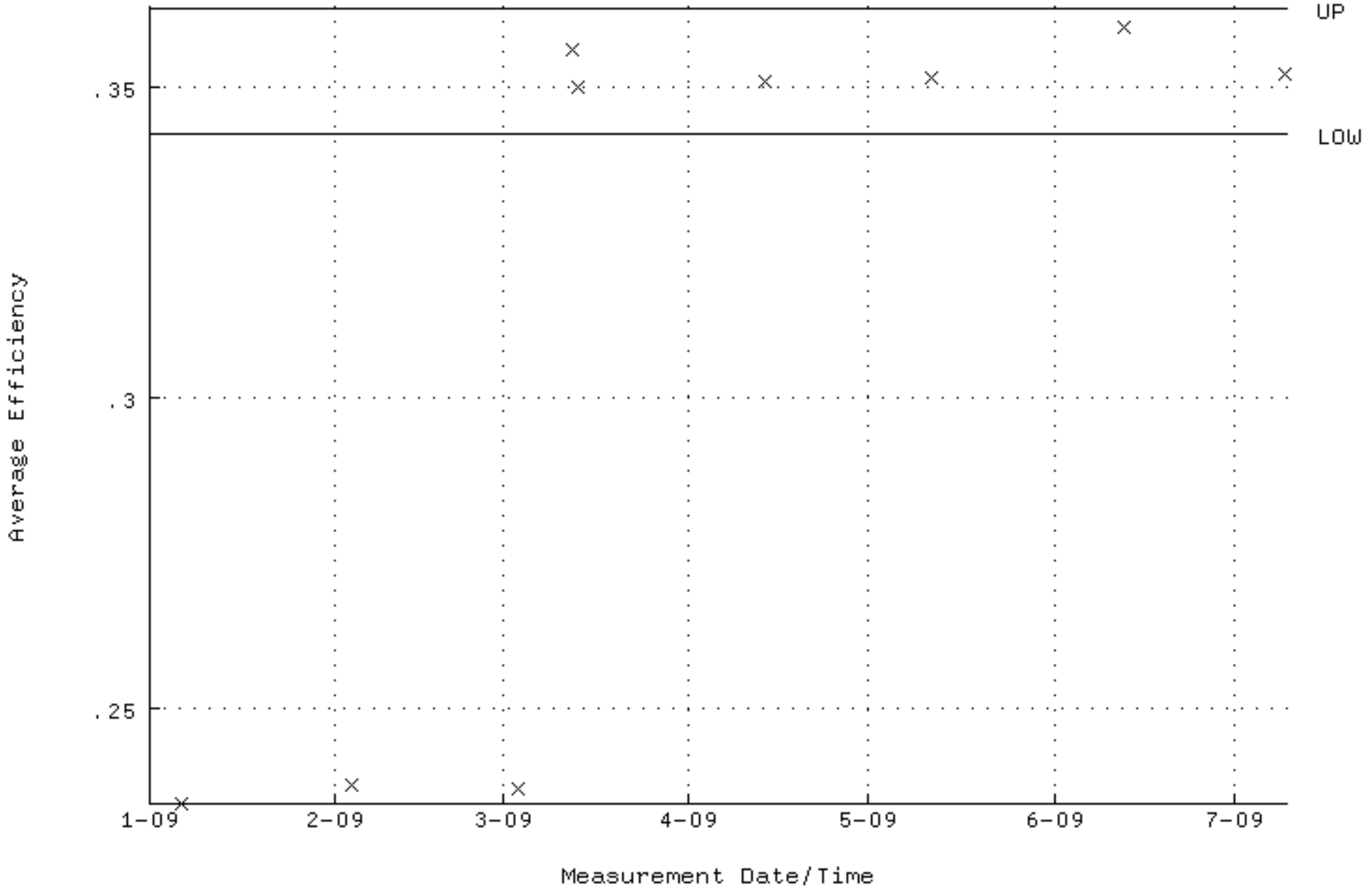
QA filename : DKA100:[ENV_ALPHA.QA.W]W069.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 6-JAN-2009 07:53:20 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 89.6479 through 99.0845



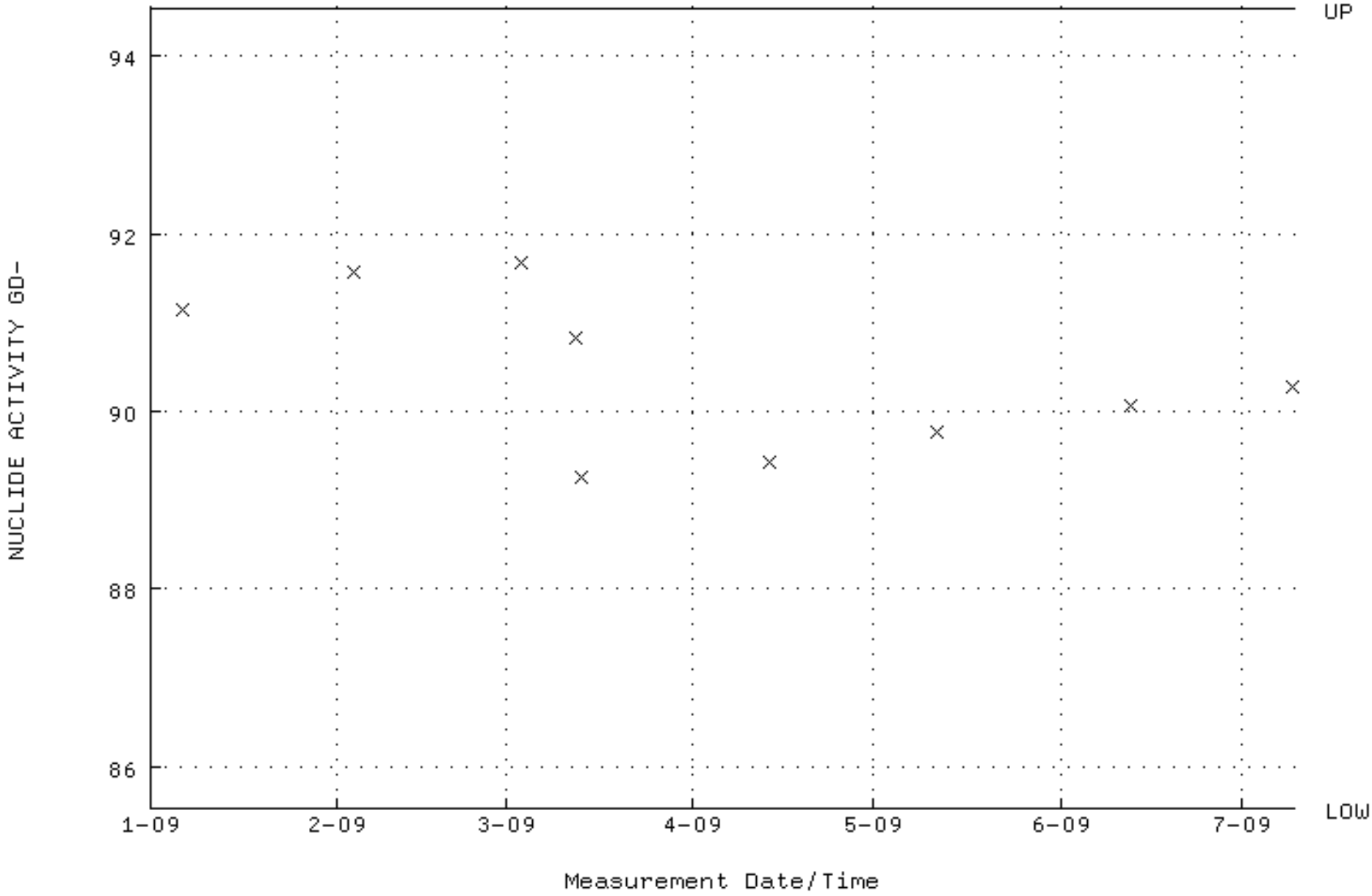
QA filename : DKA100:[ENV_ALPHA.QA.B]B069.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:21:32 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



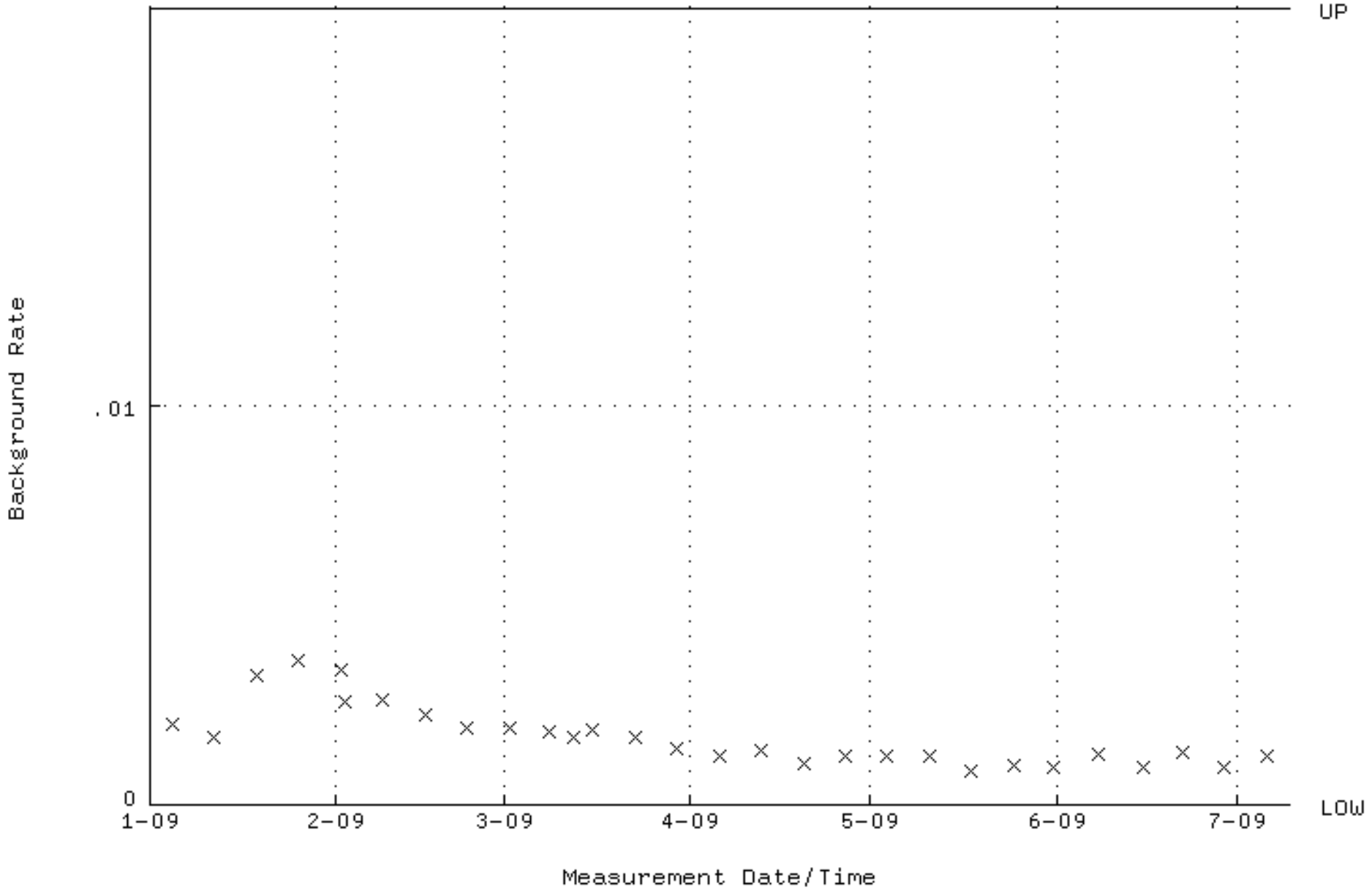
QA filename : DKA100:[ENV_ALPHA.QA.W]W070.QAF;3
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 6-JAN-2009 07:53:20 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.342785 through 0.362785



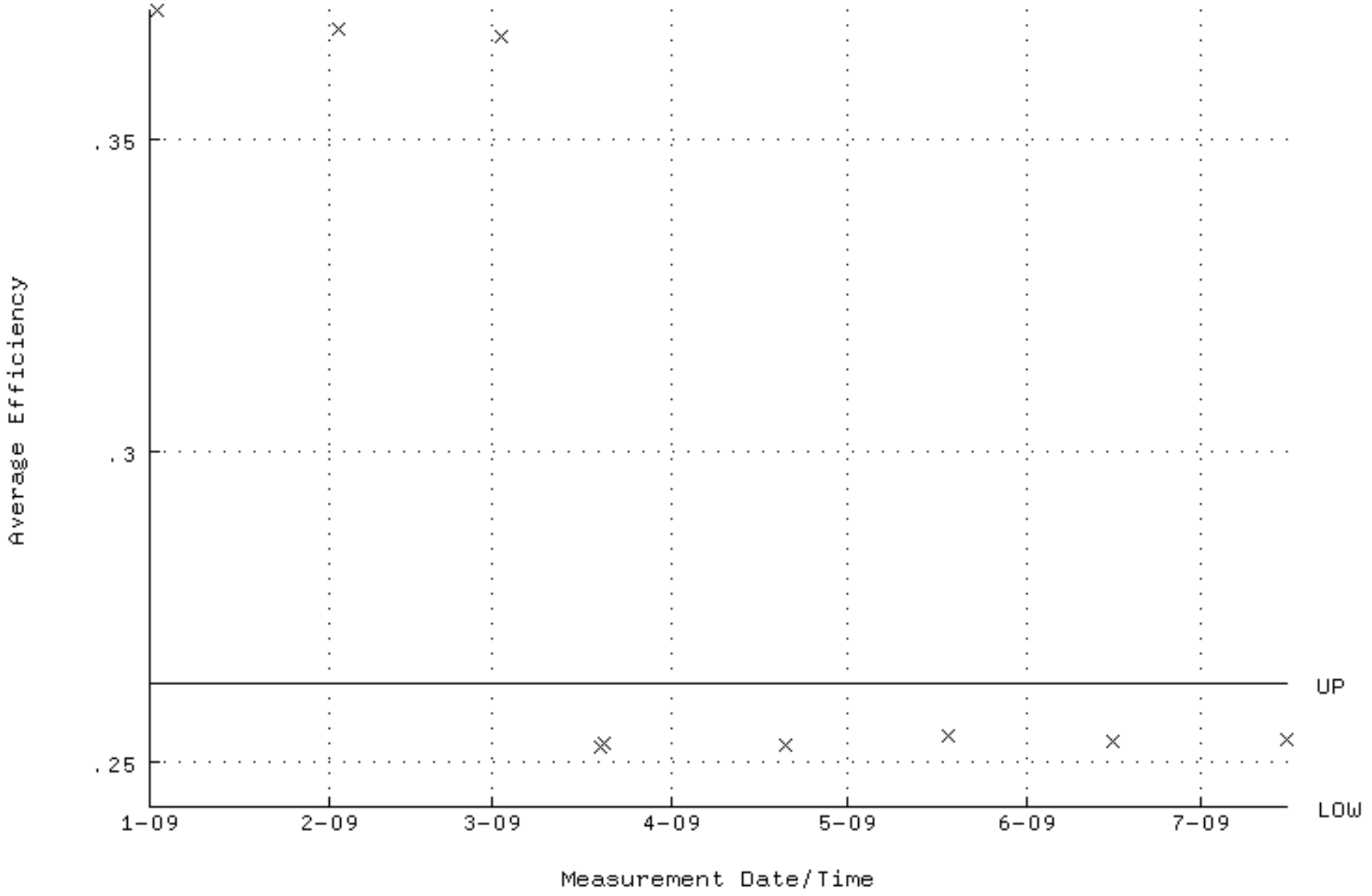
QA filename : DKA100:[ENV_ALPHA.QA.W]W070.QAF;3
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 6-JAN-2009 07:53:20 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 85.5293 through 94.5323



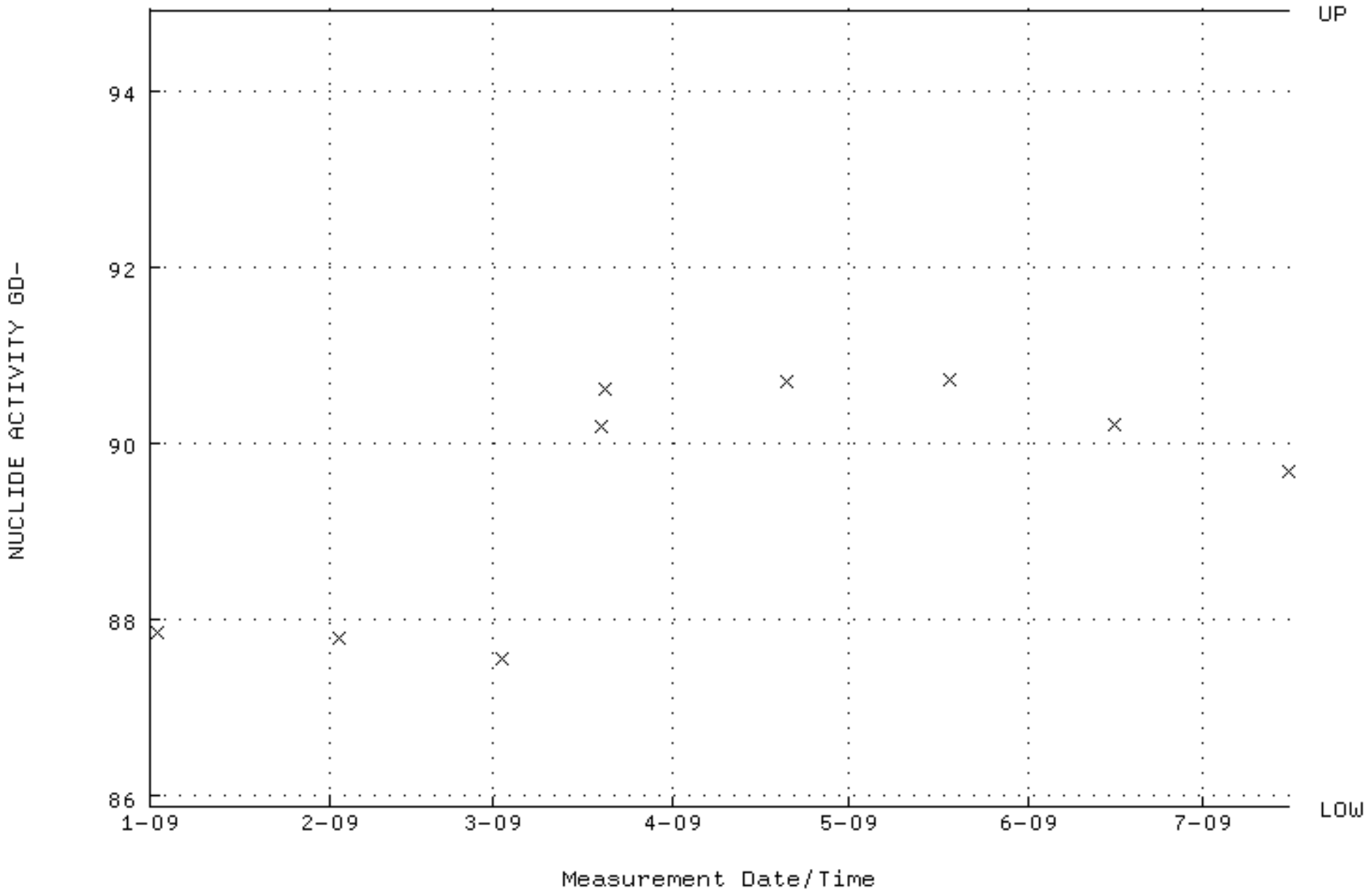
QA filename : DKA100:[ENV_ALPHA.QA.B]B070.QAF;2
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:21:32 through 9-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 2.000000E-02



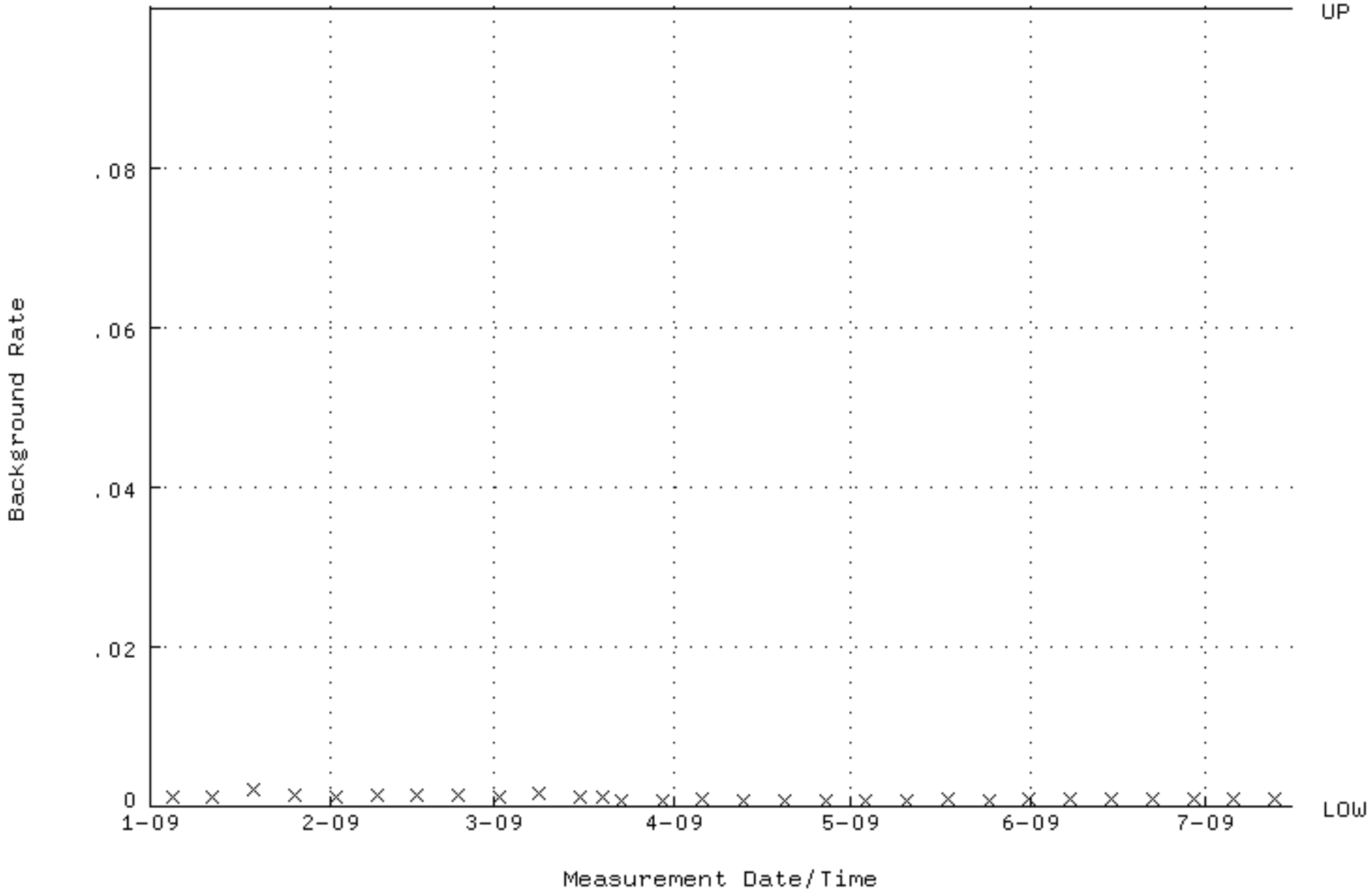
QA filename : DKA100:[ENV_ALPHA.QA.W]W117.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:22:59 through 15-JUL-2009 12:00:00
Lower/Upper Lmts: 0.242940 through 0.262940



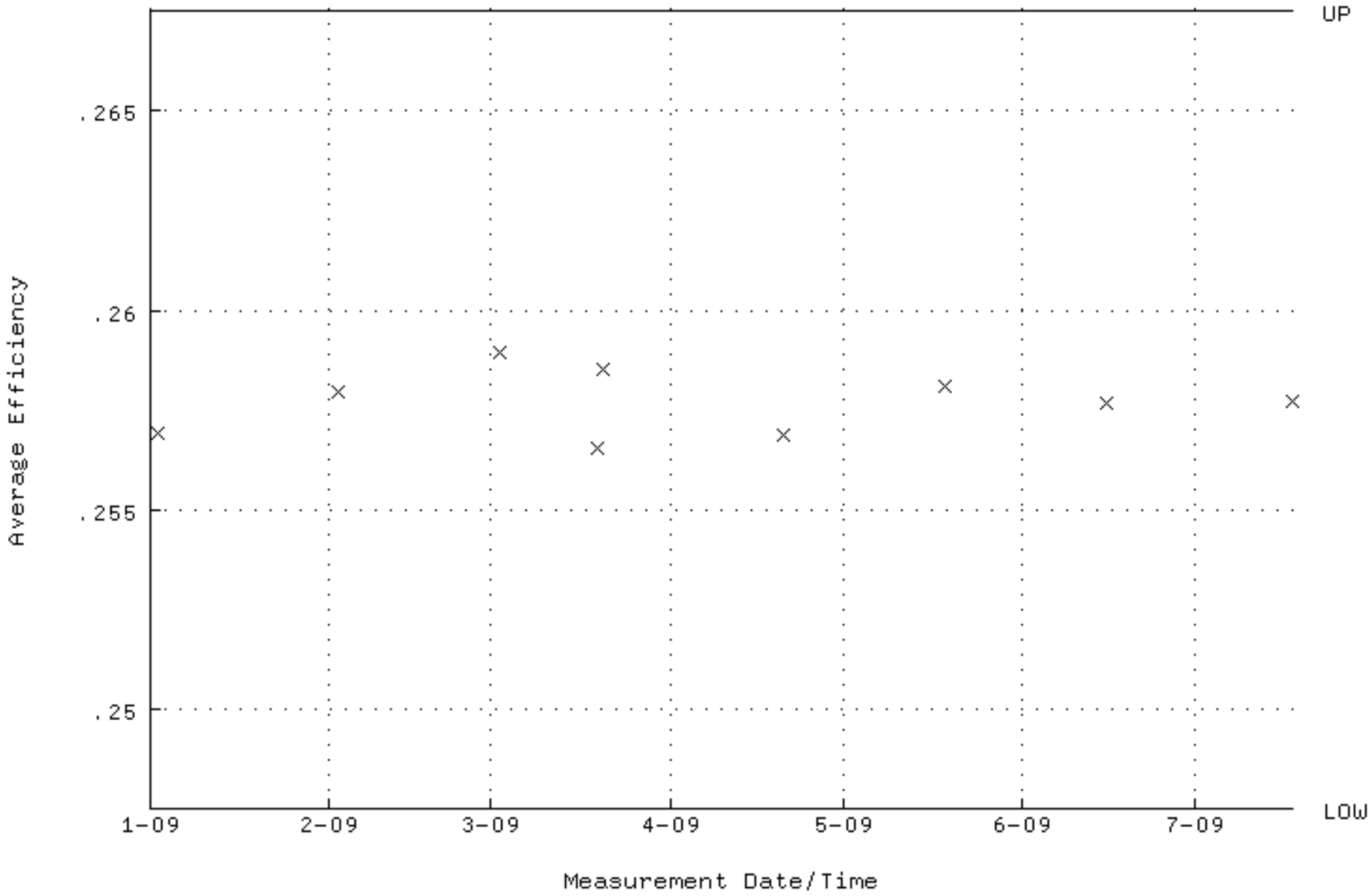
QA filename : DKA100:[ENV_ALPHA.QA.W]W117.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:22:59 through 15-JUL-2009 12:00:00
Lower/Upper Lmts: 85.8693 through 94.9081



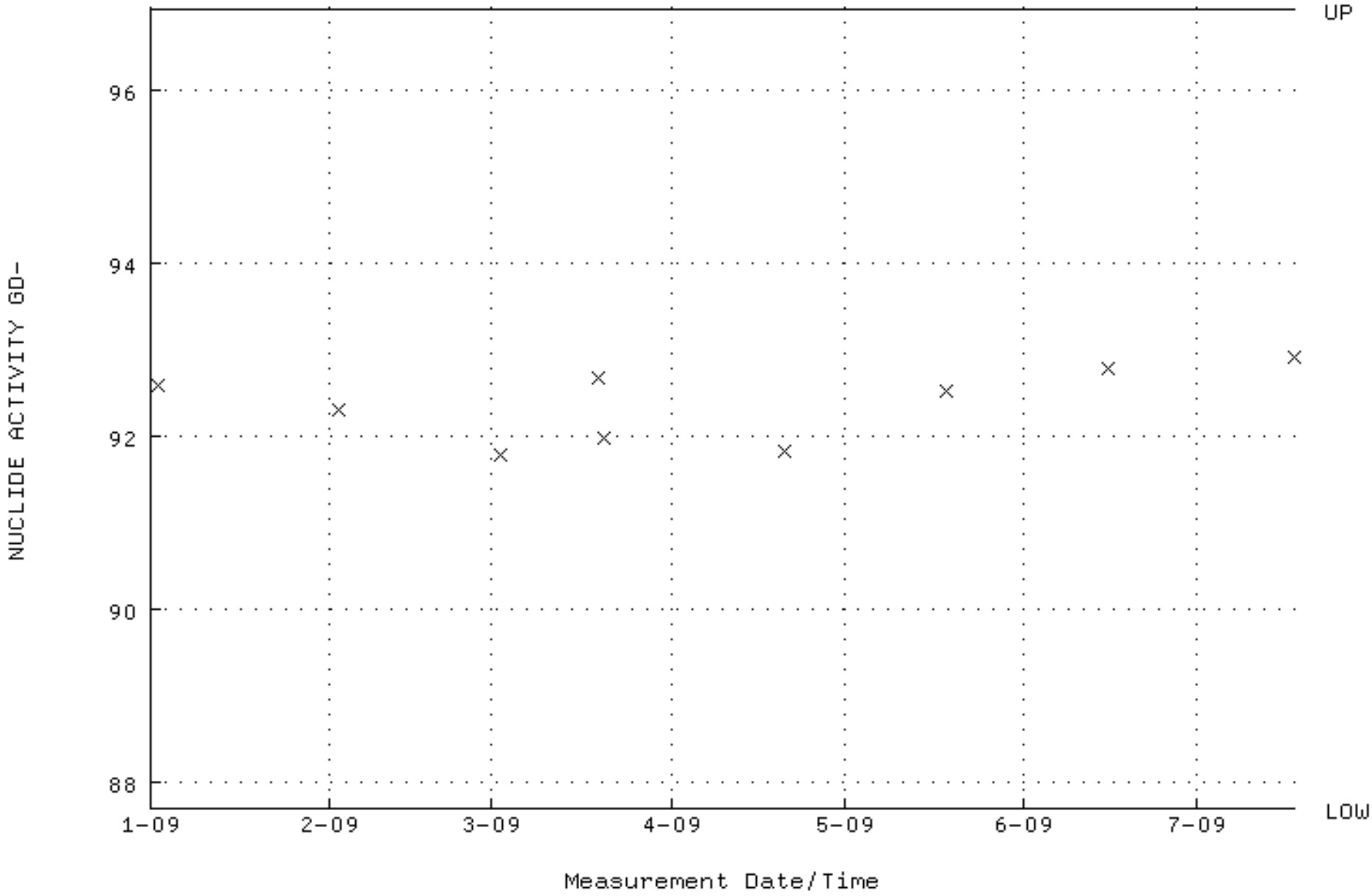
QA filename : DKA100:[ENV_ALPHA.QA.B]B117.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:22:06 through 15-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



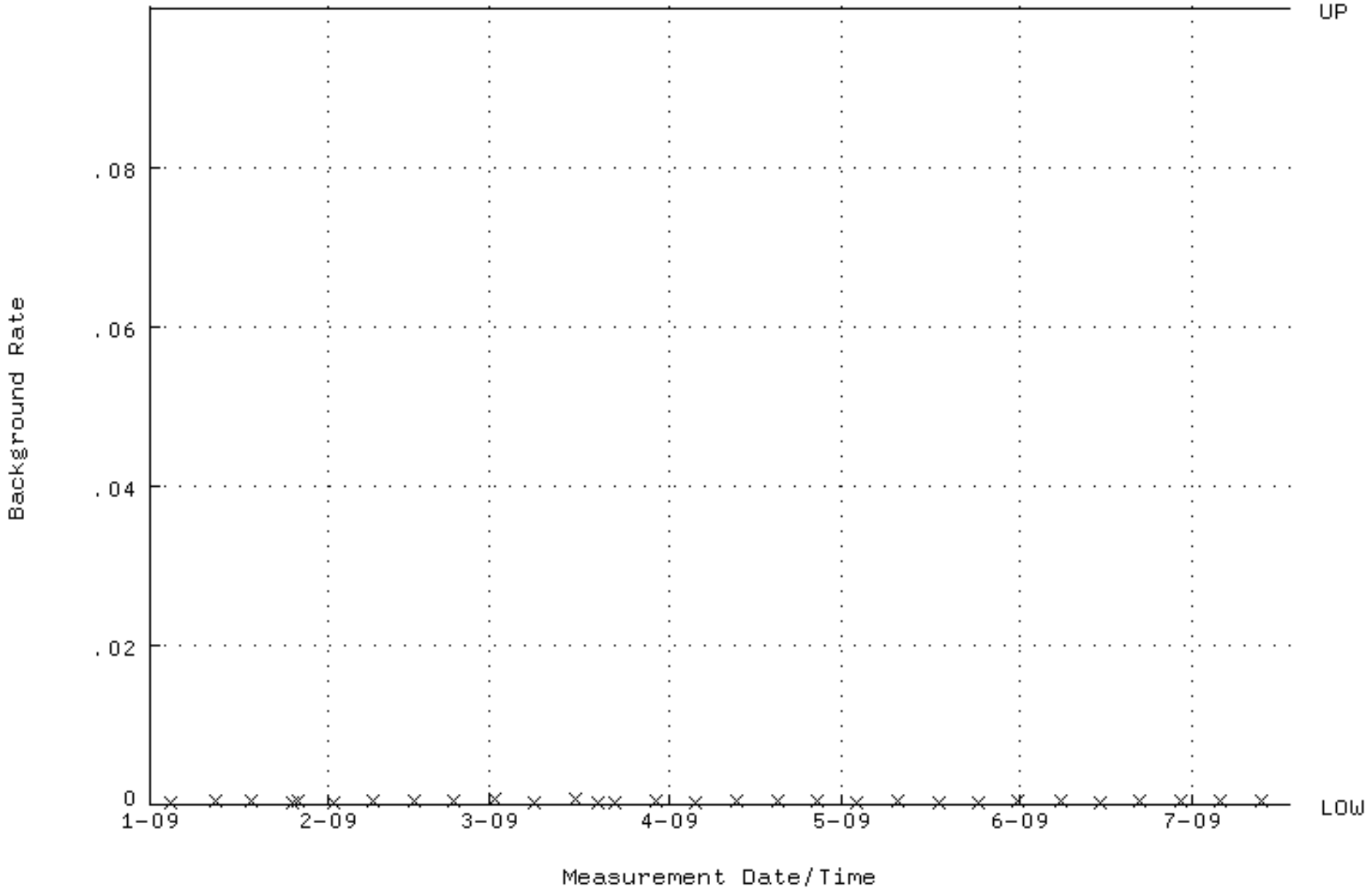
QA filename : DKA100:[ENV_ALPHA.QA.W]W125.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:23:39 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.247512 through 0.267512



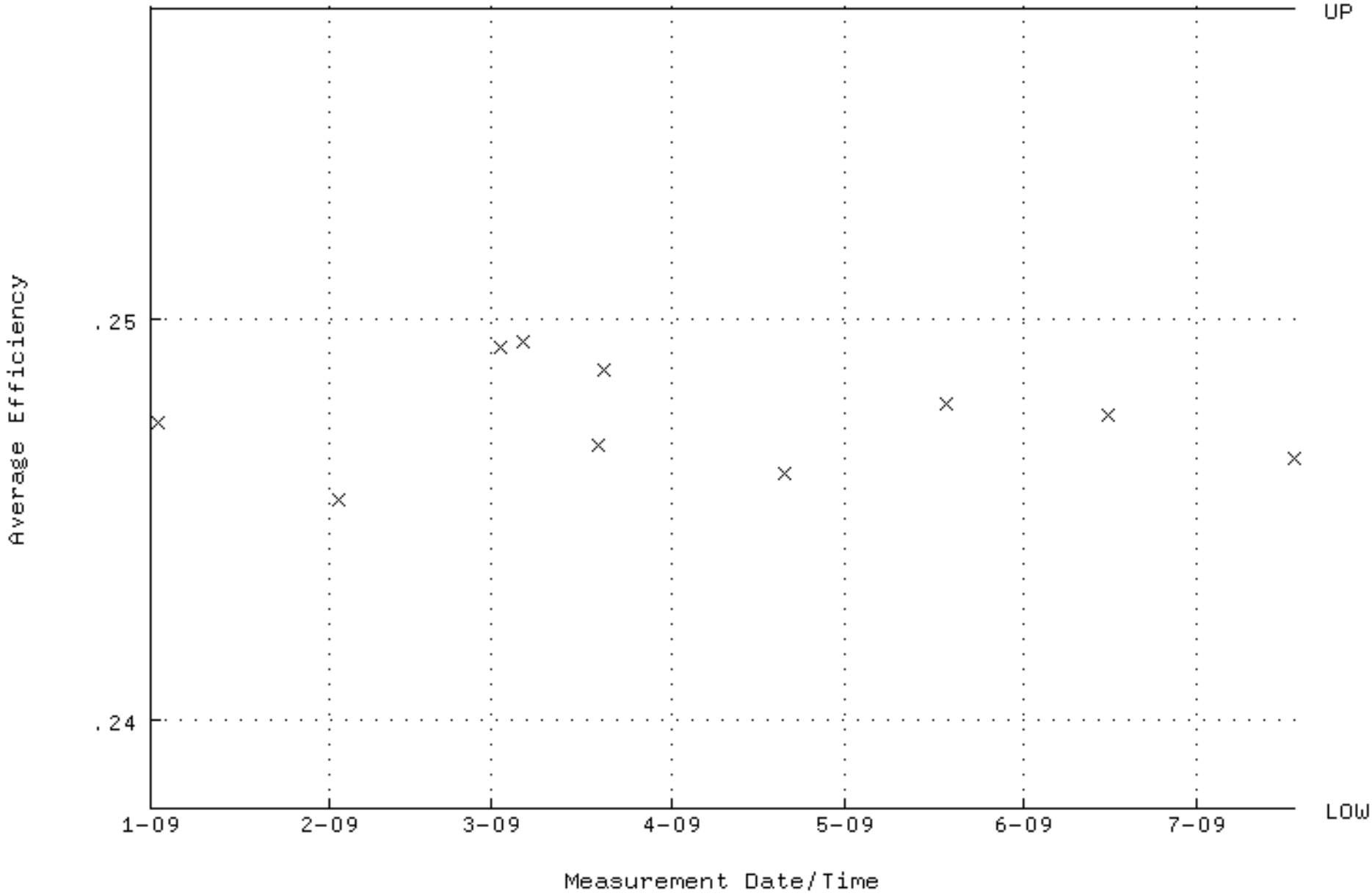
QA filename : DKA100:[ENV_ALPHA.QA.W]W125.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:23:39 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 87.6956 through 96.9268



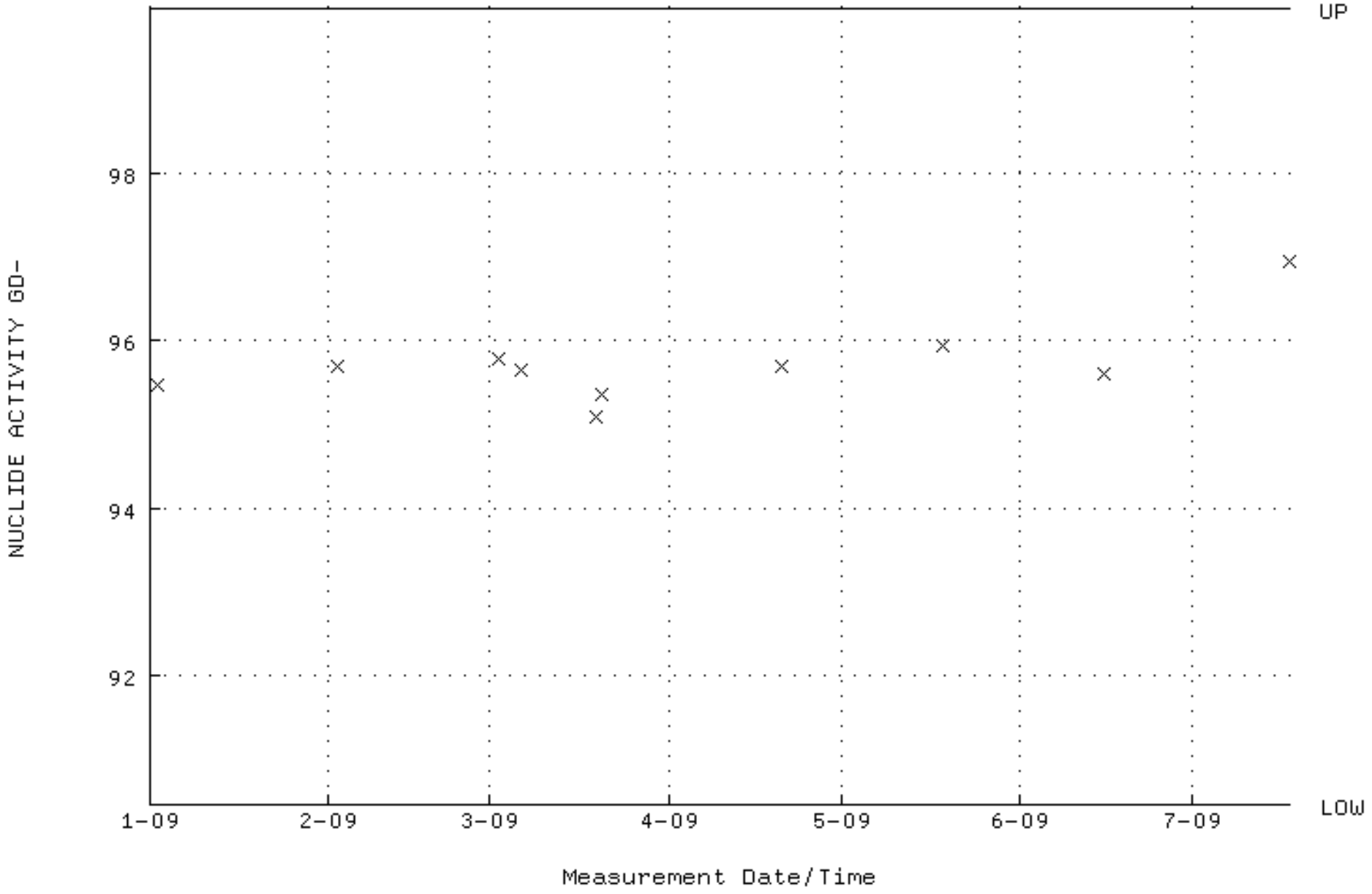
QA filename : DKA100:[ENV_ALPHA.QA.B]B125.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:22:39 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



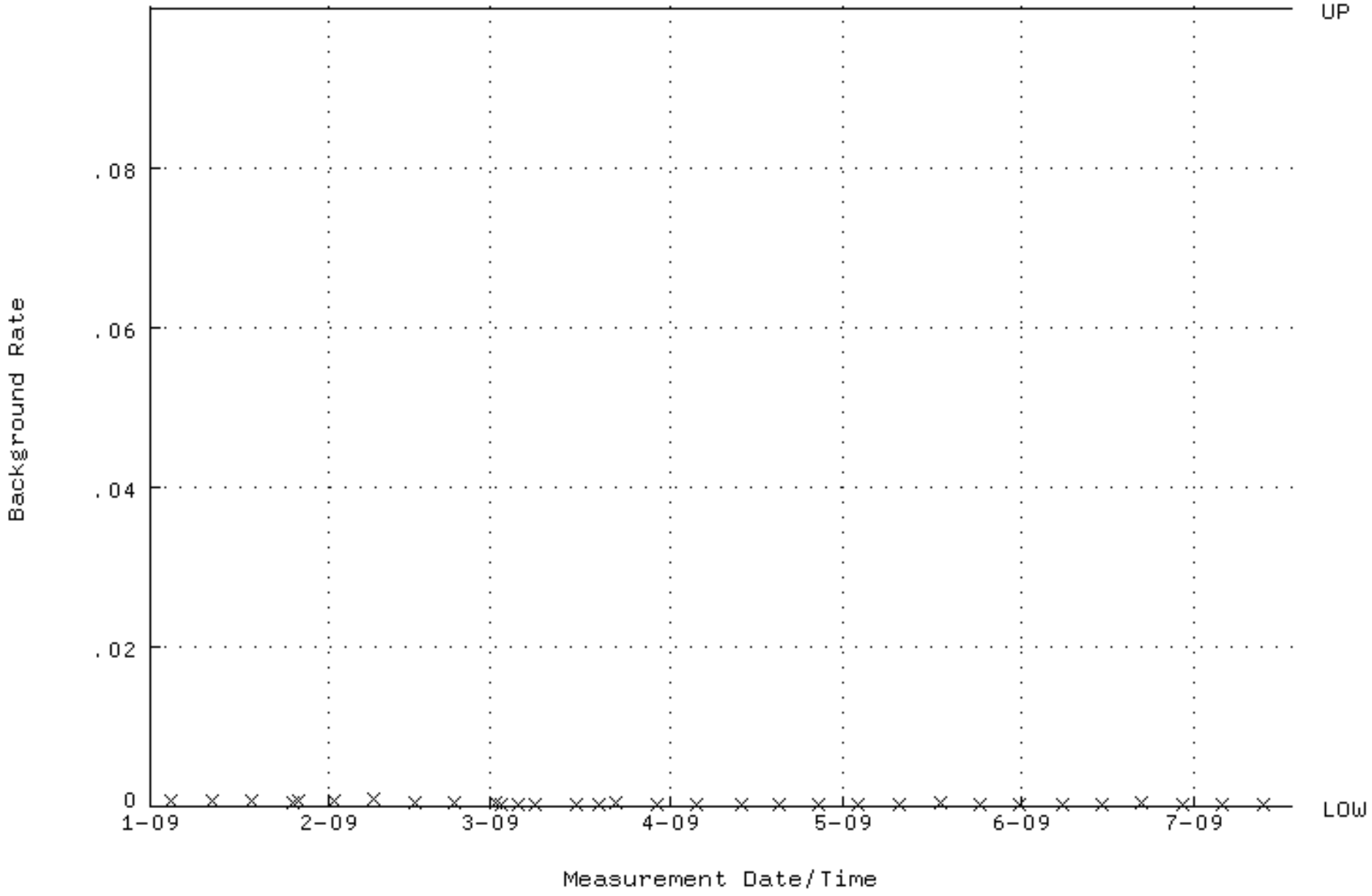
QA filename : DKA100:[ENV_ALPHA.QA.W]W127.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:23:48 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.237773 through 0.257773



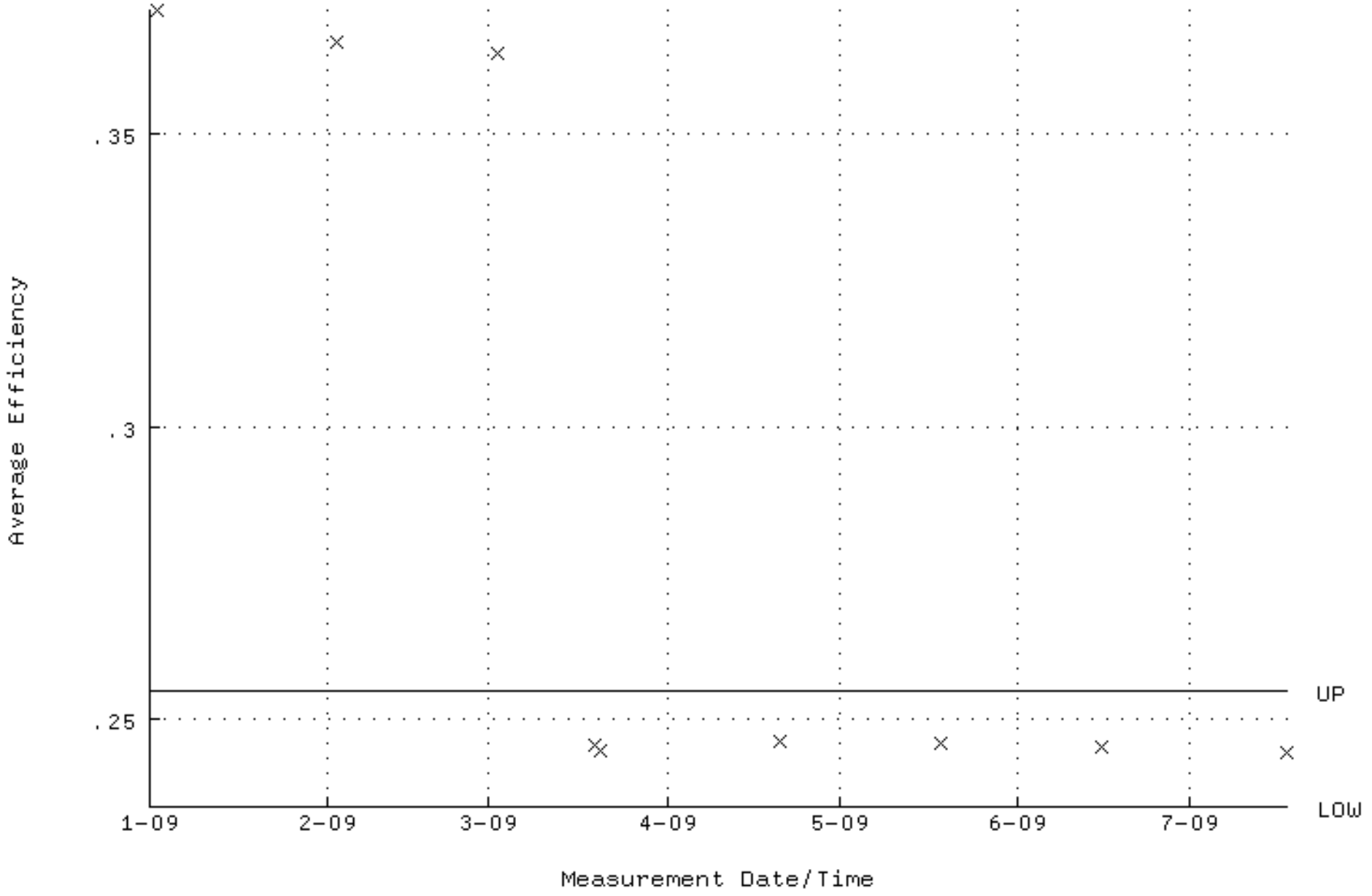
QA filename : DKA100:[ENV_ALPHA.QA.W]W127.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:23:48 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 90.4503 through 99.9713



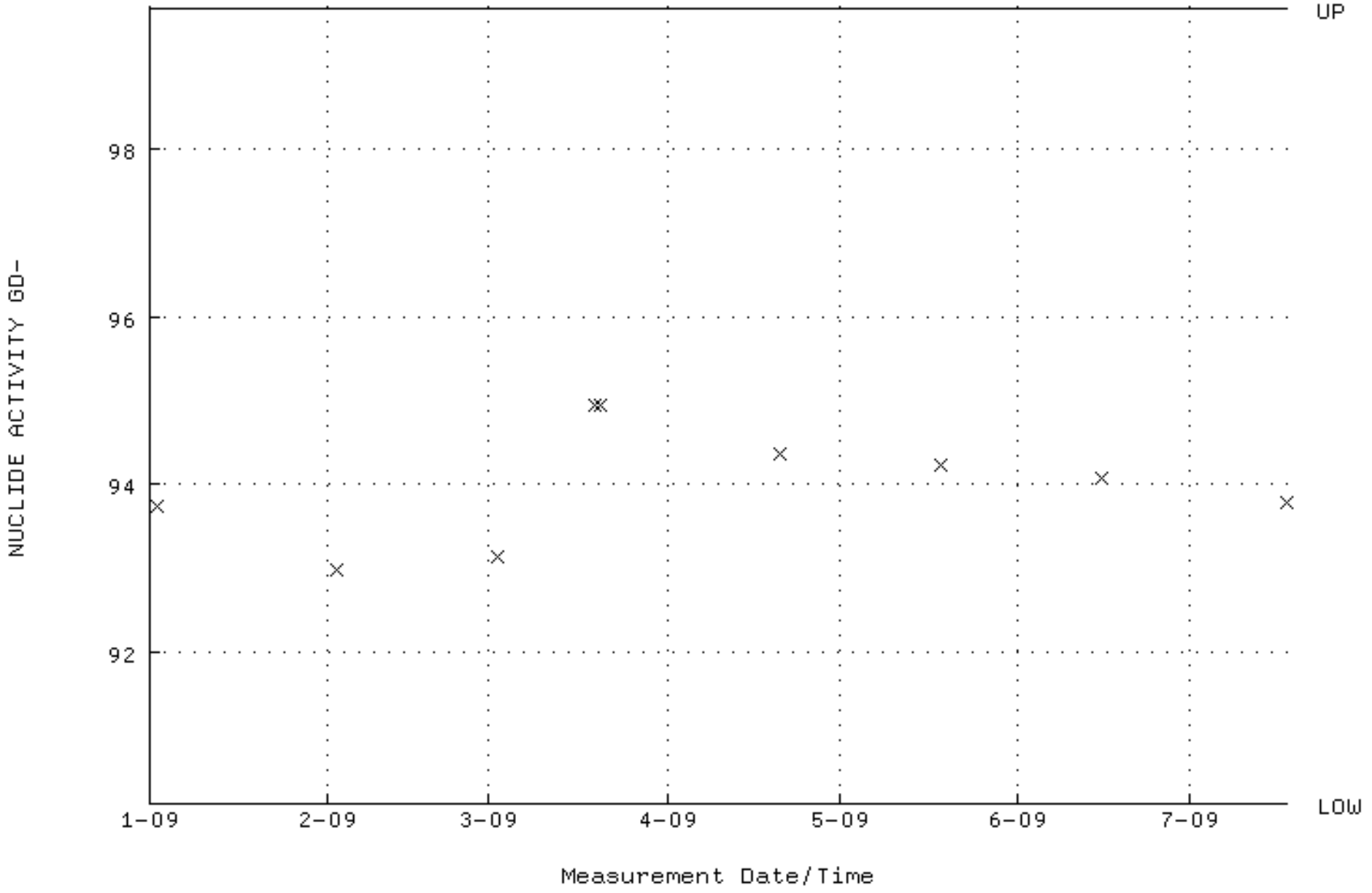
QA filename : DKA100:[ENV_ALPHA.QA.B]B127.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:22:48 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



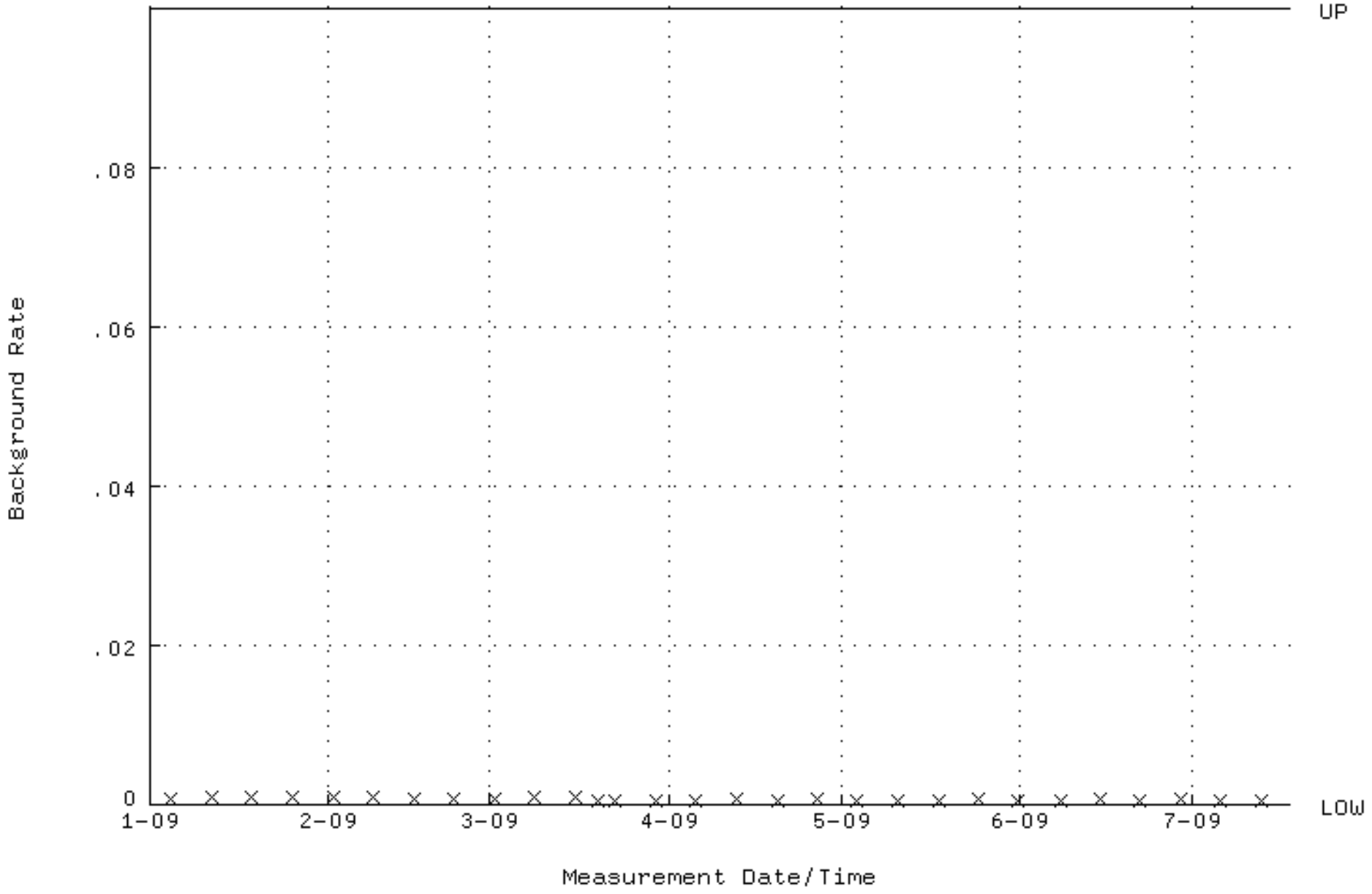
QA filename : DKA100:[ENV_ALPHA.QA.W]W133.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:24:19 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.235007 through 0.255007



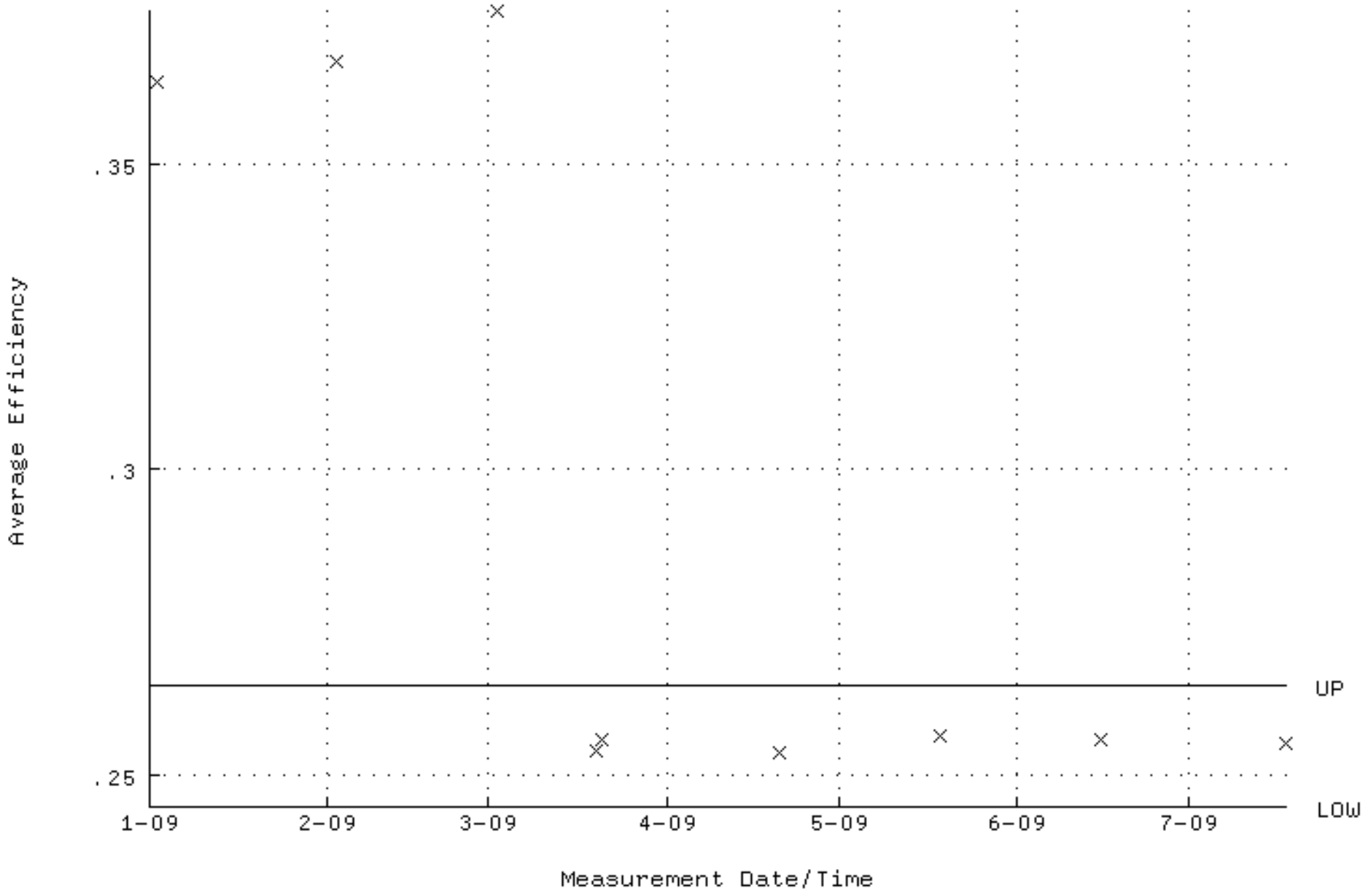
QA filename : DKA100:[ENV_ALPHA.QA.W]W133.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:24:19 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 90.1899 through 99.6835



QA filename : DKA100:[ENV_ALPHA.QA.B]B133.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:23:14 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000

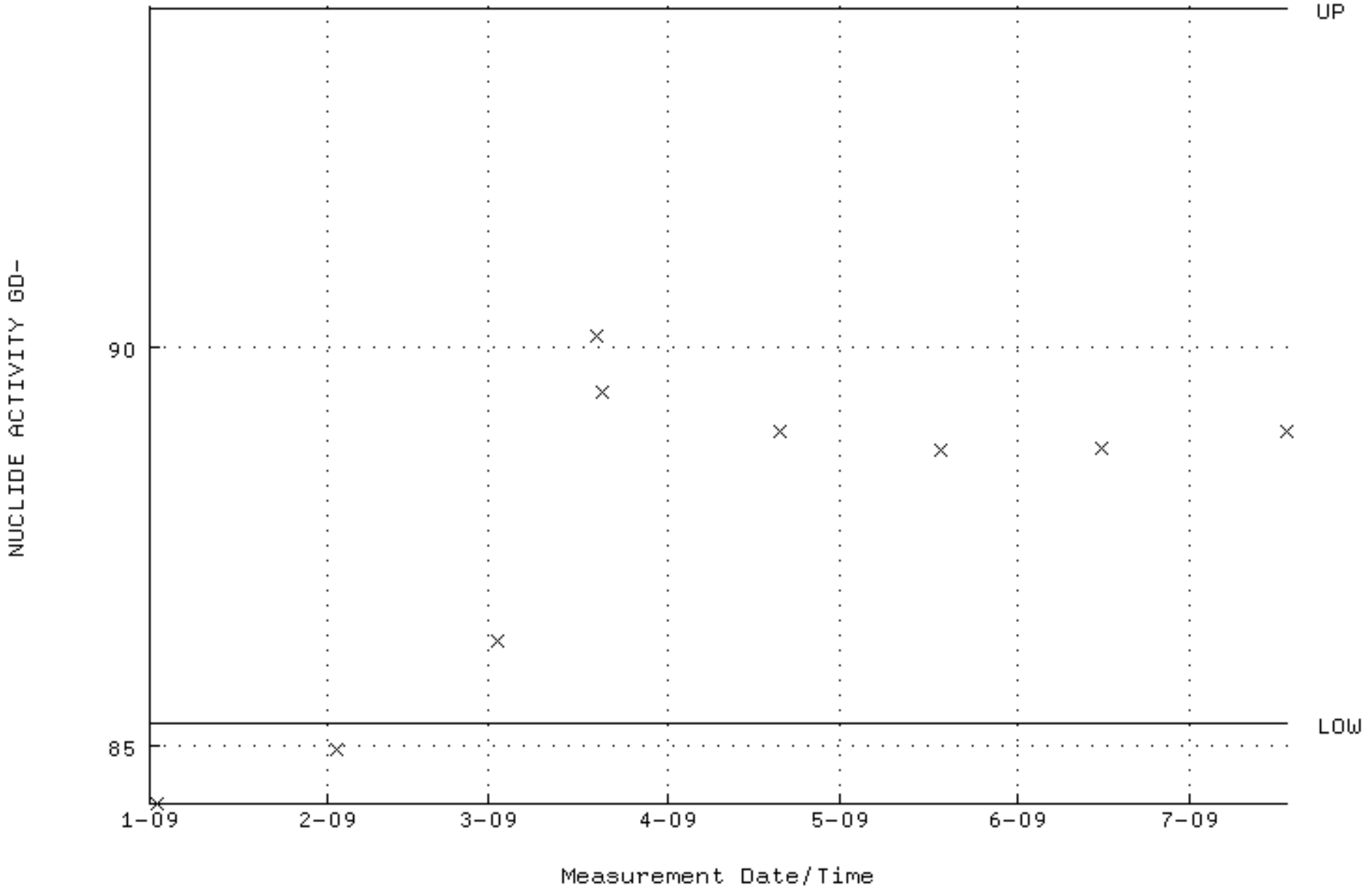


QA filename : DKA100:[ENV_ALPHA.QA.W]W137.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:24:36 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.244801 through 0.264801

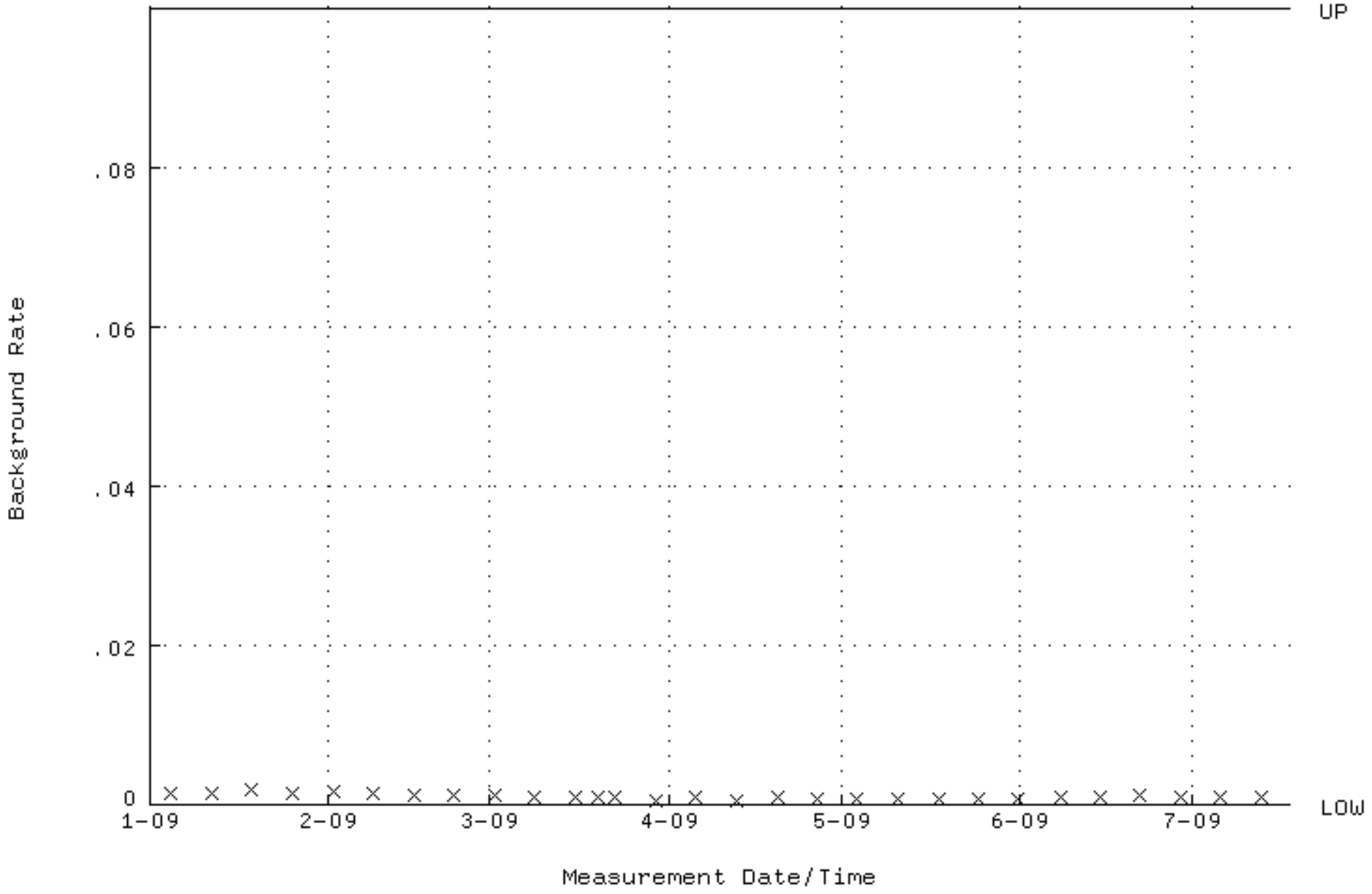


T99

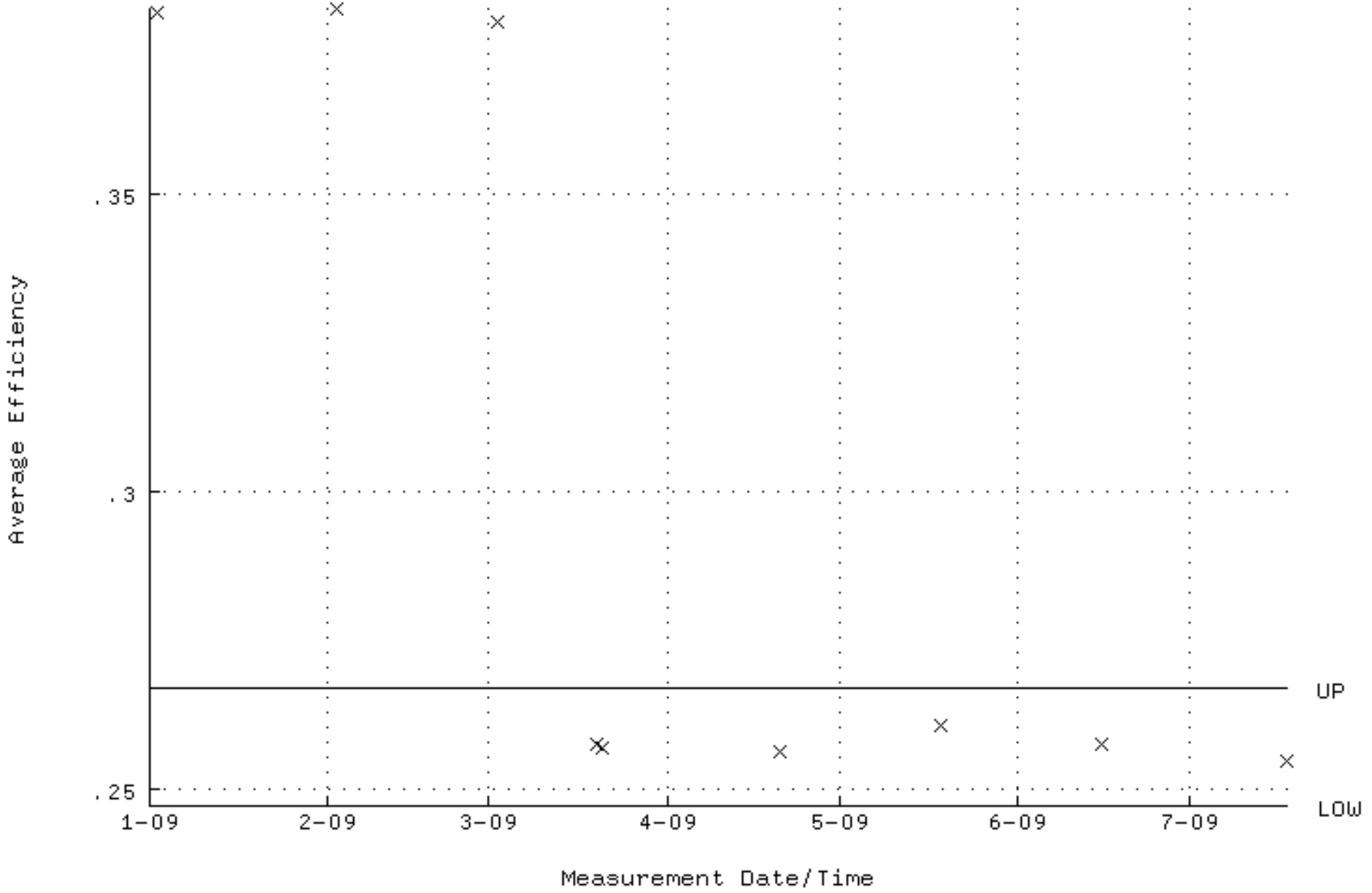
QA filename : DKA100:[ENV_ALPHA.QA.W]W137.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:24:36 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 85.2880 through 94.2656



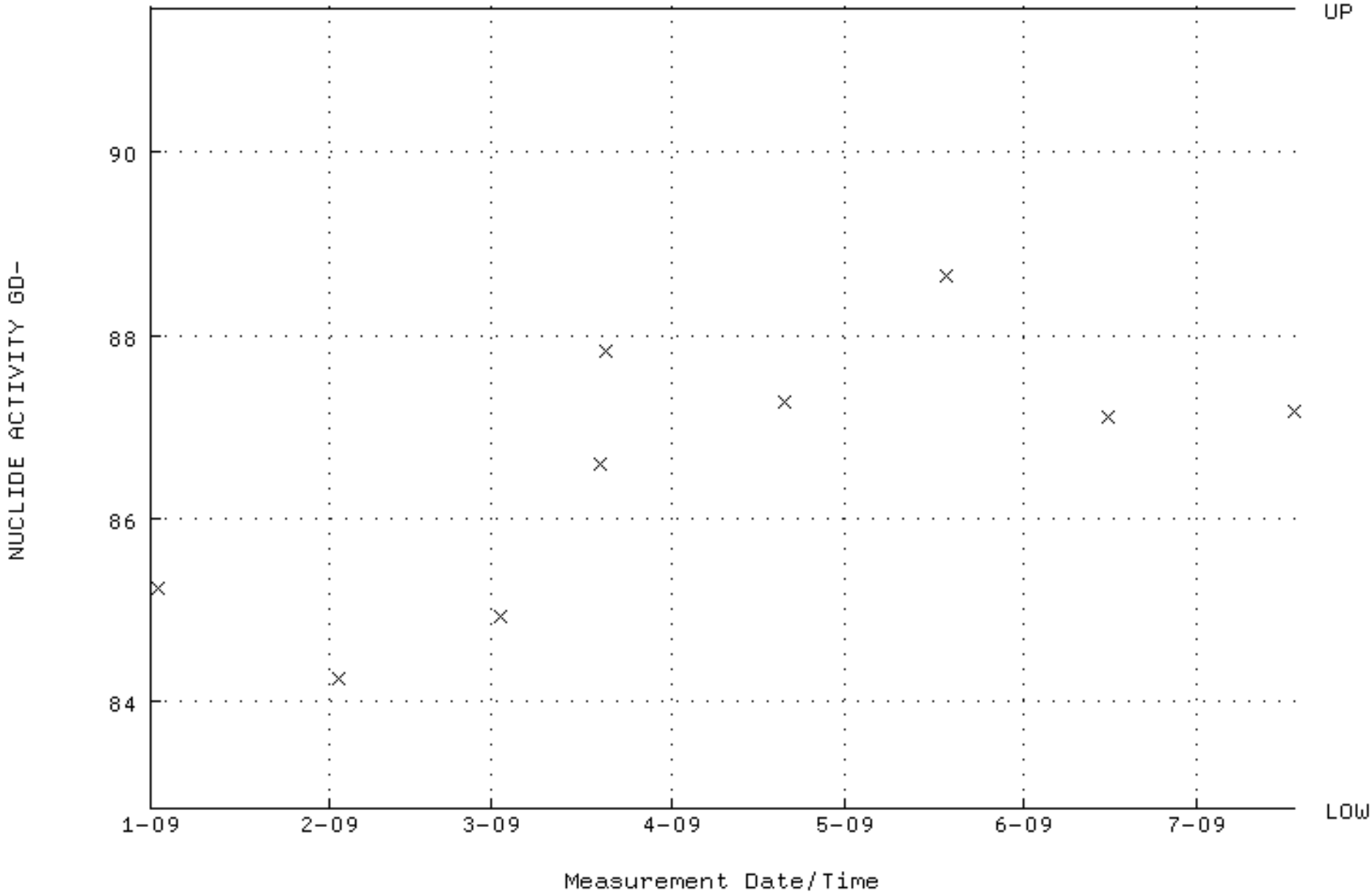
QA filename : DKA100:[ENV_ALPHA.QA.B]B137.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:23:31 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



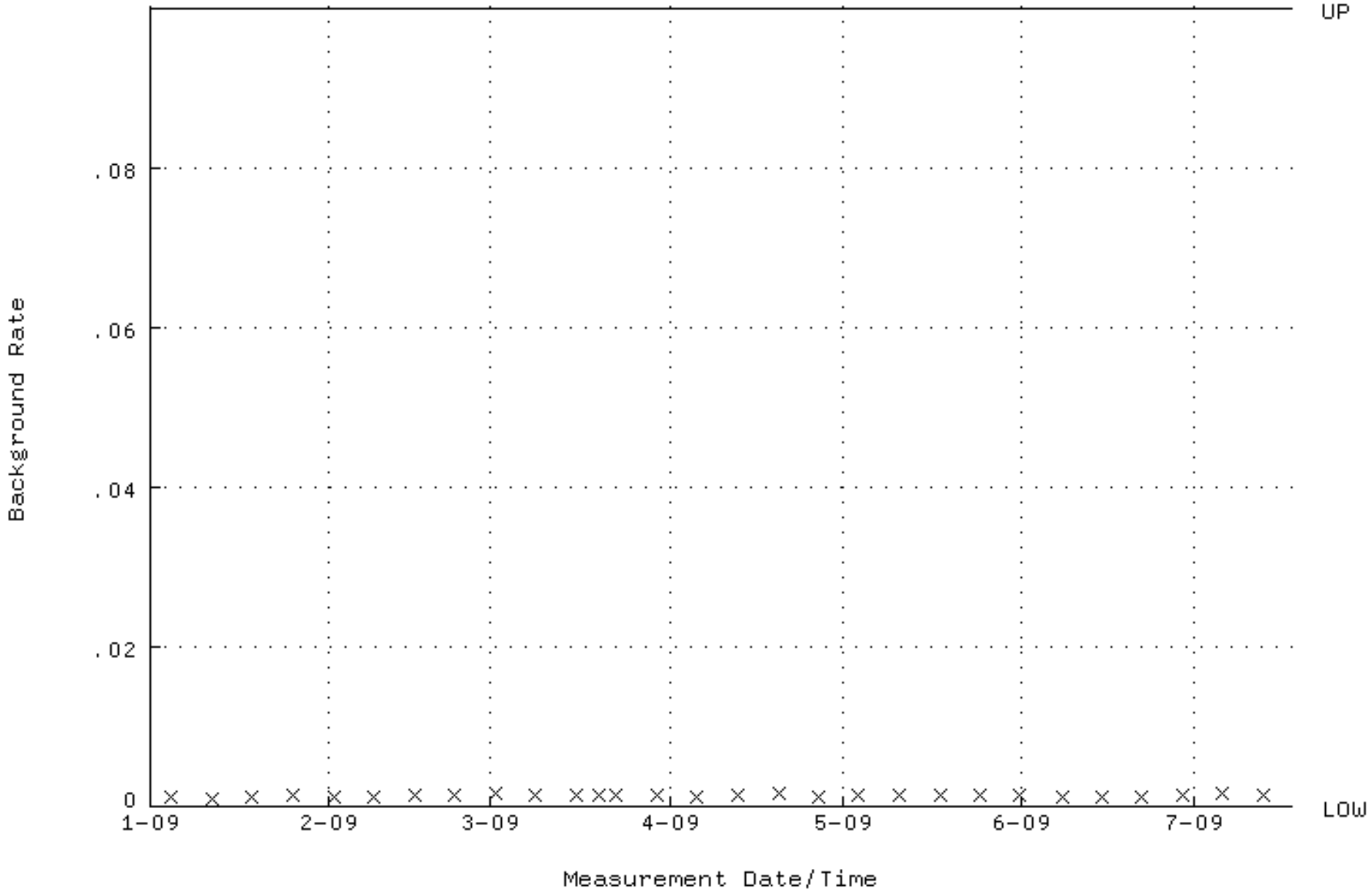
QA filename : DKA100:[ENV_ALPHA.QA.W]W138.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:24:41 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.247085 through 0.267085



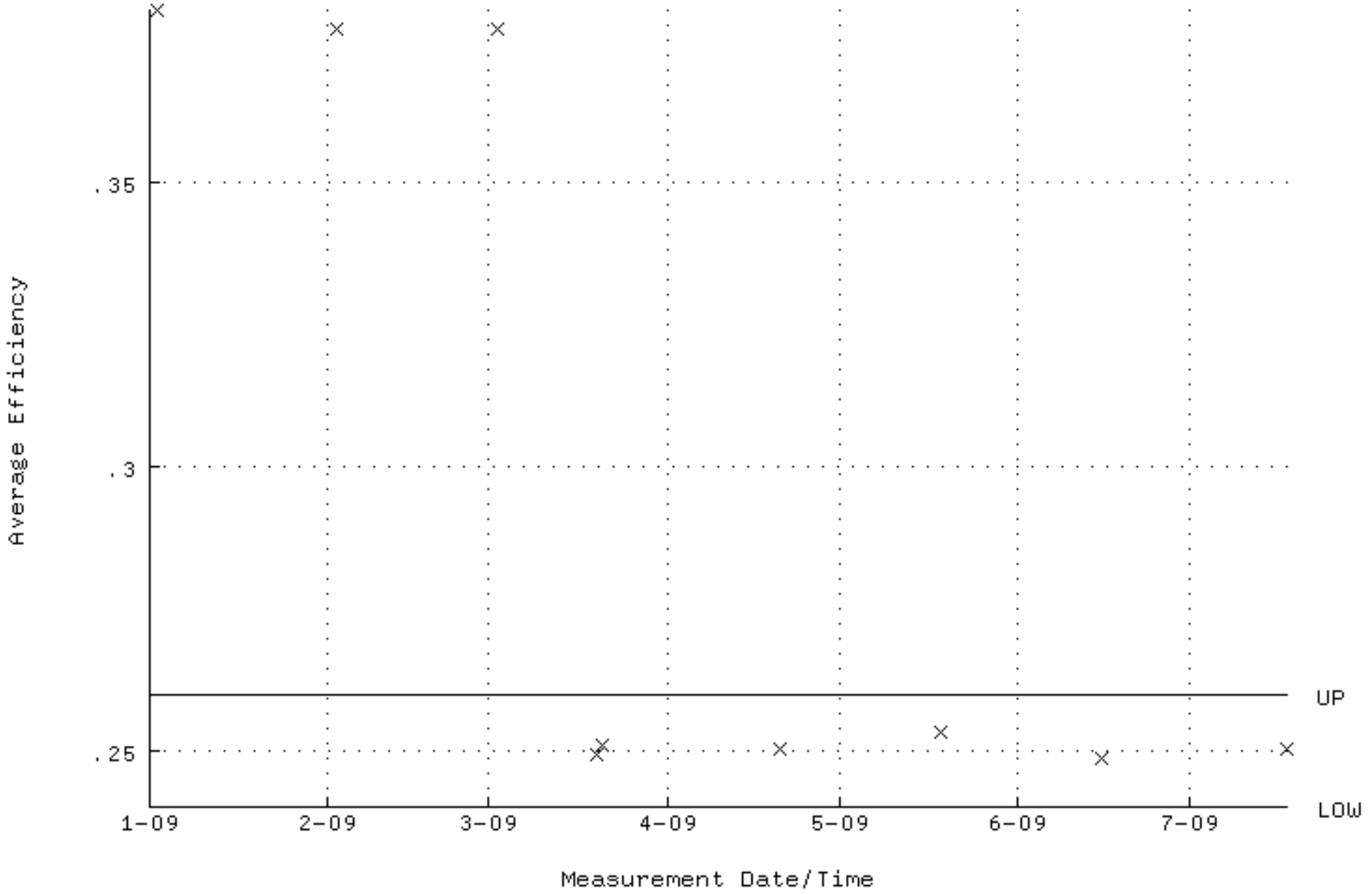
QA filename : DKA100:[ENV_ALPHA.QA.W]W138.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:24:41 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 82.8399 through 91.5599



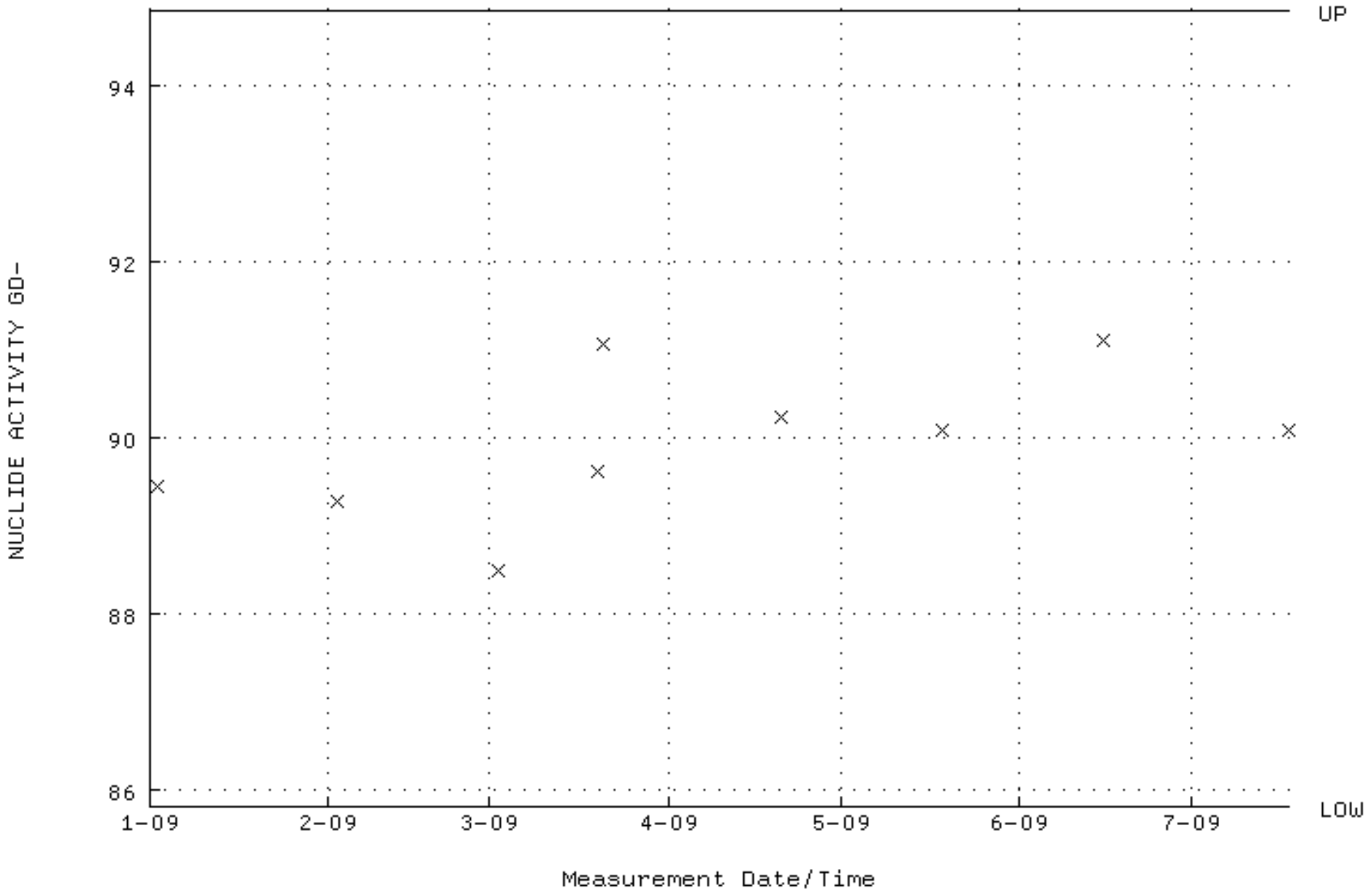
QA filename : DKA100:[ENV_ALPHA.QA.B]B138.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:23:35 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



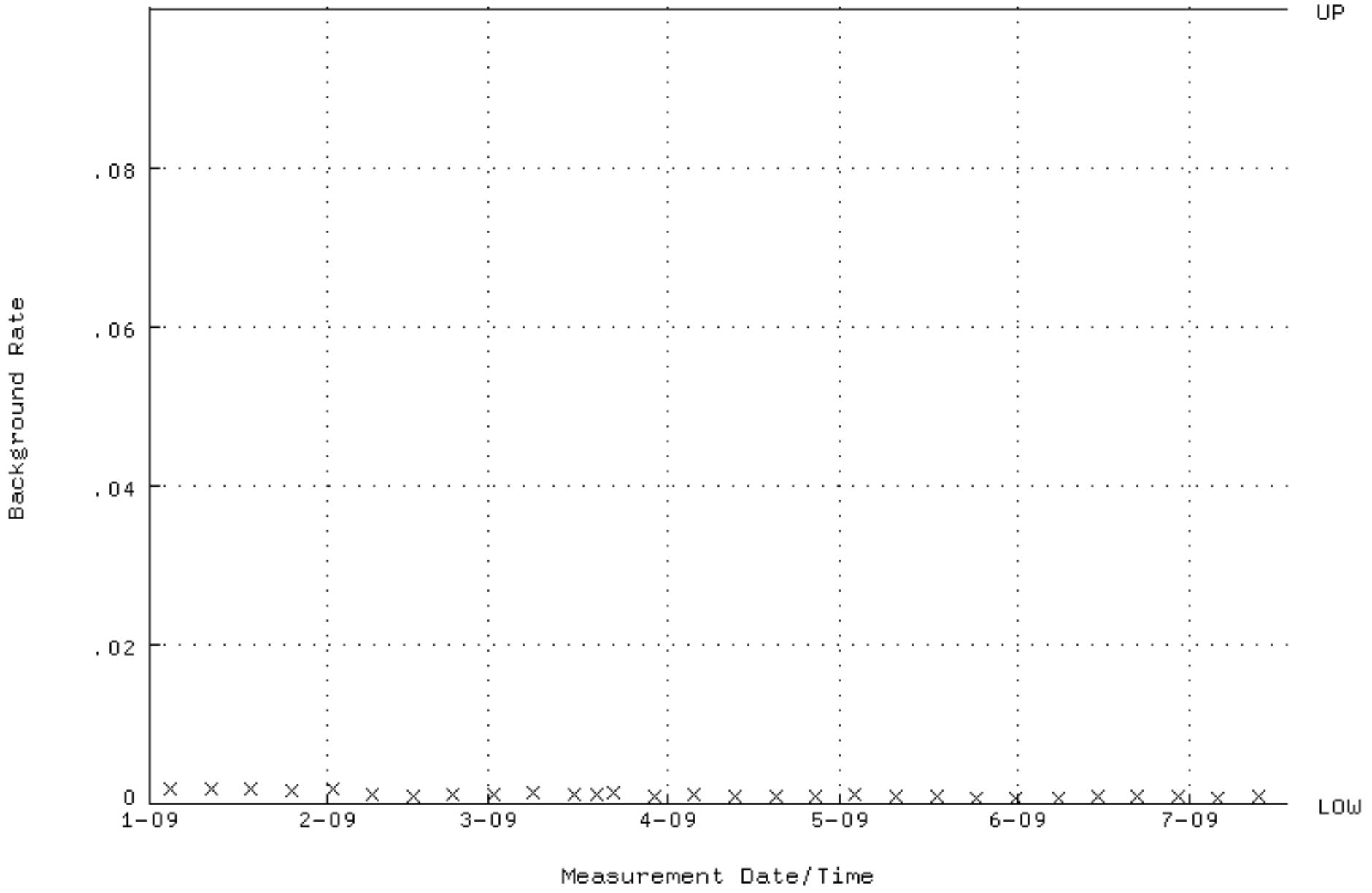
QA filename : DKA100:[ENV_ALPHA.QA.W]W139.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:24:47 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.240299 through 0.260299



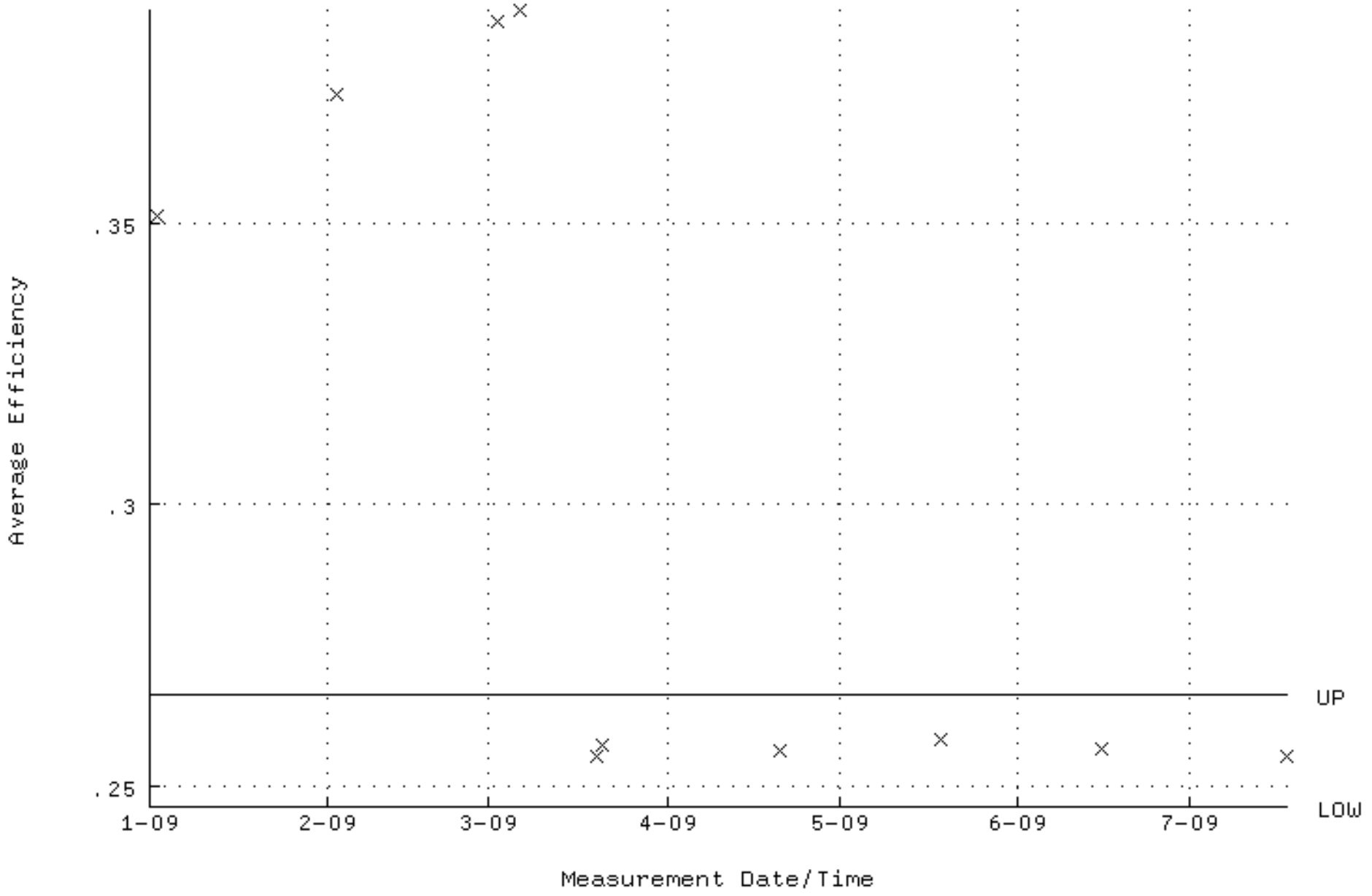
QA filename : DKA100:[ENV_ALPHA.QA.W]W139.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:24:47 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 85.8145 through 94.8477



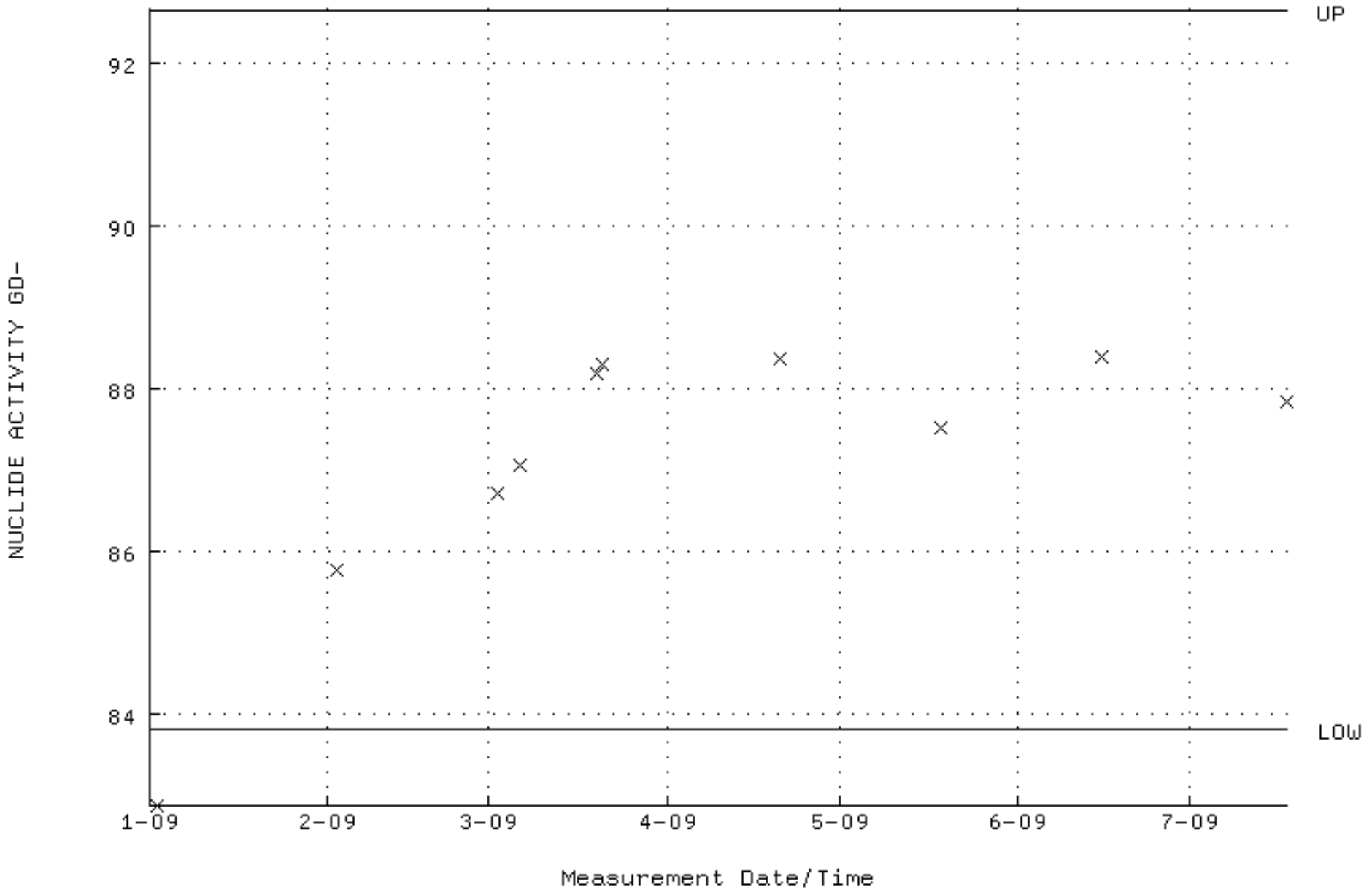
QA filename : DKA100:[ENV_ALPHA.QA.B]B139.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:23:39 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



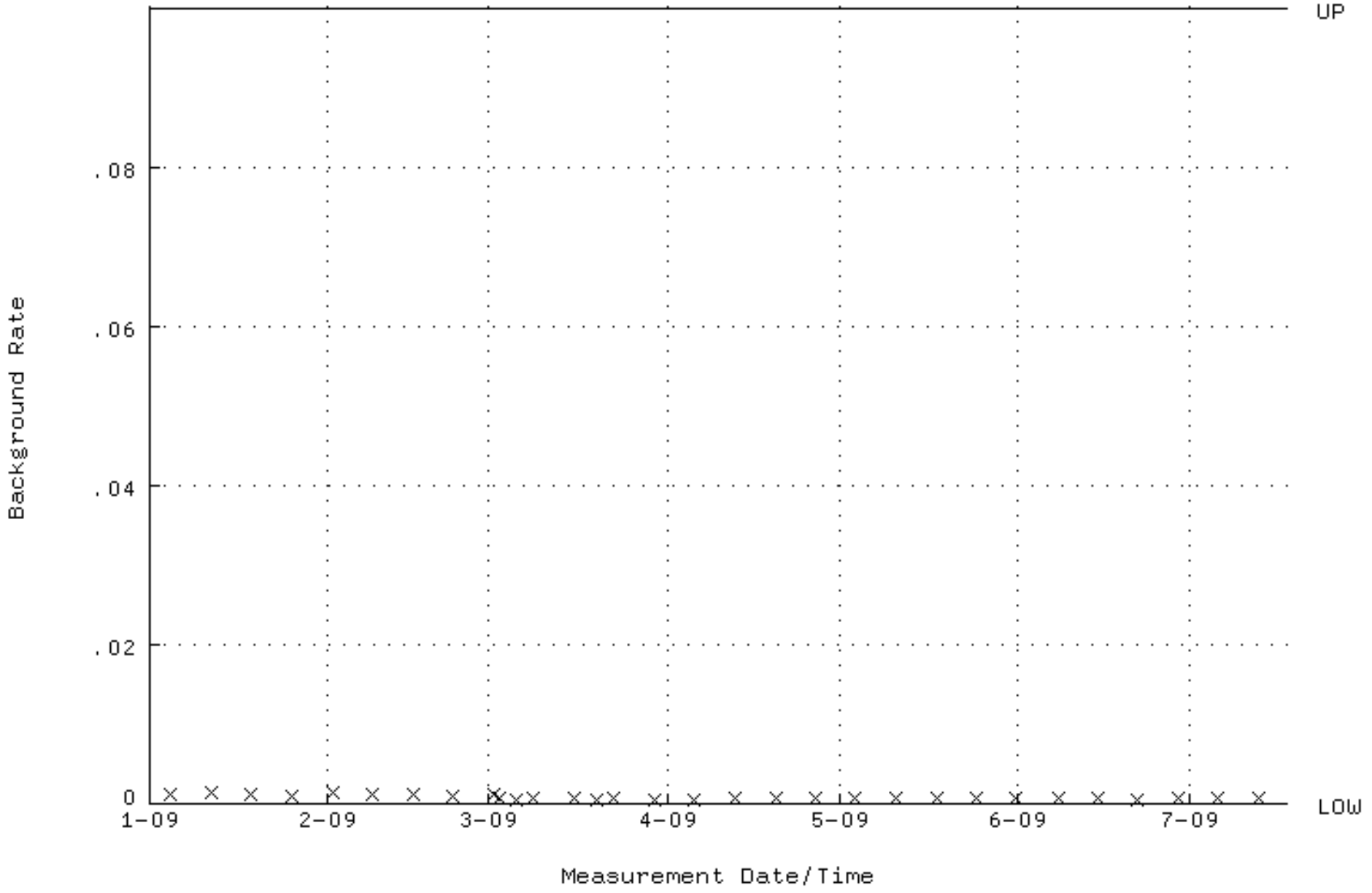
QA filename : DKA100:[ENV_ALPHA.QA.W]W140.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:24:52 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.246178 through 0.266178



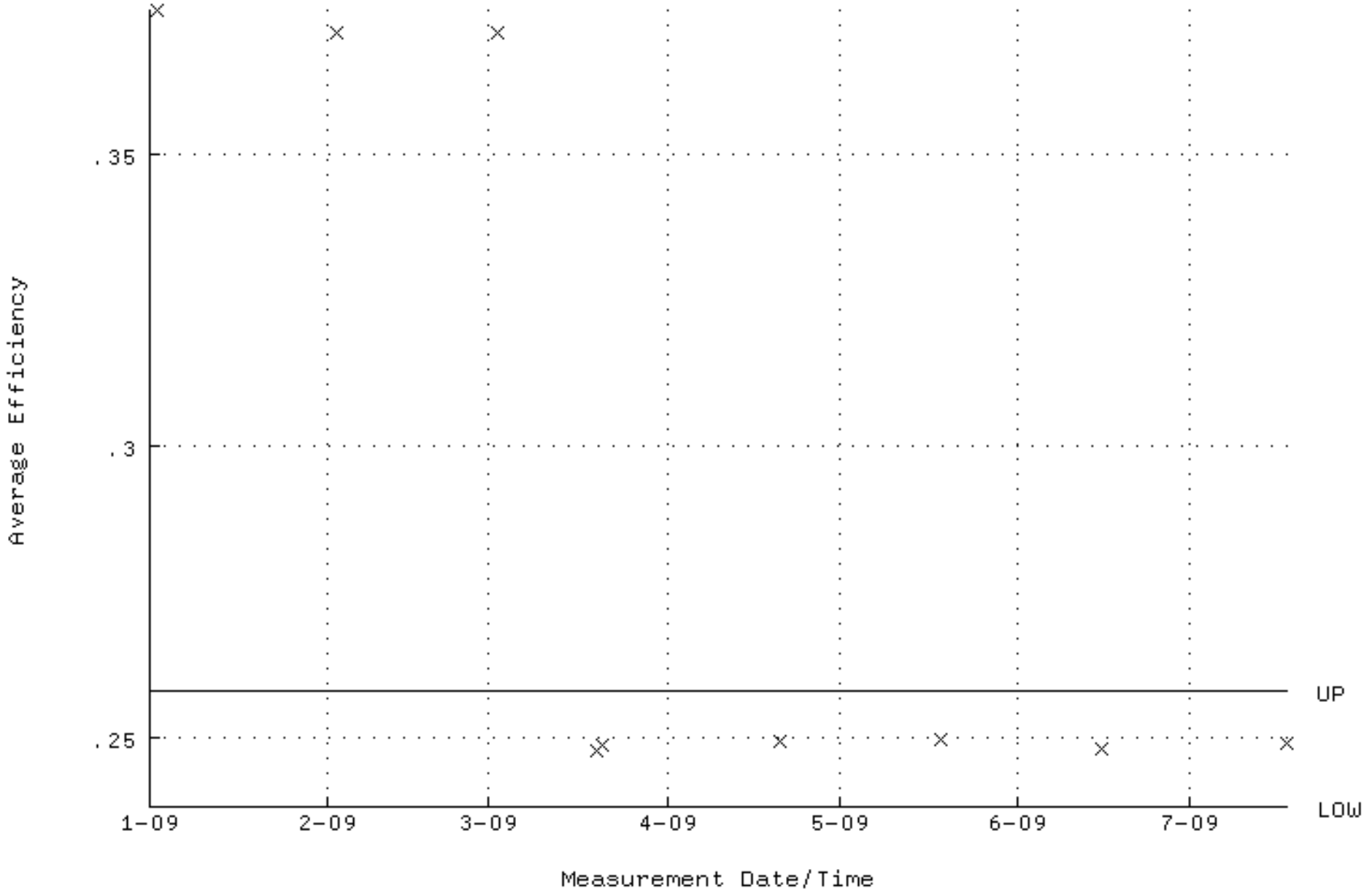
QA filename : DKA100:[ENV_ALPHA.QA.W]W140.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:24:52 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 83.8171 through 92.6399



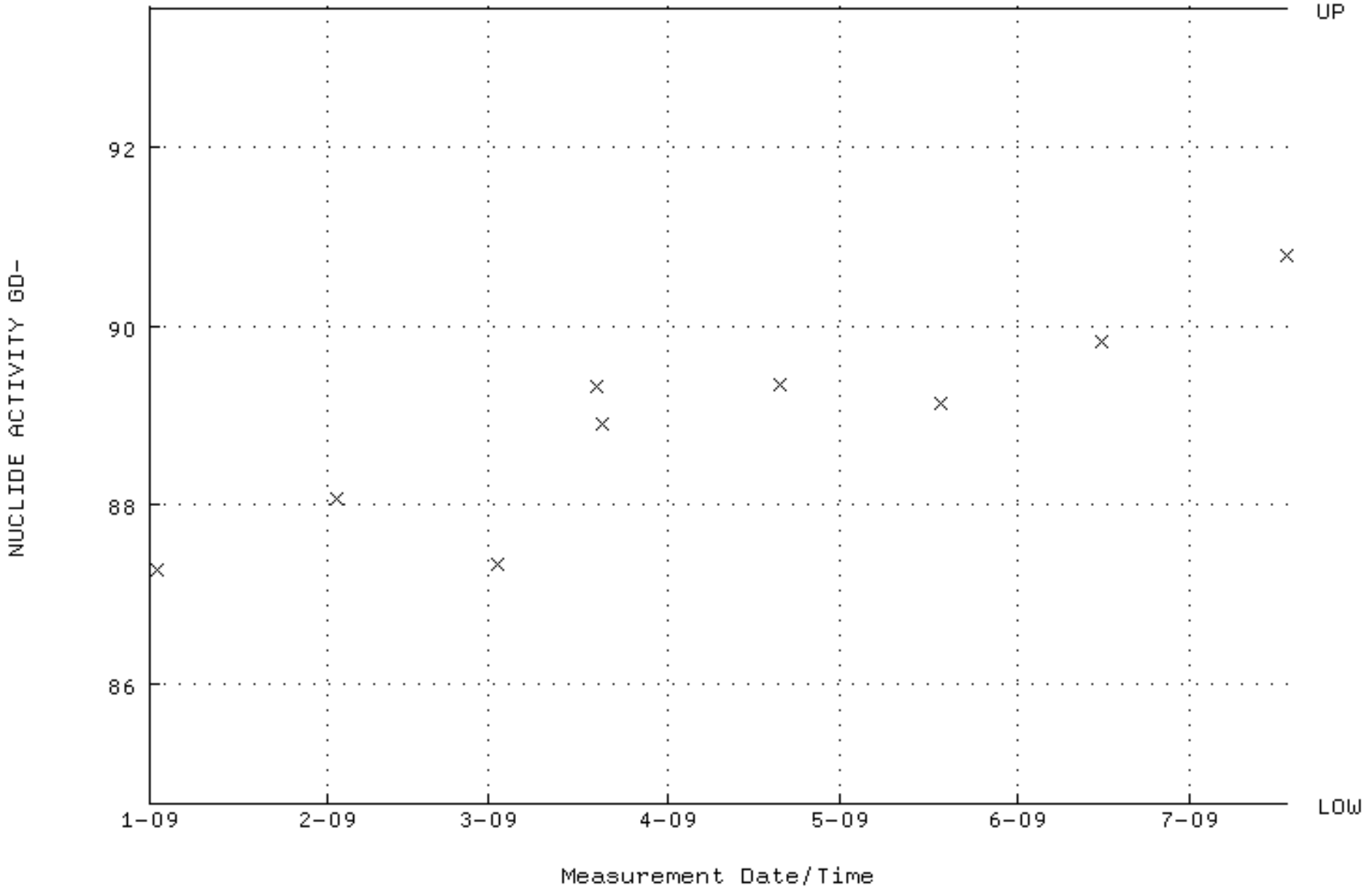
QA filename : DKA100:[ENV_ALPHA.QA.B]B140.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:23:43 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



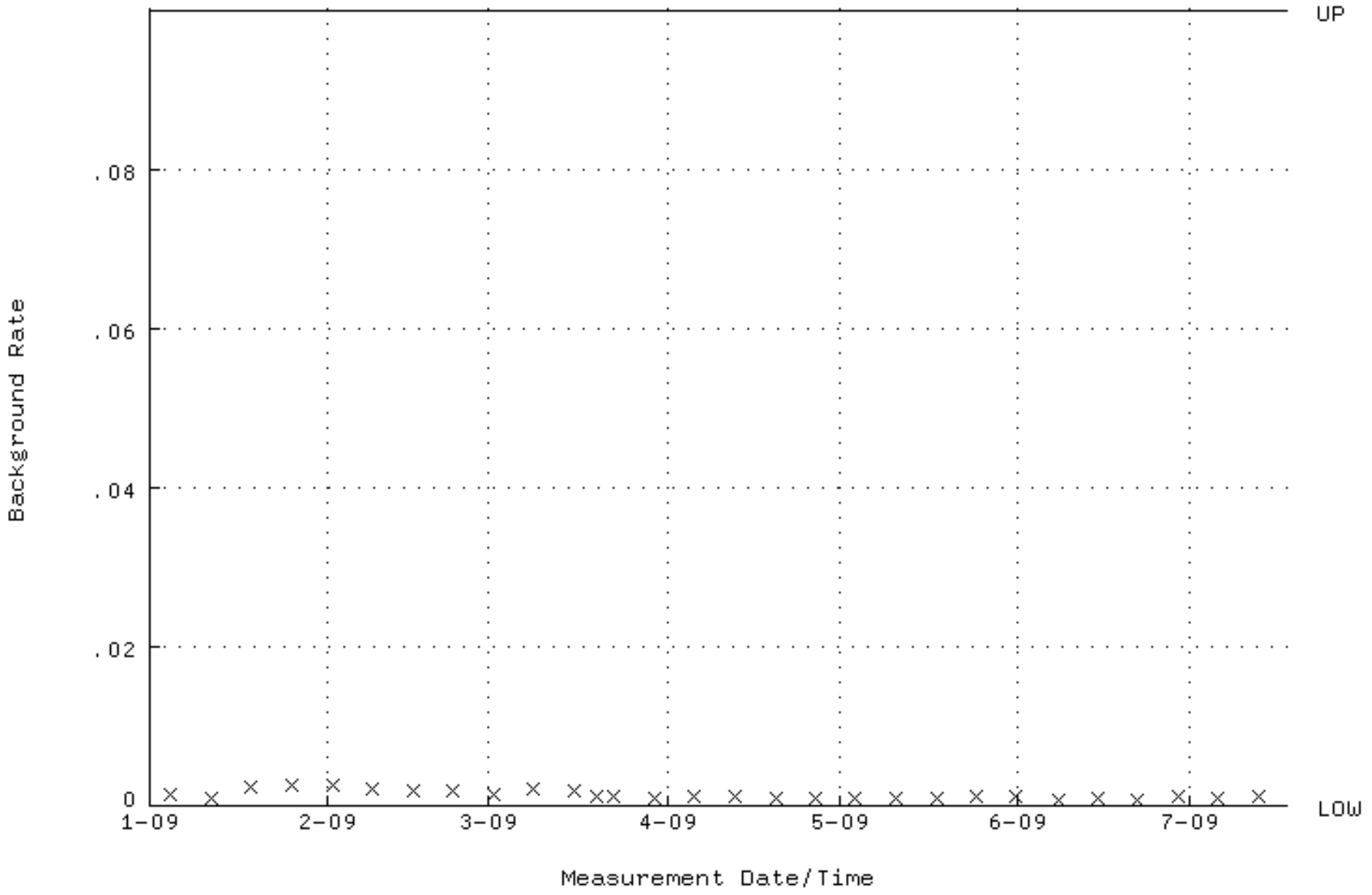
QA filename : DKA100:[ENV_ALPHA.QA.W]W144.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:25:11 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.237963 through 0.257963



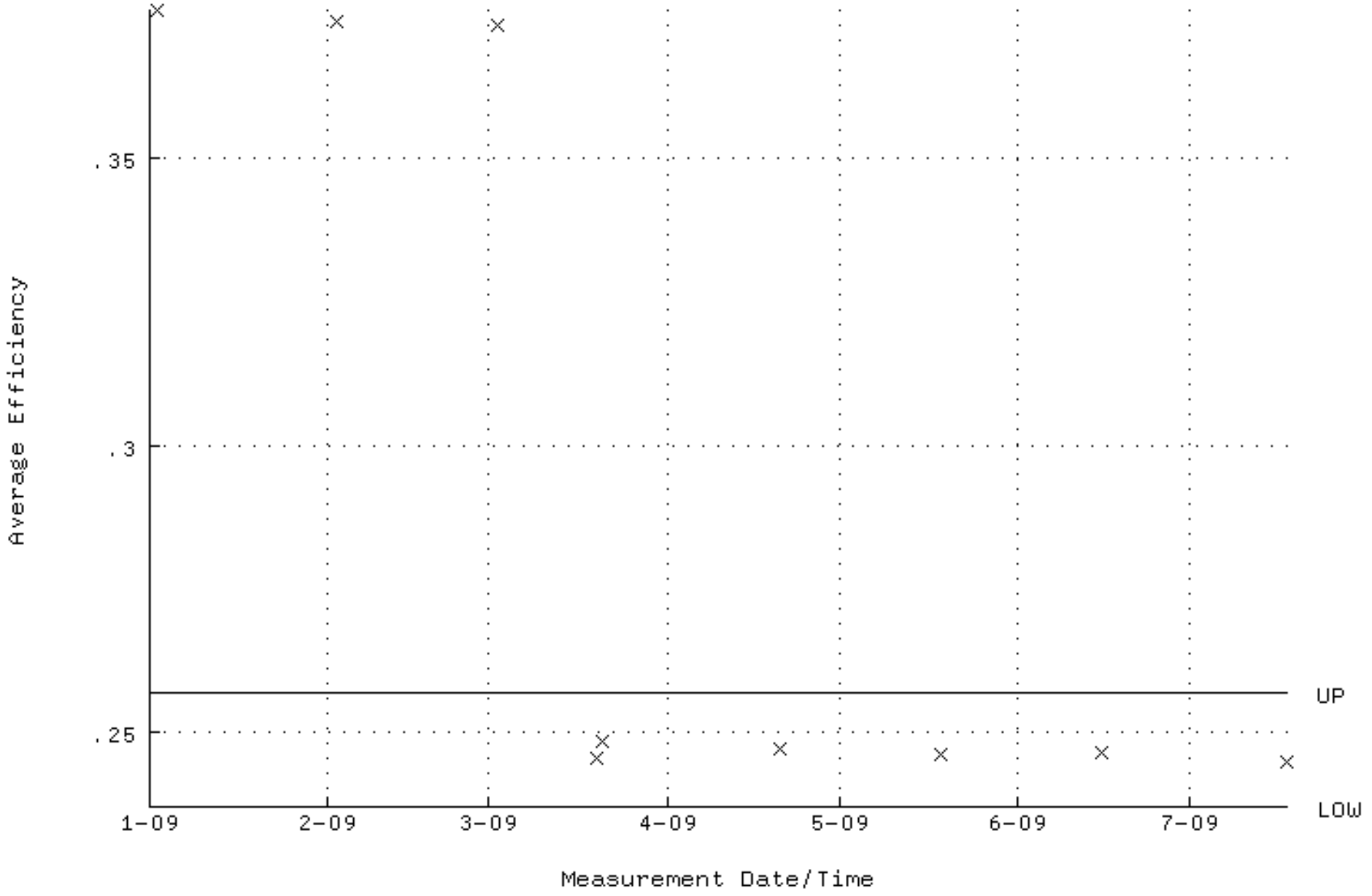
QA filename : DKA100:[ENV_ALPHA.QA.W]W144.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:25:11 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 84.6507 through 93.5613



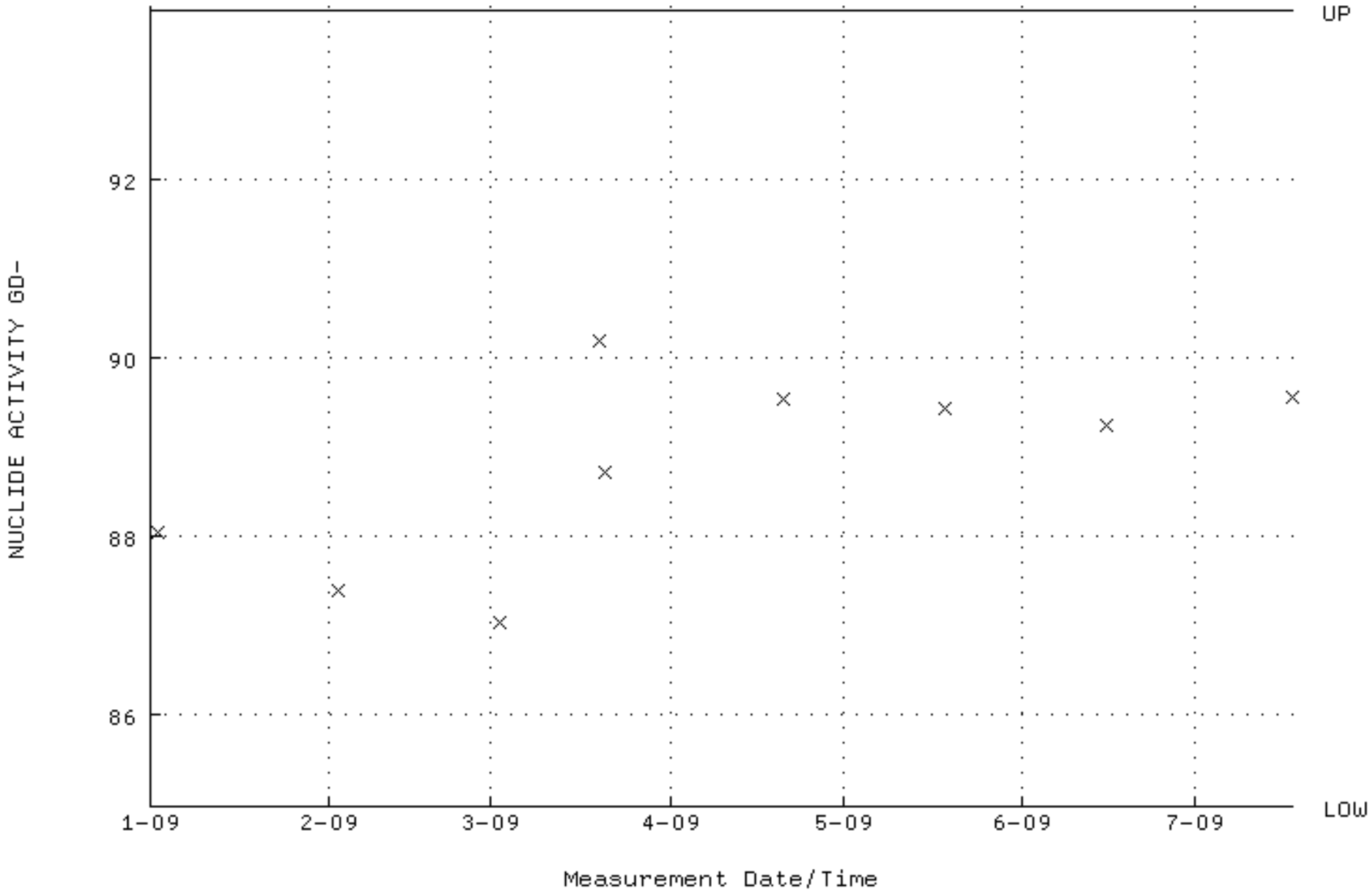
QA filename : DKA100:[ENV_ALPHA.QA.B]B144.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:24:00 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



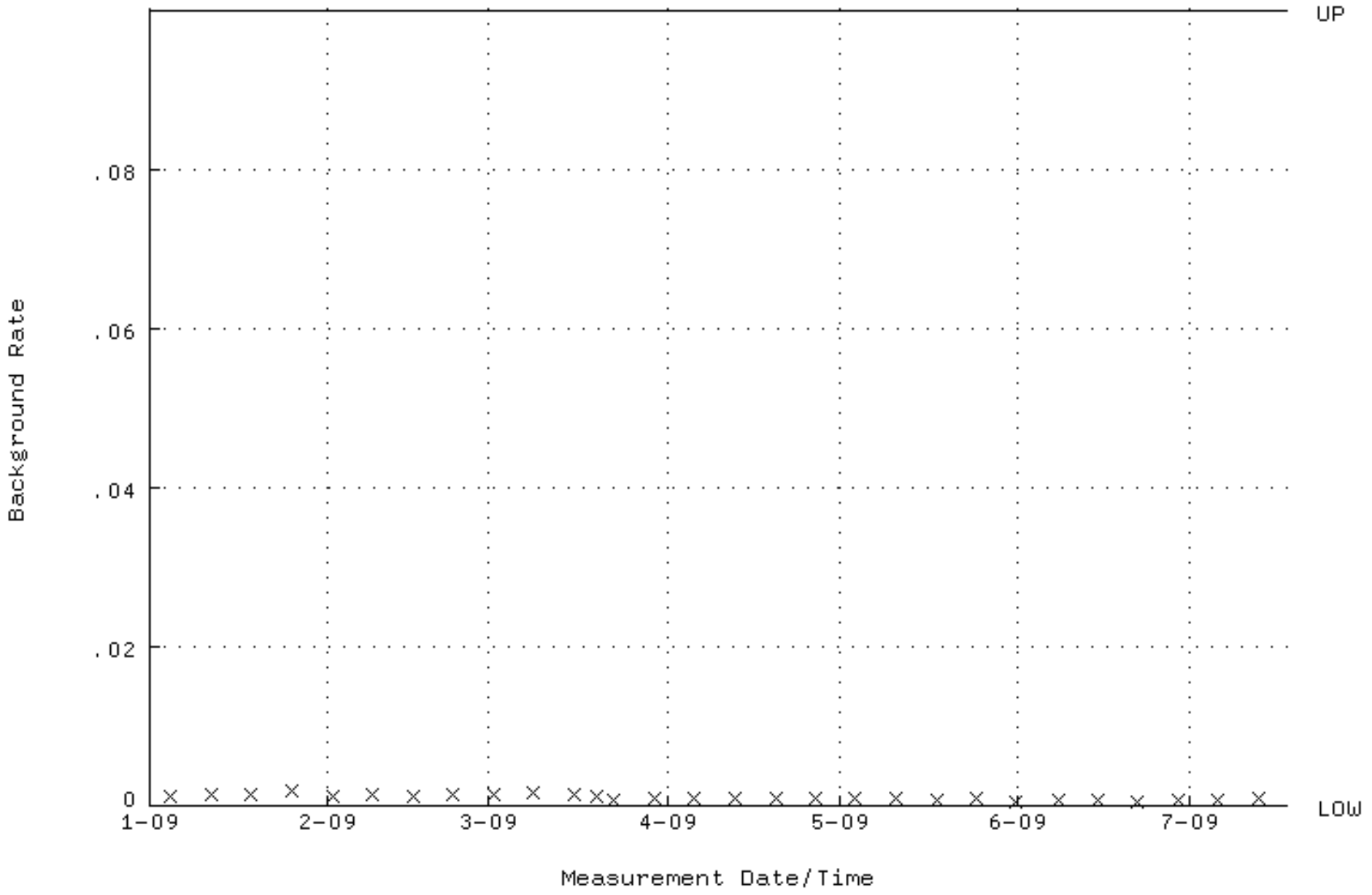
QA filename : DKA100:[ENV_ALPHA.QA.W]W147.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:25:24 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.237046 through 0.257046



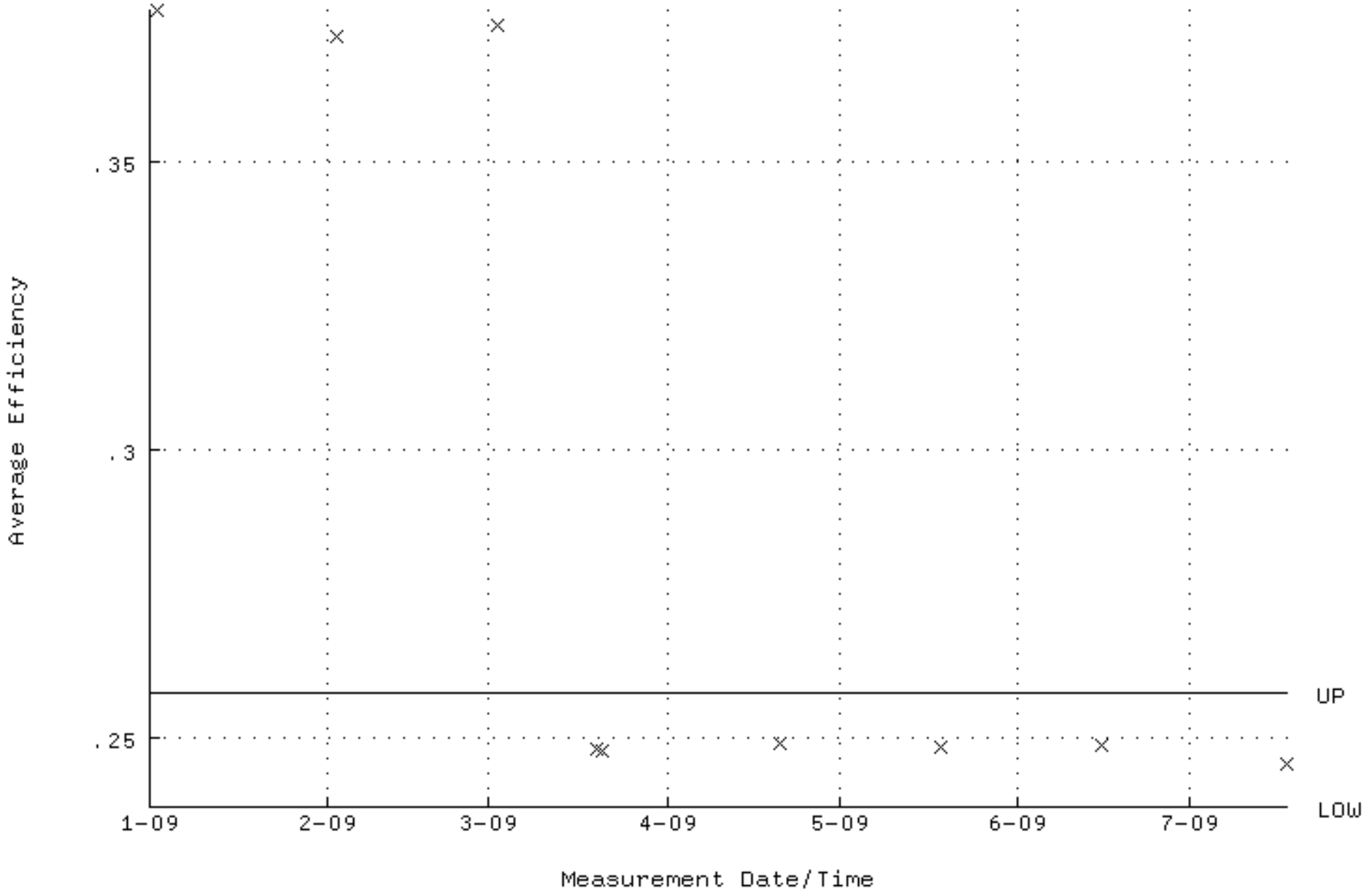
QA filename : DKA100:[ENV_ALPHA.QA.W]W147.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:25:24 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 84.9777 through 93.9227



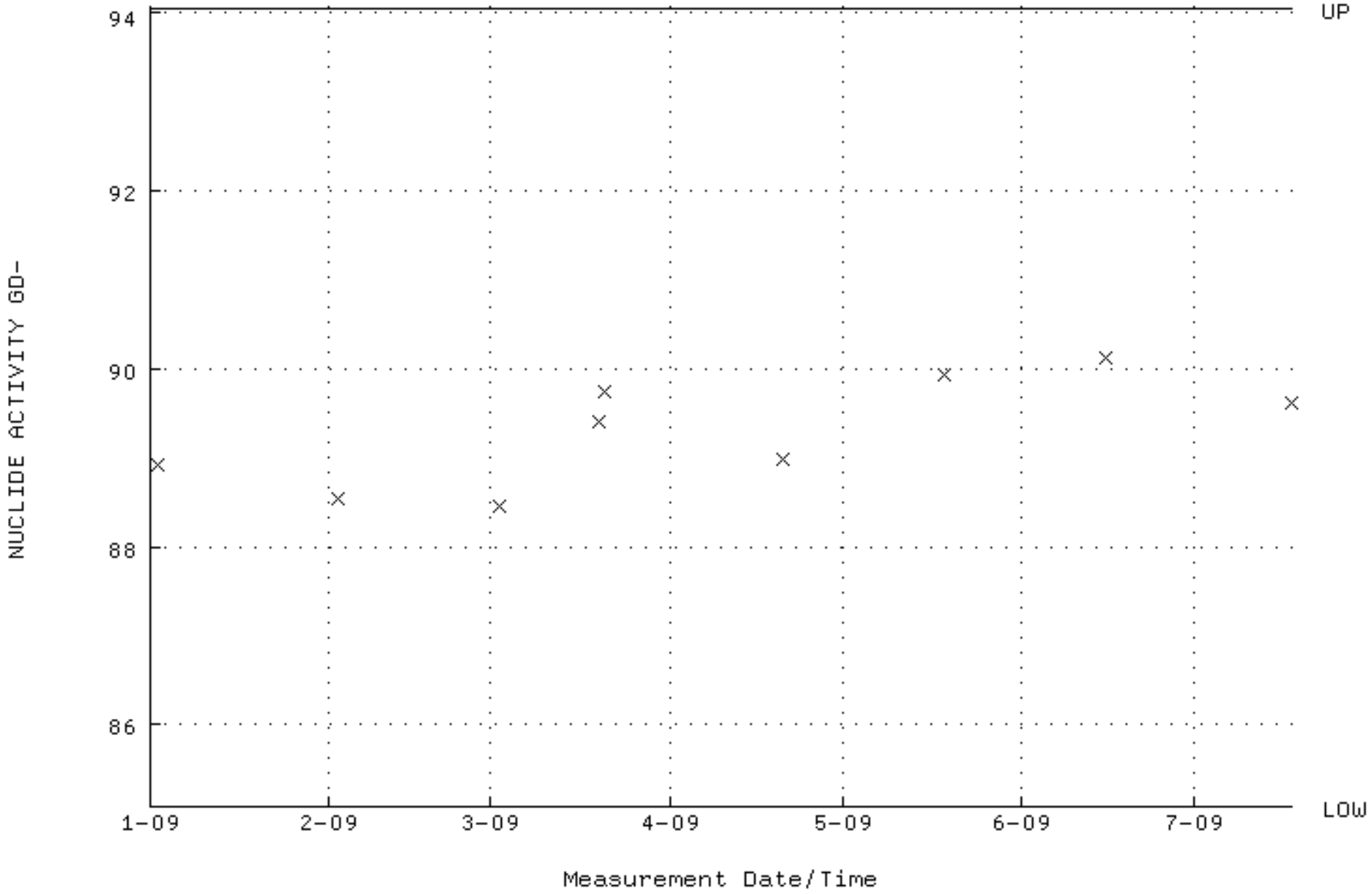
QA filename : DKA100:[ENV_ALPHA.QA.B]B147.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:24:13 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



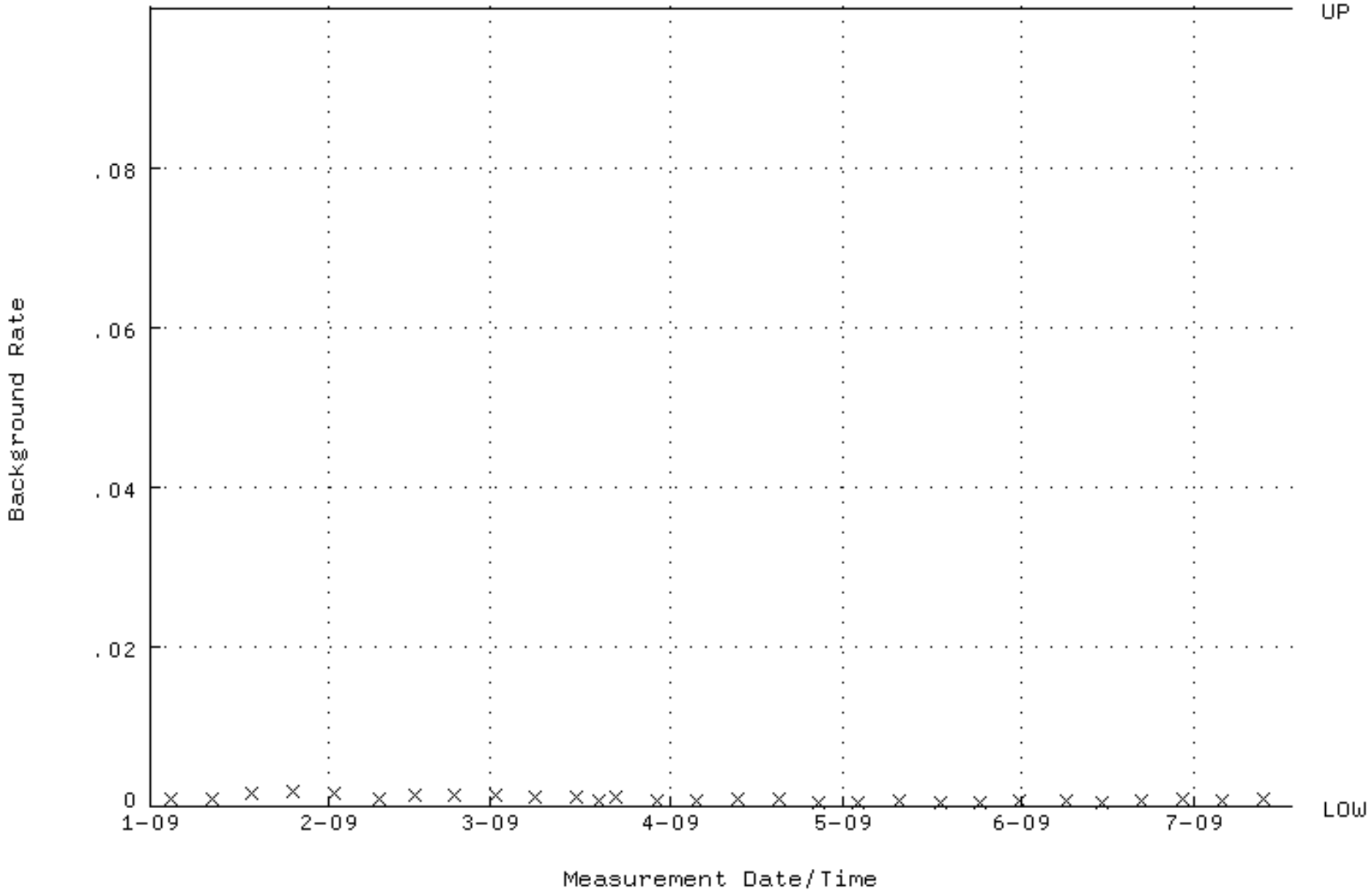
QA filename : DKA100:[ENV_ALPHA.QA.W]W148.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:25:28 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.237934 through 0.257934



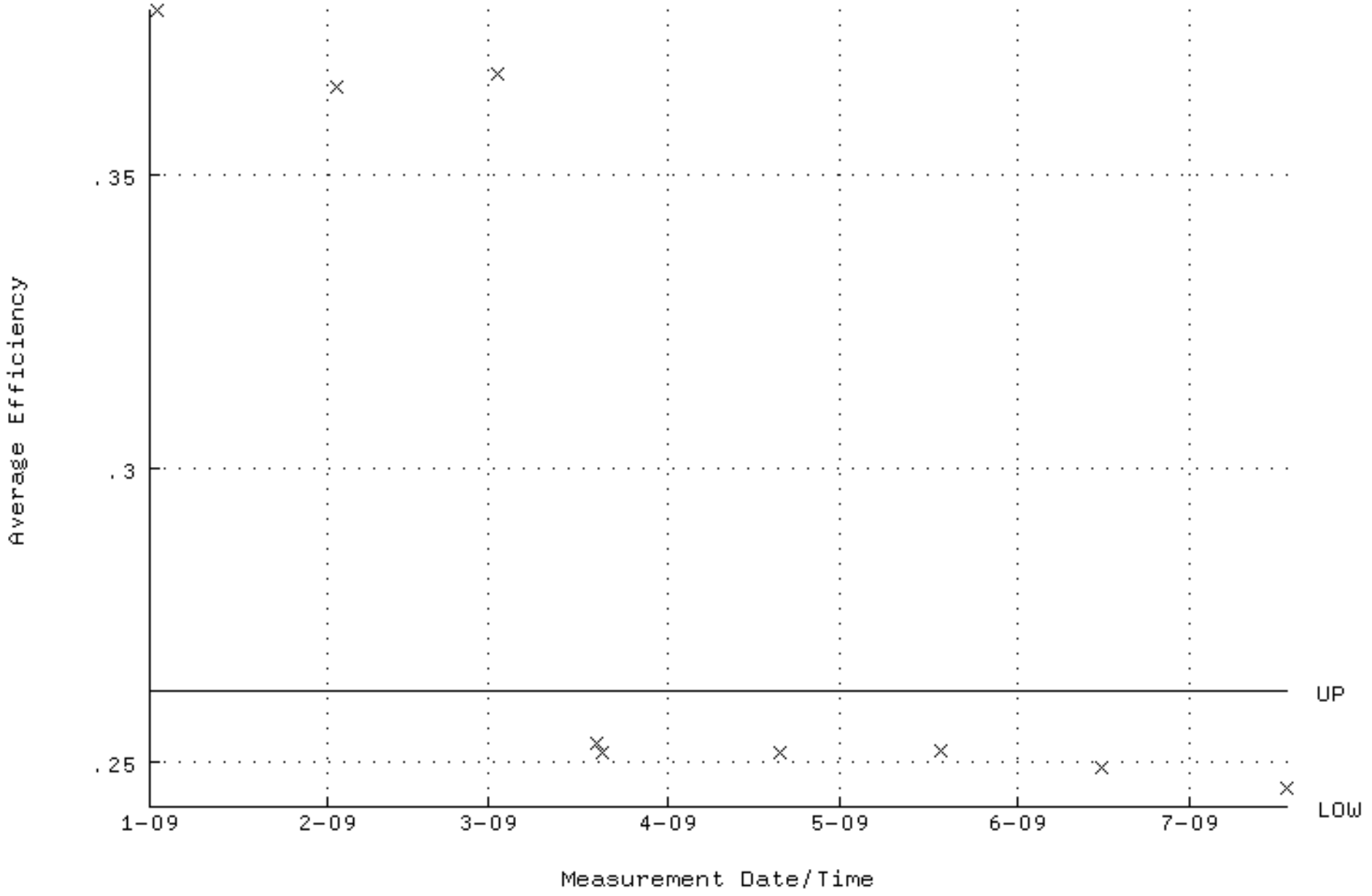
QA filename : DKA100:[ENV_ALPHA.QA.W]W148.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:25:28 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 85.0831 through 94.0393



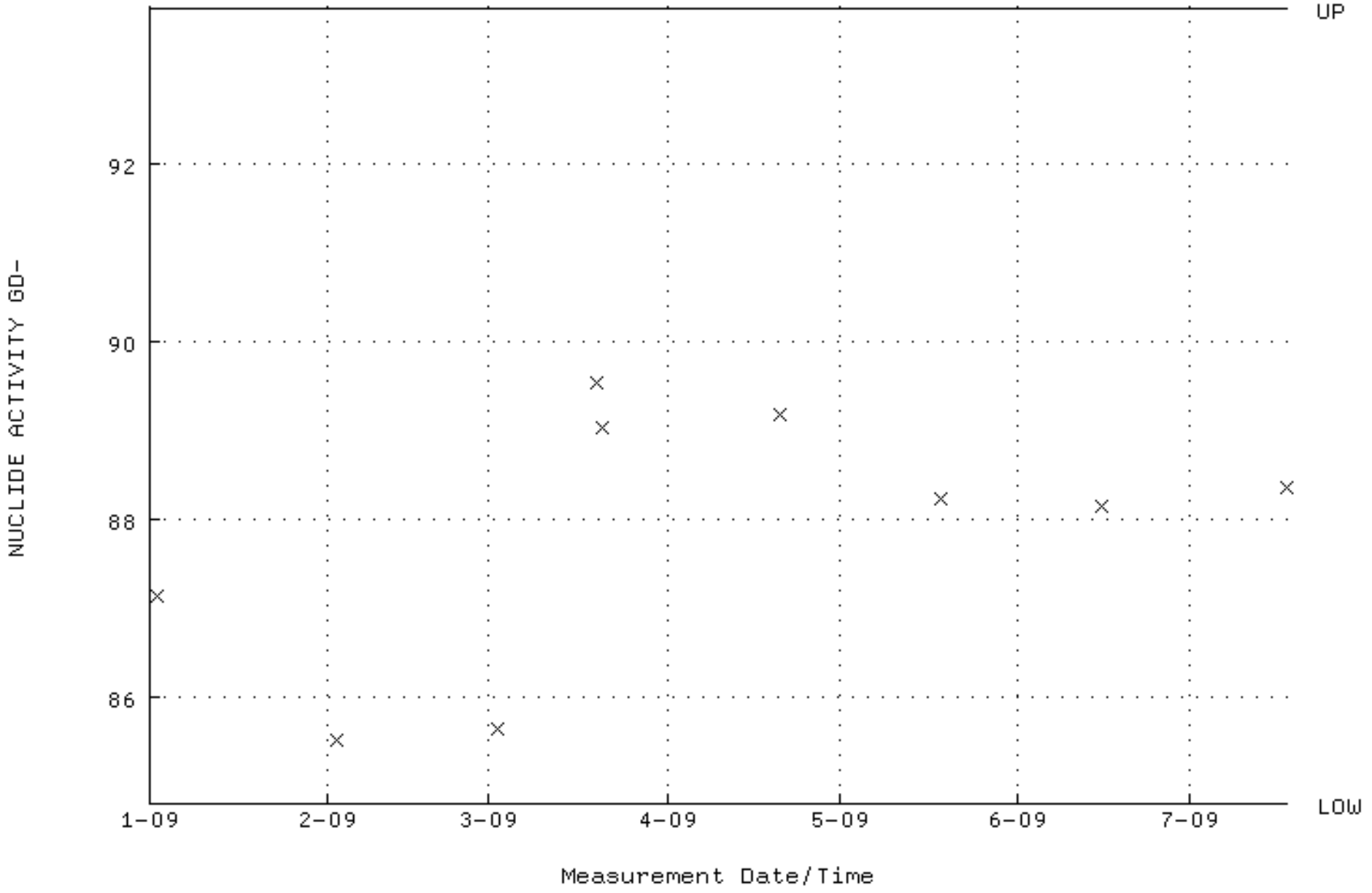
QA filename : DKA100:[ENV_ALPHA.QA.B]B148.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:24:17 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



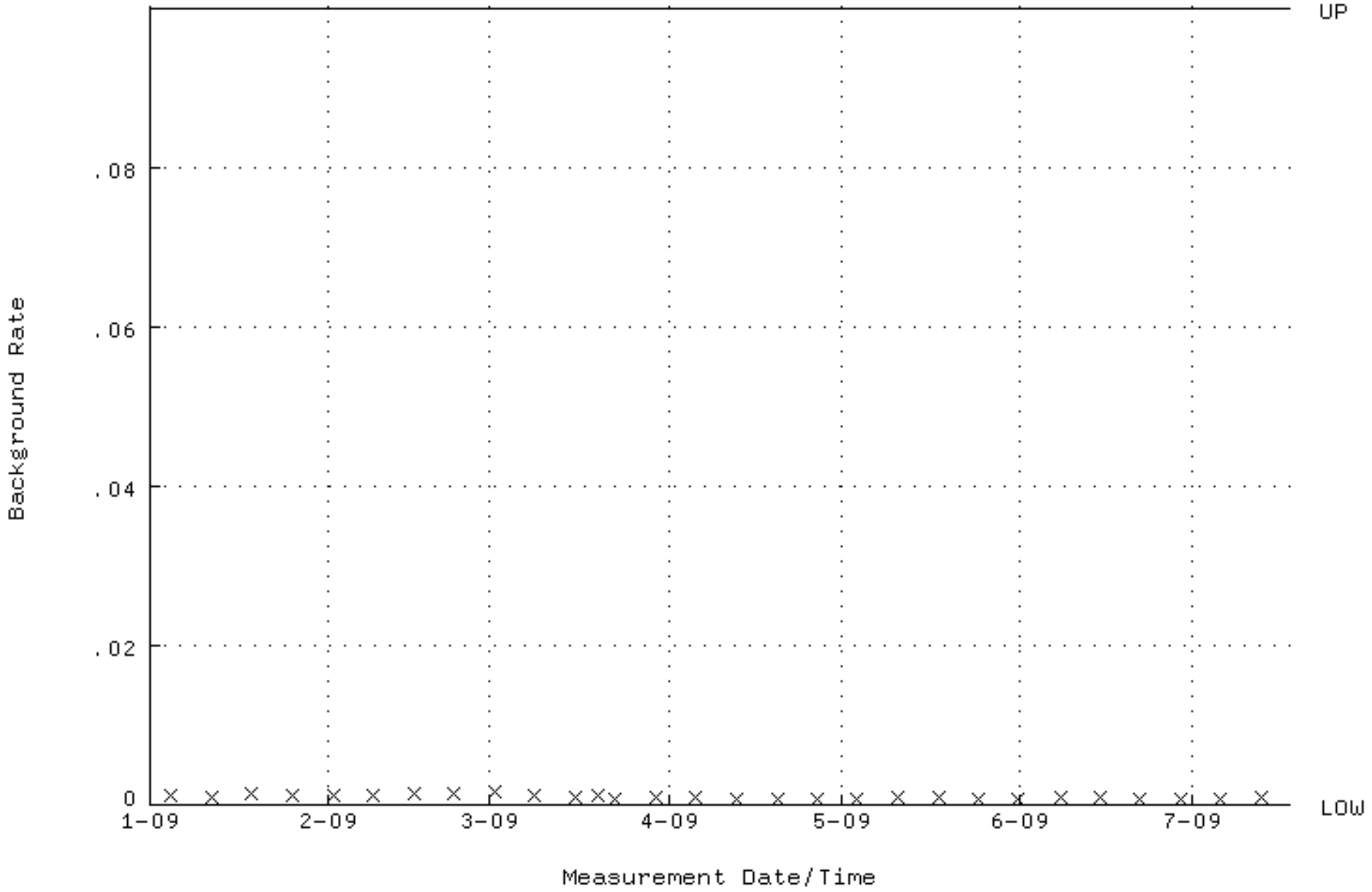
QA filename : DKA100:[ENV_ALPHA.QA.W]W149.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:25:32 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.242495 through 0.262495



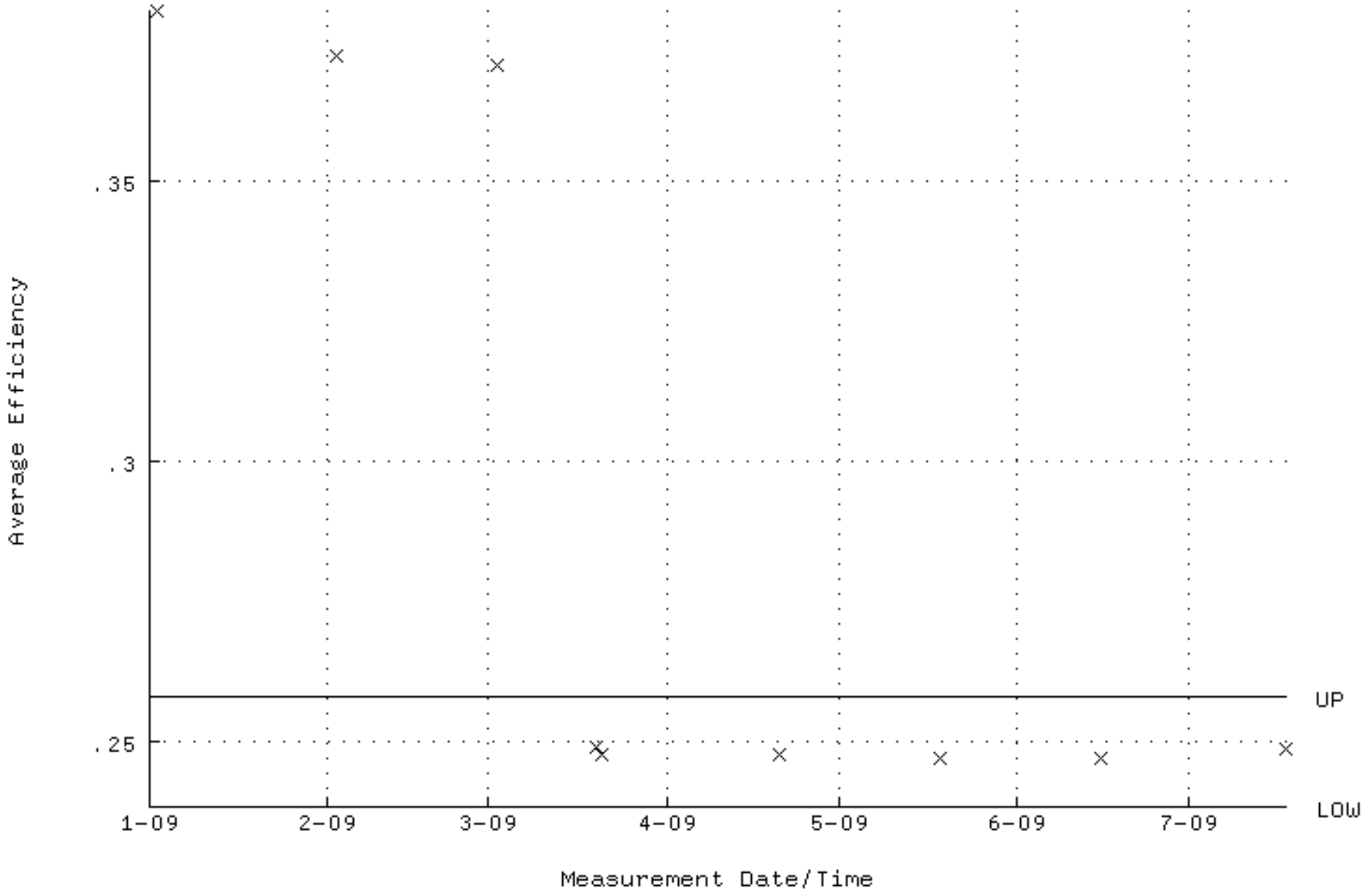
QA filename : DKA100:[ENV_ALPHA.QA.W]W149.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:25:32 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 84.8126 through 93.7402



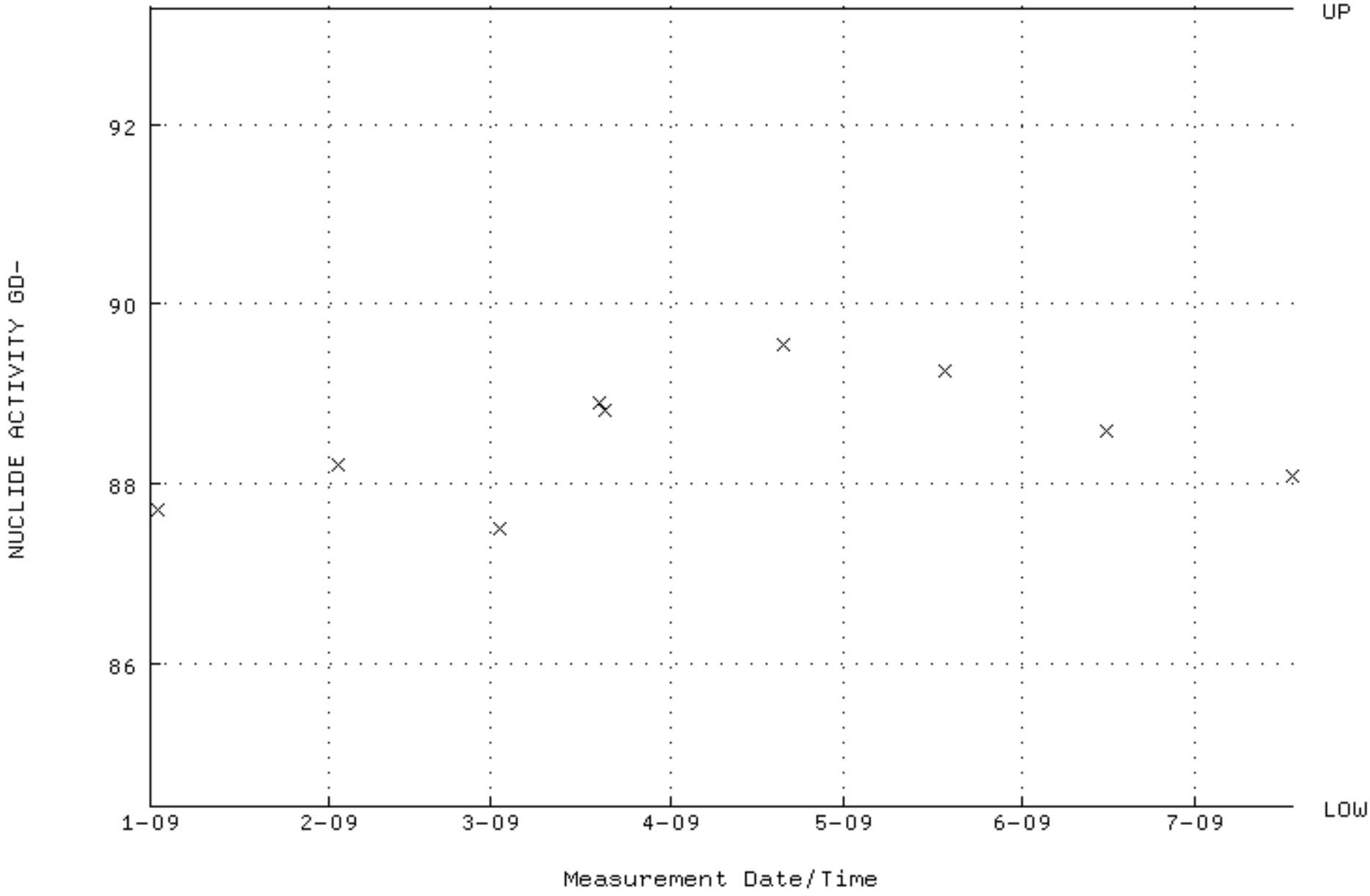
QA filename : DKA100:[ENV_ALPHA.QA.B]B149.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:24:21 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



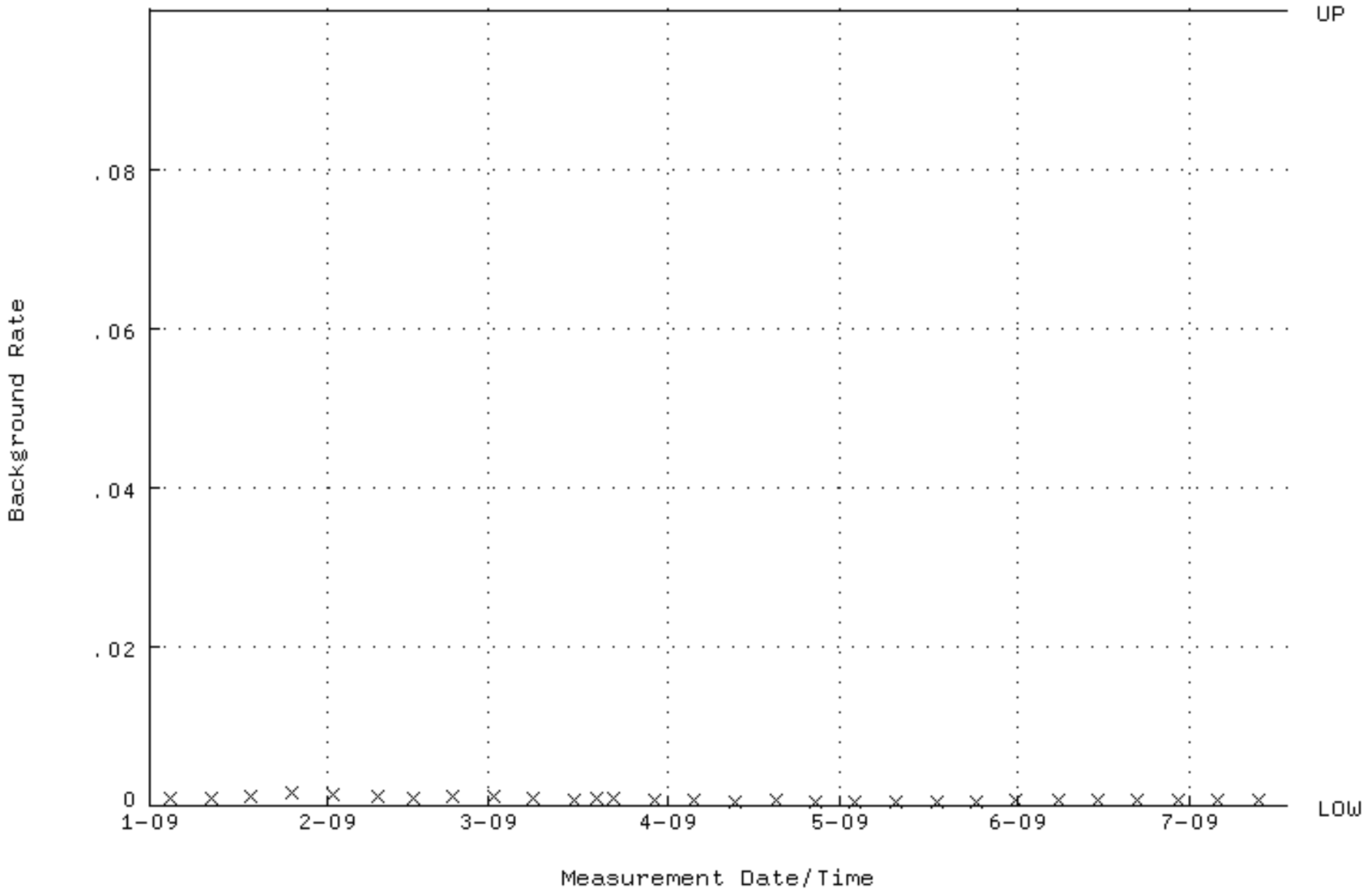
QA filename : DKA100:[ENV_ALPHA.QA.W]W150.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:25:37 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.238314 through 0.258314



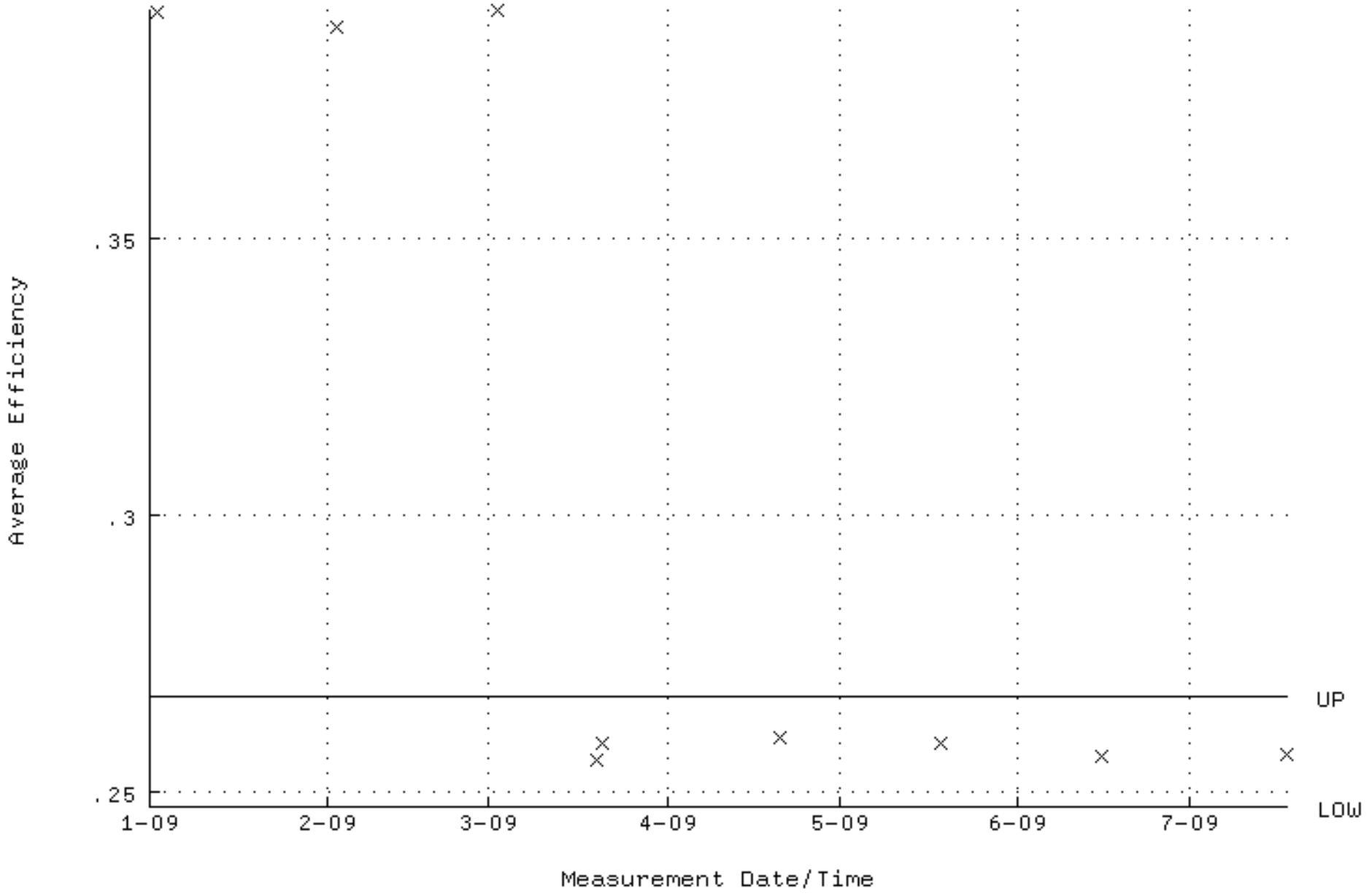
QA filename : DKA100:[ENV_ALPHA.QA.W]W150.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:25:37 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 84.4039 through 93.2885



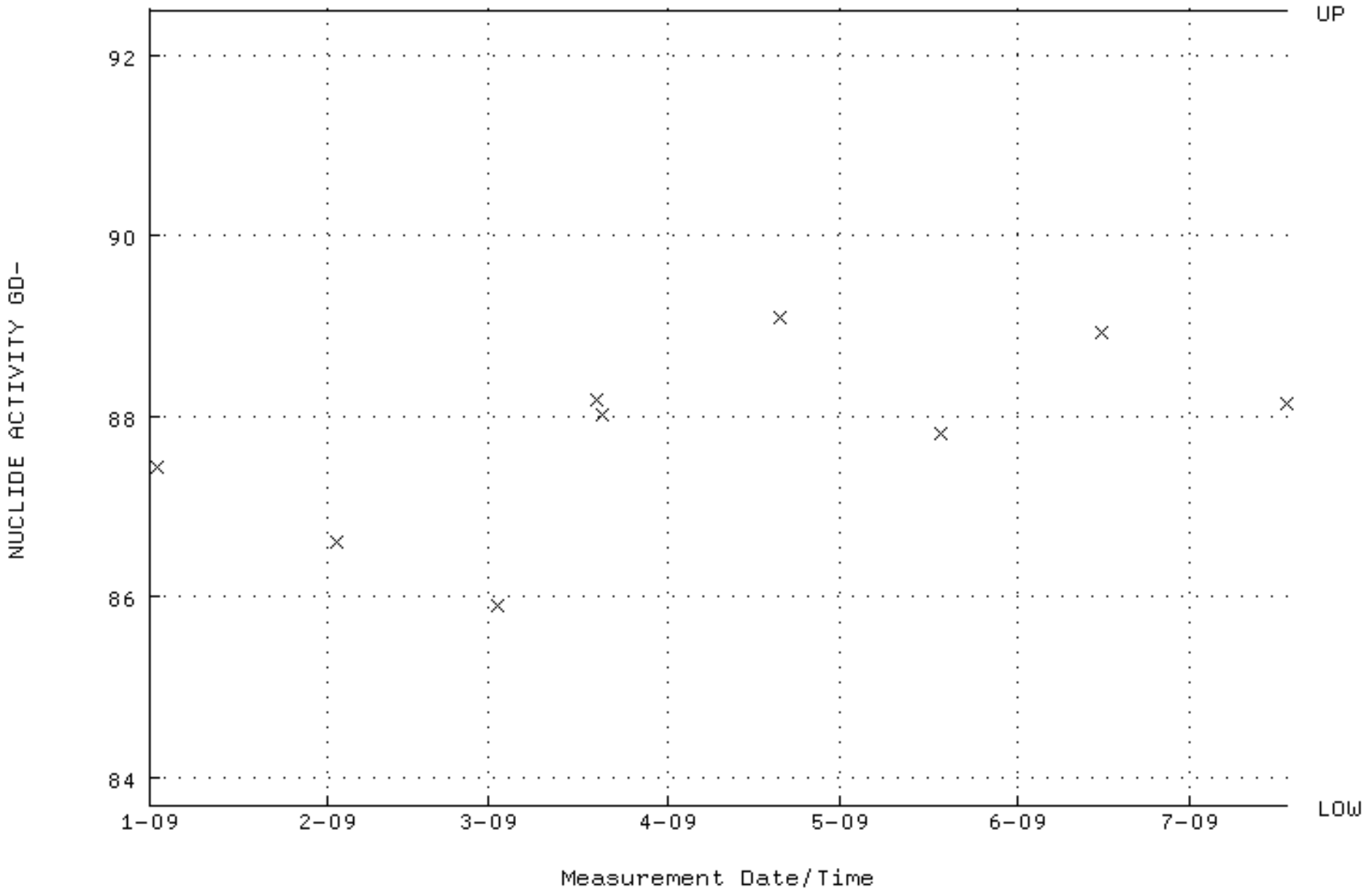
QA filename : DKA100:[ENV_ALPHA.QA.B]B150.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:24:24 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



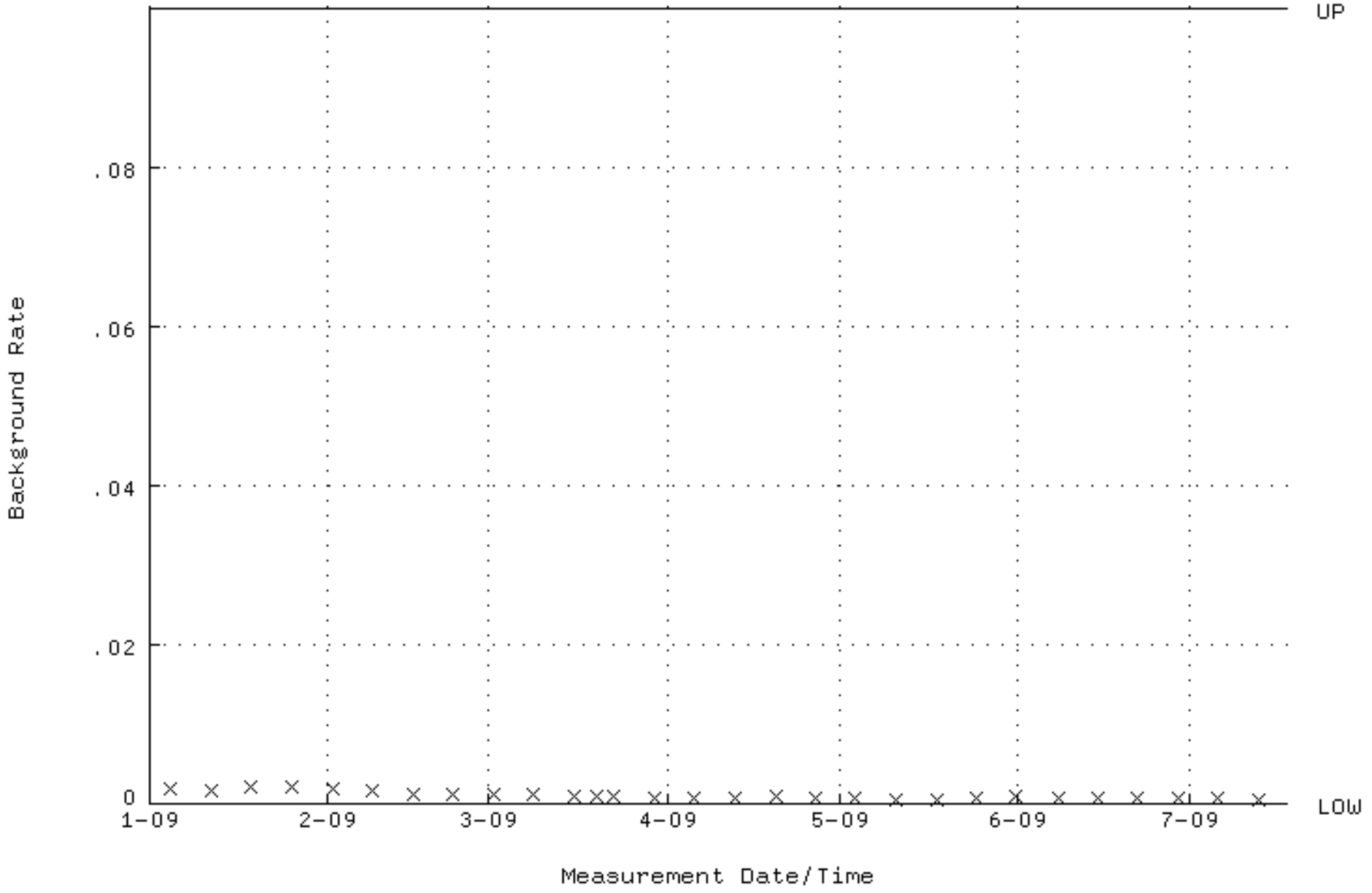
QA filename : DKA100:[ENV_ALPHA.QA.W]W155.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:26:01 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.247241 through 0.267241



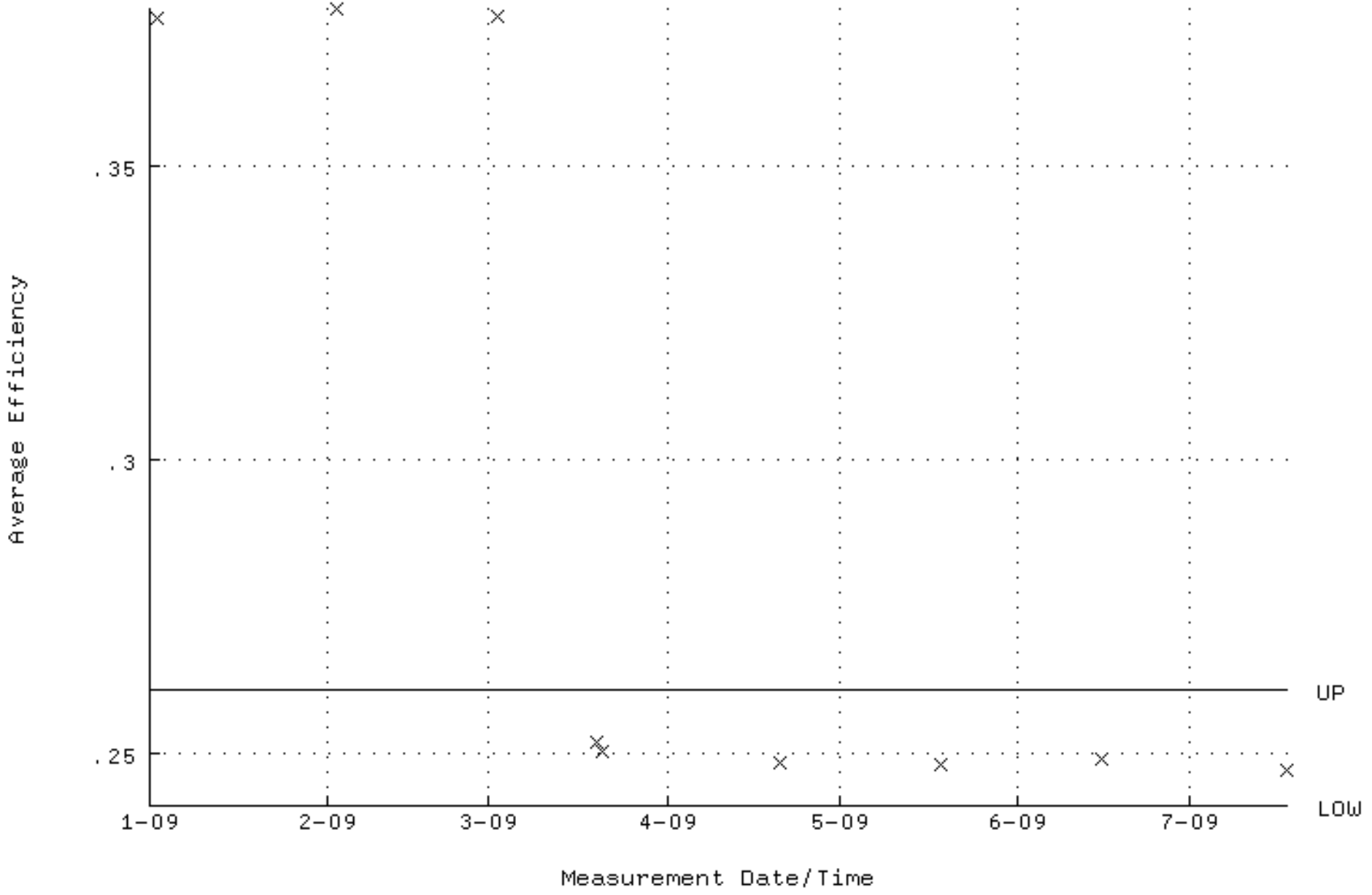
QA filename : DKA100:[ENV_ALPHA.QA.W]W155.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:26:01 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 83.6873 through 92.4965



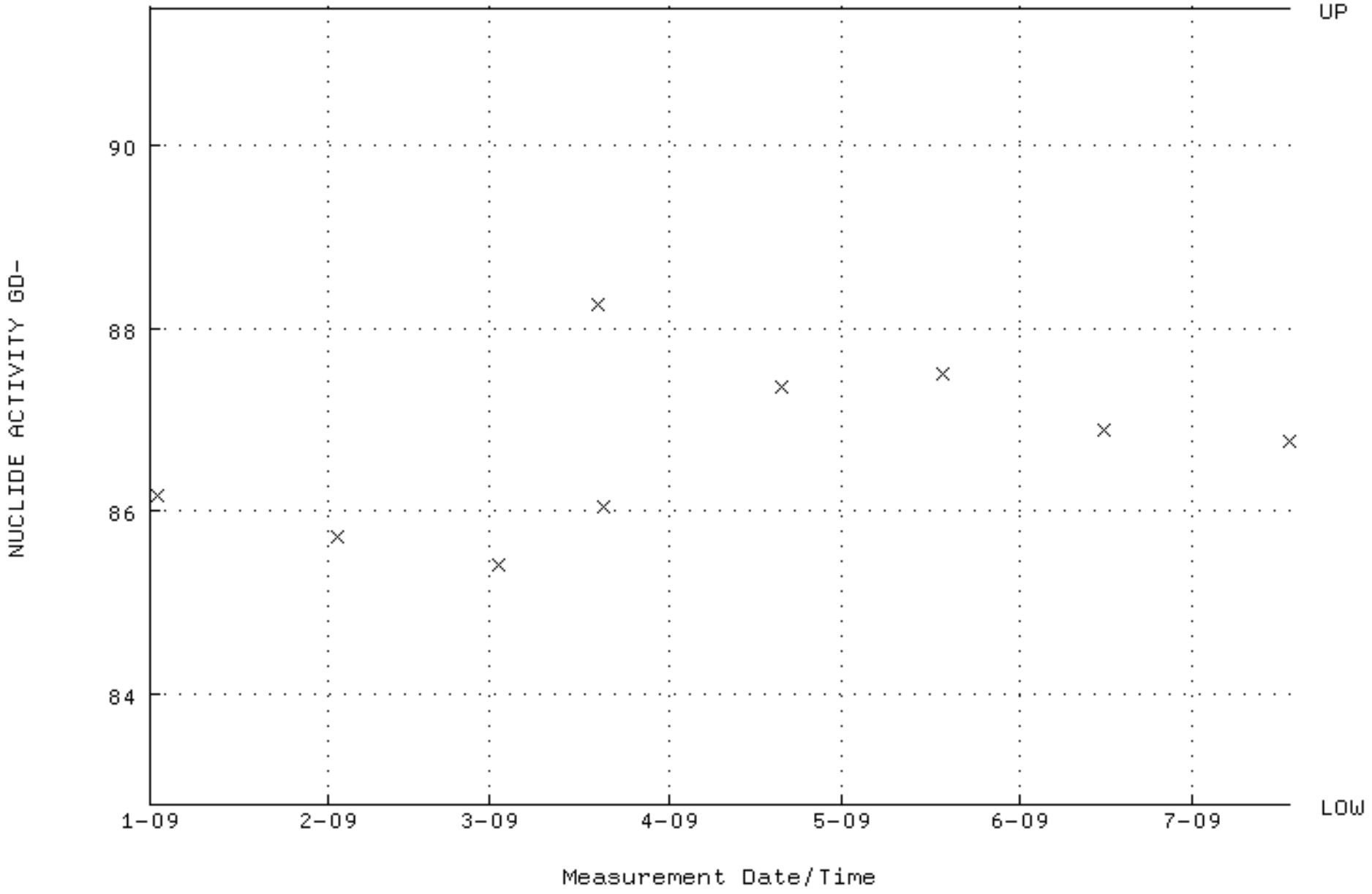
QA filename : DKA100:[ENV_ALPHA.QA.B]B155.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:24:44 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



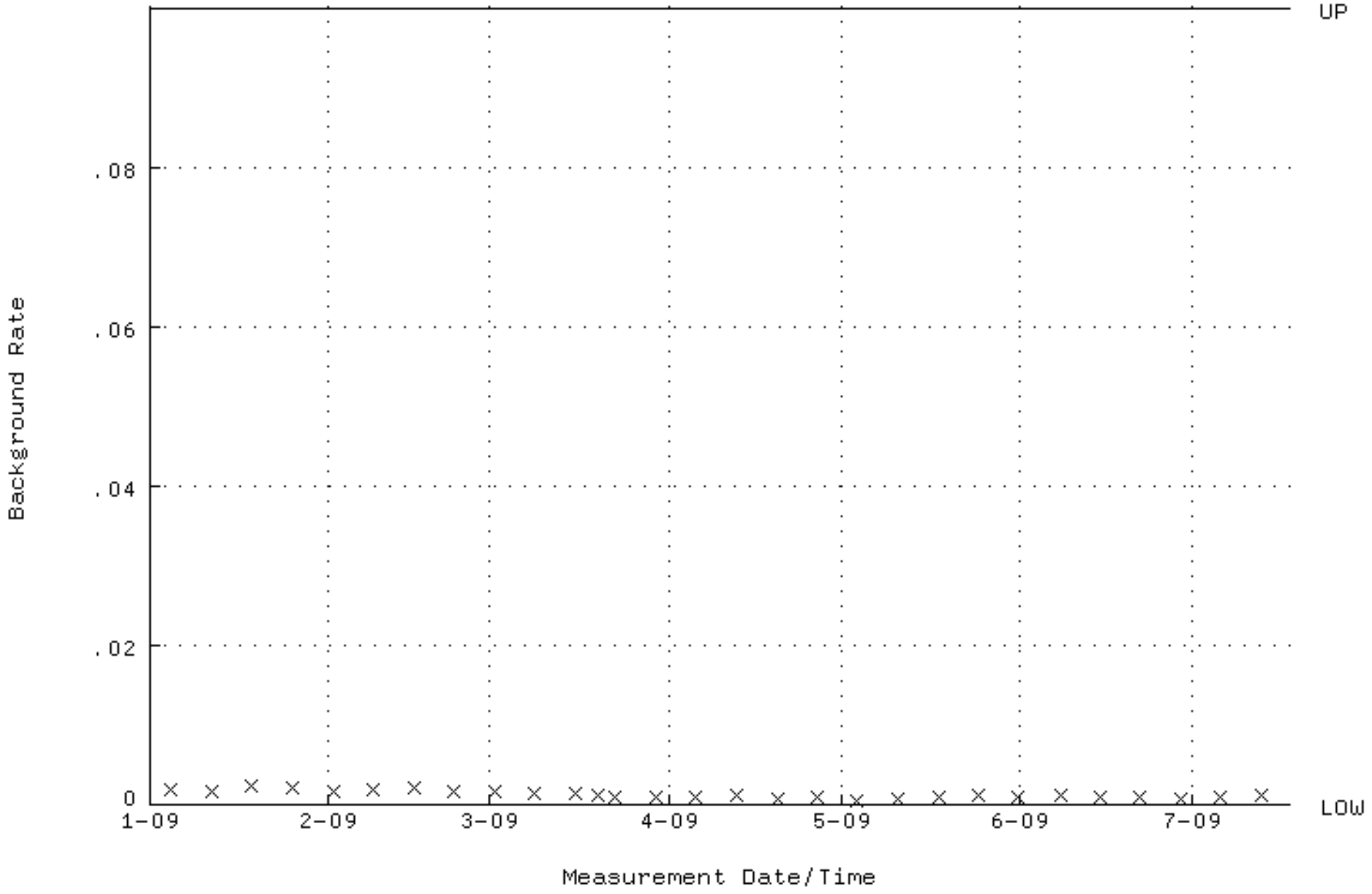
QA filename : DKA100:[ENV_ALPHA.QA.W]W156.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:26:06 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.241250 through 0.261250



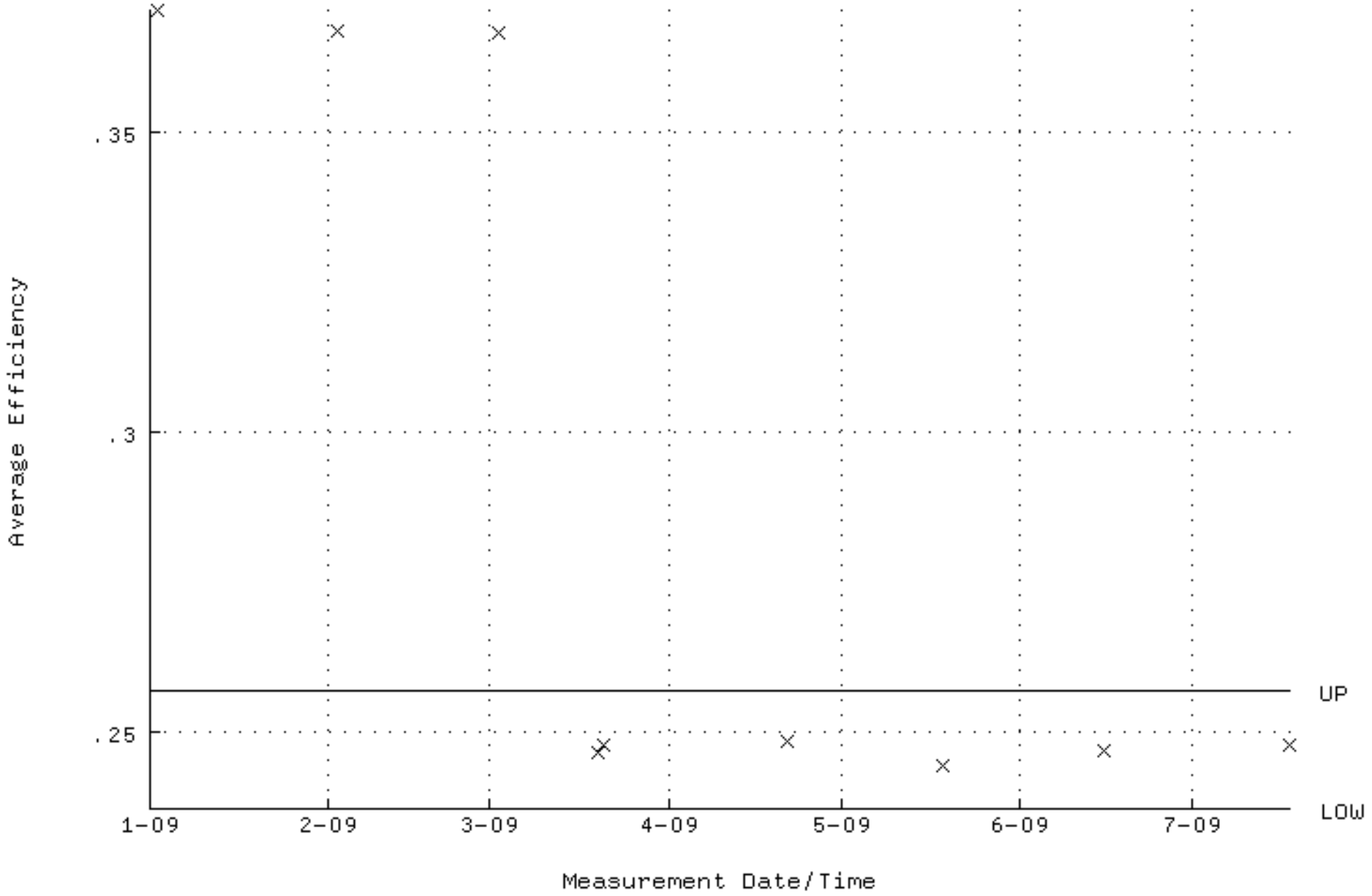
QA filename : DKA100:[ENV_ALPHA.QA.W]W156.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:26:06 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 82.7847 through 91.4989



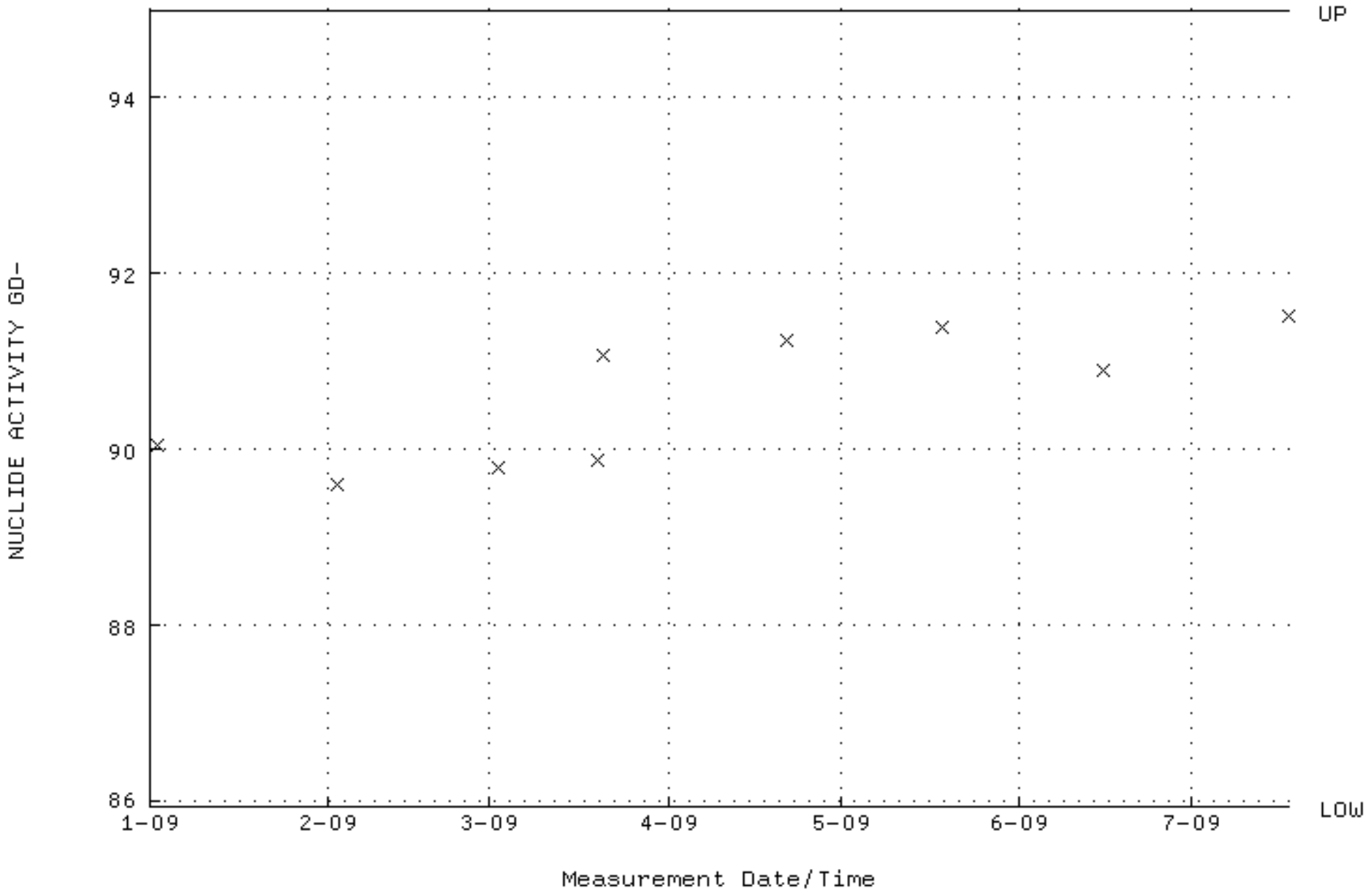
QA filename : DKA100:[ENV_ALPHA.QA.B]B156.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:24:47 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



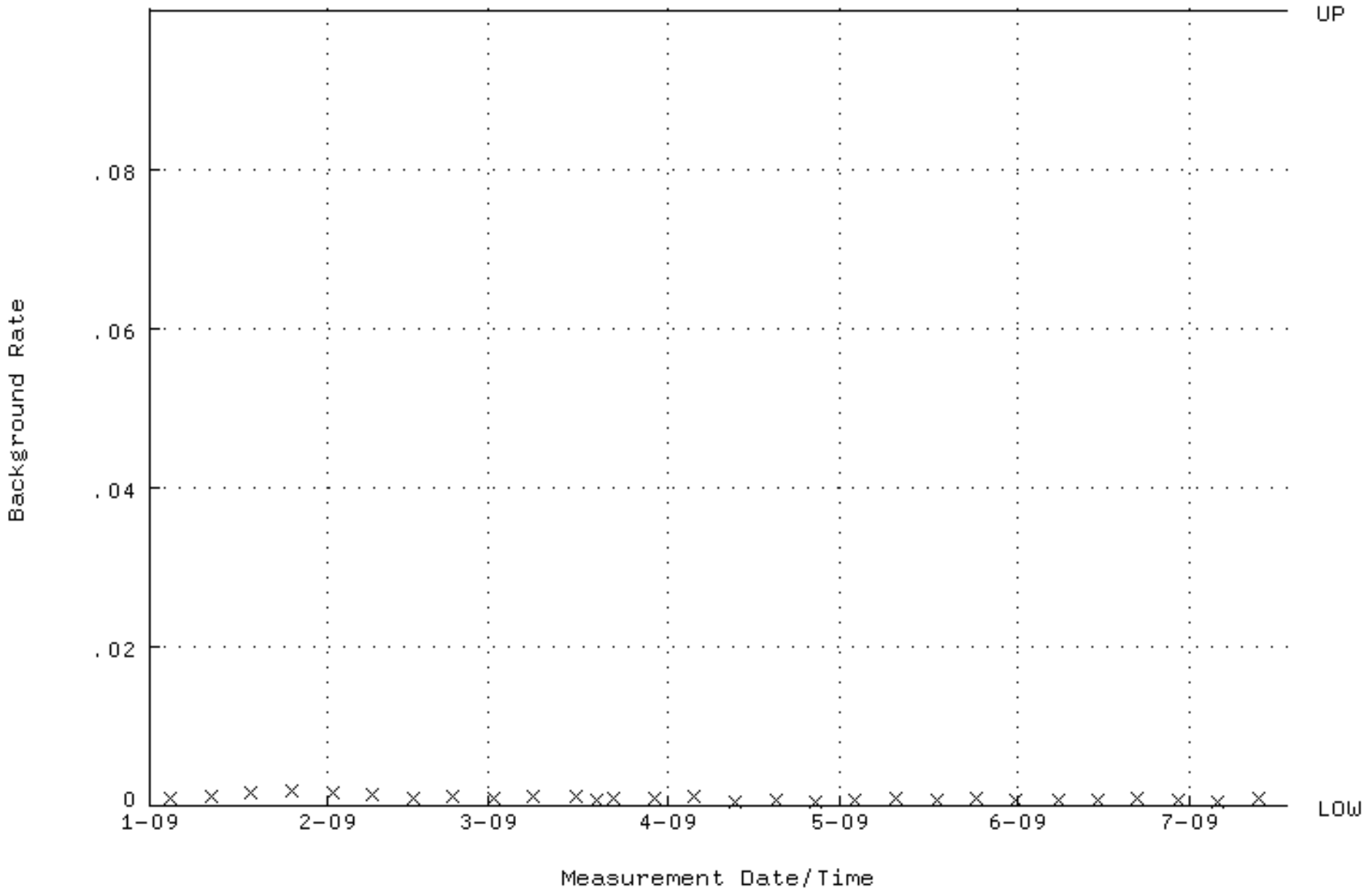
QA filename : DKA100:[ENV_ALPHA.QA.W]W157.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:26:10 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.237137 through 0.257137



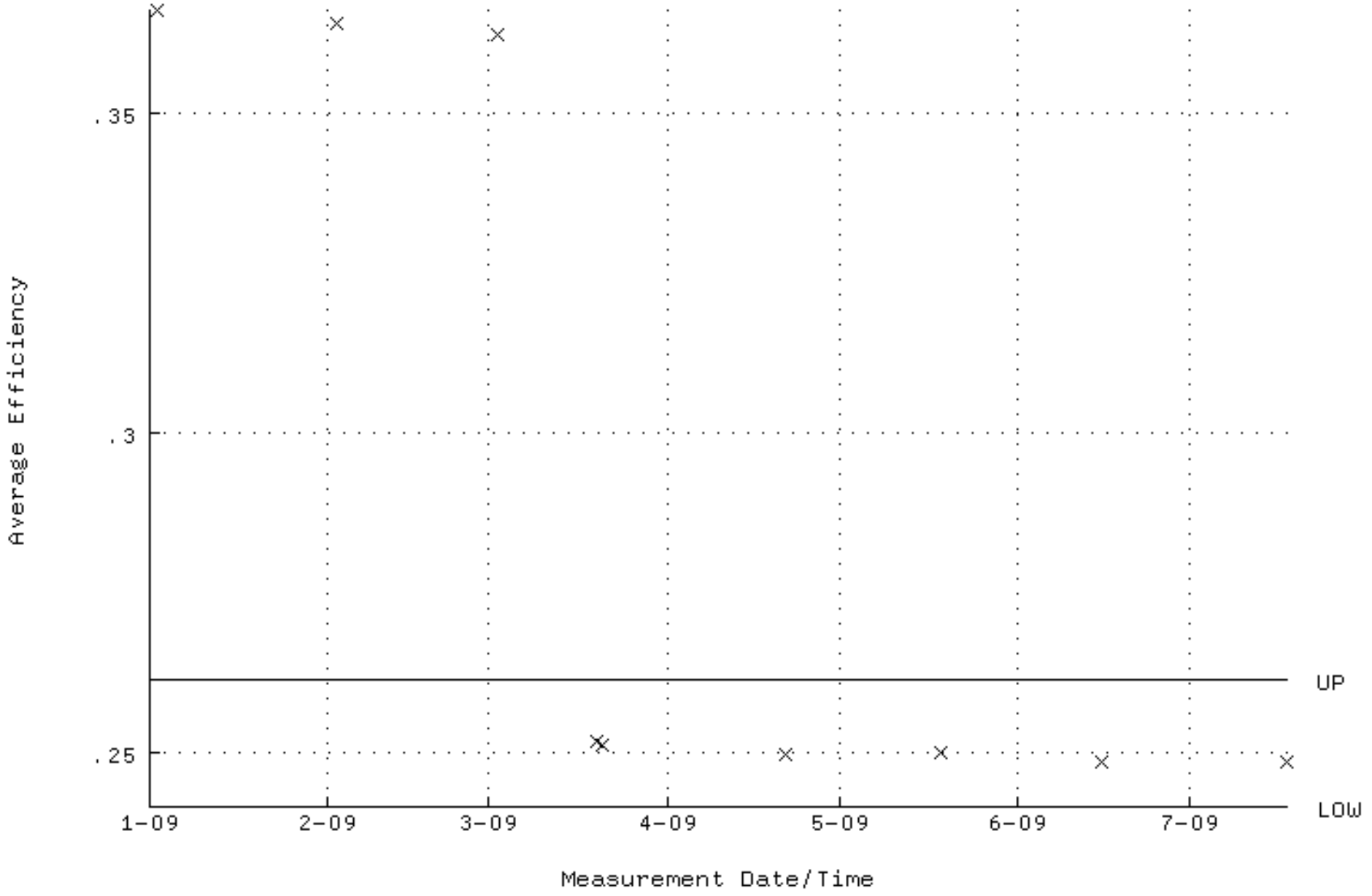
QA filename : DKA100:[ENV_ALPHA.QA.W]W157.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:26:10 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 85.9292 through 94.9744



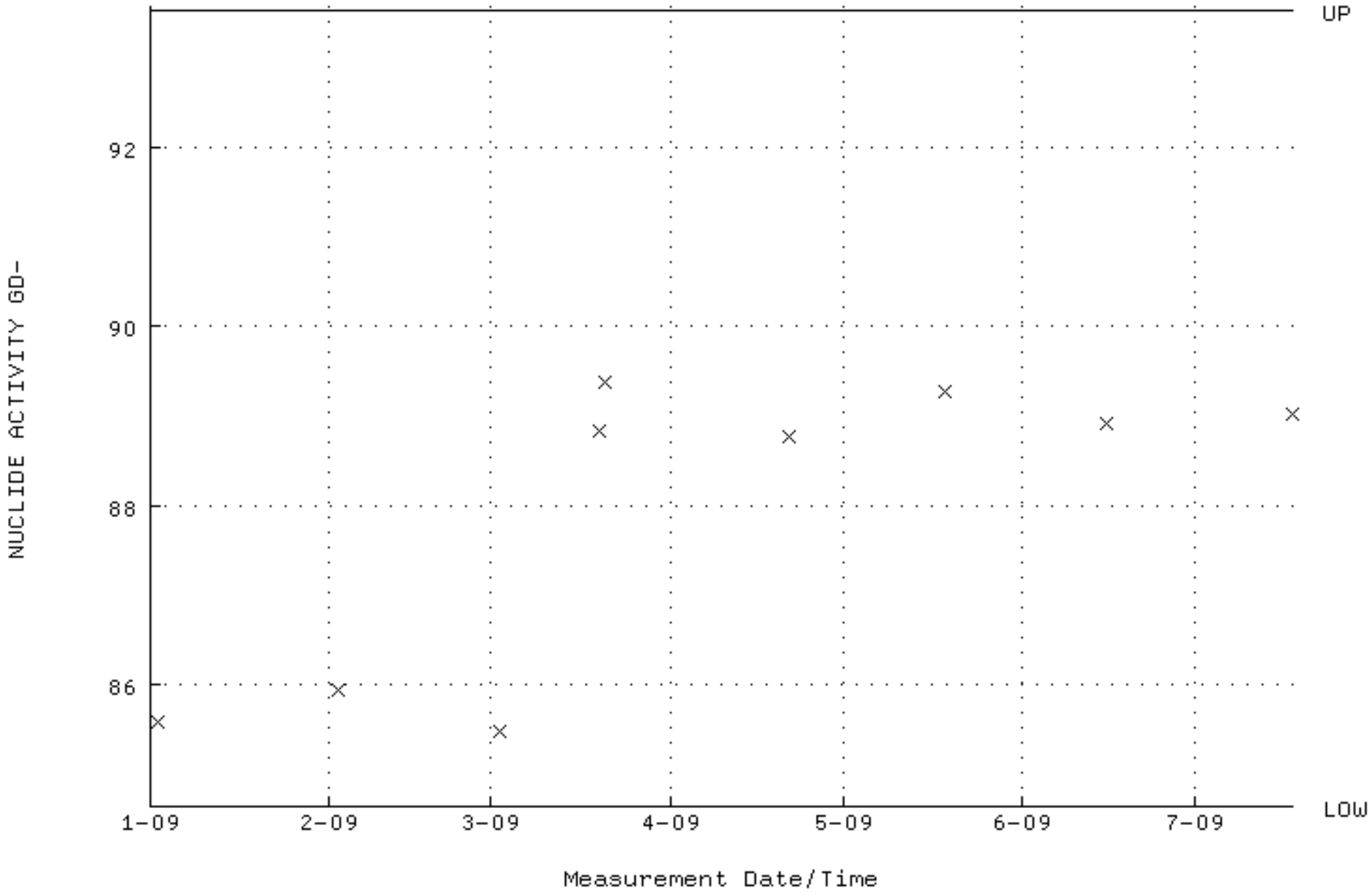
QA filename : DKA100:[ENV_ALPHA.QA.B]B157.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:24:51 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



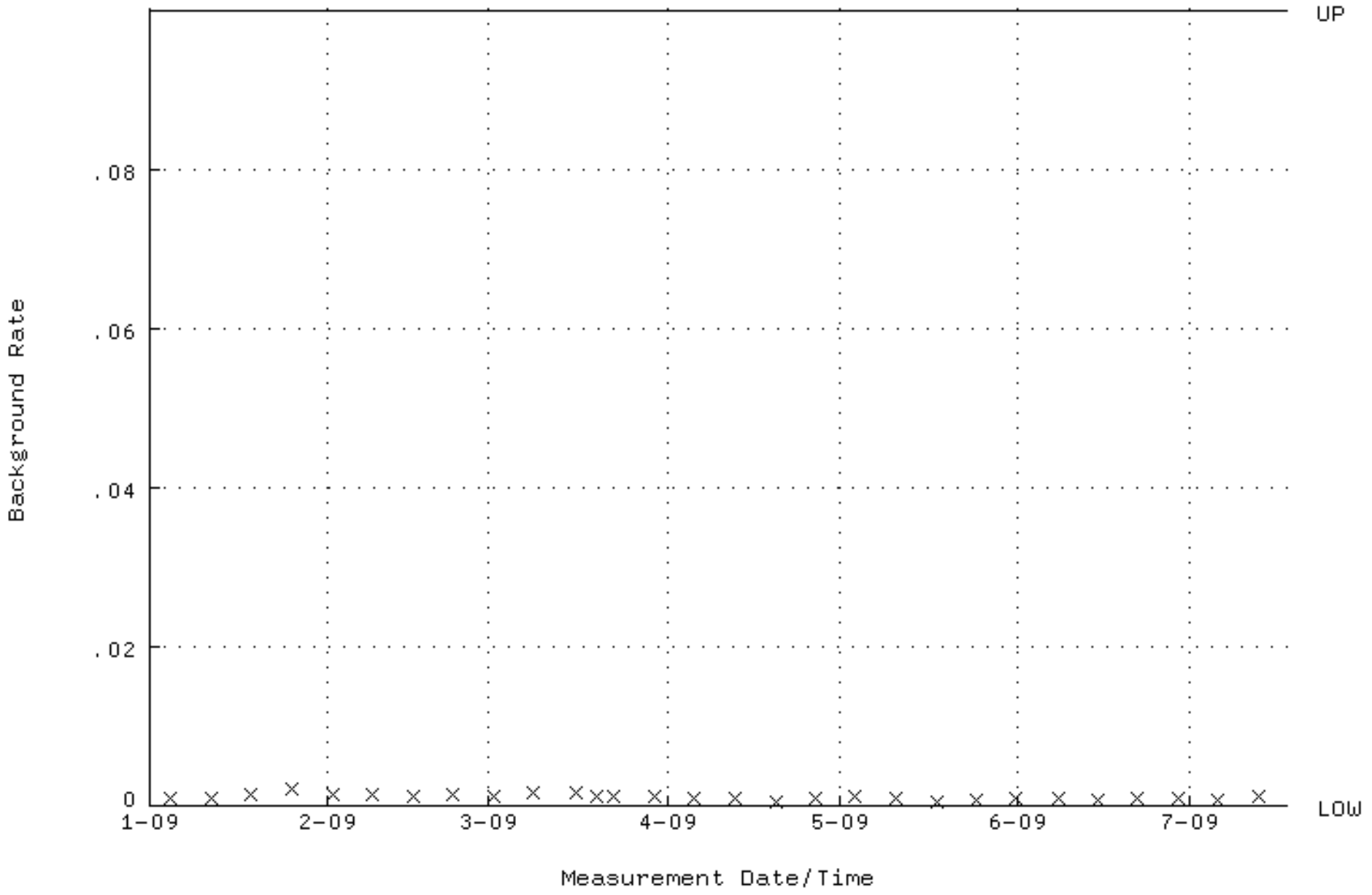
QA filename : DKA100:[ENV_ALPHA.QA.W]W158.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:26:14 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.241466 through 0.261466



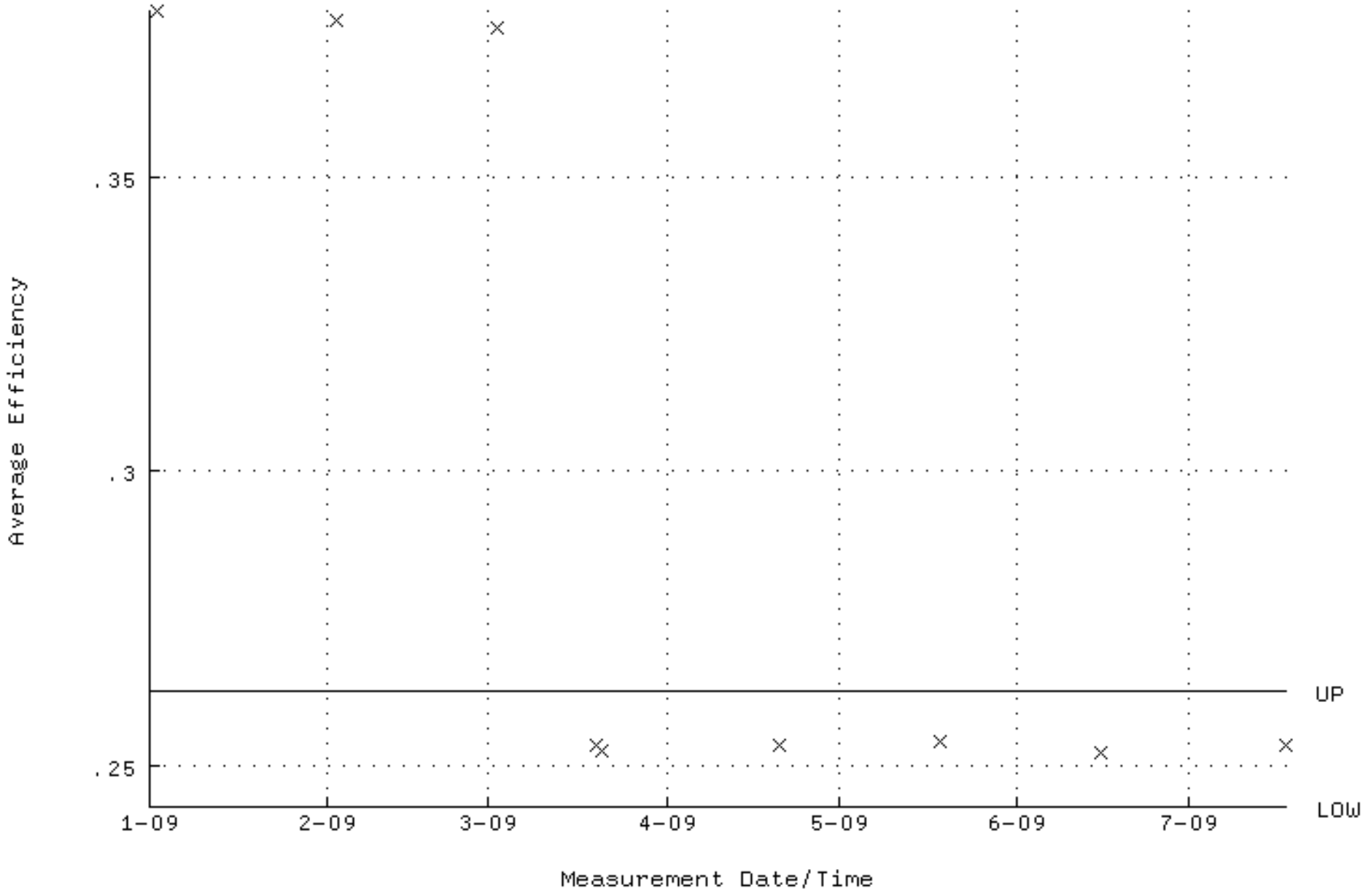
QA filename : DKA100:[ENV_ALPHA.QA.W]W158.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:26:14 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 84.6414 through 93.5510



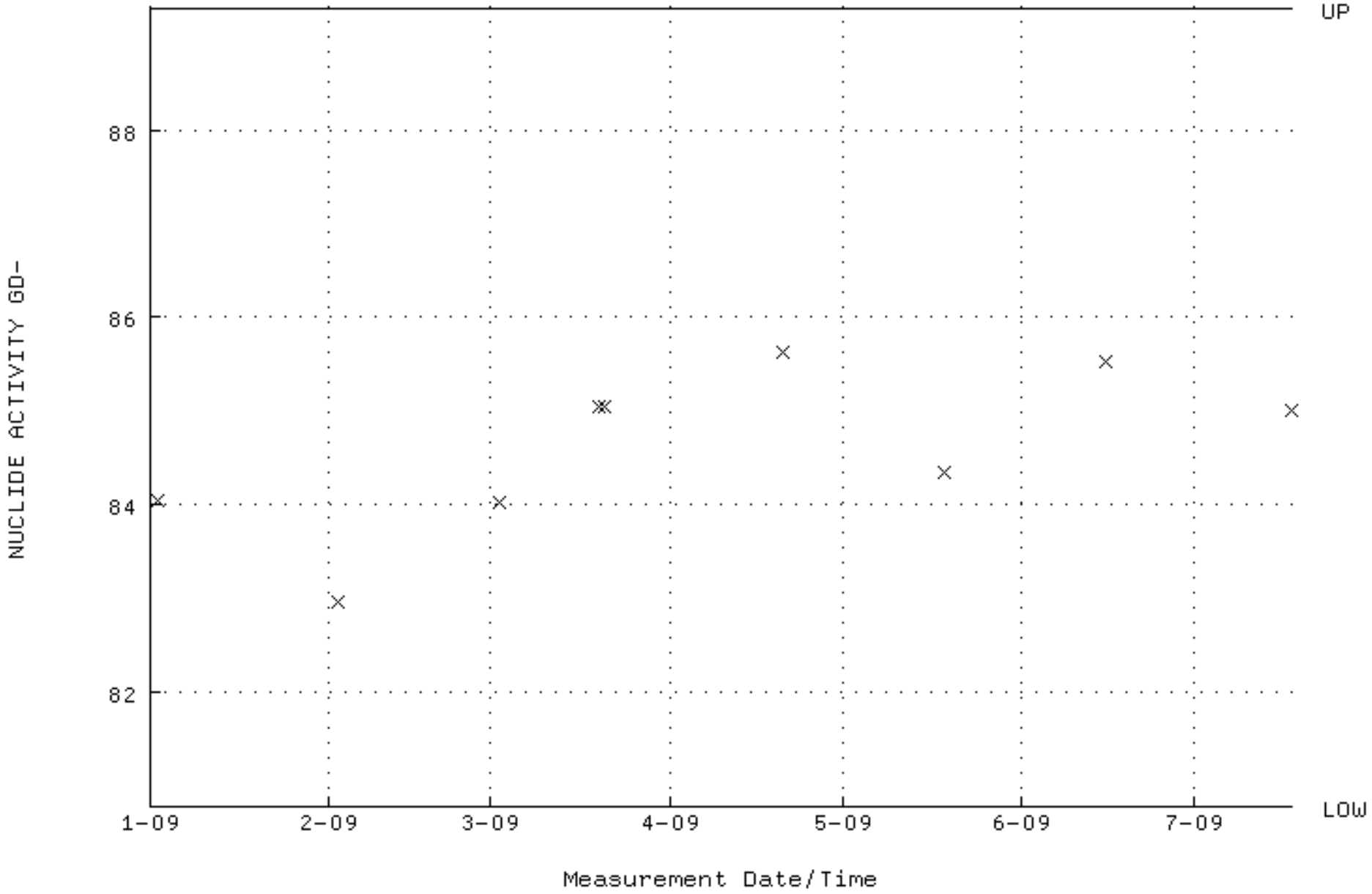
QA filename : DKA100:[ENV_ALPHA.QA.B]B158.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:24:55 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



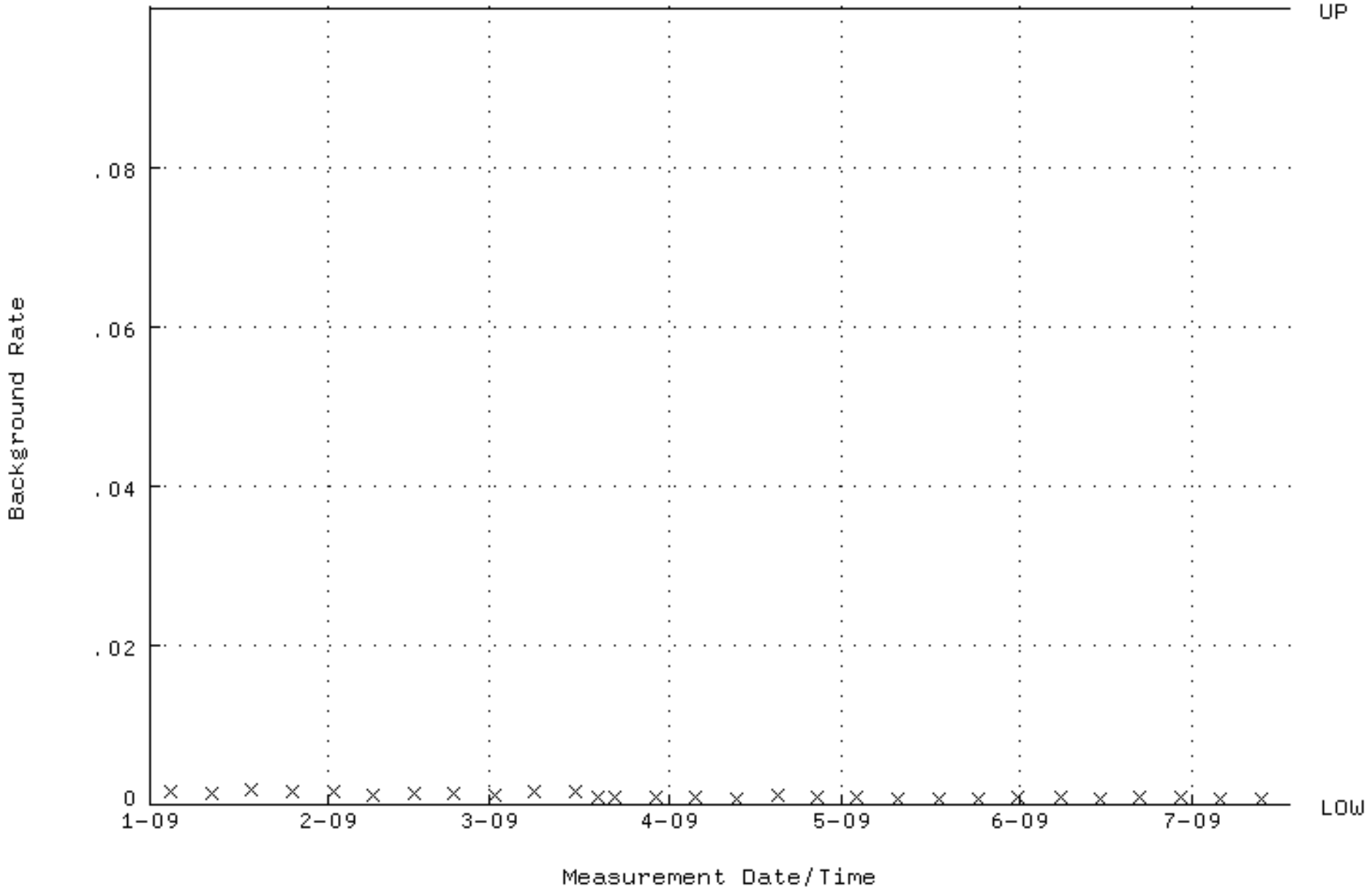
QA filename : DKA100:[ENV_ALPHA.QA.W]W159.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:26:19 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.242851 through 0.262851



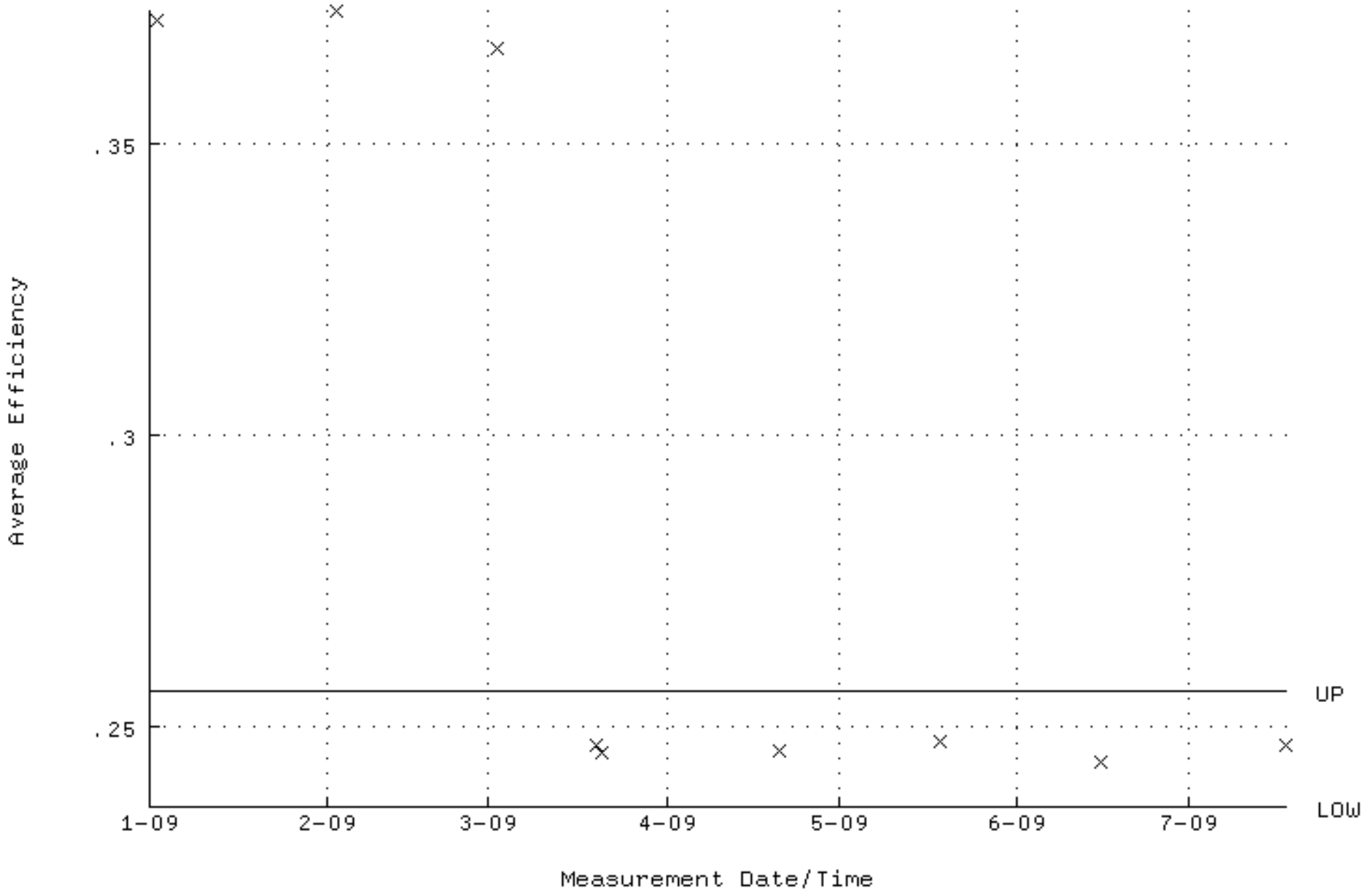
QA filename : DKA100:[ENV_ALPHA.QA.W]W159.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:26:19 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 80.7870 through 89.2909



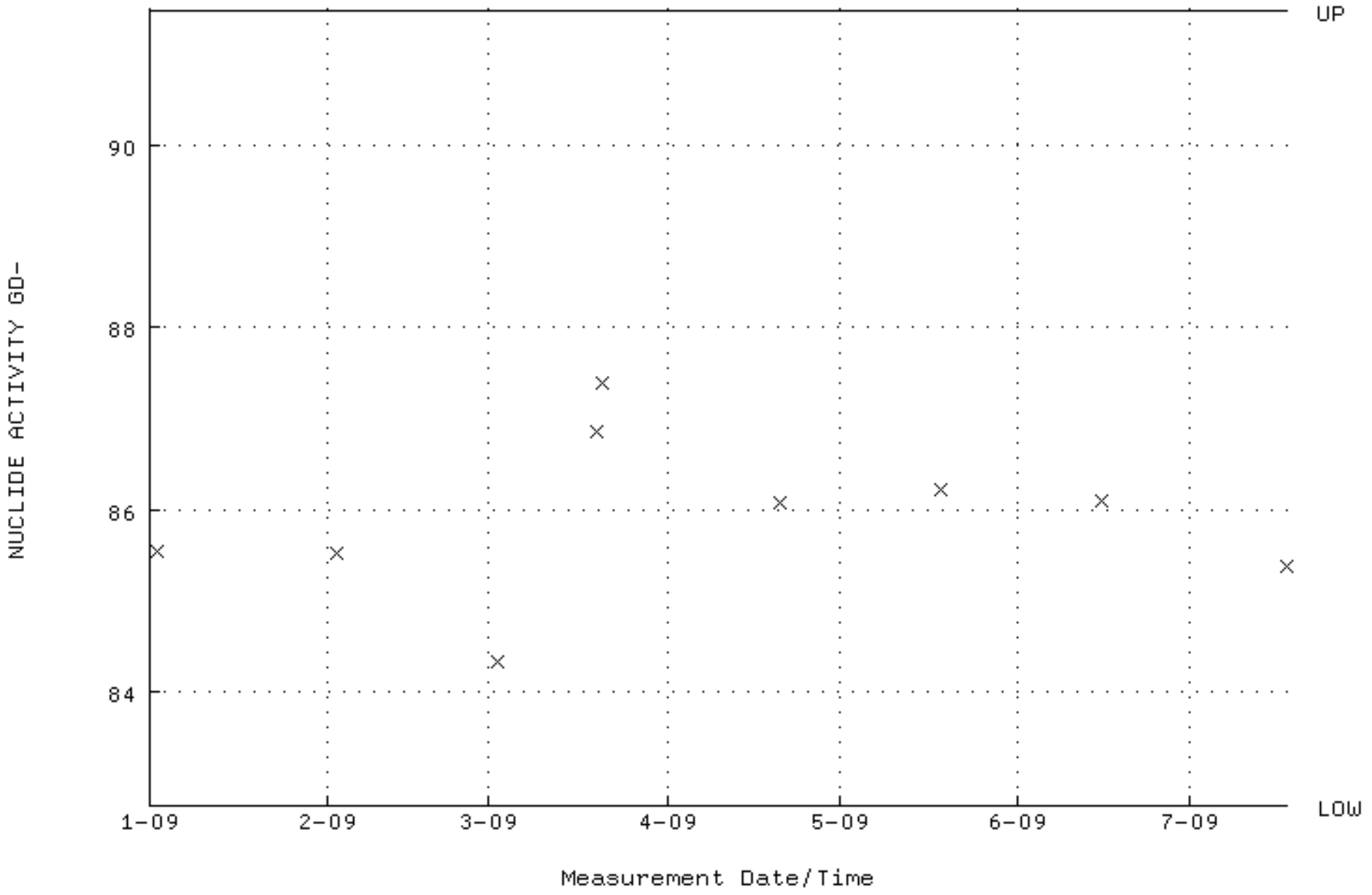
QA filename : DKA100:[ENV_ALPHA.QA.B]B159.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:24:59 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



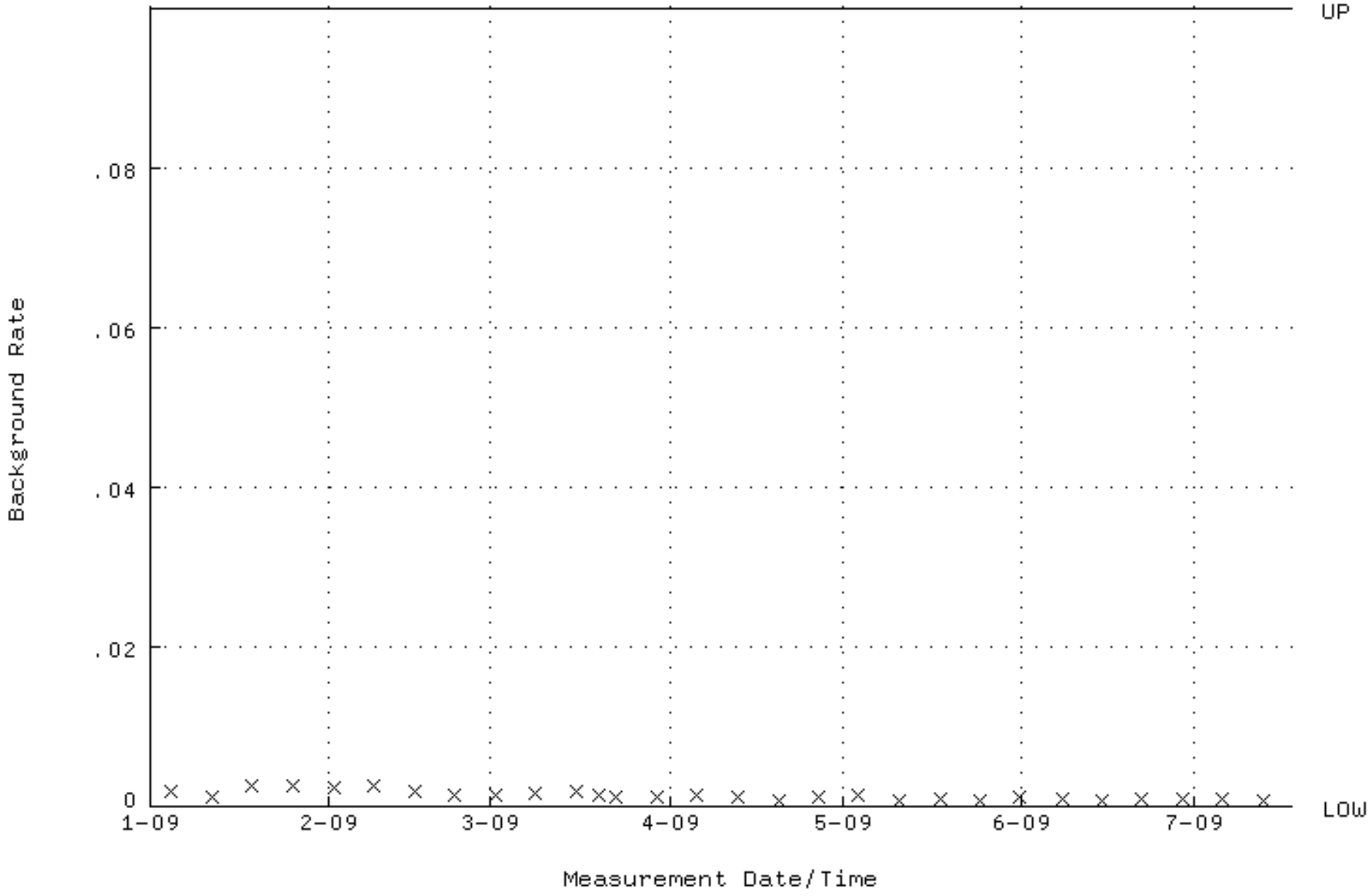
QA filename : DKA100:[ENV_ALPHA.QA.W]W160.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 07:26:23 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.236284 through 0.256284



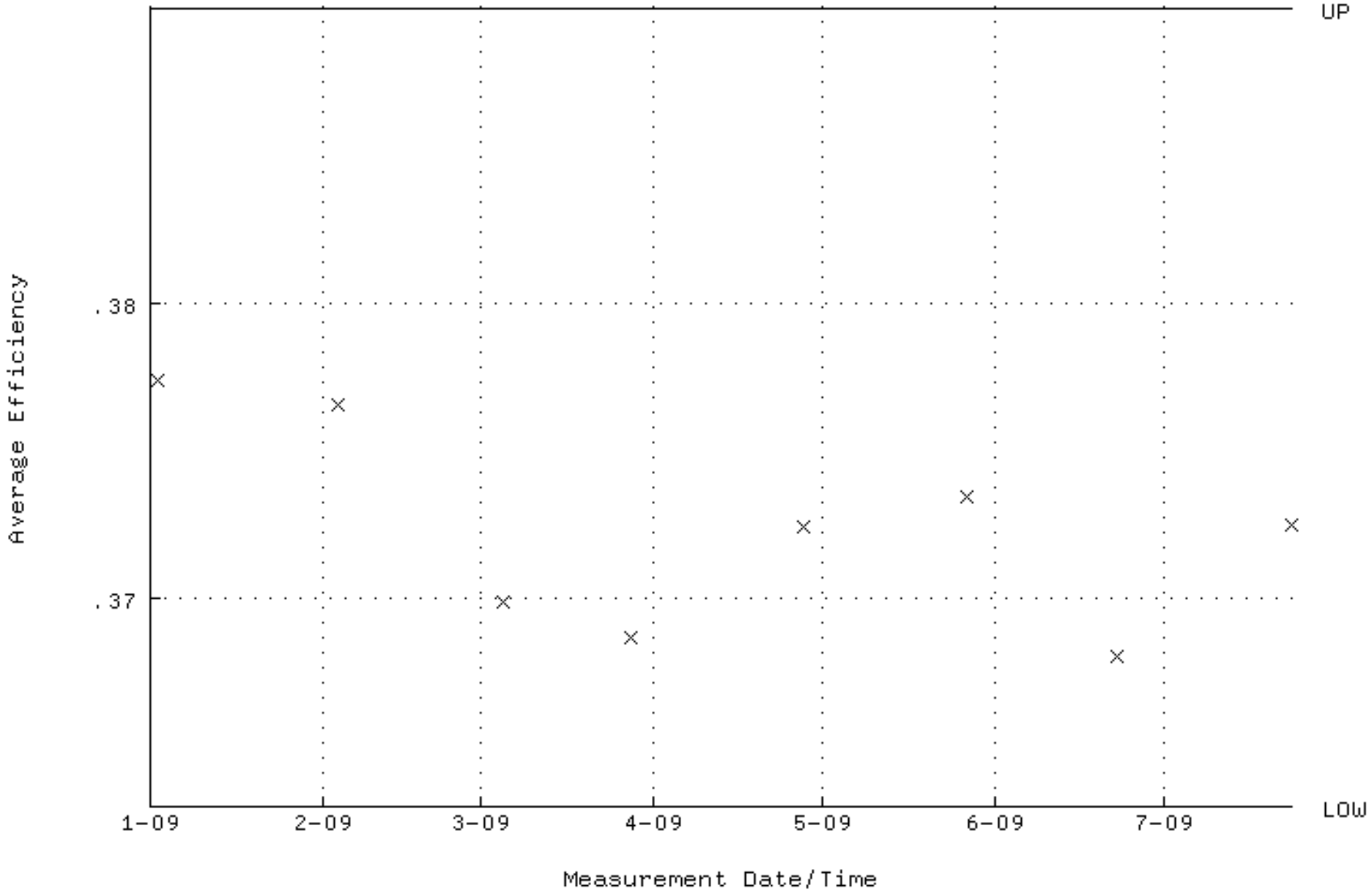
QA filename : DKA100:[ENV_ALPHA.QA.W]W160.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 07:26:23 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 82.7554 through 91.4664



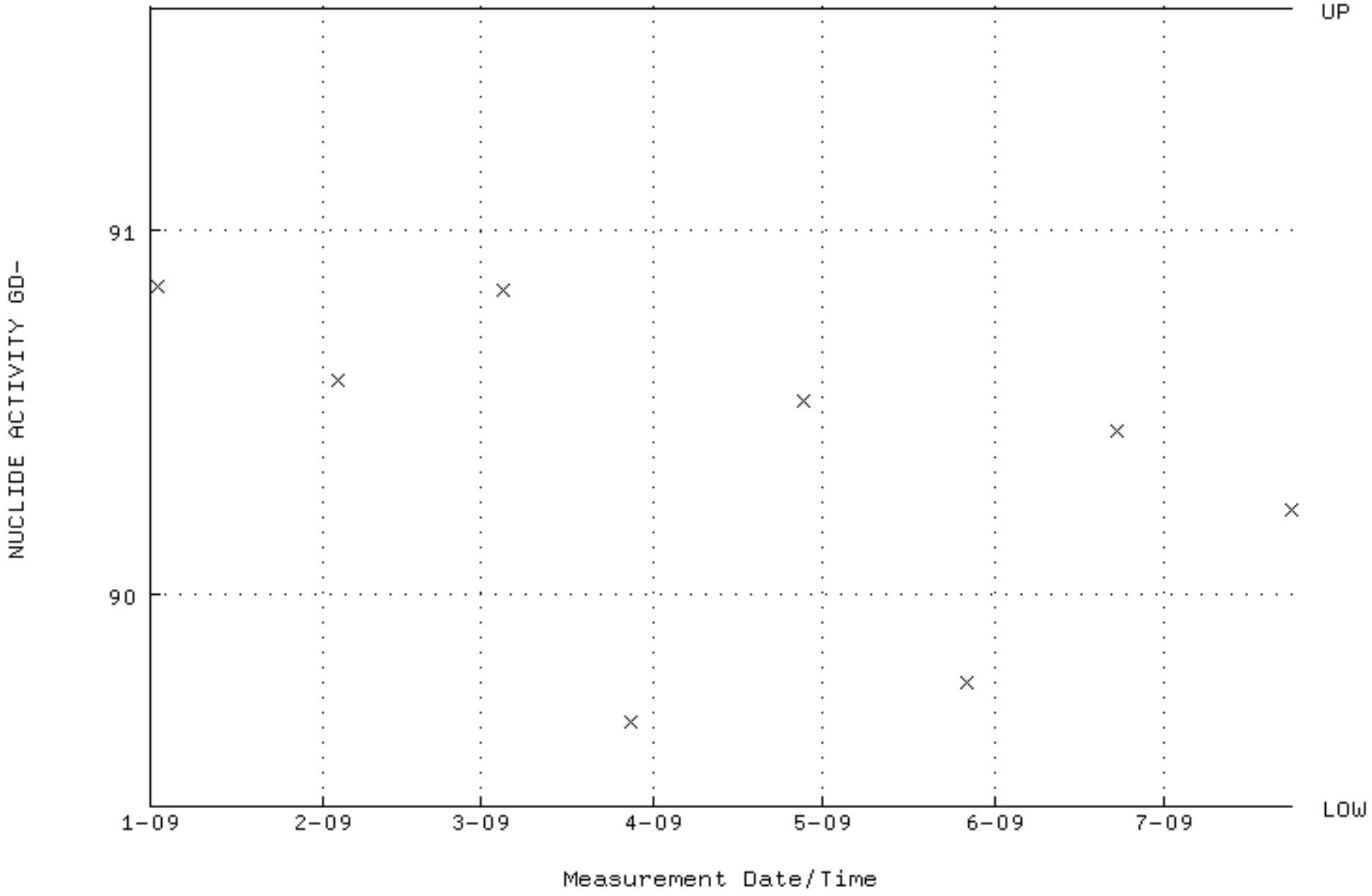
QA filename : DKA100:[ENV_ALPHA.QA.B]B160.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:25:02 through 17-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



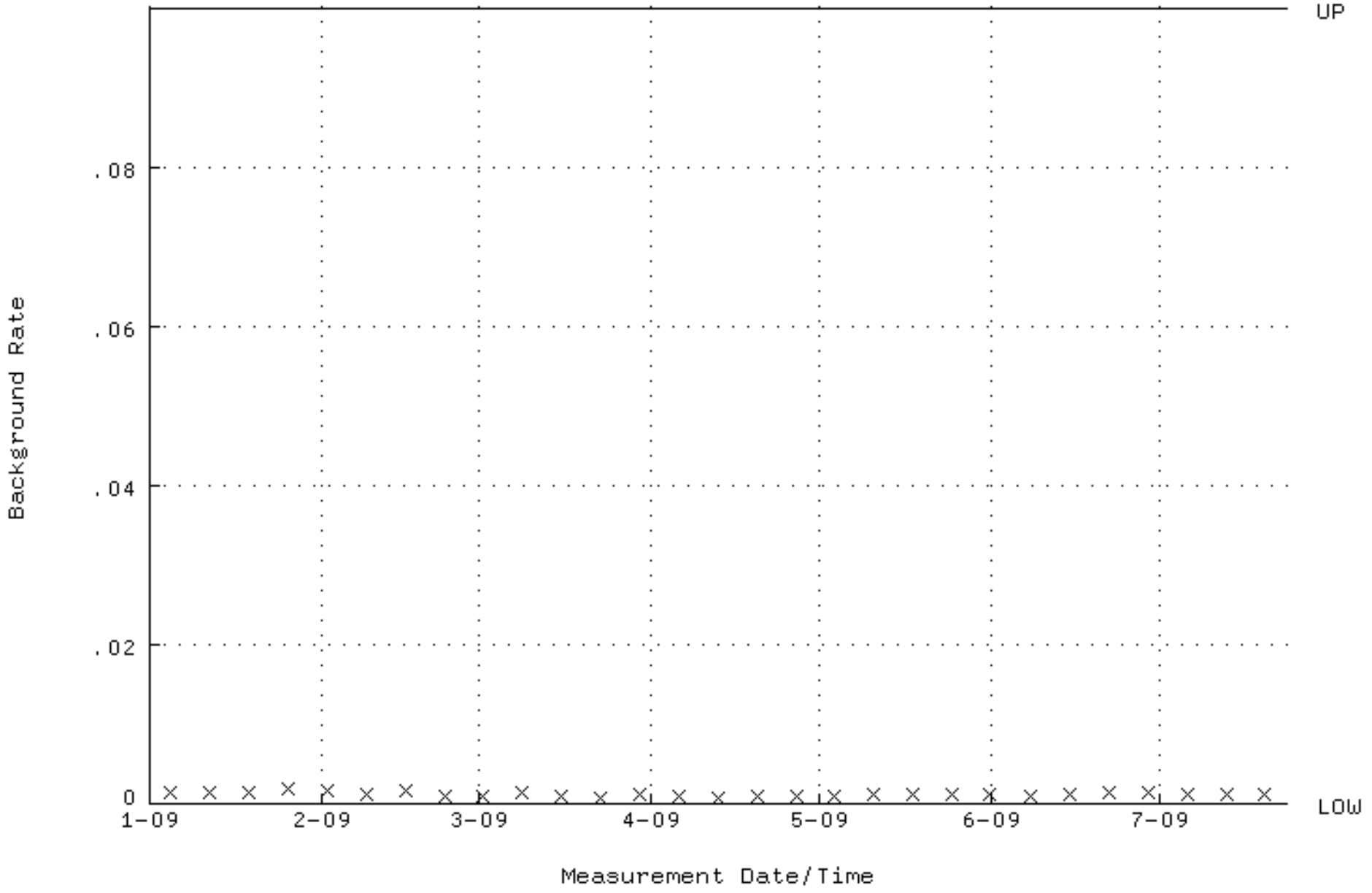
QA filename : DKA100:[ENV_ALPHA.QA.W]W161.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 12:08:44 through 23-JUL-2009 12:00:00
Lower/Upper Lmts: 0.362982 through 0.389932



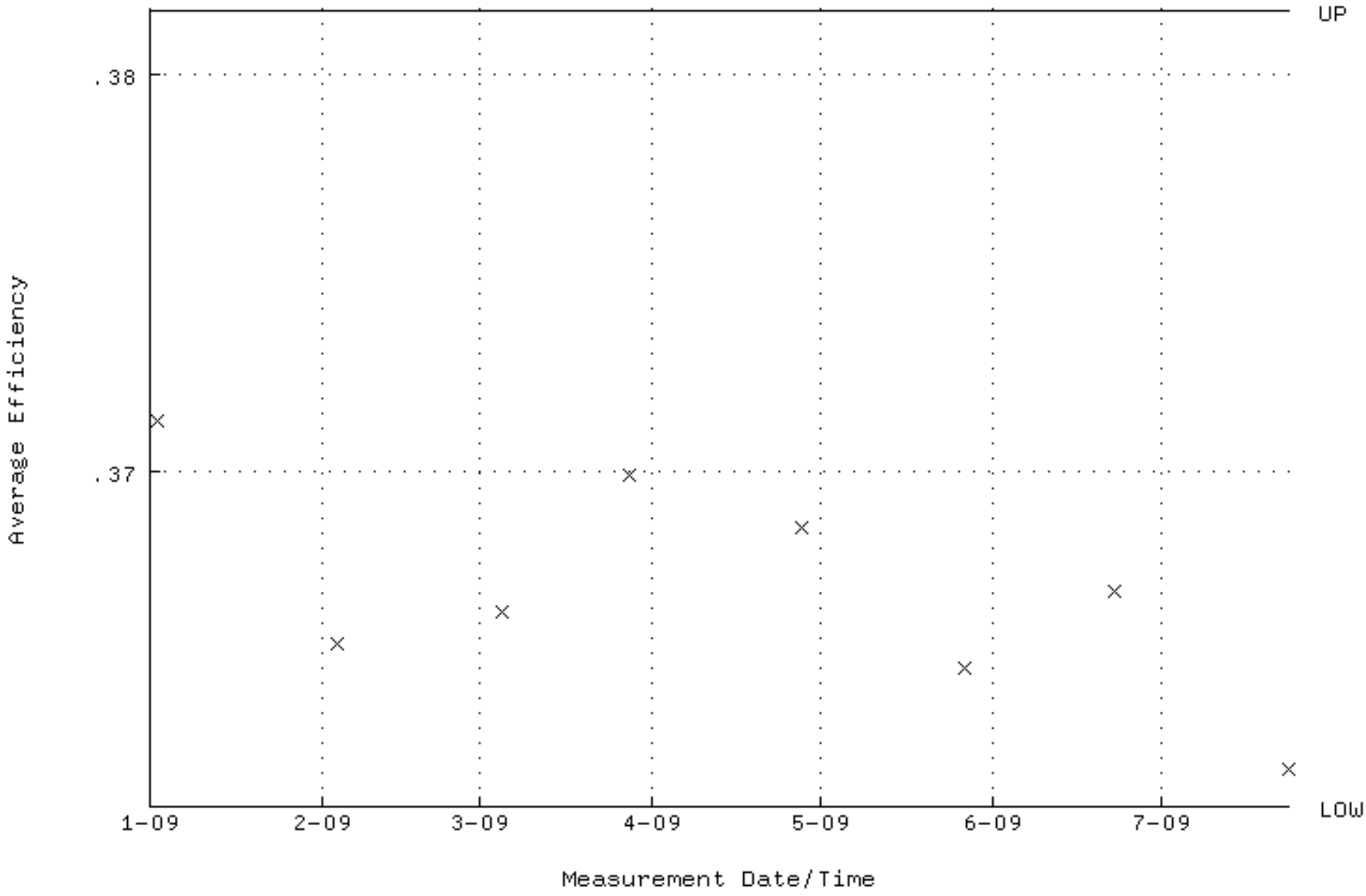
QA filename : DKA100:[ENV_ALPHA.QA.W]W161.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 12:08:44 through 23-JUL-2009 12:00:00
Lower/Upper Lmts: 89.4216 through 91.6054



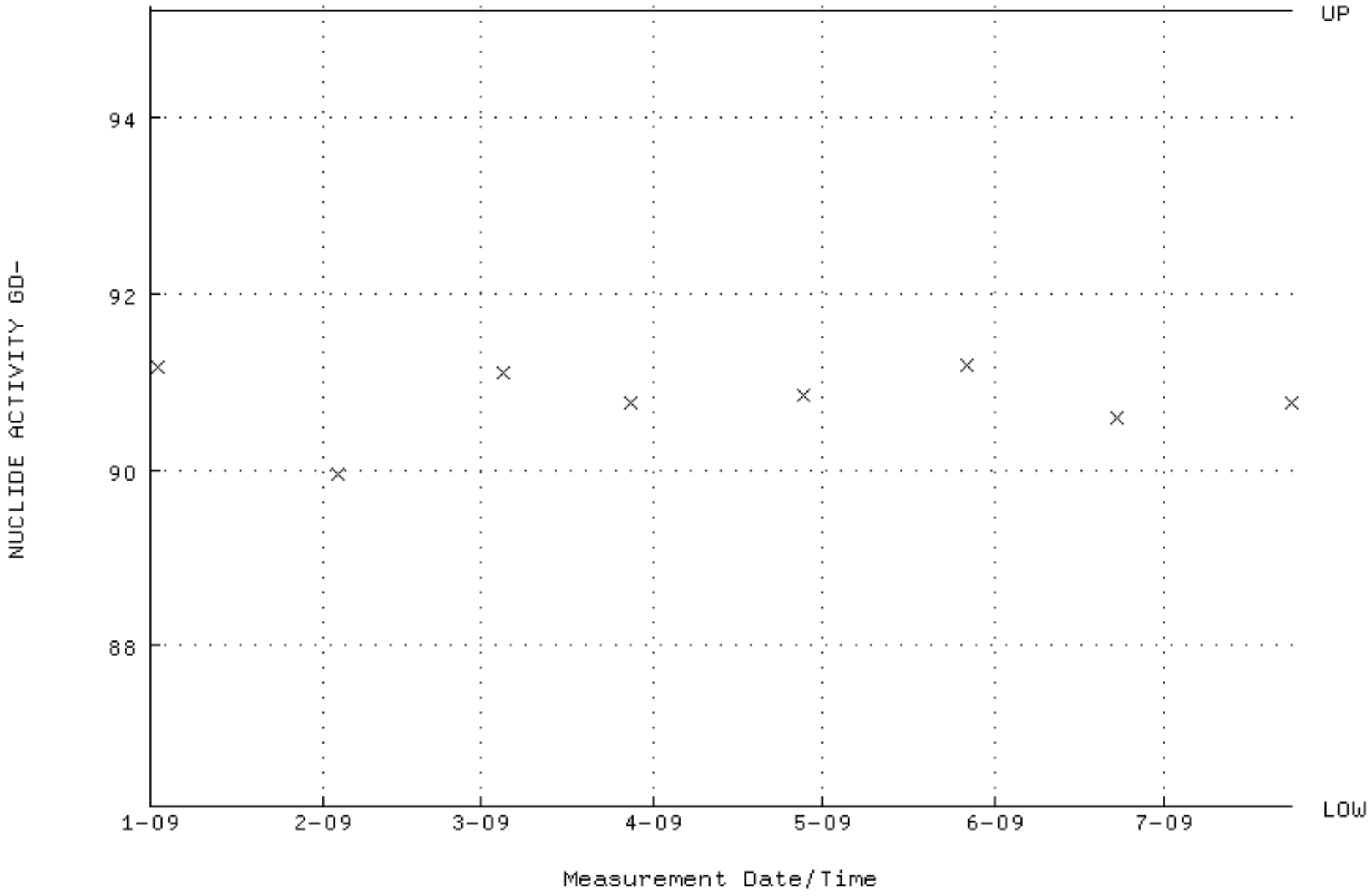
QA filename : DKA100:[ENV_ALPHA.QA.B]B161.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:25:06 through 23-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



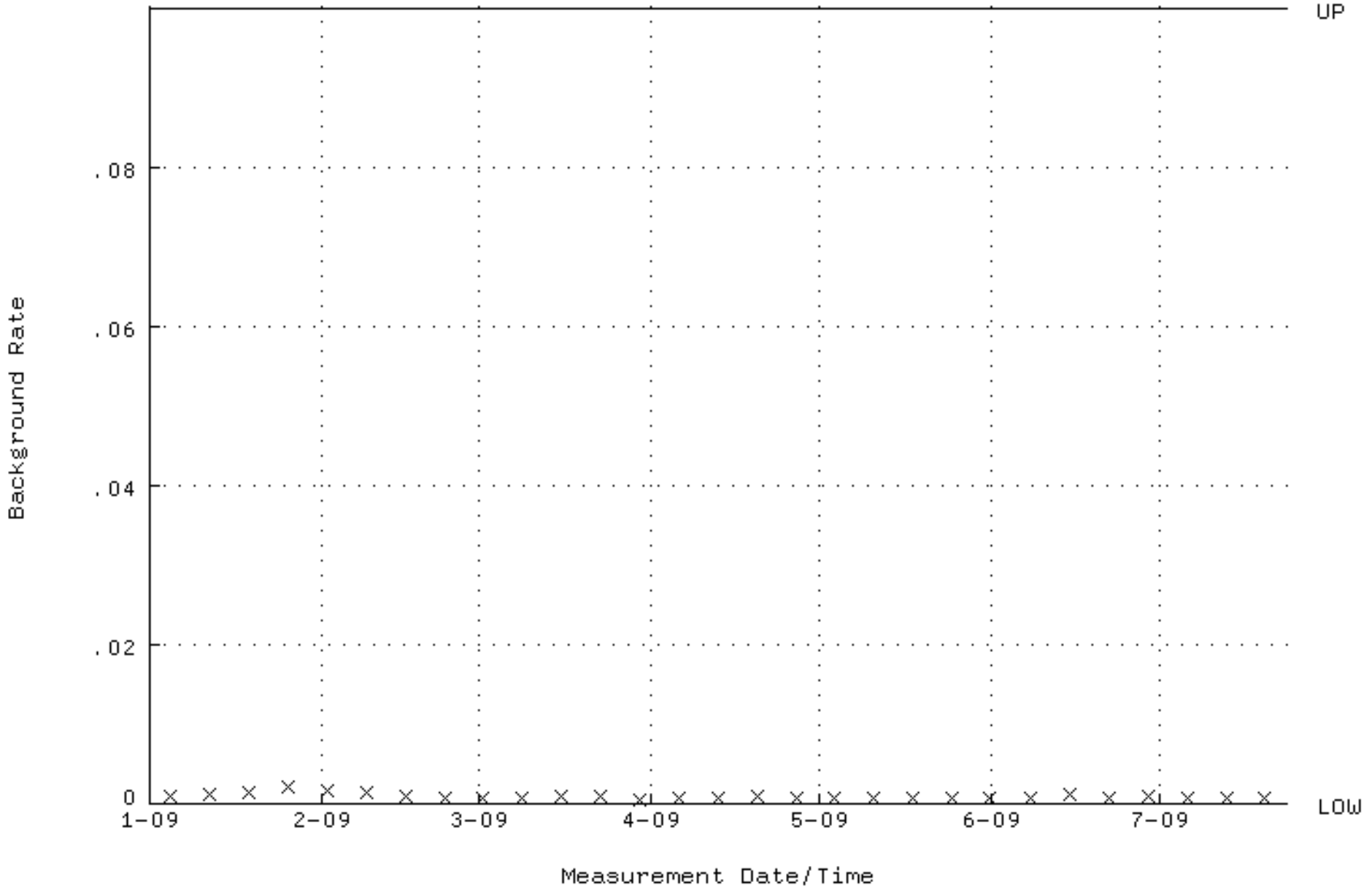
QA filename : DKA100:[ENV_ALPHA.QA.W]W162.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 12:08:49 through 23-JUL-2009 12:00:00
Lower/Upper Lmts: 0.361578 through 0.381578



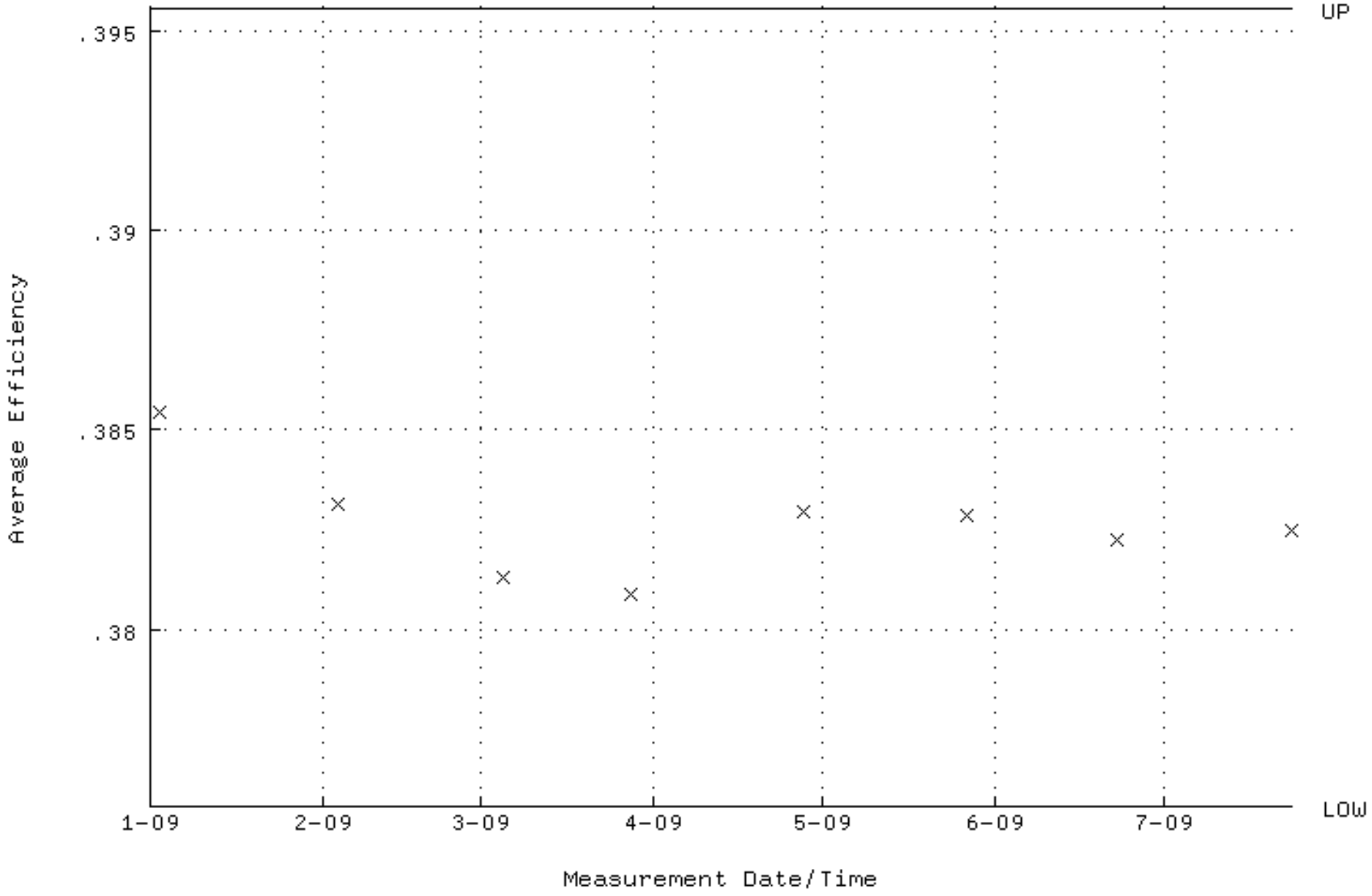
QA filename : DKA100:[ENV_ALPHA.QA.W]W162.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 12:08:49 through 23-JUL-2009 12:00:00
Lower/Upper Lmts: 86.1732 through 95.2440



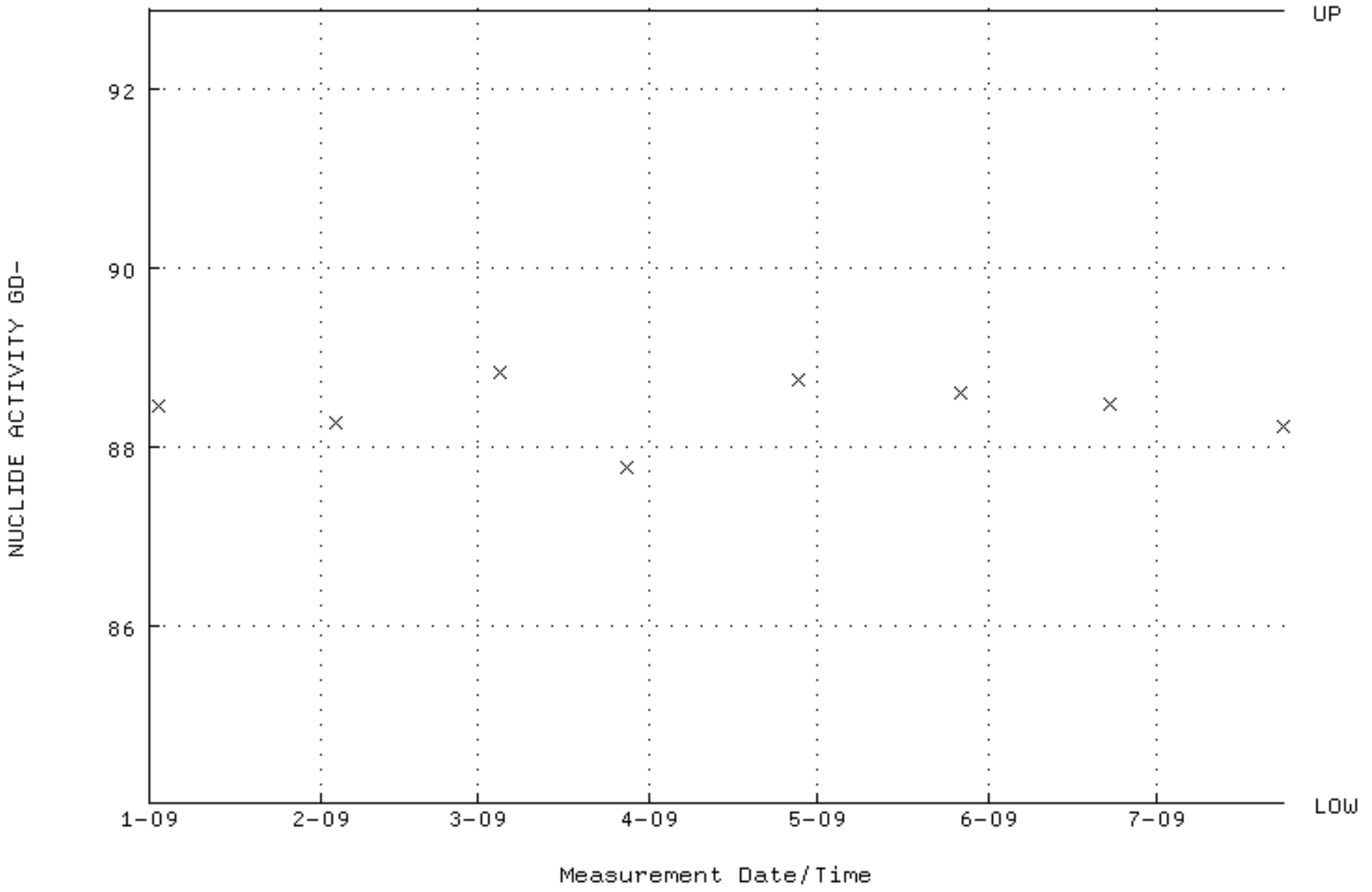
QA filename : DKA100:[ENV_ALPHA.QA.B]B162.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:25:10 through 23-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



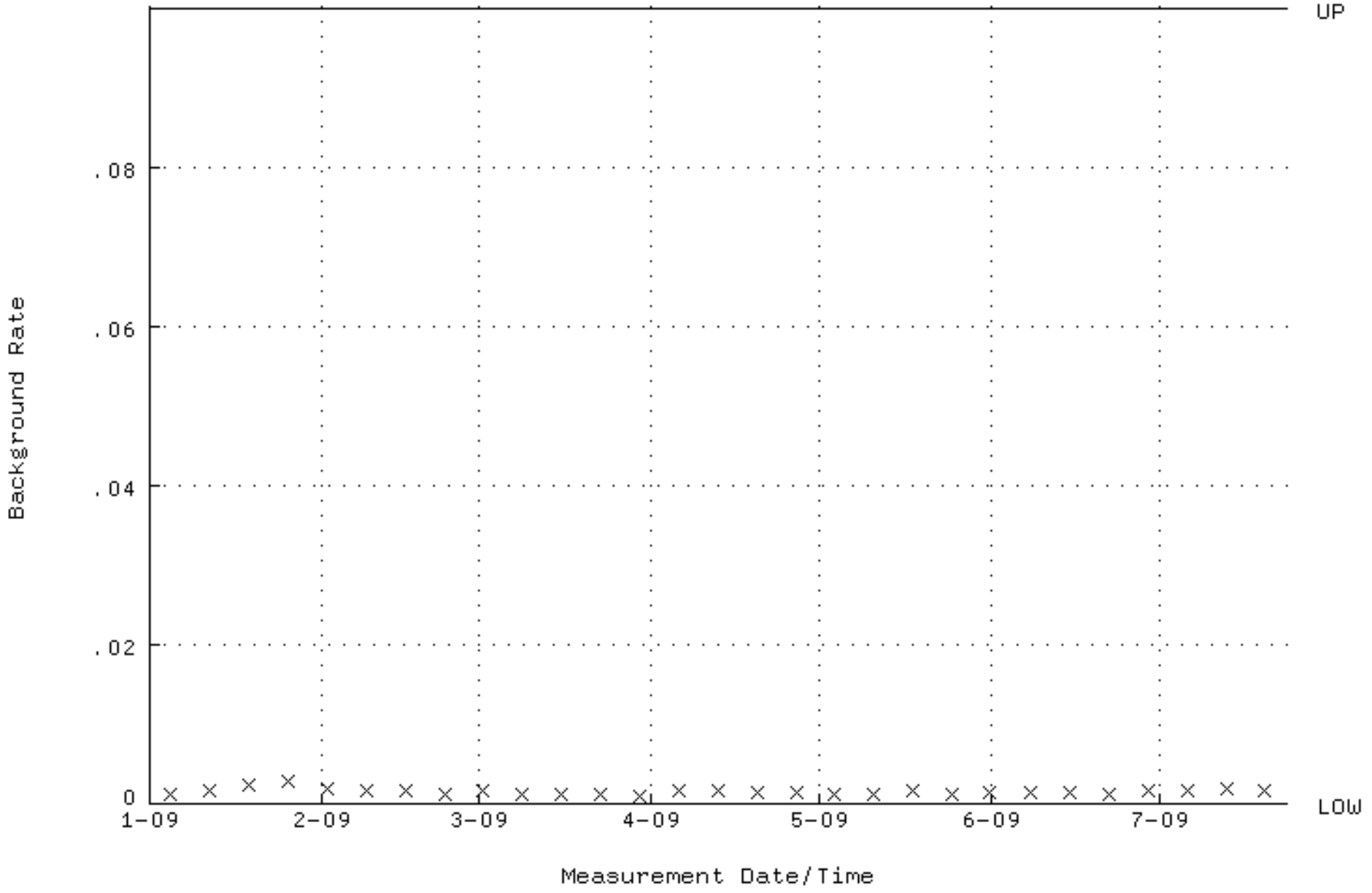
QA filename : DKA100:[ENV_ALPHA.QA.W]W163.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 2-JAN-2009 12:08:55 through 23-JUL-2009 12:00:00
Lower/Upper Lmts: 0.375557 through 0.395557



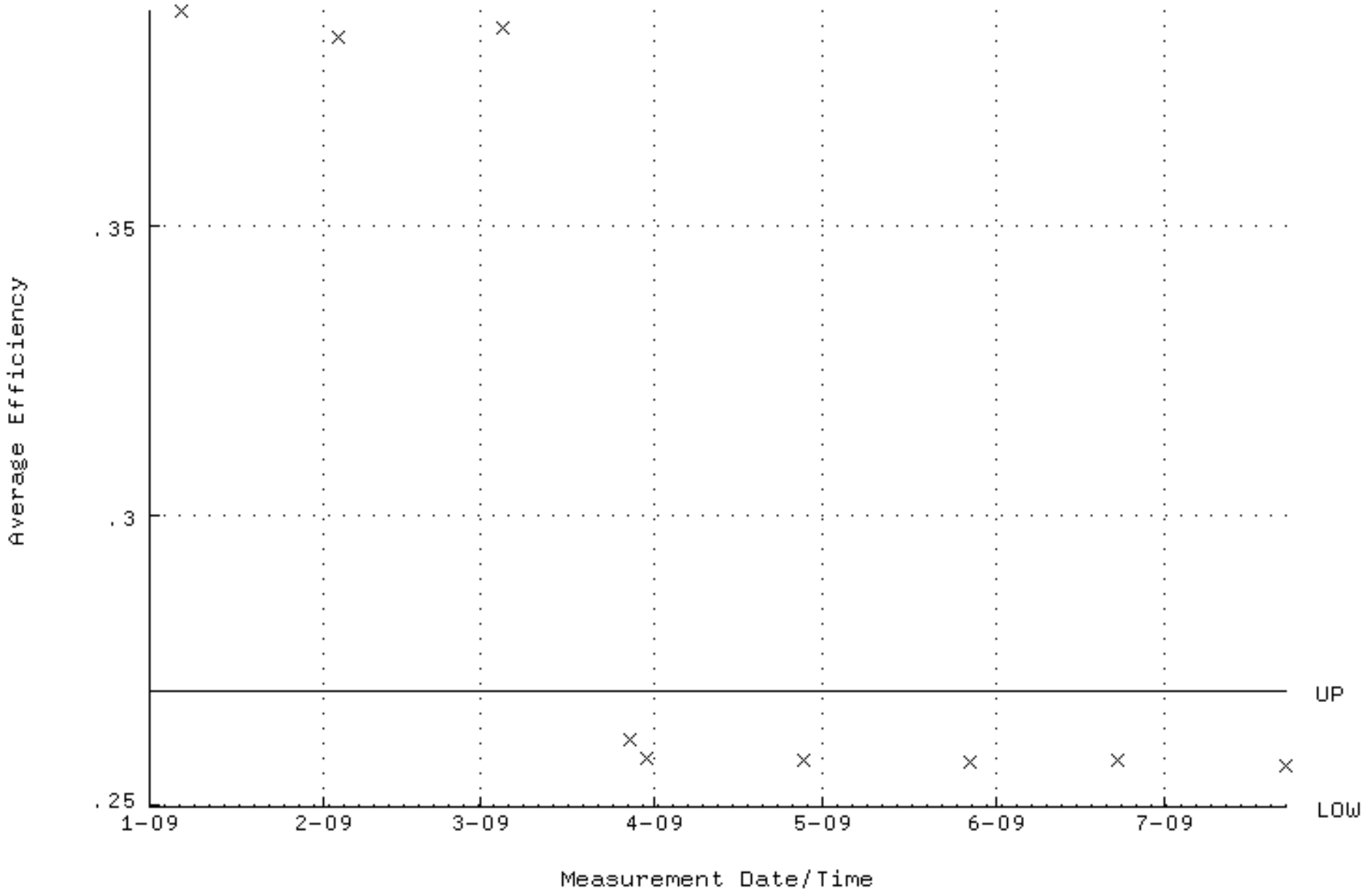
QA filename : DKA100:[ENV_ALPHA.QA.W]W163.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 2-JAN-2009 12:08:55 through 23-JUL-2009 12:00:00
Lower/Upper Lmts: 84.0322 through 92.8777



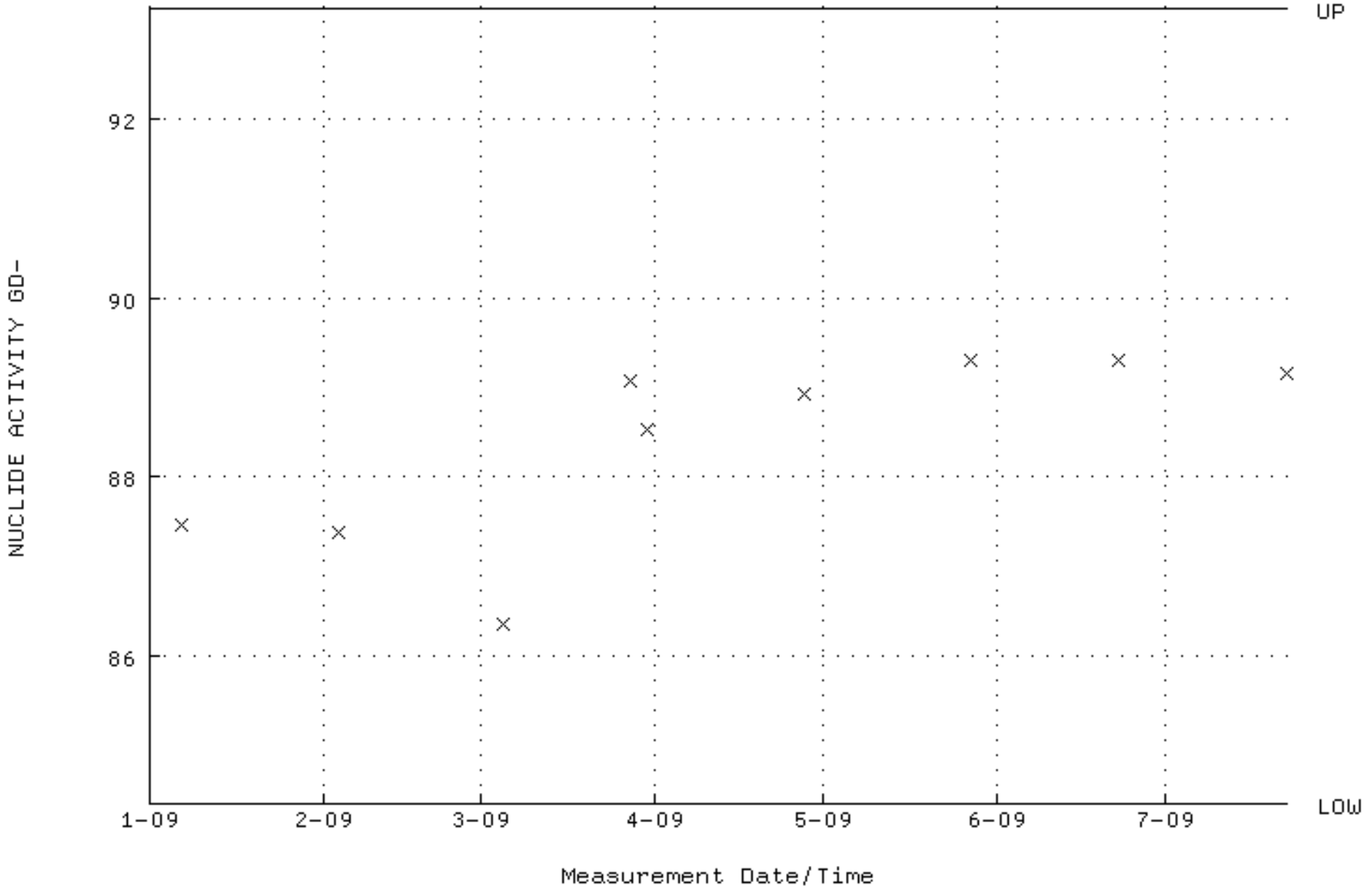
QA filename : DKA100:[ENV_ALPHA.QA.B]B163.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:25:13 through 23-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



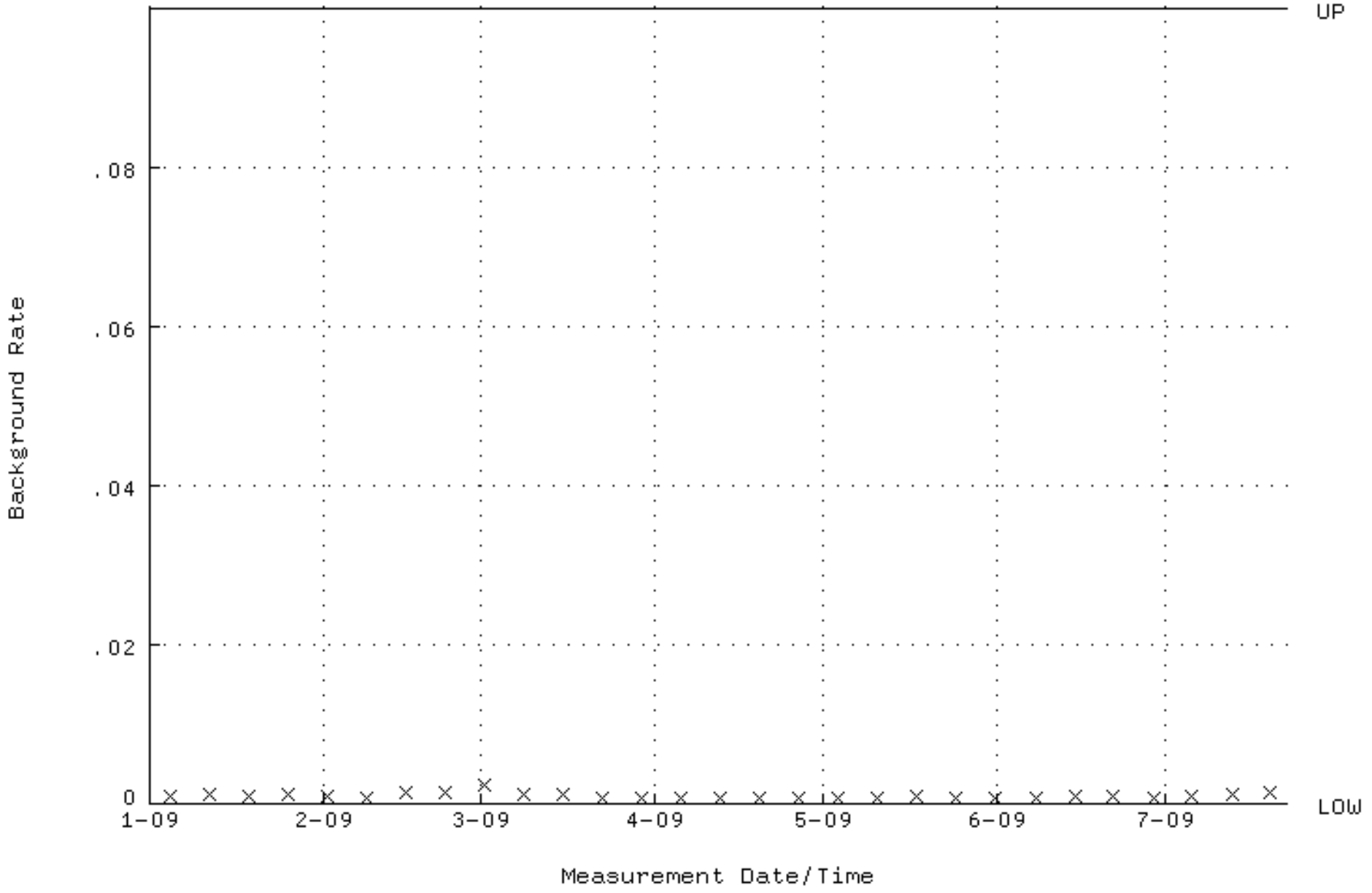
QA filename : DKA100:[ENV_ALPHA.QA.W]W185.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 6-JAN-2009 19:31:29 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.249628 through 0.269628



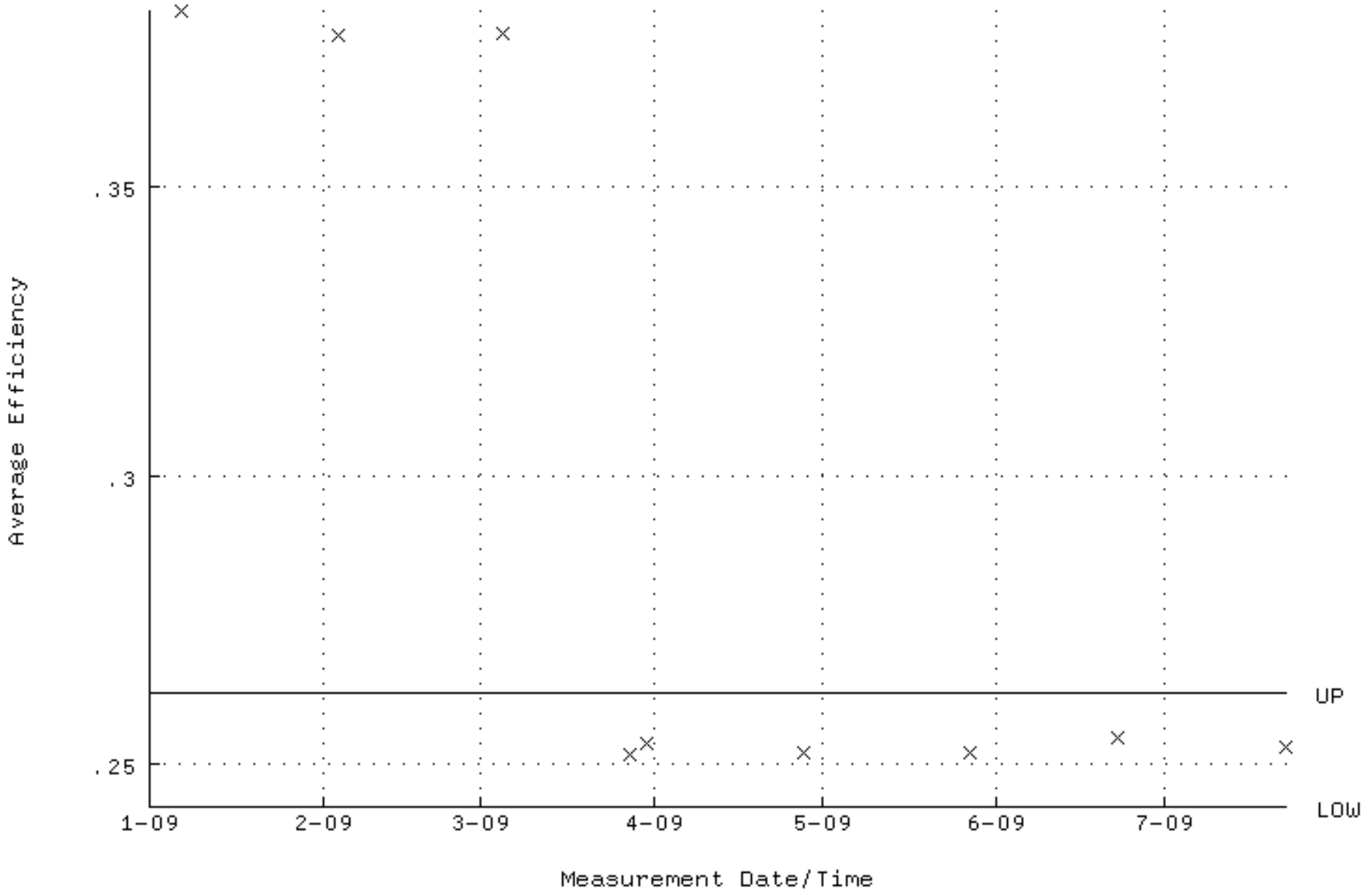
QA filename : DKA100:[ENV_ALPHA.QA.W]W185.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 6-JAN-2009 19:31:29 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 84.3502 through 93.2292



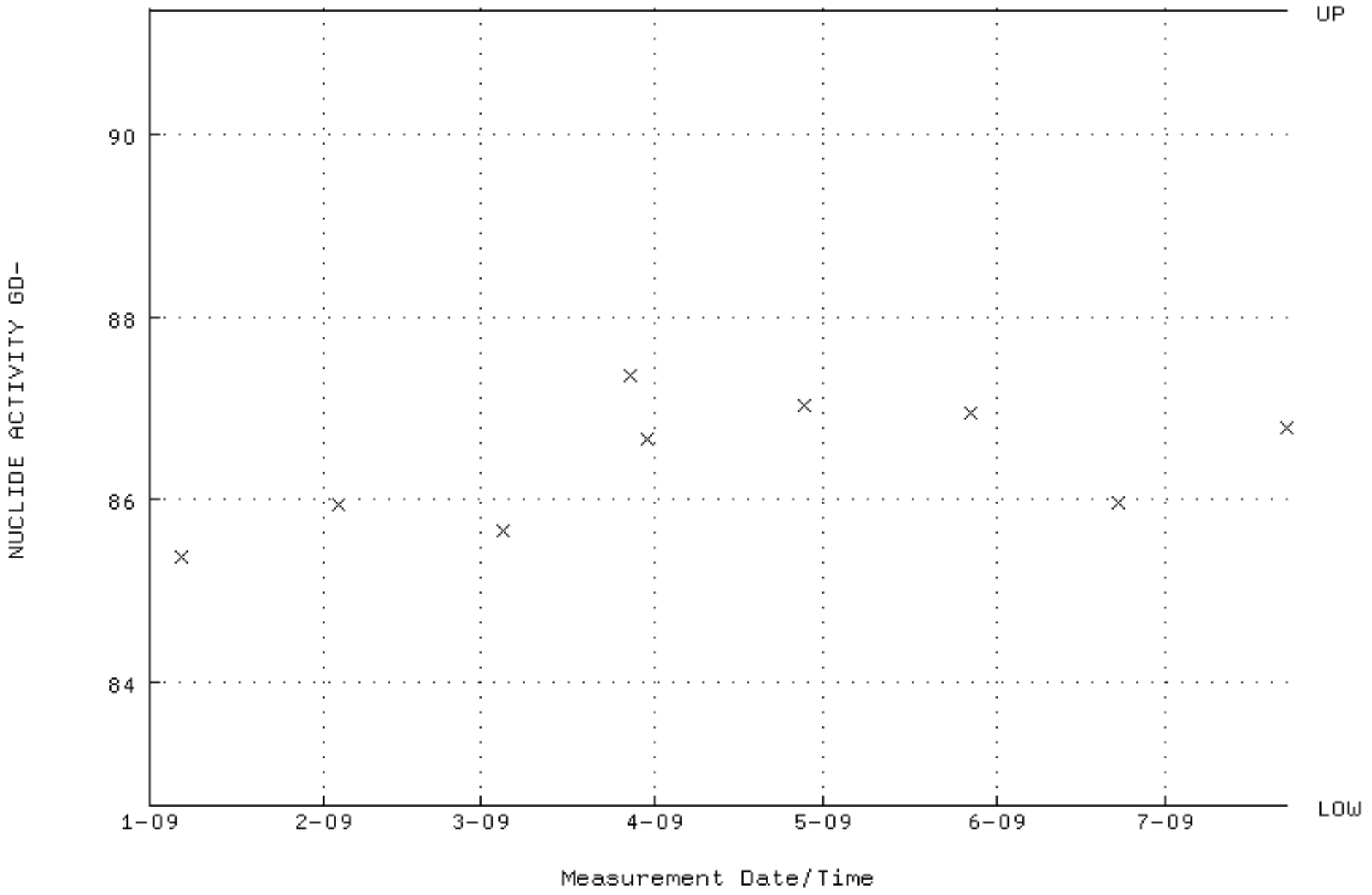
QA filename : DKA100:[ENV_ALPHA.QA.B]B185.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:26:36 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



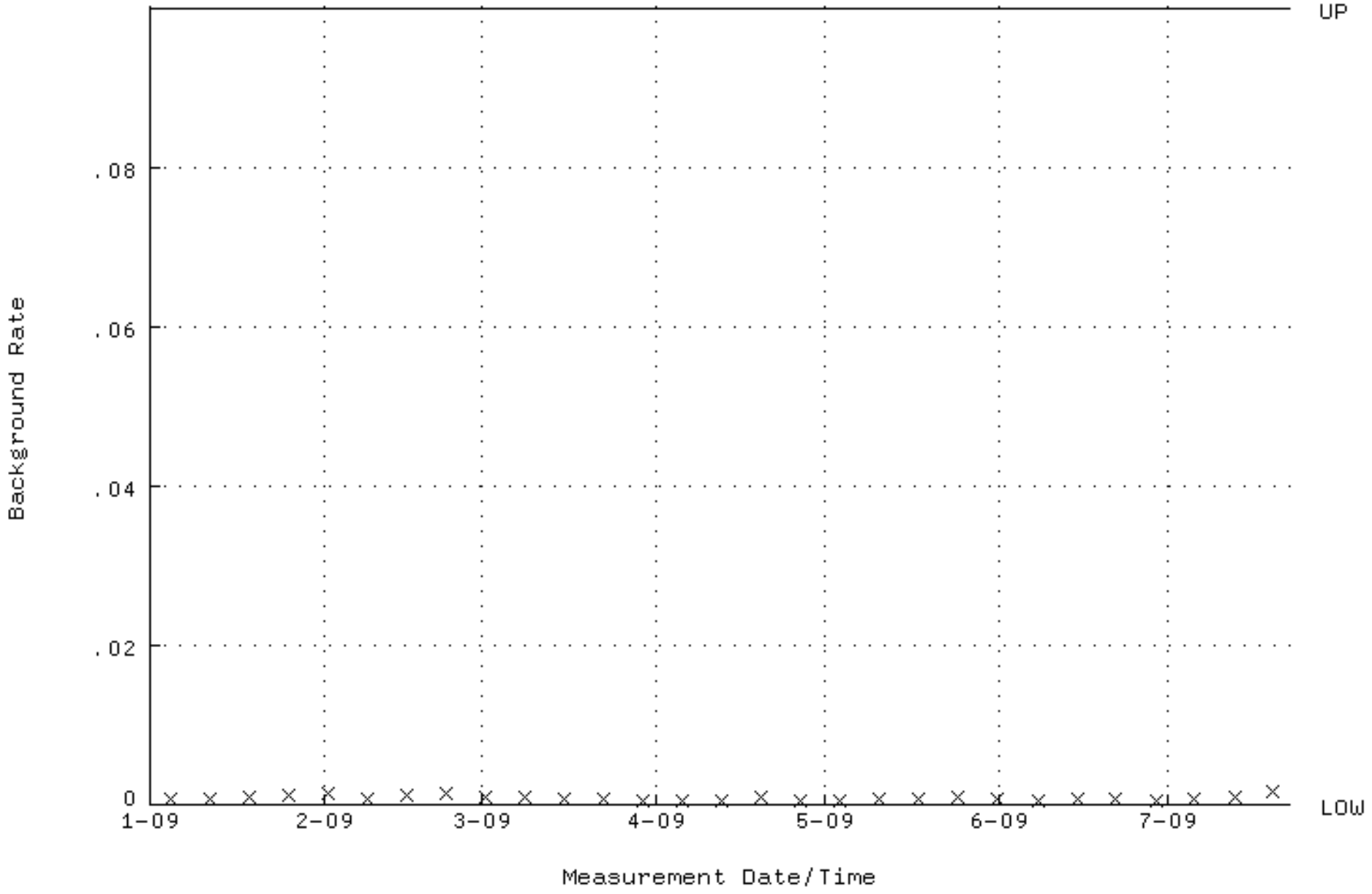
QA filename : DKA100:[ENV_ALPHA.QA.W]W186.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 6-JAN-2009 19:31:33 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.242649 through 0.262649



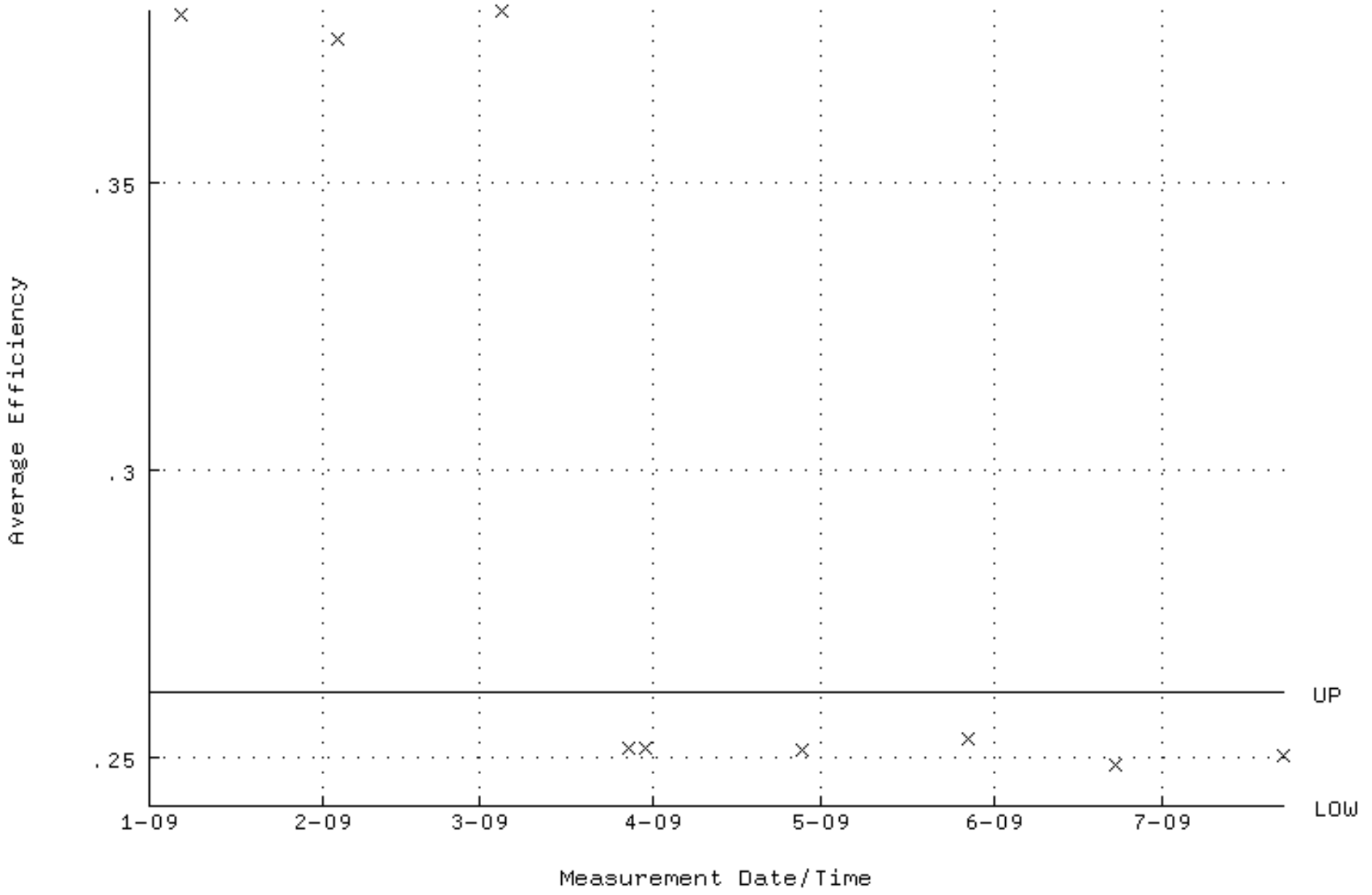
QA filename : DKA100:[ENV_ALPHA.QA.W]W186.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 6-JAN-2009 19:31:33 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 82.6495 through 91.3495



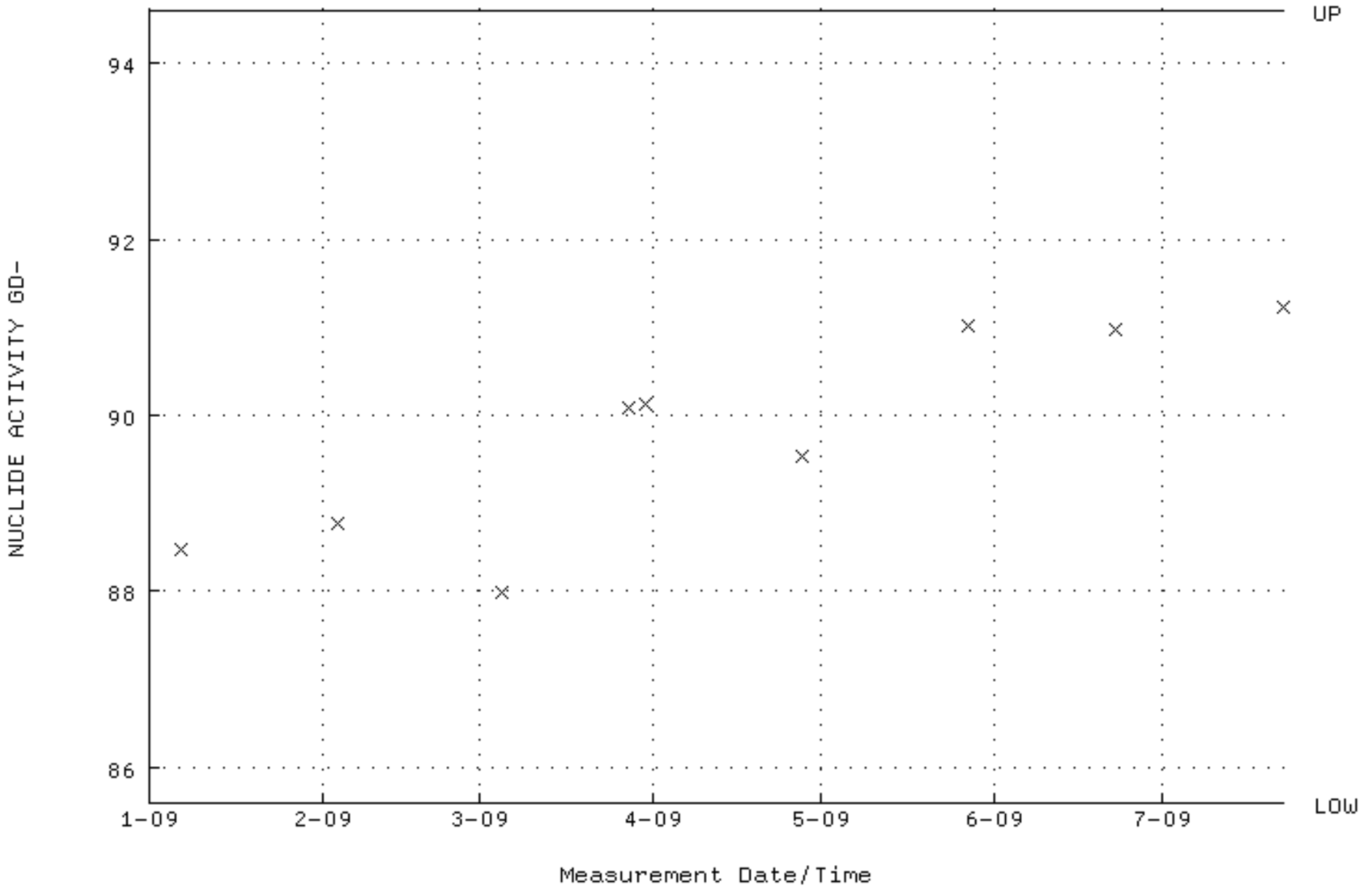
QA filename : DKA100:[ENV_ALPHA.QA.B]B186.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:26:40 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



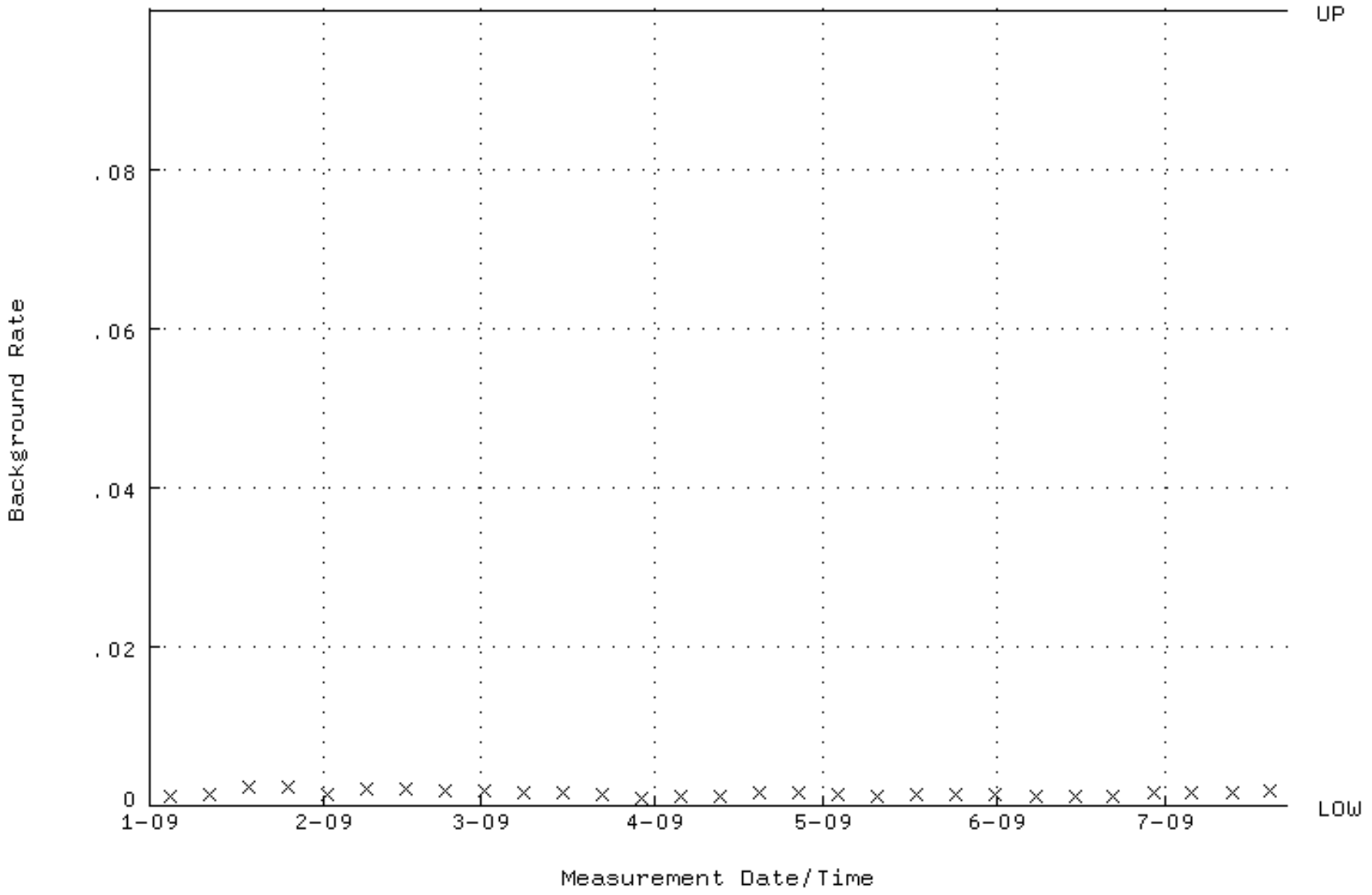
QA filename : DKA100:[ENV_ALPHA.QA.W]W187.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 6-JAN-2009 19:31:37 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.241464 through 0.261464



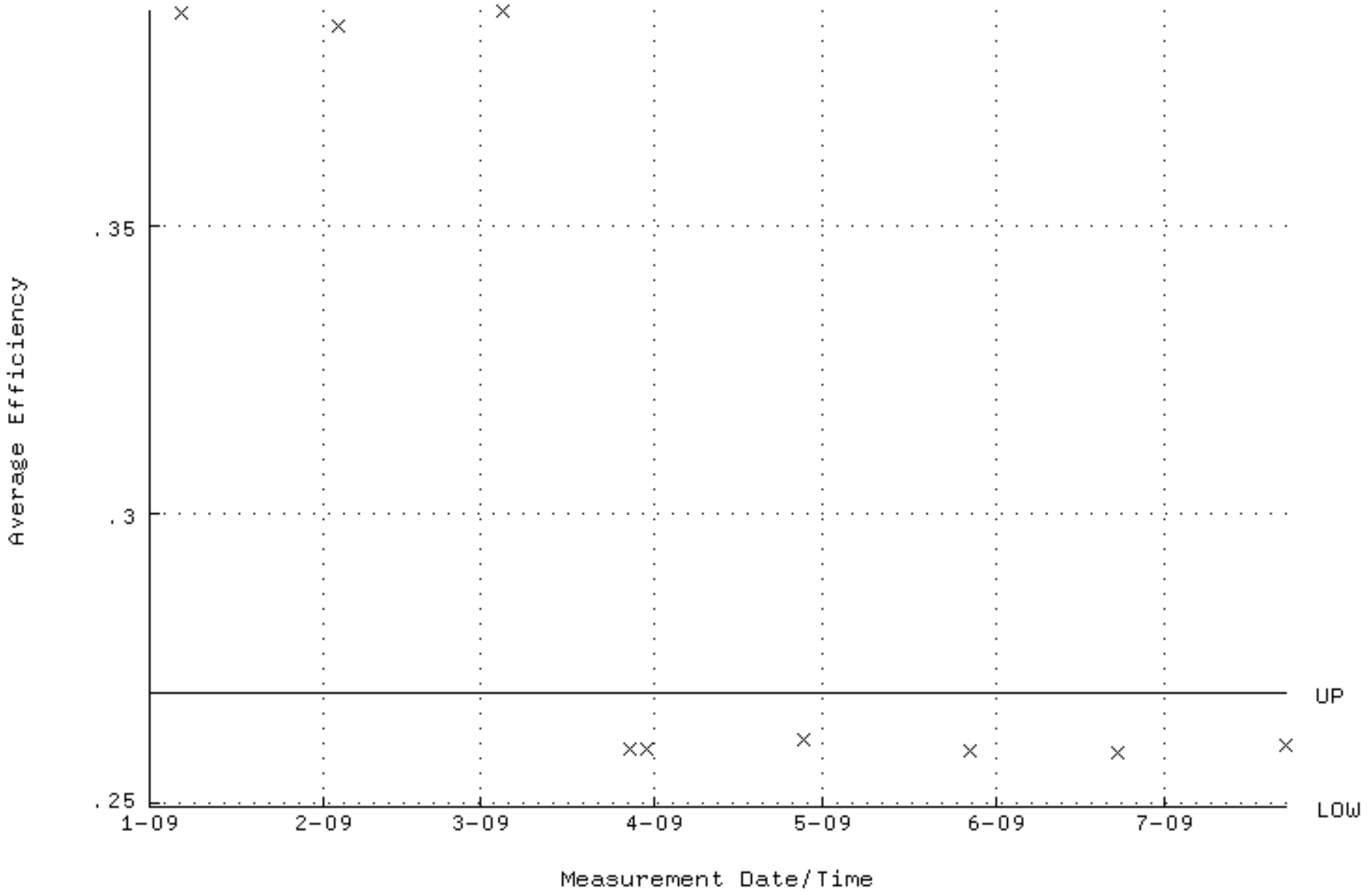
QA filename : DKA100:[ENV_ALPHA.QA.W]W187.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 6-JAN-2009 19:31:37 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 85.5888 through 94.5982



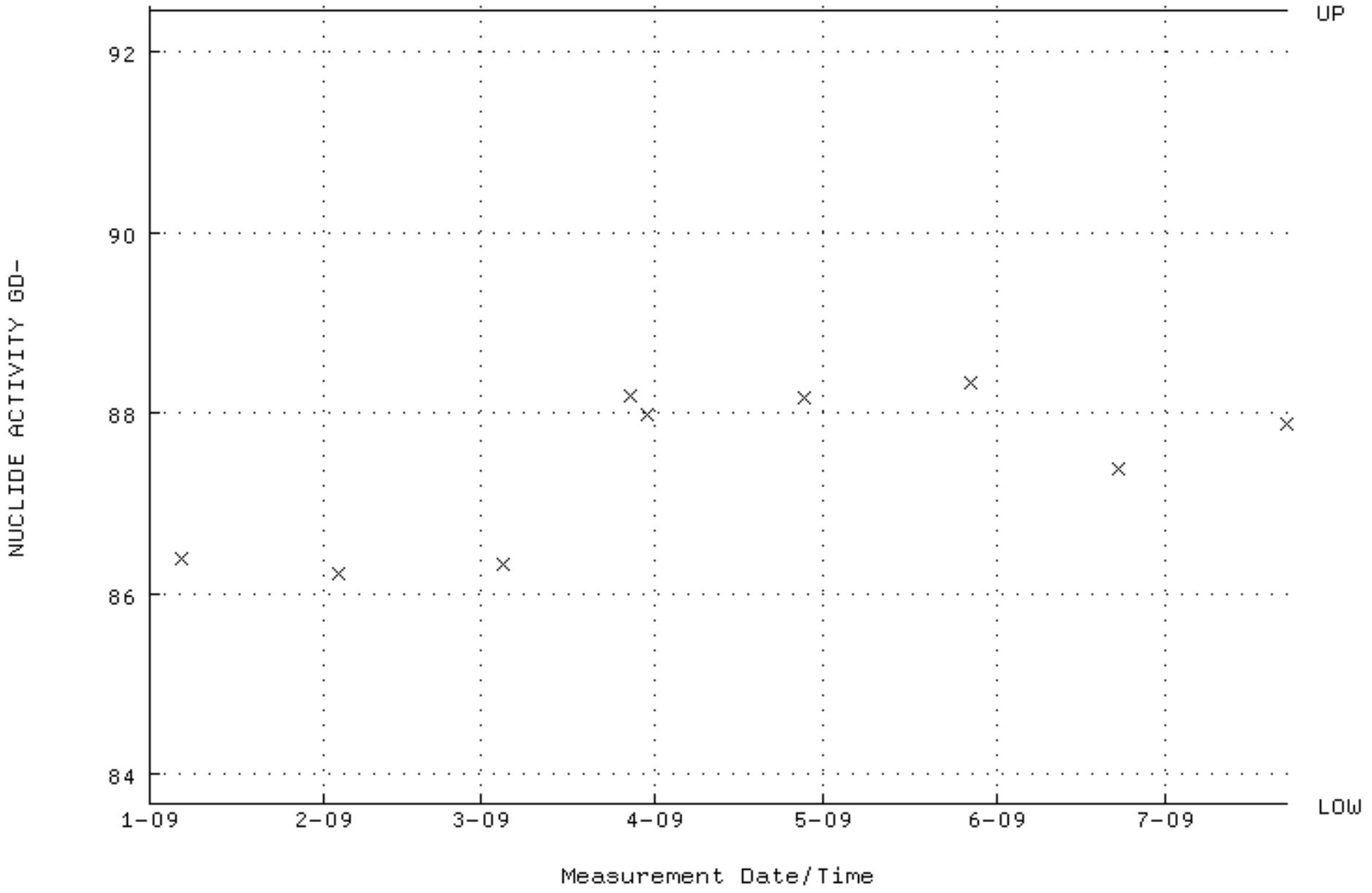
QA filename : DKA100:[ENV_ALPHA.QA.B]B187.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:26:44 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



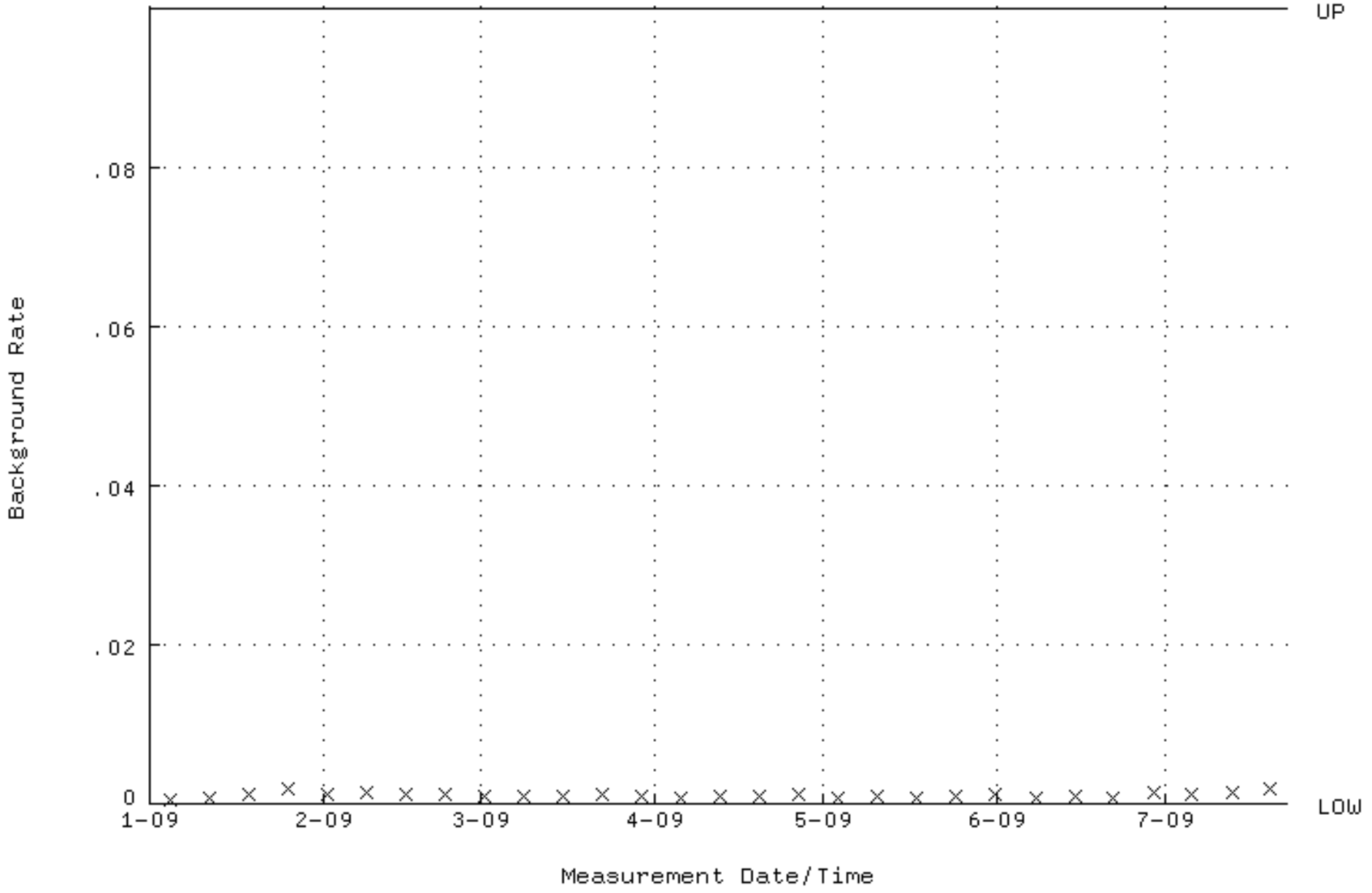
QA filename : DKA100:[ENV_ALPHA.QA.W]W188.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 6-JAN-2009 19:31:41 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.249341 through 0.269341



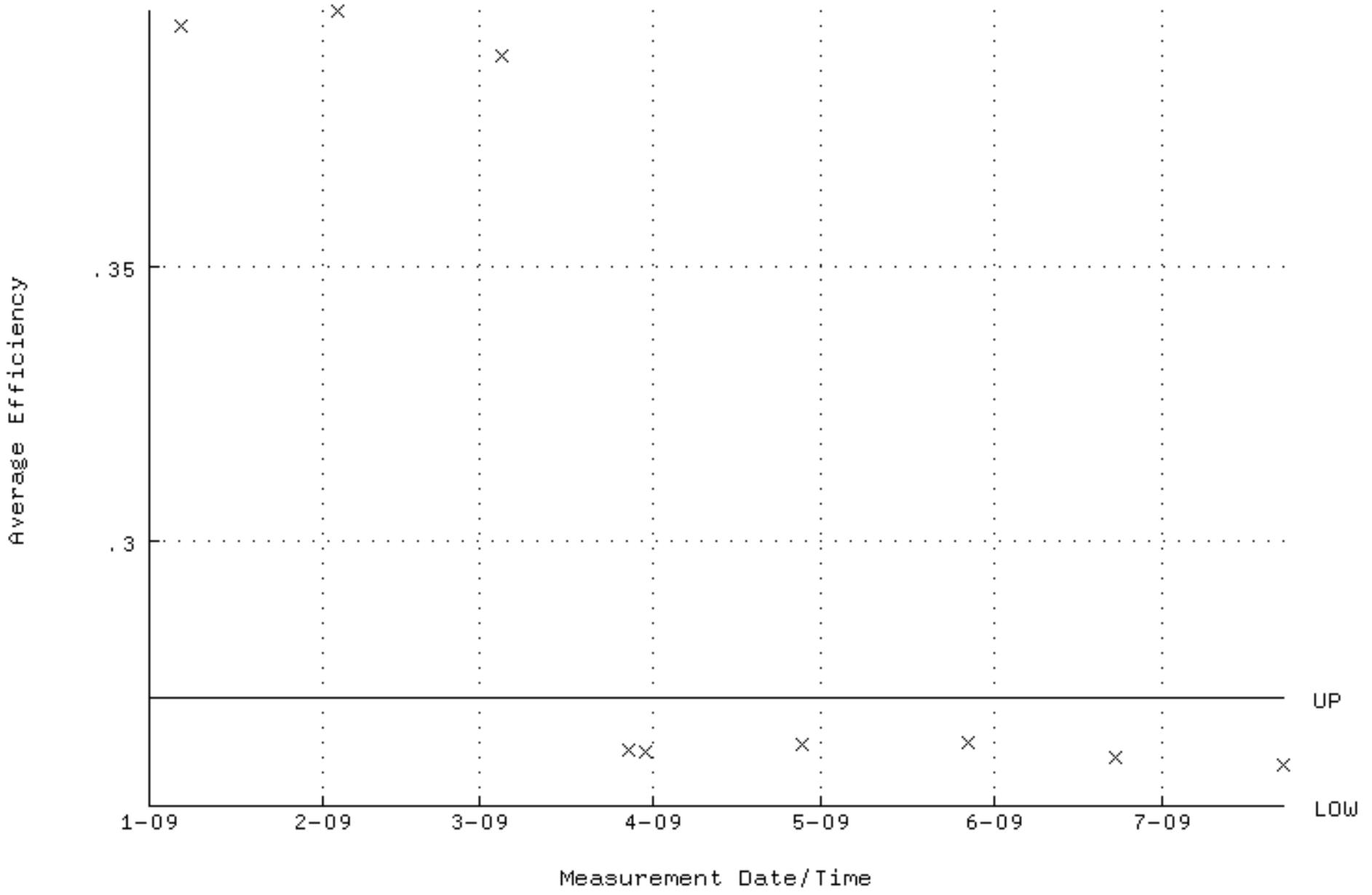
QA filename : DKA100:[ENV_ALPHA.QA.W]W188.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 6-JAN-2009 19:31:41 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 83.6747 through 92.4825



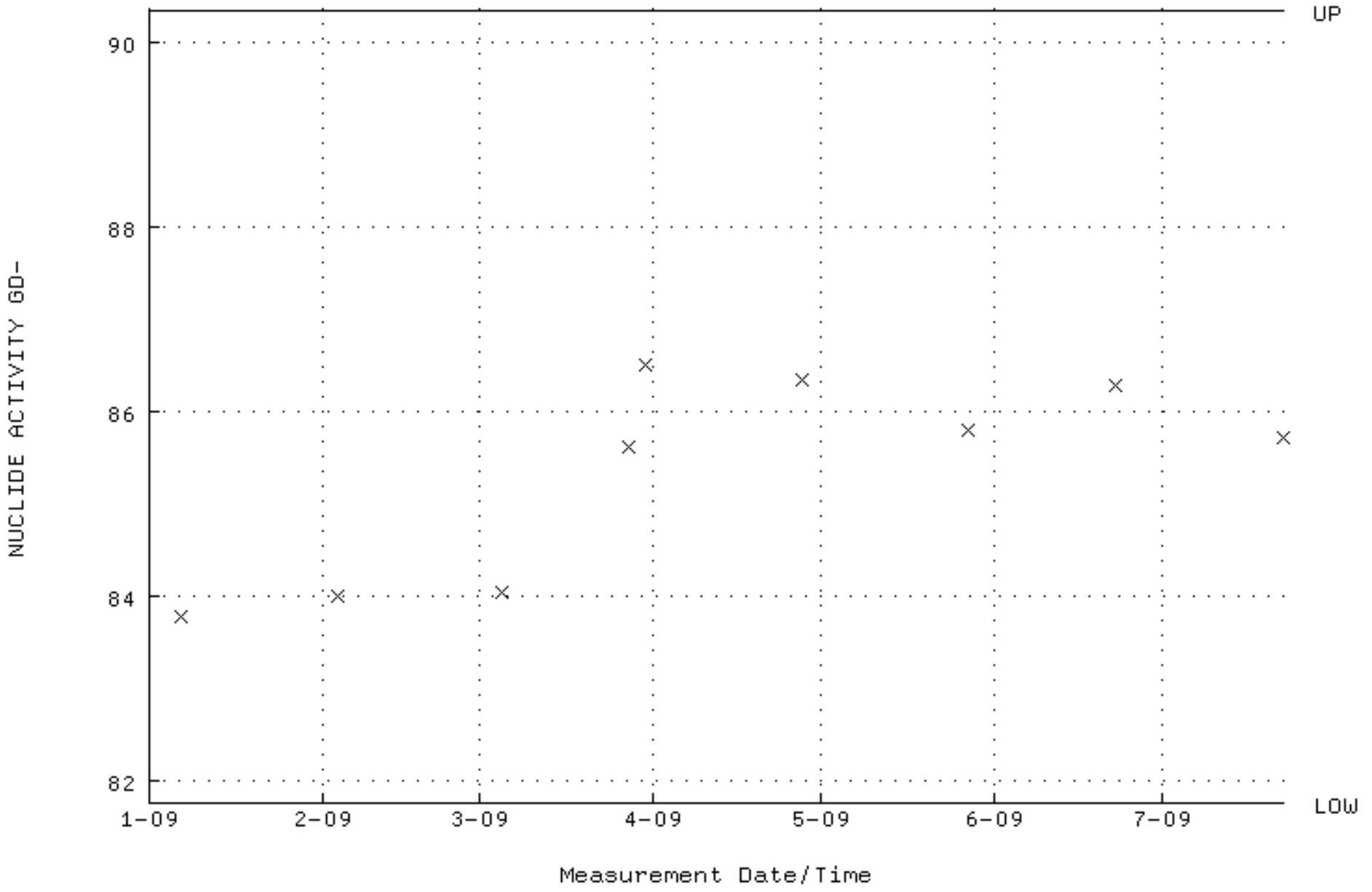
QA filename : DKA100:[ENV_ALPHA.QA.B]B188.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:26:47 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



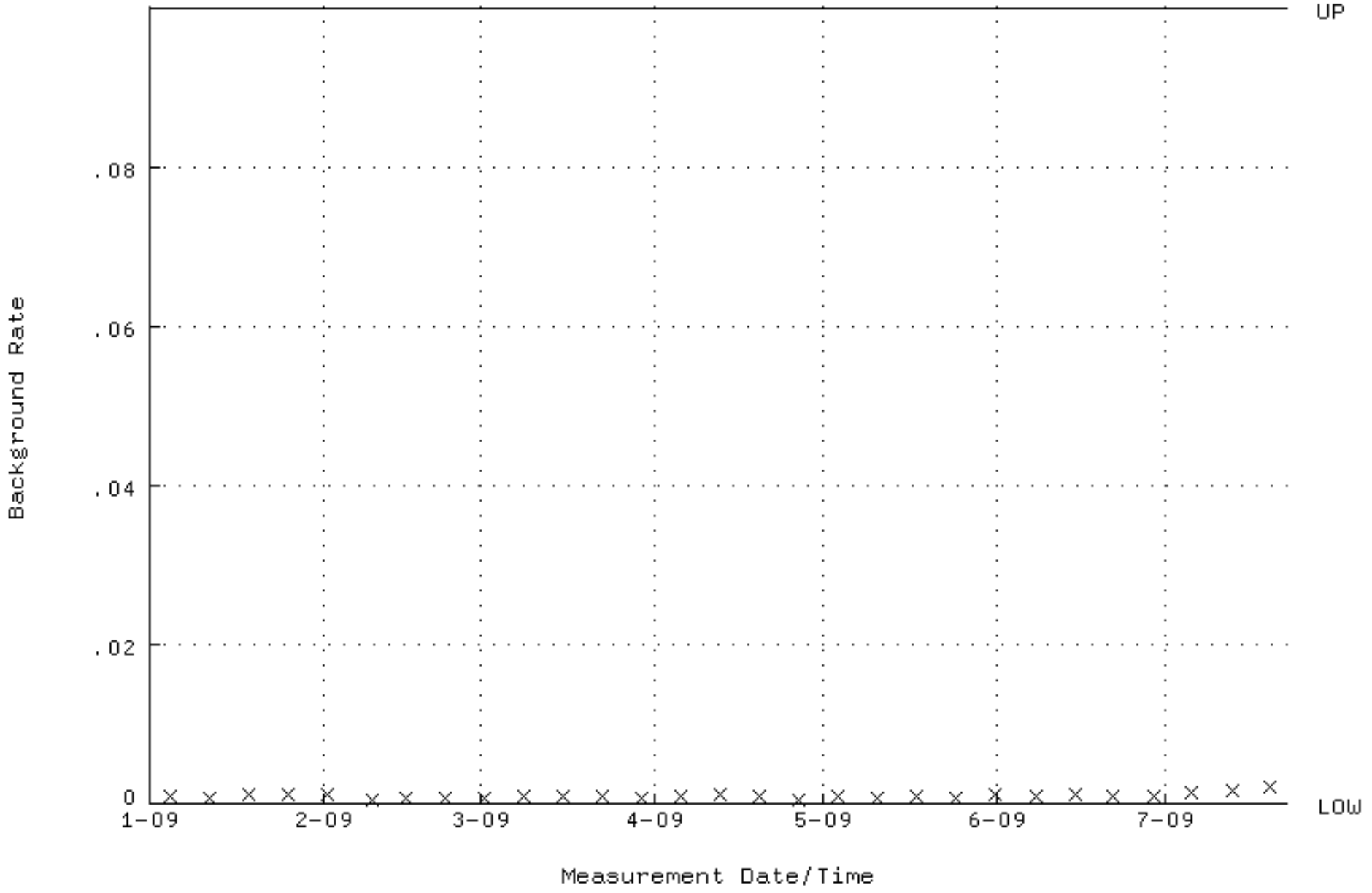
QA filename : DKA100:[ENV_ALPHA.QA.W]W189.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 6-JAN-2009 19:31:46 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.251590 through 0.271590



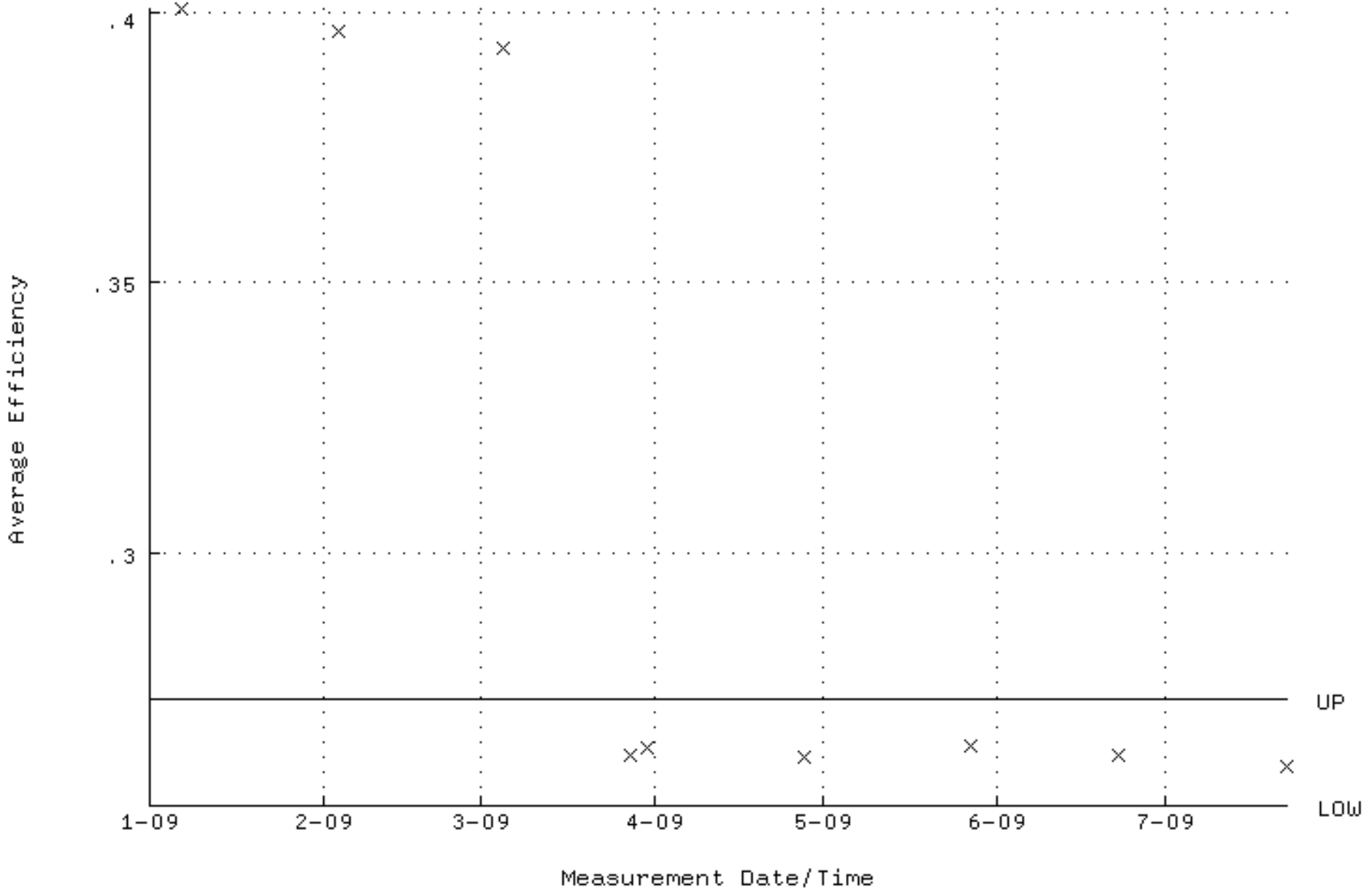
QA filename : DKA100:[ENV_ALPHA.QA.W]W189.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 6-JAN-2009 19:31:46 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 81.7473 through 90.3523



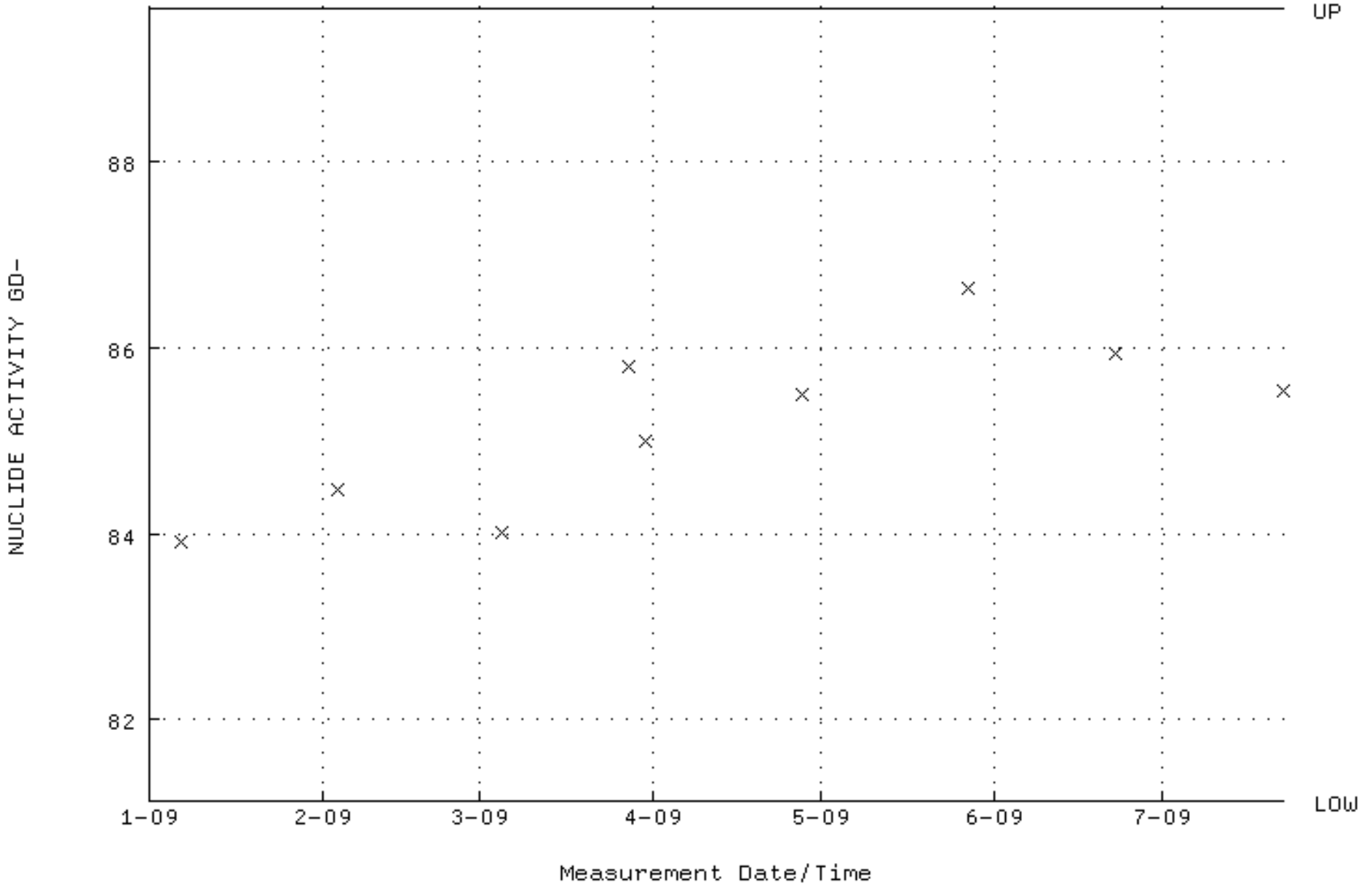
QA filename : DKA100:[ENV_ALPHA.QA.B]B189.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:26:51 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



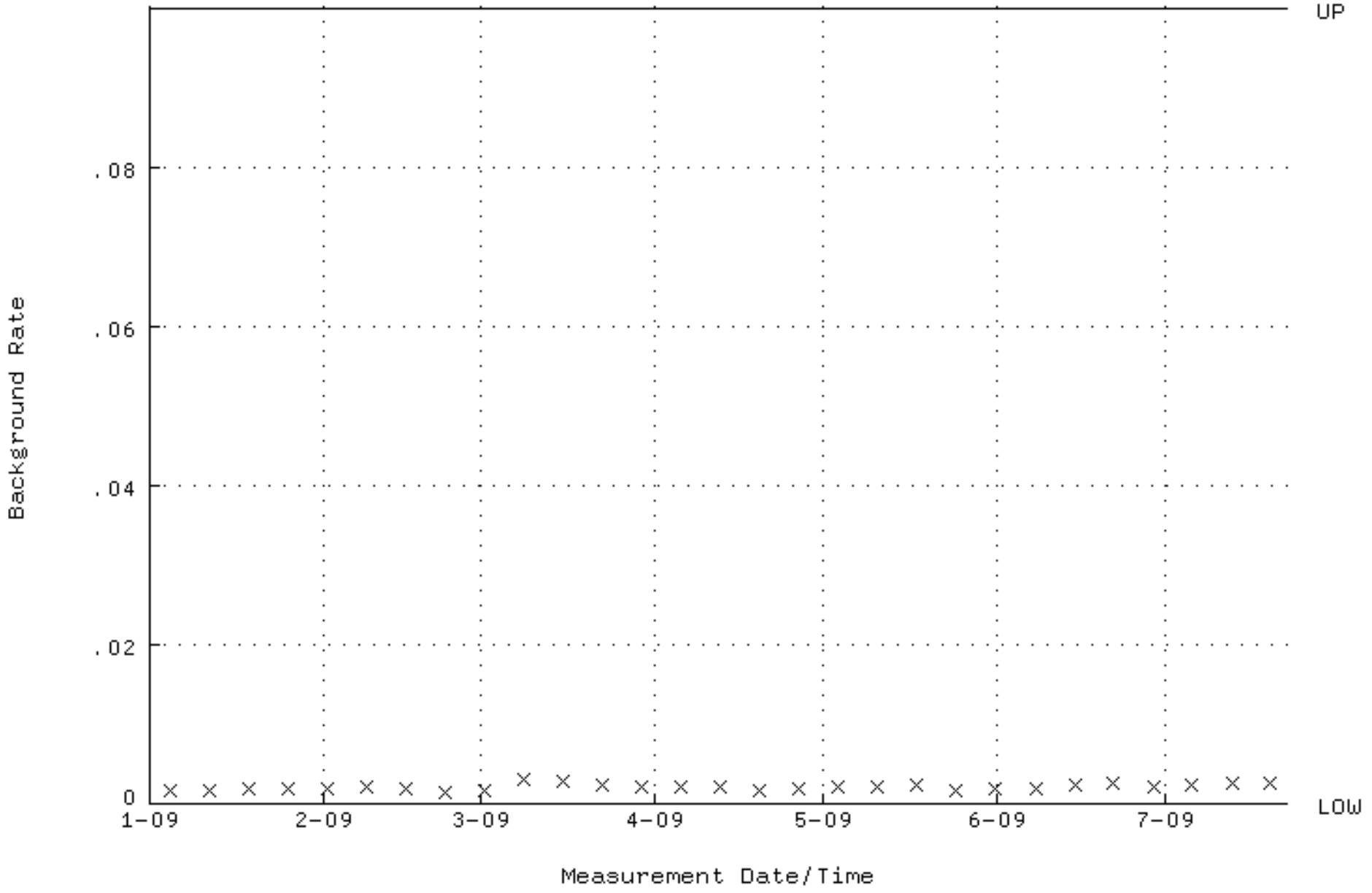
QA filename : DKA100:[ENV_ALPHA.QA.W]W190.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 6-JAN-2009 19:31:49 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.253504 through 0.273504



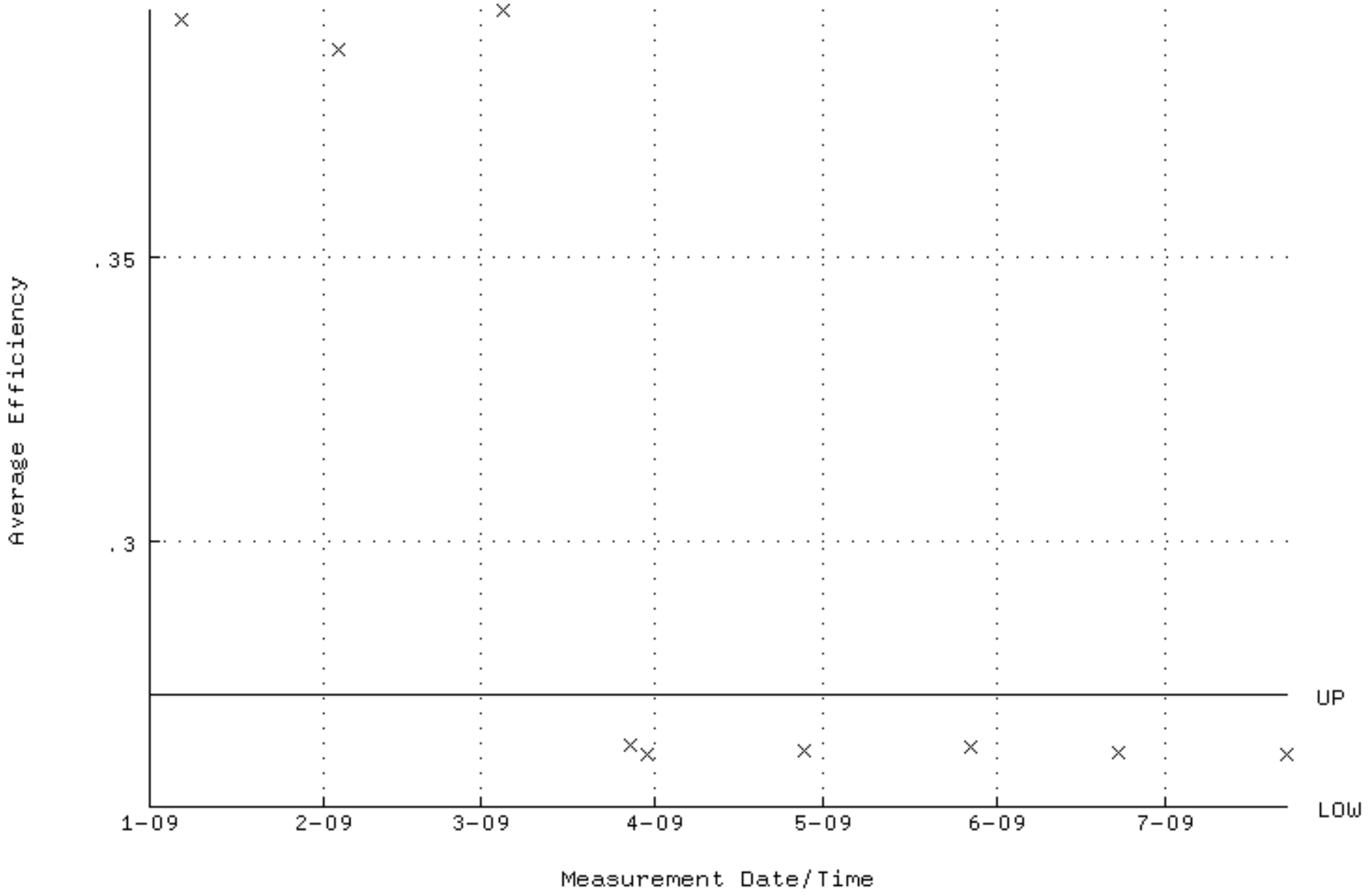
QA filename : DKA100:[ENV_ALPHA.QA.W]W190.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 6-JAN-2009 19:31:49 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 81.1176 through 89.6562



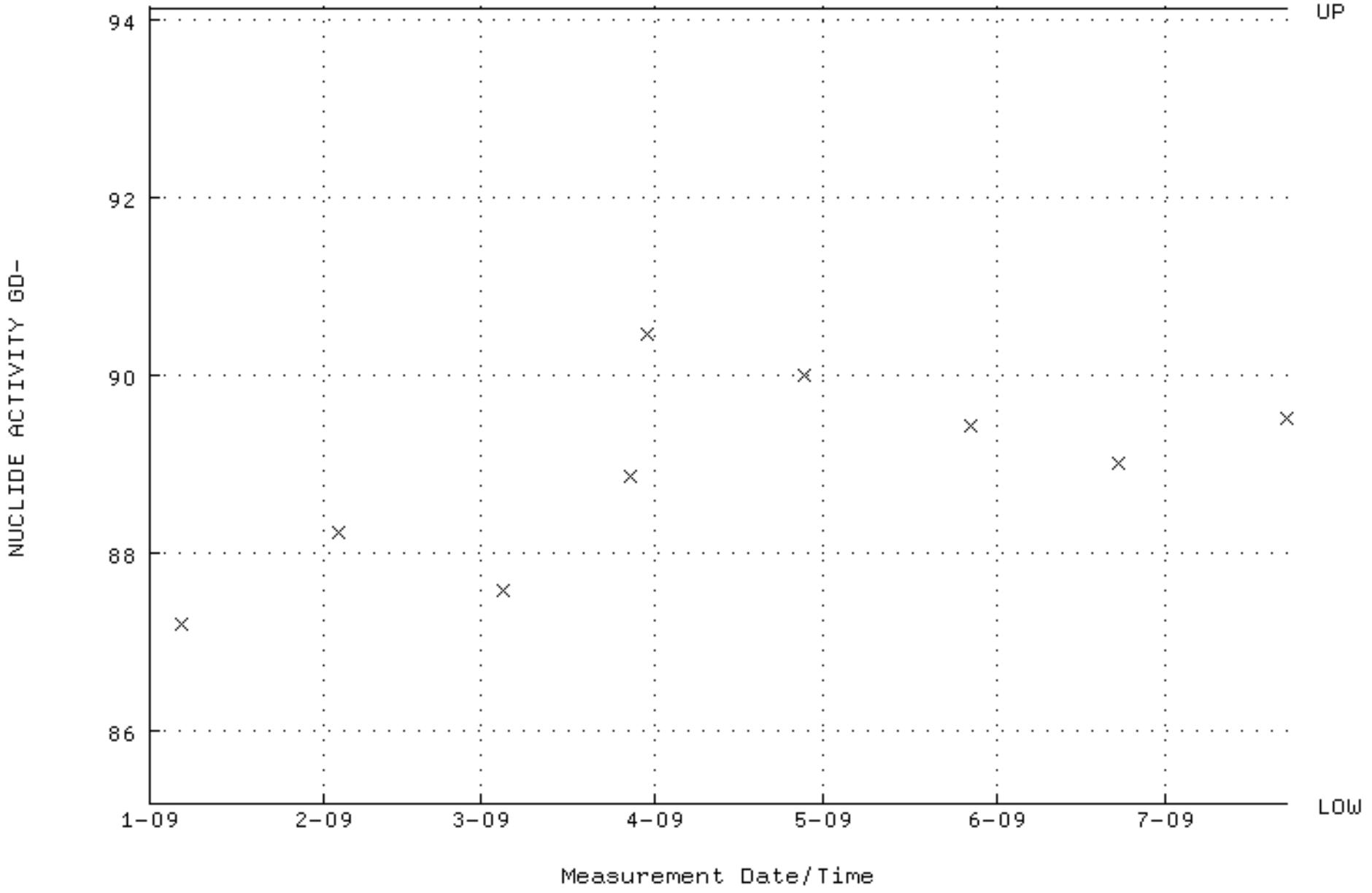
QA filename : DKA100:[ENV_ALPHA.QA.B]B190.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:26:55 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



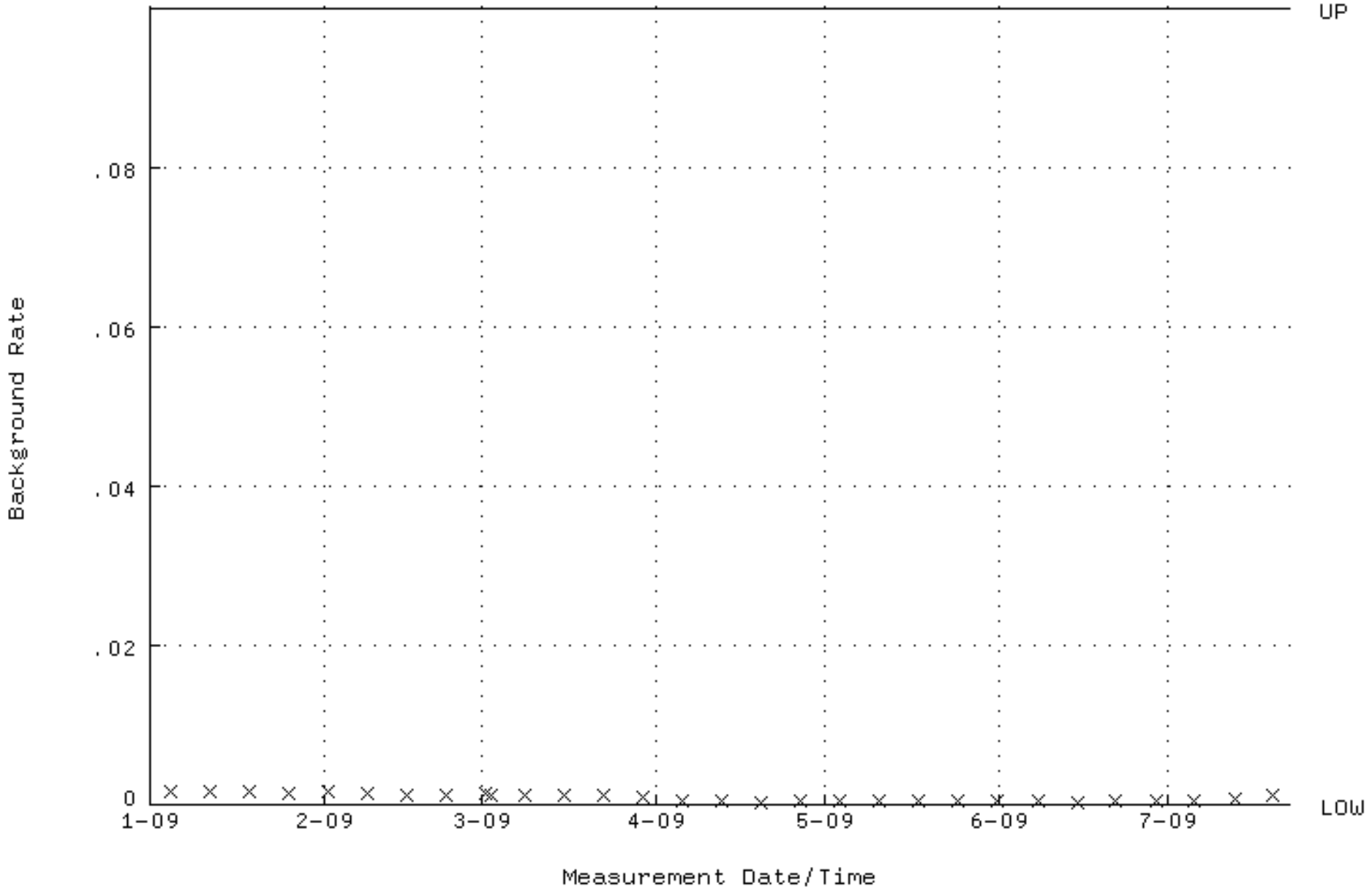
QA filename : DKA100:[ENV_ALPHA.QA.W]W191.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 6-JAN-2009 19:31:54 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.252993 through 0.272993



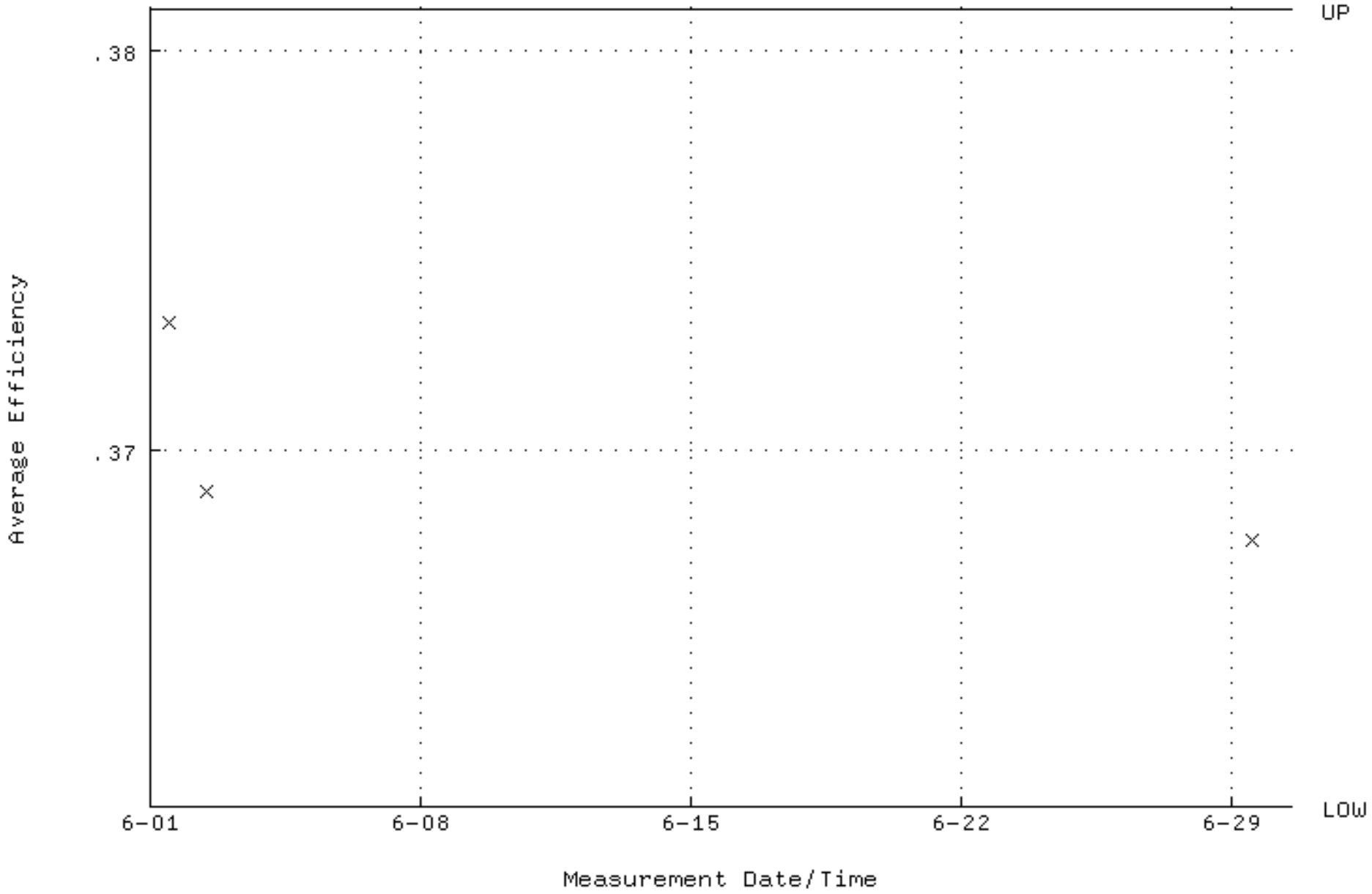
QA filename : DKA100:[ENV_ALPHA.QA.W]W191.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 6-JAN-2009 19:31:54 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 85.1712 through 94.1366



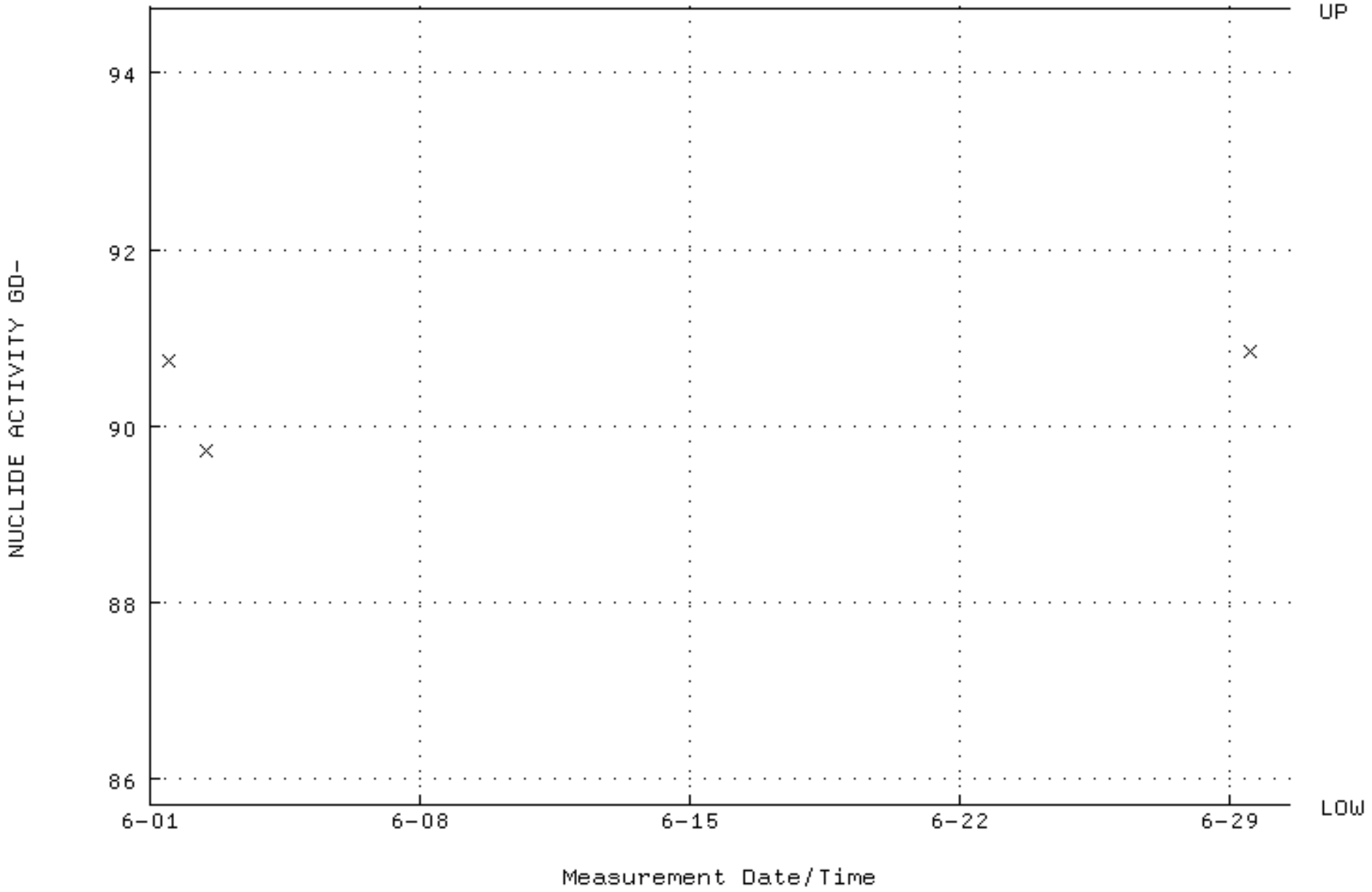
QA filename : DKA100:[ENV_ALPHA.QA.B]B191.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 4-JAN-2009 17:26:58 through 22-JUL-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



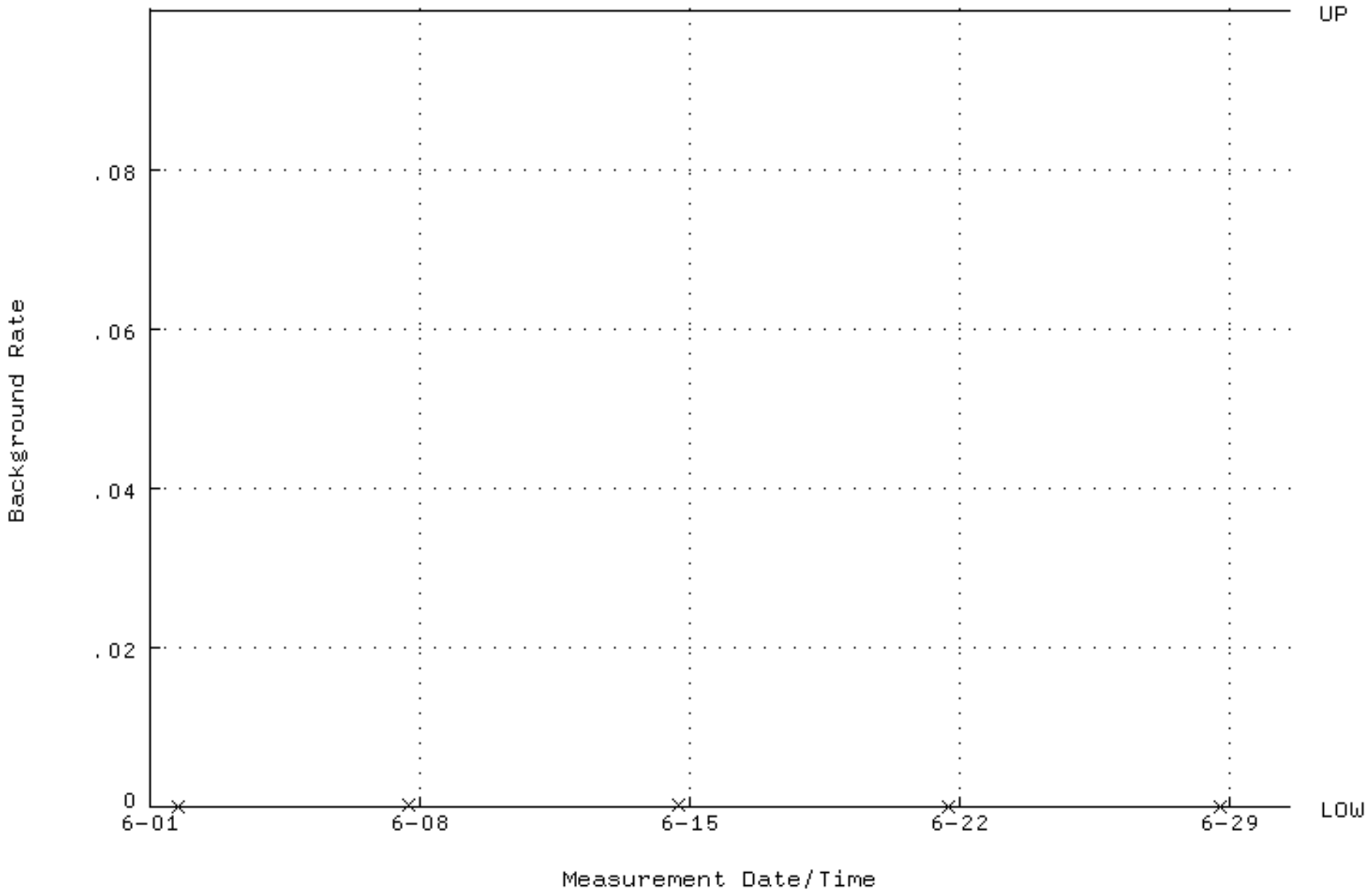
QA filename : DKA100:[ENV_ALPHA.QA.W]W209.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-JUN-2009 11:30:29 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 0.361036 through 0.381036



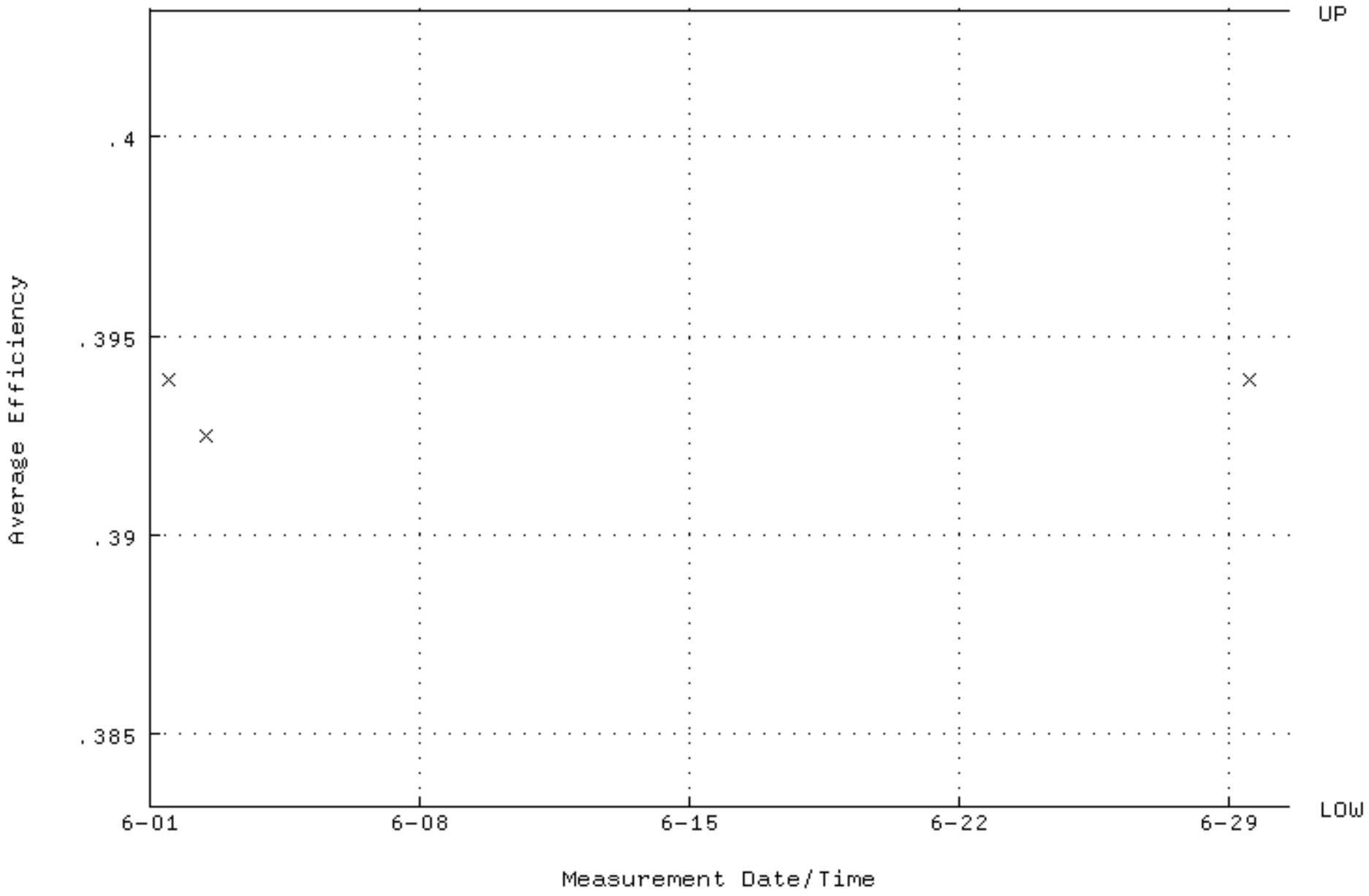
QA filename : DKA100:[ENV_ALPHA.QA.W]W209.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-JUN-2009 11:30:29 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 85.7081 through 94.7299



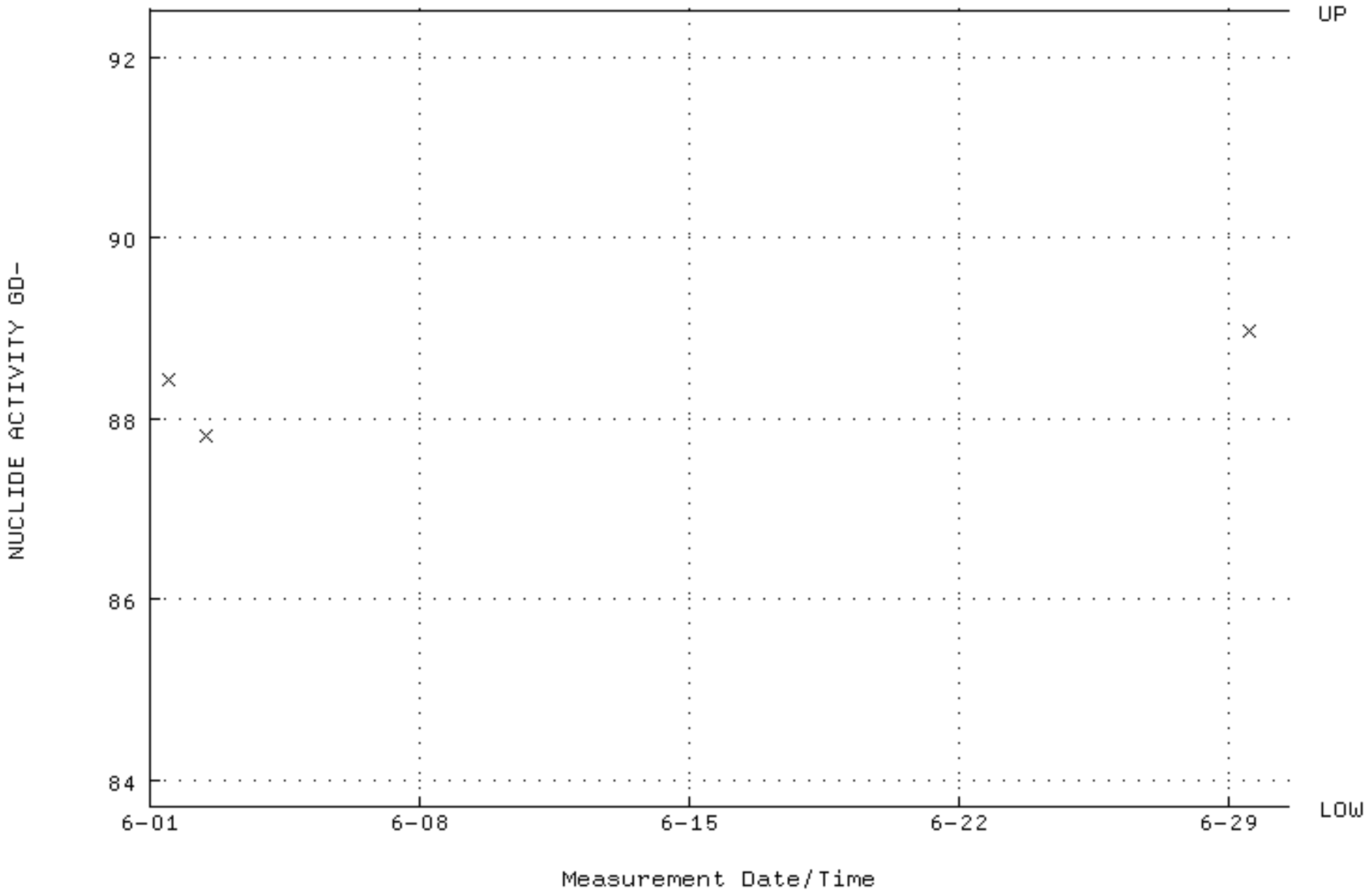
QA filename : DKA100:[ENV_ALPHA.QA.B]B209.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUN-2009 17:43:30 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



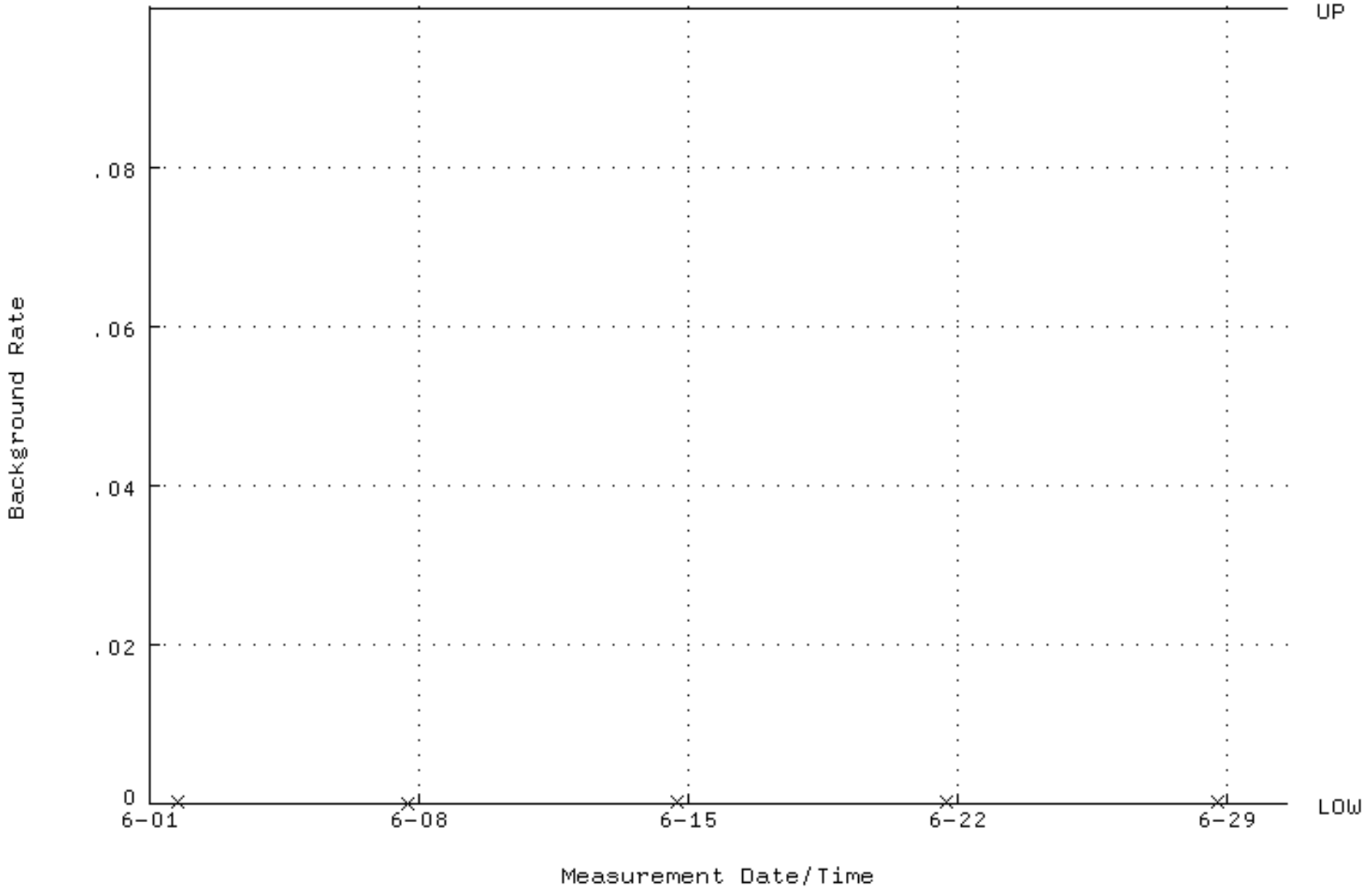
QA filename : DKA100:[ENV_ALPHA.QA.W]W210.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-JUN-2009 11:30:35 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 0.383170 through 0.403170



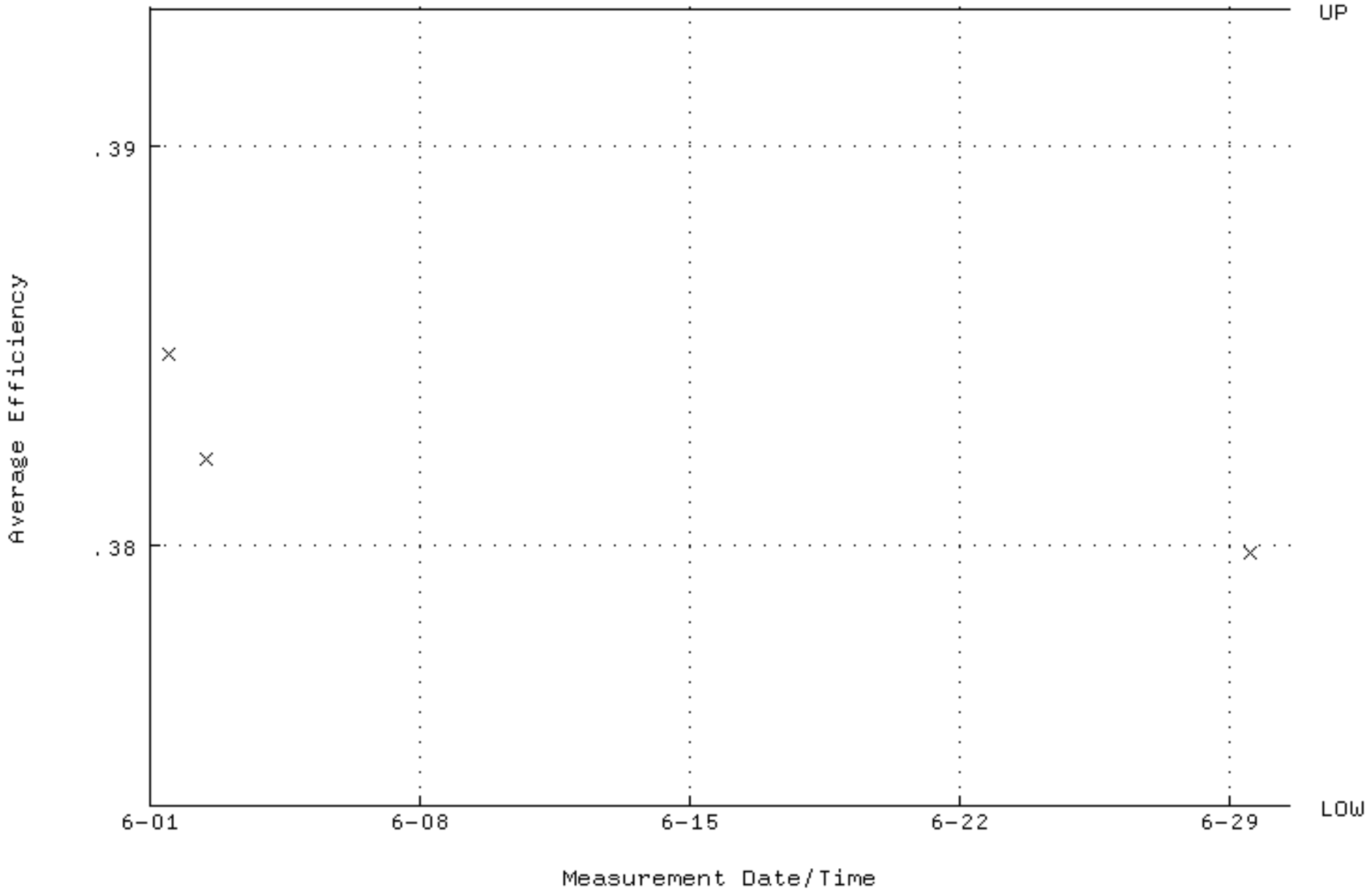
QA filename : DKA100:[ENV_ALPHA.QA.W]W210.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-JUN-2009 11:30:35 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 83.7069 through 92.5181



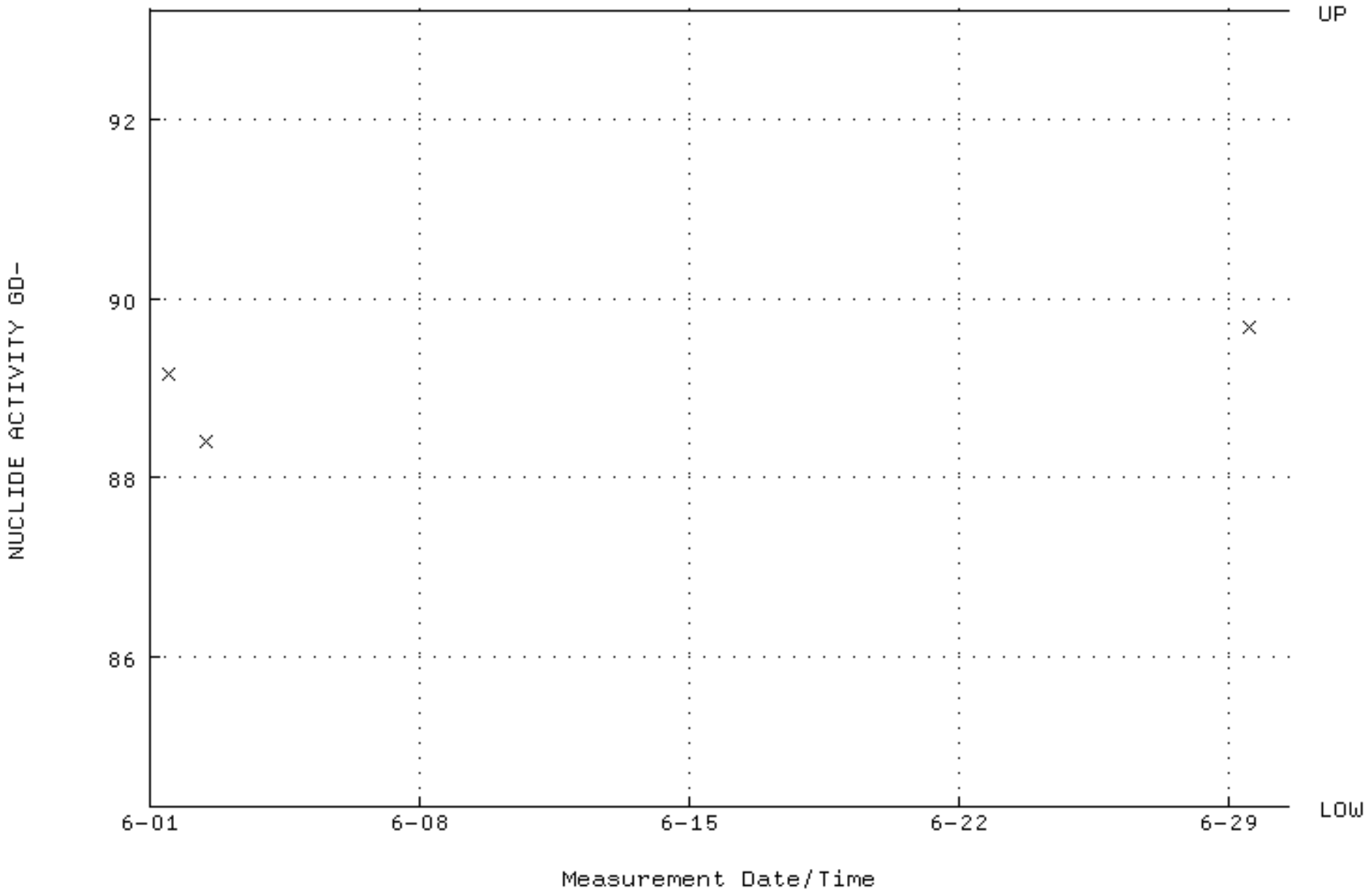
QA filename : DKA100:[ENV_ALPHA.QA.B]B210.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUN-2009 17:43:35 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



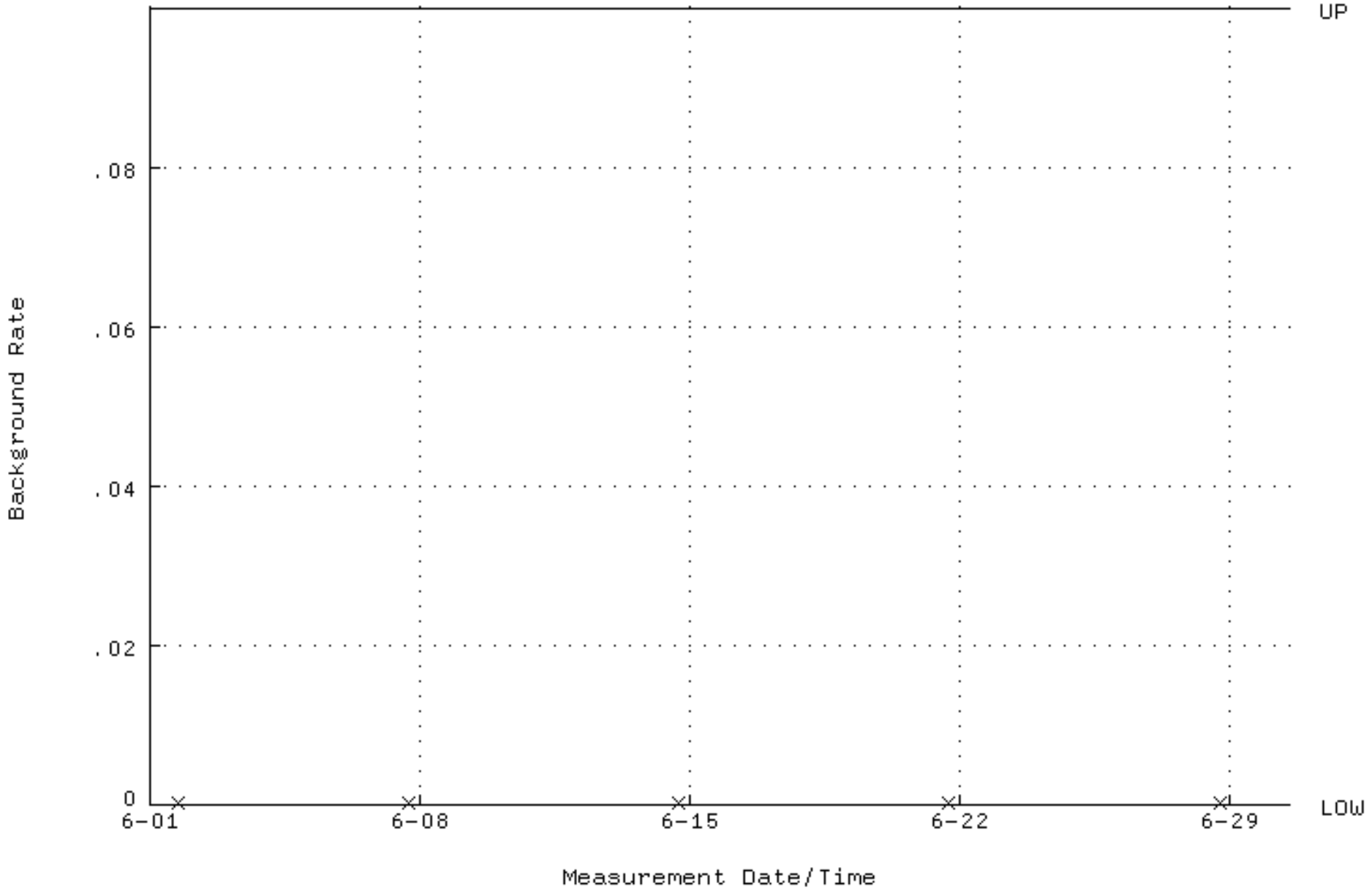
QA filename : DKA100:[ENV_ALPHA.QA.W]W211.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-JUN-2009 11:30:41 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 0.373447 through 0.393447



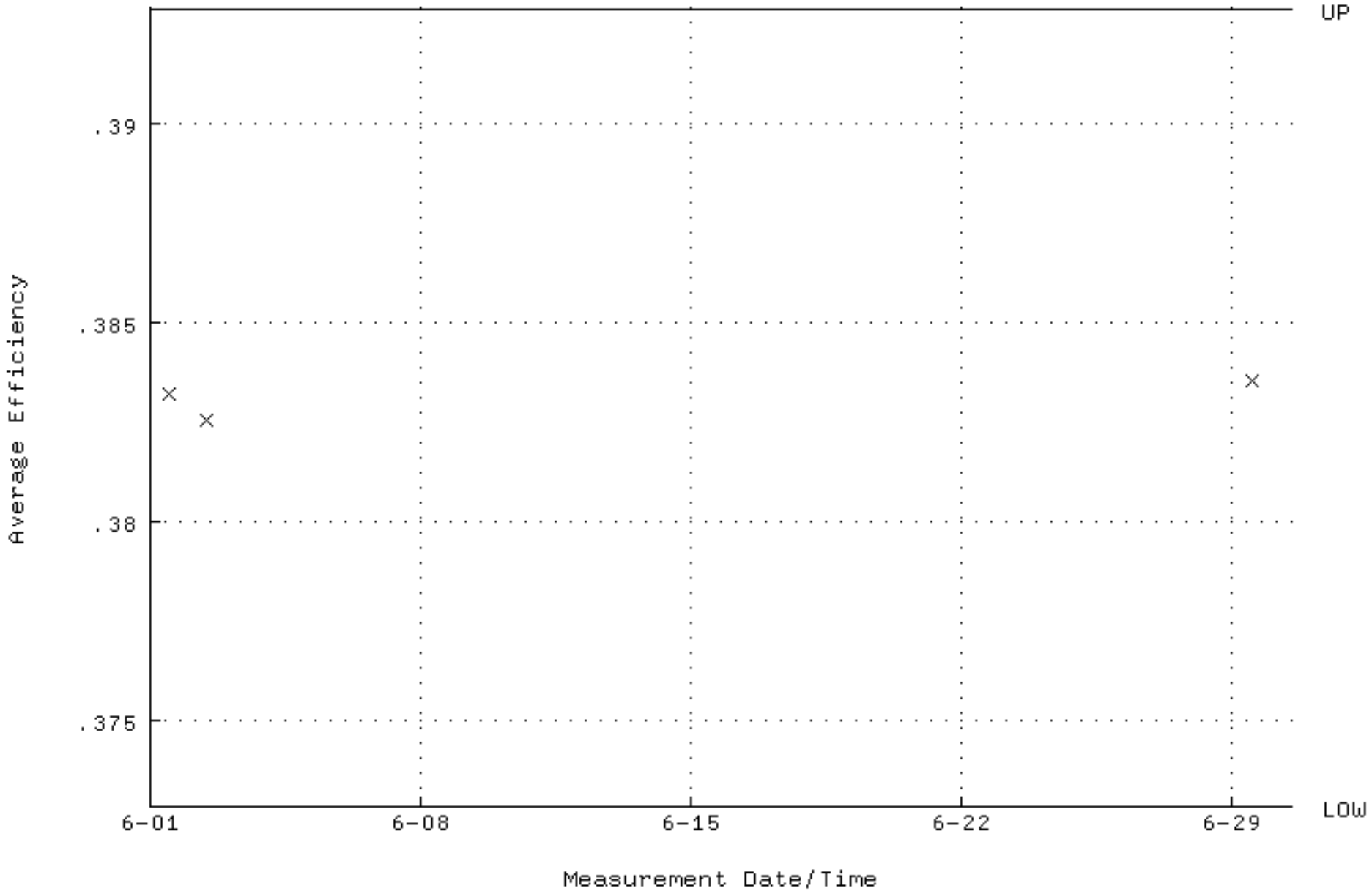
QA filename : DKA100:[ENV_ALPHA.QA.W]W211.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-JUN-2009 11:30:41 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 84.3294 through 93.2062



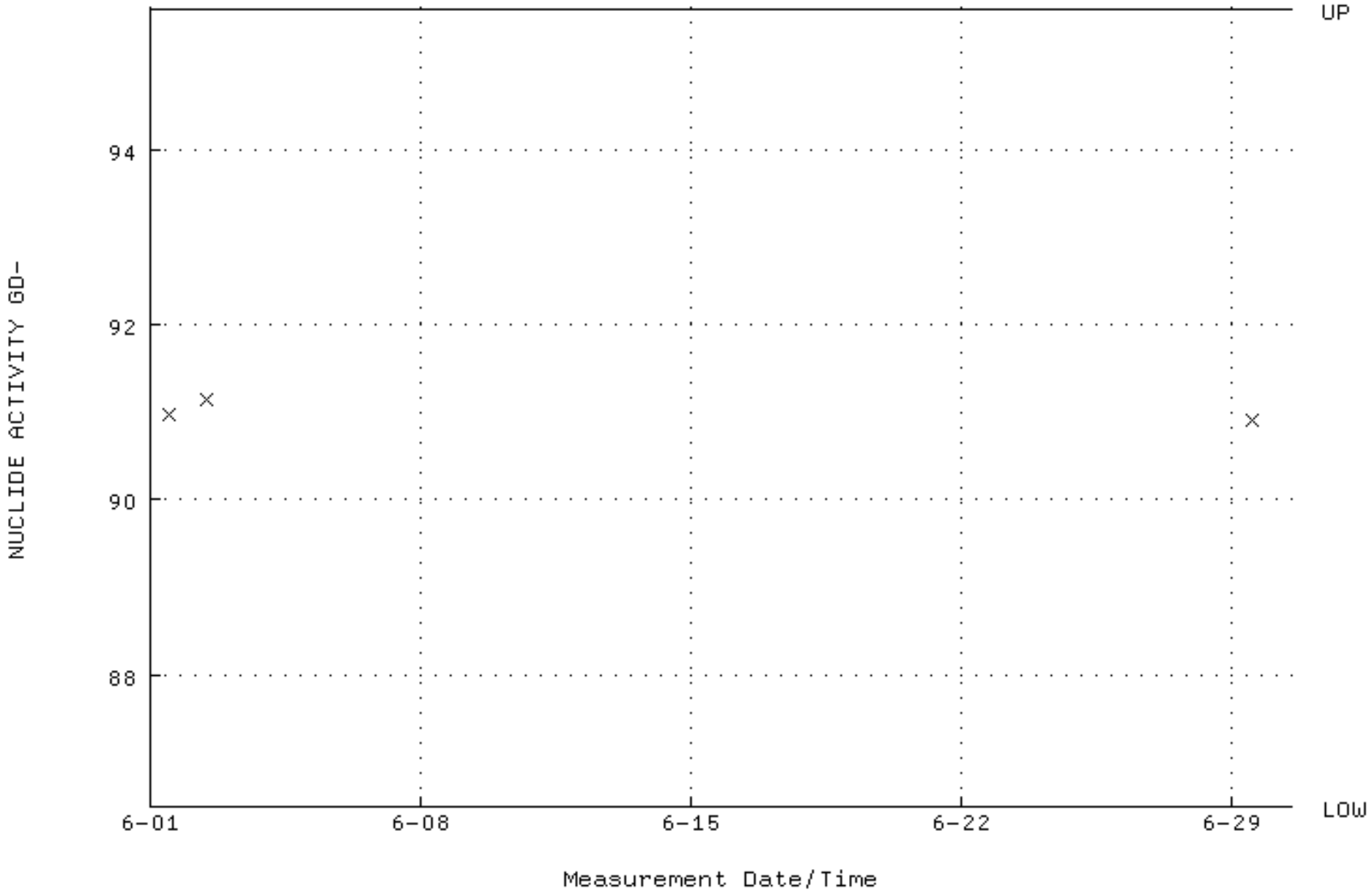
QA filename : DKA100:[ENV_ALPHA.QA.B]B211.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUN-2009 17:43:40 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



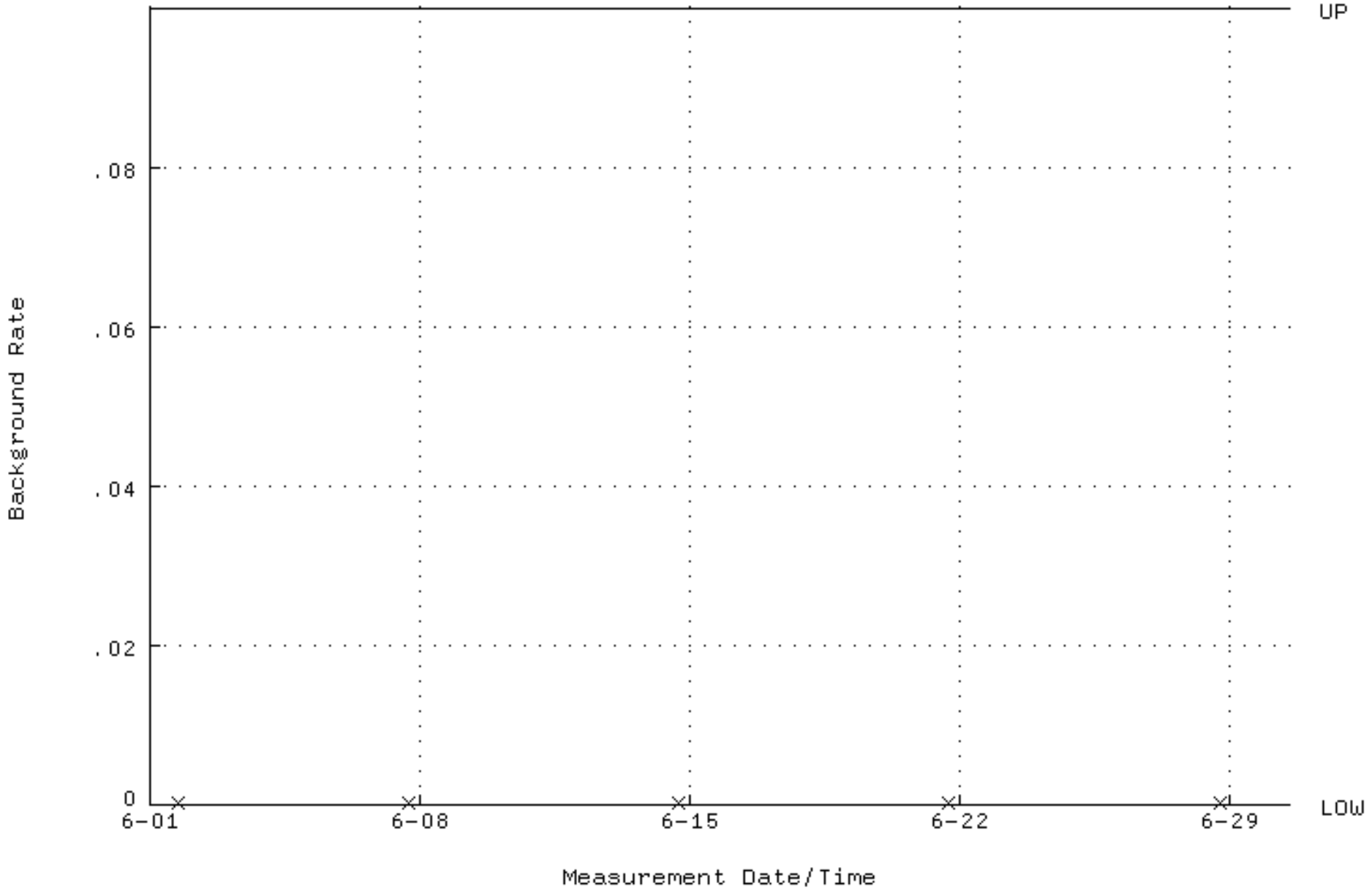
QA filename : DKA100:[ENV_ALPHA.QA.W]W212.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-JUN-2009 11:30:46 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 0.372857 through 0.392857



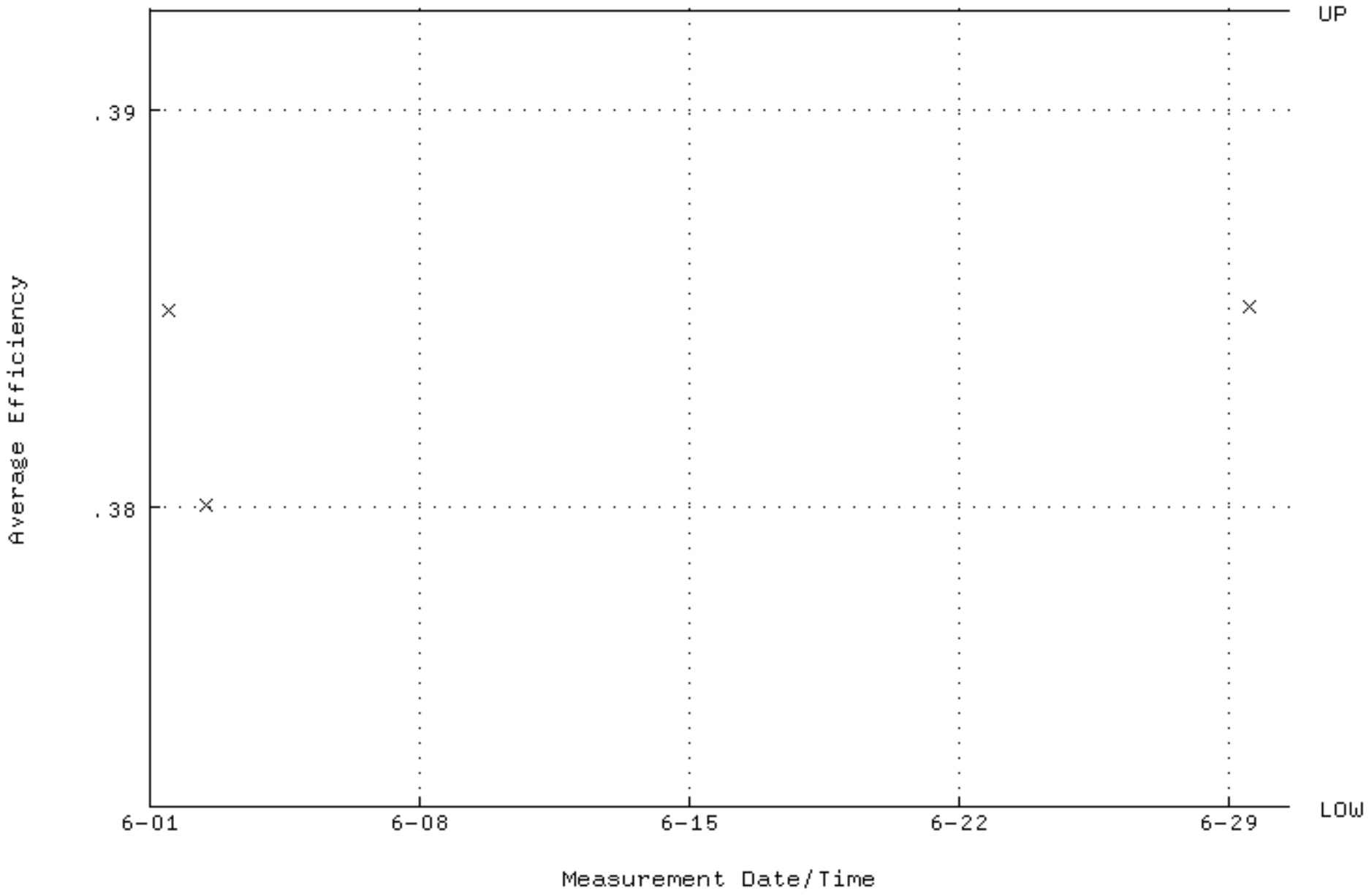
QA filename : DKA100:[ENV_ALPHA.QA.W]W212.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-JUN-2009 11:30:46 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 86.4953 through 95.6001



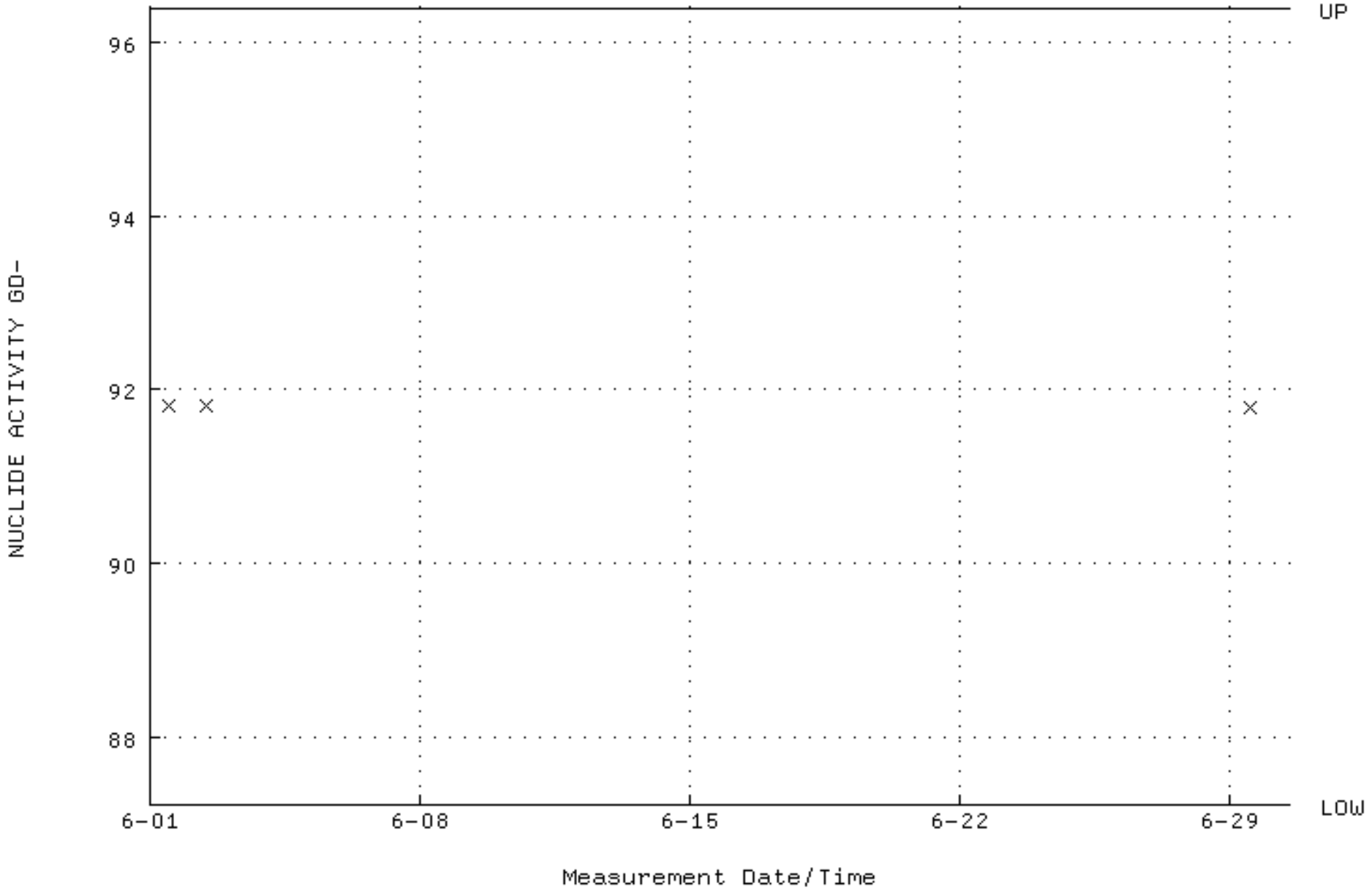
QA filename : DKA100:[ENV_ALPHA.QA.B]B212.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUN-2009 17:43:45 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



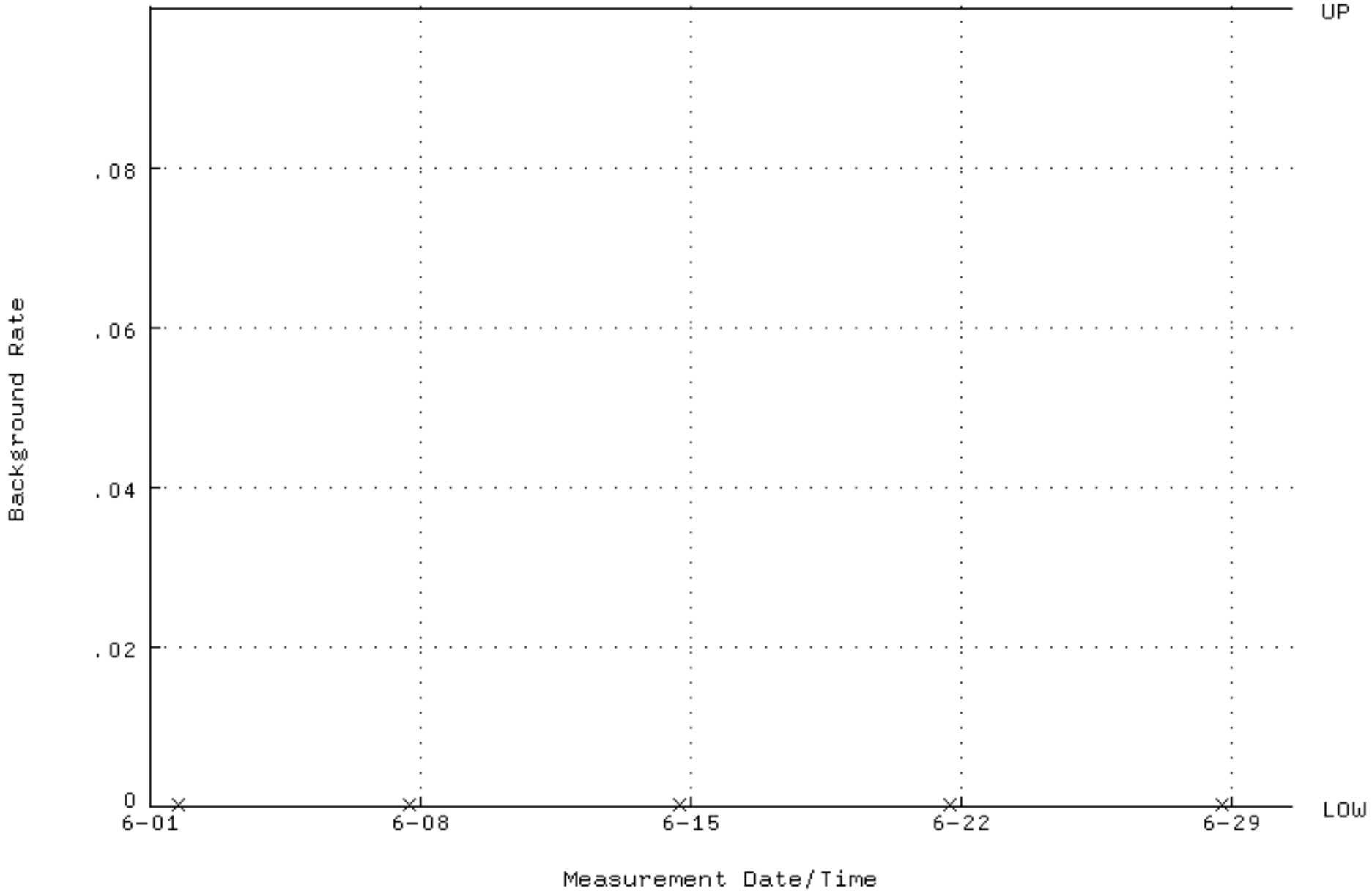
QA filename : DKA100:[ENV_ALPHA.QA.W]W215.QAF;1
Parameter Name : AVRGEFF (Average Efficiency)
Start/End Dates : 1-JUN-2009 11:31:06 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 0.372484 through 0.392484



QA filename : DKA100:[ENV_ALPHA.QA.W]W215.QAF;1
Parameter Name : NLACTVTY-GD148 (NUCLIDE ACTIVITY GD-148)
Start/End Dates : 1-JUN-2009 11:31:06 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 87.2135 through 96.3939



QA filename : DKA100:[ENV_ALPHA.QA.B]B215.QAF;1
Parameter Name : BACKRATE (Background Rate)
Start/End Dates : 1-JUN-2009 17:43:58 through 30-JUN-2009 12:00:00
Lower/Upper Lmts: 0.000000E+00 through 0.100000



RUNLOGS

Instrument Run Log

Instrument Type: GFPC **Batch ID: 882961**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232528019	SAMPLE	JXC5	PIC11C	15-JUL-09 15:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201875403	MS	JXC5	PIC12D	15-JUL-09 15:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201875401	MB	JXC5	PIC12B	15-JUL-09 15:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528004	SAMPLE	JXC5	PIC2D	15-JUL-09 15:30	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528006	SAMPLE	JXC5	PIC4D	15-JUL-09 15:30	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528009	SAMPLE	JXC5	PIC6B	15-JUL-09 15:30	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528011	SAMPLE	JXC5	PIC7B	15-JUL-09 15:30	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528005	SAMPLE	JXC5	PIC11B	15-JUL-09 20:25	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528007	SAMPLE	JXC5	PIC12B	15-JUL-09 20:25	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528008	SAMPLE	JXC5	PIC12C	15-JUL-09 20:25	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528012	SAMPLE	JXC5	PIC13A	15-JUL-09 20:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528013	SAMPLE	JXC5	PIC13B	15-JUL-09 20:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528014	SAMPLE	JXC5	PIC13D	15-JUL-09 20:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528015	SAMPLE	JXC5	PIC14A	15-JUL-09 20:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528016	SAMPLE	JXC5	PIC14B	15-JUL-09 20:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528017	SAMPLE	JXC5	PIC14C	15-JUL-09 20:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528018	SAMPLE	JXC5	PIC14D	15-JUL-09 20:26	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201875404	LCS	JXC5	PIC7C	15-JUL-09 20:27	DONE	CeF on 25mm Filter	02-JUL-09 00:00
1201875402	DUP	JXC5	PIC9C	15-JUL-09 20:27	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528001	SAMPLE	JXC5	PIC2C	15-JUL-09 20:27	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528003	SAMPLE	JXC5	PIC8D	15-JUL-09 20:27	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528020	SAMPLE	JXC5	PIC9A	15-JUL-09 20:28	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528002	SAMPLE	JXC5	PIC1D	21-JUL-09 15:55	DONE	CeF on 25mm Filter	02-JUL-09 00:00
232528010	SAMPLE	JXC5	PIC2C	21-JUL-09 15:55	DONE	CeF on 25mm Filter	02-JUL-09 00:00

Instrument Run Log

Instrument Type: LUCAS CELL DETECTOR **Batch ID: 883001**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232528001	SAMPLE	KSD1	LUCAS1	25-JUL-09 08:55	DONE	Lucas Cell	29-AUG-08 00:00
232528002	SAMPLE	KSD1	LUCAS2	25-JUL-09 08:55	DONE	Lucas Cell	19-DEC-08 00:00
232528003	SAMPLE	KSD1	LUCAS3	25-JUL-09 08:55	DONE	Lucas Cell	04-FEB-09 00:00
232528004	SAMPLE	KSD1	LUCAS4	25-JUL-09 08:55	DONE	Lucas Cell	02-MAR-09 00:00
232528005	SAMPLE	KSD1	LUCAS5	25-JUL-09 08:55	DONE	Lucas Cell	25-MAR-09 00:00
232528006	SAMPLE	KSD1	LUCAS7	25-JUL-09 08:55	DONE	Lucas Cell	21-NOV-08 00:00
232528007	SAMPLE	KSD1	LUCAS1	25-JUL-09 09:25	DONE	Lucas Cell	29-AUG-08 00:00
232528008	SAMPLE	KSD1	LUCAS2	25-JUL-09 09:25	DONE	Lucas Cell	19-DEC-08 00:00
232528009	SAMPLE	KSD1	LUCAS3	25-JUL-09 09:25	DONE	Lucas Cell	04-FEB-09 00:00
232528010	SAMPLE	KSD1	LUCAS4	25-JUL-09 09:25	DONE	Lucas Cell	02-MAR-09 00:00
232528011	SAMPLE	KSD1	LUCAS5	25-JUL-09 09:25	DONE	Lucas Cell	25-MAR-09 00:00
232528012	SAMPLE	KSD1	LUCAS7	25-JUL-09 09:25	DONE	Lucas Cell	21-NOV-08 00:00
232528013	SAMPLE	KSD1	LUCAS1	25-JUL-09 10:00	DONE	Lucas Cell	29-AUG-08 00:00
232528014	SAMPLE	KSD1	LUCAS2	25-JUL-09 10:00	DONE	Lucas Cell	19-DEC-08 00:00
232528015	SAMPLE	KSD1	LUCAS3	25-JUL-09 10:00	DONE	Lucas Cell	04-FEB-09 00:00
232528016	SAMPLE	KSD1	LUCAS4	25-JUL-09 10:00	DONE	Lucas Cell	02-MAR-09 00:00
232528017	SAMPLE	KSD1	LUCAS5	25-JUL-09 10:00	DONE	Lucas Cell	25-MAR-09 00:00
232528018	SAMPLE	KSD1	LUCAS7	25-JUL-09 10:00	DONE	Lucas Cell	21-NOV-08 00:00
232528019	SAMPLE	KSD1	LUCAS1	25-JUL-09 10:30	DONE	Lucas Cell	29-AUG-08 00:00
232528020	SAMPLE	KSD1	LUCAS2	25-JUL-09 10:30	DONE	Lucas Cell	19-DEC-08 00:00
1201875537	MB	KSD1	LUCAS3	25-JUL-09 10:30	DONE	Lucas Cell	04-FEB-09 00:00
1201875538	DUP	KSD1	LUCAS4	25-JUL-09 10:30	DONE	Lucas Cell	02-MAR-09 00:00
1201875539	MS	KSD1	LUCAS5	25-JUL-09 10:30	DONE	Lucas Cell	25-MAR-09 00:00
1201875540	LCS	KSD1	LUCAS7	25-JUL-09 10:30	DONE	Lucas Cell	21-NOV-08 00:00

Instrument Run Log

Instrument Type: ALPHA SPECTROMETER **Batch ID: 883496**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232528001	SAMPLE	HAKB	1113	15-JUL-09 13:51	DUSE		
232528002	SAMPLE	HAKB	1114	15-JUL-09 13:51	DUSE		
232528003	SAMPLE	HAKB	1115	15-JUL-09 13:51	DUSE		
232528004	SAMPLE	HAKB	1116	15-JUL-09 13:51	DUSE		
232528005	SAMPLE	HAKB	1117	15-JUL-09 13:51	DONE		
232528006	SAMPLE	HAKB	1118	15-JUL-09 13:51	DUSE		
232528007	SAMPLE	HAKB	1121	15-JUL-09 13:51	DUSE		
232528008	SAMPLE	HAKB	1122	15-JUL-09 13:51	DUSE		
232528009	SAMPLE	HAKB	1123	15-JUL-09 13:51	DUSE		
232528010	SAMPLE	HAKB	1124	15-JUL-09 13:51	DUSE		
232528011	SAMPLE	HAKB	1125	15-JUL-09 15:00	DONE		
232528012	SAMPLE	HAKB	1126	15-JUL-09 15:00	DUSE		
232528013	SAMPLE	HAKB	1127	15-JUL-09 15:00	DONE		
232528014	SAMPLE	HAKB	1129	15-JUL-09 15:00	DUSE		
232528015	SAMPLE	HAKB	1130	15-JUL-09 15:00	DUSE		
232528016	SAMPLE	HAKB	1131	15-JUL-09 15:01	DUSE		
232528017	SAMPLE	HAKB	1132	15-JUL-09 15:01	DUSE		
232528018	SAMPLE	HAKB	1133	15-JUL-09 15:01	DONE		
232528019	SAMPLE	HAKB	1134	15-JUL-09 15:01	DUSE		
232528020	SAMPLE	HAKB	1135	15-JUL-09 15:01	DUSE		
1201876826	MB	HAKB	1136	15-JUL-09 15:01	DUSE		
1201876827	DUP	HAKB	1137	15-JUL-09 15:01	DONE		
1201876828	MS	HAKB	1138	15-JUL-09 15:01	DONE		
1201876829	LCS	HAKB	1144	15-JUL-09 15:01	DONE		
232528001	SAMPLE	HAKB	1137	21-JUL-09 20:29	DONE		
232528002	SAMPLE	HAKB	1138	21-JUL-09 20:29	DONE		
232528003	SAMPLE	HAKB	1139	21-JUL-09 20:29	DONE		
232528004	SAMPLE	HAKB	1140	21-JUL-09 20:29	DONE		
232528006	SAMPLE	HAKB	1147	21-JUL-09 20:29	DONE		
232528007	SAMPLE	HAKB	1148	21-JUL-09 20:29	DONE		
232528008	SAMPLE	HAKB	1149	21-JUL-09 20:29	DONE		
232528009	SAMPLE	HAKB	1150	21-JUL-09 20:29	DONE		
232528010	SAMPLE	HAKB	1155	21-JUL-09 20:29	DONE		
232528012	SAMPLE	HAKB	1156	21-JUL-09 20:29	DONE		
232528014	SAMPLE	HAKB	1157	21-JUL-09 20:29	DONE		
232528015	SAMPLE	HAKB	1158	21-JUL-09 20:29	DONE		
232528016	SAMPLE	HAKB	1159	21-JUL-09 20:29	DONE		
232528017	SAMPLE	HAKB	1160	21-JUL-09 20:29	DONE		
232528019	SAMPLE	HAKB	1161	21-JUL-09 20:29	DONE		
232528020	SAMPLE	HAKB	1162	21-JUL-09 20:29	DONE		
1201876826	MB	HAKB	1163	21-JUL-09 20:29	DONE		

Instrument Run Log

Instrument Type: ALPHA SPECTROMETER **Batch ID: 886907**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
232528001	SAMPLE	HAKB	1065	23-JUL-09 09:55	DUSE		
232528002	SAMPLE	HAKB	1066	23-JUL-09 09:55	DUSE		
232528003	SAMPLE	HAKB	1067	23-JUL-09 09:55	DUSE		
232528004	SAMPLE	HAKB	1068	23-JUL-09 09:55	DUSE		
232528006	SAMPLE	HAKB	1069	23-JUL-09 09:55	DUSE		
232528007	SAMPLE	HAKB	1070	23-JUL-09 09:55	DUSE		
232528009	SAMPLE	HAKB	1209	23-JUL-09 10:39	DUSE		
232528010	SAMPLE	HAKB	1210	23-JUL-09 10:39	DUSE		
232528014	SAMPLE	HAKB	1211	23-JUL-09 10:39	DUSE		
232528016	SAMPLE	HAKB	1212	23-JUL-09 10:39	DUSE		
232528020	SAMPLE	HAKB	1215	23-JUL-09 10:39	DUSE		
1201885296	MB	HAKB	1216	23-JUL-09 10:39	DUSE		
1201885297	DUP	HAKB	1217	23-JUL-09 10:39	DUSE		
232528005	SAMPLE	HAKB	1035	23-JUL-09 12:11	DUSE		
232528008	SAMPLE	HAKB	1036	23-JUL-09 12:11	DUSE		
232528011	SAMPLE	HAKB	1037	23-JUL-09 12:11	DUSE		
232528012	SAMPLE	HAKB	1038	23-JUL-09 12:11	DUSE		
232528013	SAMPLE	HAKB	1039	23-JUL-09 12:11	DUSE		
232528015	SAMPLE	HAKB	1040	23-JUL-09 12:11	DUSE		
232528017	SAMPLE	HAKB	1041	23-JUL-09 12:11	DUSE		
232528018	SAMPLE	HAKB	1042	23-JUL-09 12:11	DUSE		
232528019	SAMPLE	HAKB	1043	23-JUL-09 12:11	DUSE		
1201885298	MS	HAKB	1044	23-JUL-09 12:11	DUSE		
1201885299	LCS	HAKB	1045	23-JUL-09 12:11	DUSE		
232528009	SAMPLE	HAKB	1209	24-JUL-09 07:18	DONE		
232528010	SAMPLE	HAKB	1210	24-JUL-09 07:18	DONE		
232528014	SAMPLE	HAKB	1211	24-JUL-09 07:18	DONE		
232528016	SAMPLE	HAKB	1212	24-JUL-09 07:18	DONE		
232528020	SAMPLE	HAKB	1215	24-JUL-09 07:18	DONE		
232528011	SAMPLE	HAKB	1037	24-JUL-09 07:26	DONE		
232528012	SAMPLE	HAKB	1038	24-JUL-09 07:26	DONE		
232528013	SAMPLE	HAKB	1039	24-JUL-09 07:26	DONE		
232528015	SAMPLE	HAKB	1040	24-JUL-09 07:26	DONE		
232528017	SAMPLE	HAKB	1041	24-JUL-09 07:26	DONE		
232528018	SAMPLE	HAKB	1042	24-JUL-09 07:26	DONE		
232528001	SAMPLE	HAKB	1065	24-JUL-09 07:26	DONE		
232528002	SAMPLE	HAKB	1066	24-JUL-09 07:26	DONE		
232528003	SAMPLE	HAKB	1067	24-JUL-09 07:26	DONE		
232528004	SAMPLE	HAKB	1068	24-JUL-09 07:26	DONE		
232528006	SAMPLE	HAKB	1069	24-JUL-09 07:26	DONE		
232528007	SAMPLE	HAKB	1070	24-JUL-09 07:26	DONE		
232528005	SAMPLE	HAKB	1185	24-JUL-09 13:16	DONE		
232528008	SAMPLE	HAKB	1186	24-JUL-09 13:16	DONE		
232528019	SAMPLE	HAKB	1187	24-JUL-09 13:16	DONE		

Instrument Run Log

Instrument Type: ALPHA SPECTROMETER

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
1201885296	MB	HAKB	1188	24-JUL-09 13:16	DONE		
1201885297	DUP	HAKB	1189	24-JUL-09 13:17	DONE		
1201885298	MS	HAKB	1190	24-JUL-09 13:17	DONE		
1201885299	LCS	HAKB	1191	24-JUL-09 13:17	DONE		